

FCC SDoC TEST REPORT

Report No.: DDT-B23051805-1E02

Applicant	:	TPV Electronics (Fujian) Co., Ltd.
Address	:	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China
Equipment under Test	:	LCD Monitor
Model No.	:	**16***** ("*" = 0-9, A-Z, a-z, +, -, /, \ or blank)

Issued By: Tianjin Dongdian Testing Service Co., Ltd.

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REPORT

CONTENTS

1. Summary of test results	5
2. General test information.....	6
2.1 Description of EUT	6
2.2 Accessories of EUT	6
2.3 Test peripherals.....	6
2.4 Block diagram EUT configuration for test.....	7
2.5 EUT operating mode(s)	7
2.6 Deviations of test standard.....	7
2.7 Test laboratory.....	8
2.8 Measurement uncertainty.....	8
3. Conducted Emission	9
3.1 General information	9
3.2 Test Equipment	9
3.3 Reference Standard	9
3.4 Block Diagram of Test Setup.....	9
3.5 Limits	10
3.6 Test Procedure	10
3.7 Test Result.....	11
4. Radiated Emissions	13
4.1 General information	13
4.2 Test Equipment	13
4.3 Reference Standard	13
4.4 Block diagram of test setup	14
4.5 Limits	15
4.6 Test Procedure	15
4.7 Test result	18
5. Test Setup Photos.....	20
5.1 Conducted emission at the mains ports	20
5.2 Radiated emission	21
Annex I.....	23

Test Report Declare

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Address	:	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China
Equipment Under Test	:	LCD Monitor
Model No.	:	**16***** ("*" = 0-9, A-Z, a-z, +, -, /, \ or blank)

Test Standard Used:

ANSI C63.4: 2014; 47 CFR FCC Part 15 Subpart B

We Declare:

The equipment described above is tested and assessed by Tianjin Dongdian Testing Service Co., Ltd. and in the configuration assessed the equipment complied with the standards specified above. The tested and assessed results are contained in this test report and Tianjin Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these assessments.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No.:	DDT-B23051805-1E02		
Date of Receipt:	Apr. 28, 2023	Date of Test:	May. 26, 2023 ~ May. 27, 2023

Prepared By:



May Zhang/Engineer

Approved By:



Aaron Zhang/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Tianjin Dongdian Testing Service Co., Ltd.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jun. 09, 2023	

1. Summary of test results

Description of Test Item	Standard	Result
Conducted emission at AC mains terminals	ANSI C63.4: 2014; 47 CFR FCC Part 15 Subpart B	PASS
Radiated emission	ANSI C63.4: 2014; 47 CFR FCC Part 15 Subpart B	PASS

2. General test information

2.1 Description of EUT

EUT* Name	: LCD Monitor
Model Number	: **16***** ("*" = 0-9, A-Z, a-z, +, -, /, \ or blank)
Model Differences	: All models difference is in sale marketing.
Test Model	: 16T3E
Serial Number	: N/A
EUT function description	: Please refer to user manual of this device
Power supply	: 100-240V 50/60Hz
Test Voltage	: 110V 60Hz
EUT Class	: Class B
Maximum work frequency	: 148.5 MHz

Note: EUT is the ab. of equipment under test.

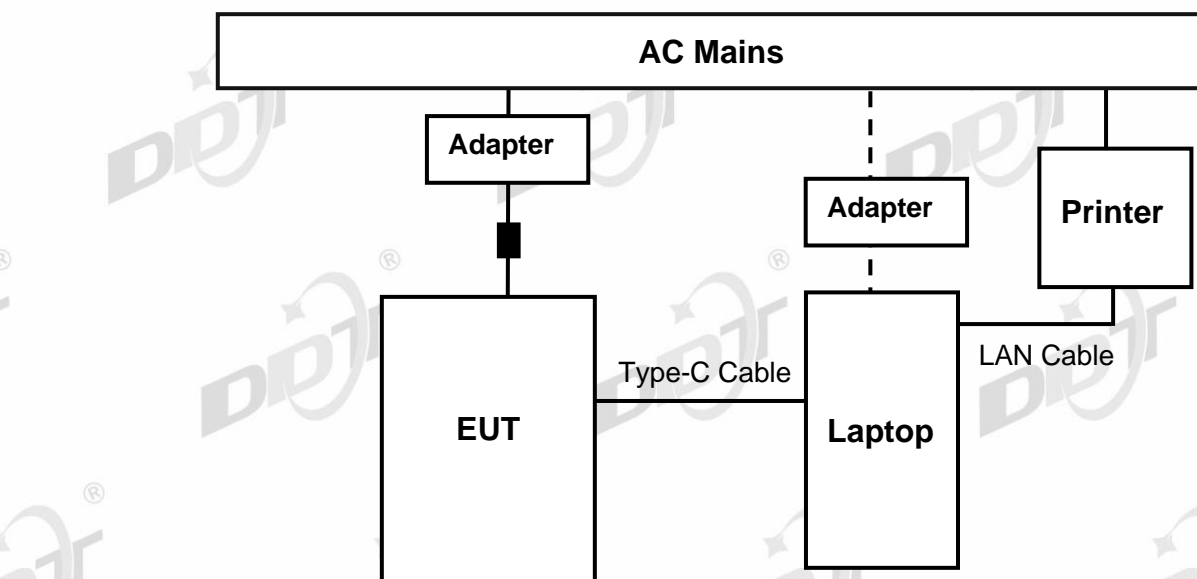
2.2 Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
AC Cable	N/A	N/A	Length: 1.2m/1.5m/1.8m, Unshielded	N/A
Type-C Cable	N/A	N/A	Length: 1.0m/1.2m/1.5m/1.8m, Shielded	N/A

2.3 Test peripherals

Device	Manufacturer	Model No.	Serial No.	Remark
Adapter	TPV	ADPC1938EX	DC 19V, 2.0A	N/A
Laptop	HP	HP ProBook 455R G6	5CD0122F5D	N/A
Laptop	LENOVO	WEI6 14 ITL	MP22HP0E	N/A
Printer	SAMSUNG	CLP-365W/SEE	Z8DLBABC200070K	N/A

2.4 Block diagram EUT configuration for test



■ Ferrite Core
■ Terminal

Note: Laptop need to connect AC Mains in Mode 2.

2.5 EUT operating mode(s)

Mode1: Type-C	Connect Type-C cable from Laptop's Type-C port to EUT's Type-C Port, Type-C power port connect AC/DC adapter. The test signal is scrolling 'H' with 1kHz audio playing.
Mode2: Type-C only	Only connect Type-C cable from Laptop's Type-C port to EUT's Type-C Port, Type-C power port do not connect AC/DC adapter, Laptop connect AC/DC adapter. The test signal is scrolling 'H' with 1kHz audio playing.

2.6 Deviations of test standard

No Deviation.

2.7 Test laboratory

Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.

Tel: +86-22-58038033, <http://www.ddttest.com>, Email: ddt@dgddt.com

NVLAP (National Voluntary Laboratory Accreditation Program) CODE: 500036-0

CNAS (China National Accreditation Service for Conformity Assessment) CODE: L13402

FCC Designation Number: CN5004; FCC Test Firm Registration Number: 368676

ISED (Innovation, Science and Economic Development Canada) Company Number: 27768

Conformity Assessment Body Identifier: CN0125

VCCI Facility Registration Number: C-20089, T-20093, R-20125, G-20122

2.8 Measurement uncertainty

Test Item	Uncertainty
Conducted disturbance at mains terminals	3.4dB (150KHz-30MHz)
Uncertainty for Radiation Emission test (30MHz-1GHz)	5.2 dB (Antenna Polarize: H)
	5.2 dB (Antenna Polarize: V)
Uncertainty for Radiation disturbance test (1GHz to 6GHz)	5.0dB(1-6GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.1 General information

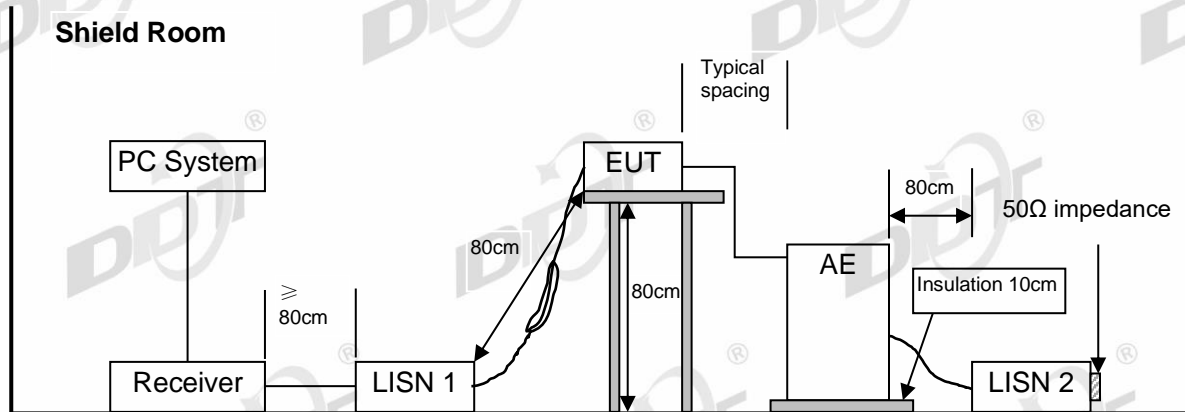
3.2 Test Equipment

ANSI C63.4: 2014; 47 CFR FCC Part 15 Subpart B

For table-top equipment



Shield Room



Class A

Frequency			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	79	66
500kHz	~	30MHz	73	60

Frequency [®]			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm (table-top device)/0.1m (floor stand device) above the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.5 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions. 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.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

The EUT with following test modes were pre-tested:

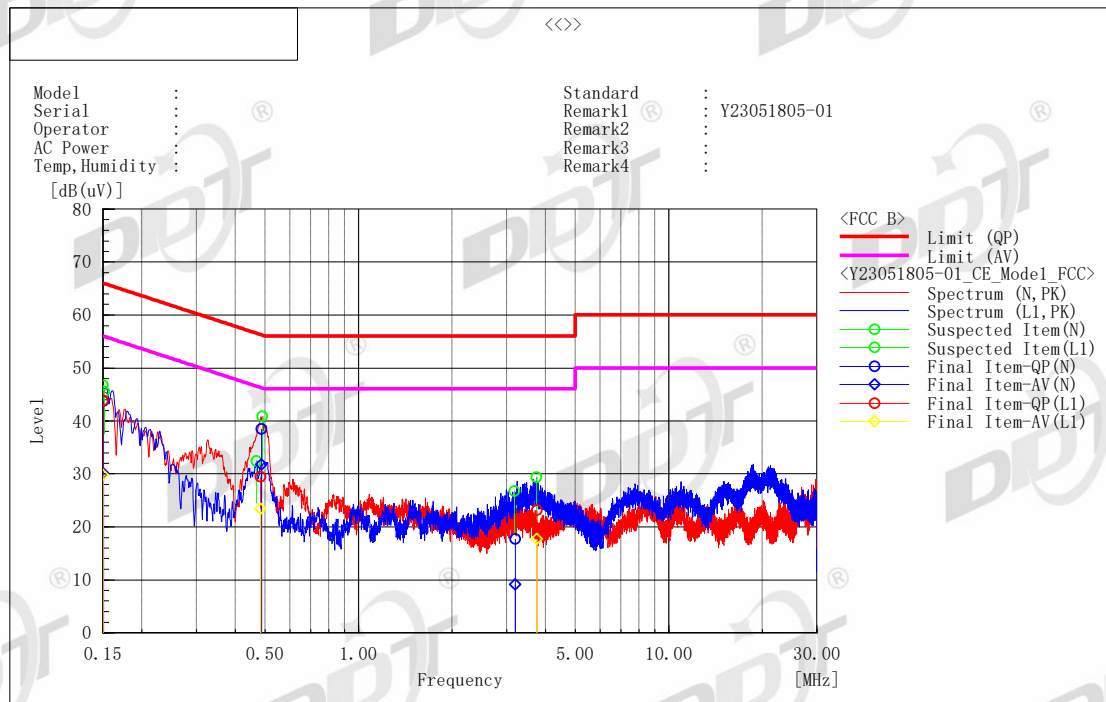
No.	Operation Mode	Cable Length	Resolution	Rotation
1. *	Mode 1 Type-C	1.8m	1920*1080@60Hz	Landscape
2.		1.8m	1280*720@60Hz	Landscape
3.		1.8m	800*600@60Hz	Landscape
4.		1.5m	1920*1080@60Hz	Landscape
5.		1.2m	1920*1080@60Hz	Landscape
6.		1.0m	1920*1080@60Hz	Landscape
7.	Mode 2: Type-C only	1.8m	1920*1080@60Hz	Landscape
8.		1.8m	1280*720@60Hz	Landscape
9.		1.8m	800*600@60Hz	Landscape
10.		1.5m	1920*1080@60Hz	Landscape
11.		1.2m	1920*1080@60Hz	Landscape
12.		1.0m	1920*1080@60Hz	Landscape
13.	Type-C 1920*1080@60Hz with 1.5m power cord			Landscape
14.	Type-C 1920*1080@60Hz with 1.2m power cord			Landscape
* Means the worst test mode.				

3.7 Test Result

PASS. (See below detailed test result)

Note 1: All emissions not reported below are too low against the prescribed limits.

Operating Mode 1: Type-C IN



Final Result

--- N Phase ---											
No.	Frequency	Reading QP	Reading CAV	c. f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV	Remark
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]	
1	0.15036	33.9	20.3	9.8	43.7	30.1	66.0	56.0	22.3	25.9	
2	0.48706	28.7	22.0	9.8	38.5	31.8	56.2	46.2	17.7	14.4	
3	3.19555	7.7	-0.9	10.0	17.7	9.1	56.0	46.0	38.3	36.9	

--- L1 Phase ---											
No.	Frequency	Reading QP	Reading CAV	c. f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV	Remark
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]	
1	0.15002	34.0	20.0	9.8	43.8	29.8	66.0	56.0	22.2	26.2	
2	0.48352	19.6	13.6	9.8	29.4	23.4	56.3	46.3	26.9	22.9	
3	3.75208	13.2	7.7	10.0	23.2	17.7	56.0	46.0	32.8	28.3	

Note1) Level (Quasi-Peak and/or C/Average) = Meter Reading + Factor

Note2) Line = Polarity of input power (Live or Neutral)

N : Abbreviation of Neutral Polarity, L1 : Abbreviation of Live Polarity,

Note3) Factor = LISN Insertion Loss + Cable Loss

Note4) Margin = Limit – Level (Quasi-Peak and/or C/Average)

Note5) C/Average : Abbreviation of CISPR Average

4. Radiated Emissions

4.1 General information

30MHz~1GHz:

Test date	May. 27, 2023	Test engineer	Dominic	
Climate condition	Ambient temperature	23.8±1℃	Relative humidity	51±1%
	Atmospheric pressure	101.2±0.2kPa		
Test place	10m Chamber			

Above 1GHz:

Test date	May. 26, 2023	Test engineer	Sam	
Climate condition	Ambient temperature	23.7±1℃	Relative humidity	50±1%
	Atmospheric pressure	101.4±0.2kPa		
Test place	10m Chamber			

4.2 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	R&S	ESCI	101024	Feb. 15, 2023	1 Year
EMI Test Receiver	R&S	ESCI	101030	Feb. 15, 2023	1 Year
Bilog Antenna	TESEQ	CBL6112D	29068	Oct. 10, 2022	2 Year
Bilog Antenna	TESEQ	CBL6112D	29069	Oct. 10, 2022	2 Year
Amplifier	Sonoma	310N	300913	Feb. 15, 2023	1 Year
Amplifier	Sonoma	310N	334532	Feb. 16, 2023	1 Year
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector1	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector2	N/A	N/A
Test software	TOYO	EP5/RE	V 5.7.10	N/A	N/A
EMI Test Receiver	R&S	ESU26	100244	Feb. 16, 2023	1 Year
Double Ridged Horn Antenna	TESEQ	BHA 9118	31754	Oct. 12, 2021	2 Year
Pre-amplifier	N/A	DPA8 1000 18000-1012	09211739	Feb. 16, 2023	1 Year
Test software	TOYO	EP5/RE	V 5.7.10	N/A	N/A

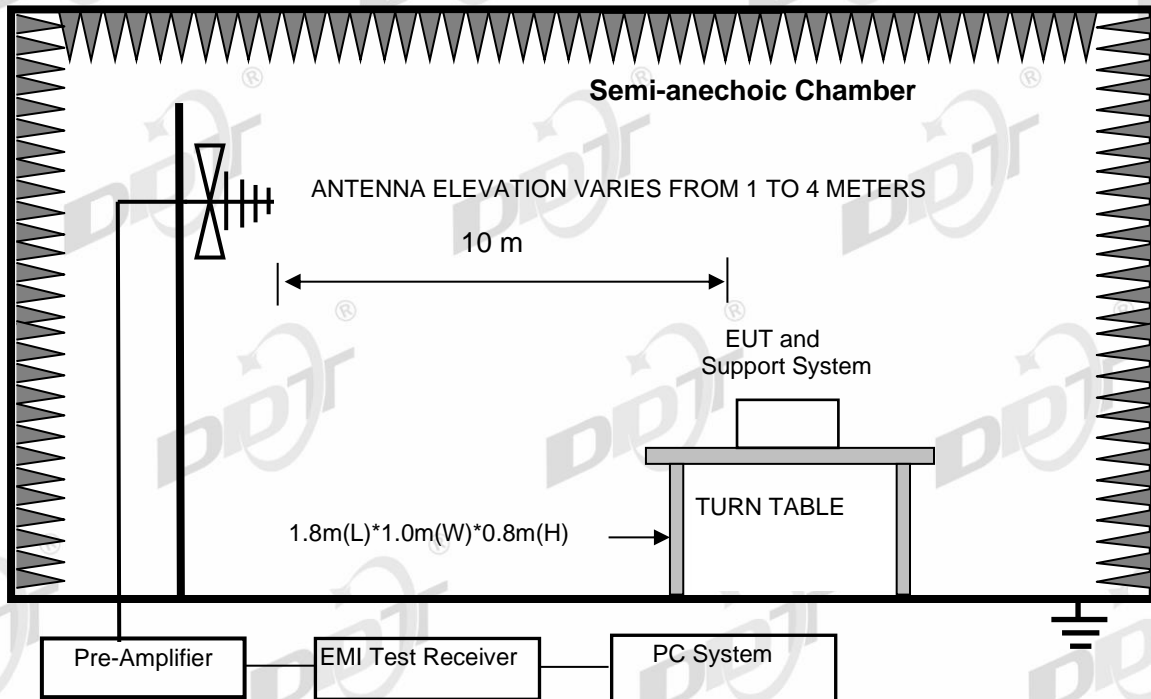
Notes. N/A means Not applicable.

4.3 Reference Standard

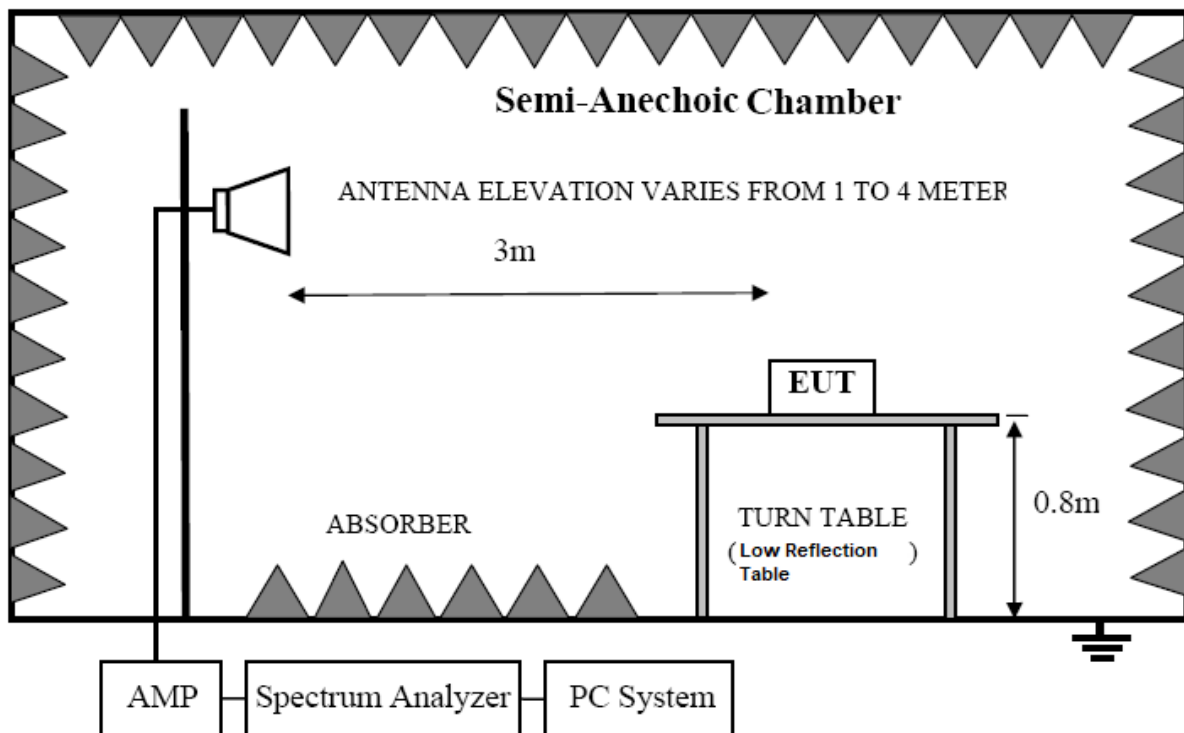
ANSI C63.4: 2014; 47 CFR FCC Part 15 Subpart B

4.4 Block diagram of test setup

Below 1GHz



Above 1GHz



4.5 Limits

Class A

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μ V)/m
30--88	10	39
88--216	10	43.5
216--960	10	46.5
960-1000	10	49.5
Above 1000	3	80.0(Peak), 60.0(Average)

Class B

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μ V)/m
30--88	10	30.0
88--216	10	33.5
216--960	10	36.0
960-1000	10	44.0
Above 1000	3	74.0(Peak), 54.0(Average)

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

4.6 Test Procedure

Procedure of Preliminary Test

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm (table-top device)/0.1m (floor stand device) above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.5 and test equipment as described in clause 4.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 10 meters (for 30MHz – 1GHz) and 3 meters (for above 1 GHz) away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 1GHz and 1GHz to 6GHz. 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.

The test mode(s) described in clause 2.5 were scanned during the preliminary test:

After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1GHz and 1GHz to 6GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement 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.

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 only Q.P. reading is presented.

For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.

For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz
The test data of the worst-case condition(s) was recorded.

The EUT with following test modes were pre-tested:

For frequency range 30MHz ~ 1GHz:

No.	Operation Mode	Cable Length	Resolution	Rotation
1. *	Mode 1 Type-C	1.8m	1920*1080@60Hz	Landscape
2.		1.8m	1280*720@60Hz	Landscape
3.		1.8m	800*600@60Hz	Landscape
4.		1.5m	1920*1080@60Hz	Landscape
5.		1.2m	1920*1080@60Hz	Landscape
6.		1.0m	1920*1080@60Hz	Landscape
7.	Mode 2: Type-C only	1.8m	1920*1080@60Hz	Landscape
8.		1.8m	1280*720@60Hz	Landscape
9.		1.8m	800*600@60Hz	Landscape
10.		1.5m	1920*1080@60Hz	Landscape
11.		1.2m	1920*1080@60Hz	Landscape
12.		1.0m	1920*1080@60Hz	Landscape
13.	Type-C 1920*1080@60Hz with 1.5m power cord			Landscape
14.	Type-C 1920*1080@60Hz with 1.2m power cord			Landscape
* Means the worst test mode.				

For frequency range above 1GHz:

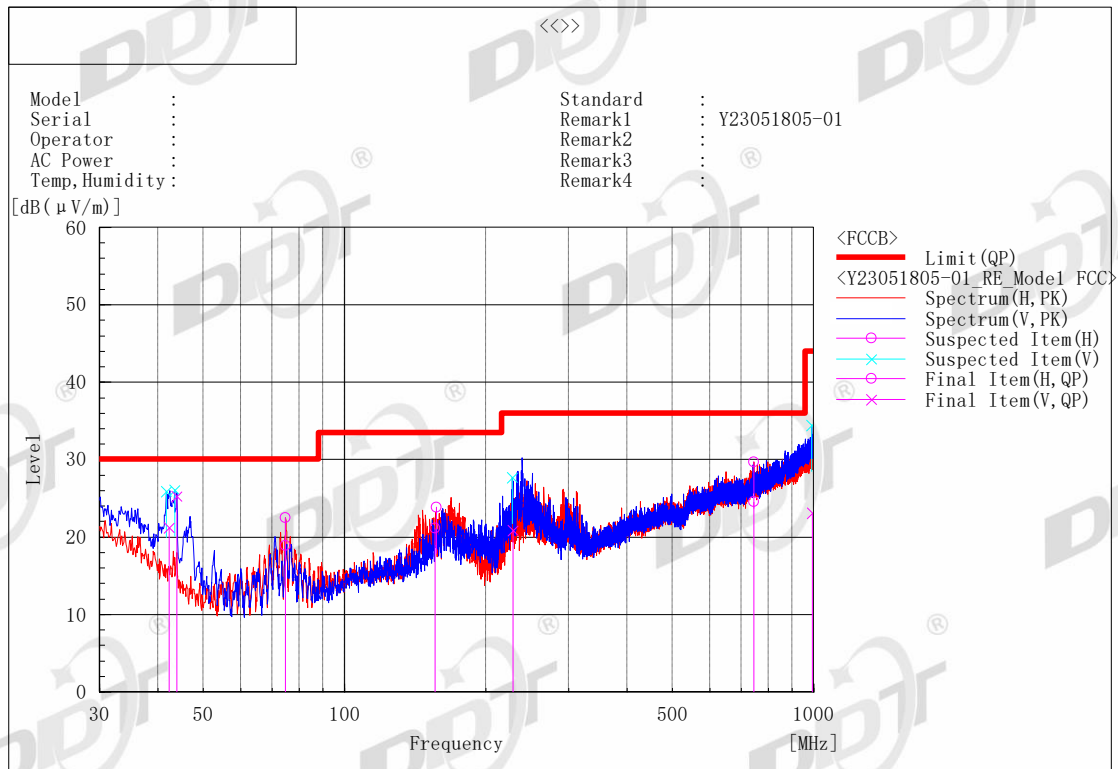
No.	Operation Mode	Cable Length	Resolution	Rotation
1. *	Mode 1 Type-C	1.8m	1920*1080@60Hz	Landscape
2.		1.8m	1280*720@60Hz	Landscape
3.		1.8m	800*600@60Hz	Landscape
4.		1.5m	1920*1080@60Hz	Landscape
5.		1.2m	1920*1080@60Hz	Landscape
6.		1.0m	1920*1080@60Hz	Landscape
7.	Mode 2: Type-C only	1.8m	1920*1080@60Hz	Landscape
8.		1.8m	1280*720@60Hz	Landscape
9.		1.8m	800*600@60Hz	Landscape
10.		1.5m	1920*1080@60Hz	Landscape
11.		1.2m	1920*1080@60Hz	Landscape
12.		1.0m	1920*1080@60Hz	Landscape
13.	Type-C 1920*1080@60Hz with 1.5m power cord			Landscape
14.	Type-C 1920*1080@60Hz with 1.2m power cord			Landscape
* Means the worst test mode.				

4.7 Test result

PASS. (See below detailed test result)

Note: All emissions not reported below are too low against the prescribed limits.

Operating Mode 1: Type-C IN



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB (μV)]	c. f [dB (1/m)]	Result QP [dB (μV/m)]	Limit QP [dB (μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]	System	Remark
1	74.815	H	35.6	-16.7	18.9	30.0	11.1	376.0	326.9	1	
2	156.013	H	33.3	-12.2	21.1	33.5	12.4	389.0	3.1	1	
3	745.456	H	22.9	1.7	24.6	36.0	11.4	120.0	198.4	1	
4	42.226	V	33.0	-11.8	21.2	30.0	8.8	327.0	354.2	2	
5	43.835	V	38.1	-12.8	25.3	30.0	4.7	136.0	95.6	2	
6	228.207	V	32.5	-11.6	20.9	36.0	15.1	113.0	64.3	2	
7	992.276	V	15.9	7.2	23.1	44.0	20.9	318.0	198.7	2	

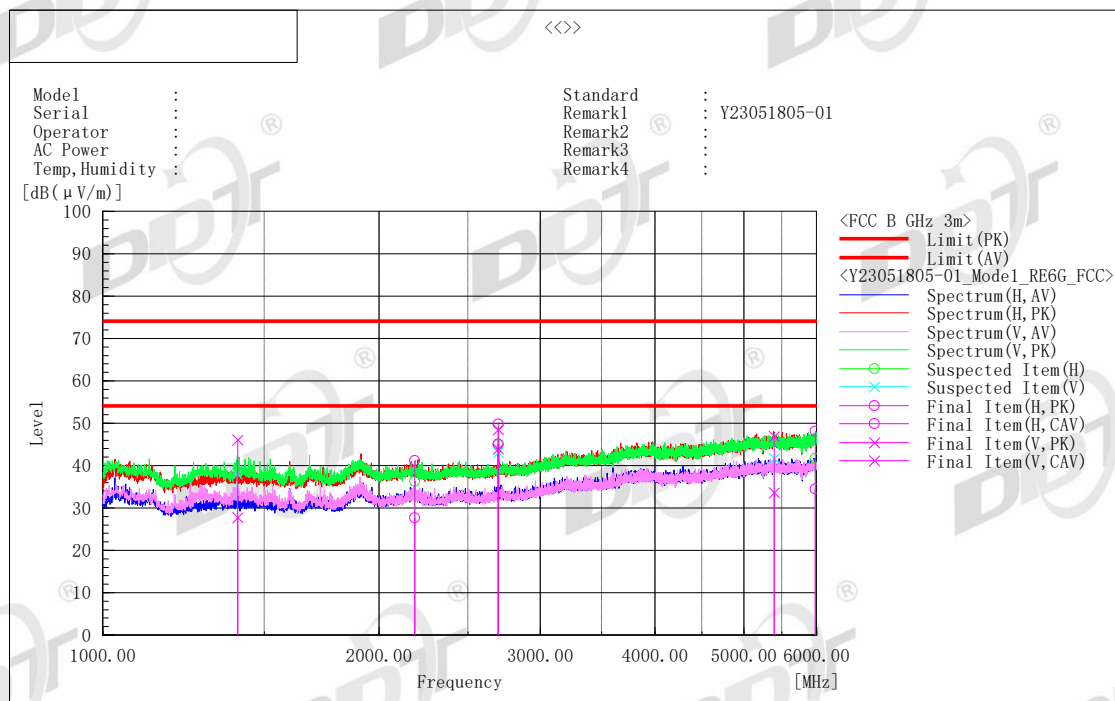
Note) Receiving antenna polarization : Horizontal and/or Vertical

Test Distance : 10 m, Antenna Height : 1 m to 4 m

Level QP (Quasi-Peak) = Reading QP + Factor (Antenna Factor + Cable Loss - Amp. Gain)

Margin QP (Quasi-Peak) = Limit - Level QP

Operating 1: Type-C IN



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result CAV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [°]
1	1402.683	V	70.9	52.6	-24.8	46.1	27.8	74.0	54.0	27.9	26.2	148.0	57.1
2	5392.091	V	59.7	46.4	-12.8	46.9	33.6	74.0	54.0	27.1	20.4	167.0	8.8
3	2187.312	H	63.7	50.2	-22.5	41.2	27.7	74.0	54.0	32.8	26.3	122.0	229.3
4	2699.991	H	70.9	66.2	-21.1	49.8	45.1	74.0	54.0	24.2	8.9	141.0	176.0
5	5977.002	H	60.1	46.5	-12.0	48.1	34.5	74.0	54.0	25.9	19.5	108.0	291.7
6	2699.980	V	69.6	65.0	-21.1	48.5	43.9	74.0	54.0	25.5	10.1	116.0	77.5

Note1) (P) : Abbreviation of Antenna Polarity

Note2) Reading PK / C/AV : Received raw Peak / C/Average signal

Note3) Factor = Antenna factor + Cable loss – Amplifier gain

Note4) Level PK / C/AV = Reading PK / C/AV + Factor, Real signal Peak / C/Average level

Note5) Margin PK / C/AV = Limit – Level PK / C/AV

PK : Abbreviation of Peak

C/AV : Abbreviation of CISPR Average

5. Test Setup Photos

5.1 Conducted emission at the mains ports

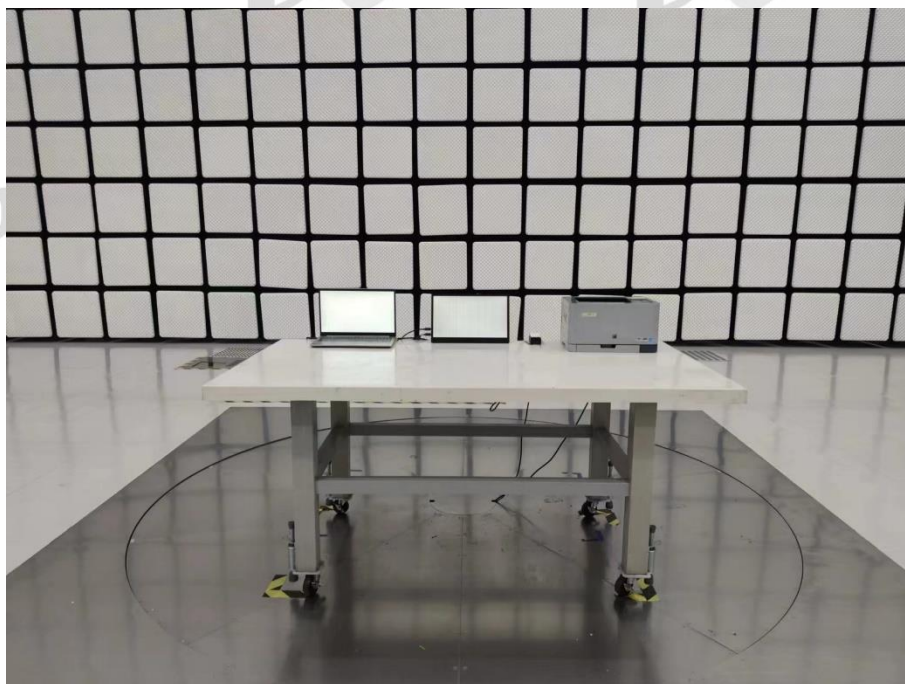


[Front]



[Rear]

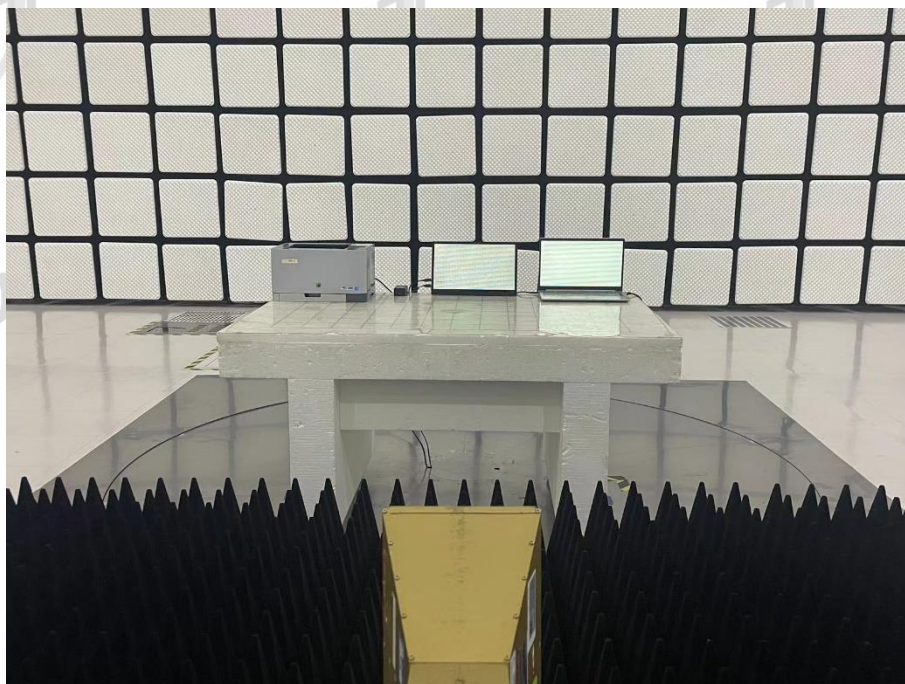
5.2 Radiated emission



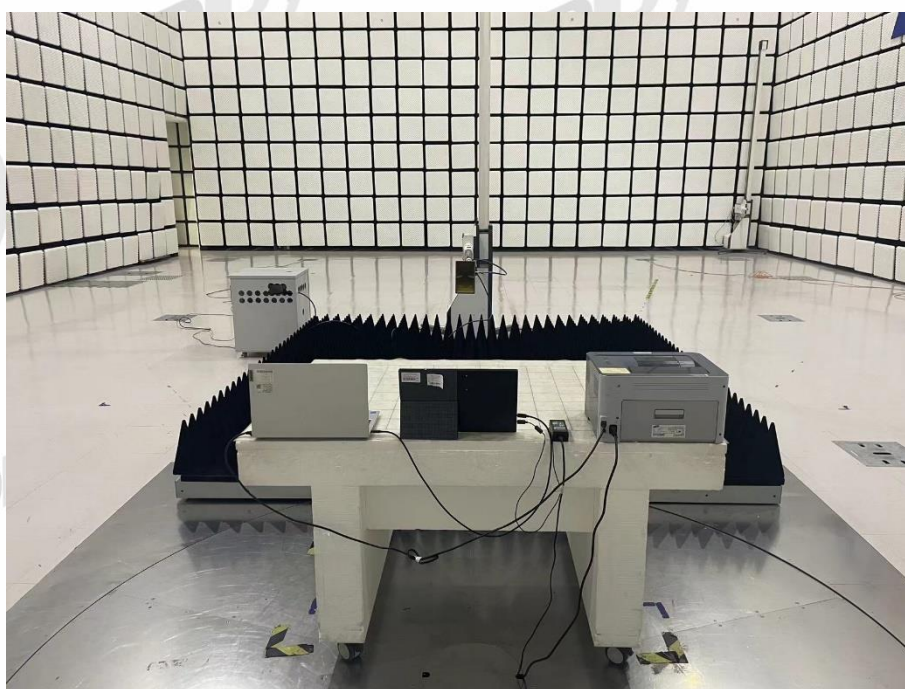
[Front]



[Rear]



[Front]



[Rear]

Annex I

Regulatory Statement and Label Marking Advice for the FCC SDoC

1. Marking Suggested for the label:

Trade Name and model number

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2. Statement suggested for the User Manual:

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

Notes: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note: If shielded cables or special accessories are required for compliance, a statement must be included which instructs the user to employ them, for example, Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.

END OF REPORT