TEST REPORT

Report No.	SST240428007EF01
Applicant:	Dongguan Midiplus Electronic Technology Co., LTD
Address of Applicant:	Room 801,Building 2,No. 8 Shuilang Industrial Road, DaLingshan Town, Dongguan City, Guangdong Province, CHINA
Product Name:	Monitor Speakers
Trade Mark:	MIDIPLUS
Standard(s):	FCC CFR Title 47 Part 15 Subpart E Section 15.247
FCC ID:	2AXTO-MSV2
Test Report Form No:	SST-RD-7.5-02-E01(A/0)
Date of sample receipt:	2024/5/6
Date of Test:	2024/5/6 - 2024/5/27
Date of report issued:	2024/5/28

*The equipment complies with the requirements according to the standard(s) or Specification above, it is applicable only to the tested sample identified in the report.

Prepared by: _____

Reviewed by: _____

Approved by: _____

GUANGDONG SET SAIL TESTING CO., LTD. **CERTIFICATE**

Revision History

Version	Description	Date of Issue
V1.0	Original	2024/5/28

2 Contents

3 Test Summary

Test items	Basics standards	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Notes:
1: NA =Not Applicable
2: Determining compliance based on the results of the compliance measurement, not taking into account measurement uncertainty. If necessary, the applicant shall informing test lab in advance
3: Additions, Deviations and Exclusions from Standards: None.

4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:
The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty (±) (k=2, 95%)	
Output Power, Conducted	0.54	
Power Spectral Density, Conducted	1.28	
Spurious Emissions, Conducted	1.28	
Radiated Emissions(<1GHz)	9KHz~30MHz	2.6
	30MHz~1GHz	5.08
Radiated Emissions(>1GHz)	1GHz~6GHz	4.02
	6GHz~18GHz	4.62
	18GHz~40GHz	4.7
Occupied Bandwidth	1.14	
Conducted Emissions—AC mains	9kHz~150KHz	1.76
	150kHz~30MHz	2.52
Conducted Emissions—Telecom	2.64	

5 General Information

5.1 Client Information

Applicant:	Dongguan Midiplus Electronic Technology Co., LTD
Address of applicant:	Room 801,Building 2,No. 8 Shuilang Industrial Road, DaLingshan Town, Dongguan City, Guangdong Province - CHINA
Manufacturer:	Same as applicant
Address of Manufacturer:	Same as applicant
Factory:	Longjoin Industrial Co., Ltd.
Address of Factory:	No.1, Workshop, No.828, Jiuzhou River Avenue Economic Development Zone, Lianjiang City, Guangdong Province

5.2 General Description of EUT

Product Name:	Monitor Speakers
Model No.:	MS6, MS5
List models are identical in the same PCB layout, interior structure and electrical circuits, the only difference is the rated power of loudspeaker	
Test model:	MS6
Test sample(s) ID:	24042800702
Sample(s) Status:	Continuously transmitter
S/N:	/
Hardware Version:	/
Software Version:	/
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Gain:	Refer to section 5.7 for details
Power supply:	AC 100-240V, 50/60Hz

5.3 Test mode(s)

Mode 1:	continuously transmitting
Mode 2:	
Mode 3:	

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see above marked

5.4 Test Facility

The test facility is recognized, certified, or accredited by these organizations:	**FCC Accredited Lab** Test Firm Registration Number: 638130 Designation Number: CN1359
	IC Registration Lab CAB Identifier No. CN0154
	A2LA Accreditation Lab Certificate No.:7057.01

Test Performed at:	**Name** GuangDong Set Sail Testing Co., Ltd.
	Address 101, No.19, Tianxin Hudie 1st Road, Huangjiang Town, Dongguan, Guangdong, China

5.5 Description of Support Units

Device Type	Brand	Model	Series No.	Note
Notebook PC	HP	ZHAN 66P	---	---

5.6 Additional Instructions

Test Software	bt_tool_v1.1.2
Power level setup	Default

5.7 Antenna Information

Ant	Manufacturer	Model	Antenna Type	Antenna Gain (dBi)
1	/	/	PCB	1.7

All above information provided by the applicant which is fully responsible for those information.

5.8 Others

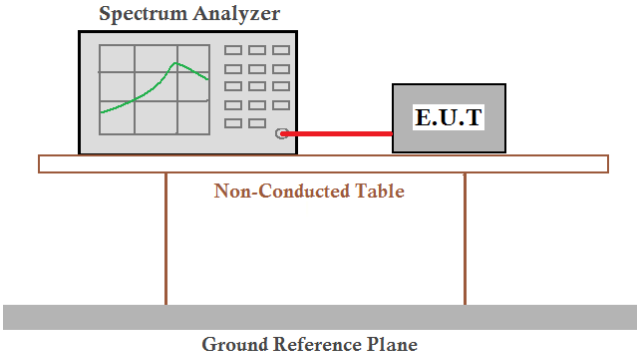
The laboratory responsible for all the information provided in the report, except those information provided by the applicant.
The applicant shall fully responsible for the information they provided.
The report would be invalid without a stamp of test laboratory and the signatures of compiler and approver.
The laboratory has not been responsible for the sampling stage; the test report merely corresponds to the test sample received.
Any objection to the test report shall submitted to the test laboratory within 15 days from the date of receipt of the report.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

6 Technical Requirement and Measurement Data

6.1 Generally requirement

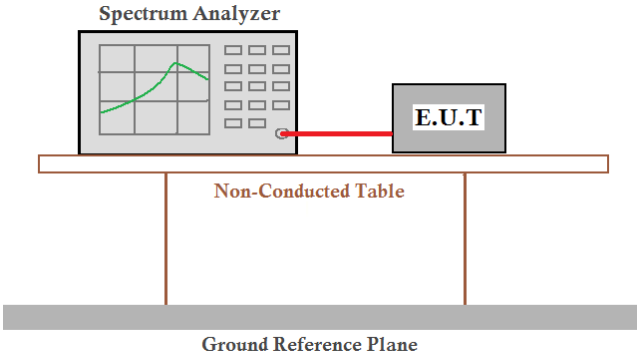
15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
15.247(c) (1)(i) requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
EUT Antenna:
Reference to the appendix II for details

6.2 Duty Cycle

Limit
Report for use
Block diagram of Test Setup

Test Instrument
Refer to Annex A for details
Test Procedures
The transmitter output connected to the Spectrum Analyzer. Test according to Procedure 6.0)b in KDB 558074 v05r02. 1.RBW=8 MHz(the largest available value) 2.VBW=8 MHz(>RBW) 3.SPAN = 0 Hz 4.Detector = Peak 5.Number of points in sweep: 30001 6.Trace mode: Clear write 7.Measure T_{total} and T_{on} 8.Calculate Duty Cycle = T_{on}/T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)
Verdict
Pass

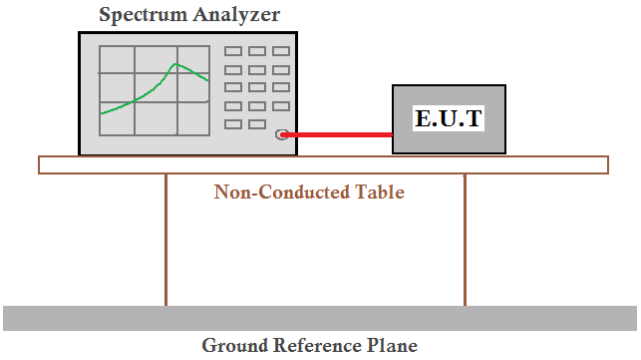
Measurement Data: The detailed test data see Appendix

6.3 Conducted Peak Output Power

Limit
1W(30dBm)
Block diagram of Test Setup

Test Instrument
Refer to Annex A for details
Test Procedures
Test applies to KDB558074 D01 15.247 Meas Guidance v05r02
Verdict
Pass

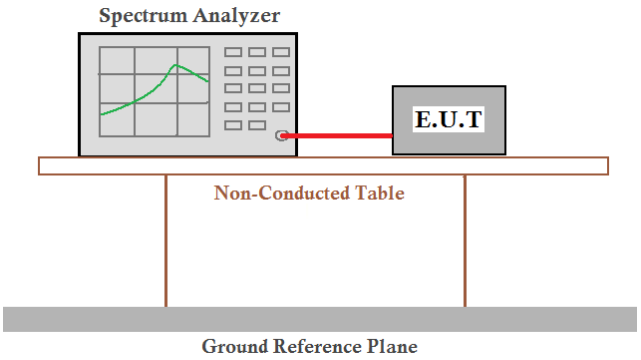
Measurement Data: The detailed test data see Appendix

6.4 Channel Bandwidth

Limit
>500KHz
Block diagram of Test Setup

Test Instrument
Refer to Annex A for details
Test Procedures
Test applies to KDB558074 D01 15.247 Meas Guidance v05r02
Verdict
Pass

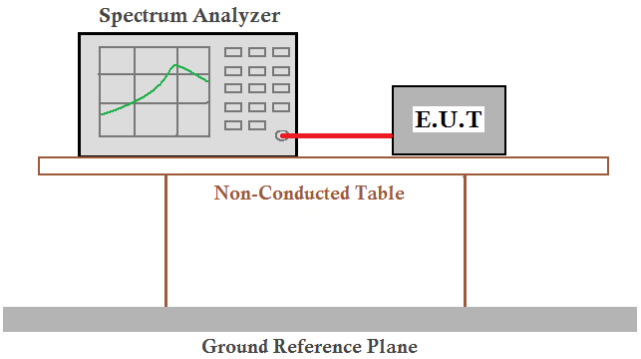
Measurement Data: The detailed test data see Appendix

6.5 Power Spectral Density

Limit
8dBm/3kHz
Block diagram of Test Setup

Test Instrument
Refer to Annex A for details
Test Procedures
Test applies to KDB558074 D01 15.247 Meas Guidance v05r02
Verdict
Pass

Measurement Data: The detailed test data see Appendix

6.6 Conducted Emission

Limit
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Block diagram of Test Setup

Test Instrument
Refer to Annex A for details
Test Procedures
Test applies to KDB558074 D01 15.247 Meas Guidance v05r02
Verdict
Pass

Measurement Data: The detailed test data see Appendix

6.7 Radiated Spurious Emission

Limit

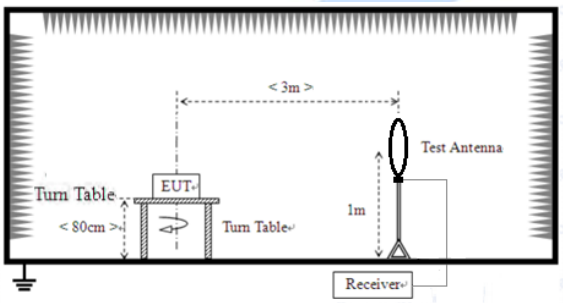
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100 **	3
88–216	150 **	3
216–960	200 **	3
Above 960	500	3

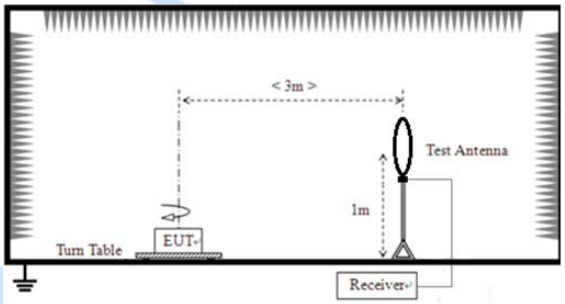
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Block diagram of Test Setup

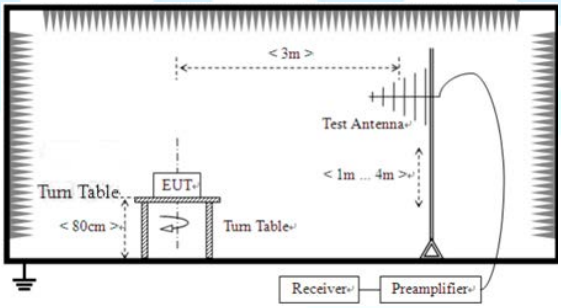
☒For table-top equipment ☐For floor standing equipment

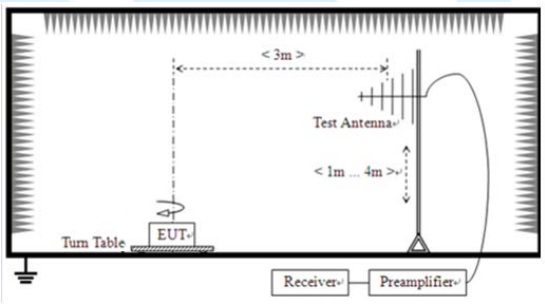
For radiated emissions from 9kHz to 30MHz



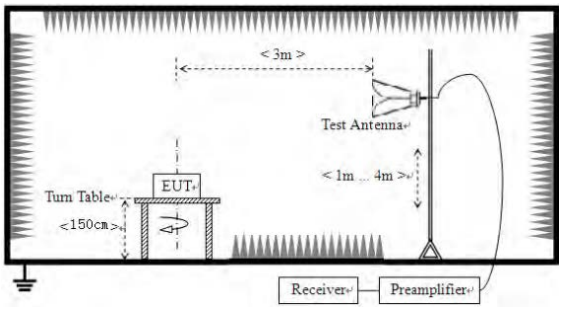


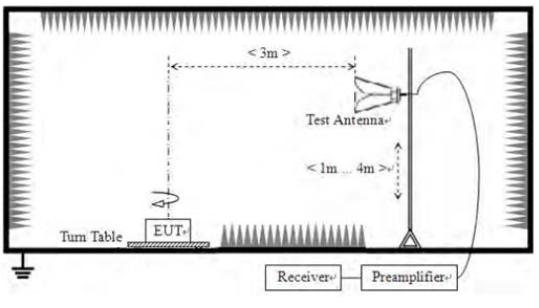
For radiated emissions from 30MHz to1GHz





For radiated emissions above 1GHz





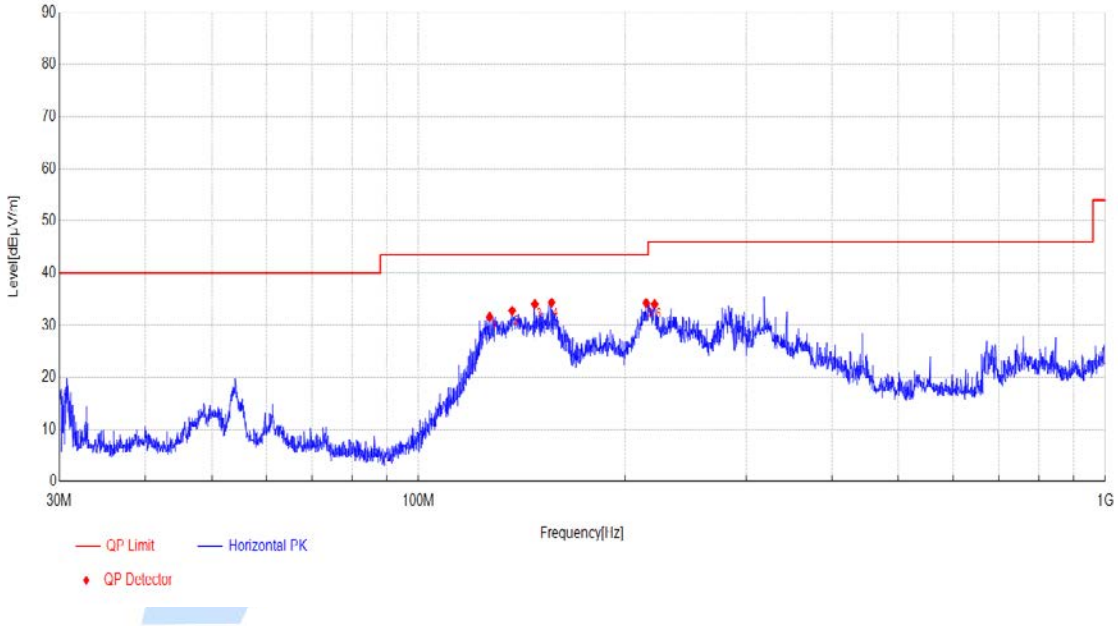
Test Instrument

Refer to Annex A for details
Test Procedures
Test applies to KDB558074 D01 15.247 Meas Guidance v05r02 & C63.10
Verdict
Pass

Note1: The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

Note2: For those undesirable emission (in the Restricted Bands and out-of-band spurious) above 1GHz, According to KDB 558074 and ANSI C63.10 subclause 11, as an alternative, antenna-port conducted measurements in conjunction with cabinet emissions tests will be permitted to demonstrate compliance.

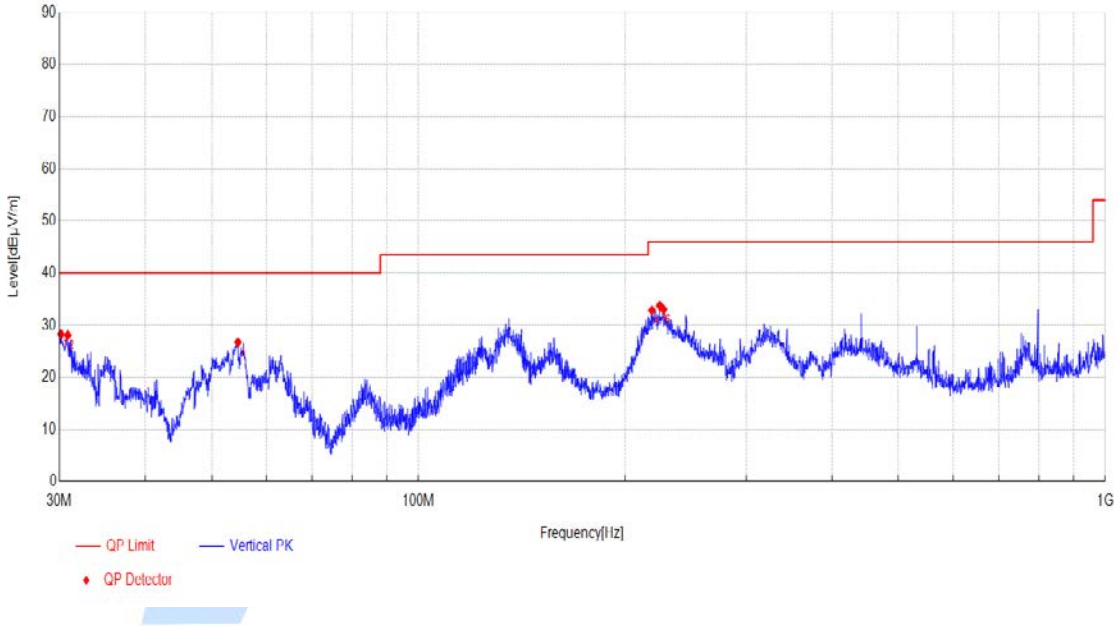
Test Result(30M~1GHz)			
Test mode	Mode 1	Polarity	Horizontal
Test voltage	AC 120V/60Hz	Temp. /Hum.	25 °C/60%



NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity	Verdict
1	126.949	-19.57	31.59	43.50	11.91	Horizontal	PASS
2	136.8872	-20.37	32.77	43.50	10.73	Horizontal	PASS
3	147.7329	-20.54	34.04	43.50	9.46	Horizontal	PASS
4	156.2562	-20.62	34.34	43.50	9.16	Horizontal	PASS
5	214.5968	-16.84	34.28	43.50	9.22	Horizontal	PASS
6	220.7005	-16.65	34.04	46.00	11.96	Horizontal	PASS

Note: Final Level =Receiver Read level + Factor
Factor= Antenna Factor + Cable Loss – Preamplifier Factor
Only the worst case report(2402MHz)

Test Result(30M~1GHz)			
Test mode	Mode 1	Polarity	Vertical
Test voltage	AC 120V/60Hz	Temp. /Hum.	25 °C/60%



NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity	Verdict
1	30.1582	-18.66	28.29	40.00	11.71	Vertical	PASS
2	30.8533	-18.59	28.11	40.00	11.89	Vertical	PASS
3	54.5868	-16.00	26.73	40.00	13.27	Vertical	PASS
4	218.7747	-16.72	32.84	46.00	13.16	Vertical	PASS
5	224.6031	-16.55	33.75	46.00	12.25	Vertical	PASS
6	227.376	-16.45	33.05	46.00	12.95	Vertical	PASS

Note: Final Level =Receiver Read level + Factor
Factor= Antenna Factor + Cable Loss – Preamplifier Factor
Only the worst case report(2402MHz)

6.8 Conducted Emissions

Limit

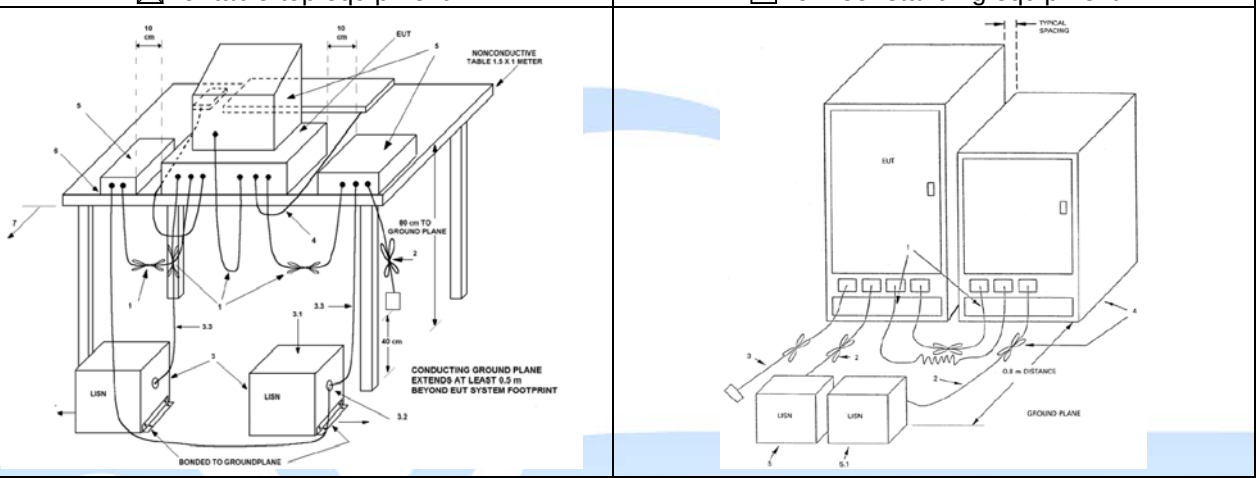
Frequency (MHz)	Quasi-peak	Average
0.15~0.50	66 to 56*	56 to 46*
0.50~5.0	56	46
5.0~30	60	50

*Decreases with the logarithm of the frequency.

If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out

Block diagram of Test Setup

☒For table-top equipment ☐For floor standing equipment



Test Instrument

Refer to Annex A for details

Test Procedures

The measurement was performed in a shield room.

Measured levels of ac power-line conducted emission shall be the radio-noise voltage from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), as terminated into a 50 Ω EMI receiver or spectrum analyzer. All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN, if used. The manufacturer shall test equipment with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended. For measurements using a LISN, the 50 Ω measuring port is terminated into a 50 Ω EMI receiver or spectrum analyzer. All other ports are terminated into 50 Ω loads.

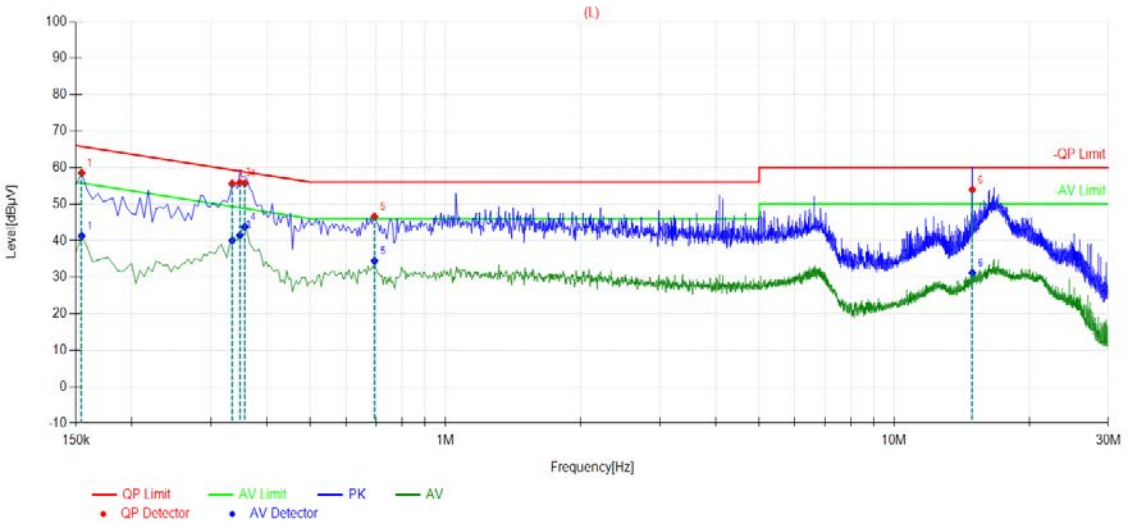
Table top devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

Verdict

Pass

Test Result			
Test mode	Mode 1	Polarity	Line
Test voltage	AC 120V/60Hz	Temp. /Hum.	25 °C/60%

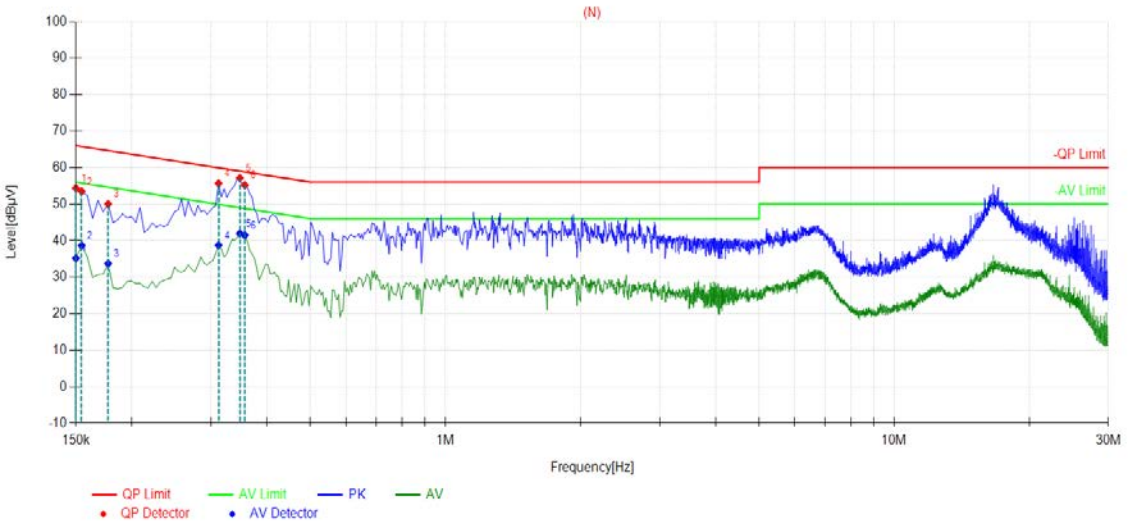


Final Data List

NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	Type
1	0.1545	58.50	65.75	7.25	41.30	55.75	14.45	PASS	L
2	0.3345	55.56	59.34	3.78	40.01	49.34	9.33	PASS	L
3	0.348	55.85	59.01	3.16	41.42	49.01	7.59	PASS	L
4	0.357	55.65	58.80	3.15	43.81	48.80	4.99	PASS	L
5	0.6945	46.55	56.00	9.45	34.46	46.00	11.54	PASS	L
6	14.9325	53.94	60.00	6.06	31.18	50.00	18.82	PASS	L

Note: Final Level =Receiver Read level + Factor
Factor= LISN Factor + Cable Loss
Only the worst case report(2402MHz)

Test Result			
Test mode	Mode 1	Polarity	Neutral
Test voltage	AC 120V/60Hz	Temp. /Hum.	25 °C/60%



Final Data List

NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	Type
1	0.15	54.34	66.00	11.66	35.14	56.00	20.86	PASS	N
2	0.1545	53.46	65.75	12.29	38.64	55.75	17.11	PASS	N
3	0.177	50.00	64.63	14.63	33.71	54.63	20.92	PASS	N
4	0.312	55.64	59.92	4.28	38.75	49.92	11.17	PASS	N
5	0.348	57.13	59.01	1.88	41.96	49.01	7.05	PASS	N
6	0.357	55.18	58.80	3.62	41.48	48.80	7.32	PASS	N

Note: Final Level =Receiver Read level + Factor
Factor= LISN Factor + Cable Loss
Only the worst case report(2402MHz)

7 Test Setup Photo

Reference to the **appendix I** for details.

8 EUT Constructional Details

Reference to the **appendix II** for details.

Annex A --Test Instruments list

Radiated Emission:						
Equipment No.	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. cycle**	**Cal.Date**
SST-E-SAC001	3m Semi- Anechoic Chamber	BOST	966	/	3 years	2023.01.07
SST-E-SCC001	Control Room	BOST	333	/	3 years	2023.01.07
SST-E-SAC002	Breiband TRILOG Messantenne	Schwarzbeck	VULB 9162	00556	1 year	2024.04.20
SST-E-SAC004	Broad-band Horn Antenna	Schwarzbeck	BBHA 9120 D	02783	1 year	2024.04.16
SST-E-SCC003	EMI Test Receiver	R&S	ESU 8	100372	1 year	2024.04.16
SST-E-SCC004	Amplifier	Schwarzbeck	BBV 9744	00327	1 year	2024.04.16
SST-E-SCC015	Amplifie （1-18GHz）	TSTPASS	LNA10180G45	TSAM2303003	1 year	2024.04.16
SST-E-SCC016	Amplifier（40G）	RFsystem	TRLA-180400G45B	23060801	1 year	2024.04.16
SST-E-SAC006	Broadband Horn Antenna（40G）	Schwarzbeck	BBHA9170	01306	1 year	2024.04.17
SST-E-RSC010	Spectrum analyzer	R&S	FSV40-N	/	1 year	2024.04.16
SST-E-SAC007	Loop Antenna	Schwarzbeck	FMZB 1513-60B	1513-60B 044	1 year	2024.04.17
SST-E-SAC005	5W 6dB attenuator	/	DC-6GHz	/	Internal calibration	/
SST-E-EMC006	Thermohygrometer	KTJ	TA218A	879030	1 year	2024.04.18
/	EMI Test Software	Tonscend	TS+	/	/	/

Conducted Emission						
Equipment No.	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. cycle**	**Cal.Date**
SST-E-CSC001	Shielding Room	BOST	854	/	3 year	2023.01.07
SST-E-CSC002	EMI Test Receiver	R&S	ESR3	103057	1 year	2024.04.16
SST-E-CSC003	LISN	R&S	ENV 216	102832	1 year	2024.04.16
SST-E-CSC004	ISN	R&S	NTFM 8158	00347	1 year	2024.04.16
SST-E-CSC007	Antenna port test assembly	/	DC-3GHz	/	Internal calibration	/
SST-E-EMC011	Thermohygrometer	KTJ	TA218A	879036	1 year	2024.04.18
/	EMI Test Software	Tonscend	TS+	V4.0	/	/

RF conducted						
Equipment No.	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. cycle**	**Cal.Date**
SST-E-RSC001	Shielding Room	BOST	543	/	3 year	2023.01.07
SST-E-RSC007	Spectrum analyzer	keysight	N9020A	MY51280659	1 year	2024.04.16
SST-E-RSC008	Analog signal source	Agilent	N5181A	MY48180054	1 year	2024.04.16
SST-E-RSC009	Vector signal source	keysight	N5172B	MY57281610	1 year	2024.04.16
SST-E-EMC007	Thermohygrometer	KTJ	TA218A	879032	1 year	2024.04.18
SST-E-RSC010	Spectrum analyzer	R&S	FSV40-N	/	1 year	2024.04.16
SST-E-RSC015-1	Power meter 1	TST	TST V2	/	1 year	2024.04.16
/	Test Software	TST PASS	TST PASS	V2.0	/	/

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