Worldwide Testing and Certification

TEST REPORT
ELECTROMAGNETIC COMPATIBILITY (EMC) AND ASSESSMENT RELATED TO HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS (EMF)

Report Reference No.....:	**423888/EMC**
Supervised by (name & signature) ...:	Jianbo Ru
Approved by (name & signature).....:	Juno Wong
Date of issue.....:	2022-03-25
Report issued by.....:	**Nemko Shanghai Ltd Shenzhen Branch**
Address.....:	**Unit C&D, Floor 10, Tower 2, Financial Base, Kefa Road 8#, Hi-Technology Park, Nanshan District, Shenzhen 518057, China**
Testing procedure.....:	Supervised testing at external laboratory
Testing location/ address.....:	See page 10
Applicant's name.....:	**SPARKELEC PTY LTD**
Address.....:	**56 Parramatta Rd Croydon NSW 2132, Sydney, Australia**
Test specification:	
Standards for EMC .....:	**EN IEC 55015:2019+A11:2020** **EN 61547:2009** **EN IEC 61000-3-2:2019+A1:2021** **EN 61000-3-3:2013+A1:2019**
Standards for EMF.....:	**EN 62493:2015**
Arrival of EUT .....:	2021-07-10
Test date of EUT	2021-07-11 to 2021-07-25
Test item description ..... :	**LED emergency lighting**
TradeMark .....:	SPARKELEC
Manufacturer.....:	**SPARKELEC PTY LTD**
Address .....:	**56 Parramatta Rd Croydon NSW 2132, Sydney, Australia**
Type.....:	**SPaaaabb-ccc series**
Serial number .....:	**See page 9**

Index of the test report:

1 Summary Emission of EN IEC55015

1.1 Standards

Generic standard	**EN 61000-3-3:2013+A1:2019** **EN IEC 61000-3-2:2019+A1:2021**
Product or product family standard	**EN IEC 55015:2019+A11:2020**
Product category	**/**

1.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Limit class	Result
Conducted Emission	AC input power ports	EN IEC 55015 /CISPR 16	**Table 1**	**Pass**
Conducted Emission	wired network ports	EN IEC 55015 /CISPR 16	**Table 2 or Table 3**	**N/A**
Conducted Emission	Local wired ports	EN IEC 55015 /CISPR 16	**Table 2b**	**N/A**
Radiated emission	Enclosure port	EN IEC 55015 /CISPR 16	**Table 10(3m)**	**Pass**
Radiated Electromagnetic Disturbance	Enclosure port	EN IEC 55015 /CISPR 16	**Table 8**	**Pass**
Harmonic current emission	AC input power ports	EN IEC 61000-3-2: 2019+A1:2021	**Class C**	**Pass**
Voltage fluctuations and flicker	AC input power ports	EN 61000-3-3: 2013+A1:2019	**Clause 5**	**Pass**

Remarks: N/A-Not Applicable

2 Summary Immunity of EN 61547

2.1 Standards

Generic standard /

Product or product family standard **EN 61547:2009**

Product category: /

Performance criteria: **See as below**

2.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Performance criteria	Result
Electrostatic Discharge	Enclosure port	EN 61000-4-2:2009	**B**	**Pass**
Radiated Electromagnetic field Susceptibility Test	Enclosure port	EN IEC 61000-4-3: 2020	**A**	**Pass**
Electrical Fast Transient /Burst Test	Input Ac Power port;	EN 61000-4-4:2012	**B**	**Pass**
Surge Test	Input Ac Power port	EN 61000-4-5: 2014+A1:2017	**C**	**Pass**
Conducted Susceptibility Test	Input Ac Power port;	EN 61000-4-6:2014	**A**	**Pass**
Voltage Dips and Interruptions Test	Input Ac Power port	EN 61000-4-11:2020	**Table 11 of EN61547:C** **Table 12 of EN61547:B**	**N/A**
Power frequency magnetic fields	Enclosure port	EN 61000-4-8:2010	**A**	**N/A****

Remarks: N/A-Not Applicable

**) Not contain components susceptible to magnetic fields

2.3 Performance criteria according to product or product family standards

Performance criterion A

During the test no change of the luminous intensity shall be observed and the regulating control, if any shall operate during the test as intended.

Performance criterion B

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criterion C

During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min,all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control. Additional requirement for lighting equipment incorporating a starting device: After the test the lighting equipment is switched off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

3 Summary EMF of EN 62493

3.1 Standards

Generic standard	/
Product or product family standard	**EN 62493:2015**
Product category	**Unintentional radiating lighting equipment**

3.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Test frequency range	Result
Van der Hoofden test	Enclosure port	EN62493	**20 kHz to 10 MHz**	**Pass**

4 General information

4.1 Description of Equipment under test (EUT)

Type of equipment

Self-ballasted lamps and semi-luminaires	☐
Independent auxiliaries	☐
Luminaries or equivalent appliances	☒

The EUT is LED emergency lighting

The model name is SPaaaabb-ccc series
The “aaaa” in the type designation can be 3001 or 3002, indicating different enclosure.
The “bb” can be DA or FE, indicating different function.
DA is manual test with DALI function, FE is manual test without DALI function.
The “ccc” can be D63 or D40, indicating different Optical grade.

Rating(s):
Charging mode: 220-240VAC, 50/60Hz, Cl. II, 4 W.
Emergency lighting mode: Lithium battery, 6.4 Vd.c., 1500mAh / 3200mAh.

Model list:

Model name	Ratings and characteristics	Installation method
SP3001DA-D63	4 W, 2 hours duration, Lithium battery 6.4 V, 3.2 Ah; Non-Maintained, manual test & DALI. D63, 300 lm.	Recessed mounting
SP3001FE-D63	4 W, 2 hours duration, Lithium battery 6.4 V, 3 Ah; Non-Maintained, manual test. D63, 400 lm.	
SP3001DA-D40	4 W, 2 hours duration, Lithium battery 6.4 V, 1.5 Ah; Non-Maintained, manual test & DALI. D40, 200 lm.	
SP3001FE-D40	4 W, 2 hours duration, Lithium battery 6.4 V, 1.5 Ah; Non-Maintained, manual test. D40, 200 lm.	
SP3002DA-D63	4 W, 2 hours duration, Lithium battery 6.4 V, 3 Ah; Non-Maintained, manual test & DALI. D63, 400 lm.	Ceiling mounting & wall mounting
SP3002FE-D63	4 W, 2 hours duration, Lithium battery 6.4 V, 3 Ah; Non-Maintained, manual test. D63, 400 lm.	
SP3002DA-D40	4 W, 2 hours duration, Lithium battery 6.4 V, 1.5 Ah; Non-Maintained, manual test & DALI. D40, 200 lm.	
SP3002FE-D40	4 W, 2 hours duration, Lithium battery 6.4 V, 1.5 Ah; Non-Maintained, manual test. D40, 200 lm.	

Remark:
The emergency driver of SPaaaaDA-ccc is identical to the emergency driver of SPaaaaFE-ccc, only differ in the emergency driver with a DALI subsidiary circuit board for model SPaaaaDA-ccc.
All models are different in appearance and color temperature, so we chose JY-1002DA-D63 and JY-1502DA-D63 for the representative test.

4.2 Measurement uncertainty

Conducted Emission:	**9-150KHz**	**3.23dB**
	150KHz-30MHz	**2.63dB**
Radiated Emission:	**30MHz~1000MHz**	**4.22dB**
Magnetic Field Emission:	**9KHz ~ 30MHz**	**1.73dB**

4.3 Test Mode (TM)

TM1 230VAC 50Hz, Charging mode (Lamp off)

TM2 Internal batteries, Emergency mode

Remark: By pre-scan, only list the mode which test result is worst in report.

4.4 Climatic conditions

parameter	admissible range	actual range	
Ambient temperature	**15 °C - 25 °C**	**24-25°C**	**OK**
Relative humidity	**30 % - 60 %RH**	**46-50%RH**	**OK**
Atmospheric pressure	**86-106kPa**	**101.1-101.2kPa**	**OK**

4.5 Testing location

AUDIX Technology (Shenzhen) Co., Ltd.
No.6, Ke Feng Rd.,52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China. – ELA 135
Nemko Shanghai Ltd. Shenzhen Branch
Unit C&D, Floor 10, Tower 2, Financial Base, Kefa Road 8#, Hi-Technology Park, Nanshan District, Shenzhen 518057, China
Remark: All tests have been supervised by a Nemko engineer.

5 Measurement of Conducted Disturbance

5.1 Standards

Generic standard	/
Product or product family standard	**EN IEC 55015:2019+A11:2020**
Limit class	**Table 1 of EN IEC55015**
Basic standard	**CISPR 16**
Date of testing	**2021-07-11**

5.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	EMI Test Receiver	2023.01.03	ESCI	100657	ROHDE & SCHWARZ
☒	Artificial Mains	2023.01.03	ESH2-Z5	100065	ROHDE & SCHWARZ
☒	Pulse Limiter	2023.01.03	ESH3-Z2	100806	ROHDE & SCHWARZ
☒	EMI Test Software	N/A	EMC32	N/A	ROHDE & SCHWARZ

5.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.
The test has been performed as following:

The cable connecting to the V-network shall not exceed 0,8 m. The lamp is placed 0,4 m above a metal plate of dimensions at least 2 m × 2 m and shall be kept at least 0,8 m from any other earthed conducting surface. The artificial mains network (V-network) shall also be placed at a distance of at least 0,8 m from the lamp. The plate shall be connected to the reference earth of the V-network.
A EMI test receiver used to test the emission from both side of AC line.

Scan setting:

Freq range			Receiver setting		
Start	Stop	Step	IF BW	Detector	Meas Time
9k	150k	100Hz	200Hz	PK+AV	10ms
150k	30M	4.5k	9k	PK+AV	10ms

Final measurement:

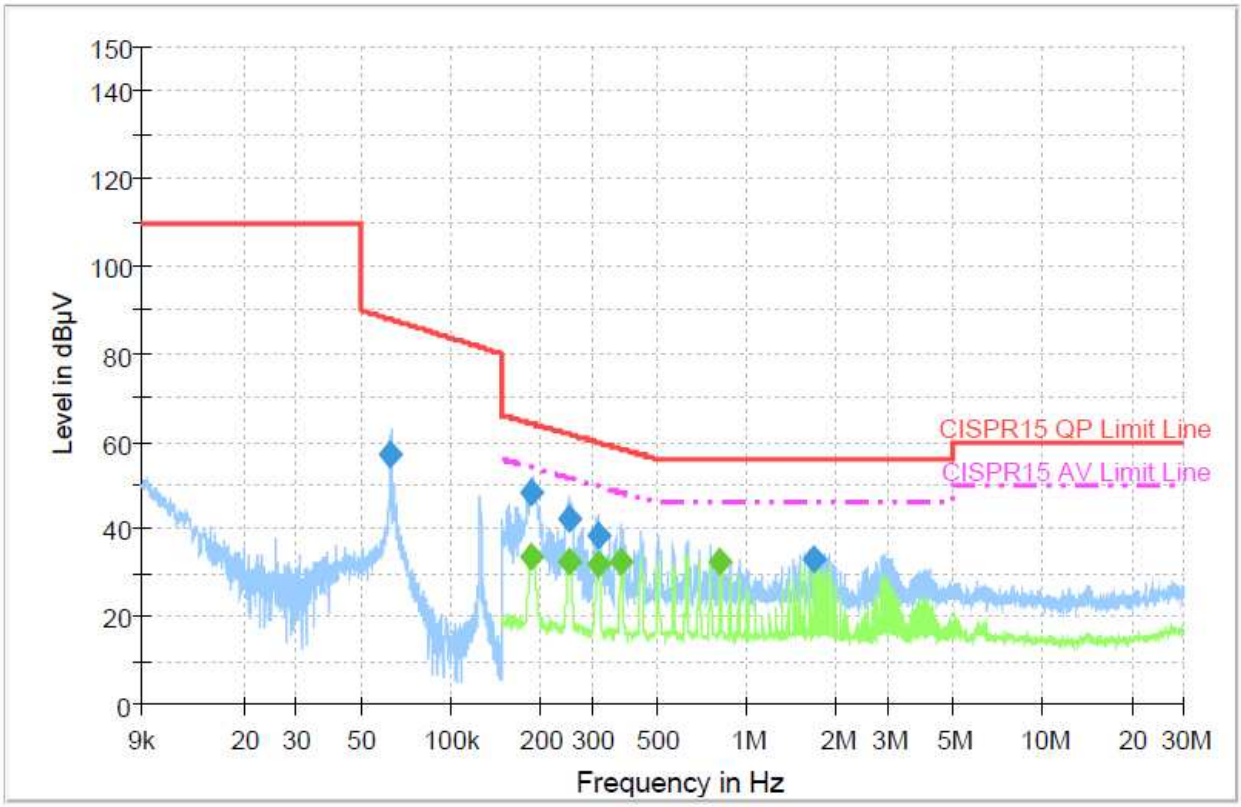
Detector	Meas time
QP/AV	1s

5.4 Test result

Model	Test Mode	Diagram	Test port	Remarks	Result
JY-1002DA-D63	TM1	001	AC input port	Line L	**Pass**
		002		Line N	**Pass**
	TM2	003	AC input port	Line L	**Pass**
		004		Line N	**Pass**
JY-1502DA-D63	TM1	005	AC input port	Line L	**Pass**
		006		Line N	**Pass**
	TM2	007	AC input port	Line L	**Pass**
		008		Line N	**Pass**
Remark:	When the PK result is comply with AV limit, then both of QP and AV are comply with their limit. Only list the diagram in the report if the result is too low to the limit.				

5.5 Diagrams

5.5.1 Diagram 001



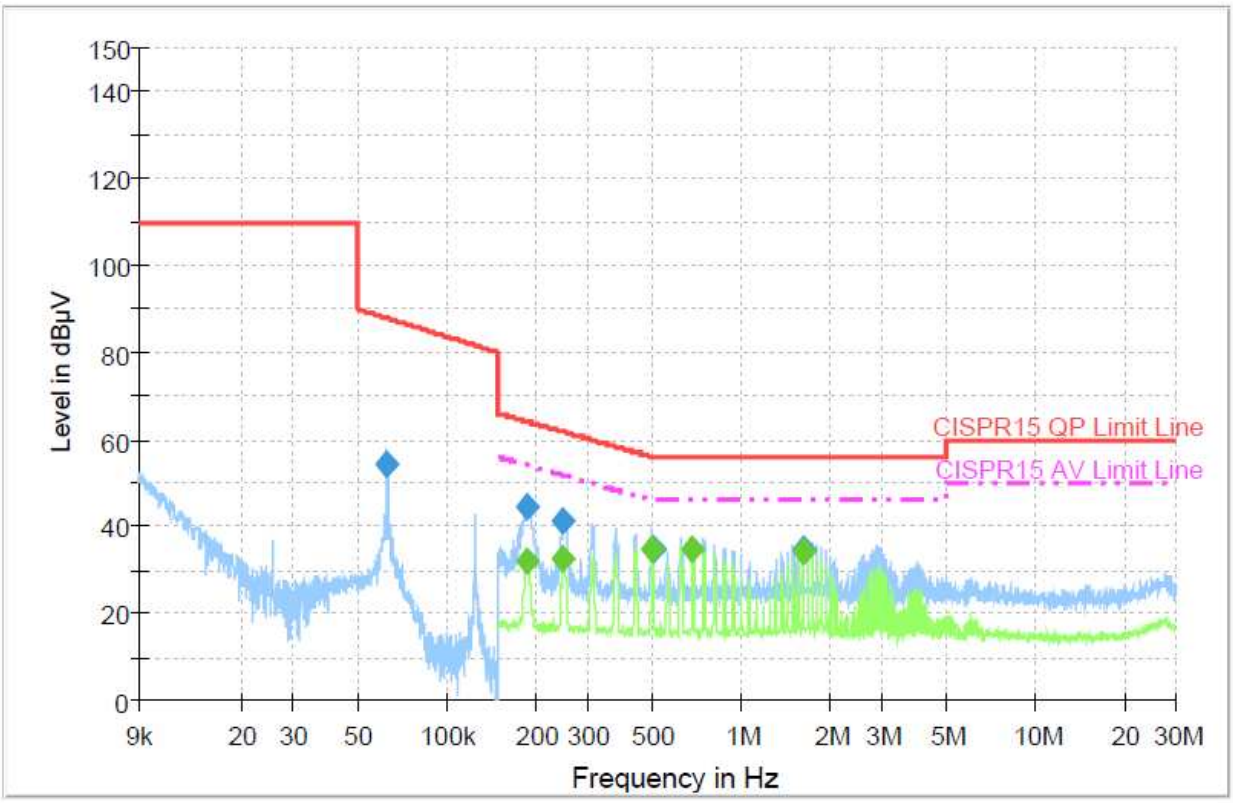
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.062861	57.3	L1	19.9	30.6	87.9
0.188500	48.3	L1	19.9	15.8	64.1
0.251168	42.6	L1	19.9	19.1	61.7
0.313658	38.6	L1	20.0	21.3	59.9
1.692111	33.4	L1	20.0	22.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.188700	33.7	L1	19.9	20.4	54.1
0.251466	32.7	L1	19.9	19.0	51.7
0.313605	31.9	L1	20.0	18.0	49.9
0.375548	32.9	L1	20.0	15.5	48.4
0.814464	32.7	L1	20.0	13.3	46.0

5.5.2 Diagram 002



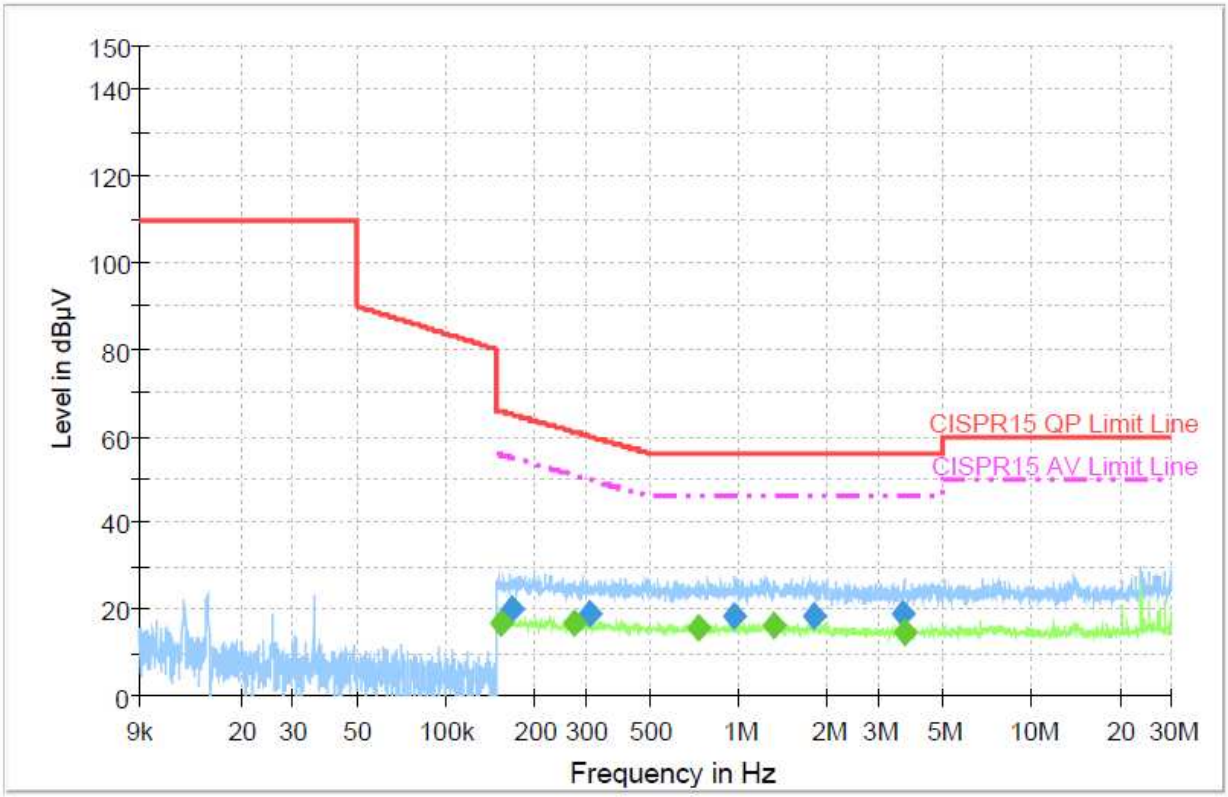
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.062408	54.1	N	19.9	33.9	88.0
0.185800	44.8	N	19.9	19.4	64.2
0.249167	41.0	N	19.9	20.8	61.8
0.501813	34.8	N	20.0	21.2	56.0
1.624210	34.8	N	20.0	21.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.188100	32.2	N	19.9	21.9	54.1
0.249371	32.5	N	19.9	19.3	51.8
0.499913	35.0	N	20.0	11.0	46.0
0.686836	34.6	N	20.0	11.4	46.0
1.622910	34.4	N	20.0	11.6	46.0

5.5.3 Diagram 003



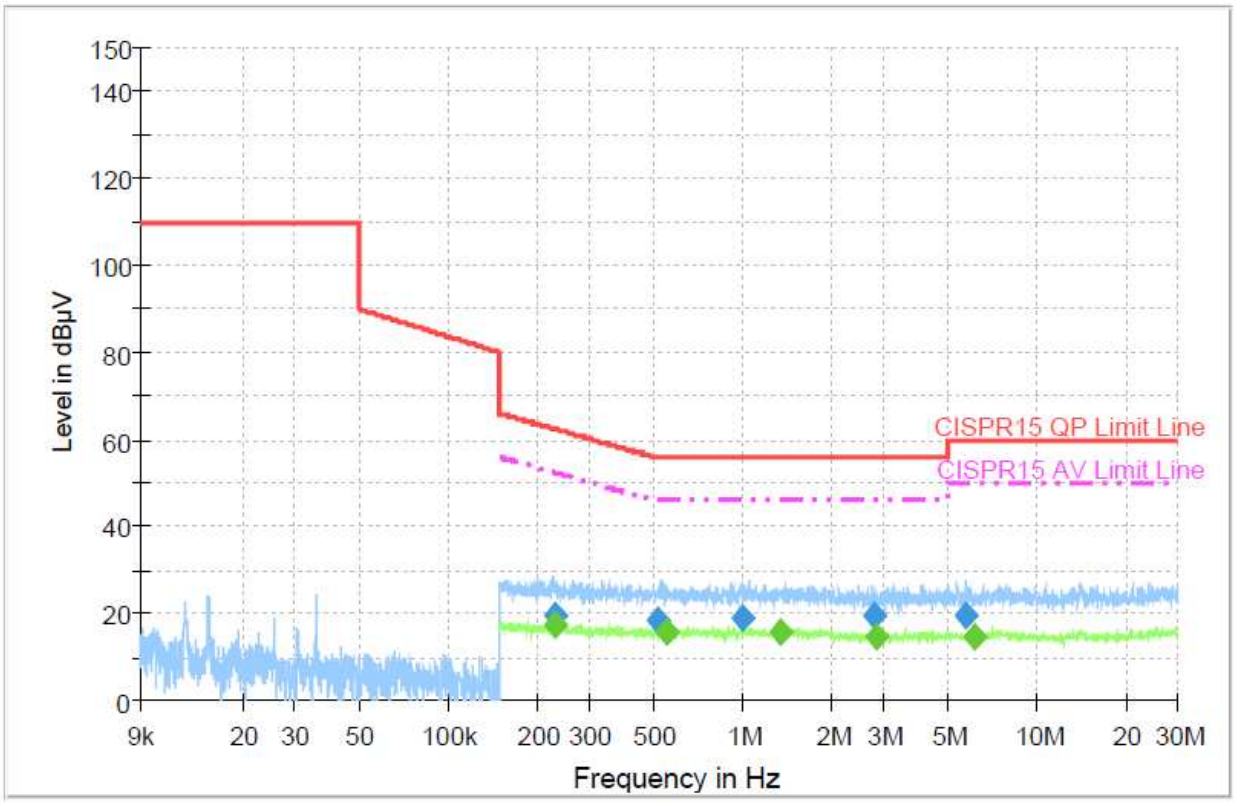
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.167400	19.9	L1	19.9	45.2	65.1
0.311883	18.9	L1	20.0	41.0	59.9
0.969490	18.5	L1	20.0	37.5	56.0
1.811820	18.3	L1	20.0	37.7	56.0
3.638841	19.2	L1	20.0	36.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154300	17.1	L1	19.9	38.7	55.8
0.273581	17.0	L1	19.9	34.0	51.0
0.724989	15.6	L1	20.0	30.4	46.0
1.321785	16.4	L1	20.0	29.6	46.0
3.713869	14.8	L1	20.0	31.2	46.0

5.5.4 Diagram 004



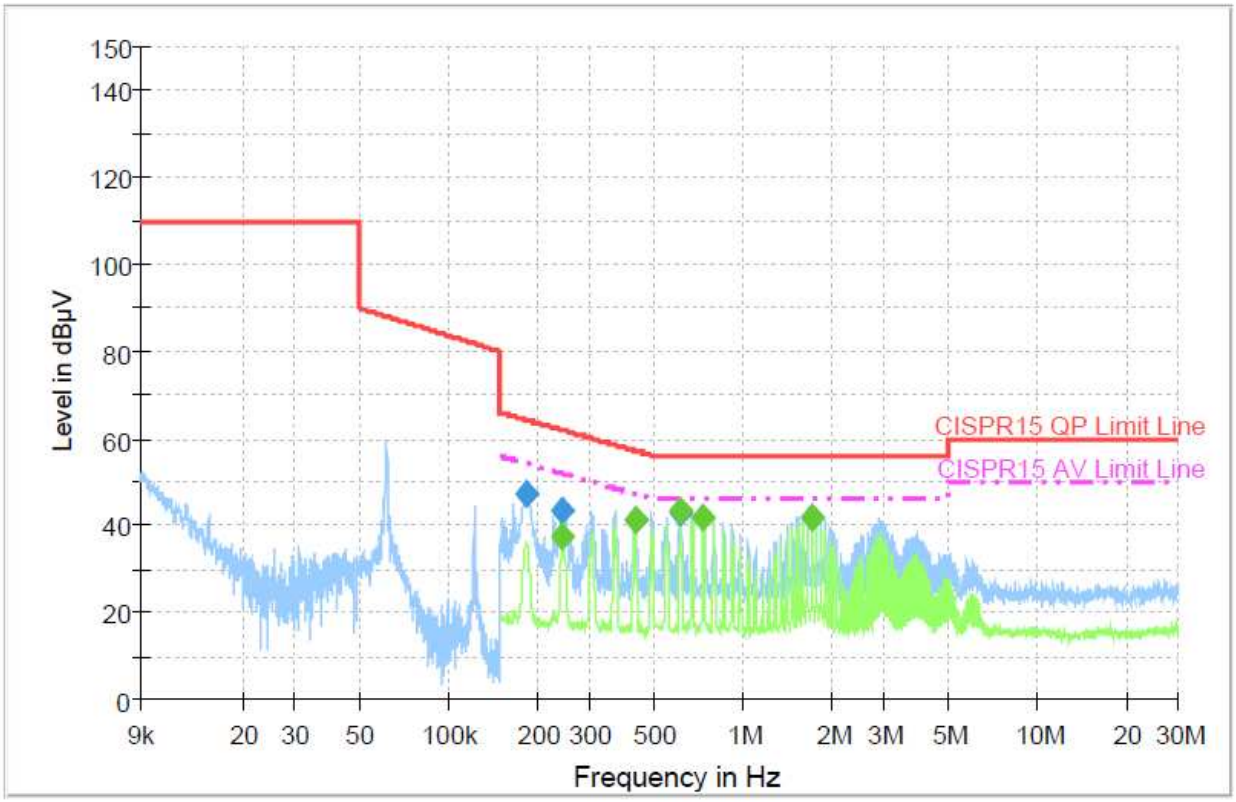
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.232235	19.8	N	19.9	42.6	62.4
0.513251	18.7	N	20.0	37.3	56.0
1.006964	18.9	N	20.0	37.1	56.0
2.809161	19.5	N	20.0	36.5	56.0
5.714205	19.5	N	20.0	40.5	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.229835	17.1	N	19.9	35.4	52.5
0.555151	15.7	N	20.0	30.3	46.0
1.348598	15.9	N	20.0	30.1	46.0
2.866306	14.7	N	20.0	31.3	46.0
6.082123	14.9	N	20.0	35.1	50.0

5.5.5 Diagram 005



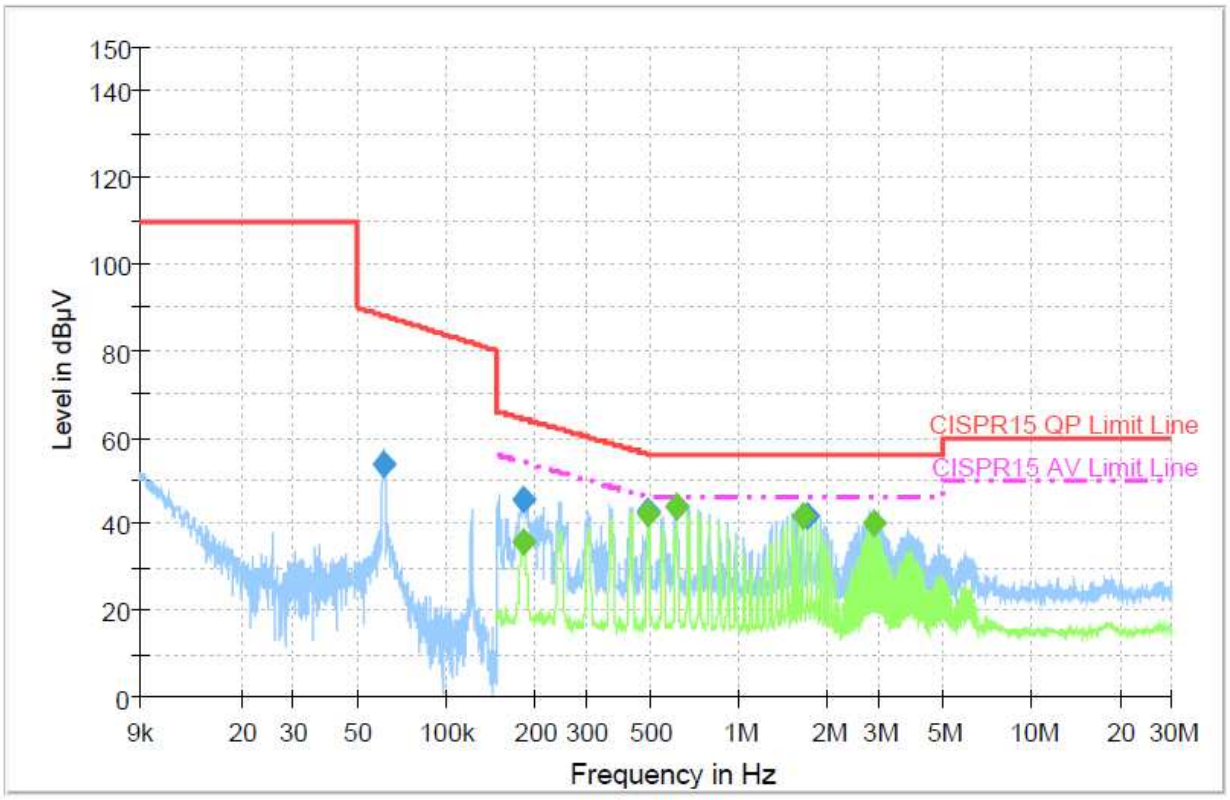
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.184000	47.3	L1	19.9	17.0	64.3
0.244485	43.6	L1	19.9	18.3	61.9
0.429855	41.4	L1	20.0	15.9	57.3
0.611605	43.0	L1	20.0	13.0	56.0
1.714269	42.0	L1	20.0	14.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.245139	37.7	L1	19.9	14.2	51.9
0.429198	41.6	L1	20.0	5.7	47.3
0.612629	43.4	L1	20.0	2.6	46.0
0.735365	41.6	L1	20.0	4.4	46.0
1.715169	41.8	L1	20.0	4.2	46.0

5.5.6 Diagram 006



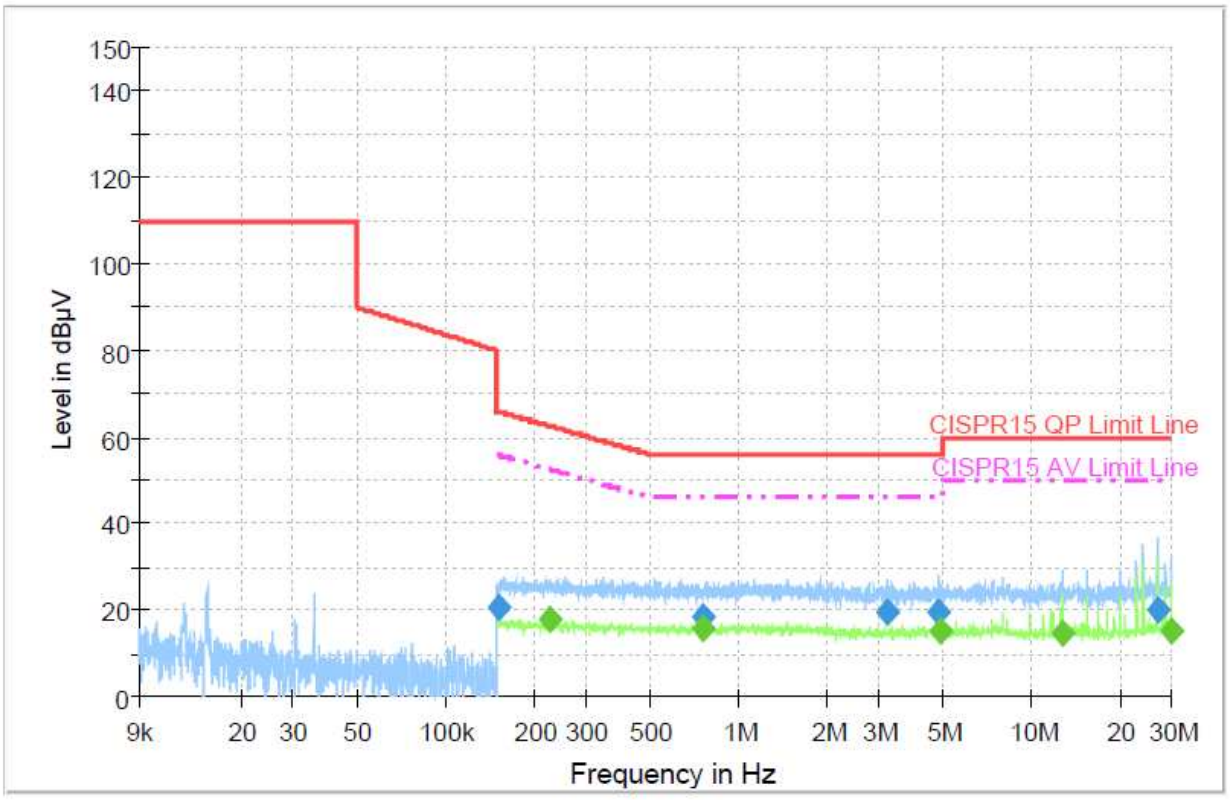
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.061094	54.0	N	19.9	34.2	88.2
0.184500	45.6	N	19.9	18.7	64.3
0.489913	42.9	N	20.0	13.3	56.2
0.611505	43.9	N	20.0	12.1	56.0
1.714269	41.9	N	20.0	14.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.184200	35.8	N	19.9	18.5	54.3
0.489613	42.6	N	20.0	3.6	46.2
0.612529	44.1	N	20.0	1.9	46.0
1.652918	41.9	N	20.0	4.1	46.0
2.877093	40.1	N	20.0	5.9	46.0

5.5.7 Diagram 007



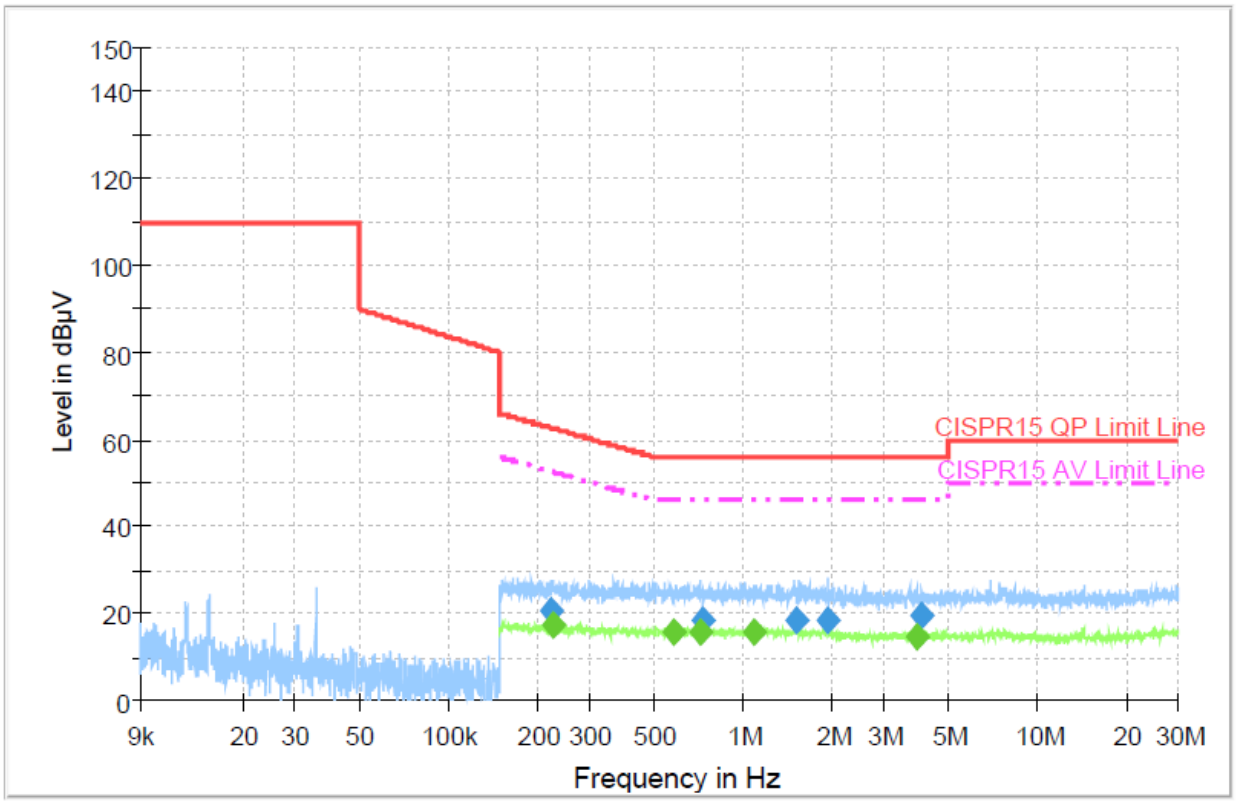
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.153218	20.5	L1	19.9	45.3	65.8
0.761562	18.6	L1	20.0	37.4	56.0
3.200066	19.4	L1	20.0	36.6	56.0
4.778581	19.6	L1	20.0	36.4	56.0
26.823594	20.3	L1	20.2	39.7	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.225938	17.7	L1	19.9	34.9	52.6
0.761105	15.5	L1	20.0	30.5	46.0
4.861103	15.0	L1	20.0	31.0	46.0
12.798171	14.6	L1	20.0	35.4	50.0
29.859906	15.5	L1	20.2	34.5	50.0

5.5.8 Diagram 008



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.224114	20.4	N	19.9	42.3	62.7
0.736112	18.6	N	20.0	37.4	56.0
1.509009	18.5	N	20.0	37.5	56.0
1.932355	18.6	N	20.0	37.4	56.0
4.023951	19.5	N	20.0	36.5	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.225271	17.5	N	19.9	35.1	52.6
0.580546	15.6	N	20.0	30.4	46.0
0.716053	15.8	N	20.0	30.2	46.0
1.096740	15.8	N	20.0	30.2	46.0
3.868230	14.8	N	20.0	31.2	46.0

6 Measurement of Radiated Emission

6.1 Standards

Generic standard	/
Product or product family standard	**EN IEC 55015:2019+A11:2020**
Limit class	**Table 10 (3m) of EN IEC55015**
Basic standard	**CISPR 16**
Date of testing	**2021-07-13**

6.2 Measurement equipment

	Equipment	Cal. due	Model No.	Serial No.	Manufacturer
☒	3#Chamber	Nov.23,22	N/A	N/A	AUDIX
☒	EMI Spectrum	Jun.18,22	E4407B	MY41440292	Agilent
☒	Test Receiver	Jun.18,22	ESVS10	834468/011	Rohde & Schwarz
☒	Amplifier	Jun.18,22	8447D	2648A04738	HP
☒	Bilog Antenna	Jun.18,22	CBL6112D	35375	TESEQ
☒	RF Cable	Jun.18,22	CFD400-NL	3# Chamber No.1	MIYAZAKI
☒	Coaxial Switch	Jun.18,22	MP59B	6200313662	Anritsu
☒	Horn Antenna	Jun.18,22	3115	9607-4877	ETS

6.3 Test set-up

The EUT has been tested according to the above-mentioned standard, as following:
The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode.

If more details are necessary, e.g. because of wiring or auxiliary equipment, annex B with a photo or a rough figure of the test set-up is attached.

The test has been performed as following:

1) Preview test; Peak; IF BW=100kHz, VBW=300kHz, Antenna: from 1 to 4m Turntable 0-360deg
2) Find frequencies with maximum emission:

   Acceptance-analysis: Limit minus 10 dB

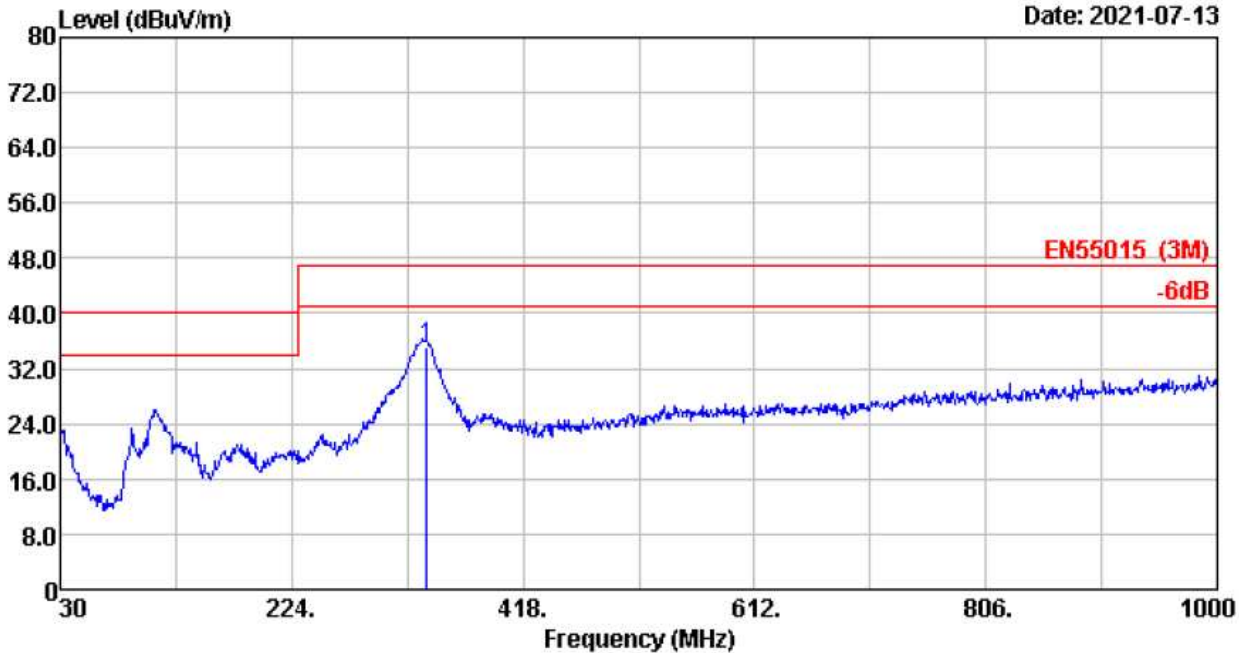
   Peak-reduction: Peaks frequency range 30 MHz - 300 MHz
3) Final test; Quasi-Peak; measuring time 1 s; at frequencies from step 2); Search maximum: vary turntable and antenna position to find the maximum readings
4) If there are more than 10 peaks within the 10 dB margin a manual test with all settings is necessary to find the maximum readings.

6.4 Test result

Model	Test Mode	Test port	Diagram	Remarks	Result
JY-1002DA-D63	TM1	Enclosure port	009	H	**Pass**
			010	V	**Pass**
	TM2	Enclosure port	011	H	**Pass**
			012	V	**Pass**
JY-1502DA-D63	TM1	Enclosure port	013	H	**Pass**
			014	V	**Pass**
	TM3	Enclosure port	015	H	**Pass**
			016	V	**Pass**

6.5 Diagrams

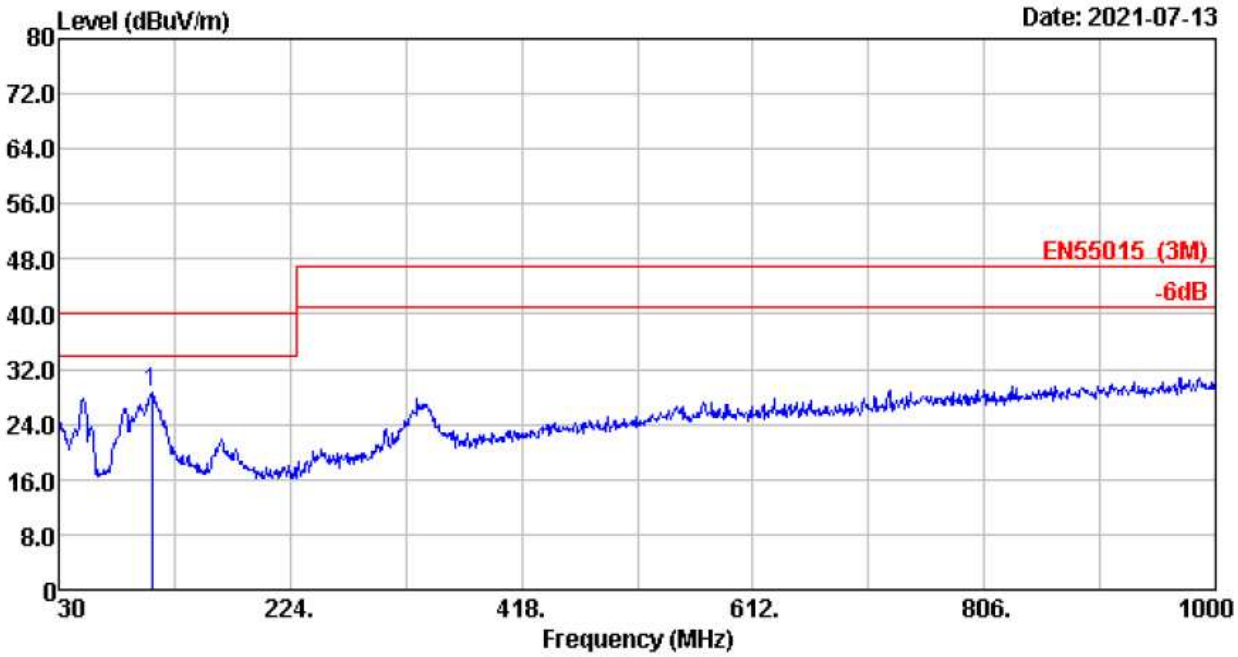
6.5.1 Diagram 009



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	337.490	19.88	1.85	13.46	35.19	47.00	11.81	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

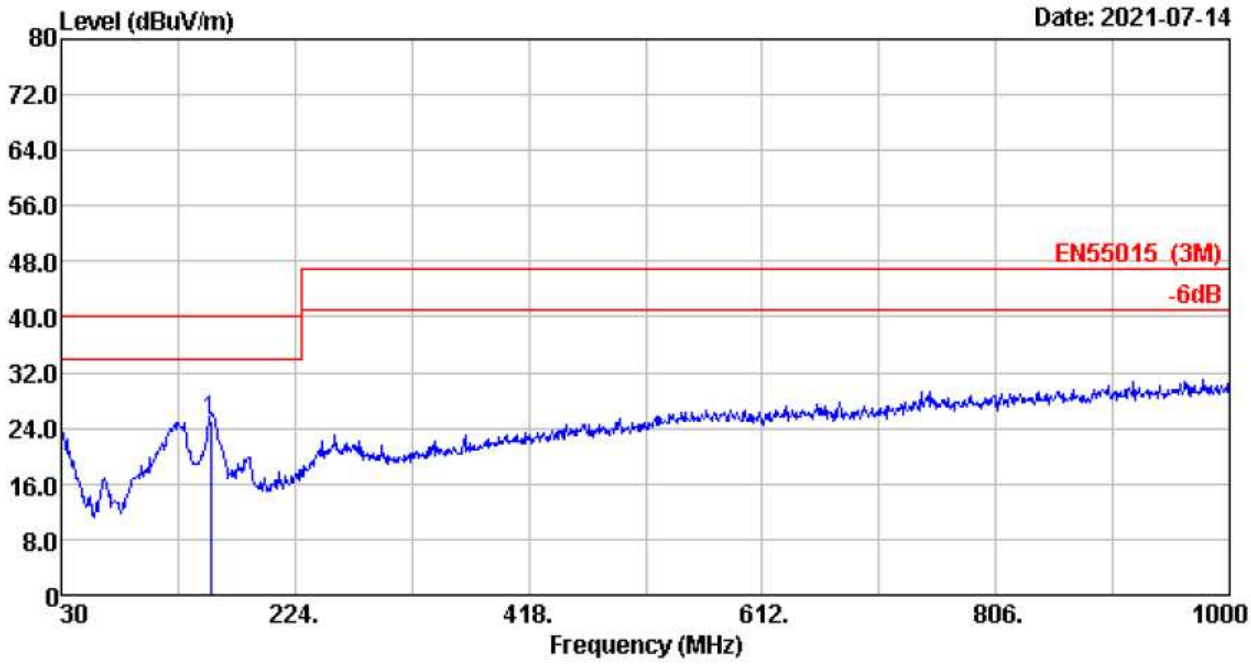
6.5.2 Diagram 010



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	107.600	17.72	1.05	9.75	28.52	40.00	11.48	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

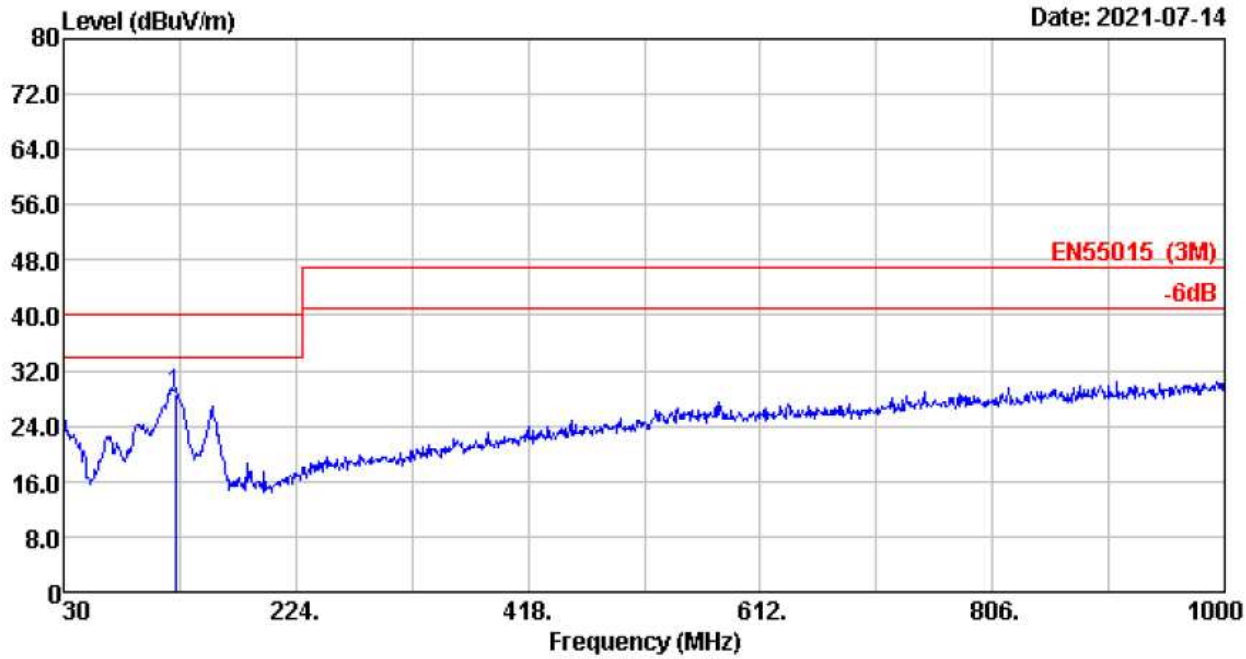
6.5.3 Diagram 011



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	154.160	16.00	1.25	7.92	25.17	40.00	14.83	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

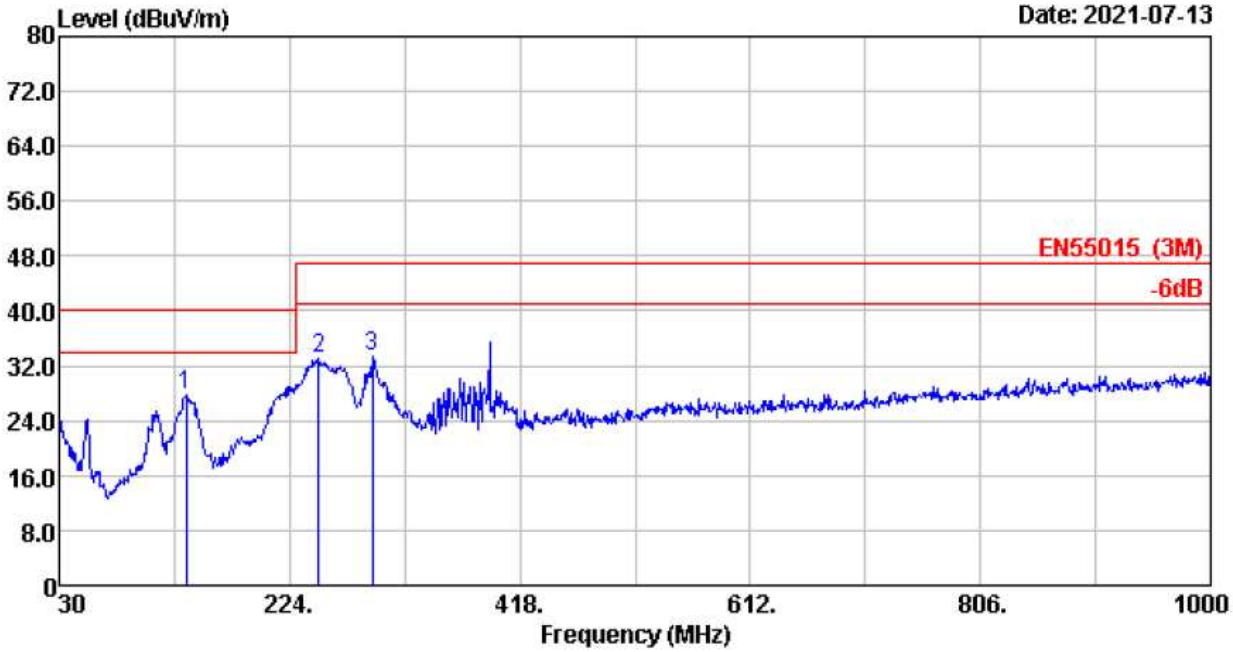
6.5.4 Diagram 012



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	123.120	17.83	1.12	9.60	28.55	40.00	11.45	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

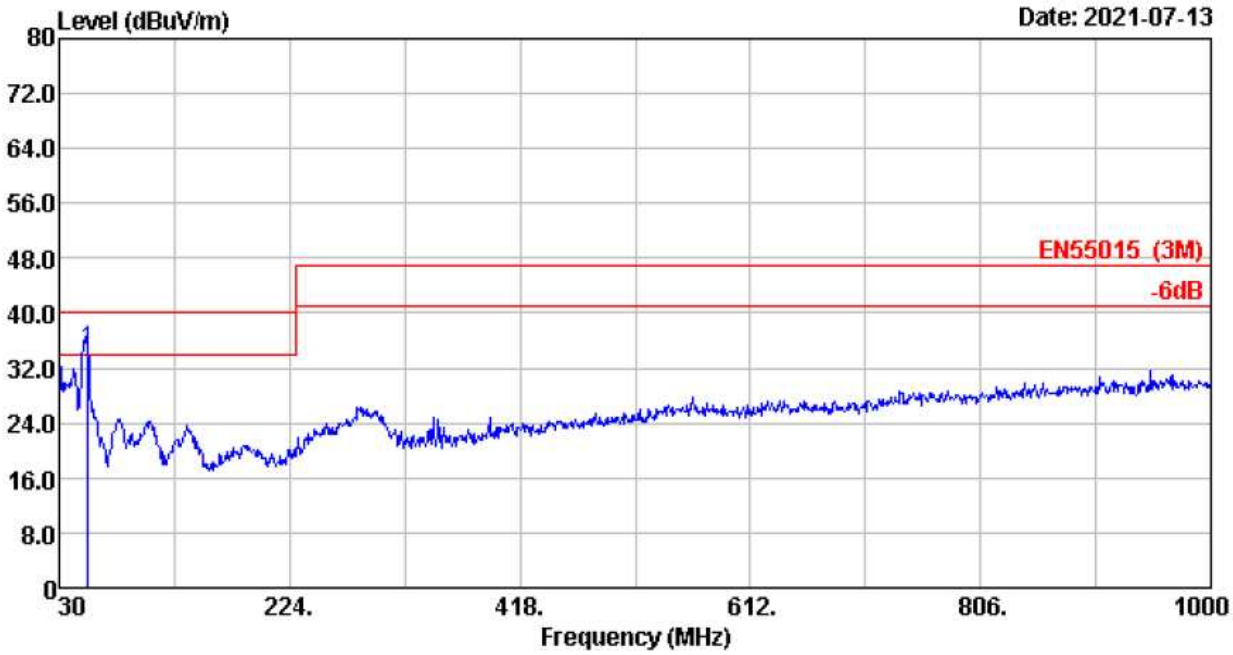
6.5.5 Diagram 013



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	136.700	17.41	1.18	37.19	27.90	40.00	12.10	Peak
2	248.250	18.17	1.57	40.45	32.94	47.00	14.06	Peak
3	293.840	18.83	1.72	39.82	33.25	47.00	13.75	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

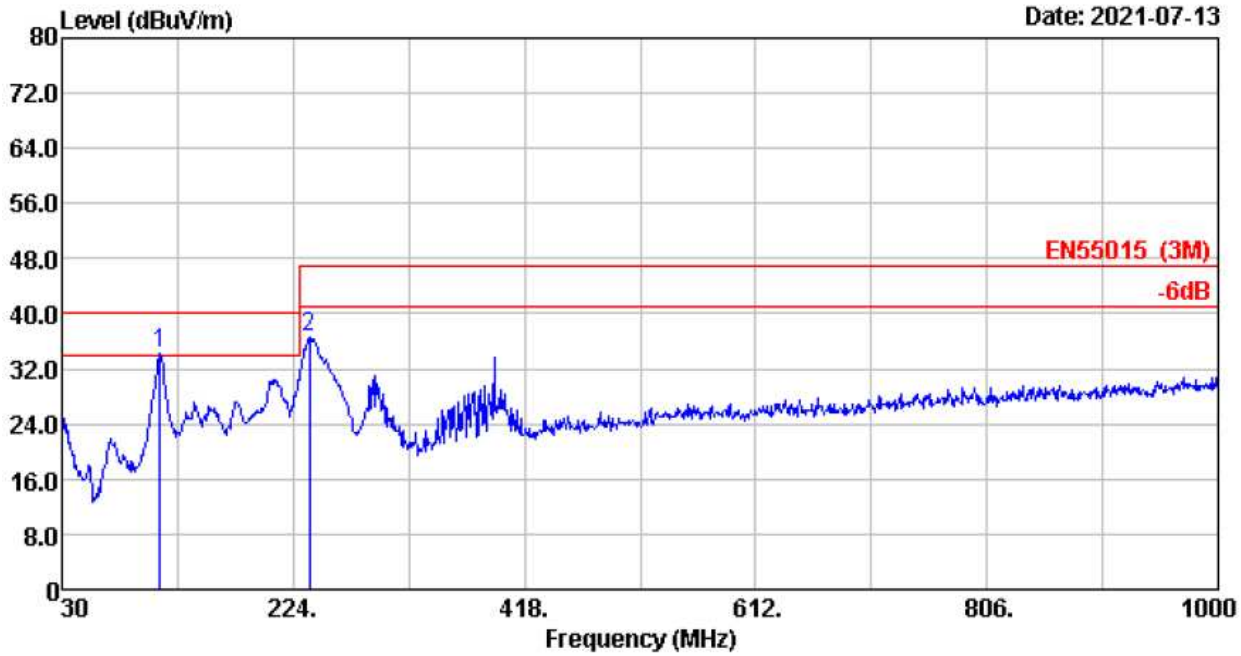
6.5.6 Diagram 014



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	54.049	13.42	0.76	20.30	34.48	40.00	5.52	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

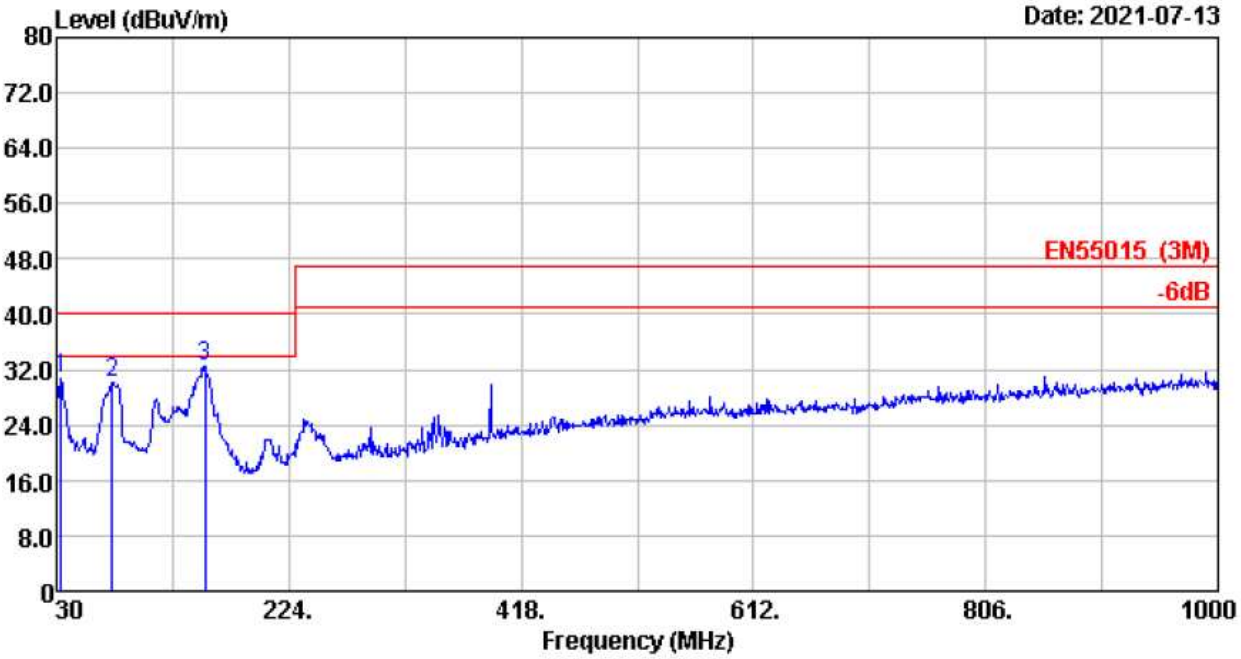
6.5.7 Diagram 015



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	112.450	17.87	1.07	43.35	34.26	40.00	5.74	Peak
2	237.580	17.48	1.54	44.81	36.55	47.00	10.45	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

6.5.8 Diagram 016



No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin Limits (dB)	Remark
1	33.880	22.64	0.65	35.63	30.64	40.00	9.36	Peak
2	76.560	12.85	0.83	44.52	30.09	40.00	9.91	Peak
3	154.160	16.00	1.25	42.92	32.41	40.00	7.59	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

7 Measurement of Radiated Electromagnetic Disturbances

7.1 Standards

Generic standard	/
Product or product family standard	**EN IEC 55015:2019+A11:2020**
Limit class	**Table 8 of EN IEC55015**
Basic standard	**CISPR 16**
Date of testing	**2021-07-12**

7.2 Measurement equipment

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
☒	EMI TEST RECEIVER	2023.01.03	ESCI	100657	R & S
☒	TRIPLE-LOOP ANTENNA(2m)	2023.01.03	HM020	100043	R & S
☒	EMI Test Software	N/A	EMC32	N/A	ROHDE & SCHWARZ

7.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.
The test has been performed as following:
The magnetic component shall be measured by means of a loop antenna as described in EN 55015.
The lighting equipment shall be placed in the center of the antenna, and the position is not critical.

The inducted current in the loop antenna is measured by means of a current probe(1V/A) and the CISPR measuring receiver. By means of a coaxial switch the three field directions can be measured in sequence. Each value shall fulfil the requirements given.

Self-ballasted lamps and semi-luminaries shall be measured when inserted in a relevant lamp-holder, mounted on a piece of insulating material.

Scan setting：

Freq range			Receiver setting		
Start	Stop	Step	IF BW	Detector	Meas Time
9k	150k	100Hz	200Hz	PK	10ms
150k	30M	4.5k	9k	PK	20ms

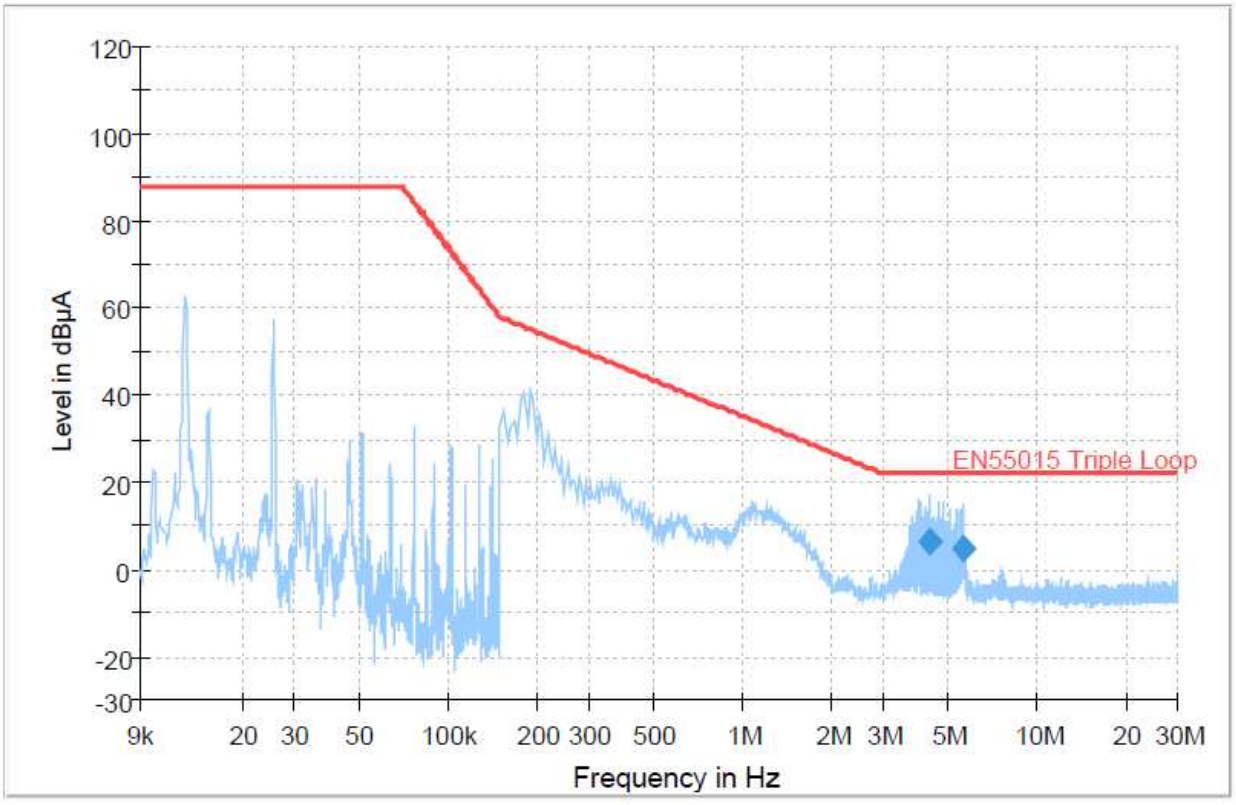
Final measurement：
Meas time :1s
Detector QP

7.4 Test result

Test port:		**Enclosure**		
Model	**Test Mode**	**Diagram**	**Remarks**	**Result**
JY-1002DA-D63	TM2	017	X	**Pass**
		018	Y	**Pass**
		019	Z	**Pass**
JY-1502DA-D63	TM2	020	X	**Pass**
		021	Y	**Pass**
		022	Z	**Pass**

7.5 Diagrams

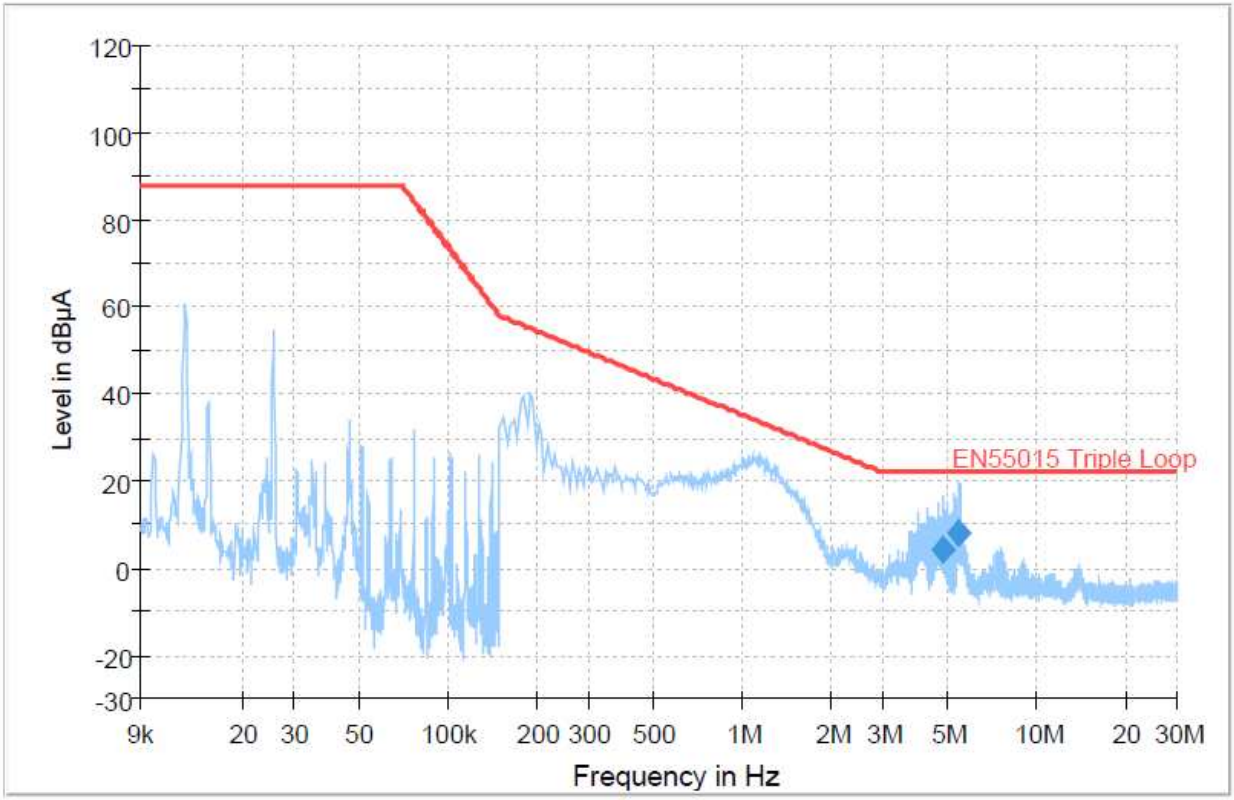
7.5.1 Diagram 017



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
4.294500	6.2	X	0.1	15.8	22.0
5.590500	4.5	X	0.1	17.5	22.0

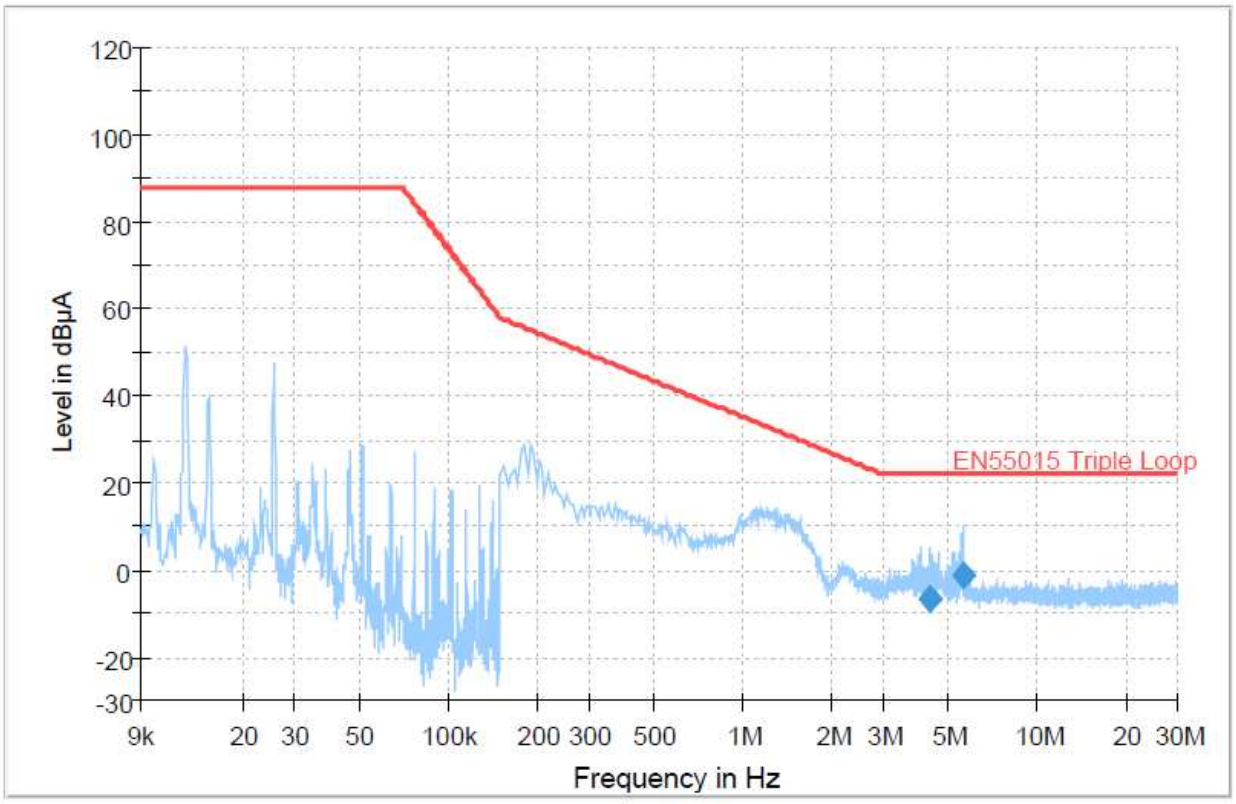
7.5.2 Diagram 018



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
4.834500	4.0	Y	0.1	18.0	22.0
5.464500	8.3	Y	0.1	13.7	22.0

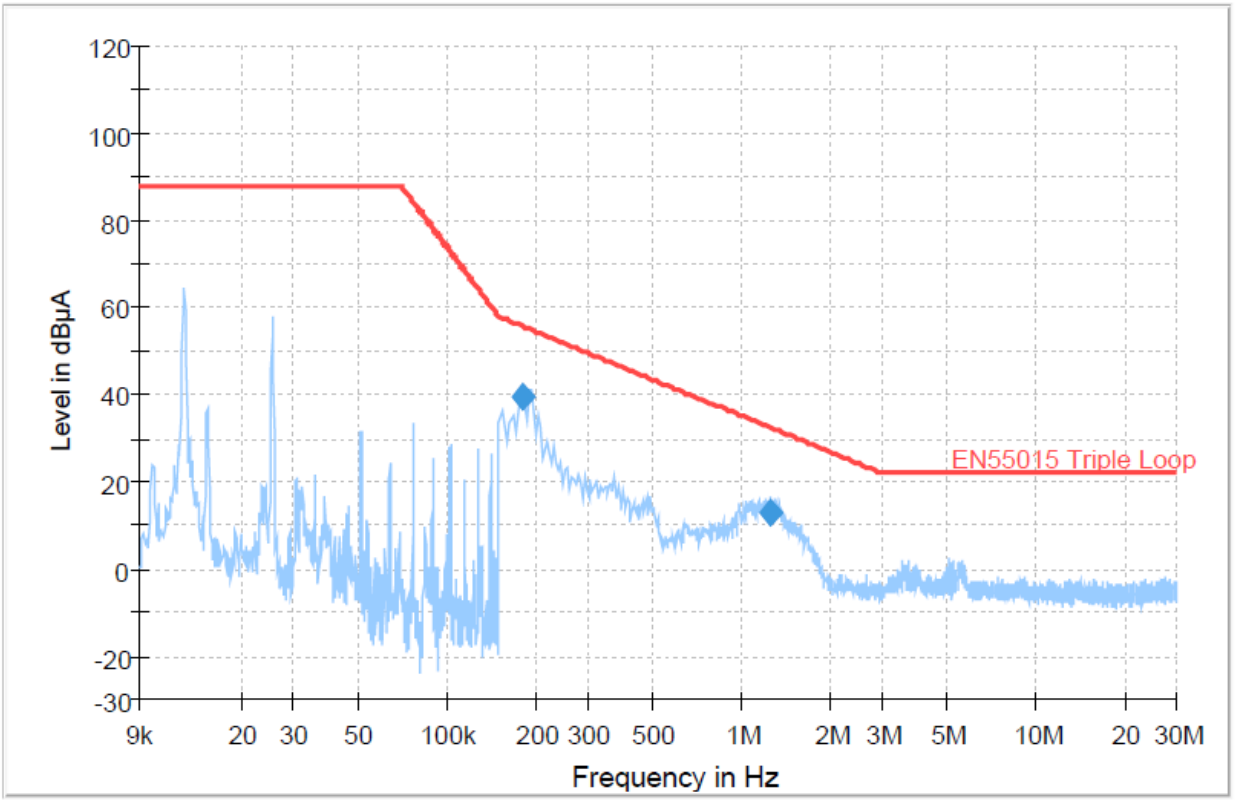
7.5.3 Diagram 019



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
4.348500	-6.4	Z	0.1	28.4	22.0
5.617500	-1.3	Z	0.1	23.3	22.0

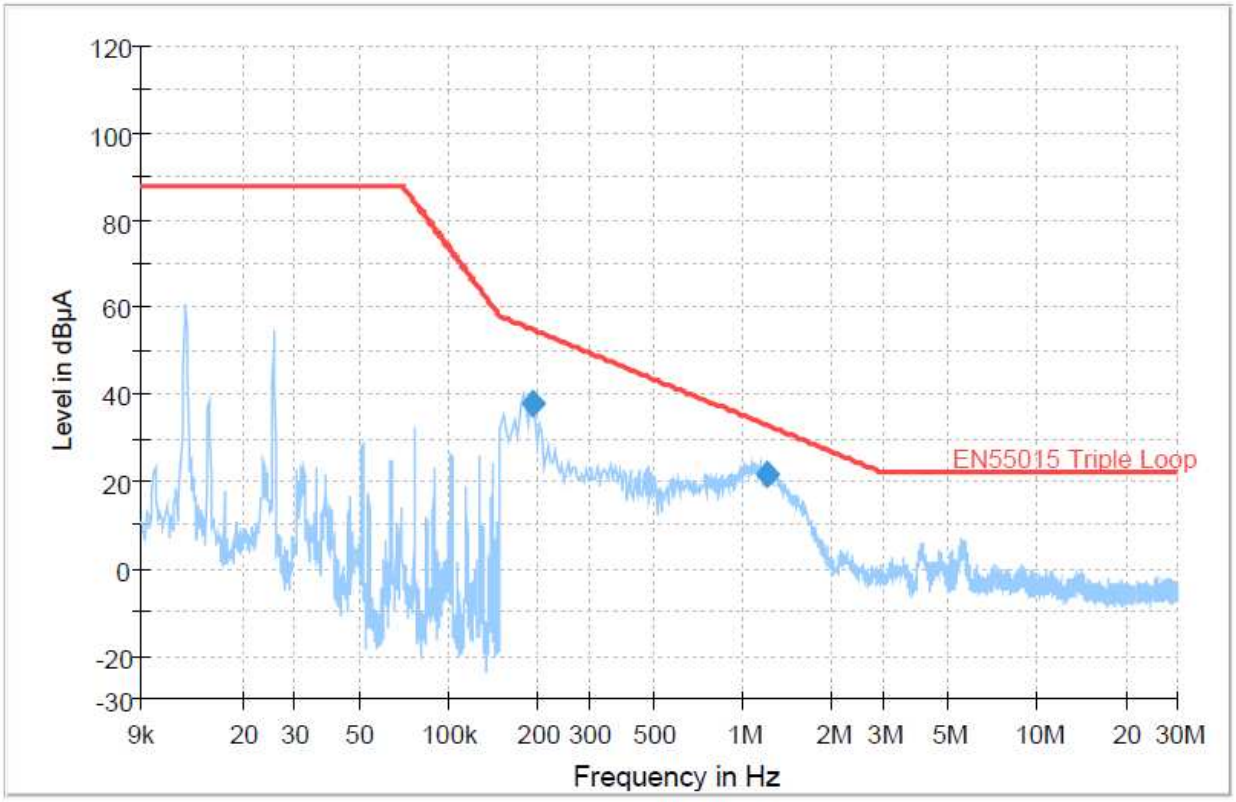
7.5.4 Diagram 020



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
0.181500	39.5	X	0.1	16.2	55.7
1.257000	12.7	X	0.1	19.8	32.5

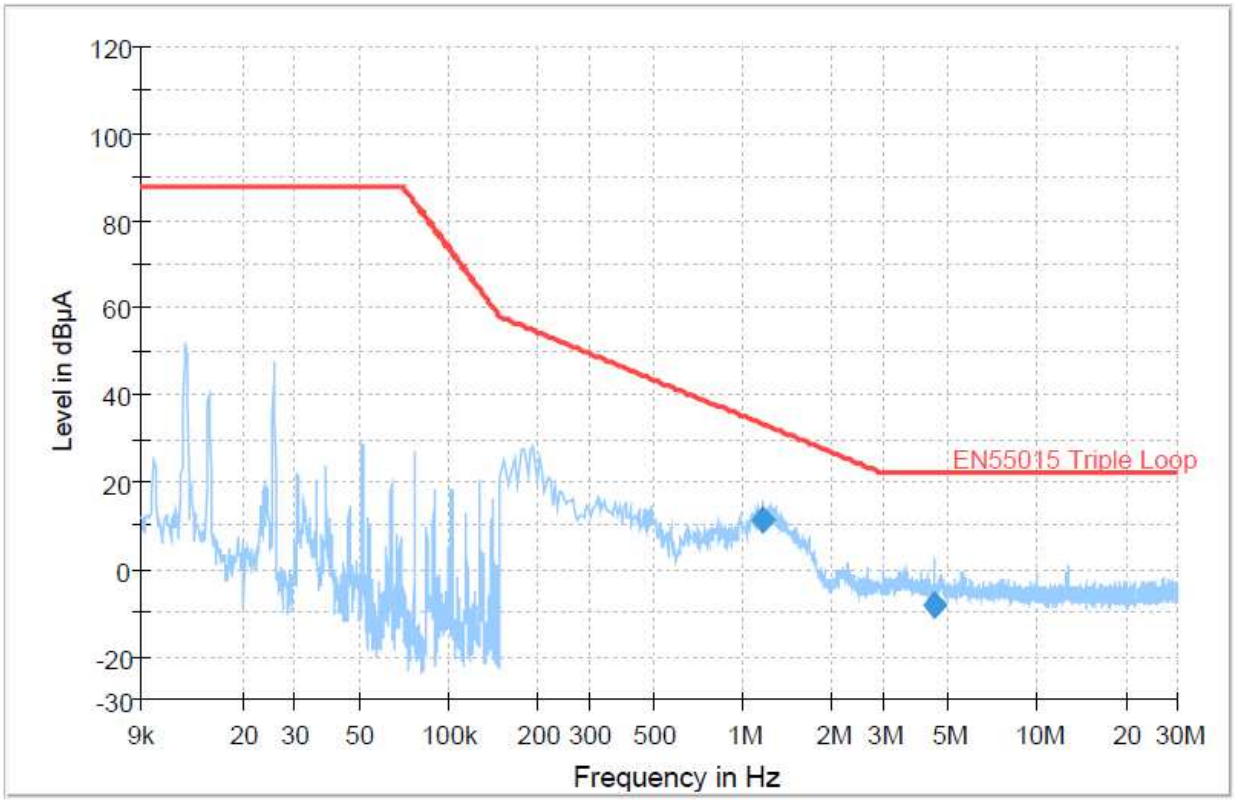
7.5.5 Diagram 021



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
0.195000	37.8	Y	0.1	17.0	54.8
1.216500	21.6	Y	0.1	11.2	32.8

7.5.6 Diagram 022



Final Result 1

Frequency (MHz)	QuasiPeak (dBµA)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dBµA)
1.171500	11.5	Z	0.1	21.8	33.3
4.479000	-8.4	Z	0.1	30.4	22.0

8 Harmonic current

8.1 Standard

Generic standard	**EN IEC 61000-3-2:2019+A1:2021**
Limit class	**Class C**
Date of testing	**/**

8.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	AC Power Source	2023.01.03	NSG 1007	57877	SCHAFFNER
☒	Signal Conditioning unit	2023.01.03	CCN1000-1	72538	SCHAFFNER

8.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

Devices with an active input power of P < 25 W		☒
Balanced three-phase equipment and all other equipment, expect that stated in one of the following classes	**Class A**	☐
Portable tools	**Class B**	☐
Lighting equipment, including dimming devices	**Class C**	☒
Equipment having an input current with a "special wave shape" as defined in figure 1 in the standard and an active input power, P ≤ 600 W and motor driven with phase angle control	**Class D**	☐

The power cord of the EUT is connected to the output of the test systems, Turn on the power of the EUT and use the test system to test the harmonic current level. Observation time: 150s

If Harmonic current less than 0.6% of the input current measured under the test condition, or less than 5mA, then whichever is greater, are disregarded.

8.4 Test results

Model	Mode	Table	Test port	Power	Result
JY-1002DA-D63	TM2	/	AC Input	2.9 W	N/A*
JY-1502DA-D63	TM2	/	AC Input	3.0 W	N/A*

Remark:
The active input power equal to or less than 5W Therefore there are no harmonic limits for LED equipment below 5 W.

9 Voltage fluctuations and flicker

9.1 Standard

Generic standard **EN61000-3-3:2013+A1:2019**

Date of testing **2021-07-15**

9.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	AC Power Source	2023.01.03	NSG 1007	57877	SCHAFFNER
☒	Signal Conditioning unit	2023.01.03	CCN1000-1	72538	SCHAFFNER

9.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The power cord of the EUT is connected to the output of the test systems , Turn on the power of the EUT and use the test system to test the voltage fluctuation and flicker.

There is no testing required if the device does not generate any significant voltage fluctuations or flicker. A short time measurement confirmed the assumption that this is the fact. The details in the test module are representing the results of the short time measurement.

Short time (Pst): 10 min

9.4 Test results

Model	Test mode	Table	Description	Result
JY-1002DA-D63	TM2	023	AC Input Port	**Pass**
JY-1502DA-D63	TM2	024	AC Input Port	**Pass**

9.5 Table

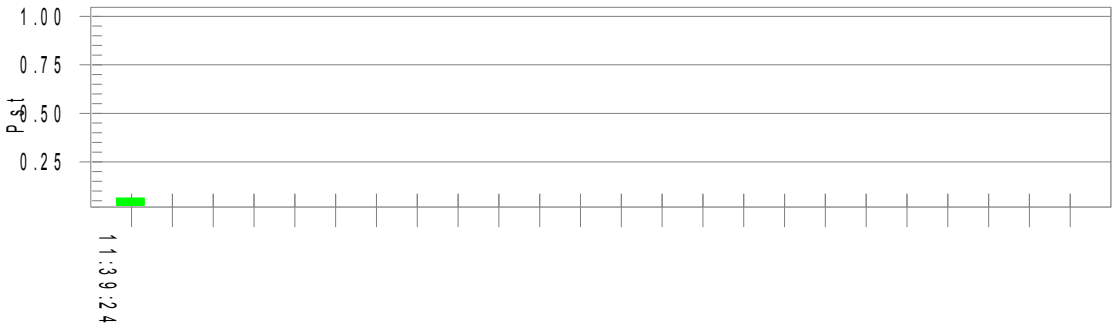
9.5.1 Table 023

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: JY-1002DA-D63 **Tested by: RJB**
Test category: dt,dmax,dc and Pst (European limits) **Test Margin: 100**
Test date: 2021/7/15 **Start time: 11:29:02** **End time: 11:39:30**
Test duration (min): 10 **Data file name: F-001259.cts_data**
Comment: ON
Customer: Customer information

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Parameter values recorded during the test:

Vrms at the end of test (Volt):	**229.92**			
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**

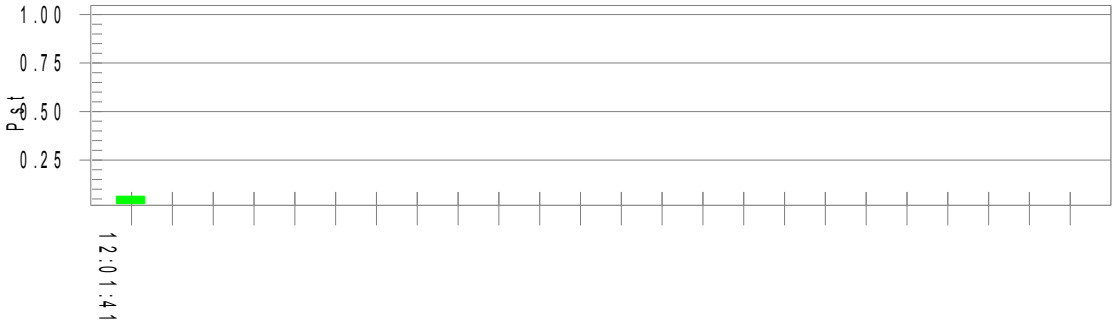
9.5.2 Table 024

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: JY-1502DA-D63 **Tested by: RJB**
Test category: dt,dmax,dc and Pst (European limits) **Test Margin: 100**
Test date: 2021/7/15 **Start time: 11:51:20** **End time: 12:01:47**
Test duration (min): 10 **Data file name: F-001261.cts_data**
Comment: ON
Customer: Customer information

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Parameter values recorded during the test:

Vrms at the end of test (Volt):	**229.90**			
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**

10 Electrostatic Discharge

10.1 Standard

Generic standard **EN 61000-4-2:2009**

Date of testing **2021-07-20**

Performance criteria: **B**

10.2 Measurement equipment

	Equipment	Calibration due.	Type	Serial No.	Manufacturer
☒	ESD generator power	2023.01.03	NSG437	161	TESEQ
☒	ESD generator	2023.01.03	NSG437	130-149	TESEQ

10.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

These tests are carried out according to IEC 61000-4-2, with test levels as given in Table 1 of this standard. Contact discharge is the preferred test method. Twenty discharges (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure (terminals are excluded). Air discharges shall be used where contact discharges cannot be applied. Discharges shall be applied on the horizontal or vertical coupling planes, as specified in
IEC 61000-4-2.

Contact Discharge: The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Air Discharge: Air discharge is used where contact discharge can't be applied.. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed .Indirect discharge for horizontal coupling plane At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. Indirect discharge for vertical coupling plane At least 20 single discharge shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

10.4 Test results

Port: Enclosure			
Test Model	**Test Mode**	**Table**	**Result**
JY-1002DA-D63 JY-1502DA-D63	TM1, TM2	025	**Pass**

10.5 Table

10.5.1 Table 025

Location	Voltage	Amount of test points	Amount of discharge	Discharge Method	Performance
Conductive Enclosure: Screws	±2,4kV	10	200	Contact	A
Nonconductive Enclosure: slot Button	±2,4,8kV	20	400	Air	A
HCP	±2,4kV	4	80	Contact	A
VCP	±2,4kV	4	80	Contact	A

11 Radiated Electromagnetic Field Immunity

11.1 Standard

Generic standard **EN IEC 61000-4-3:2020**

Date of testing **2021-07-20**

Performance criteria: **A**

11.2 Measurement equipment

	Equipment	Calibration due	Model No.	Serial No.	Manufacturer
☒	2#Chamber	Apr.28,22	N/A	N/A	AUDIX
☒	Signal Generator	Oct.29,22	N5181A	MY49061013	Agilent
☒	Amplifier	NCR	100W/1000M1	17028	A&R
☒	Power Meter	Aug.20,22	ML2487A	6K00002472	Anritsu
☒	Power Sensor	Aug.20,22	MA2491A	032516	Anritsu
☒	Log-periodic Antenna	NCR	AT1080	16512	A&R
☒	Test Software	N/A	I2	3.2010-1-8	AUDIX

11.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on Test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

11.4 Test results

Test Model	Test Mode	Table	Description	Result
JY-1002DA-D63 JY-1502DA-D63	TM1, TM2	026	Enclosure Port	**Pass**

11.5 Table

11.5.1 Table 026

Frequency Range (MHz)	80-1000MHz	
Field Strength(V/m)	3V/m; 1kHz 80%AM (sine wave)	
Steps (%)	1%	
Dwell time	1s	
Polarization	Horizontal	Vertical
Front	A	A
Rear	A	A
Left	A	A
Right	A	A

12 Electrical Fast Transients/Bursts Immunity

12.1 Standard

Generic standard **EN 61000-4-4:2012**

Date of testing **2021-07-20**

Performance criteria: **B**

12.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	Multi-function generator	2023.01.03	NSG 3060	083	TESEQ
☒	Coupling- decoupling Network	2023.01.03	CDN3061	083	TESEQ

12.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT located 0.1m±0.01m above the ground reference plane. The ground reference plane shall project beyond the EUT at least 0.1m on all side, All cables to the EUT shall be placed on the insulation support 0.1m above the ground reference plane.

When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, shall be 0,5 m. Unless otherwise specified in the product standard or the product family standard, the length of the signal and power lines between the coupling device and the EUT shall be 0,5 m ± 0,05 m. If the manufacturer provides a non-detachable supply cable more than 0,5 m ± 0,05 m long with the equipment, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0,1 m above the ground reference plane.

Fast transients are carried out during 2min with a positive polarity and during 2min with a negative polarity.

Test level at input is as below:
1kV (peak); 5/50ns;5kHz

and Test level output dc. power ports is as below:
0.5kV (peak); 5/50ns;5kHz

12.4 Test results

Port: AC input			
Test Model	**Test Mode**	**Table**	**Result**
JY-1002DA-D63 JY-1502DA-D63	TM1, TM2	027	**Pass**

12.5 Test results

12.5.1 Table 027

Test specification	AC input: 1KV; 5/50ns Tr/Th;5kHz repetition frequency			
Injected Line	Voltage (kV)	Test Time (s)	Injected Method	Performance
L	+1	120	Direct	A
	-1	120	Direct	A
N	+1	120	Direct	A
	-1	120	Direct	A
L, N	+1	120	Direct	A
	-1	120	Direct	A
	-1	120	Direct	A

13 Surge Immunity

13.1 Standard

Basic standard **EN 61000-4-5:2014+A1:2017**

Date of testing **2021-07-20**

Performance criteria: **B**

13.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	Multi-function generator	2023.01.03	NSG 3060	083	TESEQ
☒	Coupling- decoupling Network	2023.01.03	CDN 3061	083	TESEQ

13.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

If not otherwise specified the power cord between the EUT and the coupling/decoupling network shall not exceed 2m in length.

These tests are carried out according to IEC 61000-4-5, with test levels as given in Table 10 of this standard. Lower levels need not to be tested. Pulses shall be applied to the a.c. voltage wave as follows; five positive polarity pulses at the 90º phase angle, five negative polarity pulses at the 270º phase angle. Two test levels are given for different types of lighting equipment.

13.4 Test results

Port：AC input				
Test model	**Test mode**	**Table**	**Test specification**	**Result**
JY-1002DA-D63 JY-1502DA-D63	TM1, TM2	028	Input AC power Port 1.2/50(8/20) μs Tr/Th ■<=25W 0.5KV L-N,1KV L-PE,N-PE □> 25W 1.0KV L-N ,2KV L-PE,N-PE	**Pass**

13.5 Table

13.5.1 Table 028

Injected Line	Wave Form	Voltage(kV)	Phase	Number of Pulse/per phase	Interval time	Performance
L-N	1.2/50μs	+0.5	90°	5	60s	A
		-0.5	270°	5	60s	A

14 Conducted Immunity

14.1 Standard

Basic standard **EN 61000-4-6:2014**

Date of testing **2021-07-20**

Performance criteria: **A**

14.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	Conducted immunity test system	2023.01.03	NSG4070	25795	SCHAFFNER
☒	Attenuator	2023.01.03	ATN6075	25366	TESEQ
☒	CDN	2023.01.03	M016	25127	TESEQ

14.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

Set up the EUT, CDN and test generators as shown above. The equipment to be tested is placed on an insulating support of 0.1m height above a ground reference plane, all cable exiting the EUT shall be supported at a height of at least 30mm above the ground reference plane.

The test is performed with the generator contacted to each CDN in turn. The frequency range is swept from 150kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

14.4 Test results

Port: AC input				
Test model	**Test mode**	**Table**	**Test specification**	**Result**
JY-1002DA-D63 JY-1502DA-D63	TM1, TM2	029	0.15MHz~80MHz 3V(r.m.s.) (unmodulated) 1kHz ,80%AM, sine wave Source impedance 150Ω	**Pass**

14.5 Table

14.5.1 Table 029

Frequency Range (MHz)	Injecteded Position	Strength	Performance
0.15MHz ~ 80MHz	AC main port	3V(r.m.s, Unmodulated)	A
Dwell time: 1s; Steps: 1%			

15 Induced current density

15.1 Standard

Generic standard **EN 62493:2015**

Date of testing **2021-07-20**

15.2 Measurement equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
☒	EMI Test Receiver	2023.01.03	ESCI	100657	ROHDE & SCHWARZ
☒	Protection Network for "Van der Hoofden" Test-Head	2023.01.03	VDH30	SC069O	AFJ
☒	EMI Test Software	N/A	EMC32	N/A	ROHDE & SCHWARZ

15.3 Test set-up

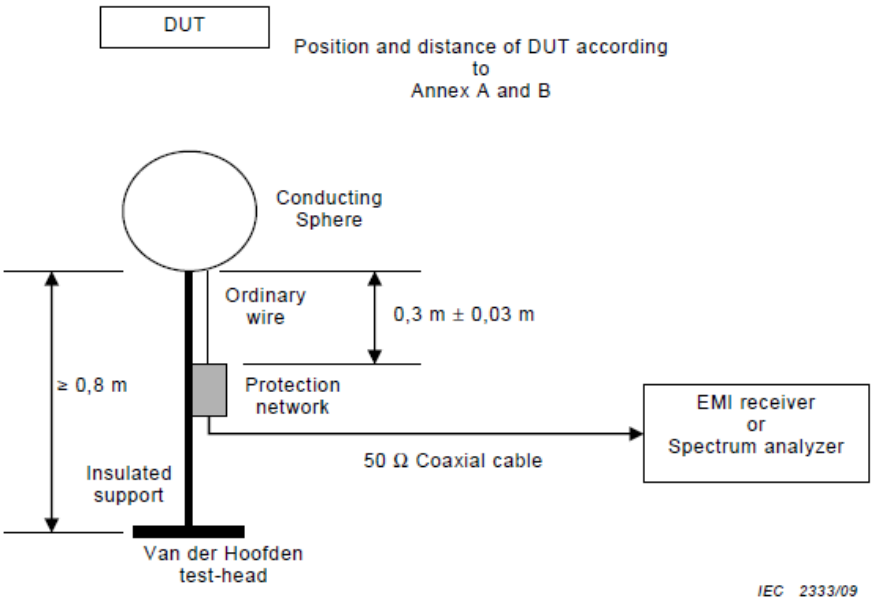
Annex B with a photo or a rough figure of the test set-up is attached.

30mins stabilisation time.

Receiver setting:

Frequency range	B_6 according to CISPR 16-1-1	Measurement time	f_{step}	Detector
20 kHz – 150 kHz	200 Hz	100 ms	220 Hz	Peak
150 kHz – 10 MHz	9 kHz	20 ms	10 kHz	Peak

Measurement setup:



If the lighting equipment is provided with an earthing terminal, the lighting equipment shall be connected by means of an earth conductor contained in the power cable to the lighting equipment.

During the tests no conductive plane or object or human being should be closer to the lighting equipment than 0,8 m.
The height of the insulated support is minimum 0,8 m. The conducting sphere is connected to the protection network via an ordinary wire of length 30 cm ± 3 cm. The protection network is then connected to the EMI receiver, or spectrum analyser, by a 50 Ω coaxial cable having a maximum cable loss of 0,2 dB and a d.c. resistance of ≤10Ω.

$$\sum_{\substack{f_i=20\text{kHz}\\ \text{Step}=220\text{Hz}}}^{150\text{kHz}} \frac{E_{\text{cap}}(f_i,d)}{E_{\text{Lim}}(f_i)} + \sum_{\substack{f_i=150\text{kHz}\\ \text{Step}=10\text{kHz}}}^{10\text{MHz}} \frac{E_{\text{cap}}(f_i,d)}{E_{\text{Lim}}(f_i)} \le 1$$

15.4 Test results

Test Model	Test	Tables	Description*	Result
JY-1002DA-D63	TM2	030	Set over against to the central to the point of illumination	**Pass**
JY-1502DA-D63	TM2	031	Set over against to the central to the point of illumination	**Pass**

15.5 Tables 030

Test position	Test distance	Test mode	Model	Factor (F)	Limit	Result
Set over against to the central to the point of illumination	50cm	TM2	JY-1002DA-D63	0.03361	1	**Pass**
Remark:	*: The measured (weighted and summarized) induced current density due to the electric field in the frequency range 20 kHz to 10 MHz does not exceed the factor (*F*) 1 as defined in Annex D of EN62493.					

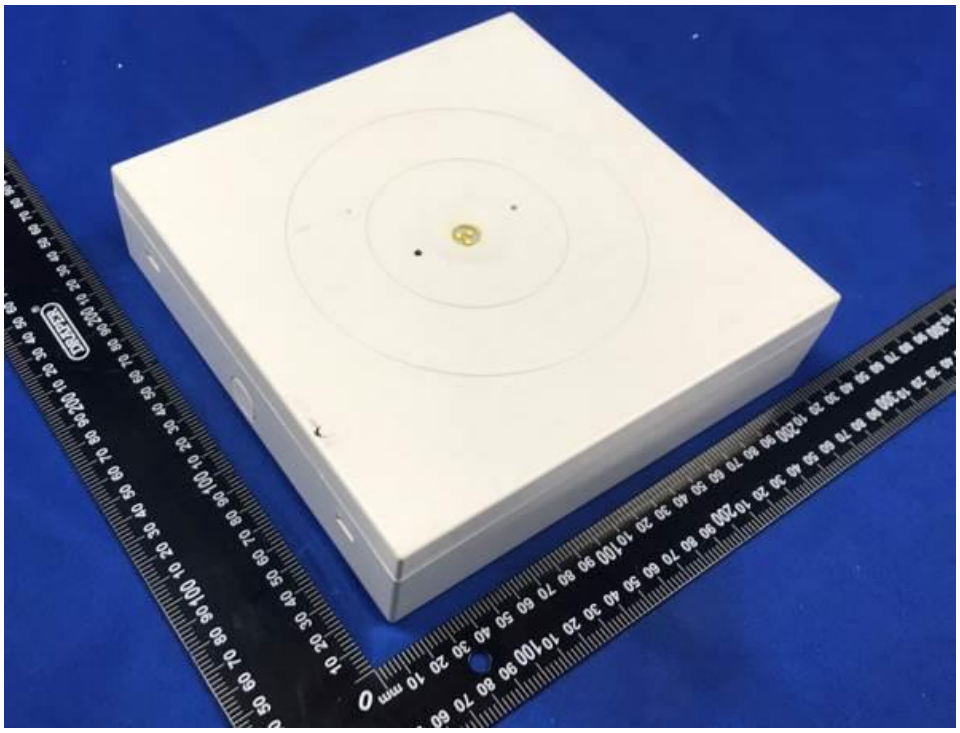
15.6 Tables 031

Test position	Test distance	Test mode	Model	Factor (F)	Limit	Result
Set over against to the central to the point of illumination	50cm	TM2	JY-1502DA-D63	0.03662	1	**Pass**
Remark:	*: The measured (weighted and summarized) induced current density due to the electric field in the frequency range 20 kHz to 10 MHz does not exceed the factor (*F*) 1 as defined in Annex D of EN62493.					

Annex A

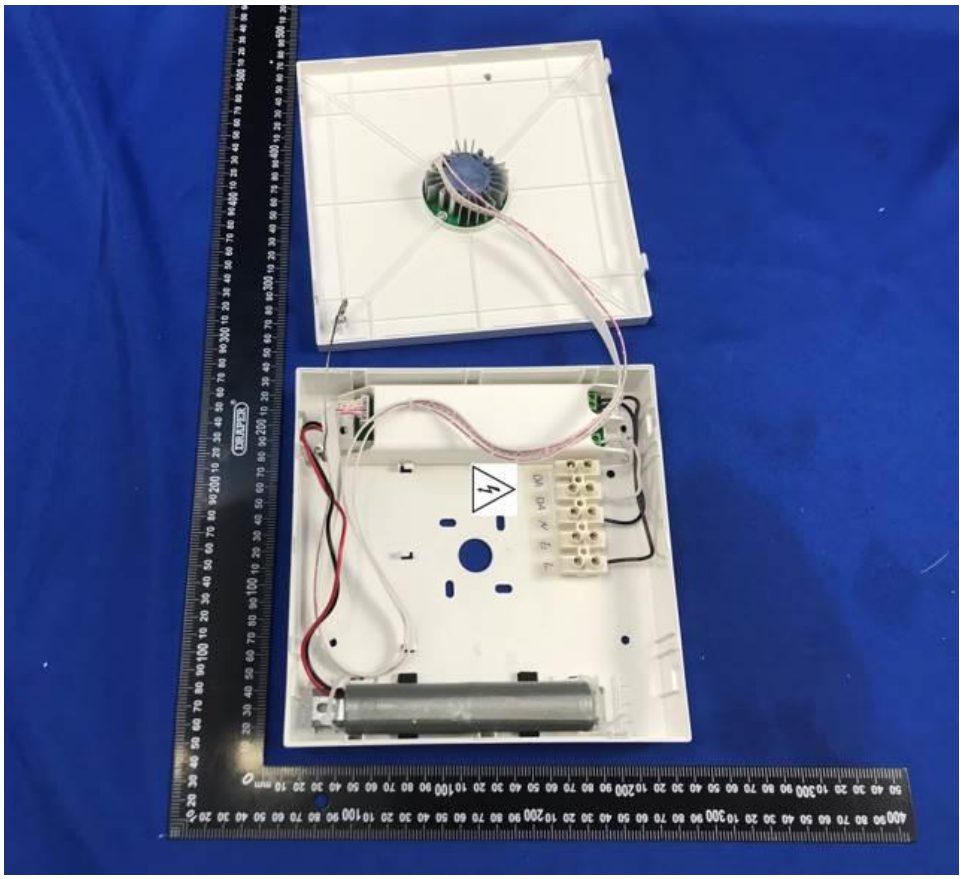
EUT / technical data

Port	Label	Description		
Enclosure	GH	Enclosure port Plastic		
Mains input AC	NAC.E	220-240V,50/60Hz		
Mains input DC	NDC.E	N.A		
Mains output AC	NAC.E	N.A		
Mains output DC	NAC.A	N.A		
Process measurement and control ports	PMS.E/A	N.A		
I/O and communication ports	SD.E/A	N.A		
Protective earth connection	EA	Yes		
Interface Cables	**Length**	**Shielded**	**Type**	**Special**
		☐	☐	☐

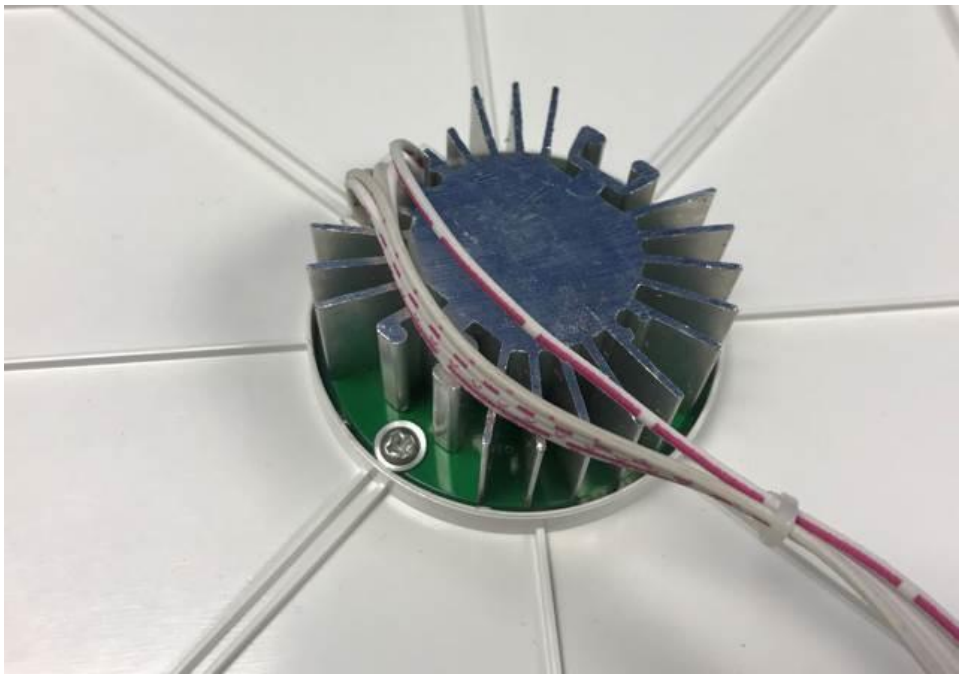


Overall view of SP3002DA-D63, SP3002FE-D63, SP3002DA-D40, SP3002FE-D40

Overall view of SP3002DA-D63, SP3002FE-D63, SP3002DA-D40, SP3002FE-D40



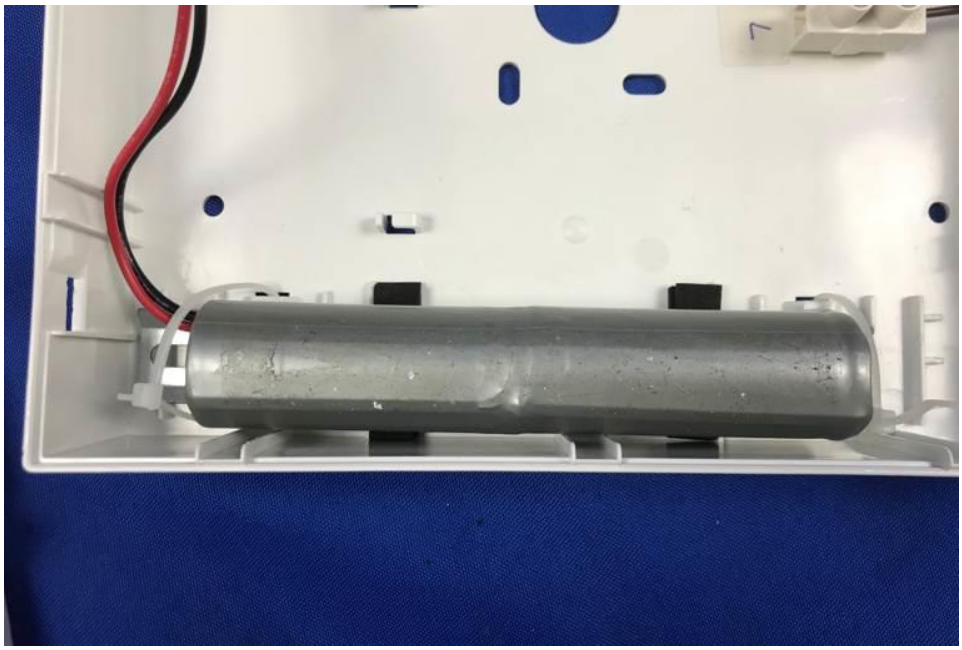
Internal view of SP3002DA-D63, SP3002FE-D63, SP3002DA-D40, SP3002FE-D40



LED module part

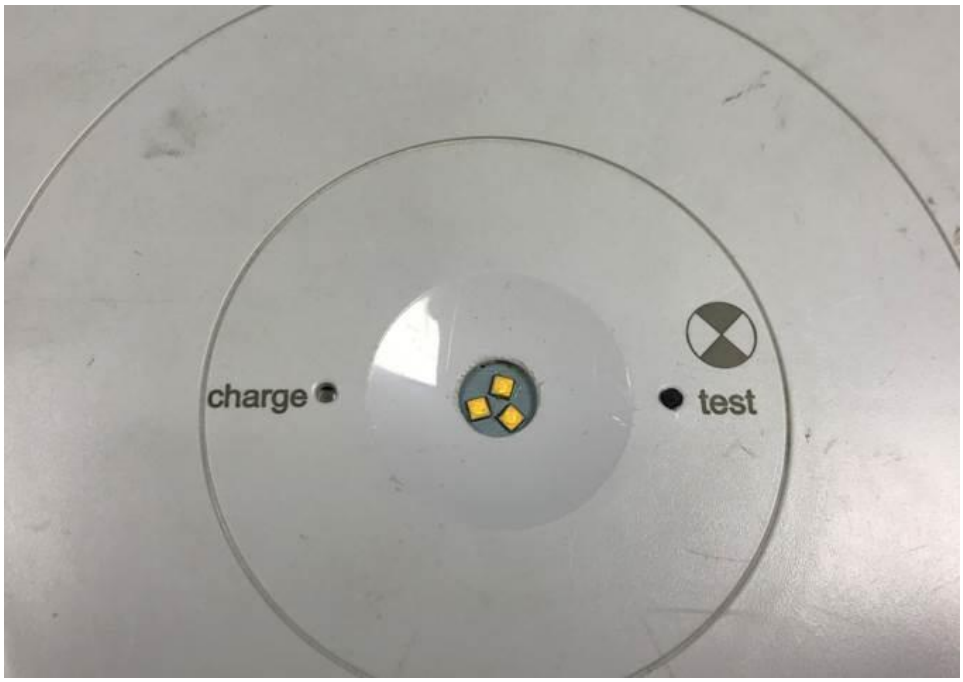
Input terminal block

Internal wire



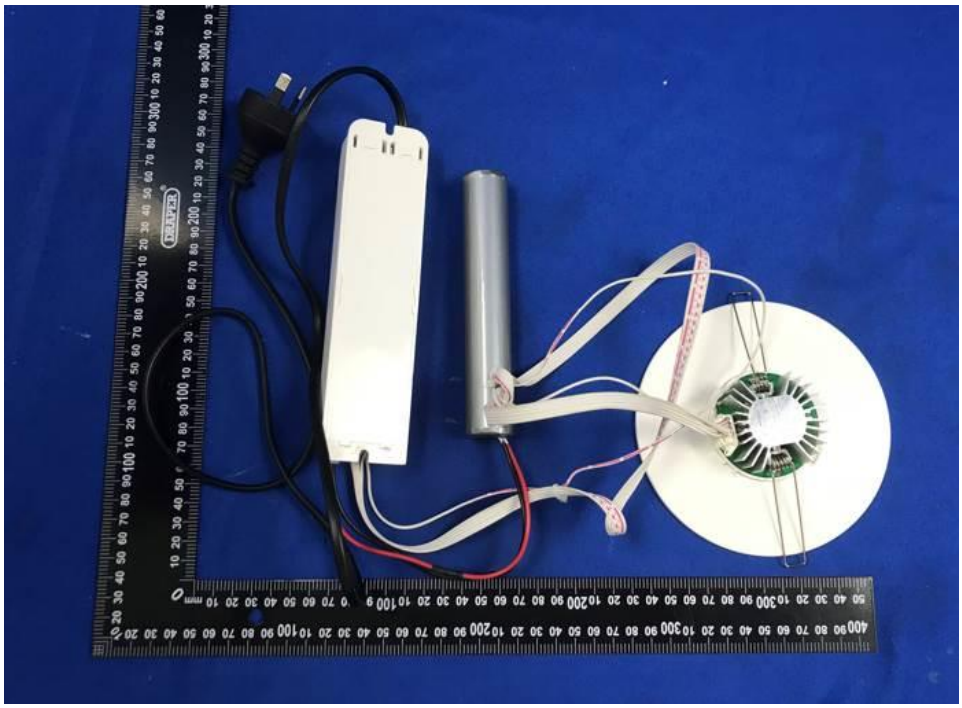
Battery

Output terminal of emergency controlgear



LED indicator, LED module, test switch

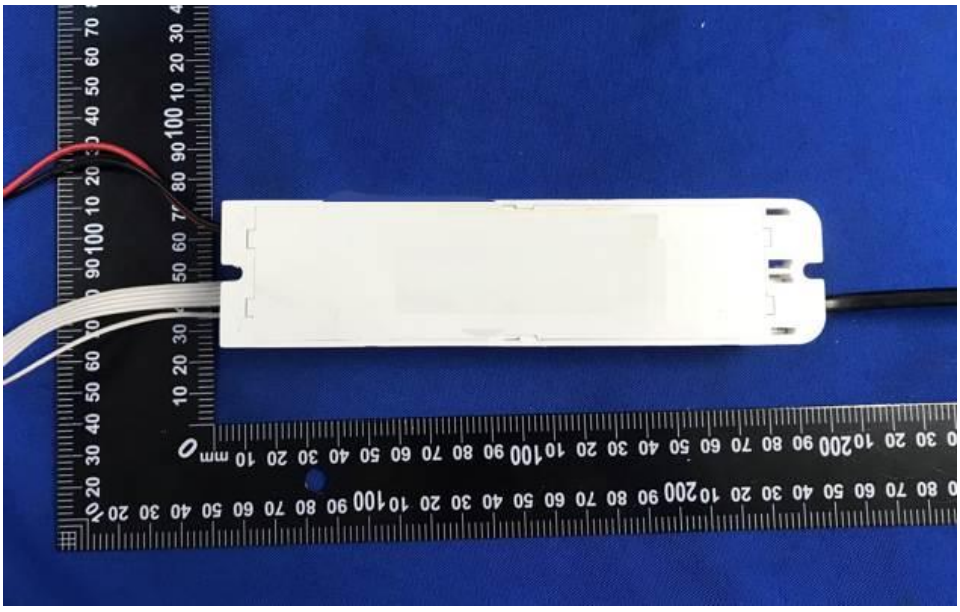
Overall view of SP3001DA-D63, SP3001FE-D63, SP3001DA-D40, SP3001FE-D40



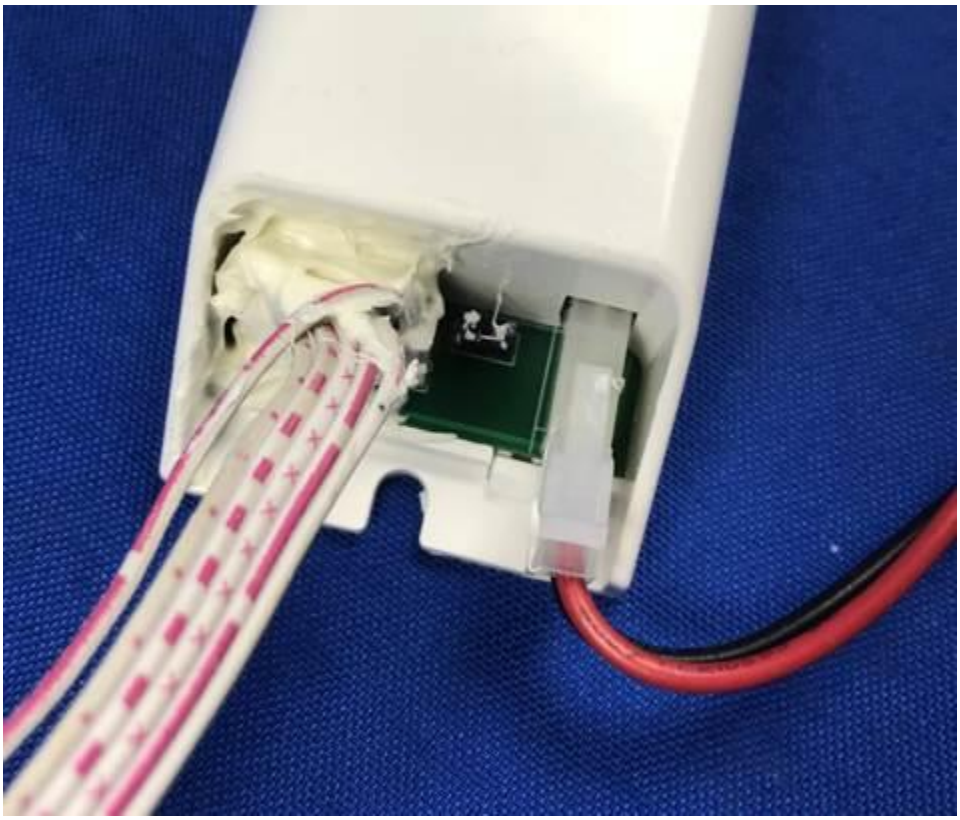
Overall view of SP3001DA-D63, SP3001FE-D63, SP3001DA-D40, SP3001FE-D40

Mains plug

Emergency controlgear

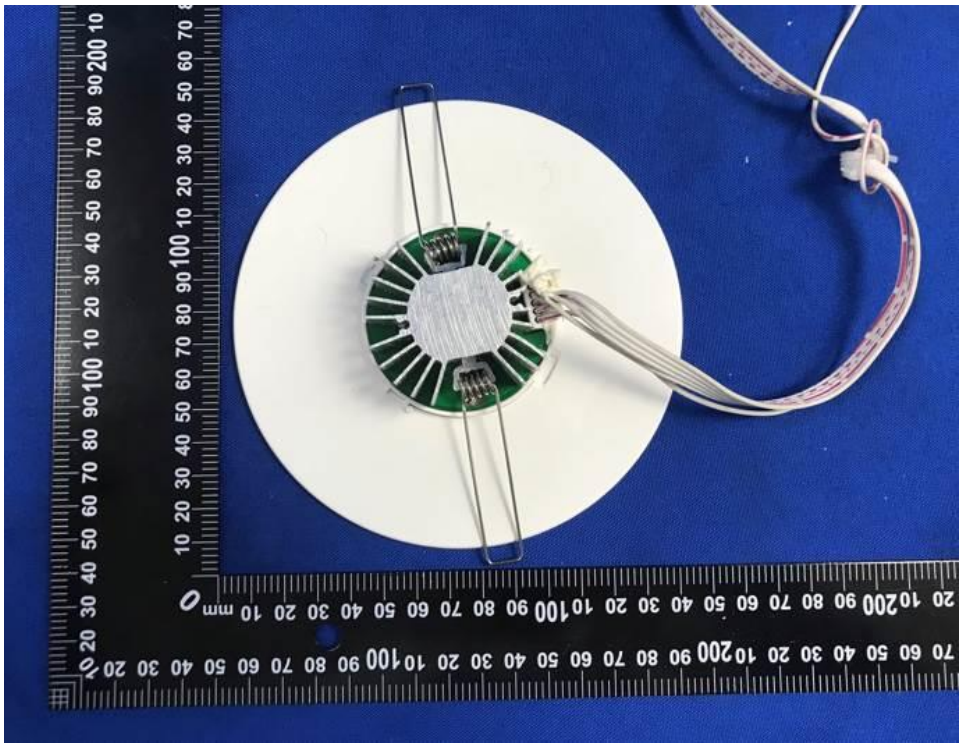


Emergency controlgear

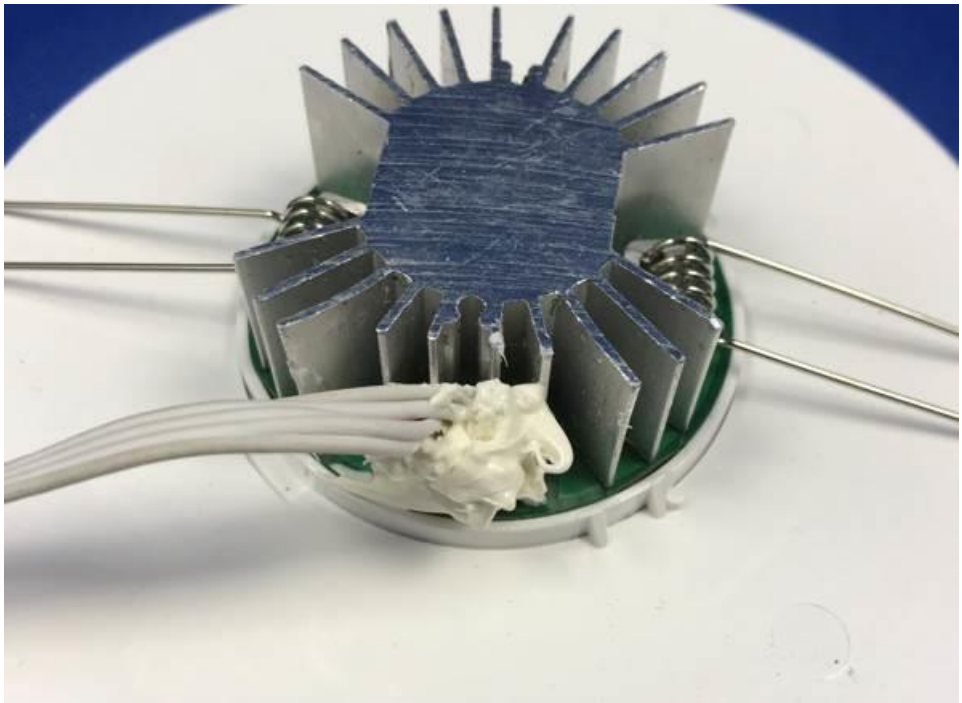


Output terminal with wire link for SPaaaabb-D63

Output terminal without wire link for SPaaaabb-D40

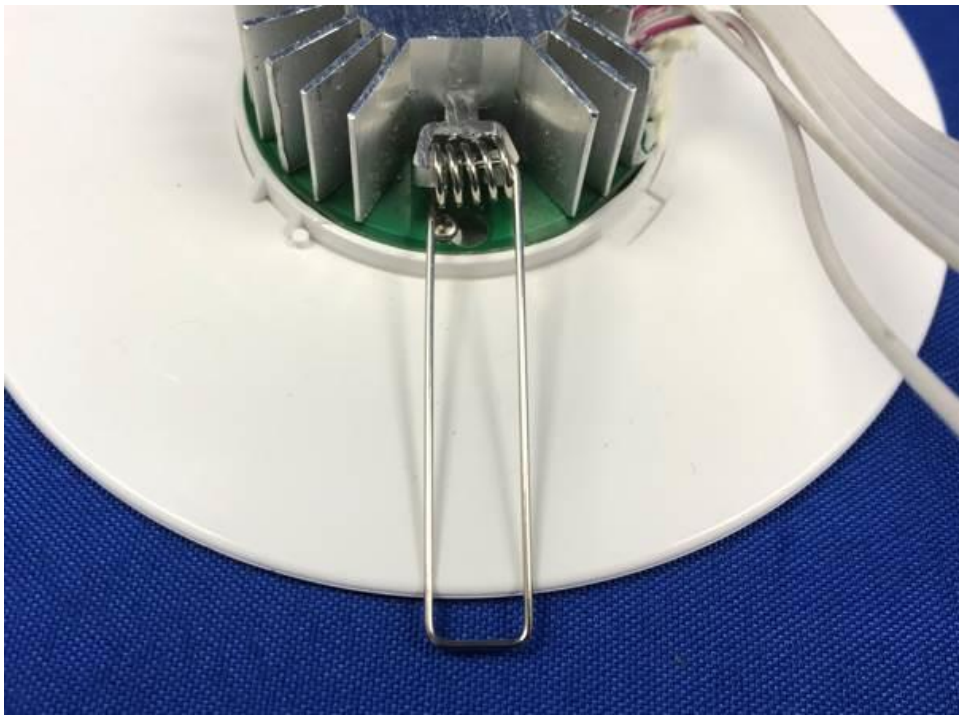


LED module for SP3001 series

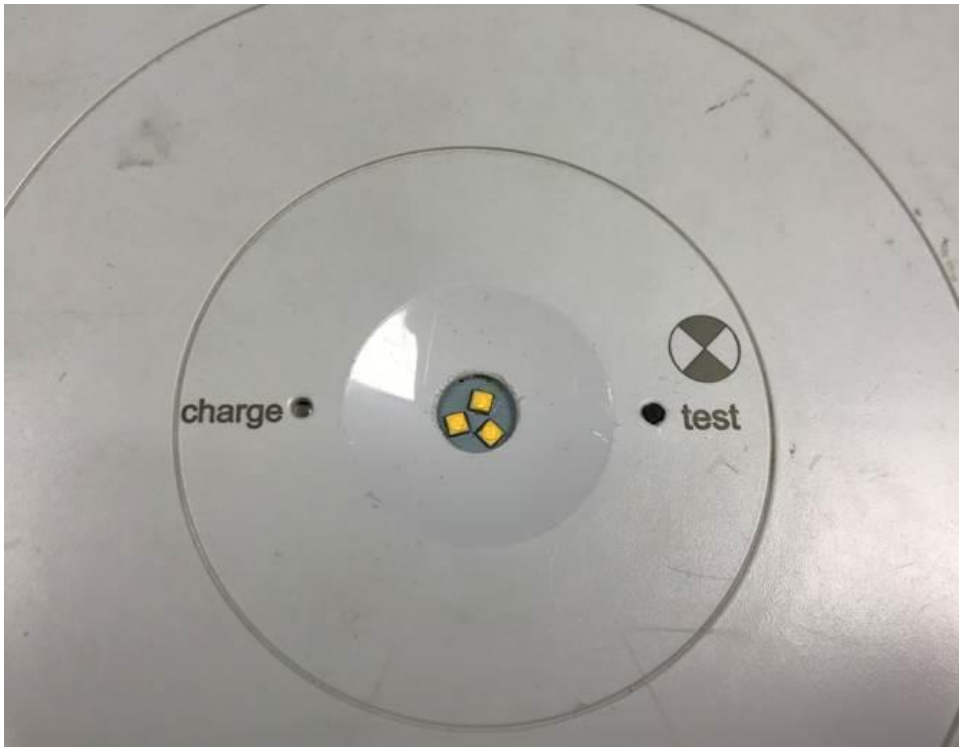


DC connector of LED module is fixed by glue for SP3001 series

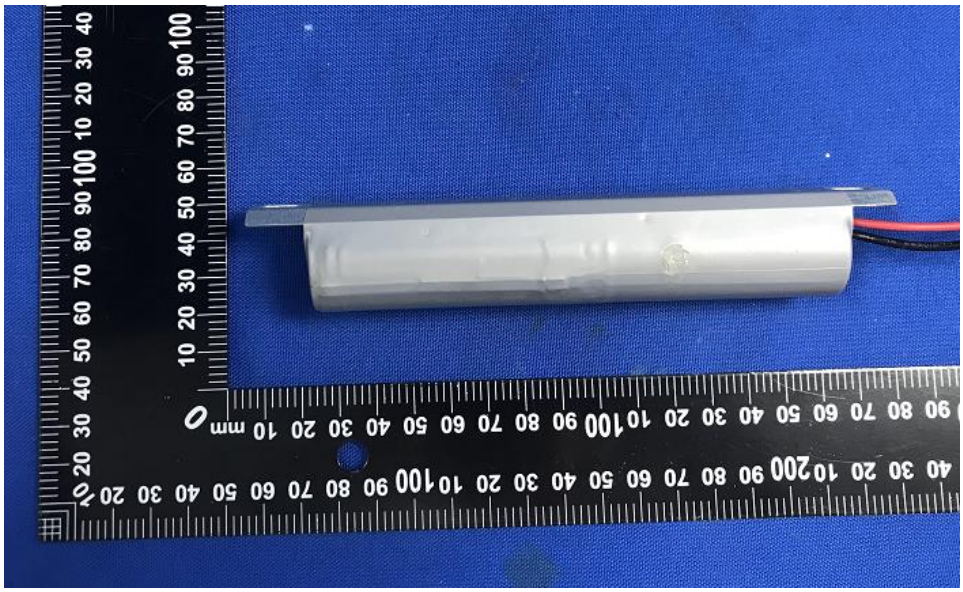
(If the glue is removed or damaged, the product will be destroyed)



Fixed device

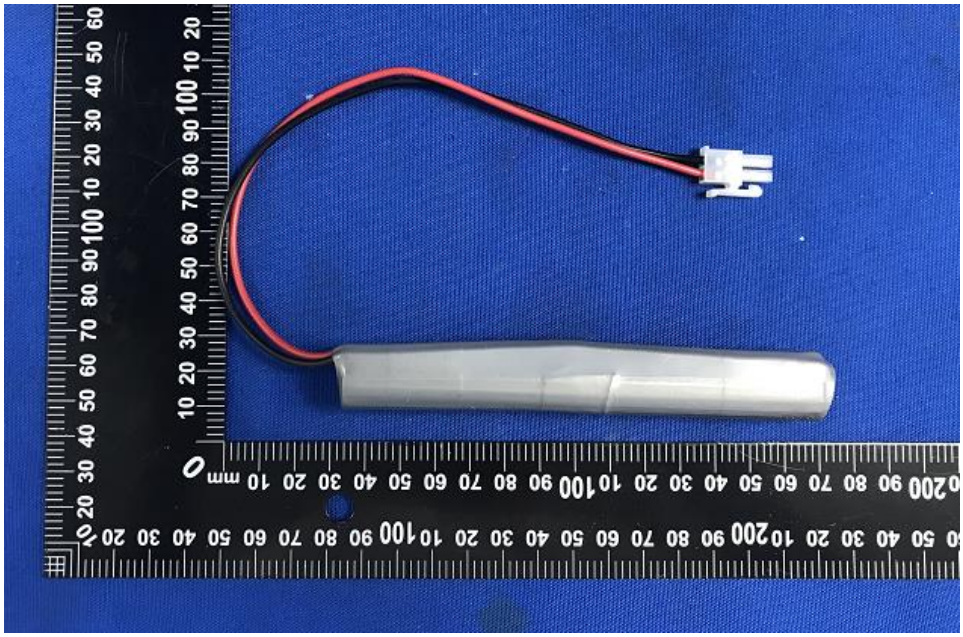


LED indicator, LED module and test switch



Overall view of battery for SP3002bb-ccc

(Two 3200 mAH 3.2V battery cells)

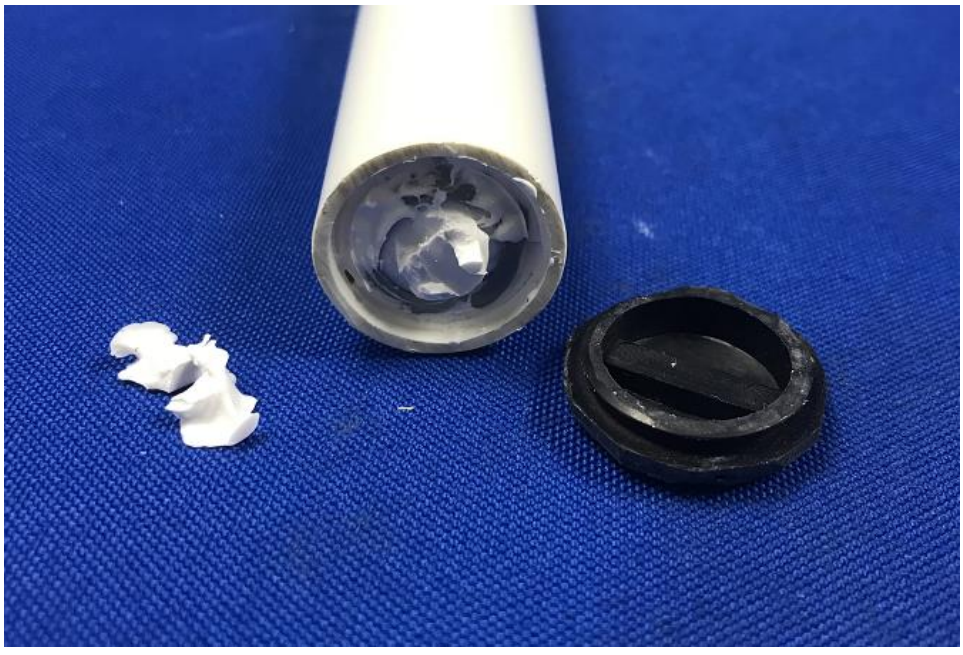


Overall view of battery for SP3002bb-ccc
(Two 1500 mAH 3.2V battery cells)

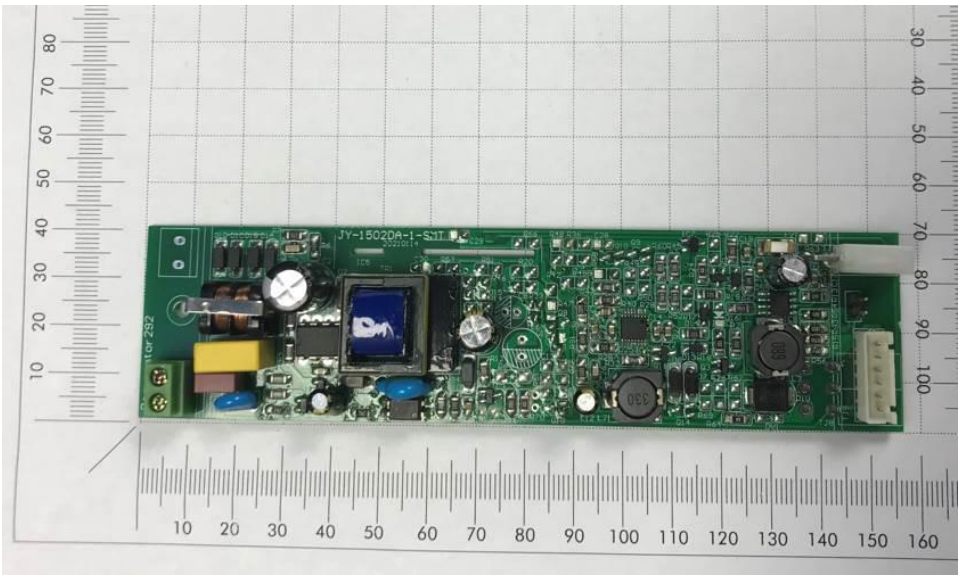
Overall view of battery with enclosure for for SP3001bb-ccc
(Two 3200 mAH 3.2V battery cells)

Overall view of battery with enclosure for SP3001bb-ccc
(Two 1500 mAH 3.2V battery cells)

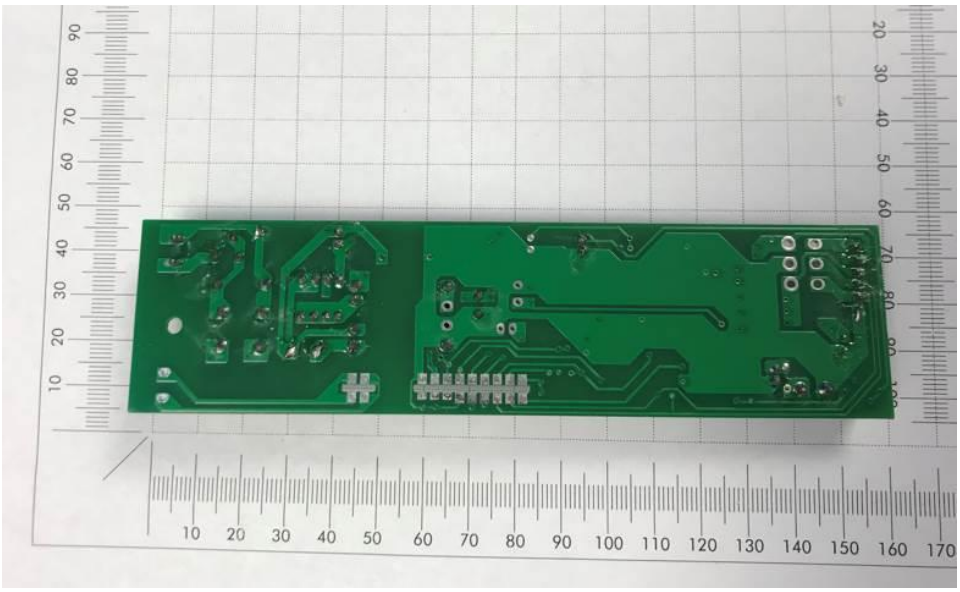
Disassembly view of battery for SP3001bb-ccc
(Two 1500 mAH 3.2V battery cells in the encloasure)



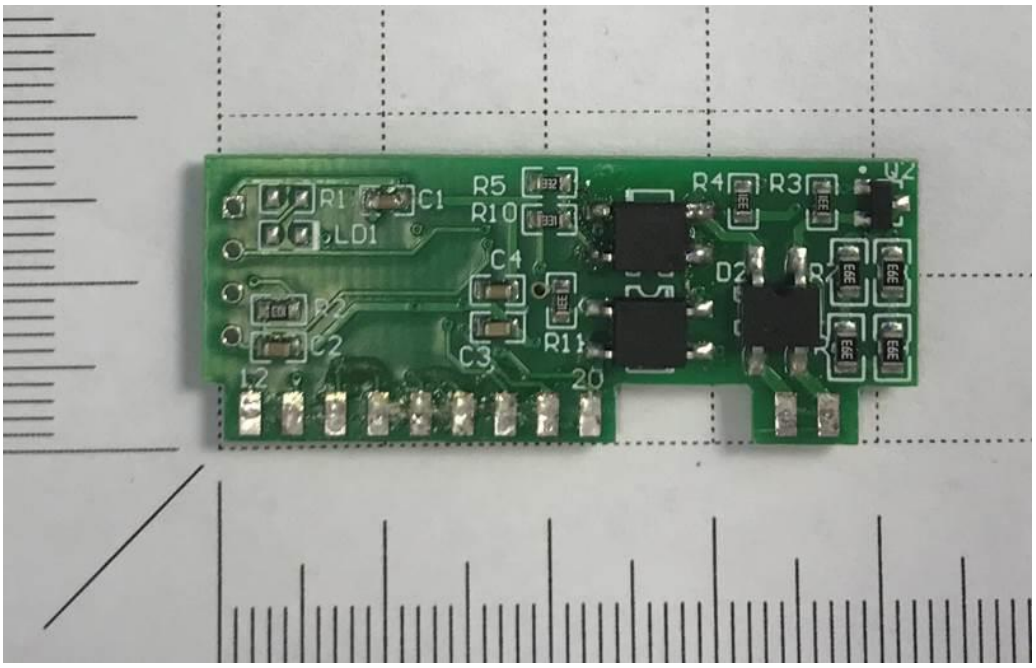
Internal view of battery with enclosure for SP3001bb-ccc



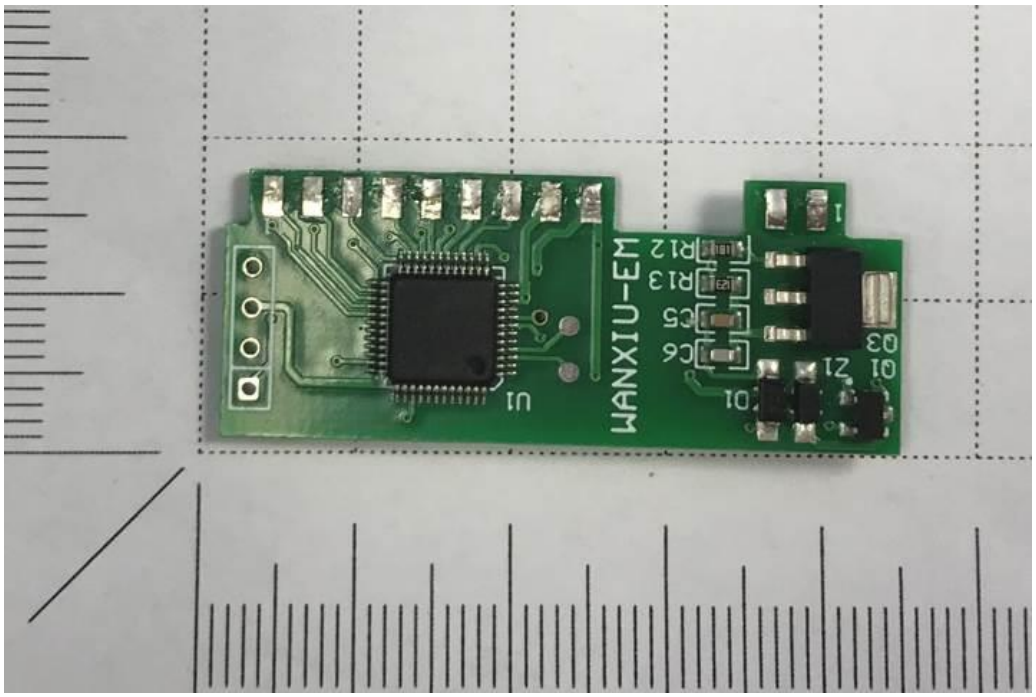
Component side of controlgear



Solder side of controlgear



Subsidiary circuit board



Subsidiary circuit board

Annex B

EUT set-up -details-

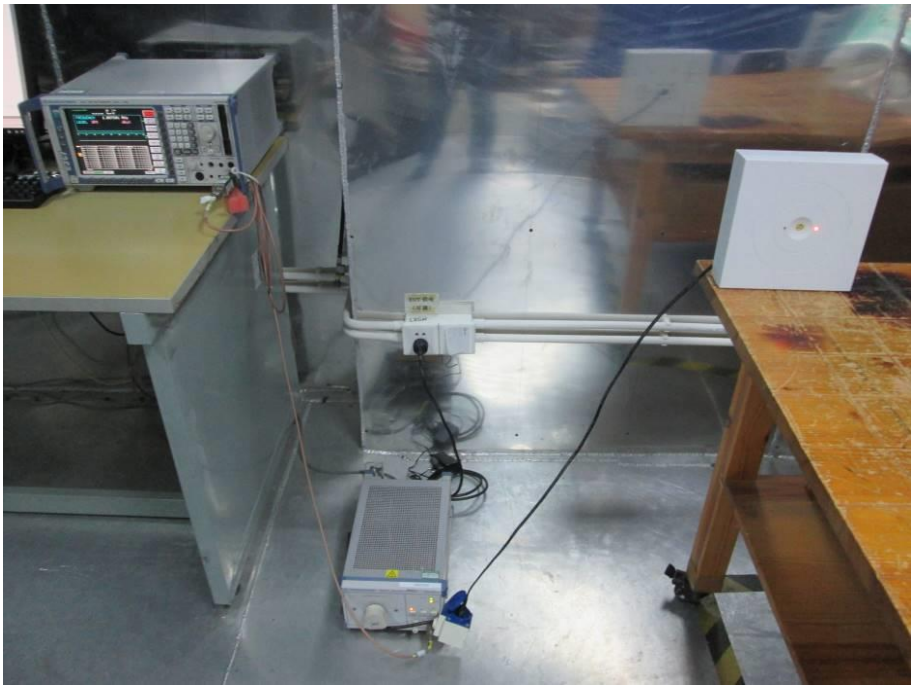


Figure B-1 Setup for Conducted Emission (Charging)

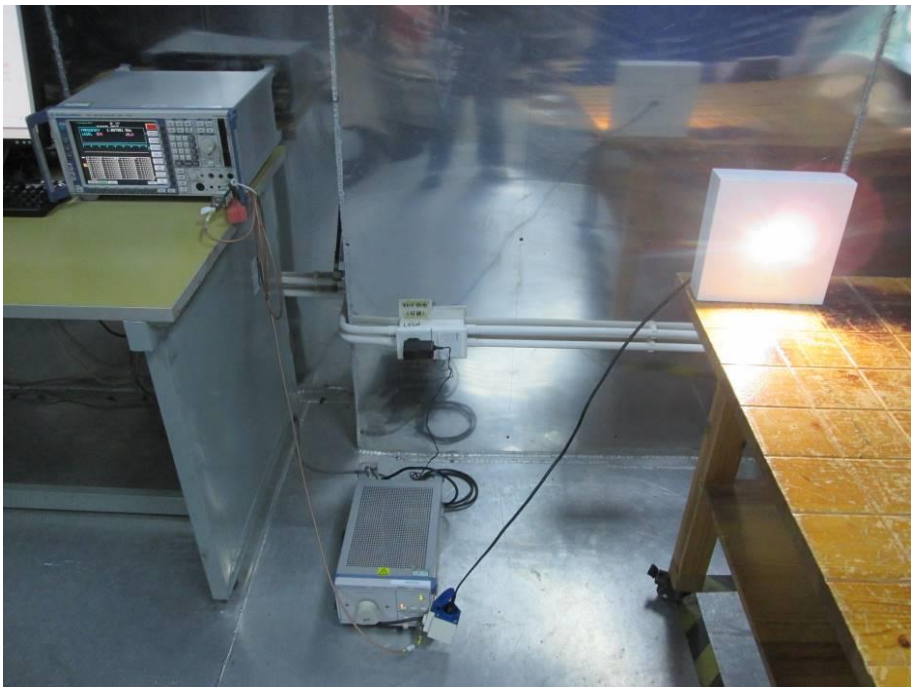


Figure B-2 Setup for Conducted Emission (Emergency)

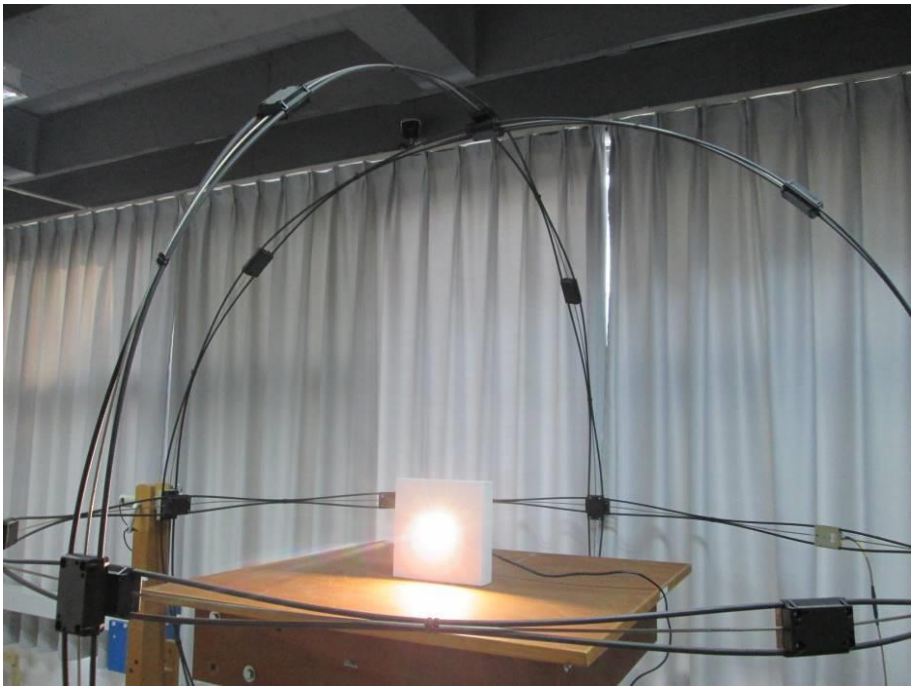


Figure B-3 Setup for Radiated Electromagnetic Disturbances (Emergency)

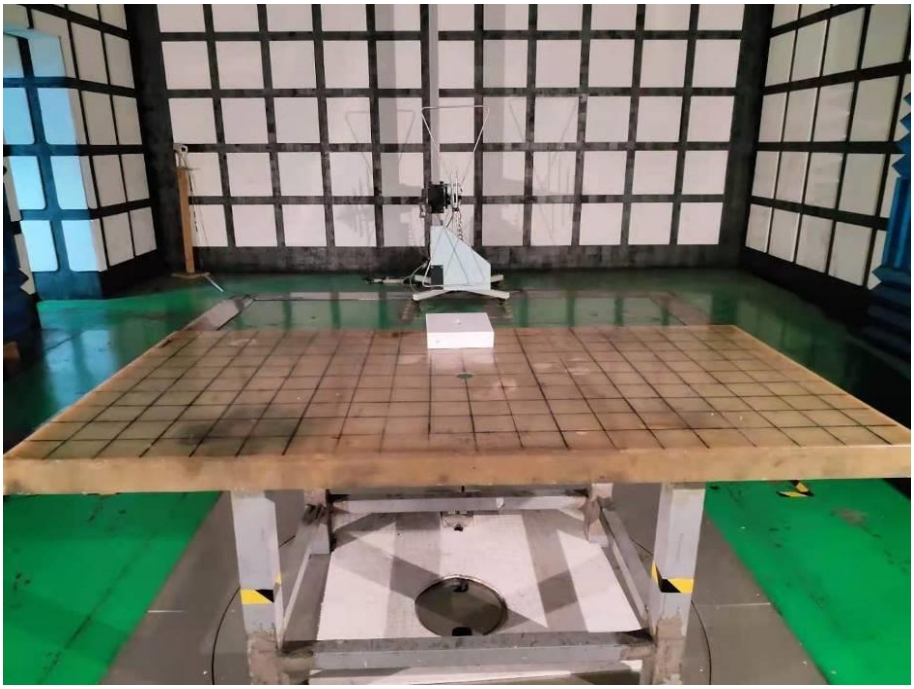


Figure B-4 Setup for Radiated Emission (Charging)

Figure B-5 Setup for Radiated Emission (Emergency)

Figure B-6 Setup for Voltage fluctuations and flicker (Charging)

Figure B-7 Setup for Electrostatic Discharge (Charging)

Figure B-8 Setup for Electrostatic Discharge (Emergency)

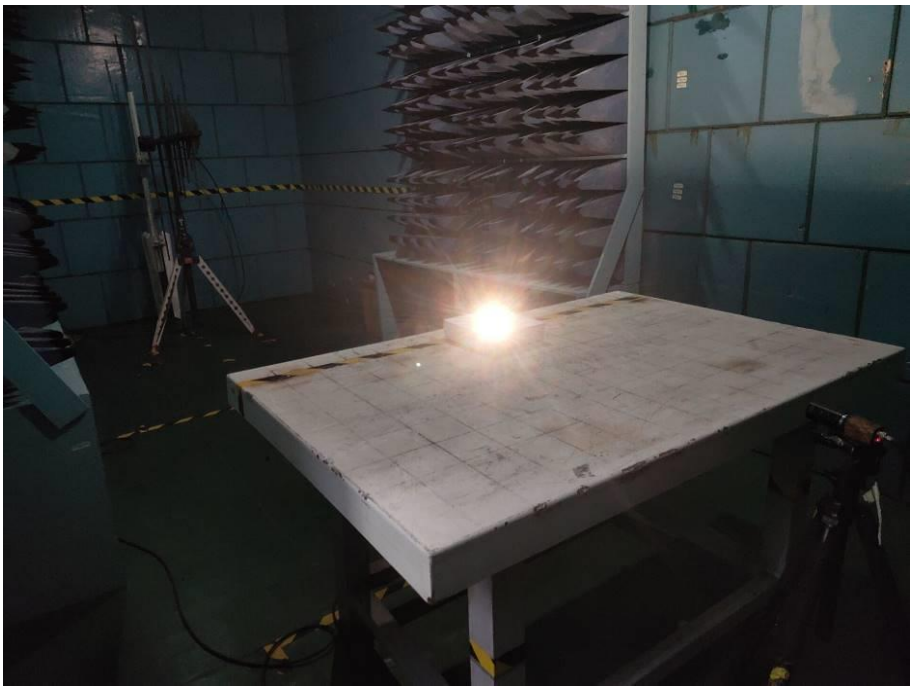


Figure B-9 Setup for Radiated Immunity (Emergency)

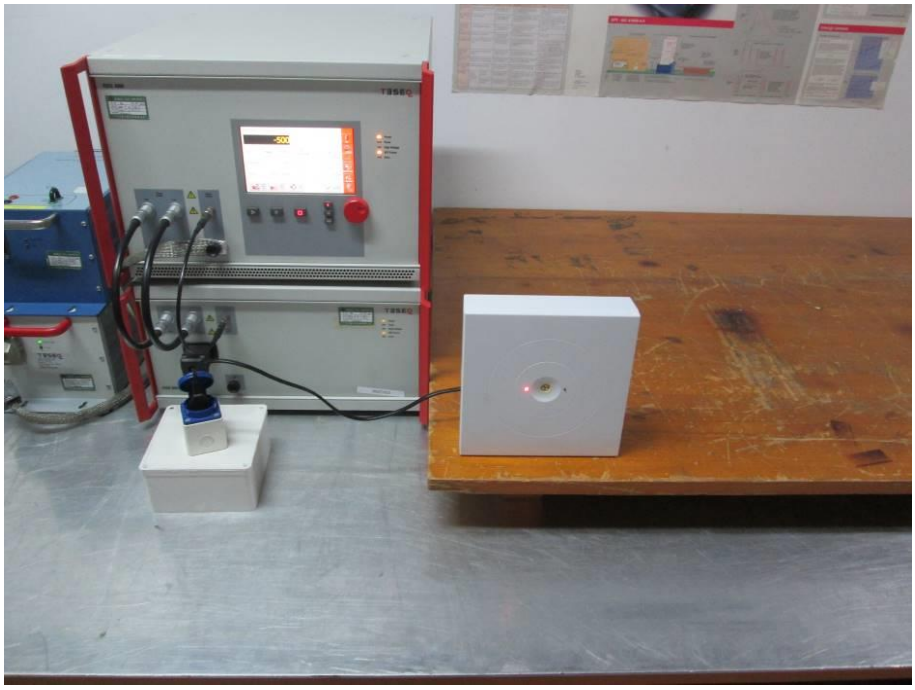


Figure B-10 Setup for Electrical Fast Transients/Bursts, Surge (Charging)

Figure B-11 Conducted Immunity (Charging)

Figure B-12 Setup for Induced current density (Emergency)

***** End of Test Report *****