

TEST REPORT

Applicant: NINGBO XUYANG ELECTRONIC PRODUCTS CO.,LTD.

Address of Applicant:

Manufacturer/Factory:

Address of

Manufacturer/Factory:

Equipment Under Test (EUT)

Product Name: camping lantern

Model No.: CL284-milky(#5818895), CL226-milky(#5818946, #5818941, #5818905, #5818906, #5818907), CL288-milky(#5818890), CL234-milky(#5818870, #5818871, #5818911, #5818912, #5818913), CL281-milky(#5818880)

Applicable standards: EN IEC 55015:2019+A11:2020
EN 61547:2009

Date of sample receipt: July 14, 2021

Date of Test: July 14- 20, 2021

Date of report issued: July 20, 2021

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above

Authorized Signature:



Robinson Luo

Laboratory Manager

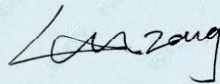
This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



2 Version

Version No.	Date	Description
00	July 20, 2021	Original

Prepared By:

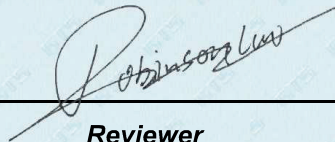


Date:

July 20, 2021

Project Engineer

Check By:



Date:

July 20, 2021

Reviewer

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4 Test Summary

Test item	Test Requirement	Test Method	Class / Severity	Result
Radiated electromagnetic disturbances (9kHz-30MHz)	EN IEC 55015	EN IEC 55015	Table 9	Pass
Radiated electromagnetic disturbances	EN IEC 55015	EN IEC 55015	Table 10	Pass
Disturbance voltages	EN IEC 55015	EN IEC 55015	Table 1	N/A
Harmonic Emission	EN IEC 61000-3-2	EN IEC 61000-3-2	Class C	N/A
Flicker Emission	EN 61000-3-3	EN 61000-3-3	Clause 5 of EN61000-3-3	N/A
Electrostatic discharges	EN 61547	EN 61000-4-2	Contact ± 4 kV Air ± 8 kV	Pass
Radio-frequency electromagnetic fields	EN 61547	EN 61000-4-3	3V/m 80%, 1kHz, AM	Pass
Fast Transients	EN 61547	EN 61000-4-4	AC ± 1.0 kV	N/A
Surges	EN 61547	EN 61000-4-5	Table 10	N/A
Injected currents	EN 61547	EN 61000-4-6	3Vrms (emf), 80%, 1kHz Amp. Mod.	N/A
Voltage dips and short interruptions	EN 61547	EN 61000-4-11	0 % UT* for 0.5per 70 % UT* for 10per	N/A

Remark:

UT* is the nominal supply voltage.

N/A: Not applicable.

5 General Information

5.1 General Description of EUT

Product Name:	camping lantern
Model No.:	CL284-milky(#5818895), CL226-milky(#5818946, #5818941, #5818905, #5818906, #5818907), CL288-milky(#5818890), CL234-milky(#5818870, #5818871, #5818911, #5818912, #5818913), CL281-milky(#5818880)
Test Model No:	CL284-milky(#5818895)
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose.</i>	
Power Supply:	DC 4.5V(3*1.5V, SIZE"D" battery)

5.2 Test mode and voltage

Test mode:	
On mode	Keep the EUT in the operation mode.
Test voltage:	
DC 4.5V	

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Monitoring of EUT for All Immunity Test

Visual:	Monitored the luminous intensity.
Audio:	N/A

5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

- **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.8 Test Location

Radiated immunity test was performed at:

China Shenzhen Academy of Metrology and Quality Inspection,
Metrology and Quality Inspection building, Central Section of LongZhu Road, Nan Shan, Shenzhen

All other test items were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480; Fax: 0755-27798960

6 Test Instruments List

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	June. 24 2021	June. 23 2022
2	Thermo meter	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022

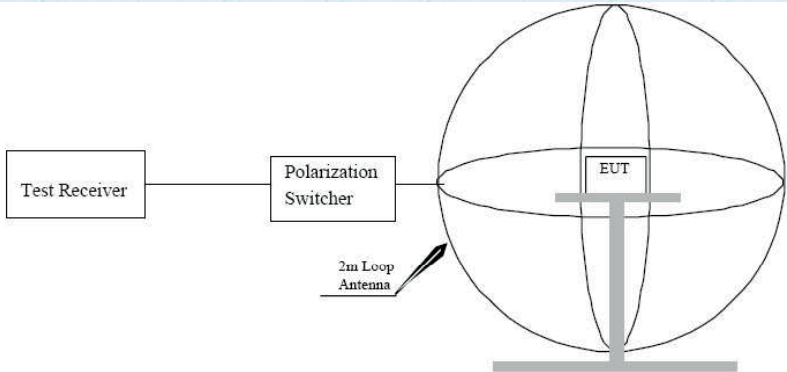
Loop						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	TPIPLE-LOOP ANTENNA	EVERFINE	LLA-2	GTS539	June. 24 2021	June. 23 2022

Radiated Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	2020-05-09	2023-05-08
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2021-03-31	2022-03-30
3	Stacked Log.-Per.- Broadband Antenna (70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
4	Signal Generator (9kHz-6GHz)	Rohde & Schwarz	SMB100A	SEM006-11	2021-03-31	2022-03-30
5	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	2020-09-23	2021-09-22
6	Broadband Amplifier(800MHz- 3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	2021-03-31	2022-03-30
7	Broadband Amplifier(2.5GHz- 6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	2021-04-10	2022-04-09
8	Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

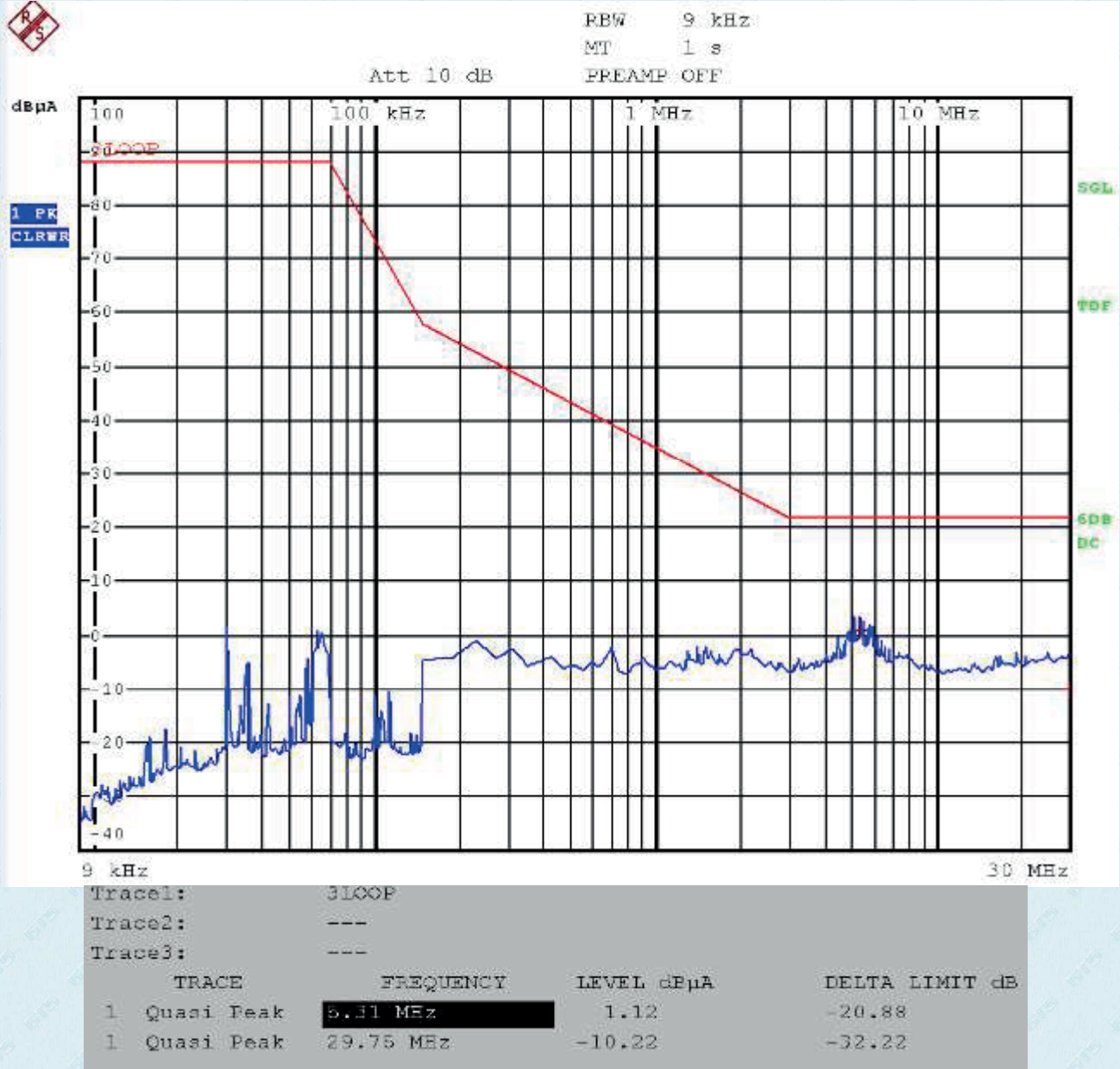
7 Emission Test Results

7.1 Radiated Electromagnetic Disturbance(9kHz-30MHz)

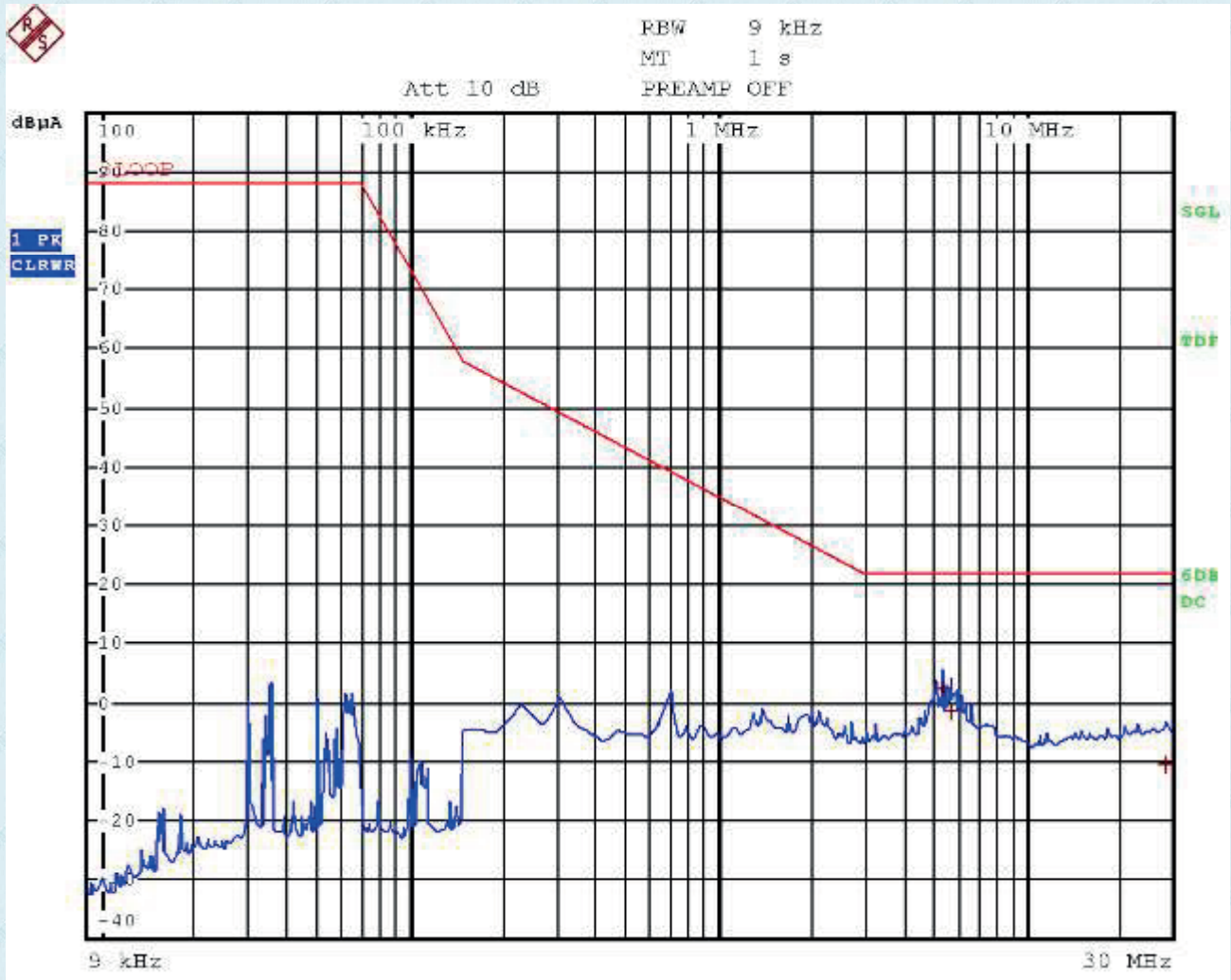
Test Requirement:	EN IEC 55015					
Test Method:	EN IEC 55015					
Test Frequency Range:	9kHz to 30MHz					
Receiver set:	Frequency	Detector	RBW	VBW	Value	
	9KHz~150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak	
	150KHz~30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak	
Limit:	Frequency range (MHz)		Limits for loop diameter dBuA @2m			
	0.009-0.070		88			
	0.070-0.150		88 to 58*			
	0.15-3.0		58 to 22*			
	3.0-30		22			
*Decreasing linearly with the logarithm of the frequency. For electrodeless lamps and luminaires, the limit in the frequency range of 2,2 MHz to 3,0 MHz is 58 dB(μA) for 2 m, 51dB(μA) for 3 m and 45 dB(μA) for 4 m loop diameter.						
Test Setup:						
Test procedure	<ol style="list-style-type: none"> 1. An initial pre-scan was performed in the 2m loop antenna using the spectrum analyser in peak detection mode. 2. The EUT was measured for X(A), Y(B), Z(C) polarities. 3. No further quasi-peak measurements were performed since no peak emissions from the EUT were detected within 6dB of the limit for 2m diameter loop antenna. 					
Test Instruments:	Temp.:	25 °C	Humid.:	50%	Press.:	1 012mbar
Measurement Record:	Uncertainty: 3.26dB					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

Measurement Data

X:

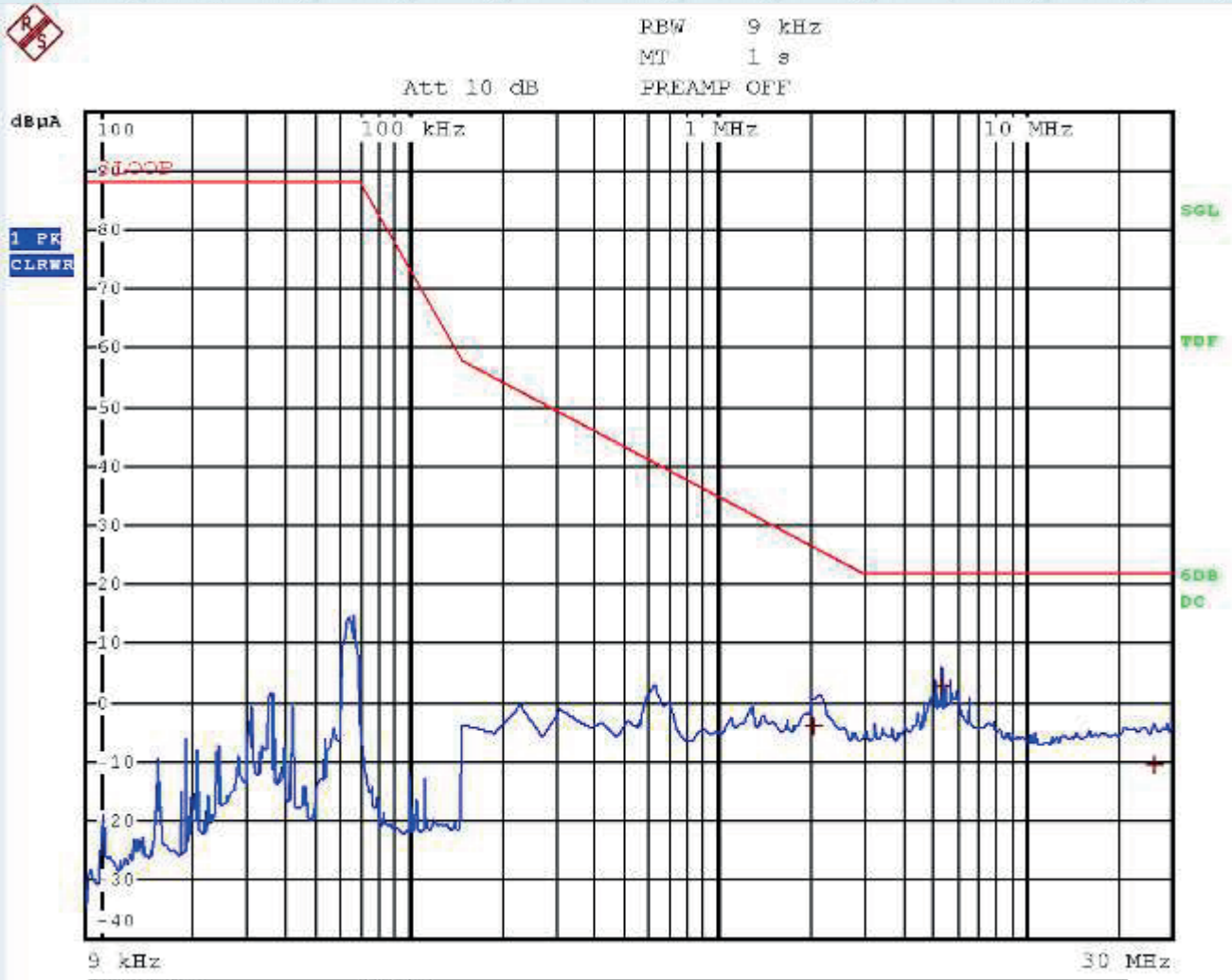


Y:



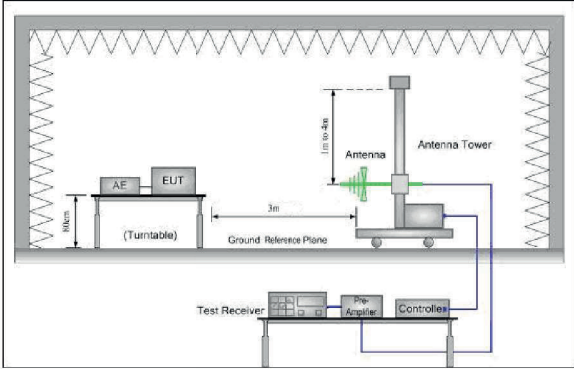
Trace1:	3LOOP		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµA	DELTA LIMIT dB
1 Quasi Peak	5.31 MHz	2.30	-19.69
1 Quasi Peak	5.71 MHz	-1.11	-23.12
1 Quasi Peak	28.35 MHz	-10.36	-32.36

Z:



Trace1:	3100P		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµA	DELTA LIMIT dB
1 Quasi Peak	2.11 MHz	-3.97	-30.20
1 Quasi Peak	5.31 MHz	2.92	-19.07
1 Quasi Peak	26.47 MHz	-10.47	-32.47

7.2 Radiated electromagnetic disturbances(30MHz-1000MHz)

Test Requirement:	EN IEC 55015	
Test Method:	EN IEC 55015	
Test Frequency Range:	30MHz to 1000MHz	
Test site:	Measurement Distance: 3m	
Limit:	Frequency range(MHz)	Limit @3m (dBuV)
	30 to 230	40.00
	230 to 1000	47.00
* At the transition frequency, the lower limit applies.		
Test setup:		
Test procedure	<ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. 	
Measurement Record:	Uncertainty: 3.8039dB (30MHz-200MHz) 3.9679dB (200MHz-1GHz)	
Test Instruments:	Refer to section 6 for details	
Test mode:	Refer to section 5.2 for details	
Test results:	Pass	

Measurement Data

Test mode:	On mode	Antenna Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	63.7588	28.03	-15.98	12.05	40.00	-27.95	QP
2	84.9993	31.55	-20.69	10.86	40.00	-29.14	QP
3	157.5587	26.48	-16.89	9.59	40.00	-30.41	QP
4	222.9501	28.62	-17.55	11.07	40.00	-28.93	QP
5	352.9433	29.40	-11.22	18.18	47.00	-28.82	QP
6 *	948.7608	27.80	0.36	28.16	47.00	-18.84	QP

Test mode:	On mode	Antenna Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	65.8029	34.63	-19.22	15.41	40.00	-24.59	QP
2	124.1329	30.99	-20.86	10.13	40.00	-29.87	QP
3	199.9855	25.91	-15.60	10.31	40.00	-29.69	QP
4	381.2485	25.81	-8.84	16.97	47.00	-30.03	QP
5	609.9215	27.55	-5.94	21.61	47.00	-25.39	QP
6 *	948.7608	27.95	-0.17	27.78	47.00	-19.22	QP

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$1. \text{ Final Level} = \text{Receiver Read level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamplifier Factor}$$

8 Immunity Test Results

8.1 Performance Criteria Description in Clause 4.2 of EN 61547

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.
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.
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.

8.2 Electrostatic Discharge

Test Requirement:	EN 61547
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> Air discharge: The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed Contact Discharge: The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. Indirect discharge for horizontal coupling plane At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. Consideration should be given to exposing all sides of the EUT. Indirect discharge for vertical coupling plane

	At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Test points:	I: N/A			
	II: All plastic seams			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 4	Contact	I	N/A	N/A
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

A: No degradation in the performance of the EUT was observed.

8.3 Radio-frequency electromagnetic fields

Test Requirement:	EN 61547
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing

	<p>each side of the EUT.</p> <p>7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.</p> <p>8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.</p>
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remark:

A: No degradation in the performance of the EUT was observed.

9 Test Setup Photo

Radiated Emission



ESD



Radiated Electromagnetic Disturbance

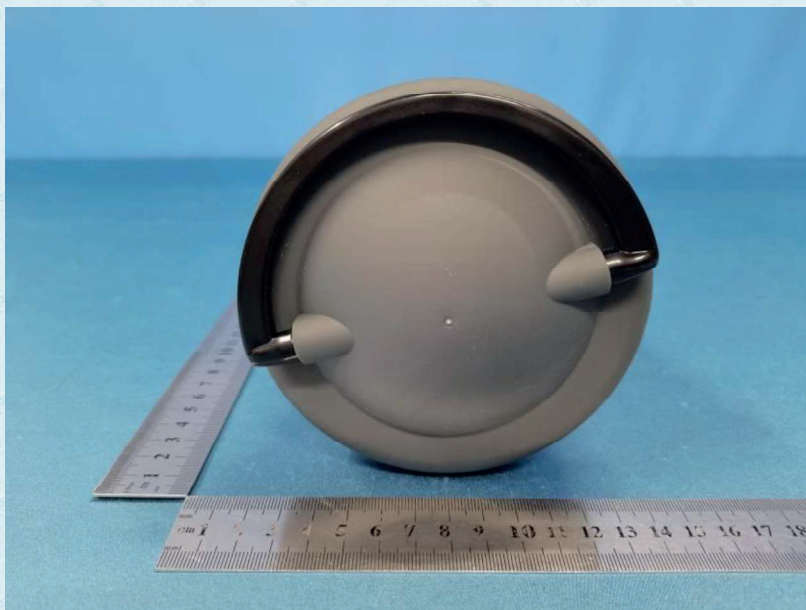


10 EUT Constructional Details











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