CE EMC Test Report

(Declaration of Conformity)

For

Electromagnetic compatibility

Of

Product :	COB soft light band
Trade Mark :	N/A
Model Number :	384 light bar, 320 light bar, 336 light bar, 480 light bar, 528 light bar, Two-color light, RGB light bar

Prepared for

Shenzhen shangsuzhiguang Technology Co., Ltd.

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's Name ..... :	Shenzhen shangsuzhiguang Technology Co., Ltd.
Address ..... :	304 Jinshan Industrial Park, 178 Songming Avenue, Songgang street, Bao'an District, Shenzhen
Manufacturer's Name ..... :	Shenzhen shangsuzhiguang Technology Co., Ltd.
Address ..... :	304 Jinshan Industrial Park, 178 Songming Avenue, Songgang street, Bao'an District, Shenzhen

Product description

Product name ..... :	COB soft light band
Model and/or type reference .. :	384 light bar, 320 light bar, 336 light bar, 480 light bar, 528 light bar, Two-color light, RGB light bar
Standards ..... :	EN IEC 55015:2019+A11:2020 EN 61547:2009

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Date of Test ..... :	
Date (s) of performance of tests ..... :	10 May 2021 ~ 18 May 2021
Date of Issue ..... :	18 May 2021
Test Result ..... :	**Pass**

Testing Engineer : Estelle. Chen

(Estelle Chen)

Technical Manager : Sky Zhang

(Sky Zhang)

Authorized Signatory : Alex

(Alex)

Table of Contents **Page**

1 . TEST SUMMARY 5
1.1 TEST FACILITY 6
1.2 MEASUREMENT UNCERTAINTY 6
2 . GENERAL INFORMATION 8
2.1 GENERAL DESCRIPTION OF EUT 8
2.2 DESCRIPTION OF TEST MODES 9
2.3 DESCRIPTION OF TEST SETUP 10
2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL 11
2.5 MEASUREMENT INSTRUMENTS LIST 12
3 . EMC EMISSION TEST 14
3.1 CONDUCTED EMISSION MEASUREMENT 14
3.1.1 POWER LINE CONDUCTED EMISSION 14
3.1.2 LOAD TERMINAL CONDUCTED EMISSION 14
3.1.3 CONTROL TERMINAL CONDUCTED EMISSION 14
3.1.4 TEST PROCEDURE 15
3.1.5 TEST SETUP 15
3.1.6 EUT OPERATING CONDITIONS 15
3.1.7 TEST RESULTS 16
3.2 RADIATED EMISSION MEASUREMENT 18
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 18
3.2.2 TEST PROCEDURE 18
3.2.3 TEST SETUP 19
3.2.4 EUT OPERATING CONDITIONS 19
3.2.5 TEST RESULTS(30-1000MHz) 20
3.2.6 TEST RESULTS(0.009-30MHz) 22
4 . EMC IMMUNITY TEST 25
4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA 25
4.2 GENERAL PERFORMANCE CRITERIA 26
4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP 26
4.4 ESD TESTING 27
4.4.1 TEST SPECIFICATION 27
4.4.2 TEST PROCEDURE 27
4.4.3 TEST SETUP 28
4.4.4 TEST RESULTS 29
4.5 RS TESTING 30
4.5.1 TEST SPECIFICATION 30

Table of Contents **Page**

4.5.2 TEST PROCEDURE 30
4.5.3 TEST SETUP 31
4.5.4 TEST RESULTS 32
4.6 EFT/BURST TESTING 33
4.6.1 TEST SPECIFICATION 33
4.6.2 TEST PROCEDURE 33
4.6.3 TEST SETUP 34
4.6.4 TEST RESULTS 35
4.7 INJECTION CURRENT TESTING 36
4.7.1 TEST SPECIFICATION 36
4.7.2 TEST PROCEDURE 36
4.7.3 TEST SETUP 37
4.7.4 TEST RESULTS 38
5 . EUT TEST PHOTO 39
ATTACHMENT PHOTOGRAPHS OF EUT 41

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN IEC 55015:2019+A11:2020	Conducted Emission	------	PASS	
	Radiated Emission	------	PASS	
EMC Immunity				
Section EN 61547:2009	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2	Electrostatic Discharge	B	PASS	
EN 61000-4-3	RF electromagnetic field	A	PASS	
EN 61000-4-4	Fast transients	B	PASS	
EN 61000-4-5	Surges	C	N/A	
EN 61000-4-6	Injected Current	A	PASS	
EN 61000-4-8	Power Frequency Magnetic Field	A	N/A	
EN 61000-4-11	Volt. Interruptions Volt. Dips	B / C	N/A	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report.

(2) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.
Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L5516

IC-Registration : The Certificate Registration Number is CN0074

FCC- Accredited : Test Firm Registration Number: 463705
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

Test Item	Measurement Frequency Range	K	U(dB)
AC Mains Conducted Emission	0.009kHz ~ 0.15MHz	2	2.66
AC Mains Conducted Emission	0.15MHz ~ 30MHz	2	2.80
Telecom Conducted Emission (Cat 3)	0.15MHz ~ 30MHz	2	2.40
Telecom Conducted Emission (Cat 5)	0.15MHz ~ 30MHz	2	2.58
Radiated Emission	30MHz ~ 1000MHz	2	2.64
Radiated Emission	1000MHz ~ 6000MHz	2	5.10
Radiated Emission	6000MHz ~ 18000MHz	2	2.52
Power Clamp	30MHz ~ 300MHz	2	2.20

Revision History

Report No.	Version	Description	Issued Date
S21051003401001	Rev.01	Initial issue of report	May 18, 2021

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>COB soft light band</td></tr>
<tr><td>Model Name</td><td>384 light bar</td></tr>
<tr><td>Additional Model Number(s)</td><td>320 light bar, 336 light bar, 480 light bar, 528 light bar, Two-color light, RGB light bar</td></tr>
<tr><td>Model Difference</td><td>All models are identical except model name and different sales targets.</td></tr>
<tr><td>Product Description</td><td>The EUT is a COB soft light band.
<table><tr><td>Operating frequency:</td><td>N/A</td></tr><tr><td>Connecting I/O port:</td><td>N/A</td></tr></table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an LED Lighting Device. More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Power Source</td><td>DC Voltage</td></tr>
<tr><td>Power Rating</td><td>DC 24V</td></tr>
</table>

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Lighting

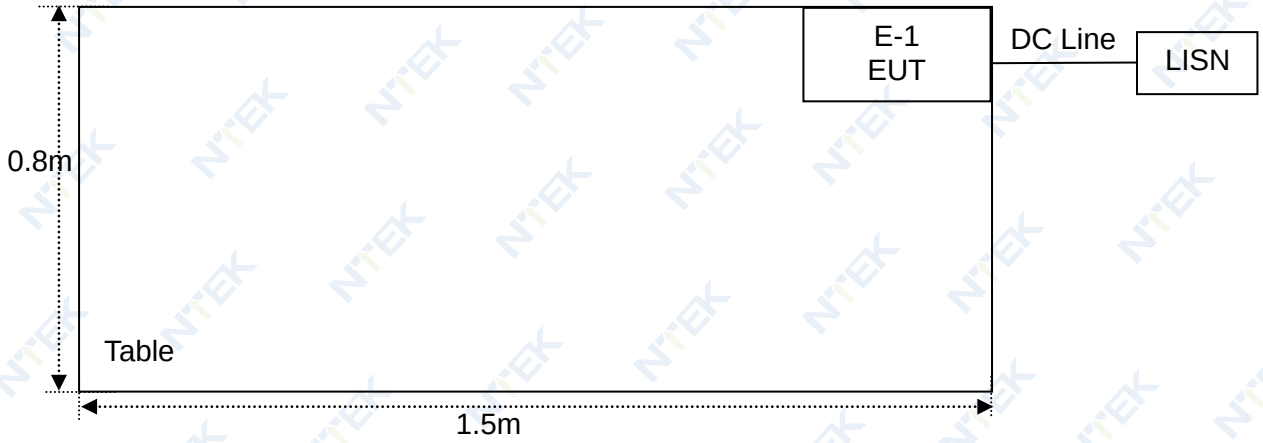
For Conducted Test	
Final Test Mode	Description
Mode 1	Lighting

For Radiated Test	
Final Test Mode	Description
Mode 1	Lighting

For EMS Test	
Final Test Mode	Description
Mode 1	Lighting

2.3 DESCRIPTION OF TEST SETUP

Mode CE : Lighting



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	COB soft light band	N/A	384 light bar	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) "YES" means "shielded" "with core"; "NO" means "unshielded" "without core".

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED TEST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Single Phase LISN	R&S	ENV216	101490	Jul. 13, 2020	Jul. 12, 2021	1 year
2	Single Phase LISN	R&S	ENV216	101313	Apr. 27, 2021	Apr. 26, 2022	1 year
3	Three-Phase LISN	SCHWARZBECK	NNLK 8129	8129245	Apr. 27, 2021	Apr. 26, 2022	1 year
4	Low frequency cable	N/A	C-01	N/A	May 11, 2020	May 10, 2023	3 years
5	50Ω Coaxial Switch	Anritsu	MP59B	6200983704	May 11, 2020	May 10, 2023	3 years
6	EMI Test Receiver	R&S	ESCI	101160	Apr. 27, 2021	Apr. 26, 2022	1 year

2.5.2 RADIATED TEST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	R&S	ESPI7	101318	Apr. 27, 2021	Apr. 26, 2022	1 year
2	Bilog Antenna	TESEQ	CBL6111D	31216	Mar. 29, 2021	Mar. 28, 2022	1 year
3	System Controller	SKET	N/A	N/A	N/A	N/A	N/A
4	Antenna Mast	SKET	N/A	N/A	N/A	N/A	N/A
5	System Controller	ADT	SC100	N/A	N/A	N/A	N/A
6	Antnna Mast	ADT	N/A	N/A	N/A	N/A	N/A
7	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	May 11, 2020	May 10, 2023	3 years
8	Low Frequency Cable	N/A	R-03	N/A	Jun. 28, 2019	Jun. 27, 2022	3 years
9	RF Cable	Pasternack	PE332-1000CM	N/A	Nov. 10, 2019	Nov. 09, 2022	3 years
10	Broadband Horn Antenna	EM	EM-AH-10180	2011071402	Mar. 29, 2021	Mar. 28, 2022	1 year
11	Spectrum Analyzer	Agilent	E4407B	MY45108040	Apr. 27, 2021	Apr. 26, 2022	1 year
12	Low Noise Amplifier	B&Z	BZ-P540-550850-452727	16476-11729	Apr. 01, 2021	Mar. 31, 2022	1 year
13	Cable	Keysight	A40-2.92M2.92M-2M	1808041	Nov. 18, 2019	Nov. 17, 2022	3 years
14	Triple Loop Antenna	EVERFINE	LLA-2	11020003	Jul. 13, 2020	Jul. 12, 2021	1 year
15	50Ω Coaxial Switch	Anritsu	MP59B	6200983704	May 11, 2020	May 10, 2023	3 years

2.5.3 ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrostatic Discharge Generator	Lioncel	ESD-203B	ESD203B0150402	Aug. 07, 2020	Aug. 06, 2021	1 year

2.5.4 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	RF Test System Controller	AR	SC1000	0350156	Feb. 22, 2021	Feb. 21, 2024	3 years
2	3M Semi Anechoic Chamber	N/A	8*4*4	N/A	Aug. 07, 2020	Aug. 06, 2023	3 years
3	Broadband Amplifier	AR	60S1G6	0350414	Mar. 25, 2021	Mar. 24, 2022	1 year
4	Bilog Antenna	ETS	3142E	00214344	Dec. 13, 2020	Dec. 12, 2021	1 year
5	Power Amplifier	rflight	NTWPA-00810200	17063153	Jul. 13, 2020	Jul. 12, 2021	1 year
6	ESG Vetctor Signal Generator	Agilent	E4438C	MY45093347	Apr. 27, 2021	Apr. 26, 2022	1 year

2.5.5 EFT/BURST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrical Intelligent Transient Generator	EVERFINE	EMS61000-4A-V2	1012005	Apr. 27, 2021	Apr. 26, 2022	1 year
2	Capacitive Coupling Clamp	EVERFINE	EFTC-2-V1	910006	Apr. 27, 2021	Apr. 26, 2022	1 year

2.5.6 CONTINUOUS RADIO FREQUENCY DISTURBANCES

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal Generator	R&S	SML03	100954	Nov. 09, 2020	Nov. 08, 2021	1 year
2	Coupling and Decoupling Network	TESEQ	CDN M016	38722	Jul. 13, 2020	Jul. 12, 2021	1 year
3	Power Amplifier	TESEQ	CBA 230M-080	T44376	Jul. 13, 2020	Jul. 12, 2021	1 year
4	EM Clamp	TESEQ	KEMZ 801A	47860	Nov. 19, 2020	Nov. 18, 2021	1 year
5	RF Cable	TESEQ	RF Cable	N/A	N/A	N/A	N/A
6	Attenuator	Jingtenghong	JTH-SJ-100W-6dB	100145143000686	May 13, 2019	May 12, 2022	3 years

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 9kHz-30MHz)

FREQUENCY (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.009 - 0.05	136	/
0.05 - 0.15	116 - 106 *	/
0.15 - 0.5	92 - 82 *	82 - 72 *
0.50 - 5.0	82	72
5.0 - 30.0	86	76

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.1.2 LOAD TERMINAL CONDUCTED EMISSION (Frequency Range 150kHz-30MHz)

FREQUENCY (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	80	70
0.50 - 30.0	74	64

Note:

(1) The tighter limit applies at the band edges.

(2) Based on our laboratory conditions, this test is not performed.

3.1.3 CONTROL TERMINAL CONDUCTED EMISSION (Frequency Range 150kHz-30MHz)

FREQUENCY (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	84 - 74*	74 - 64*
0.50 - 30.0	74	64

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

(3) Based on our laboratory conditions, this test is not performed.

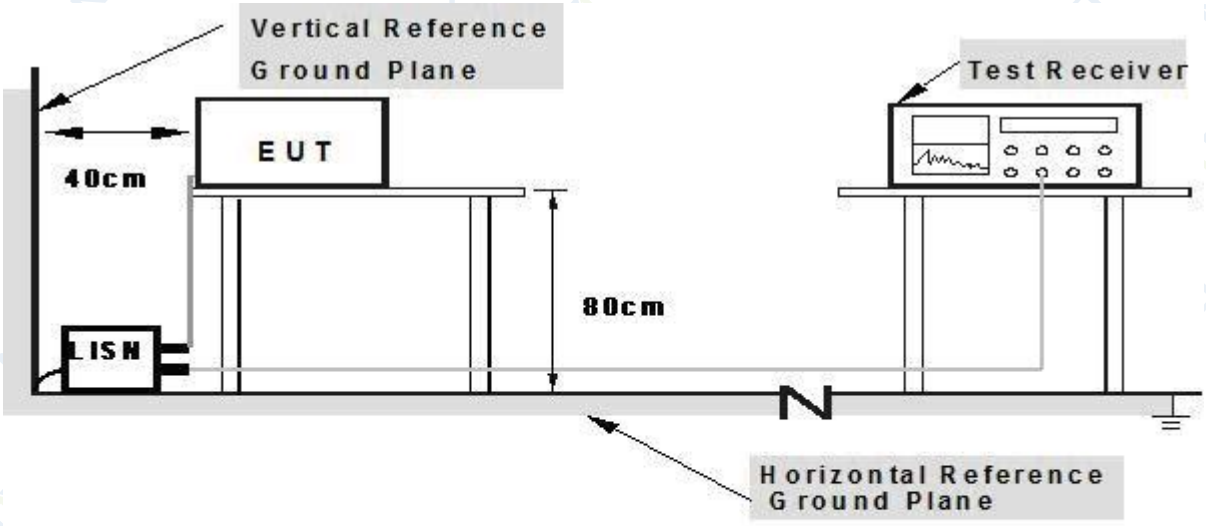
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.009 MHz
Stop Frequency	30 MHz
IF Bandwidth	200Hz and 9 kHz

3.1.4 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.5 TEST SETUP



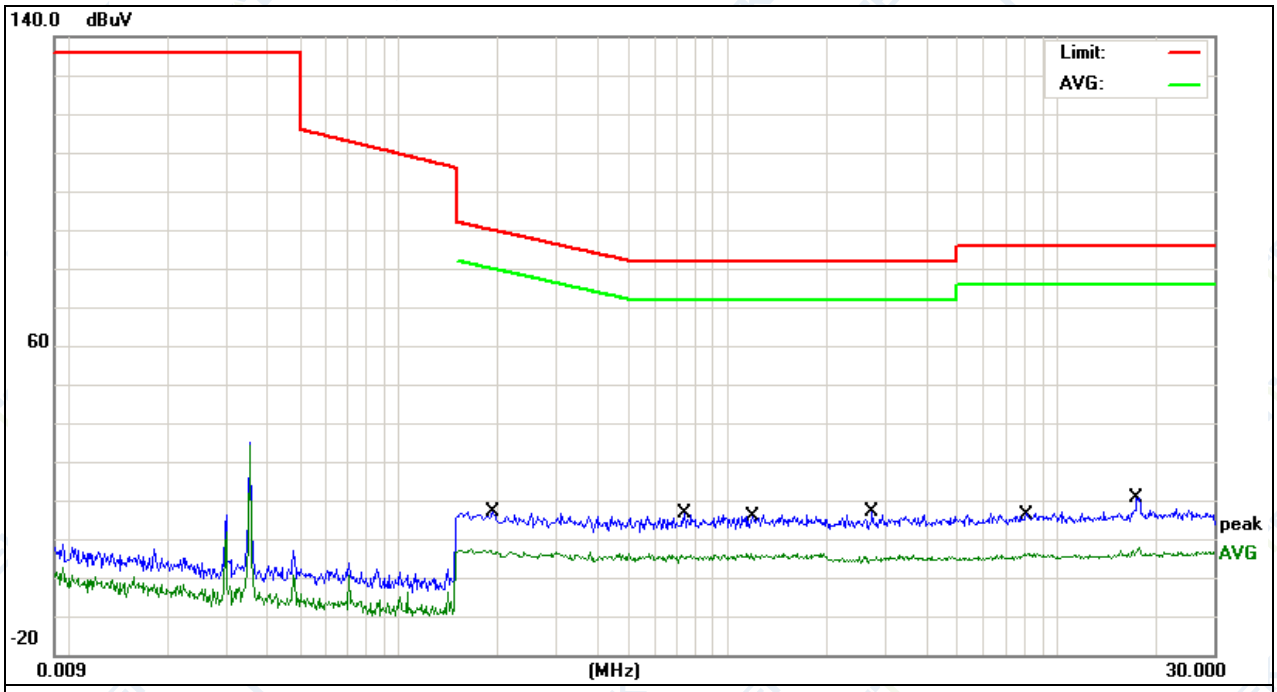
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.7 TEST RESULTS

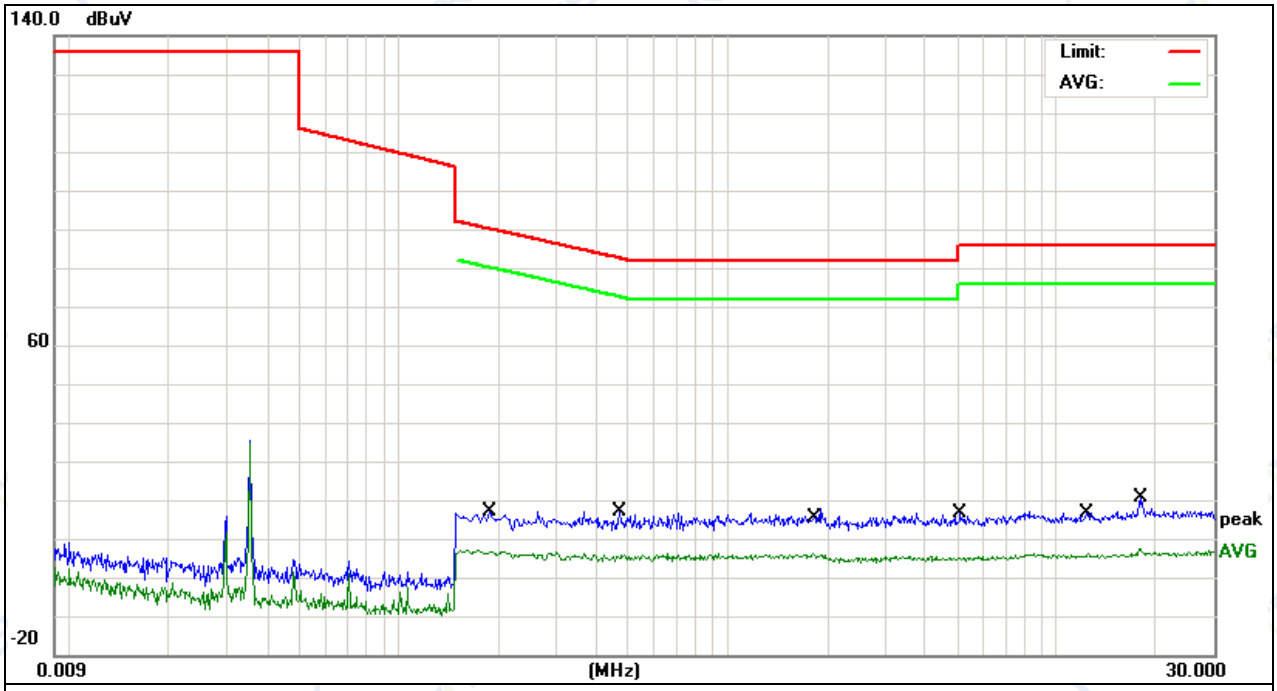
EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	20.3℃	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2021-05-15
Test Mode:	Lighting	Phase:	DC +
Test Voltage:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	7.48	9.55	17.03	89.86	-72.83	QP	
2		0.1940	-2.68	9.55	6.87	79.86	-72.99	AVG	
3		0.7380	6.90	9.55	16.45	82.00	-65.55	QP	
4		0.7380	-3.73	9.55	5.82	72.00	-66.18	AVG	
5		1.1740	6.59	9.56	16.15	82.00	-65.85	QP	
6		1.1740	-3.35	9.56	6.21	72.00	-65.79	AVG	
7	*	2.7460	7.43	9.59	17.02	82.00	-64.98	QP	
8		2.7460	-4.30	9.59	5.29	72.00	-66.71	AVG	
9		8.2980	7.10	9.67	16.77	86.00	-69.23	QP	
10		8.2980	-3.43	9.67	6.24	76.00	-69.76	AVG	
11		17.5419	10.92	9.86	20.78	86.00	-65.22	QP	
12		17.5419	-2.13	9.86	7.73	76.00	-68.27	AVG	

Remark:
Factor = Insertion Loss + Cable Loss.

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	20.3℃	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2021-05-15
Test Mode:	Lighting	Phase:	DC -
Test Voltage:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	7.59	9.54	17.13	90.03	-72.90	QP	
2		0.1900	-2.87	9.54	6.67	80.03	-73.36	AVG	
3		0.4700	7.48	9.54	17.02	82.51	-65.49	QP	
4		0.4700	-3.79	9.54	5.75	72.51	-66.76	AVG	
5	*	1.8220	8.05	9.57	17.62	82.00	-64.38	QP	
6		1.8220	-3.29	9.57	6.28	72.00	-65.72	AVG	
7		5.0860	7.17	9.61	16.78	86.00	-69.22	QP	
8		5.0860	-4.41	9.61	5.20	76.00	-70.80	AVG	
9		12.4140	6.90	9.72	16.62	86.00	-69.38	QP	
10		12.4140	-3.56	9.72	6.16	76.00	-69.84	AVG	
11		17.8300	10.71	9.84	20.55	86.00	-65.45	QP	
12		17.8300	-2.29	9.84	7.55	76.00	-68.45	AVG	

Remark:
Factor = Insertion Loss + Cable Loss.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	☒ 2m	☐ 3m	☐ 4m
	dB(μA)	dB(μA)	dB(μA)
9kHz ~ 70kHz	88	81	75
70kHz ~ 150kHz	88 to 58	81 to 51	75 to 45
150kHz ~ 3MHz	58 to 22	51 to 15	45 to 9
3MHz ~ 30MHz	22	15 to 16	9 to 12

FREQUENCY (MHz)	☐At 10m	☒At 3m
	dBμV/m	dBμV/m
30 - 230	30	40
230 - 1000	37	47

Notes:

(1) The limit for radiated test was performed according to as following: CISPR 15.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBμV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

a. The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz.

b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

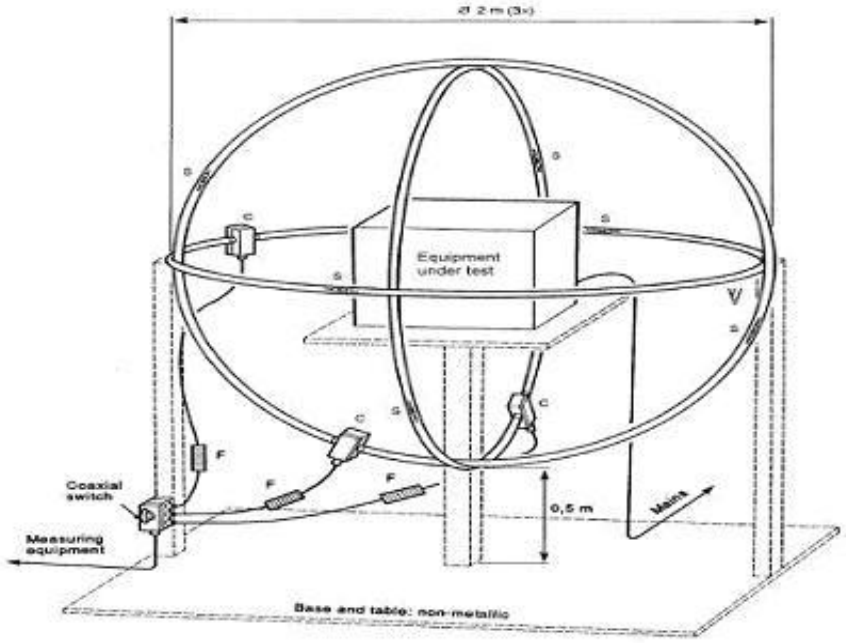
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.

e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.

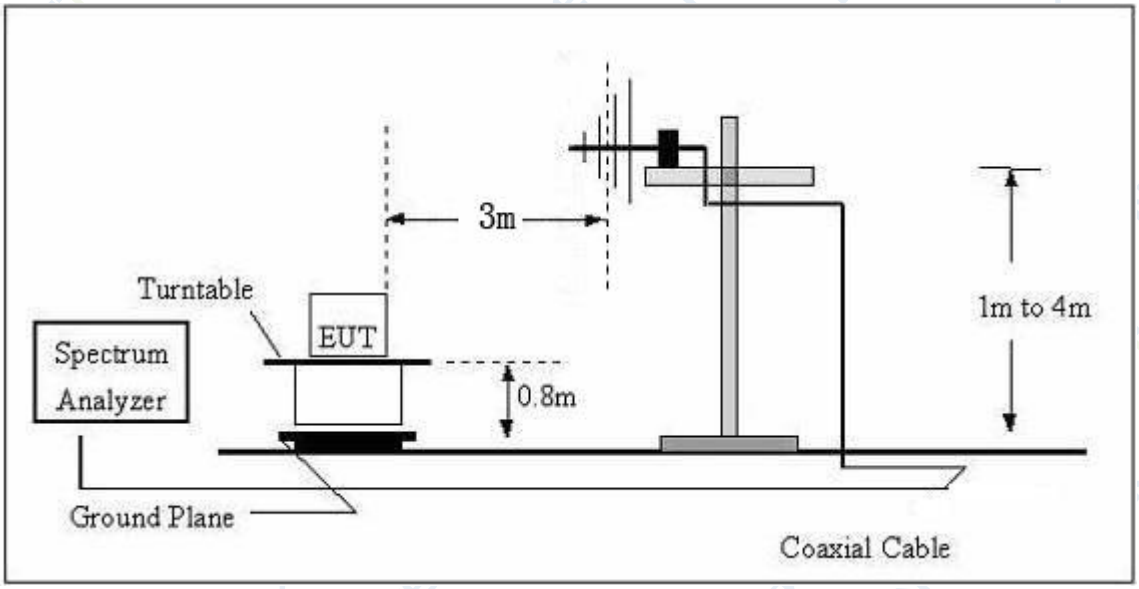
f. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 30 MHz



(B) Radiated Emission Test Set-Up Frequency Above 30 MHz

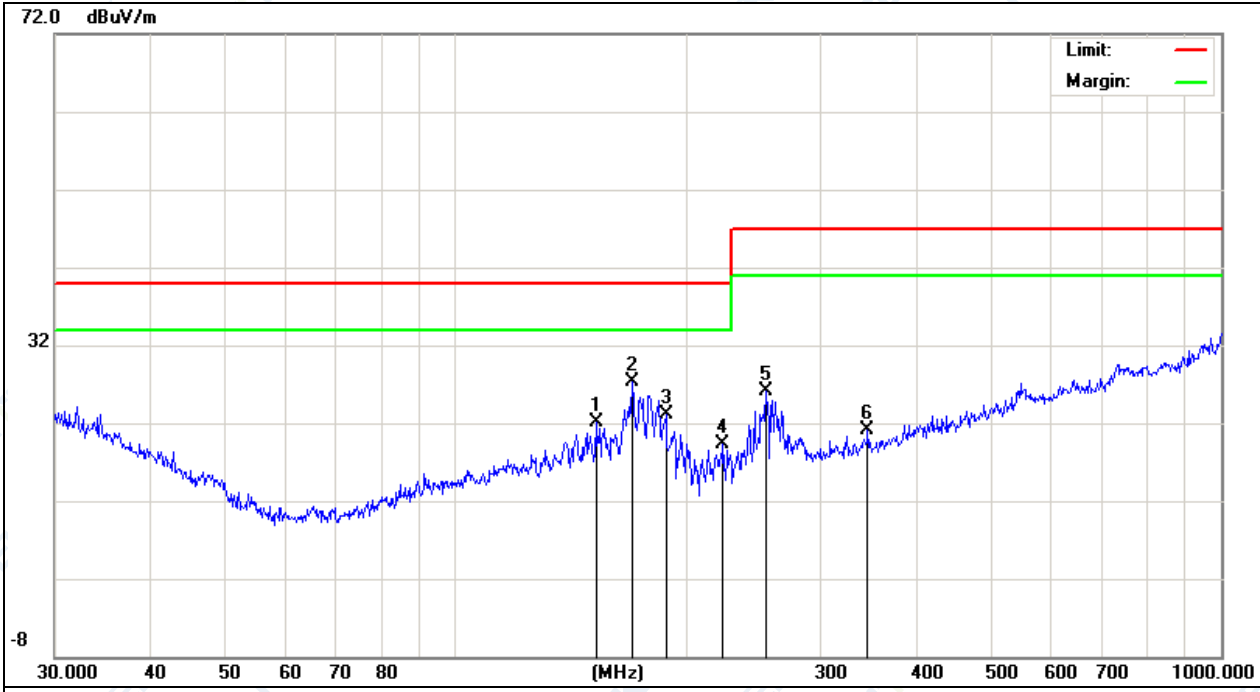


3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS(30-1000MHz)

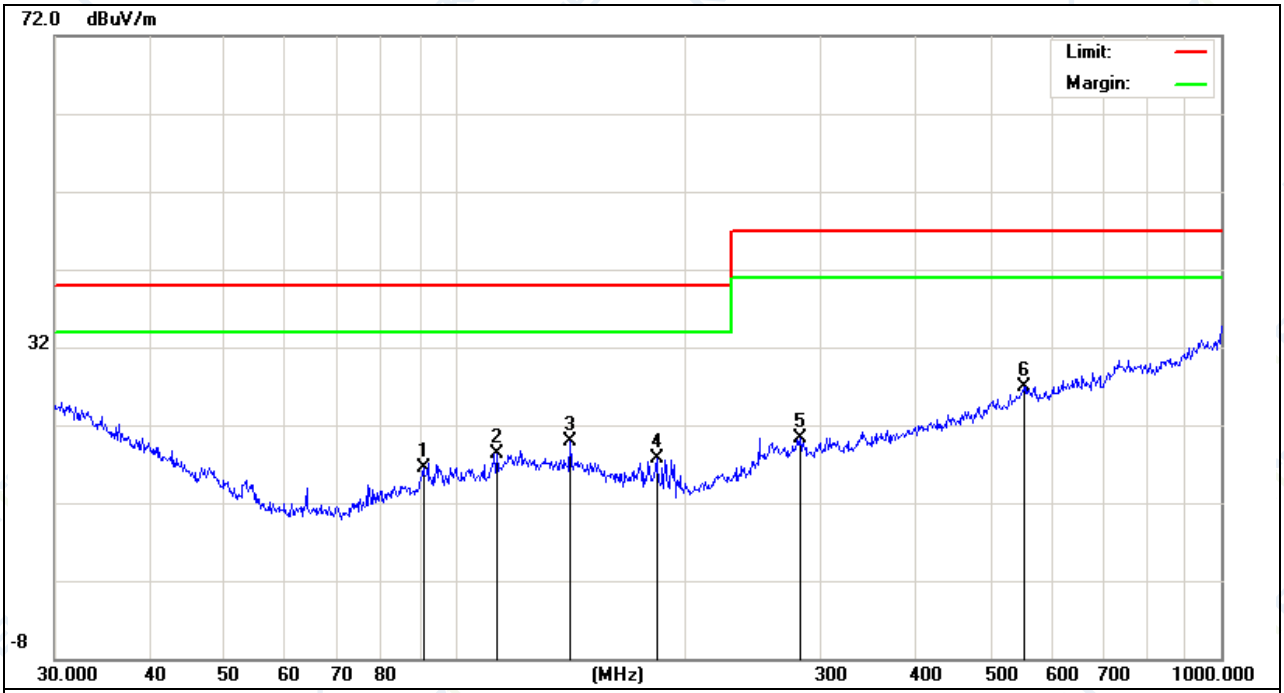
EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	25.1℃	Relative Humidity:	55%
Pressure:	1010hPa	Test Date:	2021-05-14
Test Mode:	Lighting	Polarization:	Horizontal
Test Power:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		152.6639	11.33	10.74	22.07	40.00	-17.93	QP			
2	*	170.1947	17.68	9.67	27.35	40.00	-12.65	QP			
3		188.4123	15.04	8.16	23.20	40.00	-16.80	QP			
4		223.7333	9.68	9.53	19.21	40.00	-20.79	QP			
5		254.7282	13.80	12.38	26.18	47.00	-20.82	QP			
6		345.5951	6.59	14.49	21.08	47.00	-25.92	QP			

Remark:
Factor = Antenna Factor + Cable Loss - Amplifier.

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	25.1℃	Relative Humidity:	55%
Pressure:	1010hPa	Test Date:	2021-05-14
Test Mode:	Lighting	Polarization:	Vertical
Test Power:	DC 24V		

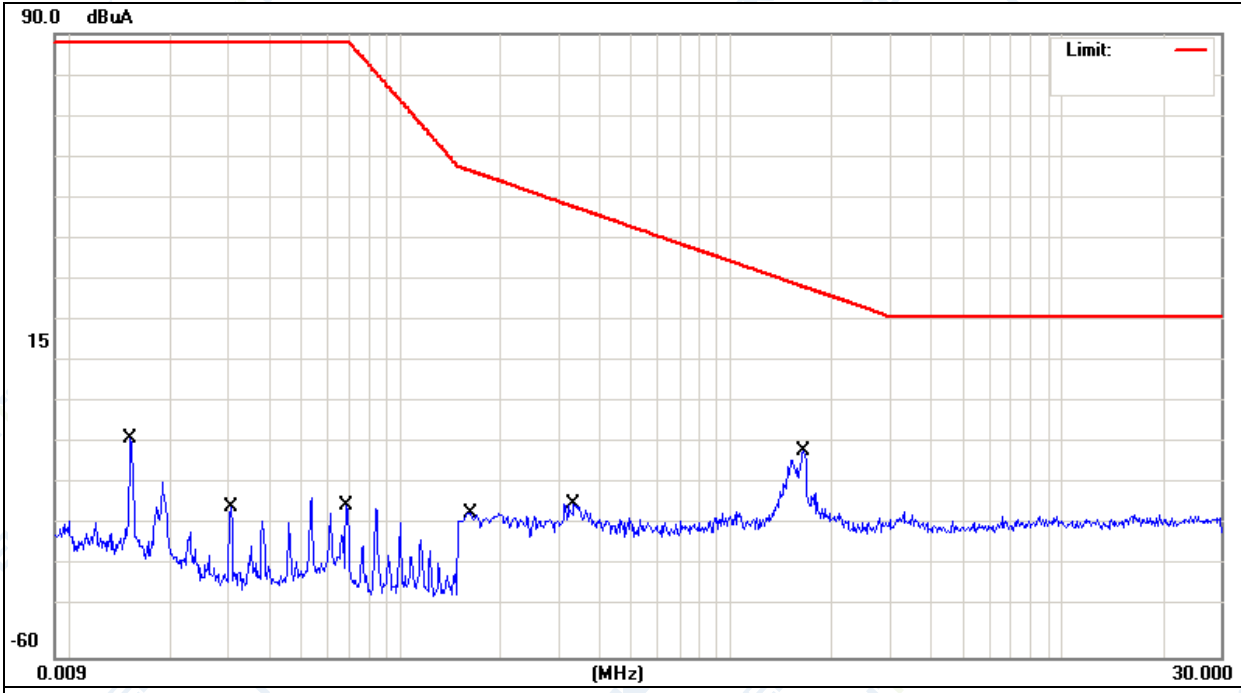


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		90.8554	7.43	9.07	16.50	40.00	-23.50	QP			
2		113.3163	7.30	11.10	18.40	40.00	-21.60	QP			
3	*	141.3298	8.66	11.29	19.95	40.00	-20.05	QP			
4		183.2005	9.02	8.64	17.66	40.00	-22.34	QP			
5		281.9946	6.57	13.82	20.39	47.00	-26.61	QP			
6		552.8832	6.43	20.51	26.94	47.00	-20.06	QP			

Remark:
Factor = Antenna Factor + Cable Loss - Amplifier.

3.2.6 TEST RESULTS(0.009-30MHz)

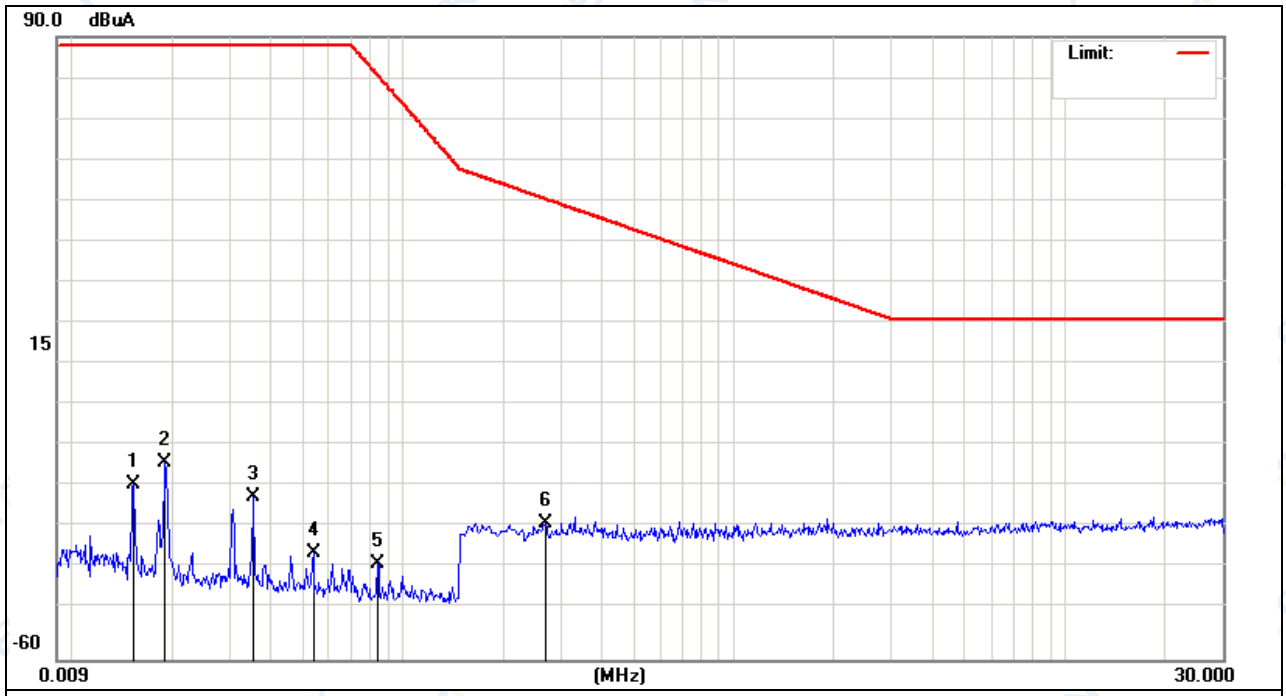
EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	20.3℃	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2021-05-15
Test Mode:	Lighting	Polarization:	X
Test Power:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1		0.0153	-7.25	0.01	-7.24	88.00	-95.24	QP	
2		0.0307	-23.94	0.02	-23.92	88.00	-111.92	QP	
3		0.0689	-23.62	0.05	-23.57	88.00	-111.57	QP	
4		0.1620	-25.48	0.10	-25.38	57.07	-82.45	QP	
5		0.3339	-23.09	0.12	-22.97	48.38	-71.35	QP	
6	*	1.6500	-10.52	0.35	-10.17	29.18	-39.35	QP	

Remark:
Factor = Antenna Factor + Cable Loss.

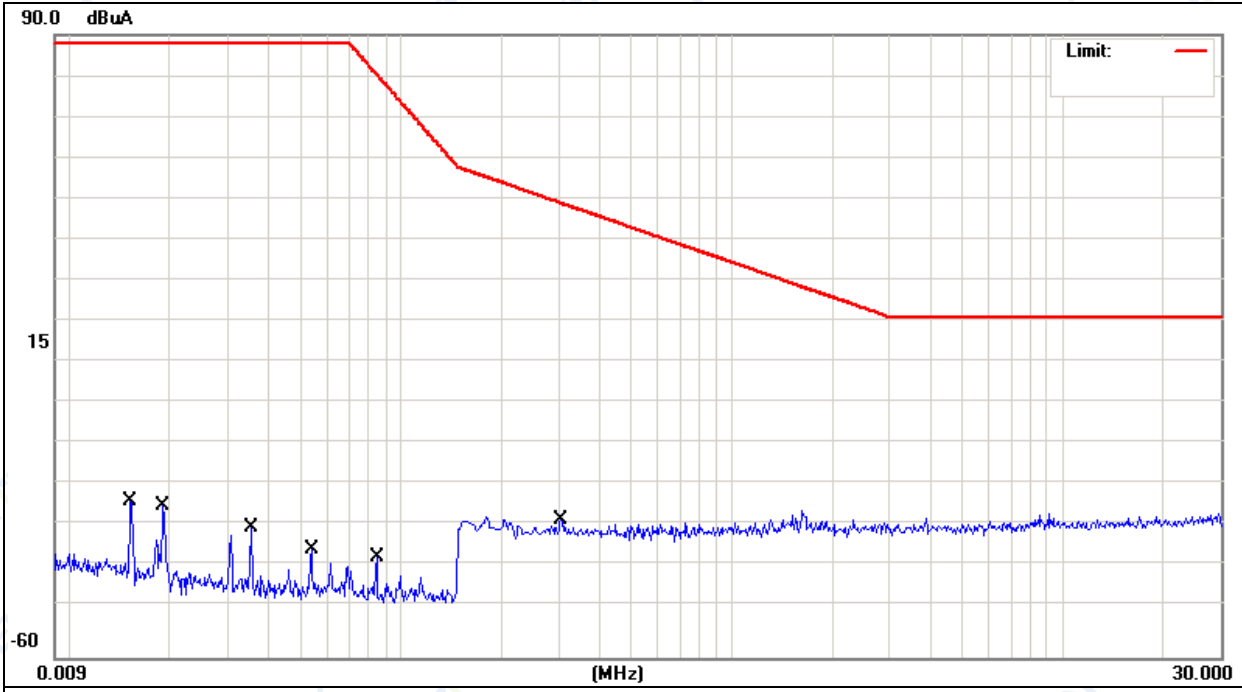
EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	20.3℃	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2021-05-15
Test Mode:	Lighting	Polarization:	Y
Test Power:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1		0.0154	-17.64	0.01	-17.63	88.00	-105.63	QP	
2		0.0190	-12.54	0.01	-12.53	88.00	-100.53	QP	
3		0.0352	-20.92	0.02	-20.90	88.00	-108.90	QP	
4		0.0538	-34.29	0.03	-34.26	88.00	-122.26	QP	
5		0.0840	-36.87	0.06	-36.81	80.82	-117.63	QP	
6	*	0.2700	-27.26	0.11	-27.15	50.93	-78.08	QP	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	20.3℃	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2021-05-15
Test Mode:	Lighting	Polarization:	Z
Test Power:	DC 24V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1		0.0153	-22.24	0.01	-22.23	88.00	-110.23	QP	
2		0.0191	-23.54	0.01	-23.53	88.00	-111.53	QP	
3		0.0354	-28.79	0.02	-28.77	88.00	-116.77	QP	
4		0.0537	-33.99	0.03	-33.96	88.00	-121.96	QP	
5		0.0846	-35.95	0.06	-35.89	80.54	-116.43	QP	
6	*	0.3060	-26.79	0.12	-26.67	49.43	-76.10	QP	

Remark:
Factor = Antenna Factor + Cable Loss.

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION Level	Test Mode Test Ports	Perform. Criteria
1. ESD IEC/EN 61000-4-2	8kV air discharge 4kV contact discharge	Direct Mode	B
	4kV HCP discharge 4kV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 1000Hz, 80%, AM modulated	Enclosure	A
3. EFT/Burst IEC/EN 61000-4-4	5/50ns Tr/Th 5kHz Repetition Freq.	Power Supply Port	B
	5/50ns Tr/Th 5kHz Repetition Freq.	CTL / Signal Data Line Port	B
5. Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	CTL / Signal Port	A
	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	AC Power Port	A
	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	DC Power Port	A

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 61547** standard, the general performance criteria as following:

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330ohm / 150pF
Required Performance:	B
Discharge Voltage:	Air Discharge:2kV/4kV/8kV (Direct) Contact Discharge:2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Indirect application of the discharge:

Vertical Coupling Plane (VCP):

At least 10 single discharges (in the most sensitive polarity) shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0,5 m × 0,5 m, is placed parallel to, and positioned at a distance of 0,1 m from, the EUT.

Discharges shall be applied to the coupling plane, with sufficient different positions such that the four faces of the EUT are completely illuminated. One VCP position is considered to illuminate 0,5 m × 0,5 m area of the EUT surface.

Horizontal Coupling Plane (HCP):

Discharge to the HCP shall be made horizontally to the edge of the HCP.

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the centre point of each unit (if applicable) 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.

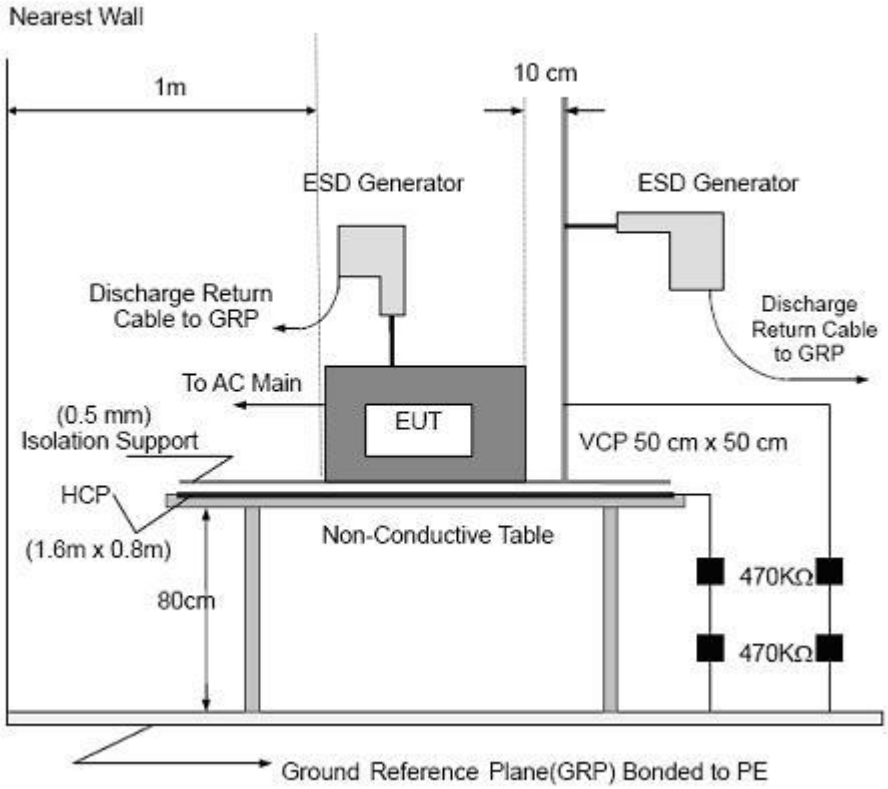
The discharge electrode shall be in contact with the edge of the HCP before the discharge switch is operated

b. Direct application of discharges to the EUT

The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.

For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.4.4 TEST RESULTS

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	22.0℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2021-05-17
Test Mode:	Lighting		
Test Power:	DC 24V		

Mode	Contact Discharge (Indirect)							Criterion	Result
Test level(kV)	Test Point	2		4		6			
Test Location		+	-	+	-	+	-		
HCP	Front	P	P	P	P			B	Complies
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				
VCP	Front	P	P	P	P				
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				

Mode	Air Discharge								Contact Discharge								Criterion	Result
Test level(kV)	2		4		8		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
Gap	P	P	P	P	P	P											B	Complies
Metal									P	P	P	P						

Note:

1) +/- denotes the Positive/Negative polarity of the output voltage.
2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
3) Criteria A: Normal performance within limits specified by the manufacturer, requestor or purchaser.
4) Criteria B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention.
5) Criteria C: Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
6) Criteria D: Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

4.5 RS TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	3 seconds

4.5.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

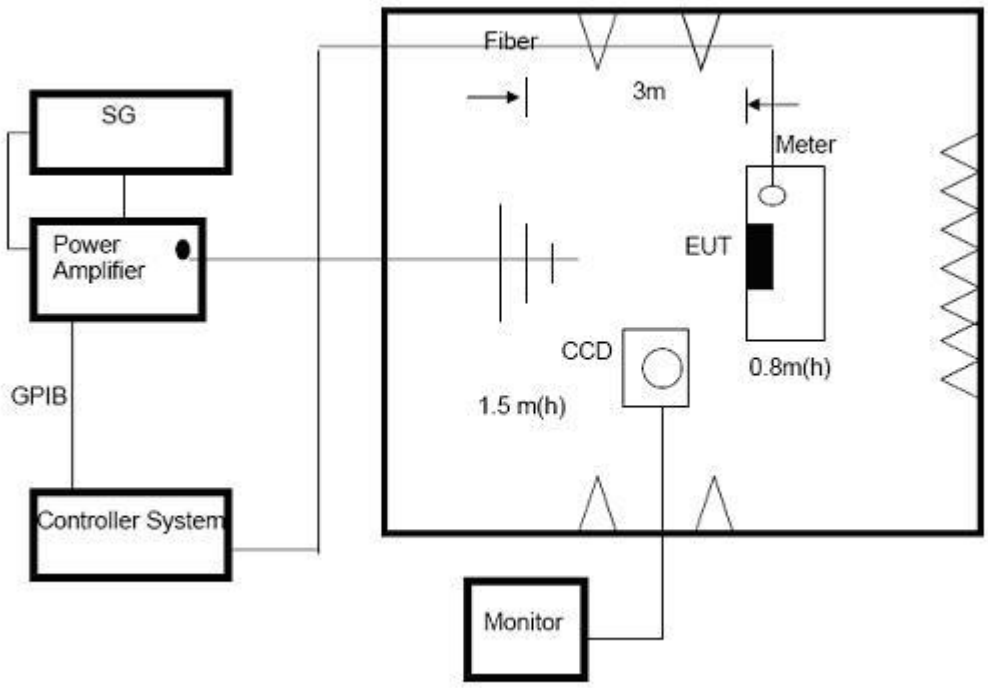
a. The frequency range is swept from 80 MHz to 1000 MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

b. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.5.4 TEST RESULTS

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	27.3℃	Relative Humidity:	48%
Pressure:	1010hPa	Test Date:	2021-05-17
Test Mode:	Lighting		
Test Power:	DC 24V		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (r.m.s) AM Modulated 1000Hz, 80%	Front	**A**	**P**	**Complies**
			Rear			
			Left			
			Right			

Note:

1) N/A - denotes test is not applicable in this test report.
2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

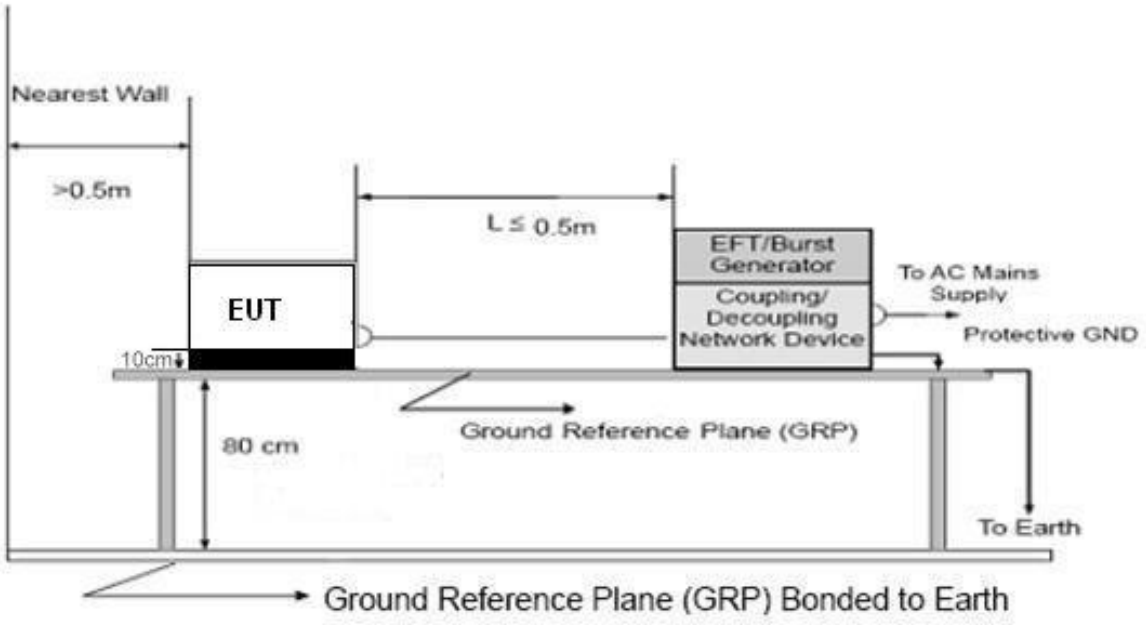
Basic Standard:	IEC/EN 61000-4-4
Required Performance:	B
Test Voltage:	Power Line:0.5 kV Signal/Control Line:0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	2 minutes

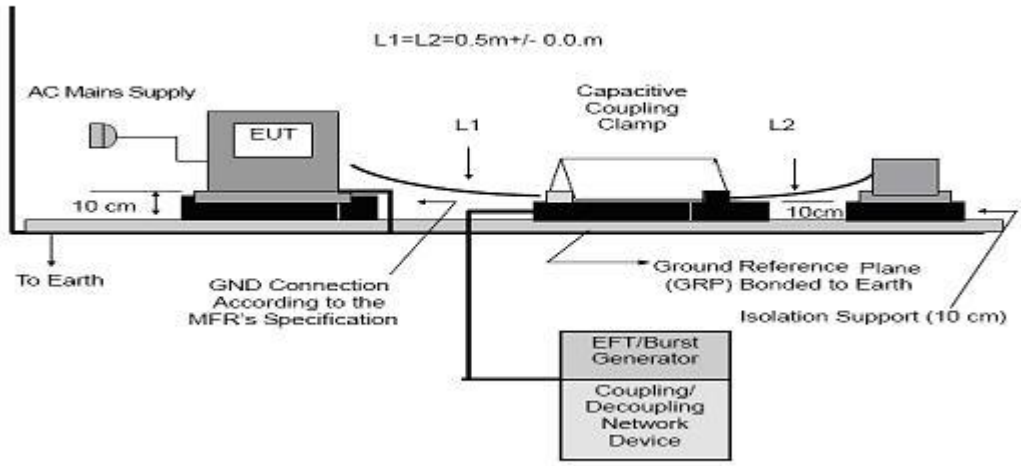
4.6.2 TEST PROCEDURE

The EUT and its simulators were placed on a ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. The other condition as following manner:

a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.
b. Both positive and negative polarity discharges were applied.
c. The duration time of each test sequential was 2 minutes.

4.6.3 TEST SETUP





Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.6.4 TEST RESULTS

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	22.0℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2021-05-17
Test Mode:	Lighting		
Test Power:	DC 24V		

Coupling Line		Test level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC line	L									B	Complies
	N										
	PE										
	L+N										
	L+PE										
	N+PE										
	L+N+PE										
DC Line		P	P								
Signal Line											

Note:

1) +/- denotes the Positive/Negative polarity of the output voltage.
2) N/A - denotes test is not applicable in this test report
3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
4) Criteria A: There was no change operated with initial operating during the test.
5) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
6) Criteria C: The system shut down during the test.

4.7 INJECTION CURRENT TESTING

4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance:	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	3 seconds

4.7.2 TEST PROCEDURE

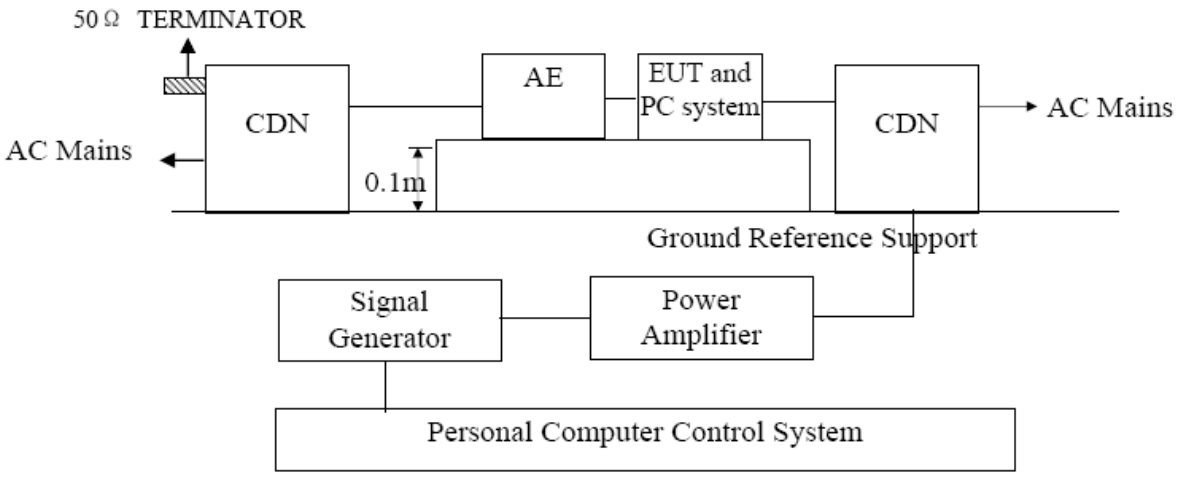
The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible). The disturbance signal described below is injected to EUT through CDN.

The other condition as following manner:

a. The frequency range is swept from 150 kHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

4.7.3 TEST SETUP



NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

4.7.4 TEST RESULTS

EUT:	COB soft light band	Model Name:	384 light bar
Temperature:	22.0℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2021-05-17
Test Mode:	Lighting		
Test Power:	DC 24V		

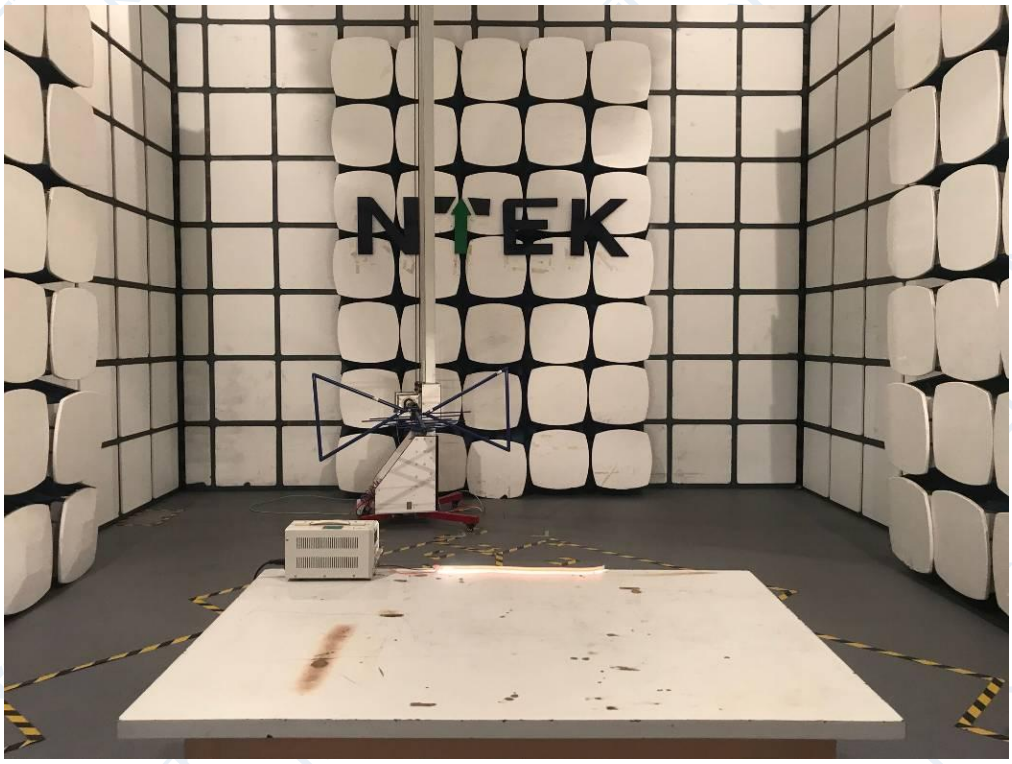
Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input AC. Power Port	0.15 --- 80	3V(r.m.s) AM Modulated 1000Hz, 80%	**A**	**N/A**	**N/A**
Input DC. Power Port	0.15 --- 80		**A**	**P**	**Complies**
Signal Line	0.15 --- 80		**A**	**N/A**	**N/A**

Note:

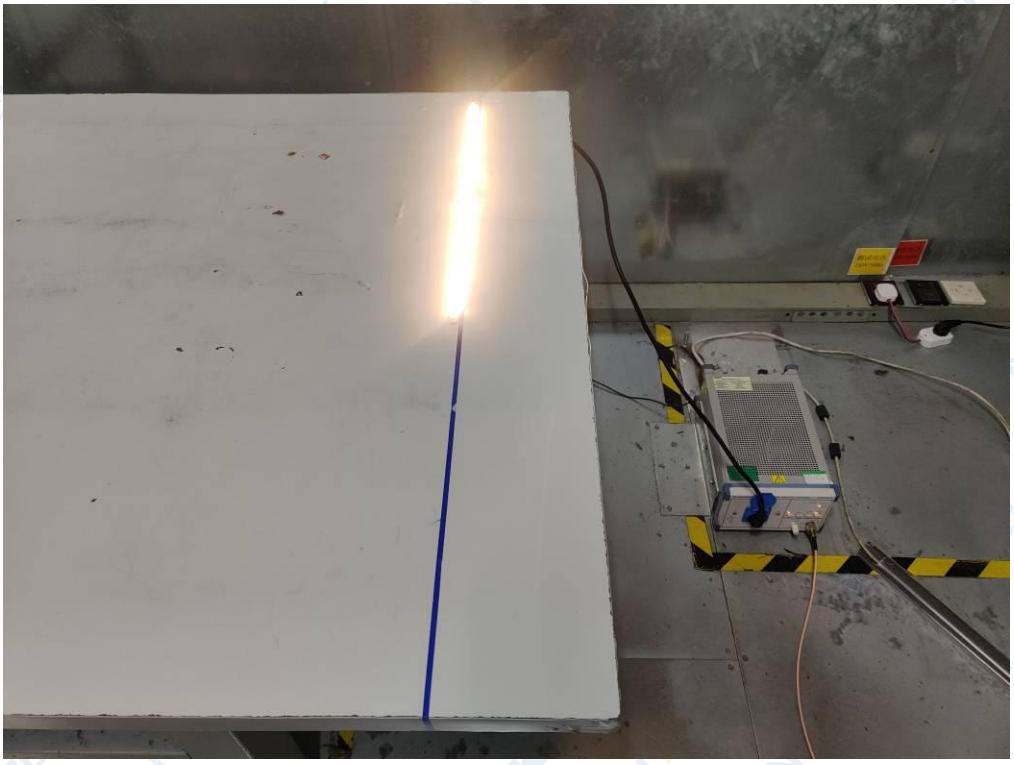
1) N/A - denotes test is not applicable in this Test Report.
2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

5. EUT TEST PHOTO

Radiated Measurement Photo



Conducted Measurement Photo



ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1

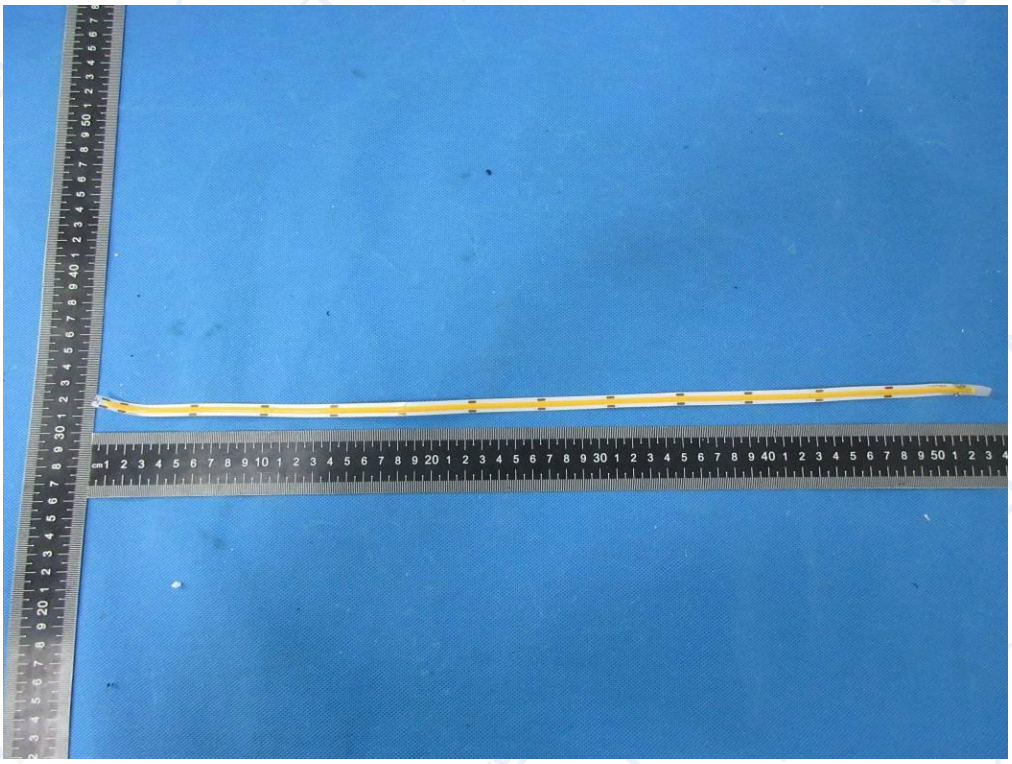


Photo 2

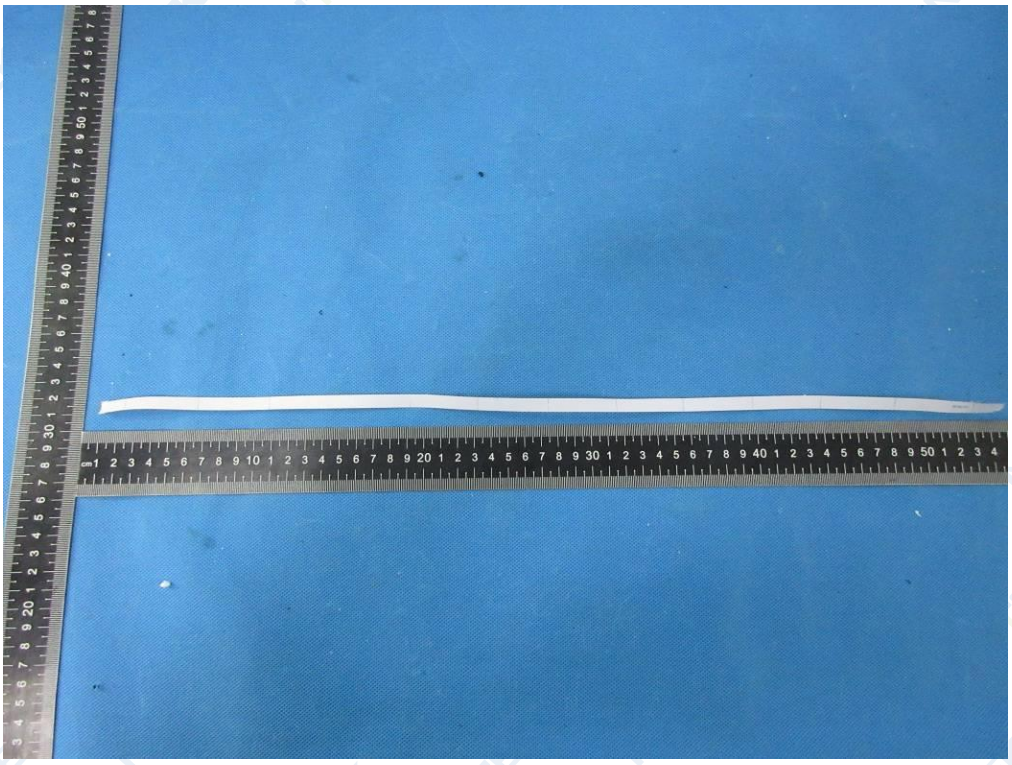
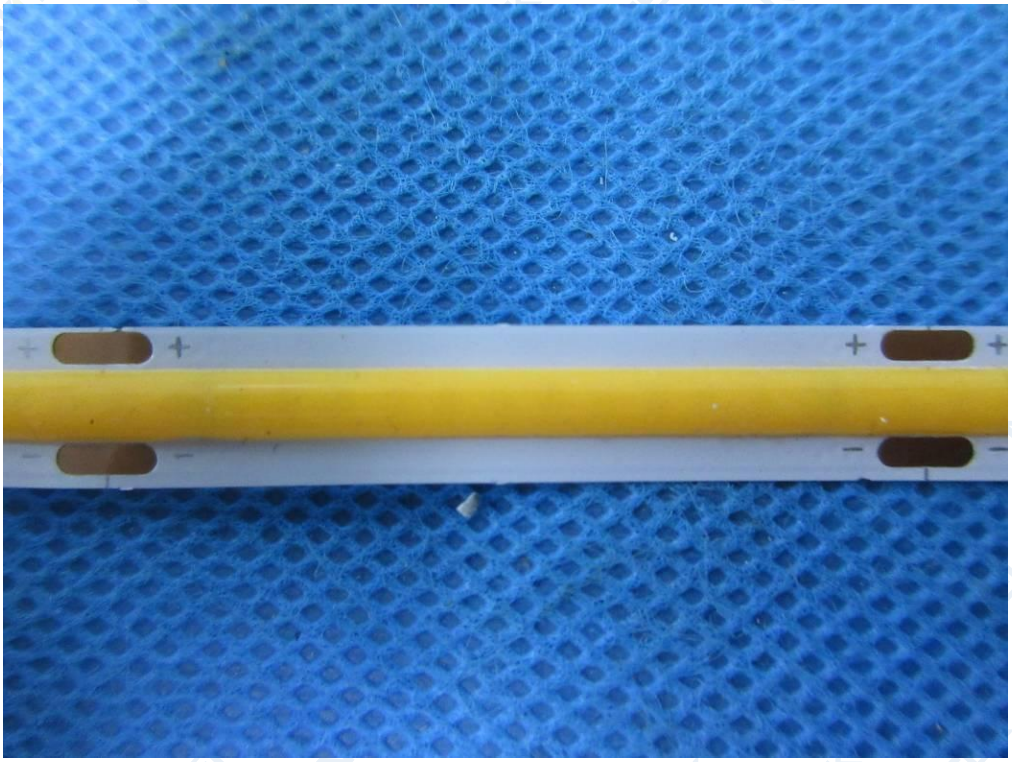


Photo 3



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