TEST REPORT

Applicant:

Address of Applicant:

Equipment Under Test (EUT)

Product Name:	5m/19mm, 2-in-1 measuring tape with LED 3x light
Model No.:	P113.271
Applicable standards:	EN 55015:2013/A1:2015
	EN 61547:2009
Date of sample receipt:	August 22, 2018
Date of Test:	August 22- 27, 2018
Date of report issued:	August 27, 2018
Test Result :	PASS *

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

Authorized Signature:

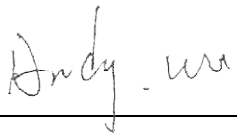
Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*August 27, 2018*	*Original*

Prepared By:  ***Date:*** *August 27, 2018*

Project Engineer

Reviewed By:  ***Date:*** *August 27, 2018*

Reviewer

3 Contents

4 Test Summary

Test item	Test Requirement	Test Method	Class / Severity	Result
Radiated electromagnetic disturbances (9kHz-30MHz)	EN 55015	EN 55015	Table 3a	Pass
Radiated electromagnetic disturbances	EN 55015	EN 55015	Table 3b	Pass
Disturbance voltages	EN 55015	EN 55015	Table 2a	N/A
Harmonic Emission	EN 61000-3-2	EN 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 ± 1.0kV	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:	5m/19mm, 2-in-1 measuring tape with LED 3x light
Model No.:	P113.271
Power supply:	DC3.0V(2*1.5V, SIZE"AA")

5.2 Test mode and voltage

Test mode:	
On mode	Keep the EUT in lighting status
Test voltage:	
DC3.0V	

5.3 Description of Support Units

None.

5.4 Monitoring of EUT for All Immunity Test

Visual:	Monitor the light of EUT
Audio:	N/A

5.5 Test Facility

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

- **FCC —Registration No.: 381383**

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. Registration No.: 381383 January 08, 2018.

- **Industry Canada (IC) —Registration No.: 9079A-2**

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 with Registration No.: 9079A-2, August 15, 2016.

5.6 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. 301-309, 3/F., 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. 03 2015	July. 02 2020
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. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019

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.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	TPIPLE-LOOP ANTENNA	EVERFINE	LLA-2	GTS539	June. 27 2018	June. 26 2019

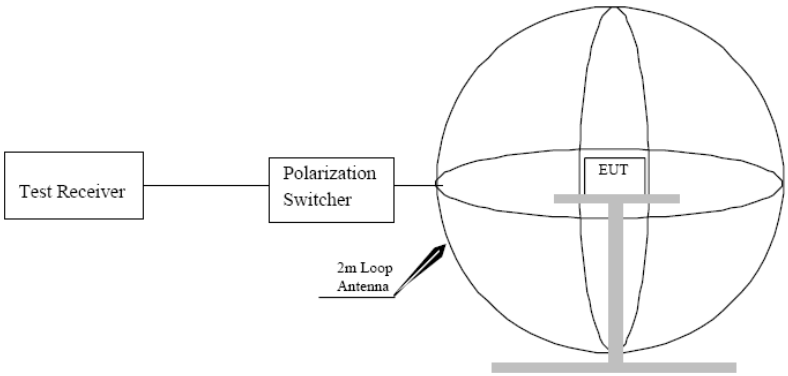
ESD						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	June. 27 2018	June. 26 2019
2	Thermo meter	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019

Radiated Immunity (80MHz-6GHz)						
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	2017-05-10	2020-05-09
2	Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A
3	Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2018-04-02	2019-04-01
4	Broadband Amplifier(80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	2017-09-27	2018-09-26
5	Broadband Amplifier(800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	2018-04-02	2019-04-01
6	Broadband Amplifier(2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	2018-04-13	2019-04-12
7	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2018-04-02	2019-04-01
8	Stacked Log.-Per.-Broadband Antenna(70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
9	Amplifier(10kHz-250MHz)	Amplifier Research	75A250A	SEM005-11	2018-04-02	2019-04-01
10	Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	SEM010-01	2017-09-27	2018-09-26
11	Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2018-04-02	2019-04-01
12	Conditioning Amplifier	Brüel & Kjaer	2690-OS2	SEM005-10	2018-04-20	2019-04-19
13	Mouth Simulator	Brüel & Kjaer	4227	SEM017-01	2018-04-10	2019-04-09
14	Signal Source	Brüel & Kjaer	4231	SEM017-02	2018-04-14	2019-04-13
15	Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03	2017-09-27	2018-09-26

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. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

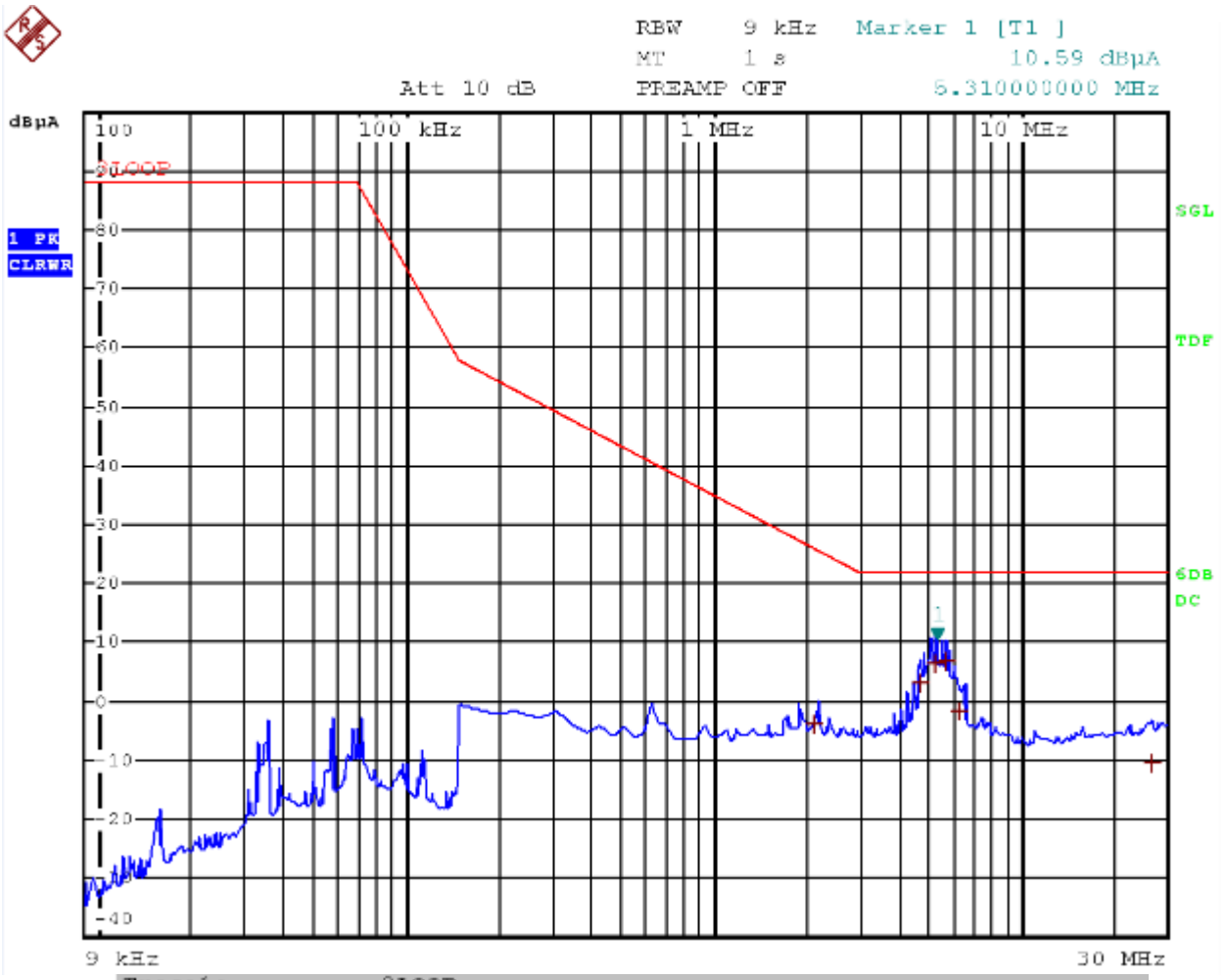
7 Emission Test Results

7.1 Radiated Electromagnetic Disturbance(9kHz-30MHz)

<table>
<tr><td>Test Requirement:</td><td>EN 55015</td></tr>
<tr><td>Test Method:</td><td>EN55015</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 30MHz</td></tr>
<tr><td>Receiver set:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz~150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz~30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency range (MHz)</th><th>Limits for loop diameter
dBuA @2m</th></tr>
<tr><td>0.009-0.070</td><td>88</td></tr>
<tr><td>0.070-0.150</td><td>88 to 58*</td></tr>
<tr><td>0.15-3.0</td><td>58 to22*</td></tr>
<tr><td>3.0-30</td><td>22</td></tr>
</table>
*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.
</td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test procedure</td><td>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.</td></tr>
<tr><td>Test Instruments:</td><td>Temp.: | 25 °C | Humid.: | 50% | Press.: | 1 012mbar</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ± 4.5dB</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

Measurement Data

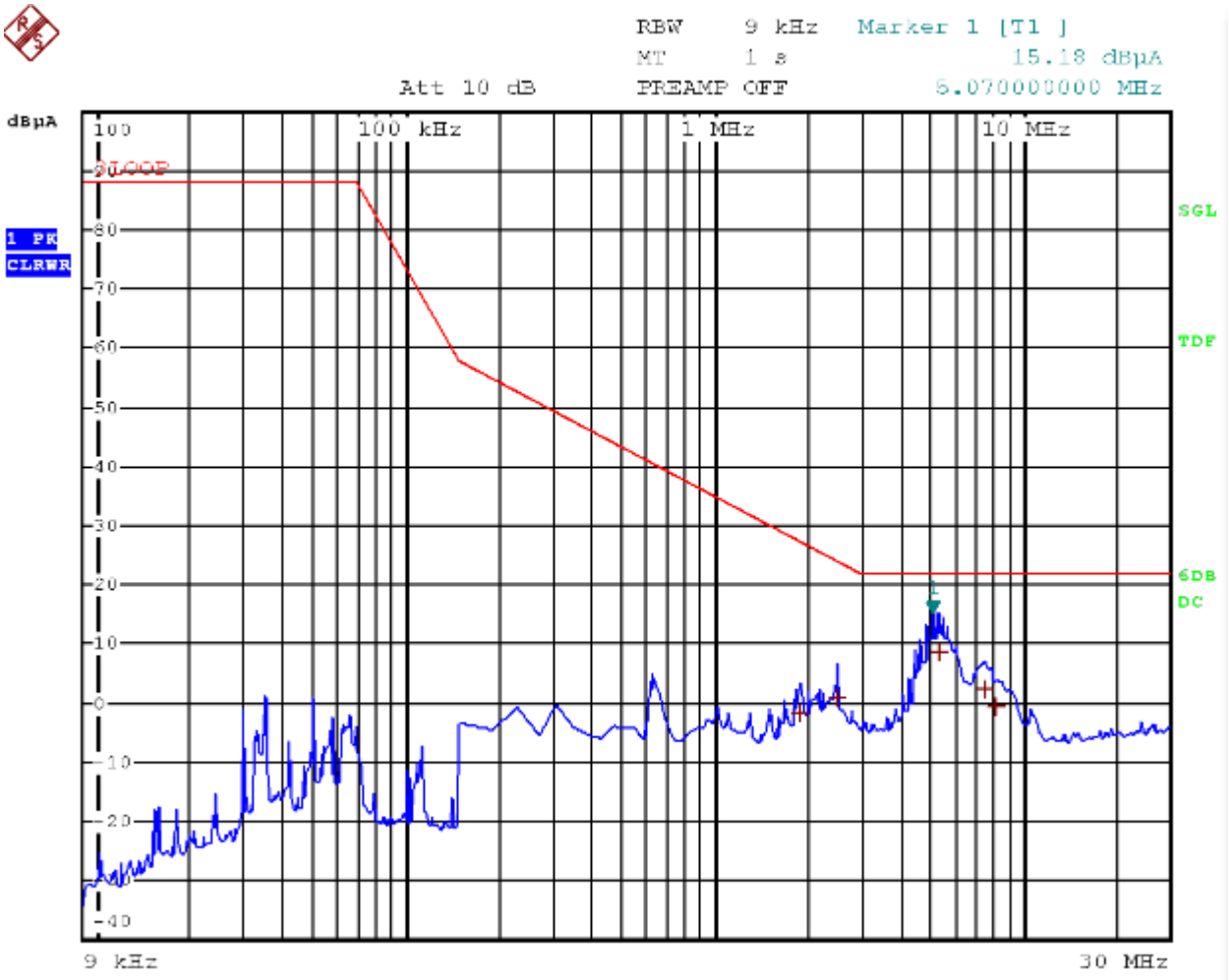
X:



Trace1: 3LOOP
Trace2: ---
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµA	DELTA LIMIT dB
1	Quasi Peak	1.909 MHz	-2.67	-30.10
1	Quasi Peak	2.47 MHz	-2.07	-26.40
1	Quasi Peak	4.87 MHz	6.93	-15.06
1	Quasi Peak	5.07 MHz	8.27	-13.72
1	Quasi Peak	5.31 MHz	8.12	-13.87
1	Quasi Peak	8.61 MHz	-7.25	-29.25

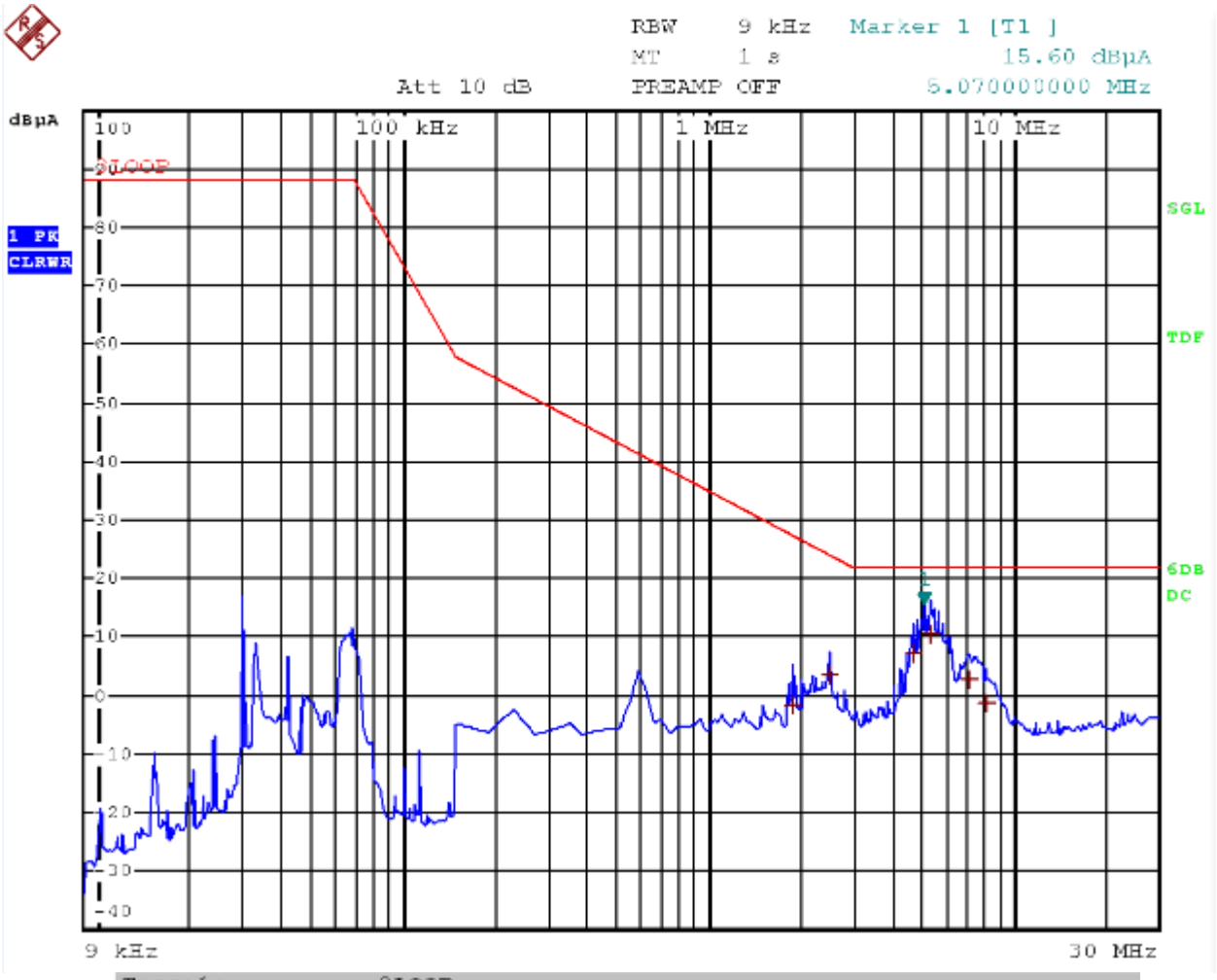
Y:



Trace1:	3LOOP	
Trace2:	---	
Trace3:	---	

TRACE	FREQUENCY	LEVEL dBµA	DELTA LIMIT dB
1 Quasi Peak	1.91 MHz	-1.75	-29.17
1 Quasi Peak	2.47 MHz	1.04	-23.28
1 Quasi Peak	5.31 MHz	8.70	-13.29
1 Quasi Peak	7.55 MHz	2.47	-19.52
1 Quasi Peak	8.11 MHz	-0.61	-22.61

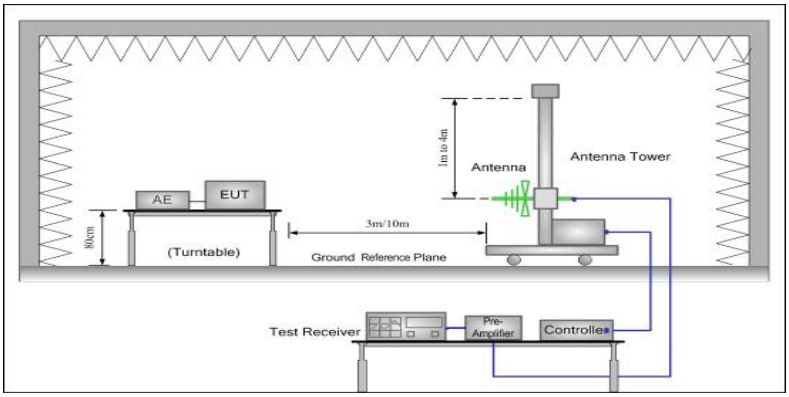
Z:



Trace1: 3LOOP
Trace2: ---
Trace3: ---

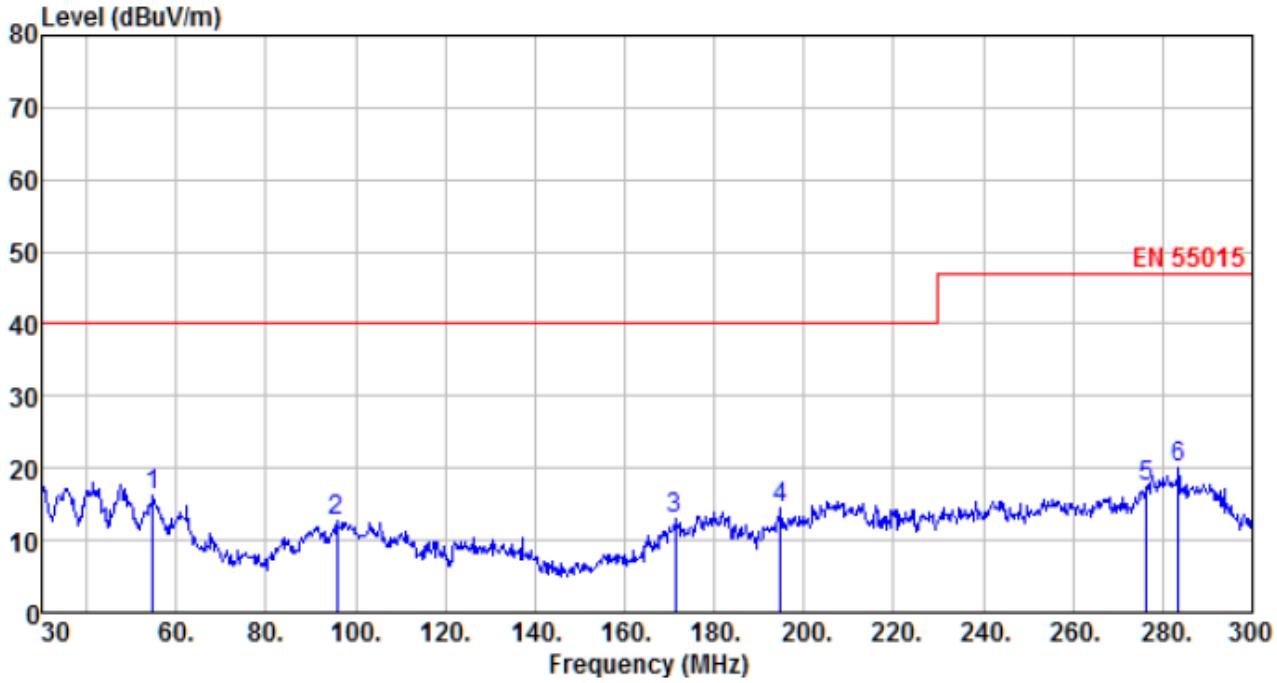
TRACE		FREQUENCY	LEVEL dBµA	DELTA LIMIT dB
1	Quasi Peak	1.91 MHz	-1.60	-29.02
1	Quasi Peak	2.47 MHz	3.65	-20.68
1	Quasi Peak	4.67 MHz	7.37	-14.62
1	Quasi Peak	5.31 MHz	10.36	-11.63
1	Quasi Peak	7.15 MHz	2.82	-19.17
1	Quasi Peak	8.19 MHz	-1.20	-23.20

7.2 Radiated electromagnetic disturbances(30MHz-300MHz)

Test Requirement:	EN 55015
Test Method:	EN 55015
Test Frequency Range:	30MHz to 300MHz
Test site:	Measurement Distance: 3m
Limit:	Frequency range(MHz) / Limit @3m (dBuV) 30 to 230 / 40.00 230 to 300 / 47.00 * At the transition frequency, the lower limit applies.
Test setup:	
Test procedure	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: ± 4.50dB
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2for details
Test results:	Pass

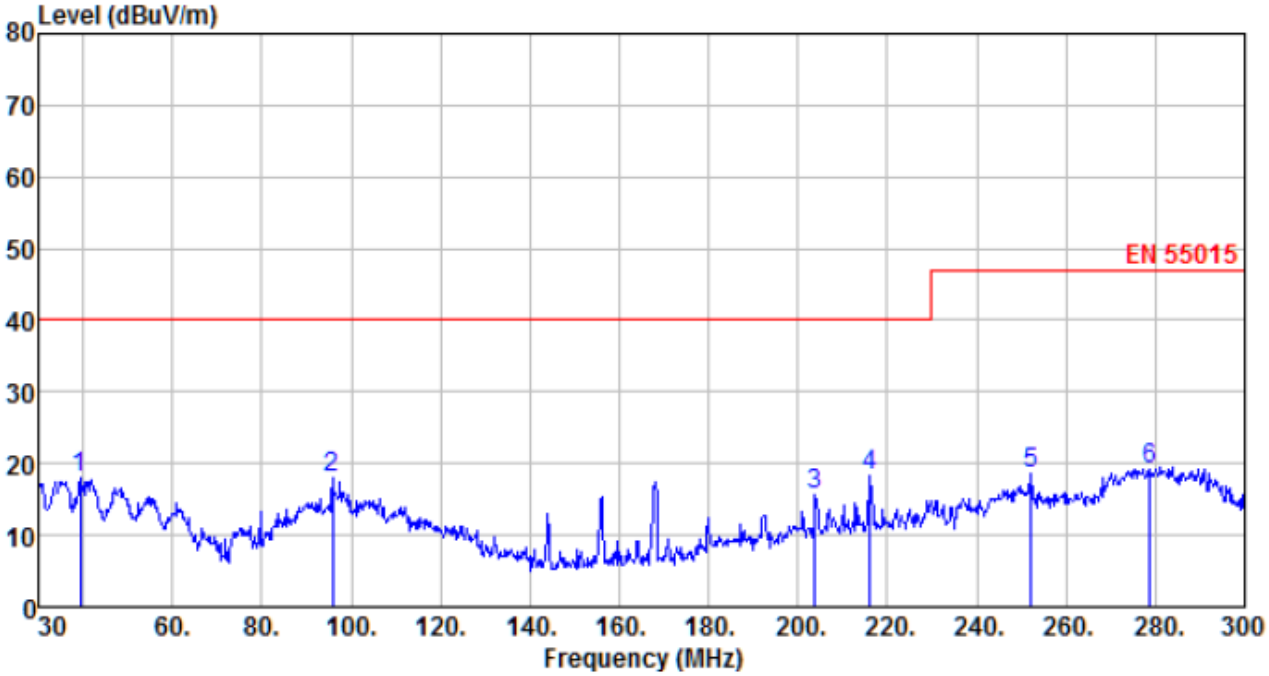
Measurement Data

Test mode:	On mode	Antenna Polarity:	Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
54.840	39.90	11.80	0.82	36.25	16.27	40.00	-23.73	QP
95.880	36.49	11.59	1.16	36.69	12.55	40.00	-27.45	QP
171.210	39.97	8.53	1.69	37.19	13.00	40.00	-27.00	QP
194.700	39.84	10.13	1.81	37.31	14.47	40.00	-25.53	QP
276.510	39.63	12.95	2.25	37.40	17.43	47.00	-29.57	QP
283.530	41.90	13.16	2.28	37.41	19.93	47.00	-27.07	QP

Test mode:	On mode	Antenna Polarity:	Vertical



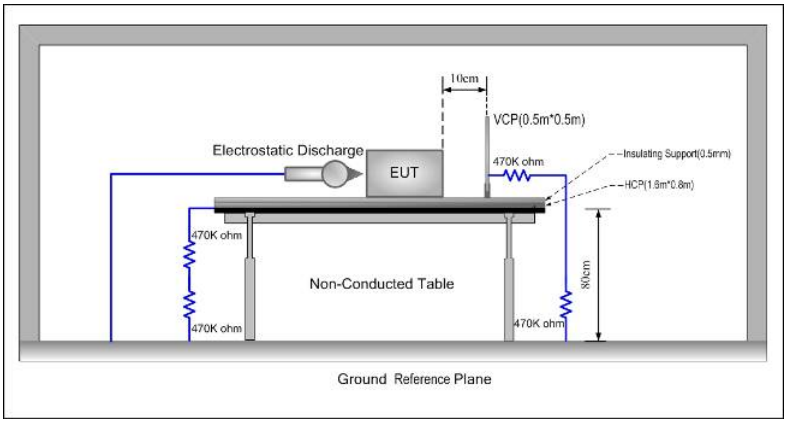
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
39.450	40.88	12.11	0.65	35.63	18.01	40.00	-21.99	QP
95.880	41.88	11.59	1.16	36.69	17.94	40.00	-22.06	QP
203.880	40.49	10.55	1.86	37.33	15.57	40.00	-24.43	QP
216.030	42.60	11.02	1.93	37.35	18.20	40.00	-21.80	QP
252.210	41.63	12.22	2.14	37.38	18.61	47.00	-28.39	QP
278.670	41.39	13.02	2.27	37.40	19.28	47.00	-27.72	QP

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 quipment shall start and operate as intended.

8.2 Electrostatic Discharge

Test Requirement:	EN 61547
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge:±4kV Air Discharge: ±8kV HCP/VCP: ±4kV
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:	**1. 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 **2. 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. **3. 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. **4. 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:

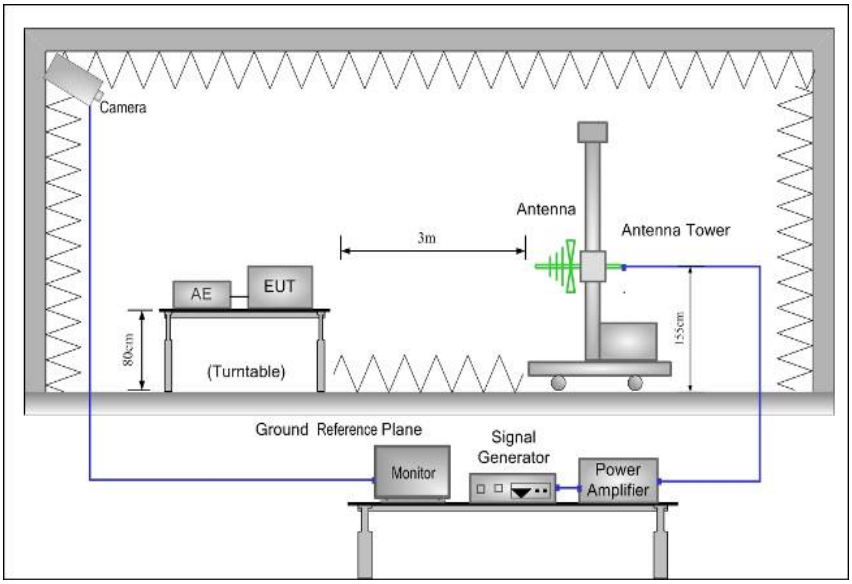
Test points:	I: Metal parts II: plastic parts and seams			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 4	Contact	I	A	Pass
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	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:

Performance Criteria: A, B, C: Refer to section 8.1 for details

N/A: Not applicable

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:	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 each side of the EUT.

	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. 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.					
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:

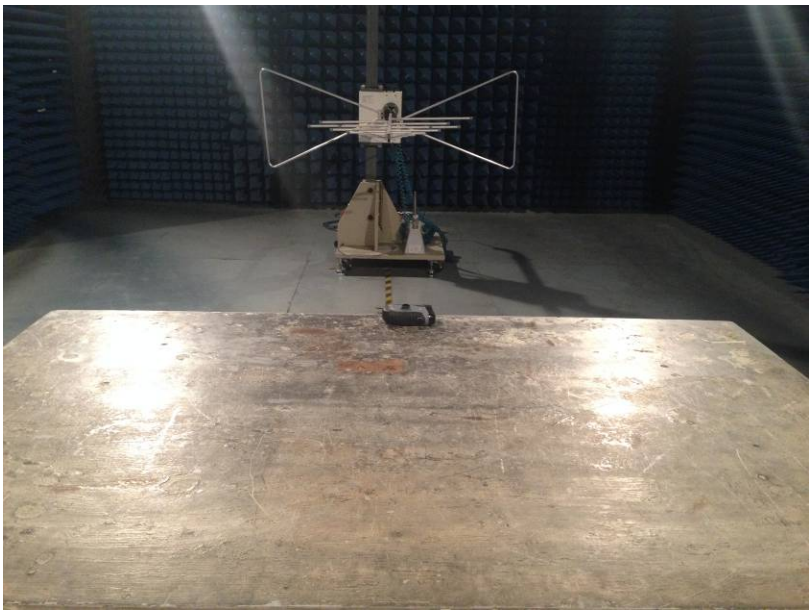
Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remark:

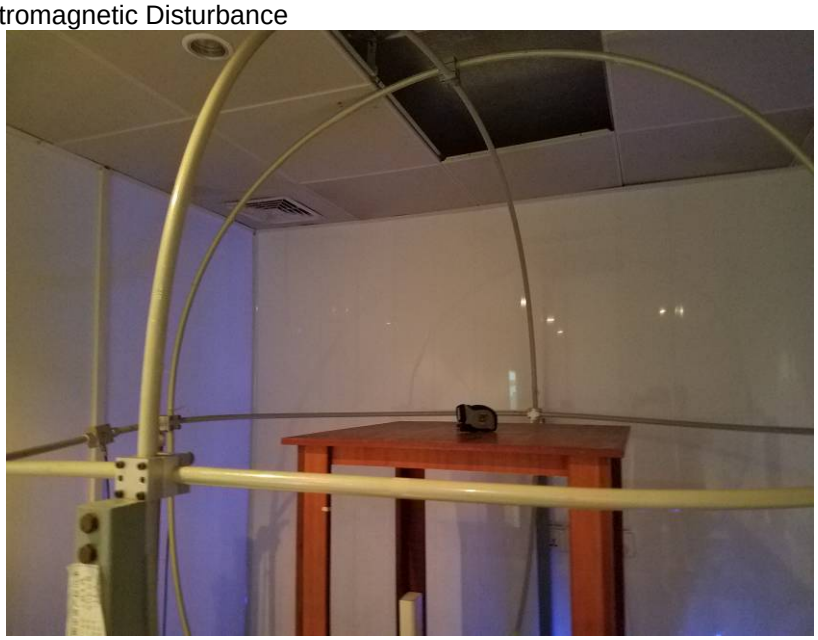
Performance Criteria: A, B, C: Refer to section 8.1 for details

9 Test Setup Photo

Radiated Emission

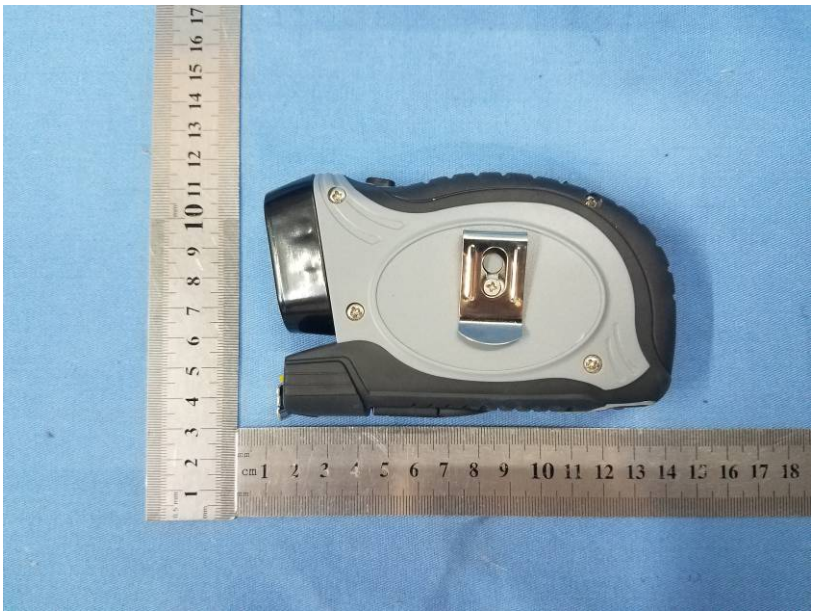


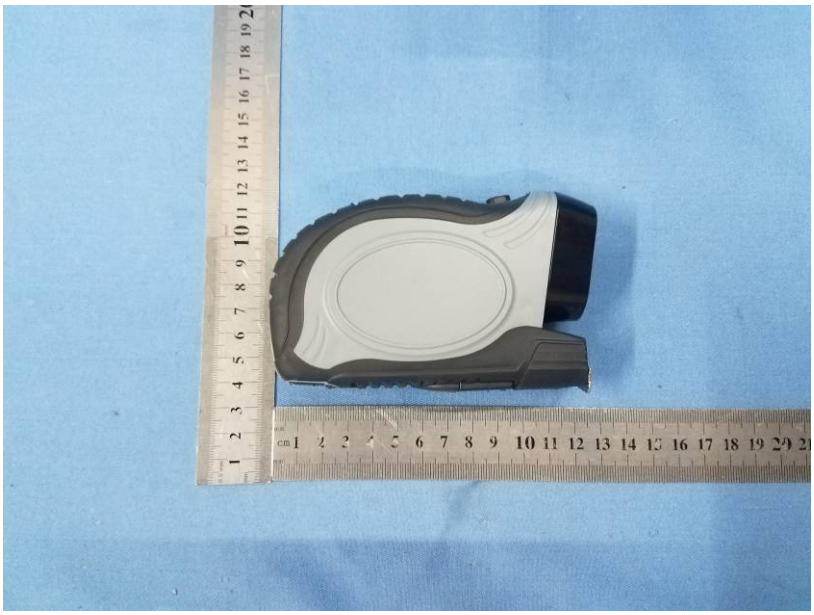
Radiated Electromagnetic Disturbance

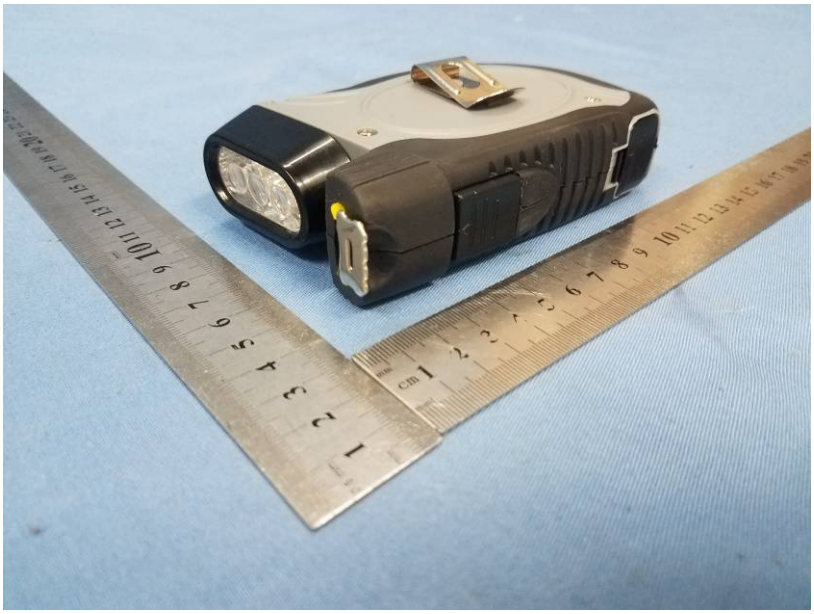


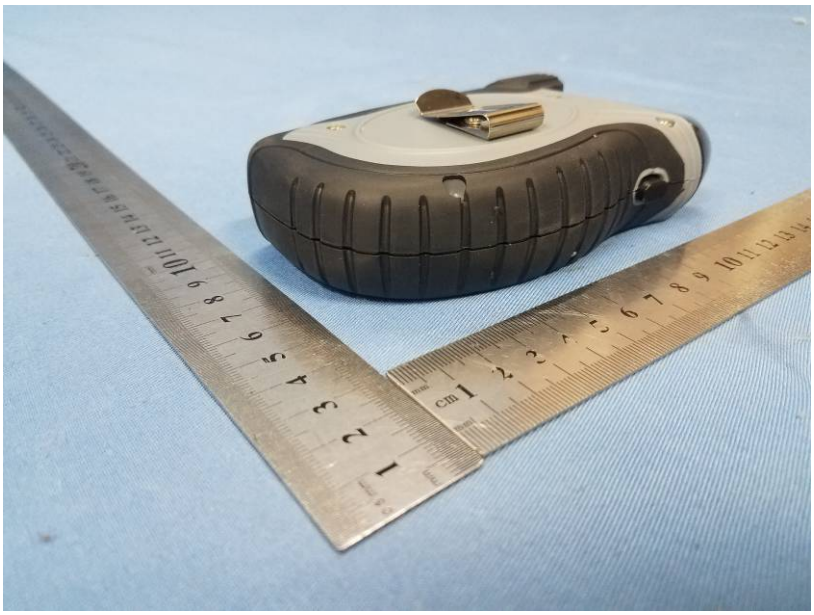
Electrostatic discharge

10 EUT Constructional Details









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