LTA
Laboratory for Test & Approval Co.,Ltd.

243 Jubug-ri, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-822, Korea
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

EMC TEST REPORT

Dates of Tests: August 17 - 22, 2017
Test Report S/N: LR500121708Z
Test Site : LTA Co., Ltd.

Model No. **SLA-T2480V**

APPLICANT **Hanwha Techwin Co., Ltd.**

Manufacturing Description	:	**LENS MODULE**
Manufacturer	:	**Hanwha Techwin Co., Ltd.**
Model name	:	**SLA-T2480V**
Additional model name	:	**-**
Test Device Serial No.:	:	**Identification**
Directive	:	**Electromagnetic Compatibility Directive 2014/30/EU**
Rule Part(s)	:	**EN 55032:2012/AC:2013**
		EN 50130-4:2011/A1:2014

Data of reissue : **August 24, 2017**

This test report is issued under the authority of:

Young Kyu Shin, Technical Manager

The test was supervised by:

Hyo Joon Kang , Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

NVLAP LAB CODE 200723-0

Revision	Date of issue	Test report No.	Description
0	24.08.2017	LR500121708Z	Initial

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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd.**

Address : 243, Jubug-ri,Yangji-Myeon,Yongin-Si, Kyunggi-Do, Korea. 449-822

Web site : http://www.ltalab.com

E-mail : chahn@ltalab.com

Telephone : +82-31-323-6008

Facsimile +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2017-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2019-04-13	FCC CAB
VCCI	JAPAN	R-2133(10 m), C-2307	Updating	VCCI registration
VCCI	JAPAN	T-2009	2017-12-23	VCCI registration
VCCI	JAPAN	G-847	2018-12-13	VCCI registration
IC	CANADA	5799A-1	2019-11-07	IC filing
KOLAS	KOREA	NO.551	Updating	KOLAS accredited Lab.

2. Information's about test item

2-1 Client/ Manufacturer

Company name	:	Hanwha Techwin Co., Ltd.
Address	:	6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA
Telephone / Facsimile	:	+82-70-7147-8753

Factory #1

Company name	:	Hanwha Techwin (Tianjin) Co., Ltd.
Address	:	No.11 Weiliu Rd,Micro-Electronic Industrial Park,TEDA,Tianjin,300385,People's Republic of China

Factory #2

Company name	:	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.
Address	:	Lot O-2, Que Vo Industrial Zone extended area ,Nam Son commune, Bac Ninh city,Bac Ninh province, Vietnam

Factory #3

Company name	:	D-TECH CO.,LTD.
Address	:	173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea (Suwon Industrial Complex)

2-2 Equipment Under Test (EUT)

Class	:	A
Category	:	LENS MODULE
Model name	:	SLA-T2480V
Serial number	:	Identification
Date of receipt	:	August 07, 2017
EUT condition	:	Pre-production, not damaged
Interface ports	:	POE
Power rating	:	DC 5 V
Firmware version	:	XXXX

2-3 Model Specification

-NONE

2-4 Test conditions

Temp. / Humid. / Pressure	:	+(24 - 26) ℃ / (50 - 54) %RH / (99.4 - 99.7) kPa
Tested Model	:	SLA-T2480V
Test mode	:	Capture mode
Power supply	:	AC 230 V / 50 Hz

2-5 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Network Camera	XNB-6001	N/A	Hanwha Techwin (Tianjin) Co., Ltd.
Notebook	PP37L	N/A	DELL

3. Test Report

3.1 Summary of tests

Parameter	Applied Standard	Status
I. Emission		
Radiated Emission	EN 55032:2012/AC:2013	C
Conducted Emission	EN 55032:2012/AC:2013	C
Harmonic Current Emission	EN 61000-3-2:2014	NA Note 4
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	NA Note 5
II. Immunity		
Electrostatic Discharge	EN 61000-4-2:2009	C
RF Electromagnetic field	EN 61000-4-3:2006/A2:2010	C
Fast Transients Common mode	EN 61000-4-4:2012	C
Surges, line to line and line to ground	EN 61000-4-5:2014	NA
RF common mode	EN 61000-4-6:2014	C
Voltage dips and Interruptions	EN 61000-4-11:2004	NA
Main supply voltage variations	EN 50130-4:2011	NA

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The device is operated by DC Power.

Note 3: The data in this test report are traceable to the national or international standards.

Note 4: We did not test EN61000-3-2 (Harmonic current emissions) for the **SLA-T2480V** because equipment whose rated power is less or equal 75W don't need to be tested.

Note 5: We did not test EN 61000-3-3 (Flicker) for the **SLA-T2480V** because of clause 6.1, this standard Predicate as follows: "Devices which produce no significant voltage dips or flicker with a certain probability have not to be tested."

3.2 EMISSION

3.2.1 Conducted emissions

Definition:

The test assesses the ability of the EUT to limit its internal noise from being present on the AC mains Power In/Output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Measurement Frequency range	:	150 kHz - 30MHz
Test method	:	EN 55032:2012/AC:2013
Measurement RBW	:	9 kHz
Test mode	:	Capture mode
Result	:	**Complies**

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

A sample calculation:

COR. F (correction factor)= LISN Insertion loss + Cable loss

Emission Level= meter reading + COR.F

Limits for conducted disturbance at the mains ports of class A ITE

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	79 dBuV	66 dBuV
(0.5 – 30) MHz	73 dBuV	60 dBuV
Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz		

Limits for conducted disturbance at the mains ports of class B ITE

Frequency Range	Quasi-peak	Average
(0.15 – 0.5) MHz	(66 – 56) dBuV	(56 - 46) dBuV
(0.5 – 5) MHz	56 dBuV	46 dBuV
(5 – 30) MHz	60 dBuV	50 dBuV
Note: The limits will decrease with the frequency logarithmically within 0.15 MHz to 0.5 MHz		

TEST EQUIPMENT USED: 01, 02, 03, 11, 08, 60

Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class A equipment

Frequency Range	Voltage limits		Current limits	
	Quasi-peak	Average	Quasi-peak	Average
(0.15 – 0.5) MHz	(97 − 87) dBuV	(84 − 74) dBuV	(53 − 43) dBuV	(40 − 30) dBuV
(0.5 – 30) MHz	87 dBuV	74 dBuV	43 dBuV	30 dBuV

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150/I= 44 dB)

Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class B equipment

Frequency Range	Voltage limits		Current limits	
	Quasi-peak	Average	Quasi-peak	Average
(0.15 – 0.5) MHz	(84 − 74) dBuV	(74 − 64) dBuV	(40 − 30) dBuV	(30 − 20) dBuV
(0.5 – 30) MHz	74 dBuV	64 dBuV	30 dBuV	20 dBuV

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150/I= 44 dB)

TEST EQUIPMENT USED: 01, 02, 03, 11, 08, 60

Conducted emissions / TEL

LTA
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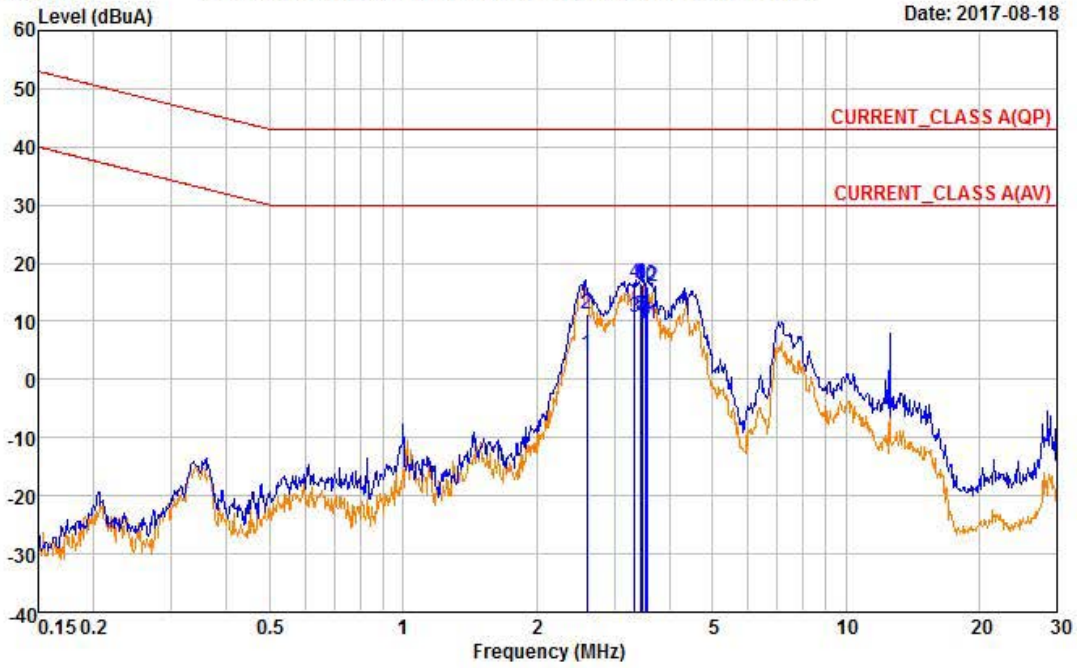
4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: SLA-T2480V	Phase	: POE
Test Mode	: Capture mode	Test Power	: 230 / 50
Temp. / Humi.	: 24 / 50	Test Engineer	: KANG H J

Data: 1027 File: D:\Conducted Data\2017\LTA_Conduction_2017_08.EM6 (1623)



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuA	dBuA	dB	dBuA	dBuA	dBuA	dBuA	dB	dB
2.598	-8.34	-15.31	19.59	11.25	4.28	43.02	30.02	31.77	25.74
3.331	-3.16	-8.94	19.69	16.53	10.75	43.02	30.02	26.49	19.27
3.456	-3.25	-8.74	19.70	16.45	10.96	43.02	30.02	26.57	19.06
3.462	-3.32	-8.86	19.70	16.38	10.84	43.02	30.02	26.64	19.18
3.535	-3.57	-9.62	19.71	16.14	10.09	43.02	30.02	26.88	19.93
3.569	-3.71	-10.13	19.71	16.00	9.58	43.02	30.02	27.02	20.44

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

3.2.2 Radiated Emission

Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 55032:2012/AC:2013
Measuring Distance	:	10m
Measurement Frequency range	:	30 MHz – 1 000 MHz
Measurement RBW	:	120 kHz
Test mode	:	Capture mode
Result	:	**Complies**

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

TEST EQUIPMENT USED: 13, 14, 15, 19, 60

Limit of 10 m for below 1 GHz

CLASS A

Frequency Range	Quasi-peak
(30 – 230) MHz	40 dBuV/m
(230 – 1 000) MHz	47 dBuV/m

CLASS B

Frequency Range	Quasi-peak
(30 – 230) MHz	30 dBuV/m
(230 – 1 000) MHz	37 dBuV/m

Limit of 3m for above 1 GHz

CLASS A

Frequency Range	Average Limit @ 3m (dBµV/m)	Peak limit @ 3m (dBµV/m)
(1 000 – 3 000) MHz	56	76
(3 000 – 6 000) MHz	60	80
NOTE:	The lower limit applies at the transition frequency.	

CLASS B

Frequency Range	Average Limit @ 3m (dBµV/m)	Peak limit @ 3m (dBµV/m)
(1 000 – 3 000) MHz	50	70
(3 000 – 6 000) MHz	54	74
NOTE:	The lower limit applies at the transition frequency.	

TEST EQUIPMENT USED: 13, 14, 15, 19, 60

Radiated Emission (Below 1 GHz) / V

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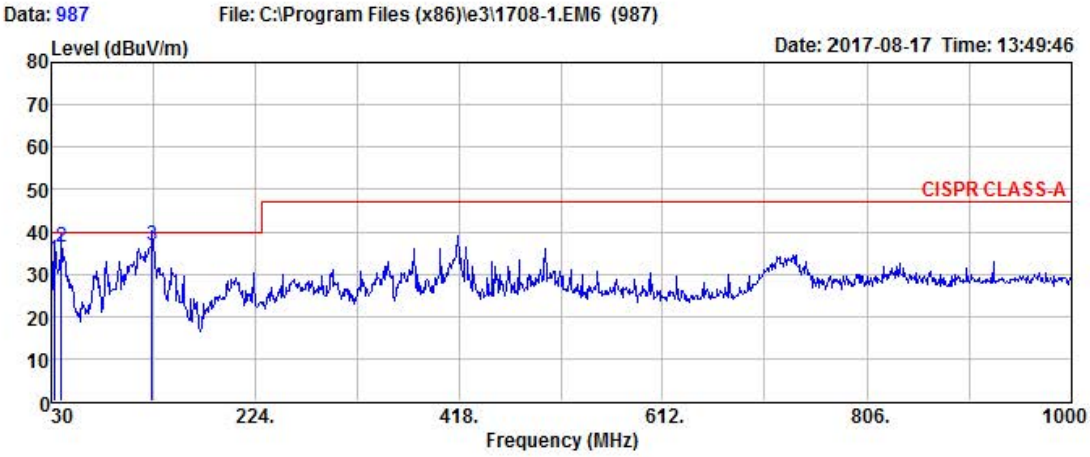
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: SLA-T2480V Temp/Humi: 26 / 54

Test Mode : Capture mode Tested by: KANG H J



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
32.91	48.27	-14.90	33.37	40.00	6.63	105	117	VERTICAL
39.70	50.56	-14.24	36.32	40.00	3.68	118	249	VERTICAL
126.03	49.91	-13.20	36.71	40.00	3.29	126	230	VERTICAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emission (Below 1 GHz) / H

Laboratory for Test & Approval Co.,Ltd.

4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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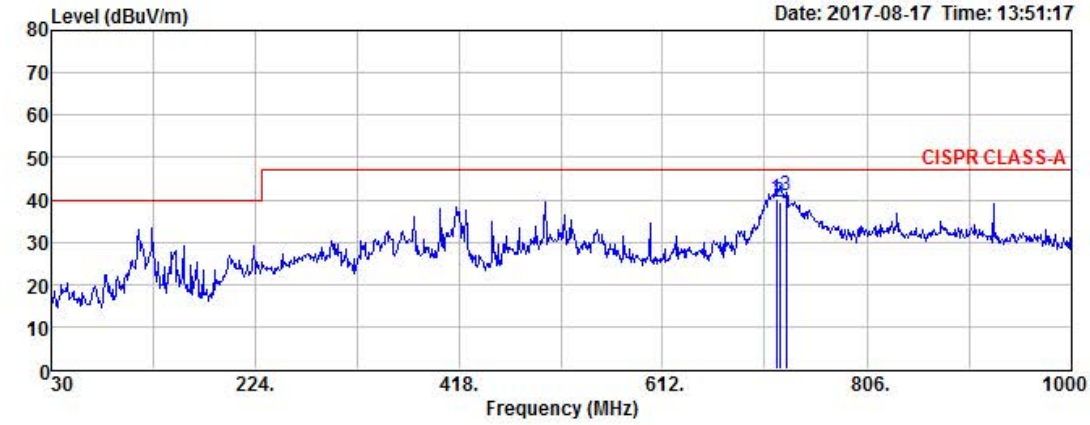
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: SLA-T2480V Temp/Humi: 26 / 54

Test Mode : Capture mode Tested by: KANG H J

Data: 988 File: C:\Program Files (x86)\e3\1708-1.EM6 (988)



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
720.64	42.45	-2.41	40.04	47.00	6.96	118	210	HORIZONTAL
723.55	41.80	-2.31	39.49	47.00	7.51	243	108	HORIZONTAL
729.37	43.25	-2.11	41.14	47.00	5.86	130	98	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.3 Harmonic Current (AC power input port)

Definition:

This part deals with the Limitation of harmonic currents injected into the public supply system.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-3-2:2014
Test mode	:	Capture mode
Rated power	:	- W
Result	:	**Not Applicable**

Measurement Data:

- We did not test EN61000-3-2 (Harmonic current emissions) for the **SLA-T2480V** because equipment whose rated power is less or equal 75W don't need to be tested.

- Uncertainty(HAR) = +/- 2.24 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the HAR generator meets the specified requirements in the standard with at least 95 % confidence."

3.2.4 Voltage Variation and Flicking (AC power input port)

Definition:

This section is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-3-3:2013
Test mode	:	- W
Result	:	**Not Applicable**

Measurement Data:

- We did not test EN 61000-3-3 (Flicker) for the **SLA-T2480V** because of clause 6.1, this standard Predicate as follows: "Devices which produce no significant voltage dips or flicker with a certain probability have not to be tested."

- Uncertainty(FLK) = +/- 9.94 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the FLK generator meets the specified requirements in the standard with at least 95 % confidence."

3.3 IMMUNITY

3.3.1 Electrostatic Discharge

Definition:

The test assesses the ability of the EUT to operate as intended in the event of an electrostatic discharge.
We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-2 :2009
Temperature / Humidity / Pressure	:	26 ℃ / 52 %RH / 99.6 kPa
Discharge Impedance	:	(330 ±10%)Ω / (150 ±10%) pF
Type of Discharge (air discharge)	:	± 2kV, ± 4 kV, ± 8 kV
Type of Discharge (contact discharge)	:	± 6 kV
Number of discharges at each point	:	10 of each polarity
Discharge Repetition on Rate	:	1 / sec
Test mode	:	Capture mode
Result	:	**Complies**

Measurement Data:

- Uncertainty(ESD) = +/- 5 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least 95 % confidence."

Criteria for compliance:

- There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

1-2. **Indirect Discharge**

No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies	No reaction recognized
2	VCP	Contact	Complies	No reaction recognized

1-2. Direct Discharge

No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Air	Complies	No reaction recognized
2	LENS	Air	Complies	No reaction recognized
3	POE	Air	Complies	No reaction recognized

TEST EQUIPMENT USED: 27, 28, 15

3.3.2 RF Electromagnetic Field

Definition:

The test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic field disturbance.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-3:2006/A2:2010
Frequency range	:	80 ㎒ to 1 000 ㎒, 1 400 ㎒ to 2 000 ㎒, 2 000 ㎒ to 2 700 ㎒
Test level	:	10 V/m (measured unmodulated)
Amplitude Modulation	:	AM, 80 %, 1 ㎑ Sinusoidal
		PM, 1 ㎐ (0.5s ON : 0.5s OFF)
Step size	:	1 % of fundamental
Dwell Time	:	3 s
Test mode	:	Capture mode
Result	:	**Complies**

Measurement Data:

- Uncertainty = +/- 1.6dB (with a 95 % confidence level, k=2.28)

"It has been demonstrated that the RS generator meets the specified requirements in the standard with at least 95 % confidence."

Port	Test level (V/m)	Result		Remark
		Horizontal	Vertical	
Enclosure	10	Complies	Complies	No reaction recognized

Criteria for compliance:

- There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicatiors occurs at a field strength of 3 V/m.
- For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m.

a) There is no permanent damage or change to the EUT.

b) At 3 V/m, any deterioration of the picture is so minor that the system could still be used.

c) There is no observable deterioration of the picture at 1 V/m

TEST EQUIPMENT USED: 29, 30, 31, 32, 33, 34, 35, 03, 28

3.3.3 Electrical fast transients

Definition:

The test assesses the ability of the EUT to operate as intended in the event of fast transients presence on one of the input/output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-4:2012
Cable length	:	< 3 m
Test level	:	1.0 kV (Signal port)
Polarity	:	Negative/ positive
Repetition frequency	:	5 kHz
Test mode		Capture mode
Result	:	**Complies**

Measurement Data:

- Uncertainty = +/- 10 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the EFT/Burst generator meets the specified requirements in the standard with at least 95 % confidence."

Criteria for compliance:

- There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Signal Line	Test level	Result	Remarks
POE	+ 1 kV	Complies	No reaction recognized
	- 1 kV	Complies	No reaction recognized

TEST EQUIPMENT USED: 57, 28, 15, 58

3.3.4 Surge

Definition:

The test assesses the ability of the EUT to operate as intended in the event of surge presence on the AC main power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-5:2014
Test level	:	± 0.5 kV, ±1 kV (line to line) ± 0.5 kV, ± 1 kV, ± 2 kV (line to ground), ± 0.5 kV, ± 1 kV (signal line)
Polarity	:	Negative/ positive
Wave shape	:	1.2/ 50 μs pulse
Number of surges	:	5 (at each phase)
Test mode		- mode
Result	:	**Not Applicable**

Measurement Data:

- Uncertainty = +/- 10 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the Surge generator meets the specified requirements in the standard with at least 95 % confidence."

Criteria for compliance:

- There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

3.3.5 Conducted disturbances, induced by radio-frequency fields

Definition:

The test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic disturbance on the input/output ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-6:2014
Frequency range	:	0.15MHz – 100 MHz
Test level	:	10 Vrms unmodulated
Amplitude Modulation	:	AM, 80 %, 1 kHz Sinusoidal
Step size	:	1 % of fundamental.
Test mode	:	Capture mode
Result	:	**Complies**

Measurement Data:

- Uncertainty = +/-1.25 dB (with a 95 % confidence level, k=2)

Port	Test level (Vrms)	Result	Remarks
POE	10	Complies	No reaction recognized

Criteria for compliance:

- There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at U_0 = 130 dBuV.
- For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U_0 = 140 dBuV.

  a) There is no permanent damage or change to the EUT.

  b) At U_0 = 130 dBuV, any deterioration of the picture is so minor that the system could still be used.

  c) There is no observable deterioration of the picture at U_0 = 120 dBuV

TEST EQUIPMENT USED: 46, 47, 48, 03, 28, 49, 51

3.3.6 Mains supply voltage dips, short interruptions

Definition:

The test assesses the ability of the EUT to operate as intended in the event of voltage dips and interruptions present on the AC mains power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 61000-4-11:2004
Ut	:	230 Vac
Test mode	:	- mode
Result	:	**Not Applicable**

Measurement Data:

- Uncertainty = +/- 5 % (with a 95 % confidence level, k=2)

"It has been demonstrated that the Voltage dips generator meets the specified requirements in the standard with at least 95 % confidence."

Test Level %Ut	Voltage droop and interruptions %Ut	Duration of Reduction (period)	Result	Remarks
80	20	250	-	-
70	30	25	-	-
40	60	10	-	-
0	100	250	-	-

Criteria for compliance:

- Mains supply voltage variations

There shall be no damage, malfunction or change of status due to the different supply voltage conditions.

- Mains supply voltage dips and short interruptions

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

During the 250 period power loss, in accordance with the standard, a UPS was used to maintain full operation of the unit.

3.3.7 Mains supply voltage variations

Definition:

The test assesses the ability of the EUT to operate as intended in the event of voltage variations present on the AC mains power input ports.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	EN 50130-4 Clause 7
Supply Voltage maximum	:	*U*nom + 10 %
Supply Voltage minimum		*U*nom – 15 %
Ut	:	230 Vac
Test mode	:	- mode
Result	:	**Not Applicable**

Measurement Data:

*U*nom = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, *U*max = (Maximum *U*nom) + 10 %, and *U*min = (Minimum *U*nom) p 15 %. In any case the range of *U*nom must include the European nominal mains voltage of 230 V.

2 **Mains supply voltage variations**

Test LevelCondition		Test Level (V)	Result	Remarks
Unom	+10%	253	-	–
Unom	-15%	195.5	-	–

APPENDIX A

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment are identified by the Test Laboratory.

	Description	Model No.	Serial No.	Manufacturer	Interval	LAST Cal.
1	EMI TEST Receiver	ESR	101499	Rohde & Schwarz	1 year	Jul-17
2	Pulse Limiter	ESH3-Z2	100710	Rohde & Schwarz	1 year	Mar-17
3	DIGITAL THERMO HYGROMETER	TH-611	NONE	BODYCOM	1 year	Sep-16
4	DTV Signal Generator	MFG-100	15M2002	MFLO	1 year	Mar-17
5	Color TV Pattern Generator	PM-5518-TX	LO5333	Philips	-	-
6	LISN	ESH3-Z6	100378	Rohde & Schwarz	1 year	Sep-16
7	LISN(main)	ESH3-Z5	893045/017	Rohde & Schwarz	1 year	Mar-17
8	LISN(sub)	ENV216	100408	Rohde & Schwarz	1 year	Sep-16
9	ISN	ISN T800	27109	TESEQ	1 year	Jan-17
10	ISN	ENY81-CA6	101565	Rohde & Schwarz	1 year	Jan-17
11	CURRENT PROBE	EZ-17	100508	Rohde & Schwarz	1 year	Jan-17
12	LISN	ESH3-Z6	100378	Rohde & Schwarz	1 year	Sep-16
13	EMI TEST Receiver	ESCI7	100772	Rohde & Schwarz	1 year	Sep-16
14	Amplifier (25 dB)	8447D	2944A07974	HP	1 year	Sep-16
15	DIGITAL THERMO HYGROMETER	TESTEK-303A	TAEGUANG	-	1 year	Mar-17
16	STEP TRANSFORMER	INA6502	34270	SCHAFFNER	1 year	Sep-16
17	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	2 year	Apr-17
18	Biconical Antenna	VHA 9103	VHA 9103-2315	SCHWARZBECK	2 year	Apr-17
19	TRILOG Antenna	VULB9160	9160-3237	SCHWARZBECK	2 year	May-17
20	TRILOG Antenna	VULB9160	9160-3237	SCHWARZBECK	2 year	Apr-17
21	Amplifier (25 dB)	8449B	3008A00337	HP	1 year	Mar-17
22	Spectrum Analyzer (~ 26.5 GHz)	E4407B	MY45108946	Agilent	1 year	Mar-17
23	HORN ANTENNA	3115	55005	ETS	2 year	May-17
24	HORN ANTENNA	3115	55005	ETS	2 year	Apr-17
25	Universal Power Analyzer	PM6000	1.00007E+11	Voltech Instruments	1 year	Mar-17
26	Reference Impedance Network	ES4152	9074424	NF Corp.	1 year	Sep-16
27	ESD Slimulator	ESS-2000	ESS0625187	NOISEKEN	1 year	Apr-17
28	Hygro-Thermograph	THB-36	0041557-01	ISUZU	1 year	Dec-16
29	Signal Generator	E4432B	MY41310632	Agilent	1 year	May-17
30	Power Meter	E4419B	GB38410133	Agilent	1 year	Jun-17
31	RF POWER AMPLIFIER	ITA0300KL-300	0300KL 1507 001	INFINITECH	-	-
32	RF POWER AMPLIFIER	ITA2000KL-120	200KL 1507 001	INFINITECH	-	-
33	RF POWER AMPLIFIER	ITA4500KL-70	4500KL 1507 001	INFINITECH	-	-
34	RF POWER AMPLIFIER	ITA0750KL-300	0750KL 1507 001	INFINITECH	-	-
35	Log.-Per.Antenna (80 MHz ~ 3 GHz)	K9128	NONE	RAPA	-	-
36	Microphone	MP201	530147	BSWA	1 year	Nov-16
37	Sound Acoustic Tester	TST-1000	15065-A	TESTEK	1 year	Nov-16

	Description	Model No.	Serial No.	Manufacturer	Interval	LAST Cal.
38	Horn Antenna	3115A	114105	ETS	2 year	Jul-15
39	Signal Generator	SMB 100A	177621	R&S	1 year	Mar-17
40	EFT Simulator	FNS-AX2	4000B01332	NoiseKen	1 year	Sep-16
41	Capacitive Coupling Clamp	CDN 8015	21240	SCHAFFNER	1 year	Sep-16
42	LIGHTNING SURGE SIMULATOR	LSS-6030	LSS02X0153	NOISEKEN	1 year	Sep-16
43	R-BOX (4x100O HM)	INA 172	SL403-109	SCHAFFNER	1 year	-
44	CDN	CDN 117	20985	SCHAFFNER	1 year	-
45	CDN	CDN 118	20082	SCHAFFNER	1 year	-
46	Signal generator	SML03	103026/0013	R&S	1 year	Mar-17
47	POWER METER	NRVD	101689	R&S	1 year	Mar-17
48	RF Power Amplifier	FLL75A	1033	FRANKONIA	1 year	Dec-16
49	EM INJECTION CLAMP	TSIC-23	529	F.C.C	1 year	Jun-17
50	CDN (M1)	TSCDN-M1-16A	7004	F.C.C	1 year	Sep-16
51	CDN (M2)	TSCDN-M2-16A	7008	F.C.C	1 year	Sep-16
52	CDN (M3)	TSCDN-M3-16A	7017	F.C.C	1 year	Sep-16
53	Coil	INA 702	132	SCHAFFNER	6 month	Apr-17
54	Magnetic Field Generator	MFO6502	34267	SCHAFFNER	6 month	Apr-17
55	Modula System	MODULA6100	34395	SCHAFFNER	1 year	Sep-16
56	TRILOG Antenna	VULB9168	577	SCHWARZBECK	2 year	Mar-17
57	Compact Generator	NX5	P1640185038	EMTEST	1 year	May-17
58	AC Power Source	Variac NX1-260-16	P1648188071	EMTEST	1 year	May-17
59	Capacitive Coupling Clamp	CCI	P1703190739	EMTEST	1 year	Nov-16
60	TEST PROGRAM	e3_Ver:6.2009-10-12a	-	AUDIX	-	-

APPENDIX B

PERFORMANCE CRITERIA

Performance criteria

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.
If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.
A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test
(see Clause 6), after the conditioning.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing.
(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
(b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
(c) there is no observable deterioration of the picture at 1 V/m.
The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of the bursts is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test
(see Clause 6), after the conditioning.

Slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of the surges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test
(see Clause 6), after the conditioning.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at U0 = 130 dBμV.
For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U0 = 140 dBμV, providing

(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings, etc.)
(b) at U0 = 130 dBμV, any deterioration of the picture is so minor that the system could still be used, and
(c) there is no observable deterioration of the picture at U0 = 120 dBμV.
The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), after the conditioning.

Mains supply voltage variations

There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test(see Clause 6), during the conditioning.

APPENDIX C

Measurement Uncertainty

1. Conducted Emission
2. Radiated Emission

1. Conducted Emission

Input Quantity	Probability Distribution	Probability Distribution (dB)	Standard
		9 kHz – 30 MHz	
Cable loss(RG400)	Standard Deviation(SD)	± 0.061	10th measurement
Receiver corrections; -Sine wave voltage -Pulse amplitude response -Pulse repetition rate response	 Rectangular (√ 3) Rectangular (√ 3) Rectangular (√ 3)	 ± 0.17 ± 0.02 ± 0.58	 Cal. Report Cal. Report Cal. Report
LISN corrections (ENV216) ; -Voltage division factor	Normal (k = 2)	± 0.09	Cal. Report
Mismatch ; - Receiver VRC* : Γi = 0.09 -LISN VRC :Γg = 0.14(150kHz) = 0.05(30MHz) - Uncertainty: 20log(1± Γi Γg)	U-type(√ 2)	± 0.89	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.28	10th measurement
Combined measurement uncertainty Uc(y)	Normal	+ 0.73 - 0.73	
Expended measurement uncertainty (95.%,Confidence level,k = 2)dB	Normal(k = 2)	+ 1.46 - 1.46	

2. Below 1 GHz Radiated Emission

Input Quantity	Probability Distribution	Probability Distribution (dB)		Standard
		Trilog		
		3m	10m	
Antenna Factor (VULB 9160)	Normal (k = 2)	30 MHz – 1 GHz ± 2.00	30 MHz – 1 GHz ± 2.00	ANT Cal. uncertainty
Cable loss (HFB-5010/HFC12D)	Standard Deviation(SD)	± 0.14	± 0.14	10th measurement
Receiver corrections; -Sine Wave Voltage -Pulse amplitude response -Pulse repetition rate response	 Normal (k = 2) Normal (k = 2) Rectangular(√ 3)	 ± 0.17 ± 0.58 ± 1.50	 ± 0.17 ± 0.58 ± 1.50	 Cal. Report Cal. Report CISPR16-4-2
Antenna Directivity	Rectangular(√ 3)	± 1.00	± 1.00	CISPR16-4-2
AF Height Dependence	Rectangular(√ 3)	± 0.10	± 0.10	CISPR16-4-2
Phase Center Location	Rectangular(√ 3)	± 0.20	± 0.20	CISPR16-4-2
Separation Distance	Rectangular(√ 3)	± 0.30	± 0.30	CISPR16-4-2
Uncertainty of Site	Triangular(√ 6)	± 2.97	± 2.97	NSA
Mismatch ; - Receiver VRC* : Γi = 0.09 -ANT. VRC : Γg = 0.09 - Uncertainty: 20log(1± Γi Γg)	U-type (√ 2)	± 0.54	± 0.54	CISPR16-4-2
Pre-amp.	Normal (k = 2)	± 0.14	± 0.14	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.60	± 0.60	10th measurement
Combined measurement uncertainty Uc(y)	Normal	+ 1.97 - 1.97	+ 1.97 - 1.97	
Expended measurement uncertainty (95%,Confidence level,k=2)dB	Normal(k = 2)	30 MHz – 1 GHz + 3.94 - 3.94	30 MHz – 1 GHz + 3.94 - 3.94	

Note:VRC(Voltage Reflection Coefficient)

3. Above 1 GHz Radiated Emission

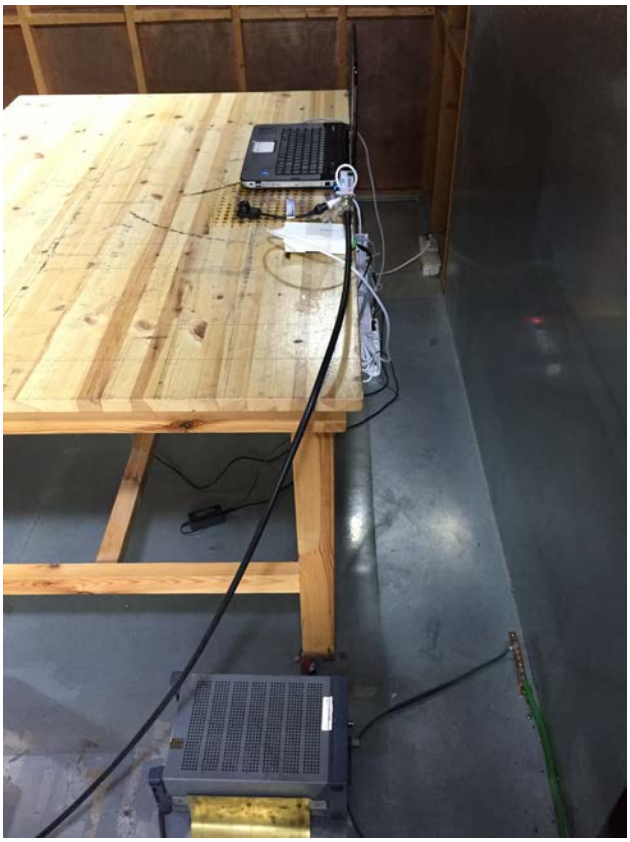
Input Quantity	Probability Distribution	Probability Distribution (dB)	Standard
		HORN	
Antenna Factor (ETS 3115)	Normal (k=2) (normal)	1 GHz - 6 GHz ± 1.00	ANT Cal. uncertainty
Cable loss (SUHNER MULTIFLEX microwave cables)	Standard Deviation(SD)	± 0.32	10th measurement
Receiver corrections; -Sine Wave Voltage -Pulse amplitude response -Pulse repetition rate response	 Normal (k = 2) Normal (k = 2) Rectangular(√ 3)	 ± 0.17 ± 0.58 ± 1.50	 Cal. Report Cal. Report CISPR16-4-2
Antenna Directivity	Rectangular(√ 3)	± 1.00	CISPR16-4-2
AF Height Dependence	Rectangular(√ 3)	± 0.10	CISPR16-4-2
Phase Center Location	Rectangular(√ 3)	± 0.20	CISPR16-4-2
Separation Distance	Rectangular(√ 3)	± 0.30	CISPR16-4-2
Uncertainty of Site	Standard Deviation(SD)	± 0.13	SVSWR 10th measurement
Mismatch ; - Receiver VRC* : Γi = 0.09 -ANT. VRC : Γg = 0.09 - Uncertainty: 20log(1± Γi Γg)	U-type (√ 2)	± 0.54	CISPR16-4-2
Pre-amp.	Normal (k = 2)	± 0.60	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.34	10th measurement
Combined measurement uncertainty Uc(y)	Normal	+ 1.73 - 1.73	
Expended measurement uncertainty (95%,Confidence level,k=2)dB	Normal(k = 2)	1 GHz - 6 GHz + 3.46 - 3.46	

Note:VRC(Voltage Reflection Coefficient)

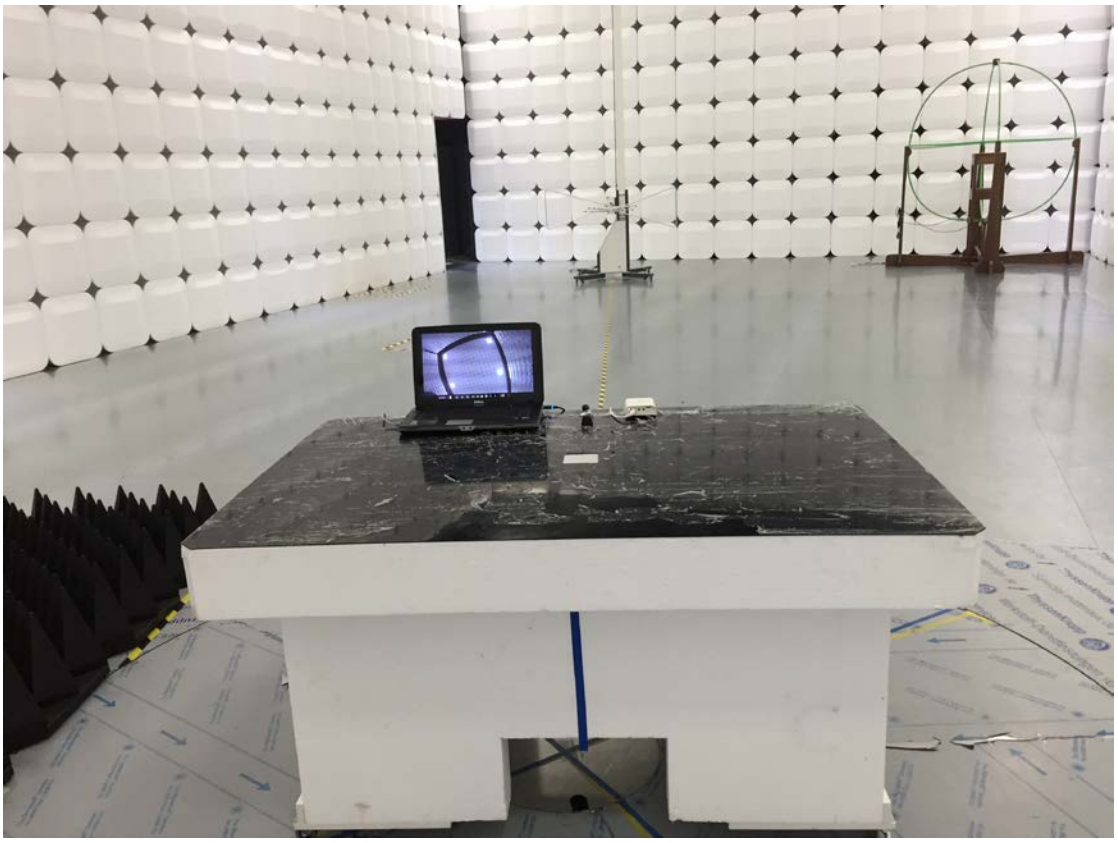
APPENDIX D

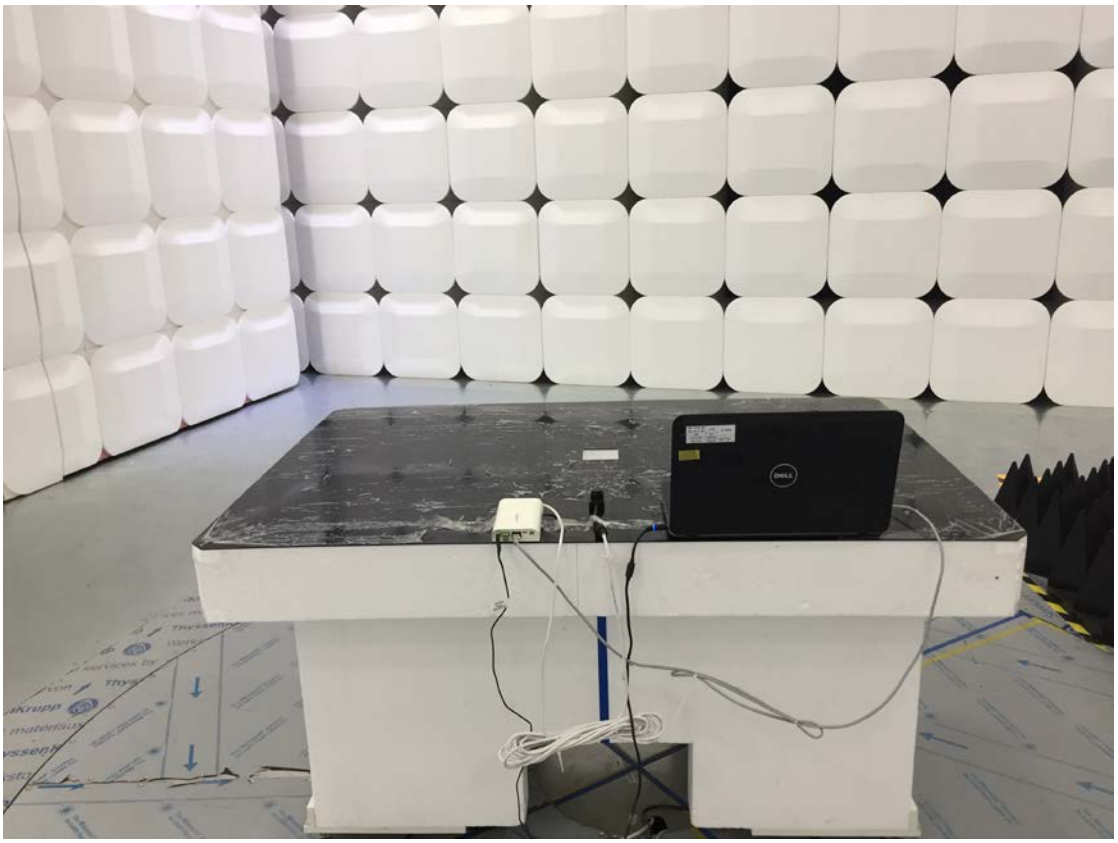
PHOTOGRAPHS

Conducted emission (Maximum emission configuration) _ TEL



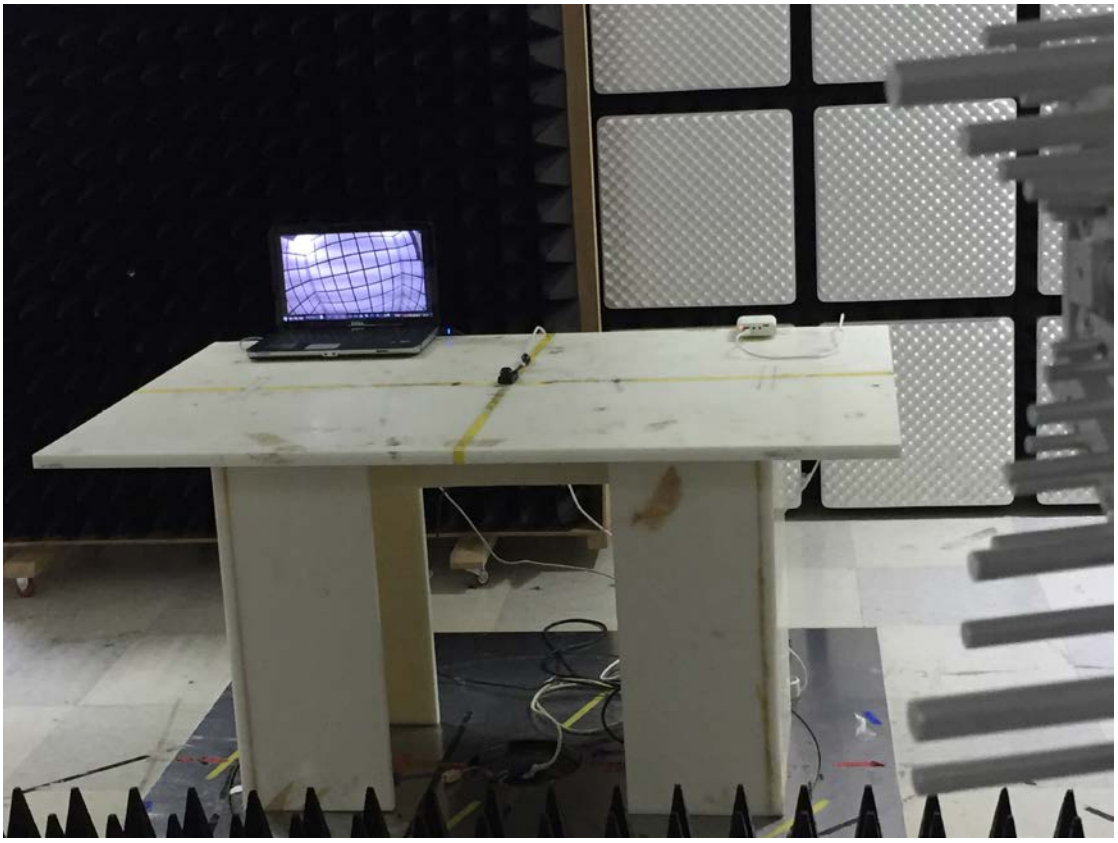
Radiated emission (Maximum emission configuration)-Below 1 GHz





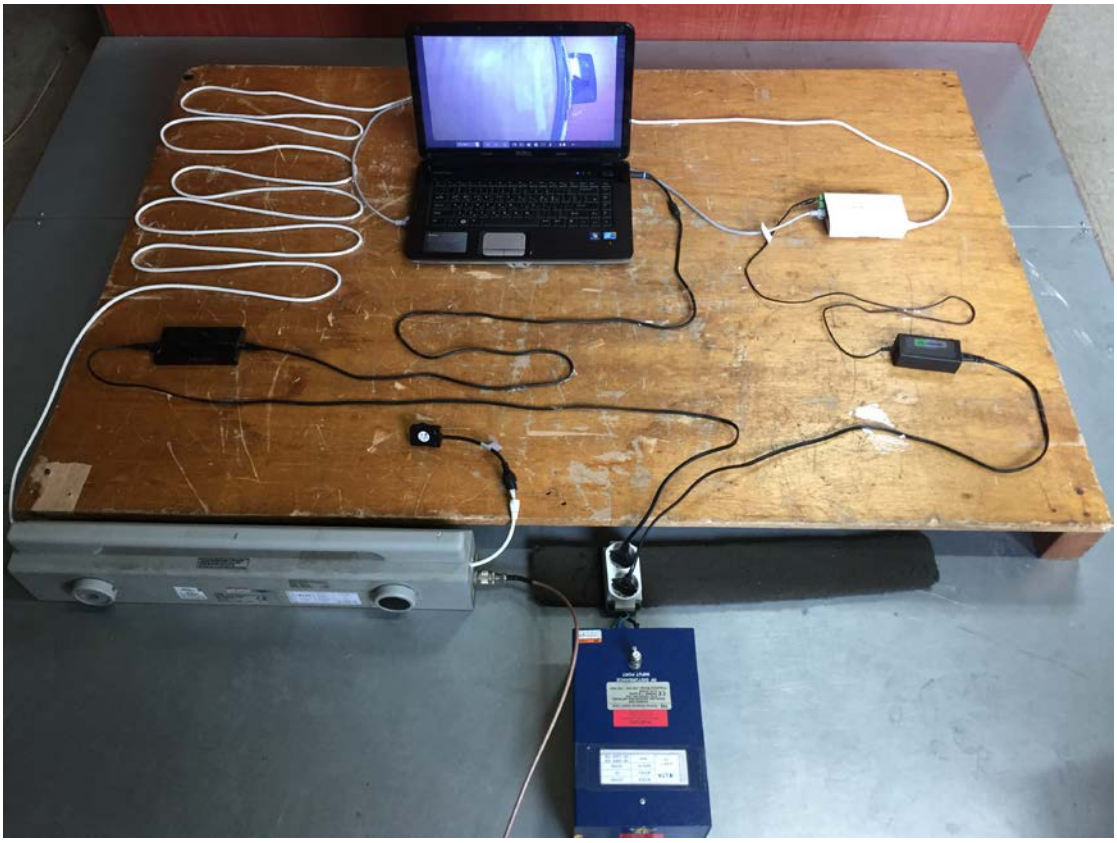
Electrostatic discharge

RF Electromagnetic Field



Electrical fast transients

Conducted Disturbances, Induced by Radio-Frequency Fields



EUT