

EMC TEST REPORT

Dates of Tests: October 27, 2017
Test Report S/N: LR500122302AD
Test Site : LTA Co., Ltd.

Model No.

SLA-T1080F

APPLICANT

Hanwha Techwin Co., Ltd.

Manufacturing Description : LENS MODULE
Manufacturer : Hanwha Vision Co., Ltd
Brand : -
Model name : SLA-T1080F
Additional Model : -
Test Device Serial No.: : Identification
Rule Part(s) : AS/NZS CISPR 32:2013
CISPR 32 Ed1.0

Date of issue : February 21, 2023

This test report is issued under the authority of:

The test was supervised by:



Young Kyu Shin, Technical Manager



Jong Chae Kim, Test Engineer

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NVLAP LAB CODE 200723-0

Revision	Date of issue	Test report No.	Description
0	27.10.2017	LR5001121710P	Initial
1	21.02.2023	LR500112302AD	Change company name and manufacturer name



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1. General information's

1-1 Test Performed

Company name : **LTA Co., Ltd.**
 Address : 243 Jubug-ri, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-822, Korea
 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	Updating	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2019-04-13	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
		T-2416,	2020-09-10	
		R-4483(10 m),	2020-10-15	
		G-847	2018-12-13	
IC	CANADA	5799A-1	2019-11-07	IC filing
KOLAS	KOREA	NO.551	2021-08-20	KOLAS accredited Lab.

2. Information's about test item

2-1 Client / Manufacturer

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

Factory #1

Company name : HANWHA VISION VIETNAM COMPANY LIMITED
 Address : Lot O-2, Que Vo Industrial Zone extended area ,Nam Son commune, Bac Ninh city,Bac Ninh province, Vietnam

Factory #2

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
 Brand : -
 Model name : SLA-T1080F
 Additional model name : -
 Additional model differences : -
 Serial number : Identification
 Date of receipt : October 11, 2017
 EUT condition : Pre-production, not damaged
 Interface Ports : POE
 Power rating : DC 5 V
 Test memory size : -
 Modulator : -
 Crystal/Oscillator(s) : -
 Firmware version : xxxx

2-3 Modification

-NONE

2-4 Test conditions

Temp. / Humid. / Pressure : +(18) °C / (48) %RH
 Tested Model : SLA-T1080F
 Operating mode : Capture mode
 Tested Voltage : 240 Vac , 50 Hz

2-5 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Network Camera	XNB-6001	N/A	HANWHA VISION VIETNAM COMPANY LIMITED D-TECH CO.,LTD.
Notebook	PP37L	N/A	DELL

3. Test Report**3.1 Summary of tests**

Parameter	Applied Standard	Status
I. Emission		
Radiated Emission	AS/NZS CISPR32:2013	C
Conducted Emission	AS/NZS CISPR32:2013	C

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

Note 2: The data in this test report are traceable to the national or international standards.

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/Telecommunication ports.

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

Test method	: AS/NZS CISPR32:2013
Measurement Frequency range	: 150 kHz - 30 MHz
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

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)

Conducted emissions (TEL)



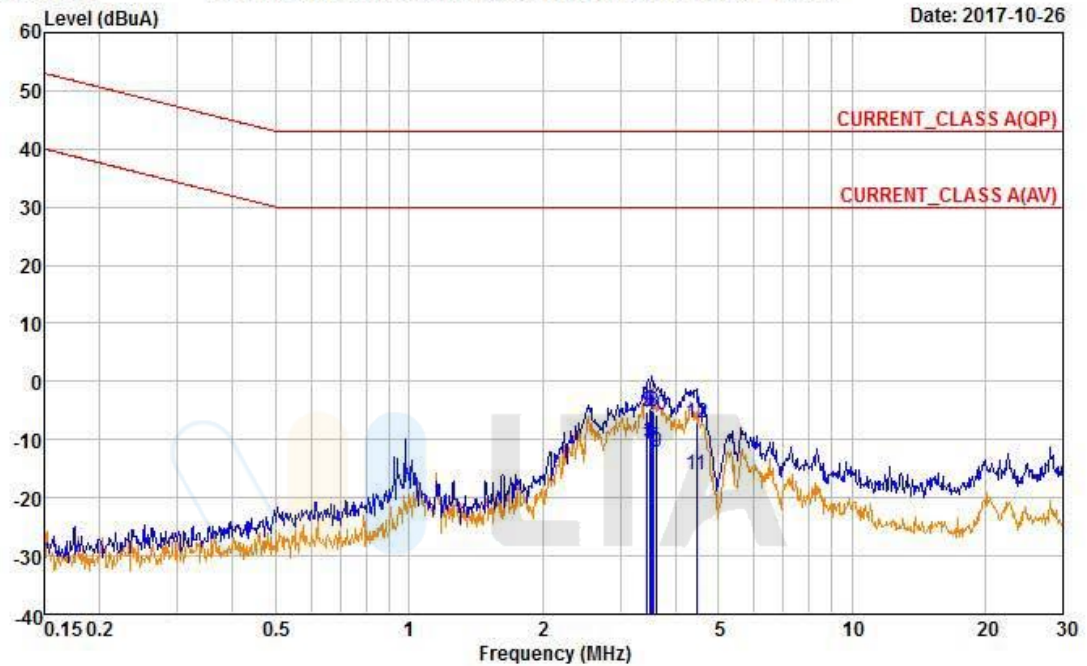
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Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel: +82-31-3236008, 9
Fax: +82-31-3236010

EUT / Model No. : SLA-T1080F	Phase : POE
Test Mode : Capture mode	Test Power : 240 / 50
Temp. / Humi. : 24 / 37	Test Engineer : KANG H J

Data: 2475

File: D:\Conducted Data\2017\LTA_Conduction_2017_10.EM6 (2475)

Date: 2017-10-26



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuA	dBuA	dB	dBuA	dBuA	dBuA	dBuA	dB	dB
3.452	-25.00	-30.55	19.70	-5.30	-10.85	43.02	30.02	48.32	40.87
3.499	-24.37	-30.31	19.70	-4.67	-10.61	43.02	30.02	47.69	40.63
3.527	-24.49	-30.39	19.71	-4.78	-10.68	43.02	30.02	47.80	40.70
3.570	-24.94	-30.93	19.71	-5.23	-11.22	43.02	30.02	48.25	41.24
3.625	-25.43	-31.75	19.72	-5.71	-12.03	43.02	30.02	48.73	42.05
4.463	-26.97	-35.76	19.75	-7.22	-16.01	43.02	30.02	50.24	46.03

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	: AS/NZS CISPR32:2013
Measuring Distance	: 10 m for below 1 GHz
Measurement Frequency range	: 30 MHz – 1 000 MHz
Measurement RBW	: 120 kHz @ 10 m
Test mode	: Capture mode
Result	: Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

- The highest internal source of an EUT is below 108 MHz, the measurement shall only be made up to 1 GHz.
(The highest internal source of an EUT : Below 108 MHz)

A sample calculation:

$$\text{COR. F (correction factor)} = \text{Antenna factor} + \text{Cable loss} - \text{Amp. gain} - \text{Distance correction}$$

$$\text{Emission Level} = \text{meter reading} + \text{COR.F}$$

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 (dB μ V/m)	Peak limit @ 3m (dB μ V/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 (dB μ V/m)	Peak limit @ 3m (dB μ V/m)
(1 000 – 3 000) MHz	50	70
(3 000 – 6 000) MHz	54	74
NOTE:	The lower limit applies at the transition frequency.	

Radiated Emission (Below 1 GHz) / V



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EUT/Model No.: SLA-T1080F

Temp/Humi: 18 / 48

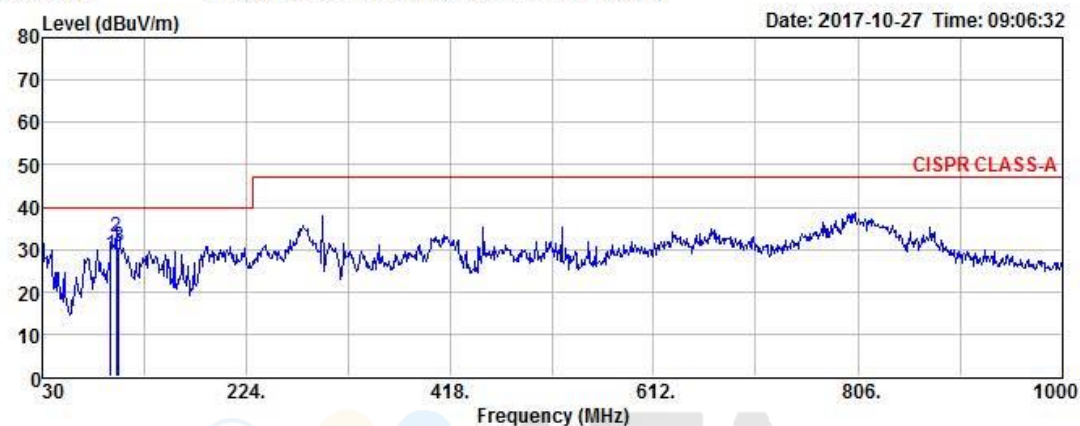
Test Mode : Capture mode

Tested by: KANG H J

Data: 1391

File: C:\Program Files (x86)\e3\1710-1.EM6 (1391)

Date: 2017-10-27 Time: 09:06:32



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
94.99	46.19	-17.36	28.83	40.00	11.17	100	82	VERTICAL
100.81	49.30	-16.24	33.06	40.00	6.94	103	112	VERTICAL
102.75	46.50	-15.83	30.67	40.00	9.33	106	120	VERTICAL

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

Radiated Emission (Below 1 GHz) / H



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EUT/Model No.: SLA-T1080F

Temp/Humi: 18 / 48

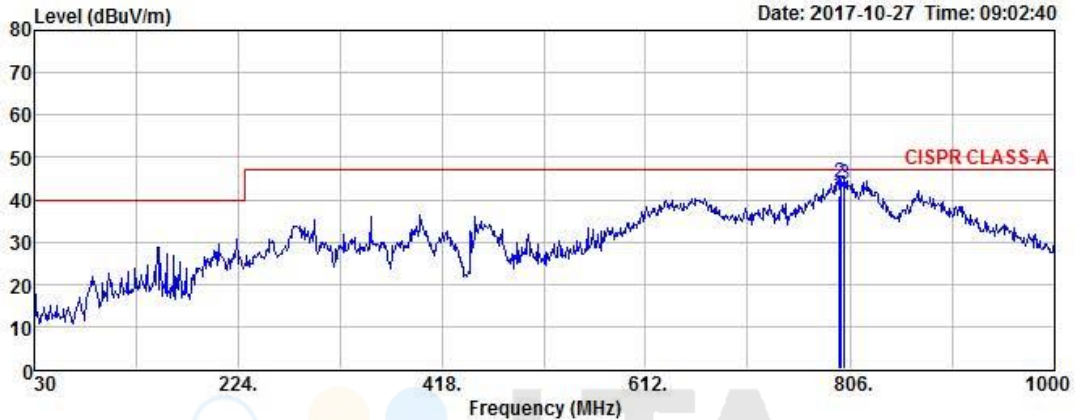
Test Mode : Capture mode

Tested by: KANG H J

Data: 1389

File: C:\Program Files (x86)\e3\1710-1.EM6 (1389)

Date: 2017-10-27 Time: 09:02:40



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
794.36	42.09	-1.11	40.98	47.00	6.02	106	84	HORIZONTAL
796.30	45.00	-1.09	43.91	47.00	3.09	115	115	HORIZONTAL
800.18	44.80	-1.04	43.76	47.00	3.24	118	104	HORIZONTAL

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

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.

Radiated Emission – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2018.09.07	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07974	2018.09.07	1 year
☐	DTV Signal Generator	MFG-100	MFLO	15M2002	2018.03.20	1 year
☐	Color TV Pattern Generator	PM-5518-TX	Philips	LO5333	-	-
☒	TRILOG Antenna	VULB9160	SCHWARZBECK	9160-3237	2019.05.16	2 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

Conducted emissions

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESR	Rohde & Schwarz	101499	2018.07.11	1 year
☒	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100710	2018.03.20	1 year
☒	ISN	ISN T800	TESEQ	27109	2018.01.25	1 year
☒	ISN	ENY81-CA6	Rohde & Schwarz	101565	2018.01.25	1 year
☐	CURRENT PROBE	EZ-17	Rohde & Schwarz	100508	2018.01.25	1 year
☐	LISN	ESH3-Z6	Rohde & Schwarz	100378	2018.09.07	1 year
☒	LISN(main)	ENV216	Rohde & Schwarz	100408	2018.09.07	1 year
☒	LISN(sub)	KNW-407	Kyoritsu	8-1430-1	2018.09.07	1 year
☒	TEST PROGRAM	e3_Ver: 5.5.201a	AUDIX	-	-	-

APPENDIX B

PERFORMANCE CRITERIA



Performance 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.

Performance 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 apparatus 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. 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.

Performance criterion C:

Loss of function is allowed, provided the function is self-recoverable or can be restored by the operating 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.

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	10 th measurement
Receiver corrections; -Sine wave voltage -Pulse amplitude response -Pulse repetition rate response	Rectangular ($\sqrt{3}$) Rectangular ($\sqrt{3}$) Rectangular ($\sqrt{3}$)	± 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* : $\Gamma_i = 0.09$ -LISN VRC : $\Gamma_g = 0.14(150\text{kHz})$ = 0.05(30MHz) - Uncertainty: $20\log(1 \pm \Gamma_i \Gamma_g)$	U-type($\sqrt{2}$)	± 0.89	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.28	10 th 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	30 MHz – 1 GHz	ANT Cal. uncertainty
		± 2.00	± 2.00	
Cable loss (HFB-5010/HFC12D)	Standard Deviation(SD)	± 0.14	± 0.14	10 th measurement
Receiver corrections; -Sine Wave Voltage -Pulse amplitude response -Pulse repetition rate response	Normal (k = 2)	± 0.17	± 0.17	Cal. Report Cal. Report CISPR16-4-2
	Normal (k = 2)	± 0.58	± 0.58	
	Rectangular(√ 3)	± 1.50	± 1.50	
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	10 th 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	10 th 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 10 th measurement
Mismatch ; - Receiver VRC* : $\Gamma_i = 0.09$ -ANT. VRC : $\Gamma_g = 0.09$ - Uncertainty: $20\log(1 \pm \Gamma_i \Gamma_g)$	U-type (√ 2)	± 0.54	CISPR16-4-2
Pre-amp.	Normal (k = 2)	± 0.60	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.34	10 th measurement
Combined measurement uncertainty $U_c(y)$	Normal	+ 1.73 - 1.73	
Expanded measurement uncertainty (95%,Confidence level,k=2)dB	Normal(k = 2)	1 GHz - 6 GHz + 3.46 - 3.46	

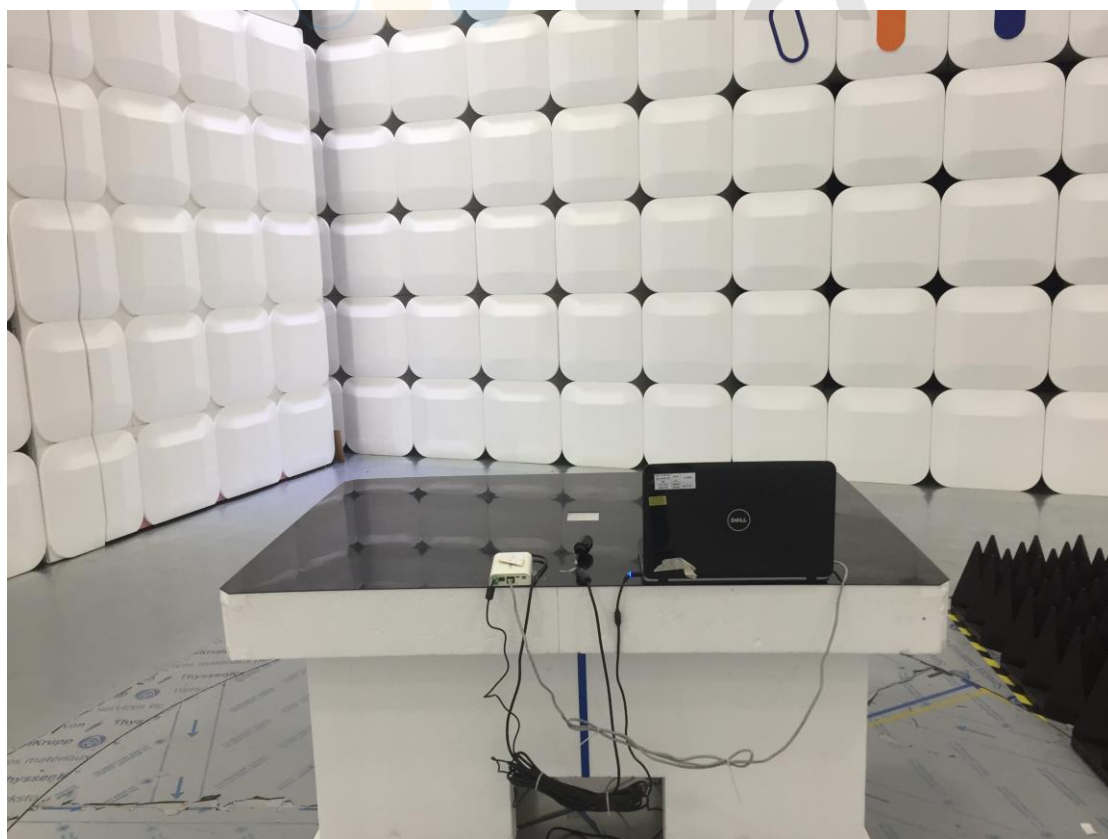
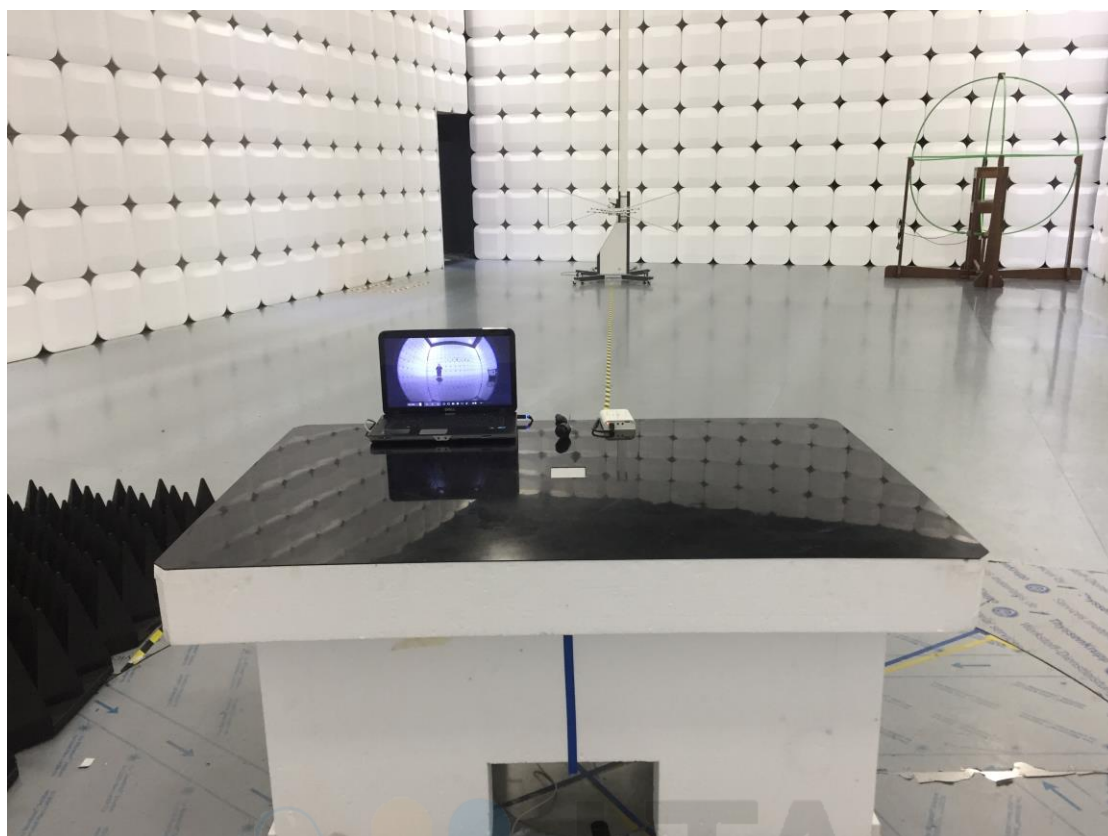
Note:VRC(Voltage Reflection Coefficient)

APPENDIX D

PHOTOGRAPHS



Radiated emission (Maximum emission configuration)-Below 1 GHz



Conducted emission (Maximum emission configuration)



EUT



EUT



EUT



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