

TEST REPORT

Application No.: HKEM2005000420AT
Applicant: Ruijie Networks Co.,Ltd.
Address of Applicant: 19#Building,Juyuanzhou Industrial Park,No.618 Jinshan Avenue, Cangshan District · Fuzhou · China
Manufacturer: Ruijie Networks Co.,Ltd.
Address of Manufacturer: 19#Building,Juyuanzhou Industrial Park,No.618 Jinshan Avenue, Cangshan District · Fuzhou · China
Equipment Under Test (EUT):
EUT Name: Thermal Camera
Model No.: RG-WX-TC02
Trade mark: Ruijie
Standard(s) : EN 55032:2015
EN 55035:2017
EN IEC 61000-3-2:2019
EN 61000-3-3:2013+A1:2019
EN 50130-4:2011
Date of Receipt: 2020-05-18
Date of Test: 2020-05-20 to 2020-05-25
Date of Issue: 2020-05-28

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

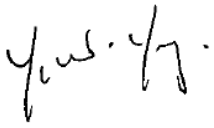



Law Man Kit
EMC Manager

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-05-28		Original

Authorized for issue by:				
				
		Yung Yuk Wah /Project Engineer		Date: 2020-05-28
				
		Law Man Kit /Reviewer		Date: 2020-05-28

2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	EN 55032:2015	EN 55032:2015	Class B	Pass
Asymmetric Mode Conducted Emissions (150kHz-30MHz)	EN 55032:2015	EN 55032:2015	Class B	Pass
Radiated Emissions (30MHz-1GHz)	EN 55032:2015	EN 55032:2015	Class B	Pass
Harmonic Current Emission	EN IEC 61000-3-2:2019	EN IEC 61000-3-2:2019	N/A	Pass
Voltage Fluctuations and Flicker	EN 61000-3-3: 2013+A1:2019	EN 61000-3-3: 2013+A1:2019	Clause 5 of EN 61000-3-3	Pass

N/A: Not applicable

Immunity Part				
Item	Standard	Method	Requirement	Result
Electrostatic Discharge	EN55035:2017 / EN 50130-4:2011	EN 61000-4-2:2009	Table 3 of EN 50130-4:2011	Pass
Radiated Immunity (80MHz-1GHz,1800MHz,2600 MHz,3500MHz,5000 MHz)	EN55035:2017 / EN 50130-4:2011	EN 61000-4-3:2006 +A1:2008+A2:2010	Table 4 of EN 50130-4:2011	Pass
Electrical Fast Transients/Burst at Power Port	EN55035:2017 / EN 50130-4:2011	EN 61000-4-4:2012	Table 6 of EN 50130-4:2011	Pass
Electrical Fast Transients/Burst at Signal Port	EN55035:2017 / EN 50130-4:2011	EN 61000-4-4:2012	Table 6 of EN 50130-4:2011	Pass
Surge at Power Port	EN55035:2017 / EN 50130-4:2011	EN 61000-4-5:2014 +A1:2017	Table 7 of EN 50130-4:2011	Pass
Surge at Signal Port	EN55035:2017 / EN 50130-4:2011	EN 61000-4-5:2014 +A1:2017	Table 7 of EN 50130-4:2011	Pass
Conducted Immunity at Power Port (150kHz-80MHz)	EN55035:2017 / EN 50130-4:2011	EN 61000-4-6:2014	Table 5 of EN 50130-4:2011	Pass
Conducted Immunity at Signal Port (150kHz-80MHz)	EN55035:2017 / EN 50130-4:2011	EN 61000-4-6:2014	Table 5 of EN 50130-4:2011	Pass
Voltage Dips and Interruptions	EN55035:2017 / EN 50130-4:2011	EN 61000-4-11:2004 +A1:2017	Table 2 of EN 50130-4:2011	Pass
Main Supply Voltage Variation	EN 50130-4:2011	EN 50130-4:2011	Clause 7 of EN 50130-4:2011	Pass

N/A: Not applicable

Internal Source	Upper Frequency
Below 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5 times the highest frequency or 6 GHz, whichever is less

Declaration of EUT Family Grouping:

None

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4 General Information

4.1 Details of E.U.T.

Power supply:	Adaptor model: KPL-040F-VI Input: 100-240VAC, 50/60Hz, 1.7A Output: 12V, 3.33A
Test voltage:	230VAC, 50Hz
Cable:	125cm unscreened DC cable

4.2 Description of Support Units

The EUT has been tested with the shielded LAN cable which is provided by SGS HK.

4.3 Measurement Uncertainty

EMI

No.	Item	Measurement Uncertainty
1	Conduction emission	2.5dB (9kHz to 150kHz)
		2.6dB (150kHz to 30MHz)
2	Radiated emission	5.1dB (30MHz-1GHz)
		4.9dB (1GHz-6GHz)

EMS

No.	Item	Measurement Uncertainty
3	Radiated Immunity	1.3dB
4	Conducted Immunity	1.2dB
5	ESD	5.7 %
6	EFT (Electrical Fast Transients)	7.3 %
7	Surge Immunity	7.4 %
8	Voltage Dips and Interruptions	5.7 %
9	Temperature test	± 1 °C
10	Humidity test	± 3%
11	DC power test	± 0.5 %

Remark:

The U_{lab} (lab Uncertainty) is less than U_{cispri} (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

According to decision rule based on Clause 4.2 of CISPR 16-4-2, the EUT complied with the standards specified above.

4.4 Test Location

All tests were performed at:

SGS Hong Kong Limited

Unit 2 and 3, G/F, Block A, Po Lung Centre,

11 Wang Chiu Road, Kowloon Bay, Kowloon, Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480

No tests were sub-contracted.

4.5 Test Facility

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

• **HOKLAS (Lab Code: 009)**

SGS Hong Kong Limited has been accepted by HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a HOKLAS Accredited Laboratory, this laboratory meets the requirements of ISO/IEC 17025:2017 and it has been accredited for performing specific test as listed in the scope of accreditation within the test category of Electrical and Electronic Products.

• **FCC Recognized Accredited Test Firm (CAB Registration No.: 446297)**

SGS IECC Limited has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: HK0010, Test Firm Registration Number: 446297.

• **Industry Canada (Site Registration No.: 5193A; CAB Identifier No.: HK0010)**

SGS IECC Limited has been recognized by Department of Innovation, Science and Economic Development (ISED) Canada as a wireless testing laboratory. The acceptance letter from the ISED is maintained in our files. CAB Identifier No: HK0001, Site Registration Number: 5193A-2.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Test Receiver	Rohde & Schwarz	ESHS 30 / 839667/002	TE279D	2019/8/21	2020/8/20
Signal Generator	Rohde & Schwarz	SMT03	E177	2020/03/12	2021/03/11
Artificial Mains Network (LISN)	Schwarzbeck	NSLK 8127 / 8127312	TE10	2020/05/12	2021/05/11
Impulse Limiter	Rohde & Schwarz	ESH-3-Z2 / 357881052	TE36	2019/10/23	2020/10/22
EMC32 Test software	Rohde & Schwarz	Version 10	N/A	N/A	N/A

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ChamPro	N/A	E229	2019/8/9	2020/8/8
Coaxial Cable	SGS	N/A	E167	2019/7/22	2020/7/21
EMI Test Receiver 9kHz to 3.6GHz	Rohde & Schwarz	ESR3 / 102326	E231	2019/9/2	2020/9/1
TRILOG Super Broadb. Test Antenna, (25) 30-1000 (2)	Schwarzbeck	VULB 9168	E264	2018/10/20	2020/10/19
EMC32 Test software	Rohde & Schwarz	Version 10	N/A	N/A	N/A
Boresight Mast Controller	ChamPro	AM-BS-4500-E	E237	--	--
Turntable with Controller	ChamPro	EM1000	E238	--	--

Harmonic Current Emission					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
AC Power Source	California Instruments	5001iX-CTS-400-413 /	E184	2020/5/18	2021/5/17
Compliance and Test System	California Instruments	PACS-1 / 59355	E184	2020/5/18	2021/5/17

Voltage Fluctuations and Flicker					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
AC Power Source	California Instruments	5001iX-CTS-400-413 /	E184	2020/5/18	2021/5/17
Compliance and Test System	California Instruments	PACS-1 / 59355	E184	2020/5/18	2021/5/17

Electrostatic Discharge					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
ESD Generator	TESEQ AG	NSG 437	TE160	2019/5/20	2020/5/19

Radiated Immunity (80MHz-1GHz,1800MHz,2600MHz,3500MHz,5000MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Amplifier 80 - 1000MHz, 175Watts	Milmega	80RF1000-175 / 10489	E197	2018/10/15	2020/10/14
RF Amplifier 0.8 – 2.7GHz, 55Watts	Milmega	AS0827-55 / 1052118	E208	2018/10/15	2020/10/14
Antenna BiLog Type (30MHz - 1000MHz)	Schaffner	CBL6111C	E154	2018/12/08	2020/12/07
Stacked Double Log-Periodic Antenna 0.7GHz-9GHz	Schwarzbeck	STLP9149 / 9149-179	E210	2019/5/18	2021/5/17
Signal Generator	Rohde & Schwarz	SMT03 / 827786/015	E177	2020/03/12	2021/03/11
Dual Directional Coupler 80 - 1000MHz, 200Watts	Amplifier Research	DC6080A / 0339242	E198	2018/1/30	2021/1/29
RF Power head with USB interface, 9kHz - 2.7GHz	Dare	RPR1006A / 06D00705S	E200	2019/8/22	2020/8/21
RF Power head with USB interface, 9kHz - 2.7GHz	Dare	RPR1006A / 06D00705S	E201	2019/8/22	2020/8/21
Signal Generator	Rohde & Schwarz	SMB100A SIGNAL GENER	E236	2019/8/21	2020/8/20
2.5 - 6GHz Power Amplifier	Rohde & Schwarz	BBA150-E30	E268	2018/10/15	2020/10/14

Electrical Fast Transients/Burst at Power Port					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMC Test System	TESEQ	NSG 3060 / 4120	E255	2019/8/22	2020/8/21
Single phase CDN	TESEQ	CDN3061-C16 / 5060	E256	2019/8/22	2020/8/21
Power source	TESEQ	INA 6501 / 1016	E257	2019/8/22	2020/8/21

Electrical Fast Transients/Burst at Signal Port					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMC Test System	TESEQ	NSG 3060 / 4120	E255	2019/8/22	2020/8/21
Single phase CDN	TESEQ	CDN3061-C16 / 5060	E256	2019/8/22	2020/8/21
Power source	TESEQ	INA 6501 / 1016	E257	2019/8/22	2020/8/21

Surge at Power Port					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMC Test System	TESEQ	NSG 3060 / 4120	E255	2019/8/22	2020/8/21
Single phase CDN	TESEQ	CDN3061-C16 / 5060	E256	2019/8/22	2020/8/21
Power source	TESEQ	INA 6501 / 1016	E257	2019/8/22	2020/8/21

Conducted Immunity at Power Port (150kHz-80MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Signal Generator	Rohde & Schwarz	SMT03	E177	2020/03/12	2021/03/11
-6dB Attenuator 60W	Trilithic	HFP-560/6-NM/NF	TE134F	CAL IN USE	CAL IN USE
RF Amplifier	Amplifier Research	AR75A250	TE154	2018/10/15	2020/10/14
Millivoltmeter	Rohde & Schwarz	URV5 / 892679/041	TE149	2019/5/14	2020/6/13
100V Probe	Rohde & Schwarz	URV5-Z4	TE127	2019/5/14	2020/6/13
EM Injection Clamp	F.C.C.	F-203I-23mm / 491	E165	2019/6/12	2020/6/11
Audio Analyzer DC	Rohde & Schwarz	UPV w/UPV-K4 & UPL-Z	E166	2020/05/12	2021/5/11
Coupling-Decoupling Unit	Schaffner	CDN M016 / 21257	E169	2020/3/14	2021/3/13

Conducted Immunity at Signal Port (150kHz-80MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Signal Generator	Rohde & Schwarz	SMT03	E177	2020/03/12	2021/03/11
-6dB Attenuator 60W	Trilithic	HFP-560/6-NM/NF	TE134F	CAL IN USE	CAL IN USE
RF Amplifier	Amplifier Research	AR75A250	TE154	2018/10/15	2020/10/14
Millivoltmeter	Rohde & Schwarz	URV5 / 892679/041	TE149	2019/5/14	2020/6/13
100V Probe	Rohde & Schwarz	URV5-Z4	TE127	2019/5/14	2020/6/13
EM Injection Clamp	F.C.C.	F-203I-23mm / 491	E165	2019/6/12	2020/6/11
Audio Analyzer DC	Rohde & Schwarz	UPV w/UPV-K4 & UPL-Z	E166	2020/05/12	2021/5/11
Coupling-Decoupling Unit	Schaffner	CDN M016 / 21257	E169	2020/3/14	2021/3/13

Voltage Dips and Interruptions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMC Test System	TESEQ	NSG 3060 / 4120	E255	2019/8/22	2020/8/21
Single phase CDN	TESEQ	CDN3061-C16 / 5060	E256	2019/8/22	2020/8/21
Power source	TESEQ	INA 6501 / 1016	E257	2019/8/22	2020/8/21

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Digital temperature & humidity data logger	SATO	SK-L200TH II	E232	2019/10/28	2020/10/27
Electronic Digital Thermometer with Hygrometer	nil	2074/2075	E159	2019/10/28	2020/10/27
Barometer with digital thermometer	SATO	7612-00	E218	2020/4/23	2021/4/22
Conditional Chamber	Zhong Zhi Testing Instruments	CZ-E-608D	E216	2019/8/22	2020/8/21

6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement: EN 55032:2015
Test Method: EN 55032:2015
Frequency Range: 150kHz to 30MHz

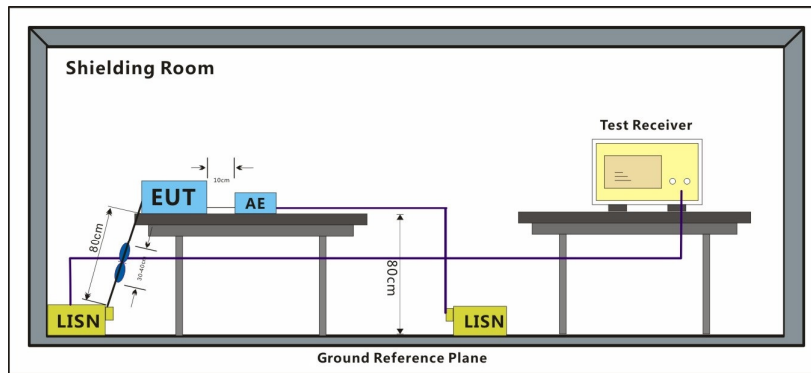
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C Humidity: 51.1 % RH :

Test mode a: Normal Working

6.1.2 Test Setup Diagram



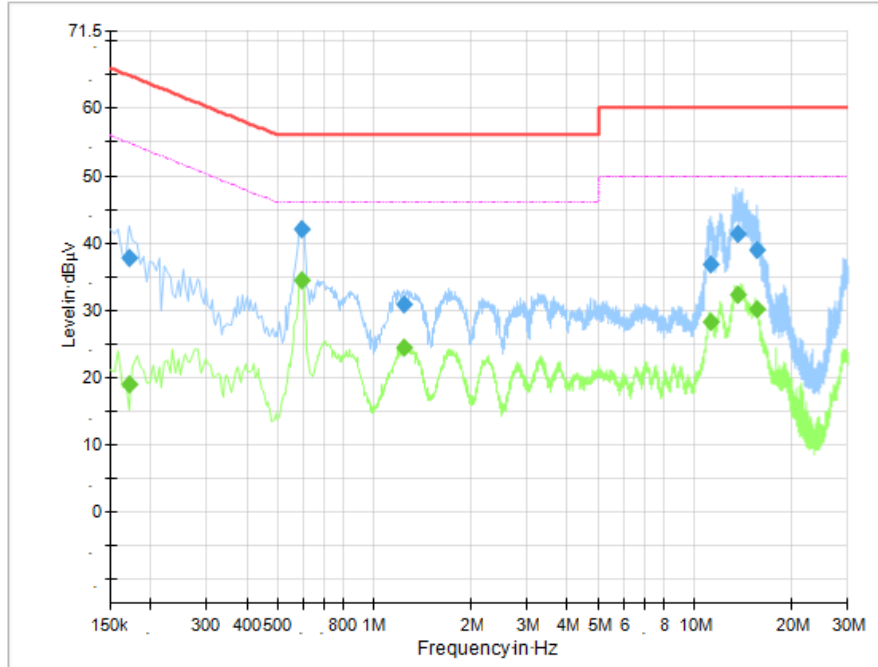
6.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Remark:

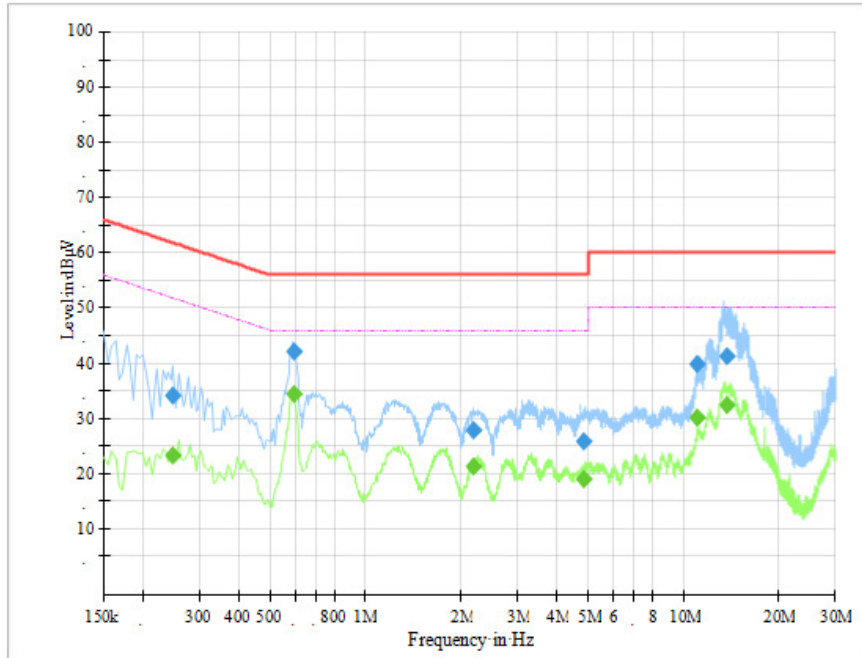
1. For radiated emission test: Correction Factor = Antenna Factor + Cable Loss.
2. For conducted emission test: Correction Factor = LISN Factor + Cable Loss.
3. Margin = Limit – Reading
4. Pol = Polarization

Mode: a;
Line: Live Line



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Corr. (dB)	Result
0.172500	---	19.1	54.8	35.7	10.2	Pass
0.172500	37.7	---	64.8	27.2	10.2	Pass
0.595500	---	34.4	46.0	11.6	10.2	Pass
0.595500	42.1	---	56.0	14.0	10.2	Pass
1.243500	---	24.4	46.0	21.6	10.2	Pass
1.243500	31.0	---	56.0	25.0	10.2	Pass
11.206500	---	28.2	50.0	21.8	10.5	Pass
11.206500	36.8	---	60.0	23.2	10.5	Pass
13.650000	---	32.3	50.0	17.7	10.5	Pass
13.650000	41.4	---	60.0	18.6	10.5	Pass
15.562500	---	30.2	50.0	19.8	10.6	Pass
15.562500	39.0	---	60.0	21.0	10.6	Pass

Mode: a;
Line: Neutral Line



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Corr. (dB)	Result
0.249000	---	23.5	51.8	28.3	10.2	Pass
0.249000	34.3	---	61.8	27.5	10.2	Pass
0.595500	---	34.4	46.0	11.6	10.2	Pass
0.595500	42.1	---	56.0	14.0	10.2	Pass
2.184000	---	21.4	46.0	24.6	10.2	Pass
2.184000	27.9	---	56.0	28.1	10.2	Pass
4.843500	---	19.2	46.0	26.8	10.3	Pass
4.843500	25.8	---	56.0	30.2	10.3	Pass
11.067000	---	30.2	50.0	19.8	10.5	Pass
11.067000	39.9	---	60.0	20.1	10.5	Pass
13.609500	---	32.4	50.0	17.6	10.5	Pass
13.609500	41.3	---	60.0	18.7	10.5	Pass

6.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	EN 55032:2015
Test Method:	EN 55032:2015
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz-230MHz	40 dB(μ V/m) quasi-peak
230MHz-1 GHz	47 dB(μ V/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz

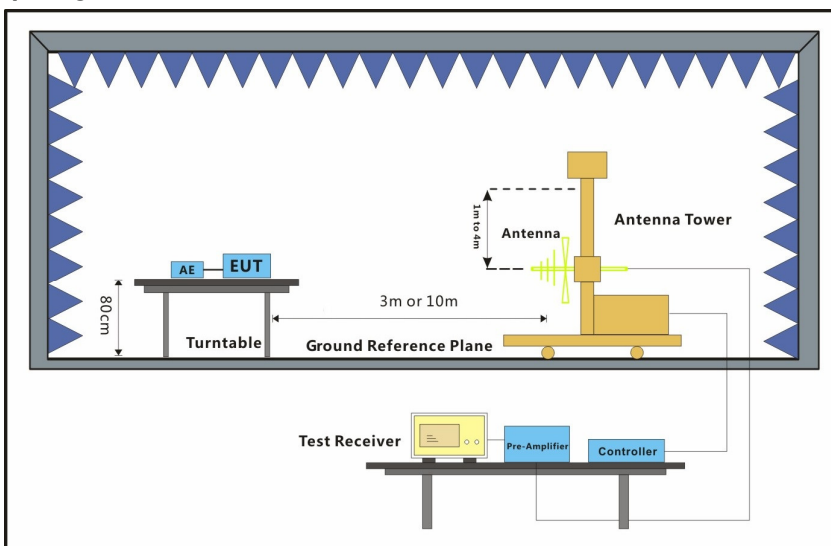
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C Humidity: 51.2 % RH :

Test mode a: Normal Working

6.2.2 Test Setup Diagram



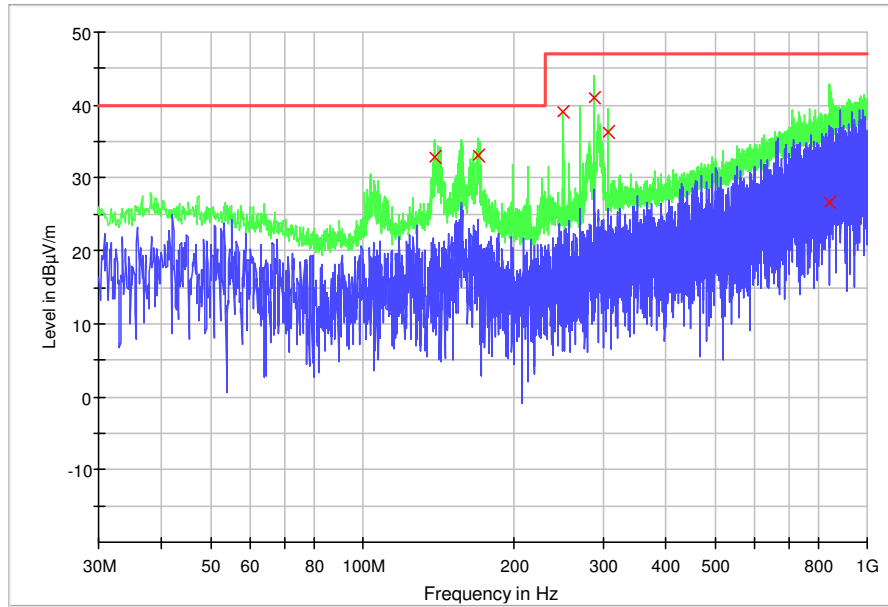
6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Remark:

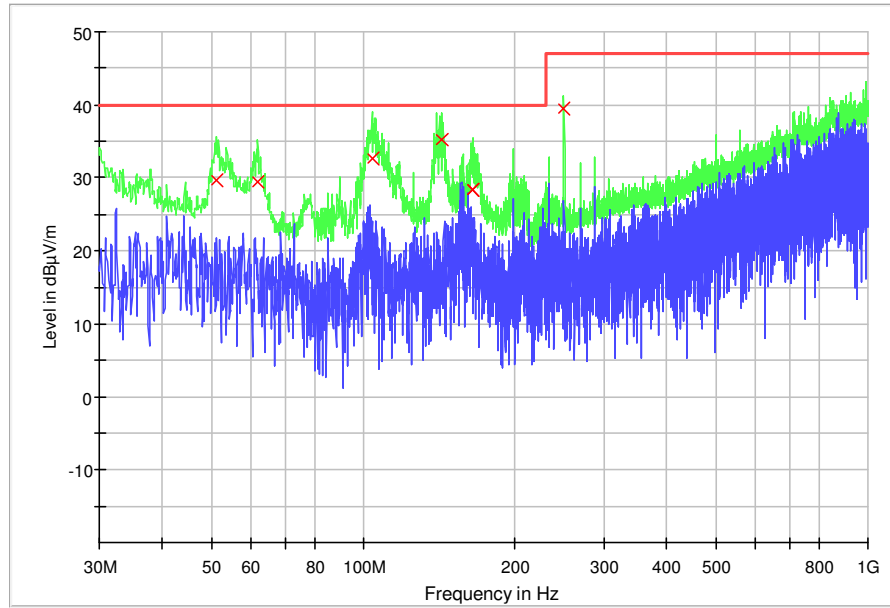
1. For radiated emission test: Correction Factor = Antenna Factor + Cable Loss.
2. For conducted emission test: Correction Factor = LISN Factor + Cable Loss.
3. Margin = Limit – Reading
4. Pol = Polarization

Mode: a;
Polarization: Horizontal
Quasi-peak measurement:



Frequency (MHz)	QuasiPeak (dBμV/m)	Pol.	Corr. (dB/m)	Margin (dB)	Limit (dBμV/m)	Result
139.222000	32.9	H	13.1	7.1	40.0	Pass
169.583000	33.1	H	14.1	6.9	40.0	Pass
249.996000	39.0	H	12.9	8.0	47.0	Pass
288.020000	41.0	H	13.5	6.0	47.0	Pass
305.965000	36.3	H	14.6	10.7	47.0	Pass
845.285000	26.8	H	25.6	20.3	47.0	Pass

Mode: a;
Polarization: Vertical
Quasi-peak measurement:



Frequency (MHz)	QuasiPeak (dBμV/m)	Pol.	Corr. (dB/m)	Margin (dB)	Limit (dBμV/m)	Result
51.243000	29.6	H	13.7	10.4	40.0	Pass
61.719000	29.5	H	12.7	10.5	40.0	Pass
104.108000	32.7	H	10.8	7.3	40.0	Pass
142.811000	35.2	H	13.5	4.8	40.0	Pass
165.024000	28.4	H	14.2	11.6	40.0	Pass
249.996000	39.4	H	12.9	7.6	47.0	Pass

6.3 Harmonic Current Emission

Test Requirement: EN IEC 61000-3-2:2019

Test Method: EN IEC 61000-3-2:2019

Frequency Range: 100Hz to 2kHz

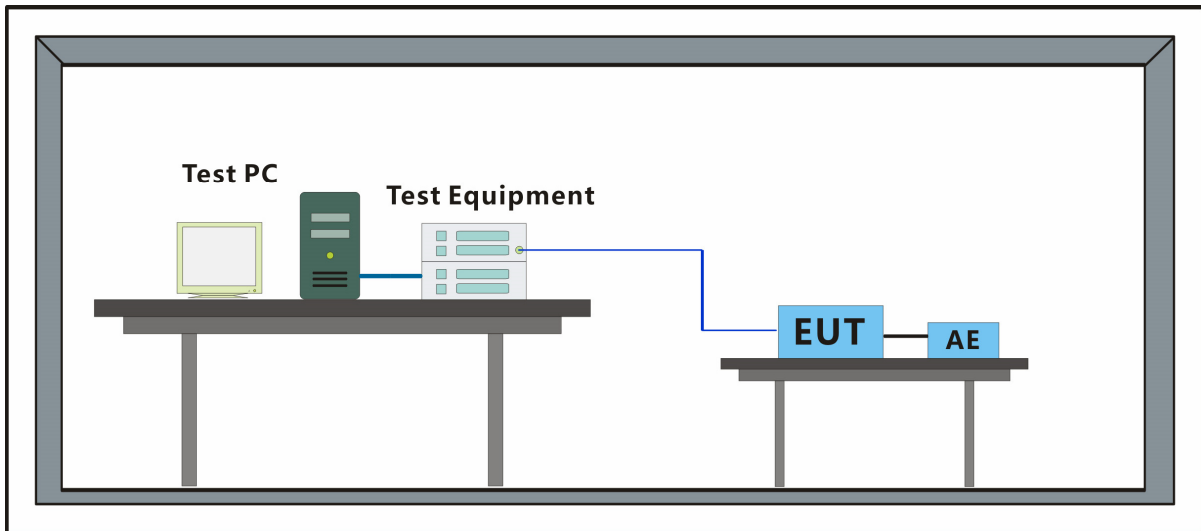
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.2 % RH :

Test mode a: Normal Working

6.3.2 Test Setup Diagram

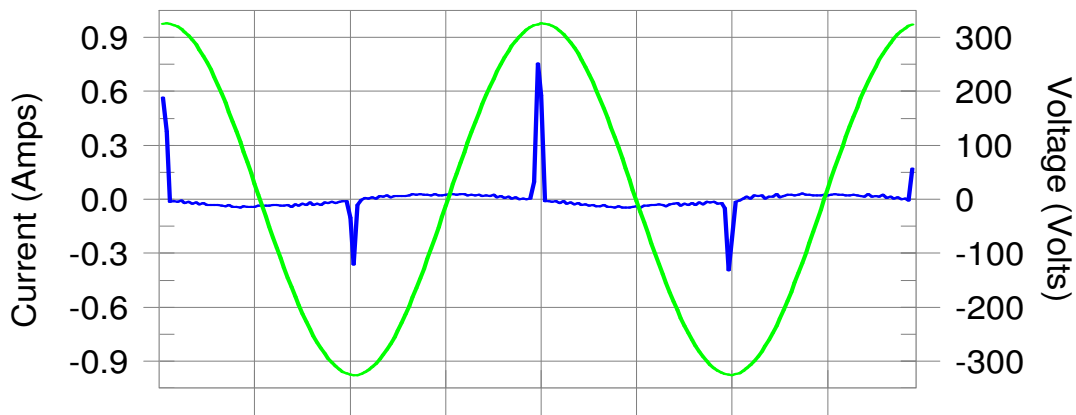


6.3.3 Measurement Data

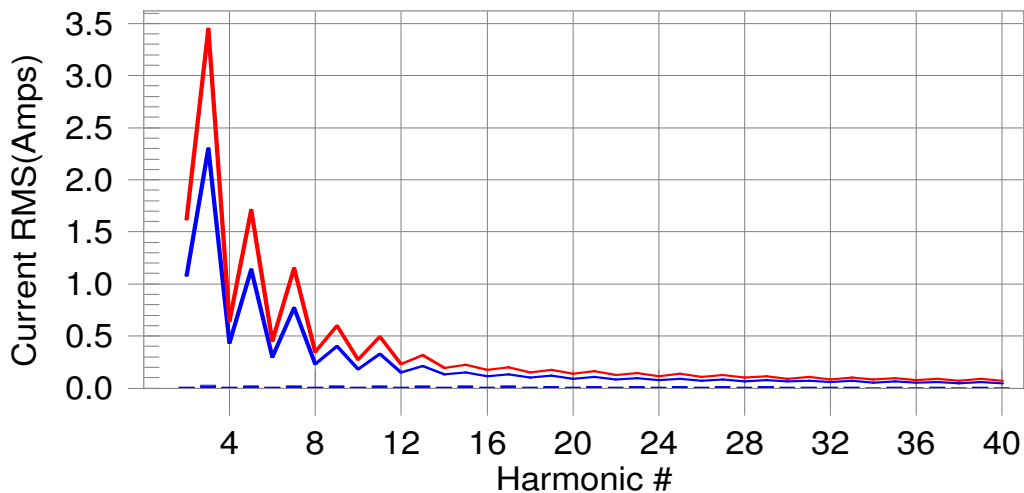
Highest parameter values during test:

V_RMS (Volts):	230.41	Frequency(Hz):	50.00
I_Peak (Amps):	0.816	I_RMS (Amps):	0.093
I_Fund (Amps):	0.035	Crest Factor:	8.920
Power (Watts):	5.7	Power Factor:	0.275

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #25 with 16.66% of the limit.

6.4 Voltage Fluctuations and Flicker

Test Requirement: EN 61000-3-3:2013+A1:2019

Test Method: EN 61000-3-3:2013+A1:2019

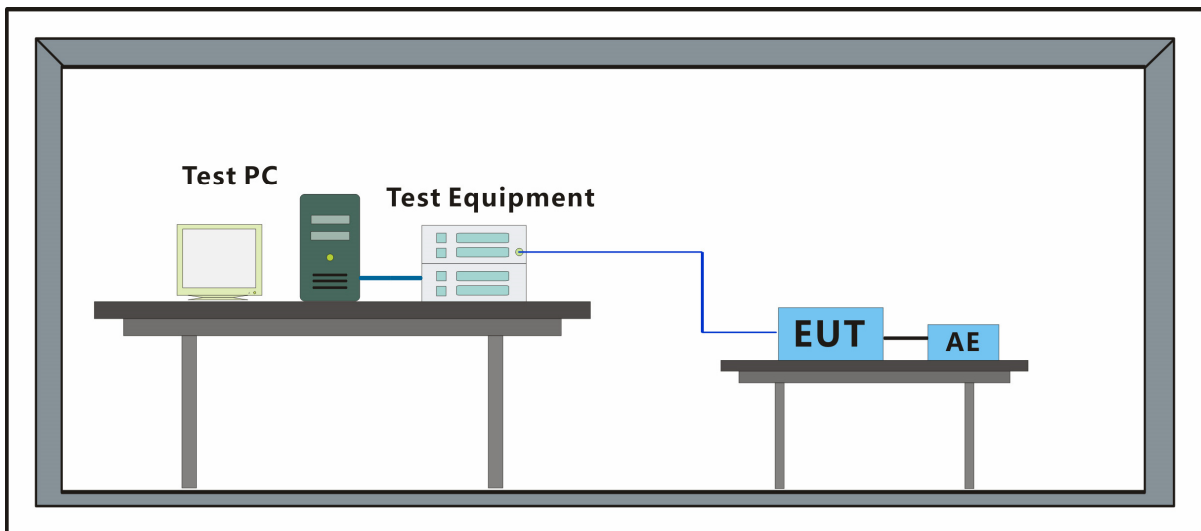
6.4.1 E.U.T. Operation

Operating Environment:

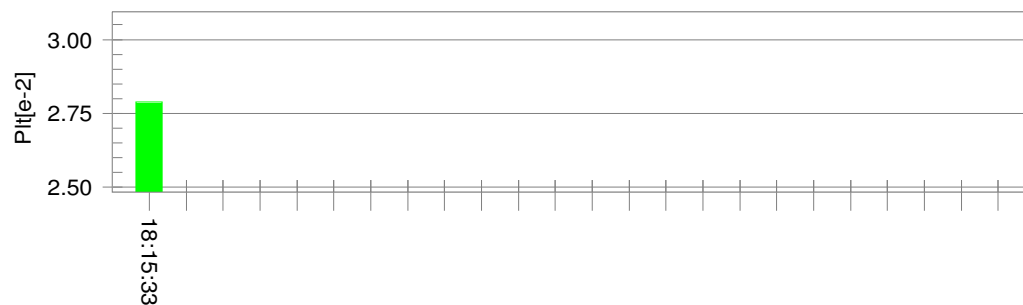
Temperature: 23.2 °C Humidity: 53.2 % RH :

Test mode a: Normal Working

6.4.2 Test Setup Diagram



6.4.3 Measurement Data



Parameter values recorded during the test:

Urms at the end of test (Volt):	230.40		
Highest dt (%):	0.00	Test limit (%):	3.30 Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass

7 Immunity Test Results

Performance Criteria Description in EN 50130-4:2011

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.

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 C

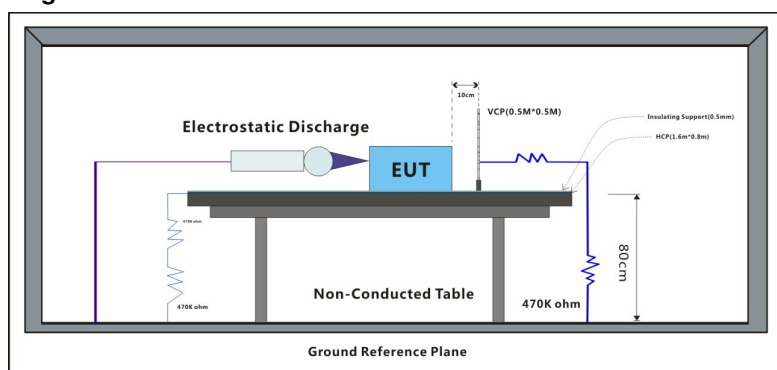
Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

7.1 Electrostatic Discharge

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-2:2009
Performance Criterion: B
Discharge Impedance: 330Ω/150pF
Number of Discharge: Minimum 10 times at each test point
Discharge Mode: Single Discharge
Discharge Period: 1 second minimum

7.1.1 Test Setup Diagram



7.1.2 E.U.T. Operation

Operating Environment:
Temperature: 23.1 °C Humidity: 53.1 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.1.3 Test Results:

- Observations: Test Point:
1. All insulated enclosure and seams.
 2. All accessible metal parts of the enclosure.
 3. All side

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Contact Discharge	6	+	2	A
Contact Discharge	6	-	2	A
Horizontal Coupling	6	+	3	A
Horizontal Coupling	6	-	3	A
Vertical Coupling	6	+	3	A
Vertical Coupling	6	-	3	A

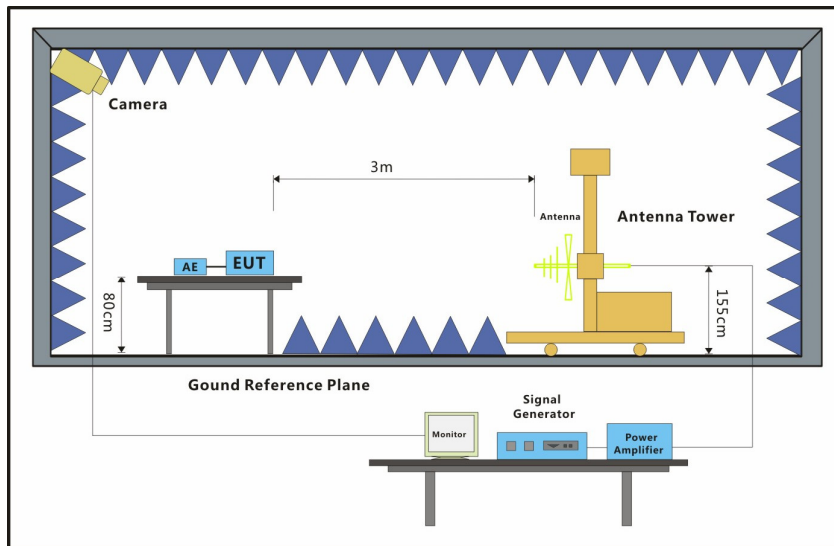
Results:

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

7.2 Radiated Immunity (80MHz-1GHz,1800MHz,2600MHz,3500MHz,5000MHz)

Test Requirement:	EN 50130-4:2011
Test Method:	EN 61000-4-3:2006 +A1:2008+A2:2010
Performance Criterion:	A
Frequency Range:	80MHz to 1GHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Antenna Polarisation:	Vertical and Horizontal
Modulation	1kHz,80% Amp. Mod,1% increment

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:			
Temperature:	22.7 °C	Humidity:	52.5 % RH
		Atmospheric Pressure:	1011 mbar
Test mode:	a: Normal Working		

7.2.3 Test Results:

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	10	Front	2s	A
80MHz-1GHz	10	Back	2s	A
80MHz-1GHz	10	Left	2s	A
80MHz-1GHz	10	Right	2s	A
80MHz-1GHz	10	Top	2s	A
80MHz-1GHz	10	Underside	2s	A
1800MHz	10	Front	2s	A
1800MHz	10	Back	2s	A
1800MHz	10	Left	2s	A
1800MHz	10	Right	2s	A
1800MHz	10	Top	2s	A
1800MHz	10	Underside	2s	A
2600MHz	10	Front	2s	A
2600MHz	10	Back	2s	A
2600MHz	10	Left	2s	A
2600MHz	10	Right	2s	A
2600MHz	10	Top	2s	A
2600MHz	10	Underside	2s	A
3500MHz	10	Front	2s	A
3500MHz	10	Back	2s	A
3500MHz	10	Left	2s	A
3500MHz	10	Right	2s	A
3500MHz	10	Top	2s	A
3500MHz	10	Underside	2s	A
5000MHz	10	Front	2s	A
5000MHz	10	Back	2s	A
5000MHz	10	Left	2s	A
5000MHz	10	Right	2s	A
5000MHz	10	Top	2s	A
5000MHz	10	Underside	2s	A

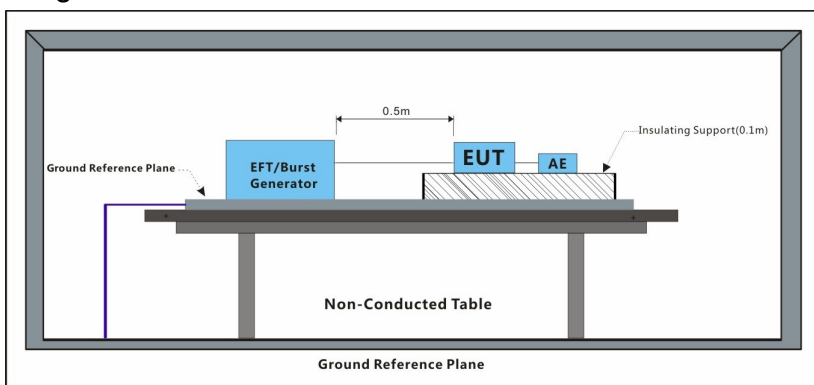
Results:

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

7.3 Electrical Fast Transients/Burst at Power Port

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-4:2012
Performance Criterion: B
Repetition Frequency: 5kHz
Burst Period: 300ms
Test Duration: 2 minute per level & polarity

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.3.3 Test Results:

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	1	+	CDN	A
AC power port	1	-	CDN	A

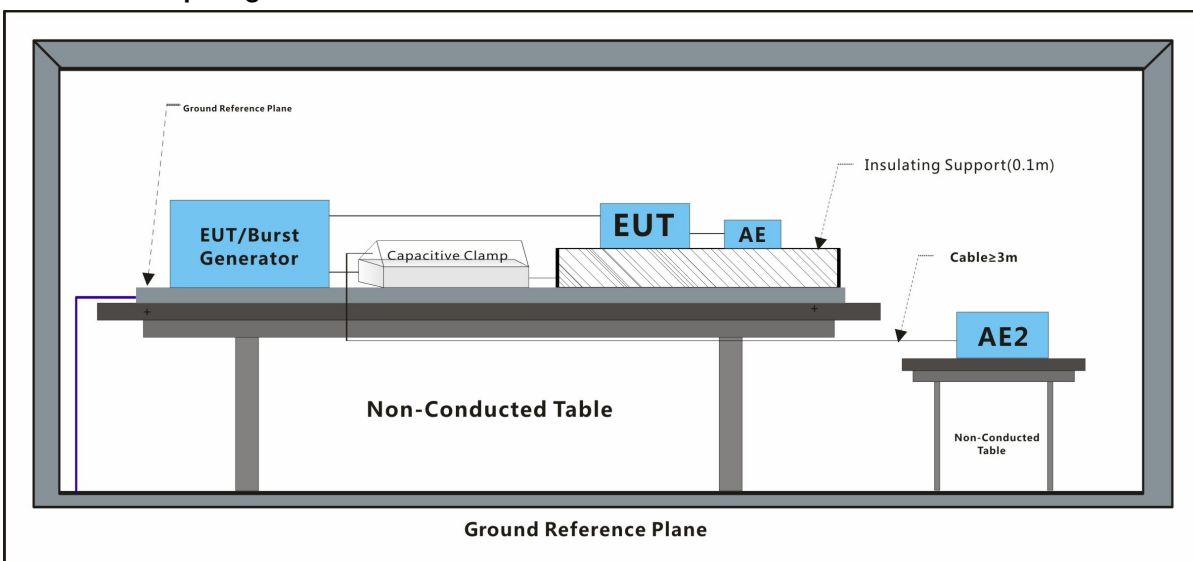
Results:

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

7.4 Electrical Fast Transients/Burst at Signal Port

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-4:2012
Performance Criterion: B
Repetition Frequency: 5kHz
Burst Period: 300ms
Test Duration: 2 minute per level & polarity

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 51.2 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.4.3 Test Results:

Port	Level (kV)	Polarity	CDN/Clamp	Result / Observations
Signal port	1	+	CDN	A
Signal port	1	-	CDN	A

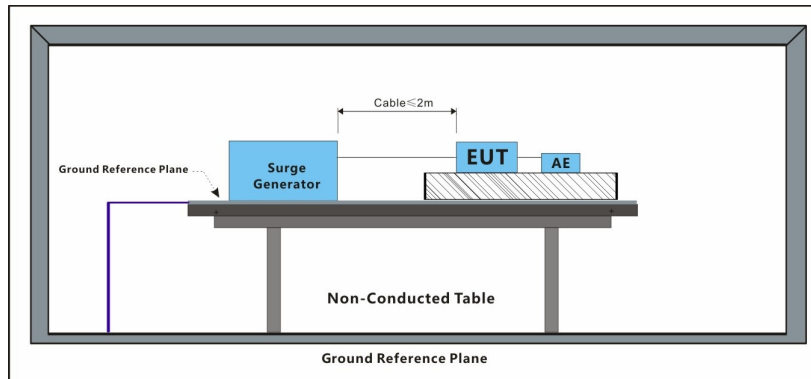
Results:

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

7.5 Surge at Power Port

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-5:2014 +A1:2017
Performance Criterion: B
Interval: 60s between each surge
No. of surges: 20 positive, 20 negative at 90°, 270°

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 53.2 % RH Atmospheric Pressure: 1011 mbar
Test mode: a:Normal Working

7.5.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	0.5	+	90	A
L-N	0.5	-	270	A
L-N	1	+	90	A
L-N	1	-	270	A
L-PE	0.5	+	90	A
L-PE	0.5	-	270	A
L-PE	1	+	90	A
L-PE	1	-	270	A
L-PE	2	+	90	A
L-PE	2	-	270	A
N-PE	0.5	+	90	A
N-PE	0.5	-	270	A
N-PE	1	+	90	A
N-PE	1	-	270	A
N-PE	2	+	90	A
N-PE	2	-	270	A

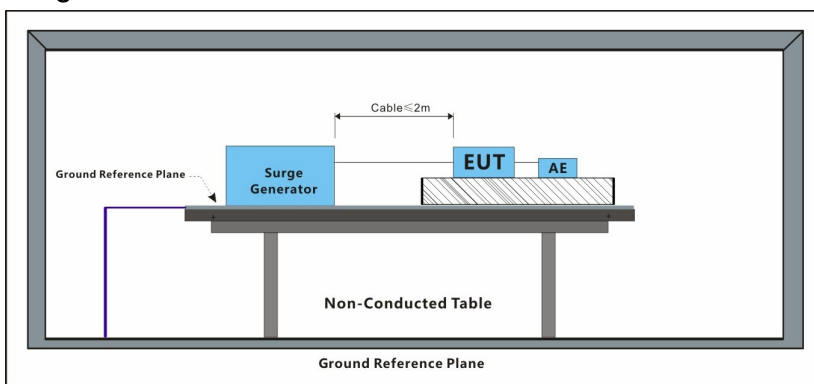
Results:

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

7.6 Surge at Signal Port

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-5:2014 +A1:2017
Performance Criterion: B
Interval: 60s between each surge
No. of surges: 5 positive, 5 negative at 90°, 270°

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 53.2 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.6.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
Signal port	0.5	+	90	A
Signal port	0.5	-	270	A
Signal port	1	+	90	A
Signal port	1	-	270	A

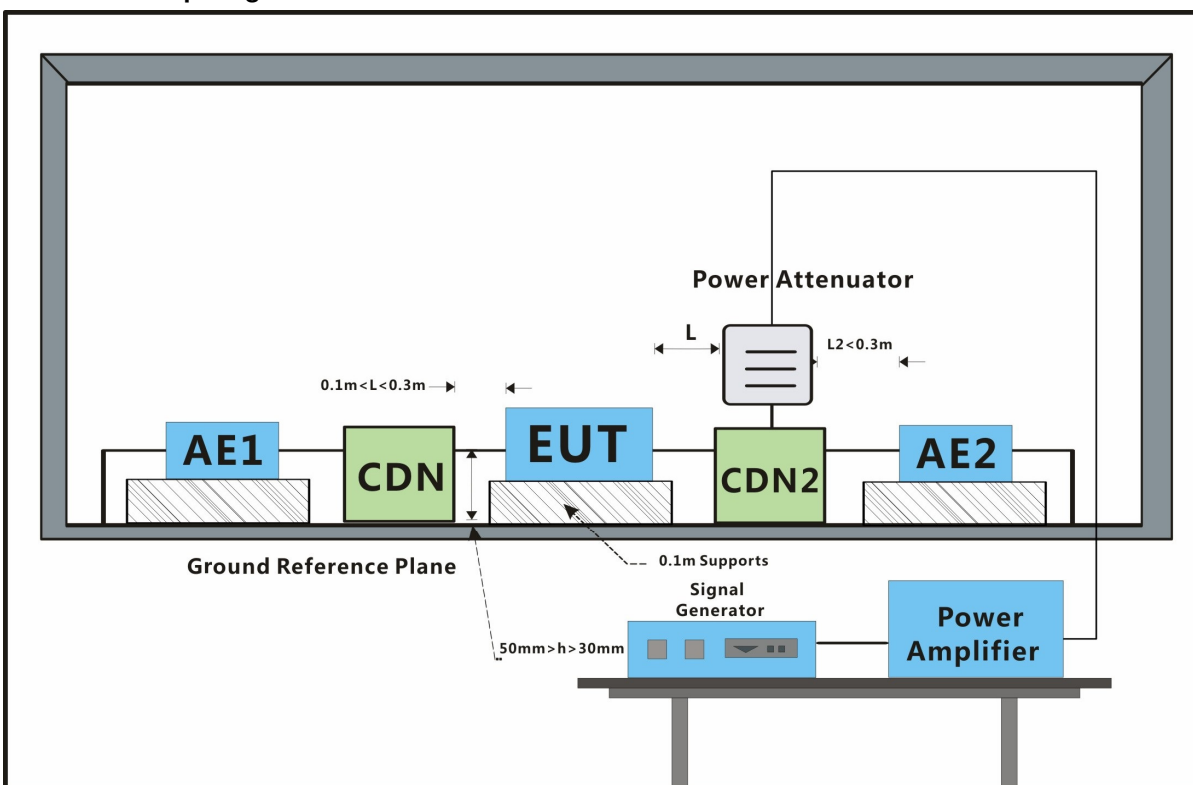
Results:

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

7.7 Conducted Immunity at Power Port (150kHz-100MHz)

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-6:2014
Performance Criterion: A
Frequency Range: 0.15MHz to 80MHz
Modulation: 80%, 1kHz Amplitude Modulation
Step Size: 1%

7.7.1 Test Setup Diagram



7.7.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 53.1 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.7.3 Test Results:

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	10	CDN	2s	A
AC power port	10	CDN	2s	A
AC power port	10	CDN	2s	A

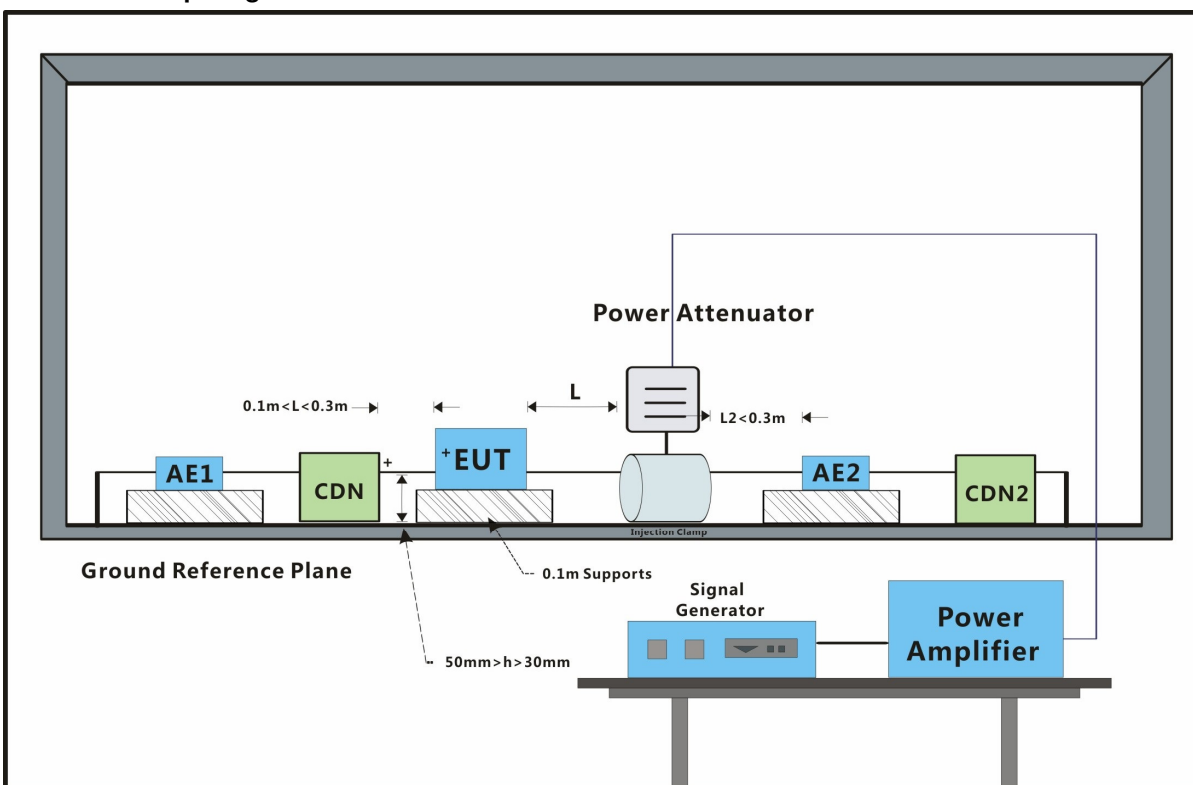
Results:

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

7.8 Conducted Immunity at Signal Port (150kHz-100MHz)

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-6:2014
Performance Criterion: A
Frequency Range: 0.15MHz to 80MHz
Modulation: 80%, 1kHz Amplitude Modulation
Step Size: 1%

7.8.1 Test Setup Diagram



7.8.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 51.2 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.8.3 Test Results:

Port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
Signal port	10	Clamp	2s	A
Signal port	10	Clamp	2s	A
Signal port	10	Clamp	2s	A

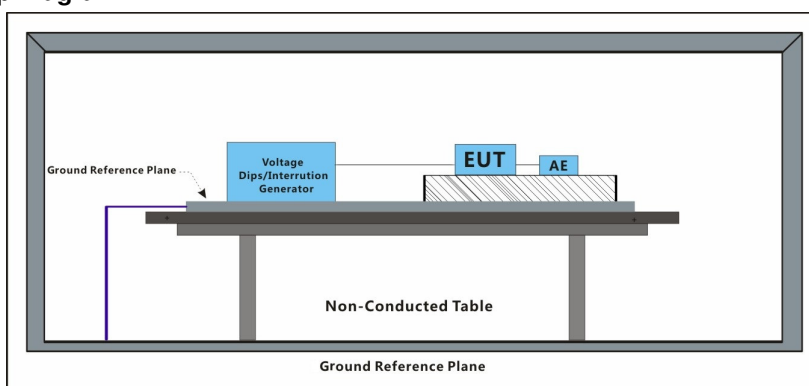
Results:

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

7.9 Voltage Dips and Interruptions

Test Requirement: EN 50130-4:2011
Test Method: EN 61000-4-11:2004 +A1:2017
Performance Criterion: <5% residual voltage for 0.5 periods: B
70% residual voltage for 25 periods: C
<5% residual voltage for 250 periods: C
No. of Dips / Interruptions: 3 per Level
Time between dropout 10s

7.9.1 Test Setup Diagram



7.9.2 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 51.2 % RH Atmospheric Pressure: 1011 mbar
Test mode: a: Normal Working

7.9.3 Test Results:

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
0	0	250 Cycles	3	C
40	0	10 Cycles	3	A
70	0	25 Cycles	3	A
80	0	250 Cycles	3	A

Results:

A: No degradation in the performance of the EUT was observed.
C: EUT turned off during test, it required end-user to recover.

7.10 Main Supply Voltage variation

Test Requirement:	EN 50130-4
Test Method:	EN 50130-4
Criterion Required:	Supply voltage max (Umax): $U_{nom} + 10\%$ Supply voltage min (Umin): $U_{nom} - 15\%$
Test Date:	2018-05-21
Power Supply (U_{nom}) =:	AC 230 V
Test Level:	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 charging), 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. 220/240V) without adaptation, $U_{max} = (\text{Maximum } U_{nom}) + 10\%$ and $U_{min} = (\text{Minimum } U_{nom}) - 15\%$. In any case the range of U_{nom} must include the European nominal mains voltage of 230V.

7.10.1 E.U.T. Operation

Operating Environment:	
Temperature: 22.5°C	Humidity: 51.2% RH
Test mode: a: Normal Working	

7.10.2 Test Results:

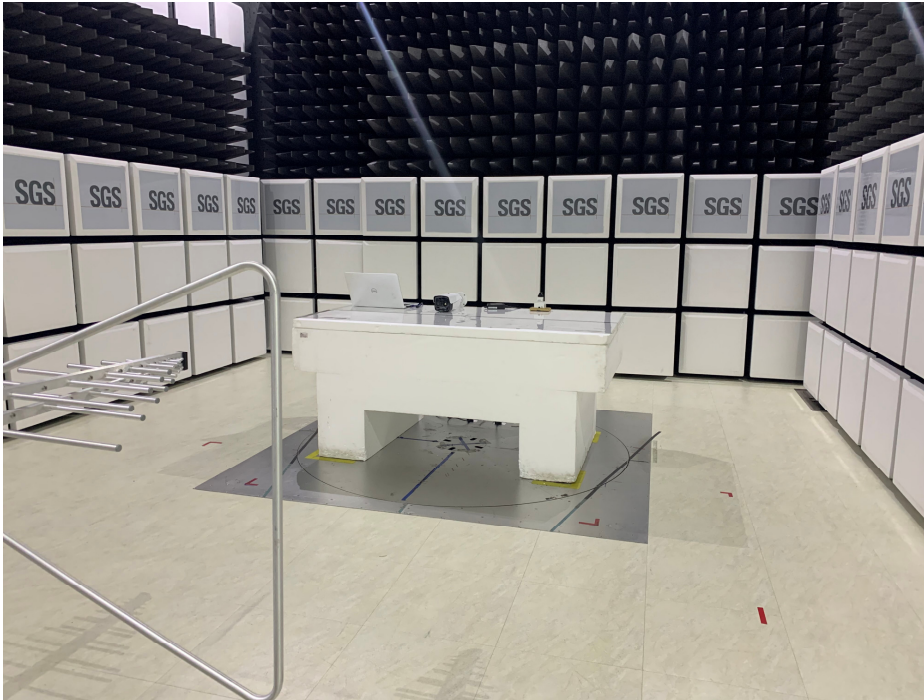
Level supply	Test voltage	Result / Observations
$U_{min} = (\text{Minimum } U_{nom}) - 15\%$.	195.5VAC	A
$U_{max} = (\text{Maximum } U_{nom}) + 10\%$	253VAC	A

Results:

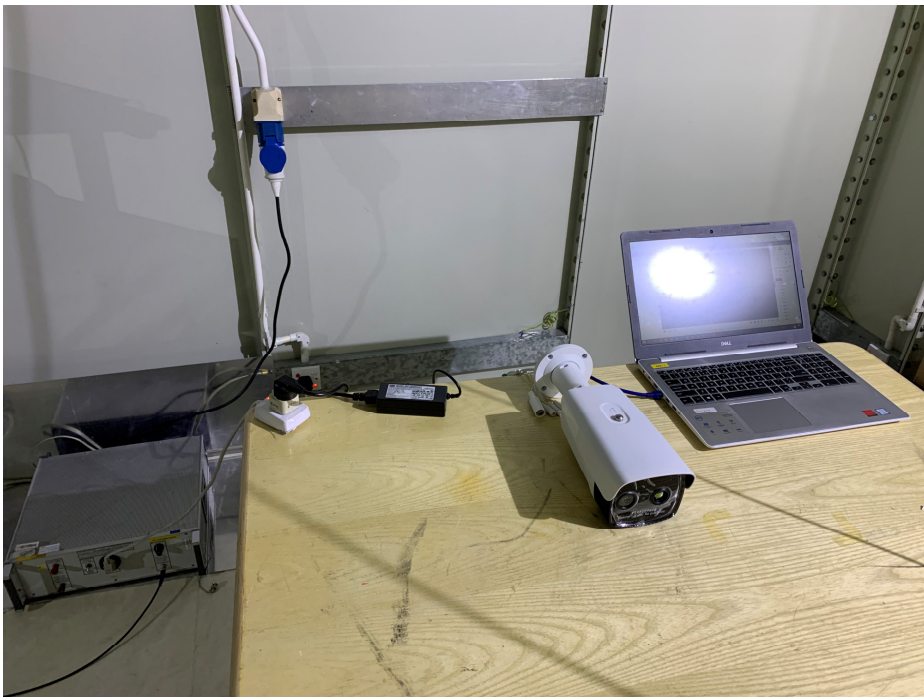
A: No degradation in the performance of the EUT was observed.

8 Photographs

8.1 Radiated Emission Test Setup



8.2 Conducted Emission Test Setup



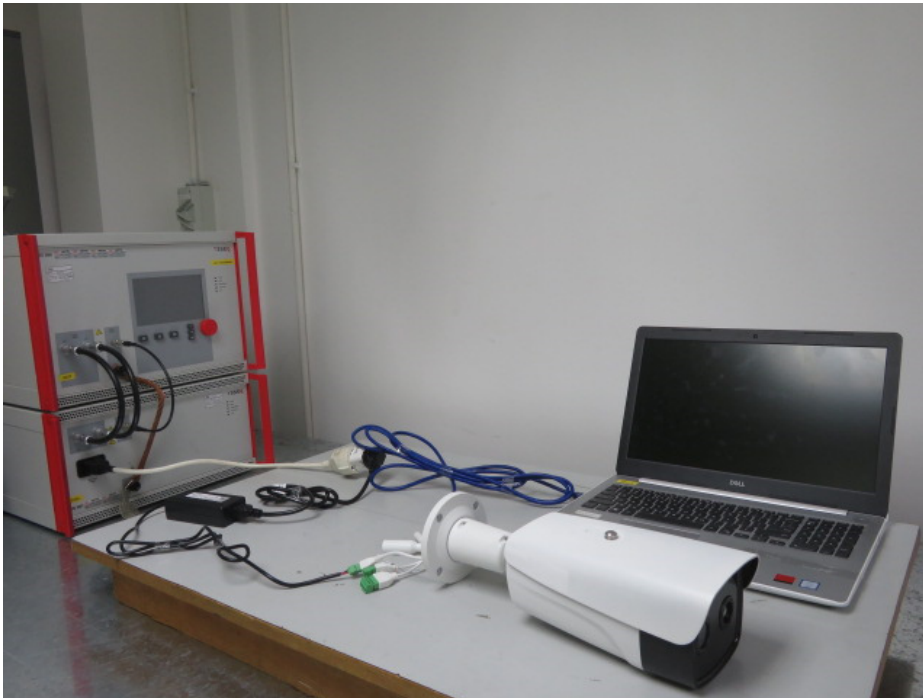
8.3 Harmonics & Flicker Test Setup



8.4 ESD Test Setup



8.5 EFT, Surge, Voltage Dip and Interruptions Test Setup



8.6 Radiated Immunity Test Setup



8.7 Conducted Immunity Test Setup



8.8 EUT Constructional Details (EUT Photos)







- End of the Report -