



**BUREAU
VERITAS**

Test Report No.: CE2209WDG0272



TEST REPORT

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Address	Room 332-333, Zhengshang Center, No.2229 Meilong Dadao, Long hua New area, Baoan District, Shenzhen City, China

Manufacturer or Supplier	CLOUD EMBEDDED TECHNOLOGY LIMITED	
Address	Floor 8, Building 1B, Shangzhi Science and Technology Park, Fenghuang Street, Guang Ming District, Shenzhen, China, 518107	
Product	Industrial Computer	
Brand Name	CESIPC	
Model	UTC-S1262A	
Additional Models & Model Difference	UTC-xxxxyz, KLD-xxxxyz, IPC-xxxxyz, FPM-xxxxyz, TPC-xxxxyz, UPC-xxxxyz, PPC-xxxxyz, CTN-xxxxyz, See item 2.1	
Date of tests	Oct. 28, 2022 ~ Nov. 10, 2022	

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- EN 55032:2015+A1:2020, CLASS B
- EN IEC 61000-3-2:2019+A1:2021
- EN 61000-3-3:2013+A2:2021
- EN 55035:2017+ A11:2020

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Loren Luo Project Engineer / EMC Department	Approved by Madison Luo Assistant Manager / EMC Department
	Date: Nov. 28, 2022

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Test Report No.: CE2209WDG0272

RELEASE CONTROL RECORD

Issue No.	Description	Date Issued
CE2209WDG0272	Original release	Nov. 28, 2022

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1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Emission			
Standard	Test Item	Result	Remarks
EN 55032:2015 + A1:2020, CLASS B	Conducted test	PASS	Minimum passing margin is -4.20dB at 0.55704MHz
	Conducted Test (Telecom port)	PASS	Minimum passing margin is -7.50dB at 1.15400MHz
	Radiated test (30MHz~1GHz)	PASS	Minimum passing margin is -3.53dB at 99.95MHz
	Radiated emission 1GHz -6GHz	PASS	Minimum passing margin is -14.60dB at 2144.90MHz
EN IEC 61000-3-2:2019+ A1:2021	Harmonic current emissions	PASS	Meets the requirements.
EN 61000-3-3:2013 +A2:2021	Voltage fluctuations & flicker	PASS	Meets the requirements.



IMMUNITY (EN55035:2017+A11:2020)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3:2020 ED. 4.0	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4:2012 ED. 3.0	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2017 ED. 3.1	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2013 ED. 4.0	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8:2009 ED. 2.0	Power frequency magnetic field immunity test.	PASS	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
IEC 61000-4-11:2020 ED. 3.0	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of Voltage Dips: i) >95% reduction - Performance Criterion A ii) 30% reduction – Performance Criterion A iii) >95% reduction– Performance Criterion C



1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted Emission Test	0.15MHz ~ 30MHz	+/- 3.36dB
Disturbance Voltage at the telecom Terminals Emission	0.15MHz ~ 30MHz	+/- 4.84dB
Radiated Disturbance Test	30MHz ~ 1000MHz	+/- 3.94dB
	1GHz ~ 6GHz	+/- 4.96dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Industrial Computer
BRAND	CESIPC
TEST MODEL	UTC-S1262A
ADDITIONAL MODELS	UTC-xxxxyz, KLD-xxxxyz, IPC-xxxxyz, FPM-xxxxyz, TPC-xxxxyz, UPC-xxxxyz, PPC-xxxxyz, CTN-xxxxyz
POWER SUPPLY	DC 12V from adapter input AC 100-240V 50/60Hz
CABLE SUPPLIED	N/A
THE HIGHEST OPERATING FREQUENCY	Above108MHz

NOTE:

1. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. Please refer to the EUT photo document (Reference No.:2209WDG0272) for detailed product photo.
4. Additional model (see above table) are identical with the test model UTC-S1262A except the color of the appearance, brand name, product name and model number for trading purpose.
5. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	CWT
MODEL:	KPL-060F-VI
INPUT:	AC 100-240V, 50/60Hz 1.7A
OUTPUT:	DC 12V, 5A
DC LINE:	Unshielded, detachable, 1.1m
AC LINE:	Unshielded, detachable, 1.3m



2.2 DESCRIPTION OF TEST MODES

The EUT were tested under the following modes, the final worst mode was marked in boldface and recorded in this report.

◆ FOR CONDUCTED EMISSIONS TEST :

No.	Test Mode	Test Voltage
1	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 230/50Hz
2	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 100Mbps (More than 10%) +VGA Out(1024*768)	
3	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 10Mbps (More than 10%) +VGA Out(1024*768)	
4	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(800*600)	
5	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM2 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
6	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
7	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(1024*768)	
8	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(800*600)	
9	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 2 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
10	Run BurnIn Test software +USB 2.0*5 Data Transmitting + USB 3.0 Data Transmitting + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(1024*768)	



11	Power on and Standby	
12	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 110/60Hz

◆ FOR CONDUCTED EMISSION AT THE TELECOM TERMINALS TEST

No.	Test Mode	Test Voltage
1	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 230/50Hz
2	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 100Mbps (More than 10%) +VGA Out(1024*768)	
3	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 10Mbps (More than 10%) +VGA Out(1024*768)	
4	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
5	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone+RJ45 1 Data Transmitting 100Mbps (More than 10%) +VGA Out(1024*768)	AC 110/60Hz



◆ FOR RADIATED EMISSIONS TEST (Below 1GHz):

No.	Test Mode	Test Voltage
1	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 230/50Hz
2	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 100Mbps (More than 10%) +VGA Out(1024*768)	
3	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 10Mbps (More than 10%) +VGA Out(1024*768)	
4	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone+RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(800*600)	
5	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM2 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
6	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
7	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(1024*768)	
8	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(800*600)	
9	Worst Mode+RJ45 2 Data Transmitting 1000Mbps (More than 10%)	
10	Run BurnIn Test software +USB 2.0*5 Data Transmitting + USB 3.0 Data Transmitting + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(1024*768)	
11	Power on and Standby	
12	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone+RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(800*600)	AC 110/60Hz



◆ FOR RADIATED EMISSIONS TEST (Above 1GHz):

No.	Test Mode	Test Voltage
1	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 230/50Hz
2	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
3	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
4	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 2 Data Transmitting 1000Mbps (More than 10%)	AC 110/60Hz



◆ **FOR OTHER IMMUNITY TESTS:**

No.	Test Mode	Test Voltage
1	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	AC 230/50Hz AC 110/60Hz
3	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 10Mbps (More than 10%) +VGA Out(1024*768)	
5	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM2 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
6	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM3 (RS232) Data Transmitting + Earphone+RJ45 1 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
7	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 1 Data Transmitting 1000Mbps (More than 10%) + HDMI Out(1024*768)	
9	Run BurnIn Test software +USB 2.0*2 Data Transmitting + USB 3.0 Data Transmitting + mouse + keyboard + printer + COM1 (RS232) Data Transmitting + Earphone +RJ45 2 Data Transmitting 1000Mbps (More than 10%) +VGA Out(1024*768)	
10	Power on and Standby	



2.3 TEST PROGRAM USED AND OPERATION DESCRIPTIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type described in manufacturer's specifications or the user's manual.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturers, the EUT must comply with the requirements of the following standards:

- EN 55032:2015+A1:2020, CLASS B**
- EN IEC 61000-3-2:2019+A1:2021**
- EN 61000-3-3:2013+A2:2021**
- EN 55035:2017 + A11:2020**
- IEC 61000-4-2:2008 ED. 2.0
- IEC 61000-4-3:2020 ED. 4.0
- IEC 61000-4-4:2012 ED. 3.0
- IEC 61000-4-5:2017 ED. 3.1
- IEC 61000-4-6:2013 ED. 4.0
- IEC 61000-4-8:2009 ED. 2.0
- IEC 61000-4-11:2020 ED. 3.0

All applicable tests have been performed and recorded as per the above standards.

2.5 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Printer	HP	ENVY 4520	N/A	N/A
2	Printer	Lenovo	LJ2200J	LP02857415	N/A
3	Keyboard	DELL	L100	CN-ORH656	N/A
4	Mouse	LENOVO	MSU1175	N/A	N/A
5	Modem	ACEEX	MODEM1414	980020541	N/A
6	U Disk	QingHuaZiGua ng	Q24Z150C	JAS00121	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.4m; USB Cable: Shielded, Detachable 1.4m.
2	AC Line: Unshielded, Detachable. 1.5m; USB Line: Unshielded, Detachable. 1.5m
3	USB Line: Unshielded, Detachable 1.8m
4	USB Line: Unshielded, Detachable 1.8m.
5	AC Line: Unshielded, Detachable 1.4m; RS232: Unshielded, Detachable 1.4m
6	N/A



3 CONDUCTED EMISSION FROM THE AC MAINS POWER PORT

3.1 LIMITS

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100666	Jun. 14, 23
Artificial Mains Network	Rohde&Schwarz	ENV216	102477	Jun. 19, 23
Artificial Mains Network	SCHWARZBECK	NSLK 8127	8127713	Apr. 18, 23
Capacitive Voltage Probe	Rohde&Schwarz	CVP 9222	9222-044	Aug. 29, 23
Voltage Probe	SCHWARZBECK	TK 9421	9421-0332	Jun. 23, 23
Current Probe	Rohde&Schwarz	EZ-17	0816.2063.02	Apr. 19, 23
ISN	Rohde&Schwarz	ENY81-CA6	101928	Jun. 14, 23
ISN	TESEQ	ISN T800	34373	Feb. 16, 23
Coaxial RF Cable	COMMATE	CFD300-NL	5D-001	Oct. 24, 23
Shielding Room	Burgeon	5m*4m*3m	D3040008DG-1	Jul. 22, 24
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A

NOTE: 1. The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in shielded room 543.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China

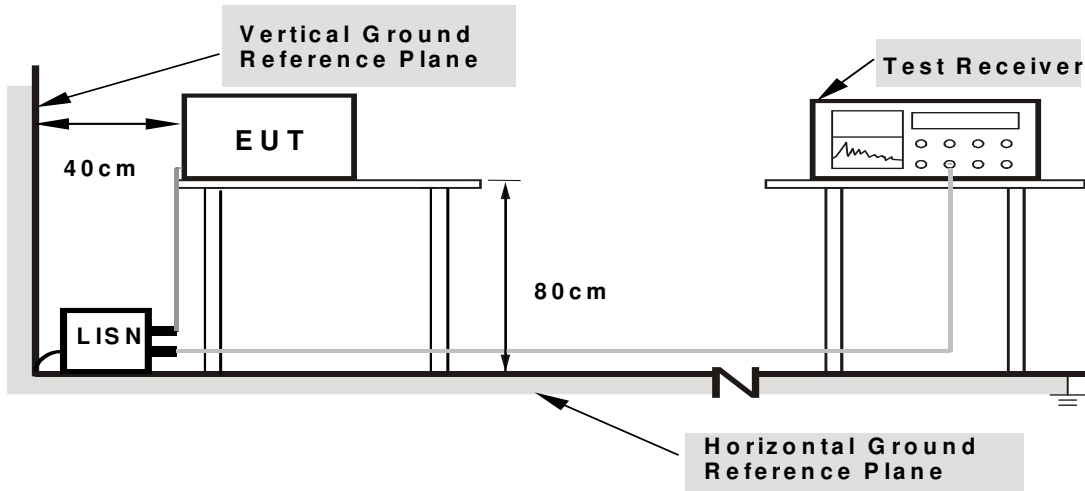
3.3 TEST ARRANGEMENT

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



3.4 TEST SETUP



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

3.5 SUPPLEMENTARY INFORMATION

N/A

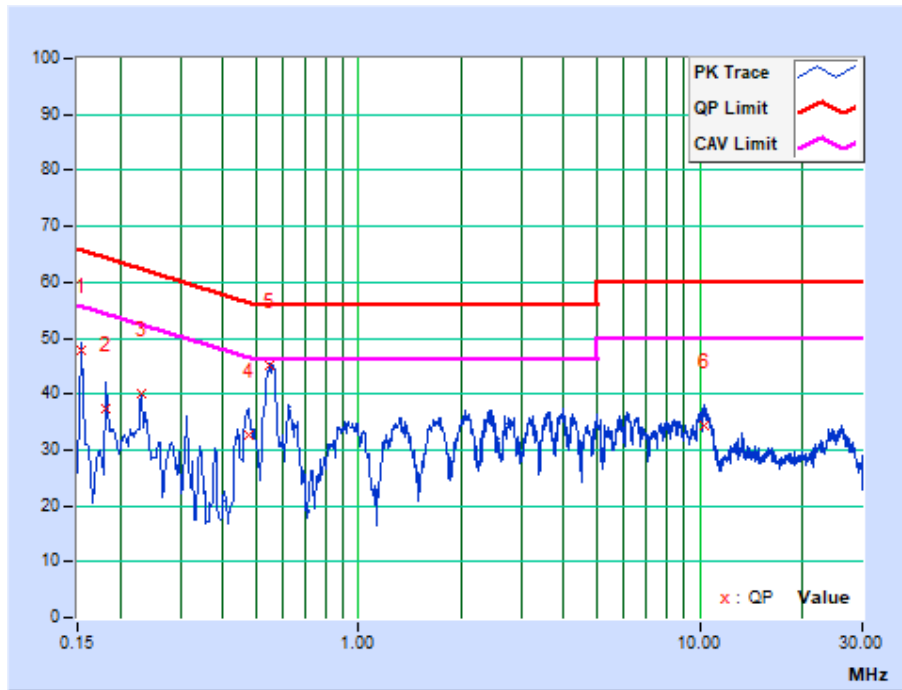


3.6 TEST RESULTS

TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 75% RH	TESTED BY	Bob

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.76	38.15	25.18	47.91	34.94	65.78	55.78	-17.87	-20.84
2	0.18200	9.78	27.44	6.53	37.22	16.31	64.39	54.39	-27.17	-38.08
3	0.23000	9.80	30.27	22.38	40.07	32.18	62.45	52.45	-22.38	-20.27
4	0.47400	9.80	22.70	14.35	32.50	24.15	56.44	46.44	-23.95	-22.30
5	0.54975	9.79	35.19	27.24	44.98	37.03	56.00	46.00	-11.02	-8.97
6	10.31400	9.86	24.40	17.97	34.26	27.83	60.00	50.00	-25.74	-22.17

REMARKS: The emission levels of other frequencies were very low against the limit.

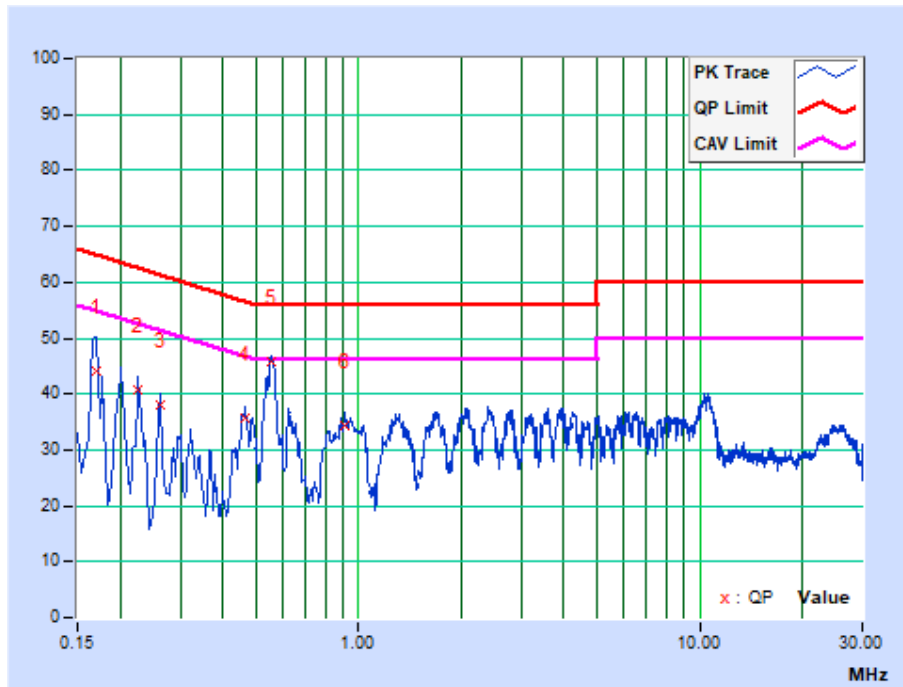




TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 75% RH	TESTED BY	Bob

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16932	9.74	34.28	23.70	44.02	33.44	64.99	54.99	-20.97	-21.55
2	0.22600	9.78	30.80	20.55	40.58	30.33	62.60	52.60	-22.02	-22.27
3	0.26200	9.77	28.30	19.27	38.07	29.04	61.37	51.37	-23.29	-22.32
4	0.46567	9.78	25.77	22.15	35.55	31.93	56.59	46.59	-21.04	-14.66
5	0.55704	9.77	35.89	32.21	45.66	41.98	56.00	46.00	-10.34	-4.02
6	0.91409	9.79	24.67	19.83	34.46	29.62	56.00	46.00	-21.54	-16.38

REMARKS: The emission levels of other frequencies were very low against the limit.





4 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

4.1 LIMIT OF CONDUCTED ASYMMETRIC MODE DISTURBANCE AT TELECOMMUNICATION PORTS

FOR CLASS A EQUIPMENT

FREQUENCY (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	97 – 87	84 - 74	53 – 43	40 – 30
0.5 - 30.0	87	74	43	30

FOR CLASS B EQUIPMENT

FREQUENCY (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 - 74	74 - 64	40 – 30	30 – 20
0.5 - 30.0	74	64	30	20

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

4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100666	Jun. 14, 23
Artificial Mains Network	Rohde&Schwarz	ENV216	102477	Jun. 19, 23
Artificial Mains Network	SCHWARZBECK	NSLK 8127	8127713	Apr. 18, 23
Capacitive Voltage Probe	Rohde&Schwarz	CVP 9222	9222-044	Aug. 29, 23
Voltage Probe	SCHWARZBECK	TK 9421	9421-0332	Jun. 23, 23
Current Probe	Rohde&Schwarz	EZ-17	0816.2063.02	Apr. 19, 23
ISN	Rohde&Schwarz	ENY81-CA6	101928	Jun. 14, 23
ISN	TESEQ	ISN T800	34373	Feb. 16, 23
Coaxial RF Cable	COMMATE	CFD300-NL	5D-001	Oct. 24, 23
Shielding Room	Burgeon	5m*4m*3m	D3040008DG-1	Jul. 22, 24
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A

NOTE: 1. The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in shielded room 543.

3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



4.3 TEST PROCEDURE

For using ISN:

- a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to ISN directly to reference ground plane.
- b. If voltage measurement is used, measure voltage at the measurement port of the ISN, correct the reading by adding the ISN voltage division factor, and compare to the voltage limit.
- c. If current measurement is used, measure current with the current probe and compare to the current limit.
- d. It is not necessary to apply the voltage and the current limit if the ISN is used. A 50 Ω load has to be connected to the measurement port of the ISN during the current measurement.
- e. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT.

For using a 150 Ω load to the outside surface of the shield cable:

- a. Break the insulation and connect a 150 Ω resistor from the outside surface of the shield cable to ground, and apply a ferrite tube or clamp between 150 Ω connection and AE.
- b. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AE with the shield cable.
- c. Measure current with a current probe and compare to the current limit. The common mode impedance towards the right of the 150 Ω resistor.
- d. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT.

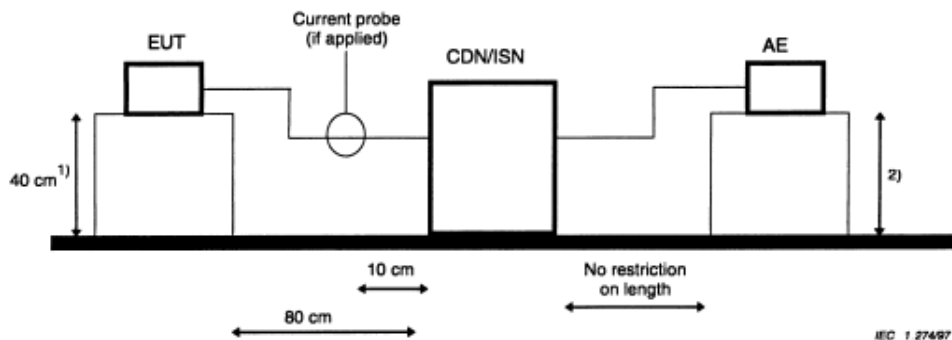


For using a combination of current probe and capacitive voltage probe:

- a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AE with a cable. The cable contains more than four balanced pairs or to unbalanced cable.
- b. Measure current with a current probe and compare to the current limit.
- c. Measure voltage with a capacitive probe and adjust the measured voltage as follows:
- d. – current margin ≤ 6 dB – subtract the actual current margin from measured voltage;
- e. – current margin > 6 dB – subtract 6 dB from measured voltage.
- f. Compare adjusted voltage with the applicable voltage limit.
- g. Both the measured current and the adjusted voltage shall be below the applicable current and voltage limits.
- h. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT

4.4 TEST SETUP

For using ISN:

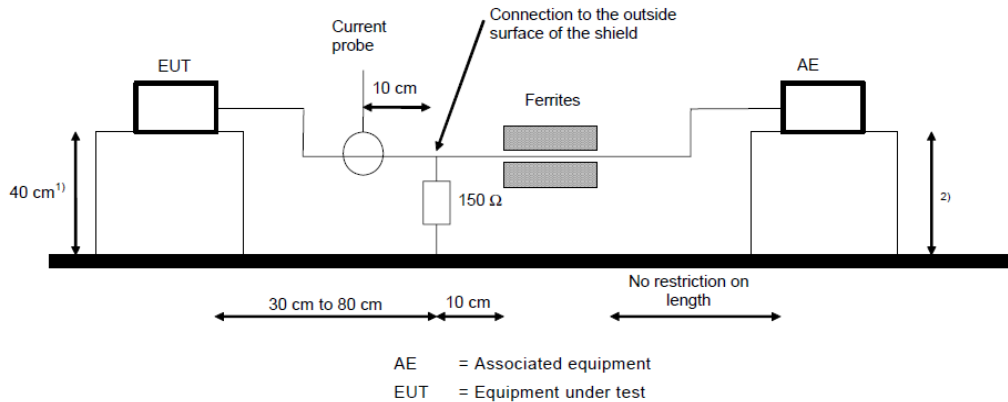


AE = Associated equipment
EUT = Equipment under test

- ¹⁾ Distance to the reference groundplane (vertical or horizontal).
- ²⁾ Distance to the reference groundplane is not critical.

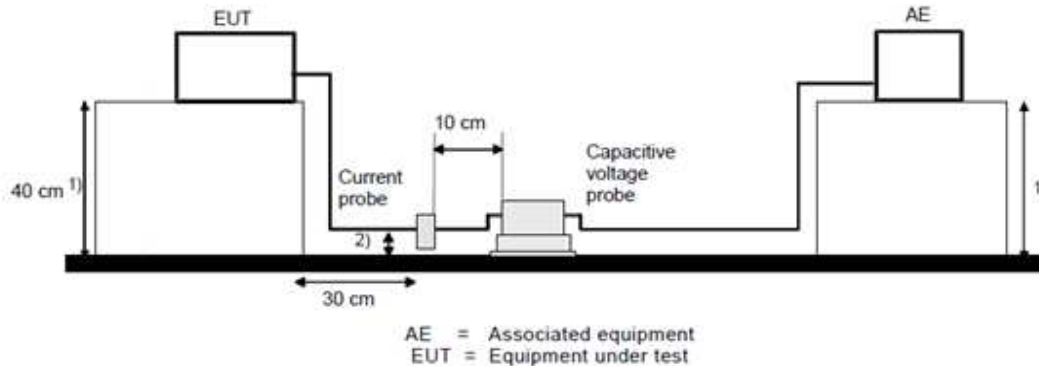


For using a 150 Ω load to the outside surface of the shield cable:



- 1) Distance to the reference groundplane (vertical or horizontal).
- 2) Distance to the reference groundplane is not critical.

For using a combination of current probe and capacitive voltage probe:



- 1) Distance to the reference groundplane (vertical or horizontal).
- 2) Distance 4 ± 1 cm from the reference groundplane.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.5 SUPPLEMENTARY INFORMATION

No deviation.

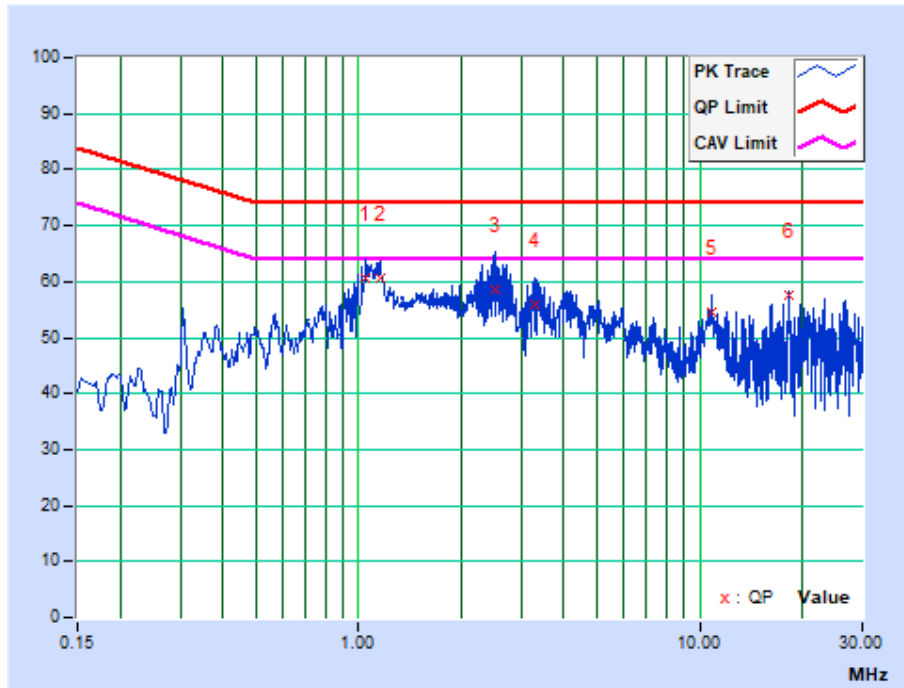


4.6 TEST RESULTS

TEST MODE	See section 2.2	6dB BANDWIDTH	9 kHz
TEST VOLTAGE	See section 2.2	PHASE	T8
ENVIRONMENTAL CONDITIONS	25 deg. C, 75% RH,	TEST BY	Bob

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	1.05384	9.56	51.14	45.32	60.70	54.88	74.00	64.00	-13.30	-9.12
2	1.15400	9.55	51.13	46.95	60.68	56.50	74.00	64.00	-13.32	-7.50
3	2.52200	9.50	49.13	40.22	58.63	49.72	74.00	64.00	-15.37	-14.28
4	3.29800	9.52	46.36	35.16	55.88	44.68	74.00	64.00	-18.12	-19.32
5	10.79400	9.56	45.09	41.28	54.65	50.84	74.00	64.00	-19.35	-13.16
6	18.24200	9.58	47.90	46.81	57.48	56.39	74.00	64.00	-16.52	-7.61

REMARK: The emission levels of other frequencies were very low against the limit.





5 RADIATED EMISSION MEASUREMENT

5.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FOR FREQUENCY BELOW 1000 MHz

For Other equipment

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	40	30
230 – 1000	47	37

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	50	40
230 – 1000	57	47

For FM receivers

Distance (m)	Source	Frequency Range (MHz)	Limits dB (uV/m)	
			Quasi-peak	
10	Local oscillator	≤1000	Fundamental	50
		30 to 300	Harmonics	42
		300 to 1000	Harmonics	46
	Other	30 to 230		30
		230 to 1000		37
3	Local oscillator	≤1000	Fundamental	60
		30 to 300	Harmonics	52
		300 to 1000	Harmonics	56
	Other	30 to 230		40
		230 to 1000		47



FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 6	80	60	74	54

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 3. All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



5.2 TEST INSTRUMENTS

FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU8	100184	Jun. 14, 23
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	01319	Nov, 29, 22
Pre-Amplifier	SCHWARZBECK	BBV 9745	00242	Jun. 14, 23
3m Semi-anechoic Chamber	ETS-Lindgren	9m*6m*6m	D3040004DG-1	Aug. 02, 24
Coaxial RF Cable	Joinfront	JFAA6-NMNM-8000	2100033742	Oct. 24, 23
Coaxial RF Cable	Joinfront	JFAA6-NMNM-2000	2100033742	Oct. 24, 23
Coaxial RF Cable	Joinfront	JFAA6-NMNM-1500	2100033742	Oct. 24, 23
Test software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A

- NOTES:**
- The test was performed in 966 Chamber-2.
 - The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 - Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU8	100184	Jun. 14, 23
Horn Antenna	ETS-Lindgren	3117	00240040	Jun. 07, 23
Broadband Preamplifier	SCHWARZBECK	BBV 9718C	00143	Jun. 14, 23
3m Semi-anechoic Chamber	ETS-Lindgren	9m*6m*6m	D3040004DG-1	Aug. 02, 24
Coaxial RF Cable	Joinfront	JFAA6-NMNM-8000	2100033742	Oct. 24, 23
Coaxial RF Cable	Joinfront	JFAA6-NMNM-2000	2100033742	Oct. 24, 23
Coaxial RF Cable	Joinfront	JFAA6-NMNM-1500	2100033742	Oct. 24, 23
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A

- NOTE:**
- The test was performed in 3m Chamber-2.
 - The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 - Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



5.3 TEST PROCEDURE

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.



<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

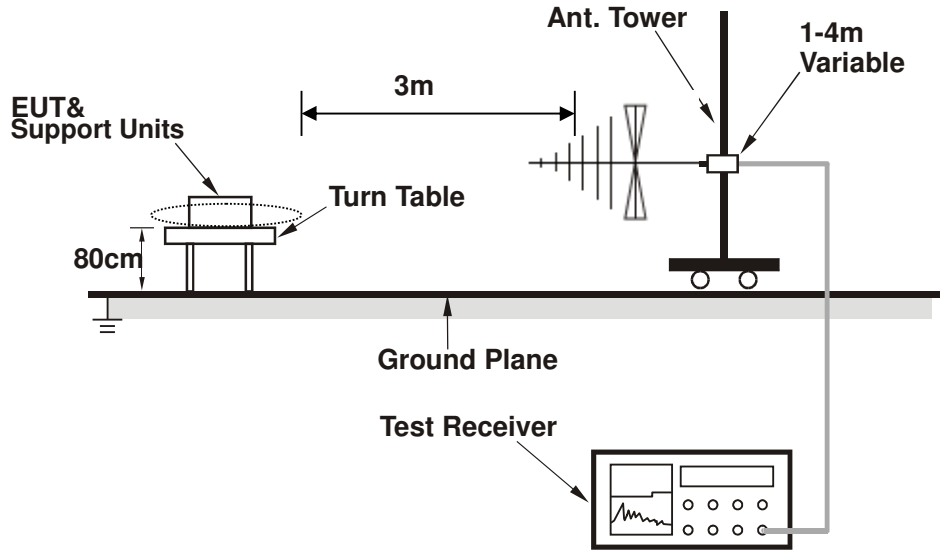
NOTE:

1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
6. Margin value = Emission level – Limit value.

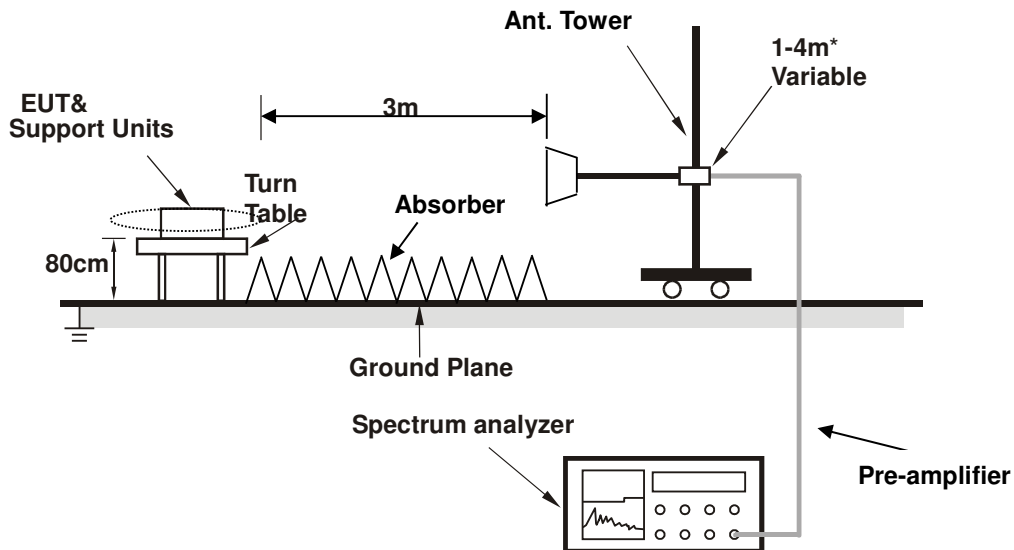


5.4 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

5.5 SUPPLEMENTARY INFORMATION

N/A

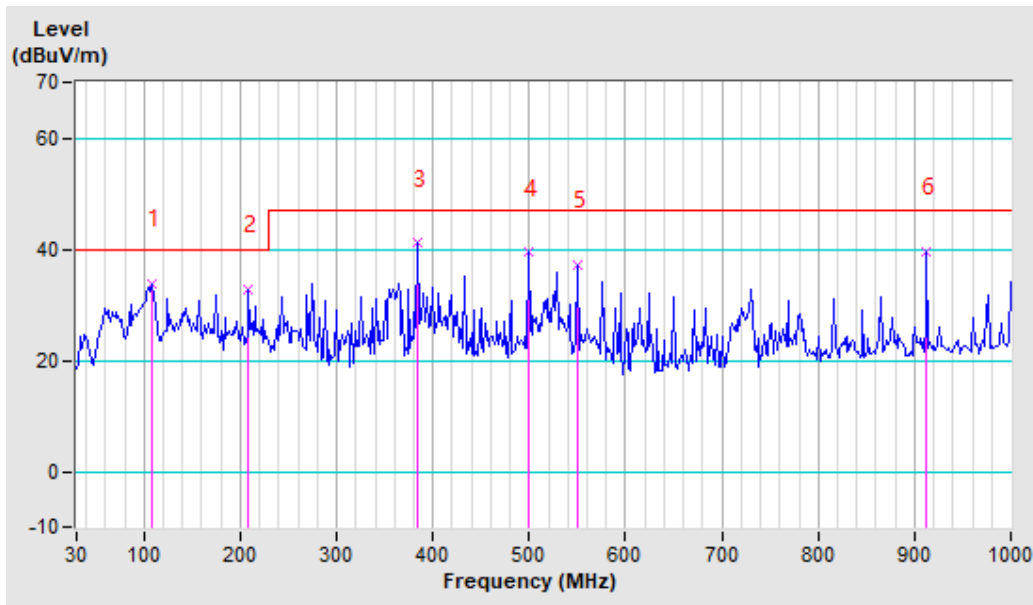


5.6 TEST RESULTS (Below 1GHz)

TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	See section 2.2	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 58% RH	TESTED BY: Rollins	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	107.72	-20.44	54.27	33.83	40.00	-6.17	100	165
2	208.77	-20.67	53.37	32.70	40.00	-7.30	100	174
3	384.42	-16.02	57.11	41.09	47.00	-5.91	100	124
4	499.46	-13.88	53.21	39.33	47.00	-7.67	100	0
5	550.75	-12.54	49.67	37.13	47.00	-9.87	100	147
6	912.95	-7.08	46.63	39.55	47.00	-7.45	100	136

REMARKS: The emission levels of other frequencies were very low against the limit.
The emission exceeding the limit is from the FM signal generator.

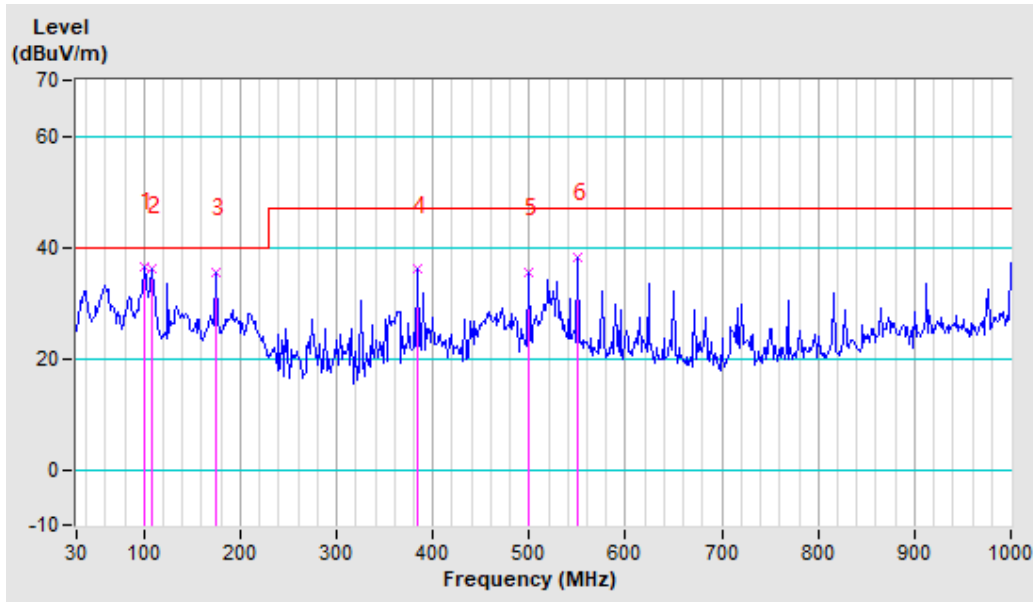




TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	See section 2.2	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 58% RH	TESTED BY: Rollins	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	99.95	-21.17	57.64	36.47	40.00	-3.53	100	123
2	107.72	-20.44	56.38	35.94	40.00	-4.06	100	235
3	174.57	-18.76	54.16	35.40	40.00	-4.60	100	201
4	384.42	-16.02	52.01	35.99	47.00	-11.01	100	302
5	499.46	-13.88	49.31	35.43	47.00	-11.57	100	158
6	550.75	-12.54	50.62	38.08	47.00	-8.92	100	186

REMARKS: The emission levels of other frequencies were very low against the limit.
The emission exceeding the limit is from the FM signal generator.





5.7 TEST RESULTS (ABOVE 1GHz)

TEST MODE	See section 2.2		
TEST VOLTAGE	See section 2.2	FREQUENCY RANGE	1-6 GHz
ENVIRONMENTAL CONDITIONS	25.0deg. C, 55.0% RH	TESTED BY: Durant	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1092.75PK	-5.72	58.02	52.30	70.00	-17.70	133	192
2	1092.75AV	-5.72	38.42	32.70	50.00	-17.30	280	27
3	1754.25PK	-1.78	50.38	48.60	70.00	-21.40	224	127
4	1754.25AV	-1.78	32.88	31.10	50.00	-18.90	211	357
5	2145.32PK	1.09	46.81	47.90	70.00	-22.10	125	280
6	2145.32AV	1.09	32.61	33.70	50.00	-16.30	101	348
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1068.45PK	-5.81	54.01	48.20	70.00	-21.80	160	256
2	1068.45AV	-5.81	38.21	32.40	50.00	-17.60	116	145
3	2144.90PK	1.08	49.02	50.10	70.00	-19.90	212	338
4	2144.90AV	1.08	34.32	35.40	50.00	-14.60	260	131
5	3868.81PK	5.26	45.24	50.50	74.00	-23.50	222	47
6	3868.81AV	5.26	32.04	37.30	54.00	-16.70	139	70

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 6GHz.
 4. Only emissions significantly above equipment noise floor are reported.



6 HARMONICS CURRENT MEASUREMENT

6.1 LIMITS

Limits for Class A equipment		Limits for Class D equipment		
Harmonic Order n	Max. permissible harmonics current A	Harmonic Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15 ≤ n ≤ 39	0.15 x 15/n	15 ≤ n ≤ 39	3.85/n	0.15 x 15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8 ≤ n ≤ 40	0.23 x 8/n			

- NOTES: 1. Class A and Class D are classified according to section 5 of EN IEC 61000-3-2.
 2. According to section 7 of EN IEC 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 5 W and no limits apply for equipment with an active input power up to and including 75 W.

Limits for Class B equipment:

For class B equipment, the harmonics of the input current shall not exceed the maximum permissible values given for class A equipment multiplied by a factor of 1.5



Limits for Class C equipment	
Harmonic Order n	Max. permissible harmonics current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
11 ≤ n ≤ 39 (odd harmonics only)	3
*λ is the circuit power factor	

- NOTES:** 1. Lighting equipment having a rated power greater than or equal to 5 W and less than equal to 25 W shall not exceed the power-related limits of class D, column 2. or the third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 % and the fifth harmonic current shall not exceed 61 %. In addition, the waveform of the input current shall be such that it reaches the 5 % current threshold before or at 60°, has its peak value before or at 65° and does not fall below the 5 % current threshold before 90°, referenced to any zero crossing of the fundamental supply voltage. Or the THD shall not exceed 70 %. The third order harmonic current, expressed as a percentage of the fundamental current, shall not exceed 35 %, the fifth order current shall not exceed 25 %, the seventh order current shall not exceed 30 %, the ninth and eleventh order currents shall not exceed 20 % and the second order current shall not exceed 5 %.
2. For luminaires with incandescent lamps and built-in phase control dimming having a rated power greater than 25 W, the harmonics of the input current shall not exceed the Class C equipment limits

6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
3kVA AC Power Source	California Instruments	3001 iX	54140	Feb. 23, 23
Harmonic/Flicker Test System	California Instruments	PACS-1	1319A01862	Feb. 23, 23
Test Software	California Instruments	CTS 4 – V4.29.0	N/A	N/A

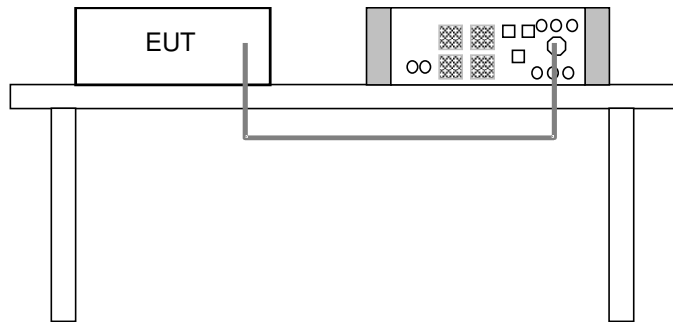
- NOTE: 1. The test was performed in EMS Test Room2.
2. The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



6.3 TEST ARRANGEMENT

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under Normal Operating conditions for each successive harmonic component in turn.
- b. The classification of EUT is according to section 5 of EN IEC 61000-3-2.
The EUT is classified as follows:
Class A: Balanced three-phase equipment, household appliances, excluding those specified as belonging to Class B, C or D, vacuum cleaners, high pressure cleaners, tools, excluding portable tools, independent phase control dimmers, audio equipment, professional luminaires for stage lighting and studios.
Class B: Portable tools. ; Arc welding equipment which is not professional equipment
Class C: Lighting equipment.
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers and refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).
- c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen.
- d. The measure time shall be not less than the time necessary for the EUT to be exercised.

6.4 TEST SETUP



6.5 TEST RESULTS

The limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment). The EUT is not required to meet this test item as its power consumption is lower than 75W.

For further details, please refer to Clause 7 of EN IEC 61000-3-2:2019+A1:2021.



7 VOLTAGE FLUCTUATIONS AND FLICKER MEASUREMENT

7.1 LIMITS

Test item	Limit	Note
P_{st}	1.0	P_{st} : short-term flicker severity.
P_{lt}	0.65	P_{lt} : long-term flicker severity.
T_{max} (ms)	500	T_{max} : maximum time duration during the observation period that the voltage deviation $d(t)$ exceeds the limit for d_c .
d_{max} (%)	4	d_{max} : maximum absolute voltage change during an observation period.
d_c (%)	3.3	d_c : maximum steady state voltage change during an observation period.

7.2 TEST INSTRUMENTS

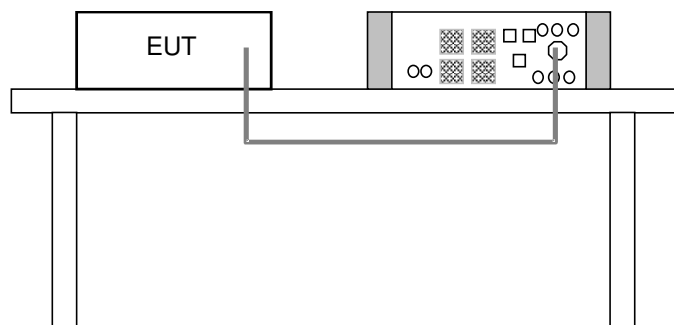
Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
3kVA AC Power Source	California Instruments	3001 iX	54140	Feb. 23, 23
Harmonic/Flicker Test System	California Instruments	PACS-1	1319A01862	Feb. 23, 23
Test Software	California Instruments	CTS 4 – V4.29.0	N/A	N/A

- NOTE: 1. The test was performed in EMS Test Room2.
 2. The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

7.3 TEST ARRANGEMENT

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.4 TEST SETUP





7.5 TEST RESULTS

Observation (T_p)	10 min.	Test Date	2022-11-04
Fundamental Voltage/Ampere	230.04Vrms	Power Frequency	50.00Hz
Environmental Conditions	25.6deg. C, 53.4% RH	Tested by	Ming Bai
Test Mode	See section 2.2		

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.182	1.00	Pass
P_{lt}	0.079	0.65	Pass
T_{max} (ms)	0	500	Pass
d_{max} (%)	0	4	Pass
d_c (%)	0	3.3	Pass

- Note: (1) P_{st} means short-term flicker indicator.
(2) P_{lt} means long-term flicker indicator.
(3) T_{max} means accumulated time value of $d(t)$ with a deviation exceeding 3.3 %.
(4) d_{max} means maximum relative voltage change.
(5) d_c means maximum relative steady-state voltage change.



8 IMMUNITY TEST

8.1 GENERAL DESCRIPTION

Product Standard:	EN 55035:2017+A11:2020	
Basic Standard, Specification, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), 1800 MHz,3V/m, 80% AM (1kHz), 2600 MHz,3V/m, 80% AM (1kHz), 3500 MHz,3V/m, 80% AM (1kHz), 5000 MHz,3V/m, 80% AM (1kHz)
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT AC Power line: 1kV, DC Power line: 0.5kV Signal line: 0.5kV Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, 10/700 us Open Circuit Voltage, 5 /320 us Short Circuit Current, AC Power Line: line to line 1 kV, line to earth 2kV Signal line: 1kV, 4kV Shielded line and DC line:0.5kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-10 MHz, 3Vrms, 10MHz-30MHz, 3Vrms-1Vrms, 30MHz-80MHz, 1Vrms 80% AM, 1kHz
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A



	IEC 61000-4-11	Meets the requirements of Voltage Dips: i) reduction for >95% Performance Criterion B ii) reduction for 30% Performance Criterion C iii) reduction for >95% Performance Criterion C
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8.1.1 GENERAL PERFORMANCE CRITERIA DESCRIPTION

According to Clause 8.2, 8.3, 8.4 of EN 55035 standard, the following describes the general performance criteria.

CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state 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.
	For audio output device: The measured acoustic interference ratio and/or the measured electrical interference during the test shall be -20dB or better(see note1)
CRITERION B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, 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), or recovery time, 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. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Note 1: This performance criterion only using for Continuous inducted RF disturbances and Continuous RF electromagnetic field disturbances item.



Modified test levels for performance criterion A for the broadcast reception function:

Performance criteria	Test Item	Group 1	Group 2
A	RS	The disturbance level is reduced to 1V/m for in-band frequencies	No test requirements apply
A	CS	The disturbance level is reduced to 1V/m for in-band frequencies	

Notes: 1. In-band is defined as the entire tuneable operating range of the selected broadcast reception function.
2. The tuned channel $\pm 0,5$ MHz (lower edge frequency – 0,5 MHz up to the upper edge frequency + 0,5 MHz of the tuned channel) is excluded from testing.
3. Group 1: Equipment in which the desired RF broadcast signal enters the equipment through a coaxial broadcast receiver tuner port. These coaxial ports are intended to be connected via a coaxial cable to an antenna or a cable distribution system.
4. Group 2: Broadcast reception equipment which is not included in Group 1.



8.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN55035)

8.2.1 TEST SPECIFICATION

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

8.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
ESD Generator	TESEQ	NSG 437	603	Mar. 24, 23
Test Software	TESEQ	V03.03	N/A	N/A

- NOTE:**
- The test was performed in ESD Test Room.
 - The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 - Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

8.2.3 TEST PROCEDURE

The basic test procedure was in accordance with IEC 61000-4-2:

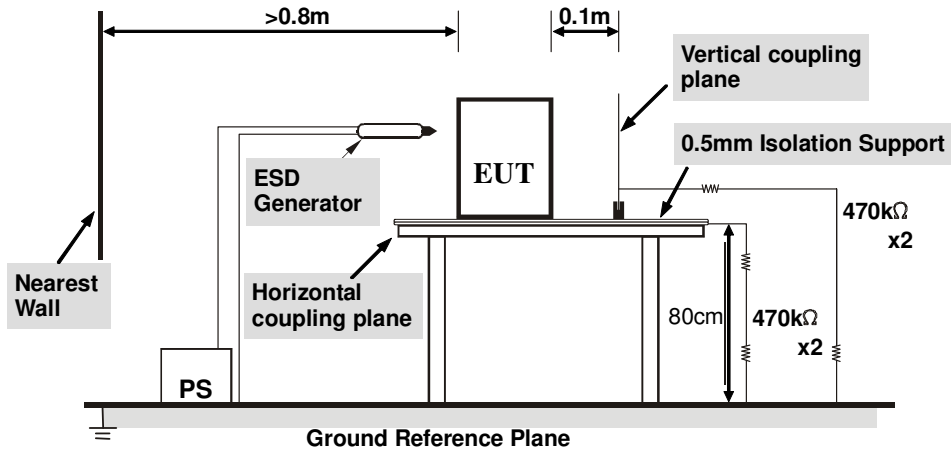
- Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The discharge return cable of the generator shall be kept at a distance of at least 0.2 m from the EUT whilst the discharge is being applied and should not be held by the operator.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontal at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



8.2.4 DEVIATION FROM TEST STANDARD

No deviation.

8.2.5 TEST SETUP



NOTE:

TABLE-TOP EQUIPMENT

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

FLOOR-STANDING EQUIPMENT

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



8.2.6 TEST RESULTS

TEST VOLTAGE	See section 2.2	ENVIRONMENTAL CONDITIONS	20.1deg. C, 51.0% RH, 102.0kPa
TESTED BY	Stalker		

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
4	+ / -	Other metal parts	A	N/A
8	+ / -	All non-metal parts	N/A	A
4	+ / -	LAN1, LAN2	B	N/A

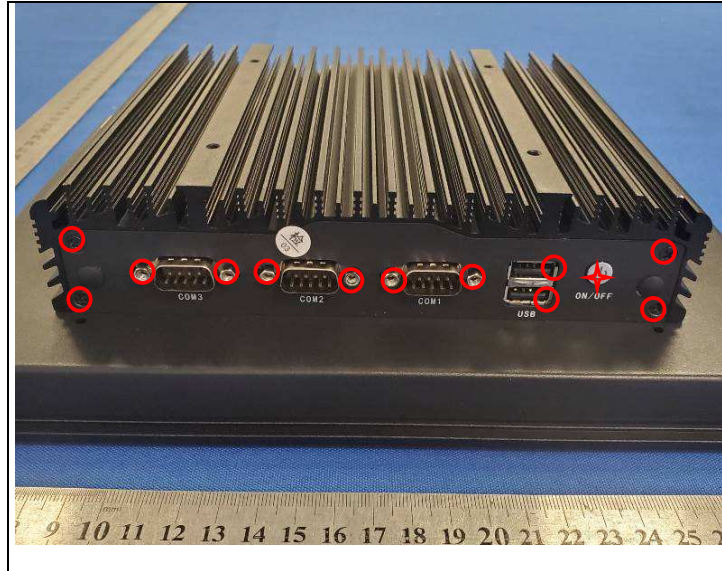
Indirect Discharge Application				
Discharge Level (kV)	Polarity	Test Point	Test Result of HCP	Test Result of VCP
4	+ / -	All Sides	A	N/A
4	+ / -	All Sides	N/A	A

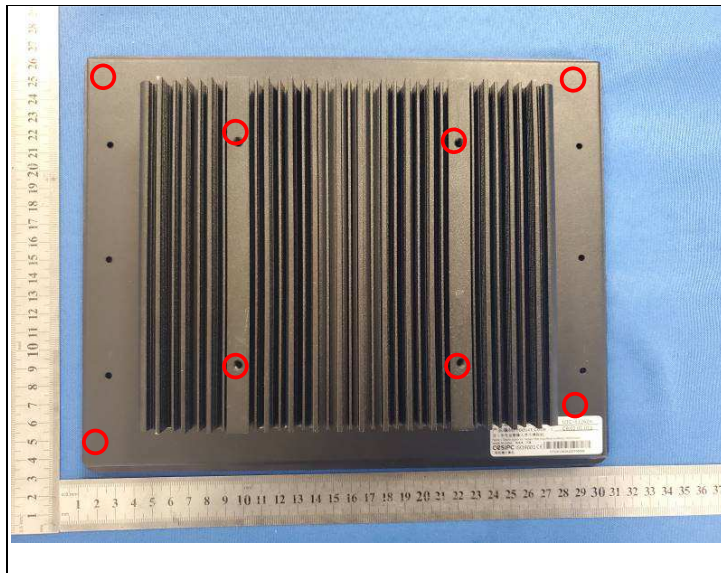
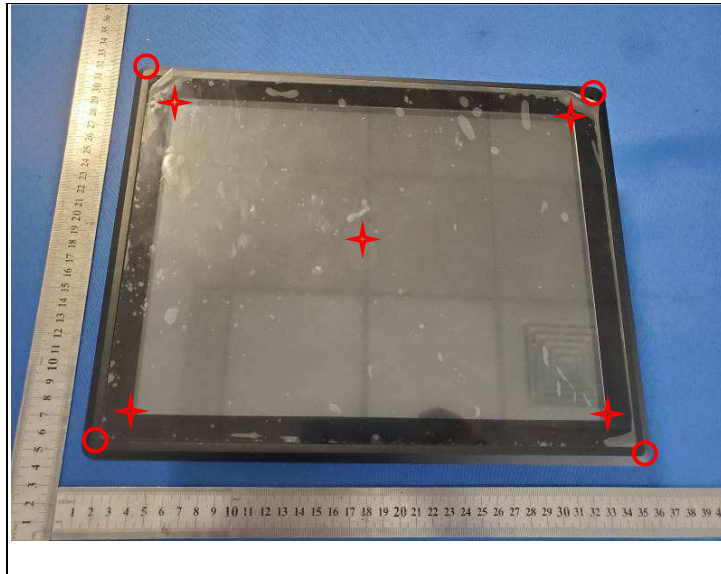
NOTE: A: There was no change compared with initial operation during the test.

B: When the device works properly, Contact Discharge to LAN1 and LAN2, and the network connection of the device is interrupted. Then the device automatically recovers.



ESD TEST POINT
(○ - Direct Contact Discharge; ✦ - Air Discharge)









8.3 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) (EN55035)

8.3.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	at least 3 seconds

8.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Rohde&Schwarz	SMB 100A	107636	Jun. 19, 23
Antenna Log-Periodic (80MHz~6GHz)	AR	ATR80M6G	0357505	N/A
Switch Controller	Tonscend	JS0806S	21G8060447	N/A
RF Power Meter	Rohde&Schwarz	NRP2	106419	Dec.13, 22
Power Sensor	Rohde&Schwarz	NRP6A	103355	Jun. 19, 23
Power Sensor	Rohde&Schwarz	NRP6A	103357	Jun. 19, 23
E-Field probe	Narda	NBM-520	D-1702	Jun. 16, 23
Power Amplifier (80MHz~1GHz)	AR	500W1000CM33	0357919	N/A
Power Amplifier (1~6GHz)	AR	125S1G6M1	0398054	N/A
Dual Directional Coupler (80MHz~1GHz)	AR	DC6180A	0357475	Oct. 16, 23
Dual Directional Coupler(1~6GHz)	AR	DC7200A	0358250	Jun. 19, 23
Audio analyzer	Rohde&Schwarz	UPV	100508	Apr. 27, 23
Conditioning Amplifier	B&K	2690-W-013	3009832	Feb. 27, 23
EAR SIMULATOR	B&K	4192-L-001	3192610	Jan. 24, 23
RS Chamber	ETS-Lindgren	7m*4m*4m	D3040005DG-1	Aug. 05, 24
Test Software	Tonscend	TS+	3.0.0.5	N/A

- NOTE:**
1. The test was performed in RS Chamber-2.
 2. The calibration interval of the above test equipment (except shielded room and chamber) is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



8.3.3 TEST PROCEDURE

The test procedure was in accordance with IEC 61000-4-3

- a. The testing was performed in a fully-anechoic chamber.
- b. The frequency range is swept from 80 MHz to 1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
- c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5s.
- d. The field strength levels were 3V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

For Broadcast reception function:

- f. **Group1:** Equipment in which the desired RF broadcast signal enters the equipment through a coaxial broadcast receiver tuner port. These coaxial ports are intended to be connected via a coaxial cable to an antenna or a cable distribution system.
- g. **Group 2:** Broadcast reception equipment which is not included in Group 1.
- h. AM/FM/DAB equipment with a coaxial broadcast receiver tuner port is classified as Group 2 equipment if the manufacturer declares that the equipment is not intended to be connected to a CATV or other cable distribution network.
- i. The broadcast reception function shall be tested in each reception mode for which the receiver is designed, for example analogue reception, DVB-T, DVB-T2, DVB-C, DVB-C2, DVB-S, DVB-S2. The receiver shall be tuned to one channel and provided with an appropriate wanted signal on that channel or other input typical of normal use.

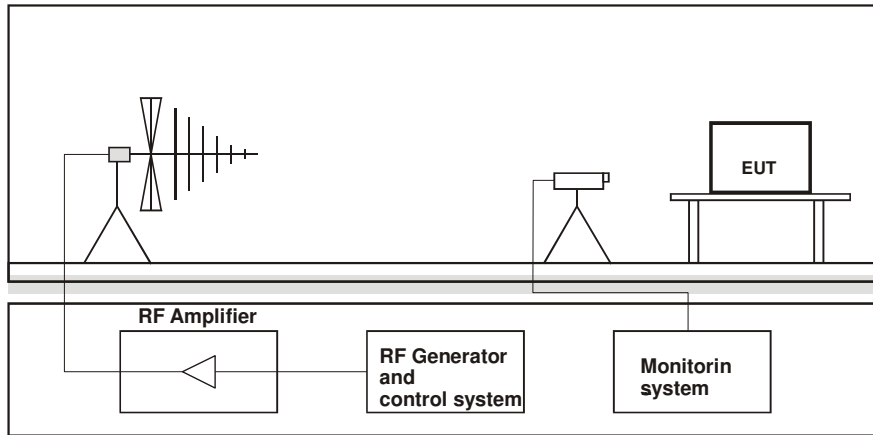
8.3.4 DEVIATION FROM TEST STANDARD

No deviation.

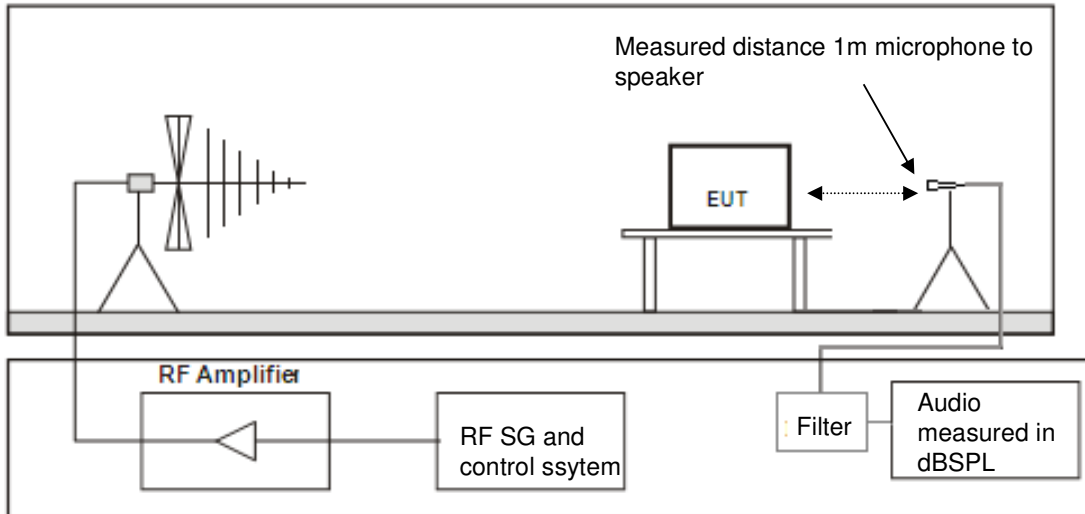


8.3.5 TEST SETUP

For Picture monitoring:

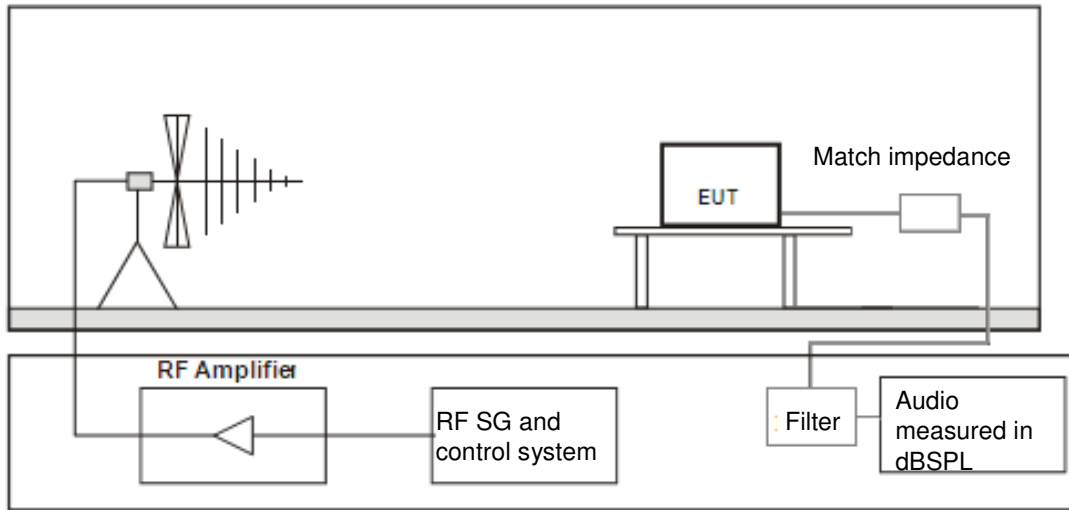


For Acoustic mode:





For Electrical mode:



NOTE:

1. The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.
2. Filter: 1kHz 3dB band pass filter.
3. The measurement distance: EUT to interference antenna was 3m.



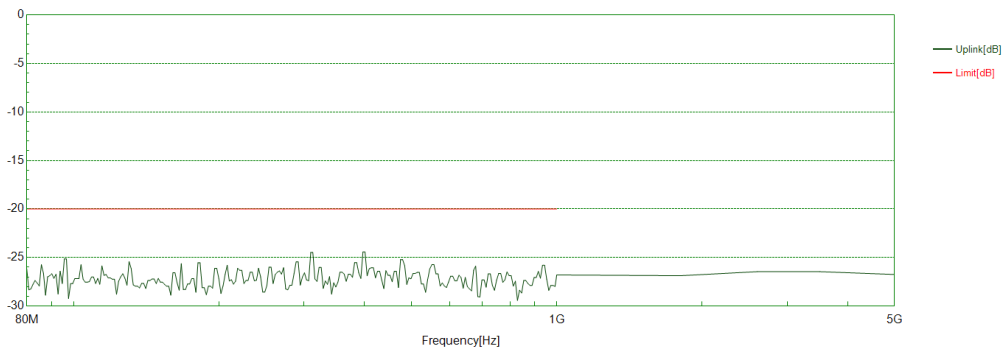
8.3.6 TEST RESULTS

TEST MODE	See section 2.2	TEST VOLTAGE	See section 2.2
ENVIRONMENTAL CONDITIONS	24.7deg., 47.1% RH	TESTED BY: Bob	

Field Strength (V/m)	Test Frequency (MHz)	Test mode	Test method	Reference Level	Audio output	Interference Ratio
3	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	USB	Acoustic	-13.41 dBV	AUDIO OUT	-26.1365
Limit		≤ -20				
Test Result		Pass				
performance criteria		A				

Worst case mode: USB

Note: The value of the reference level was reduce 20dB as the limit.





TEST MODE	See section 2.2	TEST VOLTAGE	See section 2.2
ENVIRONMENTAL CONDITIONS	24.7deg., 47.1% RH	TESTED BY: Bob	

Field Strength (V/m)	Test Frequency (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	H&V	3	A	0, 90, 180, 270

Note#1:

Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880MHz

NOTE: A: There was no change compared with initial operation during the test



8.4 ELECTRICAL FAST TRANSIENT (EFT) (EN55035)

8.4.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-4
Test Voltage:	Power Line: 1kV Signal/Control Line: 0.5kV
Polarity:	Positive & Negative
Impulse Frequency:	100 kHz : only for single lines of xDSL equipment 5 kHz : other
Impulse Waveshape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 min.

8.4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
CM-TELCD Telecom Coupler/De-coupler	Thermo Fisher SCIENTIFIC	CM-TELCD	1112216	Apr. 20, 23
Capacitor Clamp	Thermo Fisher SCIENTIFIC	CCL-A	1112111	Jun. 14, 23
Test Software	Thermo Fisher SCIENTIFIC	CE ware32	V4.1	N/A
EFT Tester	HAEFELY	PEFT4010	150546	Jan. 18, 23
EFT Coupling Clamp	HAEFELY	IP4A	150407	Jan. 18, 23
Test Software	HAEFELY	SWPE4010 1.22	N/A	N/A

- NOTE:**
1. The test was performed in EMS Test Room-1.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China

8.4.3 TEST PROCEDURE

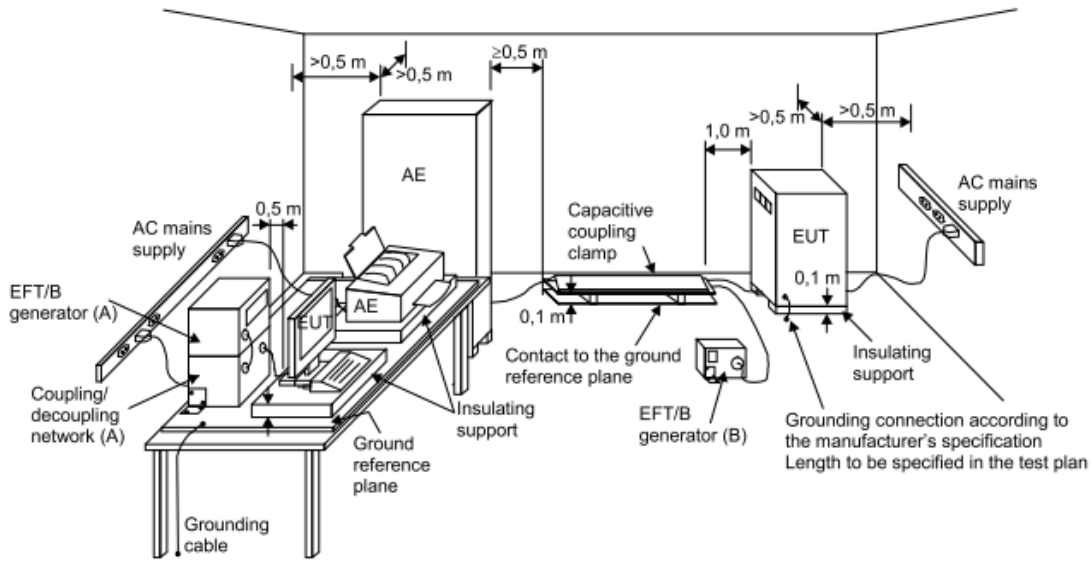
- a Both positive and negative polarity discharges were applied.
- b The distance between any coupling devices and the EUT should be (0.5 – 0/+0.1) m for table-top equipment testing, and (1.0 ± 0.1) m for floor standing equipment.
- c The duration time of each test sequential was 1 minute.
- d The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

8.4.4 DEVIATION FROM TEST STANDARD

No Deviation.



8.4.5 TEST SETUP



IEC 645/12

- (A) location for supply line coupling
- (B) location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



8.4.6 TEST RESULTS

TEST VOLTAGE	See section 2.2	ENVIRONMENTAL CONDITIONS	23.5deg. C, 51.7% RH
TESTED BY	Ming Bai		

Pulse Voltage	1 kV		0.5 kV		kV		kV	
Pulse Polarity	+	-	+	-	+	-	+	-
L	A	A	/	/	/	/	/	/
N	A	A	/	/	/	/	/	/
PE	A	A	/	/	/	/	/	/
L+N	A	A	/	/	/	/	/	/
L+PE	A	A	/	/	/	/	/	/
N+PE	A	A	/	/	/	/	/	/
L+N+PE	A	A	/	/	/	/	/	/
RJ45	/	/	A	A	/	/	/	/

NOTE: A: There was no change compared with initial operation during the test.



8.5 SURGE IMMUNITY (EN55035)

8.5.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Test Voltage:	Power Line :1kV
Surge Input/Output:	L-N
Generator Source Impedance:	2 ohm between networks
Polarity:	Positive/Negative
Phase Angle:	90°/270°
Pulse Repetition Rate:	1 time / 1min.
Number of Tests:	5 positive and 5 negative at selected points

8.5.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
CM-TELCD Telecom Coupler/De-coupler	Thermo Fisher SCIENTIFIC	CM-TELCD	1112216	Apr. 20, 23
I/O Line Coupler/De-coupler	Thermo Fisher SCIENTIFIC	CM-I/OCD	1112214	Apr. 20, 23
Test Software	Thermo Fisher SCIENTIFIC	CE ware32	V4.1	N/A

- NOTE:**
1. The test was performed in EMS Test Room-1.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



8.5.3 TEST PROCEDURE

a. For EUT power supply:

The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

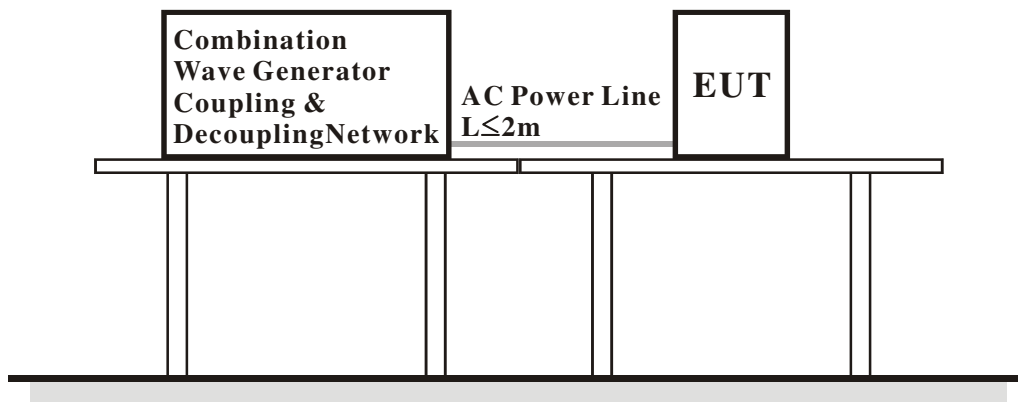
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrester was not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

8.5.4 DEVIATION FROM TEST STANDARD

No deviation.

8.5.5 TEST SETUP





8.5.6 TEST RESULTS

TEST VOLTAGE	See section 2.2	ENVIRONMENTAL CONDITIONS	24.7deg. C, 51.6% RH
TESTED BY	Ming Bai		

AC/DC Power port:

\ Voltage (kV)	\ Phase angle \ Test point	\ Test result \ Polarity	0°	90°	180°	270°	/	DC Power Port
			1.0	L-N	+	/	A	
		-	/	/	/	A	/	N/A
2.0	L-PE	+	/	A	/	/	/	N/A
		-	/	/	/	A	/	N/A
2.0	N-PE	+	/	A	/	/	/	N/A
		-	/	/	/	A	/	N/A

NOTE: A: There was no change compared with initial operation during the test.



8.6 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS) (EN55035)

8.6.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz - 10 MHz, 10 MHz – 30 MHz, 30 MHz – 80MHz
Field Strength:	3 V _{r.m.s} , 3 V _{r.m.s} - 1V _{r.m.s} , 1V _{r.m.s} ,
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Coupled Cable:	Power Mains, Unshielded
Coupling Device:	CDN-M2(2 wires)

8.6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Rohde&Schwarz	SMC 100A	107350	Jun. 19, 23
Power Meter	Rohde&Schwarz	NRX	103107	Jun. 19, 23
Power Sensor	Rohde&Schwarz	NRP6A	103356	Jun. 19, 23
CDN	TESEQ	CDN M016	59949	Jun. 19, 23
CDN	COM-POWER	T2E	581001	Feb. 16, 23
CDN	COM-POWER	T8	581547	Feb. 16, 23
CDN	COM-POWER	M325E	521114	Feb. 16, 23
CDN	TESEQ	CDN T800	59708	Jun. 14, 23
6dB 150Watt Attenuator	GUBO	N-CA100W06-3G	210712	Jun. 14, 23
Power Amplifier	PRANA	N-DR 290	2105-2867	N/A
Electromagnetic Injection Clamp	AMETEK	KEMZ801A	59633	Apr. 18, 23
Audio analyzer	Rohde&Schwarz	UPV	100508	Apr. 27, 23
Conditioning Amplifier	B&K	2690-W-013	3009832	Feb. 27, 23
EAR SIMULATOR	B&K	4192-L-001	3192610	Jan. 24, 23
Test Software	Tonscend	TS+	4.0.0.0	N/A

- NOTE:**
1. The test was performed in CS Test Shielding Room (Baodun).
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



8.6.3 TEST PROCEDURE

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- d. The frequency range is swept from 0.15 MHz - 10 MHz, 10 MHz – 30 MHz and 30 MHz – 80MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.
- e. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.
- f. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

For Broadcast reception function:

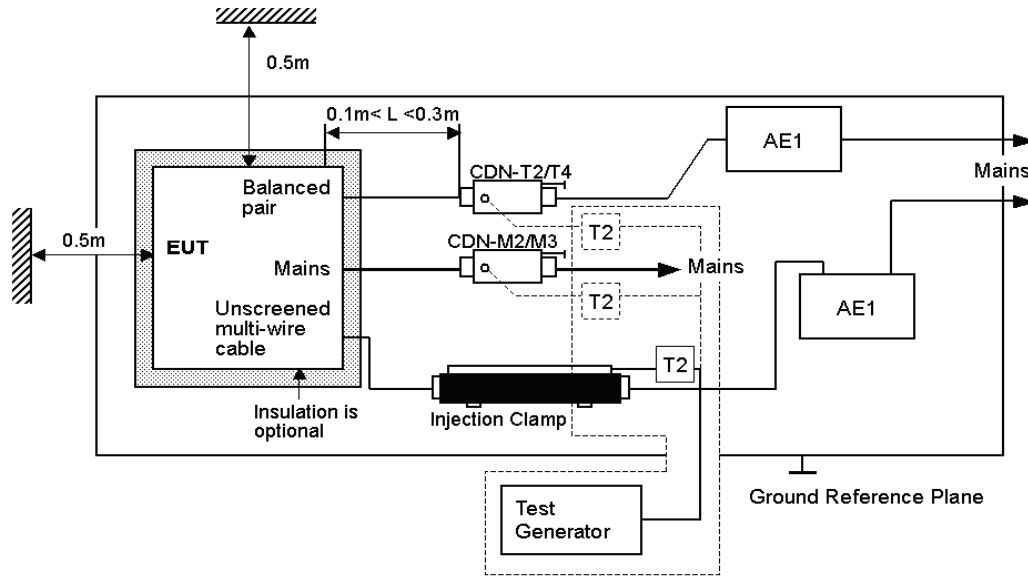
- j. **Group1:** Equipment in which the desired RF broadcast signal enters the equipment through a coaxial broadcast receiver tuner port. These coaxial ports are intended to be connected via a coaxial cable to an antenna or a cable distribution system.
- k. **Group 2:** Broadcast reception equipment which is not included in Group 1.
- l. AM/FM/DAB equipment with a coaxial broadcast receiver tuner port is classified as Group 2 equipment if the manufacturer declares that the equipment is not intended to be connected to a CATV or other cable distribution network.
- m. The broadcast reception function shall be tested in each reception mode for which the receiver is designed, for example analogue reception, DVB-T, DVB-T2, DVB-C, DVB-C2, DVB-S, DVB-S2. The receiver shall be tuned to one channel and provided with an appropriate wanted signal on that channel or other input typical of normal use.

8.6.4 DEVIATION FROM TEST STANDARD

No deviation.

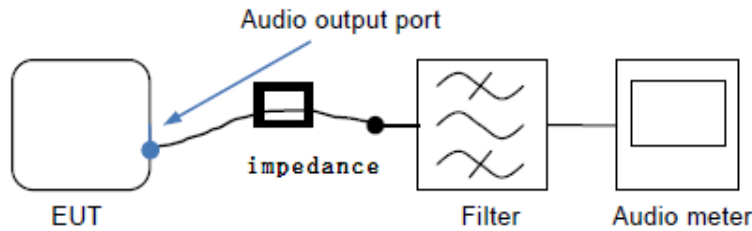


8.6.5 TEST SETUP

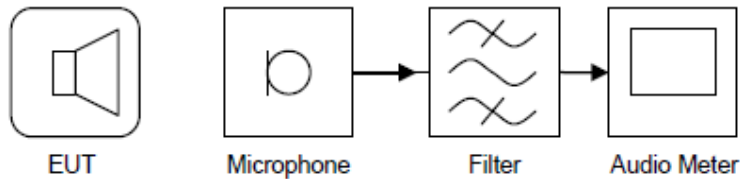


NOTE: The EUT clearance from any metallic obstacles shall be at least 0.5m.
All non-excited input ports of the CDNs shall be terminated by 50Ω loads.

For Electrical measurements setup:



For Acoustic measurements setup:



NOTE:

1. The EUT installed in a representative system was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.
2. Filter: 1kHz 3dB band pass filter.



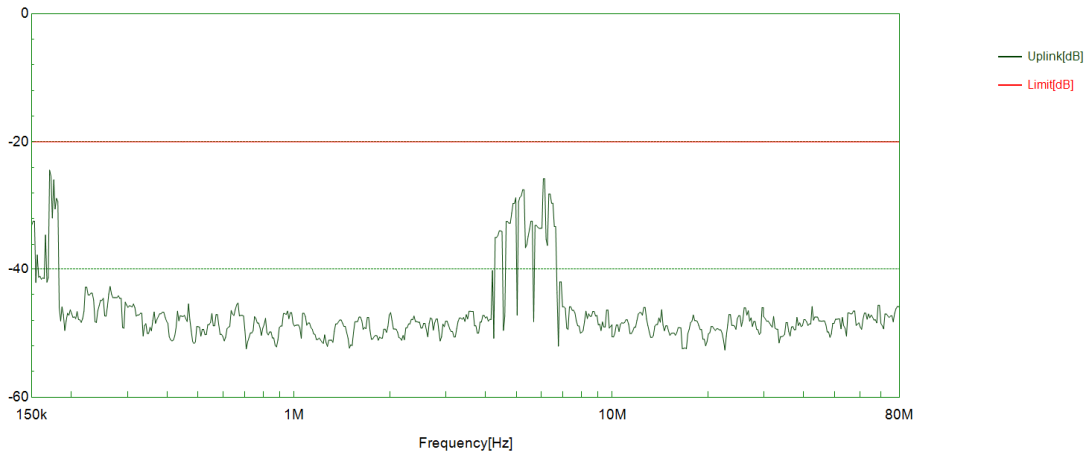
8.6.6 TEST RESULTS

TEST MODE	See section 2.2	TEST VOLTAGE	See section 2.2
ENVIRONMENTAL CONDITIONS	23.5deg. C, 51.6% RH	TESTED BY: Ming Bai	

Voltag e (V)	Test Frequency (MHz)	Tested Line	Injection Method.	Test mode	Reference Level	Test method	Audio output	Interferenc e Ratio
3 3-1 1	0.15 –10MHz 10 –30 MHz 30 –80 MHz	AC Line	CDN-M3	USB	-14.25 dBV	Electrical	AUDIO OUT	-32.9894
Limit		≤ -20						
Test Result		Pass						

Worst case mode: USB

Note: The value of the reference level was reduce 20dB as the limit.





TEST MODE	See section 2.2	TEST VOLTAGE	See section 2.2
ENVIRONMENTAL CONDITIONS	23.5deg. C, 51.6% RH	TESTED BY: Ming Bai	

Voltage (V)	Test Frequency Note#1 (MHz)	Tested Line	Injection Method.	Test Result	Remark
3	0.15–10 MHz	AC Line	CDN-M3/T8	A	N/A
3 -1	10–30 MHz				
1	30–80 MHz				

Note#1: Tested Israel SII Frequencies 0.2,0.53,1,1.5,7.1,13.56,21,27.12,40.68,65,68 MHz

NOTE: A: There was no change compared with initial operation during the test



8.7 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST (EN55035)

8.7.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1A/m,
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

8.7.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Frequency Magnetic Field Generator	Sanki	SKS-0805	080118005E	Apr. 19, 23
Test Software	N/A	N/A	N/A	N/A

- NOTE:**
1. The test was performed in Shielding Room 843.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

8.7.3 TEST PROCEDURE

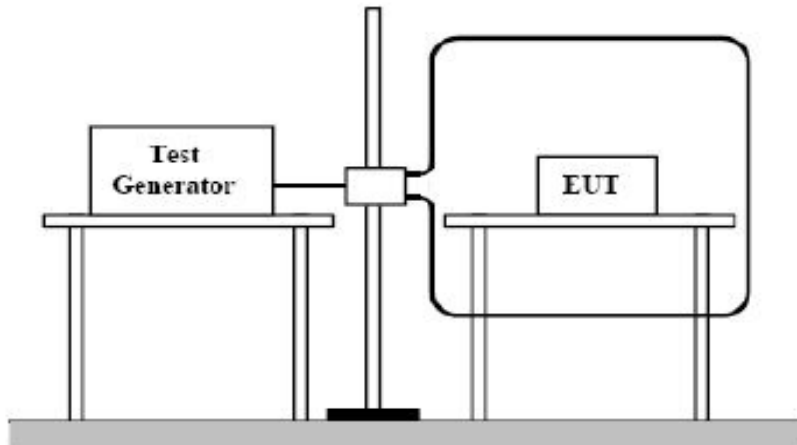
- a. The equipment is configured and connected to satisfy its functional requirements.
- b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- c. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

8.7.4 DEVIATION FROM TEST STANDARD

No deviation.



8.7.5 TEST SETUP



NOTE:

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.



8.7.6 TEST RESULTS

TEST VOLTAGE	See section 2.2	ENVIRONMENTAL CONDITIONS	23.5deg. C, 51.7% RH
TESTED BY	Ming Bai		

Magnetic field direction	Testing result	Remark
X - Axis	A	1A/m
Y - Axis	A	1A/m
Z - Axis	A	1A/m

NOTE: A: There was no change compared with initial operation during the test.



8.8 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST (EN55035)

8.8.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0° & 180°
Test Cycle:	3 times

8.8.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
3kVA AC Power Source	California Instruments	3001 iX	54140	Feb. 23, 23
Harmonic/Flicker Test System	California Instruments	PACS-1	1319A01862	Feb. 23, 23

- NOTE:**
- The test was performed in EMS Test Room2.
 - The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 - Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People’s Republic of China.

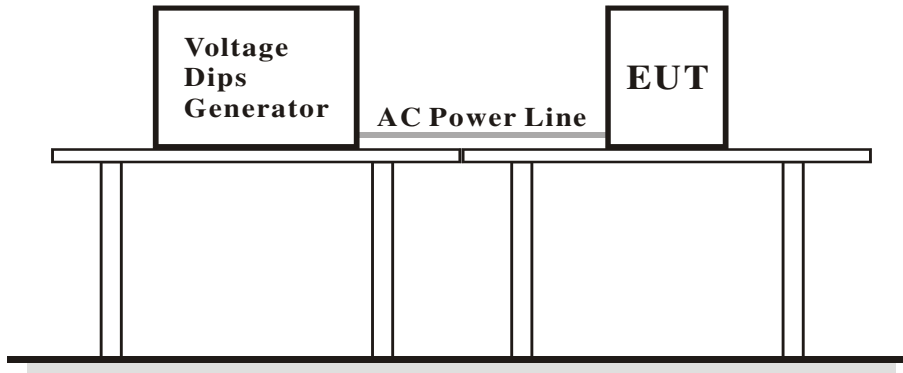
8.8.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

8.8.4 DEVIATION FROM TEST STANDARD

No deviation.

8.8.5 TEST SETUP





8.8.6 TEST RESULTS

TEST VOLTAGE	See section 2.2	ENVIRONMENTAL CONDITIONS	23.5deg. C, 51.7% RH
TESTED BY	Ming Bai		

Ut : <u>230</u> Vac <u>50</u> Hz	Durations		Event interval (sec)	Total events (time)	Test result
	(period)	(ms)			
>95	0.5	10	10	3	A
30	25	500	10	3	A
>95	250	5000	10	3	C

NOTE: A: There was no change compared with initial operation during the test.

C: The EUT stopped operation when at the 5% voltage interruption, but it can recover by itself.



9 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



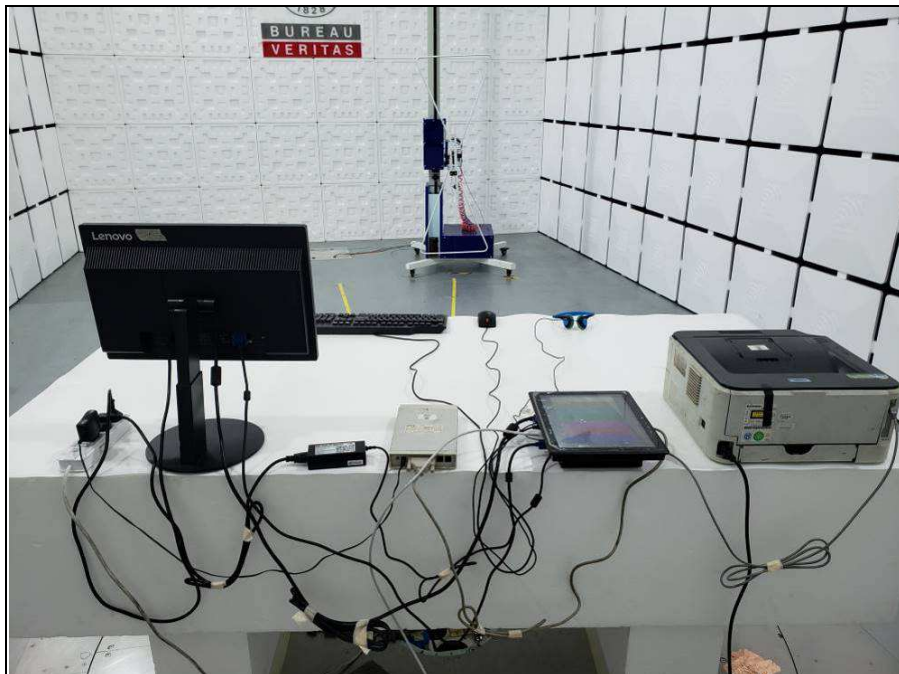
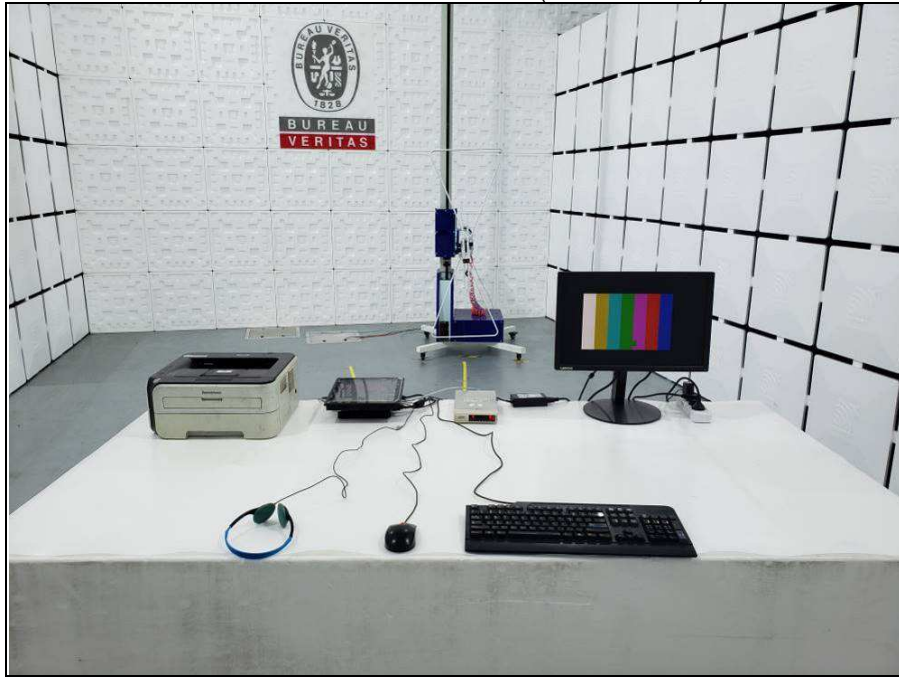


CONDUCTED EMISSION TEST (TELECOM PORT)



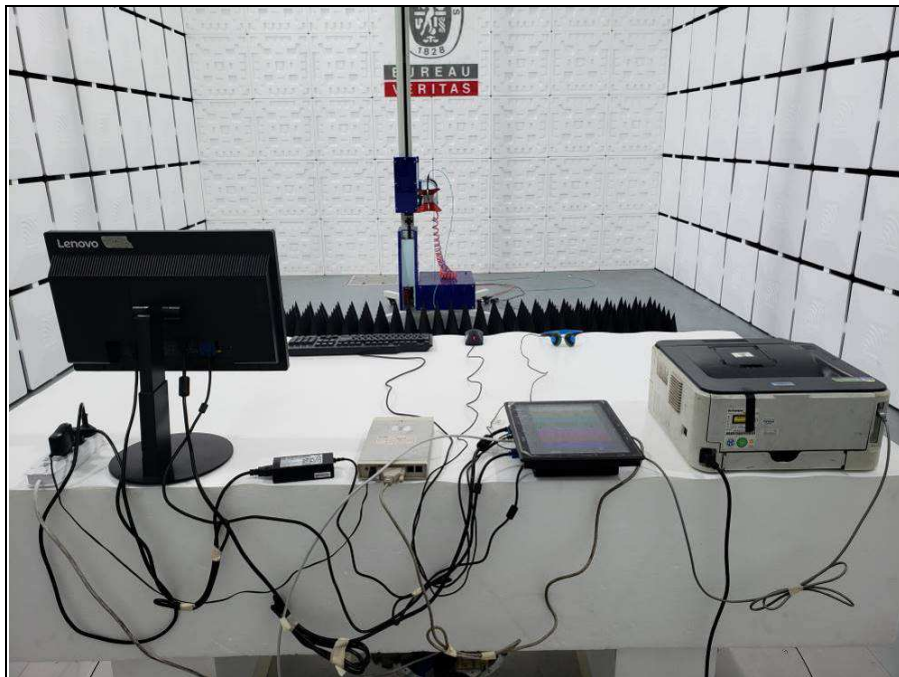


RADIATED EMISSION TEST (30MHz-1GHz)





RADIATED EMISSION TEST ((ABOVE 1GHz))





HARMONICS EMISSION TEST &
VOLTAGE FLUCTUATIONS AND FLICKER TEST

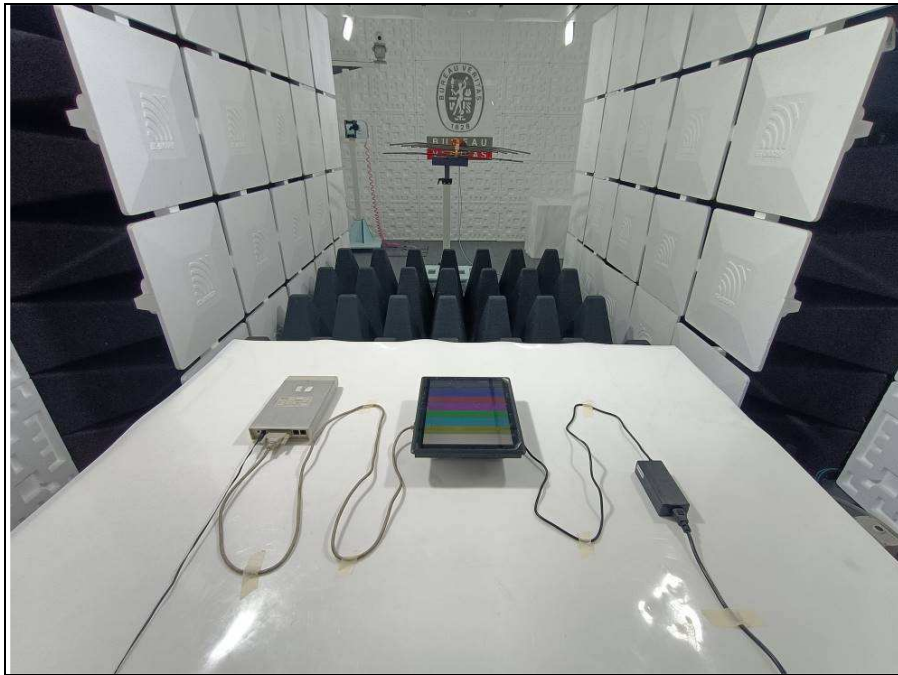


ESD TEST

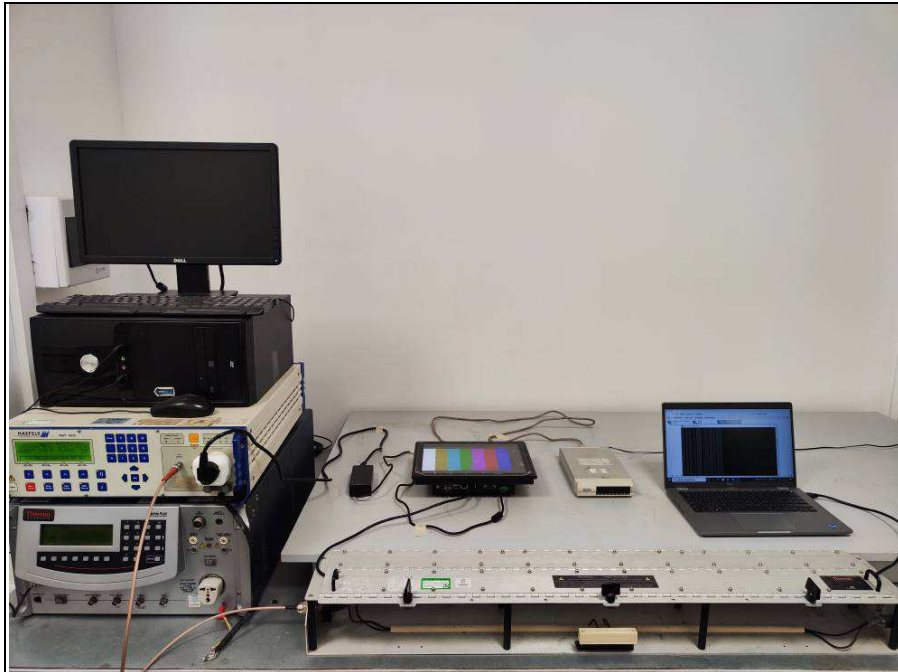




RS TEST



EFT AND SURGE TESTS

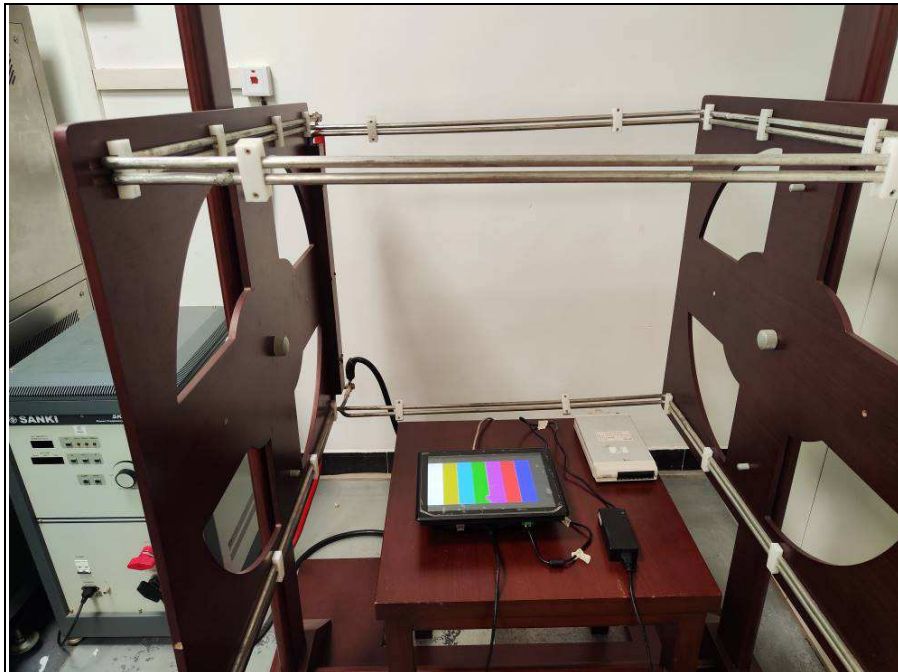




CS TEST



POWER-FREQUENCY MAGNETIC FIELDS TEST





VOLTAGE DIPS AND INTERRUPTIONS TEST





Test Report No.: CE2209WDG0272

10 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

End