

**CTS (Dongguan) Testing Technology Co., Ltd.**

Building 1, No.1 Baima Xianfeng Erlu, Nancheng Subdistrict, Dongguan City,
Guangdong Province, China

TEST REPORT**Report Reference No.....: CTSE25051305**

Date of issue.....: 2025-05-14

Testing Laboratory Name.....: CTS (Dongguan) Testing Technology Co., Ltd.Address.....: Building 1, No.1 Baima Xianfeng Erlu, Nancheng Subdistrict,
Dongguan City, Guangdong Province, China

Supervised by

(Testing Engineer).....: Marx Zhou

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(Testing Engineer).....: Jimmy Liu

Jimmy Liu

Approved by

(Manager).....: Bill Li

Bill Li**Applicant's name.....: Guangzhou wangkong Ltd.**Address.....: Room 207, Building C, #3 Yangmeiling Street, KeMulang,
Tianhe district, Guangzhou, Guangdong, China**Manufacture's name.....: Guangzhou wangkong Ltd.**Address.....: Room 207, Building C, #3 Yangmeiling Street, KeMulang,
Tianhe district, Guangzhou, Guangdong, China**Test specification:**

Standard.....: EN IEC 61326-1:2021

EN IEC 61000-3-2: 2019+A1:2021+A2:2024

EN 61000-3-3:2013+A1:2019+A2:2021

Receiver Date.....: 2025-04-09**Test Period.....: 2025-04-09 to 2025-04-16****Test item description.....: Digital/Analog Inputs/Outputs Monitor**

Trade Mark.....: MONIGEAR, WANGKONG

Model/Type reference.....: MN-NIO

Listed Mode.....: N/A

Ratings.....: 12Vdc/PoE

Result.....: PASS

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TEST REPORT

Test Report No. :	CTSE25051305	Apr. 14, 2025 Date of issue
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Equipment under Test : Digital/Analog Inputs/Outputs Monitor

Type / Model : MN-NIO

Listed Model : N/A

Model Different : N/A

Applicant : Guangzhou wangkong Ltd.

Address : Room 207, Building C, #3 Yangmeiling Street,
KeMulang, Tianhe district, Guangzhou,
Guangdong, China

Manufacturer : Guangzhou wangkong Ltd.

Address : Room 207, Building C, #3 Yangmeiling Street,
KeMulang, Tianhe district, Guangzhou,
Guangdong, China

Test Result	PASS
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The above equipment has been tested by CTS (Dongguan) Testing Technology Co., Ltd., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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1 TEST SUMMARY

Emission			
Standard	Item	Verdict	Remark
EN IEC 61326-1	Conducted Emission	PASS	Meet the requirements of limit
	Power Clamp	N/A	The EUT does not need to be tested Disturbance Power after been tested radited emission.
	Radiated Emission	PASS	Meet the requirements of limit
EN 61000-3-3	Voltage Fluctuations & Flicker	PASS	The EUT is unlikely to produce significant voltage fluctuations or flicker
EN IEC 61000-3-2	Harmonic Current Emissions	N/A	Meet the requirements of limit

Immunity (EN IEC 61326-1)			
Standard	Item	Result	Remark
IEC 61000-4-2	ESD	PASS	Meets the requirements of Criterion B
ICE 61000-4-3	RS	PASS	Meets the requirements of Criterion A
IEC 61000-4-4	EFT	PASS	Meets the requirements of Criterion B
IEC 61000-4-5	Surge	PASS	Meets the requirements of Criterion B
IEC 61000-4-6	CS	PASS	Meets the requirements of Criterion A
IEC 61000-4- 11	Voltage Dips & Voltage Variations	PASS	Meets the requirements of Voltage Dips: 1)100% reduction Criterion C 2) 60% reduction Criterion C 3) 30% reduction Criterion C

The test results of this report was related only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

2 EUT INFORMATION

2.1 I/O Port Description

I/O Port Types	Q'TY	Test Description
1). /	/	/

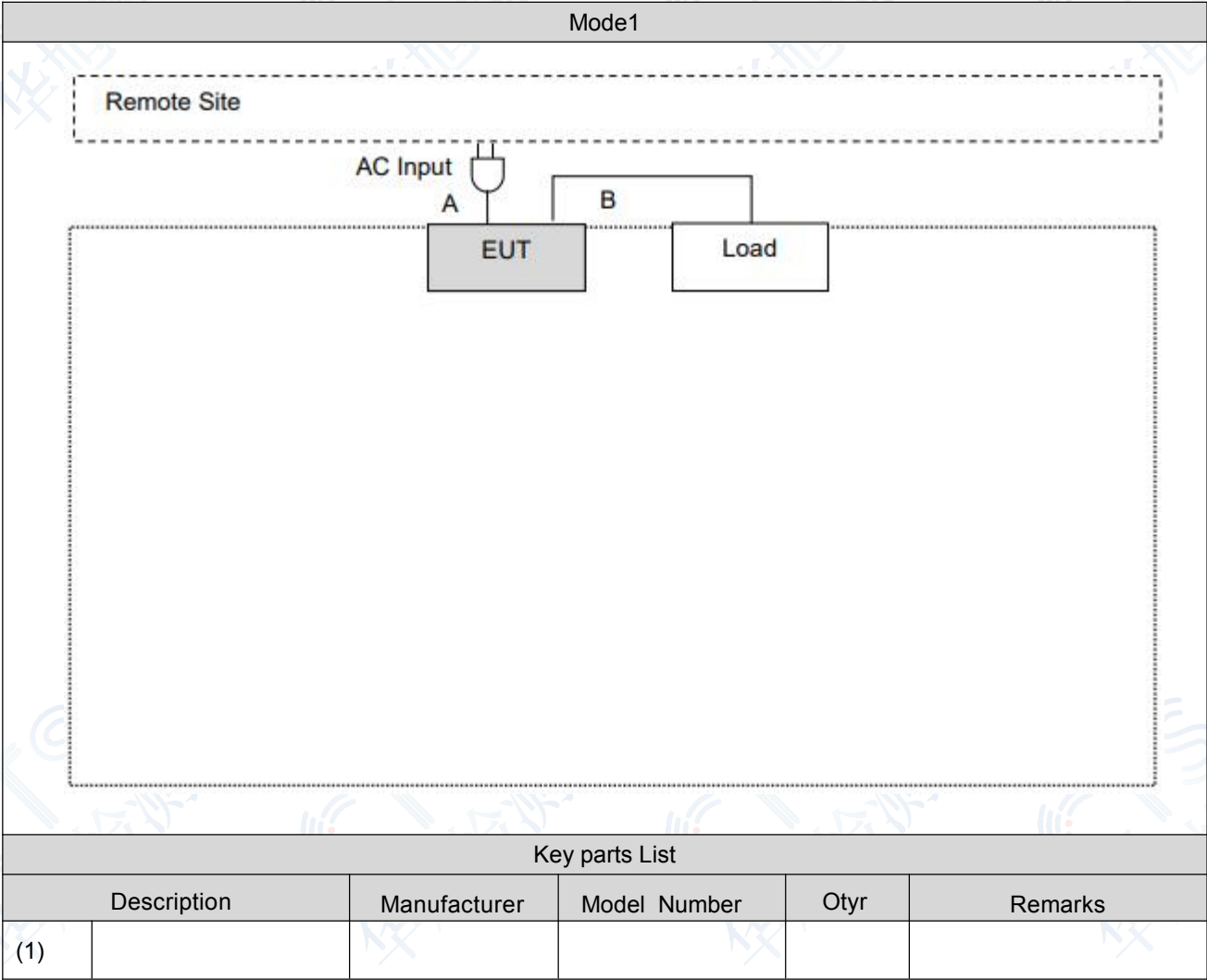
2.2 EUT operation mode

Pre-Test Mode	Mode 1: Working	
Final Test Mode	Conducted Emission	Mode 1
	Power Clamp	N/A
	Radiated Emission	Mode 1
	Harmonic Current Emissions	Rated power is less than 75W , No limit requirement.
	Voltage Fluctuations & Flicker	Mode 1
	ESD	Mode 1
	RS	Mode 1
	EFT	Mode 1
	Surge	Mode 1
	CS	Mode 1
	Voltage Dips & Voltage Variations	Mode 1

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

2.3 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:



3 **TEST ENVIRONMENT**

3.1 **Address of the test laboratory**

CTS (Dongguan) Testing Technology Co., Ltd.

Building 1, No.1 Baima Xianfeng Erlu, Nancheng Subdistrict, Dongguan City, Guangdong Province, China

3.2 **Test Facility**

The test facility is recognized, certified:

CTS (Dongguan) Testing Technology Co., Ltd.

3.3 **Test Software**

Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	JS32-RE	Ver 2 5
2	Radiated Emission _ Below 1GHz	JS32-RE	Ver 2.5. 1.8
3	Radiated Emission _ Above 1GHz	JS32-RE	Ver 2.5. 1.8
4	Harmonic Current Emissions	Harcs	4 21 0 0
5	Voltage Fluctuations & Flicker	Harcs	4.21.0.0
6	RS	EMC-RS	2.0.1.2
7	CS	IEC/EN 61000-4-6	V1 1 2

3.4 Statement of the measurement uncertainty

Test Item	Test Site	Frequency Range		Uncertainty (dB)
Conducted Emission AC Power Port	Conductive Shielding Room	9 kHz ~ 150 kHz		2.7
		150 kHz ~ 30 MHz		2.7
Radiated Emission	966	30 MHz ~ 1000 MHz	Horizontal	5.6
			Vertical	6.0

Test Item		Uncertainty
Harmonic Current Emission		36 mA/A
Voltage Fluctuations And Flicker		4.4 mV/V
Electrostatic Discharge	Voltage	0.86 %
	Current	2.5 %
	Timing	6.0 %
Radiated Susceptibility		3.2 dB
Electrical Fast Transient/ Burst		2 %
Surge	Voltage	3 %
	Current	3 %
	Timing	3 %
Conducted Susceptibility	CDN	3.8 dB
	EM Clamp/ Direct Injection	2.8 dB
Power Frequency Magnetic Field		36 mA/A
Voltage Dips and Interruption	Voltage	1 004 %
	Timing	1.004 %

The measurement uncertainty is not included in the test result.

3.5 Test Site Environmental

Test Item	Required (IEC 60068- 1)		Actual
Conducted Emission	Temperature (C)	15-35	25
	Humidity (%RH)	25-75	60
	Barometric pressure (mbar)	860- 1060	950
Radiated Emission	Temperature (C)	15-35	25
	Humidity (%RH)	25-75	60
	Barometric pressure (mbar)	860- 1060	950
Harmonic Current Emissions	Temperature (C)	--	26.0
	Humidity (%RH)	--	60.0
	Barometric pressure (mbar)	--	950
Voltage Fluctuations & Flicker	Temperature (C)	--	26.0
	Humidity (%RH)	--	60.0
	Barometric pressure (mbar)	--	950
ESD	Temperature (C)	15-35	26.0
	Humidity (%RH)	30-60	60.0
	Barometric pressure (mbar)	860- 1060	950
RS	Temperature (C)	--	26.0
	Humidity (%RH)	--	60.0
	Barometric pressure (mbar)	--	950
EFT	Temperature (C)	15-35	26.0
	Humidity (%RH)	30-60	60.0
	Barometric pressure (mbar)	860- 1060	950
Surge	Temperature (C)	15-35	26.0
	Humidity (%RH)	10-75	60.0
	Barometric pressure (mbar)	860- 1060	950
CS	Temperature (C)	--	26.0
	Humidity (%RH)	--	60.0
	Barometric pressure (mbar)	--	950
Voltage Dips & Voltage Variations	Temperature (C)	15-35	26.0
	Humidity (%RH)	25-75	60.0
	Barometric pressure (mbar)	860- 1060	950

3.6 Test Instruments

Conducted Emission test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESPI	101841	07/ 17/2024	1 year
Transient Limiter	CYBERTEK	EM5010A	E1950100106	07/ 17/2024	1 year
LISN	R&S	ESH2-Z5	893606/008	07/ 17/2024	1 year
LISN	CYBERTEK	EM5040A	E1850400105	07/ 17/2024	1 year
ISN	SCHWARZBECK	CAT 3	066	09/ 11/2024	1 year
ISN	SCHWARZBECK	CAT 5	121	09/ 11/2024	1 year
ISN	SCHWARZBECK	NTFM	102	09/ 11/2024	1 year
Test Site	XINJU	Conductive Shielding Room	N/A	N.C.R.	----

966 Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Amplifier	SCHWARZBECK MESS- ELEKTRONIK	BBV 9743	202	07/ 17/2024	1 year
Amplifier	EMCI	EMC051845SE	980355	07/ 17/2024	1 year
Test Receiver	R&S	ESCI 7	101102	09/ 19/2024	1 year
Spectrum Analyzer	R&S	FSV40-N	101800	07/ 17/2024	1 year
Broadband Antenna	SCHWARZBECK MESS- ELEKTRONIK	VULB 9163	00976	08/08/2024	1 year
Double Ridged Horn Antenna (1~18GHz)	SCHWARZBECK MESS- ELEKTRONIK	BBHA 9120D	01622	09/ 19/2024	1 year
Test Site	XINJU	966	N/A	12/28/2024	3 year

Disturbance power					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESPI	101841	07/ 17/2024	1 year
Test Site	XINJU	RF Shielding Room	N/A	N.C.R.	----

Harmonics Current / Voltage Fluctuation and Flicker test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Harmonics & Flicker Teste	EMC- PARTNER AG	HARMONICS 1000	HAR1000- 1P 230V-0221	09/21/2024	1 year
Test Site	XINJU	RF Shielding Room	N/A	N.C.R.	----

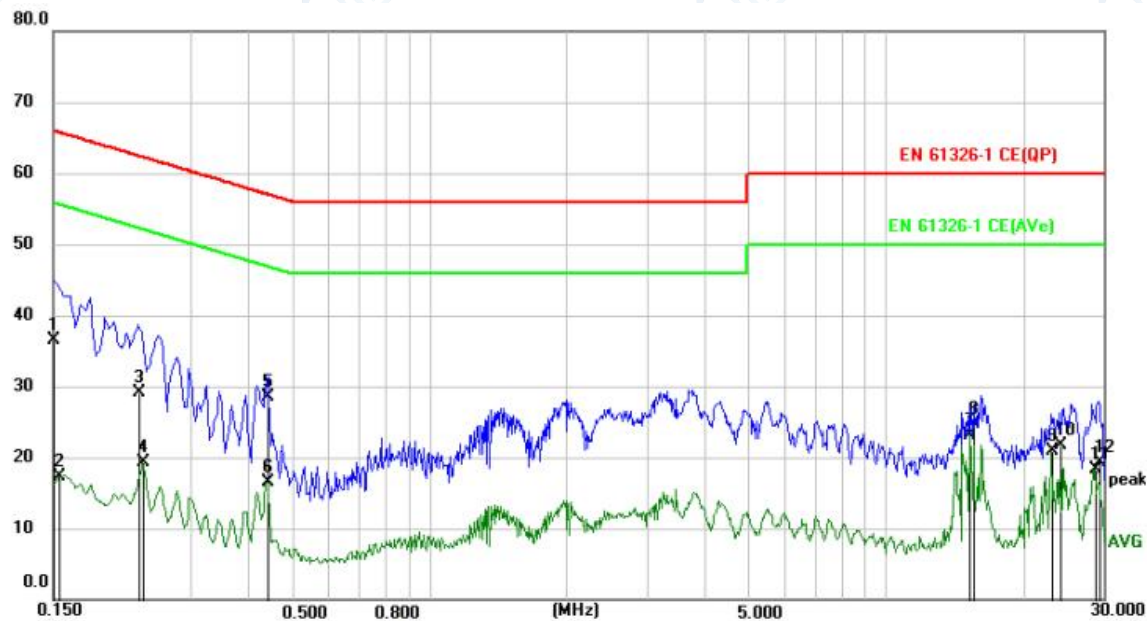
Electrostatic Discharge test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
ESD Simulator	EMC- PARTNER AG	ESD 3000	ESD3000-1680	09/ 19/2024	1 year
0.8m Height Wooden Table	N/A	N/A	N/A	N.C.R.	-----
Test Site	EMS Lab	N/A	N/A	N.C.R.	-----

Radiated Electromagnetic Field test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
SMB 100A SIGNAL GENERATOR	R&S	SMB100A	100724	07/ 17/2024	1 year
NRP-Z91 POWER SENSOR	R&S	NRP-Z91	100611	07/ 17/2024	1 year
NRP-Z91 POWER SENSOR	R&S	NRP-Z91	100613	07/ 17/2024	1 year
NRP POWER METER	R&S	NRP	101591	07/ 17/2024	1 year
Solid State Power Amplifier	R&K	GA020M102-5454F	830140	N.C.R.	-----
Direction Coupler	WERLATONE	C8686-714	109646	N.C.R.	-----
Signal Generator Module	R&S	SM300 Module	102209	N.C.R.	-----
RS Amplifier	MILMEGA	AS0860B-50/50	1078855	N C R	-----
Broad-Band Horn Antenna	SCHWARZBECK MESS- ELEKTRONIK	BBHA 9120	BBHA 9120 E388	N.C.R.	-----
Test Site	XINJU	966	N/A	12/28/2024	3 years

Electrical Fast Transient/Burst / Surge / Power Frequency Magnetic Field / Voltage Dips and Interruption test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
EMC Immunity Tester	EMC- PARTNER AG	TRANSIENT 3000	TRA3000 F5-S-D-V- 1527	09/ 11/2024	1 year
Coupling Clamp	EMC- PARTNER AG	CN-EFT1000	CN-EFT1000-1574	09/ 11/2024	1 year
Signal Line Coupling Network	EMC- PARTNER AG	CN-R40C05	CN-R40C05-1513	09/ 11/2024	1 year
Magnetic Field Antenna	EMC- PARTNER AG	MF1000- 1	155	09/ 19/2024	1 year
Test Site	EMS Lab	N/A	N/A	N.C.R.	-----

Conducted disturbances induced by radio-frequency fields					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
CS Test system	Frankonia	CIT-10-75	126B1333	09/ 11/2024	1 year
6 dB Attenuator	Frankonia	75-A-FFN-06	1509	09/25/2024	1 year
CDN	Frankonia	M2+M3	A2210239	09/ 11/2024	1 year

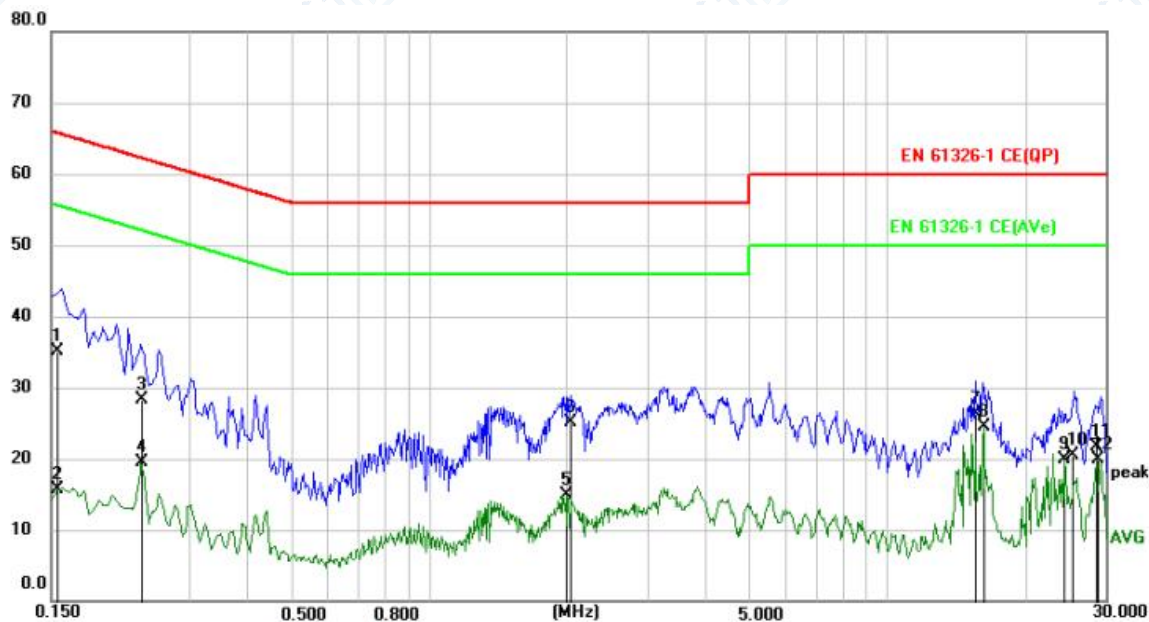
Test Standard:	EN IEC 61326-1	Power Line:	L1
Test Mode:	Mode 1	Test Power:	AC 230V / 50 Hz
Description:	DC 12V		



No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Margin dB	Detector	Comment
1		0.1500	26.74	9.84	36.58	66.00	-29.42	QP	
2		0.1548	7.44	9.84	17.28	55.74	-38.46	AVG	
3		0.2310	19.24	9.82	29.06	62.41	-33.35	QP	
4		0.2355	9.53	9.82	19.35	52.25	-32.90	AVG	
5		0.4425	18.78	9.79	28.57	57.01	-28.44	QP	
6		0.4425	6.75	9.79	16.54	47.01	-30.47	AVG	
7	*	15.2520	13.26	9.90	23.16	50.00	-26.84	AVG	
8		15.6165	14.90	9.90	24.80	60.00	-35.20	QP	
9		23.1270	10.85	9.98	20.83	50.00	-29.17	AVG	
10		24.0450	11.73	10.01	21.74	60.00	-38.26	QP	
11		28.6845	8.39	9.99	18.38	50.00	-31.62	AVG	
12		29.2335	9.38	9.97	19.35	60.00	-40.65	QP	

Note: 1. Result (dB μV) = Reading (dB μV) + Factor (dB)
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

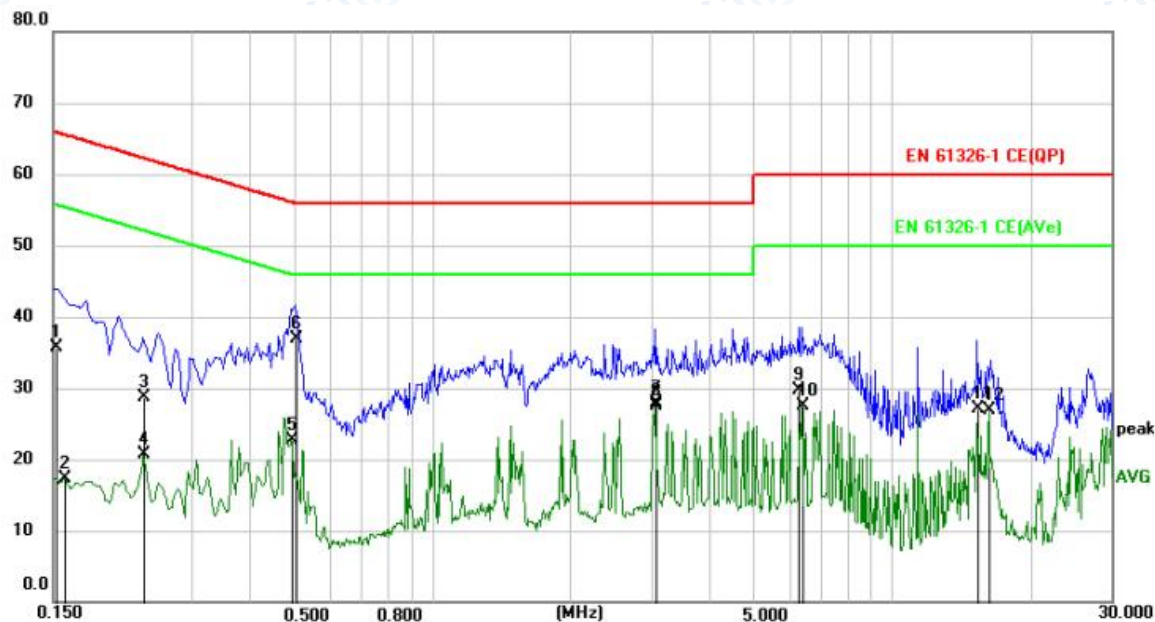
Test Standard:	EN IEC 61326-1	Power Line:	N
Test Mode:	Mode 1	Test Power:	AC 230V / 50 Hz
Description:	DC 12V		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1548	25.37	9.70	35.07	65.74	-30.67	QP	
2		0.1548	5.91	9.70	15.61	55.74	-40.13	AVG	
3		0.2355	18.58	9.73	28.31	62.25	-33.94	QP	
4		0.2355	9.68	9.73	19.41	52.25	-32.84	AVG	
5		1.9950	5.22	9.77	14.99	46.00	-31.01	AVG	
6		2.0400	15.40	9.77	25.17	56.00	-30.83	QP	
7		15.6165	16.32	9.92	26.24	60.00	-33.76	QP	
8	*	16.2285	14.52	9.94	24.46	50.00	-25.54	AVG	
9		24.3510	9.82	10.15	19.97	50.00	-30.03	AVG	
10		25.4175	10.34	10.19	20.53	60.00	-39.47	QP	
11		28.5000	11.42	10.22	21.64	60.00	-38.36	QP	
12		28.6845	9.70	10.22	19.92	50.00	-30.08	AVG	

Note: 1. Result (dB μV) = Reading (dB μV) + Factor (dB)
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Test Standard:	EN IEC 61326-1	Power Line:	L1
Test Mode:	Mode 1	Test Power:	AC 230V / 50 Hz
Description:	DC 12V+PoE power supply		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1524	25.92	9.84	35.76	65.87	-30.11	QP	
2		0.1590	7.53	9.83	17.36	55.52	-38.16	AVG	
3		0.2355	18.87	9.82	28.69	62.25	-33.56	QP	
4		0.2355	10.87	9.82	20.69	52.25	-31.56	AVG	
5		0.4965	12.82	9.79	22.61	46.06	-23.45	AVG	
6		0.5055	27.06	9.79	36.85	56.00	-19.15	QP	
7		3.0660	17.97	9.86	27.83	56.00	-28.17	QP	
8	*	3.0660	17.66	9.86	27.52	46.00	-18.48	AVG	
9		6.2835	19.73	9.96	29.69	60.00	-30.31	QP	
10		6.3600	17.56	9.96	27.52	50.00	-22.48	AVG	
11		15.3510	17.18	9.90	27.08	60.00	-32.92	QP	
12		16.2285	17.07	9.91	26.98	50.00	-23.02	AVG	

Note: 1. Result (dB μ V) = Reading (dB μ V) + Factor (dB)
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

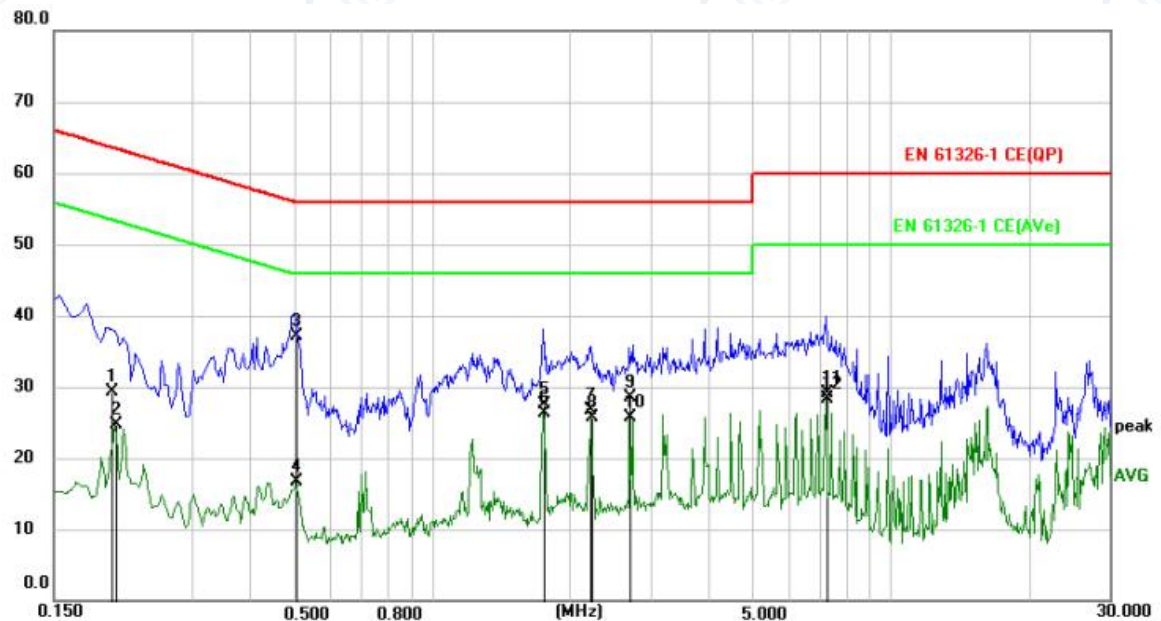
Test Standard: EN IEC 61326-1

Power Line: N

Test Mode: Mode 1

Test Power: AC 230V / 50 Hz

Description: DC 12V+PoE power supply



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1997	19.69	9.70	29.39	63.62	-34.23	QP	
2		0.2040	15.05	9.70	24.75	53.45	-28.70	AVG	
3	*	0.5055	27.36	9.84	37.20	56.00	-18.80	QP	
4		0.5055	6.94	9.84	16.78	46.00	-29.22	AVG	
5		1.7520	17.80	9.77	27.57	56.00	-28.43	QP	
6		1.7520	16.54	9.77	26.31	46.00	-19.69	AVG	
7		2.2155	17.02	9.78	26.80	56.00	-29.20	QP	
8		2.2290	16.02	9.78	25.80	46.00	-20.20	AVG	
9		2.7060	18.59	9.84	28.43	56.00	-27.57	QP	
10		2.7060	15.87	9.84	25.71	46.00	-20.29	AVG	
11		7.2150	19.21	9.96	29.17	60.00	-30.83	QP	
12		7.2150	18.28	9.96	28.24	50.00	-21.76	AVG	

- Note: 1. Result (dB μ V) = Reading (dB μ V) + Factor (dB)
 2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

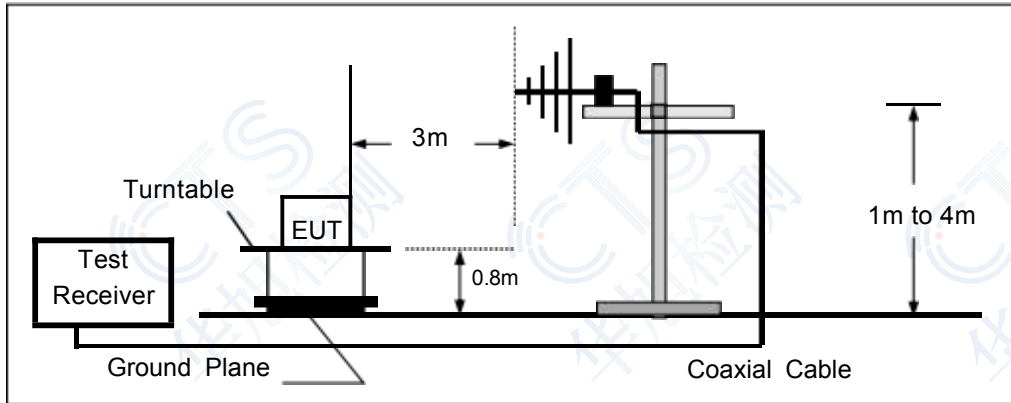
4.2 Radiated Emission

4.2.1 Limits of Disturbance

Please refer to EN IEC 61326-1.

4.2.2 Test Configuration

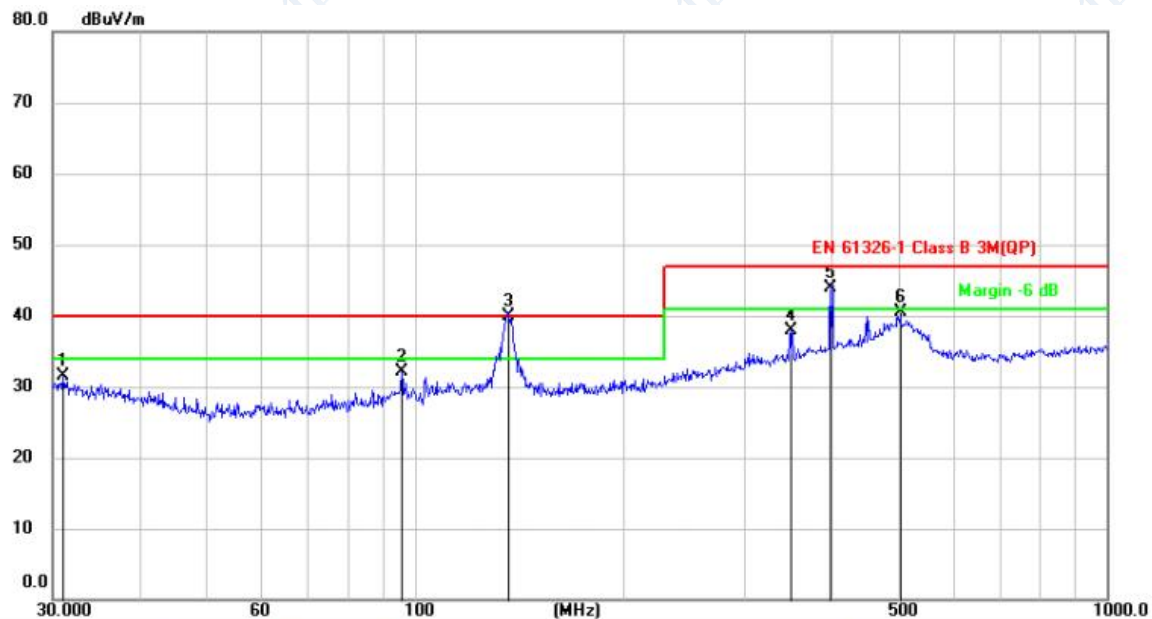
a) Radiated emission test set-up, frequency below 1000MHz:



4.2.3 Test Result

Please refer to the below test data:

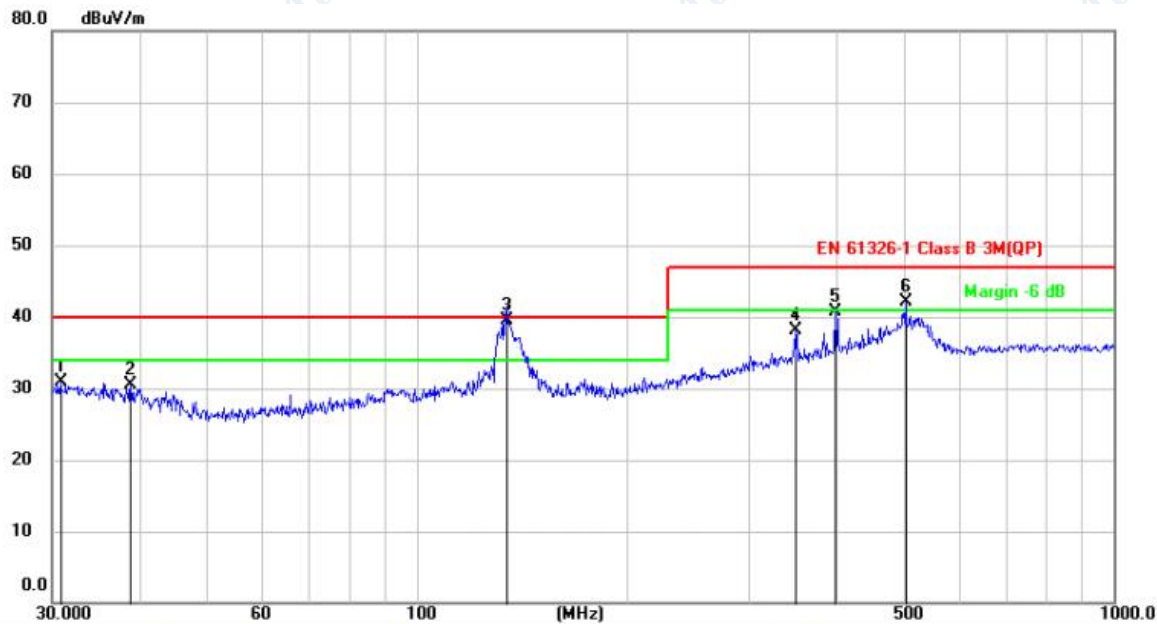
Test Standard:	EN IEC 61326-1	Test Distance:	3 m
Test Mode:	Mode 1	Test Power:	AC 230V / 50 Hz
Measurement Range:	30 MHz~ 1 GHz	Ant.Polar.:	Horizontal
Remark:	DC 12V		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		31.0706	18.36	13.14	31.50	40.00	-8.50	QP	100	116
2		95.7622	20.66	11.52	32.18	40.00	-7.82	QP	400	358
3	*	136.3088	27.11	12.87	39.98	40.00	-0.02	QP	400	144
4		349.2500	21.64	16.23	37.87	47.00	-9.13	QP	100	234
5	!	398.4165	26.02	17.82	43.84	47.00	-3.16	QP	400	323
6		502.9395	19.17	21.30	40.47	47.00	-6.53	QP	100	37

Note: 1. Result (dBuV/m) = Reading (dBuV/m) + Factor (dB/m) .
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Test Standard:	EN IEC 61326-1	Test Distance:	3 m
Test Mode:	Mode 1	Test Power:	AC 230V / 50 Hz
Measurement Range:	30 MHz~ 1 GHz	Ant.Polar.:	Vertical
Remark:	DC 12V		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table
		MHz	Level	Factor	ment			Height	Degree
			dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree
							Detector		Comment
1		30.8535	17.73	13.17	30.90	40.00	-9.10	QP	100
2		38.8878	18.69	11.85	30.54	40.00	-9.46	QP	100
3	*	134.5842	26.55	12.86	39.41	40.00	-0.59	QP	100
4		349.2500	21.86	16.23	38.09	47.00	-8.91	QP	100
5		399.0302	22.86	17.84	40.70	47.00	-6.30	QP	100
6	!	502.9395	20.75	21.30	42.05	47.00	-4.95	QP	100

Note: 1. Result (dBuV/m) = Reading (dBuV/m) + Factor (dB/m) .
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

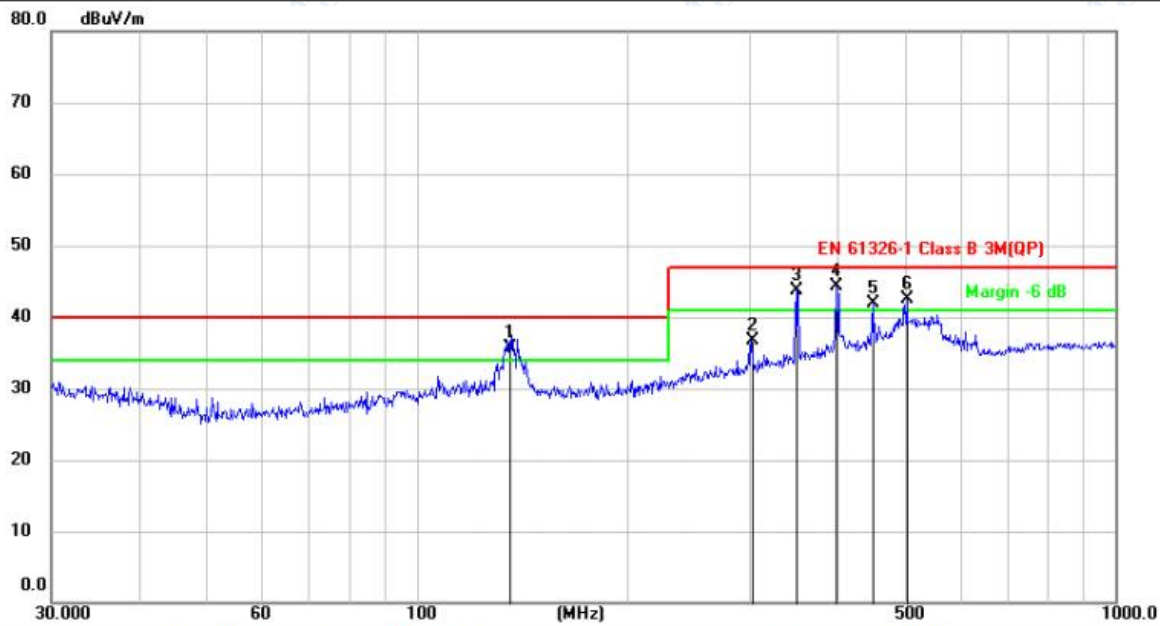
Test Standard:	EN IEC 61326-1	Test	3 m
Test Mode:	Mode 1	Distance:	AC 230V / 50 Hz
Measurement Range:	30 MHz~ 1 GHz	Test Power:	Horizontal
Remark:	DC 12V+PoE power supply	Ant. Polar.:	



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	Comment
1	!	30.4238	23.10	13.24	36.34	40.00	-3.66	QP	100	56
2		51.1209	24.75	9.18	33.93	40.00	-6.07	QP	100	282
3	*	136.3243	24.94	12.87	37.81	40.00	-2.19	QP	100	0
4		351.7079	23.94	16.29	40.23	47.00	-6.77	QP	100	115
5	!	399.0302	24.72	17.84	42.56	47.00	-4.44	QP	100	125
6	!	499.4247	22.14	21.27	43.41	47.00	-3.59	QP	100	8

Note: 1. Result (dBuV/m) = Reading (dBuV/m) + Factor (dB/m) .
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Test Standard:	EN IEC 61326-1	Test	3 m
Test Mode:	Mode 1	Distance:	AC 230V / 50 Hz
Measurement Range:	30 MHz~ 1 GHz	Test Power:	Vertical
Remark:	DC 12V+PoE power supply	Ant.Polar.:	



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	!	135.6113	22.81	12.87	35.68	40.00	-4.32	QP	100	87
2		301.4224	21.32	15.41	36.73	47.00	-10.27	QP	100	100
3	!	349.2500	27.51	16.23	43.74	47.00	-3.26	QP	100	80
4	*	399.0300	26.46	17.84	44.30	47.00	-2.70	QP	400	20
5	!	449.5558	23.09	18.78	41.87	47.00	-5.13	QP	100	100
6	!	502.9395	21.11	21.30	42.41	47.00	-4.59	QP	100	1

Note: 1. Result (dBuV/m) = Reading (dBuV/m) + Factor (dB/m) .
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

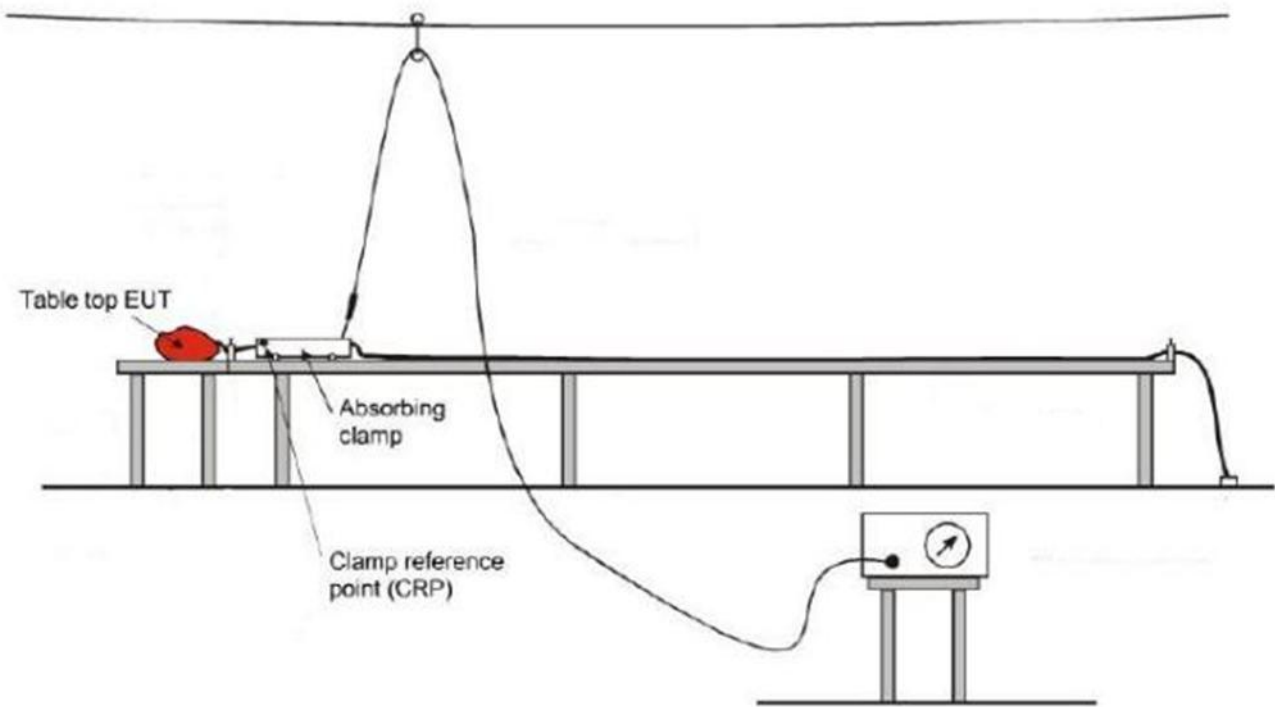
4.3 Disturbance Power

4.3.1 Limits of Disturbance

Frequency Range (MHz)	Limits (dBpW)	
	Quasi- Peak	Average
30~300	45~55	35~45

Note: (1) The limit line is a linear line.

4.3.2 Test Configuration



4.3.3 Test Procedure

EUT is placed on a nonmetal table which is 0.8 meter (or 0. 1 meter for floor-stood equipments) above the reference ground plane. The line under test is put through the absorbing clamp. Also, voltage of the power supply is varied over a range of 0.9 to 1. 1 times of the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage at the selected frequency about 50 MHz. Then the absorbing clamp can be remote-controlled to slide on the slidebar which is 6 meters long to determine the position of the maximum emission level. Other terminals of EUT are tested with the same steps described above.

4.3.4 Test Results

The EUT does not need to be tested Disturbance Power after been tested radited emission.

4.4 Harmonic Current

4.4.1 Limit

Class A Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current (A)	Harmonics Order n	Maximum Permissible harmonic current (A)
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	$8 \leq n \leq 40$	$0.23 * 8/n$
11	0.33		
13	0.21		
$15 \leq n \leq 39$	$0.15 * 15/n$		

Class B Harmonics Currents

For Class B equipment, the harmonic of the input current shall not exceed the maximum permissible values given in table which is the limit of Class A multiplied by a factor of 1.5.

Class C Harmonics Currents

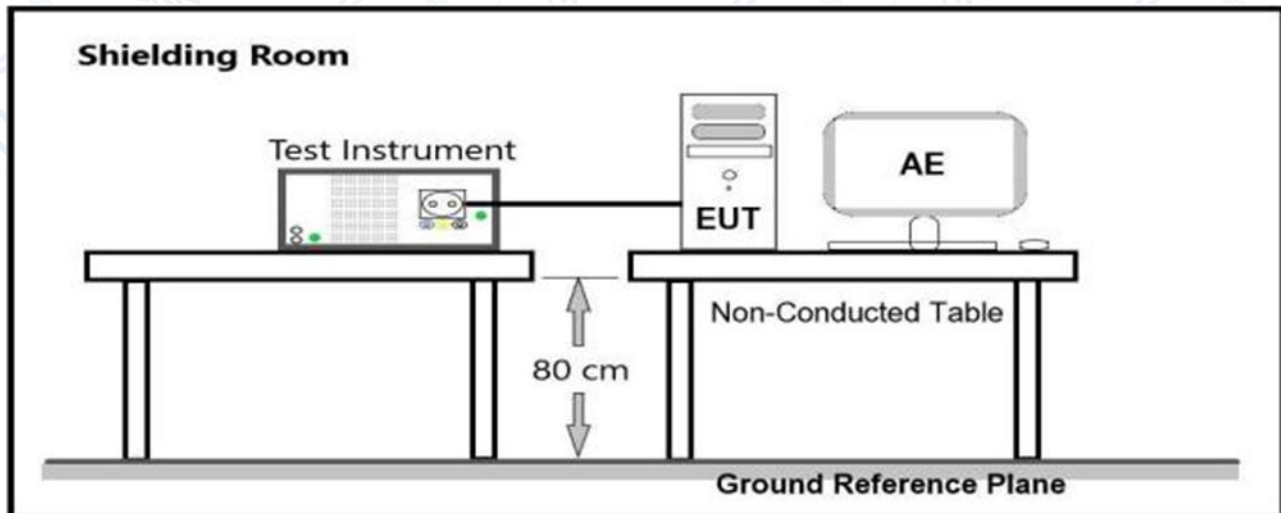
Harmonics Order n	Maximum Permissible harmonic current Expressed as a percentage of the input current at the fundamental frequency (%)
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

* λ is the circuit power factor

Class D Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current per watt (mA/W)	Maximum Permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$11 \leq n \leq 39$ (odd harmonics only)	$3.85/n$	See limit of Class A

4.4.2 Test Configuration



4.4.3 Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and the EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

A definition of the normal load or of the conditions for adequate heat discharge can usually be found in the EN publication corresponding to the equipment under test.

Equipment may have several separately controlled circuits. Each circuit is considered as a single piece of equipment if it can be operated independently and separately from the other circuits.

4.4.4 Test Results

This product is not defined as lighting equipment, and has rated power less than 75W , therefore, no limit applies according to EN 61000-3-2

4.5 Voltage Fluctuation and Flicker

4.5.1 Limit

The following limits apply:

- the value of P_{st} shall not be greater than 1.0;
 - the value of P_{1t} shall not be greater than 0.65;
 - T_{max} , the accumulated time value of $d(t)$ with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms;
 - the relative steady-state voltage change, d_c , shall not exceed 3.3 %;
 - the maximum relative voltage change, d_{max} , shall not exceed;
- a) 4 % without additional conditions;
 - b) 6 % for equipment which is:
 - switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

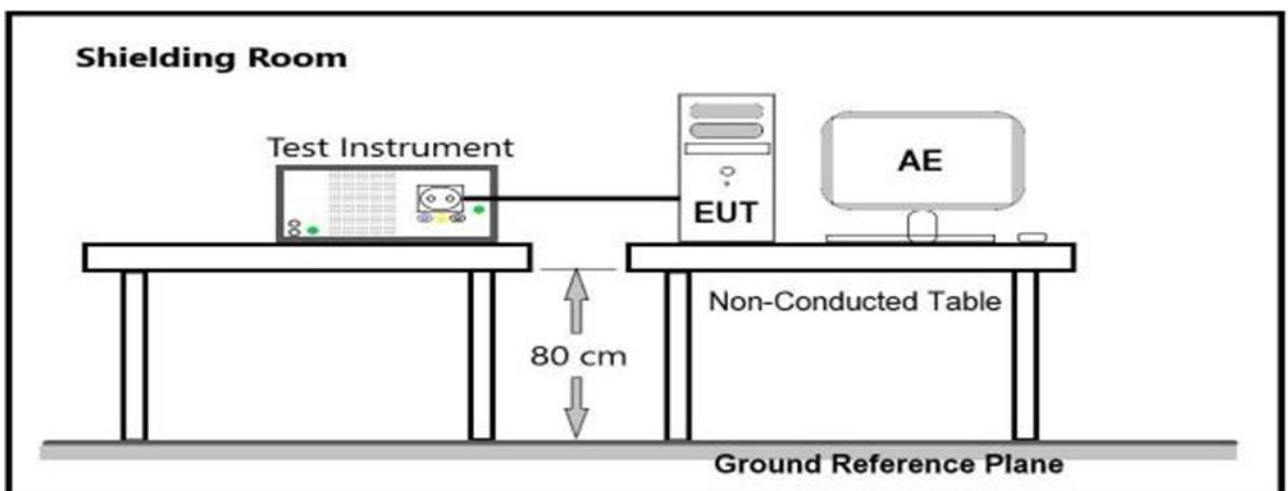
Note: The cycling frequency will be further limited by the P_{st} and P_{1t} limit.

For example: a d_{max} of 6 % producing a rectangular voltage change characteristic twice per hour will give a P_{1t} of about 0.65.

- c) 7 % for equipment which is:
 - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
 - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

P_{st} and P_{1t} requirements shall not be applied to voltage changes caused by manual switching.

4.5.2 Test Configuration



4.5.3 Test Procedure

The EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

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.

4.5.4 Test Results

	EUT values	Limit	Result
Pst	0.072	1.00	PASS
Plt	0.072	0.65	PASS
dc [%]	0	3.00	PASS
dmax [%]	0	4.00	PASS
dt [s]	0	0.20	PASS

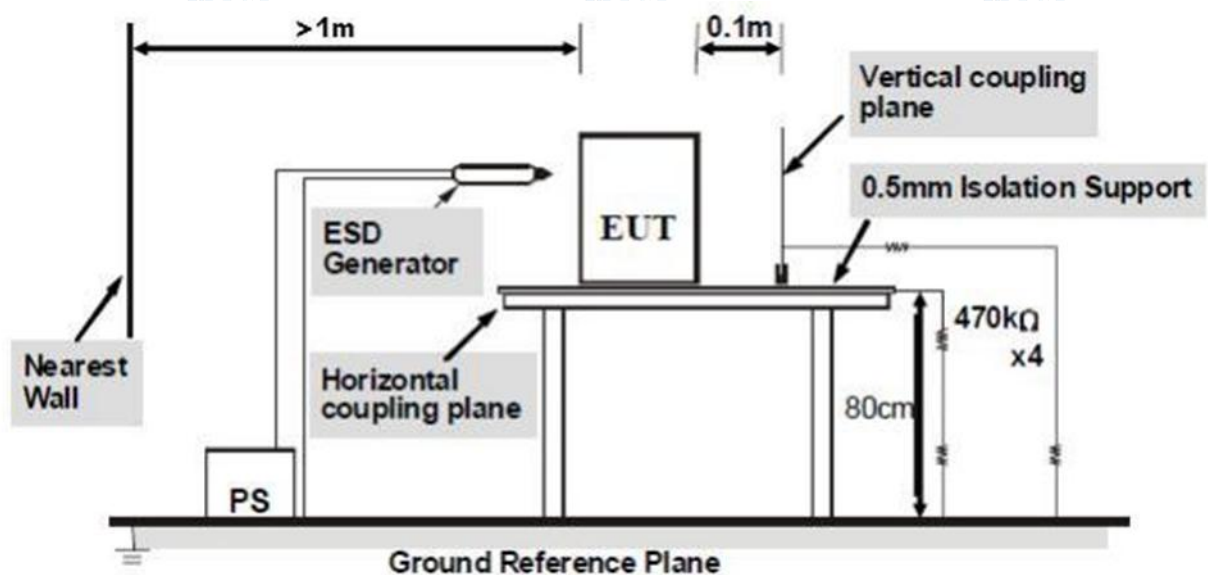
4.6 Electrostatic Discharge

4.6.1 Test Levels of Electrostatic Discharge

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

Performance criterion: **B**

4.6.2 Test Configuration



4.6.3 Test Procedure

Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT . Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT . Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

4.6.4 Test Results

Test Mode: Mode 1									
Air Discharge									
Test Points	Test Levels						Verdict		
	± 2 kV	Performance Criterion	± 4 kV	Performance Criterion	± 8 kV	Performance Criterion	Pass	Fail	Observation
key	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note1
Shell	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note1
Contact Discharge									
Test Points	Test Levels						Verdict		
	± 2kV	Performance Criterion	± 4 kV	Performance Criterion	± 6 kV	Performance Criterion	Pass	Fail	Observation
N/A	<input type="checkbox"/>	<input type="checkbox"/> A <input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A <input type="checkbox"/> B	<input type="checkbox"/>	<input type="checkbox"/> A <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Discharge To Horizontal Coupling Plane									
Side of EUT	Test Levels				Verdict				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation	
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Discharge To Vertical Coupling Plane									
Side of EUT	Test Levels				Verdict				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation	
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note1	

4.7 Radiated Electromagnetic Field (RS)

4.7.1 Test Specification

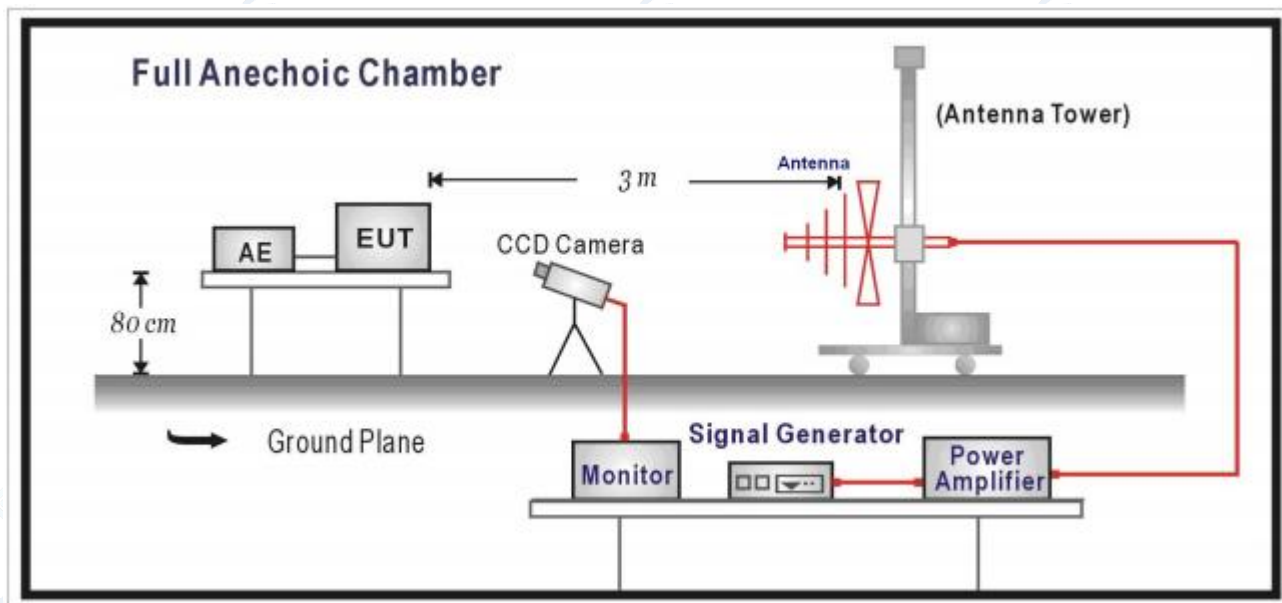
PERFORMANCE CRITERION

Criteria A

TEST LEVEL

3V/m (80%, 1kHz Amplitude Modulation)

4.7.2 Test Configuration



4.7.3 Test Procedure

Please refer to EN 61000-4-3 for the measurement methods.

TEST MODE

Please reference to the section 2.2

4.7.4 Test Results

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

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

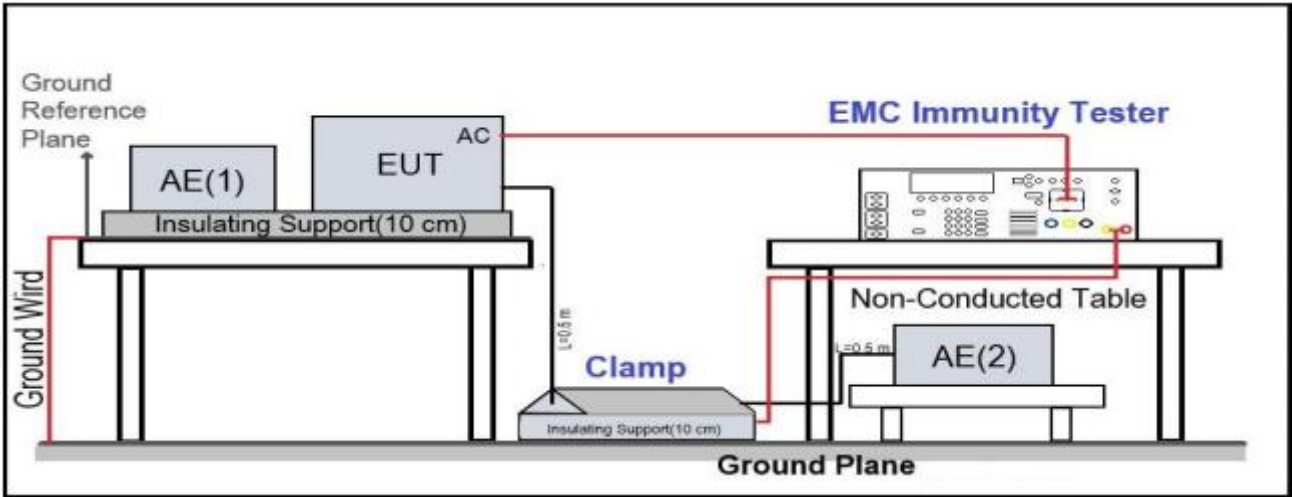
4.8 Electrical Fast Transient/Burst Test

4.8.1 Test Levels of Electrical Fast Transient/Burst Test

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1.	0.5	5 or 100	0.25	5 or 100
2.	1	5 or 100	0.5	5 or 100
3.	2	5 or 100	1	5 or 100
4.	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

Performance criterion: B

4.8.2 Test Configuration



4.8.3 Test Procedure

AC power input lines:

— EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 2mins.

Signal Line and Control Line:

— Coupling clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. The signal lines and control lines of EUT are put through the coupling clamp which couples the EFT signal to these lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 2mins.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.8.4 Test Result

☒ Results of Final Tests (Mode 1)

Impulse Frequency: 5 kHz

Tr/Th: 5/50ns

Burst Duration: 1.5 ms

Burst Period: 300 ms

Test duration: 120s

Injection Line	Voltage (kV)	Repetition rate (kHz)	Injected Method	Criterion	Result (Pass / Fail)
<input checked="" type="checkbox"/> L	± 1	5	Direct	B	Pass
<input checked="" type="checkbox"/> N	± 1	5	Direct	B	Pass
<input checked="" type="checkbox"/> L+N	± 1	5	Direct	B	Pass

Remarks: During the test no deviation was detected to the selected operation mode(s).

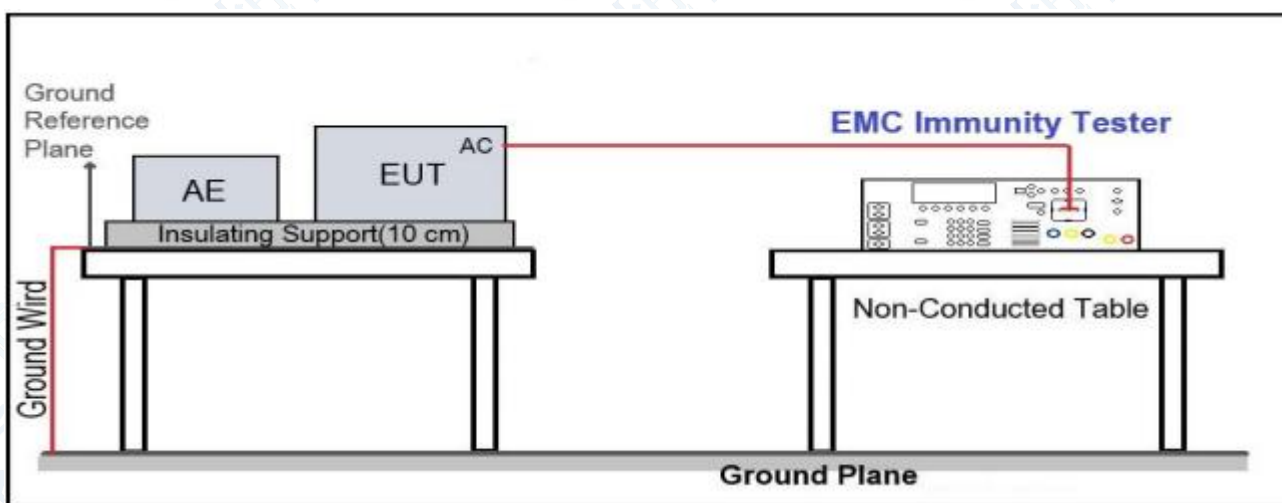
4.9 Surge Test

4.9.1 Test Levels of Surge

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

Performance criterion: **B**

4.9.2 Test Configuration



4.9.3 Test Procedure

In this test, the 1.2/50us & 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is twice of that for line to line. At least 5 positive from 90 phase angles and 5 negative from 270 phase angles surge signal with a maximum 1/min repetition rate are injected to AC power lines during the test.

4.9.4 Test Results

☒ Results of Final Tests (Mode 1)

Voltage Waveform: 1.2/50 us

Current Waveform: 8/20 us

Number of surges: 5

Repetition rate: 60 s

Coupling Line	Voltage (kV)	Phase angle	Polarity	Coupling Method	Criterion	Result (Pass/Fail)
<input checked="" type="checkbox"/> L - N	1	90	positive	Direct	B	Pass
<input checked="" type="checkbox"/> L - N	1	270	negative	Direct	B	Pass

Remarks: During the test no deviation was detected to the selected operation mode(s)

4.10 Conducted Disturbances Induced by Radio-Frequency Fields

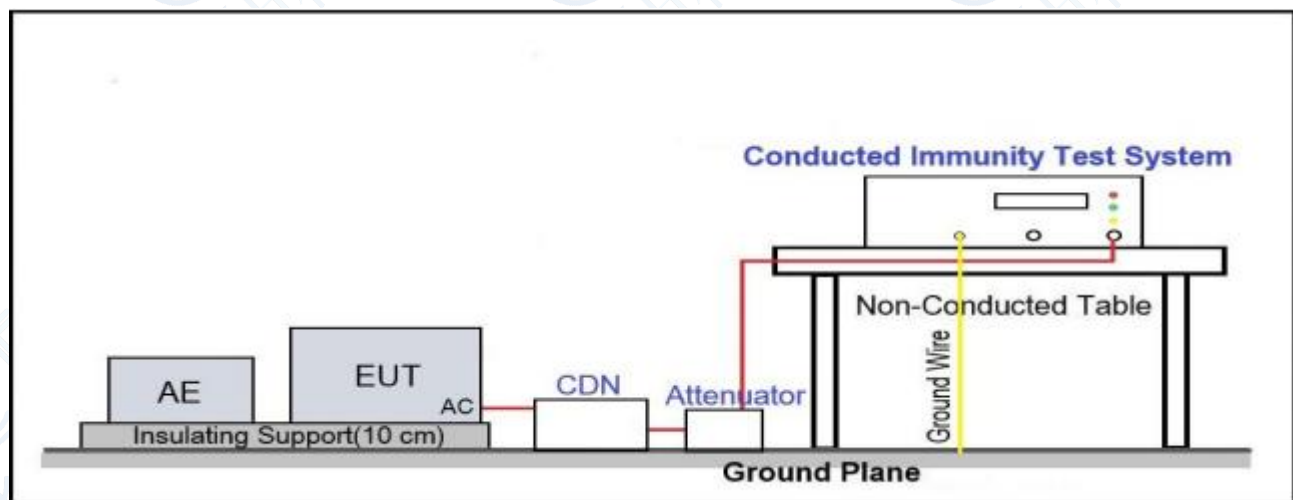
4.10.1 Test Levels of Conducted Disturbances Induced by Radio-Frequency Fields

Level	Field Strength (V)
1.	1
2.	3
3.	10
X	Special

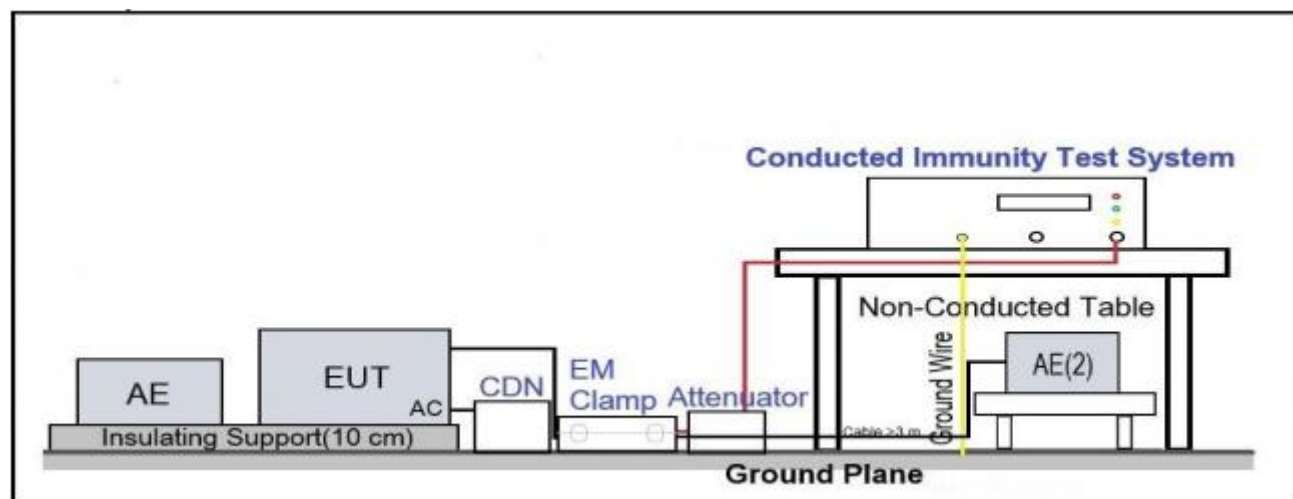
Performance criterion: A

4.10.2 Test Configuration

CDN Method



EM Clamp Method



4.10.3 Test Procedure

AC power input lines:

— EUT is placed on an insulating support of 0.1 m high above a ground reference plane. It must be 0.3 m away from the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal amplified by amplifier is injected to EUT through CDN.

Signal Line and Control Line:

— EUT is placed on an insulating support of 0.1 m high above a ground reference plane. The EM clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. Cables between EUT and auxiliary equipment are put through the EM clamp. The disturbance signal amplified by amplifier is injected to EUT through EM clamp.

4.10.4 Test Result☒ **Results of Final Tests (Mode 1)**

Frequency Range: 0.15 MHz~230 MHz

Frequency Step: 1 %

Dwell time: 1 Sec.

☒ **80% A.M., 1 kHz Sine wave**☒ **Coupling type:** ☒ **CDN** / ☐ **RF Current Probe** / ☐ **EM CLAMP**

Range (MHz)	Field	Injected Position	Criterion	Result (Pass/Fail)
0.15-230	3V	AC Main	A	Pass

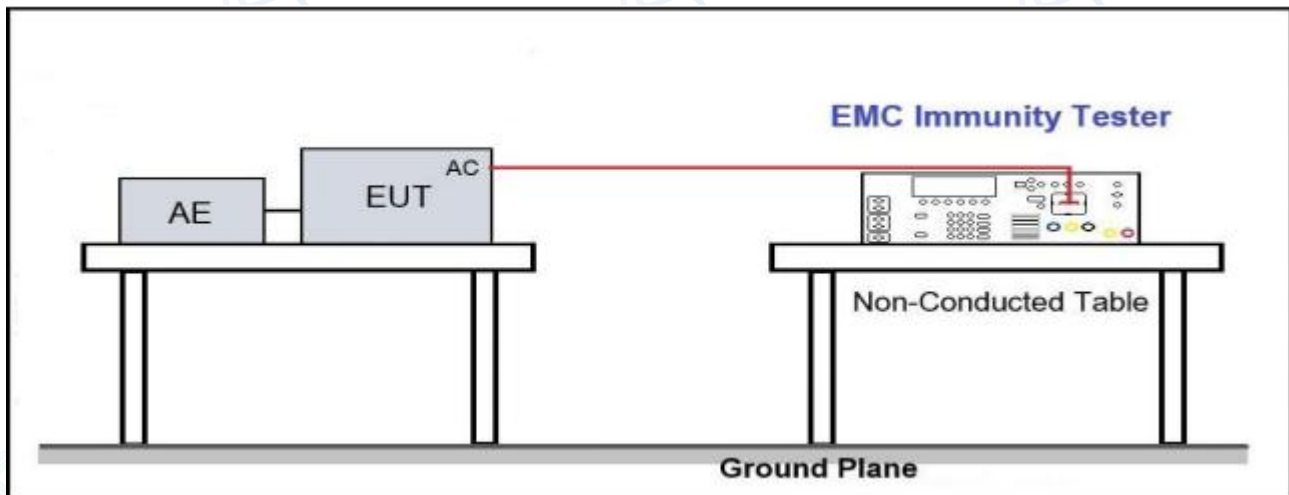
Remarks: During the test no deviation was detected to the selected operation mode(s).

4.11 Voltage Dips and Interruptions

4.11.1 Test Levels of Voltage Dips and Interruptions

Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Performance Criterion	Duration (In Period)
0	100	C	0.5
40	60	C	10
70	30	C	25

4.11.2 Test Configuration



4.11.3 Test Procedure

EUT is connected to the simulator according to the setup outline of 4. 12.2. When conducting the test level of 0.5 period duration, make sure that it shall start at the phase angle of 0° and 180°

4.11.4 Test Result

☒ Interruption at phase angles of 0° , 90° , 180° , 270° in a 10 sec-interval.

Nominal Mains Voltage (VN):	■ 230 V AC
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 30 % / 500ms
Nominal Mains Voltage (VN):	■ 230 V AC
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 60 % / 200ms
Nominal Mains Voltage (VN):	■ 230 V AC
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 100 % / 10ms

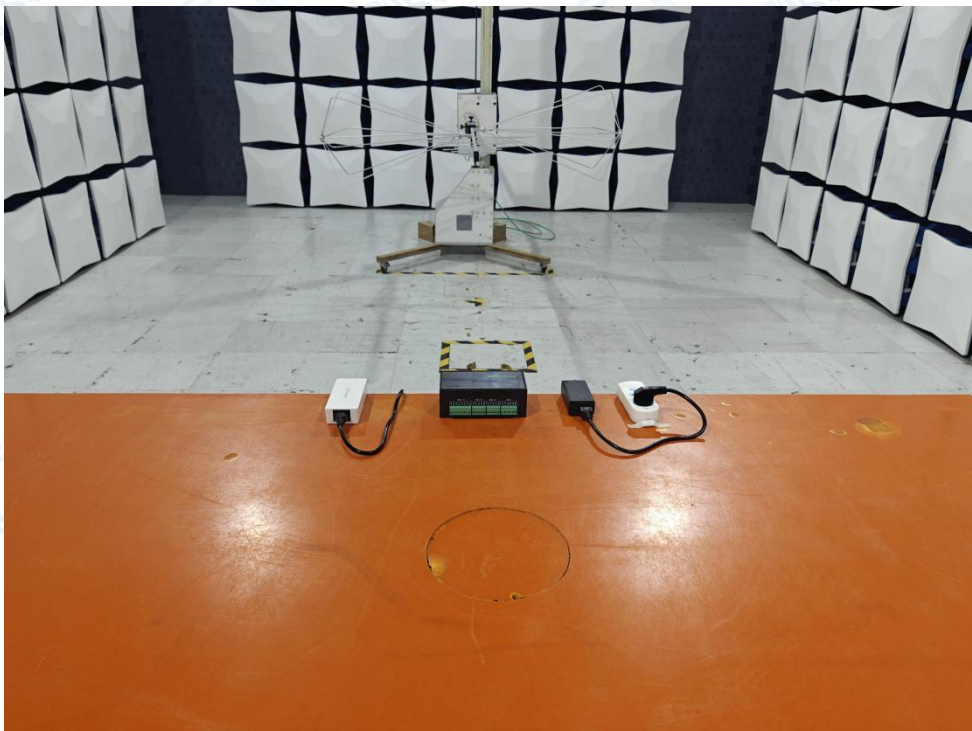
Remarks: During the test no deviation was detected to the selected operation mode(s).

5 TEST SETUP PHOTOS OF THE EUT

Conducted Emission



Radiated Emission



6 EXTERNAL AND INTERNAL PHOTOS OF THE EUT

6.1 External photos of the EUT

Photo 1 External View

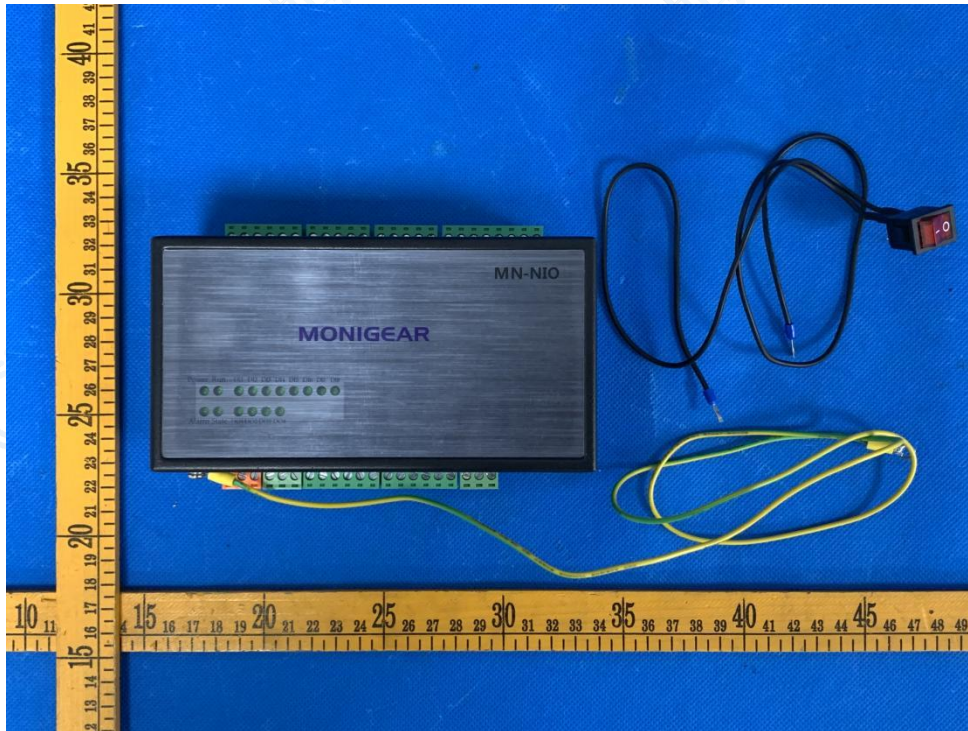
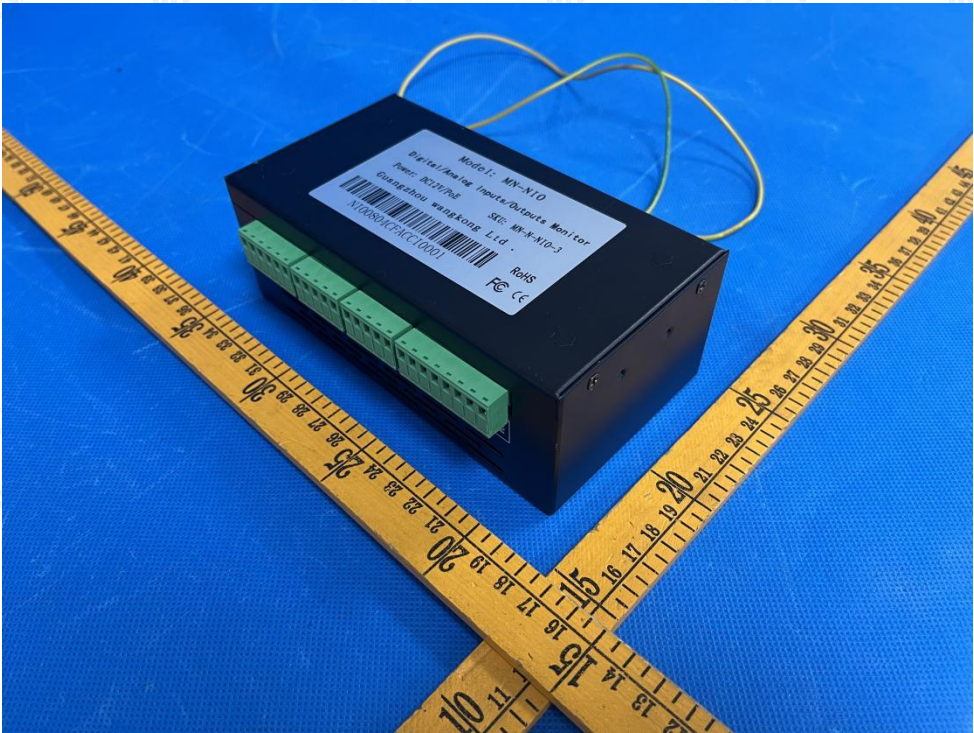


Photo 2 External View



Photo 3 External View



6.2 Internal photos of the EUT

Photo 1 Internal View

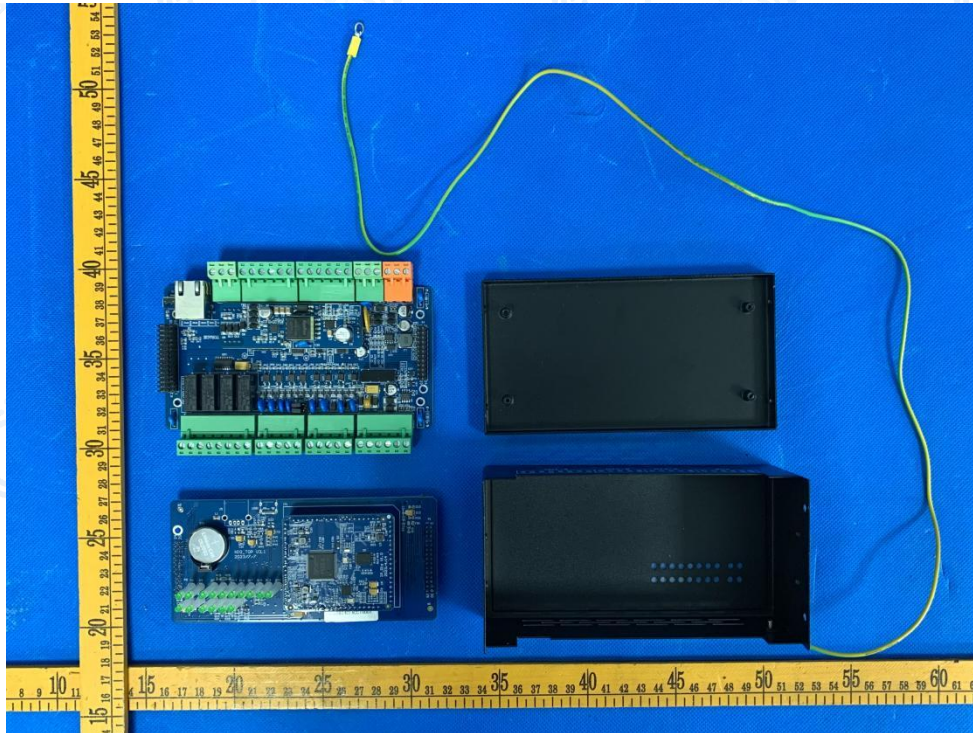


Photo 2 PCB View

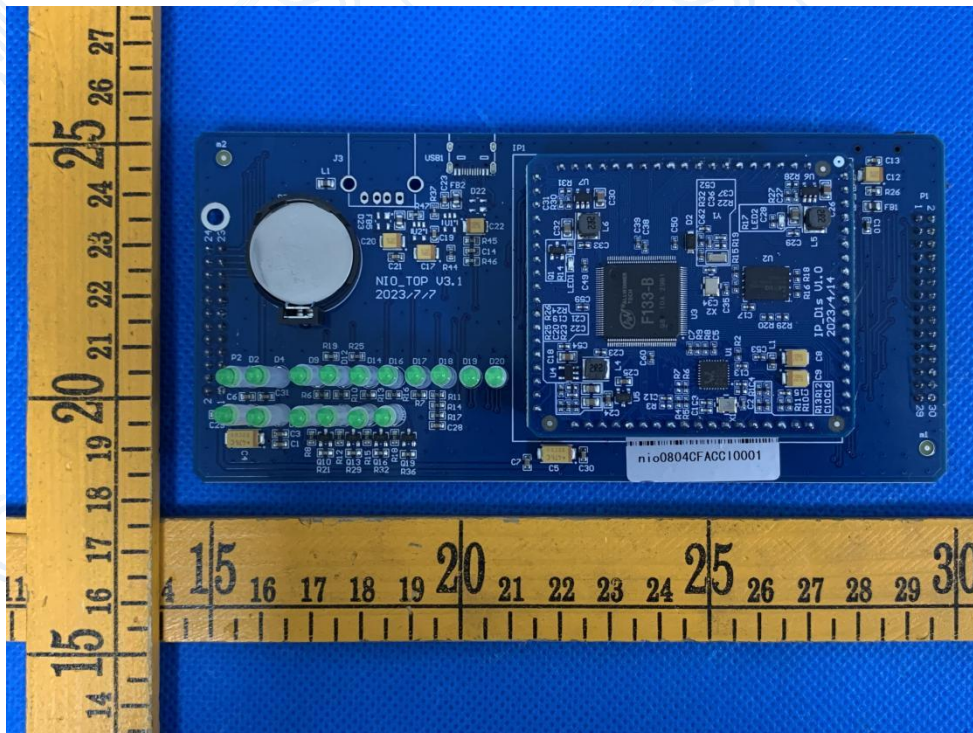


Photo 3 PCB View

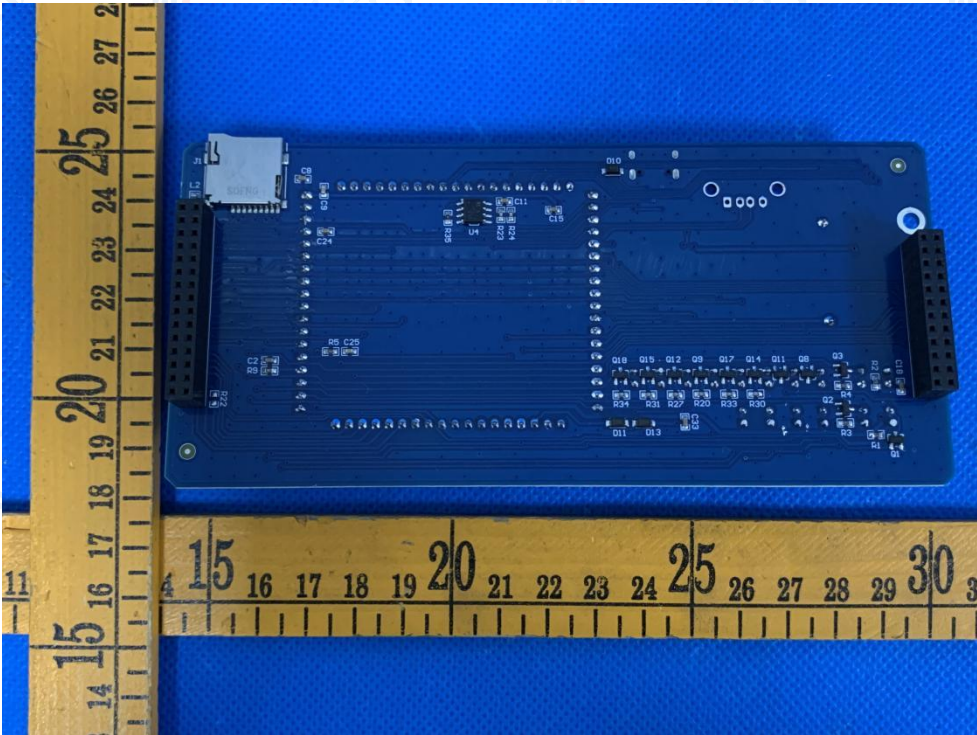


Photo 4 PCB View

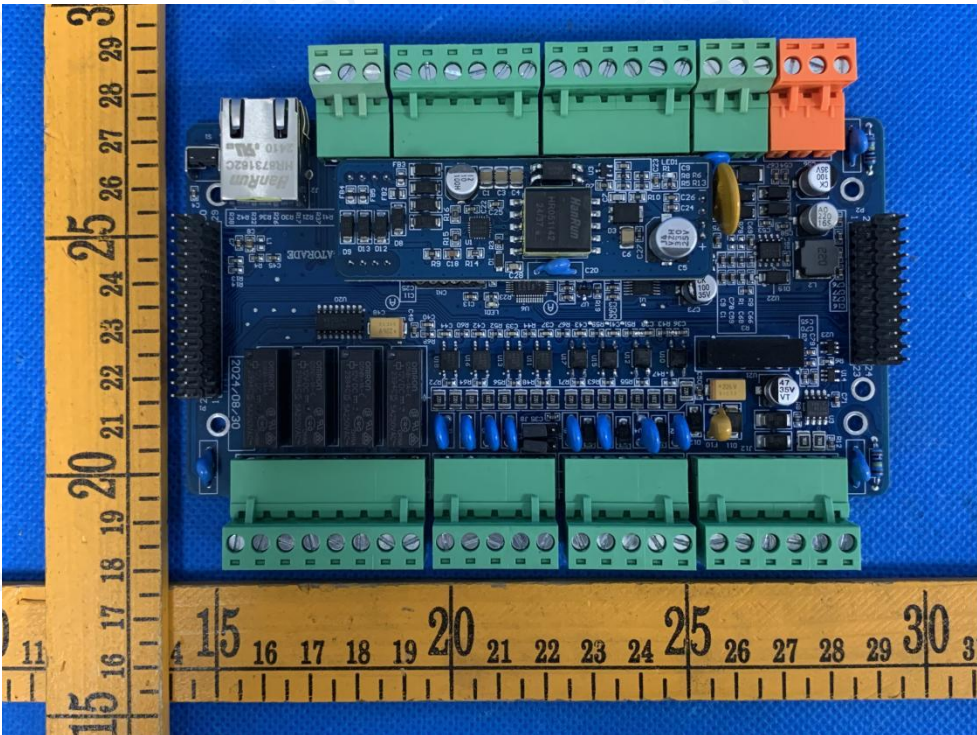
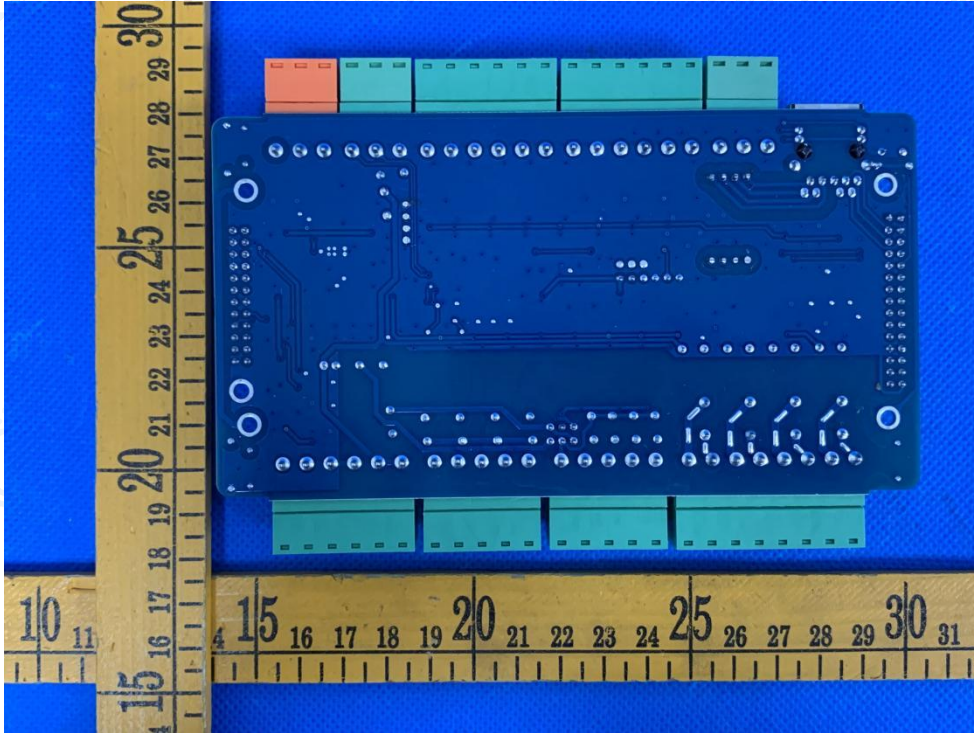


Photo 5 PCB View



.....End of Report.....