



REPORT No.: SZ20090288E01

TEST REPORT

MANUFACTURER : POCSTARS Technology Co., Ltd.

PRODUCT NAME : MiniServer

MODEL NAME : M200

BRAND NAME : POCSTARS

STANDARD(S) : EN 55032: 2015/AC:2016
EN 55035: 2017
EN 61000-3-3: 2013
EN 61000-3-2: 2014

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Change History		
Version	Date	Reason for Change
1.0	2020-10-29	First edition



1. Technical Information

Note: Provide by manufacturer.

1.1. Manufacturer and Factory Information

Manufacturer:	POCSTARS Technology Co., Ltd.
Manufacturer Address:	Room509, Building B, Jingu Venture Park, Longzhu 4th Road, Nanshan District, Shenzhen City, Guangdong Province, China.
Factory:	Shineman Technology(Shen Zhen) Co., Ltd.
Factory Address:	504/Rom, Building C, #1 East Area Shangxue Science Park, Jihua Road, Longgang District, Shenzhen City, Guangdong Province, China.

1.2. Equipment Under Test (EUT) Description

Product Name:	MiniServer	
Serial No.:	(N/A, marked #1 by test site)	
Hardware Version:	NSM-BT19-4L_V3.0	
Software Version:	NSM-BT19-4L_V2.2	
Ancillary Equipment:	Battery	
	Brand Name:	weineng
	Model No.:	CR2032
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	210mAh
	Rated Voltage:	3V
	Charge Limit:	N/A
	Manufacturer:	POWER GLORY BATTERY TECH (HK) CO LTD
	AC Adapter	
	Brand Name:	Huntkey
	Model No.:	HKA06012050-7F
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V~50/60Hz 1.5A
	Rated Output:	12V=5A
	Manufacturer:	Shenzhen Huntkey Electric Co., Ltd.



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Note:

1. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

2. Test Results

2.1. Applied Reference Documents

The objective of the report is to perform testing according to following standards for CE marking:

No.	Identity	Document Title
1	EN55032:2015/AC:2016	Electromagnetic compatibility of multimedia equipment - Emission requirements
2	EN 55035:2017	Electromagnetic compatibility of multimedia equipment - Immunity requirements
3	EN 61000-3-3:2013	Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
4	EN 61000-3-2:2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

Test detailed items required and results are listed as below (the latest versions of basic standards are applied):

No.	Base Standard	Test Type	Test Engineer	Result	Method Determination Remark
Emission					
1	CISPR16-2-3	Radiated Emission	Peng Xuewei	PASS	No deviation
2	CISPR16-2-1	Conducted Emission	Huang Zhiye	PASS	No deviation
3	CISPR16-2-1	Conducted Emission - Signal Ports	Huang Zhiye	PASS	No deviation
4	EN 61000-3-2	Harmonic Current Emissions	N/A	N/A ^{Note1}	No deviation
5	EN 61000-3-3	Voltage Fluctuations and Flicker	Huang Zhiye	PASS	No deviation
Immunity					
6	IEC 61000-4-2	Electrostatic Discharge Immunity	Wu Runfeng	PASS	No deviation



7	IEC 61000-4-3	Radiated Immunity	Zhang Weizhi	PASS	No deviation
8	IEC 61000-4-4	Electrical Fast Transient/Burst Immunity	Huang Zhiye	PASS	No deviation
9	IEC 61000-4-5	Surge Immunity	Huang Zhiye	PASS	No deviation
10	IEC 61000-4-6	Conducted Immunity	Zhang Weizhi	PASS	No deviation
11	IEC 61000-4-8	Power frequency magnetic field immunity	N/A	N/A ^{Note1}	No deviation
12	IEC 61000-4-11	Voltage Dips and Short Interruptions Immunity	Huang Zhiye	PASS	No deviation
13	IEC 61000-4-6	Broadband impulsive conducted disturbances	N/A	N/A ^{Note1}	No deviation

Note 1: The test item is not applicable.

Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 3: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.



2.2. EUT Setup and Operating Conditions

Note: All of the following test modes are tested in all the test items.

Test Modes	
Mode 1	: EUT + Adapter + RJ45 Link + USB FLASH DRIVE + USB KEYBOARD + VGA CONNECTED TO MONITOR
Mode 2	: EUT + Adapter + RJ45 Link + USB FLASH DRIVE + USB KEYBOARD + HDMI CONNECTED TO MONITOR
Remark: The above test mode in boldface (Mode 2) was the worst case of conducted emission, radiated emission and flicker tests, only the test data of these modes were reported. And for the ESD, RS, DIP, SURGE, EFT and CS tests, all test modes have the same test results, only the result in the boldface mode (Mode 1) is recorded in this report.	

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

3. Emission Tests

3.1. Radiated Emission

3.1.1. Limits of Radiated Emission

Frequency Range (MHz)	Quasi-peak Limit (dB μ V/m)	--
30 – 230	50	--
230 – 1000	57	--
Frequency Range (MHz)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000-3000	76	56
3000-6000	80	60

Note:

1. The limit is applicable to 3m measurement distance.
2. The lower limit shall apply at the transition frequency.
3. Additional provisions may be required for cases where interference occurs.

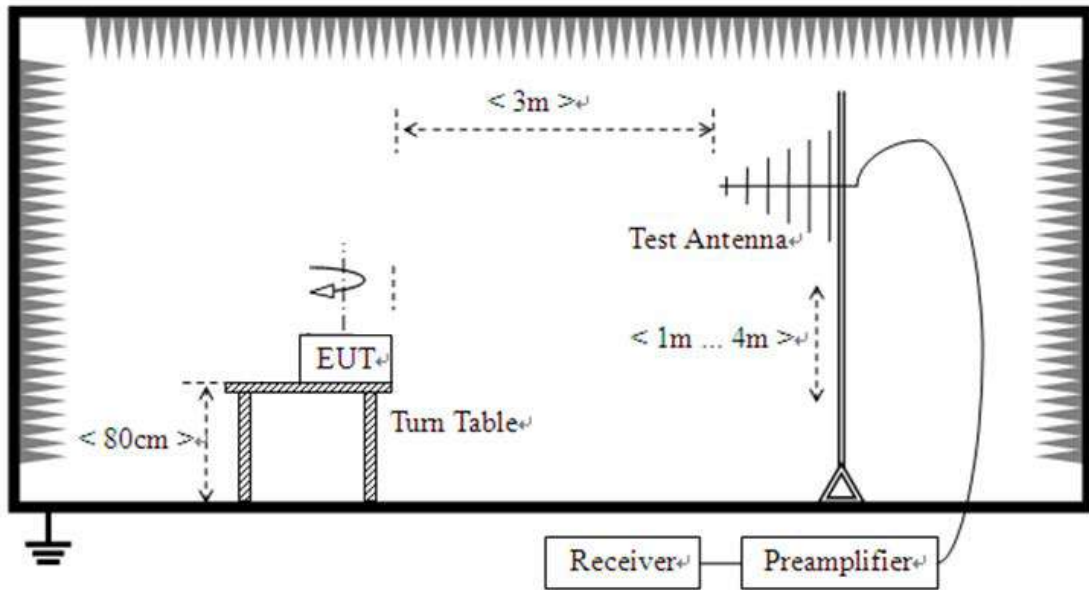
3.1.2. Test Procedure

1. The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.
2. For each suspected emission, the EUT is arranged to its worst case and then the Test Antenna is tuned to the heights from 1 to 4m and the Turn Table is tuned from 0 to 360 degrees to find the maximum reading.
3. The Test Antenna height is varied from 1 to 4m above the ground to determine the maximum value of the field strength. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests.
4. The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with QP and AV detectors.

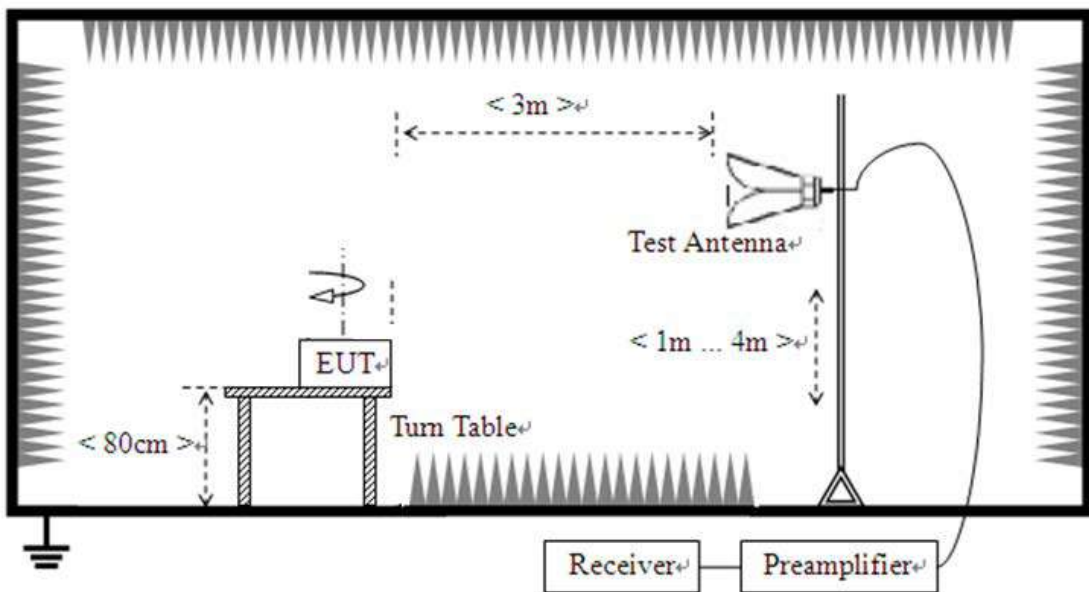
3.1.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.

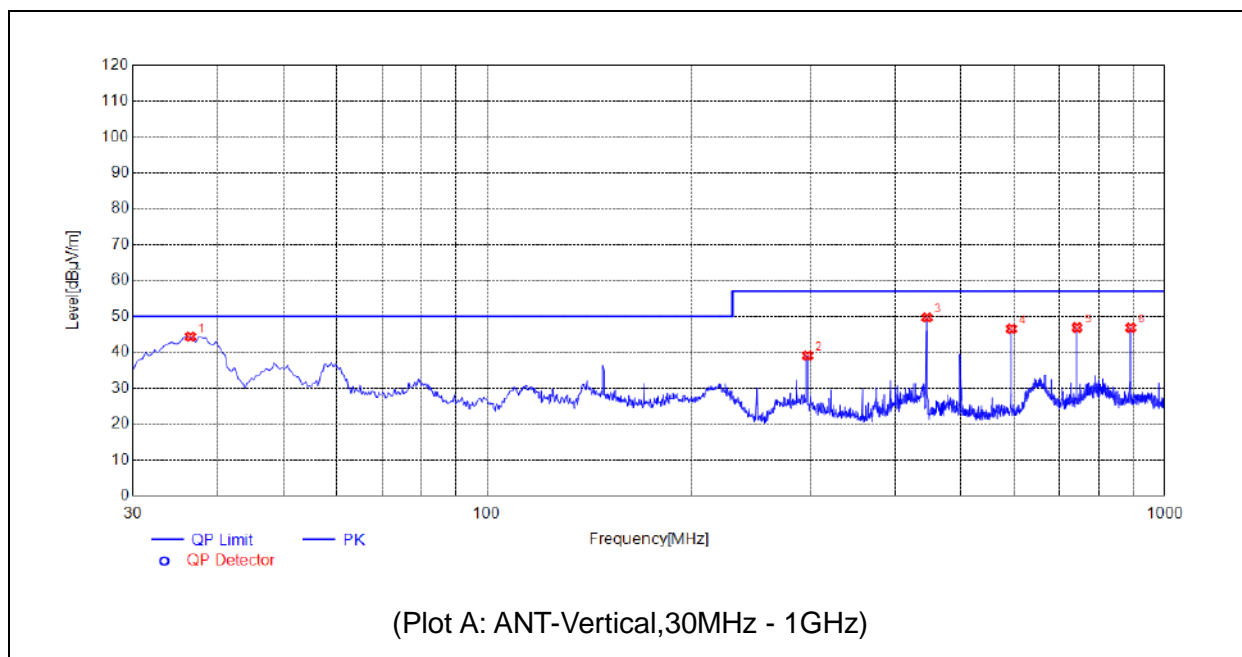
- 1) For radiated emissions from 30MHz to 1GHz



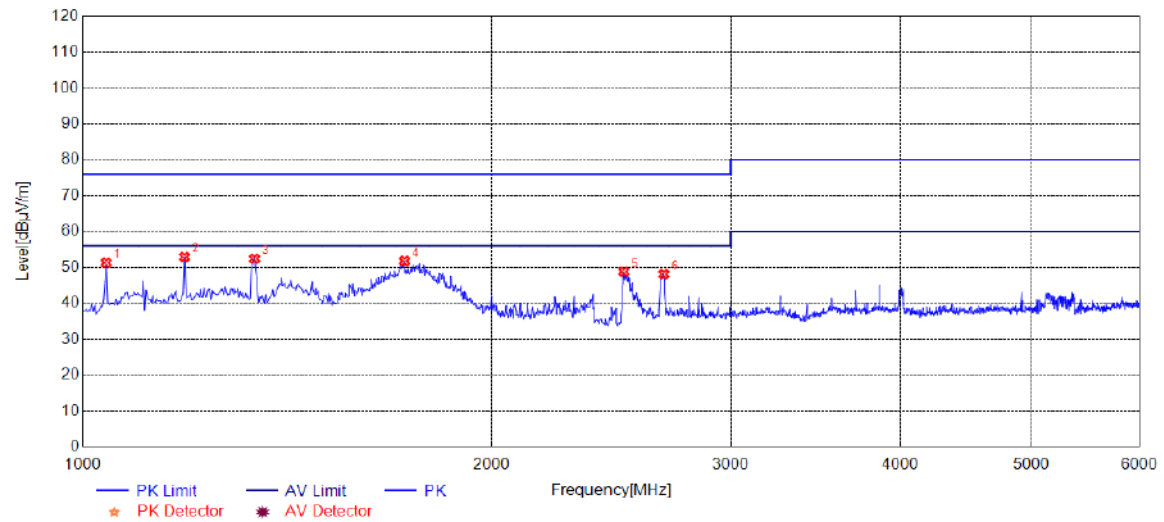
- 1) For radiated emissions above 1GHz



3.1.4. Test Result

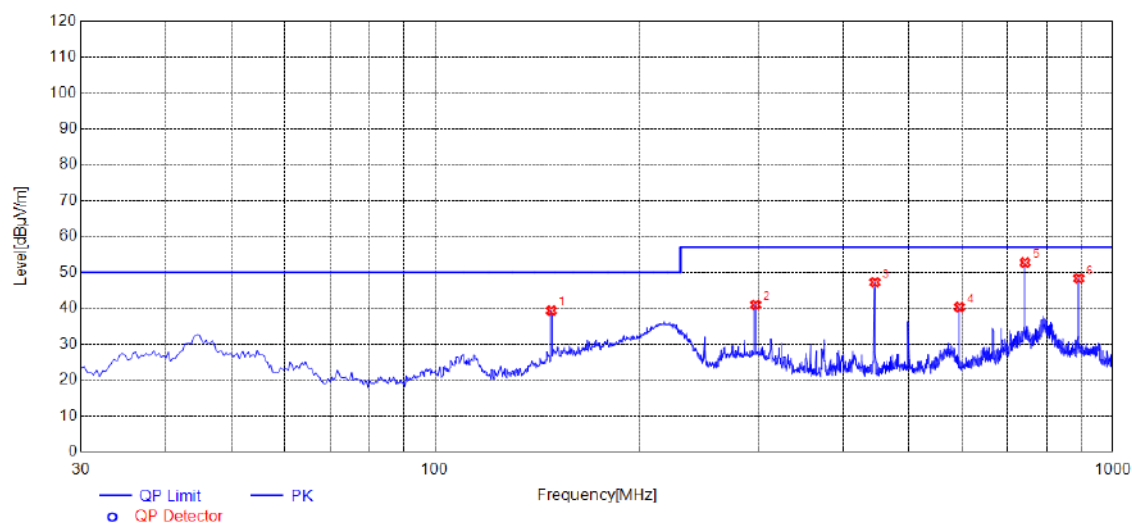


No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	36.4688	44.32	N.A.	N.A.	N.A.	50.00	N.A.	V	PASS
2	297.1624	39.05	N.A.	N.A.	N.A.	57.00	N.A.	V	PASS
3	445.6219	49.68	N.A.	N.A.	N.A.	57.00	N.A.	V	PASS
4	594.0814	46.49	N.A.	N.A.	N.A.	57.00	N.A.	V	PASS
5	742.5408	46.84	N.A.	N.A.	N.A.	57.00	N.A.	V	PASS
6	891.0003	46.79	N.A.	N.A.	N.A.	57.00	N.A.	V	PASS



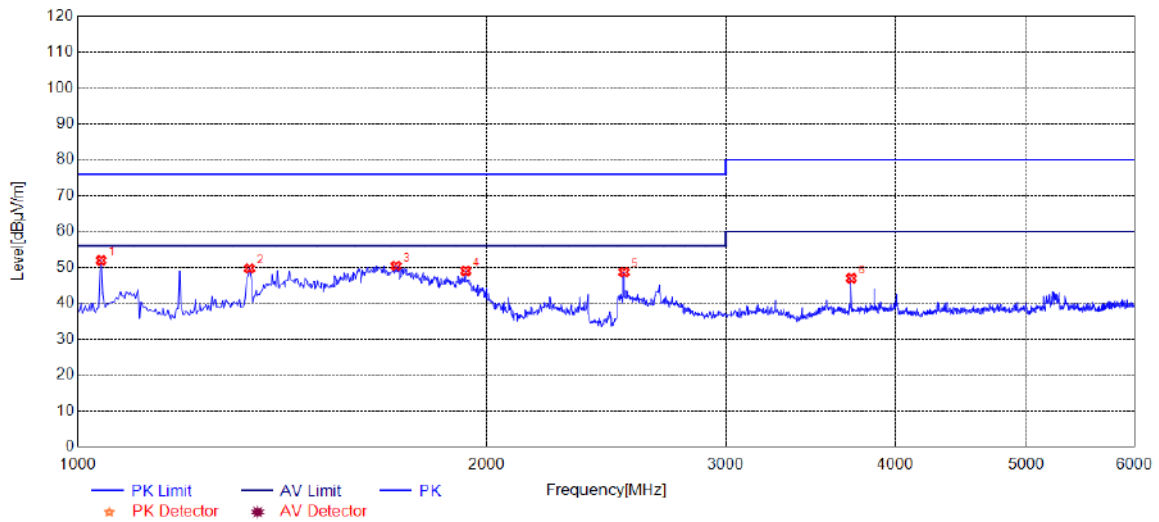
(Plot B: ANT-Vertical, 1GHz - 6GHz)

No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	1040.0200	51.33	N.A.	N.A.	76.00	N.A.	56.00	V	PASS
2	1187.5938	52.92	N.A.	N.A.	76.00	N.A.	56.00	V	PASS
3	1337.6688	52.43	N.A.	N.A.	76.00	N.A.	56.00	V	PASS
4	1725.3627	51.79	N.A.	N.A.	76.00	N.A.	56.00	V	PASS
5	2503.2516	48.77	N.A.	N.A.	76.00	N.A.	56.00	V	PASS
6	2678.3392	48.07	N.A.	N.A.	76.00	N.A.	56.00	V	PASS



(Plot C:ANT- Horizontal, 30MHz - 1GHz)

No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	148.3795	39.33	N.A.	N.A.	N.A.	50.00	N.A.	H	PASS
2	297.1624	40.93	N.A.	N.A.	N.A.	57.00	N.A.	H	PASS
3	445.6219	47.20	N.A.	N.A.	N.A.	57.00	N.A.	H	PASS
4	594.0814	40.31	N.A.	N.A.	N.A.	57.00	N.A.	H	PASS
5	742.5408	52.74	N.A.	N.A.	N.A.	57.00	N.A.	H	PASS
6	891.0003	48.27	N.A.	N.A.	N.A.	57.00	N.A.	H	PASS



(Plot D:ANT- Horizontal, 1GHz - 6GHz)

No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	1040.0200	51.98	N.A.	N.A.	76.00	N.A.	56.00	H	PASS
2	1337.6688	49.68	N.A.	N.A.	76.00	N.A.	56.00	H	PASS
3	1715.3577	50.41	N.A.	N.A.	76.00	N.A.	56.00	H	PASS
4	1930.4652	48.98	N.A.	N.A.	76.00	N.A.	56.00	H	PASS
5	2525.7629	48.62	N.A.	N.A.	76.00	N.A.	56.00	H	PASS
6	3713.8569	46.94	N.A.	N.A.	80.00	N.A.	60.00	H	PASS

3.2. Conducted Emission

3.2.1. Limits of Conducted Emission

Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	79	66
0.50 - 30	73	60

Note:

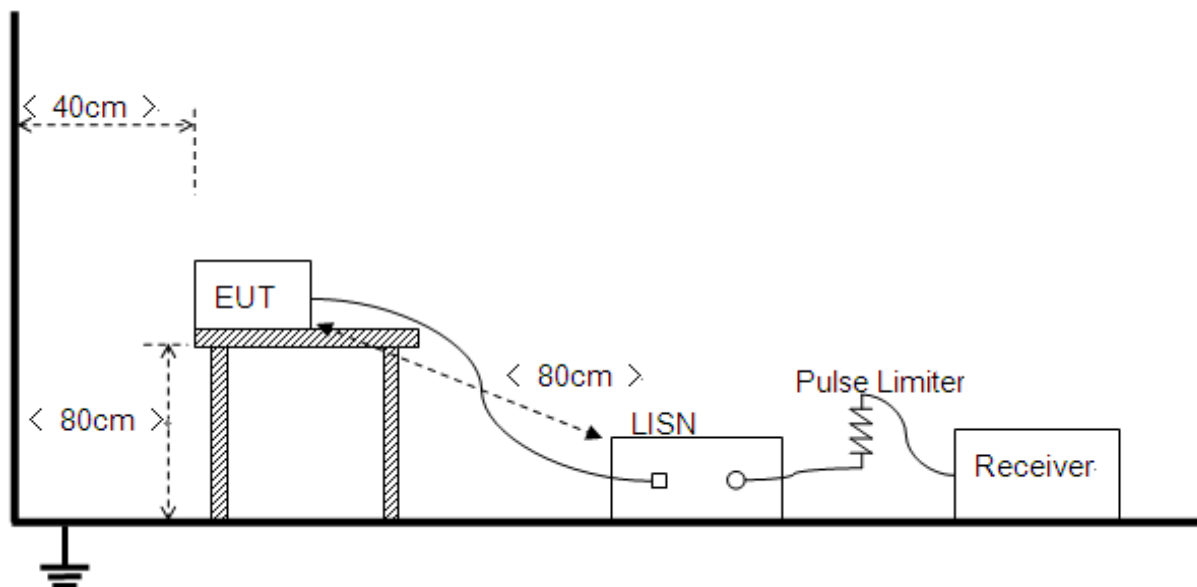
1. The lower limit shall apply at the band edges.

3.2.2. Test Procedure

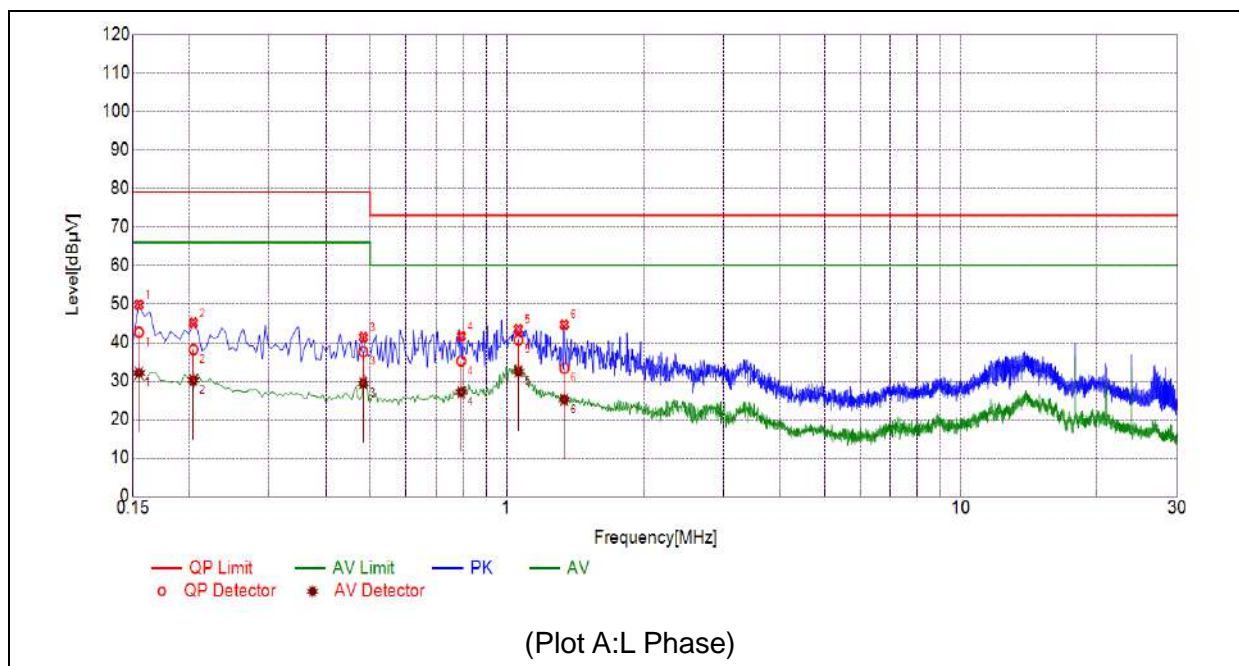
1. The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument.
2. The test frequency range is from 150kHz to 30MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.
3. Tests for both Line and Neutral lines of the power mains connected to the EUT are performed.

3.2.3. Test Setup

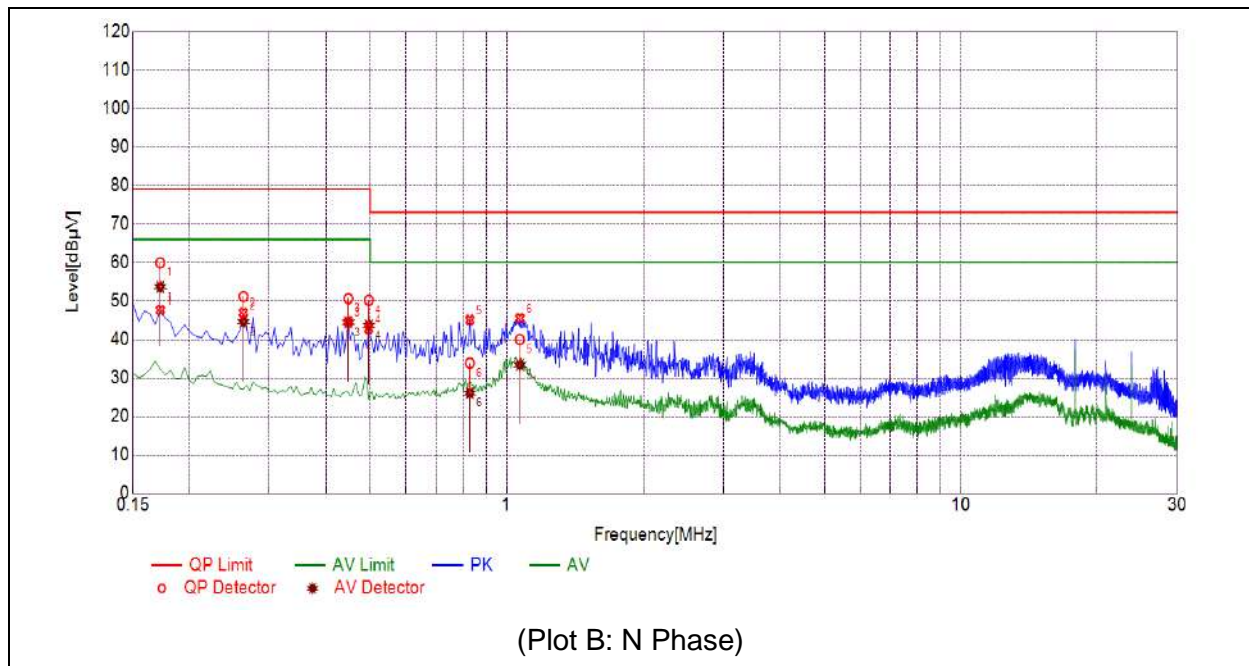
Please refer to Annex A for the photographs of the Test Configuration.



3.2.4. Test Result



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1546	42.63	32.07	79.00	66.00	Line	PASS
2	0.2040	38.13	30.16	79.00	66.00		PASS
3	0.4827	37.62	29.35	79.00	66.00		PASS
4	0.7931	35.14	27.04	73.00	60.00		PASS
5	1.0595	40.62	32.41	73.00	60.00		PASS
6	1.3379	33.27	25.12	73.00	60.00		PASS



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1724	59.91	53.64	79.00	66.00	Neutral	PASS
2	0.2627	51.13	44.61	79.00	66.00		PASS
3	0.4472	50.61	44.43	79.00	66.00		PASS
4	0.4968	50.18	43.59	79.00	66.00		PASS
5	1.0672	39.97	33.37	73.00	60.00		PASS
6	0.8292	33.85	26.07	73.00	60.00		PASS

3.3. Conducted Emission - Signal Port

3.3.1. Limits of Conducted Emission - Signal Port

Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 – 0.50	97 to 87	84 to 74
0.50 – 30	87	74

Note:

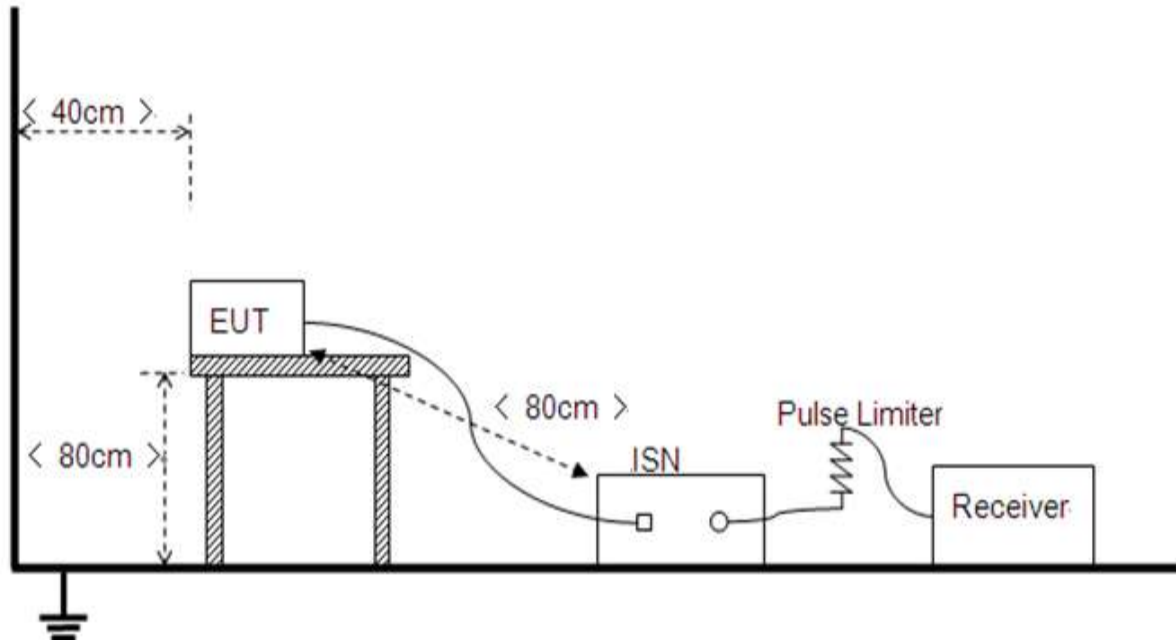
1. The limit is applicable to Class A equipment.
2. The lower limit shall apply at the band edges.
3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 – 0.50MHz.

3.3.2. Test Procedure

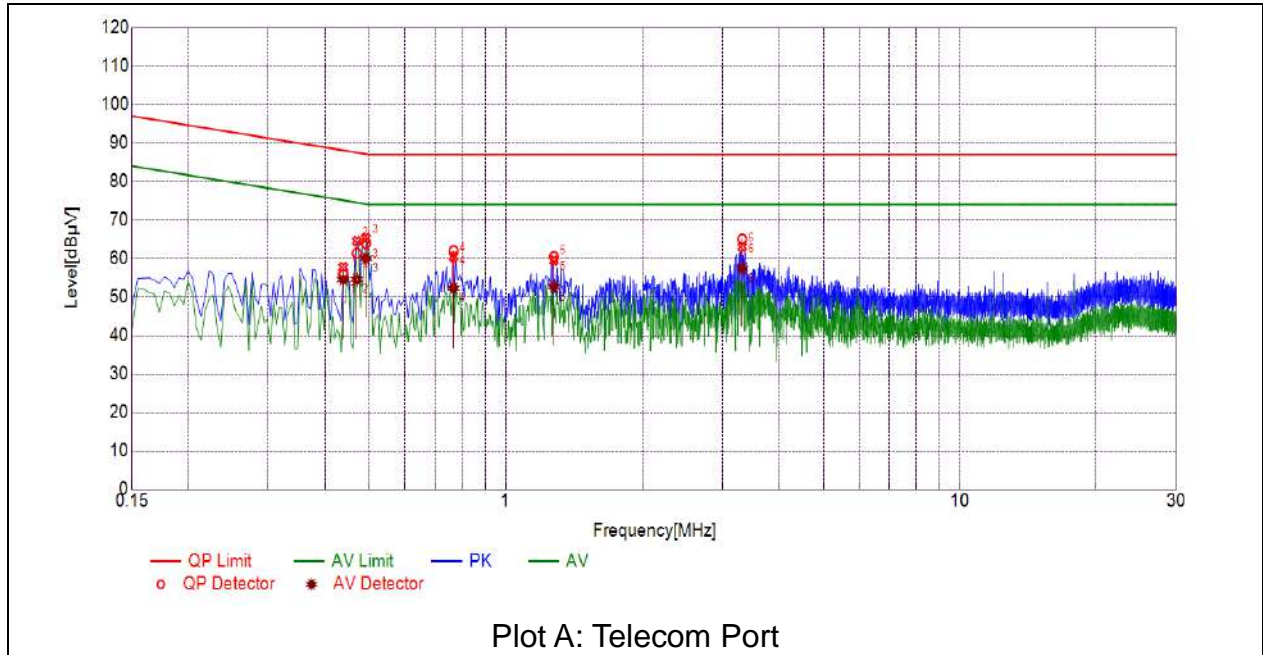
1. The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN and the telecommunication port is connected to an ISN for the measuring instrument.
2. The test frequency range is from 150kHz to 30MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.

3.3.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



3.3.4. Test Result



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Verdict
		Quai-peak	Average	Quai-peak	Average	
1	0.4380	55.78	54.48	88.10	75.10	PASS
2	0.4695	61.34	54.54	87.52	74.52	PASS
3	0.4920	63.89	60.04	87.13	74.13	PASS
4	0.7665	61.96	52.25	87.00	74.00	PASS
5	1.2750	60.47	52.61	87.00	74.00	PASS
6	3.3180	64.98	57.44	87.00	74.00	PASS

3.4. Voltage Fluctuations and Flicker

3.4.1. Limits of Voltage Fluctuations and Flicker

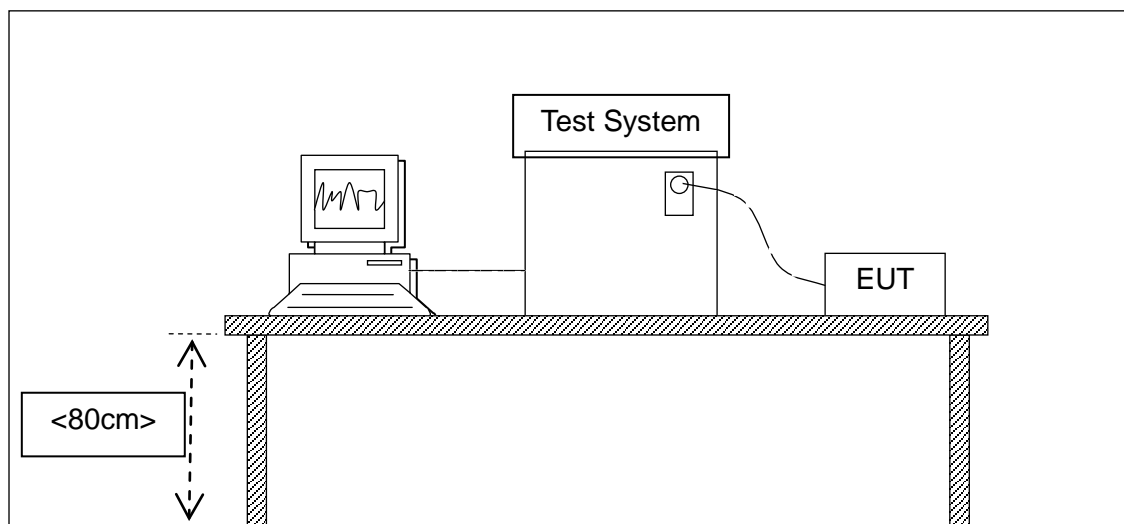
Test Item	Limit	Note
P_{st}	1.0	Short-term flicker indicator
P_{lt}	0.65	Long-term flicker indicator
T_{dt}	0.5	Maximum time that dt exceeds 3%
d_{max} (%)	4%	Maximum relative voltage change
d_c (%)	3.3%	Relative steady-state voltage change

3.4.2. Test Procedure

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

3.4.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.





3.4.4. Test Result

A. Test Specification:

No.	Specification	Value
1	Test Frequency	50Hz
2	Test Voltage	230VAC
3	Waveform	Sine
4	Test Time	10 minutes for P_{st} ; 2 hours for P_{lt}

B. Test Verdict:

Test Mode	Test Parameter	Limit	Measurement Value	Verdict
See section 2.2	P_{st}	1.0	0.05	PASS
	P_{lt}	0.65	0.03	PASS
	T_{dt}	0.5	0.00	PASS
	d_{max} (%)	4%	0.01%	PASS
	d_c (%)	3.3%	0.00%	PASS

4. Immunity Tests

4.1. EUT Operation and Performance Criteria

4.1.1. Performance Criteria

Type	Description
Criterion A	<p>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.</p> <p>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.</p>
Criterion B	<p>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.</p> <p>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.</p> <p>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.</p>
Criterion C	<p>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. Are boot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

4.2. Electrostatic Discharge Immunity

4.2.1. Test Specification

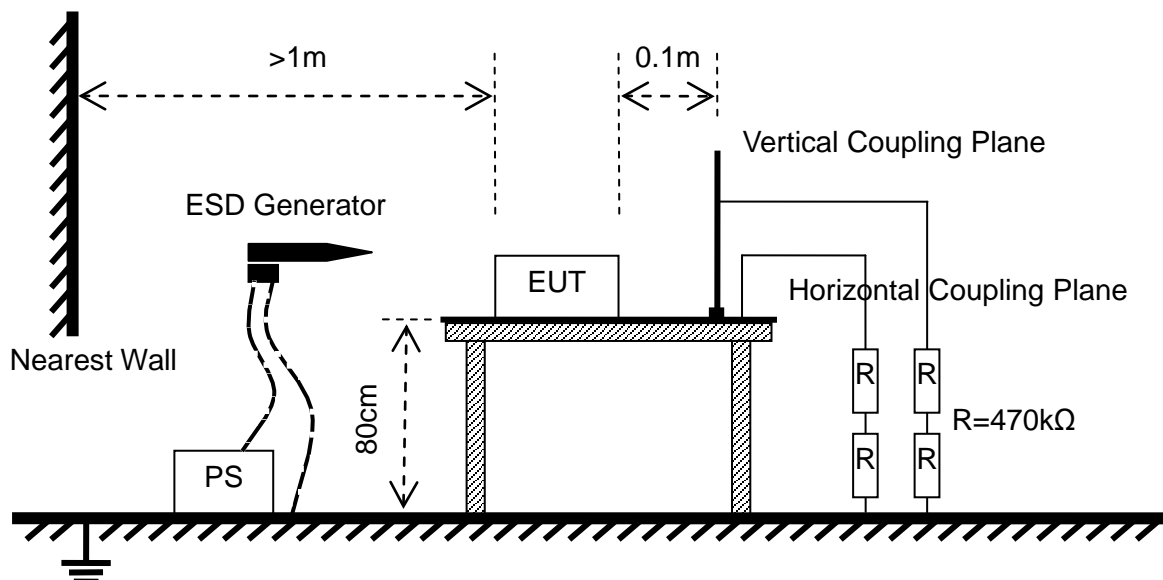
Specification	Value
Basic Standard	IEC 61000-4-2:2008
Discharge Impedance	330Ohm / 150pF
Discharge Voltage	Air Discharge: 8kV; Contact Discharge: 4kV
Polarity	Positive / Negative
Number of Discharge	Minimum 10 times at each test point
Discharge Mode	Single discharge
Discharge Period	1 second minimum

4.2.2. Test Procedure

1. Electrostatic discharges are applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test is performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges is at least 1 second.
4. The ESD generator is held perpendicularly to the surface to which the discharge is applied and the return cable is at least 0.2 meters from the EUT.
5. Contact discharges are applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges are 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 is removed from the EUT and re-triggered for a new single discharge. The test is repeated until all discharges were completed.
7. At least ten single discharges (in the most sensitive polarity) are applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator is positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) are 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*0.5m) is placed vertically to and 0.1 meters from the EUT.

4.2.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



4.2.4. Test Result

Performances of all test modes of the EUT should comply with the performance criteria for Criterion B. All test modes have the same test results, only one result is recorded in this report.

Test Points	Discharge Level (kV)	Discharge Mode	Number of Discharge	Test Mode	Observation	Verdict
HCP	±4	Contact	10	See section 2.2	A	PASS
VCP	±4	Contact	10		A	PASS
Please refer to the blue arrow	±4	Contact	10		A	PASS
Please refer to the red arrow	±2,±4,±8	Air	10		A	PASS

4.2.5. The ESD test points







Represent air discharge



Represents contact discharge

4.3. Radiated Immunity

4.3.1. Test Specification

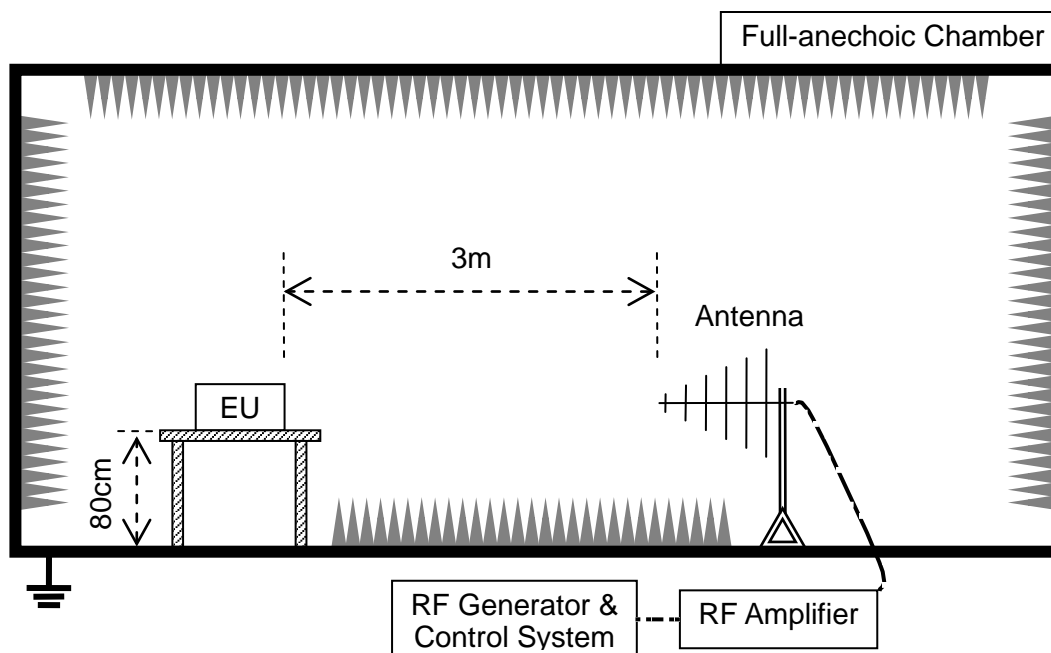
Specification	Value
Basic Standard:	IEC 61000-4-3:2006/AMD1:2007/AMD2:2010
Frequency Range:	80 MHz –1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Field Strength:	3V/m
Modulation:	1 kHz sine wave, 80%, AM modulation
Frequency Step:	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance:	3m
Antenna Height:	1.5m
Dwell Time:	3 seconds

4.3.2. Test Procedure

The test procedure was in accordance with IEC 61000-4-3:2006/AMD1:2007/AMD2:2010.

1. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
2. The test signal was 80% amplitude modulated with a 1 kHz sine wave.
3. The frequency range was swept from 80 MHz to 1000MHz and 1800MHz, 2600MHz, 3500MHz, 5000MHz. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
4. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
5. The field strength level was 3V/m.
6. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.3.3. Test Setup



For the actual test configuration refer to Annex A for the photographs of the Test Configuration.

4.3.4. Test Result

Performances of all test modes of the EUT should comply with the performance criteria for Criterion A. All test modes have the same test results, only one result is recorded in this report.

Operating Mode	Field Strength	Frequency (MHz)	Modulation	EUT Face	Observation	Verdict
See Section 2.2	3 V/m	80-1000, 1800, 2600, 3500, 5000	1KHz, 80% Amp. Mod, 1% increment	Front	A	PASS
				Rear	A	PASS
				Left	A	PASS
				Right	A	PASS



4.4. Electrical Fast Transient / Burst Immunity

4.4.1. Test Specification

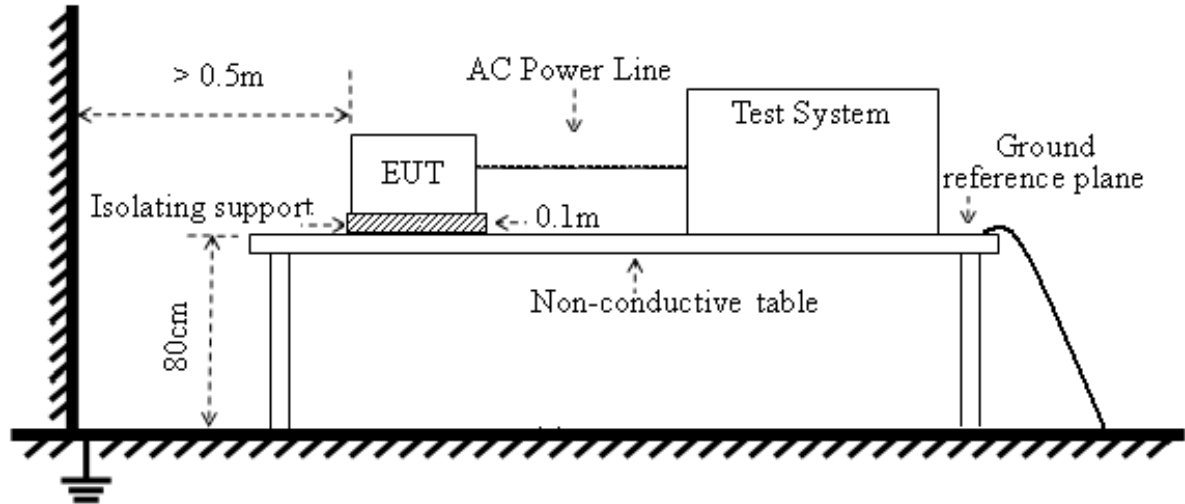
Specification	Value
Basic Standard	IEC 61000-4-4:2012
Test Voltage	AC Power Port: 1KV, Telecommunication Ports:0.5KV
Polarity	Positive / Negative
Impulse Frequency	5kHz (100kHz for xDSL wired network ports)
Impulse Wave Shape	5/50ns
Burst Duration	15ms
Burst Period	300ms
Test Duration	Telecommunication Ports: ≥ 1min; AC Power Port: ≥ 2min

4.4.2. Test Procedure

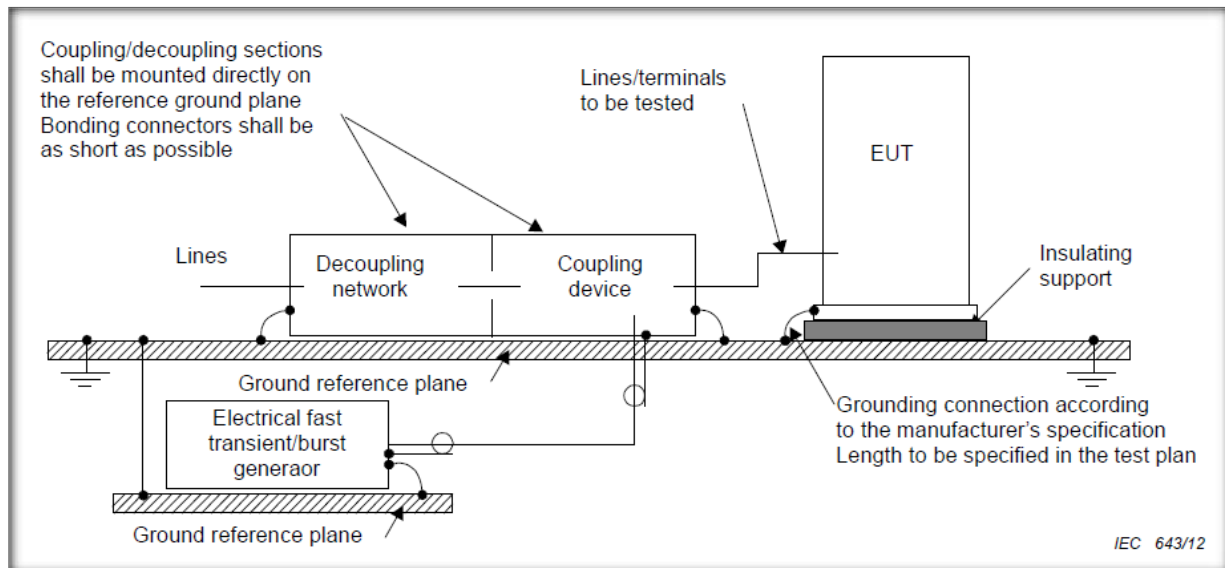
1. The EUT is tested with 1000V discharges to the AC power input leads and tested with 500V discharges to the Telecommunication Ports.
2. Both positive and negative polarity discharges are applied.
3. The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1m.
4. The duration time of each test sequential is 2min.
5. The transient / burst waveform is in accordance with IEC 61000-4-4:2012, 5/50ns.

4.4.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



AC Power Port



Telecommunication Ports



4.4.4. Test Result

Performances of all test modes of the EUT should comply with the performance criteria for Criterion B. All test modes have the same test results, only one result is recorded in this report.

EUT Operating Mode	Test Point	Polarity	Test Level (kV)	Observation	Verdict
See section 2.2	AC Port, L	+ / -	1	A	PASS
	AC Port, N	+ / -	1	A	PASS
	AC Port, L-N	+ / -	1	A	PASS
	AC Port, L-PE	+ / -	1	A	PASS
	AC Port, N-PE	+ / -	1	A	PASS
	AC Port, L-N-PE	+ / -	1	A	PASS
	AC Port, PE	+ / -	1	A	PASS
	Telecommunication Port	+ / -	0.5	A	PASS



4.5. Surge Immunity

4.5.1. Test Specification

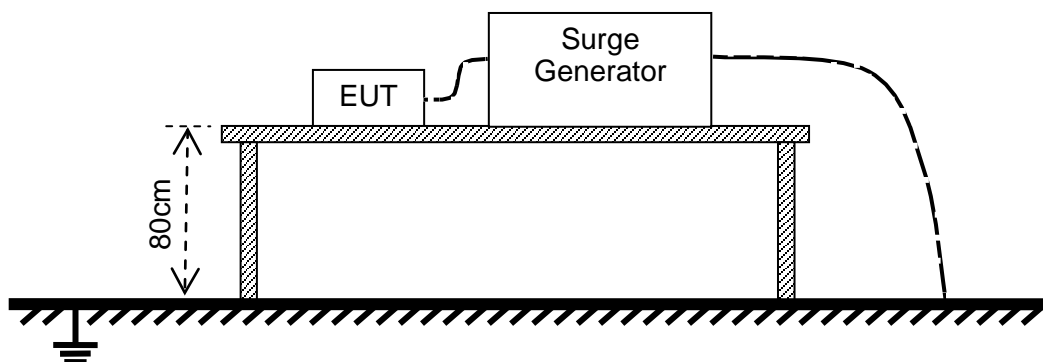
Specification	Value
Basic Standard	IEC 61000-4-5:2005
Waveform	AC Power Port: Voltage: 1.2/50 μ s; Current: 8/20 μ s Telecommunication Port: Voltage: 10/700 μ s; Current: 5/320 μ s
Test Voltage	AC Power Port: line to ground 2kV, line to line 1kV Telecommunication Port: line to ground 1kV (primary protection is not intended)
Polarity	Positive / Negative
Phase Angle	90°, 270°
Repetition Rate	60 seconds
Times	5 times per condition

4.5.2. Test Procedure

1. The EUT and the auxiliary equipment are placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m*1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT is less than 2 meters (provided by the manufacturer).
2. The EUT is connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise is applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
3. The surges are applied line to line and line(s) to earth. When testing line to earth the test voltage is applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level are tested. The polarity of each surge level included positive and negative test pulses.

4.5.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



4.5.4. Test Result

Performances of all test modes of the EUT should comply with the performance criteria for Criterion B. All test modes have the same test results, only one result is recorded in this report.

EUT Operating Mode	Coupling Line	Polarity	Voltage (kV)	Observation	Verdict
See section 2.2	AC Port, L-N	+ / -	0.5	A	PASS
			1		
	AC Port, L-PE		0.5	A	PASS
			1		
			2		
	AC Port, N-PE		0.5	A	PASS
			1		
			2		
	Telecommunic ation Port		0.5	A	PASS
			1		

4.6. Conducted Immunity

4.6.1. Test Specification

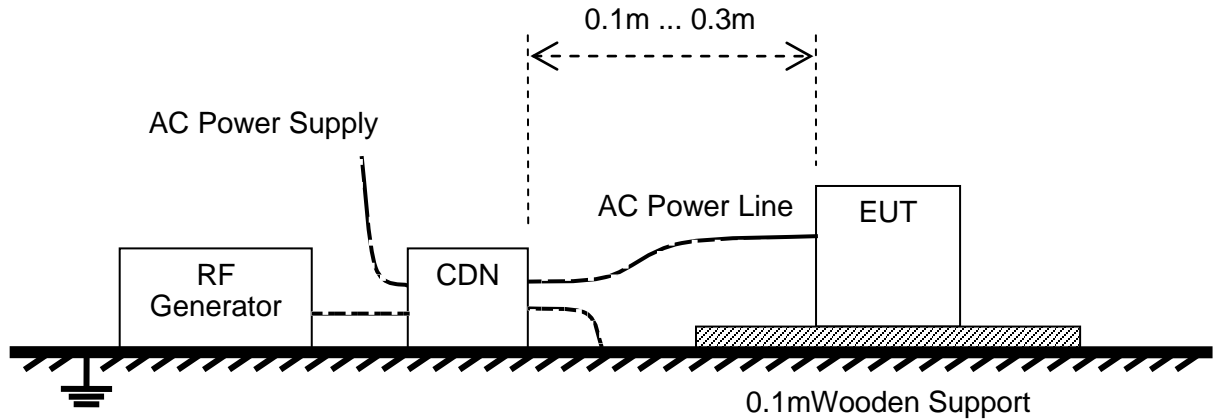
Specification	Value
Basic Standard	IEC 61000-4-6:2008
Frequency Range	0.15MHz - 80MHz
Field Strength	3V(0.15MHz - 10MHz), 3V to 1V(10MHz - 30MHz), 1V(30MHz - 80MHz)
Modulation	1kHz sine wave, 80% AM
Frequency Step	1% of fundamental
Coupled Cable	AC Power Line/Communication Line
Coupling Device	CDN-M2/M3,EM101

4.6.2. Test Procedure

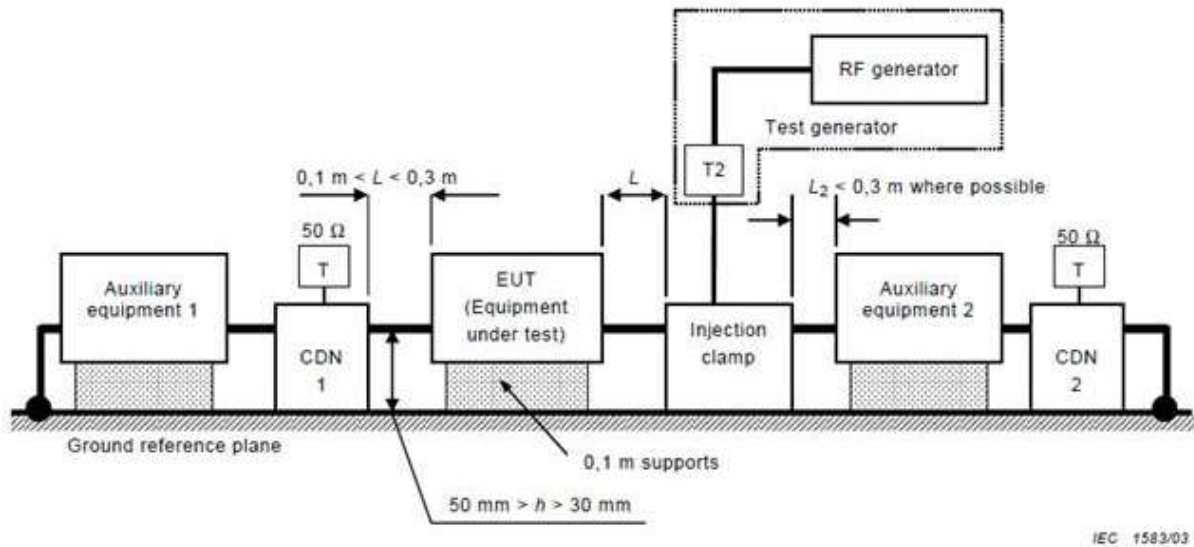
1. The EUT shall be tested within its intended operating and climatic conditions.
2. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50Ohm load resistor.
3. The test signal is 80% amplitude modulated with a 1kHz sine wave.
4. The frequency range is swept from 150kHz to 80MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
5. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
6. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

4.6.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



AC Power Port



Telecommunication Port



4.6.4. Test Result

Performances of all test modes of the EUT should comply with the performance criteria for Criterion A. All test modes have the same test results, only one result is recorded in this report.

EUT Operating Mode	Test Point	Frequency (MHz)	Voltage Level (V)	Observation	Verdict
See section 2.2	AC Port	0.15 – 10	3	A	PASS
		10 – 30	3 – 1		
		30 - 80	1		
	Telecommu ication Port	0.15 – 10	3	A	PASS
		10 – 30	3 – 1		
		30 - 80	1		

4.7. Voltage Dips and Short Interruptions Immunity

4.7.1. Test Specification

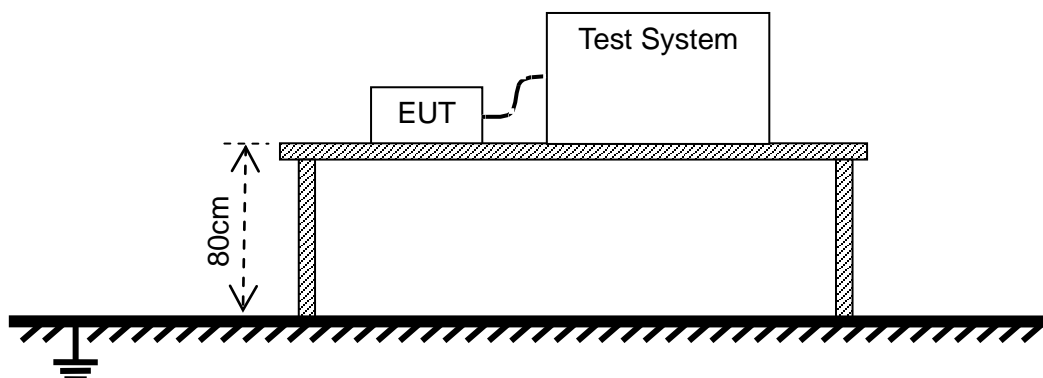
Specification	Value
Basic Standard	IEC 61000-4-11:2004
Voltage Dips	100% reduction: 0.5 cycle; 30% reduction: 25 cycles
Voltage Interruptions	100% reduction: 250 cycles
Voltage Phase Angle	0°&180°

4.7.2. Test Procedure

1. The power cord is used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.
2. The EUT is tested for a) 100% voltage dip of supplied voltage with duration of 0.5 cycle; b) 30% voltage dip of supplied voltage and duration 25 cycles. Both of the dip tests are carried out for a sequence of three voltage dips with intervals of 10 seconds.
3. 100% voltage interruption of supplied voltage with duration of 250 cycles is followed, which is a sequence of three voltage interruptions with intervals of 10 seconds.
4. Voltage reductions occur at 0 degrees crossover point of the voltage waveform. The performance of the EUT is checked after the voltage dip or interruption.

4.7.3. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



4.7.4. Test Result

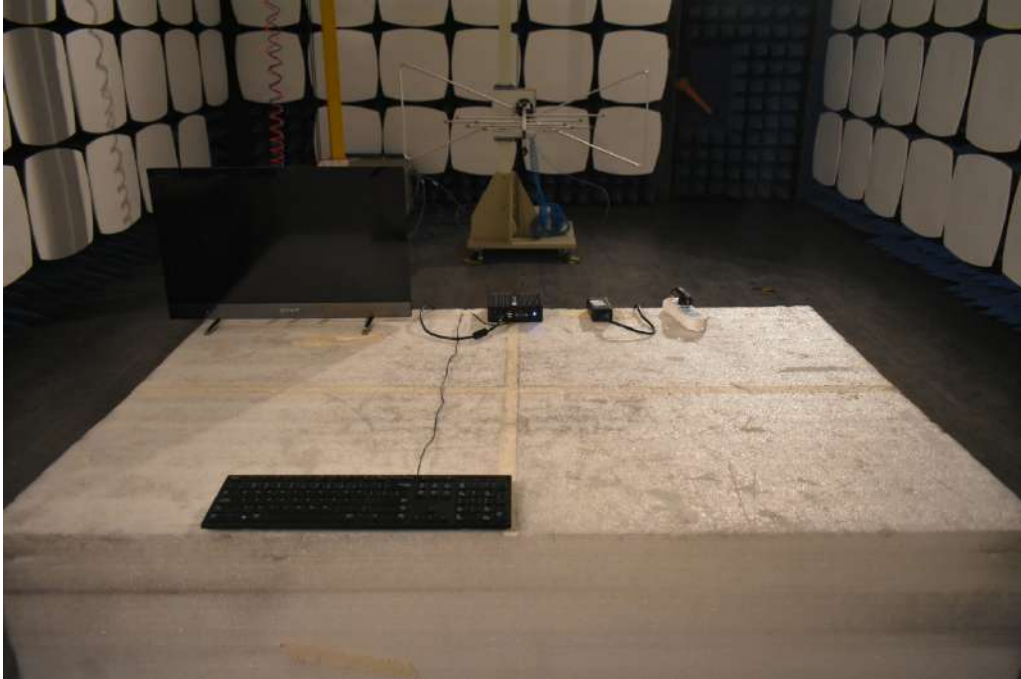
The performance criteria B shall apply except 30% voltage dips and voltage interruption tests. All test modes have the same test results, only one result is recorded in this report.

EUT Operating Mode	Test Mode	Voltage Reduction	Cycle(s)	Times	Interval (sec)	Observation	Verdict
See section 2.2	Voltage Dips	30%	25	3	10	A	PASS
		100%	0.5	3	10	A	PASS
	Voltage Interruptions	100%	250	3	10	C ^{Note 1}	PASS

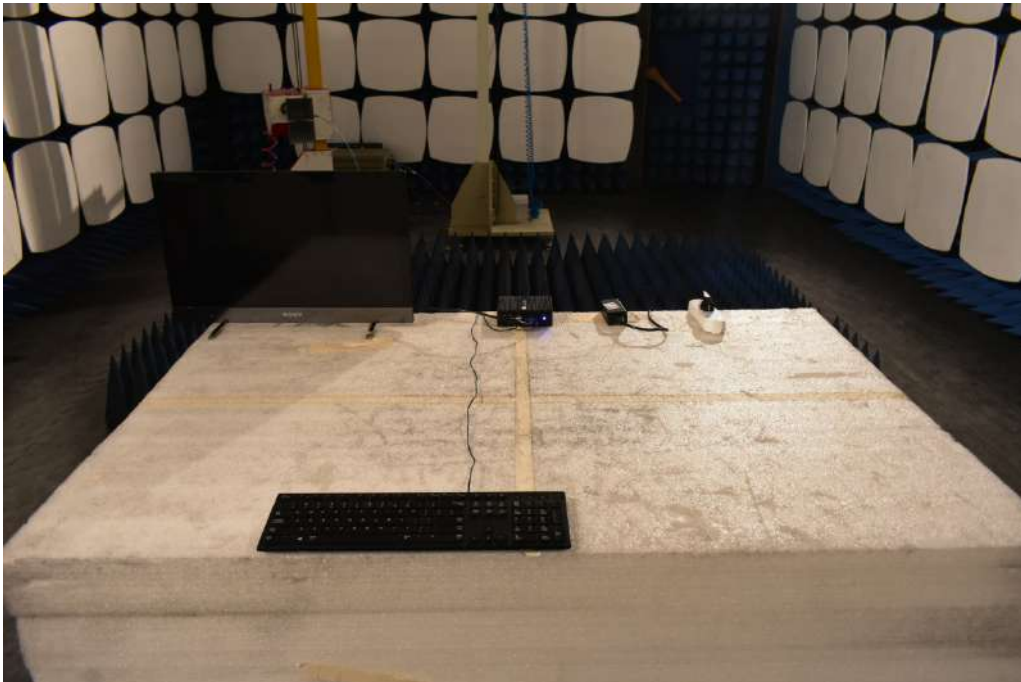
Note 1: During the test, the sample is powered off, and manual operation is required to restore the normal operation after the restart.

Annex A Photographs of Test Setup

1. Radiated Emission (30MHz-1GHz)



2. Radiated Emission (Above 1GHz)



3. Conducted Emission



4. Conducted Emission - Signal Port



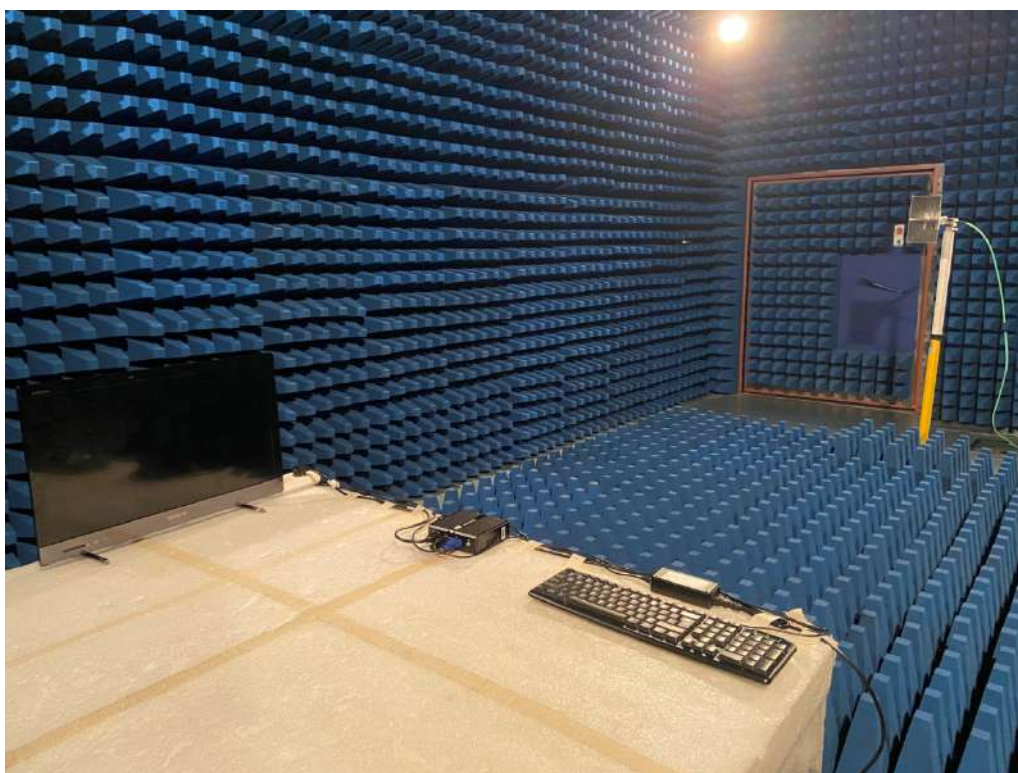
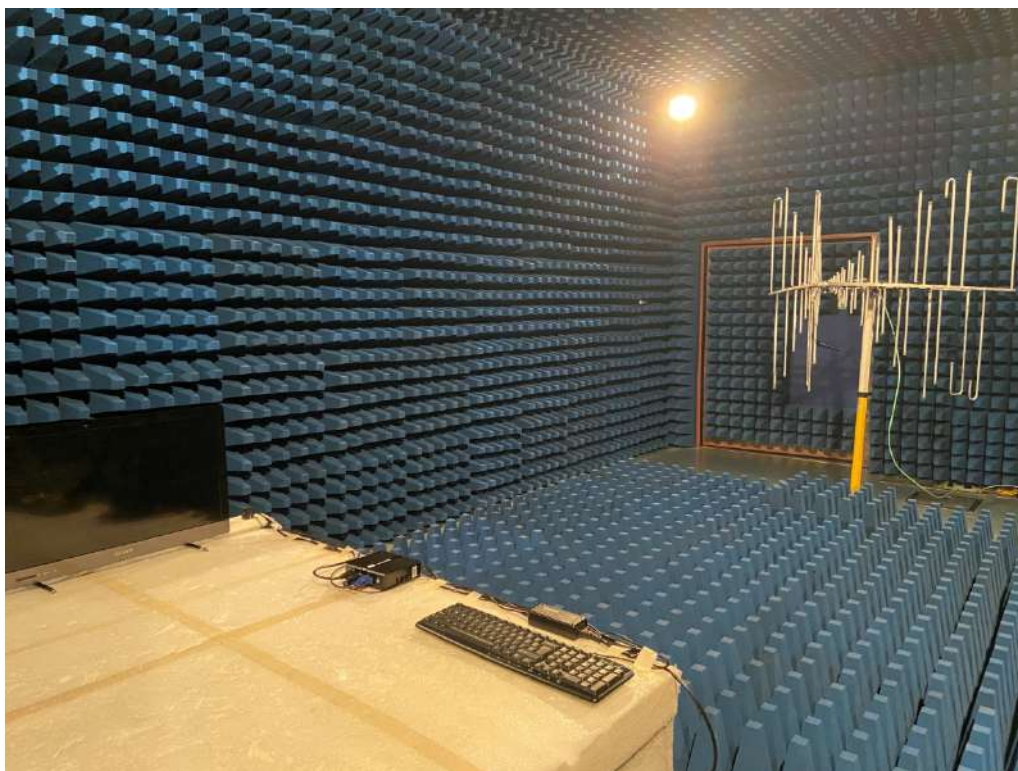
5. Voltage Fluctuations and Flicker



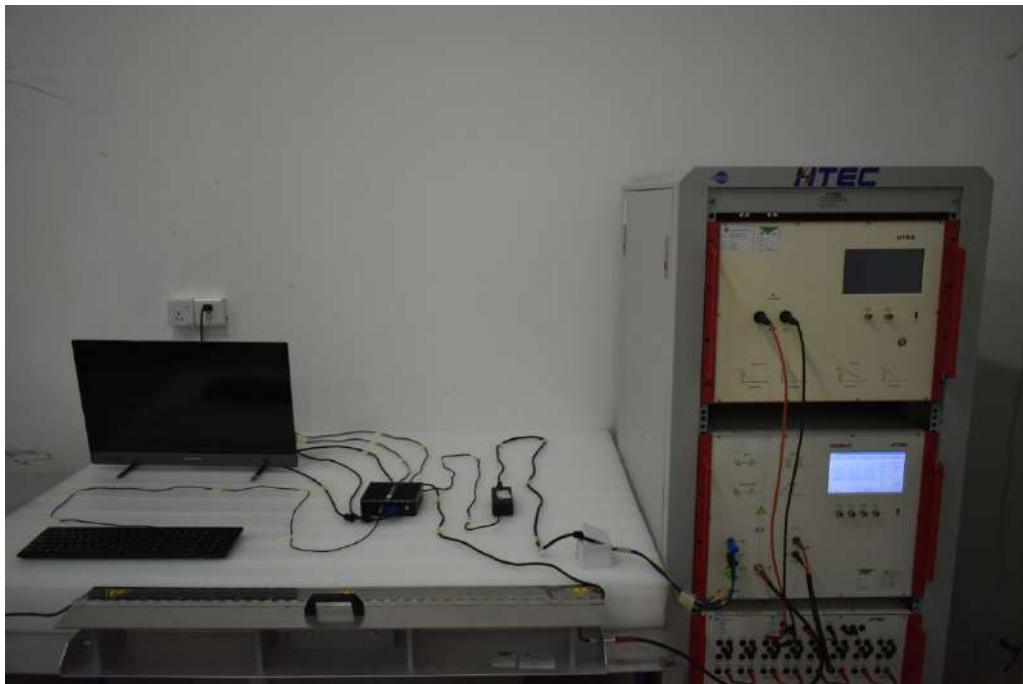
6. Electrostatic Discharge Immunity



7. Radiated Immunity



8. Electrical Fast Transient/Burst Immunity



9. Surge Immunity



10. Conducted Immunity



11. Voltage Dips and Short Interruptions Immunity



Annex B Photos of the EUT

1. Appearance of the EUT



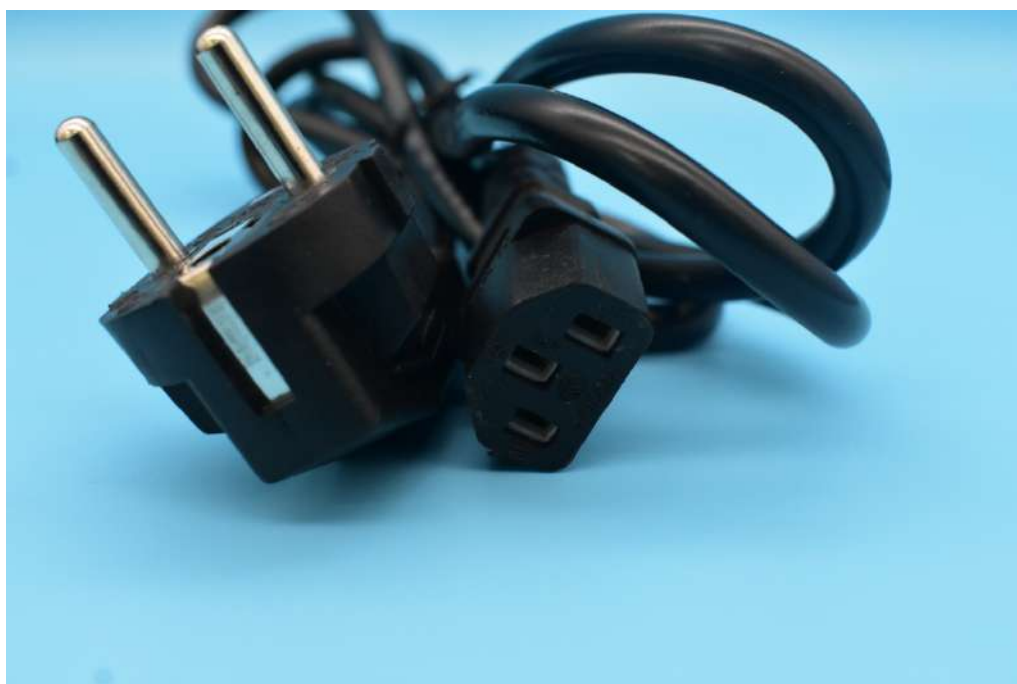






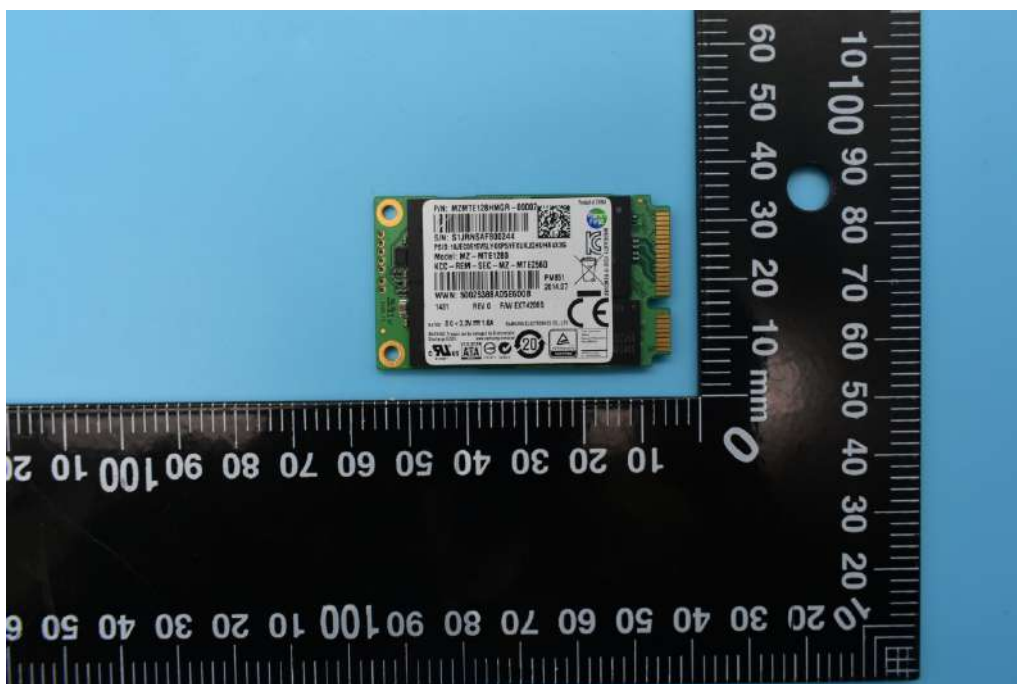
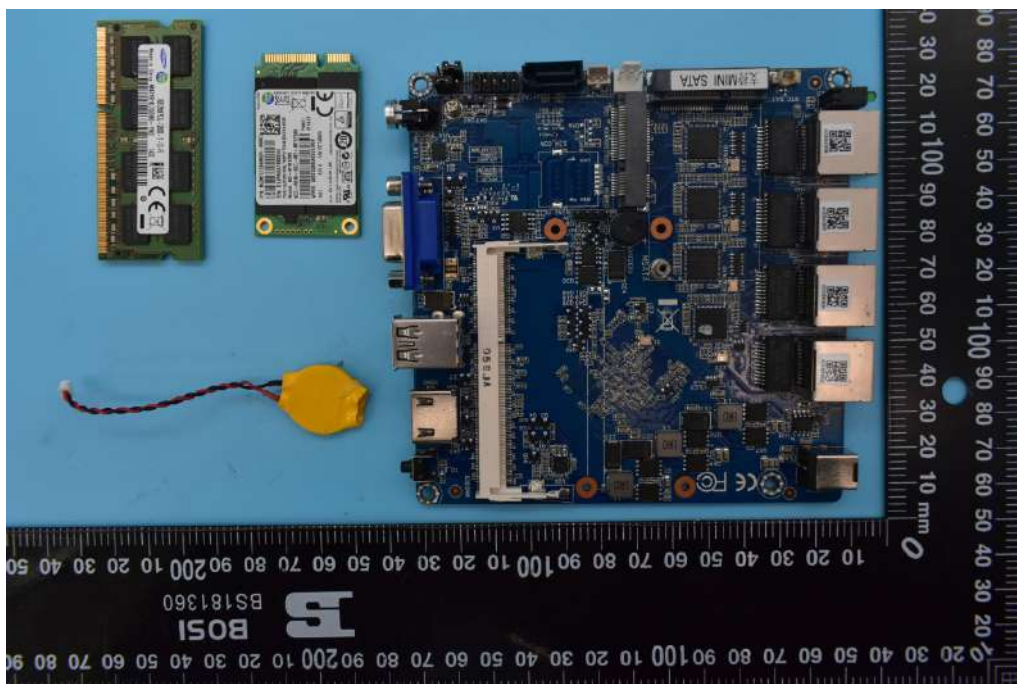


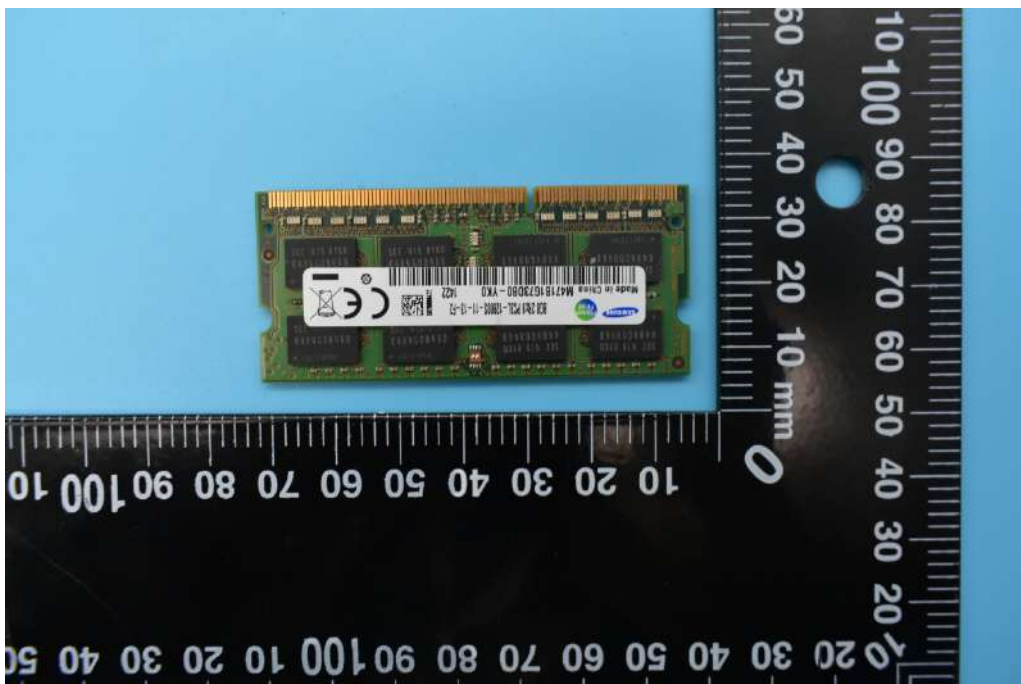
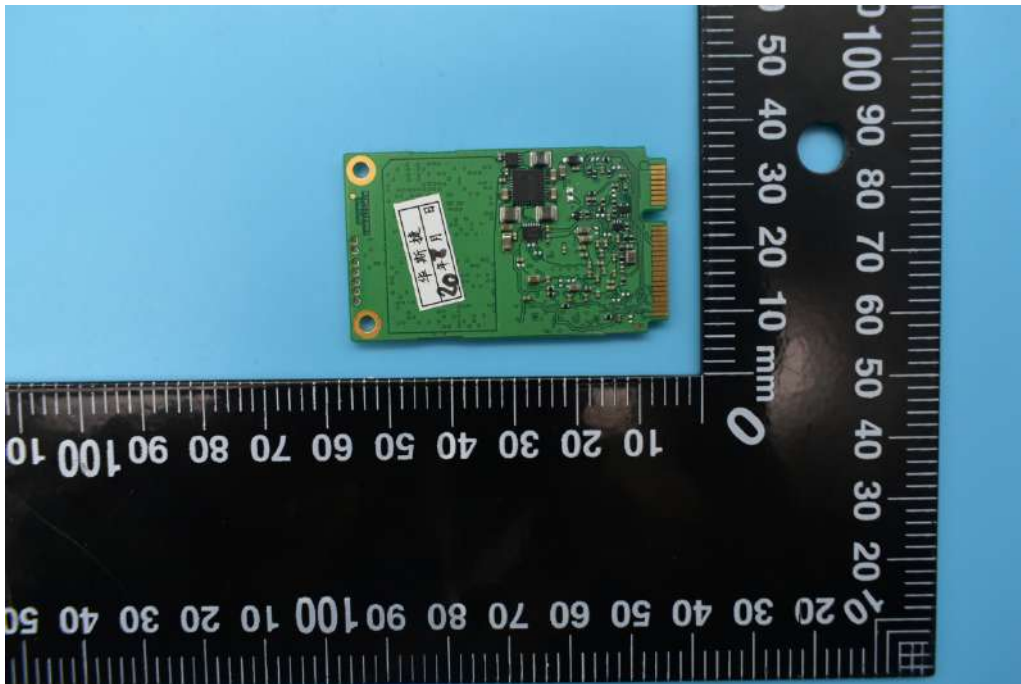


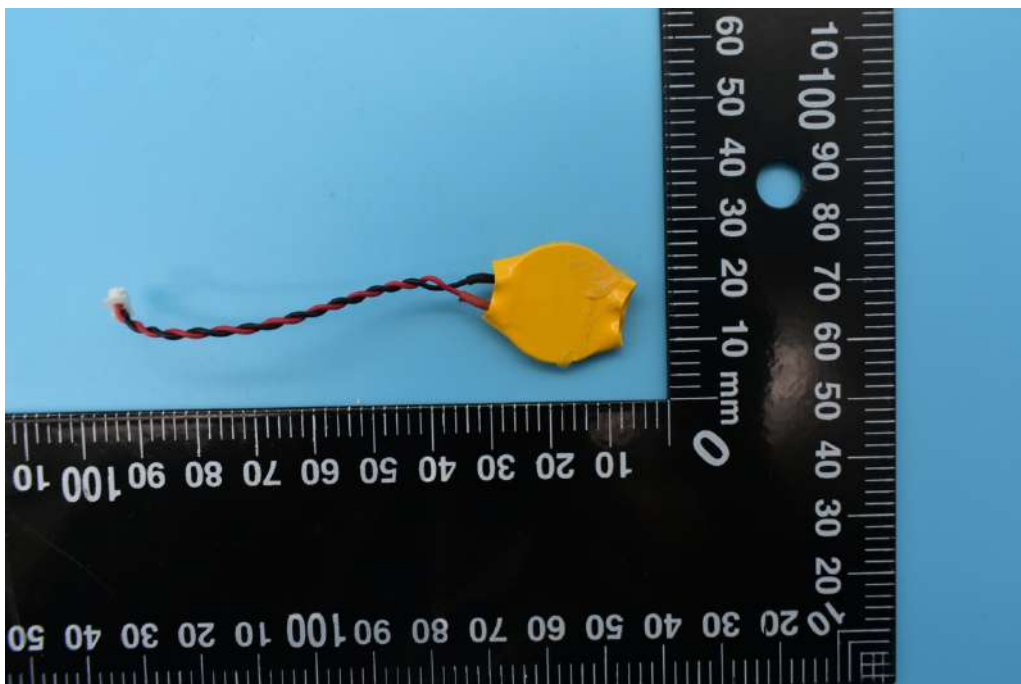
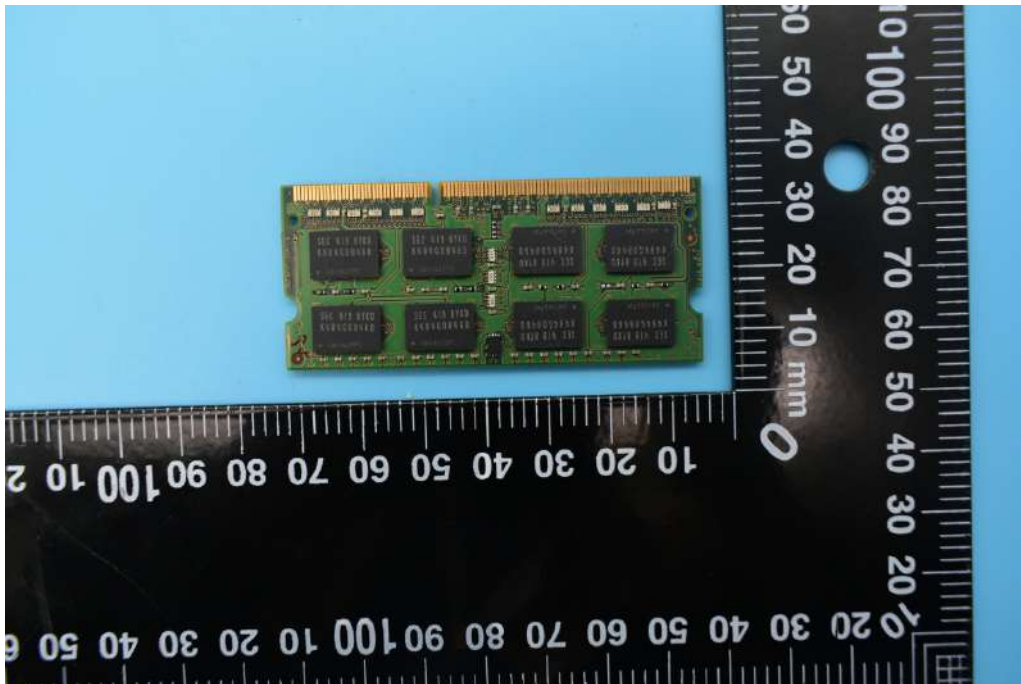


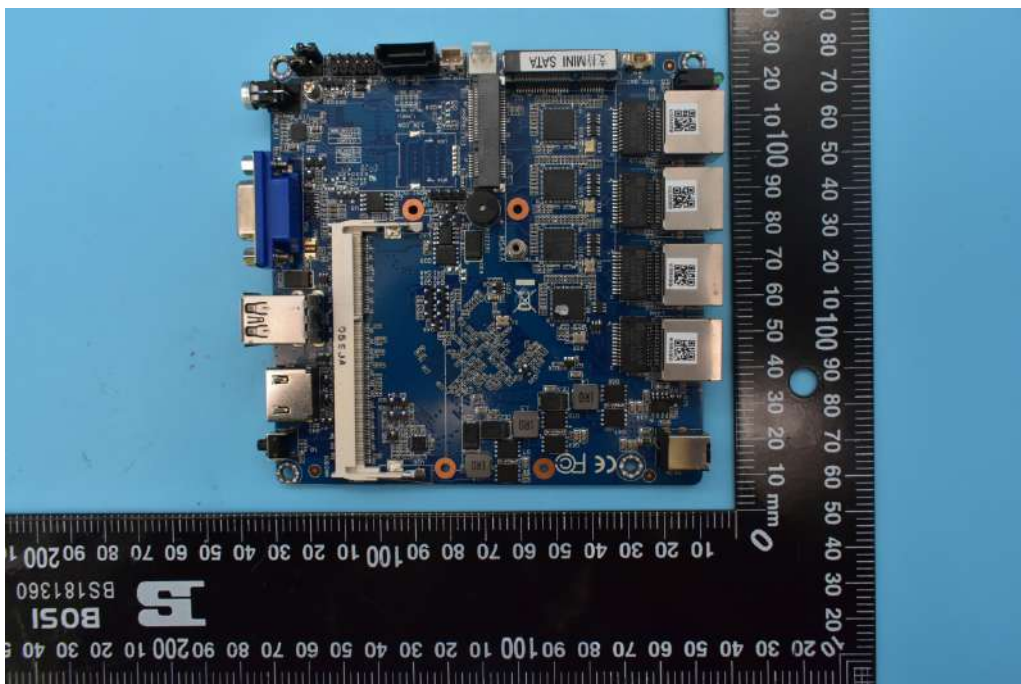
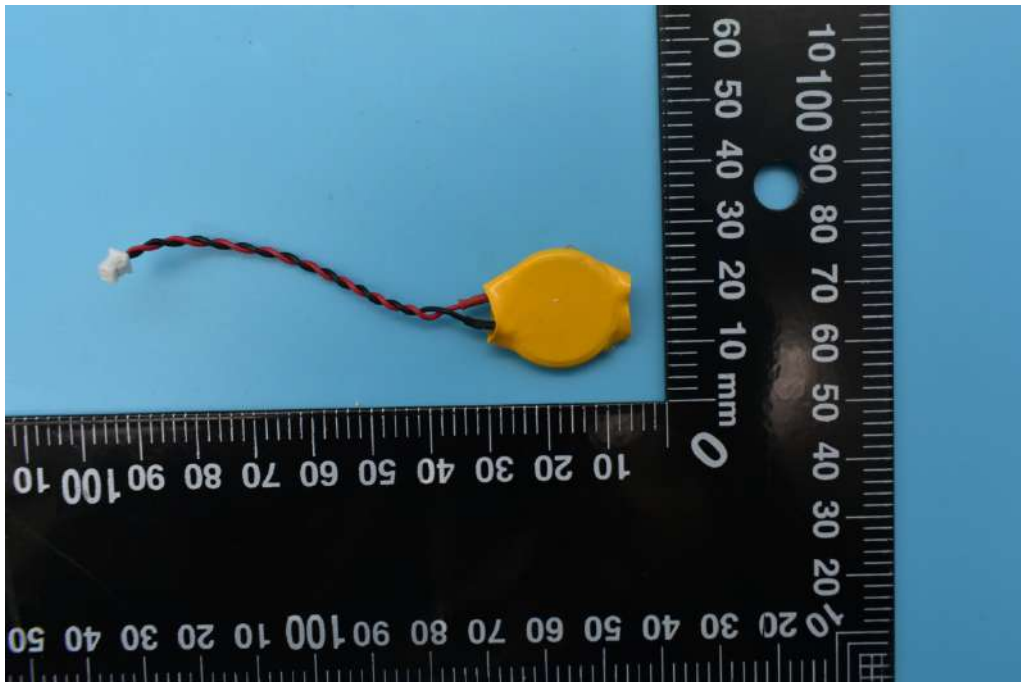
2. Inside of the EUT

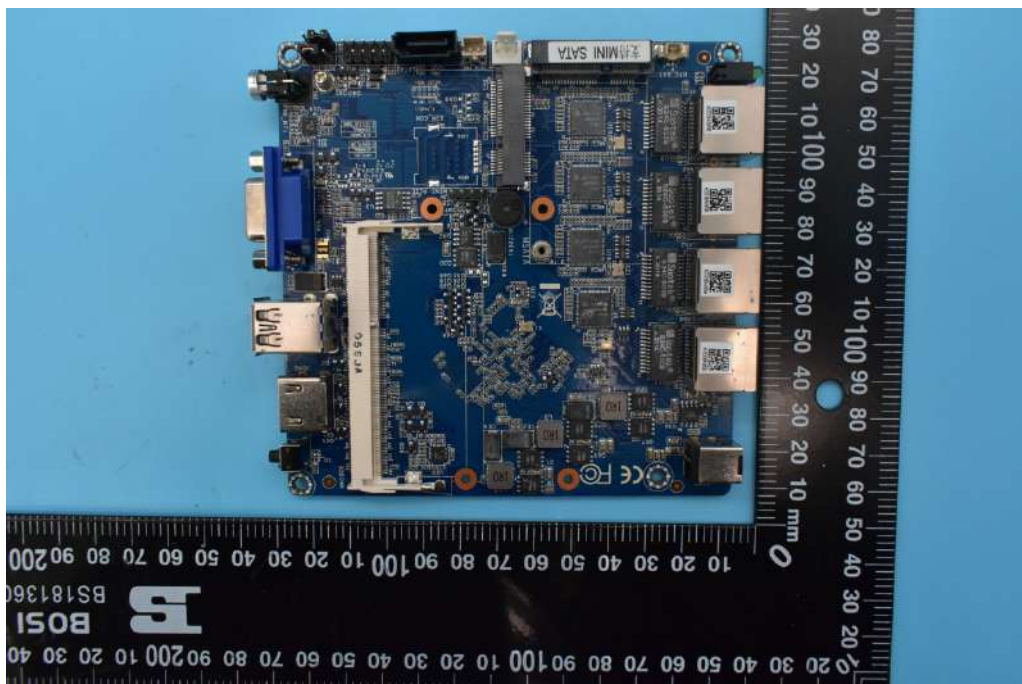
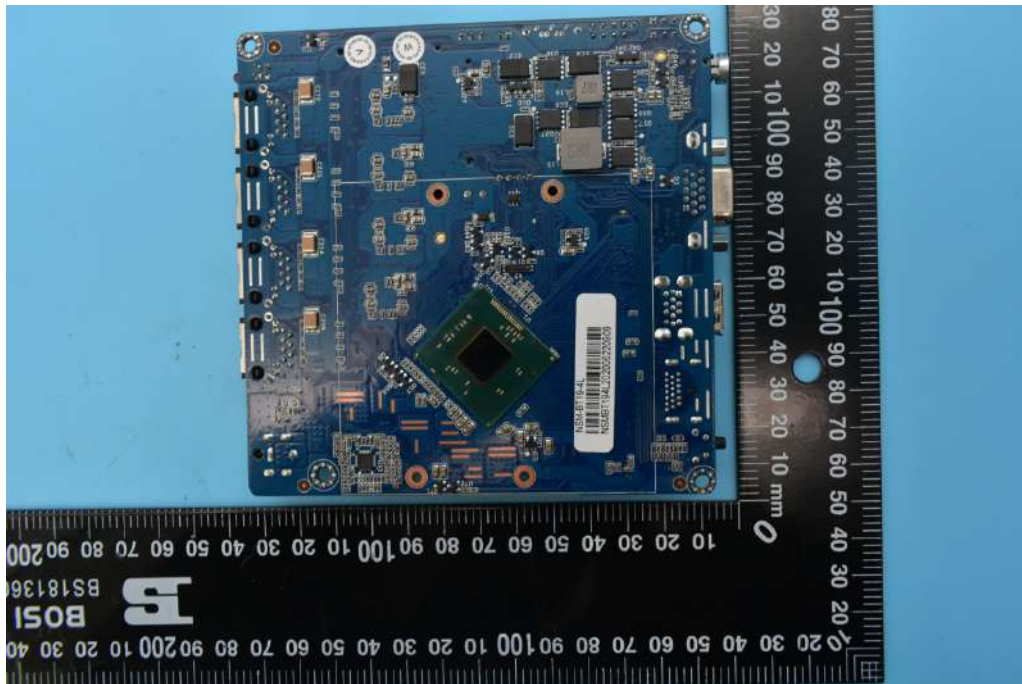


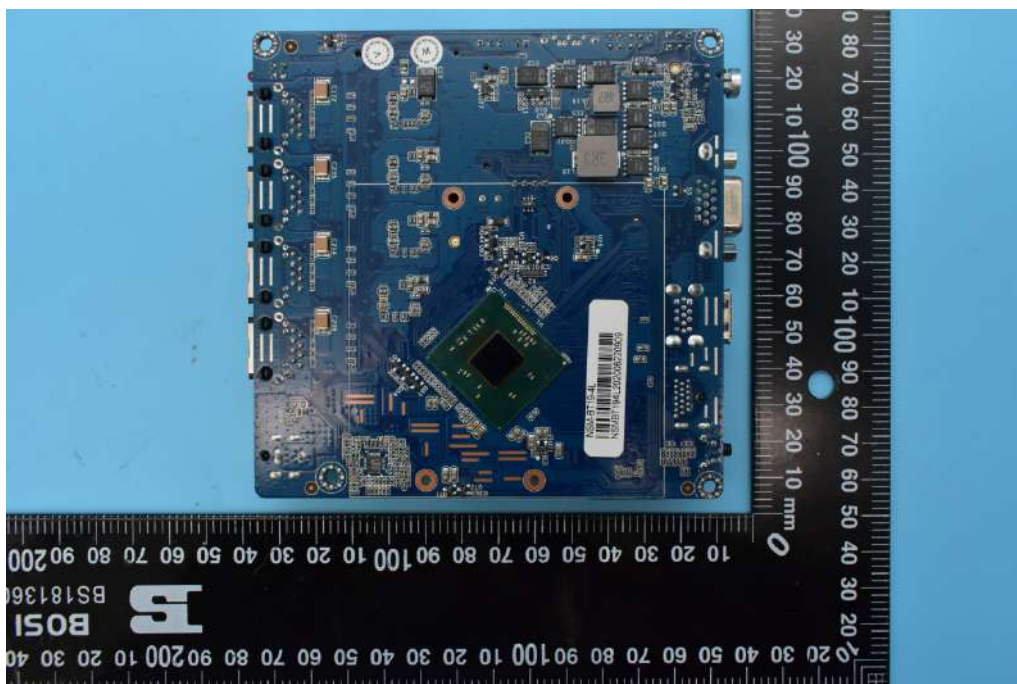




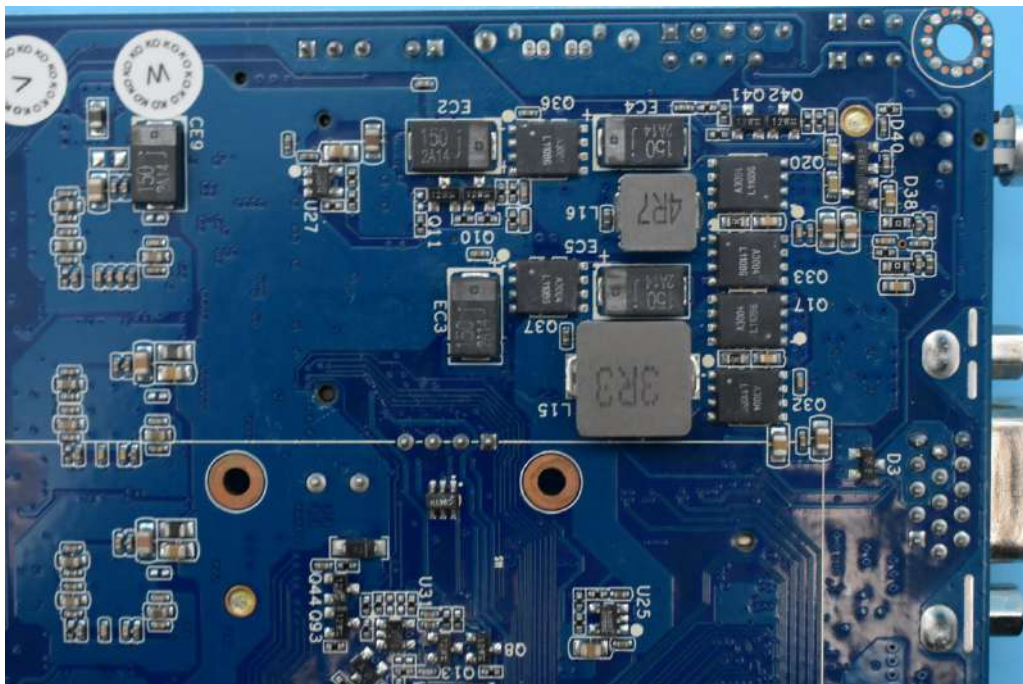
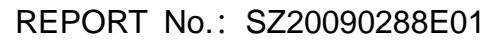


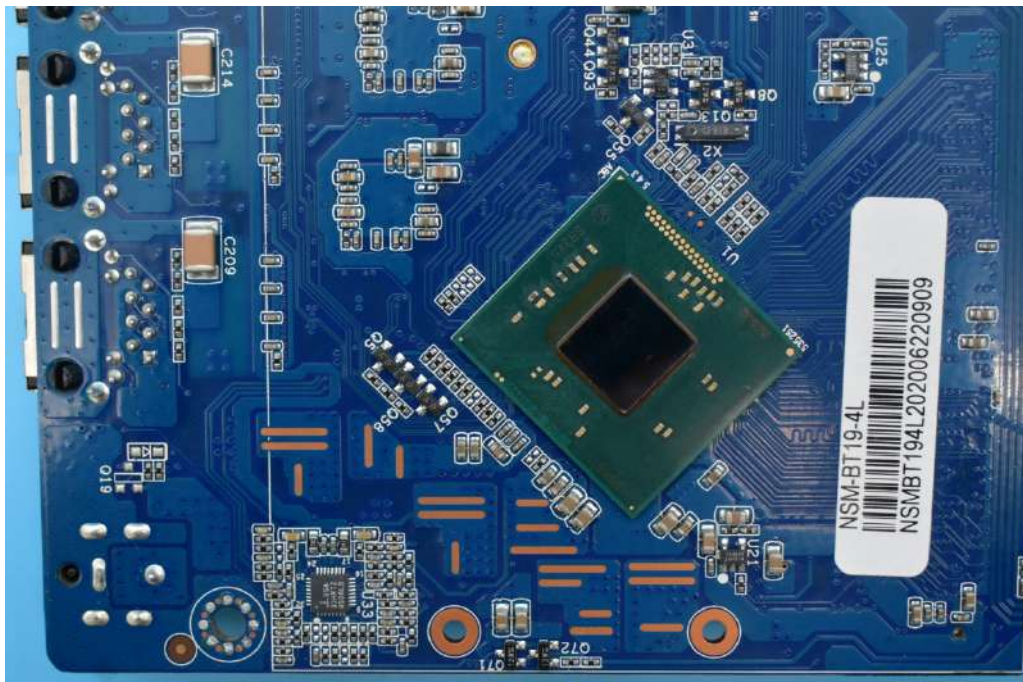
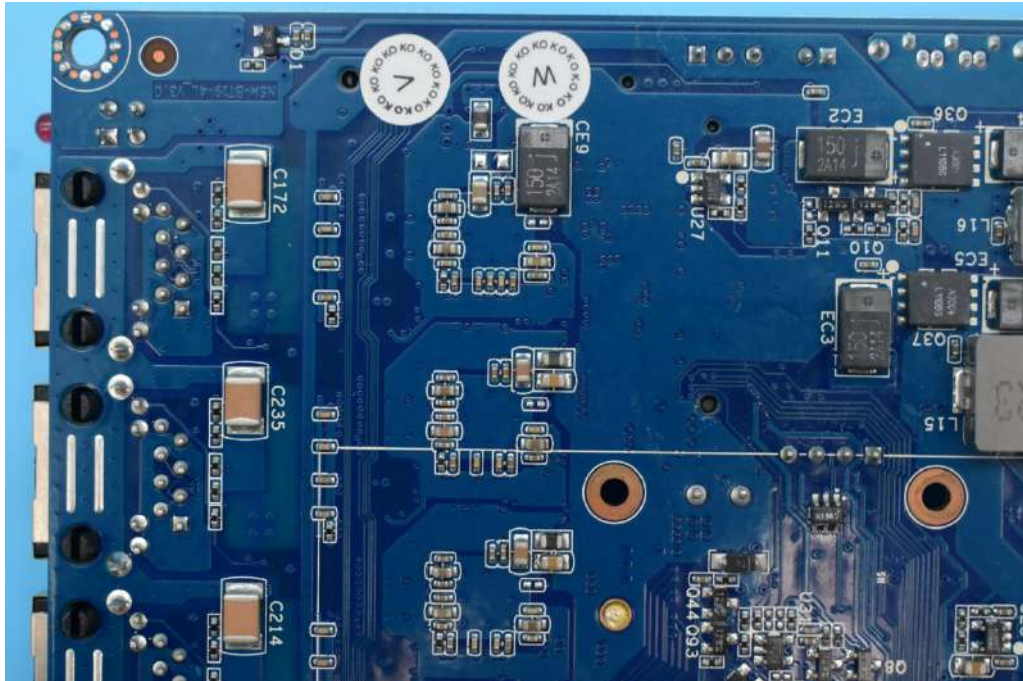


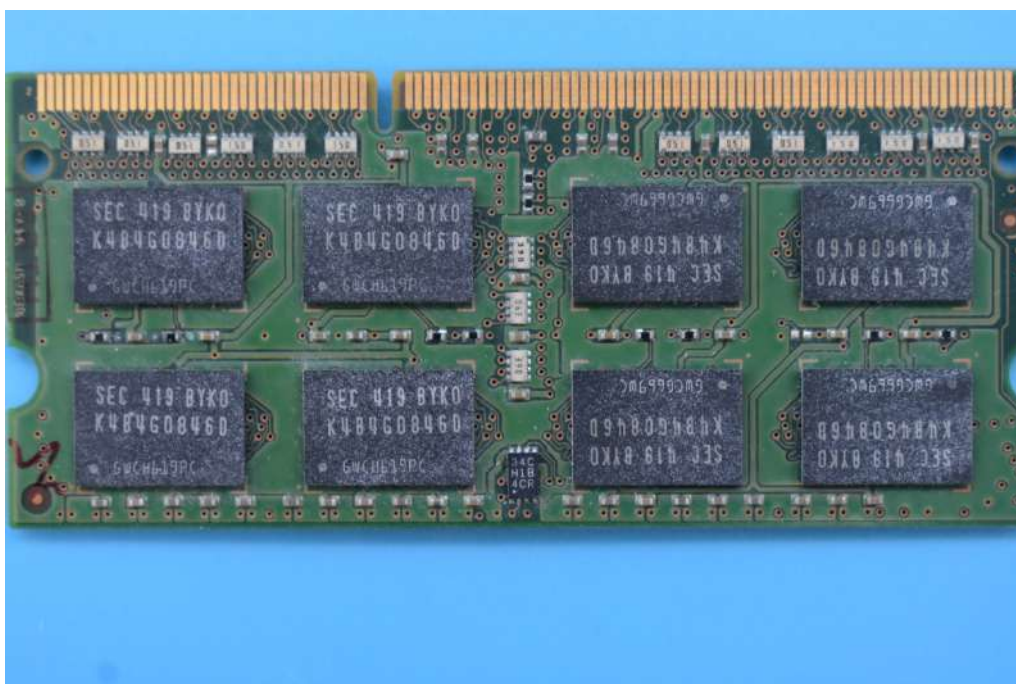


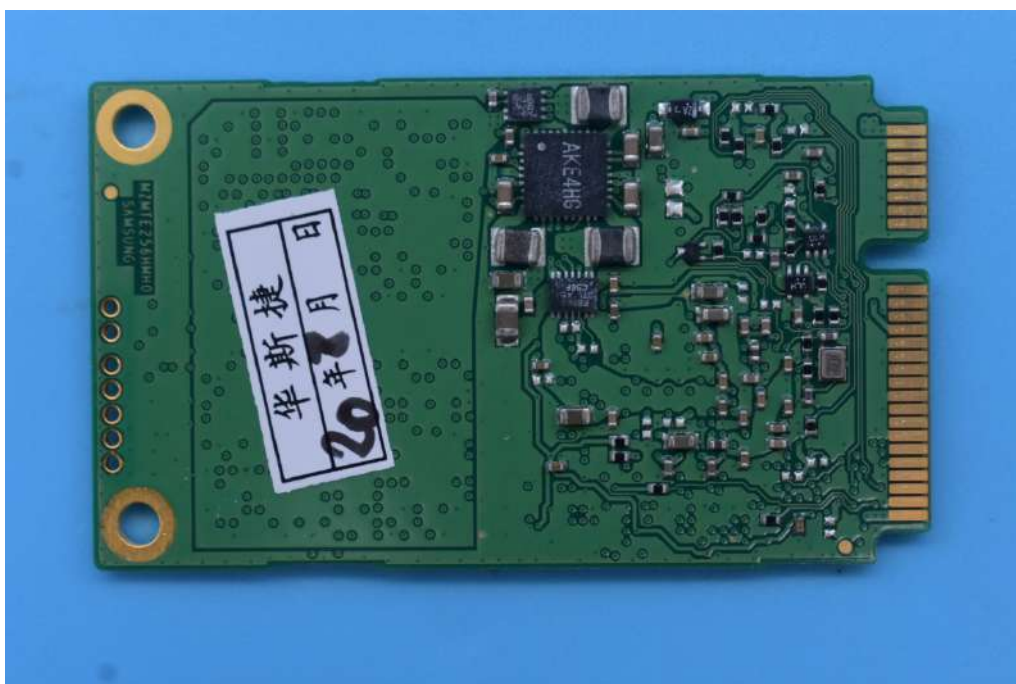
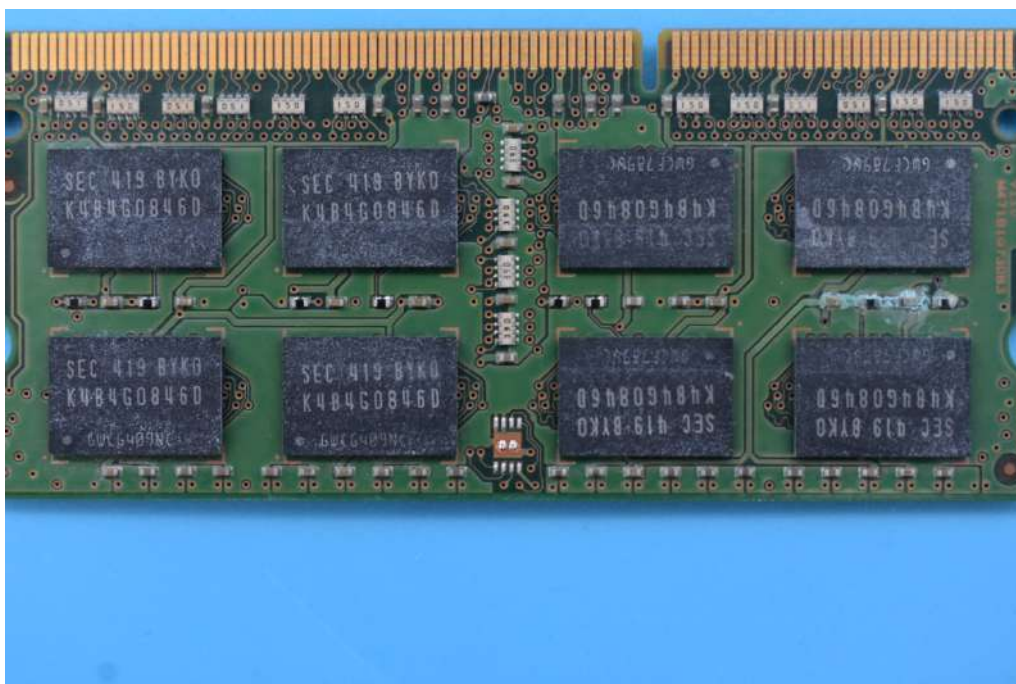














Annex C Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	9kHz-150kHz	±3.3dB
	150kHz-30MHz	±2.8dB

Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.04dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB

Uncertainty of voltage fluctuations and flicker Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	±0.702%
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Uncertainty of Radiated Susceptibility Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	80MHz-1GHz	±1.78dB
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Uncertainty of Conducted Susceptibility Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	150kHz-80MHz	±1.96dB
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Uncertainty of Electrostatic Discharge Measurement

	Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))
Electrostatic Discharge – Rise Time	11.0%
Electrostatic Discharge – Peak Current	8.0%
Electrostatic Discharge – 30ns Current	8.0%
Electrostatic Discharge – 60ns Current	8.0%



Uncertainty of SURGE Measurement

	Measuring Uncertainty for a Level of Confidence of 95%($U=2U_c(y)$)
Open-circuit Peak Voltage	10.0%
Short-circuit Peak Current	8.0%
Front Time	8.3%
Duration	4.0%

Uncertainty of EFT/B Measurement

	Measuring Uncertainty for a Level of Confidence of 95%($U=2U_c(y)$)
Peak Voltage	4.0%
Repetition frequency	0.0%
Burst Duration	2.6%
Burst period	0.0%
Rise Time	22%
Pulse Width	23%

Uncertainty of DIP Measurement

	Measuring Uncertainty for a Level of Confidence of 95%($U=2U_c(y)$)
Voltage Variations	0.9%
Voltage Rising/Fall Time	0.0%
Phase	5.7%



Annex D Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

3. Test Software Utilized

Model	Version Number	Producer
TS+ -[JS32-RE]	Version 2.5.1.5	Tonscend
TS+ -[JS32-CE]	Version2.5.0.0	Tonscend
TS+ -[JS35-CS]	Version 2.0.2.0	Tonscend
TS+ -[JS35-RS]	Version 2.0.1.9	Tonscend
Tti HA1600 Power &HARMONICS ANALYSER HA-PC Link Plus	Version 3.01	Thurlby Thandar Instruments

**4. Test Equipments Utilized**

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2020.07.21	2021.07.20
Test Receiver	R&S	ESPI	101052	2020.07.21	2021.07.20
LISN	Schwarzbeck	NSLK 8127	8127449	2020.03.26	2021.03.25
ISN	TESEQ	ISN T800	27958	2020.03.26	2021.03.25
Pulse Limiter (10dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2020.07.24	2021.07.23
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	01774	2019.07.26	2022.07.25
Radiated Disturbance Preamplifier	rflight	S020180L3 203	61171/61172	2020.07.21	2021.07.20
Radiated Disturbance Preamplifier	rflight	S10M100L3 802	46732	2020.07.21	2021.07.20
Test Antenna- Stacked double Log.-Per.Antenna	Schwarz Beck	9128DS02	STLP 9128D	2019.11.23	2020.11.22
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2020.01.06	2023.01.05
ESD Test System	SANKI	SKS-0220S E	020312009E 327	2020.07.24	2021.07.23
EFT/Surge/DIP Testing System	HTEC	HCOMPAC T7	160701	2020.07.21	2021.07.20
Signal Generator	Agilent	N5181A	MY50141911	2020.04.01	2021.03.31
Power Amplifier	rflight	NTWPAS-00810200	17033067	2020.03.25	2021.03.24
Power Amplifier	rflight	NTWPAS-2560100	17043104	2020.03.25	2021.03.24
Power Amplifier	Prana	AP32 DR180	908-961	2020.03.25	2021.03.24
Power Amplifier	rflight	NTWPAS-1 025100	17033064	2020.03.25	2021.03.24
Power Meter	Agilent	E4419B	MY45104496	2019.10.28	2020.10.27
CDN	LuthiElektronik -Feinmechanik	CDNL-801 M2/M3	2575	2020.03.26	2021.03.25



	AG				
Electromagnetic clamp	Luthi	EM101	35952	2020.03.26	2021.03.25
Flicker and Harmonic test system	LAPLACE	AC2000A	377949	2020.03.20	2021.03.19
INTELLIGENT PURE SINE-WAVE POWER SUPPLY	YuanFang	TPS 500B	1008004	2019.10.30	2020.10.29

5. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
KEYBOARD	DELL	N/A	N/A
USB FLASH DRIVE	SanDisk	N/A	N/A
MONITOR	SONY	KDL-24EX 520	6007712

————— END OF REPORT —————