



TEST REPORT

Product Name: Type-c HUB
Trademark: N/A
Model Number: T08
T08S, T18, T18A, T28A, T28, T08PRO, T18PRO, T28PRO
Prepared For: Dongguan Huachuang Electronic Co., Ltd.
Address: Wanfeng Innovation Center, 1048th 358 Provincial Road, Shatou Area, Chang'an Towm, Dongguan City, Guangdong, China.
Manufacturer: Dongguan Huachuang Electronic Co., Ltd.
Address: Wanfeng Innovation Center, 1048th 358 Provincial Road, Shatou Area, Chang'an Towm, Dongguan City, Guangdong, China.
Prepared By: Shenzhen BCTC Testing Co., Ltd.
Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Sample Received Date: Oct. 10, 2019
Sample tested Date: Oct. 10, 2019 to Oct. 12, 2019
Issue Date: Oct. 12, 2019
Report No.: BCTC-FY190906337E
Test Standards EN 55032:2015, EN 55035: 2017
Test Results PASS

Compiled by:

Blake Cai

Blake Cai

Reviewed by:

Eric Yang

Eric Yang

Approved by:

Zero Zhou

Zero Zhou/Manager



The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.



TABLE OF CONTENT

| Test Report Declaration | Page |
|---|------|
| 1. VERSION | 3 |
| 2. TEST SUMMARY | 4 |
| 3. MEASUREMENT UNCERTAINTY | 5 |
| 4. PRODUCT INFORMATION AND TEST SETUP | 6 |
| 4.1 Product Information | 6 |
| 4.2 Test Setup Configuration | 6 |
| 4.3 Support Equipment | 6 |
| 4.4 Test Mode | 6 |
| 5. TEST FACILITY AND TEST INSTRUMENT USED | 7 |
| 5.1 Test Facility | 7 |
| 5.2 Test Instrument Used | 7 |
| 6. RADIATED EMISSIONS TEST | 9 |
| 6.1 Block Diagram Of Test Setup | 9 |
| 6.2 Limits | 9 |
| 6.3 Test Procedure | 9 |
| 6.4 Test Results | 10 |
| 7. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA | 12 |
| 8. ELECTROSTATIC DISCHARGE (ESD) | 13 |
| 8.1 Test Specification | 13 |
| 8.2 Block Diagram of Test Setup | 13 |
| 8.3 Test Procedure | 13 |
| 8.4 Test Results | 14 |
| 9. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES (RS) | 15 |
| 9.1 Test Specification | 15 |
| 9.2 Block Diagram of Test Setup | 15 |
| 9.3 Test Procedure | 16 |
| 9.4 Test Results | 16 |
| 10. EUT PHOTOGRAPHS | 17 |
| 11. EUT TEST SETUP PHOTOGRAPHS | 20 |

(Note: N/A means not applicable)



1. VERSION

| Report No. | Issue Date | Description | Approved |
|-------------------|---------------|-------------|----------|
| BCTC-FY190906337E | Oct. 12, 2019 | Original | Valid |
| | | | |
| | | | |



2. TEST SUMMARY

The Product has been tested according to the following specifications:

| EMISSION | | |
|----------|---|------------------|
| Standard | Test Item | Test result |
| EN 55032 | Conducted emissions from the AC mains power ports | N/A ³ |
| EN 55032 | Asymmetric mode conducted emissions | N/A ¹ |
| EN 55032 | Conducted differential voltage emissions | N/A ² |
| EN 55032 | Radiated emissions | Pass |

| IMMUNITY (EN 55035) | | |
|---------------------|--|------------------|
| Standard | Test Item | Test result |
| IEC 61000-4-2 | Electrostatic discharge (ESD) | Pass |
| IEC 61000-4-3 | Continuous RF electromagnetic field disturbances(RS) | Pass |
| IEC 61000-4-4 | Electrical fast transients/burst (EFT) | N/A ³ |
| IEC 61000-4-5 | Surges | N/A ³ |
| IEC 61000-4-6 | Continuous induced RF disturbances (CS) | N/A ³ |
| IEC 61000-4-6 | Broadband impulse noise disturbances, repetitive | N/A ⁴ |
| IEC 61000-4-6 | Broadband impulse noise disturbances, isolated | N/A ⁴ |
| IEC 61000-4-8 | Power frequency magnetic field (PFMF) | N/A ⁵ |
| IEC 61000-4-11 | Voltage dips and interruptions (DIPS) | N/A ³ |

Remark:

1. Applicable to ports listed above and intended to connect to cables longer than 3 m.
2. The Product has no antenna port.
3. The EUT is powered by the DC only , the test item is not applicable
4. Applicable only to CPE xDSL ports.
5. The Product doesn't contain any device susceptible to magnetic fields.



3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

| Test item | Value (dB) |
|-------------------------------|------------|
| Radiated Emission(30MHz~1GHz) | 4.30 |
| Radiated Emission(1GHz~6GHz) | 4.90 |



4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Ratings: DC 5V from PC

Model difference: All models are identical except for the appearance color, the test model is T08 and the test results are applicable to other tests.

Cable of Product

| No. | Cable Type | Quantity | Provider | Length (m) | Specification | Note |
|-----|------------|----------|-----------|------------|---------------|------|
| 1 | -- | -- | Applicant | --- | Shielded | -- |
| 2 | -- | -- | BCTC | -- | Unshielded | -- |

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

| No | Device Type | Brand | Model | Series No. | Data Cable | Power Cord |
|----|-------------------|--------|---------------|------------|------------|------------|
| 1. | Notebook computer | lenovo | Lenovo B51-80 | --- | --- | --- |
| 2 | Display | TPV | T3250 MDK | --- | --- | --- |

Notes:

- All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

| Test item | Test Mode | Test Voltage |
|--|-----------|----------------|
| Radiated emissions(30MHz-1GHz) Class B | Working | DC 5V from PC* |
| Electrostatic discharge (ESD) B <input checked="" type="checkbox"/> Air Discharge: ±8kV <input checked="" type="checkbox"/> Contact Discharge: ±4kV <input checked="" type="checkbox"/> HCP & VCP: ±4kV | Working | DC 5V from PC |
| Continuous RF electromagnetic field disturbances(RS) A 80MHz-1000MHz,2600MHz,3500MHz,5000MHz, 3V/m,80% | Working | DC 5V from PC |
| All test mode were tested and passed, Radiated Emissions shows (*) is the worst case mode which were recorded in this report. | | |



5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

| Radiated emissions Test (966 chamber) | | | | | |
|---------------------------------------|--------------|------------|--------------|---------------|---------------|
| Equipment | Manufacturer | Model# | Serial# | Last Cal. | Next Cal. |
| 966 chamber | ChengYu | 966 Room | 966 | Jun. 19, 2018 | Jun. 18, 2021 |
| Receiver | R&S | ESR3 | 102075 | Jun. 13, 2019 | Jun. 12, 2020 |
| Receiver | R&S | ESRP | 101154 | Jun. 13, 2019 | Jun. 12, 2020 |
| Amplifier | Schwarzbeck | BBV9718 | 9718-309 | Jun. 25, 2019 | Jun. 24, 2020 |
| Amplifier | Schwarzbeck | BBV9744 | 9744-0037 | Jun. 25, 2019 | Jun. 24, 2020 |
| TRILOG Broadband Antenna | schwarzbeck | VULB 9163 | VULB9163-942 | Jun. 22, 2019 | Jun. 21, 2020 |
| Horn Antenna | SCHWARZBECK | BBHA9120 D | 1201 | Jun. 22, 2019 | Jun. 21, 2020 |
| Software | Frad | EZ-EMC | FA-03A2 RE | \ | \ |

| Electrostatic discharge immunity Test | | | | | |
|---------------------------------------|--------------|-----------|----------|---------------|---------------|
| Equipment | Manufacturer | Model# | Serial# | Last Cal. | Next Cal. |
| ESD Tester | KIKISUI | KES4201 A | UH002321 | Jul. 12, 2019 | Jul. 10, 2020 |

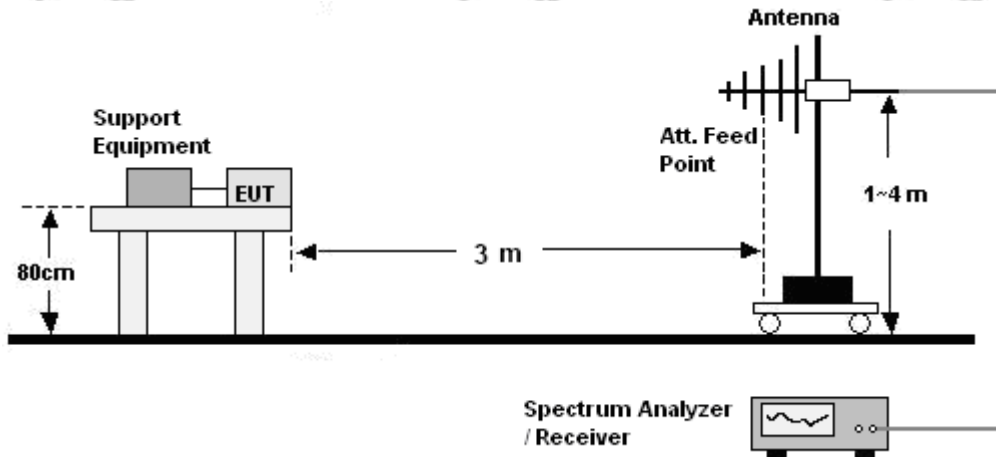


| Continuous RF electromagnetic field disturbances Test | | | | | |
|---|--------------|----------------------|----------------|---------------|---------------|
| Equipment | Manufacturer | Model# | Serial# | Last Cal. | Next Cal. |
| Power meter | Keysight | E4419 | GB4242144 0 | Jun. 17, 2019 | Jun. 16, 2020 |
| Power sensor | Keysight | E9300A | US3921130 5 | Jun. 17, 2019 | Jun. 16, 2020 |
| Power sensor | Keysight | E9300A | US3921165 9 | Jun. 17, 2019 | Jun. 16, 2020 |
| Amplifier | SKET | HAP-8010 00M-250W | / | Jun. 25, 2019 | Jun. 24, 2020 |
| Amplifier | SKET | HAP-8010 00M-75W | / | Jun. 25, 2019 | Jun. 24, 2020 |
| Amplifier | SKET | HAP-8010 00M-50W | / | Jun. 25, 2019 | Jun. 24, 2020 |
| Stacked double Log.-Per. Antenna | Schwarzbeck | STLP 9129 | 077 | \ | \ |
| Field Probe | Narda | EP-601 | 80256 | Jul. 07, 2019 | Jul. 06, 2020 |
| Signal Generator | Agilent | N5181A | MY5014374 8 | Jun. 13, 2019 | Jun. 12, 2020 |
| Software | SKET | EMC-S | 1.2.0.18 | \ | \ |

6. RADIATED EMISSIONS TEST

6.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:



6.2 Limits

Limits for radiated disturbance of Class B MME

| Frequency (MHz) | Quasi-peak limits at 3m dB(μ V/m) |
|-----------------|---|
| 30-230 | 40 |
| 230-1000 | 47 |

Note: The lower limit shall apply at the transition frequencies.

6.3 Test Procedure

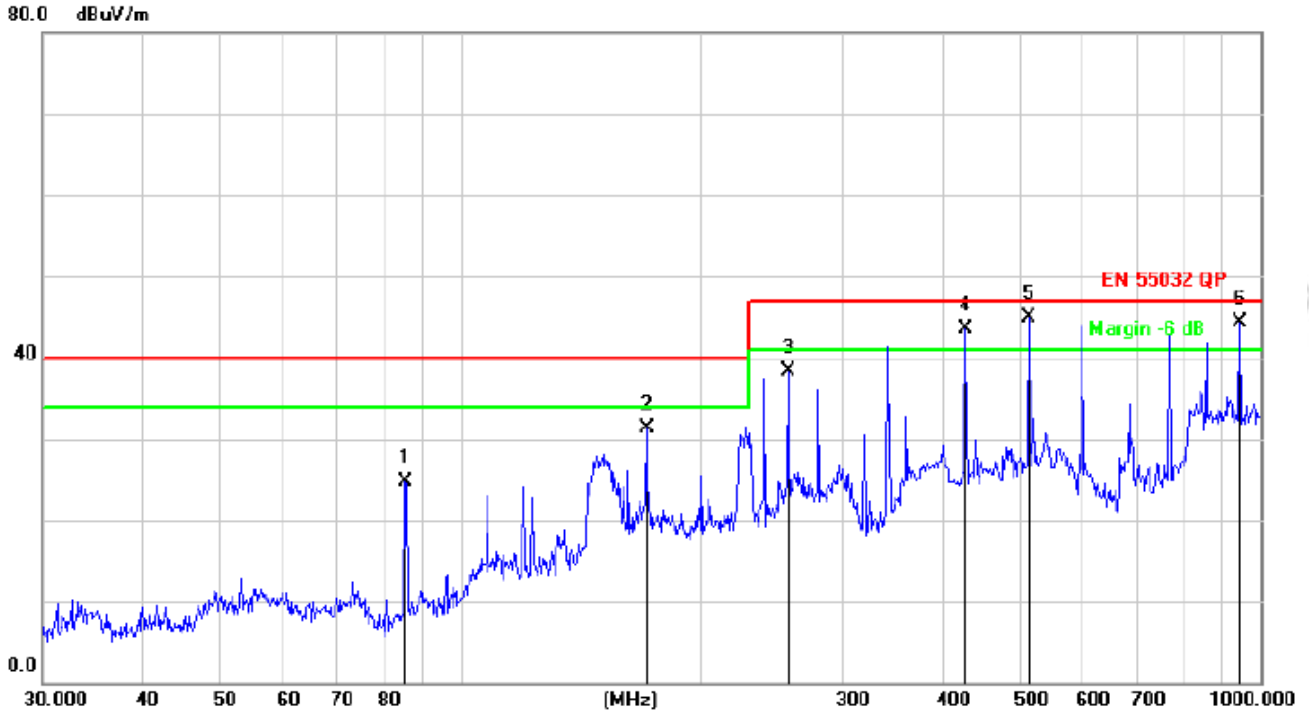
30MHz ~ 1GHz:

- The Product was placed on the nonconductive turntable 0.8m above the ground in a semi anechoic chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.



6.4 Test Results

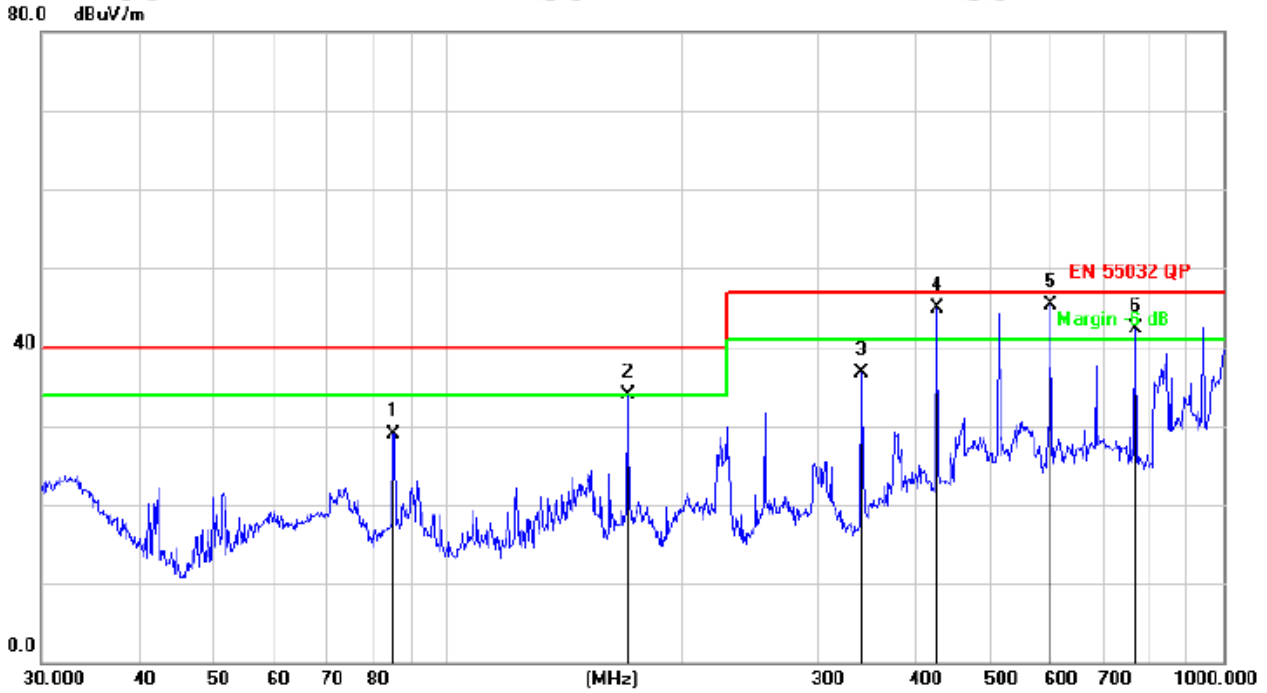
| | | | |
|----------------|---------------|--------------------|------------|
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 101kPa | Phase : | Horizontal |
| Test Voltage : | DC 5V from PC | Test Mode: | Working |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|-------------------------|---------------------------|---------|
| 1 | | 85.2980 | 43.77 | -19.07 | 24.70 | 40.00 | -15.30 | QP | | |
| 2 | | 170.7925 | 49.66 | -18.29 | 31.37 | 40.00 | -8.63 | QP | | |
| 3 | | 256.5210 | 53.27 | -14.87 | 38.40 | 47.00 | -8.60 | QP | | |
| 4 | ! | 428.0192 | 53.46 | -9.91 | 43.55 | 47.00 | -3.45 | QP | | |
| 5 | * | 513.6331 | 53.09 | -8.13 | 44.96 | 47.00 | -2.04 | QP | | |
| 6 | ! | 942.1304 | 45.07 | -0.84 | 44.23 | 47.00 | -2.77 | QP | | |



| | | | |
|----------------|---------------|--------------------|----------|
| Temperature: | 26°C | Relative Humidity: | 54% |
| Pressure: | 101kPa | Phase : | Vertical |
| Test Voltage : | DC 5V from PC | Test Mode: | Working |



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Antenna Height | Table Degree | |
|-----|-----|----------|---------------|----------------|-------------|-------|--------|----------------|--------------|---------|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | cm | degree | Comment |
| 1 | | 85.2980 | 48.02 | -19.07 | 28.95 | 40.00 | -11.05 | QP | | |
| 2 | | 170.7923 | 52.15 | -18.29 | 33.86 | 40.00 | -6.14 | QP | | |
| 3 | | 341.9786 | 49.08 | -12.46 | 36.62 | 47.00 | -10.38 | QP | | |
| 4 | ! | 428.0192 | 54.72 | -9.91 | 44.81 | 47.00 | -2.19 | QP | | |
| 5 | * | 599.3211 | 52.17 | -6.95 | 45.22 | 47.00 | -1.78 | QP | | |
| 6 | ! | 771.4486 | 46.48 | -4.08 | 42.40 | 47.00 | -4.60 | QP | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



7. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

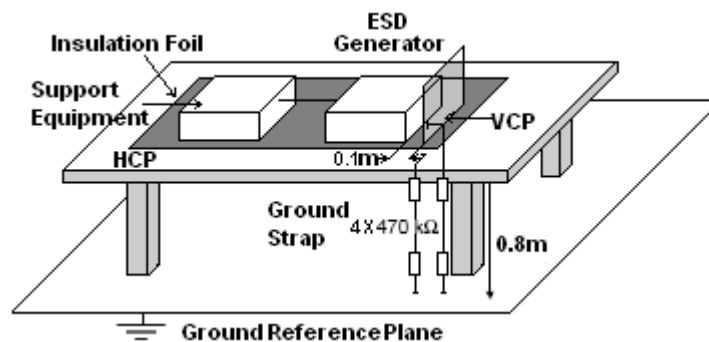
| Product Standard | EN 55035:2017 clause 5 |
|--------------------|--|
| CRITERION A | <p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. 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. A reboot 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> |

8. ELECTROSTATIC DISCHARGE (ESD)

8.1 Test Specification

| | |
|----------------------------|-------------------------------------|
| Test Port | : Enclosure port |
| Discharge Impedance | : 330 ohm / 150 pF |
| Discharge Mode | : Single Discharge |
| Discharge Period | : one second between each discharge |

8.2 Block Diagram of Test Setup



8.3 Test Procedure

- Electrostatic discharges were applied only to those points and surfaces of the Product 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 ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
- 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 Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product 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 Product. The ESD generator was positioned vertically at a distance of 0.1 meters from the Product with the discharge electrode touching the HCP.



h. 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 Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

8.4 Test Results

| | | | |
|----------------|---------------|--------------------|---------|
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 101kPa | Test Mode: | Working |
| Test Voltage : | DC 5V from PC | | |

| Discharge Method | Discharge Position | Voltage (±kV) | Min. No. of Discharge per polarity (Each Point) | Required Level | Performance Criterion |
|-------------------|---|---------------|---|----------------|-----------------------|
| Contact Discharge | Conductive Surfaces | 4 | 10 | B | A |
| | Indirect Discharge HCP | 4 | 10 | B | A |
| | Indirect Discharge VCP | 4 | 10 | B | A |
| Air Discharge | Slots, Apertures, and Insulating Surfaces | 8 | 10 | B | A |
| Note:N/A | | | | | |

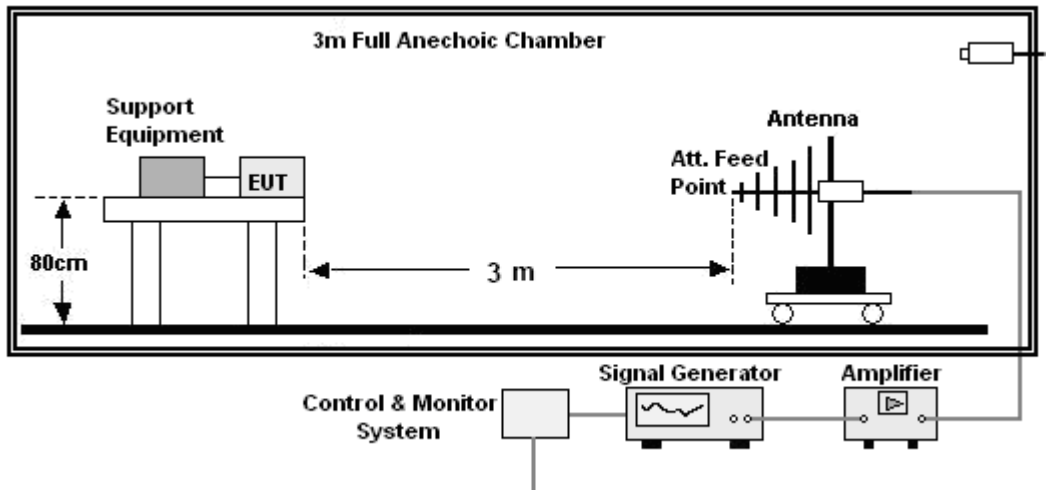
9. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES (RS)

9.1 Test Specification

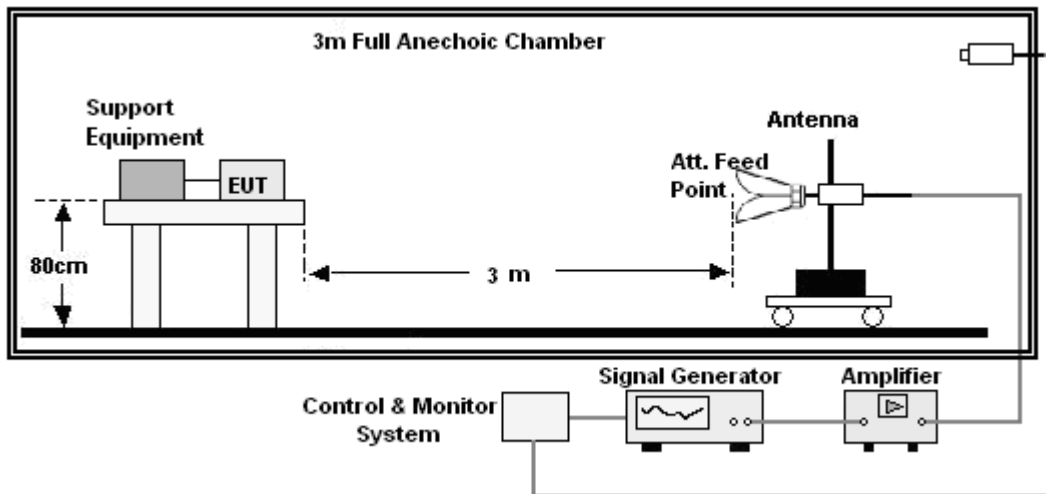
| | |
|---------------------|-------------------------|
| Test Port | : Enclosure port |
| Step Size | : 1% |
| Modulation | : 1kHz, 80% AM |
| Dwell Time | : 1 second |
| Polarization | : Horizontal & Vertical |

9.2 Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:





9.3 Test Procedure

- a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
- b. The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1%.
- c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond, but should not exceed 5 s at each of the frequencies during the scan.
- d. The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.
- e. For Broadcast reception function: Group 2 not apply in this test.

9.4 Test Results

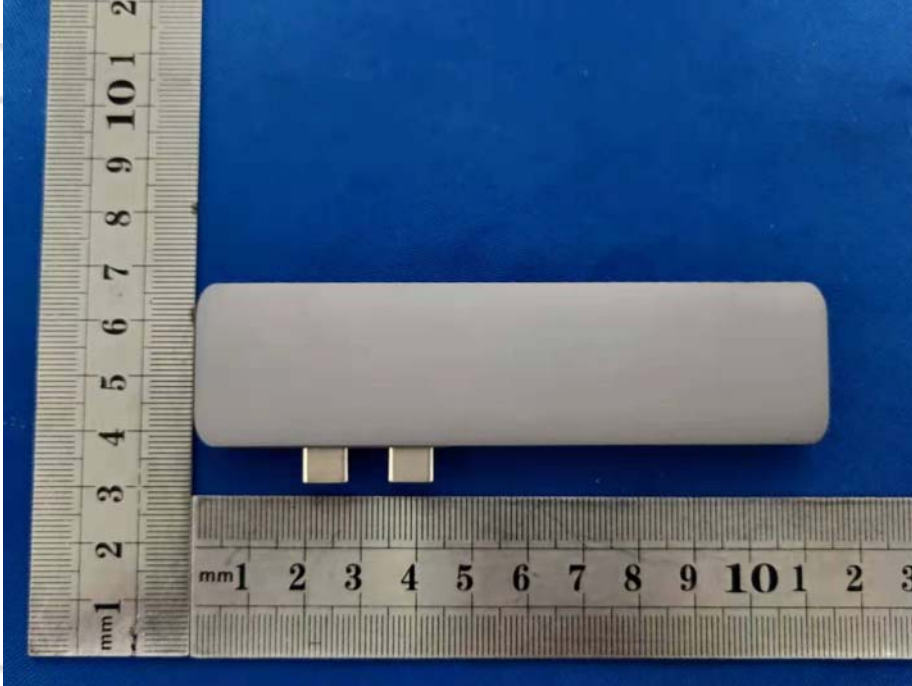
| | | | |
|----------------|---------------|--------------------|---------|
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 101kPa | Test Mode: | Working |
| Test Voltage : | DC 5V from PC | | |

| Frequency | Position | Field Strength (V/m) | Required Level | Performance Criterion |
|--|-----------------------------|----------------------|----------------|-----------------------|
| 80 - 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz | Front, Right, Back, Left | 3 | A | A |

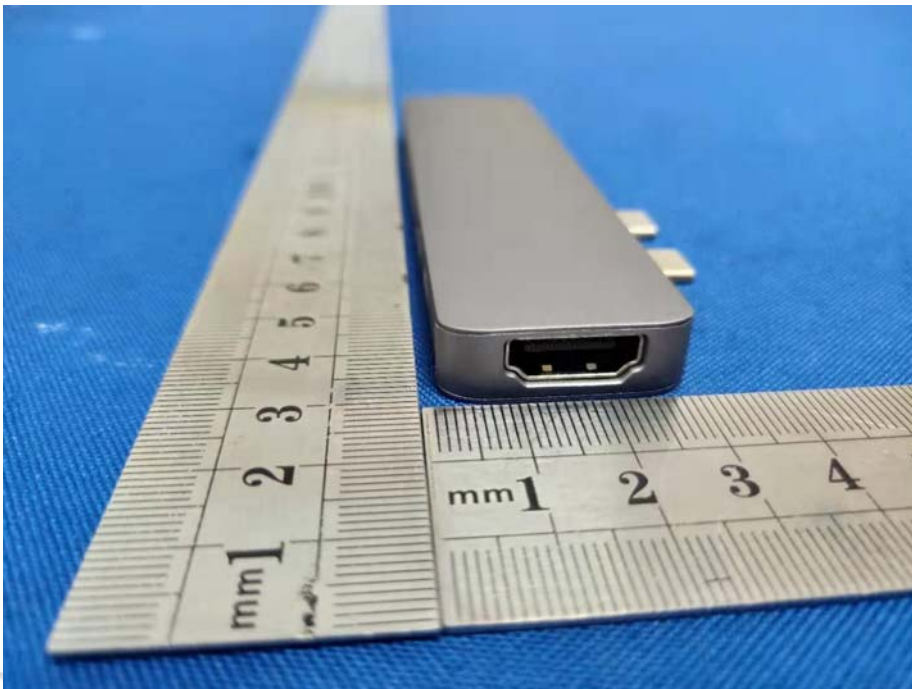
Note: N/A

10. EUT PHOTOGRAPHS

EUT Photo 1



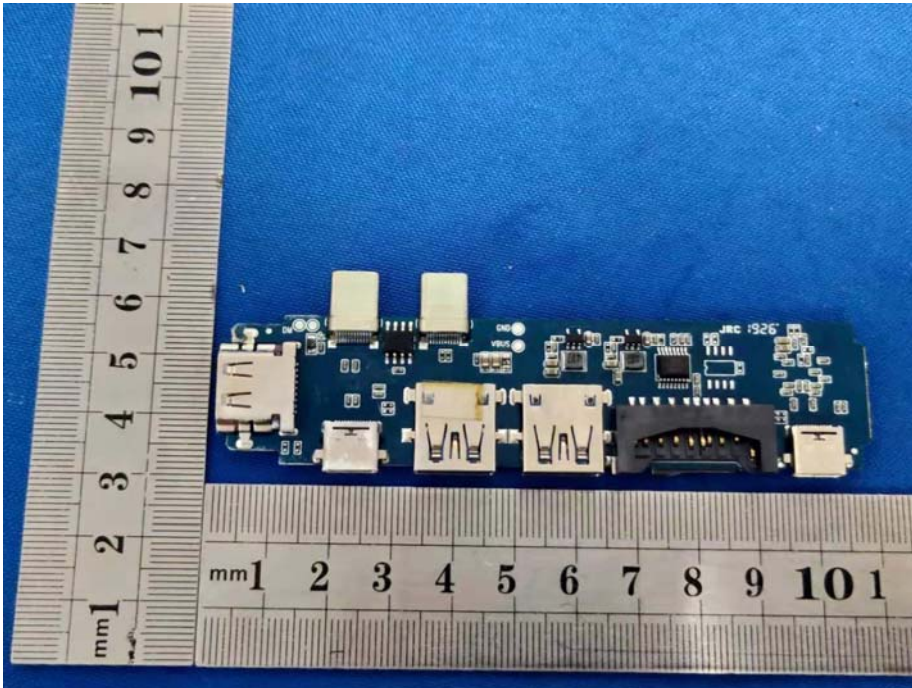
EUT Photo 2



EUT Photo 3

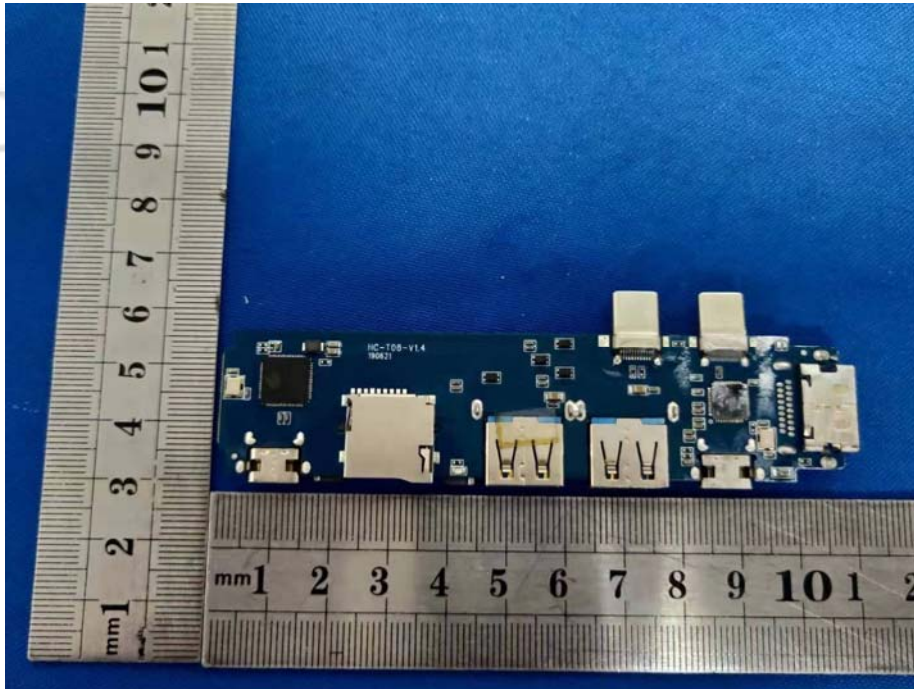


EUT Photo 4





EUT Photo 5



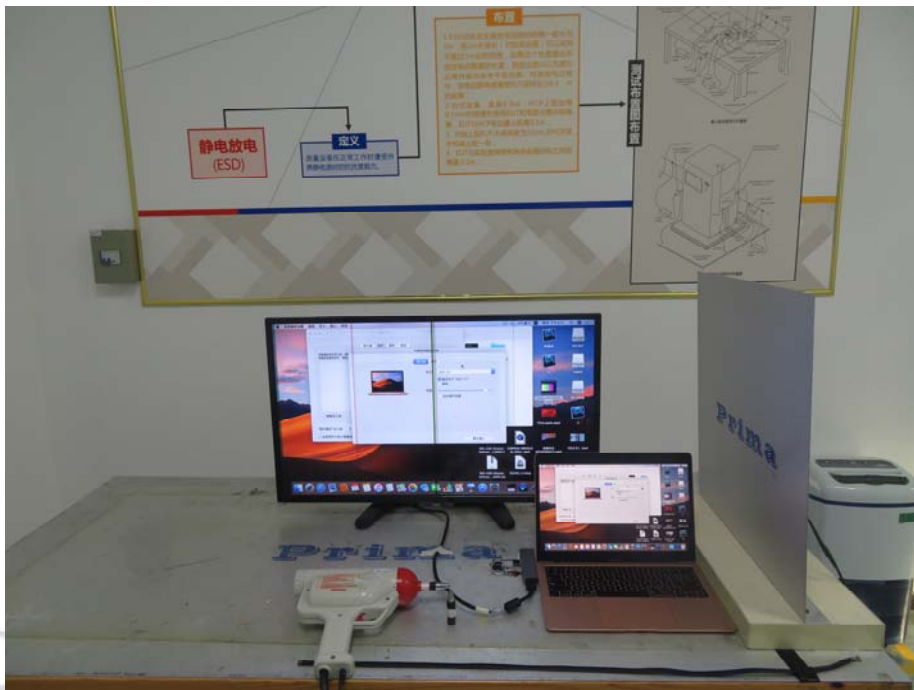


11. EUT TEST SETUP PHOTOGRAPHS

Radiated emissions



ESD





RS



***** END OF REPORT *****