

FCC Test Report

| | |
|--------------|------------|
| Product Name | ORB X |
| Model No. | IXS-OX1 |
| FCC ID | 2AR8X-ORBX |

| | |
|-----------|---|
| Applicant | Cooler Master Technology Inc. |
| Address | 7F., No. 398, Xinhua 1st Rd., Neihu Dist., Taipei City, 114065 Taiwan (R.O.C.) |

| | |
|-----------------|-----------------------|
| Date of Receipt | Jul. 19, 2022 |
| Issued Date | Sep. 14, 2022 |
| Report No. | 2270501R-RFUSOTHV02-A |
| Report Version | V1.0 |



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Sep. 14, 2022

Report No.: 2270501R-RFUSOTHV02-A



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| Product Name | ORB X |
| Applicant | Cooler Master Technology Inc. |
| Address | 7F., No. 398, Xinhua 1st Rd., Neihu Dist., Taipei City, 114065 Taiwan (R.O.C.) |
| Manufacturer | WEE CHIN ELECTRIC MACHINERY INC. |
| Model No. | IXS-OX1 |
| FCC ID | 2AR8X-ORBX |
| EUT Rated Voltage | AC 100-240V, 50-60Hz |
| EUT Test Voltage | DC 12V |
| Trade Name | Cooler Master |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013 |
| Test Result | Complied |

Documented By : Jinn Chen
(Supervisor / Jinn Chen)

Tested By : Ivan Chuang
(Senior Engineer / Ivan Chuang)

Approved By : Alan Chen
(Senior Engineer / Alan Chen)

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Revision History

| Report No. | Version | Description | Issued Date |
|-----------------------|---------|--------------------------|---------------|
| 2270501R-RFUSOTHV02-A | V1.0 | Initial issue of report. | Sep. 14, 2022 |

1. GENERAL INFORMATION

1.1. EUT Description

| | |
|--------------------|---------------------------------------|
| Product Name | ORB X |
| Trade Name | Cooler Master |
| Model No. | IXS-OX1 |
| FCC ID | 2AR8X-ORBX |
| Frequency Range | 127.5kHz |
| Type of Modulation | ASK |
| Type of antenna | Coil Antenna |
| Remote controller | MFR: COOLER MASTER, M/N: 622045760-GP |
| Power Cord | MFR: LIAN DUNG, M/N: LT-202 |

Frequency of Channel:

| Channel | Frequency |
|------------|-----------|
| Channel 1: | 127.5kHz |

Note:

1. The EUT is an ORB X with a built-in 127.5kHz transceiver.
2. Only the worst case is shown in the report.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.

| | |
|-----------|------------------|
| Test Mode | Mode 1: Transmit |
|-----------|------------------|

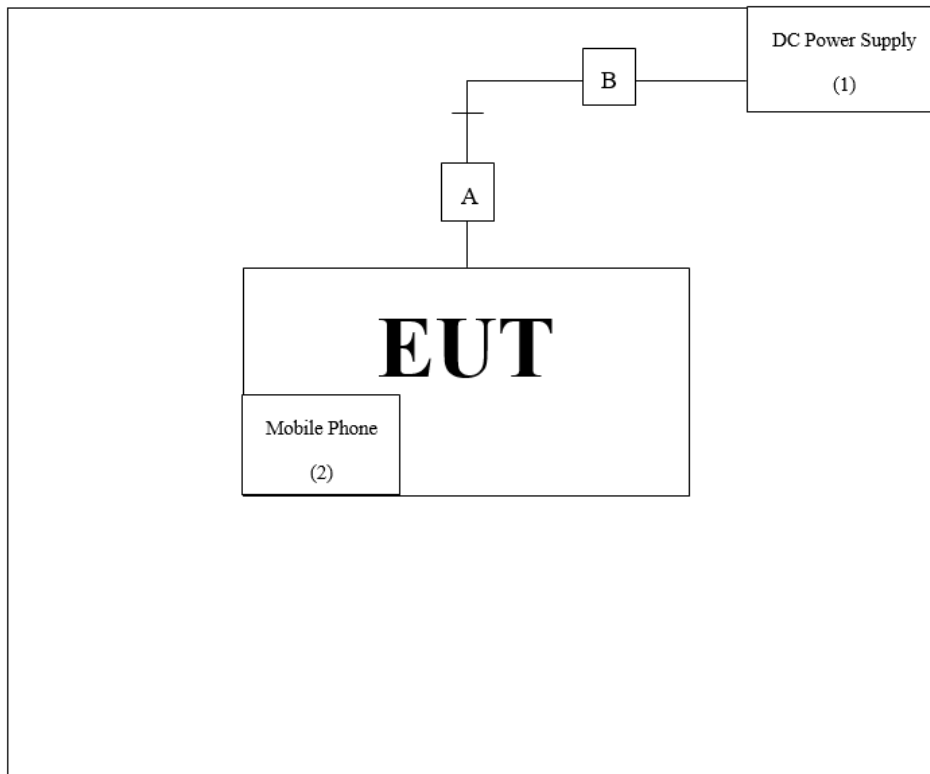
1.2. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | Manufacturer | Model No. | Serial No. | Power Cord |
|-------------------|--------------|-----------|------------|--------------------|
| 1 DC Power Supply | KEYSIGHT | E36234A | MY59001234 | Non-shielded, 1.8m |
| 2 Mobile Phone | SONY | H8296 | 43027566 | N/A |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| A Power Cable | Non-shielded, 0.6m |
| B Power Cable | Non-shielded, 1m |

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Turn on the power of all equipment.
- (3) Start the continuous receiver.
- (4) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

| Performed Item | Items | Required | Actual |
|--------------------|------------------|----------|---------|
| Conducted Emission | Temperature (°C) | 10~40 °C | 23.4 °C |
| | Humidity (%RH) | 10~90 % | 55.2 % |
| Radiated Emission | Temperature (°C) | 10~40 °C | 22.8 °C |
| | Humidity (%RH) | 10~90 % | 57.4 % |

USA : **FCC Registration Number: TW0033**

Canada : **CAB Identifier Number: TW3023 / Company Number: 26930**

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan
Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.
Phone number : +886-3-275-7255
Fax number : +886-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements / HY-SR01

| | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due. Date |
|---|--------------------|--------------|-----------|------------|------------|------------|
| X | EMI Test Receiver | R&S | ESR7 | 101601 | 2022/06/23 | 2023/06/22 |
| X | Two-Line V-Network | R&S | ENV216 | 101306 | 2022/05/23 | 2023/05/22 |
| X | Two-Line V-Network | R&S | ENV216 | 101307 | 2022/07/04 | 2023/07/03 |
| X | Coaxial Cable | SUHNER | RG400 BNC | RF001 | 2022/05/24 | 2023/05/23 |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9.

For Radiated measurements / HY-CB03

| | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due. Date |
|---|-------------------|---------------|-------------------|--------------|------------|------------|
| X | Loop Antenna | AMETEK | HLA6121 | 49611 | 2022/03.18 | 2023/03/17 |
| X | Bi-Log Antenna | SCHWARZBECK | VULB9168 | 9168-675 | 2021/08/11 | 2023/08/10 |
| | Horn Antenna | ETS-Lindgren | 3117 | 00201259 | 2021/11/09 | 2022/11/08 |
| | Horn Antenna | Com-Power | AH-840 | 101087 | 2021/06/16 | 2022/06/15 |
| X | Pre-Amplifier | SGH | SGH0301-9 | 20211007-10 | 2022/02/22 | 2023/02/21 |
| | Pre-Amplifier | EMCI | EMC051835SE | 980313 | 2021/11/24 | 2022/11/23 |
| | Pre-Amplifier | EMCI | EMC05820SE | 980310 | 2021/07/07 | 2022/07/06 |
| | Pre-Amplifier | EMCI | EMC184045SE | 980369 | | |
| | Coaxial Cable | EMCI | EMC102-KM-KM-600 | 1160314 | 2022/05/12 | 2023/05/11 |
| | Coaxial Cable | EMCI | EMC102-KM-KM-7000 | 170242 | | |
| | Filter | MICRO TRONICS | BRM50702 | G251 | 2021/09/16 | 2022/09/15 |
| | Filter | MICRO TRONICS | BRM50716 | G188 | 2021/09/16 | 2022/09/15 |
| X | EMI Test Receiver | R&S | ESR | 102793 | 2021/12/15 | 2022/12/14 |
| X | Spectrum Analyzer | R&S | FSV3044 | 101113 | 2022/01/25 | 2023/02/24 |
| | Coaxial Cable | SGH | SGH18 | 2021005-1 | | |
| X | Coaxial Cable | SGH | SGH18 | 202108-4 | 2022/03/18 | 2023/03/17 |
| | Coaxial Cable | SGH | SGH18 | GD20110223-1 | | |
| | Coaxial Cable | SGH | HA800 | GD20110222-3 | | |

Note:

1. Bi-Log Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

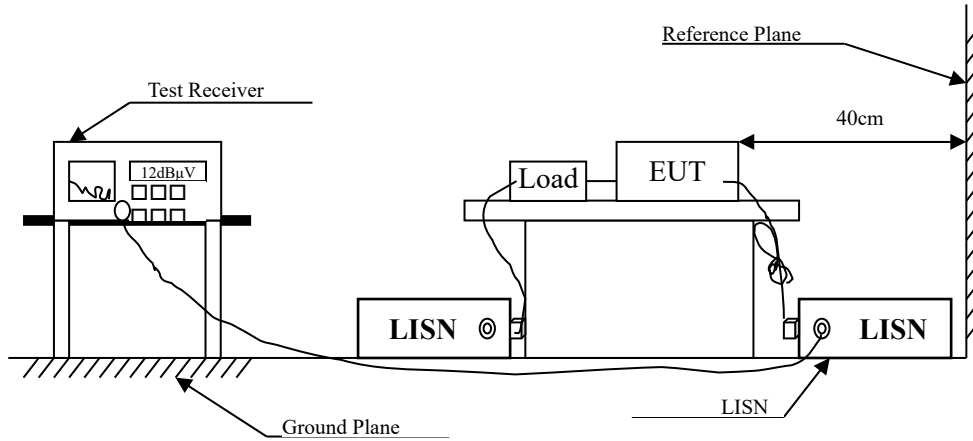
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

| Test item | Uncertainty | |
|--------------------|-----------------------------|-----------------------------|
| Conducted Emission | ± 3.42 dB | |
| Radiated Emission | Under 1GHz ± 4.06 dB | Above 1GHz ± 3.73 dB |

2. Conducted Emission

2.1. Test Setup



2.2. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit | | |
|---|-----------------------|-----------------------|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 ^(§§) | 56-46 ^(§§) |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

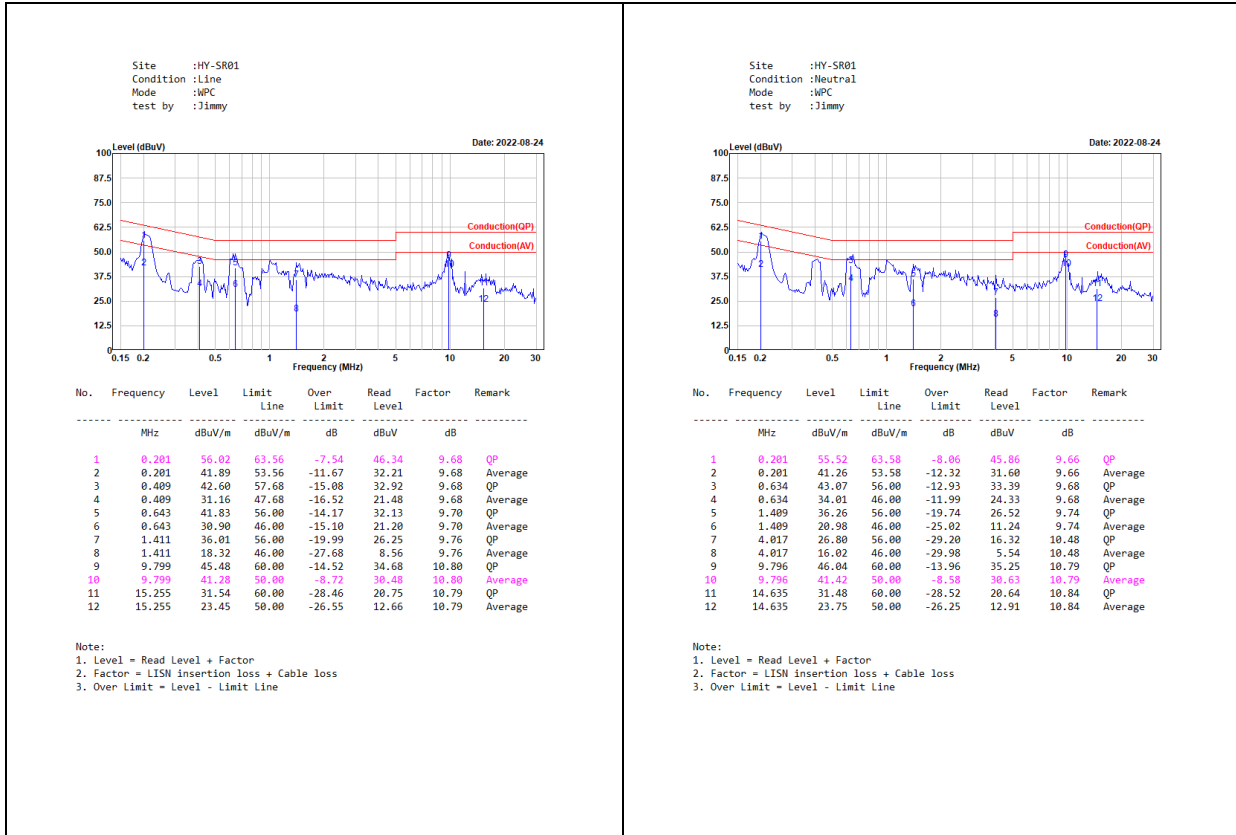
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

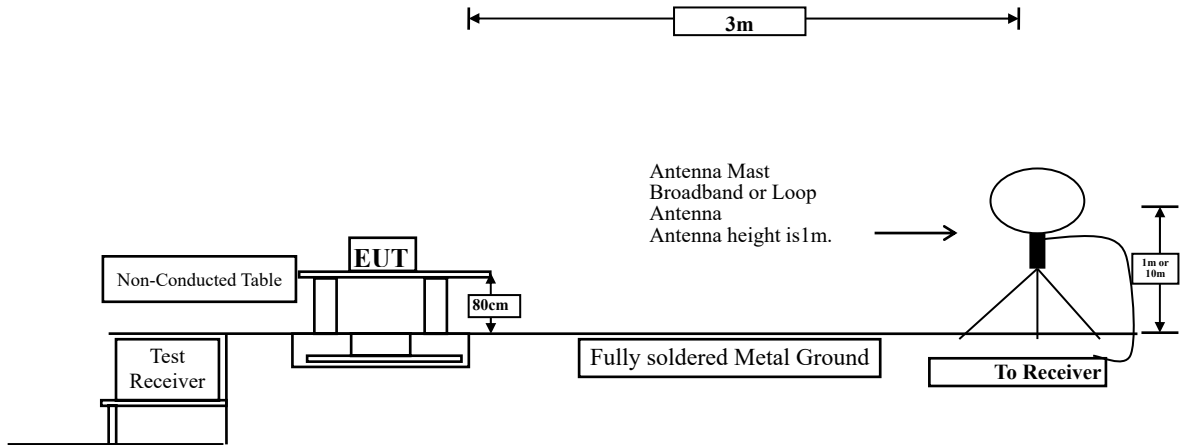
2.4. Test Result of Conducted Emission



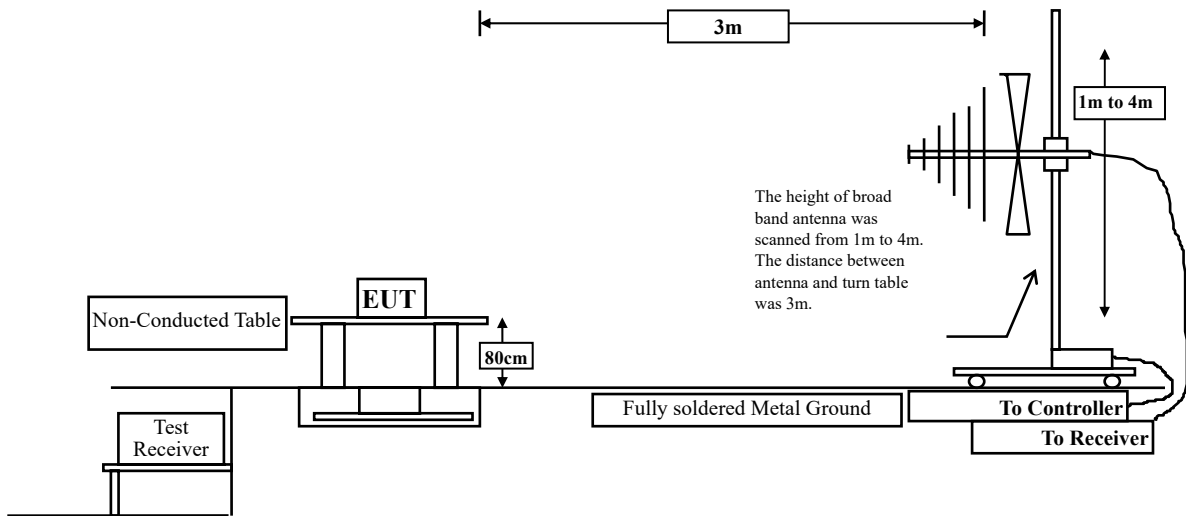
3. Radiated Emission

3.1. Test Setup

Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



3.2. Limits

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|--|--|---|
| Frequency MHz | Field strength (microvolts/meter) | Measurement distance (meter) |
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

- Remarks :
1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.209 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission

