# TEST REPORT

Dt&C

**Dt&C Co., Ltd.**
42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2307-0082
2. Customer
   - Name (FCC) : Iclo co.ltd
   - Address (FCC) : 25, Seohonam-ro Seogwipo-si Jeju-do South Korea
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : ICLO All in One Care System / ICLO001
   FCC ID : 2BBTE-ICLO001
5. FCC Regulation(s) : FCC Part 15 Subpart C
   Test Method used : ANSI C63.10-2013
6. Date of Test : 2023.07.03 ~ 2023.07.07
7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing
8. Testing Environment: See appended test report.
9. Test Result: Refer to the attached test result.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test report is not related to KOLAS accreditation.

| | | |
|---|---|---|
| Affirmation | Tested by<br>Name : SeungMin Gil (Signature) | Technical Manager<br>Name : JaeJin Lee (Signature) |

**2023 . 07 . 14 .**

**Dt&C Co., Ltd.**

**If this report is required to confirmation of authenticity, please contact to report@dtnc.net**

# Test Report Version

| Test Report No. | Date | Description | Tested by | Reviewed by |
|---|---|---|---|---|
| DRTFCC2307-0082 | Jul. 14, 2023 | Initial issue | SeungMin Gil | JaeJin Lee |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# CONTENTS

# 1. General Information

## 1.1. Description of EUT

| | |
|---|---|
| **FCC Equipment Class** | Part 15 Low Power Transmitter Below 1705kHz(DCD) |
| **Product Name** | ICLO All in One Care System |
| **Model Name** | ICLO001 |
| **Add Model Name** | - |
| **Firmware Version Identification Number** | 1.0 |
| **EUT Serial Number** | No Specified |
| **Declared Frequency** | 116.3 kHz |
| **Wireless charging output** | Max : 10 W |
| **Power Supply** | DC 5 V |
| **Antenna type** | Coil Antenna |

## 1.2. Testing Laboratory

| **Dt&C Co., Ltd.** | | |
|---|---|---|
| The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.<br>The test site complies with the requirements of Part 2.948 according to ANSI C63.4-2014.<br>**- FCC & IC MRA Designation No. : KR0034**<br>**- ISED#: 5740A** | | |
| www.dtnc.net | | |
| Telephone | : | + 82-31-321-2664 |
| FAX | : | + 82-31-321-1664 |

## 1.3. Testing Environment

| **Ambient Condition** | |
|---|---|
| ▪ Temperature | 21 ℃ ~ 23 ℃ |
| ▪ Relative Humidity | 43 % ~ 46 % |

## 1.4. Measurement Uncertainty

| Parameter | Measurement uncertainty |
|---|---|
| AC power-line conducted emission | 3.4 dB (The confidence level is about 95 %, k = 2) |
| Radiated emission (1 GHz Below) | 4.8 dB (The confidence level is about 95 %, k = 2) |

# 2. Information about test items

## 2.1 Test mode and Support equipment

This device has been tested with typical client device.

| Support Equipment | Model Name | Manufacturer | NOTE |
|---|---|---|---|
| All-in-one Main Body | ICLO001 | Iclo co.ltd | - |

Note: The above equipment was supported by manufacturer.

## 2.2 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

# 3. Antenna requirements

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

**The antenna is permanently attached.**

**Please refer to the internal photo. Therefore this E.U.T Complies with the requirement of §15.203**

# 4. Test Report

## 4.1 Summary of tests

| FCC Part Section(s) | Parameter | Limit | Test Condition | Status Note 1 |
|---|---|---|---|---|
| 15.215 | 20 dB Bandwidth | N/A | Radiated | C |
| 15.209 | Radiated Emission | Part 15.209 limits (Refer to section 4) | | C |
| 15.207 | AC Conducted Emissions | Part 15.207 limits (Refer to section 4) | AC Line Conducted | C |
| 15.203 | Antenna Requirements | Part 15.203 (Refer to section 3) | - | C |

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS.

## 4.2 Transmitter requirements

### 4.2.1 20 dB Bandwidth

**- Procedure:**

The 20 dB Bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.
And spectrum analyzer setting use following test procedure of **ANCSI C63.10-2013 – Section 6.9.2.**

1. Center frequency = EUT channel center frequency
2. Span = 2 ~ 5 times the OBW
3. RBW = 1 % ~ 5 % OBW
4. VBW ≥ 3 x RBW
5. Detector = Peak
6. Trace = Max hold
7. The trace was allowed to stabilize
8. Determine the reference value = Set the spectrum analyzer marker to the highest level of the displayed trace
9. Using the marker-delta function of the instrument, determine the "−xx dB down amplitude" using [(reference value) − xx].
10. Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

**- Measurement Data: Comply**

| Tested Frequency(kHz) | 20dB Bandwidth(Hz) |
|---|---|
| 116.3 | 101.0 |


**- Minimum Standard: NA**

### 4.2.2 Radiated Emissions

**- Limit: FCC Part 15.209(a): General requirement**

| Frequency [MHz] | Field Strength [uV/m] | Measurement Distance [Meters] |
|---|---|---|
| 0.009 ~ 0.490 | 2 400/F (kHz) | 300 |
| 0.490 ~ 1.705 | 24 000/F (kHz) | 30 |
| 1.705 ~ 30 | 30 | 30 |
| 30 ~ 88 | 100** | 3 |
| 88 ~ 216 | 150** | 3 |
| 216 ~ 960 | 200** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 - 72 MHz, 76 - 88 MHz, 174 - 216 MHz or 470 - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

**- Procedure:**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**- Measurement Data: Comply** (refer to the next page)

**- Measurement Data:**

Measurement Distance : **3 Meters**

| Tested Frequency(kHz) | Freq. [MHz] | ANT pol (Note 2) | Reading [dBuV] | TF [dB/m] | DCF | Field Strength [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|
| 116.3 | #0.116 | P | 51.40 | 12.02 | 80 | -16.58 | 26.32 | 42.90 |
| | 0.232 | P | 46.80 | 11.97 | 80 | -21.23 | 20.29 | 41.52 |
| | 31.940 | H | 31.80 | -9.72 | 0 | 22.08 | 40.00 | 17.92 |
| | 31.940 | V | 35.60 | -9.72 | 0 | 25.88 | 40.00 | 14.12 |
| | *648.856 | V | 31.00 | 2.82 | 0 | 33.82 | 54.00 | 20.18 |
| | *946.638 | H | 29.40 | 8.40 | 0 | 37.80 | 54.00 | 16.20 |

Note 1. # = Fundamental emission ,
***** = Noise Floor

Note 2. Loop antenna orientation (Below 30 MHz)
"P"= Parallel, "V"= perpendicular, "G"= ground-parallel
Hybrid antenna polarization (Above 30 MHz)
"H"= Horizontal, "V"= Vertical

Note 3. All data were recorded using a spectrum analyzer employing a peak detector.
If PK results were meet Quasi-peak limit, Quasi-peak measurements were omitted.

Note 4. No other spurious and harmonic emissions were reported greater than listed emissions above table.

Note 5. Sample calculation
Margin = Limit – Field Strength
Field Strength = Reading + TF – Distance factor
TF = AF + CL – AG
Distance factor = 20log(Measurement distance / The measured distance)$^2$
Where, TF = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCF = Distance Correction Factor

## 4.3. AC Power-Line Conducted Emissions

▣ **Test Requirements and limit, Part 15.207**

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

| Frequency Range (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 ~ 0.5 | 66 to 56 * | 56 to 46 * |
| 0.5 ~ 5.0 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

* Decreases with the logarithm of the frequency

### 4.3.1. Test Setup

See test photographs for the actual connections between EUT and support equipment.

### 4.3.2. Test Procedures

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

### 4.3.3. Test Results

Refer to the next page. (The worst case data was reported.)

## AC Power-Line Conducted Emissions (Graph)

# Results of Conducted Emission

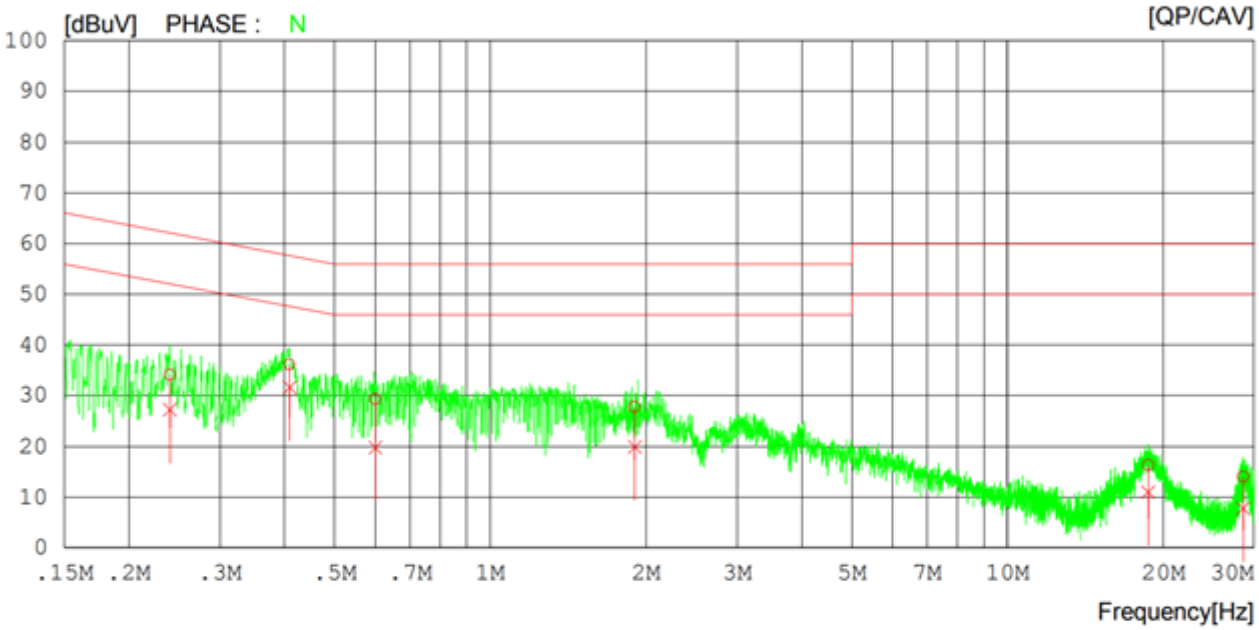
DTNC

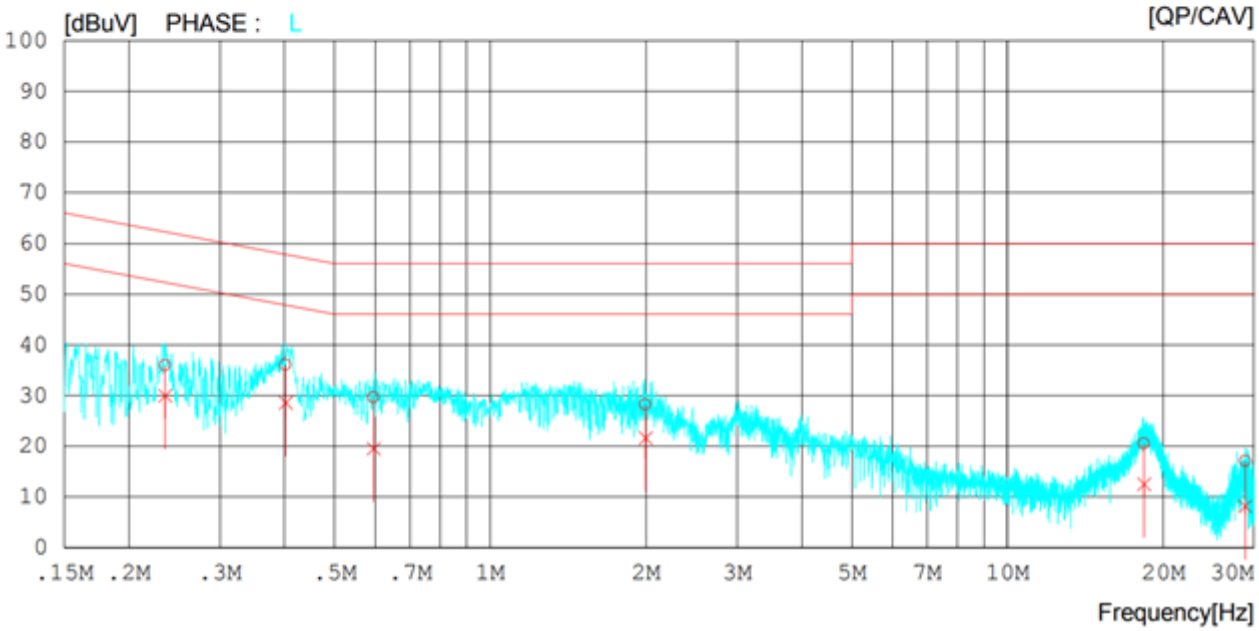
Date 2023-07-07

| | | | |
|---|---|---|---|
| Order No. | | Referrence No. | |
| Model No. | ICLO001 | Power Supply | |
| Serial No. | | Temp/Humi. | 21 'C / 45 % |
| Test Condition | 116.3 kHz | Operator | S.M.Gil |

Memo

LIMIT : FCC P15.207 AV
FCC P15.207 QP



## AC Power-Line Conducted Emissions (List)

# Results of Conducted Emission

DTNC Date 2023-07-07

| | | | |
|---|---|---|---|
| Order No. | | Referrence No. | |
| Model No. | ICLO001 | Power Supply | |
| Serial No. | | Temp/Humi. | 21 'C / 41 % |
| Test Condition | 116.3 kHz | Operator | S.M.Gil |

Memo

LIMIT : FCC P15.207 AV
FCC P15.207 QP

| NO | FREQ | READING | | C.FACTOR | RESULT | | LIMIT | | MARGIN | | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | QP | CAV | | QP | CAV | QP | CAV | QP | CAV | |
| | [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | |
| 1 | 0.24006 | 24.20 | 17.35 | 9.88 | 34.08 | 27.23 | 62.09 | 52.09 | 28.01 | 24.86 | N |
| 2 | 0.40899 | 26.25 | 21.78 | 9.89 | 36.14 | 31.67 | 57.67 | 47.67 | 21.53 | 16.00 | N |
| 3 | 0.59927 | 19.39 | 9.89 | 9.90 | 29.29 | 19.79 | 56.00 | 46.00 | 26.71 | 26.21 | N |
| 4 | 1.90120 | 17.81 | 9.99 | 9.94 | 27.75 | 19.93 | 56.00 | 46.00 | 28.25 | 26.07 | N |
| 5 | 18.70920 | 6.06 | 0.74 | 10.23 | 16.29 | 10.97 | 60.00 | 50.00 | 43.71 | 39.03 | N |
| 6 | 28.54220 | 3.68 | -2.62 | 10.36 | 14.04 | 7.74 | 60.00 | 50.00 | 45.96 | 42.26 | N |
| 7 | 0.23488 | 26.03 | 20.01 | 9.88 | 35.91 | 29.89 | 62.28 | 52.28 | 26.37 | 22.39 | L |
| 8 | 0.40199 | 26.19 | 18.70 | 9.89 | 36.08 | 28.59 | 57.81 | 47.81 | 21.73 | 19.22 | L |
| 9 | 0.59479 | 19.72 | 9.64 | 9.90 | 29.62 | 19.54 | 56.00 | 46.00 | 26.38 | 26.46 | L |
| 10 | 1.99680 | 18.27 | 11.68 | 9.94 | 28.21 | 21.62 | 56.00 | 46.00 | 27.79 | 24.38 | L |
| 11 | 18.36840 | 10.32 | 2.32 | 10.22 | 20.54 | 12.54 | 60.00 | 50.00 | 39.46 | 37.46 | L |
| 12 | 28.83140 | 6.73 | -2.21 | 10.37 | 17.10 | 8.16 | 60.00 | 50.00 | 42.90 | 41.84 | L |

# APPENDIX I

## TEST EQUIPMENT FOR TESTS

| Type | Manufacturer | Model | Cal.Date (yy/mm/dd) | Next.Cal.Date (yy/mm/dd) | S/N |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent Technologies | N9020A | 22/12/16 | 23/12/16 | MY50110097 |
| Multimeter | FLUKE | 17B+ | 22/12/16 | 23/12/16 | 36390701WS |
| Signal Generator | Rohde Schwarz | SMBV100A | 22/12/16 | 23/12/16 | 255571 |
| Loop Antenna | ETS-Lindgren | 6502 | 22/04/22 | 24/04/22 | 00203480 |
| Hybrid Antenna | Schwarzbeck | VULB 9160 | 22/12/16 | 23/12/16 | 3362 |
| PreAmplifier | H.P | 8447D | 22/12/16 | 23/12/16 | 2944A07774 |
| Thermohygrometer | BODYCOM | BJ5478 | 22/12/16 | 23/12/16 | 120612-2 |
| EMI Test Receiver | ROHDE&SCHWARZ | ESCI7 | 23/01/31 | 24/01/31 | 100910 |
| PULSE LIMITER | Rohde Schwarz | ESH3-Z2 | 22/08/22 | 23/08/22 | 101333 |
| LISN | SCHWARZBECK | NSLK 8128 RC | 22/10/26 | 23/10/26 | 8128 RC-387 |
| Thermo Hygro Meter | TESTO | 608-H1 | 23/01/13 | 24/01/13 | 45084791 |
| Cable | HUBER+SUHNER | SUCOFLEX100 | 23/01/04 | 24/01/04 | M-01 |
| Cable | HUBER+SUHNER | SUCOFLEX100 | 23/01/04 | 24/01/04 | M-02 |
| Cable | JUNKOSHA | MWX241/B | 23/01/04 | 24/01/04 | M-03 |
| Cable | JUNKOSHA | J12J101757-00 | 23/01/04 | 24/01/04 | M-07 |
| Cable | HUBER+SUHNER | SUCOFLEX106 | 23/01/04 | 24/01/04 | M-09 |
| Cable | Dt&C | Cable | 23/01/04 | 24/01/04 | RFC-69 |
| Test Software | tsj | Radiated Emission Measurement | NA | NA | Version 2.00.0147 |
| Test Software | tsj | Noise Terminal Measurement | NA | NA | Version 2.00.0185 |

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017
Note2: The cable is not a regular calibration item, so it has been calibrated by Dt&C itself.