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# **Release Control Record**

| Issue No.              | Description      | Date Issued  |
|------------------------|------------------|--------------|
| RFBEDV-WTW-P24010339-1 | Original Release | May 03, 2024 |



#### **Certificate of Conformity** 1

| Product:       | Outdoor camera                                 |
|----------------|--|
| Brand:         | SimpliSafe                                     |
| Test Model:    | CM021  |
| Sample Status: | Engineering Sample                             |
| Applicant:     | SimpliSafe, Inc                                |
| Test Date:     | Feb. 21 ~ Apr. 22, 2024                        |
| Standards:     | 47 CFR FCC Part 15, Subpart C (Section 15.231) |
|                | ANSI C63.10-2013                               |

The above equipment has been tested by Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

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Date: May 03, 2024

Approved by :

Jeremy Lin \_, Date: May 03, 2024

Jeremy Lin / Project Engineer

Report No.: RFBEDV-WTW-P24010339-1



## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.231) |                                |         |   |  |  |  |
|--|--------------------------------|---------|---|--|--|--|
| FCC<br>Clause                                  | Test Item                      | Remarks |   |  |  |  |
| 15.207   | AC Power Conducted Emission    | Pass    | Meet the requirement of limit.<br>Minimum passing margin is -5.16 dB<br>at 0.74200 MHz. |  |  |  |
| 15.209<br>15.231(b)                            | Radiated Emission Test         | Pass    | Meet the requirement of limit.<br>Minimum passing margin is<br>-0.8 dB at 433.92 MHz.   |  |  |  |
| 15.231(c)                                      | Emission Bandwidth Measurement | Pass    | Meet the requirement of limit.  |  |  |  |
| 15.231(a)                                      | De-activation                  | Pass    | Meet the requirement of limit.  |  |  |  |
| 15.203   | Antenna Requirement            | Pass    | No antenna connector is used.   |  |  |  |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

#### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                        | Frequency        | Expanded Uncertainty<br>(k=2) (±) |
|------------------------------------|------------------|-----------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.88 dB                           |
| Radiated Emissions up to 1 GHz     | 30 MHz ~ 1 GHz   | 3.64 dB                           |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz   | 2.29 dB                           |

## 2.2 Modification Record

There were no modifications required for compliance.

FW default SubGHz PA Power setting: -4 SubGHz PA power setting modified to +2 FW default SubGHz PA power setting will be updated to +2



## 3 General Information

# 3.1 General Description of EUT

| Product           |                                    | Outdoor camera                   |  |  |
|-------------------|------------------------------------|----------------------------------|--|--|
| Brand             |                                    | SimpliSafe                       |  |  |
| Test Model        |                                    | CM021                            |  |  |
| Sampla Status     |                                    |                                  |  |  |
|                   |                                    | 3.65Vdc from battery             |  |  |
| Power Supply F    | Rating                             | 5Vdc from adapter                |  |  |
| Modulation Typ    | e                                  | FSK                              |  |  |
| Operating Freq    | uency                              | 433.92MHz                        |  |  |
| Field Strength    |                                    | 80.0 dBuV/m                      |  |  |
| Antenna Type      |                                    | Loop Antenna with -6.60 dBi gain |  |  |
| Antenna Conne     | ector                              | NA                               |  |  |
| Accessory Dev     | ice                                | Refer to Note as below           |  |  |
| Cable Supplied    | I                                  | Refer to Note as below           |  |  |
| FW Version        |                                    | 4.24.0.1380.97181ca              |  |  |
| FW Hash           |                                    | 97181ca                          |  |  |
| Serial Number     |                                    | F12949DC                         |  |  |
| HW Version        |                                    | PCA-10355:B                      |  |  |
|                   |                                    | Default: -4                      |  |  |
| Radio PA Settin   | ng                                 | Modified to: +2                  |  |  |
| SubGHz Data r     | ate                                | Up to 4.8 kbps                   |  |  |
| Frequency Dev     | viation                            | +/- 13kHz                        |  |  |
| Maximum mess      | sage type                          | Event                            |  |  |
| Maximum mess      | sage length                        | 64 butes / 106 mg                |  |  |
| (bytes / millised | conds)                             | 64 bytes / 106 ms                |  |  |
| Note:             |                                    |                                  |  |  |
| 1. The EUT use    | s following accesso                | ries.                            |  |  |
| Battery           |                                    |                                  |  |  |
| Brand             | Simplisafe                         |                                  |  |  |
| Model             | SSCAM-BAI1                         |                                  |  |  |
| Manufacturer      | Getac                              |                                  |  |  |
| Rating            | 3.65V, 21.9Wh                      |                                  |  |  |
| AC Adapter        | O'mentine fe                       |                                  |  |  |
| Brand             |                                    |                                  |  |  |
| Manufact          |                                    |                                  |  |  |
| Manufacturer      |                                    |                                  |  |  |
| Part Number       | ASIVI-10296-00                     |                                  |  |  |
| Power             | I/P: 100-240V, 0.35<br>O/P: 5V. 2A | DA                               |  |  |
| USB Cable         | ,                                  |                                  |  |  |
| Brand             | RAPID                              |                                  |  |  |
| Model             | MIRCO USB TO T                     | YPEA                             |  |  |
| Manufacturer      | RAPID                              |                                  |  |  |
| Part Number       | RS-2007-609                        |                                  |  |  |
| Signal Line       | 0.1 meter                          |                                  |  |  |



| Power cord   | Power cord   |  |  |  |  |
|--------------|--------------|--|--|--|--|
| Brand        | Simplisafe   |  |  |  |  |
| Manufacturer | LUXSHARE     |  |  |  |  |
| Part Number  | MEC-10572-00 |  |  |  |  |
| Signal Line  | 7.62 meter   |  |  |  |  |

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

3. The DSC and DTS bands cannot transmit simultaneously.

# 3.2 Description of Test Modes

| Test Mode | Mode Initiation  | Mode Description                                      |
|-----------|--|---|
| 1         | Send CLI command<br>"mfg radio fcc-test-type+eventtx_interval=4" | Device will transmit an Event message every 2 seconds |



| UTC   | Configure  |   |   | Applicable to   |   |  | _   |
|---|--|---|---|---|---|--|---|
| Mode  |  | RE≥1G   | RE < 1G   | PLC   | EB  | DT   | Description   |
|   | -  | $\checkmark$  | $\checkmark$  | $\checkmark$  | $\checkmark$  | $\checkmark$   | -   |
| here  | RE≥1   | G: Radiated Emis  | sion above 1GHz   |   | RE<1G: Radiated   | d Emission belo  | w 1GHz  |
|   | PLC: I   | Power Line Cond   | ucted Emission  |   | EB: 20dB Bandw  | idth measureme   | ent   |
|   | DT: De   | eactivation Time ı  | neasurement   |   |   |  |   |
|   |  |   |   |   |   |  |   |
|   |  |   |   |   |   |  |   |
| adiat   | ted Emis   | sion Test (Al   | bove 1GHz):   |   |   |  |   |
|   | re-Scan  | has been con  | ducted to deter   | mine the wor  | st-case mode fr   | om all possi   | ble combinations  |
| be  | etween a   | vailable modu   | ilations, data ra   | ates and ante   | nna ports (if EU  | T with anten   | na diversity  |
| ar  | rchitectur   | e).   |   |   |   |  |   |
| ] Fo  | ollowing   | channel(s) wa   | is (were) select  | ed for the fina   | al test as listed   | below.   |   |
| E   | EUT Config   | gure Mode   | Available C   | Channel   | Tested Cha  | nnel   | Modulation Typ  |
|   | -  |   | 1   |   | 1   |  | FSK   |
|   | – .  |   |   |   |   |  |   |
| adiat   | ted Emis   | sion Test (Be   | <u>elow 1GHz):</u>  |   |   |  |   |
| ] Pi  | re-Scan  | has been con  | ducted to deter   | mine the wor  | st-case mode fr   | om all possi   | ble combinations  |
| be  | etween a   | vailable modu   | ilations, data ra   | ates and ante   | nna ports (if EU  | T with anten   | na diversity  |
| ar  | rchitectur   | re).  |   |   |   |  |   |
| Л Г.  |  | channel(e) wa   | is (were) select  | ed for the fination   | al test as listed   | below.   |   |
|   | ollowing   |   |   |   |   |  |   |
|   | ollowing<br>EUT Config   | gure Mode   | Available C   | hannel  | Tested Cha  | nnel   | Modulation Typ  |
| <u> </u>  | ollowing<br>EUT Config<br>-<br>r Line Cc   | onducted Em   | Available C<br>1<br>ission Test:<br>ducted to deter   | mine the wor  | Tested Cha<br>1<br>st-case mode fr  | om all possil  | <u>Modulation Typ</u><br>FSK<br>ble combinations  |
|   | ollowing<br>EUT Config<br>r Line Co<br>re-Scan<br>etween a<br>rchitectur   | pinducted Em<br>has been conducted in the solution of the solutio | Available O<br>1<br>ission Test:<br>ducted to deter<br>ilations, data ra  | mine the wor  | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU  | om all possil<br>T with anten  | <u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity  |
| Ower<br>Ower  | ollowing<br>EUT Config<br>r Line Co<br>Pre-Scan<br>etween a<br>rchitectur<br>ollowing  | pnducted Em<br>has been conducted in the solution of the solution | Available C<br>1<br>ission Test:<br>ducted to deter<br>ilations, data ra  | mine the wor<br>ates and ante   | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU<br>al test as listed   | om all possil<br>T with anten<br>below.  | Modulation Typ<br>FSK<br>ble combinations<br>na diversity   |
| <u>e</u><br><u>e</u><br><u>e</u><br><u>e</u><br><u>e</u><br><u>e</u><br><u>e</u>  | ollowing<br>EUT Config<br>r Line Co<br>re-Scan l<br>etween a<br>rchitectur<br>ollowing<br>EUT Config   | pnducted Em<br>has been convailable modu<br>re).<br>channel(s) wa   | Available C<br>1<br>ission Test:<br>ducted to deter<br>llations, data ra<br>is (were) select<br>Available C   | mine the wor<br>ates and ante<br>ated for the fina  | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU<br>al test as listed<br>Tested Cha   | om all possil<br>T with anten<br>below.  | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ   |
| <b>ower</b><br><b>0 e</b><br><b>0 e</b><br><b>1</b> P<br>be<br>ar<br><b>1</b> F<br><b>1 c</b><br><b>1 c</b>   | ollowing<br>EUT Config<br>r Line Co<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config   | pnducted Em<br>has been con<br>vailable modu<br>re).<br>channel(s) wa   | Available C<br>1<br>ission Test:<br>ducted to deter<br>ilations, data ra<br>is (were) select<br>Available C<br>1  | mine the wor<br>ates and ante<br>red for the fina<br>Channel  | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU<br>al test as listed<br><u>Tested Cha</u><br>1   | om all possil<br>T with anten<br>below.  | <u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK  |
| Yower<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G<br>G  | ollowing<br>EUT Config<br>r Line Cc<br>Pre-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>  | pinducted Em<br>has been conducted in the solution of the solutio | Available C<br>1<br>ission Test:<br>ducted to deter<br>ilations, data ra<br>is (were) select<br>Available C<br>1<br>urement:  | mine the wor<br>ates and ante<br>and for the finance  | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU<br>al test as listed<br>Tested Cha<br>1  | om all possil<br>T with anten<br>below.<br>Innel   | <u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK  |
| 2 Pr<br>2 Ower<br>3 Pr<br>be<br>ar<br>3 Fc<br>E<br>5<br>5<br>1 Pr<br>be<br>ar<br>3 Fc<br>1 Pr<br>be<br>ar<br>3 Fc<br>1 Pr<br>be<br>ar<br>3 Fc<br>1 Pr<br>be<br>ar<br>5 C<br>1 Pr<br>1 P | ollowing<br><u>EUT Config</u><br><u>r Line Cc</u><br>re-Scan l<br>etween a<br>rchitectur<br>ollowing<br><u>EUT Config</u><br><u>-</u><br><u>sion Ban</u>   | anducted Em<br>bas been conv<br>vailable modu<br>re).<br>channel(s) wa<br>gure Mode   | Available C<br>ission Test:<br>ducted to deter<br>lations, data ra<br>(were) select<br>Available C<br>1<br>urement:   | mine the wor<br>ates and ante<br>ated for the fine<br>Channel   | Tested Cha<br>1<br>st-case mode fr<br>nna ports (if EU<br><u>al test as listed</u><br><u>Tested Cha</u><br>1  | om all possil<br>T with anten<br>below.  | <u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK  |
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| Image: Picket in the sector           Ower           Image: Picket in the sector           Image: Picket in the sector <t< td=""><td>ollowing<br/>EUT Config<br/>r Line Co<br/>re-Scan<br/>etween a<br/>rchitectur<br/>ollowing<br/>EUT Config<br/>etween a<br/>rchitectur<br/>ollowing<br/>EUT Config<br/>EUT Config<br/>EUT Config<br/>EUT Config<br/>EUT Config</td><td>pinducted Em<br/>has been conducted Em<br/>has been conducted Em<br/>has been conducted<br/>channel(s) wa<br/>gure Mode<br/>dwidth Meas<br/>has been conducted<br/>channel(s) wa<br/>gure Mode<br/>ime Measure<br/>has been conducted</td><td>Available C<br/>1<br/>ission Test:<br/>ducted to deter<br/>lations, data ra<br/>is (were) select<br/>Available C<br/>1<br/>urement:<br/>ducted to deter<br/>lations, data ra<br/>is (were) select<br/>Available C<br/>1<br/>ment:<br/>ducted to deter</td><td>mine the wor<br/>ates and ante<br/>ates and ante<br/>ates and ante<br/>mine the wor<br/>ates and ante<br/>ates and ante<br/>ates and ante<br/>ates and ante</td><td>Tested Cha         1         rst-case mode fr         nna ports (if EU         al test as listed         1         rst-case mode fr         1         rst-case mode fr         1         st-case mode fr         1         rst-case mode fr         1         st-case mode fr         1         st-case mode fr         1         st-case mode fr         1</td><td>om all possil<br/>T with anten<br/>below.<br/>Innel</td><td>Modulation Typ<br/>FSK<br/>ble combinations<br/>na diversity<br/>Modulation Typ<br/>FSK<br/>ble combinations<br/>na diversity<br/>Modulation Typ<br/>FSK</td></t<>   | ollowing<br>EUT Config<br>r Line Co<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>EUT Config<br>EUT Config<br>EUT Config<br>EUT Config   | pinducted Em<br>has been conducted Em<br>has been conducted Em<br>has been conducted<br>channel(s) wa<br>gure Mode<br>dwidth Meas<br>has been conducted<br>channel(s) wa<br>gure Mode<br>ime Measure<br>has been conducted  | Available C<br>1<br>ission Test:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>urement:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>ment:<br>ducted to deter  | mine the wor<br>ates and ante<br>ates and ante<br>ates and ante<br>mine the wor<br>ates and ante<br>ates and ante<br>ates and ante<br>ates and ante   | Tested Cha         1         rst-case mode fr         nna ports (if EU         al test as listed         1         rst-case mode fr         1         rst-case mode fr         1         st-case mode fr         1         rst-case mode fr         1         st-case mode fr         1         st-case mode fr         1         st-case mode fr         1   | om all possil<br>T with anten<br>below.<br>Innel   | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK   |
| Image: Project in the sector in the secto   | ollowing<br>EUT Config<br>r Line Cc<br>re-Scan l<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>ivation T<br>re-Scan l<br>etween a<br>rchitectur<br>ollowing   | anducted Em<br>bas been conducted Em<br>has been conducted<br>vailable modu<br>e).<br>channel(s) wa<br>gure Mode<br>dwidth Meas<br>has been conducted<br>vailable modu<br>re).<br>channel(s) wa<br>gure Mode<br>"ime Measure<br>has been conducted<br>vailable modu   | Available C<br>1<br>ission Test:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>urement:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>ement:<br>ducted to deter<br>1  | mine the wor<br>ates and ante<br>ates and ante<br>ates and ante<br>ates and ante<br>ates and ante<br>ates and ante<br>ates and ante   | Tested Cha         1         st-case mode fr         al test as listed         1         st-case mode fr         1  | om all possil<br>T with anten<br>below.<br>mnel<br>T with anten<br>below.<br>below.<br>mnel  | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity |
| Ower<br>E<br>Ower<br>Ower<br>De<br>ar<br>E<br>Miss<br>A<br>Pr<br>be<br>ar<br>C<br>E<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C  | ollowing<br>EUT Config<br>r Line Cc<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>sion Ban<br>re-Scan<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>re-Scan<br>etween a<br>rchitectur<br>ollowing   | anducted Em<br>bas been convailable modu<br>re).<br>channel(s) wa<br>gure Mode<br>dwidth Meas<br>has been conv<br>vailable modu<br>re).<br>channel(s) wa<br>gure Mode<br>ime Measure<br>has been conv<br>vailable modu<br>re).  | Available C<br>1<br>ission Test:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>urement:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>ement:<br>ducted to deter<br>1  | mine the wor<br>ates and ante<br>ates and ante<br>channel<br>mine the wor<br>ates and ante<br>channel<br>mine the wor<br>ates and ante  | Tested Cha         1         rst-case mode fr         al test as listed         Tested Cha         1         rst-case mode fr         nna ports (if EU         al test as listed         1         rst-case mode fr         al test as listed         1         rst-case mode fr         1         rested Cha         1         st-case mode fr         1         rst-case mode fr         1  | om all possil<br>T with anten<br>below.<br>Innel<br>Om all possil<br>T with anten<br>below.<br>Innel<br>Om all possil<br>T with anten                                    | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity<br><u>Modulation Typ</u><br>FSK<br>ble combinations<br>na diversity |
| ower<br>ewer<br>ower<br>Pi<br>be<br>ar<br>E<br>eacti<br>E<br>eacti<br>ar<br>E<br>eacti<br>Fe<br>ar<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E<br>E   | ollowing<br>EUT Config<br>r Line Co<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>sion Ban<br>re-Scan<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>re-Scan<br>etween a<br>rchitectur<br>ollowing   | anducted Em<br>bas been convailable modu<br>re).<br>channel(s) wa<br>gure Mode<br>dwidth Meas<br>has been convailable modu<br>re).<br>channel(s) wa<br>gure Mode<br>ime Measure<br>has been conv<br>vailable modu<br>re).<br>channel(s) wa<br>channel(s) wa   | Available C         1         ission Test:         ducted to deter         alations, data ra         is (were) select         Available C         1         urement:         ducted to deter         alations, data ra         is (were) select         alations, data ra         is (were) select         Available C         1         ement:         ducted to deter         alations, data ra         is (were) select         1         ement:         ducted to deter         alations, data ra         is (were) select         alations, data ra         is (were) select | mine the wor<br>ates and ante<br>ates and ante                                   | Tested Cha         1         st-case mode fr         al test as listed         1         st-case mode fr         st-case mode fr         st-case mode fr         st-case mode fr         st-case mode fr      < | om all possil<br>T with anten<br>below.<br>Innel<br>Om all possil<br>T with anten<br>below.<br>Innel<br>Om all possil<br>T with anten<br>below.                          | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK<br>ble combinations<br>na diversity               |
| Ower           0wer           0   | ollowing<br>EUT Config<br>r Line Cc<br>re-Scan l<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>EUT Config<br>EUT Config<br>ivation T<br>re-Scan l<br>etween a<br>rchitectur<br>ollowing<br>EUT Config<br>Config<br>EUT Config<br>Config<br>Config   | anducted Em<br>bas been conducted Em<br>has been conducted<br>channel(s) was<br>channel(s) was<br>dwidth Meas<br>has been conducted<br>vailable moducted<br>channel(s) was<br>gure Mode<br>ime Measure<br>has been conducted<br>vailable moducted<br>channel(s) was<br>gure Mode  | Available C<br>1<br>ission Test:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>urement:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1<br>ement:<br>ducted to deter<br>lations, data ra<br>is (were) select<br>Available C<br>1   | mine the wor<br>ates and ante<br>ates and ante | Tested Cha         1         st-case mode fr         nna ports (if EU         al test as listed         1         st-case mode fr         nna ports (if EU         1         st-case mode fr         nna ports (if EU         al test as listed         1         st-case mode fr         nna ports (if EU         1         st-case mode fr         nna ports (if EU         al test as listed         Tested Cha         1         st-case listed   | om all possil<br>T with anten<br>below.<br>om all possil<br>T with anten<br>below.<br>om all possil<br>T with anten<br>below.<br>om all possil<br>T with anten<br>below. | Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK<br>ble combinations<br>na diversity<br>Modulation Typ<br>FSK<br>ble combinations<br>na diversity               |



# Test Condition:

| Applicable to | Environmental Conditions | Input Power    | Tested by  |
|---------------|--------------------------|----------------|------------|
| RE≥1G         | 23 deg. C, 67 % RH       | 120 Vac, 60 Hz | Luis Lee   |
| RE<1G         | 23 deg. C, 67 % RH       | 120 Vac, 60 Hz | Luis Lee   |
| PLC           | 23 deg. C, 67 % RH       | 120 Vac, 60 Hz | Adair Peng |
| EB/DT         | 23 deg. C, 67 % RH       | 120 Vac, 60 Hz | Luis Lee   |





Duty cycle of test signal is 100 %, duty factor is not required.

## 3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks               |
|----|---------|-------|-----------|------------|--------|-----------------------|
| А  | Laptop  | DELL  | E5430     | 2RL3YW1    | N/A    | Provided by Lab       |
| В  | Jig     | N/A   | N/A       | N/A        | N/A    | Supplied by applicant |

| ID | Descriptions       | Qty. | Length (m) | Shielding<br>(Yes/No) | Cores (Qty.) | Remarks               |
|----|--------------------|------|------------|-----------------------|--------------|-----------------------|
| 1. | USB Cable          | 1    | 0.1        | Y                     | 0            | Supplied by applicant |
| 2. | USB Cable          | 1    | 1.5        | Y                     | 0            | Supplied by applicant |
| 3. | USB Cable Extender | 1    | 1          | Y                     | 0            | Provided by Lab       |
| 4. | Cable              | 1    | 0.1        | Ν                     | 0            | Supplied by applicant |

## 3.4.1 Configuration of System under Test

Worst case orientation: Camera upright, lens facing forward Worst case accessory configuration: Long cable plugged in



# 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

# Test standard: FCC Part 15, Subpart C (15.231) ANSI C63.10- 2013

All test items have been performed and recorded as per the above standards.



#### 4 Test Types and Results

#### 4.1 Radiated Emission Measurement

#### 4.1.1 Limits of Radiated Emission Measurement

| Fundamental     | Field Strength | of Fundamental | Field Strength of Spurious |               |  |
|-----------------|----------------|----------------|----------------------------|---------------|--|
| Frequency (MHz) | uV/meter       | dBuV/meter     | uV/meter                   | dBuV/meter    |  |
| 40.66 ~ 40.70   | 2250           | 67.04          | 225                        | 48.04         |  |
| 70 ~ 130        | 1250           | 61.94          | 125                        | 41.94         |  |
| 130 ~ 174       | 1250 ~ 3750    | 61.94 ~ 71.48  | 125 ~ 375                  | 41.94 ~ 51.48 |  |
| 174 ~ 260       | 3750           | 71.48          | 375                        | 51.48         |  |
| 260 ~ 470       | 3750 ~ 12500   | 71.48 ~ 81.94  | 375 ~ 1250                 | 51.48 ~ 61.94 |  |
| Above 470       | 12500          | 81.94          | 1250                       | 61.94         |  |

Note:

1. Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)- 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

2. The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance (meters) |
|----------------------|--------------------------------------|-------------------------------|
| 0.009 ~ 0.490        | 2400/F(kHz)                          | 300                           |
| 0.490 ~ 1.705        | 24000/F(kHz)                         | 30                            |
| 1.705 ~ 30.0         | 30                                   | 30                            |
| 30 ~ 88              | 100                                  | 3                             |
| 88 ~ 216             | 150                                  | 3                             |
| 216 ~ 960            | 200                                  | 3                             |
| Above 960            | 500                                  | 3                             |

Note:

1. The lower limit shall apply at the transition frequencies.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



#### 4.1.2 Test Instruments

| Description &<br>Manufacturer            | Model No.                    | Serial No.               | Date of Calibration | Due Date of<br>Calibration |
|--|------------------------------|--------------------------|---------------------|----------------------------|
| Antenna Tower<br>inn-co GmbH             | MA 4000                      | 010303                   | N/A                 | N/A                        |
| Bi_Log Antenna<br>Schwarzbeck            | VULB 9168                    | 9168-155                 | 168-155 2023/10/13  |                            |
| EMI Test Receiver<br>R&S                 | ESR3                         | 102782                   | 2023/12/7           | 2024/12/6                  |
| Preamplifier<br>Agilent                  | 8447D                        | 2944A10631               | 2023/5/7            | 2024/5/6                   |
| RF Coaxial Cable<br>Woken                | 8D-FB                        | Cable-CH4-01             | 2023/7/8            | 2024/7/7                   |
| Signal & Spectrum<br>Analyzer<br>R&S     | FSW43                        | 101582                   | 2023/4/13           | 2024/4/12                  |
| Software<br>BV ADT                       | ADT_Radiated_<br>V7.6.15.9.5 | N/A                      | N/A                 | N/A                        |
| Turn Table<br>BV ADT                     | TT100                        | TT93021705               | N/A                 | N/A                        |
| Turn Table Controller<br>BV ADT          | SC100                        | SC93021705               | N/A                 | N/A                        |
| Antenna Tower<br>inn-co GmbH             | MA 4000                      | 010303                   | N/A                 | N/A                        |
| Boresight antenna tower<br>fixture<br>BV | BAF-02                       | 5                        | N/A                 | N/A                        |
| EMI Test Receiver<br>R&S                 | ESR3                         | 102782                   | 2023/12/7           | 2024/12/6                  |
|  | BBHA 9120D                   | 9120D-408                | 2023/11/12          | 2024/11/11                 |
| Horn Antenna                             |                              | 9170-480                 | 2023/11/12          | 2024/11/11                 |
| Schwarzbeck                              | BBHA 9170                    | BBHA9170241              | 2023/10/16          | 2024/10/15                 |
|  |                              | BBHA9170243              | 2023/11/12          | 2024/11/11                 |
| Preamplifier<br>EMCI                     | EMC 184045                   | 980116                   | 2023/9/27           | 2024/9/26                  |
| Preamplifier<br>Keysight                 | 83017A                       | MY53270295               | 2023/5/7            | 2024/5/6                   |
| RF Coaxial Cable                         | EMC102-KM-KM-<br>600         | 150928                   | 2023/7/8            | 2024/7/7                   |
| EMCI                                     | EMC102-KM-KM-<br>3000        | 150929                   | 2023/7/8            | 2024/7/7                   |
| RF Coaxial Cable                         | SUCOFLEX 104                 | Cable-CH4-<br>03(250724) | 2023/5/7            | 2024/5/6                   |
| HUBER+SUHNER                             | SUCOFLEX 104                 | MY<br>13380+295012/04    | 2023/5/7            | 2024/5/6                   |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HY - 966 chamber 3.



#### 4.1.3 Test Procedures

#### For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

#### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) or Average detection (AV) and Peak detection (PK) at frequency below 1GHz. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Average detection (AV) (RMS) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

# 4.1.4 Deviation from Test Standard

No deviation.

## 4.1.5 Test Set Up

#### Radiated emission below 30MHz





For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 4.1.6 EUT Operating Conditions

a. Set the EUT under transmission condition continuously at specific channel frequency.



# 4.1.7 Test Results

| EUT Test Condition |                | Measurement Detail |                 |  |
|--------------------|----------------|--------------------|-----------------|--|
| Channel            | Channel 1      | Frequency Range    | 433.92MHz       |  |
| Input Power        | 120 Vac, 60 Hz | Detector Function  | Quasi-Peak (QP) |  |

| Antenna Polarity & Test Distance: Horizontal at 3m |                  |          |           |        |          |        |        |            |
|--|------------------|----------|-----------|--------|----------|--------|--------|------------|
|  | Freq             | Emission | Limit     | Margin | Antenna  | Table  | Raw    | Correction |
| No.  | (MHz)            | Level    | (dBu)//m) | (dB)   | Height   | Angle  | Value  | Factor     |
|  | (MHz) (dBuV/m) ( |          | (UD)      | (m)    | (Degree) | (dBuV) | (dB/m) |            |
| 1  | 433.92           | 71.2 QP  | 80.8      | -9.6   | 1.70 H   | 352    | 52.5   | 18.7       |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit.





| EUT Test Condition |                | Measurement Detail        |                 |  |
|--------------------|----------------|---------------------------|-----------------|--|
| Channel Channel 1  |                | Frequency Range 433.92MHz |                 |  |
| Input Power        | 120 Vac, 60 Hz | Detector Function         | Quasi-Peak (QP) |  |

| Antenna Polarity & Test Distance: Vertical at 3m |                |                               |                   |                |                          |                            |                        |                                |
|--|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No.  | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1  | 433.92         | 80.0 QP                       | 80.8              | -0.8           | 1.12 V                   | 268                        | 61.3                   | 18.7                           |

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit.





| EUT Test Condition |                | Measurement Detail |                 |  |
|--------------------|----------------|--------------------|-----------------|--|
| Channel            | Channel 1      | Frequency Range    | Below 1000MHz   |  |
| Input Power        | 120 Vac, 60 Hz | Detector Function  | Quasi-Peak (QP) |  |

| Antenna Polarity & Test Distance: Horizontal At 3m |                |                               |                   |                |                          |                            |                        |                                |
|--|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No.  | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1  | 867.84         | 39.6 QP                       | 60.8              | -21.2          | 1.40 H                   | 146                        | 35.9                   | 3.7                            |

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4. The other emission levels were very low against the limit.





| EUT Test Condition |                | Measurement Detail |                 |  |
|--------------------|----------------|--------------------|-----------------|--|
| Channel            | Channel 1      | Frequency Range    | Below 1000MHz   |  |
| Input Power        | 120 Vac, 60 Hz | Detector Function  | Quasi-Peak (QP) |  |

| Antenna Polarity & Test Distance: Vertical At 3m |                |                               |                   |                |                          |                            |                        |                                |
|--|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No.  | Freq.<br>(MHz) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1  | 867.84         | 39.9 QP                       | 60.8              | -20.9          | 1.17 V                   | 231                        | 36.2                   | 3.7                            |

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4. The other emission levels were very low against the limit.





| EUT Test Condition |                | Measurement Detail            |                 |  |
|--------------------|----------------|-------------------------------|-----------------|--|
| Channel Channel 1  |                | Frequency Range Below 1000MHz |                 |  |
| Input Power        | 120 Vac, 60 Hz | Detector Function             | Quasi-Peak (QP) |  |

|     | Antenna Polarity & Test Distance: Horizontal At 3m |                               |                   |                |                          |                            |                        |                                |  |
|-----|--|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| No. | Freq.<br>(MHz)                                     | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |  |
| 1   | 35.62  | 24.6 QP                       | 40.0              | -15.4          | 1.00 H                   | 319                        | 34.5                   | -9.9                           |  |
| 2   | 111.54   | 26.0 QP                       | 43.5              | -17.5          | 1.49 H                   | 282                        | 37.7                   | -11.7                          |  |
| 3   | 150.90   | 27.6 QP                       | 43.5              | -15.9          | 1.49 H                   | 94                         | 36.2                   | -8.6                           |  |
| 4   | 266.17   | 30.3 QP                       | 46.0              | -15.7          | 1.00 H                   | 171                        | 38.8                   | -8.5                           |  |
| 5   | 336.46   | 30.4 QP                       | 46.0              | -15.6          | 1.00 H                   | 127                        | 37.2                   | -6.8                           |  |
| 6   | 540.30   | 30.1 QP                       | 46.0              | -15.9          | 1.49 H                   | 148                        | 33.3                   | -3.2                           |  |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) Pre-Amplifier Factor(dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.





| EUT Test Condition         |  | Measurement Detail |                 |  |
|----------------------------|--|--------------------|-----------------|--|
| Channel Channel 1          |  | Frequency Range    | Below 1000MHz   |  |
| Input Power 120 Vac, 60 Hz |  | Detector Function  | Quasi-Peak (QP) |  |

|     | Antenna Polarity & Test Distance: Vertical At 3m |          |            |         |        |          |            |        |  |
|-----|--|----------|------------|---------|--------|----------|------------|--------|--|
|     | Frog   | Emission | Emission   | Antenna | Table  | Raw      | Correction |        |  |
| No. |  | Level    | (dRu)//m)  | (dP)    | Height | Angle    | Value      | Factor |  |
|     | (10172)  | (dBuV/m) | (ubuv/iii) | (UD)    | (m)    | (Degree) | (dBuV)     | (dB/m) |  |
| 1   | 52.49  | 33.2 QP  | 40.0       | -6.8    | 1.01 V | 19       | 41.8       | -8.6   |  |
| 2   | 112.94   | 30.7 QP  | 43.5       | -12.8   | 1.01 V | 14       | 42.2       | -11.5  |  |
| 3   | 149.49   | 30.8 QP  | 43.5       | -12.7   | 1.01 V | 40       | 39.4       | -8.6   |  |
| 4   | 285.86   | 25.9 QP  | 46.0       | -20.1   | 1.01 V | 190      | 33.7       | -7.8   |  |
| 5   | 378.64   | 26.8 QP  | 46.0       | -19.2   | 1.49 V | 5        | 32.8       | -6.0   |  |
| 6   | 565.61   | 29.1 QP  | 46.0       | -16.9   | 1.01 V | 158      | 31.8       | -2.7   |  |

- 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) Pre-Amplifier Factor(dB)
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.





| EUT Test Condition         |  | Measurement Detail          |                           |  |
|----------------------------|--|-----------------------------|---------------------------|--|
| Channel Channel 1          |  | Frequency Range 1GHz ~ 5GHz |                           |  |
| Input Power 120 Vac, 60 Hz |  | Detector Function           | Peak (PK)<br>Average (AV) |  |

|     | Antenna Polarity & Test Distance: Horizontal at 3m |          |          |       |                   |                |              |                      |  |  |
|-----|--|----------|----------|-------|-------------------|----------------|--------------|----------------------|--|--|
| No. | Freq. Emission Limit Margin                        |          |          |       | Antenna<br>Height | Table<br>Angle | Raw<br>Value | Correction<br>Factor |  |  |
|     | (MHZ)  | (dBuV/m) | (dBuv/m) | (dB)  | (m)               | (Degree)       | (dBuV)       | (dB/m)               |  |  |
| 1   | 1301.76  | 38.6 PK  | 74.0     | -35.4 | 1.90 H            | 199            | 41.5         | -2.9                 |  |  |
| 2   | 1301.76  | 30.2 AV  | 54.0     | -23.8 | 1.90 H            | 199            | 33.1         | -2.9                 |  |  |

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4. The other emission levels were very low against the limit.





| EUT Test Condition         |  | Measurement Detail          |                           |  |
|----------------------------|--|-----------------------------|---------------------------|--|
| Channel Channel 1          |  | Frequency Range 1GHz ~ 5GHz |                           |  |
| Input Power 120 Vac, 60 Hz |  | Detector Function           | Peak (PK)<br>Average (AV) |  |

|     | Antenna Polarity & Test Distance: Vertical at 3m |                               |                   |                |                            |                        |                                |      |  |  |
|-----|--|-------------------------------|-------------------|----------------|----------------------------|------------------------|--------------------------------|------|--|--|
| No. | Freq.<br>(MHz)                                   | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |      |  |  |
| 1   | 1301.76  | 38.4 PK                       | 74.0              | -35.6          | 2.19 V                     | 238                    | 41.3                           | -2.9 |  |  |
| 2   | 1301.76  | 29.6 AV                       | 54.0              | -24.4          | 2.19 V                     | 238                    | 32.5                           | -2.9 |  |  |

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4. The other emission levels were very low against the limit.





## 4.2 Conducted Emission Measurement

## 4.2.1 Limits of Conducted Emission Measurement

|                 | Conducted Limit (dBuV) |         |  |  |  |
|-----------------|------------------------|---------|--|--|--|
| Frequency (MHZ) | Quasi-Peak             | Average |  |  |  |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |  |  |  |
| 0.50 - 5.0      | 56                     | 46      |  |  |  |
| 5.0 - 30.0      | 60                     | 50      |  |  |  |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

## 4.2.2 Test Instruments

| Description<br>Manufacturer                | Model No.               | Serial No.     | Calibrated<br>Date | Calibrated<br>Until |
|--|-------------------------|----------------|--------------------|---------------------|
| 50 ohm terminal resistance<br>HUBER+SUHNER | E1-011315               | 13             | 2023/11/22         | 2024/11/21          |
| E0 obm terminal registence                 | E1-011279               | 04             | 2023/11/22         | 2024/11/21          |
|  | E1-011280               | 05             | 2023/11/22         | 2024/11/21          |
| DC-LISN<br>Schwarzbeck                     | NNBM 8126G              | 8126G-069      | 2023/11/7          | 2024/11/6           |
| EMI Test Receiver<br>R&S                   | ESCI                    | 100613         | 2023/12/4          | 2024/12/3           |
| Fixed Attenuator<br>Mini-Circuits          | HAT-10+                 | PAD-COND1-01   | 2024/1/6           | 2025/1/5            |
| LISN                                       |                         | 100311         | 2023/9/6           | 2024/9/5            |
| R&S  | ESH3-20                 | 100312         | 2023/9/12          | 2024/9/11           |
| RF Coaxial Cable<br>Woken                  | 5D-FB                   | Cable-cond1-01 | 2024/1/6           | 2025/1/5            |
| Software<br>BVADT                          | BVADT_Cond_<br>V7.4.1.0 | N/A            | N/A                | N/A                 |
| V-LISN<br>Schwarzbeck                      | NNBL 8226-2             | 8226-142       | 2023/8/31          | 2024/8/30           |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

- 3. The VCCI Site Registration No. is C-12040.
- 4. Test date: 2024/3/29



## 4.2.3 Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit 20 dB) was not recorded.

**Note:** The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

## 4.2.4 Deviation from Test Standard

No deviation.

## 4.2.5 Test Setup



## 4.2.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Set the EUT under transmission condition continuously at specific channel frequency.



## 4.2.7 Test Results

| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average<br>(AV), 9kHz |
|-----------------|----------------|--|---|
| Input Power     | 120Vac, 60Hz   | Environmental<br>Conditions              | 23 °C, 67% RH                           |
| Tested by       | Adair Peng     |  |   |

|    | Phase Of Power : Line (L) |            |        |         |         |                |       |       |        |        |  |
|----|---------------------------|------------|--------|---------|---------|----------------|-------|-------|--------|--------|--|
|    | Frequency                 | Correction | Readin | g Value | Emissic | Emission Level |       | nit   | Margin |        |  |
| No |                           | Factor     | (dB    | uV)     | (dB     | uV)            | (dB   | uV)   | (d     | B)     |  |
|    | (MHz)                     | (dB)       | Q.P.   | AV.     | Q.P.    | AV.            | Q.P.  | AV.   | Q.P.   | AV.    |  |
| 1  | 0.15000                   | 9.68       | 39.73  | 20.63   | 49.41   | 30.31          | 66.00 | 56.00 | -16.59 | -25.69 |  |
| 2  | 0.23000                   | 9.72       | 29.77  | 13.80   | 39.49   | 23.52          | 62.45 | 52.45 | -22.96 | -28.93 |  |
| 3  | 0.28200                   | 9.75       | 33.87  | 17.47   | 43.62   | 27.22          | 60.76 | 50.76 | -17.14 | -23.54 |  |
| 4  | 0.75400                   | 9.84       | 24.03  | 10.20   | 33.87   | 20.04          | 56.00 | 46.00 | -22.13 | -25.96 |  |
| 5  | 1.48600                   | 9.88       | 28.46  | 16.78   | 38.34   | 26.66          | 56.00 | 46.00 | -17.66 | -19.34 |  |
| 6  | 13.62600                  | 10.12      | 31.08  | 21.07   | 41.20   | 31.19          | 60.00 | 50.00 | -18.80 | -18.81 |  |

Remarks:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





| Fragueney Denge |              | Detector Function &         | Quasi-Peak (QP) / Average |
|-----------------|--------------|-----------------------------|---------------------------|
| Frequency Range |              | Resolution Bandwidth        | (AV), 9kHz                |
| Input Power     | 120Vac, 60Hz | Environmental<br>Conditions | 23 °C, 67% RH             |
| Tested by       | Adair Peng   |                             |                           |

| Phase Of Power : Neutral (N) |           |            |               |             |                |        |       |       |        |        |
|------------------------------|-----------|------------|---------------|-------------|----------------|--------|-------|-------|--------|--------|
|                              | Frequency | Correction | Reading Value |             | Emission Level |        | Limit |       | Margin |        |
| No                           |           | Factor     | (dB           | 3uV) (dBuV) |                | (dBuV) |       | (dB)  |        |        |
|                              | (MHz)     | (dB)       | Q.P.          | AV.         | Q.P.           | AV.    | Q.P.  | AV.   | Q.P.   | AV.    |
| 1                            | 0.20600   | 9.70       | 36.02         | 21.77       | 45.72          | 31.47  | 63.37 | 53.37 | -17.65 | -21.90 |
| 2                            | 0.27000   | 9.75       | 32.09         | 17.50       | 41.84          | 27.25  | 61.12 | 51.12 | -19.28 | -23.87 |
| 3                            | 0.74200   | 9.87       | 34.68         | 30.97       | 44.55          | 40.84  | 56.00 | 46.00 | -11.45 | -5.16  |
| 4                            | 1.20200   | 9.91       | 30.49         | 25.81       | 40.40          | 35.72  | 56.00 | 46.00 | -15.60 | -10.28 |
| 5                            | 3.40200   | 9.99       | 27.28         | 18.13       | 37.27          | 28.12  | 56.00 | 46.00 | -18.73 | -17.88 |
| 6                            | 13.11400  | 10.16      | 30.37         | 18.50       | 40.53          | 28.66  | 60.00 | 50.00 | -19.47 | -21.34 |

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





## 4.3 20dB Bandwidth Measurement

#### 4.3.1 Limits of 20dB Bandwidth Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

| Fundamental Frequency (MHz) | Limit of Emission Bandwidth (kHz) |  |  |
|-----------------------------|-----------------------------------|--|--|
| 433.92                      | 1085 kHz                          |  |  |

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedures

- a. The EUT was placed on the turn table.
- b. The signal was coupled to the spectrum analyzer through an antenna.
- c. Set the resolution bandwidth to 1kHz and video bandwidth to 3kHz then select Peak function to scan the channel frequency.
- d. The emission bandwidth was measured and recorded.

# 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

Same as Item 4.1.6.



## 4.3.7 Test Results

| Channel | Frequency (MHz) | 20dB Bandwidth<br>(kHz) | Maximum Limit<br>(kHz) | Pass / Fail |
|---------|-----------------|-------------------------|------------------------|-------------|
| 1       | 433.92          | 34.620                  | 1085                   | Pass        |

\*Limit: 433.92MHz \* 0.25% = 1085 kHz



## 4.4 Deactivation Time Measurement

#### 4.4.1 Limits of Deactivation Time Measurement

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

## 4.4.2 Test Setup



#### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.4.4 Test Procedures

a. The EUT was placed on the turning table.

- b. The signal was coupled to the spectrum analyzer through an antenna.
- c. Set the resolution bandwidth to 1kHz and video bandwidth to 3kHz. The spectrum analyser was turned to the centre frequency of the transmitter's and the analyser's marker function was used to determine the duration of transmission.
- d. The transmission duration was measured and recorded.

#### 4.4.5 Deviation from Test Standard

No deviation.

#### 4.4.6 EUT Operating Conditions

Same as Item 4.1.6.



#### 4.4.7 Test Results

| Push Button  | Frequency (MHz)  | Maximum Limit (Sec)   | Pass/Fail   |  |  |  |  |  |
|--|--|---|---|--|--|--|--|--|
| 1  | 433.92   | 5   | Pass  |  |  |  |  |  |
| Spectrum Plot of Value   |  |   |   |  |  |  |  |  |
|  |  |   |   |  |  |  |  |  |
|  |  |   |   |  |  |  |  |  |
| MultiView       Spectrum       Spectrum 2       X       Spectrum 3       X       Spectrum 4       X       Spectrum 5       X         Ref Level       77.00 dBµV <ul> <li>RBW 1 kHz</li> <li>SGL</li> </ul> Spectrum 4       X       Spectrum 5       X |  |   |   |  |  |  |  |  |
| Att UdB SWI 10s     1 Zero Span  | VBW 3 KHZ  |   | o 1 AP Clrw   |  |  |  |  |  |
|  |  |   | D1[1] 0.95 dB   |  |  |  |  |  |
| 70 dBµV  |  |   |   |  |  |  |  |  |
| 60 dBµV  |  |   | 560.00 ms   |  |  |  |  |  |
| Start of trans   | mission  |   |   |  |  |  |  |  |
|  | nicolon  |   |   |  |  |  |  |  |
|  | 11551011   |   |   |  |  |  |  |  |
| MiD1   |  |   |   |  |  |  |  |  |
| 30 dBµV-   |  |   |   |  |  |  |  |  |
|  |  |   |   |  |  |  |  |  |
| 20 dBµV-   |  |   |   |  |  |  |  |  |
| 10 dBuV  |  |   |   |  |  |  |  |  |
| Transmission   | of Activated   |   |   |  |  |  |  |  |
| 0 dBµV   |  |   |   |  |  |  |  |  |
| reteril a me day later a second state and a second   | u, ma dile , della , della , della , dalla sua le la dua matur ma di | Adaptala, an anna battala an abhchat baraar ar 6 a fait At 1, 100 ia  | al da na ch thacth las ato con c'toar diallet dan aberritan i |  |  |  |  |  |
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| -20 dBµW   |  |   |   |  |  |  |  |  |
| CF 433.92 MHz 1001 pts 1.0 s/  |  |   |   |  |  |  |  |  |
| 2 Marker Table<br>Type Ref TrcX-   | Value Y-Value  | Function  | Function Result   |  |  |  |  |  |
| M1 1 560<br>D1 M1 1 110  | 0.0 ms 35.23 dBµ<br>0.0 ms 0.95 dl                                   | /   |   |  |  |  |  |  |
| M2 1 550   | .0 ms -9.53 dBµ  | Ī   |   |  |  |  |  |  |

11:51:10 22.04.2024



# 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).



#### Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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