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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------|----------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test Report No.: 60263491-003                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           | <b>Auftrags-Nr.:</b><br>Order No.: 23870191                                                                                                    |                      | Seite 1 von 7<br>Page 1 of 7              |                                  |
| <b>Kunden Referenz-Nr.:</b><br>Client Reference No.: -                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           | <b>Auftragsdatum</b><br>Order date: 2019-05-28                                                                                                 |                      |                                           |                                  |
| <b>Auftraggeber:</b><br>Client: ANTICIMEX INNOVATION CENTER A/S<br>Skovgaardsvej 25<br>DK-3200 Helsingør<br>Denmark                                                                                                                                                                                                                                                                                                                                                                      |                                           | Mr. Rasmus Skou Bjerre<br>Email: <a href="mailto:rasmus.skou.bjerre@anticimex.com">rasmus.skou.bjerre@anticimex.com</a><br>Phone: +45 26799509 |                      |                                           |                                  |
| <b>Prüfgegenstand:</b><br>Test item: Smart Connect Mini                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type No.: 300110<br>FCC ID: 2A0FP-300110                                                                                                                                                                                                                                                                                                                                                                                               |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Auftrags-Inhalt:</b><br>Order content: RF Exposure Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Prüfgrundlage:</b><br>Test specification: FCC 47 CFR §2.1091<br>IEEE Std. C95.1:2005                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Wareneingangsdatum:</b><br>Date of receipt: N/A                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Prüfmuster-Nr.:</b><br>Test sample No.: N/A                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Prüfzeitraum:</b><br>Testing period: N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Ort der Prüfung:</b><br>Place of testing: Lund, Sweden                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Prüflaboratorium:</b><br>Testing laboratory: TÜV Rheinland Sweden                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Prüfergebnis:</b><br>Test results: See detail in report                                                                                                                                                                                                                                                                                                                                                                                                                               |                                           |                                                                                                                                                |                      |                                           |                                  |
| <b>Geprüft von</b><br>Tested by: Håkan Sjöberg<br>Technical Expert<br>2020-01-21                                                                                                                                                                                                                                                                                                                                                                                                         |                                           | <b>Kontrolliert von</b><br>Reviewed by: Per Isacsson<br>Lab Manager<br>2020-01-21                                                              |                      |                                           |                                  |
| <b>Datum</b><br>Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Name / Stellung</b><br>Name / Position | <b>Unterschrift</b><br>Signature                                                                                                               | <b>Datum</b><br>Date | <b>Name / Stellung</b><br>Name / Position | <b>Unterschrift</b><br>Signature |
| <b>Sontiges /</b><br>Other:                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                                                                                                                                                |                      |                                           |                                  |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/> <b>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test or accreditation mark/logo</b></p> |                                           |                                                                                                                                                |                      |                                           |                                  |

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| Revisions<br>Revisions |               |                                       |                     |
|------------------------|---------------|---------------------------------------|---------------------|
| Revision<br>Revision   | Datum<br>Date | Anmerkung<br>Remark                   | Verfasser<br>Author |
| 001                    | 2019-07-23    | First Release                         | Niall Forrester     |
| 002                    | 2019-12-19    | Updated power levels and calculations | Niall Forrester     |
| 003                    | 2020-01-21    | Removed support for LTE NB-IoT        | Håkan Sjöberg       |
|                        |               |                                       |                     |

Note: Latest revision report will replace all previous reports

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## PRODUCT INFORMATION

### 1.1 Equipment under Test (EUT) description

|                      |                                                           |
|----------------------|-----------------------------------------------------------|
| <b>Model name:</b>   | Smart Connect Mini                                        |
| <b>Manufacturer:</b> | Anticimex Innovation Center A/S                           |
| <b>Model number:</b> | 300110                                                    |
| <b>FCC ID:</b>       | 2AOFP-300110                                              |
| <b>Description:</b>  | Cellular and sub-GHz gateway for the smart Connect system |

### 1.2 Wireless Technologies and Frequency Bands supported by the DUT

| Technology            | Band        | Frequency Range (Tx)    | Evaluation Performed |
|-----------------------|-------------|-------------------------|----------------------|
| GSM (GPRS)            | 850         | 824.2 MHz – 848.8 MHz   | YES                  |
| GSM (GPRS)            | 900         | 880.2 MHz – 914.8 MHz   | NO                   |
| GSM (GPRS)            | 1800        | 1710.2 MHz – 1784.8 MHz | NO                   |
| GSM (GPRS)            | 1900        | 1850.2 MHz – 1909.8 MHz | YES                  |
| LTE CAT-M1            | B1          | 1920 MHz – 1980 MHz     | NO                   |
| LTE CAT-M1            | B2          | 1850 MHz – 1910 MHz     | YES                  |
| LTE CAT-M1            | B3          | 1710 MHz – 1785 MHz     | NO                   |
| LTE CAT-M1            | B4          | 1710 MHz – 1755 MHz     | YES                  |
| LTE CAT-M1            | B5          | 824 MHz – 849 MHz       | YES                  |
| LTE CAT-M1            | B8          | 880 MHz – 915 MHz       | NO                   |
| LTE CAT-M1            | B12         | 699 MHz – 716 MHz       | YES                  |
| LTE CAT-M1            | B13         | 777 MHz – 787 MHz       | YES                  |
| LTE CAT-M1            | B20         | 832 MHz – 862 MHz       | NO                   |
| LTE CAT-M1            | B28         | 703 MHz – 748 MHz       | NO                   |
| 'Sub GHz' Proprietary | 868.3 MHz   | 868.3 MHz               | NO                   |
| 'Sub GHz' Proprietary | 917-926 MHz | 917 MHz – 926 MHz       | YES                  |

### 1.3 Conducted Power and Antenna Gain

| Technology               | Band           | Maximum Conducted Output Power (dBm) | Antenna Gain (dBi) |
|--------------------------|----------------|--------------------------------------|--------------------|
| GSM (GPRS)               | 850            | 32.5                                 | -1.9               |
| GSM (GPRS)               | 1900           | 29.5                                 | 1.3                |
| LTE CAT-M1               | B2             | 25.7                                 | 1.0                |
| LTE CAT-M1               | B4             | 25.7                                 | 0.9                |
| LTE CAT-M1               | B5             | 25.7                                 | -1.9               |
| LTE CAT-M1               | B12            | 25.7                                 | 1.4                |
| LTE CAT-M1               | B13            | 25.7                                 | -1.6               |
| 'Sub GHz'<br>Proprietary | 917-926<br>MHz | 14.0                                 | 1.3                |

Maximum Power and Antenna Gain are based on details supplied by the device manufacturer.

## EVALUATION

### 1.4 Summary

At 20cm, the device is compliant with the "General Population / Uncontrolled" requirements set out in FCC 47 CFR §1.1310 Table 1 (B) for all supported combinations of wireless technologies.

## 1.5 Limits

### 47 CFR § 1.1310 - Radiofrequency radiation exposure limits

**Table 1B**  
**Limits for Maximum Permissible Exposure (MPE)**  
**(Limits for general Population / Uncontrolled Exposure)**

| Frequency Range (MHz) | Electric Field strength (V/m) | Magnetic Field strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 0.3 - 1.34            | 614                           | 1.63                          | *100                                | 30                       |
| 1.34 - 30             | 824/f                         | 2-19/f                        | *180/f <sup>2</sup>                 | 30                       |
| 30 - 300              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300 - 1500            | -                             | -                             | f/1500                              | 30                       |
| 1500 - 10000          | -                             | -                             | 1.0                                 | 30                       |

Notes:

1.  $f$  = frequency in MHz
2. \* = Plane-wave equivalent power density

## 1.6 Stand-alone Calculations

The Power Density at 20cm separation distance has been calculated for each of the transmitter technologies supported by the device according to a re-arrangement of the Friis formula, as below:

$$S = \frac{P * G}{4\pi * r^2}$$

Where:

- “S” is power density in mW/cm<sup>2</sup>
- “P” is maximum avg. conducted power (incl. tolerances) in mW according to data from the manufacturer
- “G” is the peak antenna gain (numerical) according to data from the manufacturer
- “r” is the separation distance (20 cm)

### Power Density (S) at 20cm Distance for Each Transmitter

| Technology            | Band        | Frequency (MHz)* | Power (dBm) | P (mW)  | Gain (dBi) | G (Numerical) | r (cm) | S (mW/cm <sup>2</sup> ) | Limit** (mW/cm <sup>2</sup> ) |
|-----------------------|-------------|------------------|-------------|---------|------------|---------------|--------|-------------------------|-------------------------------|
| GSM (GPRS)            | 850         | 824.2            | 32.5        | 1778.28 | -1.9       | 0.65          | 20     | 0.23                    | 0.55                          |
| GSM (GPRS)            | 1900        | 1850.2           | 29.5        | 891.25  | 1.3        | 1.35          | 20     | 0.24                    | 1.00                          |
| LTE CAT-M1            | B2          | 1850             | 25.7        | 371.54  | 1.0        | 1.26          | 20     | 0.09                    | 1.00                          |
| LTE CAT-M1            | B4          | 1710             | 25.7        | 371.54  | 0.9        | 1.23          | 20     | 0.09                    | 1.00                          |
| LTE CAT-M1            | B5          | 824              | 25.7        | 371.54  | -1.9       | 0.65          | 20     | 0.05                    | 0.55                          |
| LTE CAT-M1            | B12         | 699              | 25.7        | 371.54  | 1.4        | 1.38          | 20     | 0.10                    | 0.47                          |
| LTE CAT-M1            | B13         | 777              | 25.7        | 371.54  | -1.6       | 0.69          | 20     | 0.05                    | 0.52                          |
| ‘Sub GHz’ Proprietary | 917-926 MHz | 917              | 14.0        | 25.12   | 1.3        | 1.35          | 20     | 0.01                    | 0.61                          |

\*The lowest frequency in each band has been chosen, to give the most conservative limit

\*\*The limits listed are from FCC 47 CFR §1.1310 Table 1 (B): “Limits for General Population/Uncontrolled”

From 300MHz to 1500MHz, the limit is f/1500 mW/cm<sup>2</sup> where “f” is the frequency in MHz

From 1500MHz to 100000MHz, the limit is 1.0 mW/cm<sup>2</sup>

## 1.7 Simultaneous Transmission Calculations

The device can transmit on cellular and proprietary Sub-GHz bands simultaneously, but only one cellular (i.e. one GSM or one LTE band) and one sub-GHz band can be active at any time. All relevant combinations of transmitters have been evaluated at 20cm distance below, using the following equation, rearranged from IEEE Std. C95.1:2005 Annex D.2:

$$\sum_{i=1}^n \left( \frac{S_i}{S_{L,i}} \right) = \text{"Evaluation Result"}$$

Where:

- $S_i$  is the power density for transmitter 'i'
- $S_{L,i}$  is the power density MPE limit from Table 1(B) of 47 CFR § 1.1310

If the evaluation result is  $\leq 1$ , the device is compliant with the limits even for the simultaneous transmission configuration.

### Evaluation of Compliance at 20cm for Supported Combinations of Transmitters

| Technology 1 | Band 1 | Technology 2          | Band 2      | $S_1$<br>(mW/cm <sup>2</sup> ) | $S_{L,1}$<br>(mW/cm <sup>2</sup> ) | $S_2$<br>(mW/cm <sup>2</sup> ) | $S_{L,2}$<br>(mW/cm <sup>2</sup> ) | Evaluation Result | Result |
|--------------|--------|-----------------------|-------------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|-------------------|--------|
| GSM (GPRS)   | 850    | 'Sub GHz' Proprietary | 917-926 MHz | 0.23                           | 0.55                               | 0.01                           | 0.61                               | 0.427             | OK     |
| GSM (GPRS)   | 1900   | 'Sub GHz' Proprietary | 917-926 MHz | 0.24                           | 1.00                               | 0.01                           | 0.61                               | 0.250             | OK     |
| LTE CAT-M1   | B2     | 'Sub GHz' Proprietary | 917-926 MHz | 0.09                           | 1.00                               | 0.01                           | 0.61                               | 0.104             | OK     |
| LTE CAT-M1   | B4     | 'Sub GHz' Proprietary | 917-926 MHz | 0.09                           | 1.00                               | 0.01                           | 0.61                               | 0.102             | OK     |
| LTE CAT-M1   | B5     | 'Sub GHz' Proprietary | 917-926 MHz | 0.05                           | 0.55                               | 0.01                           | 0.61                               | 0.098             | OK     |
| LTE CAT-M1   | B12    | 'Sub GHz' Proprietary | 917-926 MHz | 0.10                           | 0.47                               | 0.01                           | 0.61                               | 0.230             | OK     |
| LTE CAT-M1   | B13    | 'Sub GHz' Proprietary | 917-926 MHz | 0.05                           | 0.52                               | 0.01                           | 0.61                               | 0.110             | OK     |