

|                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |                                                                                    |                                                                                       |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                 | <b>60500216-001</b>                                                                 | <b>Auftrags-Nr.:</b><br>Order no.:                                                 | <b>23870622 030</b>                                                                   | Seite 1 von 22<br>Page 1 of 22           |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                        | <b>2384582</b>                                                                      | <b>Auftragsdatum:</b><br>Order date:                                               | <b>2021.10.20</b>                                                                     |                                          |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                             | <b>Raytelligence AB</b>                                                             |                                                                                    |                                                                                       |                                          |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                        | <b>Radar Sensor</b>                                                                 |                                                                                    |                                                                                       |                                          |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                 | <b>Eazense / FCC ID: 2A3XO-A01</b>                                                  |                                                                                    |                                                                                       |                                          |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                   | <b>Accredited testing</b>                                                           |                                                                                    |                                                                                       |                                          |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                | <b>FCC 47 CFR Part 15B with parts 15.107 &amp; 15.109<br/>ANSI C63.4: 2014</b>      |                                                                                    |                                                                                       |                                          |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                       | <b>2021.10.20</b>                                                                   |                                                                                    |                                                                                       |                                          |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                  | <b>See section 2.3</b>                                                              |                                                                                    |                                                                                       |                                          |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                     | <b>2021.11.16 – 2021.12.09</b>                                                      |                                                                                    |                                                                                       |                                          |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                | <b>Lund, Sweden</b>                                                                 |                                                                                    |                                                                                       |                                          |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                             | <b>TÜV Rheinland Sweden</b>                                                         |                                                                                    |                                                                                       |                                          |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                      | <b>Pass</b>                                                                         |                                                                                    |                                                                                       |                                          |
| <b>überprüft von:</b><br>reviewed by:                                                                                                                                                                                                                                                                                                                                                                       |  | <b>genehmigt von:</b><br>authorized by:                                            |  |                                          |
| <b>Datum: 2022.01.28</b><br>Date:                                                                                                                                                                                                                                                                                                                                                                           | Signed by: Niall Forrester                                                          | <b>Datum: 2022.01.28</b><br>Date:                                                  | Signed by: Hakan Ahlberg                                                              |                                          |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                 | <b>Senior Technical Expert</b>                                                      | <b>Stellung / Position:</b>                                                        | <b>Lab Manager</b>                                                                    |                                          |
| <b>Sonstiges / Other:</b>                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                     |                                                                                    |                                                                                       |                                          |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                             |                                                                                     | <b>Prüfmuster vollständig und unbeschädigt</b><br>Test item complete and undamaged |                                                                                       |                                          |
| * Legende:                                                                                                                                                                                                                                                                                                                                                                                                  | 1 = sehr gut<br>P(ass) = entspricht o.g. Prüfgrundlage(n)                           | 2 = gut<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)                         | 3 = befriedigend<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)                   | 4 = ausreichend<br>N/A = nicht anwendbar |
| * Legend:                                                                                                                                                                                                                                                                                                                                                                                                   | 1 = very good<br>P(ass) = passed a.m. test specification(s)                         | 2 = good<br>F(ail) = failed a.m. test specification(s)                             | 3 = satisfactory<br>F(ail) = failed a.m. test specification(s)                        | 4 = sufficient<br>N/A = not applicable   |
| 5 = mangelhaft<br>N/T = nicht getestet<br>5 = poor<br>N/T = not tested                                                                                                                                                                                                                                                                                                                                      |                                                                                     |                                                                                    |                                                                                       |                                          |
| <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></p> <p><i>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.</i></p> |                                                                                     |                                                                                    |                                                                                       |                                          |

## Revision History

| REVISION | DATE       | REMARKS       | AUTHOR          |
|----------|------------|---------------|-----------------|
| 001      | 2022-01-28 | First release | Niall Forrester |
|          |            |               |                 |
|          |            |               |                 |

Note: Latest revision report will replace all previous reports

This report based on FCC Part 15B no JBP Template version 1.2

## Summary of Test Results

| FCC 47 CFR Rule Part | Test Description                                            | Applicability | Report Section | RESULT | REMARKS |
|----------------------|-------------------------------------------------------------|---------------|----------------|--------|---------|
| 15.107               | AC Power Line Conducted Emissions (Unintentional Radiators) | YES           | 4.1            | PASS   |         |
| 15.109               | Radiated Emissions (Unintentional Radiators)                | YES           | 4.2            | PASS   |         |

Possible test case verdicts:

- |                                                |                       |
|------------------------------------------------|-----------------------|
| - Test case does not apply to the test object: | N/A                   |
| - Test object complies with the requirement:   | PASS or COMPLIANT     |
| - Test object does not meet the requirement:   | FAIL or NOT COMPLIANT |
| - Test case not performed on the test object:  | N.P.                  |

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## 1. GENERAL INFORMATION

### 1.1 Test Site

|                                     |                         |
|-------------------------------------|-------------------------|
| Test Facility:                      | TÜV Rheinland Sweden AB |
| Address:                            | Mobilvägen 10           |
|                                     | 223 62 Lund             |
|                                     | Sweden                  |
|                                     |                         |
| Swedac Registration Number:         | 10325                   |
| FCC Test Firm Registration Number:  | 517458                  |
| ISED Test Site Registration Number: | 24753                   |

### 1.2 Client Information

|                            |                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------|
| Company Name:              | Raytelligence AB                                                                                    |
| Address:                   | Olofdalsvägen 40                                                                                    |
|                            | 30241 Halmstad                                                                                      |
|                            | Sweden                                                                                              |
|                            |                                                                                                     |
| Contact Person:            | Emil Nilsson                                                                                        |
| Contact e-Mail / Telephone | <a href="mailto:emil.nilsson@raytelligence.com">emil.nilsson@raytelligence.com</a><br>+46 730797744 |

## 2. PRODUCT INFORMATION

### 2.1 General Description

|                                       |                                                                                                           |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Model name:</b>                    | Eazense                                                                                                   |
| <b>Manufacturer:</b>                  | Raytelligence AB                                                                                          |
| <b>Model number / Marketing name:</b> | Eazense                                                                                                   |
| <b>FCC ID:</b>                        | 2A3XO-A01                                                                                                 |
| <b>Description:</b>                   | “Radar sensor eazense is a cost-effective, non-intrusive sensor providing 24-hour monitoring of activity” |
| <b>Ancillary Equipment:</b>           | See section 2.7                                                                                           |

### 2.2 Device Characteristics

|                                          |                                                                  |
|------------------------------------------|------------------------------------------------------------------|
| <b>Device Class for 47 CFR Part 15 B</b> | B                                                                |
| <b>Type of Power Supply</b>              | Power over Ethernet                                              |
| <b>Nominal Supply Voltage</b>            | 48V DC PoE<br>(115V AC input to PoE Switch adapter)              |
| <b>Supply Voltage Range</b>              | 37V – 57V DC PoE<br>(100V – 240V AC input to PoE Switch adapter) |
| <b>Operating Temperature Range</b>       | 10°C - 40°C                                                      |
| <b>Operating Air Humidity Range</b>      | 20% - 80% RH                                                     |
| <b>Highest Internal Frequency Source</b> | 63.00 GHz                                                        |

### 2.3 Test Samples

| EUT # | EUT ID         | Description     | Used For: |
|-------|----------------|-----------------|-----------|
| 1     | A003152562-006 | Standard Sample | All tests |

### 2.4 Wireless Technologies and Bands Supported by the EUT

| Technology | Band      | Frequency Range (Tx)  | Evaluation Performed* |
|------------|-----------|-----------------------|-----------------------|
| Radar      | 57–71 GHz | 60.75 GHz – 63.00 GHz | YES                   |

\*This statement refers only to this report. Other wireless technologies may be covered by other reports.

## 2.5 Antenna Information

| Technology | Band      | Number of Antennas | Antenna Type(s)     | Gain  |
|------------|-----------|--------------------|---------------------|-------|
| Radar      | 57–71 GHz | 1                  | Patch Antenna Array | 7 dBi |

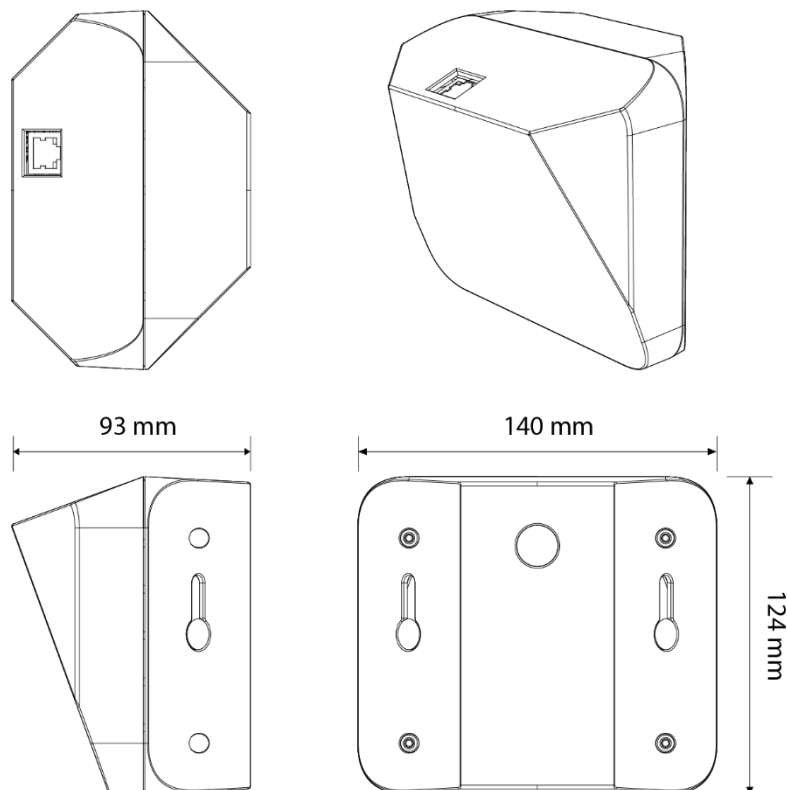
## 2.6 Wireless Technology Details

| Technology | Band      | Modulation Type(s) | No. of Channels | Channel Spacing | Adaptivity |
|------------|-----------|--------------------|-----------------|-----------------|------------|
| Radar      | 57–71 GHz | FMCW               | N/A             | N/A             | N/A        |

## 2.7 Ancillary Equipment

|                |                                                 |
|----------------|-------------------------------------------------|
| A003152562-007 | PoE Switch (D-Link DGS-100P) with AC/DC Adapter |
|----------------|-------------------------------------------------|

## 2.8 EUT Diagrams



### 3. TEST METHODS

#### 3.1 Test Standards

Testing was performed according to the following standards / references

| Standard          | Version | Description              |
|-------------------|---------|--------------------------|
| FCC 47 CFR 15.107 | -       | Conducted limits         |
| FCC 47 CFR 15.109 | -       | Radiated emission limits |

#### 3.2 Additional references

The following standards / references were also considered for the testing

| Standard   | Version | Description                                                                                                                                                         |
|------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANSI C63.4 | 2014    | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |

### 3.3 Limits

| FCC 47 CFR Rule Part | Test Description                                            | Limit Reference (FCC 47 CFR Reference)        |
|----------------------|-------------------------------------------------------------|-----------------------------------------------|
| 15.107               | AC Power Line Conducted Emissions (Unintentional Radiators) | 15.107 (a) for Class B Devices                |
| 15.109               | Radiated Emissions (Unintentional Radiators)                | 15.109 (a) for Class B Devices<br>*See Note 1 |

Interpretation of the measurement results has been performed in accordance with ANSI C63.4 section 10.2.8.2

Compliance with the requirements has been based on the results of the measurements compared to the specified limits, not taking into account measurement instrumentation uncertainty.

Measurement Uncertainty figures are stated in section 6

#### Note 1

Radiated Emissions limits in the tables from 47 CFR sections 15.109 are presented in  $\mu\text{V/m}$ . Measurements on the test system are made in  $\text{dB}\mu\text{V/m}$ . To convert between these, the following adjustment is used:

$$\text{New Limit} = 20 \log \left( \frac{\text{Original Limit}}{10^6} \right) + 120$$

Example: from 15.209(a) the limit for 30MHz – 88MHz is  $100\mu\text{V/m}$  at 3m. This gives:

$$\text{New Limit} = 20 \log \left( \frac{100}{10^6} \right) + 120 = 40\text{dB}\mu\text{V/m at 3m}$$

Additionally, in some cases testing has been performed at distances other than those specified in the tables. When this has occurred, the limits have been adjusted in accordance with the requirements in 47 CFR 15.31, using an extrapolation factor of 40dB/decade at frequencies below 30MHz and 20dB/decade at or above 30MHz

Example: from 15.209(a) the limit for 1.705MHz – 30MHz is  $30\mu\text{V/m}$  (=29.54  $\text{dB}\mu\text{V/m}$ ) at 30m

$$\text{Limit@3m} = \text{Limit@30m} + 40 \log \left( \frac{30}{3} \right) = 29.54 + 40.00 = 69.54 \text{ dB}\mu\text{V/m at 3m}$$

Example: from 15.209(a) the limit for 1GHz – 18GHz is  $500\mu\text{V/m}$  (=53.98  $\text{dB}\mu\text{V/m}$ ) at 3m

$$\text{Limit@1m} = \text{Limit@3m} + 20 \log \left( \frac{3}{1} \right) = 53.98 + 9.54 = 63.52 \text{ dB}\mu\text{V/m at 1m}$$

### 3.4 Description of Test Methods and Equipment Setup

#### 3.4.1 General Description

Testing was performed in accordance with the various requirements of ANSI C63.4 and ANSI C63.10. Any deviations from the test methods are described in section 3.7

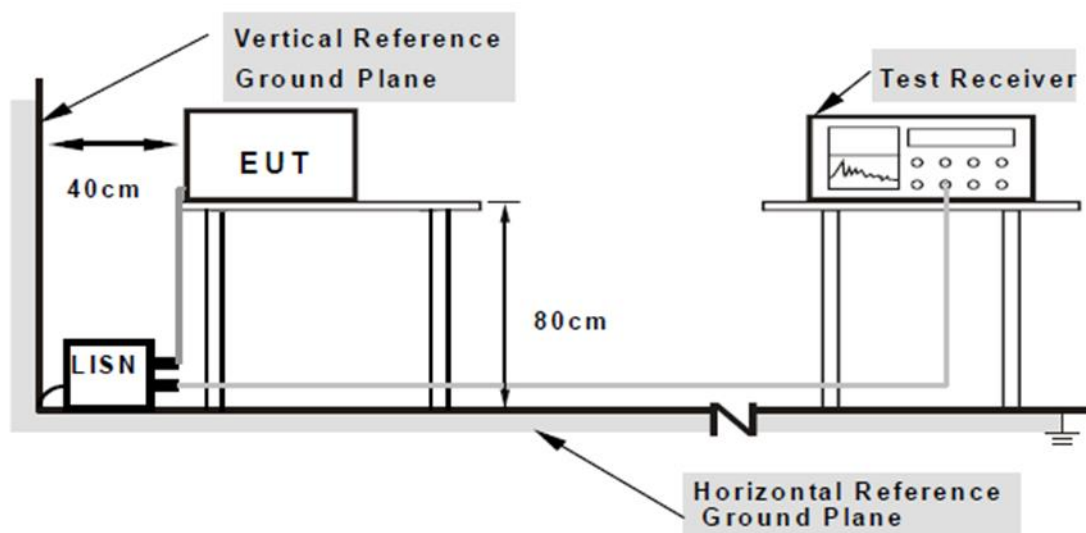
Where different arrangements of equipment were used for different types of measurements, these are tabulated in section 3.4.2 and details of each arrangement are included in subsequent sections

#### 3.4.2 Test Equipment Setup Used by Test Type

| FCC 47 CFR Rule Part | Test Description                                            | Test Equipment Used |
|----------------------|-------------------------------------------------------------|---------------------|
| 15.107               | AC Power Line Conducted Emissions (Unintentional Radiators) | Conducted Emissions |
| 15.109               | Radiated Emissions (Unintentional Radiators)                | SAC5                |

#### 3.4.3 Test Equipment Setup – Conducted Emissions

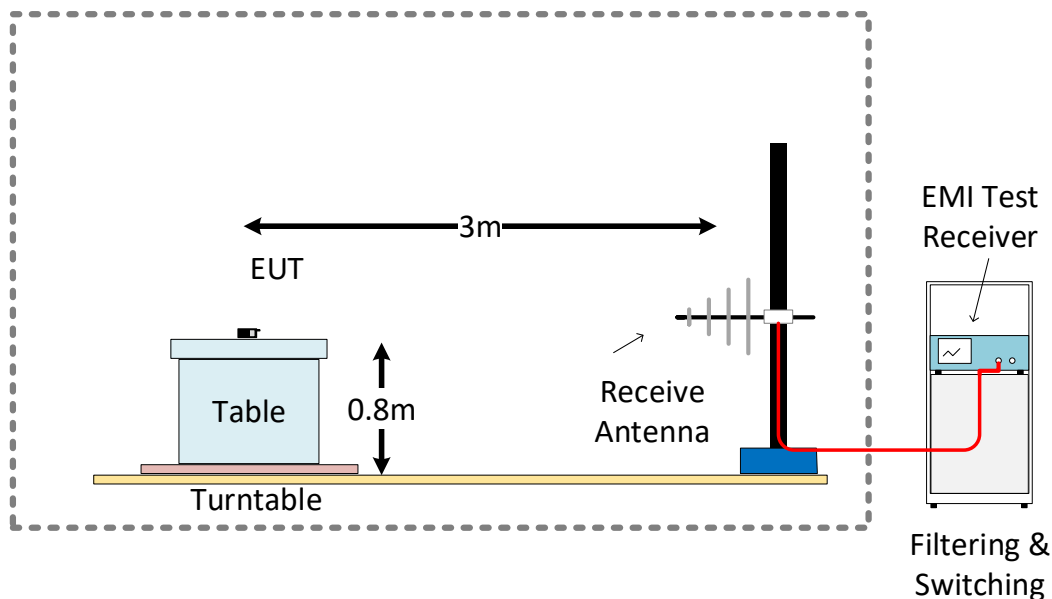
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The LISNs provide 50Ω/ 50μH of coupling impedance for the measuring instrument.
- The lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10 dB under the prescribed limits could not be reported.



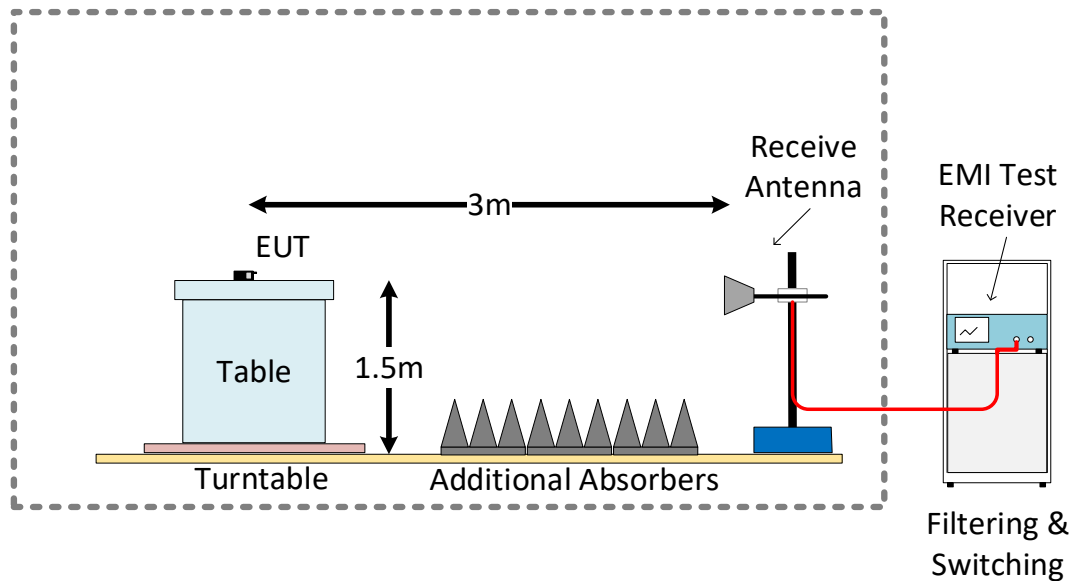
#### 3.4.4 Test Equipment Setup – SAC 5 (Radiated Emissions)

- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to 150 cm from floor, and 1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.
- For all frequency ranges the turntable was rotated 360° for obtaining the maximum emission.

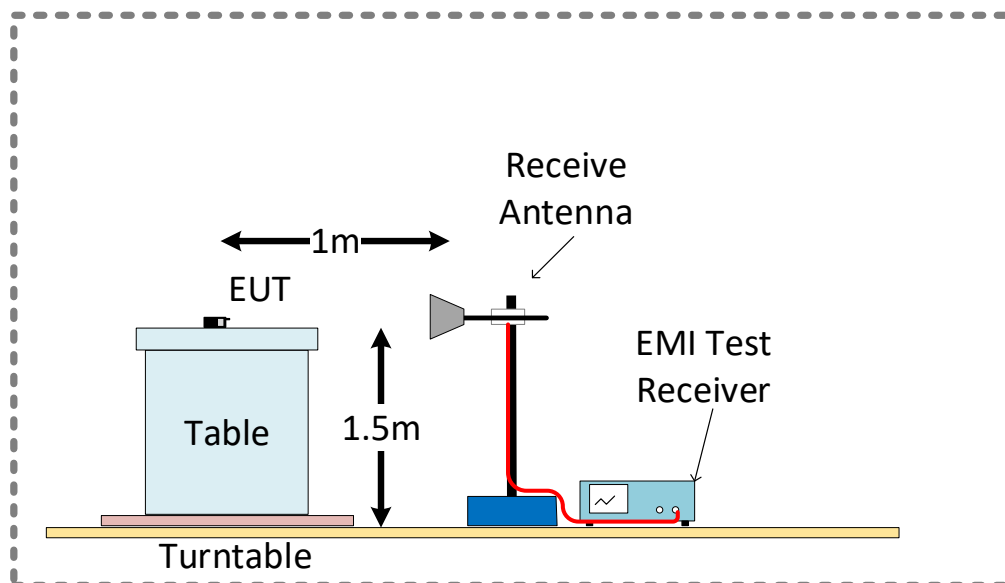
**SAC 5 Test Setup Configuration 30MHz – 1GHz**



**SAC 5 Test Setup Configuration 1GHz – 18GHz**

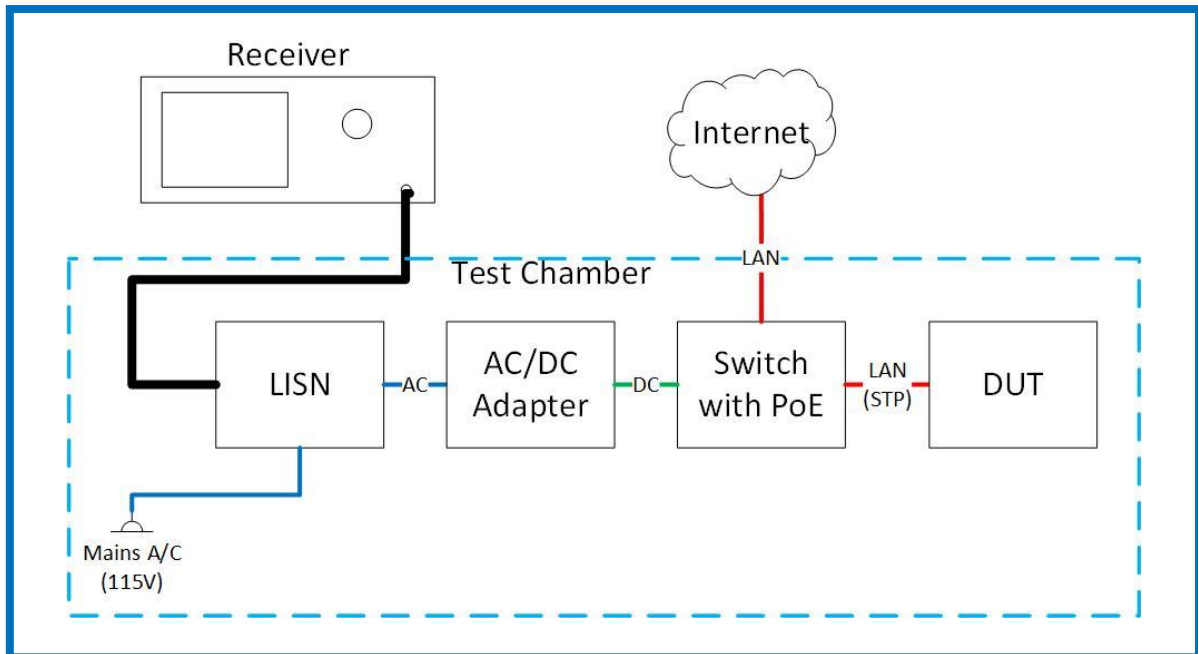


**SAC 5 Test Setup Configuration 18GHz – 40GHz**

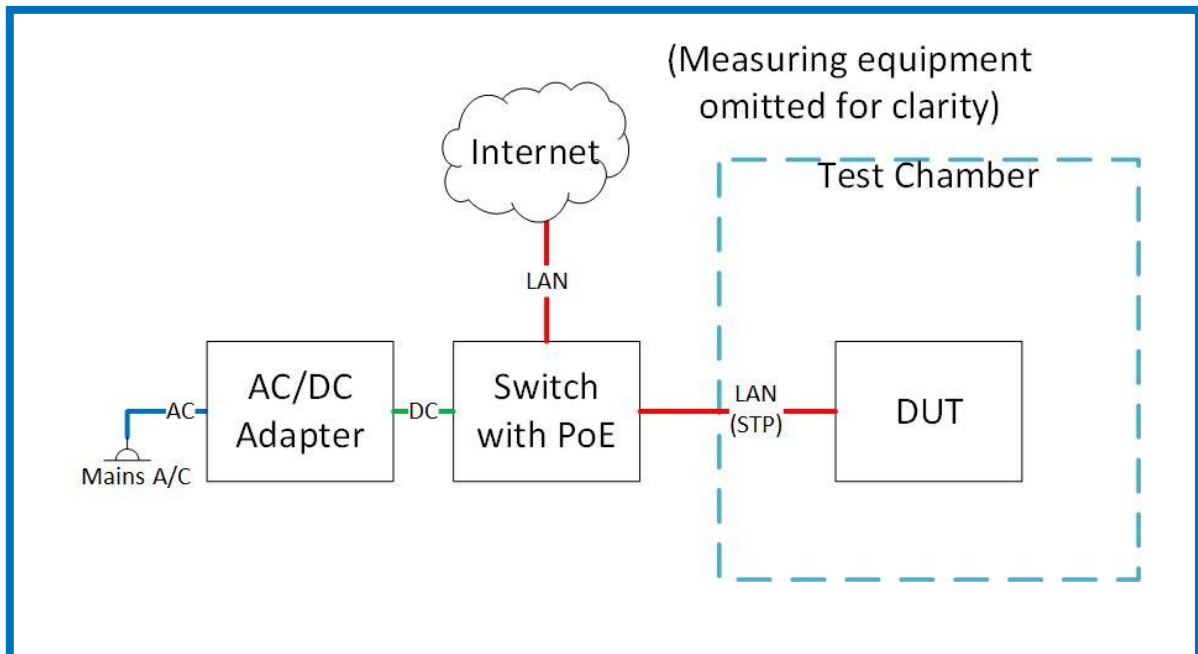


### 3.5 EUT Configuration During Test

Conducted Emissions Testing: Block Diagram (Power via PoE)



Radiated Emissions Testing: Block Diagram (Power via PoE)



### 3.6 EUT Operation Modes

| Operation mode | Description                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Default        | The device is powered and the radar is operating as normal. Power via PoE over an STP LAN cable with a ferrite attached at the DUT end. |

### 3.7 Deviations from the Test Standard

Note that the radar output in the device is always active when the device is powered. No 'idle' or 'receive' mode is implemented. As the frequency of the transmitter in this case is higher than the maximum frequency to be tested, testing could be performed with the transmitter active.

Hence measurements used for these unintentional transmitter tests are identical to those used for the intentional transmitter tests (below 40GHz)

### 3.8 Environmental Conditions

#### 3.8.1 Environmental Conditions – Conducted Emissions System

| Date       | Time  | Temperature (°C) | Relative Humidity (%) |
|------------|-------|------------------|-----------------------|
| 2021-12-09 | 13:30 | 22.8             | 32                    |

#### 3.8.2 Environmental Conditions – SAC5 (Radiated Emissions)

| Date       | Time  | Temperature (°C) | Relative Humidity (%) |
|------------|-------|------------------|-----------------------|
| 2021.11.16 | 08:05 | 18.5             | 44                    |
| 2021.11.24 | 08:28 | 19.2             | 43                    |
| 2021.11.27 | 09:22 | 18.6             | 44                    |

## 4. TEST RESULTS

### 4.1 Test Results – AC Power Line Conducted Emissions (Unintentional Trans.)

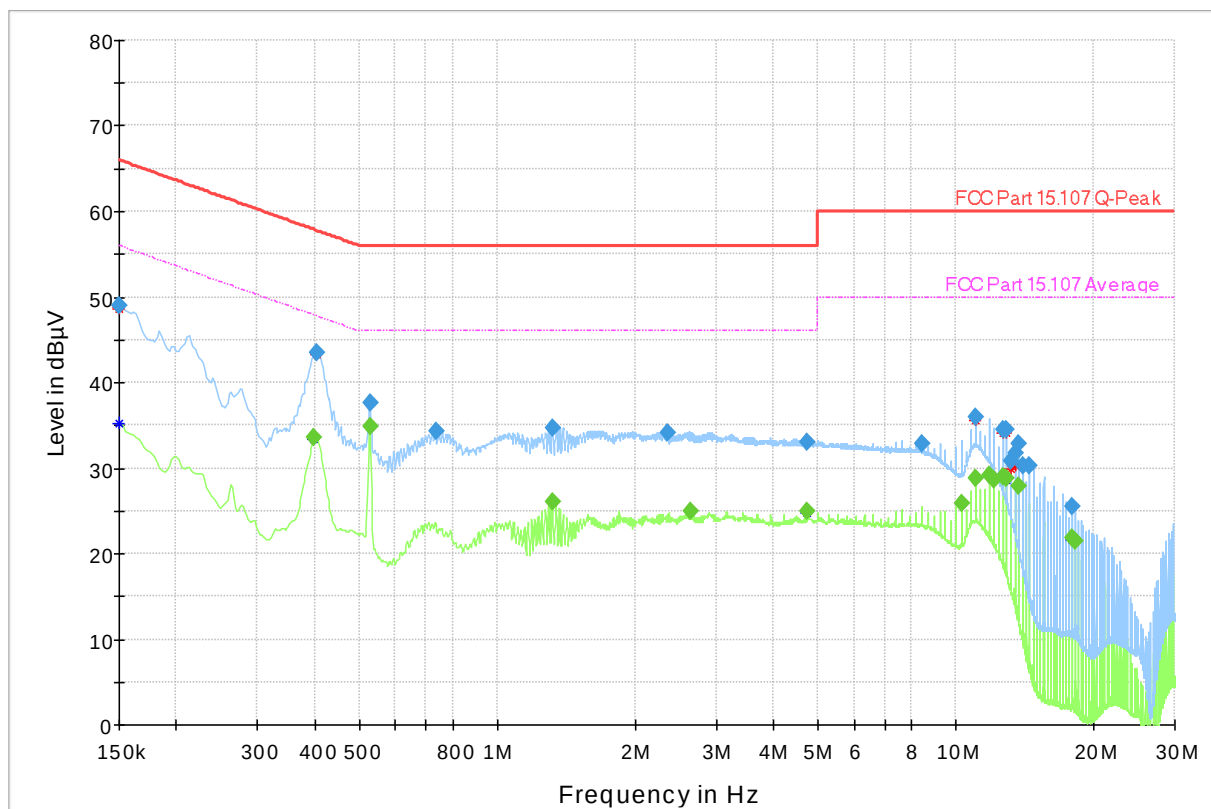
#### 4.1.1 AC Power Line Conducted Emissions (Unintentional) – Test Summary

| Test Specification                                   | FCC 47 CFR 15.107 (Part 15 Subpart B) |                |
|------------------------------------------------------|---------------------------------------|----------------|
| Test Engineer & Date                                 | Niall Forrester                       | 2021.12.09     |
| EUT and Ancillary Equipment IDs                      | A003152562-006                        | A003152562-007 |
| EUT Operation Mode(s)                                | Default                               |                |
| EUT Wireless Configuration(s)                        | Chirp Mode                            |                |
| EUT Hardware Configuration(s)                        | -                                     |                |
| Overall Result                                       | PASS                                  |                |
| Test Parameter                                       | Frequency Range                       | Result*        |
| AC Power Line Emissions<br>115V A/C 60Hz – “N” Line  | 150 kHz – 30 MHz                      | PASS           |
| AC Power Line Emissions<br>115V A/C 60Hz – “L1” Line | 150 kHz – 30 MHz                      | PASS           |

\* For detailed measurements, see tables and graphs in sections below

#### 4.1.2 AC Power Line Conducted Emissions (Unintentional) – Test Details

|                     |                     |                  |
|---------------------|---------------------|------------------|
| Test mode condition | Conducted Emissions |                  |
| Sweep frequency     | 150 kHz – 30 MHz    |                  |
| Standard            | FCC 47 Part 15.107  |                  |
| EUT                 | A003152562-006      |                  |
| Ancillary Equipment | A003152562-007      |                  |
| Test Engineer       | Niall Forrester     | Date: 2021.12.09 |



— Preview Result 2-CAV  
— Preview Result 1-QPK  
— FCC Part 15.107 Q-Peak  
— FCC Part 15.107 Average  
♦ Critical\_Freqs CAV  
♦ Final\_Result CAV  
♦ Final\_Result QPK

| Frequency<br>(MHz) | QuasiPeak<br>(dBµV) | CAverage<br>(dBµV) | Limit<br>(dBµV) | Margin<br>(dB) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Line | Filter |
|--------------------|---------------------|--------------------|-----------------|----------------|--------------------|--------------------|------|--------|
| 0.150000           | 48.91               | ---                | 66.00           | 17.09          | 1000.0             | 9.000              | N    | ON     |
| 0.399750           | ---                 | 33.58              | 47.86           | 14.28          | 1000.0             | 9.000              | L1   | ON     |
| 0.404250           | 43.49               | ---                | 57.77           | 14.28          | 1000.0             | 9.000              | N    | ON     |
| 0.528000           | ---                 | 34.82              | 46.00           | 11.18          | 1000.0             | 9.000              | L1   | ON     |
| 0.528000           | 37.67               | ---                | 56.00           | 18.33          | 1000.0             | 9.000              | N    | ON     |
| 0.735000           | 34.25               | ---                | 56.00           | 21.75          | 1000.0             | 9.000              | N    | ON     |
| 1.317750           | 34.72               | ---                | 56.00           | 21.28          | 1000.0             | 9.000              | N    | ON     |
| 1.320000           | ---                 | 26.06              | 46.00           | 19.94          | 1000.0             | 9.000              | N    | ON     |
| 2.352750           | 34.18               | ---                | 56.00           | 21.82          | 1000.0             | 9.000              | N    | ON     |
| 2.636250           | ---                 | 25.03              | 46.00           | 20.97          | 1000.0             | 9.000              | N    | ON     |
| 4.744500           | ---                 | 24.86              | 46.00           | 21.14          | 1000.0             | 9.000              | L1   | ON     |
| 4.744500           | 32.98               | ---                | 56.00           | 23.02          | 1000.0             | 9.000              | N    | ON     |
| 8.434500           | 32.92               | ---                | 60.00           | 27.08          | 1000.0             | 9.000              | N    | ON     |
| 10.277250          | ---                 | 25.79              | 50.00           | 24.21          | 1000.0             | 9.000              | L1   | ON     |
| 11.069250          | 35.89               | ---                | 60.00           | 24.11          | 1000.0             | 9.000              | N    | ON     |
| 11.069250          | ---                 | 28.76              | 50.00           | 21.24          | 1000.0             | 9.000              | N    | ON     |
| 11.859000          | ---                 | 29.14              | 50.00           | 20.86          | 1000.0             | 9.000              | L1   | ON     |
| 12.124500          | ---                 | 28.63              | 50.00           | 21.37          | 1000.0             | 9.000              | L1   | ON     |
| 12.651000          | 34.47               | ---                | 60.00           | 25.53          | 1000.0             | 9.000              | N    | ON     |
| 12.651000          | ---                 | 28.99              | 50.00           | 21.01          | 1000.0             | 9.000              | L1   | ON     |
| 12.914250          | 34.44               | ---                | 60.00           | 25.56          | 1000.0             | 9.000              | N    | ON     |
| 12.914250          | ---                 | 28.82              | 50.00           | 21.18          | 1000.0             | 9.000              | L1   | ON     |
| 13.177500          | 30.81               | ---                | 60.00           | 29.19          | 1000.0             | 9.000              | N    | ON     |
| 13.440750          | 31.70               | ---                | 60.00           | 28.30          | 1000.0             | 9.000              | N    | ON     |
| 13.704000          | ---                 | 27.89              | 50.00           | 22.11          | 1000.0             | 9.000              | L1   | ON     |
| 13.704000          | 32.86               | ---                | 60.00           | 27.14          | 1000.0             | 9.000              | N    | ON     |
| 13.967250          | 30.25               | ---                | 60.00           | 29.75          | 1000.0             | 9.000              | N    | ON     |
| 14.496000          | 30.29               | ---                | 60.00           | 29.71          | 1000.0             | 9.000              | N    | ON     |
| 17.920500          | 25.44               | ---                | 60.00           | 34.56          | 1000.0             | 9.000              | L1   | ON     |
| 17.922750          | ---                 | 21.77              | 50.00           | 28.23          | 1000.0             | 9.000              | N    | ON     |
| 18.186000          | ---                 | 21.53              | 50.00           | 28.47          | 1000.0             | 9.000              | L1   | ON     |

## 4.2 Test Results – Radiated Emissions (Unintentional Transmitter)

### 4.2.1 Radiated Emissions (Unintentional) – Test Summary

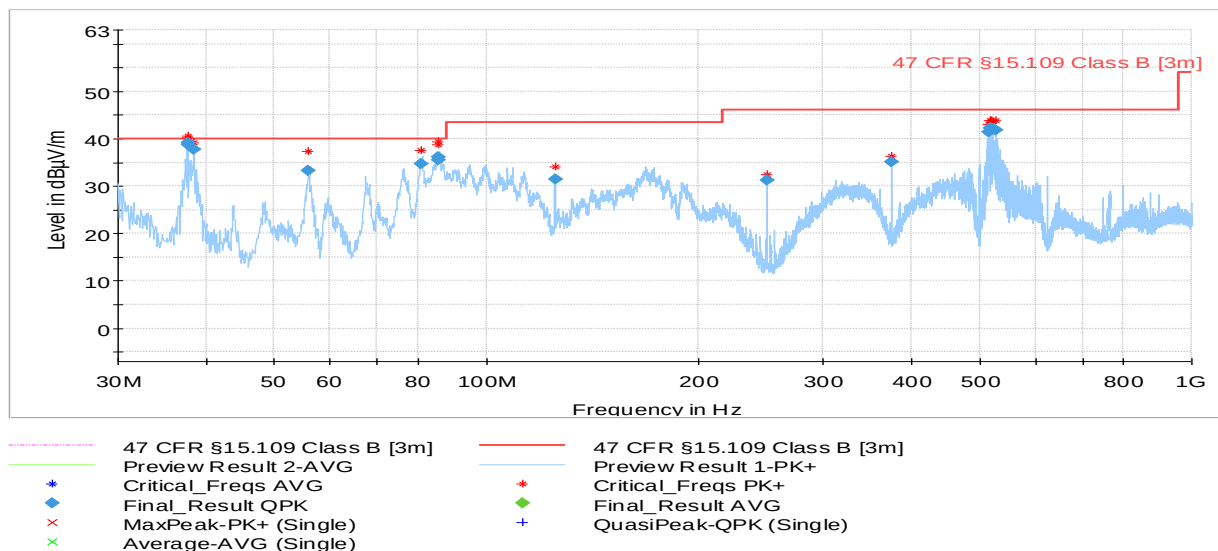
| Test Specification              | FCC 47 CFR 15.109 (Part 15 Subpart B) |                         |
|---------------------------------|---------------------------------------|-------------------------|
| Test Engineer & Date            | Niall Forrester                       | 2021.11.16 – 2021.11.27 |
| EUT and Ancillary Equipment IDs | A003152562-006                        | A003152562-007          |
| EUT Operation Mode(s)           | Default                               |                         |
| EUT Wireless Configuration(s)   | Chirp Mode                            |                         |
| EUT Hardware Configuration(s)   | -                                     |                         |
| Overall Result                  | PASS                                  |                         |
| Test Parameter                  | Frequency Range                       | Result*                 |
| Radiated Emissions - Idle Mode  | 30 MHz – 1 GHz                        | PASS                    |
| Radiated Emissions - Idle Mode  | 1 GHz – 18 GHz                        | PASS                    |
| Radiated Emissions - Idle Mode  | 18 GHz – 40 GHz                       | PASS                    |

\* For detailed measurements, see tables and graphs in sections below

#### 4.2.2 Radiated Emissions (Unintentional) – Test Details

##### 30MHz – 1GHz

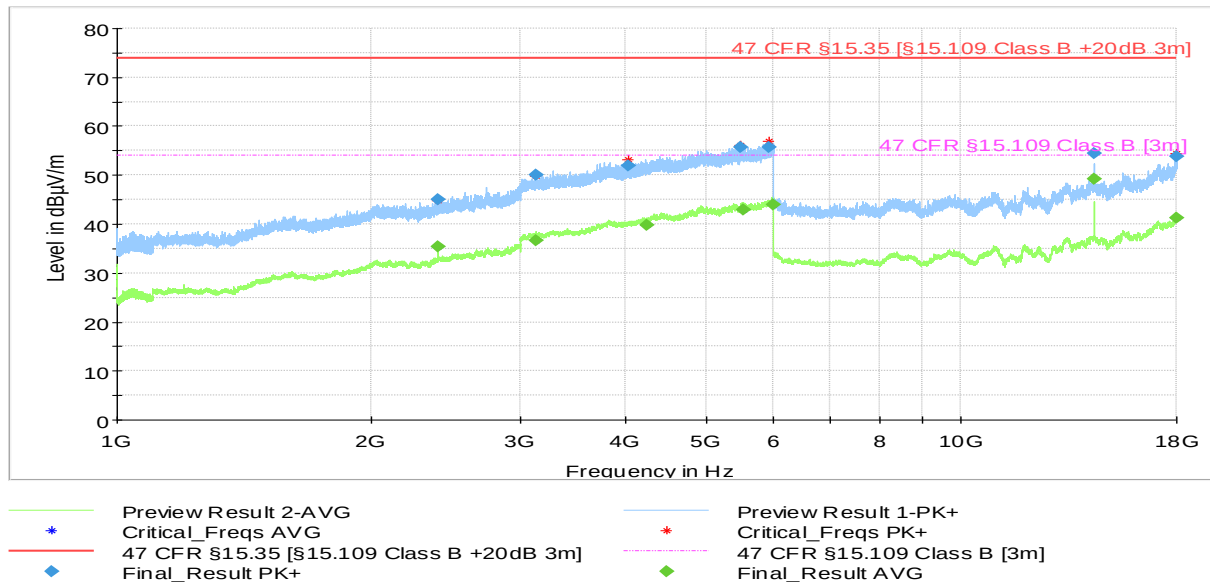
|                     |                              |                  |
|---------------------|------------------------------|------------------|
| Test mode condition | Default mode                 |                  |
| Antenna orientation | Horizontal and Vertical      |                  |
| Sweep frequency     | 30 MHz – 1 GHz               |                  |
| Standard            | 47 CFR FCC Part 15 subpart B |                  |
| EUT                 | A003152562-006               |                  |
| Ancillary Equipment | A003152562-007               |                  |
| Test Engineer       | Niall Forrester              | Date: 2021.11.16 |
| Chamber details     | Chamber: SAC 5               |                  |



| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 37.649640       | 38.74              | 40.00          | 1.26        | 1000.0          | 120.000         | 125.0       | V   | 200.0         |
| 37.667920       | 39.17              | 40.00          | 0.83        | 1000.0          | 120.000         | 125.0       | V   | 200.0         |
| 38.453880       | 37.71              | 40.00          | 2.29        | 1000.0          | 120.000         | 125.0       | V   | 200.0         |
| 55.866320       | 33.32              | 40.00          | 6.68        | 1000.0          | 120.000         | 375.0       | V   | 9.0           |
| 80.885600       | 34.72              | 40.00          | 5.28        | 1000.0          | 120.000         | 275.0       | H   | 72.0          |
| 85.327800       | 35.58              | 40.00          | 4.42        | 1000.0          | 120.000         | 275.0       | H   | 267.0         |
| 85.570600       | 36.10              | 40.00          | 3.90        | 1000.0          | 120.000         | 258.0       | H   | 72.0          |
| 124.986640      | 31.39              | 43.52          | 12.13       | 1000.0          | 120.000         | 125.0       | V   | 334.0         |
| 249.978800      | 31.16              | 46.02          | 14.86       | 1000.0          | 120.000         | 125.0       | H   | 41.0          |
| 374.955520      | 35.06              | 46.02          | 10.96       | 1000.0          | 120.000         | 229.0       | V   | 311.0         |
| 516.112840      | 41.49              | 46.02          | 4.53        | 1000.0          | 120.000         | 100.0       | V   | 296.0         |
| 518.207480      | 42.33              | 46.02          | 3.69        | 1000.0          | 120.000         | 100.0       | V   | 296.0         |
| 520.187000      | 42.24              | 46.02          | 3.78        | 1000.0          | 120.000         | 100.0       | V   | 296.0         |
| 523.043320      | 42.07              | 46.02          | 3.95        | 1000.0          | 120.000         | 100.0       | V   | 296.0         |
| 526.476480      | 41.92              | 46.02          | 4.10        | 1000.0          | 120.000         | 100.0       | V   | 296.0         |

1GHz – 18GHz

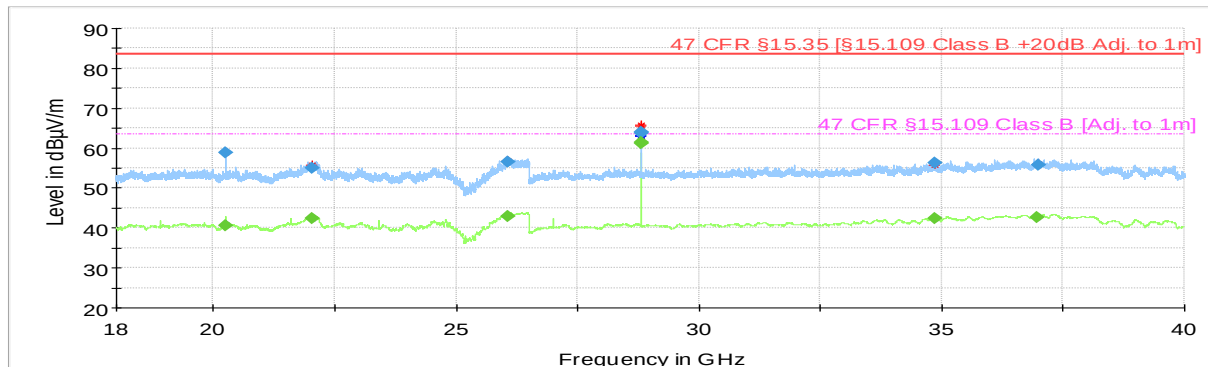
|                     |                              |                  |
|---------------------|------------------------------|------------------|
| Test mode condition | Default mode                 |                  |
| Antenna orientation | Horizontal and Vertical      |                  |
| Sweep frequency     | 1 GHz – 18 GHz               |                  |
| Standard            | 47 CFR FCC Part 15 subpart B |                  |
| EUT                 | A003152562-006               |                  |
| Ancillary Equipment | A003152562-007               |                  |
| Test Engineer       | Niall Forrester              | Date: 2021.11.27 |
| Chamber details     | Chamber: SAC 5               |                  |



| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2399.047000     | 45.07            | ---              | 73.98          | 28.91       | 1000.0          | 1000.000        | 100.0       | H   | 232.0         |
| 2399.874000     | ---              | 35.39            | 53.98          | 18.59       | 1000.0          | 1000.000        | 100.0       | V   | -8.0          |
| 3132.121000     | 50.10            | ---              | 73.98          | 23.88       | 1000.0          | 1000.000        | 365.0       | H   | 188.0         |
| 3140.387000     | ---              | 36.74            | 53.98          | 17.24       | 1000.0          | 1000.000        | 100.0       | H   | 142.0         |
| 4036.352000     | 51.93            | ---              | 73.98          | 22.05       | 1000.0          | 1000.000        | 239.0       | H   | 52.0          |
| 4237.534000     | ---              | 39.79            | 53.98          | 14.18       | 1000.0          | 1000.000        | 335.0       | H   | 188.0         |
| 5475.189000     | 55.79            | ---              | 73.98          | 18.19       | 1000.0          | 1000.000        | 100.0       | V   | 38.0          |
| 5527.358000     | ---              | 42.90            | 53.98          | 11.08       | 1000.0          | 1000.000        | 285.0       | V   | 128.0         |
| 5928.989000     | 55.74            | ---              | 73.98          | 18.24       | 1000.0          | 1000.000        | 165.0       | H   | 52.0          |
| 5987.662000     | ---              | 43.98            | 53.98          | 10.00       | 1000.0          | 1000.000        | 185.0       | H   | 312.0         |
| 14399.212000    | 54.48            | ---              | 73.98          | 19.50       | 1000.0          | 1000.000        | 410.0       | V   | 42.0          |
| 14399.272000    | ---              | 49.22            | 53.98          | 4.76        | 1000.0          | 1000.000        | 385.0       | V   | 52.0          |
| 17965.980000    | 53.87            | ---              | 73.98          | 20.11       | 1000.0          | 1000.000        | 189.0       | V   | -4.0          |
| 17984.868000    | ---              | 41.20            | 53.98          | 12.78       | 1000.0          | 1000.000        | 100.0       | V   | -4.0          |

18GHz – 40GHz

|                     |                              |                  |
|---------------------|------------------------------|------------------|
| Test mode condition | Default mode                 |                  |
| Antenna orientation | Horizontal and Vertical      |                  |
| Sweep frequency     | 18 GHz – 40 GHz              |                  |
| Standard            | 47 CFR FCC Part 15 subpart B |                  |
| EUT                 | A003152562-006               |                  |
| Ancillary Equipment | A003152562-007               |                  |
| Test Engineer       | Niall Forrester              | Date: 2021.11.24 |
| Chamber details     | Chamber: SAC 5               |                  |



- Preview Result 2-AVG
- Preview Result 1-PK+
- \* Critical\_Freqs AVG
- \* Critical\_Freqs PK+
- 47 CFR §15.35 [§15.109 Class B +20dB Adj. to 1m]
- 47 CFR §15.109 Class B [Adj. to 1m]
- ◆ Final\_Result PK+
- ◆ Final\_Result AVG
- × MaxPeak-PK+ (Single)
- + Average-AVG (Single)

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 20248.837000    | 58.97            | ---              | 83.52          | 24.55       | 1000.0          | 1000.000        | 150.0       | H   | 116.0         |
| 20248.967000    | ---              | 40.66            | 63.52          | 22.86       | 1000.0          | 1000.000        | 150.0       | H   | 116.0         |
| 22038.142000    | 55.12            | ---              | 83.52          | 28.40       | 1000.0          | 1000.000        | 150.0       | H   | 188.0         |
| 22042.532000    | ---              | 42.33            | 63.52          | 21.19       | 1000.0          | 1000.000        | 150.0       | H   | 56.0          |
| 26069.723000    | ---              | 43.01            | 63.52          | 20.51       | 1000.0          | 1000.000        | 150.0       | V   | -8.0          |
| 26072.097000    | 56.64            | ---              | 83.52          | 26.88       | 1000.0          | 1000.000        | 150.0       | H   | 188.0         |
| 28798.515000    | 63.85            | ---              | 83.52          | 19.67       | 1000.0          | 1000.000        | 150.0       | V   | 326.0         |
| 28798.549000    | ---              | 61.30            | 63.52          | 2.22        | 1000.0          | 1000.000        | 150.0       | V   | 326.0         |
| 28798.562000    | ---              | 61.36            | 63.52          | 2.16        | 1000.0          | 1000.000        | 150.0       | V   | 326.0         |
| 28798.569000    | 63.93            | ---              | 83.52          | 19.59       | 1000.0          | 1000.000        | 150.0       | V   | 326.0         |
| 34846.542000    | ---              | 42.49            | 63.52          | 21.03       | 1000.0          | 1000.000        | 150.0       | V   | 22.0          |
| 34866.993000    | 56.17            | ---              | 83.52          | 27.35       | 1000.0          | 1000.000        | 150.0       | V   | 172.0         |
| 36948.280000    | ---              | 42.53            | 63.52          | 20.99       | 1000.0          | 1000.000        | 150.0       | V   | 292.0         |
| 36987.621000    | 55.73            | ---              | 83.52          | 27.79       | 1000.0          | 1000.000        | 150.0       | H   | 186.0         |

## 5. TEST EQUIPMENT STATUS

### 5.1 List of Hardware with Calibration Dates

#### 5.1.1 Hardware List – Conducted Emissions System

| Type                          | Manufacturer                 | Model          | Serial Number / ID           | Calibration Date | Calibration Due |
|-------------------------------|------------------------------|----------------|------------------------------|------------------|-----------------|
| Two Line V-Network            | Rohde & Schwarz              | ENV 216        | 101090<br>2704076            | 2021.08.03       | 2022.08.03      |
| Test Receiver 9KHz to 3.5 GHz | Rohde & Schwarz              | ESR3           | 101674<br>2704016            | 2021.07.09       | 2022.07.09      |
| RF Probe                      | Fischer Custom Communication | F-52           | 22<br>2902256                | 2021.07.21       | 2022.07.22      |
| Temperature & humidity Logger | Lufft                        | OPUS 20<br>THI | 113.0118.0802.033<br>2771025 | 2020.07.31       | 2022.07.31      |

#### 5.1.2 Hardware List – SAC5 System

| Type                                 | Manufacturer    | Model                | Serial Number / ID           | Calibration Date | Calibration Due |
|--------------------------------------|-----------------|----------------------|------------------------------|------------------|-----------------|
| EMI Test Receiver                    | Rohde & Schwarz | ESW44                | 101760<br>2881044            | 2021.07.15       | 2022.07.15      |
| Ultra Broadband Antenna              | Rohde & Schwarz | HL562E               | 100988<br>2823181            | 2021.07.26       | 2023.07.26      |
| Double Ridged Waveguide Horn Antenna | Rohde & Schwarz | HF907                | 102678<br>2823164            | 2021.07.26       | 2023.07.26      |
| Horn Antenna                         | ETS Lindgren    | UG-596A/U            | 20898<br>2814839             | 2020.07.27       | 2022.07.27      |
| Horn Antenna                         | ETS Lindgren    | UG-600A/U            | 20623<br>2814834             | 2020.07.27       | 2022.07.27      |
| Control Device                       | Maturo          | NCD                  | NCD/393/2372.01              | N/A              | N/A             |
| Open Switch & Control Unit           | Rohde & Schwarz | OSP150               | 100081<br>2884198            | 2021.08.04       | 2022.08.04      |
| Open Switch & Control Unit           | Rohde & Schwarz | OSP120               | 100084<br>2761253            | 2021.08.04       | 2022.08.04      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F<br>Extension 1 | 101333<br>2761265            | 2021.08.04       | 2022.08.04      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F<br>Extension 2 | 101335<br>2761266            | 2021.08.04       | 2022.08.04      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F Base<br>Unit   | 101330<br>2761262            | 2021.08.04       | 2022.08.04      |
| Humidity Temperature Probe           | Lufft           | OPUS 20<br>THI       | 126.0118.0802.033<br>2771042 | 2020.07.31       | 2022.07.31      |

## 5.2 Software / Firmware Versions

| Equipment                  | Software / Firmware Name | Version   |
|----------------------------|--------------------------|-----------|
| Conducted Emissions System | EMC 32                   | V10.60.20 |
| SAC 5                      | EMC 32                   | V10.60.20 |

## 6. MEASUREMENT UNCERTAINTY

### 6.1 Measurement Uncertainty for Conducted Emissions

| Parameter                                      | Uncertainty (Coverage Factor k=2) |
|------------------------------------------------|-----------------------------------|
| Conducted emissions with LISN 150KHz to 30 MHz | 2.98 dB                           |

### 6.2 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)

| Parameter                       | Uncertainty (Coverage Factor k=2) |
|---------------------------------|-----------------------------------|
| Field Strength 10 Hz -9 kHz     | 3.38 dB                           |
| Field Strength 9 kHz -30 MHz    | 3.38 dB                           |
| Field Strength 30 MHz -1000 MHz | 3.38 dB                           |
| Field Strength 1 GHz -18 GHz    | 4.88 dB                           |
| Field Strength 18 GHz - 40 GHz  | 5.14 dB                           |

## 7. PHOTOGRAPHS

For photographs see Appendix 1.