

|                                                             |                                                                                   |                                      |              |                                |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|--------------|--------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test Report No.:                 | <b>20062902.f01</b>                                                               | <b>Auftrags-Nr.:</b><br>Order No.:   | 89217296     | Seite 1 von 27<br>Page 1 of 27 |
| <b>Kunden-Referenz-Nr.:</b><br>Client Reference No.:        | PO #3001923364-AX210D2W                                                           | <b>Auftragsdatum:</b><br>Order date: | July 9, 2020 |                                |
| <b>Auftraggeber:</b><br>Client:                             | Intel Corporation SAS, Le Cargo B6 / 424 Rue de Goa, 06600 Antibes, France        |                                      |              |                                |
| <b>Prüfgegenstand:</b><br>Test item:                        | Wireless Network Card                                                             |                                      |              |                                |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type No.: | AX210D2W                                                                          |                                      |              |                                |
| <b>Auftrags-Inhalt:</b><br>Order content:                   | Testing compliance with EMC Standards                                             |                                      |              |                                |
| <b>Prüfgrundlage:</b><br>Test specification:                | 47 CFR PART 15 (10-1-19 EDITION), Subpart 15B<br>ICES-003 (Issue 6, January 2016) |                                      |              |                                |

|                                                 |                                              |
|-------------------------------------------------|----------------------------------------------|
| <b>Wareneingangsdatum:</b><br>Date of receipt:  | September 24, 2020                           |
| <b>Prüfmuster-Nr.:</b><br>Test sample No.:      | 1208                                         |
| <b>Prüfzeitraum:</b><br>Testing period:         | October 02, 2020 – October 12, 2020          |
| <b>Ort der Prüfung:</b><br>Place of testing:    | Leek                                         |
| <b>Prüflaboratorium:</b><br>Testing laboratory: | TÜV Rheinland Nederland B.V. Leek Laboratory |
| <b>Prüfergebnis*:</b><br>Test result*:          | Pass                                         |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Getestet von / Tested by:</b> W. Brouwer                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Reviewed and Authorized by:</b> T.E.T. Koning                            |
| <b>Ausstelldatum:</b><br>Issue date: October 13, 2020                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Ausstelldatum:</b><br>Issue date: October 14, 2020                       |
| <b>Stellung / Position:</b> EMC Expert                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Stellung / Position:</b> Senior EMC Expert                               |
| <b>Sonstiges / Other:</b> None                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                             |
| <b>Zustand des Prüfgegenstandes bei Anlieferung: 1</b><br>Condition of the test item at delivery: 1                                                                                                                                                                                                                                                                                                                                                                      | Prüfmuster vollständig und unbeschädigt<br>Test item complete and undamaged |
| * Legende: 1 = sehr gut<br>P(ass) = entspricht o.g.<br>2 = gut<br>Prüfgrundlage(n)<br>3 = befriedigend<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)<br>4 = ausreichend<br>N/A = nicht anwendbar<br>5 = mangelhaft<br>N/T = nicht getestet<br>Legend: 1 = very good<br>P(ass) = passed a.m.<br>2 = good<br>Test specification(s)<br>3 = satisfactory<br>F(ail) a.m. test specification(s)<br>4 = sufficient<br>N/A = not applicable<br>5 = poor<br>N/T = not tested |                                                                             |
| <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><i>This test report only relates to the a.m. testsample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This report does not entitle to carry any test mark</i>                       |                                                                             |

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**Liste der verwendeten Prüfmittel**  
**List of used test equipment**

| Prüfmittel Nr. / ID-Nr.<br>Equipment No. / ID-No. |                 | Prüfmittel<br>Test equipment |                                          | Nächste Kalibrierung<br>Next calibration |
|---------------------------------------------------|-----------------|------------------------------|------------------------------------------|------------------------------------------|
| Conducted emission                                |                 |                              |                                          |                                          |
| 2789421                                           | Rohde & Schwarz | ESCS30                       | Measurement Receiver                     | 1-11-2020                                |
| 2790495                                           | Rohde & Schwarz | ESH3-Z2                      | Impulse Limiter                          | 18-5-2021                                |
| 2788823                                           | Rohde & Schwarz | ESH3-Z2                      | Impulse Limiter                          | 24-9-2021                                |
| 2788795                                           | Emco            | 3625/2                       | LISN 5 uH / 50 ohm                       | 24-9-2021                                |
| 2789124                                           | Rohde & Schwarz | ESH2-Z5                      | LISN- artificial Network                 | 12-8-2021                                |
| 2788791                                           | Rohde & Schwarz | ESH2-Z5                      | LISN- artificial Network                 | 17-7-2021                                |
| 2788866                                           | COMTEST         | 1415                         | Conducted Reference Source 9kHz-50MHz    | 18-5-2021                                |
| 2790528                                           | Rohde & Schwarz | ESH 3-Z5                     | LISN                                     | 24-9-2021                                |
| 2789211                                           | Extech          | SD 500                       | Humidity / Temperature Data logger       | 3-7-2021                                 |
| Radiated emission                                 |                 |                              |                                          |                                          |
| 2789083                                           | Rohde & Schwarz | ESCI                         | Measurement Receiver (9kHz-3GHz)         | 12-3-2021                                |
| 2789106                                           | R&S             | FSV30                        | Signal Analyzer/Spectrum Analyzer        | 28-8-2021                                |
| 2790260                                           | R&S             | FSV40                        | Signal Analyzer/Spectrum Analyzer        | 20-8-2021                                |
| 2788849                                           | Chase           | CBL6111B                     | Biconilog                                | 29-10-2021                               |
| 2788801                                           | Emco            | 4610                         | Gen. field source                        | 30-1-2021                                |
| 2789009                                           | Siepel          | FCC                          | FCC Test Site Registration nr 786213     | 8-3-2022                                 |
| 2789082                                           | Comtest         |                              | Site registration filing Industry Canada | 20-11-2020                               |
| 2789206                                           | Siepel          |                              | S-AR                                     | 4-5-2023                                 |
| 2789217                                           | Gigalink        | APG0500                      | RF Cable S-AR                            | 10-3-2021                                |
| 2789237                                           | Teseq           | CBL 6111D                    | Antenne S-AR, BiLog 30MHz-1GHz           | 7-11-2020                                |
| 2790499                                           | Rohde & Schwarz | ESR7                         | EMI Test Receiver 7GHz                   | 18-9-2021                                |
| 2788776                                           | Emco            | 3115                         | Guide ant. 1-18GHz                       | 19-12-2020                               |
| 2788777                                           | Emco            | 3115                         | Guide ant. 1-18GHz                       | 26-2-2022                                |
| 2788779                                           | Emco            | 3116                         | Guide ant. 18-40GHz                      | 12-2-2022                                |
| 2788780                                           | Emco            | 3160-09                      | Gain horn 18-26.5GHz                     | 12-2-2022                                |
| 2788982                                           | Emco            | 3160-09                      | Gain horn 18-26.5GHz                     | 12-2-2022                                |
| 2788983                                           | Emco            | 3160-10                      | Gain horn 26.5-40GHz                     | 12-2-2022                                |
| 2789108                                           | H&S             | Sucotest 18/Sucoflex 102     | Cable RF S-AR >1G setup                  | 30-6-2021                                |
| 2789109                                           | H&S             | Sucotest 18/Sucoflex 102     | Cable RF                                 | 30-6-2021                                |
| 2789110                                           | H&S             | Sucotest 18/Sucoflex 102     | Cable RF                                 | 30-6-2021                                |
| 9001993                                           | Teseq           | CMAD 20B                     | Common Mode Absorption Device            | 2-1-2022                                 |
| 9001994                                           | Teseq           | CMAD 20B                     | Common Mode Absorption Device            | 2-1-2022                                 |
| 9001995                                           | Teseq           | CMAD 20B                     | Common Mode Absorption Device            | 2-1-2022                                 |
| 2789214                                           | Extech          | SD 500                       | Humidity / Temperature Data logger       | 3-7-2021                                 |

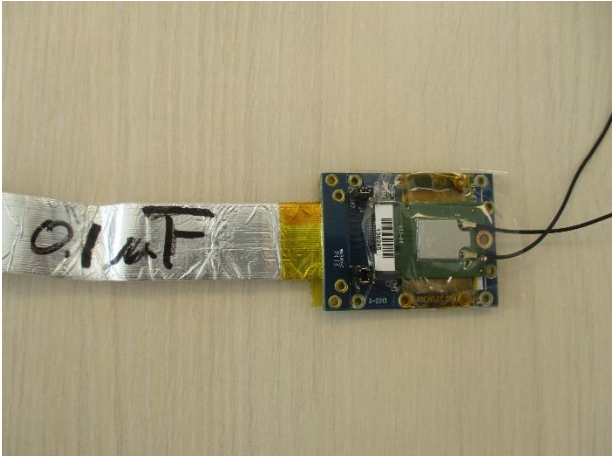
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|          |                                                                |                                            |
|----------|----------------------------------------------------------------|--------------------------------------------|
| <b>1</b> | <b>Produktdetails</b><br><i>Product details</i>                | Wireless Network Card AX210D2W             |
| <b>2</b> | <b>Maße / Gewicht</b><br><i>Dimensions / Weight</i>            | << 50 gr                                   |
| <b>3</b> | <b>Bedienelemente</b><br><i>Operating elements</i>             | Built inside Extender, processed by laptop |
| <b>4</b> | <b>Ausstattung / Zubehör</b><br><i>Equipment / Accessories</i> | Extender card                              |
| <b>5</b> | <b>Verwendete Materialien</b><br><i>Used materials</i>         | None                                       |
| <b>6</b> | <b>Sonstiges</b><br><i>Other</i>                               | None                                       |
| <b>7</b> | <b>Dieser raport betrifft:</b><br><i>This report concerns:</i> | <b>EMC Verification</b>                    |

|                                                                            |                                |
|----------------------------------------------------------------------------|--------------------------------|
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| Absatz<br>Clause | Anforderungen – Prüfungen / Requirements - Tests                                                          |                                      |                      |                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1                | 47 CFR Part 15 (10-1-19 Edition) - 15.107(a)<br>ICES-003 (Issue 6, January 2016) –<br>Section 6.1 Table 2 | AC Power Line Conducted<br>Emissions | P<br>F<br>N/A<br>N/T | <input checked="" type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> |
| 2                | 47 CFR Part 15 (10-1-19 Edition) - 15.109<br>ICES-003 (Issue 6, January 2016) –<br>Section 6.2.1 Table 5  | Radiated unwanted emissions          | P<br>F<br>N/A<br>N/T | <input checked="" type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> |

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| EUT:                                                                                | Extender card:                                                                       |
|  |  |

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| Zusammenfassung der Prüfergebnisse<br>Summary of test results |                         |                             |                       |                                                                                      |                     |
|---------------------------------------------------------------|-------------------------|-----------------------------|-----------------------|--------------------------------------------------------------------------------------|---------------------|
| Prüfung<br>Test                                               | Anwendbar<br>Applicable | Prüfergebnis<br>Test result | Paragraf<br>Paragraph | Messungen un-<br>ter Akkreditie-<br>rung ausge-<br>führt<br>under accredita-<br>tion | Kommentar<br>Remark |
| Radiated emission<br>< 1000 MHz                               | Yes                     | Pass                        | 3.1                   | Yes                                                                                  |                     |
| Radiated emission<br>> 1000 GHz                               | Yes                     | Pass                        | 3.2                   | Yes                                                                                  | fx max: 7.125 GHz   |
| Conducted emis-<br>sion AC/DC port                            | Yes                     | Pass                        | 3.3                   | Yes                                                                                  |                     |

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| Revisions<br>Revisions |                  |                     |                     |
|------------------------|------------------|---------------------|---------------------|
| Revision<br>Revision   | Datum<br>Date    | Anmerkung<br>Remark | Verfasser<br>Author |
| 00                     | October 13, 2020 | First Release       | W. Brouwer          |
|                        |                  |                     |                     |
|                        |                  |                     |                     |

Note: Latest revision report will replace all previous reports

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## CONDITIONS FOR TESTING

### 1 General test configuration.

Communication with access point is established and data is transferred and monitored with Iperf. Two modes were tested. 1 : 5GHz WIFI communication at the highest channel including Bluetooth (receiving dummy file from smartphone). 2 : 2.4GHz WIFI communication at auto channel. EUT tested in external extension board.

|         |                                                                                                                                                                                                                                                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks | <p>All EMC Emission and Immunity testing has taken place:</p> <ol style="list-style-type: none"> <li>1) within an environmental temperature range between 15 and 35 degrees Celsius</li> <li>2) within an environmental relative humidity range between 20 and 85%</li> <li>3) within an environmental air pressure range between 860 and 1060 mbar</li> </ol> |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| List of tested cables |          |       |        |        |         |
|-----------------------|----------|-------|--------|--------|---------|
| Number                | Function | From  | To     | Length | Remarks |
| 1                     | AC       | Mains | Laptop | <3     |         |

### 1.1 Tested system auxiliary details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

#### Description of test configuration.

|                  |                                                  |
|------------------|--------------------------------------------------|
| Test item (EUT1) | : Wireless Communication Card 6E                 |
| Manufacturer     | : Intel Corporation SAS                          |
| Brand mark       | : Intel                                          |
| Model            | : AX210D2W                                       |
| Serial number    | : Engineering Sample                             |
| Remark           | : Tested in Laptop (AUX1)                        |
| Test item (AUX1) | : Extender board                                 |
| Manufacturer     | : Intel Corporation SAS                          |
| Brand mark       | : Intel                                          |
| Remark           | : Used to have a functional EUT outside a laptop |
| Test item (AUX2) | : Laptop including PSU                           |
| Manufacturer     | : Dell                                           |
| Brand mark       | : Dell                                           |
| Model            | : E5401                                          |
| Remark           | : Used as Host for EUT1                          |
| Test item (AUX3) | : Mobile Phone                                   |
| Manufacturer     | : Samsung                                        |
| Brand mark       | : Samsung                                        |
| Model            | : Galaxy J7 (2016)                               |
| Remark           | : Used for BT communication                      |

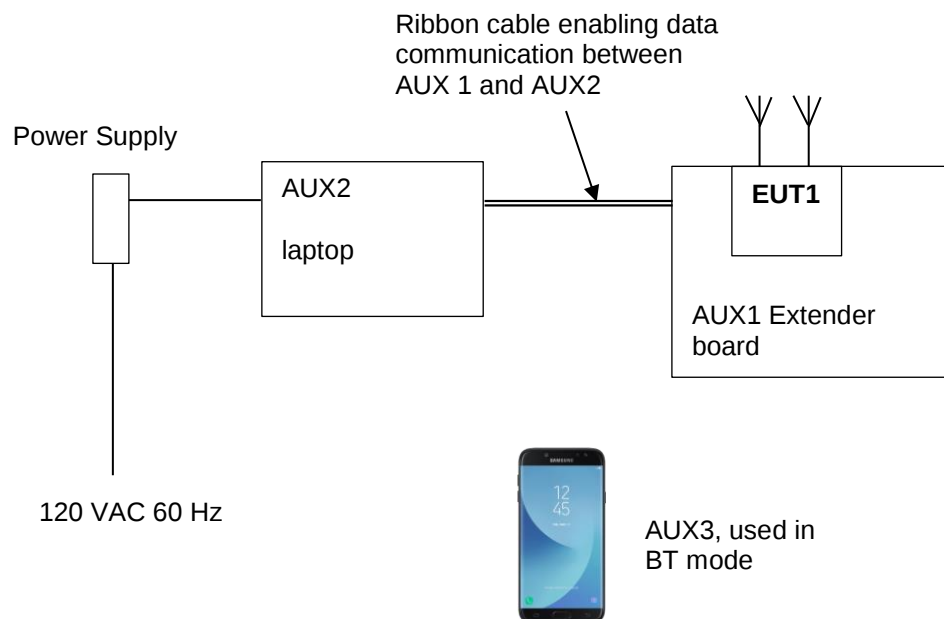


Figure 1. Total set-up used during testing

## 1.2 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-19 Edition), sections 15.31, 15.107 and 15.109 and ICES-003 Issue 6 (January 2016) Sections 6.1 and 6.2. The EUT was tested in horizontal position only and is regarded as floor standing equipment.

The test methods, which have been used, are based on ANSI C63.4-2014.

Radiated emission tests were performed at a measurement distance of 3 meters.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

## 1.3 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located at Eiberkamp 10, 9351 VT Leek, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 786213. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under registration number 2932G-2. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

## 1.4 Test conditions.

Normal test conditions:

|                      |                   |
|----------------------|-------------------|
| Temperature (*)      | : +15°C to +35°C  |
| Relative humidity(*) | : 20 % to 75 %    |
| Supply voltage       | : 120 Vac / 60 Hz |

*\*When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.*

# 2 System test configuration.

## 2.1 Justification.

The system was configured for testing in a typical situation as a customer would normally use it. The test sample was configured by the applicant to enable continuous transmit.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4-2014.

## 2.2 EUT mode of operation.

The unintentional radiator tests have been performed with a complete functioning EUT.

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### **2.3 Special accessories.**

No special accessories are used and/or needed to achieve compliance.

### **2.4 Equipment modifications.**

No modifications have been made to the equipment.

### 3 Test results Emission according to FCC CRF47 Part 15B

#### 3.1 Enclosure Radiated Emission 30-1000 MHz

##### 3.1.1 Definition

Result of the measurements concerning radiated electromagnetic fields (electric component) emitted by the total set-up of the EUT.

##### 3.1.2 Basic standard

The test is performed according to FCC CRF 47 Part 15B § 15.109

##### 3.1.3 Limit

FCC 15.109(a) and IC ICES-003 section 6.2

Except for Class A digital devices, the field strength of radiated emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (µV/meter) | Field strength (dBµV/m) | Measurement distance (meters) |
|-----------------|---------------------------|-------------------------|-------------------------------|
| 30-88           | 100                       | 40.0                    | 3                             |
| 88-216          | 150                       | 43.5                    | 3                             |
| 216-960         | 200                       | 46.0                    | 3                             |
| Above 960       | 500                       | 54.0                    | 3                             |

Table of applicable limits

##### 3.1.4 Test procedures

ANSI C63.4-2014.

Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X, Y, Z) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 30MHz to 35625 MHz, the fifth harmonic of the highest intentional generated frequency. Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit.

##### 3.1.5 Test deviation

There is no deviation with the original standard

##### 3.1.6 Test results

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| Test conditions     |                              |               |      |
|---------------------|------------------------------|---------------|------|
|                     |                              | Test location | Leek |
| Applied Standard(s) | FCC CRF 47 Part 15B § 15.109 |               |      |
| Test engineer       | W. Brouwer                   | Test result   | Pass |
| Test date           | October 07, 2020             |               |      |

| Results and limits 5GHz + Bluetooth mode |                       |                      |                      |        |             |             |
|------------------------------------------|-----------------------|----------------------|----------------------|--------|-------------|-------------|
| Frequency (MHz)                          | Result (dB $\mu$ V/m) | Antenna polarization | Limit (dB $\mu$ V/m) | Margin | Height (cm) | Angle (deg) |
| 30.70                                    | 24.0                  | Vertical             | 40.0                 | 16.0   | 99.8        | 289.7       |
| 44.03                                    | 23.3                  | Vertical             | 40.0                 | 16.7   | 99.8        | 188.0       |
| 107.62                                   | 30.5                  | Vertical             | 43.5                 | 13.0   | 267.0       | 289.1       |
| 375.92                                   | 16.5                  | Vertical             | 46.0                 | 29.5   | 160.1       | 3.2         |
| 425.24                                   | 29.0                  | Vertical             | 46.0                 | 17.0   | 130.8       | 359.7       |
| 859.84                                   | 25.5                  | Vertical             | 46.0                 | 20.5   | 99.8        | 29.8        |

Table 1 Results Enclosure Radiated Emission 30.0 – 1000 MHz, 5GHz + BT mode

| Results and limits 2.4GHz mode |                       |                      |                      |        |             |             |
|--------------------------------|-----------------------|----------------------|----------------------|--------|-------------|-------------|
| Frequency (MHz)                | Result (dB $\mu$ V/m) | Antenna polarization | Limit (dB $\mu$ V/m) | Margin | Height (cm) | Angle (deg) |
| 37.98                          | 20.8                  | Vertical             | 40.0                 | 19.2   | 99.7        | 173.9       |
| 107.51                         | 29.4                  | Vertical             | 40.0                 | 10.6   | 293.8       | 277.8       |
| 374.40                         | 20.4                  | Vertical             | 43.5                 | 23.1   | 120.8       | 199.3       |
| 424.32                         | 30.2                  | Vertical             | 46.0                 | 15.8   | 131.5       | 356.2       |
| 510.00                         | 28.3                  | Vertical             | 46.0                 | 17.7   | 99.8        | 350.7       |
| 794.56                         | 25.9                  | Vertical             | 46.0                 | 20.1   | 99.8        | 341.3       |

Table 2 Results Enclosure Radiated Emission 30.0 – 1000 MHz, 2.4GHz mode

Used Equipment

|         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|
| 2790499 | 2789109 | 2789237 | 2789217 | 2789110 | 2789029 | 2789206 | 2789214 |
|---------|---------|---------|---------|---------|---------|---------|---------|

**Notes:**

- Field strength values of radiated emissions at frequencies not listed in the table above are more than 25 dB below the applicable limit.
- Measurement uncertainty is +/- 5.22 dB.
- The EUT was tested in horizontal orientation only-it's normal operation orientation, the measuring antenna was varied in horizontal and vertical orientations and also around its axis and height. The reported value is the worst case found at the reported frequency.
- A selection of Photos and Graphical Displays is provided on the next pages.

### 3.1.7 Photograph test setup

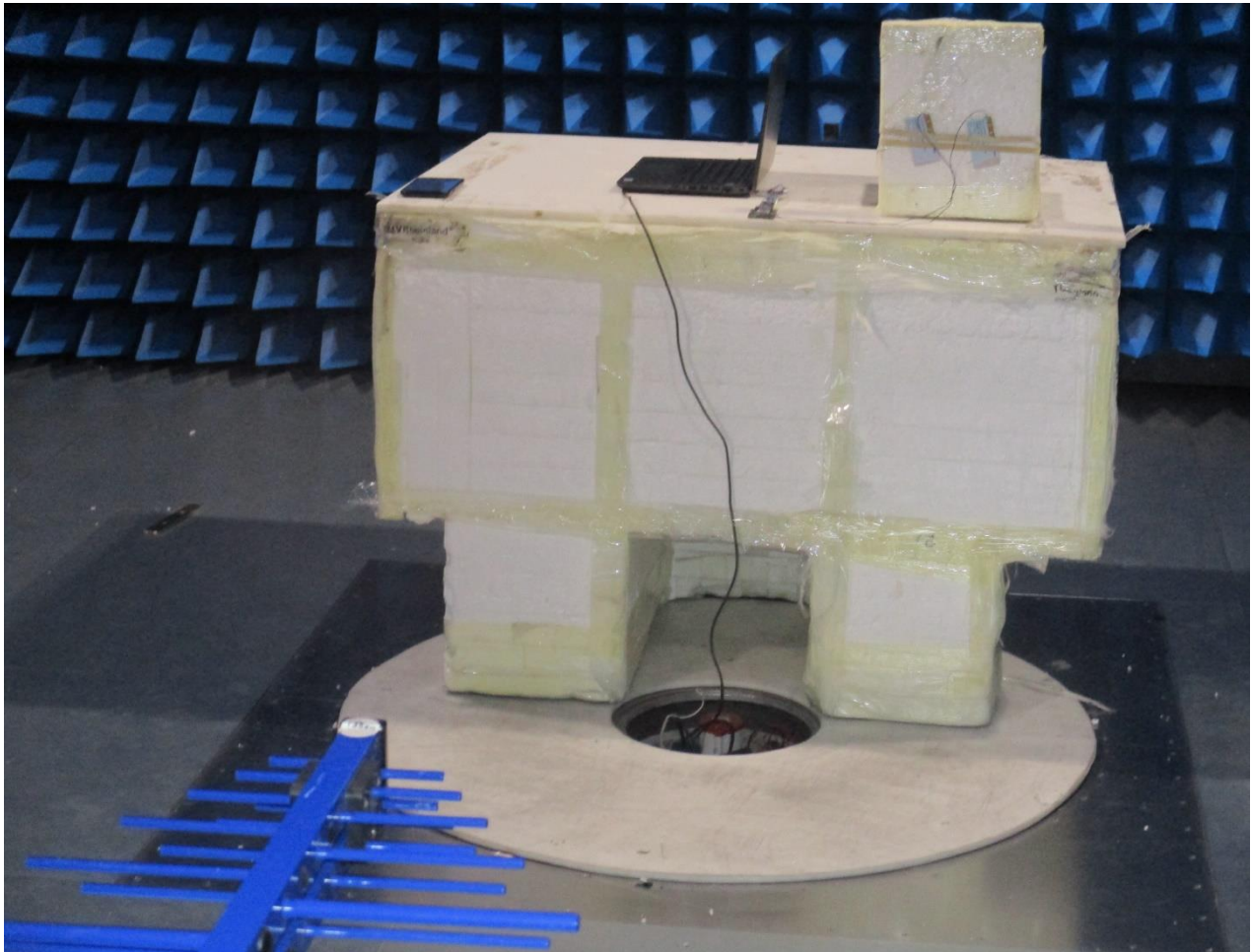
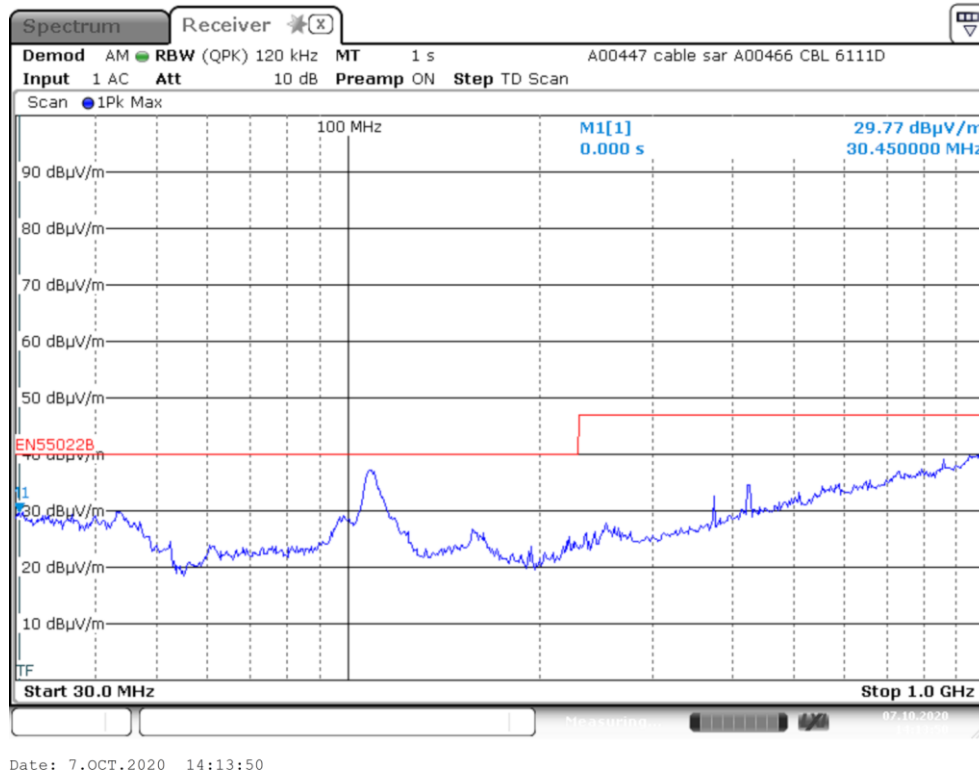


Photo 1 Photograph test setup radiated emissions 30-1000 MHz

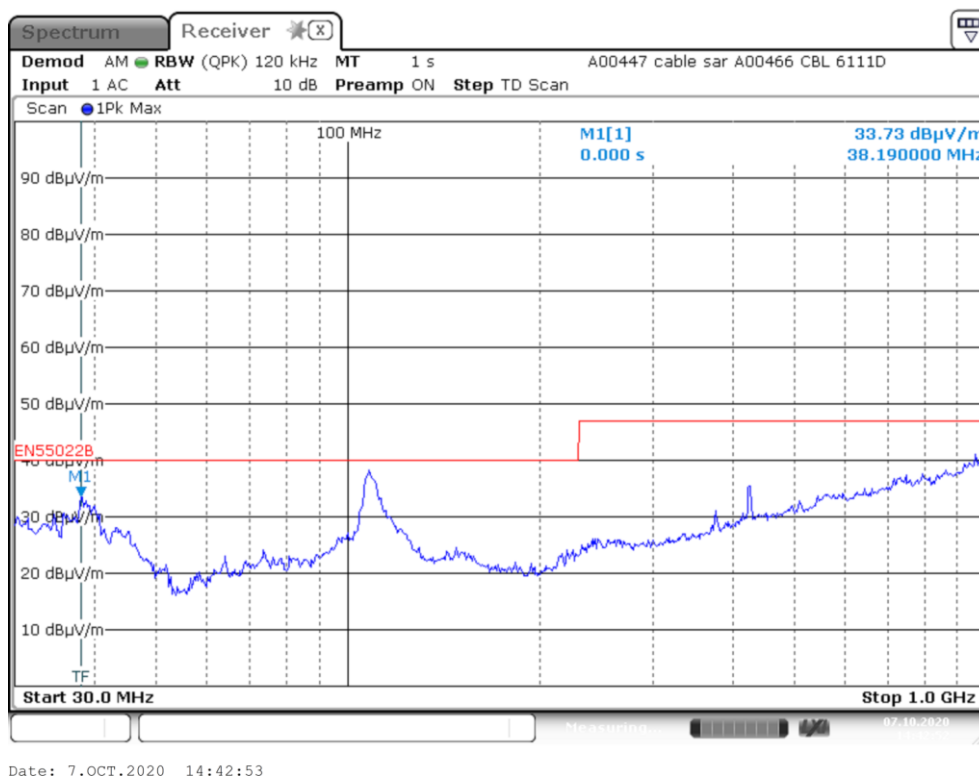
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### 3.1.8 Spectrum plot



Plot 1: Pre-scan plot with peak detector. Radiated emissions from 30 MHz to 1000 MHz 5GHz + BT mode



Plot 2: Pre-scan plot with peak detector. Radiated emissions from 30 MHz to 1000 MHz 2.4GHz mode

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### 3.2 Enclosure Radiated emission 1000 MHz – 35625 MHz

| Results and limits 5GHz + Bluetooth mode |                              |                            |                         |                              |                            |                         |
|------------------------------------------|------------------------------|----------------------------|-------------------------|------------------------------|----------------------------|-------------------------|
| Frequency<br>(GHz)                       | Peak Results                 |                            |                         | Average Results              |                            |                         |
|                                          | Horizontal<br>(dB $\mu$ V/m) | Vertical<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Horizontal<br>(dB $\mu$ V/m) | Vertical<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) |
| 1.330                                    | 46.8                         | 47.9                       | 74.0                    | 26.8                         | 25.4                       | 54.0                    |
| 1.768                                    | 48.8                         | 48.5                       | 74.0                    | 24.7                         | 25.7                       | 54.0                    |
| 11.60                                    | 62.8                         | 63.0                       | 74.0                    | 49.7                         | 49.7                       | 54.0                    |
| 17.79                                    | 66.8                         | 67.4                       | 74.0                    | 52.7                         | 52.0                       | 54.0                    |
| 18.36                                    | 53.4                         | 53.0                       | 74.0                    | 39.6                         | 39.6                       | 54.0                    |
| 20.04                                    | 53.7                         | 53.7                       | 74.0                    | 39.8                         | 39.8                       | 54.0                    |
| 29.61                                    | 52.9                         | 52.9                       | 74.0                    | 39.4                         | 39.5                       | 54.0                    |

Table 3 Results Enclosure Radiated Emission 1000.0 – 35625 MHz 5GHz + BT mode

| Results and limits 5GHz + Bluetooth mode |                              |                            |                         |                              |                            |                         |
|------------------------------------------|------------------------------|----------------------------|-------------------------|------------------------------|----------------------------|-------------------------|
| Frequency<br>(GHz)                       | Peak Results                 |                            |                         | Average Results              |                            |                         |
|                                          | Horizontal<br>(dB $\mu$ V/m) | Vertical<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Horizontal<br>(dB $\mu$ V/m) | Vertical<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) |
| 1.333                                    | 40.9                         | 44.8                       | 74.0                    | 25.3                         | 23.7                       | 54.0                    |
| 1.827                                    | 42.0                         | 44.5                       | 74.0                    | 30.1                         | 29.0                       | 54.0                    |
| 2.304                                    | 43.9                         | 52.9                       | 74.0                    | 30.7                         | 35.6                       | 54.0                    |
| 2.559                                    | 49.8                         | 59.4                       | 74.0                    | 37.3                         | 42.2                       | 54.0                    |
| 11.60                                    | 61.9                         | 63.2                       | 74.0                    | 49.7                         | 49.7                       | 54.0                    |
| 17.93                                    | 66.9                         | 66.8                       | 74.0                    | 52.7                         | 52.1                       | 54.0                    |
| 20.86                                    | 54.5                         | 53.8                       | 74.0                    | 40.8                         | 40.8                       | 54.0                    |
| 29.23                                    | 52.8                         | 52.5                       | 74.0                    | 39.3                         | 39.3                       | 54.0                    |

Table 4 Results Enclosure Radiated Emission 1000.0 – 35625 MHz 2.4GHz mode

#### Notes:

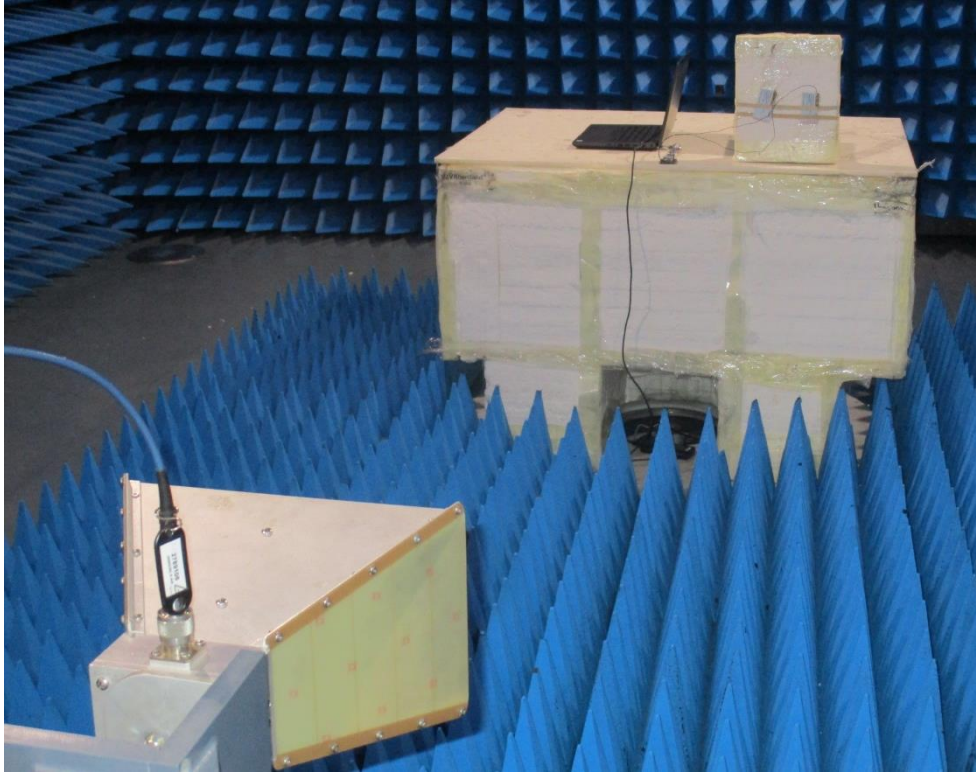
Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.

1. Measurement uncertainty is +/- 5.1 dB
2. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
3. A Peak and Average detector was used with a resolution bandwidth of 1MHz.

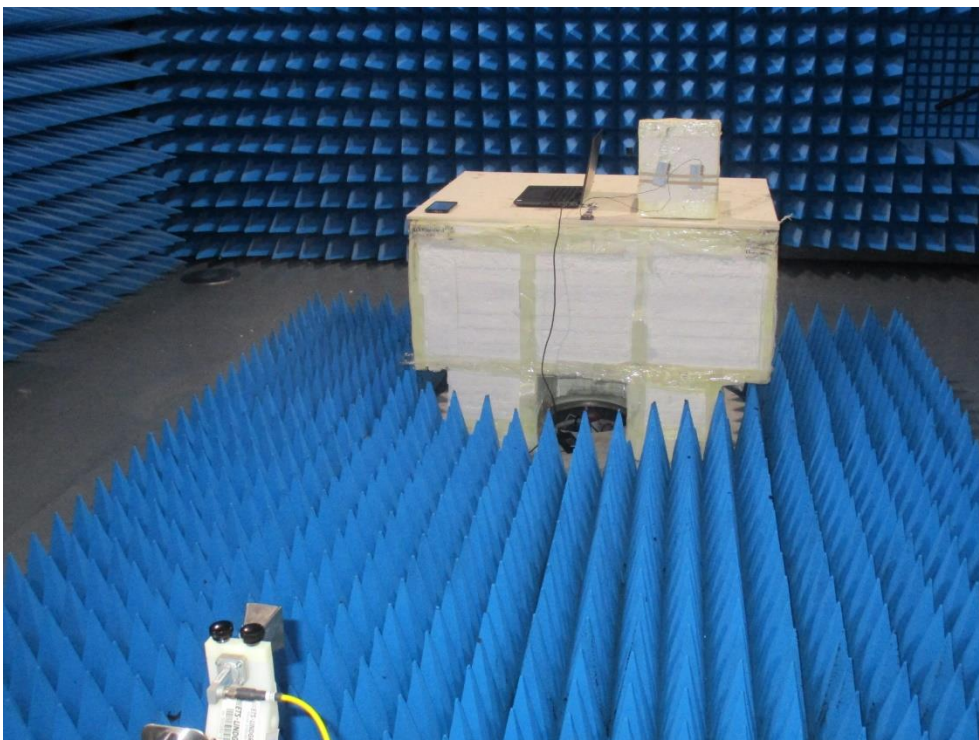
#### Used Equipment

|         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 2790499 | 2789109 | 2788776 | 2789217 | 2789110 | 2789029 | 2789206 | 2789108 | 2789214 |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|

### 3.2.1 Photograph test setup



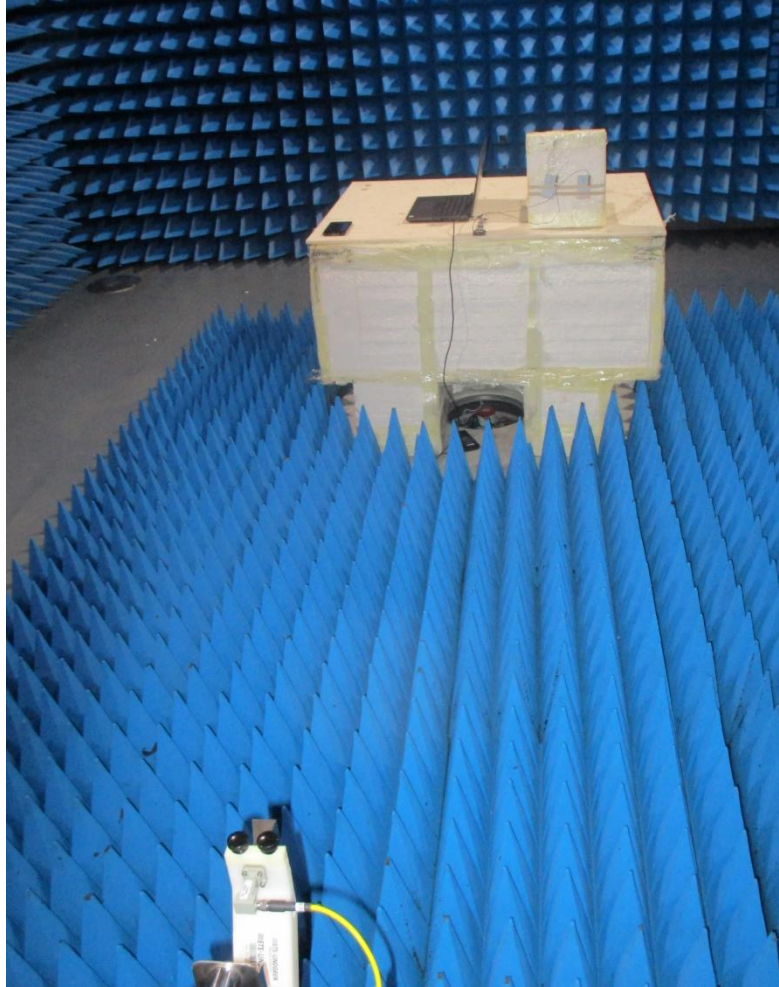
*Photo 2: Photograph radiated emissions 1 – 18 GHz*



*Photo 3: Photograph radiated emissions 18 – 26.5 GHz*

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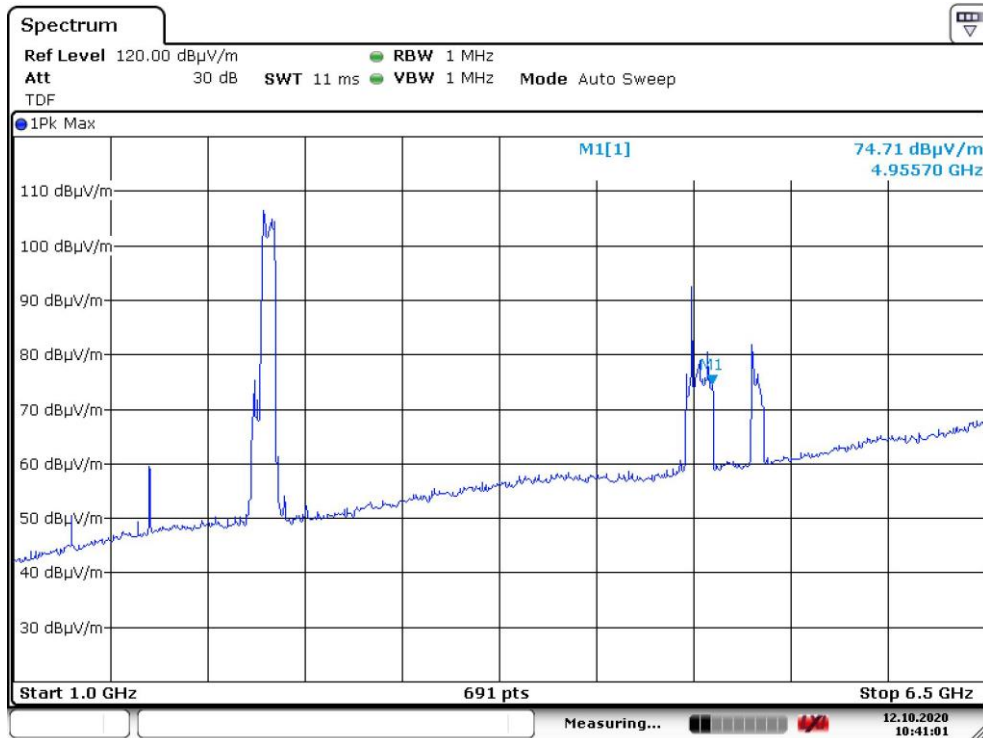


*Photo 4: Photograph radiated emissions 26.5 – 36 GHz*

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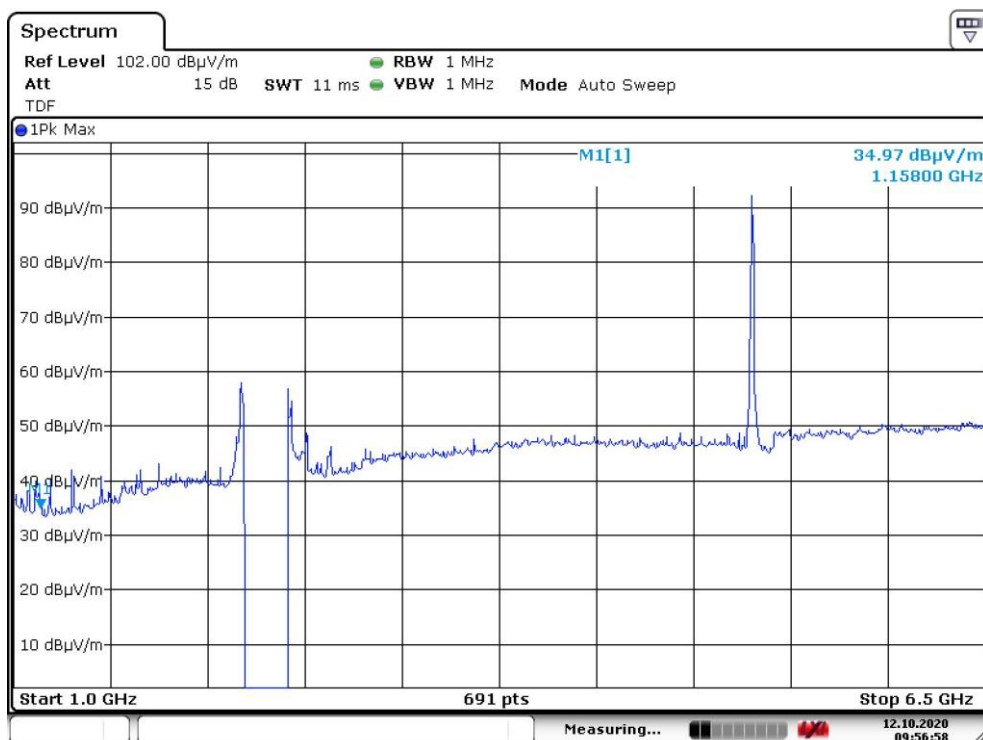
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### 3.2.2 Spectrum plot



Date: 12.OCT.2020 10:41:01

Plot 3: Pre-scan plot with peak detector. Radiated emissions from 1 GHz – 6.5 GHz, 5GHz + BT mode

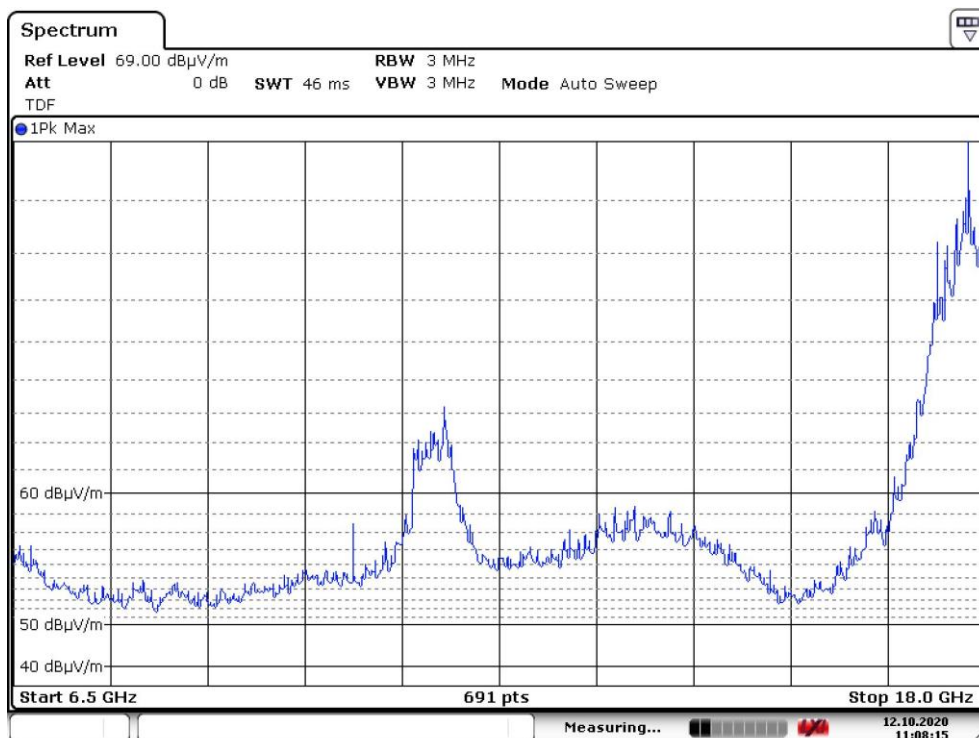


Date: 12.OCT.2020 09:56:59

Plot 4: Pre-scan plot with peak detector. Radiated emissions from 1 GHz – 6.5 GHz, 2.4GHz mode

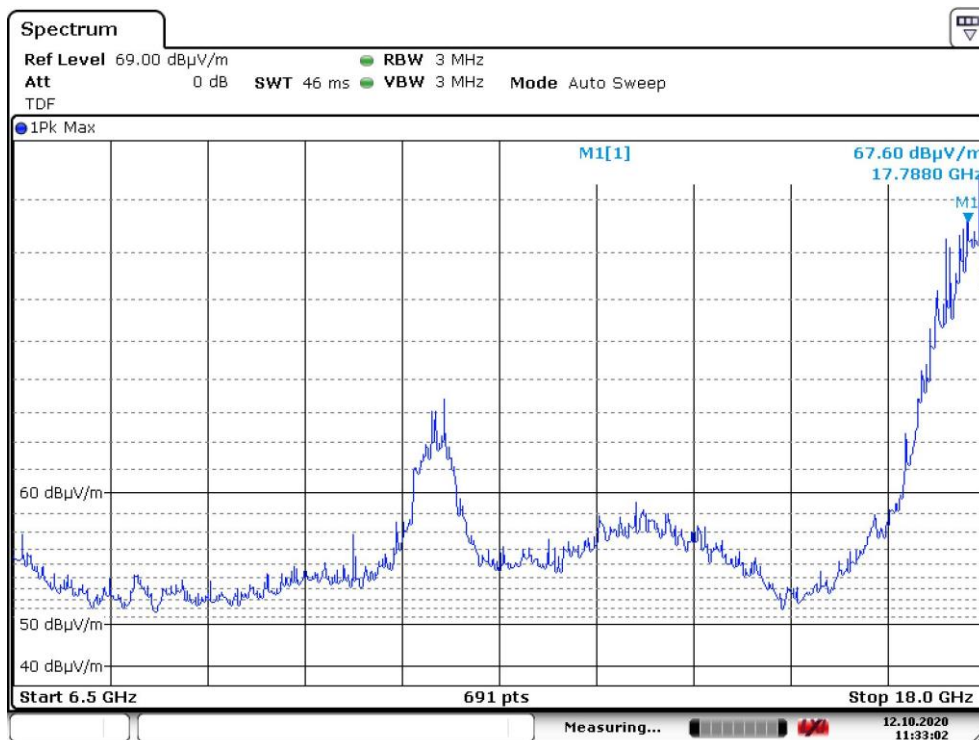
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Date: 12.OCT.2020 11:08:15

Plot 5: Pre-scan plot with peak detector. Radiated emissions from 6.5 GHz – 18 GHz, 5GHz + BT mode

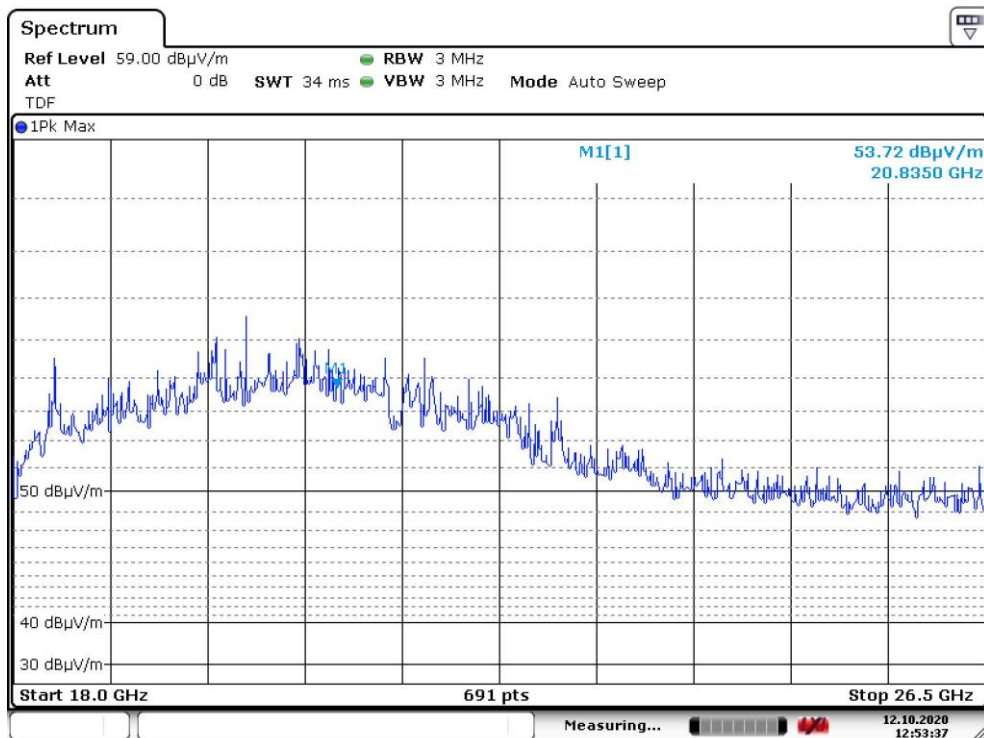


Date: 12.OCT.2020 11:33:03

Plot 6: Pre-scan plot with peak detector. Radiated emissions from 6.5 GHz – 18 GHz, 2.4GHz mode

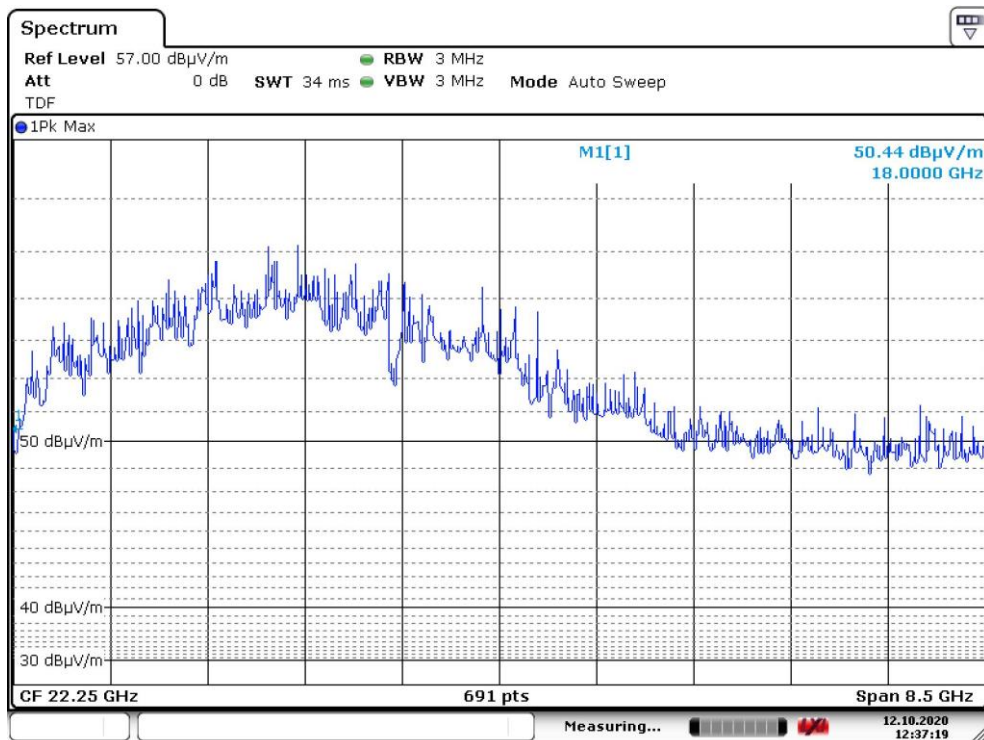
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Date: 12.OCT.2020 12:53:37

Plot 7: Pre-scan plot with peak detector. Radiated emissions from 18 GHz – 26.5 GHz, 5GHz + BT mode

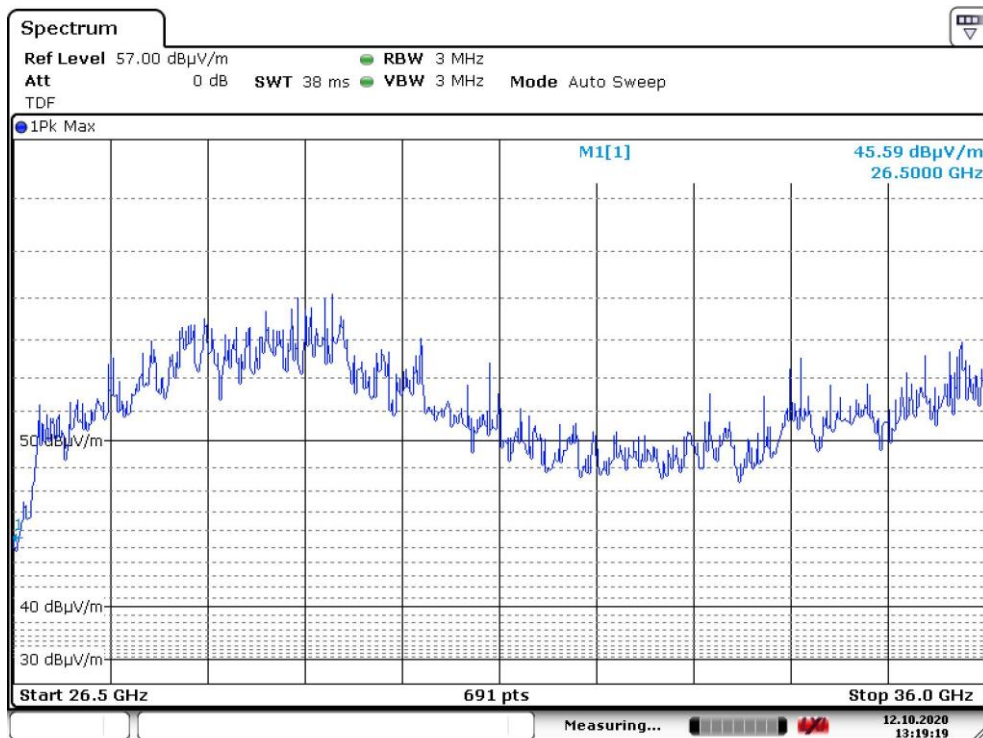


Date: 12.OCT.2020 12:37:20

Plot 8: Pre-scan plot with peak detector. Radiated emissions from 18 GHz – 26.5 GHz, 2.4GHz mode

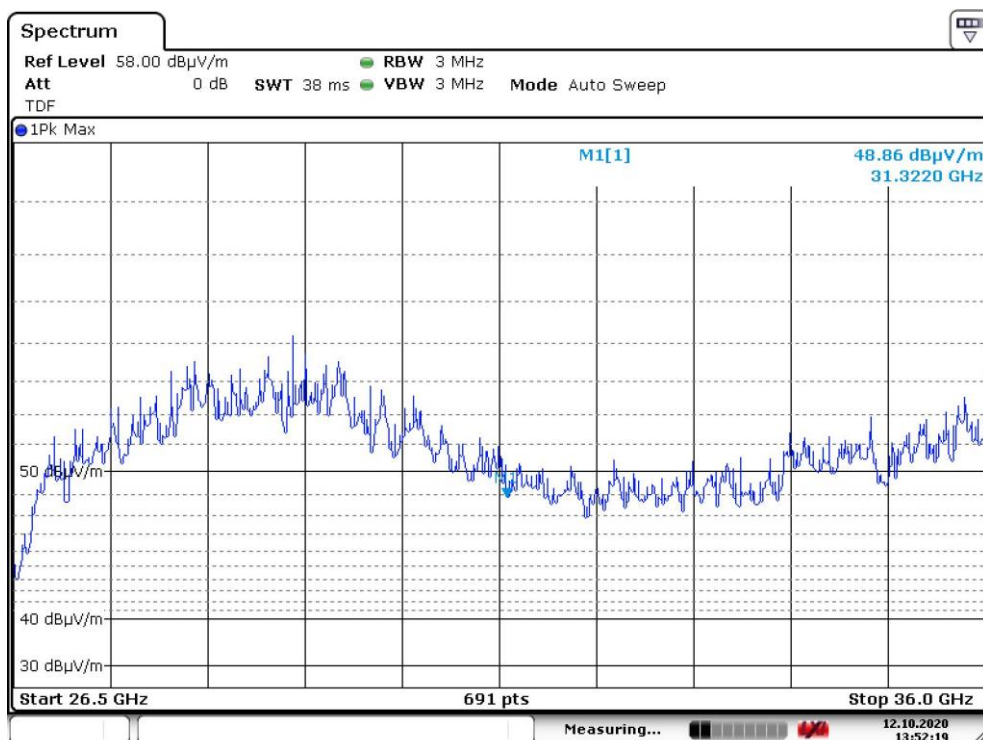
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Date: 12.OCT.2020 13:19:20

Plot 9: Pre-scan plot with peak detector without correction factor.  
Radiated emissions from 26.5 GHz – 36 GHz, 5GHz + BT mode



Date: 12.OCT.2020 13:52:19

Plot 10: Pre-scan plot with peak detector without correction factor.  
Radiated emissions from 26.5 GHz – 36 GHz, 2.4GHz mode

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### 3.3 AC Mains Conducted Emission 0.15-30 MHz

#### 3.3.1 Definition

Result of the measurements concerning the disturbance voltage level at the power input port emitted by the total set-up of the EUT.

#### 3.3.2 Basic standard

The test is performed according to FCC CRF 47 Part 15B § 15.107

#### 3.3.3 Limit

| Frequency (MHz) | Limit<br>Quasi-peak(dB $\mu$ V) | Limit<br>Average(dB $\mu$ V) |
|-----------------|---------------------------------|------------------------------|
| 0.15 - 0.50     | 66.0 – 56.0                     | 56.0 – 46.0                  |
| 0.50 - 5.0      | 56.0                            | 46.0                         |
| 5.0 – 30.0      | 60.0                            | 50.0                         |

#### 3.3.4 Test procedures

Requirements: 15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table above, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Test procedure according to ANSI C63.4-2014: Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50  $\mu$ H / 50  $\Omega$  LISN. The frequency range from 150kHz to 30MHz was examined. The six highest EUT emissions relative to the limit were noted. The EUT was positioned at least 40cm from a vertical ground reference plane and at least 80cm from the LISN.

#### 3.3.5 Test deviation

There is no deviation with the original standard

#### 3.3.6 Test results

| Test conditions     |                                 |               |      |
|---------------------|---------------------------------|---------------|------|
|                     |                                 | Test location | Leek |
| Applied Standard(s) | to FCC CRF 47 Part 15B § 15.107 |               |      |
| Test engineer       | W. Brouwer                      | Test result   | Pass |
| Test date           | October 2, 2020                 |               |      |

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| Results and limits Neutral, 5GHz + Bluetooth mode |                     |       |        |                  |       |        |
|---------------------------------------------------|---------------------|-------|--------|------------------|-------|--------|
| Frequency (MHz)                                   | Quasi peak detector |       |        | Average detector |       |        |
|                                                   | Result              | Limit | Margin | Result           | Limit | Margin |
| 0.53                                              | 37.3                | 56.0  | 18.8   | 22.3             | 46.0  | 23.7   |
| 1.00                                              | 33.1                | 56.0  | 22.9   | 17.8             | 46.0  | 28.3   |
| 6.39                                              | 35.0                | 60.0  | 25.1   | 23.7             | 50.0  | 26.3   |
| 17.18                                             | 35.2                | 60.0  | 24.9   | 27.8             | 50.0  | 22.2   |
| 29.86                                             | 18.3                | 60.0  | 41.7   | 11.9             | 50.0  | 38.1   |
| Results and limits L1, 5GHz + Bluetooth mode      |                     |       |        |                  |       |        |
| Frequency (MHz)                                   | Quasi peak detector |       |        | Average detector |       |        |
|                                                   | Result              | Limit | Margin | Result           | Limit | Margin |
| 0.53                                              | 40.2                | 56.0  | 15.8   | 24.8             | 46.0  | 21.2   |
| 1.00                                              | 32.6                | 56.0  | 23.4   | 15.9             | 46.0  | 30.1   |
| 6.39                                              | 34.6                | 60.0  | 25.5   | 23.7             | 50.0  | 26.3   |
| 17.18                                             | 38.3                | 60.0  | 21.7   | 30.7             | 50.0  | 19.3   |
| 29.86                                             | 16.9                | 60.0  | 43.2   | 10.7             | 50.0  | 39.3   |

Table 5 Results Conducted Emission 0.15 - 30 MHz, 5GHz + BT mode

| Results and limits Neutral, 2.4GHz mode |                     |       |        |                  |       |        |
|-----------------------------------------|---------------------|-------|--------|------------------|-------|--------|
| Frequency (MHz)                         | Quasi peak detector |       |        | Average detector |       |        |
|                                         | Result              | Limit | Margin | Result           | Limit | Margin |
| 0.61                                    | 38.1                | 56.0  | 17.9   | 23.5             | 46.0  | 22.5   |
| 1.57                                    | 31.1                | 56.0  | 24.9   | 13.2             | 46.0  | 32.8   |
| 6.78                                    | 33.7                | 60.0  | 26.3   | 20.6             | 50.0  | 29.4   |
| 8.56                                    | 23.9                | 60.0  | 36.1   | 12.8             | 50.0  | 37.2   |
| 17.20                                   | 31.4                | 60.0  | 28.6   | 24.4             | 50.0  | 25.6   |
| Results and limits L1, 2.4GHz mode      |                     |       |        |                  |       |        |
| Frequency (MHz)                         | Quasi peak detector |       |        | Average detector |       |        |
|                                         | Result              | Limit | Margin | Result           | Limit | Margin |
| 0.61                                    | 41.0                | 56.0  | 15.0   | 26.2             | 46.0  | 19.9   |
| 1.57                                    | 28.3                | 56.0  | 27.7   | 11.9             | 46.0  | 34.1   |
| 6.78                                    | 33.8                | 60.0  | 26.2   | 20.5             | 50.0  | 29.6   |
| 8.56                                    | 23.0                | 60.0  | 37.0   | 12.5             | 50.0  | 37.6   |
| 17.20                                   | 34.6                | 60.0  | 25.4   | 27.5             | 50.0  | 22.5   |

Table 6 Results Conducted Emission 0.15 - 30 MHz, 2.4GHz mode

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.107 and ICES-003 Section 6.1, at the 120 Volts AC mains connection terminals of the system, are depicted in Table 4. Maximum values were recorded. The system is tested as in whole, so with all equipment as shown in Figure 1 in place and functioning. Being the worst case situation.

Notes:

1. Measurement uncertainty is  $\pm 3.5$ dB
2. The resolution bandwidth used was 9 kHz.
3. The six highest values relative to the applicable limits were noted.
4. Photo and Graphical Display is provided on the next page.

Used Equipment

|         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|
| 2789421 | 2790495 | 2788791 | 2789124 | 2788866 | 2790513 | 2789211 |
|---------|---------|---------|---------|---------|---------|---------|

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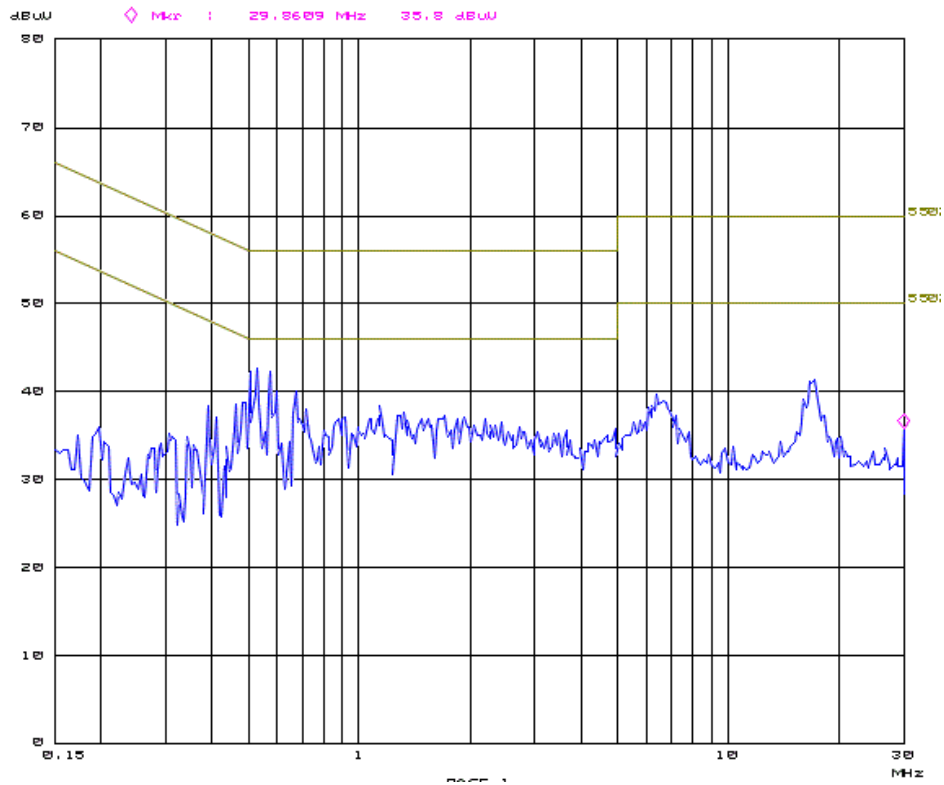
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### 3.3.7 Photograph test setup

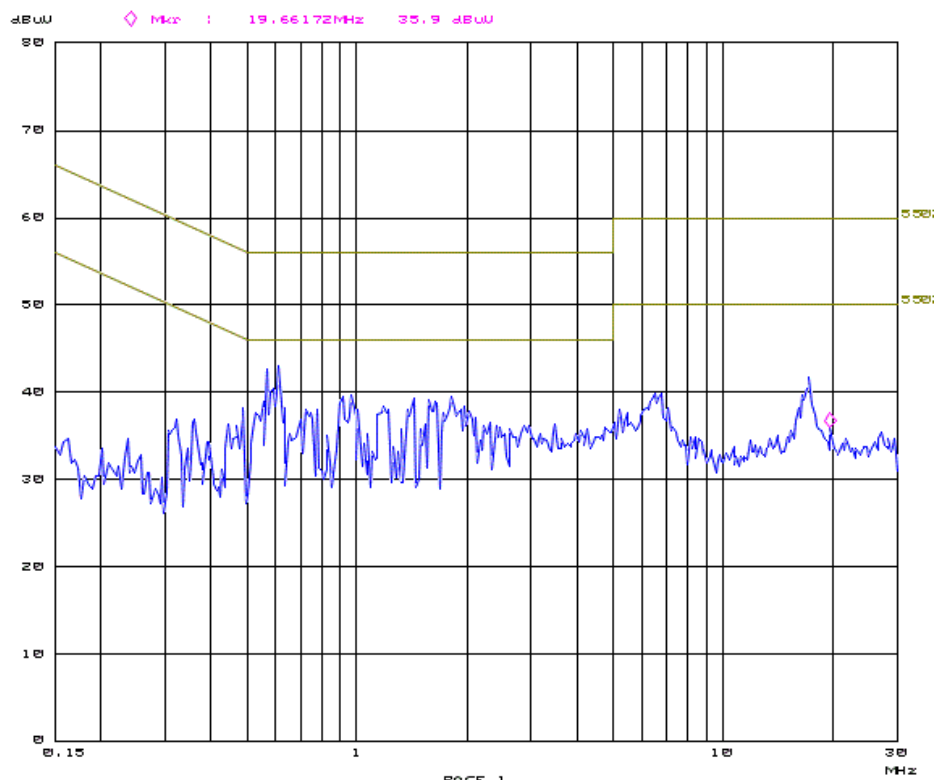


Photo 5: Photograph conducted emissions 0.15-30 MHz

### 3.3.8 Spectrum plot



Plot 11: Pre-scan plot with peak detector. Conducted emissions from 0.15 - 30 MHz, 5GHz + BT mode



Plot 12: Pre-scan plot with peak detector. Conducted emissions from 0.15 - 30 MHz, 2.4GHz mode

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