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| Prüfbericht-Nr.: Test Report No.: | 19111401A.r01 | Auftrags-Nr.: Order No.: | 89003529 | Seite 1 von 49 Page 1 of 49 |
|--|--|--|--|--|
| Kunden-Referenz-Nr.: Client Reference No.: | 1659792 | Auftragsdatur Order date: | m: 23.03.2020 | |
| Auftraggeber: Client: | Nedap N.V. | | | |
| Prüfgegenstand: Test item: | Digital Transmission S | System (DTS) Larr | np driver 4kW, Radio inte | rface |
| Bezeichnung / Typ-Nr.: Identification / Type No.: | Lamp driver 4kW | | | |
| Auftrags-Inhalt: Order content: | Compliance with standard | | | |
| Prüfgrundlage: Test specification: | FCC 47 CFR Part 15, Sub RSS-Gen (Issue 5, March ANSI C63.10-2013 KDB 558074 D0115.247 I | 2019) and RSS-247 | (Issue 2, February 2017) | |
| Wareneingangsdatum: Date of receipt: | 23.04.2020 | | - | I |
| Prüfmuster-Nr.: Test sample No.: | Sample 1 (radiated tests) Sample 3 (conducted tests | S) | | kine the transformer of the tran |
| Prüfzeitraum: Testing period: | 28.04.2020 - 13.05.2020 | LAMPER 4W EMC SAMPLE 2 | | |
| Ort der Prüfung: Place of testing: | Leek | | | |
| Prüflaboratorium: Testing laboratory: | TÜV Rheinland Nederland B. Leek Laboratory | V. | | |
| Prüfergebnis*: Test result*: | PASS | | | |
| geprüft von / tested by: | | Kontrolliert vo | n / reviewed & approved by | r: |
| 8-Jun-20 Richard van der | Meer/ Test Engineer | 8-Jun-20 Eri | k van der Wal, Senior Expe | rt Telecom |
| Datum N | Name / Stellung Unte | erschrift Date ature Date | um Name / Stellung | |
| Sonstiges / Other: report iss | ue date is equal to approved da | ite. | | |
| Zustand des Prüfgegenstar Condition of the test item at c | | | imuster vollständig und unb t item complete and undam | |
| * Legende: 1 = seh P(ass) | rr gut 2 = gut = entspricht o.g. Prüfgrundlage(n) | 3 = befriedigend F(ail) = entspricht nicht o.g. | 4 = ausreichend Prüfgrundlage(n) N/A = nicht anwe | |
| | y good 2 = good = passed a.m. Test specification(s) | 3 = satisfactory F(ail) a.m. test specification | 4 = sufficient $N/A = not applications$ | 5 = poor $Bold N/T = not tested$ |
| This test report only relat | es to the a.m. testsample. With duplicated in extracts. This rep | | | not permitted to be |

FCC ID: CGDLD4KW IC: 1444A-LD4KW

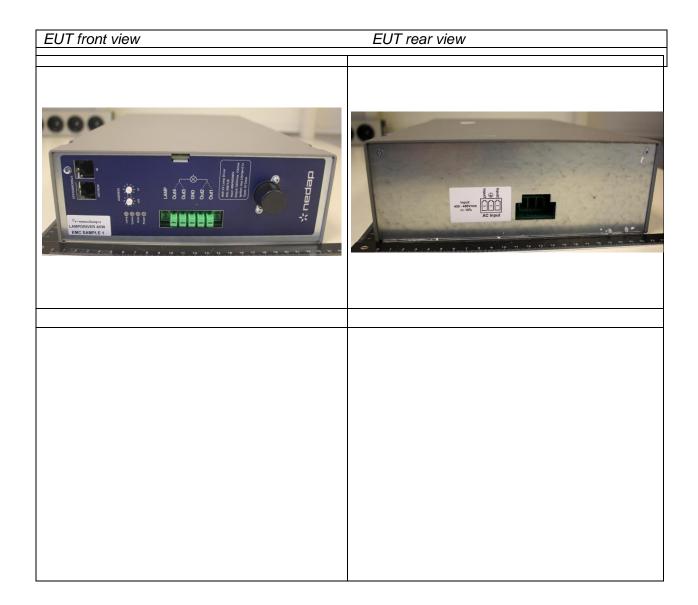


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TÜV Rheinland Nederland B.V. · Eiberkamp 10 · 9351 VT Leek · Tel: + 31 88 8887888 Mail: <u>info@nl.tuv.com</u> · Web: www.tuv.com







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TEST SUMMARY

| Test Specification Clause | Test Case | Pass | Fail | Not applicable | Not performed |
|---------------------------------|---|-----------|------|-------------------|------------------|
| §15.247(a2) | Spectrum Bandwidth of a DTS System / 6dB BW | \square | | | |
| § 15.247 (b) (3) | Maximum output power (conducted) | \square | | | |
| §15.247 (e) | Peak power spectral density | \square | | | |
| §15.247 (d) | Band-edge compliance of conducted emissions | | | | |
| §15.205 | Band-edge compliance of radiated emissions | \square | | | |
| §15.247 (d) | Spurious Emission - conducted (Transmitter) | \square | | | |
| § 15.209 | Spurious Emission - radiated (Transmitter) | \square | | | |
| § 15.207 | AC Power Line Conducted Emissions <30 MHz | \square | | | |

| | | Revisions <i>Revisions</i> | |
|-----------------------------|---------------------------|-------------------------------|---------------------|
| Revision Revision | Datum Date | Anmerkung Remark | Verfasser Author |
| - | 08.06.2020 | First release | R. van der Meer |
| Note: Latest re | evision report will repla | ce all previous reports | |





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1. General Remarks

1.1.1 Complementary Materials

There is no attachment to this test report.

1.1.2 Special Accessories

None.

1.1.3 Equipment modifications

None





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2. Test Sites

2.1 Test Facilities

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meters. The site is listed with the FCC and ISED and accredited by RvA (Cert #L484). The 3 meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located in Leek, 9351VT Eiberkamp 10, 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 Designation Number NL0005 (test site 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 CABID number NL0002 (test site 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.

Normal test conditions:

Temperature (*): +15°C to +35°CRelative humidity(*): 20 % to 75 %Supply voltage: 400 Vac.

(*)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.





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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

| For Antenna Port Conducted Emissions Temperature- Humiditymeter Extech SD500 2789213 06/2019 06/2020 Spectrum Analyzer Rohde & Schwarz FSV 2790260 07/2018 07/2020 Power supply Chroma 61705 2790478 01/2020 01/2020 Power supply Chroma 61705 2790478 07/2019 07/2020 For Radiated Emissions WF 2789116 /A00347 07/2019 07/2020 For Radiated Emissions Rohde & Schwarz ERC7 2790497 07/2019 07/2020 Fr Cable S-AR Gigalink APG0500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply Chroma 61705 2790478 01/2020 01/2021 Test facility Comtest FSV 2790106 07/2018 07/2020 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Spect | Kind of Equipment | Manufacturer | Model Name | Inventory number | Calibration date (mm/yyyy) | Calibration due date (mm/yyyy) |
|---|---------------------------|------------------|-------------------|---------------------|----------------------------------|--------------------------------------|
| Humiditymeter Extectin SD300 2789213 06/2013 06/2013 Spectrum Analyzer Rohde & Schwarz FSV 2790260 07/2018 07/2020 Power supply Chroma 61705 2790478 01/2020 01/2021 RF Cable Rohde & Schwarz WF 2789116 /A00347 07/2019 07/2020 For Radiated Emissions WF 2790497 07/2019 07/2020 RF Cable S-AR Gigalink APG6500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply Chroma 61705 2790478 01/2020 01/2021 400Vac/60Hz Chroma 61705 2790478 01/2020 01/2021 Test facility Comtest FCC listed: 786213 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 | For Antenna Port Cond | lucted Emissions | | · | | |
| Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 01/2021 RF Cable Rohde & Schwarz WF 2789116 (A00347 07/2019 07/2020 For Radiated Emissions Mesurement Receiver Rohde & Schwarz ERC7 2790497 07/2019 07/2020 RF Cable S-AR Gigalink APG0500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 03/2020 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Guidehom 1-18 GHz EMCO 3115 2789714 06/2019 06/2020 Guidehom 1-8 GHz | | Extech | SD500 | 2789213 | 06/2019 | 06/2020 |
| 400Vac/60H2 Chroma 61705 2190478 01/2020 01/2021 RF Cable Rohde & Schwarz WF 2789116 07/2019 07/2020 For Radiated Emissions Measurement Receiver Rohde & Schwarz ERC7 2790497 07/2019 07/2020 RF Cable S-AR Gigalink APG0500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 03/2021 Test facility Comtest FCC listed: 786213 IC: 2932G-2 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 278914 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2789148/ 2790233 01/2018 01/2021 Ampl | | Rohde & Schwarz | FSV | 2790260 | 07/2018 | 07/2020 |
| RF Cable Ronde & Schwarz WF /A00347 07/2019 07/2020 For Radiated Emissions Measurement Receiver Rohde & Schwarz ERC7 2790497 07/2019 07/2020 RF Cable S-AR Gigalink APG0500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 03/2021 Test facility Comtest FCC listed: 786213 IC: 2932G-2 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2788777 02/2019 02/2022 Guidehorn 1-8-6.5 GHz ETS-Lindgren 3160-09 2789824 01/2018 01/2020 | | Chroma | 61705 | 2790478 | 01/2020 | 01/2021 |
| Measurement Receiver Rohde & Schwarz ERC7 2790497 07/2019 07/2020 RF Cable S-AR Gigalink APG0500 2789217 03/2020 03/2021 Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 01/2021 Test facility Comtest FCC listed: 786213 IC: 2932G-2 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1.18 GHz EMCO 3115 2788777 02/2018 01/2021 Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789137 N/A N/A Bandpass filter 4-10 GHz | RF Cable | Rohde & Schwarz | WF | | 07/2019 | 07/2020 |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | For Radiated Emission | S | | | | |
| Controller Maturo SCU/088/ 8090811 A00450 N/A N/A Power supply 400Vac/60Hz Chroma 61705 2790478 01/2020 01/2021 Test facility Comtest FCC listed: 786213 IC: 2932G-2 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2788777 02/2019 02/2022 Guidehorn 1-8 GHz ETS-Lindgren 3160-09 2789842 01/2018 01/2021 Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789343 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-GHz <td>Measurement Receiver</td> <td>Rohde & Schwarz</td> <td>ERC7</td> <td>2790497</td> <td>07/2019</td> <td>07/2020</td> | Measurement Receiver | Rohde & Schwarz | ERC7 | 2790497 | 07/2019 | 07/2020 |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | RF Cable S-AR | Gigalink | APG0500 | 2789217 | 03/2020 | 03/2021 |
| 400Vac/60Hz Chroma 61705 2790478 01/2020 01/2020 Test facility Comtest FCC listed: 786213 IC: 2932G-2 2789009 03/2020 03/2020 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2789777 02/2019 02/2022 Guidehorn 18-26.5 GHz ETS-Lindgren 3160-09 278982 01/2018 01/2020 Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 278894 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 278924 N/A N/A Bandpass filter 10-26 GHz | | Maturo | | A00450 | N/A | N/A |
| Test facility Comtest 786213 IC: 2932G-2 2789009 03/2020 03/2022 Spectrum Analyzer Rohde & Schwarz FSV 2790106 07/2018 07/2020 Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2788777 02/2019 02/2022 Guidehorn 1-8 GHz ETS-Lindgren 3160-09 2789822 01/2018 01/2021 Amplifier 18-40 GHz EcntricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788937 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter Reactel 005/26.5G- 511 2788924 N/A N/A D-26 GHz Miteq< | | Chroma | 61705 | 2790478 | 01/2020 | 01/2021 |
| Antenna mast+control Innco CO3000 9002463 N/A N/A Temperature- Humiditymeter Extech SD500 2789214 06/2019 06/2020 Guidehorn 1-18 GHz EMCO 3115 2788777 02/2019 02/2022 Guidehorn 1-18 GHz EMCO 3115 2788777 02/2019 02/2022 Guidehorn 18-26.5 GHz ETS-Lindgren 3160-09 278948/ 2790233 01/2018 01/2021 Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788037 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 005/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | Test facility | Comtest | 786213 | 2789009 | 03/2020 | 03/2022 |
| Temperature-HumiditymeterExtechSD500278921406/201906/2020Guidehorn 1-18 GHzEMCO3115278877702/201902/2022Guidehorn 18-26.5 GHzETS-Lindgren3160-09278898201/201801/2021Amplifier 18-40 GHzETS-Lindgren2160-092789148/ 279023311/201911/2020RF Cable 18-40 GHzCentricRFC6464-160-120900199612/201912/2020Biconilog TestantennaTeseqCBL 6111D278923710/201910/20202.4 GHz bandreject filterBSCXN-1783278837N/AN/ABandpass filter 4-10 GHzReactel7AS-7G-6G- 511278904N/AN/ABandpass filter 10-26 GHzReactel9HS- 10G/26.5G- S11278924N/AN/APreamplifier 0.5 - 18 GHzMiteqAMF-5D- 005180-28- 13p2789021N/AN/A | Spectrum Analyzer | Rohde & Schwarz | FSV | 2790106 | 07/2018 | 07/2020 |
| HumiditymeterExtecnSD500278921406/201906/2019Guidehorn 1-18 GHzEMCO3115278877702/201902/2022Guidehorn 18-26.5 GHzETS-Lindgren3160-09278988201/201801/2021Amplifier 18-40 GHzCentricRFC6464-160-120900199612/201911/2020Biconilog TestantennaTeseqCBL 6111D278923710/201910/20202.4 GHz bandreject filterBSCXN-1783278837N/AN/ABandpass filter 4-10 GHzReactel7AS-7G-6G- 5112789244N/AN/ABandpass filter 10-26 GHzReactel9HS- 10G/26.5G- S11278924N/AN/APreamplifier 0.5 - 18 GHzMiteqAMF-5D- 005180-28- 13p2789021N/AN/A | Antenna mast+control | Innco | CO3000 | 9002463 | N/A | N/A |
| Guidehorn 18-26.5 GHz ETS-Lindgren 3160-09 2788982 01/2018 01/2021 Amplifier 18-40 GHz 2789148/ 2790233 11/2019 11/2020 RF Cable 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788937 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | | Extech | SD500 | 2789214 | 06/2019 | 06/2020 |
| Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788837 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | Guidehorn 1-18 GHz | EMCO | 3115 | 2788777 | 02/2019 | 02/2022 |
| Amplifier 18-40 GHz CentricRF C6464-160-120 9001996 12/2019 12/2020 Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788837 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | Guidehorn 18-26.5 GHz | ETS-Lindgren | 3160-09 | 2788982 | 01/2018 | 01/2021 |
| Biconilog Testantenna Teseq CBL 6111D 2789237 10/2019 10/2020 2.4 GHz bandreject filter BSC XN-1783 2788837 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | Amplifier 18-40 GHz | | | | 11/2019 | 11/2020 |
| 2.4 GHz bandreject filter BSC XN-1783 2788837 N/A N/A Bandpass filter 4-10 GHz Reactel 7AS-7G-6G- 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | RF Cable 18-40 GHz | CentricRF | C6464-160-120 | 9001996 | 12/2019 | 12/2020 |
| Bandpass filter 4-10 GHzReactel7AS-7G-6G- 5112788904N/AN/ABandpass filter 10-26 GHzReactel9HS- 10G/26.5G- \$112788924N/AN/APreamplifier 0.5 - 18 GHzMiteqAMF-5D- 005180-28- 13p2789021N/AN/A | Biconilog Testantenna | Teseq | CBL 6111D | 2789237 | 10/2019 | 10/2020 |
| Bandpass filter 4-10 GHZ Reactel 511 2788904 N/A N/A Bandpass filter 10-26 GHz Reactel 9HS- 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | 2.4 GHz bandreject filter | BSC | | 2788837 | N/A | N/A |
| Bandpass filter 10-26 GHz Reactel 10G/26.5G- S11 2788924 N/A N/A Preamplifier 0.5 - 18 GHz Miteq AMF-5D- 005180-28- 13p 2789021 N/A N/A | Bandpass filter 4-10 GHz | Reactel | 511 | 2788904 | N/A | N/A |
| Preamplifier Miteq 005180-28- 2789021 N/A N/A 0.5 - 18 GHz 13p 13p <td< td=""><td></td><td>Reactel</td><td>10G/26.5G- S11</td><td>2788924</td><td>N/A</td><td>N/A</td></td<> | | Reactel | 10G/26.5G- S11 | 2788924 | N/A | N/A |
| | | Miteq | 005180-28- | 2789021 | N/A | N/A |
| | Filterbox | EMCS | | 2789029 | 11/2019 | 11/2020 |





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| Kind of Equipment | Manufacturer | Model Name | Inventory number | Calibration date (mm/yyyy) | Calibration due date (mm/yyyy) |
|--|-----------------|------------|---------------------|----------------------------------|--------------------------------------|
| For AC Powerline Conducted Emissions | | | | | |
| Pulse limiter | R&S | ESH3-Z2 | 2788823 | 09/2019 | 09/2020 |
| Variac | RFT | LSS020 | 2788944 | NA | NA |
| LISN | R&S | ESH2-Z5 | 2788791 | 06/2018 | 06/2020 |
| Measurement Receiver | Rohde & Schwarz | ESCS30 | 2789421 | 11/2019 | 11/2020 |
| Shielded room for Conducted emissions | | | 2789207 | NA | NA |
| Temperature-Humidity meter | Extech | SD500 | 2789213 | 06/2019 | 06/2020 |
| Power supply 400Vac/60Hz | Chroma | 61705 | 2790478 | 01/2020 | 01/2021 |

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing. NA= Not Applicable

Accreditation

The reported tests were performed under ISO17025:2005 accreditation, unless otherwise specified as 'not under Accreditation'

An overview of all TÜV Rheinland Nederland B.V. accreditations, notifications and designations, please visit our website <u>www.tuv.com/nl</u>. You can find the relevant declarations under the download link.

2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

| Measurement Type | Frequency | Uncertainty |
|-----------------------------------|----------------|-------------|
| Antenna Port Conducted Emission | < 1.3GHz | 1.7dB |
| | 1.3 - 40GHz | 2.9 – 3.4dB |
| Radiated Emission | 150kHz - 30MHz | ±5.0dB |
| | 30MHz - 1GHz | ±5.0dB |
| | > 1GHz | ±5.5dB |
| AC Power Line Conducted Emissions | 150kHz - 30MHz | ±3.5dB |





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3. General Product Information

The EUT is designed to operate in the 2.4 GHz ISM frequency band. The EUT utilizes communication Protocol based RF Interface:

Protocol: Bluetooth Low Energy (BLE)

The PCB implementation is based on a M41W9VT4 chipset. Bluetooth v4.2 Low Energy compliant 1 Mbps GFSK modulation. The EUT, has 1 antenna for transmitting and receiving.

| Technical Specifications | Value |
|--------------------------|-------------------------------|
| Operating Frequency band | 2402 – 2480 MHz , Non Hopping |
| Modulation | GFSK 1Mbps |
| Antenna Gain | 5.3 dBi |

There are no interface ports present on the EUT.

3.1 Countermeasures to achieve compliance

No additional measures were employed to achieve compliance.

3.2 Operation Modes

Testing was performed at the lowest operating frequency (2402 MHz), at the operating frequency in the middle of the specified frequency band (2440 MHz) and at the highest operating frequency (2480 MHz). These operation modes were selected after review of the capabilities and characteristics of the EUT.

| Modulation | Power level | Test frequencies (MHz) | | | | | Test frequencies (MHz) | | z) |
|------------|-------------|------------------------|--------|---------|--|--|------------------------|--|----|
| | Setting | Lowest | Middle | Highest | | | | | |
| BLE | 31 (=Max) | 2402 | 2440 | 2480 | | | | | |





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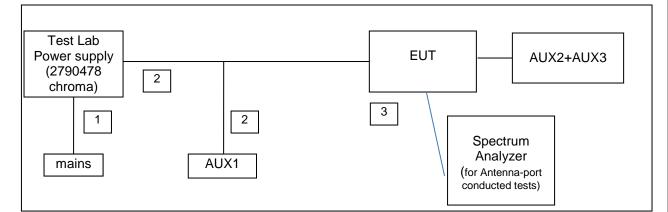
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3.3 Physical Configuration for Testing

The EUT was tested on a stand-alone basis as per Figure 1 for the antenna port conducted tests and with lamp driver and motion detector.

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 C63.10-2013.

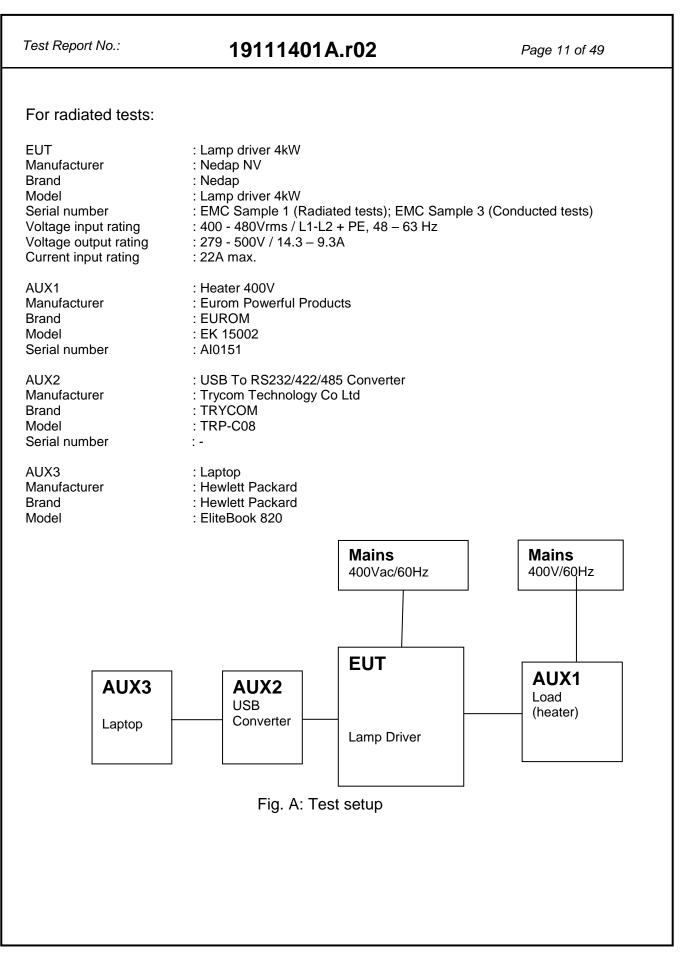
Figure 1: Test Setup Diagram – antenna port conducted tests and programming.



| No. | Port | From | То | Remarks |
|-----|--------------|--------------|----------------------|-----------------|
| 1. | Mains | Mains | Power Supply | - |
| 2. | AC Power | Power Supply | EUT+AUX1 | - |
| 3. | Antenna port | EUT | Spectrum analyzer | Conducted tests |
| | | | | |





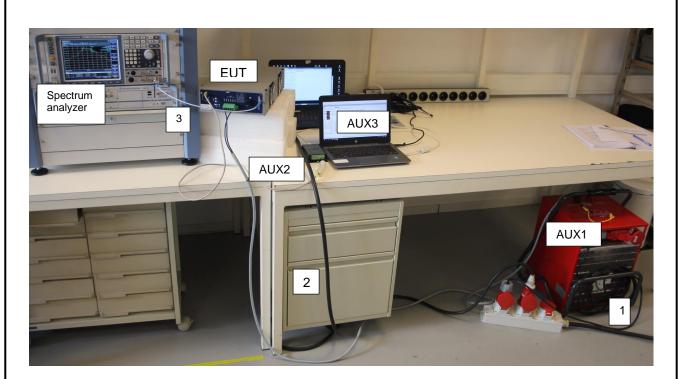






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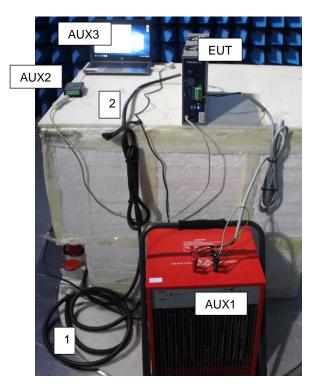


Figure 3: Test Setup Photos – radiated tests





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3.4 Test Software

The test modes were set by using Windows program ControlTool4kW-FCC-1.5. This software was running on a laptop computer (AUX3). It was used to enable the test operation modes below, as appropriate.

Dedicated samples was provided by the applicant for conducted and radiated emissions tests.

Screenshot of the software:

| 🎇 Nedap ControlTool 4kW (0.0 | .1.5) | | | | - | |
|-------------------------------------|---------------------------|---|---------------------------|---|--|-----------|
| File Settings Help | | | | | | |
| Activate all Monitoring I | mode | | | | | |
| 4kW driver | | | | | | |
| Rx/Tx Activate | 4kW | driver | | | | |
| Firmware (Major.Minor.Relea | ase.Build): 0 . 0 | . 3 . 4 Firmwar | e Version Secondary: 2 | | | Sw update |
| Power 9 W Vlamp 0 V Iprim 1 m | Control Direct O Phase | Max Power 40 Run current max. 150 Warmup Current 170 | | opude | Varning 🗌 Reset Wa ault 🗌 Reset Fai | - |
| Vin 408 V Vout 0 V Iout 0 m | Full range 🗌 | Voltage 10 Ignition voltage 10 Ignition duration 10 | 00 V 00 V Erequency | Normal Message 2402MHz 3125 0 Reset |] | |
| Status | Primary | | | Temperatures (°C): | Secondary Fanstate | |
| Driver state: 2 | VoutPK (V): 574 | SyncAmplIPos: 1165 | SyncItDel: 65534 | Halfbridge 31.6 | RPM1 | 3113 |
| Fault state id: 0 | VignPK (V): 261 | SyncAmplINeg: 221 | SyncItHigh: 1 | PFC 32.2 | RPM2 | 3149 |
| Fault value: 0 | Phase: 0 | | | Rectifier 35.8 | Fan Current | 269 |
| Fault class: | IBus: 17 | Range: 4 | | Ambient 31.2 | Leak A | -0.3 |
| Warning state id: 0 | DcBus: 567 | Mains Freq: 50.0 | Cext: 0.0 | Airflow 29.9 | Leak B | -0.3 |
| Warning value: 0 | BusMid: 284 | Mains Duty: 49.9 | Tper: 1833 | Ext Trf 0.0 | Leak Gnd | -0.6 |
| TTFailure (min): | Line: 2918 | Airflow 1.1 | PrimCurrPhase: 0 | Humidity(%) 24.1 | Gnd¥ Out12Div | -0.4 |
| | Neutral: 2914 | 3V3 (mV): 8 | Ext¥outPhase: 131 | LampDC 0.1 | Out34Div | 26.6 |
| | GndCheck: 3316.0 | 4¥ (m¥): 4539 | ExtCurrPhase: 129 | | 12¥ iso | 10344 |
| | Ycm: 0 | 20¥ (m¥): 15498 | PhaseRefPhase: 0 | | Iso Test V | 51.8 |
| Serial number: 2100 | 104332 | Modbus id | :1 ~ | J | J | |
| Serial port no.:5 Baud rate:11520 | 0 | | | | | |

3.5 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:





Test Report No.: 19111401A.r02 Page 14 of 49 4. **Test Results** 4.1.1 DTS (6dB) and 99% Bandwidth **RESULT: PASS** Date of testing: 2020-05-06 **Requirements:** FCC 15.247(a)(2) and RSS-247 Section 5.2(1) For systems using digital modulation in the 2400-2483.5MHz band, the 6dB bandwidth shall be at least 500kHz. For 99% Bandwidth: RSS-Gen Section 4.6.1: No requirement is given. Test procedure 6dB bandwidth: ANSI C63.10-2013 section 11.8.1 Option 1 A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 100kHz, video bandwidth to 300kHz and the span wide enough to capture the modulated carrier. For 99% Bandwidth: Test procedure: RSS-Gen. The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission sideskirts. The resolution bandwidth shall be set as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 1% of the selected span, Video bandwidth was set to 3 times the resolution bandwidth. The span was set to capture the whole modulation process. The Spectrum analyzers automated function for 99% BW was used. Measurement uncertainty is +/-

Plots A1,B1 and C1 shown on the next pages are of the 6 dB bandwidth. Plots A2,B2 and C2 shown on the next pages are of the 99% bandwidth



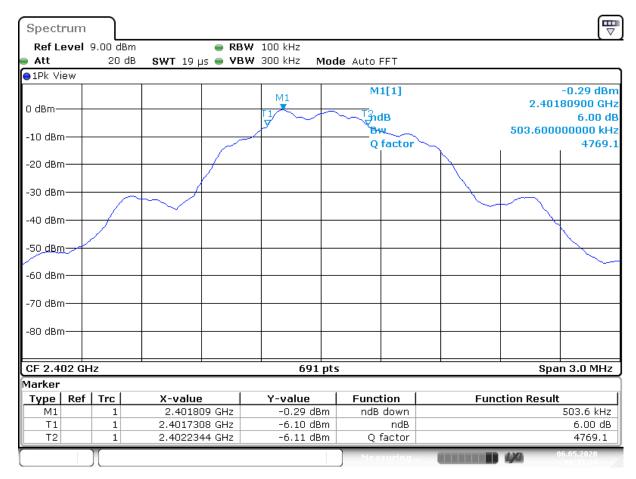


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6dB and 99% Bandwidth

| Operating Frequency [MHz] | 99% Bandwidth [kHz] | 6dB Bandwidth [kHz] | Limit [kHz] | Verdict [Pass/Fail] | Plot number |
|---------------------------------|---------------------------|---------------------------|----------------|------------------------|----------------|
| 2402 | 1034 | 503.6 | >500 | Pass | A1/A2 |
| 2440 | 1034 | 503.6 | >500 | Pass | B1/B2 |
| 2480 | 1037 | 508.0 | >500 | Pass | C1/C2 |



Date: 6 M AY 2020 08:41:24

Plot A1



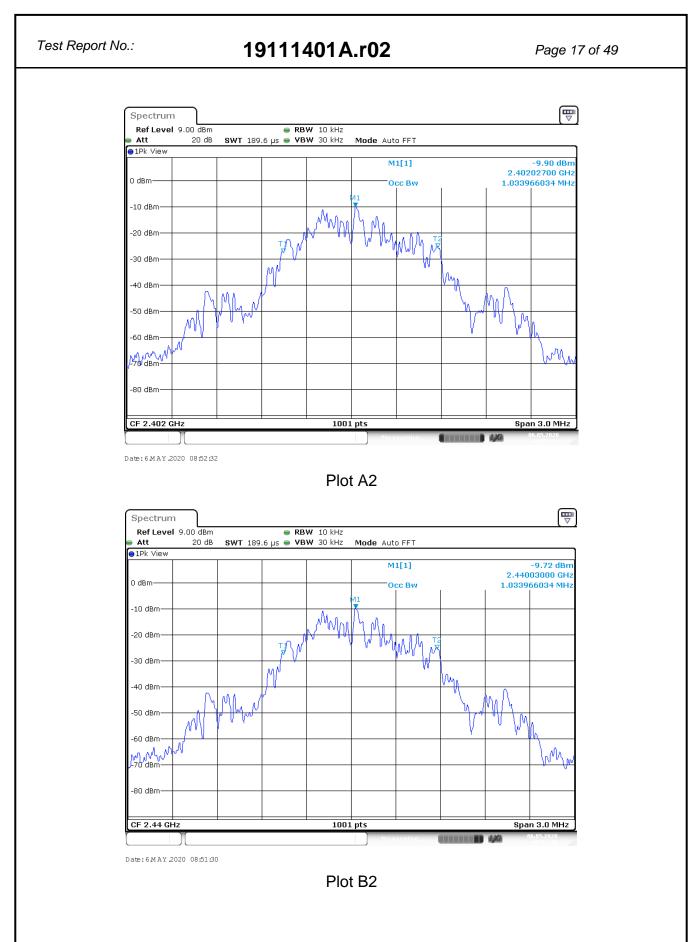




Plot C1

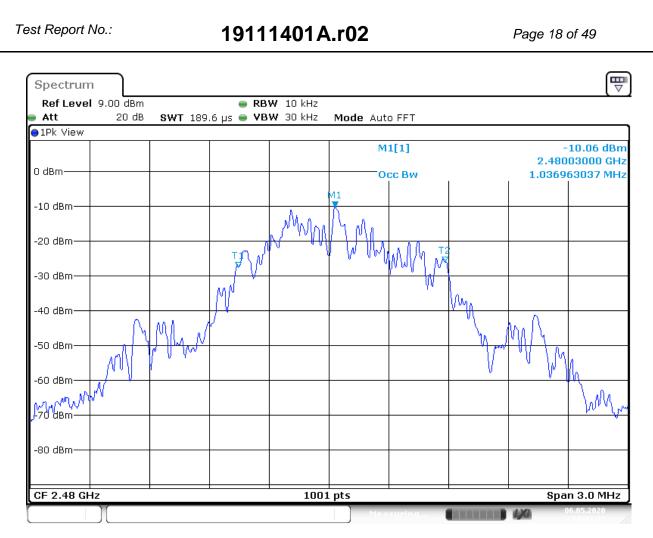












Date: 6 MAY .2020 08:47:24

Plot C2





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4.1.2 Conducted Output Power

RESULT: PASS

Date of testing:

2020-05-06

Requirements:

FCC 15.247(b)(3)

For systems using digital modulation in the 2400-2483.5 MHz band, the maximum peak output power is 1W (+30dBm).

RSS-247 section 5.4(4): the e.i.r.p. shall not exceed 4 W (+36 dBm).

Test procedure:

The Peak Conducted Output Power was measured using the method according to section 11.9.1.1 in ANSI C63.10-2013.

The maximum peak output power (conducted) was measured at the antenna connector with a spectrum analyzer. The final measurement takes into account the loss generated by all the involved cables.

Measurement uncertainty is +/- 0.7 dB.

Notes: $mW = 10 \land (dBm/10)$ dBm = 10 x log(mW)

plots : Peak power plots,

Figures 1a, 1b and 1c show plots of the Peak Power outputs, correction factors (= 0.01 dB Cable loss) included in the reading.





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Conducted Output Power

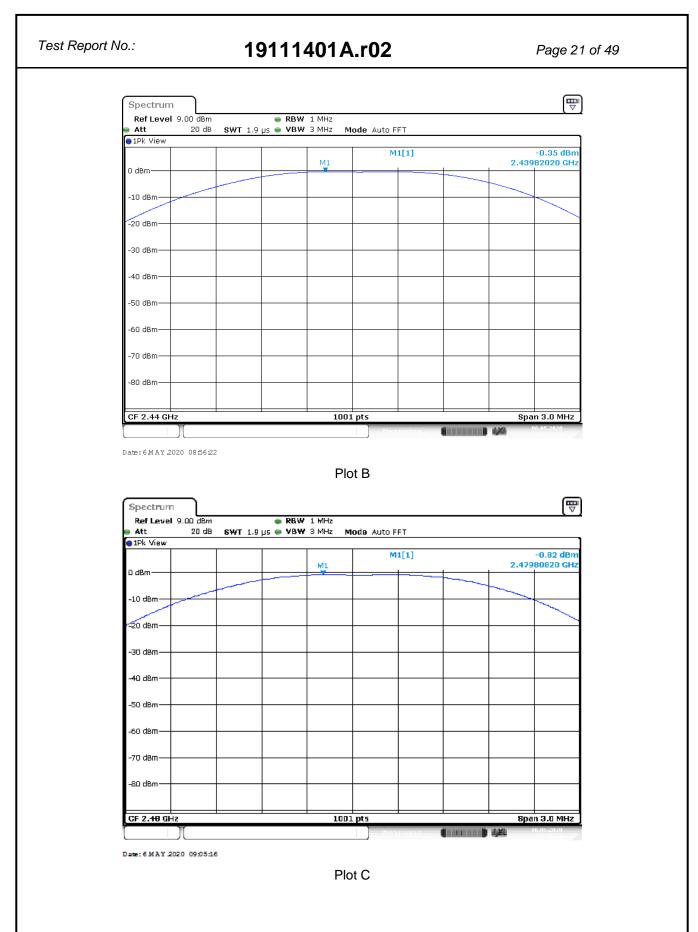
| Frequency | Output Power | Limit | Verdict | Plot number |
|-----------|-------------------------|----------------|-------------|-------------|
| [MHz] | [W] | [W] | [Pass/Fail] | |
| 2402 | 0.00089 (-0.50 dBm) | 1 (+30 dBm) | Pass | 1A |
| 2440 | 0.00092 (-0.35 dBm) | 1 (+30 dBm) | Pass | 1B |
| 2480 | 0.00083 (-0.82 dBm) | 1 (+30 dBm) | Pass | 1C |

| | е RBW 1 MHz 1.9 µs е VBW 3 MHz М 6 | ode Auto FFT | |
|--------------|--|--------------|---------------|
| ●1Pk View | | M1[1] | -0.50 dBi |
| | M1 | milil | 2.40180820 GF |
| 0 dBm | | | |
| -10 dBm | | | |
| | | | |
| -20 dBm | | | |
| -30 dBm | | | |
| | | | |
| -40 dBm | | | |
| | | | |
| -50 dBm | | | |
| -60 dBm | | | |
| | | | |
| -70 dBm | | | |
| -80 dBm | | | |
| | | | |
| CF 2.402 GHz | 1001 | nts | Span 3.0 MHz |
| | 1001 | | 06.05.2020 |

Plot A











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4.1.3 Peak Power Spectral Density

RESULT: PASS

Date of testing:

2020-05-06

Requirements:

FCC 15.247(e) and RSS-247 section 5.2(2)

For digitally modulated systems, the power spectral density (PSD) conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

Test procedure:

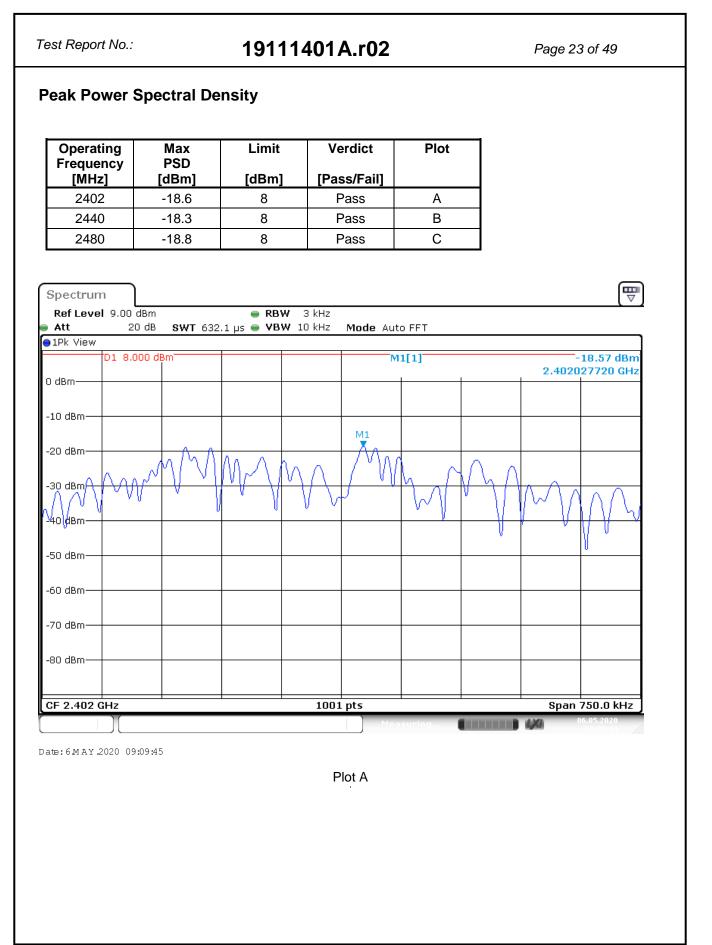
ANSI C63.10-2013

The section 11.10.2 PKPSD peak PSD procedure was used. A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 3kHz and the video bandwidth was set to 10kHz. The sweep time was set to auto couple and the trace was allowed to stabilize before making the final measurement. By using the Peak marker function the maximum amplitude was determined. The final measurement takes into account the loss generated by all the involved cables.

Measurement uncertainty is +/- 0.7 dB.

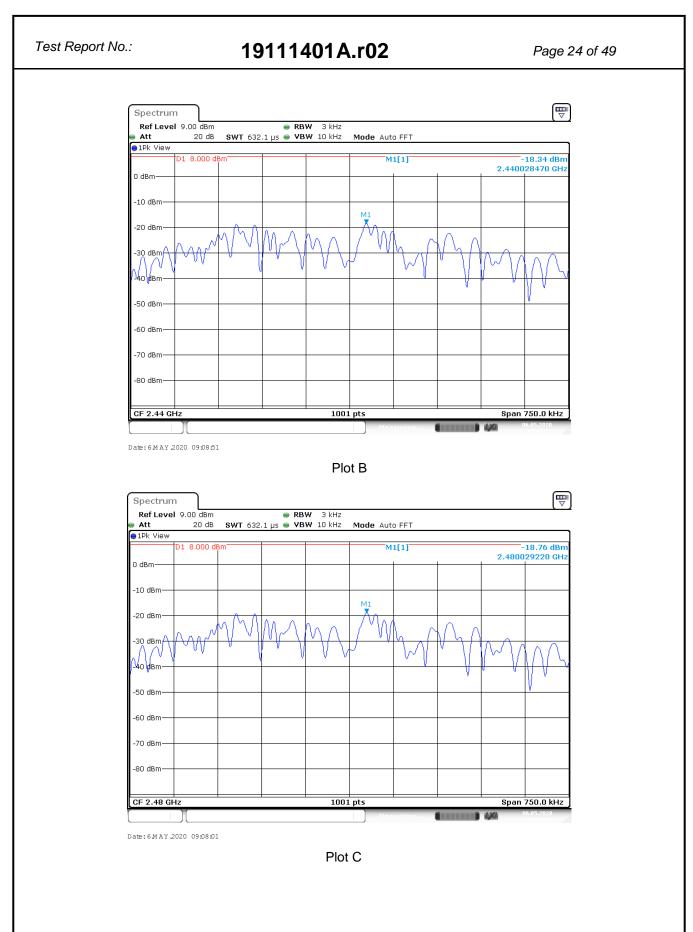
















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4.1.4 Band Edge Conducted Emissions

RESULT: Pass

Date of testing:

2020-05-06

Requirements:

FCC 15.205, FCC 15.209, FCC 15.247(d) and RSS-247 section 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test procedure:

The marker-delta method, as described in ANSI C63.10 was used.

Antenna port conducted measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: RBW = 100kHz, VBW = 300kHz.

The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Measurement uncertainty is +/- 0.7 dB.

Results: All out of band spurious emissions are more than 20 dB below the fundamental. See the figures on the following pages.





| Spectrum | | | | Ē |
|---------------------------------|--|--|--------------|---------------------------|
| Ref Level 9.00 dBm Att 20 dB | ● RBW 100 k SWT 132.7 μs ● VBW 300 k | | | |
| 1Pk View | 3W1 132.7 µ3 • 7 BW 300 k | | | |
| | | M1[1] | | -0.73 dBm 2.401810 GHz |
| D. dBm D1 -0.700 de | Bm | D2[1] | | -45.15 dB -3.960 MHz |
| -10 dBm | | | | -3.900 MH2 |
| | | | | |
| 20.dBmD2 -20.7 | 700 dBm | | | |
| 30 dBm | | | | |
| | | | | 144 |
| -40 dBm | | | | D2 |
| -50 dBm | | | | <u> </u> |
| | | | A | |
| -60 dBm | | | | 1.1 |
| R. A. Har March March | untration material and | About we for the but here be | | af ur m |
| Ů U | and the second sec | or of the contract of the cont | ₩ ₩ ₩ | |
| 80 dBm | | | | |
| -80 dBm | | 001 pts | | F1 Stop 2.41 GH: |

Date: 6 MAY 2020 10:15:26

Plot: Band Edge Conducted Emission, Spectral Diagram, 2402 MHz

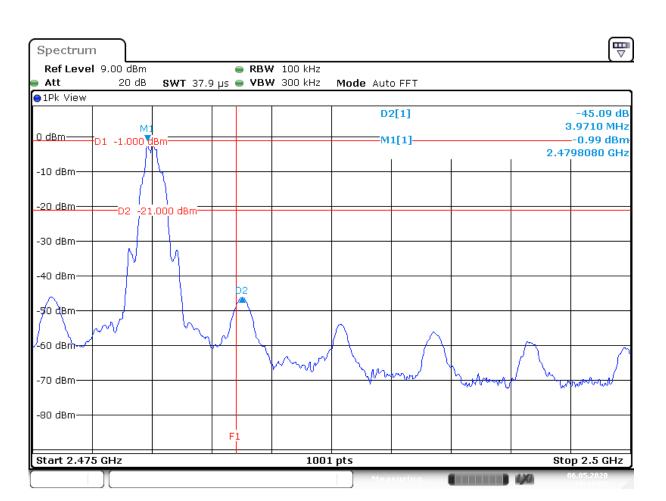
Plot showing more than 20 dB band edge attenuation. F1 shows the band edge frequency of 2400 MHz.





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Date: 6 MAY 2020 10:17:52

Plot: Band Edge Conducted Emission, Spectral Diagram, 2480 MHz. Plot showing more than 20 dB band edge attenuation. F1 shows the band edge frequency of 2483.5 MHz.





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4.1.5 Radiated Spurious Emissions of Transmitter

RESULT: PASS

Date of testing:

Frequency range:

Requirements:

FCC 15.209 and FCC 15.247(d) and RSS-Gen

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a) or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

2020-05-12 & 13

30MHz - 25GHz

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen Table 6, must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen Table 4.

Test procedure:

ANSI C63.10-2013

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 were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 30MHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs. 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. Where Peak (Pk) values where at least 6 dB under the Average (Av) limits, Av value was not tested. Were Average values were tested, Average values were measured using a reduced Video Bandwidth, with a minimum of 10 kHz.





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Radiated Emissions, 30MHz - 1GHz

| Frequency [MHz] | EUT Orientation | Antenna Orientation | Level QP [dBµV/m] | Limit QP [dBµV/m] | Verdict [Pass/Fail] |
|--------------------|--------------------|------------------------|----------------------|----------------------|------------------------|
| 52.0 | Vertical | Vertical | 37.1 | 40.0 | Pass |
| 58.8 | Side | Vertical | 32.0 | 40.0 | Pass |
| 103.4 | Side | Vertical | 33.5 | 43.5 | Pass |
| 117.5 | Side | Vertical | 35.1 | 43.5 | Pass |
| 121.9 | Vertical | Vertical | 36.0 | 43.5 | Pass |
| 667.4 noise | - | Vertical | 23.5 | 46.0 | Pass |

Note: - Level QP = Reading QP + Factor

- Tested in modes as described in section 3.2, the 6 highest values noted. Preliminary measurements indicated that the radiated emissions from EUT were not affected by the EUT's operating mode or frequency.

- *R refers to a frequency in a restricted band, *H refers to a harmonic of the fundamental

- Quasi Peak detector used with a bandwidth of 120 kHz..

- Measurement uncertainty is +/- 5.0 dB.

- a selection of plots are provided on the next pages





SOIDBUV/M

30 dBµv/m-30 dBµV/m-10 dBµV/m-0 dBµV/m--10 dBµV/m-

CF 515.0 MHz

Marker Type Ref Trc

M1 M2 M3 M4

M5 M6

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Y

Apply a fresh and a star

Span 970.0 MHz

12.05.2020 09:52:11

Function Result

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Plot of the emissions in the range 30 -1000 MHz ♥ Spectrum X Receiver Ref Level 82.00 dBµV/m RBW 100 kHz SWT 948.1 µs ● VBW 300 kHz Mode Auto FFT Input 1 AC Att 10 dB PS PA TDF ⊖1Pk View 45.84 dBµV/n 52.060 MH M1[1] 70 dBµV/m 41.70 dBμV/n 72.420 MH M2[1] 60 dBµV/m

2001 pts

Function

Measuring...

Y-value 45.84 dBµV/m 41.70 dBµV/m

45.15 dBµV/m 32.55 dBµV/m

27.43 dBµV/m 34.70 dBµV/m

Date: 12.MAY.2020 09:52:11

X-value 52.06 MHz 72.42 MHz

121.86 MHz 151.05 MHz

176.74 MHz 677.39 MHz

Plot of the emissions in the range 30 – 1000 MHz (Peak detector values shown), EUT Vertical, Normal mode

| Receiver | s | pectrum | × | | | | | | |
|-------------|-------------|---|---------------------|---------------------------|----------------------|-------------|------------------------|---------------------------|--|
| Ref Leve | 82.00 d | BµV/m | | RBW 100 | kHz | | | | |
| Att | | 10 dB SWT | 948.1 µs | • VBW 300 l | kHz Mo | de Auto | FFT Inp | ut 1 AC | |
| PS PA TDF | | | | | | | • | | |
| ●1Pk View | | | | | | | | | |
| Limit | heck | | P | ASS | | M1[1] | | | 35.58 dBµV/m |
| Line F | CC Part 1 | .5 E-Field 3m | Op P | ASS | | | | | 58.840 MHz |
| 70 dBµV/m- | | | si | + + | | M2[1] | | | 37.52 dBµV/m |
| 60 ID 11/ | | | | | | | | | 103.440 MHz |
| 60 dBµV/m- | | | | | | | | | |
| 50 dBµV/m- | | | | | | | | | |
| | | | | | | _ | | | |
| FCC Part 15 | n riald oa | _ | | | | _ | | | virangelysisteritoristations and and |
| FCC Part 15 | E-Field 3ff | i Qp | | | a deficient a | يم والس | alle an and the second | Line and the party way to | And the state of the second state of the secon |
| 30 dBµV/m- | | M1-M5 | and a second second | Anether the provident the | A BUILDING AND AND A | We show the | | | |
| Y | March March | مر المراجع المرجع الم | Harrison Harrison | | | | | | |
| 20 dBµV/m- | | - Marine - M | | | | | | | |
| 10 dBµV/m- | | | | | | | | | |
| 10 0001,111 | | | | | | | | | |
| 0 dBµV/m— | | | | | | _ | | | |
| | | | | | | | | | |
| -10 dBµV/m | | | | + + | | | | | |
| | | | | | | | | | |
| Start 30.0 | MHz | | | 2001 | pts | | | | Stop 1.0 GHz |
| Marker | | | | | | | | | |
| Type Re | f Trc | X-value | | Y-value | Fun | ction | | Function R | esult |
| M1 | 1 | | 4 MHz | 35.58 dBµV/r | | | | | |
| M2 | 1 | | 4 MHz | 37.52 dBµV/r | | | | | |
| M3 | 1 | | 5 MHz | 38.16 dBµV/r | | | | | |
| M4 | 1 | | 4 MHz | 25.50 dBµV/r | | | | | |
| M5 | 1 | 287.6 | 5 MHz | 25.20 dBµV/r | n | | | | |
| | | | | | Mr | asuring. | | | 12.05.2020 |
| | | | | | | as as mig. | | | 09:45:24 |

Date: 12.MAY.2020 09:45:25

Plot of the emissions in the range 30 – 1000 MHz (Peak detector values shown). EUT Sideways, Normal mode





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| 20 dBµV/m | and a star water of the start o | and the second s | | | | | |
|--|--|--|---|----------------|-------------------------------------|--|-------------|
| 0 dBµV/m | late and manager of respective to be derived and a feature of the second and the | | | | | | |
| 10 dBµV/m | | | | | | | |
| 0 dBµV/m | | | | | | | |
| -10 dBµV/m | | | | | | | |
| CF 515.0 MHz Marker | | 2001 | pts | | Span 97 | 0.0 MHz | |
| Type Ref Trc M1 1 M2 1 M3 1 M4 1 | X-value 52.06 MHz 70.48 MHz 114.11 MHz 129.77 MHz | Y-value 36.57 dBµV/m 34.68 dBµV/m 40.34 dBµV/m 35.35 dBµV/m 29.54 dDµV/m | 1 1 1 | n Fur | nction Result | | |
| M5 1 | 145.77 MHz | 29.54 dBµV/m | Measuri | ing | | 05.2020 | |
| lot of the em | nissions in the | e range 30 - | – 1000 M | 1Hz (Peak d | etector va | alues sł | nown), |
| Plot of the em EUT Horizonta | nissions in the | e range 30 - | – 1000 M | 1Hz (Peak d | etector va | _ | nown), |
| Plot of the em EUT Horizonta Receiver St Ref Level 82.00 df | hissions in the al, 2402 MHz | e RBW 100 k | Hz | | | alues sł | nown),] |
| Ref Level 82.00 dE Att PS PA TDF | hissions in the al, 2402 MHz | | Hz | 1Hz (Peak d | | _ | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF 1Pk View | hissions in the al, 2402 MHz | ● RBW 100 k µs ● VBW 300 k | :Hz :Hz Mode A | Auto FFT Input | 1 AC | | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF IPK View Limit Greck Line FSC Part 1 | hissions in the al, 2402 MHz Dectrum ® DU/V/m 10 dB SWT 948.1 | e RBW 100 k | Hz Hz Mode A M2[1 | Auto FFT Input | 1 AC 40.8 11 | € dBµV/m 0.560 MHz | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF IPk View Limit Greck Line FCC Part 1 70 dBµV/m | hissions in the al, 2402 MHz Dectrum ® DU/V/m 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k ₽Å <mark>\$</mark> \$ | :Hz :Hz Mode A | Auto FFT Input | 1 AC 40.8 11 36.7 | (₩ ▼ 6 dBµV/m | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF IPk View Limit Greck Line FCC Part 1 70 dBµV/m | hissions in the al, 2402 MHz Dectrum ® DU/V/m 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k ₽Å <mark>\$</mark> \$ | Hz Hz Mode A M2[1 | Auto FFT Input | 1 AC 40.8 11 36.7 | € dBµV/m 0.560 MHz 0 dBµV/m | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF IPK View Line FCC Part 13 70 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz Dectrum ® DU/V/m 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k ₽Å <mark>\$</mark> \$ | Hz Hz Mode A M2[1 | Auto FFT Input | 1 AC 40.8 11 36.7 | € dBµV/m 0.560 MHz 0 dBµV/m | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 db Att PS PA TDF IPk View Line FC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 db Att PS PA TDF IPk View Line FC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown),] |
| Plot of the em EUT Horizonta Ref Level 82.00 db Att PS PA TDF IPk View Line FC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Ref Level 82.00 db Att PS PA TDF 1Pk View Line F C Part 1. 70 dBµV/m 60 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz pectrum (x) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Receiver Sp Ref Level 82.00 de Att PS PA TDF 1Pk View Line F C Part 1. 70 dBµV/m 60 dBµV/m 50 dBµV/m 50 dBµV/m 20 dBµV/m 31 dBµV/m 32 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Refevel 82.00 de Att PS PA TDF IPK View Line FPC Part 1 70 dBµV/m 60 dBµV/m 50 dBµV/m 50 dBµV/m 20 dBµV/m 10 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Refevel 82.00 de Att PS PA TDF IPK View Line FPC Part 1 70 dBµV/m 60 dBµV/m 50 dBµV/m 50 dBµV/m 20 dBµV/m 10 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Ref Level 82.00 db Att PS PA TDF IPk View Line FC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF IPk View Line FDC Part 1 70 dBµV/m 60 dBµV/m 50 dBµV/m 20 dBµV/m 10 dBµV/m -10 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 1 AC 40.8 11 36.7 6 | € dBµV/m 3.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Receiver Sp Ref Level 82.00 de Att PS PA TDF 1Pk View Line FOC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m 30 dBµV/m 10 dBµV/m 0 dBµV/m | hissions in the al, 2402 MHz Dectrum (X) 10 dB SWT 948.1 | ● RBW 100 k µs ● VBW 300 k PASS PASS | Hz Mode A | Auto FFT Input | 1 AC 40.8 11 36.7 6 | 6 dBµV/m 0.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Ref Level 82.00 de Att PS PA TDF 1Pk View Limit direck Line FOC Part 1 70 dBµV/m 50 dBµV/m 50 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m 10 dBµV/m | A ulindia walk | RBW 100 k VBW 300 k PASS PASS ASS | Hz Mode A M2[1 M1]] | Auto FFT Input | 1 AC 40.8 11 36.7 6 | € dBµV/m 3.560 MHz 0 dBµV/m 1.750 MHz | nown), |
| Plot of the em EUT Horizonta Receiver Sp Ref Level 82.00 de Att PS PA TDF 1Pk View Line FDC Part 1. 70 dBµV/m 50 dBµV/m 50 dBµV/m 20 dBµV/m 0 dBµV/m 0 dBµV/m 10 dBµV/m 51 dBµV/m 52 dBµV/m 53 dBµV/m 54 dBµV/m 55 dBµV/m 56 dBµV/m 57 dBµV/m 58 dBµV/m 50 dBµV/ | hissions in the al, 2402 MHz pectrum (*) pectrum (*) | ■ RBW 100 k µs ■ VBW 300 k PASS PASS | Hz Mode A M2[1 M2[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1[1 M1]] | Auto FFT Input | 1 AC 40.8 11 36.7 6 | € dBµV/m 3.560 MHz 0 dBµV/m 1.750 MHz | nown), |

Plot of the emissions in the range 30 - 1000 MHz (Peak detector values shown). EUT Vertical,2480 MHz





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Radiated Emissions, 1 - 25GHz, 2402 MHz.

| Frequency [MHz] | EUT Orientation | Antenna Orientation | Detector | Level [dBµV/m] | Limit [dBµV/m] | Result |
|--------------------|--------------------|------------------------|----------|--------------------|-------------------|--------|
| 1198* ^R | Horizontal | Vertical | Pk | 49.2 | 74 Pk 54 Av | Pass |
| 1800 | Horizontal | Vertical | Pk | 46.5 | 74 Pk 54 Av | Pass |
| 1994 | Horizontal | Vertical | Pk | 48.6 | 74 Pk 54 Av | Pass |
| 6000 | Side | Vertical | Pk | 49.7 | 74 Pk 54 Av | Pass |
| 7206* ^H | Side | Vertical | Pk | 56.0 Pk 50.9 Av | 74 Pk 54 Av | Pass |
| 9609*H | Side | Vertical | Pk | 55.3 Pk 50.5 Av | 74 Pk 54 Av | Pass |
| 13.57 | Horizontal | Vertical | Pk | 59.0 Pk 47.6 Av | 74 Pk 54 Av | Pass |

Radiated Emissions, 1 - 25GHz, 2440 MHz.

| Frequency [MHz] | EUT Orientation | Antenna Orientation | Detector | Level [dBµV/m] | Limit [dBµV/m] | Result |
|---------------------|--------------------|------------------------|----------|--------------------|-------------------|--------|
| 1195 | Horizontal | Vertical | Pk | 51.5 | 74 Pk 54 Av | Pass |
| 1994 | Horizontal | Vertical | Pk | 47.6 | 74 Pk 54 Av | Pass |
| 6000 | Horizontal | Vertical | Pk | 51.5 | 74 Pk 54 Av | Pass |
| 7321* ^{HR} | Horizontal | Vertical | Pk | 55.9 Pk 50.1 Av | 74 Pk 54 Av | Pass |
| 9759* ^H | Horizontal | Vertical | Pk | 53.8 Pk 48.8 Av | 74 Pk 54 Av | Pass |
| 12201* ^R | Side | Vertical | Pk | 57.7 Pk 50.0 Av | 74 Pk 54 Av | Pass |





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Radiated Emissions, 1 - 25GHz, 2480 MHz.

| Frequency [MHz] | EUT Orientation | Antenna Orientation | Detector | Level [dBµV/m] | Limit [dBµV/m] | Result |
|----------------------------|--------------------|------------------------|----------|--------------------|-------------------|--------|
| 1199* ^R | Vertical | Horizontal | Pk | 51.5 | 74 Pk 54 Av | Pass |
| 6000 | Side | Vertical | Pk | 52.8 | 74 Pk 54 Av | Pass |
| 7440* ^{H*R} | Side | Vertical | Pk | 55.0 Pk 51.5 Av | 74 Pk 54 Av | Pass |
| 11500 -12400* ^R | Side | Vertical | Pk | 56.8 Pk 52.5 Av | 74 Pk 54 Av | Pass |

Radiated Emissions, 1 - 25GHz, Normal Mode.

| Frequency [MHz] | EUT Orientation | Antenna Orientation | Detector | Level [dBµV/m] | Limit [dBµV/m] | Result |
|-------------------------|--------------------|------------------------|----------|--------------------|-------------------|--------|
| 1195* ^R | Horizontal | Vertical | Pk | 51.6 | 74 Pk 54 Av | Pass |
| 7859* ^{H*R} | Vertical | Horizontal | Pk | 52.3 | 74 Pk 54 Av | Pass |
| 9920* ^{H*R} | Vertical | Horizontal | Pk | 53.5 | 74 Pk 54 Av | Pass |
| 11000 -12000*R noise | - | Vertical | Pk | 60.2 Pk 52.9 Av | 74 Pk 54 Av | Pass |

Emissions in restricted bands (Band Edges, radiated-worst case)

| Frequency [MHz] | EUT Frequency [MHz} &Orientation | Antenna Orientation | Detector | Level [dBµV/m] | Limit [dBµV/m] | Result |
|--------------------|---|------------------------|----------|--------------------|-------------------|--------|
| 2397.8 | 2402 Horizontal | Horizontal | Pk | 61.2 Pk 42.3 Av | 74 Pk 54 Av | Pass |
| 2483.7 | 2480 Horizontal | Vertical | Pk | 55.2 Pk 33.8 Av | 74 Pk 54 Av | Pass |

Notes: - *R refers to a frequency in a restricted band,

- *H refers to a frequency which is a harmonic of the fundamental.

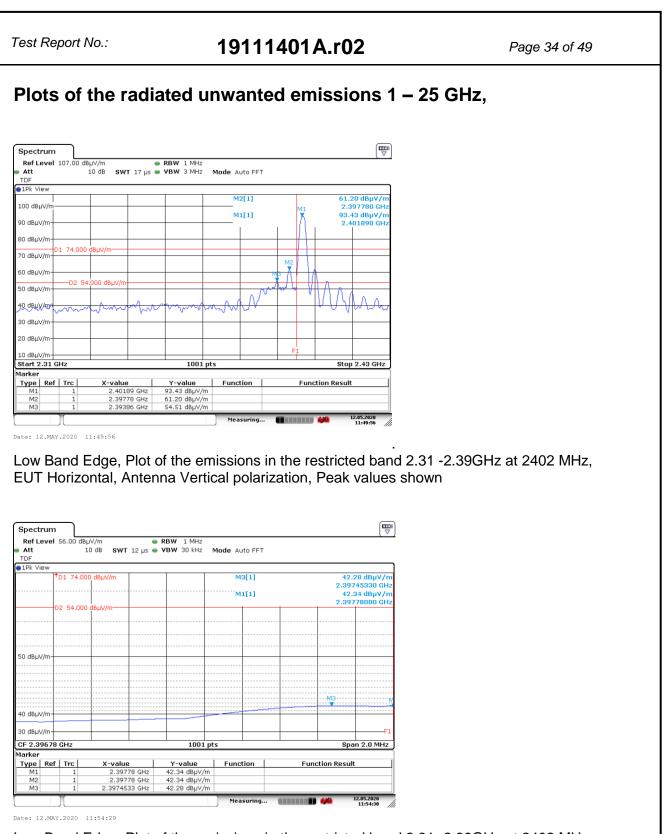
- 1 MHz residual bandwidth filter setting used.

- Field strength values of radiated emissions not listed in the tables above are
- more than 20 dB below the applicable limit.
- Measurement uncertainty is +/- 5.5 dB
- No emissions within 20dB of the applicable limit were observed above $18 \mbox{GHz}$

- a selection of plots are provided on the next pages.







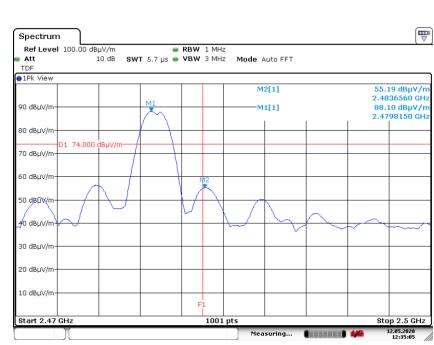
Low Band Edge, Plot of the emissions in the restricted band 2.31 -2.39GHz at 2402 MHz, EUT Horizontal, Antenna Vertical polarization, Average value shown





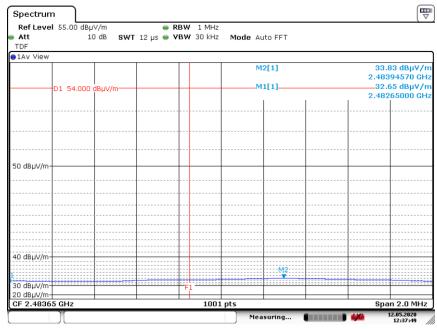
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Date: 12.MAY.2020 12:35:05

High Band Edge, Plot of the emissions in the restricted band 2.4835-2.5GHz at 2480 MHz, EUT Horizontal, Antenna Vertical polarization, Peak values shown



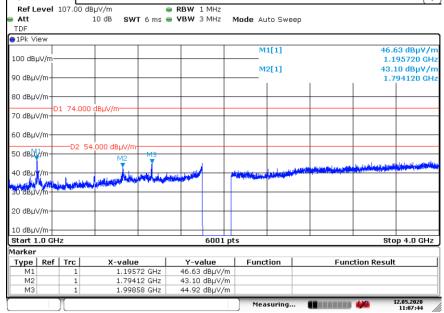
Date: 12.MAY.2020 12:37:49

High Band Edge, Plot of the emissions in the restricted band 2.4835-2.5GHz at 2480 MHz, EUT Horizontal, Antenna Vertical polarization, Average value shown





Test Report No .: 19111401A.r02 Page 36 of 49 **T** Spectrum Ref Level 107.00 dBuV/m RBW 1 MHz 10 dB SWT 6 ms 👄 VBW 3 MHz Att Mode Auto Sweep TDF ⊖1Pk View M1[1] 49.19 dBµV/r 1.198220 GHz 46.46 dBµ∀/m 100 dBuV/r M2[1] 90 dBµV/m 1.800620 GH 80 dBµV/m D1 74.000 dBµV/m 70 dBµV/m 60 dBµV/m D2 54.000 dBuV/n 50 dBµ**y**/m 40 dBiy Vm 30 dBuV/m 20 dBµV/m 10 dBµV/m Start 1.0 GHz 6001 pts Stop 4.0 GHz larker Type | Ref | Trc Y-value Function Function Result X-value 1.19822 GHz 1.80062 GHz 49.19 dBµV/m 46.46 dBµV/m M1 M2 МЗ 1.994084 GHz 48.62 dBµV/m 12.05.2020 11:16:23 Measuring... 2 Date: 12.MAY.2020 11:16:23 Plot Radiated unwanted emissions in the range 1 – 4 GHz in at 2402 MHz, EUT Horizontal (Peak values, Antenna Vertical position shown- gap is by the 2.4G Notch filter). **T** Spectrum Ref Level 107.00 dBµV/m RBW 1 MHz



Date: 12.MAY.2020 11:07:45

Plot Radiated unwanted emissions in the range 1 – 4 GHz in at 2402 MHz, EUT Vertical (Peak values, Antenna Vertical position shown- gap is by the 2.4G Notch filter)





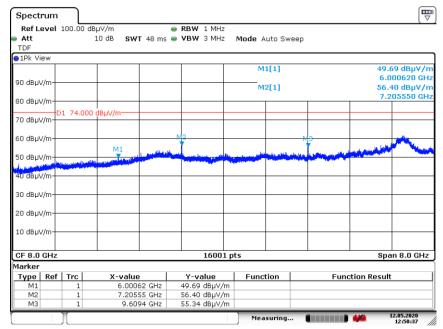
19111401A.r02

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| Att TDF | | IdBµV/m | | RBW | | | | | | |
|-------------|---------|---------------------|--------------|--------|------------------|---------|----------------------|---|---------------|------------------------|
| | | 10 dB SW | T6ms(| ● VBW: | 3 MHz | Mode Au | ito Swee | эp | | |
| ⊜1Pk View | | | | | | | | | | |
| 100 40 4/4 | | | | | | М | 1[1] | | | 29 dBµV∕ |
| 100 dBµV/m- | | | | | | 5.4 | 2[1] | | | l98220 GF 50 dBµV∕I |
| 90 dBµV/m | | | | | | | 2[1] | | | 798120 GF |
| | | | | | | | | | 1 | |
| 80 dBµV/m+ | | | | _ | | | | | - | |
| 70 dBuV/m | 01 74.0 | 100 dBµV/m | | _ | | | | | | |
| Т | | | | | | | | | | |
| 60 dBµV/m | | | | _ | | | | | | |
| N41 | D2 | 54.000 dBµV/m | M3 | _ | | | | | | |
| 50 dBµ//m+ | | | ₩13 ▼ | | | | | | | |
| 40 dBµ | | <u>k</u> | | | | | فالجو بالرياك والسال | and the state of the | - | And the second second |
| | فالسالي | want wanter a frame | Same reading | | | | | | | |
| 30 dBµV/m- | | | | _ | | | | | | |
| | | | | | | | | | | |
| 20 dBµV/m+ | | | | | | | | | | |
| 10 dBµV/m- | | | | | | | | | _ | |
| Start 1.0 G | Ηz | | 1 | | 6001 p | ts | | | Sto | p 4.0 GH |
| Marker | | | | | | | | | | |
| Type Ref | | X-valu | | Y-V | | Func | tion | Fu | nction Result | : |
| M1 | 1 | | 22 GHz | | dBµV/m | | | | | |
| M2 M3 | 1 | | 12 GHz | | dBµV/m dBµV/m | | | | | |

Date: 12.MAY.2020 11:17:55

Radiated unwanted emissions in the range 1 – 4 GHz at 2402 MHz (Peak values, EUT Sideways, Antenna vertical position shown, gap is by the 2.4G Notch filter).

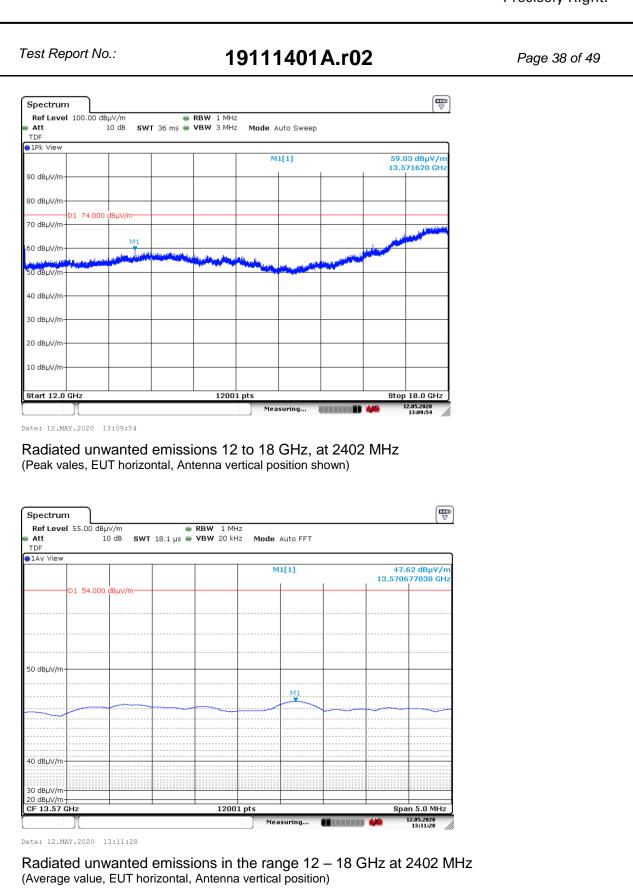


Date: 12.MAY.2020 12:50:37

Radiated unwanted emissions in the range 4 – 12 GHz at 2402 MHz (Peak values, EUT side ways, Antenna vertical position shown)











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| Ref Level | 100.00 dB | μV/m | | RBW 1 M | Hz | | | | |
|-----------------|-----------|-----------------|------------|-------------------|----------------|-----------|---|-------------------------------|--|
| Att | | 10 dB SW | T 280 ms 🖷 | VBW 50 k | Hz Mode | Auto Swee | р | | |
| TDF 1Pk View | | | | | | | | | |
| JIK HOM | | | | | M | 1[1] | | 48.: | 20 dBµV/n |
| | | | | | | | | | 77600 GH |
| 90 dBµV/m- | | | | | | | | | |
| 80 dBµV/m- | | | | | | | | | |
| | | | | | | | | | |
| 70 dBµV/m- | D1 74.000 | dBµV/m | | | | | | | |
| | | | | | | | | | |
| 50 dBµV/m- | | | | | | | | | |
| | | .000 dBµV/m | | | | | | | |
| 50 dBµV/m- | | | | المتريس والمستعمل | | | | | |
| | | | | | | | | | - |
| 40 dBµV/m- | | | | | | | | a second second second second | a di kali kati kati ya di kati ya di k |
| 30 dBµV/m- | | | | | | | | | |
| | | | | | | | | | |
| 20 dBµV/m- | | | | | | | | | |
| | | | | | | | | | |
| 10 dBµV/m- | | | | | | | | | |
| | | | | | | | | | |
| CF 21.5 GH | 17 | | | 1400 | l 1 nts | | | l Sna | in 7.0 GHz |

Date: 13.MAY.2020 09:13:26

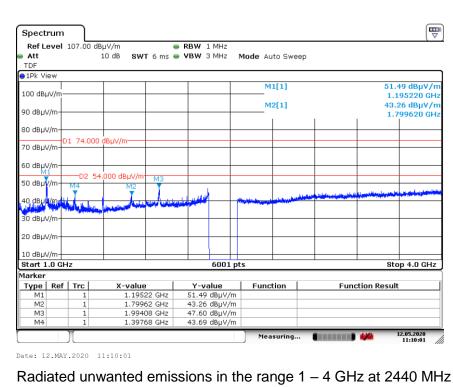
Radiated unwanted emissions in the range 18 - 25 GHz at 2402 MHz (Peak values, EUT horizontal, Antenna vertical position shown)



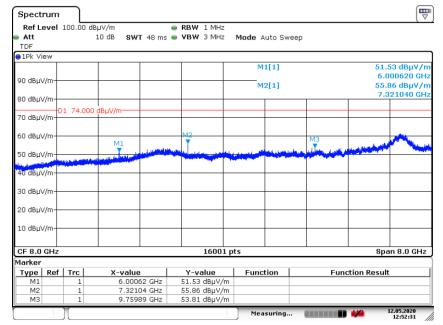


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(Peak values, EUT horizontal, Antenna vertical position shown, gap is by the 2.4G Notch filter)



Date: 12.MAY.2020 12:52:31

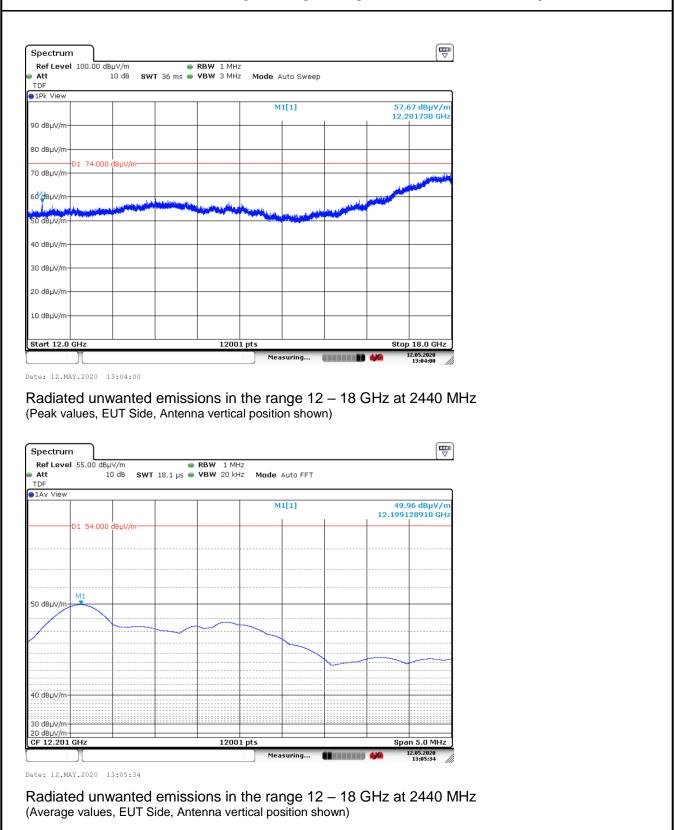
Radiated unwanted emissions in the range 4 – 12 GHz at 2440 MHz (Peak values, EUT side ways, Antenna vertical position shown)





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| Ref Level | | | - | RBW 1 № | | | | | | |
|------------|------------------|-------------------------|---------------------|----------------|-------------------------|-----------|---|-----------------------|----------------------------|--|
| Att TDF | | 10 dB SW | ' T 280 ms 🖷 | • VBW 50 k | Hz Mode | Auto Swee | 0 | | | |
| 1Pk View | | | | | | | | | | |
| | | | | | м | 1[1] | | | 8.08 dBµV/r).626630 GH | |
| 90 dBµV/m+ | | | | | | | | 19.0 | | |
| | | | | | | | | | | |
| 30 dBµV/m+ | | | | | | | | | | |
| | 01 74.000 | dBµV/m | | | | | | | | |
| 70 dBµV/m+ | | | | | | | | | | |
| 50 dBµV/m+ | | | | | | | | | | |
| | | .000 dBµV/m M1 | | | | | | | | |
| 50 dBµV/m+ | a at the detroit | M1 | | | | | | | | |
| | | | | | Construction of Sectors | | | and constant on the l | desta de calencia de | |
| 40 dBµV/m+ | | | | | | | | | | |
| 30 dBµV/m+ | | | | | | | | | | |
| | | | | | | | | | | |
| 20 dBµV/m+ | | | | | | | | | | |
| | | | | | | | | | | |
| 10 dBµV/m+ | | | | | | | | | | |
| | | | | | | | | | | |

Date: 13.MAY.2020 09:17:18

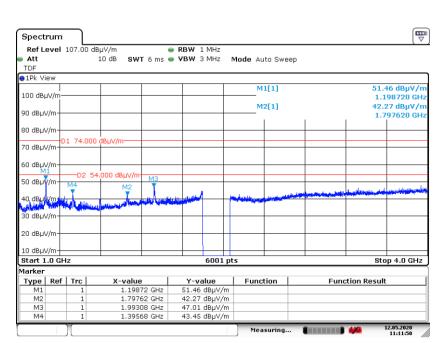
Radiated unwanted emissions in the range 18 – 25 GHz at 2440 MHz (Peak values, EUT horizontal ways, Antenna vertical position shown)





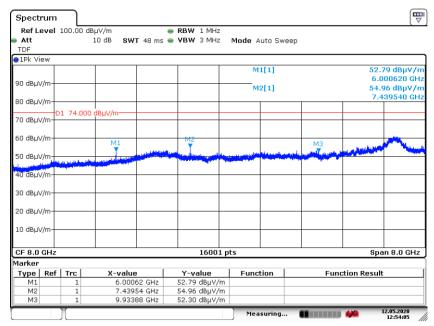
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Date: 12.MAY.2020 11:11:50

Radiated unwanted emissions in the range 1 – 4 GHz at 2480 MHz (Peak values, EUT Vertical, Antenna horizontal position shown, gap is by the 2.4G Notch filter)



Date: 12.MAY.2020 12:54:05

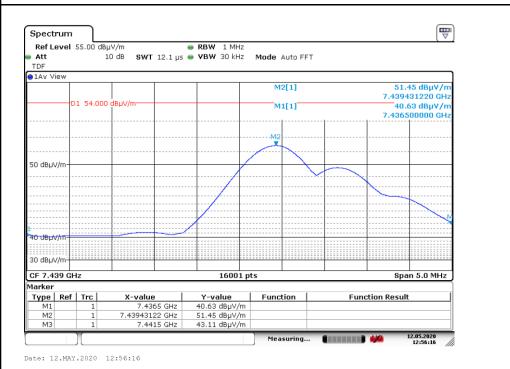
Radiated unwanted emissions in the range 4 – 12 GHz at 2480 MHz (Peak values, EUT Sideways, Antenna vertical position shown)



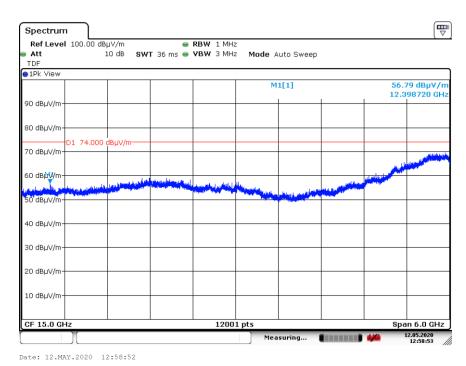


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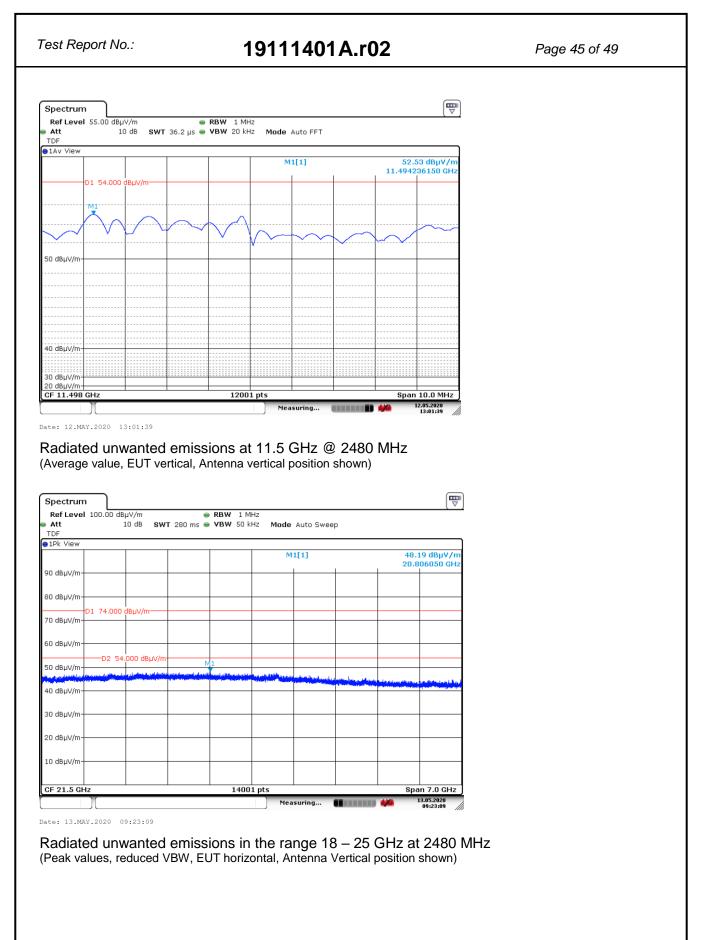
Radiated unwanted emissions at 7.4 GHz, harmonic of 2480 MHz (Average value, EUT Side ways, Antenna vertical position shown)



Radiated unwanted emissions in the range 12 – 18 GHz at 2480 MHz (Peak values reduced VBW, EUT Side ways, Antenna vertical position shown)











Test Report No .: 19111401A.r02 Page 46 of 49 **P** Spectrum Ref Level 107.00 dBµV/m 🔵 RBW 1 MHz Att 10 dB SWT 6 ms 👄 VBW 3 MHz Mode Auto Sweep TDF ⊖1Pk View 51.64 dBµV/n 1.195220 GHa M1[1] 100 dBµV/r M2[1] 45.69 dBµV/r 90 dBµV/m 1.792620 GH 80 dBµV/m 1 74.000 3µV/m 70 dBuV/m 60 dBµV/n MB -D2 54)00 dBµV/ 50 dBuV/m 40 dBµ<mark>k/m</mark> 30 dBµV/m 20 dBµV/m 10 dBµV/m Span 3.0 GHz CF 2.5 GHz 6001 pts Marker Type Ref Trc M1 1 M2 1 X-value Y-value Function Function Result 1.19522 GHz 1.79262 GHz 51.64 dBµV/m 45.69 dBµV/m ΜЗ 1.99658 GHz 49.93 dBµV/m M4 1 1.39568 GHz 41.48 dBµV/m Measuring... 12.05.2020 11:14:39 Date: 12.MAY.2020 11:14:39 Radiated unwanted emissions in the range 1 – 4 GHz, Normal Mode (Peak values, EUT horizontal, Antenna vertical position shown, gap is by the 2.4G Notch filter) [₩ Spectrum Ref Level 100.00 dBuV/m RBW 1 MHz SWT 48 ms 👄 VBW 3 MHz 10 dB Att Mode Auto Sweep TDF ⊖1Pk View M1[1] 47.87 dBuV/r 4.807700 GH 90 dBµV/m 52.25 dBµV/n 7.858510 GH M2[1] 80 dBµV/m 74.000 lBµV/m 70 dBµV/m 60 dBµV/m M2 50 dBµV/m 40 dBuV/m 30 dBuV/m 20 dBµV/m 10 dBµV/m Span 8.0 GHz CF 8.0 GHz 16001 pts Marker Type Ref Trc X-value 4.8077 GHz Function Y-value Function Result 47.87 dBµV/m 52.25 dBµV/m 53.50 dBµV/m 7.85851 GHz 9.92038 GHz M2 МЗ 12.05.2020 12:46:18 Measuring... **(**....) **(**() Date: 12.MAY.2020 12:46:18 Radiated unwanted emissions in the range 4 - 12 GHz Normal mode (Peak values, EUT Vertical, Antenna horizontal position shown)





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4.2 AC Power Line Conducted Measurements

RESULT: Pass.

Date of testing: Tested by: 2019-12-09 Willem Brouwer

Requirements: 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 following table, as measured using a 50 μ 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.

| Frequency of Emission (MHz) | Conducted Limit (dBµV) Quasi-Peak | Conducted Limit (dBµV) Average |
|--------------------------------|--------------------------------------|-----------------------------------|
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 - 30 | 46 | 50 |

*Decreases with the logarithm of the frequency.

Test procedure:

ANSI C63.10-2013.

Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50 μ H / 50 Ω LISN. The frequency range from 150kHz to 30MHz was searched. The six highest EUT emissions relative to the limit were noted. The EUT was positioned at least 80cm from the LISN. The power cable was routed over the non-conductive plate to the LISN.





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4.2.1 AC Power Line Conducted Emission of Transmitter

| Results and limits L1 | | | | | | | | |
|-----------------------|--------|--------------|--------|------------------|-------|--------|--|--|
| Frequency | Qua | si peak dete | ector | Average detector | | | | |
| (MHz) | Result | Limit | Margin | Result | Limit | Margin | | |
| 0.16 | 61.3 | 65.5 | 4.1 | 40.0 | 55.5 | 15.5 | | |
| 0.17 | 62.2 | 65.0 | 2.7 | 45.5 | 55.0 | 9.5 | | |
| 0.19 | 58.0 | 64.0 | 6.1 | 39.9 | 54.0 | 14.1 | | |
| 0.20 | 58.3 | 63.6 | 5.3 | 38.4 | 53.6 | 15.3 | | |
| 0.25 | 47.9 | 61.8 | 13.8 | 30.0 | 51.8 | 21.7 | | |
| 3.13 | 48.4 | 56.0 | 7.6 | 36.4 | 46.0 | 9.6 | | |
| 9.96 | 39.6 | 60.0 | 20.4 | 32.2 | 50.0 | 17.8 | | |

| Results and limits L2 | | | | | | | | |
|-----------------------|--------|--------------|--------|------------------|-------|--------|--|--|
| Frequency | Qua | si peak dete | ector | Average detector | | | | |
| (MHz) | Result | Limit | Margin | Result | Limit | Margin | | |
| 0.16 | 61.8 | 65.5 | 3.7 | 40.3 | 55.5 | 15.1 | | |
| 0.17 | 62.7 | 65.0 | 2.2 | 45.8 | 55.0 | 9.2 | | |
| 0.19 | 58.6 | 64.0 | 5.5 | 40.4 | 54.0 | 13.7 | | |
| 0.20 | 59.0 | 63.6 | 4.6 | 38.9 | 53.6 | 14.7 | | |
| 0.25 | 48.9 | 61.8 | 12.8 | 30.8 | 51.8 | 20.9 | | |
| 3.13 | 48.6 | 56.0 | 7.4 | 36.3 | 46.0 | 9.7 | | |
| 9.96 | 44.8 | 60.0 | 15.2 | 36.4 | 50.0 | 13.6 | | |

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207(a) and RSS-Gen section 8.8, at the 120 Volts/ 60 Hz AC mains connection terminals of the EUT, are depicted in the table above.

Notes:

- 1. The resolution bandwidth used was 9 kHz.
- 2. From pre-test the worst case configuration proved to be the normal operation mode Worst case values noted.
- 3. Measurement uncertainty is +/- 3.5 dB.
- 4. Plots are provided on the next pages.





