

| <b>RADIO REPORT</b><br><b>FCC 47 CFR Part 15C</b><br><b>ISED Canada RSS-247</b><br><b>Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Reference No</b>                                                                                                                                               | G0M-2205-1454-TFC247WF-V02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Testing Laboratory</b>                                                                                                                                                | Eurofins Product Service GmbH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Address</b>                                                                                                                                                           | Storkower Str. 38c<br>15526 Reichenwalde<br>Germany                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Accreditation</b>                                                                                                                                                     |    <br>DAkkS - Registration number : D-PL-12092-01-03 (ISED)<br>ISED Testing Laboratory site: 3470A<br>DAkkS - Registration number : D-PL-12092-01-04 (FCC)<br>FCC Filed Test Laboratory, Reg.-No.: 96970 |
| <b>Applicant</b>                                                                                                                                                         | u-blox AG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Address</b>                                                                                                                                                           | Zürcherstrasse 68<br>8800 Thalwil<br>Switzerland                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Test Specification</b>                                                                                                                                                | 47 CFR Part 15C<br>RSS-247, Issue 2, 2017-02<br>RSS-Gen, Issue 5, Amendment 2, 2021-02                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Non-Standard Test Method</b>                                                                                                                                          | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Equipment under Test (EUT):</b>                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Product Description</b>                                                                                                                                               | Stand-alone multiradio module                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Model(s)</b>                                                                                                                                                          | NORA-W101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Additional Model(s)</b>                                                                                                                                               | NORA-W106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Brand Name(s)</b>                                                                                                                                                     | u-blox                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hardware Version(s)</b>                                                                                                                                               | 04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Software Version(s)</b>                                                                                                                                               | V1.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>FCC ID</b>                                                                                                                                                            | XPYNORAW1W2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IC</b>                                                                                                                                                                | 8595A-NORAW1W2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Test Result</b>                                                                                                                                                       | <b>PASSED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|
| <b>Possible test case verdicts:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                                                                                       |
| Required by standard but not tested                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/T              |                                                                                       |
| Not required by standard                                                                                                                                                                                                                                                                                                                                                                                                                                                       | N/R              |                                                                                       |
| Not applicable to EUT                                                                                                                                                                                                                                                                                                                                                                                                                                                          | N/A              |                                                                                       |
| Test object does meet the requirement                                                                                                                                                                                                                                                                                                                                                                                                                                          | P(PASS)          |                                                                                       |
| Test object does not meet the requirement                                                                                                                                                                                                                                                                                                                                                                                                                                      | F(FAIL)          |                                                                                       |
| <b>Testing:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                       |
| Test Lab Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20 °C - 30 °C    |                                                                                       |
| Test Lab Humidity                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 25 % - 55 %      |                                                                                       |
| Date of receipt of test item                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2022-07-18       |                                                                                       |
| <b>Report:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                                                                                       |
| Compiled by                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Odai Qawasmeh    |                                                                                       |
| Tested by (+ signature)<br>(Responsible for Test)                                                                                                                                                                                                                                                                                                                                                                                                                              | Odai Qawasmeh    |    |
| Approved by (+ signature)<br>(Test Lab Engineer)                                                                                                                                                                                                                                                                                                                                                                                                                               | Wilfried Treffke |  |
| Date of Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2023-02-24       |                                                                                       |
| Total number of pages                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 230              |                                                                                       |
| <b>General Remarks:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |                                                                                       |
| <p>The test results presented in this report relate only to the object tested.</p> <p>The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> |                  |                                                                                       |
| <b>Additional Comments:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                       |
| <p>According to customer declaration, the additional model NORA-W106 and the fully tested model NORA-W101 are identical, the only hardware difference is that NORA-W106 has an internal integrated antenna. Therefore only radiated emission tests have been conducted on the additional model.</p>                                                                                                                                                                            |                  |                                                                                       |

## ADDITIONAL VARIANTS

| Additional Variants<br>(partially tested)                                 |                          |                                                                 |
|---------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------|
| Tested Variant                                                            | Description              |                                                                 |
| 1                                                                         | Product Type Description | Stand-alone multiradio module                                   |
|                                                                           | Model name               | NORA-W106<br>(with integrated PCB antenna type: AT1608-A2R4NAA) |
|                                                                           | Brand name               | u-blox                                                          |
|                                                                           | Hardware Version         | 04                                                              |
|                                                                           | Software Version         | V1.08                                                           |
| 2                                                                         | Product Type Description | Stand-alone multiradio module                                   |
|                                                                           | Model name               | NORA-W101<br>(with external antenna type: PN PRO-IS-237)        |
|                                                                           | Brand name               | u-blox                                                          |
|                                                                           | Hardware Version         | 04                                                              |
|                                                                           | Software Version         | V1.08                                                           |
| <b>Comment:</b> The additional variant mentioned above were spot-checked. |                          |                                                                 |

| Additional Variants<br>(not tested and not evaluated variants)                                                                                                                                                                                                    |                          |                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|
| Not-tested Variant                                                                                                                                                                                                                                                | Description              |                               |
| 1                                                                                                                                                                                                                                                                 | Product Type Description | Stand-alone multiradio module |
|                                                                                                                                                                                                                                                                   | Model name               | NORA-W251AWS                  |
|                                                                                                                                                                                                                                                                   | Brand name               | u-blox                        |
|                                                                                                                                                                                                                                                                   | Hardware Version         | 04                            |
|                                                                                                                                                                                                                                                                   | Software Version         | V1.08                         |
| 2                                                                                                                                                                                                                                                                 | Product Type Description | Stand-alone multiradio module |
|                                                                                                                                                                                                                                                                   | Model name               | NORA-W256AWS                  |
|                                                                                                                                                                                                                                                                   | Brand name               | u-blox                        |
|                                                                                                                                                                                                                                                                   | Hardware Version         | 04                            |
|                                                                                                                                                                                                                                                                   | Software Version         | V1.08                         |
| <b>Comment:</b> Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated. |                          |                               |

## VERSION HISTORY

| Version History |            |                                                                                                                                                                   |             |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Version         | Issue Date | Remarks                                                                                                                                                           | Revised By  |
| 01              | 2022-12-21 | Initial Release                                                                                                                                                   | O. Qawasmeh |
| 02              | 2023-02-24 | Replaced document: G0M-2205-1454-TFC247WF-V01<br>Replaced by: G0M-2205-1454-TFC247WF-V02<br><br>Reason:<br>Correction of calibration dates in section 3.8 and 3.9 | R. Jaafar   |

## ABBREVIATIONS AND ACRONYMS

| Acronyms         |                                                     |
|------------------|-----------------------------------------------------|
| Acronym          | Description                                         |
| BPSK             | Binary Phase Shift Keying                           |
| DSSS             | Direct Sequence Spread Spectrum                     |
| EUT              | Equipment Under Test                                |
| FCC              | Federal Communications Commission                   |
| HT               | High Throughput                                     |
| IEEE 802.11      | MAC and PHY Layer for WiFi                          |
| ISED             | Innovation, Science and Economic Development Canada |
| OFDM             | Orthogonal Frequency Division Multiplexing          |
| QAM              | Quadrature Amplitude Modulation                     |
| QPSK             | Quadrature Phase Shift Keying                       |
| RBW              | Resolution bandwidth                                |
| RMS              | Root mean square                                    |
| VBW              | Video bandwidth                                     |
| V <sub>NOM</sub> | Nominal supply voltage                              |

## REPORT INDEX

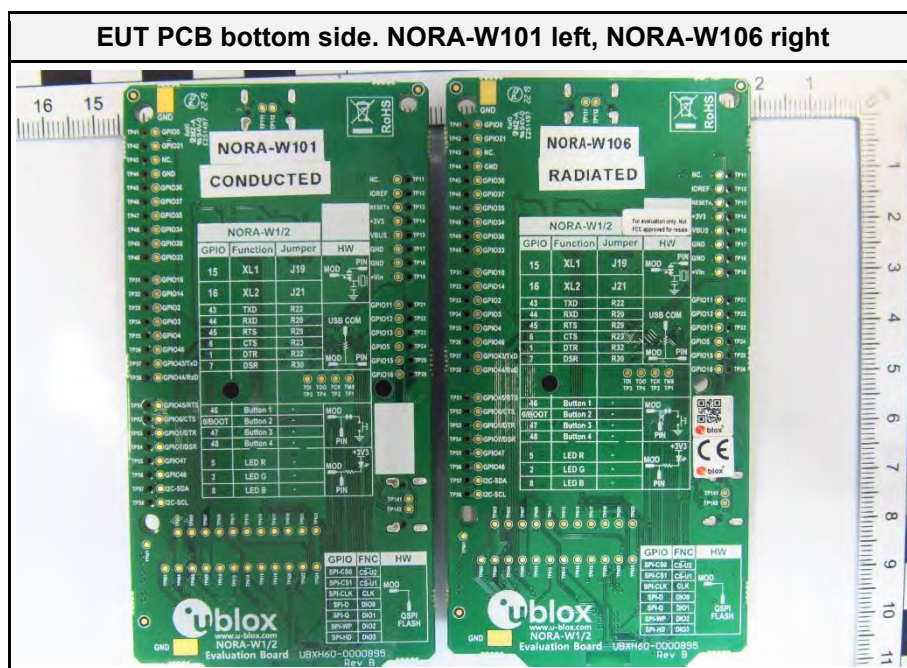
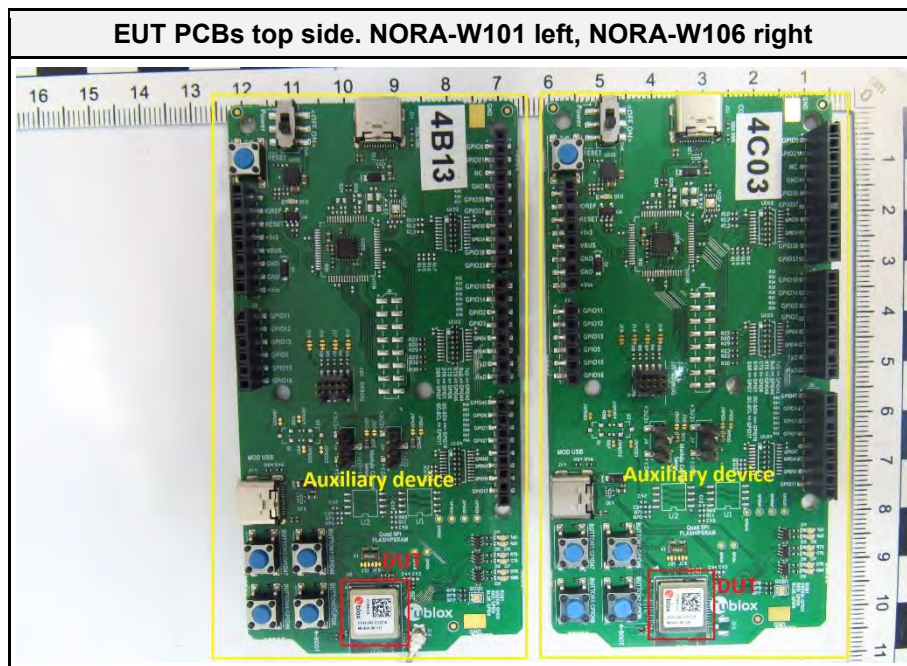
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## 1 Equipment (Test Item) Under Test

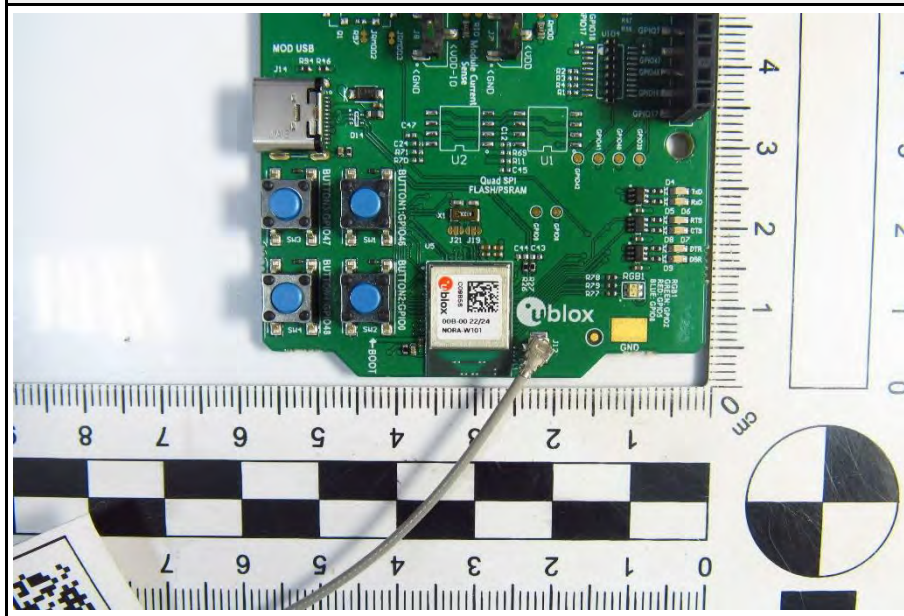
|                                                                                                    |                                                                   |                          |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------|
| Description                                                                                        | Stand-alone multiradio module                                     |                          |
| Model                                                                                              | NORA-W101                                                         |                          |
| Additional Model(s)                                                                                | NORA-W106                                                         |                          |
| Brand Name(s)                                                                                      | u-blox                                                            |                          |
| Serial Number(s)                                                                                   | NORA-W101: 919100.0400.000<br>NORA-W106: 919200.0400.000          |                          |
| Test Sample Id(s)                                                                                  | 40682 (4B16, Radiated)<br>40677 (4B13, Conducted)<br>40680 (4C03) |                          |
| Hardware Version(s)                                                                                | 04                                                                |                          |
| Software Version(s)                                                                                | V1.08                                                             |                          |
| PMN                                                                                                | NORA-W101, NORA-W106, NORA-W251AWS, NORA-W256AWS                  |                          |
| HVIN                                                                                               | NORA-W101, NORA-W106, NORA-W251AWS, NORA-W256AWS                  |                          |
| FVIN                                                                                               | n/a                                                               |                          |
| HMN                                                                                                | n/a                                                               |                          |
| FCC ID                                                                                             | XPYNORAW1W2                                                       |                          |
| IC                                                                                                 | 8595A-NORAW1W2                                                    |                          |
| Equipment type                                                                                     | Radio Module                                                      |                          |
| Radio type                                                                                         | Transceiver                                                       |                          |
| Assigned frequency bands                                                                           | 2400.0 MHz - 2483.5 MHz                                           |                          |
| Radio technology                                                                                   | IEEE 802.11 b/g/n (HT20 + HT40)                                   |                          |
| Modulation                                                                                         | BPSK, QPSK, 16-QAM, 64-QAM                                        |                          |
| Number of antenna ports                                                                            | 1                                                                 |                          |
| Antenna-1 NORA-W101                                                                                | Type                                                              | External (Monopole)      |
|                                                                                                    | Model                                                             | PRO-EX-333               |
|                                                                                                    | Manufacturer                                                      | Abracon                  |
|                                                                                                    | Gain                                                              | 3.07 dBi (measured)      |
| Antenna-2 NORA-W101                                                                                | Type                                                              | External (Patch)         |
|                                                                                                    | Model                                                             | PN PRO-IS-237            |
|                                                                                                    | Manufacturer                                                      | Abracon                  |
|                                                                                                    | Gain                                                              | 1.61 dBi (measured)      |
| Antenna NORA-W106                                                                                  | Type                                                              | Integrated (PCB antenna) |
|                                                                                                    | Model                                                             | AT1608-A2R4NAA           |
|                                                                                                    | Manufacturer                                                      | Abracon                  |
|                                                                                                    | Gain                                                              | 1.12 dBi (measured)      |
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                              | External                 |
|                                                                                                    | Model                                                             | GW.26.0111               |
|                                                                                                    | Manufacturer                                                      | Taoglas                  |
|                                                                                                    | Gain                                                              | 2.0 dBi                  |
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                              | External                 |
|                                                                                                    | Model                                                             | ANT-2.4-CW-RH-RPS        |
|                                                                                                    | Manufacturer                                                      | Linx                     |
|                                                                                                    | Gain                                                              | -1.0 dBi                 |
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                              | External                 |
|                                                                                                    | Model                                                             | PRO-EX-348               |
|                                                                                                    | Manufacturer                                                      | Abracon                  |
|                                                                                                    | Gain                                                              | 3.0 dBi                  |

|                                                                                                    |                                                               |            |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------|
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                          | External   |
|                                                                                                    | Model                                                         | PRO-EX-296 |
|                                                                                                    | Manufacturer                                                  | Abracon    |
|                                                                                                    | Gain                                                          | 2.0 dBi    |
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                          | External   |
|                                                                                                    | Model                                                         | PRO-EX-327 |
|                                                                                                    | Manufacturer                                                  | Abracon    |
|                                                                                                    | Gain                                                          | 3.0 dBi    |
| Antenna NORA-W101<br>(Antenna is of same kind as PRO-EX-333 but is not tested or evaluated by lab) | Type                                                          | External   |
|                                                                                                    | Model                                                         | PRO-EX-286 |
|                                                                                                    | Manufacturer                                                  | Abracon    |
|                                                                                                    | Gain                                                          | 3.0 dBi    |
| Supply Voltage                                                                                     | V <sub>NOM</sub>                                              | 3.3 VDC    |
| Operating Temperature                                                                              | T <sub>NOM</sub>                                              | 20 °C      |
| AC/DC-Adaptor                                                                                      | N/A                                                           |            |
| Manufacturer                                                                                       | u-blox AG<br>Zürcherstrasse 68<br>8800 Thalwil<br>Switzerland |            |

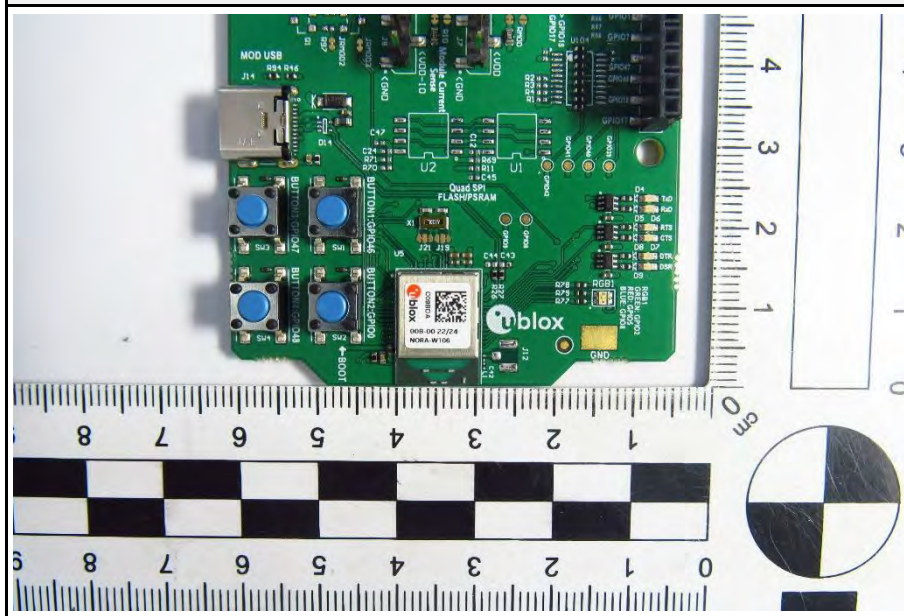
## 1.1 Photos – Equipment External



EUT radio module NORA-W101 view



EUT radio module NORA-W106 view



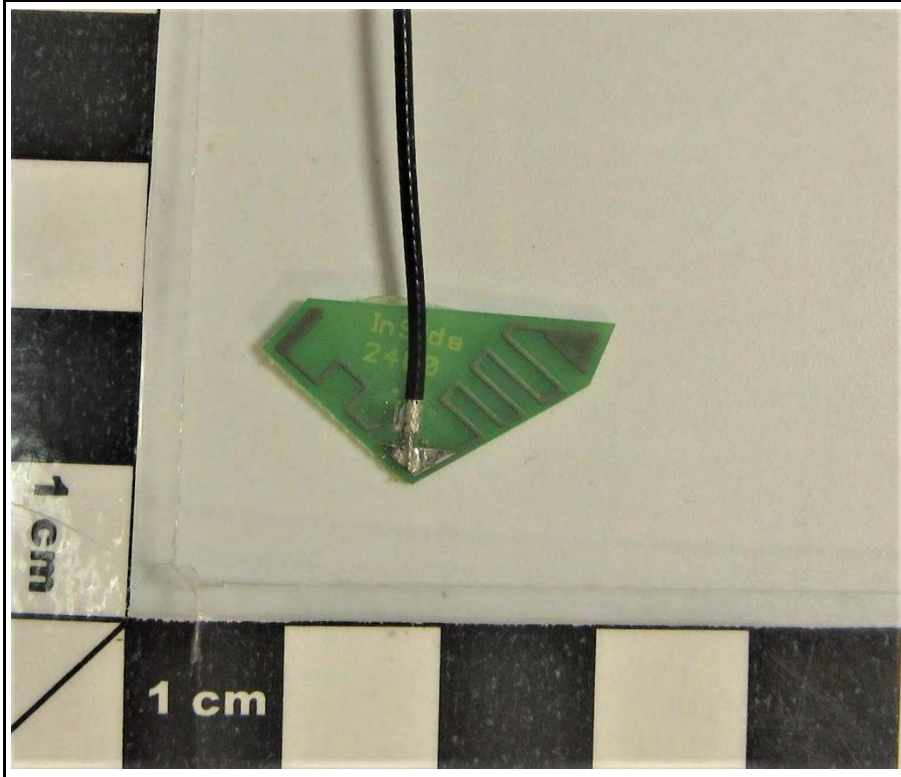
External antenna PRO-EX-333



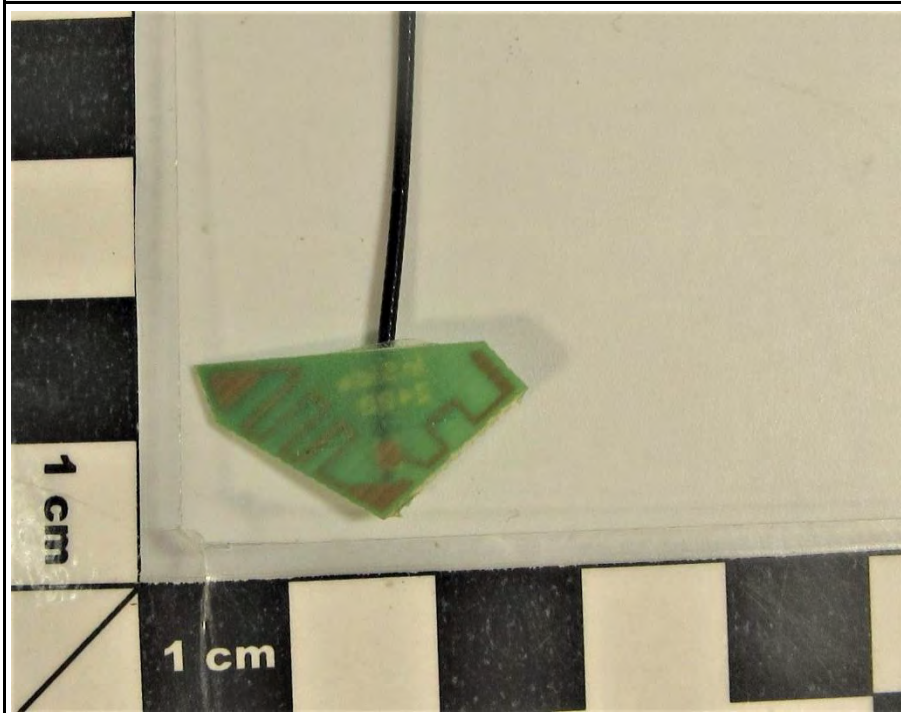
External antenna PRO-EX-333 connector

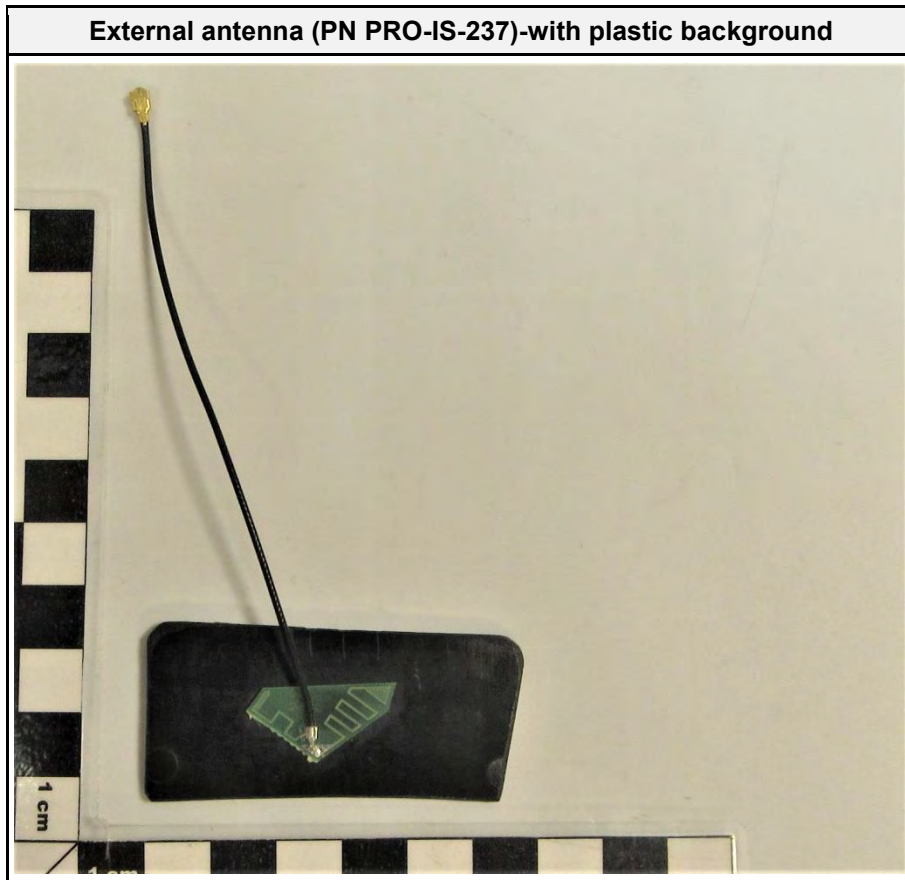


external antenna (PN PRO-IS-237)-front



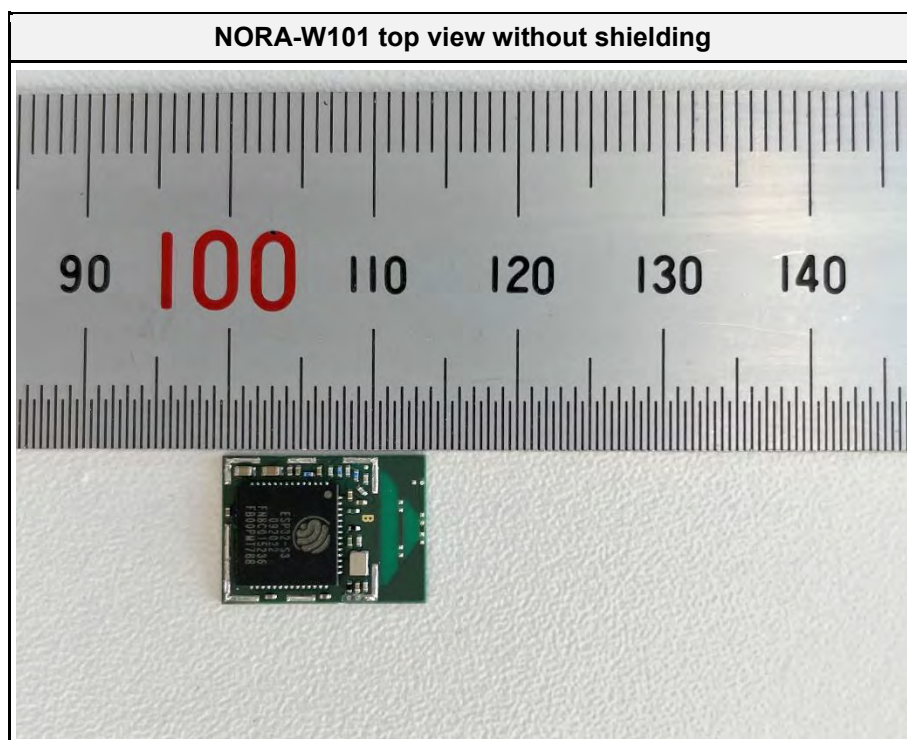
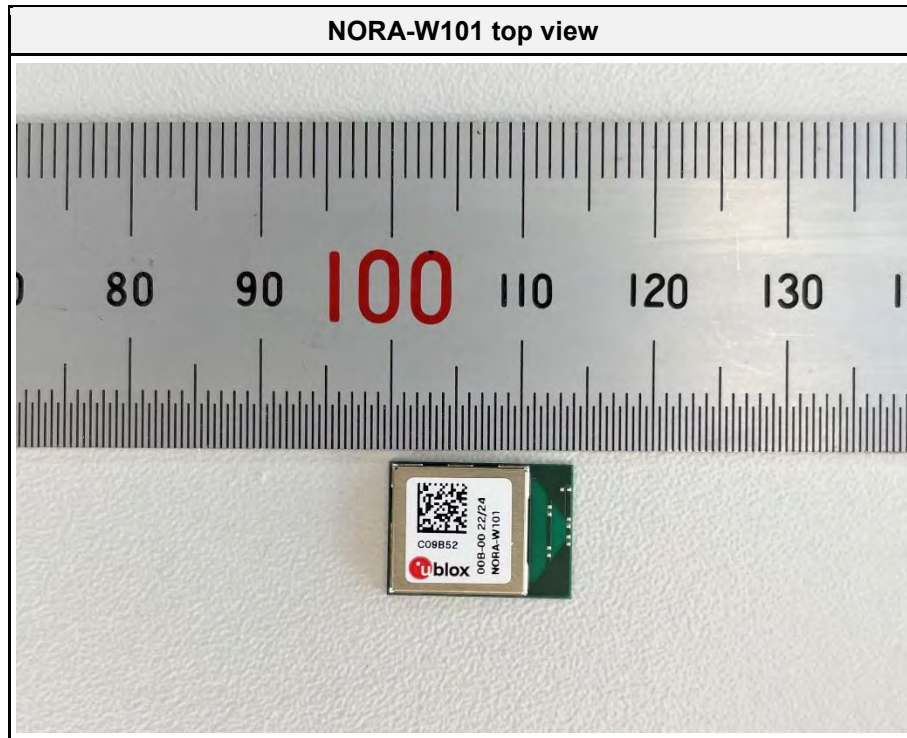
External antenna (PN PRO-IS-237)-Back



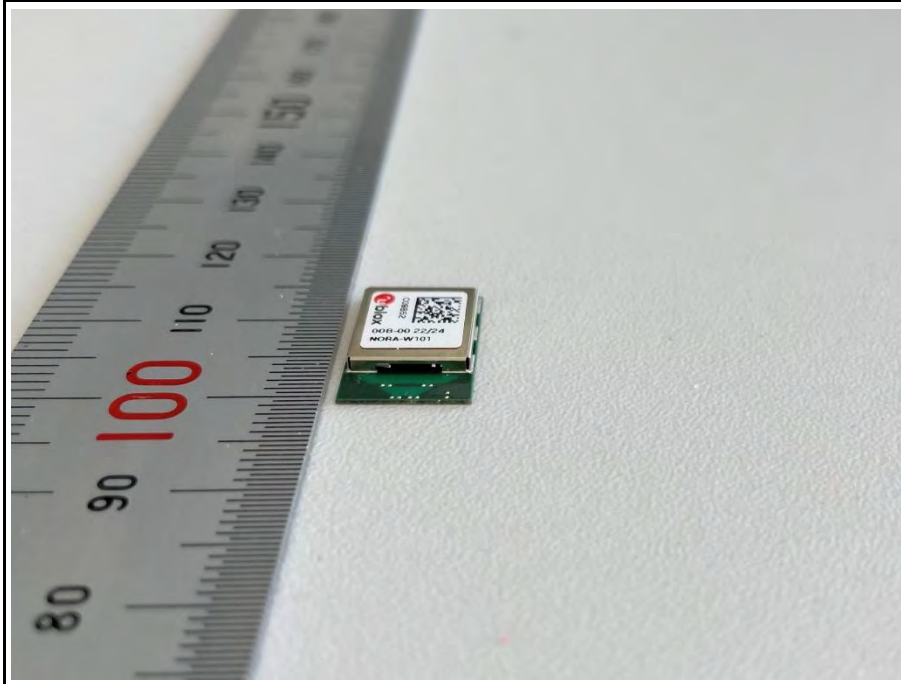


## 1.2 Photos – Equipment Internal

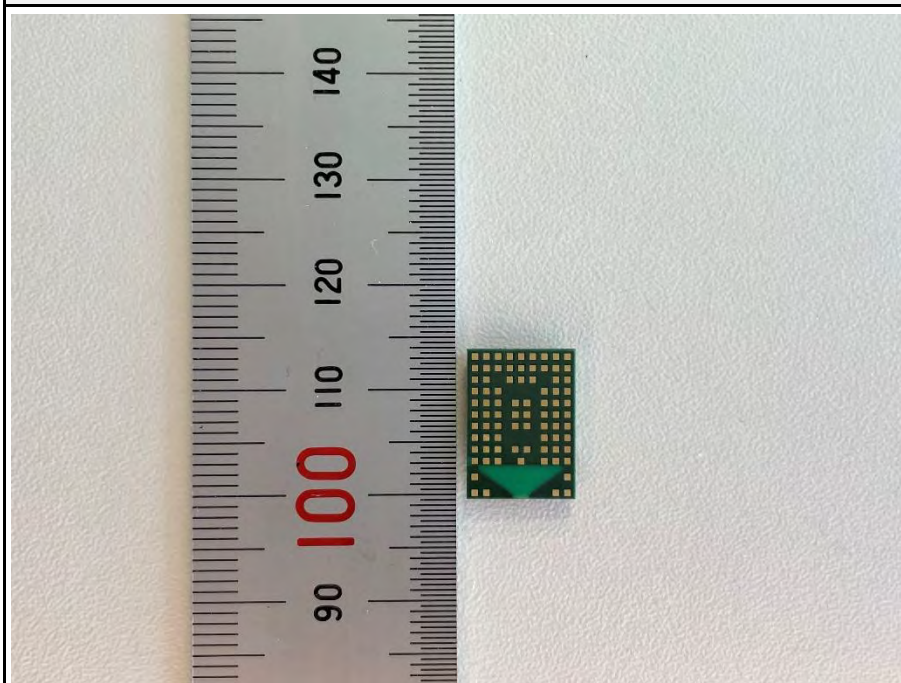
Comment: All internal photos are provided by customer.

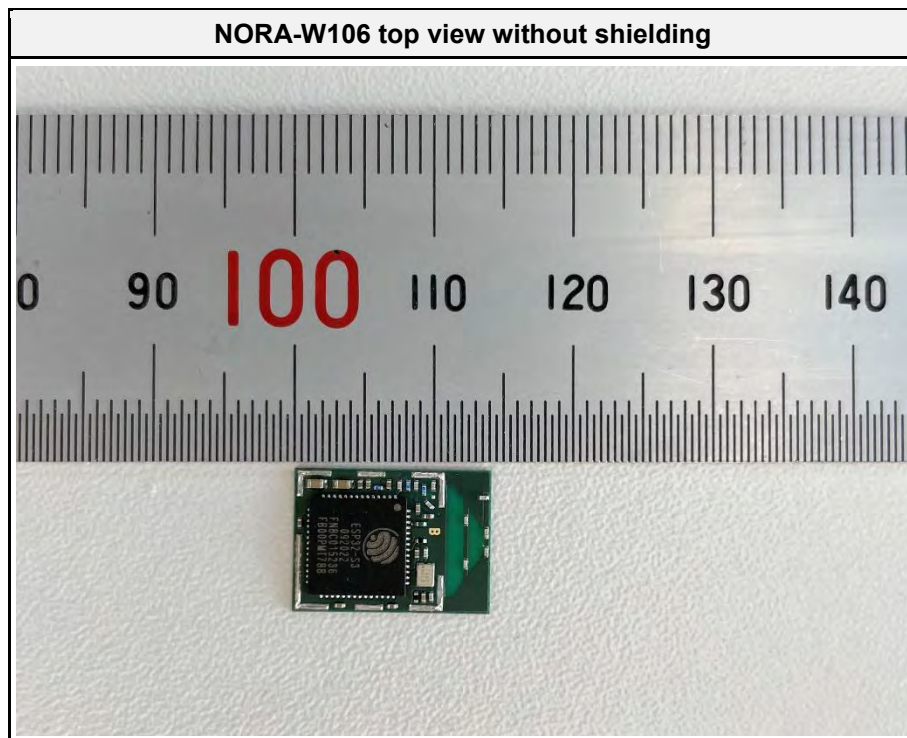
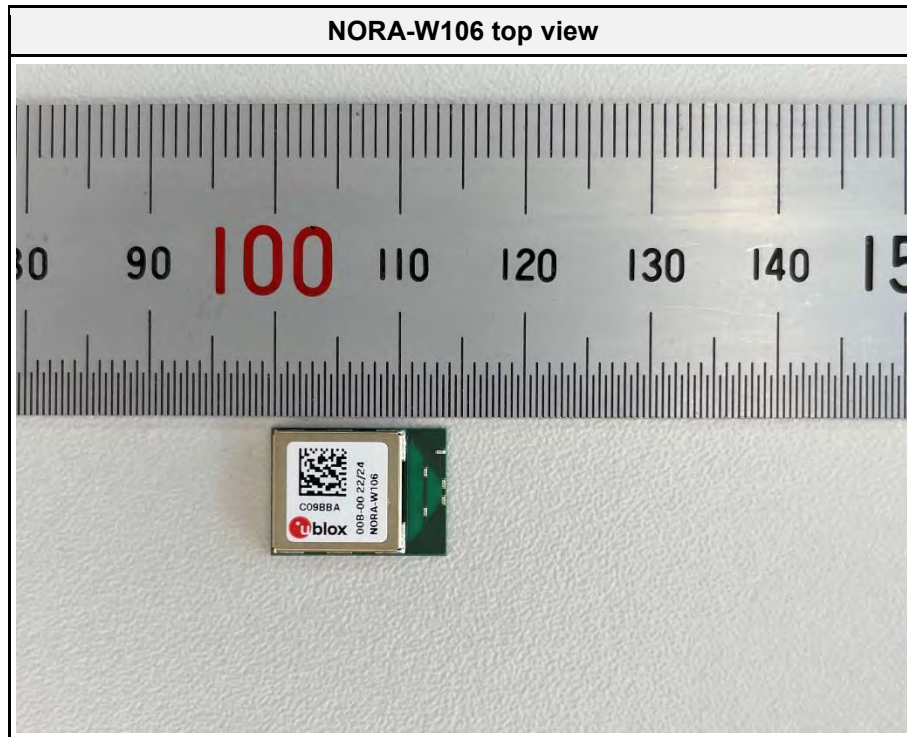


NORA-W101 perspective view

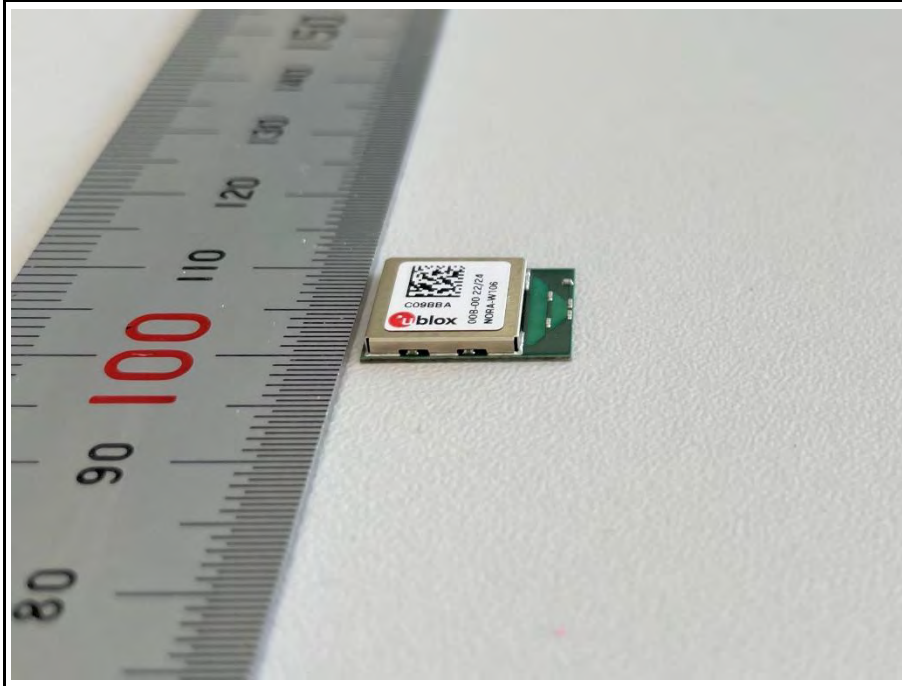


NORA-W101 bottom view

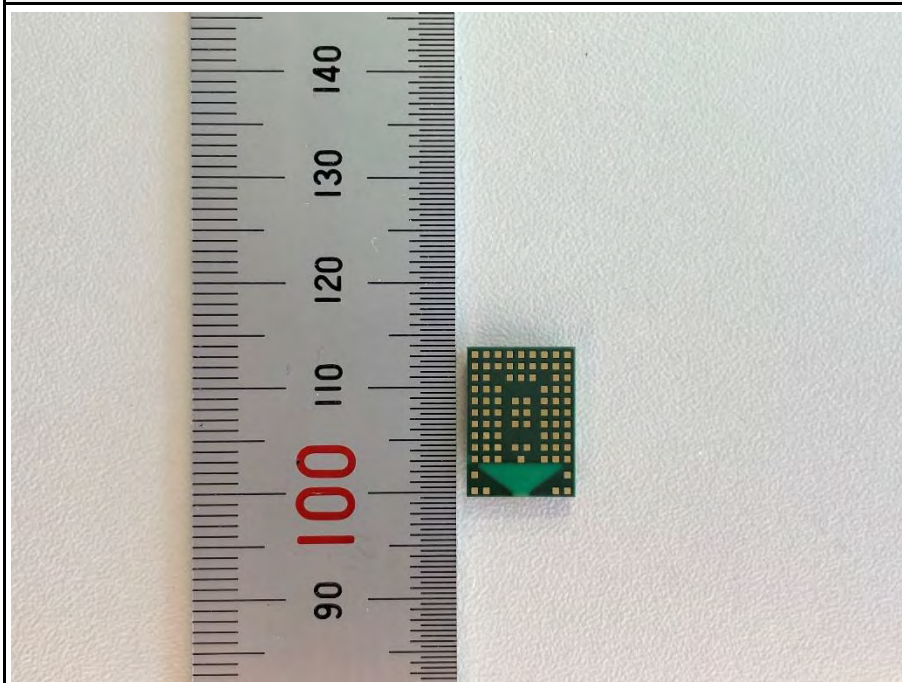




**NORA-W106 perspective view**



**NORA-W106 bottom view**



### 1.3 Support Equipment

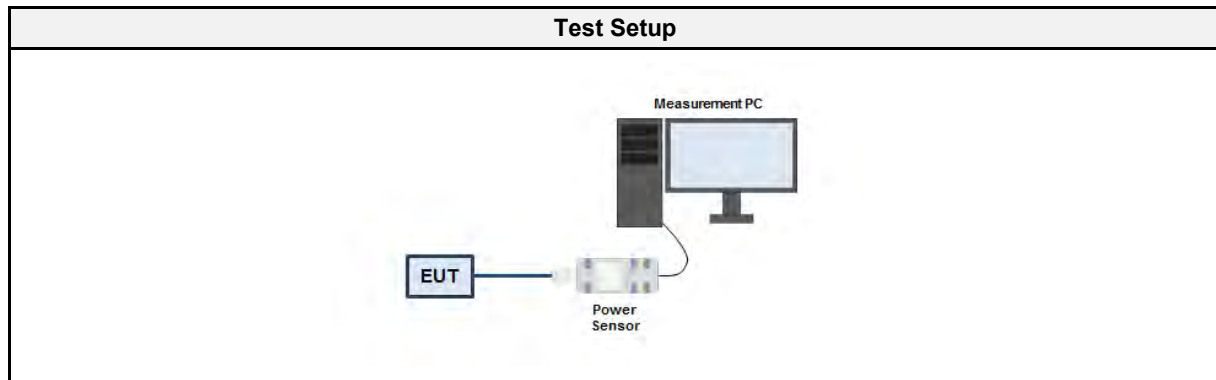
| Product Type | Device              | Manufacturer | Model       | Comment |
|--------------|---------------------|--------------|-------------|---------|
| AE           | Laptop              | Lenovo       | T450        |         |
| AE           | Laptop              | Lenovo       | T440        |         |
| AE           | Laptop power supply | Lenovo       | ADLX45NDC3A |         |
| SFT          | EspoRFTestTool      |              | v2.9        |         |
| Description: |                     |              |             |         |
| AE           | Auxiliary Equipment |              |             |         |
| SIM          | Simulator           |              |             |         |
| CBL          | Connecting Cable    |              |             |         |
| SFT          | Software            |              |             |         |
| Comment:     |                     |              |             |         |

## 1.4 Test mode output power

### 1.4.1 Information

| Test Information   |                        |
|--------------------|------------------------|
| Measurement Method | ANSI C63.10 11.9, 14.3 |

### 1.4.2 Setup



### 1.4.3 Equipment

| Test Equipment |              |         |            |           |          |
|----------------|--------------|---------|------------|-----------|----------|
| Description    | Manufacturer | Model   | Identifier | Cal. Date | Cal. Due |
| Power Sensor   | R&S          | NRP-Z81 | EF00830    | 2021-08   | 2022-08  |

### 1.4.4 Procedure

| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. The peak power is measured with the wideband power sensor</li> <li>3. The power is measured for the lowest data rate on all three channels</li> <li>4. For the channel with the highest power the power is also measured for all data rates</li> <li>5. The data rate with the highest output power is selected for test mode</li> </ol> |

## 1.4.5 Results

| Results - DSSS   |                                   |                                   |                                   |
|------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Data Rate [Mbps] | Power [dBm]<br>Channel 2412 [MHz] | Power [dBm]<br>Channel 2437 [MHz] | Power [dBm]<br>Channel 2462 [MHz] |
| 1                | <b>20.9</b>                       | 19.32                             | 19.2                              |
| 2                | 20.52                             | 19.90                             | 19.17                             |
| 5.5              | 20.03                             | 19.43                             | 19.78                             |
| 11               | 20.63                             | 19.75                             | 19.01                             |

| Results - OFDM   |                                   |                                   |                                   |
|------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Data Rate [Mbps] | Power [dBm]<br>Channel 2412 [MHz] | Power [dBm]<br>Channel 2437 [MHz] | Power [dBm]<br>Channel 2462 [MHz] |
| 6                | 23.2                              | <b>23.42</b>                      | 23.36                             |
| 9                | 23.19                             | 23.12                             | 23.04                             |
| 12               | 22.88                             | 22.98                             | 22.96                             |
| 18               | 22.91                             | 22.95                             | 22.95                             |
| 24               | 22.72                             | 23.09                             | 22.96                             |
| 36               | 22.98                             | 22.85                             | 22.93                             |
| 48               | 22.7                              | 22.87                             | 22.87                             |
| 54               | 22.77                             | 22.72                             | 22.84                             |

| Results - HT20 |                                   |                                   |                                   |
|----------------|-----------------------------------|-----------------------------------|-----------------------------------|
| MCS            | Power [dBm]<br>Channel 2412 [MHz] | Power [dBm]<br>Channel 2437 [MHz] | Power [dBm]<br>Channel 2462 [MHz] |
| 0              | 23.08                             | 23.21                             | 23.03                             |
| 1              | 23.07                             | 23.13                             | <b>23.3</b>                       |
| 2              | 22.75                             | 22.90                             | 22.84                             |
| 3              | 22.64                             | 22.37                             | 22.80                             |
| 4              | 22.60                             | 22.68                             | 22.64                             |
| 5              | 22.84                             | 22.55                             | 23.08                             |
| 6              | 22.52                             | 22.47                             | 22.48                             |
| 7              | 22.44                             | 22.42                             | 22.81                             |

| Results - HT40 |                                   |                                   |                                   |
|----------------|-----------------------------------|-----------------------------------|-----------------------------------|
| MCS            | Power [dBm]<br>Channel 2422 [MHz] | Power [dBm]<br>Channel 2437 [MHz] | Power [dBm]<br>Channel 2452 [MHz] |
| 0              | 23.01                             | <b>23.15</b>                      | 22.95                             |
| 1              | 22.61                             | 22.44                             | 22.83                             |
| 2              | 22.10                             | 22.11                             | 22.85                             |
| 3              | 22.11                             | 22.27                             | 22.21                             |
| 4              | 22.33                             | 22.17                             | 22.13                             |
| 5              | 22.71                             | 22.74                             | 22.55                             |
| 6              | 22.13                             | 22.41                             | 22.31                             |
| 7              | 22.24                             | 22.68                             | 22.49                             |

## 1.5 Test mode duty cycle

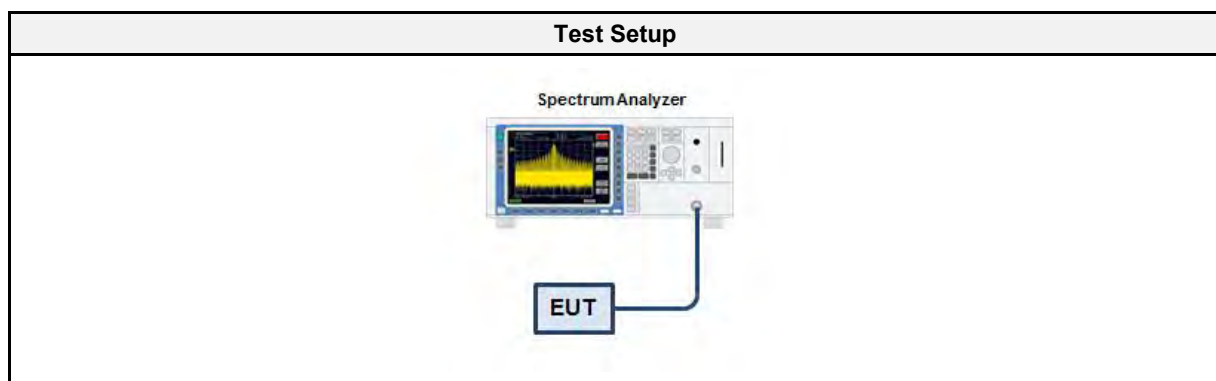
### 1.5.1 Information

| Test Information   |                  |
|--------------------|------------------|
| Measurement Method | ANSI C63.10 11.6 |

### 1.5.2 Requirements

| Requirements |                                                     |
|--------------|-----------------------------------------------------|
| Duty cycle   | Duty cycle correction                               |
| ≥ 98 %       | No correction required                              |
| < 98 %       | Correction required ( $10 \times \log_{10}(1/DC)$ ) |

### 1.5.3 Setup



### 1.5.4 Equipment

| Test Equipment    |              |        |            |           |          |
|-------------------|--------------|--------|------------|-----------|----------|
| Description       | Manufacturer | Model  | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyser | R&S          | FSU 26 | EF01003    | 2022-07   | 2023-07  |

### 1.5.5 Procedure

| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. Span is set to zero span</li> <li>3. Detector set to peak</li> <li>4. Sweep time is set long enough to capture at least 5 bursts</li> <li>5. Envelope peak value of emission spectrum is selected</li> <li>6. The maximum burst duration <math>T_{ON}</math> is measured using two markers set to the start and the end of the longest burst</li> <li>7. The minimum idle duration <math>T_{OFF}</math> is measured using two markers set to the start and the end of the shortest idle period</li> <li>8. The duty cycle is calculated by <math>DC = T_{ON} / (T_{ON} + T_{OFF})</math></li> <li>9. The duty cycle correction is calculated by <math>DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))</math></li> </ol> |

#### 1.5.6 Results

| Duty Cycle Results |            |                        |
|--------------------|------------|------------------------|
| Mode               | Duty Cycle | Correction Factor [dB] |
| DSSS               | 96%        | -0.18                  |
| OFDM               | 92%        | -0.36                  |
| HT20               | 93%        | -0.32                  |
| HT40               | 100%       | 0                      |

## 1.6 Test Modes

| Mode                                                                                                                                                               | Description                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DSSS<br>(IEEE 802.11b)                                                                                                                                             | Mode = Transmit<br>Modulation = BPSK<br>Spreading = DSSS<br>Bandwidth = 20 MHz<br>Duty cycle = 96%<br>Power setting = Pmax backed-off by 4 dB*<br>Data rate = 1 Mbps (2412)<br>Data rate = 11 Mbps (2437)<br>Data rate = 5.5 Mbps (2462)                                                                                 |
| OFDM<br>(IEEE 802.11g)                                                                                                                                             | Mode = Transmit<br>Modulation = OFDM<br>Bandwidth = 20 MHz<br>Duty cycle = 92%<br>Power setting = Pmax backed-off by 4 dB*<br>Data rate = 6 Mbps (2412)<br>Data rate = 6 Mbps (2437)<br>Data rate = 6 Mbps (2462)                                                                                                        |
| HT20<br>(IEEE 802.11n)                                                                                                                                             | Mode = Transmit<br>Modulation = OFDM<br>Bandwidth = 20 MHz<br>Duty cycle = 93%<br>Power setting (1 Simultaneous Tx) = Pmax backed-off by 4 dB*<br>Data rate = 6.5 Mbps & 13 Mbps<br>MCS (1 Simultaneous Tx) = 0 (2412)<br>MCS (1 Simultaneous Tx) = 0 (2437)<br>MCS (1 Simultaneous Tx) = 1 (2462)                       |
| HT40<br>(IEEE 802.11n)                                                                                                                                             | Mode = Transmit<br>Modulation = OFDM<br>Bandwidth = 40 MHz<br>Duty cycle = 100%<br>Power setting (1 Simultaneous Tx) = Pmax backed-off by 4 dB*<br>Data rate (1 Simultaneous Tx) = 13.5 Mbps & 27 Mbps<br>MCS (1 Simultaneous Tx) = 0 (2422)<br>MCS (1 Simultaneous Tx) = 0 (2437)<br>MCS (1 Simultaneous Tx) = 0 (2452) |
| Receive                                                                                                                                                            | Mode = Receive                                                                                                                                                                                                                                                                                                           |
| Comment: The above settings were found as worst case during pre-tests.<br>*The EUT power was attenuated by 4 dB using a control software provided by the customer. |                                                                                                                                                                                                                                                                                                                          |

## 1.7 Test Frequencies

| Designator | Mode    | Channel | Frequency [MHz] |
|------------|---------|---------|-----------------|
| F1         | Tx / Rx | 1       | 2412            |
| F2         | Tx / Rx | 3       | 2422            |
| F3         | Tx / Rx | 6       | 2437            |
| F4         | Tx / Rx | 9       | 2452            |
| F5         | Tx / Rx | 11      | 2462            |

## 1.8 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBμV/m). The FCC limits are given in units of μV/m. The following formula is used to convert the units of μV/m to dBμV/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

|                      |               |   |                           |           |
|----------------------|---------------|---|---------------------------|-----------|
| Reading + AF         | = Net Reading | : | Net reading - FCC limit   | = Margin  |
| +21.5 dBμV + 26 dB/m | = 47.5 dBμV/m | : | 47.5 dBμV/m - 57.0 dBμV/m | = -9.5 dB |

## 2 Result Summary

| FCC 47 CFR Part 15C, ISED RSS-247                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |                  |        |                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------|--------|--------------------|
| Product Standard Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Requirement                             | Reference Method | Result | Remarks            |
| ISED RSS-Gen, Issue 5 A2 (section 6.7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Occupied Bandwidth                      | ANSI C63.10-2013 | N/R    | Informational only |
| FCC § 15.247(a)(2)<br>ISED RSS-247, Issue 2 (section 5.2)                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6 dB Bandwidth                          | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.247(b)<br>ISED RSS-247, Issue 2 (section 5.4)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Maximum peak conducted power            | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.247(e)<br>ISED RSS-247, Issue 2 (section 5.2)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Power spectral density                  | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.207<br>ISED RSS-247, Issue 2 (section 3.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                      | AC power line conducted emissions       | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.247(d)<br>ISED RSS-247, Issue 2 (section 5.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Band edge compliance                    | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.247(d)<br>ISED RSS-247, Issue 2 (section 5.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Conducted spurious emissions            | ANSI C63.10-2013 | PASS   | Note 1             |
| FCC § 15.247(d)<br>FCC § 15.209<br>ISED RSS-Gen, Issue 5 A2 (section 6.13)                                                                                                                                                                                                                                                                                                                                                                                                                               | Transmitter radiated spurious emissions | ANSI C63.10-2013 | PASS   | Note 2             |
| ISED RSS-247, Issue 2 (section 3.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Receiver radiated spurious emissions    | ANSI C63.4-2014  | PASS   | Note 2             |
| Note 1: This test was only performed for the main tested module NORA-W101. It is not required for the tested variants.                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                  |        |                    |
| Note 2: This test was performed in full for the main tested module NORA-W101 and partially (Spot-check) for the tested variants.                                                                                                                                                                                                                                                                                                                                                                         |                                         |                  |        |                    |
| Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed. |                                         |                  |        |                    |

| Possible Test Case Verdicts |                                              |
|-----------------------------|----------------------------------------------|
| PASS                        | Test object does meet the requirements       |
| FAIL                        | Test object does not meet the requirements   |
| N/T                         | Required by standard but not tested          |
| N/R                         | Not required by standard for the test object |

### 3 Test Conditions and Results

#### 3.1 Test Conditions and Results - Occupied bandwidth

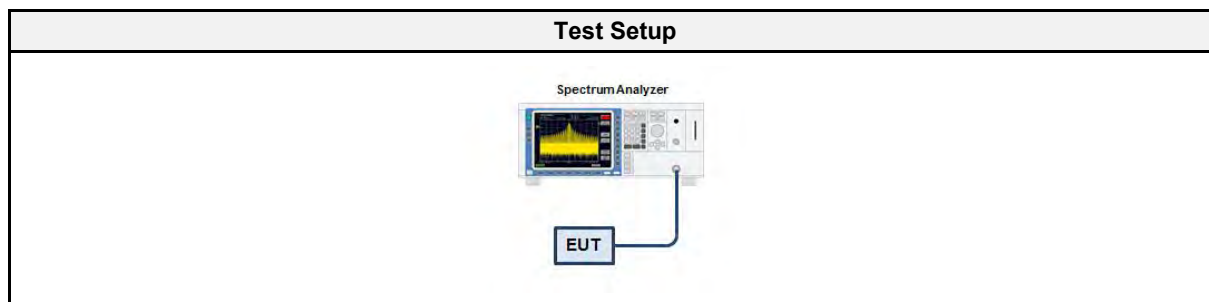
##### 3.1.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | ISED RSS-Gen, Issue 5 A2 (section 6.7)                                       |
| Measurement Method      | ANSI C63.10 6.9.3                                                            |
| Measurement Uncertainty | $\pm 1.26 \%$                                                                |
| Test Sample ID          | 40677                                                                        |
| Operator                | Dr.-Ing. Dhamia Almozani                                                     |
| Date                    | 2022-08-18                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

##### 3.1.2 Limits

| Limits                    |
|---------------------------|
| None (Informational only) |

##### 3.1.3 Setup



##### 3.1.4 Equipment

| Test Equipment    |              |             |               |           |          |
|-------------------|--------------|-------------|---------------|-----------|----------|
| Description       | Manufacturer | Model       | Identifier    | Cal. Date | Cal. Due |
| Spectrum Analyser | R&S          | FSU 26      | EF01003       | 2022-07   | 2023-07  |
| Cable (diverse)   | – (diverse)  | – (diverse) | EF00779 CAABZ | 2022-02   | 2023-02  |

##### 3.1.5 Procedure

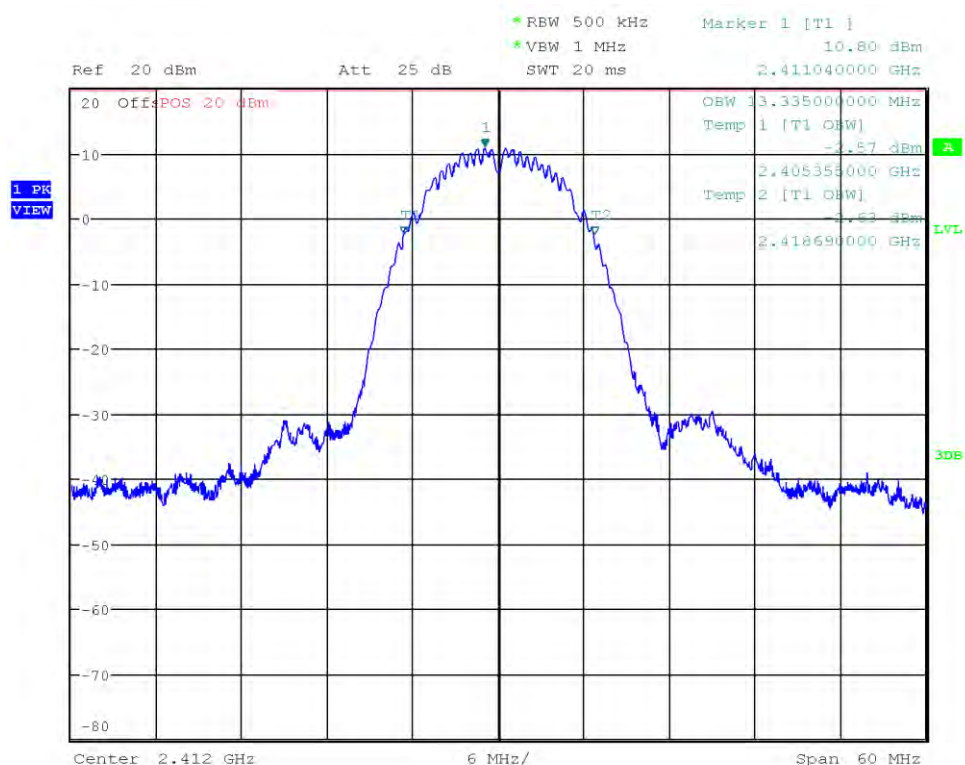
| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>EUT transmitter is activated in test mode under normal conditions</li> <li>The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum</li> <li>The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth</li> <li>The occupied bandwidth is measured with the build-in analyzer function</li> </ol> |

### 3.1.6 Results

| Test Results |                    |                    |
|--------------|--------------------|--------------------|
| Mode         | Frequency<br>[MHz] | Bandwidth<br>[MHz] |
| DSSS         | 2412               | 13.335             |
| DSSS         | 2437               | 13.185             |
| DSSS         | 2462               | 13.050             |
| OFDM         | 2412               | 18.405             |
| OFDM         | 2437               | 18.345             |
| OFDM         | 2462               | 18.495             |
| HT20         | 2412               | 18.675             |
| HT20         | 2437               | 18.675             |
| HT20         | 2462               | 18.510             |
| HT40         | 2422               | 34.92              |
| HT40         | 2437               | 34.950             |
| HT40         | 2452               | 36.000             |

## Occupied Bandwidth

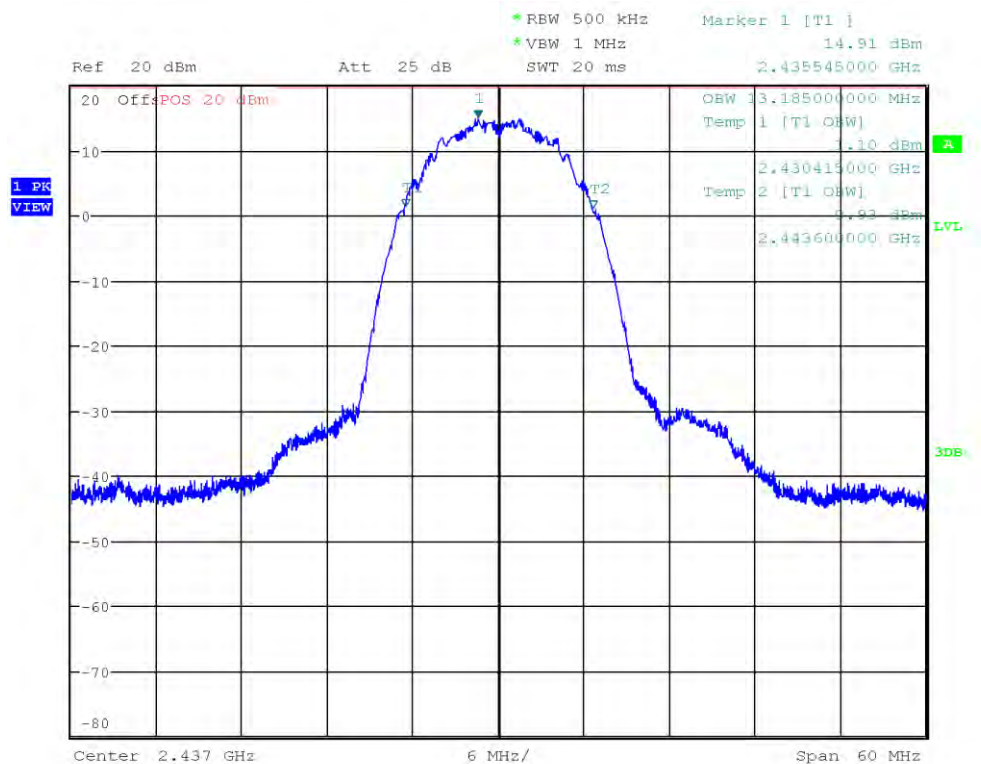
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 b, Channel: 1, 2412  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=1 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 13.335



Date: 22.AUG.2022 10:44:54

## Occupied Bandwidth

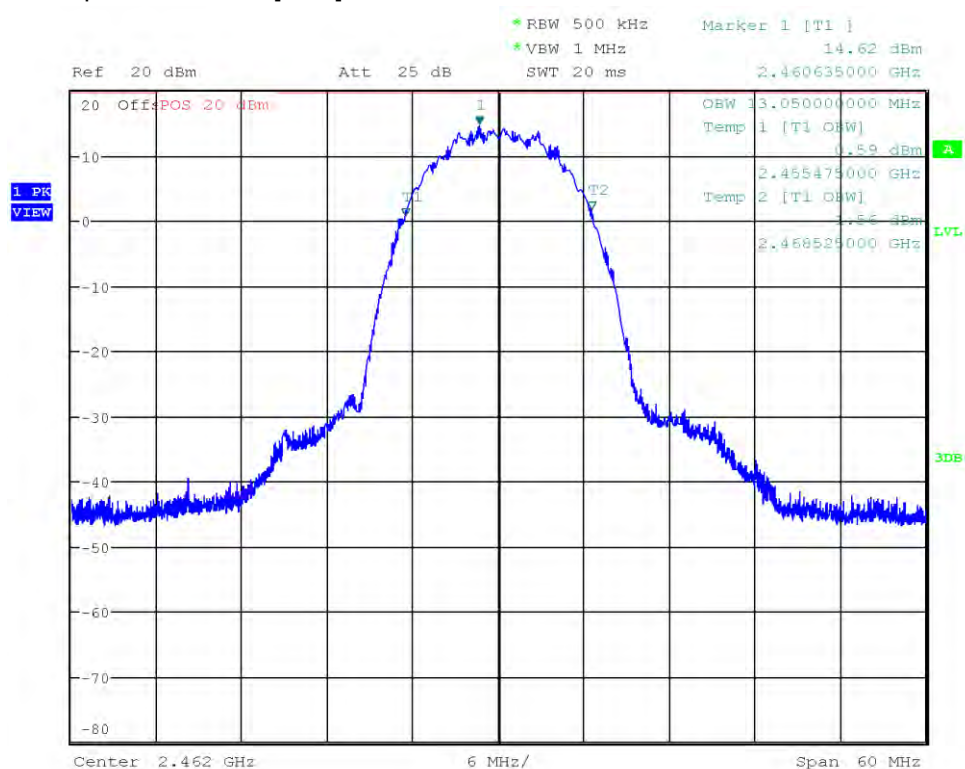
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 b, Channel: 6, 2437  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=2 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 13.185



Date: 22.AUG.2022 10:53:56

## Occupied Bandwidth

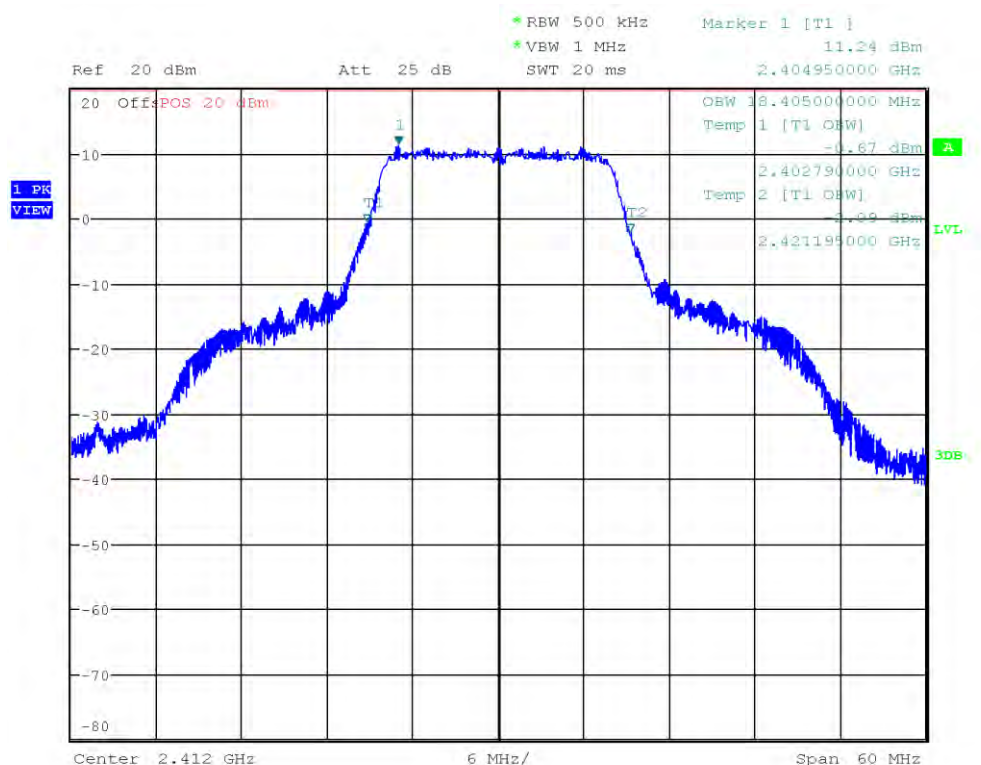
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 b, Channel: 11, 2462  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=5.5 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 13.050



Date: 22.AUG.2022 10:55:25

## Occupied Bandwidth

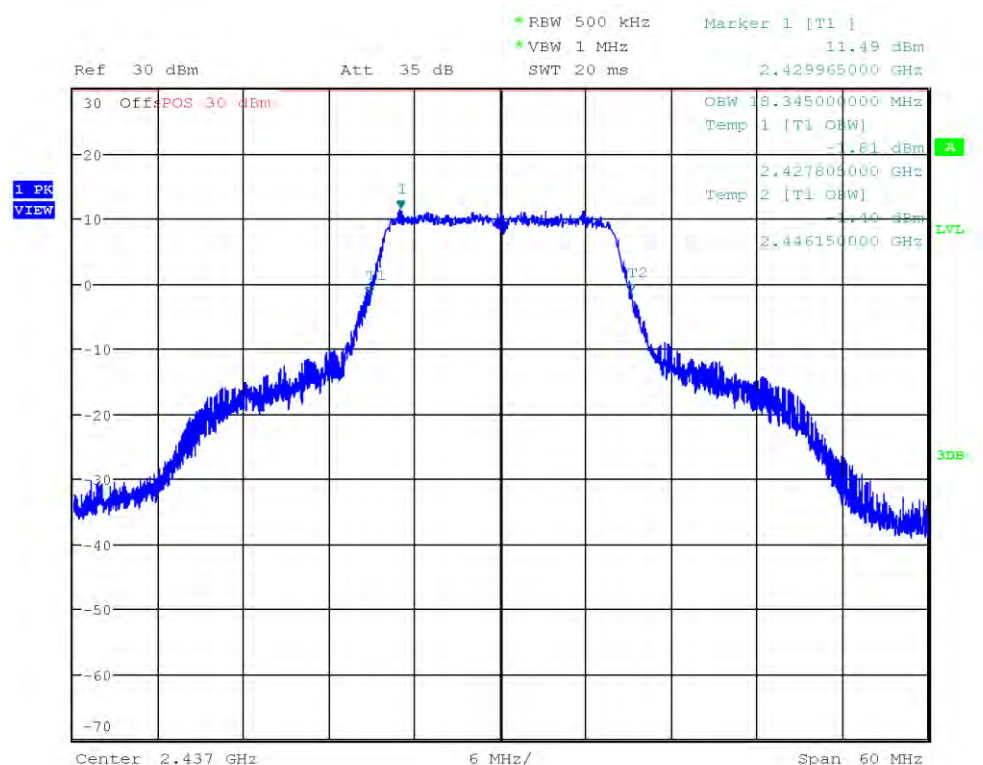
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 g, Channel: 1, 2412  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 18.405



Date: 22.AUG.2022 10:58:44

## Occupied Bandwidth

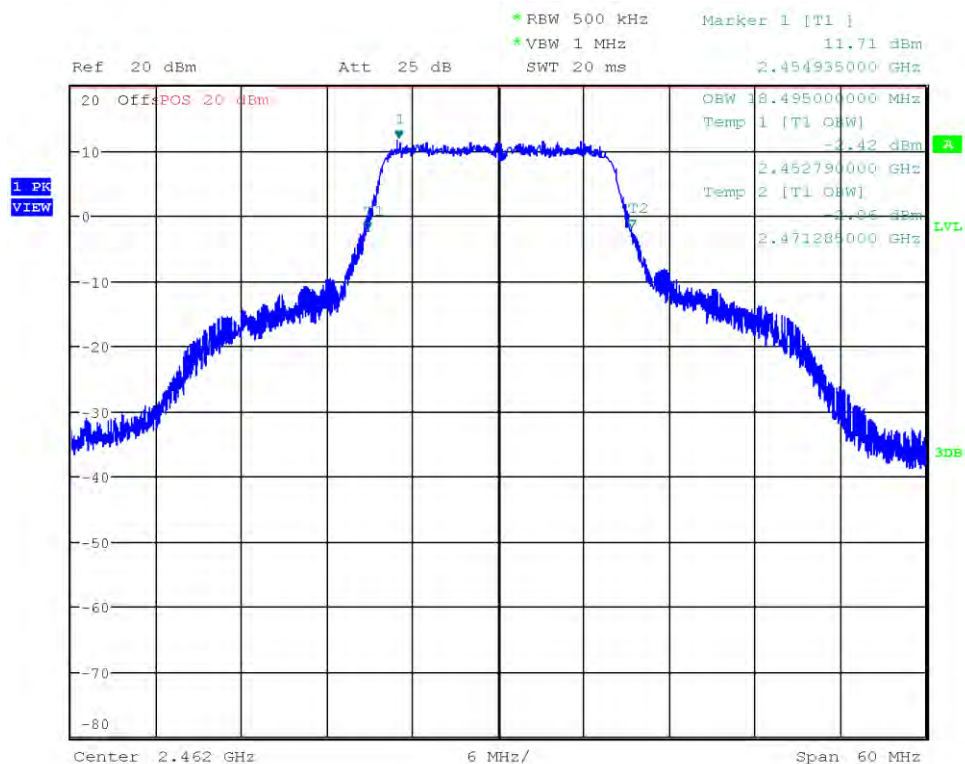
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 g, Channel: 6, 2437  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 18.345



Date: 22.AUG.2022 10:59:50

## Occupied Bandwidth

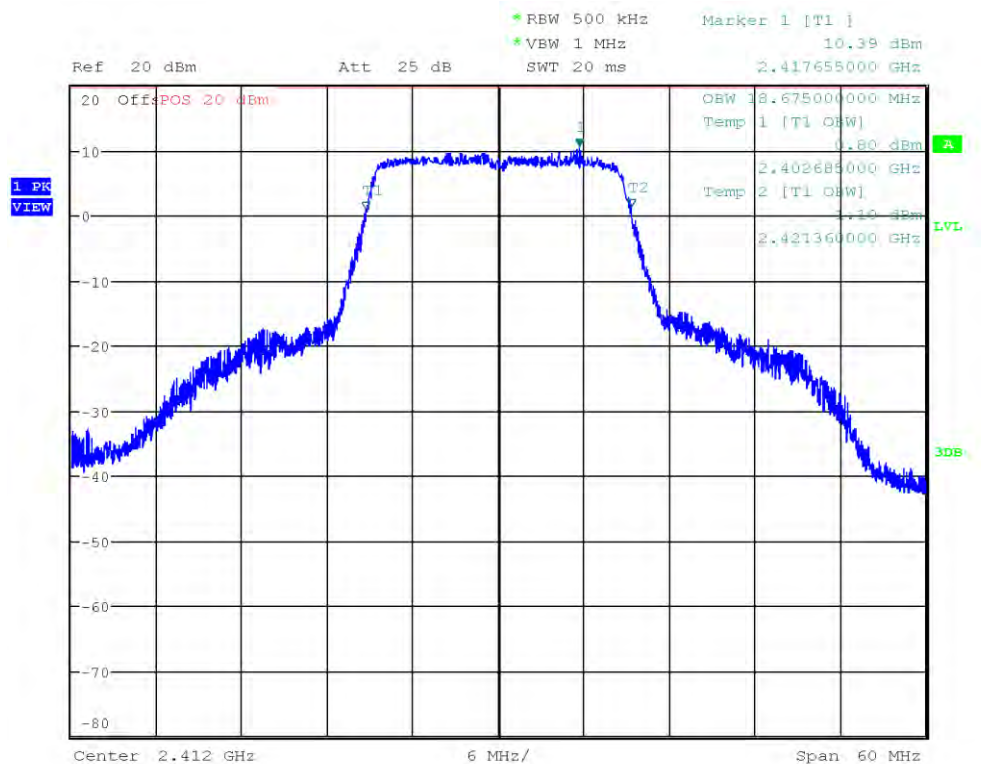
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 g, Channel: 11, 2462  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Occupied Bandwidth [MHz]: 18.495



Date: 22.AUG.2022 11:00:40

## Occupied Bandwidth

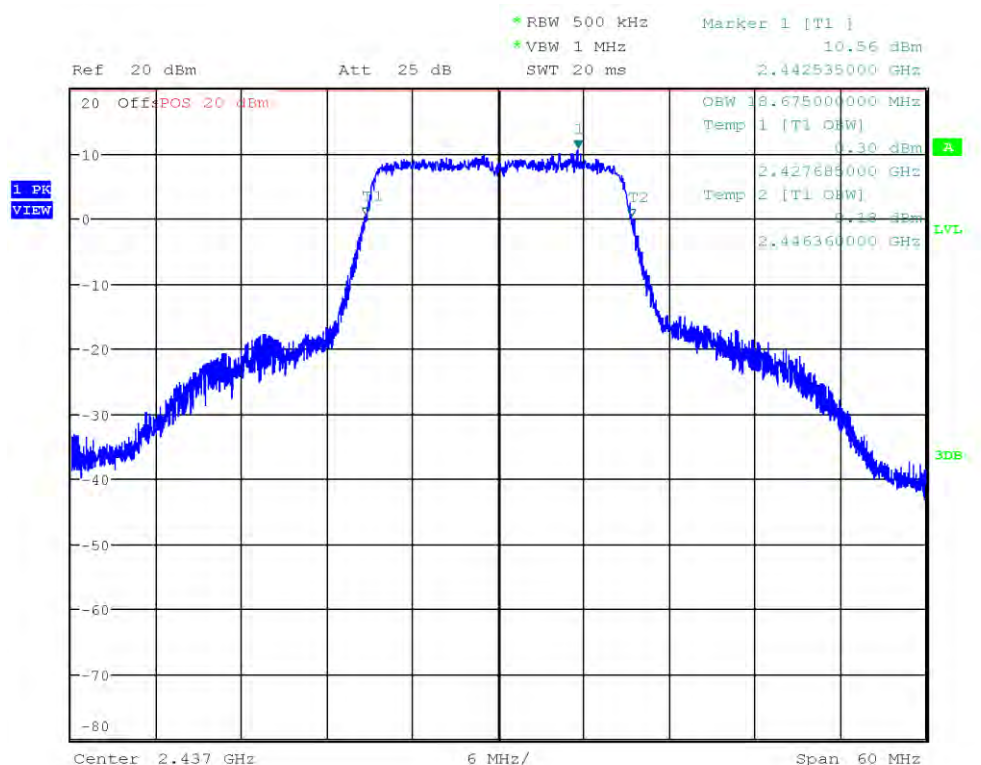
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT20, Channel: 1, 2412  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Occupied Bandwidth [MHz]: 18.675



Date: 22.AUG.2022 11:05:56

## Occupied Bandwidth

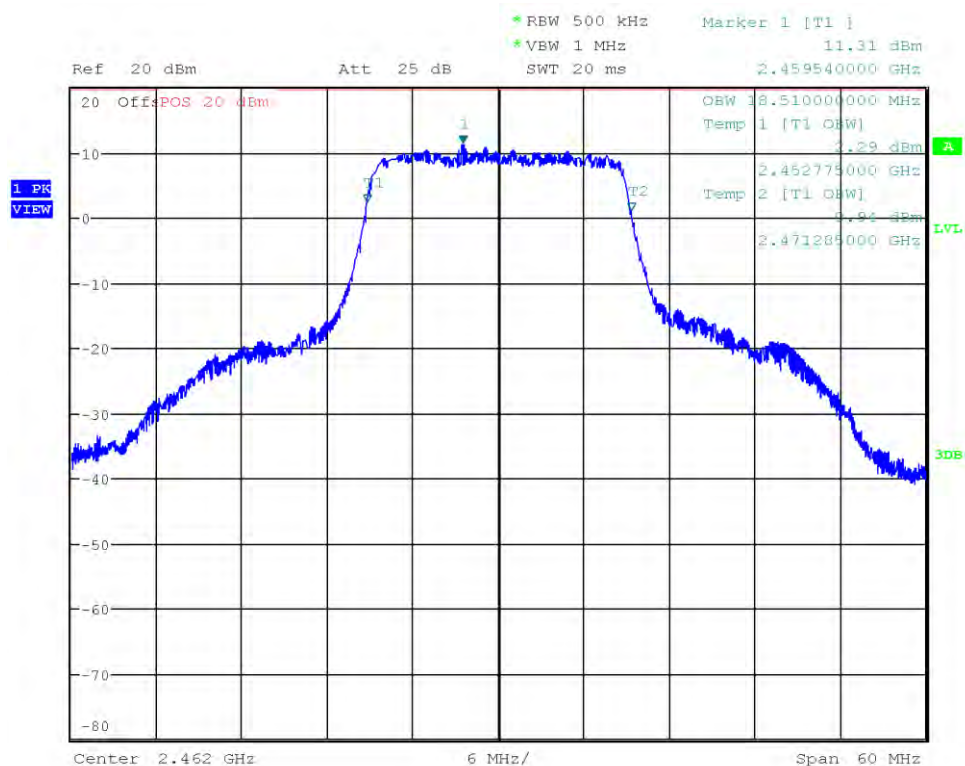
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT20, Channel: 6, 2437  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Occupied Bandwidth [MHz]: 18.675



Date: 22.AUG.2022 11:06:49

## Occupied Bandwidth

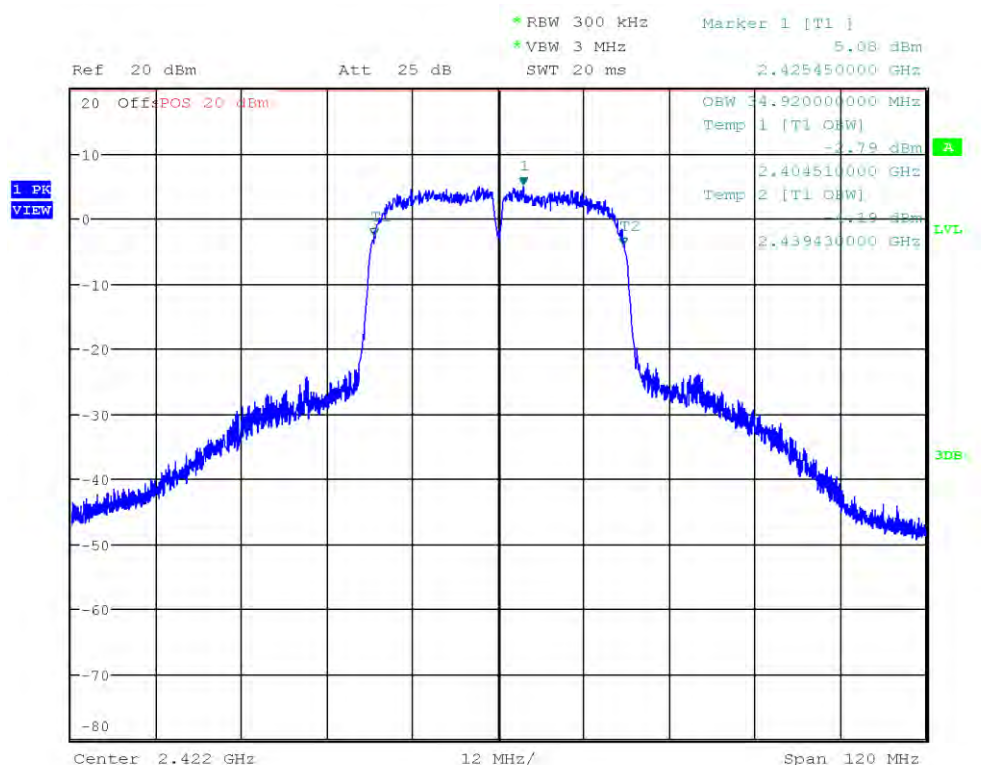
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT20, Channel: 11, 2462  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=1 MCS (worse case)  
 Occupied Bandwidth [MHz]: 18.510



Date: 22.AUG.2022 11:08:41

## Occupied Bandwidth

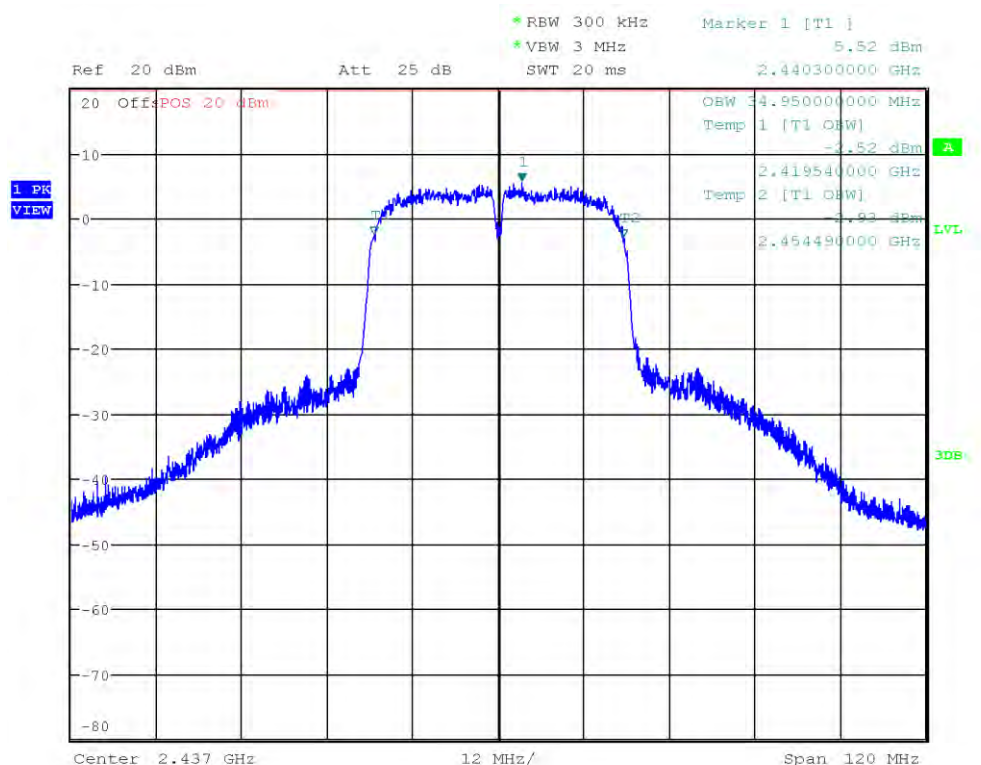
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT40, Channel: 3, 2422  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Occupied Bandwidth [MHz]: 34.920



Date: 22.AUG.2022 11:10:57

## Occupied Bandwidth

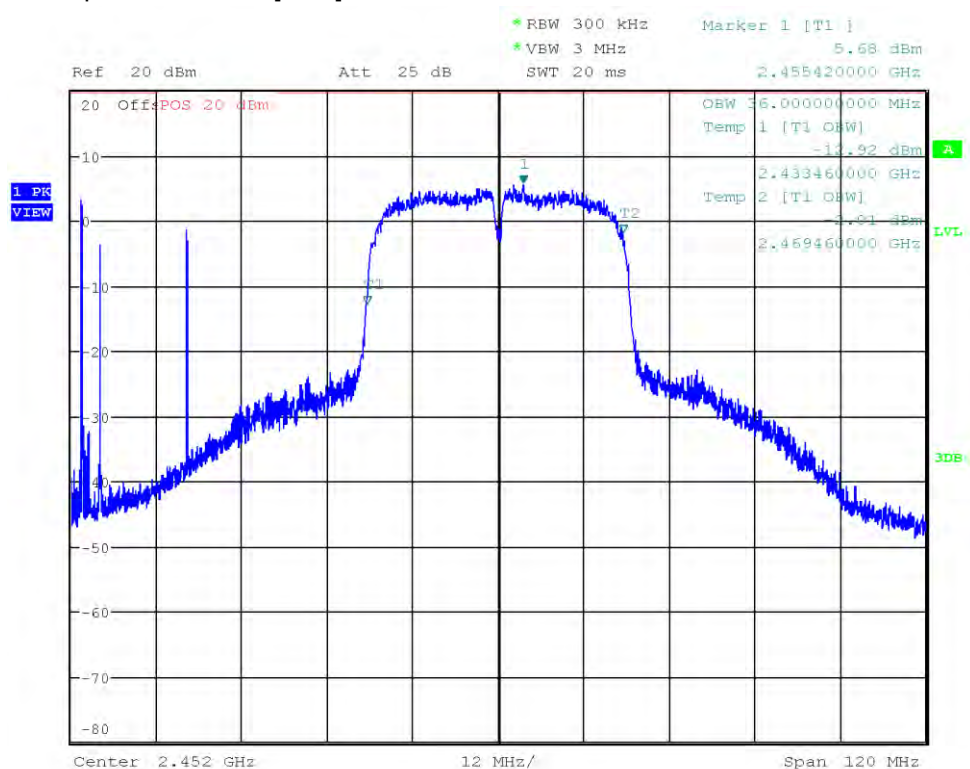
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT40, Channel: 6, 2437  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Occupied Bandwidth [MHz]: 34.950



Date: 22.AUG.2022 11:12:16

## Occupied Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: IEEE 802.11 n HT40, Channel: 9, 2452  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Occupied Bandwidth [MHz]: 36.000



Date: 22.AUG.2022 11:14:42

### 3.2 Test Conditions and Results - 6 dB bandwidth

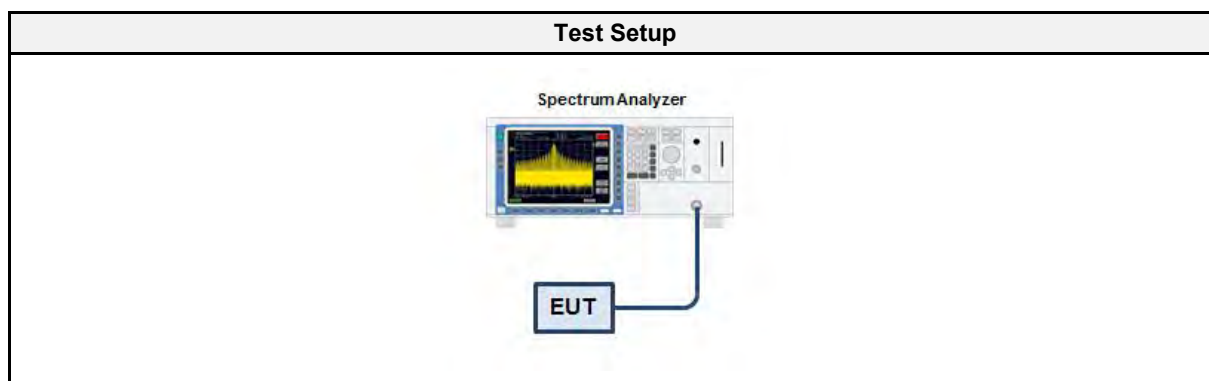
#### 3.2.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)                      |
| Measurement Method      | ANSI C63.10 11.8                                                             |
| Measurement Uncertainty | $\pm 1.26 \%$                                                                |
| Operator                | Dr.-Ing. Dhamia Almozani                                                     |
| Date                    | 2022-08-22                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.2.2 Limits

| Limits               |
|----------------------|
| $\geq 500\text{kHz}$ |

#### 3.2.3 Setup



#### 3.2.4 Equipment

| Test Equipment     |                |                |                  |           |          |
|--------------------|----------------|----------------|------------------|-----------|----------|
| Description        | Manufacturer   | Model          | Identifier       | Cal. Date | Cal. Due |
| Spectrum Analyser  | R&S            | FSU 26         | EF01003          | 2022-07   | 2023-07  |
| Cable<br>(diverse) | —<br>(diverse) | —<br>(diverse) | EF00779<br>CAABZ | 2022-02   | 2023-02  |

#### 3.2.5 Procedure

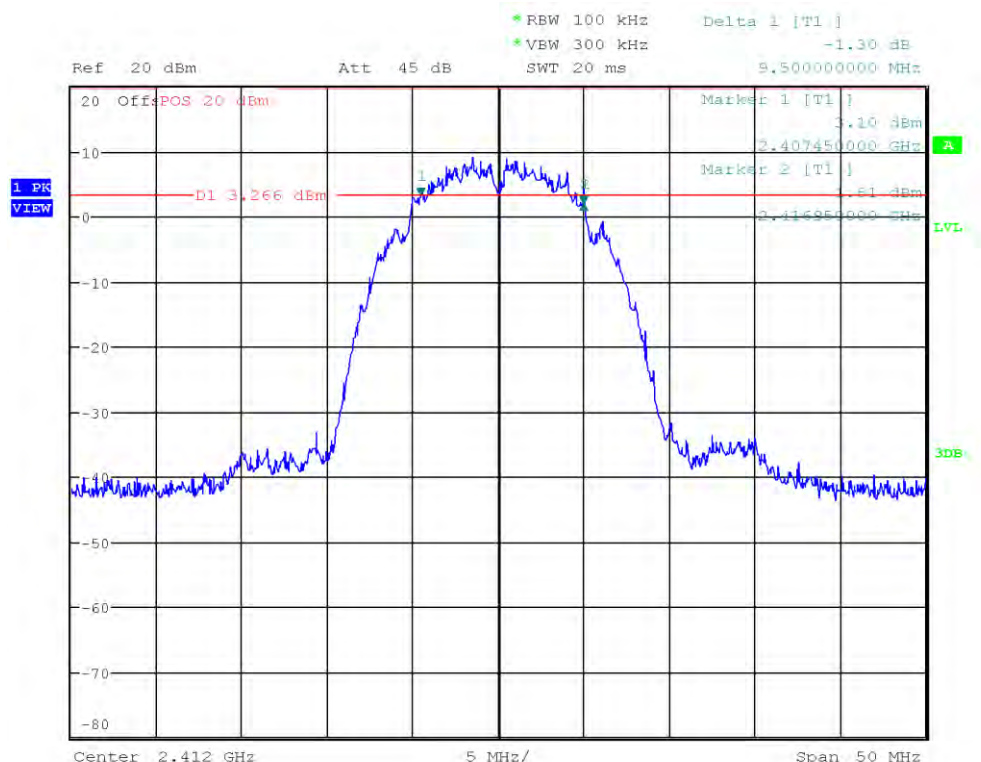
| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. Span set to at least twice the emission spectrum</li> <li>3. Detector set to peak and max hold and RBW is set to 100 kHz</li> <li>4. Envelope peak value of emission spectrum is selected</li> <li>5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak</li> <li>6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak</li> <li>7. 6 dB Bandwidth is determined by marker frequency separation</li> </ol> |

## 3.2.6 Results

| Test Results |                 |                 |             |         |
|--------------|-----------------|-----------------|-------------|---------|
| Mode         | Frequency [MHz] | Bandwidth [kHz] | Limit [kHz] | Verdict |
| DSSS         | 2412            | 9500            | 500         | PASS    |
| DSSS         | 2437            | 8800            | 500         | PASS    |
| DSSS         | 2462            | 9050            | 500         | PASS    |
| OFDM         | 2412            | 16300           | 500         | PASS    |
| OFDM         | 2437            | 16300           | 500         | PASS    |
| OFDM         | 2462            | 16300           | 500         | PASS    |
| HT20         | 2412            | 17600           | 500         | PASS    |
| HT20         | 2437            | 17600           | 500         | PASS    |
| HT20         | 2462            | 17600           | 500         | PASS    |
| HT40         | 2422            | 32600           | 500         | PASS    |
| HT40         | 2437            | 32700           | 500         | PASS    |
| HT40         | 2452            | 32600           | 500         | PASS    |

## DTS (6 dB) Bandwidth

|                        |                                           |
|------------------------|-------------------------------------------|
| Project Number:        | G0M-2205-1454                             |
| Applicant:             | u-blox AG                                 |
| Model Description:     | Stand-alone multiradio module             |
| Model:                 | NORA-W101                                 |
| Test Sample ID:        | 40677                                     |
| Reference Standards:   | FCC 15.247, RSS-247                       |
| Reference Method:      | ANSI C63.10:2013, Section 11.8.1 Option 1 |
| Operational Mode:      | IEEE 802.11 b, Channel: 1, 2412 MHz       |
| Operating Conditions:  | Tnom/Vnom                                 |
| Operator:              | Dhamia Almozani                           |
| Test Site:             | Eurofins Product Service GmbH             |
| Test Date:             | 2022-08-22                                |
| Antenna port:          | 1                                         |
| Note:                  | Mode=1 Mbps (worse case)                  |
| Lower Frequency [MHz]: | 2407.450                                  |
| Upper Frequency [MHz]: | 2416.950                                  |
| 6 dB Bandwidth [kHz]:  | 9500                                      |



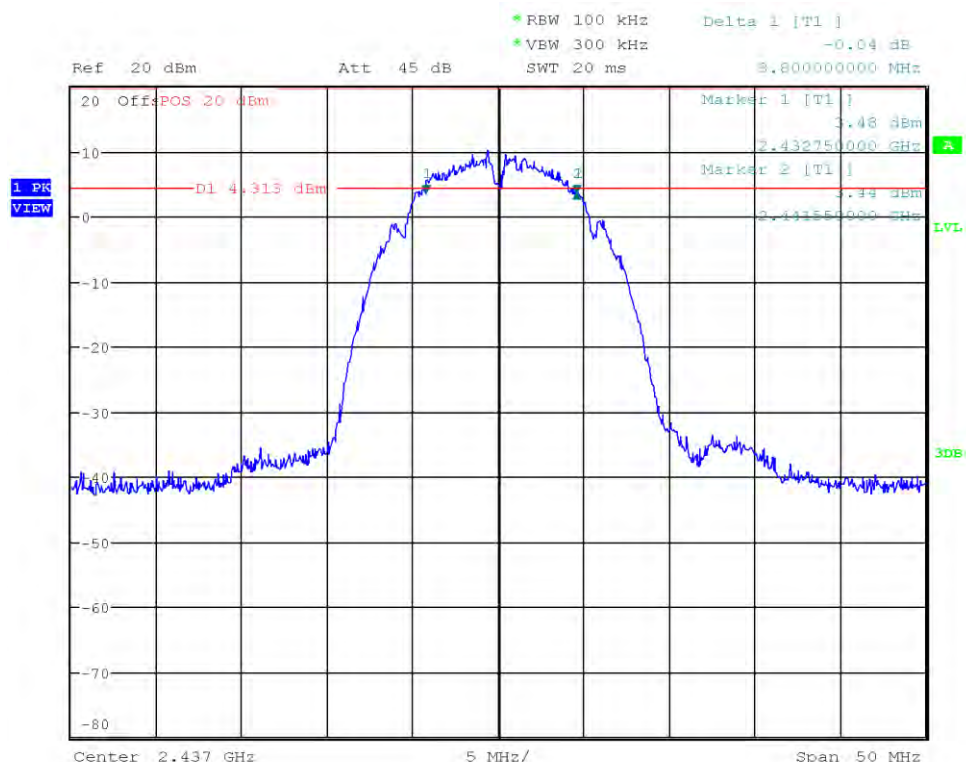
Date: 22.AUG.2022 11:22:50

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 b, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=2 Mbps (worse case)  
 Lower Frequency [MHz]: 2432.750  
 Upper Frequency [MHz]: 2441.550  
 6 dB Bandwidth [kHz]: 8800



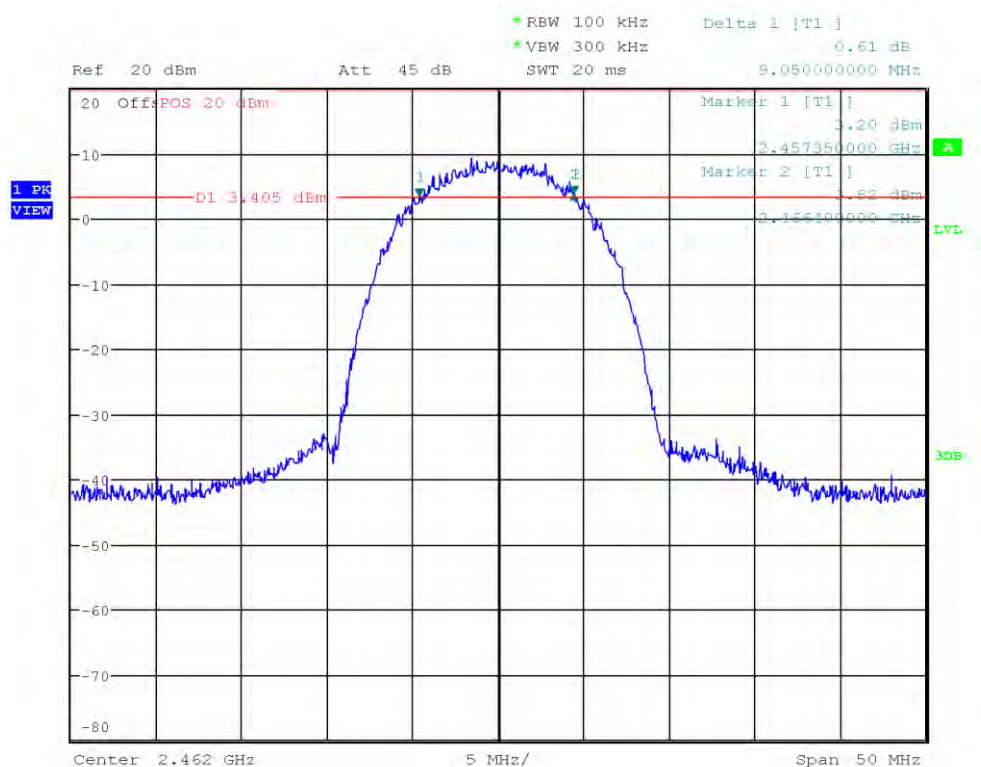
Date: 22.AUG.2022 11:25:21

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

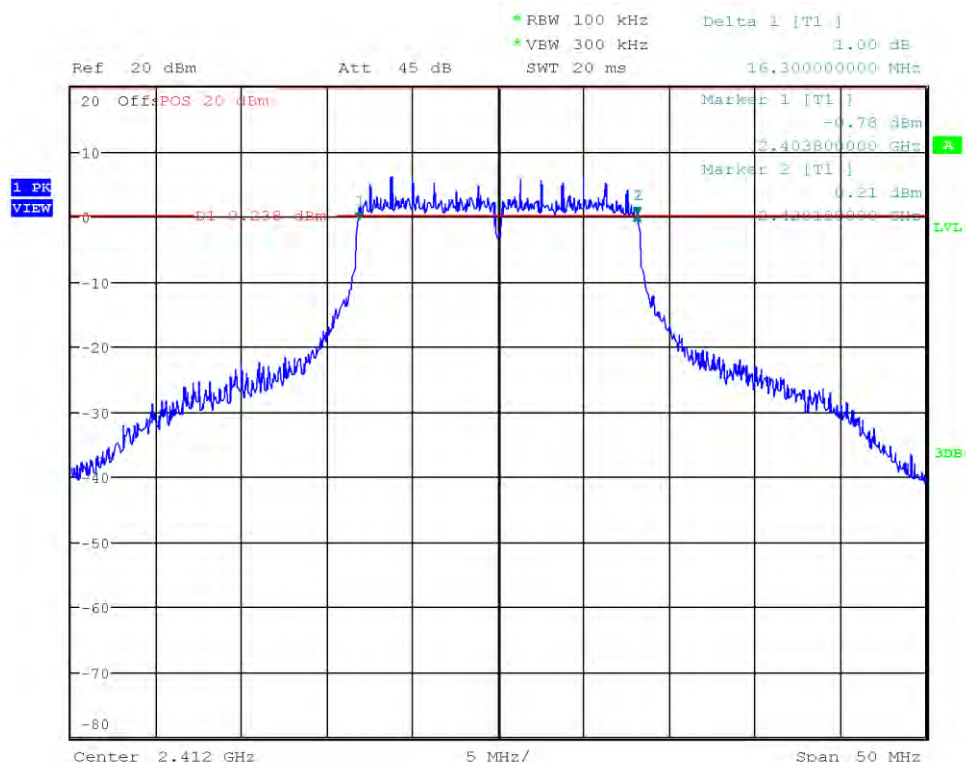
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 b, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=5.5 Mbps (worse case)  
 Lower Frequency [MHz]: 2457.350  
 Upper Frequency [MHz]: 2466.400  
 6 dB Bandwidth [kHz]: 9050



Date: 22.AUG.2022 11:26:21

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 g, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Lower Frequency [MHz]: 2403.800  
 Upper Frequency [MHz]: 2420.100  
 6 dB Bandwidth [kHz]: 16300



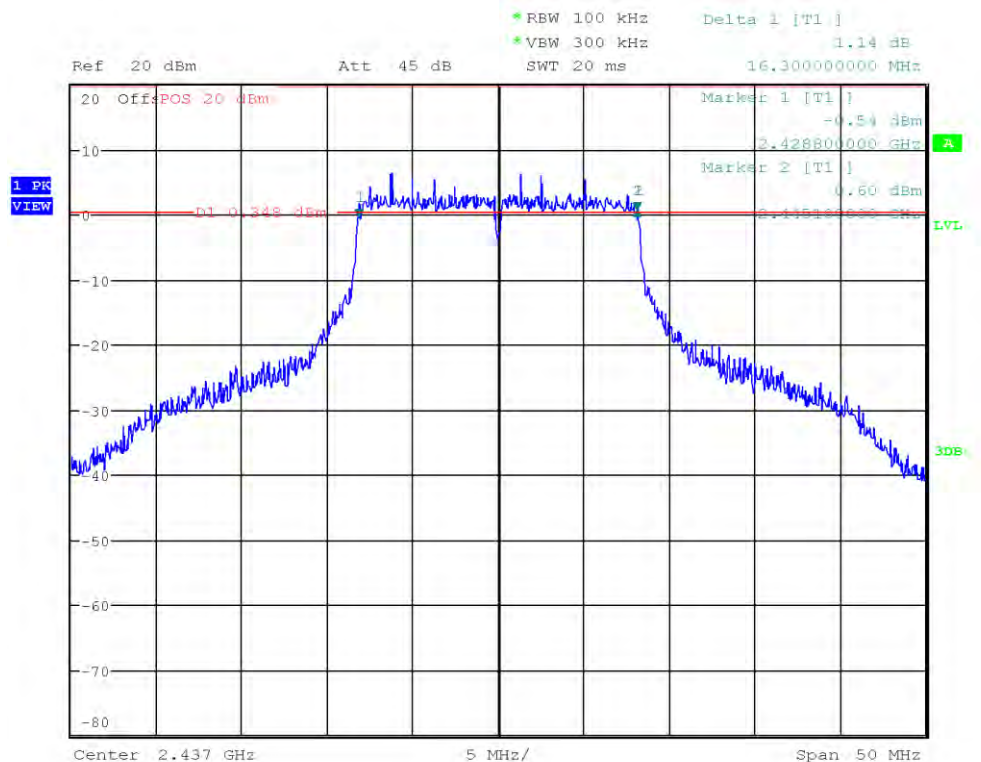
Date: 22.AUG.2022 11:29:06

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 g, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Lower Frequency [MHz]: 2428.800  
 Upper Frequency [MHz]: 2445.100  
 6 dB Bandwidth [kHz]: 16300



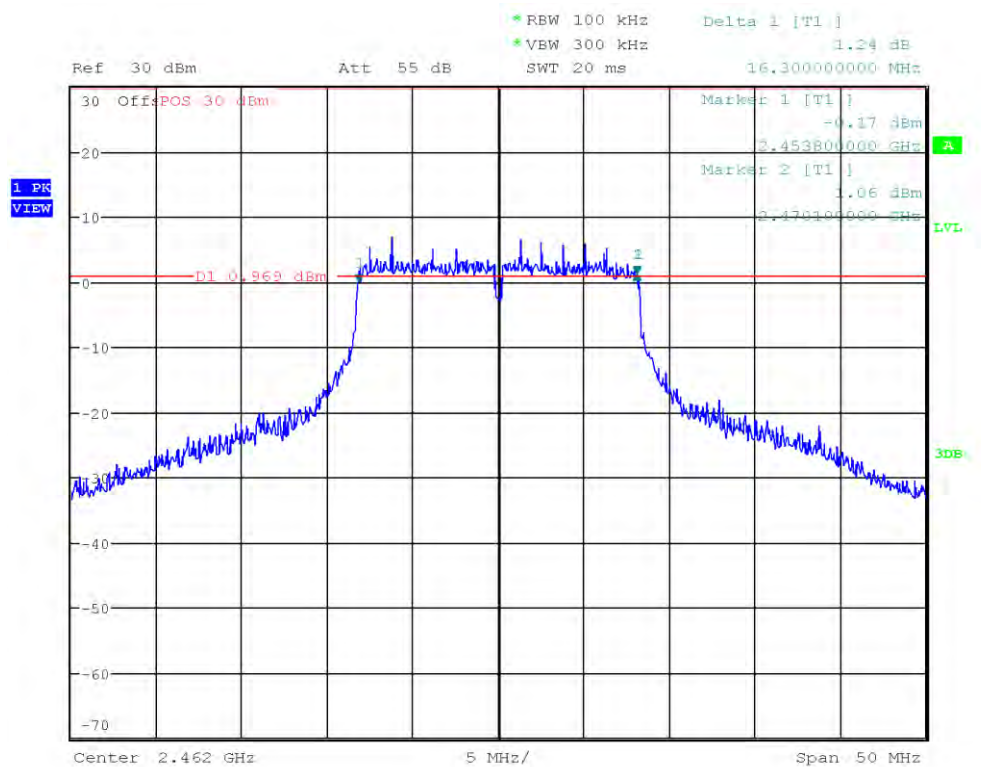
Date: 22.AUG.2022 11:29:50

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 g, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=6 Mbps (worse case)  
 Lower Frequency [MHz]: 2453.800  
 Upper Frequency [MHz]: 2470.100  
 6 dB Bandwidth [kHz]: 16300



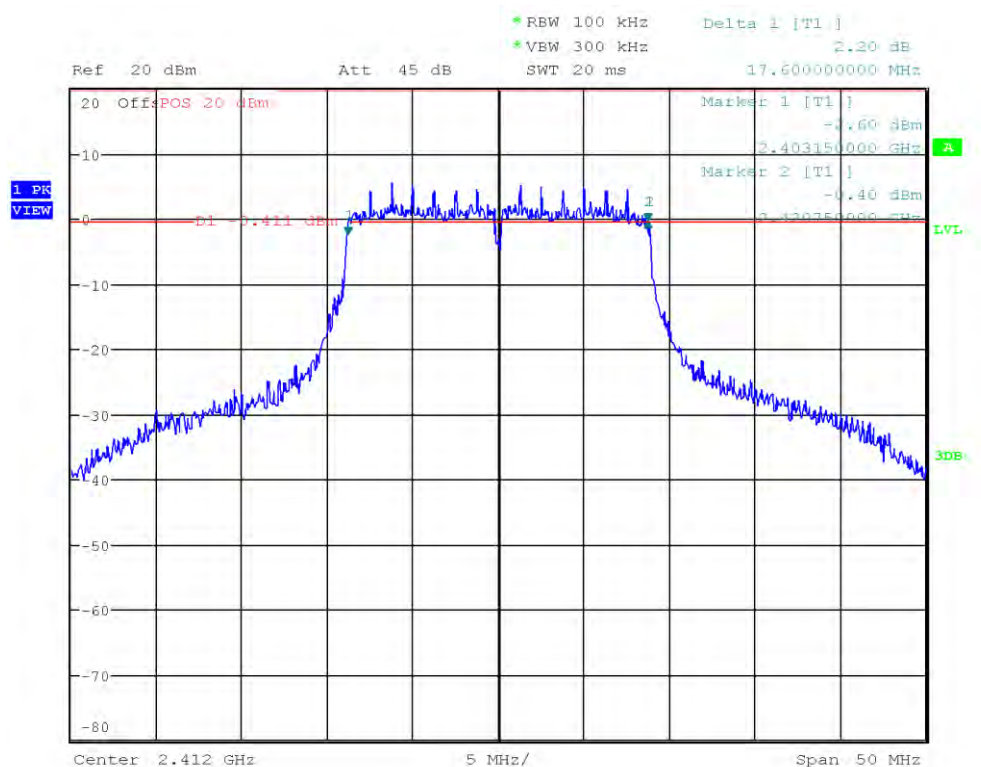
Date: 22.AUG.2022 11:30:47

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT20, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Lower Frequency [MHz]: 2403.150  
 Upper Frequency [MHz]: 2420.750  
 6 dB Bandwidth [kHz]: 17600



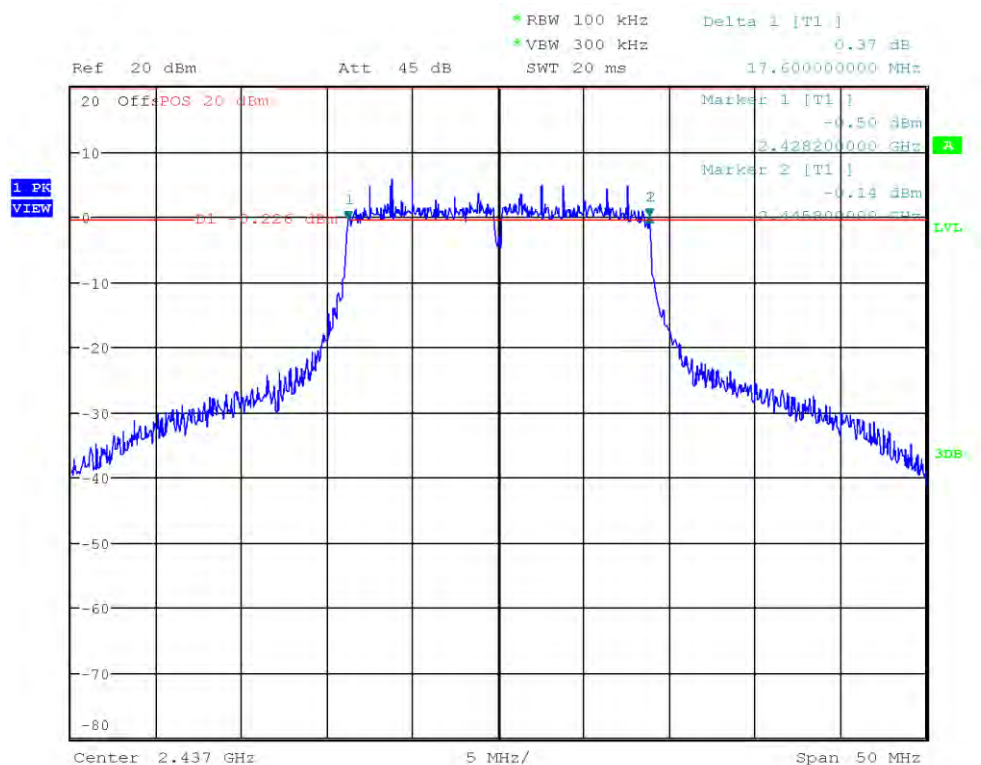
Date: 22.AUG.2022 11:33:45

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT20, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Lower Frequency [MHz]: 2428.200  
 Upper Frequency [MHz]: 2445.800  
 6 dB Bandwidth [kHz]: 17600



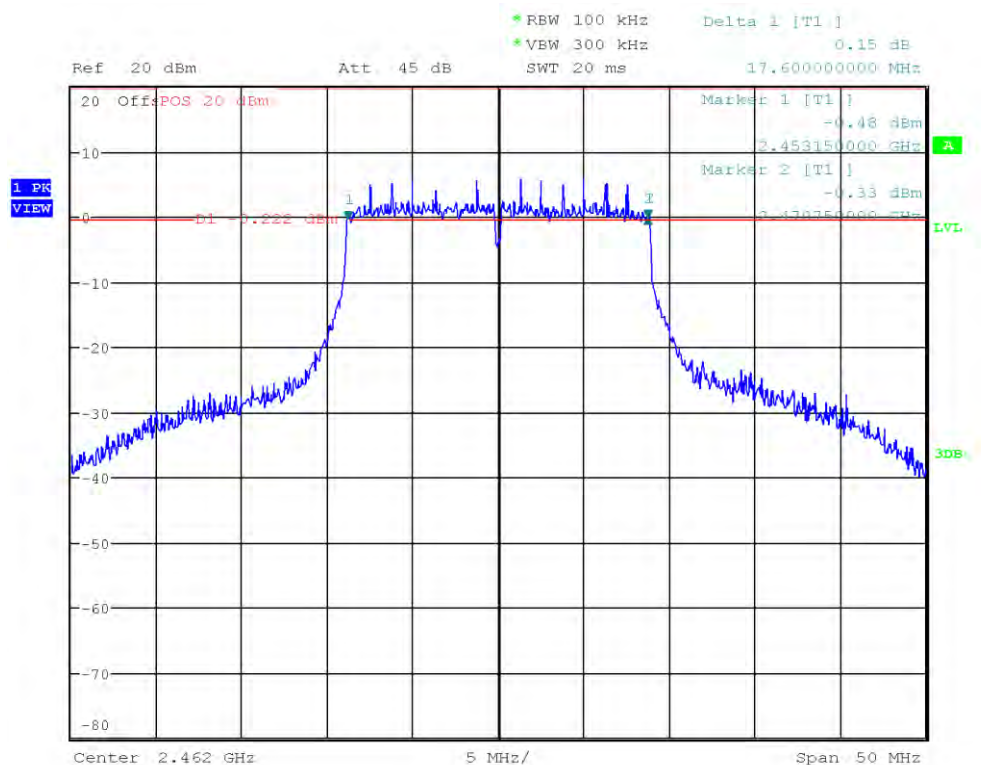
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT20, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=1 MCS (worse case)  
 Lower Frequency [MHz]: 2453.150  
 Upper Frequency [MHz]: 2470.750  
 6 dB Bandwidth [kHz]: 17600



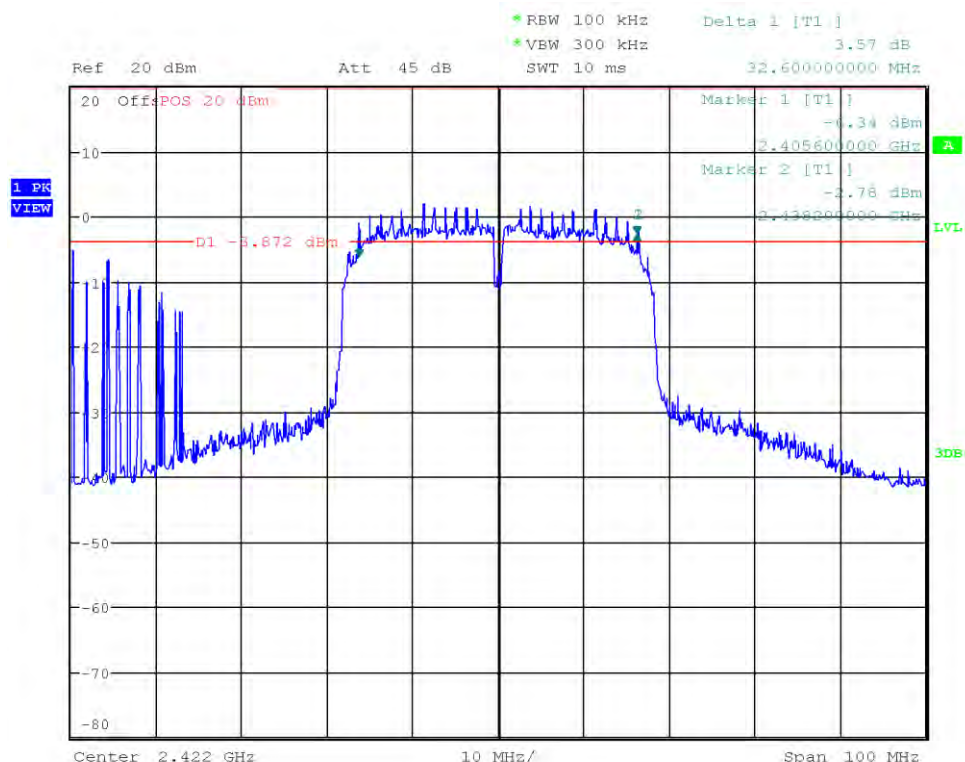
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT40, Channel: 3, 2422 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Lower Frequency [MHz]: 2405.600  
 Upper Frequency [MHz]: 2438.200  
 6 dB Bandwidth [kHz]: 32600



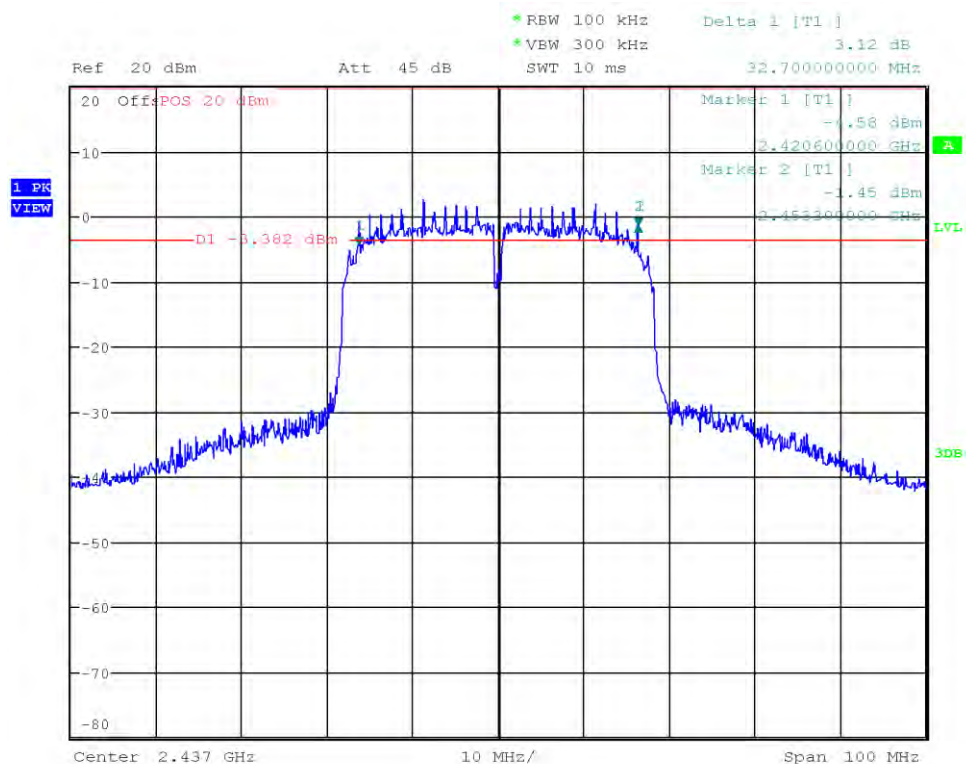
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## DTS (6 dB) Bandwidth

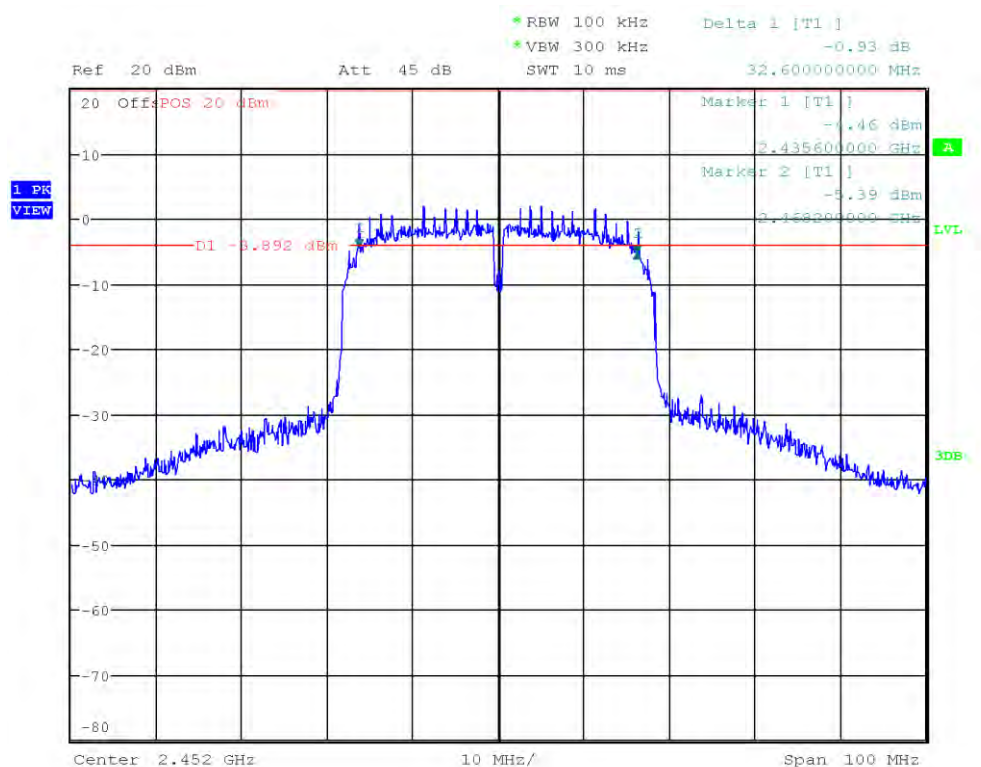
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT40, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Lower Frequency [MHz]: 2420.600  
 Upper Frequency [MHz]: 2453.300  
 6 dB Bandwidth [kHz]: 32700



Date: 22.AUG.2022 11:40:56

## DTS (6 dB) Bandwidth

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1  
 Operational Mode: IEEE 802.11 n HT40, Channel: 9, 2452 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode=0 MCS (worse case)  
 Lower Frequency [MHz]: 2435.600  
 Upper Frequency [MHz]: 2468.200  
 6 dB Bandwidth [kHz]: 32600



Date: 22.AUG.2022 11:41:50

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

### 3.3 Test Conditions and Results - Maximum peak conducted output power

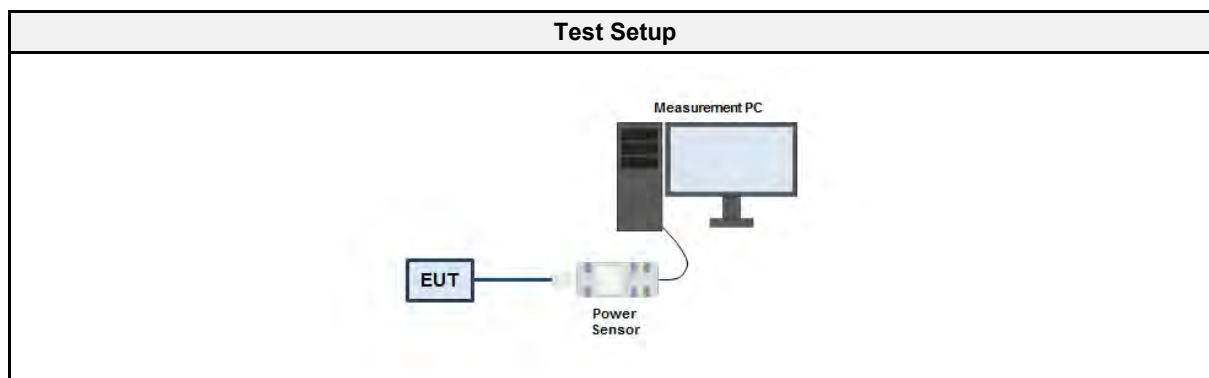
#### 3.3.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(b); ISSED RSS-247, Issue 2 (section 5.4)                        |
| Measurement Method      | ANSI C63.10 11.9.1                                                           |
| Measurement Uncertainty | ± 2.86 dB                                                                    |
| Operator                | Dr.-Ing. Dhamia Almozani                                                     |
| Date                    | 2022-08-22                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.3.2 Limits

| Limits                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 W (30 dBm)                                                                                                                                                                                                                                                                                                                                                                                                            |
| The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. |

#### 3.3.3 Setup



#### 3.3.4 Equipment

| Test Equipment |              |         |            |           |          |
|----------------|--------------|---------|------------|-----------|----------|
| Description    | Manufacturer | Model   | Identifier | Cal. Date | Cal. Due |
| Power Sensor   | R&S          | NRP-Z81 | EF00830    | 2021-08   | 2022-08  |

#### 3.3.5 Procedure

| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode (Communication tester is used if needed)</li> <li>2. The EUT antenna port is connected to a wideband power sensor</li> <li>3. The peak power is measured with the power sensor</li> <li>4. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain and the power is summed up</li> </ol> |

## 3.3.6 Results

| Test Results - DSSS |             |           |           |         |
|---------------------|-------------|-----------|-----------|---------|
| Channel [MHz]       | Power [dBm] | Power [W] | Limit [W] | Verdict |
| 2412                | 19.56       | 0.09      | 1.0       | PASS    |
| 2437                | 19.84       | 0.10      | 1.0       | PASS    |
| 2462                | 18.87       | 0.08      | 1.0       | PASS    |

| Test Results - OFDM |             |           |           |         |
|---------------------|-------------|-----------|-----------|---------|
| Channel [MHz]       | Power [dBm] | Power [W] | Limit [W] | Verdict |
| 2412                | 22.85       | 0.19      | 1.0       | PASS    |
| 2437                | 23.1        | 0.20      | 1.0       | PASS    |
| 2462                | 22.94       | 0.20      | 1.0       | PASS    |

| Test Results - HT20 |             |           |           |         |
|---------------------|-------------|-----------|-----------|---------|
| Channel [MHz]       | Power [dBm] | Power [W] | Limit [W] | Verdict |
| 2412                | 22.99       | 0.20      | 1.0       | PASS    |
| 2437                | 23.12       | 0.21      | 1.0       | PASS    |
| 2462                | 23.20       | 0.21      | 1.0       | PASS    |

| Test Results - HT40 |             |           |           |         |
|---------------------|-------------|-----------|-----------|---------|
| Channel [MHz]       | Power [dBm] | Power [W] | Limit [W] | Verdict |
| 2422                | 22.29       | 0.17      | 1.0       | PASS    |
| 2437                | 23.35       | 0.22      | 1.0       | PASS    |
| 2452                | 22.54       | 0.18      | 1.0       | PASS    |

### 3.4 Test Conditions and Results - Power spectral density

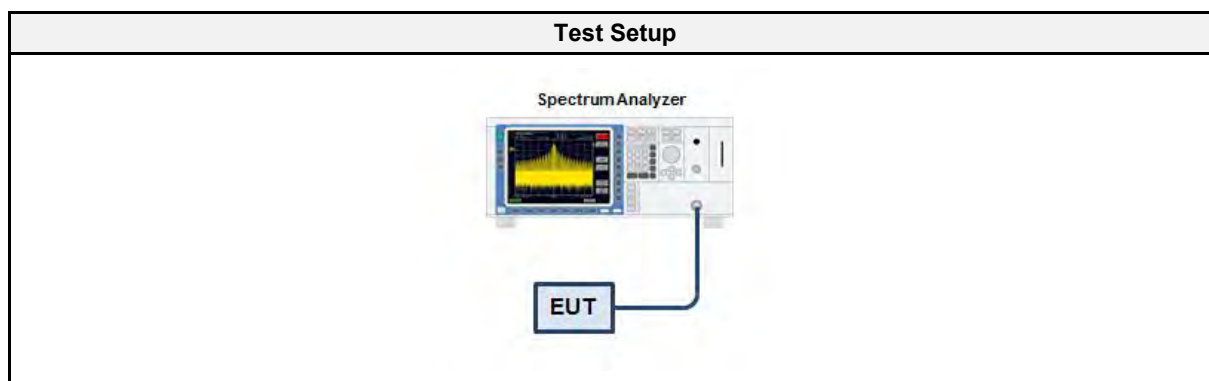
#### 3.4.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(e); ISSED RSS-247, Issue 2 (section 5.2)                        |
| Measurement Method      | ANSI C63.10 11.10.2, 14.3.2                                                  |
| Measurement Uncertainty | $\pm 2.86$ dB                                                                |
| Operator                | Dr.-Ing Dhamia Almozani                                                      |
| Date                    | 2022-08-22                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.4.2 Limits

| Limits        |
|---------------|
| 8 dBm / 3 kHz |

#### 3.4.3 Setup



#### 3.4.4 Equipment

| Test Equipment    |              |             |               |           |          |
|-------------------|--------------|-------------|---------------|-----------|----------|
| Description       | Manufacturer | Model       | Identifier    | Cal. Date | Cal. Due |
| Spectrum Analyser | R&S          | FSU 26      | EF01003       | 2022-07   | 2023-07  |
| Cable (diverse)   | — (diverse)  | — (diverse) | EF00779 CAABZ | 2022-02   | 2023-02  |

#### 3.4.5 Procedure

| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth</li> <li>3. The RBW is set to 100 kHz with VBW <math>\geq</math> RBW and the detector is set to peak with max hold</li> <li>4. After the trace has stabilized a marker is set to the envelope maximum</li> <li>5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated</li> <li>6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain</li> </ol> |

## 3.4.6 Results

| Test Results - DSSS |               |                  |         |
|---------------------|---------------|------------------|---------|
| Channel [MHz]       | PSD [dBm/RBW] | Limit [dBm/3kHz] | Verdict |
| 2412                | -0.361        | 8.0              | PASS    |
| 2437                | -0.614        | 8.0              | PASS    |
| 2462                | 0.128         | 8.0              | PASS    |

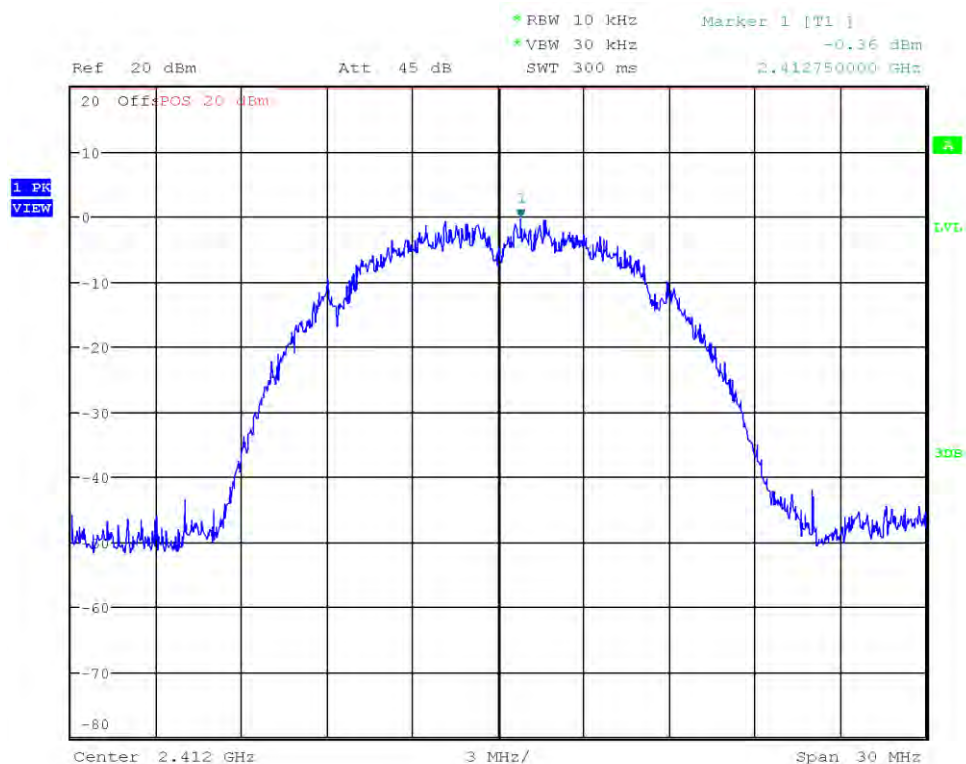
| Test Results - OFDM |               |                  |         |
|---------------------|---------------|------------------|---------|
| Channel [MHz]       | PSD [dBm/RBW] | Limit [dBm/3kHz] | Verdict |
| 2412                | 1.705         | 8.0              | PASS    |
| 2437                | 1.649         | 8.0              | PASS    |
| 2462                | 1.958         | 8.0              | PASS    |

| Test Results - HT20 |               |                  |         |
|---------------------|---------------|------------------|---------|
| Channel [MHz]       | PSD [dBm/RBW] | Limit [dBm/3kHz] | Verdict |
| 2412                | 0.219         | 8.0              | PASS    |
| 2437                | 0.630         | 8.0              | PASS    |
| 2462                | 1.183         | 8.0              | PASS    |

| Test Results - HT40 |               |                  |         |
|---------------------|---------------|------------------|---------|
| Channel [MHz]       | PSD [dBm/RBW] | Limit [dBm/3kHz] | Verdict |
| 2422                | 1.758         | 8.0              | PASS    |
| 2437                | 2.035         | 8.0              | PASS    |
| 2452                | 2.017         | 8.0              | PASS    |
| RBW = 100 kHz       |               |                  |         |

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 b, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 1 Mbps (worse case)  
 Peak Frequency [MHz]: 2412.750  
 Spectral Density [dBm/RBW]: -0.361  
 Resolution Bandwidth [kHz]: 10 kHz



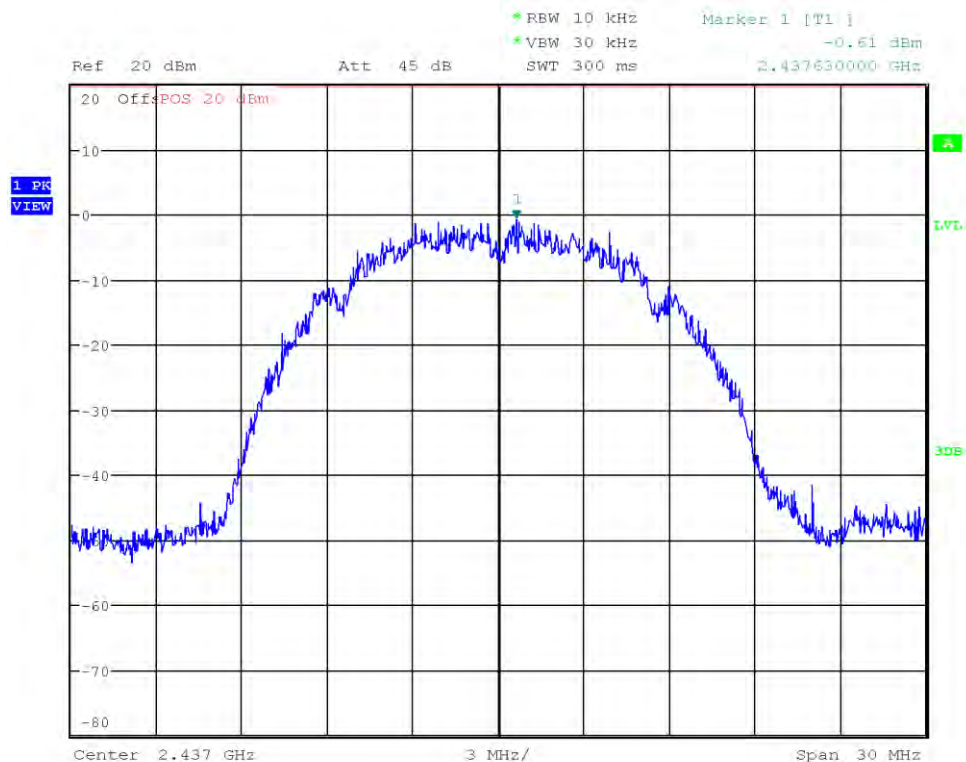
Date: 22.AUG.2022 11:46:54

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 b, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 2 Mbps (worse case)  
 Peak Frequency [MHz]: 2437.630  
 Spectral Density [dBm/RBW]: -0.614  
 Resolution Bandwidth [kHz]: 10 kHz



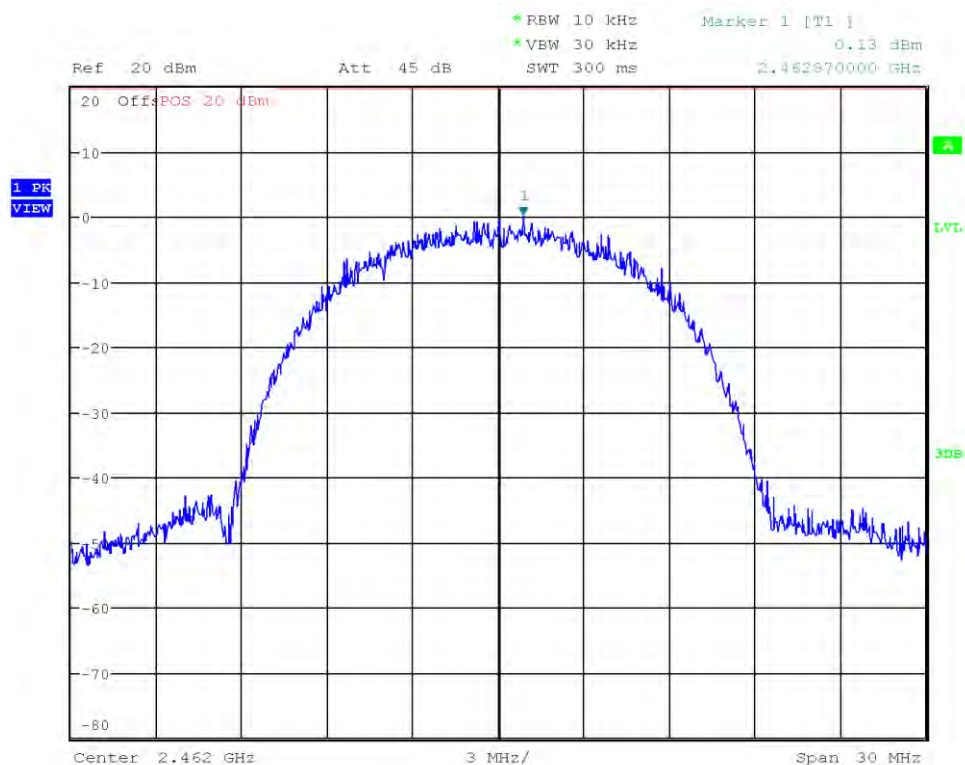
Date: 22.AUG.2022 11:51:27

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

|                             |                                      |
|-----------------------------|--------------------------------------|
| Project Number:             | G0M-2205-1454                        |
| Applicant:                  | u-blox AG                            |
| Model Description:          | Stand-alone multiradio module        |
| Model:                      | NORA-W101                            |
| Test Sample ID:             | 40677                                |
| Reference Standards:        | FCC 15.247, RSS-247                  |
| Reference Method:           | ANSI C63.10:2013, Section 11.10.2    |
| Operational Mode:           | IEEE 802.11 b, Channel: 11, 2462 MHz |
| Operating Conditions:       | Tnom/Vnom                            |
| Operator:                   | Dhamia Almozani                      |
| Test Site:                  | Eurofins Product Service GmbH        |
| Test Date:                  | 2022-08-22                           |
| Antenna port:               | 1                                    |
| Note:                       | Mode= 5.5 Mbps (worse case)          |
| Peak Frequency [MHz]:       | 2462.870                             |
| Spectral Density [dBm/RBW]: | 0.128                                |
| Resolution Bandwidth [kHz]: | 10 kHz                               |



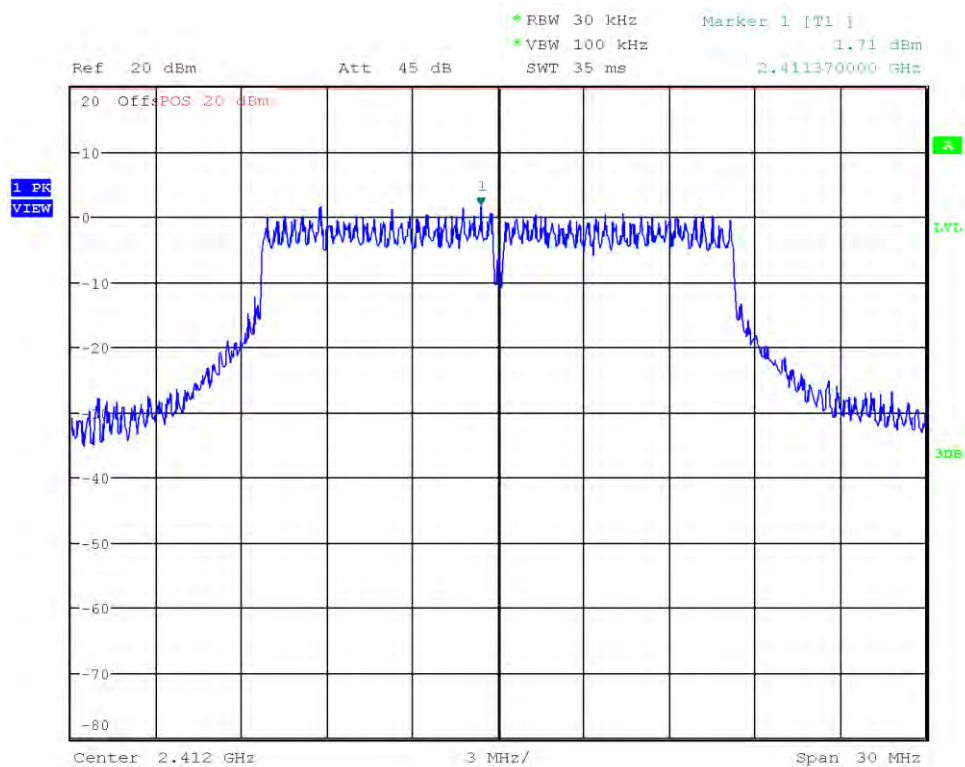
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 g, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Peak Frequency [MHz]: 2411.370  
 Spectral Density [dBm/RBW]: 1.705  
 Resolution Bandwidth [kHz]: 30 kHz



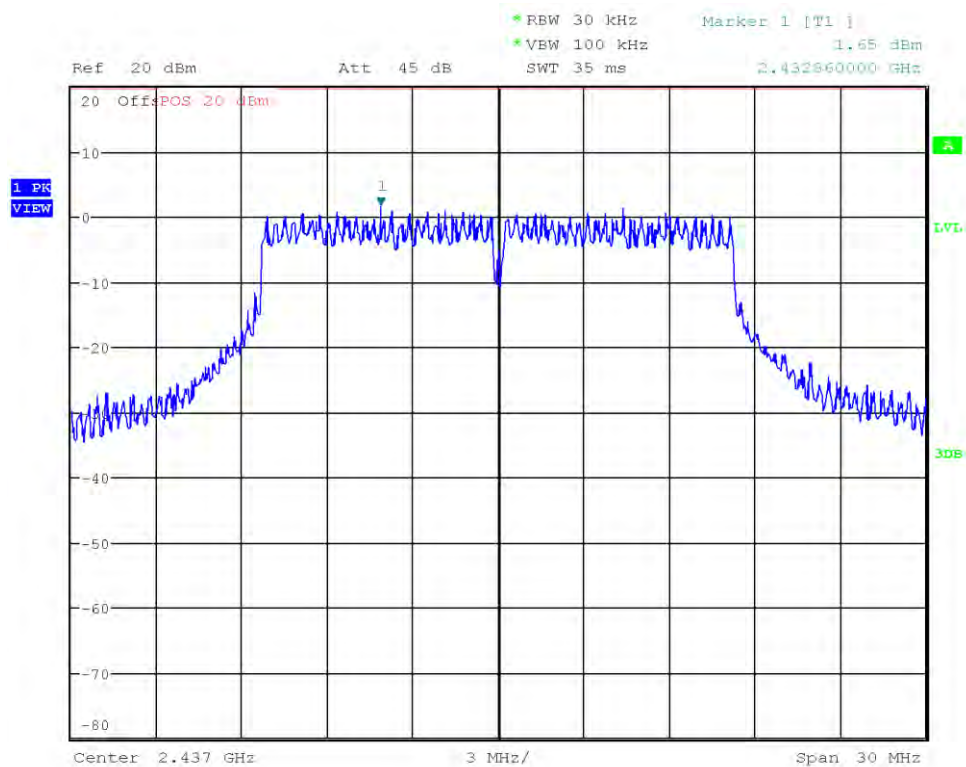
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

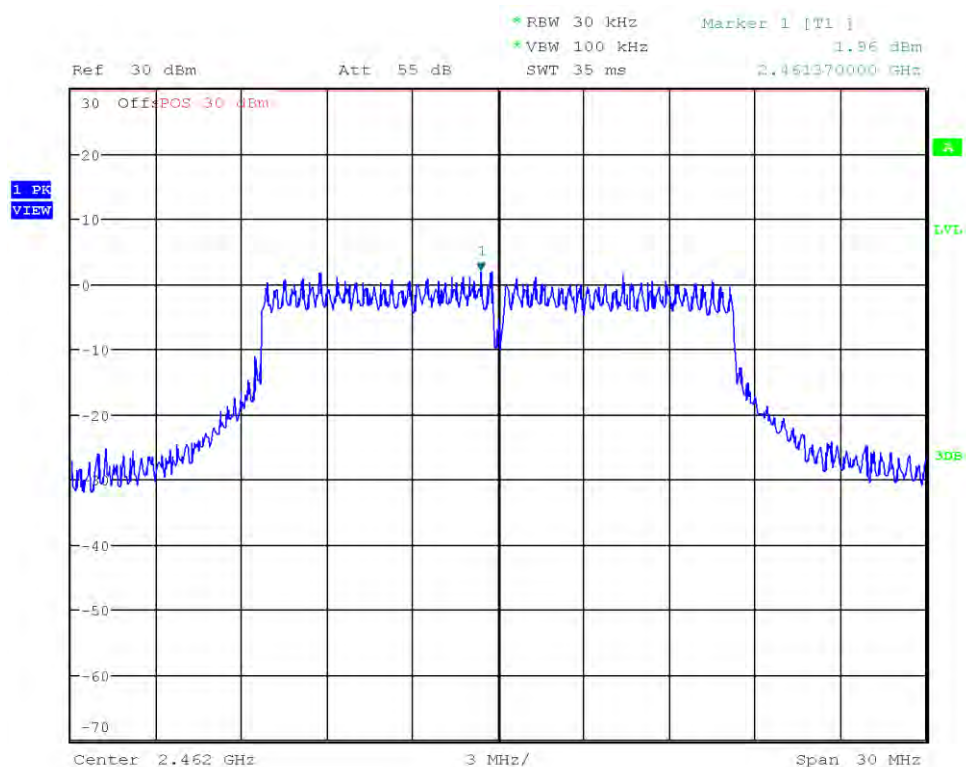
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 g, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Peak Frequency [MHz]: 2432.860  
 Spectral Density [dBm/RBW]: 1.649  
 Resolution Bandwidth [kHz]: 30 kHz



Date: 22.AUG.2022 11:58:02

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 g, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Peak Frequency [MHz]: 2461.370  
 Spectral Density [dBm/RBW]: 1.958  
 Resolution Bandwidth [kHz]: 30 kHz



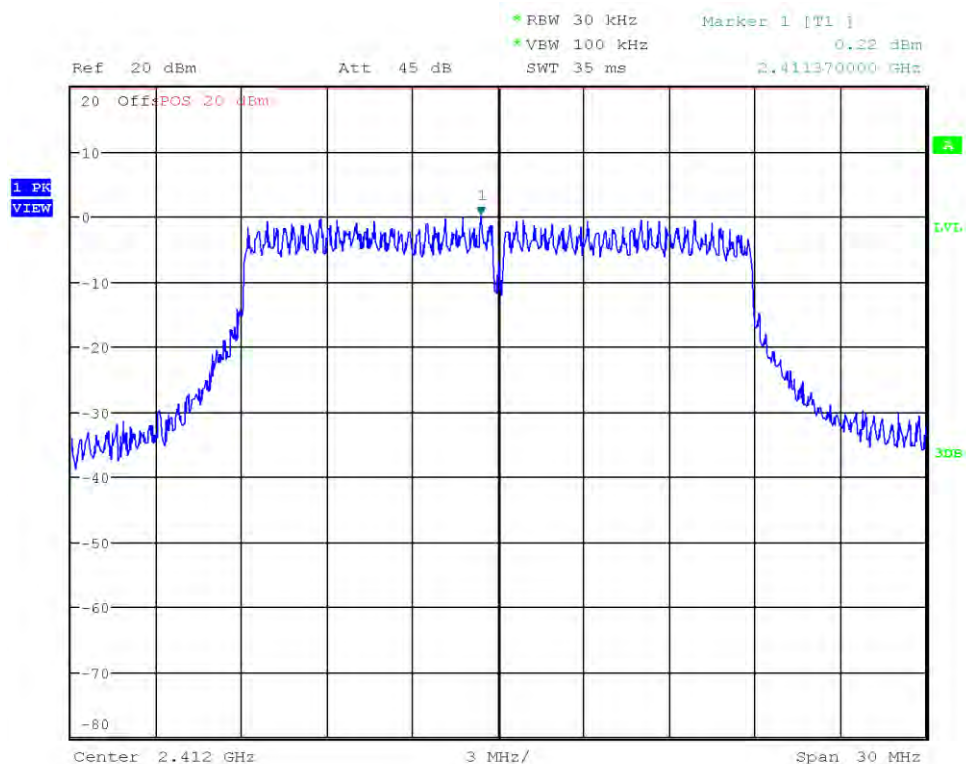
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT20, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Peak Frequency [MHz]: 2411.370  
 Spectral Density [dBm/RBW]: 0.219  
 Resolution Bandwidth [kHz]: 30 kHz



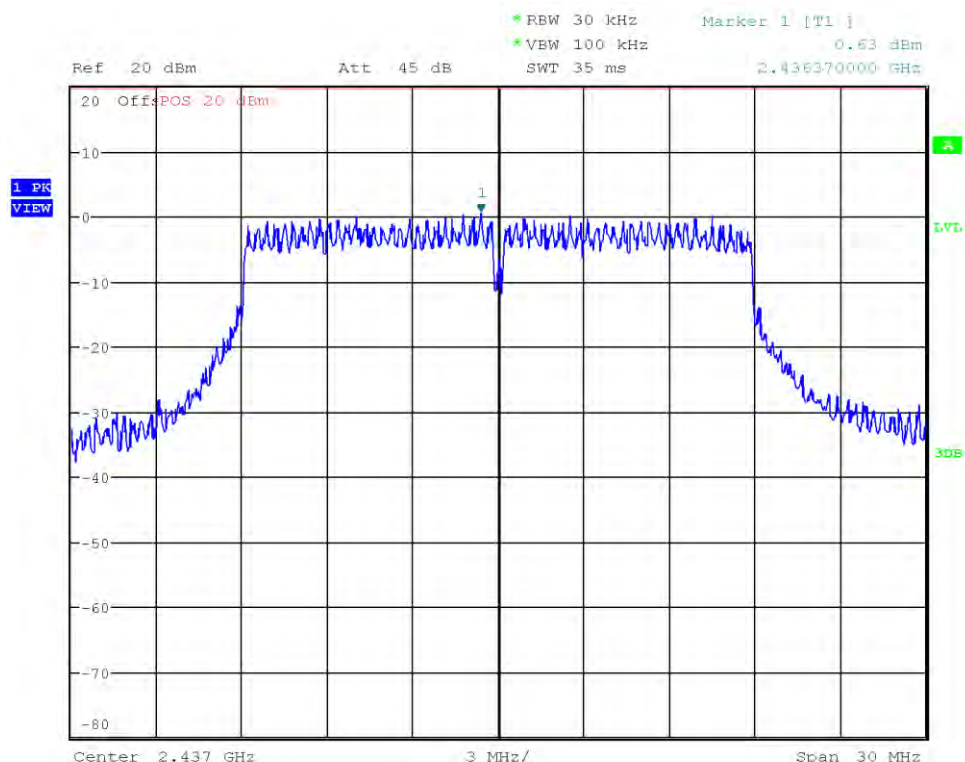
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT20, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Peak Frequency [MHz]: 2436.370  
 Spectral Density [dBm/RBW]: 0.630  
 Resolution Bandwidth [kHz]: 30 kHz



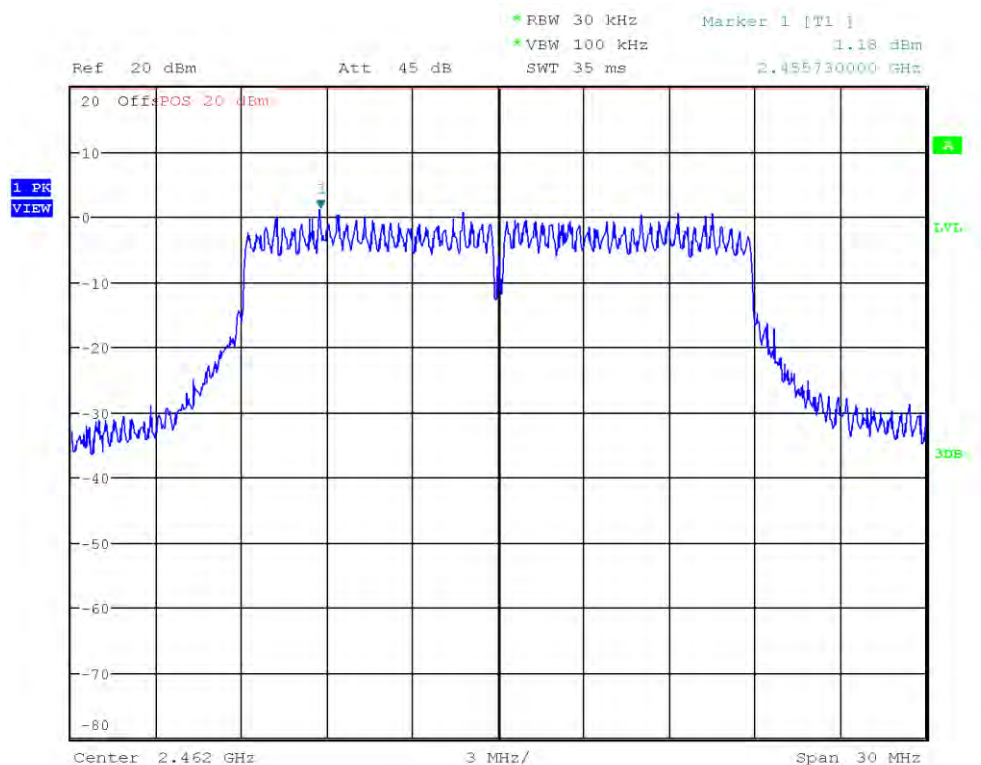
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT20, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 1 MCS (worse case)  
 Peak Frequency [MHz]: 2455.730  
 Spectral Density [dBm/RBW]: 1.183  
 Resolution Bandwidth [kHz]: 30 kHz



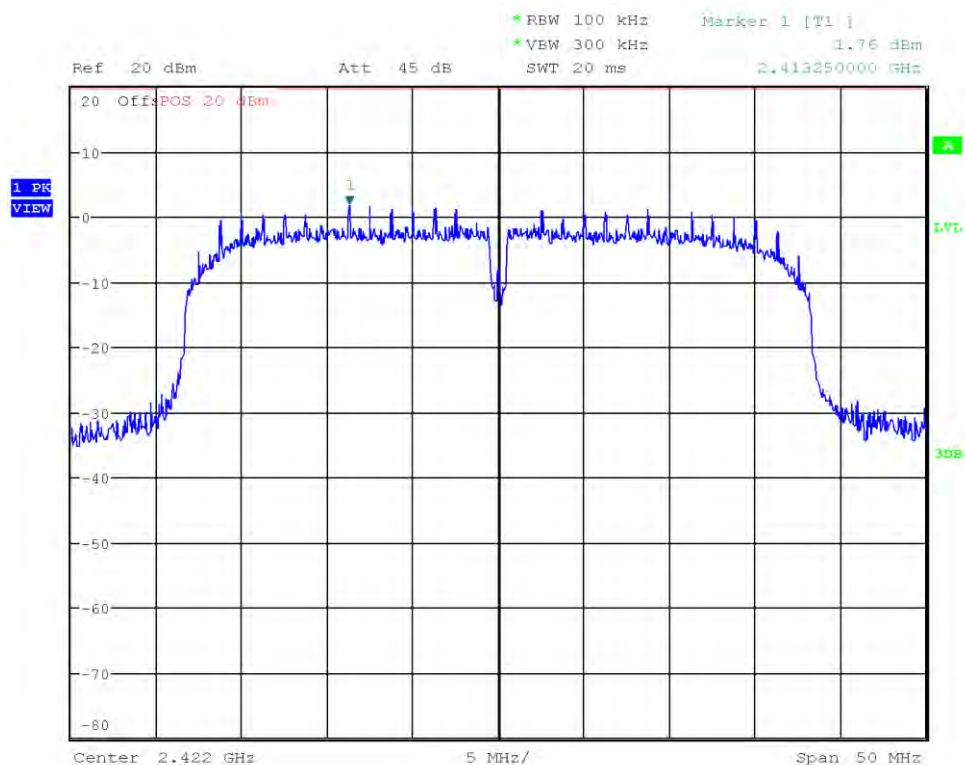
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT40, Channel: 3, 2422 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Peak Frequency [MHz]: 2413.250  
 Spectral Density [dBm/RBW]: 1.758  
 Resolution Bandwidth [kHz]: 100 kHz



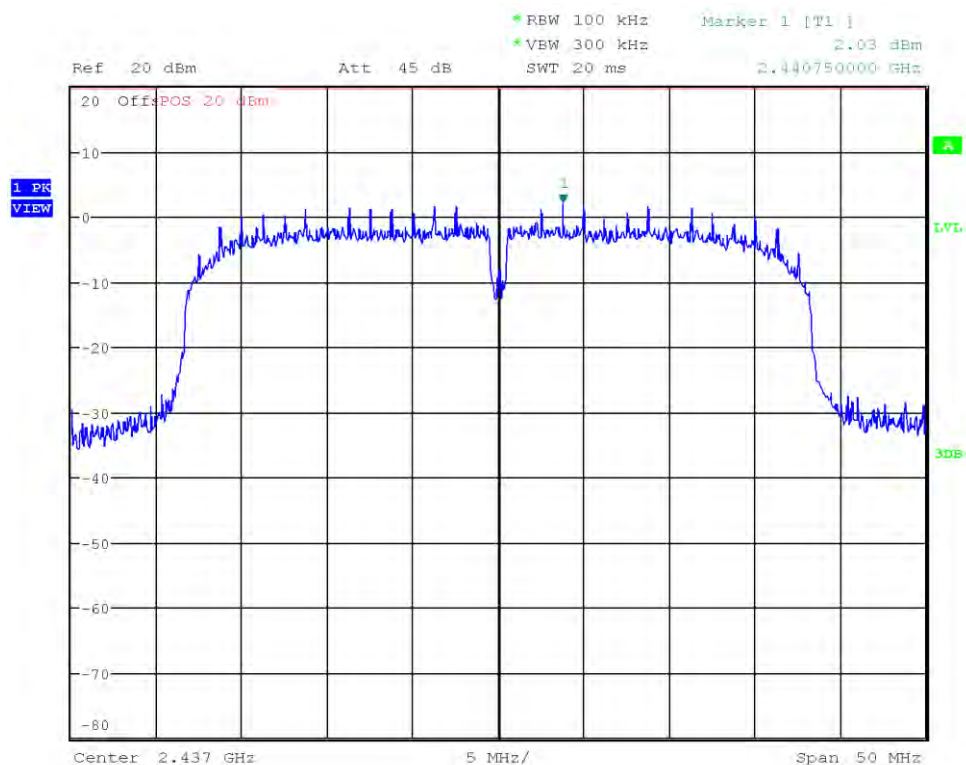
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT40, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Peak Frequency [MHz]: 2440.750  
 Spectral Density [dBm/RBW]: 2.035  
 Resolution Bandwidth [kHz]: 100 kHz



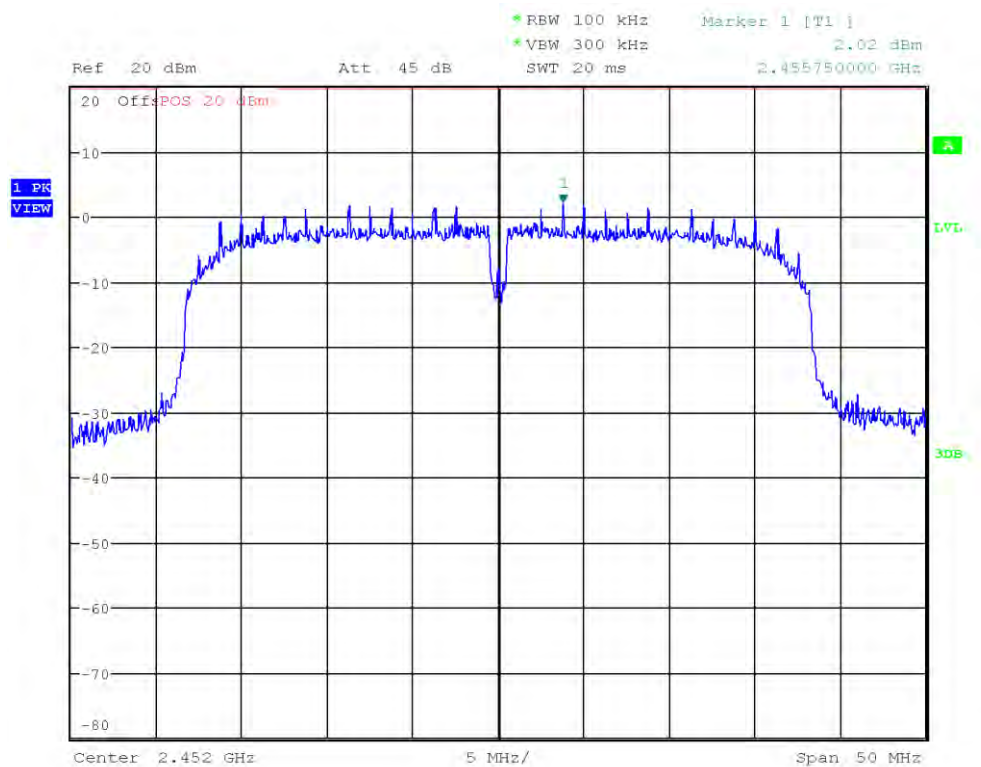
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Peak Power Spectral Density

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.10.2  
 Operational Mode: IEEE 802.11 n HT40, Channel: 9, 2452 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Peak Frequency [MHz]: 2455.750  
 Spectral Density [dBm/RBW]: 2.017  
 Resolution Bandwidth [kHz]: 100 kHz



Date: 22.AUG.2022 12:09:07

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

### 3.5 Test Conditions and Results - AC powerline conducted emissions

#### 3.5.1 Information

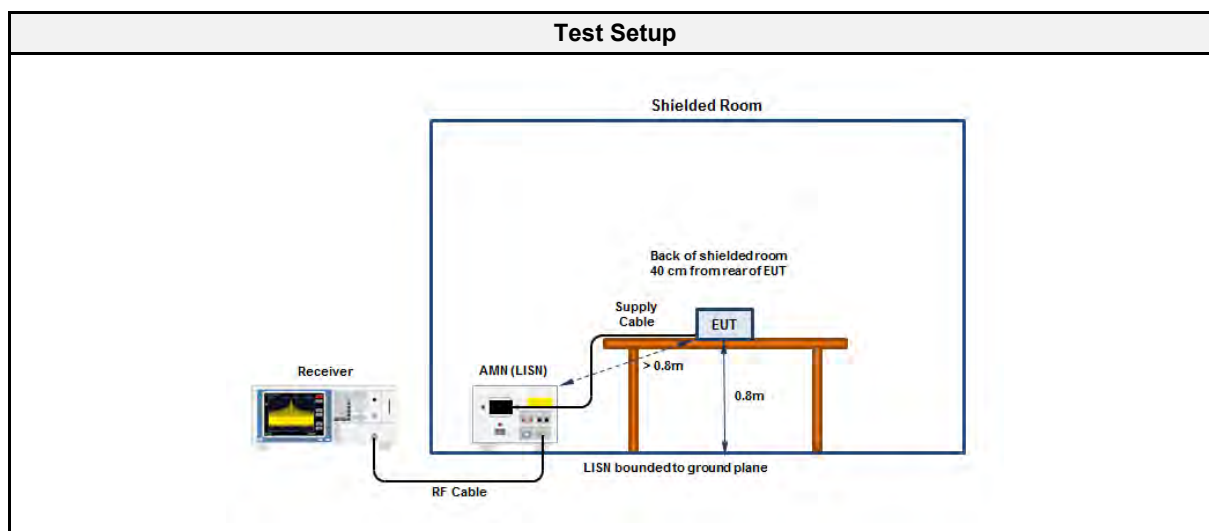
| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)                            |
| Measurement Method      | ANSI C63.10 6.2                                                              |
| Measurement Uncertainty | $\pm 3.82$ dB                                                                |
| Operator                | Florian Voigt                                                                |
| Date                    | 2022-08-29                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.5.2 Limits

| Limits          |                         |                      |
|-----------------|-------------------------|----------------------|
| Frequency [MHz] | Quasi-Peak [dB $\mu$ V] | Average [dB $\mu$ V] |
| 0.15 - 0.5      | 66 - 56*                | 56 - 46*             |
| 0.5 - 5         | 56                      | 46                   |
| 5 - 30          | 60                      | 50                   |

\* Limit decreases linearly with the logarithm of the frequency

#### 3.5.3 Setup

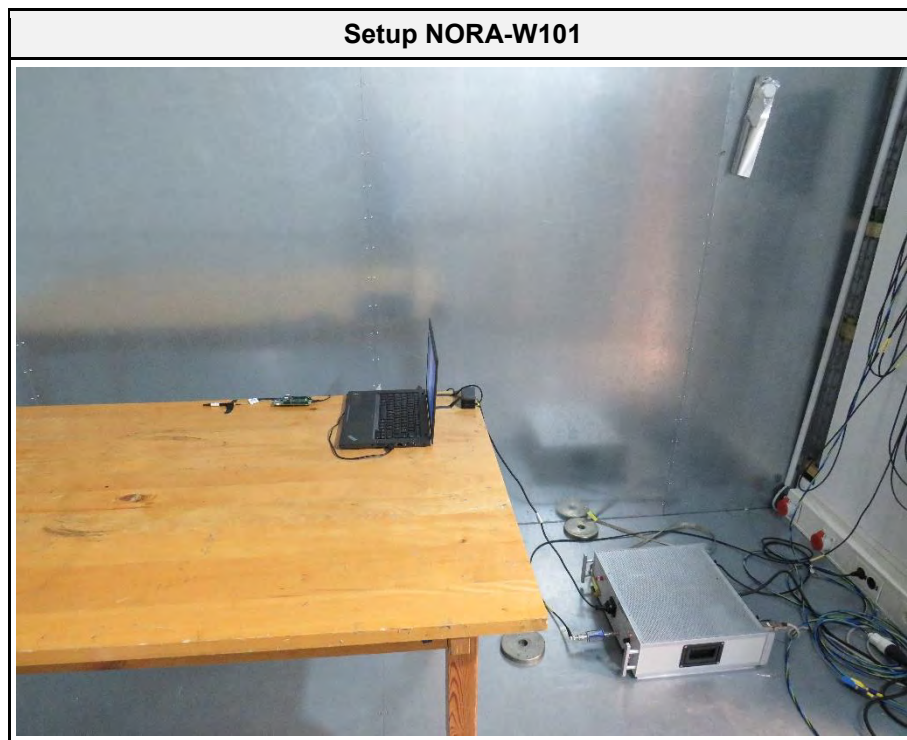


#### 3.5.4 Equipment

| Test Software |                  |            |          |
|---------------|------------------|------------|----------|
| Description   | Manufacturer     | Name       | Version  |
| EMC Software  | DARE Instruments | RadiMation | 2020.1.8 |

| Test Equipment    |              |              |            |           |          |
|-------------------|--------------|--------------|------------|-----------|----------|
| Description       | Manufacturer | Model        | Identifier | Cal. Date | Cal. Due |
| EMI Test Receiver | R&S          | ESR7         | EF00943    | 2022-07   | 2023-07  |
| Pulse Limiter     | R&S          | ESH3-Z2      | EF01222    | 2021-07   | 2023-07  |
| LISN              | Schwarzbeck  | NSLK 8127 RC | EF01592    | 2021-07   | 2023-07  |

### 3.5.5 Setup Photos

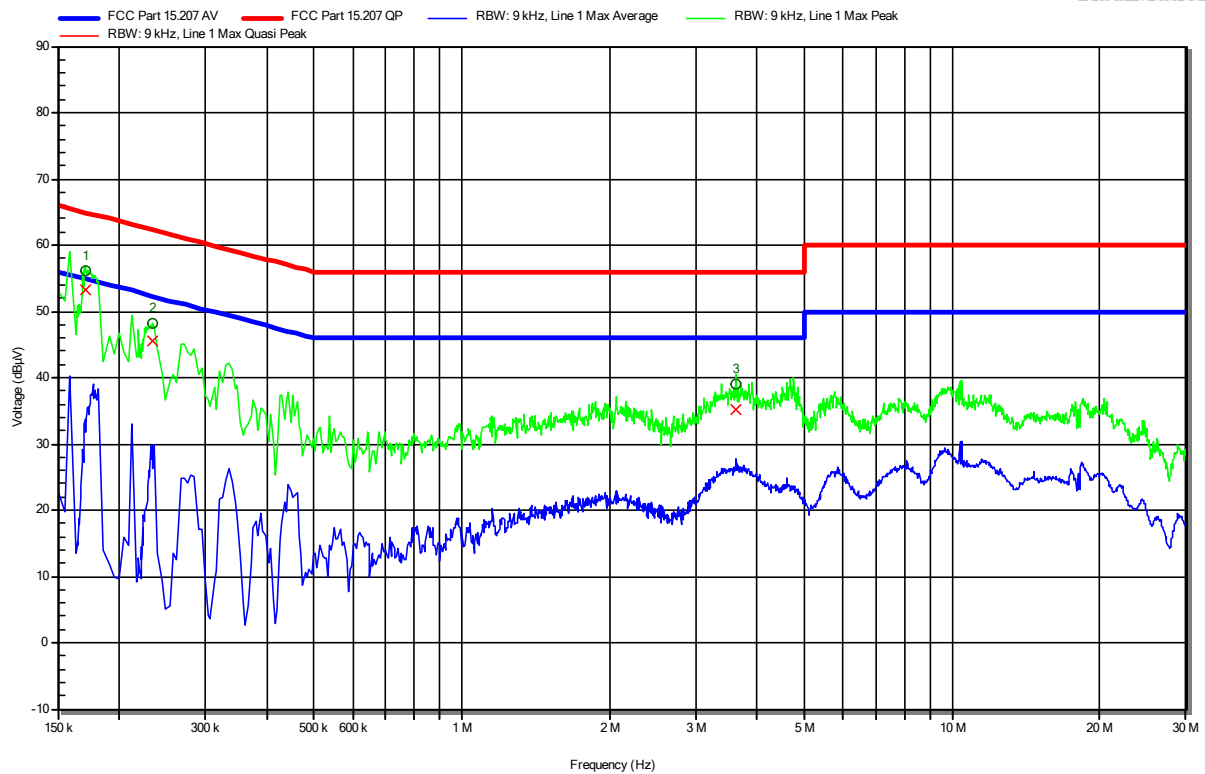


## Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127 RC L1  
 Operational Mode: IEEE802.11g; 6 Mbps; CH 1\_2412 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:

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RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | LISN   |
|-------------|-----------|------------|------------------|-----------------------|-------------------|--------|
| 1           | 171.6 kHz | 53.32 dBμV | 64.88 dBμV       | -11.57 dB             | Pass              | Line 1 |
| 2           | 233.7 kHz | 45.64 dBμV | 62.32 dBμV       | -16.68 dB             | Pass              | Line 1 |
| 3           | 3.624 MHz | 35.16 dBμV | 56 dBμV          | -20.84 dB             | Pass              | Line 1 |

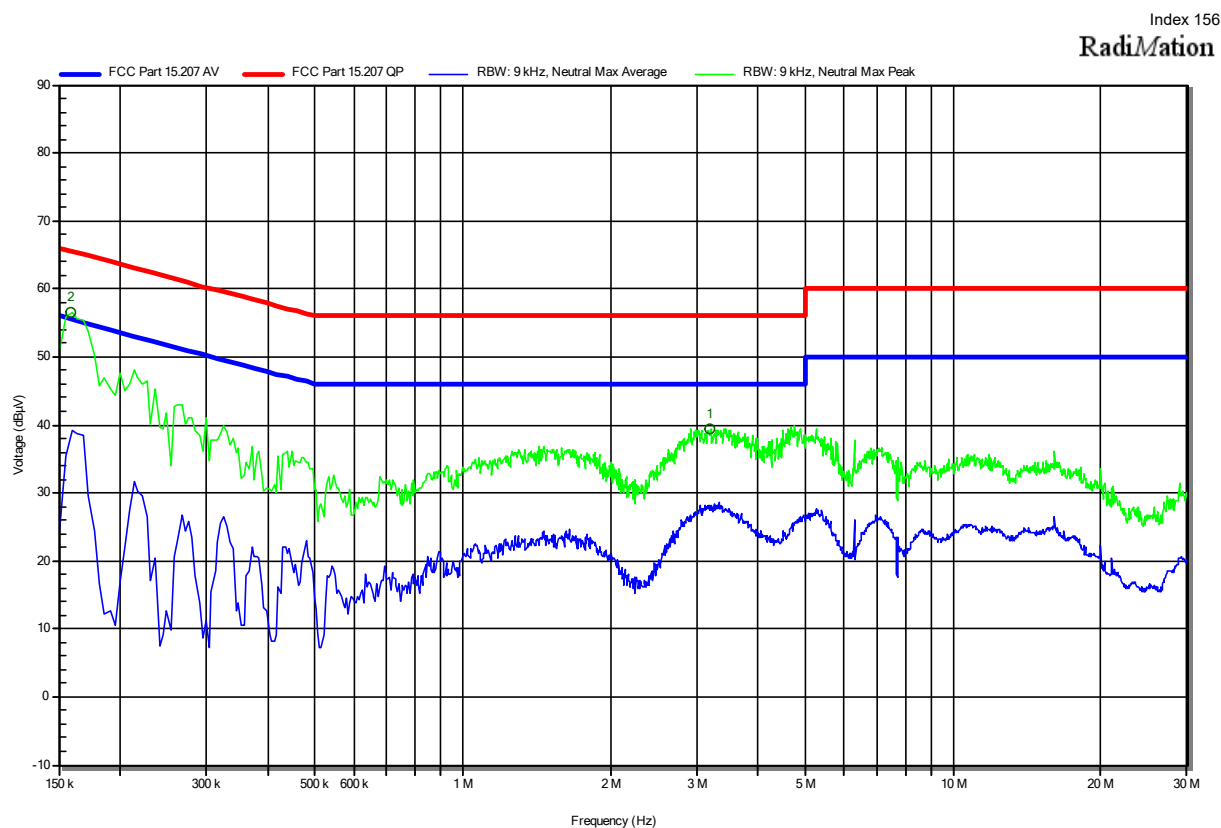
| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN   |
|-------------|-----------|------------|---------------|--------------------|----------------|--------|
| 1           | 171.6 kHz | 33.33 dBμV | 54.88 dBμV    | -21.56 dB          | Pass           | Line 1 |
| 2           | 233.7 kHz | 29.83 dBμV | 52.32 dBμV    | -22.49 dB          | Pass           | Line 1 |
| 3           | 3.624 MHz | 26.97 dBμV | 46 dBμV       | -19.03 dB          | Pass           | Line 1 |

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127  
 Operational Mode: IEEE802.11g; 6 Mbps; CH 1\_2412 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:



| Peak Number | Frequency | LISN    |
|-------------|-----------|---------|
| 1           | 3.197 MHz | Neutral |
| 2           | 159 kHz   | Neutral |

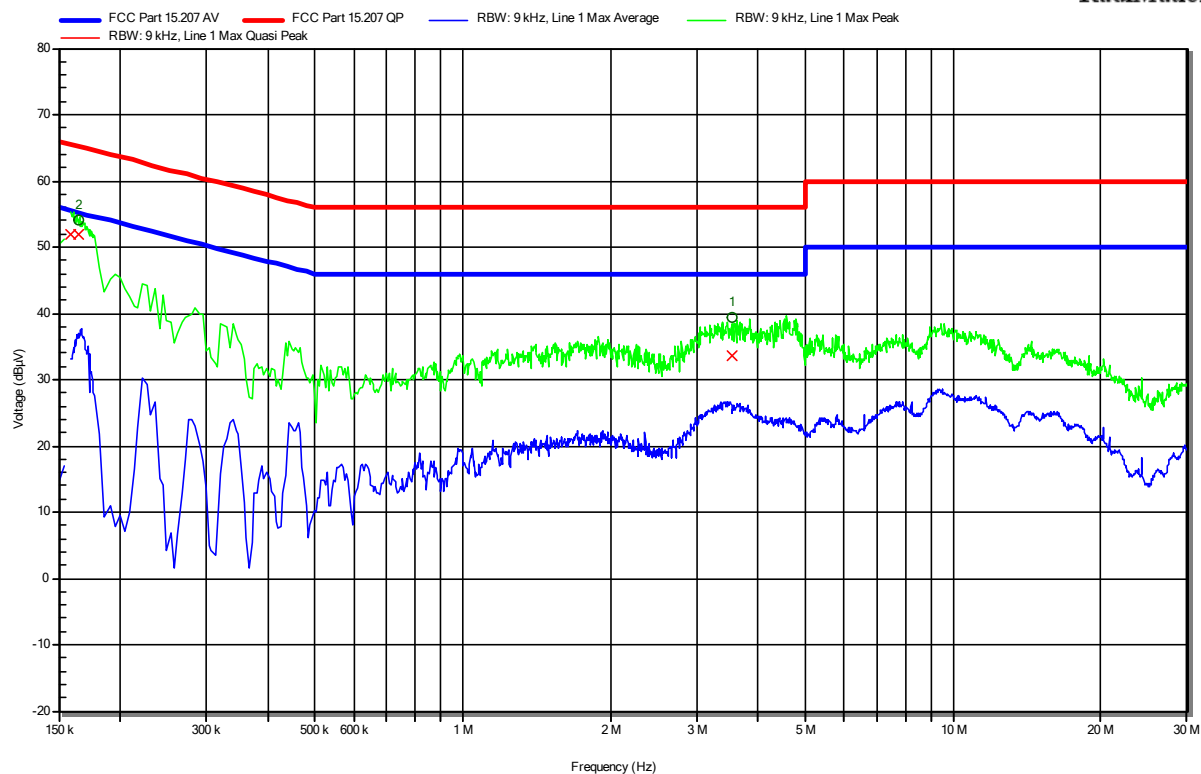
| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN    |
|-------------|-----------|------------|---------------|--------------------|----------------|---------|
| 1           | 3.197 MHz | 28.11 dBµV | 46 dBµV       | -17.89 dB          | Pass           | Neutral |
| 2           | 159 kHz   | 39.07 dBµV | 55.52 dBµV    | -16.45 dB          | Pass           | Neutral |

## Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127 RC L1  
 Operational Mode: IEEE802.11g; 6 Mbps; CH 6\_2437 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:

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**RadiMation**



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | LISN   |
|-------------|-----------|------------|------------------|-----------------------|-------------------|--------|
| 1           | 3.548 MHz | 33.66 dBµV | 56 dBµV          | -22.34 dB             | Pass              | Line 1 |
| 2           | 164.4 kHz | 51.94 dBµV | 65.24 dBµV       | -13.3 dB              | Pass              | Line 1 |

| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN   |
|-------------|-----------|------------|---------------|--------------------|----------------|--------|
| 1           | 3.548 MHz | 25.18 dBµV | 46 dBµV       | -20.82 dB          | Pass           | Line 1 |
| 2           | 164.4 kHz | 36.94 dBµV | 55.24 dBµV    | -18.3 dB           | Pass           | Line 1 |

Test Report No.: G0M-2205-1454-TFC247WF-V02

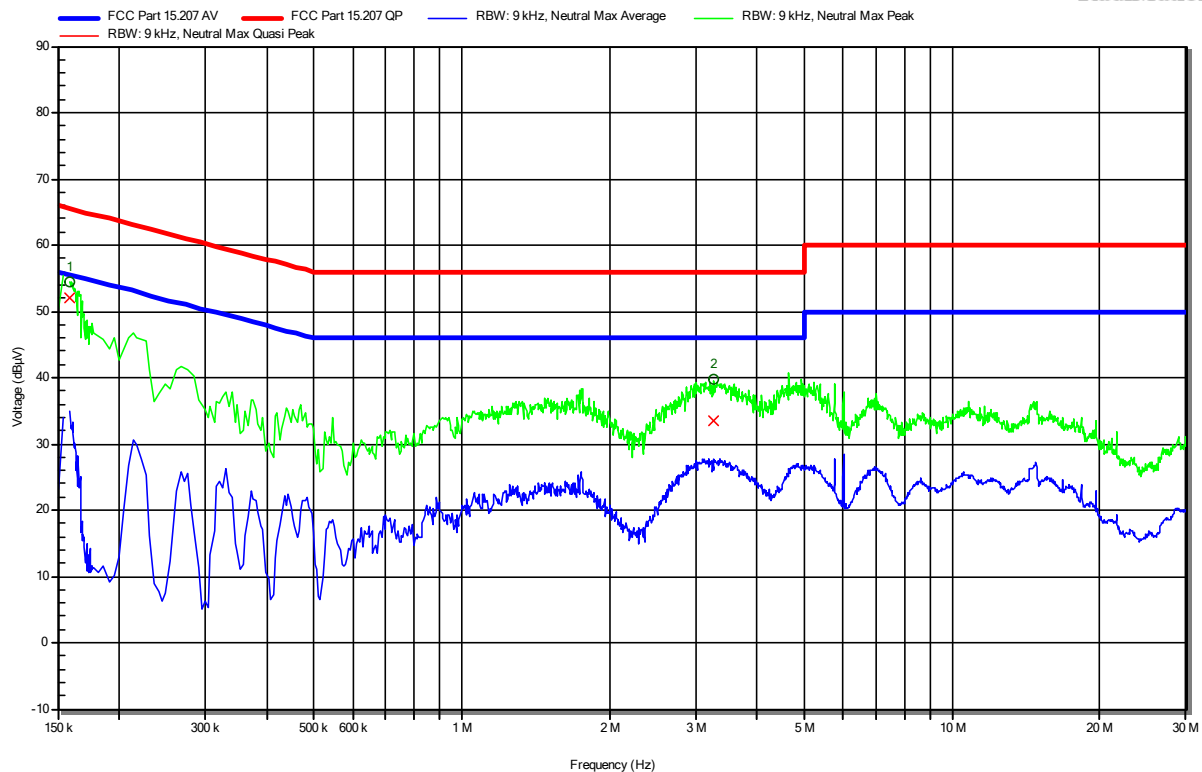
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127  
 Operational Mode: IEEE802.11g; 6 Mbps; CH 6\_2437 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:

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RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | LISN    |
|-------------|-----------|------------|------------------|-----------------------|-------------------|---------|
| 1           | 159 kHz   | 52.01 dBµV | 65.52 dBµV       | -13.5 dB              | Pass              | Neutral |
| 2           | 3.255 MHz | 33.48 dBµV | 56 dBµV          | -22.52 dB             | Pass              | Neutral |

| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN    |
|-------------|-----------|------------|---------------|--------------------|----------------|---------|
| 1           | 159 kHz   | 34.48 dBµV | 55.52 dBµV    | -21.04 dB          | Pass           | Neutral |
| 2           | 3.255 MHz | 25.97 dBµV | 46 dBµV       | -20.03 dB          | Pass           | Neutral |

Test Report No.: G0M-2205-1454-TFC247WF-V02

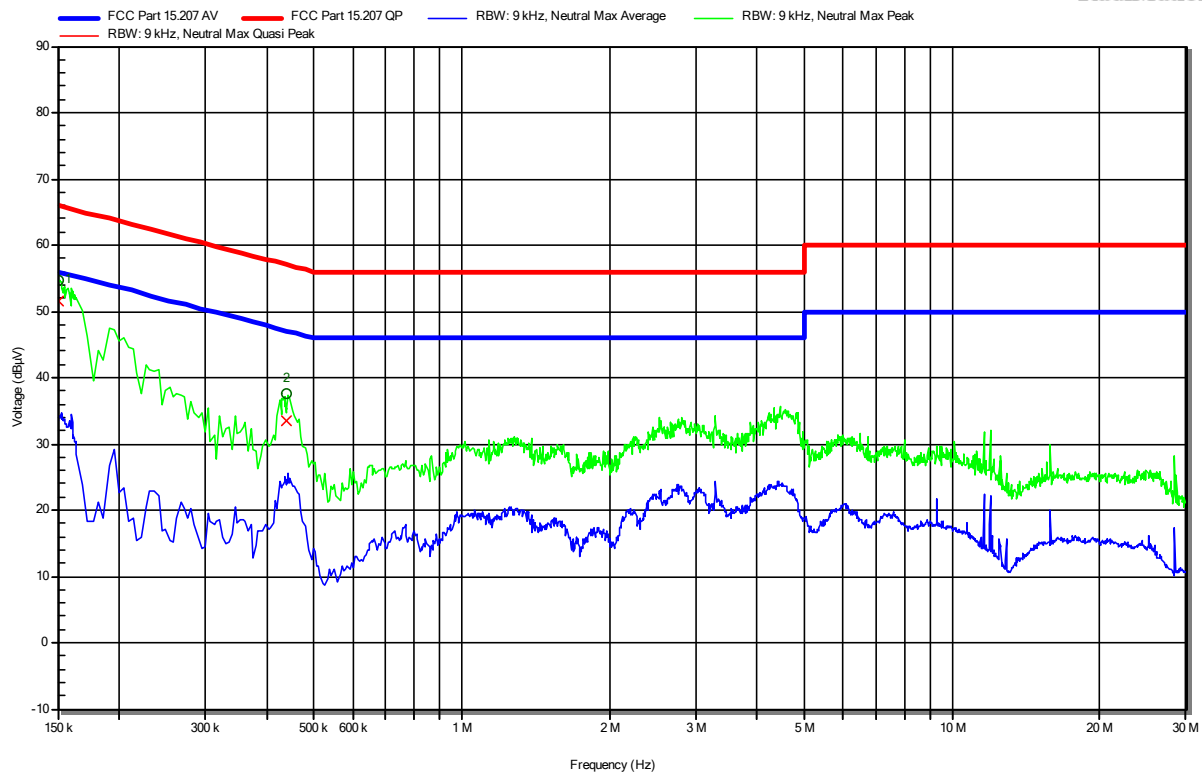
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted emissions at the mains power port according to RSS-247, RSS-Gen

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127  
 Operational Mode: RX; IEEE802.11g; CH 6\_2437 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:

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RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | LISN    |
|-------------|-----------|------------|------------------|-----------------------|-------------------|---------|
| 1           | 150 kHz   | 51.58 dBµV | 66 dBµV          | -14.42 dB             | Pass              | Neutral |
| 2           | 438 kHz   | 33.42 dBµV | 57.1 dBµV        | -23.68 dB             | Pass              | Neutral |

| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN    |
|-------------|-----------|------------|---------------|--------------------|----------------|---------|
| 1           | 150 kHz   | 33.44 dBµV | 56 dBµV       | -22.56 dB          | Pass           | Neutral |
| 2           | 438 kHz   | 24.24 dBµV | 47.1 dBµV     | -22.86 dB          | Pass           | Neutral |

Test Report No.: G0M-2205-1454-TFC247WF-V02

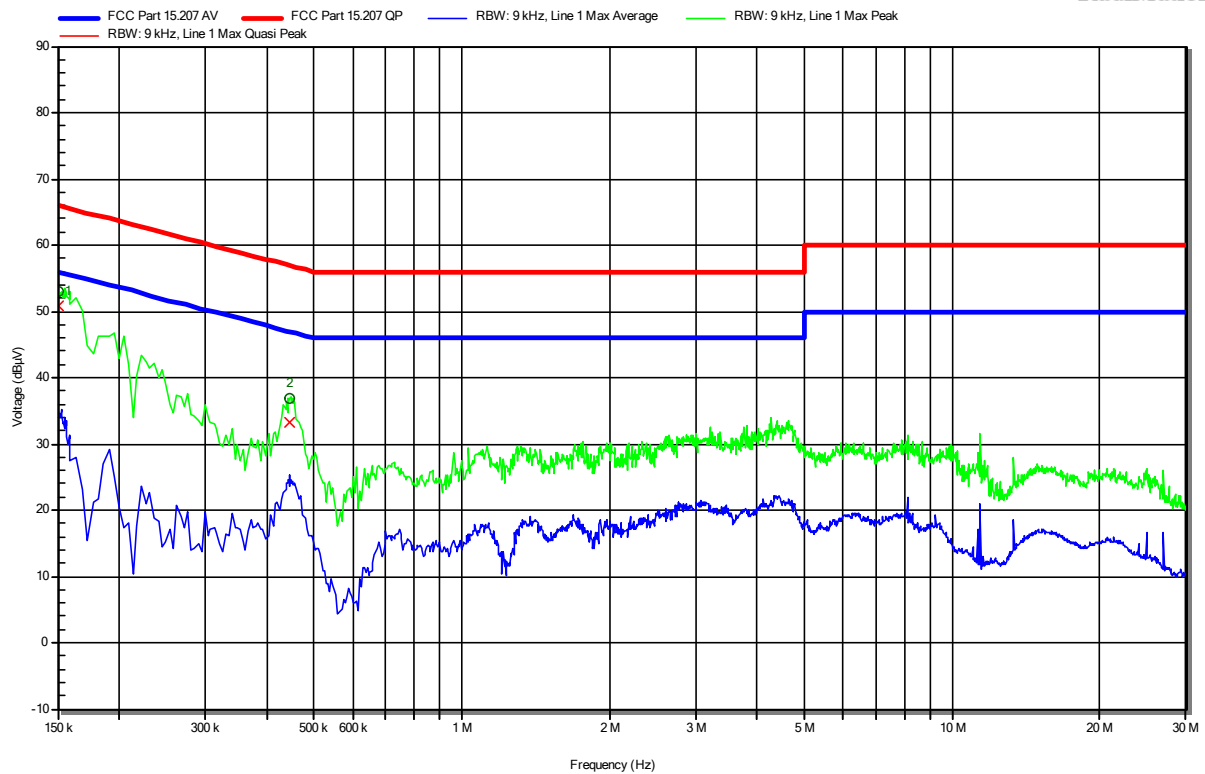
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted emissions at the mains power port according to RSS-247, RSS-Gen

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40679  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Voigt  
 Test Date: 2022-08-29  
 Operating Conditions: ambient temperature: 23 °Celsius  
 power input: 5.0 V DC  
 LISN: Schwarzbeck NSLK 8127 RC L1  
 Operational Mode: RX; IEEE802.11g; CH 6\_2437 MHz; OFDM; BW20  
 EUT Configuration:  
 Applied to Port: 120 VAC / 60 Hz  
 Note 1:

Index 160

RadiMation



| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | LISN   |
|-------------|-----------|------------|------------------|-----------------------|-------------------|--------|
| 1           | 150 kHz   | 50.87 dBµV | 66 dBµV          | -15.13 dB             | Pass              | Line 1 |
| 2           | 447 kHz   | 33.18 dBµV | 56.93 dBµV       | -23.75 dB             | Pass              | Line 1 |

| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status | LISN   |
|-------------|-----------|------------|---------------|--------------------|----------------|--------|
| 1           | 150 kHz   | 34.92 dBµV | 56 dBµV       | -21.08 dB          | Pass           | Line 1 |
| 2           | 447 kHz   | 24.43 dBµV | 46.93 dBµV    | -22.5 dB           | Pass           | Line 1 |

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

### 3.6 Test Conditions and Results - Band-edge compliance

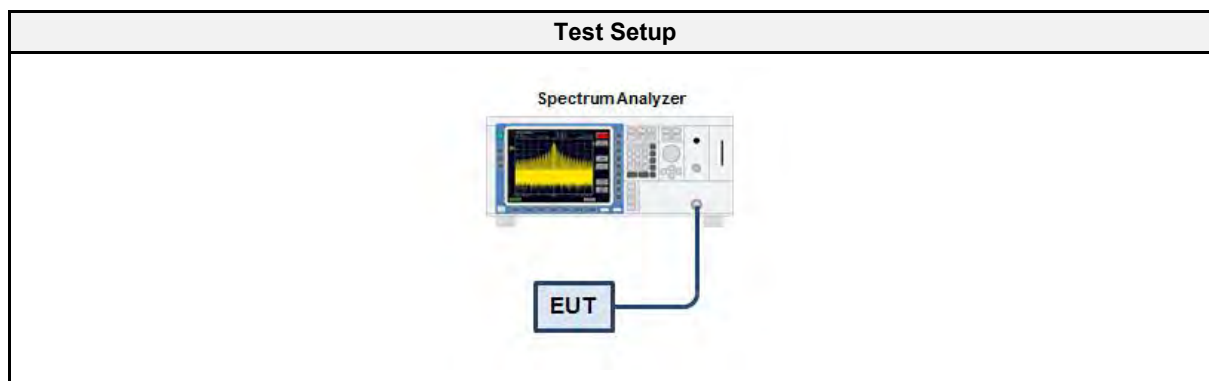
#### 3.6.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(d); ISSED RSS-247, Issue 2 (section 5.5)                        |
| Measurement Uncertainty | ± 3.64 dB                                                                    |
| Measurement Method      | ANSI C63.10 11.13                                                            |
| Operator                | Dr.-Ing Dhamia Almozani                                                      |
| Date                    | 2022-08-22                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.6.2 Limits

| Limits            |                              |
|-------------------|------------------------------|
| Power Measurement | Out-of-band attenuation [dB] |
| Peak              | 20                           |
| RMS               | 30                           |

#### 3.6.3 Setup



#### 3.6.4 Equipment

| Test Equipment    |              |             |               |           |          |
|-------------------|--------------|-------------|---------------|-----------|----------|
| Description       | Manufacturer | Model       | Identifier    | Cal. Date | Cal. Due |
| Spectrum Analyser | R&S          | FSU 26      | EF01003       | 2022-07   | 2023-07  |
| Cable (diverse)   | – (diverse)  | – (diverse) | EF00779 CAABZ | 2022-02   | 2023-02  |

#### 3.6.5 Procedure

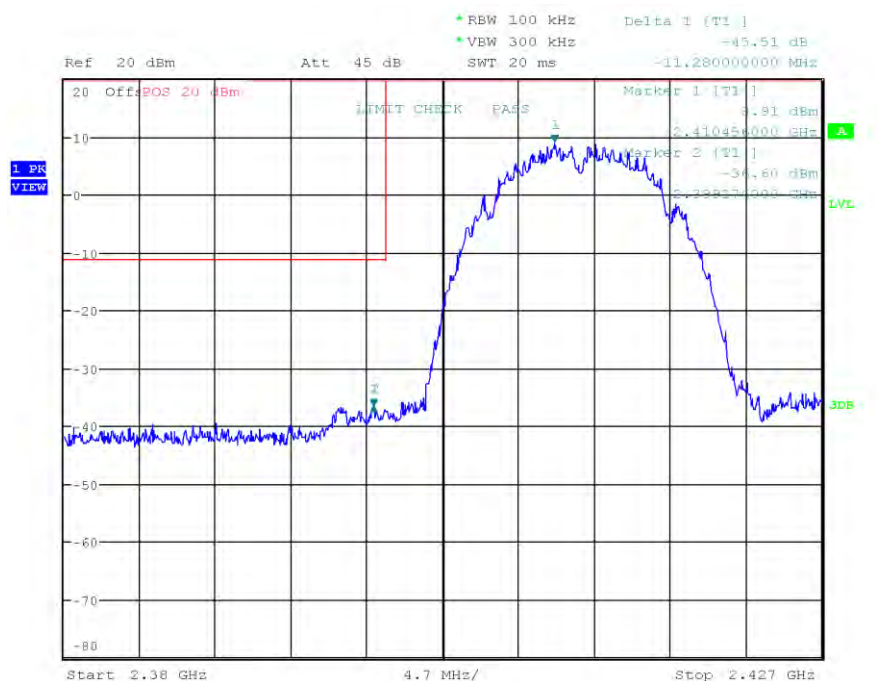
| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode (Communication tester is used if needed)</li> <li>2. Span set around lower band edge and detector is set to peak and max hold</li> <li>3. Resolution bandwidth is set to 100 kHz</li> <li>4. Markers are set to peak emission levels within frequency band and outside frequency band</li> <li>5. Band edge attenuation is determined from level difference</li> </ol> |

## 3.6.6 Results

| Test Results |               |                              |            |         |
|--------------|---------------|------------------------------|------------|---------|
| Mode         | Channel [MHz] | Out-of-band Attenuation [dB] | Limit [dB] | Verdict |
| DSSS         | 2412          | -45.52                       | -20        | PASS    |
| DSSS         | 2462          | -49.16                       | -20        | PASS    |
| OFDM         | 2412          | -27.81                       | -20        | PASS    |
| OFDM         | 2462          | -35.11                       | -20        | PASS    |
| HT20         | 2412          | -29.59                       | -20        | PASS    |
| HT20         | 2462          | -37.56                       | -20        | PASS    |
| HT40         | 2422          | -32.2                        | -20        | PASS    |
| HT40         | 2452          | -34.31                       | -20        | PASS    |

## Emissions in nonrestricted frequency bands at the Band-edge

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Project Number:                       | G0M-2205-1454                       |
| Applicant:                            | u-blox AG                           |
| Model Description:                    | Stand-alone multiradio module       |
| Model:                                | NORA-W101                           |
| Test Sample ID:                       | 40677                               |
| Reference Standards:                  | FCC 15.247, RSS-247                 |
| Reference Method:                     | ANSI C63.10:2013, Section 11.11     |
| Operational Mode:                     | IEEE 802.11 b, Channel: 1, 2412 MHz |
| Operating Conditions:                 | Tnom/Vnom                           |
| Operator:                             | Dhamia Almozani                     |
| Test Site:                            | Eurofins Product Service GmbH       |
| Test Date:                            | 2022-08-22                          |
| Antenna port:                         | 1                                   |
| Note:                                 | Mode= 1 Mbps (worse case)           |
| Band-edge                             | Lower                               |
| In-band Frequency [MHz]:              | 2410.456                            |
| Max. in-band Level [dBm/100 kHz]:     | 8.913                               |
| Out-of-band Frequency [MHz]:          | 2399.176                            |
| Max. out-of-band Level [dBm/100 kHz]: | -36.602                             |
| Attenuation [dB]:                     | -45.52                              |



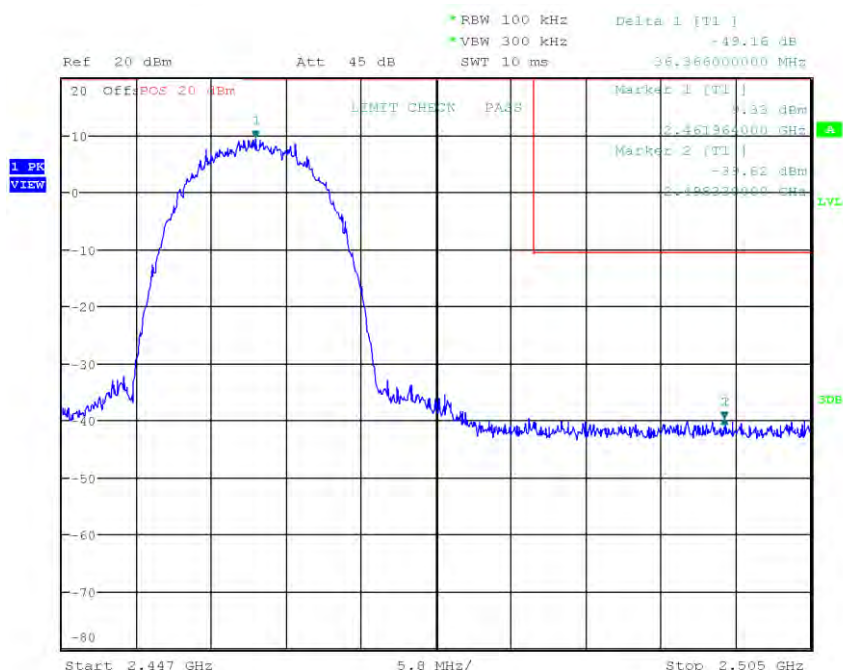
Date: 22.AUG.2022 13:06:06

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 b, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 5.5 Mbps (worse case)  
 Band-edge: Upper  
 In-band Frequency [MHz]: 2461.964  
 Max. in-band Level [dBm/100 kHz]: 9.332  
 Out-of-band Frequency [MHz]: 2498.33  
 Max. out-of-band Level [dBm/100 kHz]: -39.824  
 Attenuation [dB]: -49.16



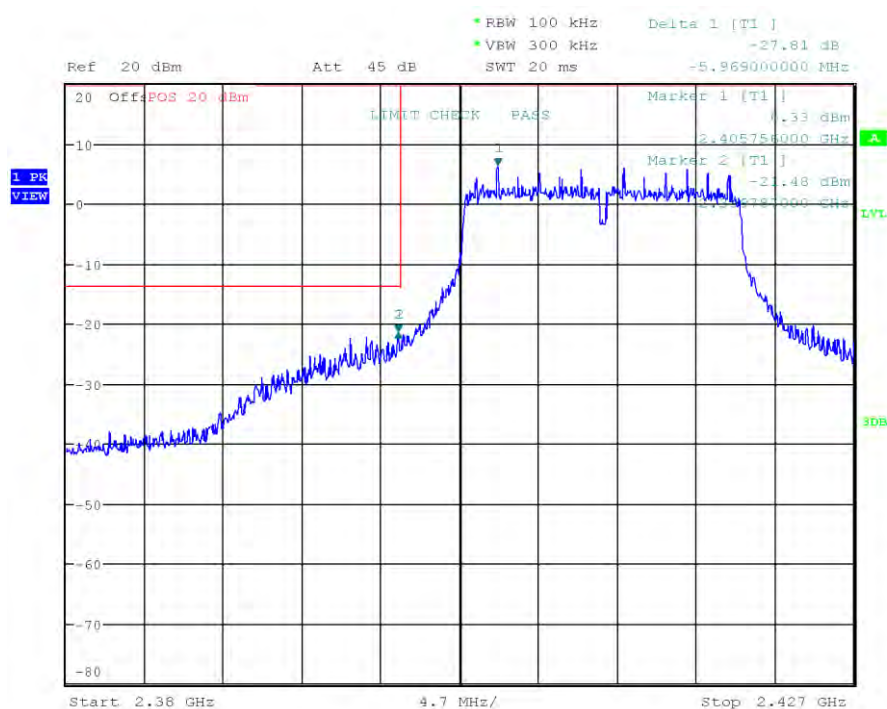
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Project Number:                       | G0M-2205-1454                       |
| Applicant:                            | u-blox AG                           |
| Model Description:                    | Stand-alone multiradio module       |
| Model:                                | NORA-W101                           |
| Test Sample ID:                       | 40677                               |
| Reference Standards:                  | FCC 15.247, RSS-247                 |
| Reference Method:                     | ANSI C63.10:2013, Section 11.11     |
| Operational Mode:                     | IEEE 802.11 g, Channel: 1, 2412 MHz |
| Operating Conditions:                 | Tnom/Vnom                           |
| Operator:                             | Dhamia Almozani                     |
| Test Site:                            | Eurofins Product Service GmbH       |
| Test Date:                            | 2022-08-22                          |
| Antenna port:                         | 1                                   |
| Note:                                 | Mode= 6 Mbps (worse case)           |
| Band-edge                             | Lower                               |
| In-band Frequency [MHz]:              | 2405.756                            |
| Max. in-band Level [dBm/100 kHz]:     | 6.333                               |
| Out-of-band Frequency [MHz]:          | 2399.787                            |
| Max. out-of-band Level [dBm/100 kHz]: | -21.476                             |
| Attenuation [dB]:                     | -27.81                              |



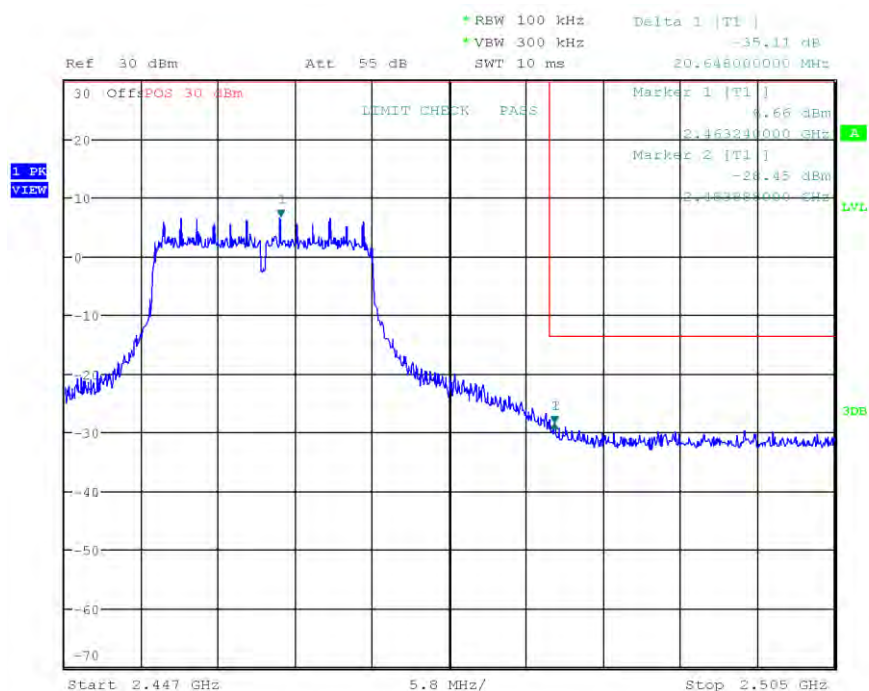
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

|                                       |                                      |
|---------------------------------------|--------------------------------------|
| Project Number:                       | G0M-2205-1454                        |
| Applicant:                            | u-blox AG                            |
| Model Description:                    | Stand-alone multiradio module        |
| Model:                                | NORA-W101                            |
| Test Sample ID:                       | 40677                                |
| Reference Standards:                  | FCC 15.247, RSS-247                  |
| Reference Method:                     | ANSI C63.10:2013, Section 11.11      |
| Operational Mode:                     | IEEE 802.11 g, Channel: 11, 2462 MHz |
| Operating Conditions:                 | Tnom/Vnom                            |
| Operator:                             | Dhamia Almozani                      |
| Test Site:                            | Eurofins Product Service GmbH        |
| Test Date:                            | 2022-08-22                           |
| Antenna port:                         | 1                                    |
| Note:                                 | Mode= 6 Mbps (worse case)            |
| Band-edge                             | Upper                                |
| In-band Frequency [MHz]:              | 2463.24                              |
| Max. in-band Level [dBm/100 kHz]:     | 6.659                                |
| Out-of-band Frequency [MHz]:          | 2483.888                             |
| Max. out-of-band Level [dBm/100 kHz]: | -28.451                              |
| Attenuation [dB]:                     | -35.11                               |



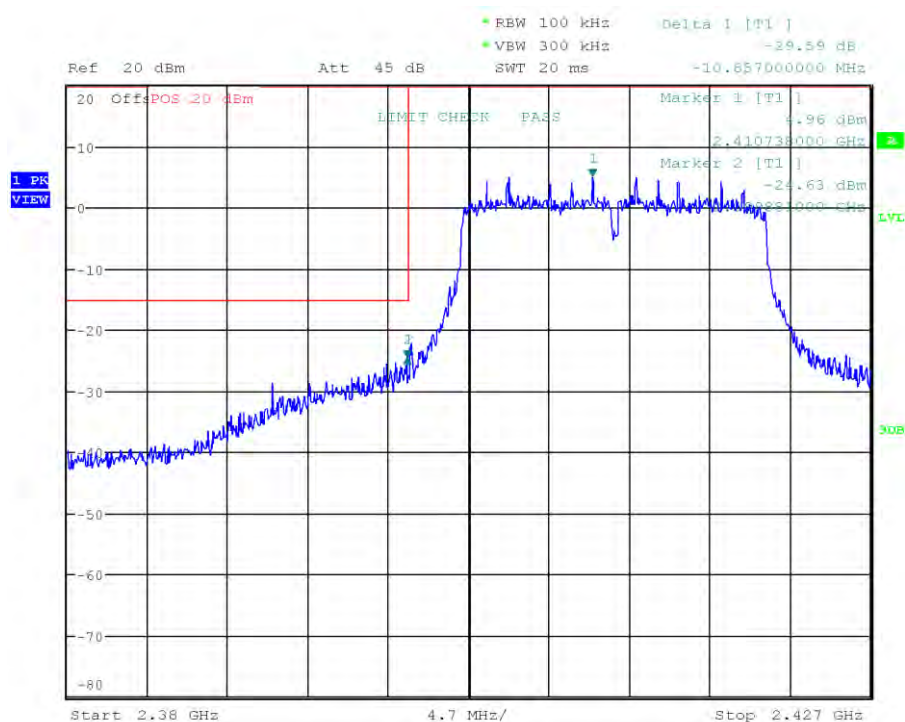
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| Project Number:                       | G0M-2205-1454                            |
| Applicant:                            | u-blox AG                                |
| Model Description:                    | Stand-alone multiradio module            |
| Model:                                | NORA-W101                                |
| Test Sample ID:                       | 40677                                    |
| Reference Standards:                  | FCC 15.247, RSS-247                      |
| Reference Method:                     | ANSI C63.10:2013, Section 11.11          |
| Operational Mode:                     | IEEE 802.11 n HT20, Channel: 1, 2412 MHz |
| Operating Conditions:                 | Tnom/Vnom                                |
| Operator:                             | Dhamia Almozani                          |
| Test Site:                            | Eurofins Product Service GmbH            |
| Test Date:                            | 2022-08-22                               |
| Antenna port:                         | 1                                        |
| Note:                                 | Mode= 0 MCS (worse case)                 |
| Band-edge                             | Lower                                    |
| In-band Frequency [MHz]:              | 2410.738                                 |
| Max. in-band Level [dBm/100 kHz]:     | 4.956                                    |
| Out-of-band Frequency [MHz]:          | 2399.881                                 |
| Max. out-of-band Level [dBm/100 kHz]: | -24.634                                  |
| Attenuation [dB]:                     | -29.59                                   |



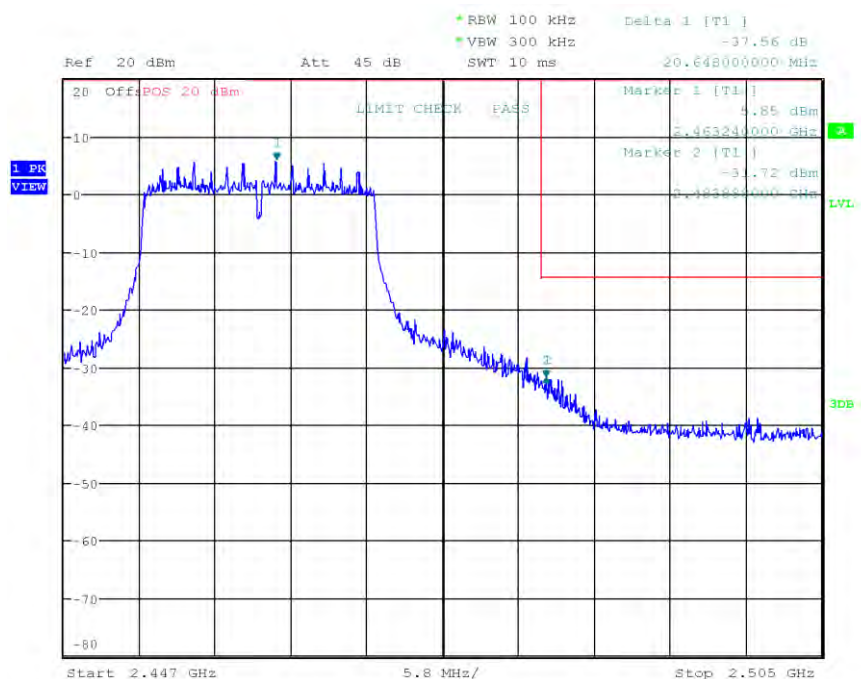
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT20, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 1 MCS (worse case)  
 Band-edge: Upper  
 In-band Frequency [MHz]: 2463.24  
 Max. in-band Level [dBm/100 kHz]: 5.846  
 Out-of-band Frequency [MHz]: 2483.888  
 Max. out-of-band Level [dBm/100 kHz]: -31.715  
 Attenuation [dB]: -37.56



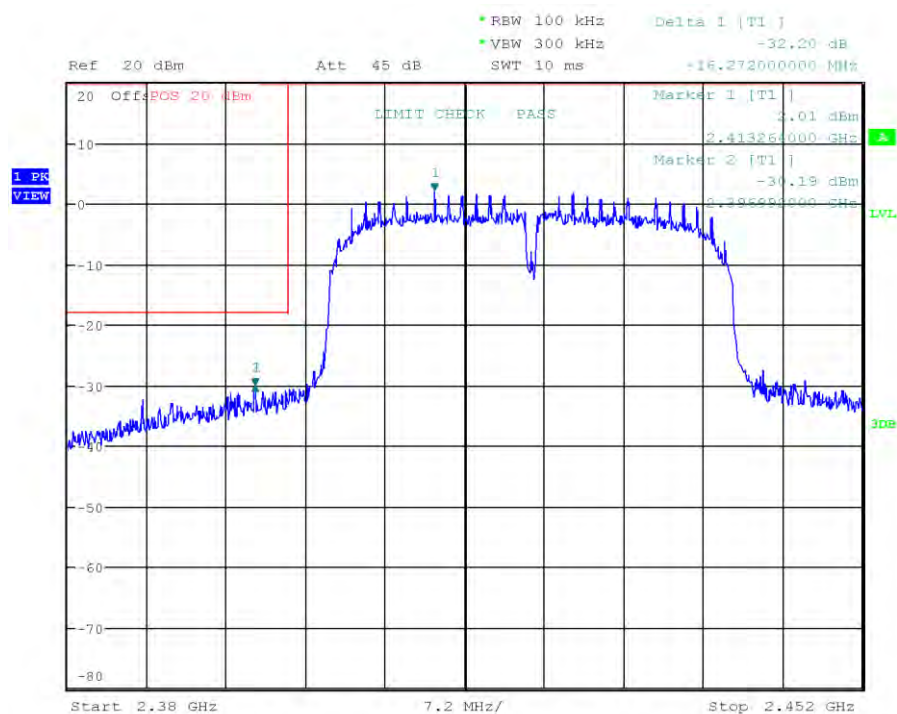
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT40, Channel: 3, 2422 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Band-edge Lower  
 In-band Frequency [MHz]: 2413.264  
 Max. in-band Level [dBm/100 kHz]: 2.009  
 Out-of-band Frequency [MHz]: 2396.992  
 Max. out-of-band Level [dBm/100 kHz]: -30.189  
 Attenuation [dB]: -32.2



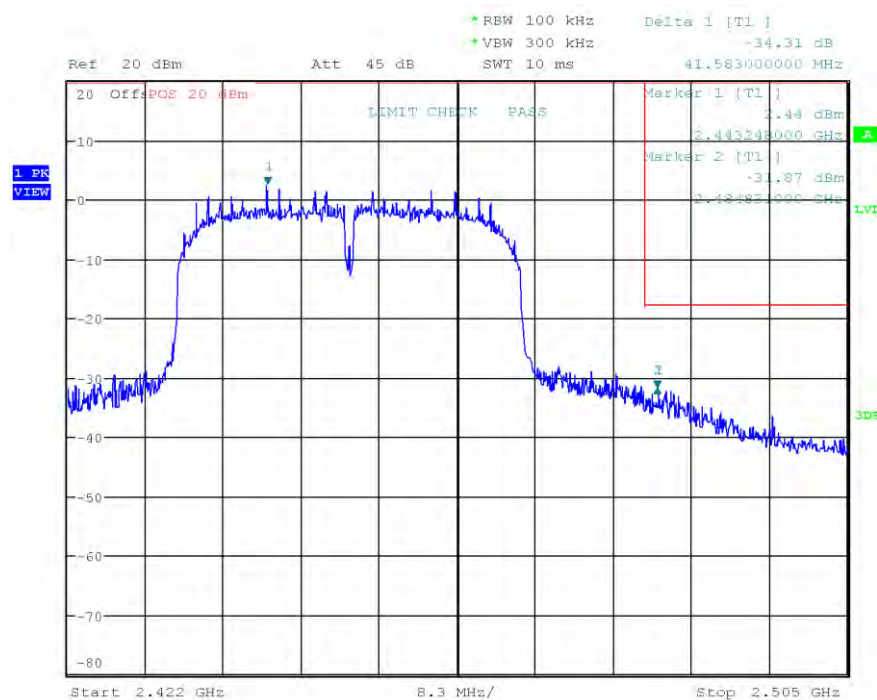
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT40, Channel: 9, 2452 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Band-edge Upper  
 In-band Frequency [MHz]: 2443.248  
 Max. in-band Level [dBm/100 kHz]: 2.439  
 Out-of-band Frequency [MHz]: 2484.831  
 Max. out-of-band Level [dBm/100 kHz]: -31.867  
 Attenuation [dB]: -34.31



Date: 22.AUG.2022 13:24:23

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

### 3.7 Test Conditions and Results - Conducted spurious emissions

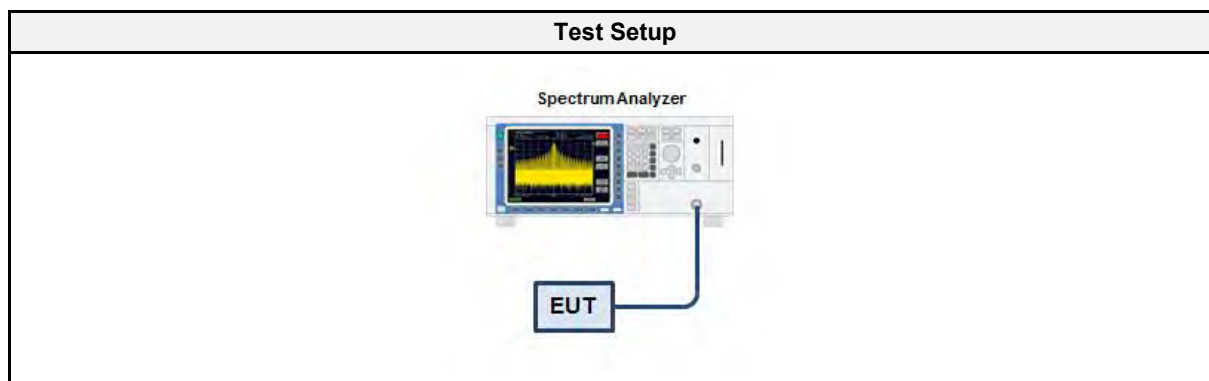
#### 3.7.1 Information

| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)                         |
| Measurement Uncertainty | ± 4.25 dB                                                                    |
| Measurement Method      | ANSI C63.10 11.11                                                            |
| Operator                | Dr.-Ing Dhamia Almozani                                                      |
| Date                    | 2022-08-22                                                                   |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.7.2 Limits

| Limits            |                              |
|-------------------|------------------------------|
| Power Measurement | Out-of-band attenuation [dB] |
| Peak              | 20                           |
| RMS               | 30                           |

#### 3.7.3 Setup



#### 3.7.4 Equipment

| Test Equipment    |              |             |               |           |          |
|-------------------|--------------|-------------|---------------|-----------|----------|
| Description       | Manufacturer | Model       | Identifier    | Cal. Date | Cal. Due |
| Spectrum Analyser | R&S          | FSU 26      | EF01003       | 2022-07   | 2023-07  |
| Cable (diverse)   | — (diverse)  | — (diverse) | EF00779 CAABZ | 2022-02   | 2023-02  |

#### 3.7.5 Procedure

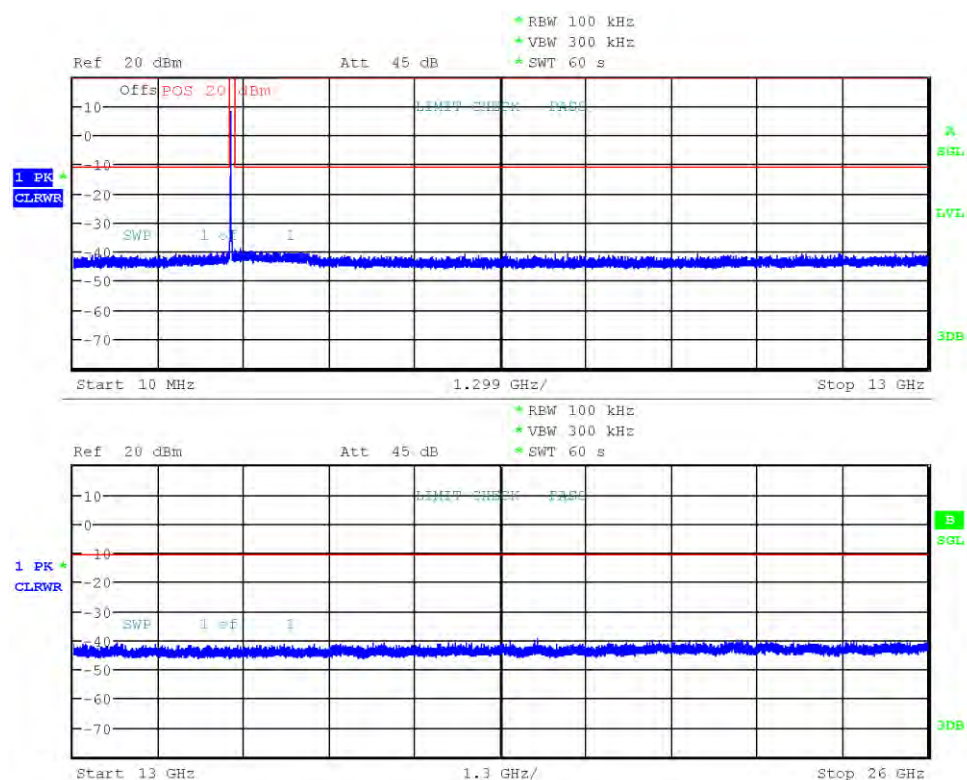
| Test Procedure                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode (Communication tester is used if needed)</li> <li>2. Span set around lower band edge and detector is set to peak and max hold</li> <li>3. Resolution bandwidth is set to 100 kHz</li> <li>4. Markers are set to peak emission levels outside frequency band</li> </ol> |

### 3.7.6 Results

| Test Results |                  |         |
|--------------|------------------|---------|
| Mode         | Channel<br>[MHz] | Verdict |
| DSSS         | 2412             | PASS    |
| DSSS         | 2437             | PASS    |
| DSSS         | 2462             | PASS    |
| OFDM         | 2412             | PASS    |
| OFDM         | 2437             | PASS    |
| OFDM         | 2462             | PASS    |
| HT20         | 2412             | PASS    |
| HT20         | 2437             | PASS    |
| HT20         | 2462             | PASS    |
| HT40         | 2422             | PASS    |
| HT40         | 2437             | PASS    |
| HT40         | 2452             | PASS    |

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 b, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 1 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2410.4  
 Max. in-band Level [dBm/100 kHz]: 9.4  
 Out-of-band Limit [dBm/100 kHz]: -10.6



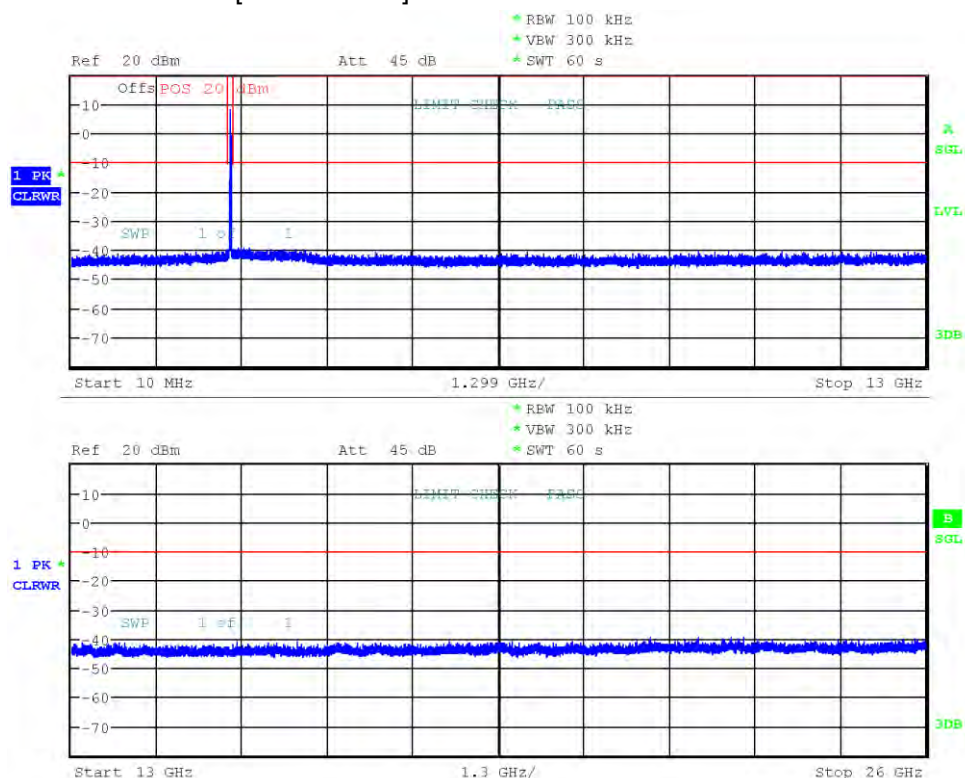
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 b, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 2 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2436.4  
 Max. in-band Level [dBm/100 kHz]: 9.8  
 Out-of-band Limit [dBm/100 kHz]: -10.2



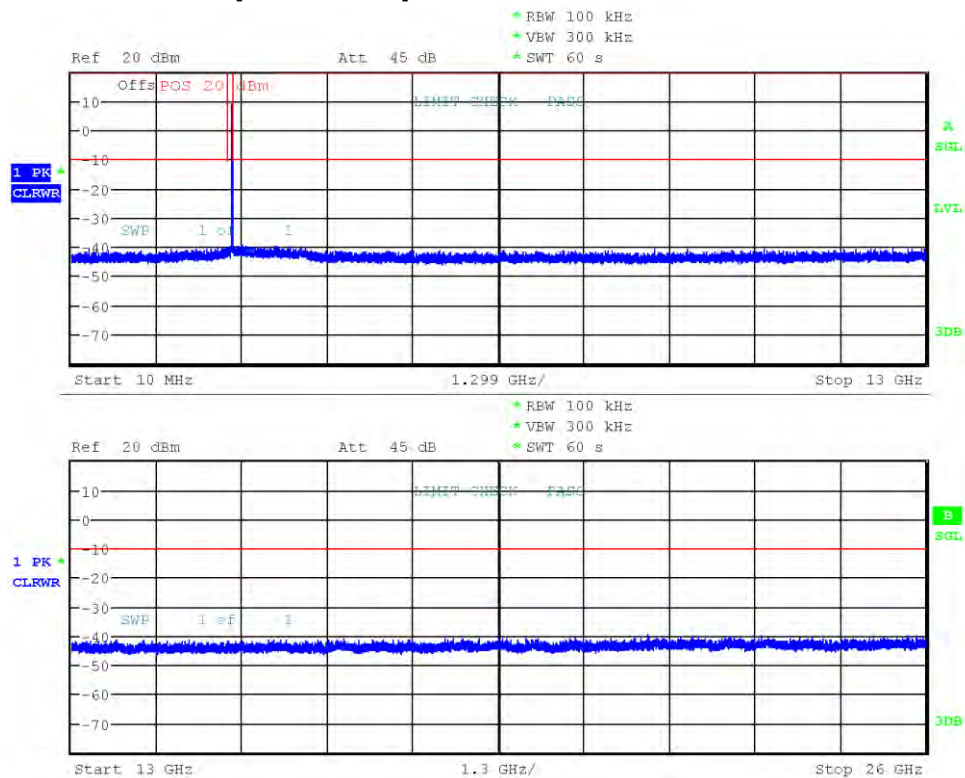
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 b, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 5.5 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2462.0  
 Max. in-band Level [dBm/100 kHz]: 9.8  
 Out-of-band Limit [dBm/100 kHz]: -10.2



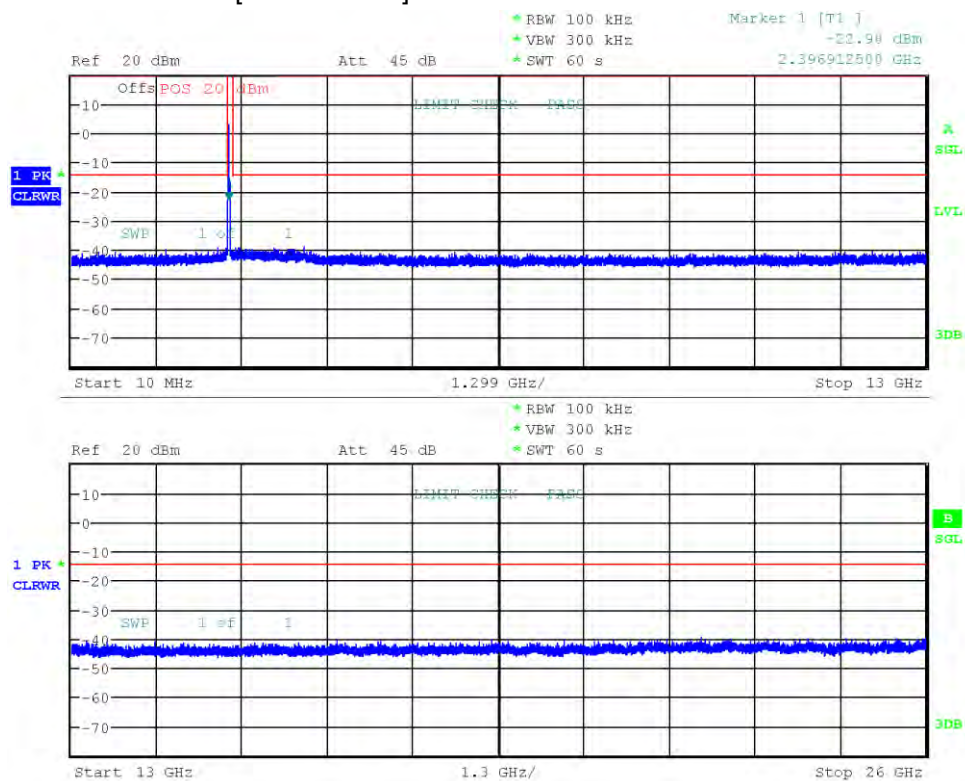
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 g, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2410.7  
 Max. in-band Level [dBm/100 kHz]: 6.0  
 Out-of-band Limit [dBm/100 kHz]: -14.0



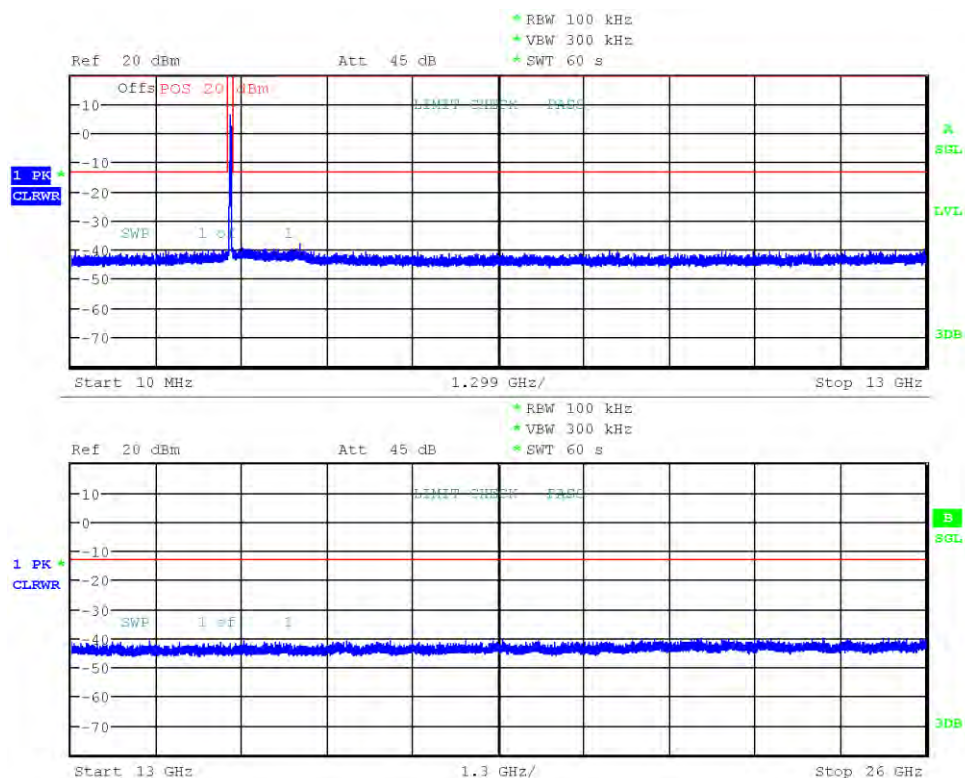
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Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 g, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2430.7  
 Max. in-band Level [dBm/100 kHz]: 6.7  
 Out-of-band Limit [dBm/100 kHz]: -13.3



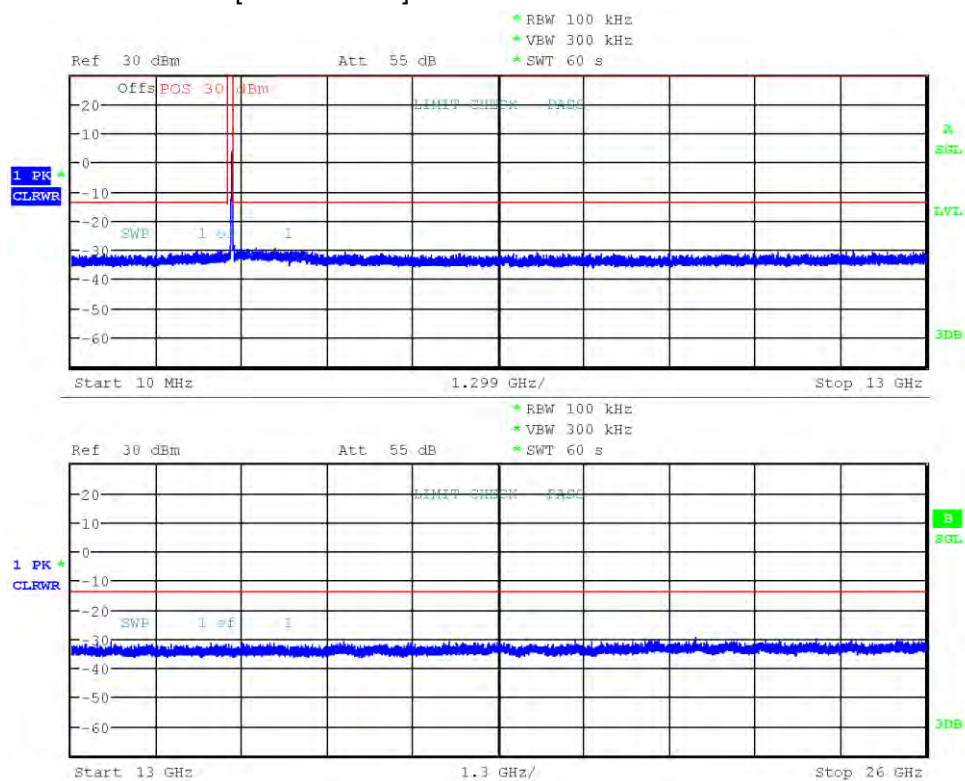
Date: 22.AUG.2022 14:22:45

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 g, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 6 Mbps (worse case)  
 Max. in-band Frequency [MHz]: 2463.3  
 Max. in-band Level [dBm/100 kHz]: 6.6  
 Out-of-band Limit [dBm/100 kHz]: -13.4



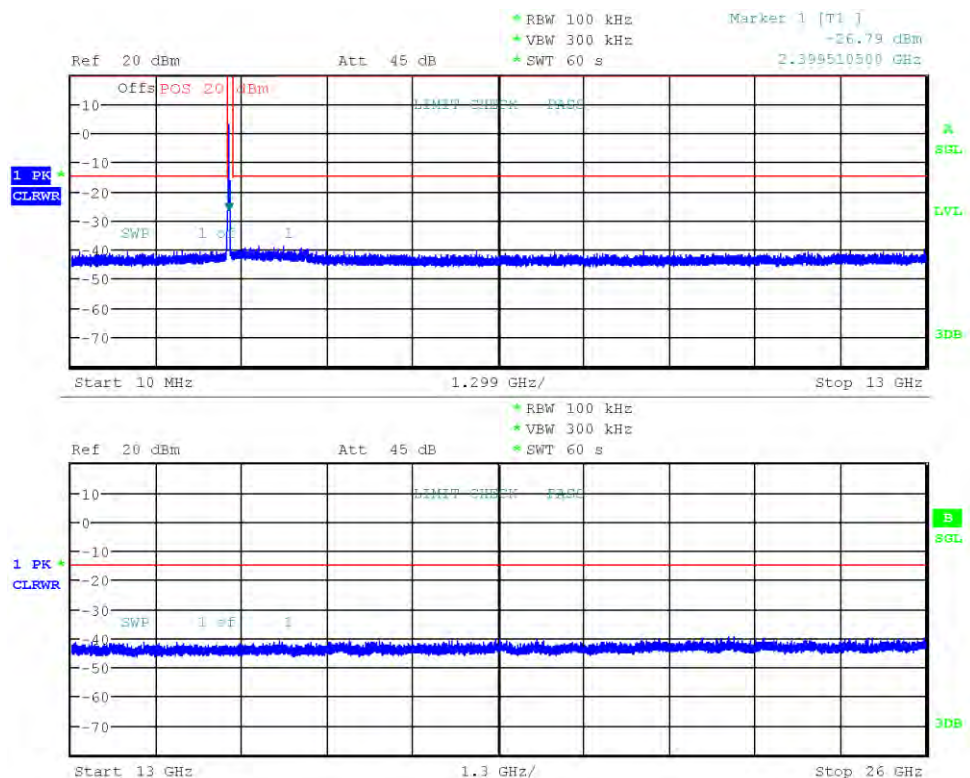
Date: 22.AUG.2022 14:25:53

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

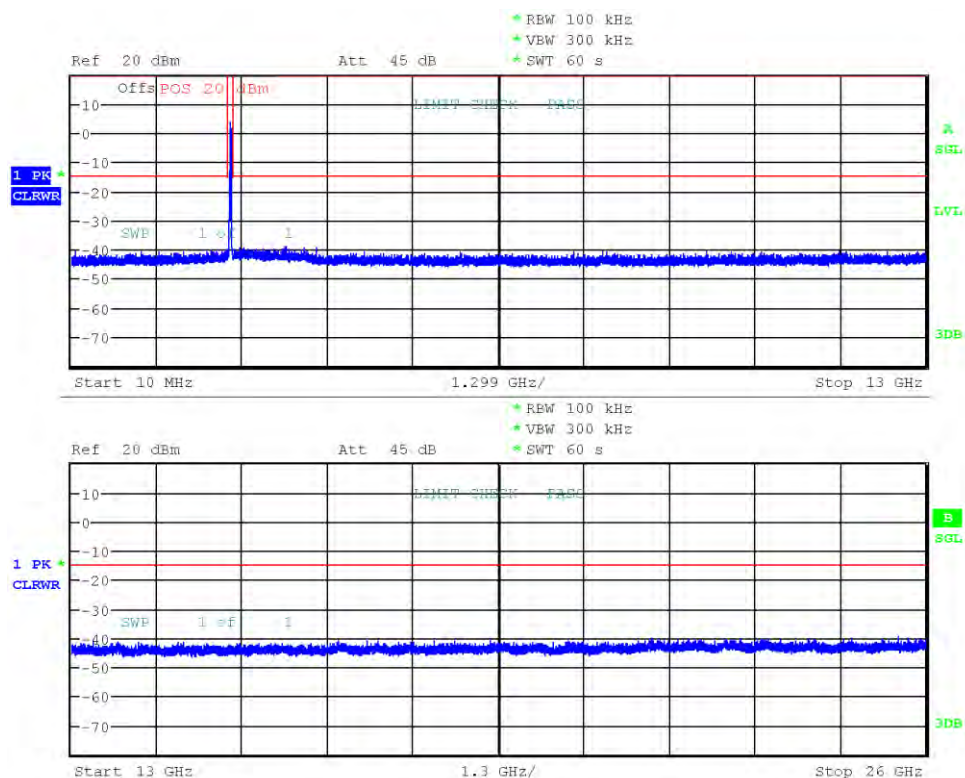
Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT20, Channel: 1, 2412 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Max. in-band Frequency [MHz]: 2405.8  
 Max. in-band Level [dBm/100 kHz]: 5.4  
 Out-of-band Limit [dBm/100 kHz]: -14.6



Date: 22.AUG.2022 14:48:35

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT20, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 0 MCS (worse case)  
 Max. in-band Frequency [MHz]: 2438.3  
 Max. in-band Level [dBm/100 kHz]: 5.3  
 Out-of-band Limit [dBm/100 kHz]: -14.7



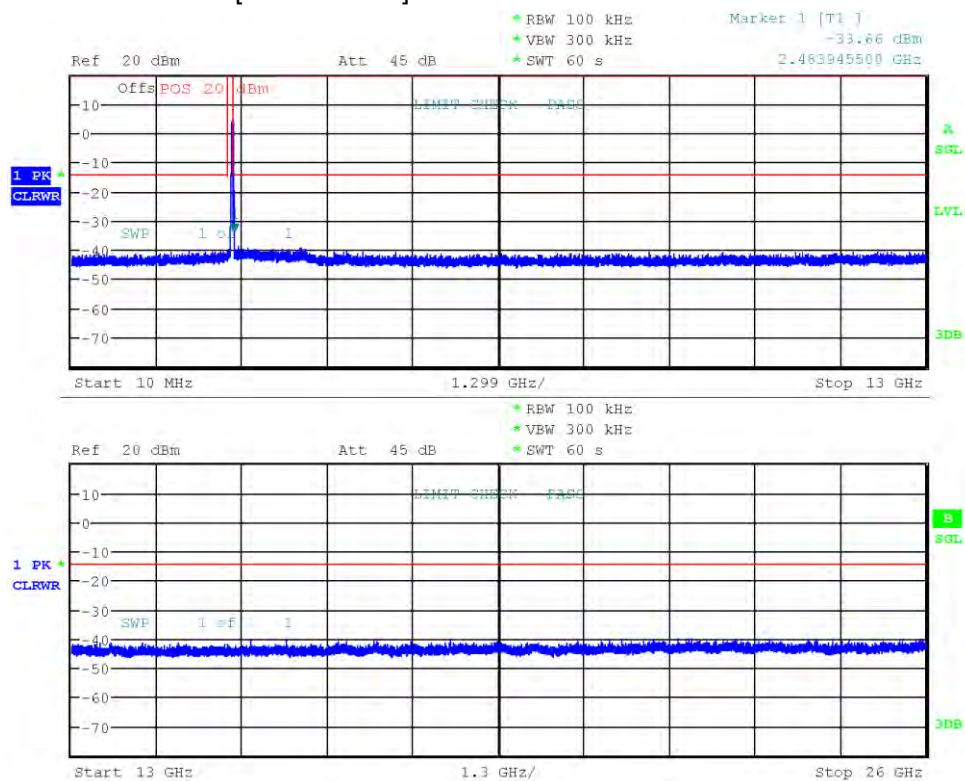
Date: 22.AUG.2022 14:53:40

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT20, Channel: 11, 2462 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-22  
 Antenna port: 1  
 Note: Mode= 1 MCS (worse case)  
 Max. in-band Frequency [MHz]: 2455.8  
 Max. in-band Level [dBm/100 kHz]: 5.9  
 Out-of-band Limit [dBm/100 kHz]: -14.1



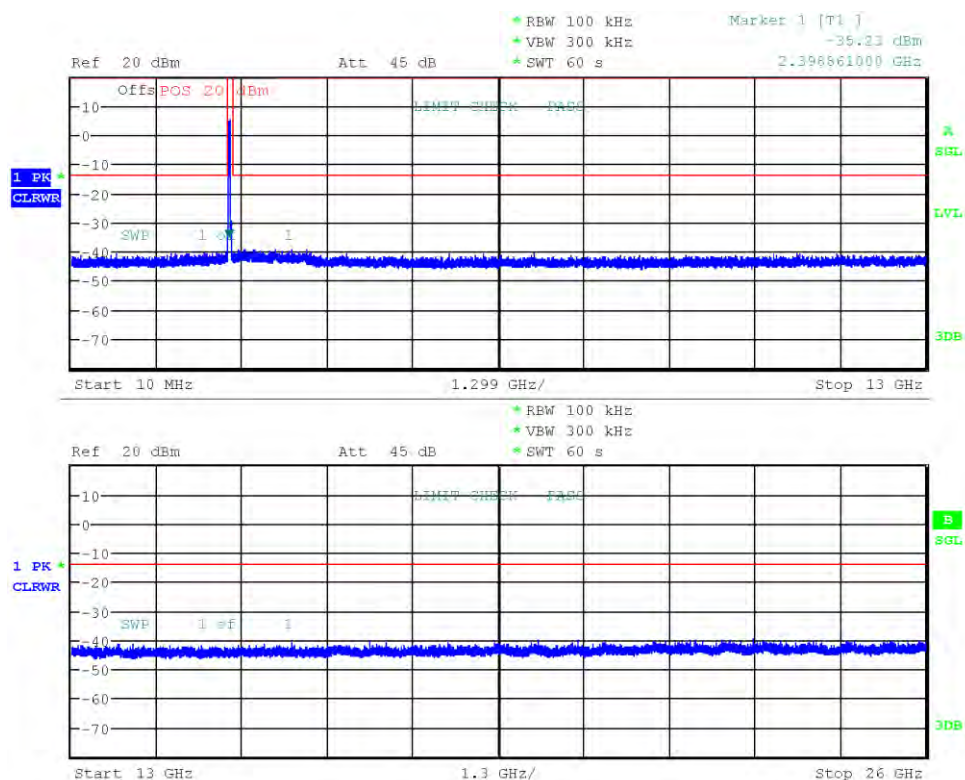
Date: 22.AUG.2022 14:57:29

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT40, Channel: 3, 2422 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-24  
 Antenna port: 1  
 Note: Mode= 0 MCS  
 Max. in-band Frequency [MHz]: 2415.8  
 Max. in-band Level [dBm/100 kHz]: 6.1  
 Out-of-band Limit [dBm/100 kHz]: -13.9



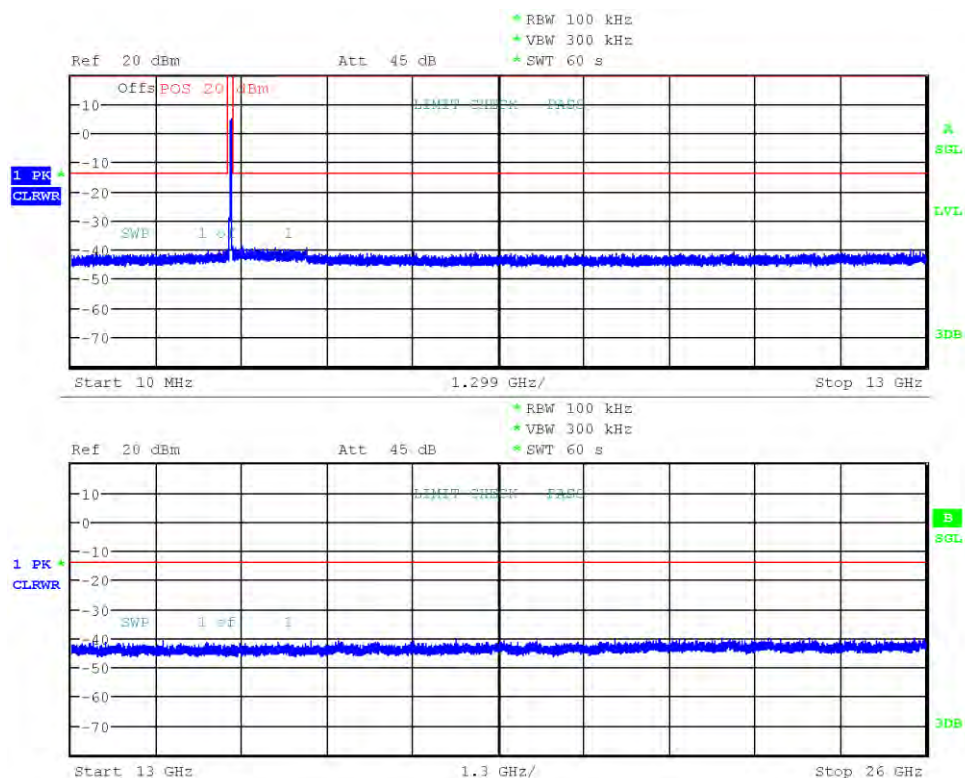
Date: 24.AUG.2022 14:04:19

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT40, Channel: 6, 2437 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-24  
 Antenna port: 1  
 Note: Mode= 0 MCS  
 Max. in-band Frequency [MHz]: 2442.0  
 Max. in-band Level [dBm/100 kHz]: 6.2  
 Out-of-band Limit [dBm/100 kHz]: -13.8



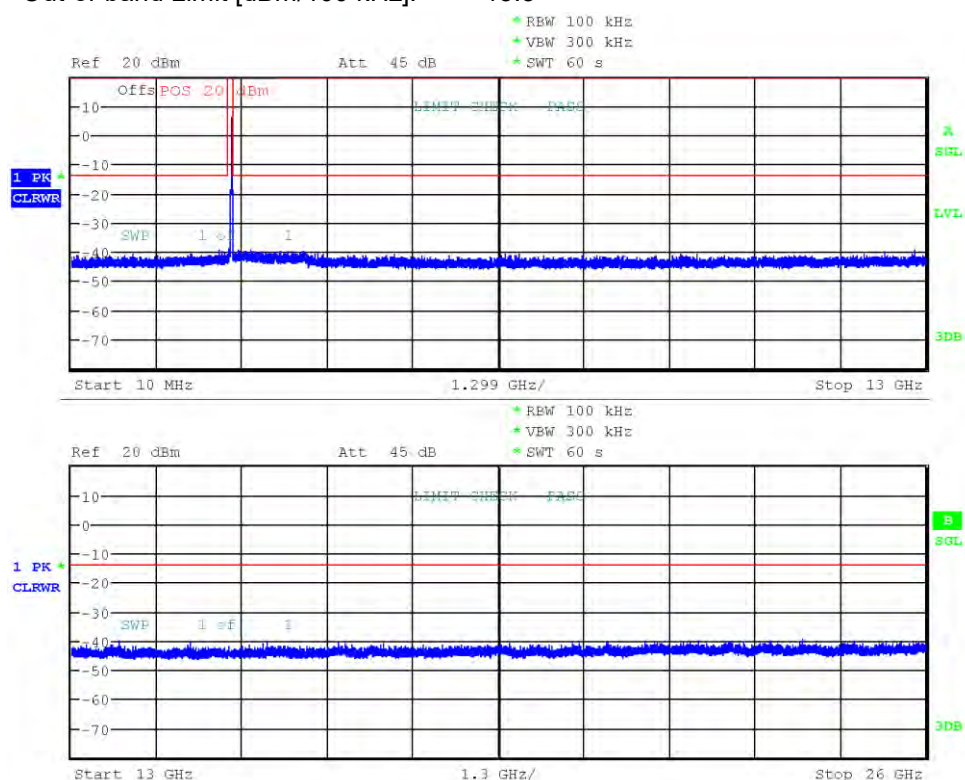
Date: 24.AUG.2022 14:07:15

Test Report No.: G0M-2205-1454-TFC247WF-V02

Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## Conducted Spurious Emissions

Project Number: G0M-2205-1454  
 Applicant: u-blox AG  
 Model Description: Stand-alone multiradio module  
 Model: NORA-W101  
 Test Sample ID: 40677  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 11.11  
 Operational Mode: IEEE 802.11 n HT40, Channel: 9, 2452 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Dhamia Almozani  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2022-08-24  
 Antenna port: 1  
 Note: Mode= 0 MCS  
 Max. in-band Frequency [MHz]: 2445.8  
 Max. in-band Level [dBm/100 kHz]: 6.5  
 Out-of-band Limit [dBm/100 kHz]: -13.5



Date: 24.AUG.2022 14:14:37

### 3.8 Test Conditions and Results - Transmitter radiated emissions

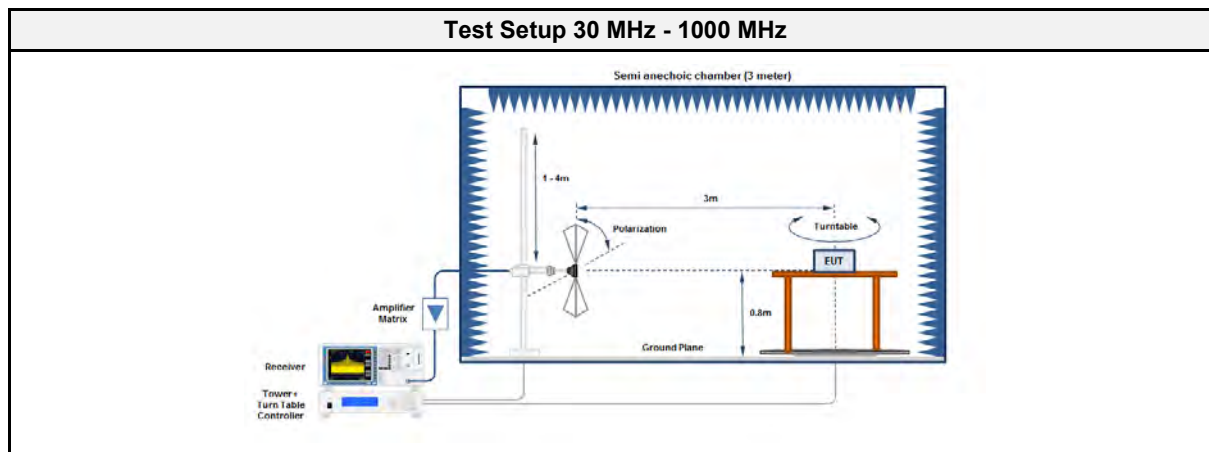
#### 3.8.1 Information

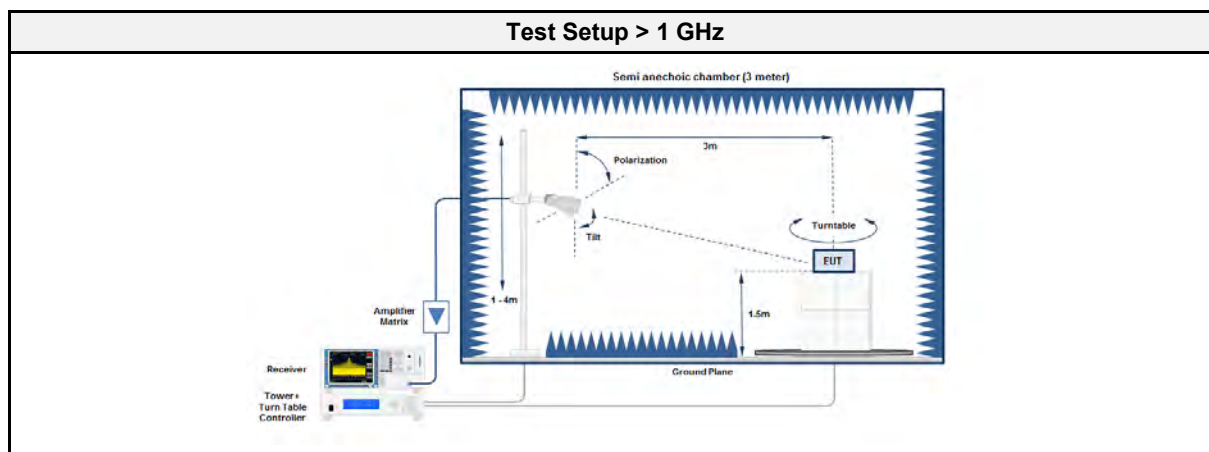
| Test Information        |                                                                              |
|-------------------------|------------------------------------------------------------------------------|
| Reference               | FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)      |
| Measurement Uncertainty | ± 5.95 dB                                                                    |
| Measurement Method      | ANSI C63.10 6.4, 6.5, 6.6, 11.12                                             |
| Operator                | Odai Qawasmeh and Radwan Jaafar                                              |
| Date                    | 2022-08-29, 2022-09-16, 2022-10-19/20 and 2022-11-11                         |
| Comment                 | Measurements were performed with attenuation level = 0 (corresponds to 0 dB) |

#### 3.8.2 Limits

| Limits                |            |                                    |                          |
|-----------------------|------------|------------------------------------|--------------------------|
| Frequency range [MHz] | Detector   | Field strength [ $\mu\text{V/m}$ ] | Measurement distance [m] |
| 0.009 - 0.09          | Average    | 2400/F[kHz]                        | 300                      |
| 0.09 - 0.110          | Quasi-Peak | 2400/F[kHz]                        | 300                      |
| 0.110 - 0.490         | Average    | 2400/F[kHz]                        | 300                      |
| 0.490 - 1.705         | Quasi-Peak | 24000/F[kHz]                       | 30                       |
| 1.705 - 30.0          | Quasi-Peak | 30                                 | 30                       |
| 30 - 88               | Quasi-Peak | 100                                | 3                        |
| 88 - 216              | Quasi-Peak | 150                                | 3                        |
| 216 - 960             | Quasi-Peak | 200                                | 3                        |
| 960 - 1000            | Quasi-Peak | 500                                | 3                        |
| >1000                 | Average    | 500                                | 3                        |

#### 3.8.3 Setup





### 3.8.4 Equipment

| Test Software |                  |            |          |
|---------------|------------------|------------|----------|
| Description   | Manufacturer     | Name       | Version  |
| EMC Software  | DARE Instruments | RadiMation | 2020.1.8 |

| Test Equipment 30 MHz - 1000 MHz |              |                |            |           |          |
|----------------------------------|--------------|----------------|------------|-----------|----------|
| Description                      | Manufacturer | Model          | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber                 | Frankonia    | AC1            | EF00062    | 2021-02   | 2024-02  |
| Measurement Receiver             | Agilent      | N9038A-526/WXP | EF01070    | 2021-07   | 2023-01  |
| Antenna                          | R&S          | HK 116         | EF00030    | 2021-05   | 2024-05  |
| Antenna                          | R&S          | HL 223         | EF00187    | 2022-06   | 2025-06  |

| Test Equipment > 1 GHz |                    |            |            |                    |                    |
|------------------------|--------------------|------------|------------|--------------------|--------------------|
| Description            | Manufacturer       | Model      | Identifier | Cal. Date          | Cal. Due           |
| Anechoic Chamber       | Frankonia          | AC2        | EF01616    | 2021-09<br>2022-10 | 2022-09<br>2023-10 |
| Spectrum analyzer      | R&S                | FSW43      | EF00896    | 2022-08            | 2023-08            |
| Horn antenna           | Schwarzbeck        | BBHA 9120B | EF01678    | 2021-03            | 2024-03            |
| Antenna                | Schwarzbeck        | HWRD 650   | EF01679    | 2021-03            | 2024-03            |
| Antenna                | Amplifier Research | AT4560     | EF00302    | 2021-06            | 2023-06            |

### 3.8.5 Procedure

| Test Procedure 30 MHz - 1000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ol style="list-style-type: none"> <li>1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground</li> <li>2. EUT set to test mode</li> <li>3. The receiver is set to peak detection with max hold</li> <li>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m</li> <li>5. All significant emissions are measured again using the corresponding final detector</li> </ol> |  |

| Test Procedure > 1 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ol style="list-style-type: none"> <li>1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground</li> <li>2. EUT set to test mode</li> <li>3. The receiver is set to peak detection with max hold</li> <li>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m</li> <li>5. All significant emissions are measured again using the corresponding final detector</li> </ol> |  |

## 3.8.6 Results

| Test Results – DSSS – 1 Mbit/s - NORA W101 |                |                |      |      |                |             |
|--------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                              | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                       | 2386.1         | 57.28          | pk   | ver  | 74.00          | -16.72      |
| 2412                                       | 2386.1         | 48.14          | avg  | ver  | 54.00          | -05.86      |
| 2412                                       | 4824           | 47.39          | pk   | hor  | 74.00          | -26.61      |
| 2412                                       | 4824           | 42.17          | avg  | hor  | 54.00          | -11.83      |
| 2412                                       | 17778          | 44.04          | pk   | ver  | 74.00          | -29.96      |
| 2412                                       | 17778          | 31.93          | avg  | ver  | 54.00          | -22.07      |
| 2412                                       | 18163          | 47.01          | pk   | ver  | 74.00          | -26.99      |
| 2412                                       | 18163          | 34.94          | avg  | ver  | 54.00          | -19.06      |
| 2462                                       | 2487.8         | 55.89          | pk   | ver  | 74.00          | -18.11      |
| 2462                                       | 2487.8         | 49.27          | avg  | ver  | 54.00          | -04.73      |
| Note: For full results see ANNEX A         |                |                |      |      |                |             |

| Test Results – OFDM – 6 Mbit/s - NORA W101 |                |                |      |      |                |             |
|--------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                              | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                       | 269.1596       | 32.50          | qpk  | hor  | 46.00          | -13.53      |
| 2412                                       | 2388.6         | 62.23          | pk   | ver  | 74.00          | -11.77      |
| 2412                                       | 2388.6         | 48.96          | avg  | ver  | 54.00          | -05.04      |
| 2412                                       | 4825.1         | 44.65          | pk   | ver  | 74.00          | -29.35      |
| 2412                                       | 4825.1         | 32.30          | avg  | ver  | 54.00          | -21.70      |
| 2412                                       | 17813          | 43.42          | pk   | ver  | 74.00          | -30.58      |
| 2412                                       | 17813          | 32.71          | avg  | ver  | 54.00          | -21.29      |
| 2412                                       | 18041          | 46.41          | pk   | ver  | 74.00          | -27.59      |
| 2412                                       | 18041          | 36.27          | avg  | ver  | 54.00          | -17.73      |
| 2437                                       | 168.0528       | 20.20          | qpk  | ver  | 43.50          | -23.30      |
| 2437                                       | 269.0225       | 27.70          | qpk  | hor  | 46.00          | -18.30      |
| 2437                                       | 4874.7         | 45.09          | pk   | ver  | 74.00          | -28.91      |
| 2437                                       | 4874.7         | 36.97          | avg  | ver  | 54.00          | -17.03      |
| 2437                                       | 17816          | 44.56          | pk   | hor  | 74.00          | -29.44      |
| 2437                                       | 17816          | 31.81          | avg  | hor  | 54.00          | -22.19      |
| 2437                                       | 18622          | 47.99          | pk   | ver  | 74.00          | -26.01      |
| 2437                                       | 18622          | 35.19          | avg  | ver  | 54.00          | -18.81      |
| 2462                                       | 2483.5         | 71.53          | pk   | ver  | 74.00          | -02.47      |
| 2462                                       | 2483.5         | 51.80          | avg  | ver  | 54.00          | -02.20      |
| 2462                                       | 4925           | 45.38          | pk   | ver  | 74.00          | -28.62      |
| 2462                                       | 4925           | 38.59          | avg  | ver  | 54.00          | -15.41      |
| 2462                                       | 17789          | 44.04          | pk   | ver  | 74.00          | -29.96      |
| 2462                                       | 17789          | 33.48          | avg  | ver  | 54.00          | -20.52      |
| 2462                                       | 18184          | 48.11          | pk   | ver  | 74.00          | -25.89      |
| 2462                                       | 18184          | 36.69          | avg  | ver  | 54.00          | -17.31      |
| Note: For full results see ANNEX A         |                |                |      |      |                |             |

| Test Results - HT20 – MCS1 - NORA W101 |                |                |      |      |                |             |
|----------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                   | 2389.5         | 58.68          | pk   | ver  | 74.00          | -15.32      |
| 2412                                   | 2389.5         | 48.31          | avg  | ver  | 54.00          | -05.69      |
| 2462                                   | 2483.5         | 66.93          | pk   | ver  | 74.00          | -07.07      |
| 2462                                   | 2483.5         | 50.79          | avg  | ver  | 54.00          | -03.21      |
| 2462                                   | 4924           | 44.55          | pk   | ver  | 74.00          | -29.45      |
| 2462                                   | 4924           | 36.04          | avg  | ver  | 54.00          | -17.96      |
| 2462                                   | 17779          | 43.47          | pk   | hor  | 74.00          | -30.53      |
| 2462                                   | 17779          | 31.62          | avg  | hor  | 54.00          | -22.38      |
| 2462                                   | 18124          | 47.59          | pk   | ver  | 74.00          | -26.41      |
| 2462                                   | 18124          | 34.64          | avg  | ver  | 54.00          | -19.36      |
| Note: For full results see ANNEX A     |                |                |      |      |                |             |

| Test Results - HT40 – MCS0 - NORA W101 |                |                |      |      |                |             |
|----------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2422                                   | 2388.9         | 61.89          | pk   | ver  | 74.00          | -12.11      |
| 2422                                   | 2388.9         | 50.26          | avg  | ver  | 54.00          | -03.74      |
| 2437                                   | 2389.5         | 56.93          | pk   | ver  | 74.00          | -17.07      |
| 2437                                   | 2389.5         | 44.28          | avg  | ver  | 54.00          | -09.72      |
| 2437                                   | 2483.7         | 58.77          | pk   | ver  | 74.00          | -15.23      |
| 2437                                   | 2483.7         | 47.42          | avg  | ver  | 54.00          | -06.58      |
| 2437                                   | 11403          | 39.88          | pk   | ver  | 74.00          | -34.12      |
| 2437                                   | 11403          | 27.46          | avg  | hor  | 54.00          | -26.54      |
| 2437                                   | 18200          | 48.07          | pk   | hor  | 74.00          | -25.93      |
| 2437                                   | 18200          | 35.95          | avg  | ver  | 54.00          | -18.05      |
| 2452                                   | 2483.5         | 68.10          | pk   | ver  | 74.00          | -05.90      |
| 2452                                   | 2483.5         | 49.87          | avg  | ver  | 54.00          | -04.13      |
| Note: For full results see ANNEX A     |                |                |      |      |                |             |

| Test Results – DSSS – 1 Mbit/s - Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA) |                |                |      |      |                |             |
|----------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                                                                   | 4820.5         | 44.51          | pk   | ver  | 74.00          | -29.49      |
| 2412                                                                                   | 4820.5         | 30.27          | avg  | ver  | 54.00          | -23.73      |
| 2412                                                                                   | 18545          | 48.21          | pk   | hor  | 74.00          | -25.79      |
| 2412                                                                                   | 18545          | 34.51          | avg  | hor  | 54.00          | -19.49      |
| Note: For full results see ANNEX B                                                     |                |                |      |      |                |             |

| Test Results – OFDM – 6 Mbit/s - Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA) |                |                |      |      |                |             |
|----------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                                                                   | 119.998        | 26.00          | pk   | ver  | 43.50          | -17.48      |
| 2412                                                                                   | 18463          | 47.17          | pk   | hor  | 74.00          | -26.83      |
| 2412                                                                                   | 18463          | 34.61          | avg  | hor  | 54.00          | -19.39      |
| 2437                                                                                   | 407.62         | 22.10          | qpk  | ver  | 46.00          | -23.86      |
| 2437                                                                                   | 2388.8         | 54.91          | pk   | ver  | 74.00          | -19.09      |
| 2437                                                                                   | 2388.8         | 38.11          | avg  | ver  | 54.00          | -15.89      |
| 2437                                                                                   | 18477          | 47.18          | pk   | ver  | 74.00          | -26.82      |
| 2437                                                                                   | 18477          | 34.58          | avg  | ver  | 54.00          | -19.42      |
| 2462                                                                                   | 119.913        | 04.30          | qpk  | ver  | 43.50          | -39.22      |
| 2462                                                                                   | 2483.5         | 63.76          | pk   | ver  | 74.00          | -10.24      |
| 2462                                                                                   | 2483.5         | 48.17          | avg  | ver  | 54.00          | -05.83      |
| 2462                                                                                   | 18504          | 47.30          | pk   | ver  | 74.00          | -26.70      |
| 2462                                                                                   | 18504          | 34.69          | avg  | ver  | 54.00          | -19.31      |
| Note: For full results see ANNEX B                                                     |                |                |      |      |                |             |

| Test Results - HT20 – MCS1 - Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA) |                |                |      |      |                |             |
|------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                      | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2462                                                                               | 2483.6         | 61.92          | pk   | ver  | 74.00          | -12.08      |
| 2462                                                                               | 2483.6         | 48.93          | avg  | ver  | 54.00          | -05.07      |
| 2462                                                                               | 17888          | 43.59          | pk   | ver  | 74.00          | -30.41      |
| 2462                                                                               | 17888          | 30.38          | avg  | ver  | 54.00          | -23.62      |
| 2462                                                                               | 18504          | 47.33          | pk   | ver  | 74.00          | -26.67      |
| 2462                                                                               | 18504          | 34.82          | avg  | ver  | 54.00          | -19.18      |
| Note: For full results see ANNEX B                                                 |                |                |      |      |                |             |

| Test Results - HT40 – MCS0 - Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA) |                |                |      |      |                |             |
|------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                      | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2437                                                                               | 2483.5         | 55.61          | pk   | ver  | 74.00          | -18.39      |
| 2437                                                                               | 2483.5         | 39.64          | avg  | ver  | 54.00          | -14.36      |
| 2437                                                                               | 17808          | 44.41          | pk   | hor  | 74.00          | -29.59      |
| 2437                                                                               | 17808          | 31.00          | avg  | hor  | 54.00          | -23.00      |
| 2437                                                                               | 18490          | 47.20          | pk   | ver  | 74.00          | -26.80      |
| 2437                                                                               | 18490          | 34.78          | avg  | ver  | 54.00          | -19.22      |
| Note: For full results see ANNEX B                                                 |                |                |      |      |                |             |

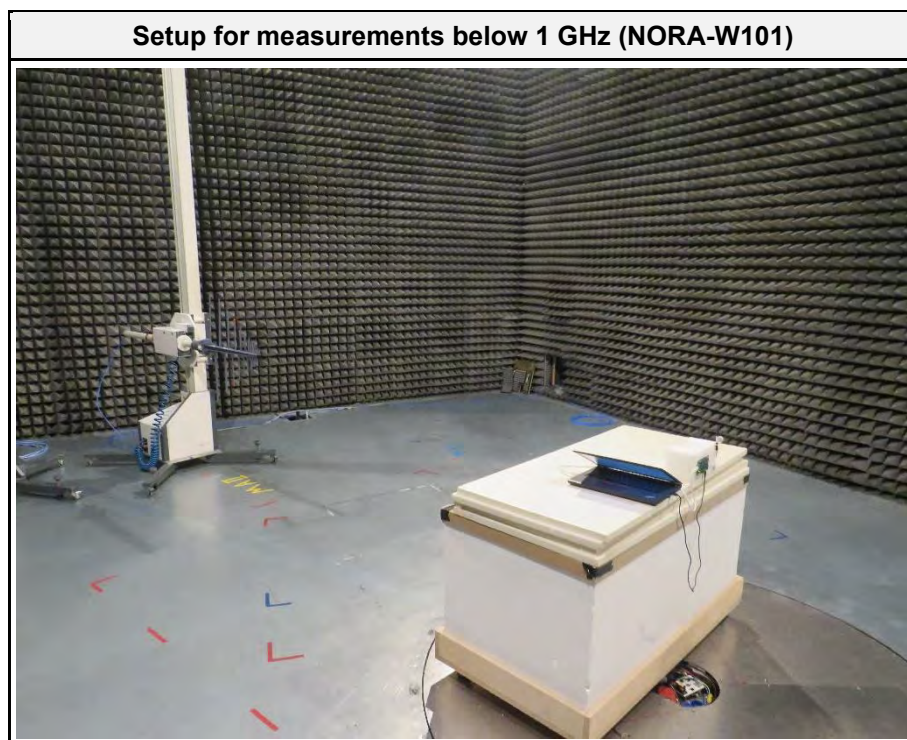
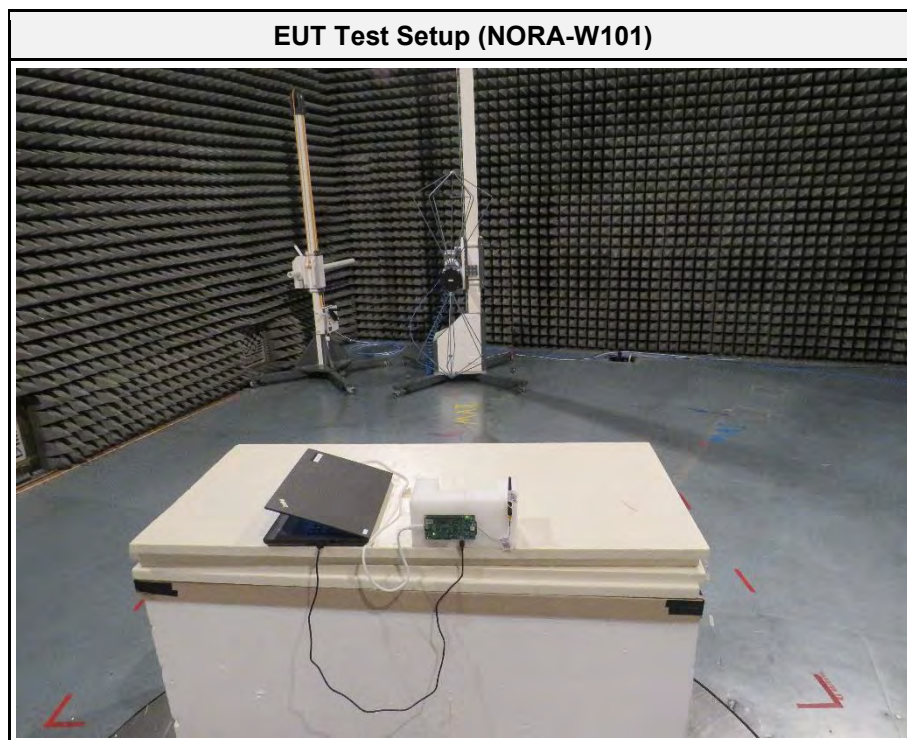
| Test Results – DSSS – 1 Mbit/s – Variant 2 (NORA W101 with external antenna PN PRO-IS-237)            |                |                |      |      |                |             |
|-------------------------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                                         | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                                                                                  | 2385.5         | 53.82          | pk   | ver  | 74.00          | -20.18      |
| 2412                                                                                                  | 2385.5         | 42.43          | avg  | ver  | 54.00          | -11.57      |
| 2462                                                                                                  | 2486.6         | 57.25          | pk   | hor  | 74.00          | -16.75      |
| 2462                                                                                                  | 2486.6         | 45.44          | avg  | hor  | 54.00          | -08.56      |
| 2462                                                                                                  | 2488.5         | 56.78          | pk   | hor  | 74.00          | -17.22      |
| 2462                                                                                                  | 2488.5         | 44.85          | avg  | hor  | 54.00          | -09.15      |
| Note: Only emissions with pk values greater than -20.0 dBm are included. For full results see ANNEX C |                |                |      |      |                |             |

| Test Results – OFDM – 6 Mbit/s – Variant 2 (NORA W101 with external antenna PN PRO-IS-237)            |                |                |      |      |                |             |
|-------------------------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                                         | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                                                                                  | 611.58         | 26.40          | pk   | ver  | 46.00          | -19.58      |
| 2412                                                                                                  | 2387.5         | 62.50          | pk   | ver  | 74.00          | -11.50      |
| 2412                                                                                                  | 2387.5         | 45.26          | avg  | ver  | 54.00          | -08.74      |
| 2412                                                                                                  | 2389.9         | 65.67          | pk   | ver  | 74.00          | -08.33      |
| 2412                                                                                                  | 2389.9         | 48.09          | avg  | ver  | 54.00          | -05.91      |
| Note: Only emissions with pk values greater than -20.0 dBm are included. For full results see ANNEX C |                |                |      |      |                |             |

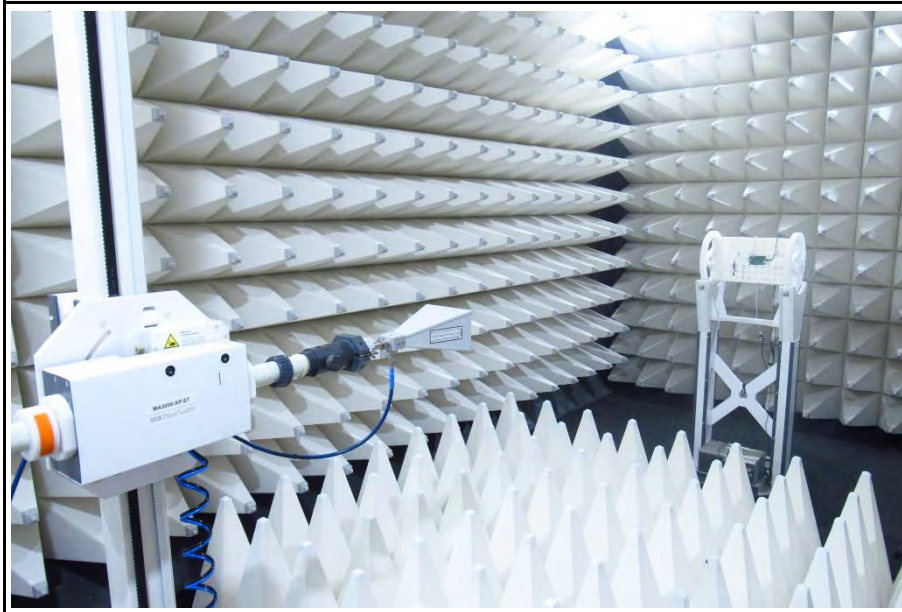
| Test Results - HT20 – MCS1 – Variant 2 (NORA W101 with external antenna PN PRO-IS-237) |                |                |      |      |                |             |
|----------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2412                                                                                   | 2389.9         | 55.43          | pk   | hor  | 74.00          | -18.57      |
| 2412                                                                                   | 2389.9         | 42.84          | avg  | hor  | 54.00          | -11.16      |
| 2412                                                                                   | 2492.6         | 48.34          | pk   | hor  | 74.00          | -25.66      |
| 2412                                                                                   | 2492.6         | 37.06          | avg  | hor  | 54.00          | -16.94      |
| Note: For full results see ANNEX C                                                     |                |                |      |      |                |             |

| Test Results - HT40 – MCS0 – Variant 2 (NORA W101 with external antenna PN PRO-IS-237) |                |                |      |      |                |             |
|----------------------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                                          | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2437                                                                                   | 2489           | 49.87          | pk   | hor  | 74.00          | -24.13      |
| 2437                                                                                   | 2489           | 39.94          | avg  | hor  | 54.00          | -14.06      |
| 2437                                                                                   | 18153          | 47.60          | pk   | ver  | 74.00          | -26.40      |
| 2437                                                                                   | 18153          | 36.38          | avg  | ver  | 54.00          | -17.62      |
| Note: For full results see ANNEX C                                                     |                |                |      |      |                |             |

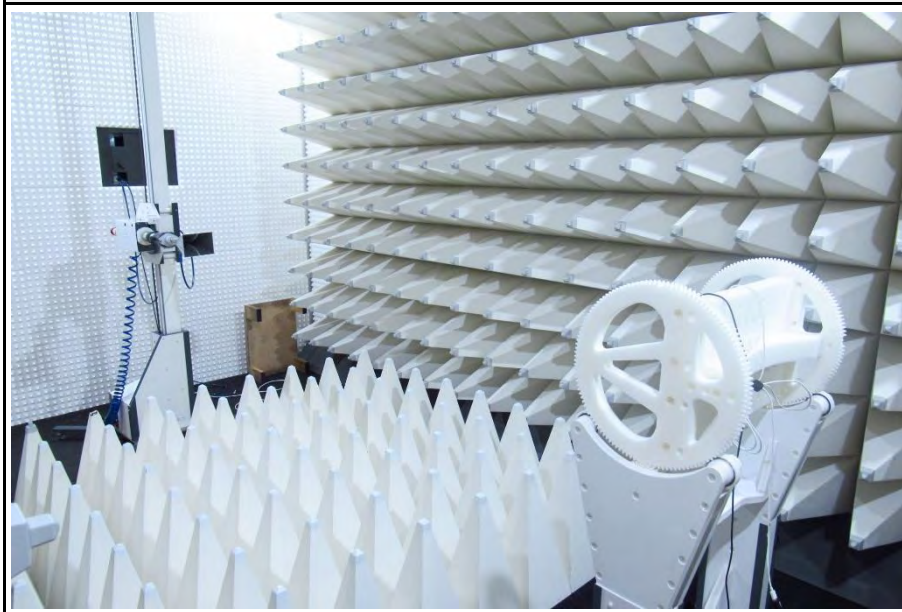
### 3.8.7 Setup Photos



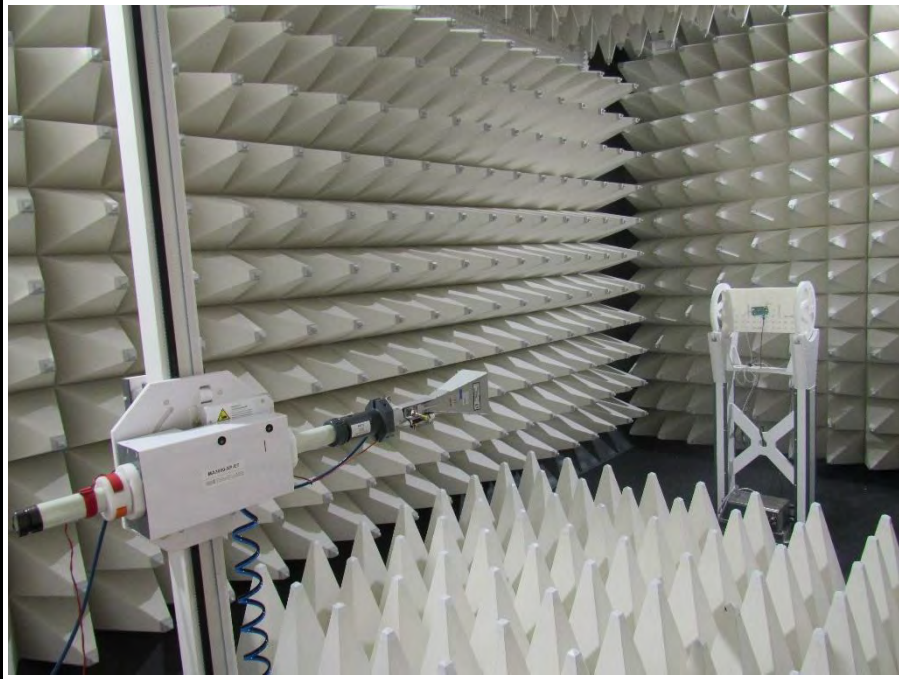
**Setup for measurements above 1 GHz (NORA-W101)**



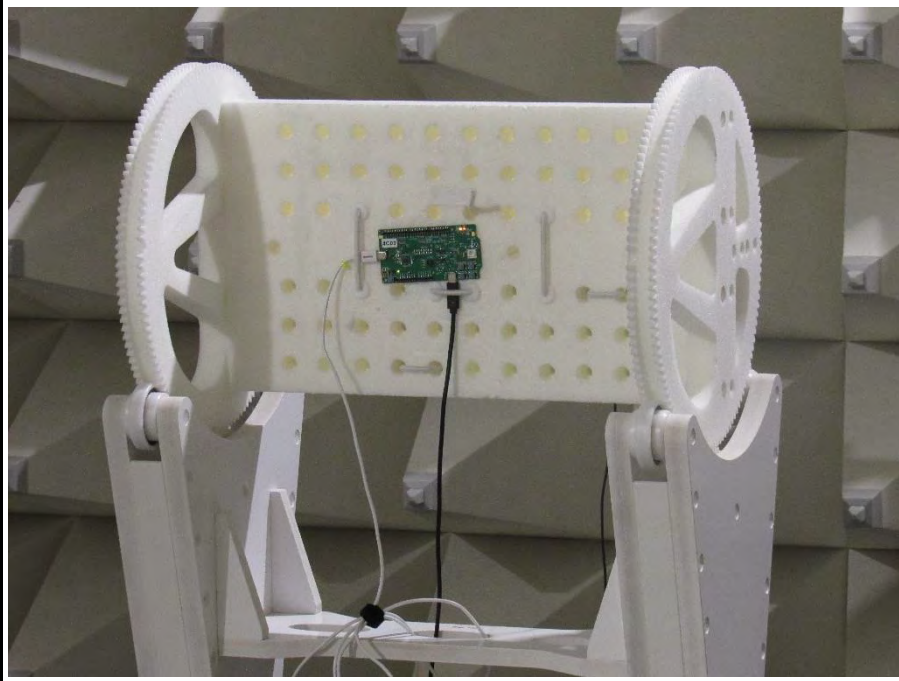
**Setup for measurements above 1 GHz (NORA-W101)**



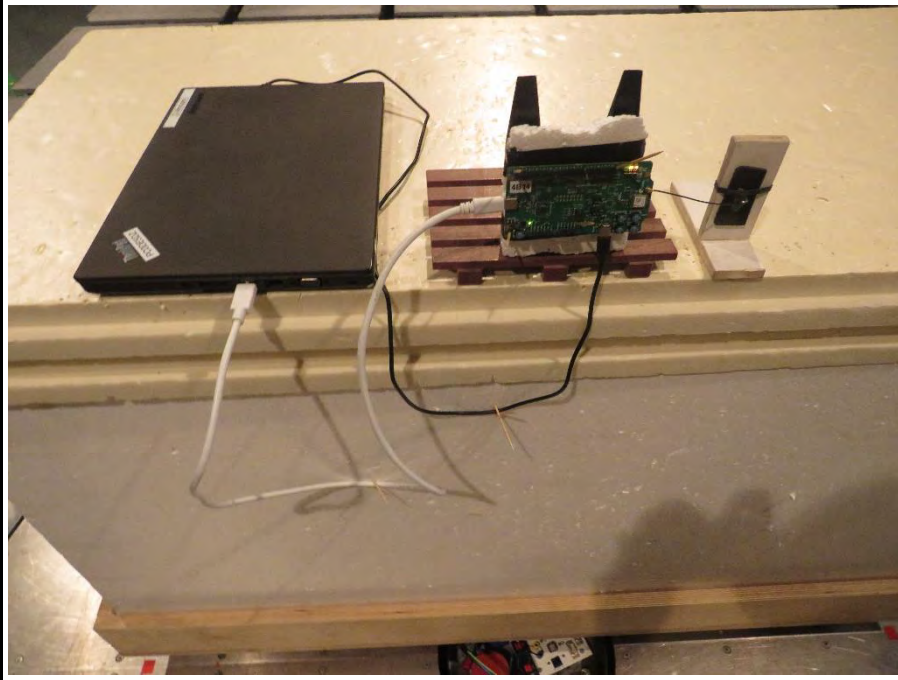
**Setup for measurements above 1 GHz for Variant 1 (NORA-W106 with PCB antenna)**



**EUT Test Setup for Variant 1 (NORA-W106 with PCB antenna)**



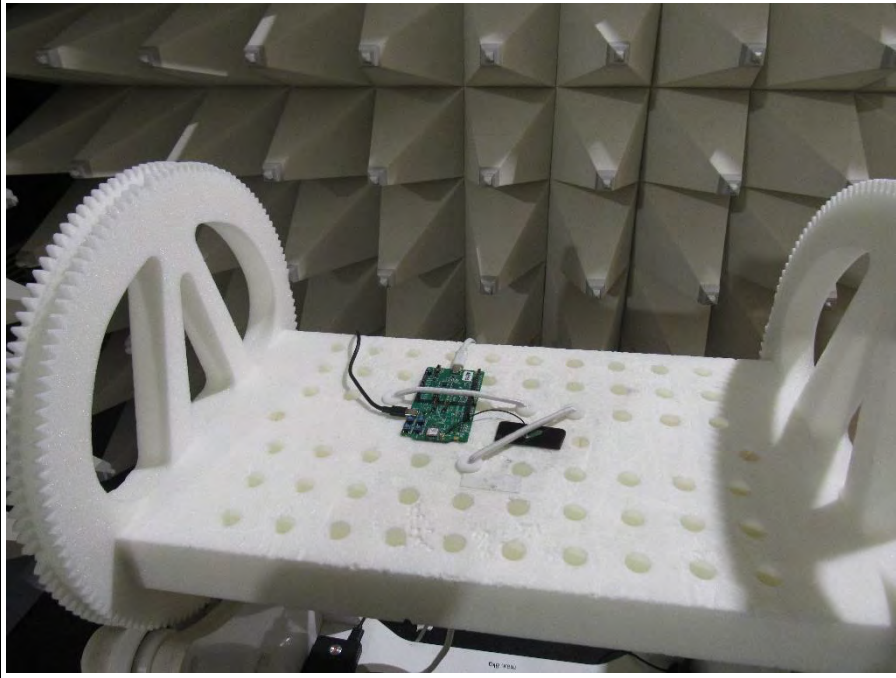
**EUT Test Setup below 1 GHz for Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)**



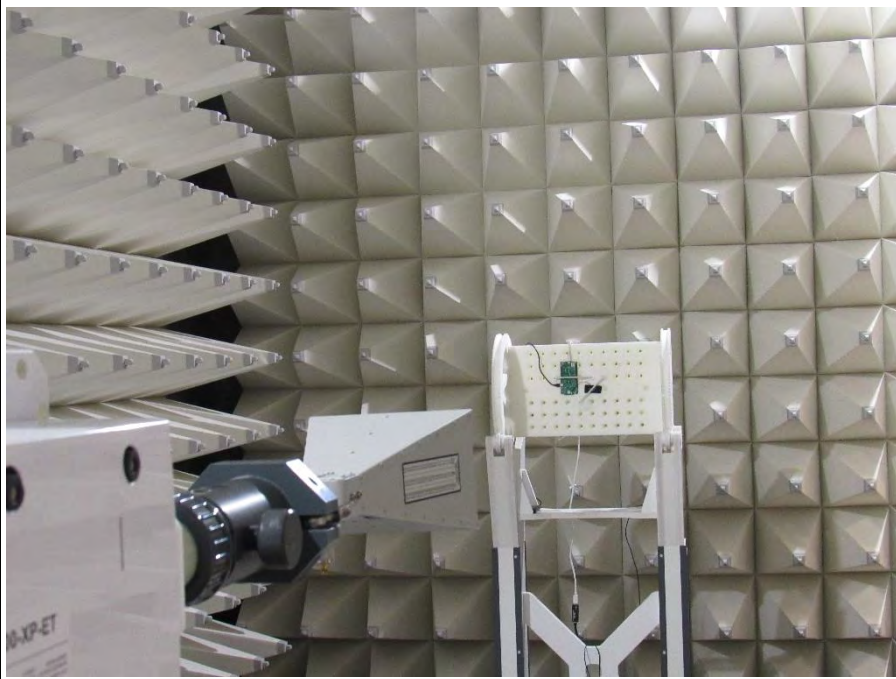
**Setup for measurements below 1 GHz for Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)**



**EUT Test Setup above 1 GHz for Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)**



**Setup for measurements above 1 GHz for Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)**



### 3.9 Test Conditions and Results - Receiver radiated emissions

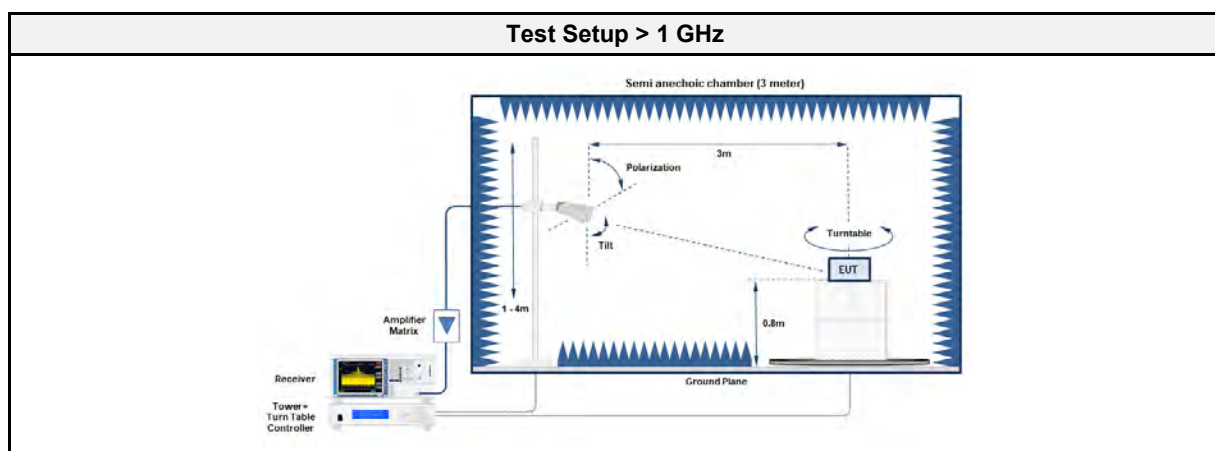
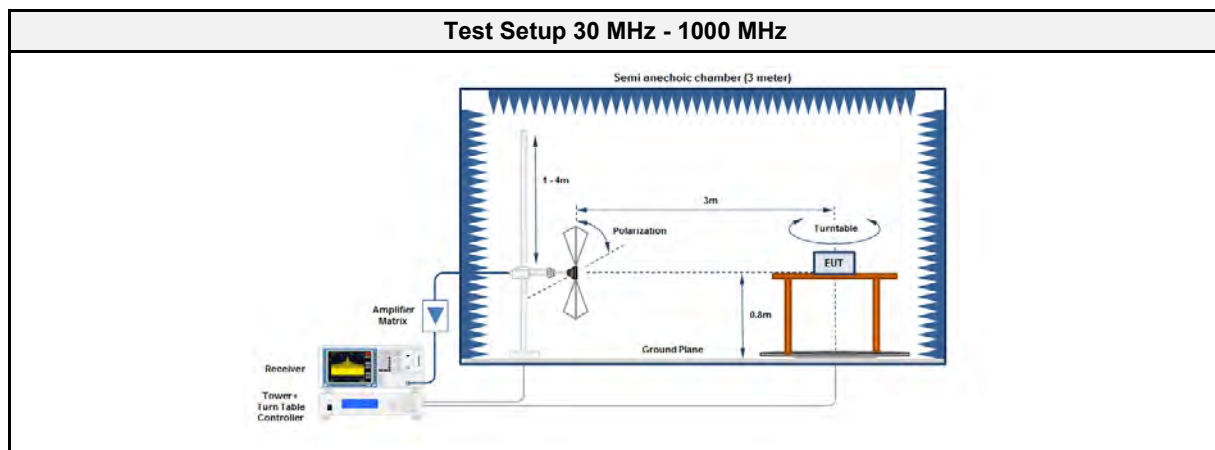
#### 3.9.1 Information

| Test Information        |                                       |
|-------------------------|---------------------------------------|
| Reference               | ISED RSS-247, Issue 2 (section 3.1)   |
| Measurement Uncertainty | $\pm 5.95$ dB                         |
| Measurement Method      | ANSI C63.4-2014 8.1-8.3               |
| Operator                | Florian Voigt + Odai Qawasmeh         |
| Date                    | 2022-08-26, 2022-08-29 and 2022-11-11 |

#### 3.9.2 Limits

| Limits                |            |                                    |                          |
|-----------------------|------------|------------------------------------|--------------------------|
| Frequency range [MHz] | Detector   | Field strength [ $\mu\text{V/m}$ ] | Measurement distance [m] |
| 30 - 88               | Quasi-Peak | 100                                | 3                        |
| 88 - 216              | Quasi-Peak | 150                                | 3                        |
| 216 - 960             | Quasi-Peak | 200                                | 3                        |
| 960 - 1000            | Quasi-Peak | 500                                | 3                        |
| >1000                 | Average    | 500                                | 3                        |

#### 3.9.3 Setup



### 3.9.4 Equipment

| Test Software |                  |            |          |
|---------------|------------------|------------|----------|
| Description   | Manufacturer     | Name       | Version  |
| EMC Software  | DARE Instruments | RadiMation | 2020.1.8 |

| Test Equipment 30 MHz - 1000 MHz |              |                |            |           |          |
|----------------------------------|--------------|----------------|------------|-----------|----------|
| Description                      | Manufacturer | Model          | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber                 | Frankonia    | AC1            | EF00062    | 2021-02   | 2024-02  |
| Measurement Receiver             | Agilent      | N9038A-526/WXP | EF01070    | 2021-07   | 2023-01  |
| Antenna                          | R&S          | HK 116         | EF00030    | 2021-05   | 2024-05  |
| Antenna                          | R&S          | HL 223         | EF00187    | 2022-06   | 2025-06  |

| Test Equipment > 1 GHz |              |                |            |           |          |
|------------------------|--------------|----------------|------------|-----------|----------|
| Description            | Manufacturer | Model          | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber       | Frankonia    | AC1            | EF01011    | 2022-06   | 2025-06  |
| Measurement Receiver   | Agilent      | N9038A-526/WXP | EF01070    | 2021-07   | 2023-01  |
| Antenna                | Schwarzbeck  | BBHA 9120D     | EF01561    | 2021-11   | 2024-11  |
| Antenna                | Schwarzbeck  | HWRD 650       | EF01679    | 2021-03   | 2024-03  |

### 3.9.5 Procedure

| Test Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ol style="list-style-type: none"> <li>1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground</li> <li>2. EUT is set to test mode</li> <li>3. The receiver is set to peak detection with max hold</li> <li>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m</li> <li>5. All significant emissions are measured again using the corresponding final detector</li> </ol> |  |

### 3.9.6 Results

| Test Results – NORA W101           |                |                |      |      |                |             |
|------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                      | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2437                               | 81.816         | 20.50          | pk   | hor  | 40.00          | -19.51      |
| 2437                               | 135.0727       | 30.90          | pk   | hor  | 43.50          | -12.64      |
| 2437                               | 284.96         | 32.10          | pk   | hor  | 46.00          | -13.85      |
| 2437                               | 323.86         | 31.90          | pk   | hor  | 46.00          | -14.11      |
| 2437                               | 417.76         | 30.60          | pk   | hor  | 46.00          | -15.39      |
| 2437                               | 909.48         | 31.00          | pk   | hor  | 46.00          | -15.02      |
| 2437                               | 5852           | 46.59          | pk   | hor  | 74.00          | -27.41      |
| 2437                               | 5852           | 38.43          | avg  | hor  | 53.98          | -15.55      |
| Note: For full results see ANNEX D |                |                |      |      |                |             |

| Test Results – Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA) |                |                |      |      |                |             |
|----------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                        | Emission [MHz] | Level [dBμV/m] | Det. | Pol. | Limit [dBμV/m] | Margin [dB] |
| 2437                                                                 | 79.3042        | 15.00          | qpk  | ver  | 40.00          | -25.00      |
| 2437                                                                 | 5804           | 44.81          | pk   | ver  | 74.00          | -29.19      |
| 2437                                                                 | 5804           | 39.57          | avg  | ver  | 53.98          | -14.41      |
| Note: For full results see ANNEX E                                   |                |                |      |      |                |             |

| Test Results – Variant 2 (NORA-W101 with external antenna PN PRO-IS-237) |                |                |      |      |                |             |
|--------------------------------------------------------------------------|----------------|----------------|------|------|----------------|-------------|
| Channel [MHz]                                                            | Emission [MHz] | Level [dBµV/m] | Det. | Pol. | Limit [dBµV/m] | Margin [dB] |
| 2437                                                                     | 149.9903       | 24.40          | pk   | ver  | 43.50          | -19.13      |
| 2437                                                                     | 679.84         | 35.70          | pk   | ver  | 46.00          | -10.30      |
| 2437                                                                     | 679.84         | 28.50          | qpk  | ver  | 46.00          | -17.51      |
| 2437                                                                     | 6494           | 49.61          | pk   | ver  | 74.00          | -24.39      |
| 2437                                                                     | 6494           | 38.82          | avg  | ver  | 53.98          | -15.16      |
| 2437                                                                     | 17812          | 48.51          | pk   | ver  | 74.00          | -25.49      |
| 2437                                                                     | 17812          | 34.54          | avg  | ver  | 53.98          | -19.44      |
| Note: For full results see ANNEX F                                       |                |                |      |      |                |             |