telefication bv
The Netherlands
Chamber of Commerce
51565536
www.telefication.com

telefication

# FCC and IC Test report for parts 15.109, 15.209, 15.247 RSS-247, RSS-Gen

| | |
|---|---|
| Product name | : WISR LR |
| Applicant | : Orlaco |
| FCC ID | : 2ADBX-PR1U |
| IC ID | : 12390A-PR1U |

Test report No. : 201001090 001 Ver 1.0

# Laboratory information

## Accreditation

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2017. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

Telefication is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The Designation number is: NL0001.

Telefication is a Wireless Device Testing laboratory recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements.

Telefication is a registered Conformity Assessment body (CAB) under the Japan-EC MRA (Agreement on Mutual Recognition between Japan and the European Community). The registration number is: 201.

## Documentation

The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 10 years at Telefication Netherlands.

## Testing Location

| | |
|---|---|
| Test Site | Kiwa NV |
| Test Site location | Wilmersdorf 50<br>7327 AC Apeldoorn<br>The Netherlands<br><br>Tel. +31 88998 3393 |
| Test Site FCC | NL0001 |

## Revision History

| Version | Date | Remarks | By |
|---|---|---|---|
| v0.50 | 02-12-2020 | First draft | PvW |
| v1.00 | 11-01-2021 | Initial release version | PvW |

# Table of Contents

## Summary of Test results

| FCC | ISED | Description | Section in report | Verdict |
|---|---|---|---|---|
| 15.247(d)<br>15.209 (a) | RSS-Gen 8.9 | Radiated spurious emissions | 3.1 | Pass |
| 15.205 (a) | RSS Gen 8.10 | Spurious emissions in the restricted bands | 3.1 | Pass |
| 15.247 (b) | RSS-247 5.4 (d) | RF output power | 3.2 | Pass |
| 15.247 (e) | RSS-247 5.2 (b) | Power spectral density | 3.3 | Pass |
| 15.247 (d) | RSS-247 5.5 | Band edge | 3.4 | Pass |

# 1 General Description

## 1.1 Applicant

| | |
|---|---|
| Client name: | Orlaco Products B.V. |
| Address: | Postbus 193, Barneveld, the Netherlands |
| Zip code: | 3770 AD |
| Telephone: | 0342 404 555 |
| E-mail: | info@orlaco.nl |
| Contact name: | Mr. A. Canrinus |

## 1.2 Manufacturer

| | |
|---|---|
| Manufacturer name: | Orlaco Products B.V. |
| Address: | Postbus 193, Barneveld, the Netherlands |
| Zip code: | 3770 AD |
| Telephone: | 0342 404 555 |
| E-mail: | compliance@orlaco.com |
| Contact name: | -- |

## 1.3 Tested Equipment Under Test (EUT)

| | |
|---|---|
| Product name: | WISR LR |
| Brand name: | Orlaco |
| FCC ID: | 2ADBX-PR1U |
| IC ID: | 12390A-PR1U |
| Product type: | Wireless Send Receive Long Range |
| Model(s): | -- |
| Batch and/or serial No. | -- |
| Software version: | V1.1.2.8 |
| Hardware version: | PR1UXXXXX |
| Date of receipt: | 30-11-2020 |
| Tests started: | 30-11-2020 |
| Testing ended: | 30-11-2020 |

## 1.4 Product specifications of Equipment under test

| | |
|---|---|
| Tx Frequency: | 802.11n: 2400 – 2483.5 MHz |
| Rx frequency: | 802.11n: 2400 – 2483.5 MHz |
| Antenna type | 2x2 MIMO Patch antenna |
| Antenna gain | +6.5 dBiC = +3.5 dBi |
| Type of modulation: | OFDM |
| Emission designator | 20M0F1D |

## 1.5 Environmental conditions

| | |
|---|---|
| Test date | 30-11-2020 |
| Ambient temperature | 19.9°C |
| Humidity | 30.5% |

## 1.6 Measurement standards

- ANSI C63.4:2014
- ANSI C63.10:2013

## 1.7 Applicable standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.109
- FCC Part 15 Subpart C §15.209
- FCC Part 15 Subpart C §15.247
- RSS-Gen Issue 5
- RSS-247 Issue 2

## 1.8 Observation and remarks

The equipment uses a pre-certified module 'Rambutan' with FCC ID Z9W-RMB.
The equipment is a modified version of the WISR, tested previously at Telefication as project no. 190501396

The manufacturer has changed the antennas to model: Pulse W3229.
This version of the WISR only uses IEEE 802.11n 20 MHz for communication.

## 1.9 Conclusions

The sample of the product showed NO NON-COMPLIANCES to the specifications stated in paragraph 1.7 of this report.

The results of the test as stated in this report, are exclusively applicable to the product items as identified in this report. Telefication accepts no responsibility for any properties of product items in this test report, which are not supported by the tests as specified in paragraph 1.7 *"Applicable standards".*

All tests are performed by:

Name : P. van Wanrooij, BASc

Review of test methods and report by:

Name : ing. P.A. Suringa

The above conclusions have been verified by the following signatory:

Date : 11-01-2021

Name : ing P.A. Suringa

Function : Senior Test Engineer

Signature :

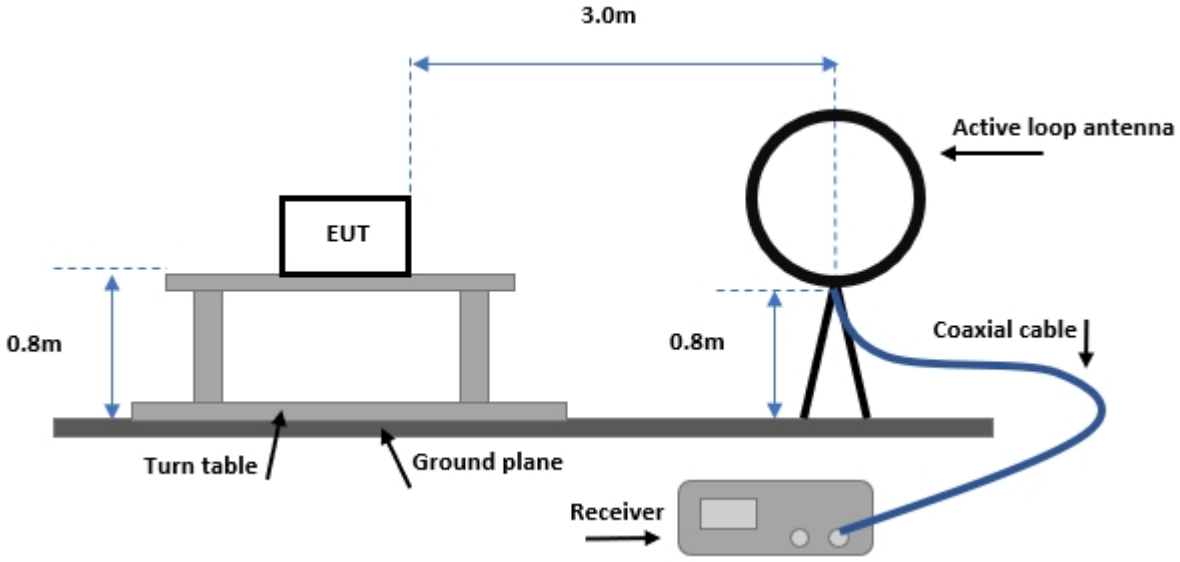
# 2 Test configuration of the Equipment Under Test

## 2.1 Test mode

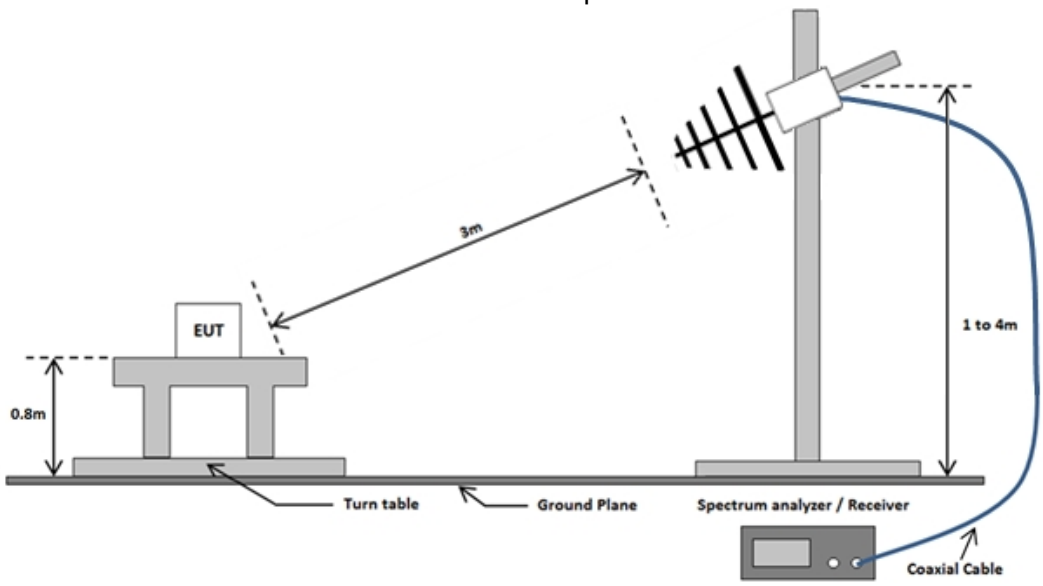
The manufacturer provided software with which it was possible to set the EUT to transmit at different operating channels. A camera streaming video was connected to the video input port, making sure the port was active during spurious emissions testing.
The software (Photoview) running on the tablet connected to the EUT had software version V.1.2.2.4-test.

## 2.2 Test setups

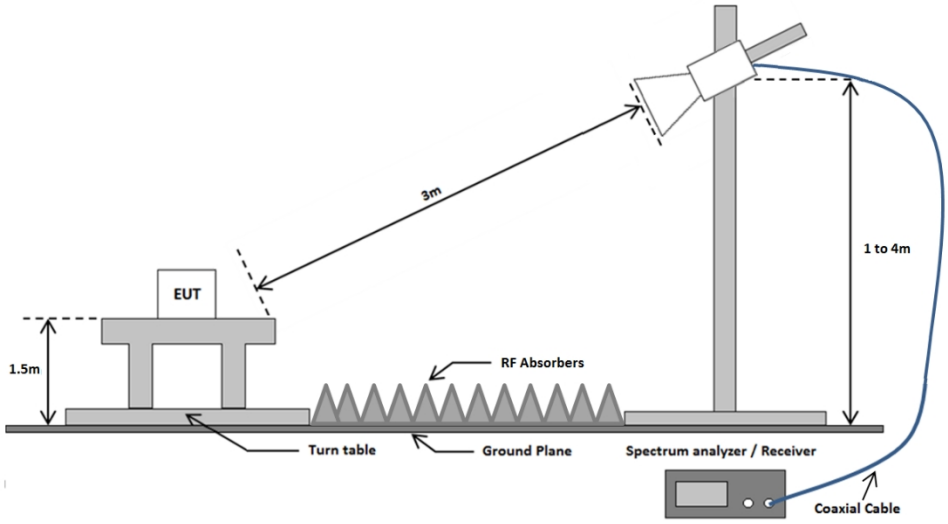
Radiated emissions test setup 9 kHz – 30 MHz



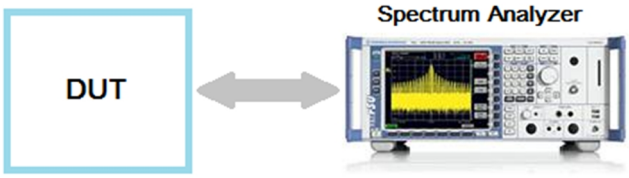

Radiated emissions test setup 30 MHz - 1 GHz



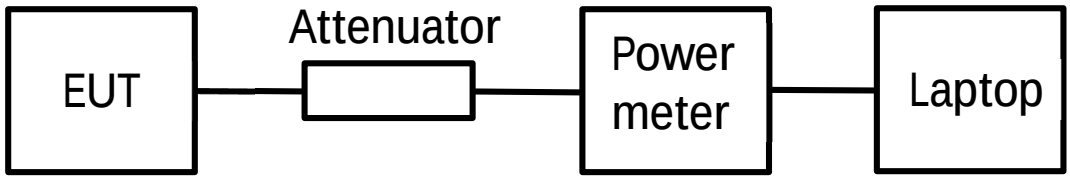
Radiated emissions test setup above 1 GHz




Band edge and PSD measurement




RF output power measurement



## 2.3 Equipment used in the test configuration

| Description | Manufacturer | Model | ID | Used at Par. |
|---|---|---|---|---|
| EMI Receiver | Rohde & Schwarz | ESR7 | TE01220 | 3.1, 3.3, 3.4 |
| Spectrum analyzer | Rohde & Schwarz | FSP40 | TE11125 | 3.1 |
| 3.0 GHz HPF | Wainwright | WHK3.0/18G-10EF | TE01140 | 3.1 |
| Active loop antenna | EMCO | 6502 | TE11171 | 3.1 |
| Biconilog antenna | Chase | CBL6112A | TE00967 | 3.1 |
| Horn antenna | EMCO | 3115 | TE00531 | 3.1, 3.2 |
| Preamplifier 1-18 GHz | µComp Nordic | MCNA-40-0010800-25-10P | TE11175 | 3.1 |
| Preamplifier 18-26 GHz | Miteq | Js4-18004000-30-8P-8SS | TE11131 | 3.1 |
| Signal generator | Rohde & Schwarz | SMB100a | | 3.2 |
| RF power meter | DARE instruments | RPR3006W | TE11140 | 3.2 |

## 2.4 Sample calculations

All formulas for data conversions and conversion factors are reported in chapter 4 of this test report.

# 3 Test results

## 3.1 Radiated spurious emissions

### 3.1.1 Limit

| Frequency (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance(m) |
|---|---|---|---|
| 0.009 – 0.490 | 2400/F(kHz) | 20*{log[2400]-log[F(kHz)]} | 300* |
| 0.490 – 1.705 | 24000/F(kHz) | 20*{log[24000]-log[F(kHz)]} | 30* |
| 1.705 – 13.11<br>14.01 – 30.0 | 30 | 29.5 | 30* |
| 30 -88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43,5 | 3 |
| 216-960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

*Note: Limit lines in the plots corrected to 3m measurement distance according to the method described in ANSI C63.10-2013, clause 6.4

### 3.1.2 Measurement instruments

The measurement instruments are listed in chapter 2.3 of this report.

### 3.1.3 Test setup

The test setup is as shown in chapter 2.2 of this report.

### 3.1.4 Test procedure

9 kHz – 30 MHz: According to ANSI C63.4-2014, section 5.4.2 and 8.2.3
30 MHz to 26.5 GHz: According to ANSI C63.4-2014, section 8.3

9 kHz to 30 MHz: IRN 026 – Method 10
30 MHz to 1 GHz: IRN 026 – Method 1
1 GHz to 18 GHz: IRN 026 – Method 2
18 to 26.5 GHz: IRN 026 – Method 3

### 3.1.5 Measurement Uncertainty

| Frequency range | Polarization | Uncertainty |
|---|---|---|
| 9 kHz – 30 MHz | -- | ±1.6 dB |
| 30 – 200 MHz | Horizontal | ±4.5 dB |
| | Vertical | ±5.4 dB |
| 200 -1000 MHz | Horizontal | ±3.6 dB |
| | Vertical | ±4.6 dB |
| 1 – 18 GHz | Horizontal | ±5.7 dB |
| | Vertical | ±5.7 dB |
| 18 – 26.5 GHz | Horizontal | ±4.9 dB |
| | Vertical | ±4.9 dB |

### 3.1.6 Results of the radiated spurious emissions measurement

Measured peaks Vertical 30 – 1000 MHz Low channel

| Frequency | Polarization | Height | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference |
|---|---|---|---|---|---|
| 45,745 MHz | Vertical | 1 m | 27,6 dBµV/m | 40 dBµV/m | -12,4 dB |

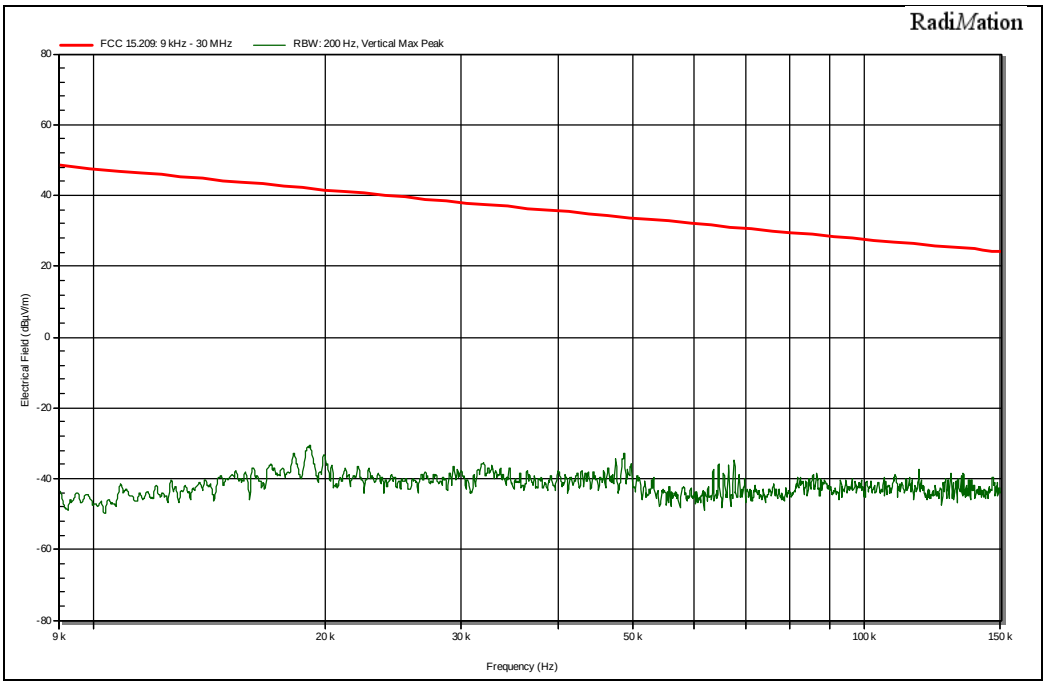
Measured peaks Vertical 1 – 18 GHz Low channel

| Frequency | Polarization | Height | Peak | Average | Peak Limit | Average Limit | Peak Difference | Average Difference |
|---|---|---|---|---|---|---|---|---|
| 4,828 GHz | Vertical | 3,5 m | 49,3 dBµV/m | 32,9 dBµV/m | 74 dBµV/m | 54 dBµV/m | -24,7 dB | -21,1 dB |

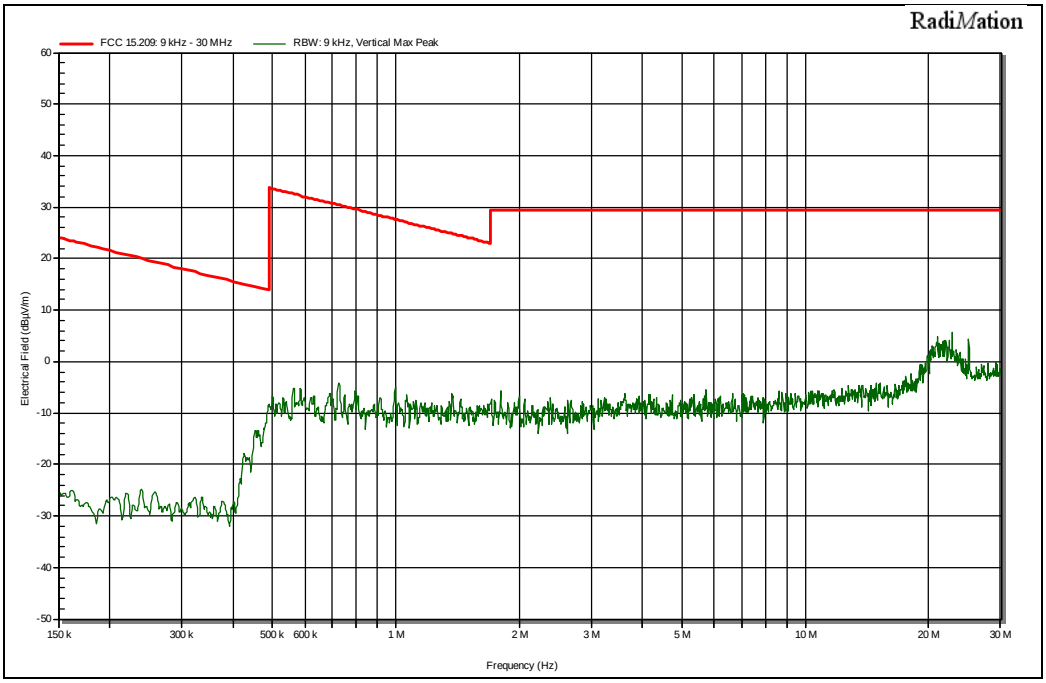
### 3.1.7 Plots of the Radiated Spurious Emissions Measurement

9 kHz to 150 kHz

Parallel

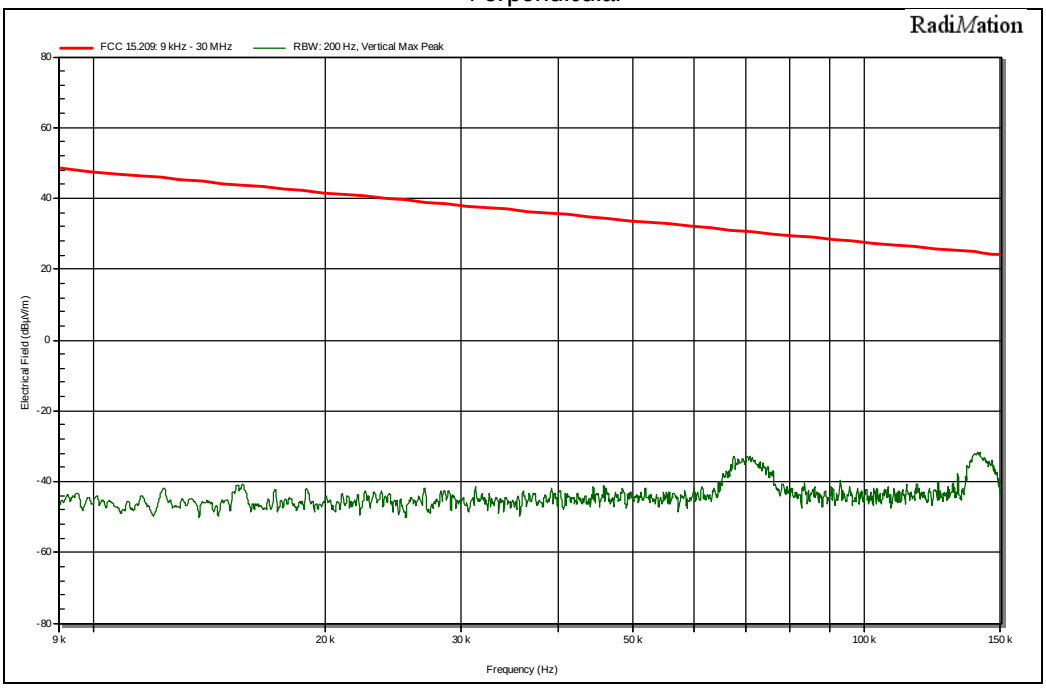



150 kHz to 30 MHz

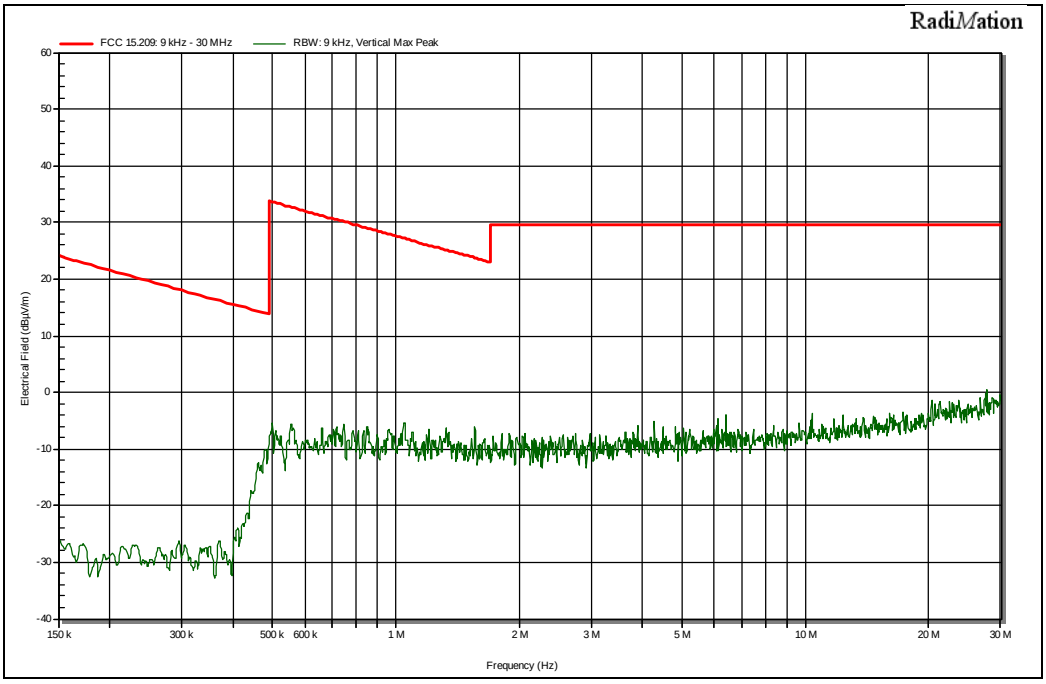


9 kHz to 150 kHz

Perpendicular

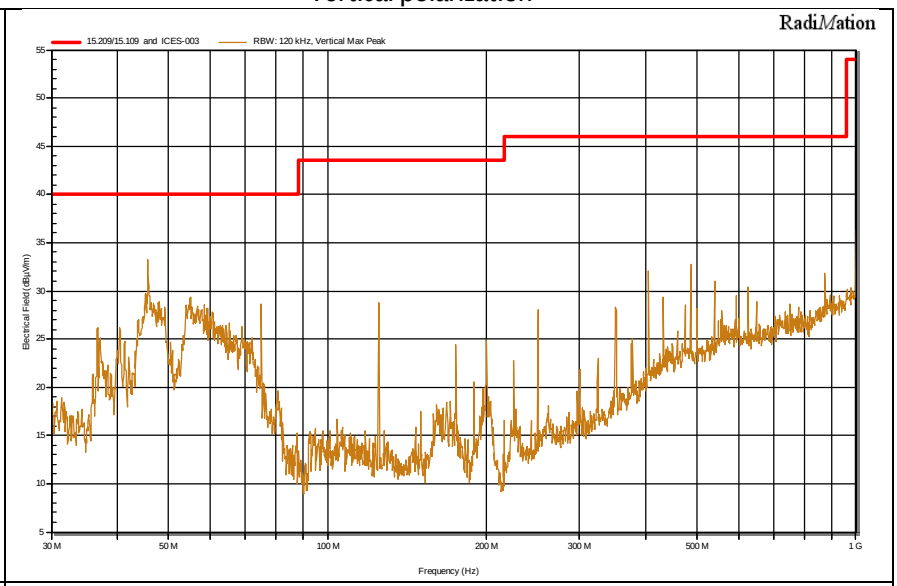
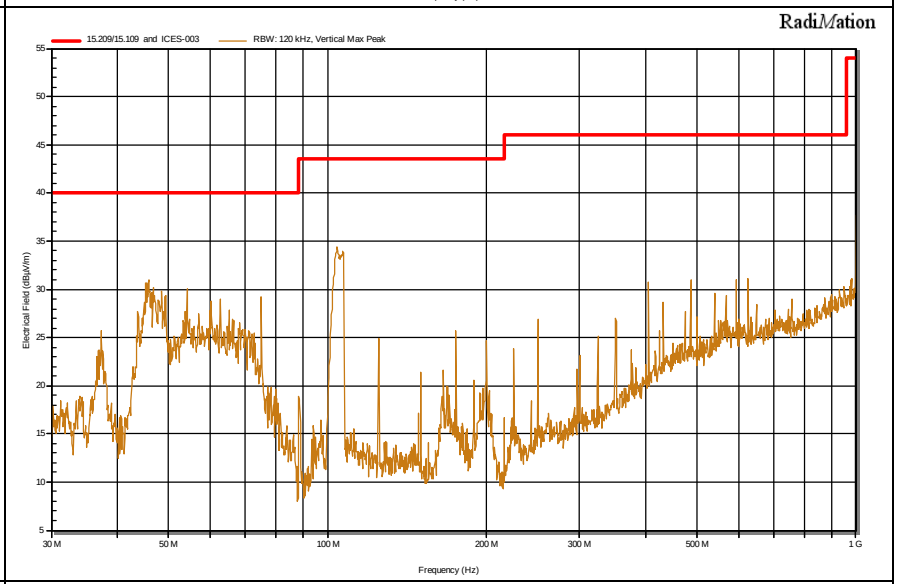
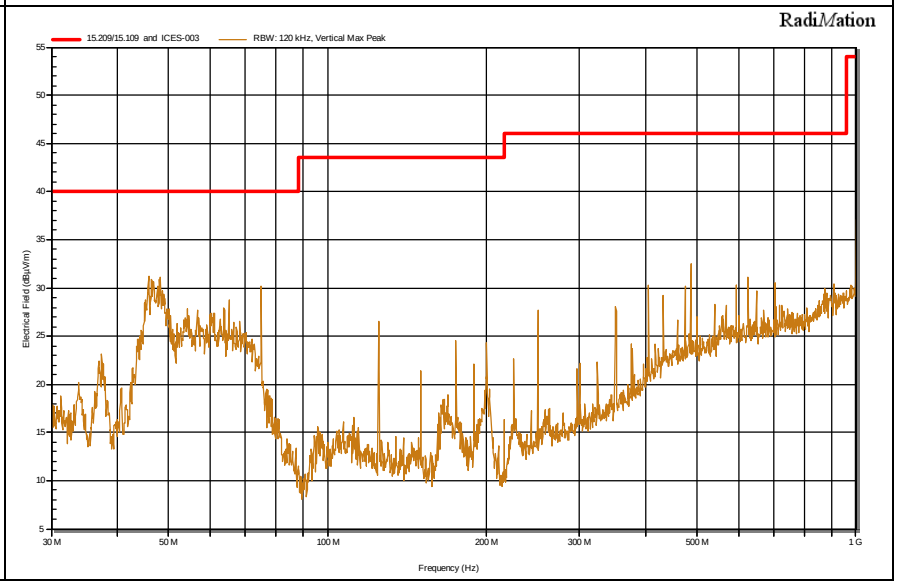



150 kHz to 30 MHz



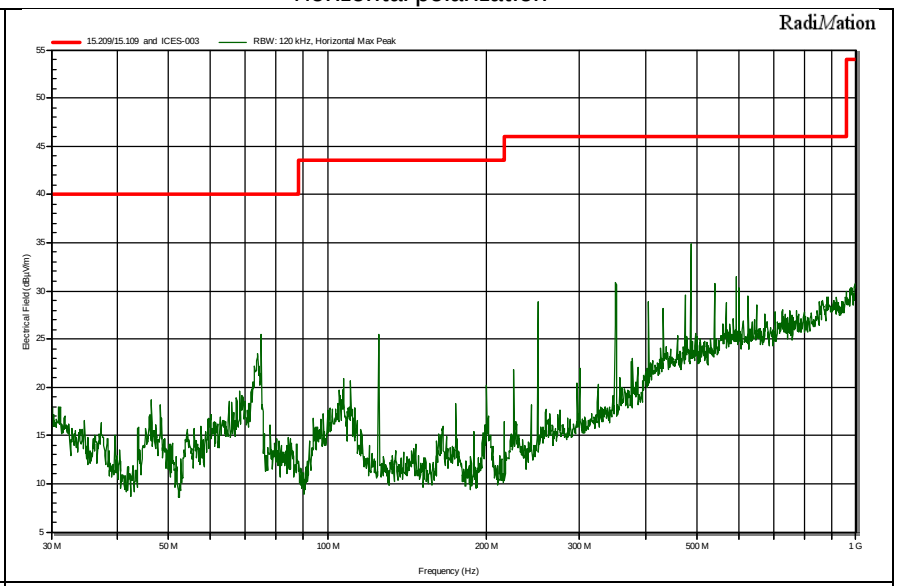
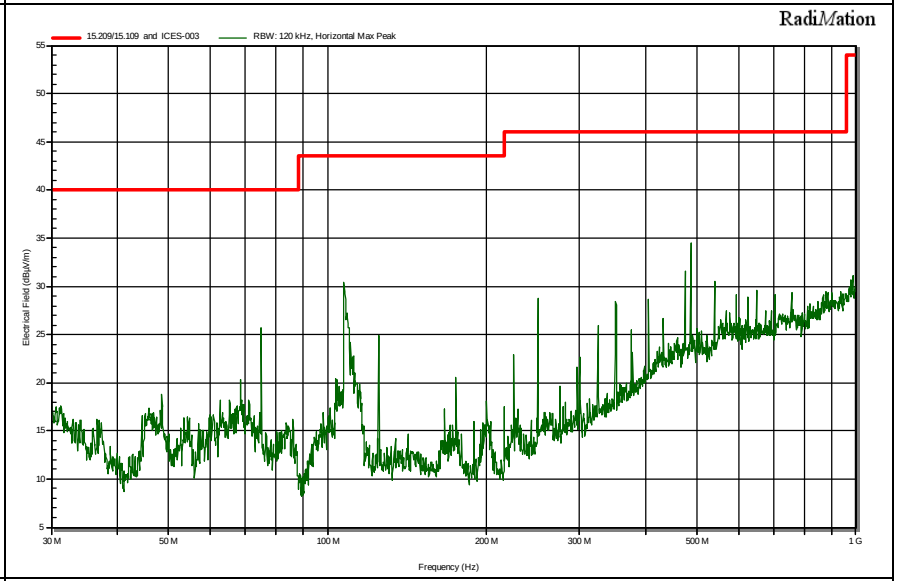
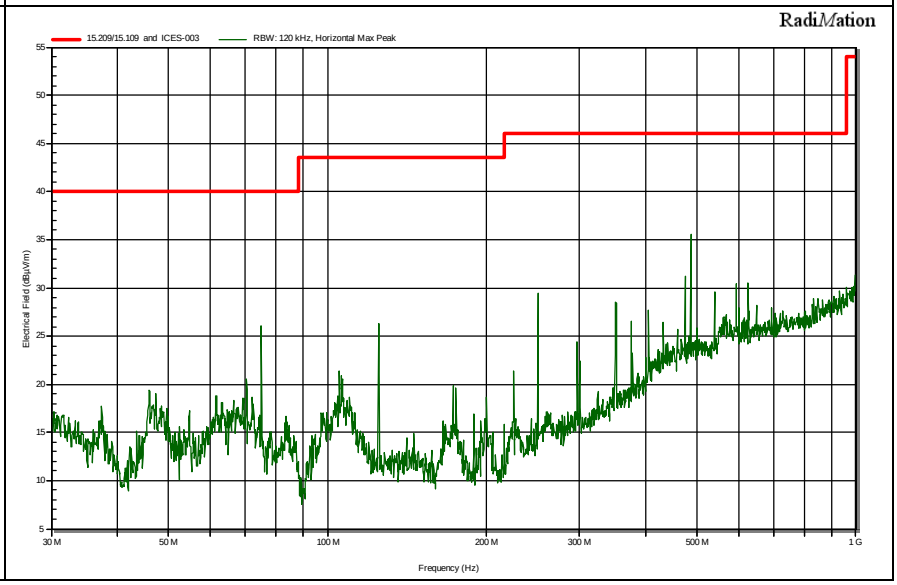
30 MHz to 1 GHz

Vertical polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

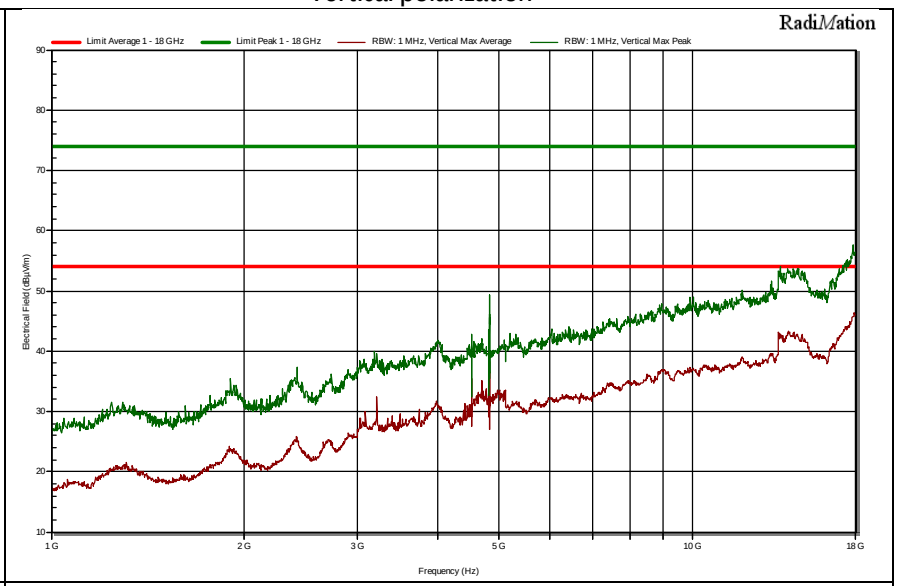
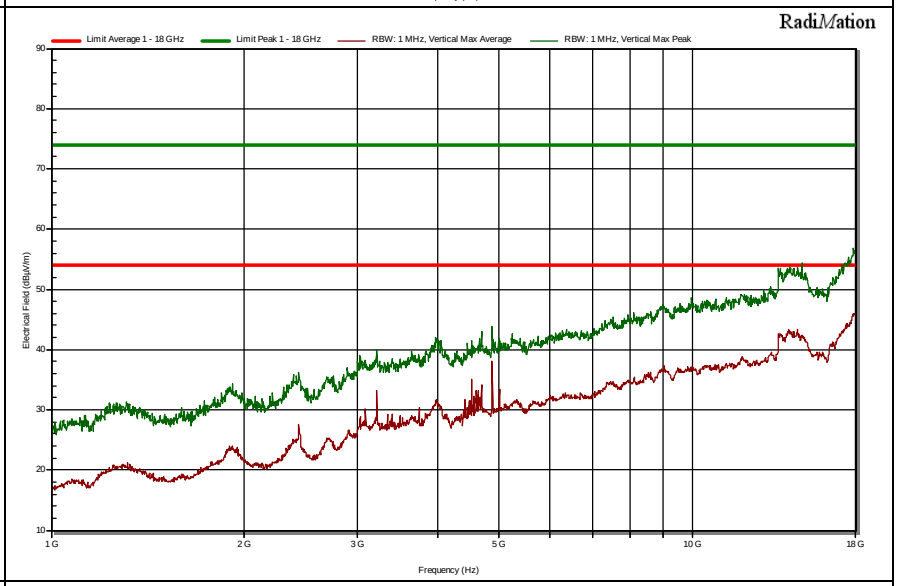
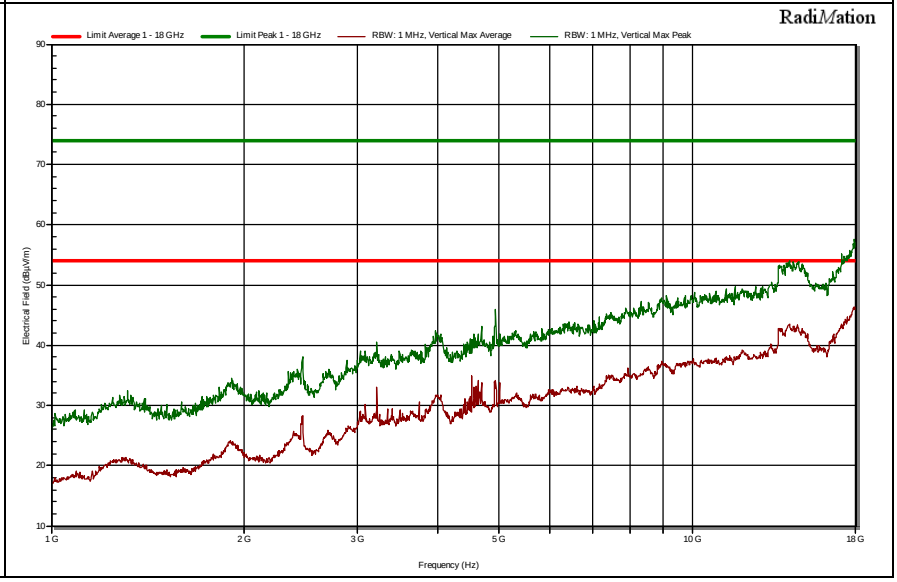
30 MHz to 1 GHz

Horizontal polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

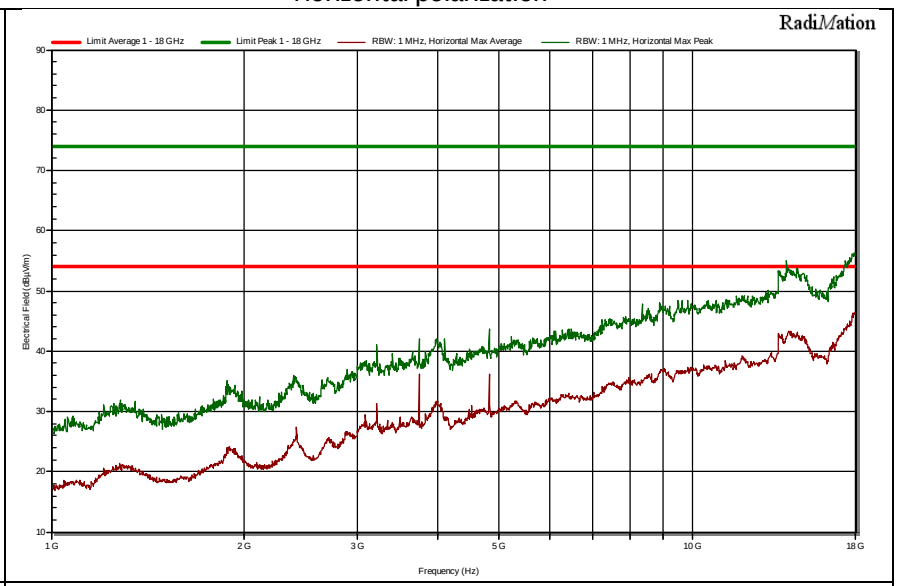
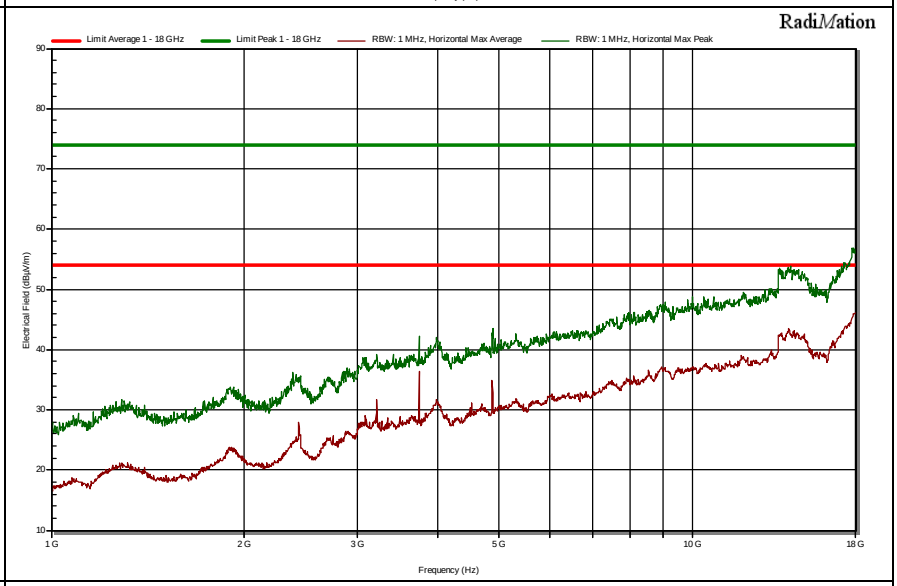
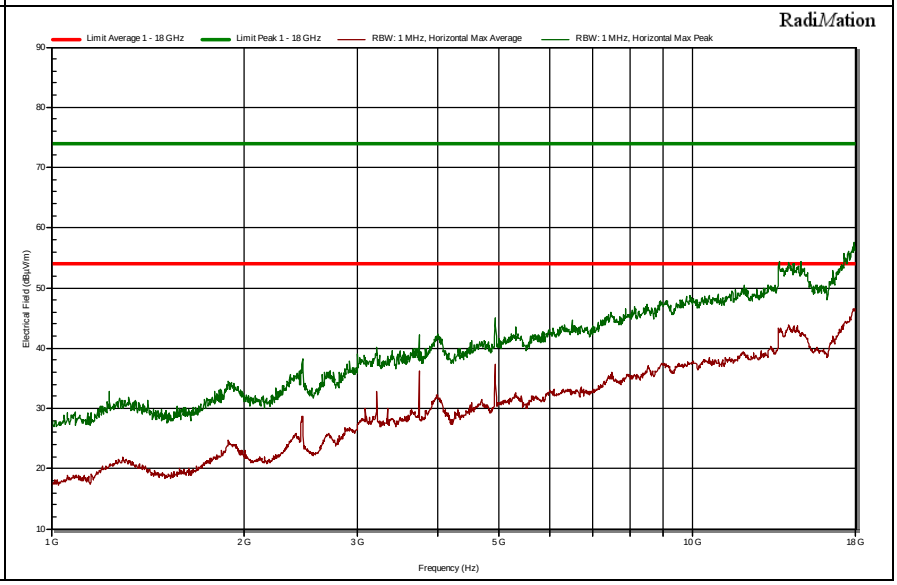
1 GHz to 18 GHz

Vertical polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

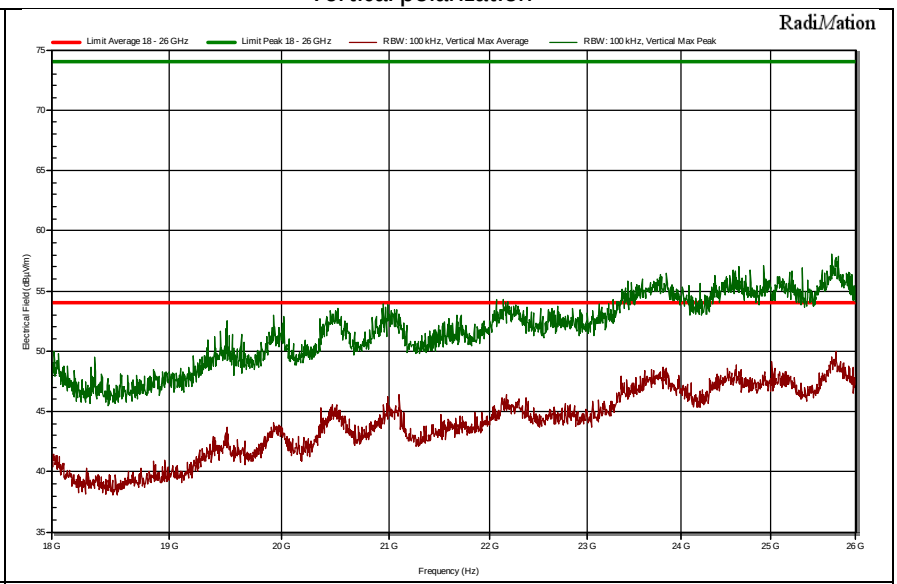
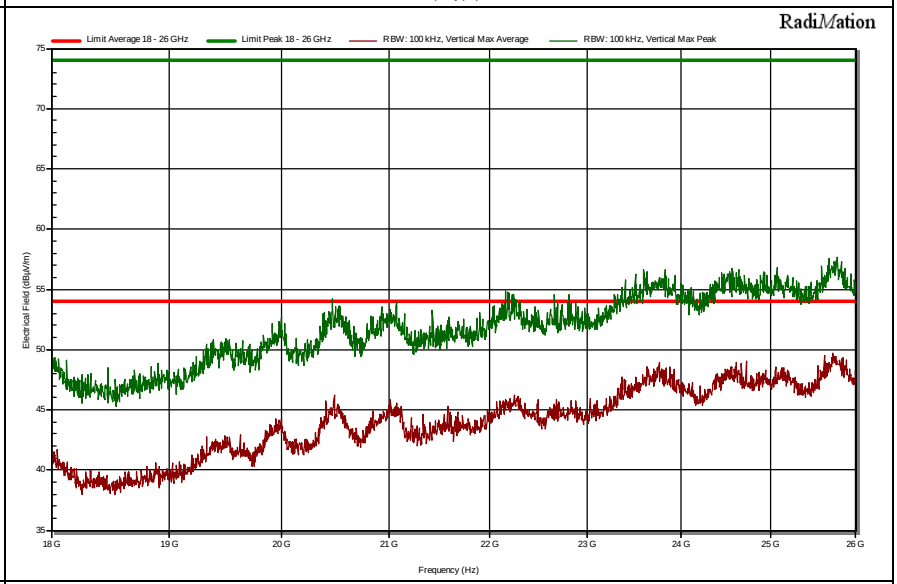
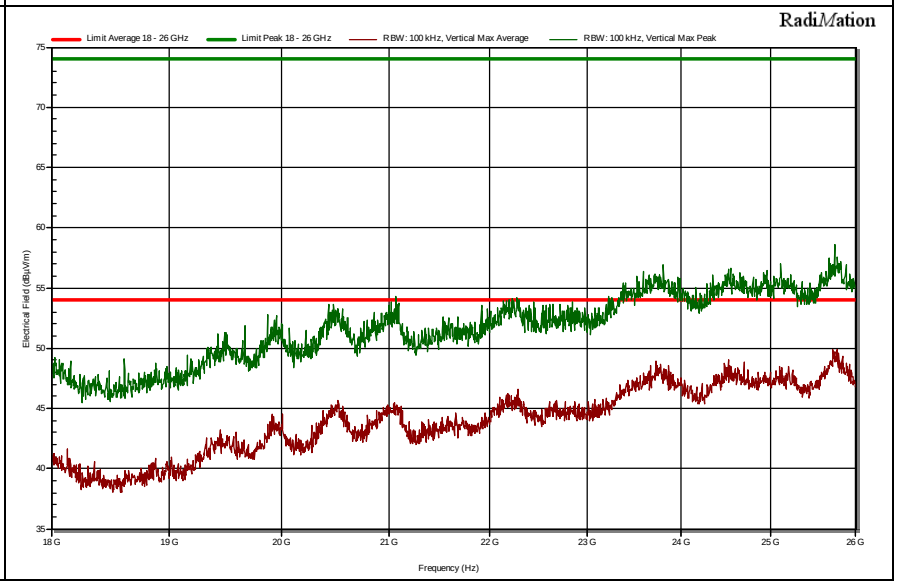
1 GHz to 18 GHz

Horizontal polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

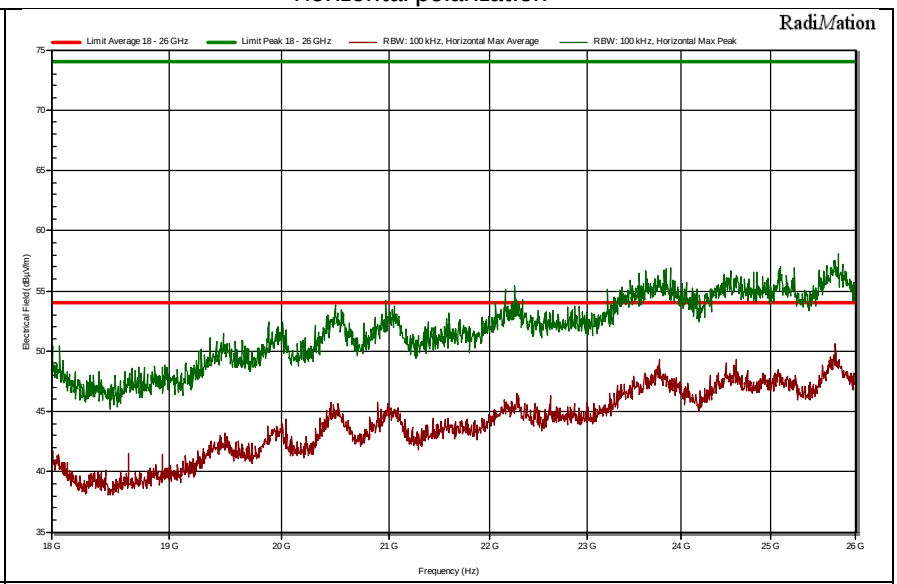
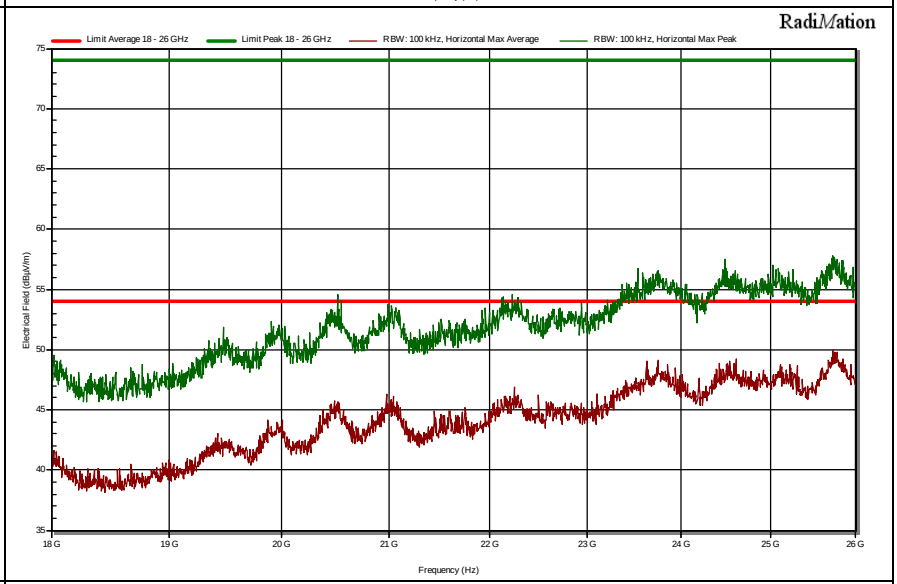
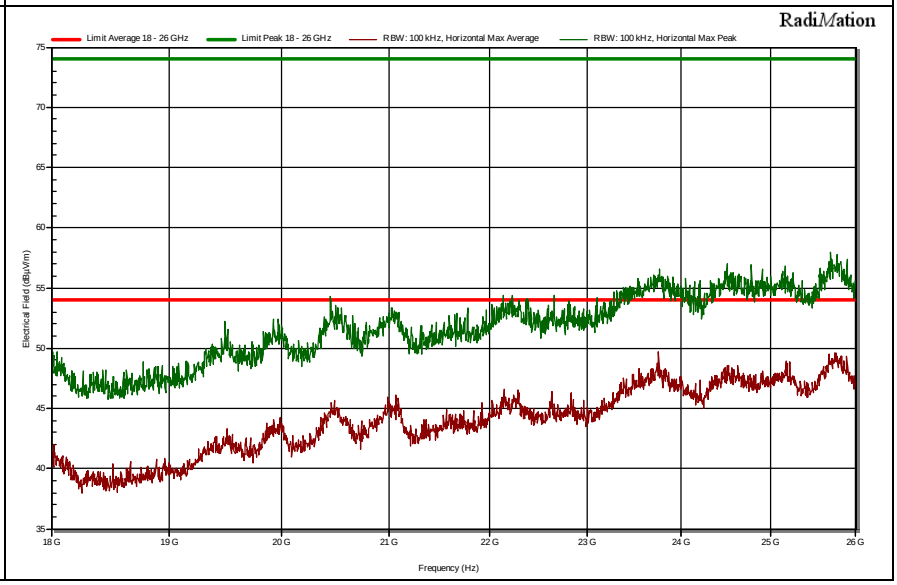
18 GHz to 26 GHz

Vertical polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

18 GHz to 26 GHz

Horizontal polarization

| | |
|---|---|
| Low ch |  |
| Mid ch |  |
| High ch |  |

## 3.2 Output Power Measurement

### 3.2.1 Limit

For systems using digital modulation in the 2400-2483.5 MHz, the limit for the peak output power is 30 dBm. If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point to point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### 3.2.2 Measurement instruments

The measurement instruments are listed in chapter 2.3 of this report.

### 3.2.3 Test setup

The test setup is as shown in chapter 2.2 of this report.

### 3.2.4 Test procedure

The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05.
IRN 014 - RF power (W) - Method 1

### 3.2.5 Test results of Output Power Measurement

Peak method

Antenna port 1

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak output power (dBm) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | 17.3 |
| | 6 | 2437 | Up to 150 Mbps | 17.0 |
| | 11 | 2462 | Up to 150 Mbps | 17.2 |
| Uncertainty | ±0.71 dB | | | |

Antenna port 2

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak output power (dBm) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | 19.0 |
| | 6 | 2437 | Up to 150 Mbps | 18.3 |
| | 11 | 2462 | Up to 150 Mbps | 18.1 |
| Uncertainty | ±0.71 dB | | | |

Total output power

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak output power (dBm) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | 21.2 |
| | 6 | 2437 | Up to 150 Mbps | 20.7 |
| | 11 | 2462 | Up to 150 Mbps | 20.7 |
| Uncertainty | ±0.71 dB | | | |

Note: the total output power is calculated by summing the peak output power of the antenna ports in linear units (mW) and converting the resulting power back to logarithmic values (dBm) using the equation below.

$$P_{tot}(dBm) = 10 * \log_{10}\left[10^{\frac{P_{ant1}(dBm)}{10}} + 10^{\frac{P_{ant2}(dBm)}{10}}\right]$$

$P_{tot}$ is the total output power
$P_{antX}$ is the output power of each antenna port

### 3.2.6 Total output power E.I.R.P.

By customer request the total radiated output power has been measured in addition to the conducted output power.
The measurement has been performed using the substitution method in ANSI C63.10-2013, clause G5.3

Total output power

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak output power E.I.R.P. (dBm) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | 19.0 |
| | 6 | 2437 | Up to 150 Mbps | 20.6 |
| | 11 | 2462 | Up to 150 Mbps | 18.6 |
| Uncertainty | ±3.8 dB | | | |

## 3.3 Power Spectral Density

### 3.3.1 Limit

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band at any time interval of continuous transmission.

### 3.3.2 Measurement instruments

The measurement instruments are listed in chapter 2.3 of this report.

### 3.3.3 Test setup

The test setup is as shown in chapter 2.2 of this report.

### 3.3.4 Test procedure

The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05.
IRN 030 - Spectral power density (W per n.Hz) - Method 5 – Peak method PKPSD (PSD in 3 kHz band)

### 3.3.5 Test results of Power Spectral Density Measurement

Antenna port 1

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak PSD (dBm/3 kHz) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | -7.9 |
| | 6 | 2437 | Up to 150 Mbps | -9.2 |
| | 11 | 2462 | Up to 150 Mbps | -7.7 |
| Uncertainty | ±2.0 dB | | | |

Antenna port 2

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak PSD (dBm/3 kHz) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | -5.2 |
| | 6 | 2437 | Up to 150 Mbps | -6.7 |
| | 11 | 2462 | Up to 150 Mbps | -7.8 |
| Uncertainty | ±2.0 dB | | | |

Total PSD

| Technology Std. | Channel | Frequency (MHz) | Data rate | Peak PSD (dBm/3 kHz) |
|---|---|---|---|---|
| 802.11n | 1 | 2412 | Up to 150 Mbps | -3.3 |
| | 6 | 2437 | Up to 150 Mbps | -4.8 |
| | 11 | 2462 | Up to 150 Mbps | -4.8 |
| Uncertainty | ±2.0 dB | | | |

Note: the total PSD is calculated by summing the peak PSD of the antenna ports in linear units (mW/3 kHz) and converting the resulting power back to logarithmic values (dBm/3 kHz) using the equation below.

$$P_{tot}(dBm) = 10 * \log_{10}\left[10^{\frac{P_{ant1}\left(\frac{dBm}{3\ kHz}\right)}{10}} + 10^{\frac{P_{ant2}\left(\frac{dBm}{3\ kHz}\right)}{10}}\right]$$

## 3.4 Band edge Measurement

### 3.4.1 Limit

Band edge:
At the edge of the authorized band the RF power shall be at least 20 dB down.

### 3.4.2 Measurement instruments

The measurement instruments are listed in chapter 2.3 of this report.

### 3.4.3 Test setup

The test setup is as shown in chapter 2.2 of this report.

### 3.4.4 Test procedure

The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05, sections 11.3 and 12.1. IRN 026 - Radiated electrical disturbance (V per m) Method 6 – Radiated electrical disturbance at the Authorized band edge.

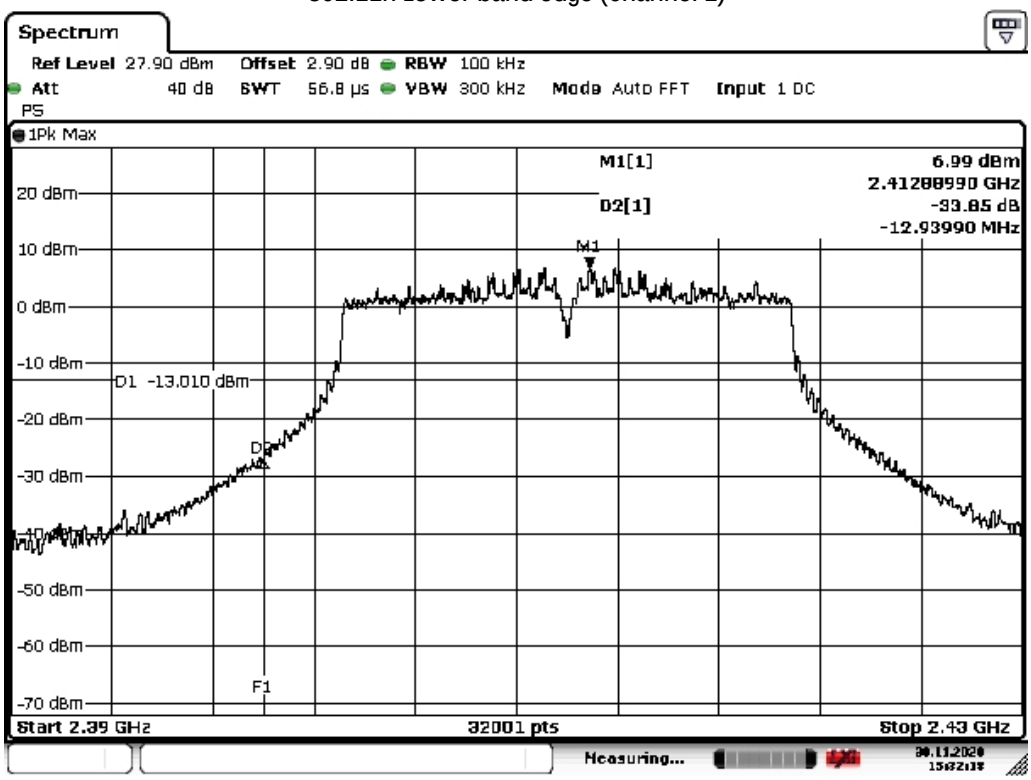
### 3.4.5 Measurement Uncertainty

± 5.7 dB.

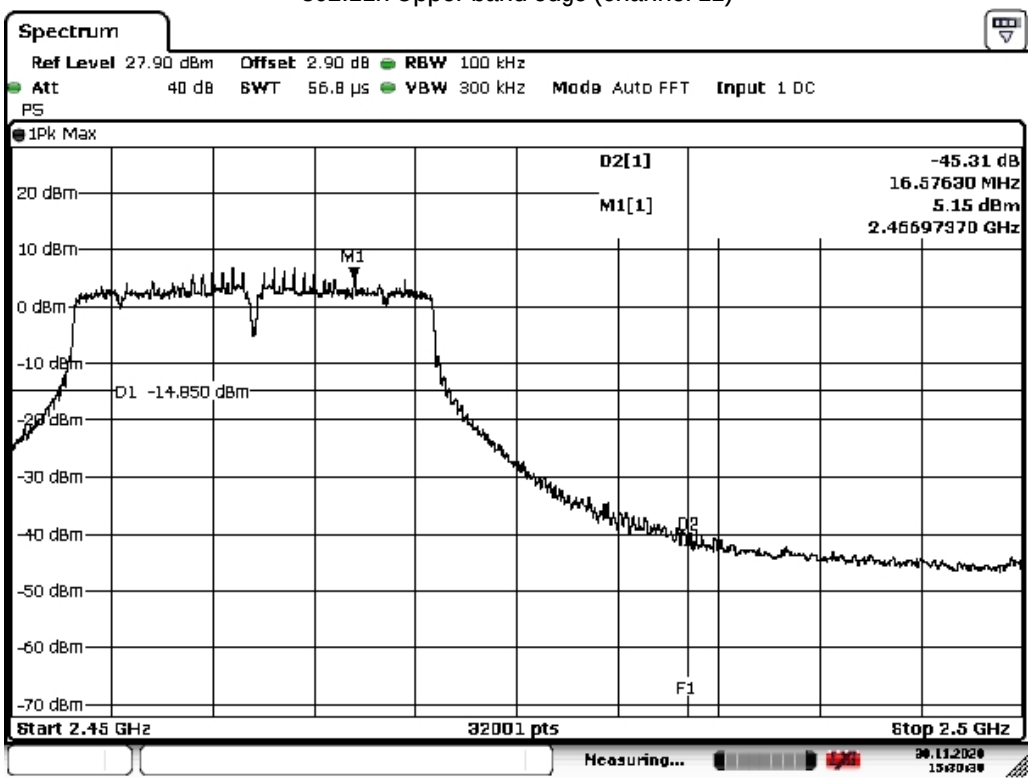
### 3.4.6 Plots of the Band edge Measurements

See next page

Antenna 1
802.11n Lower band edge (Channel 1)

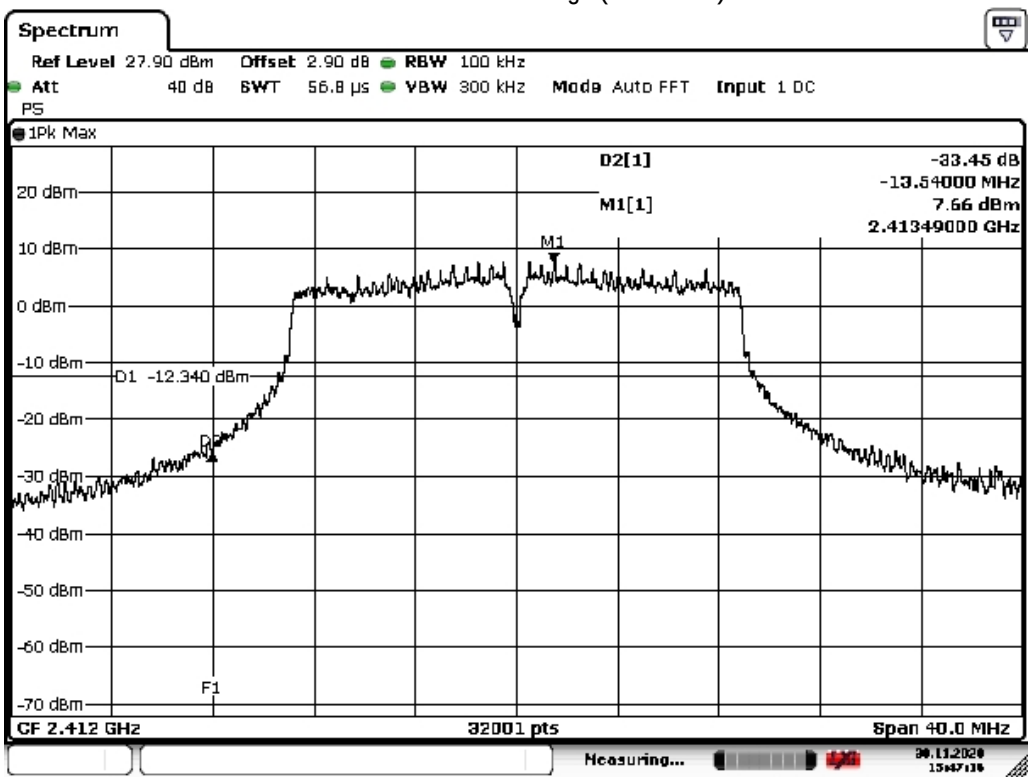



802.11n Upper band edge (Channel 11)

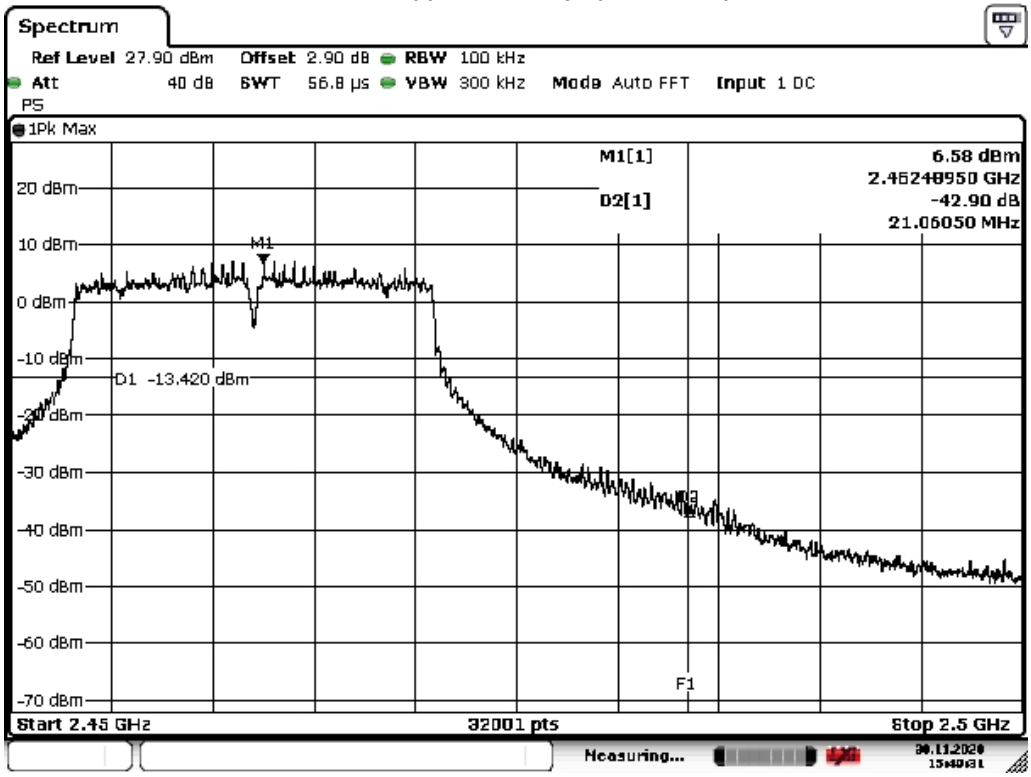


Antenna 2

802.11n Lower band edge (Channel 1)




802.11n Upper band edge (Channel 11)



# 4 Sample calculations

All formulas for data conversions and conversion factors are reported in this chapter.

Conducted emission Measurement:

$U_{lisn}$ (dBµV) = U (dBµV) + Corr. (dB)

Where:
U = Measuring receiver voltage
LISN insertion loss = Voltage division factor of LISN
Corr. = sum of single correction factors of used LISN, cables and pulse limiter.
Linear interpolation will be used for frequencies in between the values in the table.

| Frequency (Mhz) | Voltage division LISN (db) | Insertion Loss Pulse limiter (dB) | Cable loss (dB) | Corr. (dB) |
|---|---|---|---|---|
| | TE 00208 SN: 892785/004 Rohde & Schwarz ESH3-Z5 | TE 00756 SN: 5SM03153 Rohde & Schwarz ESH3-Z2 | TE 11134 | |
| 0,15 | 0,09 | 9,87 | 0,02 | 9,98 |
| 0,2 | 0,1 | 9,87 | 0,03 | 10 |
| 0,3 | 0,1 | 9,87 | 0,03 | 10 |
| 0,5 | 0,1 | 9,87 | 0,08 | 10,05 |
| 0,7 | 0,12 | 9,87 | 0,25 | 10,24 |
| 0,8 | 0,12 | 9,87 | 0,25 | 10,24 |
| 1 | 0,13 | 9,87 | 0,11 | 10,11 |
| 2 | 0,16 | 9,87 | 0,15 | 10,18 |
| 3 | 0,19 | 9,87 | 0,21 | 10,27 |
| 5 | 0,26 | 9,88 | 0,21 | 10,35 |
| 7 | 0,36 | 9,89 | 0,25 | 10,5 |
| 8 | 0,39 | 9,89 | 0,25 | 10,53 |
| 10 | 0,46 | 9,91 | 0,29 | 10,66 |
| 15 | 0,77 | 9,93 | 0,34 | 11,04 |
| 20 | 0,95 | 9,96 | 0,37 | 11,28 |
| 25 | 1,12 | 9,99 | 0,43 | 11,54 |
| 30 | 1,1 | 10,04 | 0,45 | 11,59 |

Field Strength Measurement:

E (dBµV/m) = U(dBµV) + AF (dB/m) + Corr. (dB)

Where:
E = Electric field strength
U = Measuring receiver voltage
AF = Antenna factor
CL = Cable loss

Corr. = sum of single correction factors of used cable and amplifier (if applicable).
Linear interpolation will be used for frequencies in between the values in the table.
Tables shows an extract of the values.

| Frequency (Mhz) | AF (dB/m)<br>TE 00967<br>Chase CBL6112A<br>SN: 2308 | Cable loss (dB)<br>Id: SAR cable | Corr. (dB) |
|---|---|---|---|
| 30 | 18,6 | 0,68 | 19,28 |
| 100 | 10,7 | 1,15 | 11,85 |
| 150 | 10,6 | 1,41 | 12,01 |
| 200 | 9,3 | 1,63 | 10,93 |
| 250 | 12,6 | 1,93 | 14,53 |
| 300 | 13,3 | 2,12 | 15,42 |
| 350 | 14,6 | 2,2 | 16,8 |
| 400 | 15,5 | 2,29 | 17,79 |
| 450 | 16,9 | 2,53 | 19,43 |
| 500 | 17,5 | 2,67 | 20,17 |
| 550 | 18,4 | 2,9 | 21,3 |
| 600 | 18,8 | 3,02 | 21,82 |
| 650 | 19,2 | 3,09 | 22,29 |
| 700 | 19 | 3,22 | 22,22 |
| 750 | 19,8 | 3,56 | 23,36 |
| 800 | 19,7 | 3,69 | 23,39 |
| 900 | 20,4 | 3,81 | 24,21 |
| 950 | 20,8 | 3,91 | 24,71 |
| 1000 | 21,2 | 4,3 | 25,5 |

| Frequency (Mhz) | AF (dB/m)<br>TE 00531<br>Emco 3115<br>SN: 9412-4377 | Gain (dB)<br>TE 11132<br>Miteq<br>JS4-18004000-30-8P-A1 | Cable loss (dB)<br>TE 01315 | Corr. (dB) |
|---|---|---|---|---|
| 1000 | 23,6 | 40,4 | 2,0 | 66 |
| 1500 | 25,1 | 40,5 | 2,4 | 68 |
| 2000 | 27,1 | 40,5 | 2,7 | 70,3 |
| 2500 | 28,6 | 40,7 | 3,2 | 72,5 |
| 3000 | 30,5 | 40,7 | 3,2 | 74,4 |
| 3500 | 31,2 | 40,7 | 3,4 | 75,3 |
| 4000 | 32,7 | 40,9 | 4,9 | 78,5 |
| 4500 | 32,4 | 40,9 | 4,4 | 77,7 |
| 5000 | 33,2 | 40,7 | 4,6 | 78,5 |
| 5500 | 34,0 | 40,5 | 4,5 | 79 |
| 6000 | 34,6 | 40,0 | 5,2 | 79,8 |
| 6500 | 34,3 | 39,4 | 5,9 | 79,6 |
| 7000 | 35,2 | 38,6 | 5,7 | 79,5 |
| 7500 | 36,4 | 39,2 | 5,9 | 81,5 |
| 8000 | 37,0 | 38,9 | 6,3 | 82,2 |
| 8500 | 37,5 | 38,4 | 6,4 | 82,3 |
| 9000 | 38,1 | 37,4 | 6,5 | 82 |
| 9500 | 37,8 | 37,0 | 7,1 | 81,9 |
| 10000 | 38,2 | 36,5 | 7,3 | 82 |
| 10500 | 38,1 | 36,7 | 7,6 | 82,4 |
| 11000 | 38,3 | 36,9 | 8,3 | 83,5 |
| 11500 | 38,5 | 37,6 | 8,1 | 84,2 |
| 12000 | 39,1 | 38,3 | 8,4 | 85,8 |
| 12500 | 38,7 | 38,5 | 8,3 | 85,5 |
| 13000 | 39,2 | 38,9 | 9,2 | 87,3 |
| 13500 | 40,5 | 40,2 | 8,3 | 89 |
| 14000 | 41,1 | 40,0 | 8,2 | 89,3 |
| 14500 | 41,4 | 40,1 | 8,2 | 89,7 |
| 15000 | 40,2 | 41,4 | 8,3 | 89,9 |
| 15500 | 37,9 | 41,4 | 8,6 | 87,9 |
| 16000 | 37,5 | 42,8 | 9,2 | 89,5 |
| 16500 | 38,6 | 42,3 | 8,8 | 89,7 |
| 17000 | 41,1 | 43,1 | 9,4 | 93,6 |
| 17500 | 42,7 | 43,2 | 9,4 | 95,3 |
| 18000 | 44,0 | 44,2 | 9,8 | 98 |

| Frequency (Mhz) | AF (dB/m)<br>TE 00531<br>Emco 3115<br>SN: 9412-4377 | Gain (dB)<br>TE 11132<br>Miteq<br>JS4-18004000-30-8P-A1 | Cable loss (dB)<br>TE 01315 | Corr. (dB) |
|---|---|---|---|---|
| 18000 | 31,3 | 26,2 | 9,8 | 67,3 |
| 19000 | 31,5 | 26,1 | 9,6 | 67,2 |
| 20000 | 31,7 | 25,9 | 11 | 68,6 |
| 21000 | 31,9 | 24,3 | 10,7 | 66,9 |
| 22000 | 32,1 | 18,3 | 10,5 | 60,9 |
| 23000 | 32,2 | 18,9 | 10,8 | 61,9 |
| 24000 | 32,3 | 23,6 | 11,4 | 67,3 |
| 25000 | 32,4 | 24,5 | 11,6 | 68,5 |
| 26000 | 32,5 | 25,3 | 11,7 | 69,5 |