

FCC Test report for parts 15.107, 15.109

Product name : LDX 150
Applicant : Grass Valley Nederland B.V.
FCC ID : Y2ULDX150

Test report No. : 210301074 004 v2.0

Laboratory information

Accreditation

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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 Telefication BV
Test Site location	Wilmersdorf 50 7327 AC Apeldoorn The Netherlands Tel. +31 88998 3393
Test Site FCC	NL0001
CABID	NL0001

Revision History

Version	Date	Remarks	By
v0.50	25-08-2021	First draft	LDG
v1.00	22-09-2021	Final version	LDG
V2.0	22-02-2022	Expanded peak tables updated equipment list Added block diagram of radiated test setup	PvW

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Summary of Test results

FCC	Description	Section in report	Verdict
15.109 (a)	Radiated spurious emissions	3.1	Pass
15.107 (a)	Conducted spurious emissions on AC mains	3.2	Pass

1 General Description

1.1 Applicant

Client name: Grass Valley Nederland B.V.
Address: Bergschot 69
Zip code: 4817 PA Breda
Country: The Netherlands
Telephone: +31 763032129
E-mail: Leon.derks@grassvalley.com
Contact name: L. Derks

1.2 Manufacturer

Manufacturer name: Grass Valley Nederland B.V.
Address: Bergschot 69
Zip code: 4817 PA Breda
Country: The Netherlands
Telephone: +31 763032129
E-mail: Leon.derks@grassvalley.com
Contact name: L. Derks

1.3 Tested Equipment Under Test (EUT)

Product name: LDX 150
Brand name: Grass Valley
FCC ID: Y2ULDX150
Product type: Grass Valley LDX 150 4K Broadcast system camera
Model(s): LDX 150
Batch and/or serial No. 44Z9N
Software version: Package V 00.05
Hardware version: 1-0200200-0000
Date of receipt 21-07-2021
Tests started: 21-07-2021
Testing ended: 20-08-2021

1.4 Product specifications of Equipment under test

Tx Frequency:	--
Rx frequency:	NFC: 13.56 MHz GPS: 1575.42 MHz
Antenna type:	NFC: Inductive loop antenna GPS: Active patch antenna
Antenna gain:	GPS: At 3V: 30dB $\pm$ 3dB

Disclaimer: The operating frequency is declared by the customer. The antenna gain is from the antenna datasheet.

1.5 Environmental conditions

Test date	21-07-2021 (CE)	20-08-2021 (Spurem)
Ambient temperature	20.4 °C	21.5 °C
Humidity	56.1 %	69.0%

1.6 Measurement standards

- ANSI C63.4:2014

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 B §15.107
- FCC Part 15 Subpart B §15.109

1.8 Observation and remarks

The EUT contains a passive NFC tag and a GPS receiver, therefore it is considered an unintentional radiator. The highest internal clock frequency is 12.5 GHz, when the device is operating in 179 in IP mode. Spurious emissions >1 GHz are measured in this mode.

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 conducted tests are performed by:

Name : L. de Groot, o.s. and P. van Wanrooij, BaSc

Review of test methods and report by:

Name : ing. R. van Barneveld

The above conclusions have been verified by the following signatory:

Date : 02-03-2022

Name : ing. R. van Barneveld

Function : Test Engineer

Signature :

A handwritten signature in blue ink, consisting of a stylized 'R' followed by a horizontal line.

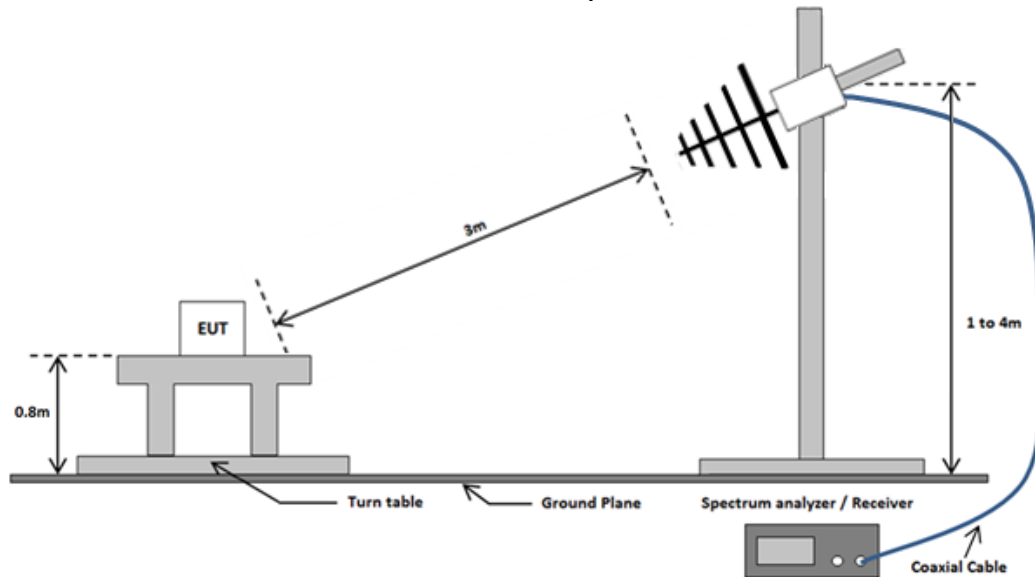
2 Test configuration of the Equipment Under Test

2.1 Test mode

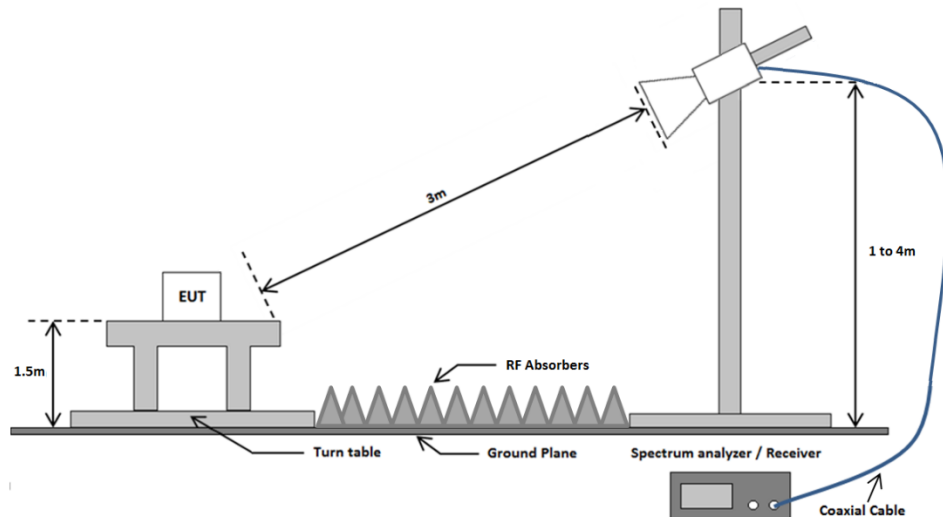
The EUT is tested in normal operating mode, with all ports connected.

2.2 Test setups

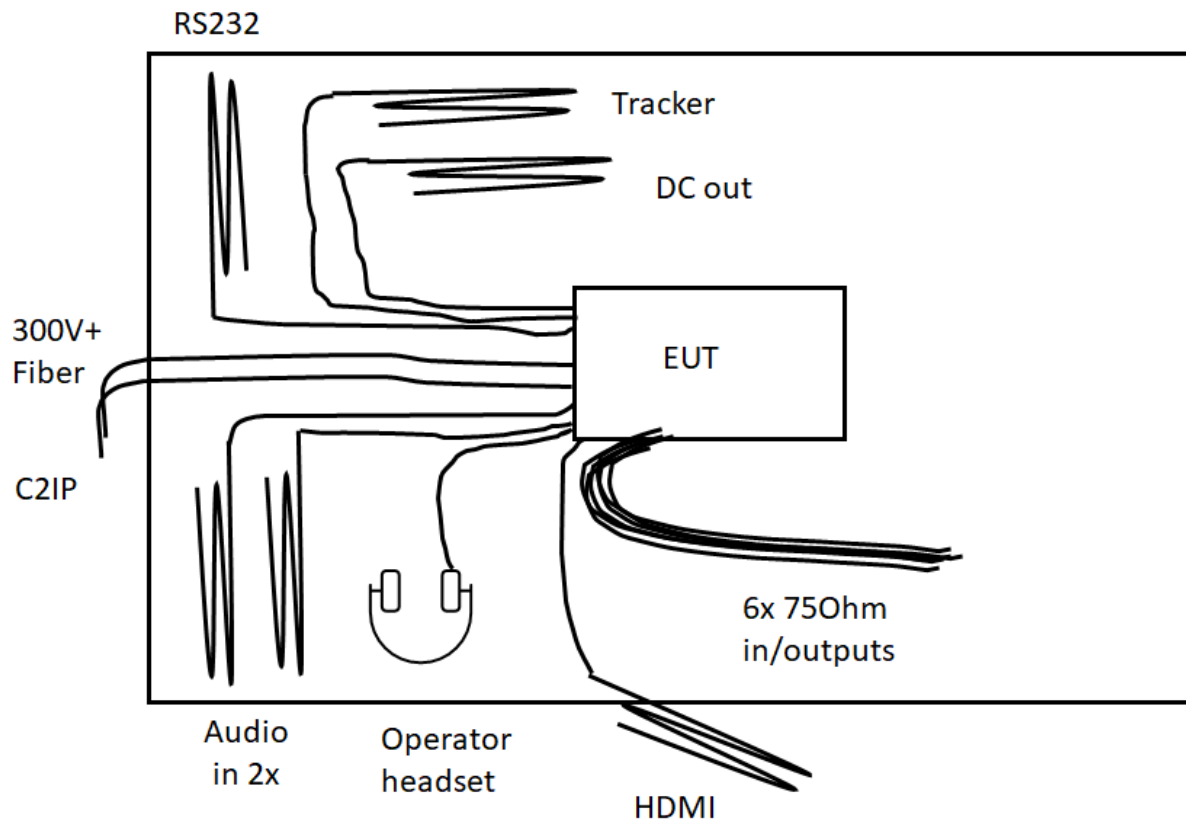
Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz

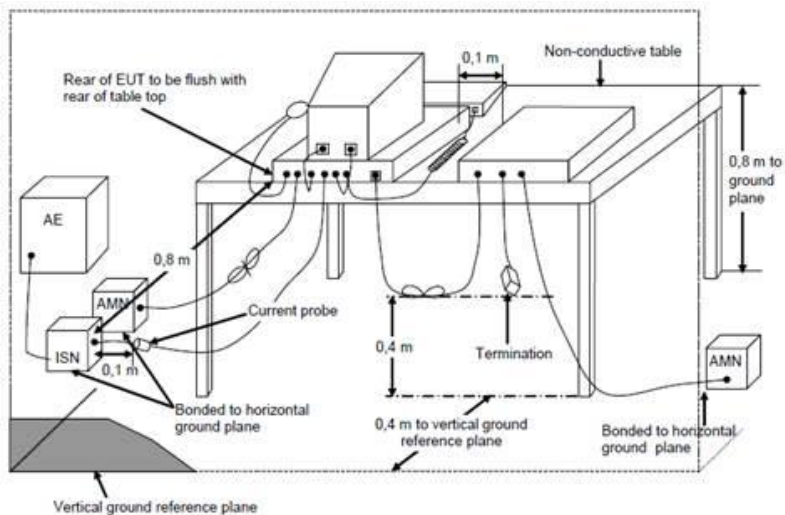


Radiated emission setup top view



Conducted emissions test setup

Emissions test at AC mains



2.3 Equipment used in the test configuration

Description	Manufacturer	Model	ID	Used at Par.	Cal. Date	Cal. Due date
Bilog antenna 30 MHz-2000 MHz	Chase	CBL6112A	114516	3.1	03-2021	03-2024
Horn antenna 1-18 GHz	EMCO	3115	114607	3.1	01-2021	01-2024
Pre-amplifier 1-18 GHz	MITEQ	AFS42-041001800-28-10P-42	114690	3.1	01-2022	01-2023
Horn antenna 18-26 GHz	Flann microwave	20240-25	114581	3.1	NA	NA
Pre-amplifier 18-26 GHz	Miteq	JS4-18004000-30-8P-A1	114693	3.1	01-2022	01-2023
Horn antenna 26-40 GHz	Scientific Atlanta	12A-26	114487	3.1	NA	NA
Green 7 m cable for antenna	Micro Coax	FB142A1070002020	114691	3.1	NA	NA
Comb generator 1-18 GHz for test setup validation	COM-POWER	CGO-5100B	114536	3.1	NA	NA
EMI test receiver 10 Hz -7 GHz	Rohde & Schwarz	ESR7	114534	3.1	02-2022	02-2023
FSP Analyzer 9 kHz – 40 GHz	Rohde & Schwarz	FSP	114792	3.1	03-2020	03-2022
Two line V-network (Line Impedance Stabilisation Network)	Rohde & Schwarz	ESH3-Z5	114379	3.2	07-2021	07-2022
Radimation EMC test software 2021-1-9	Raditeq	RMS1001A	TE 02008	3.1; 3.2	NA	NA
Power supply 120V AC	Chroma	61601	114363	3.2	01-2021	01-2022

NA = Not Applicable

3 Test results

3.1 Radiated spurious emissions

3.1.1 Limit

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance(m)
30 -88	100	40	3
88 - 216	150	43,5	3
216-960	200	46	3
Above 960	500	54	3

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

30 MHz to 40 GHz: According to ANSI C63.4-2014, section 8.3

30 MHz to 1 GHz: IRN 026 – Method 1

1 GHz to 18 GHz: IRN 026 – Method 2

18 GHz to 26.5 GHz: IRN 026 – Method 3

26.5 GHz to 40 GHz: IRN026 – Method 4

Note: The EUT can operate while powered either by a dedicated AC/DC adapter or by a special fiber+300Vdc cable. The power supply is only expected to show a difference in the 30-1000 MHz range for spurious emissions, so in that range the emission measurements have been performed with both power supply options.

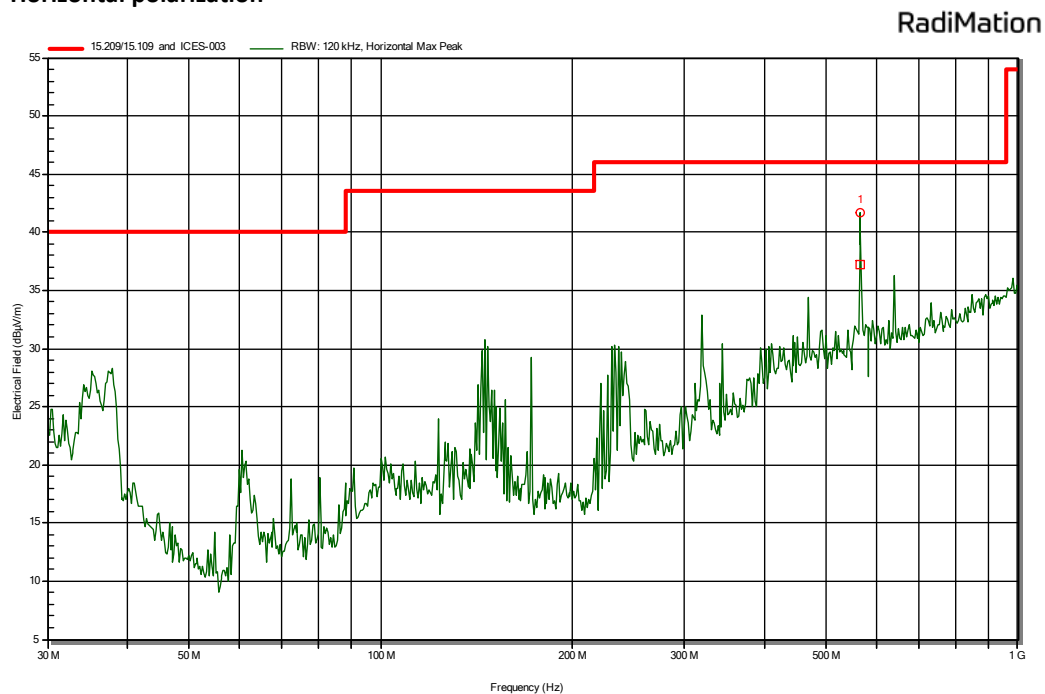
3.1.5 Measurement Uncertainty

Frequency range	Polarization	Uncertainty
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
26 – 40 GHz	Horizontal	± 4.5 dB
	Vertical	± 4.5 dB

3.1.6 Plots of the Radiated Spurious Emissions Measurement

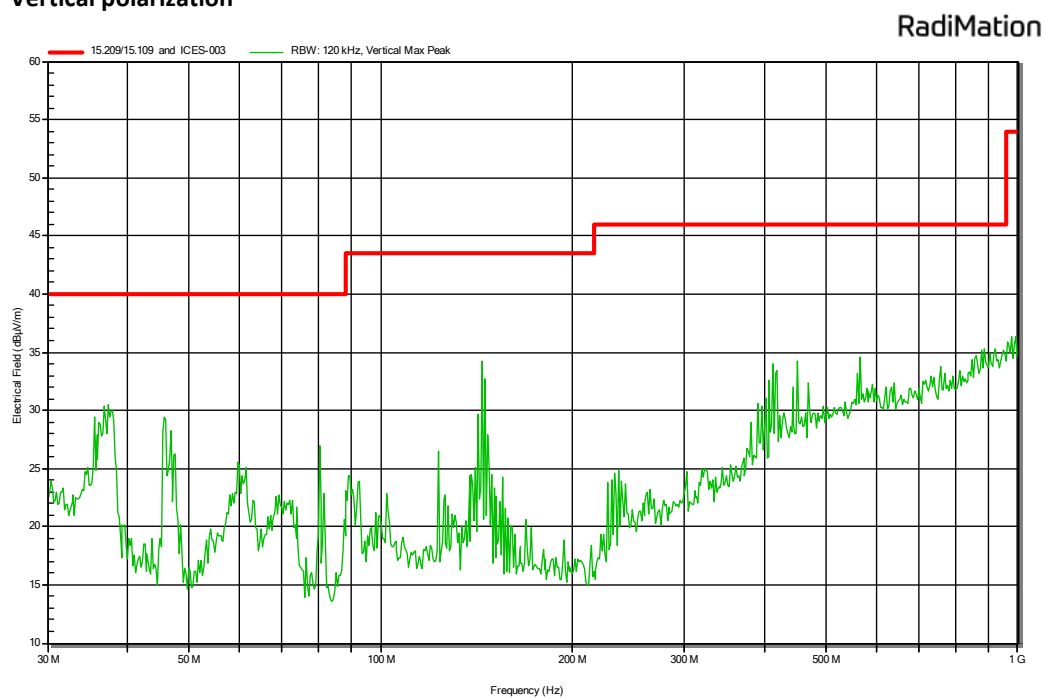
30 -1000 MHz (300V supply)

Horizontal polarization

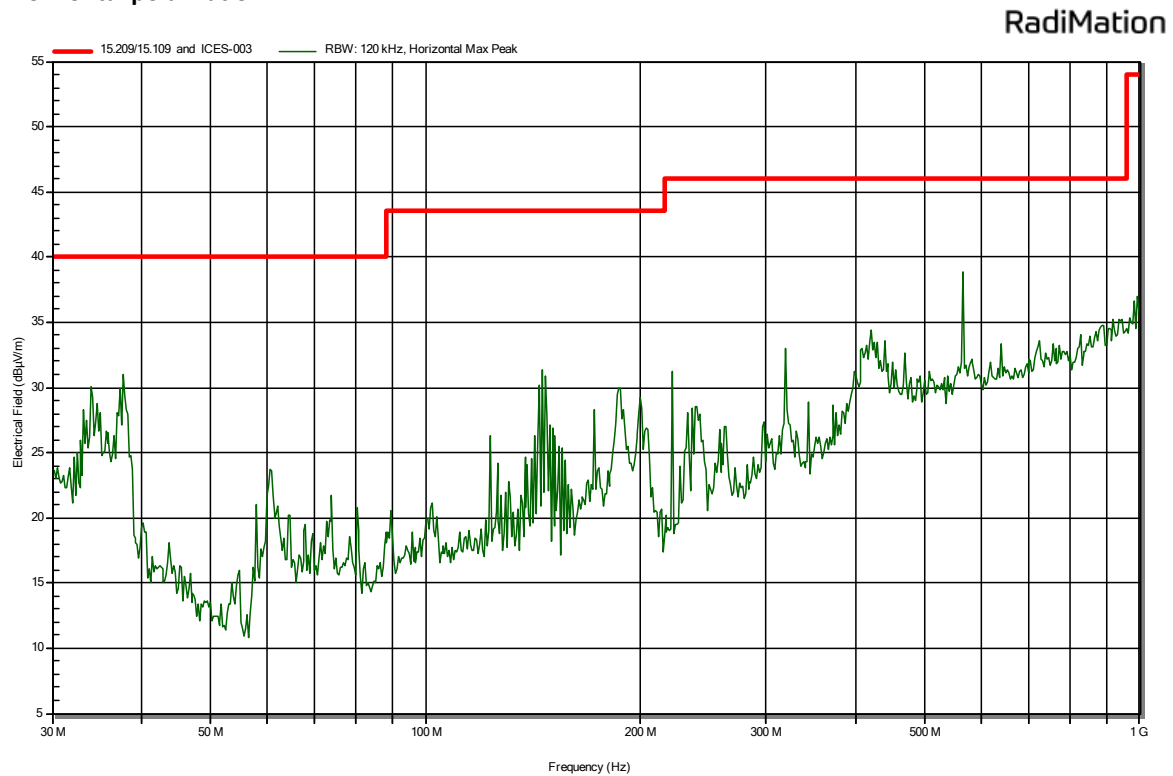


Peak Number	Frequency	Peak	Peak Limit	Quasi-Peak	Quasi-Peak Limit	Status	Polarization
1	565,238 MHz	41,6 dBµV/m	46 dBµV/m	37,2 dBµV/m	46 dBµV/m	Pass	Horizontal

Vertical polarization



30 – 1000 MHz (AC/DC supply)
Horizontal polarization

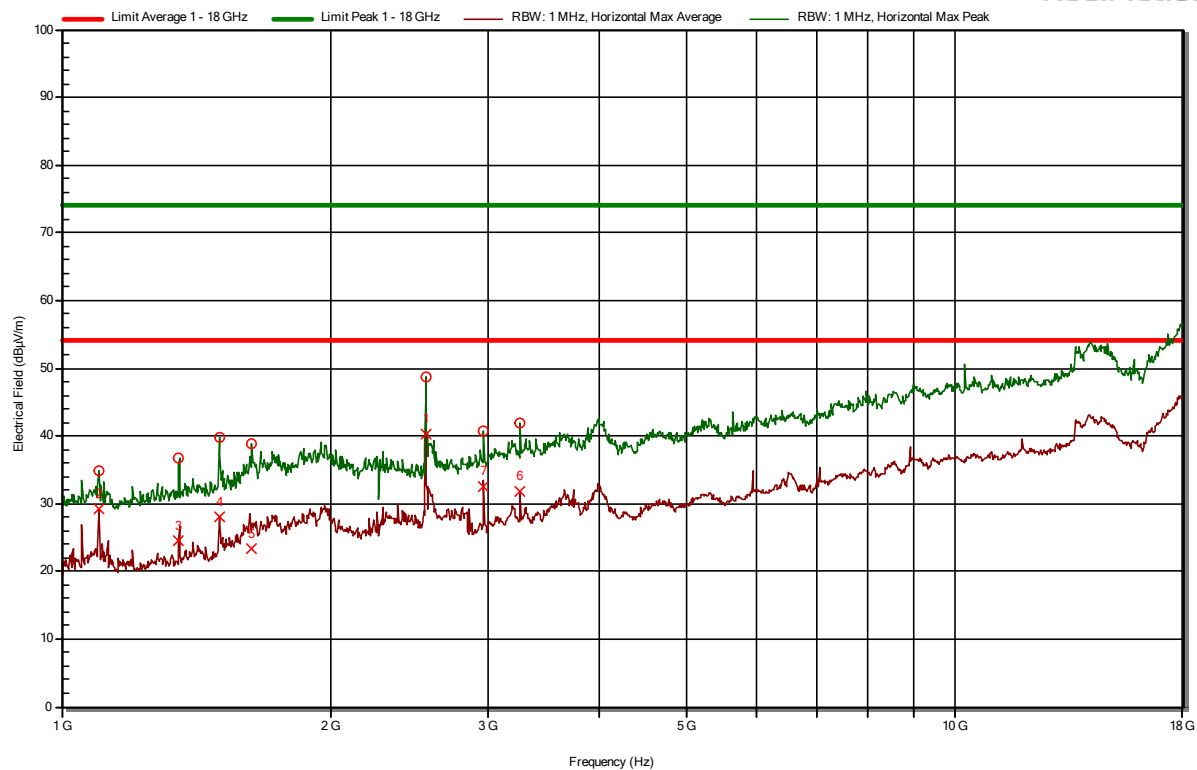


Vertical polarization



1 – 18 GHz Horizontal polarization

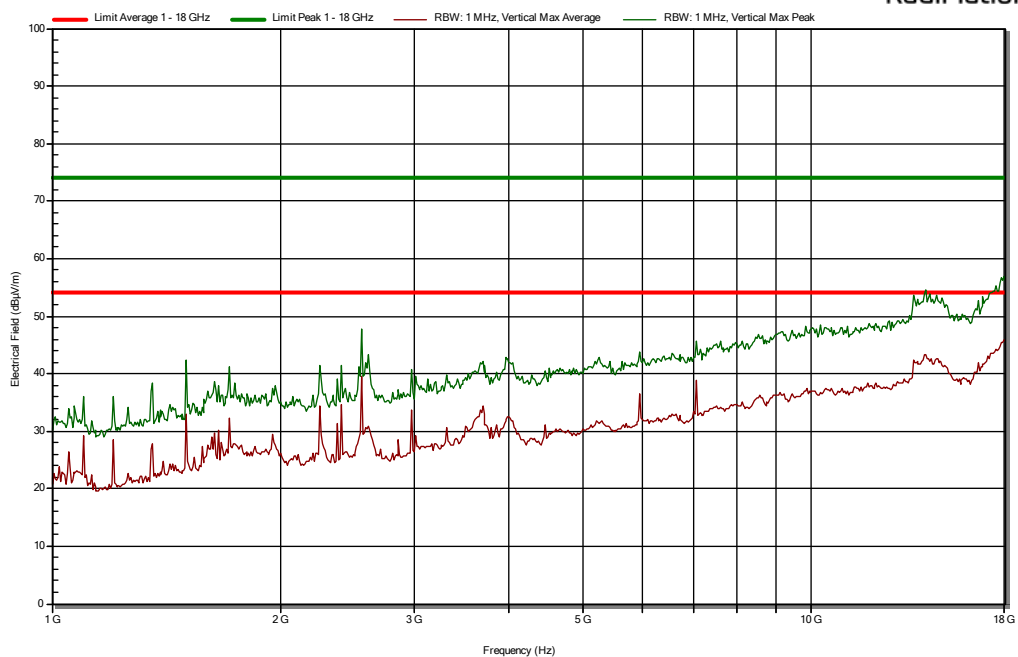
RadiMation



Peak Number	Frequency	Peak	Peak Limit	Average	Average Limit	Status	Polarization
1	2,556 GHz	48,6 dBμV/m	70 dBμV/m	40,3 dBμV/m	50 dBμV/m	Pass	Horizontal
2	1,1 GHz	34,8 dBμV/m	70 dBμV/m	29,1 dBμV/m	50 dBμV/m	Pass	Horizontal
3	1,353 GHz	36,6 dBμV/m	70 dBμV/m	24,4 dBμV/m	50 dBμV/m	Pass	Horizontal
4	1,502 GHz	39,9 dBμV/m	70 dBμV/m	28,1 dBμV/m	50 dBμV/m	Pass	Horizontal
5	1,631 GHz	38,8 dBμV/m	70 dBμV/m	23,4 dBμV/m	50 dBμV/m	Pass	Horizontal
6	3,263 GHz	41,9 dBμV/m	74 dBμV/m	31,8 dBμV/m	54 dBμV/m	Pass	Horizontal
7	2,966 GHz	40,7 dBμV/m	70 dBμV/m	32,5 dBμV/m	50 dBμV/m	Pass	Horizontal

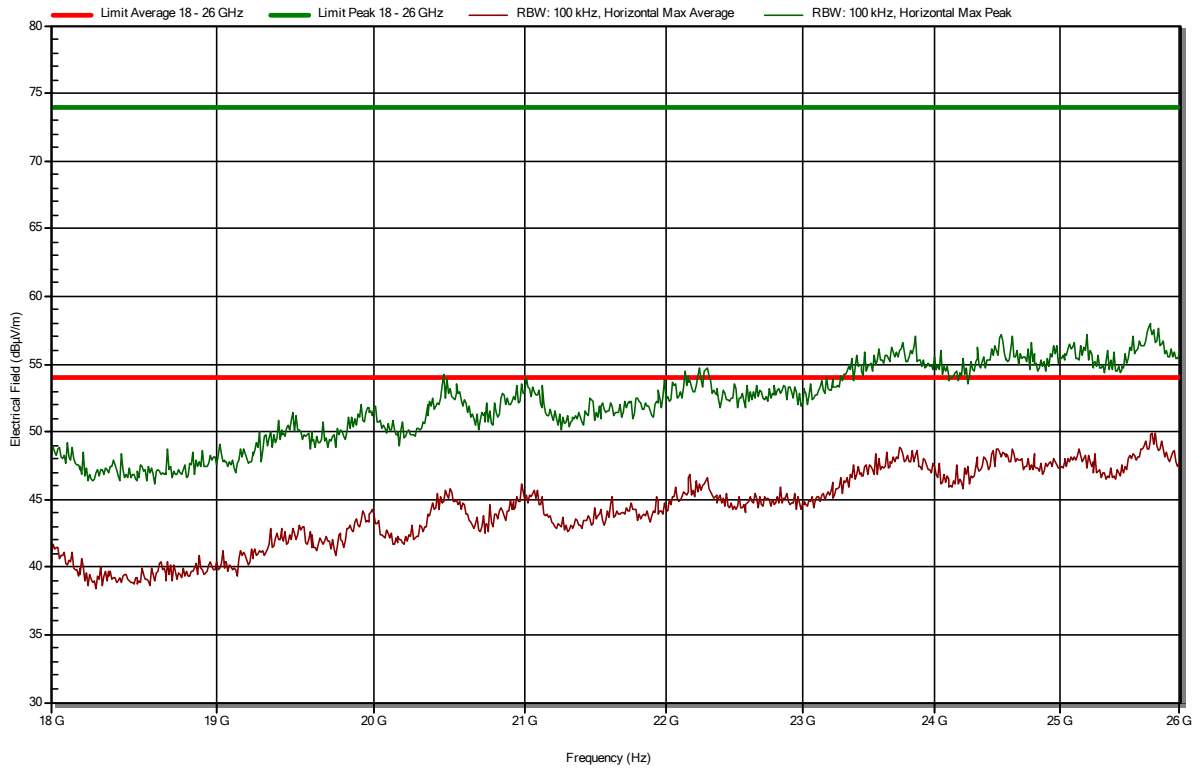
Vertical polarization

RadiMation



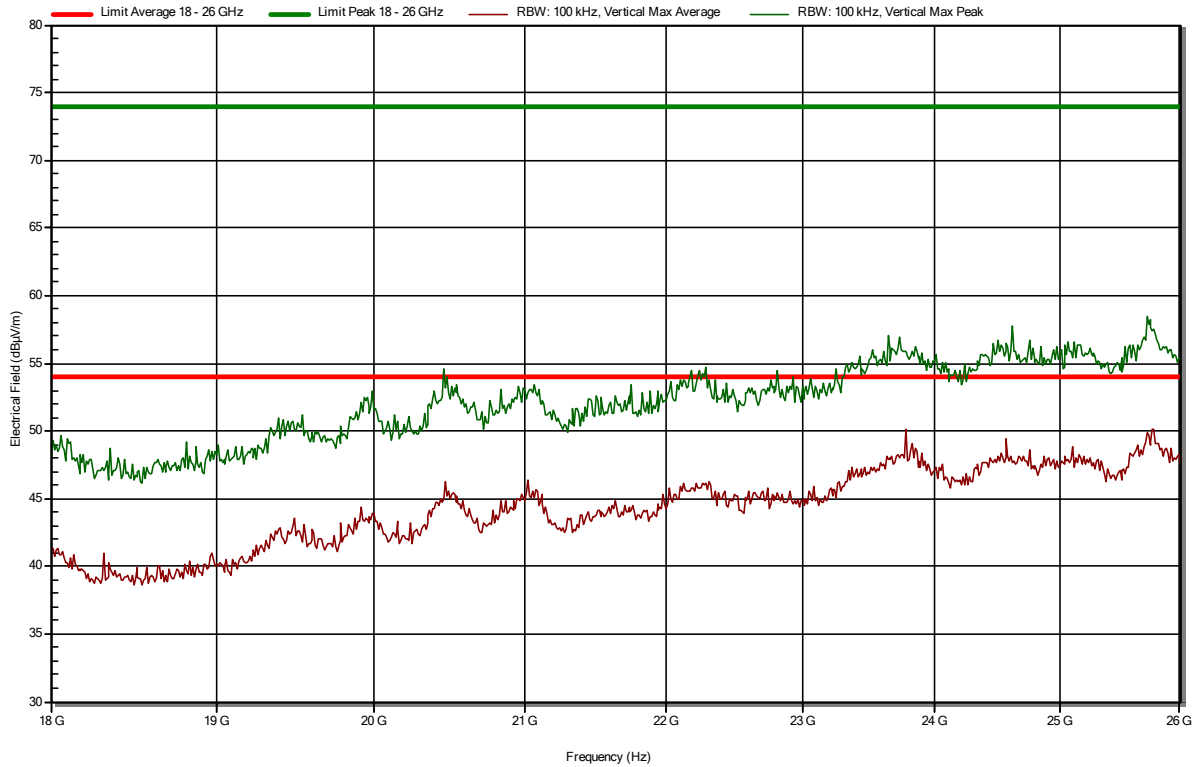
18 – 26 GHz Horizontal polarization

RadiMation



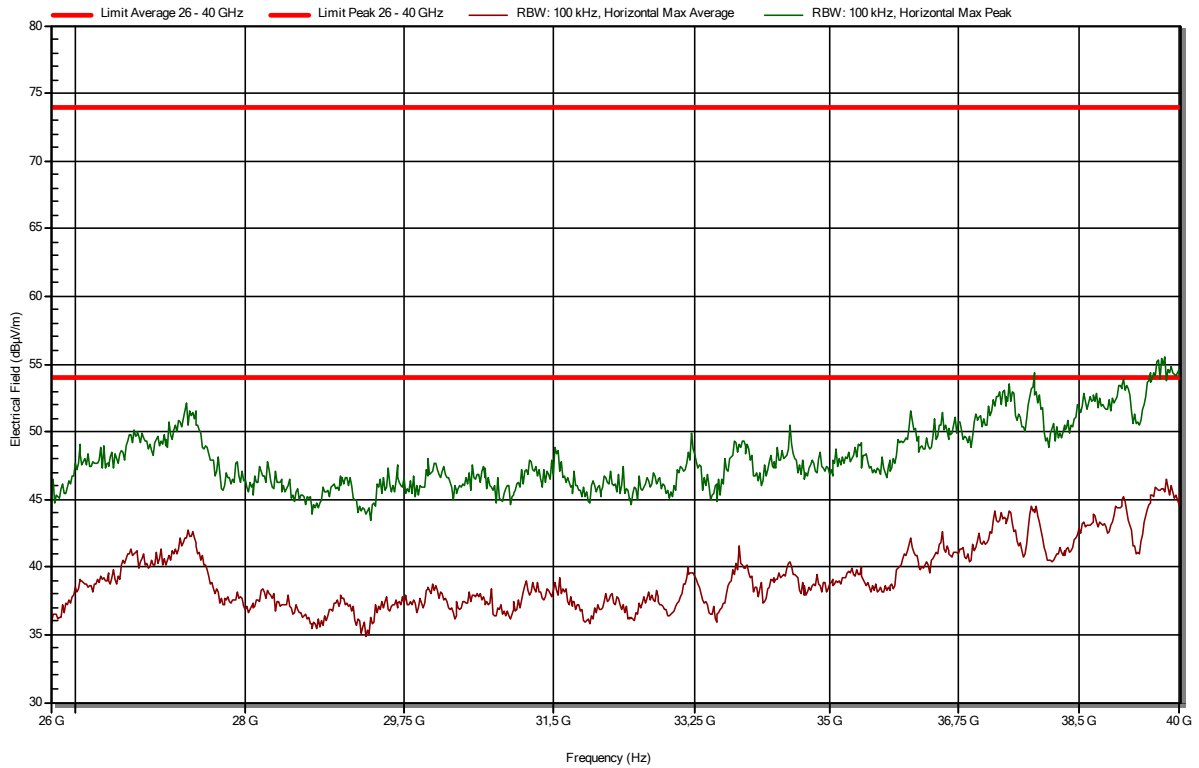
Vertical polarization

RadiMation



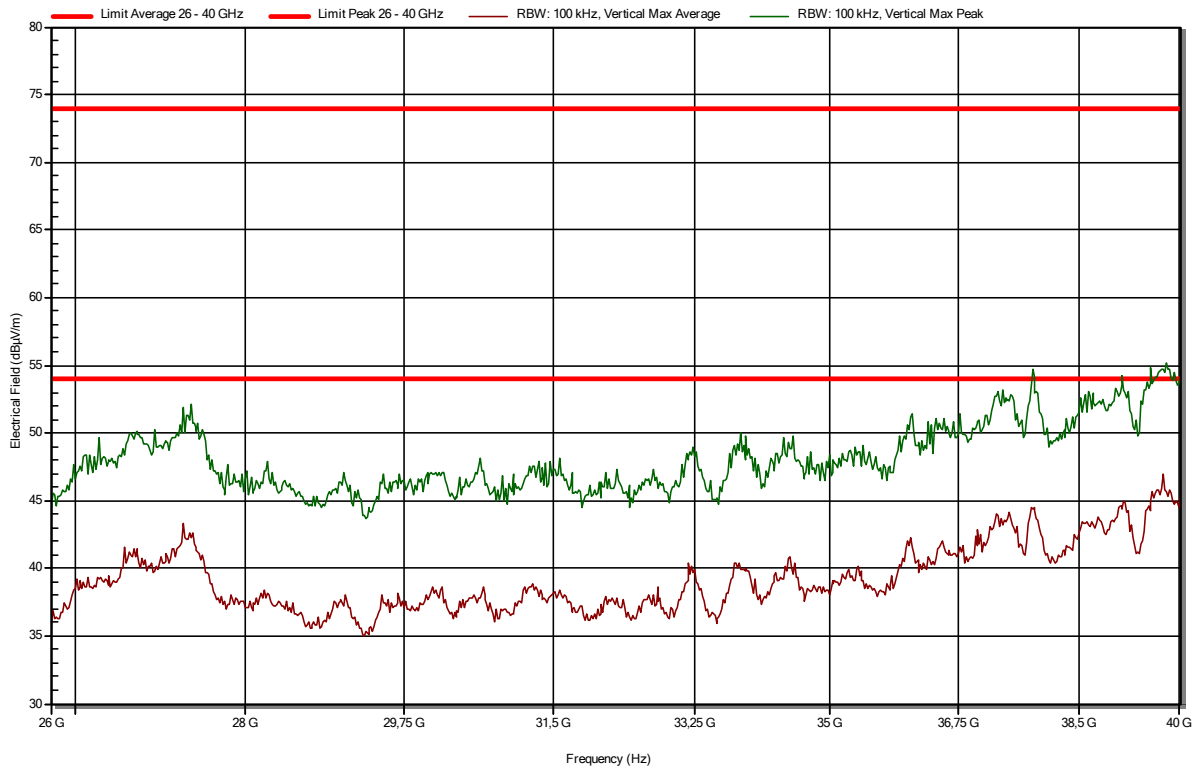
26 – 40 GHz Horizontal polarization

RadiMation



Vertical polarization

RadiMation



3.2 Conducted emissions

3.2.1 Limit

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

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

According to ANSI C63.4: 2014, section 13.3

IRN 029 – Method 1

3.2.5 Test results and plots of the AC mains conducted measurement

See next page.

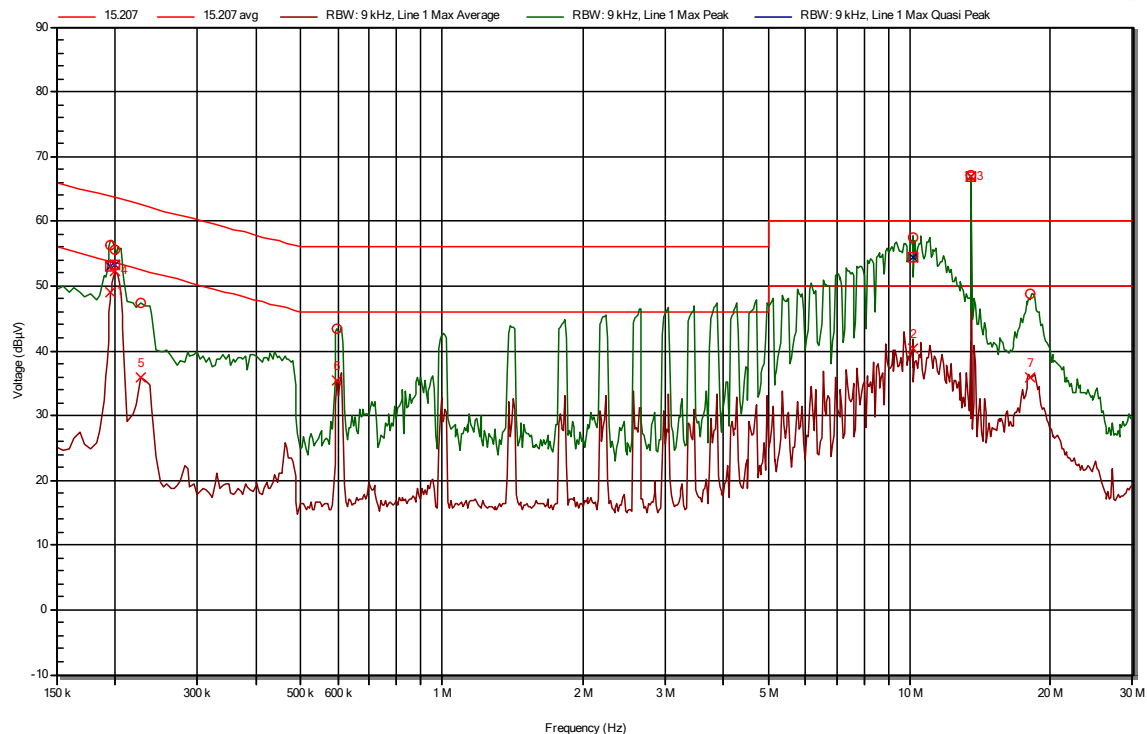
3.2.6 Measurement uncertainty

+/- 3.6 dB

3.2.7 Plots of the AC mains conducted spurious measurement

Phase

RadiMation

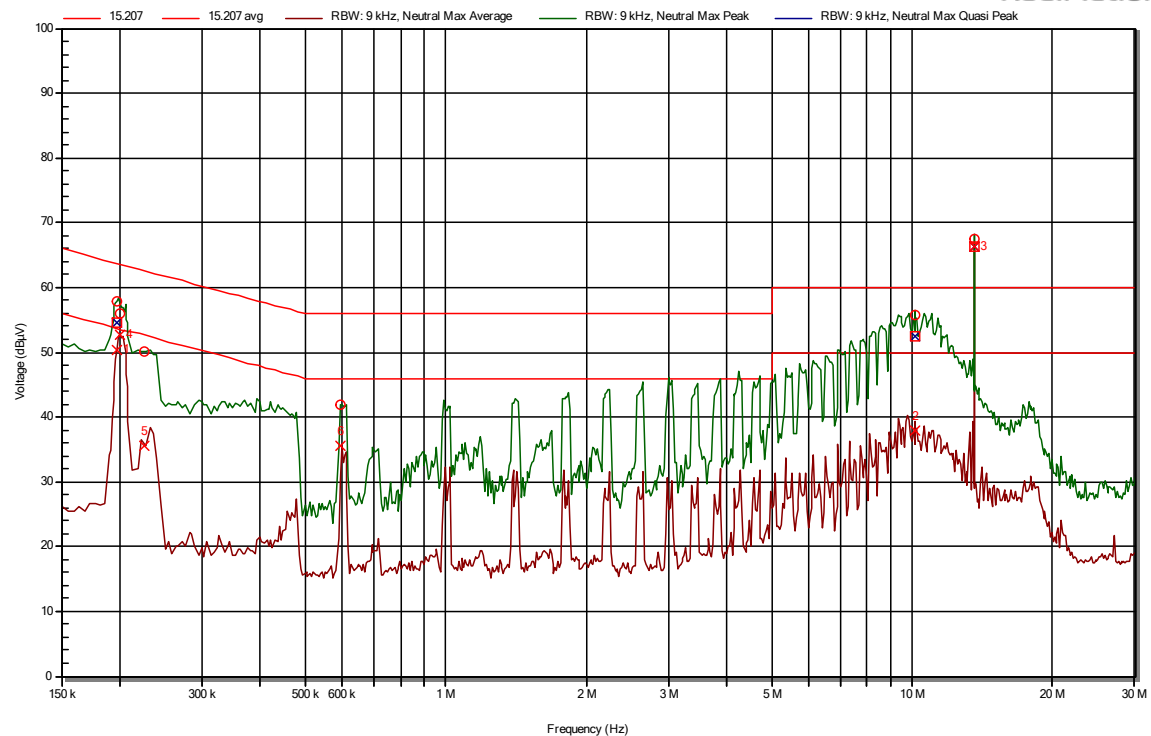


Peak Number	Frequency	Average	Average Limit	Quasi-Peak	Quasi-Peak Limit	Status
1	196,35 kHz	49,1 dBμV	53,8 dBμV	53,1 dBμV	63,8 dBμV	Pass
2	10,172 MHz	40,2 dBμV	50 dBμV	54,4 dBμV	60 dBμV	Pass
3	13,56 MHz	66,9 dBμV	50 dBμV	66,9 dBμV	60 dBμV	Pass*
4	199,95 kHz	52,3 dBμV	53,6 dBμV	53,2 dBμV	63,6 dBμV	Pass
5	226,5 kHz	35,9 dBμV	52,6 dBμV	--	--	Pass
6	595,5 kHz	35,4 dBμV	46 dBμV	--	--	Pass
7	18,155 MHz	36 dBμV	50 dBμV	--	--	Pass

*Note: the peak at 13.56 MHz is the transmission frequency of the NFC tag reader. This peak is not subject to the spurious emissions limit.

Neutral

RadiMation



Peak Number	Frequency	Average	Average Limit	Quasi-Peak	Quasi-Peak Limit	Status
1	196,8 kHz	50,3 dBμV	53,7 dBμV	54,6 dBμV	63,7 dBμV	Pass
2	10,167 MHz	37,9 dBμV	50 dBμV	52,5 dBμV	60 dBμV	Pass
3	13,56 MHz	66,3 dBμV	50 dBμV	66,3 dBμV	60 dBμV	Pass*
4	200,85 kHz	52,8 dBμV	53,6 dBμV	--	--	Pass
5	226,5 kHz	35,5 dBμV	52,6 dBμV	--	--	Pass
6	595,5 kHz	35,6 dBμV	46 dBμV	--	--	Pass

*Note: the peak at 13.56 MHz is the transmission frequency of the NFC tag reader. This peak is not subject to the spurious emissions limit.