

Report on the FCC and IC Testing of the Agrident GmbH AWR300

In accordance with FCC 47 CFR Part 15C, ISED
Canada RSS-210 and ISED Canada RSS-GEN
and FCC 47 CFR Part 15B and ICES-003

Prepared for: Agrident GmbH
Steinklippenstraße 10
D-30890 Barsinghausen

FCC ID: QG2AWR300
IC: 6252A-AWR300



Product Service

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Date: 2019-07-29
Document Number: TR-09774-38374-02 | Issue: 02

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Alex Fink	2019-07-29	
Authorised Signatory	Markus Biberger	2019-07-29	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN and FCC 47 CFR Part 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Alex Fink	2019-07-29	

Laboratory Accreditation
DAkS Reg. No. D-PL-11321-11-02

Laboratory recognition
Registration No. BNetzA-CAB-16/21-15

ISED Canada test site registration
3050A-2

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN:2016, Issue 09 (08-2016), Issue 04 (11-2014) and FCC 47 CFR Part 15B and ICES-003:2017 and 2016.

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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2019-03-18
2	RF Exposure Evaluation for Wifi and Bluetooth in chapter 2.6 added	2019-07-29

Table 1

1.2 Introduction

Applicant	Agrident GmbH
Manufacturer	Agrident GmbH
Model Number(s)	AWR300
Serial Number(s)	1244002065
Hardware Version(s)	N/A
Software Version(s)	N/A
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN:2016, Issue 09 (08-2016), Issue 04 (11-2014) and FCC 47 CFR Part 15B and ICES-003:2017 and 2016
Test Plan/Issue/Date	N/A
Order Number	2199
Date	2018-07-11
Date of Receipt of EUT	2019-01-11
Start of Test	2019-02-20
Finish of Test	2019-03-11
Name of Engineer(s)	Alex Fink, Matthias Stumpe
Related Document(s)	ANSI C63.10 (2013) ANSI C63.4: 2014



Product Service

1.3 Brief Summary

of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN and FCC 47 CFR Part 15B and ICES-003 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 7.2 V Battery Supply - Continuously reading RFID Tag				
2.1	15.249 (b)(2), N/A and 6.11	Frequency Tolerance Under Temperature Variations	Pass	ANSI C63.10 (2013)
2.2	15.209, 4.3 and 6.13	Field Strength of any Emission	Pass	ANSI C63.10 (2013)
2.3	15.215 (c), N/A and 6.6	20 dB Bandwidth	Pass	ANSI C63.10 (2013)
2.4	15.207, N/A and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10 (2013)
2.5	15.205, 4.1 and 8.10	Restricted Band Edges	Pass	ANSI C63.10 (2013)
2.6	15.107 and 6.1	Exposure of Humans to RF Fields	Pass	ANSI C63.4: 2014
Configuration and Mode: 7.2 V Battery Supply – normal operation mode				
2.7	15.109 and 6.2	Radiated Disturbance	Pass	ANSI C63.4: 2014
2.8	15.107 and 6.1	Conducted Disturbance at Mains Terminals	Pass	ANSI C63.4: 2014

Table 2



1.4 Application Form

Test sample basic information

Please enter the information below in english language, since it is directly copied to the reports, thank you!

General information (for report)	
Ordernumber (your PO number)	1275 (AWR300-WLAN Set), 1274 (AWR300 Set), 1276 (AWR300-WLAN 'Tepari' Set) (details on page 2 and 3)
Applicant (incl. address and contact person)	Agident GmbH, Steinklippenstr. 10, 30890 Barsinghausen, Germany, Mr. Helmut Ruppert
Manufacturer (when different to applicant)	
Name and address of factory(ies)	Agident GmbH, Steinklippenstr. 10, 30890 Barsinghausen, Germany

Equipment characteristics:			
Type of equipment:	Mobile RFID Reader for electronic animal identification		
Type designation*:	AWR300-WLAN, AWR300		
*Please consider:	<p>If the type designation has to be changed in the report the whole test of the product has to be repeated!</p> <p>More Info:</p> <p>Only available in german language: http://www.dakks.de/sites/default/files/dokumente/71_sd_0_019_beschluesse_horizontal_20160814_v1.0.pdf</p>		
Parts of the system:	AWR300 Stickreader, Y-Cable (for USB and Charger Power Supply)*, RS232 Cable*, Charger Power Supply* (* -> supporting devices only)		
Commercial value:	1.596,00€ (for two complete sets)		
Version of EUT: <small>In case of already tested products please describe the differences to the original sample</small>	Original Equipment		
Serial number:	1244002065, 1244002066		
Power supply:	<input type="checkbox"/> AC* Nominal: V Minimum: V Maximum: V Nominal frequency: Hz	<input type="checkbox"/> DC Nominal: V Minimum: V Maximum: V	<input checked="" type="checkbox"/> Battery Nominal: 7.2V

The AC Power Supply for internal battery charging is a supporting device only and is not part of the AWR300 approval.

highest frequency generated or used within the EUT	62.00 MHz <input checked="" type="checkbox"/> < 108 MHz
--	--

Marking plate (may only be a draft)	
<div><div><div>ag ident</div><div></div><div>P07/18</div></div><div><div>AWR300-WLAN p/n 1244 SN 1244002068 FCC ID QG2AWR300 IC: 6252A-AWR300</div><div><p>This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.</p><p>Contains Transmitter Modules: FCC ID X3ZBTMOD7 IC:8828A-MOD7 FCC ID X3ZWFMOD9 IC:8828A-MOD9</p><p>FC CE </p><p>Agident GmbH, Steinklippenstr. 10, 30890 Barsinghausen, Germany</p></div></div></div>	
<div><div><div>ag ident</div><div></div><div>P07/18</div></div><div><div>AWR300 p/n 1243 SN 1243002525 FCC ID QG2AWR300 IC: 6252A-AWR300</div><div><p>This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.</p><p>Contains Transmitter Module: FCC ID X3ZBTMOD7 IC:8828A-MOD7</p><p>FC CE </p><p>Agident GmbH, Steinklippenstr. 10, 30890 Barsinghausen, Germany</p></div></div></div>	
<div><div><div>ag ident</div><div></div><div>P07/18</div></div><div><div>AWR300-WLAN p/n 1247 SN 1247001051 FCC ID QG2AWR300 IC: 6252A-AWR300</div><div><p>This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.</p><p>Contains Transmitter Modules: FCC ID X3ZBTMOD7 IC:8828A-MOD7 FCC ID X3ZWFMOD9 IC:8828A-MOD9</p><p>FC CE </p><p>Agident GmbH, Steinklippenstr. 10, 30890 Barsinghausen, Germany</p></div></div></div>	



Explanations regarding order numbers and versions:

AWR300-WLAN: Part-Number: 1244 (the reader only, with WLAN)
AWR300-WLAN Set: Part Number: 1275 (contains accessories, like USB-Cable and Power-Supply)

AWR300-WLAN 'Tepari': Part-Number: 1247 (the reader only, with WLAN, blue sealing & other display foil)
AWR300-WLAN 'Tepari' Set: Part Number: 1276 (contains accessories, like USB-Cable and Power-Supply)

AWR300: Part-Number: 1243 (the reader only, without WLAN)
AWR300 Set: Part Number: 1274 (contains accessories, like USB-Cable and Power-Supply)

The versions with or without WLAN only differ in:

- Presence of the WLAN Module (assembled or not)
- Part Numbers
- Label

Differences between P/N 1244 (1275) and 1247 (1276) (both with WLAN):

- The sealing of the housing is blue instead red.
- The display foil has a different design (sold under a different brand name)
- Part Numbers
- Labels

Beside that, the different models are 100 percent identical.

Operating mode(s) // Methods of Observation	
Operating mode(s) for emission tests:	<ul style="list-style-type: none">▪ Continuous Reading Mode▪ FDX-B and HDX Transponder within the reading zone
Operating mode(s) for immunity tests:	<ul style="list-style-type: none">▪ Continuous Reading Mode▪ FDX-B and HDX Transponder within the reading zone
Methods of observation during immunity tests	



List of ports and cables					
No.	Description	Classification ¹	Cable type	Cable length used	Cable length maximum ²
D1	Power Supply to AWR300*	dc power	Unshielded	1.5 m**	1.5 m**
S2	Y-Cable (USB + Charge)	signal/control port	Shielded	1.1 m	1.1 m

* The AC Power Supply for internal battery charging is a supporting device only and is not part of the AWR300 approval.

** This is the cable length of the plug-in power supply. Another 1.1m are added by the Y-Cable.

For the items listed below, two of each have been provided:

List of devices connected to EUT				
No.	Description	Type designation	Serial no. or ID	Manufacturer
1		...		
2		...		

List of support devices				
No.	Description	Type designation	Serial no. or ID	Manufacturer
1	APS300 Power Supply	XP1515-1201000 (SF15-120125X)	-	Shining Fair Enterprises CO LTD
2	Y-Cable (USB + Charge)	APC300	-	Agrident

1.5 Product Information

1.5.1 Technical Description

Mobile RFID Reader for electronic animal identification

1.6 Deviations from the Standard

none

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing Test Laboratory.



Product Service

Test Name	Name of Engineer(s)
Configuration and Mode: 7.2 V Battery Supply - Continuously reading RFID Tag	
Frequency Tolerance Under Temperature Variations	Alex Fink
Field Strength of any Emission	Alex Fink, Matthias Stumpe
20 dB Bandwidth	Alex Fink
AC Power Line Conducted Emissions	Matthias Stumpe
Restricted Band Edges	Alex Fink
Configuration and Mode: 7.2 V Battery Supply – normal operation mode	
Radiated Disturbance	Alex Fink, Matthias Stumpe
Conducted Disturbance at Mains Terminals	Matthias Stumpe

Table 4

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Frequency Tolerance Under Temperature Variations

2.1.1 Specification Reference

ISED Canada RSS-210 and ISED Canada RSS-GEN, Clause N/A and 6.11

2.1.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.1.3 Date of Test

2019-03-06

2.1.4 Test Method

The EUT was set to transmit on maximum power with normal modulation. A frequency counter, was used to measure the frequency error. The temperature was adjusted between - 20°C and +50°C.

2.1.5 Environmental Conditions

Ambient Temperature 22.0 °C
Relative Humidity 32.0 %

2.1.6 Test Results

7.2 V Battery Supply - Continuously reading RFID Tag

Temperature	Voltage	kHz
- 20°C	7.2 V DC	134.19938
+ 20°C	6.6 V DC	134.19875
+ 20°C	7.2 V DC	134.19938
+ 20°C	8.4 V DC	134.19938
+ 50°C	7.2 V DC	134.19750

Table 5

ISED Canada RSS-210 Limit Clause

None specified



Product Service

2.1.7 Test Location and Test Equipment Used

This test was carried out in a non-shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2020-01-31
Climatic test chamber	ESPEC	PL-2J	18843	24	2019-03-31

Table 6

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.2 Field Strength of any Emission

2.2.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN, Clause 15.209, 4.3 and 6.13

2.2.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.2.3 Date of Test

2019-02-20 to 2019-03-11

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5. and ISED Canada RSS-Gen clause 6.13.

Measurements were made at a distance of 3 m. The limit lines shown on the plot were extrapolated from either 300 m or 30 m to the measurement distance of 3 m in accordance with ANSI C63.10 Clause 6.4.4.2.

For any emissions detected within 20 dB of the limit, a final measurement was made and recorded in the table below. The detector used for these measurements was a quasi-peak detector except for emissions within the bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where a CISPR average detector was used.

2.2.5 Environmental Conditions

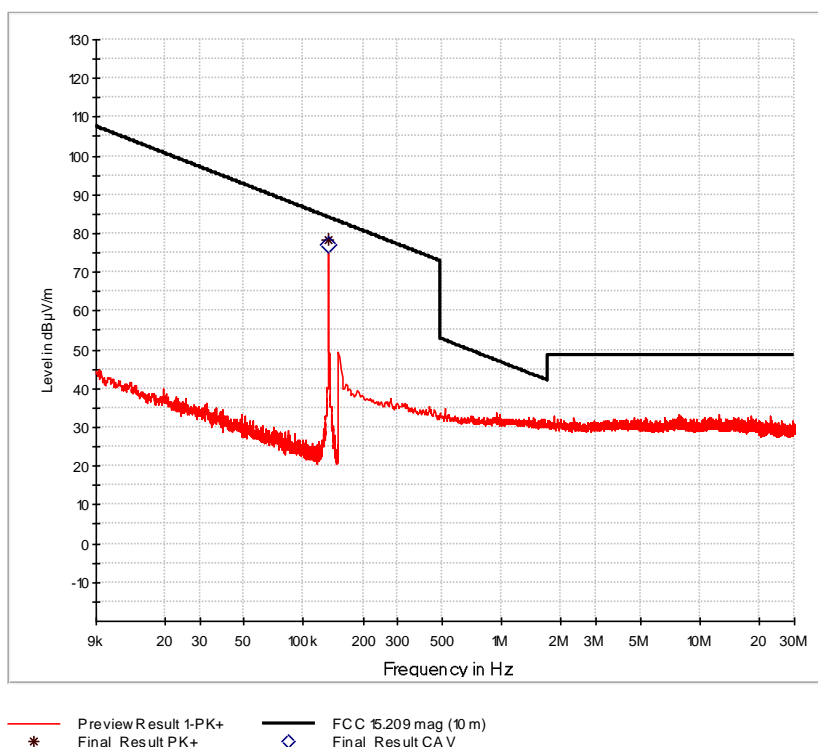
Ambient Temperature	22.0 °C
Relative Humidity	32.0 %

2.2.6 Test Results

7.2 V Battery Supply - Continuously reading RFID Tag

1. Orthogonal axis

Extrapolation factor: -40 dB/decade										
Frequency	Detector	Distance		Reading	Correction	Extrapolation	Pulse Train	Final	Limit	Margin
(MHz)		d1	d	Value	Factor	Factor	Correction	Value		
		(m)	(m)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
0,13420	Peak	10	300	58,5	20,0	-59,1		19,4	25,0	5,7

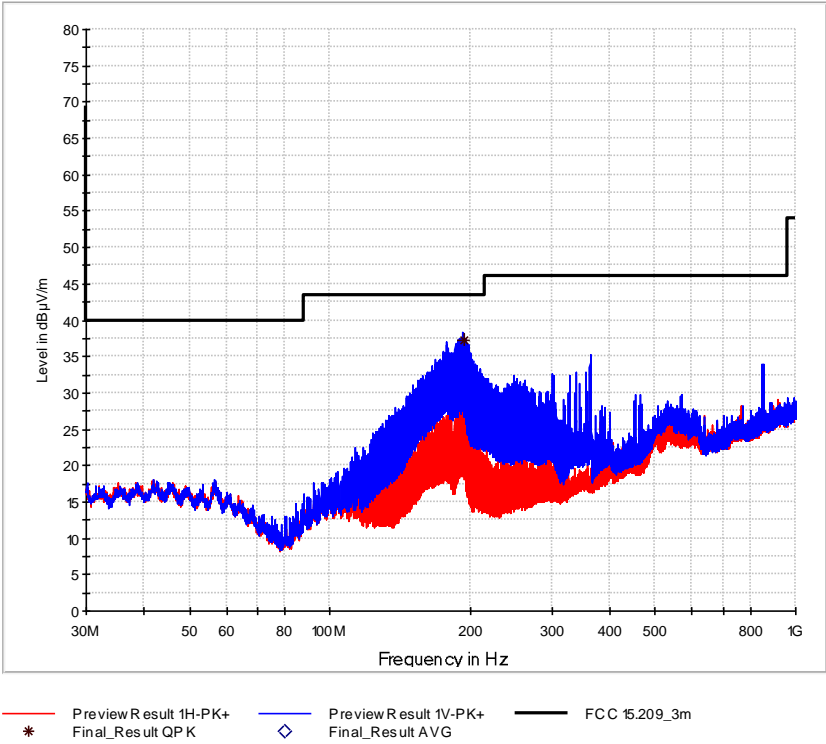


Final Results:

Frequency MHz	MaxPeak dBμV/m	CAverage dBμV/m	Limit dBμV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Pol	Azimuth deg	Corr. dB
0.134200	78.47	---	84.14	5.67	1000.0	0.200	H	-75.0	20.0
0.134200	---	77.04	---	---	1000.0	0.200	H	-75.0	20.0



Product Service



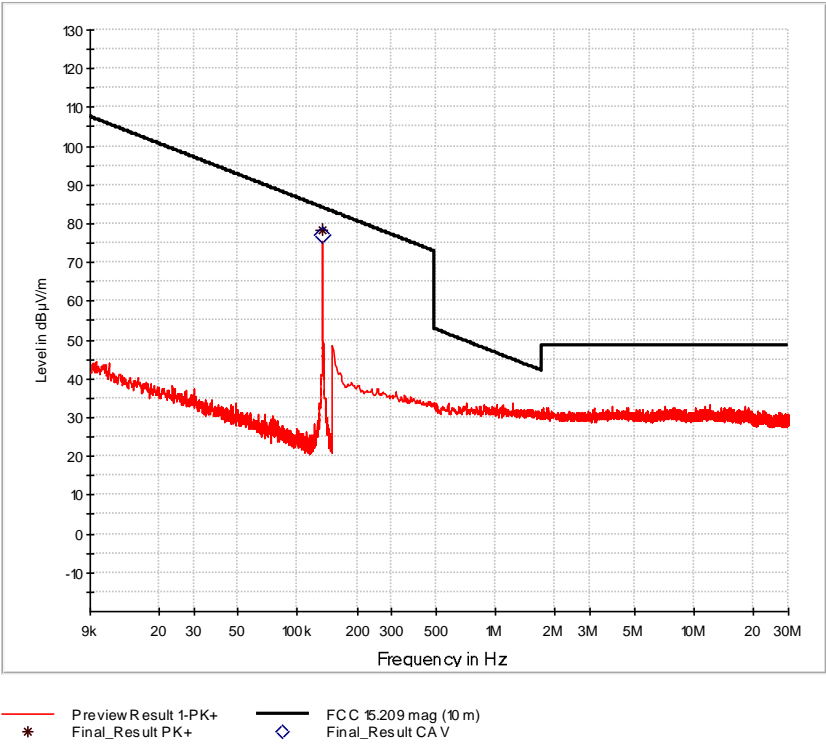
Final Results:

Frequency	QuasiPeak	Average	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB
193.525000	37.18	---	43.50	6.32	1000.0	120.000	155.0	V	-30.0	12.9



2. Orthogonal axis

Frequency (MHz)	Detector	Distance		Reading Value (dBμV)	Correction Factor (dB/m)	Extrapolation Factor (dB)	Pulse Train Correction (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
		d1 (m)	d (m)							
0,13420	Peak	10	300	58,5	20,0	-59,1		19,4	25,0	5,6

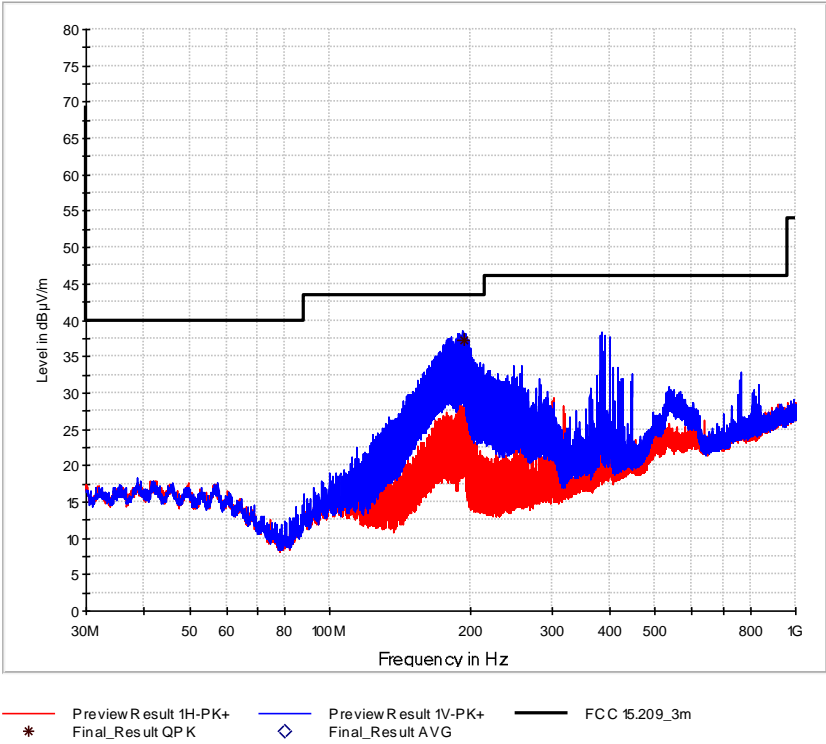


Final Results:

Frequency MHz	MaxPeak dBμV/m	CAverage dBμV/m	Limit dBμV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Pol	Azimuth deg	Corr. dB
0.134200	---	77.08	---	---	1000.0	0.200	H	-73.0	20.0
0.134200	78.51	---	84.14	5.63	1000.0	0.200	H	-73.0	20.0



Product Service



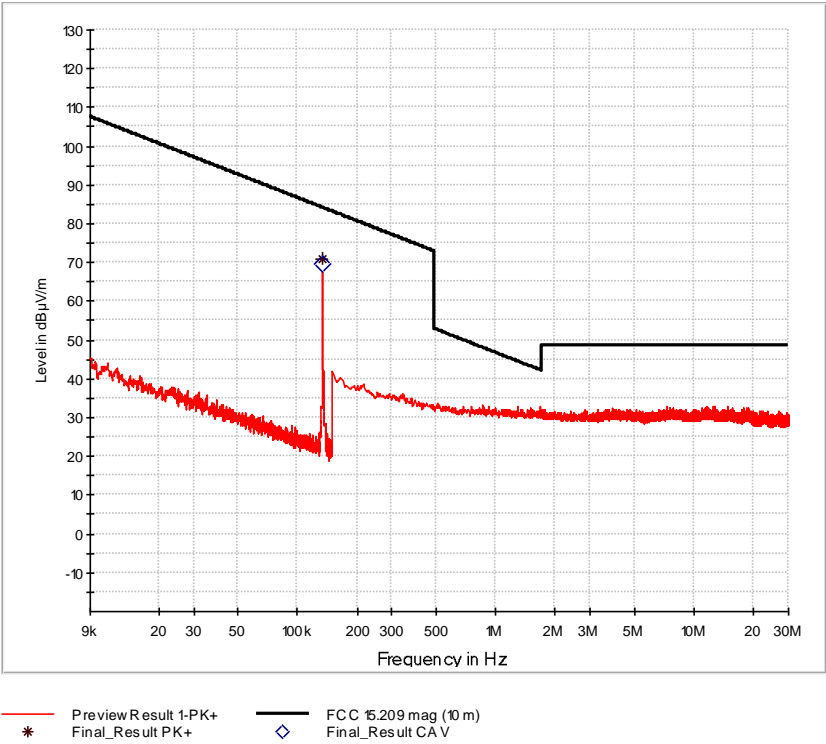
Final Results:

Frequency	QuasiPeak	Average	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB
193.525000	37.29	---	43.50	6.21	1000.0	120.000	154.0	V	144.0	12.9



3. Orthogonal axis

Extrapolation factor: -40 dB/decade										
Frequency (MHz)	Detector	Distance		Reading Value (dBμV)	Correction Factor (dB/m)	Extrapolation Factor (dB)	Pulse Train Correction (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
		d1 (m)	d (m)							
0,13420	Peak	10	300	50,9	20,0	-59,1		11,9	25,0	13,2

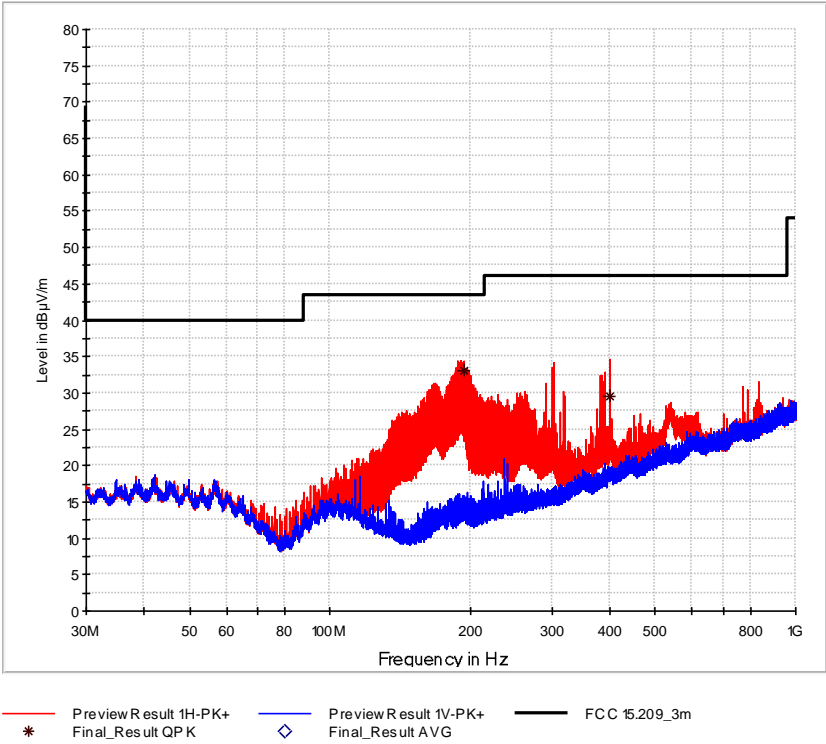


Final Results:

Frequency	MaxPeak	CAverage	Limit	Margin	Meas. Time	Bandwidth	Pol	Azimuth	Corr.
MHz	dBμV/m	dBμV/m	dBμV/m	dB	ms	kHz		deg	dB
0.134200	---	69.81	---	---	1000.0	0.200	H	195.0	20.0
0.134200	70.94	---	84.14	13.20	1000.0	0.200	H	195.0	20.0



Product Service



Final Results:

Frequency	QuasiPeak	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB
193.505000	33.13	43.50	10.37	1000.0	120.000	208.0	H	-129.0	12.9
400.440000	29.55	46.00	16.45	1000.0	120.000	110.0	H	150.0	17.8



FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1.705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	3

Table 7 - FCC Limit

NOTE: The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.

ISED Canada RSS-210, Limit Clause 4.4

Under no circumstance shall the level of any unwanted emissions exceed the level of the fundamental emissions.

ISED Canada RSS-Gen, Limit Clause 8.9

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1705 to 30	30	30

Table 8 - IC Limit, Below 30 MHz

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 metres)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 9 - IC Limit, Above 30 MHz



Product Service

2.2.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 8.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Loop Antenna	Rohde & Schwarz	HFH2-Z2	18876	36	2019-07-31
TRILOG Antenna	Schwarzbeck	VULB 9163	19691	24	2020-12-31
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31
EMC measurement software	Rohde & Schwarz	EMC32-ME+	19719	N/A	N/A

Table 10

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.3 20 dB Bandwidth

2.3.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN, Clause 15.215 (c), N/A and 6.6

2.3.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.3.3 Date of Test

2019-03-06

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.9.1.

2.3.5 Environmental Conditions

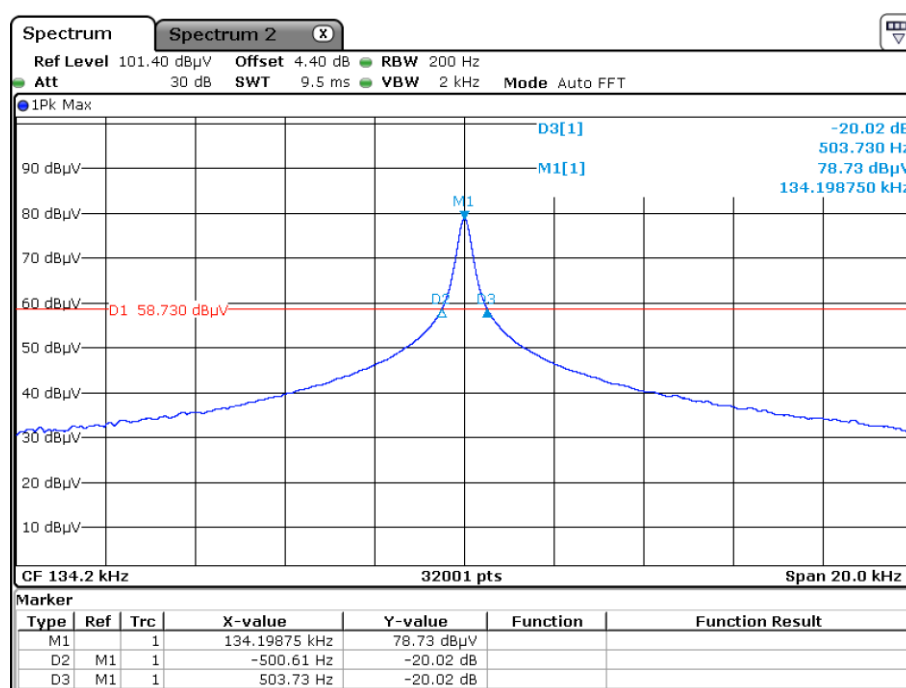
Ambient Temperature 22.0 °C
Relative Humidity 32.0 %

2.3.6 Test Results

7.2 V Battery Supply - Continuously reading RFID Tag

Frequency (kHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	F _{LOWER} (MHz)	F _{UPPER} (MHz)
134.2	1.004	2.988	133.7	134.7

Table 11

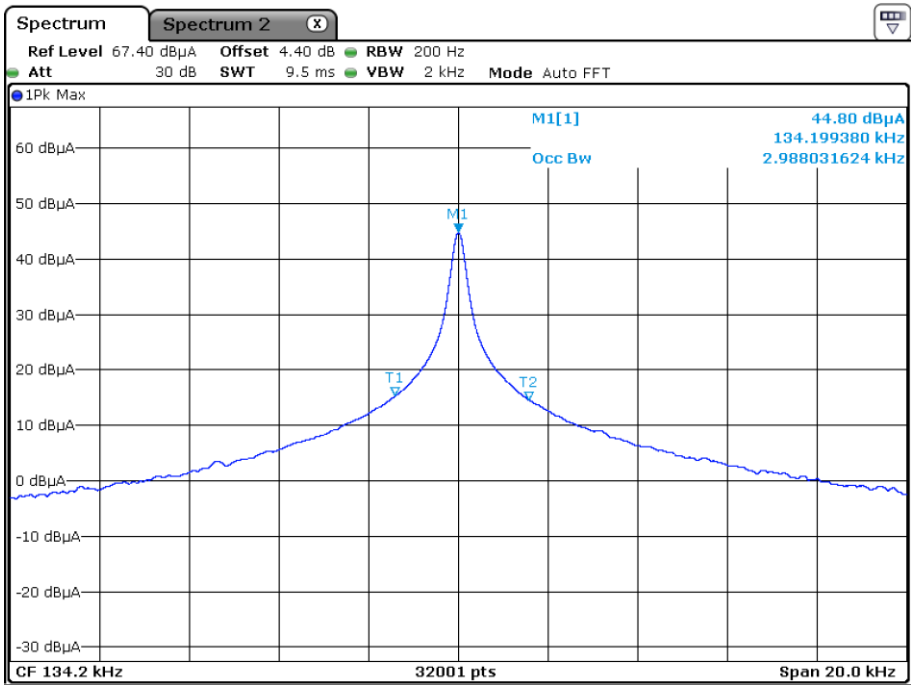


Date: 6.MAR.2019 14:25:50



Product Service

20 dB Bandwidth



Date: 6.MAR.2019 14:17:05

99% Occupied Bandwidth



FCC 47 CFR Part 15, Limit Clause 15.215 (c)

The 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

ISED Canada RSS 210 and ISED Canada RSS GEN, Limit Clause

None specified.

2.3.7 Test Location and Test Equipment Used

This test was carried out in a non-shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2020-01-31
Climatic test chamber	ESPEC	PL-2J	18843	24	2019-03-31

Table 12

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.4 AC Power Line Conducted Emissions

2.4.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN, Clause 15.207, N/A and 8.8

2.4.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.4.3 Date of Test

2019-02-21

2.4.4 Test Method

2.4.5 Environmental Conditions

Ambient Temperature	22.0 °C
Relative Humidity	32.0 %

2.4.6 Test Results

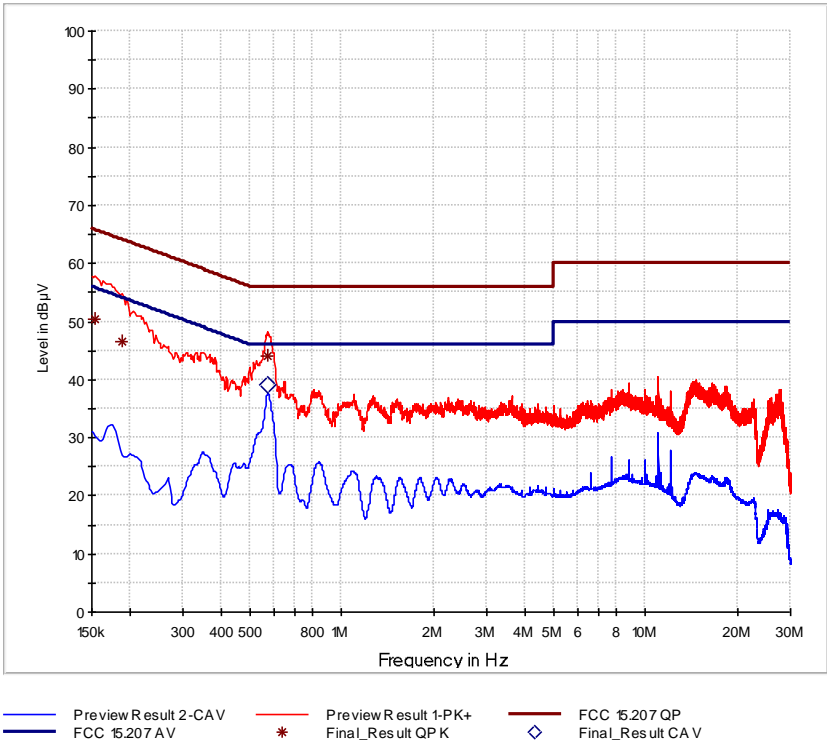
7.2 V Battery Supply - Continuously reading RFID Tag

Applied supply Voltage:	115 V AC
Applied supply frequency:	60 Hz



Product Service

L1-Line - 150k to 30 MHz



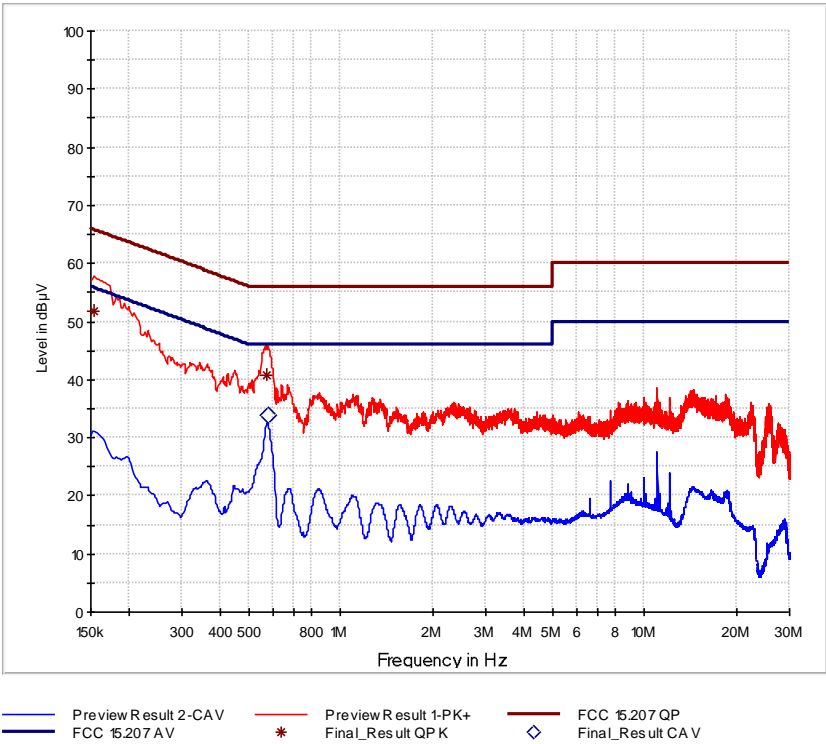
Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.154500	50.41	---	65.75	15.35	1000.0	9.000	L1	GND	0.0
0.188250	46.59	---	64.11	17.53	1000.0	9.000	L1	GND	0.0
0.566250	44.13	---	56.00	11.87	1000.0	9.000	L1	GND	0.0
0.568500	---	39.01	46.00	6.99	1000.0	9.000	L1	GND	0.0



Product Service

N-Line - 150k to 30 MHz



Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.154500	51.83	---	65.75	13.92	1000.0	9.000	N	GND	0.0
0.568500	40.67	---	56.00	15.33	1000.0	9.000	N	GND	0.0
0.573000	---	33.93	46.00	12.07	1000.0	9.000	N	GND	0.0



FCC 47 CFR Part 15, Limit Clause 15.207 and ISED Canada RSS-GEN, Limit Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 13

*Decreases with the logarithm of the frequency.

2.4.7 Test Location and Test Equipment Used

This test was carried out in a non-shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	100008	19730	18	2019-04-30
V-network	Rohde & Schwarz	894785/005	18919	36	2019-10-31
EMC measurement software	Rohde & Schwarz	EMC32-MEB	20090	N/A	N/A

Table 14

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.5 Restricted Band Edges

2.5.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-210 and ISED Canada RSS-GEN, Clause 15.205, 4.1 and 8.10

2.5.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.5.3 Date of Test

2019-03-06

2.5.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.13.1.

Plots for average measurements were taken in accordance with ANSI C63.10 clause 4.1.4.2.3.

Final average measurements were taken in accordance with ANSI C63.10 clause 4.1.4.2.2.

2.5.5 Environmental Conditions

Ambient Temperature 22.0 °C
Relative Humidity 32.0 %

2.5.6 Test Results

7.2 V Battery Supply - Continuously reading RFID Tag

See chapter 2.2 for results.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54

Table 15

ISED Canada RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (μV/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

Table 16

*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.



Product Service

2.5.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 8.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Loop Antenna	Rohde & Schwarz	HFH2-Z2	18876	36	2019-07-31
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31
EMC measurement software	Rohde & Schwarz	EMC32-ME+	19719	N/A	N/A

Table 17

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



Product Service

2.6 Exposure of Humans to RF Fields

2.6.1 Specification Reference

IC RSS-GEN Issue 4, section 3.2 and
IC RSS-102, Issue 5, section 2.5
KDB 447498 D01 General RF Exposure Guidance v06, chapter 4.3.1

2.6.2 Guide

IC RSS-102 Issue 5, section 2.5

2.6.3 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.6.4 Date of Test

2019-02-20 to 2019-03-11

2.6.5 Test Results



RFID Evaluation:

Exposure of Humans to RF Fields	Applicable	Declared by applicant	Measured	Exemption
The antenna is				
<input type="checkbox"/> detachable				
<p>The conducted output power (CP in watts) is measured at the antenna connector:</p> $CP = \dots\dots\dots \text{ W}$ <p>The effective isotropic radiated power (EIRP in watts) is calculated using</p> <p><input type="checkbox"/> the numerical antenna gain: $G = \dots\dots\dots$</p> $EIRP = G \cdot CP \Rightarrow EIRP = \dots\dots\dots \text{ W}$ <p><input type="checkbox"/> the field strength¹ in V/m: $FS = \dots\dots\dots \text{ V/m}$</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots\dots\dots \text{ W}$ <p>with:</p> <p>Distance between the antennas in m: $D = \dots\dots\dots \text{ m}$</p>			<input type="checkbox"/>	
<input checked="" type="checkbox"/> not detachable				
<p>A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by:</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \mathbf{0.2344 \text{ mW}}$ <p>with:</p> <p>Field strength in V/m: $FS = \mathbf{0.008385}$</p> <p>Distance between the two antennas in m: $D = \mathbf{10}$</p>			<input checked="" type="checkbox"/>	
Selection of output power				
<p>The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.):</p> $TP = \mathbf{0.2344 \text{ mW}}$				

¹ The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses. If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.



Exposure of Humans to RF Fields (continued)	Applicable	Declared by applicant	Measured	Exemption
Separation distance between the user and the transmitting device is				
<input checked="" type="checkbox"/> less than or equal to 20 cm		<input type="checkbox"/>		
<input type="checkbox"/> greater than 20 cm				
Transmitting device is				
<input type="checkbox"/> in the vicinity of the human head		<input type="checkbox"/>		
<input type="checkbox"/> body-worn				



SAR evaluation										
<p>SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.</p> <p>For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.</p> <p>For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.</p>										
Frequency (MHz)	Exemption limits (mW) ² at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
≤300 ³	71	101	132	162	193	223	254	284	315	345
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106

² The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

³ Transmitters operating between 3 kHz and 10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in IC RSS-102, issue 5, section 4.



Carrier frequency:	f	=	134.2 kHz				
Distance:	d	=	5 mm				
Transmitter output power:	TP	=	0.2344 mW				
Limit:	TP_{limit}	=	71 mW				<input checked="" type="checkbox"/>
<input type="checkbox"/> SAR evaluation is documented in test report no. ...							

Specifications:	RSS-102, Issue 5, Section 4, Table 4, Uncontrolled Environment SPR-002, Issue 1
Operation mode:	7.2 V Battery Supply - Continuously reading RFID Tag
Comment:	The nerve stimulation exposure limit is defined for the frequency range 3 kHz to 10 MHz, only. Thus, the carrier at 134.2 kHz was evaluated, only.

Test procedure:	IEC 62236-1, Section 4.2 “Measurement to show accordance to the reference levels”			
Test distance:	Direct contact to EUT			
Limit:	Frequency Range (MHz)	Electric Field (V/m _{rms})	Magnetic Field (A/m _{rms})	Peference Periode (min)
	0.003 – 10	83	90	Instantaneous
	0.1 – 10	---	0.73 / f	6
	1.1 - 10	87/f ^{0.5}	---	6
	f in MHz			
Test positions:	All surfaces: The antenna was moved all over the equipment under test using a test distance as stated above.			

Measured maximum value (V/m)	Maximum Limit at 134.2 kHz (V/m)	Margin to reference value (V/m)
13.53	83.00	69.47

Measured maximum value (A/m)	Maximum Limit at 134.2 kHz (A/m)	Margin to reference value (A/m)
14.90	90.00	75.1

Measured average value (A/m)	Average Limit at 134.2 kHz (A/m)	Margin to reference value (A/m)
1.29	5.84	4.55



Product Service

Wifi Evaluation

acc. to KDB 447498 D01:

Maximum measured Radiated Power (EIRP) Pmax:	10.5 dBm = 11.2 mW
Compliance Boundary d:	10 mm
Frequency f:	2472 MHz = 2.472 GHz
Numeric Threshold (Pmax / d) (f) ^{0.5}	1.76
Numeric Threshold Limit (1 g SAR):	3.0



acc. to IC RSS-GEN Issue 4, section 3.2 and IC RSS-102, Issue 5, section 2.5:

Exposure of Humans to RF Fields	Applicable	Declared by applicant	Measured	Exemption
The antenna is				
<input type="checkbox"/> detachable				
<p>The conducted output power (CP in watts) is measured at the antenna connector:</p> $CP =$ <p>The effective isotropic radiated power (EIRP in watts) is calculated using</p> <p><input type="checkbox"/> the numerical antenna gain: G</p> $EIRP = G \cdot CP \Rightarrow EIRP$ <p><input type="checkbox"/> the field strength⁴ in V/m: $FS = \dots\dots\dots$ V/m</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP =$ <p>with:</p> <p>Distance between the antennas in m: $D =$</p>			<input type="checkbox"/>	
<input checked="" type="checkbox"/> not detachable				
<p>A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by:</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP \text{ (10.5 dBm measured)} = 11.22 \text{ mW}$ <p>with:</p> <p>Field strength in V/m: $FS =$ dBμV/m</p> <p>$=$ mV/m</p> <p>Distance between the two antennas in m: $D =$</p>			<input type="checkbox"/>	
Selection of output power				
<p>The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.):</p> $TP = 11.22 \text{ mW}$				

⁴ The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses. If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.



Product Service

Exposure of Humans to RF Fields (continued)	Applicable	Declared by applicant	Measured	Exemption
Separation distance between the user and the transmitting device is				
<input checked="" type="checkbox"/> less than or equal to 20 cm	<input type="checkbox"/> greater than 20 cm	<input checked="" type="checkbox"/>		
Transmitting device is				
<input type="checkbox"/> in the vicinity of the human head	<input type="checkbox"/> body-worn	<input type="checkbox"/>		



SAR evaluation										
<p>SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.</p> <p>For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.</p> <p>For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.</p>										
Frequency (MHz)	Exemption limits (mW) ⁵ at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106
Carrier frequency:	$f = 2472 \text{ MHz}$									
Distance:	$d = 10 \text{ mm}$									
Transmitter output power:	$TP = 11.22 \text{ mW}$									
Limit:	$TP_{limit} = 17.5 \text{ mW}$									

⁵ The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.



Product Service

Bluetooth Evaluation

acc. to KDB 447498 D01:

Maximum measured Radiated Power (EIRP) Pmax:	- 0.8 dBm = 0.83 mW
Compliance Boundary d:	10 mm
Frequency f:	2480 MHz = 2.480 GHz
Numeric Threshold (Pmax / d) (f) ^{0.5}	0.13
Numeric Threshold Limit (1 g SAR):	3.0



acc. to IC RSS-GEN Issue 4, section 3.2 and IC RSS-102, Issue 5, section 2.5:

Exposure of Humans to RF Fields	Applicable	Declared by applicant	Measured	Exemption
The antenna is				
<input type="checkbox"/> detachable				
<p>The conducted output power (CP in watts) is measured at the antenna connector:</p> $CP =$ <p>The effective isotropic radiated power (EIRP in watts) is calculated using</p> <p><input type="checkbox"/> the numerical antenna gain: G</p> $EIRP = G \cdot CP \Rightarrow EIRP$ <p><input type="checkbox"/> the field strength⁶ in V/m: $FS = \dots\dots\dots$ V/m</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP =$ <p>with:</p> <p>Distance between the antennas in m: $D =$</p>			<input type="checkbox"/>	
<input checked="" type="checkbox"/> not detachable				
<p>A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by:</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP \text{ (-0.8 dBm measured)} = 0.83 \text{ mW}$ <p>with:</p> <p>Field strength in V/m: $FS =$ dBμV/m</p> <p>$=$ mV/m</p> <p>Distance between the two antennas in m: $D =$</p>			<input type="checkbox"/>	
Selection of output power				
<p>The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.):</p> $TP = 0.83 \text{ mW}$				

⁶ The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses. If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.



Product Service

Exposure of Humans to RF Fields (continued)	Applicable	Declared by applicant	Measured	Exemption
Separation distance between the user and the transmitting device is				
<input checked="" type="checkbox"/> less than or equal to 20 cm	<input type="checkbox"/> greater than 20 cm	<input checked="" type="checkbox"/>		
Transmitting device is				
<input type="checkbox"/> in the vicinity of the human head	<input type="checkbox"/> body-worn	<input type="checkbox"/>		



SAR evaluation										
<p>SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.</p> <p>For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.</p> <p>For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.</p>										
Frequency (MHz)	Exemption limits (mW) ⁷ at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106
Carrier frequency:	$f = 2480$ MHz									
Distance:	$d = 10$ mm									
Transmitter output power:	$TP = 0.83$ mW									
Limit:	$TP_{limit} = 17.5$ mW									

⁷ The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.



Product Service

2.6.6 Test Location and Test Equipment Used

This test was carried out in a Shielded room - cabin no. 4.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Electromagnetic radiation meter	Narda Safety	EMR-200	19590	36	2019-10-31
Electric field probe	Narda Safety	Type 8.3	19591	36	2019-10-31
Magnetic field probe	Narda Safety	Type 12.1	19592	36	2019-10-31
Exposure level tester	Narda Safety	ELT-400	19725	24	2020-06-30

Table 18



2.7 Radiated Disturbance

2.7.1 Specification Reference

FCC 47 CFR Part 15B and ICES-003, Clause 15.109 and 6.2

2.7.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.7.3 Date of Test

2019-03-11

2.7.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane.

A pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarisation using a peak detector; measurements were taken at a 3m distance. Using the pre-scan list of the highest emissions detected, their bearing and associated antenna polarisation, the EUT was then formally measured using a Quasi-Peak, Peak, Average detector as appropriate. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

2.7.5 Environmental Conditions

Ambient Temperature	21.0 °C
Relative Humidity	29.0 %

2.7.6 Test Results

7.4 V Battery Supply - normal operation mode

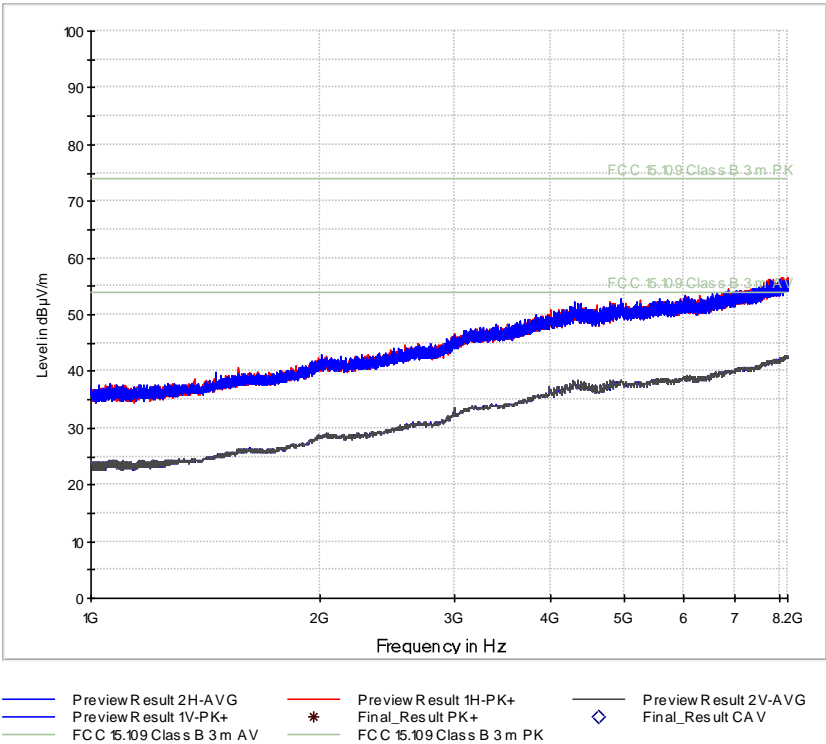
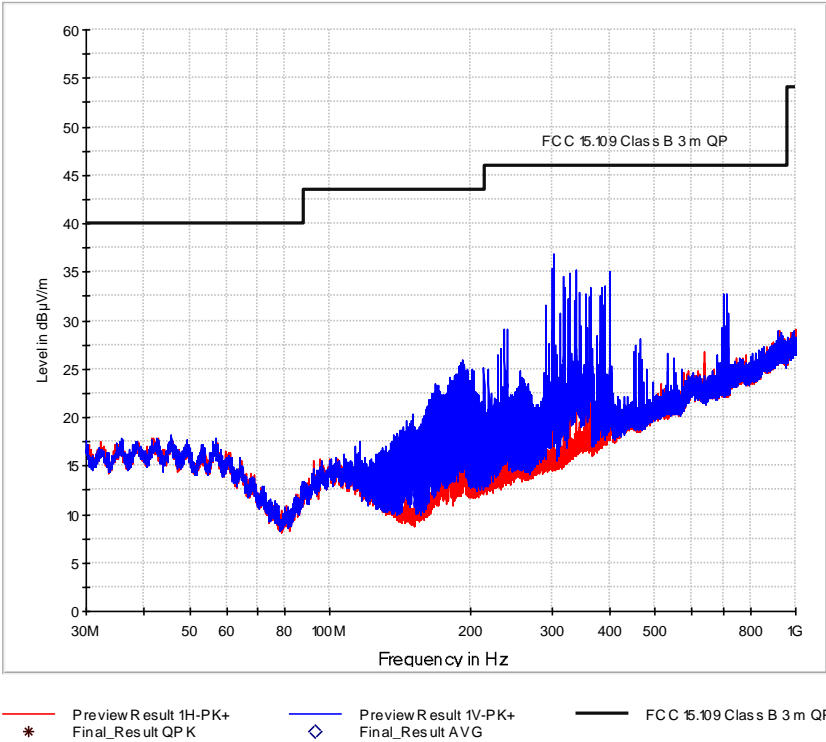
Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 2483.5 MHz
Which necessitates an upper frequency test limit of: 12.5 GHz

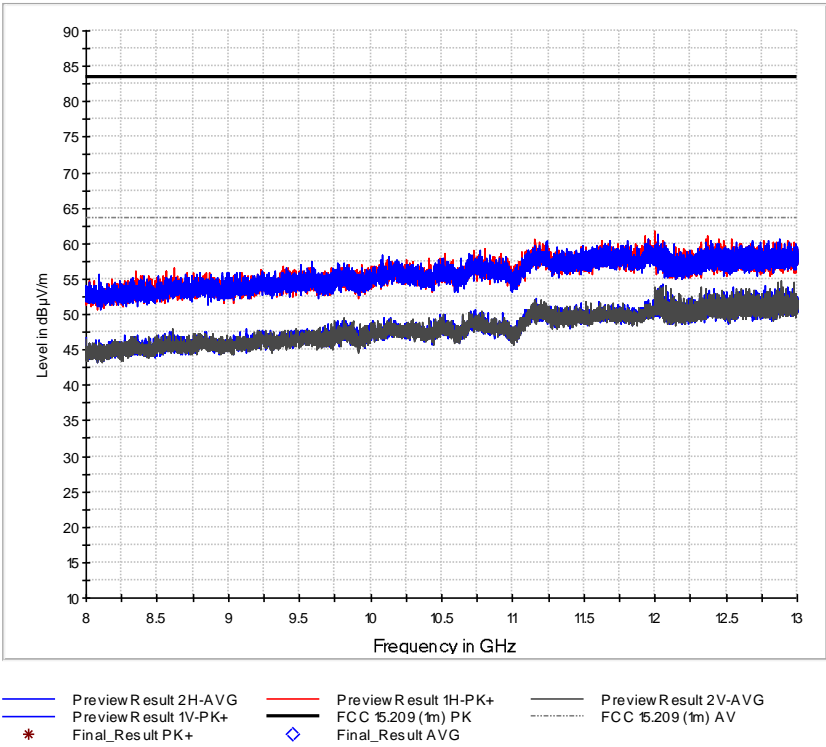


1. Orthogonal axis





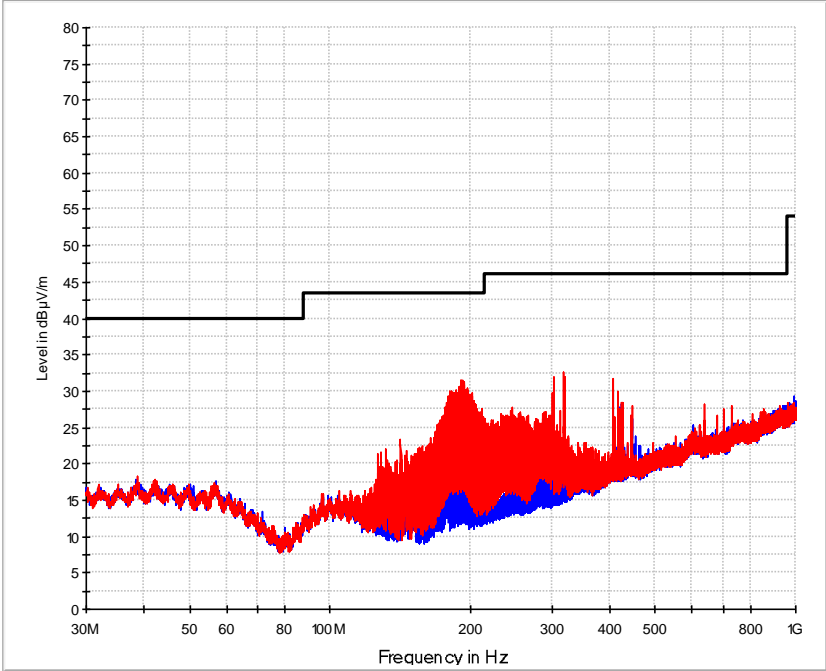
Product Service



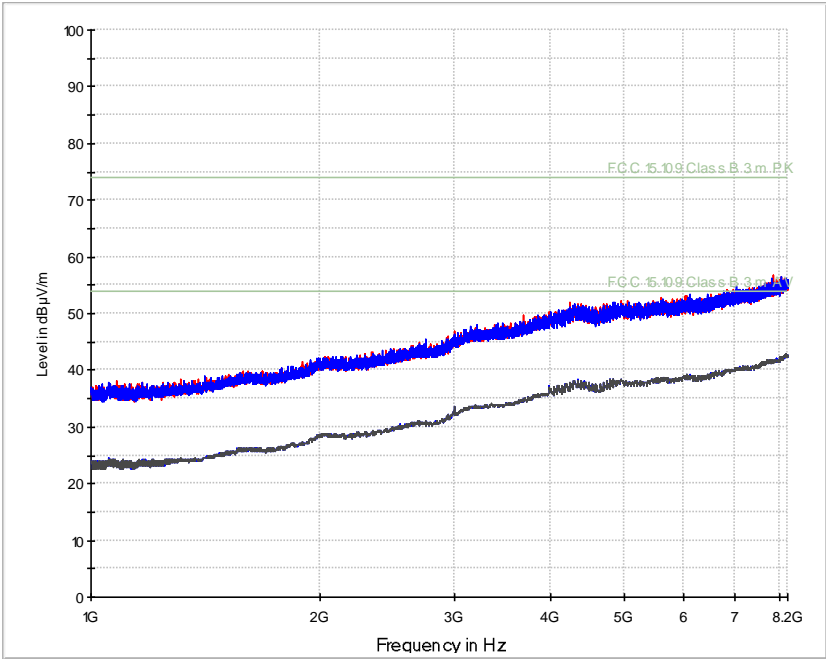


Product Service

2. Orthogonal axis



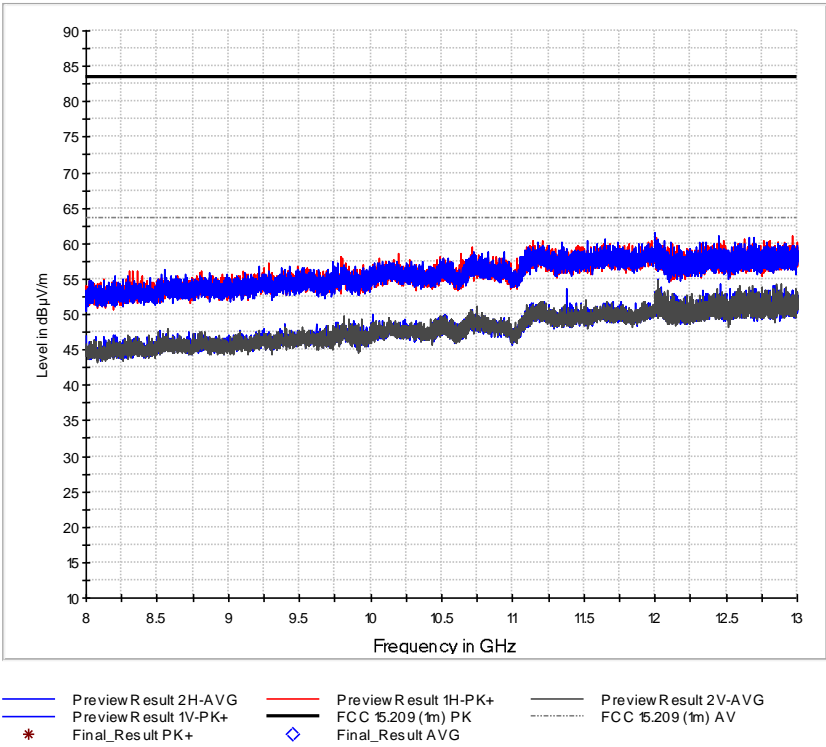
Preview Result 1V-PK+ Preview Result 1H-PK+ FCC 5.109 Class B 3 m QP
* Final Result QP K ♦ Final Result AVG



Preview Result 2H-AVG Preview Result 1H-PK+ Preview Result 2V-AVG
Preview Result 1V-PK+ * Final Result PK+ ♦ Final Result CAV
FCC 5.109 Class B 3 m AV FCC 5.109 Class B 3 m PK

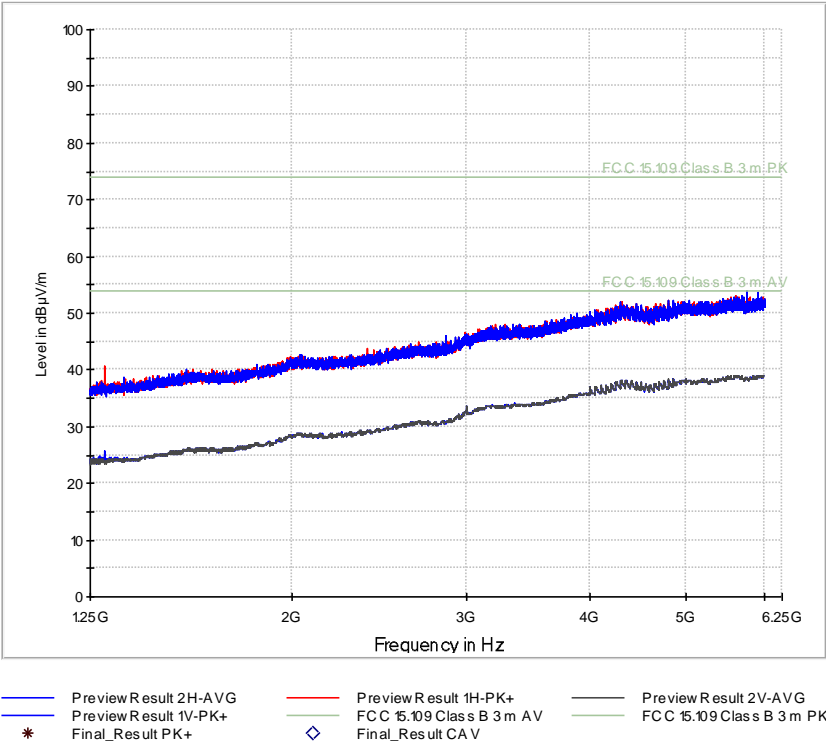
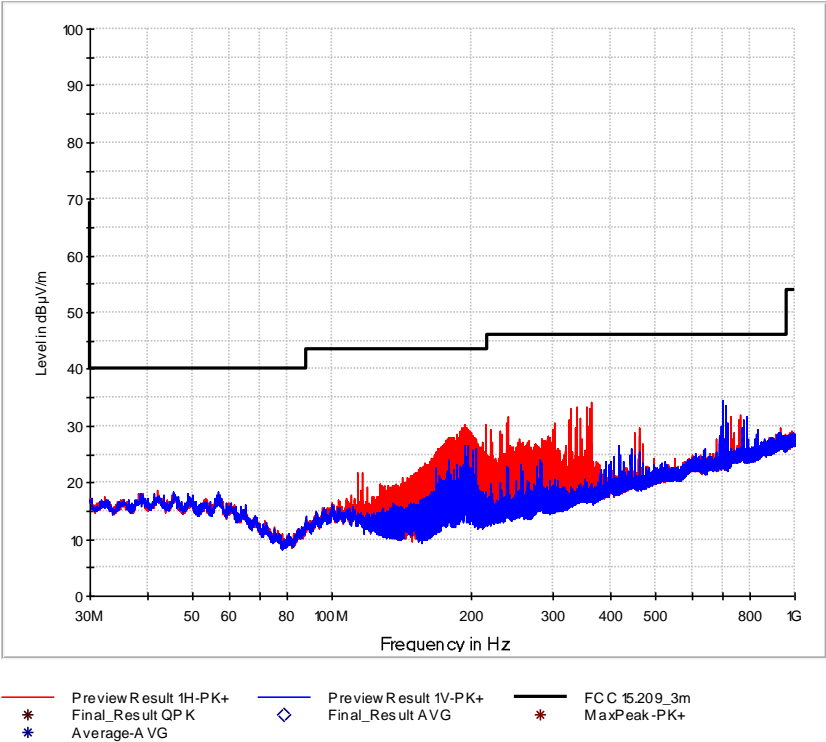


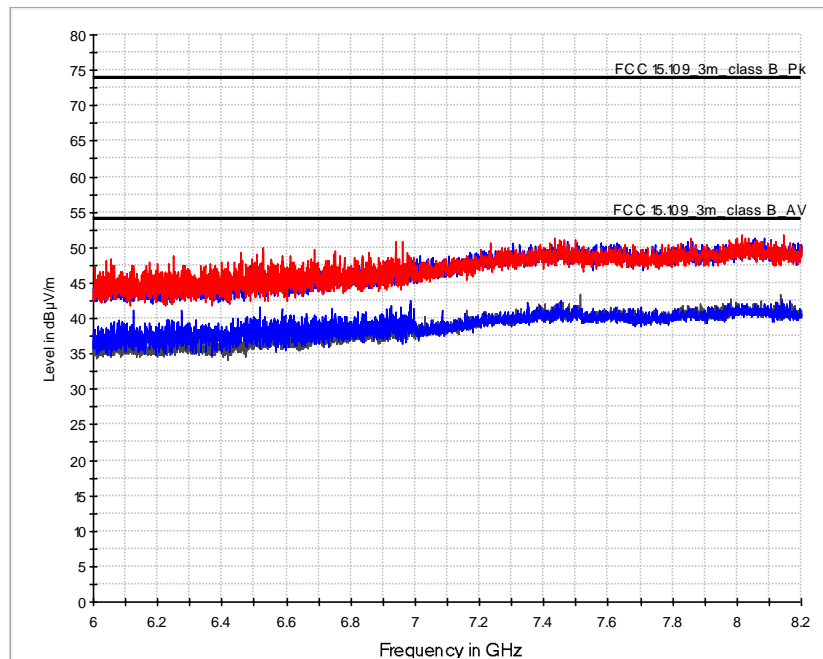
Product Service



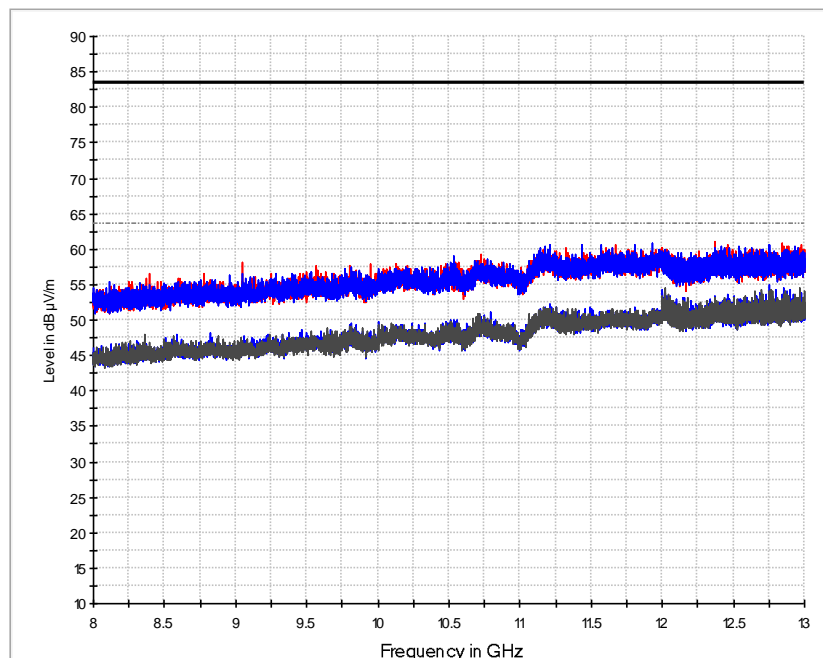


3. Orthogonal axis





— Preview Result 2V-AVG — Preview Result 1V-PK+ — Preview Result 2H-AVG
 — Preview Result 1H-PK+ * Final_Result PK+ ◇ Final_Result AVG
 — FCC 15.109_3m_class B_AV — FCC 15.109_3m_class B_Pk



— Preview Result 2H-AVG — Preview Result 1H-PK+ — Preview Result 2V-AVG
 — Preview Result 1V-PK+ * Final_Result PK+ ◇ Final_Result AVG
 — FCC 15.209 (1m) PK — FCC 15.209 (1m) AV



Product Service

2.7.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 8.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Double ridged waveguide horn antenna	Rohde & Schwarz	3115	19383	36	2020-02-29
TRILOG Antenna	Schwarzbeck	VULB 9163	19691	24	2020-12-31
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31
EMC measurement software	Rohde & Schwarz	EMC32-ME+	19719	N/A	N/A

Table 19

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.8 Conducted Disturbance at Mains Terminals

2.8.1 Specification Reference

FCC 47 CFR Part 15B and ICES-003, Clause 15.107 and 6.1

2.8.2 Equipment Under Test and Modification State

AWR300, S/N: 1244002065 - Modification State 0

2.8.3 Date of Test

2019-02-21

2.8.4 Test Method

The EUT was placed on a non-conductive table 0.8m above a reference ground plane and 0.4m away from a vertical coupling plane.

All power was connected to the EUT through an Artificial Mains Network (AMN). Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. The AMN was placed 0.8m from the boundary of the EUT and bonded to the reference ground plane.

2.8.5 Environmental Conditions

Ambient Temperature	22.0 °C
Relative Humidity	32.0 %

2.8.6 Test Results

7.4 V Battery Supply - normal operation mode

Performance assessment of the EUT made during this test: Pass.

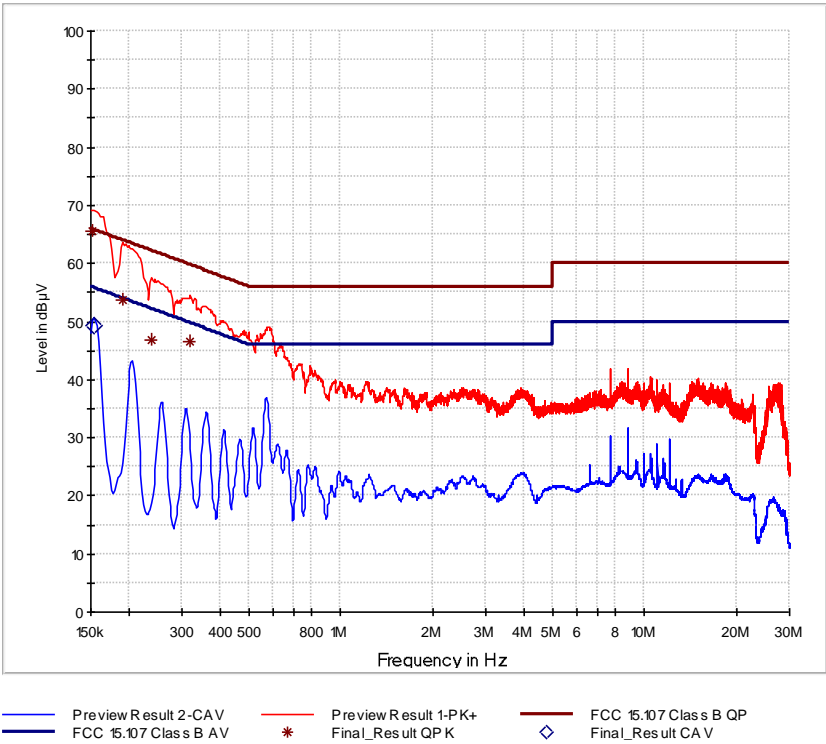
Applied supply Voltage:	115 V AC
Applied supply frequency:	60 Hz

Detailed results are shown below.



Product Service

L1-Line - 150k to 30 MHz

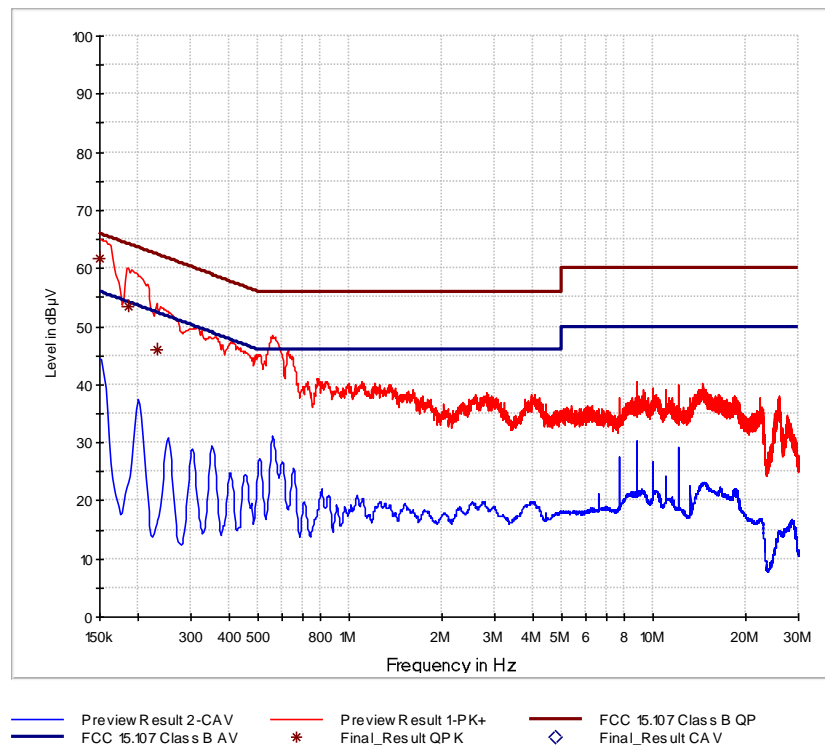


Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.152250	65.65	---	65.88	0.23	1000.0	9.000	L1	GND	0.0
0.154500	---	49.21	55.75	6.54	1000.0	9.000	L1	GND	0.0
0.190500	53.58	---	64.02	10.43	1000.0	9.000	L1	GND	0.0
0.237750	46.94	---	62.17	15.24	1000.0	9.000	L1	GND	0.0
0.318750	46.69	---	59.74	13.05	1000.0	9.000	L1	GND	0.0



N-Line - 150k to 30 MHz



Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.150000	61.57	---	66.00	4.43	1000.0	9.000	N	GND	0.0
0.186000	53.50	---	64.21	10.72	1000.0	9.000	N	GND	0.0
0.231000	46.05	---	62.41	16.36	1000.0	9.000	N	GND	0.0

2.8.7 Test Location and Test Equipment Used

This test was carried out in Shielded room - cabin no. 1.

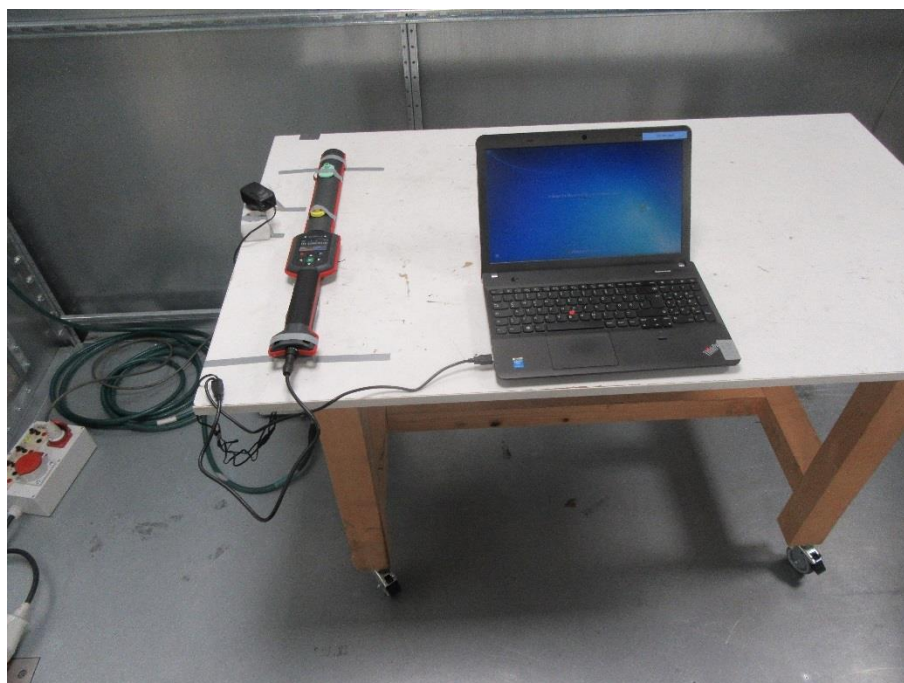
Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	100008	19730	18	2019-04-30
V-network	Rohde & Schwarz	894785/005	18919	36	2019-10-31
EMC measurement software	Rohde & Schwarz	EMC32-MEB	20090	N/A	N/A

Table 20

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

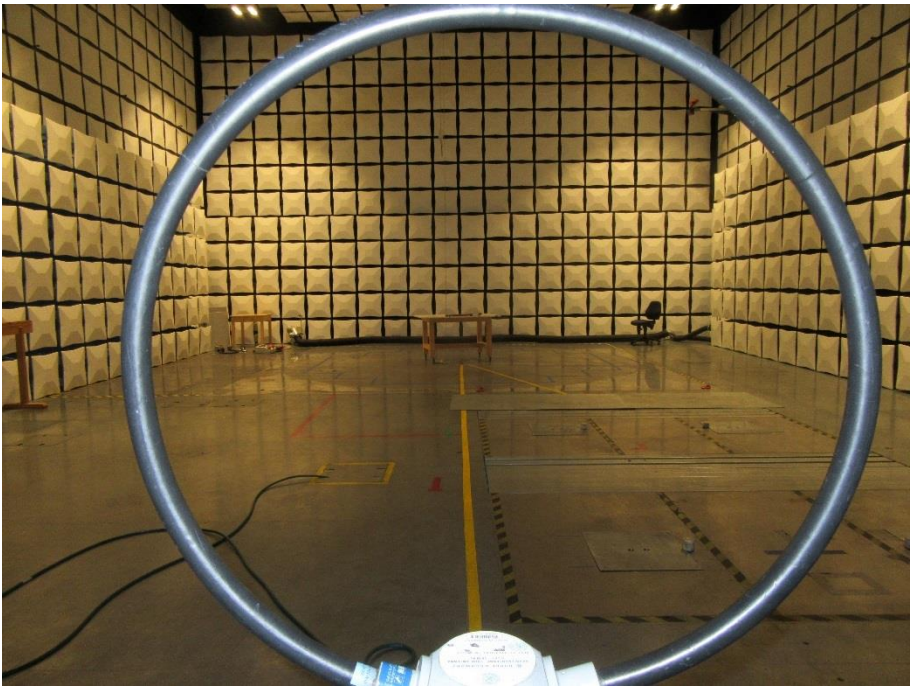
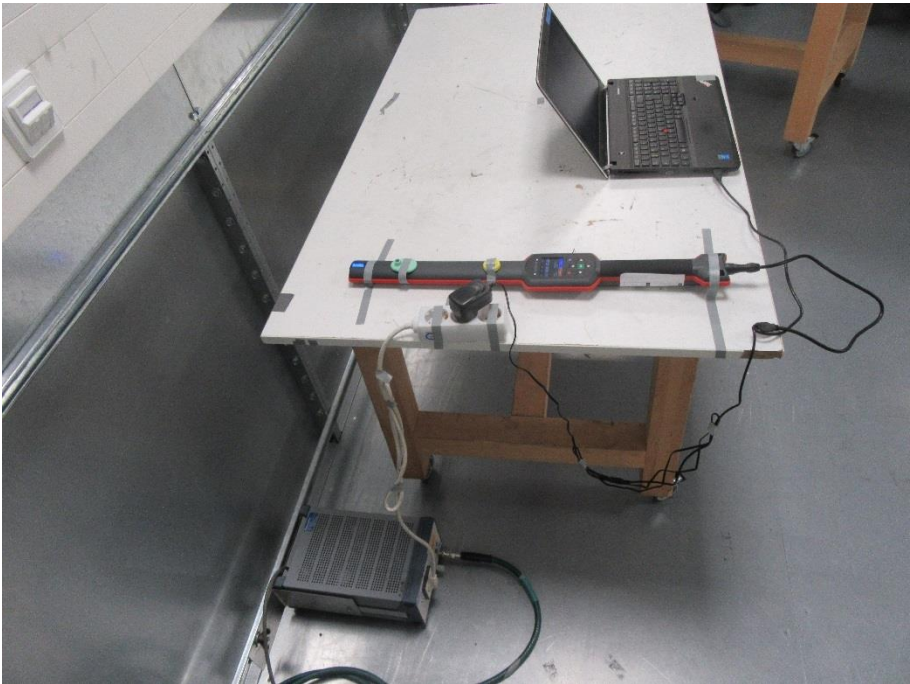
3 Photographs

3.1 Equipment Under Test (EUT)



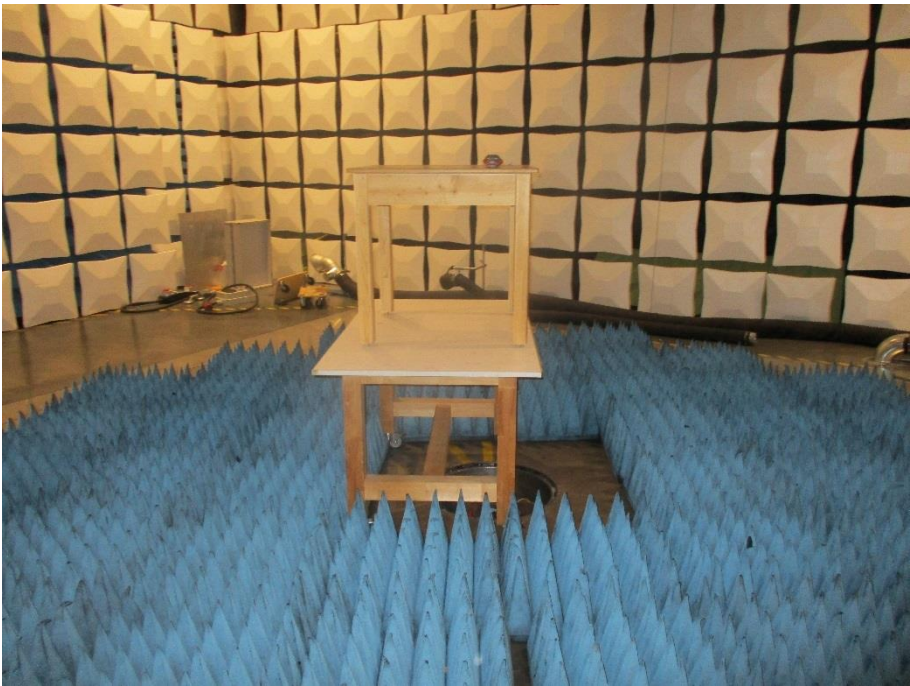
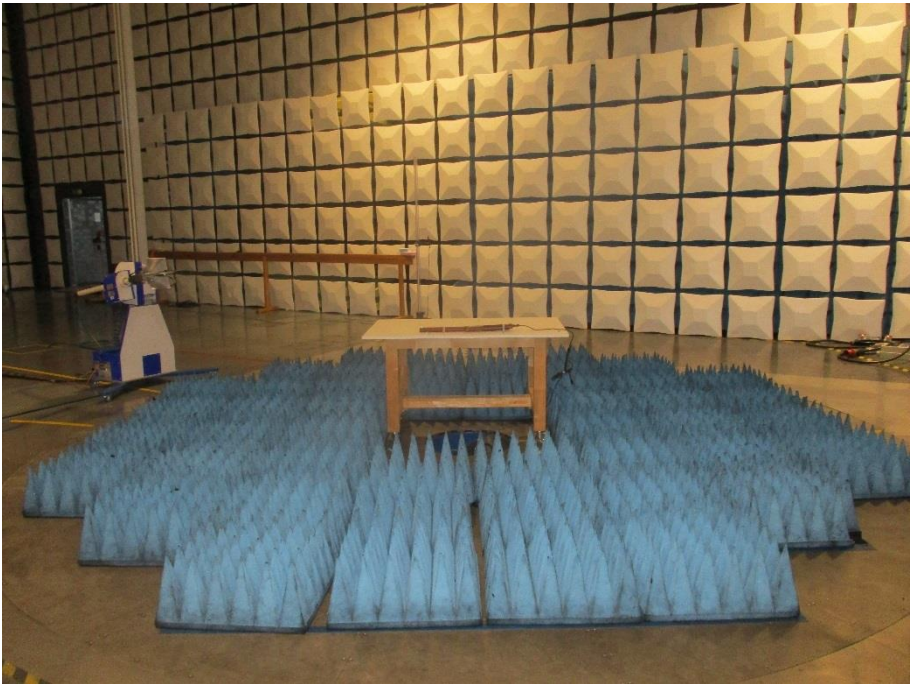


Product Service





Product Service





4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Radio Testing			
Test Name	kp	Expanded Uncertainty	Note
Occupied Bandwidth	2.0	$\pm 1.14 \%$	2
RF-Frequency error	1.96	$\pm 1 \cdot 10^{-7}$	7
RF-Power, conducted carrier	2	$\pm 0.079 \text{ dB}$	2
RF-Power uncertainty for given BER	1.96	$+0.94 \text{ dB} / -1.05$	7
RF power, conducted, spurious emissions	1.96	$+1.4 \text{ dB} / -1.6 \text{ dB}$	7
RF power, radiated			
25 MHz – 4 GHz	1.96	$+3.6 \text{ dB} / -5.2 \text{ dB}$	8
1 GHz – 18 GHz	1.96	$+3.8 \text{ dB} / -5.6 \text{ dB}$	8
18 GHz – 26.5 GHz	1.96	$+3.4 \text{ dB} / -4.5 \text{ dB}$	8
40 GHz – 170 GHz	1.96	$+4.2 \text{ dB} / -7.1 \text{ dB}$	8
Spectral Power Density, conducted	2.0	$\pm 0.53 \text{ dB}$	2
Maximum frequency deviation			
300 Hz – 6 kHz	2	$\pm 2.89 \%$	2
6 kHz – 25 kHz	2	$\pm 0.2 \text{ dB}$	2
Maximum frequency deviation for FM	2	$\pm 2.89 \%$	2
Adjacent channel power 25 MHz – 1 GHz	2	$\pm 2.31 \%$	2
Temperature	2	$\pm 0.39 \text{ K}$	4
(Relative) Humidity	2	$\pm 2.28 \%$	2
DC- and low frequency AC voltage			
DC voltage	2	$\pm 0.01 \%$	2
AC voltage up to 1 kHz	2	$\pm 1.2 \%$	2
Time	2	$\pm 0.6 \%$	2

Table 21



Radio Interference Emission Testing			
Test Name	kp	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 1 m (ALSE)			
9 kHz to 150 kHz	2	± 4.6 dB	1
150 kHz to 30 MHz	2	± 4.1 dB	1
30 MHz to 200 MHz	2	± 5.2 dB	1
200 MHz to 2 GHz	2	± 4.4 dB	1
2 GHz to 3 GHz	2	± 4.6 dB	1
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			4
Voltage Changes, Voltage Fluctuations and Flicker			4

Table 22



Immunity Testing			
Test Name	kp	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2	+32.2 / -24.3 %	5
Dynamic feedback field level	2.05	+21.2 / -17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances, induced by RF-Fields			
via CDN	2	+15.1 / -13.1 %	6
via EM clamp	2	+42.6 / -29.9 %	6
via current clamp	2	+43.9 / -30.5 %	6
Power Frequency Magnetic Field	2	+20.7 / -17.1 %	2
Pulse Magnetic Field			4
Voltage Dips, Short Interruptions and Voltage Variations			4
Oscillatory Waves			4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

Table 23

Note 1:

The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 2:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 3:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2.05$, providing a level of confidence of $p = 95.45\%$

Note 4:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence.

Note 5:

The expanded uncertainty reported according to IEC 61000-4-3 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 6:

The expanded uncertainty reported according to IEC 61000-4-6 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 7:

The expanded uncertainty reported according to ETSI TR 100 028 V1.4.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 1.96$, providing a level of confidence of $p = 95.45\%$

Note 8:

The expanded uncertainty reported according to ETSI TR 102 273 V1.2.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 1.96$, providing a level of confidence of $p = 95.45\%$