

Report on the FCC and IC Testing of the BALTECH AG

Model: 10117-501

In accordance with FCC 47 CFR Part 15C and
Industry Canada RSS-210 and Industry Canada
RSS-GEN

Prepared for: BALTECH AG
Lilienthalstr. 27
85399 Hallbergmoos - Germany

FCC ID: OKY10117501A01A
IC: 7657A-10117501



Product Service

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Date: 2018-08-20

Document Number: TR-69583-37259-01 | Issue: 02

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Michael Ingerl	2018-08-20	
Authorised Signatory	Markus Biberger	2018-08-20	

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 and Industry Canada RSS-210 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Michael Ingerl	2018-08-20	

Laboratory Accreditation

DAkkS Reg. No. D-PL-11321-11-02

Laboratory recognition

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

Industry 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, Industry Canada RSS-210 and Industry Canada RSS-GEN:2016, Issue 09 (08-2016) and Issue 04 (11-2014).

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Product Service

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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	2018-07-17
2	Added IC and FCC ID. Added Exposure of Humans to RF Fields Test. (Test were be done but it was forgotten to added in the Report)	2018-08-20

Table 1

1.2 Introduction

Applicant	BALTECH AG
Manufacturer	BALTECH AG
Model Number(s)	10117-501
Serial Number(s)	43025101
Hardware Version(s)	10117A04
Software Version(s)	1100 Test
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN:2016, Issue 09 (08-2016) and Issue 04 (11-2014)
Test Plan/Issue/Date	---
Order Number	5114606
Date	2018-06-27
Date of Receipt of EUT	2018-07-09
Start of Test	2018-07-11
Finish of Test	2018-07-12
Name of Engineer(s)	Michael Ingerl
Related Document(s)	ANSI C63.10 (2013)



1.3 Brief Summary of Results

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

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Transmitting continuously and waiting for badge (RFID card)				
2.1	15.215 (c), N/A and 6.6	20 dB Bandwidth	Pass	ANSI C63.10 (2013)
2.2	15.225 (a)(b)(c)(d), B.1 to B.9, 6.4 and 6.5.	Field Strength of any Emission	Pass	ANSI C63.10 (2013)
2.3	15.225 (e), B.1 to B.9 and 6.11.	Frequency Tolerance Under Temperature Variations	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	15.107 and 6.1	Exposure of Humans to RF Fields	Pass	ANSI C63.4: 2014

Table 2



1.4 Product Information

1.4.1 Technical Description

The RFID Reader 10117-501 controls and monitors accesses.

1.5 Deviations from the Standard

none

1.6 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
Serial Number: 43025101			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.7 Test Location

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

Test Name	Name of Engineer(s)
Configuration and Mode: Transmitting continuously and waiting for badge (RFID card)	
20 dB Bandwidth	Michael Ingerl
Field Strength of any Emission	Michael Ingerl
Frequency Tolerance Under Temperature Variations	Michael Ingerl
AC Power Line Conducted Emissions	Michael Ingerl
Exposure of Humans to RF Fields	Michael Ingerl

Table 4

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 20 dB Bandwidth

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

10117-501, S/N: 43025101 - Modification State 0

2.1.3 Date of Test

2018-07-11

2.1.4 Test Method

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

2.1.5 Environmental Conditions

Ambient Temperature 22,0 °C
Relative Humidity 31,0 %

2.1.6 Test Results

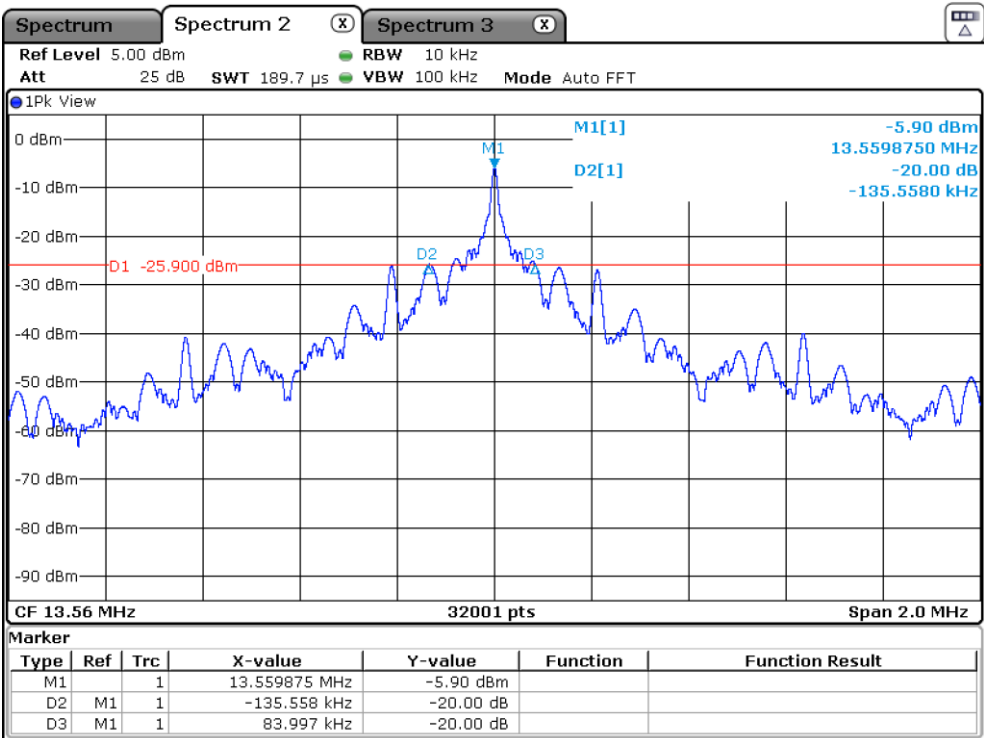
Transmitting continuously and waiting for badge (RFID card)

Frequency (MHz)	20 dB Bandwidth (Hz)	99% Occupied Bandwidth (Hz)	F _{LOWER} (MHz)	F _{UPPER} (MHz)
13.56	219555	505172	13.4245	13.6439

Table 5

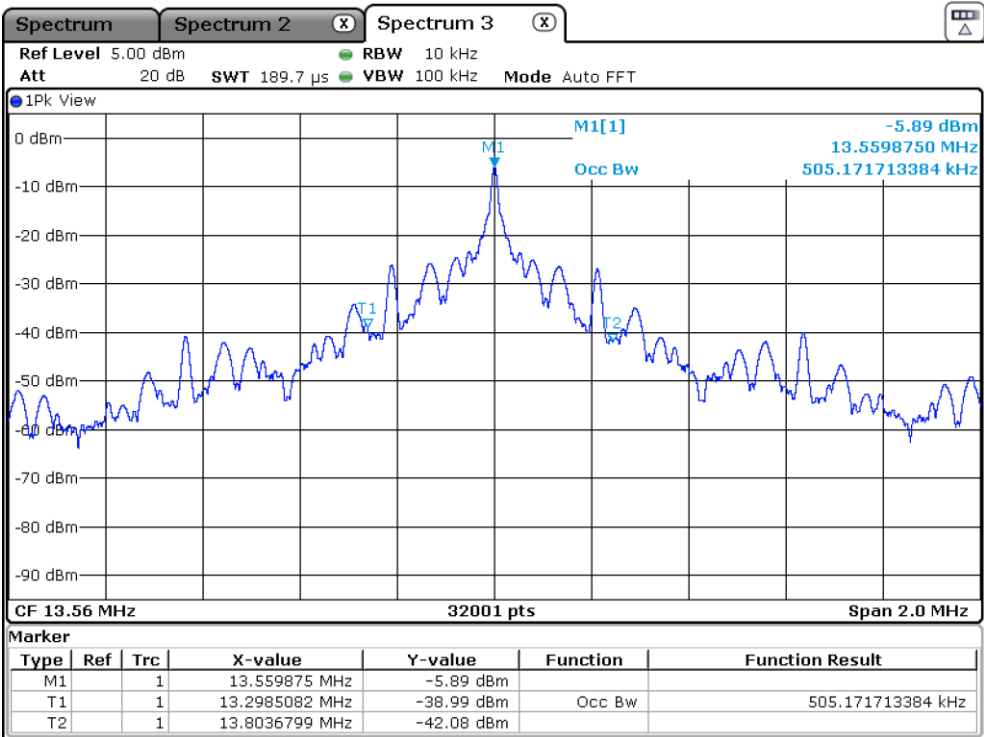


Product Service



Date: 11.JUL.2018 12:53:27

Figure 1 - 20 dB Bandwidth



Date: 11.JUL.2018 12:54:22

Figure 2 - 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.

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

None specified.

2.1.7 Test Location and Test Equipment Used

This test was carried out in Non shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2019-01-31
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



Product Service

2.2 Field Strength of any Emission

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.225 (a)(b)(c)(d), B.1 to B.9, 6.4 and 6.5.

2.2.2 Equipment Under Test and Modification State

10117-501, S/N: 43025101 - Modification State 0

2.2.3 Date of Test

2018-07-11

2.2.4 Test Method

2.2.5 Environmental Conditions

Ambient Temperature	22,0 °C
Relative Humidity	33,0 %

2.2.6 Test Results

Transmitting continuously and waiting for badge (RFID card), Carrier Results

Frequency (MHz)	Quasi-Peak Level (dB μ V/m) at 30m
13.56	32.7

Table 7

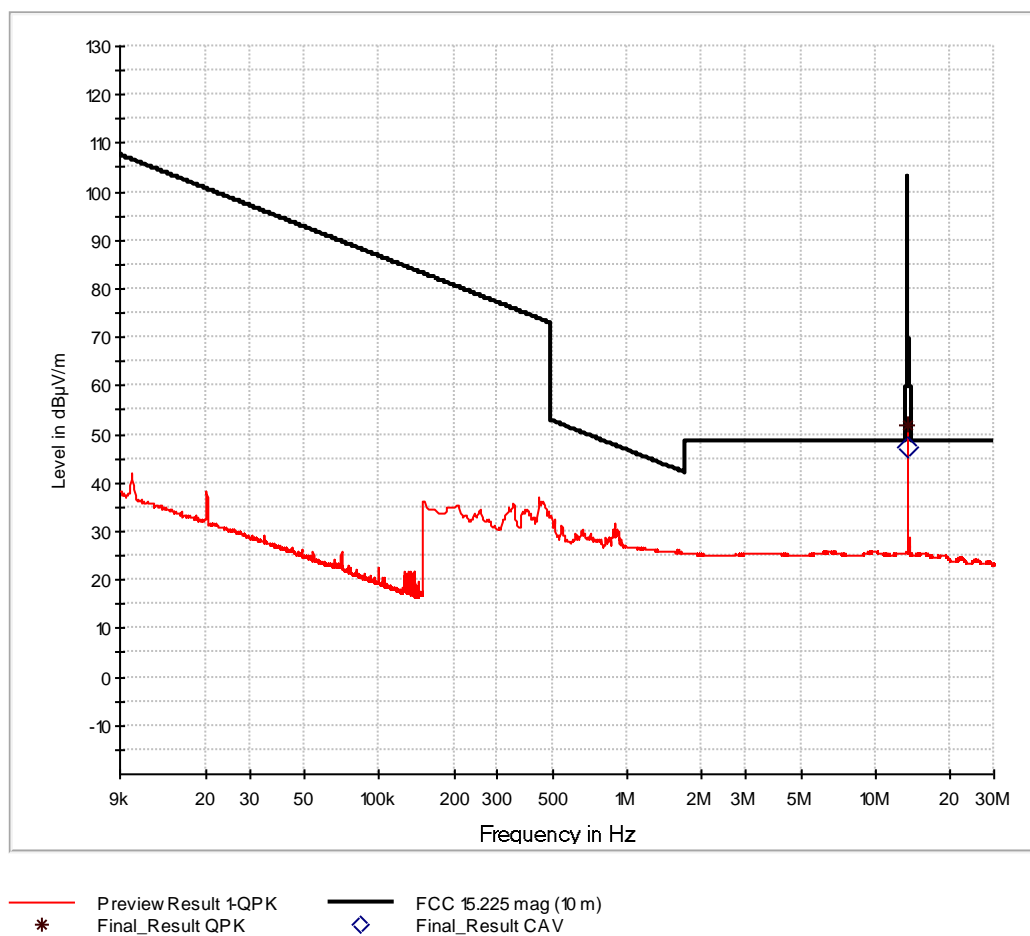


Figure 3 - 9 kHz to 30 MHz



Frequency MHz	QuasiPeak dBµV/m	Average dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
40,680000	28,89	0,00	40,00	11,11	1000,0	120,000	103,0	V	74,0	14,6
108,480000	23,48	0,00	43,50	20,02	1000,0	120,000	231,0	H	86,0	13,2
189,840000	31,44	0,00	43,50	12,06	1000,0	120,000	179,0	H	-102,0	12,3
745,800000	33,63	0,00	46,00	12,37	1000,0	120,000	105,0	V	-170,0	23,7

Table 8 - Emissions Results – 30 MHz to 1 GHz

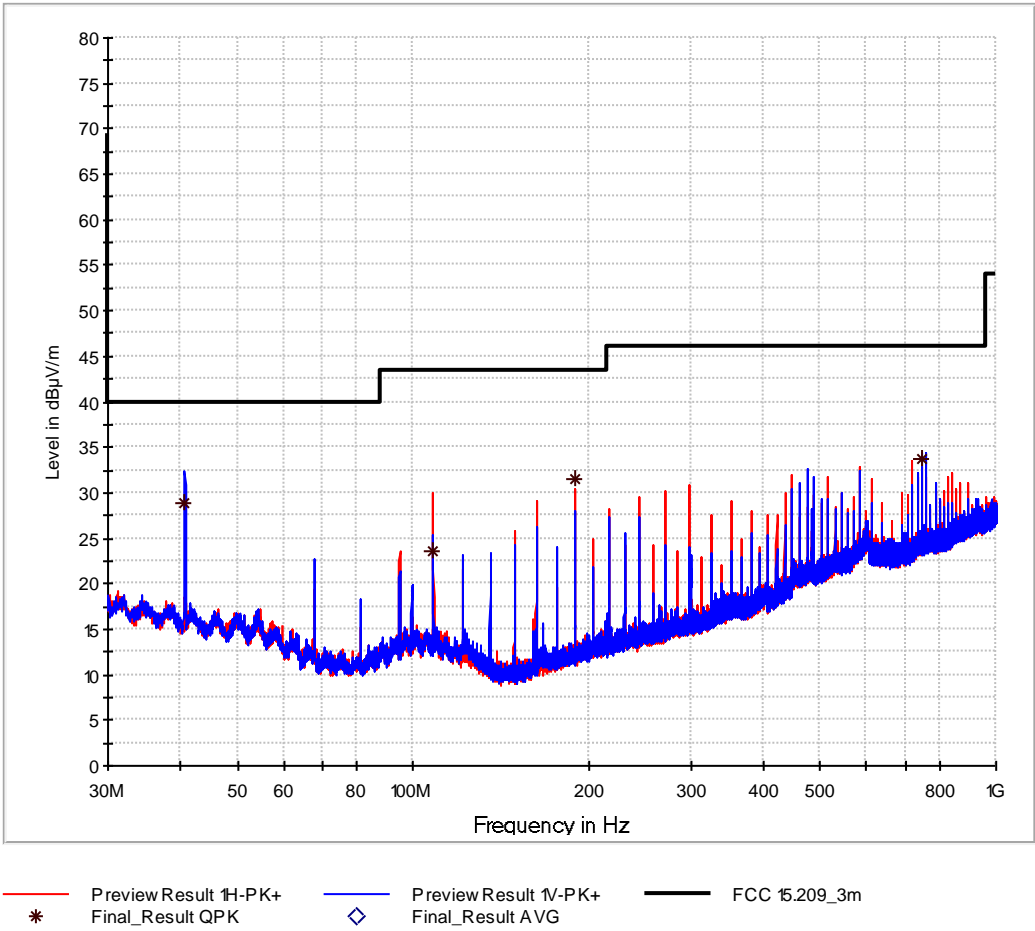


Figure 4 - 30 MHz to 1 GHz



FCC 47 CFR Part 15, Limit Clause 15.225 (a)(b)(c)(d)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 m.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 m.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 m.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

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
1705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	5

Table 9 - FCC Radiated Emission Limit



Industry Canada RSS-210, Limit Clause B.6

The field strength of any emission shall not exceed the following limits:

- (a) 15.848 mW/m (84 dBμV/m) at 30 m, within the band 13.553 – 13.567 MHz.
- (b) 334 μV/m (50.5 dBμV/m) at 30 m, within the bands 13.410 – 13.553 MHz and 13.567 – 13.710 MHz.
- (c) 106 μV/m (40.5 dBμV/m) at 30 m, within the bands 13.110 – 13.410 MHz and 13.710 – 14.010 MHz.
- (d) RSS-GEN general field strength limits for frequencies outside the band 13.110 – 14.010 MHz.

Industry Canada RSS-GEN, Limit Clause

Frequency	Electric Field Strength (μV/m)	Magnetic Field Strength (H-Field) (μA/m)	Measurement Distance (m)
9 - 490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490 - 1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1,705 kHz - 30 MHz	30	N/A	30

Table 10 - Industry Canada Radiated Emission Limit - Less than 30 MHz

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

Table 11 - Industry Canada Radiated Emission Limit - 30 MHz to 1 GHz

2.2.7 Test Location and Test Equipment Used

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

Instrument	Manufacturer	Type No	T-ID	Calibration Period (months)	Calibration Due
Loop antenna	Rohde & Schwarz	HFH2-Z2	18876	24	2018-07-31
TRILOG Antenna	Schwarzbeck	VULB 9163	19691	24	2020-12-31
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31

Table 12

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



2.3 Frequency Tolerance Under Temperature Variations

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.225 (e), B.1 to B.9 and 6.11.

2.3.2 Equipment Under Test and Modification State

10117-501, S/N: 43025101 - Modification State 0

2.3.3 Date of Test

2018-07-11

2.3.4 Test Method

2.3.5 Environmental Conditions

Ambient Temperature 23,0 °C
Relative Humidity 31,0 %

2.3.6 Test Results

Transmitting continuously and waiting for badge (RFID card)

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
-20.0 °C	5 V	13.559992	0.000708	7.080
-10.0 °C	5 V	13.559987	0.000671	6.711
0.0 °C	5 V	13.559963	0.000494	4.941
+10.0 °C	5 V	13.559934	0.000280	2.802
+20.0 °C	5 V	13.559896	0.000000	0.000
+30.0 °C	5 V	13.559882	-0.00010	-1.032
+40.0 °C	5 V	13.559865	-0.00023	-2.286
+50.0 °C	5 V	13.559863	-0.00024	-2.434

Table 13 - Frequency Tolerance Under Temperature Variation

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
+20.0 °C	4.25 V	13.559892	-0.0000295	-0.295
+20.0 °C	5 V	13.559896	0.0000000	0.000
+20.0 °C	5.75 V	13.559894	-0.0000147	-0.147

Table 14 - Frequency Tolerance Under Voltage Variation



FCC 47 CFR Part 15, Limit Clause 15.225 (e)

The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency.

Industry Canada RSS-210, Limit Clause B.6

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm)

2.3.7 Test Location and Test Equipment Used

This test was carried out in Non shielded room.

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

Table 15

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, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.207, N/A and 8.8

2.4.2 Equipment Under Test and Modification State

10117-501, S/N: 43025101 - Modification State 0

2.4.3 Date of Test

2018-07-12

2.4.4 Environmental Conditions

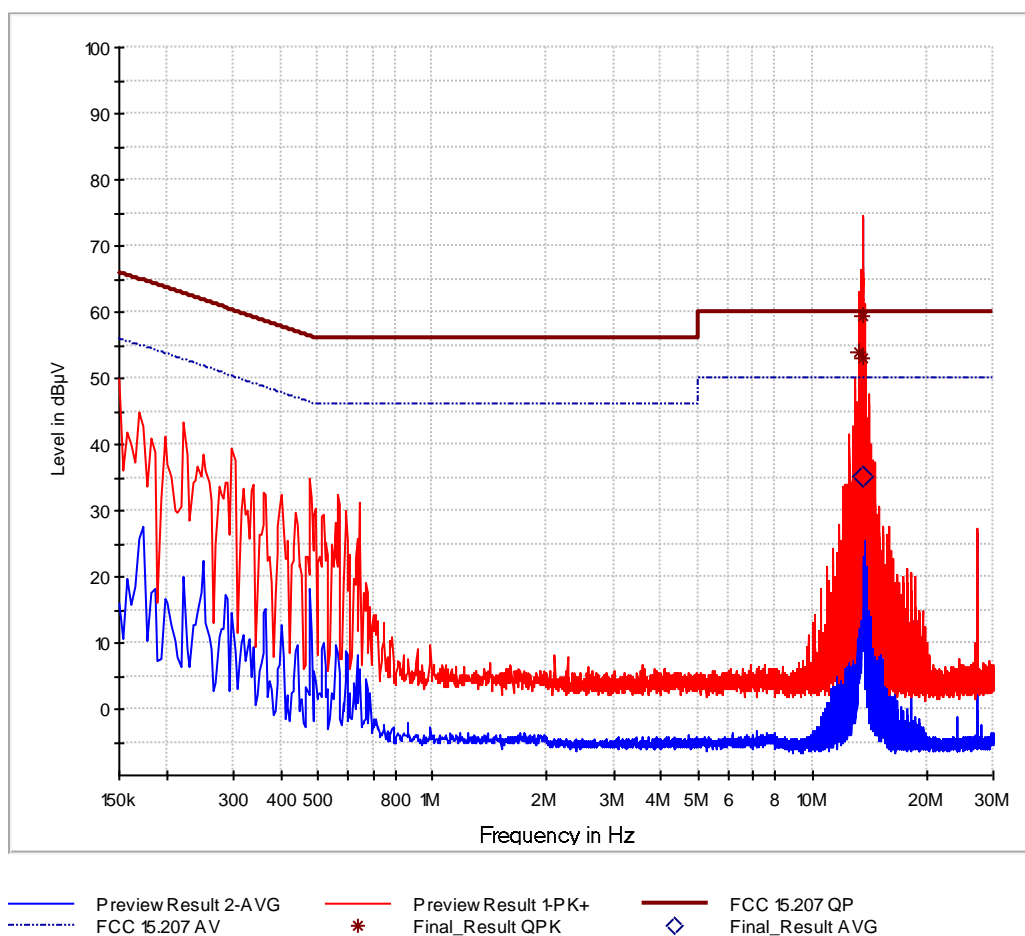
Ambient Temperature	22,0 °C
Relative Humidity	29,0 %

2.4.5 Test Results

Transmitting continuously and waiting for badge (RFID card)

Applied supply Voltage: 5 V / DC

Plus + Minus Line Emissions Results



Final Results 1:

Frequency MHz	QuasiPeak dBµV	Average dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
13,346000	54,00	0,00	60,00	6,00	1000,0	9,000	Minus	GND	0,2
13,558000	59,41	0,00	60,00	0,59	1000,0	9,000	Minus	GND	0,2
13,614000	0,00	35,13	50,00	14,87	1000,0	9,000	Minus	GND	0,2
13,694000	52,97	0,00	60,00	7,03	1000,0	9,000	Minus	GND	0,2

Figure 5 – Plus + Minus Line - 150 kHz to 30 MHz



FCC 47 CFR Part 15, Limit Clause 15.207 and Industry 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 16

*Decreases with the logarithm of the frequency.

2.4.6 Test Location and Test Equipment Used

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

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	100008	19730	12	2018-10-31
V-network	Rohde & Schwarz	894785/005	18919	36	2019-10-31

Table 17

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.5 Exposure of Humans to RF Fields

2.5.1 Specification Reference

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

2.5.2 Guide

IC RSS-102 Issue 5, section 2.5

2.5.3 Equipment Under Test and Modification State

10117-501, S/N: 43025101 - Modification State 0

2.5.4 Date of Test

2018-07-12

2.5.5 Test Results

Detailed results are shown below.

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> <p style="text-align: center;">$CP = \dots\dots\dots \text{W}$</p> <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> <p style="text-align: center;">$EIRP = G \cdot CP \Rightarrow EIRP = \dots\dots\dots \text{W}$</p> <p><input type="checkbox"/> the field strength¹ in V/m: $FS = \dots\dots\dots \text{V/m}$</p> <p style="text-align: center;">$EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots\dots\dots \text{W}$</p> <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				
A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by:				

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.



$EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = 5.60 \text{ mW}$ <p>with:</p> <p>Field strength in V/m: $FS = 4.10$</p> <p>Distance between the two antennas in m: $D = 0.10$</p>			<input checked="" type="checkbox"/>	
			<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> <p style="text-align: center;">$TP = 5.60 \text{ mW}$</p>				

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 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) 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.



Product Service

Carrier frequency:	f	=	13.56 MHz				
Distance:	d	=	5 mm				
Transmitter output power:	TP	=	5.60 mW				
Limit:	TP_{limit}	=	71.00 mW				<input checked="" type="checkbox"/>
<input type="checkbox"/> SAR evaluation is documented in test report no. ...							

2.5.6 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
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

Table 18

3 Photographs

3.1 Equipment Under Test (EUT)

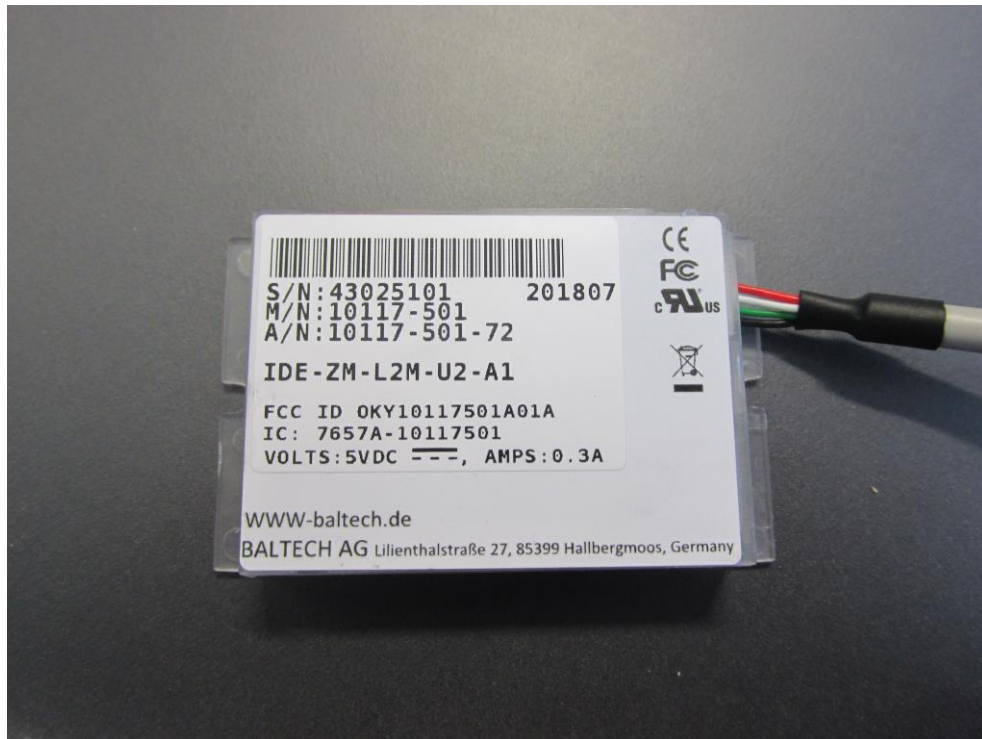


Figure 6 - EUT





Figure 7 - EUT

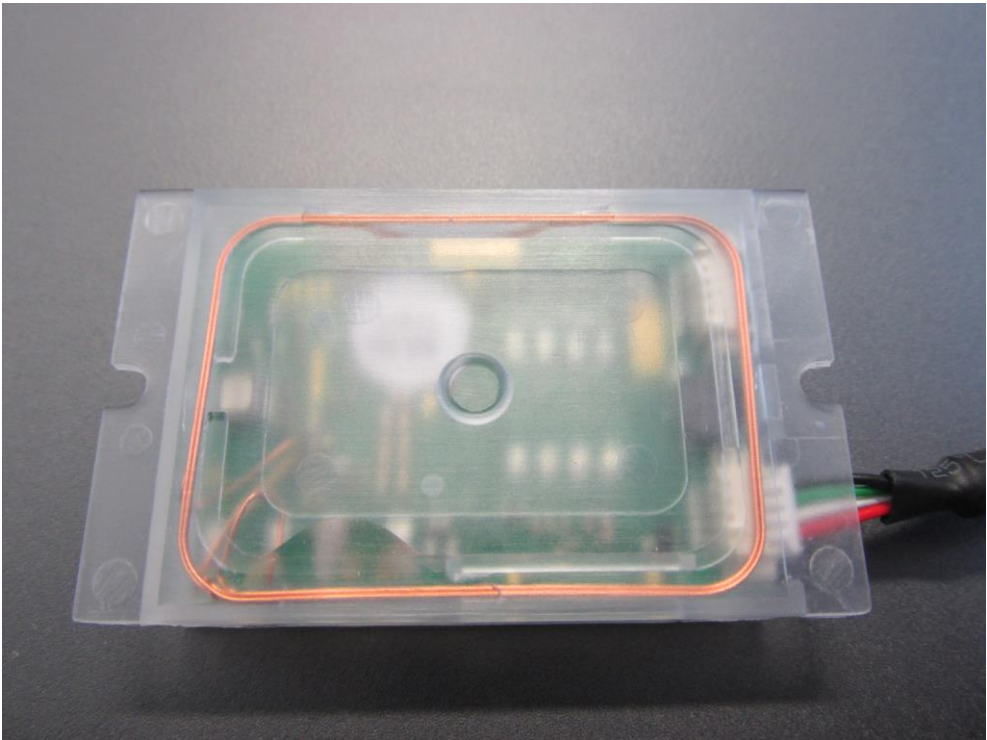


Figure 8 - EUT

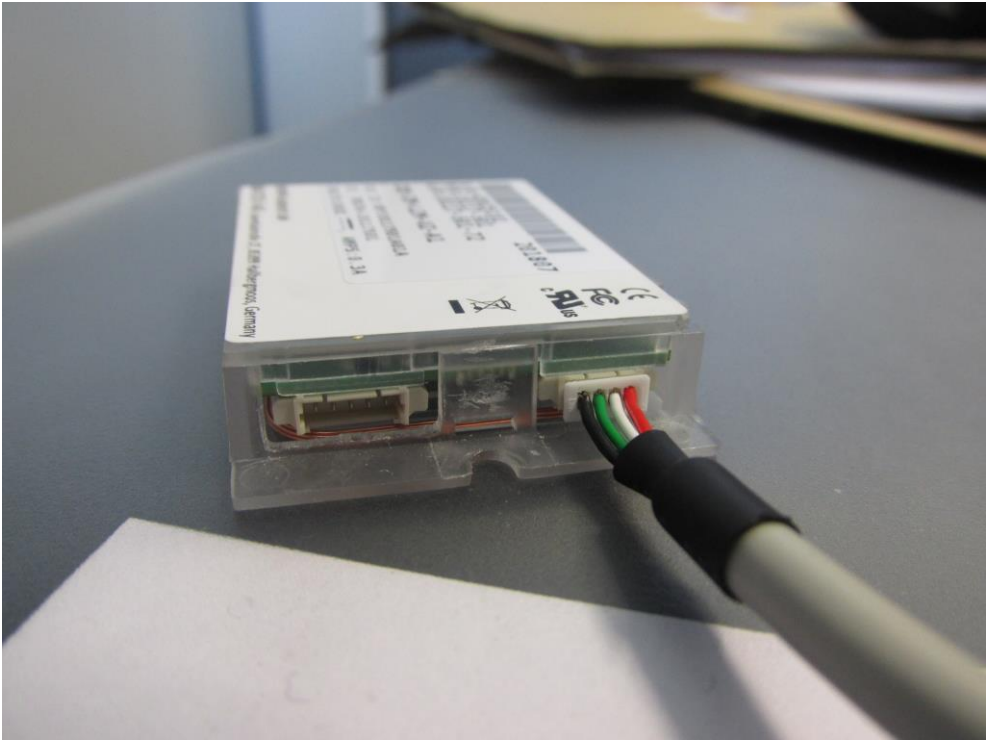


Figure 9 - EUT



Figure 10 - Test setup for radiated emission



Figure 11 - Test setup for radiated emission



Figure 12 - Test setup for radiated emission



Figure 13 - Test setup for radiated emission

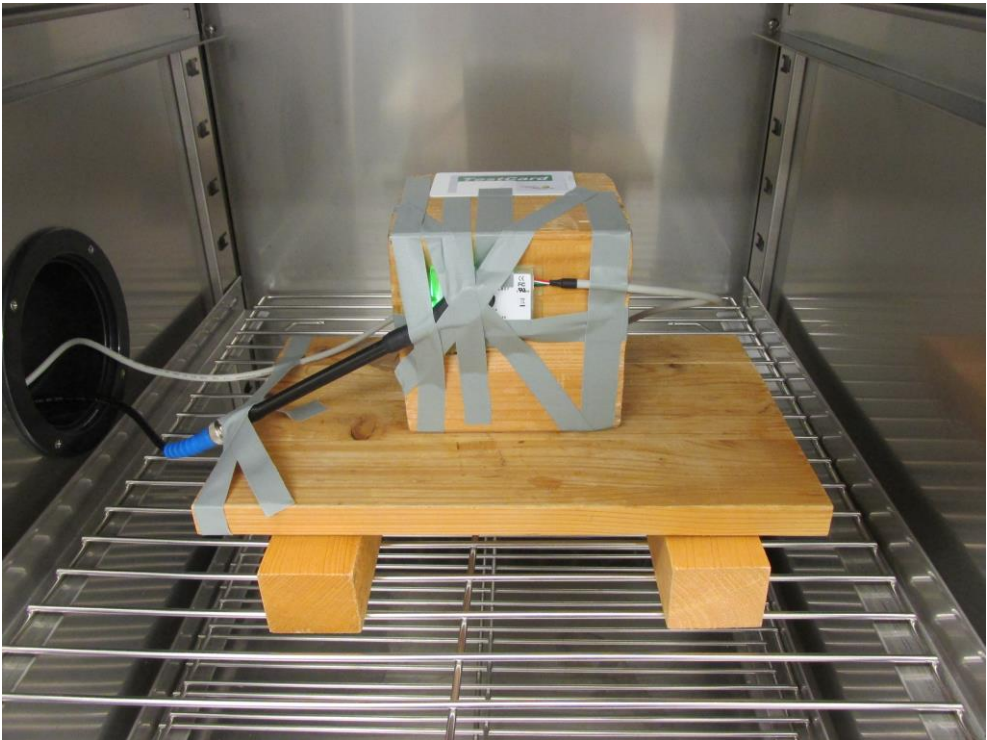


Figure 14 - Test setup for carrier frequency stability

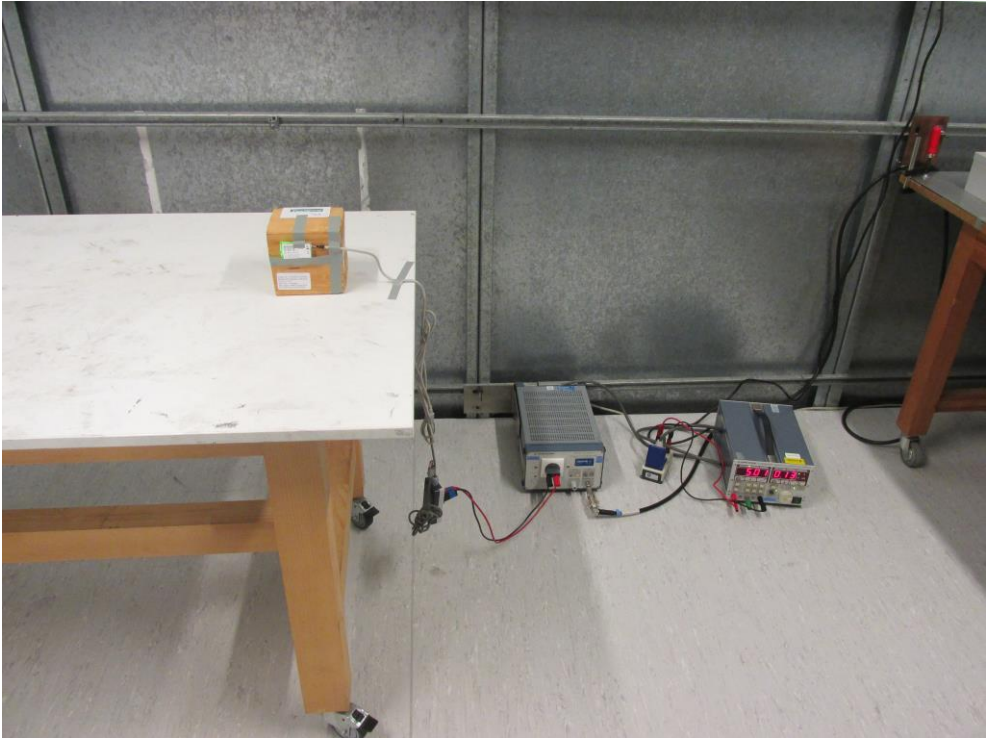


Figure 10 - Test setup for AC Power Line Conducted Emissions

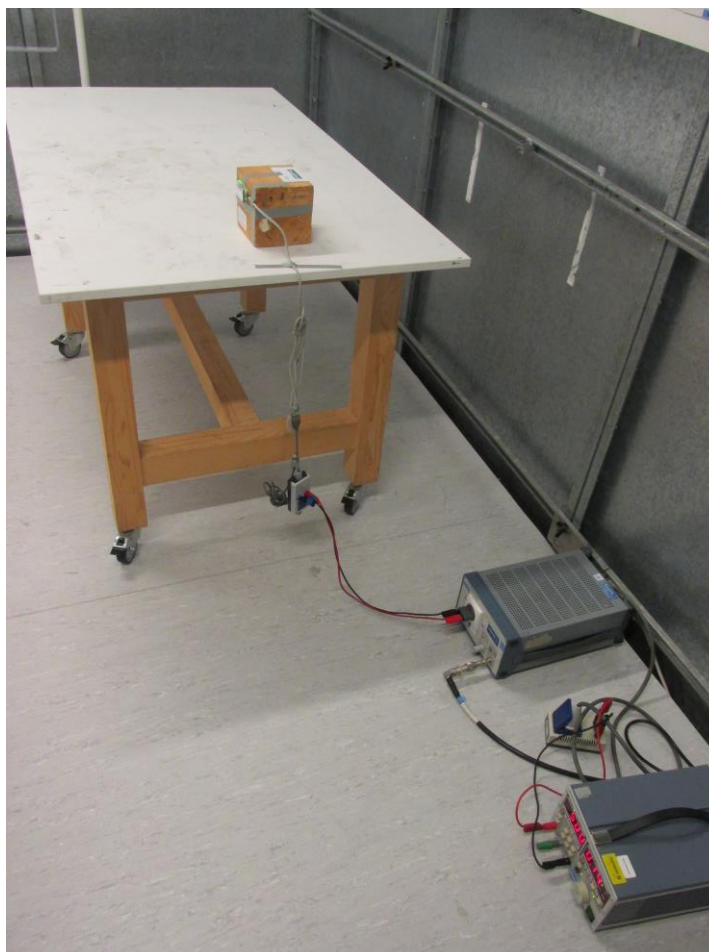


Figure 10 - Test setup for AC Power Line Conducted Emissions

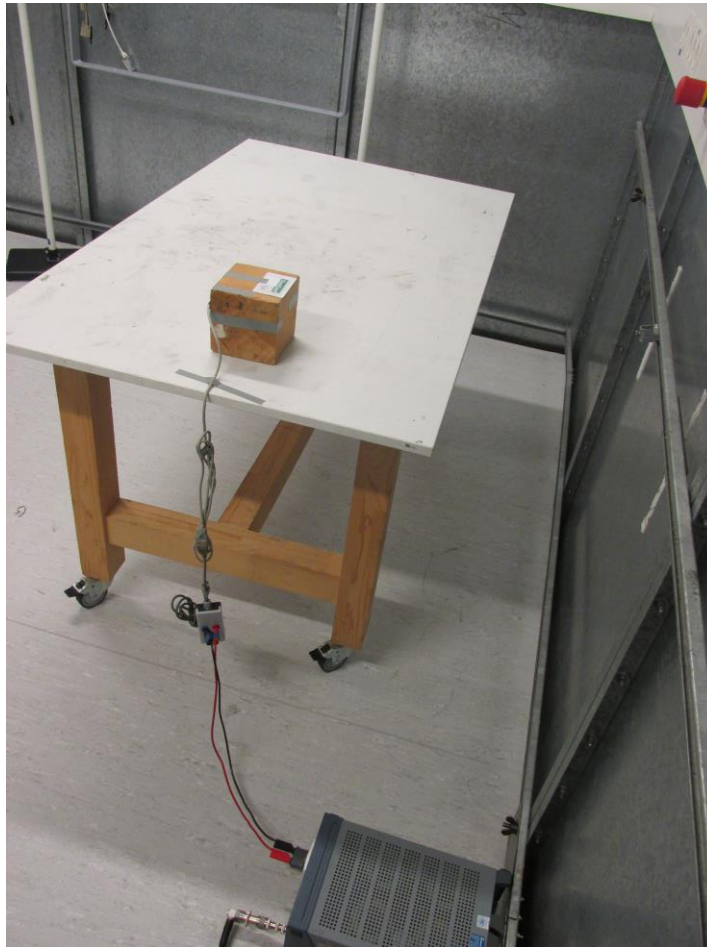


Figure 10 - Test setup for AC Power Line Conducted Emissions



Figure 15 - Test setup for Exposure of Humans to RF Fields



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 19



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 20



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 21

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 $p = 95.45\%$