
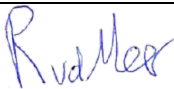



Prüfbericht-Nr.: Test Report No.:	P00286775.r02	Auftrags-Nr.: Order No.:	89218989	Seite 1 von 32 Page 1 of 32
Kunden-Referenz-Nr.: Client Reference No.:	102489	Auftragsdatum: Order date:	2021-05-12	
Auftraggeber: Client:	Vecos Europe B.V. Esp 237, 5633 AD Eindhoven, The Netherlands			
Prüfgegenstand: Test item:	Intentional Radiator - RFID Device (NFC)			
Bezeichnung / Typ-Nr.: Identification / Type No.:	Locker Lock V3+			
Auftrags-Inhalt: Order content:	Compliance with regulatory requirements			
Prüfgrundlage: Test specification:	FCC 47 CFR Part 15, Subpart C (10-1-19 Edition) RSS-Gen (Issue 5, February 2021, Amendment) RSS-210 (Issue 10, April 2020, Amendment)			

Wareneingangsdatum: Date of receipt:	2021-05-17	
Prüfmuster-Nr.: Test sample No.:	Snr. 21-16-002-002 Snr: 21-16-002-001 (AC power line only)	
Prüfzeitraum: Testing period:	2021-05-19 - 2021-06-01	
Ort der Prüfung: Place of testing:	Leek	
Prüflaboratorium: Testing laboratory:	TÜV Rheinland Nederland B.V. Leek Laboratory	
Prüfergebnis*: Test result*:	Pass	

geprüft von / tested by: 			genehmigt von / authorized by: 		
2021-06-22	R. van der Meer/Test Eng.		2021-06-22	S. Siddapur / Expert	
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung Name / Position	Unterschrift Signature
Sonstiges / Other: <i>issue date is equal to approval date.</i> <i>HW version: 02</i> <i>SW version: v.0.00.019</i>					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery: 1</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet					
Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. Test specification(s) F(ail) a.m. test specification(s) N/A = not applicable N/T = not tested					
<div>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</div> <div><i>This test report only relates to the above mentioned testsample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This report does not entitle to carry any test mark</i></div>					

V04

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None of the tests were subcontracted to qualified subcontractors.

The reported tests marked with a ✓ or Yes were performed under ISO 17025:2017 accreditation.

If the place of testing differs from the location given on page 1 this is given under the respective test clause in the report. This test report consists of multiple pages, the number of pages can be seen in the header on the top right of each page. The report ends when the last page is reached.

For the influence of the measuring uncertainties on the results, reference is made to the validation of the respective methods.

The test results exclusively relate to the tested sample.

This report is only to be read as a whole, no sections from this report may be copied.

No opinions or interpretation are included in this report.

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Statements

- This document does not represent type approval or certification of the product.
- The test results only relate to the behaviour of the test specimens of the examined product under the particular conditions of the test in laboratory conditions
- The validity of this report will expire directly after alterations or modifications of the examined product (combination)(s) and/or the criteria.
- The information provided by the customer, identified within this report, may affect on the validity of the results.

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Liste der verwendeten Prüfmittel
List of used test equipment

Prüfmittel Kind of Equipment	Hersteller / Manufacturer	Bezeichnung / Model Name	Prüfmittel- Nr. / ID-Nr. Equipment No. / ID-No.	Kalibrierung Calibration (ddmm/yyyy)	Nächste Kalibrierung Next calibration (dd/mm/yyyy)
For Radiated Emissions					
Measurement Receiver	Rohde & Schwarz	ESR7	2790499	18/09/2020	18/09/2021
RF Cable S-AR	Gigalink	APG0500	2789217	12/03/2021	12/03/2022
Controller	Maturo	SCU/088/ 8090811	2789220	N/A	N/A
Antenna mast+control	Innco Systems	MA4640-XP-ET- 0800-com	9002463	N/A	N/A
Test facility	Comtest	FCC listed: 786213 IC: 2932G-2	2789009	08/03/2020	08/03/2022
Spectrum Analyzer	Rohde & Schwarz	FSV	2789106	31/08/2020	31/08/2021
Temperature- Humiditymeter	Extech	SD500	2789214	03/07/2020	03/07/2021
Biconilog Testantenna	Teseq	CBL 6111D	2789237	04/08/2020	04/08/2021
Climat chamber	E-spec	PL3-KPH	2790470	31/08/2020	31/08/2021
Temperature meter (monitoring Climat chamber)	Dostmann	P770	2789236	15/04/2021	15/04/2022
Voltmeter (monitoring Voltage reg)	Keysight	34461A	2790157	31/08/2020	31/08/2021
Voltage regulator	RFT	LTS 006	2788905	N/A	N/A
60cm Loop antenna	Chase	HLA6120	2790033	19/12/2017	19/07/2021
Loop antenna, Passive	EMCO	6509	2788774	15/12/2020	15/12/2023
6 cm Loop antenna	ETS Lindgren	7405-901	2789078	14/02/2020	14/02/2023

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Kind of Equipment	Manufacturer	Model Name	Inventory number	Calibration date (mm/yyyy)	Calibration due date (mm/yyyy)
For AC Powerline Conducted Emissions					
Pulse limiter	R&S	ESH3-Z2	2788823	24/09/2020	24/09/2021
LISN	Rohde & Schwarz	ESH2-Z5	2788791	21/07/2020	21/07/2021
Measurement Receiver	Rohde & Schwarz	ESCS30	2789421	12/11/2020	12/11/2021
Shielded room for Conducted emissions	--	--	2789207	NA	NA
Temperature-Humiditymeter	Extech	SD500	2789211	03/07/2020	03/07/2021
Power supply for EUT	Delta Elektronika	SM6020	2788812	22/02/2021	22/02/2022
120Vac source	EMtest	DPA500N	2789197	22/11/2019	22/11/2021

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2017 has been confirmed before testing. NA= Not Applicable

Accreditation

The reported tests were performed under ISO17025:2017 accreditation, unless otherwise specified as 'not under Accreditation'

An overview of all TÜV Rheinland Nederland B.V. accreditations, notifications and designations, please visit our website www.tuv.com/nl. You can find the relevant declarations under the download link


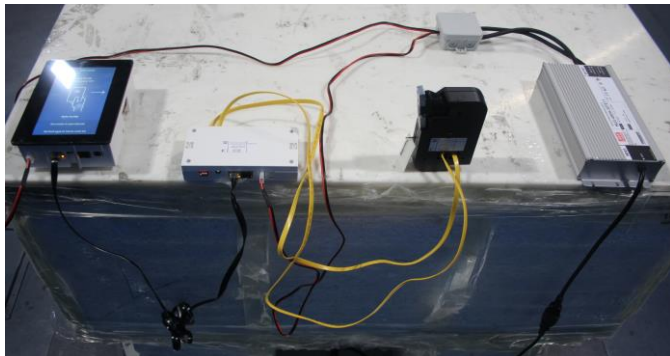
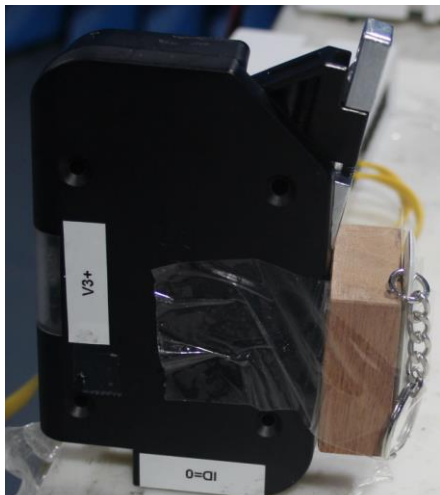

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Produktbeschreibung
DISCLAIMER - Product description
 (as provided by the client)

1	Produktdetails <i>Product details</i>	Locker Lock with NXP RFID operating on 13.56 MHz
2	Maße / Gewicht <i>Dimensions / Weight</i>	See product info
3	Bedienelemente <i>Operating elements</i>	None
4	Ausstattung / Zubehör <i>Equipment / Accessories</i>	None
5	Verwendete Materialien <i>Used materials</i>	None
6	Sonstiges <i>Other</i>	HW version: 02 SW version: v0.00.019 Antenna type: Inductive Coil (internal) Modulation method: ASK
EUT		EUT and AUX in typical setup
		
EUT reading a tag		EUT with Dummy antenna-for AC Powerline Conducted emissions
		

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Revisions Revisions			
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author
-	2021.06.08	First release	R. van der Meer
01	2021.06.16	added antenna type,HW&SW versions; Cal data extended; Limit table <30MHz added; Block diagrams added.Typos corrected	R. van der Meer
02	2021.06.17	Table corrected dBuA/m to uA/m value	R. van der Meer
03	2021.06.22	Section 1.2 RSS-210 reference corrected	R. van der Meer
Note: Latest revision report will replace all previous reports			

Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Radiated Emission	9 kHz – 1 GHz	±5.13 dB
AC Power Line	150 kHz – 30 MHz	±3.2 dB
Bandwidth	9 kHz - 40 GHz	±1 %
Frequency	>77kHz without GPS reference	1.3 ppm

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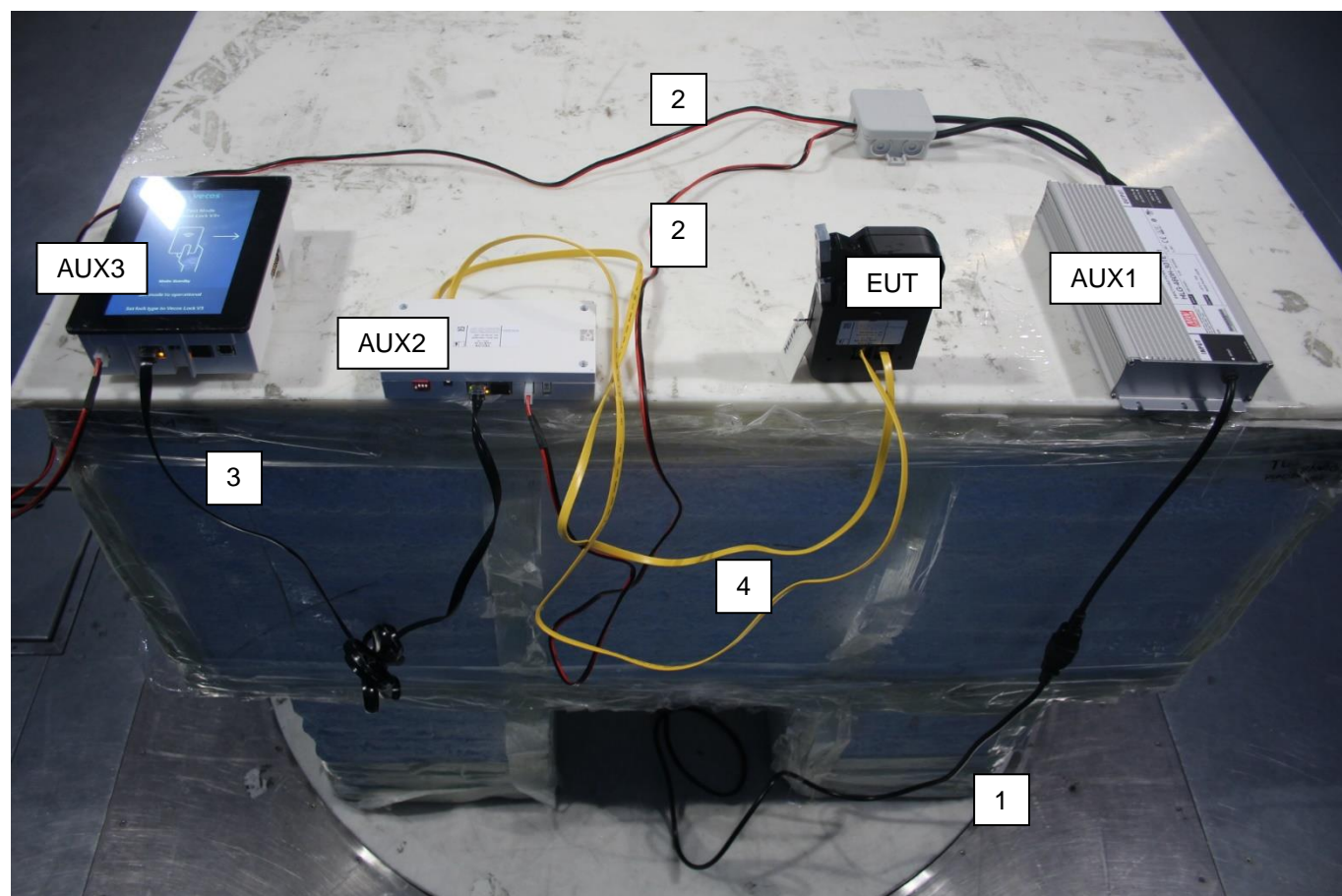
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1 General information.

1.1 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.



List of used cables					
Number	Function	From	To	Length	Remarks
1	AC Power	mains 120Vac 60 Hz	AUX1	< 3m	-
2	27 Vdc power	AUX1	AUX2 & AUX3	< 3m	-
3	Ethernet	AUX3	AUX2	< 3m	-
4	power and data	AUX2	AUX1	< 3m	-

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Details and an overview of the system and all of its components, as it has been tested, may be found below.

Test item EUT : EUT
 See page 1 and 5 for details

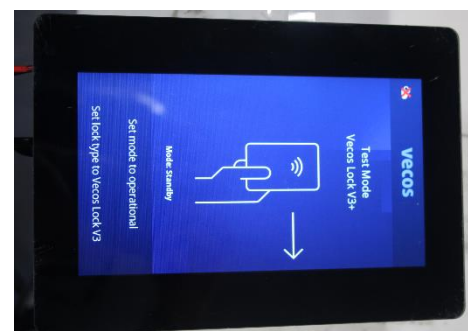
Test item AUX1 : Power supply for EUT
 Manufacturer : MEAN WELL ENTERPRISES CO.,LTD.
 Brand mark : MEAN WELL
 Model : HLG-480H-30TE11
 Output Voltage : 27 Vdc
 Serial Number : HC0ABX0365
 Remark : -



Test item AUX2 : Hub
 Manufacturer : Vecos
 Brand mark : VECOS
 Model : Hub V3-24
 Serial number : 20-36-001-060
 Remark : -



Test item AUX3 : Touch screen
 Manufacturer : Vecos
 Brand mark : VECOS
 Model : LBC 3.0
 Serial number : 21-12-006605050
 Remark : -



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1.1.1 Description of input and output ports.

There are two USB ports available on the EUT, these are included in the separate Part 15B/ICES-003 test report (nr P00286755.r03).

1.2 Test summary

The EUT was tested in accordance with the specifications given in the table below.

Test Standard		Description	Page	Pass / Fail / Not Applicable
47 CFR Part 15 (10-1-19 Edition)	RSS-210 Issue 10, Amendment, April 2020			
15.207(a)	RSS-Gen(8.8)	AC power line Conducted emissions	19 - 22	Pass
15.209, 15.225	RSS-Gen(8.9) and RSS-210(B.6.a)	Radiated emissions	13 – 18	Pass
15.215(c)	RSS-Gen(6.7)	Bandwidth of the emission	24 - 25	Pass
15.225	RSS-210 (B.6.b)	Carrier stability	23	Pass

Table: Test specifications

1.3 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-19), sections 15.31, 15.35, 15.205, 15.209, 15.225 and RSS-GEN (ISSUE 5, FEBRUARY 2021 AMENDMENT 2) RSS-210 (ISSUE 10, AMENDMENT, APRIL 2020).

The test methods, which have been used, are based on ANSI C63.10: 2013.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.

Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters.

To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the appropriate extrapolation factor is used.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.4 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located at Eiberkamp 10, 9351 VT Leek, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under Designation Number NL0005 (test site registration number: 786213). The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under CABID number NL0002 (test site registration number: 2932G-2). The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.5 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 120 Vac / 60 Hz (27Vdc to EUT)

**When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.*

2 System test configuration.

2.1 Justification.

An EUT was supplied which enabled a constant transmit mode for testing purposes. For AC PowerLine conducted emissions a special sample was delivered by the applicant whereby the antenna was replaced by a dummy resistive load.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10-2013.

2.2 EUT mode of operation.

The EUT has been tested in modulated transmit mode, i.e. the EUT is transmitting while continuously transmitting data.

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

3 Radiated emission data.

RESULT: Pass

Date of testing: 2021-05-19

Frequency range: 9kHz - 1GHz

Requirements:

FCC 15.205, FCC 15.209, FCC 15.225 and IC RSS-Gen(8.9, 8.10) and RSS-210(B.6)

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a).

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a)/ RSS-Gen (8.9) or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

3.1.1 Limit

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following tables:

Frequency (MHz)	Field strength (microvolts/meter)	Field strength (dBμV/m)	Field strength (μA/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	43.5-13.8	6.37/F (F in kHz)	300
0.490-1.705	24000/F(kHz)	33.8-22.9	63.7/F (F in kHz)	30
1.705-30.0	30	29.5	0.08	30

Frequency (MHz)	Field strength (μV/meter)	Field strength (dBμV/m)	Measurement distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Table of applicable limits

3.1.2 Measuring instrument and setting

Radiated emissions test settings	
Frequency range	30 MHz – 1000 MHz
Test distance	3 m
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical / Horizontal
Test instrument detector and bandwidth <1GHz	Quasi-peak (Qp) 120 kHz *unless otherwise noted

3.2 Test procedure:

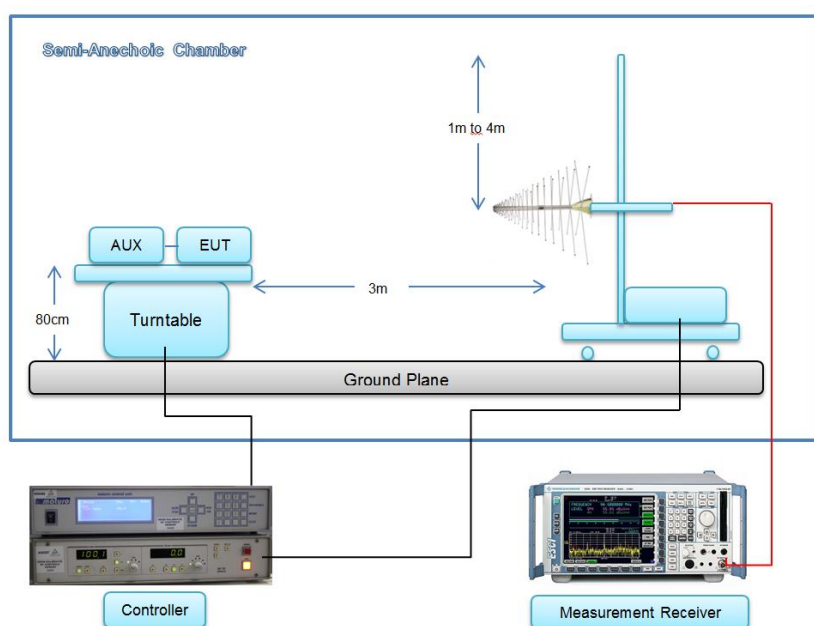
ANSI C63.10-2013.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X, Y, Z) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 9 kHz to 1000 MHz. Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

The six highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit.



Block diagram of the test setup

3.3 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

Frequency (MHz)	EUT orientation	Antenna orientation	Measurement results @3m (dB μ V/m)	Limits @3m (dB μ V/m)	Pass/Fail
40.68* ^H	X	Vertical	33.5	43.5	Pass
162.7* ^H	Z	Vertical	32.8	43.5	Pass
168.4	Y	Vertical	25.4	43.5	Pass
350	X	Horizontal	42.0	46.0	Pass
360	X	Vertical	39.5	46.0	Pass
775	Y	Vertical	36.6	46.0	Pass

Table 2 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.205, 15.209 and IC RSS-Gen(8.9, 8.10) are depicted in Table 2.

Notes:

- Field strength values of radiated emissions at frequencies not listed in the Table 2 above are more than 20 dB below the applicable limit. Worst case values noted (which from pre-test proved to be while reading a tag).
- A resolution bandwidth of 120 kHz was used.
- * H denotes a harmonic of the fundamental, *R denotes an emission in a restricted band
- A selection of plots are provided on the next pages.

Used test equipment and ancillaries:

2790499	2789217	2789009	2789214	2789237	9002463	2789197		

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3.4 Radiated field strength measurements 9 kHz – 30 MHz

Frequency (MHz)	Measurement results	Detector	Extrapolation factor	Measurement results (calculated)	Limits	Pass/Fail
	$\text{dB}\mu\text{V/m @3m}$		dB	$\text{dB}\mu\text{V/m @30m}$ (unless otherwise stated)	$\text{dB}\mu\text{V/m @30m}$ (unless otherwise stated)	
13.110-13.410 *note7	56.3	Qp	40	16.3	40.5	Pass
13.410-13.553	67.9	Qp	40	27.9	50.5	Pass
13.560 fundamental	82.9	Qp	40	42.9	84.0	Pass
13.567-13.710	67.9	Qp	40	17.9	50.5	Pass
13.710-14.010	54.2	Qp	40	14.2	40.5	Pass
27.120 harmonic	40.0	Qp	40	0.0	29.5	Pass
27.120*8 harmonic	0.26 $\mu\text{A/m}$	Qp	40	0.003 $\mu\text{A/m}$	0.08 $\mu\text{A/m}$	Pass

Table 3 Radiated emissions of the EUT, in the frequency range 0.009 – 30 MHz

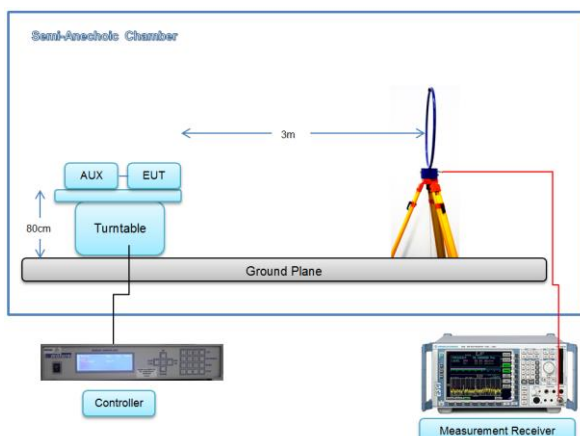
The results of the radiated emission tests in the frequency range 0.009 – 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.209, 15.225 and IC RSS-Gen Table 6, RSS-210 (B.6.a) are depicted in Table 3.

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included in initial Measurement result per transducer factor in the measuring receiver/analyzer). i.e at 13.560 MHz: $56.3 - 40\text{dB} = 16.3 \text{ dB}\mu\text{V/m}$.
2. A resolution bandwidth of 9 kHz was used during testing
3. Field strength values of radiated emissions at frequencies not listed in Table 3 are more than 20 dB below the applicable limit
4. The loop antenna was varied in horizontal and vertical orientations and also around it's axis (planar and axial). The reported value is the worst case found at the reported frequency.
5. The EUT was tested in horizontal (x), z and vertical (y) orientations. Worst case values noted.
6. Measurement uncertainty is $\pm 5.0\text{dB}$.
7. Highest value noted in the restrictedband: 13.36 – 13.41 MHz.
8. Also reported in $\mu\text{A/m}$ as per RSS-Gen table 6

3.4.1 Test equipment used (for reference see test equipment listing).

2789197	2790499	2789217	2788774	2789214	2789220	
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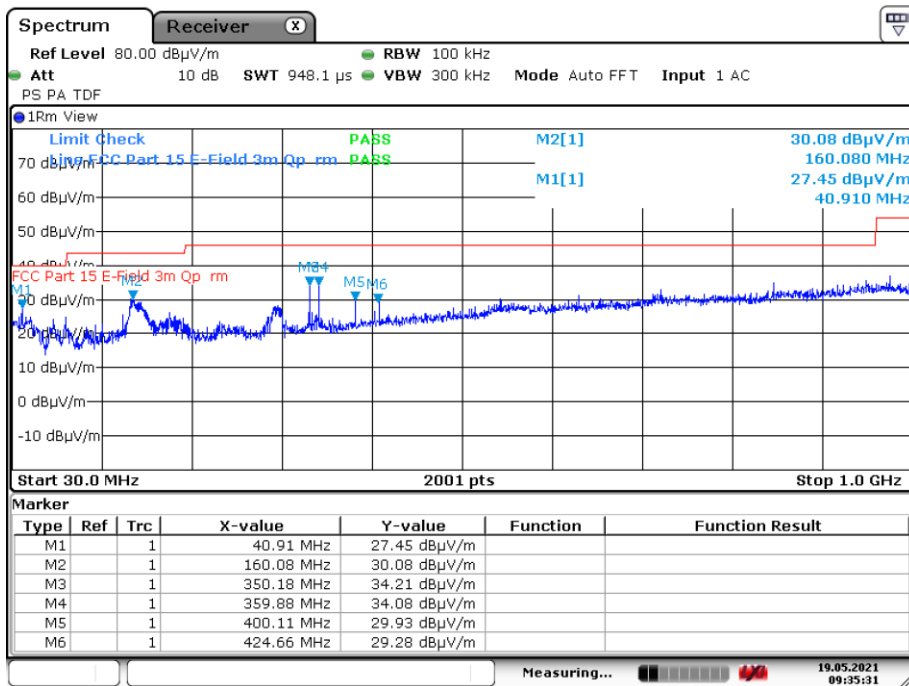


Block diagram of the test setup

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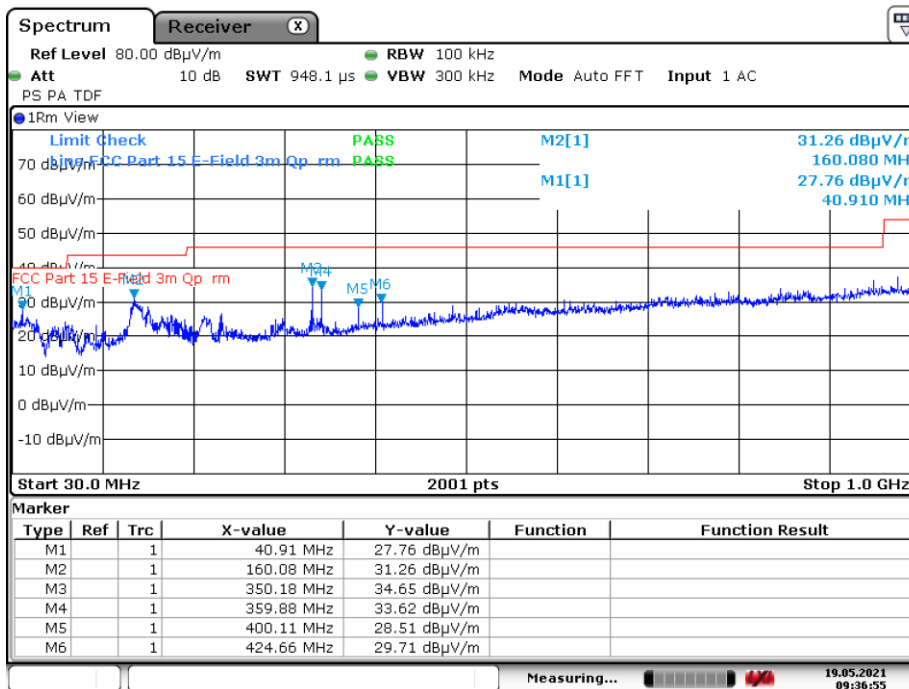
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3.5 Plots of the emissions



Date: 19.MAY.2021 09:35:31

Pre-scan Plot of the emissions in the range 30 – 1000 MHz, Antenna Vertical, EUT Y

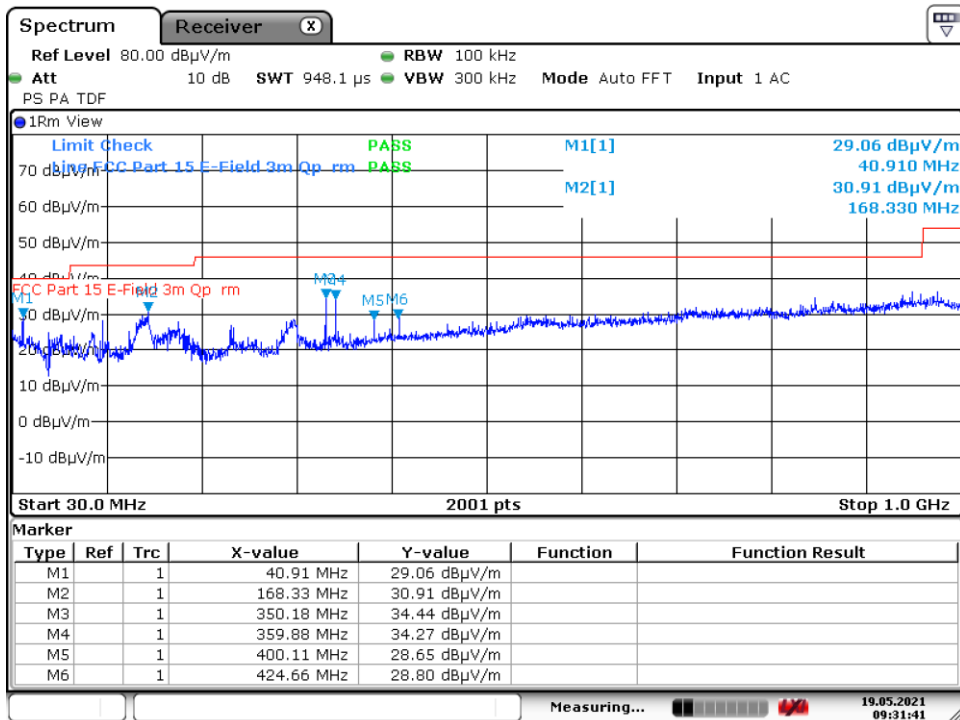


Date: 19.MAY.2021 09:36:55

Pre-scan Plot of the emissions in the range 30 – 1000 MHz, Antenna Vertical, EUT Z

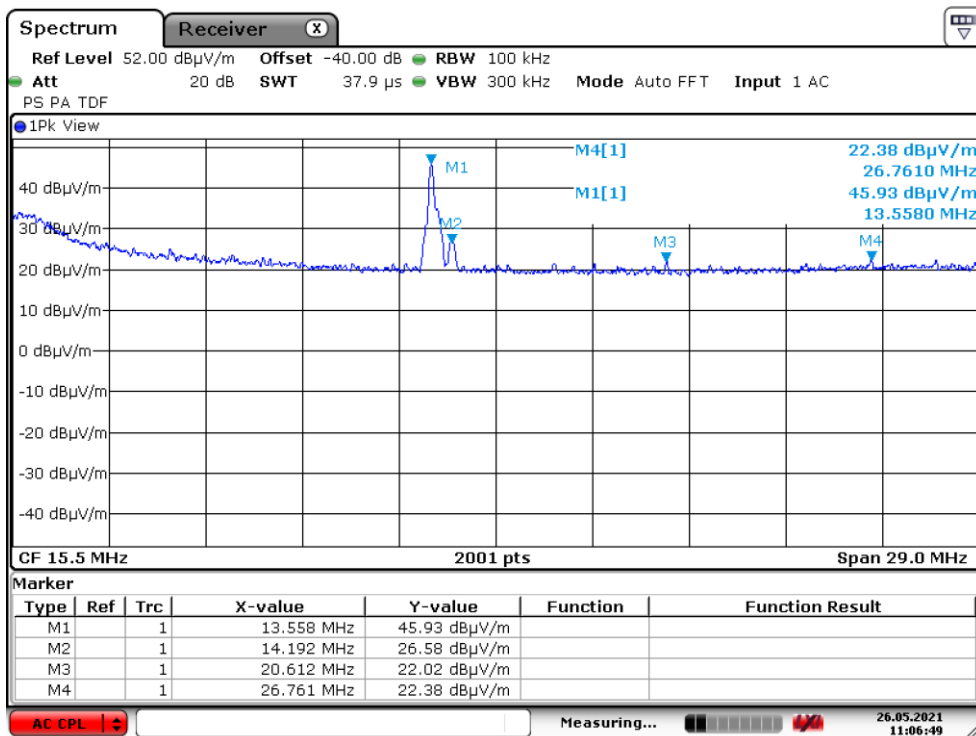
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Date: 19.MAY.2021 09:31:41

Pre-scan Plot of the emissions in the range 30 – 1000 MHz, Antenna vertical, EUT X



Date: 26.MAY.2021 11:06:49

Pre-scan Plot of the emissions in the range 1 – 30 MHz, Antenna axial, EUT Z

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4 AC Power line Conducted emission data.

4.1 AC Power Line Conducted Emission data of the EUT.

RESULT: PASS

Tested by: R. van der Meer
Date of testing: 2021-05-31

4.1.1 Requirements

47 CFR Part 15 Section 15.207 and IC RSS-Gen (8.8), for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

4.1.2 Limit

47 CFR Part 15 Section 15.207

Frequency of Emission (MHz)	Conducted Limit Quasi-Peak (dB μ V)	Conducted Limit Average (dB μ V)
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. The lower limit applies at the band edges.

4.1.3 Measuring instrument and setting

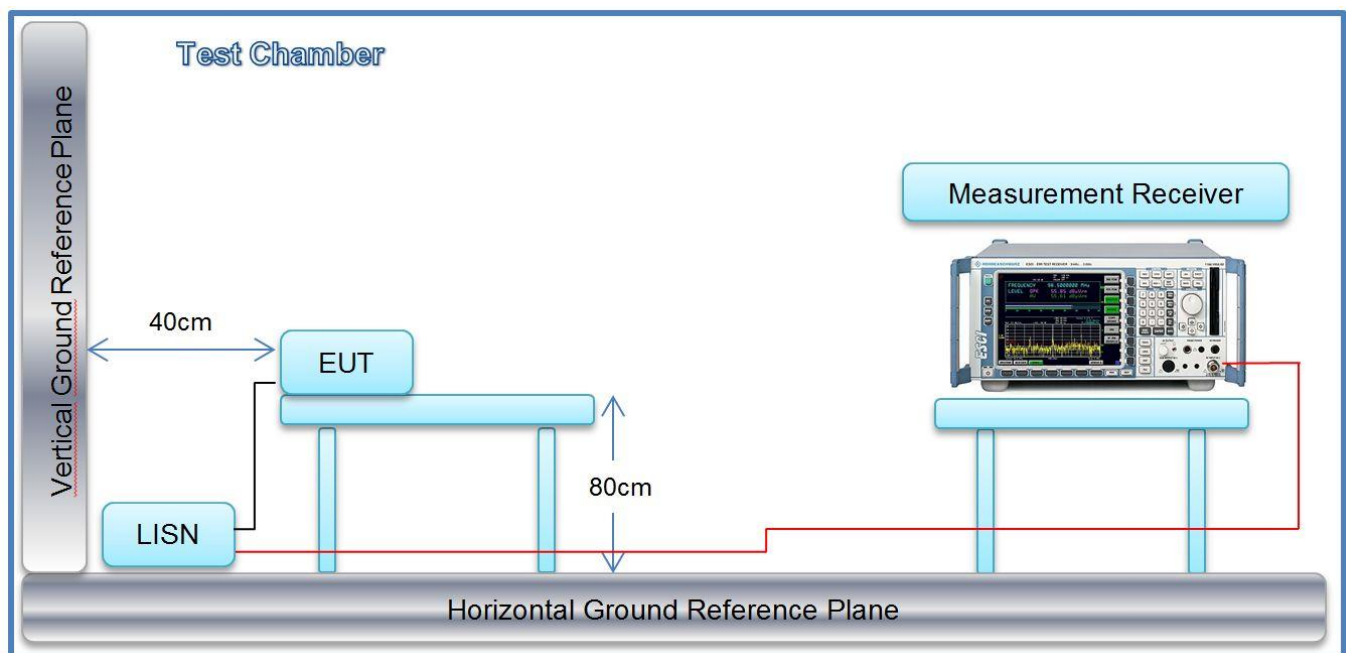
A Quasi-peak and Average detector were used with a bandwidth of 9 kHz.

4.1.4 Test procedures

ANSI C63.10-2013.

Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50 μ H / 50 Ω LISN. The frequency range from 150kHz to 30MHz was searched.

The six highest EUT emissions relative to the limit were noted for three supply voltages. The EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. The EUT was positioned at least 80cm from the LISN. The antenna was replaced with a resistive load.



Block diagram of the test setup

4.2 AC power Line Conducted emission data of the EUT.

Frequency (MHz)	Measurement results dB(μV) Line 1		Measurement results dB(μV) Neutral		Limits dB(μV)		Pass/Fail
	QP	AV	QP	AV	QP	AV	
0.18125	40.9	*3	38.7	*3	64.5	54.5	Pass
0.2477	27.5	*3	26.2	*3	61.8	51.8	Pass
2.2125	30.0	*3	29.3	*3	56.0	46.0	Pass
9.5211	33.2	*3	33.1	*3	60.0	50.0	Pass
10.025	33.0	*3	32.4	*3	60.0	50.0	Pass
13.56 ^{*4}	30.0	*3	30.0	*3	60.0	50.0	Pass

Table 4 AC power line conducted emission measurements

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207 and RSS-Gen (8.8), at the 120 Volts AC mains connection terminals of the AUX3 which was connected to the EUT, are depicted in Table 4.

Notes:

1. The values of conducted emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ± 3.2 dB.
3. Qp values already within Av limits, therefore not tested on Av.
4. Tested on a special EUT with dummy load in place of antenna.
5. USB ports not connected, this is tested in a separate Part 15B/ICES-003 report.

4.2.1 Test equipment used (for reference see test equipment listing).

2788823 2789197	2788794	2789421	2789207	2789211	2790478 / 2789158	2788812
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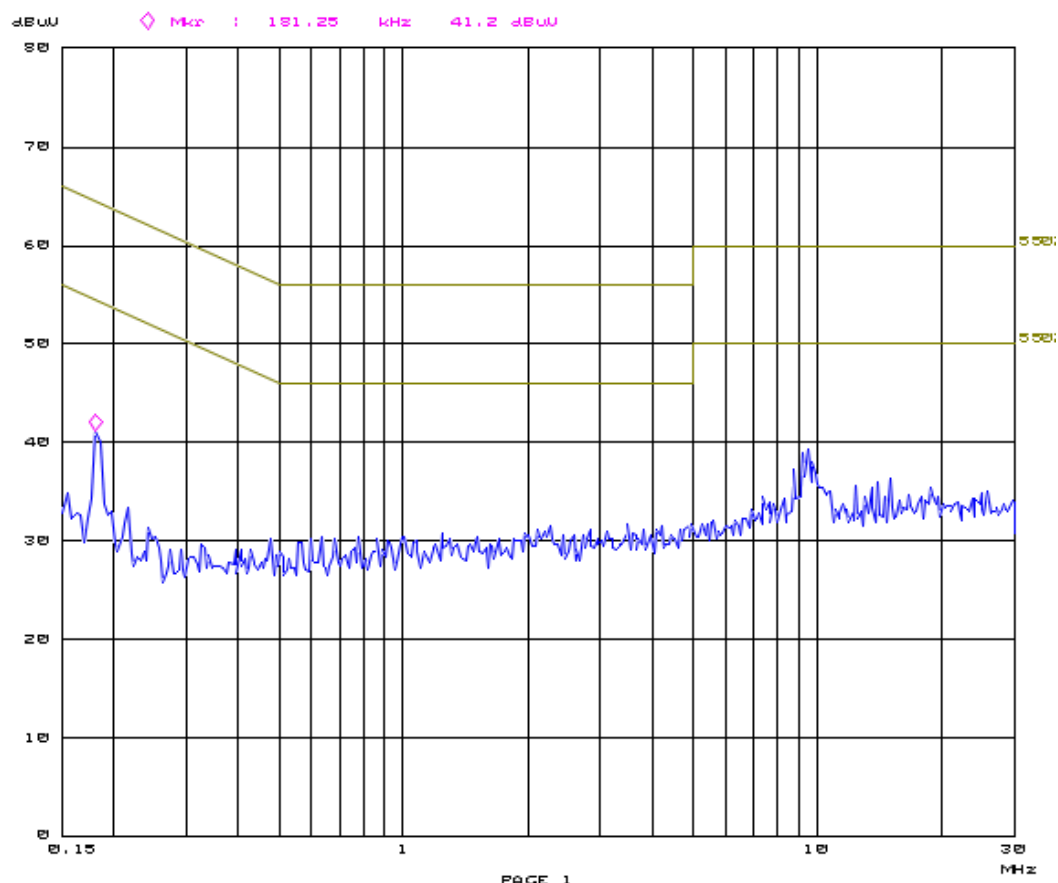
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4.2.2 Plot of the AC power Line Conducted emissions

31. May 21 11:36

Overview Scan Settings (1 Range)
 :----- Frequencies -----: Receiver Settings :-----
 Start Stop Step IF BW Detector M-Time Atten Presamp
 150k 30M 3.9k 9k PK 0.10ms 20dB LN OFF



Pre-scan (peak values) Plot of the emission on L1

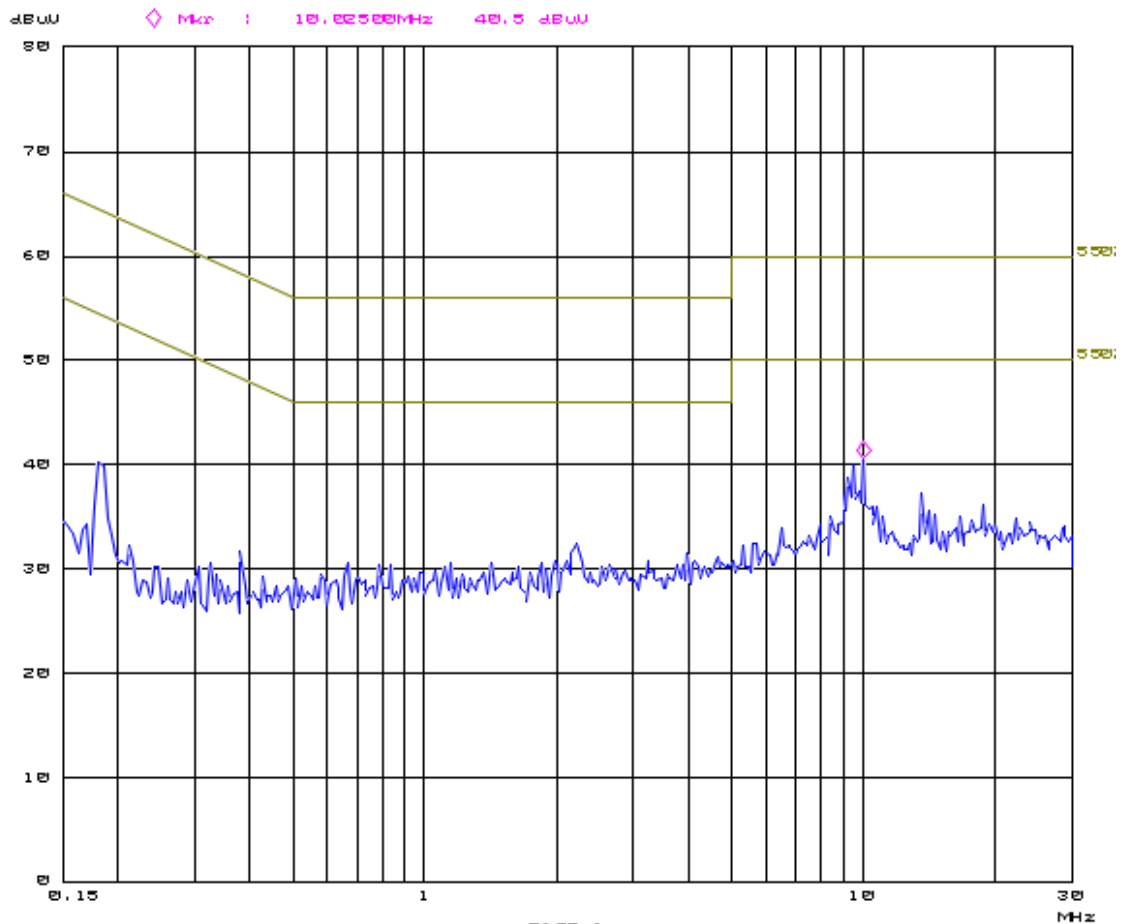
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31. May 21 11:31

Overview Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	3.9k	9k	PK	0.10ms	20dB LN OFF



Pre-scan (peak values) Plot of the emission on L2 /N

5 Carrier stability under special conditions.

5.1 Frequency stability (on 13.56 MHz) in accordance with 47 CFR Part 15, section 15.225 (e) / RSS-210 (B.6)(b):

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -5 °C to +45 °C at normal supply voltage (see Table 5).

Stability under special conditions Temperature (°C)	Supply Voltage (Vac)	Measured frequency (MHz)	Frequency deviation (limit ±0.01%) (%)	PASS/FAIL
20.0	120	13.5600580 (reference)	N.A.	N.A.
-5.0	120	13.5601450	< 0.01	PASS
45.0	120	13.5600000	< 0.01	PASS

Table 5 The frequency tolerance of the carrier signal

5.1.1 At 85% and 115% of rated voltage supply level

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency at 85% and at 115% of the rated power supply voltage at 20 °C environmental temperature. The results are stated in Table 6.

Stability under special conditions % variation U	Measured frequency (MHz)	Frequency deviation (limit ±0.01%) (%)	PASS/FAIL
100.0 (120 Vac)	13.5600580 (reference)	N.A.	N.A.
85.0 (102 Vac)	13.5600580	< 0.01	PASS
115.0 (138 Vac)	13.5600580	< 0.01	PASS

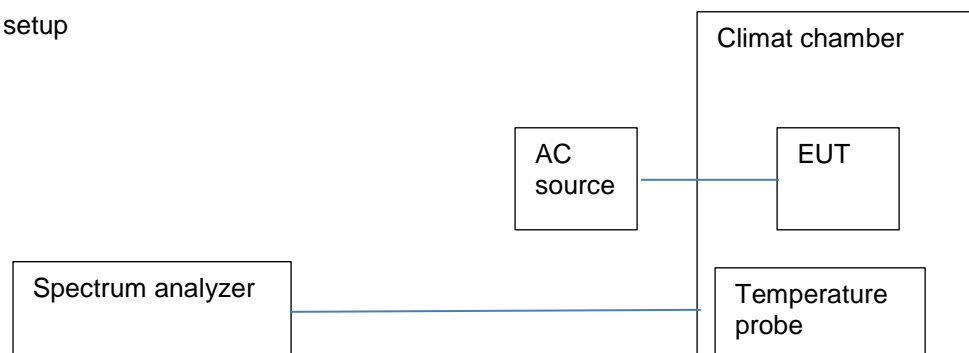
Table 6 The frequency tolerance of the carrier signal

Note: No frequency deviation observed.

5.1.2 Test equipment used (for reference see test equipment listing).

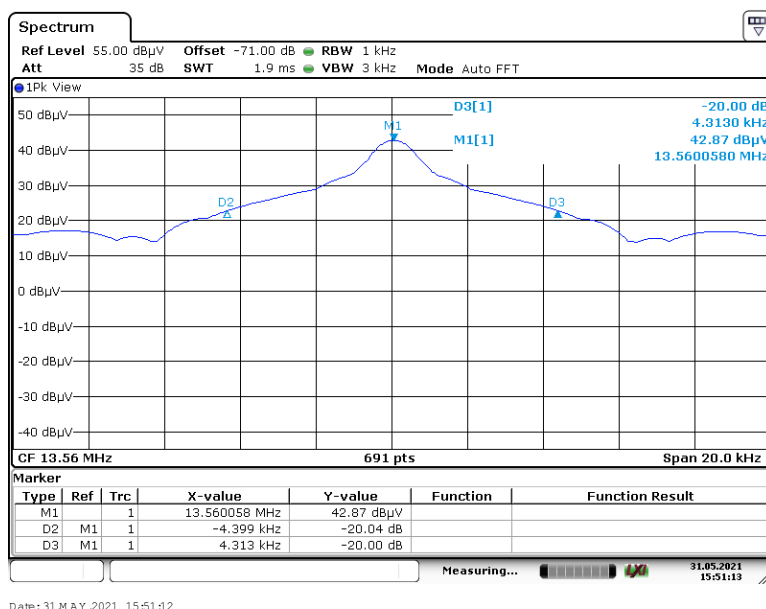
2790470	2789236	2790157	2788905	2789078	2789106	2789214
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Block diagram of the test setup

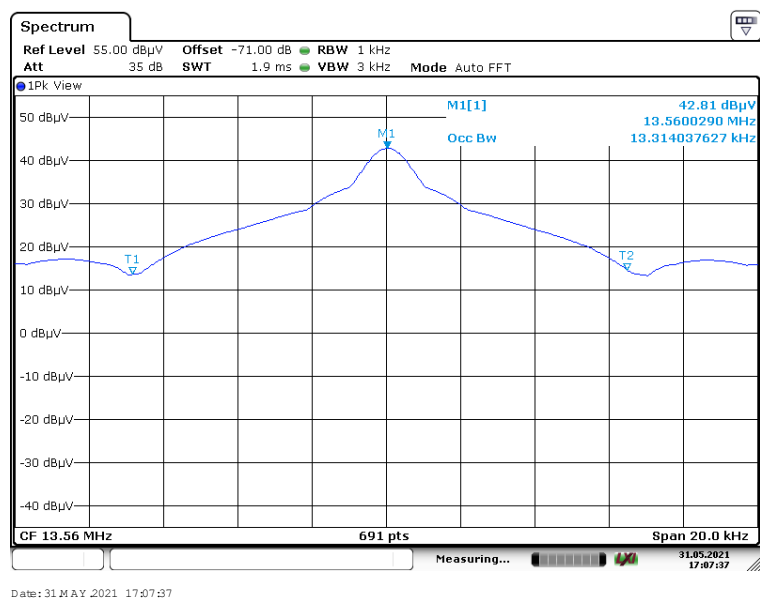


6 Plots of measurement data

6.1 Bandwidth of the emission



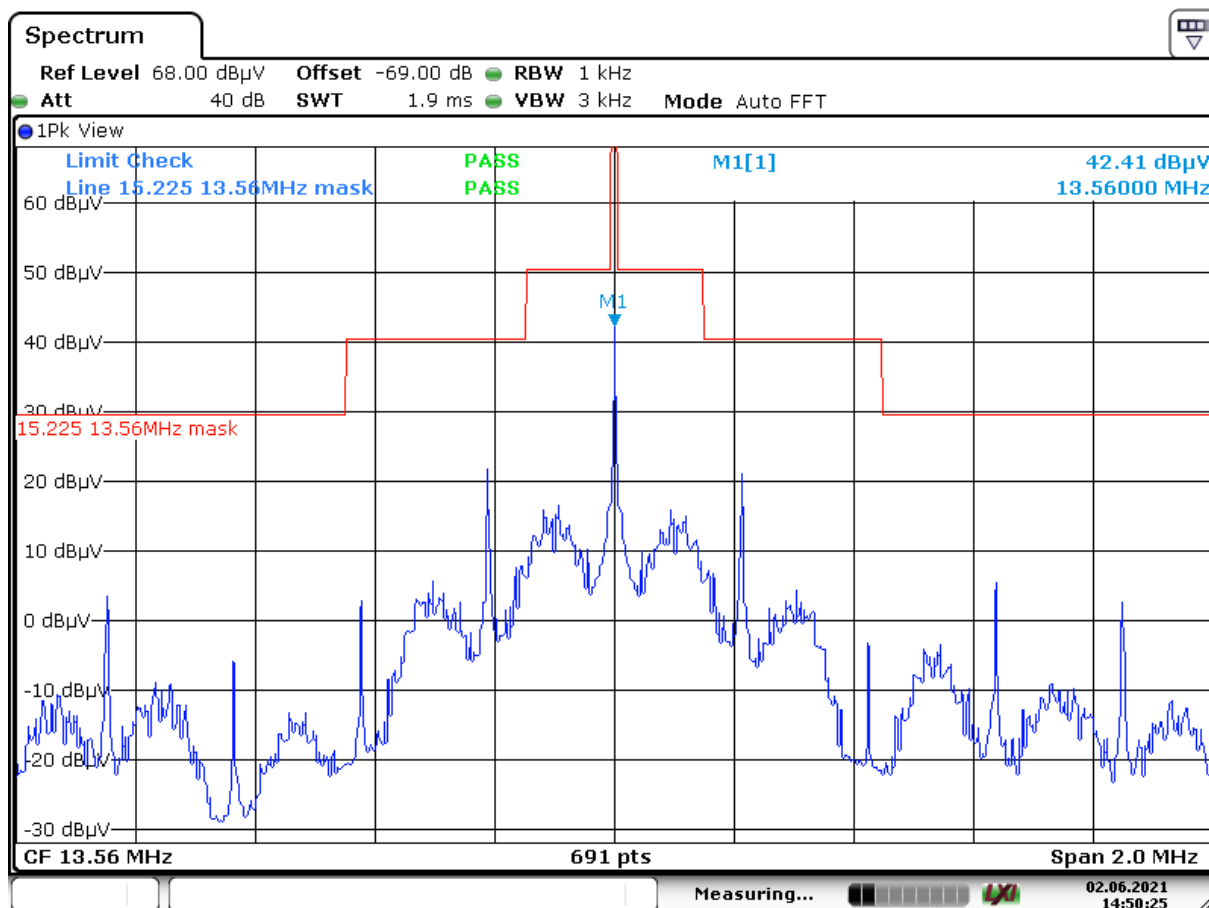
Plot1 Emission Bandwidth of kHz (-20 dB down points) of the emission at 13.560 MHz (Fundamental Carrier).
As measured with a Spectrum Analyzer



Plot2 99% Emission Bandwidth of kHz of the emission at 13.560 MHz (Fundamental Carrier).
As measured with a Spectrum Analyzer

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Date: 2 JUN 2021 14:50:25

Plot3 Spectrum mask of the emission at 13.560 MHz (Fundamental Carrier).
 As measured with a Spectrum Analyzer

7 Photograph test setup, Radiated Emissions

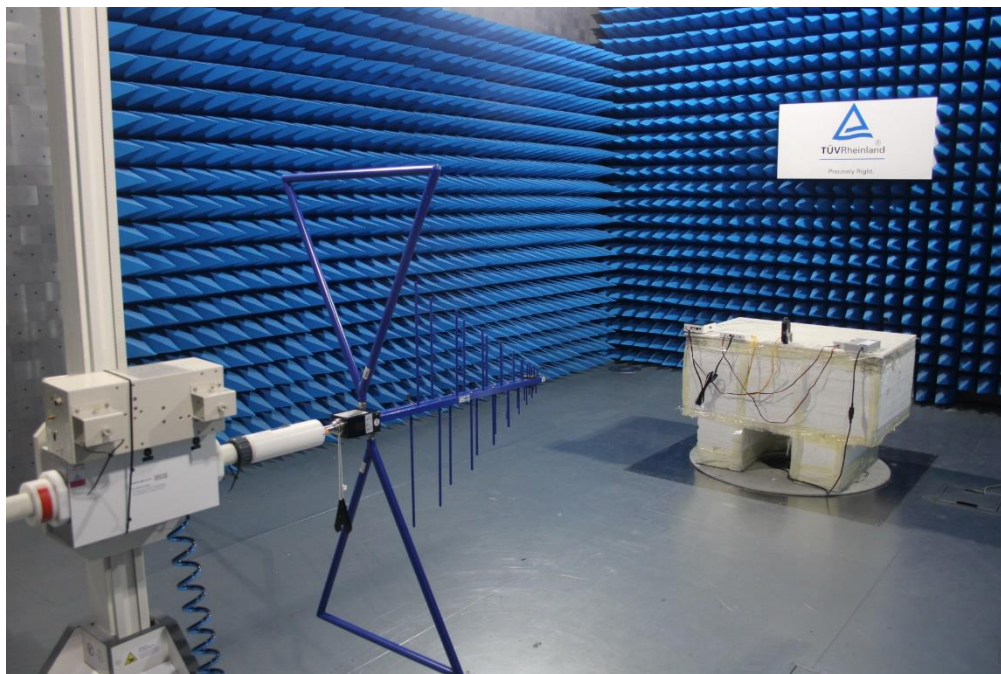


Photo 1 Photograph test setup radiated emissions 30-1000 MHz, report section 3.1

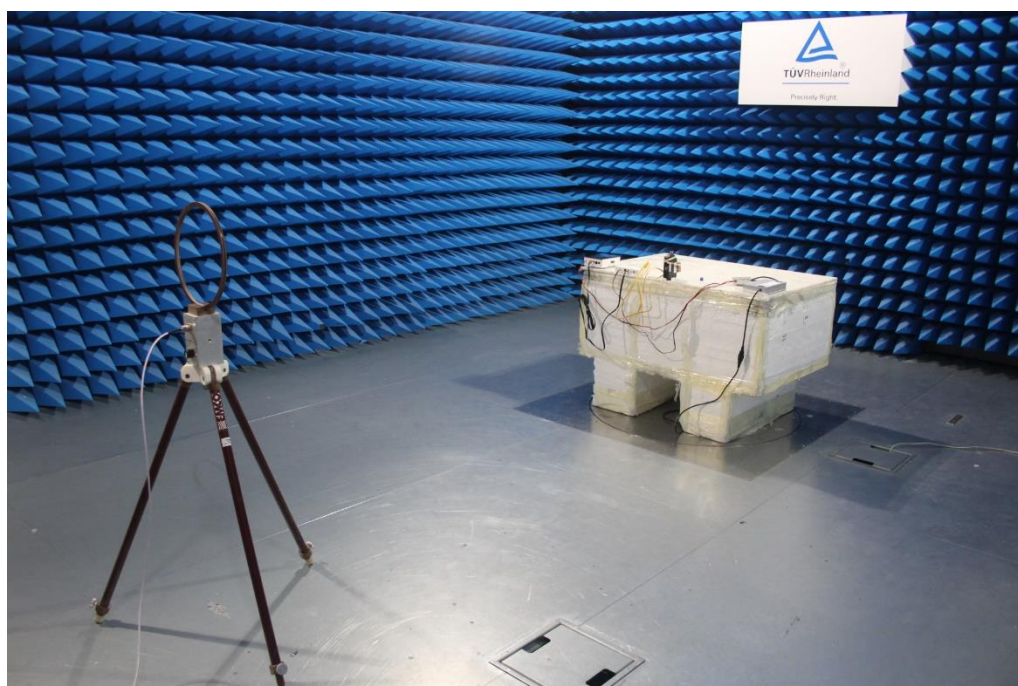


Photo 2 Photograph test setup radiated emissions <30 MHz-planar, report section 3.1

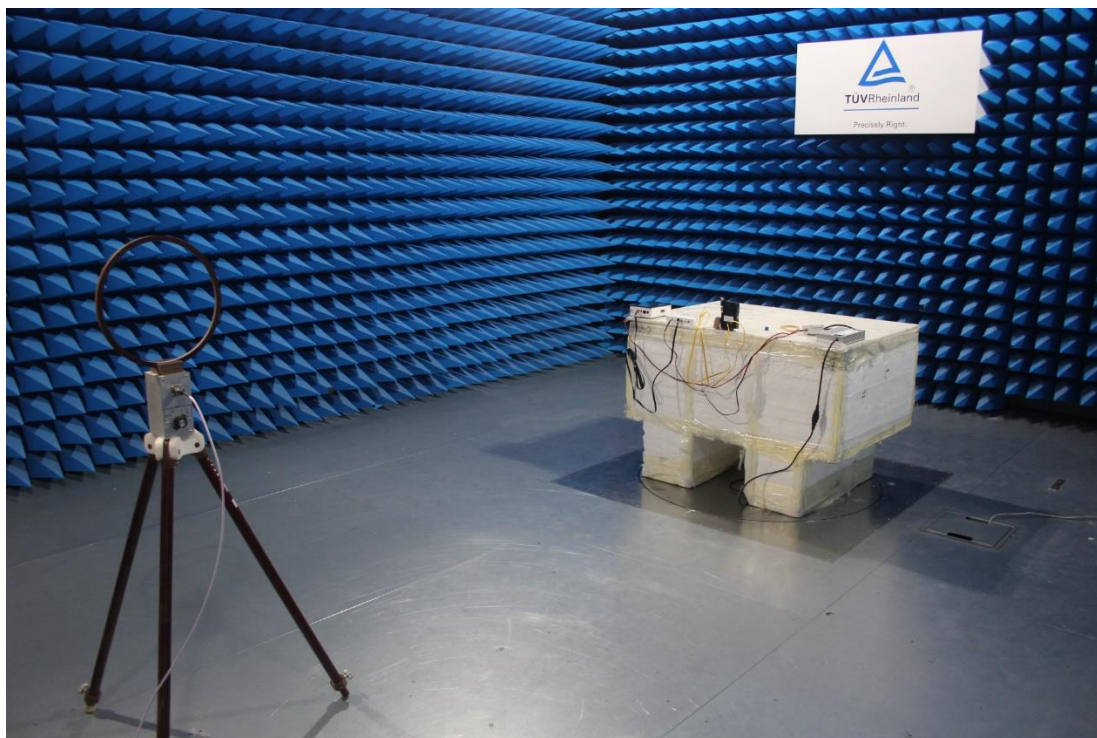


Photo 3 Photograph test setup radiated emissions <30 MHz- Axial, report section 3.1

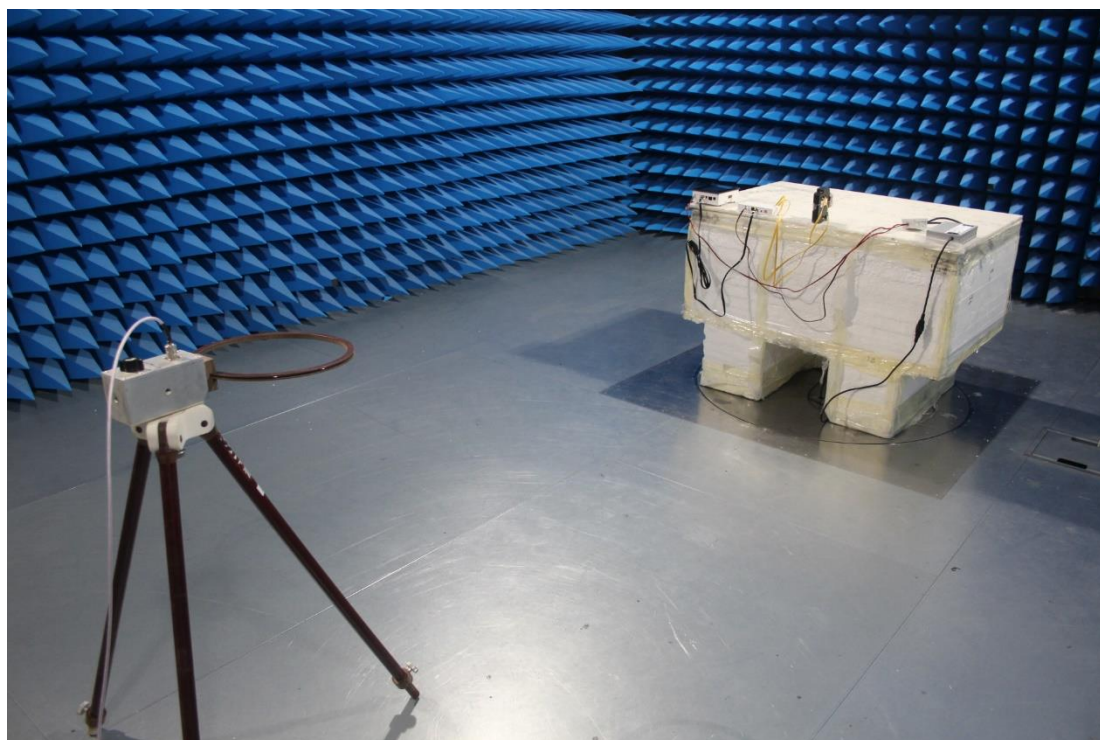


Photo 4 Photograph test setup radiated emissions <30 MHz- Z, report section 3.1

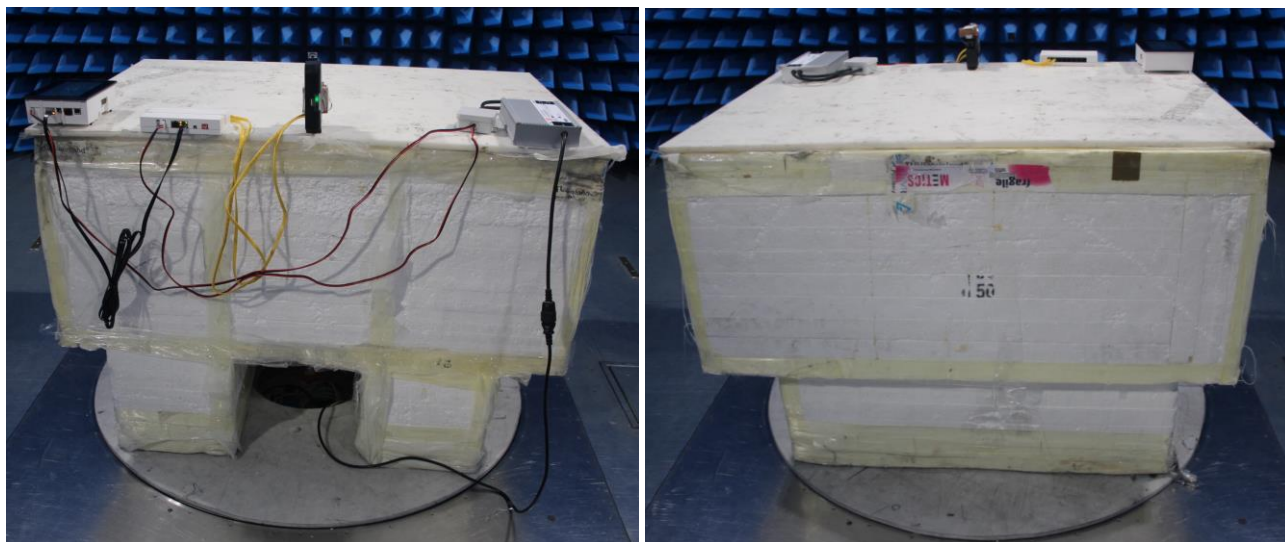


Photo 5 Photograph test setup radiated emissions-table top setup , report section 3.1

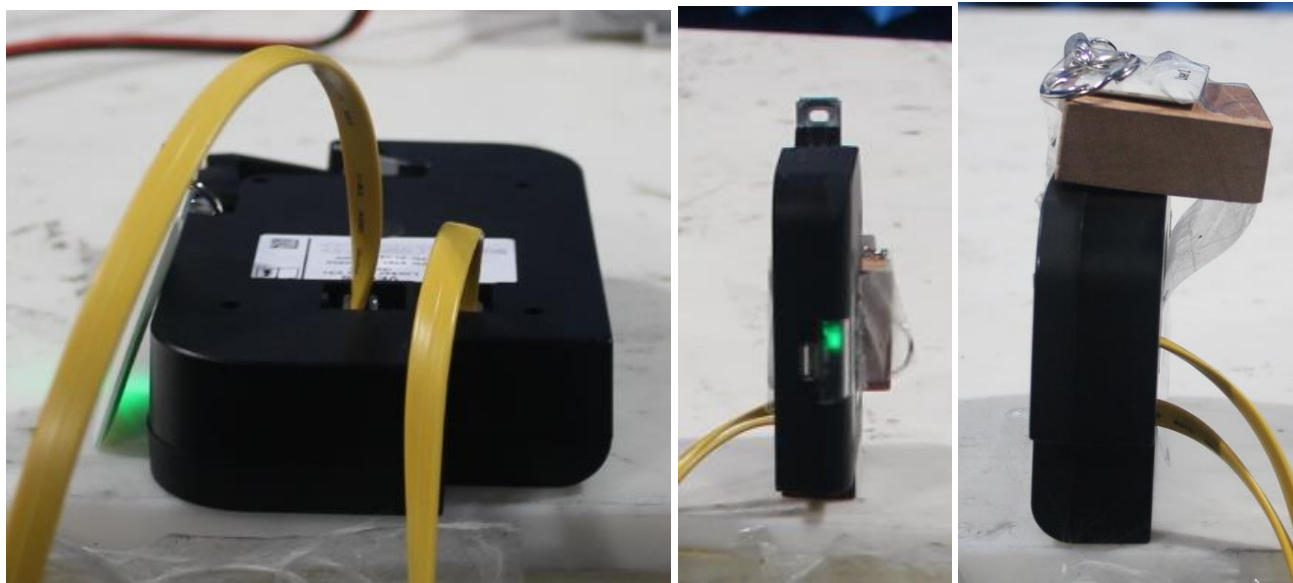


Photo a/b/c EUT positions X,Y and Z

7.1.1 Photographs of the carrier stability setup



Photo 6 Photograph test setup Carrier stability

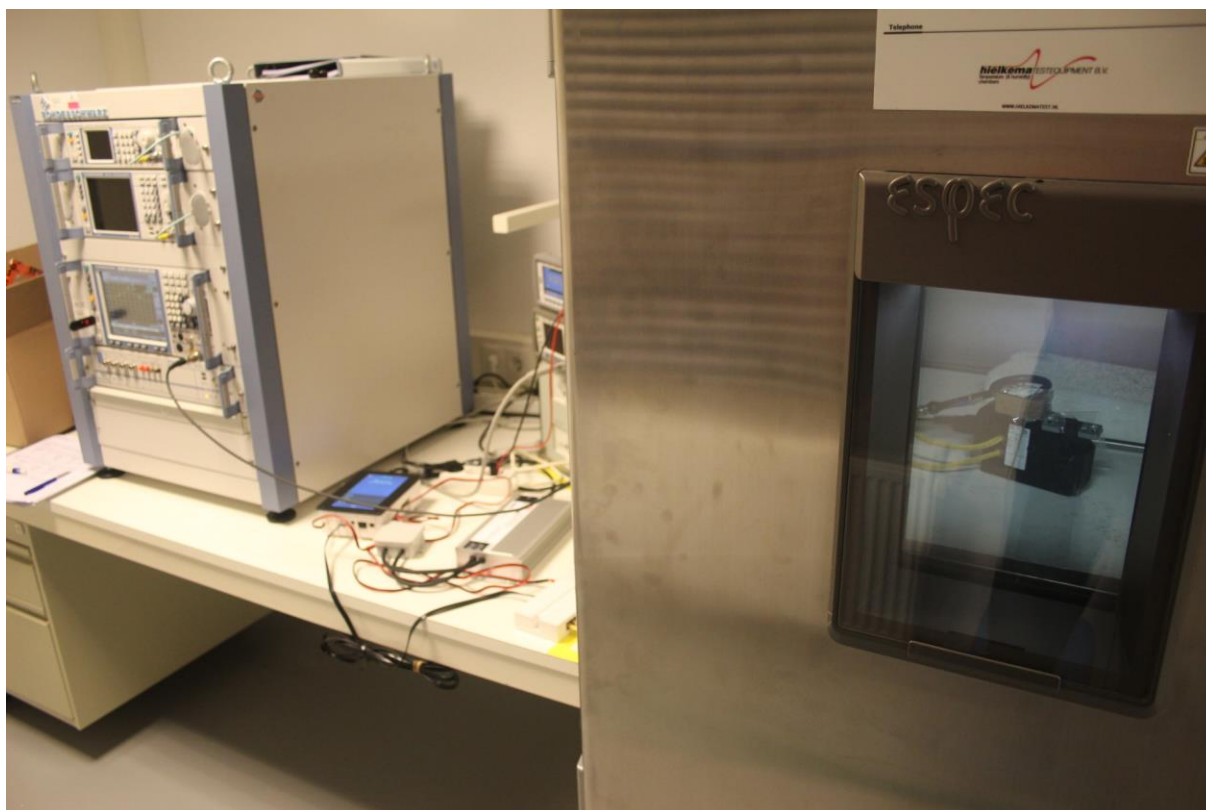


Photo 7 Photograph test setup Carrier stability

7.1.2 Photograph test setup, AC Power Line Conducted emissions

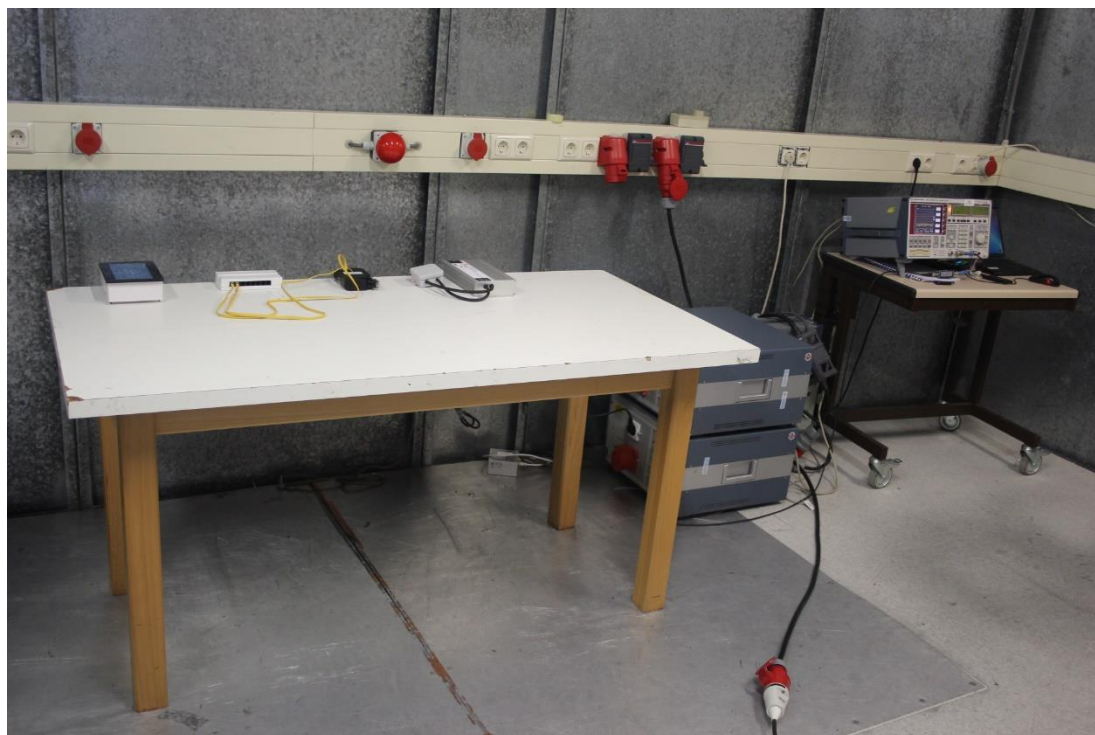
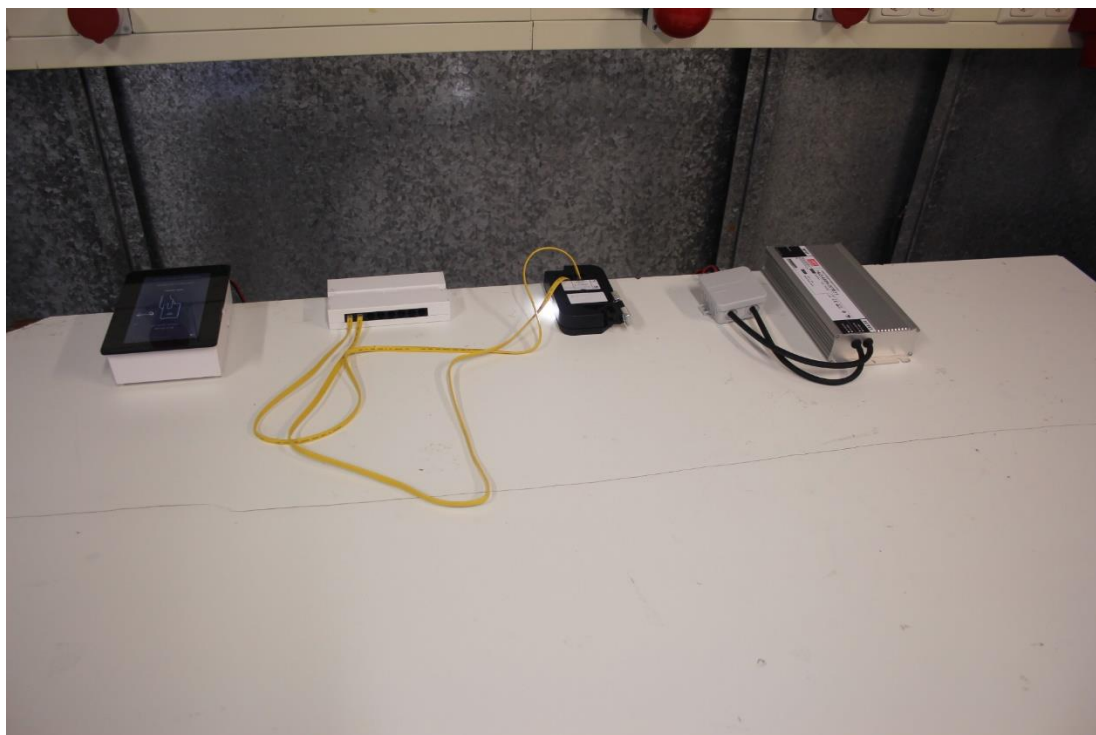


Photo 8a/b: Photographs AC Power Line conducted emissions 0.15-30 MHz, report section 4.2



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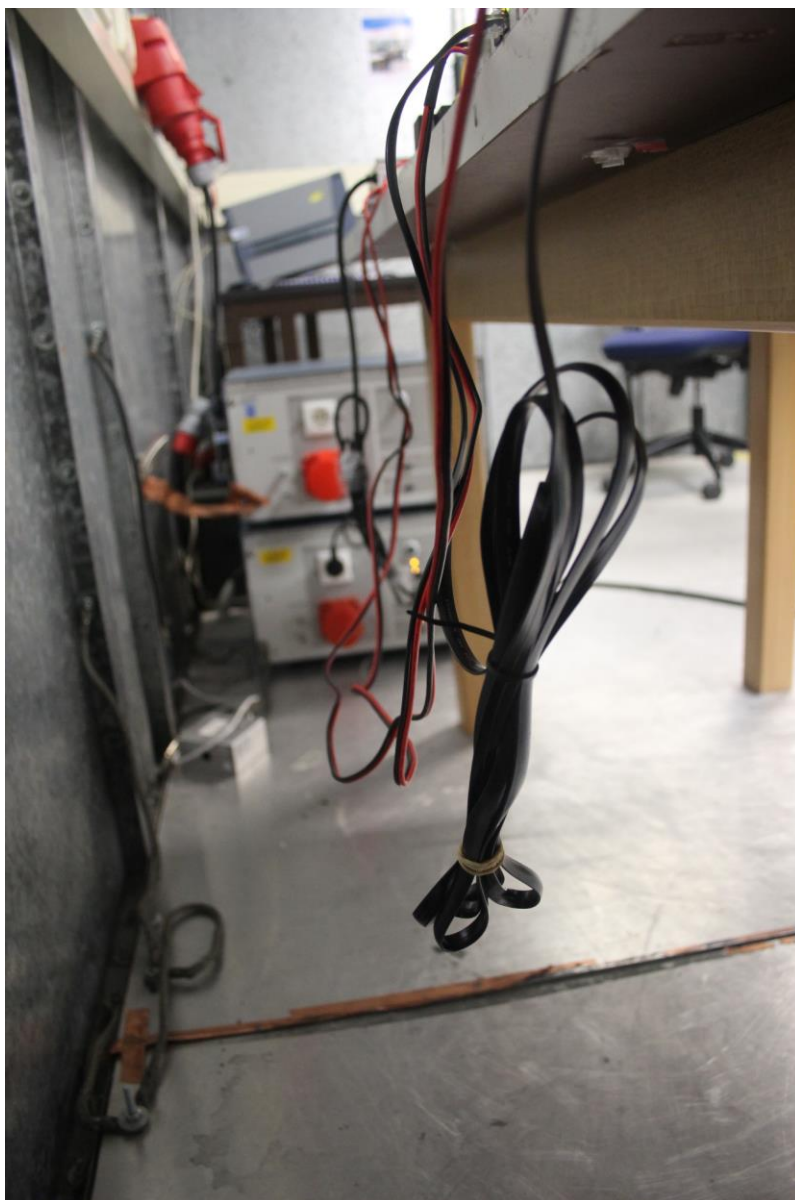


Photo 9 View of the back

<< End of report >>