

Prüfbericht-Nr.: Test report no.:	DE22249U 001	Auftrags-Nr.: Order no.:	1118418_80	Seite 1 von 34 Page 1 of 34	
Kunden-Referenz-Nr.: Client reference No.:	-	Auftragsdatum: Order date:	2022-06-23		
Auftraggeber: Client:	Tacx b.v. De Boeg 2, Oegstgeest, 2343HK, Netherlands				
Prüfgegenstand: Test item:	NBP UI-Display				
Bezeichnung / Typ-Nr.: Identification / Type no.:	A0S4230				
Auftrags-Inhalt: Order content:	Prüfung der Funkparameter nach FCC & ISCED Test of radio parameters acc. to FCC & ISCED				
Prüfgrundlage: Test specification:	Teilprüfung / Partial test FCC CFR 47 Part 15 Subpart C- 15.249 ISED RSS-210 sec. B10 (b): Issue 10:2019				
Wareneingangsdatum: Date of sample receipt:	2022-09-02 2022-05-17				
Prüfmuster-Nr.: Test sample no.:	A003329815-001 & A003329815-003				
Prüfzeitraum: Testing period:	2022-09-05 2022-09-30				
Ort der Prüfung: Place of testing:	Nürnberg Nuremberg				
Prüflaboratorium: Testing laboratory:	Wireless Labor Wireless Test Lab				
Prüfergebnis*: Test result*:	Pass				
geprüft von: tested by:			genehmigt von: authorized by:		
Datum: Date:	21.10.2022	Datum: Issue date:		24.10.2022	Matthias Kraeutlein
Stellung / Position	Sachverständige(r)/Expert		Stellung / Position	Sachverständige(r)/Expert	
Sonstiges / Other:	-				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend 3 = satisfactory	4 = ausreichend N/A = nicht anwendbar N/A = not applicable	5 = mangelhaft N/T = nicht getestet N/T = not tested
* Legende:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory 3 = satisfactory	4 = sufficient N/A = not applicable	5 = poor N/T = not tested
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. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 2 von 34
Page 2 of 34

Anmerkungen
Remarks

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Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 3 von 34
Page 3 of 34

Anmerkungen
Remarks

- | | |
|----------|--|
| 4 | <p>Die Messunsicherheit der in diesem Prüfbericht aufgeführten Messverfahren wird nicht unmittelbar in die Bewertung zur Einhaltung der jeweiligen Grenzwerte mit einbezogen. Es gelten die Anforderungen der Spezifikationen TS 103 051 und TS 100 028-1/-2 in aktueller Form, deren Grundlage der „shared risk“ Ansatz ist. Dieser beschreibt für die jeweilige Norm die maximalen zulässigen Unsicherheitsbeträge unter denen der Messwert als „wahr“ angesehen werden kann. Eine zusätzliche Betrachtung der Messunsicherheit bezüglich des gemessenen Wertes findet bei Unterschreitung der maximalen Unsicherheitsbeträge gemäß den Spezifikationen nicht statt.</p> <p><i>The measurement uncertainty of the measurement methods listed in this test report is not directly included in the assessment of compliance with the respective limit values. The requirements of the specifications TS 103 051 and TS 100 028-1/-2 apply in their current form, based on the "shared risk" approach. For the respective standard, this describes the maximum acceptable uncertainty below which the measured value can be regarded as "true". An additional consideration of the measurement uncertainty with regard to the measured value does not take place if the maximum acceptable uncertainties according to the specifications are not reached.</i></p> |
| 5 | <p>Die Aussage zur Konformität des in diesem Prüfbericht geprüften Produktes wird auf Kundenwunsch nach den Kriterien und Anforderungen der angewendeten Normen durchgeführt. Abweichende Bewertungsbedingungen durch den Kunden werden in den jeweiligen Kapiteln gesondert dokumentiert. Grundsätzlich wird eine Konformitätsbewertung auf Basis der angewendeten Normen durchgeführt, sofern mit dem Kunden keine abweichende Regelung getroffen wurde.</p> <p><i>The statement of conformity of the product tested in this test report is carried out according to the criteria and requirements of the applied standards on customer request. Deviating assessment conditions by the customer are documented separately in the respective chapters. In principle, the assessment of conformity is made on the basis of the standards applied, unless otherwise agreed with the customer.</i></p> |

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 4 von 34
Page 4 of 34

Produktbeschreibung
Product description

1	Test item	NBP UI-Display
2	Typ-No.	A0S4230
3	Identical types	-
4	Test sample obtaining	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:
5	Serial-No.	-
6	FCC ID	2AAMI-T8000D
7	IC, HVIN and PMN	11353A-T8000D, A0S4230 and NBP UI-Display
8	Description of EUT	The NBP UI-Display unit is a handlebar with display to show user feedback on Speed, cadence, power, heartrate (if sensor is used) and the gear settings chosen at that moment. The NBP UI-Display is not operational on its own, it needs to be connected to the NEO Bike Plus (electrically).
9	Supported radio technologies	ANT+
10	Max RF Field Strength (measured)	77.27dBµV/m @3m
11	Operating Frequency (declared)	2403MHz -2480MHz
12	Data Rate (Mbps)	1Mbps
13	Channel Bandwidth (declared)	1MHz
14	Number of Channels	ANT+: 8 (Only 1 Channel will be used in end application)
15	Modulation	GFSK
16	Rated Voltage / Frequency	120Vac/60Hz Input of the adaptor 48Vdc/1A Input to NBP UI-Display.
17	Antenna Type	☒ Integral antenna ☐ Dedicated antenna ☐ Permanent antenna connector
18	Antenna amount of chains	1
19	Antenna Gain (declared)	2dBi

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 5 von 34
Page 5 of 34

Produktbeschreibung
Product description

20	Software Version	006-B4230-00 Rev B
21	Hardware Version	013-01066-00 Rev C
22	Used Samples	DUT 1: A003329815-001 Radiated Test mode sample (Display Unit) DUT 2: A003329815-003 Conducted Test mode sample
23	Companion Device	PC used to configure the radio's during the testing.
24	Accessory Devices	USB cable
25	Data Cable	PC used to configure the radio's during the testing.
26	Device operating temperature range	-20°C to 55°C
27	Environmental	Indoor

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 6 von 34
Page 6 of 34

Absatz Clause	Anforderungen – Prüfungen / Requirements - Tests	Bemerkungen / Remarks	Ergebnis Result
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FCC 15.215 (c) RSS-Gen sec. 6.7	20dB Bandwidth and 99% emission bandwidth*	-	P ☐ F ☐ N/A ☐ N/T ☒
FCC 15.249 (a) RSS-210 sec. B10 (a)	Field Strength of fundamental and harmonics	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.249 (d),(e) RSS-210 sec. B10 (b)	Radiated Spurious Emission	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.207 RSS-Gen sec. 8.8	AC Power Conducted Emissions	-	P ☒ F ☐ N/A ☐ N/T ☐

Remarks: *-> Only RF power and spurious emission varified for Class 2 Permissive Change filling

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 7 von 34
Page 7 of 34

Prüfdokumentation
Test documentation

Contents

1.1	Wireless technologies and frequencies supported by the EUT	8
1.2	Standard specific classification of the EUT	8
2	General	9
2.1	Registration	9
2.2	Equipment modifications	9
2.3	Test modes	10
2.4	Worst case Test Modes	11
3	Test conditions	11
3.1	General	11
3.2	Normal test conditions	11
3.3	Antenna assemblies	11
3.4	Measurement Uncertainty	12
4	Test results in detail	13
4.1	Radiated Spurious Emissions	13
4.2	AC Power Conducted Emission	28
5	Equipment List	32
5.1	Hardware	32
5.2	Software	33
6	Change History	34

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 8 von 34
Page 8 of 34

Prüfdokumentation
Test documentation

EUT Classification

1.1 Wireless technologies and frequencies supported by the EUT

The named technologies are only those falling in the specification of the applied standard.

Technology	Operating Frequency Range	Supported by the EUT	Evaluated in this report
ANT+	2403 – 2480MHz	☒	☒

RASP 2.8 tool is used for configuration of the device.

1.2 Standard specific classification of the EUT

1.2.1 Applied standards

FCC CFR 47 Part 15 Subpart C - §15.249

ISED RSS-210:2019

1.2.2 Test Methods and Guidance Documents

ANSI C63.10:2013

KDB 558074 D01 DTS Measurement Guidance v05

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 996369 D04 Module Integration Guide v01

1.2.3 System Type

☒	DTS (Digital Transmission System)
☐	FHSS (Frequency Hopping Spread Spectrum)

1.2.4 Type of equipment

☐	Table top Equipment
☒	Floor-Standing Equipment
☐	Equipment that can be used in multiple orientations
☐	Hand held Equipment

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 9 von 34
Page 9 of 34

Prüfdokumentation
Test documentation

2 General

2.1 Registration

The measurement facilities for conducted and radiated disturbance measurements of the TÜV Rheinland LGA Products have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. Measurement data will be accepted in conjunction with applications for Certification under Parts 15 and 18 of the Commission's Rules.

FCC Registration Number: 939976

Bundesnetzagentur Registration Number: BNetzA-CAB-17/21-16

The measurement facilities are also recognized by Innovation, Science and Economic Development (ISED) Canada to test to Canadian radio equipment requirements.

Company Number: 11235A

CAB Identifier: DE0018

2.2 Equipment modifications

No modifications were found to be necessary in order to perform the tests or to achieve compliance.

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 10 von 34
Page 10 of 34

Prüfdokumentation
Test documentation

2.3 Test modes

Mode	Description	Mode configuration
	All Modes (Display Unit)	☒ The auxiliary equipment (PC) was connected to the EUT during the tests to keep the configured settings active. The notebook was placed outside of the FAC. The connection was realized by a shielded feedthrough. ☐ The auxiliary equipment (xxx) was only connected to the EUT before the tests for the mode configuration. During the test the auxiliary equipment was disconnected from the EUT.
1	ANT+ (TX)	Transmit Power setting 1dBm, Data Rate :1Mbps, Modulation : GFSK Frequency : 2403MHz(Low), 2440MHz(Mid) and 2480MHz (High) Continuous transmission.

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 11 von 34
Page 11 of 34

Prüfdokumentation
Test documentation

2.4 Worst case Test Modes

The DUT was tested for the RF power configuration as stated in the test report of the product tested in 2019-06-06.

FCC ID: 2AAMI-T8000D
IC: 11353A-T8000D

3 Test conditions

3.1 General

The DUT was tested standalone on the transmit test mode in normal test conditions.

3.2 Normal test conditions

Environmental condition	Parameter	Range
Temperature	°C	25
Relative humidity	%	65
Supply voltage	Volts DC	48Vdc input to NBP UI-Display

3.3 Antenna assemblies

Antenna connector is prepared to verify the RF power test in conducted mode with sample no.A003329815-003

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 12 von 34
Page 12 of 34

Prüfdokumentation Test documentation

3.4 Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the quality system acc. to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

The manufacturer has the sole responsibility of continued compliance of the device.

Test	Value	Unit	Range
Frequency Error	2,7 *10 ⁻⁸	Hz	-
Frequency Stability under low voltage conditions			
Time	1,1*10 ⁻⁹	s	-
Conducted Carrier Power	1.0	dB	9k-1GHz
	1.7	dB	1GHz-6GHz
Conducted Spurious Emissions (RX/TX)	2.8	dB	6GHz-40GHz
Occupied Bandwidth (OBW)	0.1	%	-
TX Power Spectral Density	4.2	mW	9kHz - 6GHz
	1.6	dB	9kHz - 6GHz
Dwell Time	4,6 *10 ⁻⁷	Hz	-
Frequency Separation			-
Measurement of conducted emissions at the power supply connection to LISN	2.3	dB	9kHz – 150kHz
	2.2	dB	150kHz – 30MHz
Measurement of the field strength at distance 3m	1.6	dB	9k-150kHz
	4.5	dB	30-1000MHz
	5	dB	1-6GHz
	5.3	dB	6-40GHz
Temperature	0.8	K	-
Humidity	4	%	-
Voltage (AC/DC)	1.0	%	-

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 13 von 34
Page 13 of 34

Prüfdokumentation
Test documentation

4 Test results in detail

4.1 Radiated Spurious Emissions

4.1.1.1 Field Strength of fundamental and harmonics

FCC Part 15 Subpart C §15.249 (a) / RSS-210 sec. B10 (a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

FCC Part 15 Subpart C §15.249 (c)

Field strength limits are specified at a distance of 3 meters

FCC Part 15 Subpart C §15.249 (e)

As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

The followings field strength limits applies to the DUT in dBµV/m

Fundamental Frequency	Average Field strength of fundamental (dBµV/m)	Peak Field strength of fundamental (dBµV/m)	Average Field strength of harmonics (dBµV/m)	Peak Field strength of harmonics (dBµV/m)
2400-2483.5 MHz	94	114	54	74

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 14 von 34
Page 14 of 34

Prüfdokumentation
Test documentation

4.1.1.2 Radiated Spurious Emission

FCC Part 15 ante Subpart C §15.249 (d) / RSS-210 sec. B10 (b)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency [MHz]	Limit [µV/m]	Measurement distance [m]	Limits [dBµV/m]
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (f)(2).

Frequency [MHz]	Limit [µV/m]	Measurement distance [m]	Limits [dBµV/m]
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
960 - 40000	500@3m	3	54.0@3m

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor:

$$\text{Limit [dBµV/m]} = 20 \log (\text{Limit [µV/m]} / 1\mu\text{V/m})$$

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 15 von 34
Page 15 of 34

Prüfdokumentation Test documentation

4.1.2 Test Method

4.1.2.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. Preliminary emission profile testing was performed inside the anechoic chamber. The receiving antenna was placed at a distance of 3m for all measurements. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT. The different measurement setup for each frequency range are shown below.

9 kHz - 30 MHz

Following Measurement Setup is used:

Test Site	Semi-anechoic chamber
Receiving Antenna	Loop antenna (HFH 2)
Receiving Antenna Height	1 m
Receiving Antenna Polarisation	Parallel – Perpendicular
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	22.5°
Receiver Configurations	Average and peak detectors
	RBW: 200Hz (9 - 150 kHz) and 9 kHz (150 kHz – 30 MHz)
	Step Size: 50Hz (9-150kHz) and 2.25kHz (150k-30MHz)
	Sweep Time: 100ms (FFT)

30 MHz - 1 GHz

Following Measurement Setup is used:

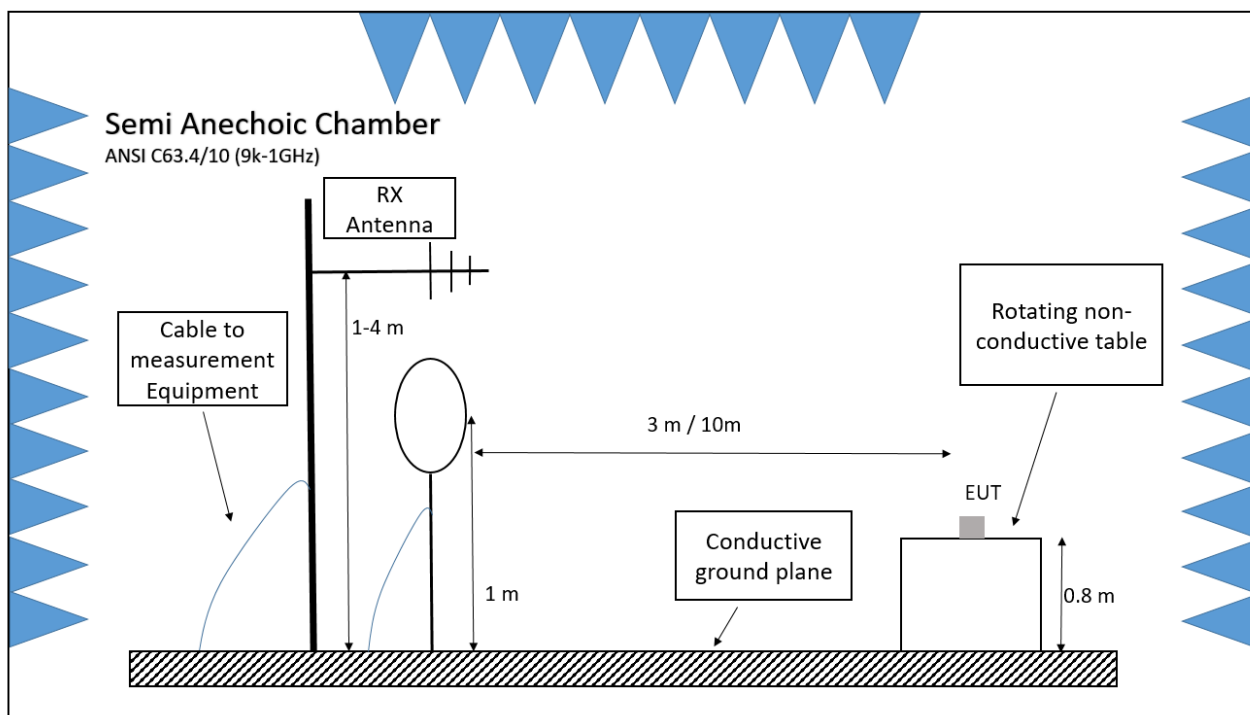
Test Site	Semi-anechoic chamber
Receiving Antenna	Hybrid Antenna VULB 9168
Receiving Antenna height	Varied (1m to 4 m, step size 1m)
Receiving Antenna Polarisation	Horizontal– Vertical
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	45°
Receiver Configurations	Peak detector
	RBW :120 kHz
	Step Size: 30kHz (30-1000MHz)
	Sweep Time : 100 ms (FFT)

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 16 von 34
Page 16 of 34

Prüfdokumentation Test documentation

For Measurements below 1 GHz, the EUT was positioned as shown in the setup photograph:



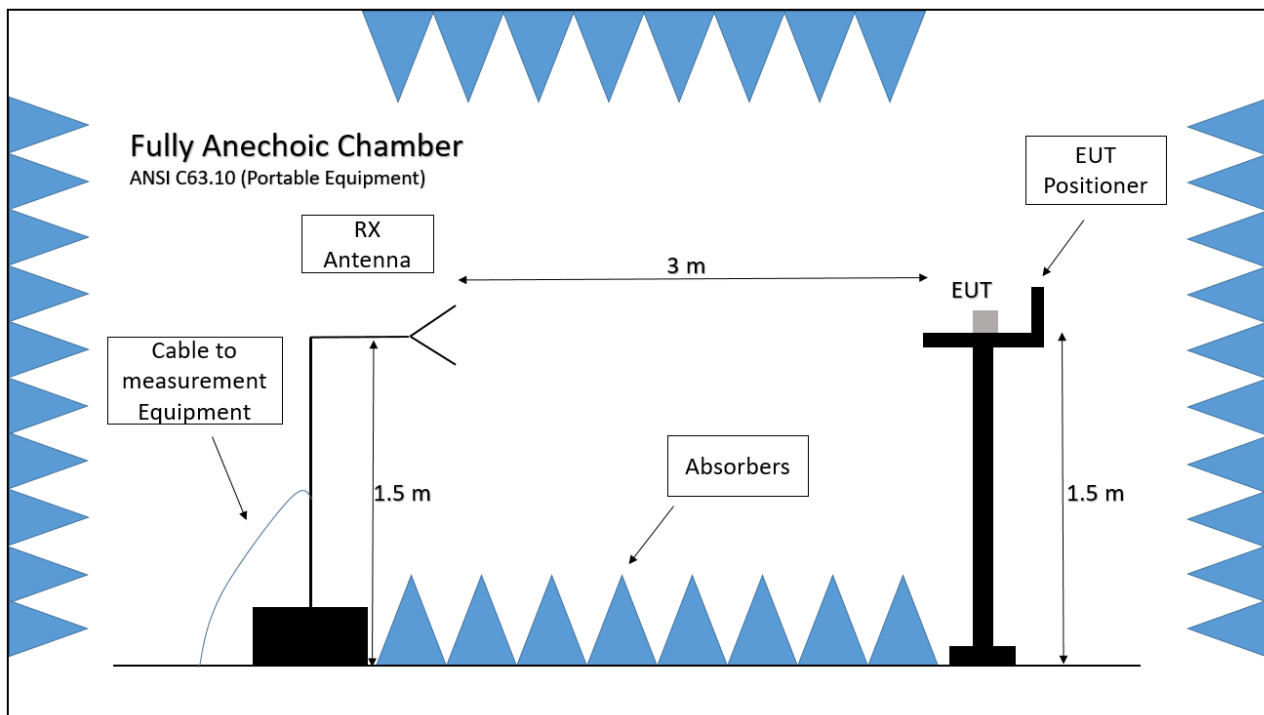
1 GHz – 26.5 GHz

Following Measurement Setup is used:

Test Site	Fully-anechoic chamber
Receiving Antenna	Horn Antenna HF907 (1-18 GHz), 3116C-PA (18-26.5 GHz)
Receiving Antenna Height	1.5 m
Receiving Antenna Polarisation	Horizontal– Vertical
EUT Positioner	40 cm x 60 cm non-conductive positioner 1.5 m above the floor / Step size,elevation angle 45°
EUT Turn Table Step Size	45°
Spectrum Analyser	Average and peak detectors
	RBW: 1 MHz
	Sweep Time : 100 ms

Prüfdokumentation Test documentation

For Measurements over 1 GHz, the EUT was positioned as shown in the setup photograph:



4.1.2.2 Final Test

The placement of EUT and cables were the same as for preliminary testing. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, then the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked. For the measurements in the frequency range 30 MHz to 1 GHz for each measured frequency the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. For measurement above 1 GHz the turntable and positioner step sizes were set to a range of 22° and the antenna height is fixed.

For the measurements in the frequency ranges (90-110 kHz, 490 kHz-1 GHz) quasi-peak detector is used, while average and peak detectors are used in other ranges.

Final testing was performed on an SVSWR compliant test site.

The final average electric field value (E_{final}) is calculated in the final measurement table using the following equation:

$$E_{final} = \text{RawRec} + \text{Corr.}$$

While

$$\text{Corr.} = \text{Trd. Corr.} + \text{Sig Path} + \text{Preamp}$$

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 18 von 34
Page 18 of 34

Prüfdokumentation
Test documentation

4.1.3 Test Setup

EUT	A003254653-010
Test Condition	Normal conditions
Companion device	-
Operation mode	1
Further parameters	-
Test engineer	Shrinivas Naikar

Prüfbericht-Nr.: DE22249U 001
Test report no.:

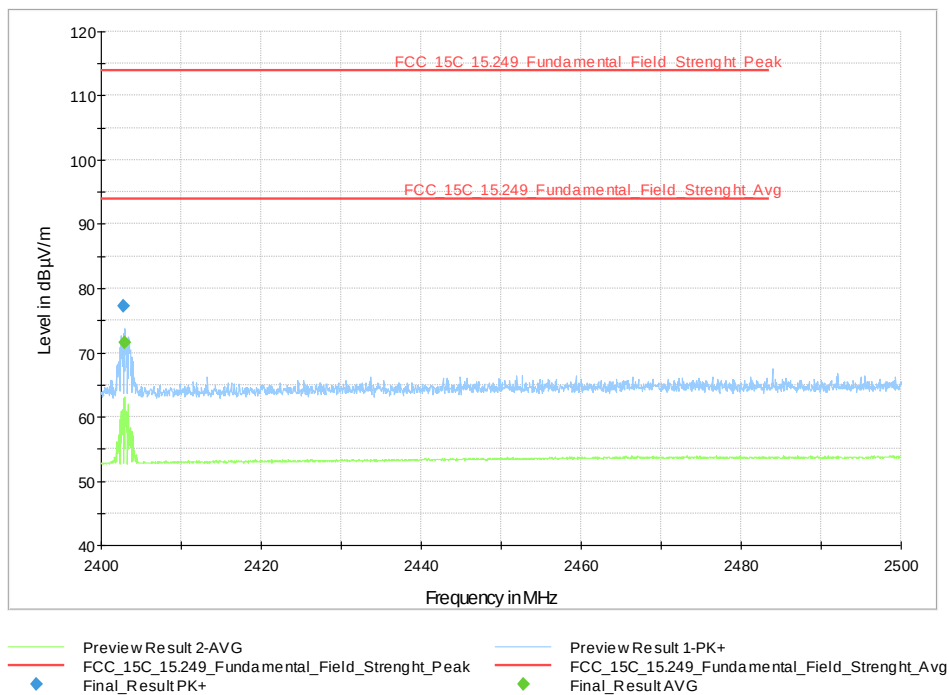
Seite 19 von 34
Page 19 of 34

Prüfdokumentation Test documentation

4.1.4 Test results

4.1.4.1 Field Strength of fundamental

- Channel_Low_ANT+



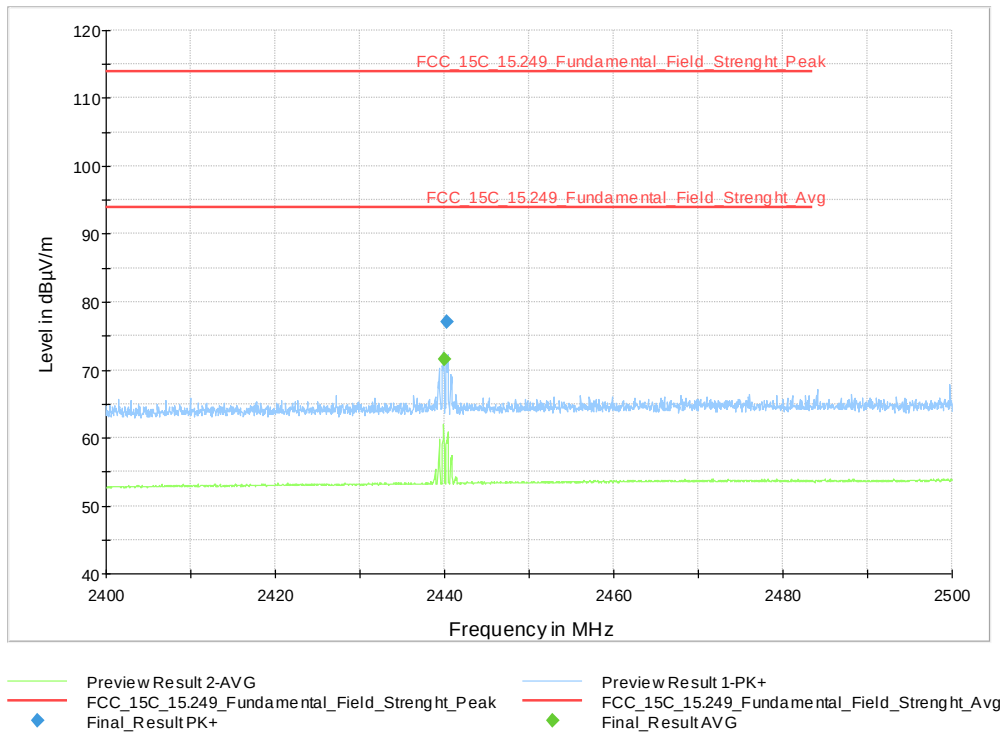
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2402.826250	---	71.56	94.00	22.44	1000.0	1000.000	150.0	V	163.0	35.1
2403.006250	77.27	---	114.00	36.73	1000.0	1000.000	150.0	V	162.0	35.1

- Channel_Mid_ANT+

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 20 von 34
Page 20 of 34

Prüfdokumentation Test documentation



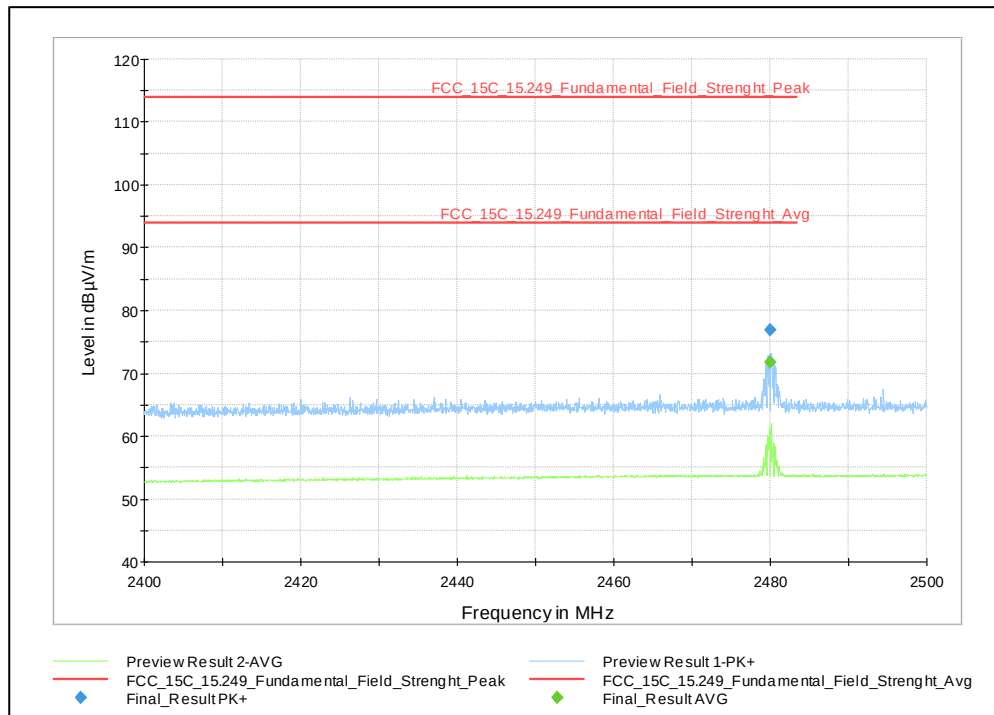
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2439.731250	77.14	---	114.00	36.86	1000.0	1000.000	150.0	V	159.0	35.3
2439.943750	---	71.57	94.00	22.43	1000.0	1000.000	150.0	V	161.0	35.3

- Channel_High_ANT+

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 21 von 34
Page 21 of 34

Prüfdokumentation Test documentation



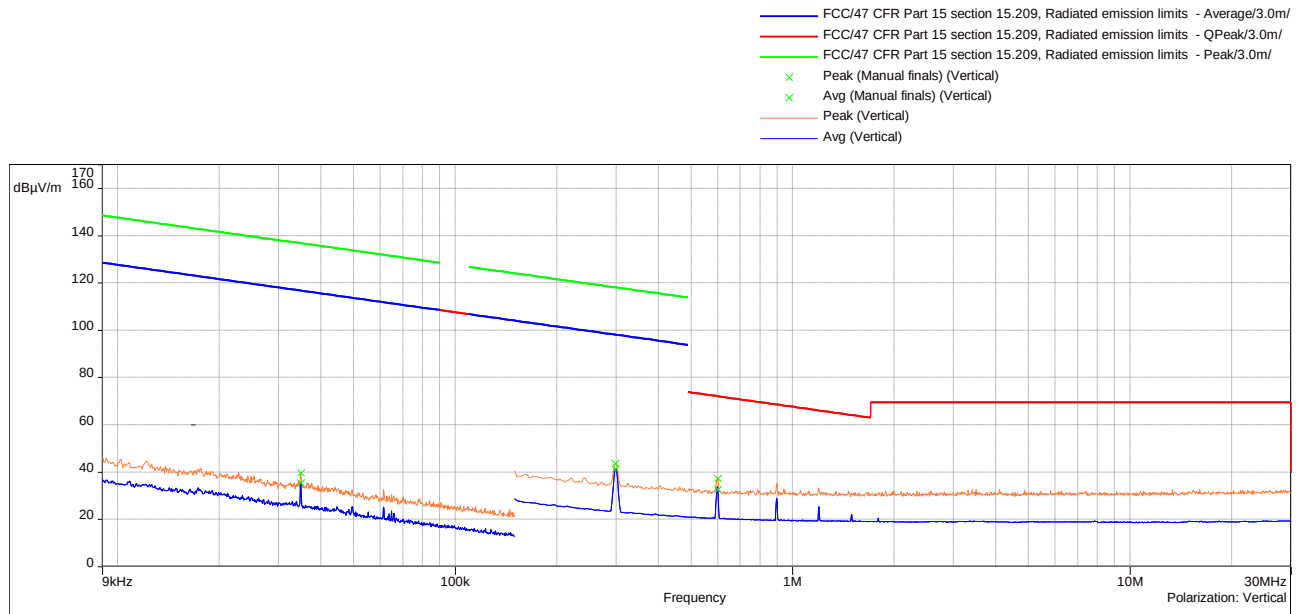
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2479.806250	76.79	---	114.00	37.21	1000.0	1000.000	150.0	V	160	35.6
2479.962500	---	71.68	94.00	22.32	1000.0	1000.000	150.0	V	162	35.6

Prüfbericht-Nr.: DE22249U 001
Test report no.:

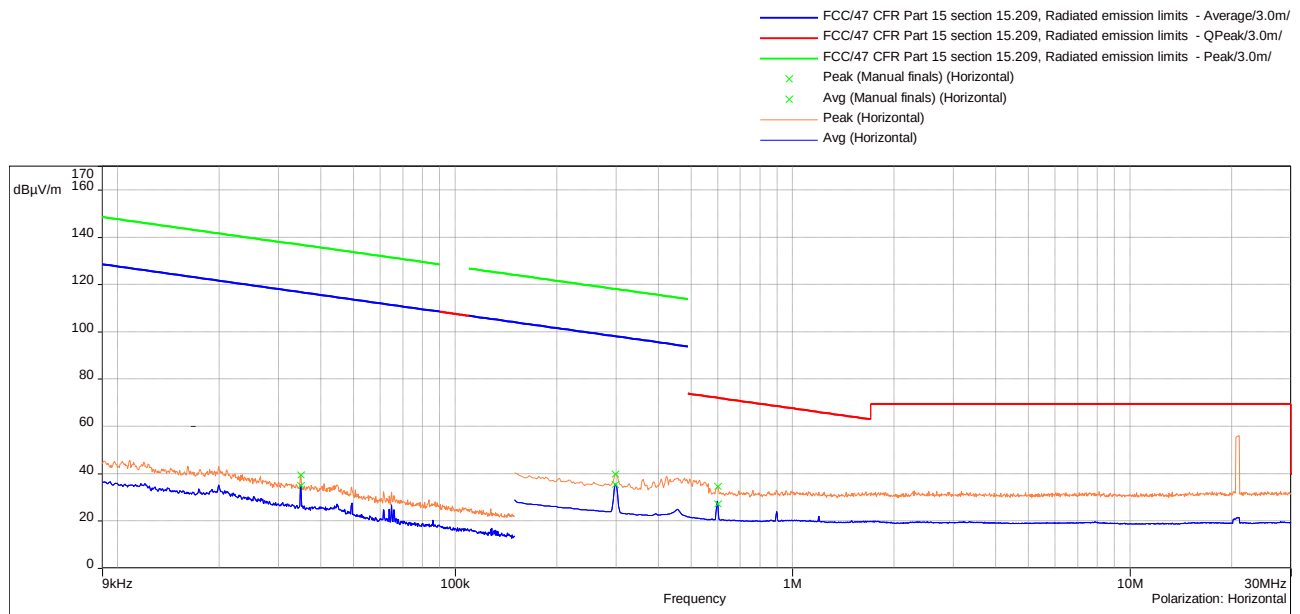
Seite 22 von 34
Page 22 of 34

Prüfdokumentation Test documentation

4.1.4.2 Spurious emissions and Field Strength of harmonics



Parallel Polarization_9kHz to 30 MHz



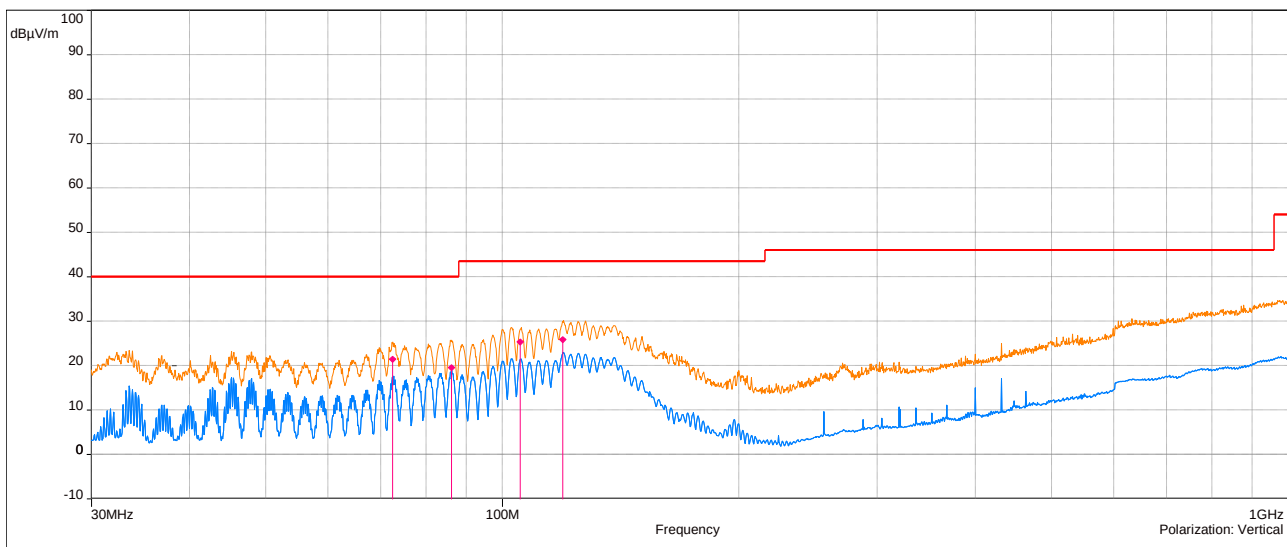
Parallel Polarization_9kHz to 30 MHz

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 23 von 34
Page 23 of 34

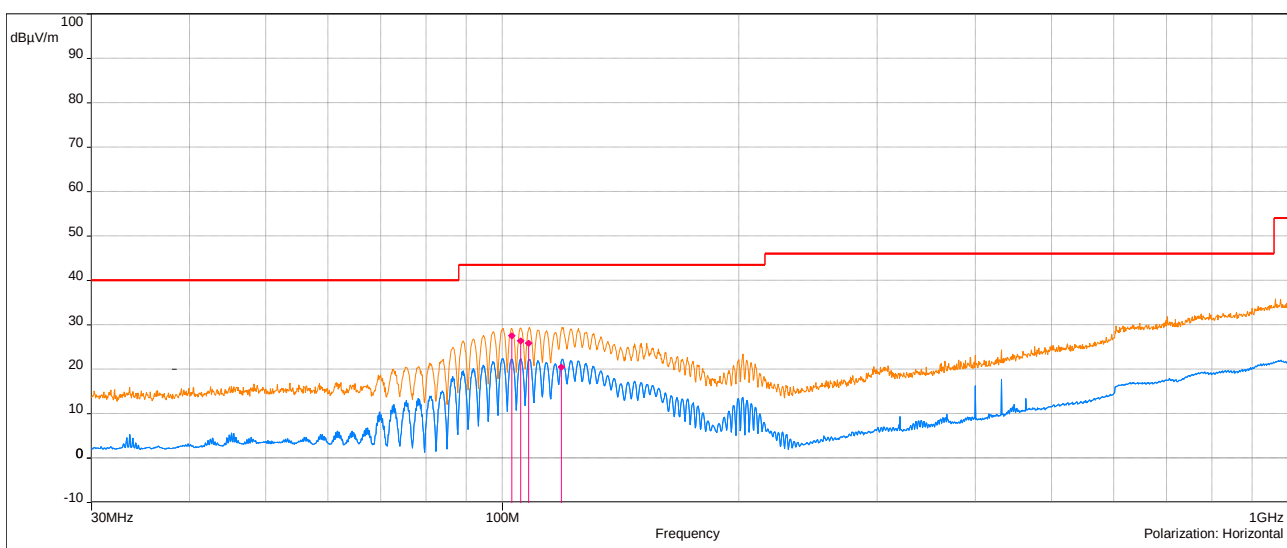
Prüfdokumentation Test documentation

- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - Average/3.0m/
- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - QPeak/3.0m/
- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - Peak/3.0m/
- Peak (Vertical)
- Avg (Vertical)
- Level (Quasipeak) (Vertical)



30 MHz – 1 GHz_Vertical Polarization

- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - Average/3.0m/
- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - QPeak/3.0m/
- FCC/47 CFR Part 15 section 15.209, Radiated emission limits - Peak/3.0m/
- Peak (Horizontal)
- Avg (Horizontal)
- Level (Quasipeak) (Horizontal)



30 MHz – 1 GHz_Horizontal Polarization

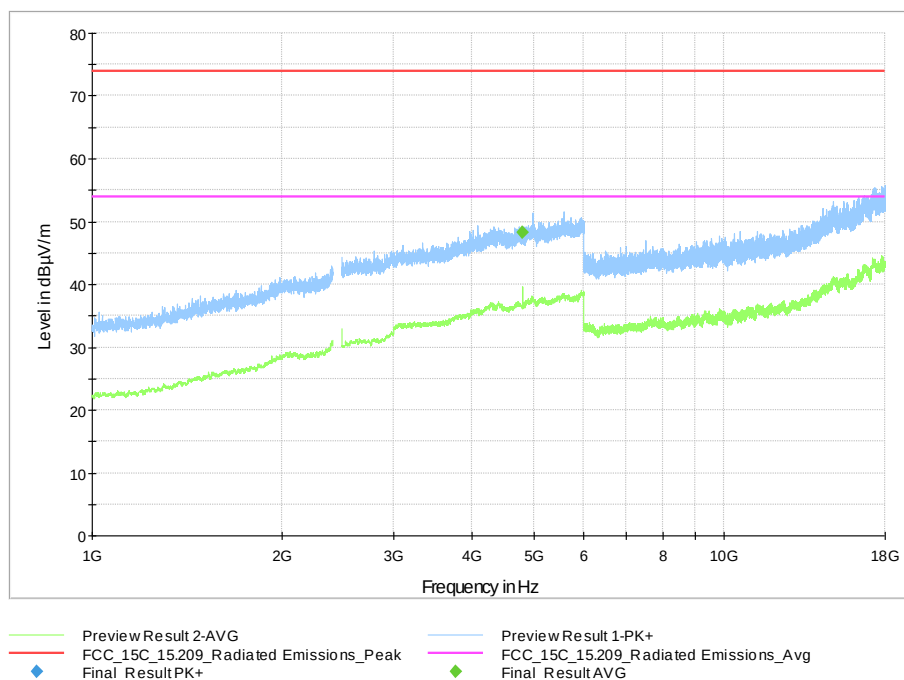
Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 24 von 34
Page 24 of 34

Prüfdokumentation
Test documentation

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (deg)	Height (m)	Pol	Meas. Time (s)	Corr. (dB)
102.75	27.55	43.50	-15.95	270.90	2.00	Horizontal	1.00	10.58
105.45	26.44	43.50	-17.06	290.90	2.00	Horizontal	1.00	11.01
108.05	25.90	43.50	-17.60	277.60	1.44	Horizontal	1.00	11.46
118.925	20.54	43.50	-22.96	342.00	1.27	Horizontal	1.00	12.83
72.475	21.43	40.00	-18.57	223.70	1.00	Vertical	1.00	12.48
86.15	19.63	40.00	-20.37	236.20	1.45	Vertical	1.00	9.68
105.4	25.42	43.50	-18.08	98.20	1.00	Vertical	1.00	11.00
119.375	25.94	43.50	-17.56	248.20	1.00	Vertical	1.00	12.88

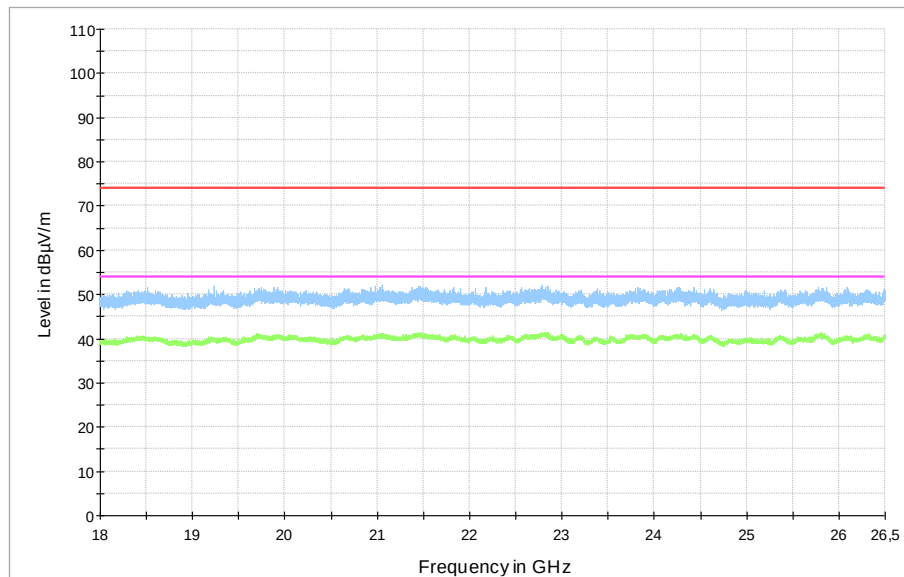
- Channel_Low_ANT+



Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 25 von 34
Page 25 of 34

Prüfdokumentation Test documentation



— Preview Result 2-AVG
* Critical_Freqs AVG
— FCC_15C_15.209_Radiated Emissions_Peak
♦ Final_Result PK+

— Preview Result 1-PK+
* Critical_Freqs PK+
— FCC_15C_15.209_Radiated Emissions_Avg
♦ Final_Result AVG

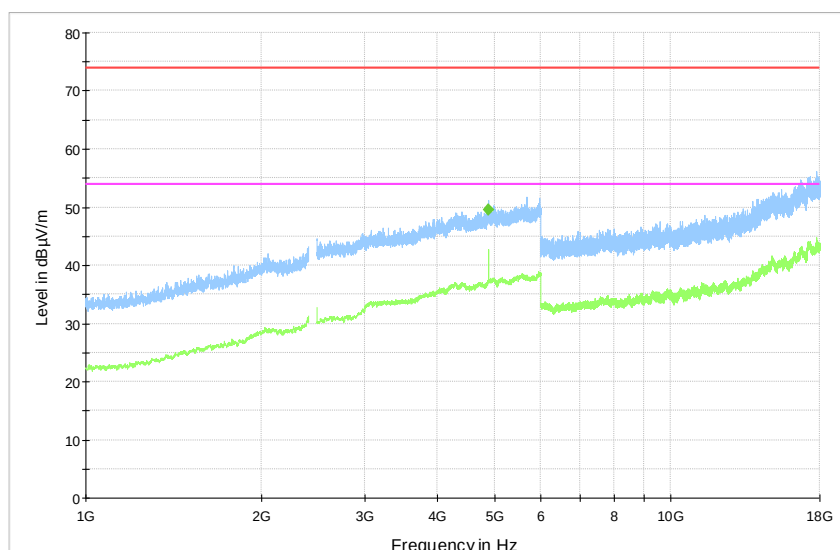
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4805.788750	---	48.19	54.00	5.81	100.0	1000.000	150.0	H	240.0	7.9

Prüfbericht-Nr.: DE22249U 001
Test report no.:

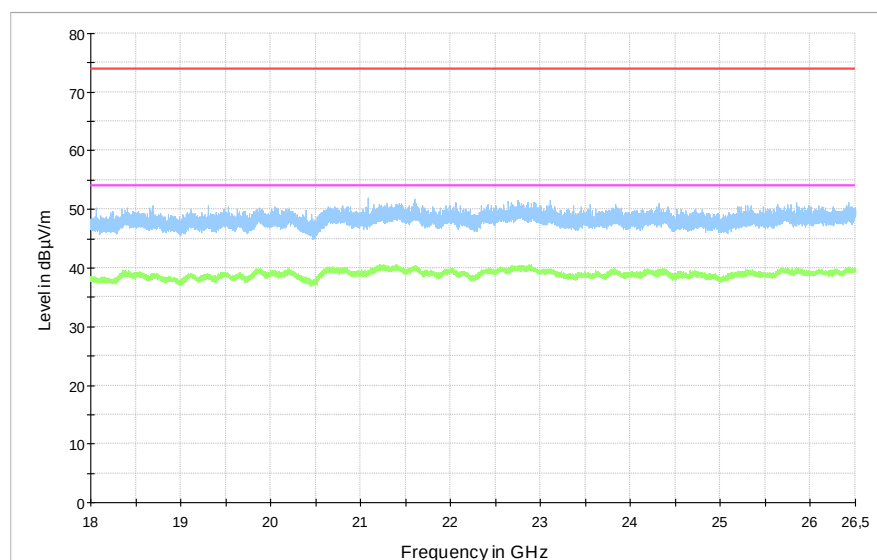
Seite 26 von 34
Page 26 of 34

Prüfdokumentation Test documentation

Channel_Mid_ANT+



— Preview Result 2-AVG
— FCC_15C_15.209_Radiated Emissions_Peak
— Preview Result 1-PK+
— FCC_15C_15.209_Radiated Emissions_Avg
◆ Final_Result PK+
◆ Final_Result AVG



— Preview Result 2-AVG
◆ Critical_Freqs AVG
— FCC_15C_15.209_Radiated Emissions_Peak
◆ Final_Result PK+
— Preview Result 1-PK+
◆ Critical_Freqs PK+
— FCC_15C_15.209_Radiated Emissions_Avg
◆ Final_Result AVG

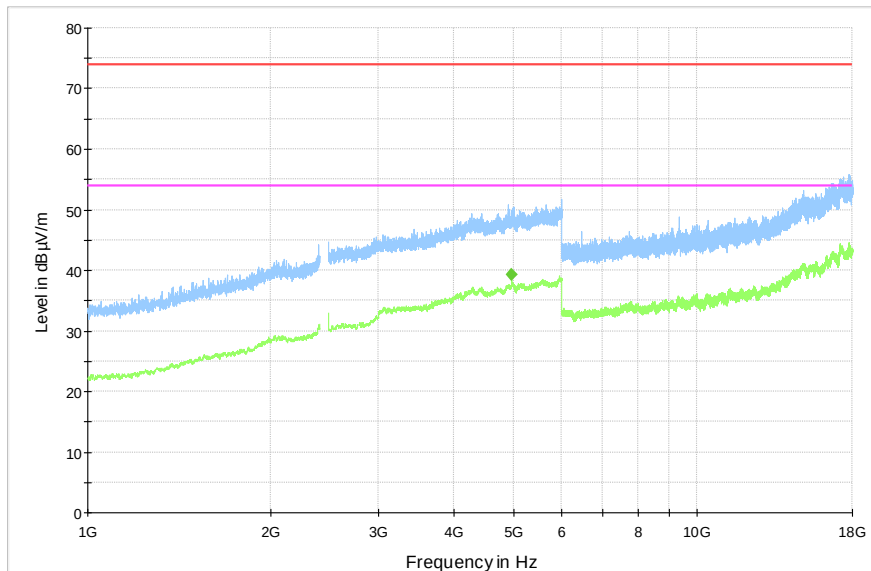
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4880.027500	---	49.61	54.00	4.39	100.0	1000.000	150.0	V	188.0	8.6

Prüfbericht-Nr.: DE22249U 001
Test report no.:

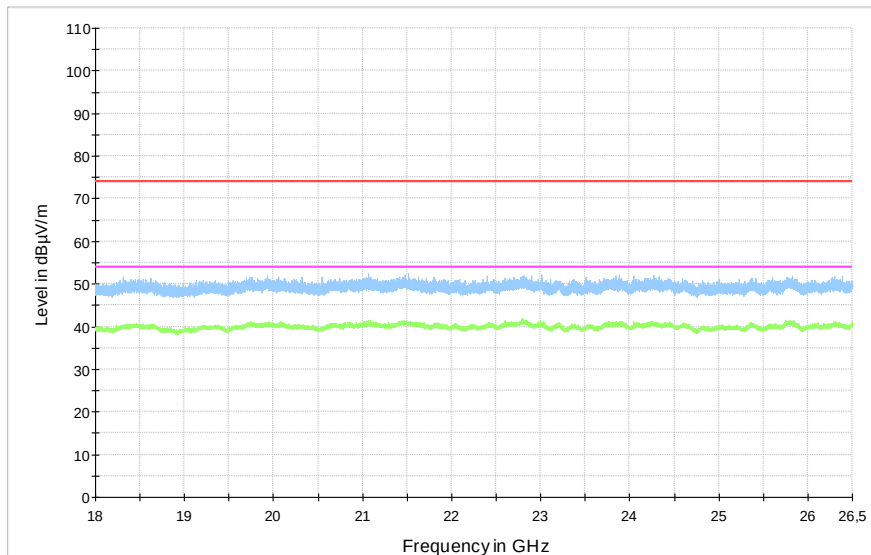
Seite 27 von 34
Page 27 of 34

Prüfdokumentation Test documentation

- Channel_High_ANT+



— PreviewResult 2-AVG
— FCC_15C_15.209_Radiated Emissions_Peak
— PreviewResult 1-PK+
— FCC_15C_15.209_Radiated Emissions_Avg
◆ Final_Result PK+
◆ Final_Result AVG



— PreviewResult 2-AVG
— PreviewResult 1-PK+
— Critical_Freqs AVG
— Critical_Freqs PK+
◆ FCC_15C_15.209_Radiated Emissions_Peak
◆ FCC_15C_15.209_Radiated Emissions_Avg
◆ Final_Result PK+
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4959.946250	---	39.30	54.00	14.70	100.0	1000.000	150.0	H	68.0	8.7

Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 28 von 34
Page 28 of 34

Prüfdokumentation
Test documentation

4.2 AC Power Conducted Emission

4.2.1 Requirements / Limits

AC power-line conducted emission measurements shall be made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio-noise voltage that is conducted from all of the EUT current-carrying power input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network.

FCC Part 15, Subpart C, §15.207 (a)

... for an intentional radiator 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).

FCC Part 15, Subpart C, §15.207, Conducted Emission Limits

Frequency [MHz]	Conducted Limit [dB μ V]	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

*Decreases with logarithm of the frequency

FCC Part 15, Subpart C, §15.207 (c)

... Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

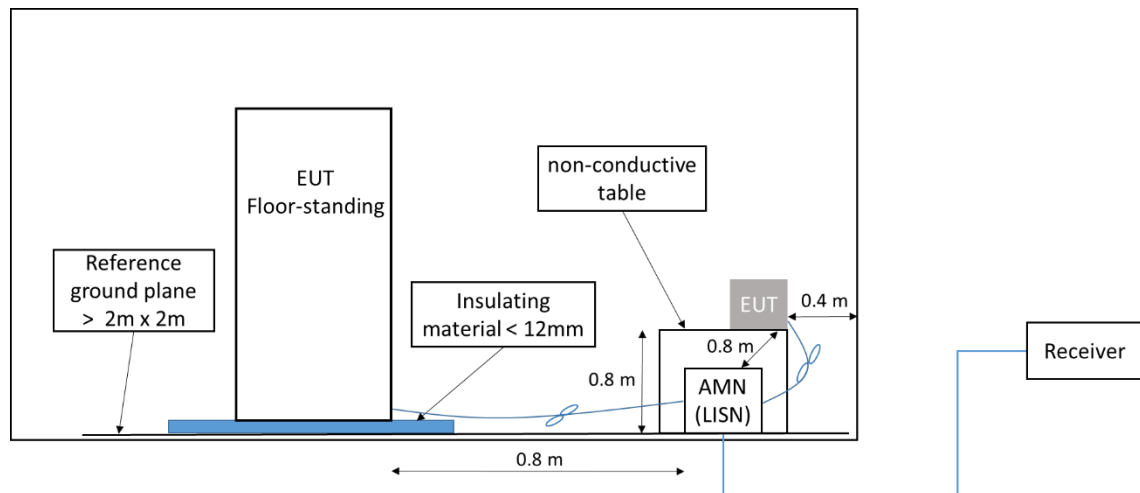
Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 29 von 34
Page 29 of 34

Prüfdokumentation Test documentation

4.2.2 Test Method

The test setup was made according to ANSI C63.10:2013 clauses 6.2.2 & 6.2.3 as shown in the photograph



The EUT was configured to transmit on the lowest channel since it has the highest output power.

4.2.3 Test Setup

EUT	DUT 1
Test Condition	Normal conditions
Companion device	-
Operation mode	Downhill with BLE&ANT+ Connection
Further parameters	-
Test engineer	Shrinivas Naikar

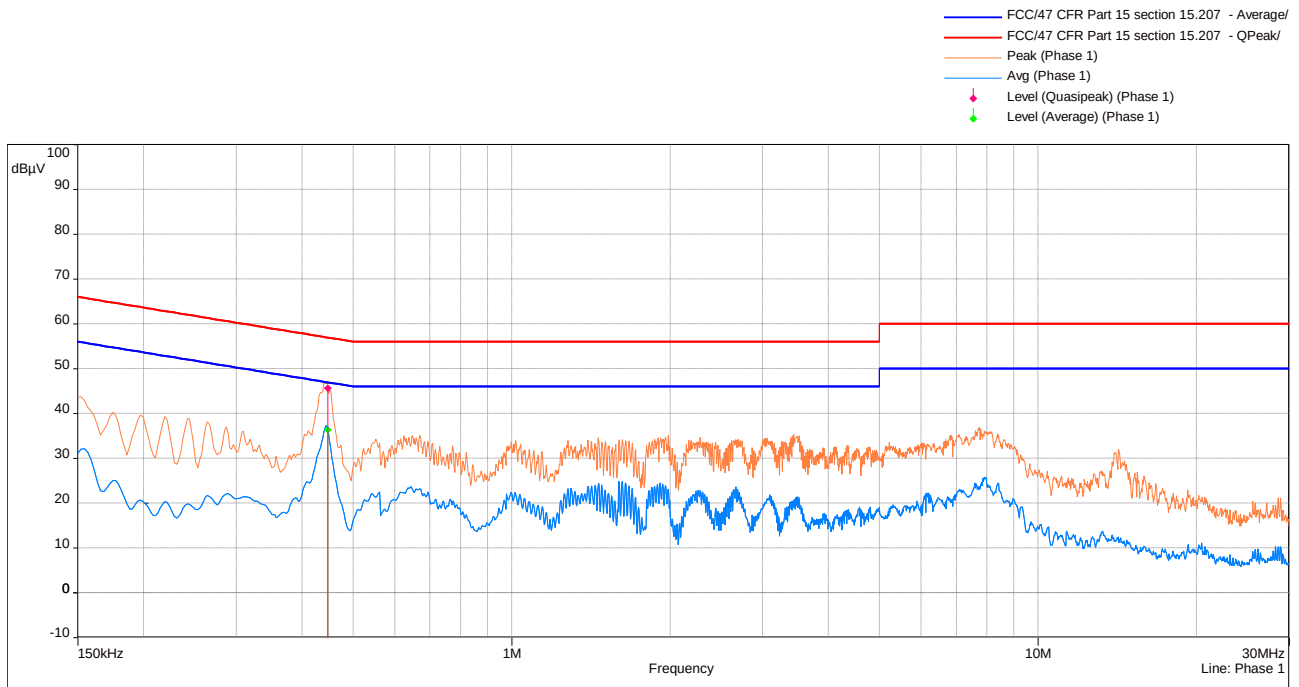
Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 30 von 34
Page 30 of 34

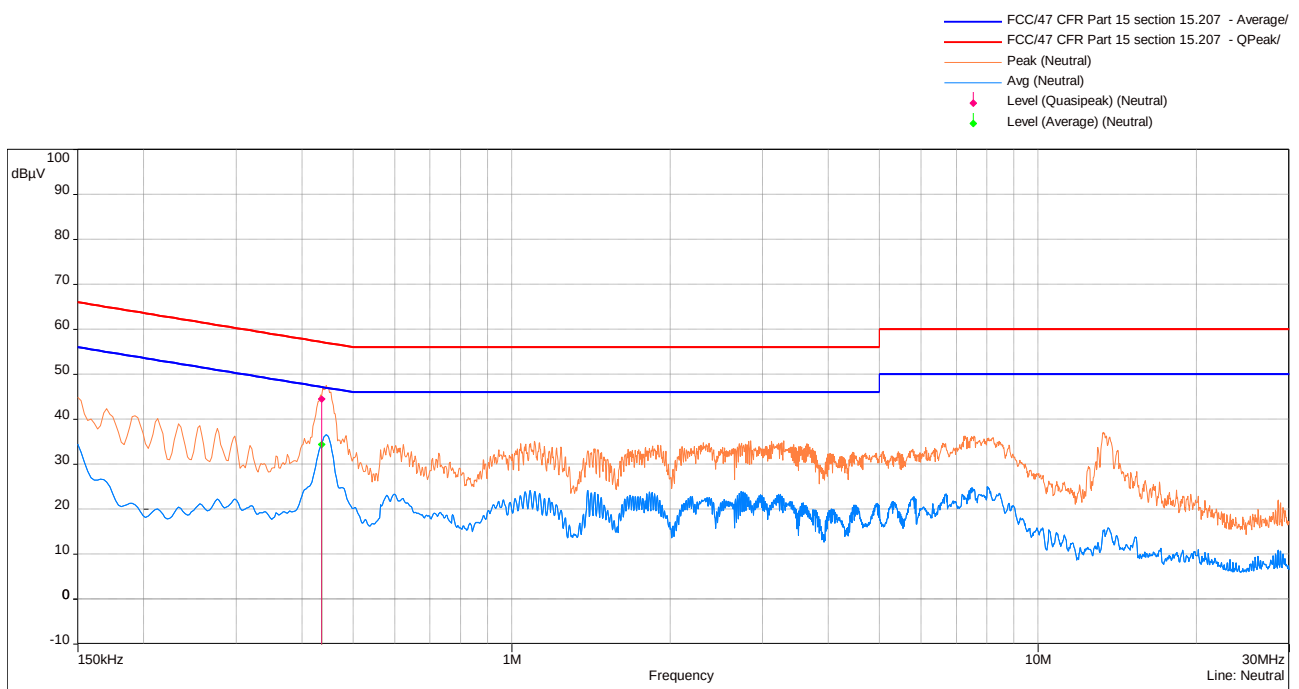
Prüfdokumentation Test documentation

4.2.4 Test results

– Line: Phase 1



– Line: Neutral



Prüfbericht-Nr.: DE22249U 001
Test report no.:

Seite 31 von 34
Page 31 of 34

Prüfdokumentation
Test documentation

Frequency (MHz)	Meas. AVG (dBμV)	Meas. Q-Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Correction (dB)
0.447	36.46	-	46.93	-10.47	Phase 1	10.05
0.43575	34.41	-	47.14	-12.73	Neutral	10.05
0.447	-	45.65	56.93	-11.28	Phase 1	10.05
0.43575	-	44.49	57.14	-12.65	Neutral	10.05

Final test result

Pass

Prüfbericht-Nr.: DE22249U 001
Test report No.:

Seite 32 von 34
Page 32 of 34

Liste der verwendeten Prüfmittel
List of used test equipment

5 Equipment List

5.1 Hardware

Prüfmittel <i>Test equipment</i>		Prüfmittel-Nr. / <i>ID-Nr.</i> <i>Equipment No.</i> <i>/ ID-No.</i>	Letzte <i>Kalibrierung</i> <i>Last calibration</i>	Nächste <i>Kalibrierung</i> <i>Next calibration</i>
Spectrum Analyzer: FSV-30	Rohde & Schwarz	9000268	16.07.2023	16.07.2023
Fully Anechoic Room	Albatross Projects GmbH	2959749	08.10.2021	08.10.2024
RSE-Filtersystem	Rohde & Schwarz	9002802	19.01.2022	19.01.2023
Signal Analyser UXA N9041B	Keysight	2971644	06.04.2022	06.04.2023
Antenna HF907	Rohde & Schwarz	2856263	01.09.2021	01.09.2024
Antenna, Double Ridged Horn Antenna 3116C-PA	ETS LINDGREN	2900393	12.10.2020	12.10.2022
Antenna HFH 2	Rohde & Schwarz	2728893	09.07.2021	09.07.2024
Semi-Anechoic Chamber 30-1000 MHz	Siemens	2729645	15.06.2022	15.06.2025
Antenna VULB 9168	Schwarzbeck	2728136	14.09.2020	04.09.2023
Receiver ESU 8	Rohde & Schwarz	2728844	23.12.2021	23.12.2022
Spectrum Analyser FSU 26	Rohde & Schwarz	2844118	08.2021	02.08.2023
EMC Power supply	Spitzenberger & Spies	2728107	-	27.01.2023
Signal generator	Chroma	9021303	-	18.01.2024

Prüfbericht-Nr.: DE22249U 001
Test report No.:

Seite 33 von 34
Page 33 of 34

Liste der verwendeten Prüfmittel
List of used test equipment

Device used for AC conducted Emission test

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Turntable	INN-CO	CO 3000	2869231	---	---
Antenna mast	INN-CO	CO 3000	2869231	---	---
Receiver	Rohde & Schwarz	ESU 8	2728844	23.12.2021	23.12.2022
Cable	—	—	LTG_1373	---	---
Cable	—	—	LTG_1800	22.06.2022	22.06.2022
Anechoic chamber	Siemens	SAC 10 (NSA 30-1000MHz)	2729645	19.06.2020	19.06.2023
Antenna	Schwarzbeck	VULB 9168	2728136	14.09.2020	04.09.2023

5.2 Software

Test Software	Developer	Version
EMC32	Rohde & Schwarz	10.60.20
BAT-EMC	NEXIO	2022.0.8.0

Prüfbericht-Nr.: DE22249U 001
Test report No.:

Seite 34 von 34
Page 34 of 34

Änderungsverzeichnis
Change history

6 Change History

Revision Number	List of revisions	Date of issue
DE22249U 001	Initial Release	24.10.2022
Note: Latest revision report will replace all previous reports.		

Ende des Prüfberichts
End of Test Report