

Prüfbericht-Nr.: <i>Test Report No.:</i>	60187980-002	Auftrags-Nr.: <i>Order No.:</i>	3268115_030	Seite 1 von 31 Page 1 of 31	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	—	Auftragsdatum: <i>Order date:</i>	28.08.2018		
Auftraggeber: <i>Client:</i>	TÜV Rheinland InterCert Kft., Váci út 48/a-b, H-1132 BUDAPEST				
Prüfgegenstand: <i>Test item:</i>	DIGITAL (IP) LPR CAMERA				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	FREEWAYCAM03 (FCC ID: XCW-FREEWAYCAM-03)				
Auftrags-Inhalt: <i>Order content:</i>	Prüfung der elektromagnetischen Verträglichkeit EMV / Test of electromagnetic compatibility EMC				
Prüfgrundlage: <i>Test specification:</i>	Komplettprüfung / Complete test 47 CFR FCC Part 15 Subpart B — — —				
Wareneingangsdatum: <i>Date of receipt:</i>	03.08.2018				
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000205634-002				
Prüfzeitraum: <i>Testing period:</i>	10.10.2018 - 11.10.2018				
Ort der Prüfung: <i>Place of testing:</i>	Nürnberg / Nuremberg				
Prüflaboratorium: <i>Testing laboratory:</i>	EMV Labor / EMC test lab				
Prüfergebnis*: <i>Test result*:</i>	PASS				
geprüft von / tested by:			kontrolliert von / reviewed by:		
04.04.2019 Oliver Wagner, SV			04.04.2019 Dr. Tobias Wirth, SV		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: Der Prüfbericht 60187980-002 ersetzt den Prüfbericht 60187980-001 (FCC ID hinzugefügt)/ <i>The test report 60187980-002 replaces the test report 60187980-001 (FCC ID added)</i>					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</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) = failed a.m. test specification(s) N/A = not applicable 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>					

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Liste der verwendeten Prüfmittel
List of used test equipment

Prüfmittel <i>Test equipment</i>	Prüfmittel-Nr. / ID-Nr. <i>Equipment No. / ID-No.</i>	Nächste Kalibrierung <i>Next calibration</i>
Absorberhalle <i>Anechoic chamber</i> SAC 10	2728890	04.2019
Messantenne <i>Antenna</i> 3115	2728607	01.2020
Messantenne <i>Antenna</i> VULB 9168	2728787	08.2019
Steuereinheit Mast <i>Antenna mast/Slide bar</i> NCD	2733253	—
Umschaltmatrix <i>Commutation relay</i> KRE-3005-ESCU	2732065	01.2019
Umschaltmatrix <i>Commutation relay</i> KRM4-5811-T-S1	09331	—
Netznachbildung <i>LISN</i> ESH2-Z5	2728096	11.2019
Impulsbegrenzer 10 dB <i>Limiter</i> ESH3-Z2	2732546	01.2019
Vorverstärker <i>Preamplifier</i> BBV 9718B	2888179	09.2020
Messem Empfänger <i>Receiver</i> ESI 40	2728600	09.2020
Messem Empfänger <i>Receiver</i> ESU 26	2723865	07.2019
Messem Empfänger <i>Receiver</i> ESU 8	2728148	08.2019
Steuereinheit Mast <i>Turntable</i> CO3000	2732515	—

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Produktbeschreibung
Product description

1	Prüfgegenstand <i>Test item</i>	DIGITAL (IP) LPR CAMERA
2	Modellbezeichnung <i>Model</i>	FREEWAYCAM03
3	Baugleiche Modelle <i>Identical types</i>	—
4	Beschreibung <i>Description</i>	—
5	Seriennummer <i>Serial number</i>	1188D95
6	Hersteller <i>Manufacturer</i>	ARH Inc.
7	Bemessungsspannung <i>Rated voltage</i>	24-28 VAC
8	Bemessungsfrequenz <i>Rated frequency</i>	50/60 Hz
9	Bemessungsstrom <i>Rated current</i>	—
10	Bemessungsleistung <i>Rated power consumption</i>	20 W
11	Gerätekategorie <i>Equipment category</i>	—
12	Anzahl der Phasen <i>Number of phases</i>	1
13	Schutzklasse <i>Protection class</i>	III - Schutzkleinspannung/Safety extra-low voltage
14	Abmessungen <i>Dimensions</i>	390x167x155
15	Gewicht <i>Weight</i>	—
16	Sonstiges <i>Other</i>	—

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Absatz		Messergebnisse - Bemerkungen	Bewertung																					
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation																					
17	Funkstörspannung <i>Conducted voltage emissions</i> 47 CFR FCC Part 15 Subpart B Section 15.107	<i>Details in protocol number:</i> #1290 <i>Operating mode:</i> Videostream <i>EUT:</i> FREEWAYCAM03 (A000205634-002) <i>Terminals:</i> Netzleitung / Supply line <i>Remarks:</i> —	P ☒ F ☐ N/A ☐ N/T ☐																					
	Grenzwerte <i>Limits</i> <i>Except for Class A digital devices, 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 µH/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.</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(µV)]</td><td>Mittelwert <i>Average</i> [dB(µV)]</td></tr><tr><td>0.15 – 0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5 – 5</td><td>56</td><td>46</td></tr><tr><td>5 – 30</td><td>60</td><td>50</td></tr></table> <i>*Decreases with the logarithm of the frequency.</i> <i>For a Class A digital device 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 µH/50 ohms 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 boundary between the frequency ranges.</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(µV)]</td><td>Mittelwert <i>Average</i> [dB(µV)]</td></tr><tr><td>0.15 – 0.5</td><td>79</td><td>66</td></tr><tr><td>0.5 – 30</td><td>73</td><td>60</td></tr></table>			Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(µV)]	Mittelwert <i>Average</i> [dB(µV)]	0.15 – 0.5	66 to 56*	56 to 46*	0.5 – 5	56	46	5 – 30	60	50	Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(µV)]	Mittelwert <i>Average</i> [dB(µV)]	0.15 – 0.5	79	66	0.5 – 30	73	60
Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(µV)]	Mittelwert <i>Average</i> [dB(µV)]																						
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0.5 – 5	56	46																						
5 – 30	60	50																						
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Absatz		Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Methode

Method

The test setup was according to ANSI C63.4. The EUT was placed on a non-conducting table at a height of 0.8 m above the reference ground plane and 0.4 m away from the conducting walls of a shielded room. The Artificial Mains Network (AMN) was placed 0.8 m away from the boundary of the unit under test and bonded to the ground reference plane. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. Supporting units were connected to other AMN if necessary. Conducted voltage measurements on all mains lines were made at the output of the AMN. The whole required frequency range was investigated for maximum conducted interferences.

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Absatz		Messergebnisse - Bemerkungen	Bewertung																				
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation																				
18	Funkstörfeldstärke <i>Radiated disturbance</i> 47 CFR FCC Part 15 Section 15.109	<i>Details in protocol number:</i> #1117 <i>Operating mode:</i> Videostream <i>EUT:</i> FREEWAYCAM03 (A000205634-002) <i>Terminals:</i> Gehäuse / Enclosure <i>Remarks:</i> —	P ☒ F ☐ N/A ☐ N/T ☐																				
	Grenzwerte <i>Limits</i> <i>Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]</td></tr><tr><td>30 – 88</td><td>40</td></tr><tr><td>88 – 216</td><td>43.5</td></tr><tr><td>216 – 960</td><td>46</td></tr><tr><td>Above 960</td><td>54</td></tr></table> <i>The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following, using measurement instrumentation employing a CISPR quasi-peak detector.</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]</td></tr><tr><td>30 – 88</td><td>39.1</td></tr><tr><td>88 – 216</td><td>43.5</td></tr><tr><td>216 – 960</td><td>46.4</td></tr><tr><td>Above 960</td><td>49.5</td></tr></table> <i>Note: For frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. When average radiated emission measurements are specified, there also is a limit on the peak level of the radio frequency emissions which is 20 dB above the maximum permitted average emission limit. (see § 15.35 Measurement detector functions and bandwidths)</i>			Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]	30 – 88	40	88 – 216	43.5	216 – 960	46	Above 960	54	Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]	30 – 88	39.1	88 – 216	43.5	216 – 960	46.4	Above 960	49.5
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Absatz		Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Methode

Method

The test setup was according to ANSI C63.4. Measurements were made in a 10-meter semi-anechoic chamber. The EUT was placed on a non-conducting table at a height of 0.8 m above the reference ground plane. Preliminary measurements were performed with a receiver employing a peak detector at an antenna to EUT distance of 3 m or 10 m as defined by the standard. The EUT was continuously rotated 360° about its azimuth to determine the position of the highest emissions. The measurement antenna was adjusted between 1 m and 4 m above ground to find the maximum signal strength. These measurements were done in both horizontal and vertical polarizations. After this, final measurements with a receiver employing a quasi-peak detector were performed by rotating the EUT 360° and adjusting the receive antenna height from 1 m to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

The quasi-peak emission limits are calculated from the field strength limit of this section using this formula:

$$\text{Emission level} \left(\frac{\text{dB}\mu\text{V}}{\text{m}} \right) = 20 \log \text{Emission level} \left(\frac{\mu\text{V}}{\text{m}} \right)$$

When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade as per §15.31(f)(1). For this documentation a distance extrapolation factor was added to the limit that was calculated using this formula:

$$\text{Emission limit}_{\text{new}} \left(\frac{\text{dB}\mu\text{V}}{\text{m}} \right) = \text{Emission limit}_{\text{old}} + 20 \log \left(\frac{d_1}{d_2} \right)$$

Where

d_1 : old distance (e.g. 3 m)

d_2 : new distance (e.g. 10 m)

The field strength is calculated by adding the antenna factor and cable loss. The basic equation with a sample calculation is as follows:

$$E = U + AF + CA$$

For example:

Frequency (MHz)	Receiver reading U (dBμV)	Correction antenna factor AF + cable loss CA (dB)	Field strength E (dBμV/m)
320	15.9	15.8	31.7

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Absatz		Messergebnisse - Bemerkungen	Bewertung																				
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation																				
19	Funkstörfeldstärke <i>Radiated disturbance</i> 47 CFR FCC Part 15 Subpart B 15.109	<i>Details in protocol number:</i> #1120 <i>Operating mode:</i> Videostream <i>EUT:</i> FREEWAYCAM03 (A000205634-002) <i>Terminals:</i> Gehäuse / Enclosure <i>Remarks:</i> —	P ☒ F ☐ N/A ☐ N/T ☐																				
	Grenzwerte <i>Limits</i> <i>Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]</td></tr><tr><td>30 – 88</td><td>40</td></tr><tr><td>88 – 216</td><td>43.5</td></tr><tr><td>216 – 960</td><td>46</td></tr><tr><td>Above 960</td><td>54</td></tr></table> <i>The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following, using measurement instrumentation employing a CISPR quasi-peak detector.</i> <table><tr><td>Frequenz <i>Frequency</i> [MHz]</td><td>Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]</td></tr><tr><td>30 – 88</td><td>39.1</td></tr><tr><td>88 – 216</td><td>43.5</td></tr><tr><td>216 – 960</td><td>46.4</td></tr><tr><td>Above 960</td><td>49.5</td></tr></table> <i>Note: For frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. When average radiated emission measurements are specified, there also is a limit on the peak level of the radio frequency emissions which is 20 dB above the maximum permitted average emission limit. (see § 15.35 Measurement detector functions and bandwidths)</i>			Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]	30 – 88	40	88 – 216	43.5	216 – 960	46	Above 960	54	Frequenz <i>Frequency</i> [MHz]	Quasi-Spitzenwert <i>Quasi-peak</i> [dB(μV)/m]	30 – 88	39.1	88 – 216	43.5	216 – 960	46.4	Above 960	49.5
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Absatz		Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Methode

Method

The test setup was according to ANSI C63.4. Measurements were made in a 10-meter semi-anechoic chamber. The EUT was placed on a non-conducting table at a height of 0.8 m above the reference ground plane. Preliminary measurements were performed with a receiver employing a peak detector at an antenna to EUT distance of 3 m or 10 m as defined by the standard. The EUT was continuously rotated 360° about its azimuth to determine the position of the highest emissions. The measurement antenna was adjusted between 1 m and 4 m above ground to find the maximum signal strength. These measurements were done in both horizontal and vertical polarizations. After this, final measurements with a receiver employing a quasi-peak detector were performed by rotating the EUT 360° and adjusting the receive antenna height from 1 m to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

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When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade as per §15.31(f)(1). For this documentation a distance extrapolation factor was added to the limit that was calculated using this formula:

$$\text{Emission limit}_{\text{new}} \left(\frac{\text{dB}\mu\text{V}}{\text{m}} \right) = \text{Emission limit}_{\text{old}} + 20 \log \left(\frac{d_1}{d_2} \right)$$

Where

d_1 : old distance (e.g. 3 m)

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The field strength is calculated by adding the antenna factor and cable loss. The basic equation with a sample calculation is as follows:

$$E = U + AF + CA$$

For example:

Frequency (MHz)	Receiver reading U (dBμV)	Correction antenna factor AF + cable loss CA (dB)	Field strength E (dBμV/m)
320	15.9	15.8	31.7

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ZUSATZDOKUMENTATION
ADDITIONAL DOCUMENTATION

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Änderungsverzeichnis
Change history

Rev. No.	List of revisions	Date Author
1	First edition (60187980-001)	2018-10-11 Oliver Wagner
2	Second edition (60187980-002): FCC ID added	2019-04-04 Oliver Wagner

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ZUSATZDOKUMENTATION
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21	Kalibrierung Calibration
	<i>Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.</i> <i>All measurement equipment calibrations are traceable to DKD or where calibration is performed outside Germany, to equivalent nationally recognized standards organizations.</i>
22	Registrierung Registration
	<i>The measurement facilities for conducted and for radiated disturbance measurement of the TRLP, 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.</i> <i>FCC Registration-Number: 939976</i> <i>Bundesnetzagentur Registriernummer: BNetzA-CAB-17/21-16</i>
23	Verifizierung Verification
	<i>Pursuant to 47 CFR part 15 - RADIO FREQUENCY DEVICES, Section 15.19.</i> <i>This device shall bear the following statement in a conspicuous location on the device:</i> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
24	Angewendete Standards Applied Standards
	<i>According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:</i> - Title 47 CFR FCC Part 15 Subpart B - ANSI C63.4-2014 (Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz) - ICES-003:2016 (Issue 6) (Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement) <i>For frequencies $f \leq 1000$ MHz the test setup and test was done according to: ANSI C63.4-2014.</i> <i>For frequencies $f > 1000$ MHz the test setup and test was done according to ANSI C63.4-2014.</i>

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ZUSATZDOKUMENTATION
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25	Testkonfiguration Equipment used during test					
	Prüfgegenstand Equipment under test					
	Nr. No.	Produktart Product type	Hersteller Manufacturer	Modell Model	Kommentare Comments	
	1	DIGITAL (IP) LPR CAMERA	ARH Inc.	FREEWAYCAM03	—	
	Hilfsmittel / Peripherie Auxiliary Equipment / Peripherals					
	Nr. No.	Produktart Product type	Hersteller Manufacturer	Modell Model	Kommentare Comments	
	1	Notebook	Medion	MD 96290		
26	Ein-/Ausgabeanschlüsse Input/Output ports					
	Nr. No.	Name	Art* Type*	Kabel- länge Cable length	Kabel geschirmt Cable shielded	Kommentare Comments
	1	Enclosure	N/E	—	—	None
	2	Power	AC	2 m	No	24 VAC, 60 Hz
		Ethernet	TP	2 m	Yes	—
	* AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

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ZUSATZDOKUMENTATION
ADDITIONAL DOCUMENTATION

27	Interne Betriebsfrequenzen Internal operating frequencies																			
	<table><tr><td>Nr. No.</td><td>Frequenz Frequency</td><td>Beschreibung Description</td></tr><tr><td>1</td><td>766 MHz</td><td>ARM Dual Core 2x766Mhz</td></tr></table> For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table: <table><tr><td>Highest frequency generated or used in the device or on which the device operates or tunes (MHz)</td><td>Upper frequency of measurement range (MHz)</td></tr><tr><td>Below 1.705</td><td>30</td></tr><tr><td>1.705–108</td><td>1000</td></tr><tr><td>108–500</td><td>2000</td></tr><tr><td>500–1000</td><td>5000</td></tr><tr><td>Above 1000</td><td>5th harmonic of the highest frequency or 40 GHz, whichever is lower.</td></tr></table>		Nr. No.	Frequenz Frequency	Beschreibung Description	1	766 MHz	ARM Dual Core 2x766Mhz	Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)	Below 1.705	30	1.705–108	1000	108–500	2000	500–1000	5000	Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.
Nr. No.	Frequenz Frequency	Beschreibung Description																		
1	766 MHz	ARM Dual Core 2x766Mhz																		
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)																			
Below 1.705	30																			
1.705–108	1000																			
108–500	2000																			
500–1000	5000																			
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.																			
28	Betriebsarten Operating modes																			
	The EUT has been connected with peripherals pursuant ANSI C63.4 and was operated in a configuration to maximize its emission characteristics in a typical application. <table><tr><td>Nr. No.</td><td>Beschreibung Description</td></tr><tr><td>1</td><td>Videostream Videostream</td></tr></table>		Nr. No.	Beschreibung Description	1	Videostream Videostream														
Nr. No.	Beschreibung Description																			
1	Videostream Videostream																			

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29	Prüfaufbau <i>EUT configuration</i>						
	Der Prüfaufbau erfolgte entsprechend den Angaben der genannten EMV-Normen. Die Messungen und Tests wurden unter "worst case"-Bedingungen durchgeführt, d.h. es wurden typische Anordnungen und Betriebszustände gewählt bzw. angenommen, die maximale Störaussendung und Störempfänglichkeit vermuten lassen (sogenannte "Ungünstigste Konfiguration"). Einzelheiten der Geräteeinstellungen sind u.a. der Fotodokumentation zu entnehmen. Soweit nicht anders angegeben, gelten diese Angaben für alle nachfolgenden Messungen. <i>The test setup was made in accordance with mentioned EMC standards.</i> <i>Measurements and tests were executed under "worst case" conditions. Typical EUT arrangements or operating modes were chosen or assumed which let suspect maximum emission or susceptibility (a so called "unfavourable configuration").</i> <i>Details of test setup or adjustments are (particularly) shown inside the photo documentation. As far as not mentioned otherwise these statements are valid for all following tests.</i>						
30	Besondere EMV-Massnahmen <i>Special EMC measures</i>						
	Keine / None						
31	Klimatische Bedingungen <i>Climatic conditions</i>						
	<table> <tr> <td><i>Umgebungstemperatur</i> <i>Ambient Temperature</i></td> <td>15 - 35 °C</td> </tr> <tr> <td><i>Relative Luftfeuchte</i> <i>Relative Humidity</i></td> <td>30 - 60 %</td> </tr> <tr> <td><i>Luftdruck</i> <i>Air pressure</i></td> <td>860 - 1060 mbar</td> </tr> </table>	<i>Umgebungstemperatur</i> <i>Ambient Temperature</i>	15 - 35 °C	<i>Relative Luftfeuchte</i> <i>Relative Humidity</i>	30 - 60 %	<i>Luftdruck</i> <i>Air pressure</i>	860 - 1060 mbar
<i>Umgebungstemperatur</i> <i>Ambient Temperature</i>	15 - 35 °C						
<i>Relative Luftfeuchte</i> <i>Relative Humidity</i>	30 - 60 %						
<i>Luftdruck</i> <i>Air pressure</i>	860 - 1060 mbar						

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Aussage zur Messunsicherheit

Statement of the measurement uncertainty

Die in diesem Dokument genannten Daten und Ergebnisse sind wahr und genau. Der Leser wird darauf hingewiesen, dass innerhalb der Kalibrierungsgrenzen der Geräte und Einrichtungen Fehler auftreten können. Die Messunsicherheit wurde für alle Prüfungen in diesem Prüfbericht gemäß CISPR 16-4 "Anforderungen an Geräte und Einrichtungen sowie Festlegung der Verfahren zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit – Teil 4-2: Unsicherheiten, Statistik und Modelle zur Ableitung von Grenzwerten (Störmodell) – Messgeräte-Unsicherheit" berechnet und ist im Qualitätssicherungssystem gemäß ISO / IEC 17025 dokumentiert. Darüber hinaus können Veränderungen bei den Bauteilen und im Herstellungsprozess zu einer zusätzlichen Abweichung führen.

Der Hersteller ist alleine verantwortlich dafür, dass zukünftige Geräte die einschlägigen Normen und Standards einhalten.

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.

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Messunsicherheiten

Measurement uncertainties

Folgende Messunsicherheiten wurden nach CISPR 16-4-2 ermittelt. Es handelt sich um die erweiterte Messunsicherheit, mit einer Wahrscheinlichkeit von 95%, dass die Werte im zugeordneten Intervall liegen ($k = 2$).

The following measurement uncertainties have been calculated in accordance with CISPR 16-4-2. The stated values are the expanded uncertainty values, the measurand lies within the assigned range of values with a probability of 95% ($k = 2$).

Measurement procedure	U_{Lab}
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 9k-150kHz (CISPR Band A)	2.3 dB
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 150k-30MHz (CISPR Band B) with 150 ohm Delta LISN	3.3 dB
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 150k-30MHz (CISPR Band B)	2.2 dB
Measurement of conducted emissions at the power supply connection to voltage probes in the frequency range 9k-30MHz (CISPR Band A and B)	2.0 dB
Measurement of conducted emissions at telecommunication connection to ISN in the frequency range 150k-30MHz (CISPR Band B) ISN CAT 5	3.3 dB
Measurement of conducted emissions at the telecommunication connection to ISN in the frequency range 150k-30MHz (CISPR Band B) ISN CAT 6 Shielded	2.6 dB
Measurement of conducted emissions at the telecommunications connection to current clamps in the frequency range 150k-30MHz (CISPR Band B)	2.2 dB
Measurement of interference power in the frequency range 30-300MHz (CISPR Band C)	2.9 dB
Measurement of interference power in the frequency range 30-300MHz (CISPR Band C) CDNE	2.6 dB
Measurement of magnetic emissions in the frequency range 9k-150kHz (CISPR Band A) with frame antenna HFH2 (small loop antenna)	1.6 dB
Measurement of magnetic emissions in the frequency range 9k-150kHz (CISPR Band A) with frame antenna HL562 (3-axis loop antenna)	1.6 dB
Measurement of the field strength in the frequency range 30-1000MHz (CISPR Band C and D) with 10m distance with VULB 9168 Vertical	4.5 dB
Measurement of the field strength in the frequency range 30-1000MHz (CISPR band C and D) with 10m distance with VULB 9168 Horizontal	4.4 dB
Measurement of the field strength in the frequency range 1-18GHz (CISPR Band E) with 3m distance with HL025 1-6GHz	5.0 dB
Measurement of the field strength in the frequency range 1-18GHz (CISPR Band E) with 3m distance with HL025 6-18GHz	5.3 dB

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Funkstörspannung Conducted voltage emissions		PASS
Prüfungsbezeichnung u. -nummer Test name and number	Conducted voltage emissions in operating mode videostream #1290	
Datum des Tests Test date	11.10.2018	
Angewendete Norm Applied Standard	47 CFR FCC Part 15 Subpart B Section 15.107	
Prüfmethode Test method	ANSI C63.4-2014	
Temperatur (°C) Temperature	24.1	
Luftfeuchte (% rH) Humidity	33.6	
Luftdruck (mbar) Air pressure	988.0	
Bearbeiter Tested by	Wagner	
Modellbezeichnung Model	FREEWAYCAM03	
Prüfmuster-Nr. Test sample No.:	A000205634-002	
Betriebsart Operating mode	Videostream	
Anschlüsse Tested terminals	Netzleitung / Supply line	
Grenzwert Limit	47 CFR Part 15 section 15.107 Class B	
Bemerkung Remarks	—	
Version der Prüfsoftware Version of testing software	3.17.0.29	

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Verwendete Prüfmittel
Used test equipment

Typ	Hersteller <i>Manufacturer</i>	Modell	ID	Kalibriert am <i>Last calibration</i>	Kalibriert bis <i>Next calibration</i>
Impulsbegrenzer 10 dB <i>Limitor</i>	Rohde & Schwarz	ESH3-Z2	2732546	16.01.2017	16.01.2019
Netznachbildung <i>LISN</i>	Rohde & Schwarz	ESH2-Z5	2728096	25.11.2016	25.11.2019
Messempfänger <i>Receiver</i>	Rohde & Schwarz	ESU 8	2728148	21.08.2018	21.08.2019
Schirmkabine <i>Shielded room</i>	TDK	SR 2	—	17.11.2016	17.11.2018

Prüfparameter zu Funkstörspannung

#1290

Test parameter of Conducted voltage emissions

Conducted voltage emissions in operating mode videostream, A000205634-002,
FREEWAYCAM03

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
150kHz	30MHz	3kHz	Phase 1	10 ms	9kHz

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
150kHz	30MHz	3kHz	Neutral	10 ms	9kHz

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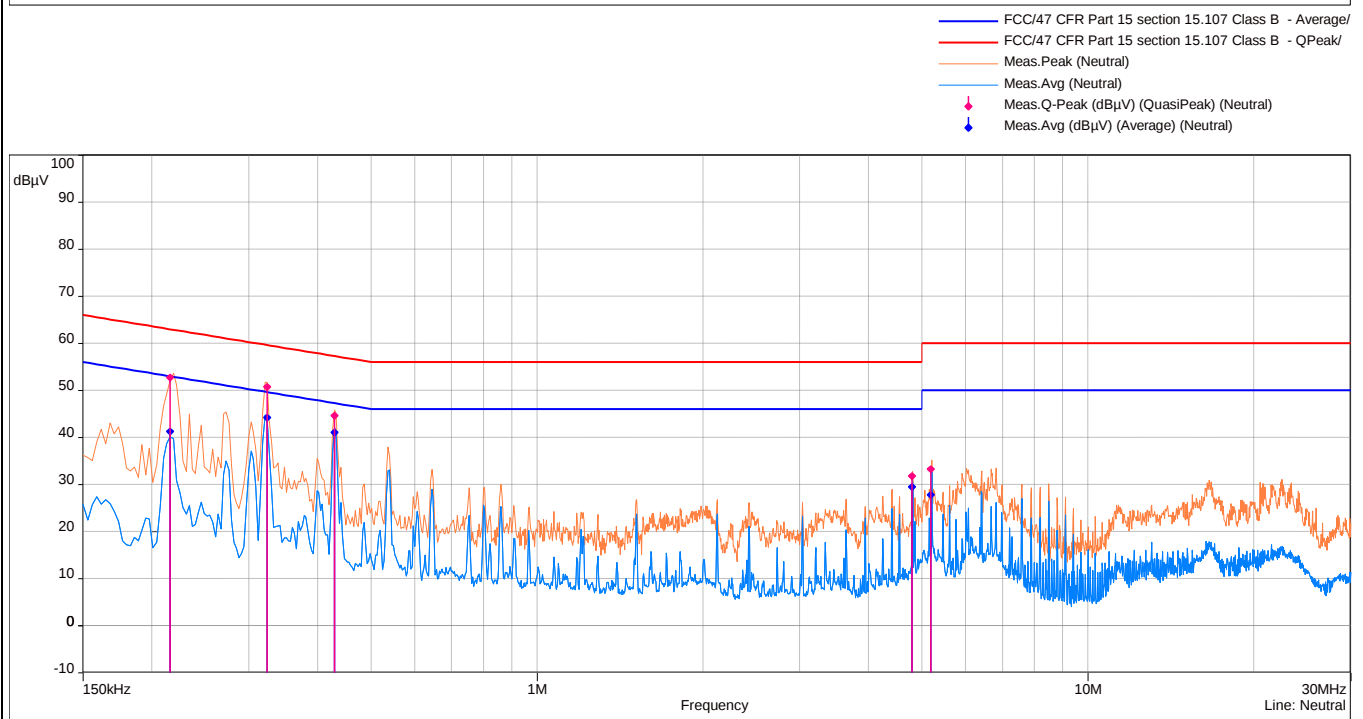
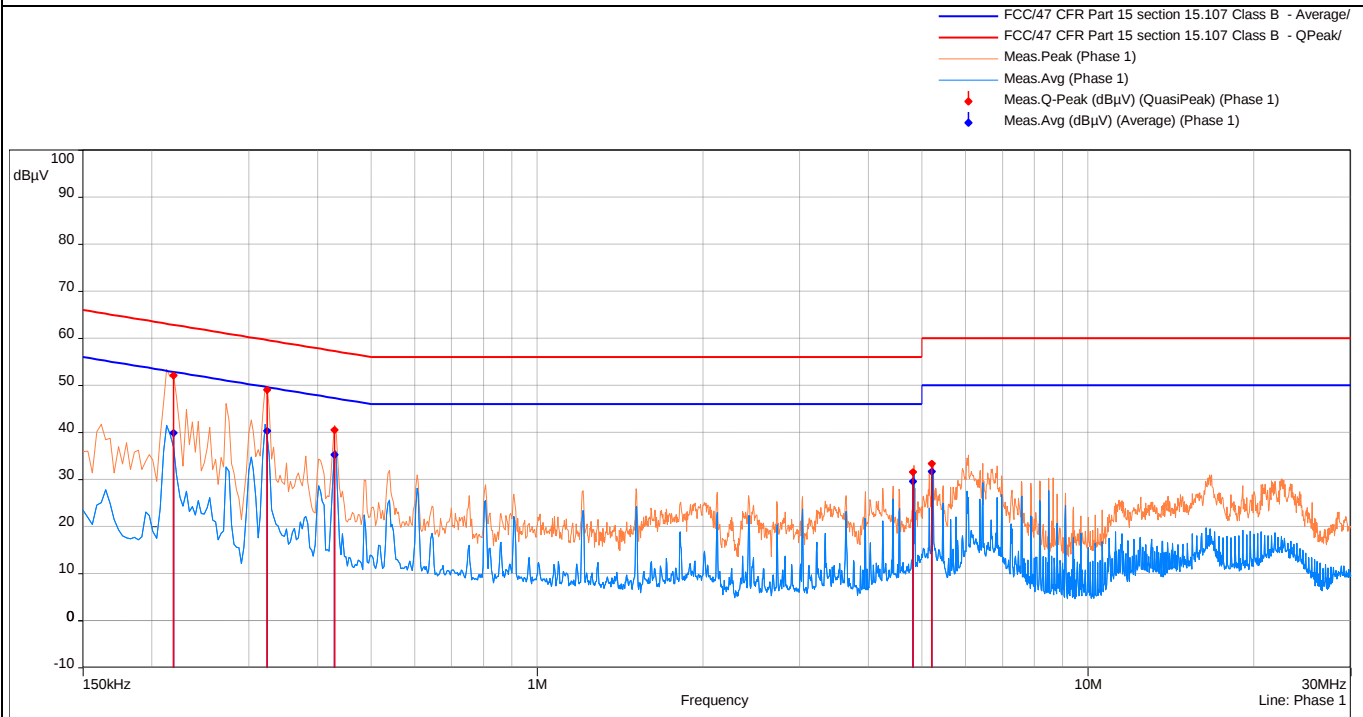
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Messdiagramme zu Funkstörspannung

#1290

Graphical presentation of Conducted voltage emissions

Conducted voltage emissions in operating mode videostream, A000205634-002,
FREEWAYCAM03



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Messdiagramme zu Funkstörspannung

#1290

Graphical presentation of Conducted voltage emissions

Conducted voltage emissions in operating mode videostream, A000205634-002,
FREEWAYCAM03

Messdaten zu Funkstörspannung

#1290

Measurement data of Conducted voltage emissions

Conducted voltage emissions in operating mode videostream, A000205634-002,
FREEWAYCAM03

Average (10)

Frequency (MHz)	Meas.Avg (dBµV)	Limit (dBµV)	Meas.-Lim (dB)	Line	Comments	Correction (dB)
0.2175	39.93	52.86	-12.93	Phase 1	Pass	10.06
0.32325	40.29	49.60	-9.31	Phase 1	Pass	10.07
0.429	35.31	47.27	-11.96	Phase 1	Pass	10.08
4.81725	29.58	46.00	-16.42	Phase 1	Pass	10.22
5.21475	31.66	50.00	-18.34	Phase 1	Pass	10.23
0.21675	41.29	52.97	-11.68	Neutral	Pass	10.06
0.32325	44.26	49.60	-5.34	Neutral	Pass	10.07
0.429	41.10	47.27	-6.17	Neutral	Pass	10.08
4.79325	29.48	46.00	-16.52	Neutral	Pass	10.22
5.19075	27.81	50.00	-22.19	Neutral	Pass	10.23

QuasiPeak (10)

Frequency (MHz)	Meas.Q-Peak (dBµV)	Limit (dBµV)	Meas.-Lim (dB)	Line	Comments	Correction (dB)
0.2175	52.14	62.86	-10.72	Phase 1	Pass	10.06
0.32325	49.06	59.60	-10.54	Phase 1	Pass	10.07
0.429	40.57	57.27	-16.70	Phase 1	Pass	10.08
4.81725	31.54	56.00	-24.46	Phase 1	Pass	10.22
5.21475	33.42	60.00	-26.58	Phase 1	Pass	10.23
0.21675	52.75	62.97	-10.22	Neutral	Pass	10.06
0.32325	50.76	59.60	-8.85	Neutral	Pass	10.07
0.429	44.63	57.27	-12.64	Neutral	Pass	10.08
4.79325	31.77	56.00	-24.23	Neutral	Pass	10.22
5.19075	33.31	60.00	-26.69	Neutral	Pass	10.23

Bemerkungen / Remarks:

Margin value = Measurement value – Limit value

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Funkstörfeldstärke Radiated disturbance		PASS
Prüfungsbezeichnung u. -nummer Test name and number	Radiated disturbance (30 MHz - 1 GHz) in operating mode videostream #1117	
Datum des Tests Test date	10.10.2018	
Angewendete Norm Applied Standard	47 CFR FCC Part 15 Section 15.109	
Prüfmethode Test method	ANSI C63.4-2014	
Temperatur (°C) Temperature	24.0	
Luftfeuchte (% rH) Humidity	40.1	
Luftdruck (mbar) Air pressure	981.0	
Bearbeiter Tested by	Wagner	
Modellbezeichnung Model	FREEWAYCAM03	
Prüfmuster-Nr. Test sample No.:	A000205634-002	
Betriebsart Operating mode	Videostream	
Anschlüsse Tested terminals	Gehäuse / Enclosure	
Grenzwert Limit	47 CFR Part 15 section 15.109	
Bemerkung Remarks	—	
Version der Prüfsoftware Version of testing software	3.17.0.29	

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Verwendete Prüfmittel
Used test equipment

Typ	Hersteller <i>Manufacturer</i>	Modell	ID	Kalibriert am <i>Last calibration</i>	Kalibriert bis <i>Next calibration</i>
Absorberhalle <i>Anechoic chamber</i>	TDK	SAC 10	2728890	13.04.2018	13.04.2019
Messantenne <i>Antenna</i>	Schw arzbeck	VULB 9168	2728787	31.08.2016	31.08.2019
Umschaltmatrix <i>Commutation relay</i>	MTS Systemtechnik	KRE-3005-ESCU	2732065	29.01.2018	29.01.2019
Messem Empfänger <i>Receiver</i>	Rohde & Schw arz	ESU 26	2723865	31.07.2018	31.07.2019

Prüfparameter zu Funkstörfeldstärke

#1117

Test parameter of Radiated disturbance

Radiated disturbance (30 MHz - 1 GHz) in operating mode videostream, A000205634-002, FREEWAYCAM03

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
30MHz	1GHz	30kHz	Horizontal	20 ms	120kHz

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
30MHz	1GHz	30kHz	Vertical	20 ms	120kHz

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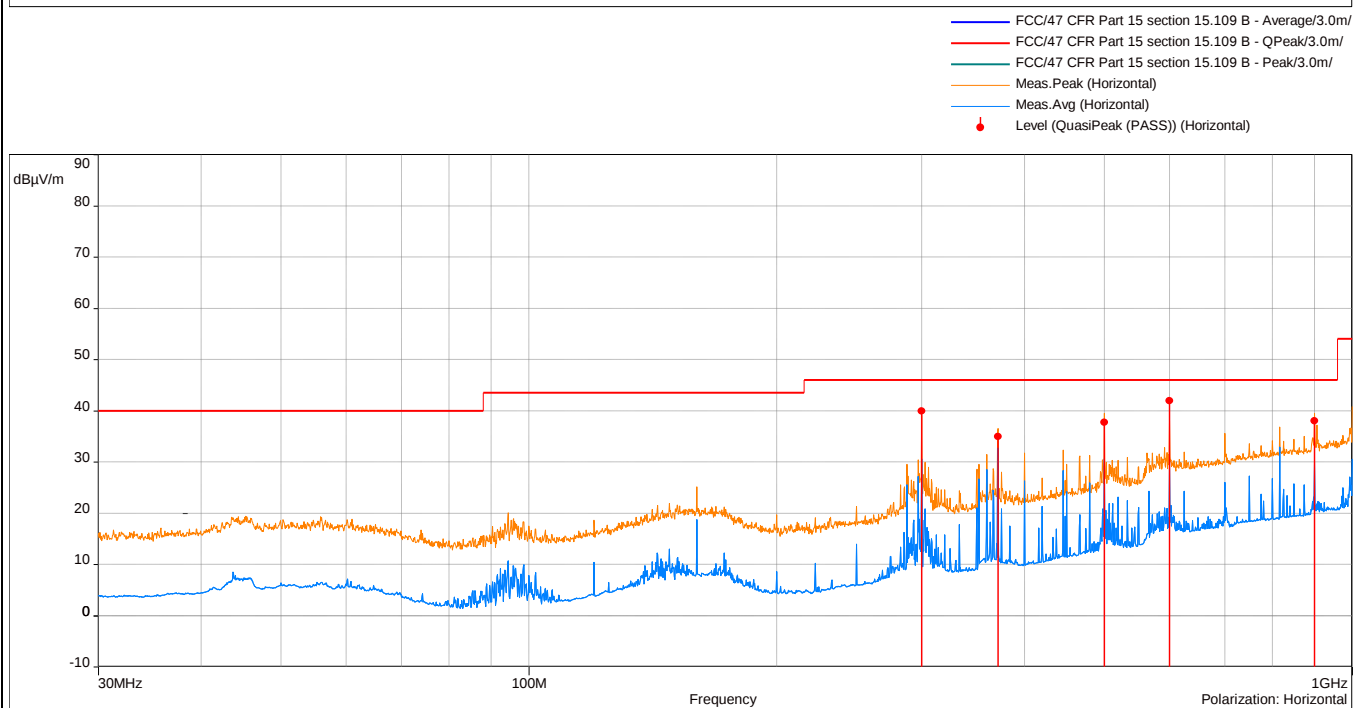
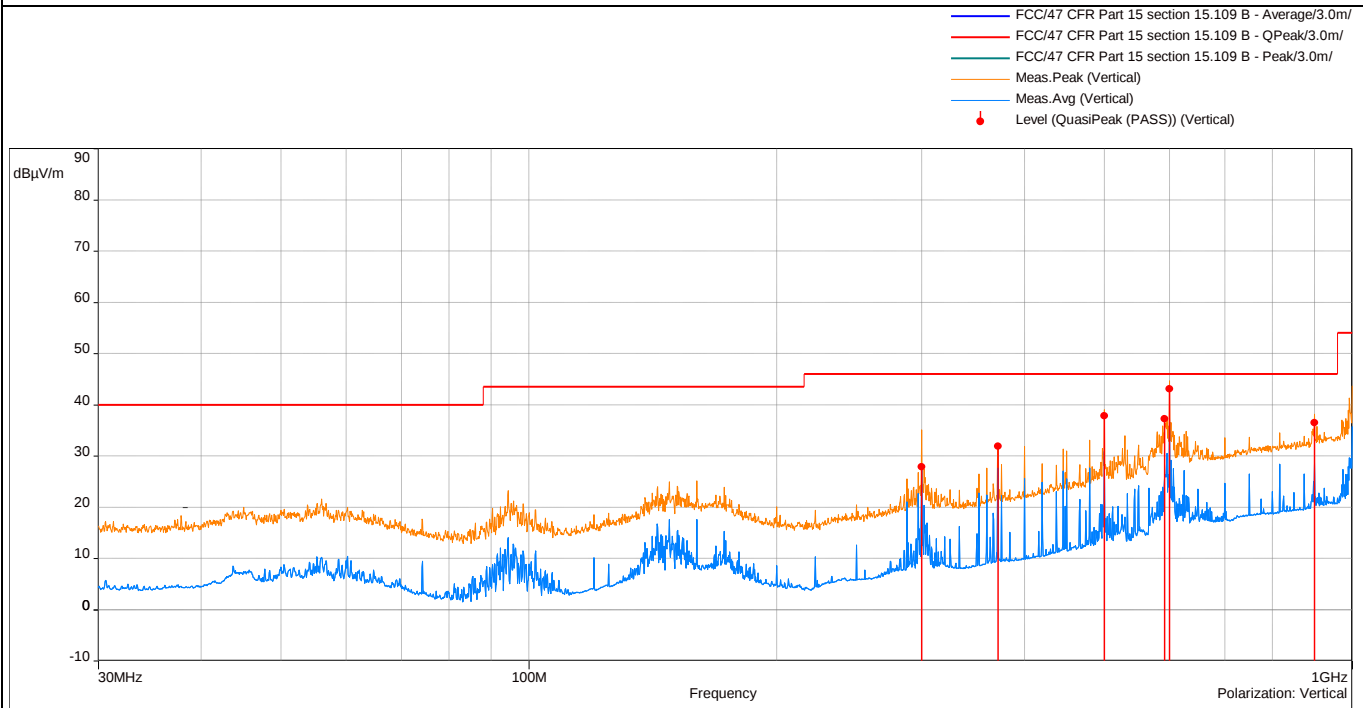
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Messdiagramme zu Funkstörfeldstärke

#1117

Graphical presentation of Radiated disturbance

Radiated disturbance (30 MHz - 1 GHz) in operating mode videostream, A000205634-002,
FREEWAYCAM03



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Messdiagramme zu Funkstörfeldstärke

#1117

Graphical presentation of Radiated disturbance

Radiated disturbance (30 MHz - 1 GHz) in operating mode videostream, A000205634-002, FREEWAYCAM03

Messdaten zu Funkstörfeldstärke

#1117

Measurement data of Radiated disturbance

Radiated disturbance (30 MHz - 1 GHz) in operating mode videostream, A000205634-002, FREEWAYCAM03

QuasiPeak (PASS) (11)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	Correction (dB)
300	39.95	46.00	-6.05	1.00	57.10	Horizontal	15.98
371.25	35.01	46.00	-10.99	1.00	25.30	Horizontal	17.76
500.01	37.76	46.00	-8.24	1.63	32.80	Horizontal	20.52
600	41.97	46.00	-4.03	1.23	24.20	Horizontal	22.85
900	38.07	46.00	-7.93	1.44	2.50	Horizontal	26.70
300	27.86	46.00	-18.14	2.97	2.90	Vertical	15.98
371.25	31.91	46.00	-14.09	1.62	268.60	Vertical	17.76
499.98	37.82	46.00	-8.18	1.00	111.90	Vertical	20.52
591.48	37.28	46.00	-8.72	1.00	300.40	Vertical	22.50
600	43.07	46.00	-2.93	1.00	243.70	Vertical	22.85
900	36.49	46.00	-9.51	2.00	100.50	Vertical	26.70

Bemerkungen / Remarks:

Margin value = Measurement value – Limit value

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Funkstörfeldstärke Radiated disturbance		PASS
Prüfungsbezeichnung u. -nummer Test name and number	Radiated disturbance (1 GHz - 6 GHz) in operating mode videostream #1120	
Datum des Tests Test date	10.10.2018	
Angewendete Norm Applied Standard	47 CFR FCC Part 15 Subpart B 15.109	
Prüfmethode Test method	ANSI C63.4-2014	
Temperatur (°C) Temperature	24.9	
Luftfeuchte (% rH) Humidity	39.4	
Luftdruck (mbar) Air pressure	978.0	
Bearbeiter Tested by	Wagner	
Modellbezeichnung Model	FREEWAYCAM03	
Prüfmuster-Nr. Test sample No.:	A000205634-002	
Betriebsart Operating mode	Videostream	
Anschlüsse Tested terminals	Gehäuse / Enclosure	
Grenzwert Limit	47 CFR Part 15 section 15.109	
Bemerkung Remarks	—	
Version der Prüfsoftware Version of testing software	3.17.0.29	

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Verwendete Prüfmittel
Used test equipment

Typ	Hersteller <i>Manufacturer</i>	Modell	ID	Kalibriert am <i>Last calibration</i>	Kalibriert bis <i>Next calibration</i>
Absorberhalle <i>Anechoic chamber</i>	TDK	SAC 10	2728890	13.04.2018	13.04.2019
Messantenne <i>Antenna</i>	EMCO	3115	2728607	11.01.2017	11.01.2020
HF-Kabel <i>Cable</i>	TRL P	N-SMA	LTG_1815	30.07.2018	30.07.2021
Vorverstärker <i>Preamplifier</i>	Schwarzbeck	BBV 9718B	2888179	21.09.2019	21.09.2020
Messempfänger <i>Receiver</i>	Rohde & Schwarz	ESI 40	2728600	05.09.2018	05.09.2020

Prüfparameter zu Funkstörfeldstärke

#1120

Test parameter of Radiated disturbance

Radiated disturbance (1 GHz - 6 GHz) in operating mode videostream, A000205634-002, FREEWAYCAM03

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
1GHz	6GHz	300kHz	Horizontal	5 ms	1MHz

Startfrequenz <i>Start Frequency</i>	Stopfrequenz <i>Stop Frequency</i>	Schrittweite <i>Frequency step</i>	Anschluss <i>Terminal</i>	Durchlaufzeit <i>Sweep time</i>	ZF-Bandbreite <i>IF bandwidth</i>
1GHz	6GHz	300kHz	Vertical	5 ms	1MHz

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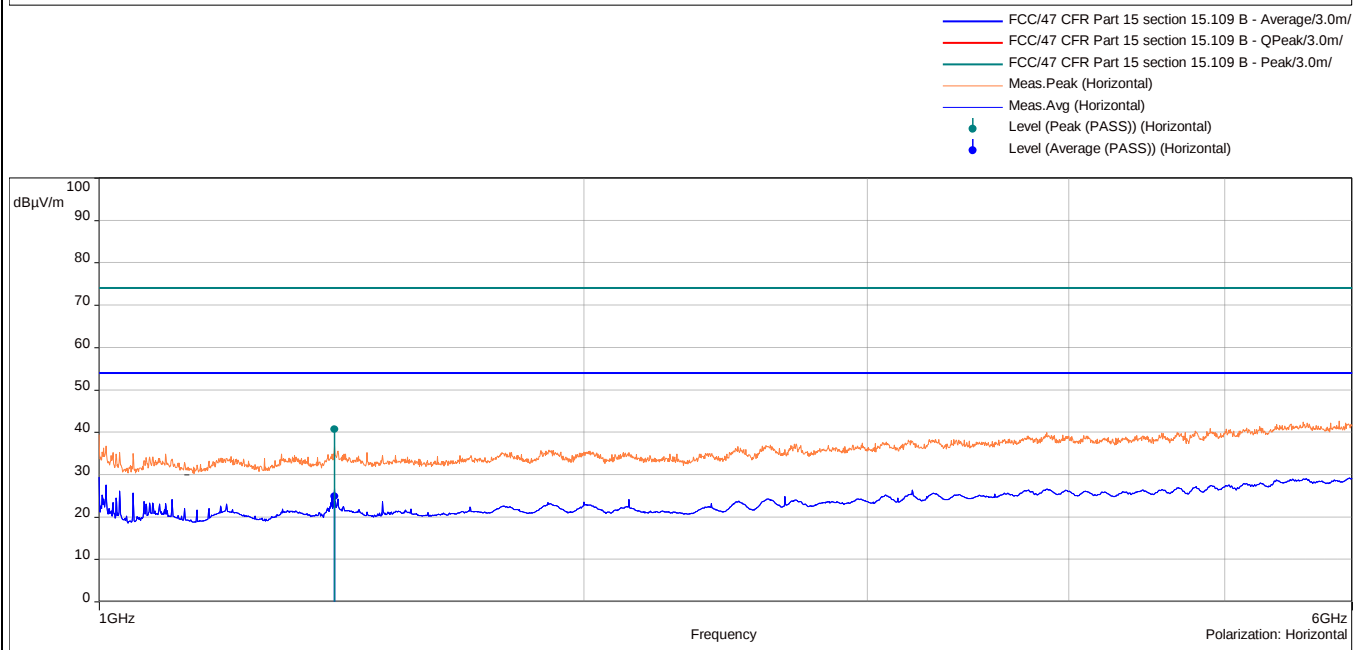
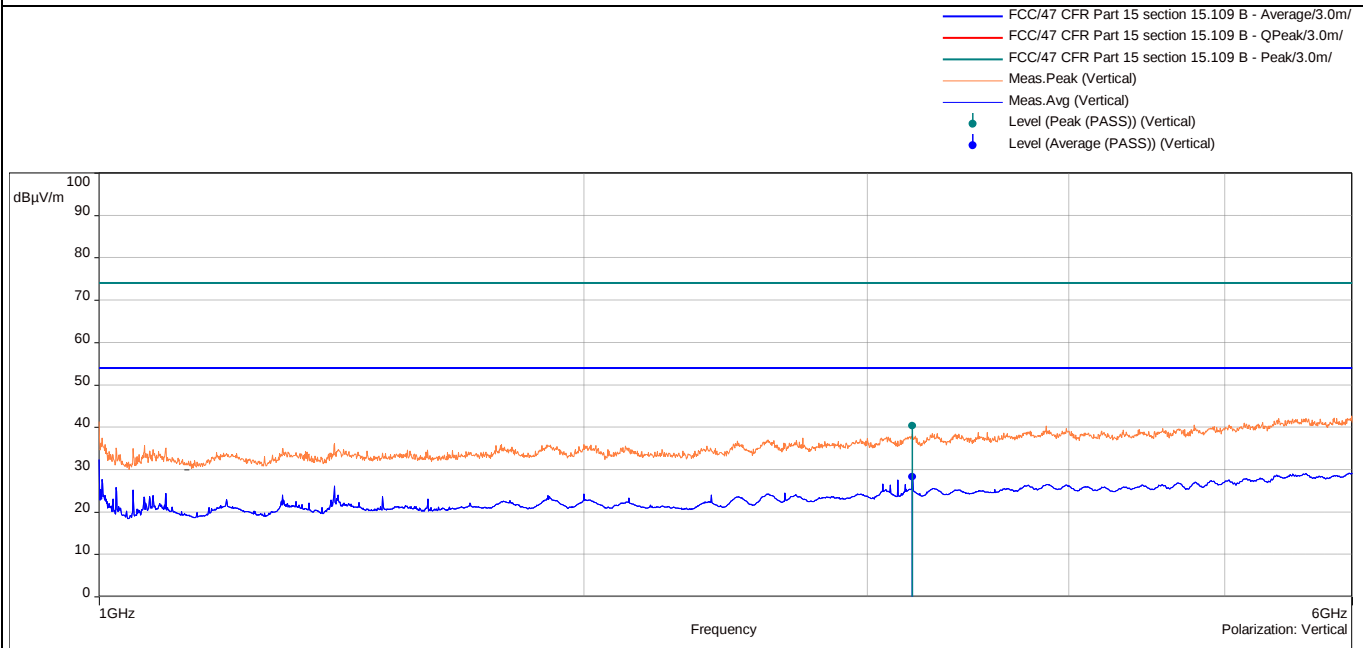
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Messdiagramme zu Funkstörfeldstärke

#1120

Graphical presentation of Radiated disturbance

Radiated disturbance (1 GHz - 6 GHz) in operating mode videostream, A000205634-002,
FREEWAYCAM03



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Messdaten zu Funkstörfeldstärke

#1120

Measurement data of Radiated disturbance

Radiated disturbance (1 GHz - 6 GHz) in operating mode videostream, A000205634-002,
FREEWAYCAM03

Average (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (m) (dB)	Azimuth (°)	Pol.	Correctio n (dB)
1399.9	24.93	54.00	-29.07	1.14	297.40	Horizontal	-7.18
3199.9	28.38	54.00	-25.62	1.99	3.20	Vertical	-2.00

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (m) (dB)	Azimuth (°)	Pol.	Correctio n (dB)
1399.9	40.78	74.00	-33.22	1.14	297.40	Horizontal	-7.18
3199.9	40.37	74.00	-33.63	1.99	3.20	Vertical	-2.00

Bemerkungen / Remarks:

Margin value = Measurement value – Limit value

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End of test report