Bundesnetzagentur

BNetzA-CAB-02/21-102

TEST REPORT

Test report no.: 1-0988/20-01-02

Testing laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
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Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate starting with the registration number: D-PL-12076-01.

Applicant

Philips Medizin Systeme Böblingen GmbH
Hewlett-Packard-Strasse 2
71034 Böblingen / GERMANY
Phone: +49 7031 463-2944
Contact: Hansjörg Geywitz
e-mail: hansjoerg.geywitz@philips.com
Phone: +49 7031 463-1879

Manufacturer

Philips Medizin Systeme Böblingen GmbH
Hewlett-Packard-Strasse 2
71034 Böblingen / GERMANY

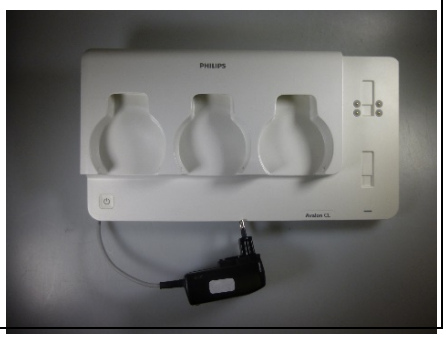
Test standard/s

FCC - Title 47 CFR Part 95	FCC - Title 47 Part 95 – Personal Radio Services
RSS - 210 Issue 10	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**Basis System**
Model name:	**866074**
FCC ID:	**PQC-OBRBSBV1**
IC:	**359C-OBRBSBV1**
Frequency:	608 MHz – 614 MHz
Technology tested:	Modulated Carrier
Antenna:	Integrated antenna
Power supply:	115 V AC by mains
Temperature range:	-20°C to +55°C



This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

cn=Marco Bertolino, o=CTC advanced GmbH, ou=BTL-161128, email=Marco.Bertolino@ctcadvanced.com, c=DE
2020.10.01 09:59:26 +02'00'

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Lab Manager
Radio Communications

Test performed:

p.o.

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2020.10.01 10:01:06 +02'00'

Andreas Curette
Testing Manager
Radio Communications

1 Table of contents

2 General information

2.1 Notes and disclaimer

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2.2 Application details

Date of receipt of order:	2020-08-14
Date of receipt of test item:	2020-08-24
Start of test:	2020-08-27
End of test:	2020-09-02
Person(s) present during the test:	-/-

2.3 Test laboratories sub-contracted

None

3 Test standard/s, references and accreditations

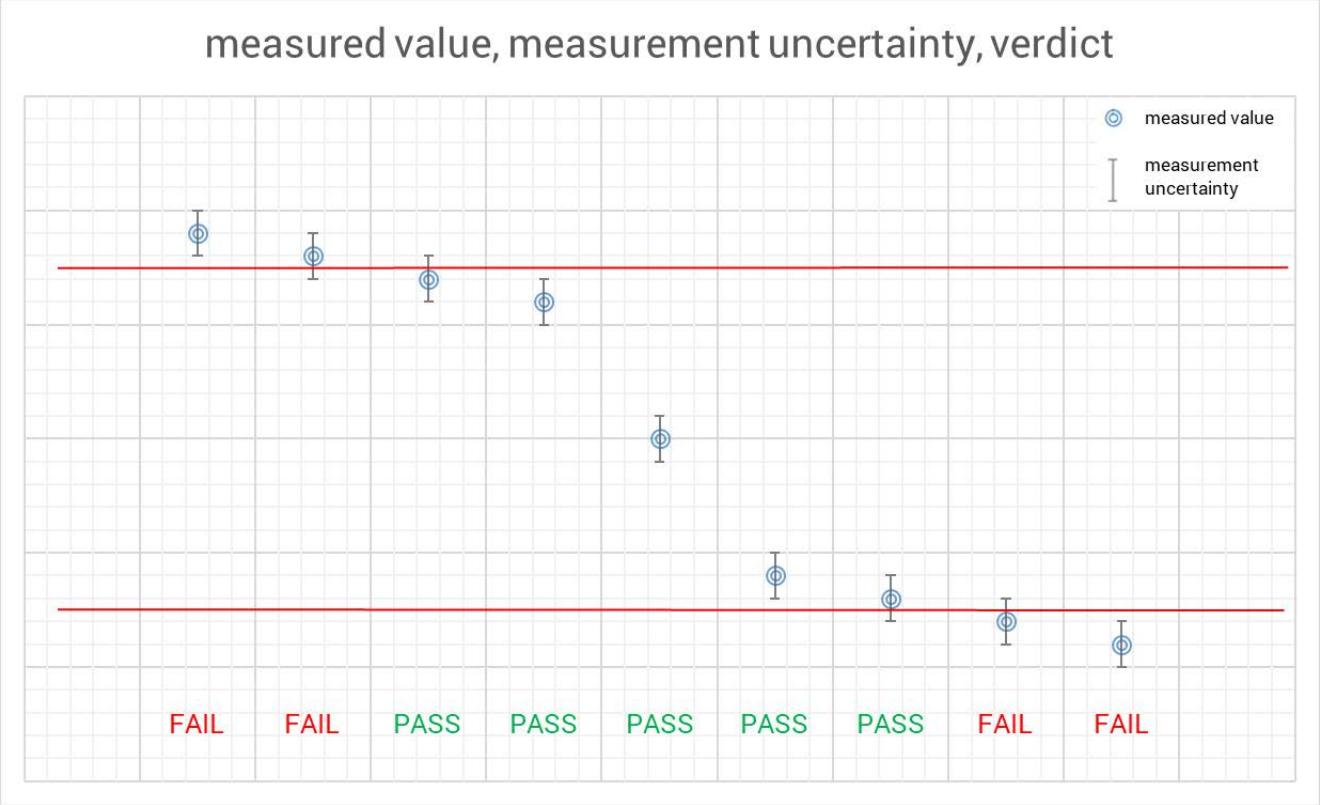
Test standard	Date	Description
FCC - Title 47 CFR Part 95	Vol5	FCC - Title 47 Part 95 – Personal Radio Services
RSS - 210 Issue 10	December 2019	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
RSS - Gen Issue 5 incl. Amendment 1	March 2019	Spectrum Management and Telecommunications Radio Standards Specification - General Requirements for Compliance of Radio Apparatus

Guidance	Version	Description
ANSI C63.4-2014	-/-	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.26-2015	-/-	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

Accreditation	Description
D-PL-12076-01-04	Telecommunication and EMC Canada https://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf
D-PL-12076-01-05	Telecommunication FCC requirements https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf

4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.
The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."



5 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+24 °C during room temperature tests No tests under extreme temperature conditions performed. No tests under extreme temperature conditions performed.
Relative humidity content	:		42 %
Barometric pressure	:		1016 hpa
Power supply	:	V_{nom} V_{max} V_{min}	115 V AC by mains No tests under extreme voltage conditions performed. No tests under extreme voltage conditions performed.

6 Test item

6.1 General description

Kind of test item	:	Basis System
Model name	:	866074
HMN	:	-/-
PMN	:	866074
HVIN	:	866074
FVIN	:	-/-
S/N serial number	:	Radiated unit: DE44806086
Hardware status	:	1810
Software status	:	B.01.07
Firmware status	:	N/A
Frequency band	:	608 MHz – 614 MHz Lowest Channel 3 (608.375 MHz) / Highest Channel 38 (613.625 MHz)
Type of radio transmission Use of frequency spectrum	: :	Modulated carrier
Type of modulation	:	GFSK
Number of channels	:	36
Antenna	:	Integrated antenna
Power supply	:	115 V AC by mains
Temperature range	:	-20°C to +55°C

6.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report: 1-0988/20-01-01_AnnexA
1-0988/20-01-01_AnnexB
1-0988/20-01-01_AnnexD

7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

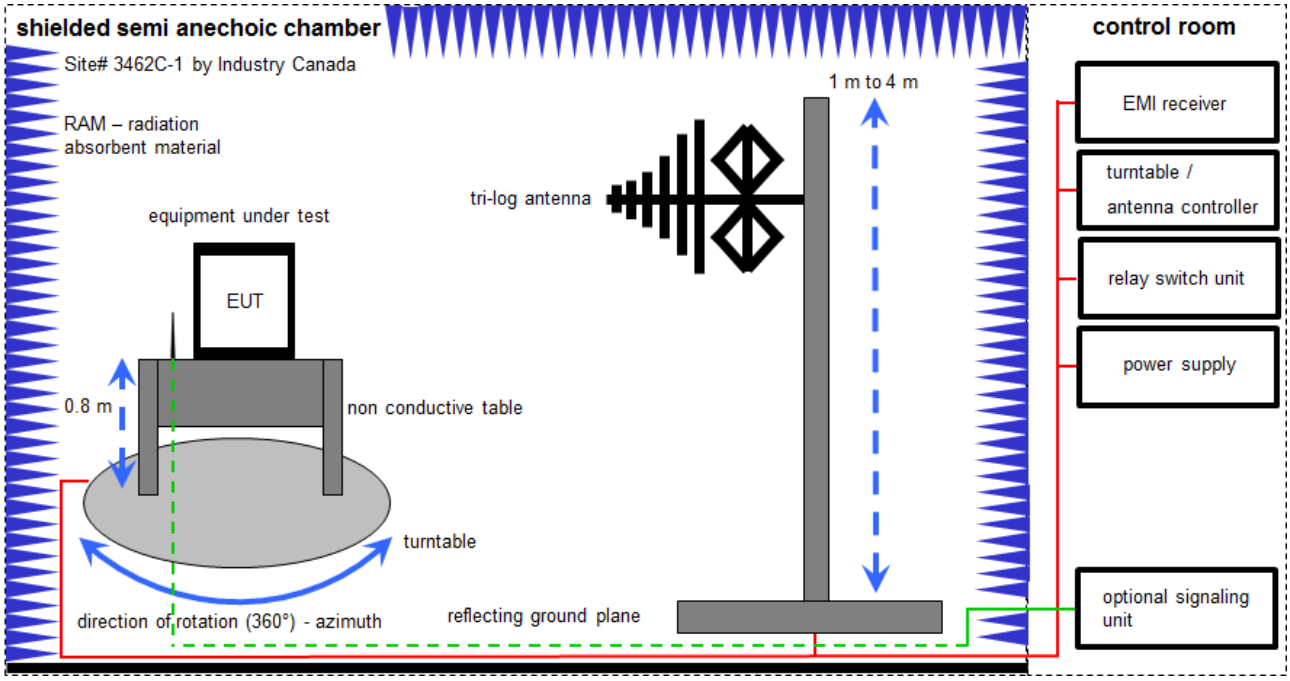
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 30 MHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform to specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter; EMC32 software version: 10.30.0

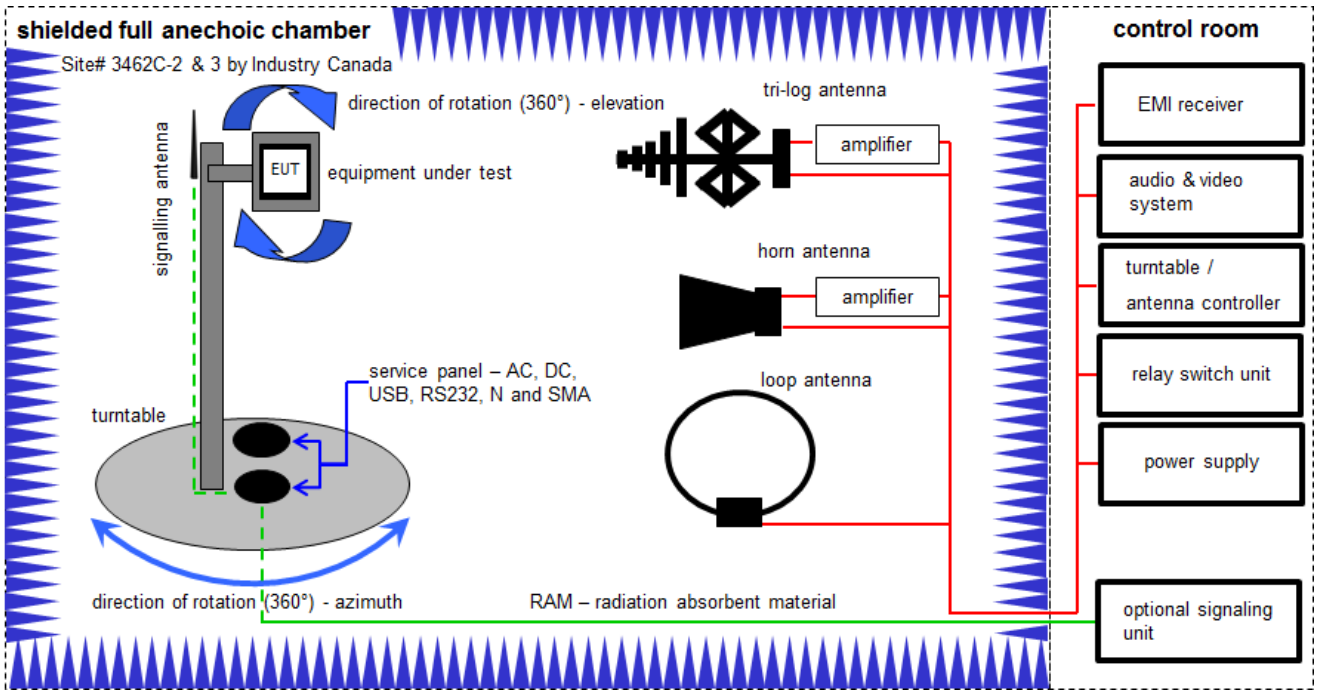
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	Meßkabine 1	HF-Absorberhalle	MWB AG 300023		300000551	ne	-/-	-/-
3	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
4	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
5	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
6	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	295	300003787	vIKI!	19.02.2019	18.02.2021
7	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	21.05.2019	20.11.2020

7.2 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter; loop antenna 3 meter

FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vIKI!	13.06.2019	12.06.2021
2	A, B, C	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	B	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9107-3697	300001605	vIKI!	27.02.2019	26.02.2021
4	A, B, C	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
5	A, B, C	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	11.12.2019	10.12.2020
6	B	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
7	B	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	19	300003790	ne	-/-	-/-
8	B	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
9	A, B, C	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
10	A, B, C	NEXIO EMV-Software	BAT EMC V3.20.02	EMCO	-/-	300004682	ne	-/-	-/-
11	A, B, C	PC	ExOne	F+W	-/-	300004703	ne	-/-	-/-
12	B	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011572	300005241	ev	-/-	-/-

8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, it is placed on a table with 0.8 m height.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement*

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT. (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT)
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

*)Note: The sequence will be repeated three times with different EUT orientations.

8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty		
Test case	**Uncertainty**	
Antenna gain	± 3 dB	
Power spectral density	± 1.15 dB	
DTS bandwidth	± 100 kHz (depends on the used RBW)	
Occupied bandwidth	± 100 kHz (depends on the used RBW)	
Maximum output power conducted	± 1.15 dB	
Detailed spurious emissions @ the band edge - conducted	± 1.15 dB	
Band edge compliance radiated	± 3 dB	
Spurious emissions conducted	> 3.6 GHz	± 1.15 dB
	> 7 GHz	± 1.15 dB
	> 18 GHz	± 1.89 dB
	≥ 40 GHz	± 3.12 dB
Spurious emissions radiated below 30 MHz	± 3 dB	
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB	
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB	
Spurious emissions radiated above 12.75 GHz	± 4.5 dB	
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB	

10 Summary of measurement results

☐	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☒	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	47 CFR Part 2 47 CFR Part 95 H RSS Gen Issue 5 RSS 210 Issue 10	See table!	2020-10-01	Delta tests according customer demand.

Test specification clause	Test case	Guideline	Temperature conditions	Power source voltages	Mode	C	NC	NA	NP	Remark
§95.2369 RSS-210 Issue 10 – C.3 (a)	Radiated field strength	-/-	Nominal	Nominal	Modulated carrier	☒	☐	☐	☐	-/-
§95.2379 RSS-210 Issue 10 – C.3 (b) RSS-Gen	TX spurious emissions rad. below 30 MHz	-/-	Nominal	Nominal	Modulated carrier	☒	☐	☐	☐	-/-
§95.2379 RSS-210 Issue 10 – C.3 (b) RSS-Gen	TX spurious emissions rad. 30 MHz to 1 GHz	-/-	Nominal	Nominal	Modulated carrier	☒	☐	☐	☐	-/-
§95.2379 RSS-210 Issue 10 – C.3 (b) RSS-Gen	TX spurious emissions rad. above 1 GHz	-/-	Nominal	Nominal	Modulated carrier	☒	☐	☐	☐	-/-
§95.2379 RSS-210 Issue 10 – C.3 (b) RSS-Gen	RX spurious emissions rad. 30 MHz to 1 GHz	-/-	Nominal	Nominal	RX	☒	☐	☐	☐	-/-
§95.2379 RSS-210 Issue 10 – C.3 (b) RSS-Gen	RX spurious emissions rad. above 1 GHz	-/-	Nominal	Nominal	RX	☒	☐	☐	☐	-/-

Notes:

C	Compliant	**NC**	Not compliant	**NA**	Not applicable	**NP**	Not performed

11 Additional comments

Reference documents: Customer_Questionnaire_Transducer.docx

Main test report: 1-4695_12-01-03-D

Update report: 1-7337_18-01-02-C

DC_Correction.pdf

PHILIPS

Declaration of Duty Cycle Correction

The RF protocol used in the products

Avalon Cableless Toco+ MP Transducer 866075

Avalon Cableless US Transducer 866076

Avalon Cableless ECG/IUP Transducer

have a maximum duty cycle of 43.2ms in a 100ms time frame.

Therefore the duty cycle correction is 20*log(0.432) = -7.3dB

The RF protocol used in the product

Avalon CL Basestation 866074

has a maximum duty cycle of 38.4ms in a 100ms time frame.

Therefore the duty cycle correction is 20*log(0.384) = -8.3dB

Böblingen, 18-Aug-2020

Hansjörg Geywitz

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Geschäftsführer: Dr. Dieter Haase (Sprecher), Dr. Peter Ziese, Matthijs de Groot
Registergericht Stuttgart Reg.-Nr. HRB 245187, Sitz der Gesellschaft: Böblingen, www.philips.com/healthcare

Special test descriptions: None

Configuration descriptions: Customer declaration:

Test mode:

☐ No test mode available
Iperf was used to ping another device with the largest support packet size

☒ Test mode available
Special-hardware setting is used.
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☒ Operating mode 1 (single antenna)
- *Equipment with 1 antenna,*
- *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
- *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*

☐ Operating mode 2 (multiple antennas, no beamforming)
- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*

☐ Operating mode 3 (multiple antennas, with beamforming)
- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.*
  In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

12 Measurement results

12.1 Radiated field strength

Measurement:

Measurement parameter	
Detector:	Quasi peak
Sweep time:	Auto
Resolution bandwidth:	120kHz
Video bandwidth:	Auto
Span:	> EBW
Trace-Mode:	Max. hold
Test setup:	See chapter 7.1 A and 7.2 C
Measurement uncertainty:	See chapter 9

Limits:

FCC	IC
CFR § 95.2369	RSS 210 Issue 10 C.3 (a)
Radiated field strength	
200 mW/m @ 3 m (106 dBµV/m @ 3 m)	

Result:

Frequency	Radiated field strength
608.375 MHz	107.5 dBµV/m @ 3m Peak 99.2 dBµV/m @ 3m AVG DC correction
610.925 MHz	107.1 dBµV/m @ 3m Peak 98.8 dBµV/m @ 3m AVG DC correction
613.625 MHz	107.2 dBµV/m @ 3m Peak 98.9 dBµV/m @ 3m AVG DC correction

The DUT passes the test due to duty cycle correction declared by the costumer.

12.2 Field strength of spurious radiation

Measurement:

Measurement parameter	
Detector:	Peak / QP / Average
Sweep time:	Auto
Resolution bandwidth:	f < 1 GHz : 120 kHz f ≥ 1GHz : 1 MHz
Video bandwidth:	f < 1 GHz : 120 kHz f ≥ 1GHz : 1 MHz
Span:	-/-
Trace mode:	Max. hold
Test setup:	See chapter 7.2 A & B
Measurement uncertainty:	See chapter 9

Limits:

FCC	IC
47 CFR § 95.2379	RSS 210 Issue 10 C.3 (B) RSS Gen Issue 5
Out-of band emissions below 960 MHz are limited to 200 microvolts/meter, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector. Out-of-band emissions above 960 MHz are limited to 500 microvolts/meter as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.	

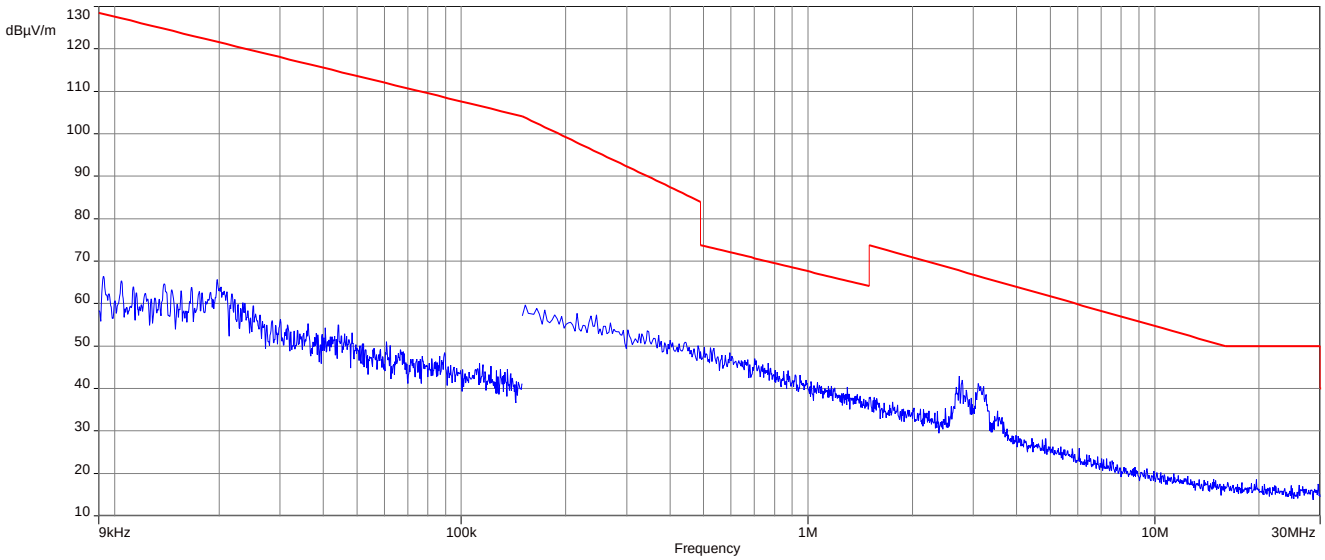
SPURIOUS EMISSIONS LEVEL (dBµV/m)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
1249.8	Peak	36.7	1260.3	Peak	39.3	1260.1	Peak	39.5
	AVG	Peak below AV Limit		AVG	Peak below AV Limit		AVG	Peak below AV Limit
1949.7	Peak	40.9	1719.6	Peak	38.5	1970.2	Peak	40.3
	AVG	Peak below AV Limit		AVG	Peak below AV Limit		AVG	Peak below AV Limit
2658.3	Peak	42.5	1958.8	Peak	40.2	2059.8	Peak	40.1
	AVG	Peak below AV Limit		AVG	Peak below AV Limit		AVG	Peak below AV Limit
3353.1	Peak	44.9	2340	Peak	42.7	3389.2	Peak	45.1
	AVG	Peak below AV Limit		AVG	Peak below AV Limit		AVG	Peak below AV Limit
4866.9	Peak	54.5	2670	Peak	44.0	4295.5	Peak	51.6
	AVG	46.2		AVG	Peak below AV Limit		AVG	Peak below AV Limit
6048.1	Peak	53.1	3374.2	Peak	45.2	-/-	Peak	-/-
	AVG	Peak below AV Limit		AVG	Peak below AV Limit		AVG	-/-
-/-	Peak	-/-	4887.1	Peak	54.1	-/-	Peak	-/-
	AVG	-/-		AVG	45.8		AVG	-/-
-/-	Peak	-/-	5498.5	Peak	52.8	-/-	Peak	-/-
	AVG	-/-		AVG	Peak below AV Limit		AVG	-/-

* For emissions below 1 GHz, see table below the plot

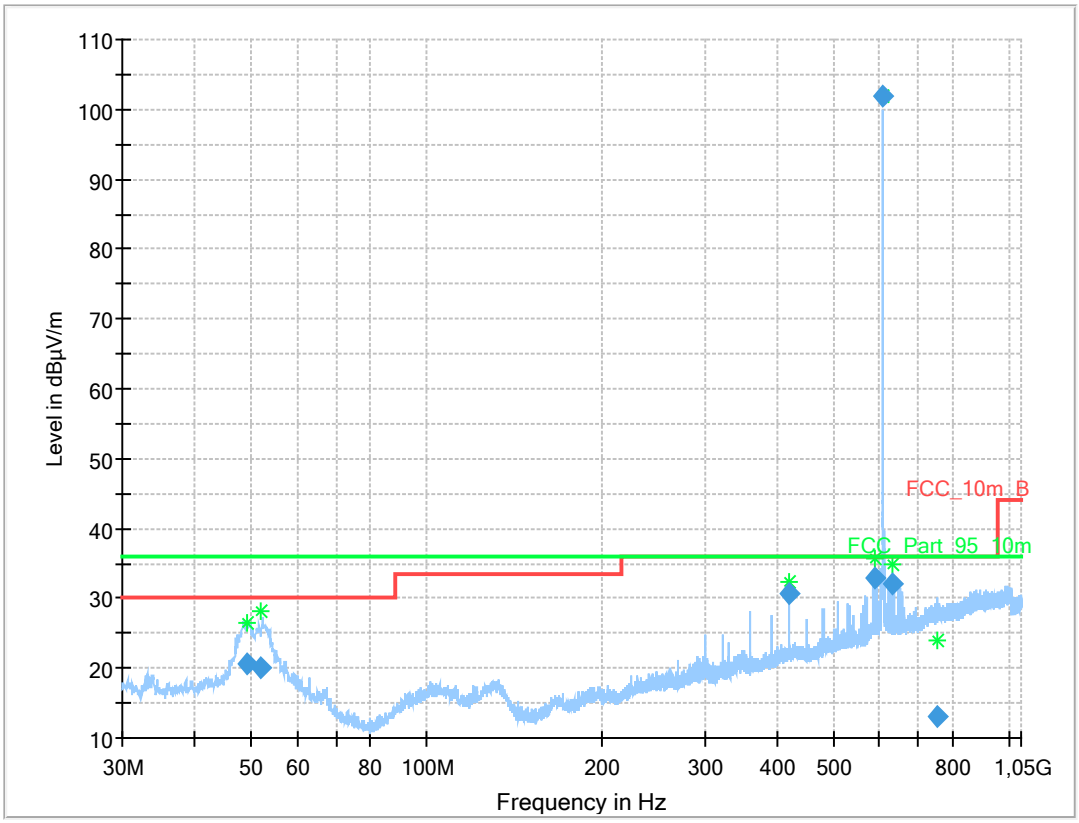
**DC correction factor (-8.3 dB) – see chapter 11 additional comments

Plots of the measurements

Plot 1: 9 kHz – 30 MHz, low channel

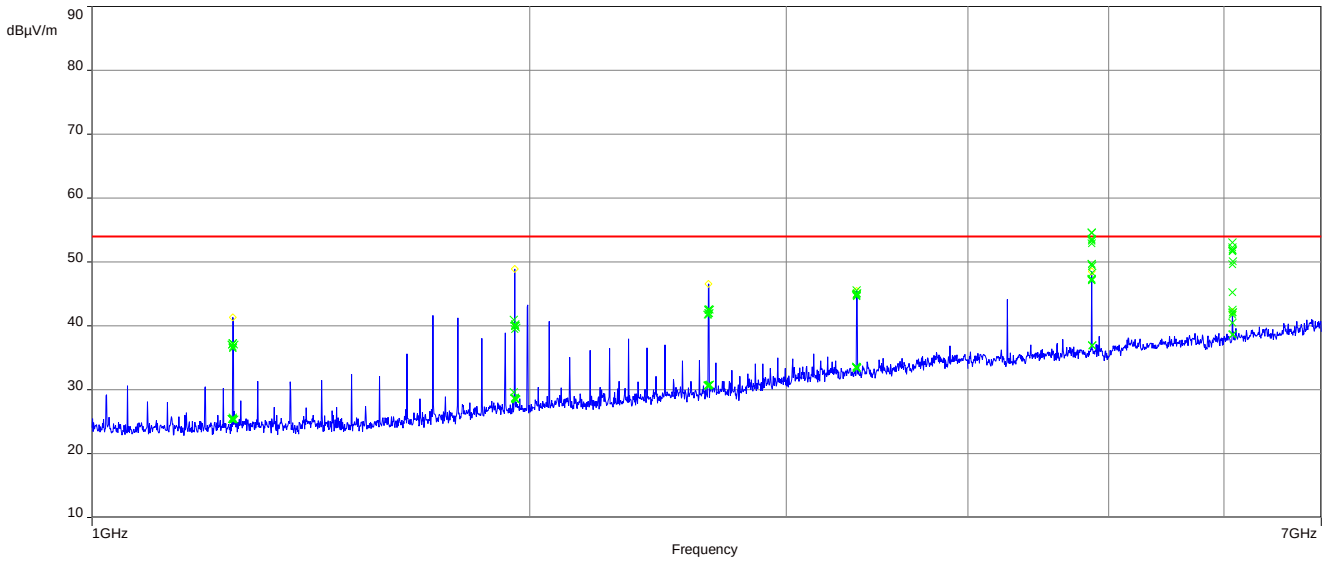


Plot 2: 30 MHz – 1 GHz, low channel

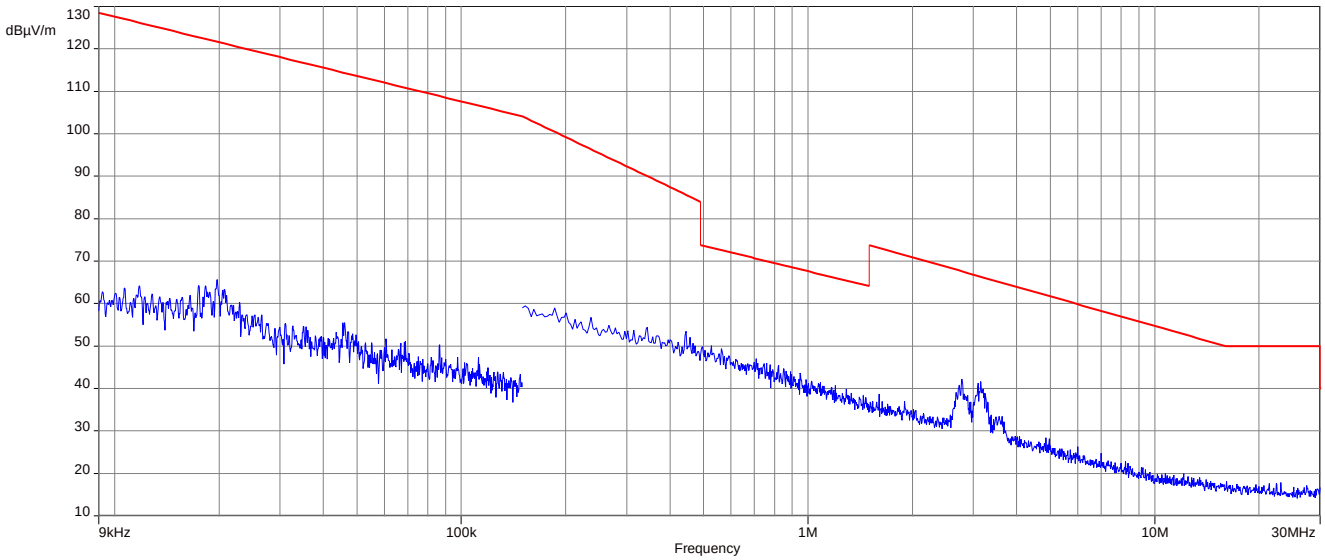


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.020	20.63	30.0	9.4	1000	120.0	122.0	V	52	14
51.953	19.95	30.0	10.1	1000	120.0	100.0	V	66	14
419.999	30.56	36.0	5.4	1000	120.0	208.0	H	232	17
586.805	32.79	36.0	3.2	1000	120.0	180.0	H	17	20
608.406	101.78	36.0	-65.8	1000	120.0	126.0	H	12	20
630.000	31.98	36.0	4.0	1000	120.0	158.0	H	9	20
750.808	13.09	36.0	22.9	1000	120.0	383.0	H	90	22

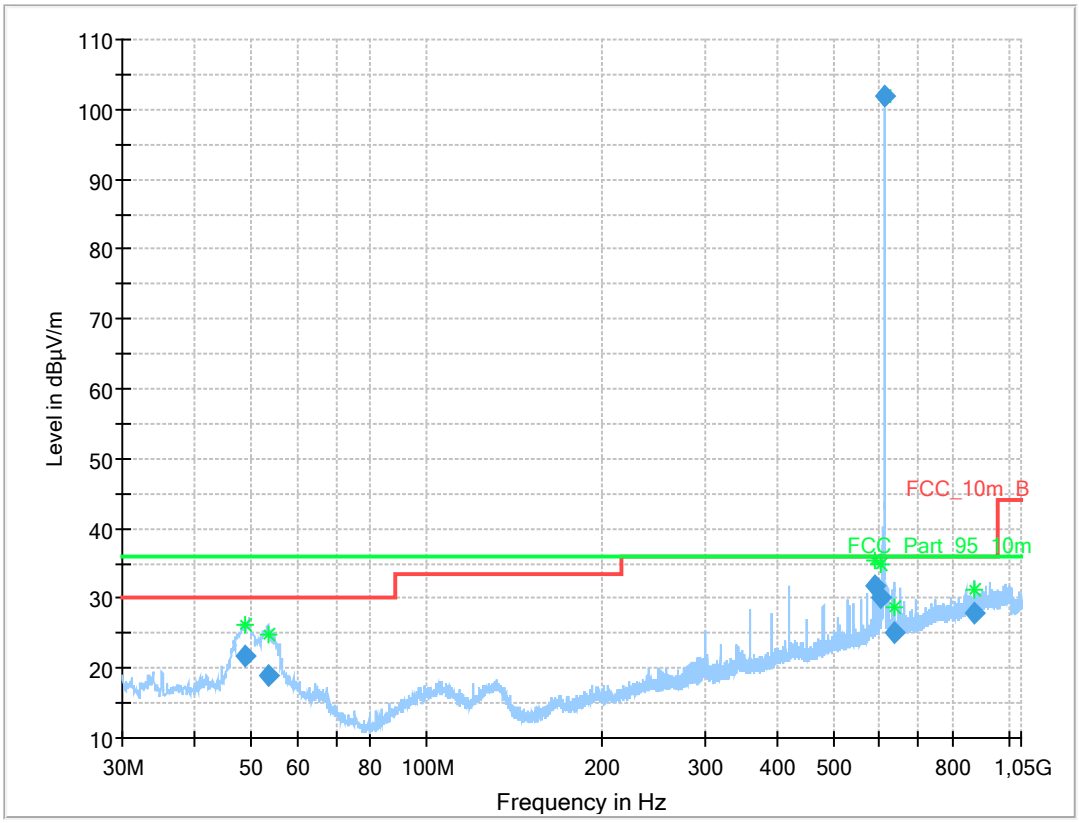
Plot 3: 1 GHz – 7 GHz, low channel



Plot 4: 9 kHz – 30 MHz, middle channel

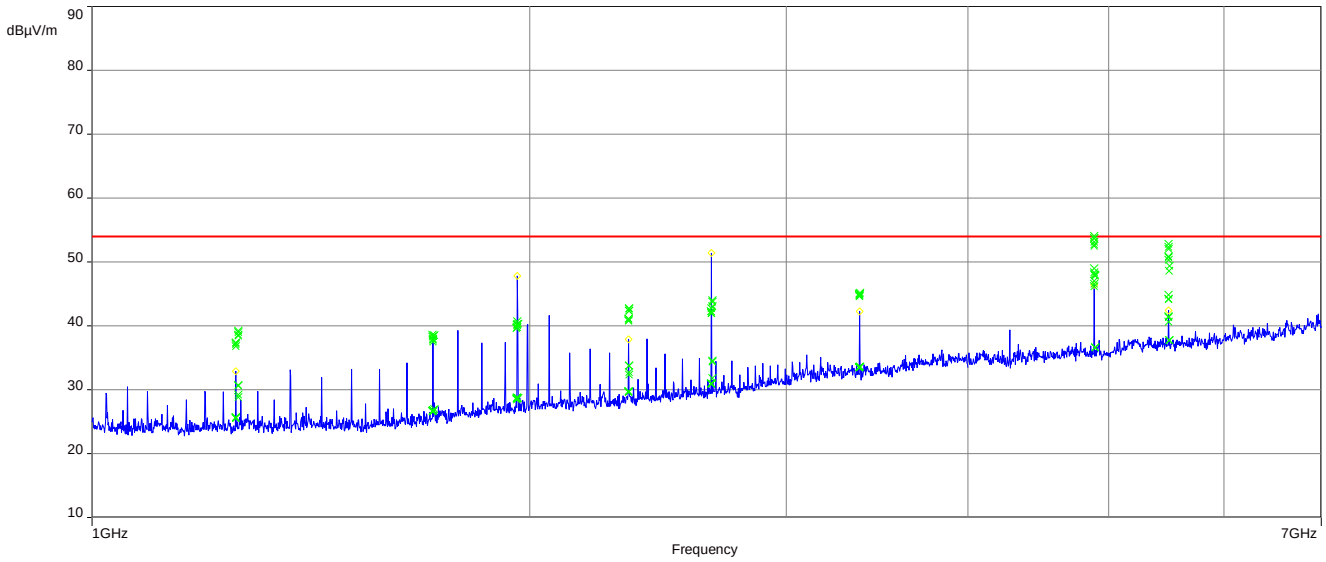


Plot 5: 30 MHz – 1 GHz, middle channel

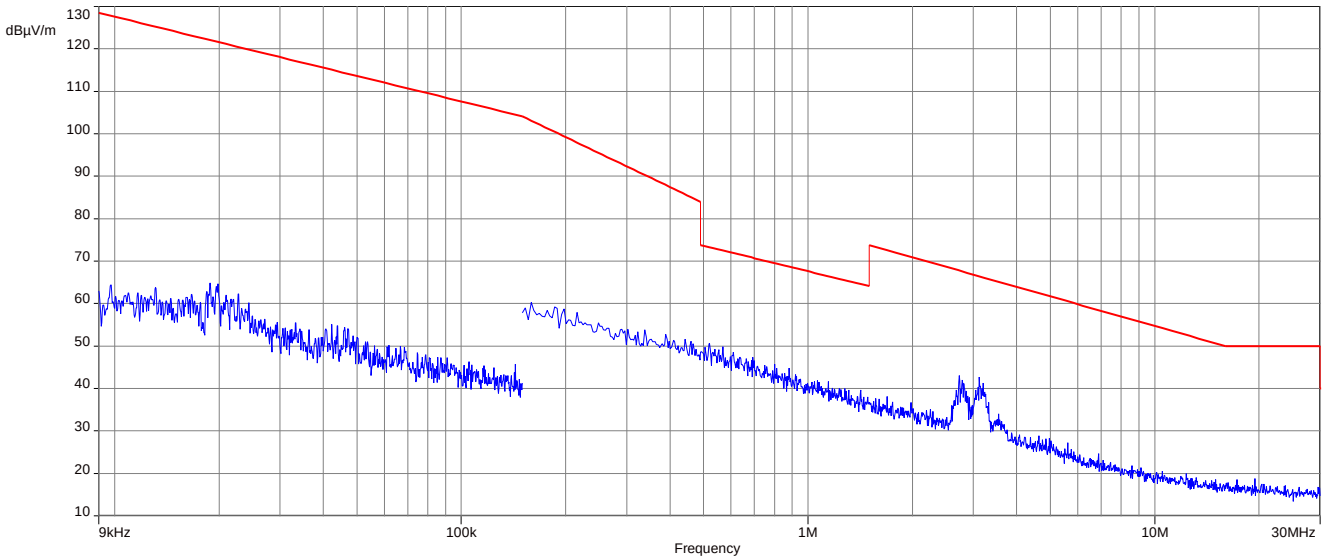


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.944	21.60	30.0	8.4	1000	120.0	103.0	V	45	14
53.611	19.05	30.0	11.0	1000	120.0	200.0	V	135	14
589.034	31.69	36.0	4.3	1000	120.0	174.0	H	18	20
602.878	30.19	36.0	5.8	1000	120.0	127.0	H	23	20
610.893	101.81	36.0	-65.8	1000	120.0	124.0	H	13	21
638.087	25.01	36.0	11.0	1000	120.0	151.0	H	-45	20
869.993	27.83	36.0	8.2	1000	120.0	123.0	H	349	23

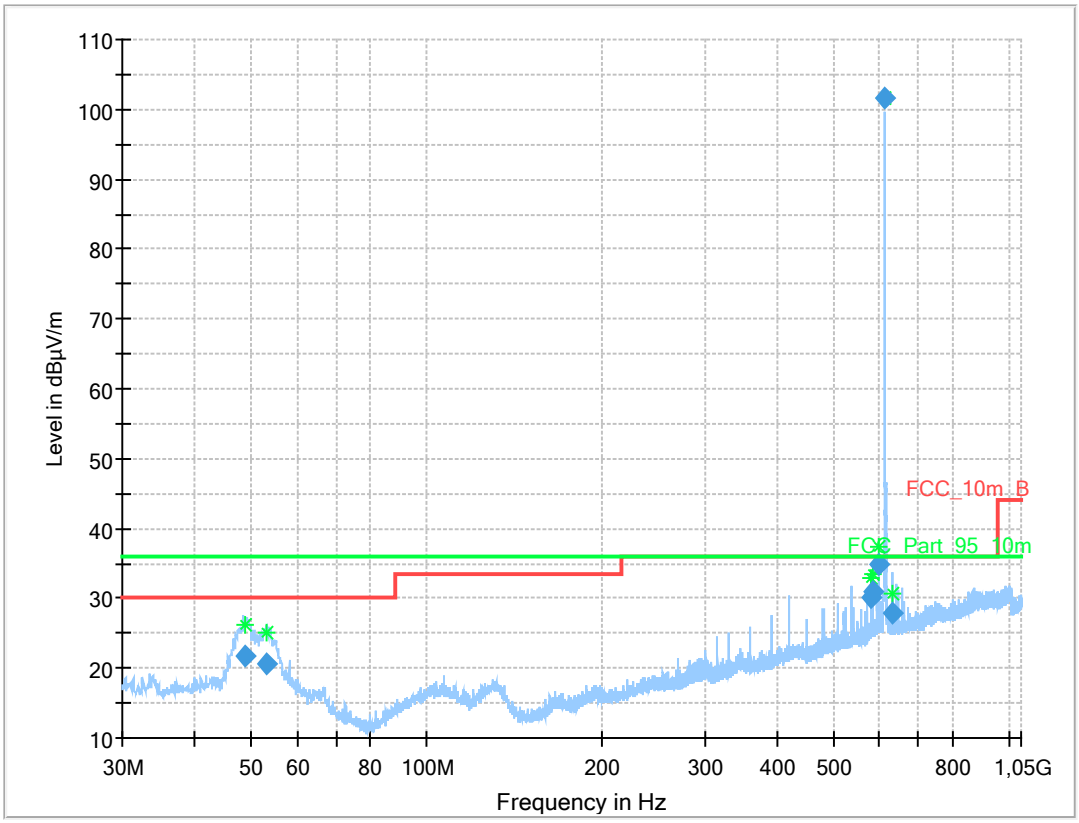
Plot 6: 1 GHz – 7 GHz, middle channel



Plot 7: 9 kHz – 30 MHz, high channel

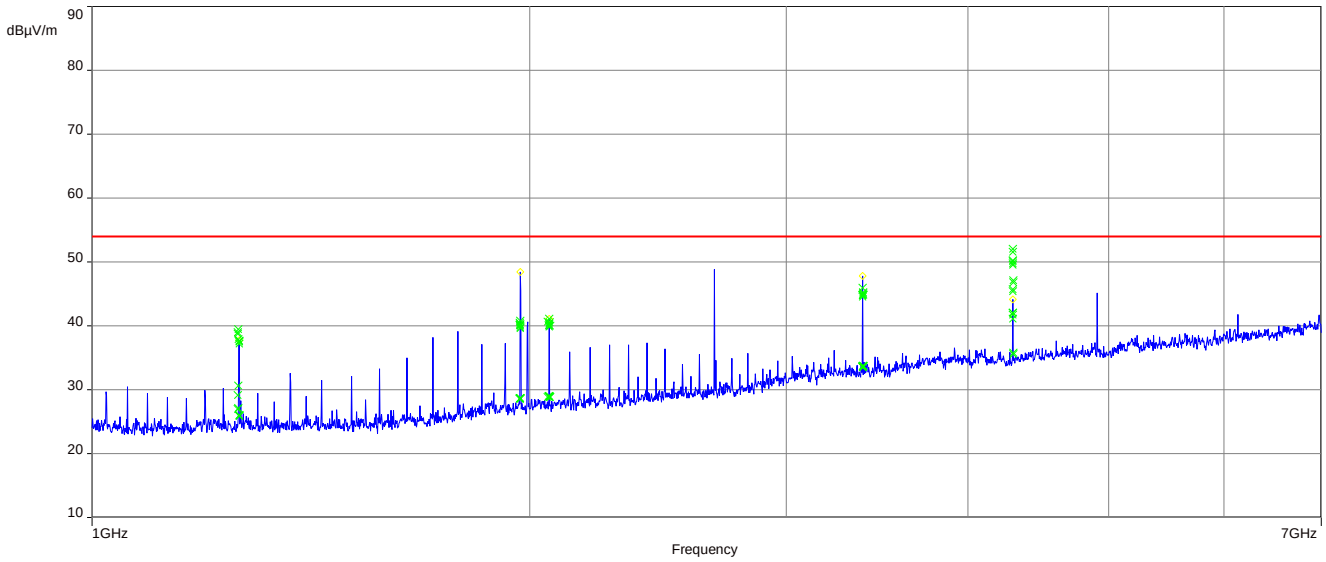


Plot 8: 30 MHz – 1 GHz, high channel



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.748	21.72	30.0	8.3	1000	120.0	100.0	V	314	14
52.899	20.55	30.0	9.5	1000	120.0	103.0	V	90	14
580.777	30.08	36.0	5.9	1000	120.0	171.0	H	8	20
586.397	31.01	36.0	5.0	1000	120.0	172.0	H	16	20
597.198	34.91	36.0	1.1	1000	120.0	169.0	H	22	20
613.593	101.55	36.0	-65.6	1000	120.0	138.0	H	14	21
629.997	27.91	36.0	8.1	1000	120.0	135.0	H	-45	20

Plot 9: 1 GHz – 7 GHz, high channel



12.3 Receiver spurious emissions

Measurement:

Measurement parameter	
Detector:	Peak / Average
Sweep time:	Auto
Video bandwidth:	f < 1 GHz : 120 kHz f ≥ 1GHz : 1 MHz
Resolution bandwidth:	f < 1 GHz : 120 kHz f ≥ 1GHz : 1 MHz
Span:	-/-
Trace mode:	Max. hold
Test setup:	See chapter 7.2 A & B
Measurement uncertainty:	See chapter 9

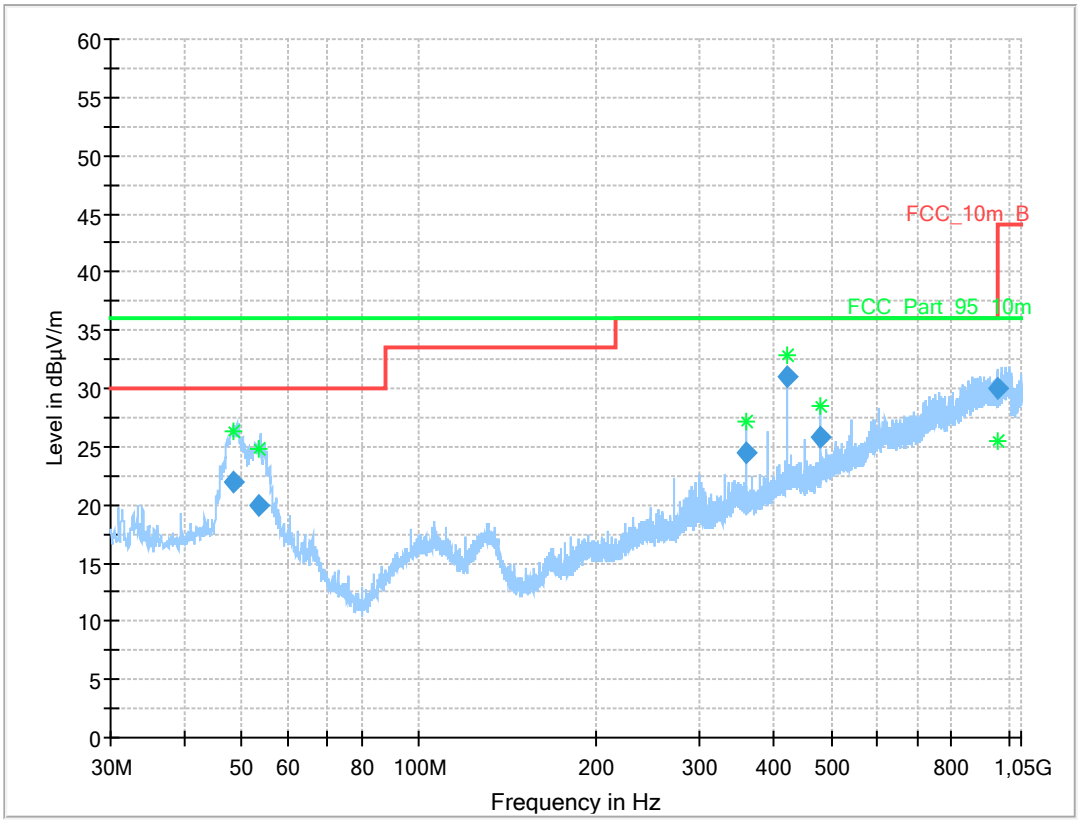
Limits:

FCC		IC
-/-		RSS 210 Issue 10 C.3 (B) RSS Gen Issue 5
Receiver Spurious Emission (radiated)		
Frequency (MHz)	**Field strength (µV/m)**	**Measurement distance (m)**
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

SPURIOUS EMISSIONS LEVEL (dBµV/m)*								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
All detected peak emissions are below the average limit.								
-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
	-/-	-/-		-/-	-/-		-/-	-/-

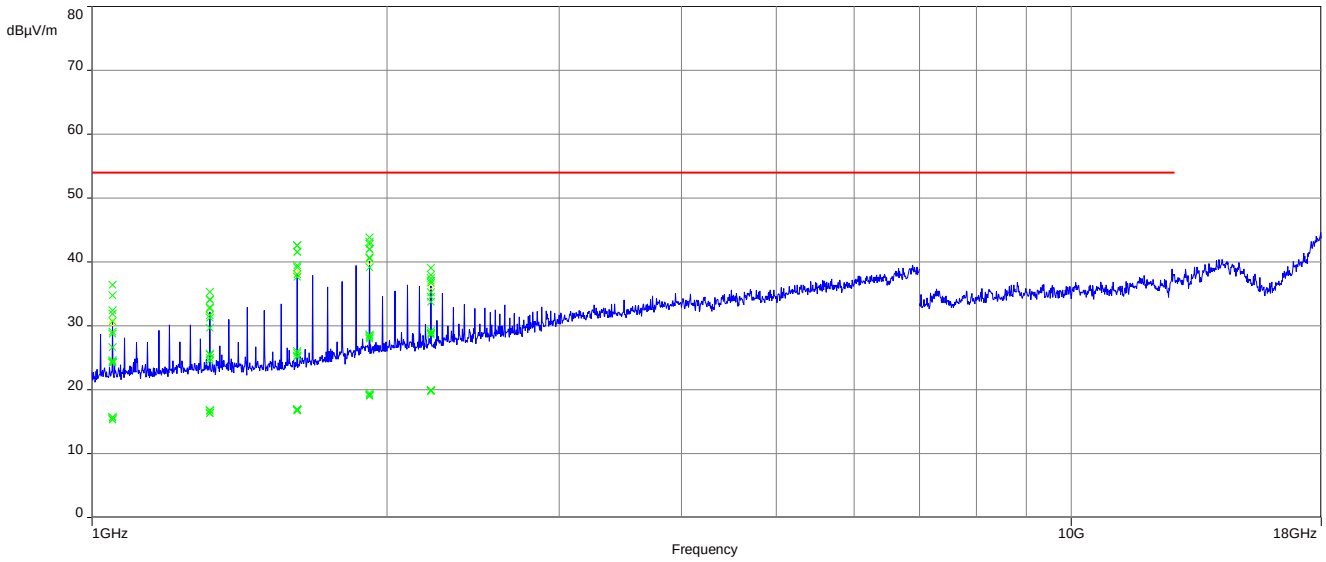
* For emissions below 1 GHz, see table below the plot

Plot 1: 30 MHz – 1 GHz



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.616	22.02	30.0	8.0	1000	120.0	100.0	V	1	14
53.628	20.01	30.0	10.0	1000	120.0	103.0	V	180	14
360.003	24.46	36.0	11.5	1000	120.0	203.0	H	206	16
419.995	30.99	36.0	5.0	1000	120.0	213.0	H	236	17
479.996	25.84	36.0	10.2	1000	120.0	235.0	H	180	18
958.382	29.97	36.0	6.0	1000	120.0	175.0	V	246	24

Plot 2: 1 GHz – 12.75 GHz, antenna horizontal/vertical



13 Observations

No observations except those reported with the single test cases have been made.

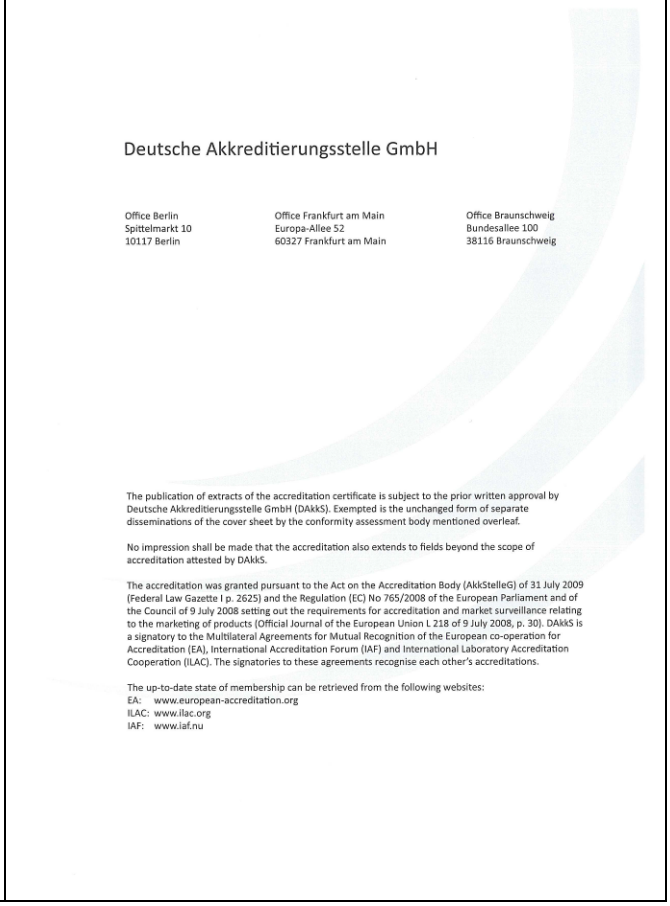
14 Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
GUE	GNSS User Equipment
ETSI	European Telecommunications Standards Institute
EN	European Standard
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
IC	Industry Canada
PMN	Product marketing name
HMN	Host marketing name
HVIN	Hardware version identification number
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware
SW	Software
Inv. No.	Inventory number
S/N or SN	Serial number
C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
PP	Positive peak
QP	Quasi peak
AVG	Average
OC	Operating channel
OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing
FHSS	Frequency hopping spread spectrum
GNSS	Global Navigation Satellite System
C/N_0	Carrier to noise-density ratio, expressed in dB-Hz

15 Document history

Version	Applied changes	Date of release
-/-	Initial release	2020-10-01

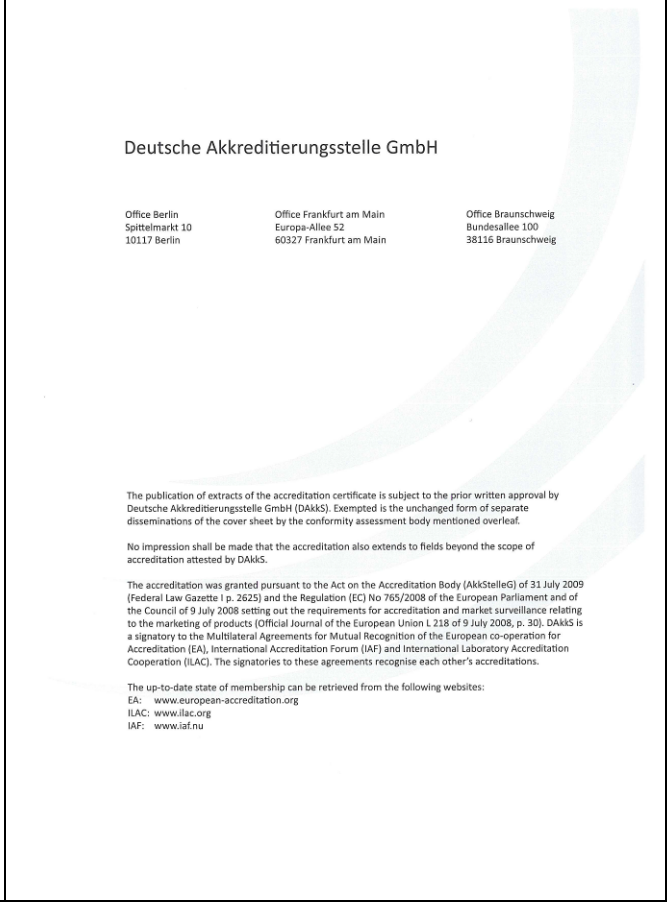
16 Accreditation Certificate – D-PL-12076-01-04

first page	last page
	

Note: The current certificate annex is published on the website (link see below) of the Accreditation Body DAkkS or may be received by CTC advanced GmbH on request

https://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf

17 Accreditation Certificate – D-PL-12076-01-05

first page	last page
	

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

CTC advanced GmbH
Untertürkheimer Straße 6-10, 66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

Telecommunication (FCC Requirements)

The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-12076-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 05 pages.

Registration number of the certificate: **D-PL-12076-01-05**

Frankfurt am Main, 09.06.2020

by order Dipl.-Ing. (FH) Ralf Egner
Head of Division

The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
https://www.dakks.de/en/content/accredited-bodies-dakks
See notes overleaf.

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https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf

################################ END OF TEST REPORT ################################