

CTC advanced
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Bundesnetzagentur

TEST REPORT

Test report no.: 1-7339/18-01-02-B



DAkkS
Deutsche
Akkreditierungsstelle
D-PL-12076-01-03

BNetzA-CAB-02/21-102

Testing laboratory

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Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-03

Applicant

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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 of the Code of Federal Regulations; chapter 95; subpart H – Wireless Medical Telemetry Services
RSS - 210 Issue 9	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
RSS - Gen Issue 5	Spectrum Management and Telecommunications Radio Standards Specification - General Requirements for Compliance of Radio Apparatus

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

Test Item

Kind of test item: Fetal Monitor
Model name: 866075; 866076; 866077
FCC ID: PQC-OBRTBV1
IC: 3549C-OBRTBV1
Frequency: 608 MHz to 614 MHz
Technology tested: Medical telemetry
Antenna: Integrated antenna
Power supply: 3.7 V DC by Li-Ion battery
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:

Marco Bertolino
Lab Manager
Radio Communications & EMC

Test performed:

Mihail Dorongovskij
Lab Manager
Radio Communications & EMC

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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This test report replaces the test report with the number 1-7339/18-01-02-A and dated 2019-01-24.

2.2 Application details

Date of receipt of order:	2018-11-23
Date of receipt of test item:	2019-01-08
Start of test:	2019-01-08
End of test:	2019-01-08
Person(s) present during the test:	Mr. Hansjörg Geywitz

2.3 Test laboratories sub-contracted

None

3 Test standard/s and references

Test standard	Date	Description
FCC - Title 47 CFR Part 95	-/-	FCC - Title 47 of the Code of Federal Regulations; chapter 95; subpart H – Wireless Medical Telemetry Services
RSS - 210 Issue 9	August 2016	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
RSS - Gen Issue 5	April 2018	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 C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

4 Test environment

Temperature	: T _{nom} T _{max} T _{min}	+24 °C during room temperature tests +55 °C during high temperature tests -20 °C during low temperature tests
Relative humidity content	:	40 %
Barometric pressure	:	1033 hpa
Power supply	: V _{nom} V _{max} V _{min}	3.70 V DC by Li-Ion battery 4.07 V 3.50 V

5 Test item

5.1 General description

Kind of test item	: Fetal Monitor
Type identification	: 866075; 866076; 866077
HMN	: -/
PMN	: 866075; 866076; 866077
HVIN	: 866075; 866076; 866077
FVIN	: C.xx.xx
S/N serial number	: DE44906463 DE45009702 DE45101386
Hardware status	: 1610
Software status	: -/
Firmware status	: C.00.16
Frequency band	: 608 MHz to 614 MHz
Type of radio transmission	: modulated carrier
Use of frequency spectrum	: modulated carrier
Type of modulation	: GFSK
Number of channels	: 36
Antenna	: Integrated antenna
Power supply	: 3.7 V DC by Li-Ion battery
Temperature range	: -20°C to +55°C

5.2 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: 1-7339/18-01-02_AnnexA
1-7339/18-01-02_AnnexB

6 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).

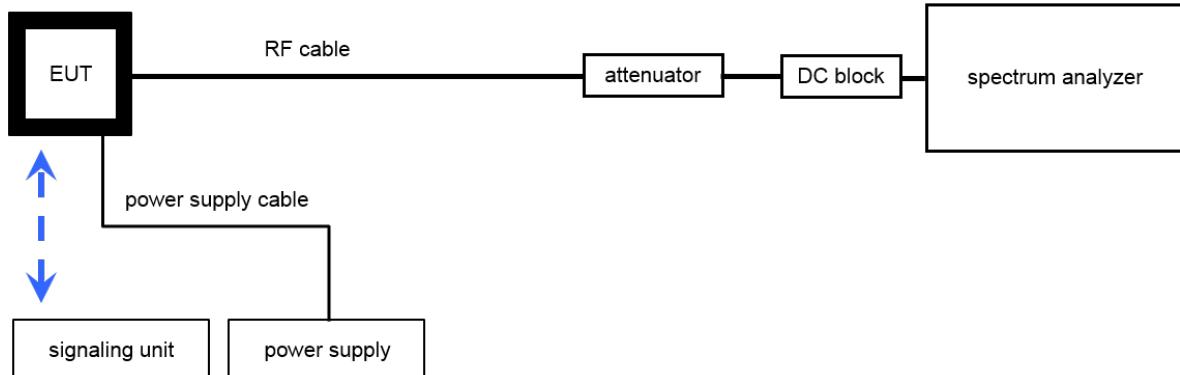
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

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

6.1 Conducted measurements

Conducted measurements normal conditions



OP = AV + CA
 (OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:

$$\text{OP [dBm]} = 6.0 \text{ [dBm]} + 11.7 \text{ [dB]} = 17.7 \text{ [dBm]} (58.88 \text{ mW})$$

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch / Control Unit (including DC-Block, Splitter)	3488A	HP	-/-	300000929	ne	-/-	-/-
2	A	Hygro-Thermometer	-/-, 5-45C, 20-100rF	Thies Clima	-/-	400000080	ev	11.05.2018	10.05.2020
3	A	Step Attenuator - 2.7GHz	RSP	Rohde & Schwarz	834500/010	300002681	EK	18.12.2018	17.12.2020
4	A	PC Laboratory 19"	Exone i3	Fröhlich + Walter	35230157A0370	300004646	ne	-/-	-/-
5	A	Spectrum Analyzer	FSV30	Rohde & Schwarz	103170	300004855	viKI!!	11.12.2018	10.12.2020
6	A	USB-GPIB-Interface	82357B	Agilent Technologies	MY54323070	300004852	ne	-/-	-/-
7	A	Power Supply DC	HMP2020	Rohde & Schwarz	102123	300005235	viKI!!	11.12.2018	10.12.2020
8	A	Tester Software C.BER	Version 5.0	CTC advanced GmbH	0001	400001379	ne	-/-	-/-

7 Measurement uncertainty

Measurement uncertainty	
Test case	Uncertainty
Occupied bandwidth	± used RBW

8 Summary of measurement results

<input checked="" type="checkbox"/>	No deviations from the technical specifications were ascertained
<input type="checkbox"/>	There were deviations from the technical specifications ascertained
<input checked="" type="checkbox"/>	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 95 H RSS 210 Issue 9 RSS Gen Issue 5	See table!	2019-06-05	Delta tests according customer demand!

Test specification clause	Test case	Guideline	Temperature conditions	Power source voltages	Mode	C	NC	NA	NP	Remark
RSS – Gen Issue 5 6.7 & FCC Part 95 H 2363 (b)	Occupied bandwidth	-/-	Nominal	Nominal	DSSS OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-

Notes:

C	Compliant	NC	Not compliant	NA	Not applicable	NP	Not performed
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9 Additional comments

Reference documents: Main report: 1-4691/12-01-07-D

Declaration HW revision

Philips Medizin Systeme Böblingen GmbH
Hewlett-Packard-Str. 2
71034 Böblingen
Germany

Declaration HW revision – Avalon CL Transducer mainboard 453564254611

To Whom It May Concern:
Product: Avalon CL Transducers
FCC ID: PQC-OBRTBV1

We hereby declare, that the RF related part of the HW revision **1610** is the same as of revision **1302**.

Sincerely

Hansjörg Geywitz
Hewlett-Packard-Str. 2
71034 Böblingen, Germany
Tel: 07031-4630
Email: hansjoerg.geywitz@philips.com

Special test descriptions: None

Configuration descriptions: None

10 Additional EUT parameter

Test mode:

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

Test mode available
Special software 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.*

11 Measurement results

11.1 Occupied bandwidth

Description:

Measurement of the 99% bandwidth and the 20 dBc bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector	Sample (IC) or Peak (FCC & IC)
Sweep time	Auto
Resolution bandwidth	1% to 5% of the actual occupied bandwidth
Video bandwidth	$\geq 3 \times$ RBW
Span	Depends on the signal – great enough to cover all sidebands
Measurement procedure	Measurement of the 20dBc bandwidth for FCC Measurement of the 99% bandwidth using the integration function of the analyzer for IC
Trace mode	Max hold
Test setup	See chapter 6.1 – A
Measurement uncertainty	See chapter 7

Usage:

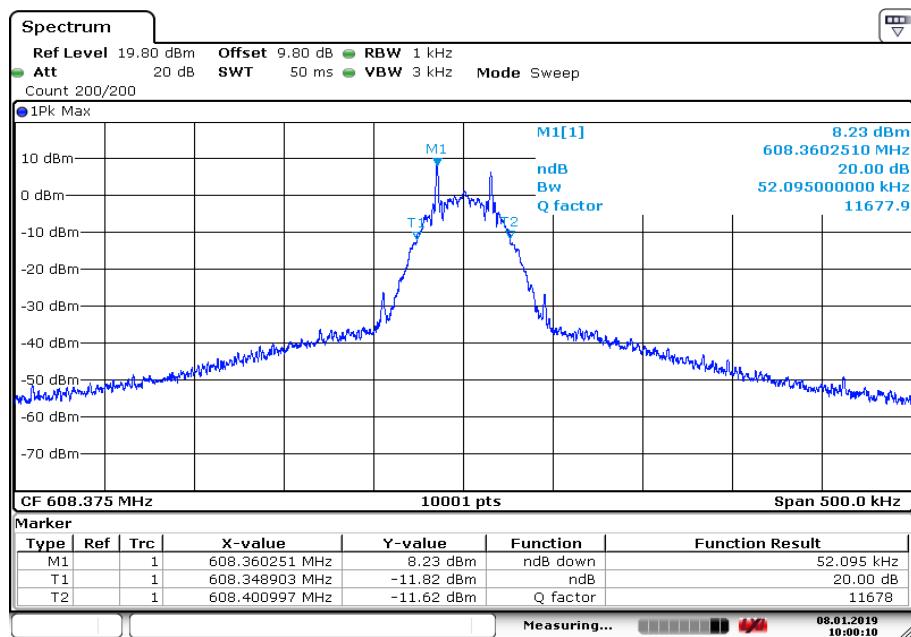
FCC Part 95 H – 95.2363 (b)	RSS – Gen Issue 5 6.7
6 MHz	When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

Result:

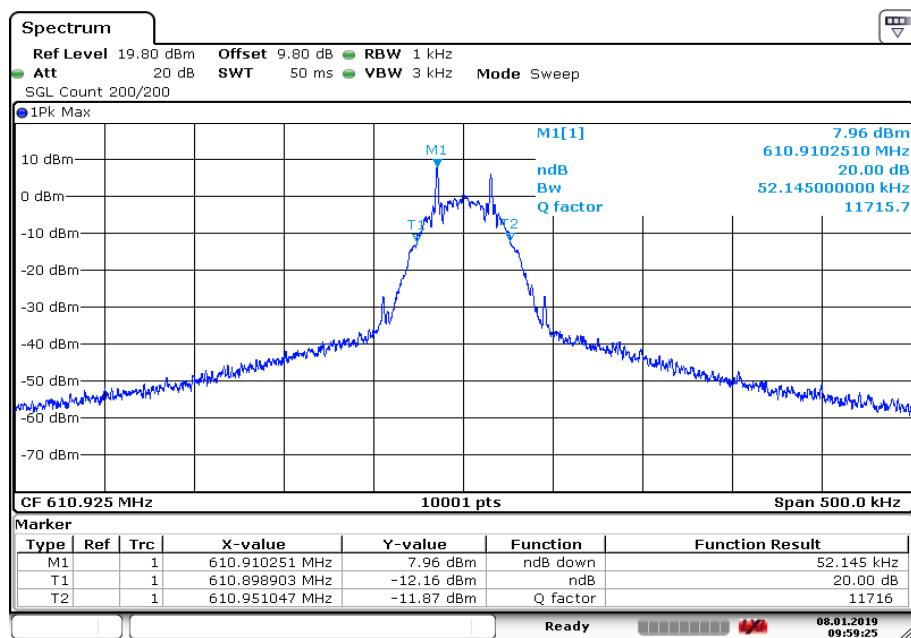
Frequency (MHz)	20 dBc bandwidth (kHz)	99% bandwidth (kHz)
608.375	52.1	54.8
610.925	52.1	55.5
613.625	52.2	55.5

Plots: 20 dBc bandwidth

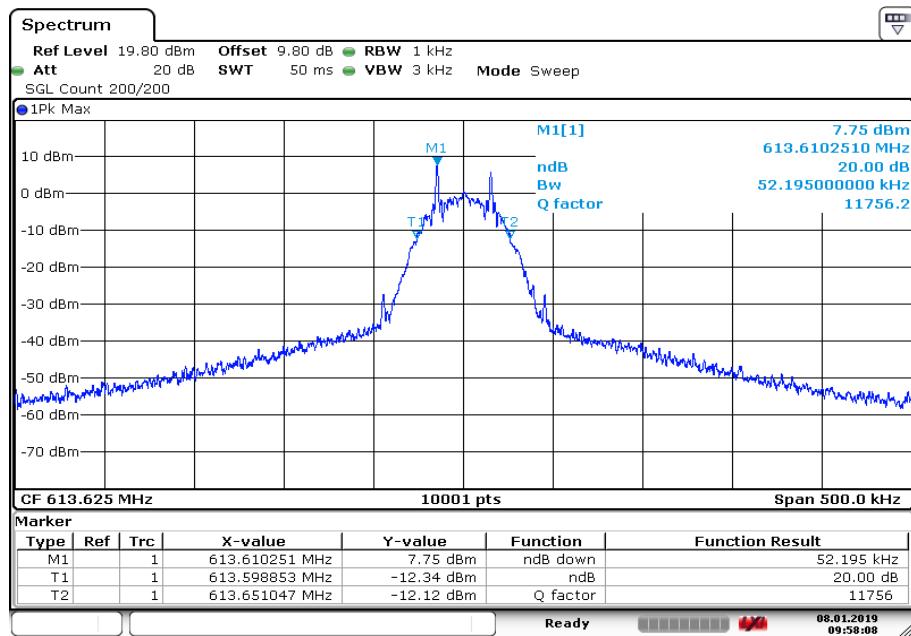
Plot 1: low channel



Plot 2: middle channel

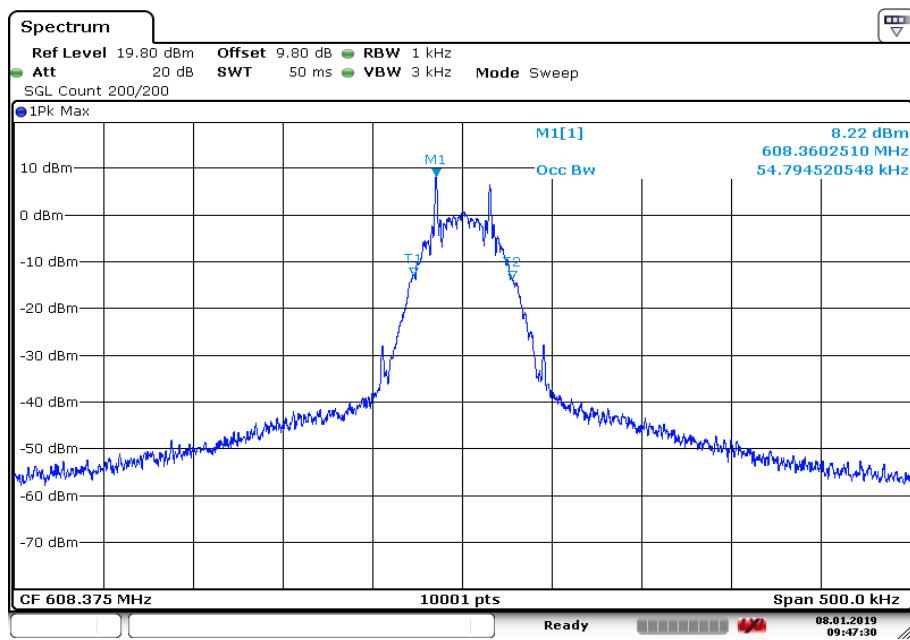


Plot 3: high channel

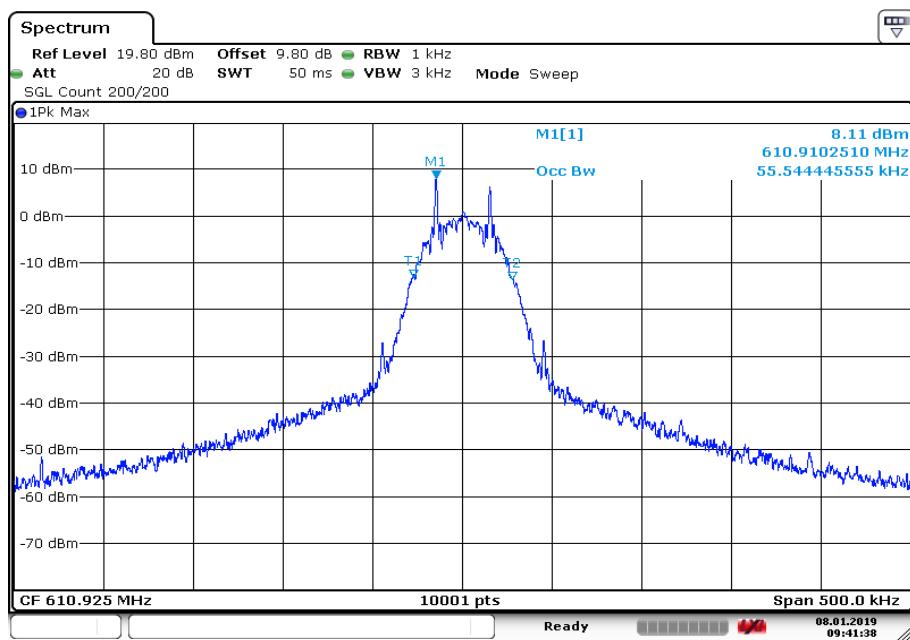


Plots: 99% bandwidth

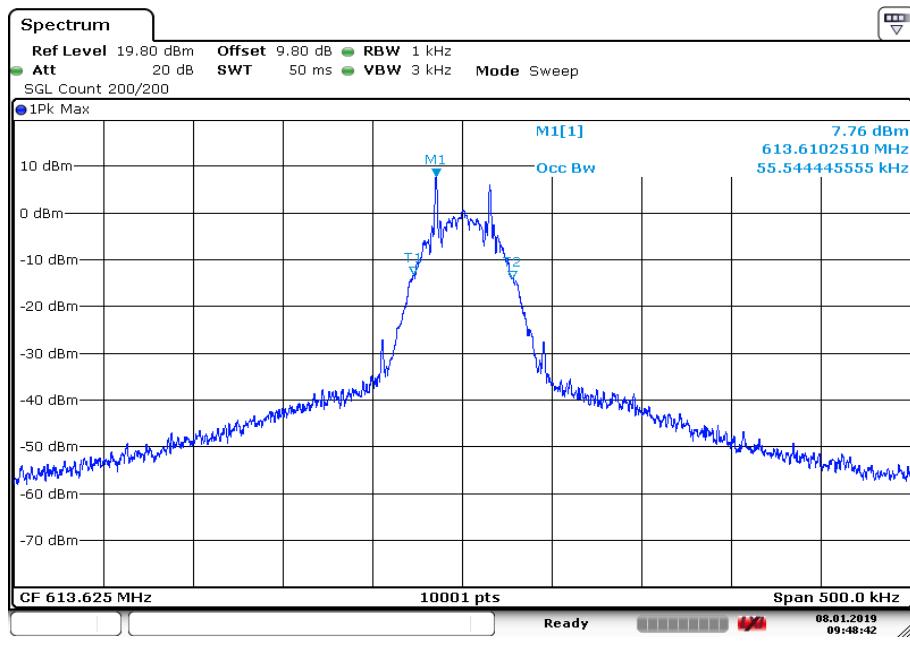
Plot 1: low channel



Plot 2: middle channel



Plot 3: high channel



12 Observations

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

Annex A 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/N₀	Carrier to noise-density ratio, expressed in dB-Hz

Annex B Document history

Version	Applied changes	Date of release
-/-	Initial release	2019-01-16
A	Editorial changes	2019-01-24
B	Editorial changes	2019-06-05

Annex C Accreditation Certificate

first page	last page
 <p>Deutsche Akkreditierungsstelle GmbH</p> <p>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</p> <p>Accreditation </p> <p>The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory CTC advanced GmbH Untertürkheimer Straße 6-10, 66117 Saarbrücken</p> <p>is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields: Telecommunication</p> <p>The accreditation certificate shall only apply in connection with the notice of accreditation of 02.06.2017 with the accreditation number D-PL-12076-01 and is valid until 21.04.2021. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 43 pages.</p> <p>Registration number of the certificate: D-PL-12076-01-03</p> <p>Frankfurt, 02.06.2017 Dipl.-Ing. (FH) Ralf Peter Head of Division</p> <p><i>[Signature]</i></p> <p>See notes overleaf.</p>	<p>Deutsche Akkreditierungsstelle GmbH</p> <p>Office Berlin Spittelmarkt 10 10117 Berlin</p> <p>Office Frankfurt am Main Europa-Allee 52 60327 Frankfurt am Main</p> <p>Office Braunschweig Bundesallee 100 38116 Braunschweig</p> <p>The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.</p> <p>No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.</p> <p>The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.</p> <p>The up-to-date state of membership can be retrieved from the following websites: EA: www.european-accreditation.org ILAC: www.ilac.org IAF: www.iaf.nu</p>

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-12076-01-03.pdf>

END OF TEST REPORT