PARTIAL Test Report
19-1-0130001T15a

Number of pages:	20	**Date of Report:**	2021-Jul-14
Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	**Applicant:**	Ortovox Sportartikel GmbH
Product: **Model:**	Avalanche Transceiver DIRACT VOICE		
FCC ID:	KF5DIR1	**IC:**	26906-DIR1
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter A Subpart C: §15.209, §15.247 (DTS) RSS-247, Issue 2 (DTS) RSS-Gen, Issue 5 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Tested Technology:	BT LE + SRD		
Test Results:	**☒ The EUT complies with the requirements in respect of selected parameters subject to the test.** The test results relate only to devices specified in this document		

Signatures:

Guangcheng Huang 2021.07.15 09:28:33 + 02'00'

Dipl.-Ing. Niels Jeß	Guangcheng Huang
Head of Compliance Testing	Test manager
Authorization of test report	Responsible of test report

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1 General information

1.1 Disclaimer and Notes

The test results of this test report relate exclusively to the test item specified in this test report as specified in chapter 2.7. CETECOM 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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Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveillance tests.

1.2 Disclaimer and Notes

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge and belief to Industry Canada standards. All of the above requirements are met in accordance with enumerated standards.

This test report checks the emissions generated by the device if operating on the intended typical way. The test case is simulated by switching-on all wireless modular transmitters (already approved) and checks the worst case channel of the Bluetooth® LE part and the short range device (SRD) at 457 kHz.

Regarding the emissions generated by the EUT, the limits requirements for Bluetooth LE and SRD are the same (FCC §15.209 / RSS-Gen).

1.3 Summary of Test Results

Test case	Reference Clause FCC ☒	Reference Clause ISED ☒	Page	Remark	Result
Duty-Cycle	§15.35(c)	RSS-Gen Issue 5, §8.2	-	1)	NP
Minimum Emission Bandwidth 6 dB	§15.247 5.2(a)	RSS-247, § 5.2(a) RSS-Gen Issue 5,: § 6.7	-	1)	NP
Occupied Channel Bandwidth 99%	2.1049(h)	RSS-Gen Issue 5, § 6.7	-	1)	NP
Peak output power (Sweep)	§15.247(b)(3)	RSS-247, § 5.4(d)	-	1)	NP
Transmitter Peak output power radiated	§15.247(b)(4)(c)(i)	RSS-247, § 5.4(d)	-	-	NP
Emissions in non-restricted frequency bands	§15.247(d)	RSS-247, § 5.5	-	1)	NP
Radiated Band-Edge emissions	§15.205(b) §15.247(d)	RSS-Gen: Issue 5 §8.9, §8.10 RSS-247, § 5.5	-	1)	NP
Power spectral density	§15.247(e)	RSS-247, § 5.2(b)	-	1)	NP
Radiated field strength emissions below 30 MHz	§15.205(a) §15.209(a)	RSS-Gen: Issue 5 §8.9 Table 6	11	-	PASSED
Radiated field strength emissions 30 MHz – 1 GHz	§15.209 §15.247(d)	RSS-Gen: Issue 5 §8.9 Table 5 RSS-247, § 5.5	15	-	PASSED
Radiated field strength emissions above 1 GHz	§15.209(a) §15.247(d)	RSS-Gen: Issue 5: §8.9 Table 5+7 RSS-247, § 5.5	15	-	PASSED
AC-Power Lines Conducted Emissions	§15.207	RSS-Gen Issue 5: § 8.8, Table 4	-	1)	NP

PASSED	The EUT complies with the essential requirements in the standard.
FAILED	The EUT does not comply with the essential requirements in the standard.
NP	The test was not performed by the CETECOM Laboratory.

Remark 1): Refer test report CETECOM_TR19-1-0130001T13a.

*The calculation of the measurement uncertainty shows compliance with the "maximum measurement uncertainties" of the tested standard and therefore for result evaluation the stated uncertainties will not be additionally added to the measured results.

1.4 Summary of Test Methods

Test case	Test method
AC-Power Lines Conducted Emissions	ANSI C63.4-2014 § 7, ANSI C63.10-2013 § 6.2
Conducted RF output power	ANSI C63.26:2015, §5.2, KDB 971168 D01 v03r01
Radiated RF output power	ANSI C63.26:2015, §5.2.7, KDB 971168 D01 v03r01
Occupied Channel Bandwidth 99%	ANSI C63.26:2015, §5.4.4, KDB 971168 D01 v03r01
26dB Emission bandwidth	ANSI C63.26:2015, §5.4.3, KDB 971168 D01 v03r01
Modulation characteristics	ANSI C63.26:2015, §5.3
Radiated Band Edge	ANSI C63.26:2015, §5.5, KDB 971168 D01 v03r01
Conducted RF Band Edge	ANSI C63.26:2015, §5.7, KDB 971168 D01 v03r01
Peak to Average ratio (PAPR)	ANSI C63.26:2015, §5.2.6
Result calculated with measured conducted RF-power value and stated/measured antenna gain for band of interest	

Radiated field strength emissions below 30 MHz	ANSI C63.4-2014 §5.3, §8.2.1, §8.3.1.1+§8.3.2.1
Spurious emissions at antenna terminals	ANSI C63.26:2015, §5.7, KDB 971168 D01 v03r01
Radiated spurious emissions	ANSI C63.26:2015, §5.5, KDB 971168 D01 v03r01, ANSI C63.26.1:2018

2 Administrative Data

2.1 Identification of the Testing Laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Responsible for testing laboratory:	Dipl.-Ing. Ninovic Perez
Accreditation scope:	DAkkS Webpage
Test location:	CETECOM GmbH; Im Teelbruch 116; 45219 Essen - Kettwig

2.2 General limits for environmental conditions

Temperature:	22±2 °C
Relative. humidity:	45±15% rH

2.3 Test Laboratories sub-contracted

Company name:	--

2.4 Organizational Items

Responsible test manager:	Guangcheng Huang
Receipt of EUT:	2021-Feb-10
Date(s) of test:	2021-Apr-29 – 2021-Jun-29
Version of template:	14.7

2.5 Applicant's details

Applicant's name:	Ortovox Sportartikel GmbH
Address:	Rotwandweg 5 82024, Taufkirchen Germany
Contact Person:	Tobias Schädel
Contact Person's Email:	tschaedel@ortovox.com

2.6 Manufacturer's details

Manufacturer's name:	x-log Elektronik GmbH
Address:	Balanstr. 55 81541 München Germany

2.7 EUT: Type, S/N etc. and short descriptions used in this test report

Short description*)	PMT Sample No.	Product	Model	Type	S/N	HW status	SW status
EUT 01	19-1-01300S08_C01	Avalanche Transceiver	DIRACT VOICE	-	DEV5	160-801B	1507d2f54e3cc4eadd3ec541707165efee368ba1
EUT 02	19-1-01300S32_C01	Avalanche Transceiver	DIRACT VOICE	-	-	160-801B	1507d2f54e3cc4eadd3ec541707165efee368ba1

*) EUT short description is used to simplify the identification of the EUT in this test report.

2.8 Auxiliary Equipment (AE): Type, S/N etc. and short descriptions

Short description*)	PMT Sample No.	Auxiliary Equipment	Type	S/N	HW status	SW status
AE 01	-	FTDI chip	UART USB	-	-	-
AE 02	-	Laptop Dell	Latitude 7480	G0CSMH2	-	-

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

2.9 Connected cables

Short description*)	PMT Sample No.	Cable type	Connectors	Length
CAB 01	--	USB	--	40 cm

*) CAB short description is used to simplify the identification of the connected cables in this test report.

2.10 Software

Short description*)	Software	SW Status
SW 01	nRFgo Studio	1.2.27.0

*) SW short description is used to simplify the identification of the used software in this test report.

2.11 EUT set-ups

set-up no.*)	Combination of EUT and AE	Description
Set. 1	EUT 01 + AE 01 + CAB 01	➢ Used for Radiated measurements.
Set. 2	EUT 02	➢ Used for Radiated measurements. EUT firmware is set accordingly that the AE is no more needed during the test.

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

2.12 EUT operation modes

EUT operating mode no.*)	Operating modes	Additional information
Op. 1	BT-LE + SRD	Both BT and SRD transmit continuously

*) EUT operating mode no. is used to simplify the test report.

3 Equipment under test (EUT)

3.1 General Data of Main EUT as Declared by Applicant

Product name	Avalanche Transceiver		
Kind of product	DIRACT VOICE		
Firmware	☐ for normal use	☒ Special version for test execution	
Power supply	☐ AC Mains	-	
	☐ DC Mains	-	
	☒ Battery	3.7 V DC Lithium Ion battery	
Operational conditions	T_{nom} = +21 °C	T_{min} = -20 °C	T_{max} = +45 °C
EUT sample type	**Pre-Production**		
Weight (kg)	0.2		
Size [LxWxH] (cm)	12x8x2		
Interfaces/Ports	USB-C, MicroUSB		
For further details refer Applicants Declaration & following technical documents			
For further details regarding radio parameters, please refer to Bluetooth Core Specification			

3.2 Detailed Technical data of Main EUT as Declared by Applicant

3.2.1 Technical information

Frequency Band	457 kHz transmitter 2.4 GHz ISM Band (2400 MHz - 2483.5 MHz)	
Number of Channels (USA/Canada -bands)	457 kHz: 1 channel 2.4 GHz: 40 channels (37 Hopping + 3 Advertising)	
Nominal Channel Bandwidth	457 kHz: 785 Hz (99% OBW) 2.4 GHz: 1 MHz	
Type of Modulation | Data Rate	☒ GFSK | 1 Mbit / s	☐ GFSK | 2 Mbit / s
	☐ GFSK | 500 kbit / s	☐ GFSK | 125 kbit / s
Other wireless options	–	
Max. Conducted Output Power	GFSK **-5.1** dBm	
EIRP Power (Calculated EIRP)	GFSK **-5.1** dBm + **5.3** dBi = **+0.2** dBm	
Antenna Type	Coil antenna & PCB antenna	
Antenna Gain	SRD: Not reported WLAN: +5.3 dBi	
FCC label attached	No	
Test firmware / software and storage location	EUT 1/2	

For further details refer Applicants Declaration & following technical documents

Description of Reference Document (supplied by applicant)	Version	Total Pages
bq24040	**March 2015**	**38**
Models	**-**	**2**

3.3 Worst case identification

Mode	Worst case identification
BT LE	2042 MHz (channel 37)
SRD	Nominal operating frequency 457 kHz

3.4 Modifications on Test sample

Additions/deviations or exclusions	--

4 Measurements

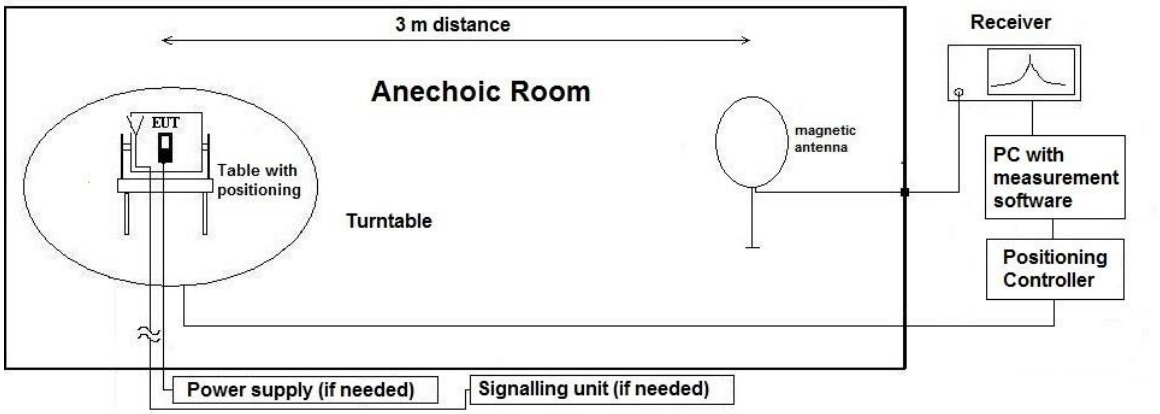
4.1 Radiated field strength emissions below 30 MHz

4.1.1 Description of the general test setup and methodology, see below example:

Evaluating the radiated field emissions are done first by an exploratory emission measurement and a final measurement for most critical frequencies determined.

The loop antenna was placed at 1 m height above ground plane and 3 m / 8 m measurement distances from set-up for investigations. Because of reduced measurement distance, correction data were applied, as stated in chapter "General Limit - Radiated field strength emissions below 30 MHz". The tests are performed in the semi anechoic room recognized by the regulatory commission.

Schematic:



Testing method:

The measurement is made according to relevant reference clauses:
(See Tables *Summary of Test Results* and *Summary of Test Methods* on page 5)

Exploratory, preliminary measurements
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 0.8 m height which is placed on the turntable. By rotating the turntable (step 90°, range 0°to 360°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT), the emission spectrum was recorded.

The loop antenna was moved at least to 2-perpendicular axes (antenna vector in direction of EUT and parallel to EUT) in order to maximize the emissions. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a data reduction table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies
Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position).

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$

$M = L_T - E_C$

AF = Antenna factor
C_L = Cable loss
D_F = Distance correction factor (if used)
E_C = Electrical field – corrected value
E_R = Receiver reading
G_A = Gain of pre-amplifier (if used)
L_T = Limit
M = Margin

All units are dB-units, positive margin means value is below limit.

Correction factors due to reduced meas. distance (f< 30 MHz):

The used correction factors when the measurement distance is reduced compared to regulatory measurement distance, are calculated according Extrapolation formulas valid for EUT's with maximum dimension of 0.625xLambda. Formula 2+3+4 as presented in ANSI C63.10, Chapter 6.4.4 are used for the calculations of proper extrapolation factors

Frequency -Range	f [kHz/MHz]	Lambda [m]	Far-Field Point [m]	Distance Limit accord. 15.209 [m]		1st Condition (dmeas< Dnear-field)	2'te Condition (Limit distance bigger dnear-field)	Distance Correction accord. Formula
kHz	9.00E+00	33333.33	5305.17	300		fullfilled	not fullfilled	-80.00
	1.00E+01	30000.00	4774.65			fullfilled	not fullfilled	-80.00
	2.00E+01	15000.00	2387.33			fullfilled	not fullfilled	-80.00
	3.00E+01	10000.00	1591.55			fullfilled	not fullfilled	-80.00
	4.00E+01	7500.00	1193.66			fullfilled	not fullfilled	-80.00
	5.00E+01	6000.00	954.93			fullfilled	not fullfilled	-80.00
	6.00E+01	5000.00	795.78			fullfilled	not fullfilled	-80.00
	7.00E+01	4285.71	682.09			fullfilled	not fullfilled	-80.00
	8.00E+01	3750.00	596.83			fullfilled	not fullfilled	-80.00
	9.00E+01	3333.33	530.52			fullfilled	not fullfilled	-80.00
	1.00E+02	3000.00	477.47			fullfilled	not fullfilled	-80.00
	1.25E+02	2400.00	381.97			fullfilled	not fullfilled	-80.00
	2.00E+02	1500.00	238.73			fullfilled	fullfilled	-78.02
	3.00E+02	1000.00	159.16			fullfilled	fullfilled	-74.49
	4.00E+02	750.00	119.37			fullfilled	fullfilled	-72.00
	4.90E+02	612.24	97.44			fullfilled	fullfilled	-70.23
	5.00E+02	600.00	95.49	30		fullfilled	not fullfilled	-40.00
	6.00E+02	500.00	79.58			fullfilled	not fullfilled	-40.00
	7.00E+02	428.57	68.21			fullfilled	not fullfilled	-40.00
	8.00E+02	375.00	59.68			fullfilled	not fullfilled	-40.00
	9.00E+02	333.33	53.05			fullfilled	not fullfilled	-40.00
MHz	1.00	300.00	47.75			fullfilled	not fullfilled	-40.00
	1.59	188.50	**30.00**			fullfilled	not fullfilled	-40.00
	2.00	150.00	23.87			fullfilled	fullfilled	-38.02
	3.00	100.00	15.92			fullfilled	fullfilled	-34.49
	4.00	75.00	11.94			fullfilled	fullfilled	-32.00
	5.00	60.00	9.55			fullfilled	fullfilled	-30.06
	6.00	50.00	7.96			fullfilled	fullfilled	-28.47
	7.00	42.86	6.82			fullfilled	fullfilled	-27.13
	8.00	37.50	5.97			fullfilled	fullfilled	-25.97
	9.00	33.33	5.31			fullfilled	fullfilled	-24.95
	10.00	30.00	4.77			fullfilled	fullfilled	-24.04
	10.60	28.30	4.50			fullfilled	fullfilled	-23.53
	11.00	27.27	4.34			fullfilled	fullfilled	-23.21
	12.00	25.00	3.98			fullfilled	fullfilled	-22.45
	13.56	22.12	3.52			fullfilled	fullfilled	-21.39
	15.00	20.00	3.18			fullfilled	fullfilled	-20.51
	15.92	18.85	**3.00**			fullfilled	fullfilled	-20.00
	17.00	17.65	2.81			not fullfilled	fullfilled	-20.00
	18.00	16.67	2.65			not fullfilled	fullfilled	-20.00
	20.00	15.00	2.39			not fullfilled	fullfilled	-20.00
	21.00	14.29	2.27			not fullfilled	fullfilled	-20.00
	23.00	13.04	2.08			not fullfilled	fullfilled	-20.00
	25.00	12.00	1.91			not fullfilled	fullfilled	-20.00
	27.00	11.11	1.77			not fullfilled	fullfilled	-20.00
	29.00	10.34	1.65			not fullfilled	fullfilled	-20.00
	30.00	10.00	1.59			not fullfilled	fullfilled	-20.00

4.1.2 Measurement Location

Test site	SAC1 and SAC5

4.1.3 Limit

Radiated emissions limits (3 meters)					
Frequency Range [MHz]	Limit [µV/m]	Limit [dBµV/m]	Distance [m]	Detector	RBW [kHz]
0.009 – 0.09	2400 / f [kHz]	67.6 – 20Log(f) (kHz)	300	Pk & Avg	0.2
0.09 – 0.11	2400 / f [kHz]	67.6 – 20Log(f) (kHz)	300	Quasi peak	0.2
0.11 – 0.15	2400 / f [kHz]	67.6 – 20Log(f) (kHz)	300	Pk & Avg	0.2
0.15 – 0.49	2400 / f [kHz]	67.6 – 20Log(f) (kHz)	300	Pk & Avg	9
0.49 – 1.705	24000 / f [kHz]	87.6 – 20Log(f) (kHz)	30	Quasi peak	9
1.705 - 30	30	29.5	30	Quasi peak	9

*Remark: In Canada same limits apply, just unit reference is different

4.1.4 Result

Diagram	Channel	Mode / setup	Maximum Level [dBµV/m] Frequency Range 0.009 – 30 MHz	Result
2.01a	1	Op. 1 / Set. 1	11.59 (QK)	PASSED
2.01b	1	Op. 1 / Set. 1	18.95 (PK) (noise level)	PASSED
2.02a	1	Op. 1 / Set. 1	-3.07 (QK)	PASSED
2.02b	1	Op. 1 / Set. 1	19.93 (PK) (noise level)	PASSED

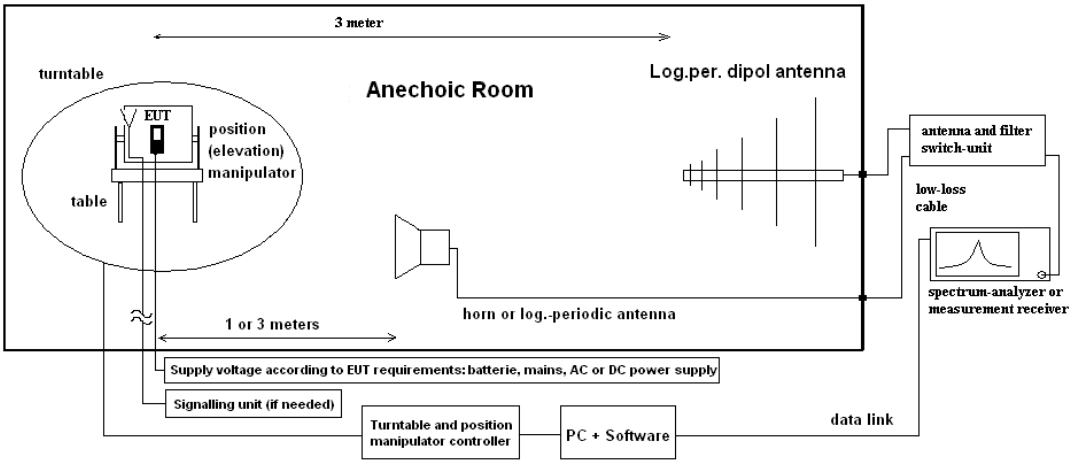
Remark: for more information and graphical plot see annex A1 **CETECOM_TR19-1-0130001T15a_A1**

4.2 Radiated spurious emissions

4.2.1 Description of the general test setup and methodology, see below example:

Evaluating the emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a CISPR 16-1-4:2010 compliant fully anechoic room (FAR) recognized by the regulatory commission. The measurement distance was set to 3 meter for frequencies up to 18 GHz and 2 meter above 18 GHz. A logarithmic periodic antenna is used for the frequency range 30 MHz to 1 GHz. Horn antennas are used for frequency range 1 GHz to 40 GHz. The EUT is aligned within 3 dB beam width of the measurement antenna with three orthogonal axis measurements on the EUT.

Schematic:



Testing method:

The measurement is made according to relevant reference clauses:
(See Tables *Summary of Test Results* and *Summary of Test Methods* on page 5)

Exploratory, preliminary measurements

The EUT and its associated accessories are placed on a non-conductive position manipulator (tipping device) of 1.50 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 45°) and the EUT itself on 3-orthogonal axis (the emission spectrum and it's characteristics was recorded with an EMI-receiver, broadband antenna and software.

The measurements are performed in horizontal and vertical polarization of the measurement antennas. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself over 3-orthogonal axis and the height for EUT with large dimensions.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.
The readings on the spectrum analyzer are corrected with conversion value between field strength and E(I)RP, so the readings shown are equivalent to ERP/EIRP values. Critical measurements near the limit are re-measured with a substitution method accord. ANSI/TIA/EIA 603 C/D

Formula:

$P_{EIRP} = P_{MEAS} + C_L + FSL - G_{PreA} – G_{ANT}$ (1)

P_{MEAS} = measured power at instrument
M = Margin
L_T = Limit

FSL = Free Space loss = Function(frequency, measurement distance)

$M = L_T - P_{EIRP}$

C_L= cable loss
G_{PreA} = Gain of pre-amplifier (if used)
G_{ANT} = Gain of antenna in [dBi]

All units are dB-units, positive margin means value is below limit.

4.2.2 Measurement Location

Test site	FAC1 and FAC2

4.2.3 Limit

Radiated emissions limits, (3 meters)				
Frequency Range [MHz]	**Limit [µV/m]**	**Limit [dBµV/m]**	**Detector**	**RBW / VBW [kHz]**
30 - 88	100	40.0	Quasi peak	100 / 300
88 - 216	150	43.5	Quasi peak	100 / 300
216 - 960	200	46.0	Quasi peak	100 / 300
960 - 1000	500	54.0	Quasi peak	100 / 300
Above 1000	500	54	Average	1000 / 3000
Above 1000	5000	74	Peak	1000 / 3000

4.2.4 Result

Diagram	Mode / setup	Maximum Level [dBµV/m] Frequency Range 30 – 1000 MHz	Result
3.07	Op. 1 / Set. 2 (EUT lying)	43.20 (QP)	PASSED
3.08	Op. 1 / Set. 2 (EUT standing)	42.98 (QP)	PASSED
8.03	Op. 1 / Set. 1	49.21 (PK)@4808MHz 43.92 (AV)@4808MHz	PASSED
9.01	Op. 1 / Set. 1	58.03 (PK) (noise level)	PASSED

Remark: for more information and graphical plot see annex A1 **CETECOM_TR19-1-0130001T15a_A1**

4.3 Results from external laboratory

None	-

4.4 Opinions and interpretations

None	-

4.5 List of abbreviations

None	-

5 Equipment lists

ID	Description	Manufacturer	SerNo	Cal due date
	120901 - SAC - Radiated Emission <1GHz			**2025-Jul-21**
20574	Biconilog Hybrid Antenna BTA-L	Frankonia GmbH	980026L	2022-May-03
20487	CETECOM Semi Anechoic Chamber < 1GHz	ETS-Lindgren Gmbh	-	2025-Jul-15
20620	EMI Test Receiver ESU26	Rohde & Schwarz Messgerätebau GmbH	100362	2023-May-12
20482	filter matrix Filter matrix SAR 1	CETECOM GmbH	-	Pre-m
25038	Loop Antenna HFH2-Z2	Rohde & Schwarz Messgerätebau GmbH	879824/13	2022-Apr-07
20885	Power Supply EA3632A	Agilent Technologies Deutschland GmbH	75305850	Pre-m
	120904 - FAC1 - Radiated Emissions			
20341	Digital Multimeter Fluke 112	Fluke Deutschland GmbH	81650455	2022-May-25
20489	EMI Test Receiver ESU40	Rohde & Schwarz Messgerätebau GmbH	1000-30	2023-May-12
20254	High Pass Filter 5HC 2600/12750-1.5KK (GSM1800/1900/DECT)	Trilithic	23042	-
20868	High Pass Filter AFH-07000	AtlanTecRF	16071300004	-
20291	High Pass Filter WHJ 2200-4EE (GSM 850/900)	Wainwright Instruments GmbH	14	-
20302	Horn Antenna BBHA9170 (Meas 1)	Schwarzbeck Mess-Elektronik OHG	155	2023-Apr-15
20549	Log. Per. Antenna HL025	Rohde & Schwarz Messgerätebau GmbH	1000060	2021-Jul-31
20720	Measurement Software EMC32 [FAC]	Rohde & Schwarz Messgerätebau GmbH	V10.xx	-
20611	Power Supply E3632A	Agilent Technologies Deutschland GmbH	KR 75305854	Pre-m
20690	Spectrum Analyzer FSU	Rohde & Schwarz Messgerätebau GmbH	100302/026	2023-May-22
20439	Ultrabroadband-Antenna HL562	Rohde & Schwarz Messgerätebau GmbH	100248	2023-Mar-10
	120907 - FAC2			

ID	Description	Manufacturer	SerNo	Cal due date
20730	FS-Z110	Rohde & Schwarz Messgerätebau GmbH	101468	2023-Jun-19
20729	FS-Z140	Rohde & Schwarz Messgerätebau GmbH	101004	2023-May-26
20731	FS-Z75	Rohde & Schwarz Messgerätebau GmbH	101022	2022-Jun-16
20811	Horn Antenna ASY-SGH-124-SMA	Antenna Systems Solutions S.L	29F14182337	2021-Oct-08
20732	Signal- and Spectrum Analyzer FSW67	Rohde & Schwarz Messgerätebau GmbH	104023	2022-May-27
20817	WR-22 Horn / SAR-2309-22-S2	SAGE Millimeter Inc.	13254-01	2023-Jul-29
	225911 - SAC5 - Radiated Emission <1GHz			**2026-Apr-05**
25360	Antennenmast BAM 4.5-P	maturo GmbH	BAM 4.5-P/091/17791115	-
25361	Controller NCD	maturo GmbH	NCD/202/17791115	-
25348	EMI Test Receiver ESR7	Rohde & Schwarz Messgerätebau GmbH	101600	2023-May-20
25352	Open Switch and control Platform OSP120	Rohde & Schwarz Messgerätebau GmbH	101542-rV	-
25358	Semi Anechoic Chamber SAC5	Albatross Projects GmbH	P27281-016	2026-Jun-30
25357	Ultrabroadband Antenna HL562E	Rohde & Schwarz Messgerätebau GmbH	100824	2023-Oct-09

5.1 Legend

Note / remarks		Calibrated during system calibration:
Interval of calibration	12 M	12 month
	24 M	24 month
	36 M	36 month
	24/12 M	Calibration every 24 months, between this every 12 months internal validation
	36/12 M	Calibration every 36 months, between this every 12 months internal validation
	Pre-m	Check before starting the measurement
	-	Without calibration

6 Measurement Uncertainty valid for conducted/radiated measurements

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved. For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it contribution to the overall uncertainty according its statistical distribution calculated.

RF-Measurement	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%						Remarks
Conducted emissions (U_{CISPR})	-	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dB 3.6 dB						-
Power Output radiated	-	30 MHz - 4 GHz	3.17 dB						Substitution method
Power Output conducted	-	Set-up No.	Cel-C1	Cel-C2	BT1	W1	W2	--	
		9 kHz - 12.75 GHz	N/A	0.60	0.7	0.25	N/A	--	-
		12.75 GHz - 26.5 GHz	N/A	0.82	--	N/A	N/A	--	
Conducted emissions on RF-port	-	9 kHz - 2.8 GHz	0.70	N/A	0.70	N/A	0.69	--	N/A - not applicable
		2.8 GHz - 12.75 GHz	1.48	N/A	1.51	N/A	1.43	--	
		12.75 GHz – 18 GHz	1.81	N/A	1.83	N/A	1.77	--	
		18 GHz - 26.5 GHz	1.83	N/A	1.85	N/A	1.79	--	
Occupied bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
			1.0 dB						Power
Emission bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
	-		See above: 0.70 dB						Power
Frequency stability	-	9 kHz - 20 GHz	0.0636 ppm						-
Radiated emissions Enclosure	-	150 kHz - 30 MHz	5.01dB						Magnetic field strength
		30 MHz - 1 GHz 1 GHz - 18 GHz 18-26.5 GHz	5.83 dB 4.91 dB 5.06 dB						Electrical Field strength

7 Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2021-Jul-14

End of Test Report