PARTIAL Test Report
18-1-0257110T02a

DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01 D-PL-12047-01-03 D-PL-12047-01-04

Number of pages:	22	**Date of Report:**	2021-Mar-11
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:**	Continental Advanced Antenna GmbH
Product: **Model:**	**RKE module** **RKE223E1**		
FCC ID:	Contains FCC-ID: 2ACC7RKE223E1	**IC:**	Contains IC: 11980A-RKE223E1
Testing has been carried out in accordance with:	**FCC Regulations:** Title 47 CFR, Chapter I, Subchapter A, Subpart C: §15.231 **ISED Regulations:** RSS-210, Issue 10, Annex A Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Tested Technology:	Remote control device (momentary operated)		
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:			 Digital signiert von: Christian Lorenz Name: CN = Christian Lorenz email = christian.lorenz@cetecom.com C = DE O = CETECOM GmbH OU = RC&EMC Datum: 2021.03.11 10:48:05 +01'00'

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Test manager
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.

1.1. Summary of Test Results

Test case	Reference in FCC ☒	Reference in ISED ☒	Page	Remark	Result
Radiated field strength emissions below 30 MHz	§15.205(a) §15.209(a)	RSS-Gen: Issue 5 §8.9 Table 6	10	--	Passed
Radiated field strength emissions 30 MHz – 1 GHz (inclusive fundamental field strength)	§15.231(b) §15.33 §15.35	RSS-210, Issue 10, §A.1, Table A.1	14	--	Passed
Radiated field strength emissions above 1 GHz	§15.231(b)§ 15.33 §15.35	RSS-210, Issue 10, §A.1, Table A.1	17	--	Passed
Transmitter timing: 1. Deactivation of transmissions 2. Periodic transmissions	§15.231 (a)(1)(2)(3)	RSS-210, Issue 10, §A1.1(a)(b)(c)	--	Not tested See initial modules report	Remark 1
20dBc bandwidth	§15.231(c)	RSS-210, Issue 10, §A1.3 RSS-Gen, Issue 5, Chapter 6.7	--	Not tested See initial modules report	Remark 1
99% bandwidth	§2.1049	RSS-Gen, Issue 5, Chapter 6.7	--	Not tested See initial modules report	Remark 1

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.

*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.

Remark1: Details can be found in initial test report for the module: CETECOM_TR18_1_0257101T93a_C2.

1.2. Summary of Test Methods

Test case	Test method
Radiated field strength emissions below 30 MHz	ANSI C63.10-2013 §6.3, §6.4
Radiated field strength emissions 30 MHz – 1 GHz	ANSI C63.10-2013 chapter 6.5
Radiated field strength emissions above 1 GHz	ANSI C63.10-2013 chapter 6.6
20dBc bandwidth, 99% bandwidth	ANSI C63.10-2013, chapter 6.9

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:	Ninovic Perez
Accreditation scope:	DAkkS Webpage
Test location:	CETECOM GmbH; Mündelheimer Weg 35; 40472 Düsseldorf

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

Order No.:	
Responsible test manager:	Christian Lorenz
Receipt of EUT:	2021-Feb-22
Date(s) of test:	2021-Feb-22 – 2021-Feb-23
Version of template:	14.5

2.5 Applicant's details

Applicant's name:	Continental Advanced Antenna GmbH
Address:	Römerring 1 31137 Hildesheim Germany
Contact Person:	Mr. Thomas Schuhbeck
Contact Person's Email:	Thomas.schuhbeck@continental.com

2.6 Manufacturer's details

Manufacturer's name:	Continental Advanced Antenna GmbH
Address:	Römerring 1 31137 Hildesheim Deutschland

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	18-1-02571S129_C01	RKE Module	RKE223E1	50020030	000170	13612160B08 V00	11.31
EUT 02	--	RKE Module	RKE223E1	50020025	000131	13612160B08 V00	11.31

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

Remark: EUT02 not tested regarding spurious emission, EUT01 determined as worst-case configuration regarding value of field strength during pre-tests session. Details can be found in test report for pre-tests CETECOM_TR18-1-0257110T01a

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	18-1-02571S131_C01	Testbox USA/Canada	29hex USA/ISED	180401C01	--	RKE223_V7.0
AE 02	18-1-02571S130_C01	Automobile with rear IR-glas windshield	S class	WDD2231631A000694	--	--
AE 03	--	Shielded box	--	#CTC1	--	--
AE 04	18-1-02571S130_C01	Automobile with rear green colored glas windshield	S class	WDD2231631A000694	--	--

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

Remark: between AE02 and AE04, AE02 was determined as worst-case regarding value of field strength during pre-tests session and therefore spurious measurement on this version of rear windshield only as worst-case configuration.

2.9 Connected cables

Short description*)	PMT Sample No.	Cable type	Connectors	Length
CAB 01	18-1-02571S132_C01	Cable Control line/power line	D-SUB9	1.5m
CAB 02	--	Cable D-SUB9	D-SUB9	1.0m

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

2.10 Software

Short description*)	PMT Sample No.	Software	Type	S/N	HW status	SW status
	--	--	--	--	--	--

*) 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
1	EUT 1 + AE 01 + AE 02 + AE03 + CAB 01 + CAB02	Used for radiated measurements. Set of channels on AE01
--	--	--

*) 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
1	TX-Mode	Continuous modulated carrier with help of AE1. Channel 2 (high) and RF-chain 2 (set on AE1) as most critical one regarding field strength radiated. Application Mode sample
--	--	--

*) 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	RKE223E1		
Kind of product	RKE Module		
Firmware	☐ for normal use	☒ Special version for test execution	
Power supply	☐ AC Mains	-	
	☒ DC Mains	**12** V DC	
	☐ Battery	Wählen Sie ein Element aus.	
Operational conditions	T_{nom} =21 °C	T_{min} =-- °C	T_{max} =-- °C
EUT sample type	**Pre-Production**		
Weight	--		
Size [LxWxH]	--		
Interfaces/Ports	See applicant's documents		
For further details refer Applicants Declaration & following technical documents: --			

3.2 Modifications on Test sample

Additions/deviations or exclusions	--

4 Measurements

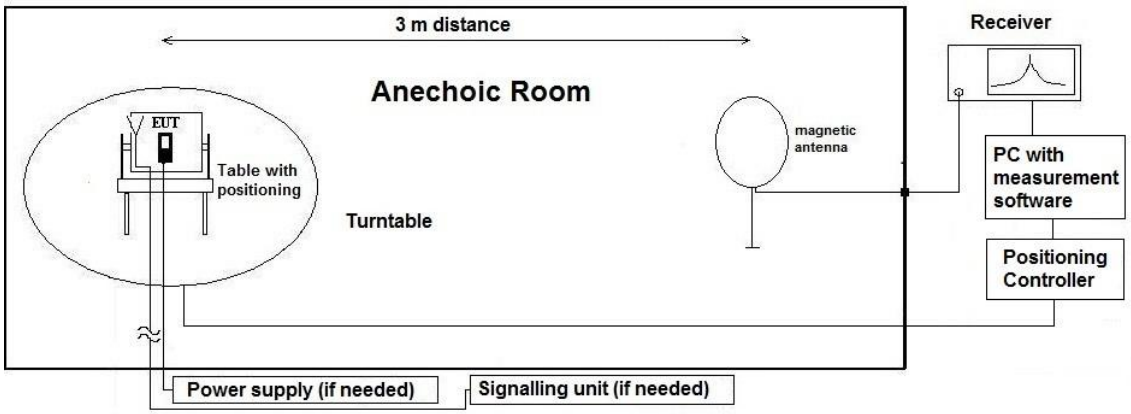
4.1 Radiated field strength emissions below 30 MHz

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 measurement distance 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 its 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 maintaining 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.

4.1.2 Measurement Location

Test site	225911 - SAC5 - Radiated Emission <1GHz

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+03	33333.33	5305.17	300		fullfilled	not fullfilled	-80.00
	1.00E+04	30000.00	4774.65			fullfilled	not fullfilled	-80.00
	2.00E+04	15000.00	2387.33			fullfilled	not fullfilled	-80.00
	3.00E+04	10000.00	1591.55			fullfilled	not fullfilled	-80.00
	4.00E+04	7500.00	1193.66			fullfilled	not fullfilled	-80.00
	5.00E+04	6000.00	954.93			fullfilled	not fullfilled	-80.00
	6.00E+04	5000.00	795.78			fullfilled	not fullfilled	-80.00
	7.00E+04	4285.71	682.09			fullfilled	not fullfilled	-80.00
	8.00E+04	3750.00	596.83			fullfilled	not fullfilled	-80.00
	9.00E+04	3333.33	530.52			fullfilled	not fullfilled	-80.00
	1.00E+05	3000.00	477.47			fullfilled	not fullfilled	-80.00
	1.25E+05	2400.00	381.97			fullfilled	not fullfilled	-80.00
	2.00E+05	1500.00	238.73			fullfilled	fullfilled	-78.02
	3.00E+05	1000.00	159.16			fullfilled	fullfilled	-74.49
	4.00E+05	750.00	119.37			fullfilled	fullfilled	-72.00
	4.90E+05	612.24	97.44			fullfilled	fullfilled	-70.23
	5.00E+05	600.00	95.49	30		fullfilled	not fullfilled	-40.00
	6.00E+05	500.00	79.58			fullfilled	not fullfilled	-40.00
	7.00E+05	428.57	68.21			fullfilled	not fullfilled	-40.00
	8.00E+05	375.00	59.68			fullfilled	not fullfilled	-40.00
	9.00E+05	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

4.1.3 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/Set-up	Maximum Level [dBµV/m] Frequency Range 0.009 – 30 MHz	Result
2.01	2 - high	2/2	10.56	Passed
2.02	2 – high	2/2	10.09	Passed

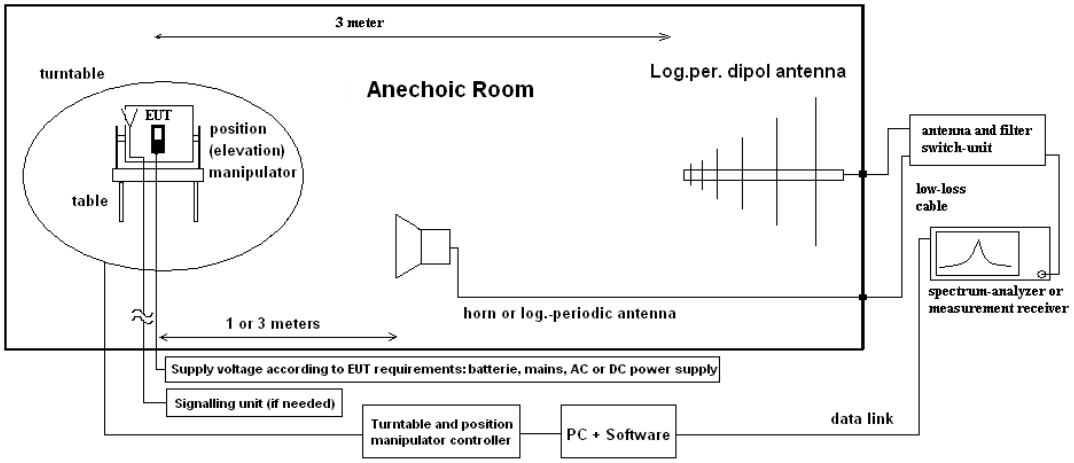
Remark: for more information and graphical plot see annex A1 **CETECOM_TR18-1-0257110T02a_A1**

4.2 Radiated field strength emissions 30 MHz – 1 GHz

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

Evaluating the field 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 NSA-compliant semi anechoic room (SAR) recognized by the regulatory commissions.

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 0.8 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 90°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and its characteristics was recorded with an EMI-receiver, broadband antenna and software.

Measurement antenna: horizontal and vertical, heights: 1,0 m and 1,82 m as worst-case determined by an exploratory emission measurements. 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. either on 10m OATS or 3m semi-anechoic room.
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). The measurement antenna height between 1 m and 4 m.

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

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

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.

4.2.2 Measurement Location

Test site	225911 - SAC5 - Radiated Emission <1GHz

4.2.3 Fundamental limits: FCC §15.231(b), RSS-210, Issue 10, Chapter A1.2

Frequency Range [MHz]	3 meters reference measurement		Spurious settings	
	Limit [µV/m]	Limit [dBµV/m]	Detector	RBW / VBW [kHz]
40.66-40.70 (Only USA)	2250	67.04	QP-Peak or AV	--/--
70-130	1250	61.93		--/--
130-174	1250 to 3750	61.93 to 71.48		--/--
174-260	3750	71.48		--/--
260-470	3750 to 12500	71.48 to 81.93		1000 / 3000
Above 470	12500	81.93		--/--
Above 1000	12500	81.93		--/--

4.2.4 Spurious emission limits: FCC §15.231(b), RSS-210, Issue 10, Chapter A1.2

Frequency Range [MHz]	3 meters reference measurement		Spurious settings	
	Limit [µV/m]	Limit [dBµV/m]	Detector	RBW / VBW [kHz]
40.66-40.70 (only USA)	225	47.04	QP-Peak or AV	100 / 300
70-130	125	41.93		100 / 300
130-174	125 to 375	41.93 to 51.48		100 / 300
174-260	375	51.48		100 / 300
260-470	375 to 1250	51.48 to 61.93		100 / 300
Above 470	1250	61.93		100 / 300
Above 1000	1250	61.93		1000/ 3000

4.2.5 Results for field strength of carrier

Diagram	Channel	Channel frequency	Op. Mode / Set-up no.	Maximum Level [dBµV/m]@3m	Limit: [dBµV/m]@3m	Result
--	1 - low	433.47 MHz	2/2	76.43 AV	80.81 AV	Passed
--	3 - middle	433.92 MHz	2/2	76.65 AV	80.82 AV	Passed
--	2 - high	434.37 MHz	2/2	76.8 AV	80.84 AV	Passed

Remarks:

1.) power level setting: 0x29, set on AE1
2.) RF-Path 2 used due higher power levels then RF Path 1 (pre-tested)
3.) Average value includes duty-cycle correction factor of -17.35dB due timing of transmitter (modules certification)
4.) EUT1 version HAF higher levels then EUT2 version non-HAF (pre-tested)
5.) IR-Glas version tested due higher levels then green glas (pre-tested)

4.2.6 Results for spurious emissions

Tests have been performed on RF-chain 2, channel 2 (max-power determined), sample EUT1 version HAF and IR-glas du worst-case pre-tests.

Diagram	Channel	Mode/Set-up	Maximum Level [dBµV/m] Frequency Range 30 – 1000 MHz	Result
3.01	2 - high	2/2	28.80 (PK)	Passed
3.02	2 - high	2/2	28.45 (PK)	Passed

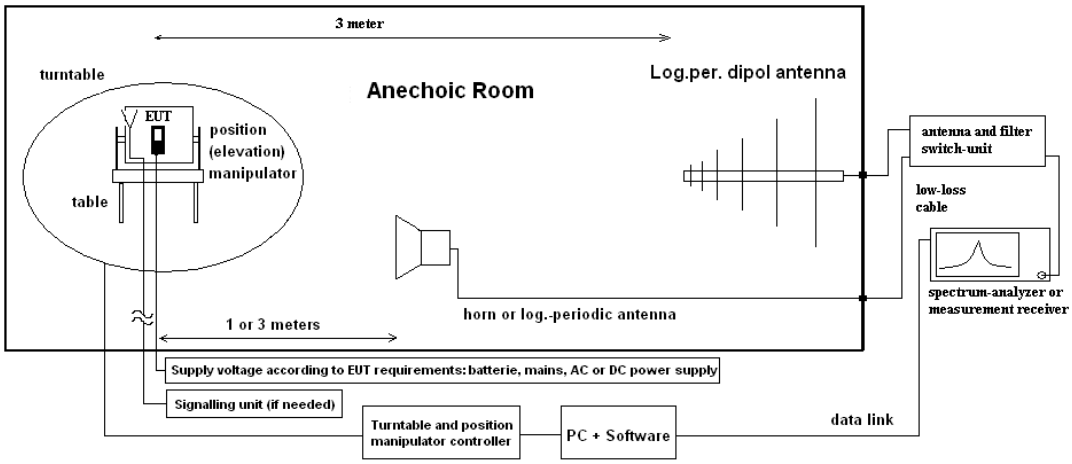
Remark: for more information and graphical plot see annex A1 **CETECOM_TR18-1-0257110T02a_A1**

4.3 Radiated field strength emissions above 1 GHz

4.3.1 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 18-1-4:2010 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 1.55 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 15°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and its 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 or three axis scan for portable/small equipment.

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

Formula:

$E_C = E_R + A_F + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

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

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

4.3.2 Measurement Location

Test site	225912 - SAC5 - Radiated Emission >1GHz

4.3.3 Spurious emission limits: FCC §15.231(b), RSS-210, Issue 10, Chapter A1.2

Frequency Range [MHz]	3 meters reference measurement		Spurious settings	
	Limit [µV/m]	Limit [dBµV/m]	Detector	RBW / VBW [kHz]
Above 1000	1250	61.93	PK / AV	1000/ 3000

4.3.4 Result

Diagram	Channel	Mode/Set-up	Maximum Level [dBµV/m] Frequency Range 1 – 5GHz	Result
4.01	2 - high	2/2	59.50 PK / 50.0 (AV)	Passed

Remark: for more information and graphical plot see annex A1 **CETECOM_TR18-1-0257110T02a_A1**

4.4 Results from external laboratory

None	-

4.5 Opinions and interpretations

None	-

4.6 List of abbreviations

None	-

5 Equipment lists

ID	Description	Manufacturer	SerNo	Cal due date
	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	2021-May-21
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
25038	Loop Antenna HFH2-Z2	Rohde & Schwarz Messgerätebau GmbH	879824/13	2022-April-01
	225912 - SAC5 - Radiated Emission >1GHz			**2026-May-04**
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	21.05.2021
25352	Open Switch and control Platform OSP120	Rohde & Schwarz Messgerätebau GmbH	101542-rV	--
25358	Semi Anechoic Chamber SAC5	Albatross Projects GmbH	P27281-016	30.06.2026

	225914 - SAC5 - Radiated Spurious Emission			2026-May-04
25374	Antennenmast CAM 4.0-P	maturo GmbH	CAM 4.0-P/239/2149.01	--
25310	Double-Ridged Horn Antenna HF 907	Rohde & Schwarz Messgerätebau GmbH	100334	2021-Jul-02
25377	Low Noise Amplifier 10MHz - 12Ghz	B&Z Technologies	16095	--
25378	Low Noise Amplifier 1Ghz - 18GHz	B&Z Technologies	16695-16511	--
25372	Open Switch and control Platform OSP120	Rohde & Schwarz Messgerätebau GmbH	101833	--
25348	EMI Test Receiver ESR7	Rohde & Schwarz Messgerätebau GmbH	101600	2021-May-21

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-Mar-11
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End Of Test Report