PARTIAL
Test Report 19-1-0137401T01a-C01a

Number of pages:	20	**Date of Report:**	2021-May-03
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:**	Bosch Healthcare Solutions GmbH
Test Object / Tested Device(s):	**Vivatmo pro (Handheld),** **System for quantitative measurement of fractional nitric oxide (FeNO) in human breath**		
Listing FCC ID:	2AVQ9VMPHH1	**ISED:**	25928-VMPHH1

Testing has been carried out in accordance with:

Title 47 CFR, Chapter I
FCC Regulations, Subchapter A
§15.247 (DTS)

ISED-Regulations
RSS-Gen, Issue 5
RSS-210 Issue 10

Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".

Tested Technology: BLE

Test Results:

☒ The EUT complies with the requirements in respect of all parameters subject to the test.
The test results relate only to devices specified in this document

The current version of Test Report CETECOM_TR19_1_0137401T01a-C01 replaces the test report CETECOM_ TR19_1_0137401T01a dated 2020-Apr-02. The replaced test report is herewith invalid.

Signatures:

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Dipl.-Ing. Ninovic Perez	B.Sc. M. Ahmed
Authorization of test report	Test manager

Table of Contents

Table of Annex			
Annex No.	**Contents**	**Reference Description**	**Total Pages**
Annex 1	Test result diagrams	**CETECOM_TR19_1_0137401T01a_A1**	14
Annex 2	External photographs of EUT	**CETECOM_TR19_1_0137401T01a_A2**	5
Annex 3	Test set-up photographs	**CETECOM_TR19_1_0137401T01a_A3**	5
The listed attachments are separate documents. For internal photographs of EUT, see applicant's documentation.			

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

The EUT integrates a BTLE transmitter. Other implemented wireless technologies were not considered within this test report.

Test case	Reference Clause FCC ☒	Reference Clause ISED ☒	Page	Remark	Result
Duty-Cycle	§15.35(c)	RSS-Gen Issue 5, §8.2	--	--	NP
Minimum Emission Bandwidth 6 dB	§15.247 5.2(a)	--	--	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)	--	--	1	NP
Transmitter Peak output power radiated	§15.247(b)(4)(c)(i)	--	--	1	NP
Emissions in non-restricted frequency bands	§15.247(d)	--	--	1	NP
Radiated Band-Edge emissions	§15.205(b) §15.247(d)	RSS-Gen: Issue 5 §8.9, §8.10	16	--	PASSED
Power spectral density	§15.247(e)	--	--	1	NP
Radiated field strength emissions below 30MHz	§15.205(a) §15.209(a)	RSS-Gen: Issue 5 §8.9 Table 6 RSS-210 Issue 10 B.10(a)	10	--	PASSED
Radiated field strength emissions 30MHz – 1GHz	§15.209 §15.247(d)	RSS-Gen: Issue 5 §8.9 Table 5 RSS-210 Issue 10 B.10(a)	12	--	PASSED
Radiated field strength emissions above 1GHz	§15.209(a) §15.247(d)	RSS-Gen: Issue 5: §8.9 Table 5+7 RSS-210 Issue 10 B.10(a)(b)	14	--	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) please refer to modules Test Report 10300014H-A-R1 issued on June 4, 2014 (FCCID VPYLBZY IC: 772C-LBZY)

1.2. Summary of Test Methods

Test case	Test method
Duty-Cycle	ANSI 63.10:2013, §11.6(b)
Minimum Emission Bandwidth 6 dB	ANSI C63.10:2013, §6.9.2, §11.8
Occupied Channel Bandwidth 99%	ANSI C63.10:2013, §6.9.3
Peak output power (Sweep)	ANSI C63.10:2013, §11.9
Power spectral density	ANSI C63.10:2013, §11.10
Emissions in non-restricted frequency bands	ANSI C63.10:2013, §11.11, §6.10.5
Radiated Band-Edge emissions	ANSI C63.10-2013; "Marker-Delta method", §6.10.5, §11.13
Transmitter Peak output power radiated	Result calculated with measured conducted RF-power value and stated/measured antenna gain for band of interest
Radiated field strength emissions below 30MHz	ANSI C63.10-2013 §6.3, §6.4
Radiated field strength emissions 30MHz- 1GHz	ANSI C63.4-2014 §8.2.3, ANSI C63.10-2013 §6.3, § 6.5
Radiated field strength emissions above 1GHz	ANSI C63.4-2014 §8.3, ANSI C63.10-2013 §6.3, § 6.6
AC-Power Lines Conducted Emissions	ANSI C63.4-2014 §7, ANSI C63.10-2013 § 6.2

And reference also to Test methods in KDB558074

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

Order No.:	1
Responsible for test report	B.Sc. M. Ahmed
Project leader:	M.Sc. P. Marzotko
Receipt of EUT:	2019-Nov-06
Date(s) of test:	2019-Nov-21 – 2019-Nov-29
Date of report:	2021-Mai-03
Version of template:	13.02

2.5 Applicant's details

Applicant's name:	Bosch Healthcare Solutions GmbH
Address:	Stuttgarter Straße 130 71332 Waiblingen Germany
Contact Person:	Mr. Markus Thürsam

2.6 Manufacturer's details

Manufacturer's name:	see Applicant's details
Address:	see Applicant's details

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

Short description*)	PMT Sample No.	EUT	Type	S/N	HW status	SW status
EUT A	19-1-01374S10	Vivatmo pro (Handheld)	System for quantitative measurement of fractional nitric oxide (FeNO) in human breath	BLE-DUT20	F09G100078	Prod_Test.hex Version 3.0.10.1

*) 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

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE1	USB - UART cable	Cable	-	-	-
AE2	DELL Laptop	Latitude E6420	VVF52 A01	Intel Core i5	Windows 7

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

2.9 Connected cables

Cable short description *)	Cable type	Connectors	Length
CAB 1	--	--	--

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

2.10 EUT set-ups

set-up no.*)	Combination of EUT and AE	Description
1	EUT A + AE1 + AE2	Used for radiated measurements. AE1 and AE2 only used for configuration and were removed during measurement.

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

2.11 EUT operation modes

EUT operating mode no.*)	Operating modes	Additional information
op. 1	Continuous TX-Mode	The EUT was put to continuous transmissions mode with help of command line tool “prodtest”.

*) 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	Vivatmo pro (Handheld)		
Kind of product	System for quantitative measurement of fractional nitric oxide (FeNO) in human breath		
Firmware	☐ for normal use	☒ Special version for test execution	
	☐ AC Mains	-	
	☐ DC Mains	-	
	☒ Battery	Lithium Ion battery 3.7 V	
Operational conditions	T_{nom} =20 °C	T_{min} =15 °C	T_{max} =27 °C
EUT sample type	**Pre-Production**		
Weight	180 g		
Size	237 x 54 x 44.5 mm		
Interfaces/Ports	**--**		
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

Frequency Band	2.4 GHz ISM Band (2400 MHz - 2483.5 MHz)	
Number of Channels (USA/Canada -bands)	40 (37 Hopping + 3 Advertising)	
Nominal Channel Bandwidth	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	☐ a/n/ac mode ☐ b/g/n mode ☐ Bluetooth EDR (not tested within this report) ☐ Cellular transceiver (2G/3G/4G/5G/GPS, not tested in this report)	
Max. Conducted Output Power (Measured RMS Power)	+0.10 dBm *1)	
EIRP Power (Calculated EIRP)	0.10 dBm – 0.6 dBi = -0.5 dBm see remark 1	
Antenna Type(s)	Monopole Antenna see remark 2	
Antenna Gain(s)	-0.6 dBi *2)	
FCC label attached	No	
Test firmware / software and storage location	See chapter 3.4	
For further details refer Applicants Declaration & following technical documents		
Description of Reference Document (supplied by applicant)	**Version**	**Total Pages**
UM-B-008 DA14580_581_583	**Version 1.7**	**19**

Remark: *1) Based on results of test report "Test Report_Murata_FCC ID VPYLBZY_10300014H-A-R1" dated June 4, 2014
*2) please see FCC Report 10300014H-A-R1

3.3 Modifications on Test sample

Additions/deviations or exclusions	

3.4 Test Software

SW name	Version	Date	Storage
DA1458x Prodtest	SDK3.0.10.1	-	Saved on AE2

4 Measurements

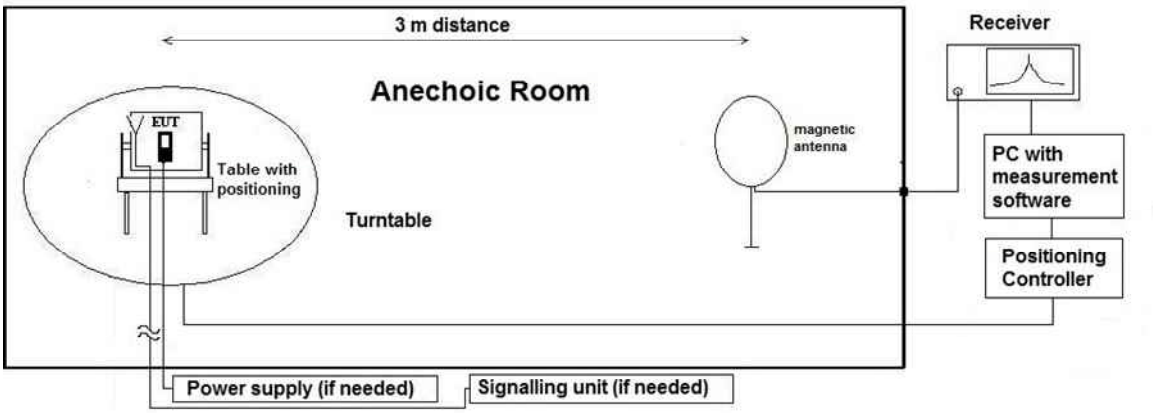
4.1 Radiated field strength emissions below 30MHz

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.

Distance correction:

Reference for applied correction (extrapolating) factors due to reduced measurement distance:
ANSI C63.10:2013, §6.4.4.2 - Equations (2) + (3) + (4)

4.1.2 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

4.1.3 Result

Diagram	Channel	Mode	Maximum Level [dBµV/m] Frequency Range 0.009 – 30MHz	Result
2.01	01	GFSK-1Mbps	20.83	PASSED
2.02	01	GFSK-1Mbps	20.74	PASSED

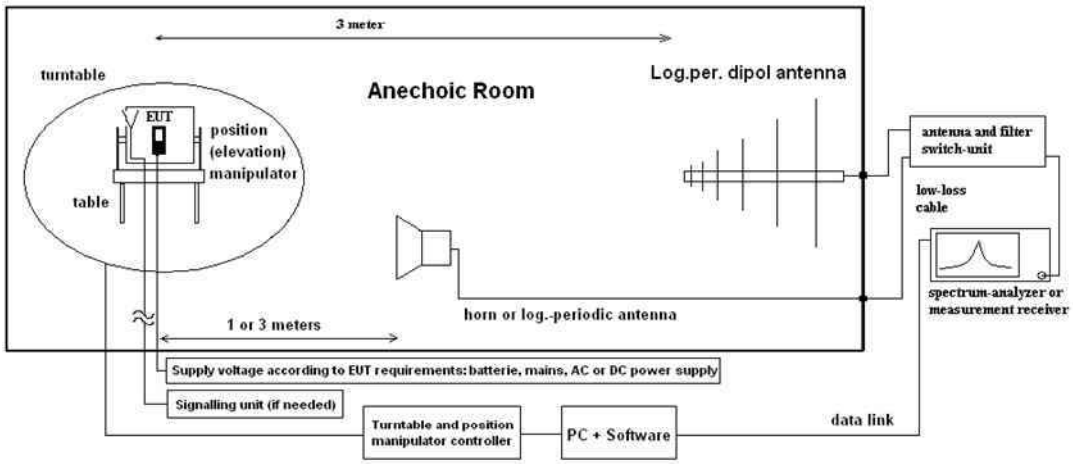
Remark: for more information and graphical plot see annex A1

4.2 Radiated field strength emissions 30MHz – 1GHz

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 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 it's 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 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

4.2.3 Result

Diagram	Channel	Mode	Maximum Level [dBµV/m] Frequency Range 30 – 1000MHz	Result
3.01	01	GFSK-1Mbps	41.62	PASSED
3.02	01	GFSK-1Mbps	42.26	PASSED

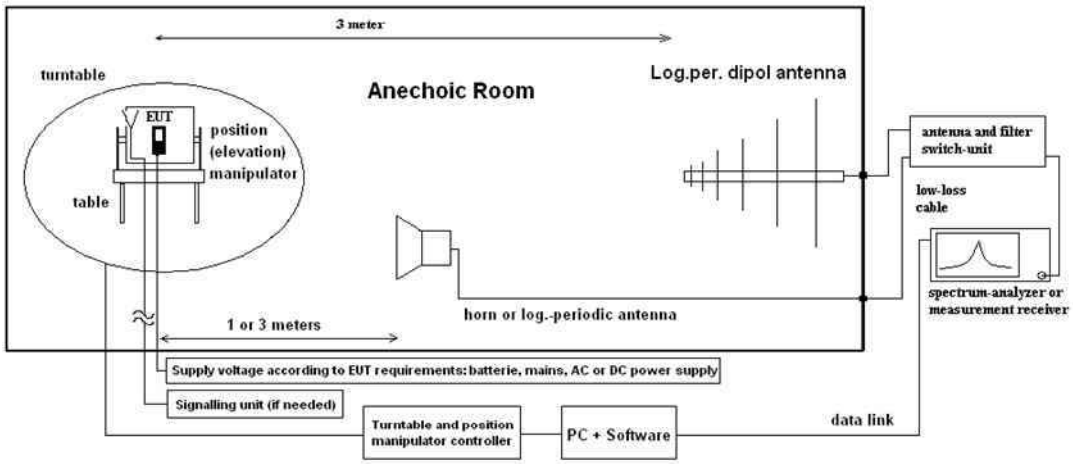
Remark: for more information and graphical plot see annex A1

4.3 Radiated field strength emissions above 1GHz

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 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 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 RSS 210 B.10 (a) Limits

Field strength (mV/m) Fundamental emissions, (3 meters)				
Frequency Range [MHz]	**Limit [mV/m]**	**Limit [dBµV/m]**	**Detector**	**RBW / VBW [kHz]**
2400-2483.5	50	94	Average	1000 / 3000

Field strength (mV/m) Harmonic emissions, (3 meters)				
Frequency Range [MHz]	**Limit [mV/m]**	**Limit [dBµV/m]**	**Detector**	**RBW / VBW [kHz]**
2400-2483.5	0.5	54	Average	1000 / 3000

4.3.3 §15.209(a) and §15.247(d) Limits

Radiated emissions limits, (3 meters)				
Frequency Range [MHz]	**Limit [µV/m]**	**Limit [dBµV/m]**	**Detector**	**RBW / VBW [kHz]**
Above 1000	500	54	Average	1000 / 3000
Above 1000	5000	74	Peak	1000 / 3000

4.3.4 Result

Diagram	Channel	Mode	Maximum Fieldstrength Fundamental Emissions[dBµV/m]	Result
4.01	01	GFSK-1Mbps	90.280 (PK) 89.495(AV)	PASSED

Radiated Harmonic emissions:

Diagram	Channel	Mode	Maximum Level [dBµV/m] Frequency Range 1 – 18GHz	Result
4.01	01	GFSK-1Mbps	63.326(PK) @ 17238.400 MHz 51.342(AV) @ 17229.600 MHz	PASSED

Remark: for more information and graphical plot see annex A1 **CETECOM_TR19_1_0137401T01a_A1**

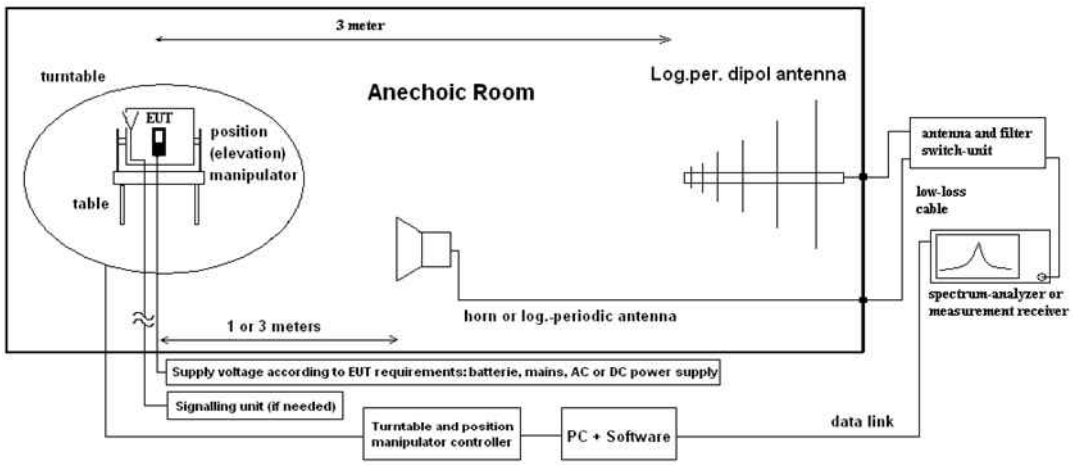
Diagram	Channel	Mode	Maximum Level [dBµV/m] Frequency Range 18 – 26.5GHz	Result
4.02	01	GFSK-1Mbps	56.32 (PK) @ 26294.510 MHz 48.35 (AV) @ 25912.440 MHz	PASSED

Remark: for more information and graphical plot see annex A1

4.4 Radiated Band-Edge emissions

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

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)

For uncritical results where a measurement resolution bandwidth of 1MHz can clearly show the compliance without influencing the results, a field strength measurement was performed to show compliance.

For critical results a Marker-Delta marker method was used for showing compliance to restricted bands.
The method consists of three independent steps:

1. Step: Prior to the measurement the fundamental radiated In-Band field strength was performed. The determined value is used as reference value.

2. Step: Second step consist of finding the relative attenuation between the fundamental emission and the maximum local out-of-band emission (within 2 MHz range around the band edge either on the band-edge directly or some modulation product if the level is greater than that on the band-edge) when measured with lower resolution bandwidth.

3. .Step: The delta value recorded in step 2 will be subtracted from value recorded in step 1, thus giving the required field strength at the band-edge. This value must fulfil the requirements for radiated spurious emissions in restricted bands in FCC §15.205 with the general limits of FCC §15.209

The EUT was instructed to send with maximum power (if adjustable) according to applicants instructions.

4.4.2 Limit

Frequency Range [MHz]	Pk Limit [dBc]	Avg Limit [dBc]	Avg Limit [dBµV/m]	Pk Limit [dBµV/m]	Detector	RBW / VBW [kHz]
Below 2390	-	-	54	74	Average / Peak	100 / 300
Above 2483.5	-	-	54	74	Average / Peak	1000 / 3000
2390 - 2400	-20	-	-	-	Peak	100 / 300
2390 - 2400	-	-30	-	-	Average	100 / 300

4.4.3 Result

Non-restricted bands near-by

Diagram	Channel	Mode	Peak [dBc]	Average [dBc]	Result
9.01	01	GFSK-1Mbps	89.49	82.78	PASSED

Remark: for more information and graphical plot see annex A1

Restricted bands near-by

Diagram	Channel	Mode	Peak [dBµV/m]	Average [dBµV/m]	Result
9.02	39	GFSK-1Mbps	88.39	87.31	PASSED

Remark: for more information and graphical plot see annex A1

4.5 Results from external laboratory

None	-

4.6 Opinions and interpretations

None	-

5 Equipment list

ID	Description	Manufacturer	SerNo	Cal Date
	120901 - SAC - Radiated Emission < 1GHz			
20021	Loop Antenna (H-Field)	EMCO Elektronik GmbH	9206-2770	30.05.2021
20482	Filter Matrix (SAR1)	--	--	--
20494	Power supply	Agilent	AG6632A	--
20574	Biconilog Hybrid Antenna	Frankonia	980026L	03.05.2022
20612	E3632A	Agilent	MY 40001321	--
20620	EMI Test Receiver ESU 26	Rohde & Schwarz Messgerätebau GmbH	100362	30.05.2020
	120904 - FAC1 - Radiated Emissions			
20720	EMC32 [FAC]	Rohde & Schwarz Messgerätebau GmbH	V10.xx	--
20552	High Pass Filter WHKX 2.8/18G-10SS (2,8-18GHz)	Wainwright Instruments GmbH	4	--
20020	Horn Antenna 3115 (Subst 1)	EMCO Elektronik GmbH	9107-3699	19.07.2021
20549	Log.Per-Antenna HL025	Rohde & Schwarz Messgerätebau GmbH	1000060	31.07.2021
20700	PC ctc662012 [FAC]	Dell Inc.	--	--
20262	Power Meter NRV-S	Rohde & Schwarz Messgerätebau GmbH	825770/0010	15.05.2020
20357	power sensor NRV-Z1	Rohde & Schwarz Messgerätebau GmbH	861761/002	21.05.2021
20338	Pre-Amplifier 100MHz - 26GHz JS4-00102600-38-5P	Miteq Inc.	838697	--
20484	Pre-Amplifier 2,5GHz - 18GHz AMF-5D-02501800-25-10P	Miteq Inc.	1244554	--
20287	Pre-Amplifier 25MHz - 4GHz AMF-2D-100M4G-35-10P	Miteq Inc.	379418	--
20690	Spectrum Analyzer FSU	Rohde & Schwarz Messgerätebau GmbH	100302/026	23.05.2021
20302	BBHA9170	Schwarzbeck Mess-Elektronik	155	30.04.2023
20732	Signal- and Spectrum Analyzer FSW67	Rohde & Schwarz Messgerätebau GmbH	104023	30.05.2021
20608	UltraLog-Antenna HL 562	Rohde & Schwarz Messgerätebau GmbH	830547/009	10.04.2023

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})	CISPR 16-2-1	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dB 3.6 dB						-
Radiated emissions Enclosure	CISPR 16-2-3	30 MHz - 1 GHz 1 GHz - 18 GHz	4.2 dB 5.1 dB						E-Field
Disturbance power	CISPR 16-2-2	30 MHz - 300 MHz	-						-
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 - 26.5GHz	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 - 12.75GHz	1.48	N/A	1.51	N/A	1.43	--	
		12.75 GHz - 18GHz	1.81	N/A	1.83	N/A	1.77	--	
		18 GHz - 26.5GHz	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 30 MHz - 1 GHz 1 GHz - 20 GHz	5.0 dB 4.2 dB 3.17 dB						Magnetic field E-field Substitution

7 Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2020-Apr-02
C01	Updated equipment list, References for ISED Standard RSS-247 removed and replaced with RSS-210 accordingly	2021-May-03

End of Test Report