

cetecom
advanced

TEST REPORT

Test report no.: 1-7493-24-01-07_TR1-R02



Testing laboratory

cetecom advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: <https://cetecomadvanced.com>
e-mail: mail@cetecomadvanced.com

Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS).

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number:

D-PL-12047-01-00.

ISED Testing Laboratory Recognized Listing Number: DE0001
FCC designation number: DE0002

Applicant

Riedel Communications GmbH & Co. KG
Uellendahler Strasse 353
42109 Wuppertal / GERMANY
Phone: -/-
Contact: Wolfgang Fritz
e-mail: certification@riedel.net

Manufacturer

Riedel Communications GmbH & Co. KG
Uellendahler Strasse 353
42109 Wuppertal / GERMANY

Test standard/s

FCC - Title 47 CFR Part 15 FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

RSS - 210 Issue 10 Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

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

Test Item

Kind of test item: **Antenne / Base Station**
Model name: **BL-ANT-1008-24B**
FCC ID: **YFJANT100824H**
IC: **8706A-ANT100824H**
Frequency: 13.56 MHz
Technology tested: RFID
Antenna: Integrated antenna
Power supply: 48V DC by PoE or 10V to 57V DC by power supply unit
Temperature range: -10°C to +45°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:

Christoph Schneider
Lab Manager
Radio Communications

Test performed:

On behalf of
Tobias Wittenmeier
Testing Manager
Radio Communications

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2 General information

2.1 Notes and disclaimer

This test report replaces the test report with the number 1-7493/24-01-07_TR1-R01 and dated 2024-06-20.

The test results of this test report relate exclusively to the test item specified in this test report. cetecom 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 is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order: 2021-03-29

Date of receipt of test item: 2021-06-14

Start of test: 2021-06-15

End of test: 2022-10-04

Person(s) present during the test: -/-

*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

2.3 Test laboratories sub-contracted

None

3 Test standard/s, references and accreditations

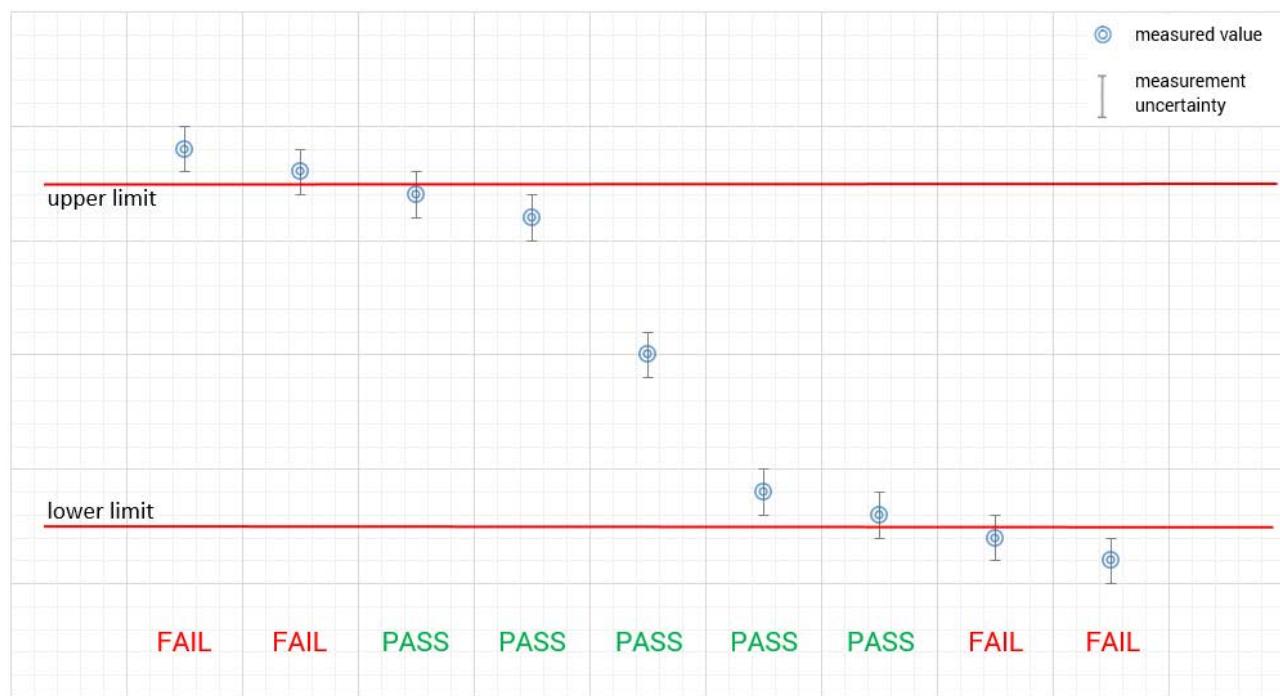
Test standard	Date	Description
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 10	December 2019	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
RSS - Gen Issue 5 incl. Amendment 1 & 2	February 2021	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 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.

The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."

measured value, measurement uncertainty, verdict



5 Test environment

Temperature	:	T_{nom}	+22 °C during room temperature tests
		T_{max}	No tests under extreme environmental conditions required.
		T_{min}	No tests under extreme environmental conditions required.
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
Power supply	:	V_{nom}	48.0 V DC by power supply unit
		V_{max}	No tests under extreme environmental conditions required.
		V_{min}	No tests under extreme environmental conditions required.

6 Test item

6.1 General description

Kind of test item	:	Antenne / Base Station
Model name	:	BL-ANT-1008-24B
HMN	:	-/-
PMN	:	BL-ANT-1008-24B (Bolero 2G4 Antenna)
HVIN	:	BL-ANT-1008-24B-H
FVIN	:	-/-
S/N serial number	:	3305015210077
Hardware status	:	10.00
Software status	:	3.1.0
Firmware status	:	0717
Frequency band	:	13.553 MHz to 13.567 MHz
Type of radio transmission	:	Modulated carrier
Use of frequency spectrum	:	
Type of modulation	:	ASK
Number of channels	:	1
Antenna	:	Integrated antenna
Power supply	:	48V DC by PoE or 10V to 57V DC by power supply unit
Temperature range	:	-10°C to +45°C

6.2 Additional information

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

Test setup and EUT photos are included in test report:

1-1776/21-03-01_AnnexA

1-1776/21-03-01_AnnexB

1-1776/21-03-01_AnnexD

7 Description of the test setup

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

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

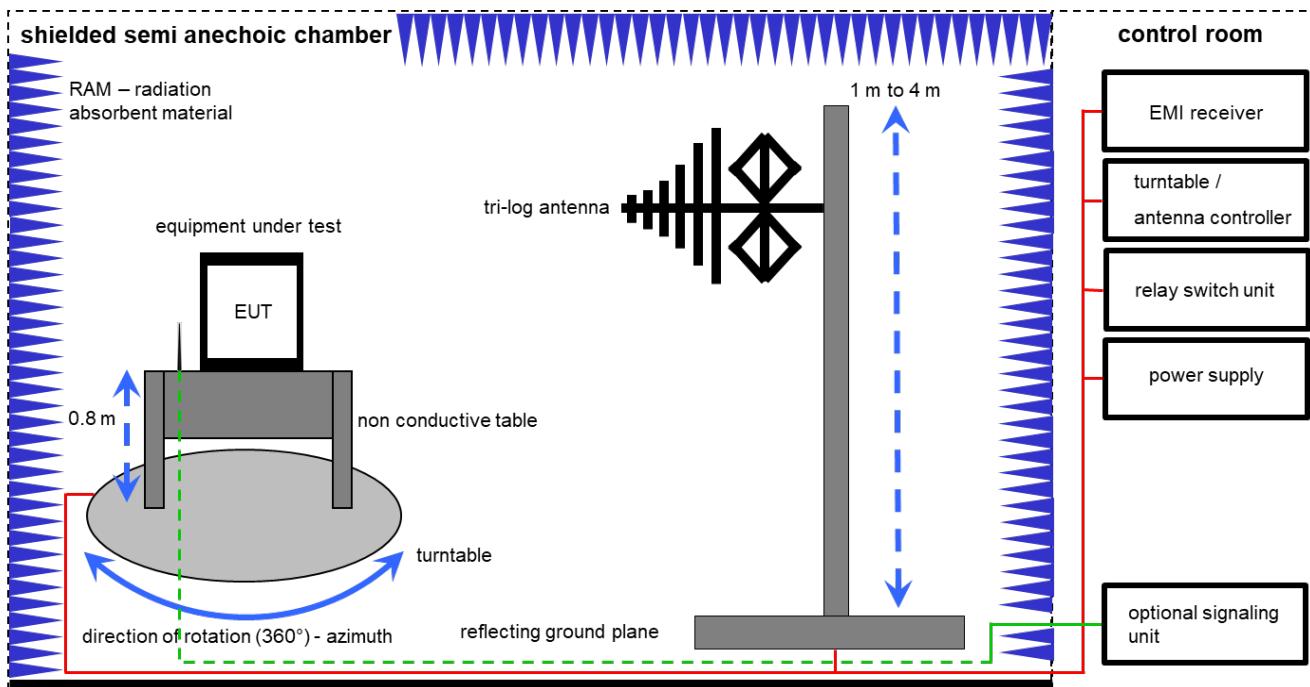
Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

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	*	next calibration ordered / currently in progress
NK!	Attention: not calibrated		

7.1 Shielded semi anechoic chamber

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



Measurement distance: tri-log antenna 10 meter

EMC32 software version: 10.59.00

FS = UR + CL + AF

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

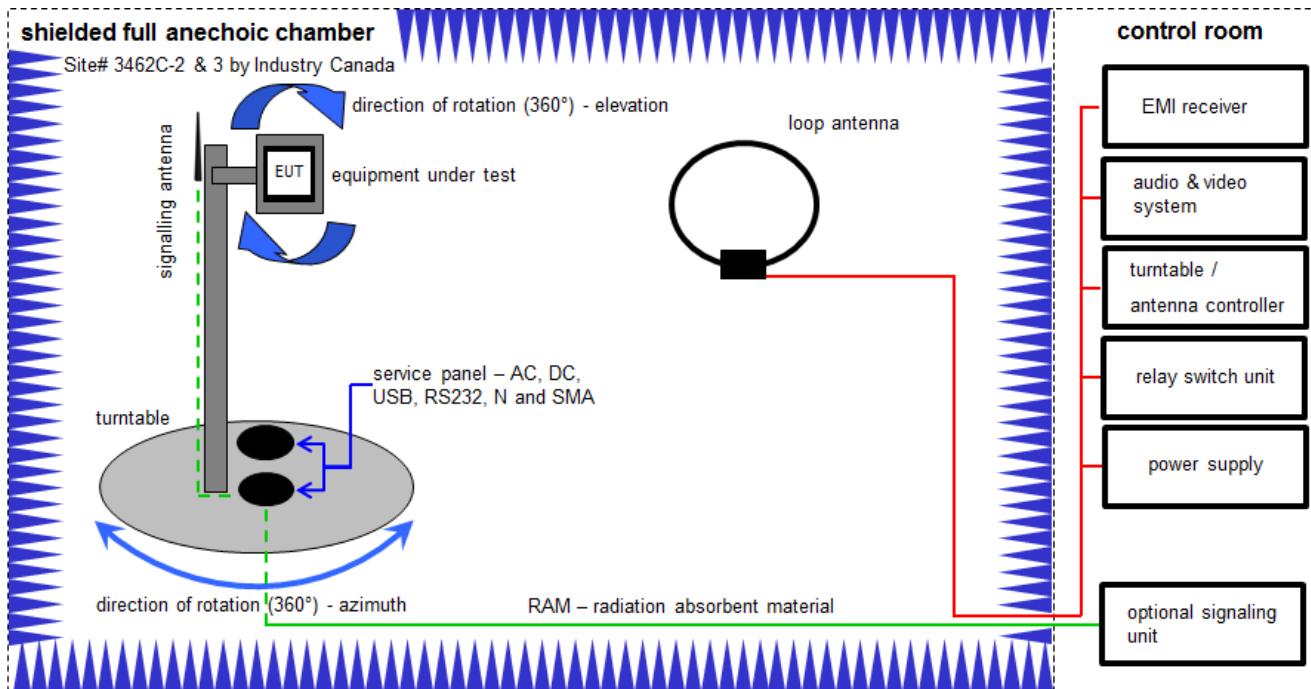
Example calculation:

$$\text{FS [dB}\mu\text{V/m]} = 12.35 \text{ [dB}\mu\text{V/m]} + 1.90 \text{ [dB]} + 16.80 \text{ [dB/m]} = 31.05 \text{ [dB}\mu\text{V/m]} (35.69 \mu\text{V/m})$$

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.07.2019	04.07.2021
2	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
3	A	Semi anechoic chamber	3000023	MWB AG		300000551	ne	-/-	-/-
4	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	vlKI!	17.01.2020	16.01.2022
5	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
6	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
7	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
8	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	318	300003696	vlKI!	04.09.2019	03.09.2021
9	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	295	300003787	vlKI!	19.02.2021	18.02.2023
10	A	PC	TecLine	F+W		300004388	ne	-/-	-/-
11	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	10.12.2020	09.06.2022

7.2 Shielded fully anechoic chamber



Measurement distance: loop antenna 3 meter / 1 meter

FS = UR + CA + AF

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

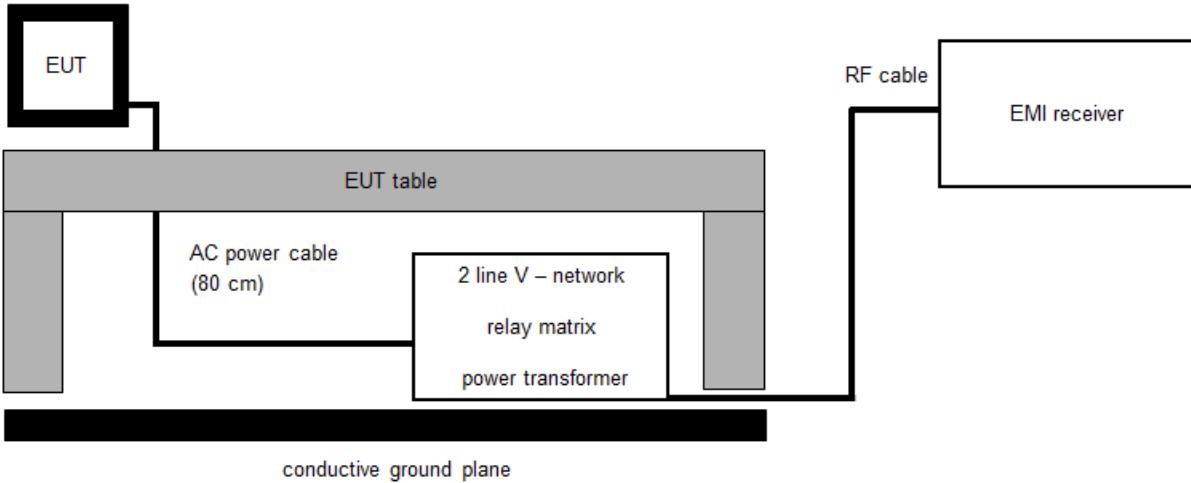
Example calculation:

$$\text{FS [dB}\mu\text{V/m]} = 40.0 \text{ [dB}\mu\text{V/m]} + (-35.8) \text{ [dB]} + 32.9 \text{ [dB/m]} = 37.1 \text{ [dB}\mu\text{V/m]} (71.61 \mu\text{V/m})$$

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vlKI!	13.06.2019	12.06.2022
2	A	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	A	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
4	A	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	11.12.2020	10.12.2021
5	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
6	A	NEXIO EMV-Software	BAT EMC V3.20.0.26	EMCO		300004682	ne	-/-	-/-
7	A	Open Switch and Control Unit and Power Sensors	OSP120 incl. B157	Rohde & Schwarz	101274, 100877	300004825	vlKI!	16.12.2020	15.12.2022
8	A	PC	ExOne	F+W		300004703	ne	-/-	-/-

7.3 AC conducted

AC conducted



$$FS = UR + CF + VC$$

(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

Example calculation:

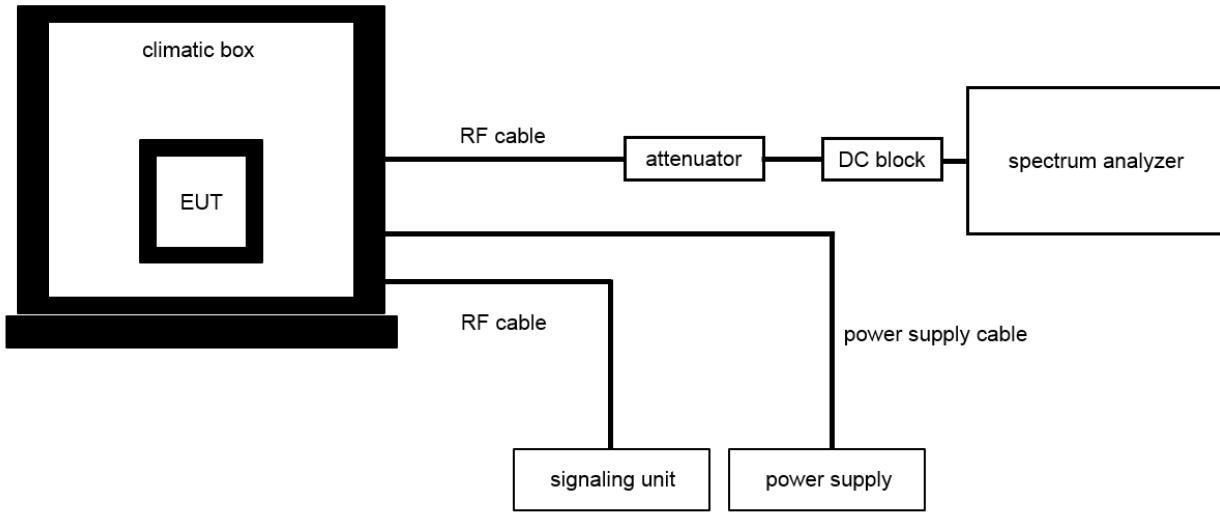
$$FS [dB\mu V/m] = 37.62 [dB\mu V/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dB\mu V/m] (244.06 \mu V/m)$$

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Two-line V-Network (LISN) 9 kHz to 30 MHz	ESH3-Z5	Rohde & Schwarz	892475/017	300002209	viKI!	11.12.2019	10.12.2021
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	NK!	-/-	-/-
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	09.12.2020	08.12.2021
4	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	viKI!	17.01.2020	16.01.2022
5	A	Hochpass 150 kHz	EZ-25	R&S	100010	300003798	ev	-/-	-/-
6	A	PC	TecLine	F+W		300003532	ne	-/-	-/-

7.4 RF measurements normal and extreme conditions

Conducted measurements normal & extreme conditions



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

Example calculation:
 OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A,B	Loop Antenna		ZEG TS Steinfurt		400001208	ev	-/-	-/-
2	A,B	RF Cable BNC	RG58	Huber & Suhner		400001209	ev	-/-	-/-
3	B	Temperature Test Chamber	VT 4011	Voetsch Industrietechnik	585662306000 10	300005363	ev	08.05.2020	07.05.2022
4	A,B	Signal analyzer	FSV30	Rohde&Schwarz	104365	300005923	k	16.12.2020	15.12.2021
5	B	Power Supply	HMP2020	Rohde & Schwarz	101961	300006102	k	04.08.2020	03.08.2022

8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

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

Premereasurement*

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

Final measurement

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

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

8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

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

Premereasurement

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

Final measurement

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

9 Measurement uncertainty

Measurement uncertainty	
Test case	Uncertainty
Occupied bandwidth	± used RBW
Field strength of the fundamental	± 3 dB
Field strength of the harmonics and spurious	± 3 dB
Receiver spurious emissions and cabinet radiations	± 3 dB
Conducted limits	± 2.6 dB

10 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 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	
Test specification clause	Test case	Temperature conditions	Power source conditions	C	NC	NA	NP	Remark
RF-Testing	CFR Part 15 RSS 210 Issue 10 RSS Gen Issue 5		See table!		2024-06-26			-/-
RSS Gen Issue 5	Occupied bandwidth	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.225 (a) RSS 210 Issue 10	Field strength of the fundamental	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.209 & § 15.225 (b-d)	Field strength of the harmonics and spurious	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.109	Receiver spurious emissions and cabinet radiations	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.107 § 15.207	Conducted limits	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.225 (a) RSS 210 Issue 10	Frequency tolerance	Normal & extreme conditions	Normal & extreme conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-

Note:

C Compliant
 NC Not compliant
 NA Not applicable
 NP Not performed

11 Additional comments

Reference documents: Original test report: 1-1776_21-03-05
New test report was created for certification purposes. See also Chapter 16. Dol for more information.

Special test descriptions: None

Configuration descriptions: None

12 Measurement results

12.1 Occupied bandwidth

Measurement:

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal.

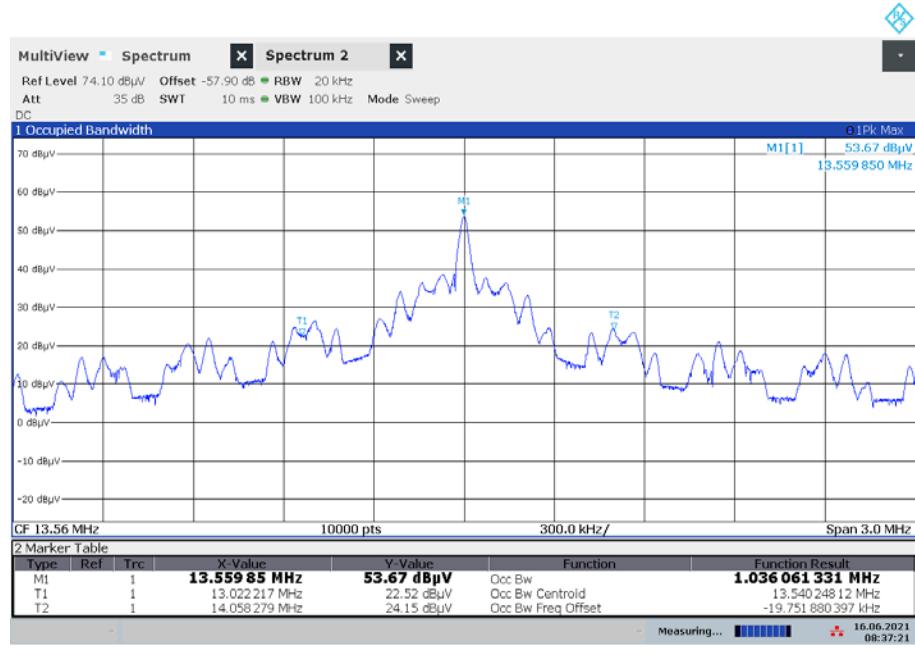
Measurement parameters	
Detector:	Peak
Resolution bandwidth:	1 % – 5 % of the occupied bandwidth
Video bandwidth:	$\geq 3 \times$ RBW
Trace mode:	Max hold
Analyser function:	99 % power function
Used equipment:	See chapter 7.4A
Measurement uncertainty:	See chapter 9

Limit:

IC
for RSP-100 test report coversheet only

Result:

99% emission bandwidth
1036 kHz

Plot:**Plot 1: 99 % emission bandwidth**

12.2 Field strength of the fundamental

Measurement:

The maximum detected field strength for the carrier signal.

Measurement parameters	
Detector:	average
Resolution bandwidth:	120 kHz
Video bandwidth:	$\geq 3x$ RBW
Trace mode:	Max hold
Used equipment:	See chapter 7.2A
Measurement uncertainty:	See chapter 9

Limit:

FCC & IC		
Frequency (MHz)	Field strength (μ V/m)	Measurement distance (m)
13.553 to 13.567	15,848 (84 dB μ V/m)	30

Recalculation:

According to ANSI C63.10		
Frequency	Formula	Correction value
13.56 MHz	$FS_{limit} = FS_{max} - 40 \log\left(\frac{d_{nearfield}}{d_{measure}}\right) - 20 \log\left(\frac{d_{limit}}{d_{nearfield}}\right)$ <p> FS_{limit} is the calculation of field strength at the limit distance, expressed in dBμV/m FS_{max} is the measured field strength, expressed in dBμV/m $d_{nearfield}$ is the $\lambda/2\pi$ distance $d_{measure}$ is the distance of the measurement point from EUT d_{limit} is the reference limit distance </p>	-21.4 from 3m to 30m

Result:

Field strength of the fundamental		
Frequency	13.56 MHz	
Distance	@ 3 m	@ 30 m
Measured / calculated value	53.6 dB μ V/m	32.2 dB μ V/m

12.3 Field strength of the harmonics and spurious

Measurement:

The maximum detected field strength for the harmonics and spurious.

Measurement parameters	
Detector:	Quasi peak / average or peak (worst case – pre-scan)
Resolution bandwidth:	F < 150 kHz: 200 Hz 150 kHz < F < 30 MHz: 9 kHz 30 MHz < F < 1 GHz: 120 kHz
Video bandwidth:	F < 150 kHz: 1 kHz 150 kHz < F < 30 MHz: 100 kHz 30 MHz < F < 1 GHz: 300 kHz
Trace mode:	Max hold
Used equipment:	See chapter 7.1A & 7.2A & 7.3A
Measurement uncertainty:	See chapter 9

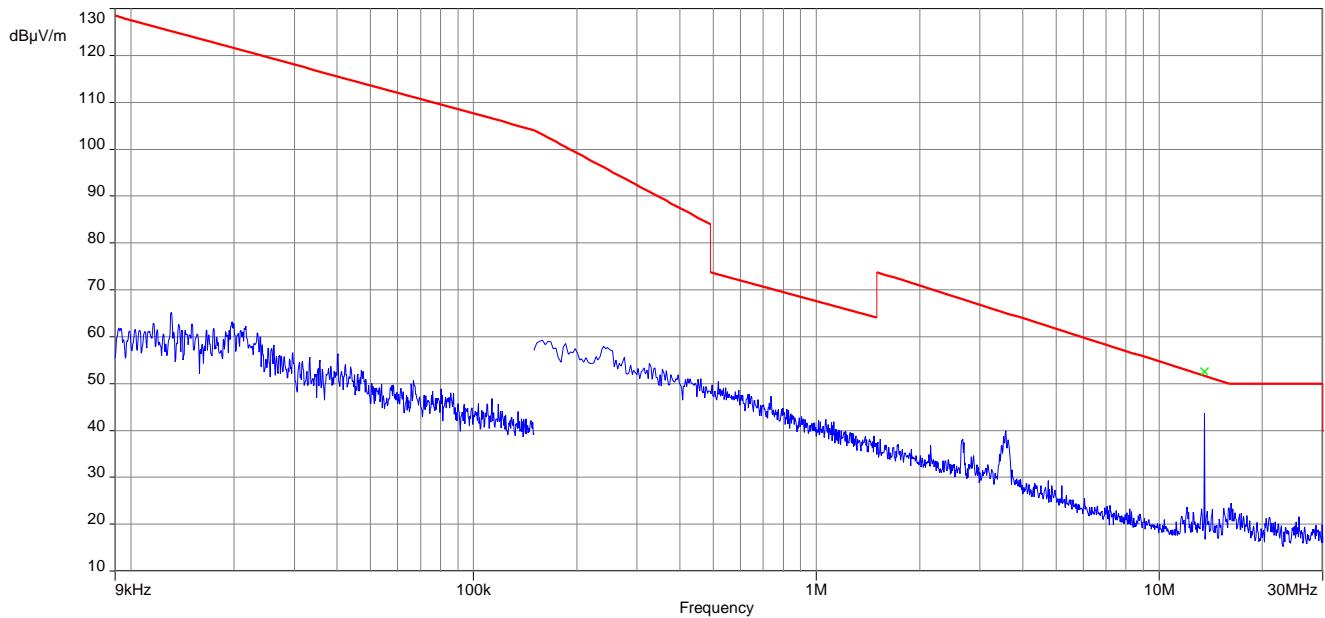
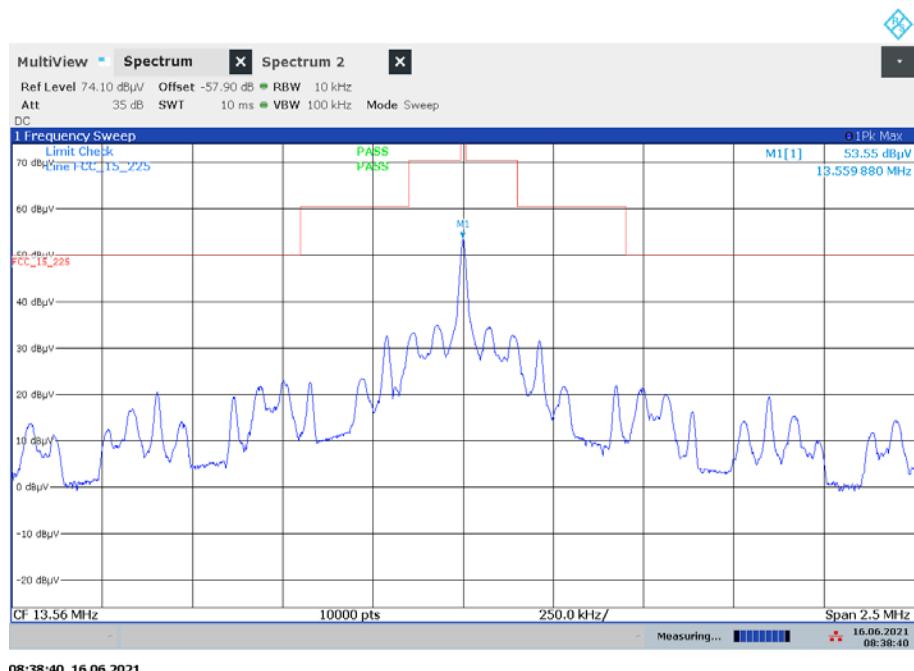
Limit:

FCC & IC		
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30 (29.5 dB μ V/m)	30
30 – 88	100 (40 dB μ V/m)	3
88 – 216	150 (43.5 dB μ V/m)	3
216 – 960	200 (46 dB μ V/m)	3

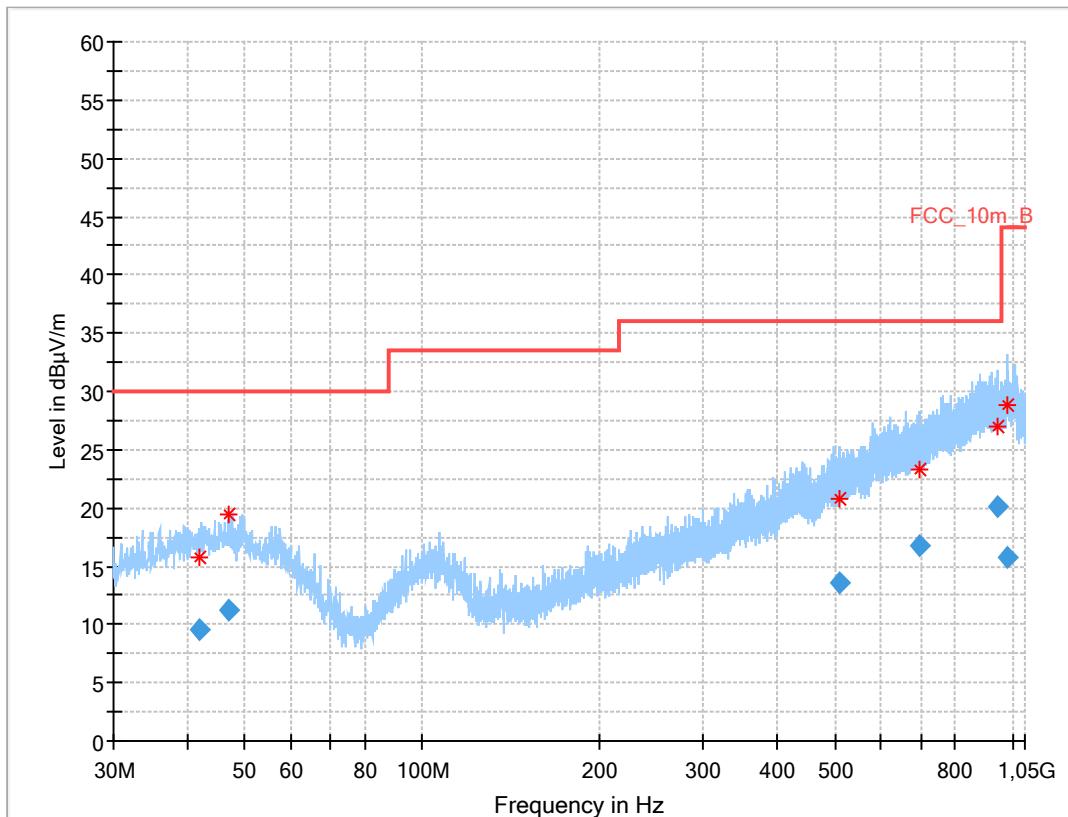
Note: For a reduced measurement distance, please take a look at the limit line and the ANSI C63.10-2013 sub clause 6.4 radiated emissions from unlicensed wireless devices below 30 MHz.

Result:

Detected emissions			
Frequency (MHz)	Detector	Resolution bandwidth (kHz)	Detected value (dB μ V/m @ 3m)
No emissions detected between 9 kHz to 30 MHz. For emissions between 30 MHz to 1 GHz see result table below the plot.			

Plots:**Plot 1:** 9 kHz – 30 MHz, magnetic emissions**Plot 2:** Spectrum mask (the limits are recalculated according to the ANSI C63.10-2013 sub clause 6.4)

Plot 3: 30 MHz – 1 GHz, vertical and horizontal polarization



Final_Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (°)	Corr. (dB/m)
42.016	9.60	30.0	20.4	1000	120.0	298.0	H	90	16
47.183	11.15	30.0	18.9	1000	120.0	293.0	V	225	16
511.314	13.53	36.0	22.5	1000	120.0	200.0	V	48	20
694.915	16.78	36.0	19.2	1000	120.0	308.0	H	90	22
940.384	20.14	36.0	15.9	1000	120.0	368.0	H	180	26
982.600	15.82	44.0	28.2	1000	120.0	392.0	V	0	26

12.4 Conducted limits

Measurement:

Measurement of the conducted spurious emissions for an intentional radiator that is designed to be connected to the public utility (AC) power line.

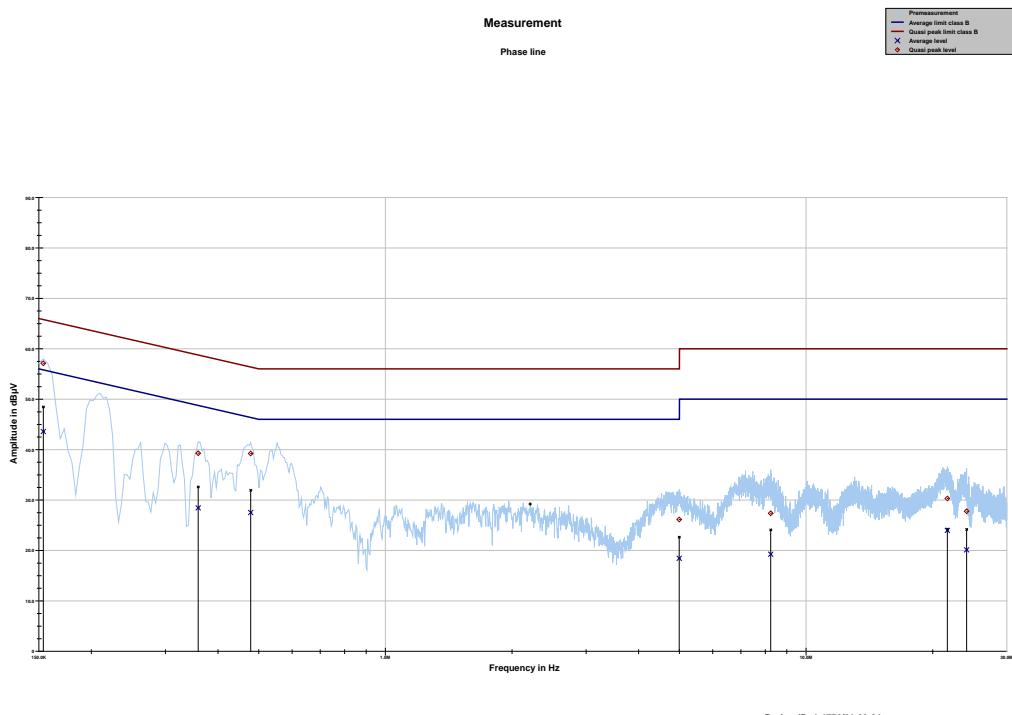
Measurement parameters	
Detector:	Quasi peak / average or peak (worst case – pre-scan)
Resolution bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Video bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Trace mode:	Max hold
Used equipment:	See chapter 7.3A
Measurement uncertainty:	See chapter 9

Limit:

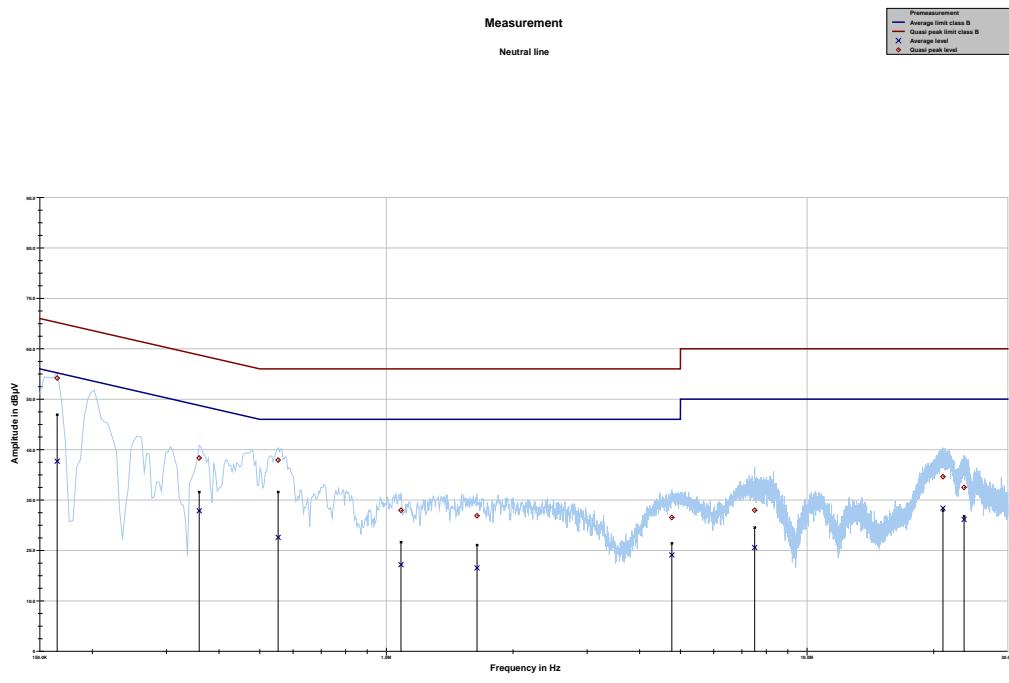
FCC & IC		
Frequency (MHz)	Quasi-peak (dB μ V/m)	Average (dB μ V/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

Result:

See result table below the plots.

Plots:**Plot 1:** 150 kHz to 30 MHz, phase line

Frequency	Quasi peak level	Margin quasi peak	Limit QP	Average level	Margin average	Limit AV
MHz	dB μ V	dB	dB μ V	dB μ V	dB	dB μ V
0.153731	57.11	8.68	65.796	43.59	12.31	55.893
0.358950	39.28	19.47	58.753	28.44	21.59	50.030
0.478350	39.21	17.15	56.368	27.51	19.11	46.619
4.993163	26.12	29.88	56.000	18.44	27.56	46.000
8.239350	27.37	32.63	60.000	19.25	30.75	50.000
21.668119	30.30	29.70	60.000	23.97	26.03	50.000
24.074775	27.78	32.22	60.000	20.12	29.88	50.000

Plot 2: 150 kHz to 30 MHz, neutral line


Project ID: 1-1776/21-03-04

Frequency	Quasi peak level	Margin quasi peak	Limit QP	Average level	Margin Average	Limit AV
MHz	dB μ V	dB	dB μ V	dB μ V	dB	dB μ V
0.164925	54.19	11.02	65.212	37.70	17.88	55.574
0.358950	38.34	20.41	58.753	27.87	22.16	50.030
0.552975	37.91	18.09	56.000	22.58	23.42	46.000
1.082812	27.96	28.04	56.000	17.19	28.81	46.000
1.642500	26.87	29.13	56.000	16.54	29.46	46.000
4.769287	26.53	29.47	56.000	19.11	26.89	46.000
7.508025	27.98	32.02	60.000	20.58	29.42	50.000
21.033806	34.62	25.38	60.000	28.40	21.60	50.000
23.623294	32.50	27.50	60.000	26.13	23.87	50.000

12.5 Frequency error

Measurement:

The maximum detected field strength for the spurious.

Measurement parameters	
Detector:	Peak detector
Resolution bandwidth:	20 Hz
Video bandwidth:	> RBW
Trace mode:	Max hold
Used equipment:	See chapter 7.4B
Measurement uncertainty:	See chapter 9

Limit:

FCC & IC
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. (± 1.356 kHz)
Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm)

Result: Temperature variation

Frequency tolerance			
Measured frequency (MHz)	Frequency error (kHz)	Conditions	Result
13.5601558	0.1558	-20 °C & 100% voltage	compliant
13.5601618	0.1618	-10 °C & 100% voltage	compliant
13.5601558	0.1558	0 °C & 100% voltage	compliant
13.5601319	0.1319	+10 °C & 100% voltage	compliant
13.5601119	0.1119	+30 °C & 100% voltage	compliant
13.5601139	0.1139	+40 °C & 100% voltage	compliant
13.5601159	0.1159	+50 °C & 100% voltage	compliant

Result: Voltage variation

Frequency tolerance			
Measured frequency (MHz)	Frequency error (kHz)	Conditions	Result
13.5601239	0.1239	+20 °C & 85% voltage	compliant
13.5601239	0.1239	+20 °C & 100% voltage	compliant
13.5601239	0.1239	+20 °C & 115% voltage	compliant

13 Observations

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

14 Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
GUE	GNSS User Equipment
ETSI	European Telecommunications Standards Institute
EN	European Standard
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
IC	Industry Canada
PMN	Product marketing name
HMN	Host marketing name
HVIN	Hardware version identification number
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware
SW	Software
Inv. No.	Inventory number
S/N or SN	Serial number
C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
PP	Positive peak
QP	Quasi peak
AVG	Average
OC	Operating channel
OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing
FHSS	Frequency hopping spread spectrum
GNSS	Global Navigation Satellite System
C/N₀	Carrier to noise-density ratio, expressed in dB-Hz

15 Document history

Version	Applied changes	Date of release
-/-	Initial release	2024-06-20
R02	Updated HVIN	2024-06-26

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RIEDEL Communications International GmbH | Uellendahler Str. 353 | 42109 Wuppertal

To
Cetecom Advanced GmbH
Untertuerkheimer Str. 6-10
66117 Saarbruecken |
Germany

Name/Telefon
 Wolfgang Fritz
 +49 202 292 90

Datum
 Wuppertal,
 June 3, 2024

Declaration of Identity

Re: Bolero BL-ANT-1008-24B

The manufacturer Riedel Communications GmbH & Co.KG, located at Uellendahler Str. 353-Wuppertal-Germany, DE 814906984 as being the manufacturer of product Bolero Wireless Base Station, model BL-ANT-1008-24, hereby declares that the product BL-ANT-1008-24B in HVIN G2 is in all relevant Radio- and Terminal approval parameters for RFID (according to the FCC - Title 47 CFR Part 15 and RSS-210, Issue 10) identical to the product BL-ANT-1008-24B certified under:

- FCC ID: YFJANT100824
- ISED certification number: 8706A-ANT100824

Furthermore, the current RFID reports can also be used for approval under new IDs due to the identical design.

Regards,

Signature of the responsible (of manufacturer)
 Wolfgang Fritz
 Senior Product Manager, Wireless Intercom

Company	Riedel Communications GmbH & Co KG
Name	Wolfgang Fritz
Phone	+49 202 292 90
Email	Wolfgang.fritz@riedel.net
Datum	June 5, 2024

RIEDEL Communications International GmbH
 Uellendahler Str. 353 | 42109 Wuppertal | Germany
 Phone +49 (0) 202 292 90 | Fax +49 (0) 202 292 99 99
 info@riedel.net | www.riedel.net

Commerzbank Wuppertal (EU8)
 IBAN: DE14 3304 0201 0235 5105 00 | BIC: COBADEFFXXX

UStId: DE 813353023
 Amtsgericht Wuppertal HRB 17038
 Geschäftsführer: Thomas Riedel, Frank Eischen, Martin Berger

END OF TEST REPORT