Antenna Performance
Test Report 21-1-0131902T001a

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

Number of pages:	11	**Date of Report:**	2023-May-11
Testing company:	cetecom advanced GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	**Customer:**	BBC Bircher AG Wiesengasse 20 8222 Beringen Switzerland
Product: **Model:**	**Antenna of Wireless Transmission System** **XRF-R.2**		
Frequency Range:	**921.5 MHz**		
Test Specification:	**CTIA Test Plan for Wireless Device Over the Air Performance, Method of Measurement for Radiated RF Power and Receiver Performance [1].**		

Signatures:

B.Eng. Martin Nunier
Authorization of Test Report

Dipl. Ing. Ninovic Perez
Test Execution and Author of 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. 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. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of cetecom advanced GmbH.
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1.2 Summary of Test Results

Frequency [MHz]	921.5
Efficiency [dB]	-2.99
Directivity [dBi]	2.05
Gain [dBi]	-0.95

Tab 1: Data Summary

2 Administrative Data

2.1 Identification of Entity Providing the Service

Company address:	cetecom advanced GmbH / Im Teelbruch 116 / 45219 Essen / Germany
Internet site:	www.cetecom.com
Responsible for laboratory:	Andreas Luckenbill
Accreditation scope:	DAkkS Webpage
Test location:	cetecom advanced GmbH / Im Teelbruch 116 / 45219 Essen / Germany

2.2 General Limits for Environmental Conditions

Temperature:	Room temperature: (22 ± 2) °C
Humidity:	Relative. humidity: 45±15% rH

2.3 Organizational Items

Project number:	21-1-0131902T001a
Test Date(s):	2023-May-02
Witness during tests:	None
Responsible for test report:	Dipl. Ing. Ninovic Perez
Date of report:	2023-May-11

2.4 Customer Details

Customer address:	BBC Bircher AG Wiesengasse 20 8222 Beringen Switzerland
Contact person:	Mr. Milos Kostic

2.5 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	22-1-01319S41_C01	Wireless Transmission System	XRF-R.2	XRF-R.2.9	N/A	N/A	N/A

3 Test Set Up and Method

3.1 TRP Test

The measurement of the total radiated power was done in a CTIA certified OTA lab and according to the appropriate test specification [0]. A schematic drawing of the actual set up is shown in Fig. 1. The antenna was fed using an external RF source and the antenna pattern have been measured (taking both polarizations into account) with an angular resolution of 15°.

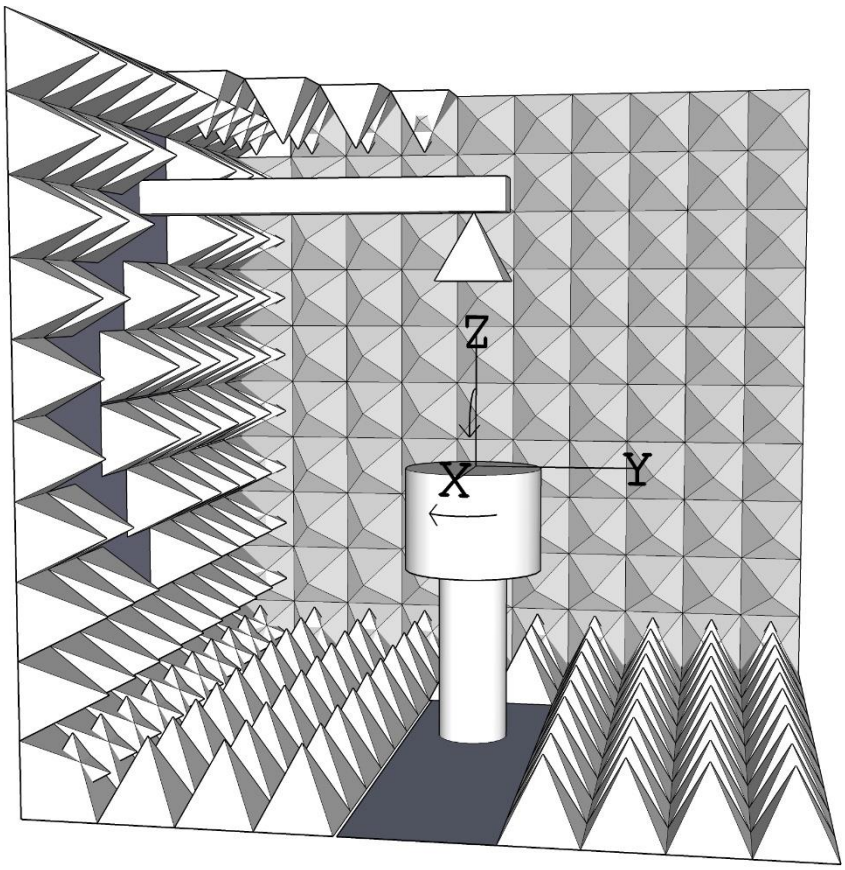

Fig 1: 3D OTA test set up.

MHz	Efficiency [%]	Directivity [dBi]	Gain [dBi]
921.5	50.20	2.05	-0.95

Tab 2: Selected numerical results for efficiency, directivity and gain.

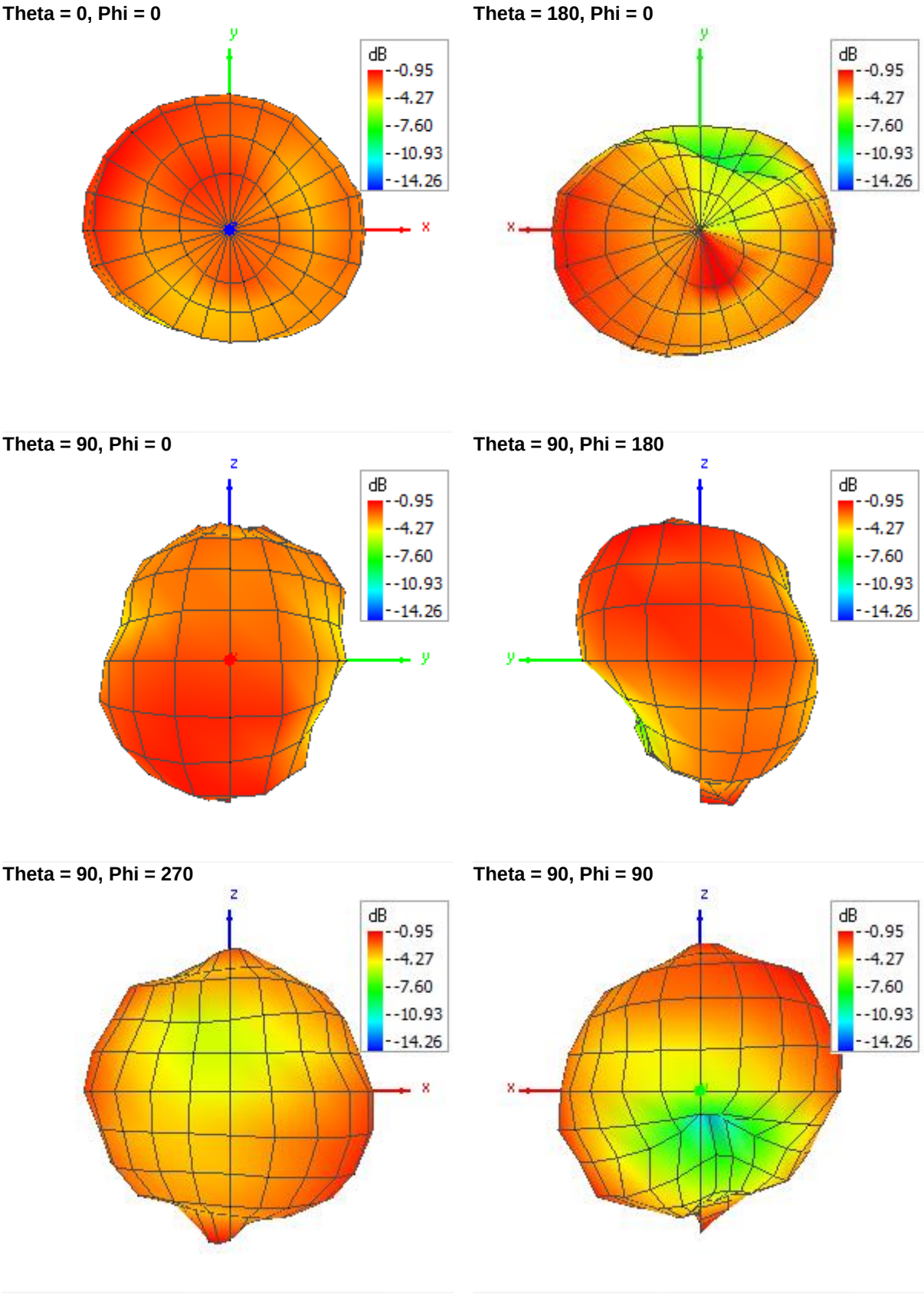

Fig 2: 3D OTA test result: Antenna pattern for 921.5 MHz, Test antenna input power setting was 0 dBm.

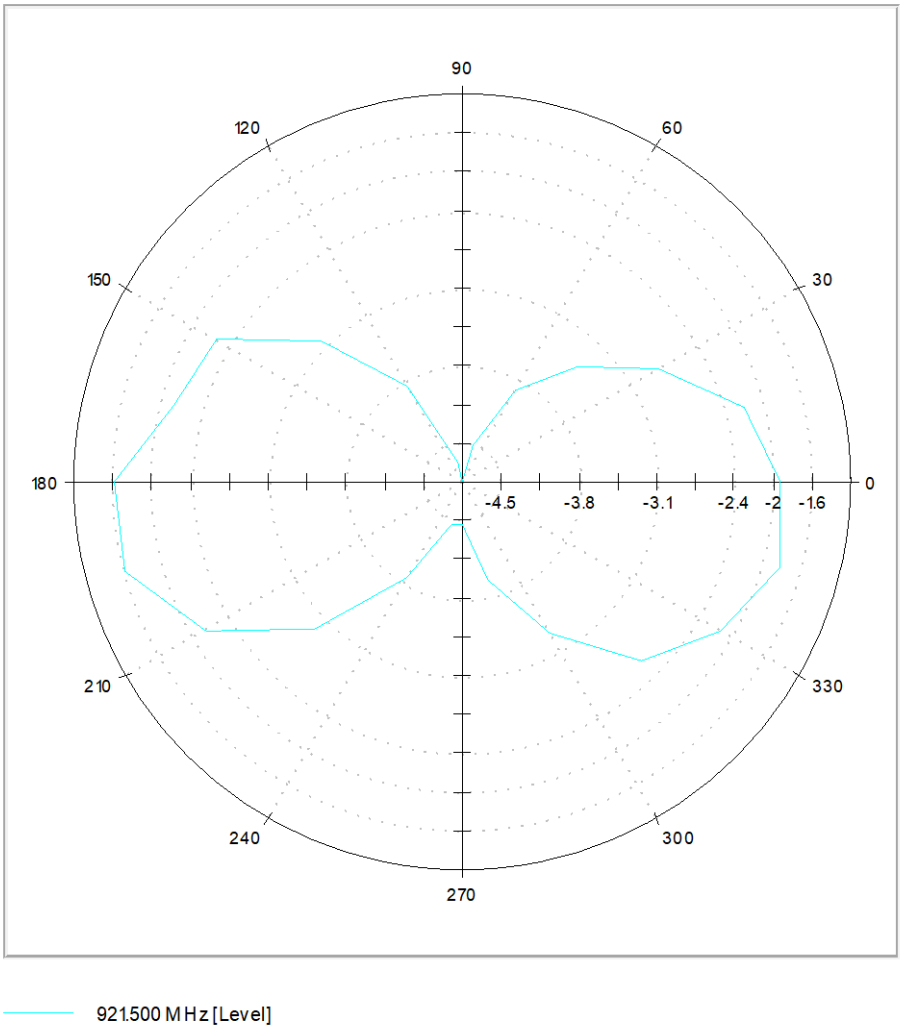

Fig 3: MainCutsPlot_XY_Plane

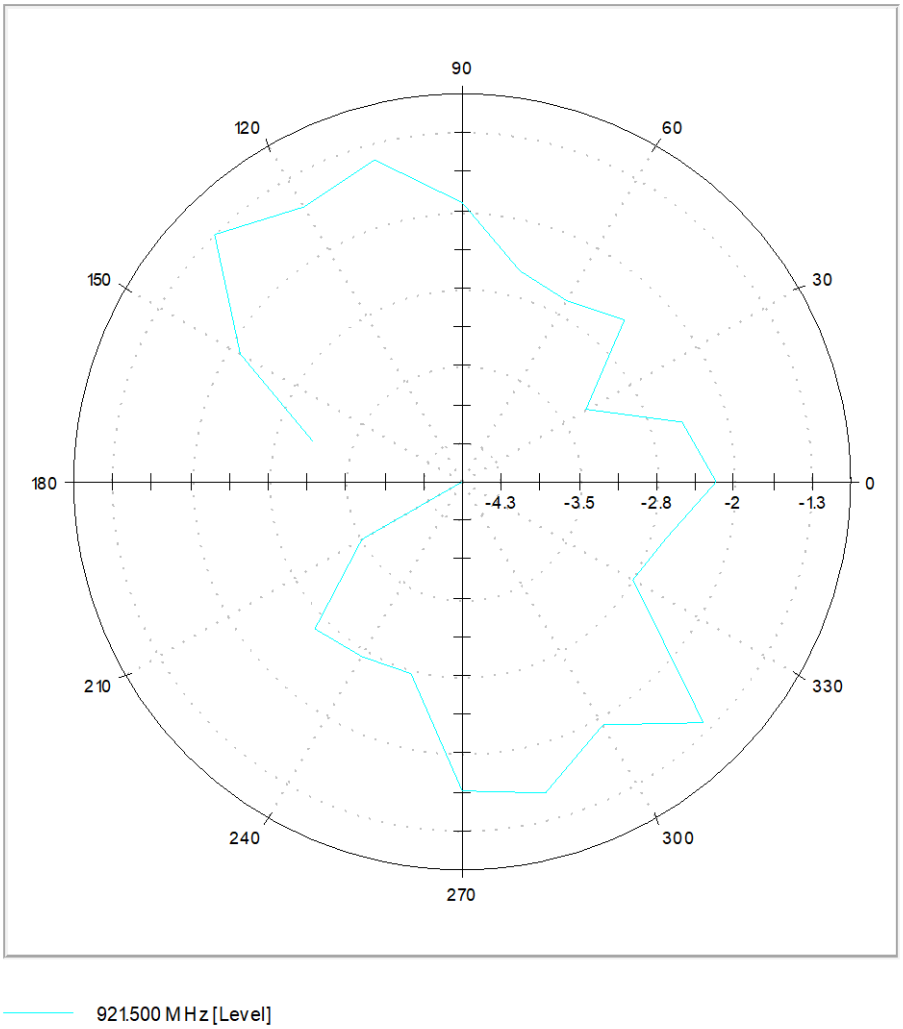

Fig 4: MainCutsPlot_XZ_Plane

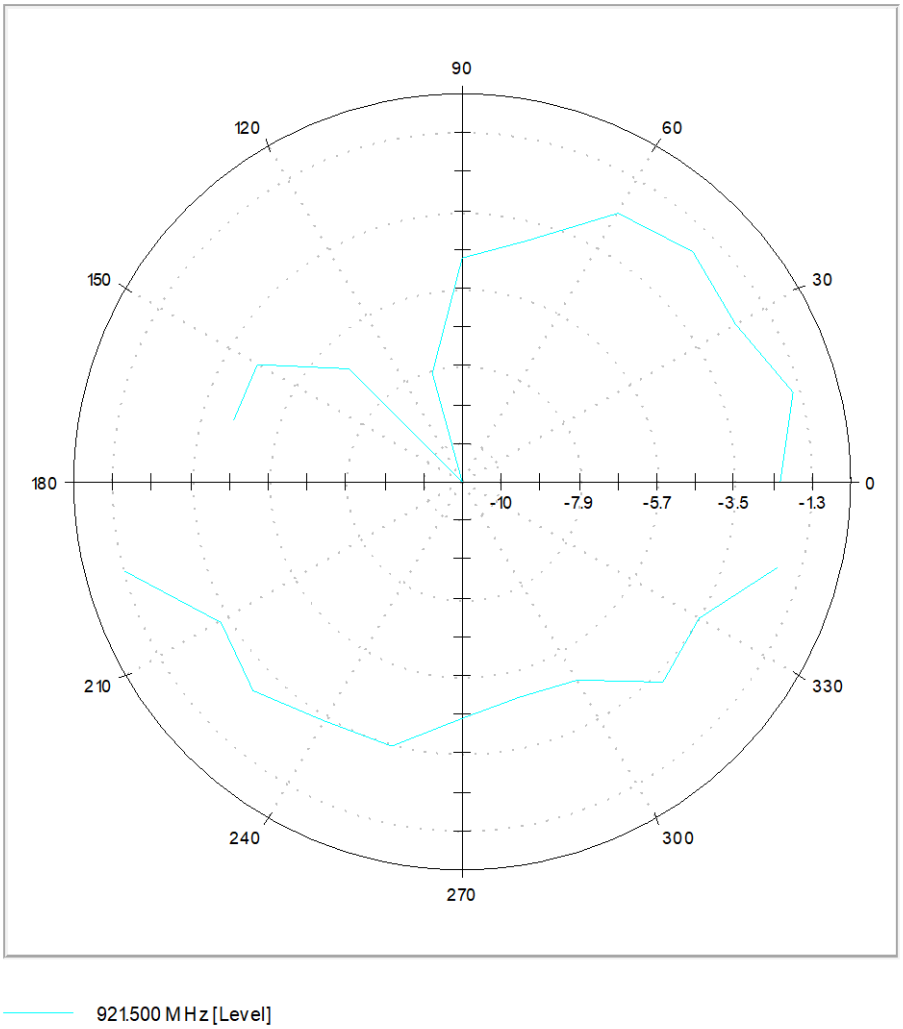

Fig 5: MainCutsPlot_YZ_Plane

4 Equipment lists

ID	Description	Manufacturer / Type	Serial Number
20557	System CTC-OTA-2 R&S TS8991	Rohde & Schwarz Messgerätebau GmbH	--
20560	Power Sensor NRP-Z11	Rohde & Schwarz Messgerätebau GmbH	100404
20562	Power Sensor NRP-Z11	Rohde & Schwarz Messgerätebau GmbH	100404
20566	Open switch and control Platform OSP120 with OSP-B105	Rohde & Schwarz Messgerätebau GmbH	100057
20567	Quad Ridged Horn Antenna QR-1	The Howland Company Inc.	1007-5V978
20570	Motion Control Unit P008 Motion Control Unit	The Howland Company Inc.	123

4.1 Measurement Uncertainty

4.1.1 TRP and Efficiency

According to a separate uncertainty calculation following the procedure as outlined by CTIA [1], for free space and frequencies below 3 GHz for TRP and also efficiency results an uncertainty of ±1.1 dB has been calculated [2].

5 References

[1] CTIA OTA Test Requirement, “Test Plan for Wireless Device Over the Air Performance, Method of Measurement for Radiated RF Power and Receiver Performance”, Revision 3.9.4, February 2022.

[2] Document “OTA v3.9.x LAD v1.2” incl. “v3.9.X Measurement Uncertainty Template”, Version 1.2 for calculating the measurement uncertainty according CTIA OTA Test Plan v3.9.x.

6 Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2023-May-11
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End of Test Report