

Antenna Report

Report Number:

F231200E4

Equipment under Test (EUT):

**Cerabar PMP43
Antenna**

Applicant:

Endress+Hauser SE+Co. KG

Manufacturer:

Endress+Hauser SE+Co. KG

References

[1] None (According customer requirements)

Tested and
written by

Signature

Reviewed and
approved by:

Signature

This test report is only valid in its original form.

Any reproduction of its contents in extracts without written permission of the accredited test laboratory PHOENIX TESTLAB GmbH is prohibited.

The test results herein refer only to the tested sample. PHOENIX TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TESTLAB Logo and the TEST REPORT NUMBER.

Contents:	Page
1 Identification	4
1.1 Applicant.....	4
1.2 Manufacturer	4
1.3 Test Laboratory	4
1.4 AUT (Antenna under test)	5
1.5 Technical Data of Equipment	6
1.6 Dates	6
2 Operational States	7
3 Antenna photographs.....	7
3.1 Internal photographs	7
4 Antenna Charts.....	9
4.1 Results (Max. Gain).....	9
4.2 Antenna Diagrams EUT Position	10
4.2.1 Test Setup Photos	10
4.2.2 Azimuth charts of transmitter	11
4.2.2.1 Frequency near top (f_{high})	11
5 Test Equipment used for Tests	13
6 Report History.....	13

1 Identification

1.1 Applicant

Name:	Endress+Hauser SE+Co. KG
Address:	Hauptstr. 1 79689 Maulburg
Country:	Germany
Name for contact purposes:	Mr. Florian SEIDLER
Phone:	+49 7622-28-0
eMail address:	florian.seidler@endress.com
Applicant represented during the test by the following person:	-

1.2 Manufacturer

Name:	Endress+Hauser SE+Co. KG
Address:	Hauptstr. 1 79689 Maulburg
Country:	Germany
Name for contact purposes:	Mr. Florian SEIDLER
Phone:	+49 7622-28-0
eMail address:	florian.seidler@endress.com
Manufacturer represented during the test by the following person:	-

1.3 Test Laboratory

The tests were carried out by: **PHOENIX TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

1.4 AUT (Antenna under test)

Test object: *	2.4 GHz antenna on module PCB
Model name: *	n/a

	AUT number
	1
Serial number: *	W1000C01225
PCB identifier: *	Display Board: 71599584 Mainboard: 71439136 Terminal Board: 71508546
Hardware version: *	01.00.00
Software version: *	S140 V7.2.0 (Soft device)

* Declared by the applicant

One EUT was used for all tests.

Note: PHOENIX TESTLAB GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

1.5 Technical Data of Equipment

General	
Frequency Range *	2402 MHz to 2480 MHz

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
4-Wire I/O Link communication & DC	M12	USB-A	2.0 m	unshielded

Equipment used for testing	
Laptop* ²	Fujitsu Lifebook; S/N DSAK010801
FTDI Adapter: * ¹	Used for test mode configuration

*¹ Provided by the applicant

*² Provided by the laboratory

1.6 Dates

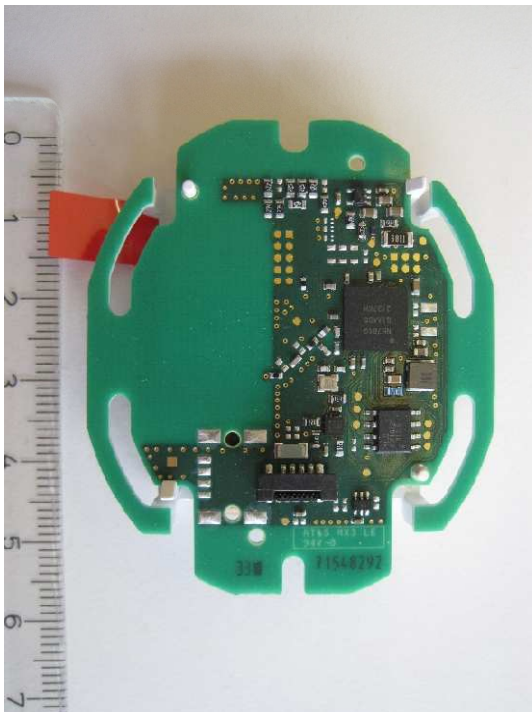
Date of receipt of test sample:	24.01.2024
Start of test:	04.07.2024
End of test:	04.07.2024

2 Operational States

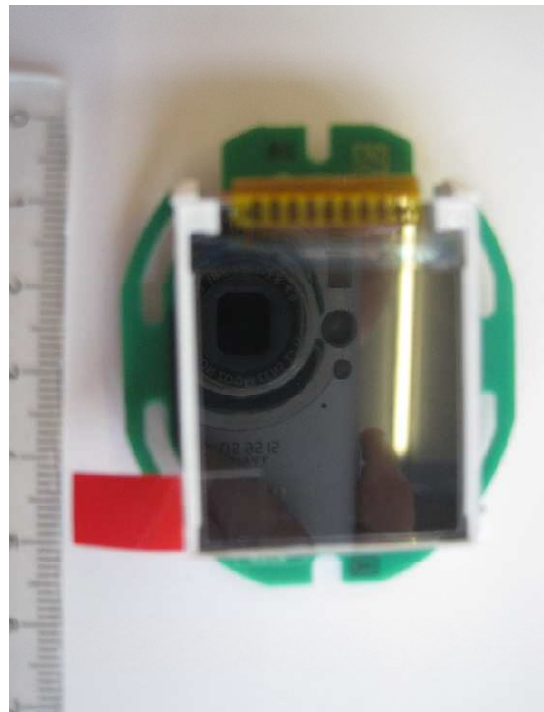
During the antenna chart measurements, the PCB antenna was supplied with a CW rf-signal generated by the EUT.

3 Antenna photographs

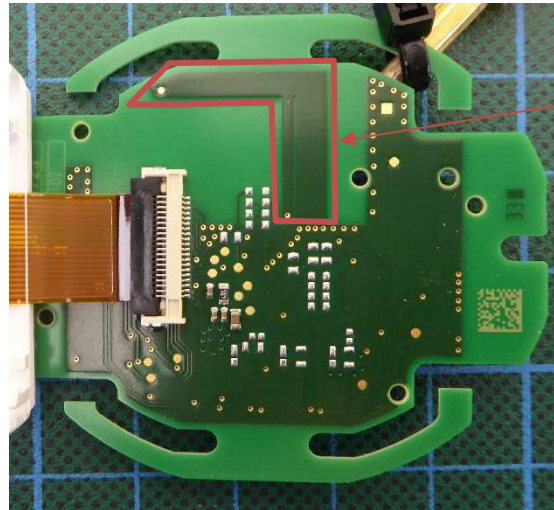
3.1 Internal photographs



Display board FMR43 bottom



Display board FMR43 top



Antenna

Display board Antenna

As defined by applicant, The PCB for the Cerabar is the same as the PCB in the level probing radar "FMR43". These photos were taken from the test report for the FMR43 "F230973E4", with the FCC ID LCGFMR43L and IC certification number 2519A-43L, issued by PHOENIX TESTLAB GmbH.

4 Antenna Charts

4.1 Results (Max. Gain)

The measurement was only carried out on the worst case frequency, in this case $f_{\text{high}} = 2480 \text{ MHz}$, as mentioned in the test report "F231200E2" issued by PHOENIX TESTLAB GmbH.

Antenna gain calculation		
		f_{high}
Conducted output power* [dBm]		6.1*
Radiated EIRP [dBm EIRP]		3.9
Antenna Gain [dBi]		-2.2
Position		Position 2
Position of maximum gain	Azimuth	312
	Polarisation	V

Conducted f_{high}^*	Meas BW (6dB) 100 kHz	Meas Time 100 ms	Frequency 2.4800000 GHz											
	Att 25 dB	Notch Off	Step TD Scan Automatic											
	Input 1 AC	PS	Preamp											
	1 Bargraph													
	Max Peak	6.14 dBm	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
	Average	6.07 dBm	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
	RMS	6.07 dBm	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10

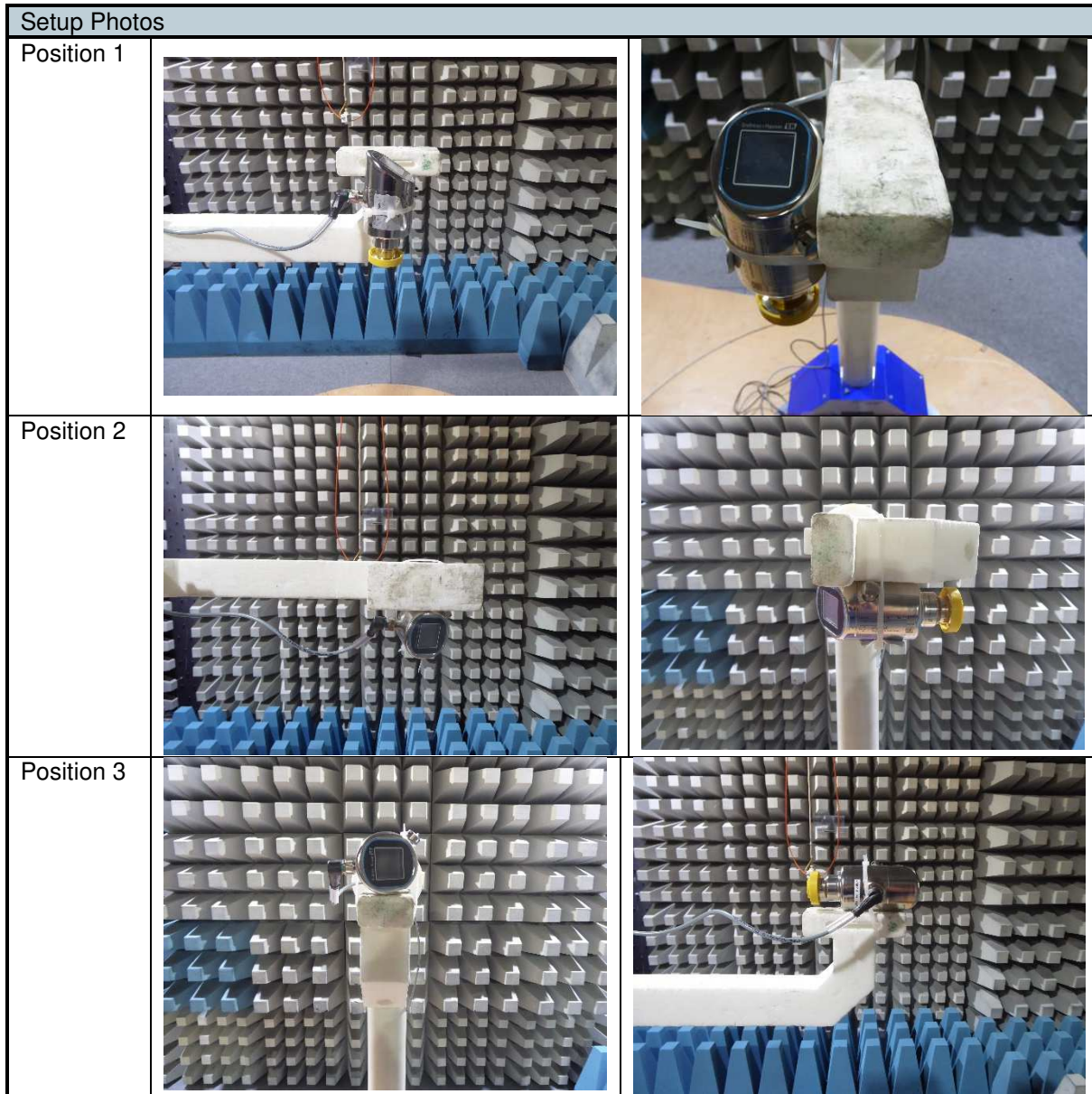
*As defined by applicant, The PCB for the Cerabar is the same as the PCB in the level probing radar "FMR43". The conducted measurement were therefore taken from the test report for the FMR43 "F230973E5", with the FCC ID LCGFMR43L and IC certification number 2519A-43L, issued by PHOENIX TESTLAB GmbH.

Test equipment (please refer to chapter 7 for details)

1 - 11

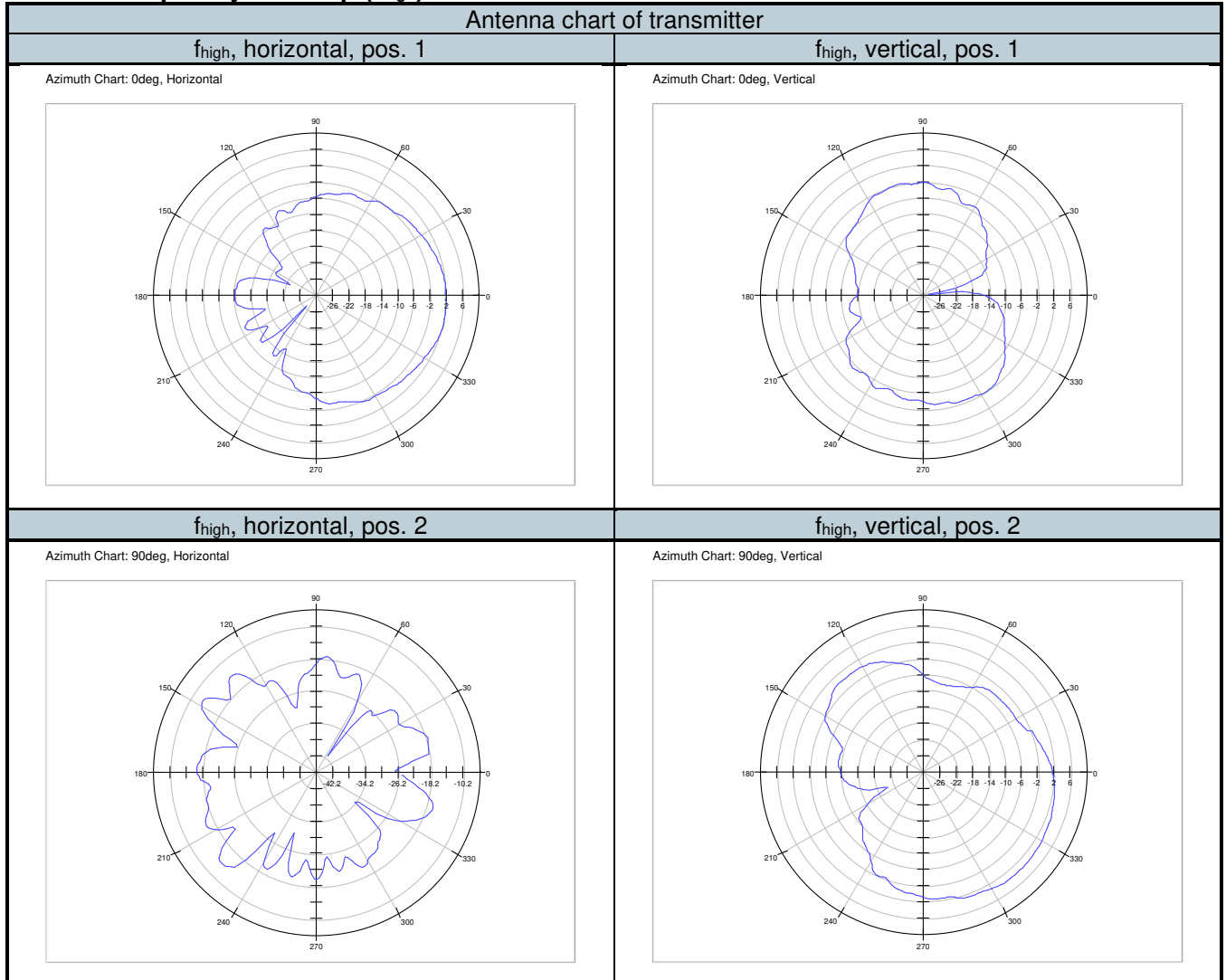
4.2 Antenna Diagrams EUT Position

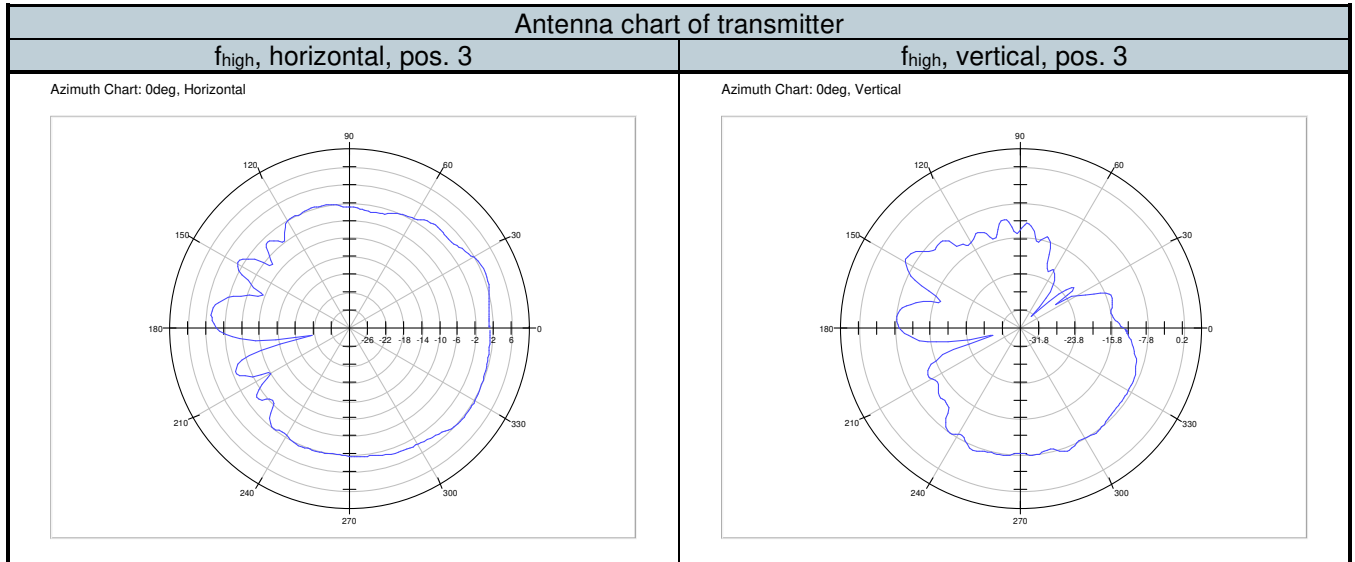
4.2.1 Test Setup Photos



4.2.2 Azimuth charts of transmitter

4.2.2.1 Frequency near top (f_{high})





5 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	Antenna (Horn)	3115	EMCO Elektronik GmbH	9609-4918	480183	Calibration not necessary	
2	RF cable	SF102/11SK/11S K 500.0	Huber+Suhner	521885/2	483401	Calibration not necessary	
3	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
4	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
5	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
6	Multiple Control Unit	MCU	Maturo GmbH	MCU/043/97110 7	480832	Calibration not necessary	
7	Positioners	TDF 1.5- 10Kg	Maturo	15920215	482034	Calibration not necessary	
8	Antenna (Horn)	3115	EMCO Elektronik GmbH	9609-4922	480184	14.11.2022	11.2025
9	CW Generator Microwave	83650L	Agilent	3844A00554	480333	27.02.2024	02.2026
10	Software	EMC32 V10.60.20	Rohde & Schwarz	---	483261	Calibration not necessary	
11	RF cable	SF106B/11N/11 N/7000.0	Huber & Suhner	500219/6B	482416	Calibration not necessary	

6 Report History

Report Number	Date	Comment
F231200E4	21.11.2024	Initial Test Report
-	-	-
-	-	-