

Antenna Report

Report Number:

F231198E4

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

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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	8
4.1 Results (Max. Gain).....	8
4.2 Antenna Diagrams EUT Position	9
4.2.1 Test Setup Photos	9
4.2.2 Azimuth charts of transmitter	10
4.2.2.1 Frequency near bottom (f_{low})	10
4.2.2.2 Frequency near middle (f_{mid})	11
4.2.2.3 Frequency near top (f_{high})	13
5 Test Equipment used for Tests.....	15
6 Report History.....	15

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
Applicant 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: 71548029 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	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

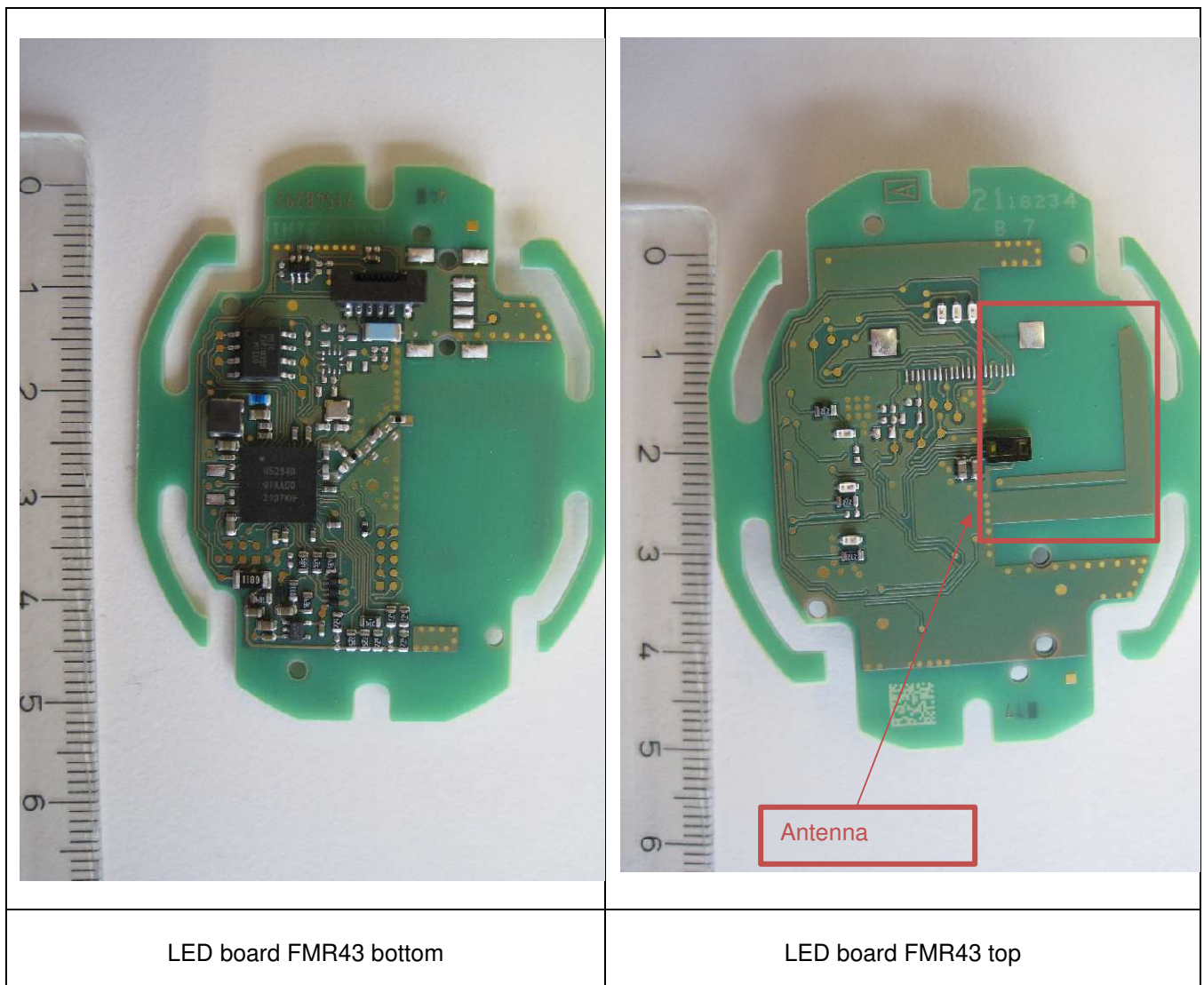
Date of receipt of test sample:	24.01.2024
Start of test:	26.06.2024
End of test:	04.07.2024

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



As defined by applicant, The PCB for the Cerabar is the same as the PCB in the level probing radar "FMR43", with the FCC ID LCGFMR43T and IC certification number 2519A-43T. These photos were taken from the test report for the FMR43 "F230975E6", issued by PHOENIX TESTLAB GmbH.

4 Antenna Charts

4.1 Results (Max. Gain)

Antenna gain calculation				
		f_{low}	f_{mid}	f_{high}
Conducted output power [dBm]		6.5	6.6	6.8
Radiated EIRP [dBm EIRP]		-9.4	-8.7	-7.1
Antenna Gain [dBi]		-15.9	-15.3	-13.9
Position		Position 3	Position 3	Position 3
Position of maximum gain	Azimuth	5	45	21
	Polarisation	V	V	V

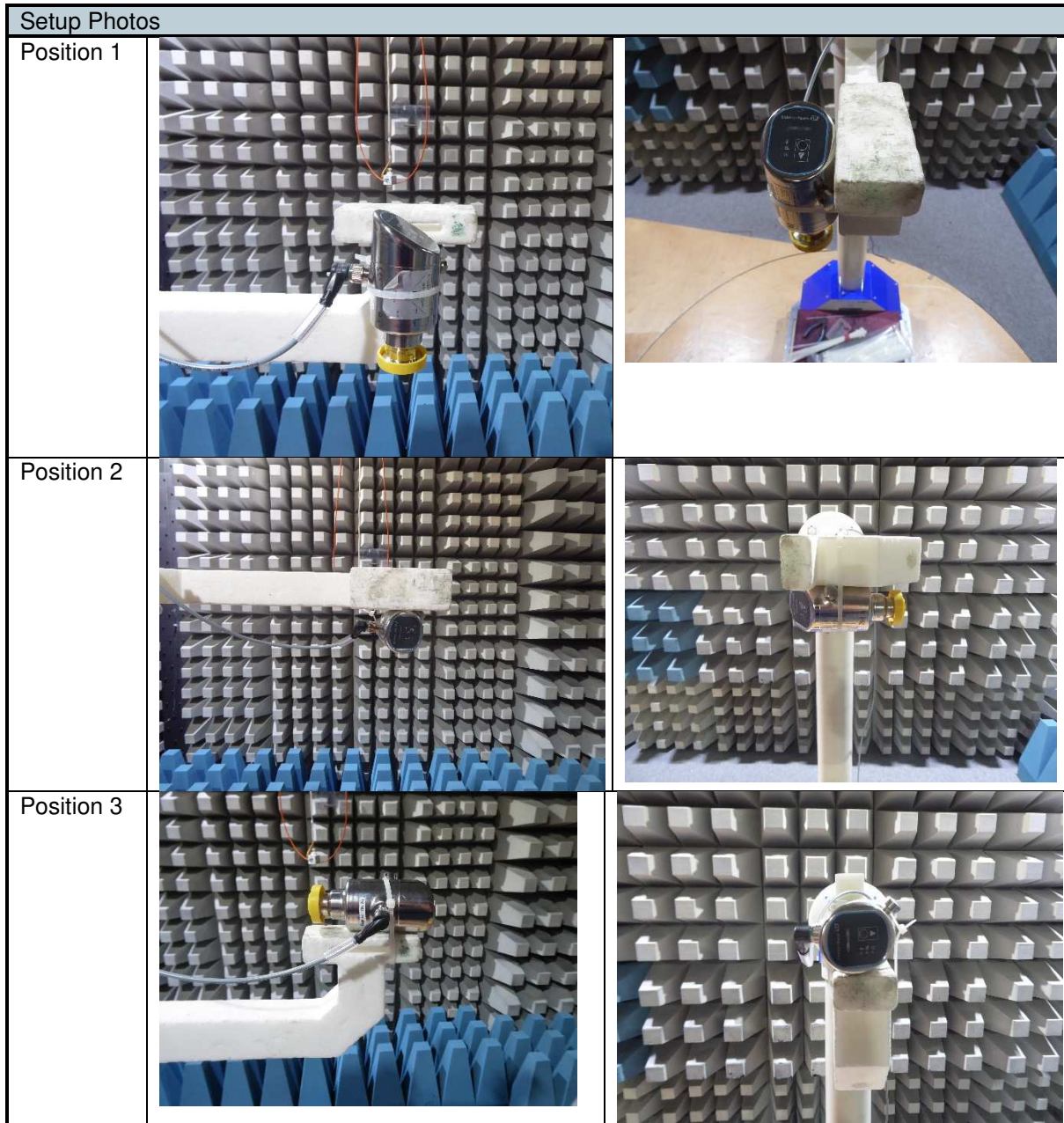
Conducted f_{low}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4020000 GHz
	1 Bargraph			
	Max Peak 6.52 dBm Average 6.49 dBm RMS 6.49 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
Conducted f_{mid}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4400000 GHz
	1 Bargraph			
	Max Peak 6.66 dBm Average 6.64 dBm RMS 6.64 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
Conducted f_{high}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4800000 GHz
	1 Bargraph			
	Max Peak 6.78 dBm Average 6.75 dBm RMS 6.75 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", with the FCC ID LCGFMR43T and IC certification number 2519A-43T. The conducted measurement were therefore taken from the test report for the FMR43, "F230975E6", issued by PHOENIX TESTLAB GmbH

Test equipment (please refer to chapter 7 for details)
1 - 11

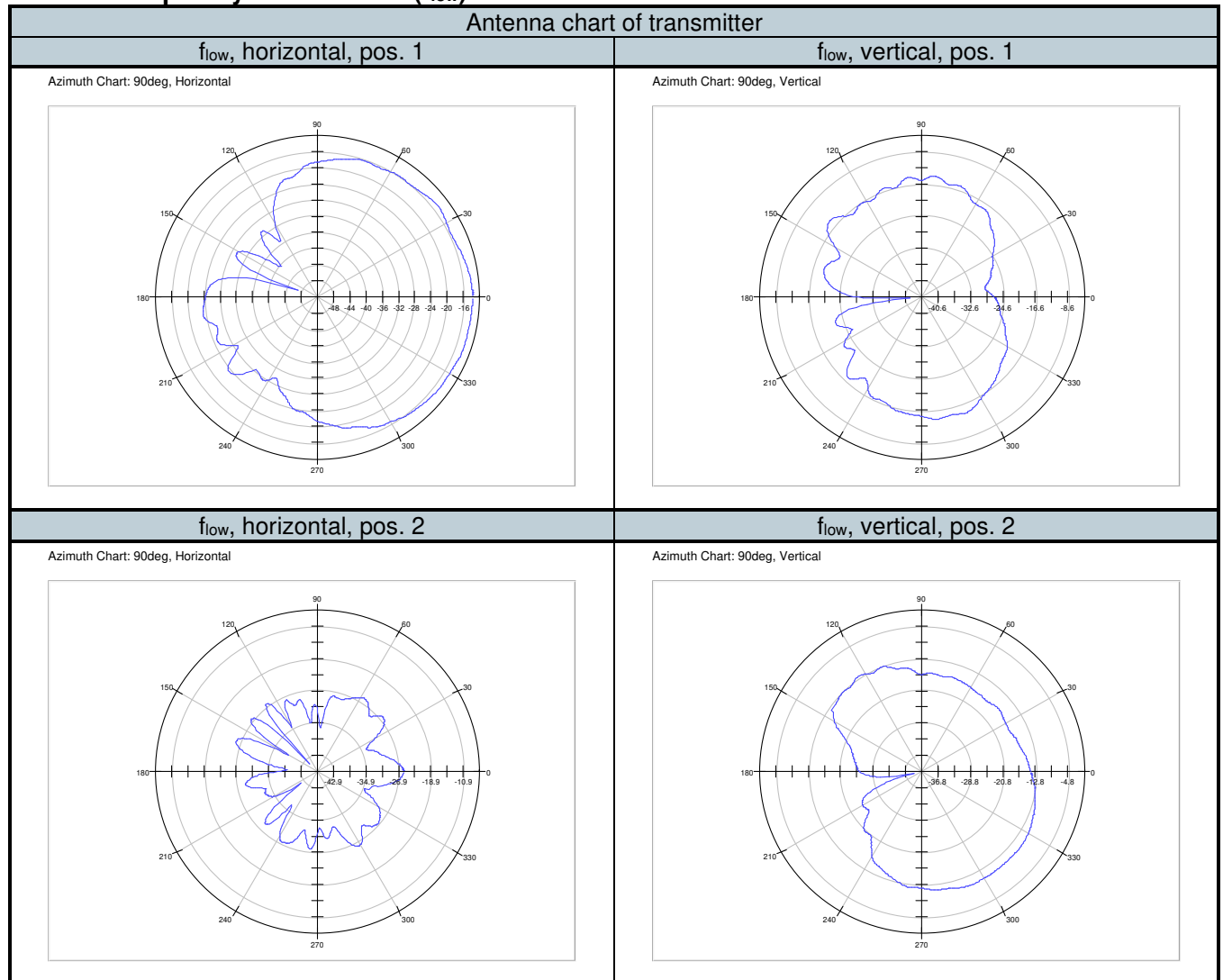
4.2 Antenna Diagrams EUT Position

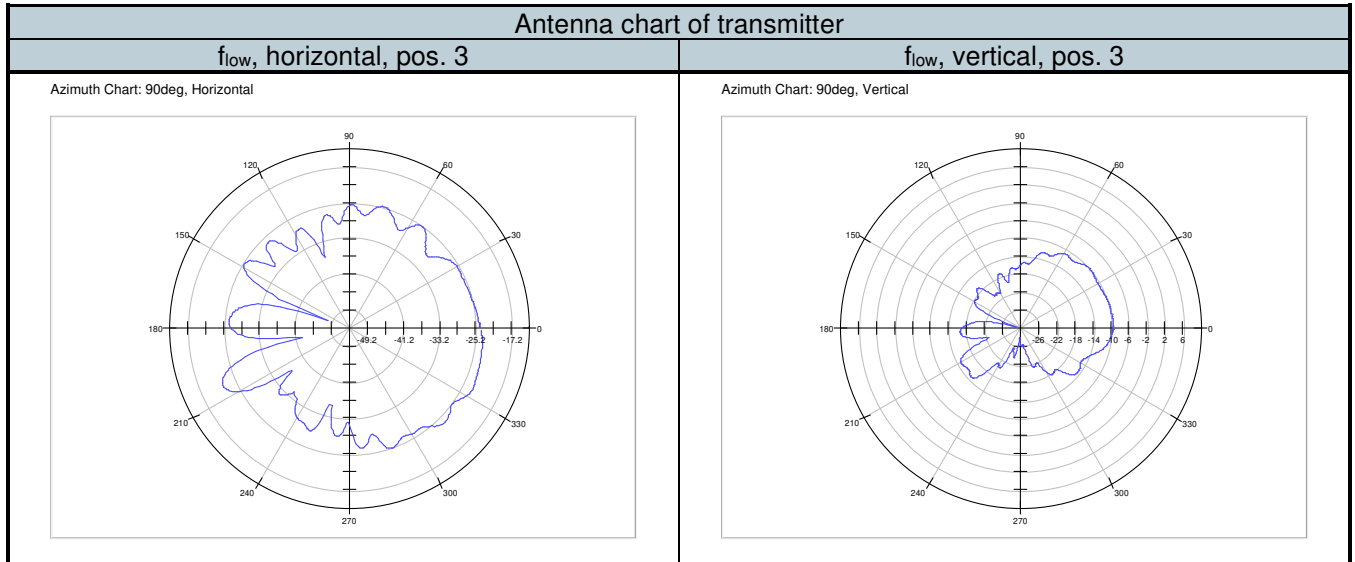
4.2.1 Test Setup Photos



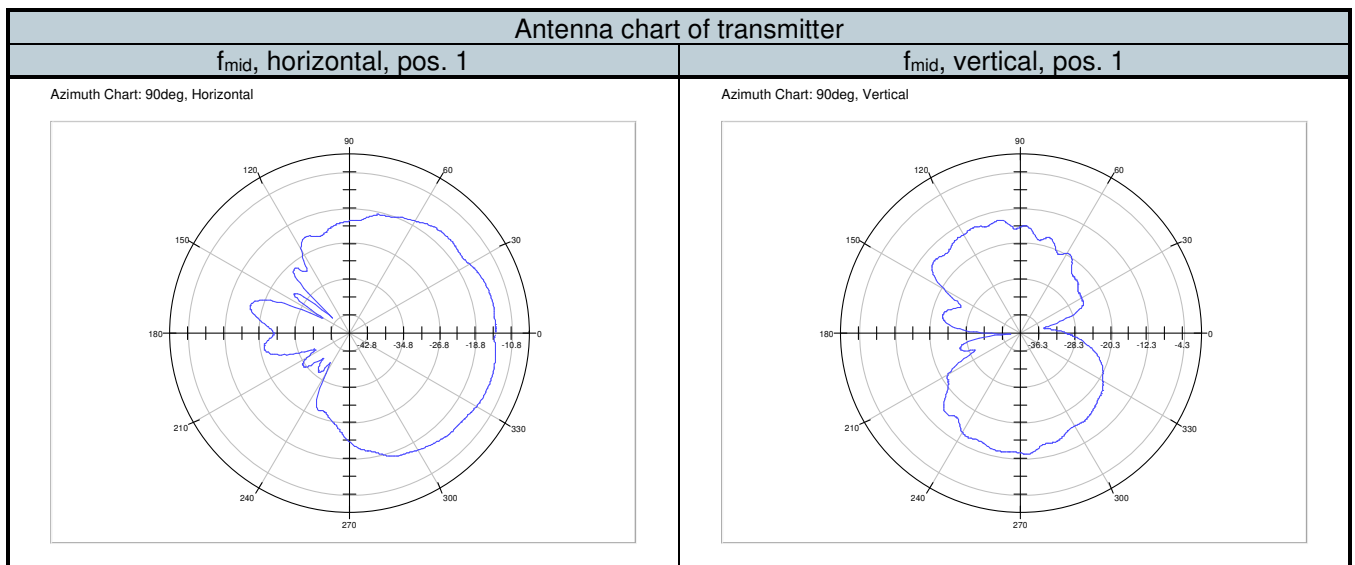
4.2.2 Azimuth charts of transmitter

4.2.2.1 Frequency near bottom (f_{low})





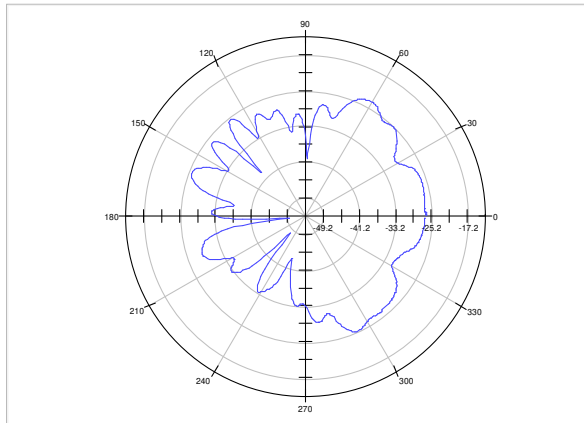
4.2.2.2 Frequency near middle (f_{mid})



Antenna chart of transmitter

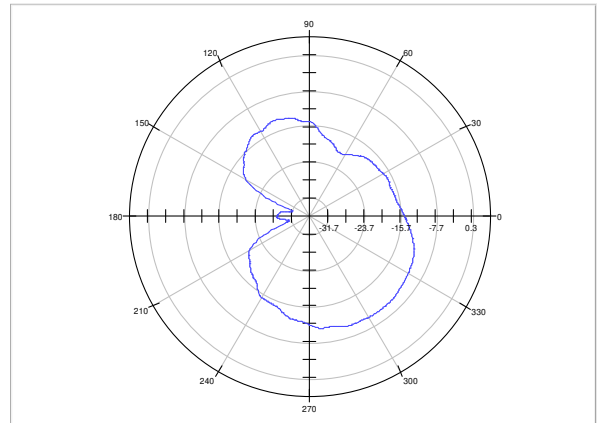
f_{mid} , horizontal, pos. 2

Azimuth Chart: 90deg, Horizontal



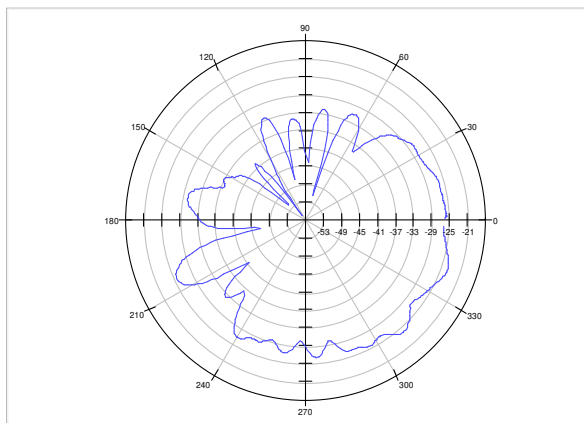
f_{mid} , vertical, pos. 2

Azimuth Chart: 90deg, Vertical



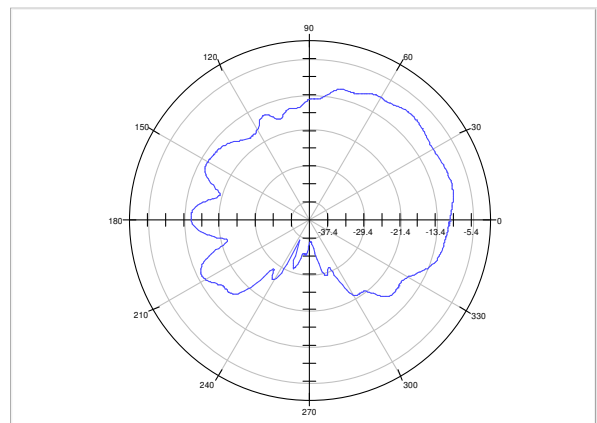
f_{mid} , horizontal, pos. 3

Azimuth Chart: 90deg, Horizontal

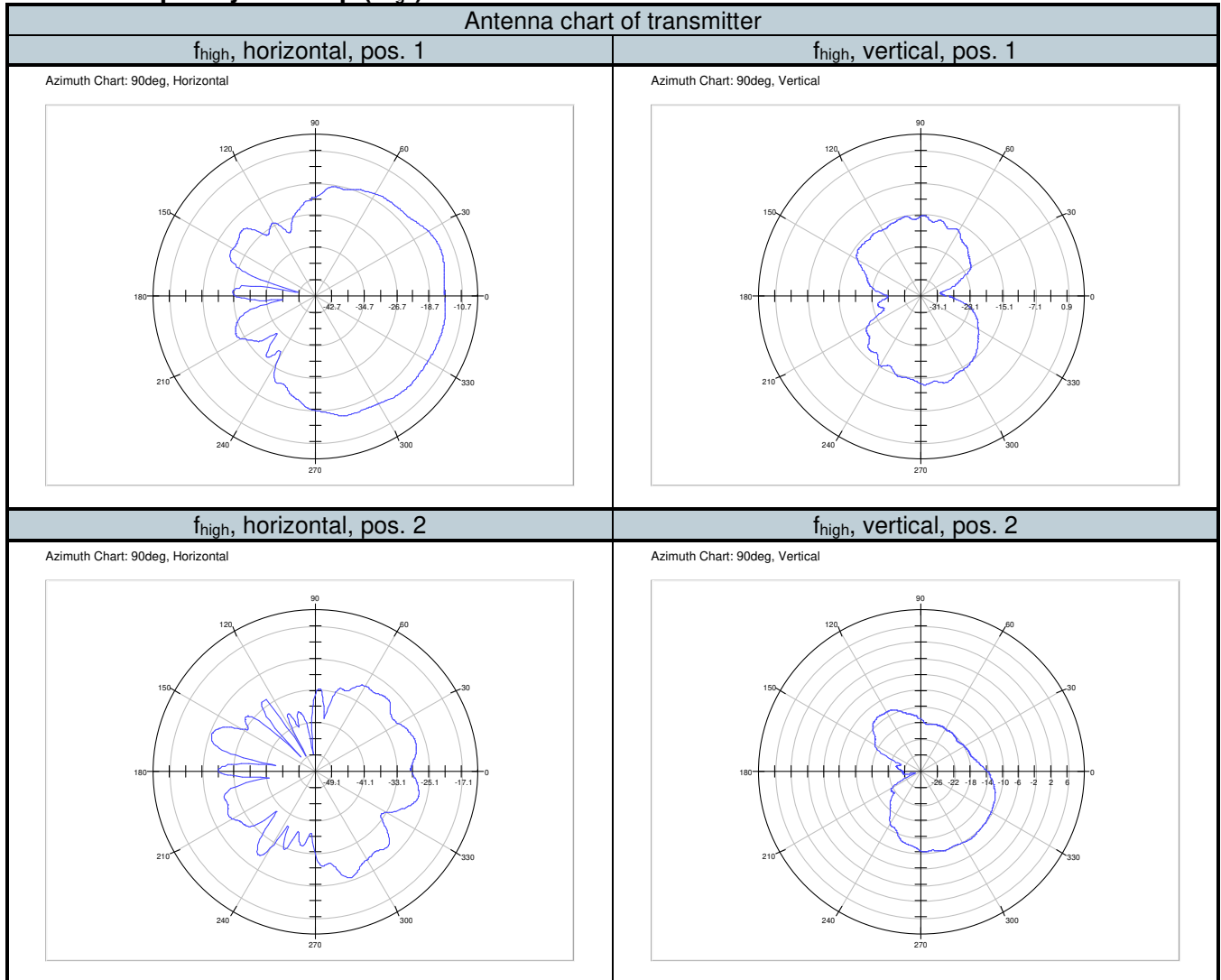


f_{mid} , vertical, pos. 3

Azimuth Chart: 90deg, Vertical



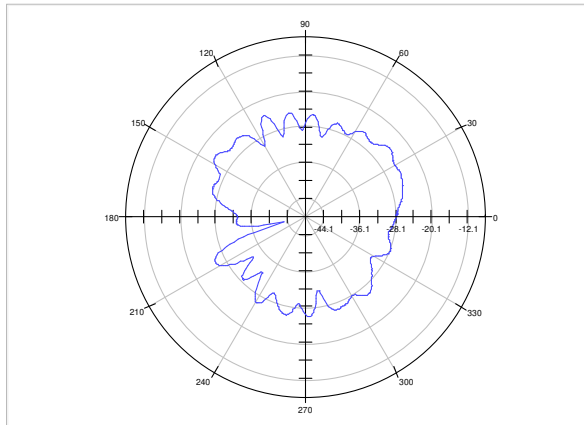
4.2.2.3 Frequency near top (f_{high})



Antenna chart of transmitter

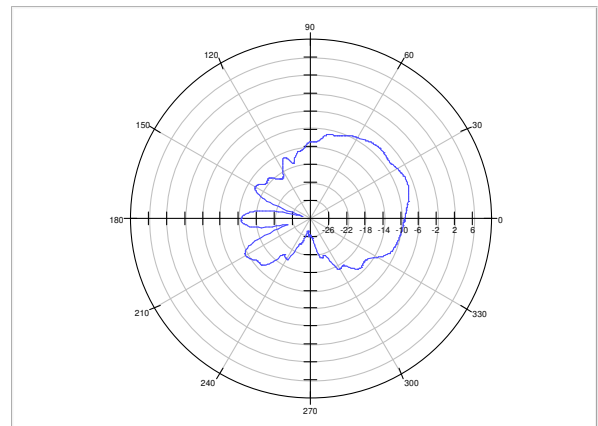
f_{high} , horizontal, pos. 3

Azimuth Chart: 90deg, Horizontal



f_{high} , vertical, pos. 3

Azimuth Chart: 90deg, Vertical



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
-	-	-
-	-	-

----- end of test report -----