

Antenna Report

Report Number:

F231195E4

Equipment under Test (EUT):

**TrackSense Pro SKY Module
Antenna**

Applicant:

Ellab A/S

Manufacturer:

Ellab A/S

References

[1] None (According customer requirements)

Disclaimer

Tested and
written by



Bernward ROHDE
15.12.2023

Signature

Reviewed and
approved by:



Bernd STEINER
21.12.2023

Signature

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1 Identification

1.1 Applicant

Name:	Ellab A/S
Address:	Trollesmindealle 25, 3400 Hilleroed
Country:	Denmark
Name for contact purposes:	James Jacobsson
Phone:	+45-4452-0500
eMail address:	JJA@ELLAB.COM
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Ellab A/S
Address:	Trollesmindealle 25, 3400 Hilleroed
Country:	Denmark
Name for contact purposes:	James Jacobsson
Phone:	+45-4452-0500
eMail address:	JJA@ELLAB.COM
Manufacturer represented during the test by the following person:	None

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: *	Johanson Technology 2450AT18D0100

	AUT number		
	1	2	3
Serial number: *	-	-	-
PCB identifier: *	-	-	-
Hardware version: *	-	-	-
Software version: *	-	-	-

* 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 *	2405 MHz to 2475 MHz

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
---	---	---	---	---

Equipment used for testing	
Ellab Sky module	

1.6 Dates

Date of receipt of test sample:	17.07.2023
Start of test:	18.08.2023
End of test:	18.08.2023

2 Operational States

During the antenna chart measurements, the antenna was supplied with a rf-signal with a level as shown in the chapter below its antenna connector.

3 Additional Information

Conducted measurements were done with a modified sample as provided by the applicant

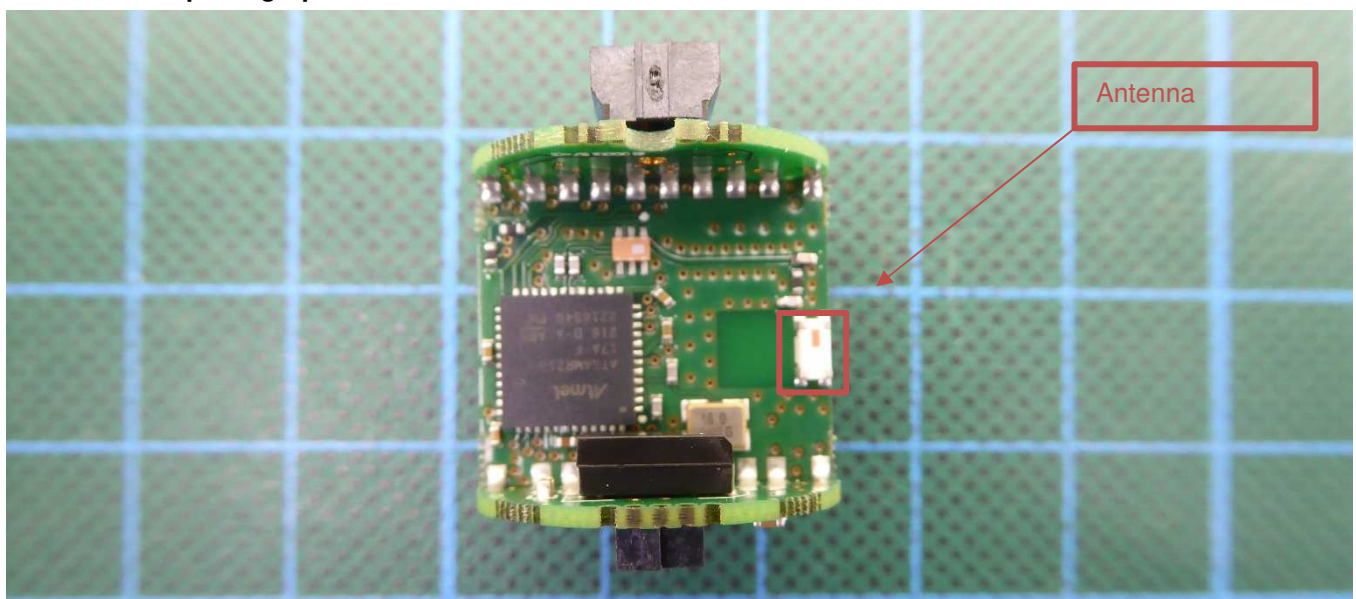
4 Antenna photographs

4.1 External photographs



AUT installed in host

4.2 Internal photographs



AUT on radio PCB

5 Antenna Charts

5.1 Results (Max. Gain)

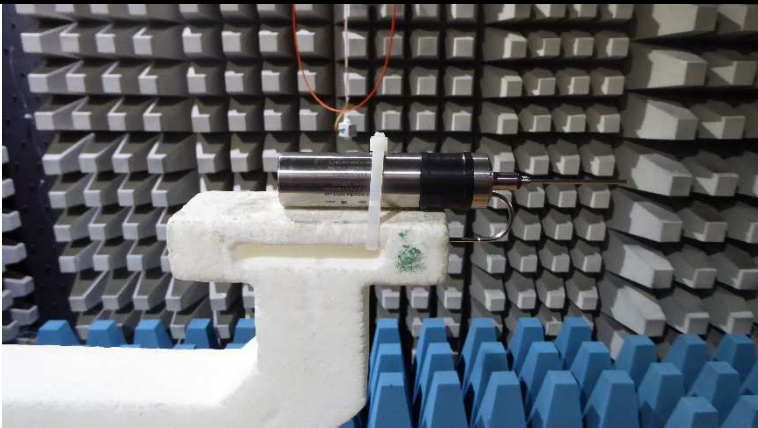
Antenna gain calculation				
		f_{low}	f_{mid}	f_{high}
Conducted output power [dBμV]		111.4	111.3	111.1
Conducted output power [dBm]		4.4	4.3	4.1
Radiated EIRP [dBm EIRP]		8.5	7.6	5.8
Antenna Gain [dBi]		4.1	3.3	1.7
Position		Position 1	Position 1	Position 1
Position of maximum gain	Azimuth	220	220	220
	Elevation	0	0	0
	Polarisation	H	H	H

Conducted f_{low}	MultiView Receiver Meas BW (6dB) 10 MHz Att 20 dB Input 1 AC Meas Time 10 ms Notch PS Step TD Scan Automatic Preamp Off Frequency 2.4050000 GHz 1 Barograph Pk+ 111.40 dBμV 111.4 2.4050000 GHz 30 40 50 60 70 80 90 100 110
Conducted f_{mid}	MultiView Receiver Meas BW (6dB) 10 MHz Att 20 dB Input 1 AC Meas Time 10 ms Notch PS Step TD Scan Automatic Preamp Off Frequency 2.4400000 GHz 1 Barograph Pk+ 111.31 dBμV 111.3 2.4400000 GHz 30 40 50 60 70 80 90 100 110
Conducted f_{high}	MultiView Receiver Meas BW (6dB) 10 MHz Att 20 dB Input 1 AC Meas Time 10 ms Notch PS Step TD Scan Automatic Preamp Off Frequency 2.4750000 GHz 1 Barograph Pk+ 111.11 dBμV 111.1 2.4750000 GHz 30 40 50 60 70 80 90 100 110

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

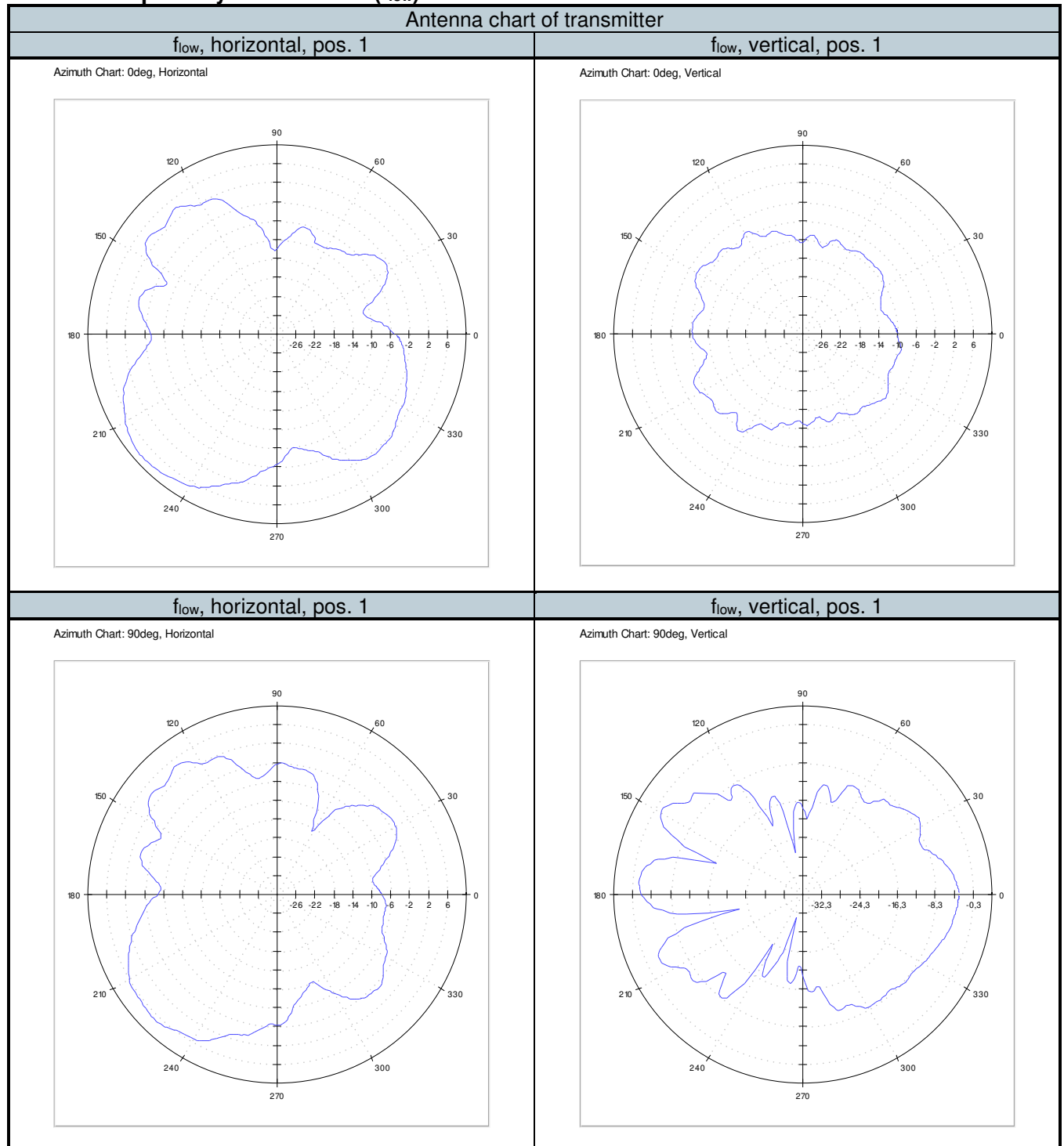
5.2 Antenna Diagrams EUT Position 1

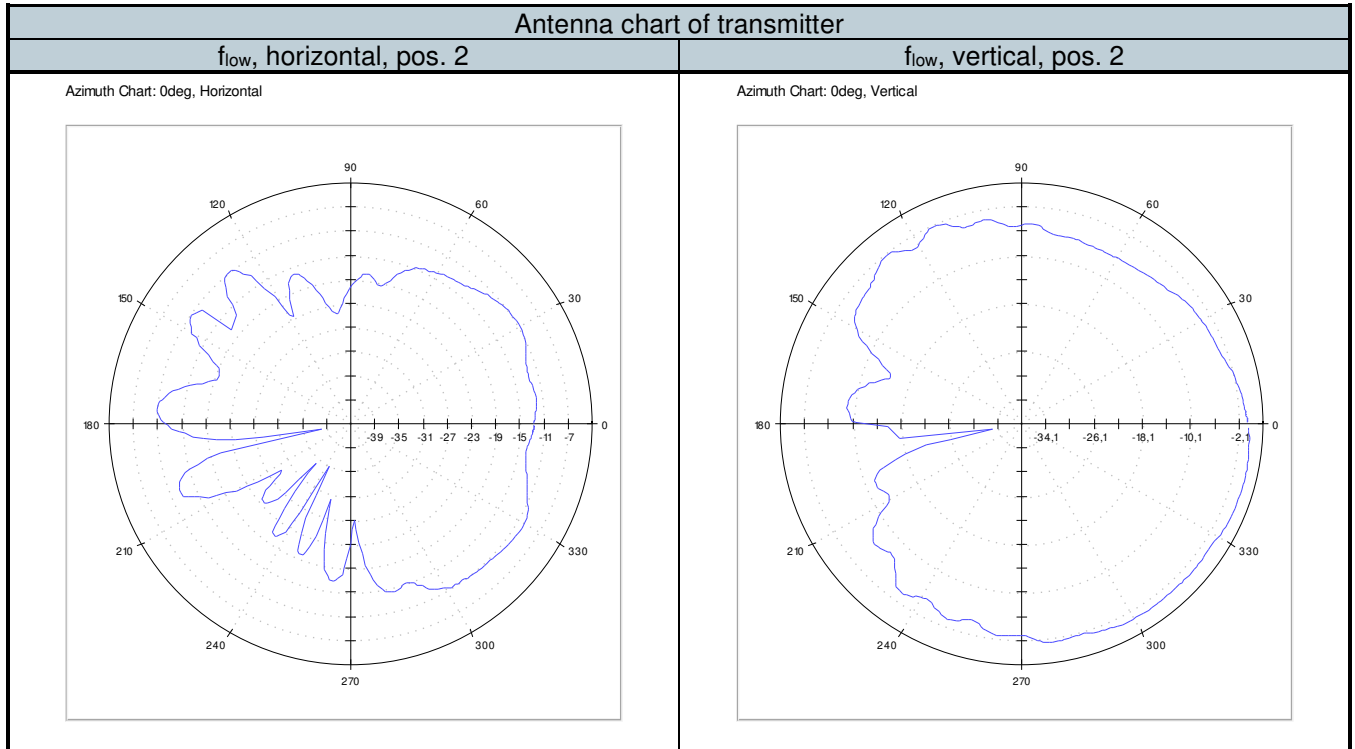
5.2.1 Test Setup Photos

Setup Photos	
Position 1	
Position 2	

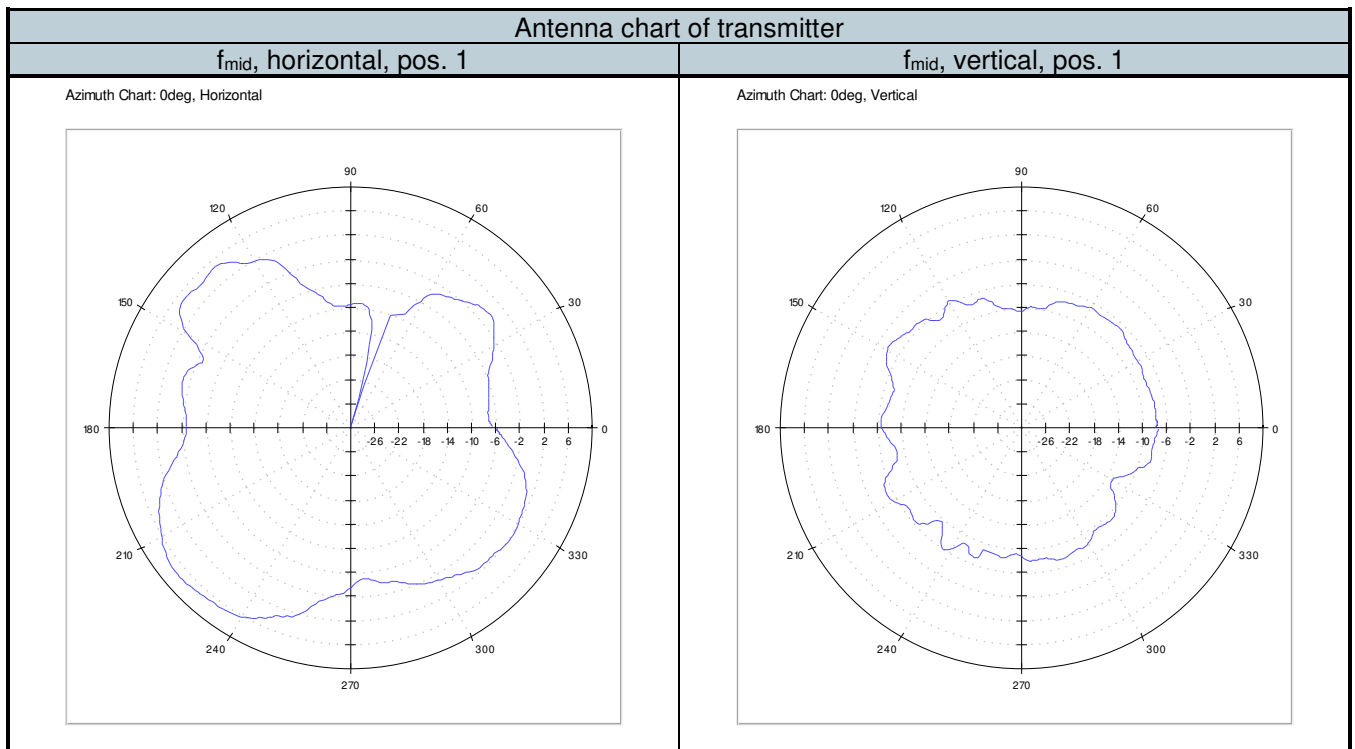
5.2.2 Azimuth charts of transmitter

5.2.2.1 Frequency near bottom (f_{low})





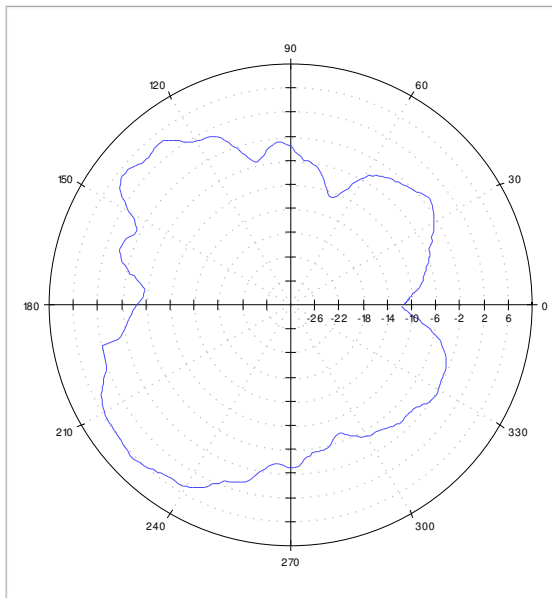
5.2.2.2 Frequency near middle (f_{mid})



Antenna chart of transmitter

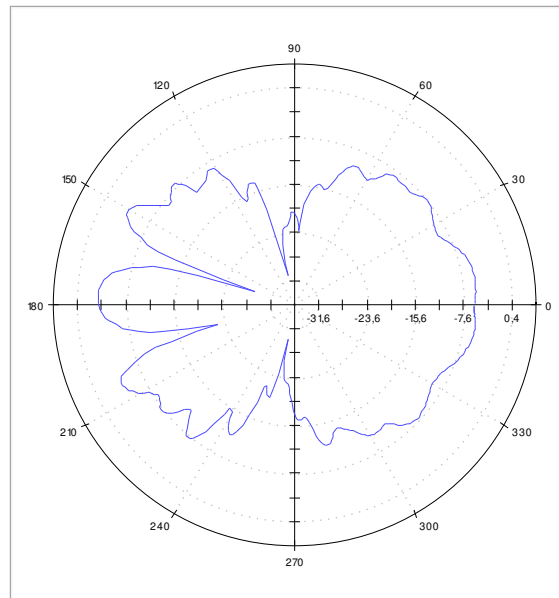
f_{mid} , horizontal, pos. 1

Azimuth Chart: 90deg, Horizontal



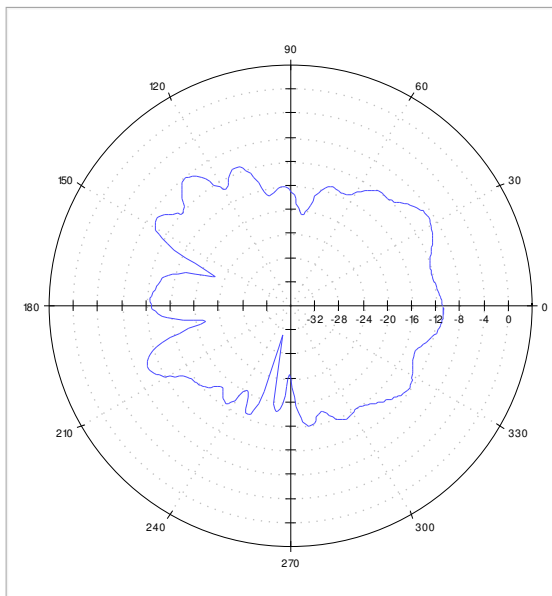
f_{mid} , vertical, pos. 1

Azimuth Chart: 90deg, Vertical



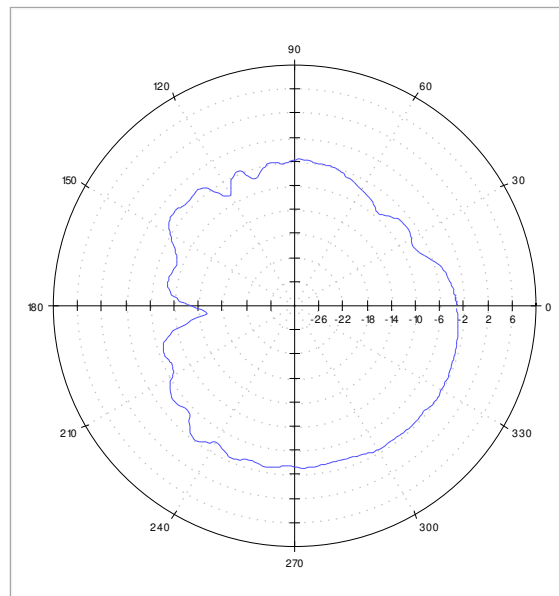
f_{mid} , horizontal, pos. 2

Azimuth Chart: 0deg, Horizontal

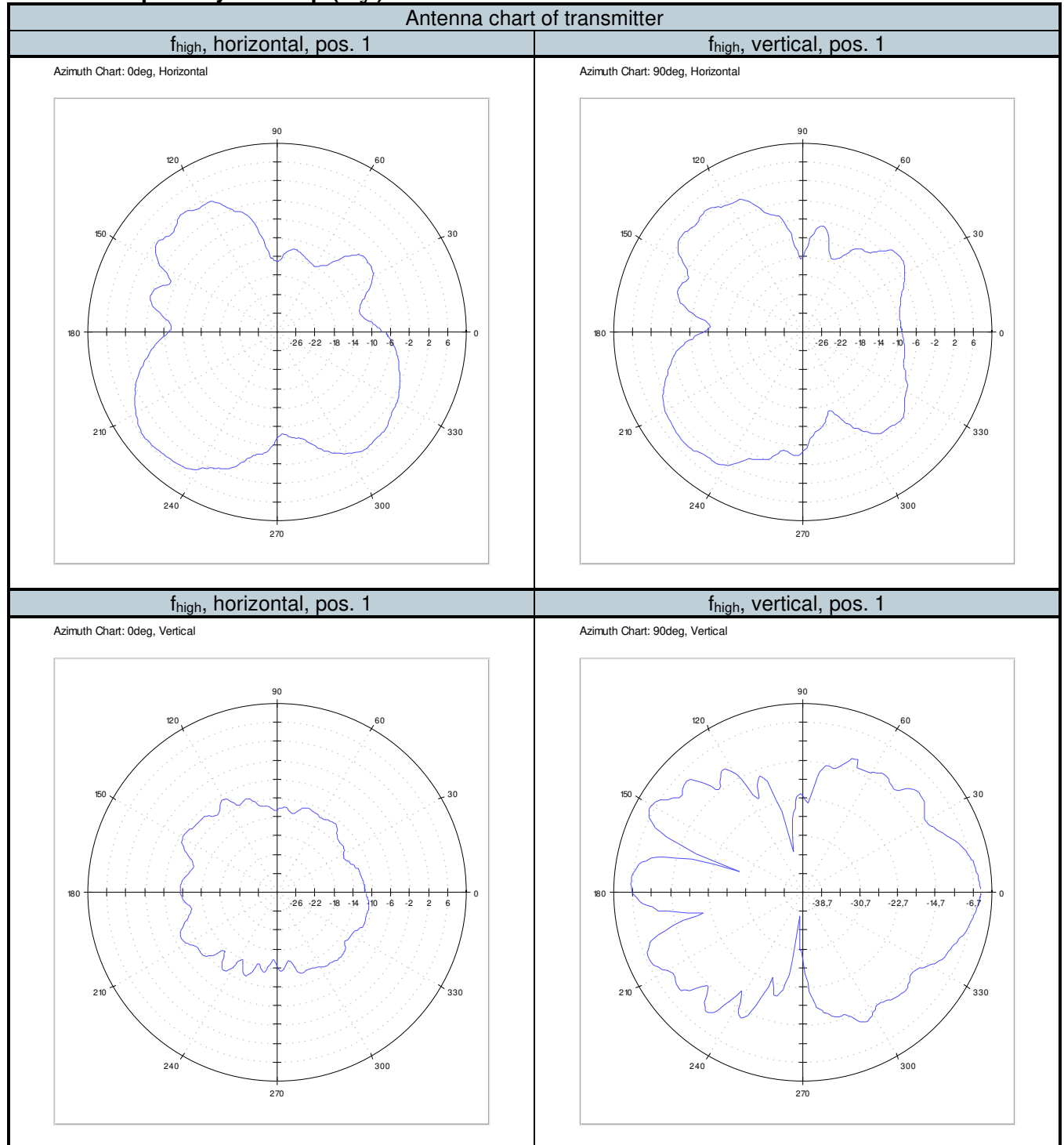


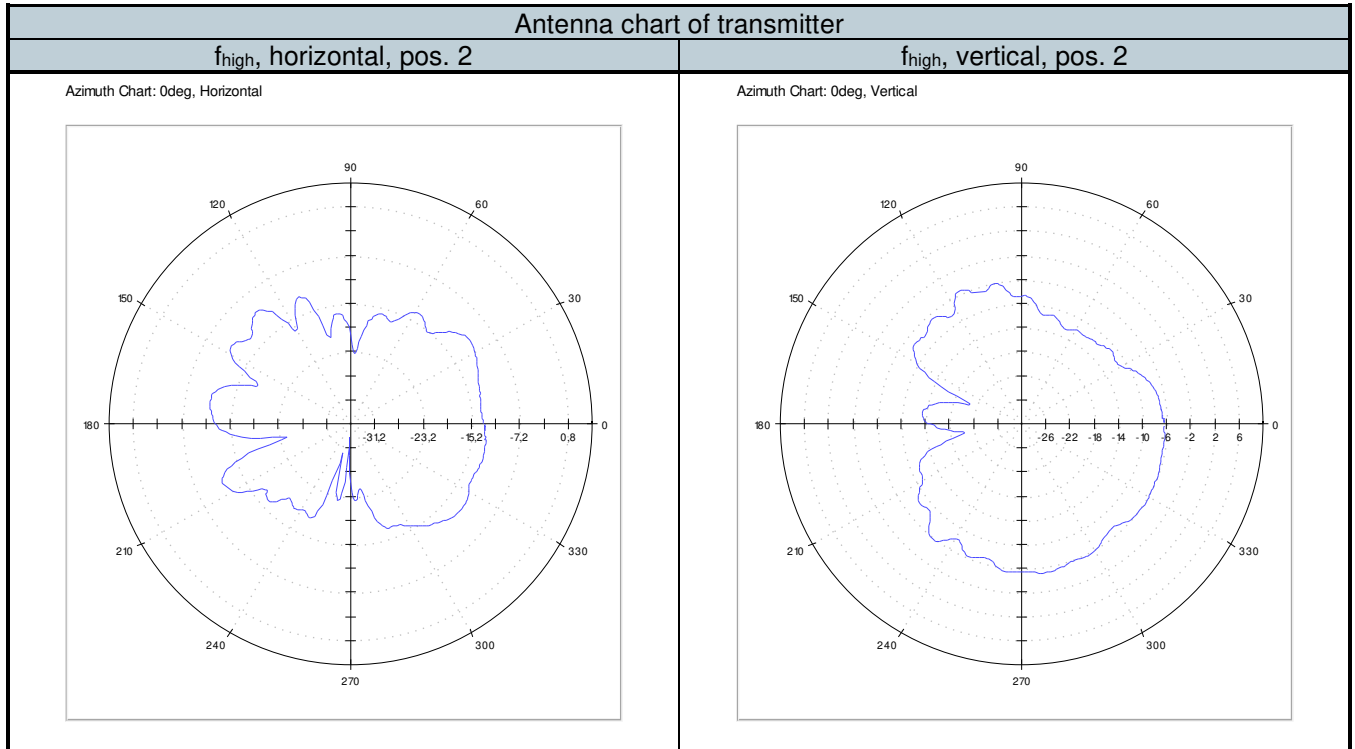
f_{mid} , vertical, pos. 2

Azimuth Chart: 0deg, Vertical



5.2.2.3 Frequency near top (f_{high})





6 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	23.02.2021	02.2024
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	22.02.2022	02.2024
10	Software	EMC32 V10.60.20	Rohde & Schwarz		483261	Calibration not necessary	
11	EMI Receiver / Spectrum Analyser	ESW44	Rohde & Schwarz	101635	482467	22.02.2022	02.2024

7 Report History

Report Number	Date	Comment
F231195E4	15.12.2023	Initial Test Report
-	-	-
-	-	-