

Antenna Report

Report Number:

F240384E8

Equipment under Test (EUT):

**Two Wire Transmitter
Liquiline CM42B
Antenna**

Applicant:

Endress+Hauser Conducta GmbH + Co. KG

Manufacturer:

Endress+Hauser Conducta GmbH + Co. KG

References

[1] None (According customer requirements)

Tested and
written by



Bernward ROHDE
10.02.2025

Signature

Reviewed and
approved by:



Paul Neufeld
10.02.2025

Signature

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1 Identification

1.1 Applicant

Name:	Endress+Hauser Conducta GmbH+Co. KG
Address:	Dieselstrasse 24, 70839 Gerlingen
Country:	Germany
Name for contact purposes:	Mr. Henryk HOFMANN
Phone:	+49 7156 209 10211
eMail address:	henryk.hofmann@endress.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Endress+Hauser Conducta GmbH+Co. KG
Address:	Dieselstrasse 24, 70839 Gerlingen
Country:	Germany
Name for contact purposes:	Mr. Henryk HOFMANN
Phone:	+49 7156 209 10211
eMail address:	henryk.hofmann@endress.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 in host
Model name: *	---

Test object: *		Two Wire Transmitter (antenna)
Model name: *		Liquiline CM42B
Model number: *		CM42B
Order number: *		CM42B
Serial number: *		WB000605G00
PCB identifier: *	Board 1	VXCM1
	Board 2	VICO1
	Board 3	VD2W1
Hardware version: *	Board 1	Vx.04.xx
	Board 2	Vx.03.xx
	Board 3	Vx.04.xx
Software version: *		SoftDevice S132 Version: 7.2.0

* 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		
---	---	---	---	---

Equipment used for testing	
CM42 – conducted sample	Radio board and mainboard as provided by the applicant, see 4.1

1.6 Dates

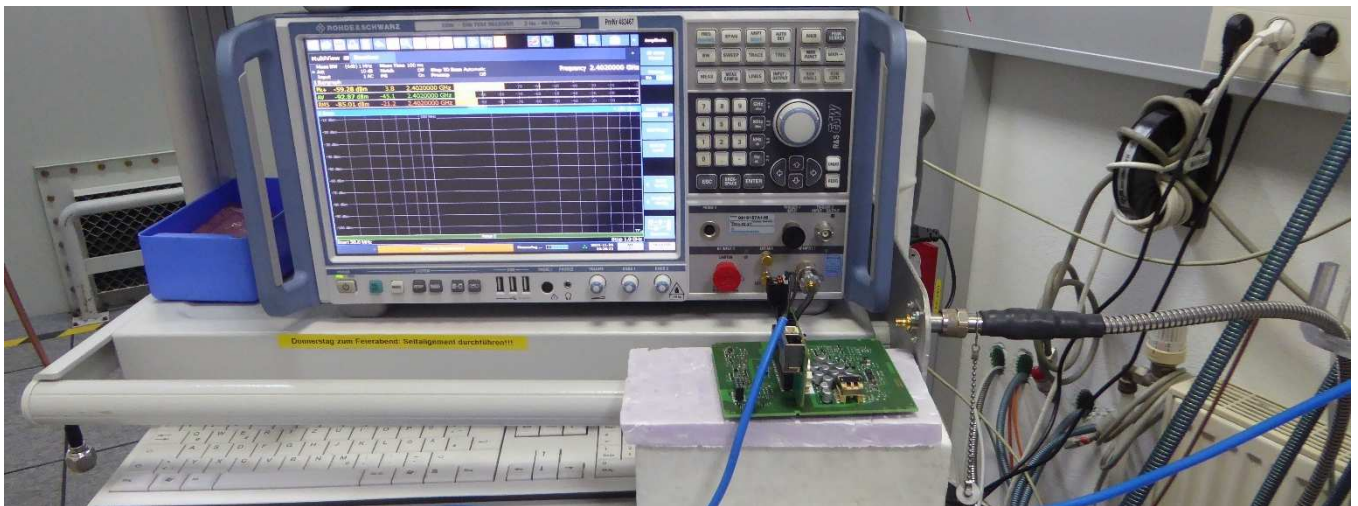
Date of receipt of test sample:	12.11.2024
Start of test:	29.11.2024
End of test:	29.11.2024

2 Operational States

During the antenna chart measurements, the antenna was supplied to its antenna connector with a CW RF-signal generated by the EU with a level as shown in the chapter below.

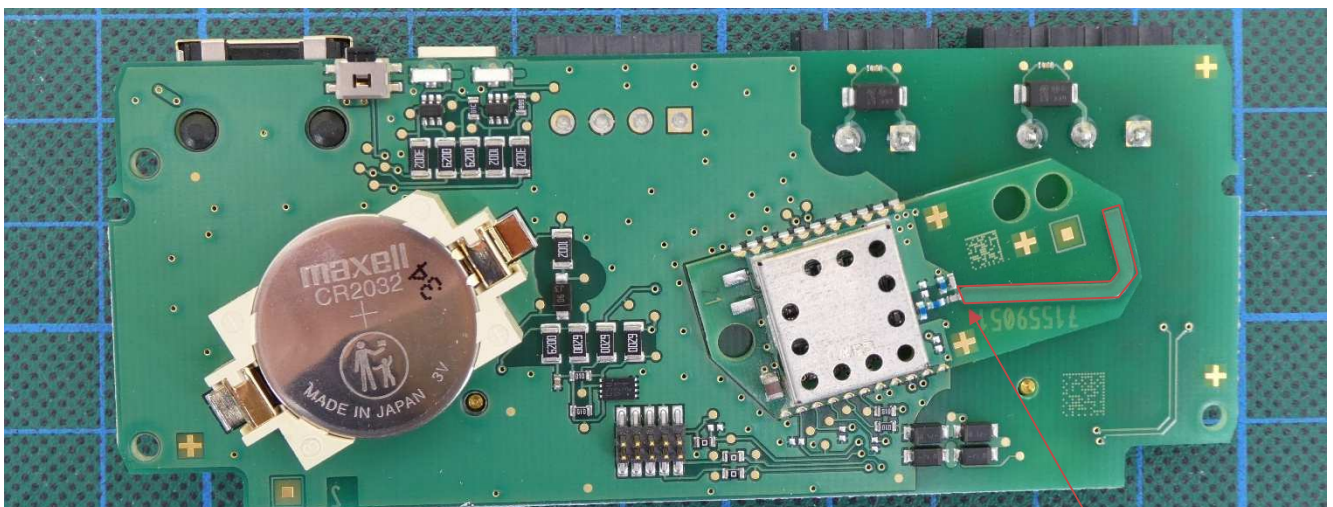
3 Additional Information

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



4 Antenna photographs

4.1 Internal photographs



AUT on radio PCB

Antenna

5 Antenna Charts

5.1 Results (Max. Gain)

Antenna gain calculation				
		f_{low}	f_{mid}	f_{high}
Conducted output power [dBm]		3.7	3.7	3.6
Radiated EIRP [dBm EIRP]		1.7	2.2	1.0
Antenna Gain [dBi]		-2.0 dBi	-1.5 dBi	-2.6 dBi
Position		Pos 2	Pos 2	Pos 3
Position of maximum gain	Azimuth	168	188	179
	Polarisation	Horizontal	Horizontal	Vertical

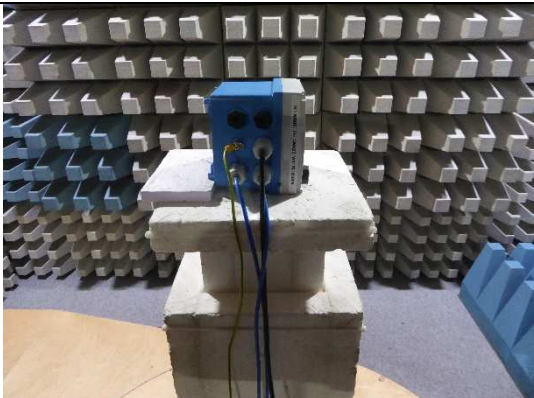
Conducted f_{low}	MultiView ☒ Receiver v															
	Meas BW (6dB) 1 MHz		Meas Time 100 ms		Frequency 2.4020000 GHz											
	Att 25 dB	Notch PS	Off On	Step TD Scan Automatic Off												
	Input 1 AC	PS	On	Preamp												
Conducted f_{mid}	MultiView ☒ Receiver v															
	Meas BW (6dB) 1 MHz		Meas Time 100 ms		Frequency 2.4400000 GHz											
	Att 25 dB	Notch PS	Off On	Step TD Scan Automatic Off												
	Input 1 AC	PS	On	Preamp												
Conducted f_{high}	MultiView ☒ Receiver v															
	Meas BW (6dB) 1 MHz		Meas Time 100 ms		Frequency 2.4800000 GHz											
	Att 25 dB	Notch PS	Off On	Step TD Scan Automatic Off												
	Input 1 AC	PS	On	Preamp												
		1 Bargraph														
		Pk+	3.76 dBm	3.8	2.4020000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		AV	3.73 dBm	3.7	2.4020000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		RMS	3.73 dBm	3.7	2.4020000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		Pk+	3.77 dBm	3.8	2.4400000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		AV	3.75 dBm	3.7	2.4400000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		RMS	3.75 dBm	3.7	2.4400000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		Pk+	3.66 dBm	3.7	2.4800000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		AV	3.62 dBm	3.6	2.4800000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10
		RMS	3.62 dBm	3.6	2.4800000 GHz	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10

Test equipment (please refer to chapter 7 for details)

1 - 11

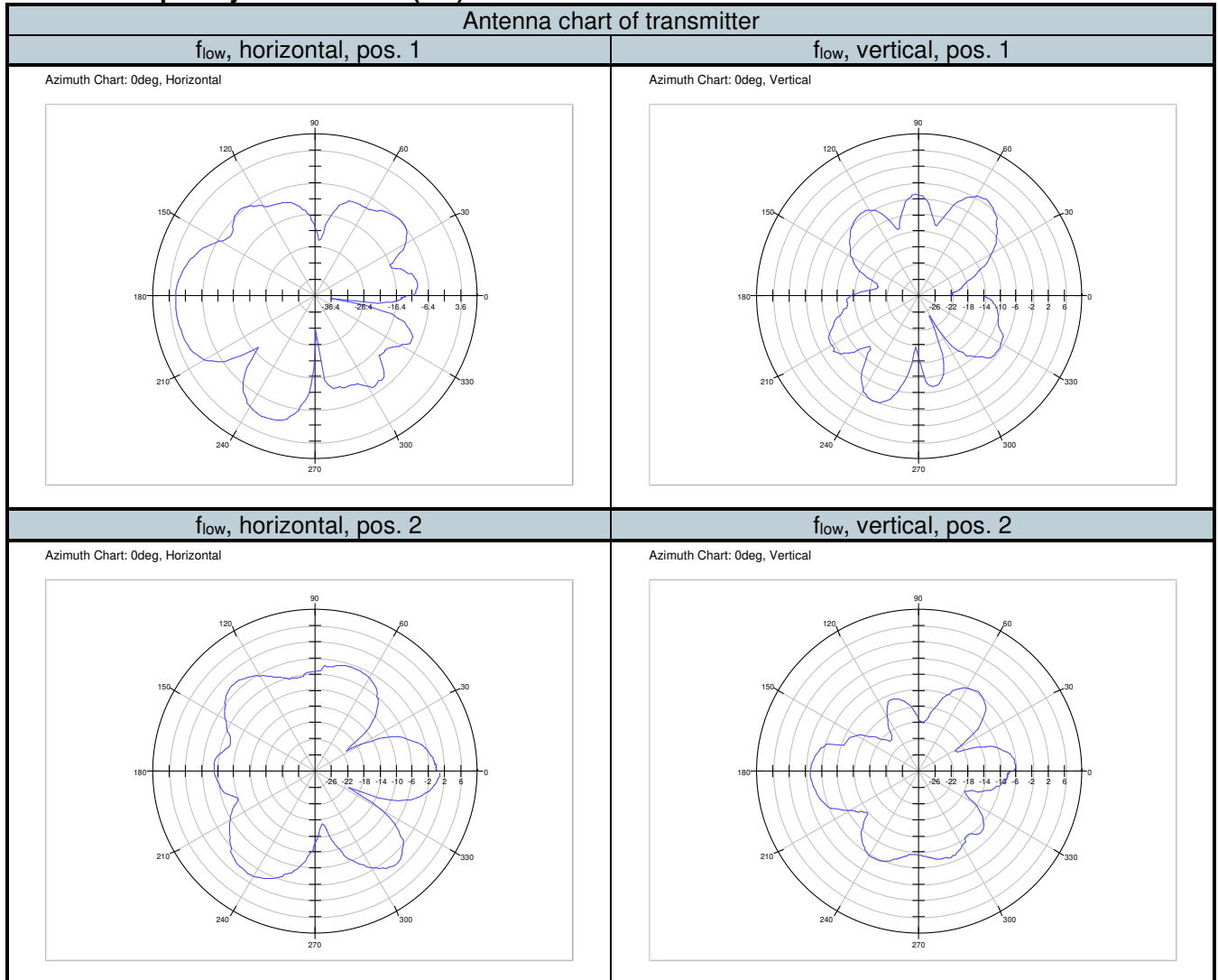
5.2 Antenna Diagrams EUT Position

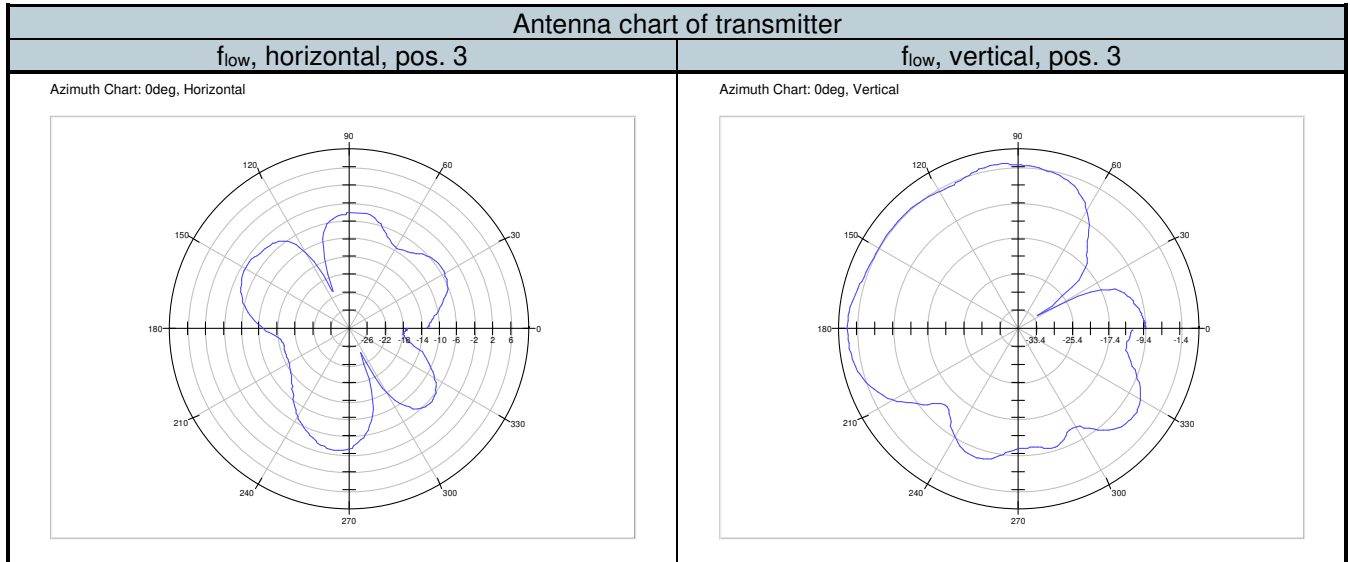
5.2.1 Test Setup Photos

Setup Photos	
Position 1	 
Position 2	 
Position 3	 

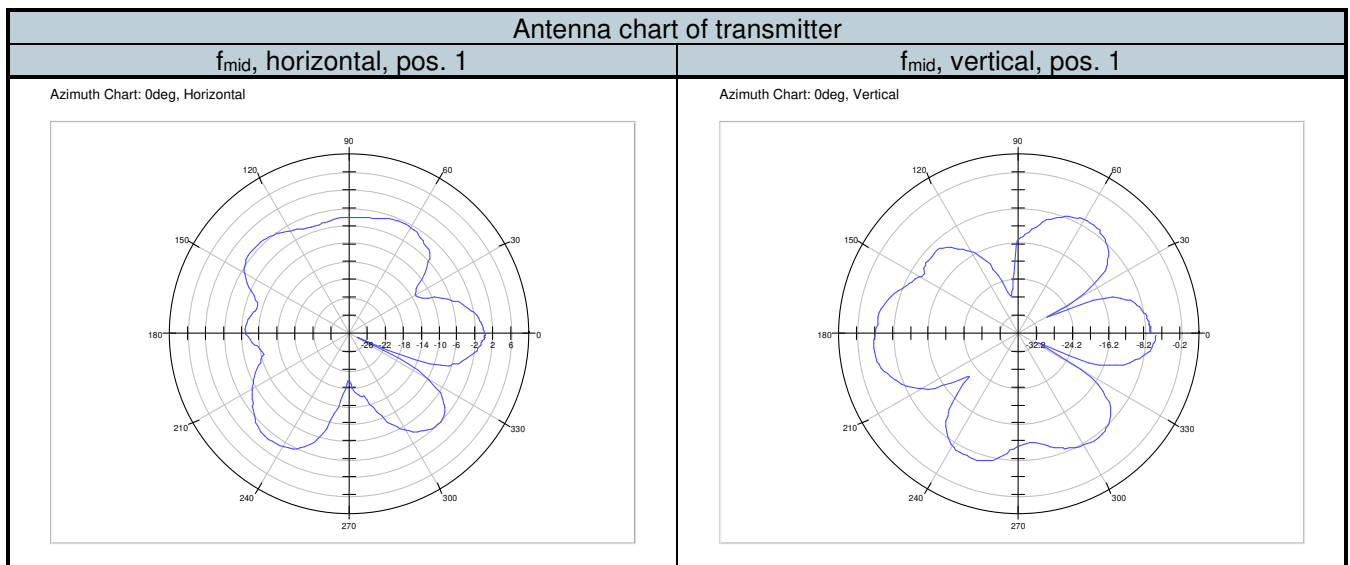
5.2.2 Azimuth charts of transmitter

5.2.2.1 Frequency near bottom (f_{low})





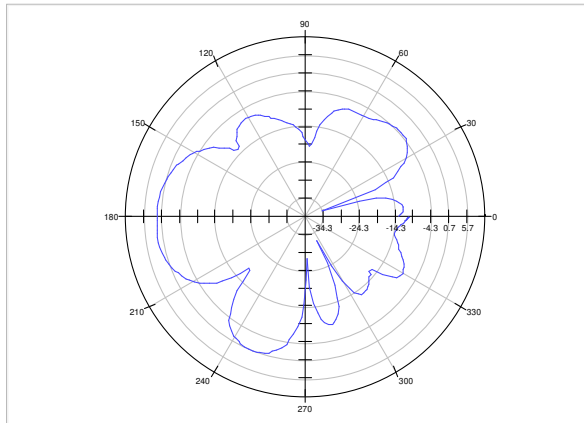
5.2.2.2 Frequency near middle (f_{mid})



Antenna chart of transmitter

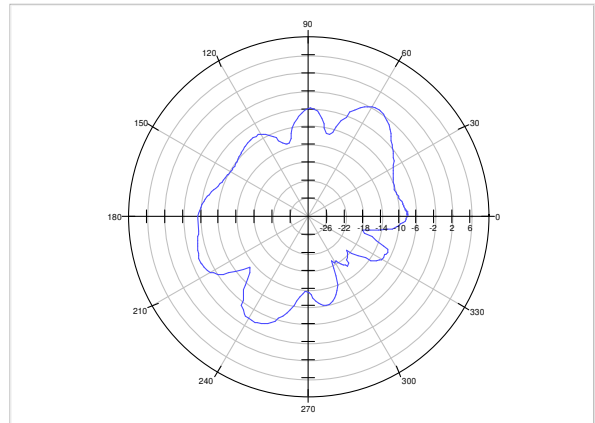
f_{mid} , horizontal, pos. 2

Azimuth Chart: 0deg, Horizontal



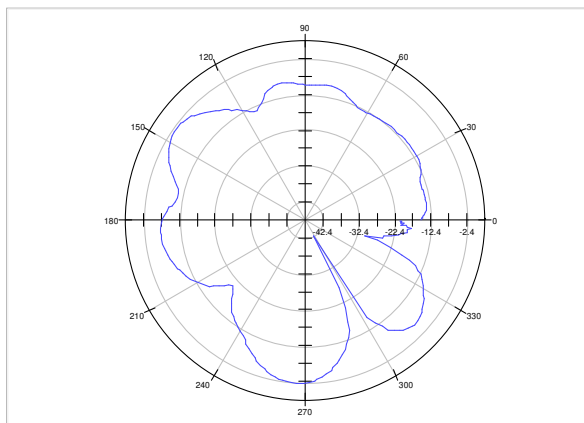
f_{mid} , vertical, pos. 2

Azimuth Chart: 0deg, Vertical



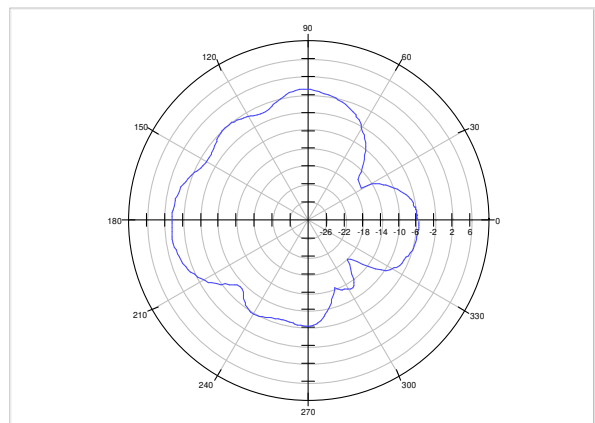
f_{mid} , horizontal, pos. 3

Azimuth Chart: 0deg, Horizontal

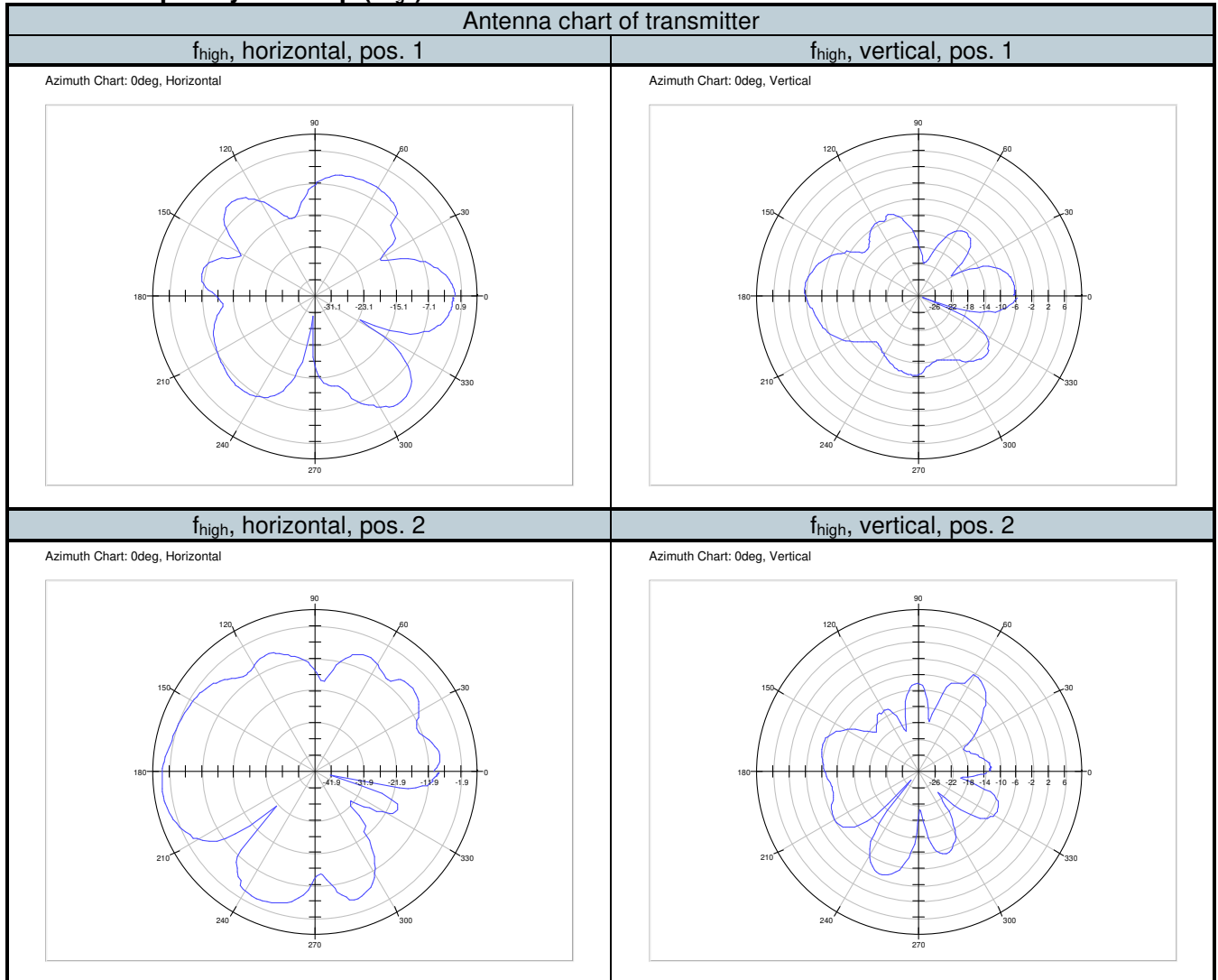


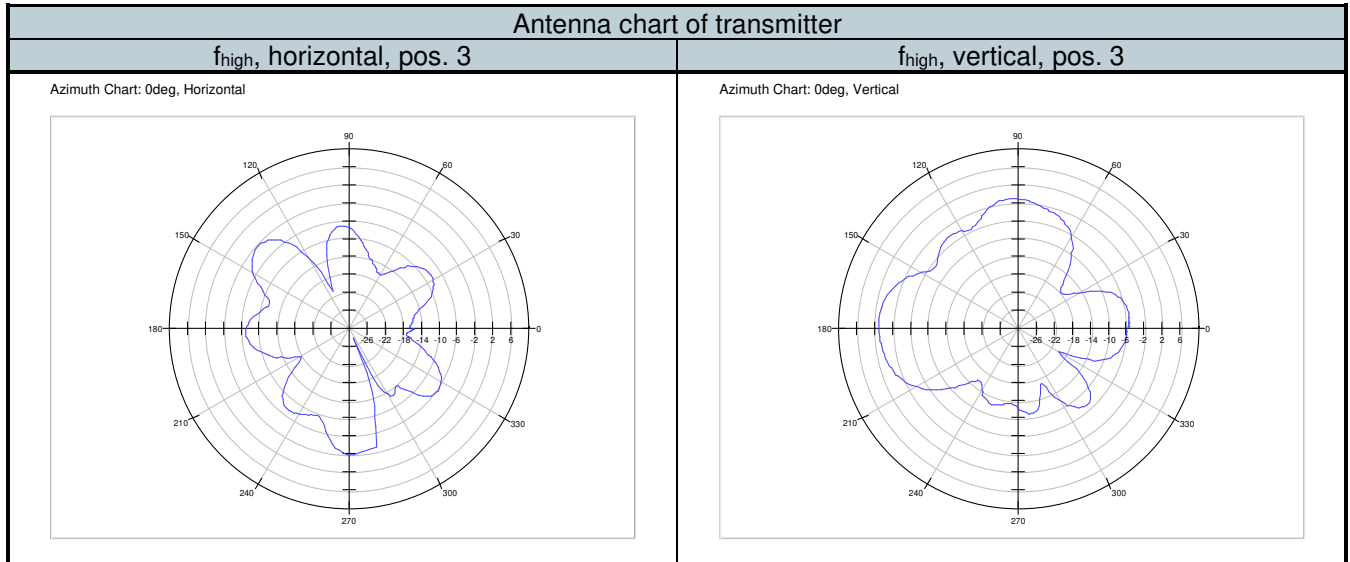
f_{mid} , vertical, pos. 3

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	RF cable 0.5 m	Sucoflex 102	Suhner	521885/2	483401	Calibration not necessary	
2	Horn antenna 1 GHz - 18 GHz	3115	EMCO Elektronik GmbH	9609-4918	480183	13.02.2024	02.2027
3	Software	EMC32 V10.60.20	Rohde & Schwarz	---	483261	Calibration not necessary	
4	RF cable	SF106B/11N/11 N/4500.0	Huber & Suhner	500218/6B	482415	Calibration not necessary	
5	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
6	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
7	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
8	Multiple Control Unit	MCU	Maturo GmbH	MCU/043/971107	480832	Calibration not necessary	
9	EMI Receiver / Spectrum Analyser	ESW44	Rohde & Schwarz	101635	482467	27.02.2024	02.2026
10	Antenna (Horn)	3115	EMCO Elektronik GmbH	9609-4922	480184	14.11.2022	11.2025
11	Microwave CW generator	83650L	Agilent	3844A00554	480333	27.02.2024	02.2026

7 Report History

Report Number	Date	Comment
F240384E8	10.02.2025	Initial Test Report
-	-	-
-	-	-

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