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# Antenna Report

Report Number:

**F230236E1**

Equipment under Test (EUT):

**RFID Antenna  
Article No. 3059790003**

Applicant:

**Müller Elektronik**

Manufacturer:

**Müller Elektronik**

## References

[1] None (According customer requirements)

## Disclaimer

Tested by:

Signature

Written by:

Signature

Reviewed and  
approved by:

Signature

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# 1 Identification

## 1.1 Applicant

Name:	Müller-Elektronik GmbH
Address:	Franz-Kleine-Str. 18 33154 Salzkotten
Country:	Germany
Name for contact purposes:	Norbert BILAU
Phone:	+49 5258 9834 6100
eMail address:	bilau@mueller-elektronik.de
Applicant represented during the test by the following person:	None

## 1.2 Manufacturer

Name:	Müller-Elektronik GmbH
Address:	Franz-Kleine-Str. 18 33154 Salzkotten
Country:	Germany
Name for contact purposes:	Norbert BILAU
Phone:	+49 5258 9834 6100
eMail address:	bilau@mueller-elektronik.de
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: *	RFID Antenna
Model name: *	RFID Antenna
Article number: *	3059790003
KD-number: *	SMSE015

	EUT number		
	1	2	3
Serial number: *	3059790003E070300	-	-
PCB identifier: *	3759790003.3140	-	-
Hardware version: *	3.0	-	-
Software version: *	n/a	-	-

\* 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 *	840 MHz to 960 MHz					
Supply voltage LED indicator: *	U <sub>nom</sub> =	n/a	U <sub>min</sub> =	3.5 VDC	U <sub>max</sub> =	5.5 VDC
Temperature range: *	-20 °C to + 70°C					

\* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
Antenna Port	Fix	SMA (m)	50cm	Yes

Equipment used for testing	
none	

\*1 Provided by the applicant

\*2 Provided by the laboratory

## 1.6 Dates

Date of receipt of test sample:	24.02.2023
Start of test:	18.04.2023
End of test:	20.04.2023

## 2 Operational States

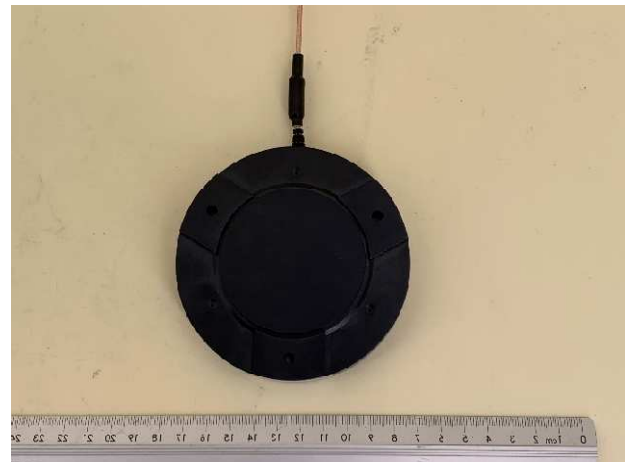
During the antenna chart measurements, the antenna was supplied with a rf-signal with a level of 0 dBm at its antenna connector.

## 3 Additional Information

The antenna was not supplied with a DC voltage during the measurements.

## 4 Antenna photographs

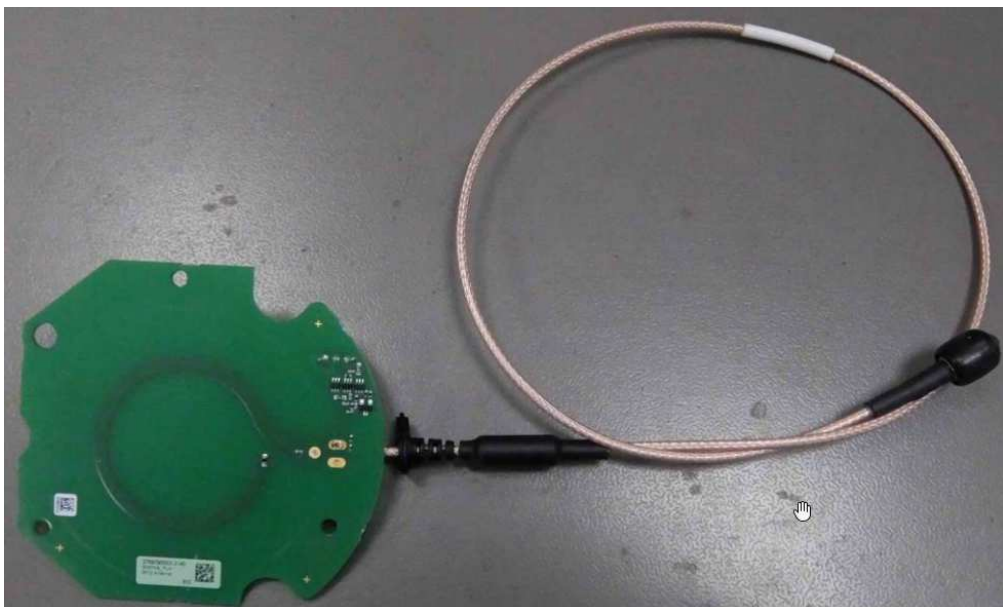
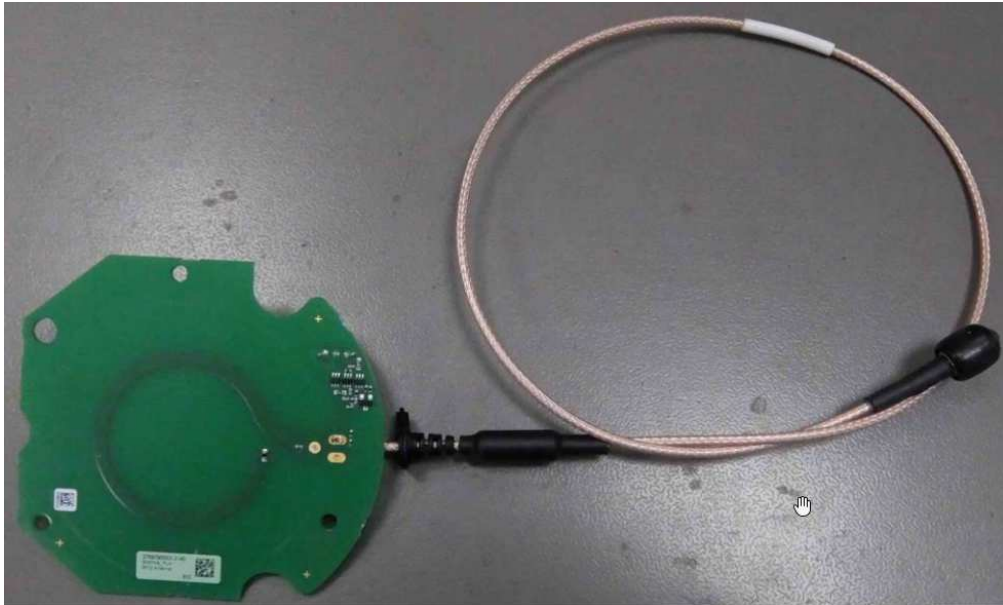
### 4.1 External photographs





#### 4.2 internal photographs

Due to the fact that the antenna is sealed these photographs were provided by the applicant.



## 5 Antenna Charts

### 5.1 Results (Max. Gain)

Frequency [MHz]	Maximum Antenna gain [dBi]	Turntable Pos [°]	EUT Positioner [°]	EUT Pos.	Antenna Polarization
840	<b>-22.19</b>	79	0	X	H
870	<b>-20.14</b>	84	0	X	H
900	<b>-18.38</b>	84	0	X	H
930	<b>-17.37</b>	90	0	X	H
960	<b>-18.70</b>	96	0	X	H

Test equipment (please refer to chapter 7 for details)

1 - 10

## 5.2 Antenna Diagrams EUT Position 1 (X-Position)

### 5.2.1 Test Setup Photos (X-Position)



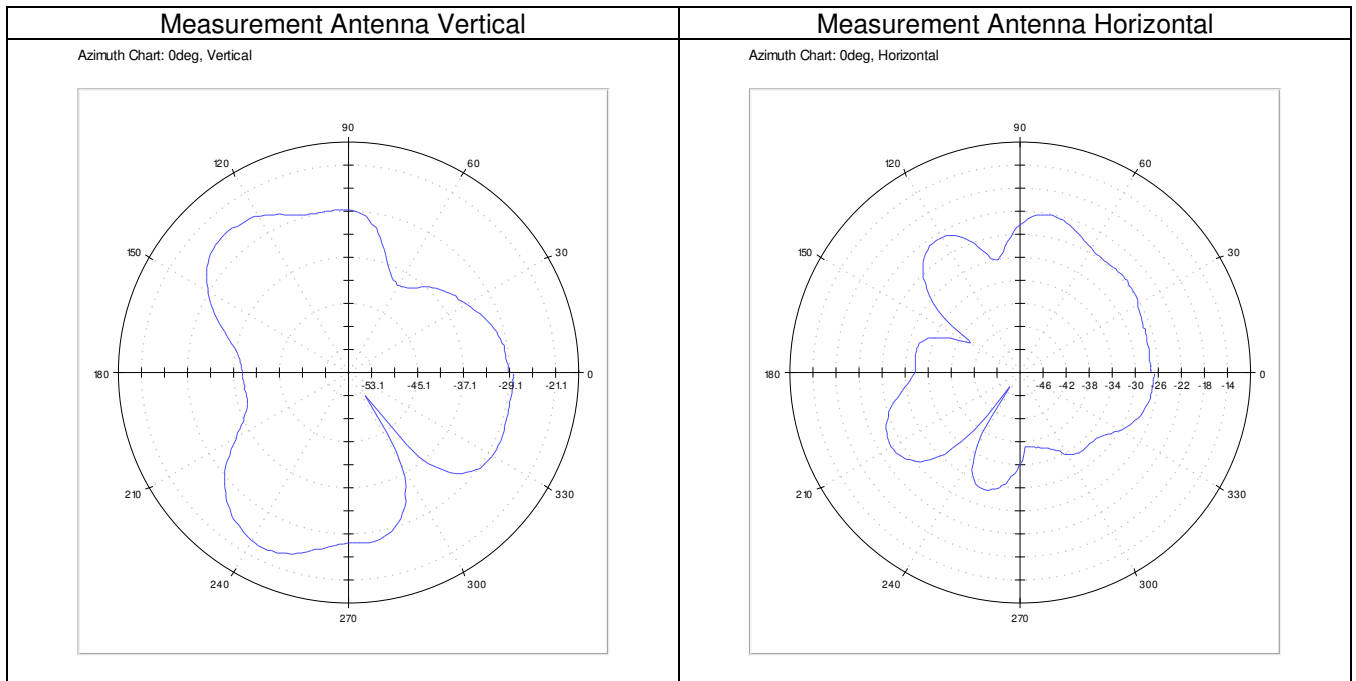
0° Position to measuring antenna



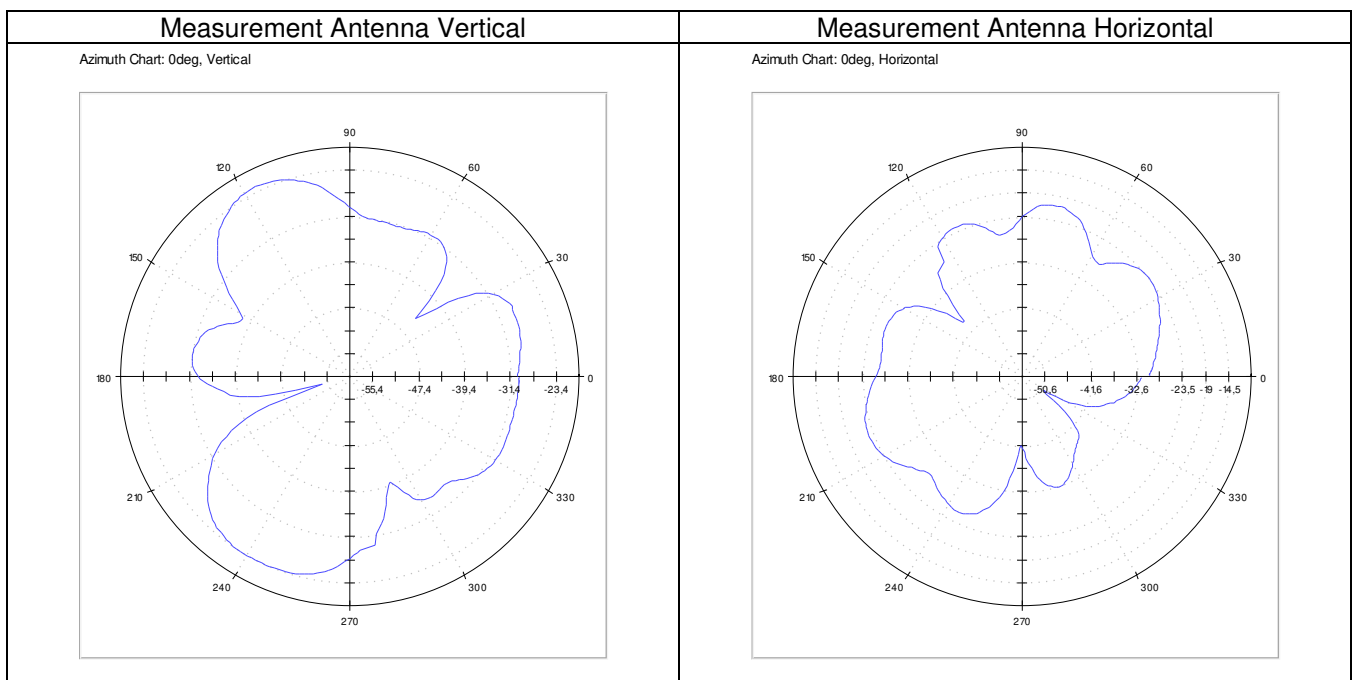
sideview

### 5.2.2 Antenna Charts X-Position

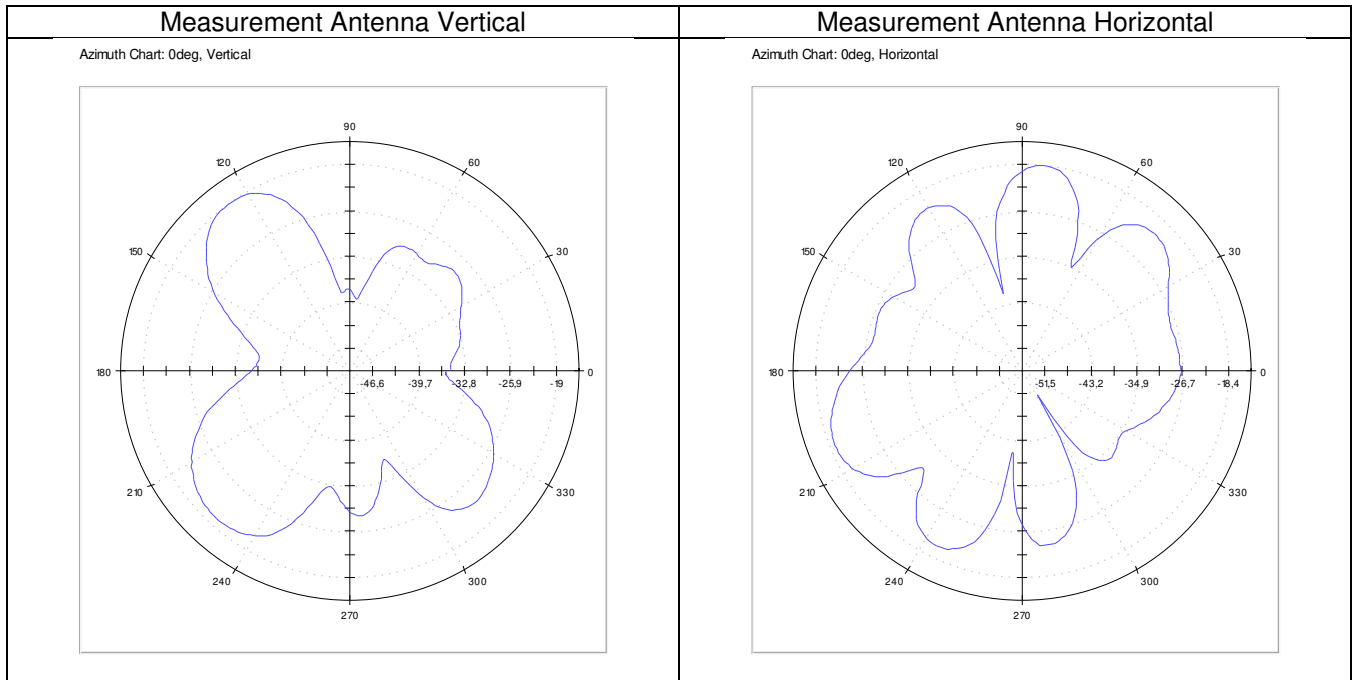
840 MHz



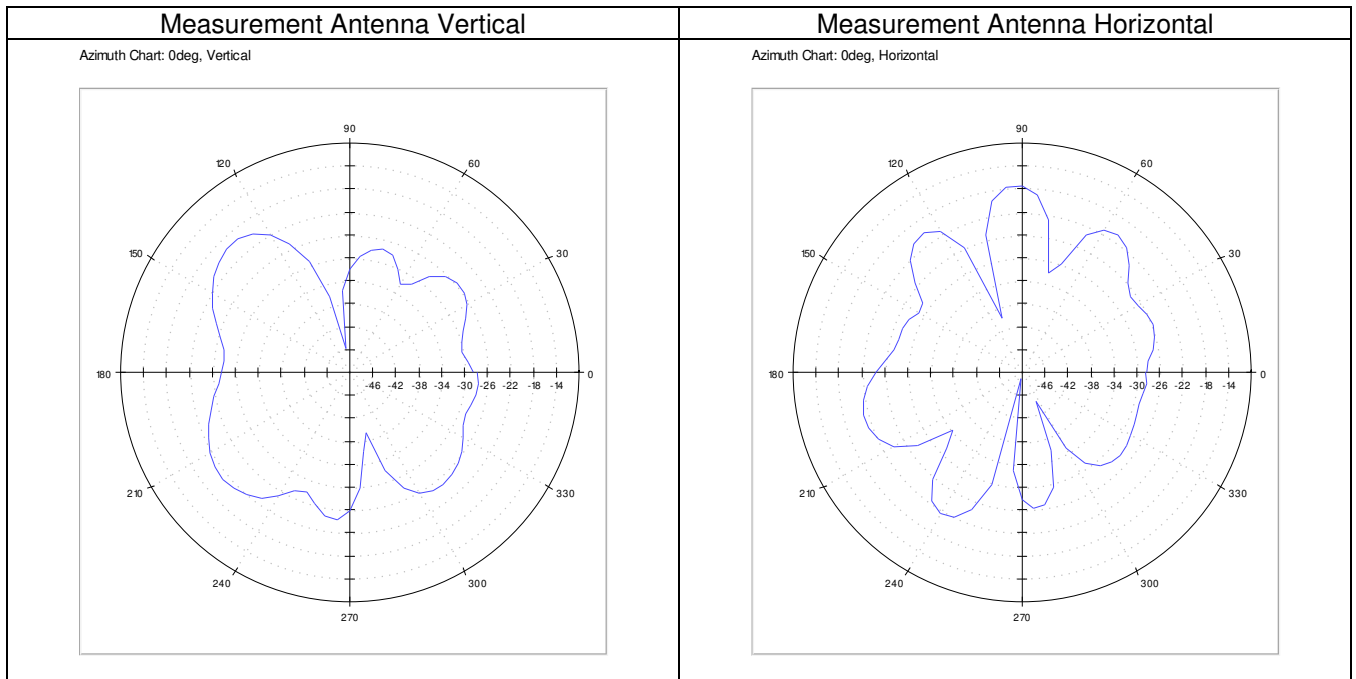
870 MHz



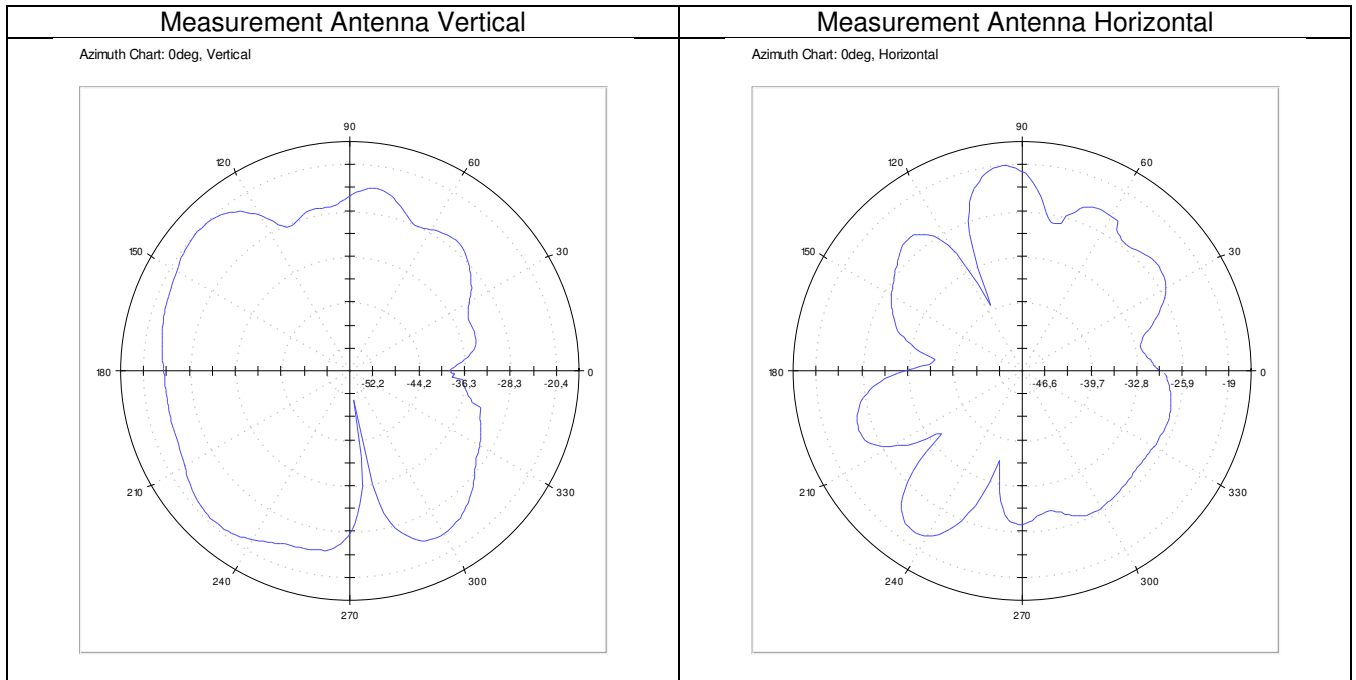
**900 MHz**



**930 MHz**



960 MHz





### 5.3 Antenna Diagrams EUT Position 2 (Y-Position)

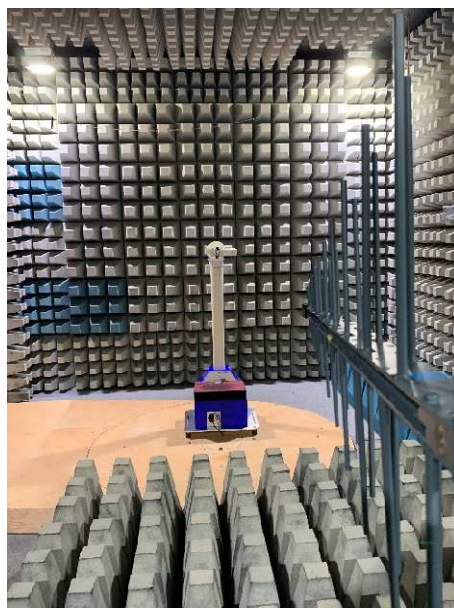
#### 5.3.1 Test Setup Photos



0° Position to measuring antenna

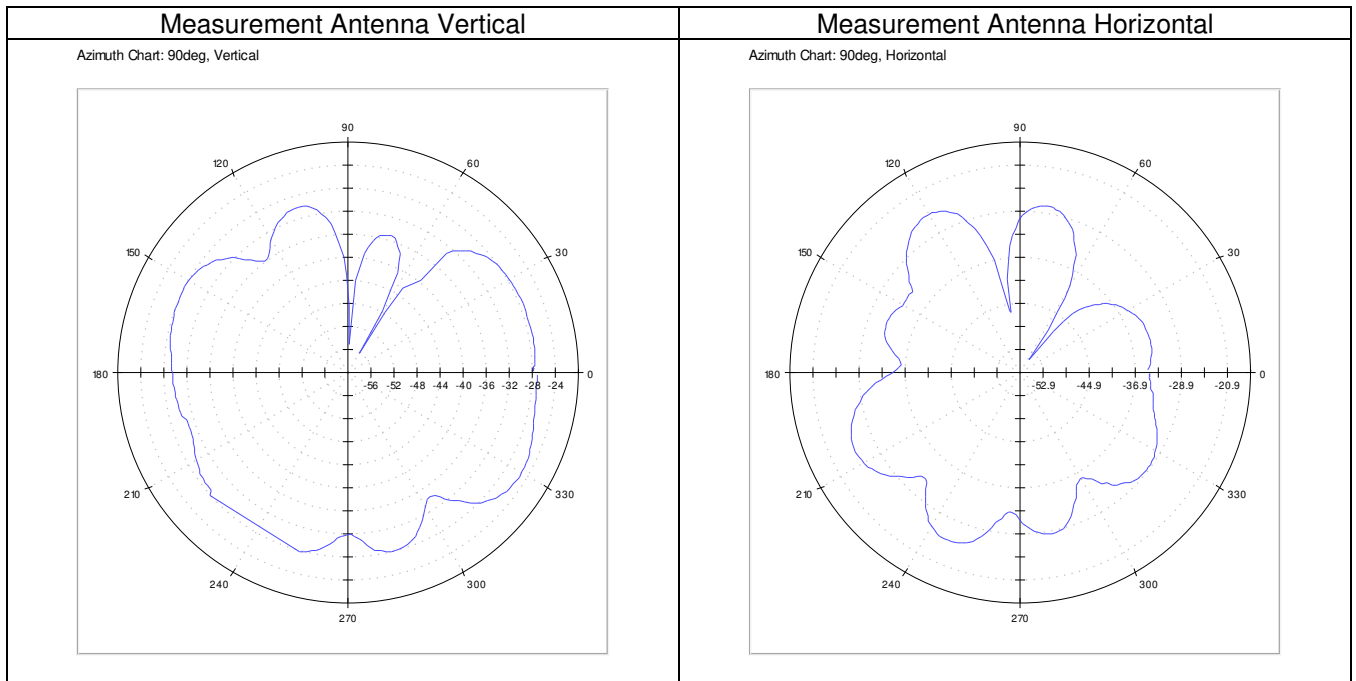


sideview

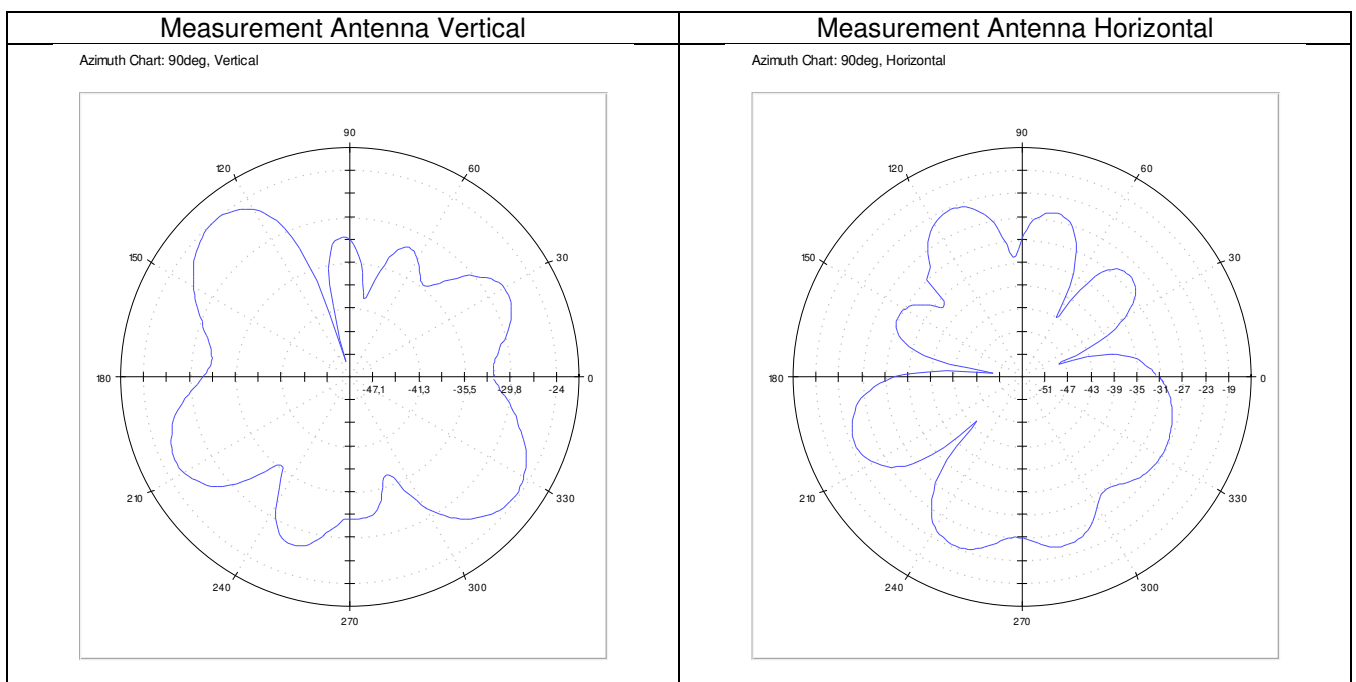


### 5.3.2 Antenna Charts Y-Position

840 MHz

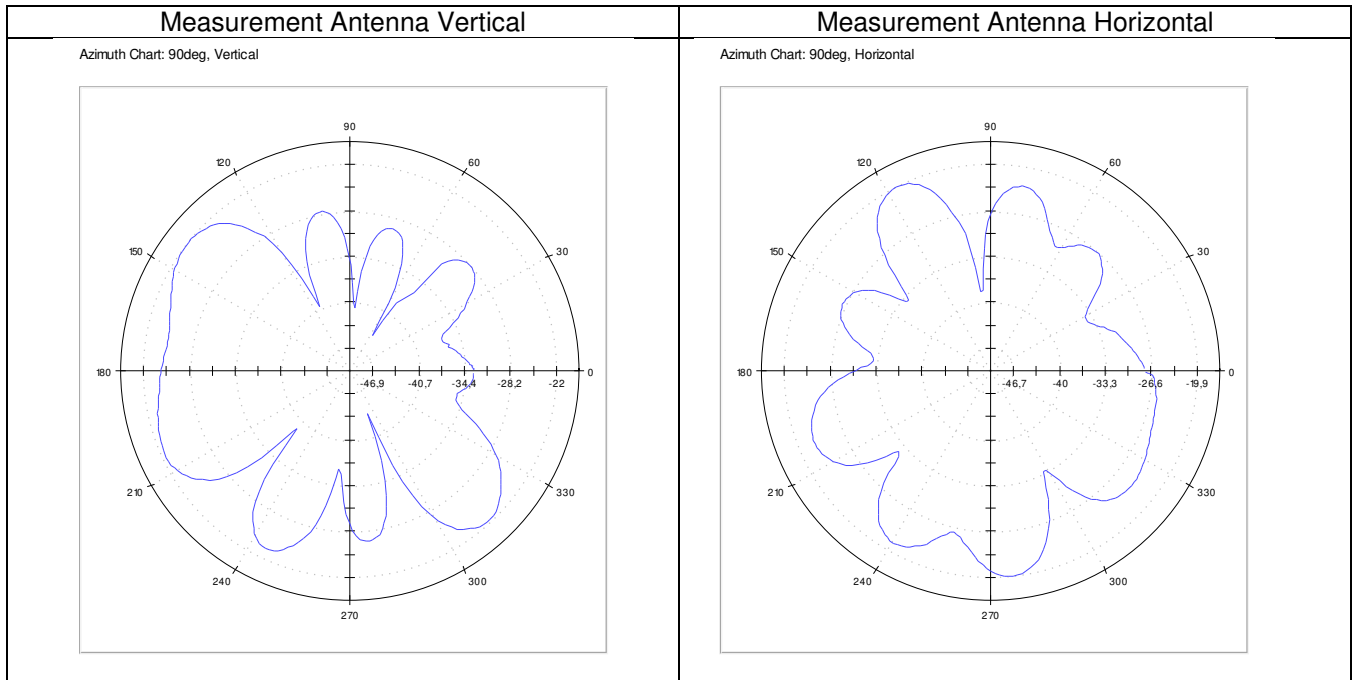


870 MHz

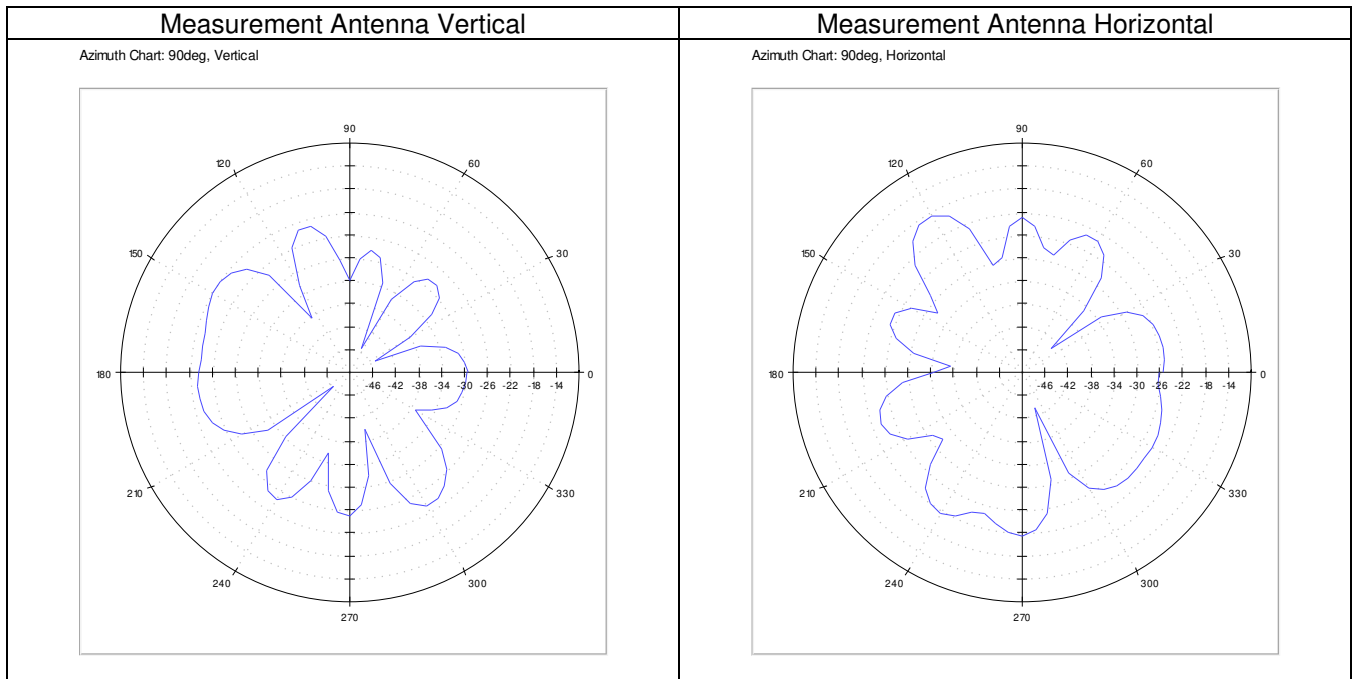




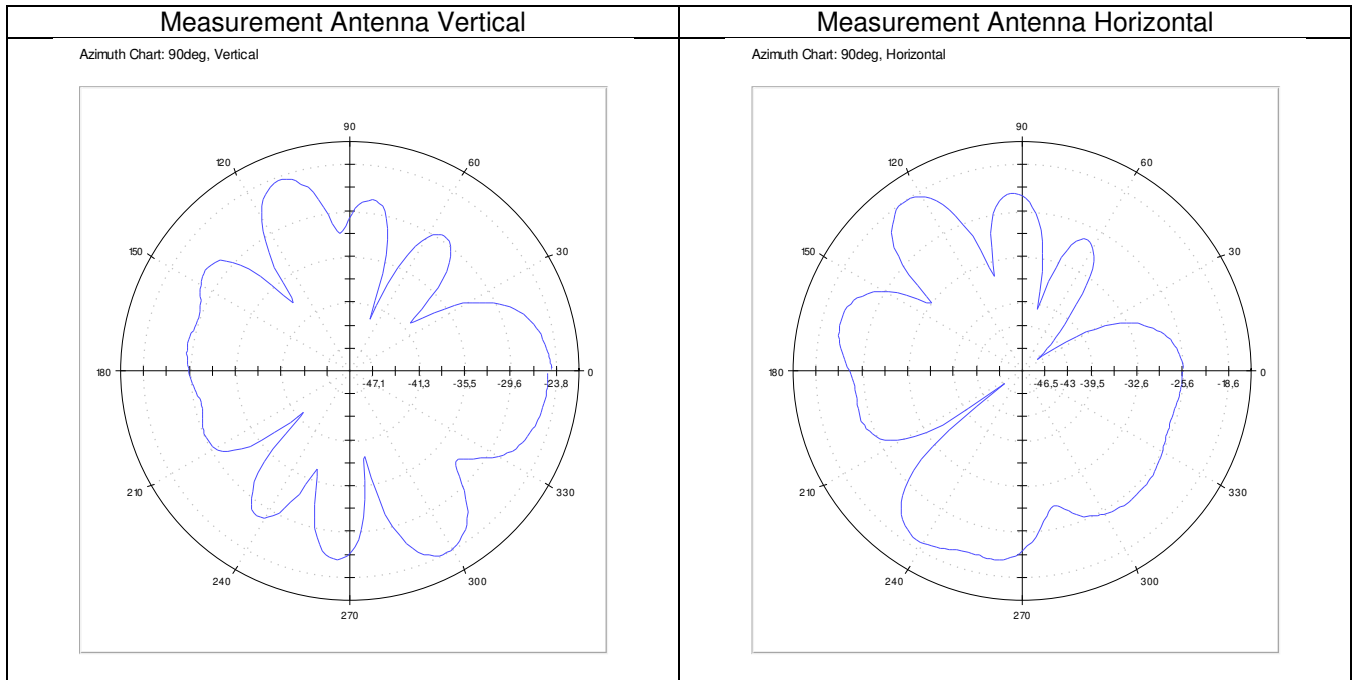
**900 MHz**



**930 MHz**



**960 MHz**



## 5.4 Antenna Diagrams EUT Position 3 (Z-Position)

### 5.4.1 Test Setup Photos



0° Position to measuring antenna

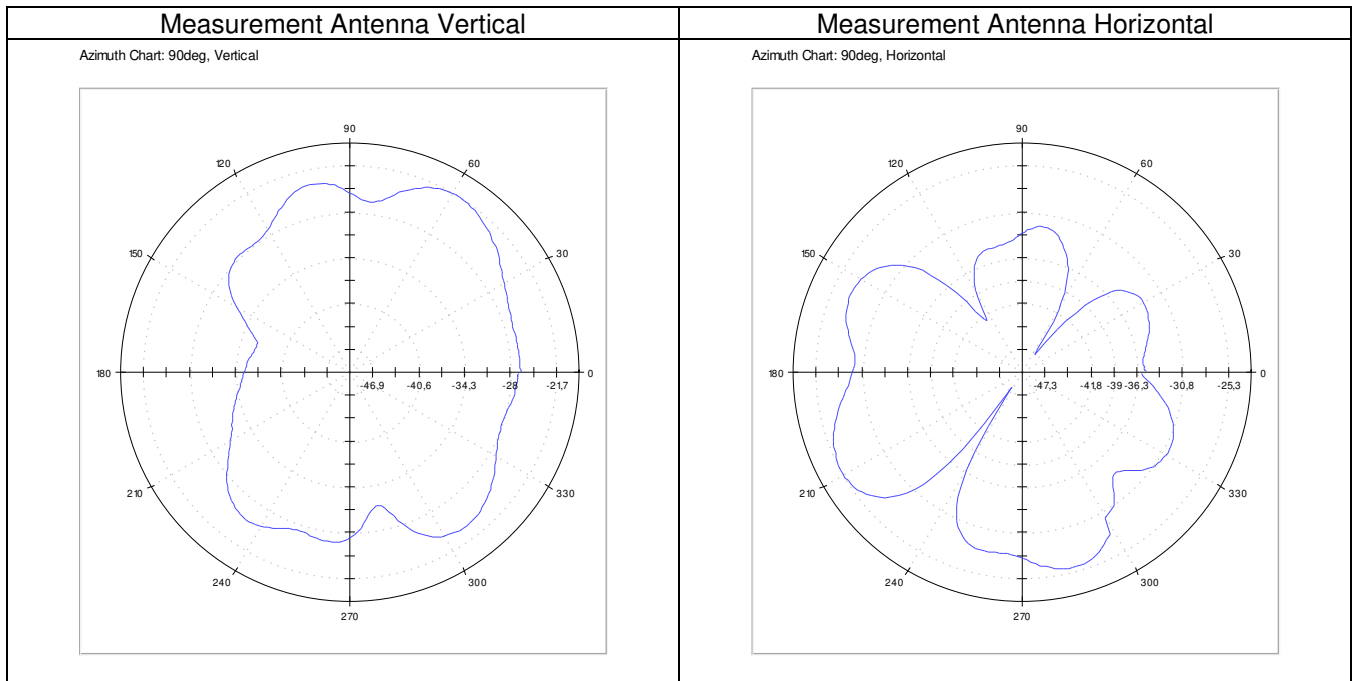


sideview

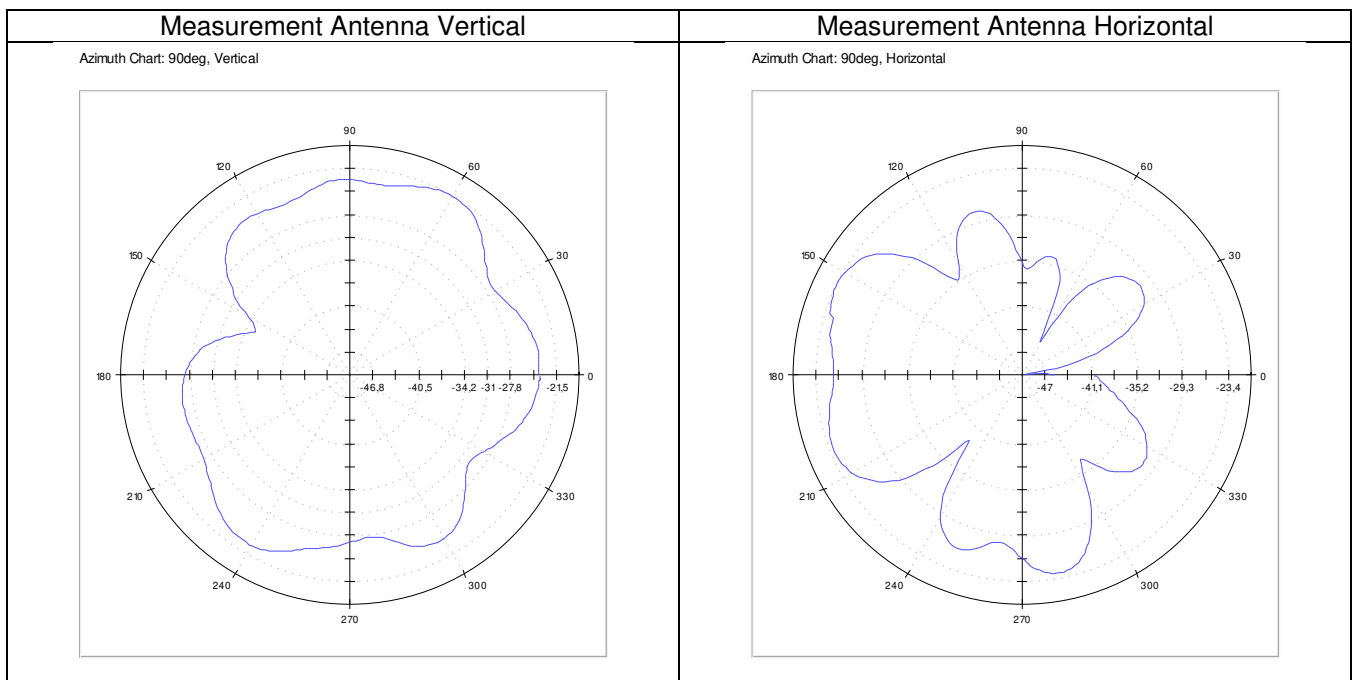


### 5.4.2 Antenna Charts Z-Position

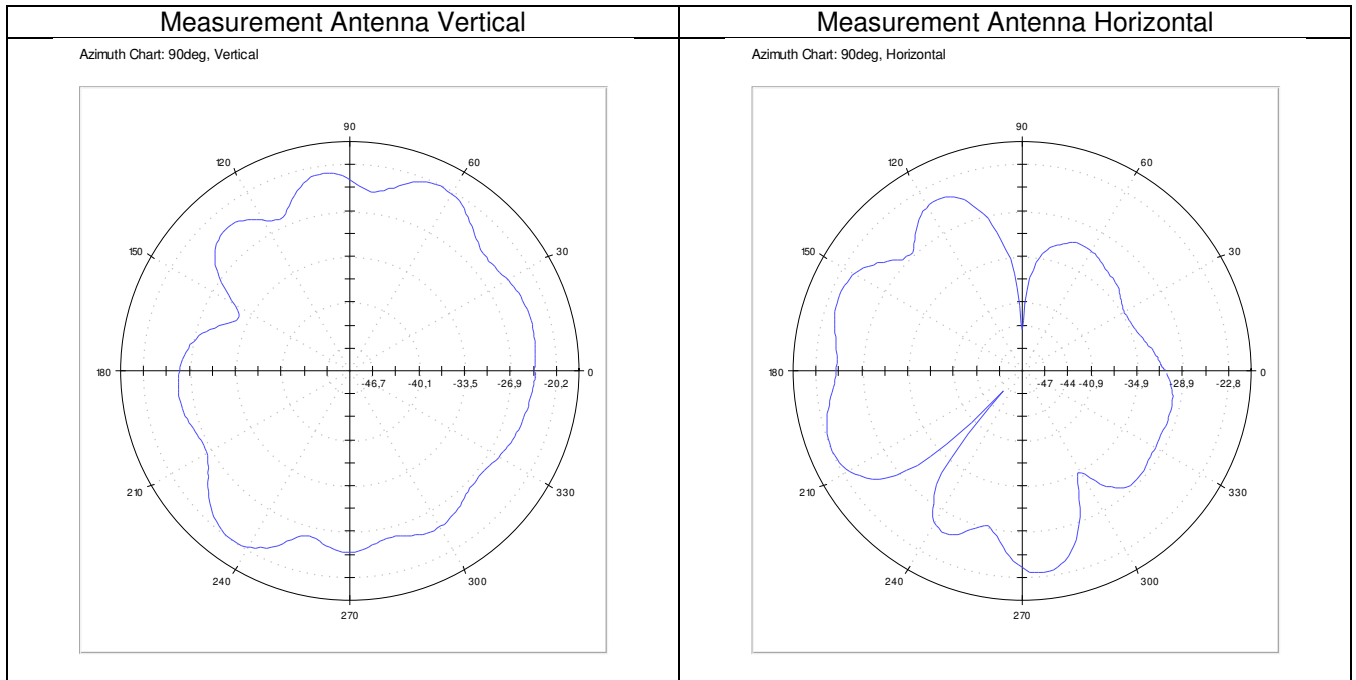
840 MHz



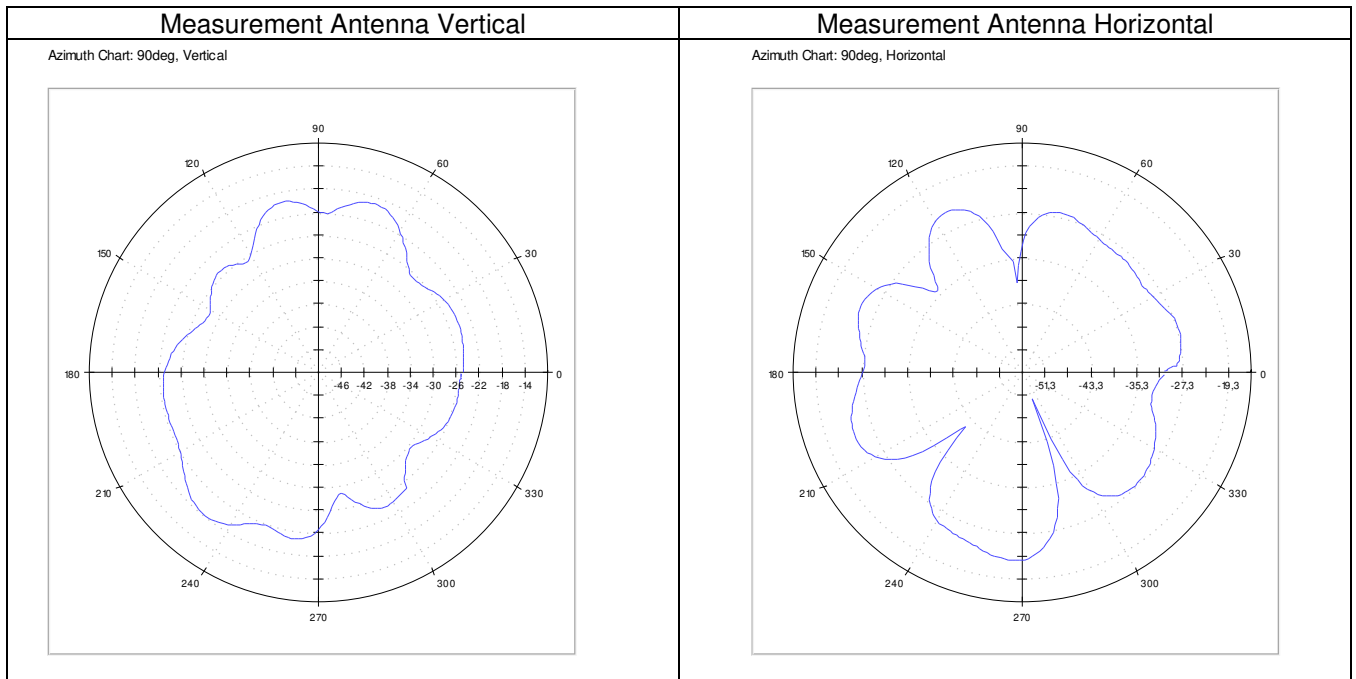
870 MHz



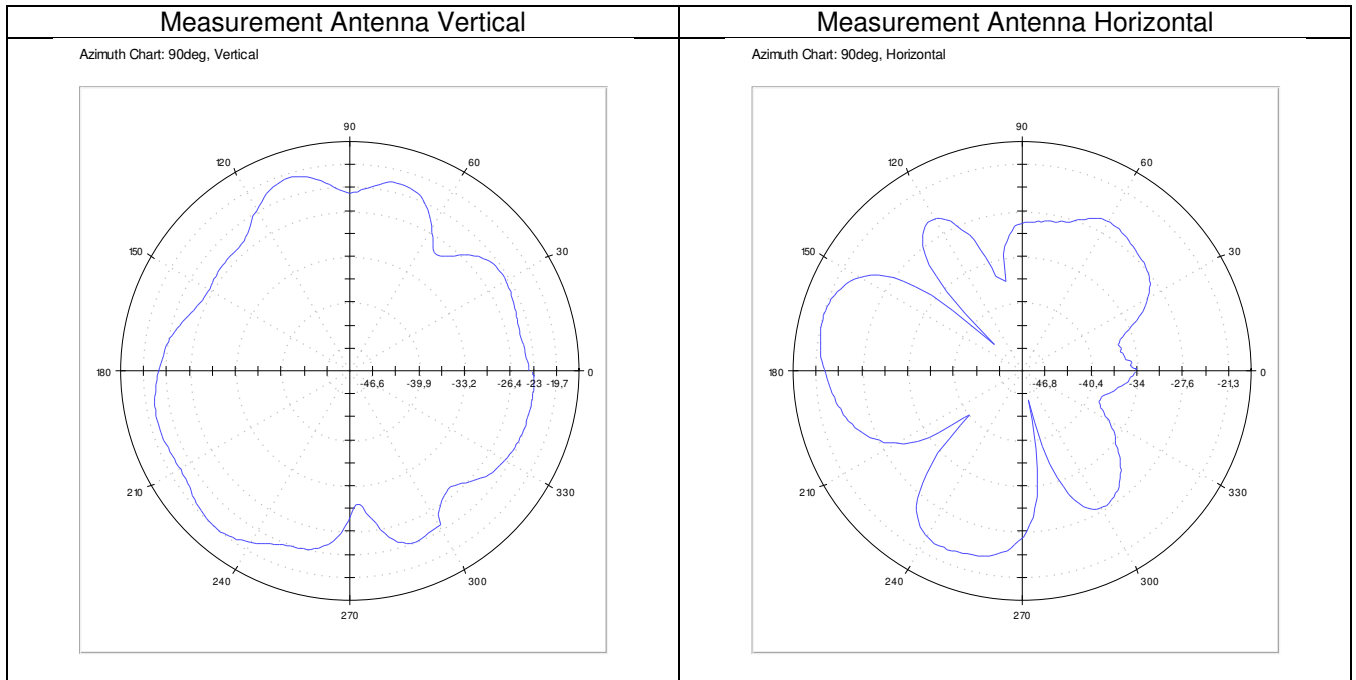
**900 MHz**



**930 MHz**

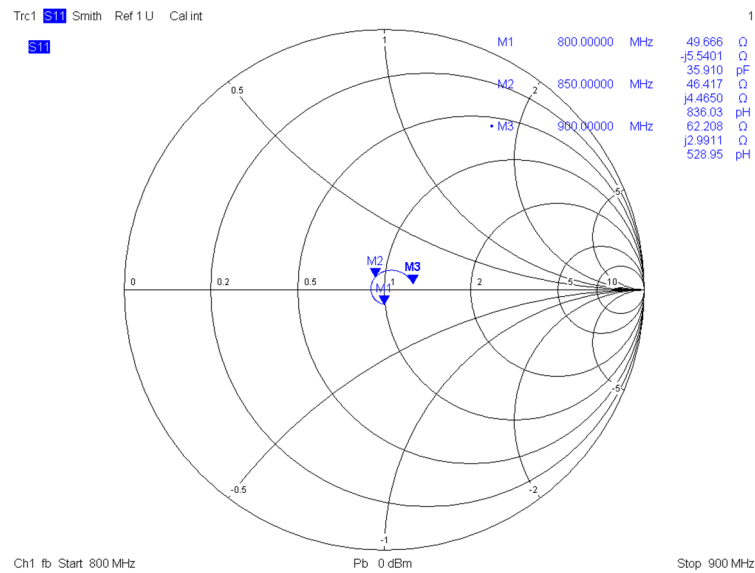


960 MHz

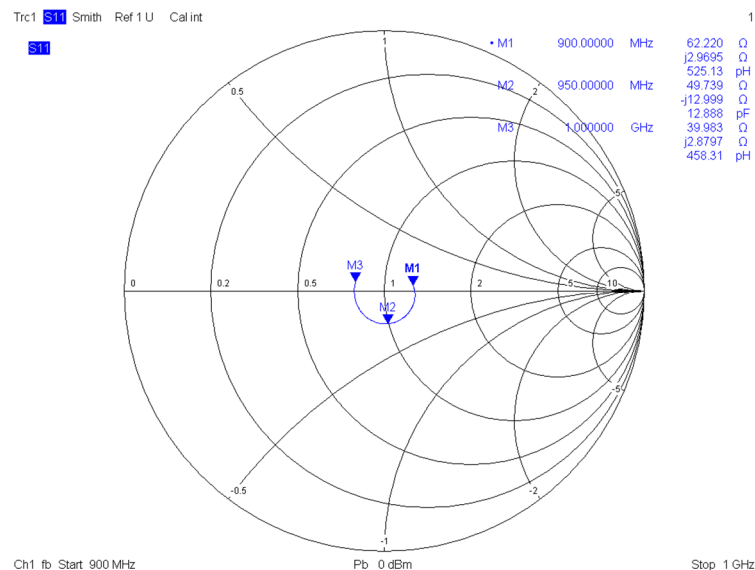


## 6 VSWR

### 6.1 Smithchart



S11 Smith Chart 800 MHz – 900 MHz

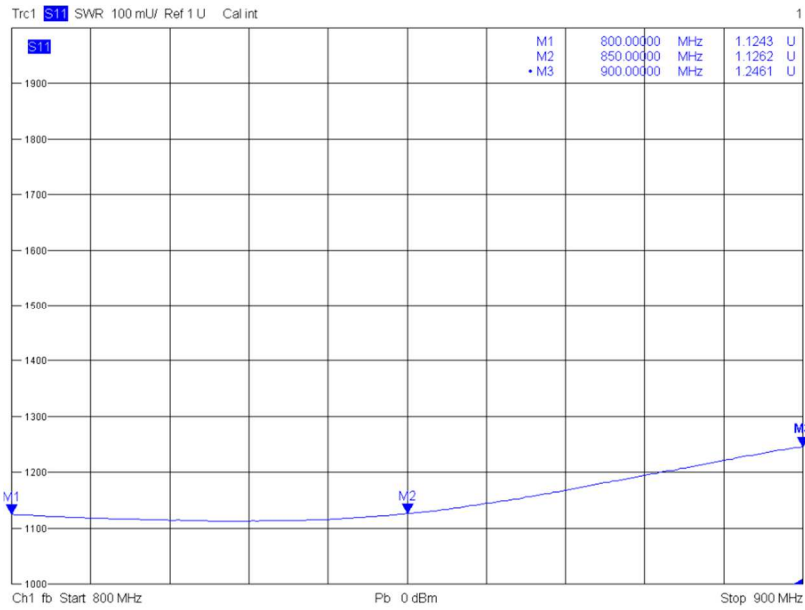


S11 Smith Chart 900 MHz – 1000 MHz

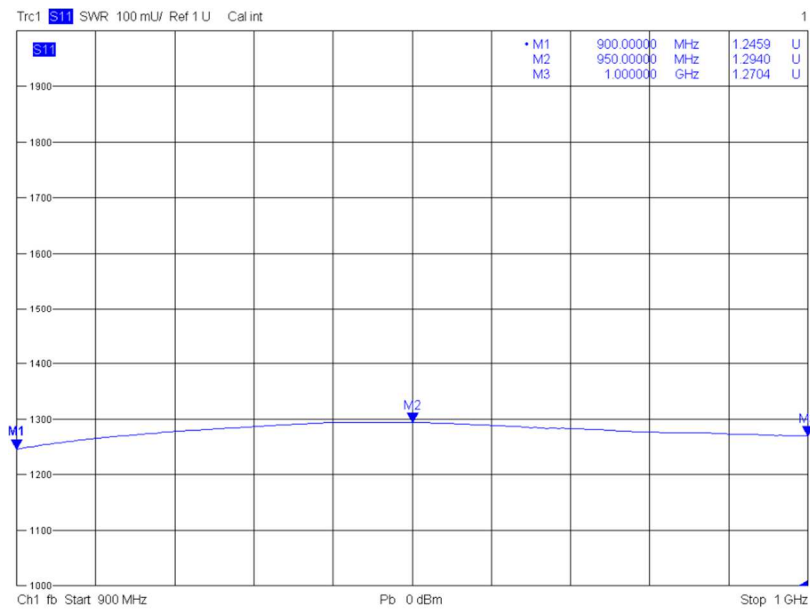
Test equipment (please refer to chapter 7 for details)

11,12

## 6.2 SWR



S11 SWR 800 MHz – 900 MHz



S11 SWR 900 MHz – 1000 MHz

Test equipment (please refer to chapter 7 for details) 11, 12
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## 7 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	EMI Receiver / Spectrum Analyser	ESW44	Rohde & Schwarz	101635	482467	22.02.2022	02.2024
2	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
3	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
4	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
5	Positioner	TDF 1.5-10kg	Maturo	15920215	482034	Calibration not necessary	
6	Multiple Control Unit	MCU	Maturo	MCU/043/971107	480832	Calibration not necessary	
7	Antenna Log Per	HL223	Rohde & Schwarz	835556/014	480123	Calibration not necessary	
8	Signal generator	SMB100A	Rohde & Schwarz	101360	482190	16.02.2022	02.2024
9	Software	EMC32 V10.60.20	Rohde & Schwarz		483261	Calibration not necessary	
10	RF-Cable No. 36	Sucoflex 106B	Suhner	500213/6B	482325	Calibration not necessary	
11	Vector Network Analyser	ZVA40	Rohde & Schwarz	100298	481538	17.02.2022	02.2024
12	Calibration Kit	ZV-Z21	Rohde & Schwarz	100149	480385	28.03.2022	03.2024

## 8 Report History

Report Number	Date	Comment
F230236E1	15.12.2023	Initial Test Report
-	-	-
-	-	-