

Antenna Pattern Measurement Test Report for XCOMB



Report Reference: MDE_VEGA_2502_OTA_03
Date: 06.05.2026

Test Laboratory:

7layers GmbH
Borsigstrasse 11
40880 Ratingen
Germany

Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

7layers GmbH
Borsigstraße 11
40880 Ratingen, Germany
T +49 (0) 2102 749 0
F +49 (0) 2102 749 350

Geschäftsführer/
Managing Directors:
Jörg-Timm Kilisch
Bernhard Retka

Registergericht/registered:
Düsseldorf HRB 75554
USt-Id.-Nr./VAT-No. DE203159652
Steuer-Nr./TAX-No. 147/5869/0385

a Bureau Veritas
Group Company

www.7layers.com

Commerzbank AG Account No. 303 016 000 Bank Code 300 400 00 IBAN DE81 3004 0000 0303 0160 00 Swift Code COBADEFF

Content:

1	TEST LAB DECLARATION	3
2	SIGNATURES	3
3	PROJECT AND RESULT SUMMARY	4
4	BRIEF DESCRIPTION OF SETTINGS AND TEST METHOD	5
4.1	References and Standards Used	5
4.2	Test Procedure TRP	5
4.3	Definitions	6
5	DETAILED RADIATED TEST RESULTS AND PATTERN	6
5.1	Equipment List	6
5.2	Radiation Pattern TRP 2402 MHz	7
5.3	Radiation Pattern TRP 2440 MHz	9
5.4	Radiation Pattern TRP 2480 MHz	11

1 Test Lab Declaration

All test results stated relate only to the device tested.

The test report must usually be reproduced in full. Reproduction of an excerpt is hereby granted, but only when:

- in the resulting document its status (being an excerpt) is clearly stated and
- in minimum chapter 3 is included completely.

2 SIGNATURES

Responsible for
Accreditation Scope:



Robert Machulec

Responsible
for Test Report:



Dieter Sütthoff

3 Project and Result Summary

DUT	XCOMB	EUT Code:	DE1373014ak02
Test lab	7layers GmbH Borsigstr. 11 40880 Ratingen Germany	Set up	free space
		Test start	27.02.2026
Customer	VEGA Grieshaber KG Am Hohenstein 113 77761 Schiltach Germany	Report date	06.05.2026
		Report by	Dieter Sütthoff
		Approved by	Robert Machulec

HW Version	Rev. 0.6.0
SW Version	Rev. 0.4.1

bluetooth low energy			
RMS Detector	2402 MHz	2440 MHz	2480 MHz
Antenna Port Input Power (Conducted Sample)	5.4	5.4	5.4
Tot. Rad. Pwr. (dBm)	3.8	3.7	3.7
Peak EIRP (dBm)	8.6	8.6	8.7
Directivity (dBi)	4.8	4.9	5.0
Efficiency (dB)	-1.6	-1.7	-1.7
Efficiency (%)	69	68	67
Gain (dBi)	3.2	3.2	3.3

Tab. 1: Test result summary

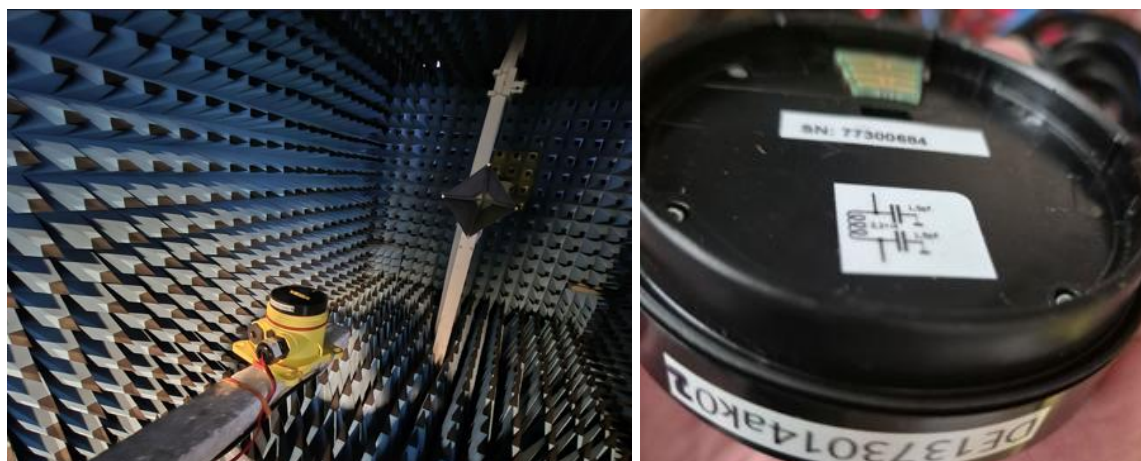


Fig. 1: Photo of DUT set up.

4 Brief Description of Settings and Test Method

4.1 References and Standards Used

- [1] CTIA: "Test Plan for Wireless Device Over the Air Performance", Revision Number 8.0.x

4.2 Test Procedure TRP

The method of measurement for radiated RF power and receiver performance are based on the principals of the test standard CTIA: "Test Plan for Mobile Station Over the Air Performance" [1].

In general, the following approach is applied for TRP measurements:

- For TRP measurement put OUT in a mode where it is transmitting periodical RF energy.
- Rotate the EUT in all room directions with an angle grid of $\leq 15^\circ$.
- Gather power data for both, vertical and horizontal polarization.
- Calculate total radiated power by integrating over the whole sphere as outlined in [1].

The test setup was placed at the turning device inside a fully anechoic chamber. The object under test (OUT) was set to transmit permanently signal on specific frequencies

The total radiated power (TRP) of the test setup was measured in all angle direction (3D) using a step width of $\leq 15^\circ$ and using two measurement antenna polarizations (vertical and horizontal).

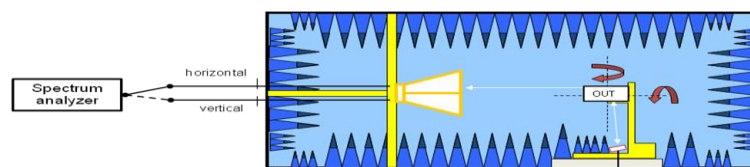


Fig. 1: Block diagram for TRP measurement

4.3 Definitions

3GPP	3 rd Generation Partnership Project
BER	Bit error rate or bit error ratio
BS	Base station
CTIA	Cellular Telecommunications & Internet Association
DUT	Device under test
FS	Free space
TP	Talk position (phone is situated at SAM = human head phantom)
TRP	Total Radiated Power
EIRP	Effective Isotropic Radiated Power
TRS	Total Radiated Sensitivity (same as TIS in CTIA), loss of link level
EIRS	Effective Isotropic Radiated Sensitivity

5 Detailed Radiated Test Results and Pattern

5.1 Equipment List

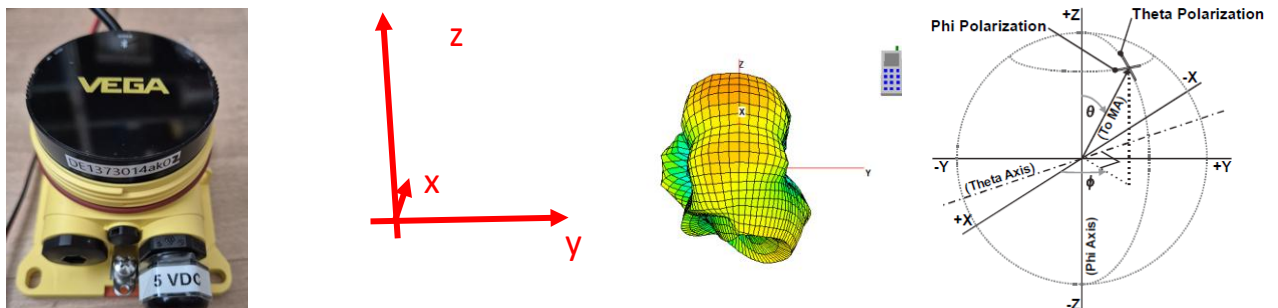
For TRP measurements:

Antenna:	Dual polarized horn ETS3164-03 by ETS	SN 00052619
Receiver (BTL):	FSP3 spectrum analyzer by R&S for 2.4 GHz	SN 838164/004

Orientation of EUT compared to a standard device

For orientation of the EUT in the result pictures below the following photos illustrate the used orientation compared to a standard device:

Fig. 2: Photo orientation of DUT compared to a phone.



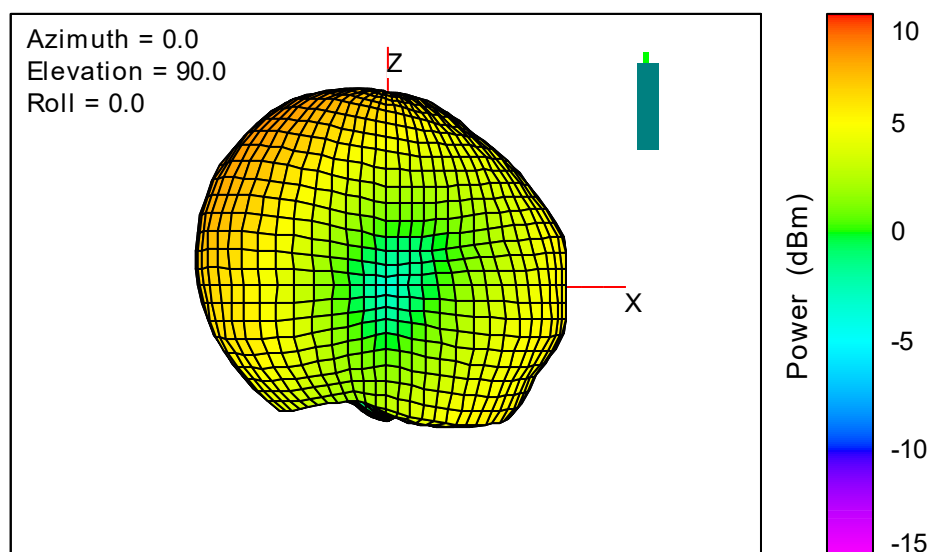
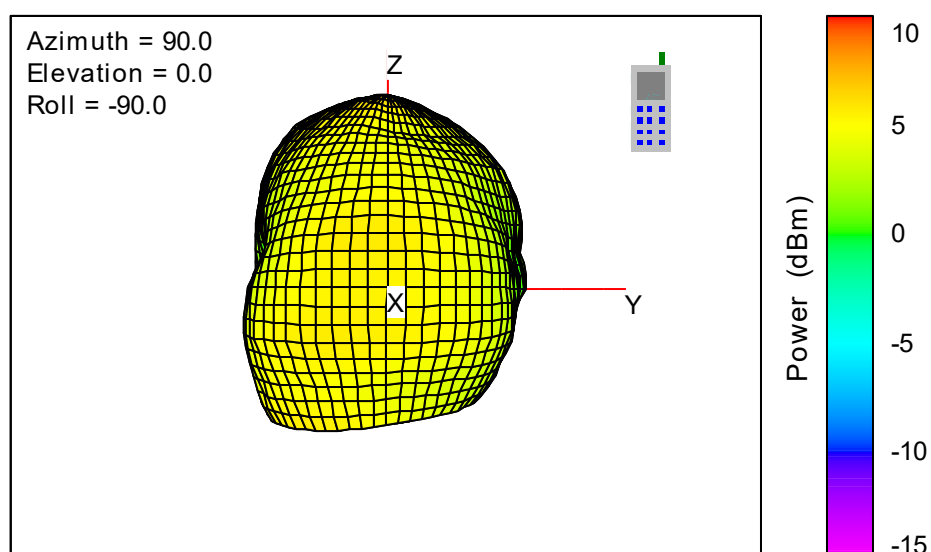
5.2 Radiation Pattern TRP 2402 MHz

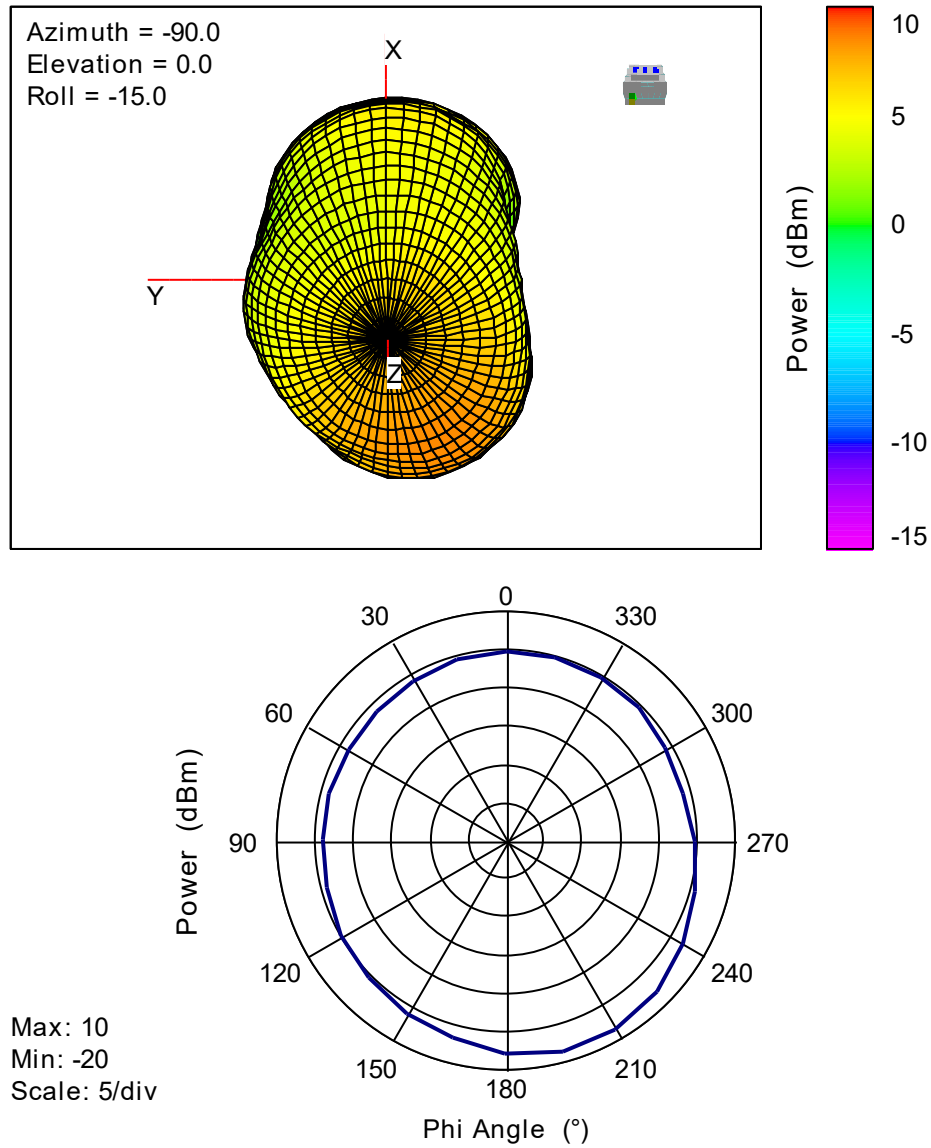
Temperature: 22.6

Humidity: 33.5

Test start: 18/03/2026

TX freq. (MHz)	Tot. Rad. Pwr. (dBm)	Peak EIRP (dBm)	Directivity (dBi)	Efficiency (dB)	Gain (dBi)
2402	3.8	8.6	4.8	-1.6	3.2





Theta = 90°

Fig. 3: 2402 MHz 3D Radiated pattern orientation of DUT.

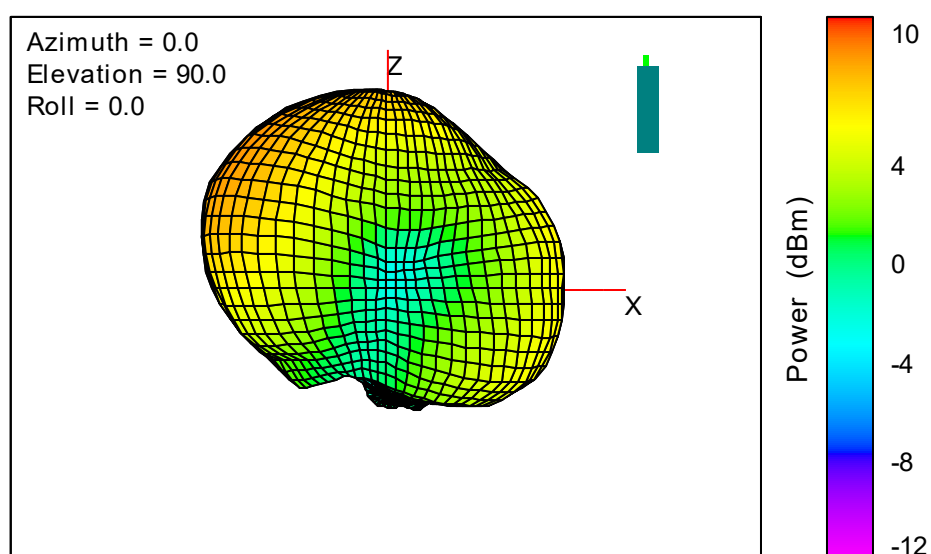
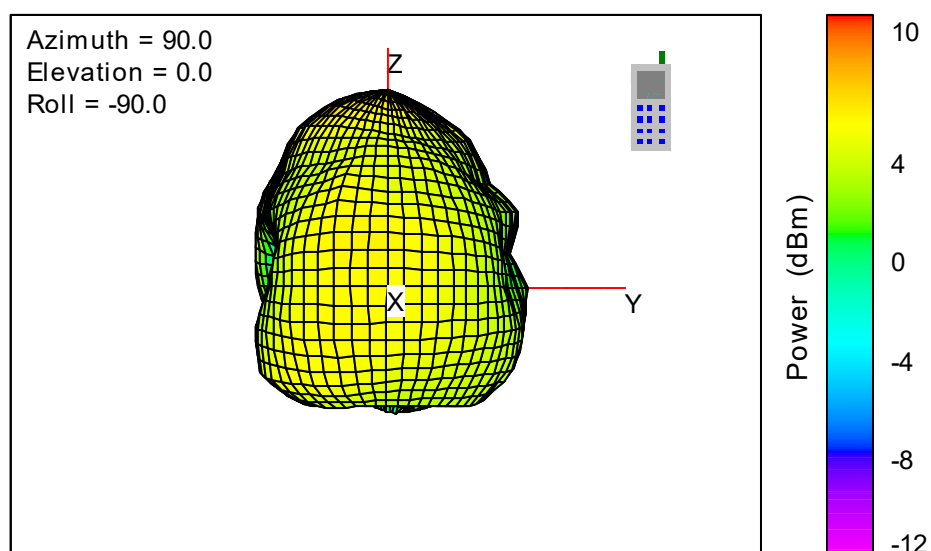
5.3 Radiation Pattern TRP 2440 MHz

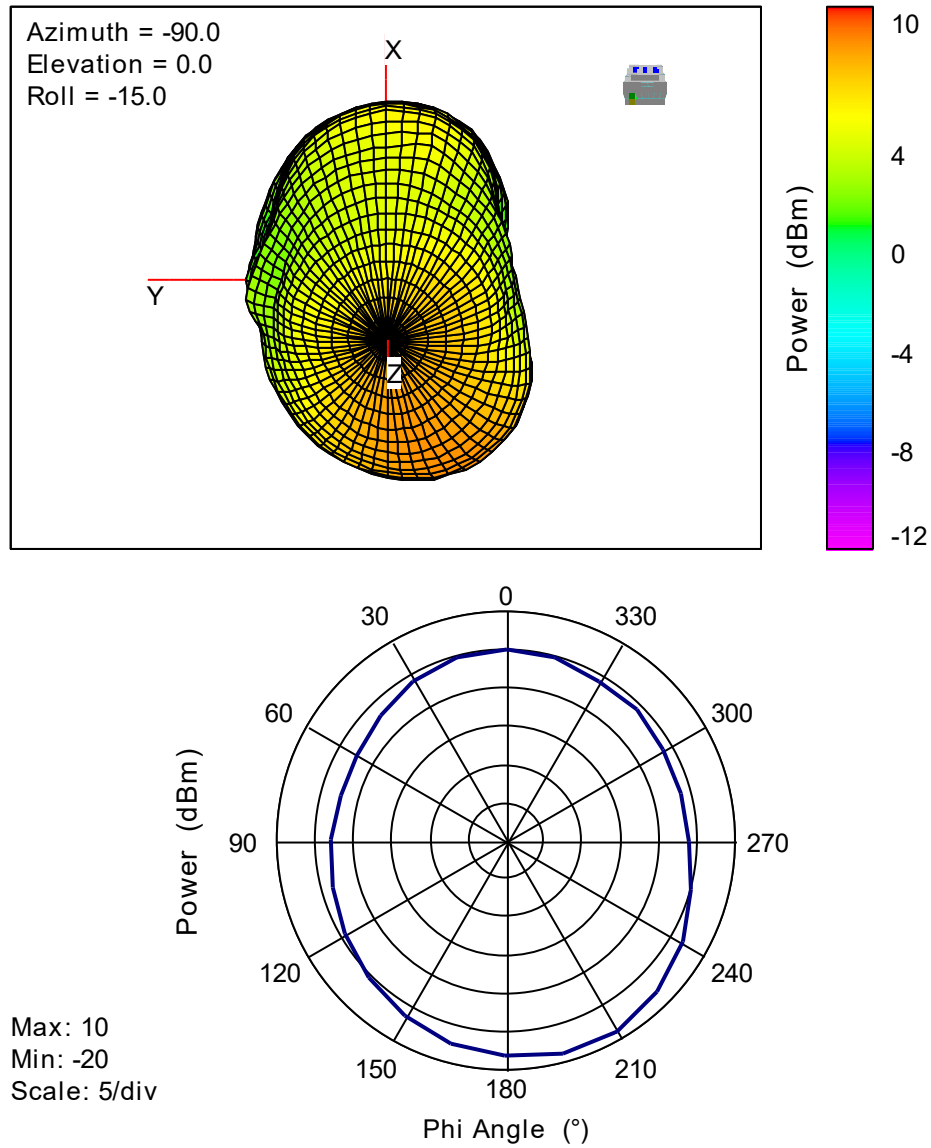
Temperature: 22.6

Humidity: 33.5

Test start: 18/03/2026

TX freq. (MHz)	Tot. Rad. Pwr. (dBm)	Peak EIRP (dBm)	Directivity (dBi)	Efficiency (dB)	Gain (dBi)
2440	3.7	8.6	4.9	-1.7	3.2





Theta = 90°

Fig. 4: 2440 MHz 3D Radiated pattern orientation of DUT.

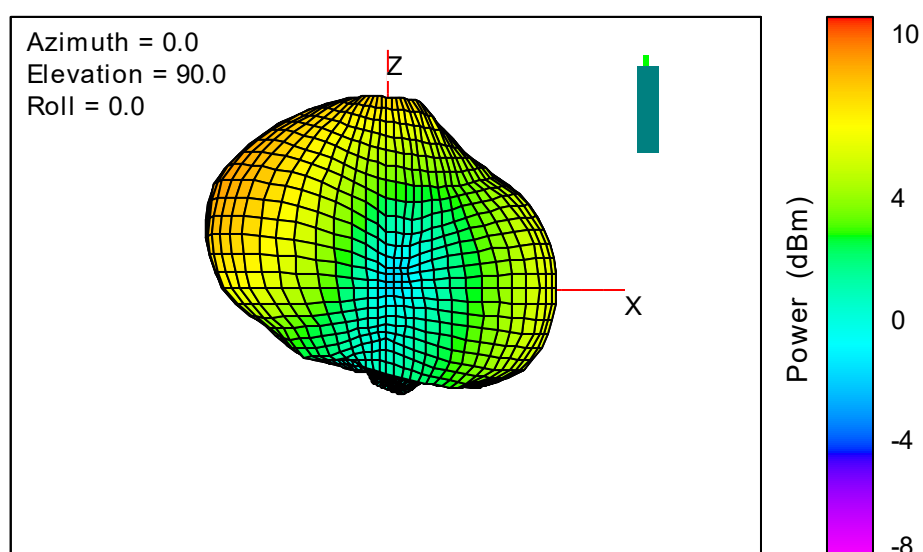
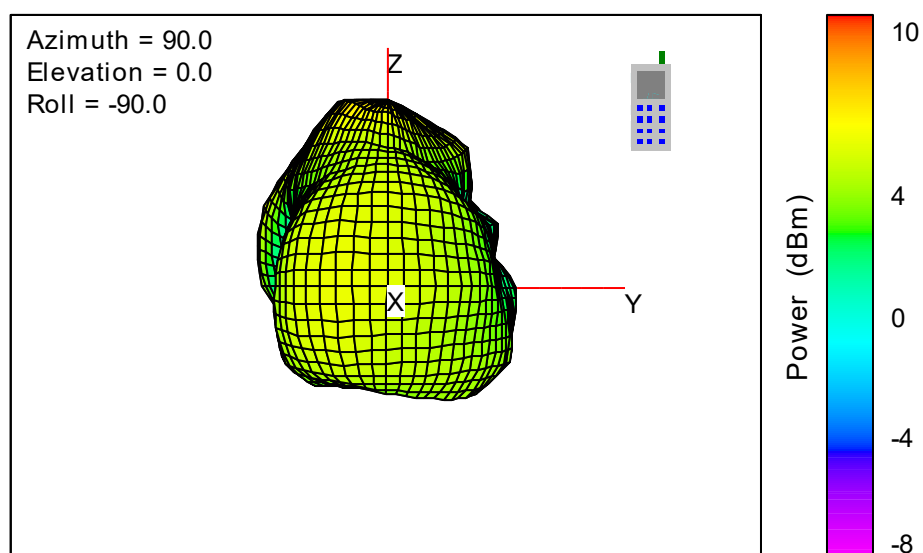
5.4 Radiation Pattern TRP 2480 MHz

Temperature: 22.6

Humidity: 33.5

Test start: 18/03/2026

TX freq. (MHz)	Tot. Rad. Pwr. (dBm)	Peak EIRP (dBm)	Directivity (dBi)	Efficiency (dB)	Gain (dBi)
2480	3.7	8.7	5.0	-1.7	3.3



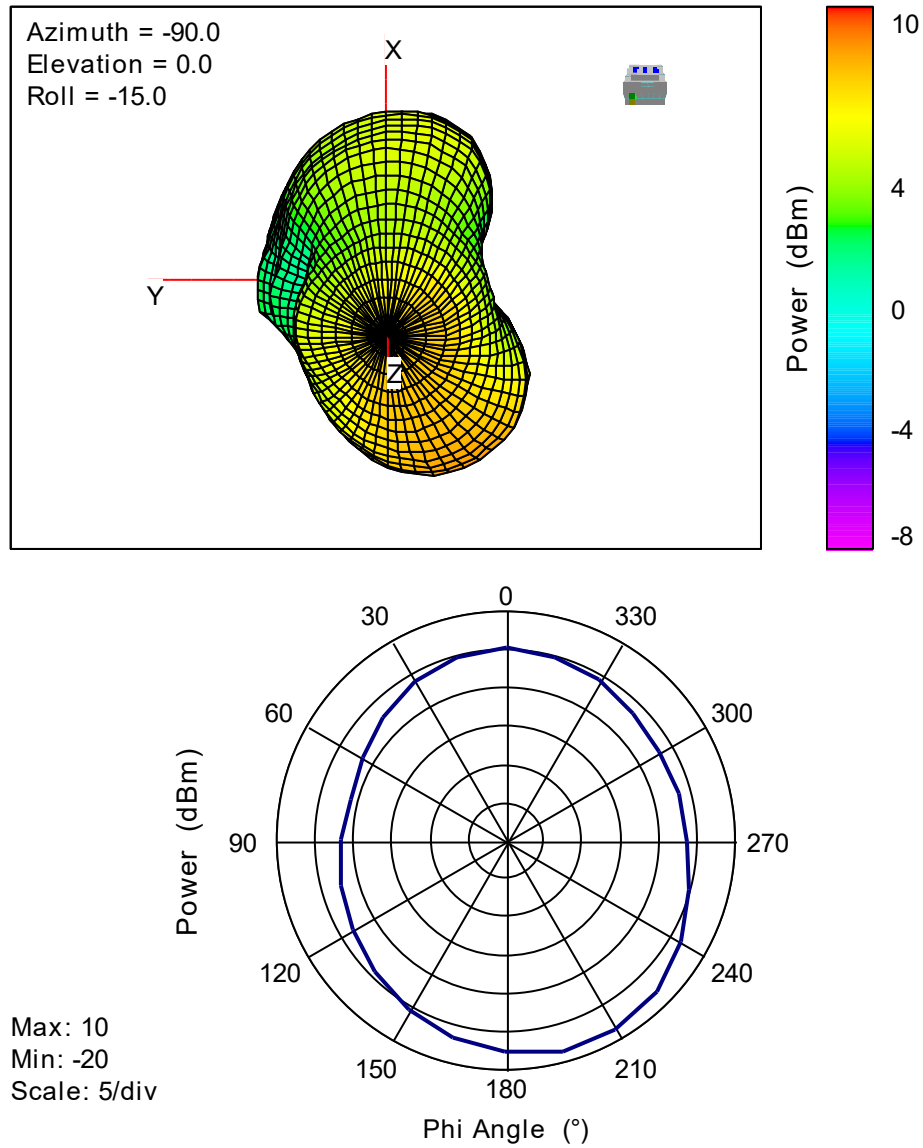


Fig. 5: 2480 MHz 3D Radiated pattern orientation of DUT.