



ANTENNA GAIN AND PATTERN MEASUREMENT REPORT

For Gain value reference

FOR

WEARABLE DEFIBRILLATOR

PART/MODEL NUMBER: LIFEVEST 5100

DATE ISSUED: MAY 16, 2022

REPORT NUMBER: 14303320-O1V1

Prepared for
Zoll Manufacturing Corporation
121 Gamma Dr
Pittsburgh, PA, 15238-2919
U.S.A.

Prepared by
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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	05/16/2022	Initial Issue	

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1 ATTESTATION OF TEST RESULTS

Company Name and Address	ZOLL Manufacturing Corporation
	121 Gamma Dr
	Pittsburgh, PA, 15238-2919
	U.S.A.
EUT Description	Wearable Defibrillator
Part/Model	LIFEVEST 5100
Date Tested	05/10/2022

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
Non-standard Test Method*	Information Only
*as agreed upon the quote for order # 14303320	

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP/A2LA, NIST, or any agency of the U.S. Government.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

Approved & Released For
UL Verification Services Inc. By:

E.B.

Ekta Budhbhatti
OTA SUPERVISOR
UL Verification Services Inc.

Tested and Prepared By:

Casey Dial

Casey Dial
TEST ENGINEER
UL Verification Services Inc.

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2 TEST FACILITY

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The test was performed in OTA A.

- Test operator and Report writer: Casey Dial
- Report reviewed by: Ekta Budhbhatti

3 TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
PNA-L Network Analyzer	Agilent	N5230C	MY49001404	09 February 2022	09 February 2023

4 DEVICE UNDER TEST INFORMATION

Antenna	
Manufacturer	ZOLL Manufacturing Corporation
Part/Model Number	LifeVest 5100
Frequency range (MHz)	699, 713, 756, 787, 824, 869, 915, 960, 1710, 1755, 1850, 1910, 1990, 2110, 2155
Device/Antenna type	Cellular Antenna

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5 RESULT SUMMARY

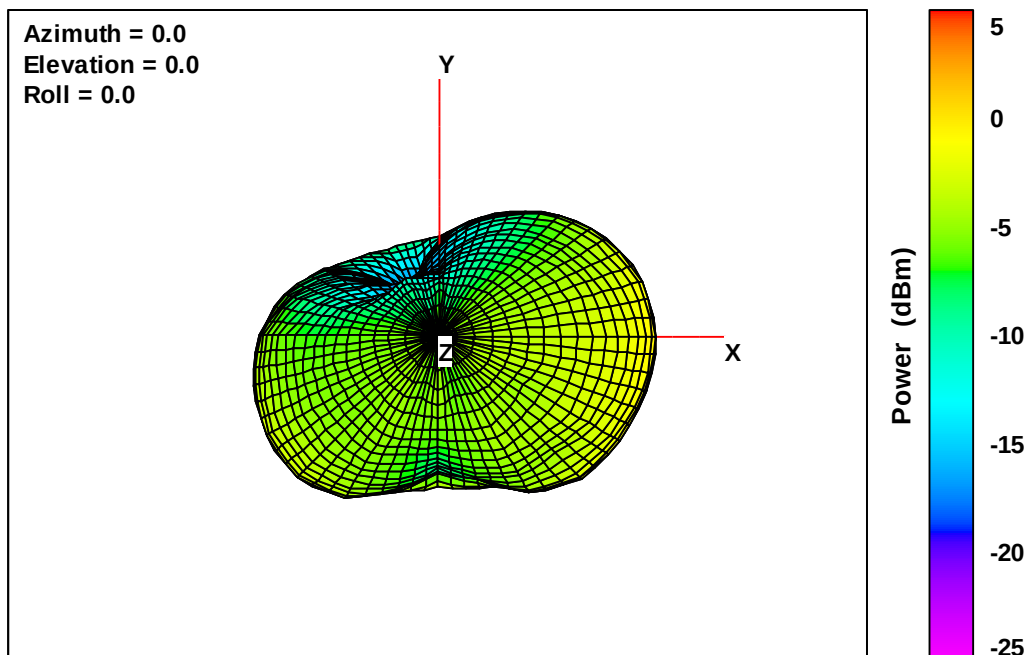
5.1 Passive Antenna Pattern

Frequency (MHz)	Measurement	
	3D Peak Gain (dBi)	3D Average Gain (dB)
699	1.25	-3.59
713	0.75	-4.15
756	-1.37	-6.32
787	-2.74	-5.28
824	-1.90	-5.53
869	-4.31	-7.83
915	-4.13	-8.18
960	-3.01	-6.86
1710	1.77	-3.38
1755	2.87	-2.39
1850	3.20	-1.61
1910	4.54	-1.38
1990	4.71	-1.86
2110	5.83	-1.13
2155	5.81	-1.06

6 PLOTS

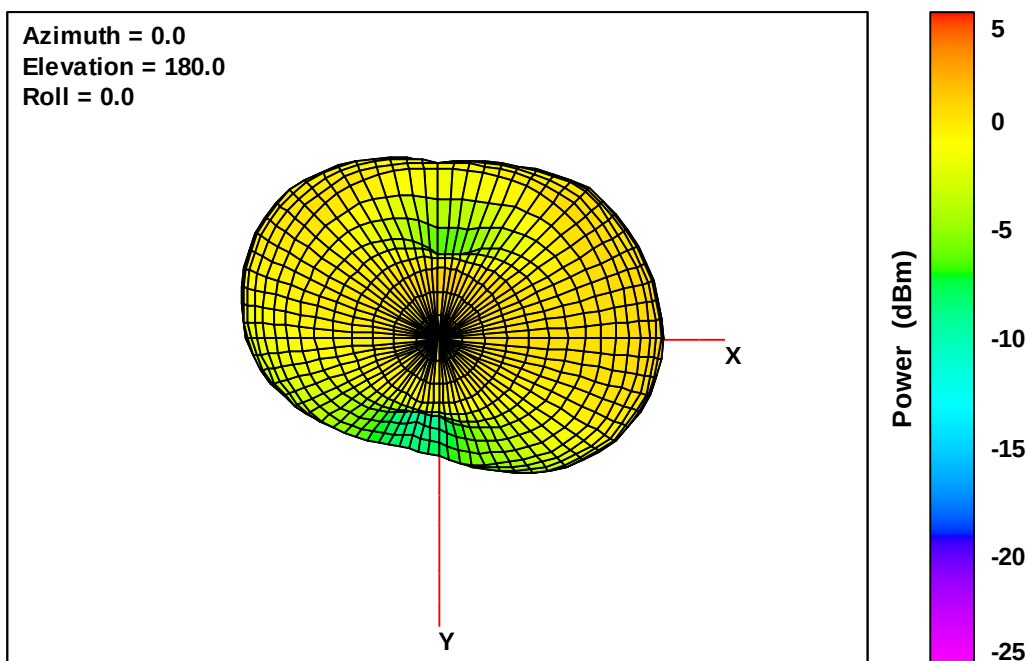
6.1 3D PASSIVE- 699 MHz

Total EIRP, Top View

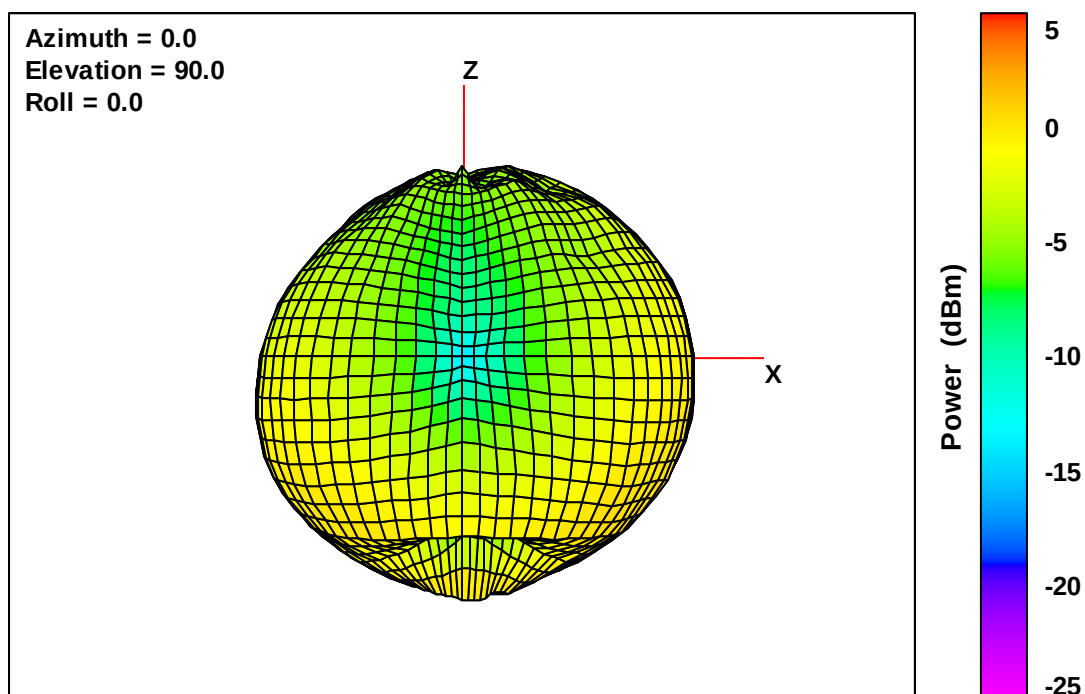
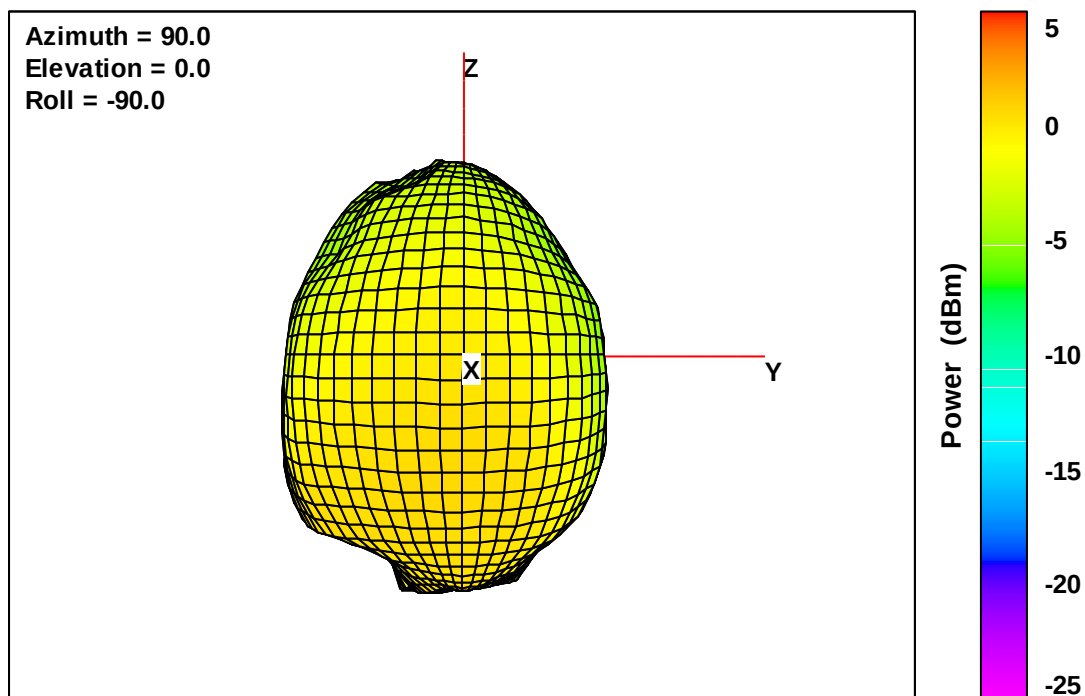


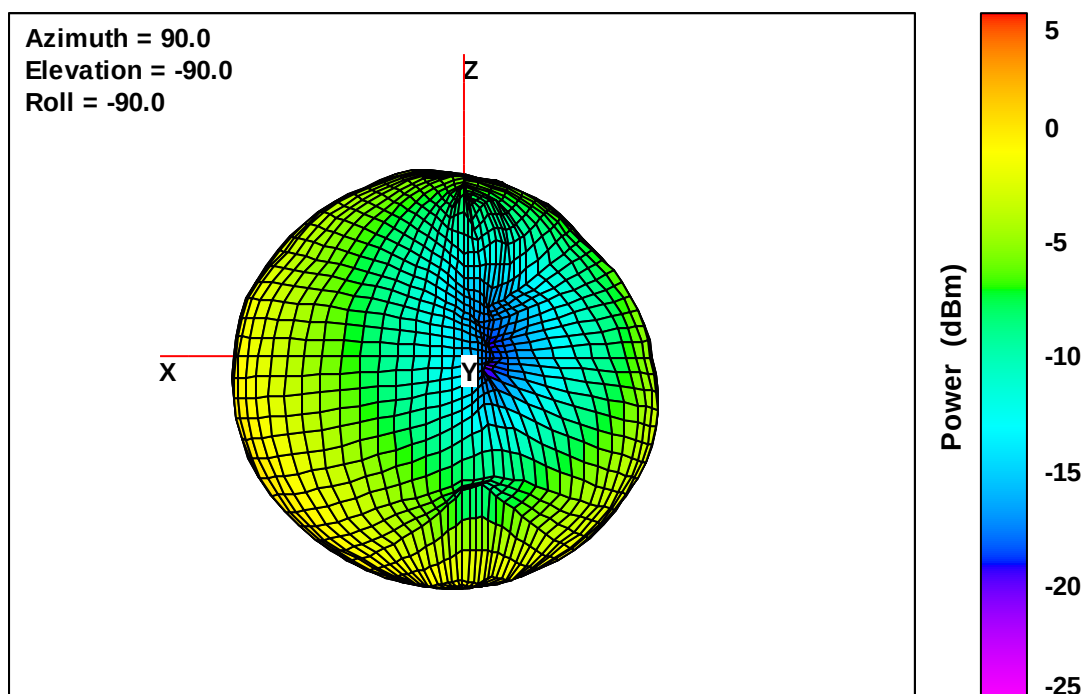
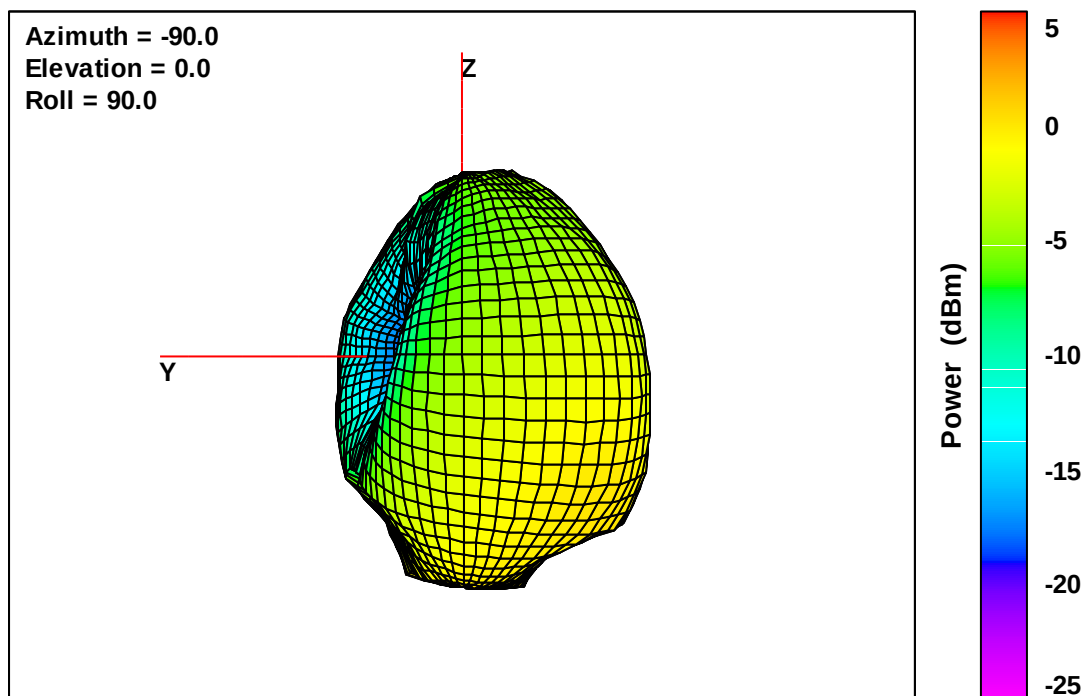
Wearable Defibrillator Free-Space Total EIRP, Top View, 699 MHz

Total EIRP, Bottom View



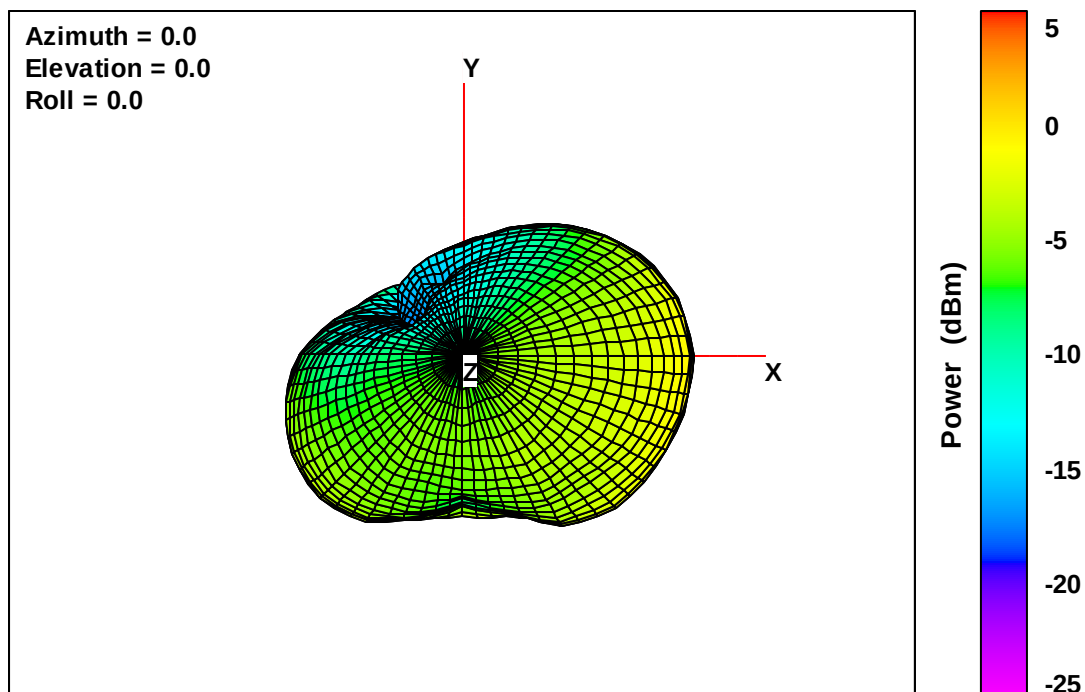
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 699 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 699 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 699 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 699 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 699 MHz**

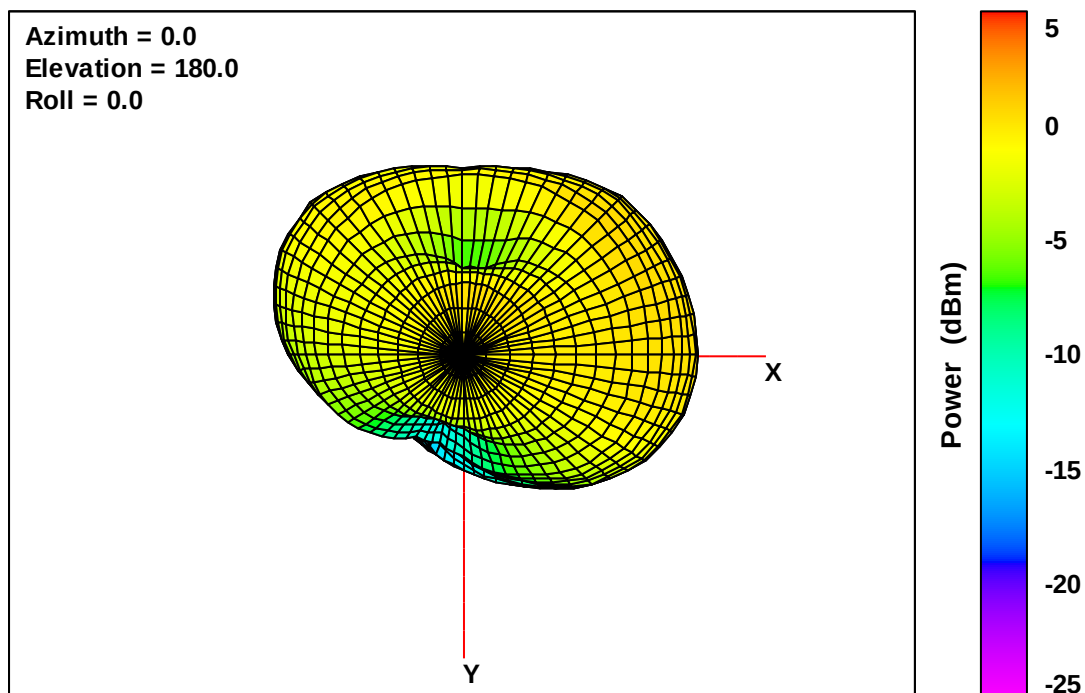
6.2 3D PASSIVE- 713 MHz

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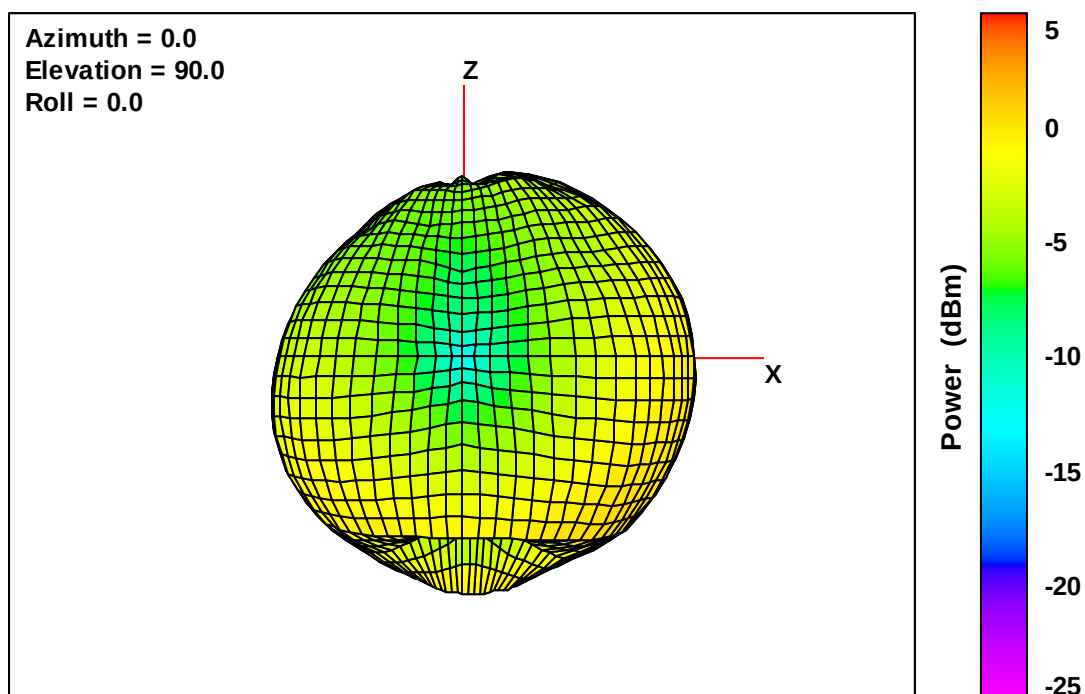
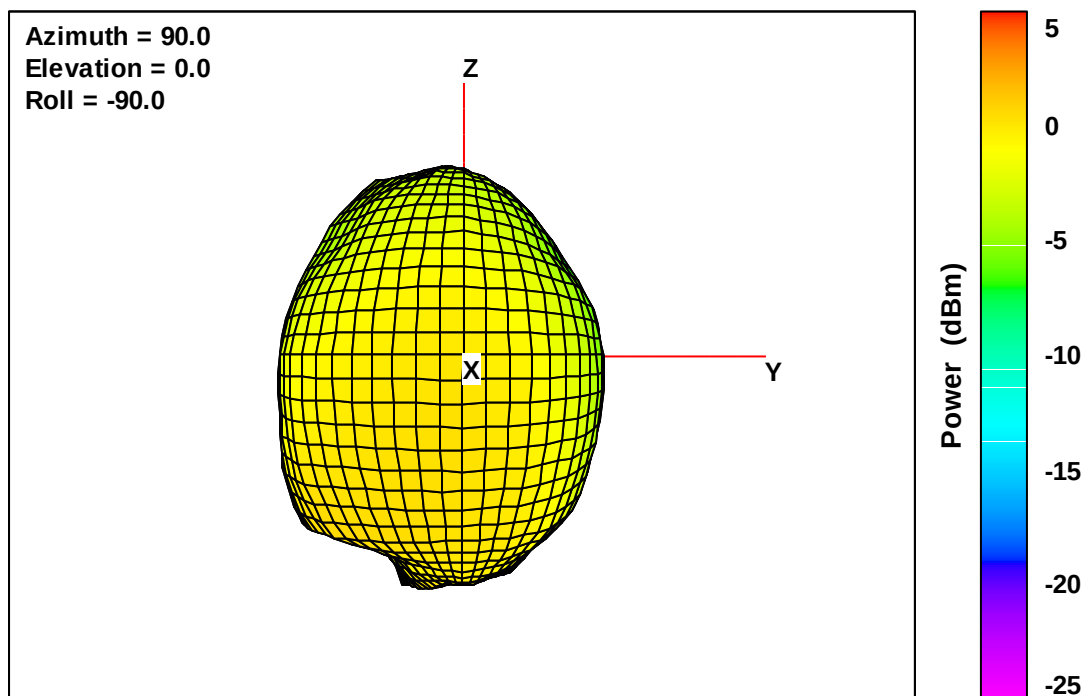


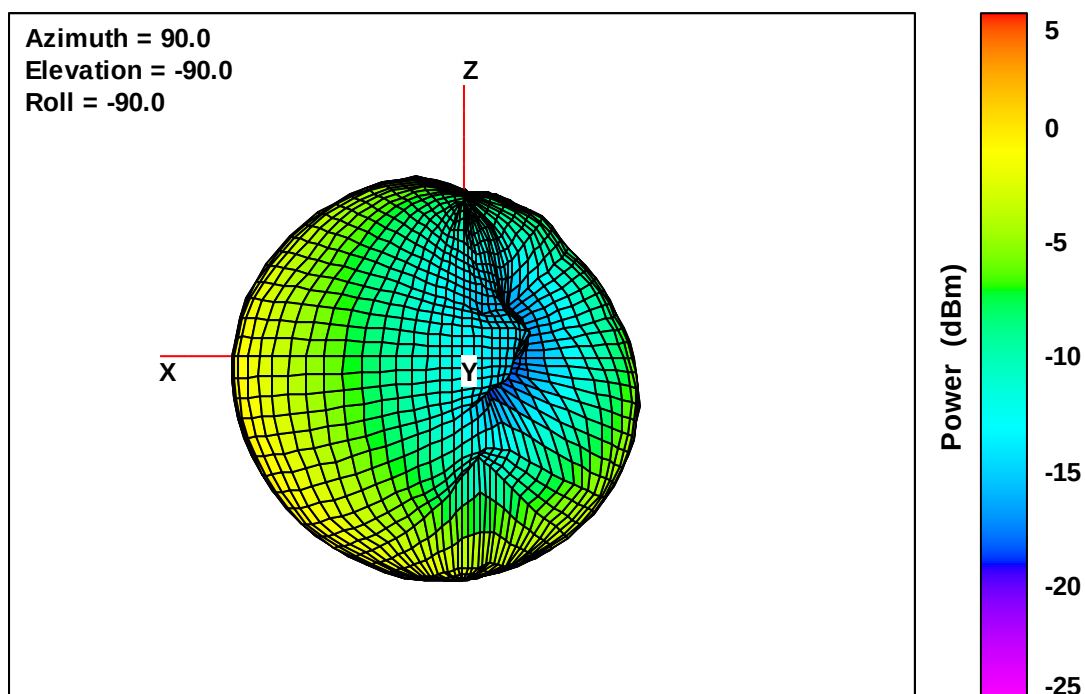
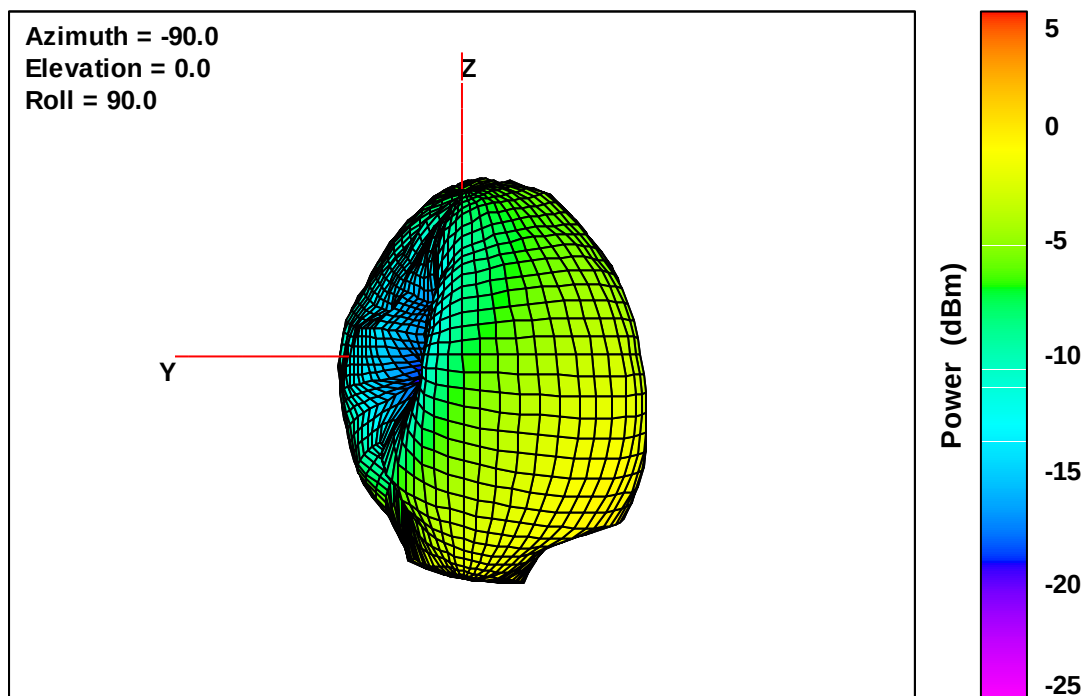
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Total EIRP, Bottom View



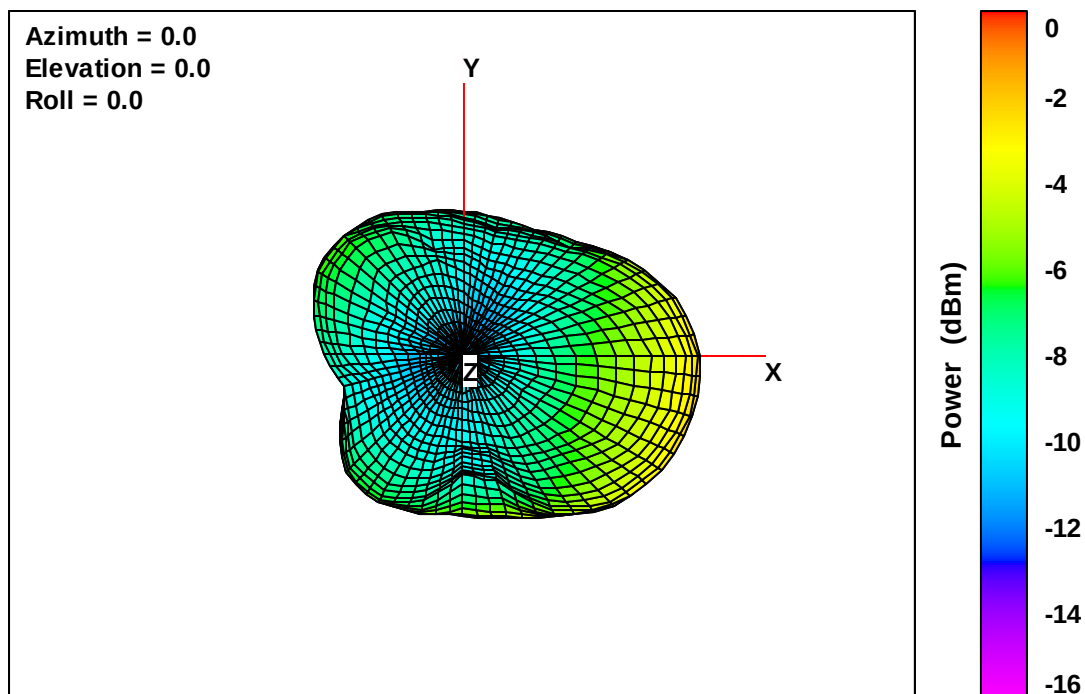
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Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 713 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 713 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 713 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 713 MHz**

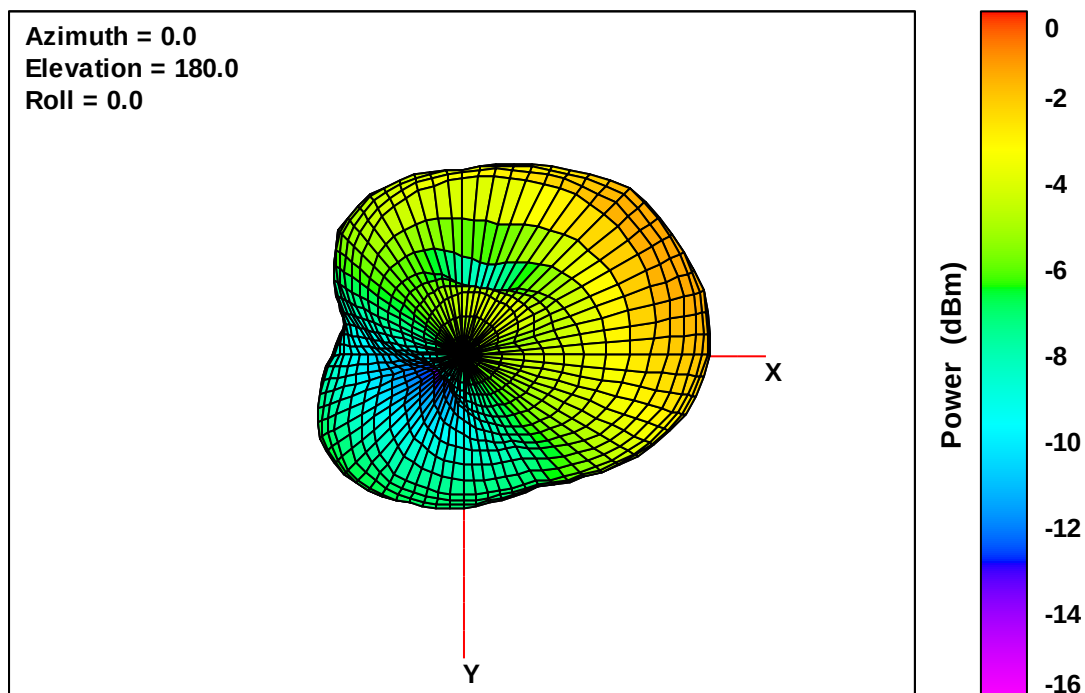
6.3 3D PASSIVE- 756 MHz

Total EIRP, Top View

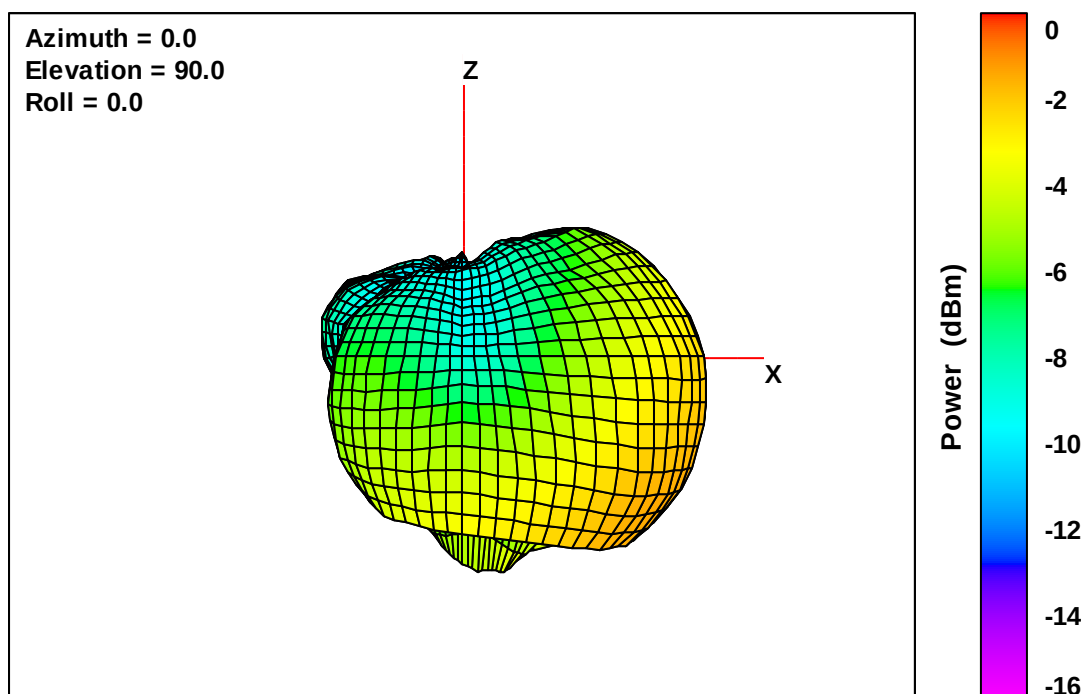
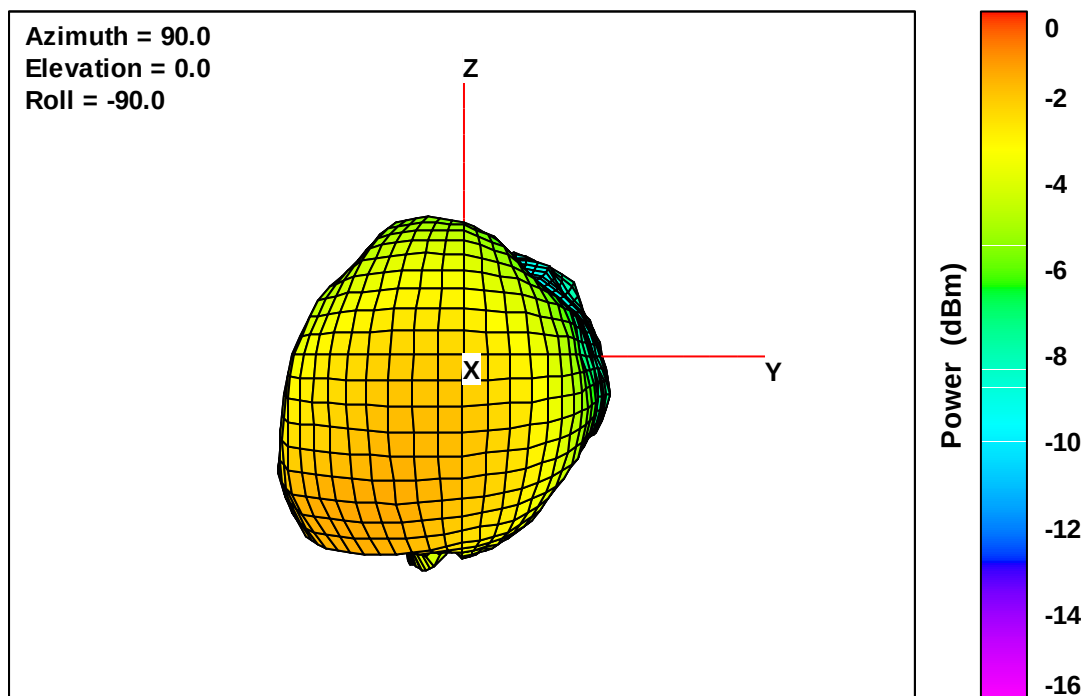


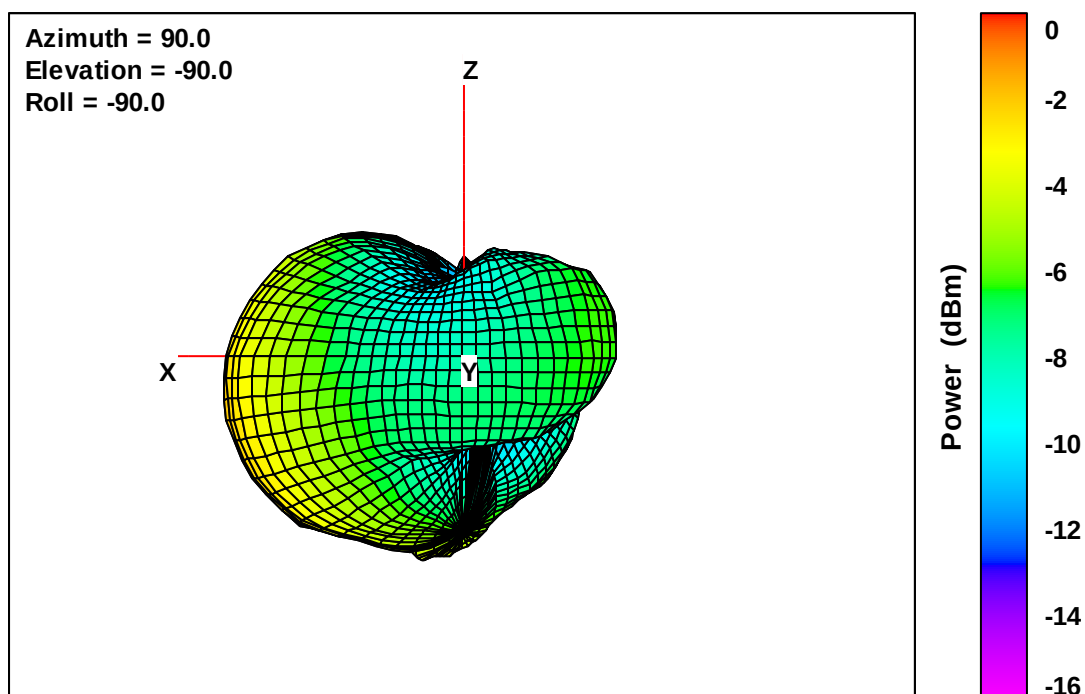
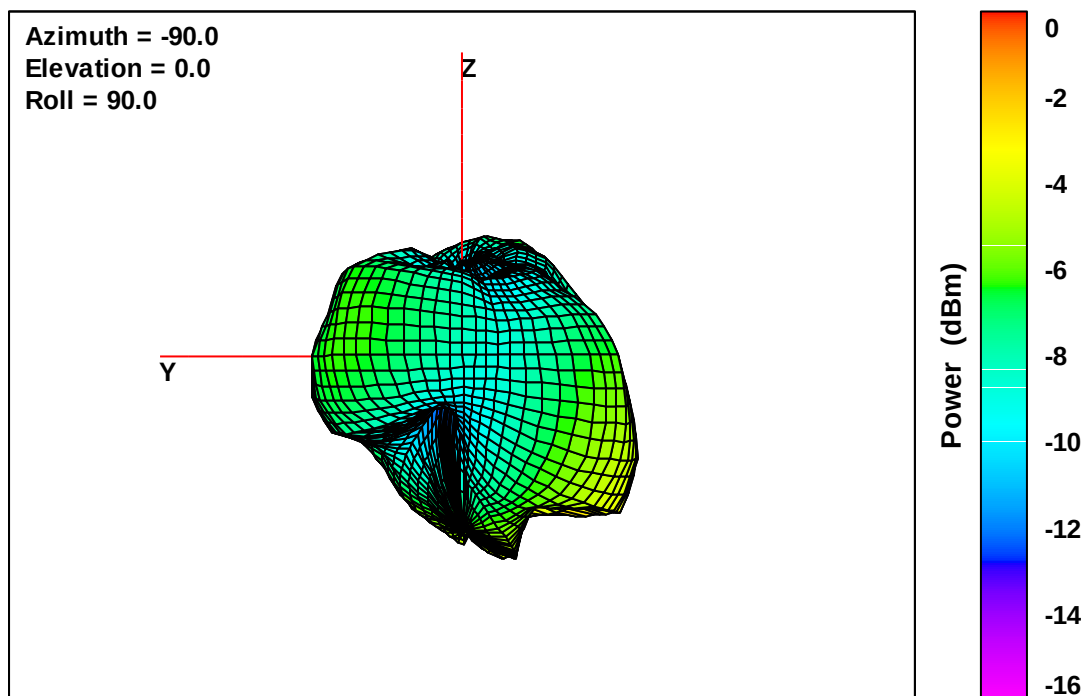
Wearable Defibrillator Free-Space Total EIRP, Top View, 756 MHz

Total EIRP, Bottom View



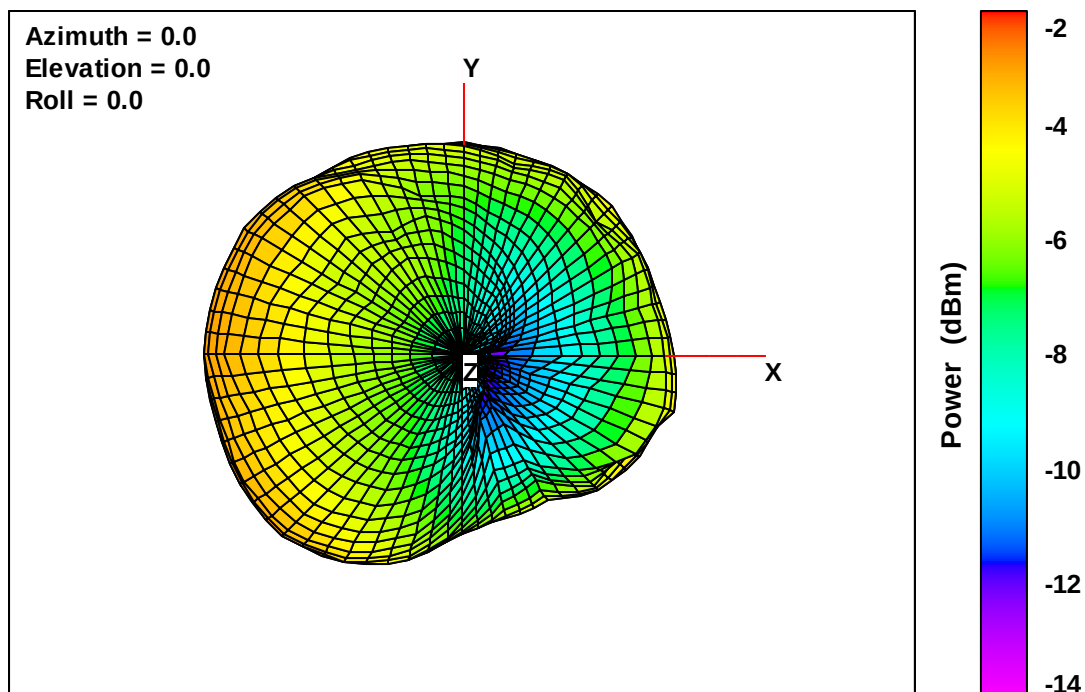
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Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 756 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 756 MHz**

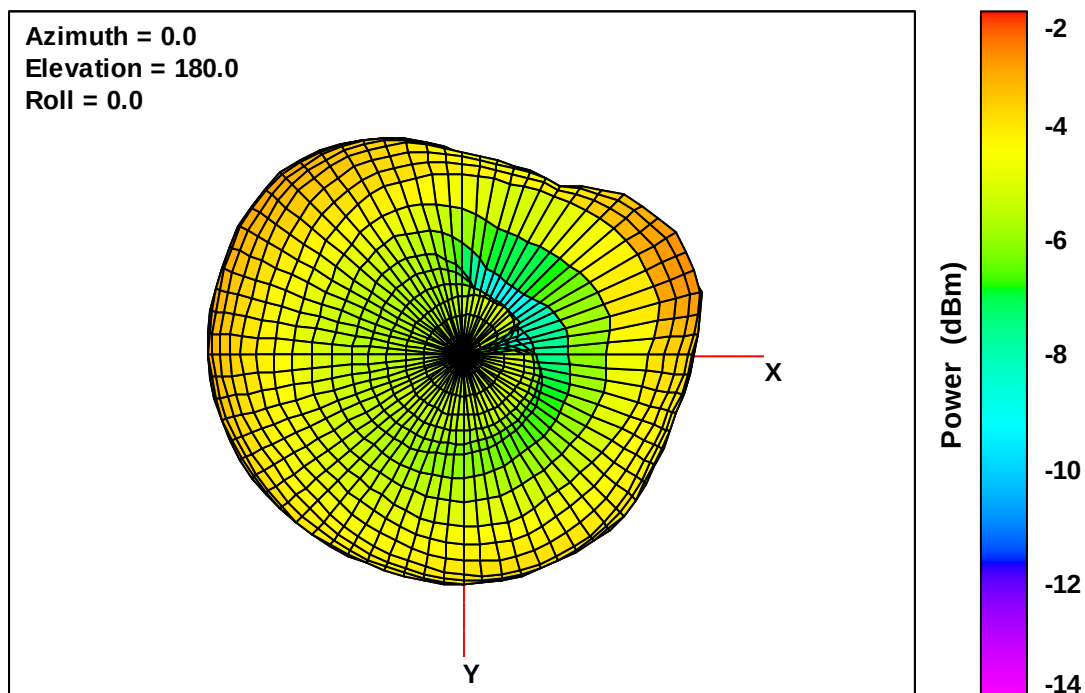
6.4 3D PASSIVE- 787 MHz

Total EIRP, Top View

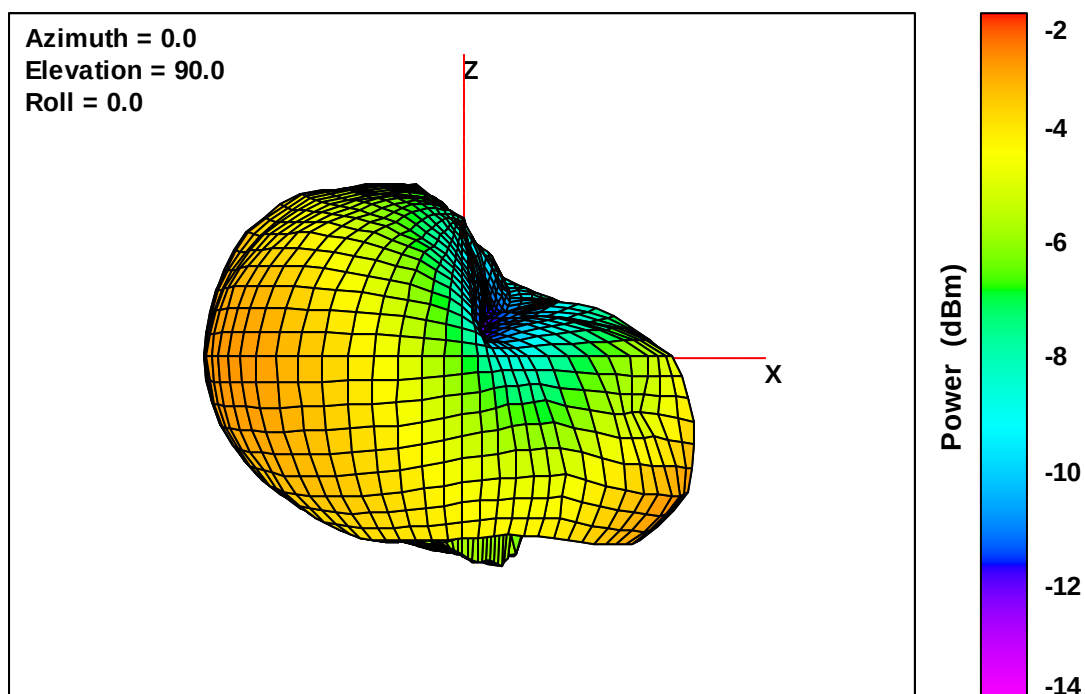
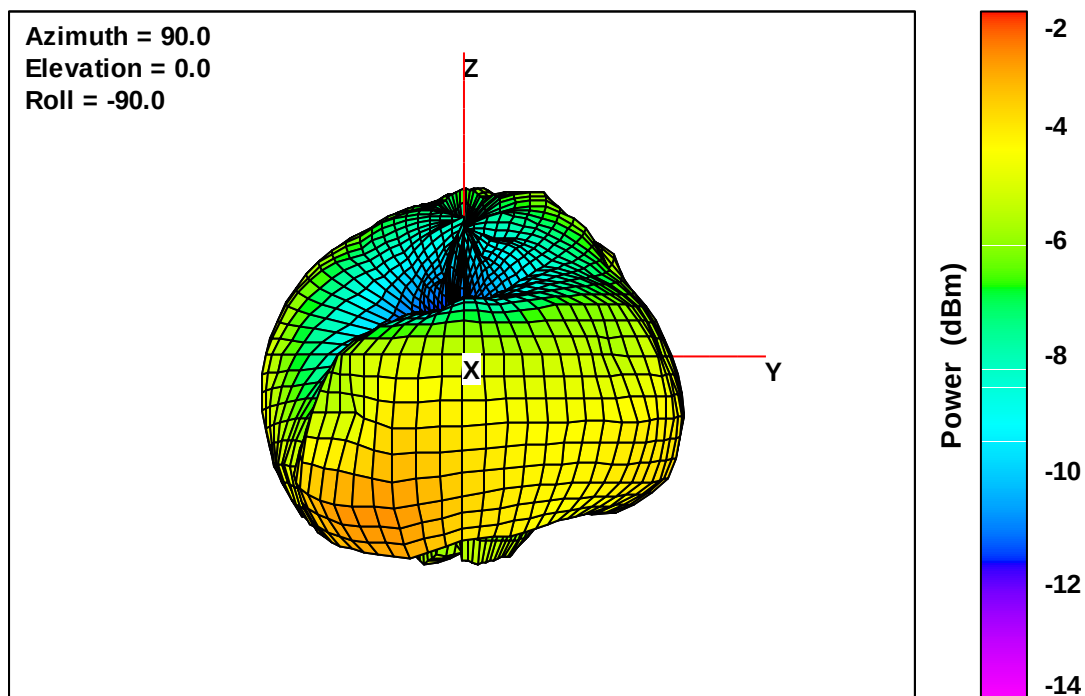


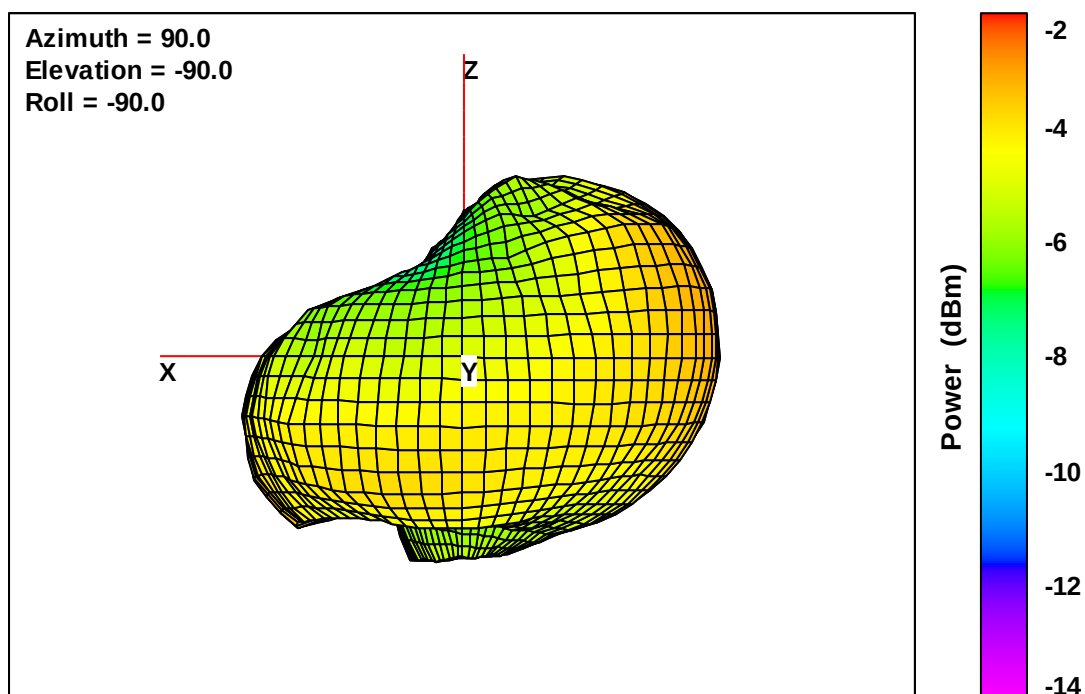
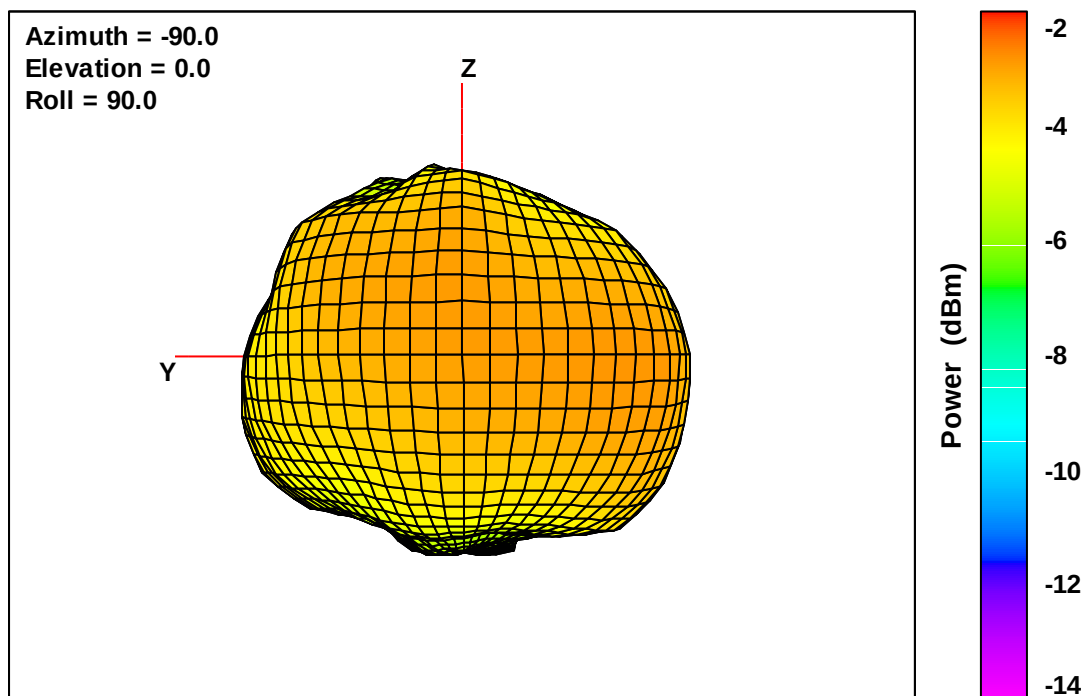
Wearable Defibrillator Free-Space Total EIRP, Top View, 787 MHz

Total EIRP, Bottom View



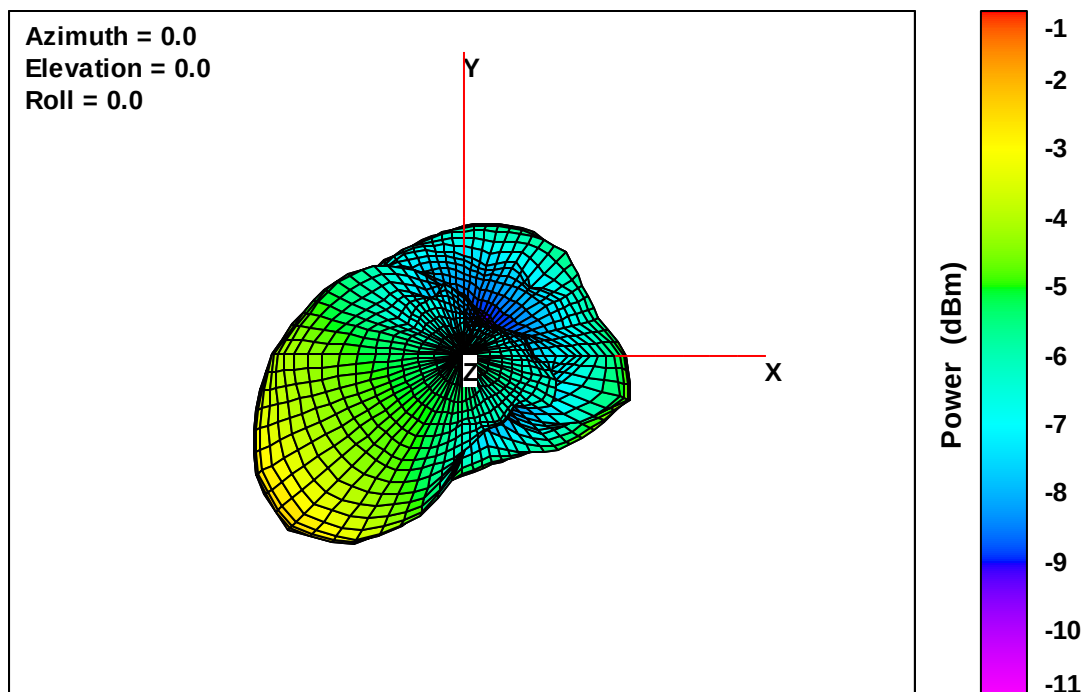
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 787 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 787 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 787 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 787 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 787 MHz**

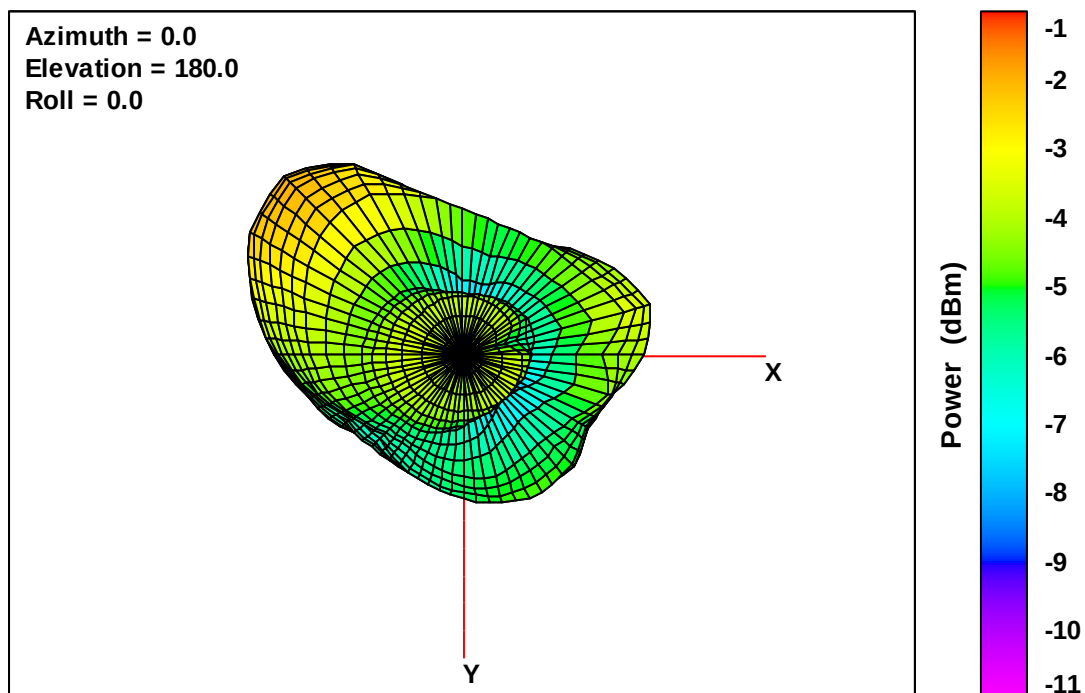
6.5 3D PASSIVE- 824 MHz

Total EIRP, Top View

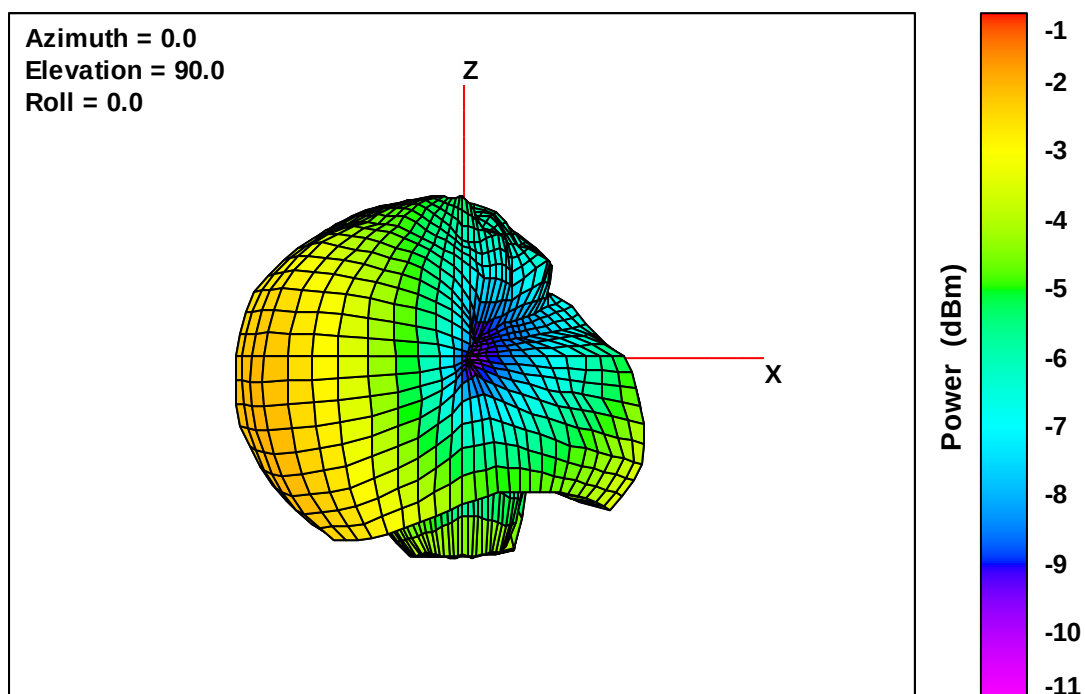
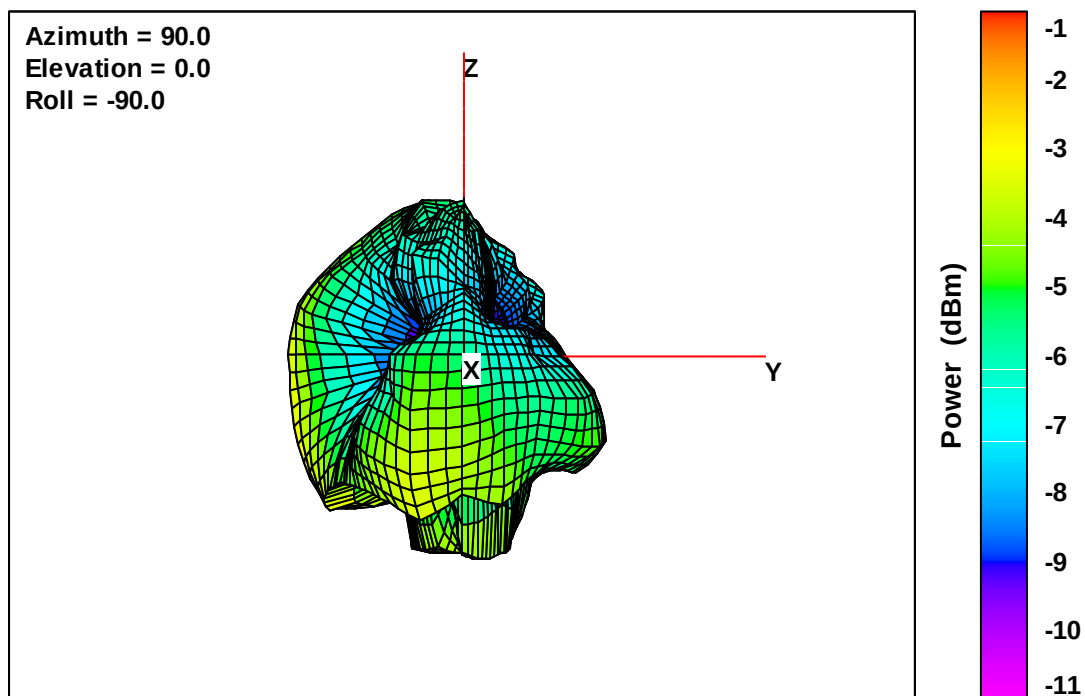


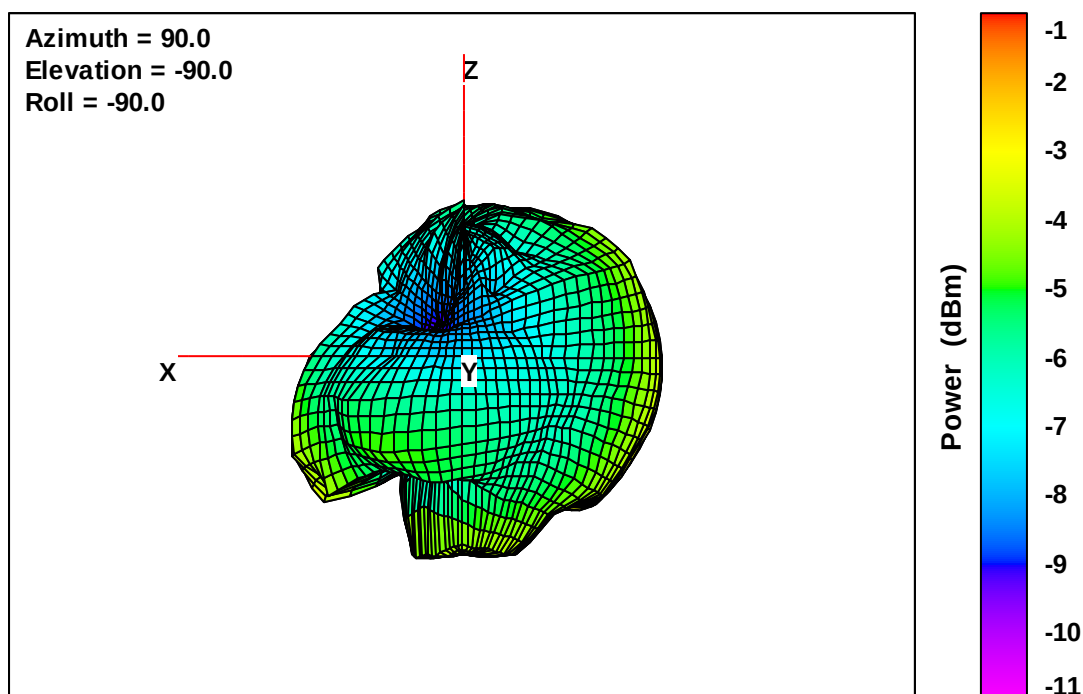
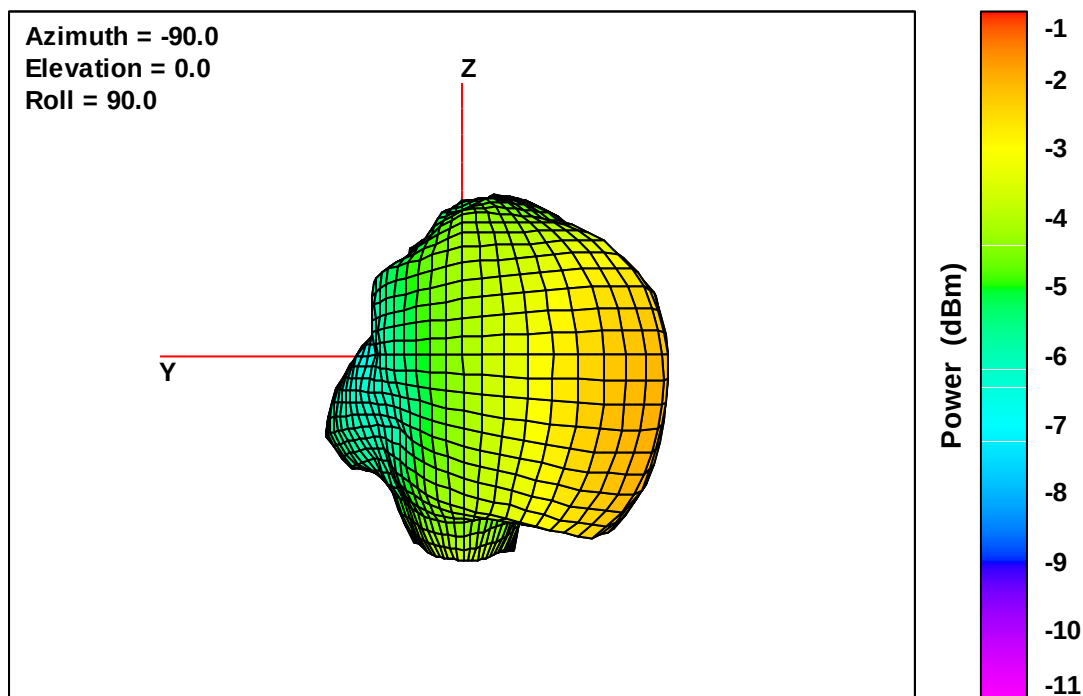
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Total EIRP, Bottom View



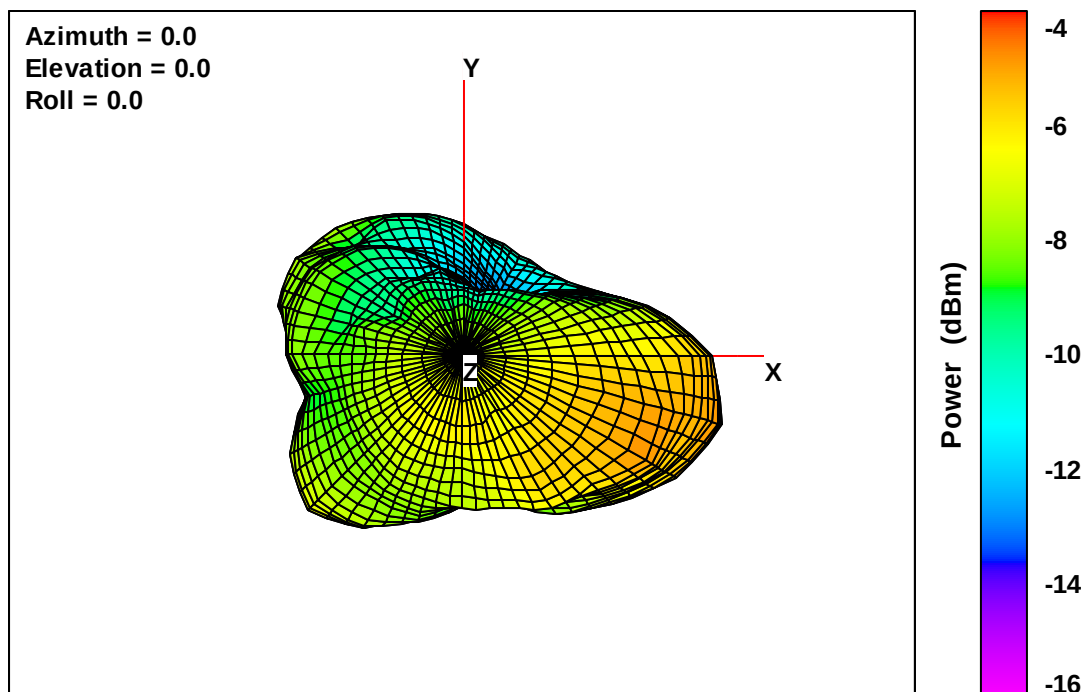
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 824 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 824 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 824 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 824 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 824 MHz**

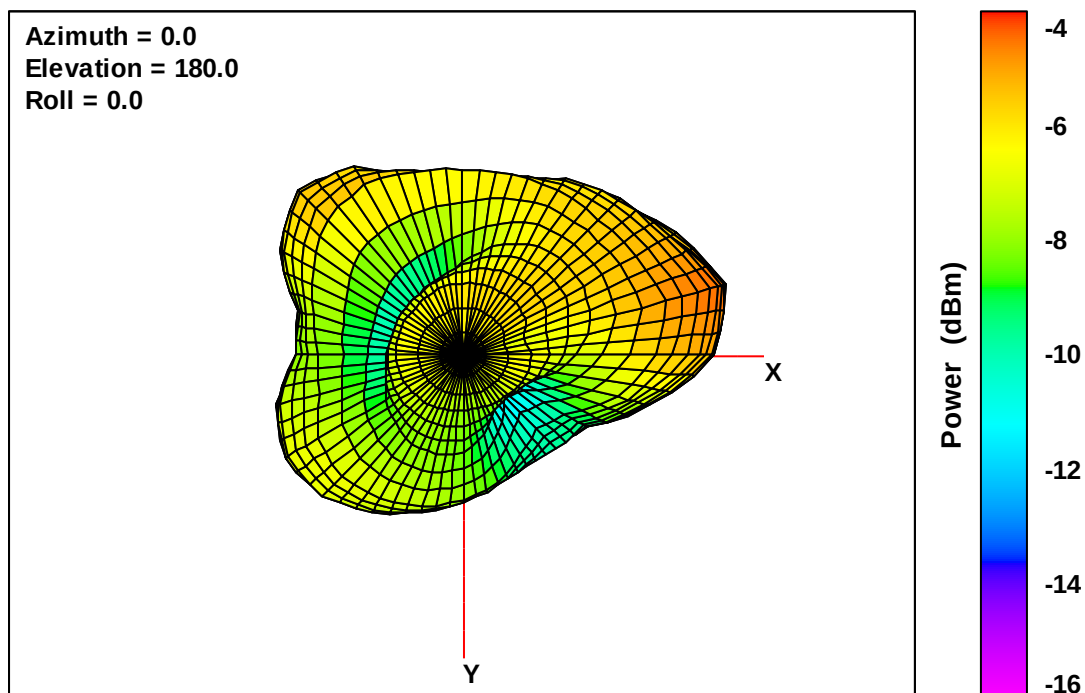
6.6 3D PASSIVE- 869 MHz

Total EIRP, Top View

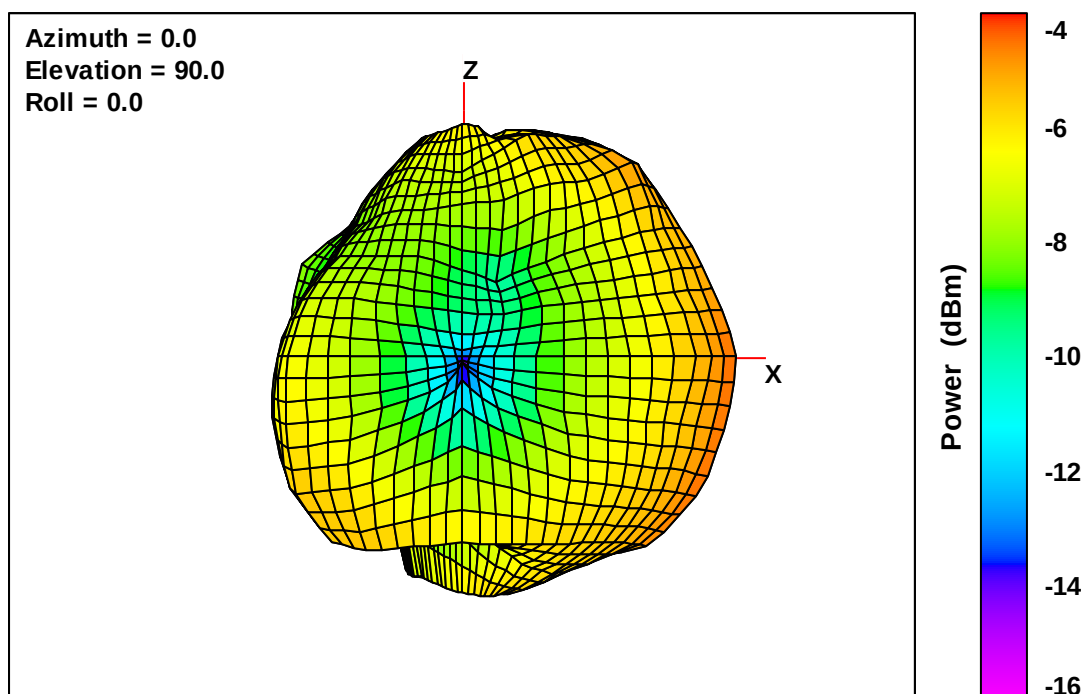
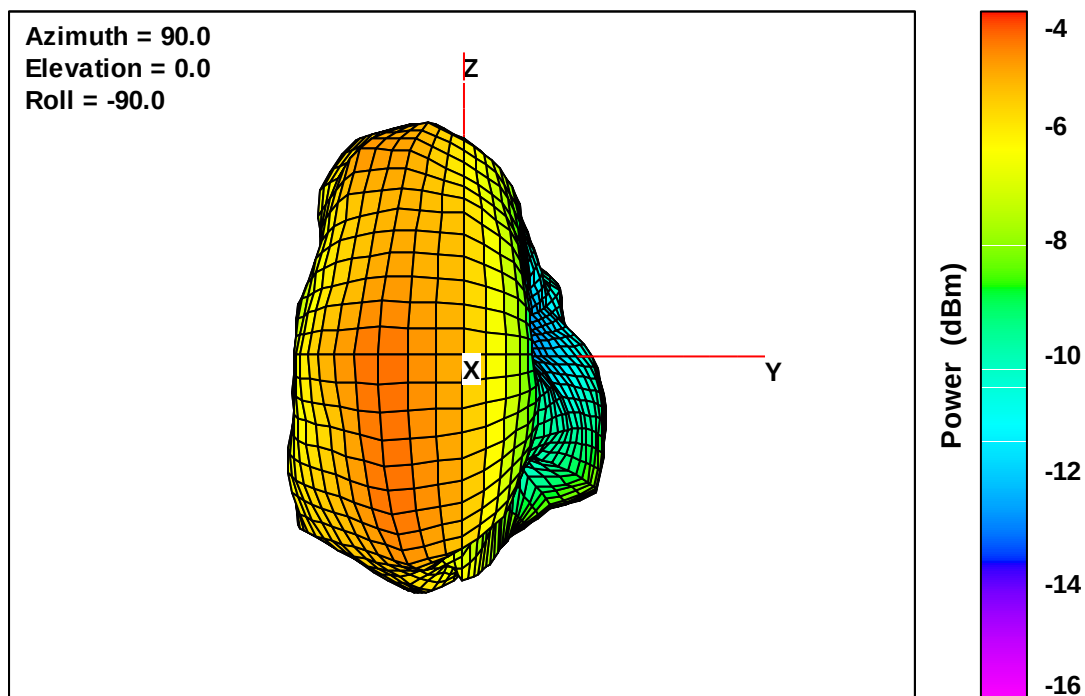


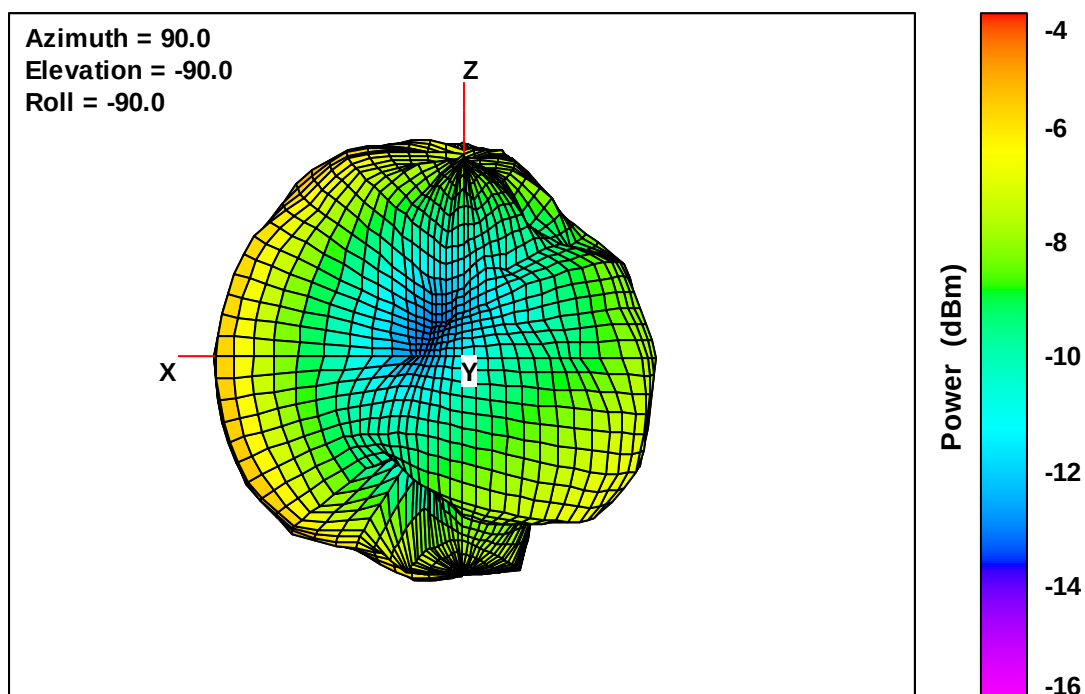
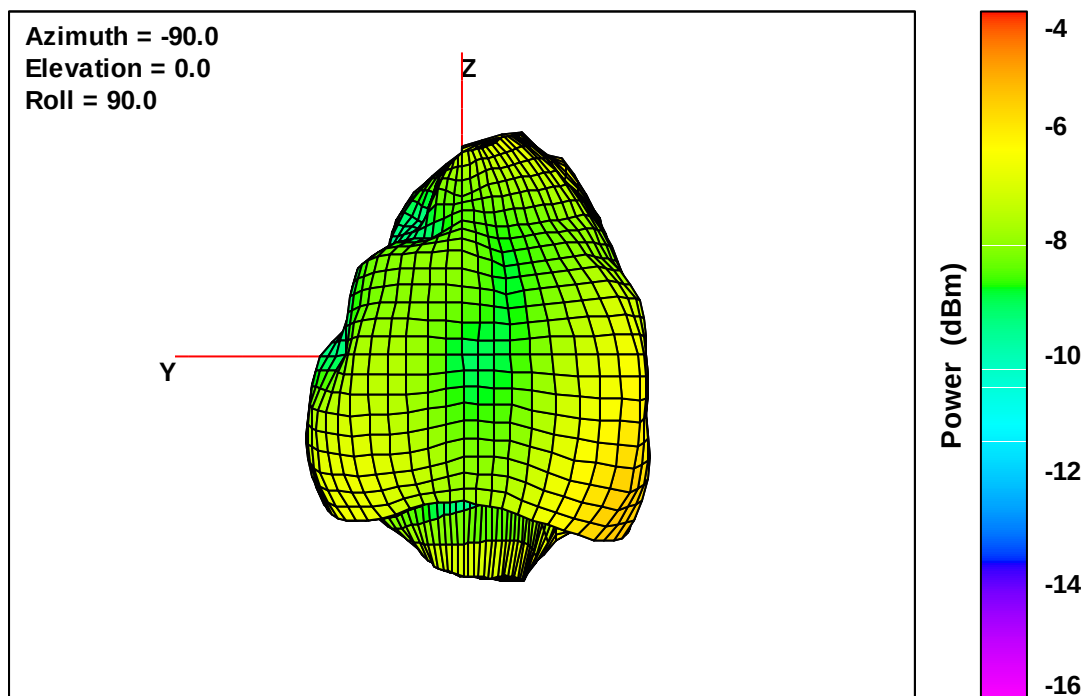
Wearable Defibrillator Free-Space Total EIRP, Top View, 869 MHz

Total EIRP, Bottom View



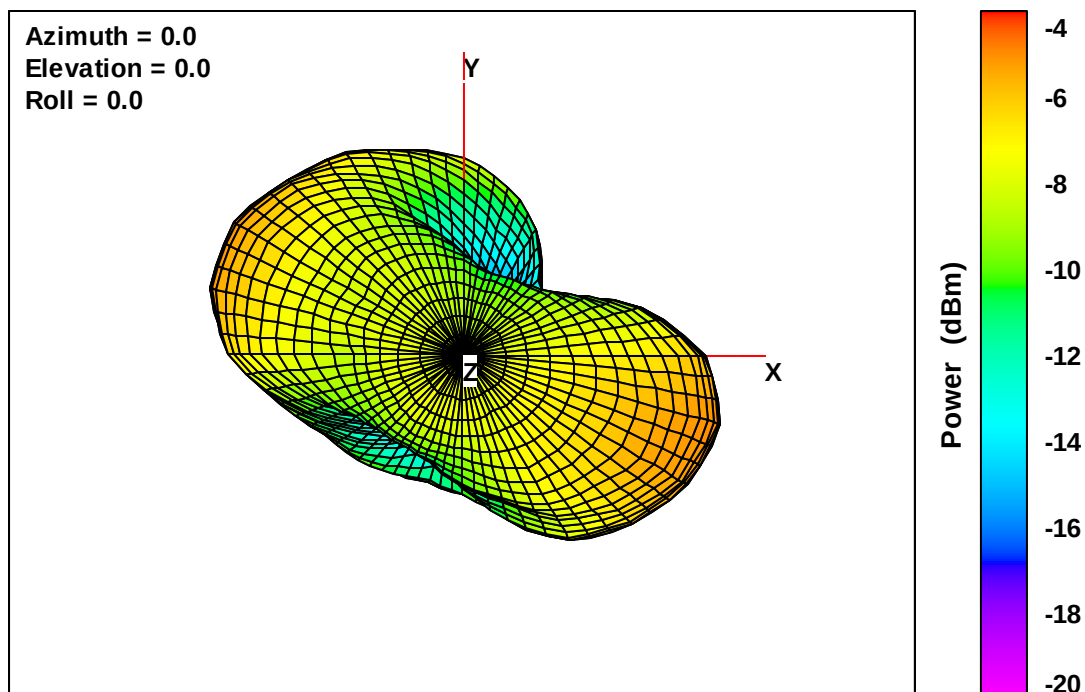
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 869 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 869 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 869 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 869 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 869 MHz**

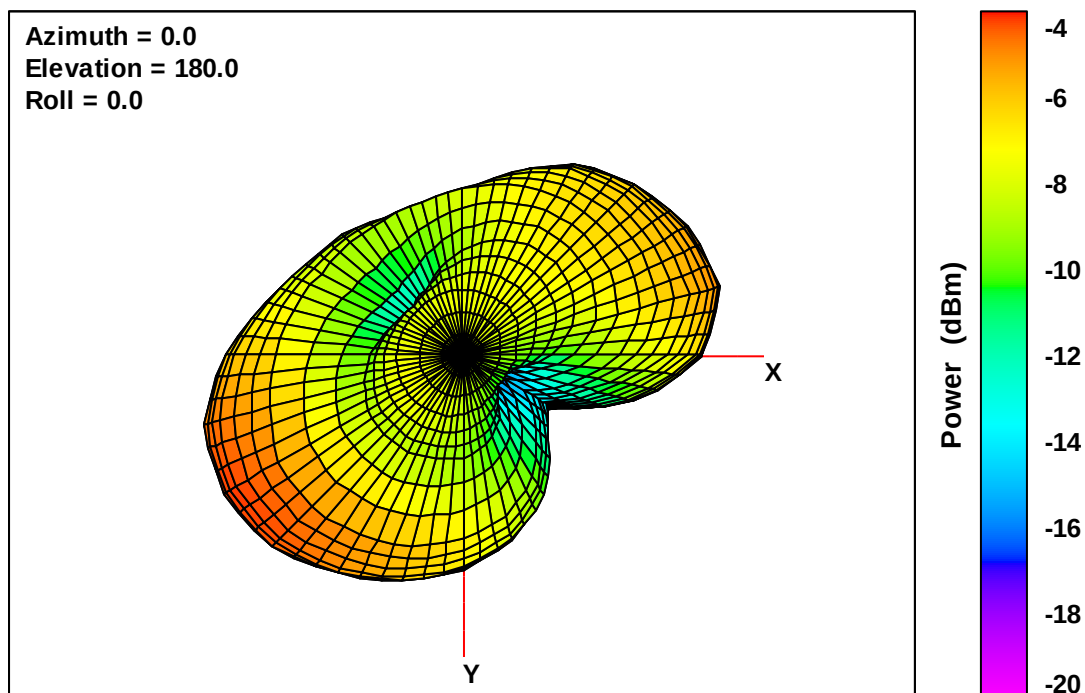
6.7 3D PASSIVE- 915 MHz

Total EIRP, Top View

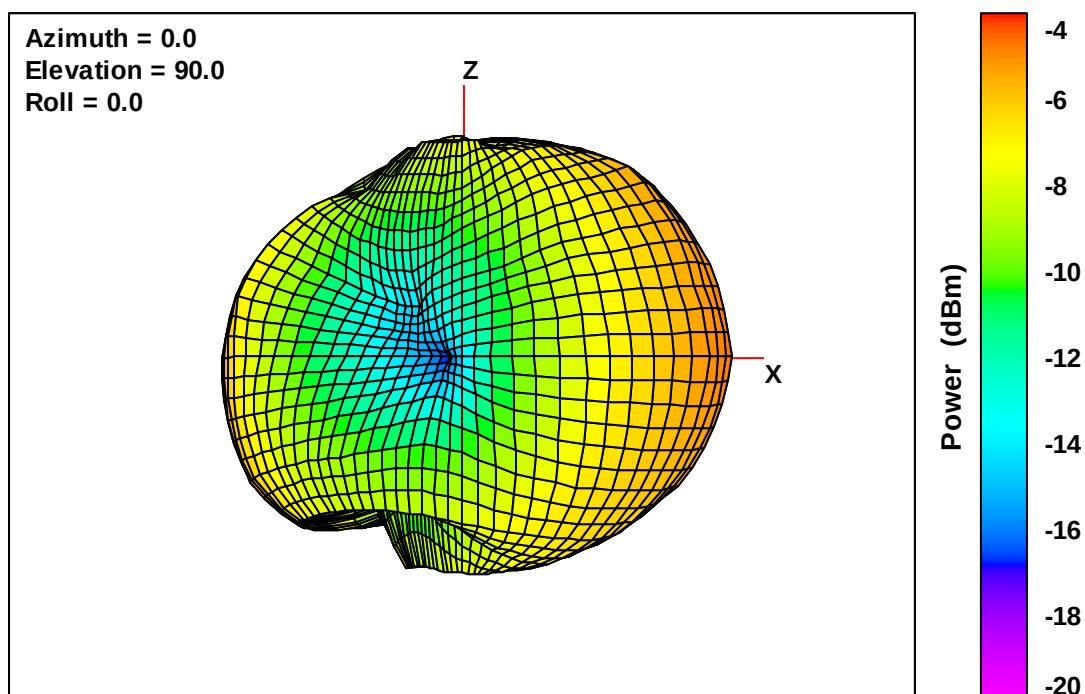
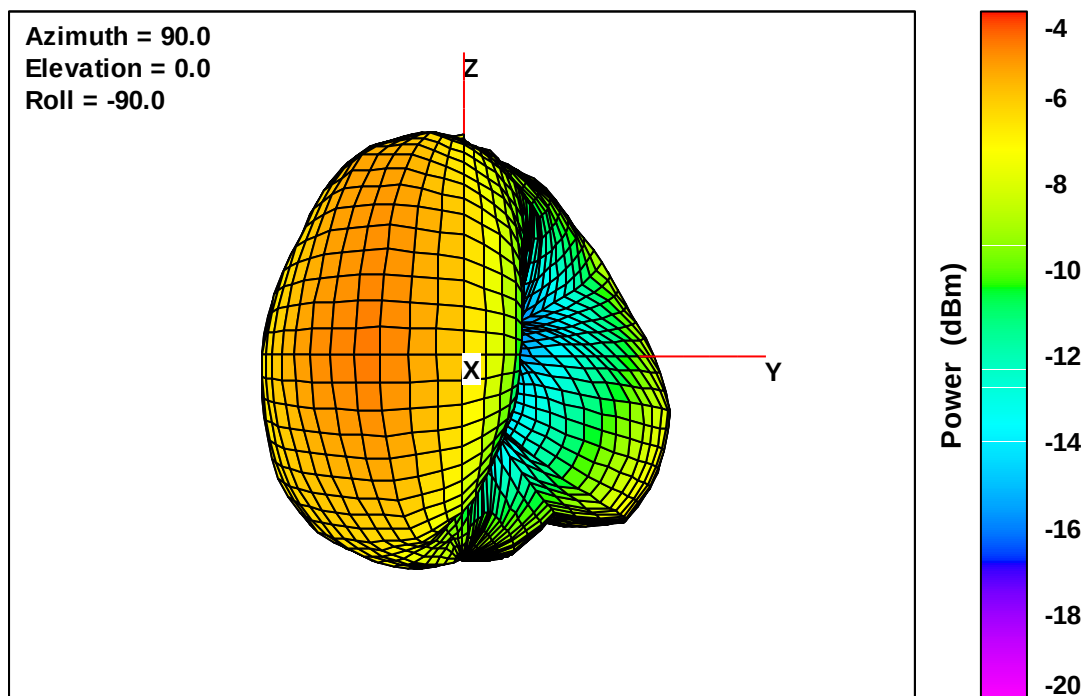


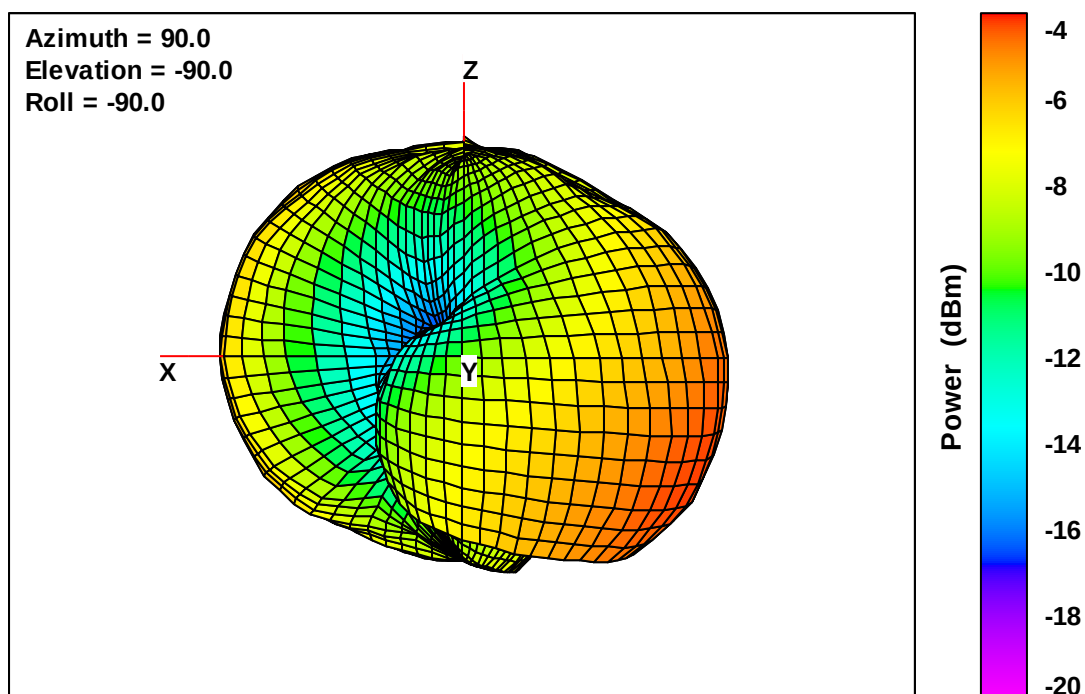
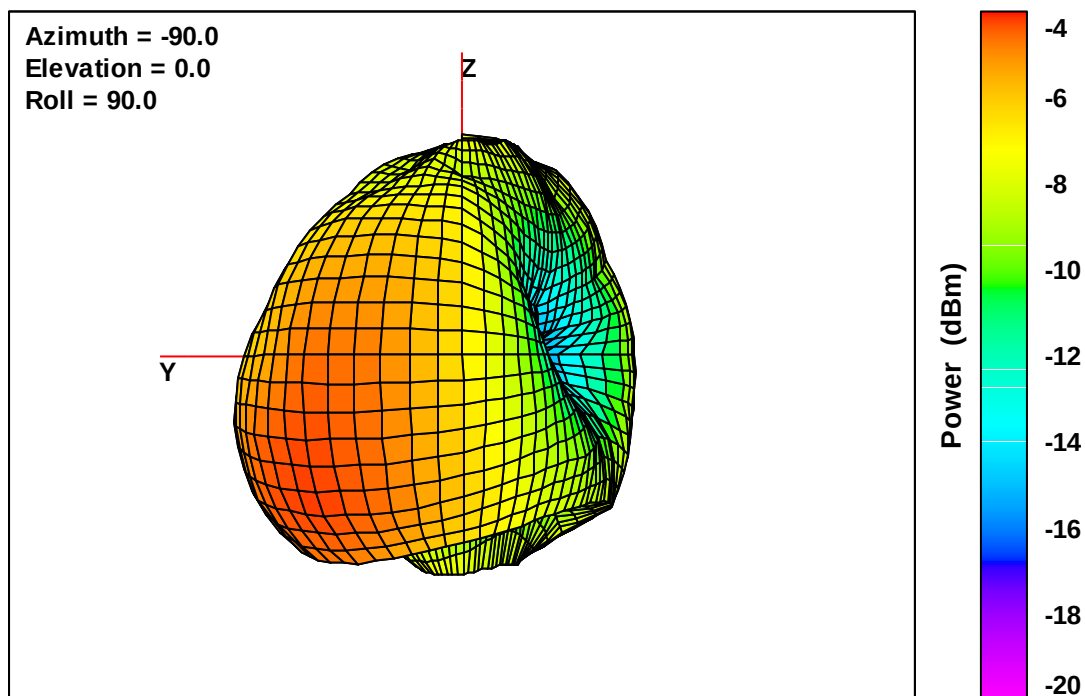
Wearable Defibrillator Free-Space Total EIRP, Top View, 915 MHz

Total EIRP, Bottom View



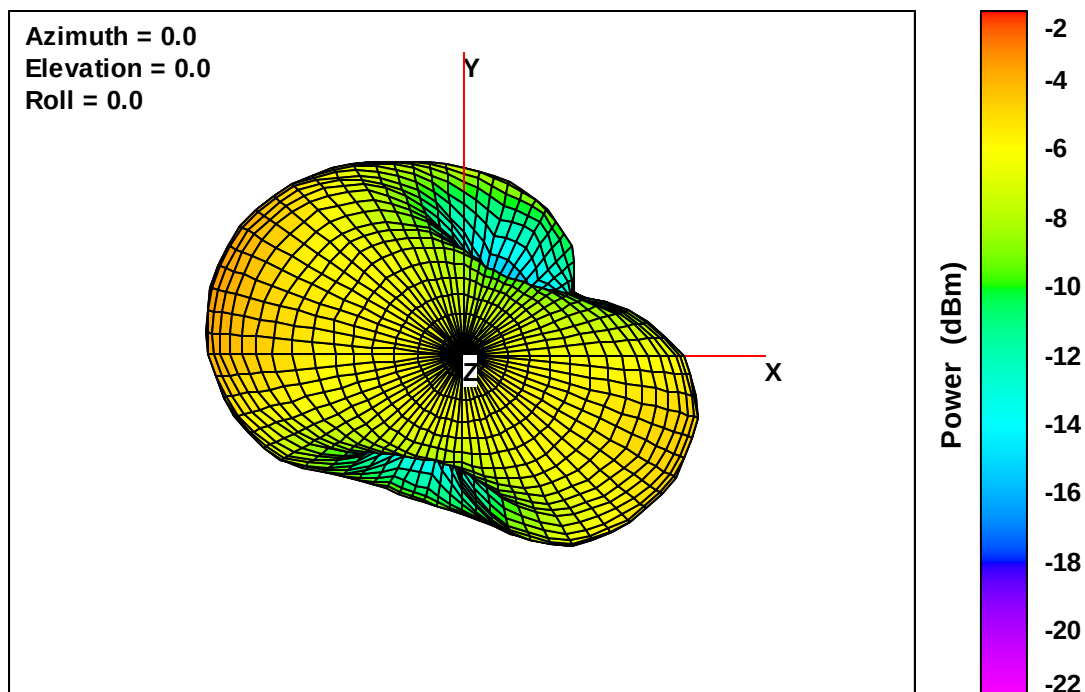
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 915 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 915 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 915 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 915 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 915 MHz**

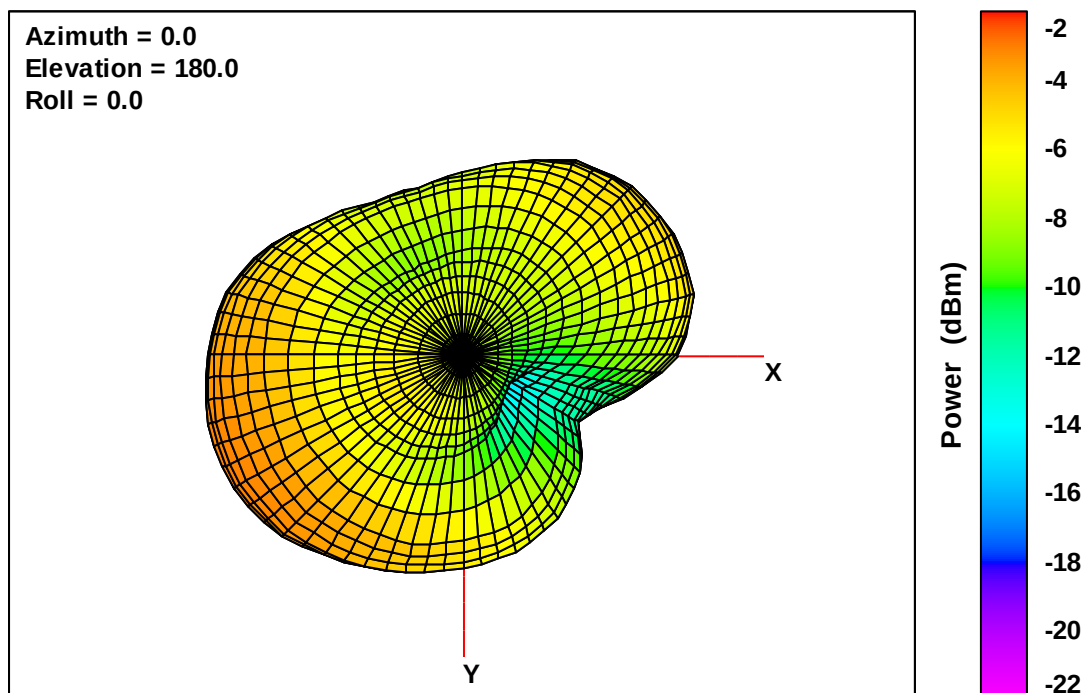
6.8 3D PASSIVE- 960 MHz

Total EIRP, Top View

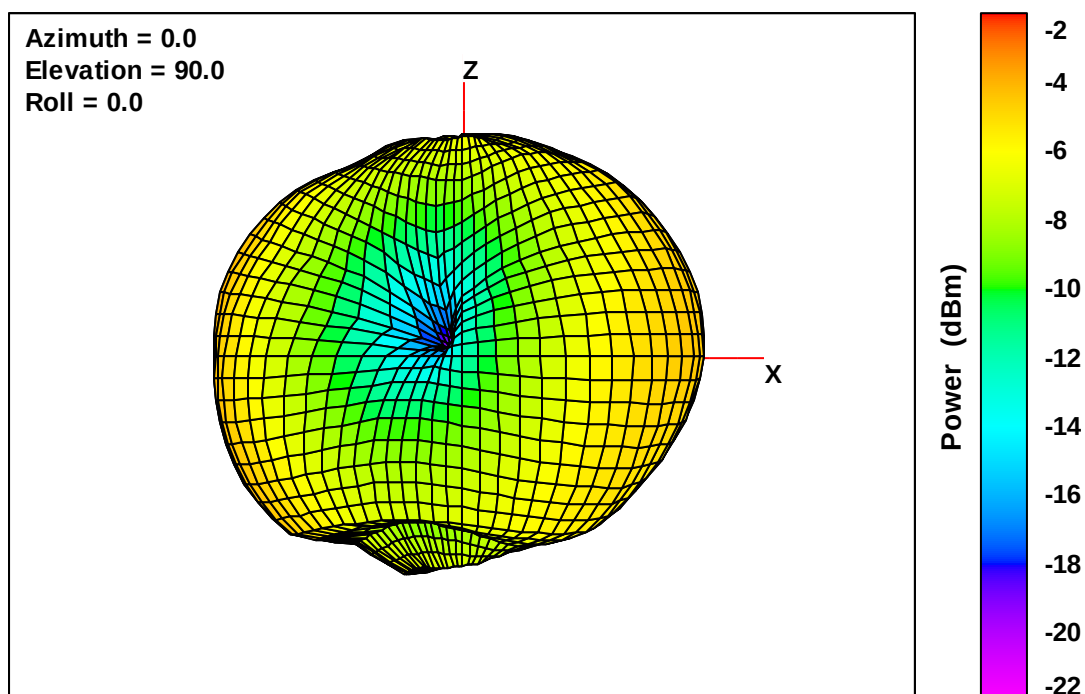
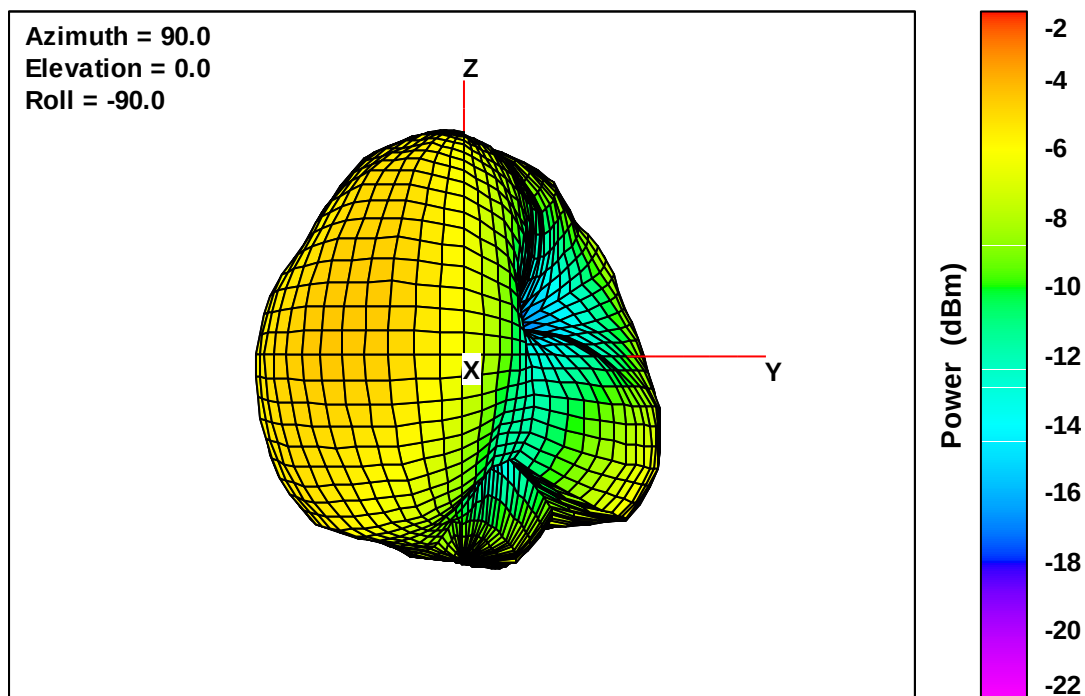


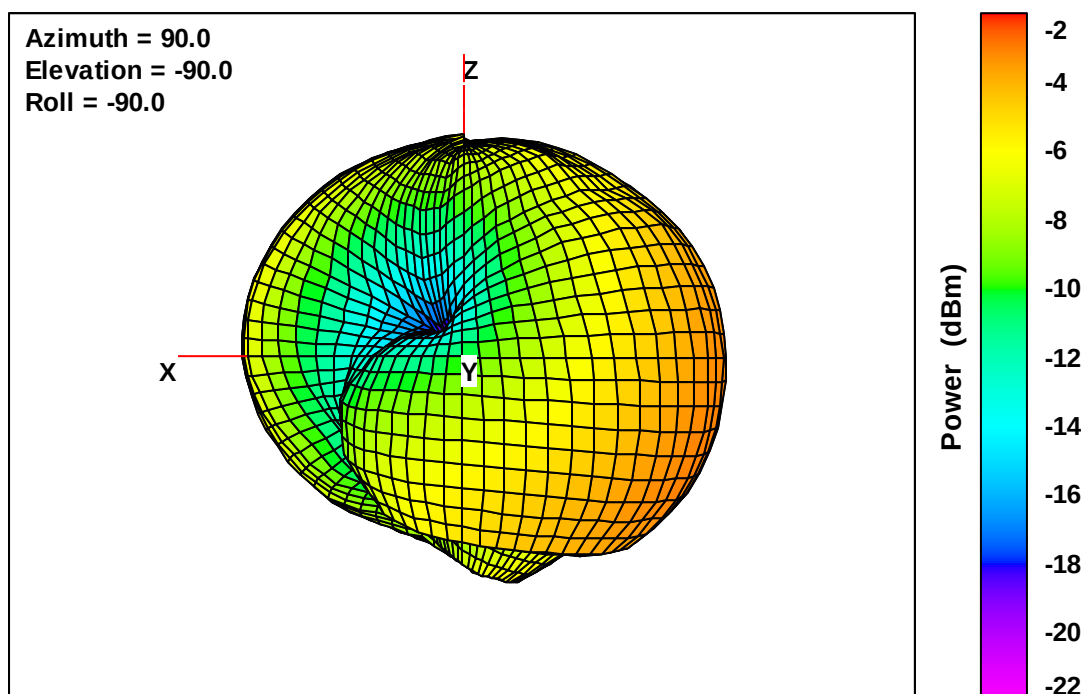
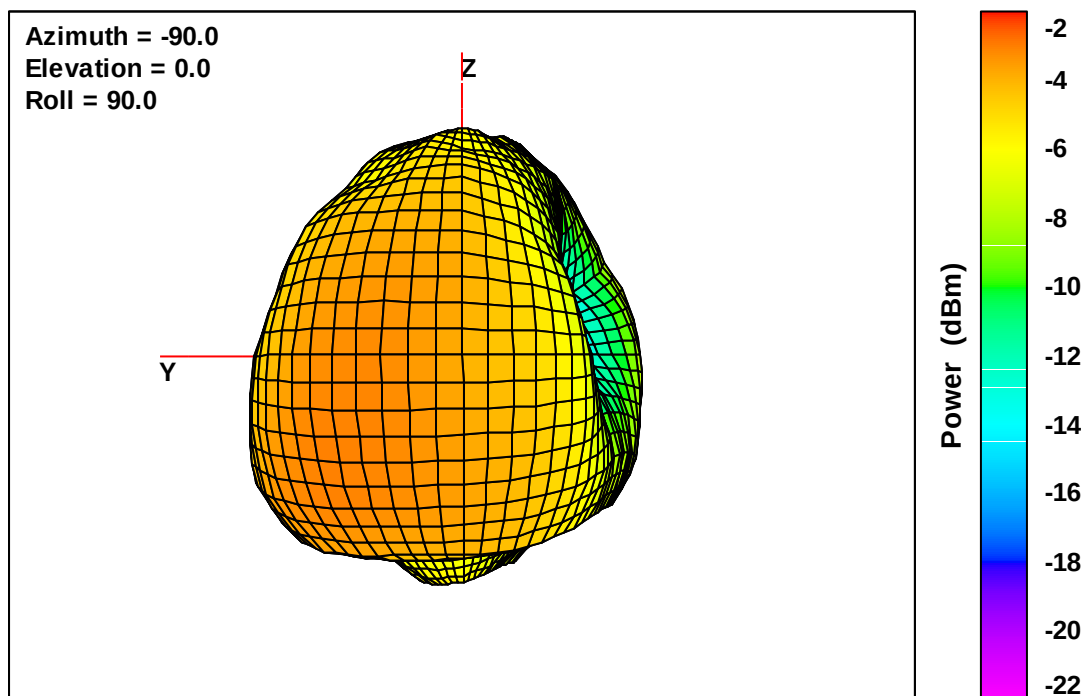
Wearable Defibrillator Free-Space Total EIRP, Top View, 960 MHz

Total EIRP, Bottom View



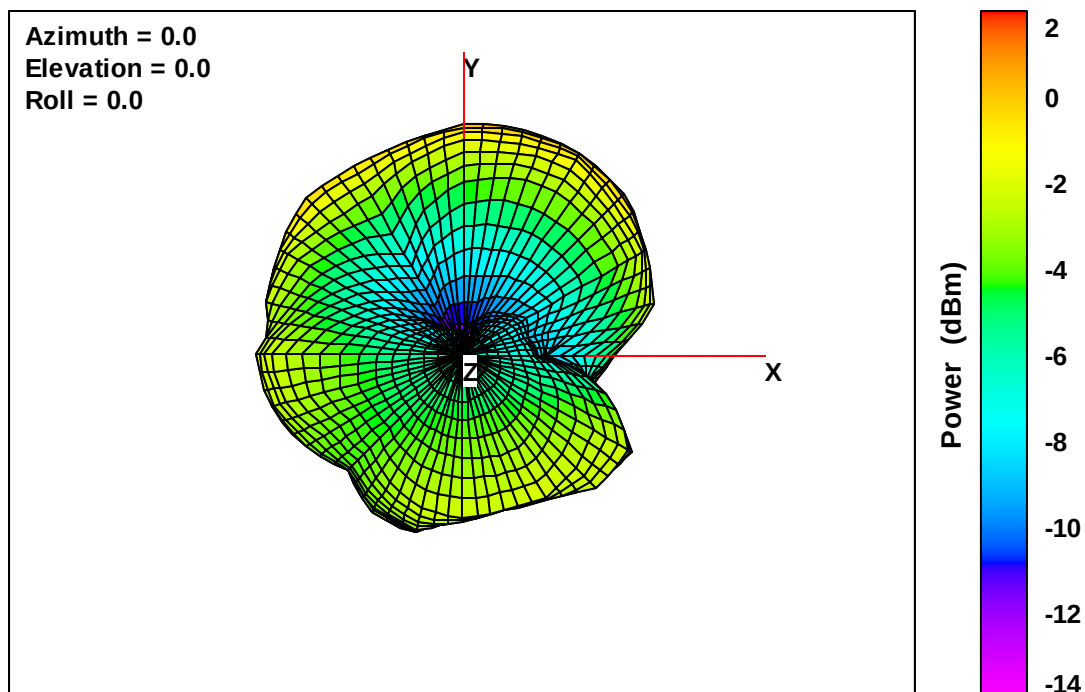
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 960 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 960 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 960 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 960 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 960 MHz**

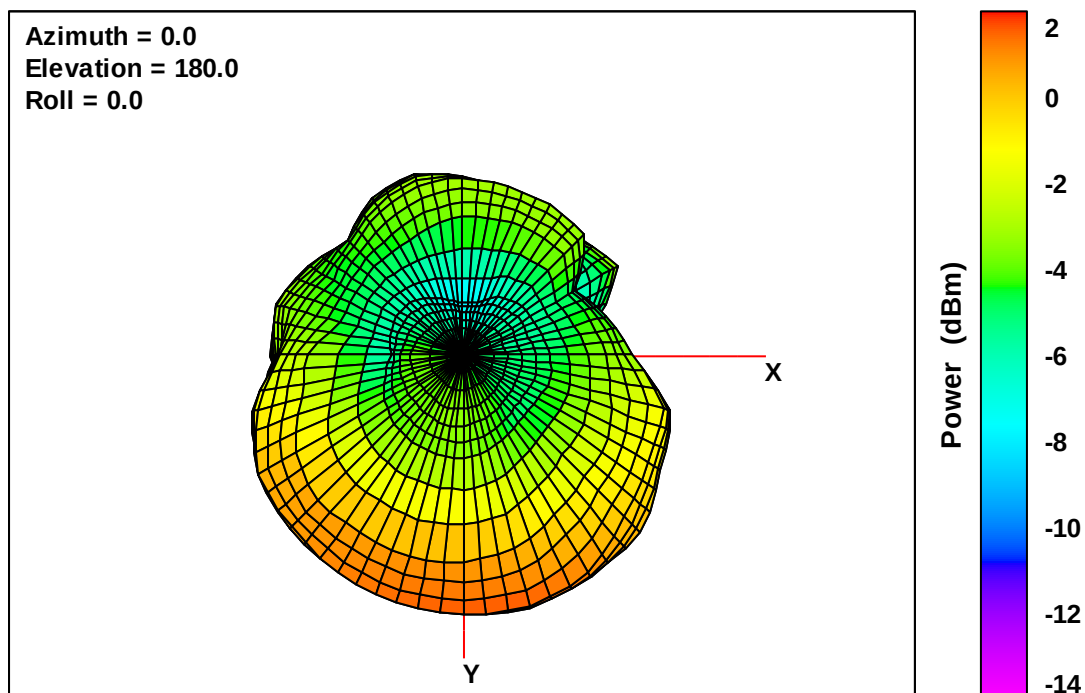
6.9 3D PASSIVE- 1710 MHz

Total EIRP, Top View

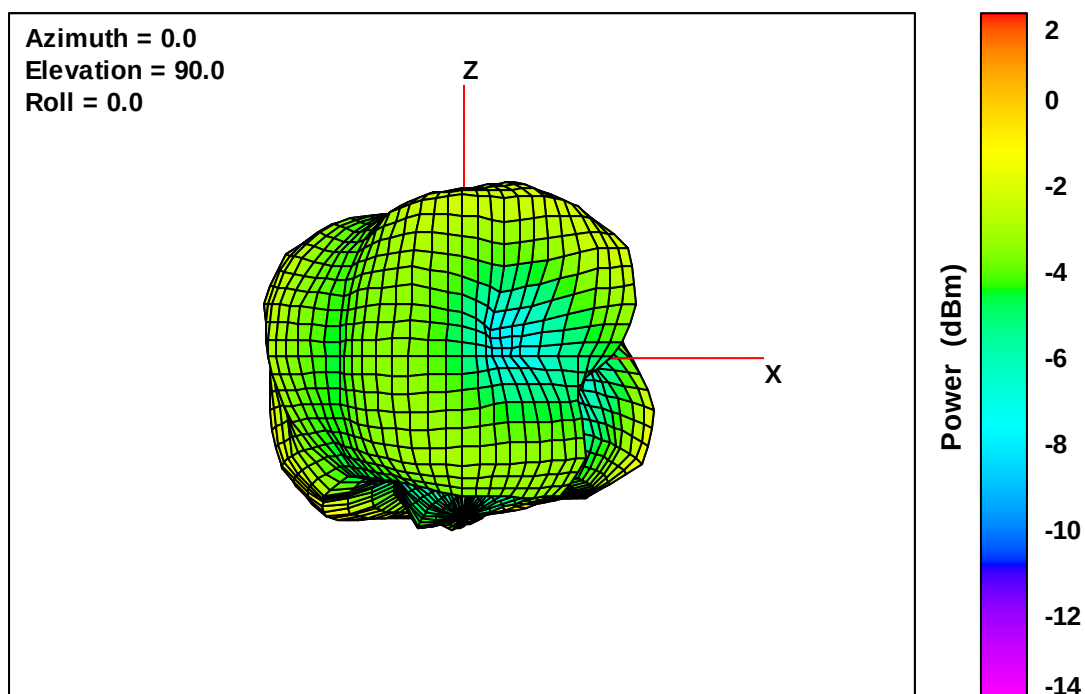
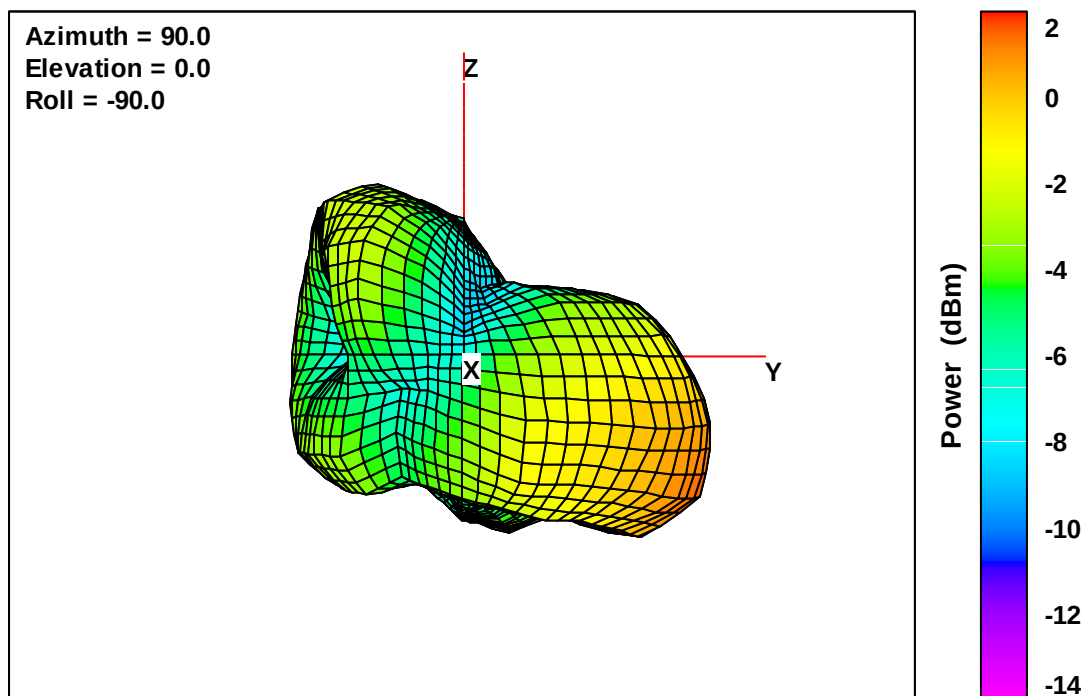


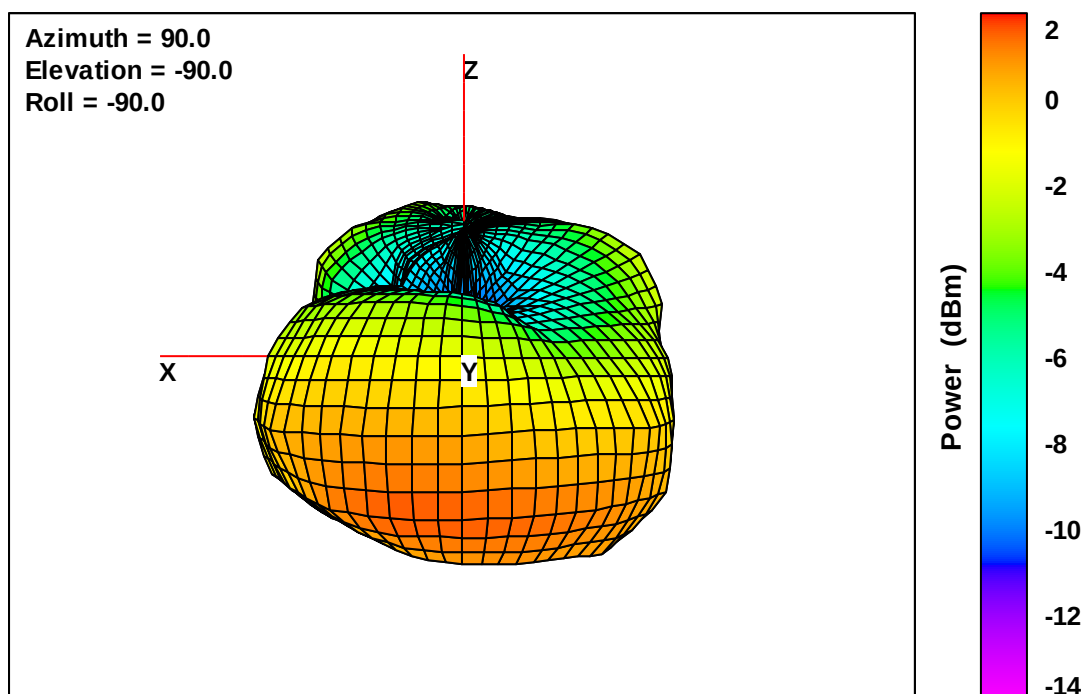
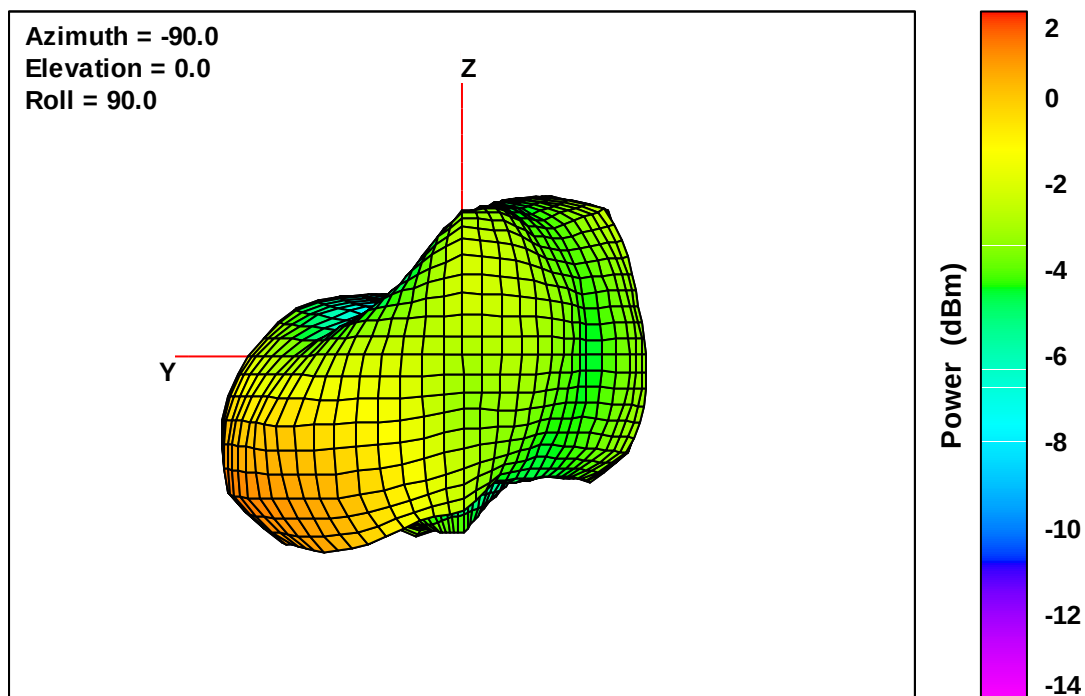
Wearable Defibrillator Free-Space Total EIRP, Top View, 1710 MHz

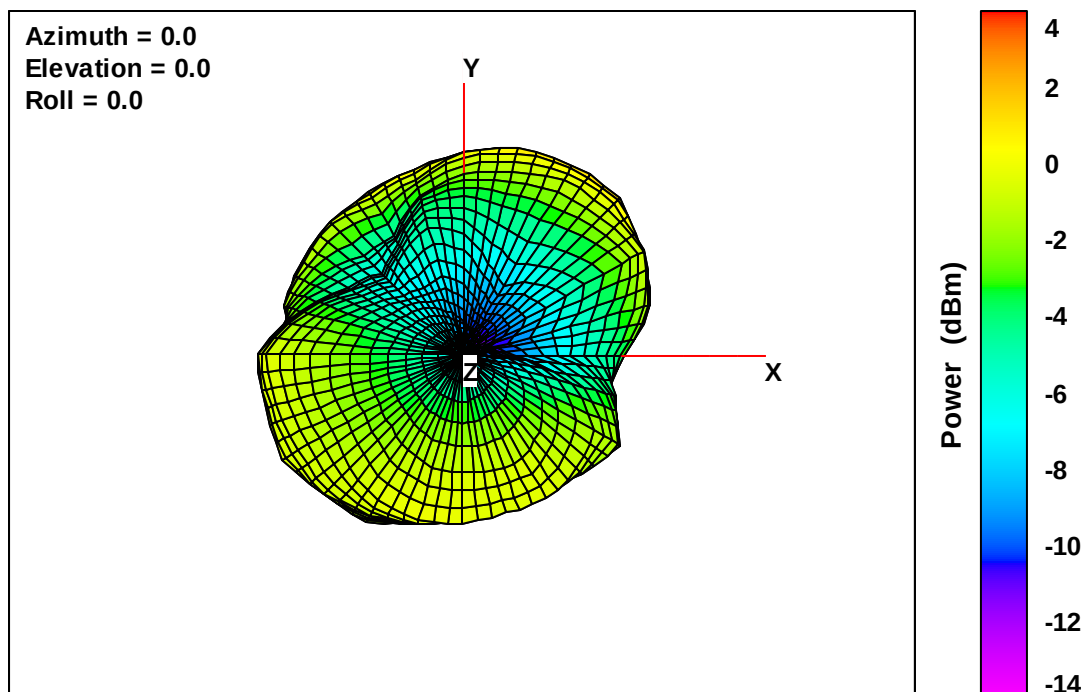
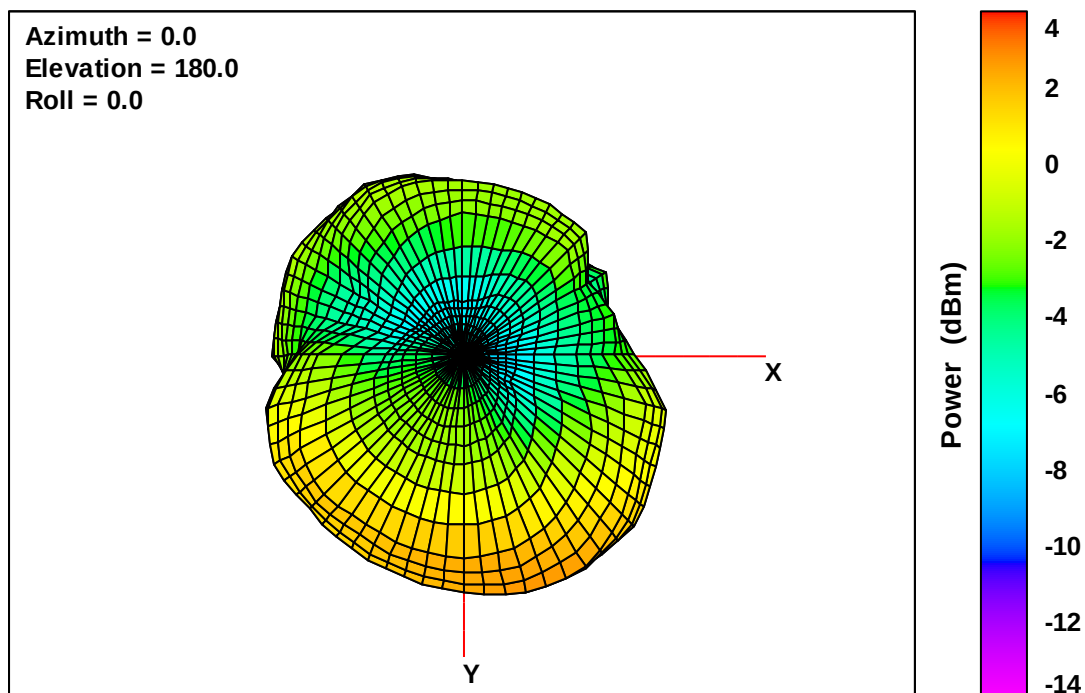
Total EIRP, Bottom View

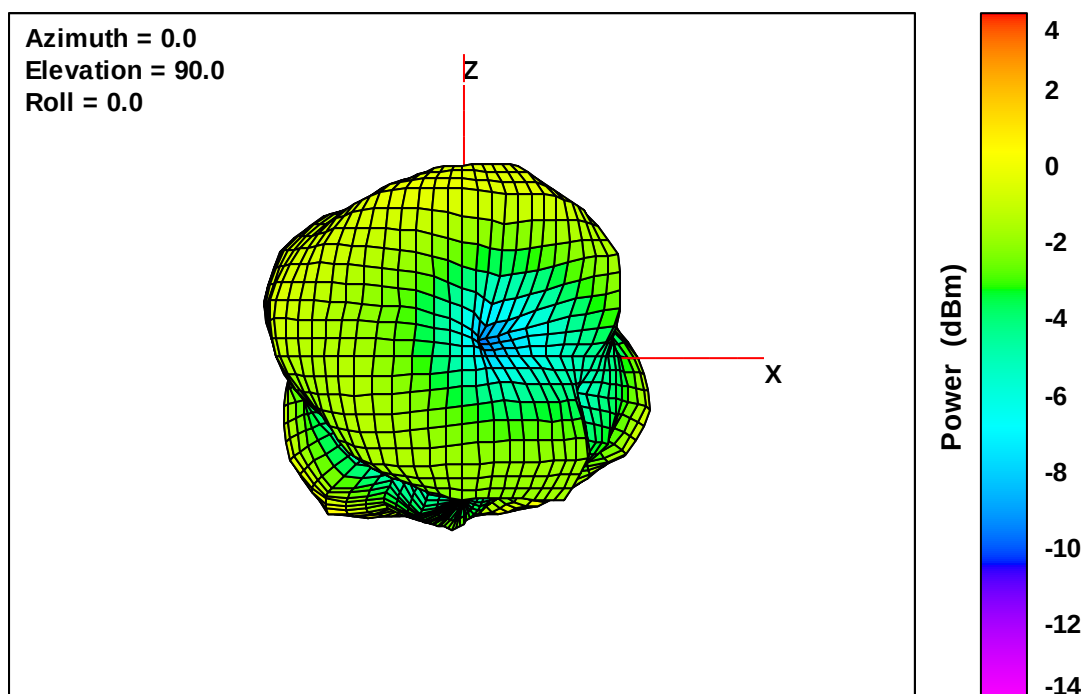
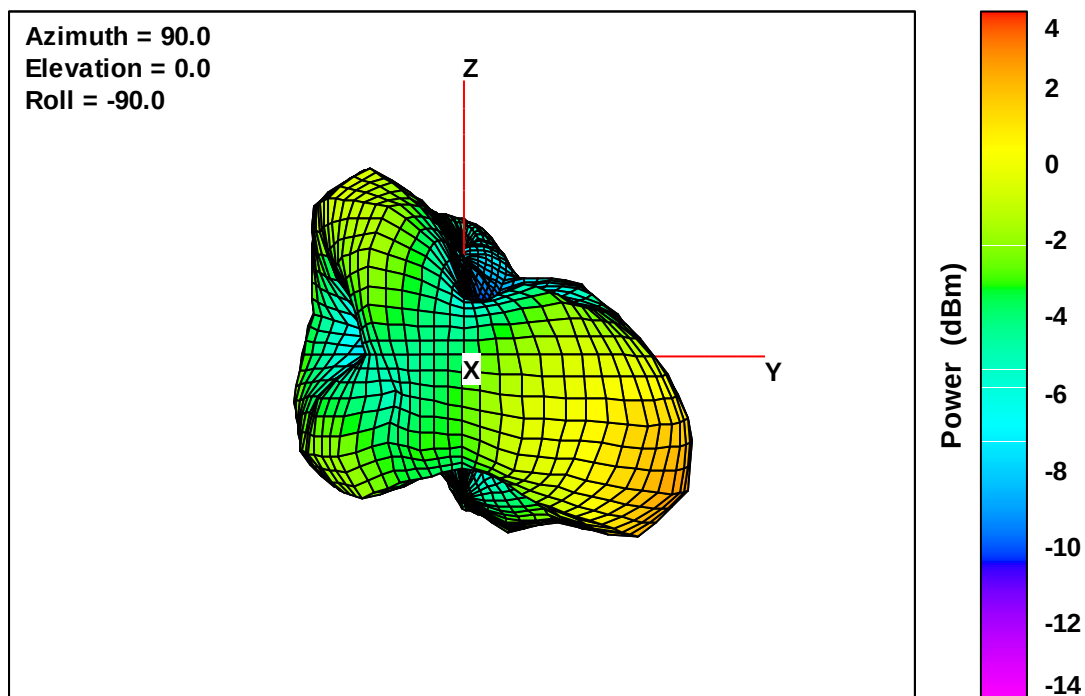


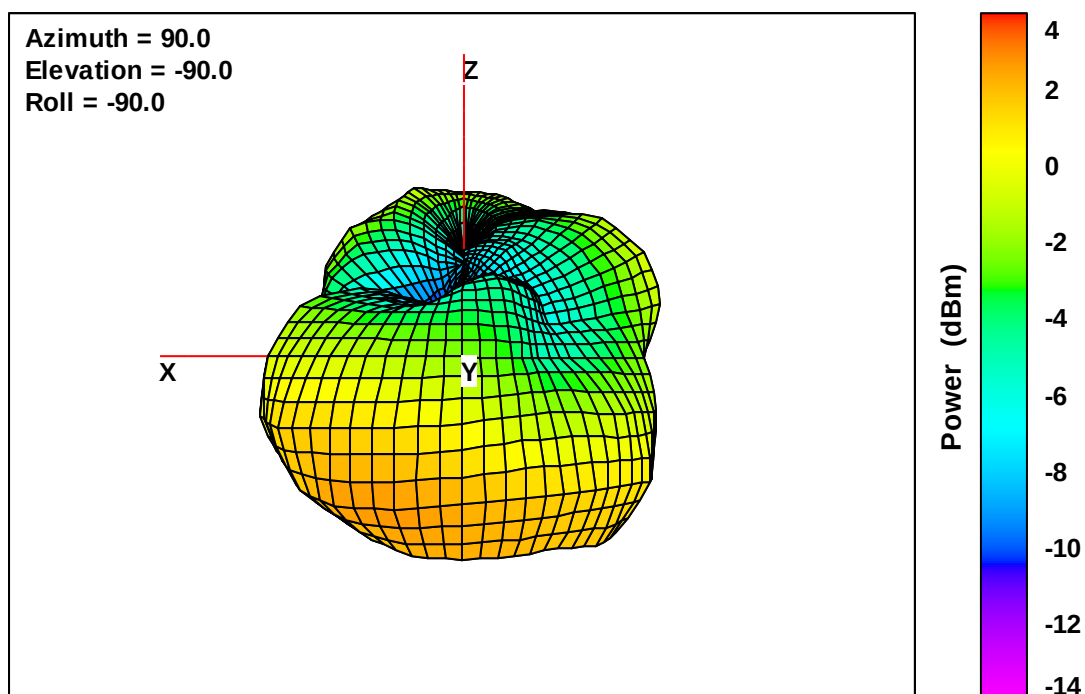
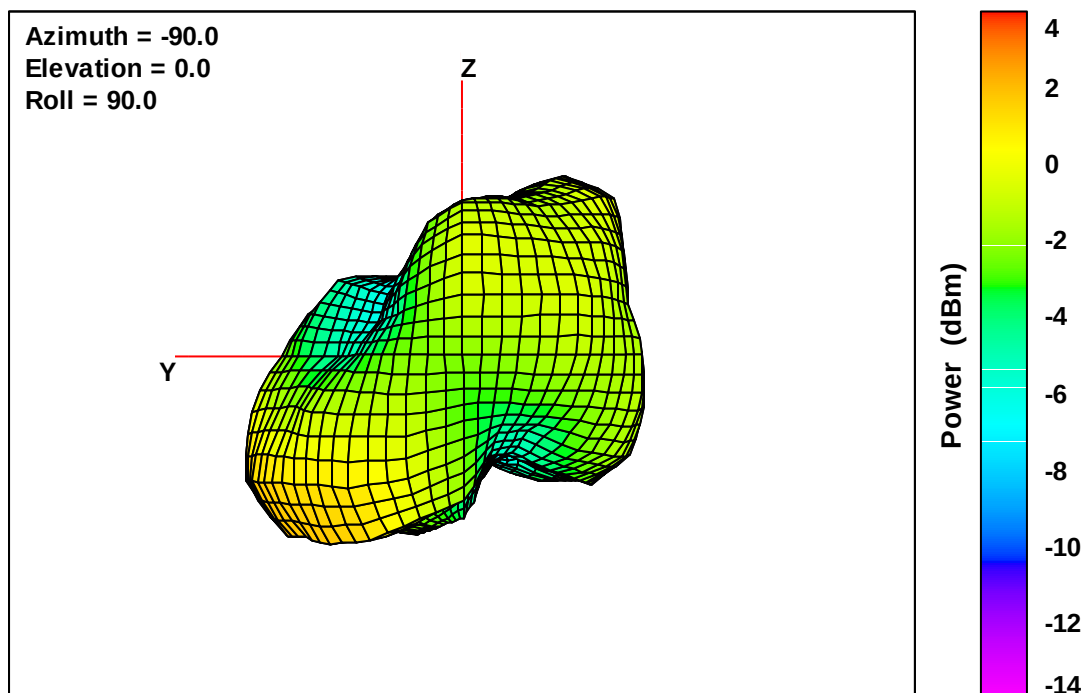
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 1710 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 1710 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 1710 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 1710 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 1710 MHz**

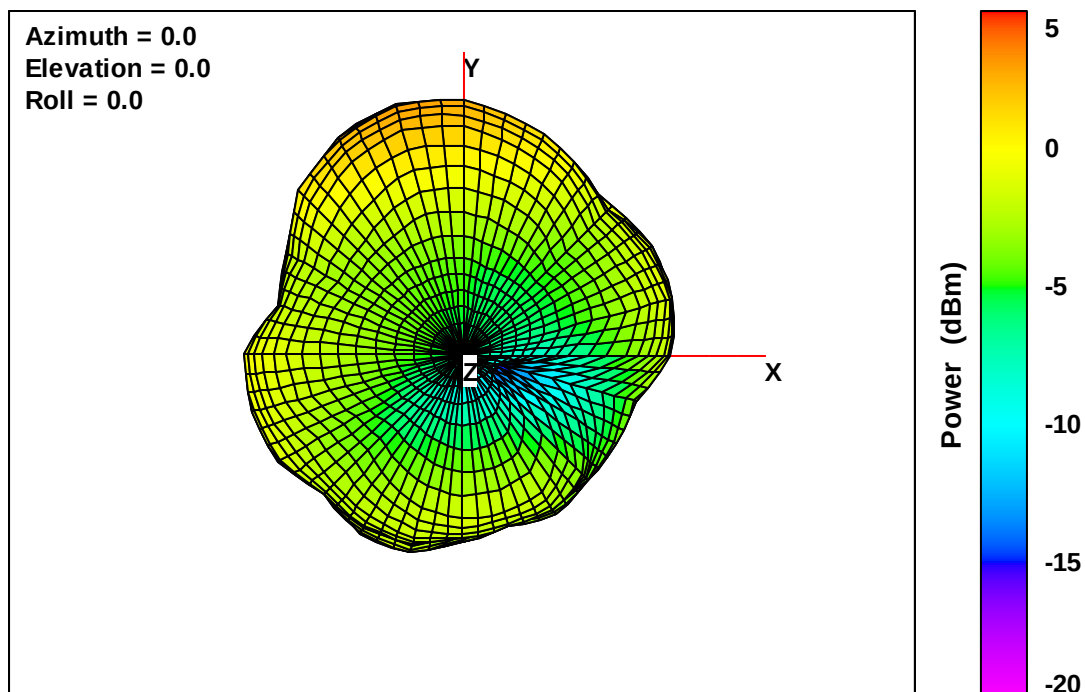
6.10 3D PASSIVE- 1755 MHz**Total EIRP, Top View****Wearable Defibrillator Free-Space Total EIRP, Top View, 1755 MHz****Total EIRP, Bottom View****Wearable Defibrillator Free-Space Total EIRP, Bottom View, 1755 MHz**

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 1755 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 1755 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 1755 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 1755 MHz**

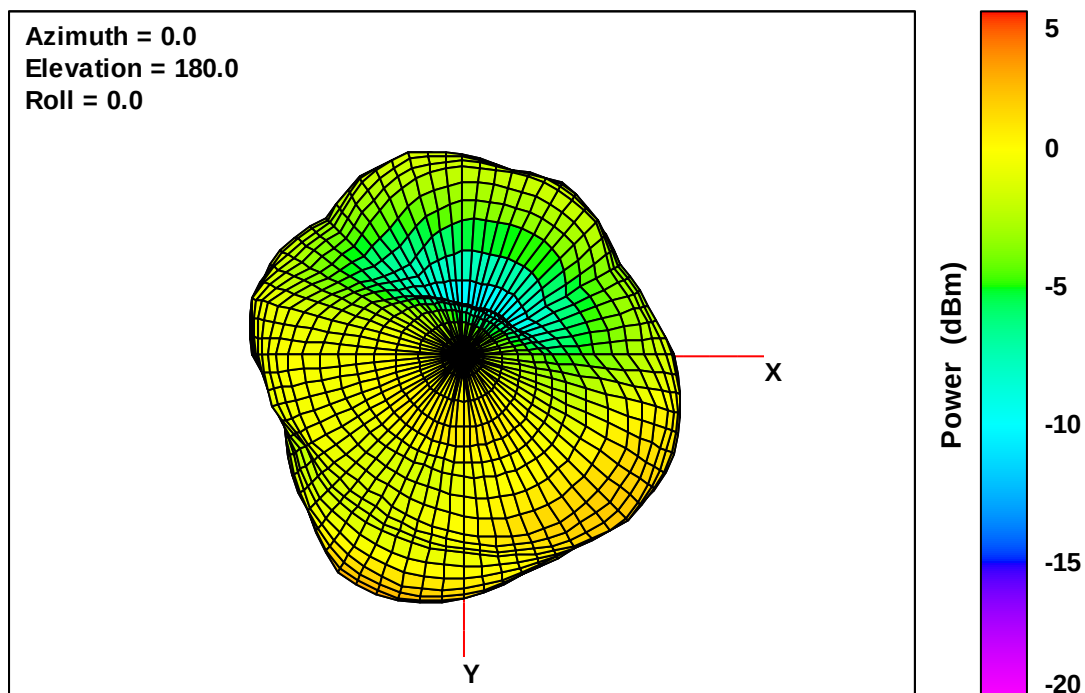
6.11 3D PASSIVE- 1850 MHz

Total EIRP, Top View

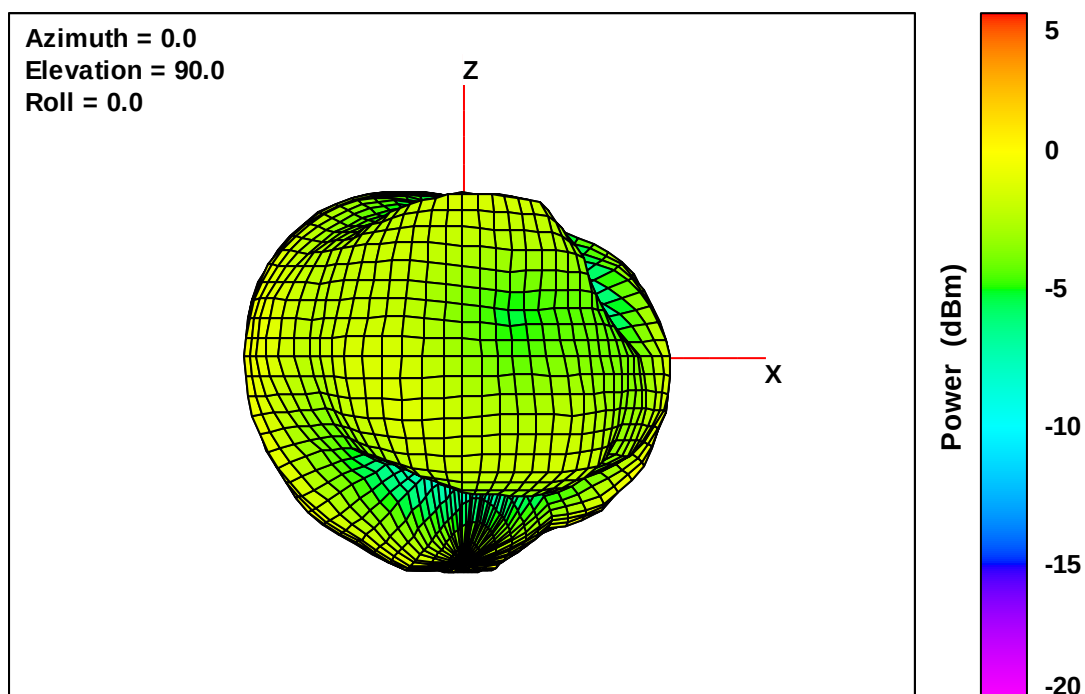
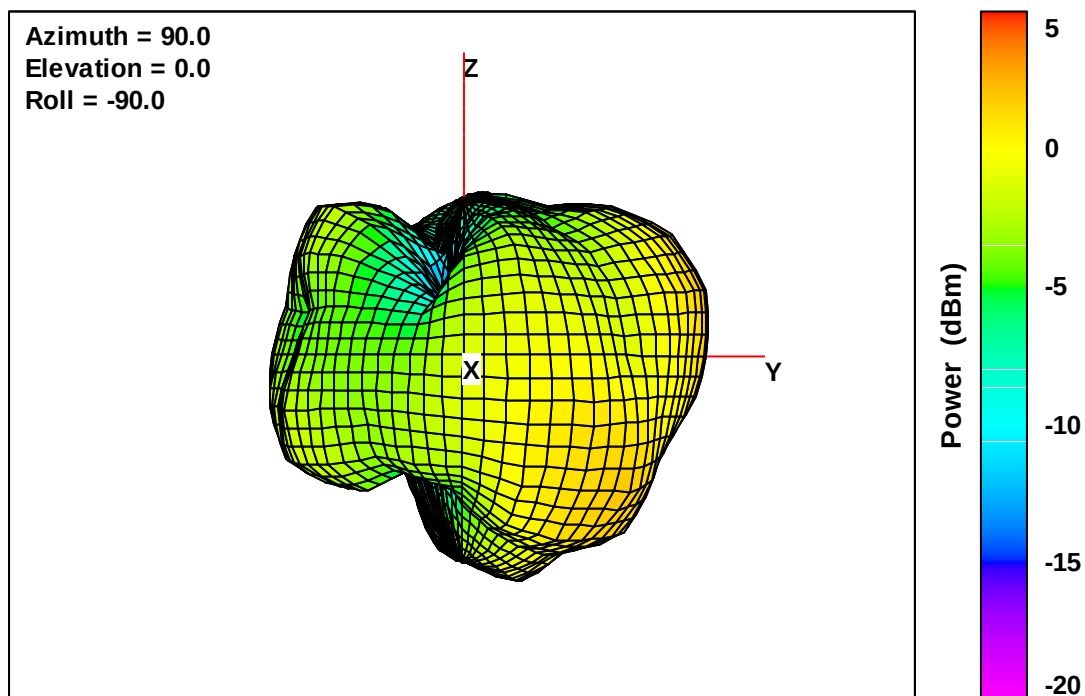


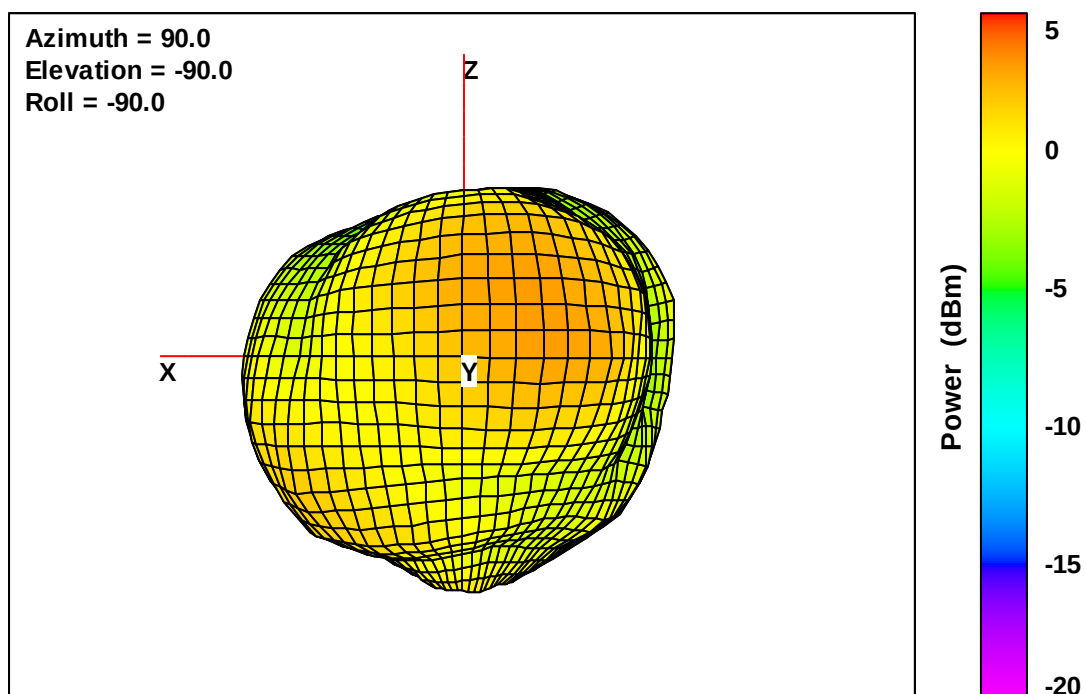
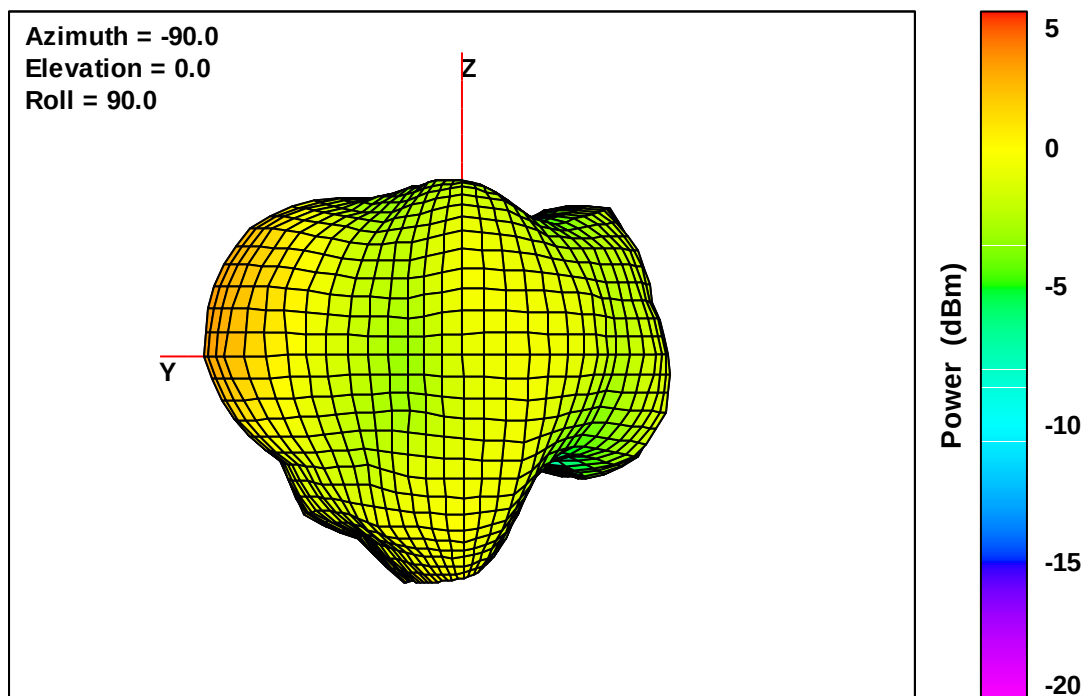
Wearable Defibrillator Free-Space Total EIRP, Top View, 1850 MHz

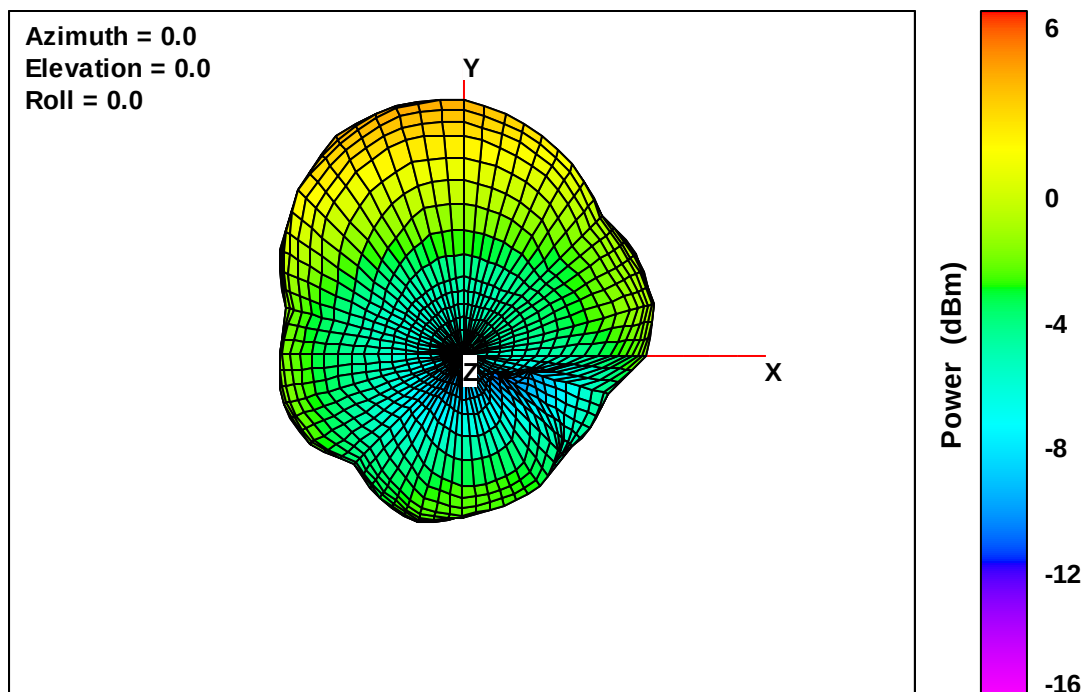
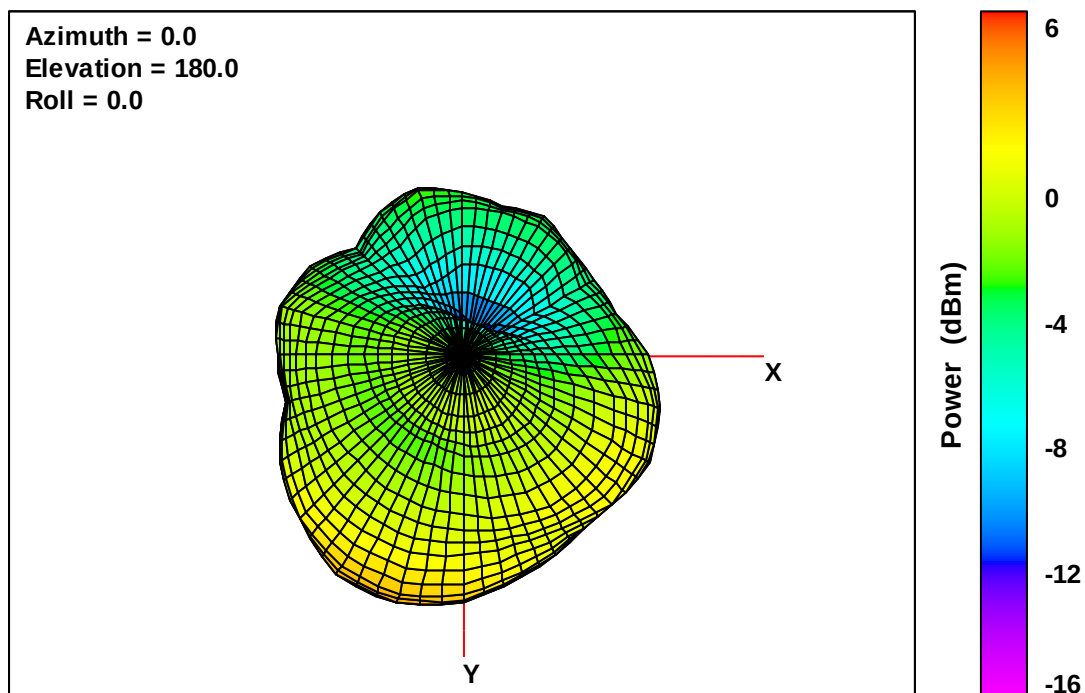
Total EIRP, Bottom View

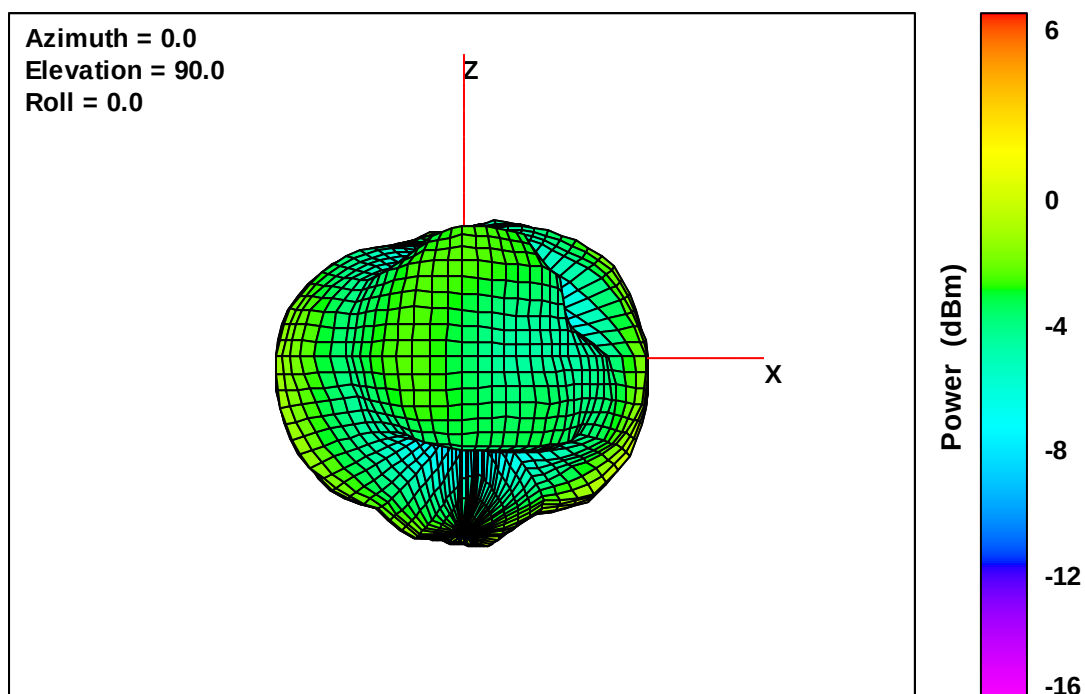
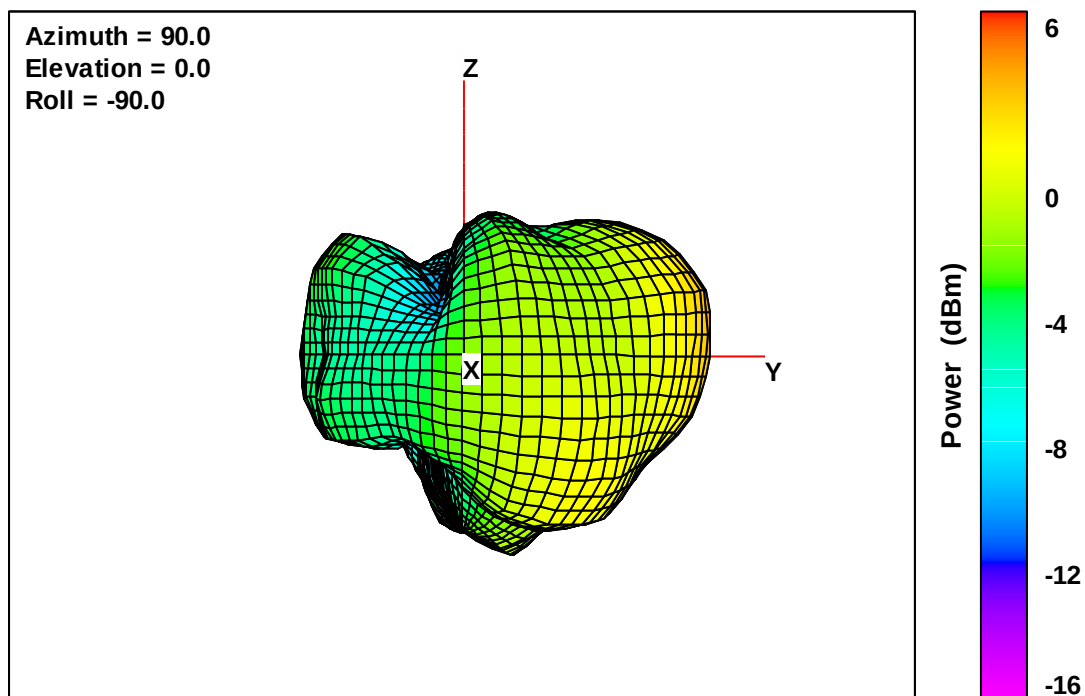


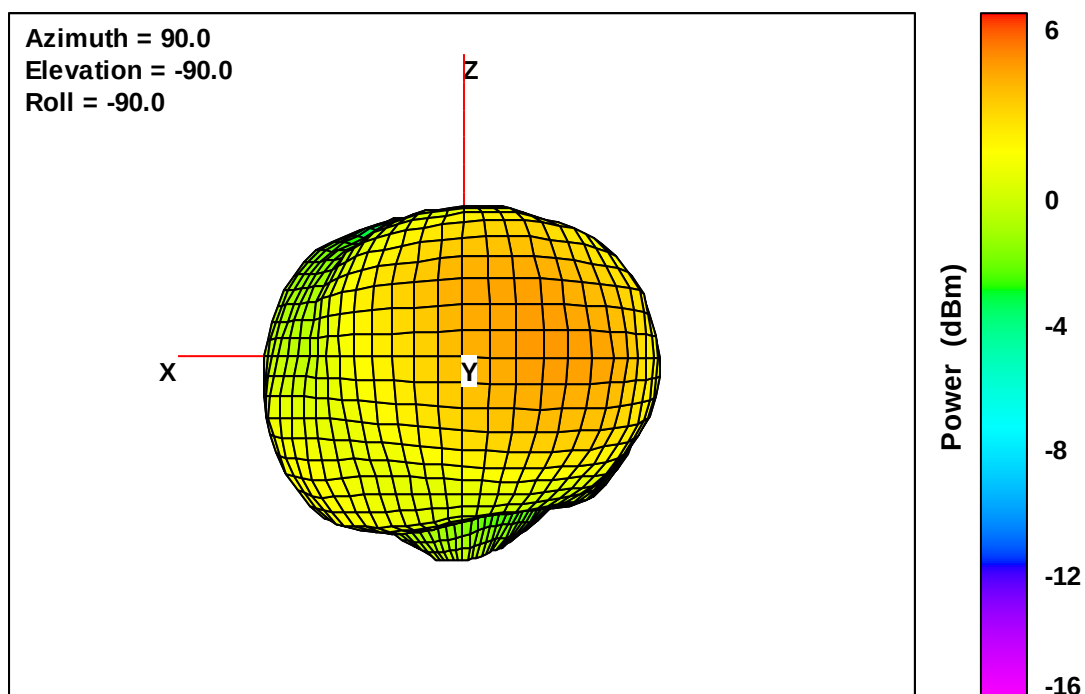
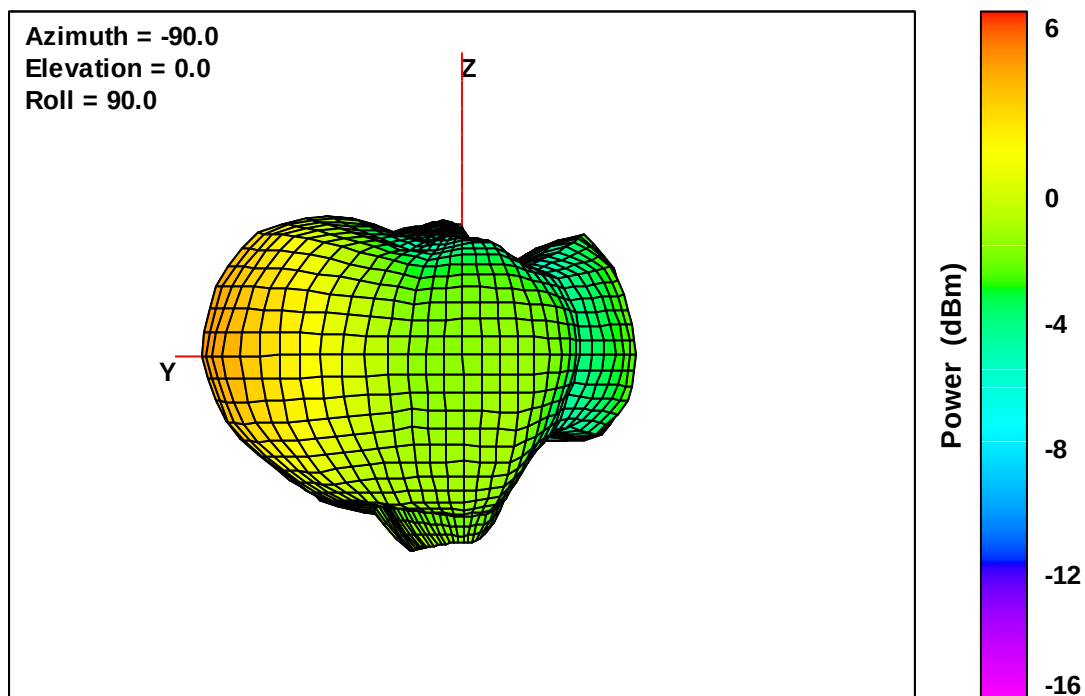
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 1850 MHz

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 1850 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 1850 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 1850 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 1850 MHz**

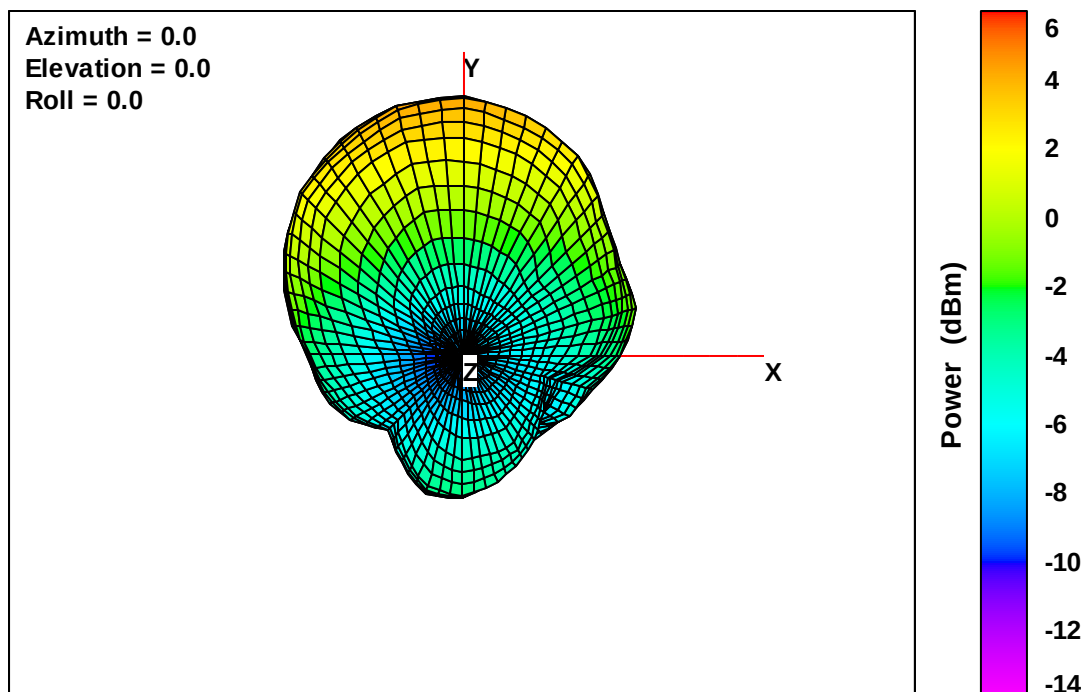
6.12 3D PASSIVE- 1910 MHz**Total EIRP, Top View****Wearable Defibrillator Free-Space Total EIRP, Top View, 1910 MHz****Total EIRP, Bottom View****Wearable Defibrillator Free-Space Total EIRP, Bottom View, 1910 MHz**

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 1910 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 1910 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 1910 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 1910 MHz**

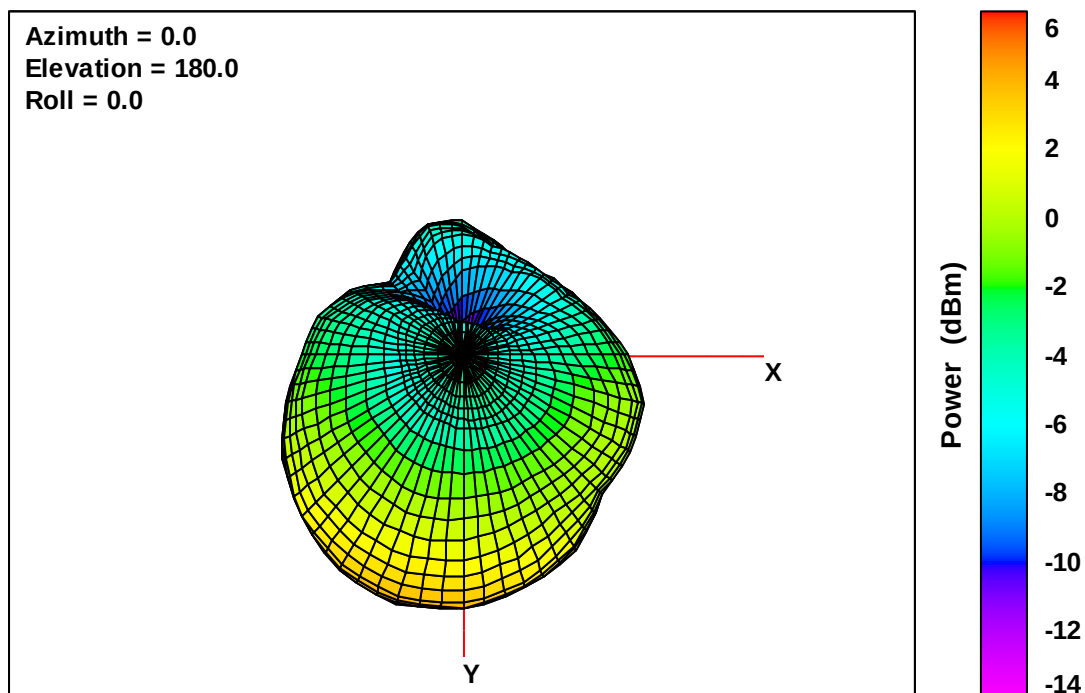
6.13 3D PASSIVE- 1990 MHz

Total EIRP, Top View

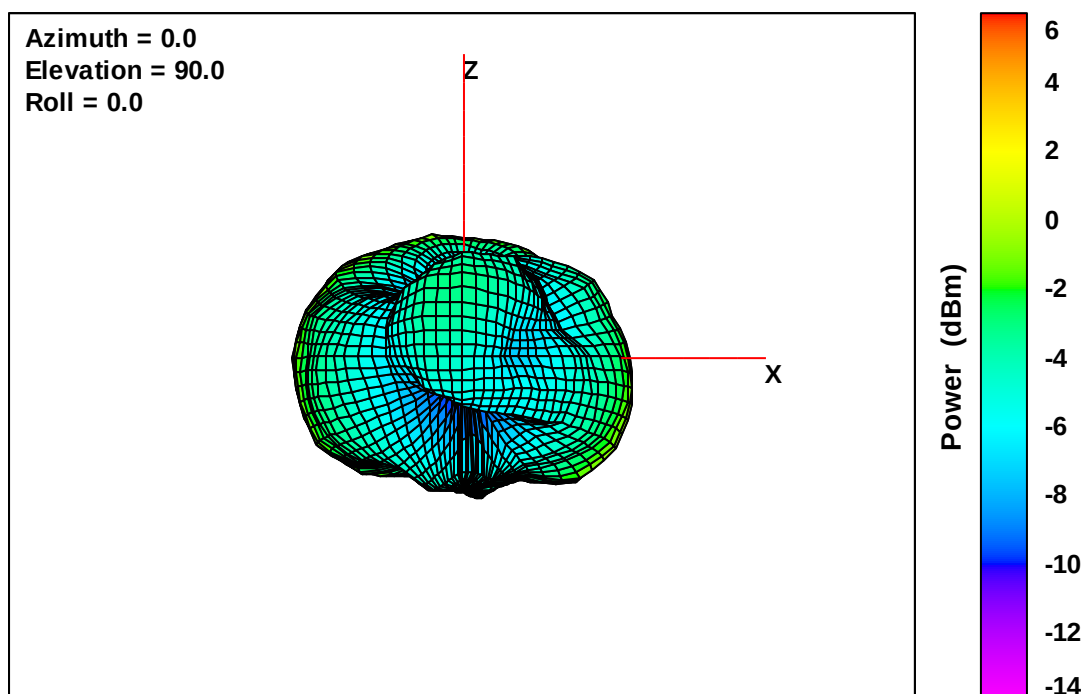
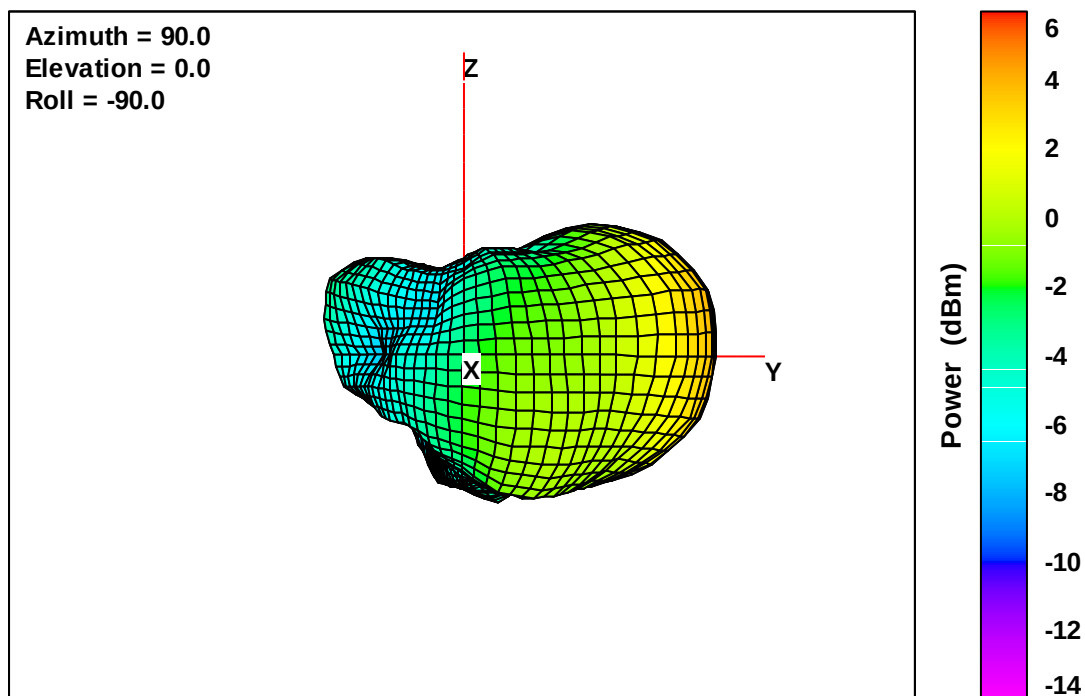


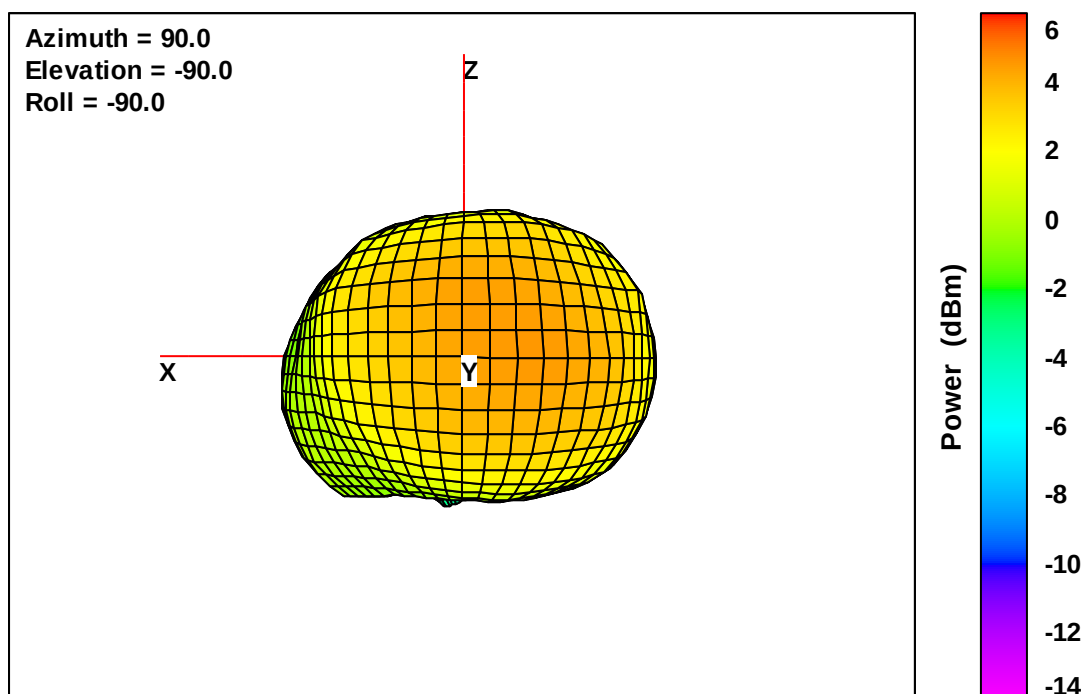
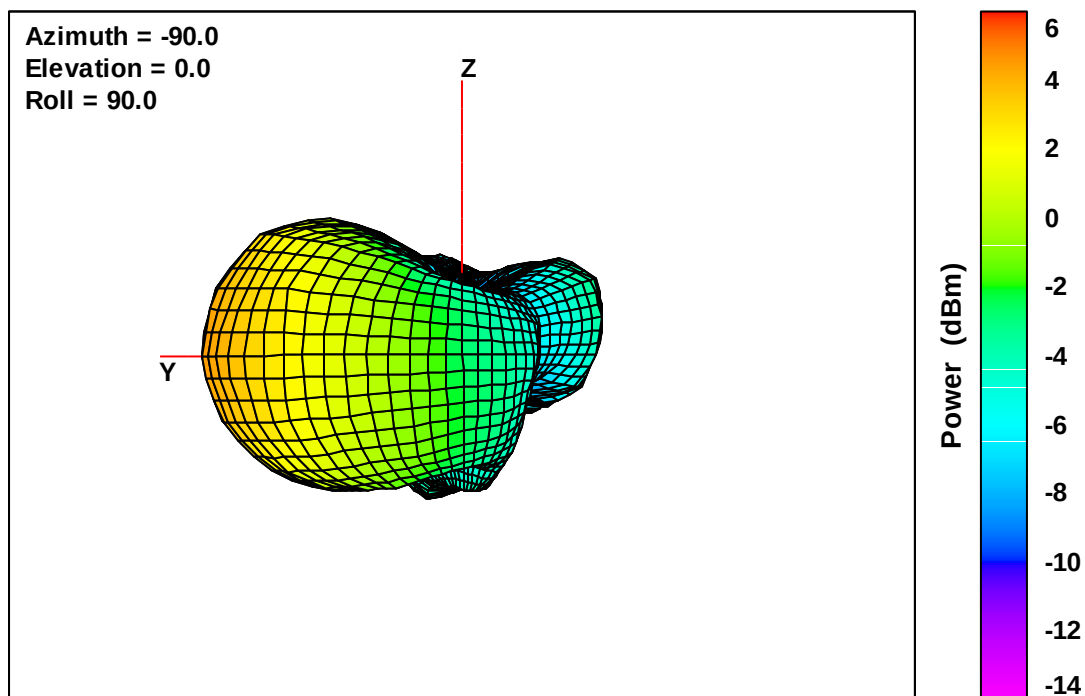
Wearable Defibrillator Free-Space Total EIRP, Top View, 1990 MHz

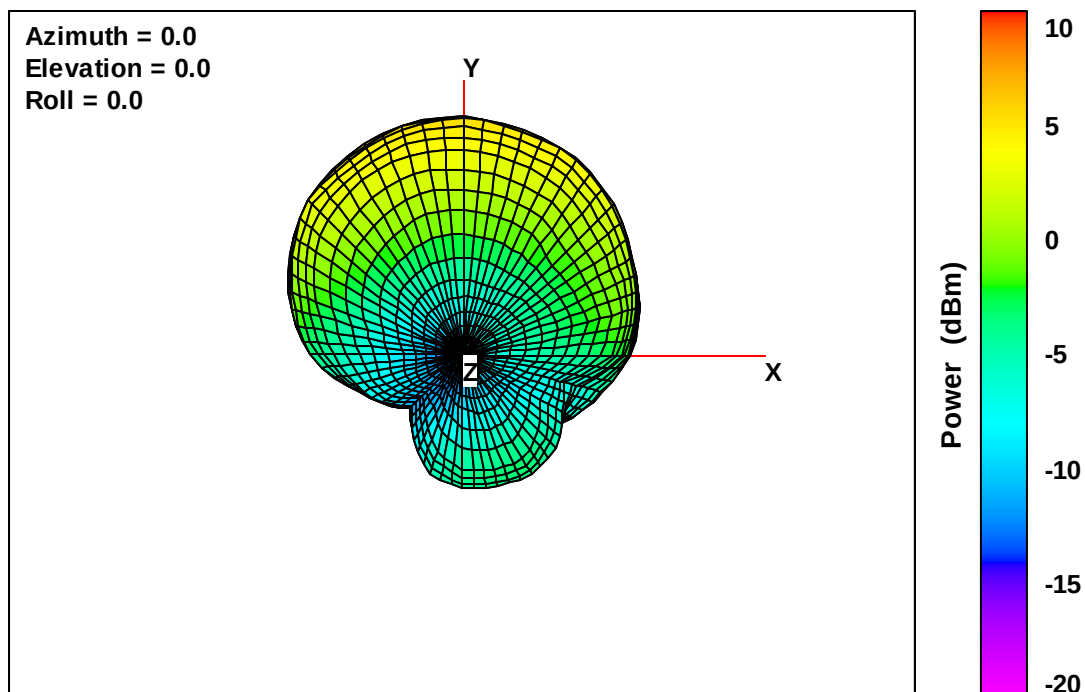
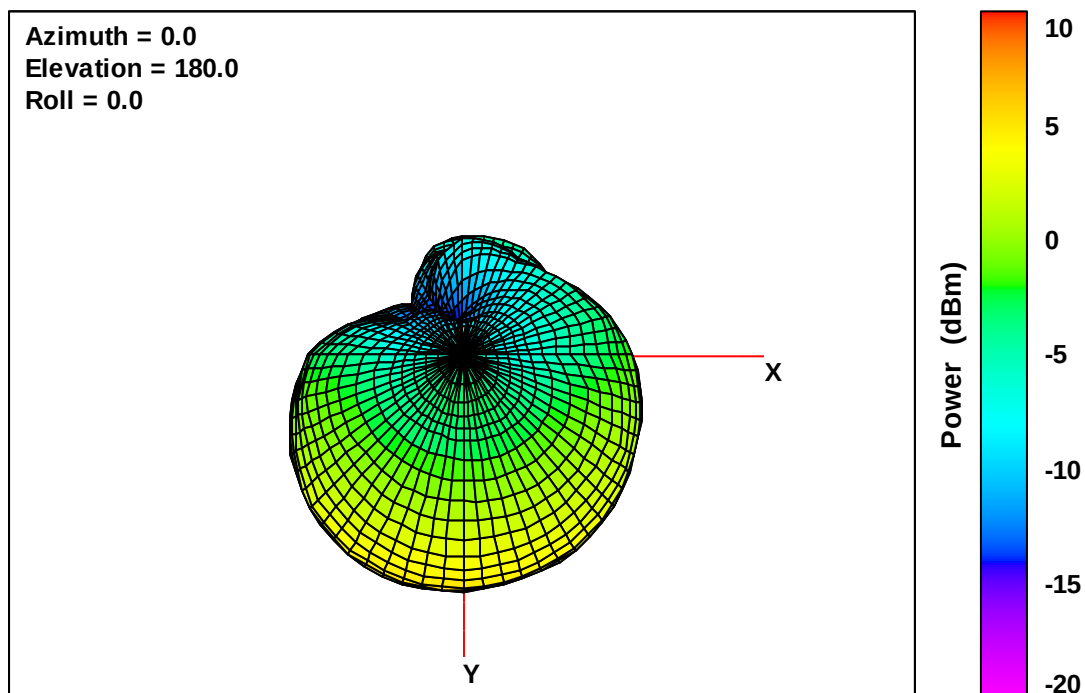
Total EIRP, Bottom View

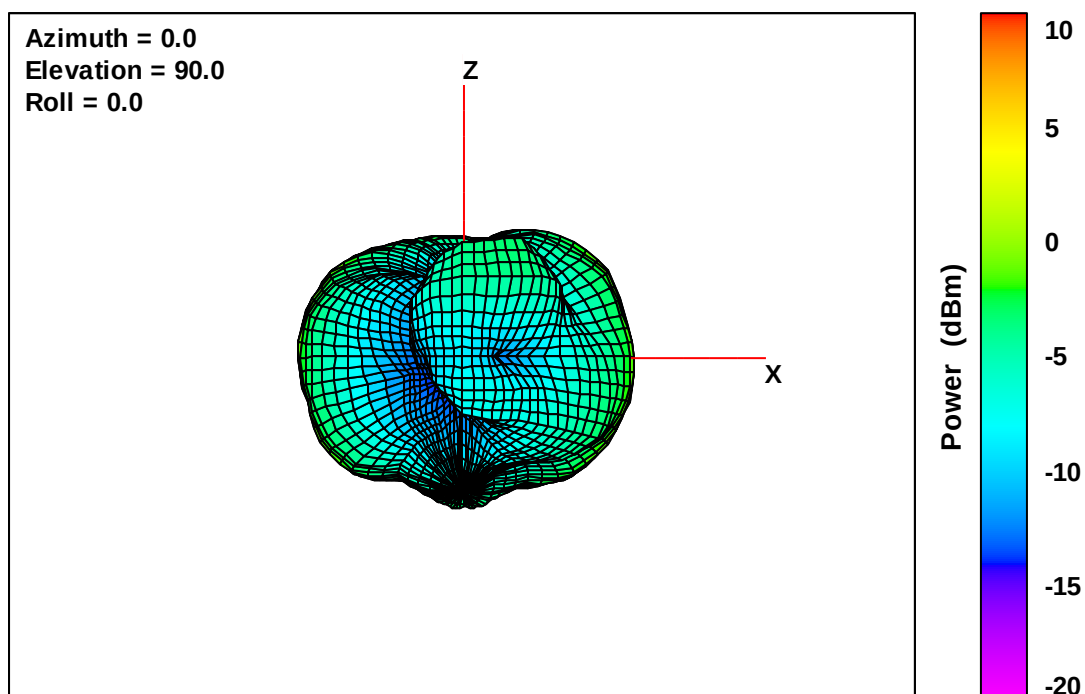
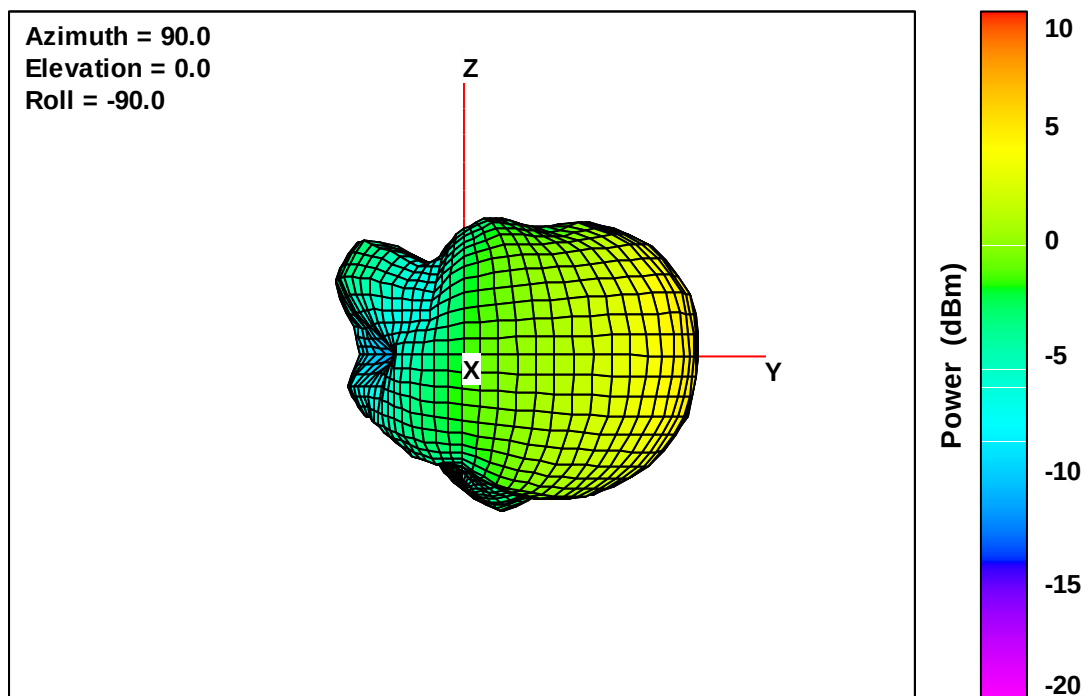


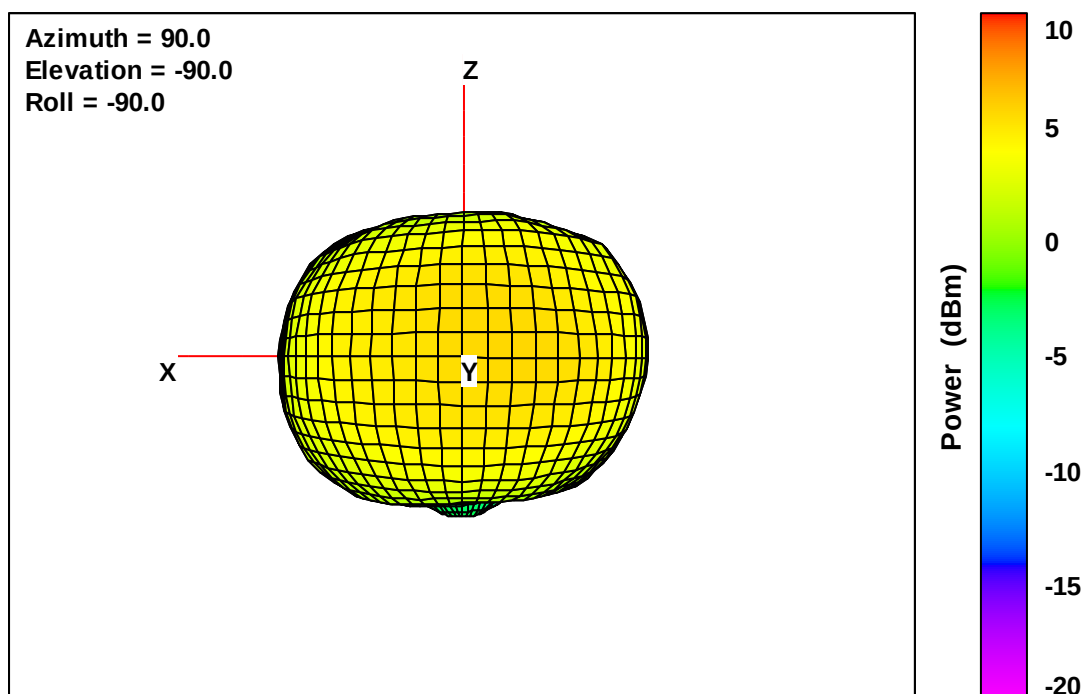
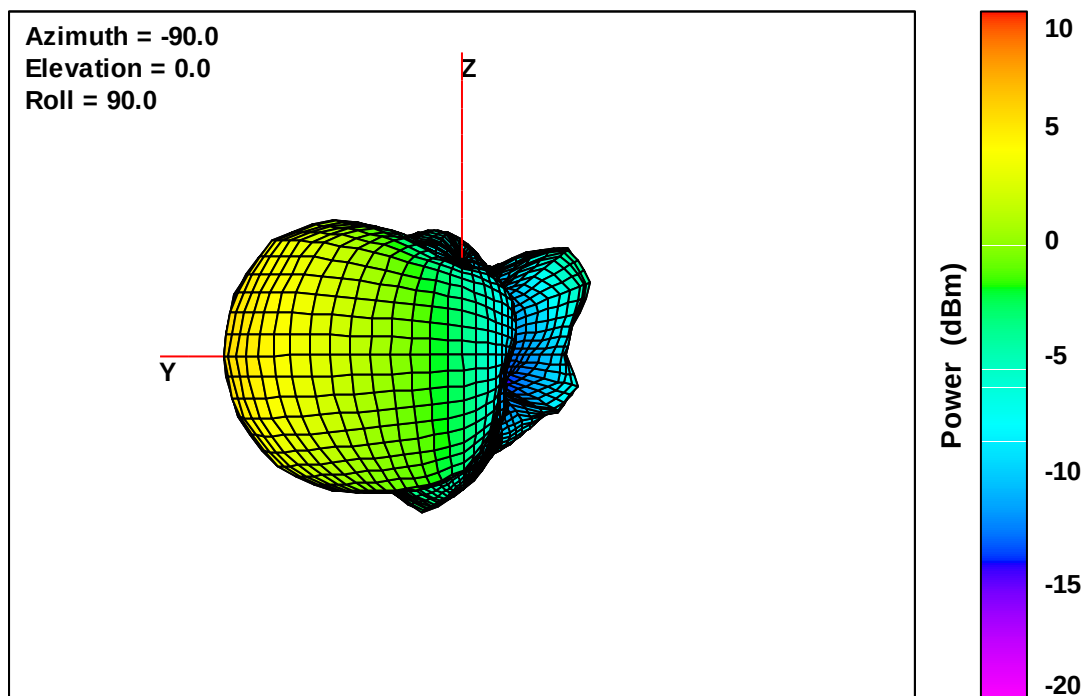
Wearable Defibrillator Free-Space Total EIRP, Bottom View, 1990 MHz

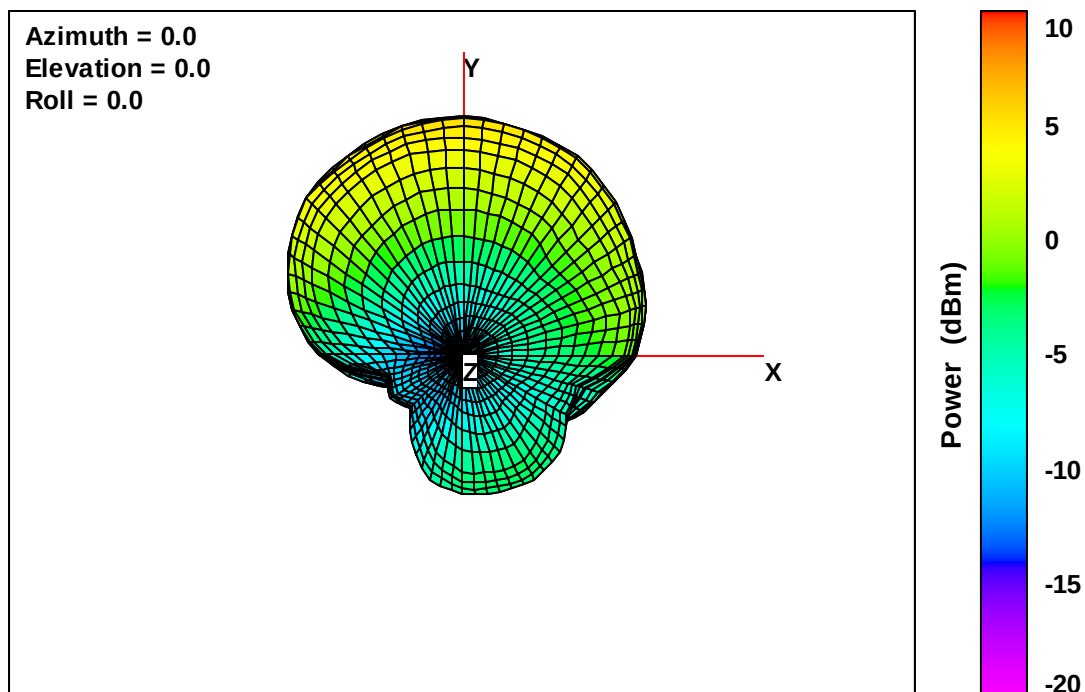
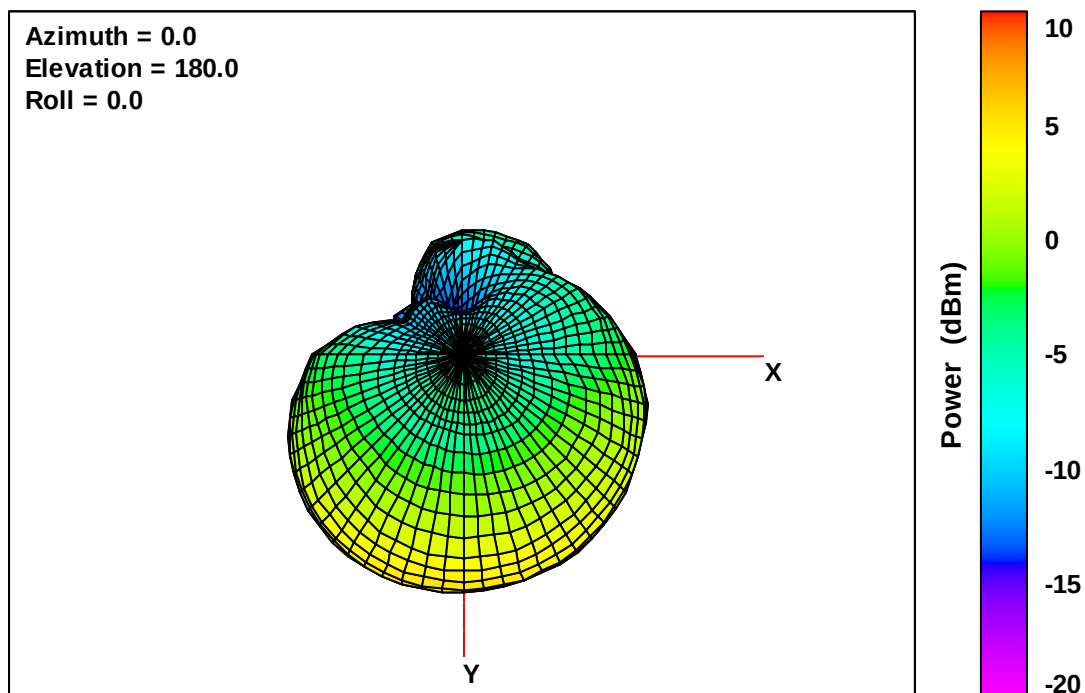
Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 1990 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 1990 MHz**

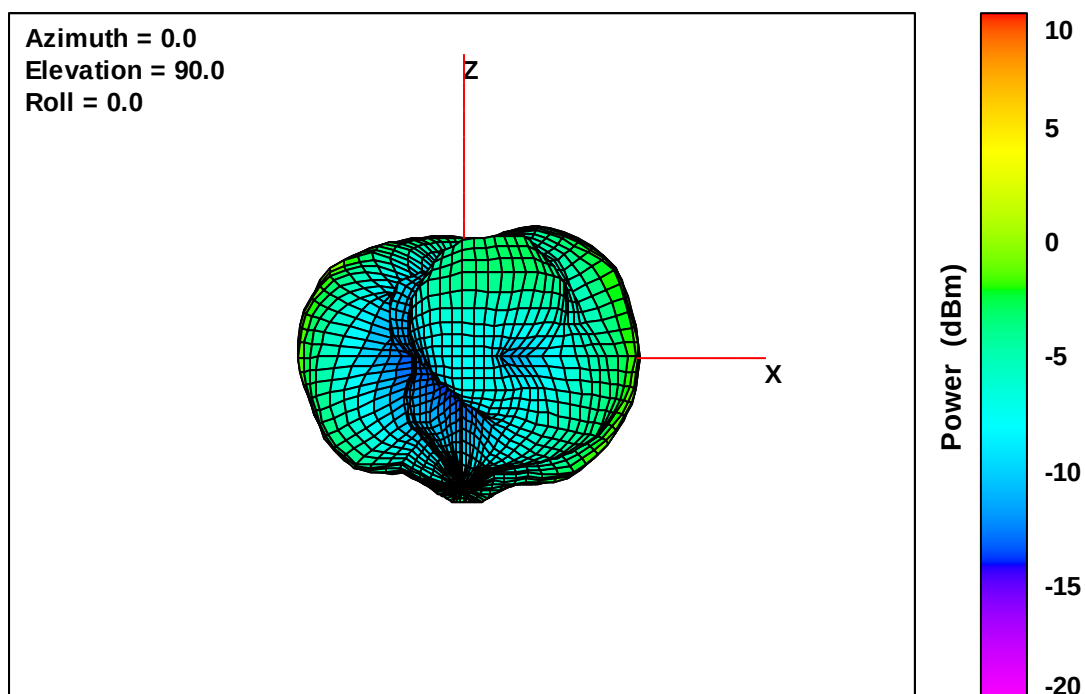
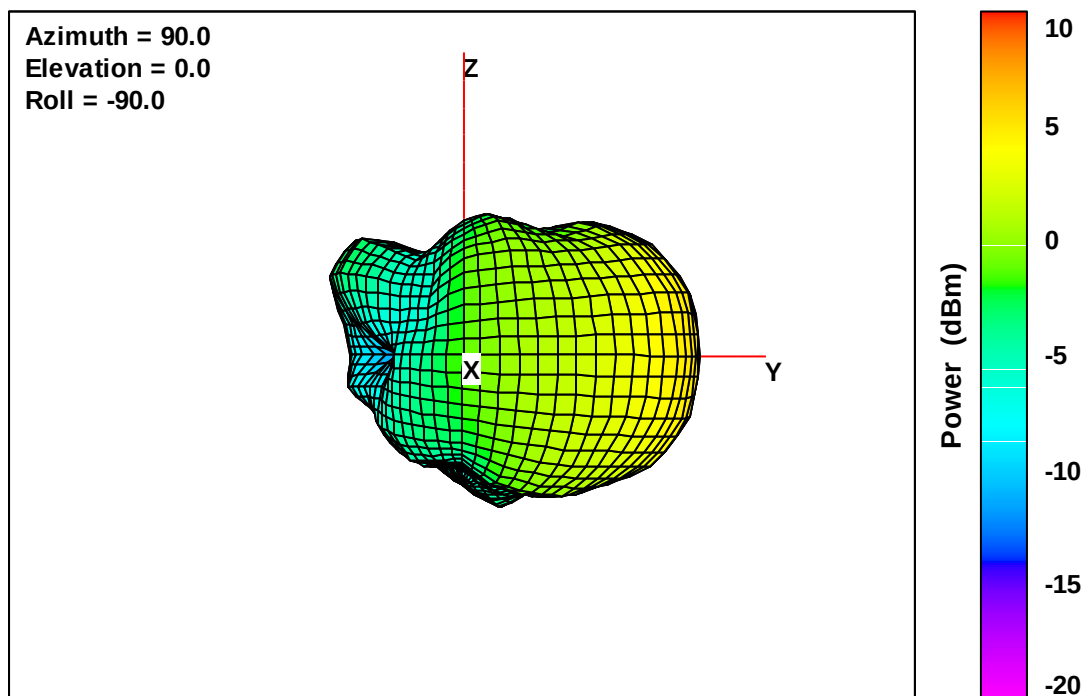
Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 1990 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 1990 MHz**

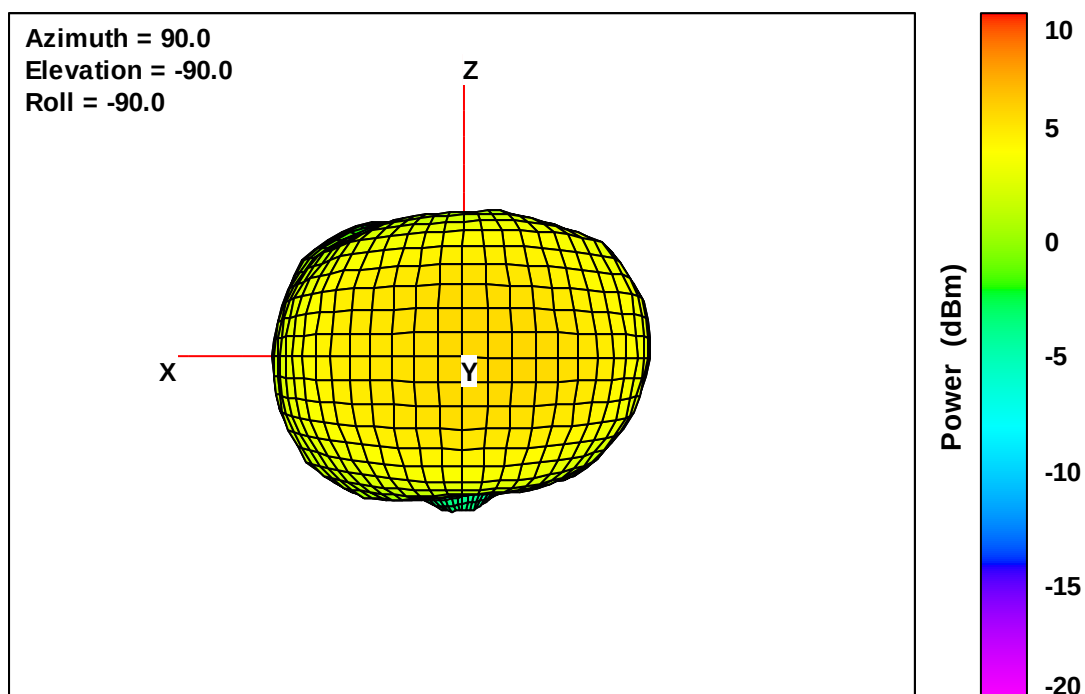
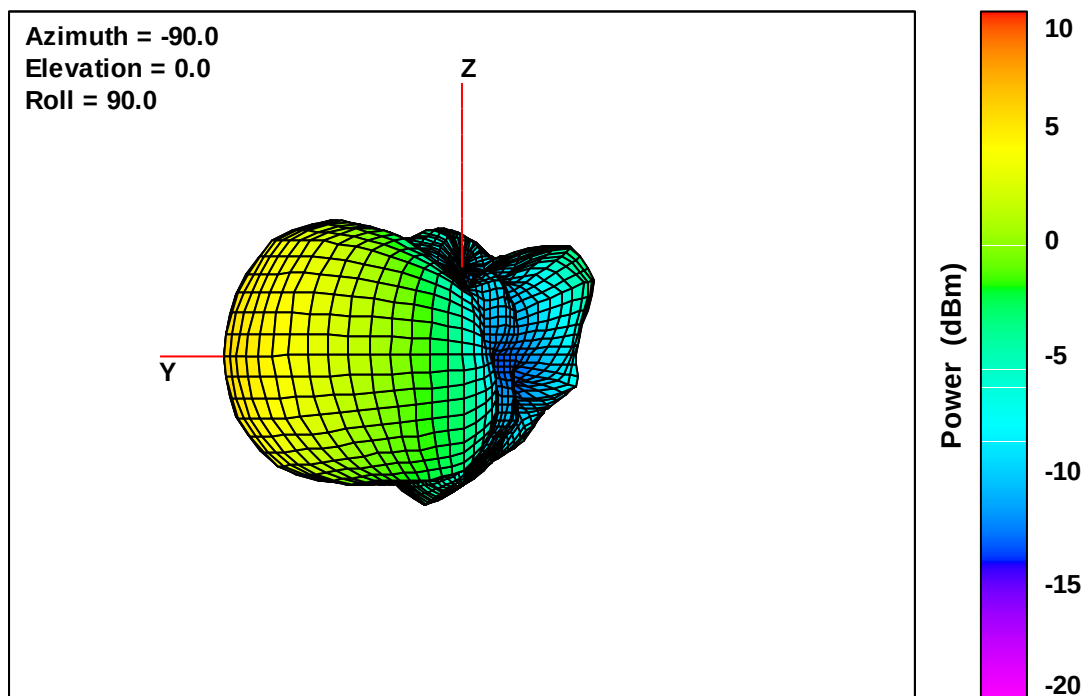
6.14 3D PASSIVE- 2110 MHz**Total EIRP, Top View****Wearable Defibrillator Free-Space Total EIRP, Top View, 2110 MHz****Total EIRP, Bottom View****Wearable Defibrillator Free-Space Total EIRP, Bottom View, 2110 MHz**

Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 2110 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 2110 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 2110 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 2110 MHz**

6.15 3D PASSIVE- 2155 MHz**Total EIRP, Top View****Wearable Defibrillator Free-Space Total EIRP, Top View, 2155 MHz****Total EIRP, Bottom View****Wearable Defibrillator Free-Space Total EIRP, Bottom View, 2155 MHz**

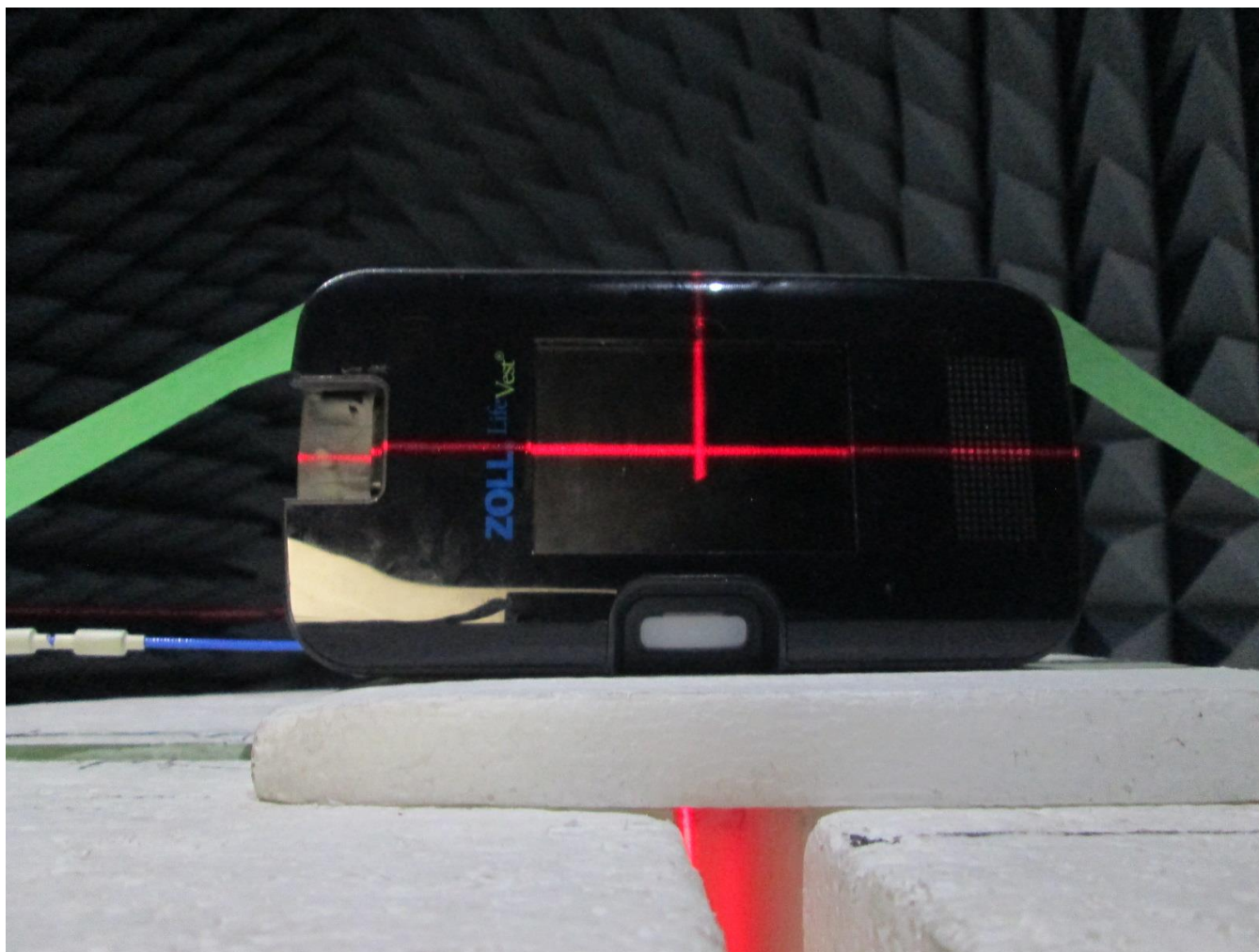
Total EIRP, Left Side View**Wearable Defibrillator Free-Space Total EIRP, Left Side View, 2155 MHz****Total EIRP, Front Face View****Wearable Defibrillator Free-Space Total EIRP, Front Face View, 2155 MHz**

Total EIRP, Right Side View**Wearable Defibrillator Free-Space Total EIRP, Right Side View, 2155 MHz****Total EIRP, Back Face View****Wearable Defibrillator Free-Space Total EIRP, Back Face View, 2155 MHz**

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EUT: WEARABLE DEFIBRILLATOR

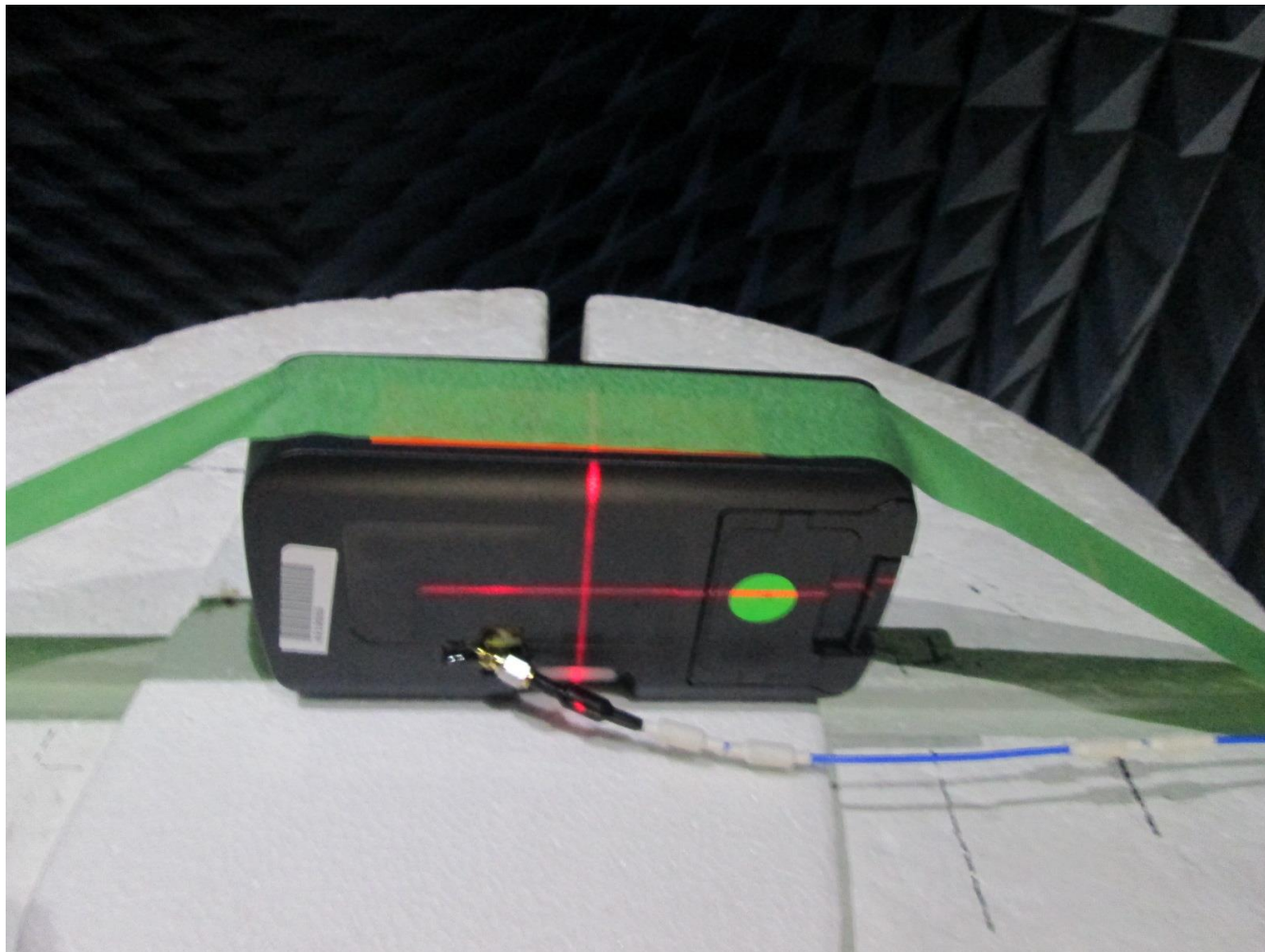
DATE: MAY 16, 2022
PART/MODEL: LIFEVEST 5100

7 TEST SETUP



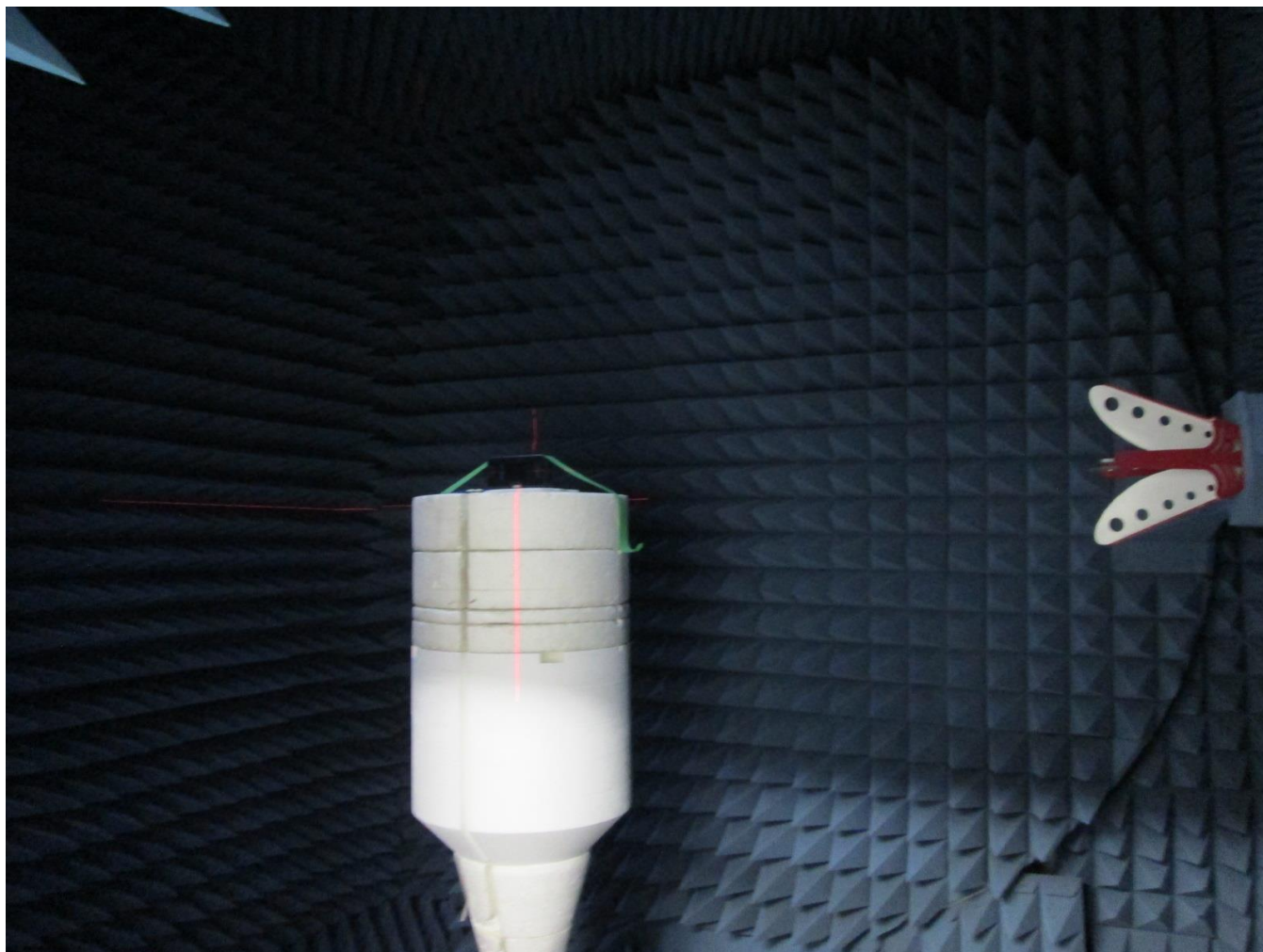
REPORT NO: 14303320-O1V1
EUT: WEARABLE DEFIBRILLATOR

DATE: MAY 16, 2022
PART/MODEL: LIFEVEST 5100



REPORT NO: 14303320-O1V1
EUT: WEARABLE DEFIBRILLATOR

DATE: MAY 16, 2022
PART/MODEL: LIFEVEST 5100



END OF REPORT