



PetLinkDOG US v1 & PetLinkDOG US a1

Antenna data information

1. Antenna Data

Type of Antenna	Monopole on flex PCB
Max Antenna Gain (LTE)	B12: -9.49 dBi / B4: -2.15 dBi / B2: -2.26 dBi
Max Antenna Gain (BLE)	-5.49 dBi

2. Antenna Description

Dimension	38mm x 22 mm x 0.16 mm
Material	Polymide
Finishing	Immersion gold

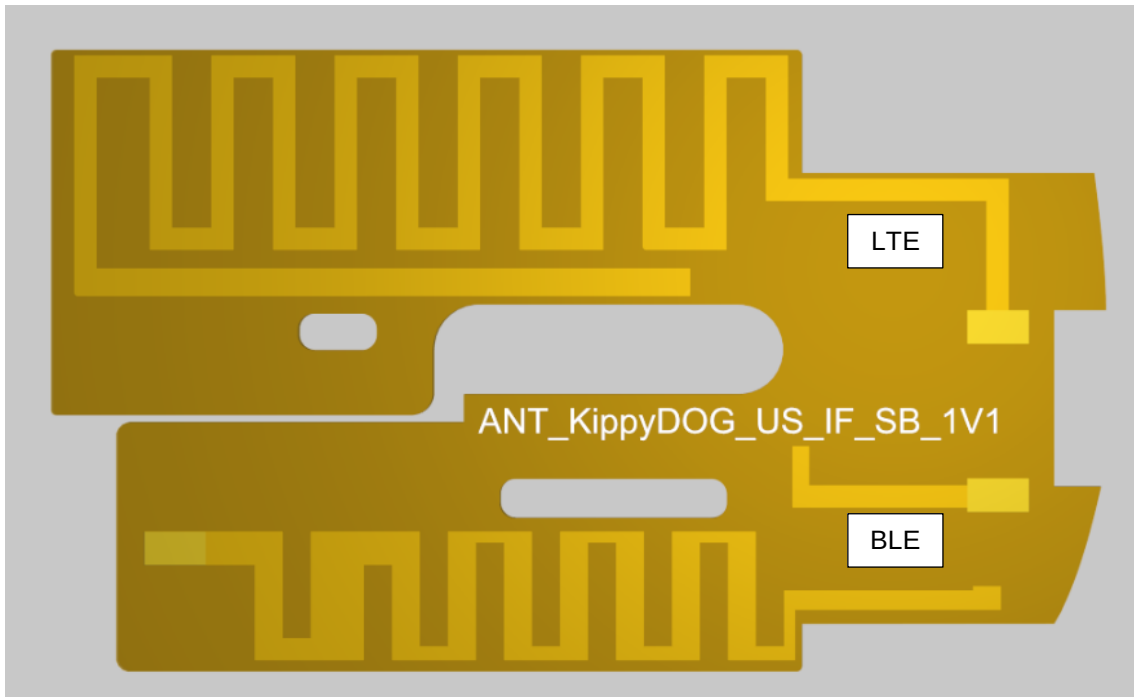


Fig. 1. Antennae location.

3. Radiation Diagram

In all operating bands the measurements for Total Radiated Power (TRP) and Effective Isotropic Radiated Power (EIRP) measurements were performed on lowest, middle and highest channels.

The output power of the device was set to maximum for all tests.

The EUT is rotated along two different spherical axes: theta (θ) and phi (Φ). The relationship between the 3D Cartesian coordinate system (X, Y, Z) and the theta and phi axes is illustrated in the following figure. This coordinate system should be used as reference in all 3D radiation pattern.

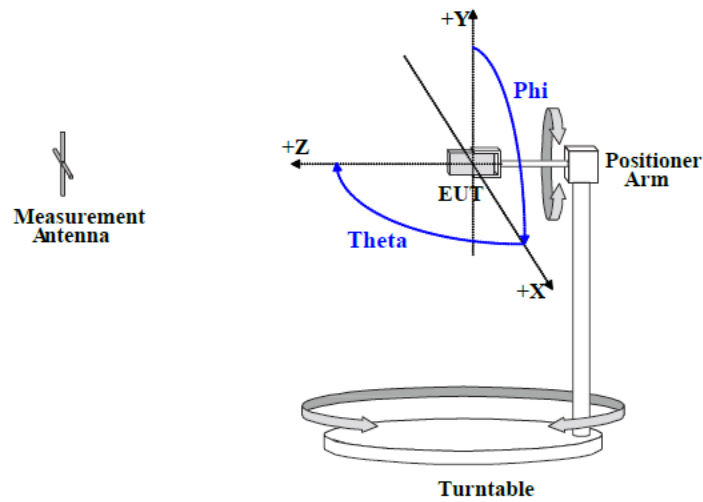
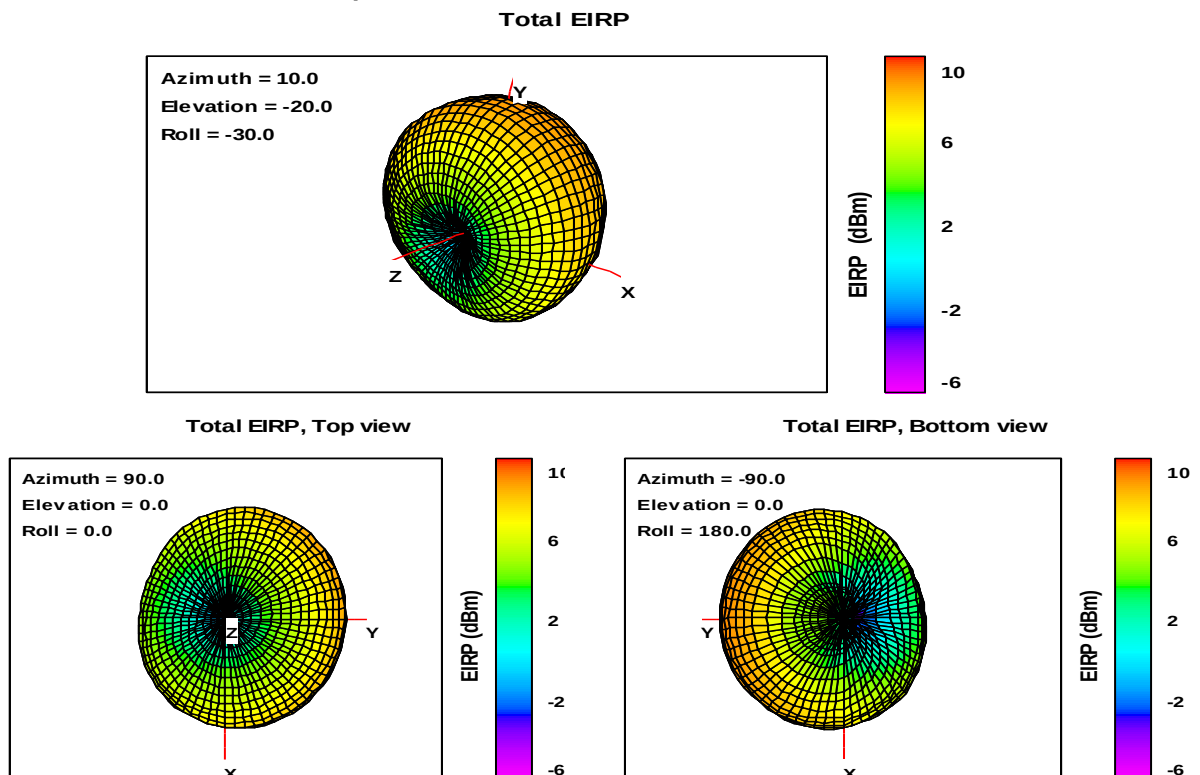


Fig. 2. Coordinate system.

Theta is the spherical axis that rotates along the Cartesian Y axis while Phi is the spherical axis that rotates along the Cartesian Z axis. The initial measurement position (Theta = 0° and Phi = 0°) is illustrated in each of the test setup photographs in Appendix B. The EUT has only one mechanical configuration and it was tested in the “Free-space” configuration, whereby the EUT has been placed directly on a support.

3.1 LTE Cat-M1 3D patterns:

LTE Cat-M1 Band 2 – Free Space



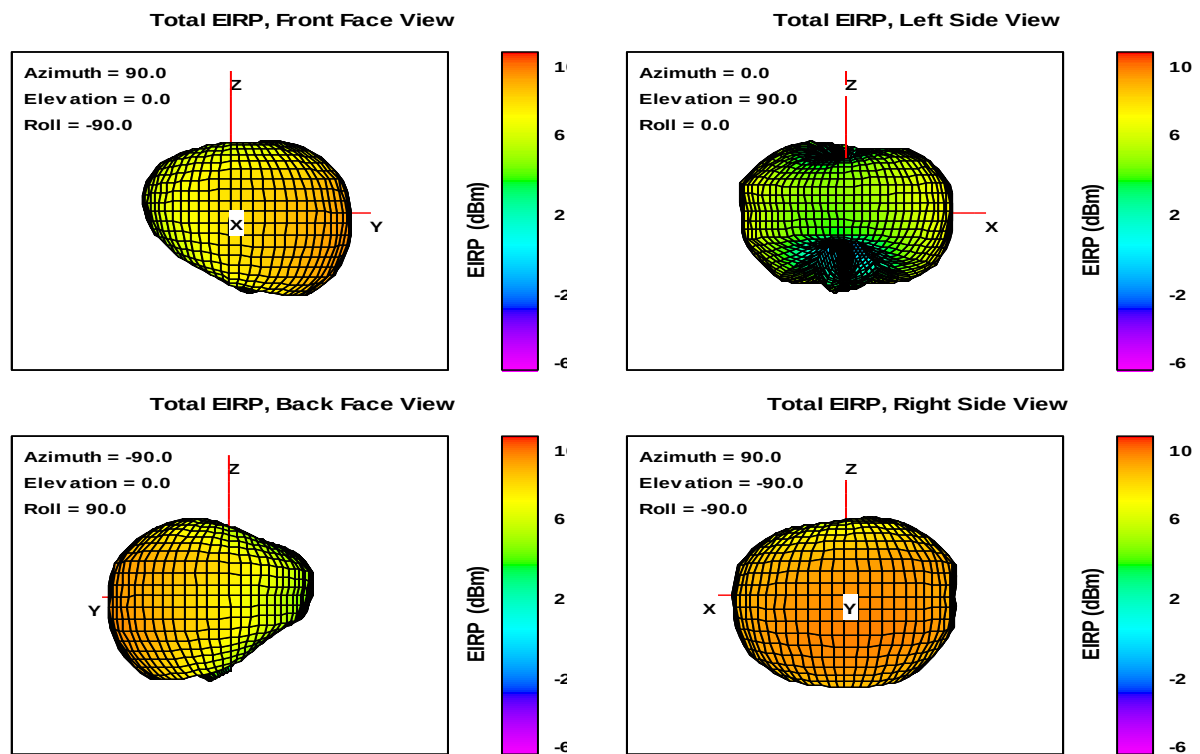
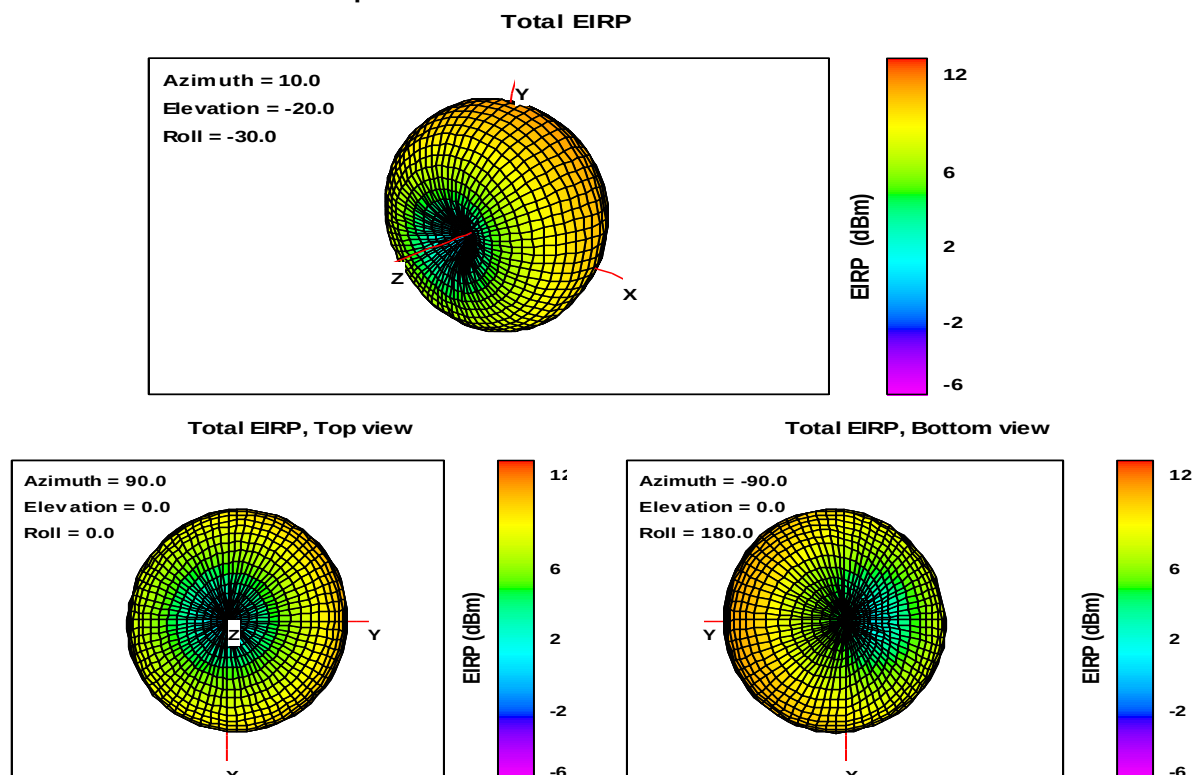


Fig. 3. Total EIRP, Free Space, LTE Cat-M1 Band 2.

LTE Cat-M1 Band 4 – Free Space



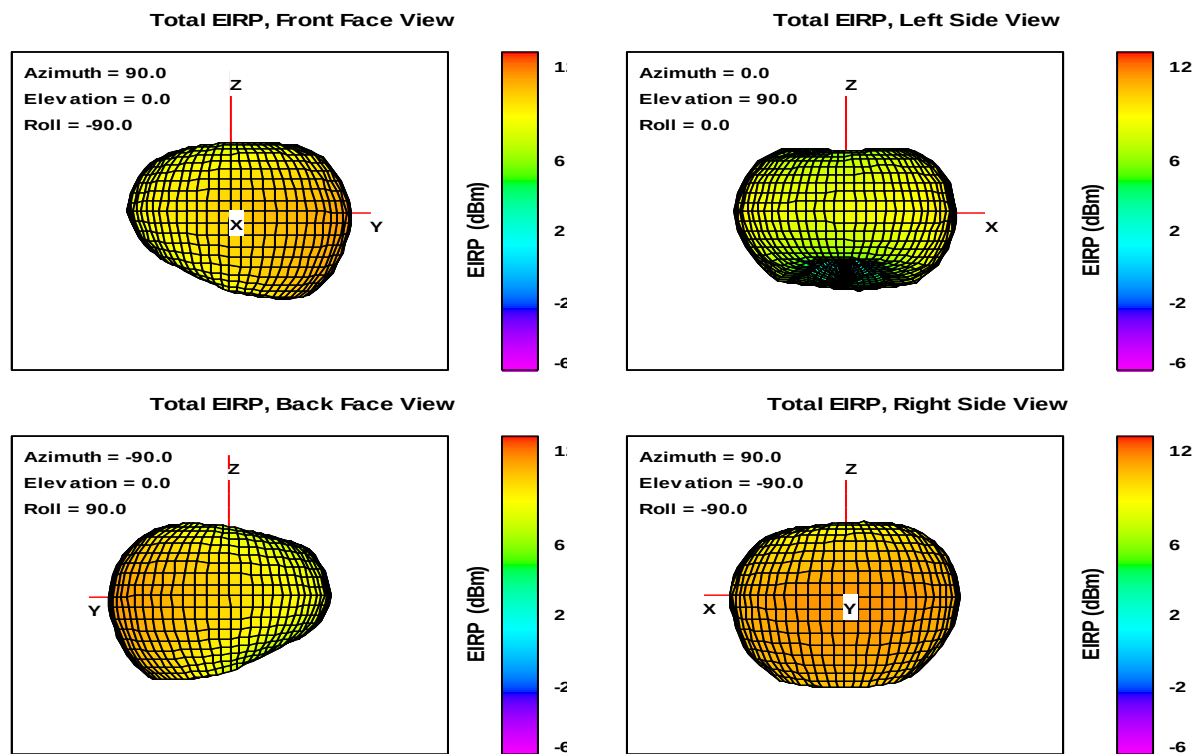
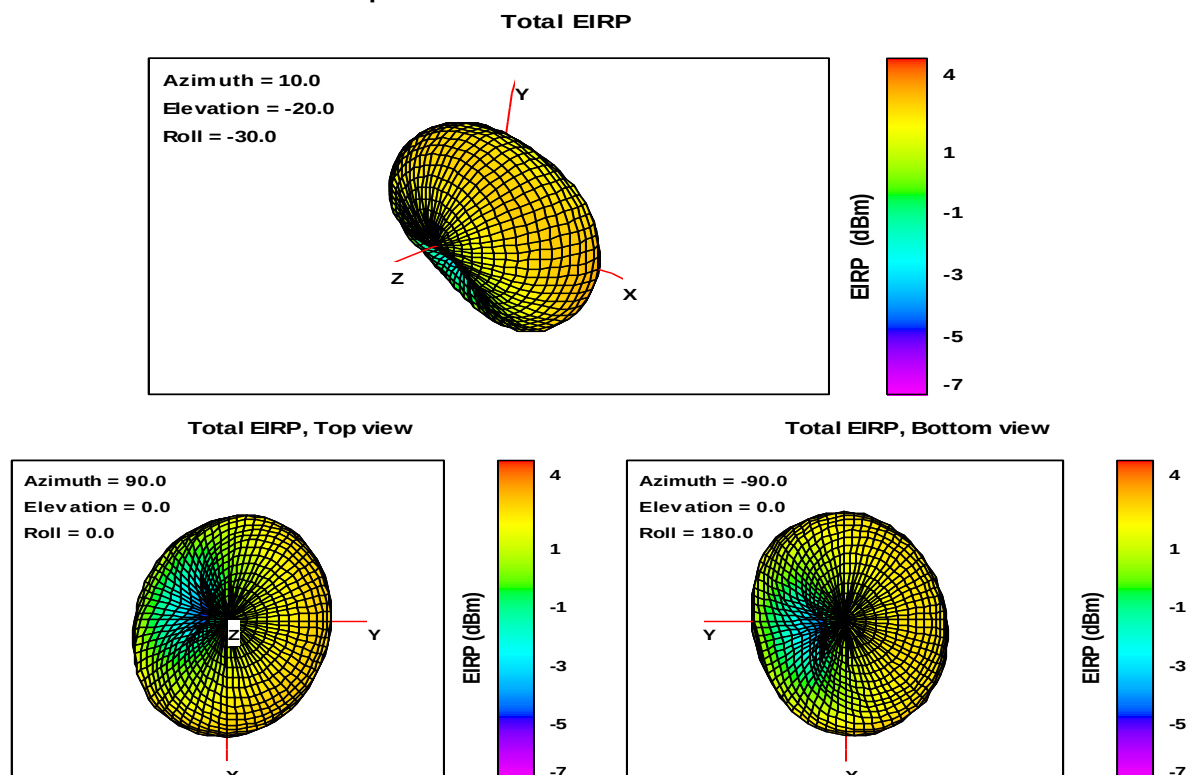


Fig. 4. Total EIRP, Free Space, LTE Cat-M1 Band 4.

LTE Cat-M1 Band 12 – Free Space



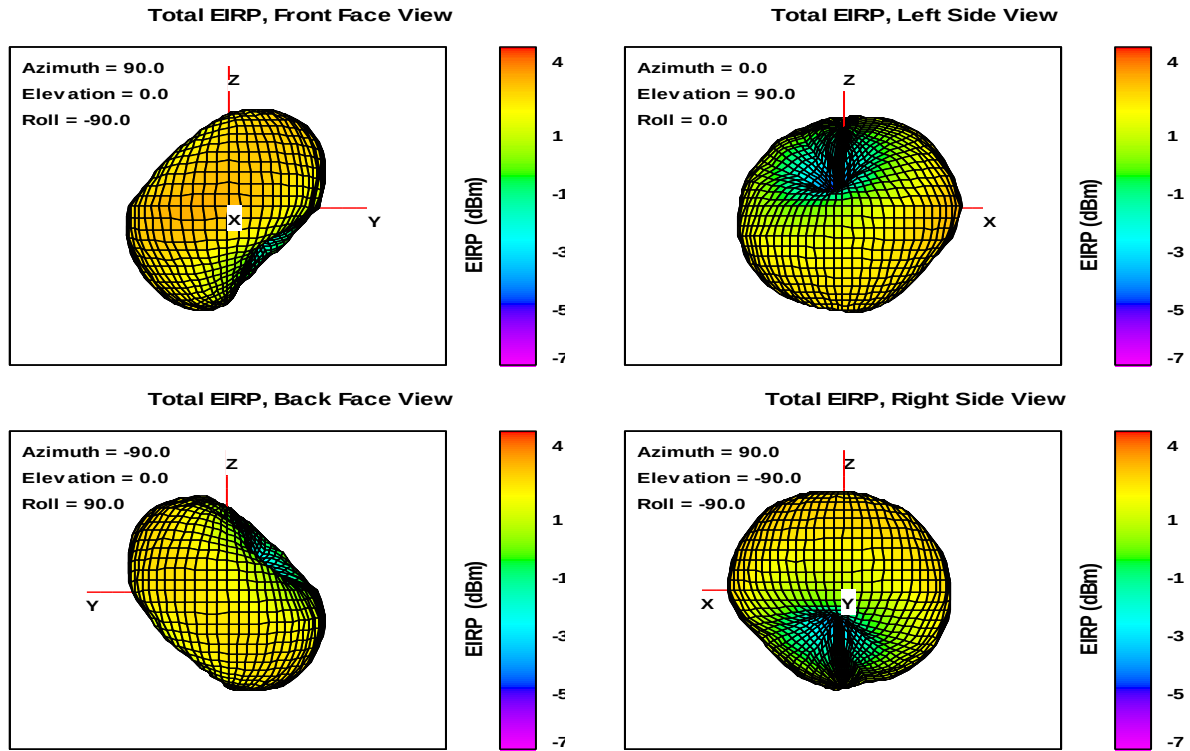


Fig. 5. Total EIRP, Free Space, LTE Cat-M1 Band 12.

Antenna Gain:

Technology /Band	Channel	Frequency (MHz)	TRP (dBm)	Max EIRP (dBm)
			FS	FS
LTE Cat-M1 2	18650	1851.04	17.24	20.41
	18900	1880.36	15.98	19.22
	19150	1908.96	14.97	18.36
LTE Cat-M1 4	20000	1711.04	17.60	20.68
	20175	1732.86	18.21	21.11
	20350	1753.96	18.23	21.42
LTE Cat-M1 12	23035	699.34	9.61	11.47
	23095	707.68	12.19	14.14
	23155	715.66	11.20	13.08

As mentioned before, the output power of the device was set to maximum for all tests. Therefore, the max antenna gain per band is:

Technology /Band	Max Output Power (dBm)	Max EIRP (dBm)	Max Antenna Gain (dBi)
LTE Cat-M1 2	22.67	20.41	-2.26
LTE Cat-M1 4	23.57	21.42	-2.15
LTE Cat-M1 12	23.63	14.14	-9.49

3.2 BLE 3D patterns:

2402 MHz – Free Space

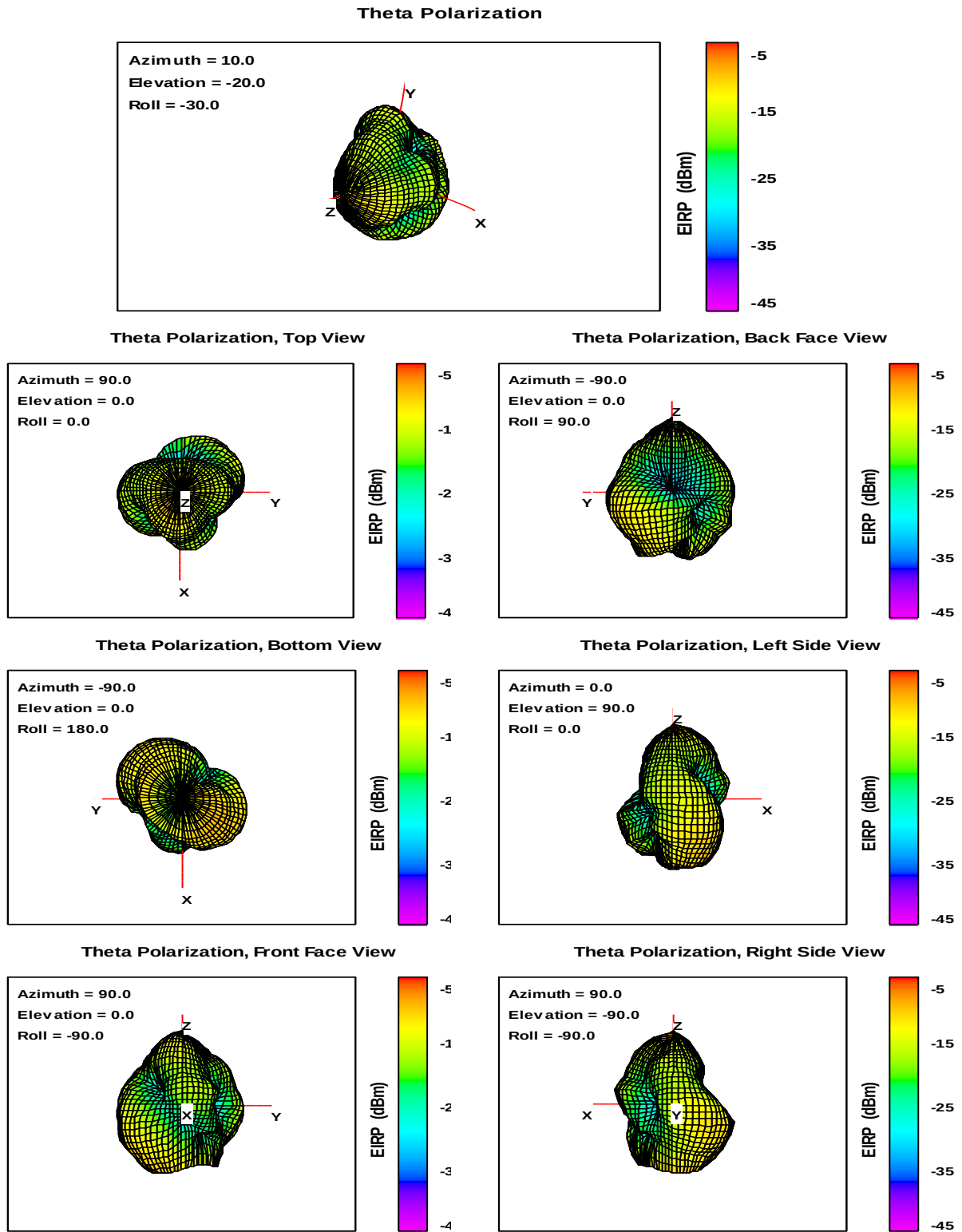


Fig. 6. Theta Polarization EIRP, Free Space, 2402 MHz.

Phi Polarization

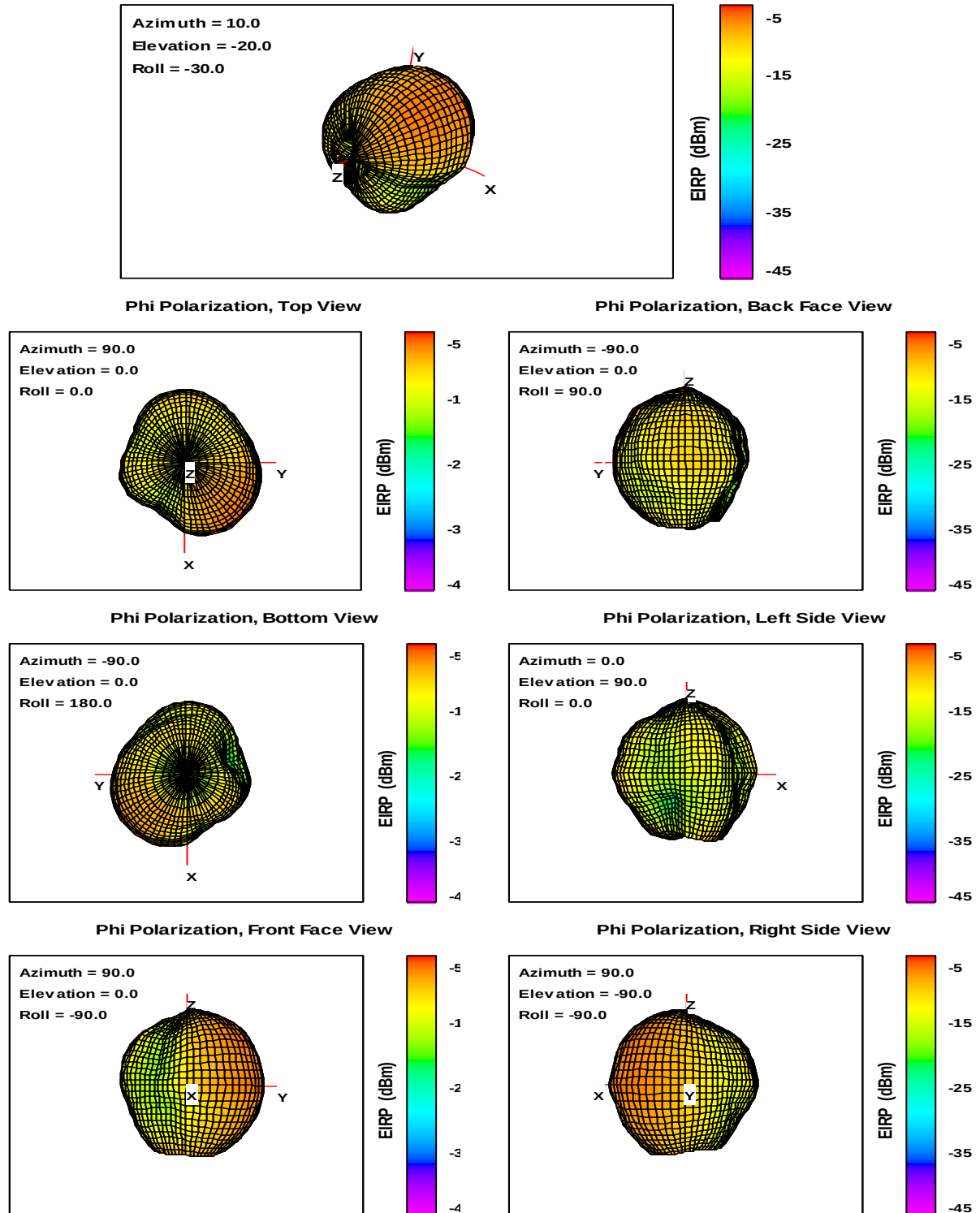


Fig. 7. Phi Polarization EIRP, Free Space, 2402 MHz.

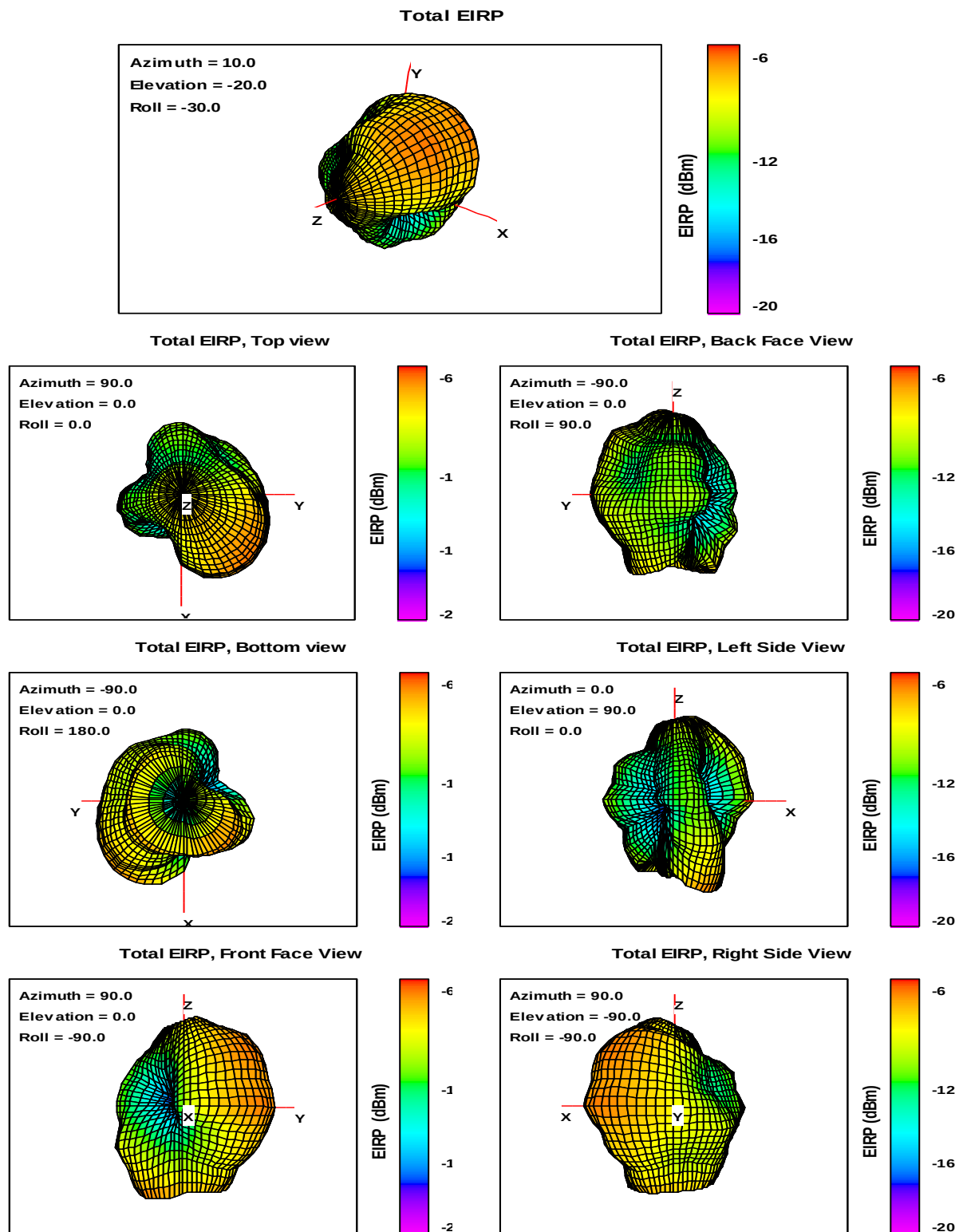


Fig. 8. Total EIRP, Free Space, 2402 MHz.

2440 MHz – Free Space

Theta Polarization

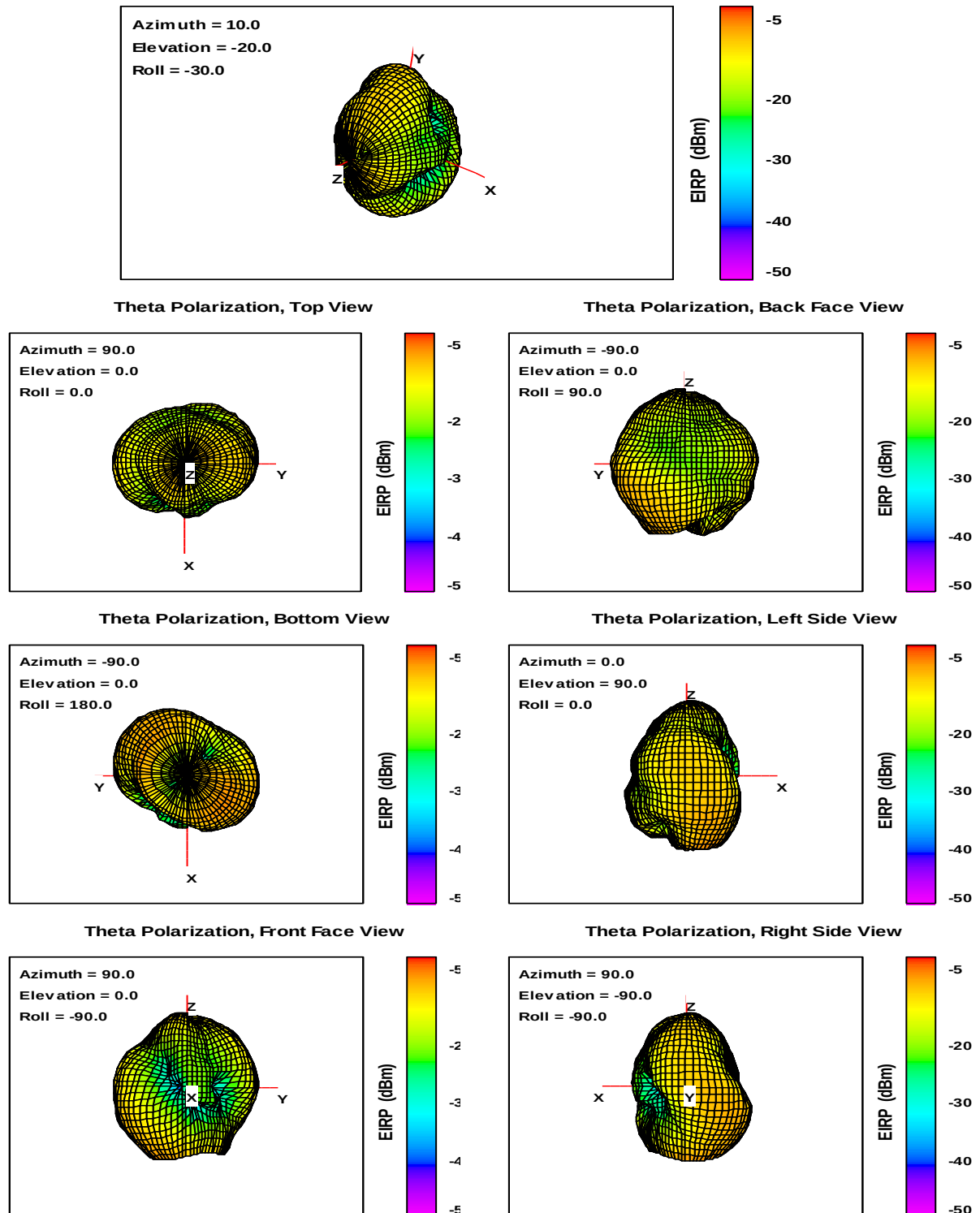


Fig. 9. Theta Polarization EIRP, Free Space, 2440 MHz.

Phi Polarization

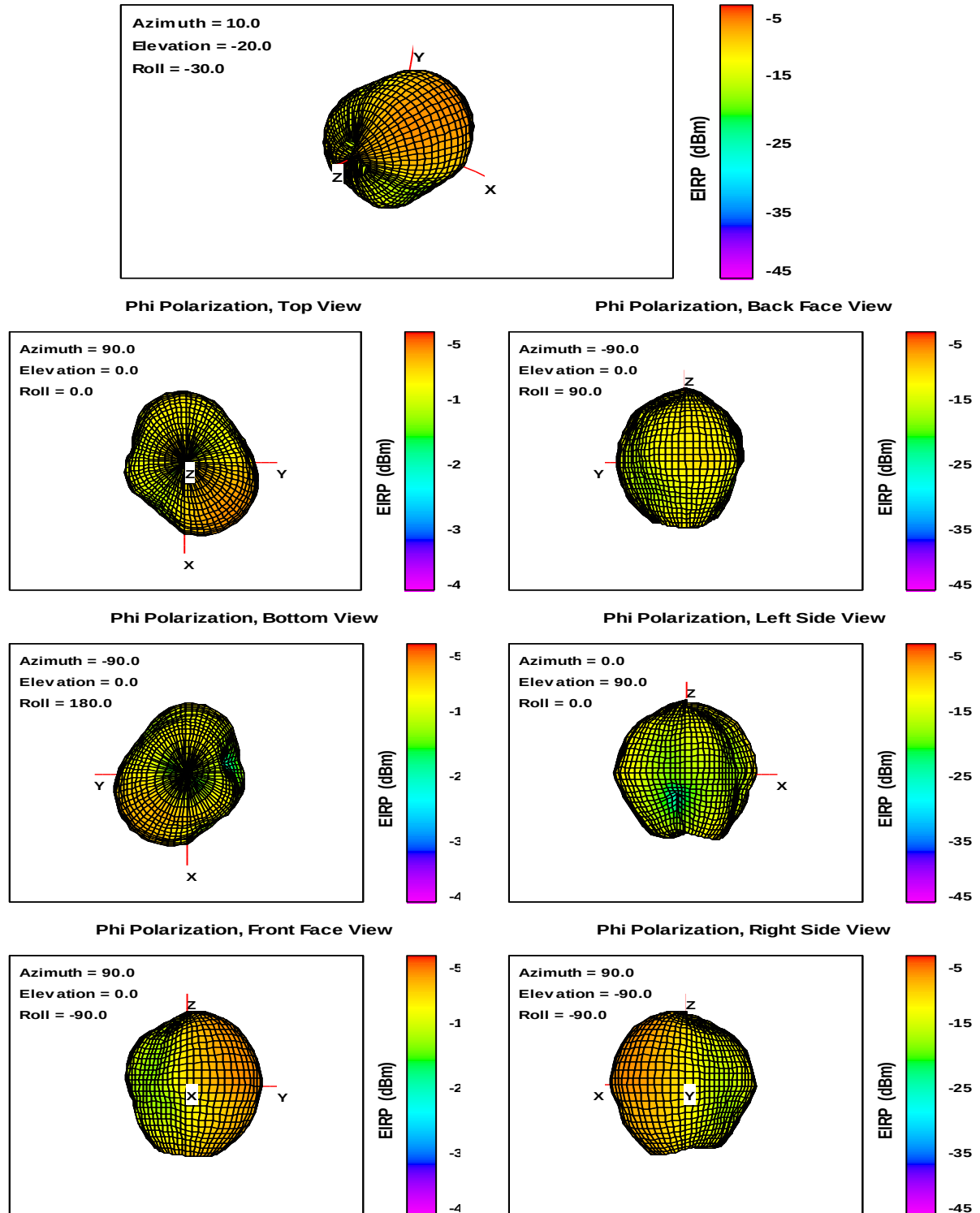


Fig. 10. Phi Polarization EIRP, Free Space, 2440 MHz.

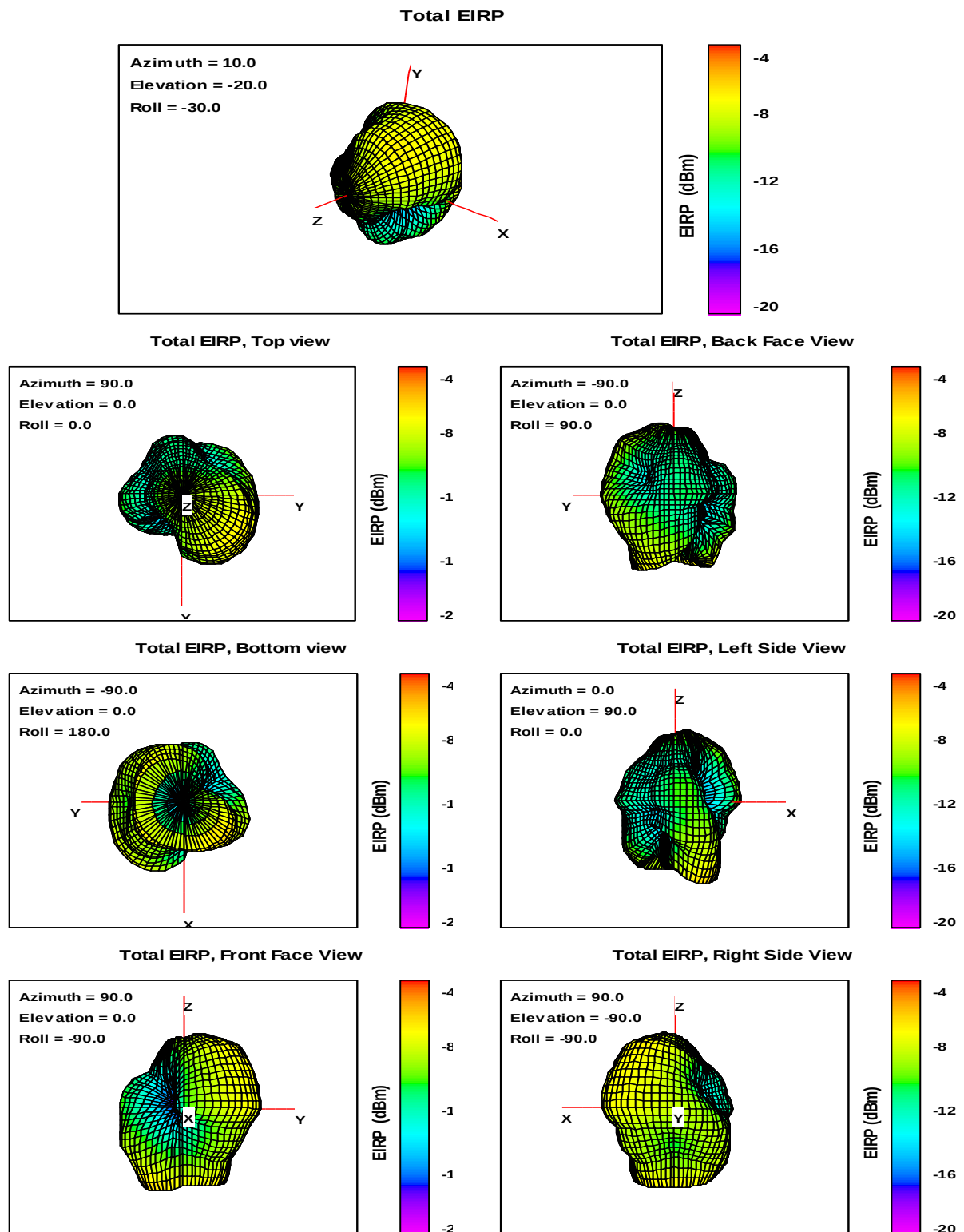


Fig. 11. Total EIRP, Free Space, 2440 MHz.

2480 MHz – Free Space

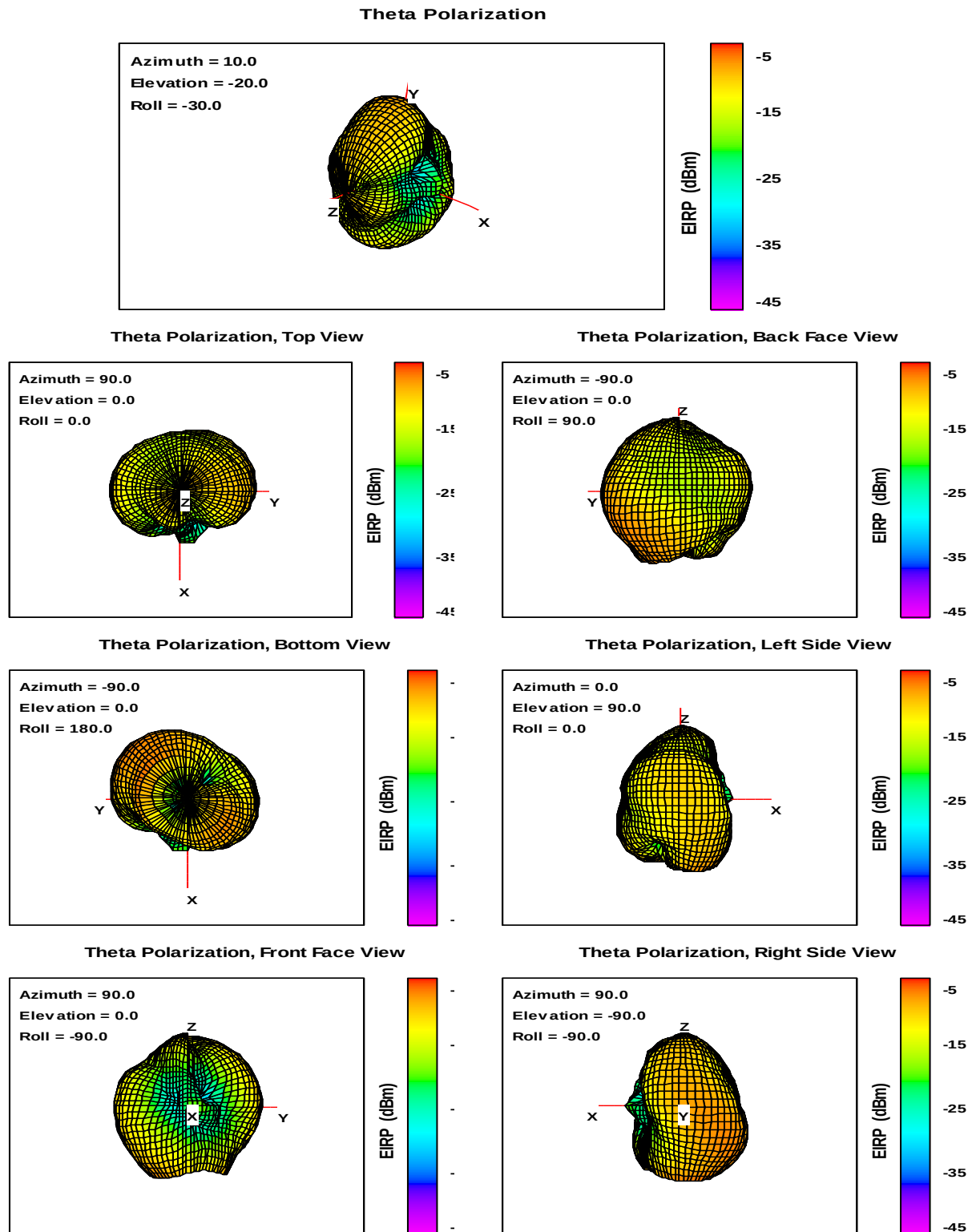


Fig. 12. Theta Polarization EIRP, Free Space, 2480 MHz.

Phi Polarization

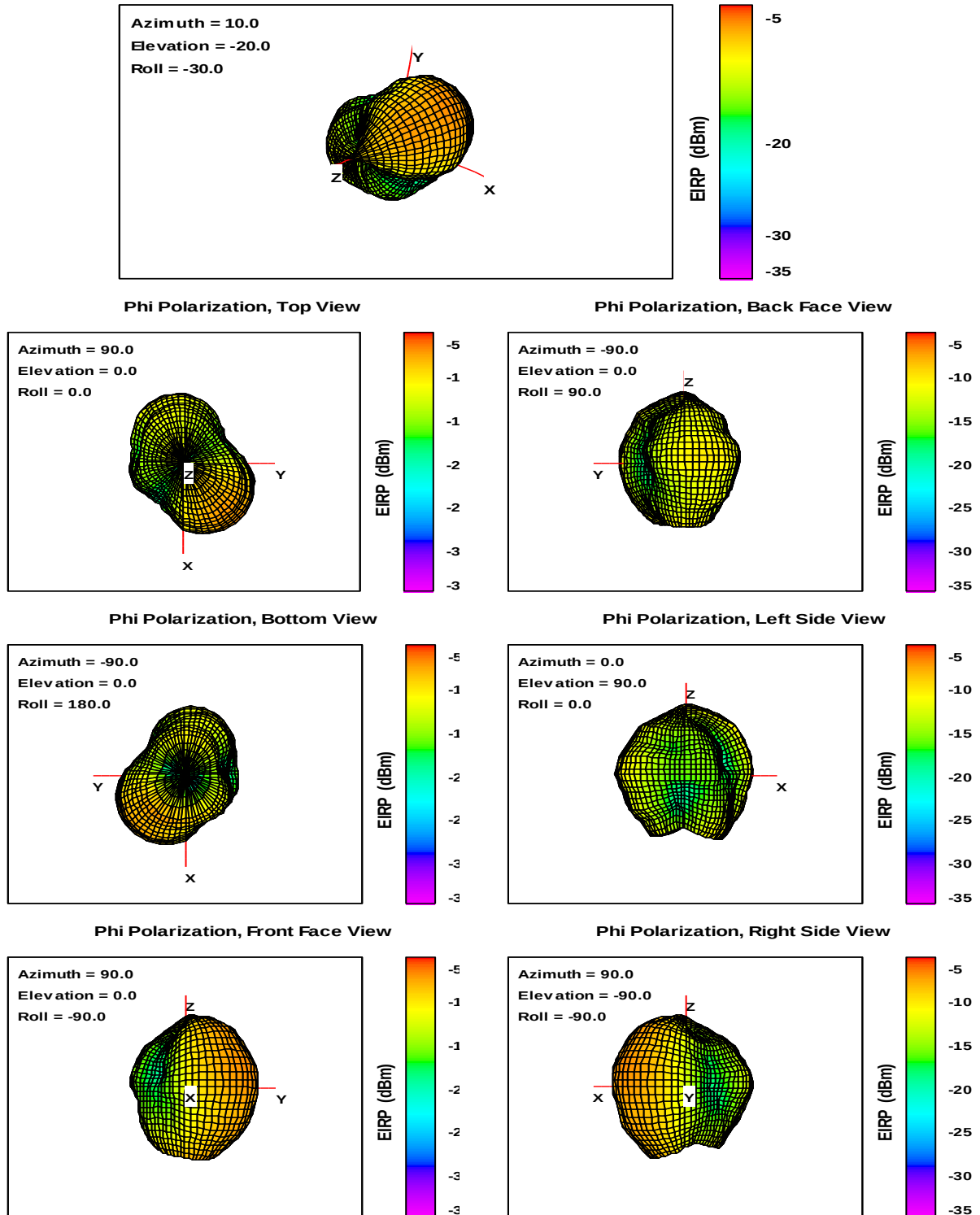


Fig. 13. Phi Polarization EIRP, Free Space, 2480 MHz.

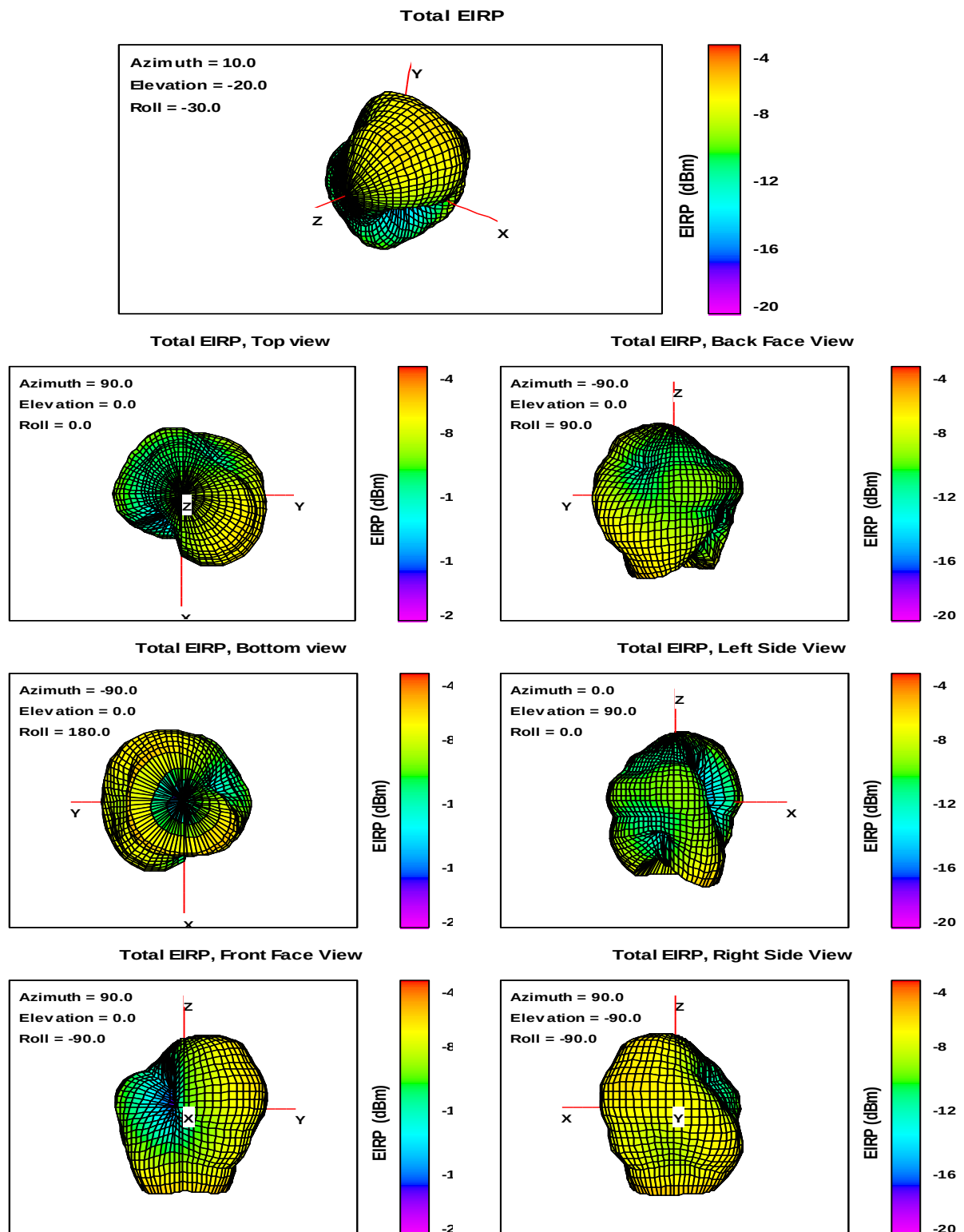


Fig. 14. Total EIRP, Free Space, 2480 MHz.

Antenna Gain:

Technology	Channel	Frequency (MHz)	Max EIRP (dBm)
BLE (2 Mbps)	Low	2402	-7.63
	Middle	2440	-8.03
	High	2480	-7.34

As mentioned before, the output power of the device was set to maximum for all tests. Therefore, the max antenna gain per band is:

Technology /Band	Max Output Power (dBm)	Max EIRP (dBm)	Max Antenna Gain (dBi)
BLE (2 Mbps)	-1.18	-7.63	-6.45
	-1.83	-7.82	-5.99
	-1.34	-6.83	-5.49