

# **WND2 OM Antenna specification for FCC Part 15 submission**

1. EUT information

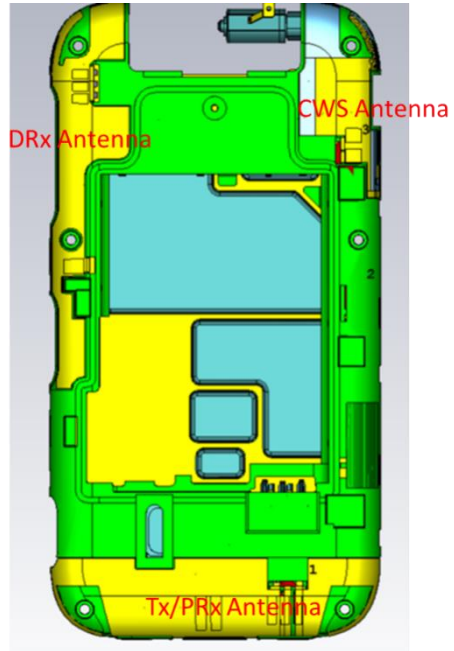
- a. Manufacturer : HMD Global Oy
- b. Description : GSM/WCDMA/LTE phone
- c. Frequency bands

Band	CDMA	N/A
	GSM Bands	850, 900, 1800, 1900
	UMTS Bands	II, IV, V
	LTE Bands	FDD: 2,4,5,7,12,13,17,25,26,66,71 TDD: B41(with HPUE)
	LTE Category	Cat 4
CWS	WIFI	2.4 G 802.11n/g/b
	BT	2.4 G
	GPS	1.5G

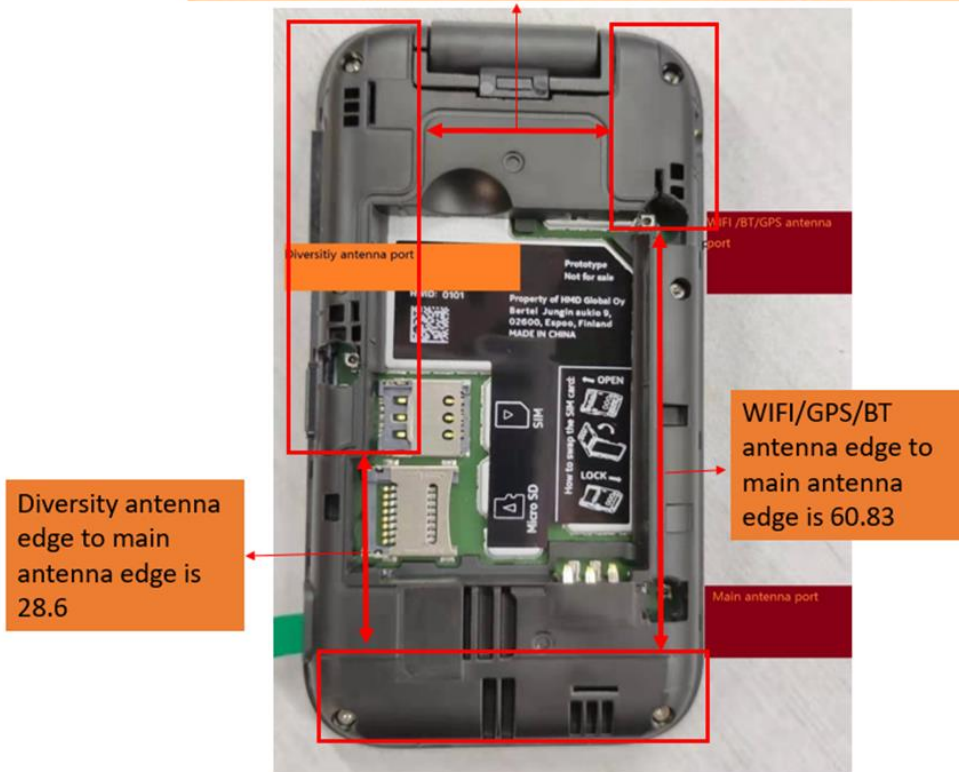
- d. Power class
  - i. GSM850/900 : 4
  - ii. GSM1800/1900 : 1
  - iii. UMTS Band II/IV/V : 3
  - iv. LTE 2/4/5/7/12/13/17/25/26/71
  - v. LTE 41 : HPUE
- e. If containing multiple Tx antennas : No
- f. Primary Mechanical Mode : Fold open

## 2. Number of Antennas and its placement

\*Note : DRx antenna is receiving only. CWS antenna is combined of 2.4G WIFI+BT+GPS

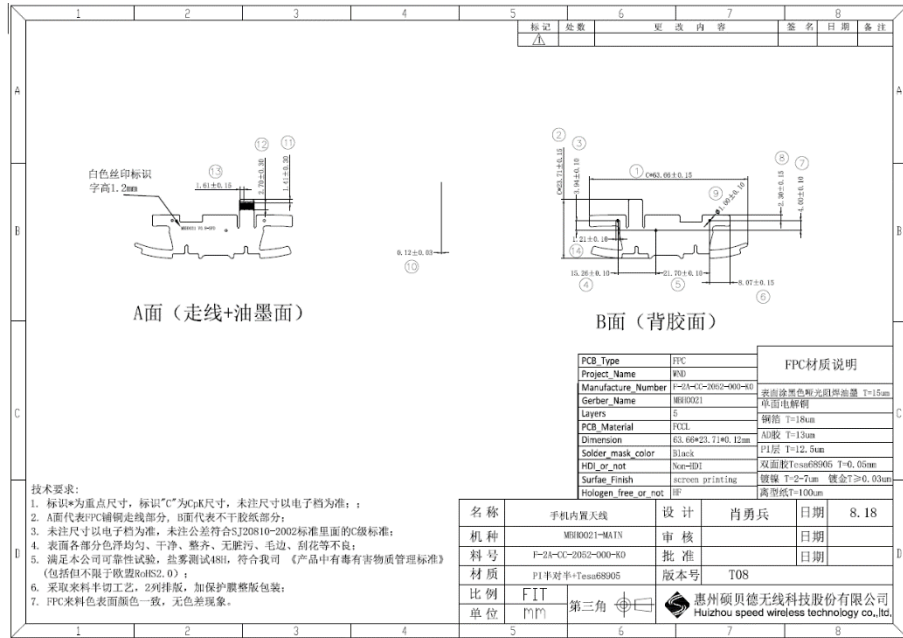


Diversity antenna edge to WIFI/GPS/BT antenna edge is 28.6

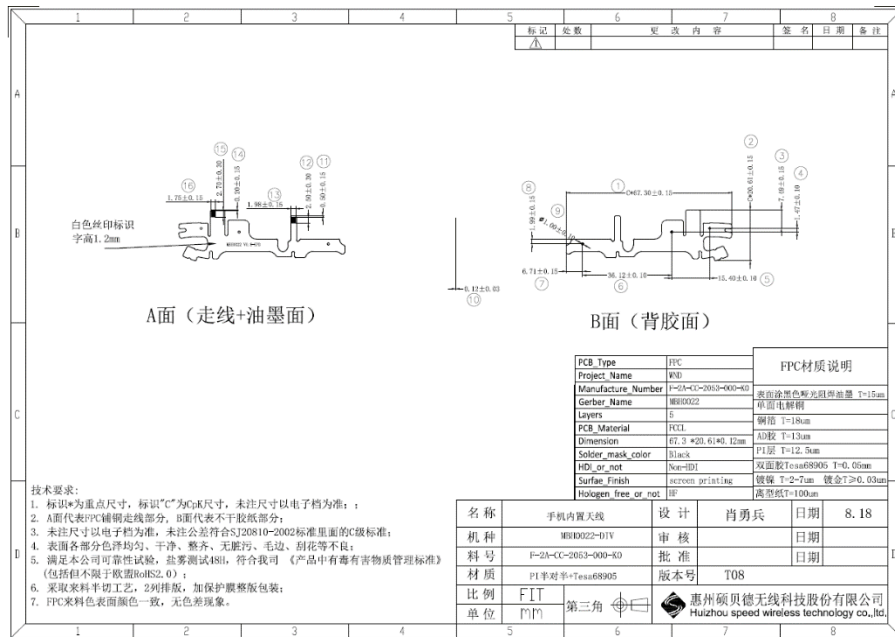


### 3. Antenna 2D drawings

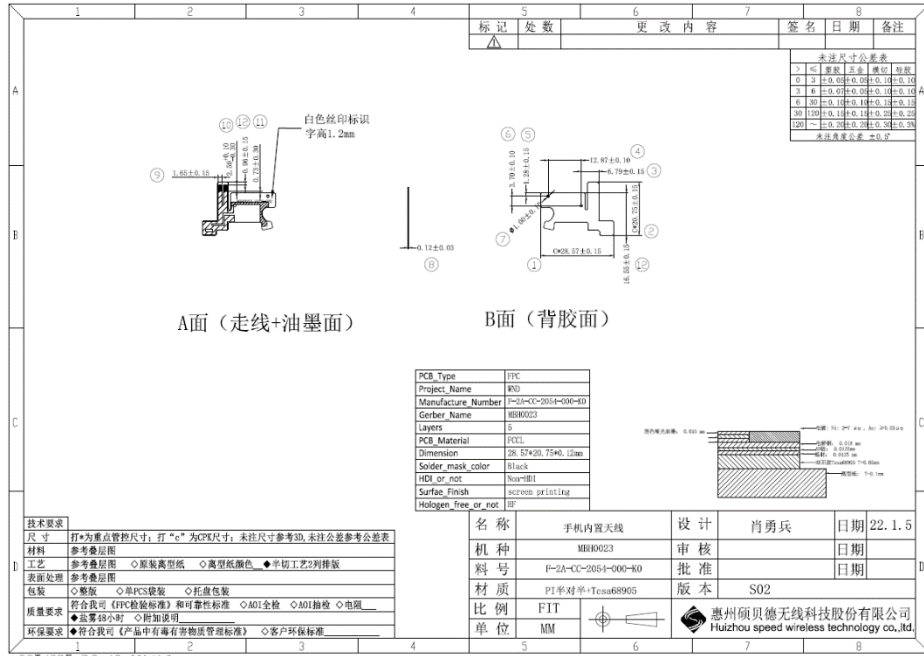
#### a. Tx/PRx antenna



#### b. DRx antenna



c. WIFI/BT/GPS 3in 1 antenna

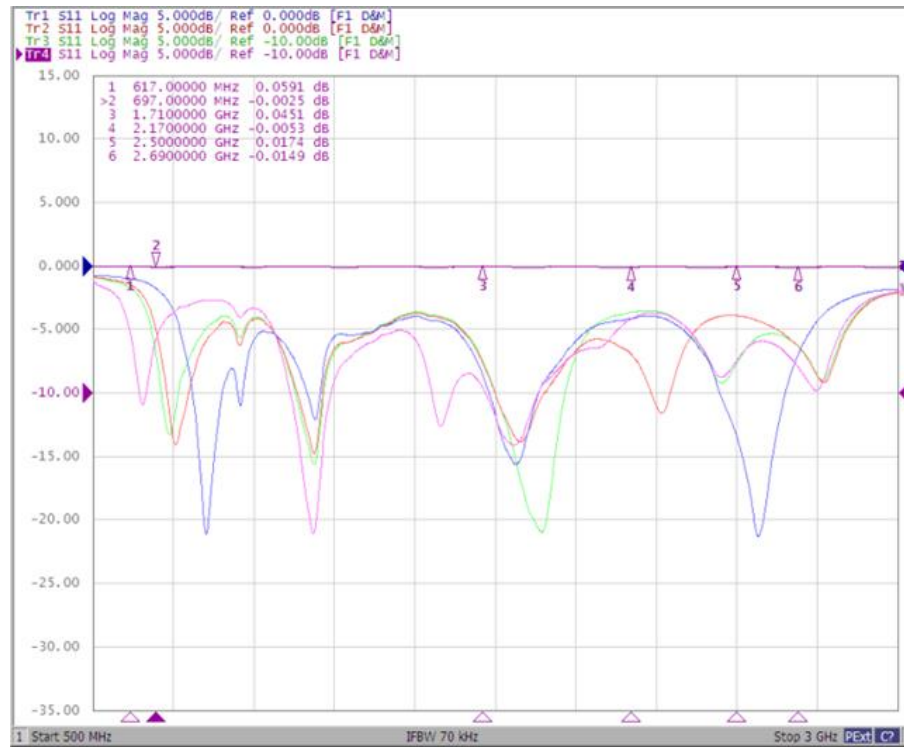


#### 4. Antenna gain

Specification	
Parameter	Spec.
VSWR	<3:1
Return Loss	<-6dB
Peak Gain	LTE 71 : -7.5dBi LTE 12, 17 : -4.06 dBi LTE 13 : -3.11 dBi LTE B5, LTE26, GSM 850, WCDMA V : -2.41 dBi GSM 900 : -3.17 dBi GSM 1800, WCDMA IV, LTE 4, 66 : -2.5 dBi GSM 1900, WCDMA II, LTE B2, LTE B25 : -2.57 dBi LTE 7, 41 : -2.1 dBi WIFI/BT: -2.5 dBi GPS: -1.77dBi
Efficiency	LTE 71 : 17.78% LTE 12, 17 : 39.81% LTE 13 : 48.98% LTE B5, GSM 850, WCDMA V : 57.54% GSM 900 : 47.86% GSM 1800, WCDMA IV, LTE 4, 66 : 56.23% GSM 1900, WCDMA II, LTE B2, : 54.95% LTE 7, 41 : 61.66% WIFI/BT:52.24% GPS:66.5%
Isolation	<-13dB
Radiation Pattern	Omni-directional

## 5. Antenna Return Loss

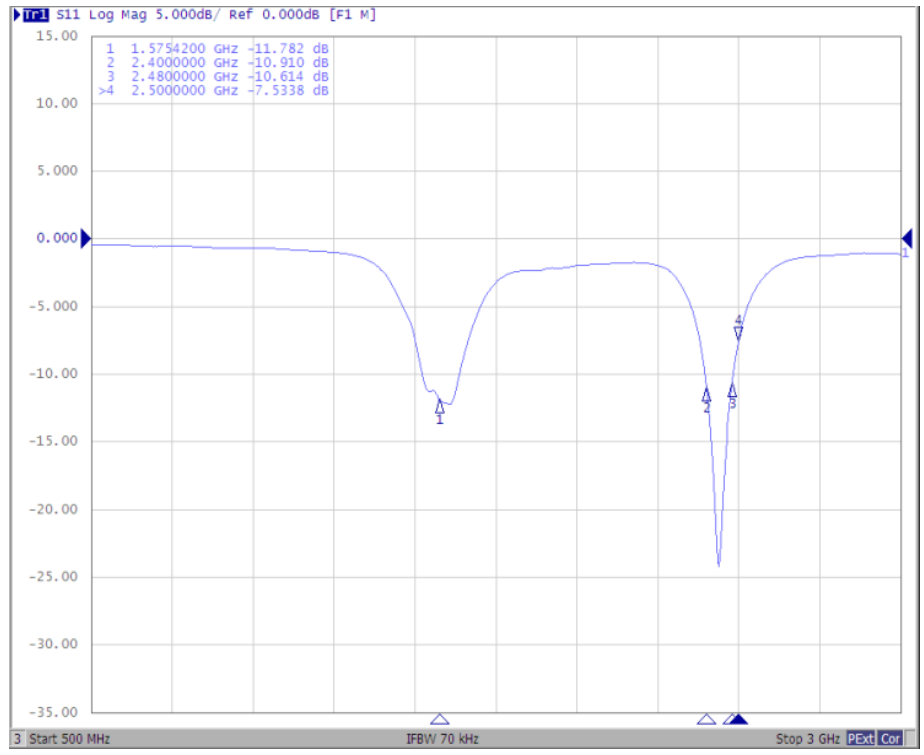
### a. Tx/PRx Antenna



### b. DRx Antenna

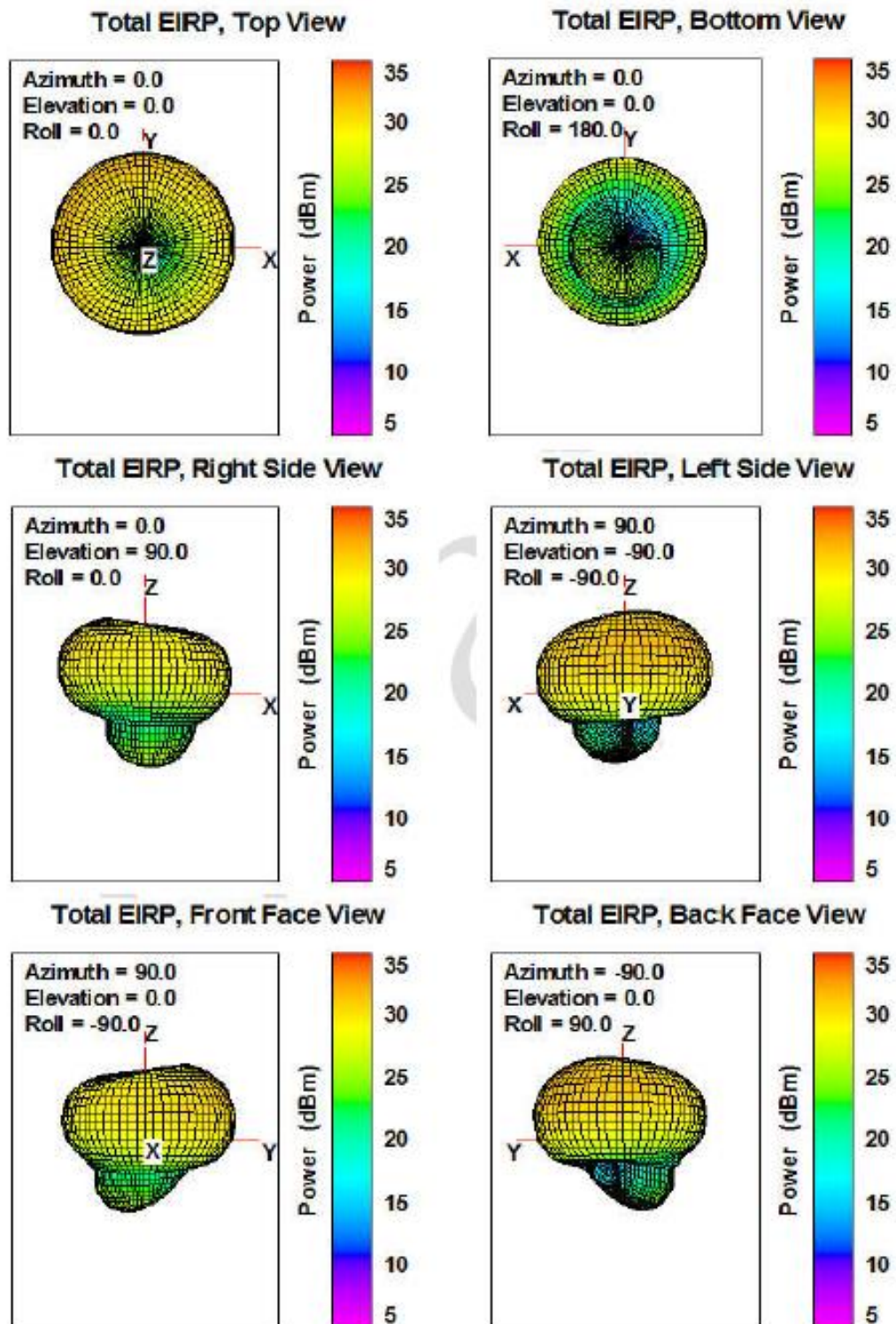


### c. WIFI/BT/GPS 3 in 1 antenna



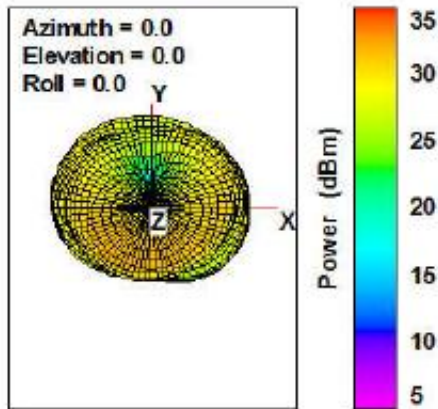


- 6. Radiation pattern
  - a. GSM 850 @ 836.6MHz

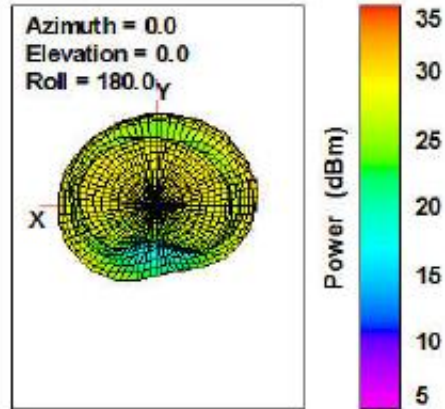


b. GSM 1900 @ 1880MHz

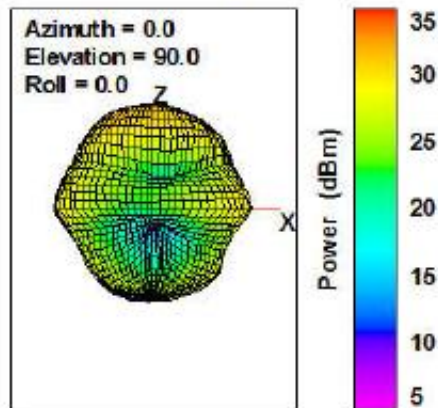
Total EIRP, Top View



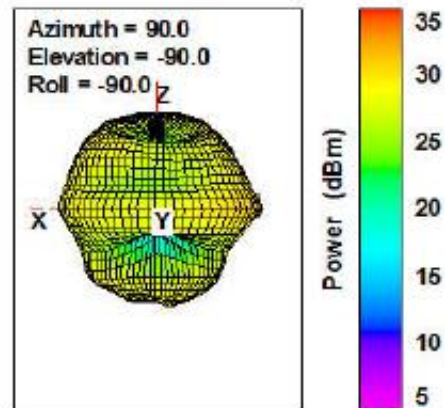
Total EIRP, Bottom View



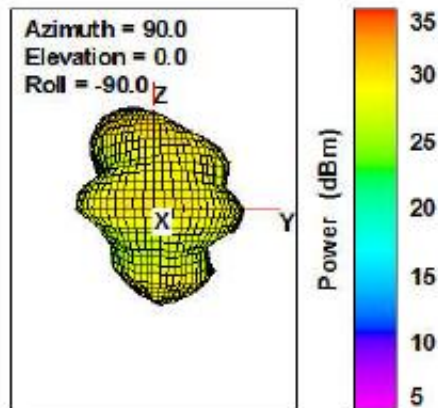
Total EIRP, Right Side View



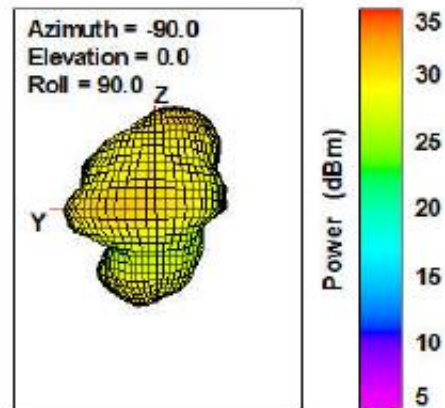
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Total EIRP, Front Face View

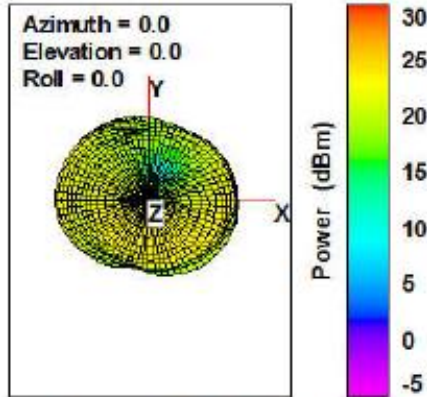


Total EIRP, Back Face View

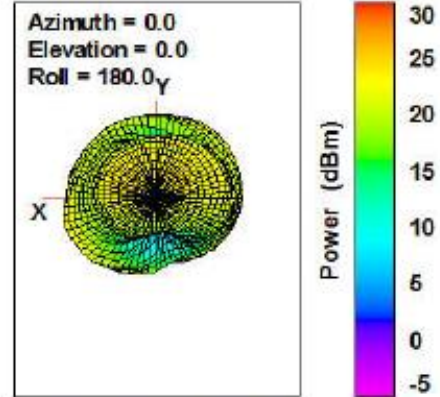


c. UMTS II @ 1880MHz

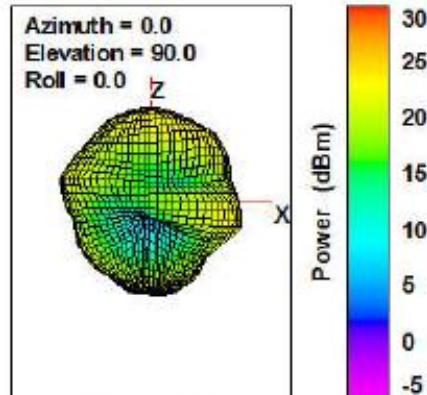
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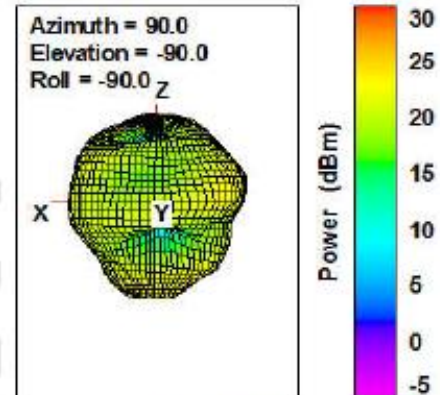
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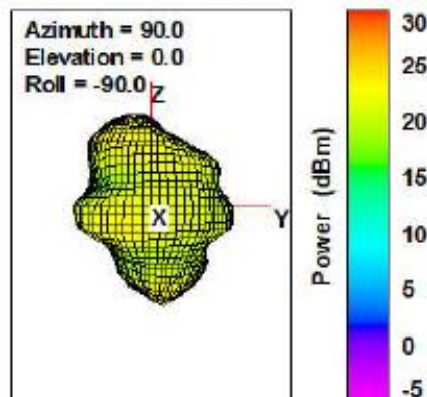
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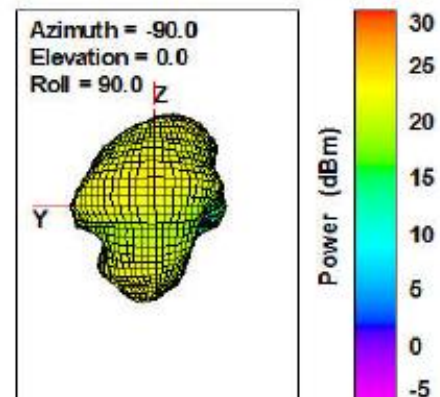
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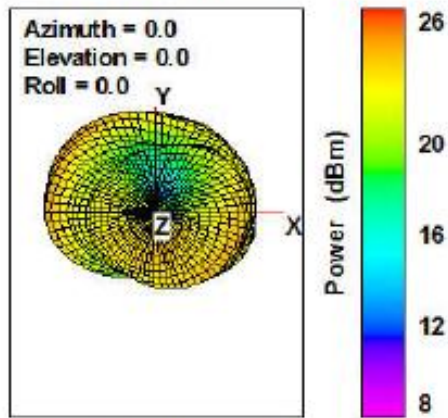


Total EIRP, Back Face View

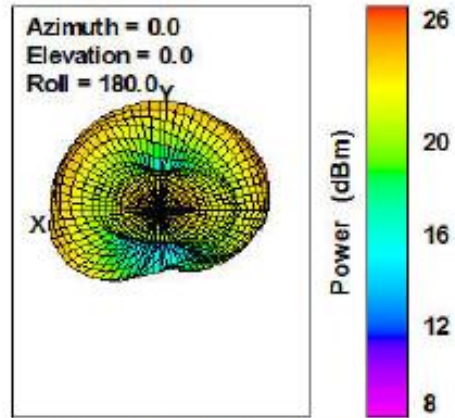


d. UMTS IV @ 1732.6MHz

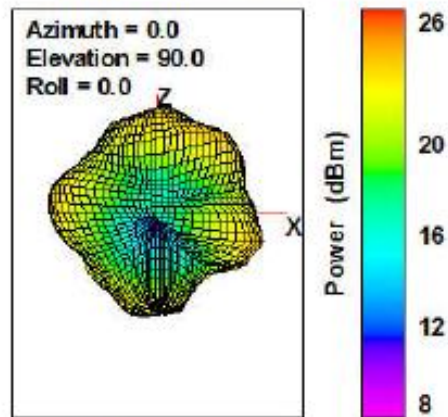
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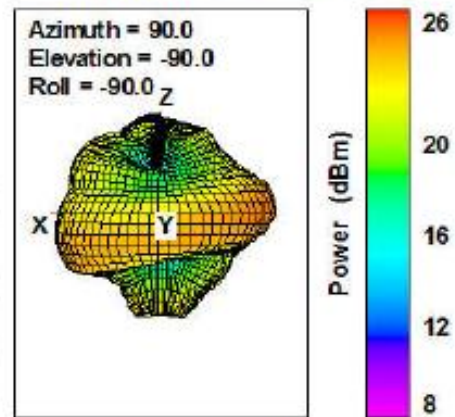
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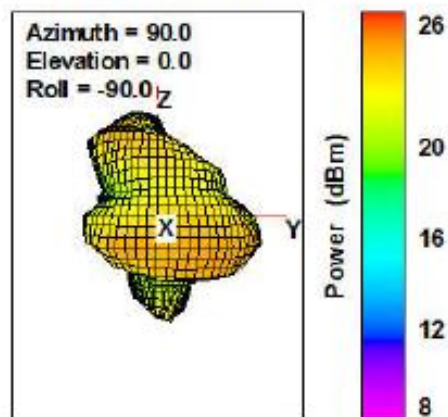
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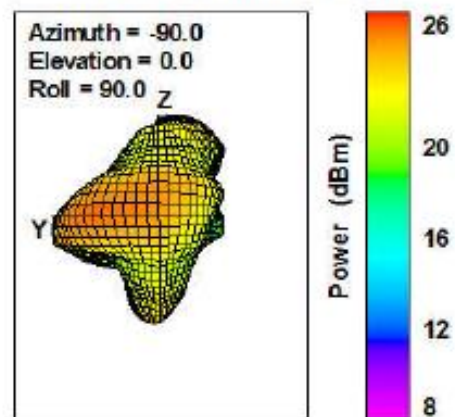
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Total EIRP, Front Face View

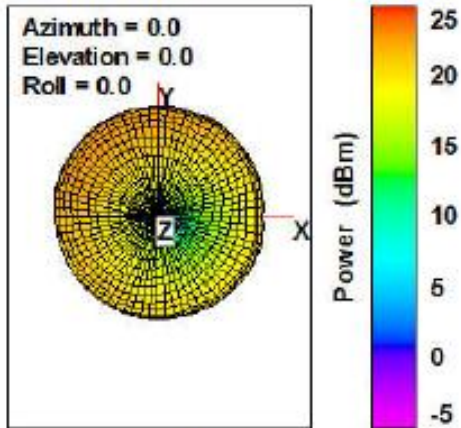


Total EIRP, Back Face View

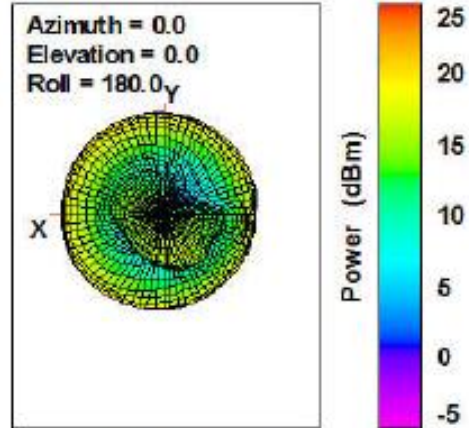


e. UMTS V @ 836.6MHz

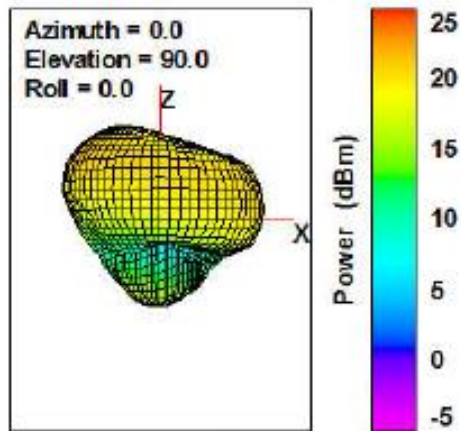
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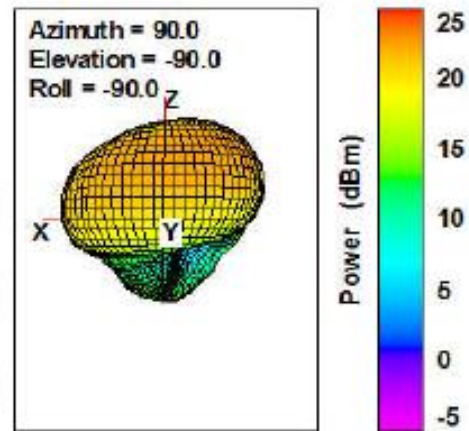
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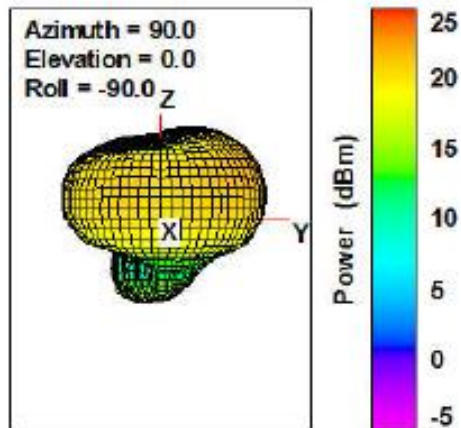
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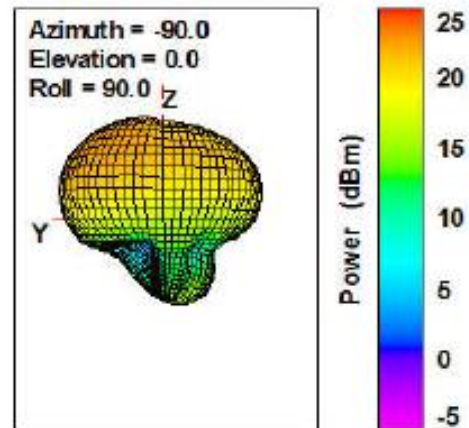
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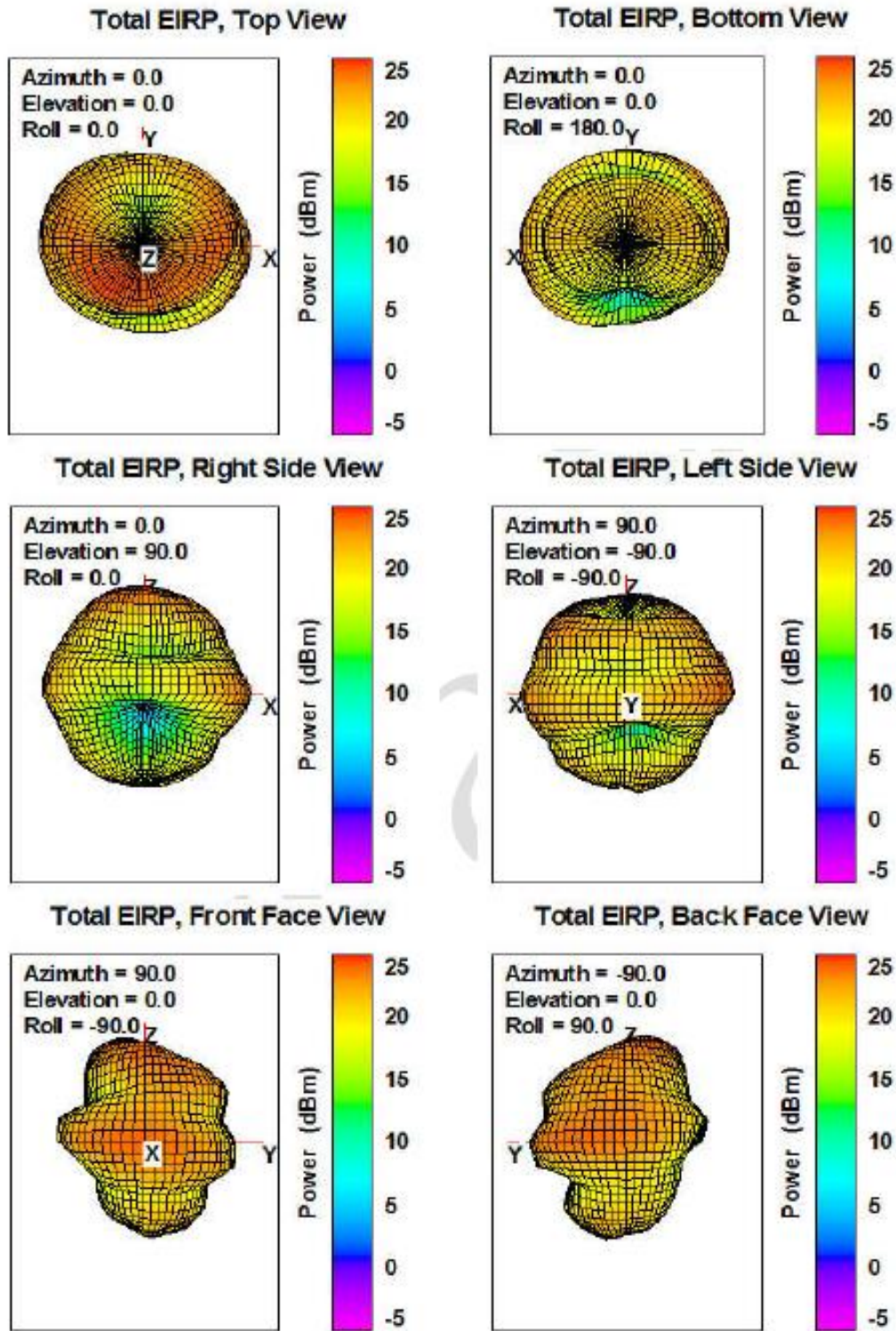
Total EIRP, Front Face View



Total EIRP, Back Face View



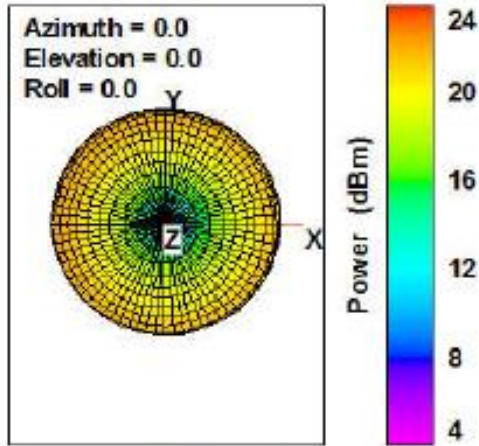
f. LTE B2/B25 @ 1880MHz



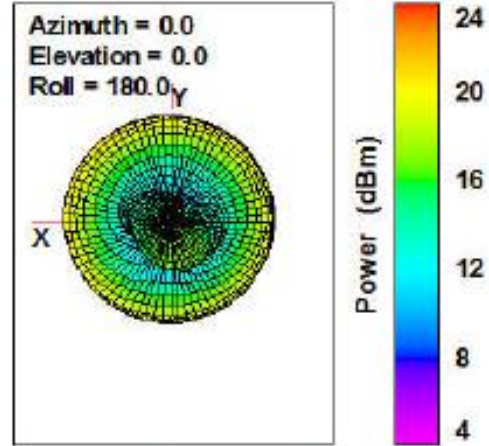
Plot 6. LTE Band 2 FS Total EIRP, 1880 MHz

g. LTE B5/B26 @ 836.5MHz

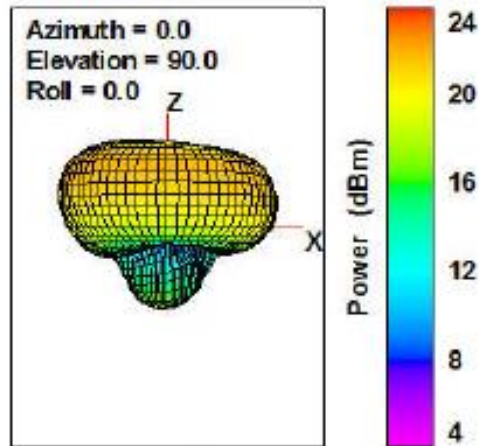
Total EIRP, Top View



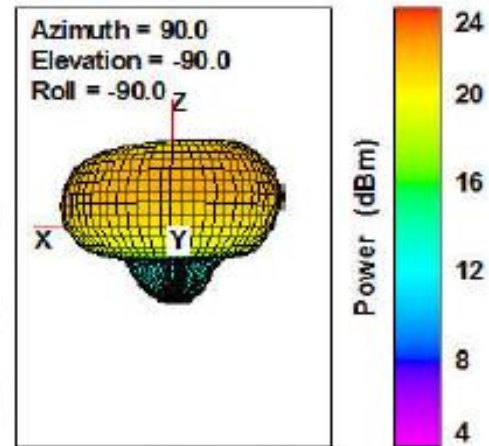
Total EIRP, Bottom View



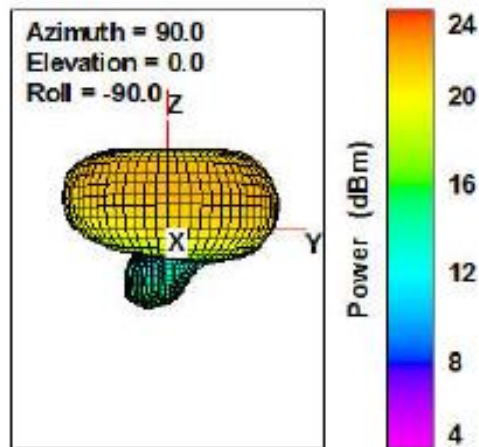
Total EIRP, Right Side View



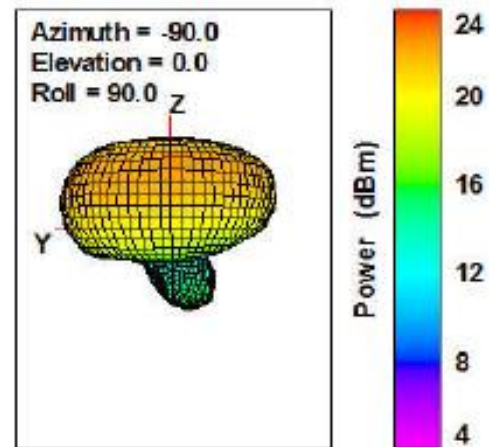
Total EIRP, Left Side View



Total EIRP, Front Face View

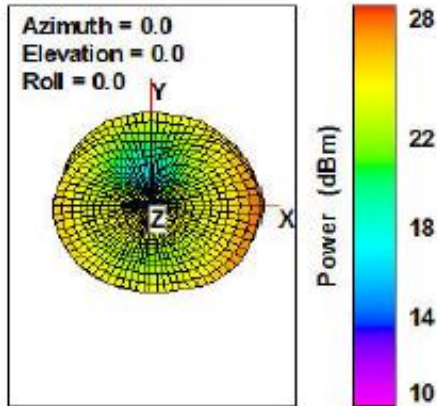


Total EIRP, Back Face View

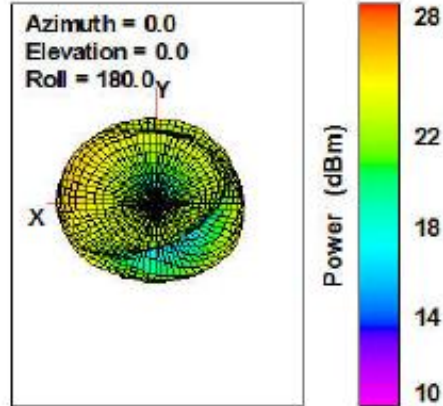


h. LTE B7 @ 2535MHz

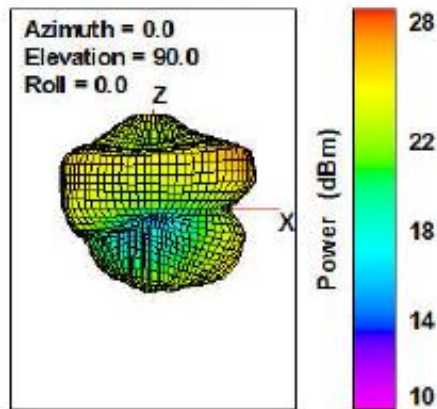
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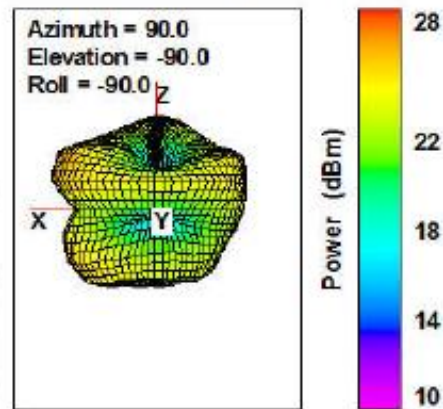
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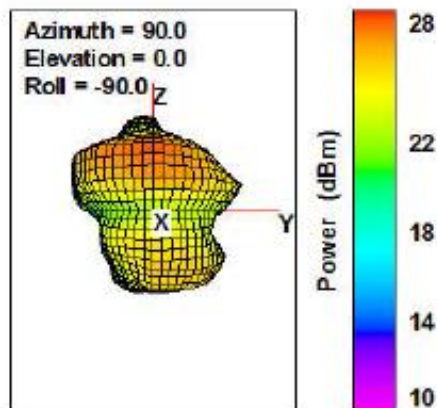
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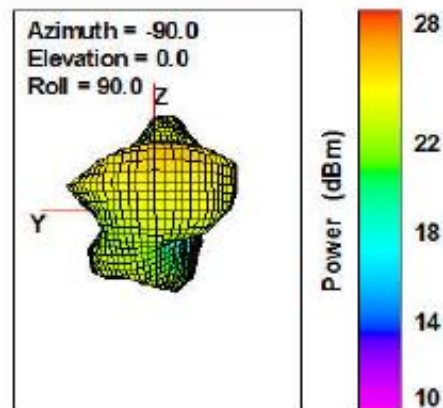
Total EIRP, Left Side View



Total EIRP, Front Face View



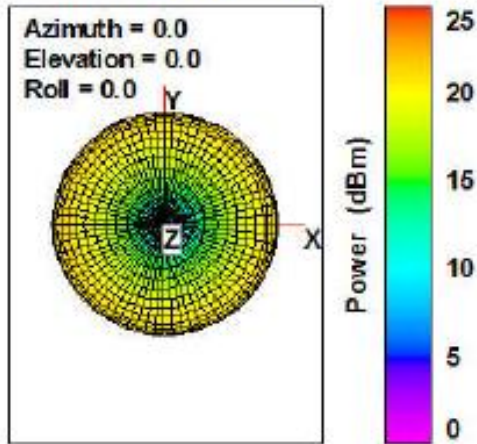
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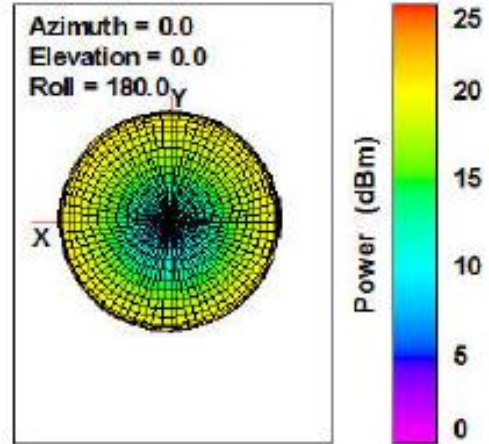


i. LTE B12/B17 @ 707.5MHz

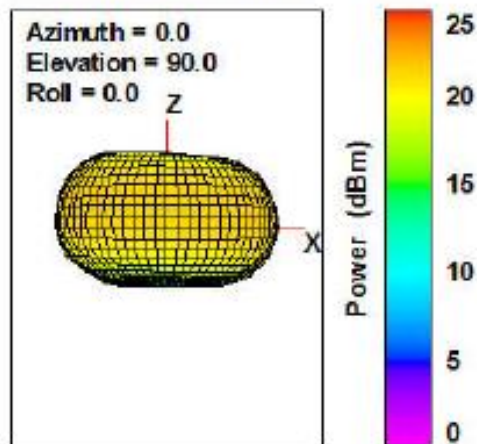
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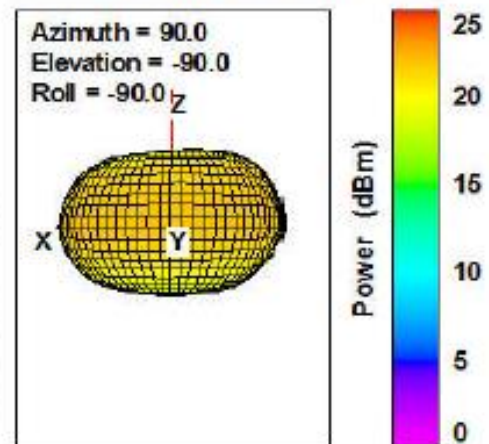
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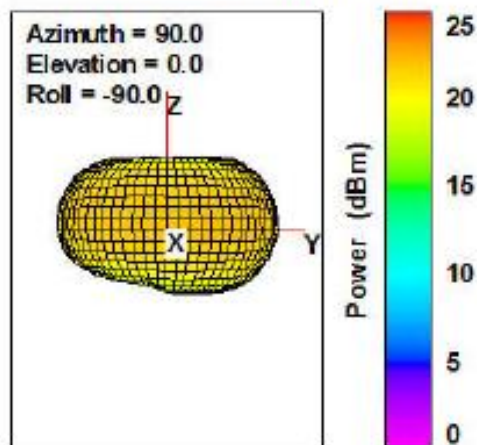
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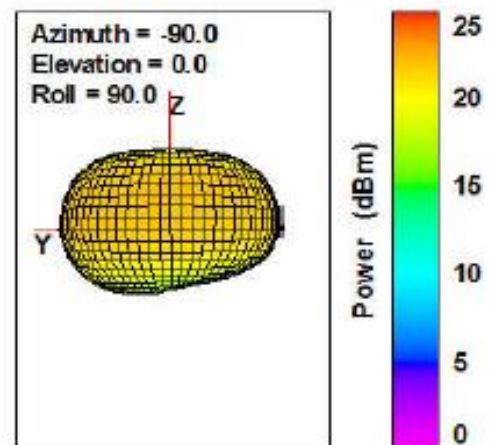
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**Total EIRP, Front Face View**

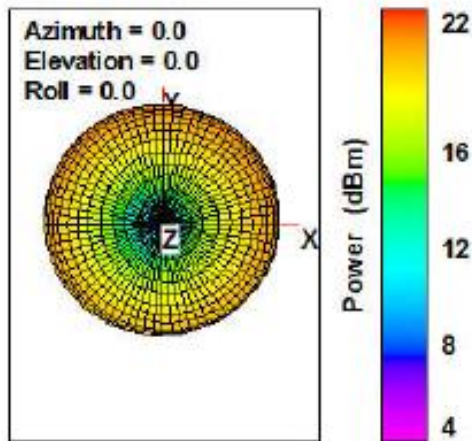


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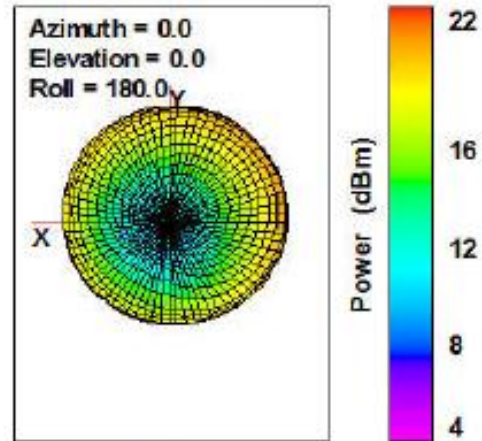


j. LTE B13 @ 782MHz

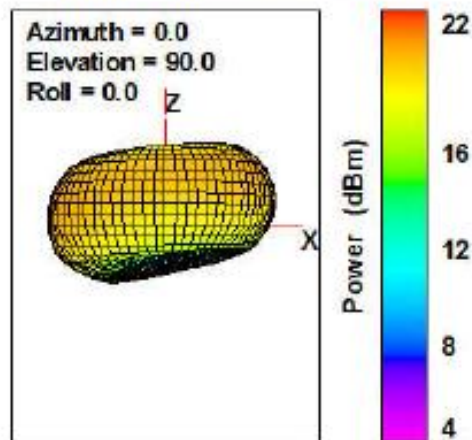
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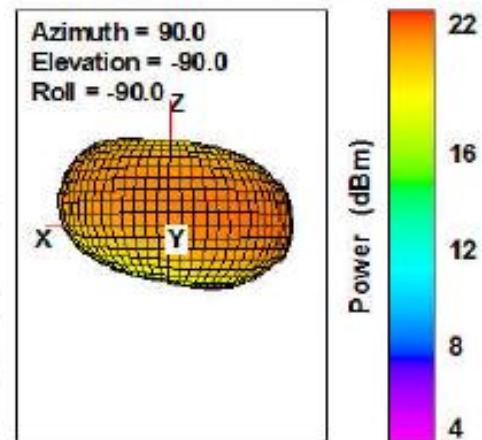
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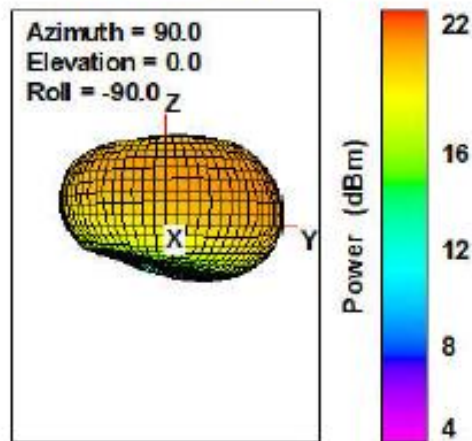
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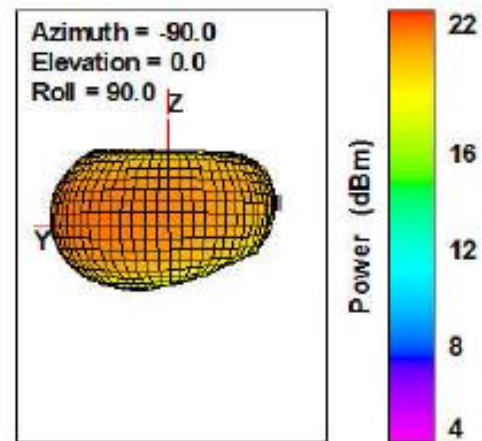
Total EIRP, Left Side View



Total EIRP, Front Face View

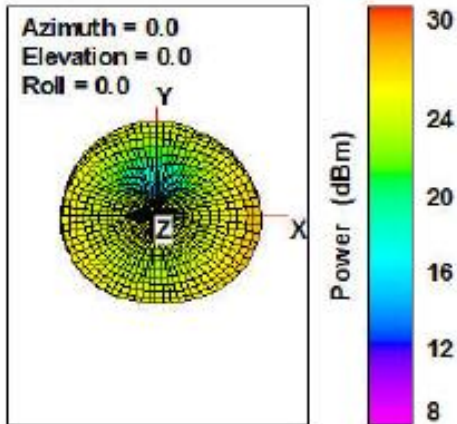


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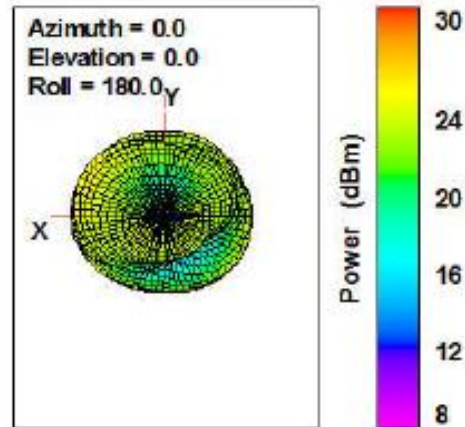


k. LTE B41 @ 2593MHz

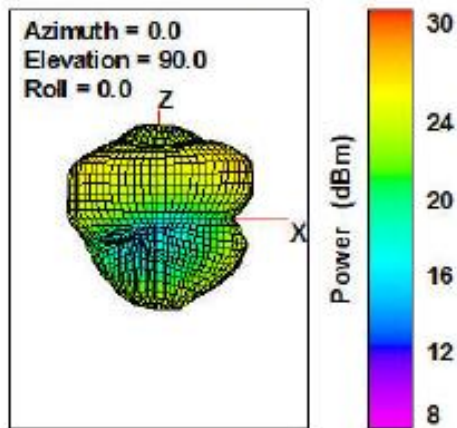
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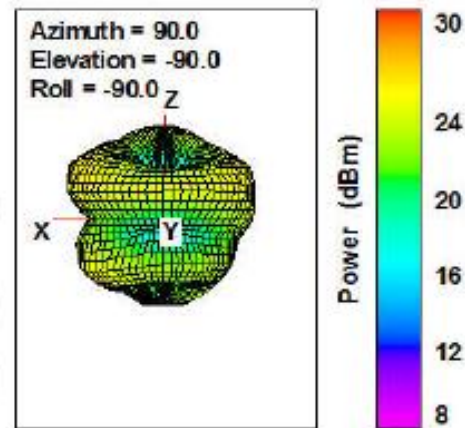
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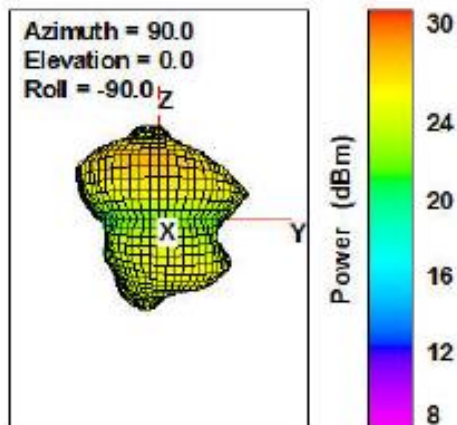
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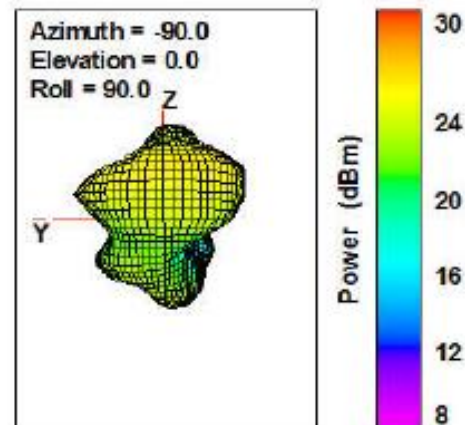
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Total EIRP, Front Face View

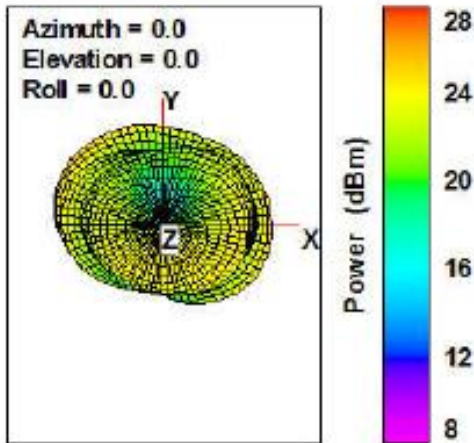


Total EIRP, Back Face View

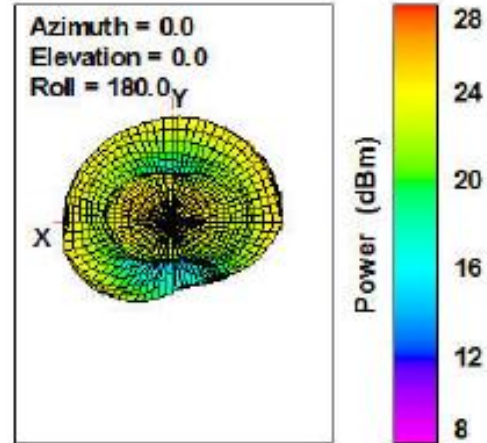


I. LTE B66/B4 @ 1745MHz

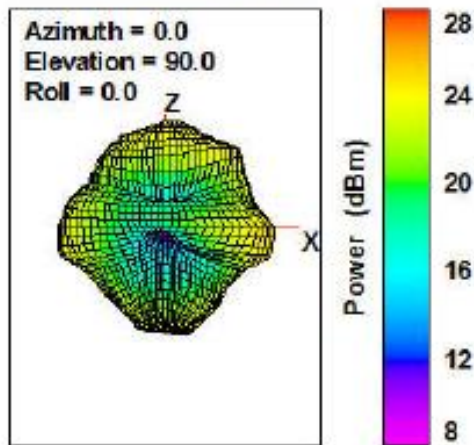
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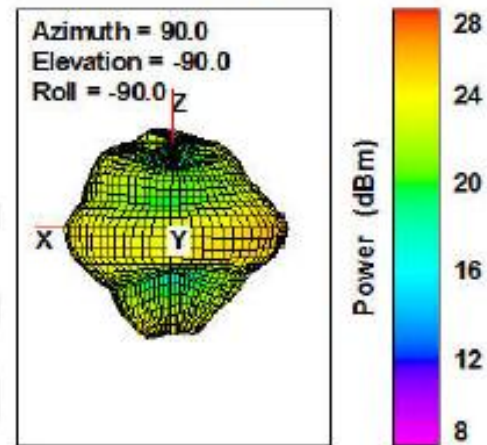
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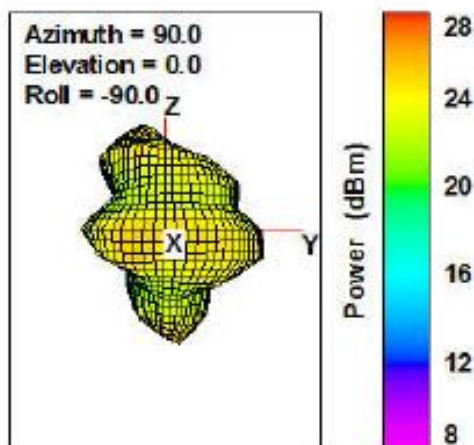
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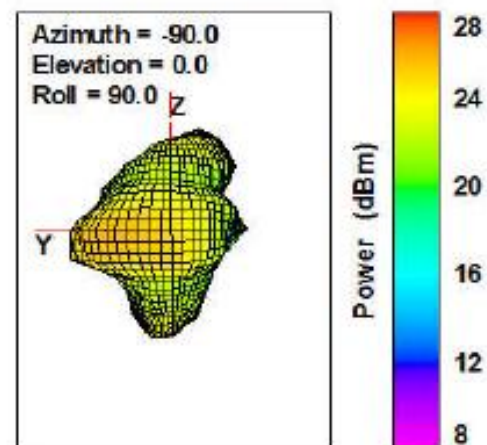
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Total EIRP, Front Face View

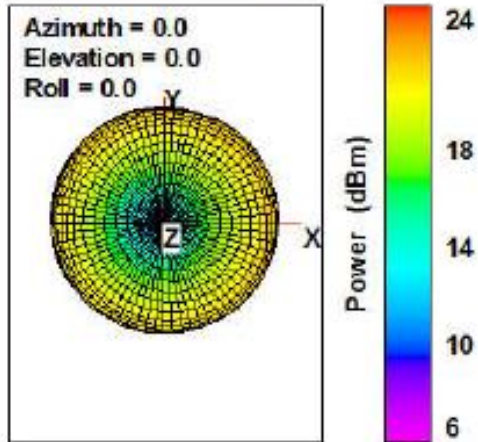


Total EIRP, Back Face View

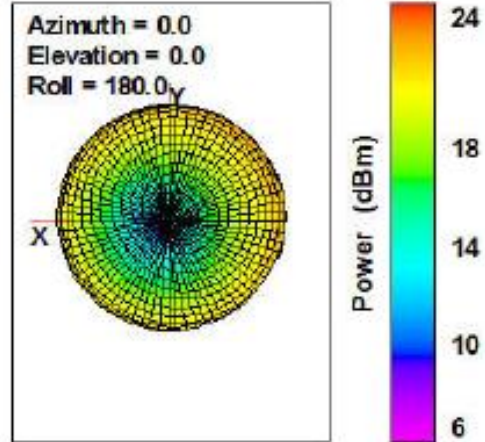


m. LTE B71 @ 680.5MHz

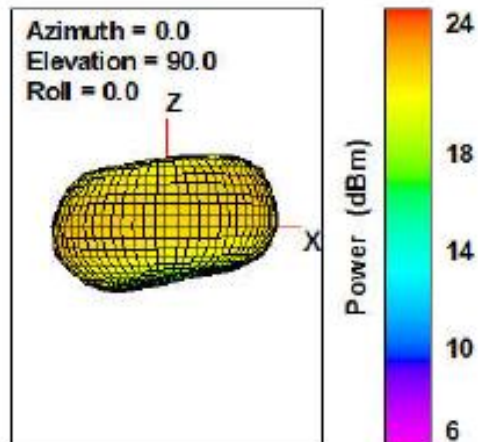
Total EIRP, Top View



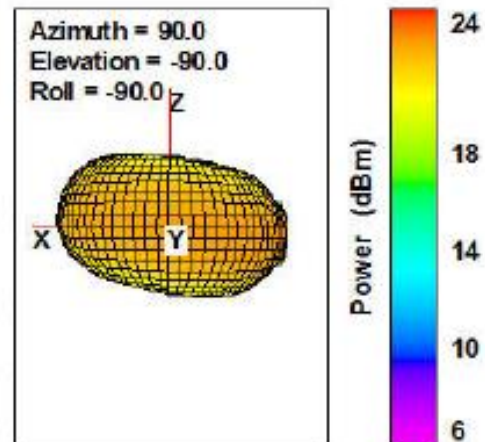
Total EIRP, Bottom View



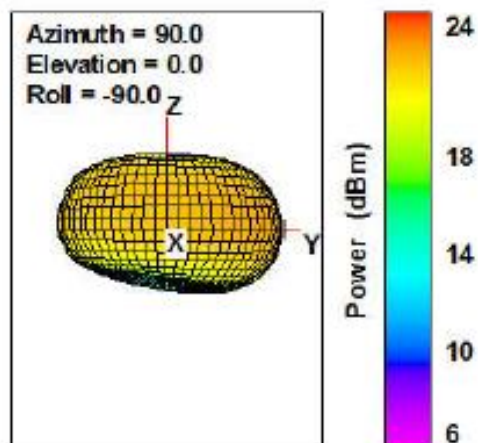
Total EIRP, Right Side View



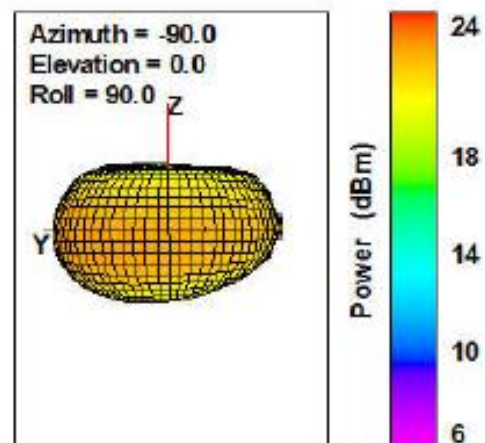
Total EIRP, Left Side View



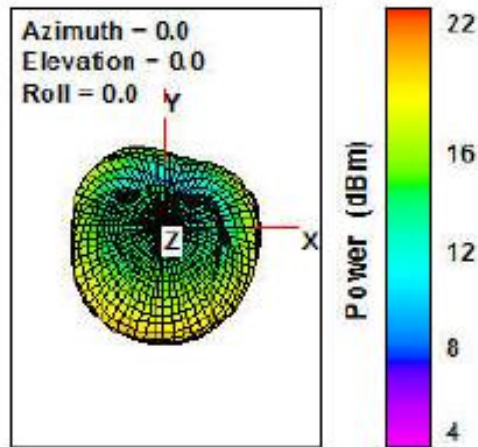
Total EIRP, Front Face View



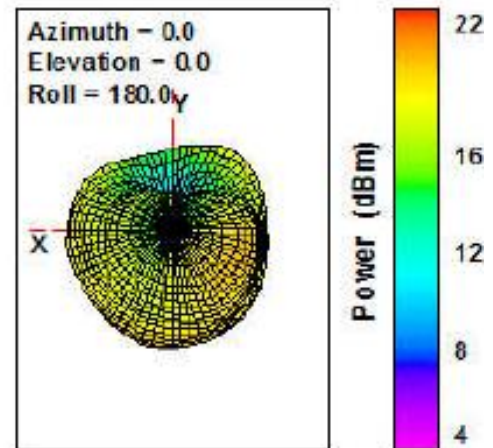
Total EIRP, Back Face View



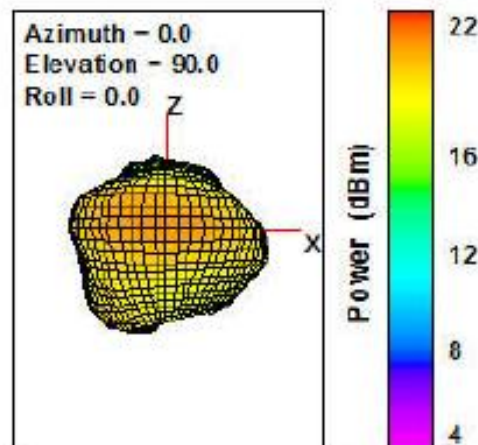
Total EIRP, Top View



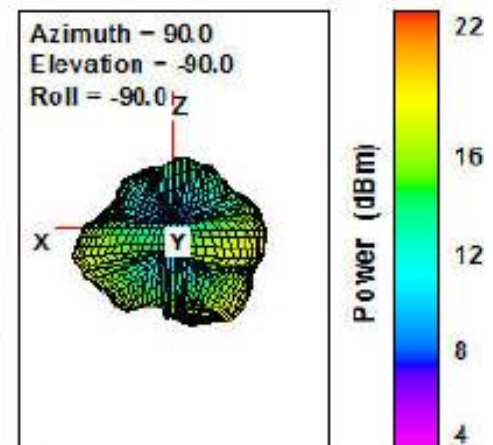
Total EIRP, Bottom View



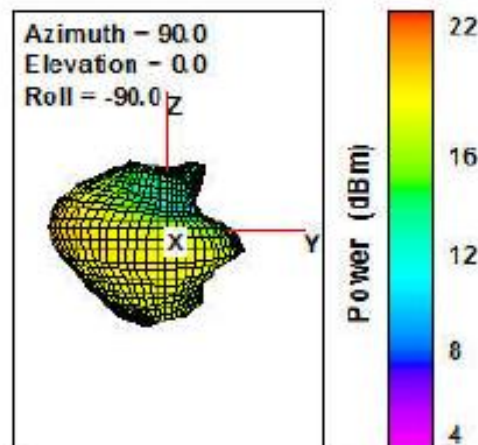
Total EIRP, Right Side View



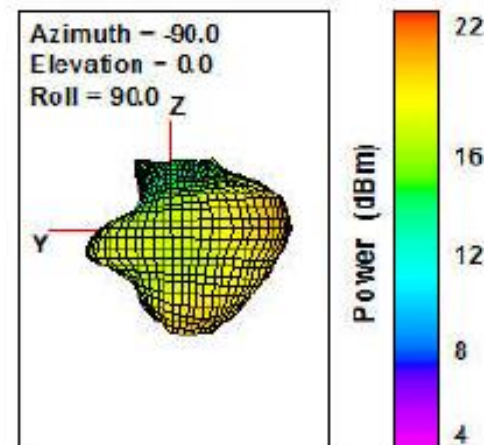
Total EIRP, Left Side View



Total EIRP, Front Face View



Total EIRP, Back Face View



7. Test Setup, equipment and procedure

a. Test Lab : Suzhou SPEED wireless test Lab



b. Test Facilities

Equipment	Model	Manufacturer	Cal. Due date	Calibration interval	
Pattern Measure SW	EMQUEST EMT-100	ETS-Lindgren	NA	NA	
Network Analyzer	E5071C	Keysight	NA	500MHZ-6GMHZ	
LTE Base station simulator	MT8820C	Anritsu	NA	NA	
Spectrum Analyzer	N9010A	Keysight	NA	NA	
Antenna positioner controller	3499	Keysight	NA	NA	
Anechoic chamber	AMS8500	ETS-Lindgren	NA	NA	

- c. Test procedure
  - i. Equipment calibration
  - ii. Air-loss calibration
  - iii. Horn Antenna calibration
  - iv. Device Mount
  - v. Start test.



8. Test Laboratory

a. Testing location

i. Location : SPEED Suzhou

ii. Address : No.2, Zhonke Intelligent, 99 Weixin Road, Suzhou Industrial Park

iii. Telephone : 0512-2836158

b. Testing Environment

i. Normal temperature : 21°C

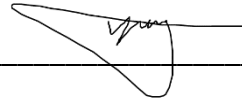
ii. Relative Humidity : 20-70%

c. Signature

Tested by : 全振



Reviewed by : JH Yoon



September 22, 2022