

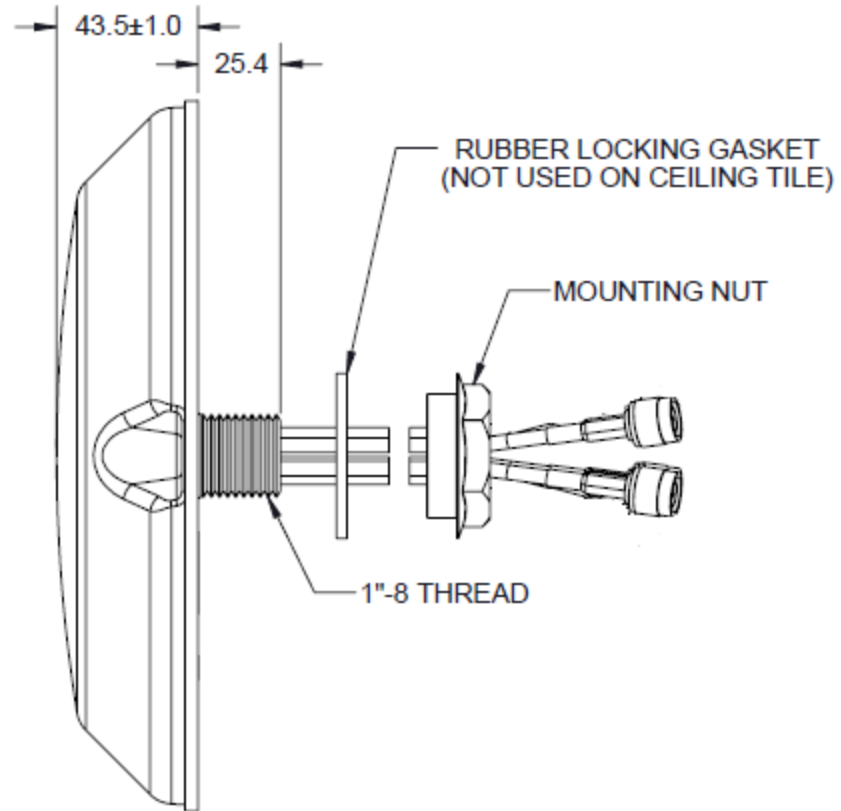
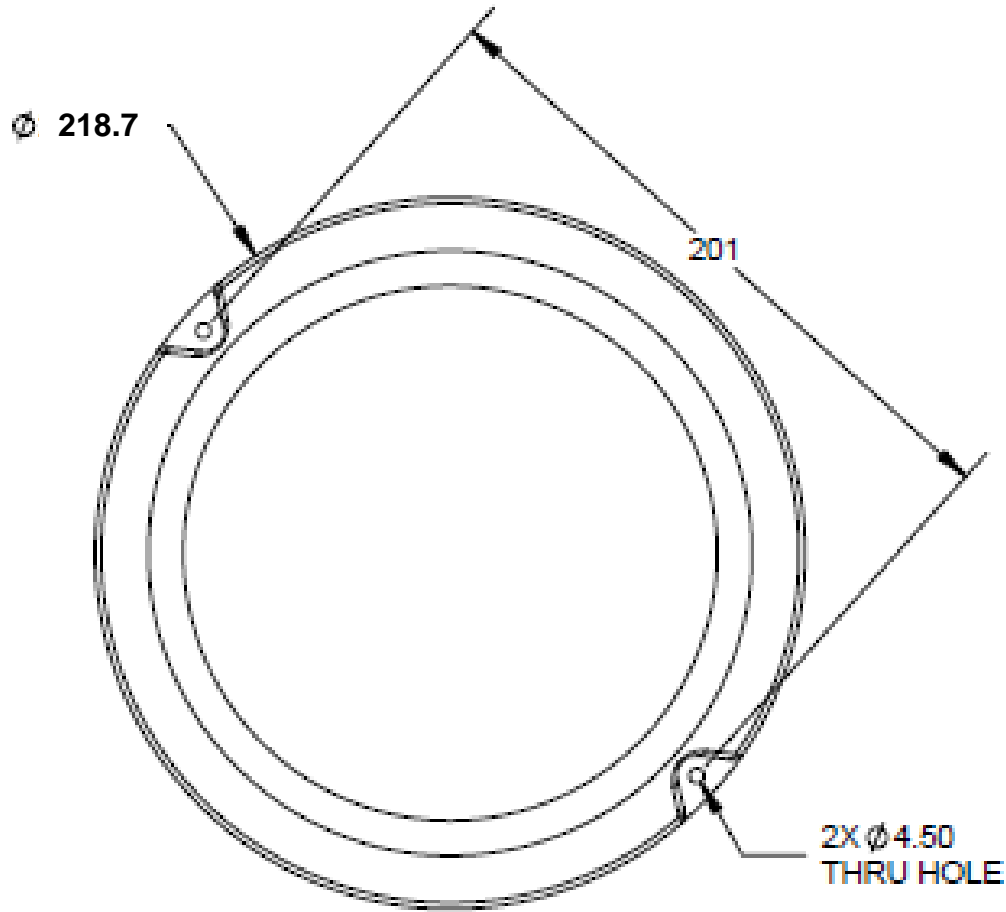


## **L-MIMO Antenna**

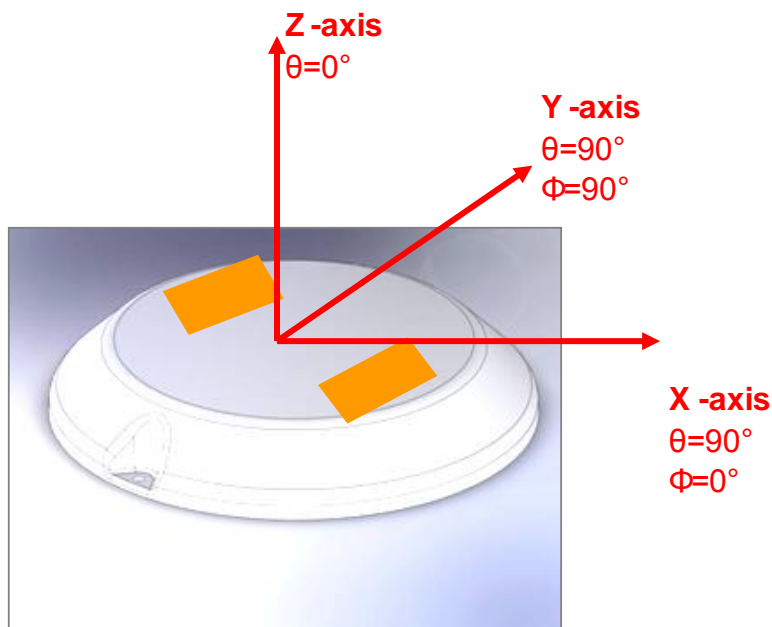
**(698/850/900/1800/1900/UMTS/  
2300/2400/2500)**

2011-10-04

# Antenna Dimension



# Test manner



- The antenna is measured in Satimo 3D Chamber in the coordinating system as show at photo besides.

X -axis  
 $\theta=90^\circ$   
 $\phi=0^\circ$

XY-Plane : Azimuth Plane

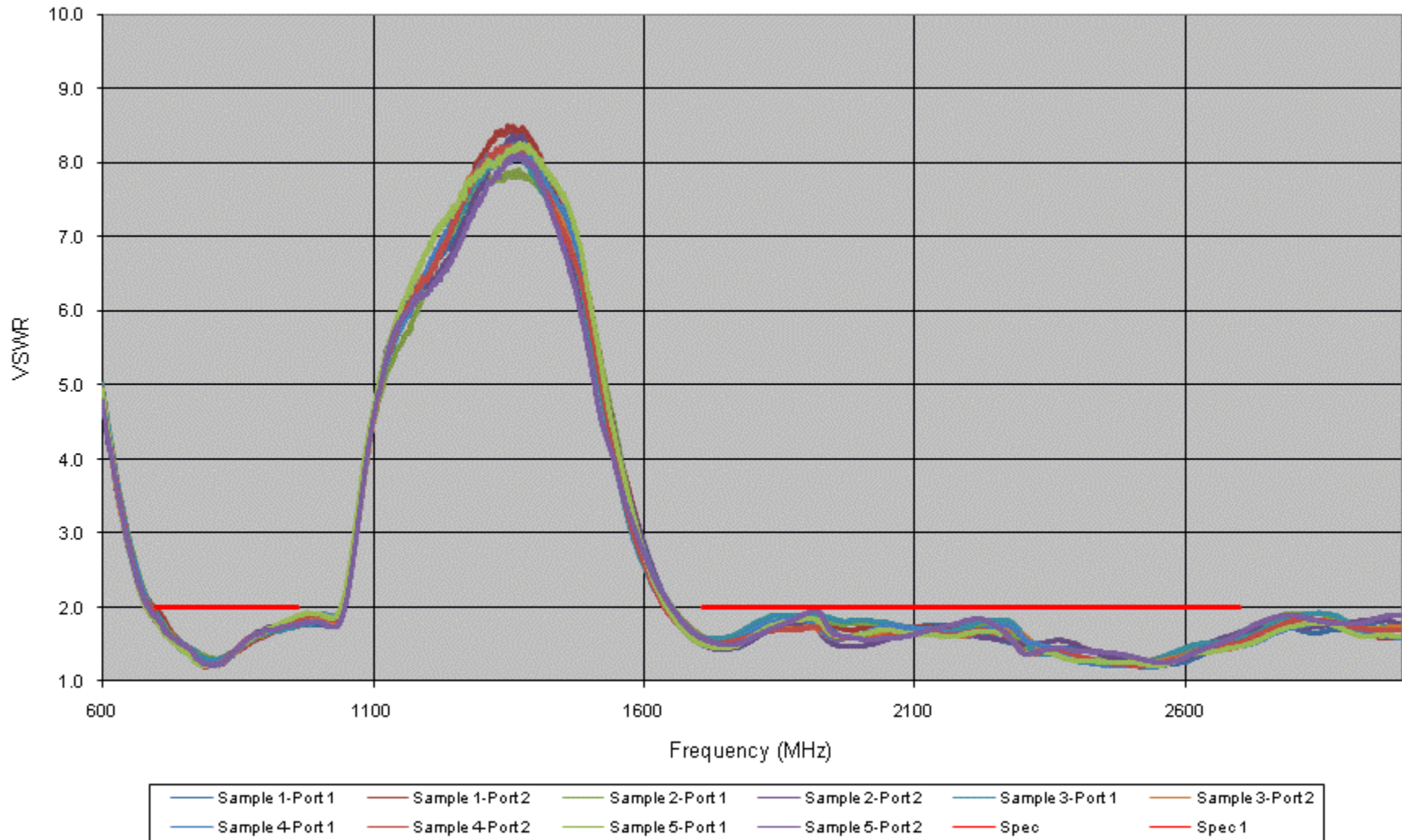
XZ-Plane : Elevation  $0^\circ$

YZ-Plane : Elevation  $90^\circ$

# CPK for 5 Samples (Finalize)

# VSWR

## L-MIMO 5 Samples CPK



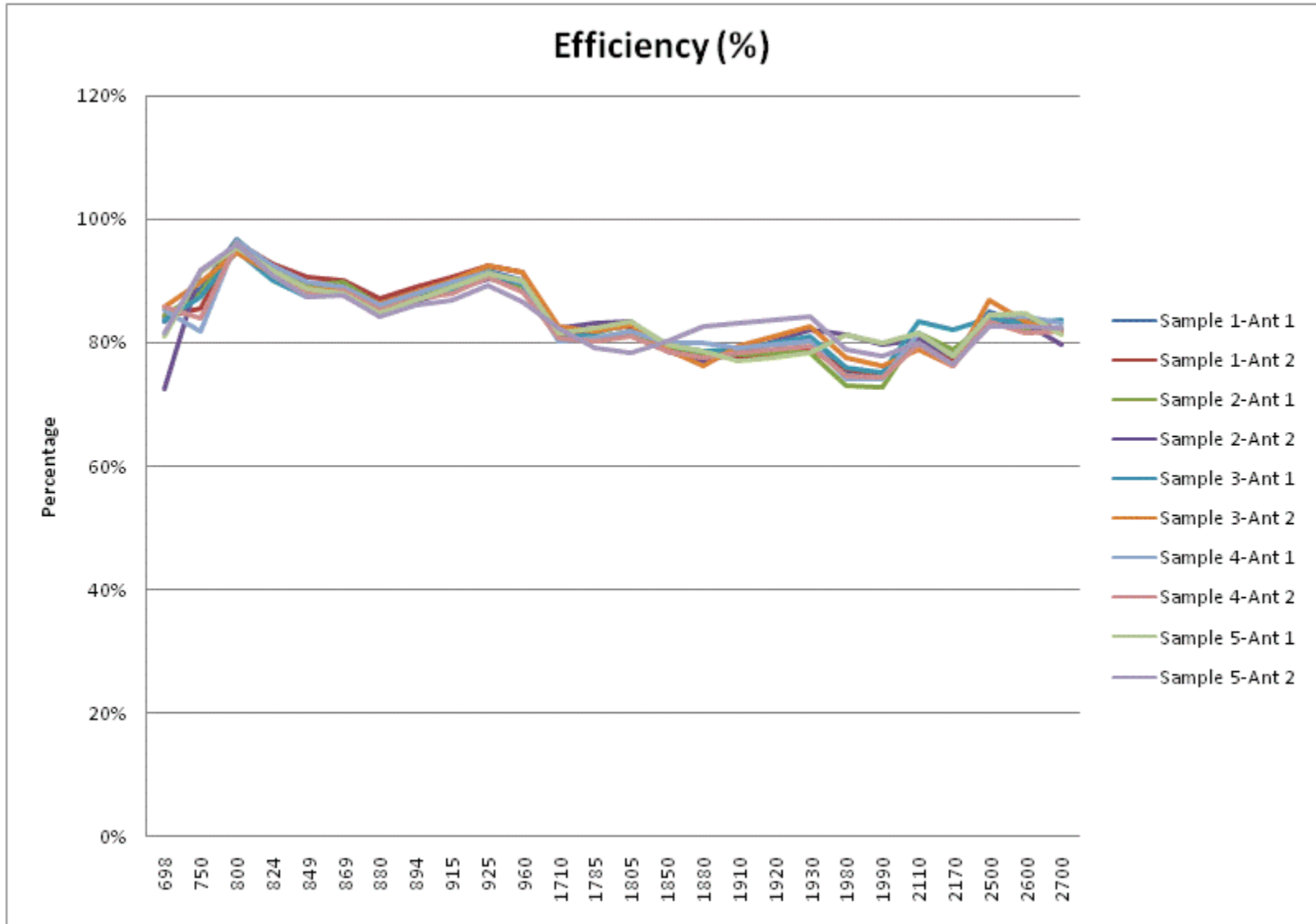
# CPK Data for 5 Samples

Antenna #	698 MHz	824 MHz	869 MHz	960 MHz	1710 MHz	1850 MHz	1910 MHz	1980 MHz	2110 MHz	2500 MHz	2700 MHz
Sample 1-Port 1	1.88	1.28	1.54	1.76	1.54	1.78	1.89	1.58	1.73	1.29	1.65
Sample 1-Port 2	1.98	1.28	1.50	1.74	1.59	1.75	1.81	1.69	1.74	1.21	1.51
Sample 2-Port 1	1.90	1.32	1.53	1.79	1.60	1.73	1.82	1.77	1.66	1.27	1.53
Sample 2-Port 2	1.82	1.25	1.56	1.79	1.49	1.74	1.75	1.46	1.68	1.25	1.64
Sample 3-Port 1	1.94	1.33	1.54	1.75	1.59	1.88	1.90	1.81	1.72	1.22	1.58
Sample 3-Port 2	1.88	1.27	1.53	1.81	1.55	1.69	1.73	1.61	1.62	1.25	1.47
Sample 4-Port 1	1.89	1.30	1.54	1.83	1.56	1.82	1.79	1.59	1.72	1.21	1.47
Sample 4-Port 2	1.89	1.29	1.57	1.81	1.57	1.69	1.73	1.58	1.64	1.22	1.52
Sample 5-Port 1	1.83	1.27	1.55	1.88	1.49	1.77	1.84	1.61	1.63	1.25	1.47
Sample 5-Port 1	1.87	1.28	1.56	1.76	1.57	1.74	1.95	1.60	1.65	1.34	1.64
Min	1.82	1.25	1.50	1.74	1.49	1.69	1.73	1.46	1.62	1.21	1.47
Max	1.98	1.33	1.57	1.88	1.60	1.88	1.95	1.81	1.74	1.34	1.65
Average	1.89	1.29	1.54	1.79	1.56	1.76	1.82	1.63	1.68	1.25	1.55
St.Dev.	0.05	0.02	0.02	0.04	0.04	0.06	0.08	0.10	0.04	0.04	0.08
Spec.	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
CPK Value	0.81	9.81	7.01	1.68	3.72	1.38	0.80	1.21	2.51	6.18	1.98

# Efficiency Data for 5 Samples

Sample 1		Sample 2		Sample 3		Sample 4		Sample 5		Max	Min	Average
Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2			
83%	84%	85%	72%	84%	86%	85%	86%	81%	82%	86%	72%	83%
89%	85%	88%	92%	87%	90%	82%	84%	91%	92%	92%	82%	88%
97%	96%	96%	95%	95%	95%	97%	96%	95%	96%	97%	95%	96%
92%	93%	92%	92%	90%	91%	93%	91%	92%	91%	93%	90%	92%
89%	90%	89%	88%	87%	89%	90%	88%	89%	87%	90%	87%	89%
90%	90%	90%	88%	88%	88%	89%	89%	88%	88%	90%	88%	89%
86%	87%	86%	85%	85%	86%	86%	85%	85%	84%	87%	84%	86%
88%	89%	88%	87%	87%	88%	88%	87%	87%	86%	89%	86%	87%
89%	91%	89%	88%	88%	90%	90%	88%	89%	87%	91%	87%	89%
92%	92%	92%	90%	91%	92%	92%	91%	91%	89%	92%	89%	91%
90%	91%	89%	90%	89%	91%	90%	88%	90%	87%	91%	87%	89%
81%	81%	81%	82%	80%	83%	80%	81%	81%	82%	83%	80%	81%
80%	82%	81%	83%	82%	82%	81%	80%	82%	79%	83%	79%	81%
82%	83%	82%	83%	83%	83%	82%	81%	83%	78%	83%	78%	82%
80%	79%	79%	79%	80%	79%	80%	79%	80%	80%	80%	79%	79%
78%	78%	78%	77%	79%	76%	80%	78%	78%	83%	83%	76%	79%
79%	78%	78%	78%	79%	79%	79%	78%	77%	83%	83%	77%	79%
80%	78%	78%	80%	80%	81%	80%	79%	78%	84%	84%	78%	80%
80%	79%	78%	82%	81%	83%	80%	79%	78%	84%	84%	78%	80%
75%	76%	73%	81%	76%	78%	74%	75%	81%	79%	81%	73%	77%
75%	75%	73%	80%	75%	76%	74%	74%	80%	78%	80%	73%	76%
81%	81%	81%	81%	83%	79%	81%	80%	81%	80%	83%	79%	81%
78%	77%	79%	78%	82%	76%	78%	76%	78%	76%	82%	76%	78%
85%	84%	83%	83%	84%	87%	84%	83%	84%	83%	87%	83%	84%
83%	84%	82%	83%	83%	83%	84%	82%	85%	83%	85%	82%	83%
82%	82%	82%	79%	83%	82%	83%	82%	81%	82%	83%	79%	82%

# Efficiency Comparison for 5 Samples



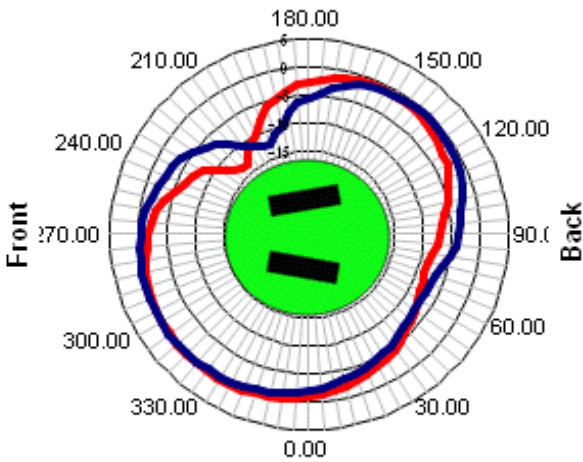


# Radiation Pattern Comparison with Golden Sample

# Radiation Pattern for (698MHz)

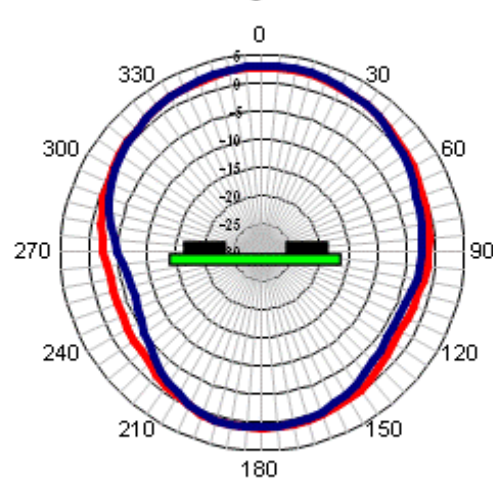
## Port 1

Azimuth Plane



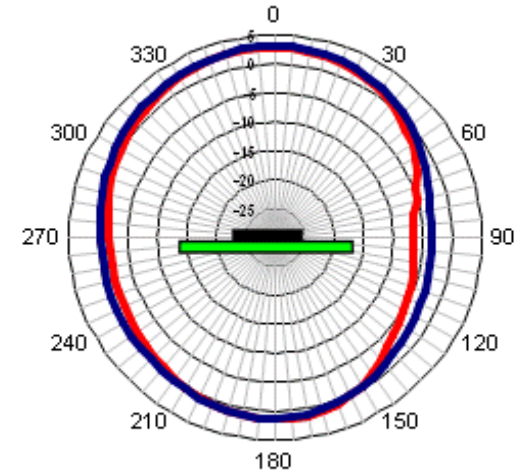
— Sample 1 — Golden Sample

Phi 0 Degree Plane



— Sample 1 — Golden Sample

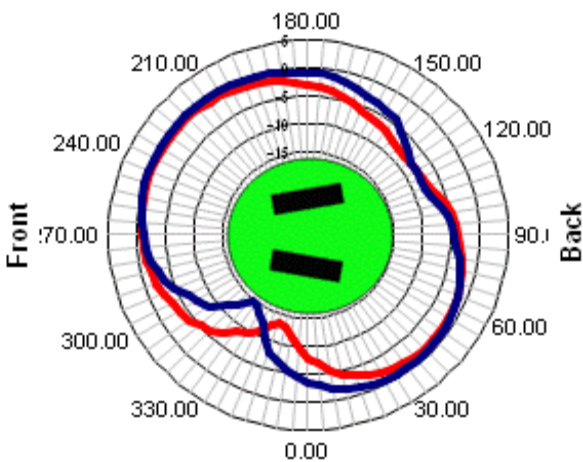
Phi 90 Degree Plane



— Sample 1 — Golden Sample

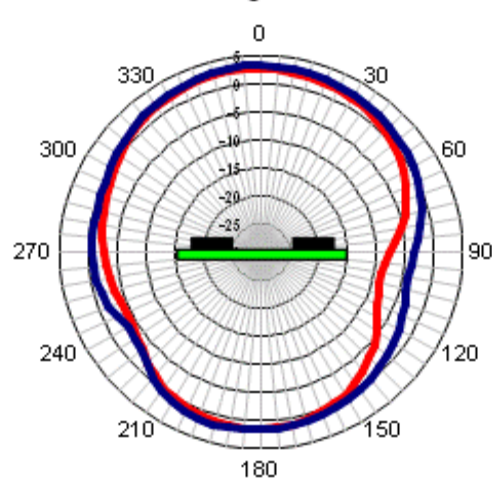
## Port 2

Azimuth Plane



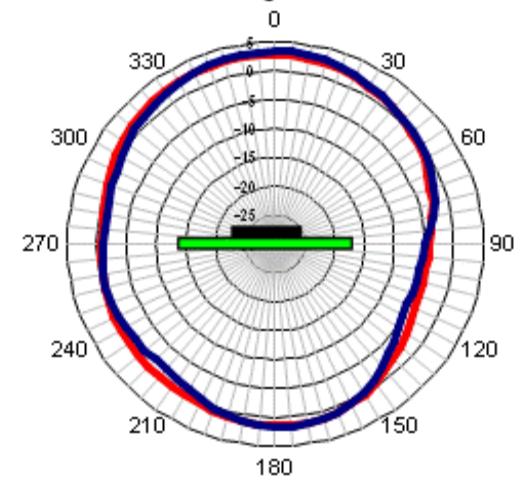
— Sample 1 — Golden Sample

Phi 0 Degree Plane



— Sample 1 — Golden Sample

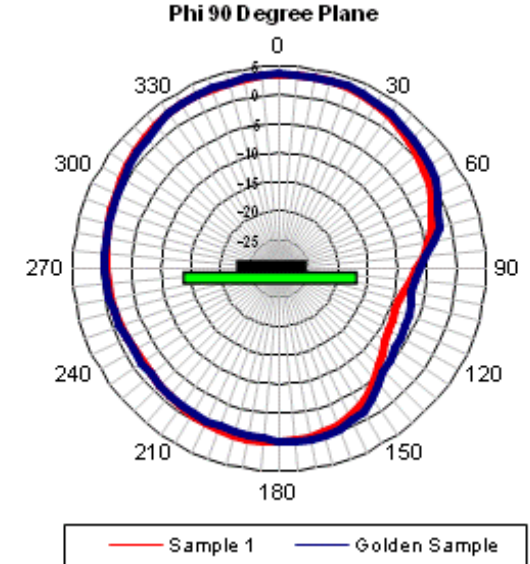
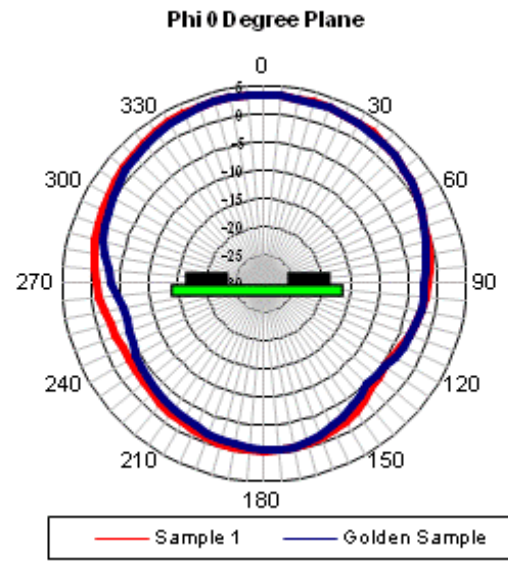
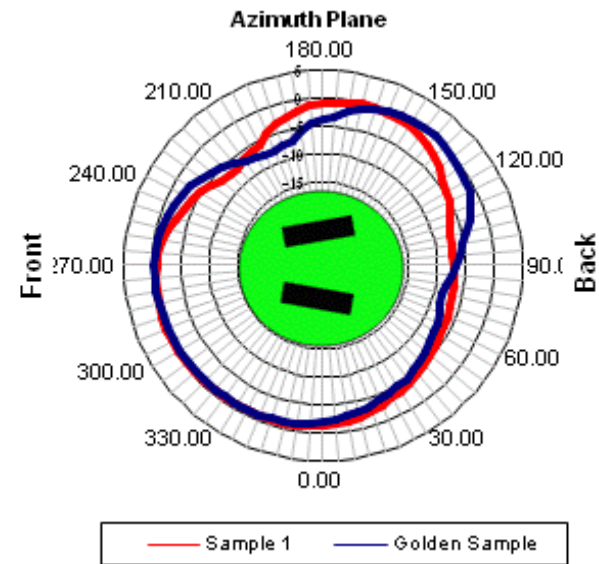
Phi 90 Degree Plane



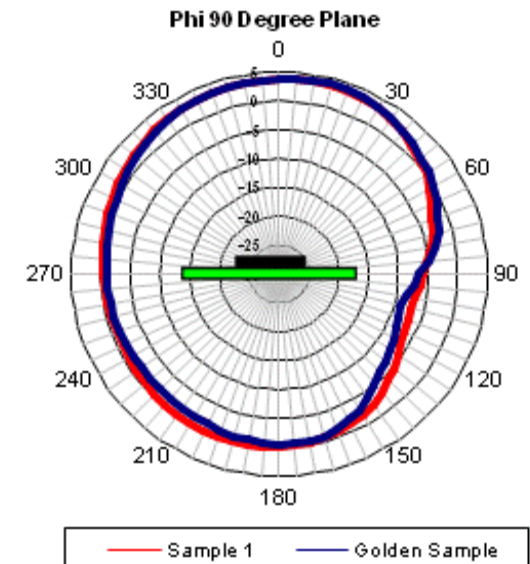
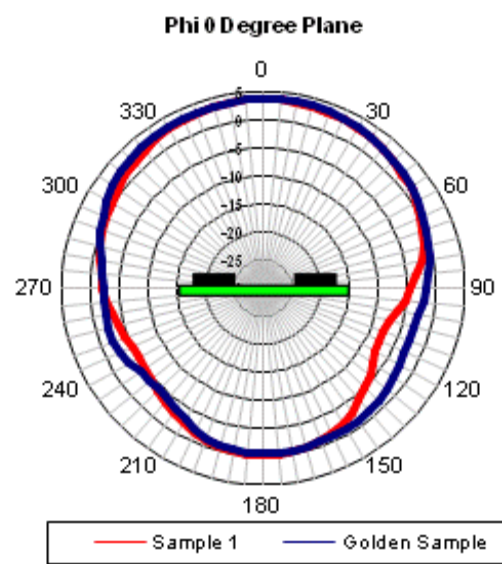
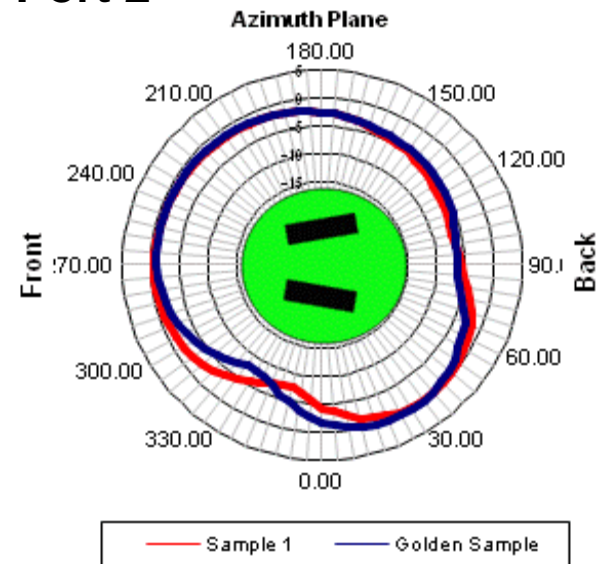
— Sample 1 — Golden Sample

## Radiation Pattern for (869MHz)

## Port 1

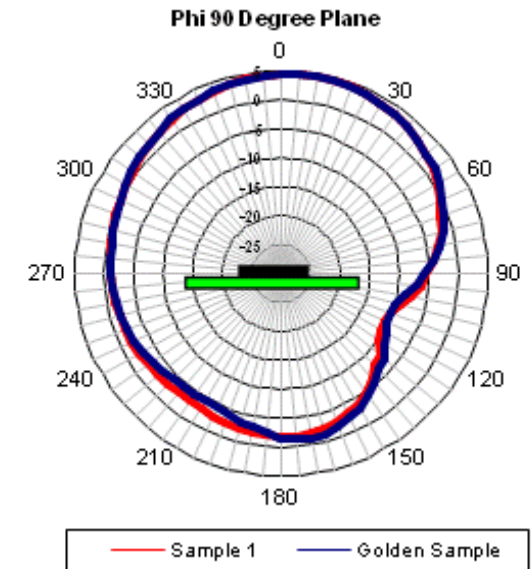
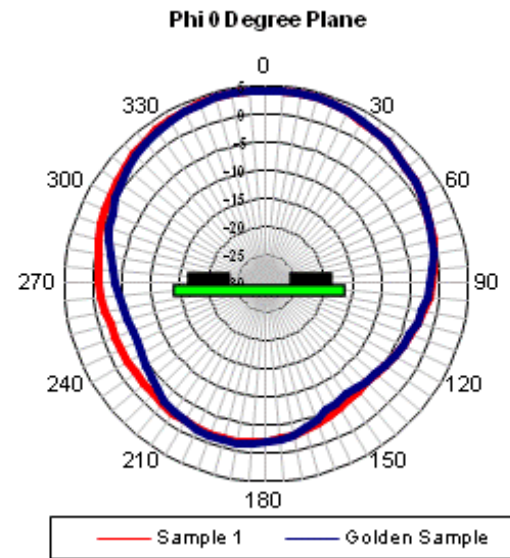
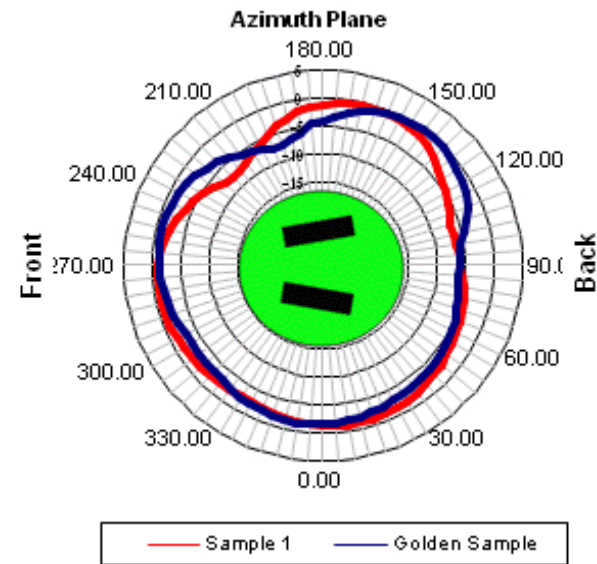


## Port 2

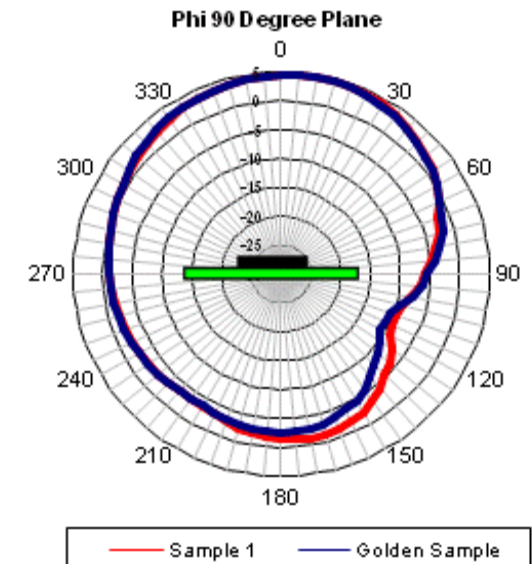
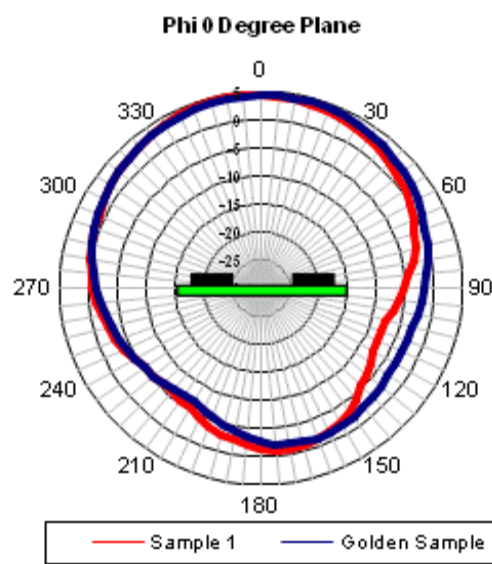
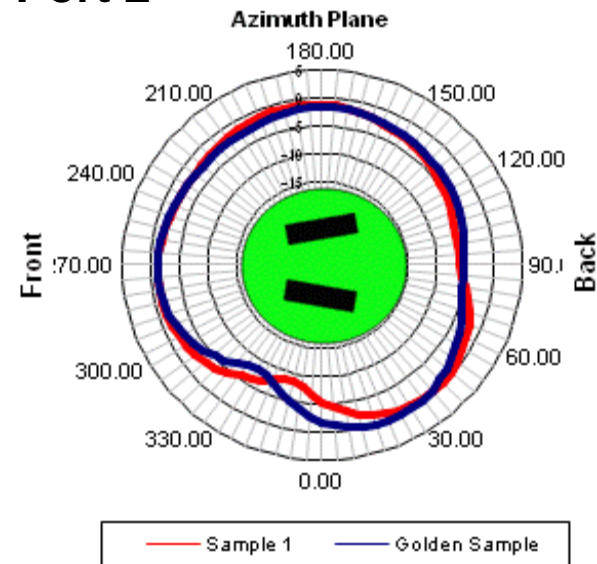


## Radiation Pattern for (960MHz)

## Port 1



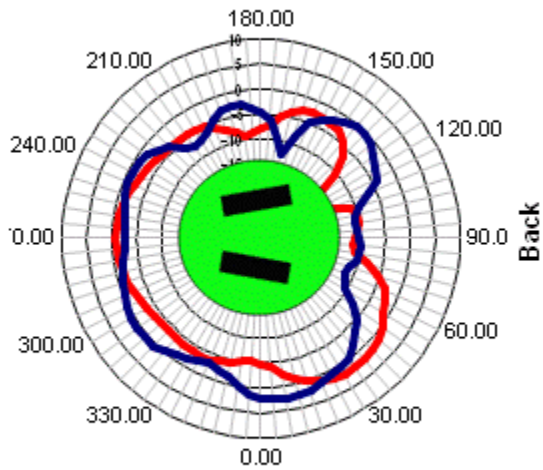
## Port 2



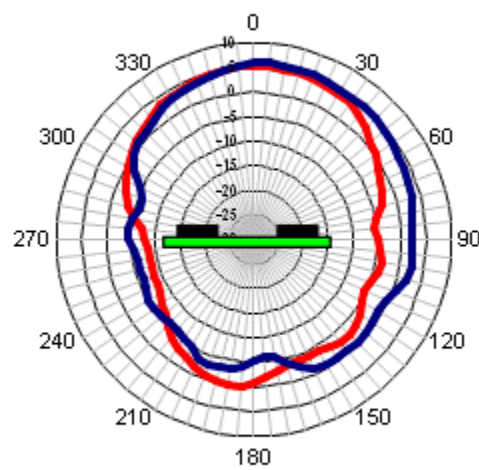
## Radiation Pattern for (1710MHz)

## Port 1

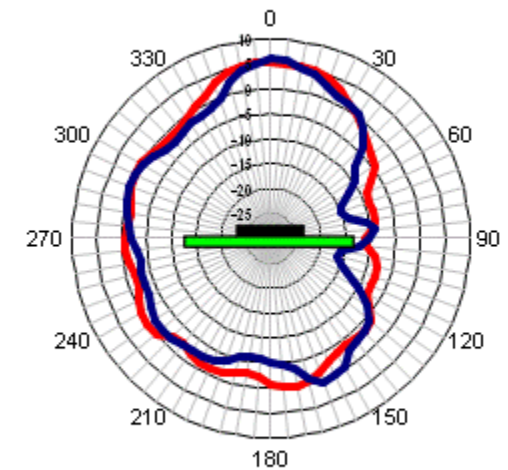
Azimuth Plane



Phi 0 Degree Plane



Phi 90 Degree Plane



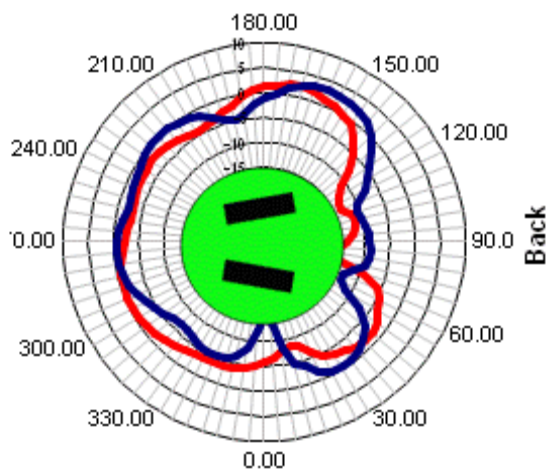
— Sample 1 — Golden Sample

— Sample 1 — Golden Sample

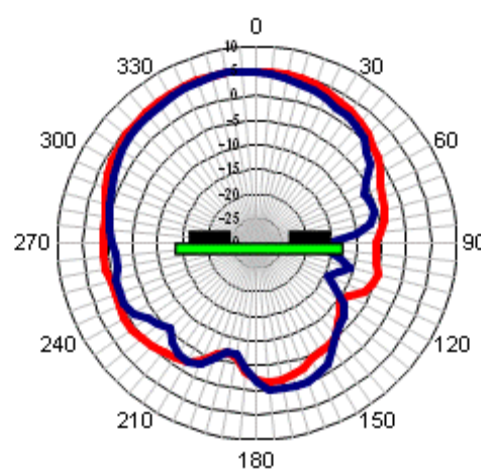
— Sample 1 — Golden Sample

## Port 2

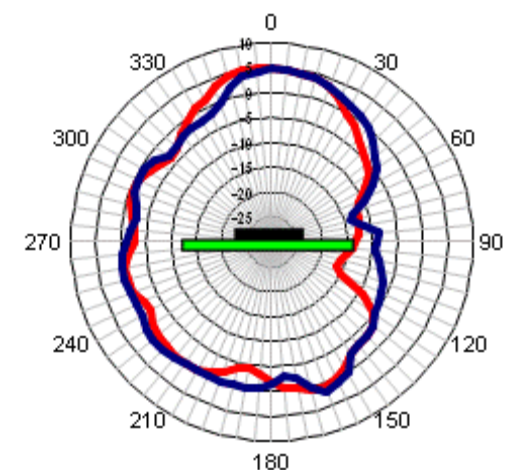
Azimuth Plane



Phi 0 Degree Plane



Phi 90 Degree Plane



— Sample 1 — Golden Sample

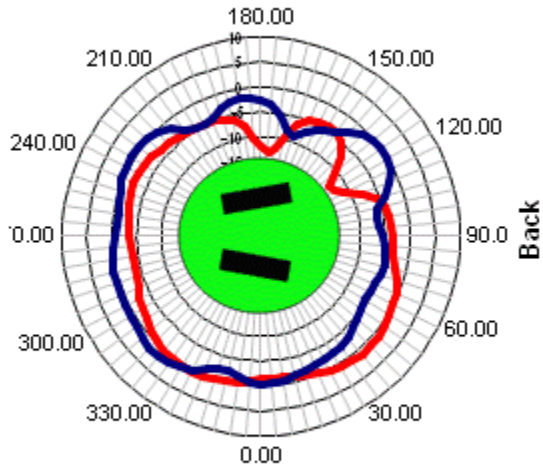
— Sample 1 — Golden Sample

— Sample 1 — Golden Sample

## Radiation Pattern for (1910MHz)

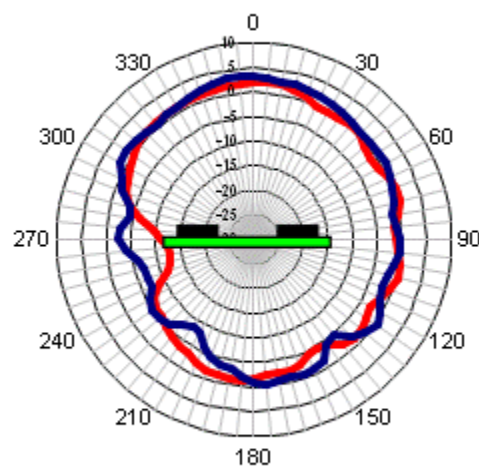
## Port 1

Azimuth Plane



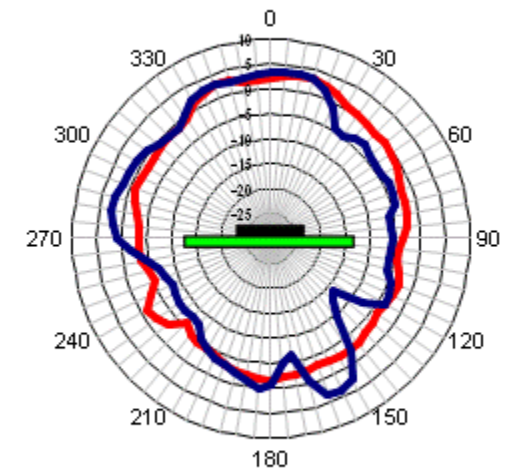
— Sample 1 — Golden Sample

Phi 0 Degree Plane



— Sample 1 — Golden Sample

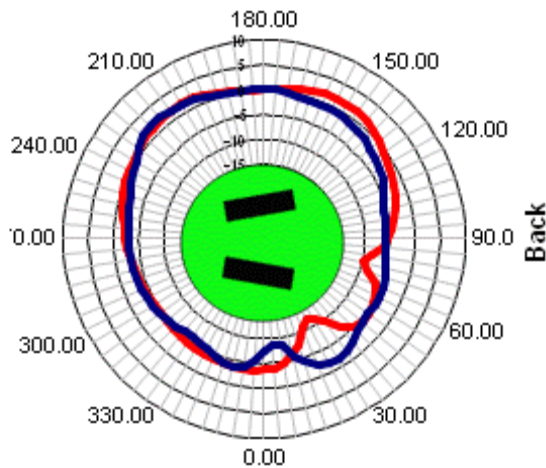
Phi 90 Degree Plane



— Sample 1 — Golden Sample

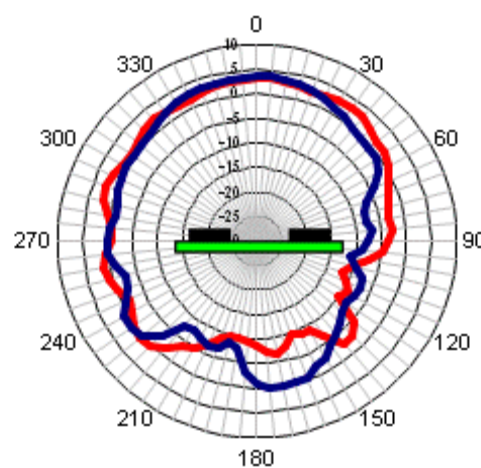
## Port 2

Azimuth Plane



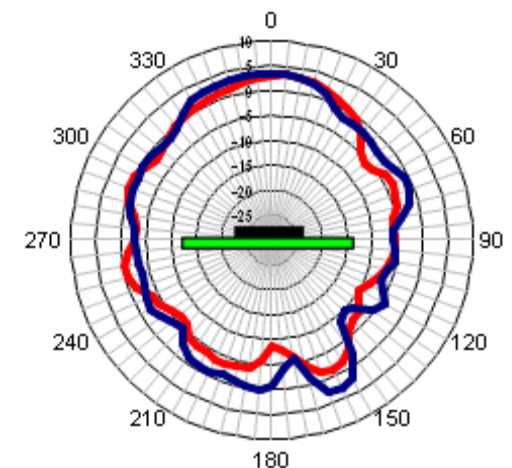
— Sample 1 — Golden Sample

Phi 0 Degree Plane



— Sample 1 — Golden Sample

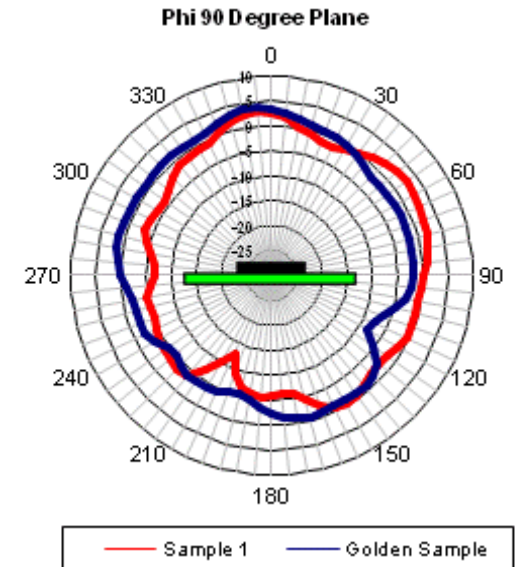
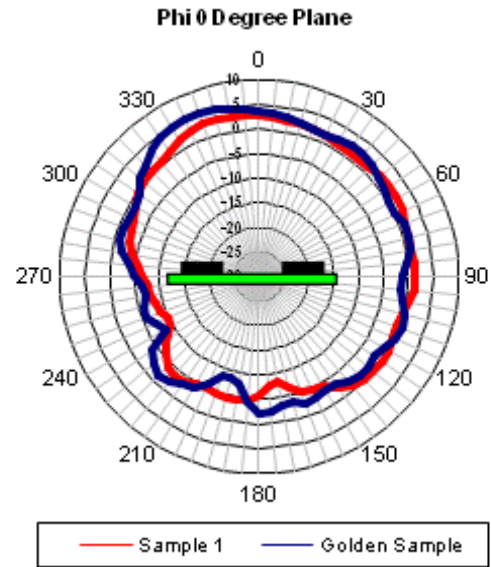
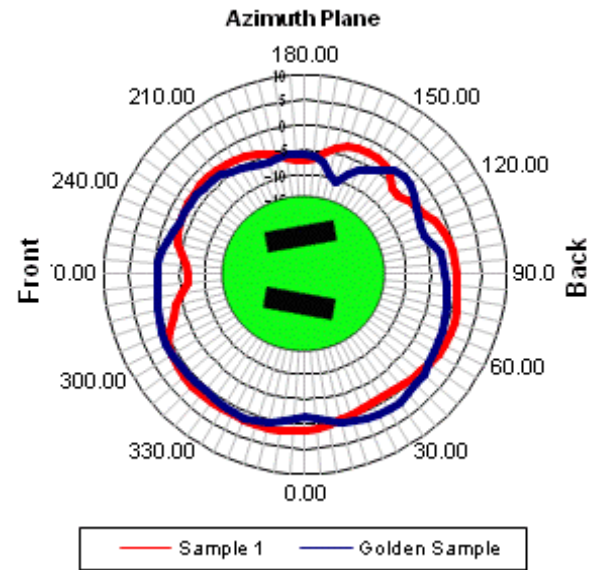
Phi 90 Degree Plane



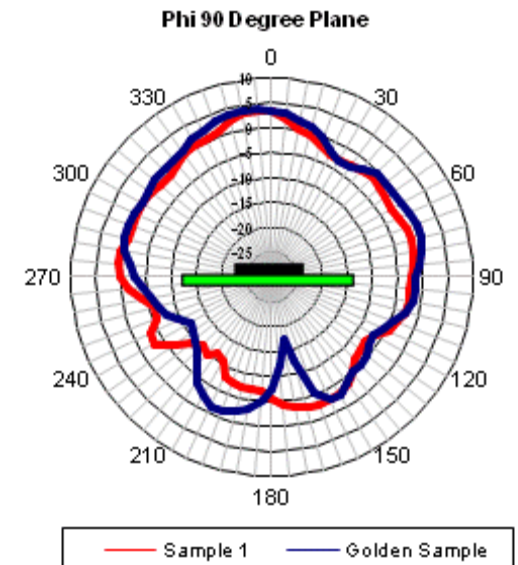
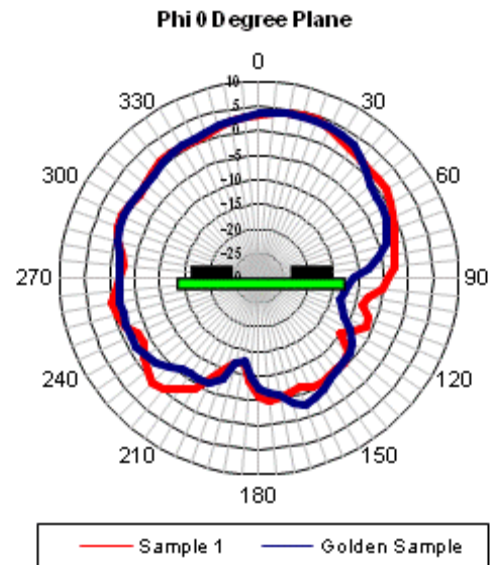
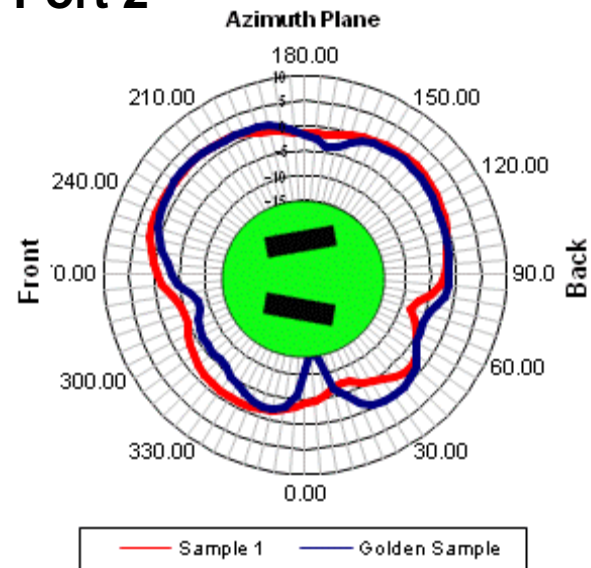
— Sample 1 — Golden Sample

## Radiation Pattern for (2110MHz)

## Port 1



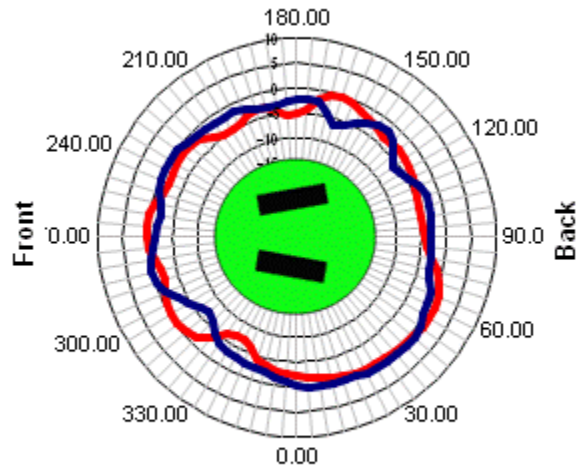
## Port 2



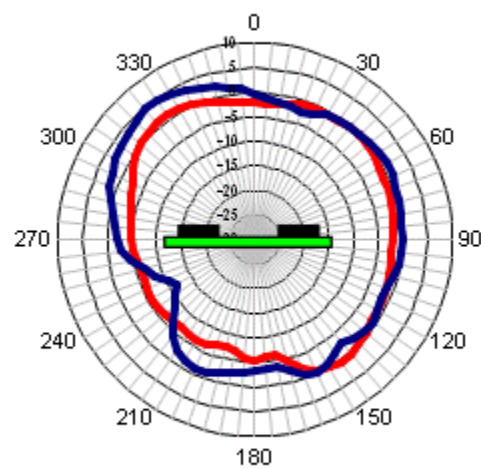
## Radiation Pattern for (2700MHz)

## Port 1

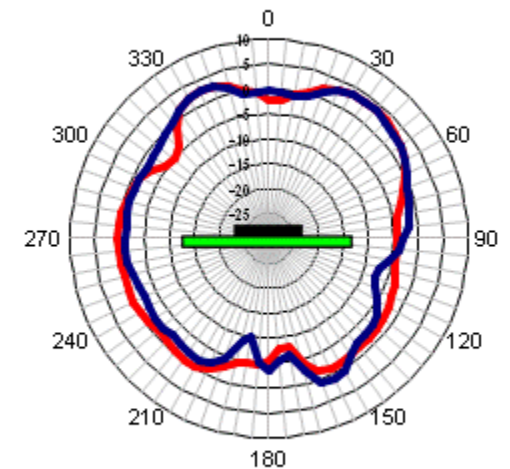
Azimuth Plane



Phi 0 Degree Plane



Phi 90 Degree Plane



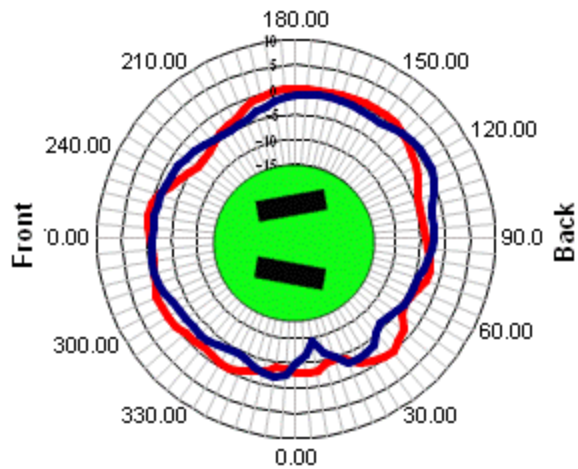
— Sample 1 — Golden Sample

— Sample 1 — Golden Sample

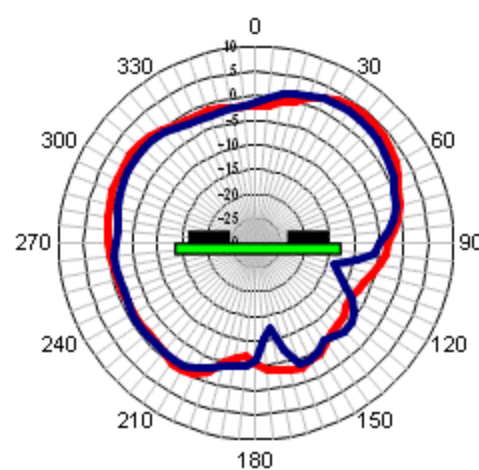
— Sample 1 — Golden Sample

## Port 2

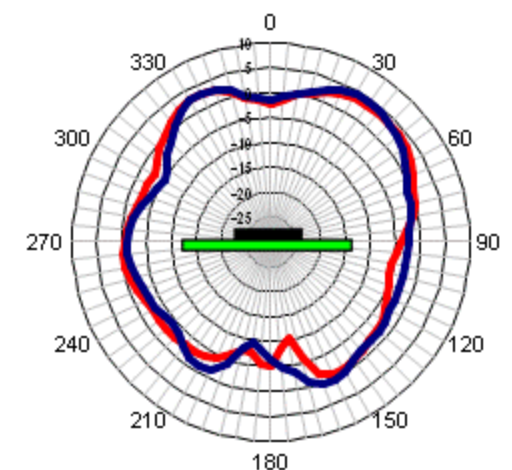
Azimuth Plane



Phi 0 Degree Plane



Phi 90 Degree Plane



— Sample 1 — Golden Sample

L

— Sample 1 — Golden Sample

— Sample 1 — Golden Sample



# Efficiency Comparison

Frequency (MHz)	Golden Sample		Sample	
	Port 1	Port 2	Port 1	Port 2
698	87%	89%	81%	82%
750	96%	98%	91%	92%
800	98%	98%	95%	96%
824	93%	95%	92%	91%
849	89%	91%	89%	87%
869	88%	90%	88%	88%
880	85%	88%	85%	84%
894	87%	90%	87%	86%
915	89%	91%	89%	87%
925	89%	91%	91%	89%
960	88%	89%	90%	87%
1710	86%	85%	81%	82%
1785	81%	79%	82%	79%
1805	81%	81%	83%	78%
1850	76%	79%	80%	80%
1880	78%	78%	78%	83%
1910	80%	79%	77%	83%
1920	80%	78%	78%	84%
1930	80%	78%	78%	84%
1980	78%	74%	81%	79%
1990	77%	74%	80%	78%
2110	86%	79%	81%	80%
2170	82%	78%	78%	76%
2500	82%	79%	84%	83%
2600	79%	81%	85%	83%
2700	78%	78%	81%	82%

