



HD3 Antenna Design



Amphenol 2012/08/03

Revision History

Revision	Destitution	Date	Drawing NO.
A	First dummy evaluation	2011/10/14	NA
B	WIFI module in battery side with cable connect to antenna evaluation	2011/10/21	NA
C	Front Cover is all metal	2011/10/24	NA
D	Different WIFI module position at front metal cover fixture	2011/10/25	NA
E	Front metal cover comparison	2011/10/26	NA
F	With/ without metal column of lens	2011/10/27	NA
G	Radiation pattern evaluation	2011/10/28	NA
H	11/2 3D drawing antenna evaluation	2011/11/03	NA
I	11/7 3D drawing antenna evaluation	2011/11/08	NA
J	Increase PCB area evaluation	2011/11/10	NA
K	11/7 3D drawing improve antenna radiation pattern and efficiency evaluation	2011/11/11	NA
L	Use real battery to evaluate	2011/11/18	NA

Revision History

Revision	Destitution	Date	Drawing NO.
M	Add PCB area close to the feed point in main board	2011/11/22	NA
N	Base on 1/17 mockup to evaluate	2012/01/20	NA
O	Evaluate antenna base on EVT 1 device	2012/02/03	NA
P	Evaluate antenna base on Chicony support grounding position	2012/02/03	NA
Q	Find grounding position to increase antenna performance-1	2012/02/04	NA
R	Find grounding position to increase antenna performance-2	2012/02/06	NA
S	Battery without connect metal plate and real board antenna evaluation	2012/02/07	NA
T	Used TCL and BYD battery to evaluate antenna	2012/02/10	NA
U	Modify EVT unit to check antenna performance	2012/02/10	NA
V	With/without water housing antenna performance	2012/02/15	NA

Revision History

Revision	Destitution	Date	Drawing NO.
W	Base on 3/9 EVT2 device to evaluate antenna	2012/03/09	C-5324-12-001-C-TB00
X	Base on 4/25 EVT3 device to evaluate antenna	2012/06/04	CY5324-12-001-C-FA00
Y	Base on 4/25 EVT3 device with water housing	2012/06/04	CY5324-12-001-C-FA00
Z	Base on DVT1 unit to evaluate antenna	2012/07/04	CY5324-12-001-C-FA00
AA	Base on PVT1 unit to measure the antenna performance	2012/08/03	CY5324-12-001-C-FB00

Outline

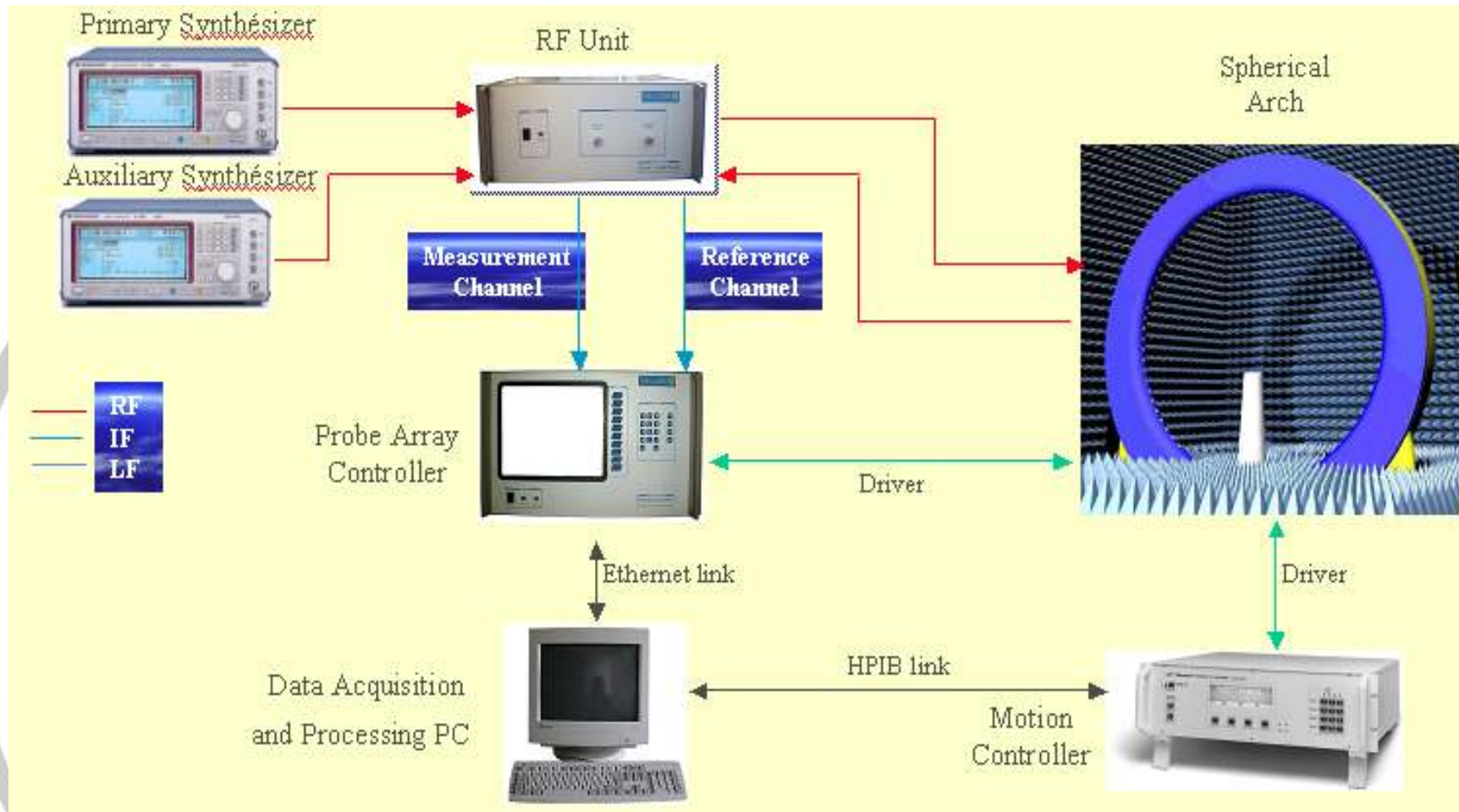
- Test equipment introduction
- Antenna Placement
- Antenna Performance
- Conclusions



Test equipment introduction



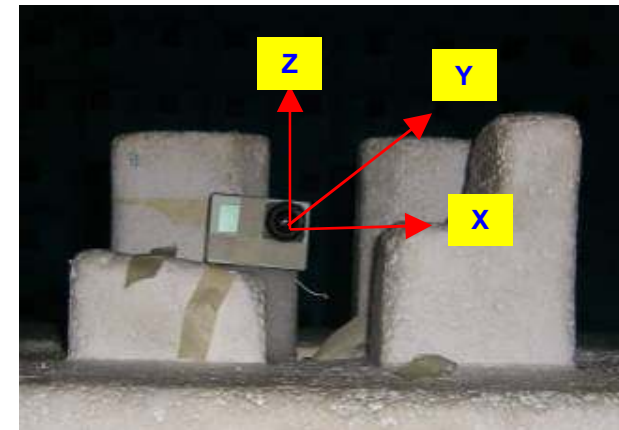
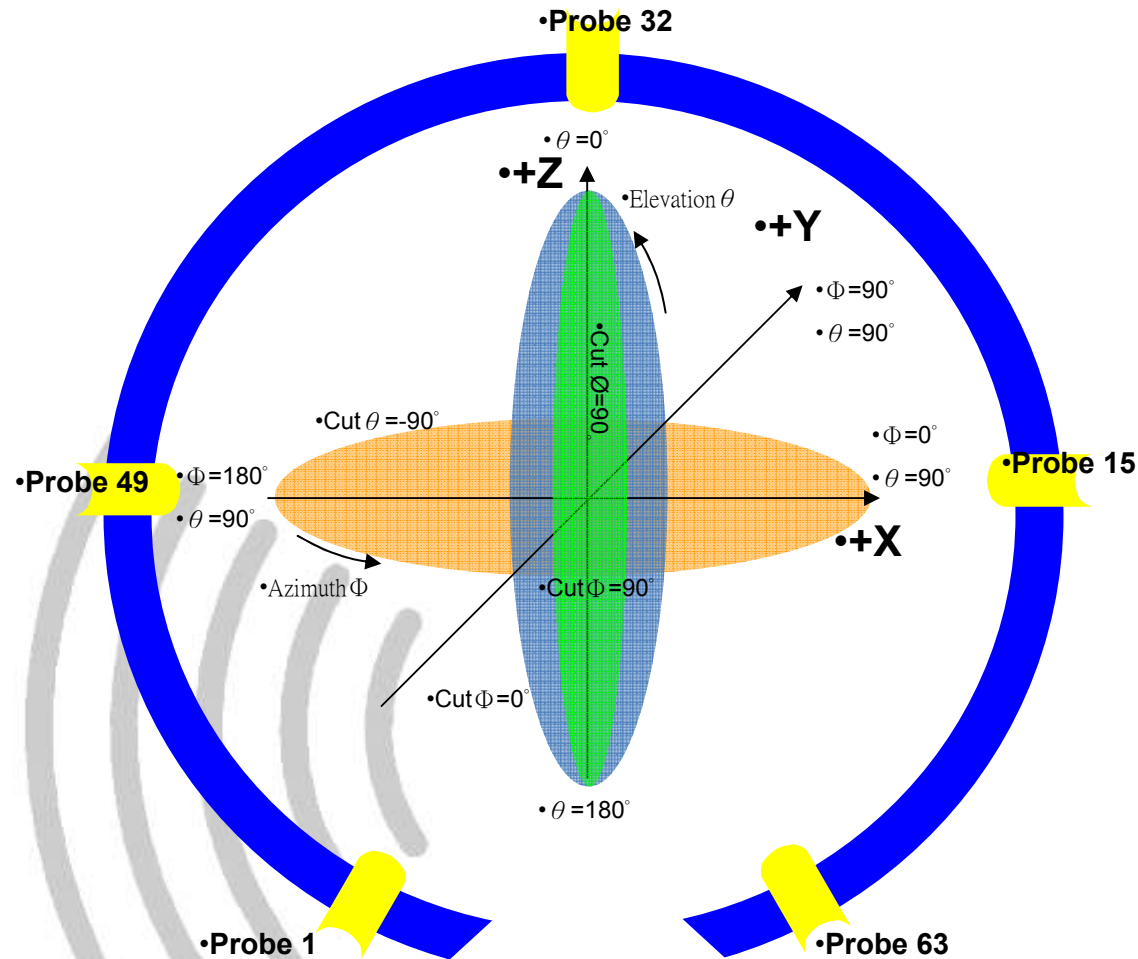
Configuration of Satimo Stargate 64



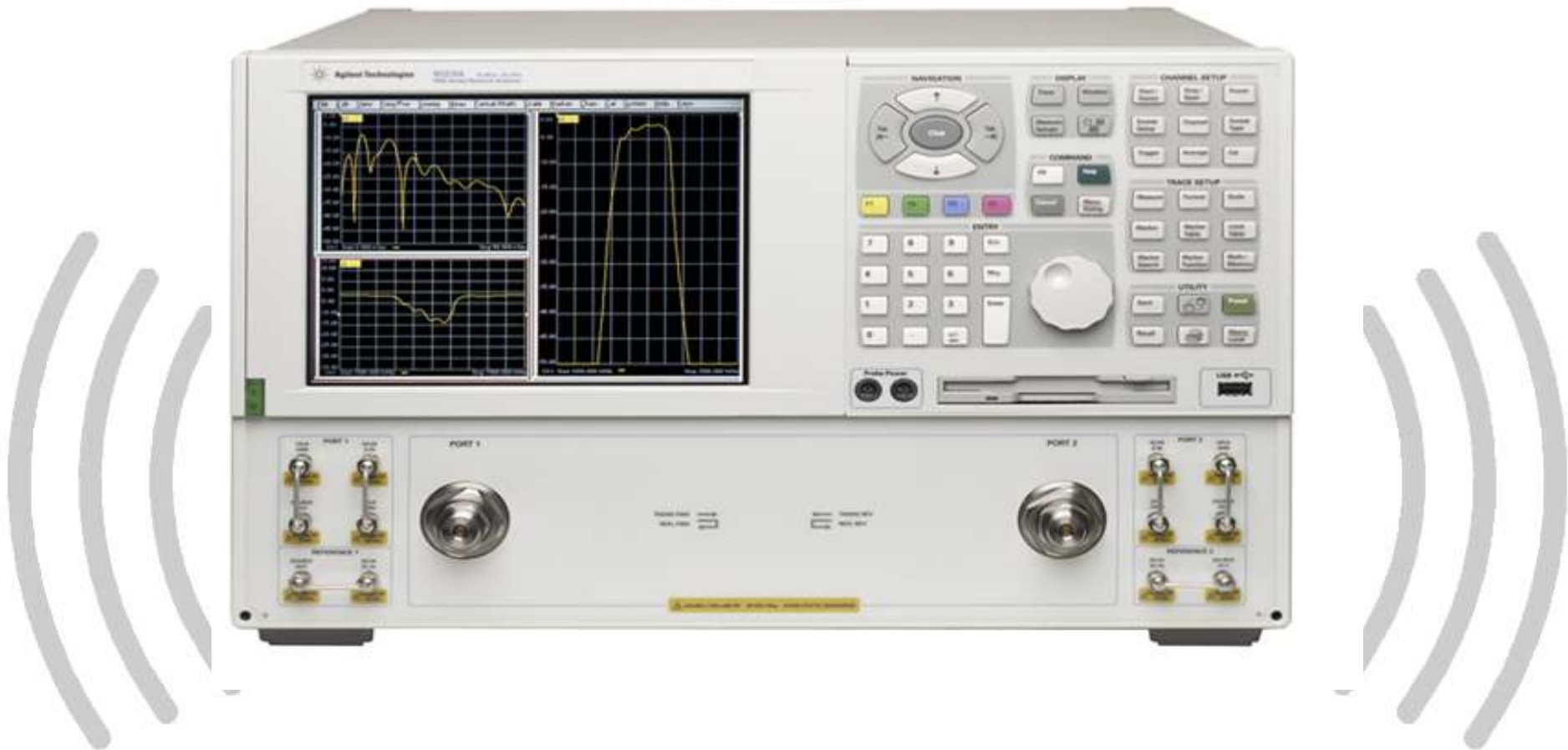
Gain Measurement Accuracy of Satimo Stargate 64

GAIN MEASUREMENT ACCURACY			
REQUIREMENT : ± 0.60 dB (1.0 – 6.0 GHz) ± 0.70 dB (0.8– 1.0 GHz) ± 1.1 dB (0.45– 0.8 GHz)		COMPLIANCE : Yes	
METHOD : Standard Gain Horn (SGH), Substitution Method			
PROCEDURE : NF measurement of the SGH, average in several planes, FF transformation, calibration of the normalized NF/FF transformation.			
SGH Measurement Errors SGH reference calibration accuracy : Return Loss SGH : SGH Measurement Errors (receiver circularity, probe response uniformity, reflectivity, receiver linearity,)	0.45 – 0.8 GHz	0.8 – 1.0 GHz	1.0 – 6.0 GHz
AUT Measurement Errors Circularity of Receiver: Linearity receiver : Stability of the RF system : Probe Response Uniformity Return Loss AUT (Antenna Under test) : Chamber Reflectivity :	± 0.50 dB ± 0.05 dB ± 0.60 dB	± 0.35 dB ± 0.05 dB ± 0.34 dB	± 0.30 dB ± 0.05 dB ± 0.27 dB
TOTAL ERROR (RSS)	± 1.0 dB	± 0.60 dB	± 0.50 dB

Satimo Stargate 64 coordinate system definitions



N5230A PNA-L Microwave Network Analyzer





Antenna Placement



Base on 7/30 PVT1 unit



Front View



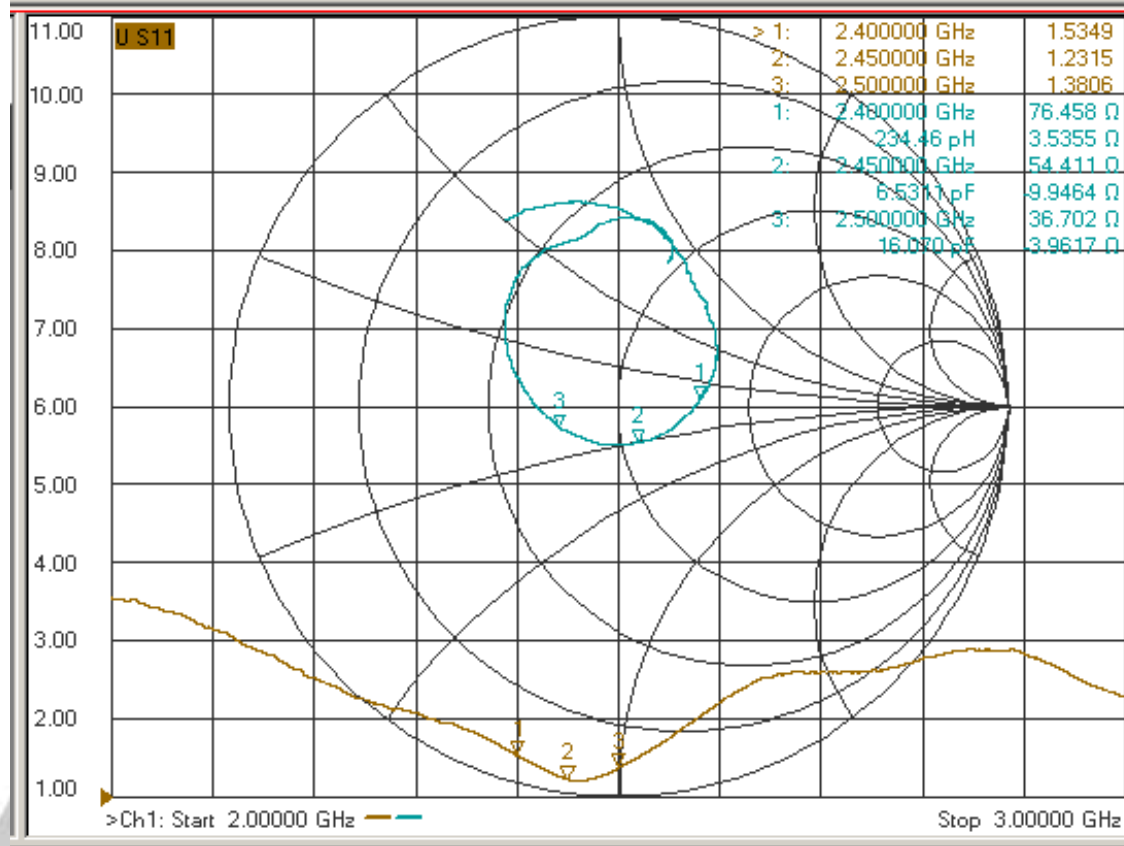
Back View



Antenna Performance



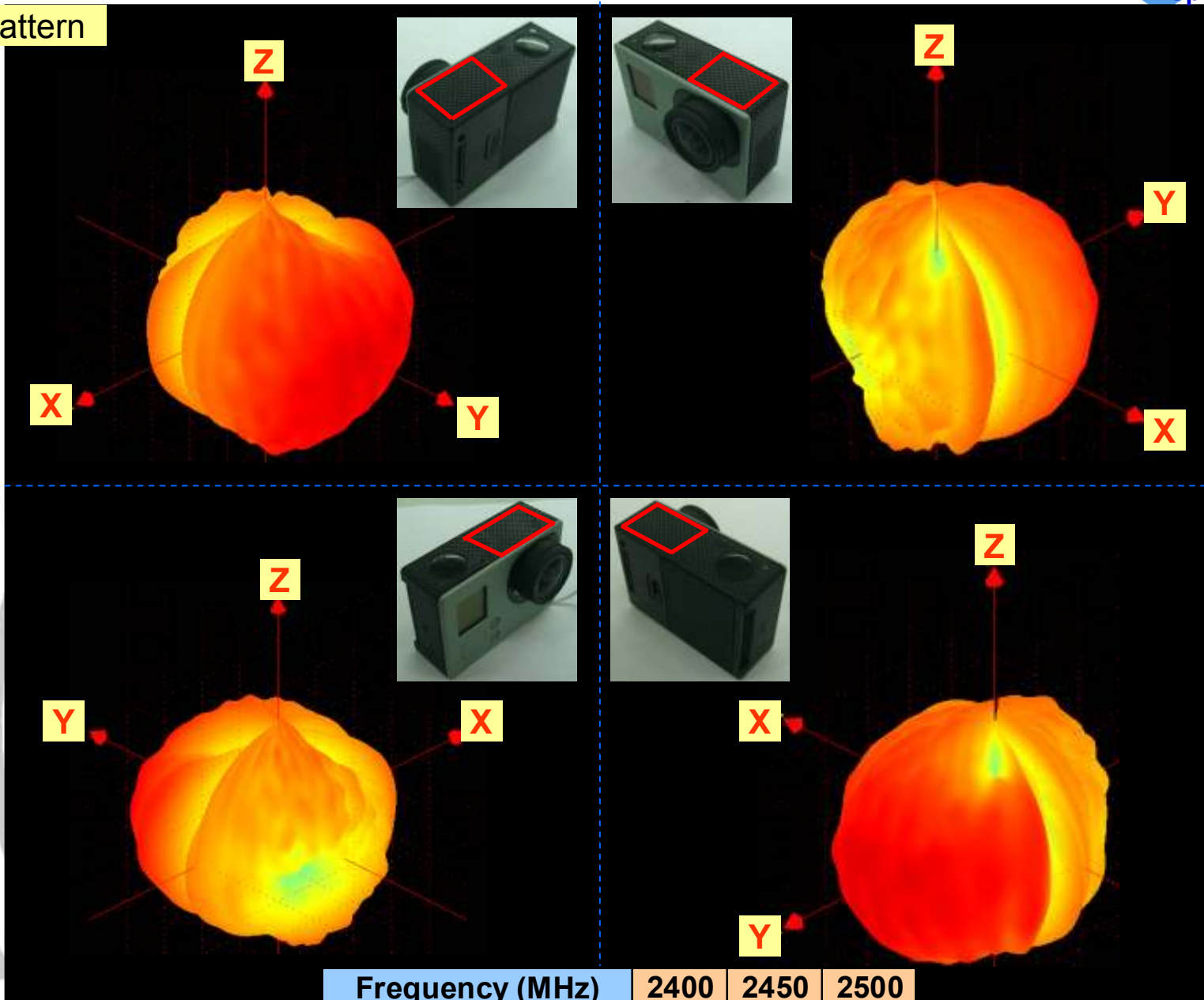
Sporton test result



Frequency (MHz)	2400	2450	2500
VSWR	1.53	1.23	1.38

Band	Frequency (MHz)	Efficiency (%)	3D Gain (dB)
WIFI	2400	46.28	-3.35
	2450	50.45	-2.97
	2500	51.34	-2.90

•3D Pattern



Frequency (MHz)	2400	2450	2500
Peak Gain (dB)	1.41	1.85	2.18



Conclusions

1. The antenna efficiency had 46~51% base on 7/30 PVT1 unit.



