



Antenna Test Report EWS660AP

2014.12.19

By Harry



Senao Networks, Inc.



Executive Summary

- **Purpose**

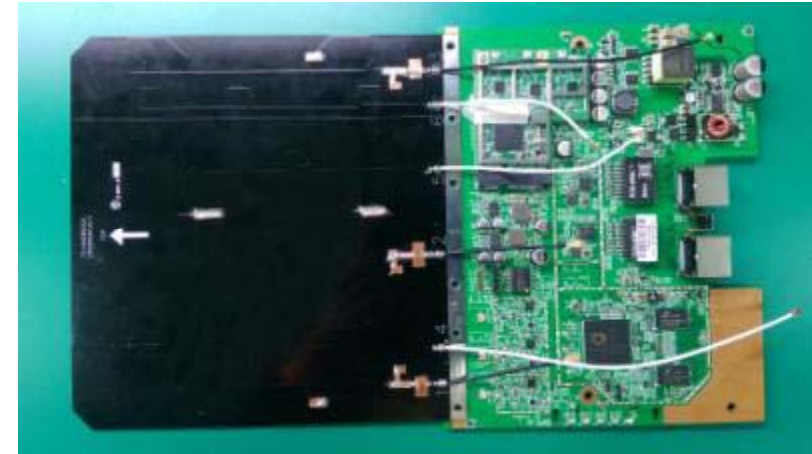
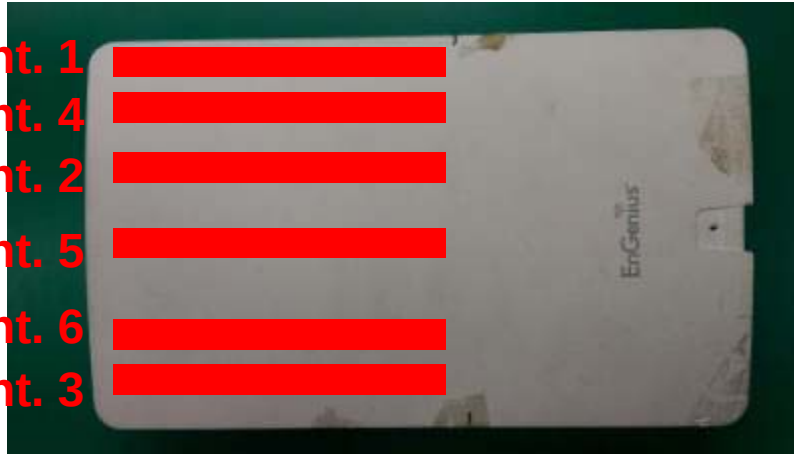
Antenna verification for **EWS660AP** device, result as following.

- **Agenda**

- Antenna Placement
- Test Result : VSWR & Isolation
- Test Result : Antenna Gain Pattern

Antenna placement and specification

Ant. 1
Ant. 4
Ant. 2
Ant. 5
Ant. 6
Ant. 3

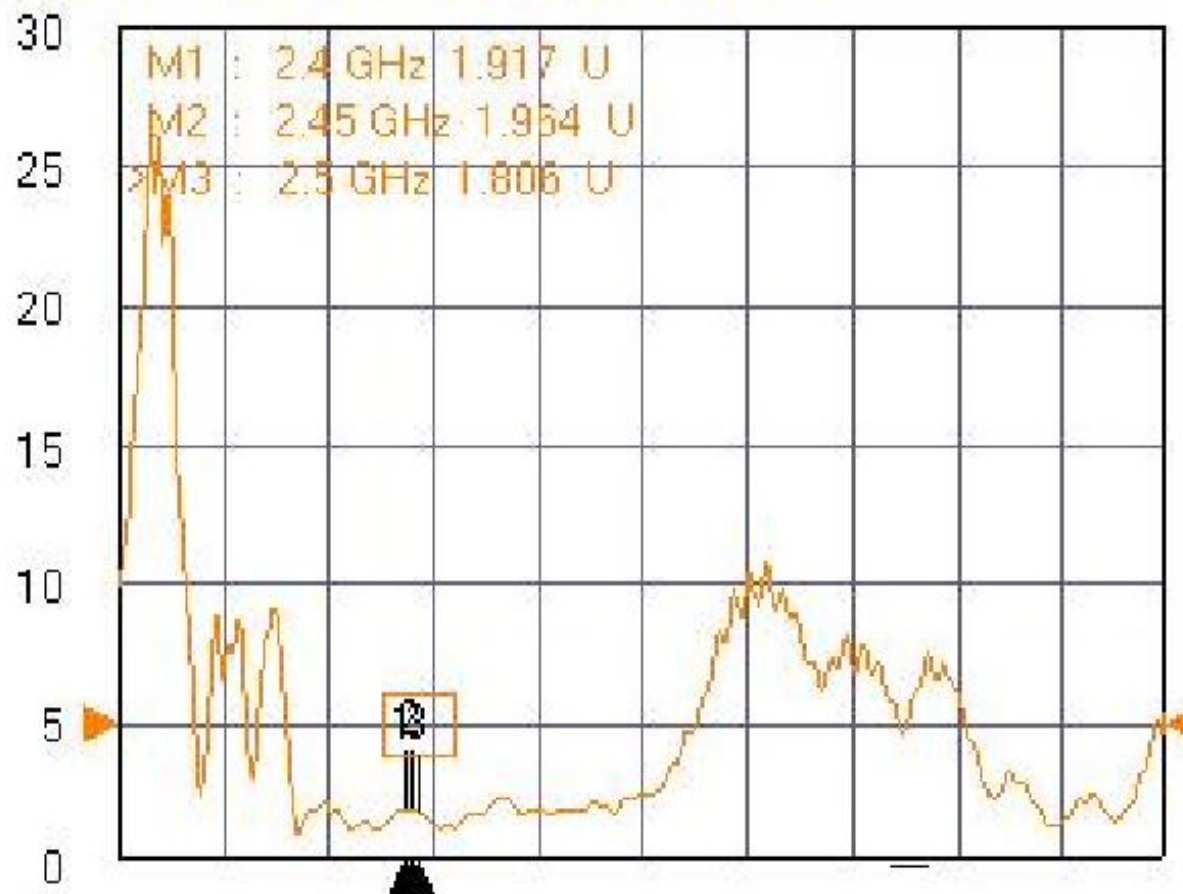


Ant.	1	2	3	4	5	6
Frequency (MHz)	2400 - 2500			5150 – 5850		
Peak Gain (dBi)	4	5	4	6	6	6
VSWR	2 : 1					
Dimension (mm)	160 x 159 x 0.8					
Connector	IPEX					
Cable Phi (mm)	1.37					
Cable Length (mm)	50	60	120	155	90	75



Ant.1 VSWR

Tr1 S11 Ref SWR Ref Lvl: 5 U Res: 5 U Div

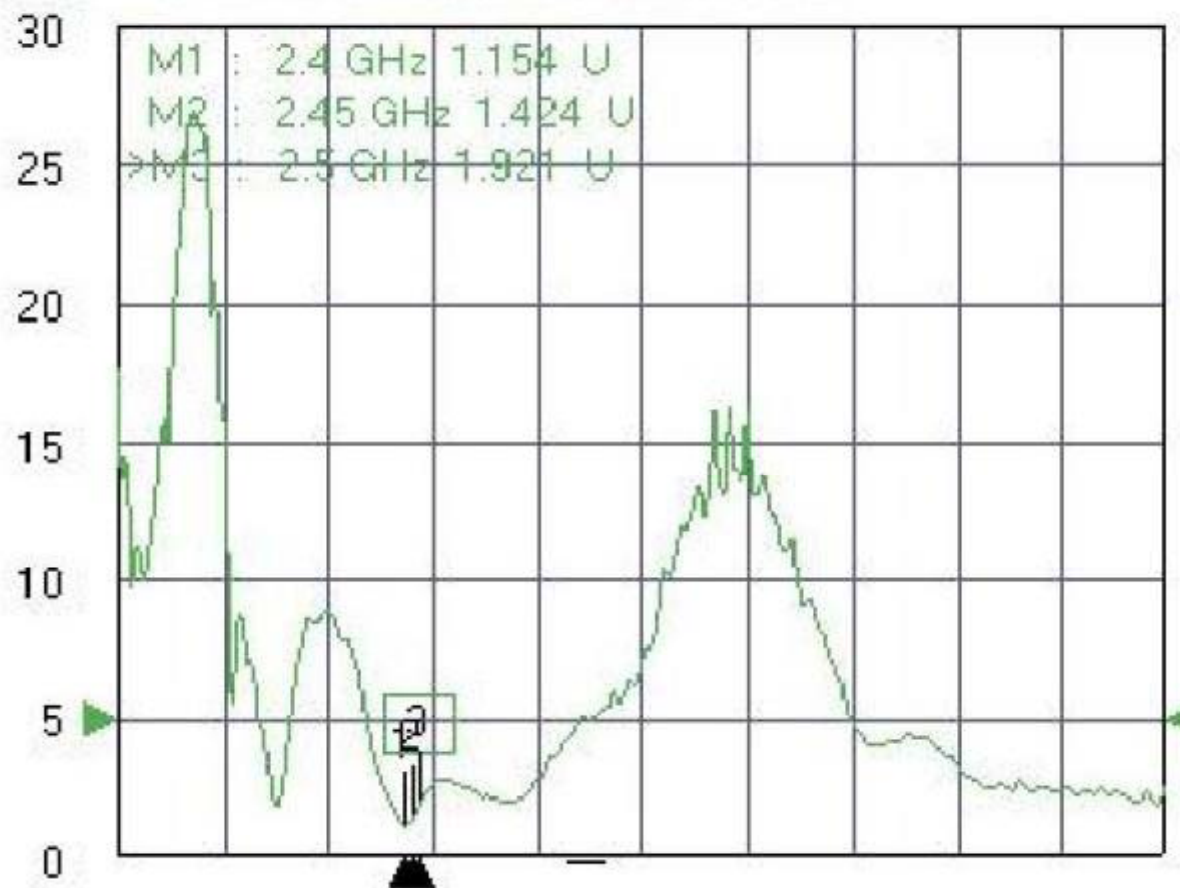


Frequency (MHz)	2400	2450	2500
VSWR	1.92	1.96	1.81



Ant.2 VSWR

Tr2 S22 Refl SWR Refl Lvl: 5 U Res: 5 U Div

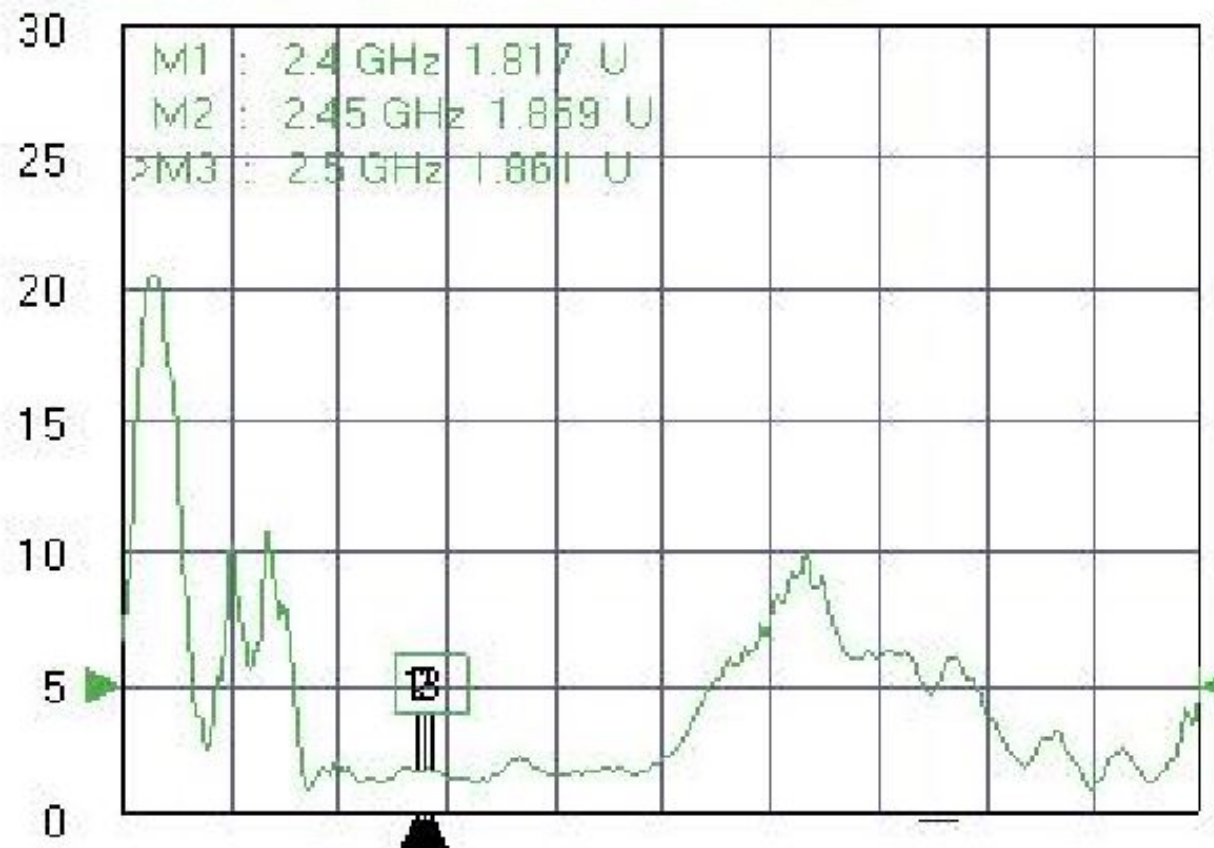


Frequency (MHz)	2400	2450	2500
VSWR	1.15	1.42	1.92



Ant.3 VSWR

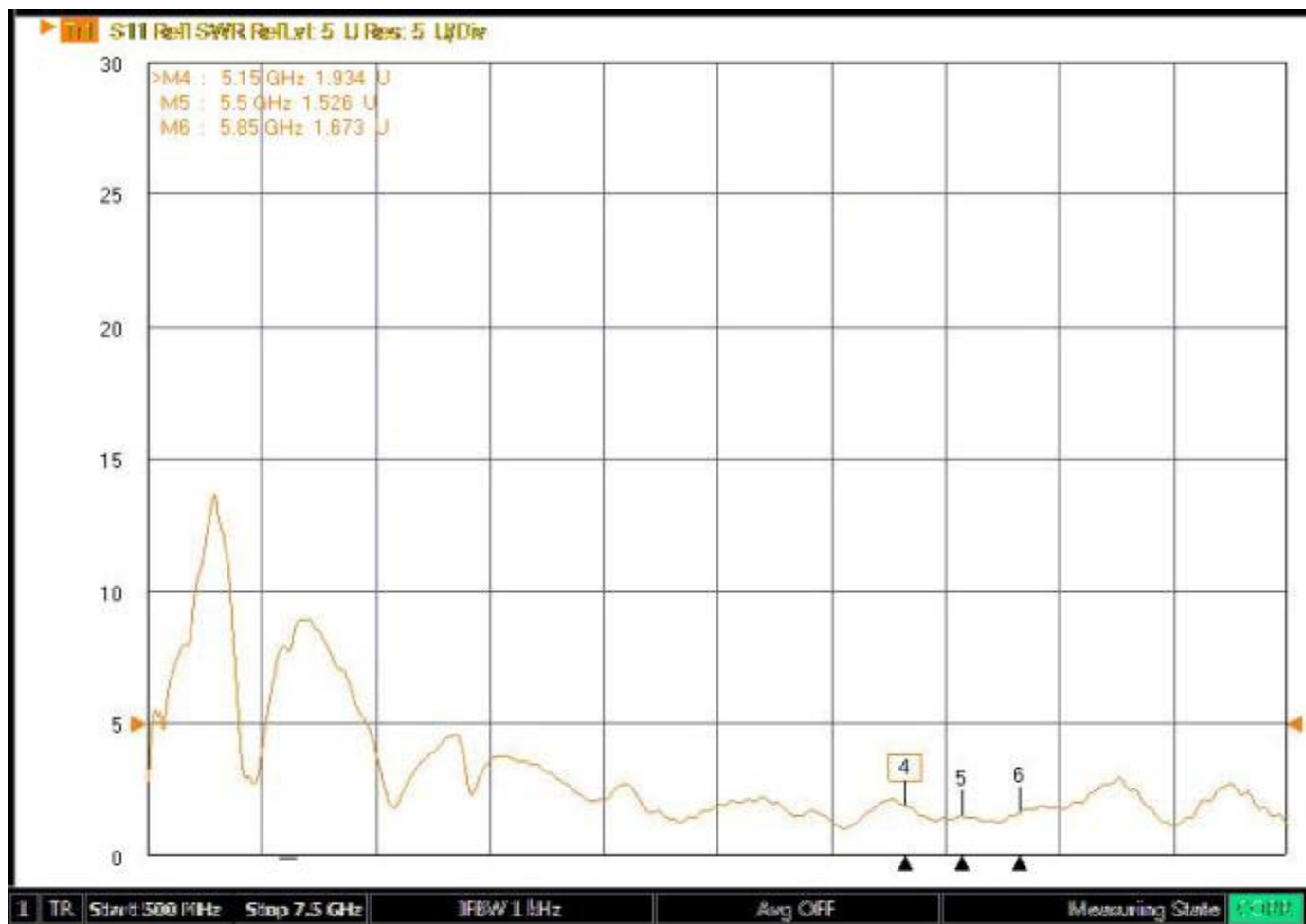
Tr2 S22 Refl SWR RefLvl: 5 U Res: 5 U Div



Frequency (MHz)	2400	2450	2500
VSWR	1.82	1.87	1.86



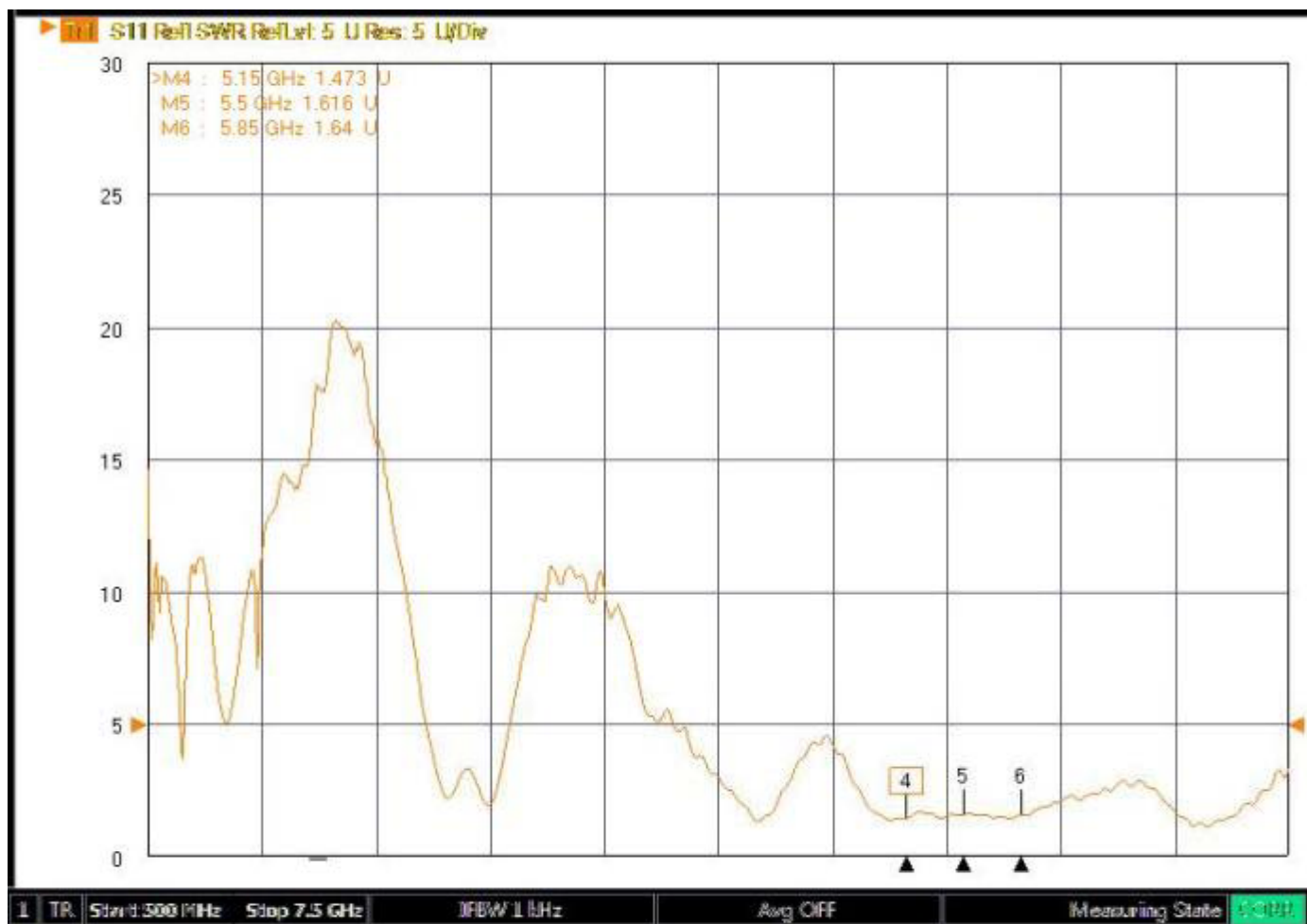
Ant.4 VSWR



Frequency (MHz)	5150	5500	5850
VSWR	1.93	1.53	1.67



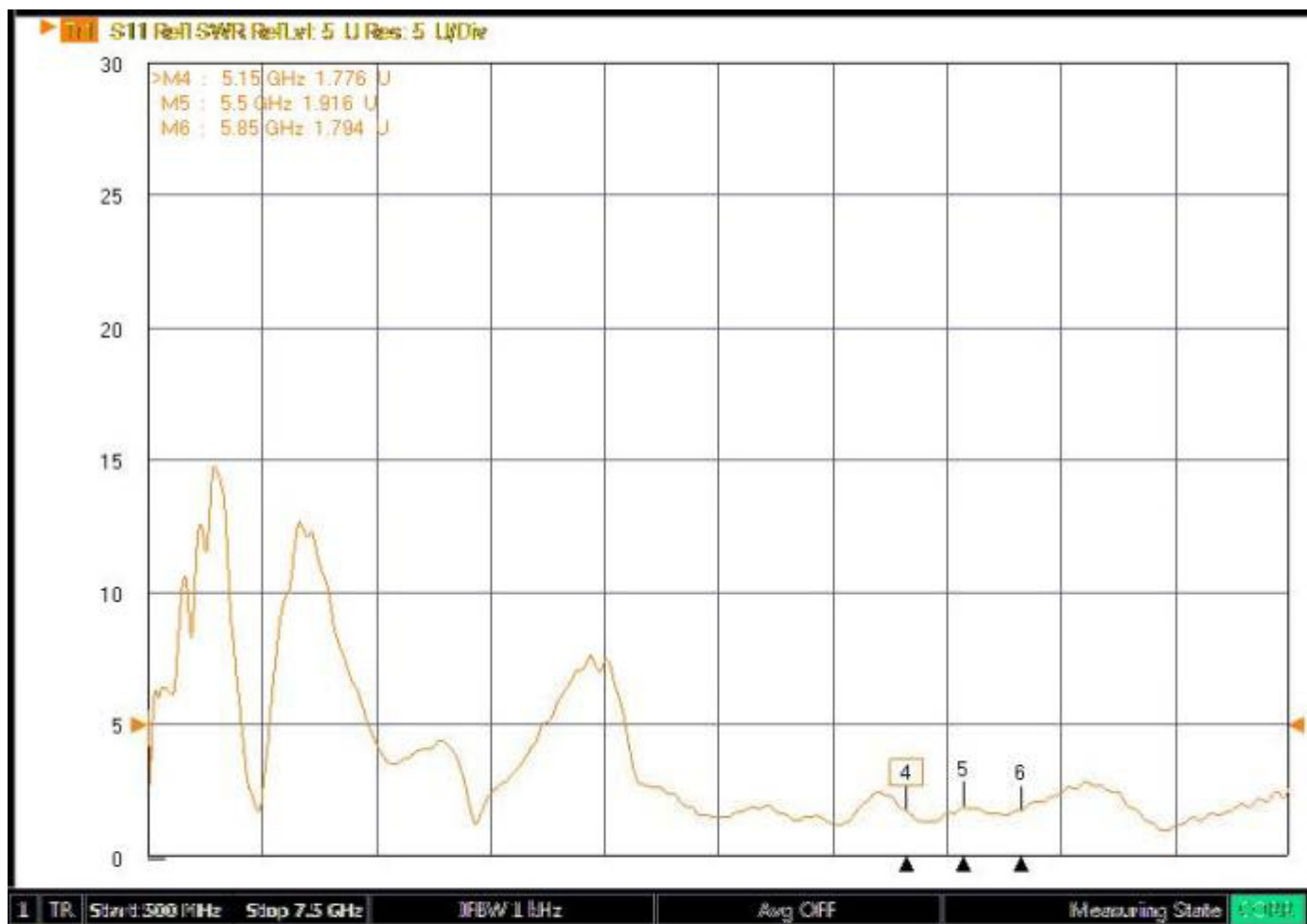
Ant.5 VSWR



Frequency (MHz)	5150	5500	5850
VSWR	1.47	1.62	1.64

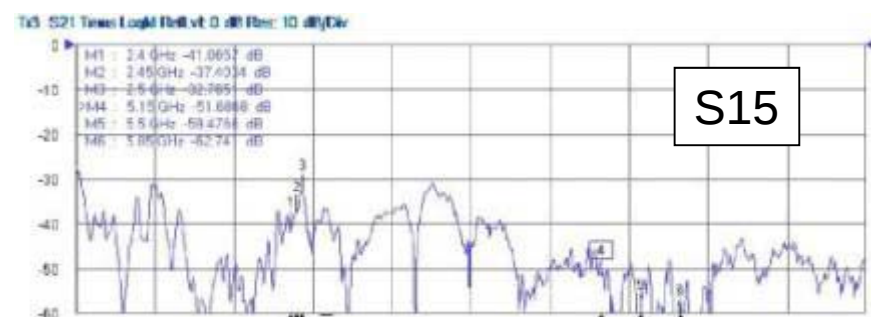
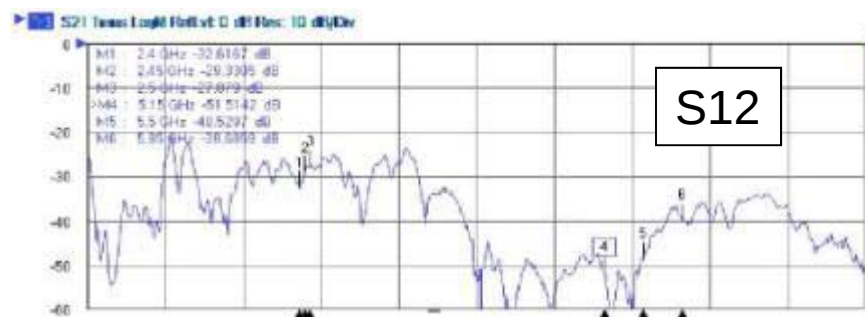


Ant.6 VSWR



Frequency (MHz)	5150	5500	5850
VSWR	1.78	1.92	1.78

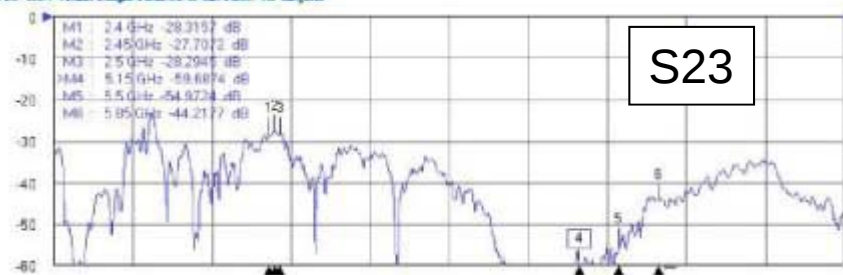
2. Isolation



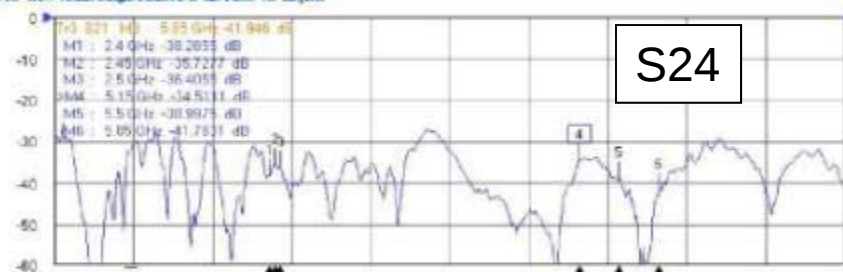
Frequency (MHz)	2400	2450	2500	5150	5500	5850
S12 (dB)	-32.6	-29.3	-27.1	-51.5	-48.5	-39.6
S13 (dB)	-42.8	-32.7	-31.7	-60.3	-59.1	-65.6
S14 (dB)	-30.6	-27.2	-27.2	-26.2	-45.4	-33.7
S15 (dB)	-41.1	-37.4	-32.8	-51.7	-59.5	-62.7
S16 (dB)	-46.5	-50.0	-45.1	-50.2	-51.5	-50.0

2. Isolation

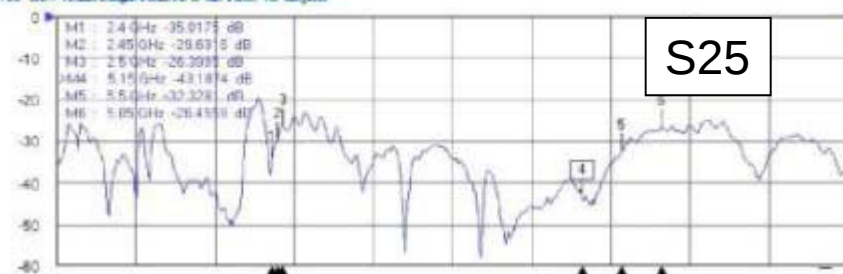
Tx3: S21 Times LogMag Ref: 0 dB Res: 10 dB/Div



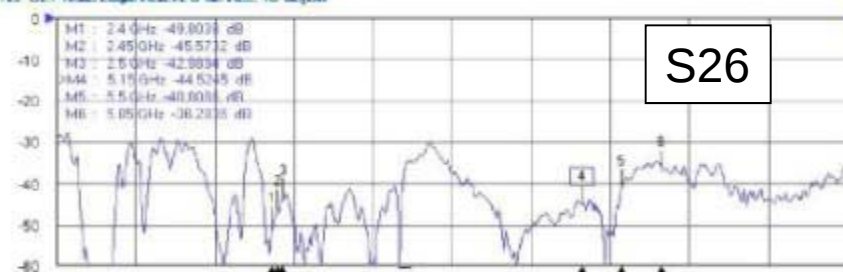
Tx3: S21 Times LogMag Ref: 0 dB Res: 10 dB/Div



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Tx3: S21 Times LogMag Ref: 0 dB Res: 10 dB/Div

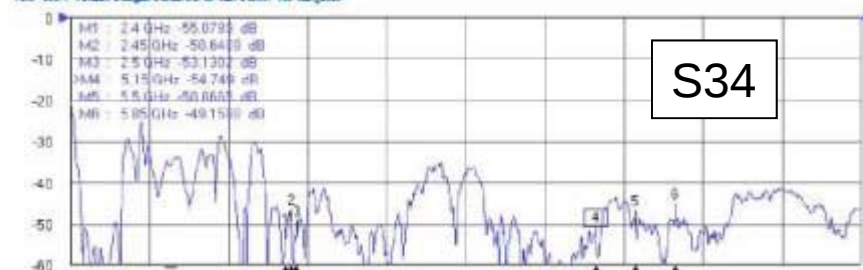


Frequency (MHz)	2400	2450	2500	5150	5500	5850
S23 (dB)	-28.3	-27.7	-28.3	-59.7	-55.0	-44.2
S24 (dB)	-38.3	-35.7	-36.4	-34.5	-39.0	-41.8
S25 (dB)	-35.0	-29.7	-26.4	-43.2	-32.3	-15.5
S26 (dB)	-49.8	-45.6	-43.0	-44.5	-40.8	-36.2



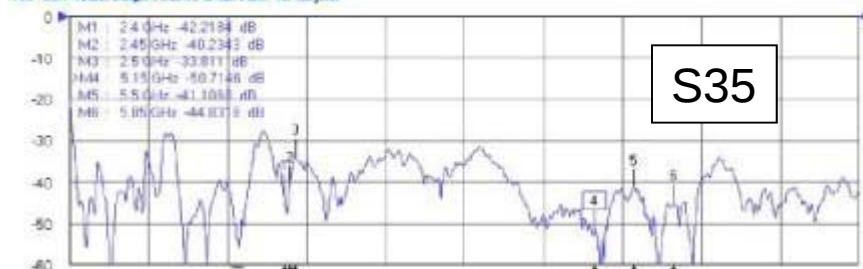
2. Isolation

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div



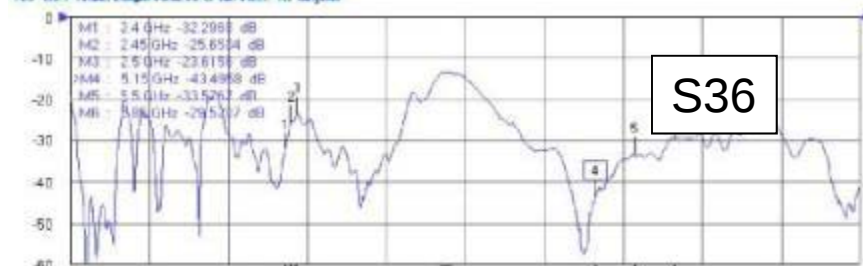
S34

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div



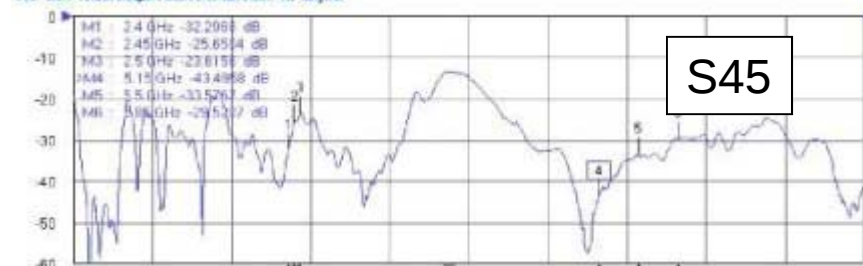
S35

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div



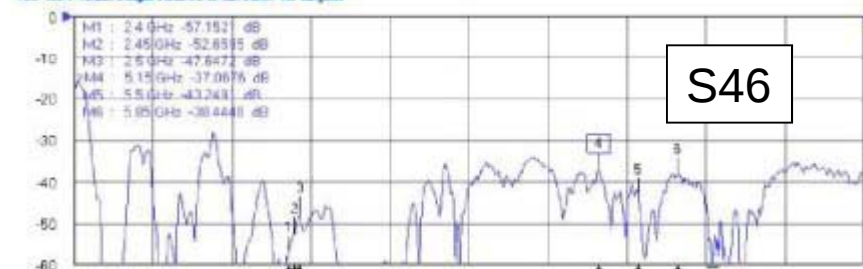
S36

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div



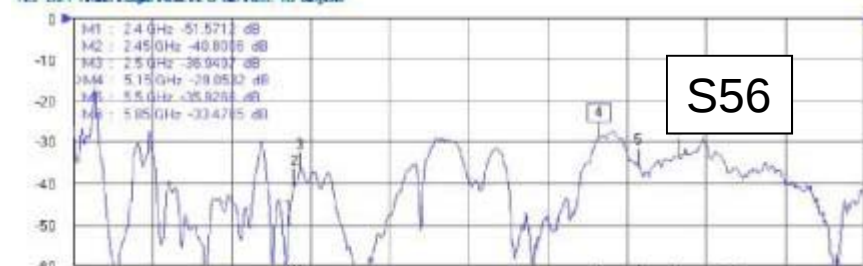
S45

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div



S46

Test S21 Time Log Plot Ref: vt 0 dB Floor: 10 dB/Div

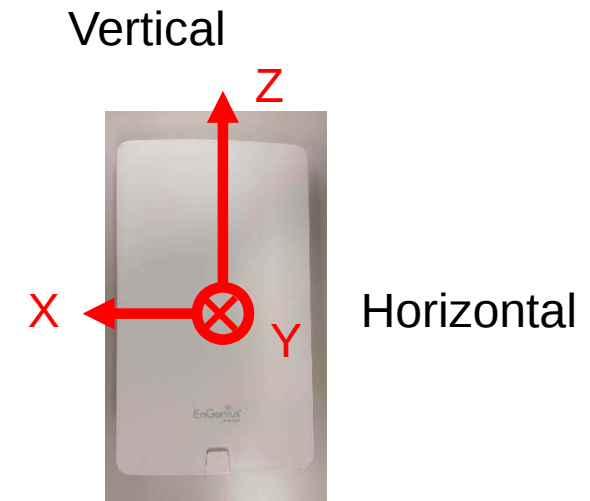
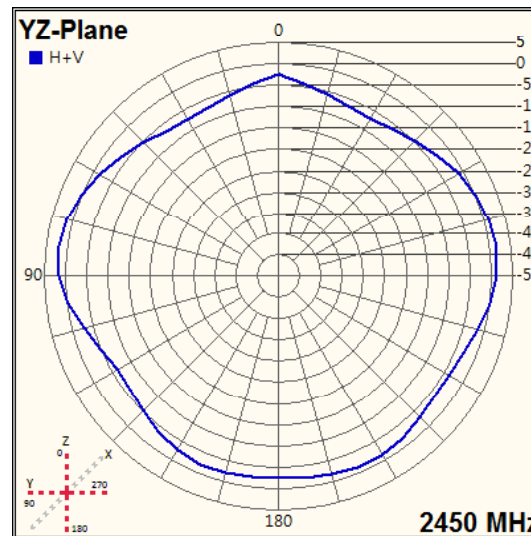
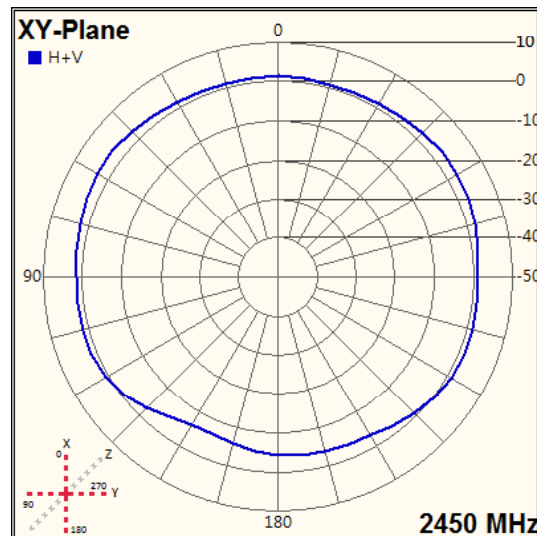
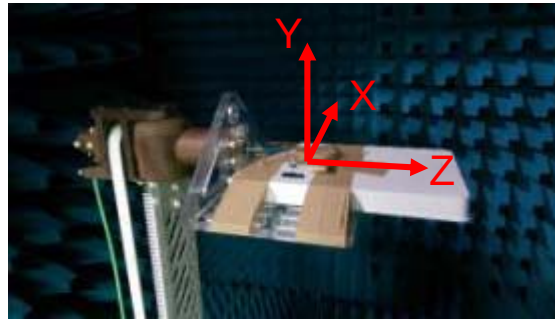


S56

Frequency (MHz)	2400	2450	2500	5150	5500	5850
S34 (dB)	-55.1	-50.6	-53.1	-54.7	-50.9	-49.2
S35 (dB)	-42.2	-40.2	-33.8	-50.7	-41.1	-44.8
S36 (dB)	-32.3	-25.7	-25.6	-43.5	-33.6	-29.5
S45 (dB)	-32.3	-25.7	-25.6	-43.5	-33.6	-29.5
S46 (dB)	-57.2	-52.7	-47.6	-37.1	-43.3	-38.4
S56 (dB)	-51.6	-40.8	-37.0	-29.1	-35.9	-33.5



Ant.1 2D Gain Pattern @ 2.45GHz



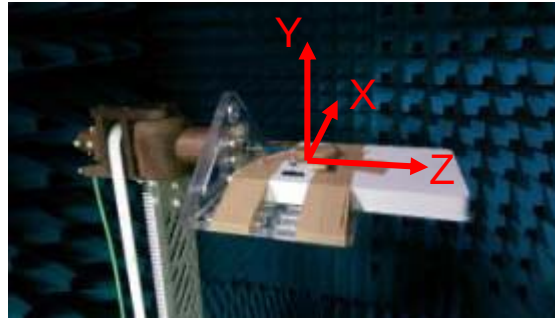
XY-plane = Horizontal plane

YZ-plane = Vertical plane

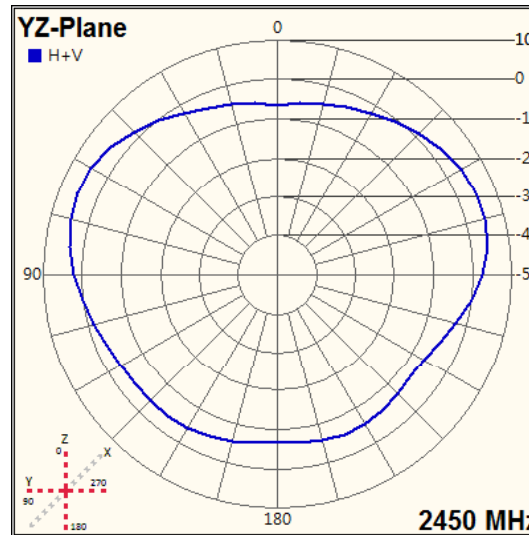
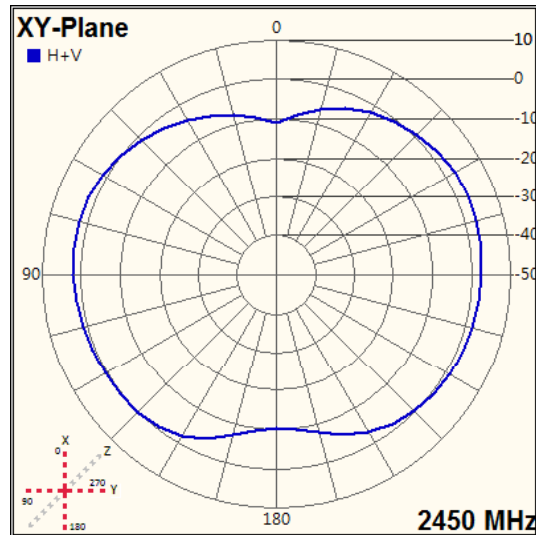
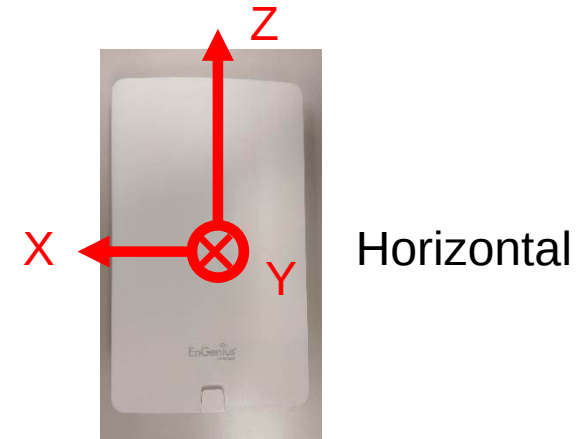
Frequency (MHz)	2400	2450	2500
Efficiency (dB)	-1.58	-1.76	-1.50
Efficiency (%)	69.58	66.66	70.82
Gain (dBi)	3.54	3.34	2.99



Ant.2 2D Gain Pattern @ 2.45GHz



Vertical



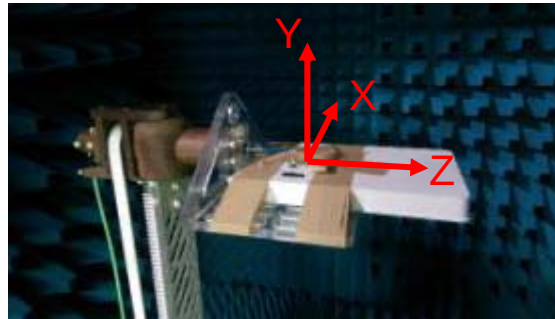
XY-plane = Horizontal plane

YZ-plane = Vertical plane

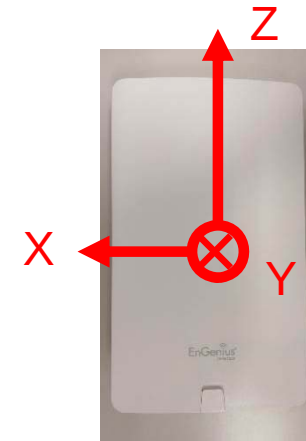
Frequency (MHz)	2400	2450	2500
Efficiency (dB)	-1.40	-1.49	-1.95
Efficiency (%)	72.40	70.96	63.81
Gain (dBi)	4.96	5.02	4.9



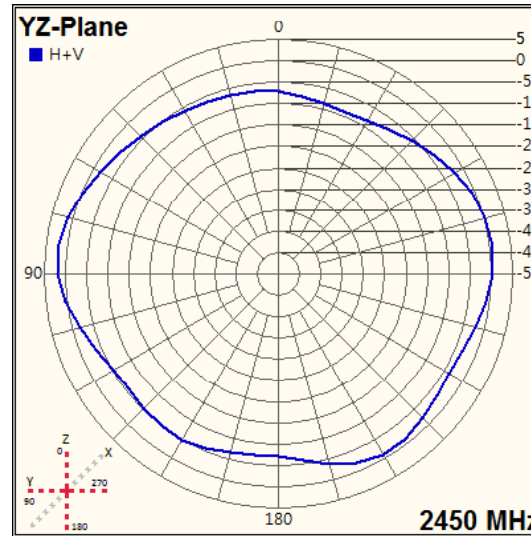
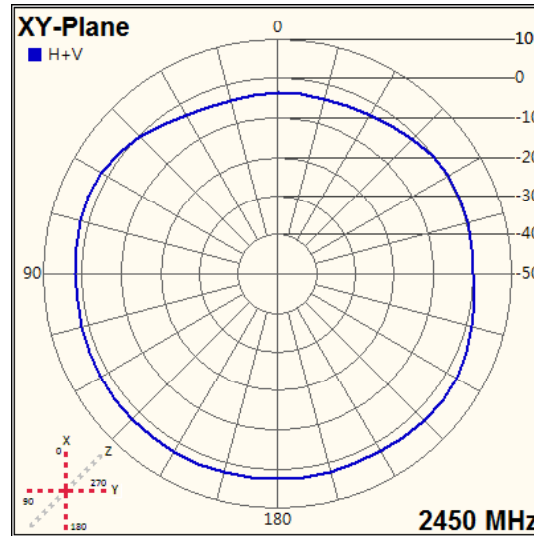
Ant.3 2D Gain Pattern @ 2.45GHz



Vertical



Horizontal

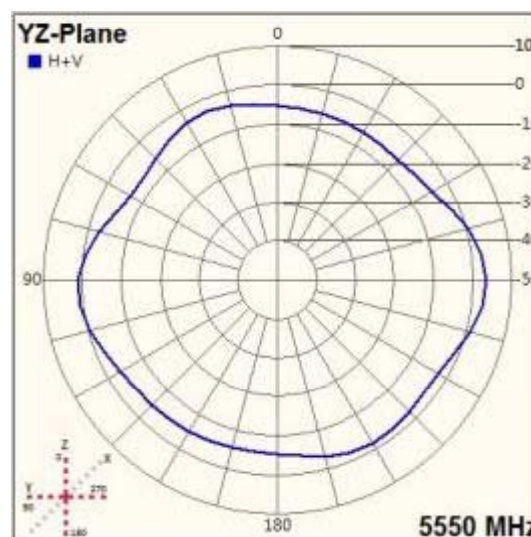
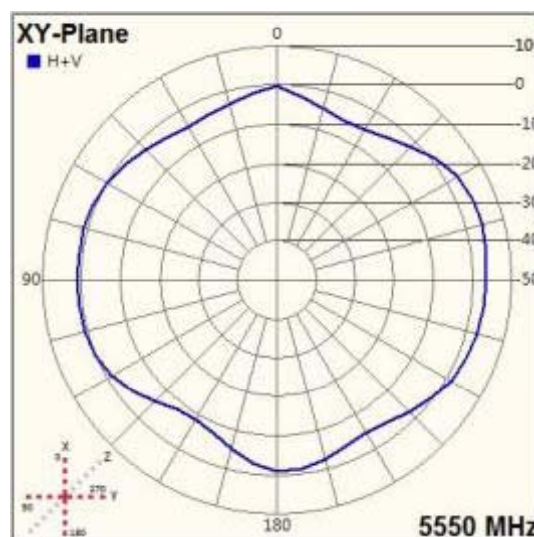
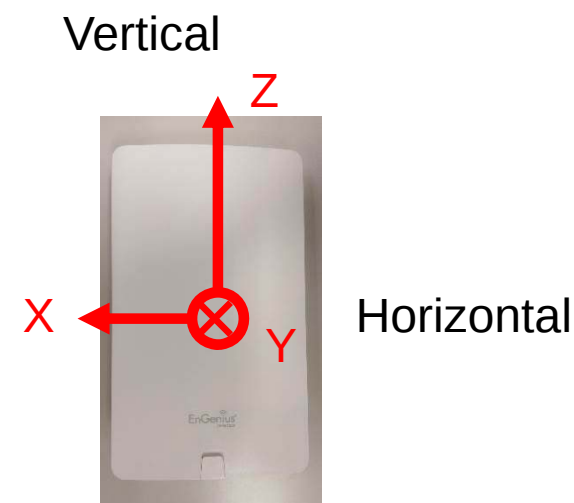
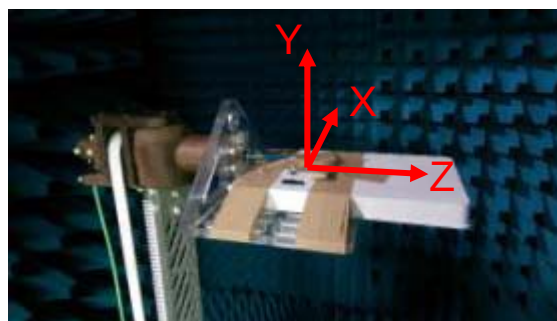


XY-plane = Horizontal plane

YZ-plane = Vertical plane

Frequency (MHz)	2400	2450	2500
Efficiency (dB)	-1.88	-1.91	-1.61
Efficiency (%)	64.88	65.45	69.05
Gain (dBi)	3.55	3.01	3.17

Ant.4 2D Gain Pattern @ 5.55GHz

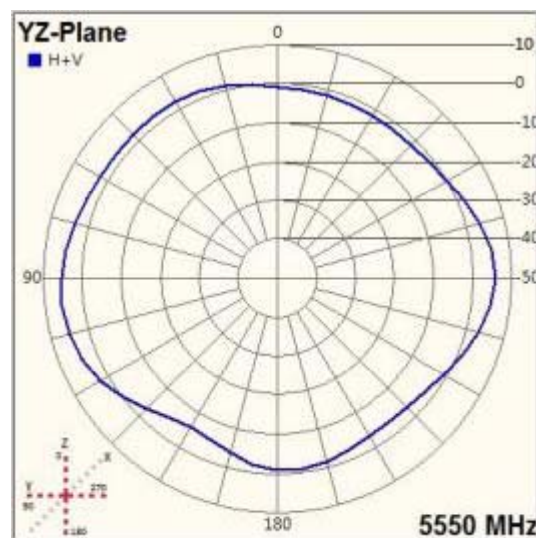
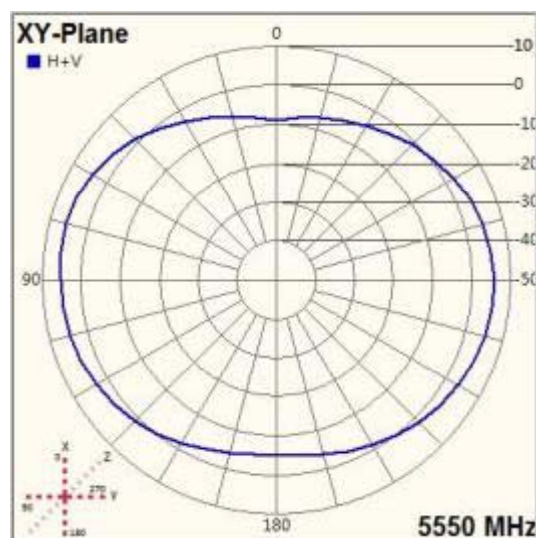
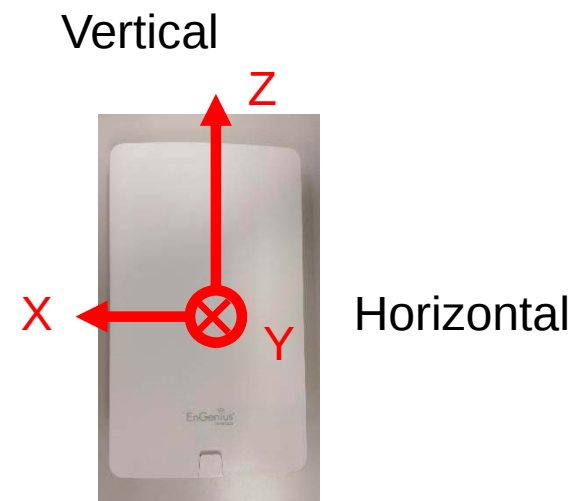


XY-plane = Horizontal plane

YZ-plane = Vertical plane

Frequency (MHz)	5150	5250	5350	5450	5550	5650	5750	5850
Efficiency (dB)	-3.08	-2.04	-1.46	-1.57	-2.76	-2.97	-2.86	-3.54
Efficiency (%)	49.24	62.40	71.44	69.64	52.91	50.43	51.75	44.17
Gain (dBi)	4.54	5.28	5.57	5.51	4.56	4.44	4.48	4.85

Ant.5 2D Gain Pattern @ 5.55GHz



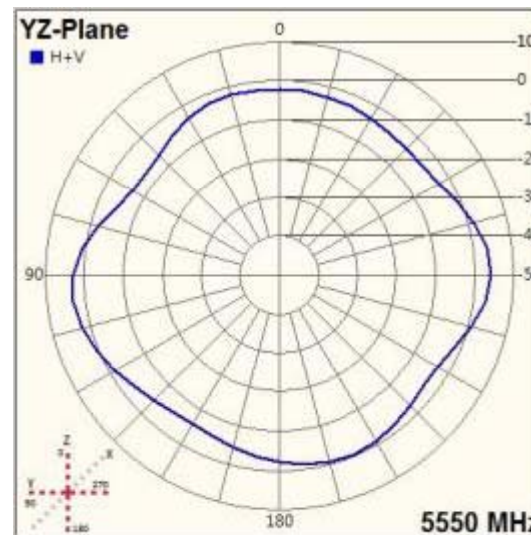
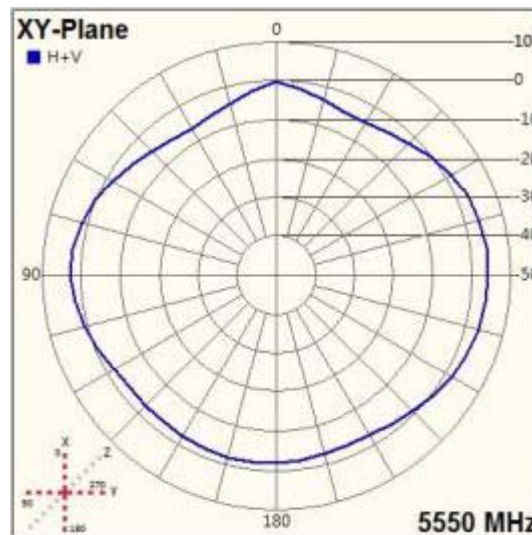
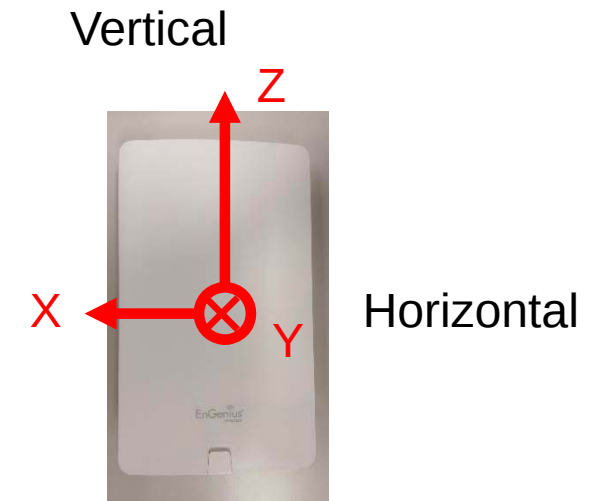
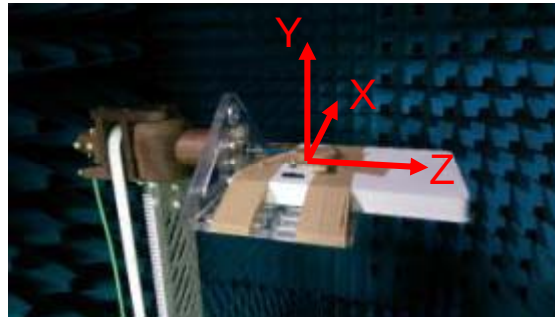
XY-plane = Horizontal plane

YZ-plane = Vertical plane

Frequency (MHz)	5150	5250	5350	5450	5550	5650	5750	5850
Efficiency (dB)	-0.72	-0.69	-0.54	-0.15	-1.09	-1.09	-0.42	-0.48
Efficiency (%)	84.68	85.25	88.29	96.64	77.89	77.78	90.72	89.64
Gain (dBi)	5.46	5.65	6.12	5.57	5.83	5.13	5.02	5.82



Ant.6 2D Gain Pattern @ 5.55GHz



XY-plane = Horizontal plane

YZ-plane = Vertical plane

Frequency (MHz)	5150	5250	5350	5450	5550	5650	5750	5850
Efficiency (dB)	-2.54	-2.02	-1.48	-1.50	-2.66	-2.96	-2.44	-3.05
Efficiency (%)	55.78	62.84	71.16	70.76	54.26	50.54	56.96	49.54
Gain (dBi)	4.98	5.70	6.26	5.98	4.27	4.20	4.46	4.38