

Alpha Wireless

Antenna Test Report

Type Name: AW3645

Type Category: (Dual Port, Omni, +/-45° Polarisation, FT)

Test Subject: NPI Build

Date of Test: 14/12/2017

Alpha Wireless Ltd.

Revision History

Revision	Author	Date	Description
Draft 1.0.0	MJ McAssey	26/10/2017	1st Iteration of Antenna, Draft 1

Name	AW3645	Type	(Dual Port, Omni, +/-45° Polarisation, FT)
Tester	Peter McCann	Date	25/10/2017
Items	<p>1. Electrical</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Return Loss <input checked="" type="checkbox"/> Isolation <input type="checkbox"/> PIM <p>2. Radiation</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Gain <input checked="" type="checkbox"/> Front to Back Ratio <input type="checkbox"/> Null-fill <input type="checkbox"/> Others <input checked="" type="checkbox"/> Ripple <input checked="" type="checkbox"/> Cross Pol <input checked="" type="checkbox"/> Upper-sidelobe Suppression <input checked="" type="checkbox"/> Azimuth Beamwidth <input checked="" type="checkbox"/> Elevation Beamwidth <input checked="" type="checkbox"/> Tilt Accuracy <p>3. Environment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Low Temp Storage <input type="checkbox"/> Low Temp Operation <input type="checkbox"/> Alternating Temp <input type="checkbox"/> Constant Humidity <input type="checkbox"/> Neutral Salty Fog <input type="checkbox"/> Pressure <input type="checkbox"/> Shock <input type="checkbox"/> Tumble <input type="checkbox"/> Water Shower <input type="checkbox"/> UV Resistance <input type="checkbox"/> High Temp Storage <input type="checkbox"/> High Temp Operation <input type="checkbox"/> Alternating Temp & Humidity <input type="checkbox"/> Alternating Salty Fog <input type="checkbox"/> Lightning Proof <input type="checkbox"/> Sinusoidal Vibration <input type="checkbox"/> Transportation Simulation <input type="checkbox"/> Wind Load Simulation <input type="checkbox"/> Others <p>4. Requirement</p> <hr/> <hr/>		
Criterion	<input checked="" type="checkbox"/> Datasheet <input type="checkbox"/> Customer Requirement <input type="checkbox"/> Others		
Standard			
Conclusion	Antenna Passing all required spec		
Notes			

Tested By: Peter McCann

Verified By: MJ Mcassey

Approved By: MJ McAssey

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Data Sheet

AW3645-S-G Data Sheet



2496 -2690MHz Omni Antenna

(Dual Port, Omni, +/-45° Polarisation, FT), with integrated GPS

*The parameters in this specification follow the definitions and recommendations per NGMN P-Basta, Release 9.6

RF Specifications

Frequency Range per Input	MHz	2496 - 2690
Polarisation:	NA	+/-45° Slant Linear
Gain		
Over all Tilt	dBi	8.2
Azimuth Beamwidth	Degree	360
Elevation Beamwidth	Degree	14
Electrical Downtilt:	Degree	16°
Electrical Downtilt Deviation	Degree <	1
Impedance	Ohms	50
VSWR	NA <	1.4
Return Loss:	dB >	15
Isolation	dB >	28
Passive Intermodulation	dBc <	-150
Upper Sidelobe Suppression, Peak to 20°	dB >	18
Cross Polar Discrimination at Sector	dB >	12
Maximum Effective Power Per Port	W	50

Mechanical Specifications

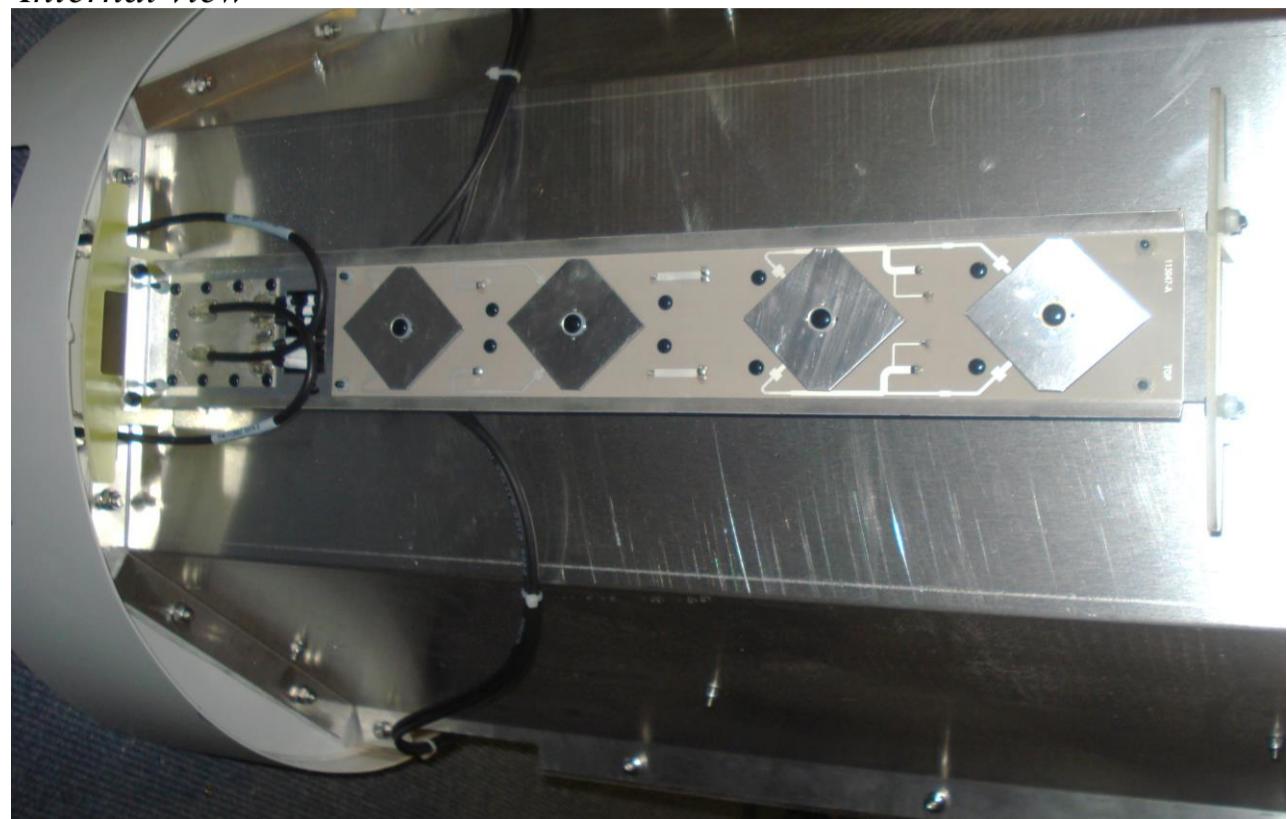
Dimensions (LxD) mm (in)	mm (in)	998 (39.3) x 518 (20.4)
Packing Size (LxWxD)	mm (in)	1200 (47.2) x 550 (21.6)
Net Weight (antenna)	kg (lb)	45 (99)
Shipping Weight	kg (lb)	48 (106)
Connector Quantity	NA	2 x Mini Din
Connector Position	NA	Bottom
Mounting Kit	NA	CL-V-133
Windload calculation	km/h	$F = 1/2 \rho (C_d p)^{1/2} v^2 A$
Windload Frontal	N	1030
Survival Wind Speed	km/h	200 (125)
Radome Material	NA	UV-Stabilised PVC
Radome Colour	RAL	7035
Product Compliance Environmental	NA	RoHS
Lightening Protection	NA	DC Grounded
Cold Temperature Survival	Celsius	-40
Hot Temperature Survival	Celsius	+ 70



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* Alpha Wireless are always improving products; specification subject to change without notice.

Antenna Notes**Antenna Photos***Internal view*

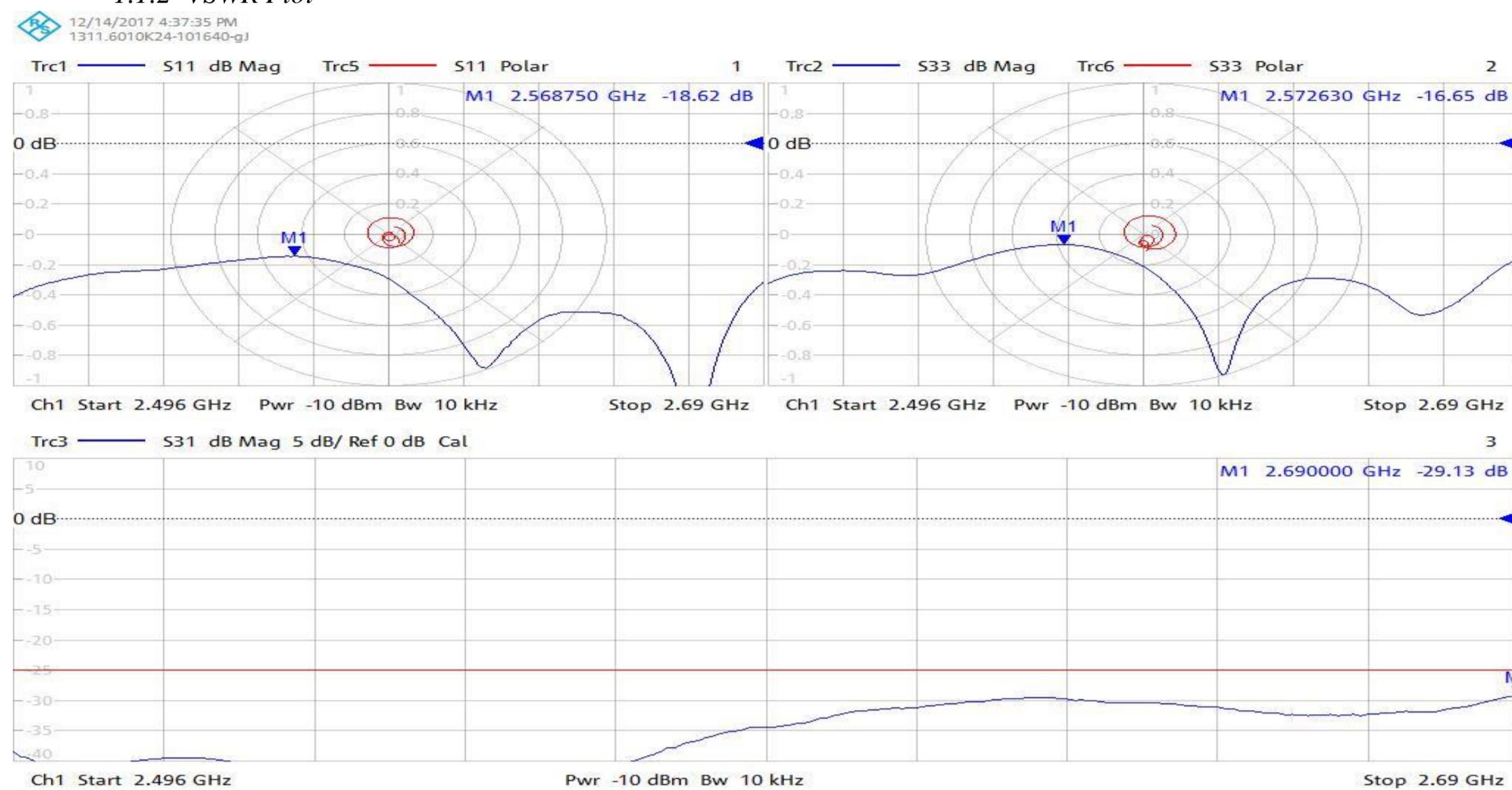
1. Electrical

1.1 VSWR

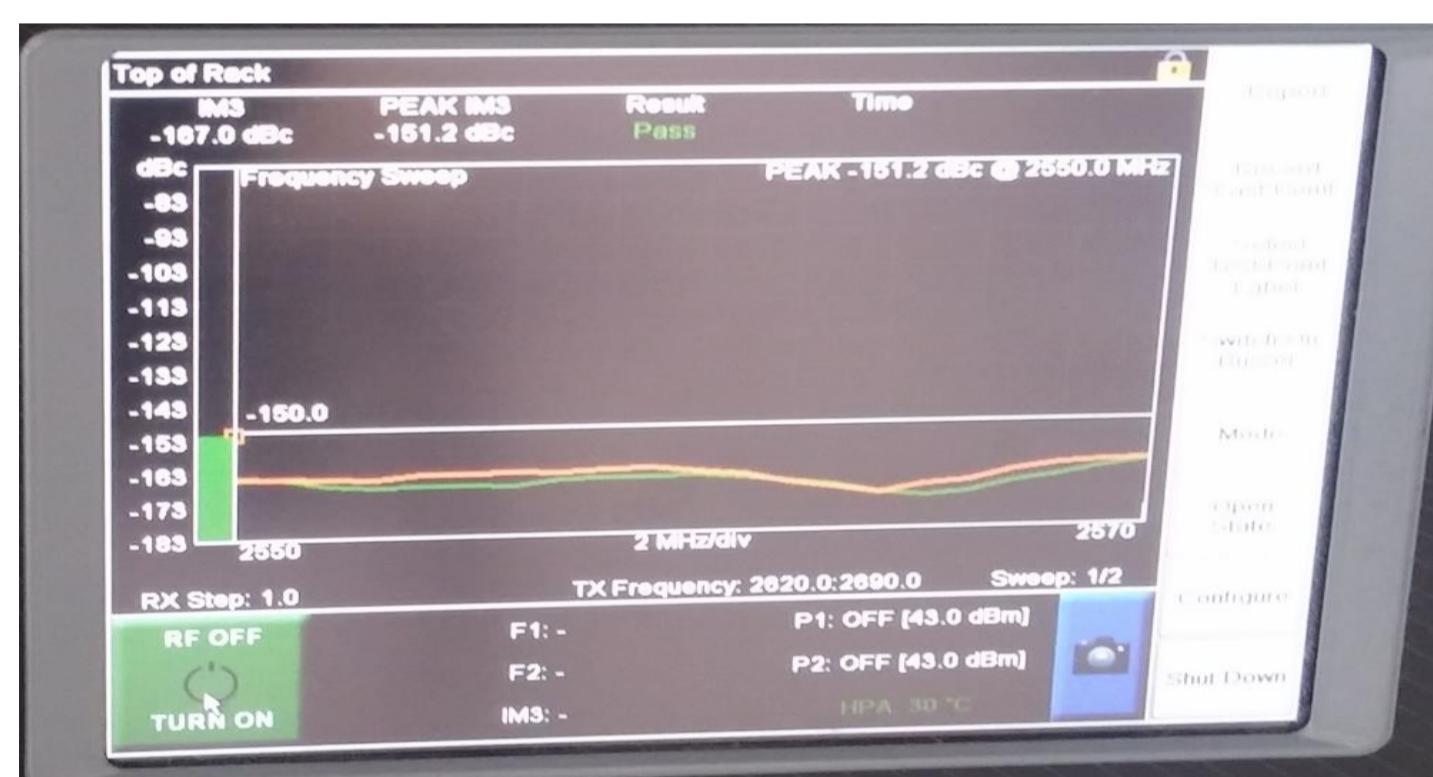
1.1.1 VSWR Tables

Items	Spec	Freq Band (MHz)	P1	P2	Conclusion
Return Loss (dB)	-15	2469 - 2690	18.62	16.65	PASS
Isolation (dB)	≤-28	2469 - 2690	29.13		PASS
PIM (dBc)	≤-150	2469 - 2690	151.20		PASS

1.1.2 VSWR Plot



1.1.3 PIM Plot

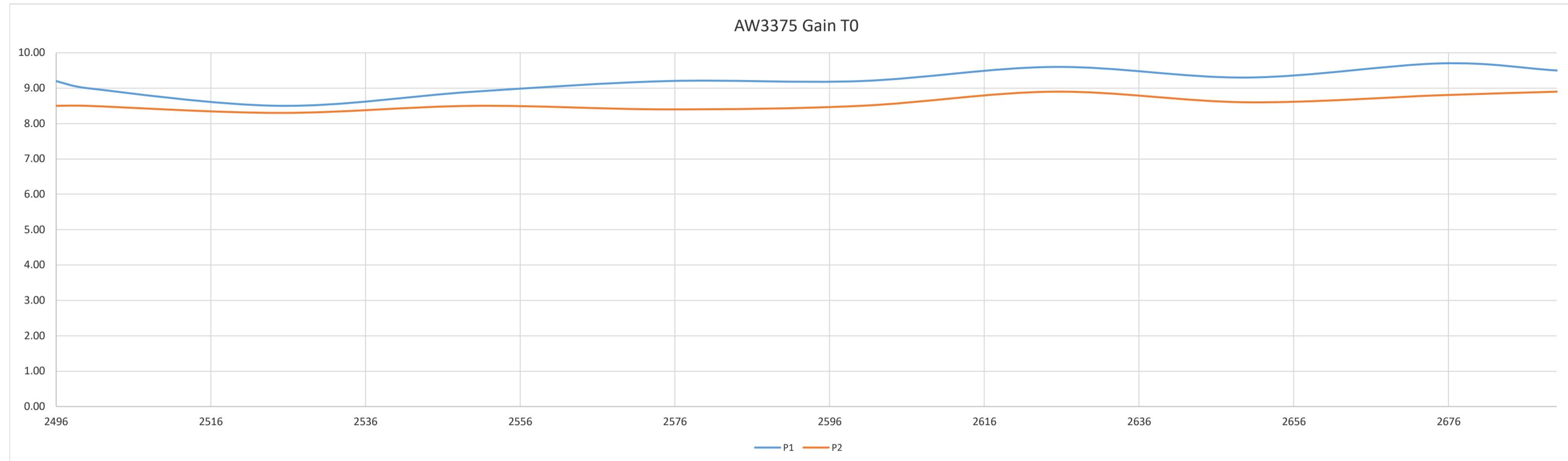


1.2 Gain

1.2.1 Gain Tables

Items	Spec.	Freq. (MHz)	P1	P2	Avr.	Max	Min	Conclusion
Gain (dBi)	8.2±1.0	2496	9.20	8.50	8.9	9.7	8.3	PASS
		2500	9.00	8.50				
		2525	8.50	8.30				
		2550	8.90	8.50				
		2575	9.20	8.40				
		2600	9.20	8.50				
		2625	9.60	8.90				
		2650	9.30	8.60				
		2675	9.70	8.80				
		2690	9.50	8.90				

1.2.2 Gain Plot



2, **Radiation**

2.1 Radiation pattern tables

2.1.1 Azimuth T0

Items	Spec.	Freq. (MHz)	P1	P2	Avr.	Max	Min	Conclusion
Horizontal Cross Pole Discrimination @ Sector (dB)	12	2496	17.81	17.81	20.3	23.2	17.2	PASS
		2500	19.77	19.77				
		2525	19.95	19.95				
		2550	23.16	23.16				
		2575	22.14	22.14				
		2600	21.76	21.76				
		2625	20.50	20.50				
		2650	22.15	22.15				
		2675	17.16	17.16				
		2690	18.89	18.89				

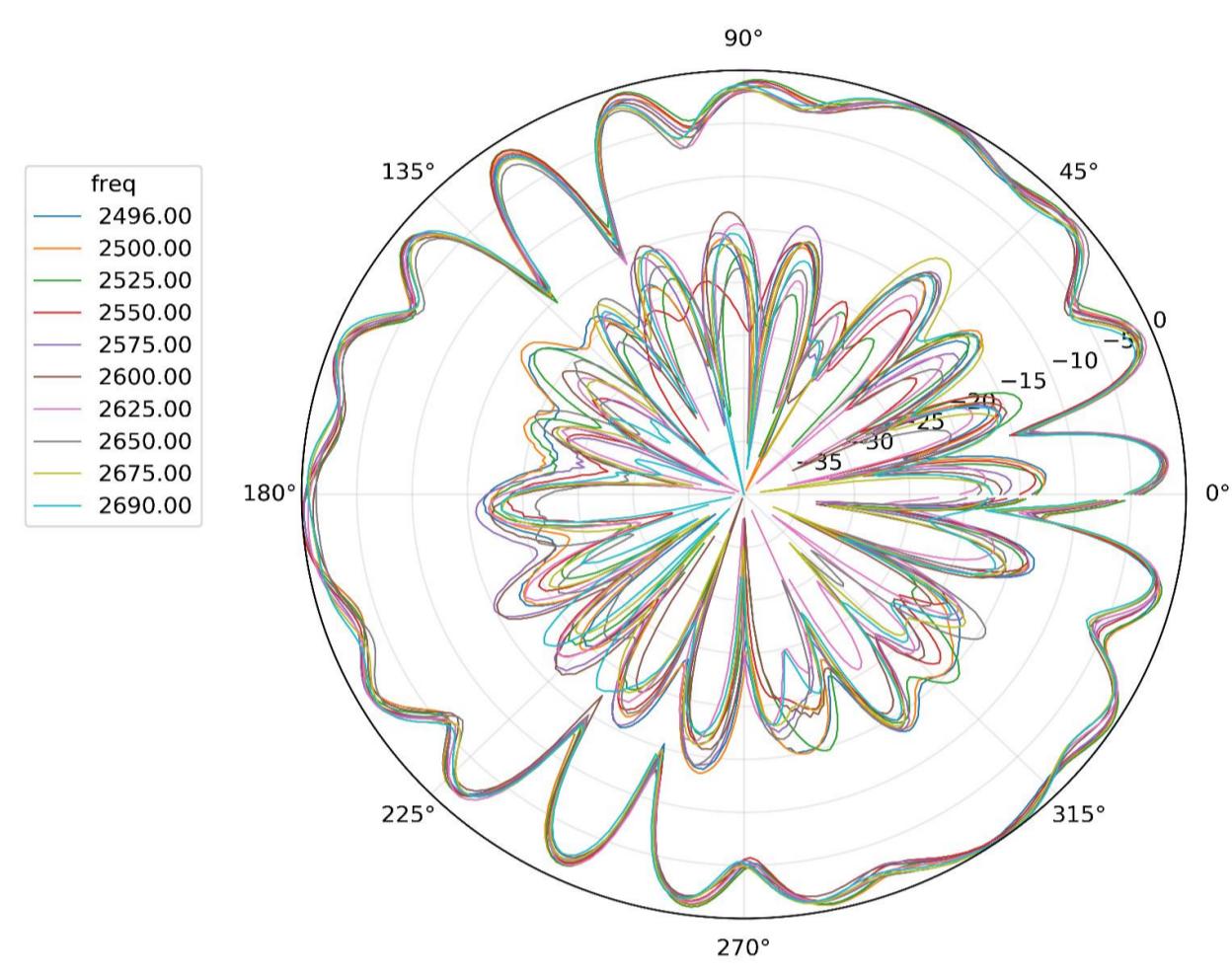
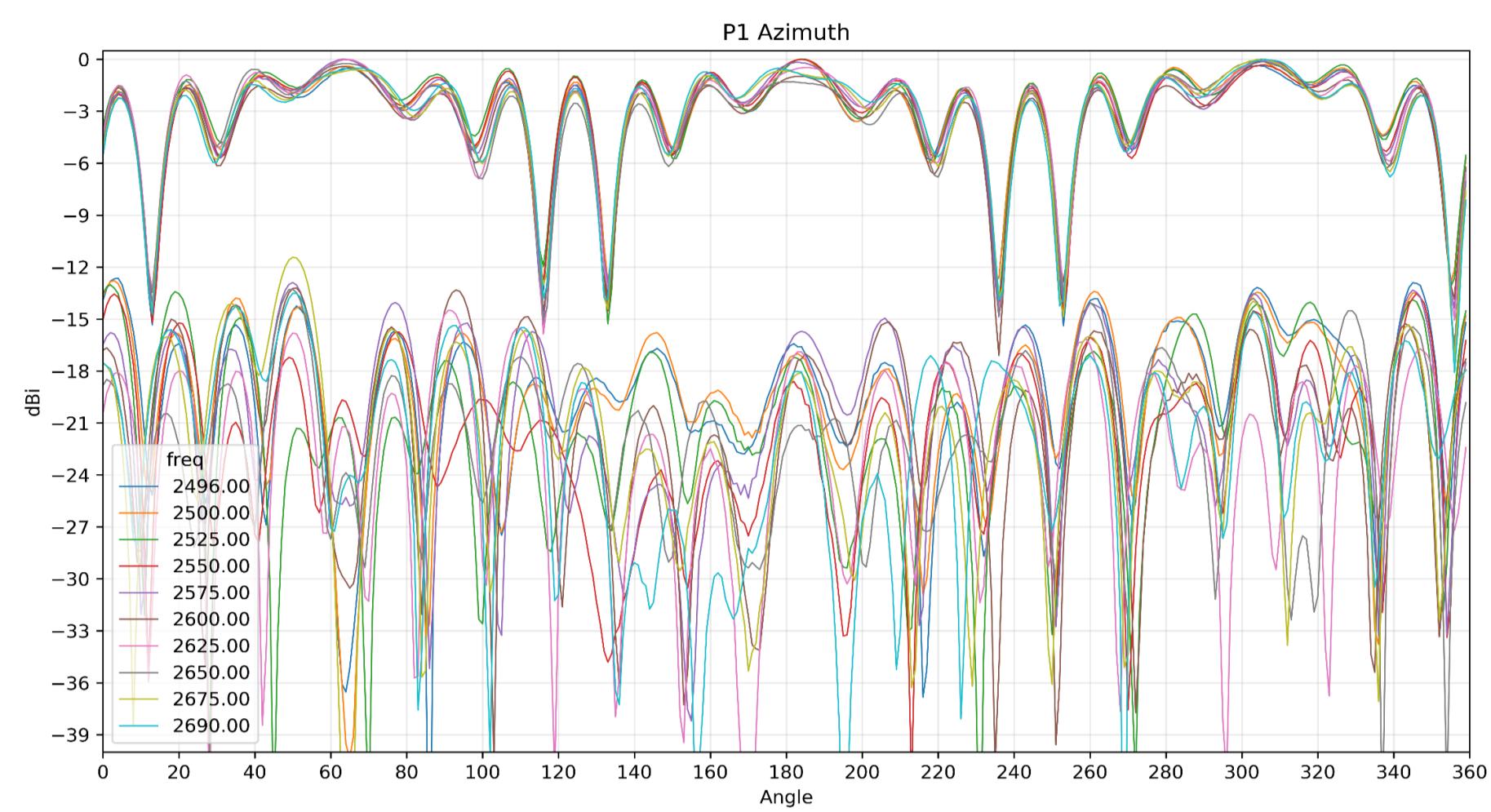
2.1.2 Elevation T6

Items	Spec.	Freq. (MHz)	P1	P2	Avr.	Max	Min	Conclusion
3dB Vertical Beamwidth (°)	14	2496	19.19	15.51	17.1	19.2	15.5	PASS
		2500	18.72	15.64				
		2525	17.40	16.12				
		2550	16.98	18.06				
		2575	17.33	18.04				
		2600	17.63	18.14				
		2625	17.05	17.32				
		2650	15.98	17.78				
		2675	15.78	17.22				
		2690	16.22	16.12				
EL Tilt Deviation (°)	1	2496	0.50	0.75	0.8	1.7	0.1	PASS
		2500	0.35	0.55				
		2525	1.40	0.25				
		2550	0.80	1.10				
		2575	0.80	1.55				
		2600	1.45	1.55				
		2625	1.15	1.65				
		2650	0.70	0.80				
Vertical Upper Sidelobe Suppression,20° to peak (dB)	18	2675	0.20	0.25	NA	NA	NA	PASS
		2690	0.40	0.10				
		2496	No Sidelobe	No Sidelobe				
		2500	No Sidelobe	No Sidelobe				
		2525	No Sidelobe	No Sidelobe				
		2550	No Sidelobe	No Sidelobe				
		2575	No Sidelobe	No Sidelobe				
		2600	No Sidelobe	No Sidelobe				
		2625	No Sidelobe	No Sidelobe				
Vertical Upper Sidelobe Suppression,1st sidelobe (dB)	NA	2650	No Sidelobe	No Sidelobe	15.9	27.5	11.0	NA
		2675	No Sidelobe	No Sidelobe				
		2690	No Sidelobe	No Sidelobe				
		2496	12.50	14.91				
		2500	13.29	14.89				
		2525	19.78	27.49				
		2550	19.34	23.23				
		2575	16.40	21.57				
		2600	16.38	15.21				

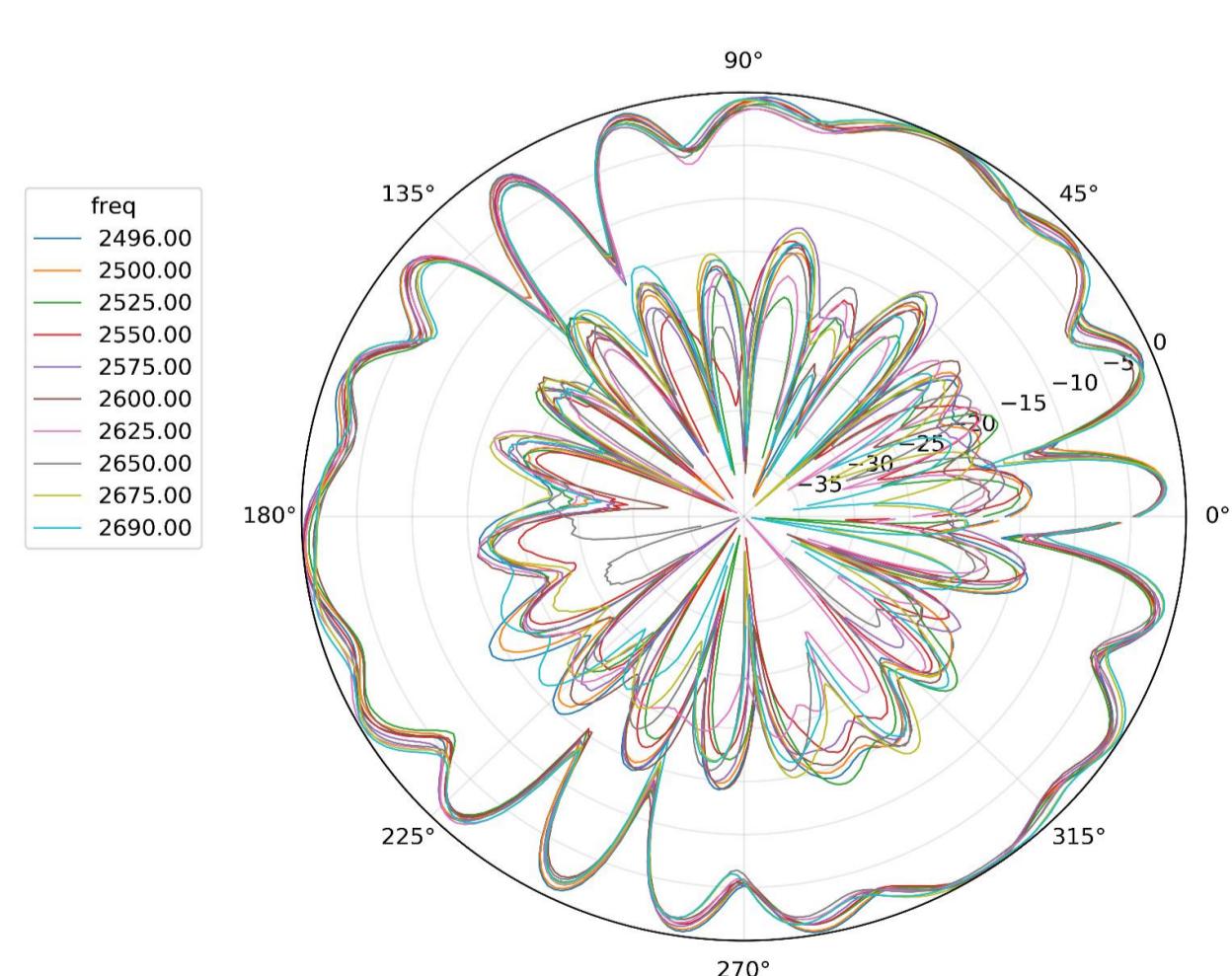
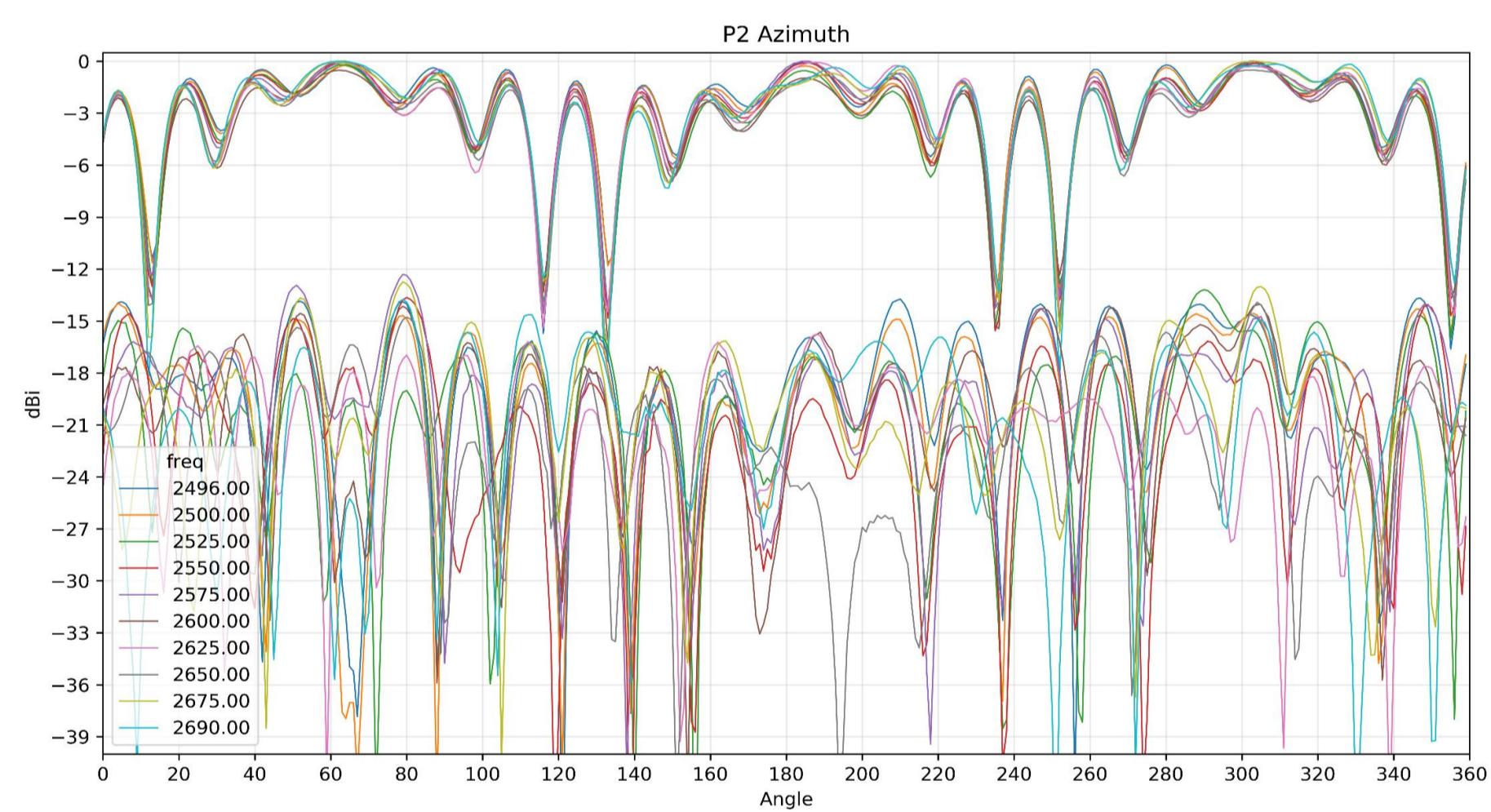
3, Radiation Plots

3.1 Azimuth Plots

3.1.1 P1 -45 T6 Azimuth

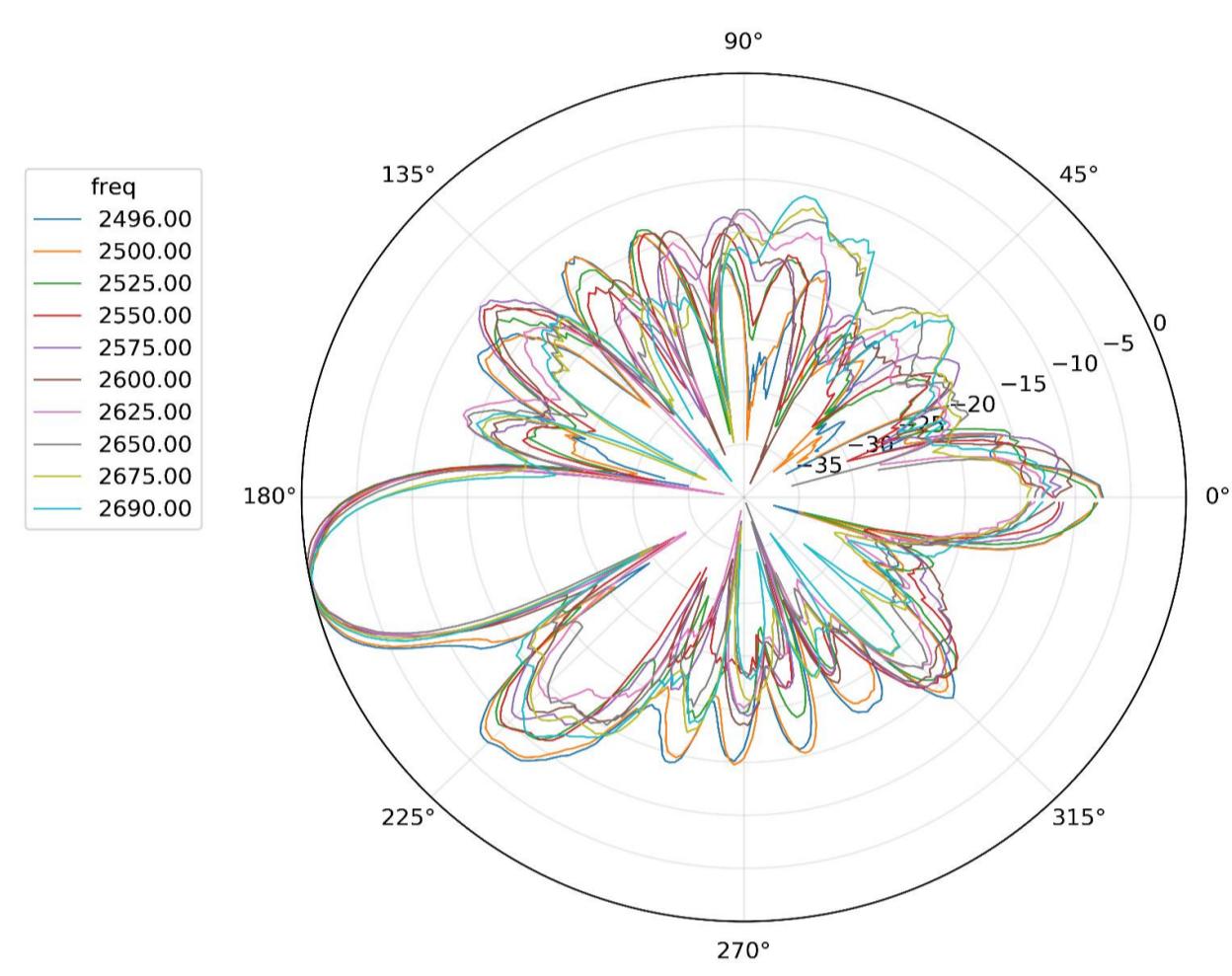
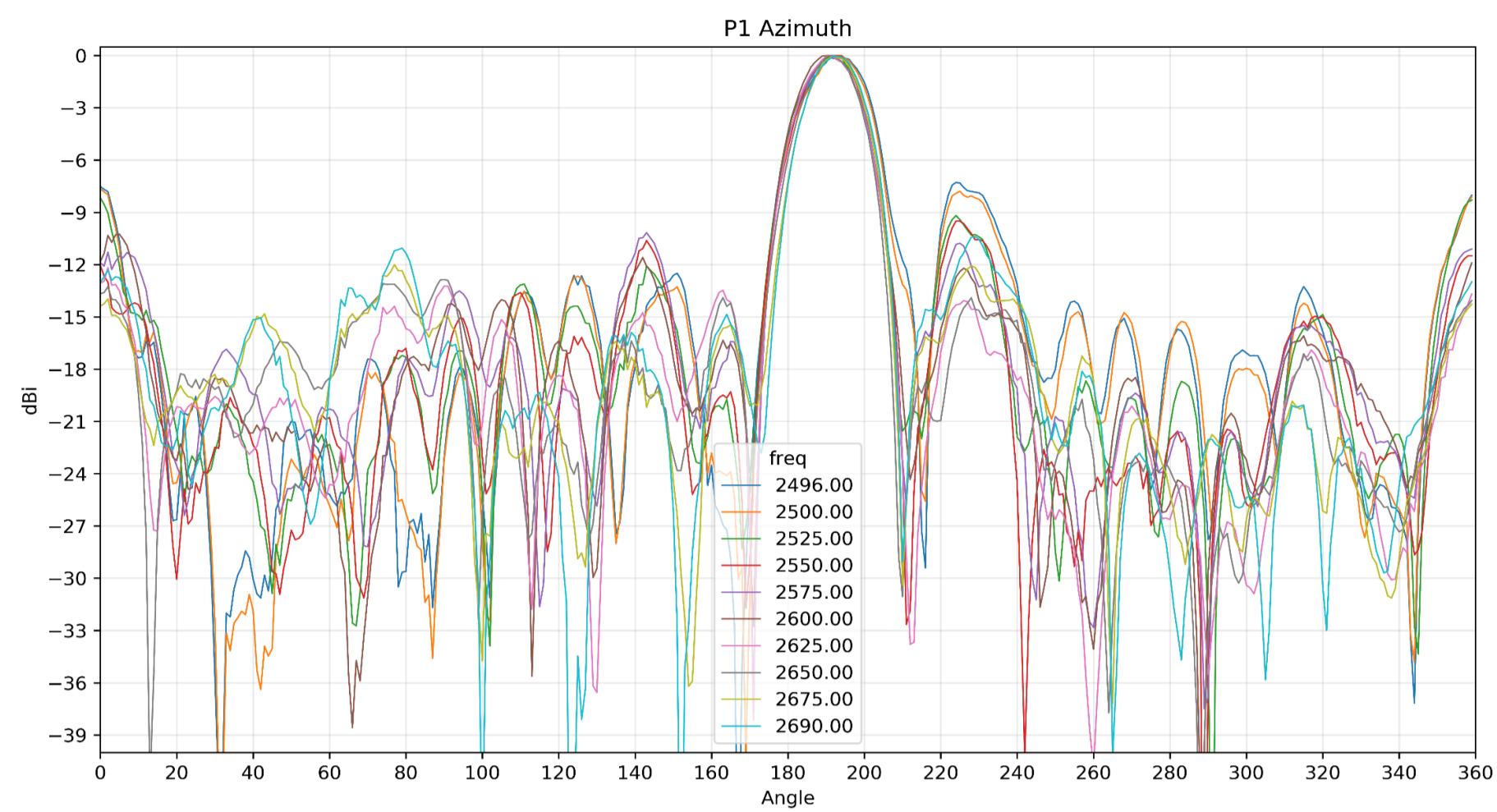


3.1.2 P2 +45 T6 Azimuth

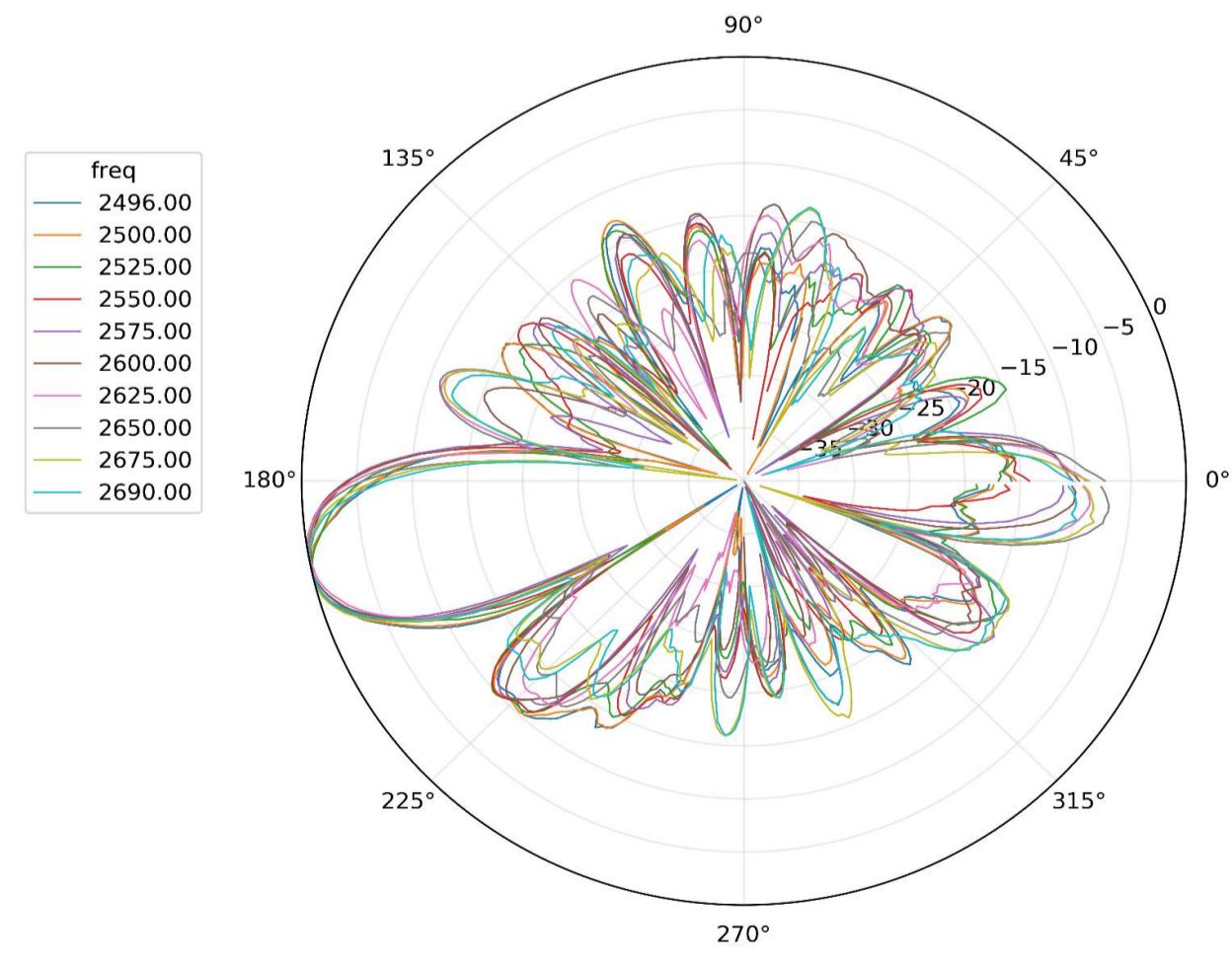
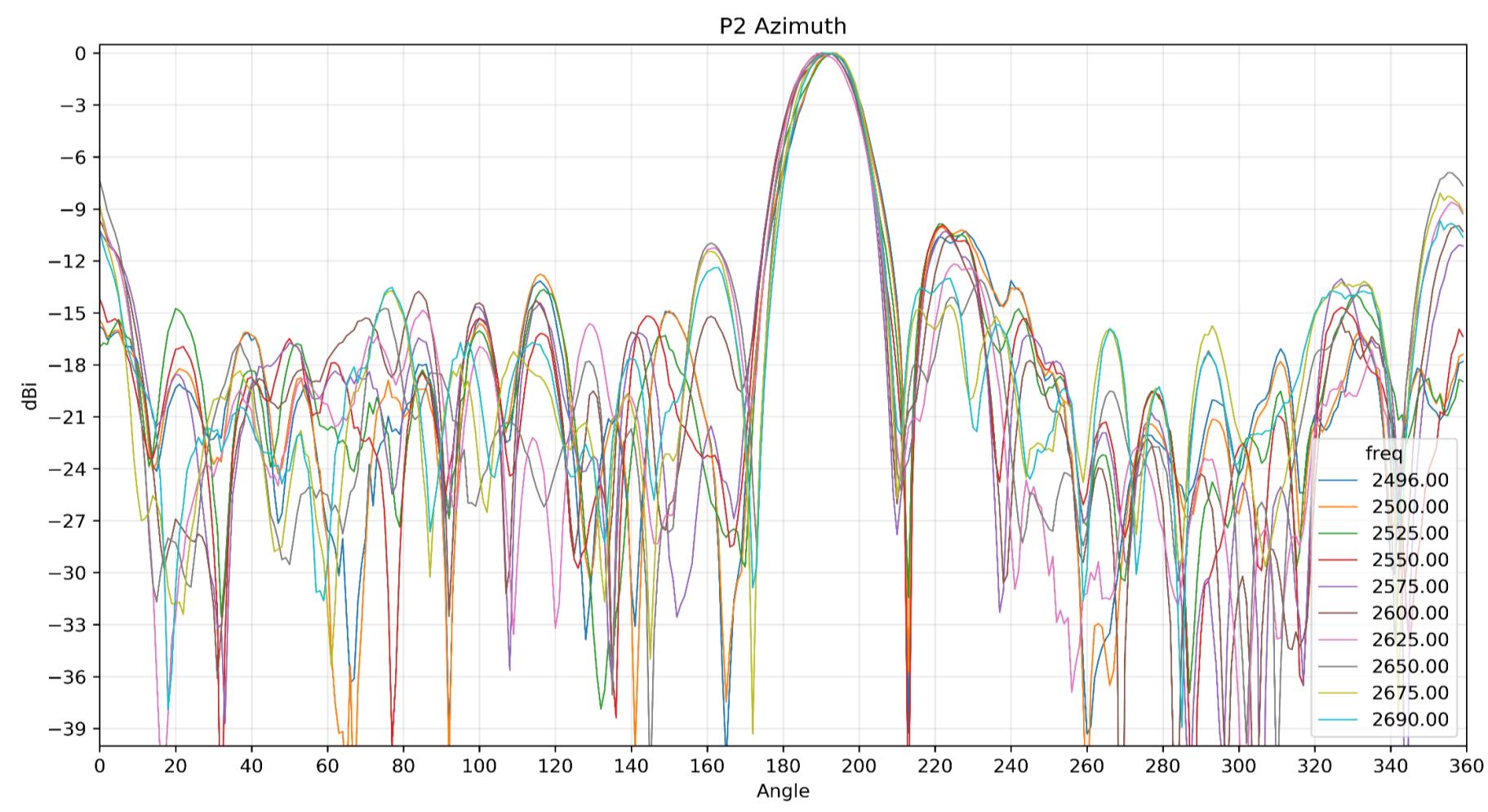


3.2 Elevation Plots

3.2.1 P1 -45 T6 Elevation



3.2.2 P2 +45 T6 Elevation



Test Notes & Calculations

Test results calculated using the new AW test software.
Tilt deviation calculated using the 3dB BW midpoint method.

The weather condition were very poor on the day test, with snowfall occurring. As a result the gain figures were a little erratic. The P1 gain appeared to down by approx 3dB compared to P2. Therefor P1's gain was calculated by the follwoing method.

P2 gain - (P1 AZ peak amp - P2 Az peak amp)

Measurement Setup Photos**Azimuth****Setup****Elevation Setup**