

ODSC 4T4R Antenna Simulation Report VVDN_MPRU 3.3-4.2GHz (Variant-2)

Premier Electronics Engineering & Manufacturing Company
Creating Opportunities & Transforming Lives

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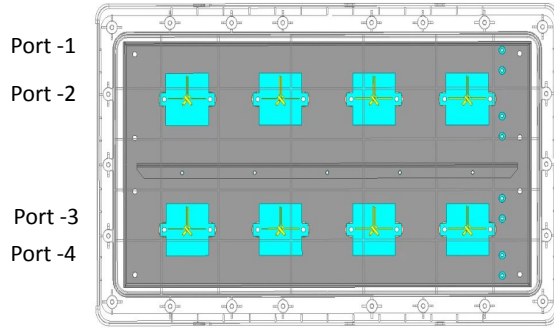
Outline

- Antenna Specification
- 4T4R Antenna Design
- Simulated Return Loss, Isolation, VSWR
- Simulated Peak realized gain, FBR
- Simulated 2D radiation Patterns
- Summary

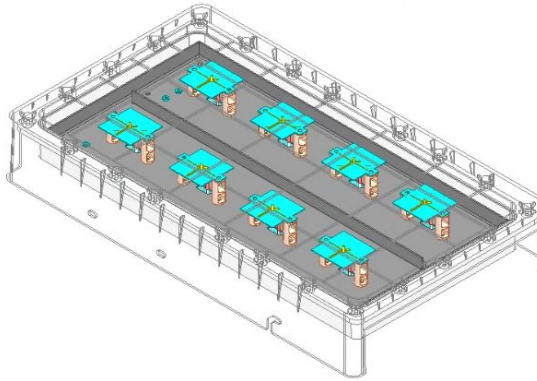
ODSC 4T4R ANTENNA SPECIFICATIONS

Electrical Parameters	Values
Antenna Type	External Clip on antenna for RU
Frequency (GHz)	3.3-4.2
Gain (dBi)	13, +/-0.5
Horizontal Beamwidth (°)	65, +/- 5 °
Vertical Beamwidth (°)	20, +/-2 °
Polarization (°)	+/- 45 °
Electrical Fix Down tilt (°)	2 °
Upper Sidelobe Suppression / USLS (dB)	> 15
Return Loss (dB)	< -10
Port to Port Isolation (dB)	> 20
Front to Back Ratio (dB)	> 20
Cross Polar Discrimination (dB) Boresight 0°	> 20
Cross Polar Discrimination (dB) Sector ±60°	> 10
Passive Intermodulation (dBc)	< -150
Impedance (ohm)	50
Power Handling (W)	> 50
Mechanical Parameters	Values
RF Ports at Bottom	4.3-10 M Straight connector with 280mm cable
Dimensions in mm (L x W x D)	330 x 248 x 67.5
Number of Ports	4
Lightning Protection	DC Ground
Relative Humidity	5% - 95%
Operating Temperature Range	-40 ~ +70 °C
Clip-On provision	4 positions
Wind Loading @ Velocity, frontal	327.0 N @ 150 km/h
IP Rating	IP67

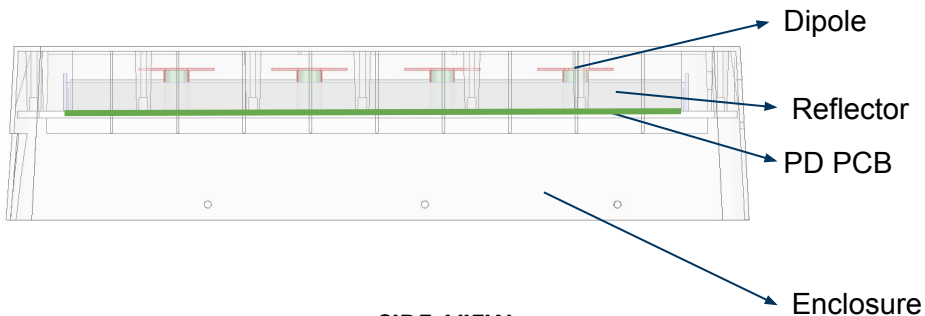
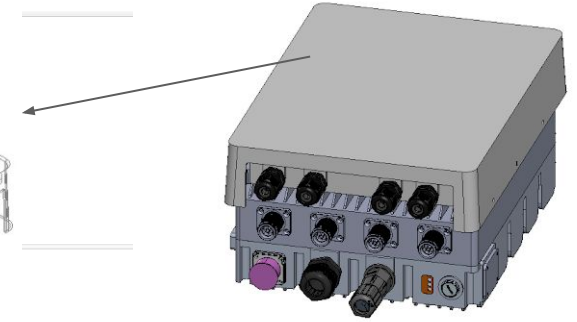
4T4R Antenna Model



TOP VIEW



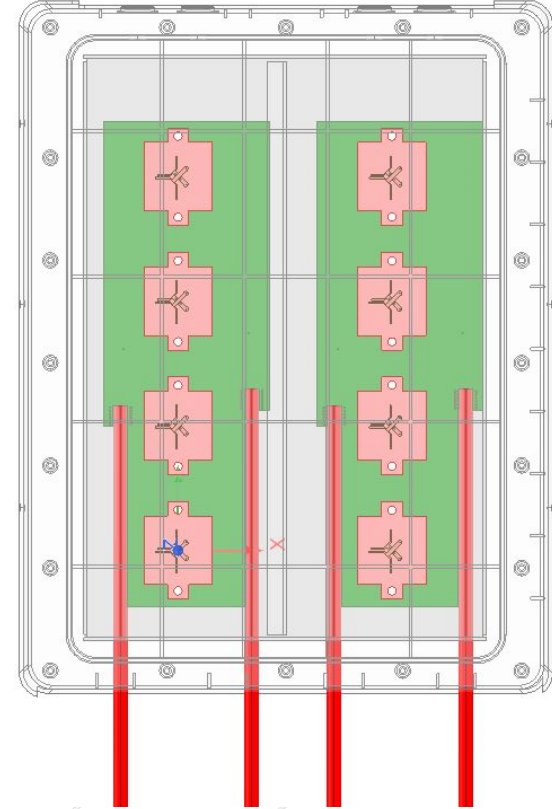
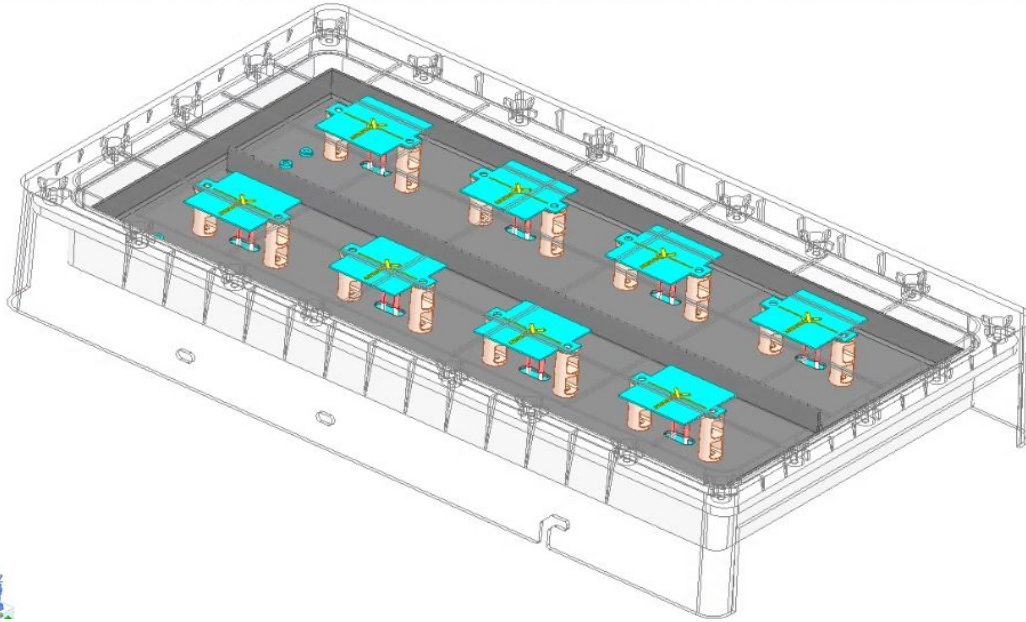
ISOMETRIC VIEW



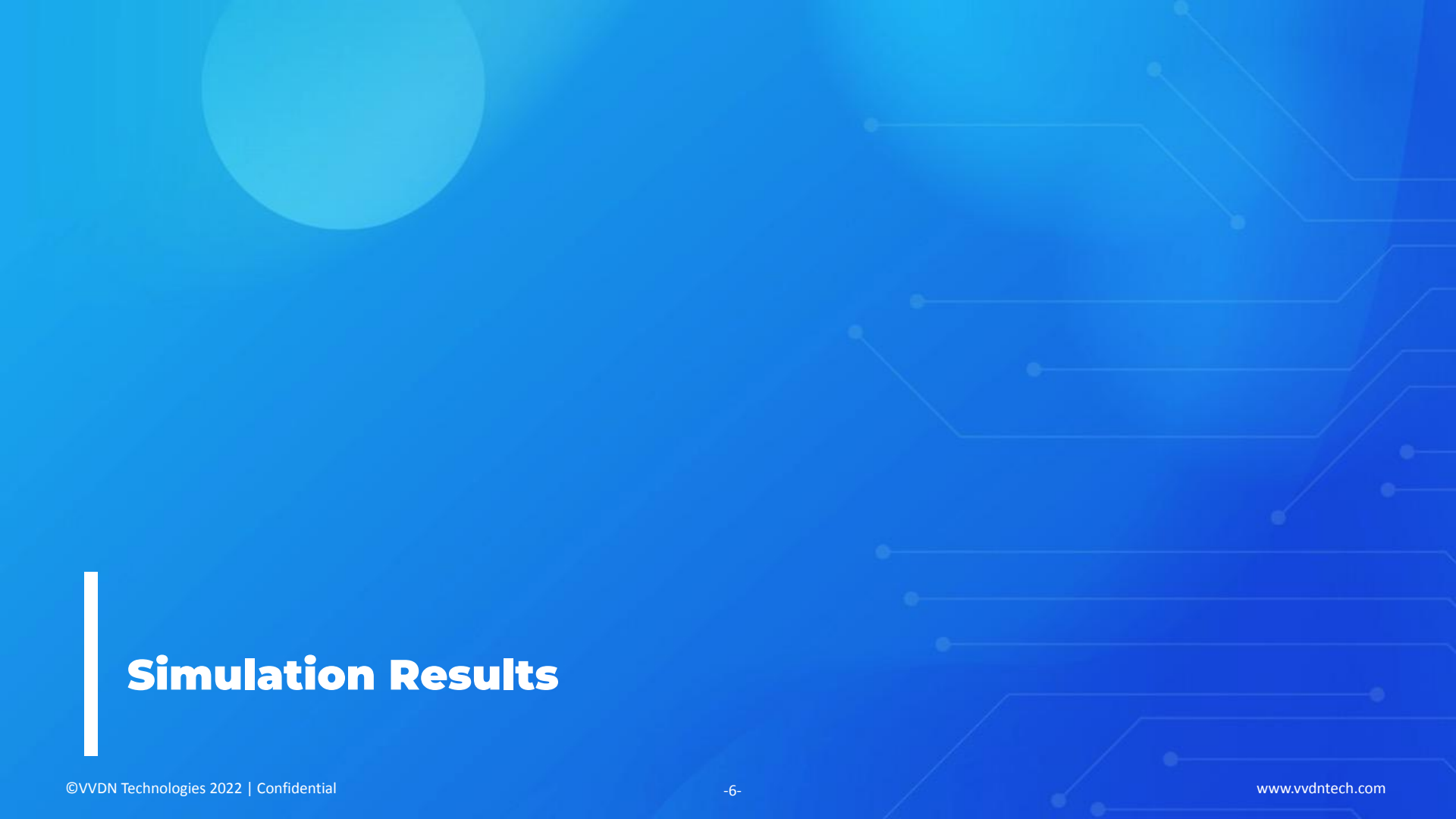
SIDE VIEW

Antenna Size including Radome	: 330(L) x 248 (W) x 78(D) mm
Reflector Size	: 280 (L) X 194 (W)
Dipole Size	: 36 X 50 X 20mm
PD PCB Size	: 85 X 250 X 0.87mm
Dipole/PD PCB	: Hydrocarbon, Dk: 3.35, Df: 0.0025
Reflector Material	: Aluminum
Spacer Material	: Nylon
Antenna Enclosure	: Polycarbonate
RU Enclosure	: Aluminium
Cable used	: RG- 086

Dipole and PD Assembly

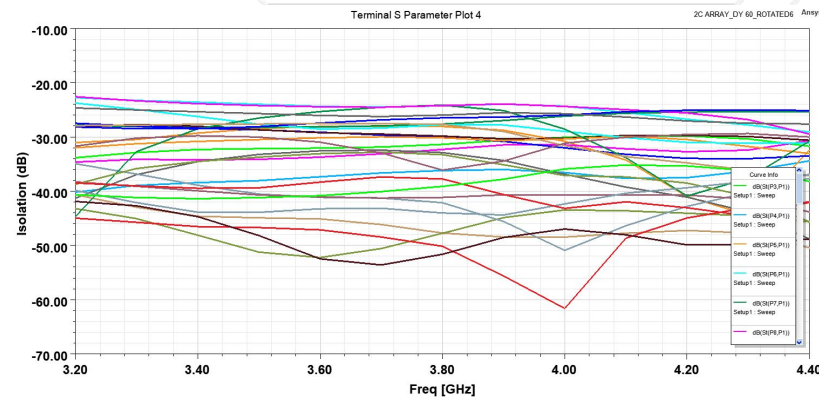
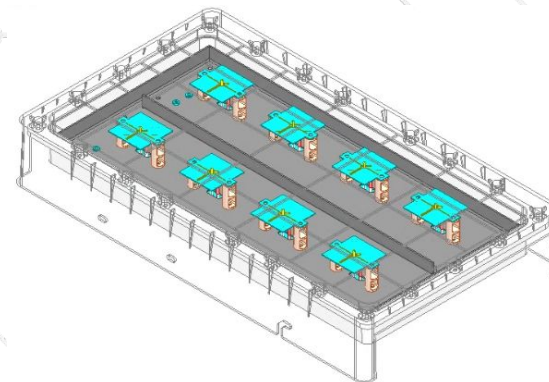
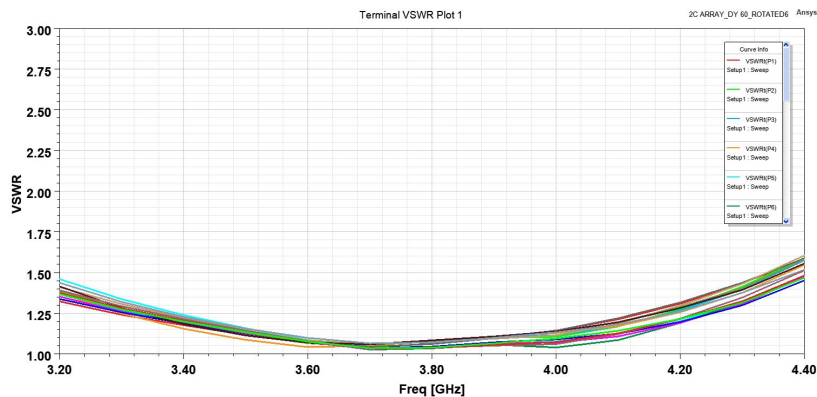
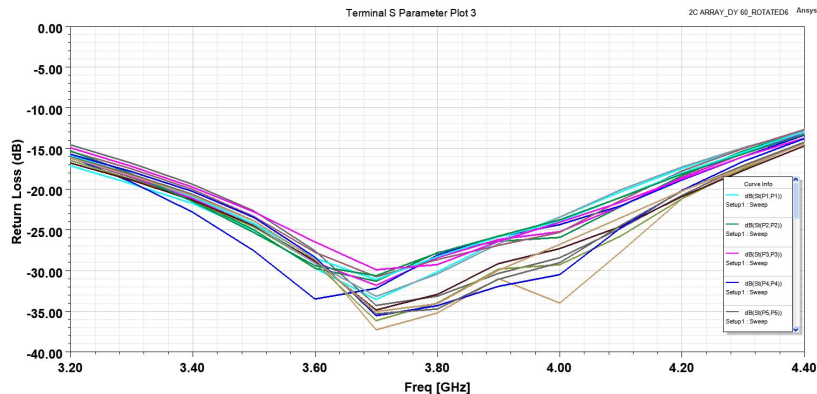


- Dipole and PD PCBs are modified to obtain the require BW.
- Mounting holes at the reflector plates are also changed.
- PD output cable type is also changed to 4.3-10 straight connector with 280mm cable length.

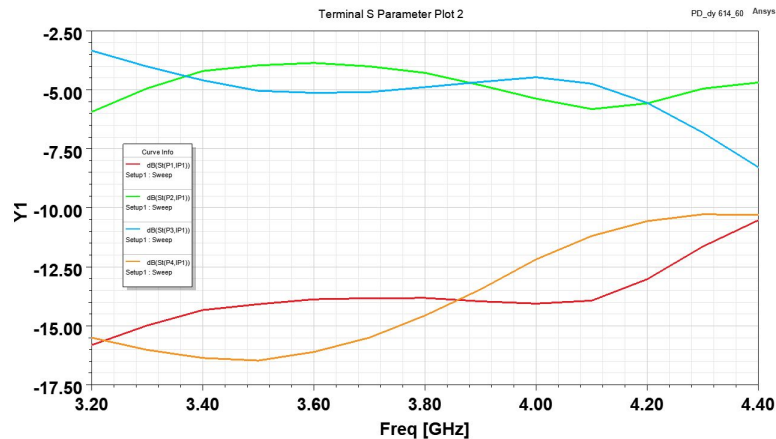
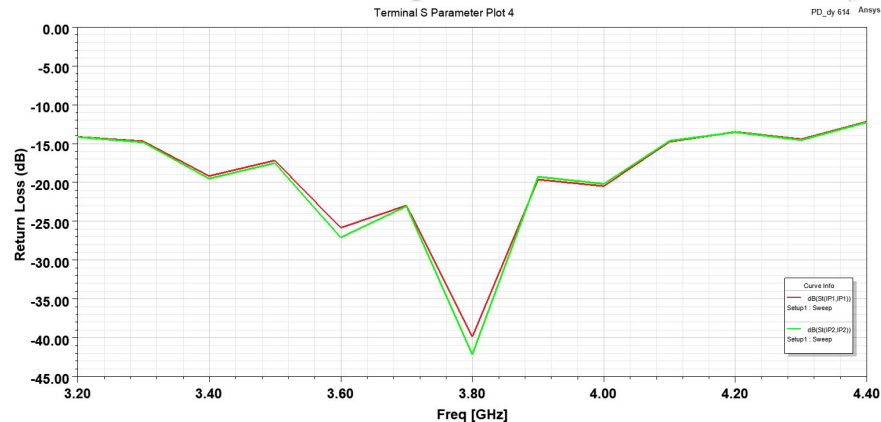
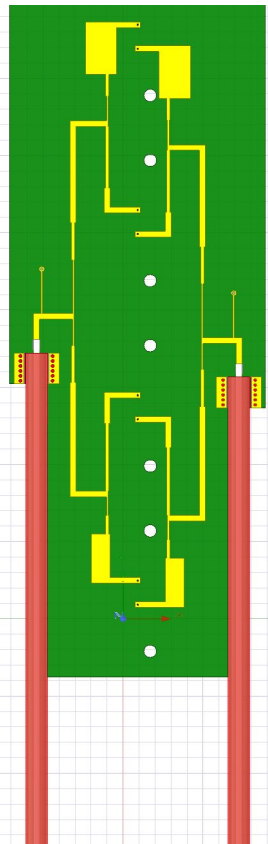


Simulation Results

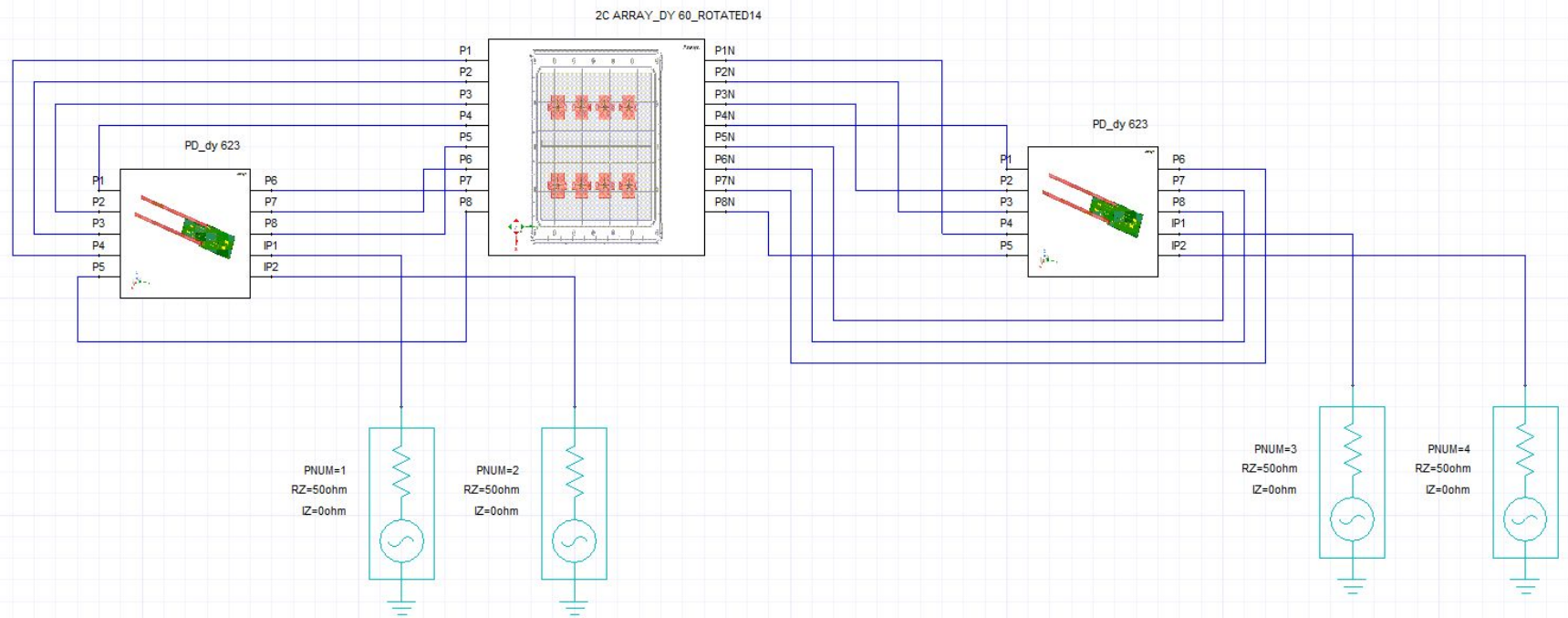
Simulation Results of Dipoles Standalone



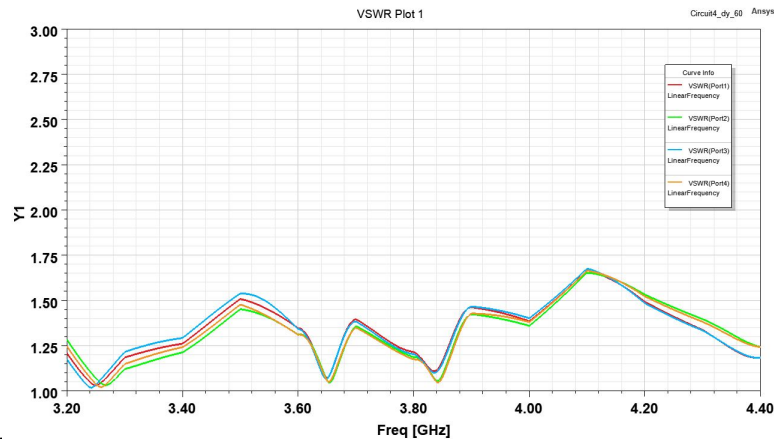
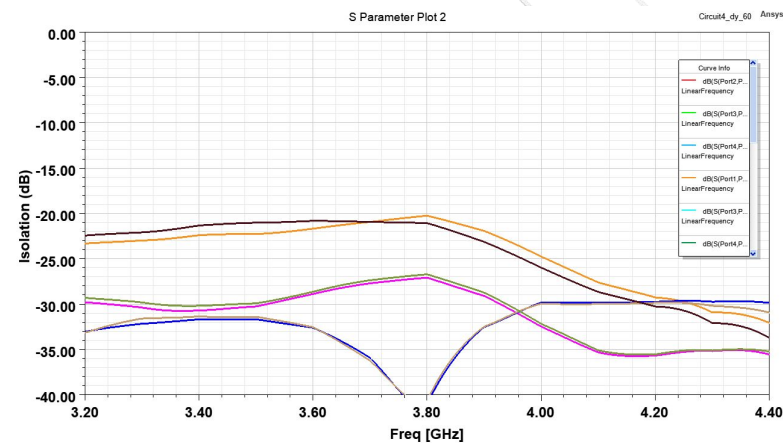
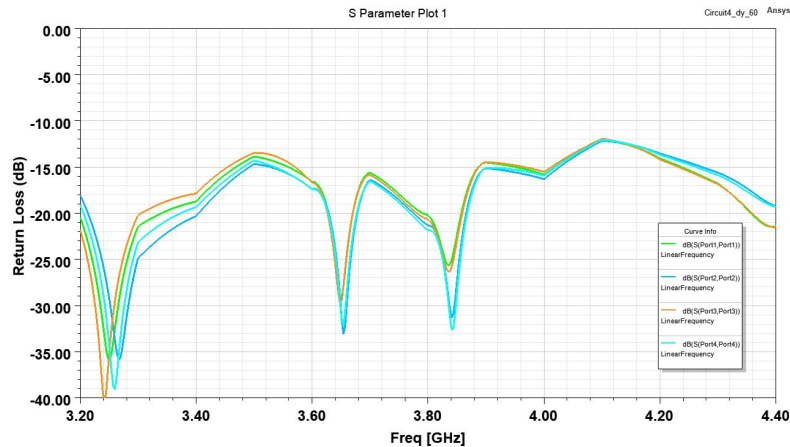
Simulation Results of Power Divider Standalone



Dynamic Link Simulation (Dipoles + PD)



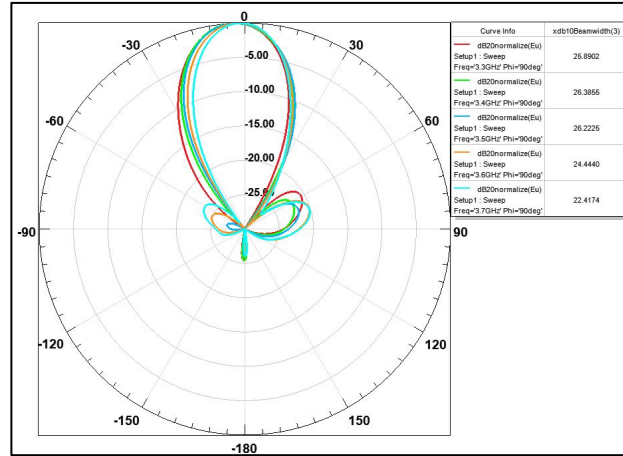
Return Loss/ VSWR, Isolation



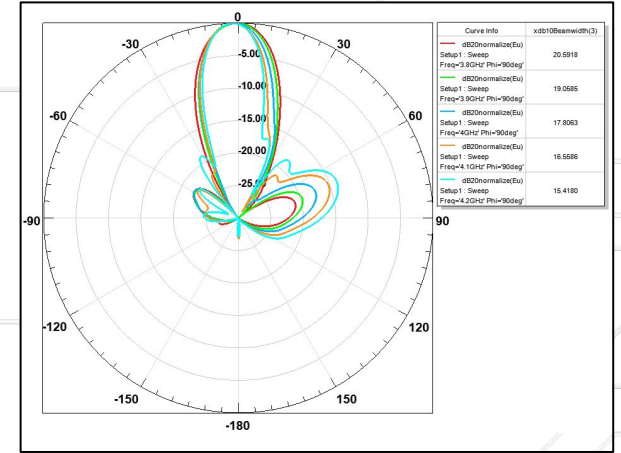
Port 1

	Freq [GHz]	dB(PeakRealizedGain) Setup1 : Sweep
1	3.300000	12.862156
2	3.400000	13.159969
3	3.500000	13.373532
4	3.600000	13.609563
5	3.700000	13.787184
6	3.800000	13.631627
7	3.900000	13.679028
8	4.000000	13.714173
9	4.100000	13.935303
10	4.200000	14.000940

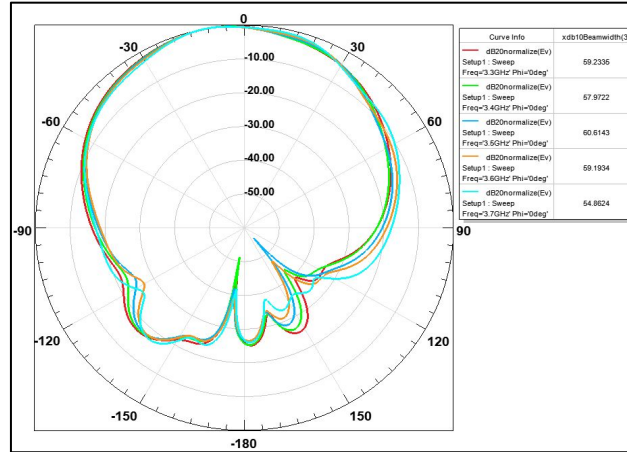
Elevation Plane, 3.3-3.7 GHz



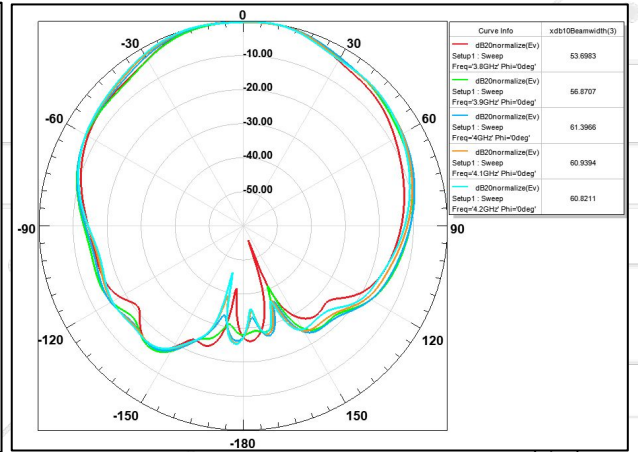
Elevation Plane, 3.8-4.2 GHz



Azimuth Plane, 3.3-3.7 GHz



Azimuth Plane, 3.8-4.2 GHz



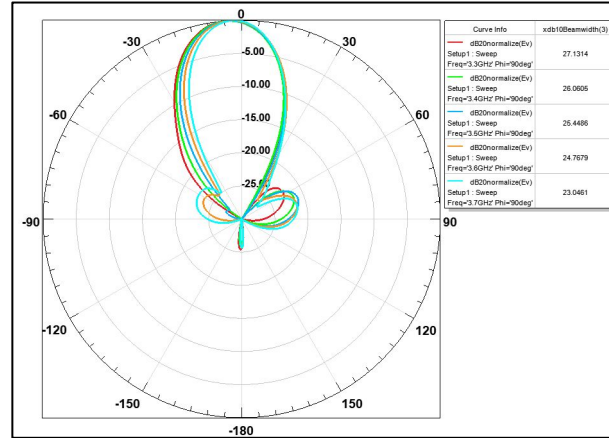
	Freq [GHz]	dB10(FrontToBackRatio) Setup1 : Sweep
1	3.300000	23.392377
2	3.400000	22.972898
3	3.500000	23.078557
4	3.600000	24.557433
5	3.700000	23.821444
6	3.800000	20.812917
7	3.900000	21.398856
8	4.000000	22.384088
9	4.100000	24.337718
10	4.200000	24.416692

Port-2

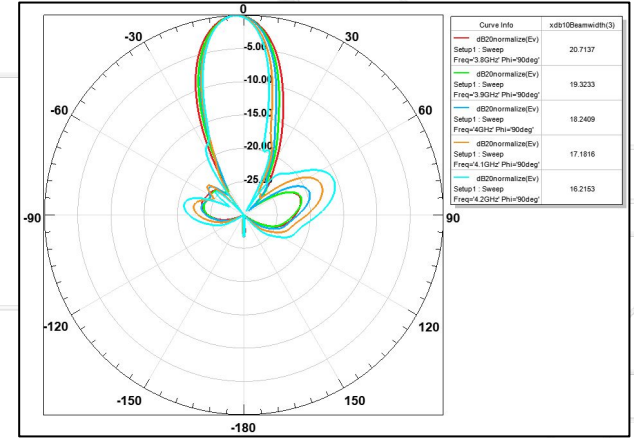
	Freq [GHz]	dB(PeakRealizedGain) Setup1 : Sweep
1	3.300000	12.770148
2	3.400000	13.134204
3	3.500000	13.405385
4	3.600000	13.569128
5	3.700000	13.636754
6	3.800000	13.580700
7	3.900000	13.723718
8	4.000000	13.720563
9	4.100000	13.979220
10	4.200000	14.111907

	Freq [GHz]	dB10(FrontToBackRatio) Setup1 : Sweep
1	3.300000	26.480489
2	3.400000	27.244140
3	3.500000	26.232256
4	3.600000	23.933693
5	3.700000	21.343323
6	3.800000	20.652846
7	3.900000	21.573521
8	4.000000	24.693167
9	4.100000	22.763639
10	4.200000	23.450295

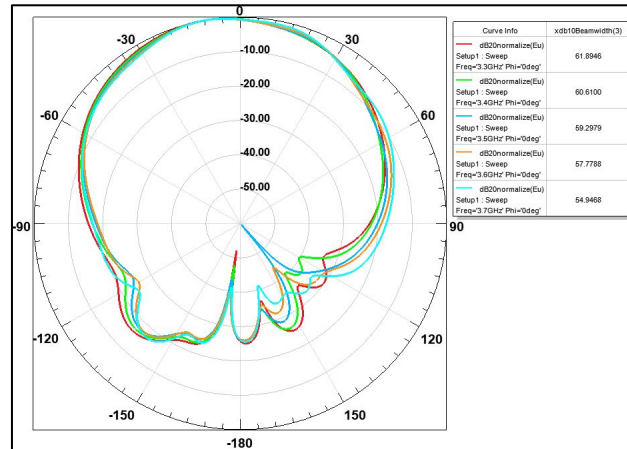
Elevation Plane, 3.3-3.7 GHz



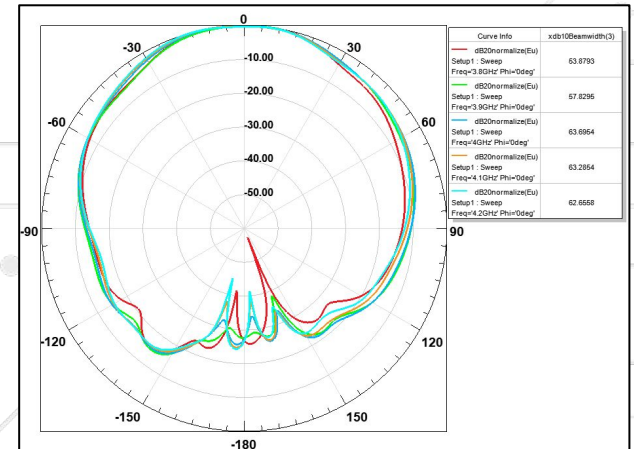
Elevation Plane, 3.8-4.2 GHz



Azimuth Plane, 3.3-3.7 GHz



Azimuth Plane, 3.8-4.2 GHz

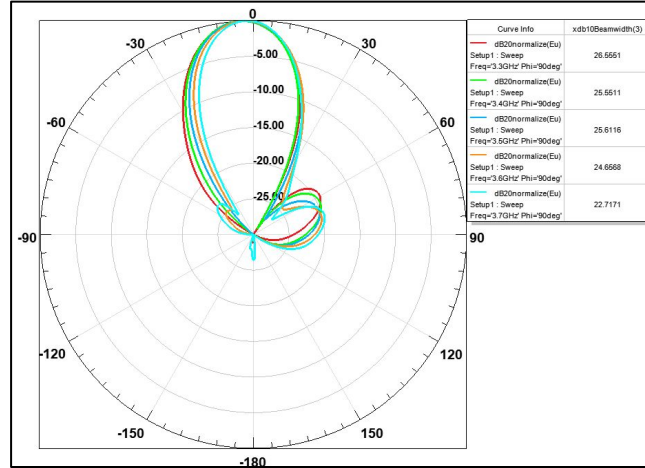


Port-3

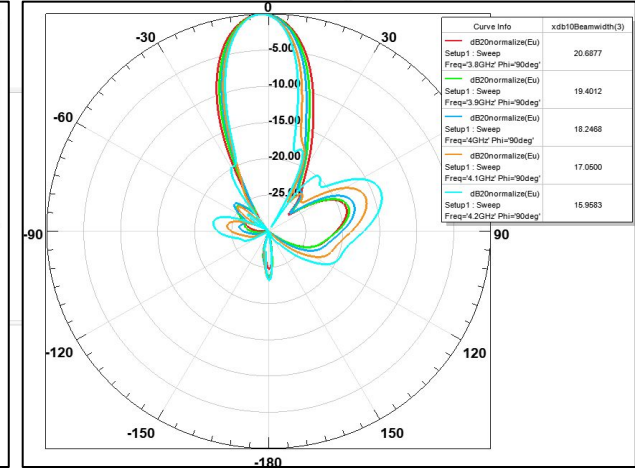
	Freq [GHz]	dB(PeakRealizedGain) Setup1 : Sweep
1	3.300000	12.750015
2	3.400000	13.031192
3	3.500000	13.307612
4	3.600000	13.367292
5	3.700000	13.476893
6	3.800000	13.895569
7	3.900000	13.916526
8	4.000000	13.888746
9	4.100000	13.927597
10	4.200000	14.064151

	Freq [GHz]	dB10(FrontToBackRatio) Setup1 : Sweep
1	3.300000	26.300464
2	3.400000	24.677677
3	3.500000	23.942244
4	3.600000	24.475142
5	3.700000	24.276004
6	3.800000	21.455775
7	3.900000	22.021706
8	4.000000	22.376985
9	4.100000	23.055014
10	4.200000	26.790090

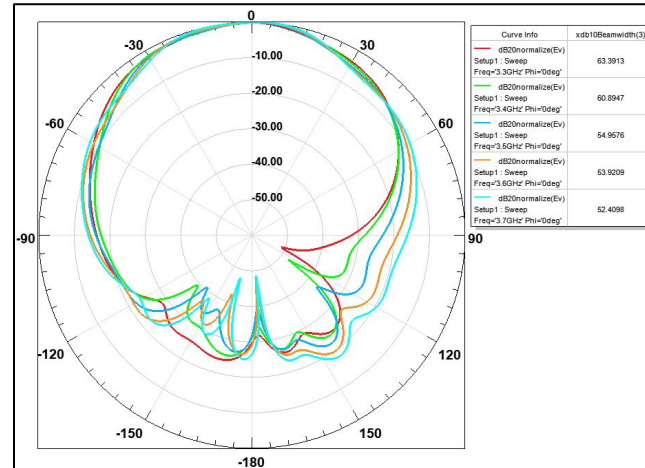
Elevation Plane, 3.3-3.7 GHz



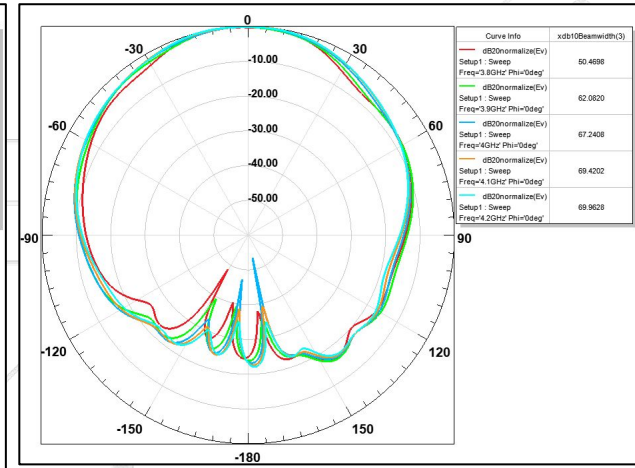
Elevation Plane, 3.8-4.2 GHz



Azimuth Plane, 3.3-3.7 GHz



Azimuth Plane, 3.8-4.2 GHz

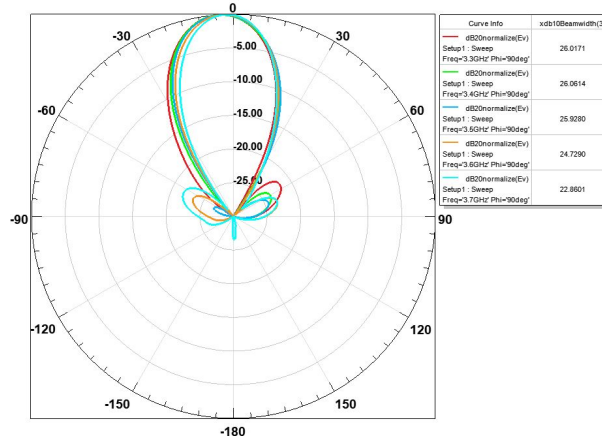


Port-4

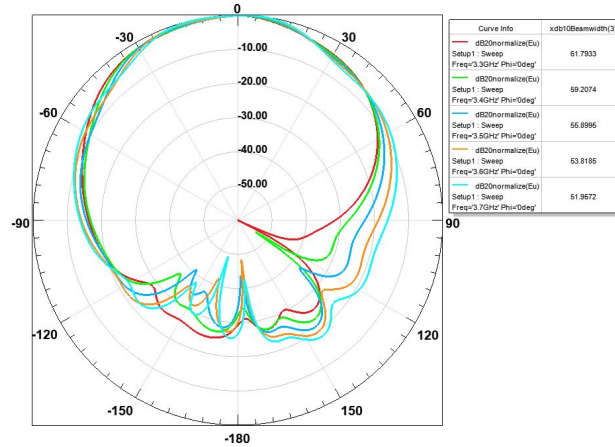
	Freq [GHz]	dB(PeakRealizedGain) Setup1 : Sweep
1	3.300000	12.863520
2	3.400000	13.125248
3	3.500000	13.310899
4	3.600000	13.430666
5	3.700000	13.539022
6	3.800000	13.828040
7	3.900000	13.906155
8	4.000000	13.918602
9	4.100000	13.995155
10	4.200000	14.184894

	Freq [GHz]	dB10(FrontToBackRatio) Setup1 : Sweep
1	3.300000	23.392377
2	3.400000	22.972898
3	3.500000	23.078557
4	3.600000	24.557433
5	3.700000	23.821444
6	3.800000	20.812917
7	3.900000	21.398856
8	4.000000	22.384088
9	4.100000	24.337718
10	4.200000	24.416692

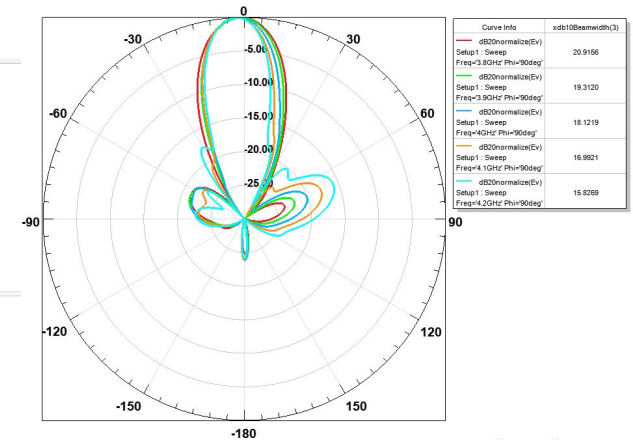
Elevation Plane, 3.3-3.7 GHz



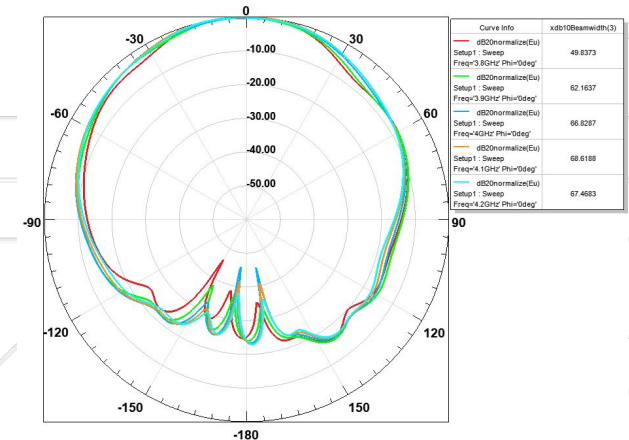
Azimuth Plane, 3.3-3.7 GHz



Elevation Plane, 3.8-4.2 GHz

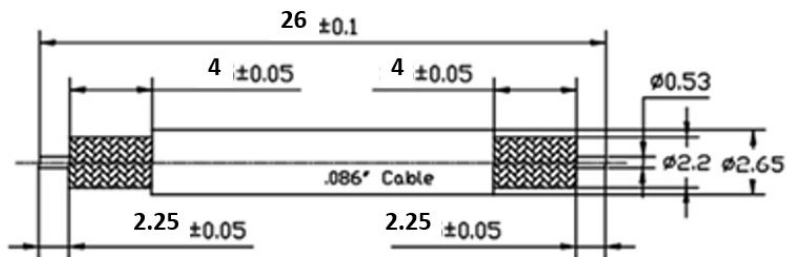


Azimuth Plane, 3.8-4.2 GHz

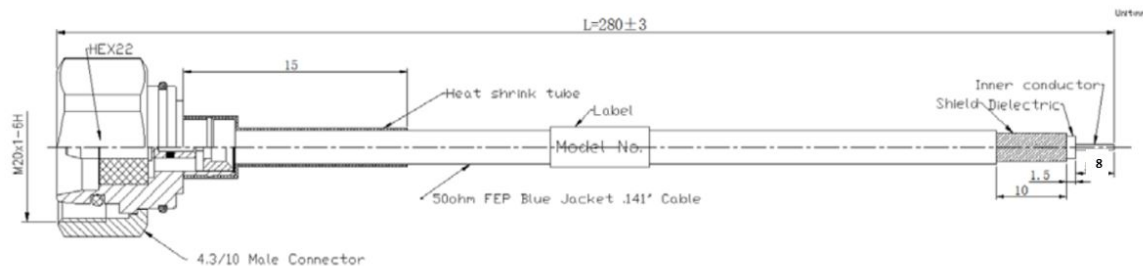


Cable Assemblies

Dipole - PD cable Assy



PD output cable Assy



Conclusion

This design gerber has released and in Fabrication stage
30 Units fabrication - Reflector Mechanical team is doing the same



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