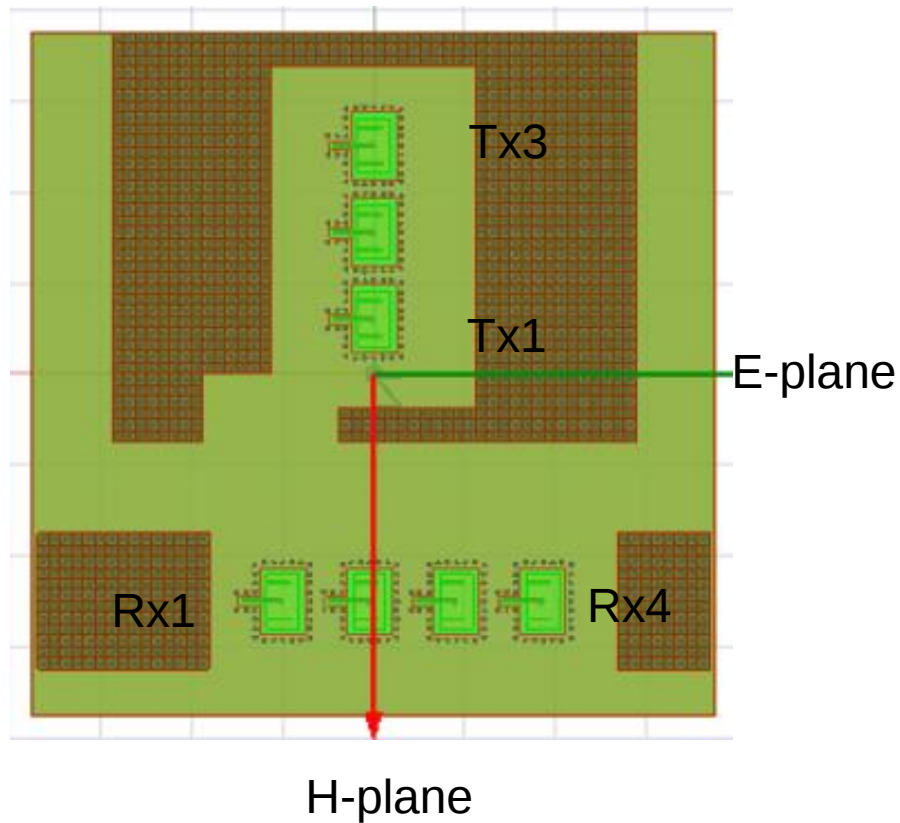


Automotive Radar: AWR1843AoP Design

06/09/2020

1843AoP Latest Pkg Design

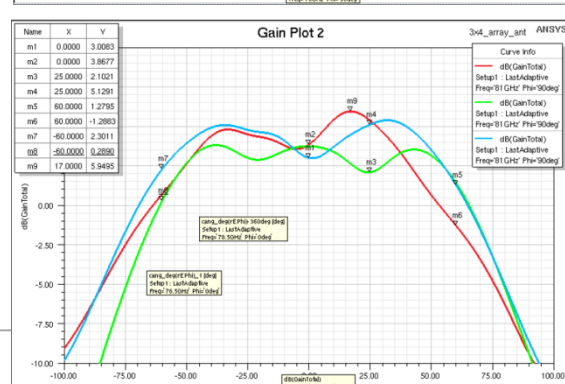
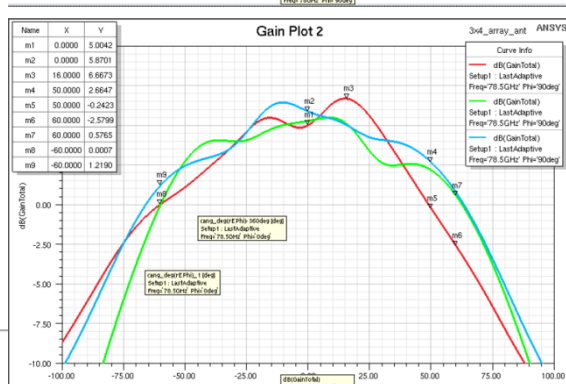
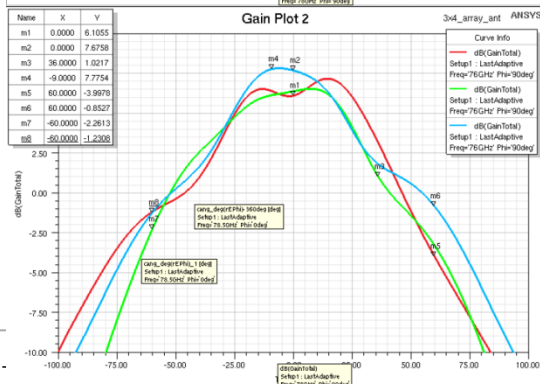
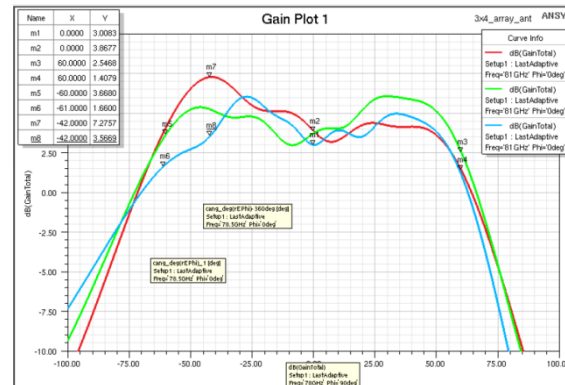
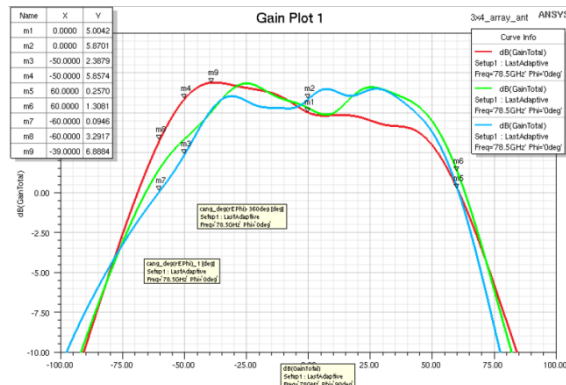
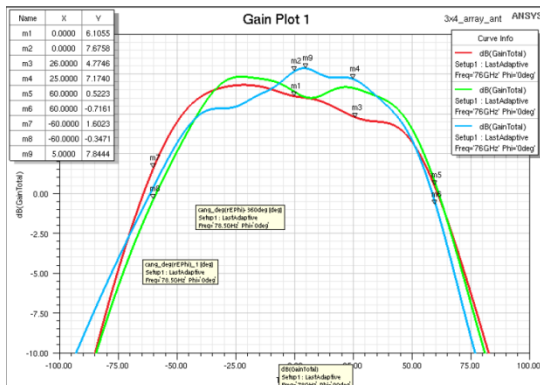


3x4 array: Tx gain pattern

76GHz

78.5GHz

81GHz



3x4 array: Tx gain/gain mismatch

Gain

76GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	7.9	6.1	-0.7	-0.3
E	7.7	6.1	-4	-2.3

78.5GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	6.9	4.6	0.3	0.1
E	6.7	5.0	-2.6	0

81GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	7.3	3	1.4	1.8
E	6.0	3	-1.3	0.3

Gain mismatch

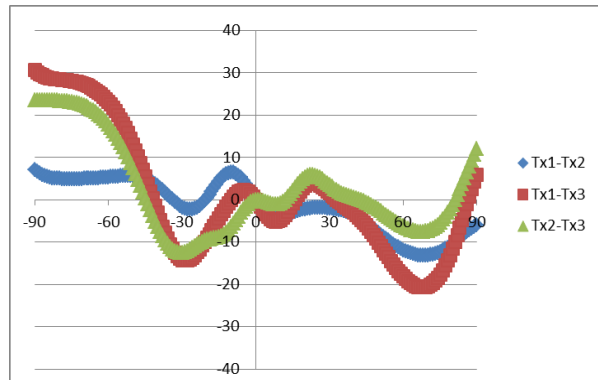
76GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	2.6	1.5	1.3	2
E	3.1	1.5	3.1	1.1

78.5GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	3.5	0.9	1	3.2
E	3.1	0.9	3.1	1.2

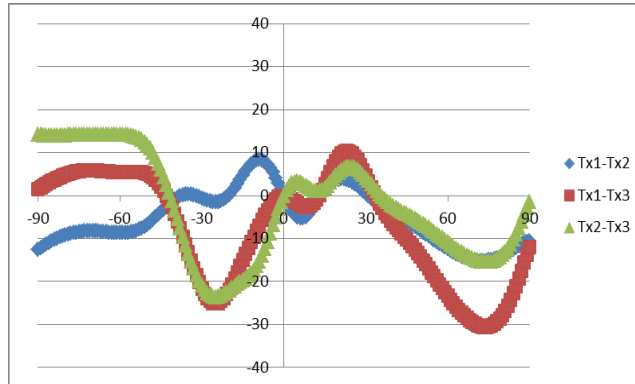
81GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	3.7	0.9	1.1	1.9
E	3.0	0.9	2.6	2

3x4 array: Tx phase mismatch

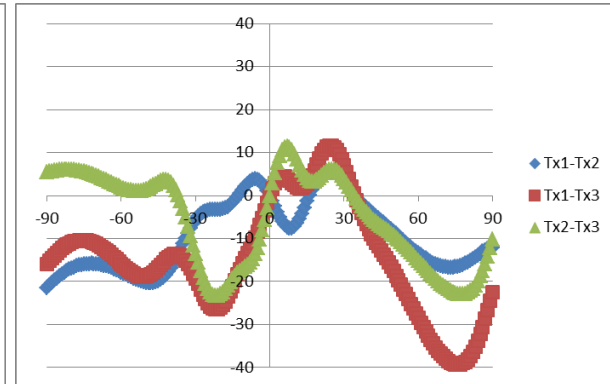
76GHz



78.5GHz

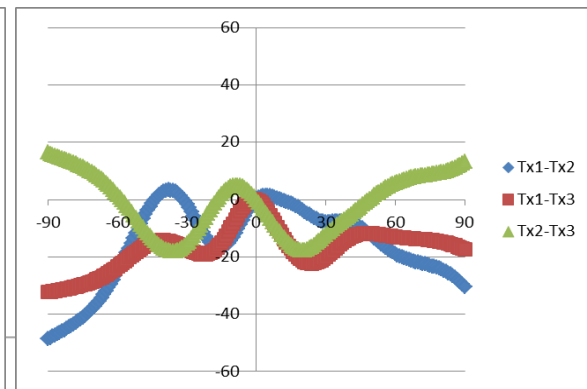
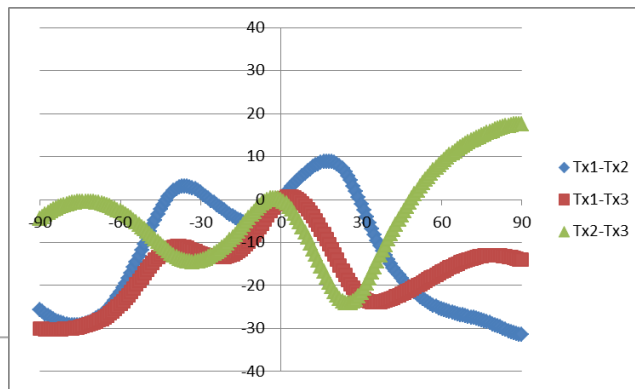
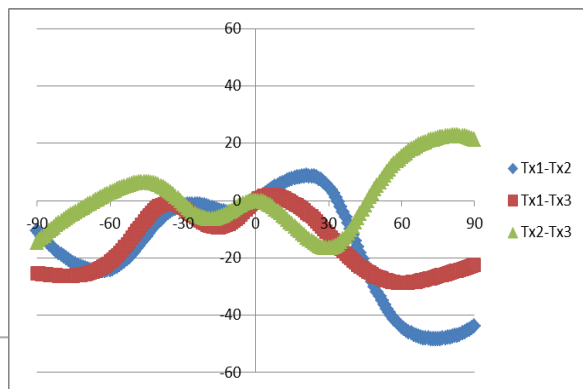


81GHz



H

E

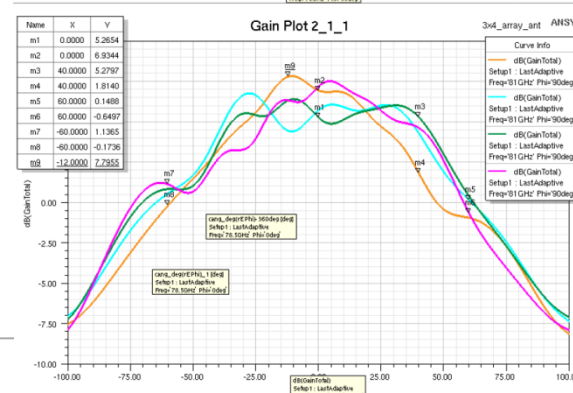
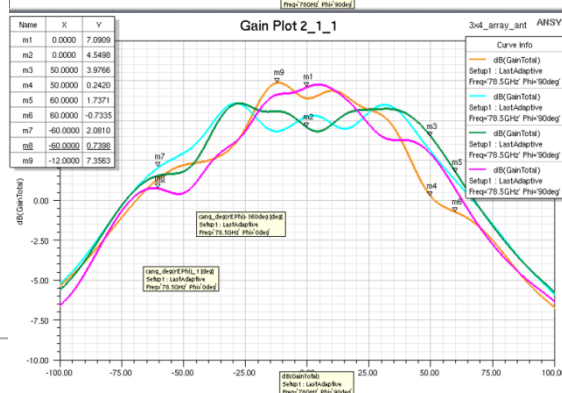
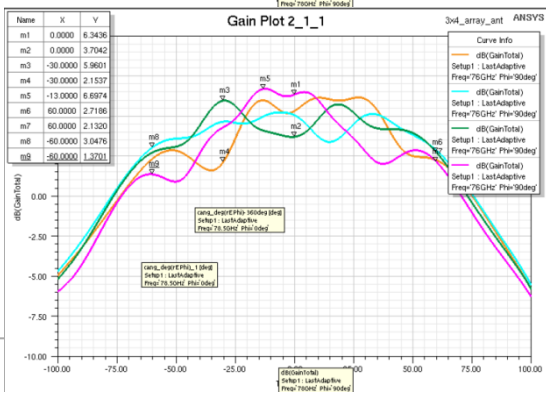
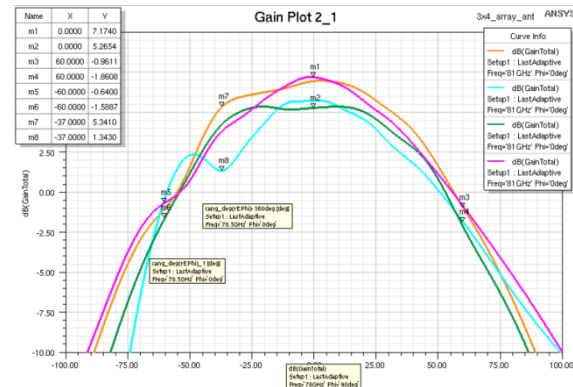
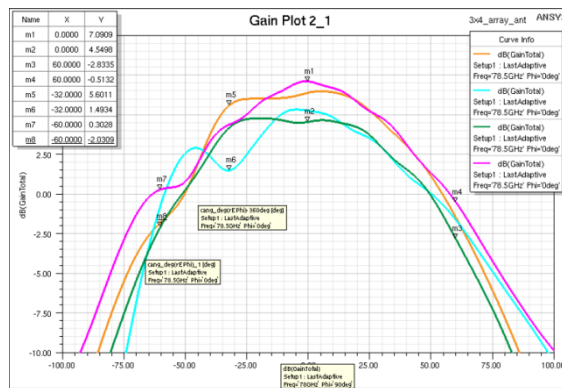
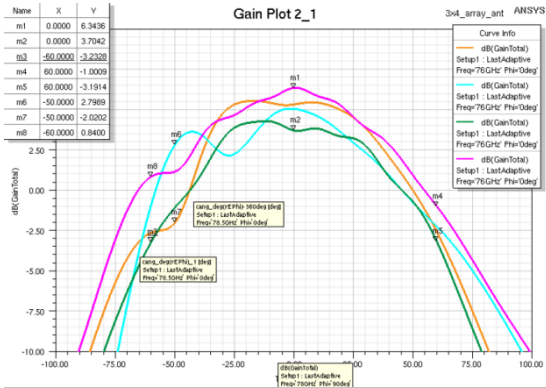


3x4 array: Rx gain pattern

76GHz

78.5GHz

81GHz



3x4 array: Rx gain/gain mismatch

Gain

76GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	6.3	3.7	-3.2	-3.2
E	6.3	3.7	2.1	1.4

78.5GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	7.1	4.5	-2.8	-2
E	7.4	4.5	0.7	0.5

81GHz	Max (dB)	Min @ 0 deg (dB)	Min @ 60 deg (dB)	Min @ -60 deg (dB)
H	7.2	5.3	-1.9	-1.6
E	7.8	5.3	-0.7	-0.2

Gain mismatch

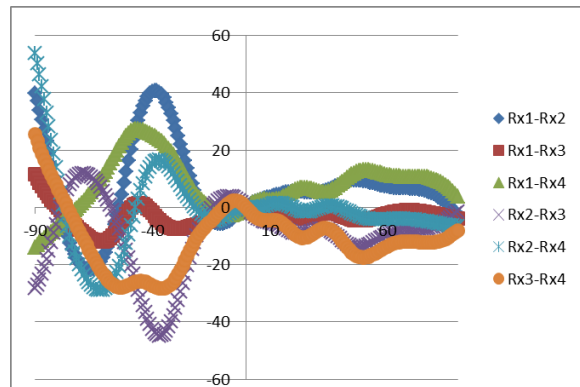
76GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	4.8	2.6	2.2	4.1
E	3.8	3.4	0.6	1.7

78.5GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	4.1	2.5	2.3	2.3
E	3.7	2.5	2.5	1.3

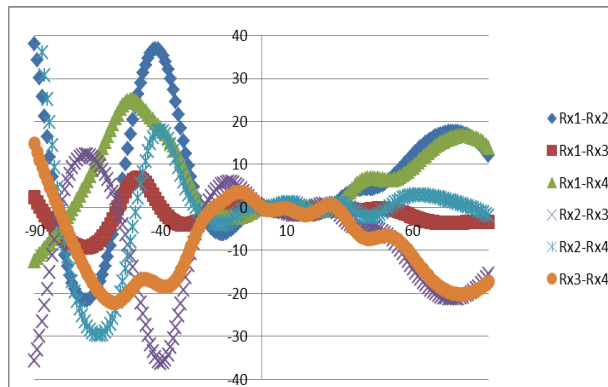
81GHz	Max (dB)	0 deg (dB)	60 deg (dB)	- 60 deg (dB)
H	4	1.9	2.5	2.2
E	3.5	1.8	0.8	1.3

3x4 array: Rx phase mismatch

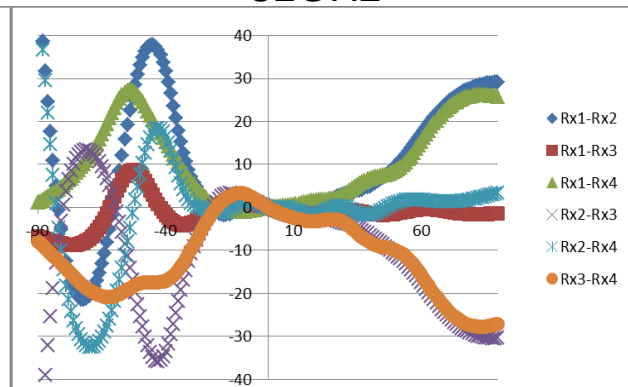
76GHz



78.5GHz

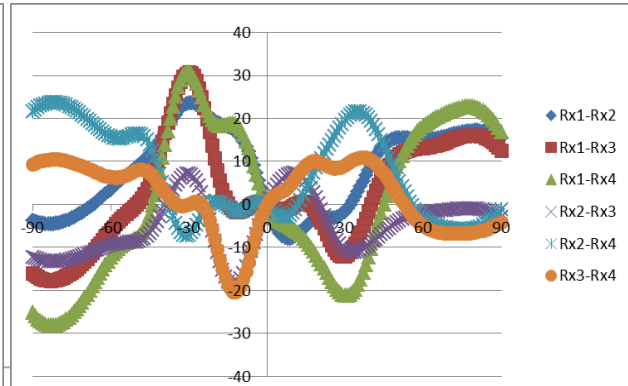
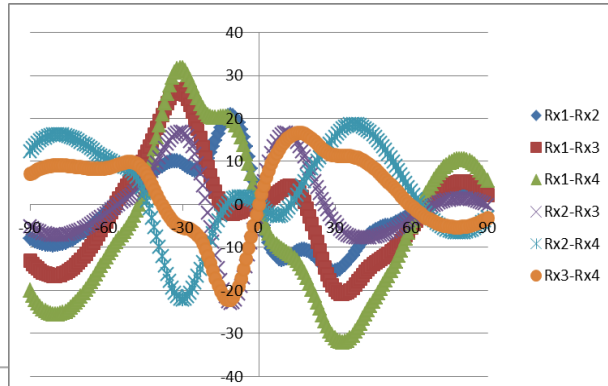
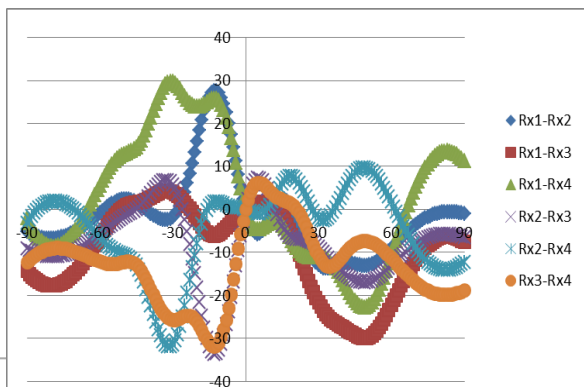


81GHz



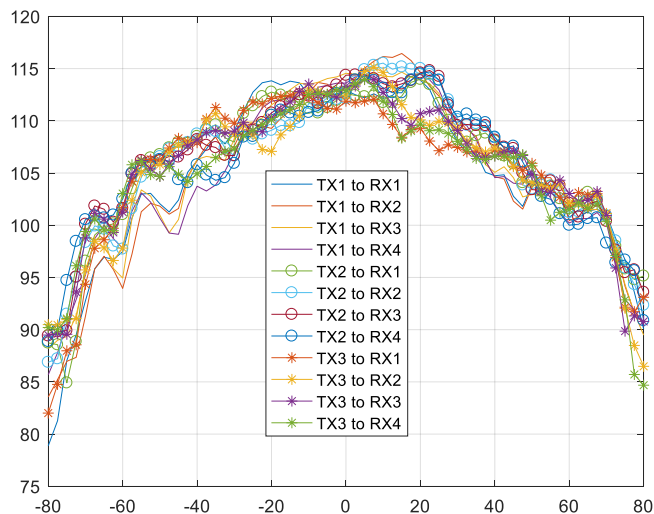
H

E

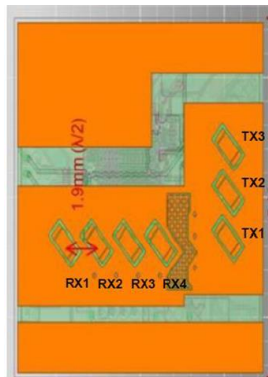
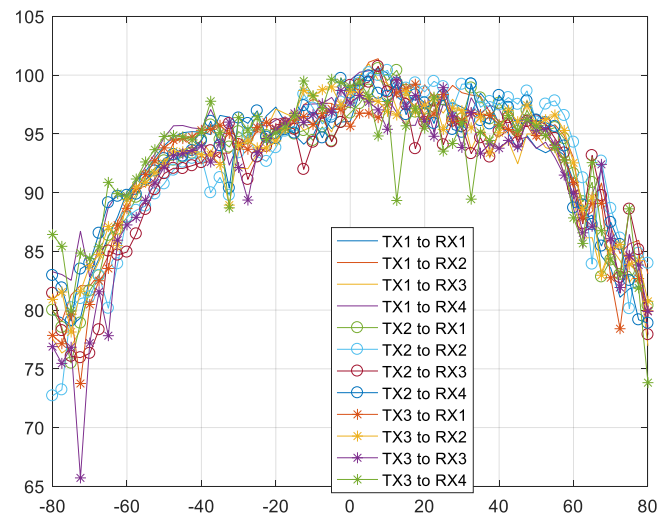


ES1.0 Performance : gain pattern

Antenna gain pattern azimuth

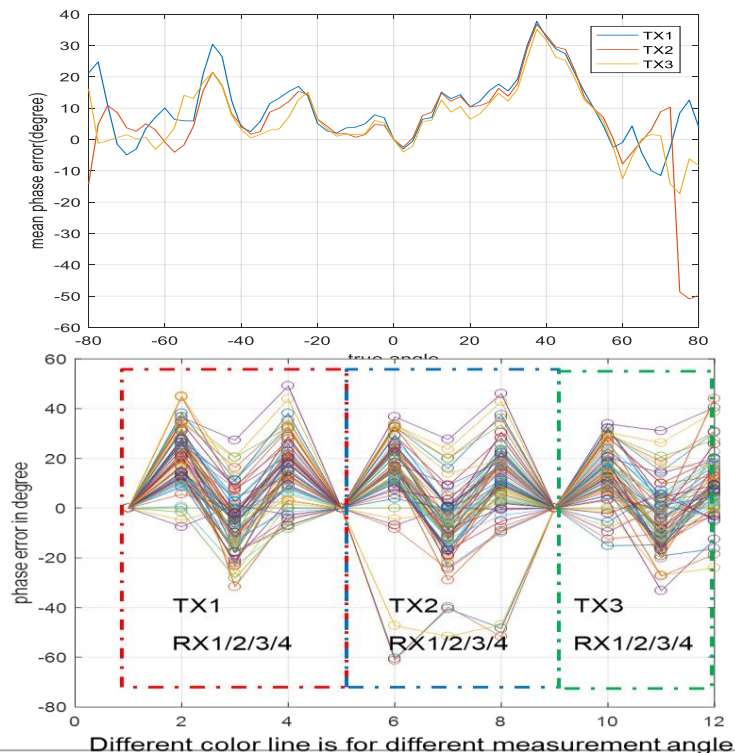


Antenna gain pattern elevation

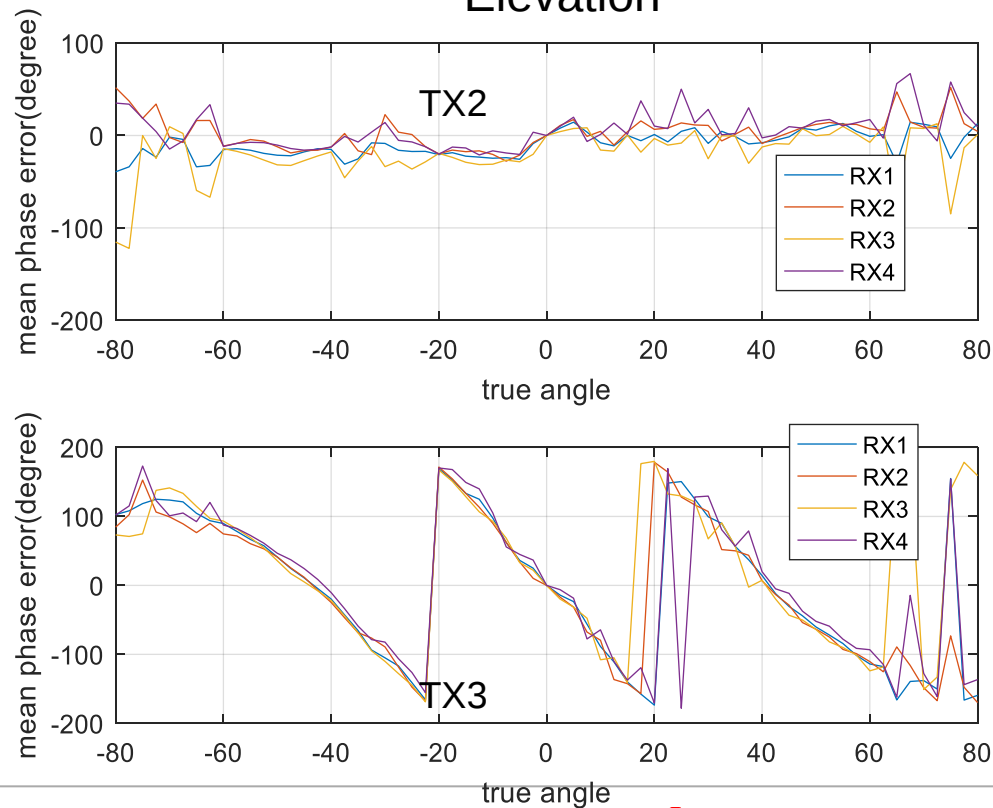


ES1.0 Performance : phase error

Azimuth

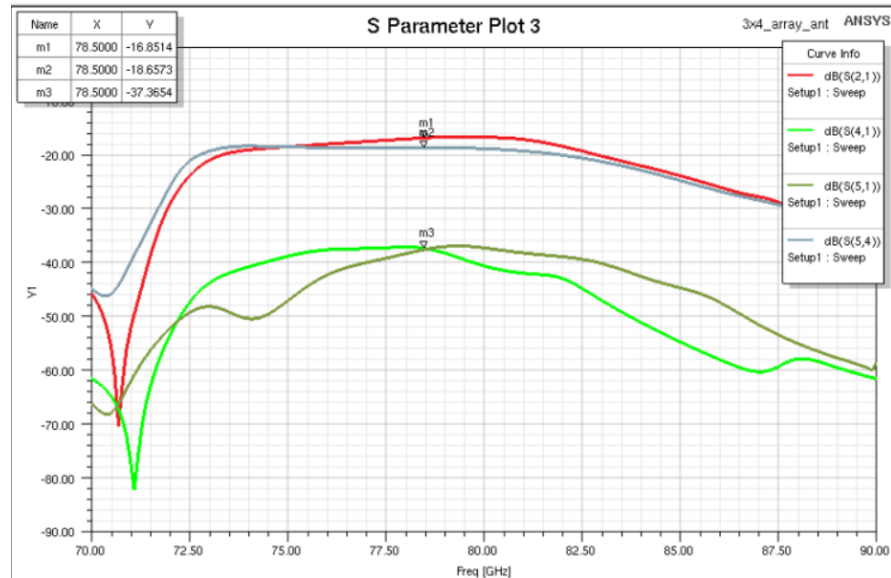
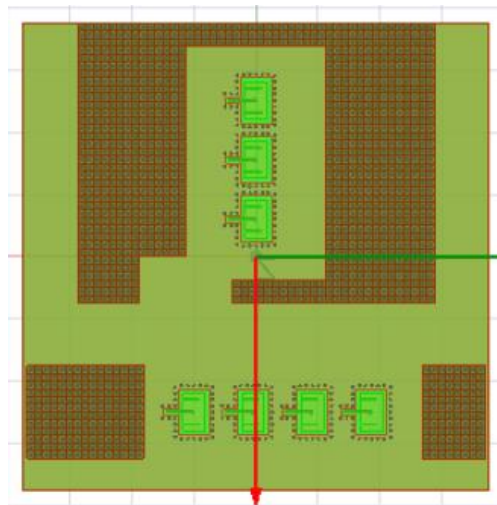


Elevation



3x4 array : Coupling

- Tx-Tx isolation: $< -16\text{dB}$
- Rx-Rx isolation: $< -18\text{dB}$
- Tx-Rx isolation: $< -37\text{dB}$ (at least 10dB improvement over ES1)



PCB impact on Tx phase mismatch

Pkg only



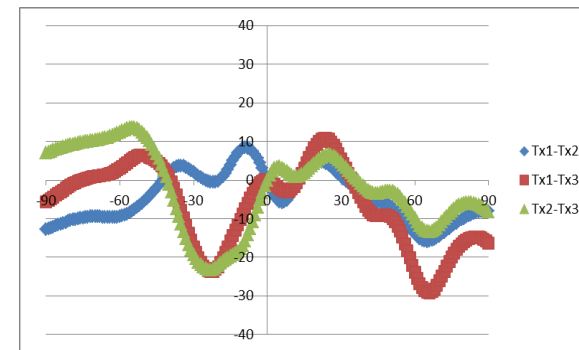
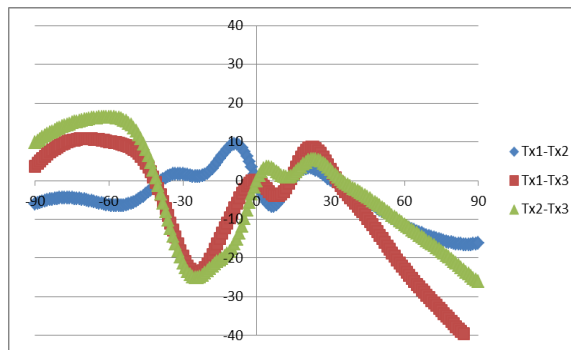
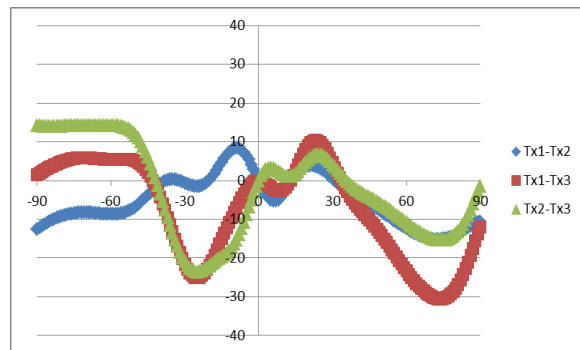
PCB along E-plane



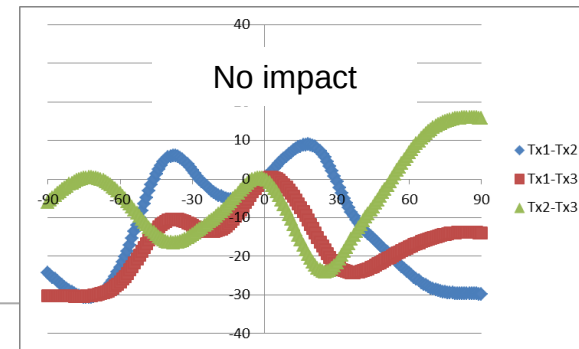
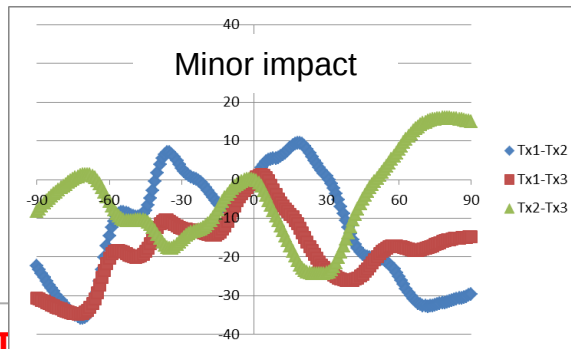
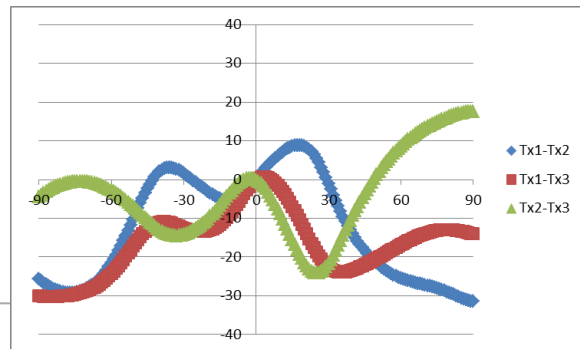
PCB along H-plane



H



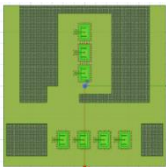
E



Internal Only, Do not share

PCB impact on Rx gain

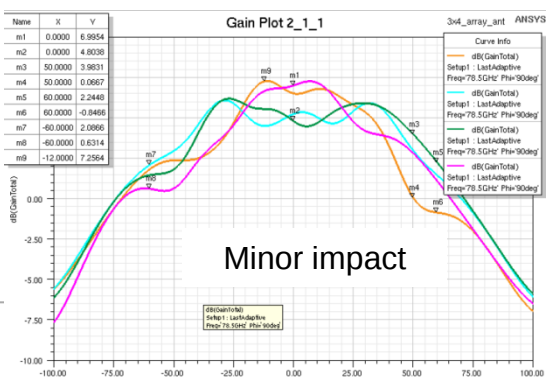
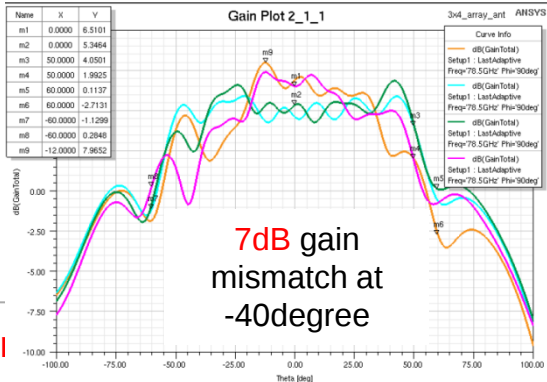
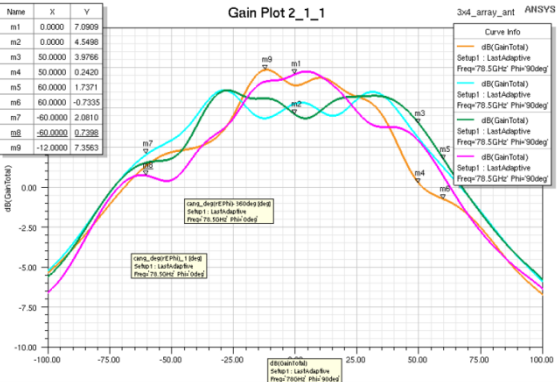
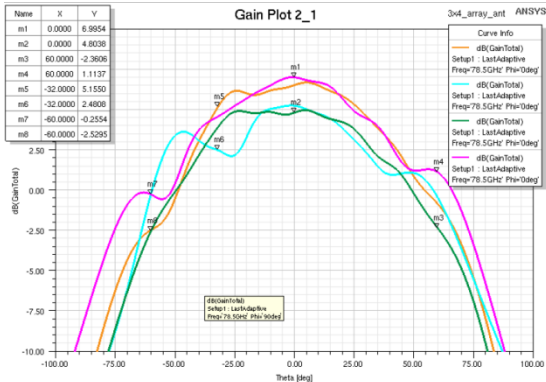
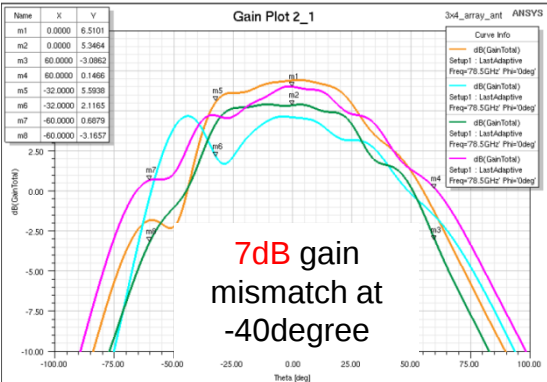
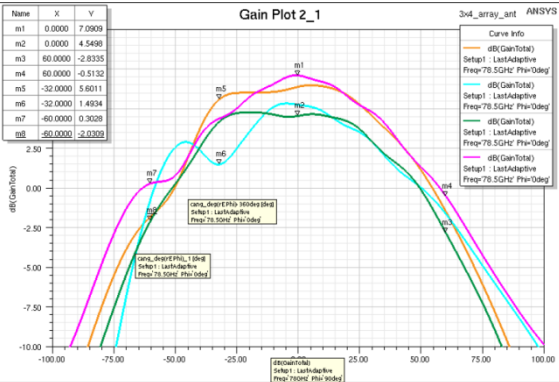
Pkg
only



PCB along
E-plane



PCB along
H-plane



PCB impact on Rx phase mismatch

Pkg only



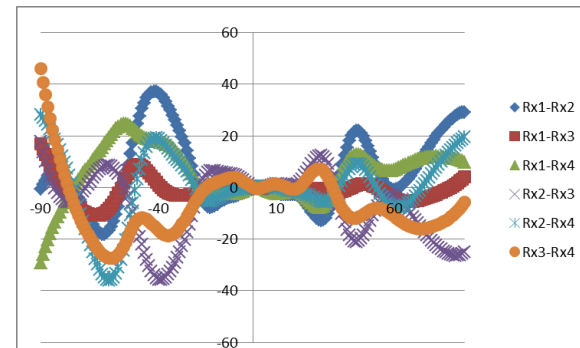
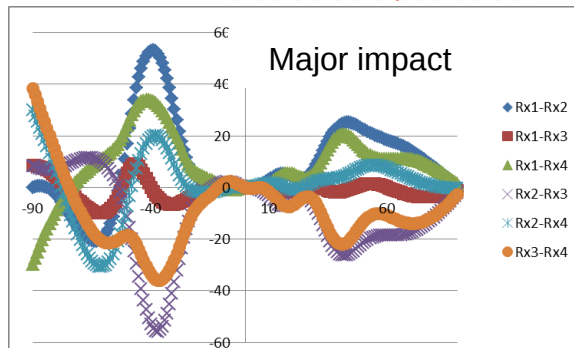
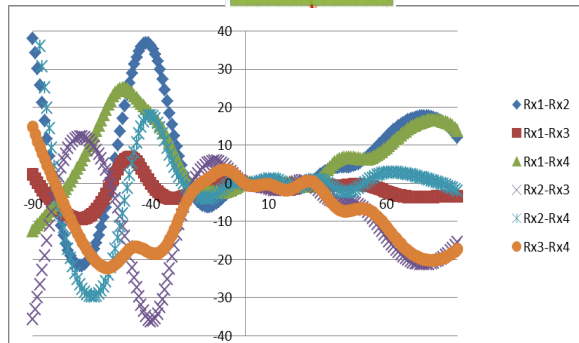
PCB along E-plane



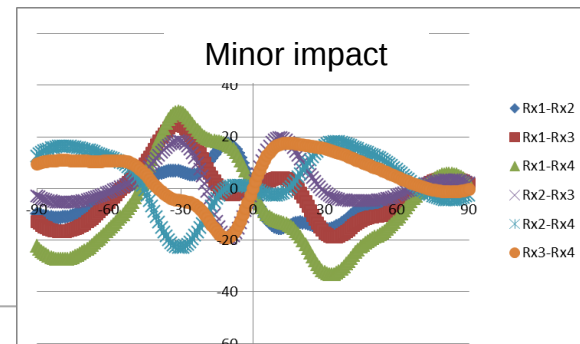
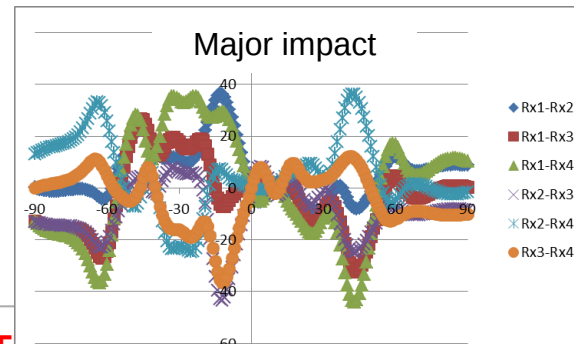
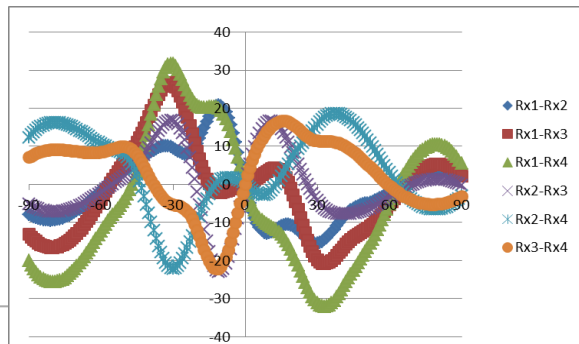
PCB along H-plane



H



E



ES2.0 board development guidance

- Minimize PCB area along antenna E-plane direction to reduce the impact of PCB for the gain pattern

