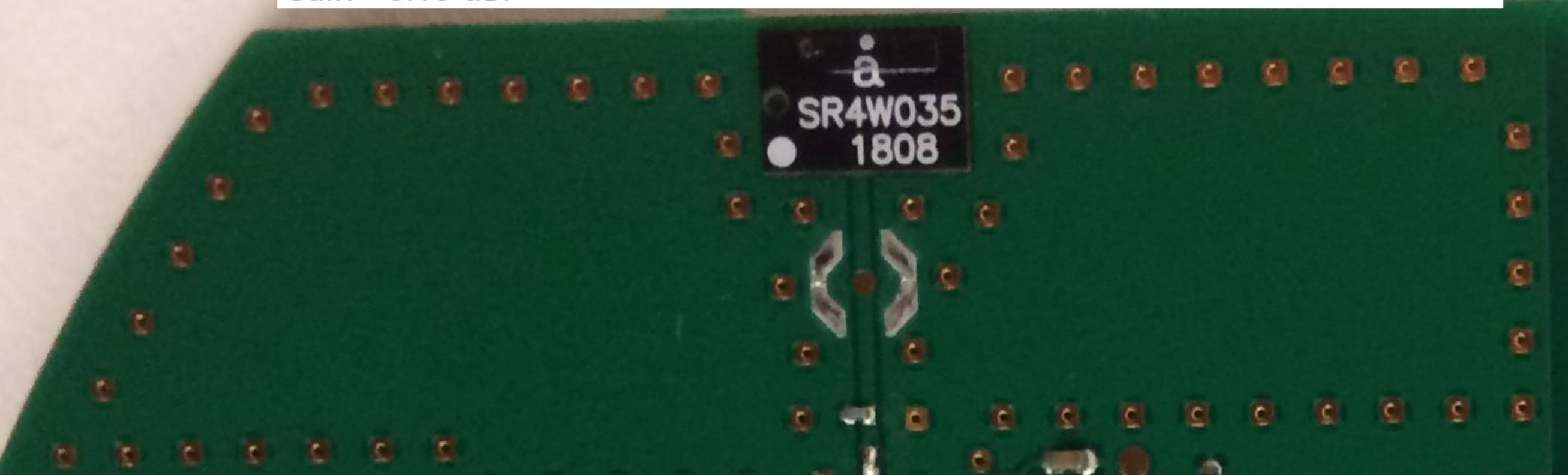


GEO20 WirelessHart Antenna System with SR4W035 Chip Antenna
TX 2405 to 2475 MHz
Gain +0.18 dBi



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch0 2405MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

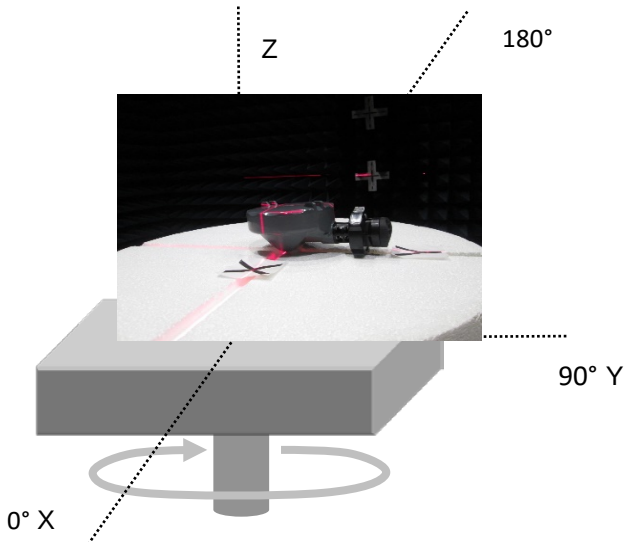
OTA 2018.01.04

COMMENTS

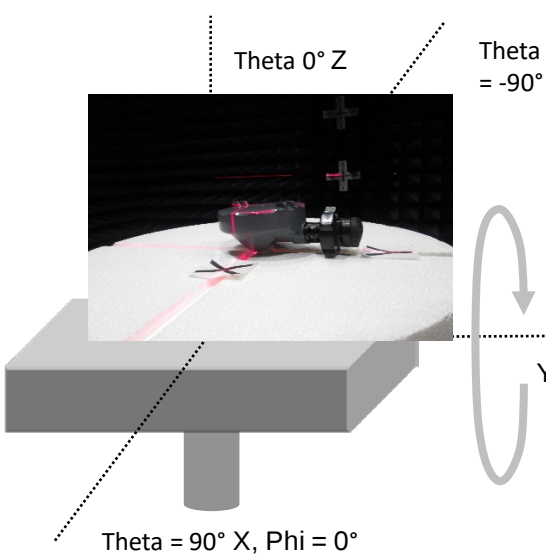
None

3D PATTERN DATA	
Frequency (MHz)	2405
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.89
Peak EIRP (dBm)	6.68
Directivity (dBi)	2.79
Efficiency (dB)	-4.11
Efficiency (%)	38.80
Gain (dBi)	-1.32
Average Gain (dB)	-4.11
E-Plane 3 dB BW (°)	157.00

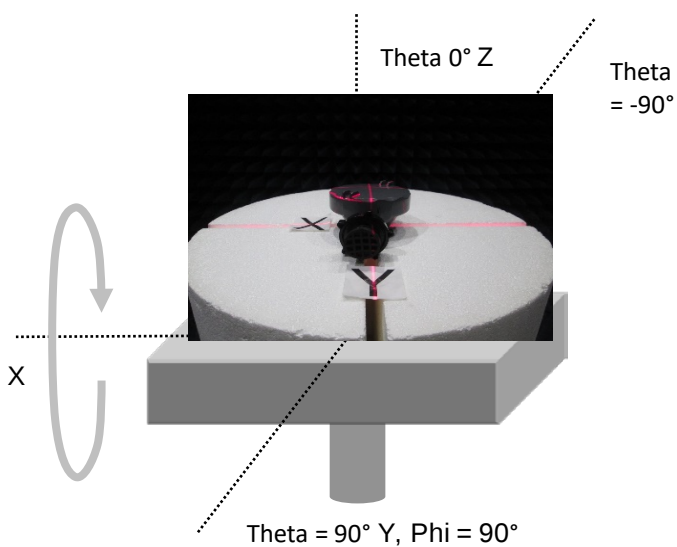
Azimuth Cut (Theta Axis = 90°)



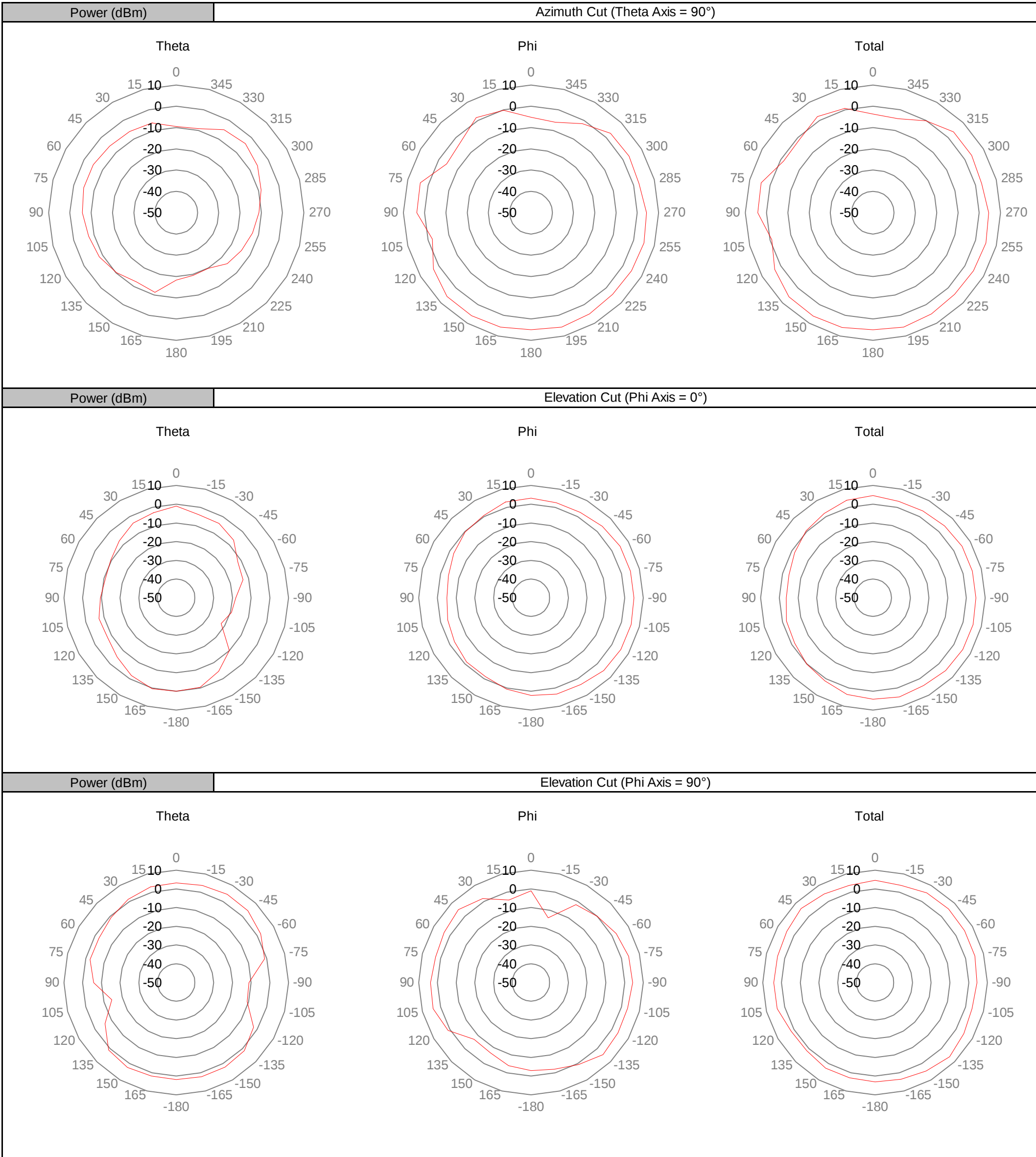
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch1 2410MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

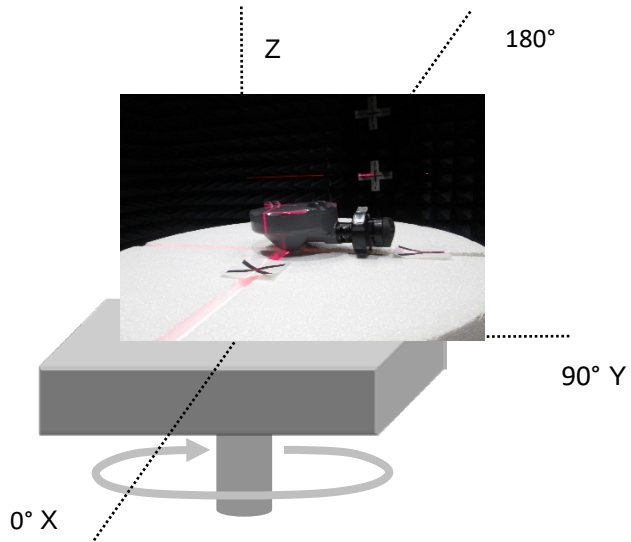
COMMENTS

None

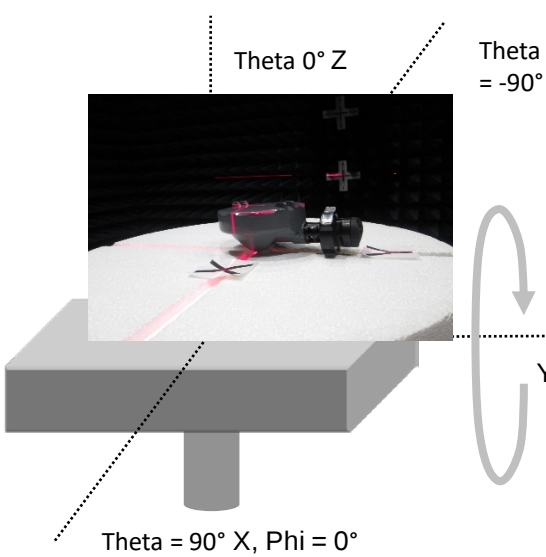
3D PATTERN DATA

Frequency (MHz)	2410
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.96
Peak EIRP (dBm)	6.72
Directivity (dBi)	2.76
Efficiency (dB)	-4.04
Efficiency (%)	39.41
Gain (dBi)	-1.28
Average Gain (dB)	-4.04
E-Plane 3 dB BW (°)	110.00

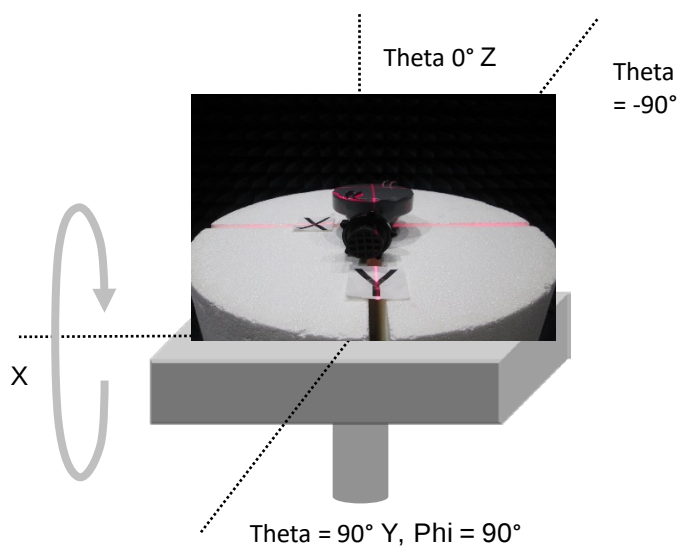
Azimuth Cut (Theta Axis = 90°)



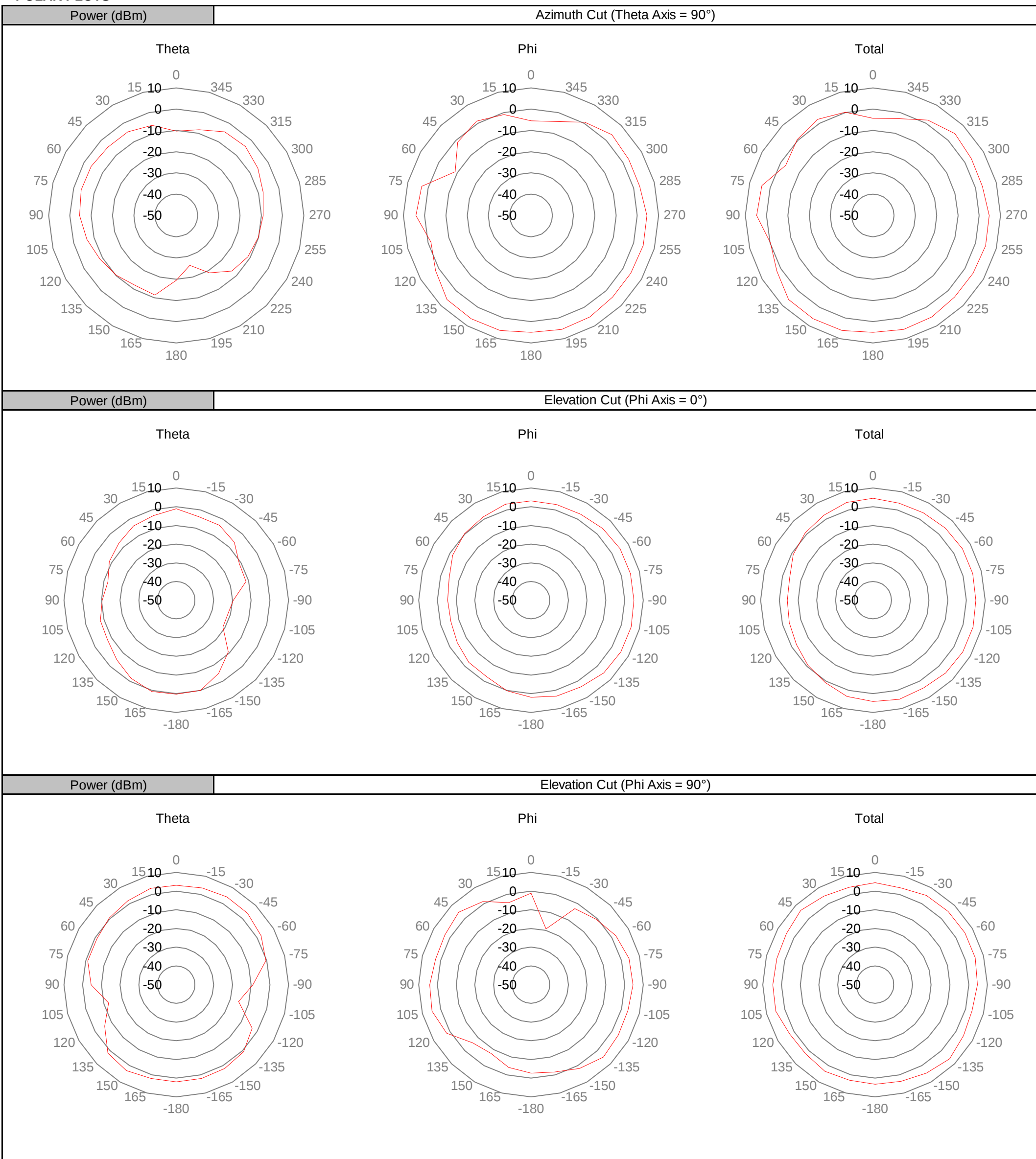
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch2 2415MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

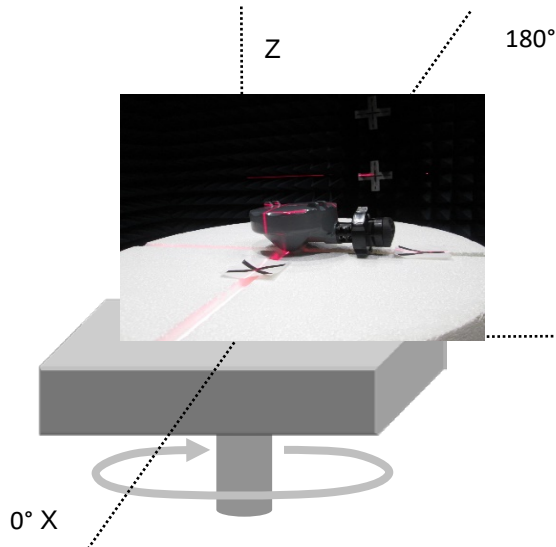
COMMENTS

None

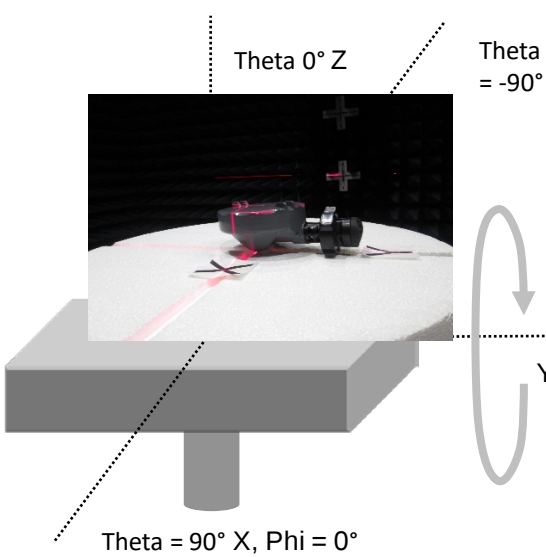
3D PATTERN DATA

Frequency (MHz)	2415
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.75
Peak EIRP (dBm)	6.46
Directivity (dBi)	2.70
Efficiency (dB)	-4.25
Efficiency (%)	37.62
Gain (dBi)	-1.54
Average Gain (dB)	-4.25
E-Plane 3 dB BW (°)	114.00

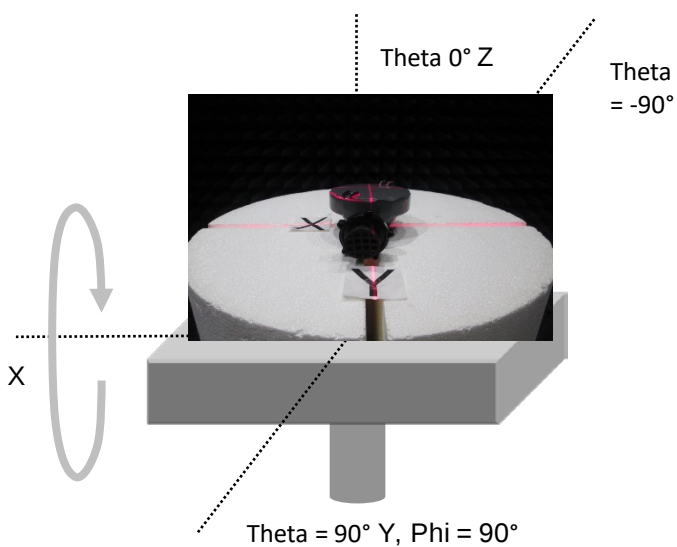
Azimuth Cut (Theta Axis = 90°)



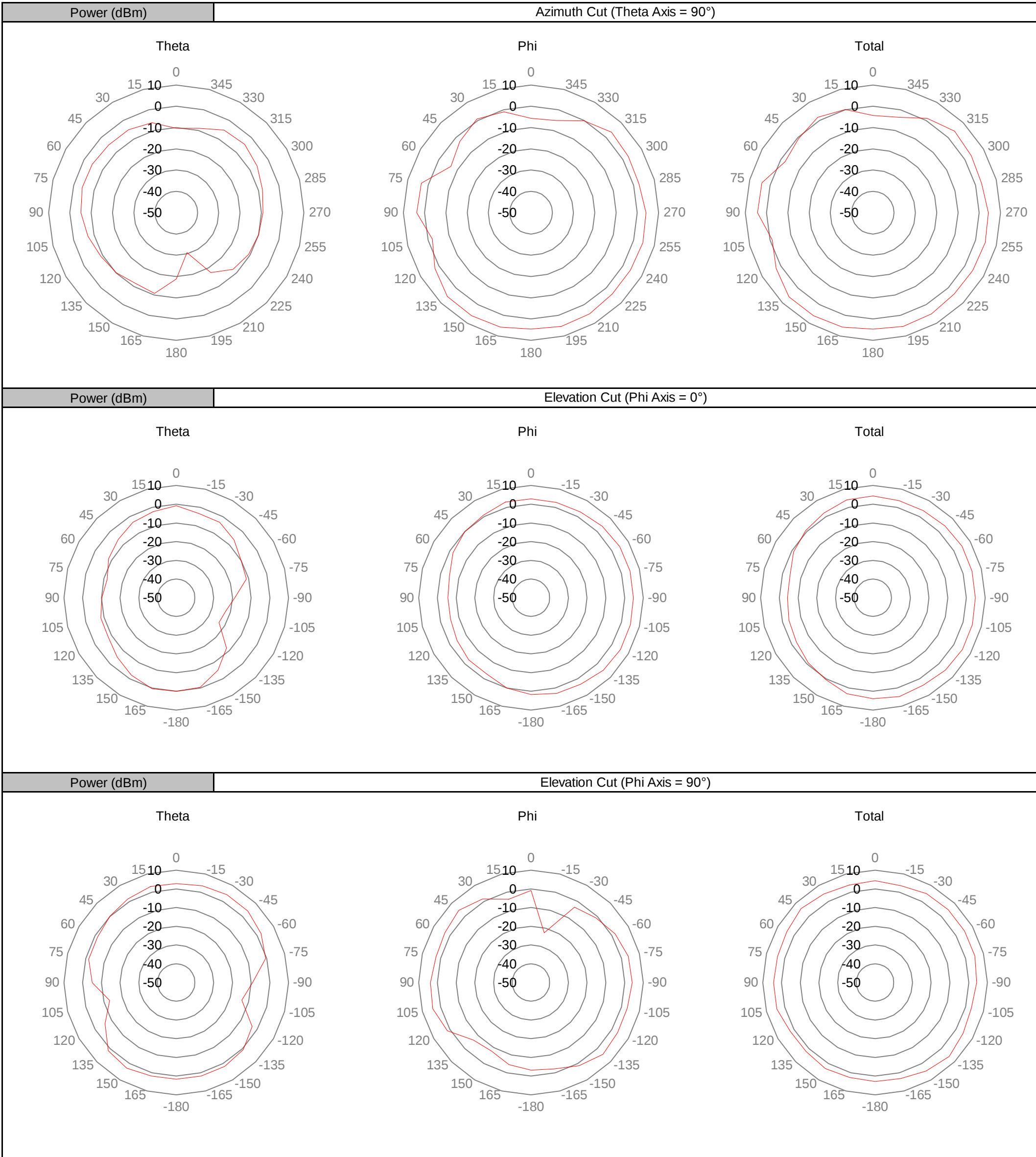
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch3 2420MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

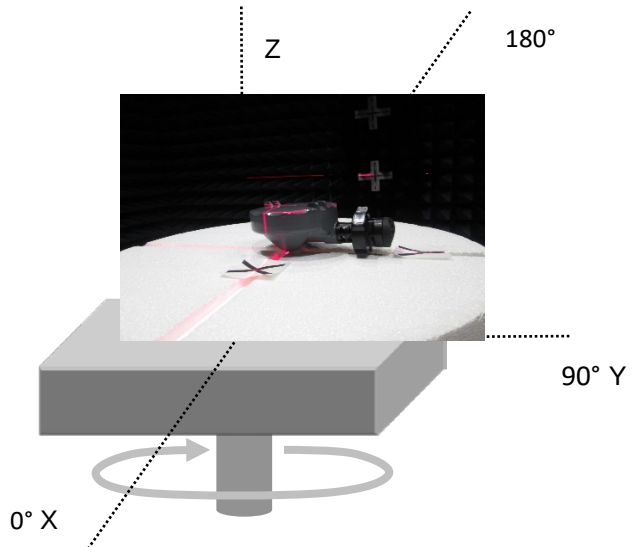
COMMENTS

None

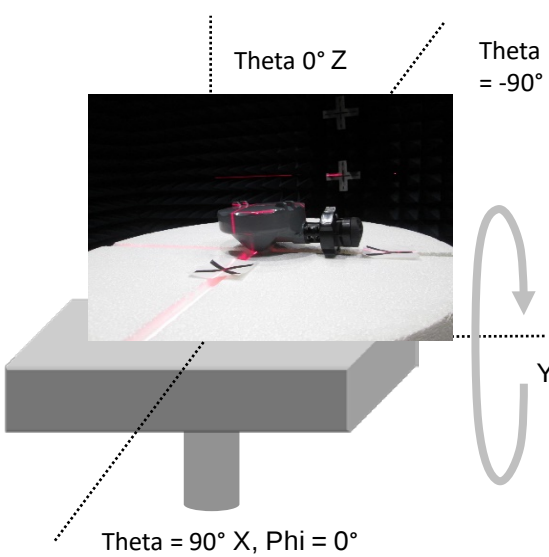
3D PATTERN DATA

Frequency (MHz)	2420
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.78
Peak EIRP (dBm)	6.39
Directivity (dBi)	2.61
Efficiency (dB)	-4.22
Efficiency (%)	37.85
Gain (dBi)	-1.61
Average Gain (dB)	-4.22
E-Plane 3 dB BW (°)	157.00

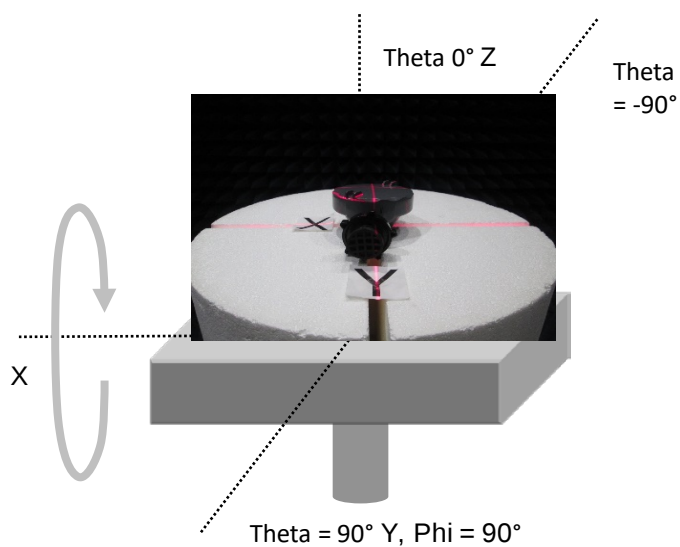
Azimuth Cut (Theta Axis = 90°)



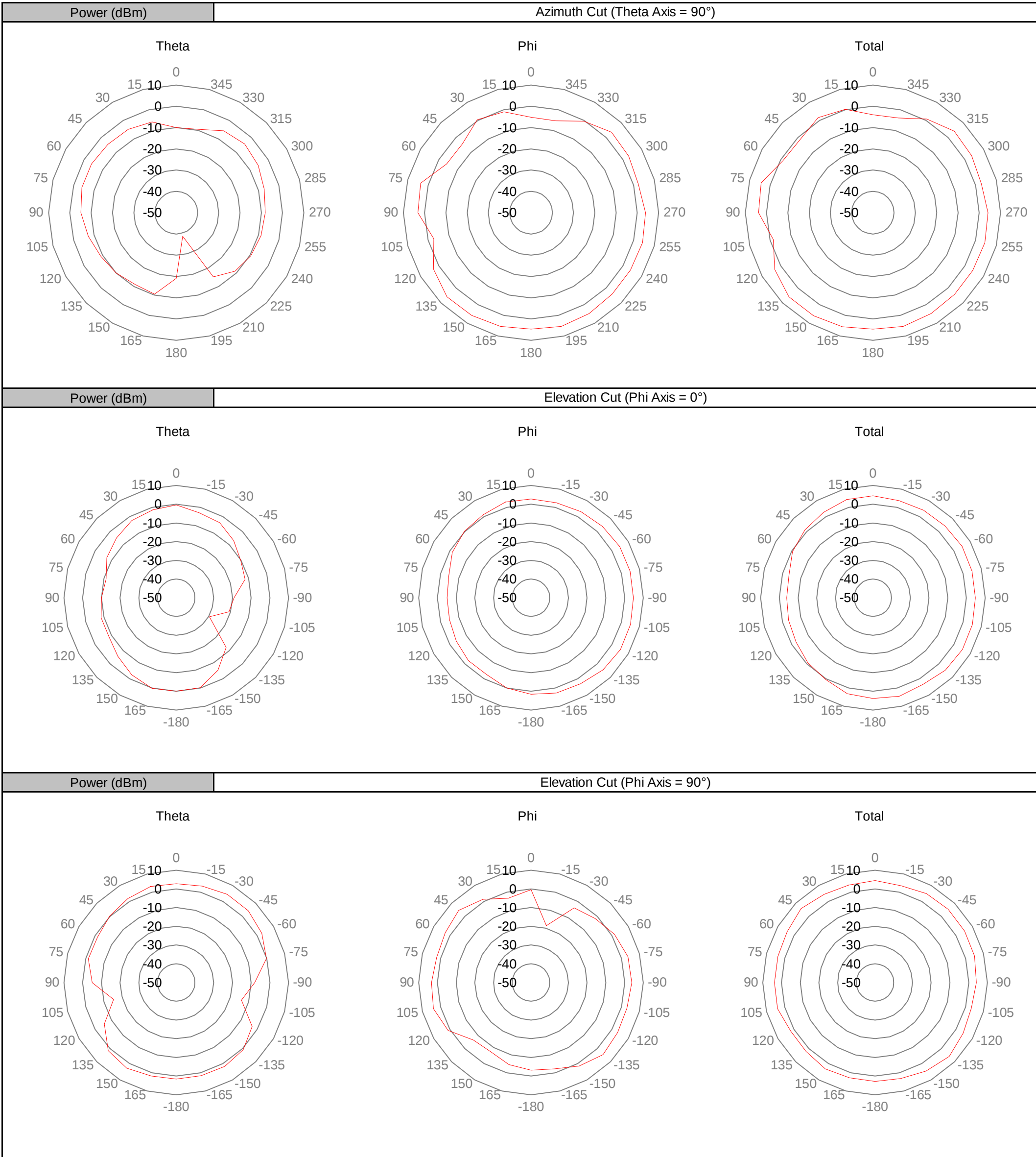
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch4 2425MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

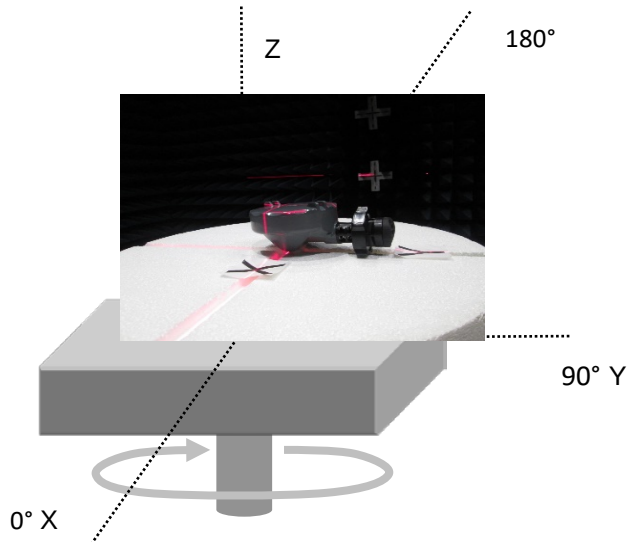
COMMENTS

None

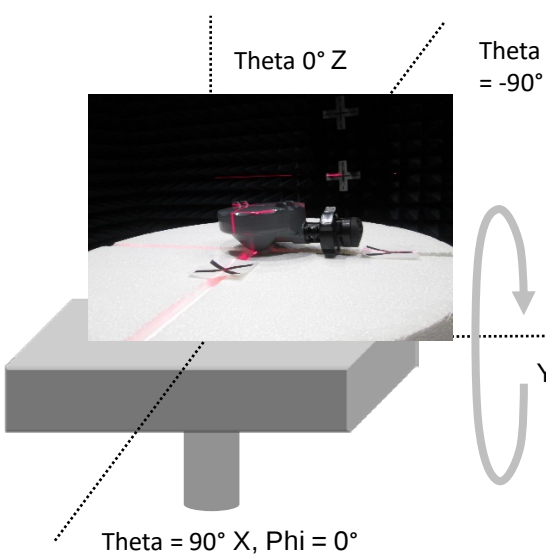
3D PATTERN DATA

Frequency (MHz)	2425
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	4.11
Peak EIRP (dBm)	6.62
Directivity (dBi)	2.52
Efficiency (dB)	-3.89
Efficiency (%)	40.82
Gain (dBi)	-1.38
Average Gain (dB)	-3.89
E-Plane 3 dB BW (°)	156.00

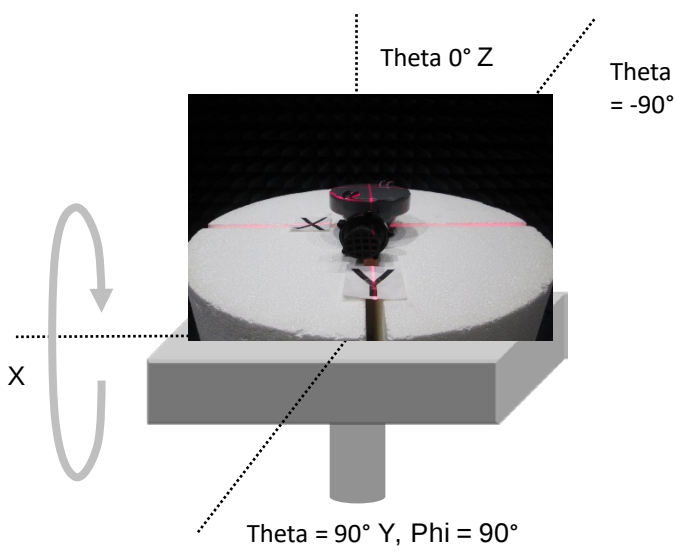
Azimuth Cut (Theta Axis = 90°)



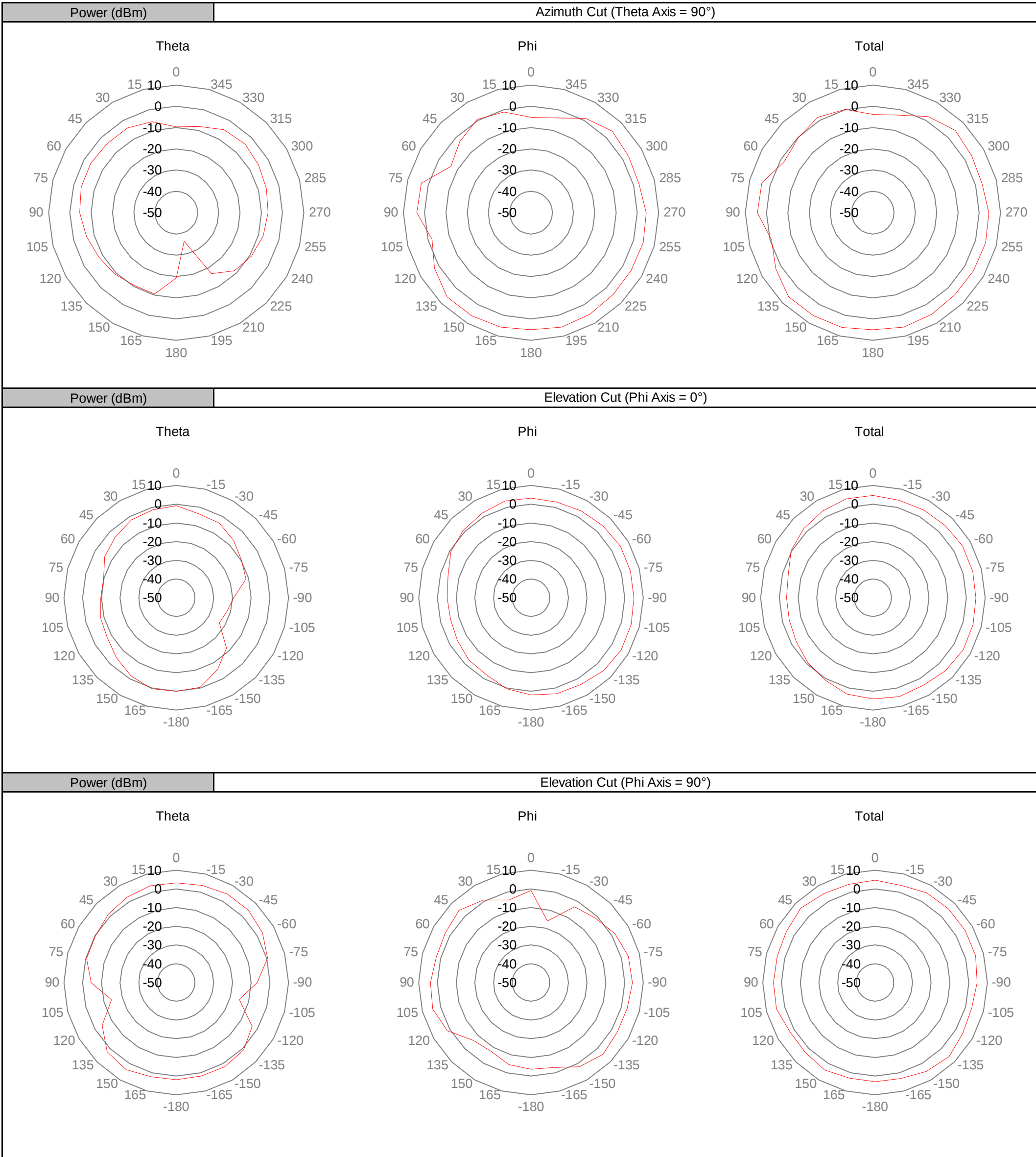
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch5 2430MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

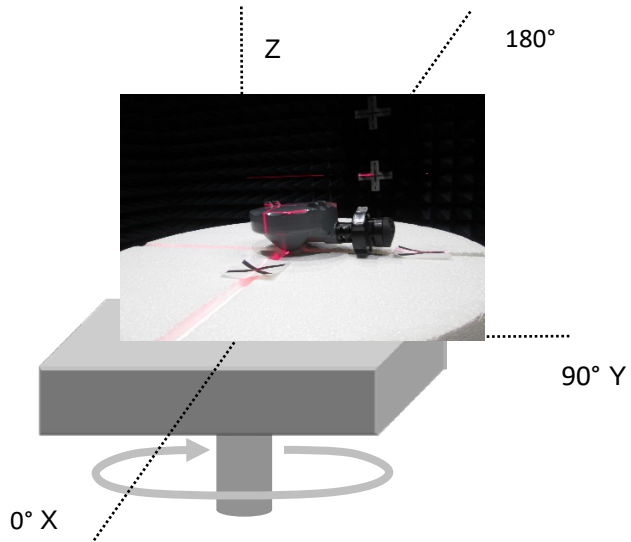
COMMENTS

None

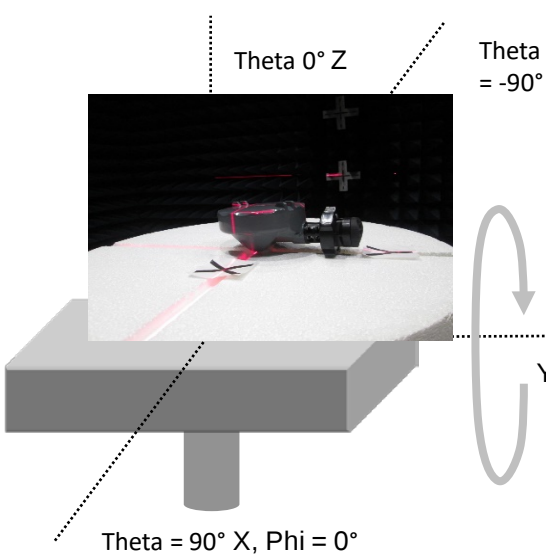
3D PATTERN DATA

Frequency (MHz)	2430
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	4.54
Peak EIRP (dBm)	7.18
Directivity (dBi)	2.64
Efficiency (dB)	-3.46
Efficiency (%)	45.12
Gain (dBi)	-0.82
Average Gain (dB)	-3.46
E-Plane 3 dB BW (°)	154.00

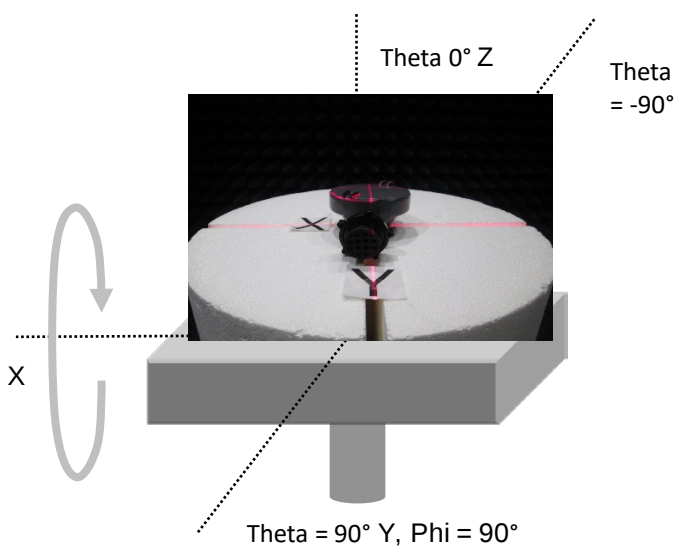
Azimuth Cut (Theta Axis = 90°)



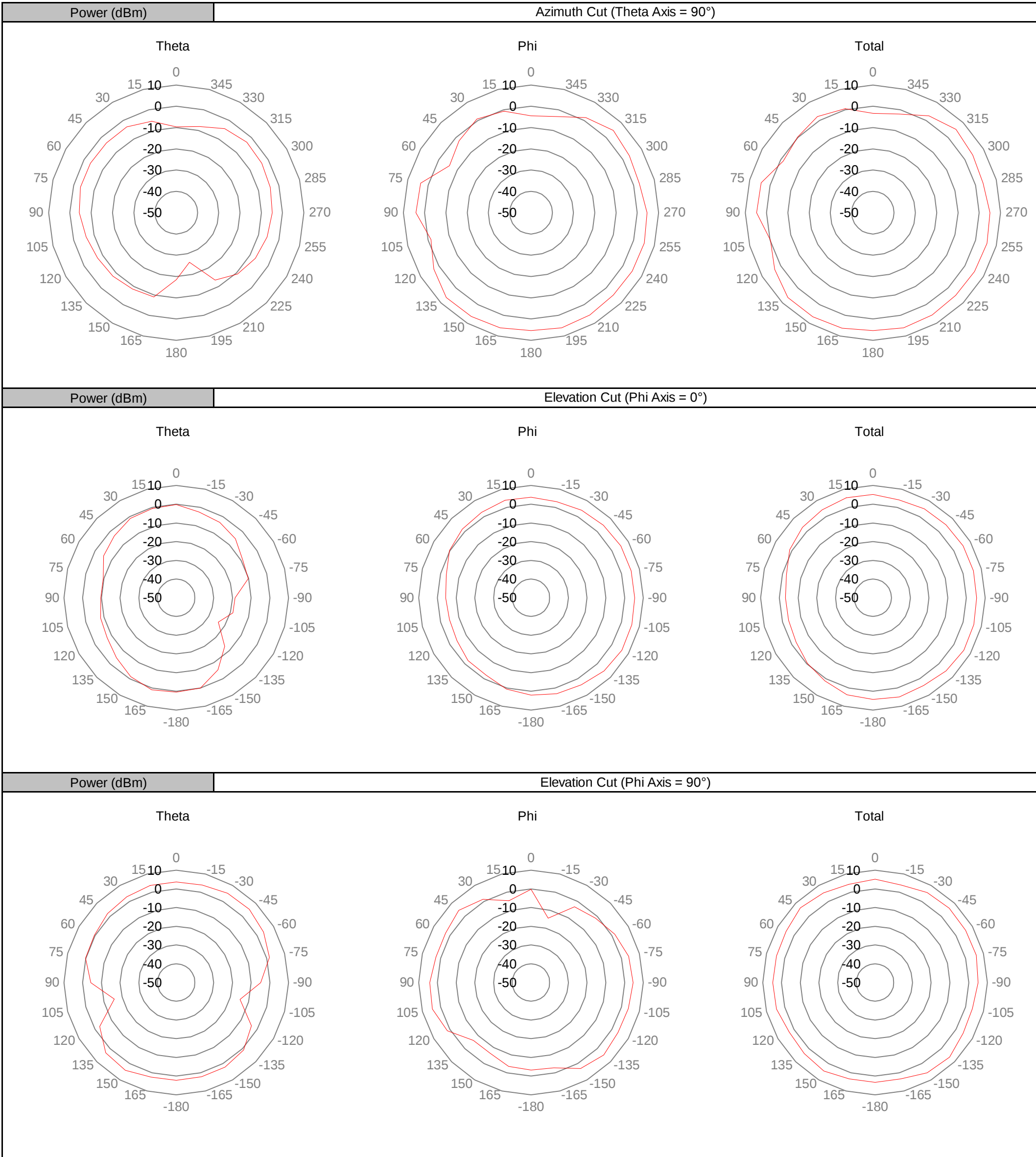
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch6 2435MHz

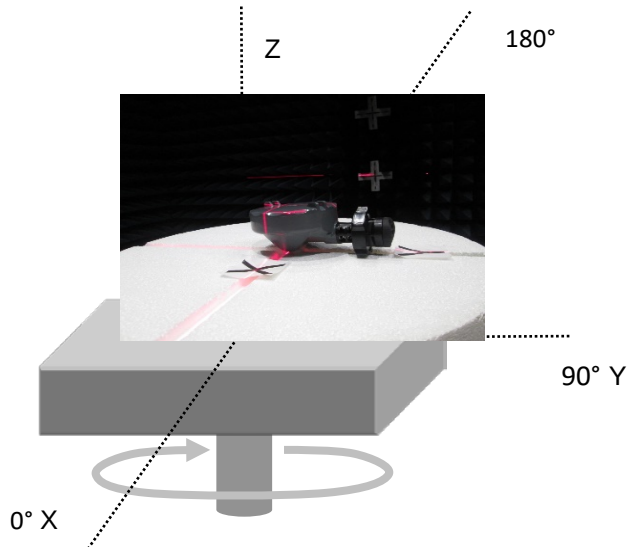
Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

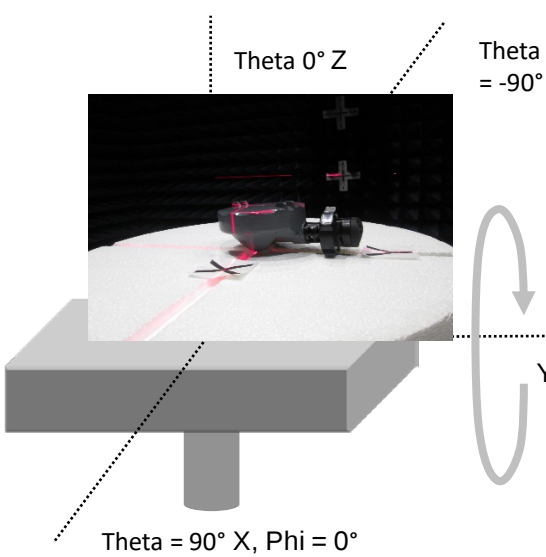
COMMENTS
None

3D PATTERN DATA	
Frequency (MHz)	2430
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	5.05
Peak EIRP (dBm)	7.71
Directivity (dBi)	2.66
Efficiency (dB)	-2.95
Efficiency (%)	50.72
Gain (dBi)	-0.29
Average Gain (dB)	-2.95
E-Plane 3 dB BW (°)	156.00

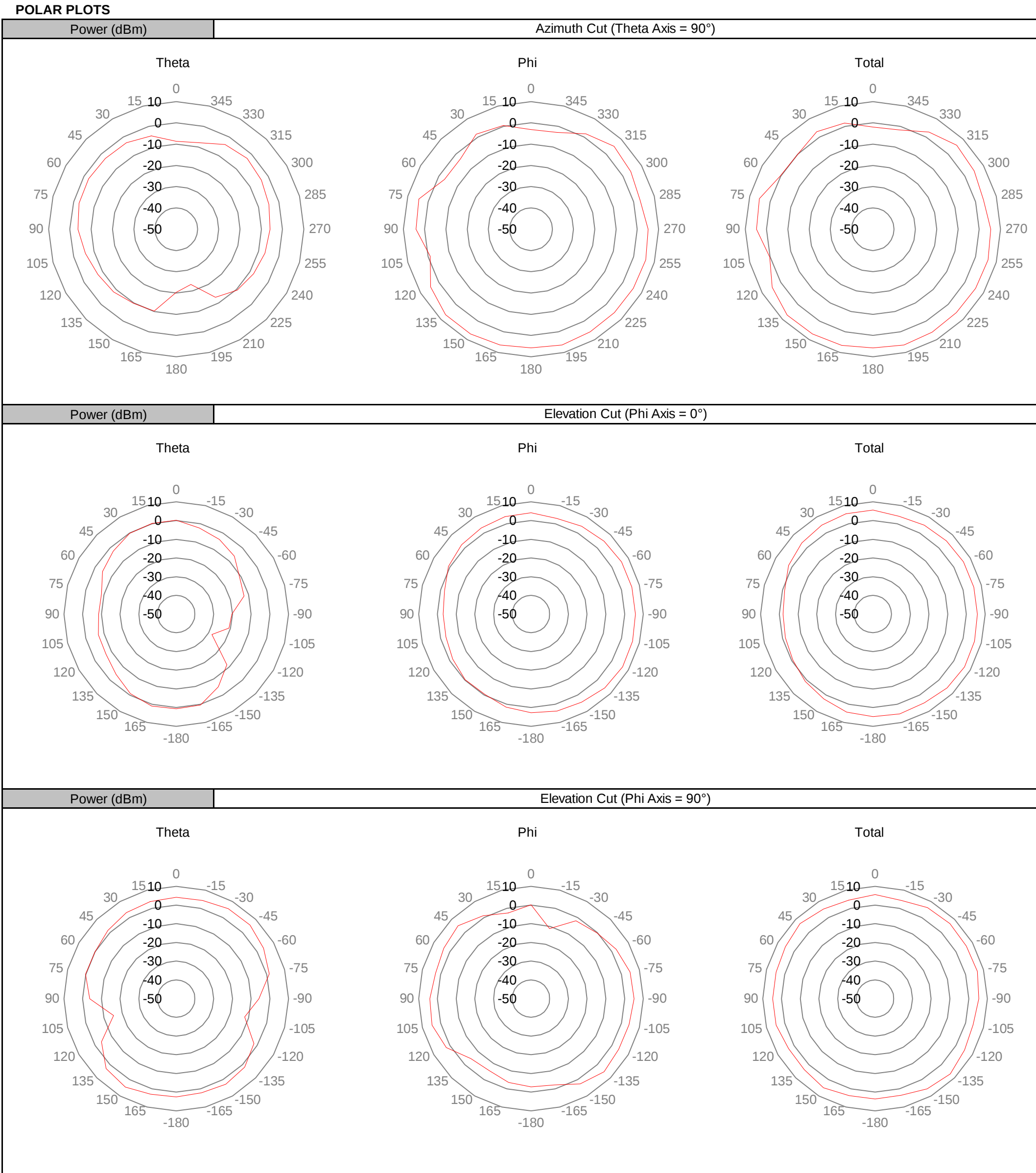
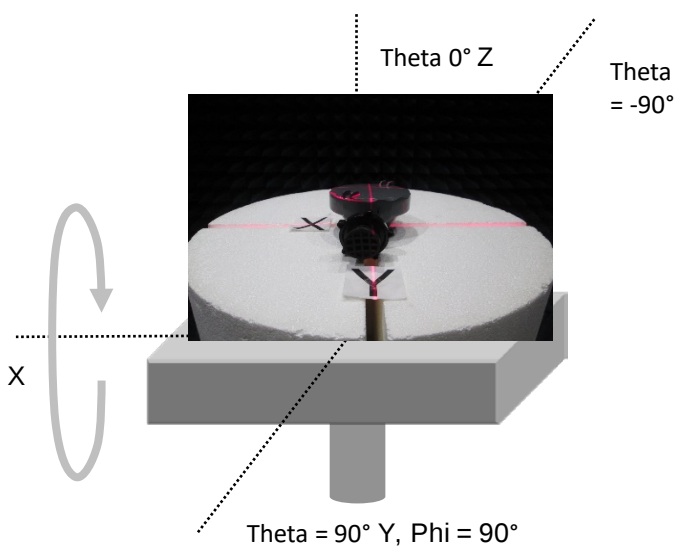
Azimuth Cut (Theta Axis = 90°)



Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch7 2440MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

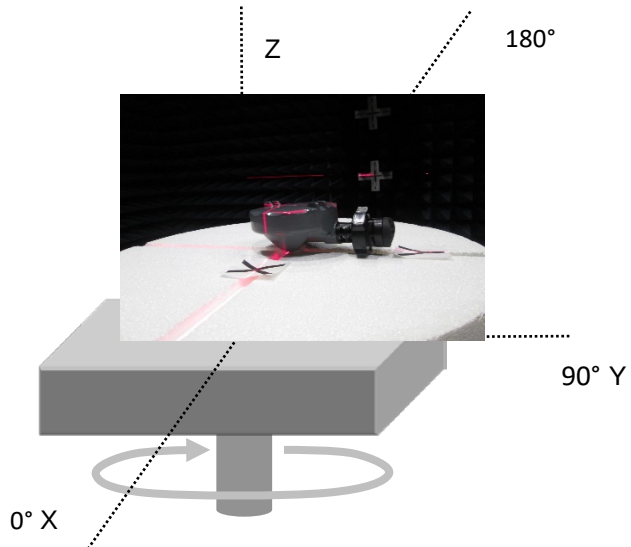
COMMENTS

None

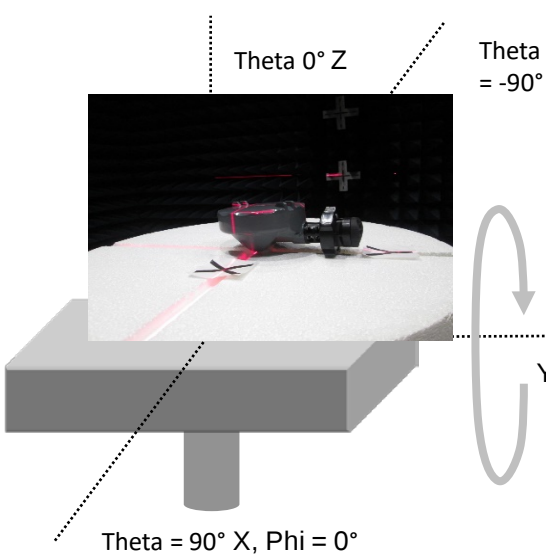
3D PATTERN DATA

Frequency (MHz)	2440
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	5.35
Peak EIRP (dBm)	8.08
Directivity (dBi)	2.73
Efficiency (dB)	-2.65
Efficiency (%)	54.31
Gain (dBi)	0.08
Average Gain (dB)	-2.65
E-Plane 3 dB BW (°)	156.00

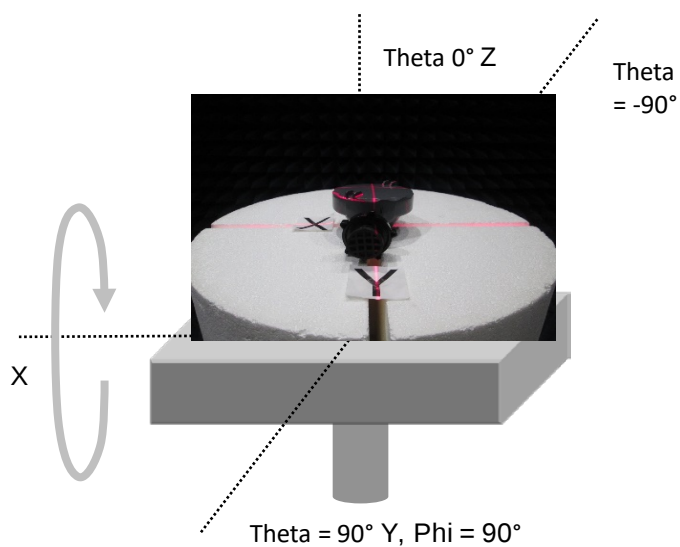
Azimuth Cut (Theta Axis = 90°)



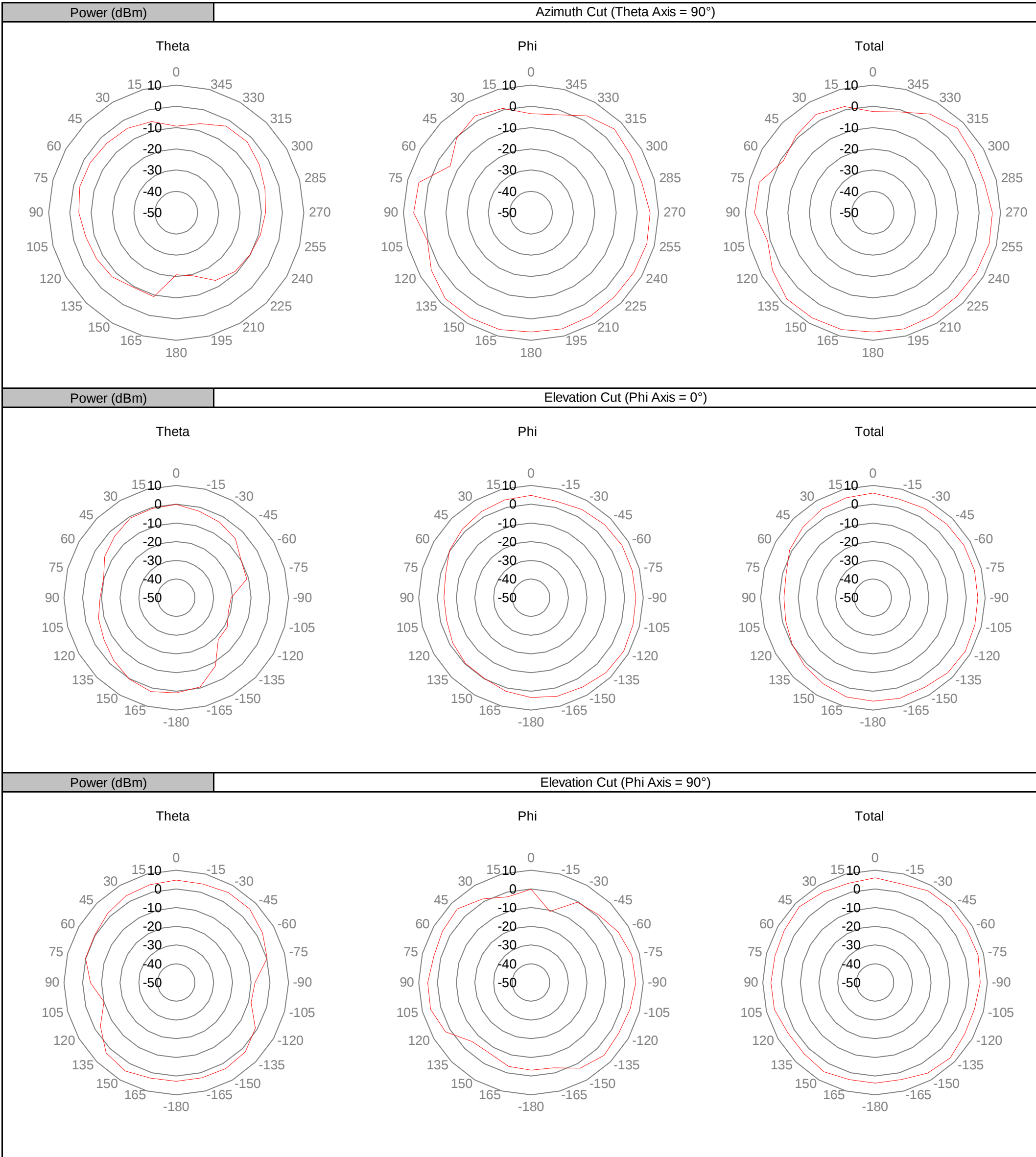
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch8 2445MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

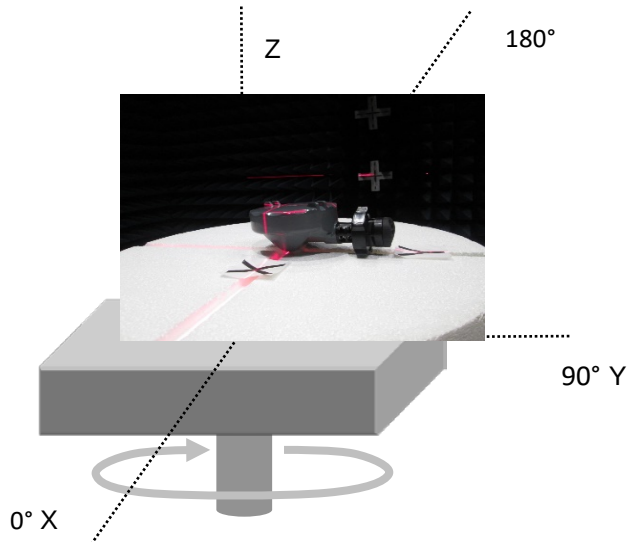
COMMENTS

None

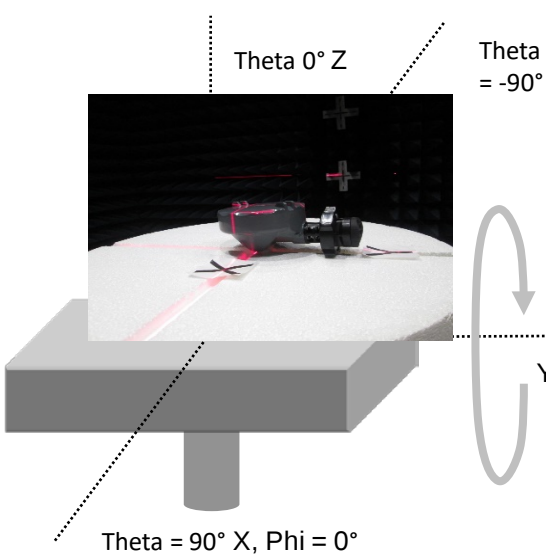
3D PATTERN DATA

Frequency (MHz)	2445
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	5.35
Peak EIRP (dBm)	8.18
Directivity (dBi)	2.83
Efficiency (dB)	-2.65
Efficiency (%)	54.28
Gain (dBi)	0.18
Average Gain (dB)	-2.65
E-Plane 3 dB BW (°)	157.00

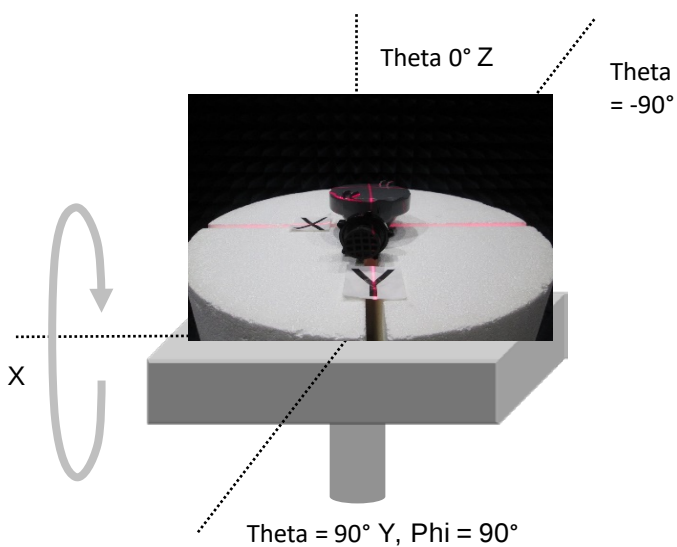
Azimuth Cut (Theta Axis = 90°)



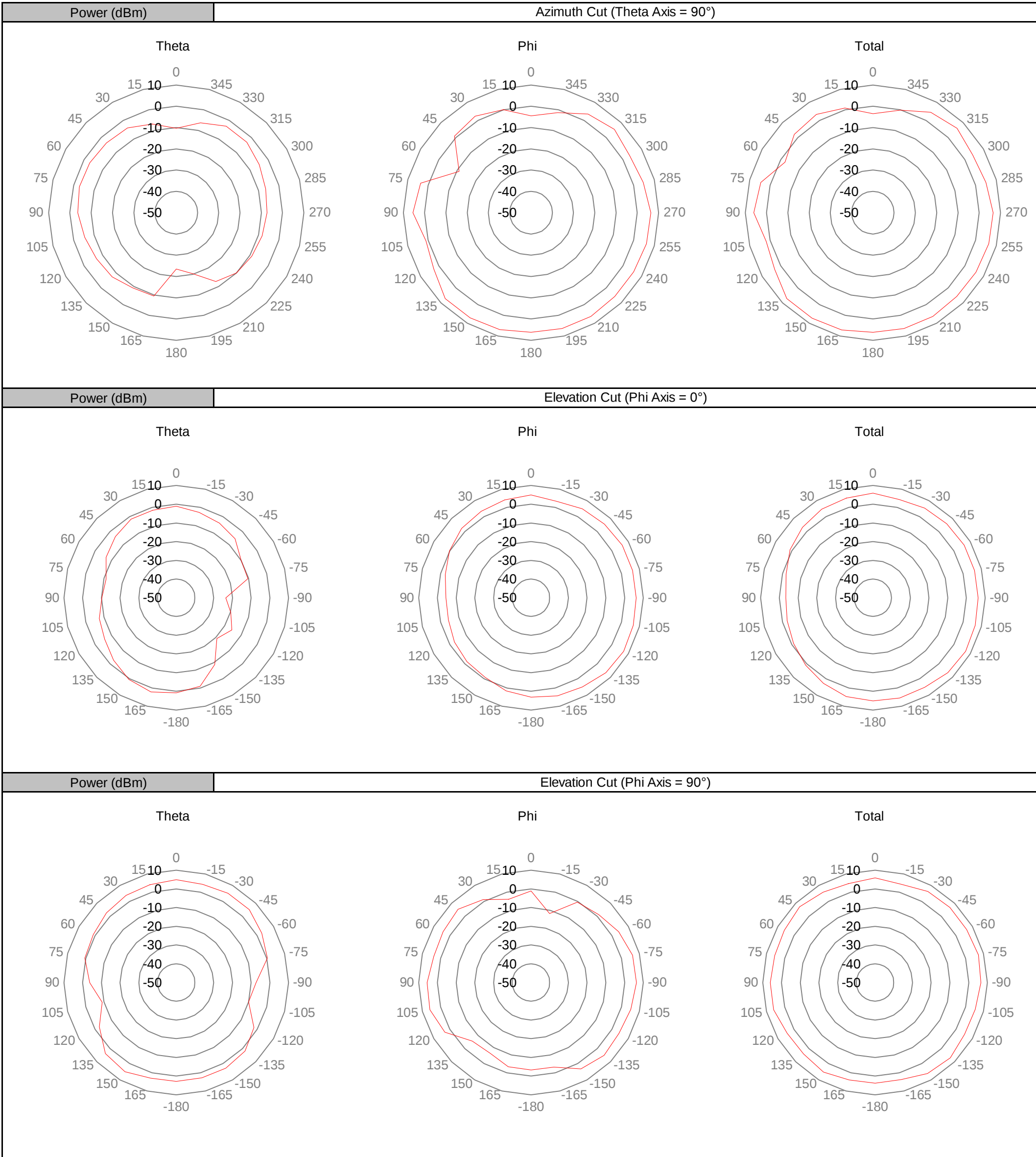
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch9 2450MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

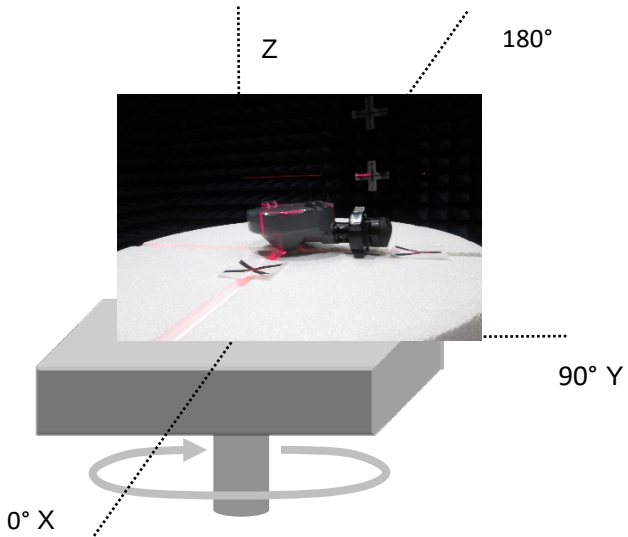
OTA 2018.01.04

COMMENTS

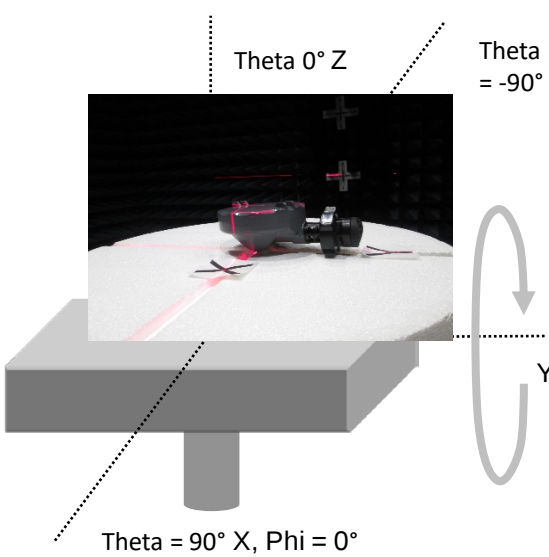
None

3D PATTERN DATA	
Frequency (MHz)	2450
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	4.93
Peak EIRP (dBm)	7.84
Directivity (dBi)	2.91
Efficiency (dB)	-3.07
Efficiency (%)	49.34
Gain (dBi)	-0.16
Average Gain (dB)	-3.07
E-Plane 3 dB BW (°)	160.00

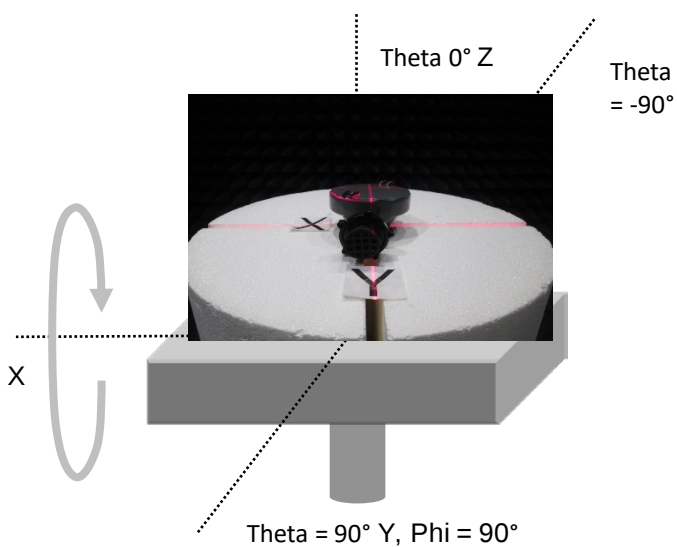
Azimuth Cut (Theta Axis = 90°)



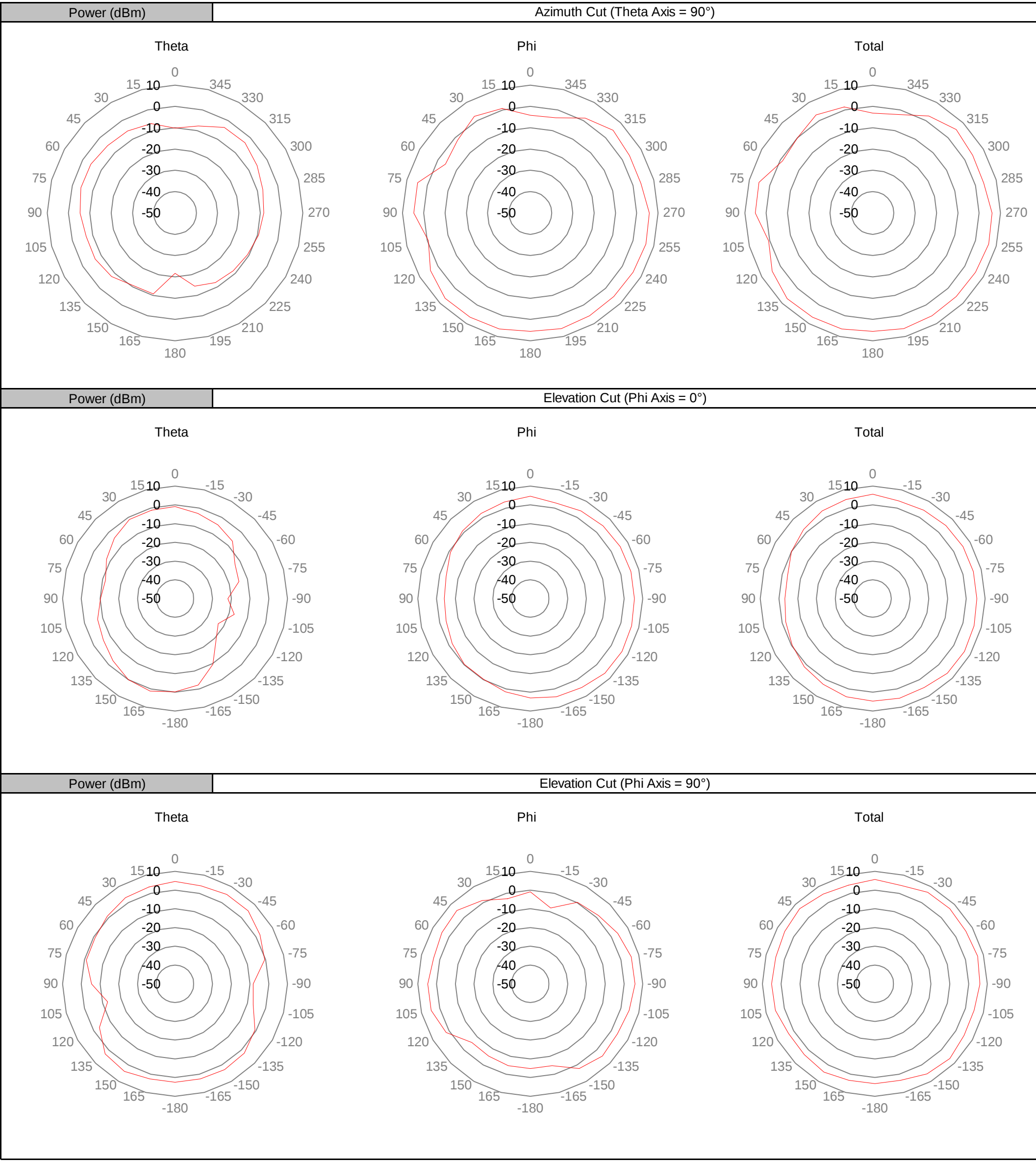
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch10 2455MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

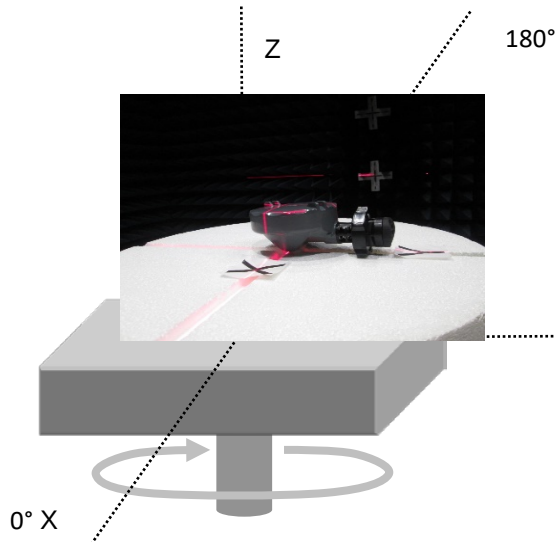
COMMENTS

None

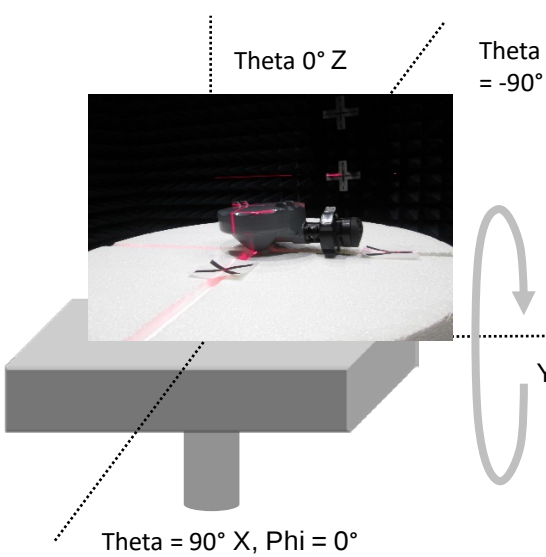
3D PATTERN DATA

Frequency (MHz)	2455
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	4.59
Peak EIRP (dBm)	7.42
Directivity (dBi)	2.83
Efficiency (dB)	-3.41
Efficiency (%)	45.61
Gain (dBi)	-0.58
Average Gain (dB)	-3.41
E-Plane 3 dB BW (°)	165.00

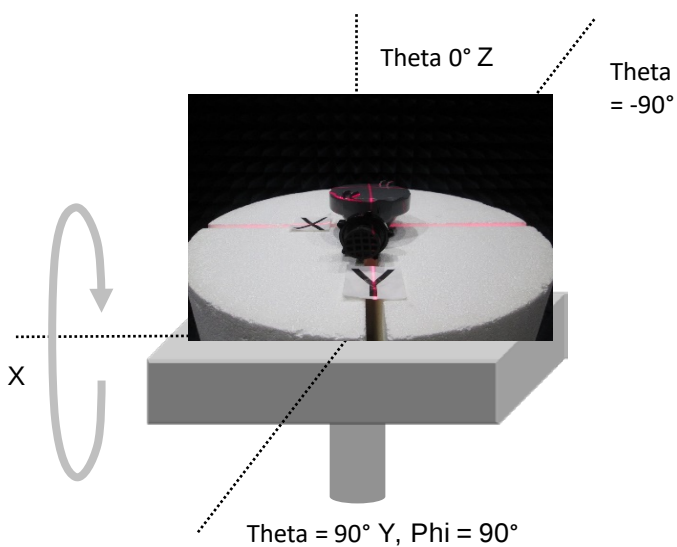
Azimuth Cut (Theta Axis = 90°)



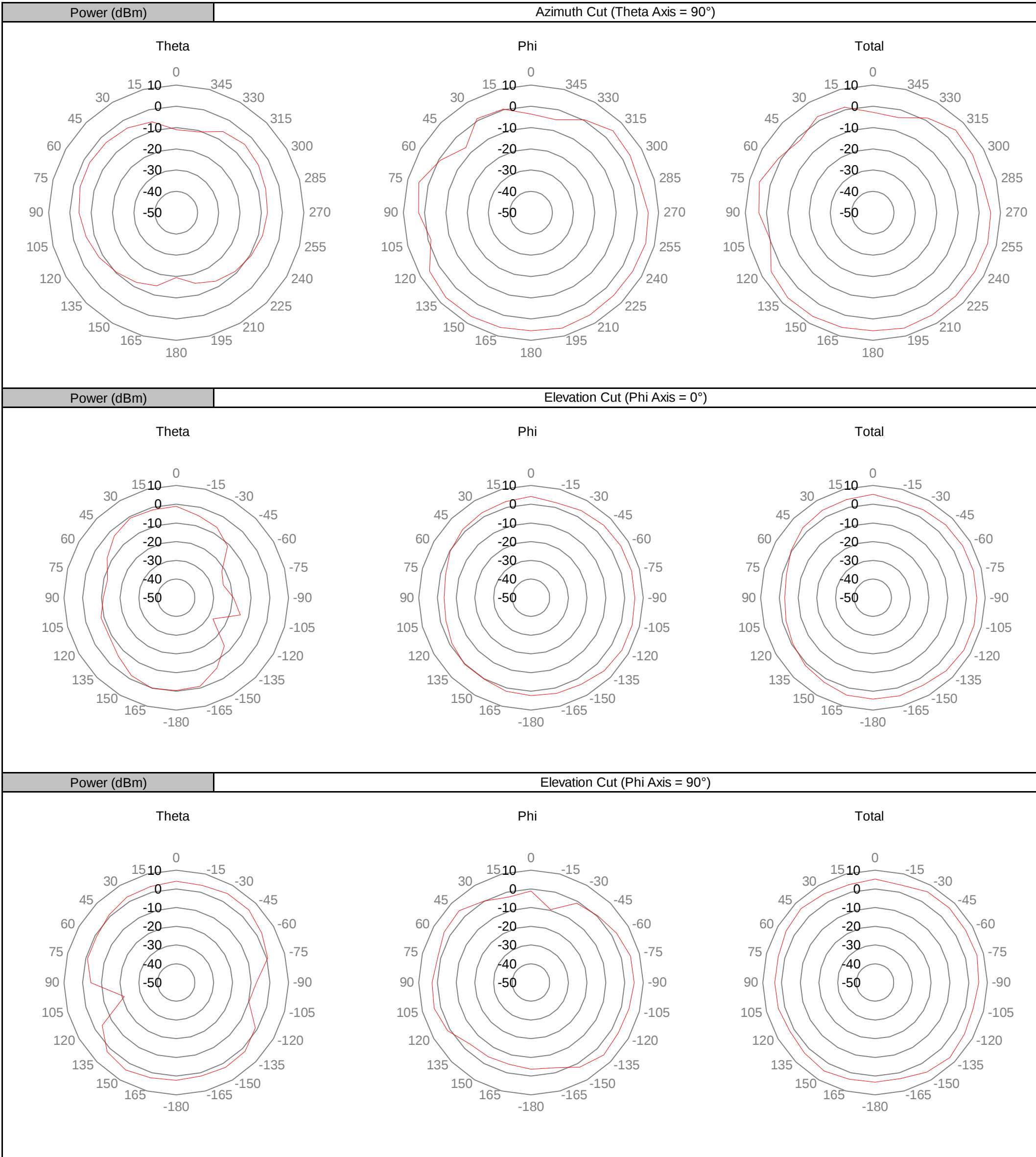
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch11 2460MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

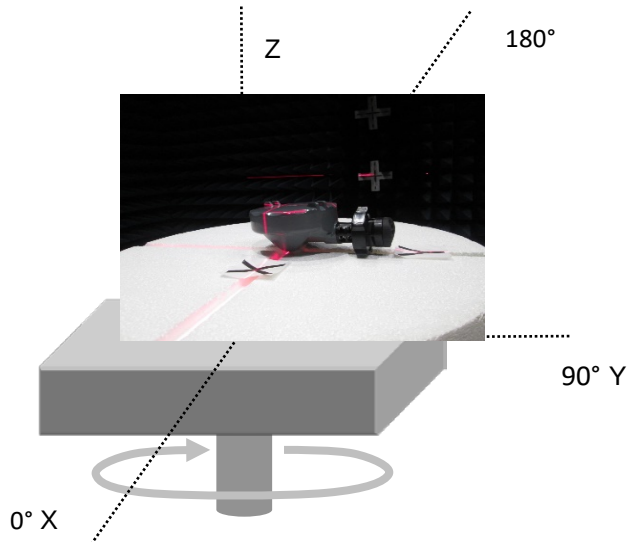
COMMENTS

None

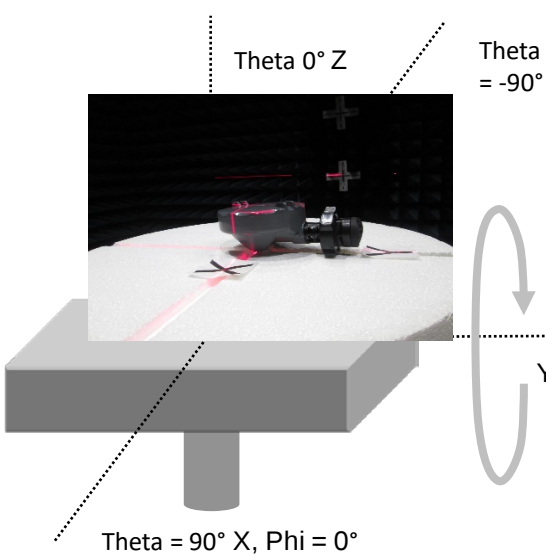
3D PATTERN DATA

Frequency (MHz)	2460
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	4.20
Peak EIRP (dBm)	7.01
Directivity (dBi)	2.81
Efficiency (dB)	-3.80
Efficiency (%)	41.68
Gain (dBi)	-0.99
Average Gain (dB)	-3.80
E-Plane 3 dB BW (°)	209.00

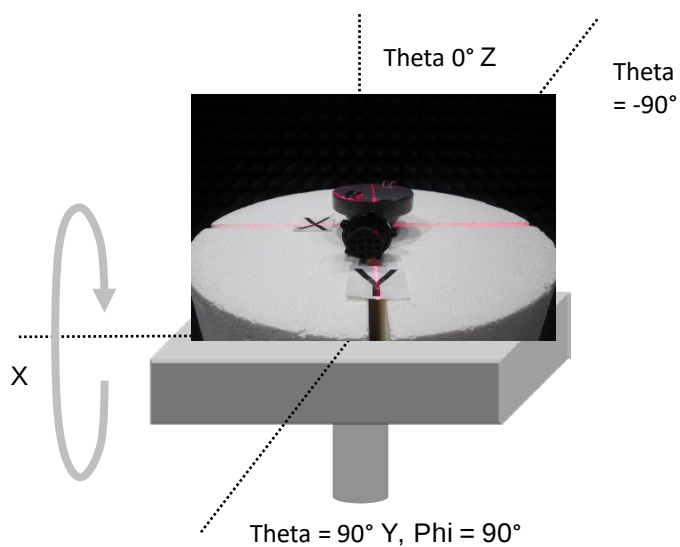
Azimuth Cut (Theta Axis = 90°)



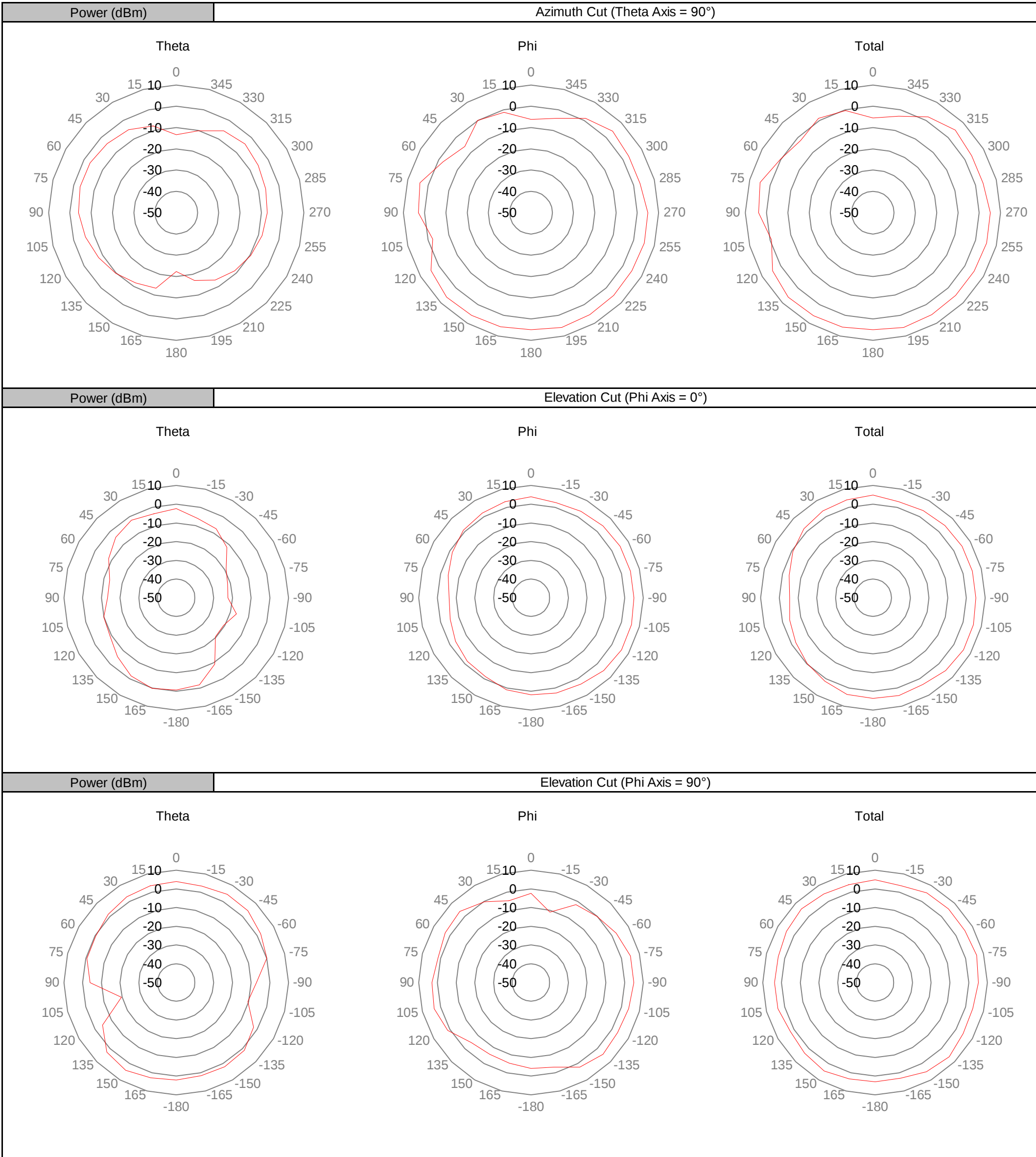
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch12 2465MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

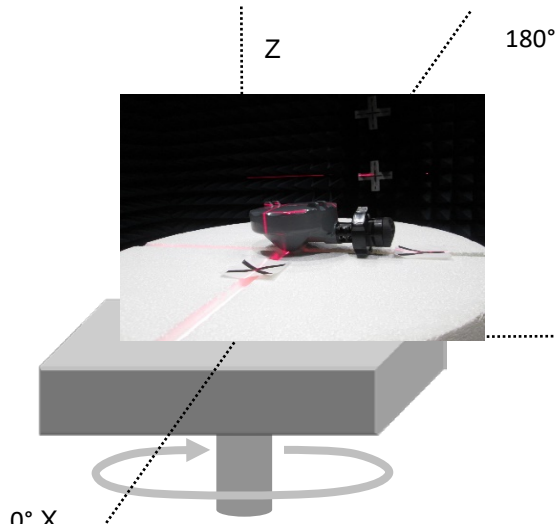
COMMENTS

None

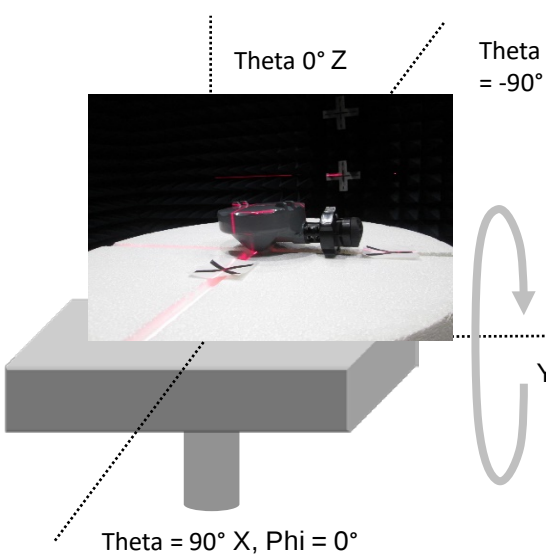
3D PATTERN DATA

Frequency (MHz)	2465
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.92
Peak EIRP (dBm)	6.72
Directivity (dBi)	2.80
Efficiency (dB)	-4.08
Efficiency (%)	39.12
Gain (dBi)	-1.28
Average Gain (dB)	-4.08
E-Plane 3 dB BW (°)	167.00

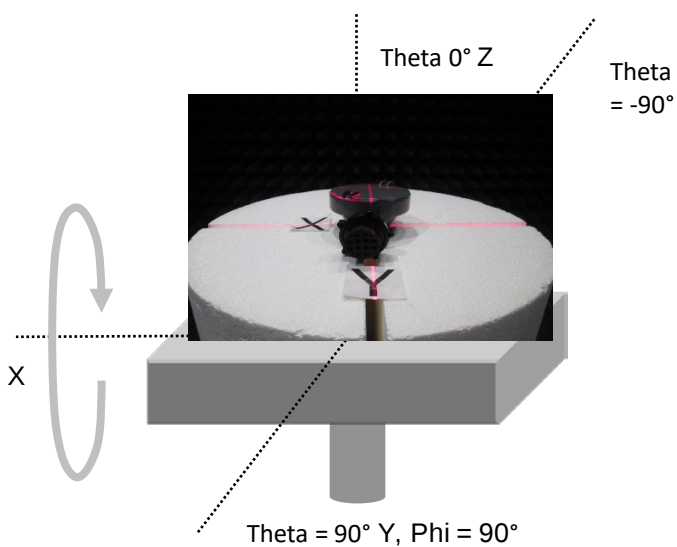
Azimuth Cut (Theta Axis = 90°)



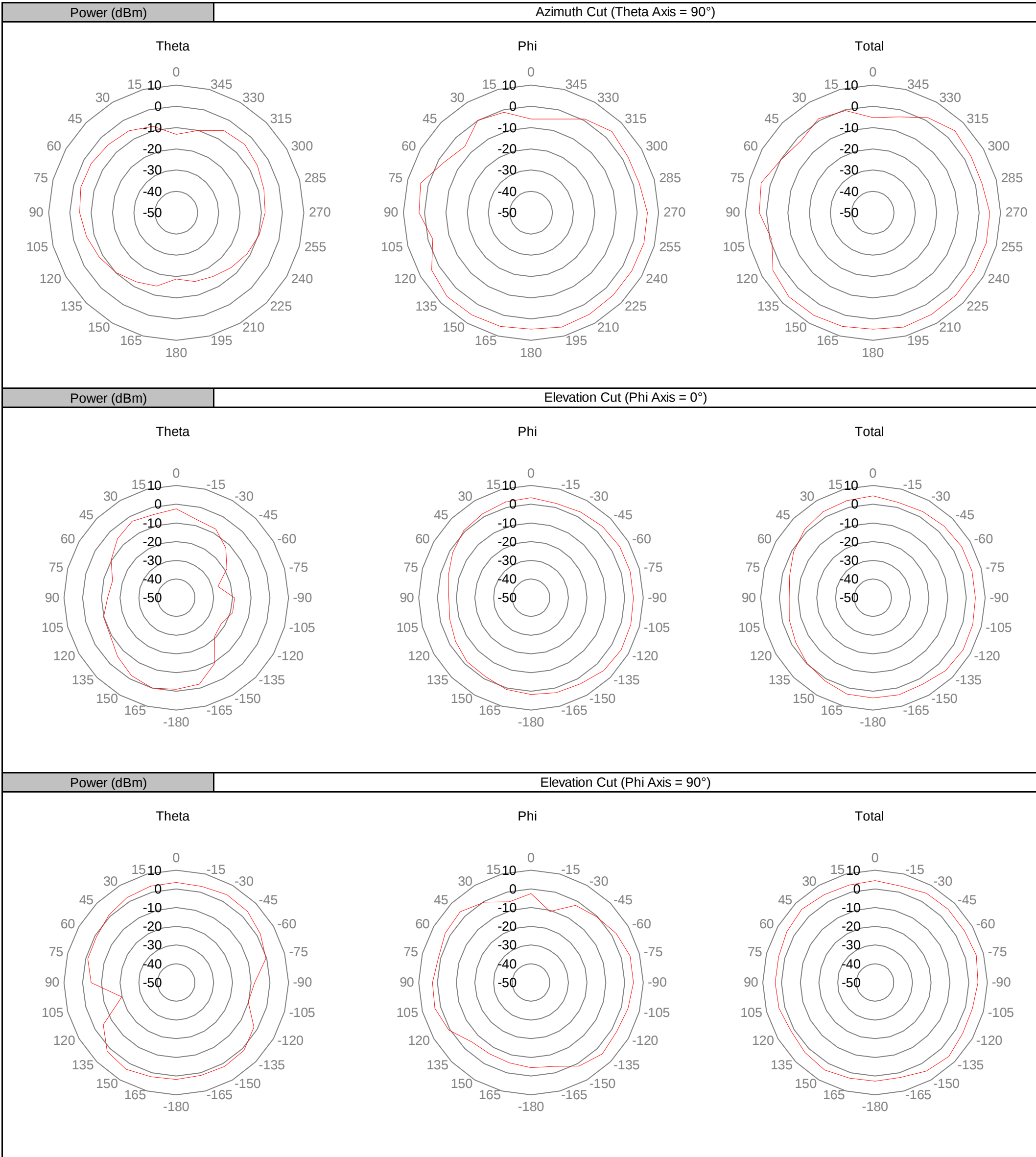
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch13 2470MHz

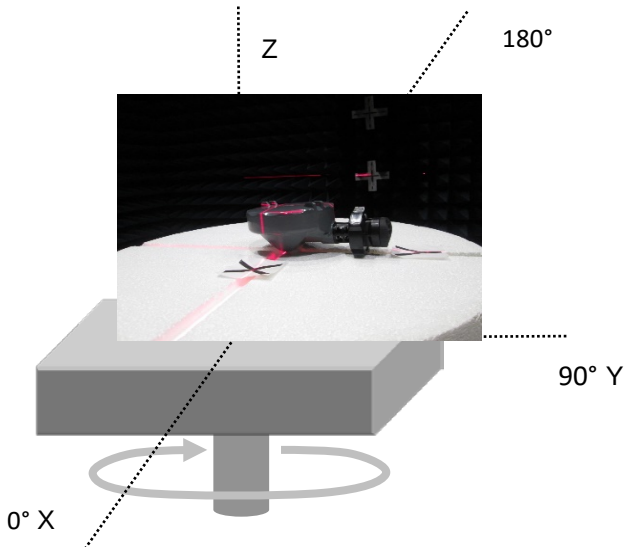
Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

COMMENTS

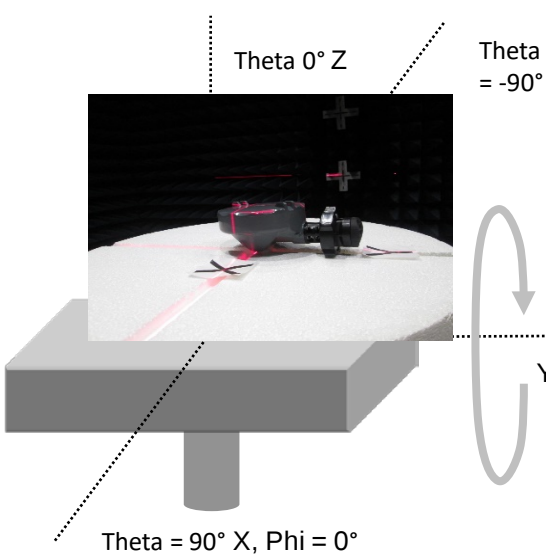
None

3D PATTERN DATA	
Frequency (MHz)	2470
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.76
Peak EIRP (dBm)	6.49
Directivity (dBi)	2.73
Efficiency (dB)	-4.24
Efficiency (%)	37.71
Gain (dBi)	-1.51
Average Gain (dB)	-4.24
E-Plane 3 dB BW (°)	174.00

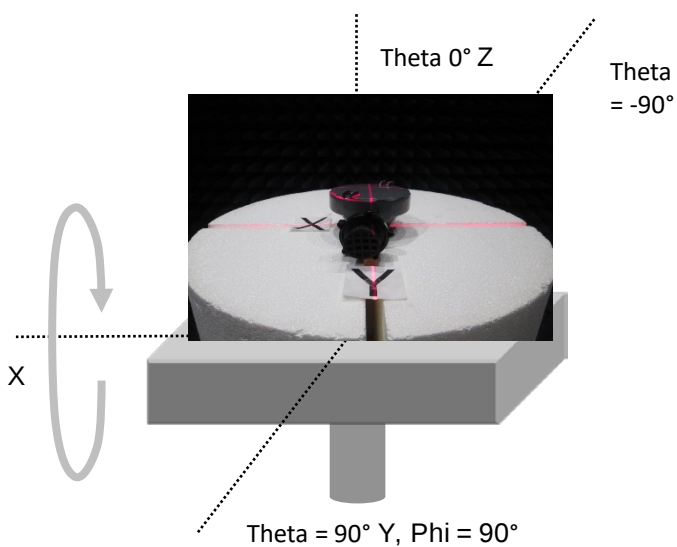
Azimuth Cut (Theta Axis = 90°)



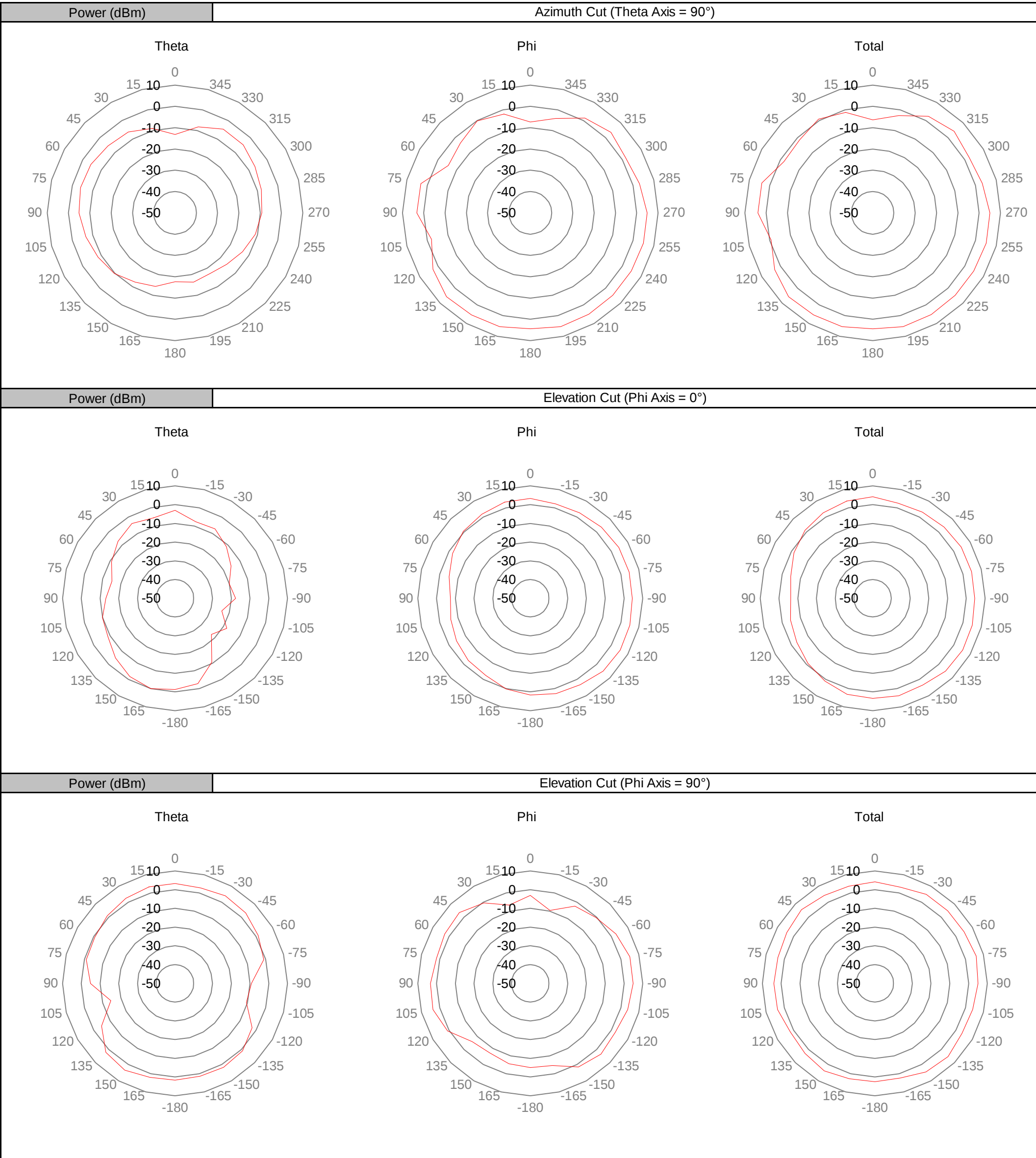
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Geo 20
Serial Number:	2400B
Customer:	Emerson Process Management
Attendees:	Merritt Pulkrabek
Customer Project:	None
Tested By:	Kyle McMullan
Test Run Description:	Hart Ch14 2475MHz

Work Order:	EMPM0079
Date:	11/12/2019
Temperature:	21.5 °C
Relative Humidity:	19.2% RH
Bar. Pressure:	1031 mbar
Job Site:	MN10

OTA 2018.01.04

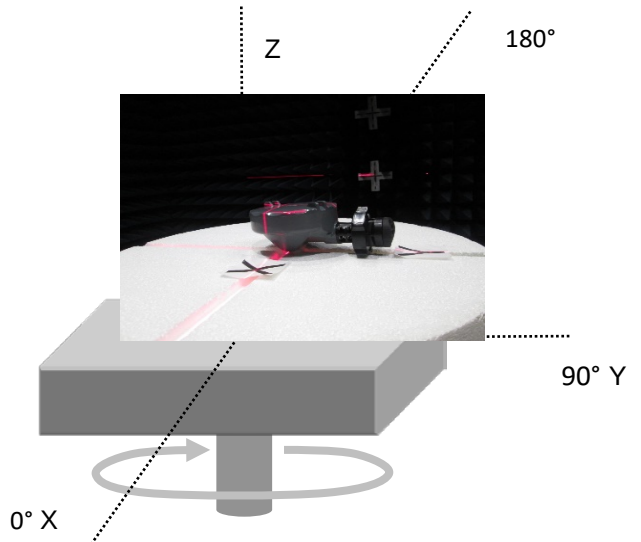
COMMENTS

None

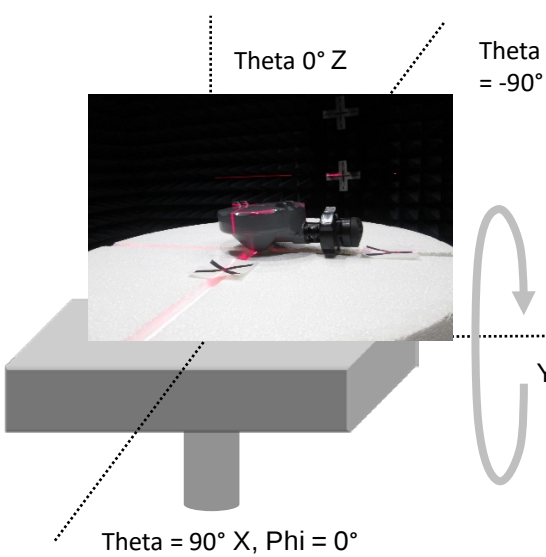
3D PATTERN DATA

Frequency (MHz)	2475
Ant. Port Input Pwr. (dBm)	8.00
Tot. Rad. Pwr. (dBm)	3.73
Peak EIRP (dBm)	6.29
Directivity (dBi)	2.56
Efficiency (dB)	-4.27
Efficiency (%)	37.44
Gain (dBi)	-1.71
Average Gain (dB)	-4.27
E-Plane 3 dB BW (°)	174.00

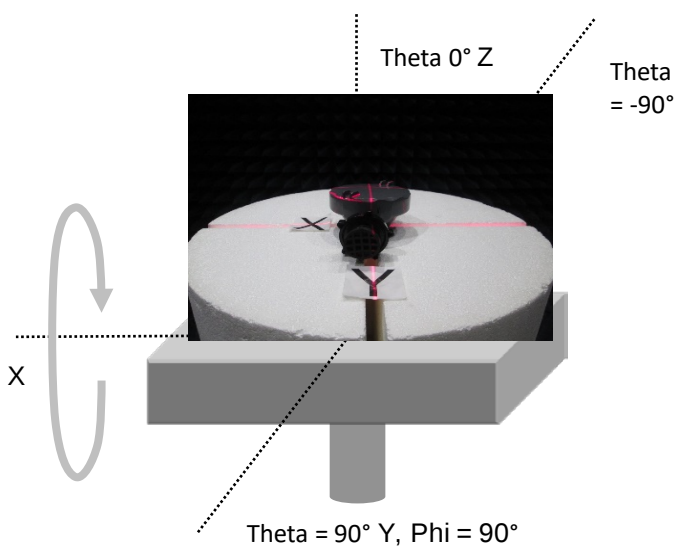
Azimuth Cut (Theta Axis = 90°)



Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS

