

9/10/2024

Attention: Application Examiner

Re: 4301 AUT Report

Applicant: Orthofix Medical, Inc.

FCC ID: 2AHVN-OFIX-4301-001

To whom it may concern,

The AUT report included on the following pages was performed on the 5000 Series Bone Growth Stimulator. A copy of this report was previously submitted under the FCC ID 2AHVN-OFIX-5000-001 exhibit “Antenna specification”.

The 5000 Series and the 4301 share the same antenna design. Referencing the 5000 Series Exhibit, “Internal photos”, the 5000 Series Control Unit photo is shown on page 1 and the PCB antenna is shown on page 8 of that exhibit. The two photos are also shown below in **Figure 1** and **Figure 2**. Figure 3 shows the identical PCB antenna is used on the 4301.



Figure 1 – 5000 Series Control Unit

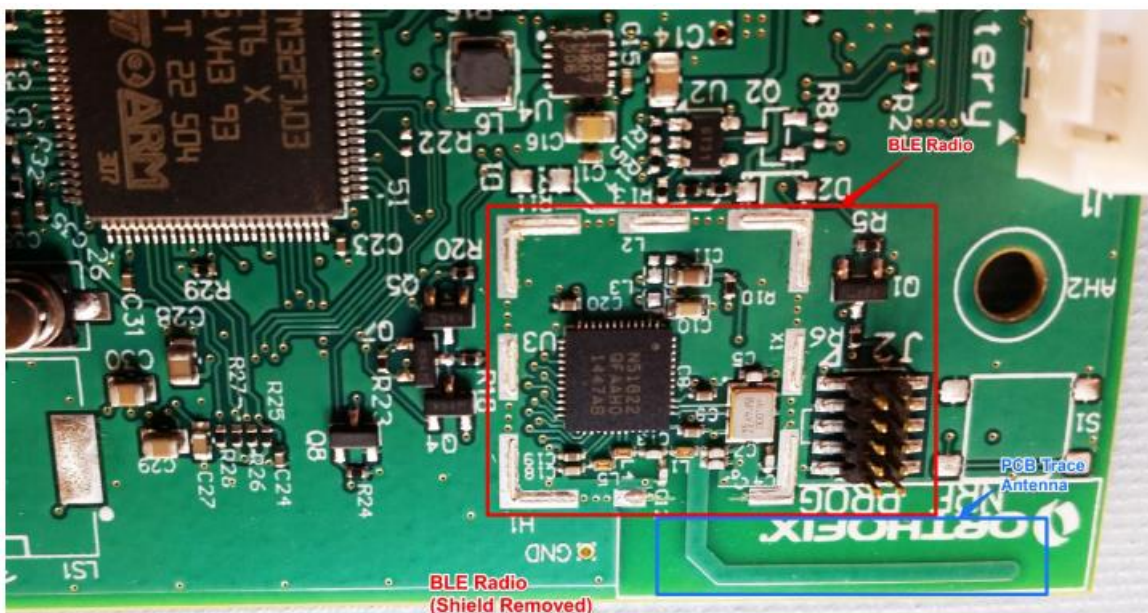


Figure 2 – 5000 Series PCB Antenna

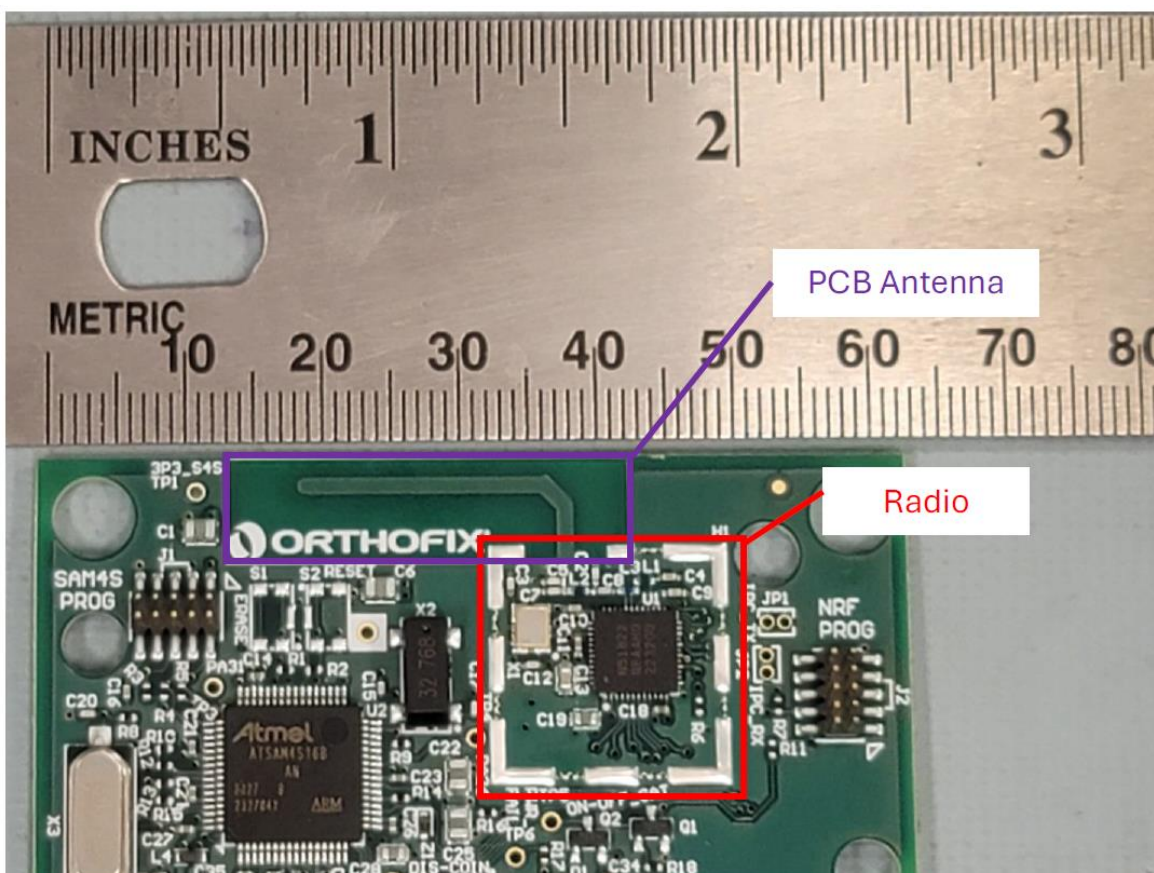


Figure 3 – 4301 PCB Antenna



If you have questions or need further information, please contact the undersigned.

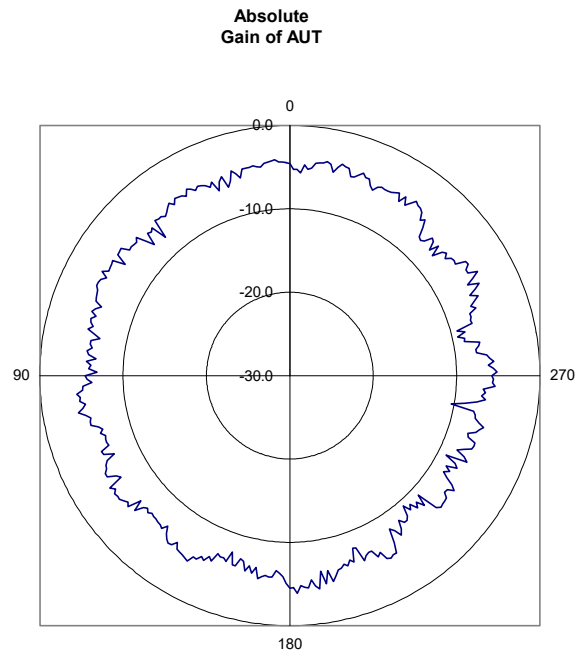
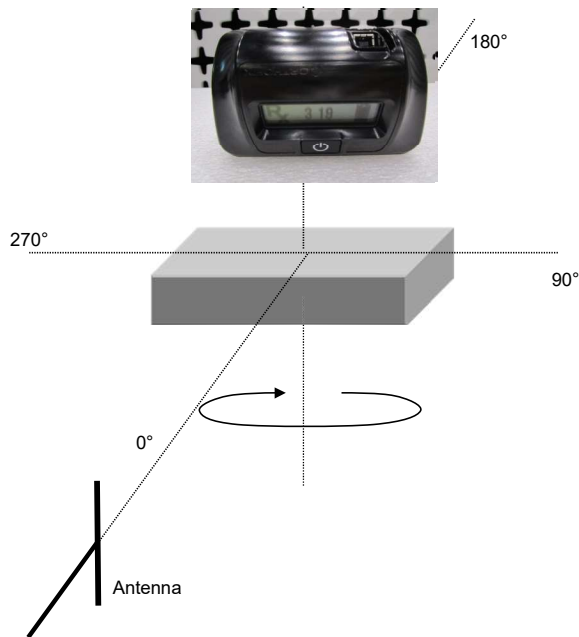
Sincerely,

A handwritten signature in black ink, appearing to read 'Philip Garman', with a long horizontal flourish extending to the right.

Philip Garman
Senior Manager, Embedded Electronics R&D
Orthofix Medical, Inc.

Work Order:	OFIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	Antenna height maxed. EUT ~ 1.5m high			

Frequency	2442	Absolute Gain of Reference Antenna (dBi)	10.17		
Measurement Antenna Polarity	Vertical	Reference Antenna Relative Gain Max (dBuV/m)	93.02		
Antenna Under Test (AUT) Polarity	Y	AUT Relative Gain Max (dBuV/m)	78.02		
Maximum Absolute Gain of AUT (dBi)	-3.86	Difference (Reference Antenna - AUT) (dB)	15.00		
Minimum Absolute Gain of AUT (dBi)	-10.36	AUT Setup Loss (dB)	0.97		
Delta (dB)	6.50	Correction Factor (Convert Relative to Absolute Gain) (dB)	81.88		
Average Absolute Gain of AUT (dBi)	-5.85				
Run #	Test Distance (m)	3m	Antenna Height(s)	Results	NA



Frequency	Value
-----------	-------

900	61.2	-0.1
850	61.2	-0.1
800	61.2	-0.1
750	61.2	-0.1
700	61.2	-0.1
650	61.2	-0.1
600	61.2	-0.1
550	61.2	-0.1
500	61.2	-0.1
450	61.2	-0.1
400	61.2	-0.1
350	61.2	-0.1
300	61.2	-0.1
250	61.2	-0.1
200	61.2	-0.1
150	61.2	-0.1
100	61.2	-0.1
50	61.2	-0.1
0	61.2	-0.1
-50	61.2	-0.1
-100	61.2	-0.1
-150	61.2	-0.1
-200	61.2	-0.1
-250	61.2	-0.1
-300	61.2	-0.1
-350	61.2	-0.1
-400	61.2	-0.1
-450	61.2	-0.1
-500	61.2	-0.1
-550	61.2	-0.1
-600	61.2	-0.1
-650	61.2	-0.1
-700	61.2	-0.1
-750	61.2	-0.1
-800	61.2	-0.1
-850	61.2	-0.1
-900	61.2	-0.1
-950	61.2	-0.1
-1000	61.2	-0.1
-1050	61.2	-0.1
-1100	61.2	-0.1
-1150	61.2	-0.1
-1200	61.2	-0.1
-1250	61.2	-0.1
-1300	61.2	-0.1
-1350	61.2	-0.1
-1400	61.2	-0.1
-1450	61.2	-0.1
-1500	61.2	-0.1
-1550	61.2	-0.1
-1600	61.2	-0.1
-1650	61.2	-0.1
-1700	61.2	-0.1
-1750	61.2	-0.1
-1800	61.2	-0.1
-1850	61.2	-0.1
-1900	61.2	-0.1
-1950	61.2	-0.1
-2000	61.2	-0.1
-2050	61.2	-0.1
-2100	61.2	-0.1
-2150	61.2	-0.1
-2200	61.2	-0.1
-2250	61.2	-0.1
-2300	61.2	-0.1
-2350	61.2	-0.1
-2400	61.2	-0.1
-2450	61.2	-0.1
-2500	61.2	-0.1
-2550	61.2	-0.1
-2600	61.2	-0.1
-2650	61.2	-0.1
-2700	61.2	-0.1
-2750	61.2	-0.1
-2800	61.2	-0.1
-2850	61.2	-0.1
-2900	61.2	-0.1
-2950	61.2	-0.1
-3000	61.2	-0.1
-3050	61.2	-0.1
-3100	61.2	-0.1
-3150	61.2	-0.1
-3200	61.2	-0.1
-3250	61.2	-0.1
-3300	61.2	-0.1
-3350	61.2	-0.1
-3400	61.2	-0.1
-3450	61.2	-0.1
-3500	61.2	-0.1
-3550	61.2	-0.1
-3600	61.2	-0.1
-3650	61.2	-0.1
-3700	61.2	-0.1
-3750	61.2	-0.1
-3800	61.2	-0.1
-3850	61.2	-0.1
-3900	61.2	-0.1
-3950	61.2	-0.1
-4000	61.2	-0.1
-4050	61.2	-0.1
-4100	61.2	-0.1
-4150	61.2	-0.1
-4200	61.2	-0.1
-4250	61.2	-0.1
-4300	61.2	-0.1
-4350	61.2	-0.1
-4400	61.2	-0.1
-4450	61.2	-0.1
-4500	61.2	-0.1
-4550	61.2	-0.1
-4600	61.2	-0.1
-4650	61.2	-0.1
-4700	61.2	-0.1
-4750	61.2	-0.1
-4800	61.2	-0.1
-4850	61.2	-0.1
-4900	61.2	-0.1
-4950	61.2	-0.1
-5000	61.2	-0.1
-5050	61.2	-0.1
-5100	61.2	-0.1
-5150	61.2	-0.1
-5200	61.2	-0.1
-5250	61.2	-0.1
-5300	61.2	-0.1
-5350	61.2	-0.1
-5400	61.2	-0.1
-5450	61.2	-0.1
-5500	61.2	-0.1
-5550	61.2	-0.1
-5600	61.2	-0.1
-5650	61.2	-0.1
-5700	61.2	-0.1
-57		

Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	None			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **72.2246**

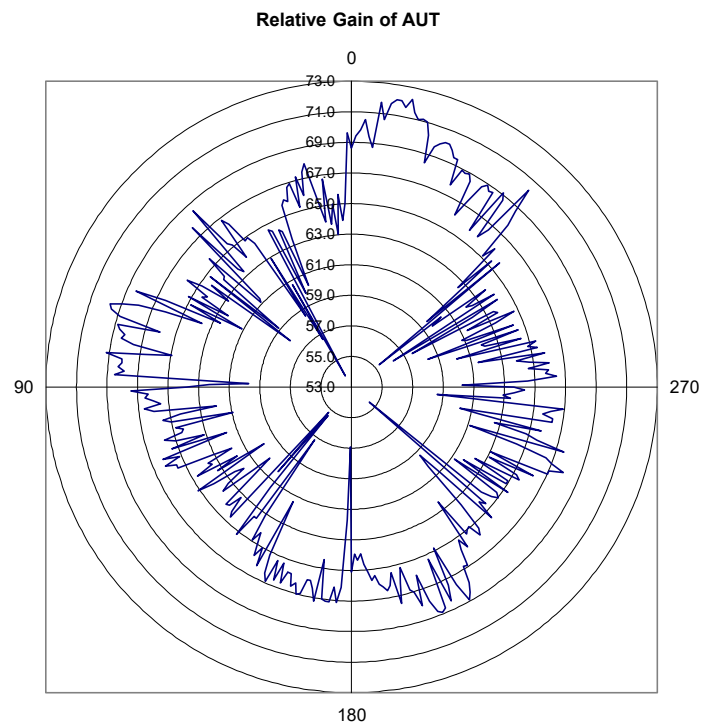
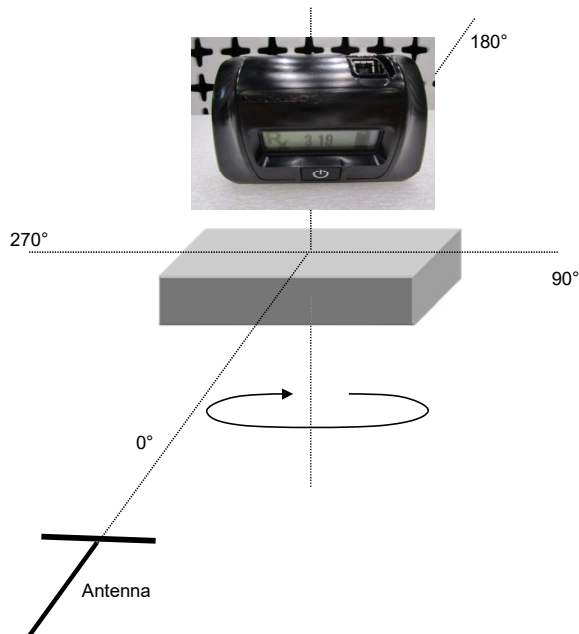
Azimuth at Maximum **347°**

Measurement Antenna Polarity **Horizontal**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **53.8246**

Azimuth at Minimum **28°**

Run #	7	Test Distance (m)	3	Antenna Height(s)	2		
-------	---	-------------------	---	-------------------	---	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	
EUT: Trace Antenna				Tested by: Jonathan Kiefer
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	None			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **77.5246**

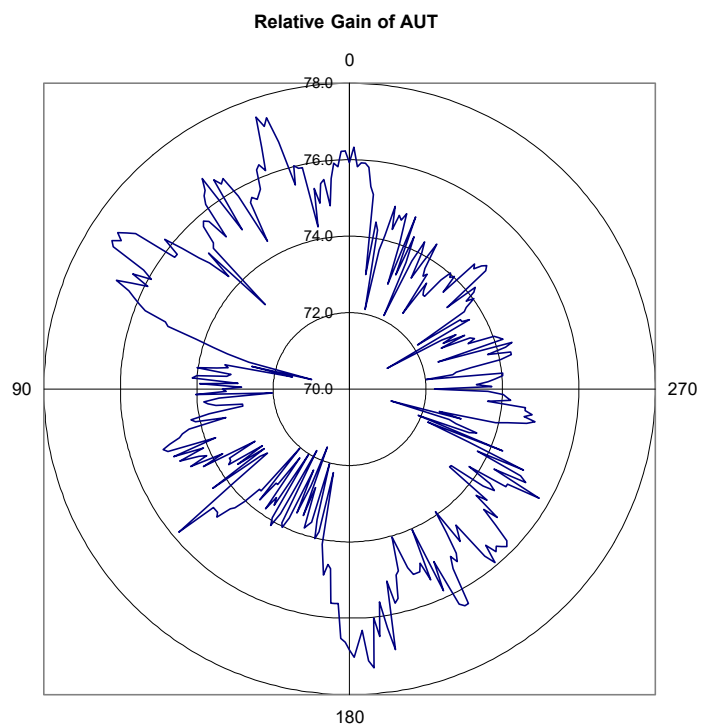
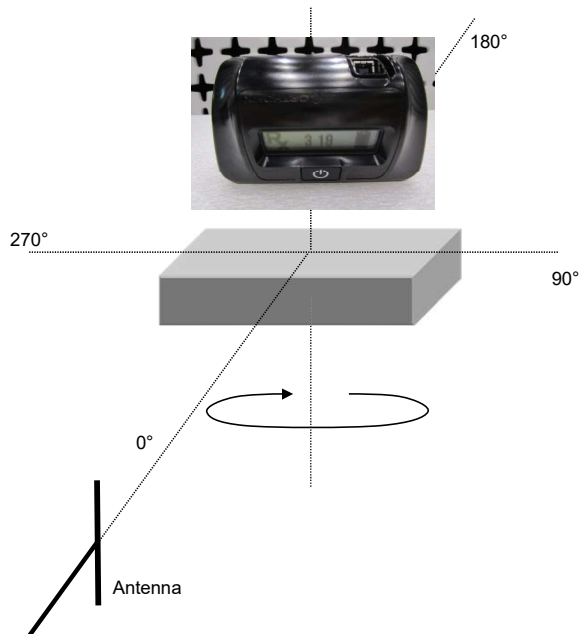
Azimuth at Maximum **18°**

Measurement Antenna Polarity **Vertical**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **71.0246**

Azimuth at Minimum **75°**

Run #	8	Test Distance (m)	3	Antenna Height(s)	2		
-------	---	-------------------	---	-------------------	---	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	None			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **72.8246**

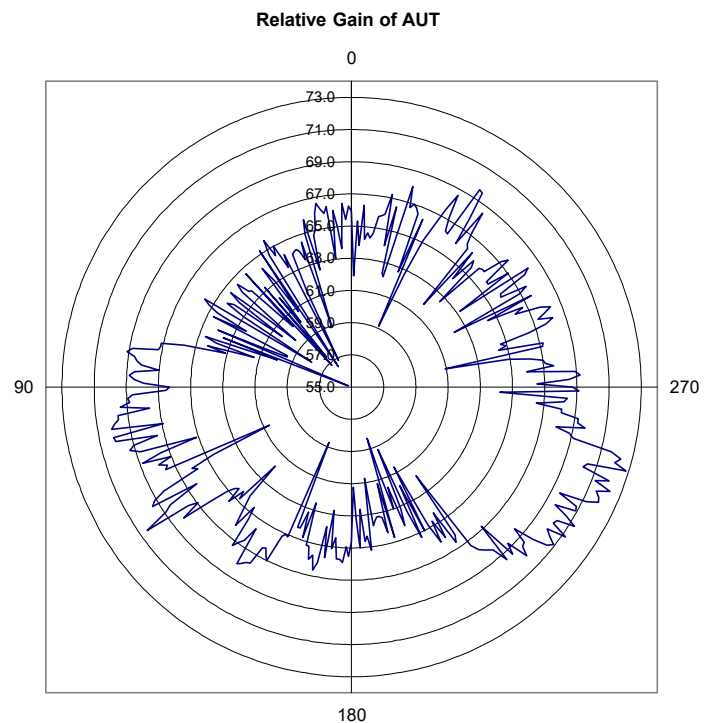
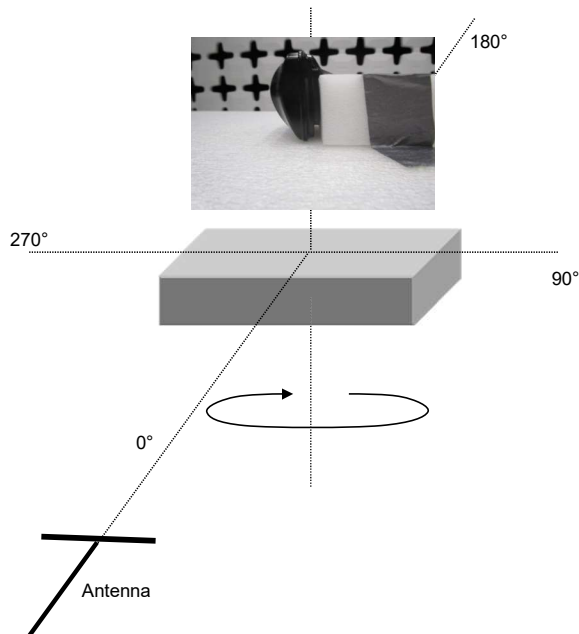
Azimuth at Maximum **252°**

Measurement Antenna Polarity **Horizontal**
Antenna Under Test (AUT) Polarity **X**

Minimum Amplitude (dBuV/m) **55.2246**

Azimuth at Minimum **67°**

Run #	9	Test Distance (m)	3	Antenna Height(s)	2		
-------	---	-------------------	---	-------------------	---	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	None			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **77.0246**

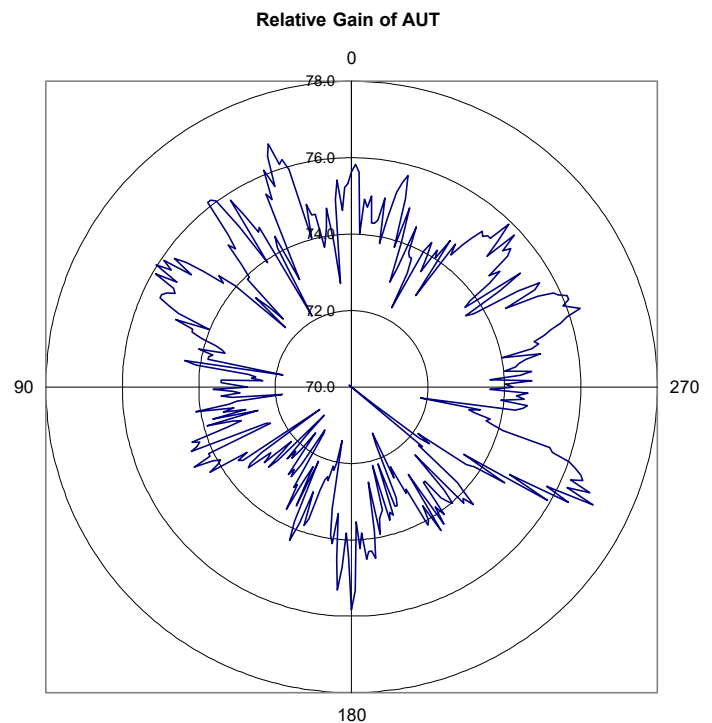
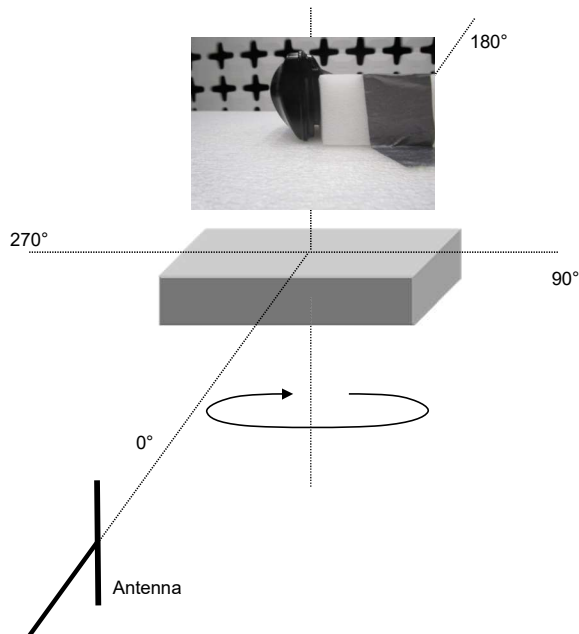
Azimuth at Maximum **243°**

Measurement Antenna Polarity **Vertical**
Antenna Under Test (AUT) Polarity **X**

Minimum Amplitude (dBuV/m) **69.9246**

Azimuth at Minimum **230°**

Run #	10	Test Distance (m)	3	Antenna Height(s)	2		
-------	----	-------------------	---	-------------------	---	--	--



Work Order:	OFIX0008	Date:	04/15/16		
Project:	None	Temperature:	20.1 °C		
Job Site:	TX02	Humidity:	49.8% RH		
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by:	Jonathan Kiefer
EUT:	Trace Antenna				
Configuration:	1				
Customer:	Orthofix				
Attendees:	Bobby Harris				
EUT Power:	Battery				
Operating Mode:	Typical Operating Mode				
Deviations:	None				
Comments:	None				

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **74.2246**

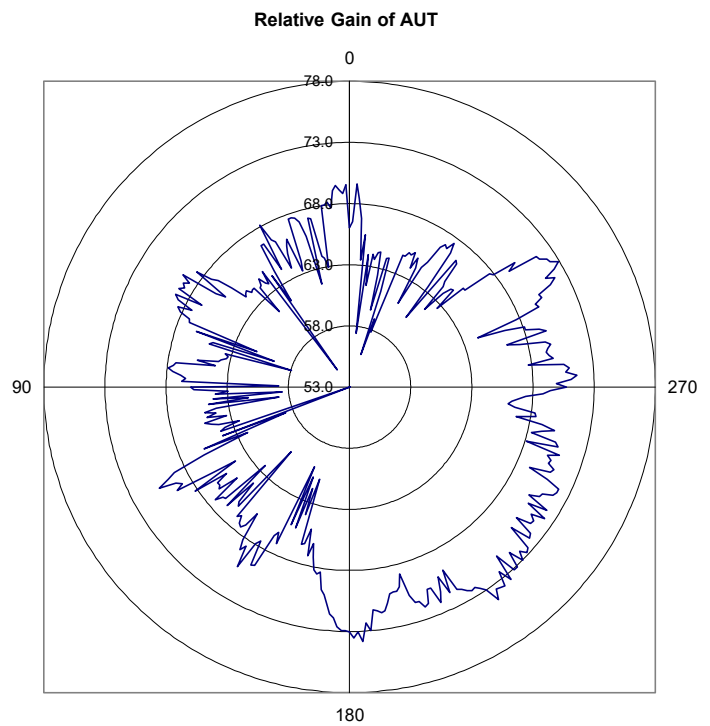
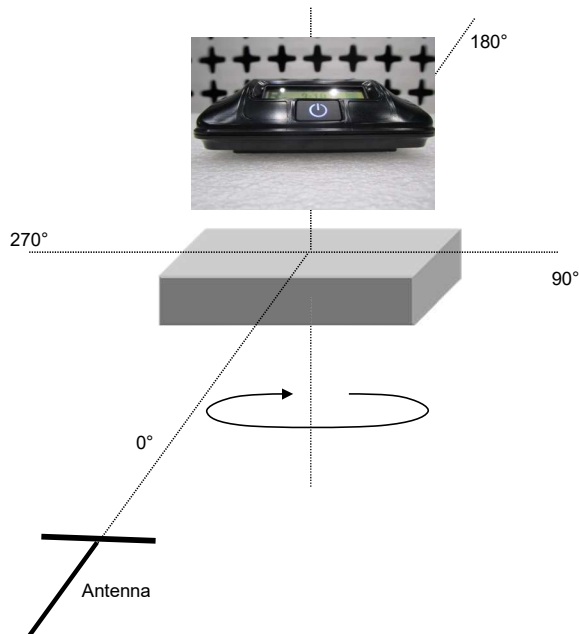
Azimuth at Maximum **214°**

Measurement Antenna Polarity **Horizontal**
Antenna Under Test (AUT) Polarity **Z**

Minimum Amplitude (dBuV/m) **52.9246**

Azimuth at Minimum **109°**

Run #	11	Test Distance (m)	3	Antenna Height(s)	2		
-------	----	-------------------	---	-------------------	---	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	None			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **71.1246**

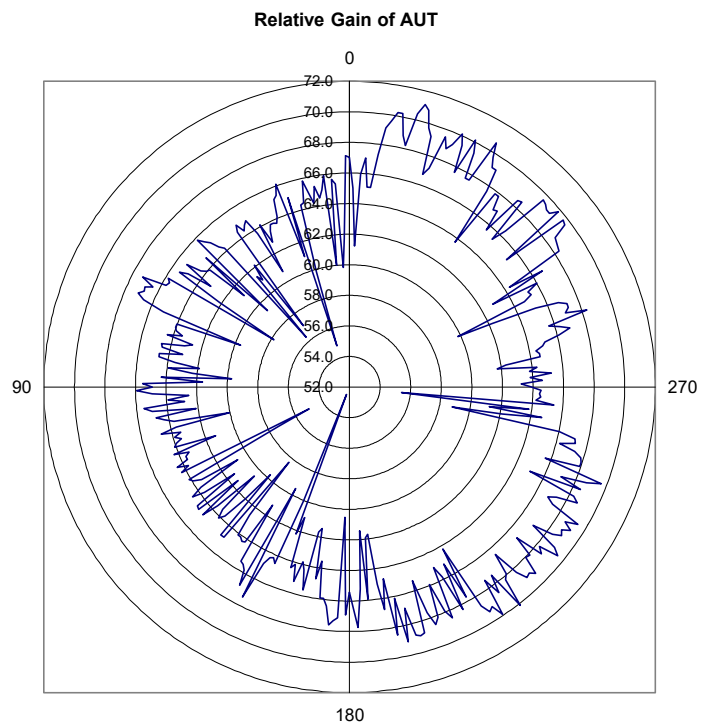
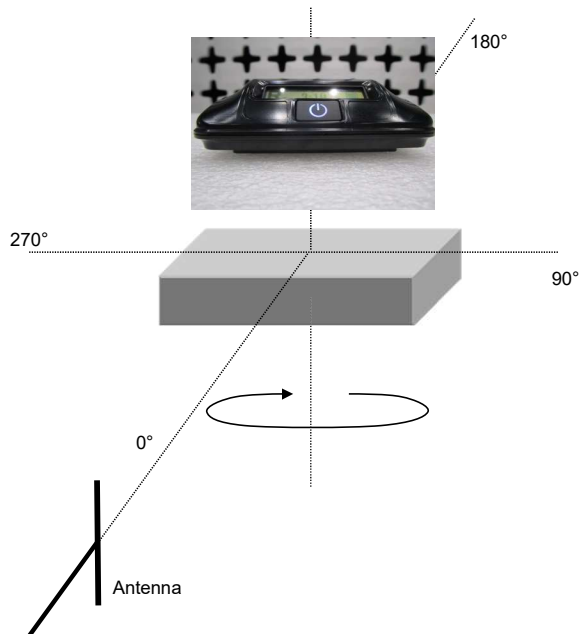
Azimuth at Maximum **344°**

Measurement Antenna Polarity **Vertical**
Antenna Under Test (AUT) Polarity **Z**

Minimum Amplitude (dBuV/m) **52.5246**

Azimuth at Minimum **158°**

Run #	12	Test Distance (m)	3	Antenna Height(s)	2		
-------	----	-------------------	---	-------------------	---	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	Antenna height maxed.			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **73.6246**

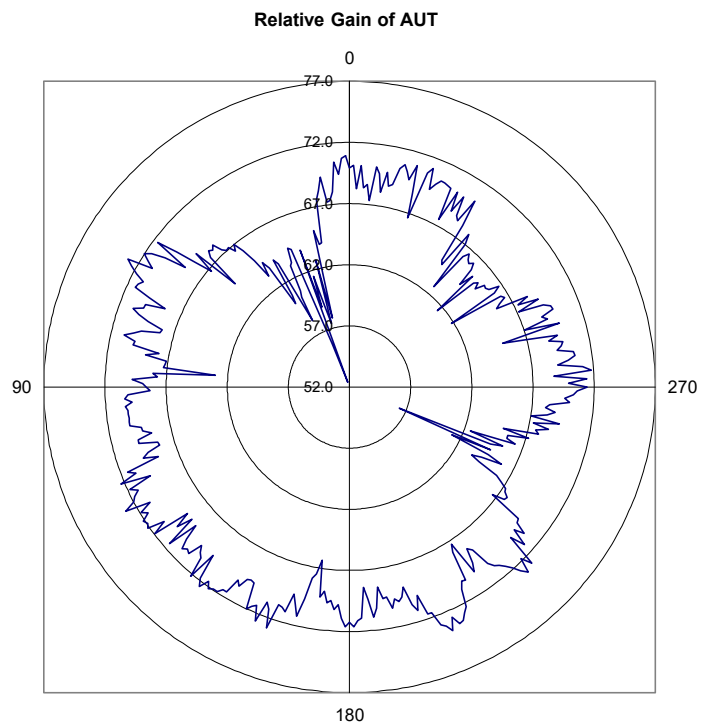
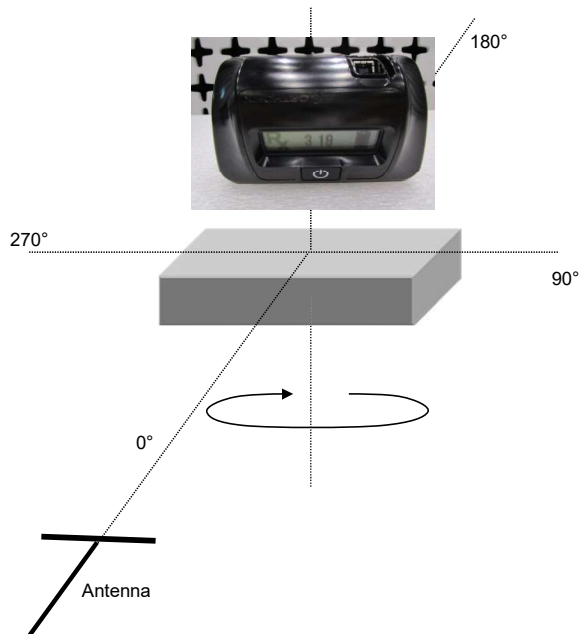
Azimuth at Maximum **202°**

Measurement Antenna Polarity **Horizontal**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **52.4246**

Azimuth at Minimum **20°**

Run #	13	Test Distance (m)	3	Antenna Height(s)	3.455		
-------	----	-------------------	---	-------------------	-------	--	--



Work Order:	OPIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	Antenna height maxed.			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **78.0246**

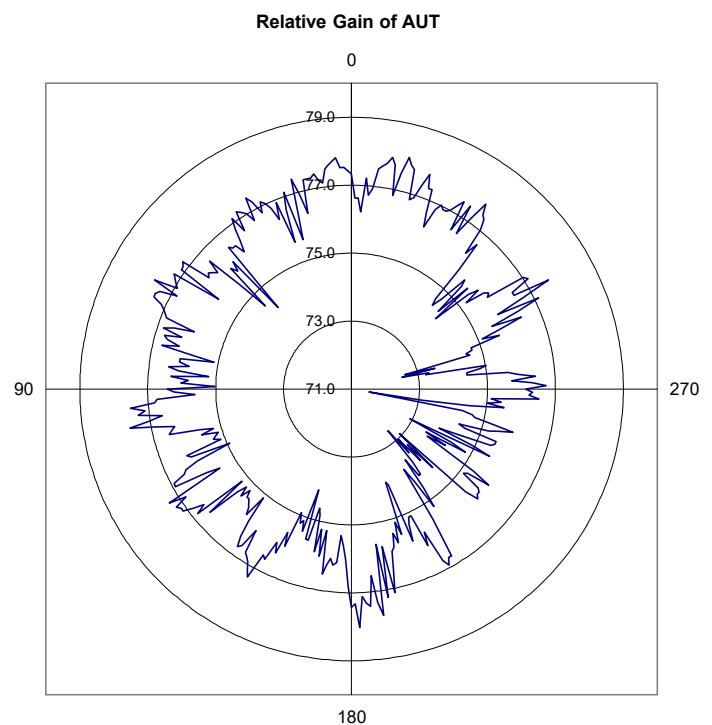
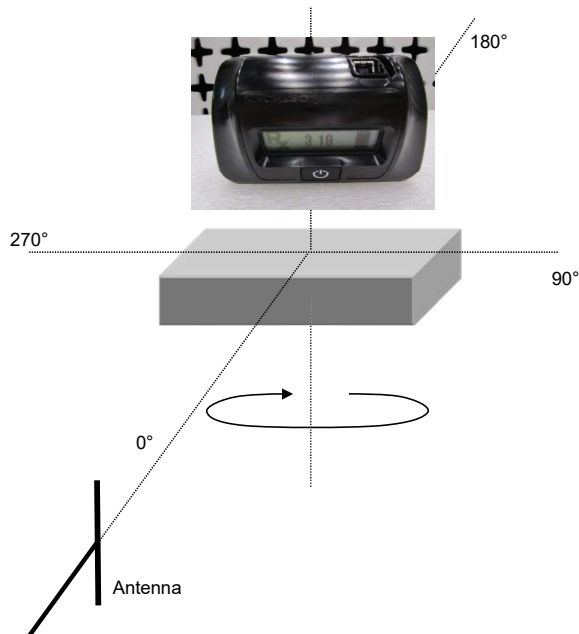
Azimuth at Maximum **345°**

Measurement Antenna Polarity **Vertical**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **71.5246**

Azimuth at Minimum **259°**

Run #	14	Test Distance (m)	3	Antenna Height(s)	3.455		
-------	----	-------------------	---	-------------------	-------	--	--



Work Order:	OFIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	2			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	Reference antenna.			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **93.0246**

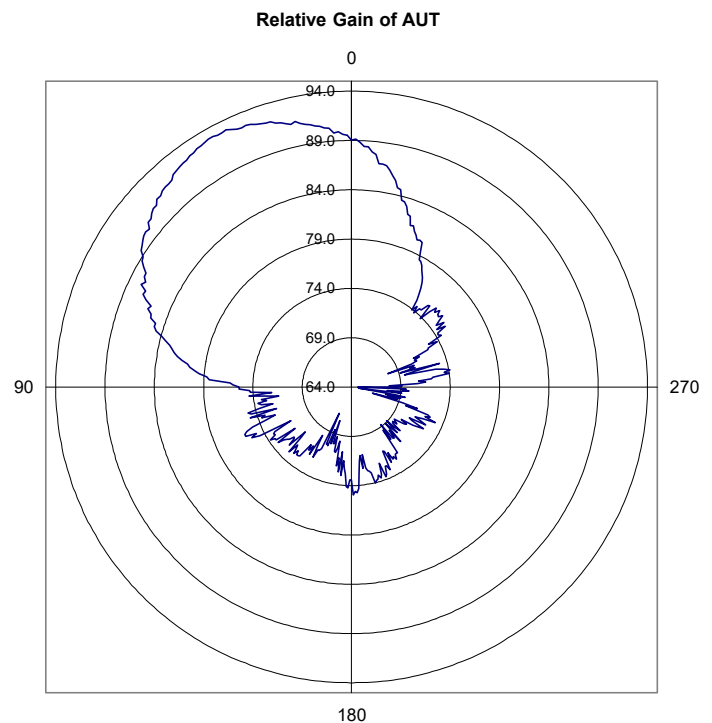
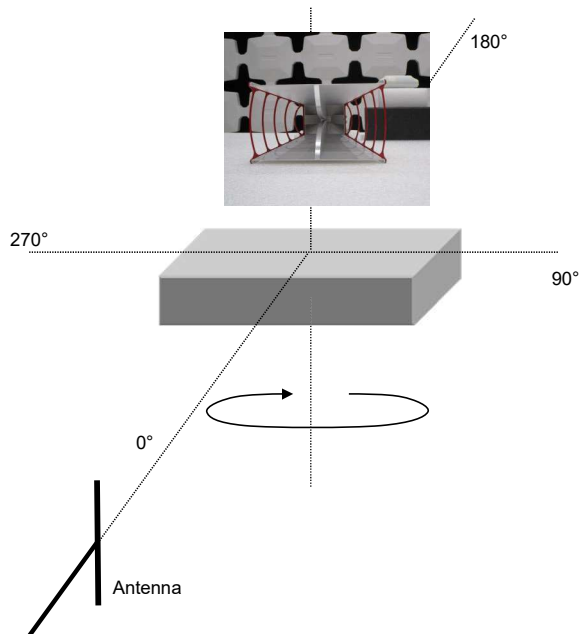
Azimuth at Maximum **29°**

Measurement Antenna Polarity **Vertical**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **64.6246**

Azimuth at Minimum **268°**

Run #	15	Test Distance (m)	3	Antenna Height(s)	2.213		
-------	----	-------------------	---	-------------------	-------	--	--



Work Order:	OFIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	2			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	Reference antenna.			

Frequency (MHz) **2442**

Maximum Amplitude (dBuV/m) **94.5246**

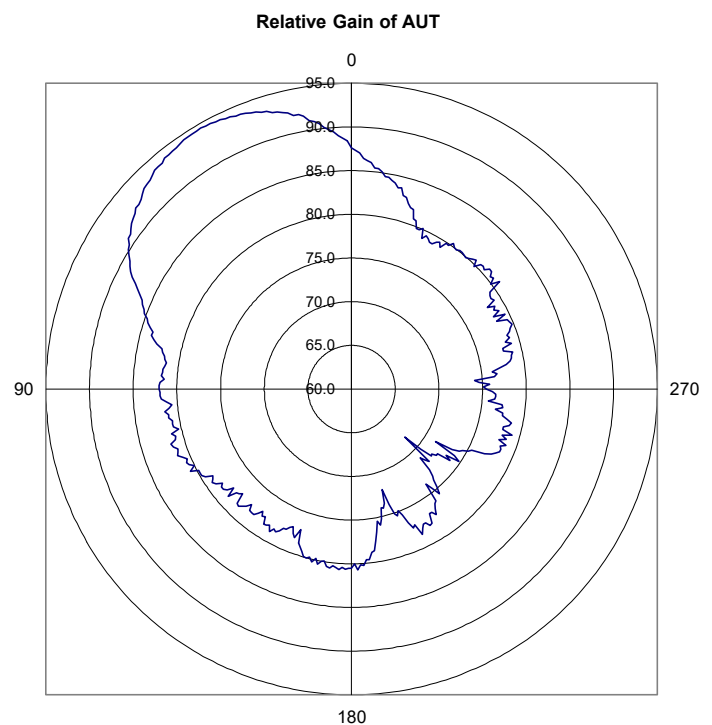
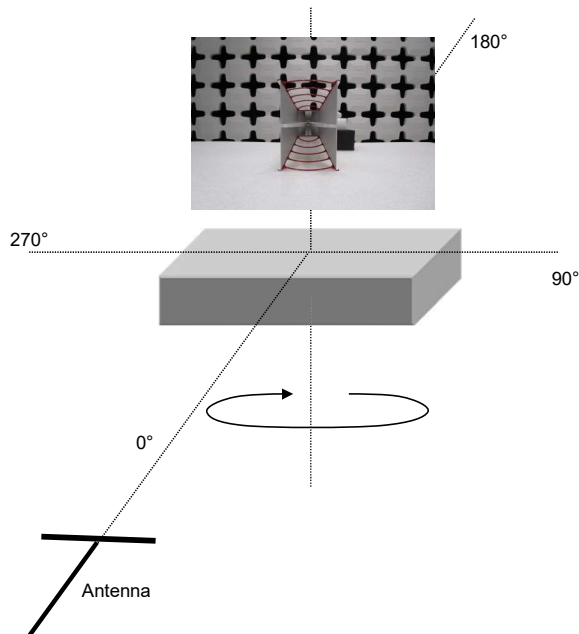
Azimuth at Maximum **29°**

Measurement Antenna Polarity **Horizontal**
Antenna Under Test (AUT) Polarity **Y**

Minimum Amplitude (dBuV/m) **68.2246**

Azimuth at Minimum **227°**

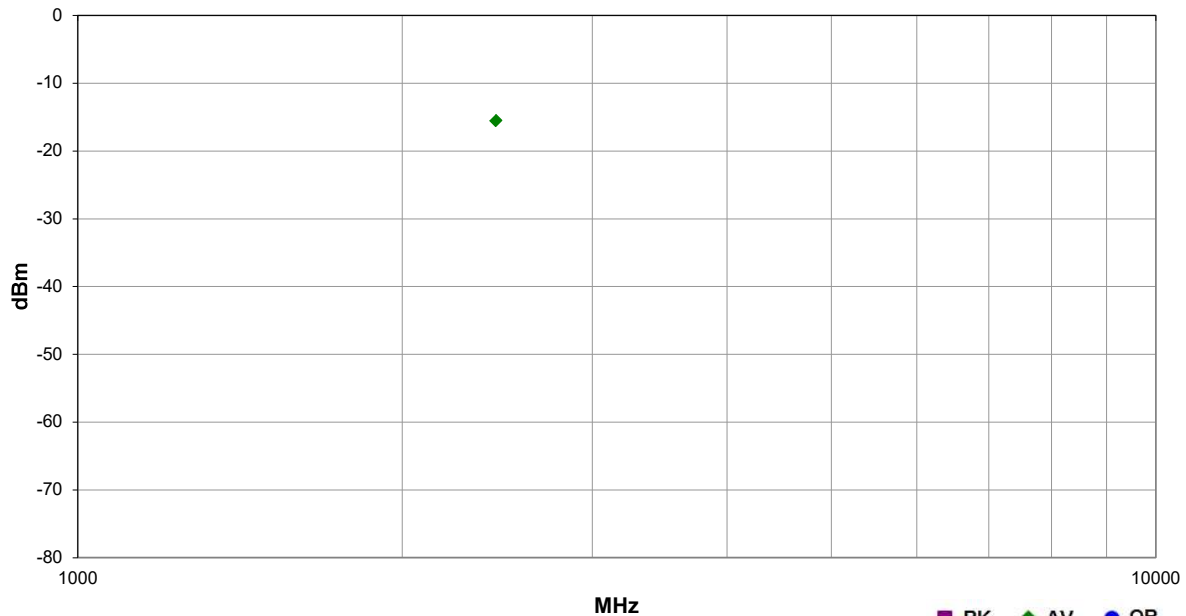
Run #	16	Test Distance (m)	3	Antenna Height(s)	2.131		
-------	----	-------------------	---	-------------------	-------	--	--



Work Order:	OFIX0008	Date:	04/15/16	
Project:	None	Temperature:	20.1 °C	
Job Site:	TX02	Humidity:	49.8% RH	
Serial Number:	None	Barometric Pres.:	1017 mbar	Tested by: Jonathan Kiefer
EUT:	Trace Antenna			
Configuration:	1			
Customer:	Orthofix			
Attendees:	Bobby Harris			
EUT Power:	Battery			
Operating Mode:	Typical Operating Mode			
Deviations:	None			
Comments:	EUT on Vertical (Y) side. PK and AVG (RMS) data. Absolute Antenna gain = MAX EIRP - conducted power + cable loss (if applicable). This data sheets shows the alternative absolute antenna gain measurement by comparing the radiated eirp of the trace antenna to the conducted output power of the direct connect unit. It is a good reference for comparison to the absolute antenna gain shown on the first page which is calculated based on the trace antenna compared to a calibrated reference antenna. Variations in the matching and any loss not accounted for with the SMA adapter provided by the customer could alter results slightly.			

Test Specifications	Test Method
EN 300 328 V1.9.1:2015	EN 300 328 V1.9.1:2015

Run #	16	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	NA
-------	----	-------------------	---	-------------------	-----------	---------	----



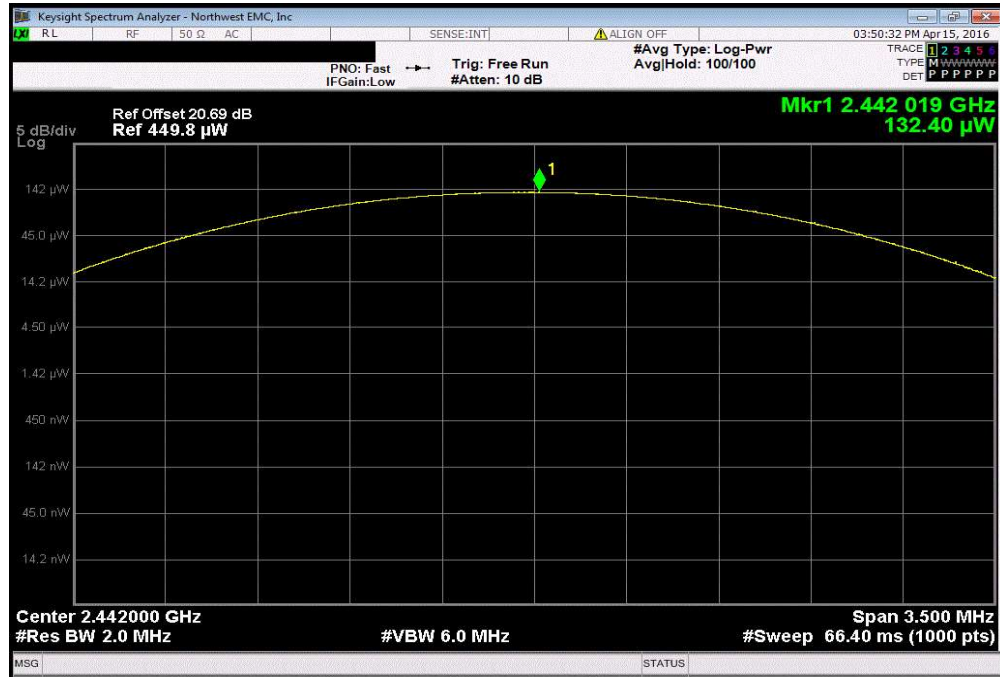
Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2442.010	3.7	114.0	Vert	PK	2.82E-05	-15.5	N/A	N/A	Conducted Output Power = -8.78 dBm. Antenna gain (dBi) = -15.5 - (-8.78 dBm) = -

OUTPUT POWER

EUT: Trace Antenna		Work Order: OFIX0008	
Serial Number: None		Date: 04/15/16	
Customer: Orthofix		Temperature: 20.2°C	
Attendees: Bobby Harris		Humidity: 49%	
Project: None		Barometric Pres.: 1013	
Tested by: Jonathan Kiefer	Power: Battery	Job Site: TX09	
TEST SPECIFICATIONS			
Test Method			
COMMENTS			
Direct Connect conducted Output Power measurement. 20.69 dB Reference offset (Attenuator plus cable loss). -4 software setting			
DEVIATIONS FROM TEST STANDARD			
N/A			
Configuration #	2	Signature	
		Value	Limit (<)
Mid Channel, 2442 MHz		132.4 uW	N/A
			Result
			N/A

OUTPUT POWER

Mid Channel, 2442 MHz							
					Value	Limit ($<$)	Result
					132.4 μ W	N/A	N/A



TEST EQUIPMENT

Description	Manufacturer	Model
Generator - Signal	Agilent	E4422B
Analyzer - Spectrum Analyzer	Keysight	N9010A
Cable	Fairview Microwave	SCK0963-60
Block - DC	Fairview Microwave	SD3379
Attenuator	Fairview Microwave	SA4018-20
Antenna - Double Ridge	ETS Lindgren	3115
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P
Cable	Northwest EMC	1-8.2 GHz
Antenna - Double Ridge	ETS Lindgren	3115
Analyzer - Spectrum Analyzer	Agilent	N9010A

ID	Last Cal.	Interval (mo)
TGS	3/27/2015	36
AFM	3/15/2016	12
TXF	11/3/2015	12
AMM	2/25/2016	12
TQY	2/25/2016	12
AJN	9/15/2014	24
PAJ	9/18/2015	12
TXC	10/21/2015	12
AJL	9/15/2014	24
AFL	10/29/2015	12

OUTPUT POWER

