



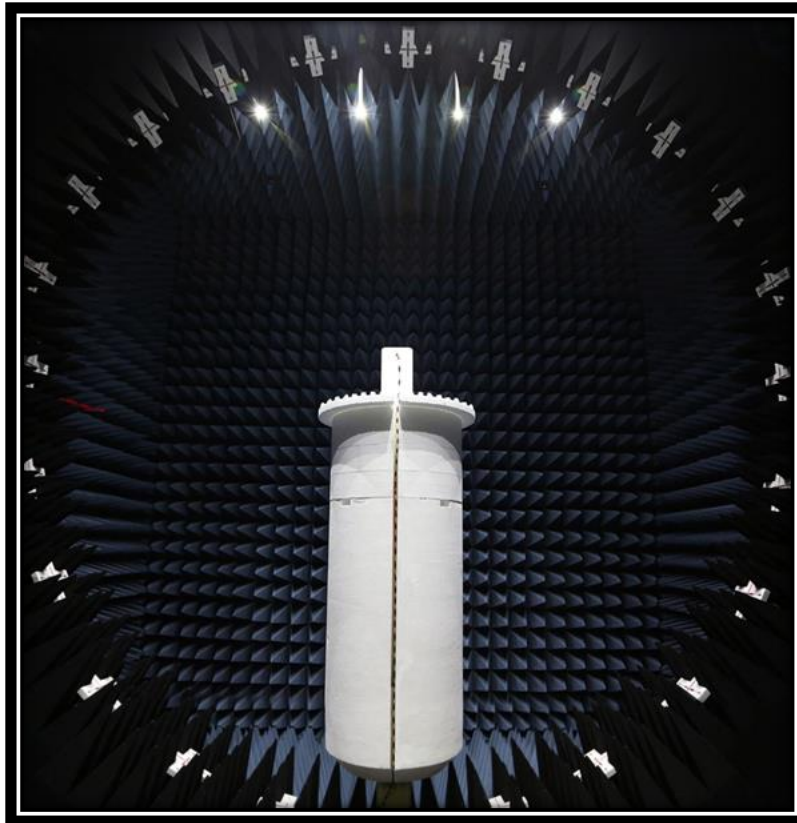
element

Fortell Research Inc.

Fortell AI Hearing Aid, Left and Right

Antenna Pattern Measurements

Report: CHRM0004.3 Rev. 0, Issue Date: October 14, 2025



Approved by:

Jeff Alcock, Senior EMC Test Engineer

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REVISION HISTORY



Revision Number		Description	Date (yyyy-mm-dd)	Page Number
00	None			

PRODUCT DESCRIPTION



Client and Equipment under Test (EUT) Information

Company Name:	Fortell Research Inc.
Address:	379 W Broadway
City, State, Zip:	New York City, NY 10012
Test Requested By:	John Becker
EUT:	Fortell AI Hearing Aid, Left and Right
First Date of Test:	September 11, 2025
Last Date of Test:	September 11, 2025
Receipt Date of Samples:	September 8, 2025
Equipment Design Stage:	Production Equivalent
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Left and right hearing aid with BTLE
Testing Objective:
To obtain 3D antenna pattern measurements and calculated antenna performance values (gain, efficiency, TRP, etc).

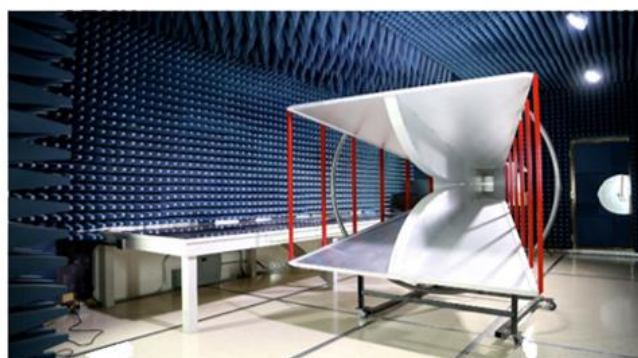
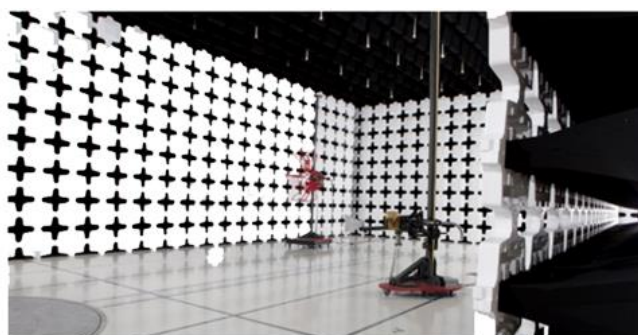
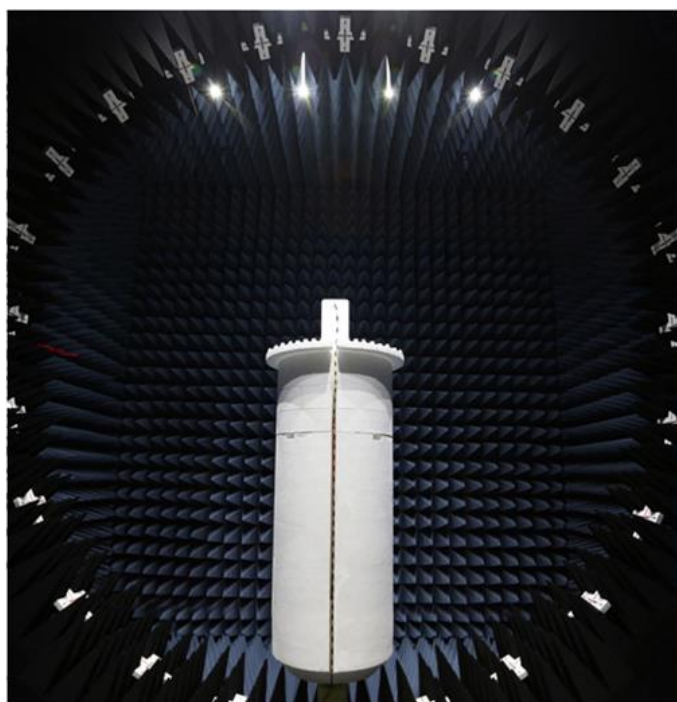
FACILITIES

Testing was performed at the following location(s)

	Location	Labs ⁽¹⁾	Address	A2LA ⁽²⁾	ISED ⁽³⁾	BSMI ⁽⁴⁾	VCCI ⁽⁵⁾	CAB	FDA ⁽⁶⁾
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
☐	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

- (1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
- (2) A2LA Certificate No.
- (3) ISED Company No.
- (4) BSMI No.
- (5) VCCI Site Filing No.
- (6) FDA ASCA No.



MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2025-09-11	Active 3D Antenna Pattern Measurements	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

OTA TEST DESCRIPTION



OTA 2018.01.04

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Chamber - OTA	ETS Lindgren	AMS-8923-195	OTA	10/8/2024	36 mo
Analyzer - Spectrum Analyzer	Agilent	E4443A	AAS	7/23/2025	12 mo
Analyzer - Network Analyzer	Agilent	E5071C	NAM	5/23/2025	36 mo
Antenna - Dipole	ETS Lindgren	3126-2450	OTF2	4/18/2024	36 mo

TEST DESCRIPTION

Using the modes of operation and configurations noted within this report, a radiated pattern measurement test was performed. The frequency ranges investigated (scanned), are also noted in this report.

The EUT was placed on a low dielectric constant support structure (Phi Axis Positioner) in the 3D center of the measurement zone using a laser alignment system.

The test begins with a measurement path configured (via ETS-Lindgren EMQuest Data Acquisition and Analysis Software) such that an electrical path is present from the Theta polarization element of the -165° detector antenna, to the measurement port of a spectrum analyzer. The EUT is commanded to transmit at the desired frequency and an absolute power measurement is obtained at the spectrum analyzer. The measurement path is then reconfigured (again via EMQuest) such that an electrical path is present from the Phi polarization element of the -165° detector antenna, to the measurement port of the spectrum analyzer. Another absolute power measurement is obtained at the spectrum analyzer. This process is repeated at each of the 23 detector antennas in turn. This process is repeated for every rotation of the Phi Axis Positioner up to 180° - Phi Axis Resolution. When this process is complete, EMQuest applies factors from a Range Calibration and Normalization to produce a final data set with 1D/2D/3D patterns and tabular values such as antenna efficiency, Equivalent Isotropic Radiated Power (EIRP), Total Radiated Power (TRP), etc.

A measurement uncertainty estimation has been performed for this testing. When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution. The expanded measurement uncertainty, 95% confidence level (K=2), for Maximum Gain / Efficiency for 2400-2483.5 MHz on active measurements is +/-1.08 dB. The expanded measurement uncertainty, 95% confidence level (K=2), for Maximum Gain / Efficiency for 2400-2483.5 MHz on passive measurements is +/-1.29. The calculations for estimating measurement uncertainty are available upon request.

Procedures for the Range Calibration and Normalization can be found in Element Materials Technology document: WP Antenna Pattern Measurements (3D)

ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Fortell AI Hearing Aid, Left
Serial Number:	7D7V2JH
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Left_2402

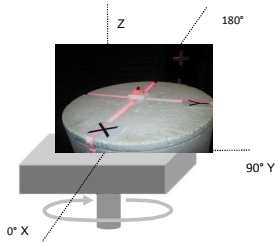
Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS

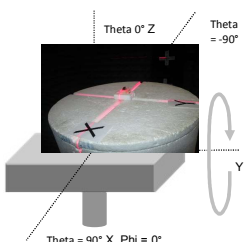
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2402
Ant. Port Input Pwr. (dBm)	5.78
Tot. Rad. Pwr. (dBm)	-4.99
Peak EIRP (dBm)	-1.36
Directivity (dBi)	3.63
Efficiency (dB)	-10.77
Efficiency (%)	8.38
Gain (dBi)	-7.14
Average Gain (dB)	-10.77
E-Plane 3 dB BW (°)	131.00

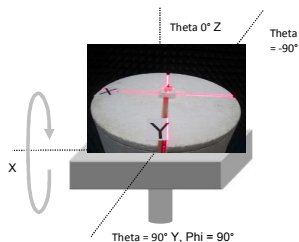
Azimuth Cut (Theta Axis = 90°)



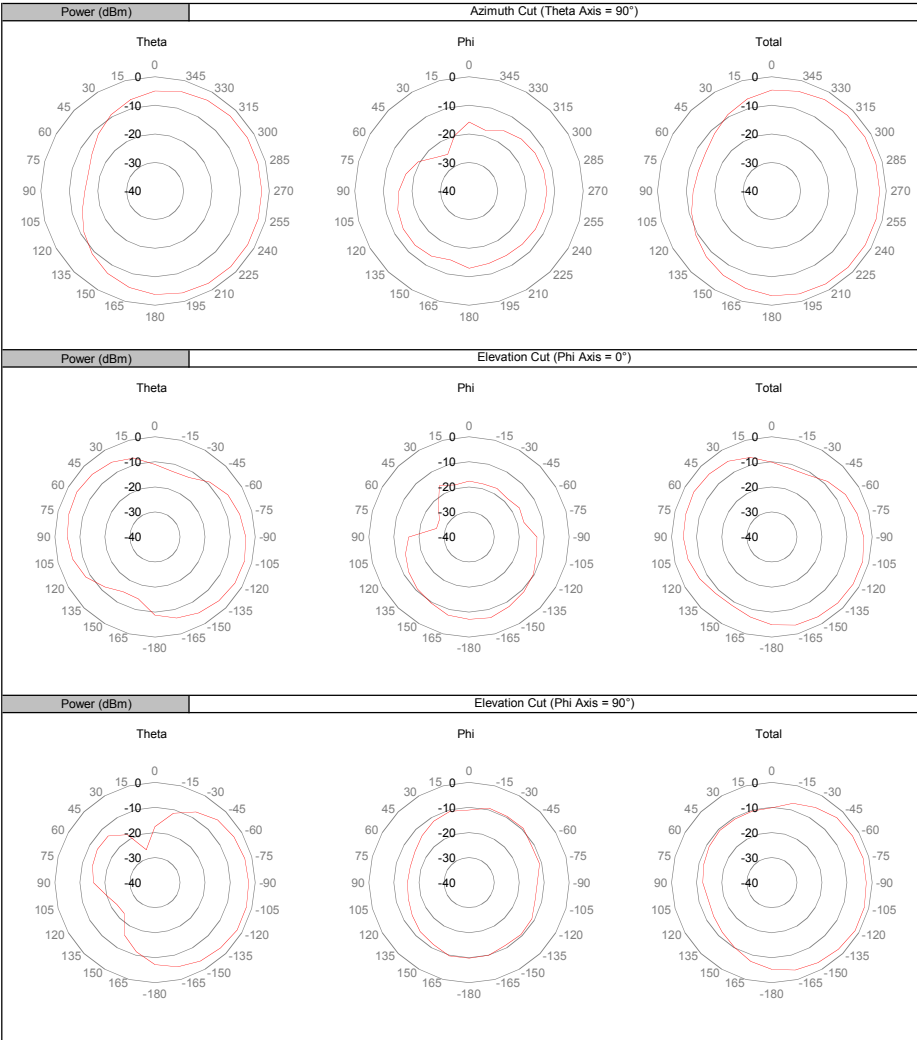
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Fortell AI Hearing Aid, Left
Serial Number:	7D7V2JH
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Left_2442

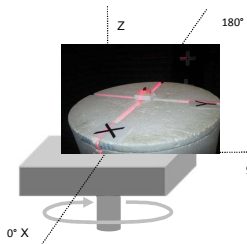
Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS

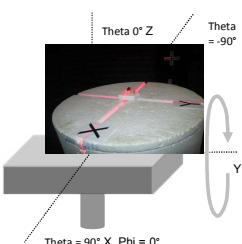
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2442
Ant. Port Input Pwr. (dBm)	5.40
Tot. Rad. Pwr. (dBm)	-5.20
Peak EIRP (dBm)	-1.82
Directivity (dBi)	3.38
Efficiency (dB)	-10.60
Efficiency (%)	8.71
Gain (dBi)	-7.22
Average Gain (dB)	-10.60
E-Plane 3 dB BW (°)	128.00

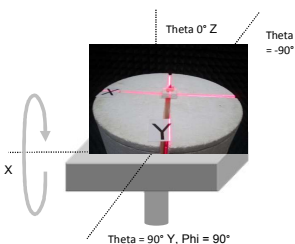
Azimuth Cut (Theta Axis = 90°)



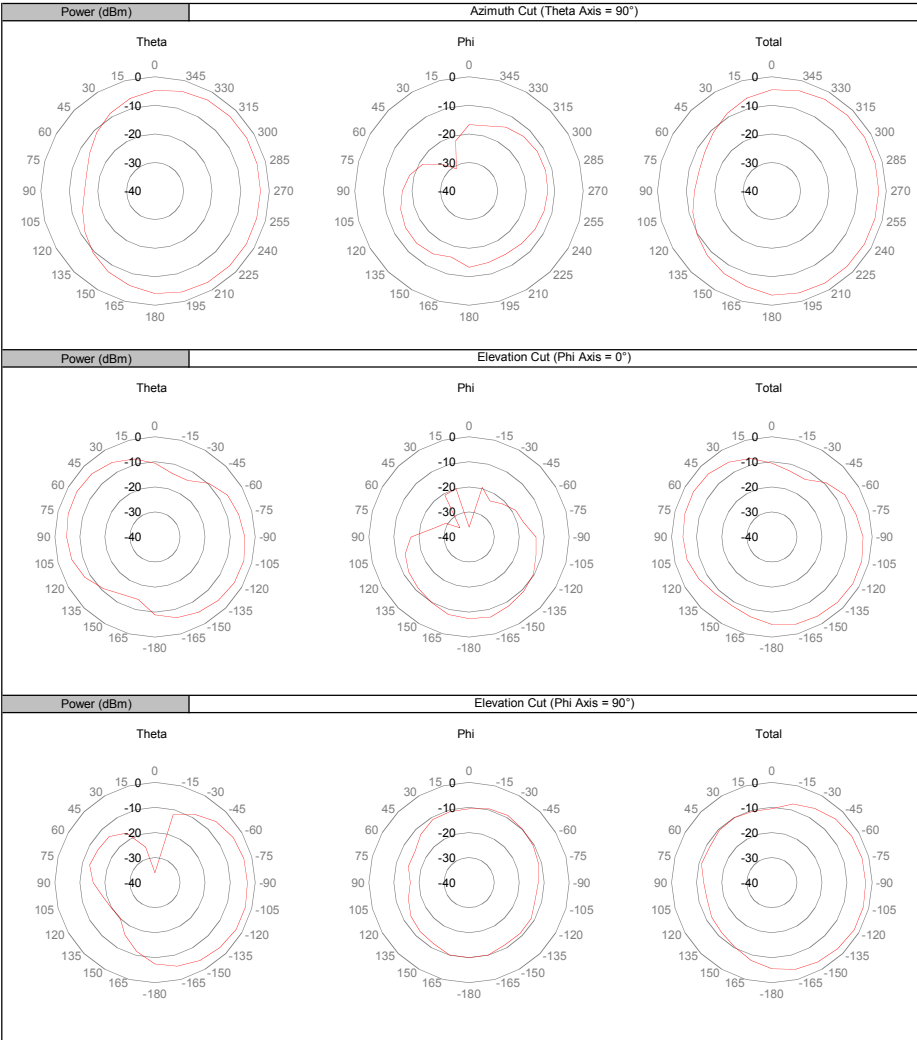
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Fortell AI Hearing Aid, Left
Serial Number:	7D7V2JH
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Left_2480

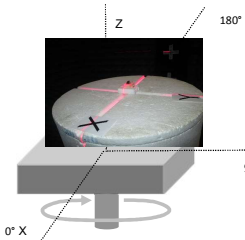
Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS

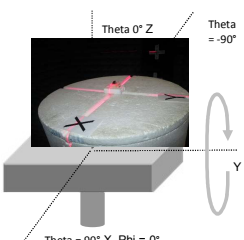
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2480
Ant. Port Input Pwr. (dBm)	5.29
Tot. Rad. Pwr. (dBm)	-5.47
Peak EIRP (dBm)	-2.31
Directivity (dBi)	3.16
Efficiency (dB)	-10.76
Efficiency (%)	8.39
Gain (dBi)	-7.60
Average Gain (dB)	-10.76
E-Plane 3 dB BW (°)	119.00

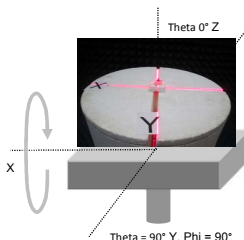
Azimuth Cut (Theta Axis = 90°)



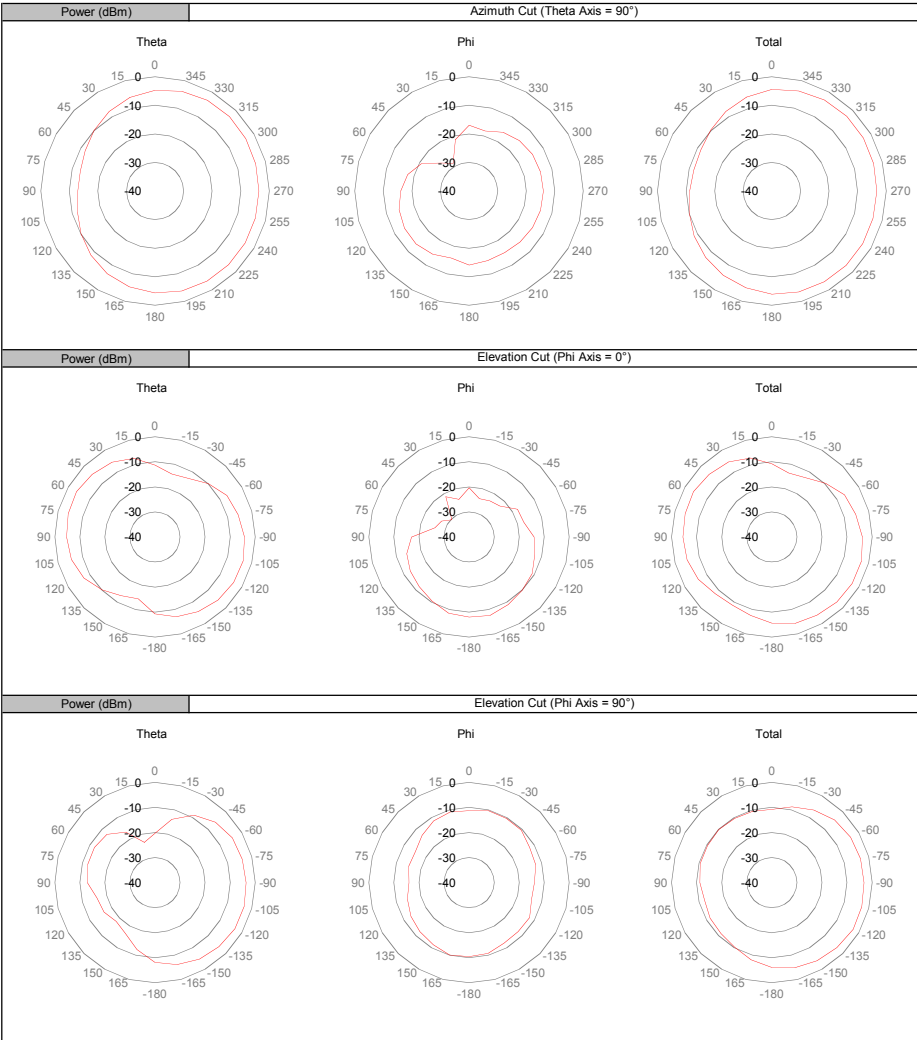
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Fortell AI Hearing Aid, Right
Serial Number:	7DK3GJF
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Right_2402

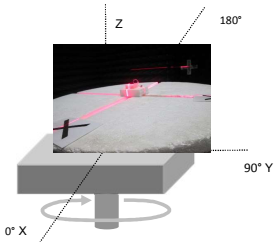
Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS

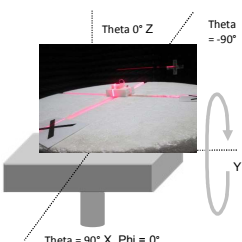
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2402
Ant. Port Input Pwr. (dBm)	5.26
Tot. Rad. Pwr. (dBm)	-2.83
Peak EIRP (dBm)	0.32
Directivity (dBi)	3.15
Efficiency (dB)	-8.09
Efficiency (%)	15.52
Gain (dBi)	-4.94
Average Gain (dB)	-8.09
E-Plane 3 dB BW (°)	116.00

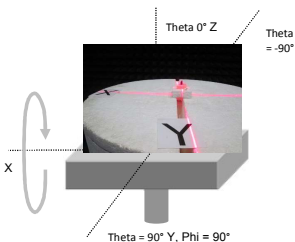
Azimuth Cut (Theta Axis = 90°)



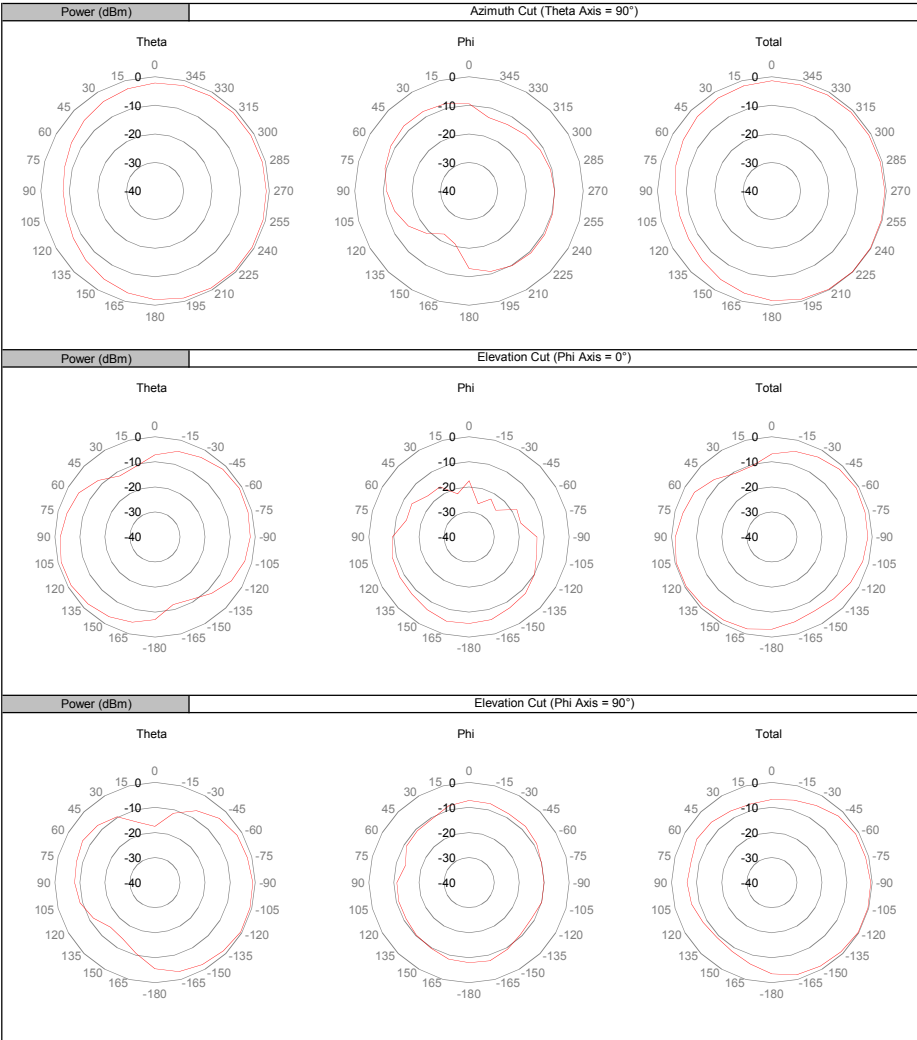
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS



EUT:	Fortell AI Hearing Aid, Right
Serial Number:	7DK3GJF
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Right_2442

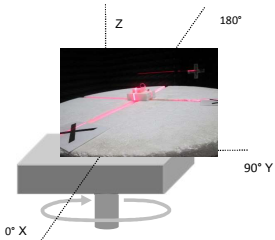
Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS

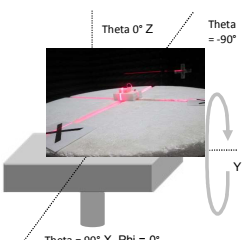
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2442
Ant. Port Input Pwr. (dBm)	5.21
Tot. Rad. Pwr. (dBm)	-2.30
Peak EIRP (dBm)	0.67
Directivity (dBi)	2.97
Efficiency (dB)	-7.51
Efficiency (%)	17.74
Gain (dBi)	-4.54
Average Gain (dB)	-7.51
E-Plane 3 dB BW (°)	111.00

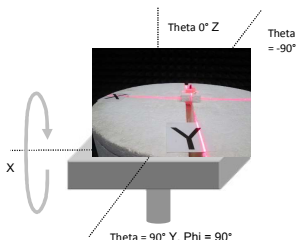
Azimuth Cut (Theta Axis = 90°)



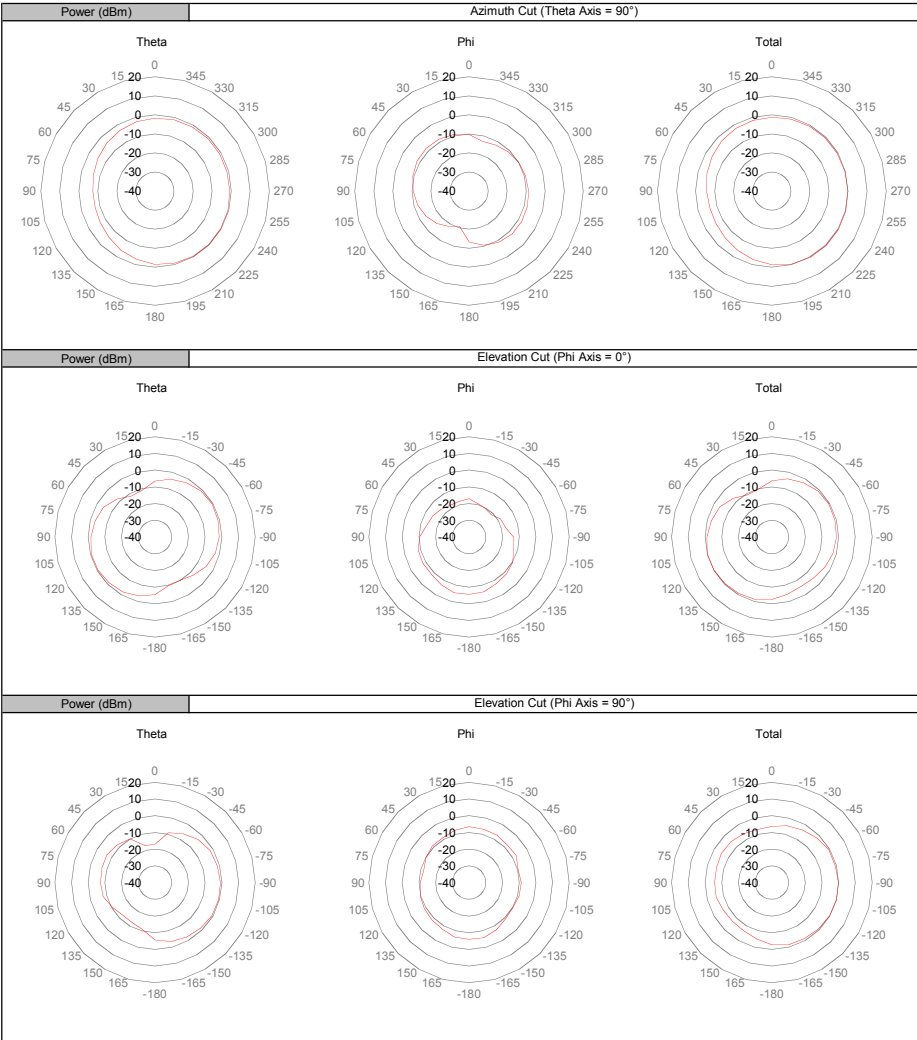
Elevation Cut (Phi Axis = 0°)



Elevation Cut (Phi Axis = 90°)



POLAR PLOTS



ACTIVE 3D ANTENNA PATTERN MEASUREMENTS

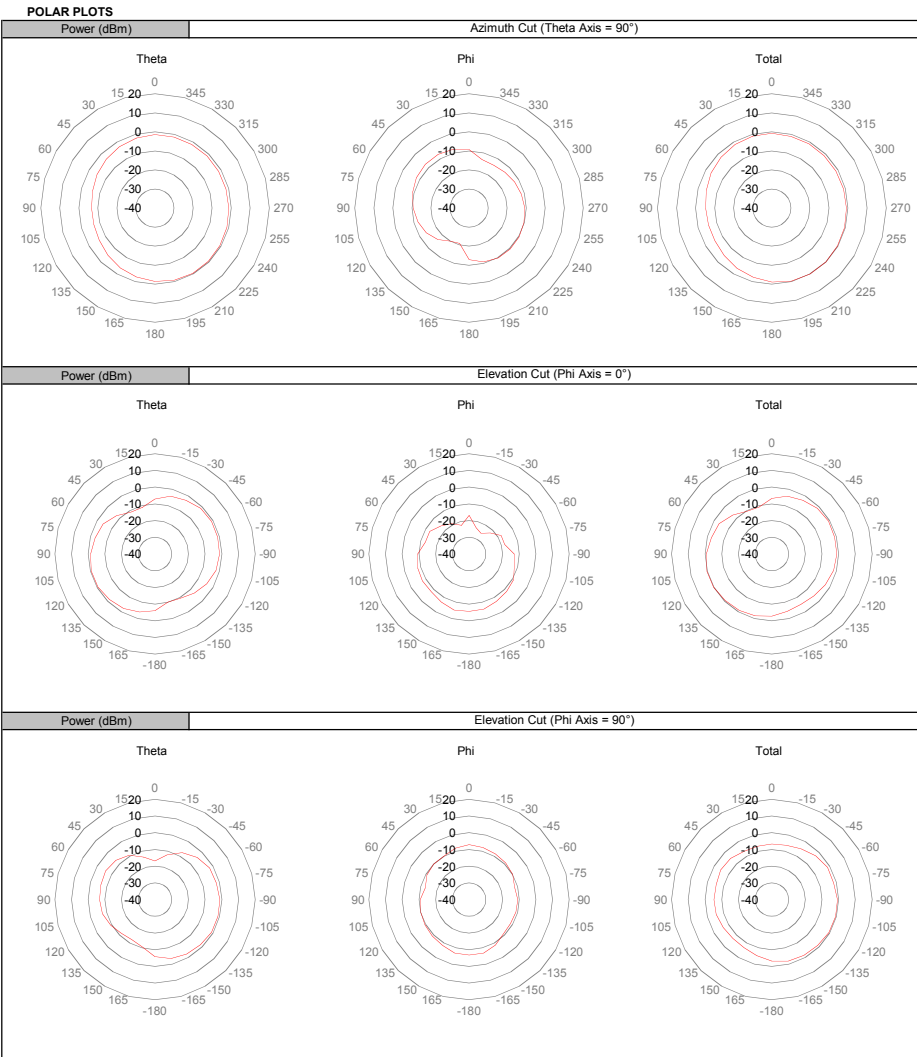
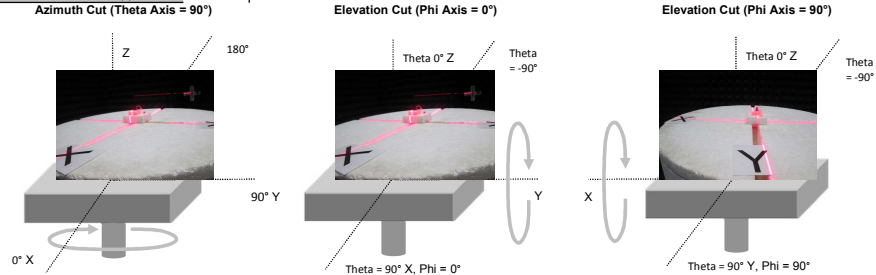


EUT:	Fortell AI Hearing Aid, Right
Serial Number:	7DK3GJF
Customer:	Fortell Research Inc.
Attendees:	John Becker
Customer Project:	None
Tested By:	Christopher Heintzelman
Test Run Description:	Right_2480

Work Order:	CHRM0004
Date:	9/11/2025
Temperature:	22.9 °C
Relative Humidity:	49.6% RH
Bar. Pressure:	1027 mbar
Job Site:	MN10

COMMENTS
Antenna Port Input Power was measured under CHRM0004. Power setting -4. Modulated, 1 Mbps.

3D PATTERN DATA	
Frequency (MHz)	2480
Ant. Port Input Pwr. (dBm)	4.98
Tot. Rad. Pwr. (dBm)	-2.51
Peak EIRP (dBm)	0.33
Directivity (dBi)	2.84
Efficiency (dB)	-7.49
Efficiency (%)	17.82
Gain (dBi)	-4.65
Average Gain (dB)	-7.49
E-Plane 3 dB BW (°)	107.00



End of Test Report