



Pit Lid Antenna Radiation Patterns and Assembly (Used with Model 520R and 520F)

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Sensus Metering Systems

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Figure 1 Antenna Assembly, Exploded

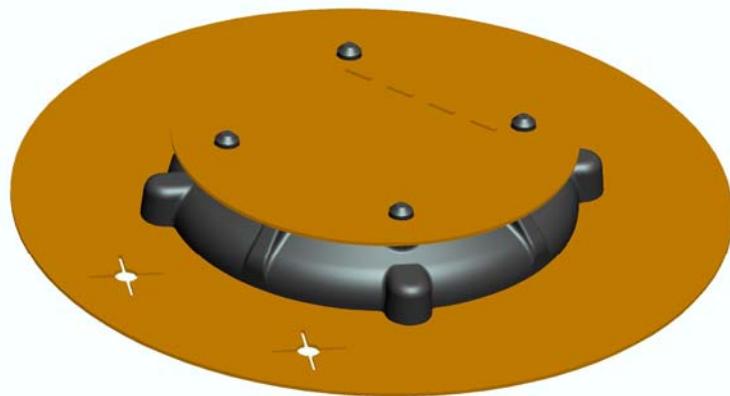


Figure 2 Antenna Assembly

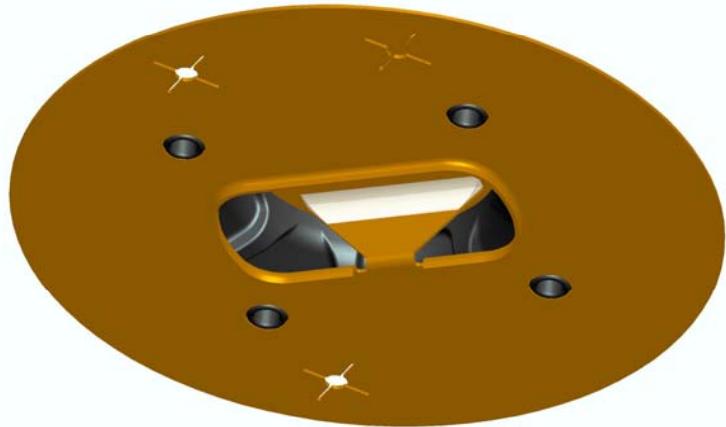


Figure 3 Antenna Assembly, Bottom View
Showing Alignment Bosses, Retaining
Clips, and Solder Connection

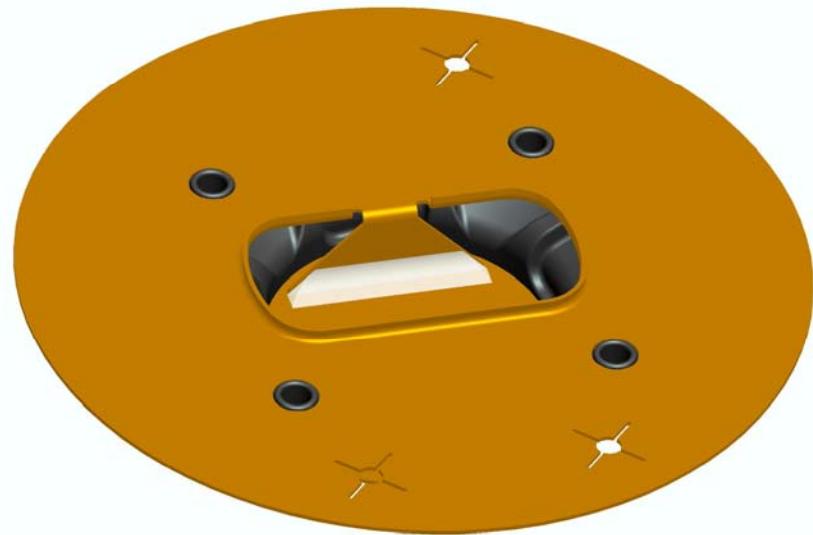


Figure 4 Antenna Assembly, Rotated
Bottom View Showing Alignment Bosses,
Retaining Clips, and Solder Connection

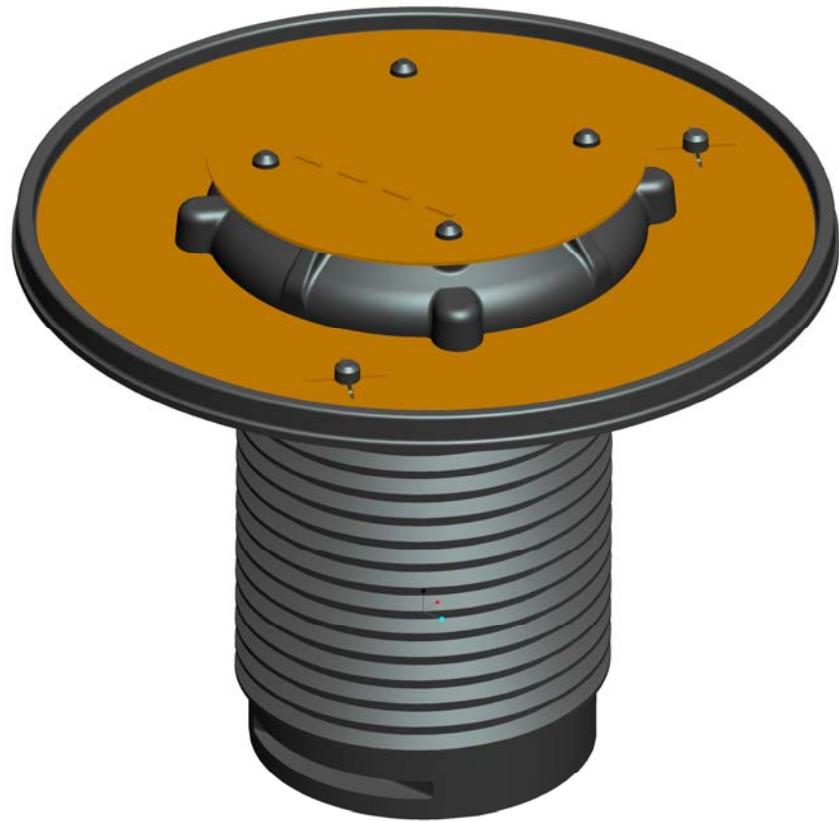


Figure 5 Antenna Lower Housing Assembly with Antenna Assembly Fastened



Figure 6 Antenna Housing Assembly

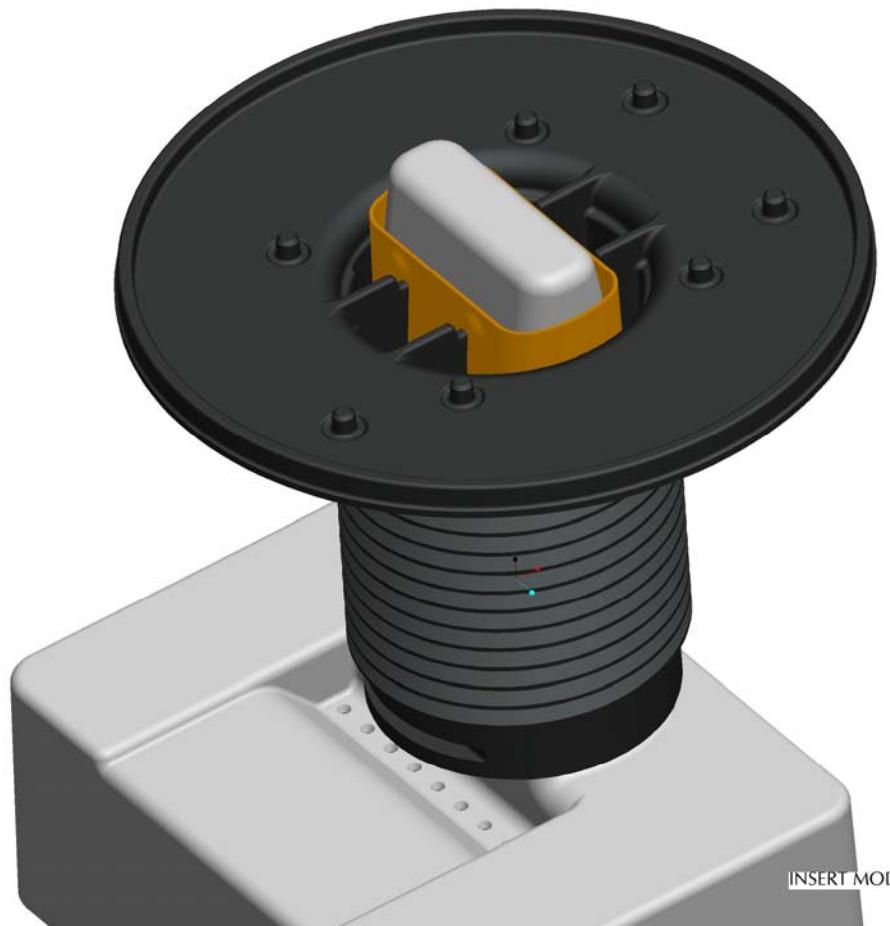


Figure 7 Antenna Lower Housing
Positioned on Transmitter Assembly



Figure 8 Mechanical Connection
Between the Antenna Ground Plane and
Transmitter Isolation Sleeve

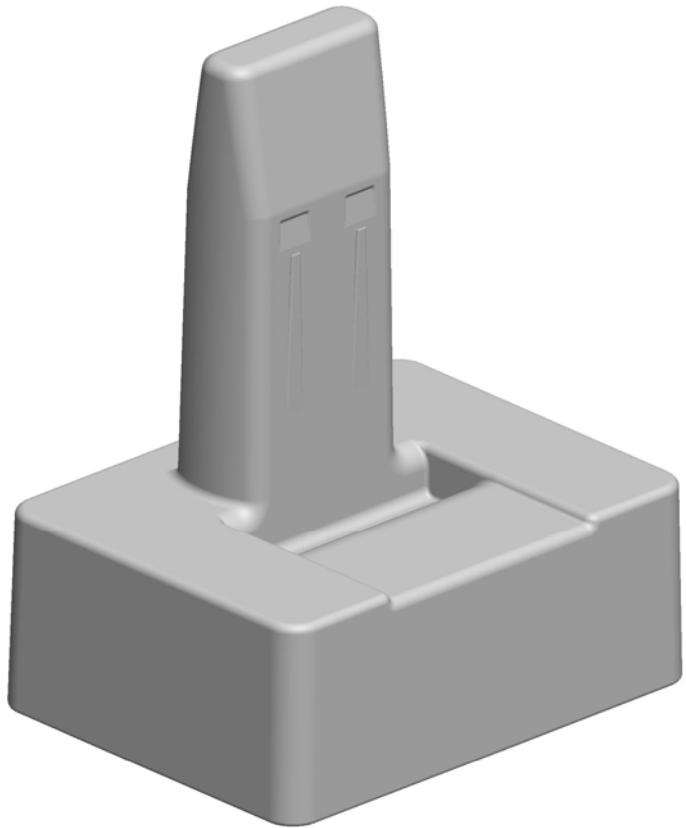


Figure 9 Proposed HDPE Modification for
Controlling the Position of the Transmitter
Isolation Sleeve

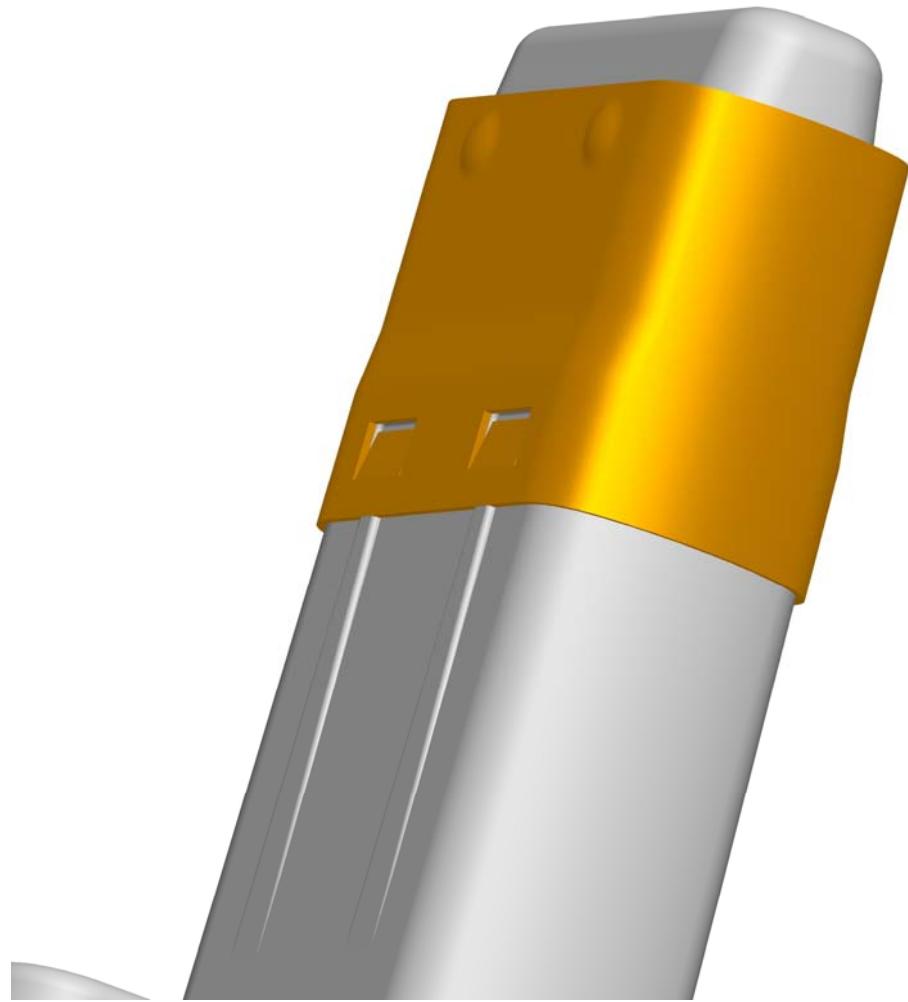


Figure 10 Transmitter Isolation Sleeve
Positioned on HDPE with Proposed
Modifications

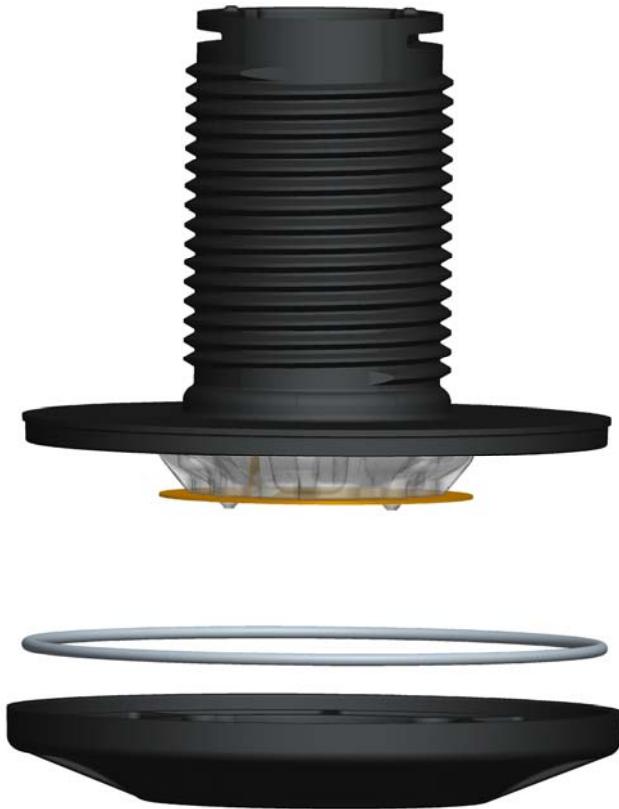


Figure 11 Antenna Housing Assembly
with EMABOND Ring



Figure 12 Antenna Housing Assembly
Rotated with EMABOND Ring

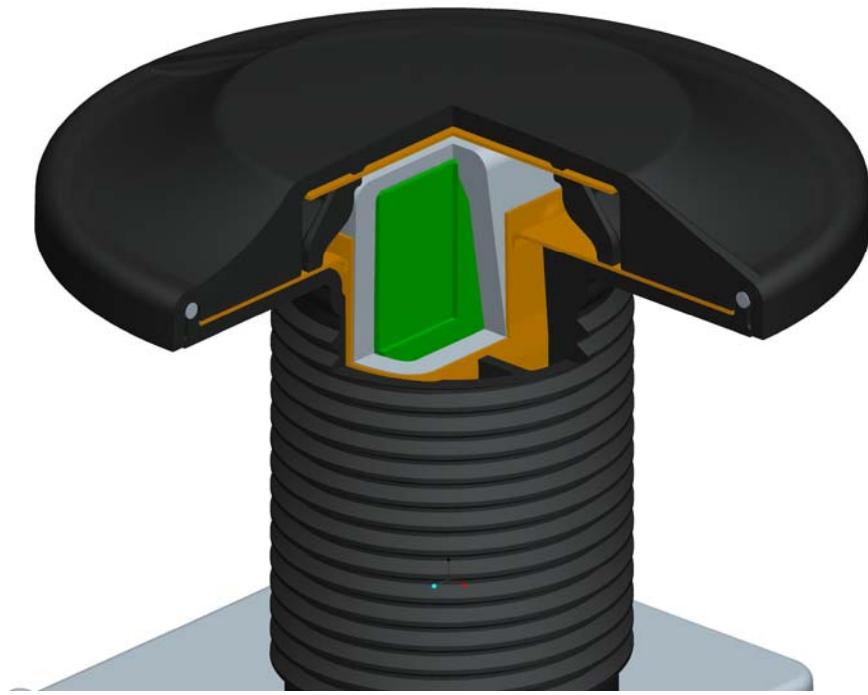


Figure 13 Antenna Housing Assembly
Section View



Figure 14 Antenna Housing Assembly
Mounted to Transmitter Housing
Assembly

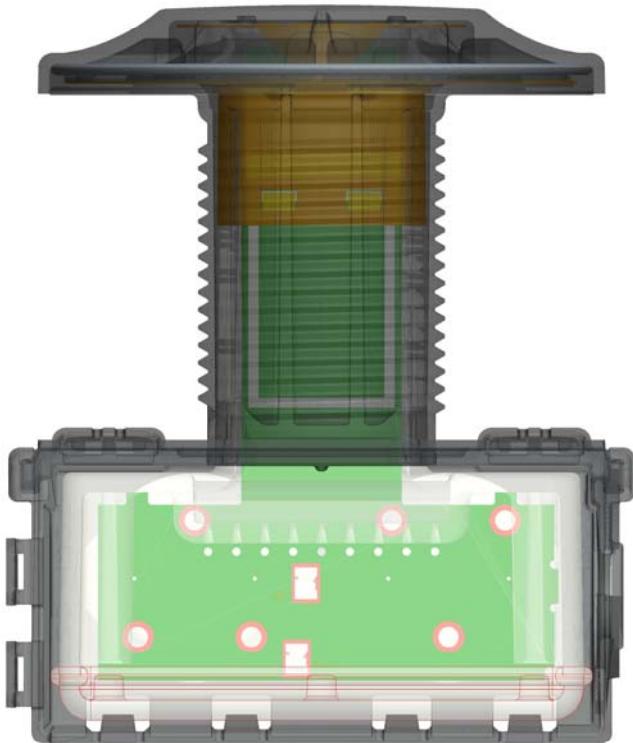


Figure 15 Antenna Housing Assembly
Semi-Transparent, Front

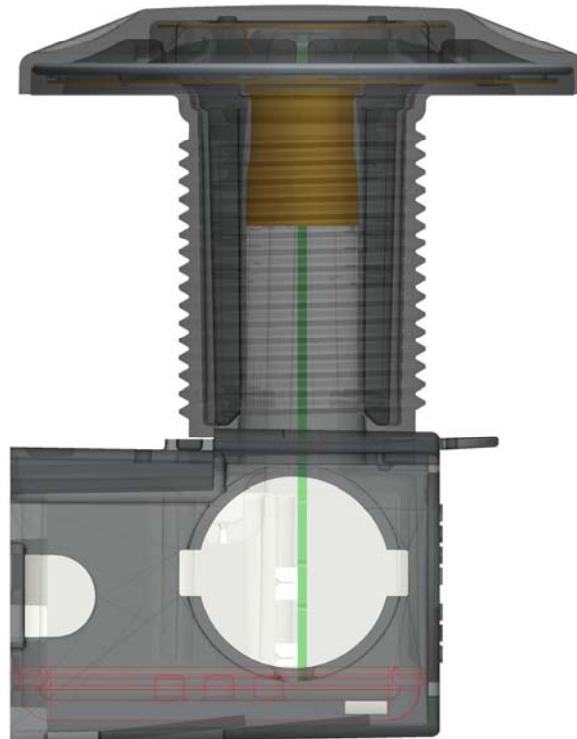


Figure 16 Antenna Housing Assembly
Semi-Transparent, Side

Repeatability Data

Circular Antenna, 3.6 in brass ground plane, 2.04 inch upper plate, nickle plate
 SLA Sleeve with 80/1000 in. copper tape added to bottom and 4 solder bumps around top

Metal pit with Metal lid

The Circular Antenna was placed into the sealed pit in the anechoic @ 3 meters from the calibrated dipole.

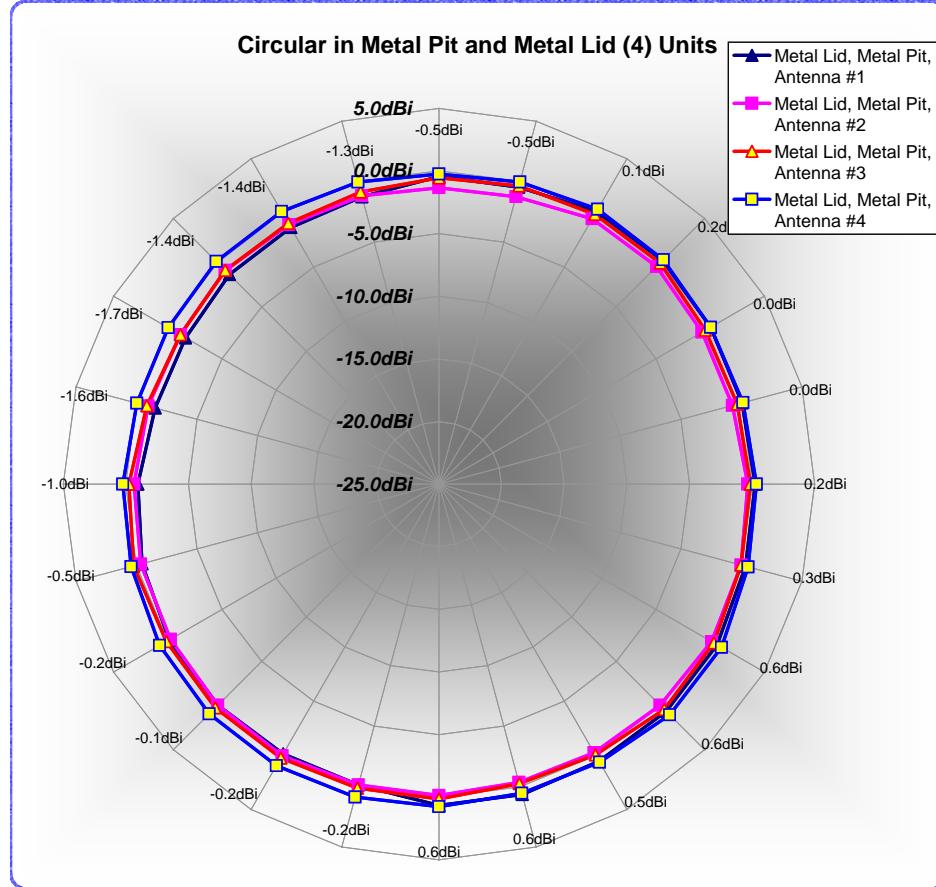
An RF generator provides a +10 dBm sine wave to the antenna

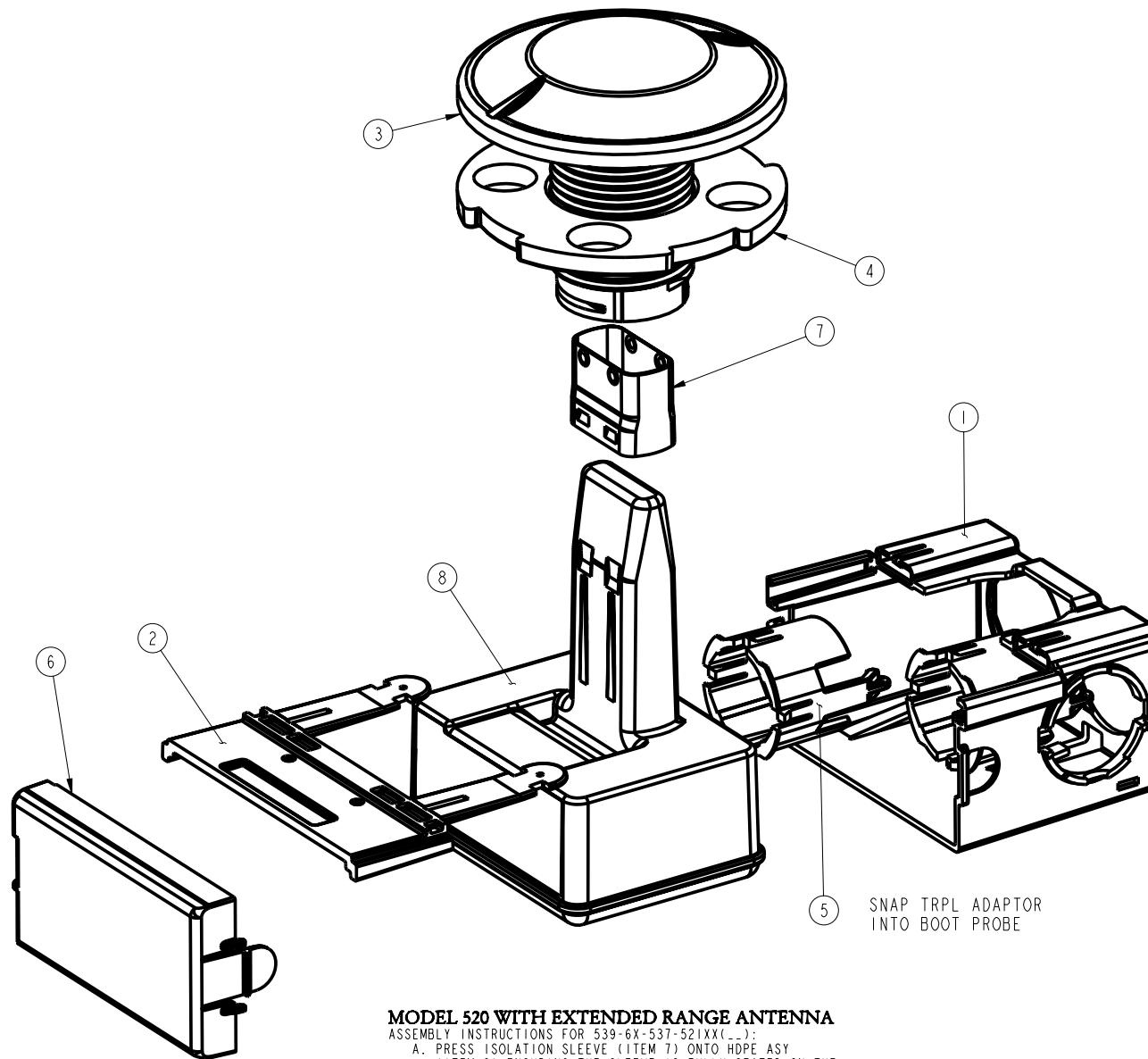
Peak envelop power out was captured at 15 degree intervals using an Agilent Model 4402 spectrum analyzer.

The angle of elevation of the dipole was 10 degrees.

Distance between plates = 0.38 inch	
3.6 inch ground plane	
2.04 inch top plate	
Modified 1.0 inch nickle plated SLA sleeve around HDPE	
80/1000 inch above top of ground plane.	
0.07 inch ground plane extender	
The band flares out and makes contact with the rectangular	
ground plane extender.	
At 0 degrees, shorting bar in back	

Metal Lid, Metal Pit, Antenna #1		Metal Lid, Metal Pit, Antenna #2		Metal Lid, Metal Pit, Antenna #3		Metal Lid, Metal Pit, Antenna #4		
Angle	SA reading	Gain	SA reading	Gain	SA reading	Gain	SA reading	Gain
0deg	-34.8dBm	-0.5dB	-35.7dBm	-1.4dB	-34.9dBm	-0.6dB	-34.6dBm	-0.3dB
15deg	-34.8dBm	-0.5dB	-35.6dBm	-1.3dB	-34.7dBm	-0.4dB	-34.4dBm	-0.1dB
30deg	-34.2dBm	0.1dB	-34.9dBm	-0.6dB	-34.5dBm	-0.2dB	-34.0dBm	0.3dB
45deg	-34.1dBm	0.2dB	-34.8dBm	-0.5dB	-34.4dBm	-0.1dB	-34.0dBm	0.3dB
60deg	-34.3dBm	0.0dB	-35.1dBm	-0.8dB	-34.8dBm	-0.5dB	-34.3dBm	0.0dB
75deg	-34.3dBm	0.0dB	-35.1dBm	-0.8dB	-34.7dBm	-0.4dB	-34.2dBm	0.1dB
90deg	-34.1dBm	0.2dB	-34.7dBm	-0.4dB	-34.5dBm	-0.2dB	-34.0dBm	0.3dB
105deg	-34.0dBm	0.3dB	-34.4dBm	-0.1dB	-34.4dBm	-0.1dB	-33.8dBm	0.5dB
120deg	-33.7dBm	0.6dB	-34.2dBm	0.1dB	-34.0dBm	0.3dB	-33.3dBm	1.0dB
135deg	-33.7dBm	0.6dB	-34.4dBm	-0.1dB	-33.9dBm	0.4dB	-33.3dBm	1.0dB
150deg	-33.8dBm	0.5dB	-34.6dBm	-0.3dB	-34.4dBm	-0.1dB	-33.7dBm	0.6dB
165deg	-33.7dBm	0.6dB	-34.7dBm	-0.4dB	-34.6dBm	-0.3dB	-33.8dBm	0.5dB
180deg	-33.7dBm	0.6dB	-34.5dBm	-0.2dB	-34.2dBm	0.1dB	-33.6dBm	0.7dB
195deg	-34.5dBm	-0.2dB	-34.5dBm	-0.2dB	-34.2dBm	0.1dB	-33.5dBm	0.8dB
210deg	-34.5dBm	-0.2dB	-34.3dBm	0.0dB	-34.1dBm	0.2dB	-33.4dBm	0.9dB
225deg	-34.4dBm	-0.1dB	-34.4dBm	-0.1dB	-34.1dBm	0.2dB	-33.4dBm	0.9dB
240deg	-34.5dBm	-0.2dB	-34.6dBm	-0.3dB	-34.2dBm	0.1dB	-33.6dBm	0.7dB
255deg	-34.8dBm	-0.5dB	-34.7dBm	-0.4dB	-34.1dBm	0.2dB	-33.9dBm	0.4dB
270deg	-35.3dBm	-1.0dB	-35.0dBm	-0.7dB	-34.6dBm	-0.3dB	-34.1dBm	0.2dB
285deg	-35.9dBm	-1.6dB	-35.3dBm	-1.0dB	-35.2dBm	-0.9dB	-34.4dBm	-0.1dB
300deg	-36.0dBm	-1.7dB	-35.5dBm	-1.2dB	-35.5dBm	-1.2dB	-34.4dBm	-0.1dB
315deg	-35.7dBm	-1.4dB	-35.2dBm	-0.9dB	-35.2dBm	-0.9dB	-34.2dBm	0.1dB
330deg	-35.7dBm	-1.4dB	-35.4dBm	-1.1dB	-35.3dBm	-1.0dB	-34.2dBm	0.1dB
345deg	-35.6dBm	-1.3dB	-35.5dBm	-1.2dB	-35.2dBm	-0.9dB	-34.4dBm	-0.1dB
Average	-0.25dB	Average	-0.55dB	Average	-0.24dB	Average	0.40dB	
Peak	0.63dB	Peak	0.13dB	Peak	0.43dB	Peak	1.03dB	



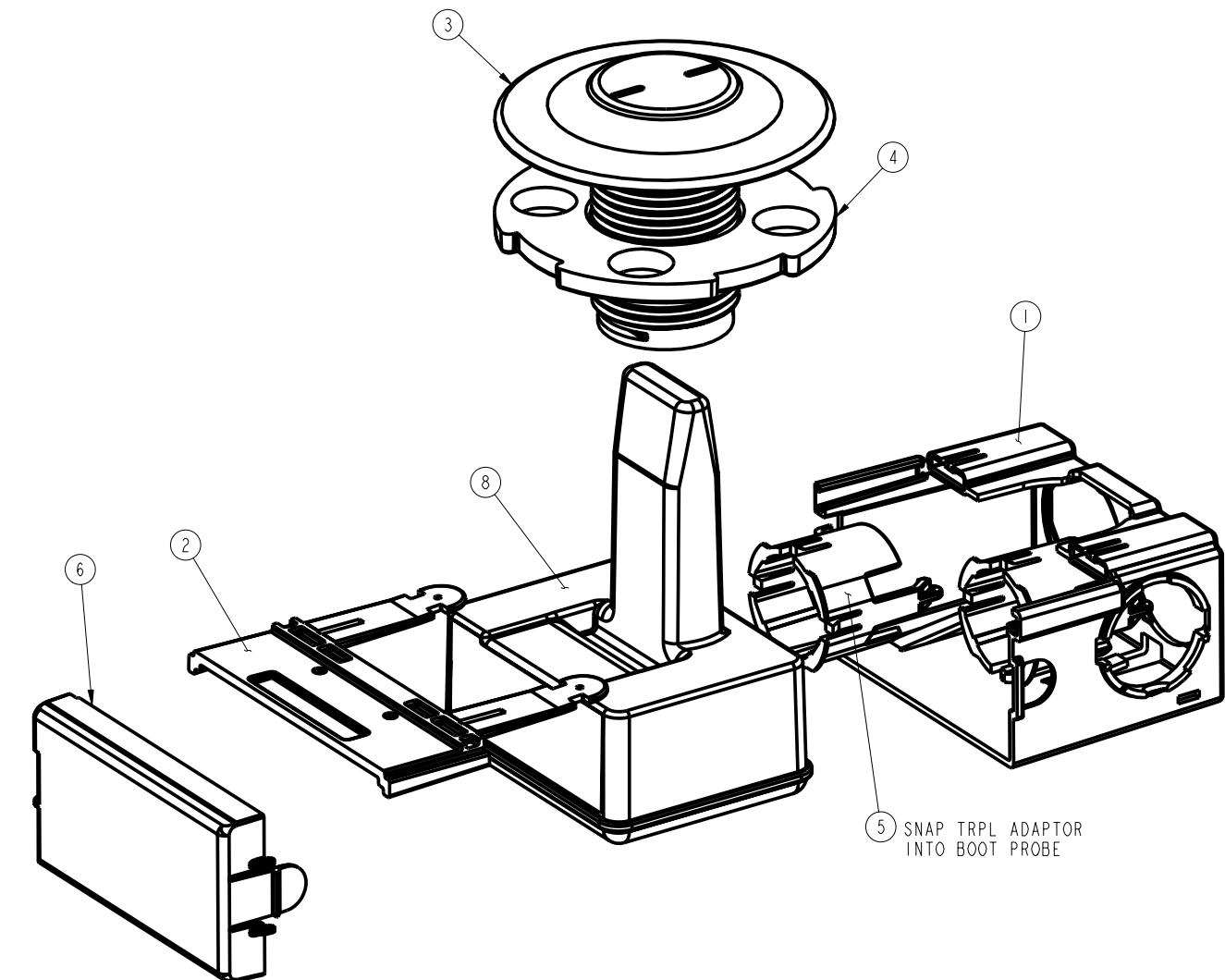
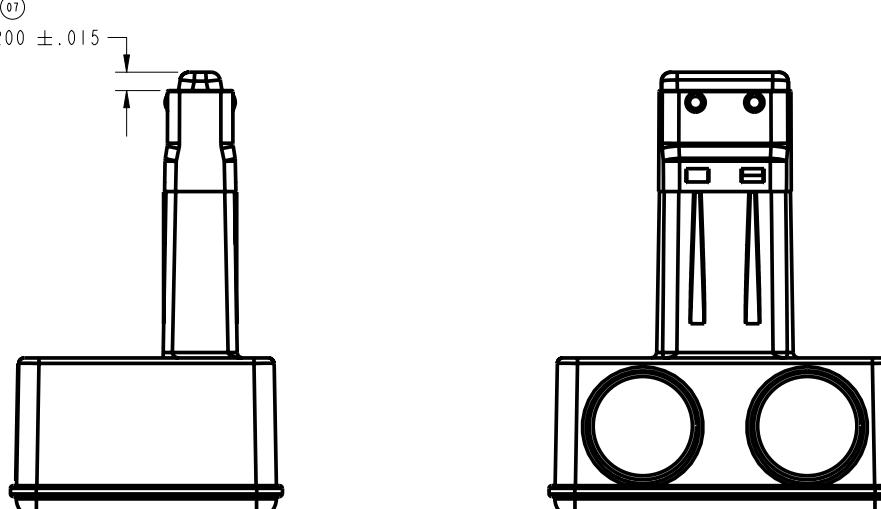


MODEL 520 WITH EXTENDED RANGE ANTENNA

ASSEMBLY INSTRUCTIONS FOR 539-6X-537-521XX(...):

- A. PRESS ISOLATION SLEEVE (ITEM 7) ONTO HDPE ASY (ITEM 8) ENSURING THE SLEEVE IS FULLY SEATED ON THE RIBS LOCATED ON ITEM 8 (REF. .200" DIMENSION) (TOOLING IS REQUIRED)
- B. SNAP BOOT CLIP (ITEM 2) TO FIRST SNAP POSITION
- C. DROP NUT (ITEM 4) AND EXTENDED RANGE ANTENNA ASY (ITEM 8) ONTO HDPE ASY (ITEM 8)
- D. BOOT CLIP (ITEM 2) TO BE FULLY ENGAGED INTO SLOTS OF HOUSING (ITEM 3) (SLOTS LOCATED AT END OF THREADED STEM)

(07) .200 ± .015



STANDARD MODEL 520

ASSEMBLY INSTRUCTIONS FOR 539-6X-537-520XX(...):

- A. SNAP BOOT CLIP (ITEM 2) TO FIRST SNAP POSITION
- B. DROP NUT (ITEM 4) AND PIT HOUSING (ITEM 3) ONTO HDPE ASY (ITEM 8)
- C. BOOT CLIP (ITEM 2) TO BE FULLY ENGAGED INTO SLOTS OF HOUSING (ITEM 3) (SLOTS LOCATED AT END OF THREADED STEM)

SENSUS METERING SYSTEMS			ASY	539-6X-537-52XXX
AT	CHANGE NOTICE NO.	DATE	MATERIAL	PART NUMBER
00	1634-F	10/19/04		
01	1634-M	04/21/05		
02	1634-P	05/31/05		
03	1670	08/03/05		
04	1670-B	09/12/05		
05	1670-E	11/16/05		
06	1667-B	12/14/05	SCALE: 1.000	DATE: 01/10/06
07	1667-C	12/15/05	IN. OR MM: MM	IN. OR MM: 05-01-06
			CM. OR IN.: IN	CM. OR IN.: 01/10/06
			AP. OR JV:	AP. OR JV: 01/10/06
			3D PART FILE: U89817	
			SHEET 1 OF 4	
			U-89817-D	