



Proposal Number	
Date	1/25/2023
Call Letters	NCE-FM
Location	Kingsland, GA
Customer	Georgia Public Broadcastin
Antenna Type	DCR-H3E
Frequency	90.3
Drawing #	

## **PATTERN CERTIFICATION**

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## **PATTERN CERTIFICATION**

### **Method of Measurement**

The azimuth pattern for NCE-FM, Dielectric Document Sketch #, was measured in the following manner.

A single full scale model "DCR-H3E" bay radiator was mounted on a truncated tower section in HFSS according to information provided to Dielectric by the customer; refer to Dielectric Document Sketch #. The antenna under test, all parasitics, all known tower appurtenances, and the tower section were solved through 360 degrees in HFSS with the appropriate input power. Both the horizontal and vertical polarization azimuth patterns were measured in HFSS.

### **Statement of Qualifications**

Nicole Starrett is an Electrical Engineer at Dielectric. She received a BS in Electrical Engineering from the University of Maine in 2014. She has 8 years experience in RF antenna engineering and has been employed by Dielectric since 2014.

Signed by: \_\_\_\_\_

Date: \_\_\_\_\_



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## FM AZIMUTH PATTERN APPROVAL

The azimuth pattern of the horizontal polarization and vertical polarization as supplied by Dielectric in the document labeled "Pattern ", is acknowledged as acceptable.

We understand that Dielectric does not guarantee or predict signal strength in any particular location.

---

(Customer's name)

By:

---

(Name typed or printed)

Title:

---

---

(Signature)



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1/25/2023

NCE-FM

Kingsland, GA

Georgia Public Broadcastin

DCR-H3E

90.3

## AZIMUTH PATTERN

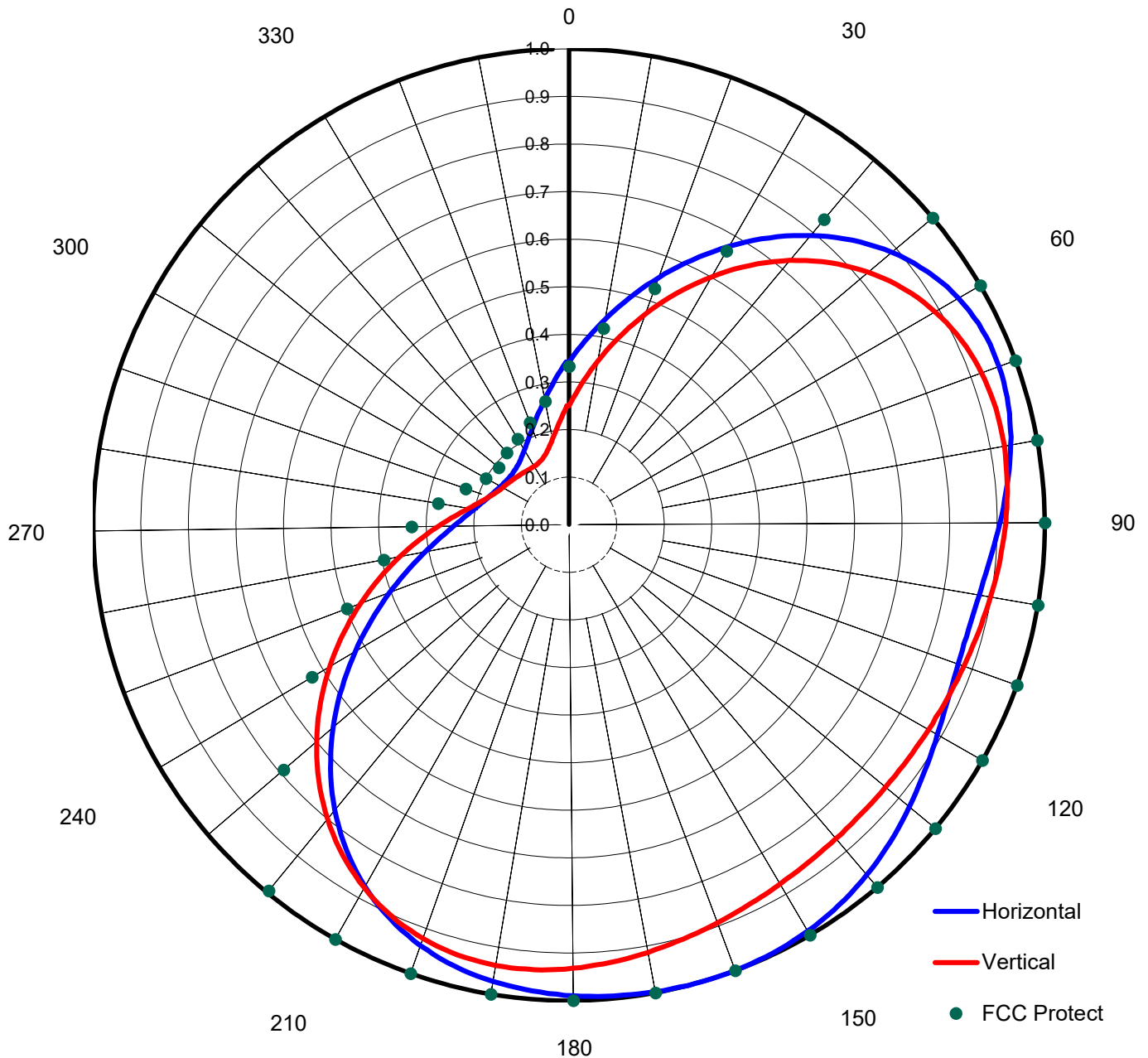
93% Ccov 51% Hrms - 49% Vrms

Gain 1.94 (2.87 dB) HPOL

1.86 (2.70 dB) VPOL

Calculated / Measured

Calculated





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## TABULATION OF HORIZONTAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
	0.342	-3.299	0.468
10	0.438	-1.150	0.767
20	0.552	0.859	1.219
30	0.675	2.607	1.823
40	0.792	3.995	2.509
50	0.888	4.989	3.154
60	0.947	5.548	3.587
70	0.963	5.693	3.709
80	0.943	5.511	3.557
90	0.906	5.163	3.283
100	0.875	4.861	3.063
110	0.869	4.801	3.021
120	0.891	5.018	3.176
130	0.929	5.381	3.452
140	0.966	5.720	3.733
150	0.990	5.933	3.920
160	1.000	6.021	4.000
170	0.998	6.003	3.984
180	0.990	5.933	3.920
190	0.973	5.783	3.787
200	0.938	5.465	3.519
210	0.873	4.841	3.049
220	0.776	3.818	2.409
230	0.653	2.319	1.706
240	0.522	0.374	1.090
250	0.403	-1.873	0.650
260	0.308	-4.208	0.379
270	0.243	-6.267	0.236
280	0.202	-7.872	0.163
290	0.178	-8.971	0.127
300	0.165	-9.630	0.109
310	0.160	-9.897	0.102
320	0.165	-9.630	0.109
330	0.183	-8.730	0.134
340	0.216	-7.290	0.187
350	0.268	-5.417	0.287



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## TABULATION OF VERTICAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
	0.250	-6.021	0.250
10	0.349	-3.123	0.487
20	0.471	-0.519	0.887
30	0.601	1.598	1.445
40	0.724	3.215	2.097
50	0.823	4.329	2.709
60	0.890	5.008	3.168
70	0.924	5.334	3.415
80	0.930	5.390	3.460
90	0.918	5.277	3.371
100	0.899	5.096	3.233
110	0.882	4.930	3.112
120	0.870	4.811	3.028
130	0.864	4.751	2.986
140	0.866	4.771	3.000
150	0.876	4.871	3.070
160	0.893	5.038	3.190
170	0.914	5.240	3.342
180	0.932	5.409	3.474
190	0.939	5.474	3.527
200	0.922	5.315	3.400
210	0.876	4.871	3.070
220	0.800	4.082	2.560
230	0.699	2.910	1.954
240	0.585	1.364	1.369
250	0.468	-0.574	0.876
260	0.362	-2.805	0.524
270	0.275	-5.193	0.303
280	0.214	-7.371	0.183
290	0.178	-8.971	0.127
300	0.160	-9.897	0.102
310	0.151	-10.400	0.091
320	0.145	-10.752	0.084
330	0.143	-10.873	0.082
340	0.151	-10.400	0.091
350	0.183	-8.730	0.134

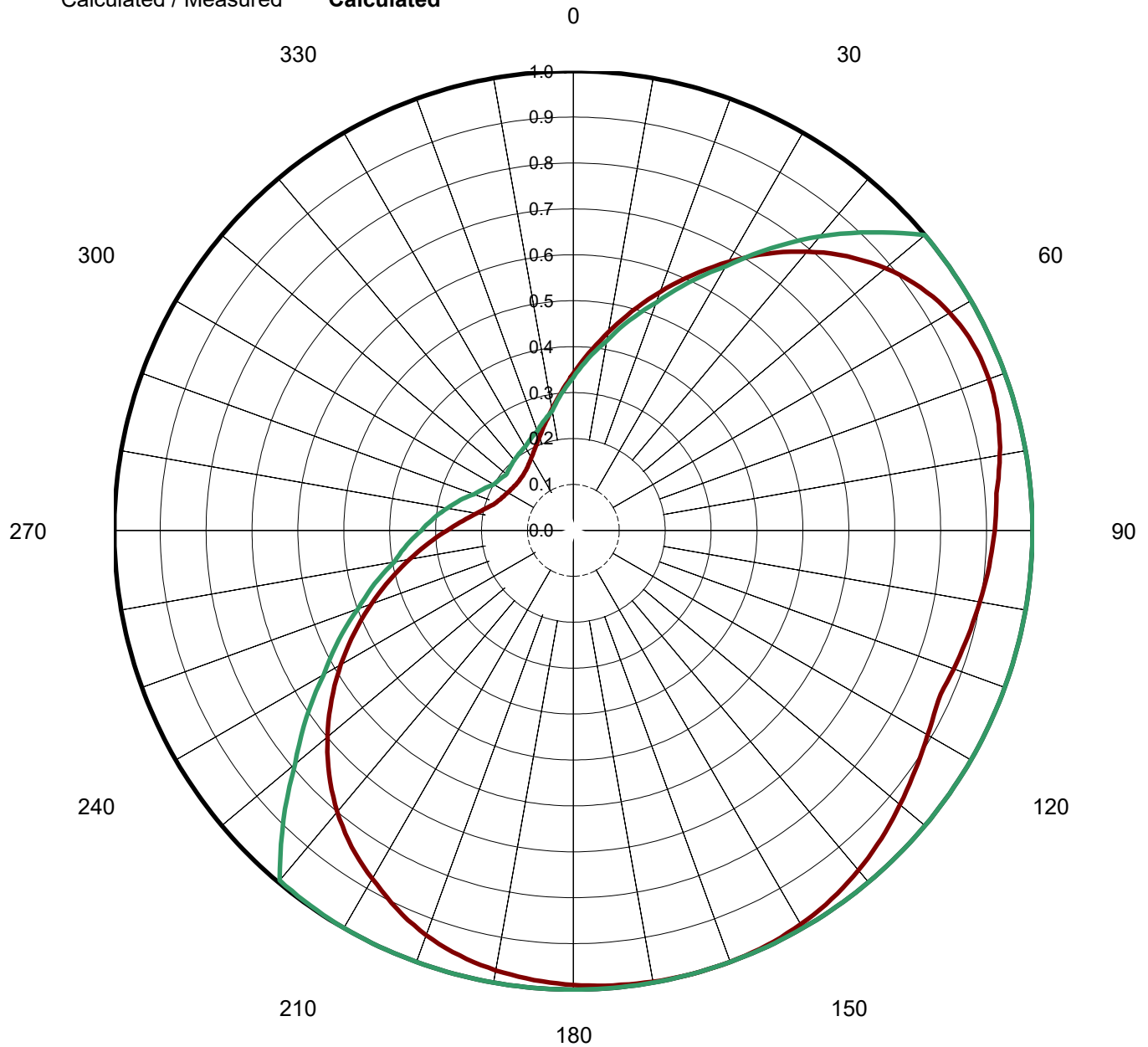


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## COMPOSITE AZIMUTH PATTERN

Calculated / Measured

Calculated





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## TABULATION OF COMPOSITE AZIMUTH PATTERN

Angle	Field	dBk	Power kW	Input Power
	0.342	-3.299	0.468	4.000
10	0.438	-1.150	0.767	4.000
20	0.552	0.859	1.219	4.000
30	0.675	2.607	1.823	4.000
40	0.792	3.995	2.509	4.000
50	0.888	4.989	3.154	4.000
60	0.947	5.548	3.587	4.000
70	0.963	5.693	3.709	4.000
80	0.943	5.511	3.557	4.000
90	0.918	5.277	3.371	4.000
100	0.899	5.096	3.233	4.000
110	0.882	4.930	3.112	4.000
120	0.891	5.018	3.176	4.000
130	0.929	5.381	3.452	4.000
140	0.966	5.720	3.733	4.000
150	0.990	5.933	3.920	4.000
160	1.000	6.021	4.000	4.000
170	0.998	6.003	3.984	4.000
180	0.990	5.933	3.920	4.000
190	0.973	5.783	3.787	4.000
200	0.938	5.465	3.519	4.000
210	0.876	4.871	3.070	4.000
220	0.800	4.082	2.560	4.000
230	0.699	2.910	1.954	4.000
240	0.585	1.364	1.369	4.000
250	0.468	-0.574	0.876	4.000
260	0.362	-2.805	0.524	4.000
270	0.275	-5.193	0.303	4.000
280	0.214	-7.371	0.183	4.000
290	0.178	-8.971	0.127	4.000
300	0.165	-9.630	0.109	4.000
310	0.160	-9.897	0.102	4.000
320	0.165	-9.630	0.109	4.000
330	0.183	-8.730	0.134	4.000
340	0.216	-7.290	0.187	4.000
350	0.268	-5.417	0.287	4.000
				4.000





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## ELLIPTICAL POLARIZATION GAIN SUMMARY

Azimuth Pattern Gain of Horizontal Polarization	1.94 (2.87 dB)
Azimuth Pattern Gain of Vertical Polarization	1.86 (2.70 dB)
Elevation Pattern Gain Per Polarization	1.68 (2.25 dB)
Peak Gain at Horizontal Polarization	3.39 (5.30 dB)
Peak Gain at Vertical Polarization	2.99 (4.75 dB)

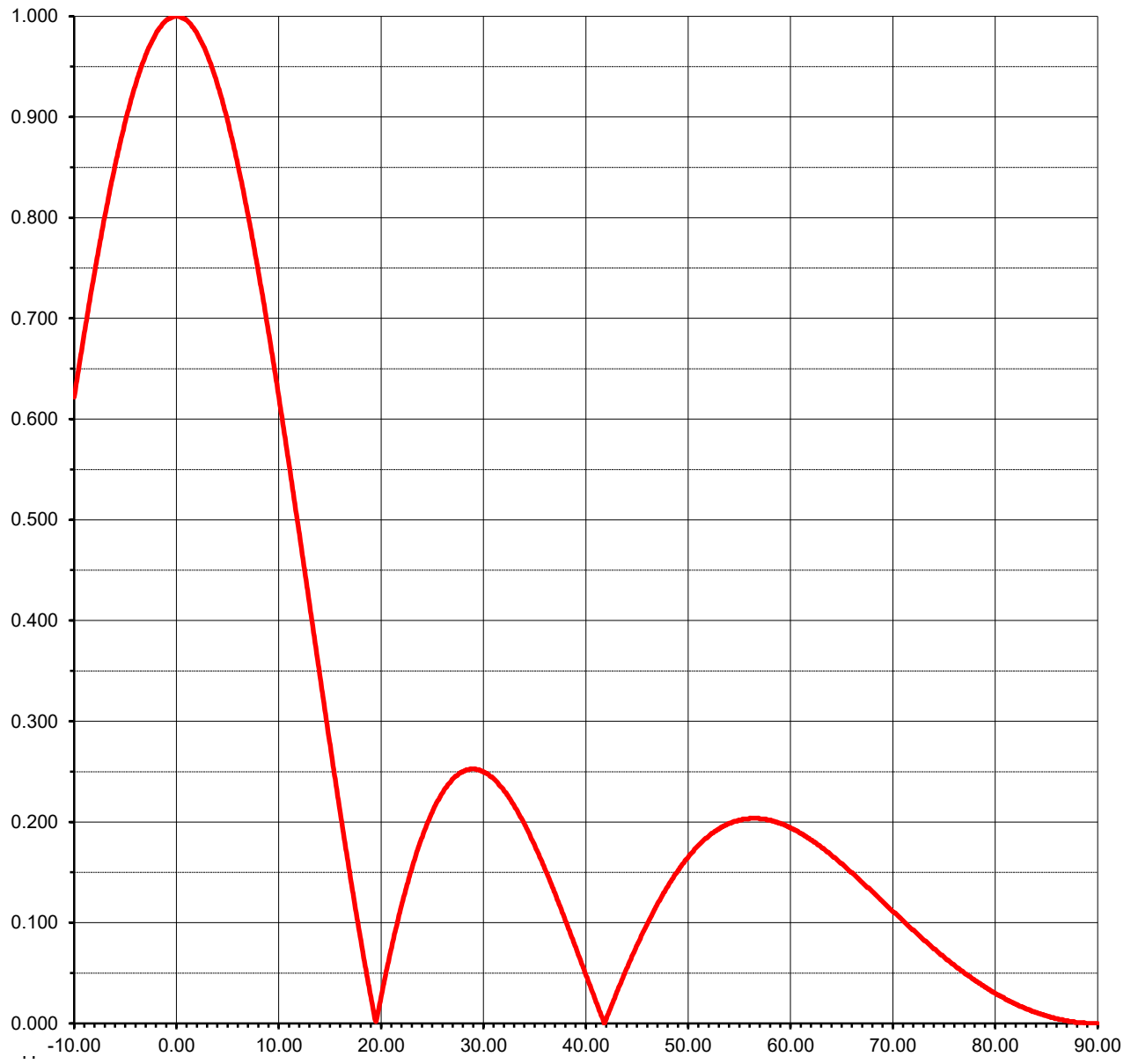


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## ELEVATION PATTERN

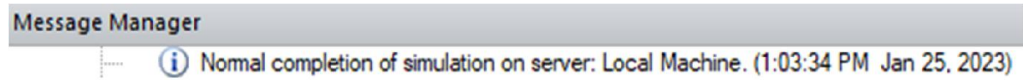
RMS Gain at Main Lobe	3.36	( 5.26 dB )
Per Polarization	1.68	( 2.25 dB )
Calculated / Measured		Calculated

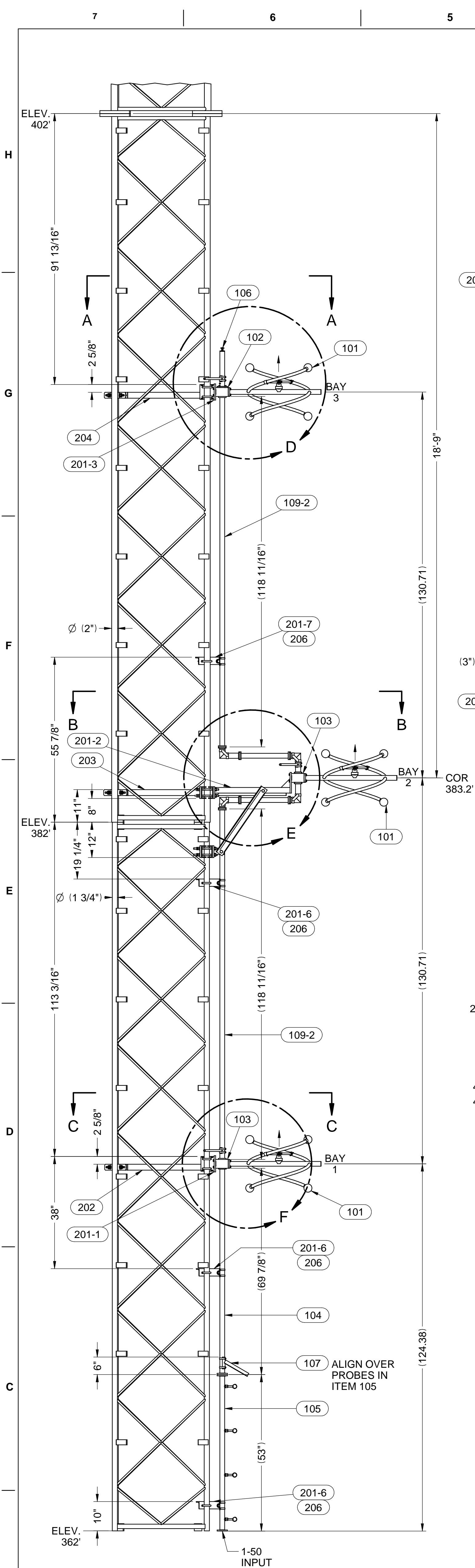
Beam Tilt	0	deg
Frequency	90.3	MHz



## Appendix A – Software Execution

This message is taken from the message manager within HFSS. It shows that the simulation completed correctly and converged without error.





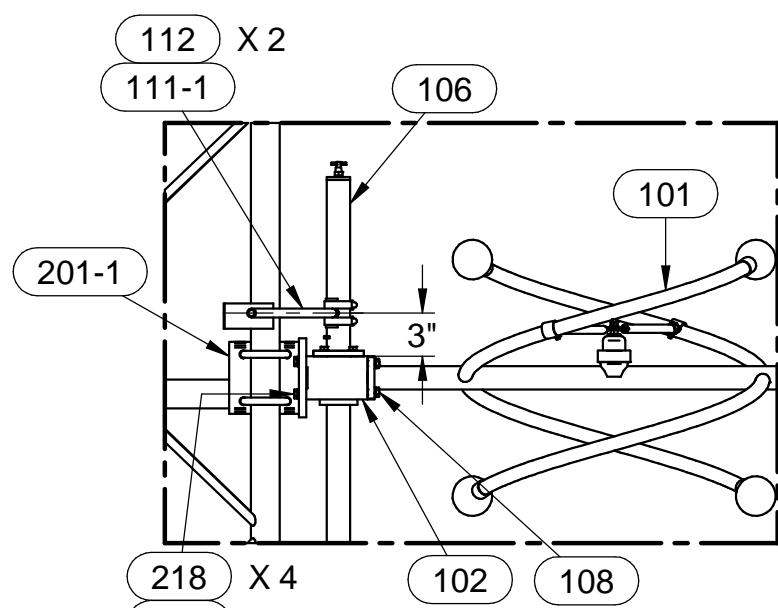
INSTALLATION NOTES:

1. ANTENNA SHALL BE INSTALLED PER THIS INSTALLATION DRAWING. ANY DEVIATIONS WILL VOID WARRANTY UNLESS APPROVED BY DIELECTRIC.
2. TO ACHIEVE ANY GIVEN PATTERN STUDY PERFORMED BY DIELECTRIC, THE PROVIDED ANTENNA MUST BE INSTALLED AND ORIENTED AS DEPICTED IN THIS DRAWING. IF ANY SUCH PATTERN WAS NOT PROVIDED, THE ANTENNA ORIENTATION AND POSITION IS AT THE DISCRETION OF THE BUYER TO WHICH THE ANTENNA WAS SOLD. SHOULD ANY QUESTIONS ARISE DURING THE INSTALLATION PROCESS, CONTACT DIELECTRIC AT, 1-800-341-9678, TO ASSIST IN THIS PROCESS; BE PREPARED TO PROVIDE THE PART NUMBER OR DRAWING NUMBER SHOWN BELOW.
3. COMPONENTS ARE MATCH MARKED FOR EASE IN ASSEMBLY.
4. ITEM NUMBERS DEPICTED ON THIS DRAWING CORRESPOND TO ITEM NUMBERS LISTED ON ENCLOSED BILL OF MATERIAL.
5. APPLY THIN LAYER OF DC4 DOW CORNING COMPOUND TO ALL "O"-RING SEALS PRIOR TO ASSEMBLY.
6. UNLESS OTHERWISE SPECIFIED, THE TOP BAY MUST NOT BE LOCATED ANY CLOSER THAN 5 ft. BELOW THE TOWER TOP.
7. BAY TAP POINT DIRECTION INDICATED BY ARROWS LOCATED IN THE BAY IN ELEVATION VIEW.
8. THE VARIABLE TRANSFORMERS ARE SHIPPED WITH ALL PROBES FULLY INSERTED. AT INSTALLATION, BE CERTAIN TO LOOSEN LOCKNUTS AND PULL ALL PROBES TO FULL OUTWARD POSITION. ALL PROBES MUST BE IN FULL OUTWARD POSITION BEFORE POWERING UP ANTENNA. REFER TO INSTRUCTION MANUAL FOR TUNING INSTRUCTIONS.
9. SUGGESTED LOCATIONS FOR TERMINATION MOUNT. LOCATION MAY VARY PER TOWER DESIGN.
10. FOR HEATED ANTENNAS ONLY: HEATER HARNESS TO BE DRESSED AND SECURED TO TOWER PER INSTALLERS DISCRETION. LOOSE OR DANGLING WIRE IN RF FIELD WILL SHORT AND RESULT IN ANTENNA FAILURE.
11. REFER TO DRAWING A88212 FOR ALL HARDWARE TORQUE SPECIFICATIONS.  
\* FOR FIBERGLASS APPLICATIONS, TORQUE MOUNTING HARDWARE TO 180 in-lbs (15 ft-lbs)
12. IT IS IMPORTANT TO MAINTAIN DOCUMENT FOR HISTORICAL PURPOSES. THE MOST CRITICAL PORTION OF INFORMATION TO BE MAINTAINED IS THE PART NUMBER AS SPECIFIED.
13. AFTER ANTENNA HAS BEEN INSTALLED AND TUNED ON THE TOWER, IT IS REQUESTED THAT A COPY OF THE TEST DATA BE FORWARDED TO:

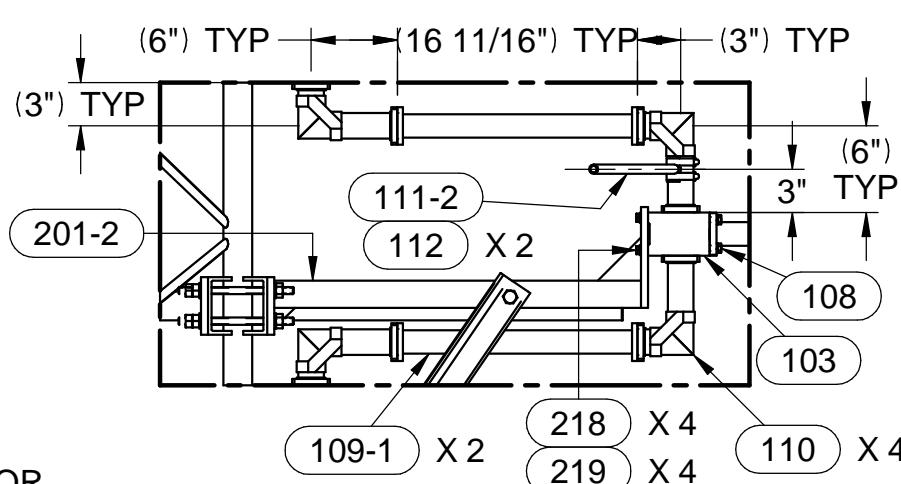
DIELECTRIC  
C/O FM ENGINEERING MANAGER  
22 TOWER RD. RAYMOND, ME. 04071  
PHONE 1 - 800 - 341 - 9678

**COMPANY CONFIDENTIAL.** INFORMATION CONTAINED HEREIN IS CONFIDENTIAL. IT IS THE PROPERTY OF DIELECTRIC. IT IS TO BE USED SOLELY FOR THE PURPOSE PROVIDED, AND IT IS NOT TO BE DISCLOSED TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF DIELECTRIC.

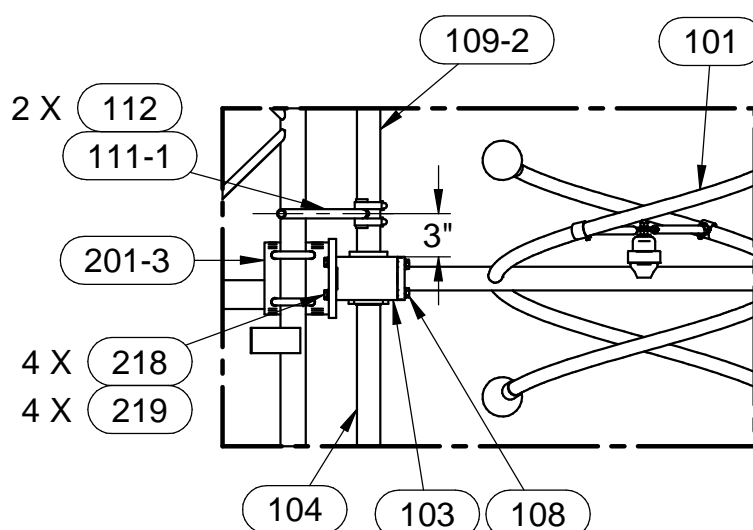
UNLESS OTHERWISE SPECIFIED  
MANUFACTURING TOLERANCE AND PROCEDURES MUST BE IN ACCORDANCE WITH D78691. ALL ALUMINUM, COPPER, AND BRASS WELDING MUST COMPLY WITH A-62700, SECT. XIV "PRODUCTION WELDING PROCEDURES". STRUCTURAL STEEL WELDING MUST COMPLY WITH "AWS 1.1 CURRENT REVISION".



## DETAIL D

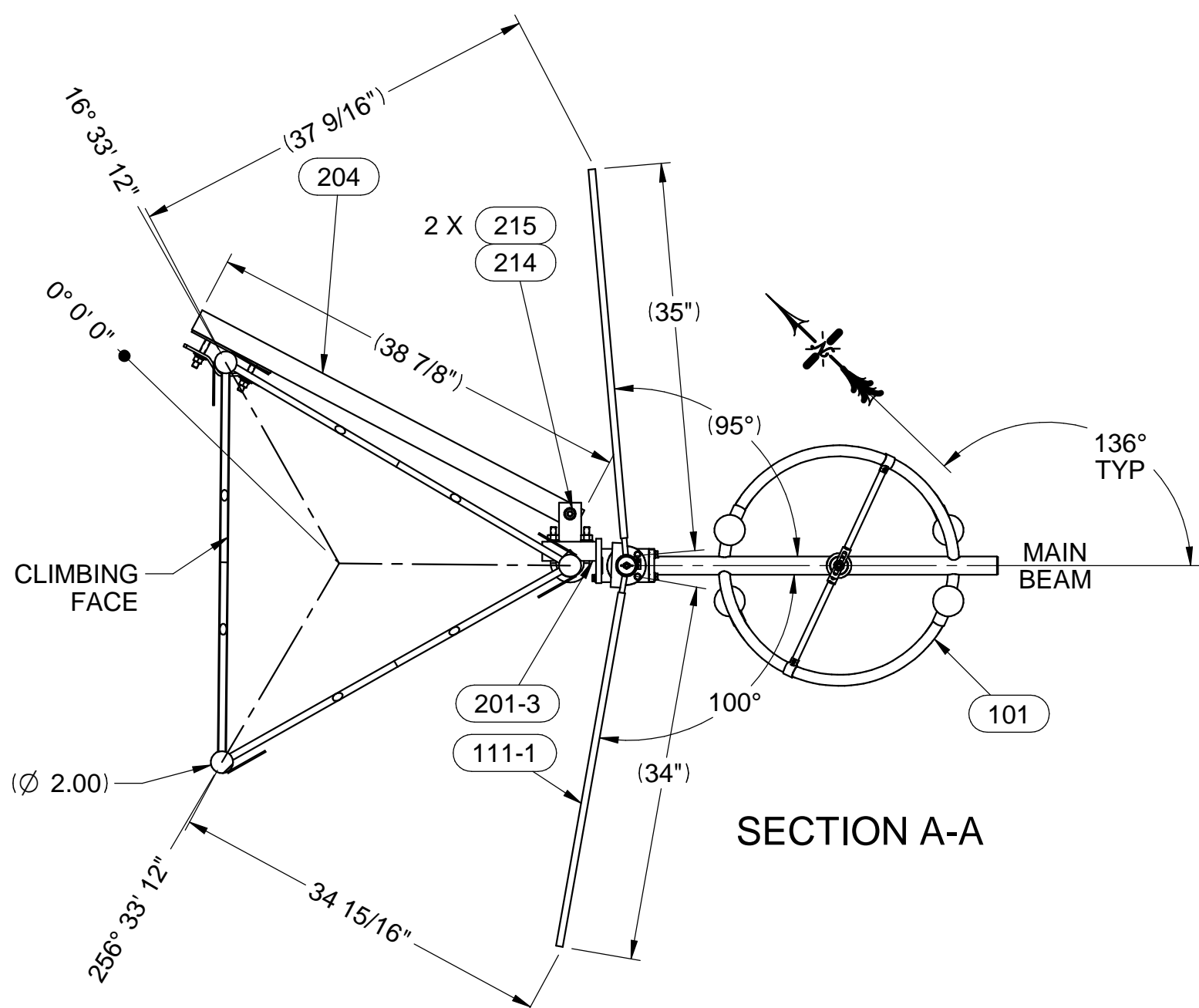


## DETAIL E

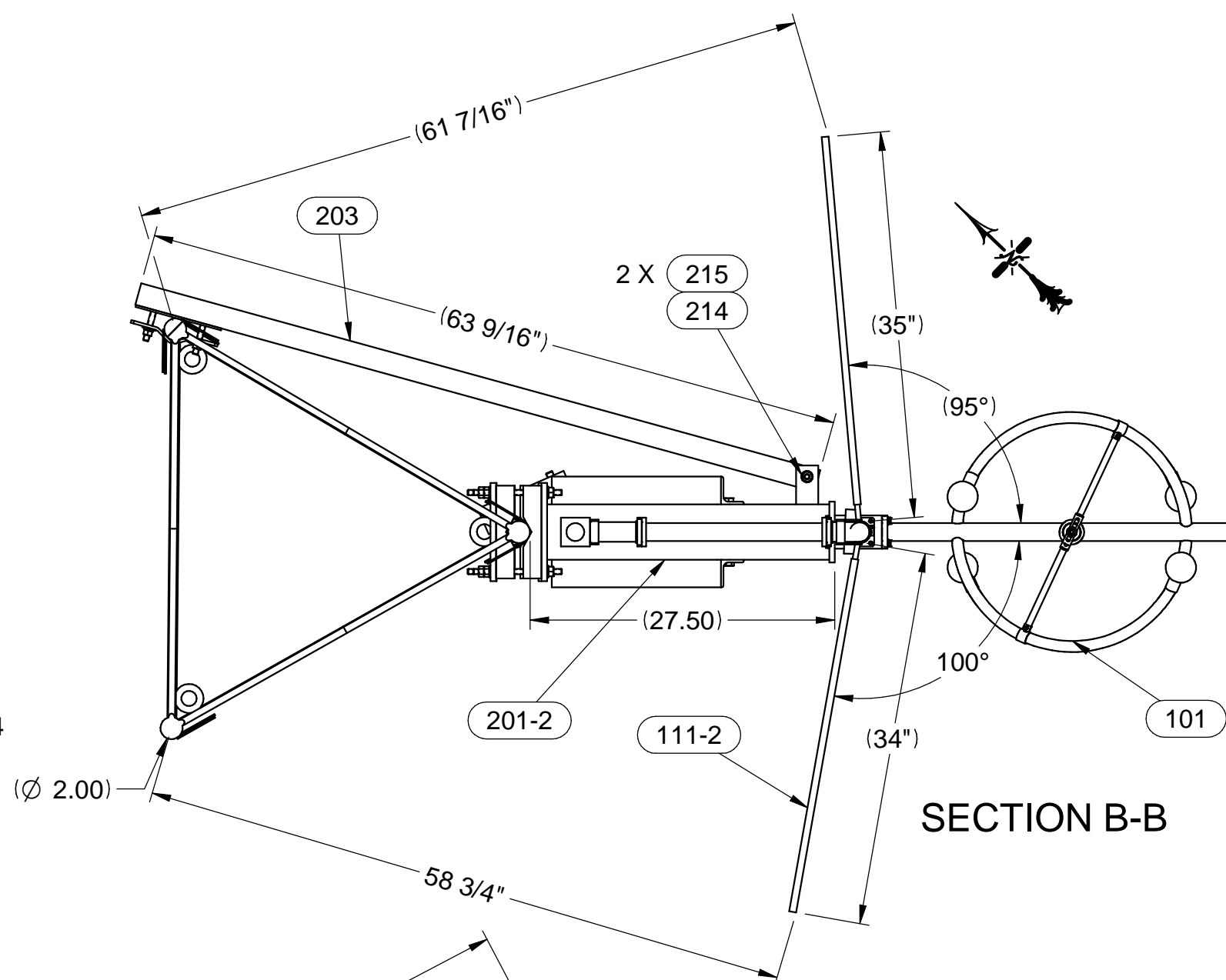


## DETAIL F

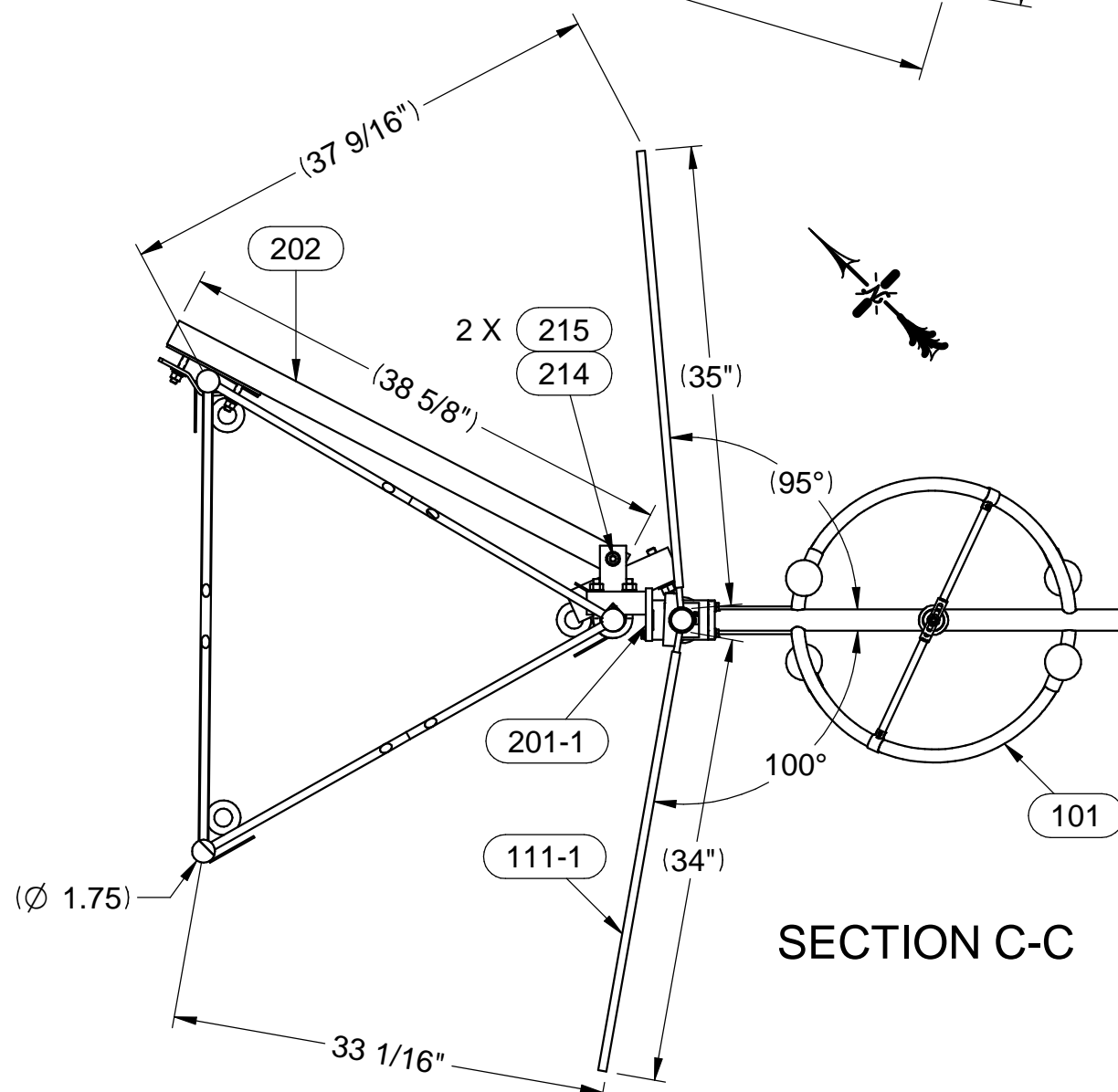
SEE SHEET 2 FOR MOUNT DETAILS  
SEE SHEET 3 FOR MATCH MARKING



SECTION A-A





## SECTION B-B



SECTION C-C

400019709 NCE-FM 90.3 DCRH3ED ANTENNA BOM			
ITEM	P/N	DESCRIPTION	QTY
101	R66905	DCRH PLAIN BAY	3
102	R68429	BLOCK JCT END DCRH/SKM ANT	2
103	R68428	BLOCK JCT CTR DCRH/SKM ANT	1
104	R80174	F/L 1-5/8 X 70 DCRH/SKM INPUT	1
105	R75886	AFM FM 1-50 X 53 LG	1
106	R103326	EXTENSION TOP BLOCK 1-50 T/L	1
107	R0046348501	ICE SHIELD KIT 1 5/8 FL	1
108	11000005999	HARDWARE BLOCK MOUNTING KIT	3
109-1	RTL2FMSQFLG	T/L KIT 1-50 SQ FLANGE FM USE 16.66 LONG	2
109-2	RTL2FMSQFLG	T/L KIT 1-50 SQ FLANGE FM USE 118.71 LONG	2
110	R0049A97201	ELBOW, 1-50, 90°, UNEQUAL LEG, REINFORCED, 3" X 6"	4
111-1	400019847-1	HORIZONTAL PARASITIC BAYS 1 & 3	2
111-2	400019847-2	HORIZONTAL PARASITIC BAY 2	1
112	R0002187007	HOSE CLAMP, 1-50, 1.06-2.00 DIA	6

400019710 NCE-FM 90.3 DCRH3ED MOUNT BOM			
201-1	400019876-1	MOUNTING BRACKET BAY 1	1
201-2	400019876-2	MOUNTING BRACKET BAY 2	1
201-3	400019876-3	MOUNTING BRACKET BAY 3	1
201-4	400019876-4	KNEE BRACE MOUNT	1
201-5	400019876-5	BAY 2 MOUNT CLAMP	2
201-6	400019876-6	T/L SUPPORT ANGLE Ø1.75 OD TOWER LEG	3
201-7	400019876-7	T/L SUPPORT ANGLE Ø2.00 OD TOWER LEG	1
201-8	400019876-8	KNEE BRACE ANGLE 27" LONG	2
202	400019877	ANTI-ROTATION STRUT BAY 1 38-5/8" LONG	1
203	400019878	ANTI-ROTATION STRUT BAY 2 63-9/16" LONG	1
204	400019879	ANTI-ROTATION STRUT BAY 3 38-5/8" LONG	1
205	R84381	CLAMPING BAR	3
206	R103295	SADDLE KIT, 1-50 T/L, 5/8-11 X 7" LONG	4
207	R0425000000	WASHER FLAT 1/2 SAE STD	12
208	R0165000000	LOCK WASHER SPLIT 1/2 SS	6
209	R0025013275	HHCS SS 1/2-13x2.75	2
210	R0025013325	HHCS SS 1/2-13x3.25	4
211	UB1212	U-BOLT 7/8-13 X 2 1/2 SAE J429 GR.2	3
212	UB1400	U-BOLT 7/8-13 X 2 SAE J429 GR.2	5
213	G12R-8	ROD THREADED 1/2-13 GALV. 8" LG. SAE J429 GR. 2	8
214	R0820500150	BOLT / ANCO NUT 1/2 X 1.50 A325	7
215	RH000160011	WASHER FLAT 1/2 GALV	46
216	R58312	NUT HEX 1/2-13 ANCO GALV	24
217	RH015196001	NUT 1/2-13 THD. GALV. A194	16
218	R0023816113	HHCS SS 3/8-16x1.13	12
219	R0163800000	LOCK WASHER SPLIT 3/8 SS	16
220	R002A80601	ANTI - ROTATION REINFORCEMENT PLATE	3
221	R0145013000	NUT HEX 1/2-13 MOLY LUBED	6

STATUS: <b>RELEASED</b>		<b>DIMENSIONAL TOLERANCES</b> (UNLESS OTHERWISE NOTED) DECIMAL DIMENSIONS 3 PLACE DIMENSIONS ±.005 2 PLACE DIMENSIONS ±.02 FRACTIONAL DIMENSIONS 9"± ±1/8" ABOVE 6" UP TO 12" ±1/16" ABOVE 12" UP TO 48" ±1/8" ABOVE 48" ±1/4" ANGULAR DIMENSIONS ±1° REFERENCE DIMENSIONS ARE NOT FOR MANUFACTURING OR INSPECTION DRAWING DETAIL VIEWS ARE NOT TO SCALE		 Raymond, ME																						
PART NO. / MATERIAL NO: <b>400019709 ANTENNA</b> <b>400019710 MOUNTS</b> SAP/DOCUMENT NO:		 <b>ANGLE PROJECTION</b>		TITLE: <b>INSTALLATION ARRANGEMENT</b> NCE-FM DCRH3ED 90.3 MHz KINGSLAND, GA C-07007																						
MATERIAL:		<table><tr><th></th><th>NAME</th><th>DATE</th></tr><tr><td>DESIGNED BY</td><td>dengelhardt</td><td>7/13/2022</td></tr><tr><td>DETAIL BY</td><td>dengelhardt</td><td>7/13/2022</td></tr><tr><td>CHKD. BY</td><td>mdavison</td><td>7/05/2022</td></tr><tr><td>ENG. 1 APPR.</td><td>cbutts</td><td>7/06/2022</td></tr><tr><td>ENG. 2 APPR.</td><td>gibman</td><td>7/11/2022</td></tr><tr><td>MANUFACT.</td><td>mdavison</td><td>7/11/2022</td></tr></table>			NAME	DATE	DESIGNED BY	dengelhardt	7/13/2022	DETAIL BY	dengelhardt	7/13/2022	CHKD. BY	mdavison	7/05/2022	ENG. 1 APPR.	cbutts	7/06/2022	ENG. 2 APPR.	gibman	7/11/2022	MANUFACT.	mdavison	7/11/2022	GAGE CODE <b>D 08441 020A66501</b> DRAWING NO:	
	NAME	DATE																								
DESIGNED BY	dengelhardt	7/13/2022																								
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ENG. 2 APPR.	gibman	7/11/2022																								
MANUFACT.	mdavison	7/11/2022																								
FINISH: N/A		12:45:40 PM		SHEET: 1 OF 3																						
REFER TO D8110 FOR PLATING REFER TO D17800 FOR FLAT																										



7

6

5

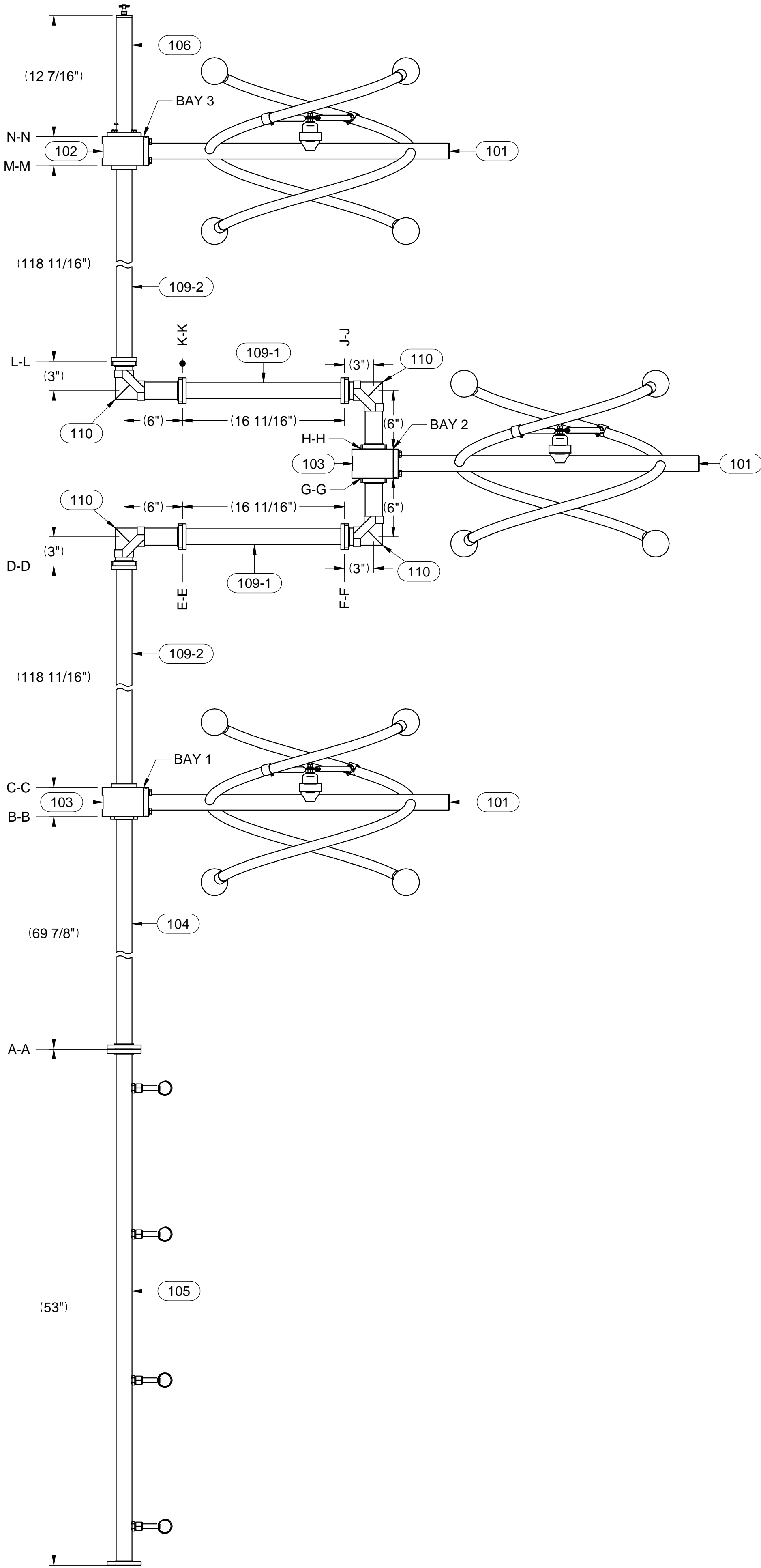
4

3

2



1

REV:	SHEET	ZONE	REVISION NOTE	ECO	DATE APPR
A			CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY. PRODUCTION RELEASE		7/13/2022



MATCH MARKING DETAILS  
STENCIL AS SHOWN USING 1/2" HIGH  
CHARACTERS WITH BLACK LAQUER

COMPANY CONFIDENTIAL. INFORMATION CONTAINED HEREIN IS CONFIDENTIAL. IT IS THE PROPERTY OF DIELECTRIC. IT IS TO BE USED SOLELY FOR THE PURPOSE PROVIDED, AND IT IS NOT TO BE DISCLOSED TO OTHERS WITHOUT THE PRIOR WRITTEN CONSENT OF DIELECTRIC.	
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PART NO.: / MATERIAL NO: <b>400019709 ANTENNA</b> <b>400019710 MOUNTS</b> SAP DOCUMENT NO:		 <b>ANGLE PROJECTION</b>		TITLE: <b>INSTALLATION ARRANGEMENT</b>	
MATERIAL:				NCE-FM DCRH3D 90.3 MHz	
FINISH: N/A				KINGSLAND, GA C-07007	
REFER TO D8110 FOR PLATING REFER TO D17800 FOR PAINT				DESIGNED BY: dpengelhardt 7/13/2022	
		DETAIL BY: dpengelhardt 7/13/2022		<b>D 08441 020A66501</b>	
		CHKD. BY: mdavison 7/05/2022			
		ENG. 1 APPR: jbouris 7/06/2022			
		ENG. 2 APPR: jgittman 7/11/2022			
MANUFACT: jmayhan 7/11/2022		12:45:40 PM		SHEET: 3 OF 3	