Report Of

Intermodulation Product Findings

Las Vegas, Nevada

KMXB – 94.1 MHz.
KLUC-FM – 98.5 MHz.
KXQQ – 100.5 MHz.
KXTE – 107.5 MHz.

Project# 35357

August 24, 2017

Electronics Research Inc.
7777 Gardner Road
Chandler, Indiana 47610
Phone (812) 925-6000 Fax (812) 925- 4030

ELECTRONICS RESEARCH, INC. ERI

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Report of Findings for Intermodulation Product Measurements

Exhibits Accompanying This Report

REPORT OF FINDINGS
Las Vegas, Nevada
BROADCAST FACILITY

Introduction: This report of findings is based on data collected at the FM broadcast facility located in Las Vegas, NV. The report includes measurements offered as proof that the combined operations of KMXB (94.1 MHz.), KLUC-FM (98.5 MHz.), KXQQ (100.5 MHz.), and KXTE (107.5 MHz.) transmitters are in compliance with the FCC Rules and Regulations as required by the Code of Federal Regulations (CFR) Title 47 section 73.317 paragraph (b) through (d). In brief, the collection of measurements presented in this report shows that all possible third order inter-modulation (IM) products generated by this combined system are less than the maximum allowable level as required by section 73.317 (b) through (d). Jeff Taylor of Electronics Research, Inc. located in Chandler, Indiana performed the measurements summarized herein on August 24, 2017.

The following exhibits are provided:

Exhibit A:
- A-1 Drawing Depicting Antenna.
- A-2 SHPX-8AC6-SP Antenna Specification Sheet.
- A-3 Drawing Depicting Combined Scheme.
- A-4 Combiner Specification Sheet.
- A-5 Theoretical Vertical Plane Relative Field Antenna Plots

Exhibit B:
- B-1 Equipment Employed In Intermodulation Product Measurement.
- B-2 Broadcasting Scheme of the Combiner Systems.

Table 1. Carrier Reference Levels.
Table 2. Calculated Third Order Products.
Table 3. Intermodulation Analysis Measurements.

Exhibits Accompanying Report: Exhibit A provides comprehensive information on both antenna and filters used by these radio stations. Exhibit B illustrates the broadcasting scheme of each station, the layout of the equipment used to isolate and measure potential intermodulation products and forward carrier reference levels. Found within Table 1 are the narrow band carrier frequency measurements that provide relative output signal levels for the IM analysis. Table 2 lists the calculated third order products that can be generated from FM transmitters broadcasting from the combined system. The IM Analysis Measurements, in Table 3, provides detailed information obtained from the product frequency investigation.

The Nature of Intermodulation Products (IM): Intermodulation products result from inadequate transmitter-to-transmitter isolation. Intermodulation products are commonly generated from radio stations operating into multiplexed facilities and congested antenna broadcast sites. The mechanics associated with the phenomenon have been well documented. When two or more transmitters are coupled to each other, new spectral components are produced by the mixing of the station frequencies in the active circuits of each transmitter. The common term used to describe this phenomenon is third order product denoted by the mathematical expression $[2(F_1)-(F_2)]$, where F_1 signifies the frequency of the transmitter that is generating the intermodulation product, and F2 signifies the frequency causing the interference.

The Multiplexed System: These measurements were taken with all four of the FM stations operating from the combined antenna system. The KMXB, KLUC-FM, KXQQ, and KXTE combined system is fundamentally comprised of antenna, feed line and combiner units. The SHPX-8AC6-SP (antenna), 780-6~783-3 Bandpass units, and rigid feedline, are products of Electronics Research, Inc. while the 4" HJ11-50 Air Heliax is a product of Andrew. Refer to Exhibit B-1, for an illustration of the Broadcasting Scheme of these stations.

To accomplish the aggregation of four transmitter signals into a common antenna feed and provide transmitter-to-transmitter isolation, a multiplexing scheme consisting of (1) 780-6 Constant Impedance and (3) 783-3 Bandpass, filter systems were installed. Specifically, the combiner utilizes one ERI Model 780-6 Constant Impedance module for frequency (941. MHz.) and three ERI Model 783-3 Bandpass modules for frequency (98.5 MHz., 100.5 MHz., and 107.5 MHz.). Interconnecting " T's" are used to combine the 98.5 MHz., 100.5 and 107.5 MHz. into the broad port of the 94.1 MHz. constant impedance module. The combiner, fully assembled, exhibited transmitter port-to-port isolation in excess of -42 dB. Other performance measurements, such as match, loss, group-delay, etc, revealed that the multiplexer unit was in proper working condition. Refer to Exhibit A-4 for the Combiner Specification Sheet.

The IM Investigation: Directional Couplers were placed at key locations throughout the combiner to monitor and maintain combiner performance. All couplers furnished with the system are factory calibrated and capable of delivering accurate and repeatable RF measurements. To facilitate the taking of the measurements, the coupler located at the antenna output of the combined system was used. Care was taken in the selection of the measurement location to insure that the measurements would be made far removed from transmitters and any filtering used to reduce broadcast emissions. The coupler selected would normally be used for antenna reflection measurements and thus would provide greater than -35 dB directivity and a forward signal sample of -55 dB.

The forward port of the coupler was used for sampling the outgoing carrier levels and IM products. The IM sampled signal was fed by shielded cable into a Band Pass Filter where all extraneous energy was steeply attenuated. Various attenuation pads were used, when needed, on the band pass filter and/or the Spectrum Analyzer to ensure an adequate signal level for measurements without overloading the measurement equipment. A Rohde & Schwarz ZVL Vector Network Analyzer with Spectrum Analyzer serial# 100396 was employed to record the level of all signals investigated. The Rohde & Schwarz was also used for selective tuning of the Band Pass Filter. The Spectrum Analyzer portion of the Rohde & Schwarz was used to measure the close in spectral attenuation of each carrier and wide band search for any anomalies that may need further investigation. See attached Exhibit B-1 for an illustration of the measurement equipment.

Prior to recording measurements, all pertinent broadcasting equipment including Transmitters, Multiplexer, Feed Line and Antenna were adjusted to optimal performance. Also, it was confirmed before taking any measurements that all transmitters were operating at full licensed power. From the equipment setup described above, the relative output signal level of each stations forward carrier was made. The resulting signal levels of these measurements are listed in Table 1, column labeled "Adjusted Level". This level will be used as the reference level for possible IM products of each carrier and was necessary to confirm that no significant levels of spurious energy, referenced to each carrier, were present from any transmitter operating from the multiplexed system.

Table 1 - Carrier Reference Levels.

Carrier Frequency (MHz)	Pad One (dB)	Bandpass Filter Loss (dB)	Measured Level (dBm)	**Adjusted Level (dBm)**	Notes
94.1	**3**	**-**	**9.86**	**12.86**	
98.5	**3**	**-**	**9.92**	**12.92**	
100.5	**3**	**-**	**10.36**	**13.36**	
107.5	**3**	**-**	**10.63**	**13.63**	

Predictable third-order products due to system harmonics mixed with all on-site interfering frequencies that could be generated from the multiplexed system are calculated and listed in Table 2.

Table 2 - Third order Products.

	Carrier Frequencies			
Interfering Frequencies	**94.1**	**98.5**	**100.5**	**107.5**
KMXB 94.1 MHz.	-----	102.9	106.9	120.9
KLUC-FM 98.5 MHz.	89.7	----	102.5	116.5
KXQQ 100.5 MHz.	87.8	96.5	----	114.5
KXTE 107.5 MHz.	80.7	89.5	93.5	----

Using the equipment previously described the IM product measurements were recorded and are listed in Table 3. The signal levels referenced to the carriers are calculated and listed in the column labeled "Level Referenced to Carrier". Refer to Exhibit B-2 for a layout of the measurement equipment.

Table 3 – Intermodulation Measurements

IM Measurements Taken in Las Vegas, NV.										
Product Frequency (MHz)	**Transmitter Frequency (MHz)**	**Interfering Frequency (MHz)**	**Pad (dB)**	**Bandpass Filter Loss (dB)**	**Total Loss**	**Measured Level (dBm)**	**Adjusted Level (dBm)**	**Carrier Reference Level (dBm)**	**Level Referenced to Carrier (dBm)**	**Notes***
Transmitter Mixes										
	94.1		3			9.86	12.86	**12.86**		
	98.5		3			9.92	12.92	**12.92**		
	100.5		3			10.36	13.36	**13.36**		
	107.5		3			10.63	13.63	**13.63**		
80.7	94.1	107.5	3	13.9	16.9	-87.75	-93.02	12.86	**-83.71**	
87.7	94.1	100.5	3	12.7	15.7	-85.93	-70.23	12.86	**-83.09**	
89.5	98.5	107.5	3	10.8	13.8	-86.34	-72.54	12.92	**-85.46**	
89.7	94.1	98.5	3	11.7	14.7	-87.97	-73.27	12.86	**-86.13**	
93.5	100.5	107.5	3	12.9	15.9	-87.7	-71.8	13.36	**-85.16**	
96.5	98.5	100.5	3	10.9	13.9	-85.97	-72.07	12.92	**-84.99**	
102.5	100.5	98.5	3	11.5	14.5	-84.95	-70.45	13.36	**-83.81**	
102.9	98.5	94.1	3	9.8	12.8	-85.96	-73.16	12.92	**-86.08**	
106.9	100.5	94.1	3	12.1	15.1	-85.89	-70.79	13.36	**-84.15**	
114.5	107.5	100.5	3	10.9	13.9	-84.6	-70.7	13.63	**-84.33**	
116.5	107.5	98.5	3	9.7	12.9	-86.69	-73.79	13.63	**-87.42**	
120.9	107.5	94.1	3	11.5	14.5	-85.78	-71.28	13.63	**-84.91**	

The Spectrum Analyzer was used to check the close in spectral attenuation of the carrier to confirm the operation of the transmitter is in compliance with Sections (b) and (c) of the FCC Rules and Regulations.

As a final proof of the systems IM Product performance, a wide band search was undertaken using the Spectrum Analyzer. The purpose for this measurement was to look for suspicious anomalies that may warrant further investigation. My search ranged the complete frequency span of the receiver and resulted in no additional investigations.

Conclusion: Based upon my observations and measurements taken on August 24, 2017 as summarized in this document, I, Jeff Taylor, find the subject system, specifically the transmitter and filter system for the operation of KMXB, KLUC-FM, KXQQ, and KXTE into the antenna to be in proper working order. Furthermore, based on the measured data, it is my opinion that there are no inter-modulation products in excess of 80 dB below carrier levels generated from or within the station operating on the installed system. Based on this recorded data, I conclude that KMXB, KLUC-FM, KXQQ, and KXTE are in compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations.

Respectfully submitted,
Electronics Research, Inc.

Jeff Taylor, Field Technician

State of Indiana)
) SS:
County of Warrick)

AFFIDAVIT

I, Jeff Taylor, hereby declare that the following statements are true and correct to the best of my knowledge and belief :

1.) I am a Field Technician for Electronics Research, Inc ("ERI ") and have been employed by ERI for 20 years. I am familiar with and have assisted in the design, manufacturing and installation of FM Antennas and FM Multiplexers in my long tenure with ERI.

2.) I have either prepared and/or directly supervised the preparation of all technical information contained in this Report of Findings and to my knowledge to be accurate and true.

3.) ERI has been requested by CBS Radio on behalf of radio Stations KMXB, KLUC-FM, KXQQ, and KXTE in Las Vegas, NV. to prepare this Report Of Findings.

Jeff Taylor; Field Technician

Jeff Taylor

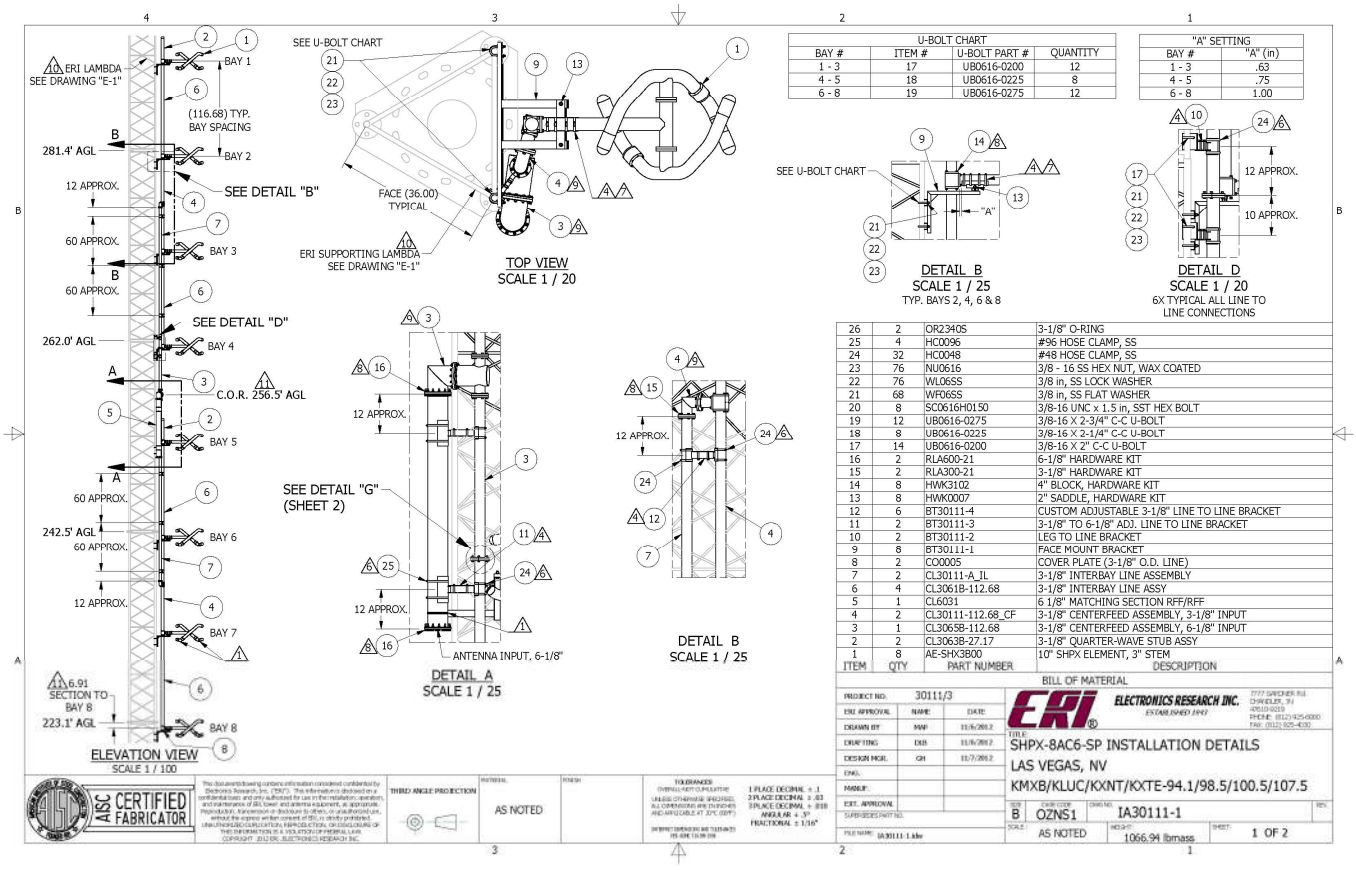
Subscribed and sworn to before me on this 24th, day of August, 2017.

Jacquelyn Glenn; Notary Public
My commission expires July 5, 2023

JACQUELYN S GLENN
Notary Public, State of Indiana
Vanderburgh County
My Commission Expires
July 05, 2023

Jacquelyn S Glenn

EXHIBIT, A-1



U-BOLT CHART			
BAY #	ITEM #	U-BOLT PART #	QUANTITY
1 - 3	17	UB0616-0200	12
4 - 5	18	UB0616-0225	8
6 - 8	19	UB0616-0275	12

"A" SETTING	
BAY #	"A" (in)
1 - 3	.63
4 - 5	.75
6 - 8	1.00

ITEM	QTY	PART NUMBER	DESCRIPTION
26	2	OR2340S	3-1/8" O-RING
25	4	HC0096	#96 HOSE CLAMP, SS
24	32	HC0048	#48 HOSE CLAMP, SS
23	76	NU0616	3/8 - 16 SS HEX NUT, WAX COATED
22	76	WL06SS	3/8 in, SS LOCK WASHER
21	68	WF06SS	3/8 in, SS FLAT WASHER
20	8	SC0616H0150	3/8-16 UNC x 1.5 in, SST HEX BOLT
19	12	UB0616-0275	3/8-16 X 2-3/4" C-C U-BOLT
18	8	UB0616-0225	3/8-16 X 2-1/4" C-C U-BOLT
17	14	UB0616-0200	3/8-16 X 2" C-C U-BOLT
16	2	RLA600-21	6-1/8" HARDWARE KIT
15	2	RLA300-21	3-1/8" HARDWARE KIT
14	8	HWK3102	4" BLOCK, HARDWARE KIT
13	8	HWK0007	2" SADDLE, HARDWARE KIT
12	6	BT30111-4	CUSTOM ADJUSTABLE 3-1/8" LINE TO LINE BRACKET
11	2	BT30111-3	3-1/8" TO 6-1/8" ADJ. LINE TO LINE BRACKET
10	2	BT30111-2	LEG TO LINE BRACKET
9	8	BT30111-1	FACE MOUNT BRACKET
8	2	CO0005	COVER PLATE (3-1/8" O.D. LINE)
7	2	CL30111-A_JL	3-1/8" INTERBAY LINE ASSEMBLY
6	4	CL3061B-112.68	3-1/8" INTERBAY LINE ASSY
5	1	CL6031	6 1/8" MATCHING SECTION RFF/RFF
4	2	CL30111-112.68_CF	3-1/8" CENTERFEED ASSEMBLY, 3-1/8" INPUT
3	1	CL3065B-112.68	3-1/8" CENTERFEED ASSEMBLY, 6-1/8" INPUT
2	2	CL3063B-27.17	3-1/8" QUARTER-WAVE STUB ASSY
1	8	AE-SHX3B00	10' SHPX ELEMENT, 3" STEM

BILL OF MATERIAL

PROJECT NO. 30111/3

ELECTRONICS RESEARCH INC. ESTABLISHED 1947

7777 GARDNER RD. CHANDLER, IN 47610-9315 PHONE: (812) 925-6000 FAX: (812) 925-4030

TITLE: SHPX-8AC6-SP INSTALLATION DETAILS
LAS VEGAS, NV
KMXB/KLUC/KXNT/KXTE-94.1/98.5/100.5/107.5

SIZE B | CAGE CODE OZNS1 | DWG NO. IA30111-1 | REV

SCALE: AS NOTED | WEIGHT: 1066.94 lbmass | SHEET: 1 OF 2

ASC CERTIFIED FABRICATOR

THIRD ANGLE PROJECTION

MATERIAL: AS NOTED

FINISH

TOLERANCES: 1 PLACE DECIMAL ± .1 | 2 PLACE DECIMAL ± .03 | 3 PLACE DECIMAL ± .010 | ANGULAR ± 5° | FRACTIONAL ± 1/16"

	NAME	DATE
DRAWN BY	MAP	11/6/2012
DRAFTING	DJS	11/6/2012
DESIGN MGR.	GH	11/7/2012
ENGR.		
MANUF.		
ERT. APPROVAL		

SUPERSEDES PART NO.

FILE NAME: IA30111-1.idw

A-2 ERI Antenna Specification Sheet

TRANSMISSION SITE
LAS VEGAS, NEVADA

General Specifications

Antenna Type . . . . . .High Power FM-Broadcast, Suitable for Multiplexing
Model Number SHPX-8AC6-SP
Number of Bay Levels .....Eight
Polarization ..... Right Hand Circular

Electrical Specifications

Antenna Input Power Capability . . . . . 30 kW Max (1)
Operating Frequency Band..... 94.1 ~ 98.4 ~ 100.5 ~ 107.5 Megahertz.
VSWR. . . . . <1.06:1 @ Operating Frequencies(2)
Azimuthal Pattern Circularity ..... Better Then +/- 2dB From RMS (Free Space)
Power Split ..... 50/50 (Horizontal & Vertical)
Frequency Specific Information:

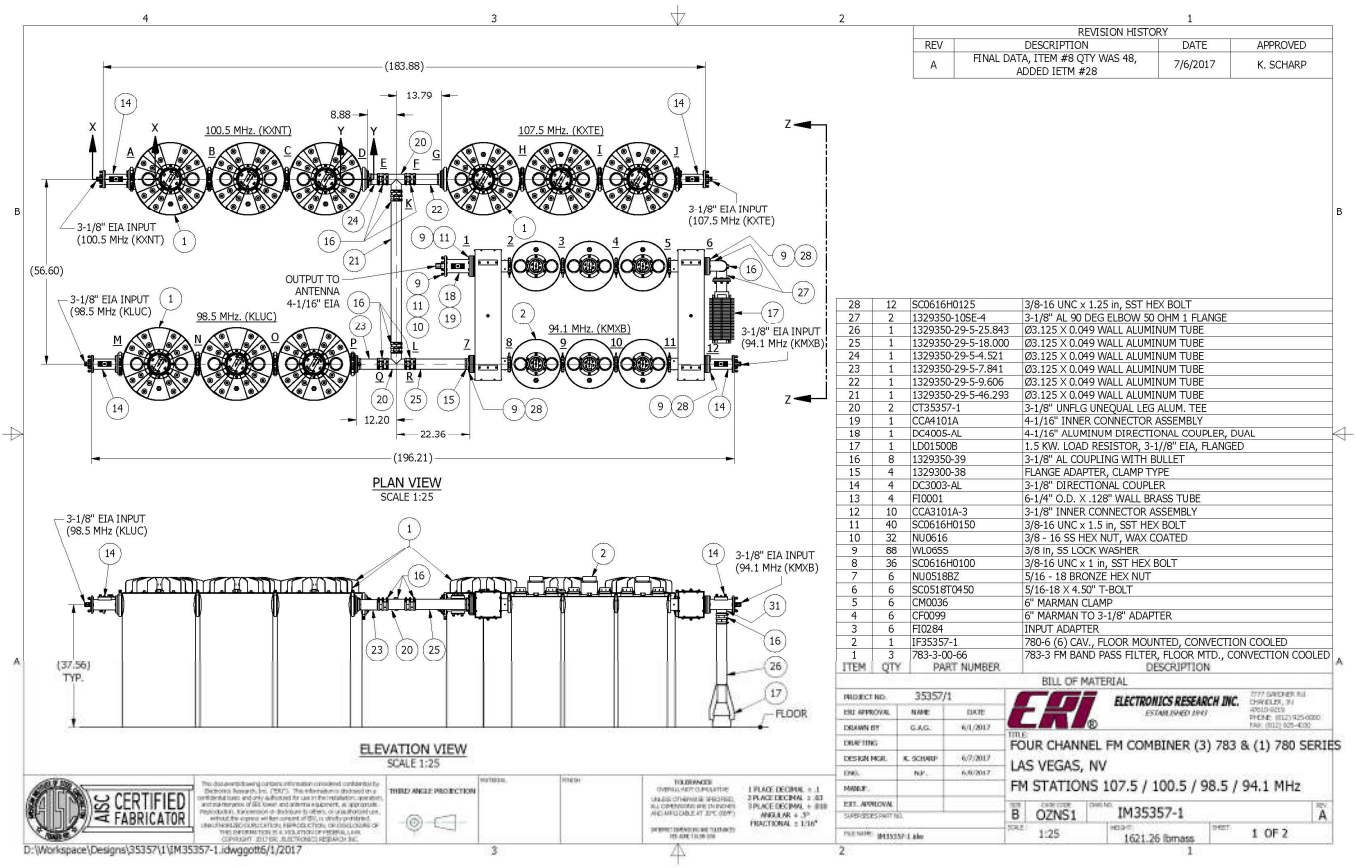
Frequency	Station ERP	Beam Tilt	First Null Fill	Second Null Fill	Power Gain	Line Loss (3)	Filter Loss (4)	Computed TPO
94.1	**24.976 kW**	**0.0°**	**0 %**	**14 %**	**4.195**	**-0.732 dB**	**-0.242 dB**	**7.547 kW**
98.5	**26.598 kW**	**0.0°**	**0 %**	**5 %**	**4.484**	**-0.752 dB**	**-0.181 dB**	**7.436 kW**
100.5	**26.607 kW**	**0.0°**	**0 %**	**1 %**	**4.493**	**-0.757 dB**	**-0.205 dB**	**7.471 kW**
107.5	**23.399 kW**	**0.0°**	**0 %**	**15 %**	**3.974**	**-0.784 dB**	**-0.228 dB**	**7.465 kW**

Mechanical Specifications

Antenna Feed System.....Single Input
Input Connector ……. . 6 1/8”-50 Ohm EIA Flanged
Element Deicing.....None
Interbay Spacing..... 116.6875” Center to Center
Array Length ..... 70.56 Feet
Construction Material (Antenna) ..... Galvanized Plated Steel and Stainless Steel
Construction Material (Mounting).....Tower Face

1) Power Capability Has Been Rated Assuming an Operating Transmission VSWR of 1.5:1
2) VSWR Specification Achieved After On Site Tuning For User Specific Frequencies.
3) Line Loss Assumes A Feed Run of 250 Feet of MACXLine-450A 3 1/8” Rigid and 497 Feet of Andrew HJ11-50 4” Heliax.
4) Losses Taken From Actual Combiner.

EXHIBIT A-3



REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
A	FINAL DATA, ITEM #8 QTY WAS 48, ADDED IETM #28	7/6/2017	K. SCHARP

ITEM	QTY	PART NUMBER	DESCRIPTION
28	12	SC0616H0125	3/8-16 UNC x 1.25 in, SST HEX BOLT
27	2	1329350-10SE-4	3-1/8" AL 90 DEG ELBOW 50 OHM 1 FLANGE
26	1	1329350-29-5-25.843	Ø3.125 X 0.049 WALL ALUMINUM TUBE
25	1	1329350-29-5-18.000	Ø3.125 X 0.049 WALL ALUMINUM TUBE
24	1	1329350-29-5-4.521	Ø3.125 X 0.049 WALL ALUMINUM TUBE
23	1	1329350-29-5-7.841	Ø3.125 X 0.049 WALL ALUMINUM TUBE
22	1	1329350-29-5-9.606	Ø3.125 X 0.049 WALL ALUMINUM TUBE
21	1	1329350-29-5-46.293	Ø3.125 X 0.049 WALL ALUMINUM TUBE
20	2	CT35357-1	3-1/8" UNFLG UNEQUAL LEG ALUM. TEE
19	1	CCA4101A	4-1/16" INNER CONNECTOR ASSEMBLY
18	1	DC4005-AL	4-1/16" ALUMINUM DIRECTIONAL COUPLER, DUAL
17	1	LD01500B	1.5 KW. LOAD RESISTOR, 3-1/8" EIA, FLANGED
16	8	1329350-39	3-1/8" AL COUPLING WITH BULLET
15	4	1329300-38	FLANGE ADAPTER, CLAMP TYPE
14	4	DC3003-AL	3-1/8" DIRECTIONAL COUPLER
13	4	FI0001	6-1/4" O.D. X .128" WALL BRASS TUBE
12	10	CCA3101A-3	3-1/8" INNER CONNECTOR ASSEMBLY
11	40	SC0616H0150	3/8-16 UNC x 1.5 in, SST HEX BOLT
10	32	NU0616	3/8 - 16 SS HEX NUT, WAX COATED
9	88	WL06SS	3/8 in, SS LOCK WASHER
8	36	SC0616H0100	3/8-16 UNC x 1 in, SST HEX BOLT
7	6	NU0518BZ	5/16 - 18 BRONZE HEX NUT
6	6	SC0518T0450	5/16-18 X 4.50" T-BOLT
5	6	CM0036	6" MARMAN CLAMP
4	6	CF0099	6" MARMAN TO 3-1/8" ADAPTER
3	6	FI0284	INPUT ADAPTER
2	1	IF35357-1	780-6 (6) CAV., FLOOR MOUNTED, CONVECTION COOLED
1	3	783-3-00-66	783-3 FM BAND PASS FILTER, FLOOR MTD., CONVECTION COOLED

BILL OF MATERIAL

ELECTRONICS RESEARCH INC. ESTABLISHED 1941
2777 GARDNER RD CHANDLER, IN 47610-9259 PHONE: (812) 925-6000 FAX: (812) 925-4030

PROJECT NO.	35357/1	
ERI APPROVAL	NAME	DATE
DRAWN BY	G.A.G.	6/1/2017
DRAFTING		
DESIGN MGR.	K. SCHARP	6/7/2017
ENG.	N.P.	6/8/2017
MMBUF		
EXT. APPROVAL		
SUPERSEDES PART NO.		
FILE NAME	IM35357-1.ide	

TITLE
FOUR CHANNEL FM COMBINER (3) 783 & (1) 780 SERIES
LAS VEGAS, NV
FM STATIONS 107.5 / 100.5 / 98.5 / 94.1 MHz

SIZE	CAGE CODE	DWG NO.	REV
B	OZNS1	IM35357-1	A

SCALE 1:25 WEIGHT 1621.26 lbmass SHEET 1 OF 2

ASC CERTIFIED FABRICATOR

THIRD ANGLE PROJECTION

D:\Workspace\Designs\35357\1\IM35357-1.dwggott6/1/2017

A-4 ERI Combiner Specification Sheet

TRANSMISSION SITE
LAS VEGAS, NEVADA

General Specifications:

Multiplexer Type ..... Branch/Constant Impedance Combiner
Number of Combining Units ..... Four
Injected Port to Injected Port Isolation ..... < - 42 dB
Output Connector ..... 4 1/16 "50 Ohm EIA (Flanged)
Output Power (Designed) ..... 30 kW(1)

Heat Removal ..... Natural Convection
Physical Arrangement ..... All Components Floor Standing

Injected Port Specifications:

Frequency Assignment ..... 94.1 ~ 98.5 ~ 100.5 and 107.5 MHz.
Power Rating, Each Injected Port (Designed) .....7.54 kW 94.1 ~ 7.43 kW 98.5 ~ 7.47 kW 100.5 ~ 7.46 kW 107.5
Input Connector ..... 3 1/8" 50 Ohm EIA (Flanged)
VSWR.....< 1.09:1 @ +/-200 KHz.(2)
Group Delay .....Less than 75 ns Overall Variation, Carrier @ +/- 150 KHz.
Insertion Loss (Measured):

94.1 MHz. ..... - 0.242 dB
98.5 MHz. ..... - 0.181 dB
100.5 MHz. ..... - 0.205 dB
107.5 MHz. ..... - 0.228 dB

1) Power Rating Listed is as Designed Only. Actual Power Capabilities May Vary.
2) When Terminated in 50 Ohm Resistive Load.

EXHIBIT A – 5

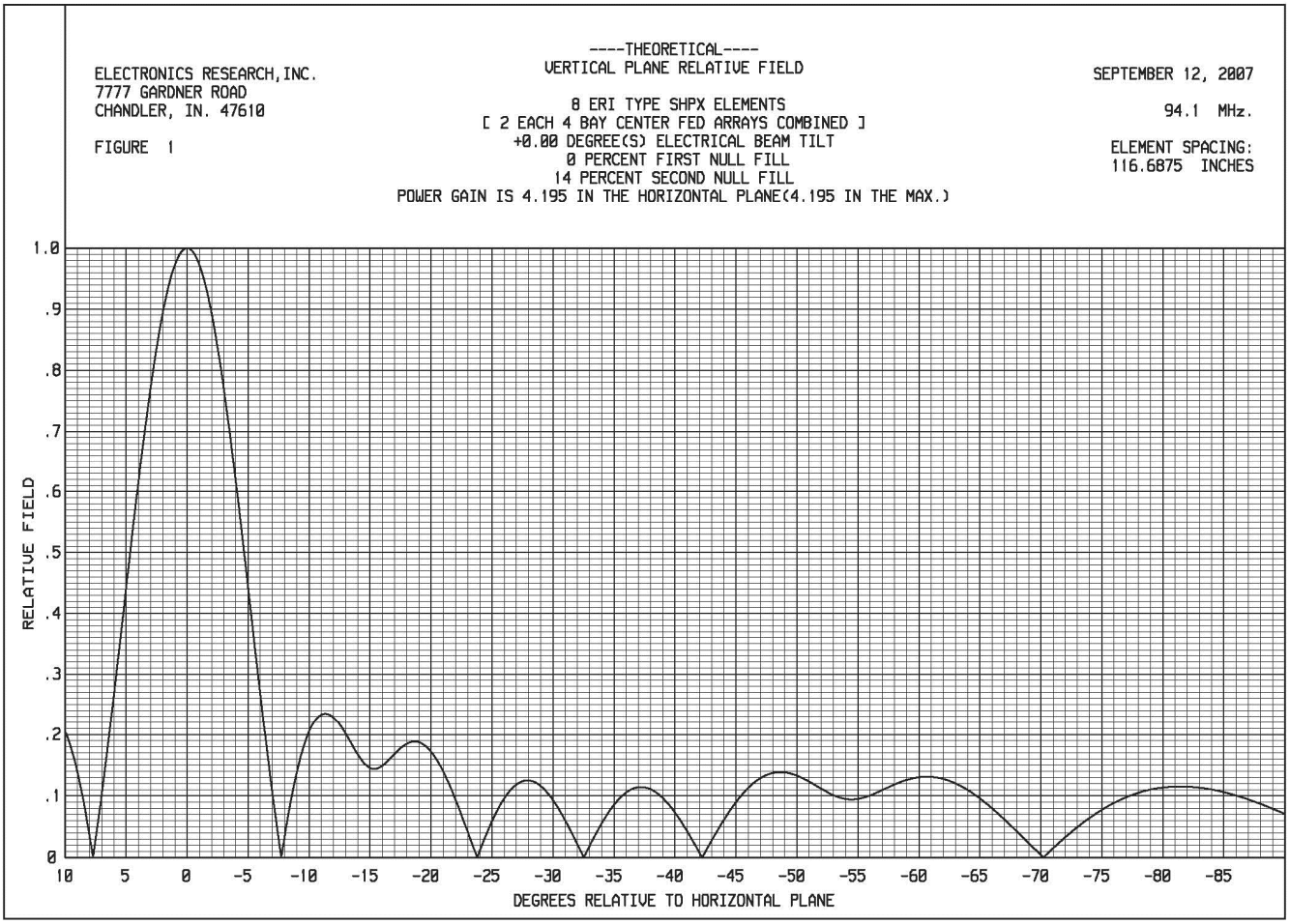

ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610
FIGURE 1
----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD
8 ERI TYPE SHPX ELEMENTS
[2 EACH 4 BAY CENTER FED ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
0 PERCENT FIRST NULL FILL
14 PERCENT SECOND NULL FILL
POWER GAIN IS 4.195 IN THE HORIZONTAL PLANE(4.195 IN THE MAX.)
SEPTEMBER 12, 2007
94.1 MHz.
ELEMENT SPACING:
116.6875 INCHES
RELATIVE FIELD
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
DEGREES RELATIVE TO HORIZONTAL PLANE

EXHIBIT A – 5

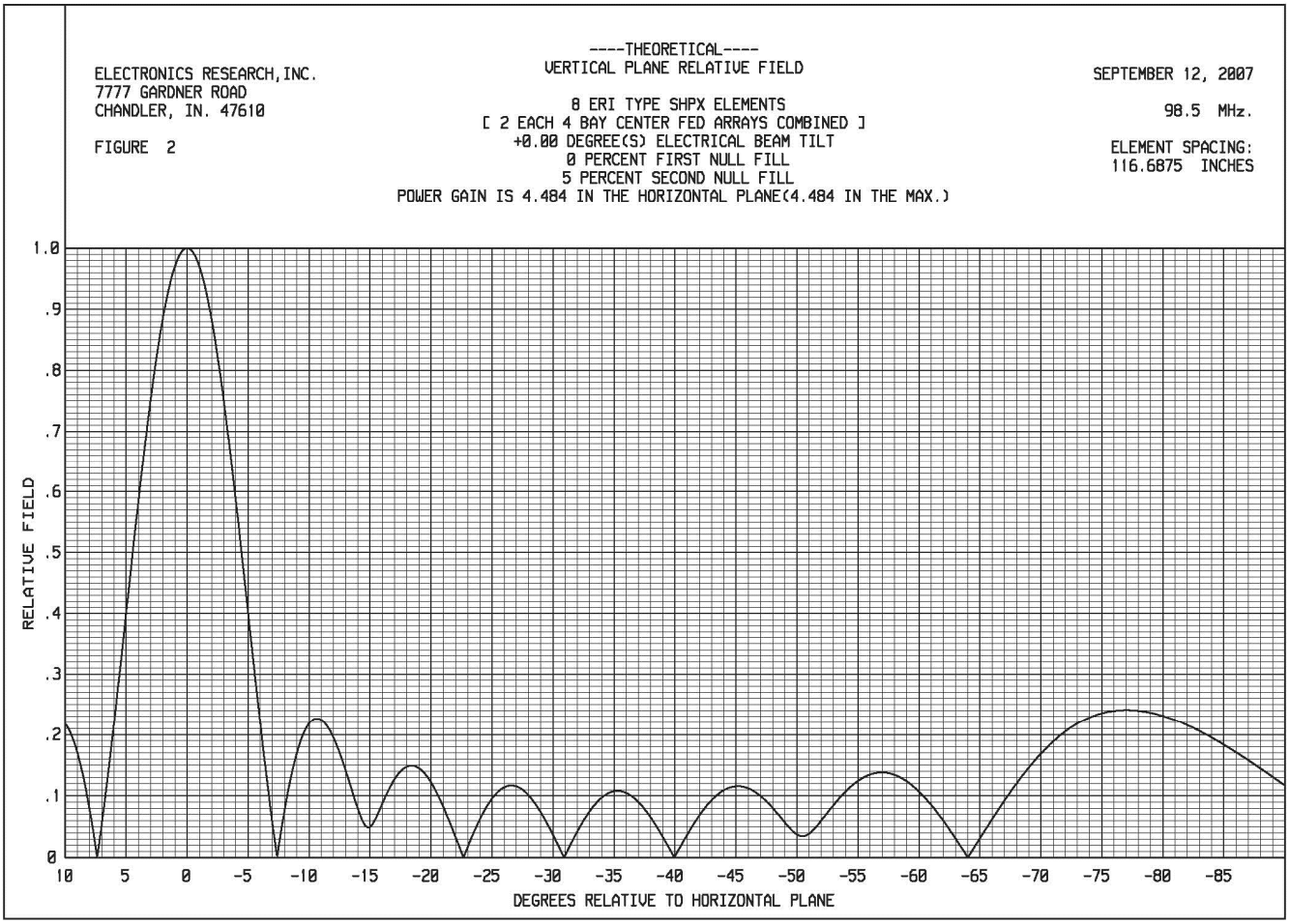
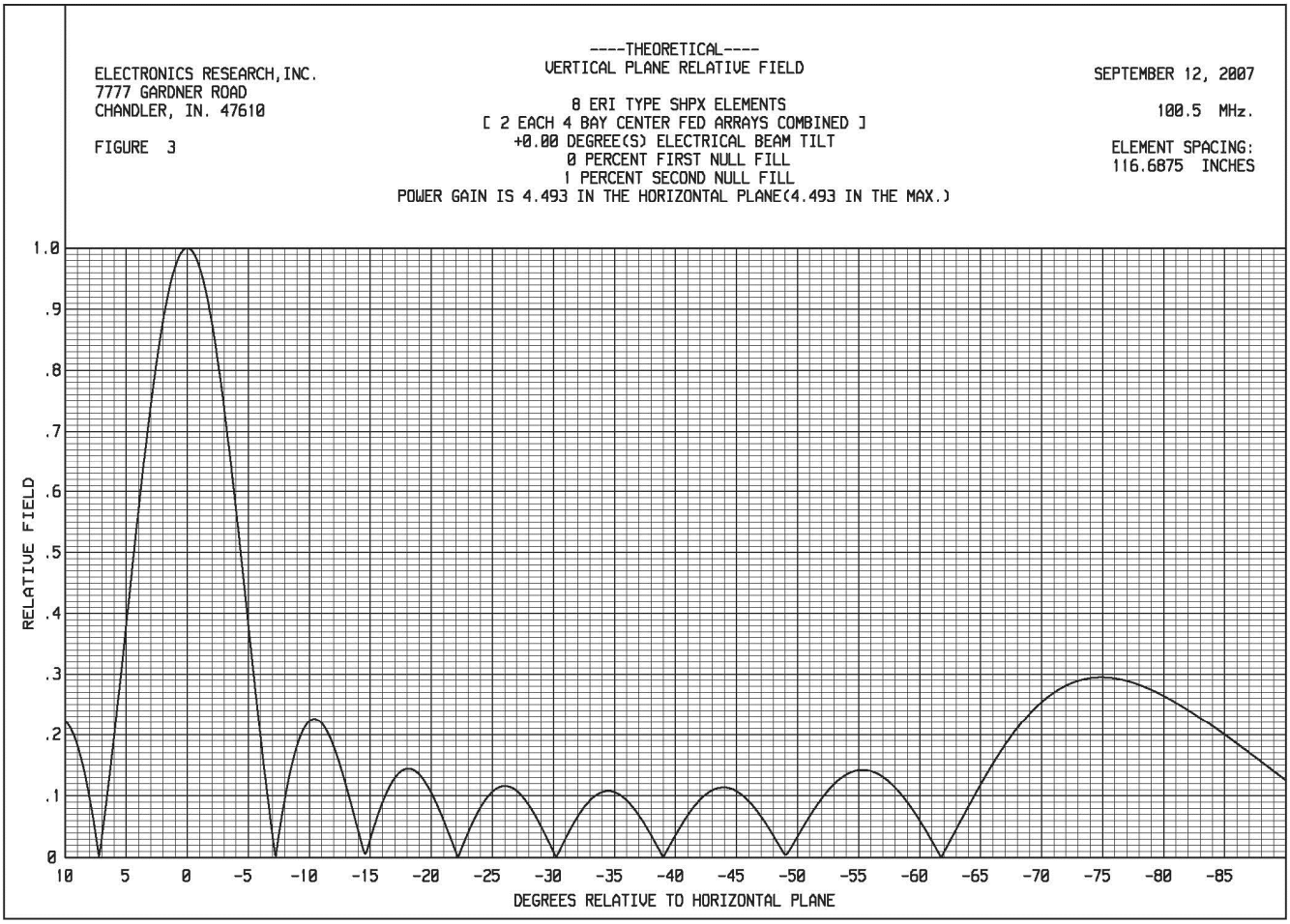
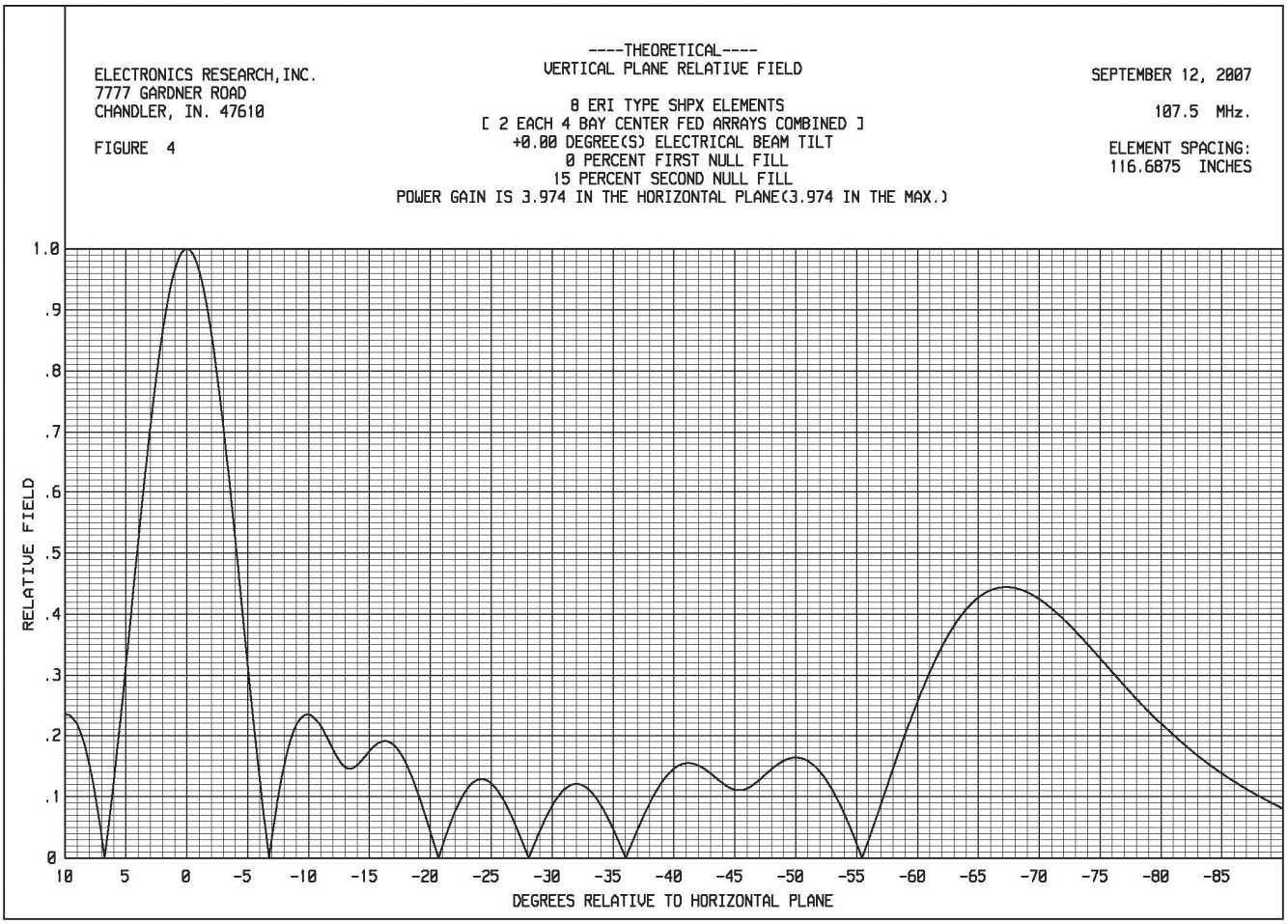
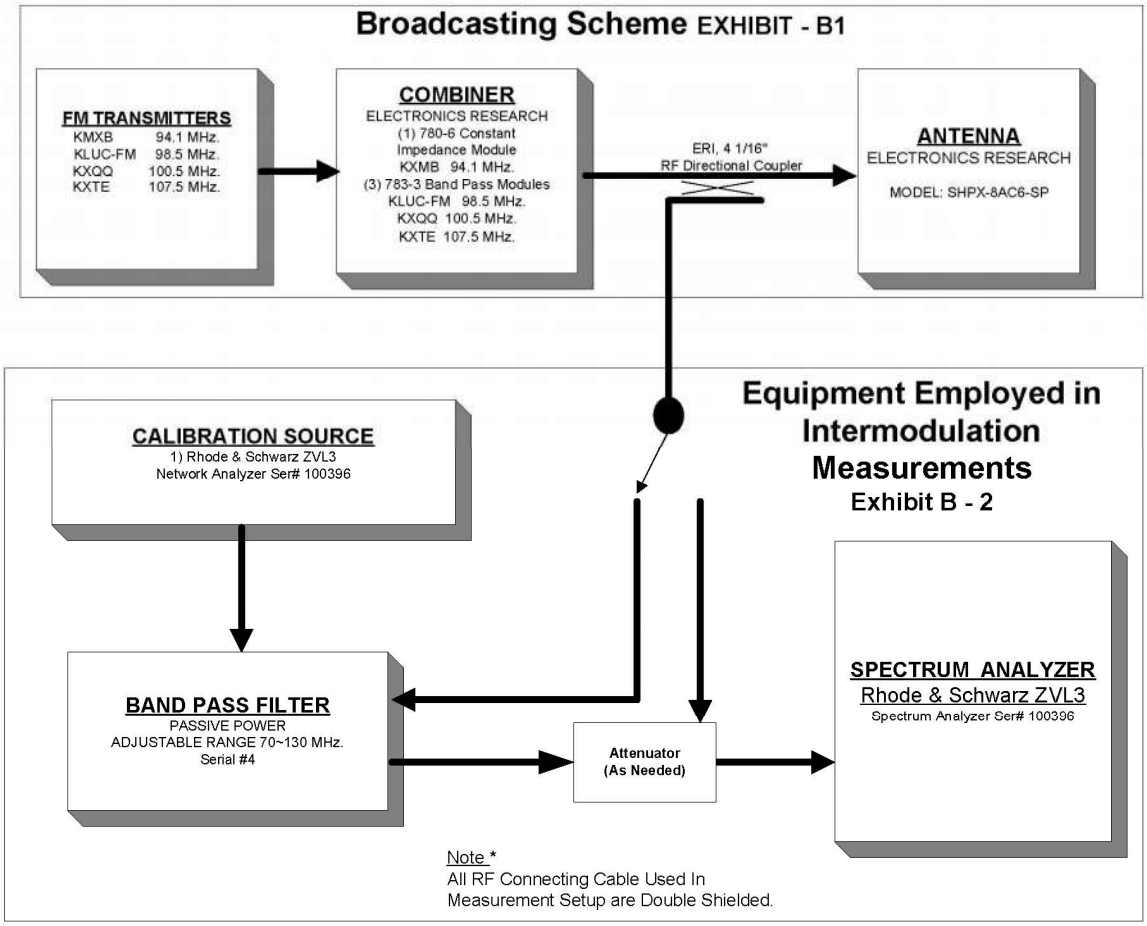

ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610
FIGURE 2
----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD
8 ERI TYPE SHPX ELEMENTS
[2 EACH 4 BAY CENTER FED ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
0 PERCENT FIRST NULL FILL
5 PERCENT SECOND NULL FILL
POWER GAIN IS 4.484 IN THE HORIZONTAL PLANE(4.484 IN THE MAX.)
SEPTEMBER 12, 2007
98.5 MHz.
ELEMENT SPACING:
116.6875 INCHES
RELATIVE FIELD
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
DEGREES RELATIVE TO HORIZONTAL PLANE

EXHIBIT A – 5


ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610
FIGURE 3
----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD
8 ERI TYPE SHPX ELEMENTS
[2 EACH 4 BAY CENTER FED ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
0 PERCENT FIRST NULL FILL
1 PERCENT SECOND NULL FILL
POWER GAIN IS 4.493 IN THE HORIZONTAL PLANE(4.493 IN THE MAX.)
SEPTEMBER 12, 2007
100.5 MHz.
ELEMENT SPACING:
116.6875 INCHES
RELATIVE FIELD
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
DEGREES RELATIVE TO HORIZONTAL PLANE


ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610
FIGURE 4
----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD
8 ERI TYPE SHPX ELEMENTS
[2 EACH 4 BAY CENTER FED ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
0 PERCENT FIRST NULL FILL
15 PERCENT SECOND NULL FILL
POWER GAIN IS 3.974 IN THE HORIZONTAL PLANE(3.974 IN THE MAX.)
SEPTEMBER 12, 2007
107.5 MHz.
ELEMENT SPACING:
116.6875 INCHES
RELATIVE FIELD
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
DEGREES RELATIVE TO HORIZONTAL PLANE



Broadcasting Scheme and Equipment Employed in Intermodulation Measurements

ELECTRONICS RESEARCH, INC. ERI

EXHIBIT B