PARKED TO ALL PARKED AND THE AND	READ INSTRUCTIONS CAREF		CC/US BANK	(	3	Approved by OMB	
(1) LOCKBOX #       SECTION A. PAYER INFORMATION         (2) PAYER NAME (if paying by credit and reff atms exactly is if appears eaths case)       (2) TOTAL LANOINT PAID (U.S. Dollars and crent)         (2) PAYER NAME (if paying by credit and reff atms exactly is if appears eaths case)       (2) TOTAL LANOINT PAID (U.S. Dollars and crent)         (2) PAYER NAME (if paying by credit and reff atms exactly is if appears eaths case)       (2) TOTAL LANOINT PAID (U.S. Dollars and crent)         (2) STREET ADDRESS LINE NO.2       (1) STREET ADDRESS LINE NO.2         (3) GUTY       (1) STREET ADDRESS LINE NO.2         (3) OUNTINE TELEPHONE NUMBER (include area code)       (10) COUNTRY CODE (if and in U.S. A.)         2004054797       IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 156-C)         (1) APPLICANT NAME       ISONOTEST EXECTION BELOW FOR EACH SERVICE, IF MORE BOAKS ARE INFERED, USE CONTINUATION SHEET         (1) APPLICANT NAME       (1) STREET ADDRESS LINE NO.3         (1) APPLICANT NAME       (2) STREET ADDRESS LINE NO.3         (1) APPLICANT NAME       (2) STREET ADDRESS LINE NO.3 <tr< th=""><th></th><th>REN</th><th>IITTANCE ADVICE FORM 159</th><th>ussion I 🖌 ,</th><th>4</th><th>3060-0589 Page No_1 of_2</th></tr<>		REN	IITTANCE ADVICE FORM 159	ussion I 🖌 ,	4	3060-0589 Page No_1 of_2	
979089         FOULTRENT ALL           (2) PAYER NAME (of paying by coadil card enter stame watery as it appears on the card)         (3) TOTAL AMOUNT PAID (U.S. Dollars and cents)           Lemman Senter PLLC         (3) TOTAL AMOUNT PAID (U.S. Dollars and cents)         (3) TOTAL AMOUNT PAID (U.S. Dollars and cents)           (4) STREET ADDRESS LINE NO. 2         (3) TOTAL AMOUNT PAID (U.S. Dollars and cents)         (3) TOTAL AMOUNT PAID (U.S. Dollars and cents)           (5) STREET ADDRESS LINE NO. 2         (6) CONE         (7) STATE         (7) STATE           (20) L STORESS LINE NO. 2         (8) CONTRY CODE (If sort in U.S.A.)         20036           (9) DAVTIME TELEPHONE NUMBER (networks are code)         (10) COUNTRY CODE (If sort in U.S.A.)         2004054797           (11) PAYER (PRN)         FOC RECISTRATION NUMBER (PRN) REQUIRED         (10) STATE         (10) STATE           (11) PAYER (PRN)         FOC RECISTRATION NUMBER (PRN) REQUIRED         (11) STATE         (12) STATE           (11) PAYER (PRN)         FOC RECISTRATION NUMBER (PRN) REQUIRED         (11) STATE         (13) APPLICANT NAME           COMPLETE SECTION RELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED (IS CONTINUATION SHEET         (13) STATE         (14) STATE           (14) FC CE VAY ANNAME         (12) COUNTRY CODE (Educt in U.S.A.)         (14) FC CE VAY ANNAME         (15) STATE           (13) APPLICANT NAME         (14) FC CE VAY ANNAME	(1) LOCKBOX #				SPECIAL HEPONEY	·	
OP PAYER NAME (if paying by credit card enter name easily as it appears on the easi)     (3) TOTAL AMOUNT PAID (U.S. Dollars and sensity       Lemman Senter PLLC     (3) TOTAL AMOUNT PAID (U.S. Dollars and sensity       (4) STREET ADDRESS LINE NO.1     (3) TOTAL AMOUNT PAID (U.S. Dollars and sensity       (3) STREET ADDRESS LINE NO.1     (4) STREET ADDRESS LINE NO.1       (10) COUNTRY TODE SECTION OF POX EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEETS (FORM 15A-C)       (11) PAYER (RRs)     (10) COUNTRY CODE (if not in U.S.A.)       202-429-8970     FCC REGISTRATION NUMBER (IRCURE)       (11) PAYER (RRs)     (12) FOC REGISTRATION NUMBER (IRCURE)       (11) PAYER (RRs)     (12) FOC REGISTRATION NUMBER (IRCURE)       (13) APRICARY NAME     (13) COUNTRY CODE (IF NO IN 15A-C)       (13) APRICARY NAME     (14) STREET ADDRESS LINE NO.1       (14) STREET ADDRESS LINE NO.1     (17) STATE       (15) APRICARY NAME     (18) ZP CODE       Bala CYNWYD     (19) ZP CODE       (19) APRICARY NAME     (19) ZP CODE       (10) APRICARY NAME     (20) COUNTRY CODE (If not in U.S.A.)       (10) APRICARY NAME     (20) COUNTRY CODE (If not in U.S.A.)       (10) APRICARY NAM	979089				FCC USE ONLY		
Lerman Senter PLLC       (1) OTAL AMOUNT PAD (0.5. Dollars and cents)         (4) STREET ADDRESS LINE NO.1       (2)         (2001 L STORESS LINE NO.1       (2)         (3) STREET ADDRESS LINE NO.2       (3)         Suite 400       (2)         (4) STREET ADDRESS LINE NO.2       (2)         (2) COUNTRY CODE (if one in U.S.A.)       (2)         (2) DAYTIME TELEPHONE NUMBER (include area code)       (10)         (10) PAYER (FRN)       (2)         (2) DAYTIME TELEPHONE NUMBER (include area code)       (2)         (10) PAYER (FRN)       (2)         (2) APPER (FRN)       (2)         (2) APPER (FRN)       (2)         (3) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.1       (2)         (10) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.1       (2)         (3) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.1       (2)         (13) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.1       (2)         (13) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.2       (2)         (3) APPER (FRN)       (2)         (4) STREET ADDRESS LINE NO.2       (2)         Suite 809       (2)	(2) PAYER NAME (if paying by open	SECT	ION A - PAYER INFORMAT	TION			
(4) STREET ADDRESS LINE NO.1       2001 L. STreet, NW         (5) STREET ADDRESS LINE NO.2       (10) STREET ADDRESS LINE NO.2         (6) CUTY       (10) COUNTRY CODE (if and in U.S.A.)         202-429-8970       (10) COUNTRY CODE (if and in U.S.A.)         (11) PAYER (FRN)       (10) COUNTRY CODE (if and in U.S.A.)         0004054797       IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEET S (FORM 159-C)         (10) APPLICANT NAME       (10) STREET ADDRESS LINE NO.1         (10) APPLICANT NAME       (11) SATATE         C10) APPLICANT NAME       (11) STATE         C10) AP	Lerman Senter PLLC	in our onto hance exactly as it app	cars on the card)	(3) TOTAL AM	OUNT PAID (U.S. Dollars an	d cents)	
2001 L STreet, NW         (3) STREET ADDRESS INE NO 2         Suite 400         (6) CITY         (6) CITY         (10) DAYTING TELEPHONE NUMBER (include area code)         (10) DAYTING TELEPHONE NUMBER (include area code)         (10) DAYTING TELEPHONE NUMBER (include area code)         (11) PATER (FRN)         0004054797         (11) APTER (FRN)         0004054797         (11) APTER (FRN)         0004054797         (11) APTER (FRN)         0004054797         (11) APTER (FRN)         (11) APTER (FRN)         (11) APTELER (FRN)         (11) APTER (FRN)         (12) STREET ADDRESS I INNE NO 1         (11) APTER (FRN)         (12) APTER (FRN)         (13) STREET (ADDRESS I INNE NO 2         Suite 800         (14) TE CLEP (APTER (FRN)         (15) STREET (ADDRESS I INNE NO 1         (16) GRO         (16) GRO         (16) GRO      <	(4) STREET A DDRESS LINE NO.1						
Contract Notices 100:002       Contract Notices 100:002         Suite 400       (0) CITY         Washington       DC         (0) CITY       20036         (0) APTIME TELEPHONE NUMBER (include area code)       (10) COUNTRY CODE (if not in U.S.A.)         202.422-9.8970       FCC REGISTRATION NUMBER (FRN) REQUIRED         (11) PAYER (FRN)       (12) FCC REGISTRATION NUMBER (FRN) REQUIRED         (10) APPLICANT NAME       FM MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)         (13) APPLICANT NAME       FM MORE ACCH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (14) STREET ADDRESS LINE NO.1       (17) STATE         401 E. City Avenue       (17) STATE         (16) CITY       (17) STATE         Suite 809       (10) STREET ADDRESS LINE NO.2         (16) CITY       (17) STATE         (17) APPLICANT PRIM       (18) ZIP CODE         Bala Cruwvd       (17) STATE         (19) APPLICANT REPERTIONE NUMBER (include area code)       (20) COUNTRY CODE (if not in U.S.A.)         (10) APPLICANT REPERTIES ESECTION CF OR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (13) APPLICANT REPERTIES ESECTION CF OR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (14) APPLICANT REPERTIES ESECTION CF OR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         <	2001 L STreet, NW						
(6) CITY       (7) STATE       (8) ZIP CODE         (9) DAYTIME TELEPHONE NUMBER (include area code)       (19) COUNTRY CODE (if not in U.S.A.)         202.429-8970       ECC REGISTRATION NUMBER (PRN) REQUIRED         (10) PAYER (FRN)       (20) FOCUSE ONLY         0000454797       (20) FOCUSE ONLY         (13) APPLICANT NAME       ETHORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)         (13) APPLICANT NAME       ETHEOREM LICE         (14) STREET ADDRESS LINE NO.1       (10) STATE         (14) STREET ADDRESS LINE NO.1       (12) FOCUSE ONLY         (15) STREET ADDRESS LINE NO.1       (12) STATE         (16) CITY       PA         Bala Cymwyd       (12) STATE         (13) APPLICANT (PRN)       (13) STREET ADDRESS LINE NO.2         Stuite 8009       (20) COUNTRY CODE (if not in U.S.A.)         (10) OD04434566       (20) COUNTRY CODE (if not in U.S.A.)         (14) APPLICANT (PRN)       (24) PAYMENT TYPE CODE         (23) ACIL SIGNOTHER ID       (24) PAYMENT TYPE CODE         (24) APPLICANT (PRN)       (24) PAYMENT TYPE CODE         (23A) CALL SIGNOTHER ID       (24A) PAYMENT TYPE CODE         (23A) CALL SIGNOTHER ID       (24A) PAYMENT TYPE CODE         (23B) CALL SIGNOTHER ID       (24B) PAYMENT TYPE CODE         (23B) CALL SIGNOTHER ID </td <td>Suite 400</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Suite 400						
UNDERSTITUE     DC     20036       (0) DAYTING TELEPHONE NUMBER (include area code)     (10) COUNTRY CODE (if not in U.S.A.)       (11) PAYER (FRN)     If PAGE USE ONLY       0004054797     If PAGE USE CONTINUATION SHEETS (FORM 159-C)       COMPLETE SECTION BLOW FOR EACH SERVICE. IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET       III) APPLICANT NAME       Entercom License, LLC       (10) STREET ADDRESS LINE NO.1       401 E. City Avenue       (13) STREET ADDRESS LINE NO.1       401 E. City Avenue       (13) STREET ADDRESS LINE NO.1       401 E. City Avenue       (13) STREET ADDRESS LINE NO.2       Suite 809       (14) STREET ADDRESS LINE NO.2       (15) DAYTINE TILEPHONE NUMBER (include area code)       (12) DAYTINE TILEPHONE NUMBER (include area code)       (12) SCOUNTRY CODE (if and in U.S.A.)       0004434966 //       (21) APPLICANT (FRN)       0004434966 //       (23) COLL SIGNOTHER ID       (CAN PEC CODE I       (23) COLL SIGNOTHER ID       (24) PAYMENT TYPE CODE       (23) COLL SIGNOTHER ID       (240) PAYMENT TYPE CODE       (235) COD<	(6) CITY	······································		(7) STATE	(8) ZIP CODE		
(10) COUNTRY CODE (if not in U.S.A.)  PCC REGISTRATION NUMBER (FRN) REQUIRED  (11) PAYER (FRN)  COMPLETE SECTION BELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET  Entercom License, LLC  (14) STREET ADDRESS LINE NO.1  401 E. City Avenue  (15) STREET ADDRESS LINE NO.2  Suite 809  (16) CITY Bala Cynwyd  (17) STATE  (18) ZIP CODE  (19) DAYTME TELEPHONE NUMBER (include are code)  (10) APPLICANT (FRN)  (20) COUNTRY CODE (if not in U.S.A.)  (21) APPLICANT (FRN)  (22) FOC USE ONLY  (23) COUNTRY CODE (if not in U.S.A.)  COMPLETE SECTION READ  (24) FOR USE ONLY  (25) FOC USE ONLY  (25) FOC USE ONLY  (26) FOC USE ONLY  (27) FOC USE ONLY  (27) TOTAL FEE  FOC USE ONLY  (28) FOC ODE I  (28) FOC CODE I  (28) FOC CODE I  (29) FOC CODE I  (29) FOC USE ONLY  (29) FOC USE ONLY	(9) DAYTIME TELEPHONE MENT	EP (include and other	<b>1</b>	DC	20036		
FCC REGISTRATION NUMBER (FRN) REQUIRED         (11) PAYER (FRN)         (12) FEGUSE ONLY         (13) APPLICANT NAME         Enterson License, LLC         (14) STREET ADDRESS LINE NO.1         (14) STREET ADDRESS LINE NO.1         (14) STREET ADDRESS LINE NO.1         (15) STREET ADDRESS LINE NO.1         (15) STREET ADDRESS LINE NO.1         (16) CTY         Bala Cynwyd         (17) STATE         (18) ZIP CODE         PA         (18) ZIP CODE         PA         (18) ZIP CODE         PA         (19) DAYTINE TELEPHONE NUMBER (Include area code)         (20) COUNTRY CODE (If to in U.S.A.)         (20) FCC CURE ONLY         (20) FCC CURE ONLY         (21) APULCANT (PRN)         (24) FCC CURE ONLY         (24) FCC CODE 1 </td <td>202-429-8970</td> <td>unciude area code)</td> <td>(10) COUNTRY</td> <td>Y CODE (if not in U.</td> <td>S.A.)</td> <td></td>	202-429-8970	unciude area code)	(10) COUNTRY	Y CODE (if not in U.	S.A.)		
(11) FATER (FRN)       [12] FOCUSE ONLY         0004054797       IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEET'S (FORM ISS.C)         (13) APPLICANT NAME       [13] APPLICANT NAME         Entercom License, LLC       [14] STREET ADDRESS LINE NO.1         (14) STREET ADDRESS LINE NO.1       [15] STREET ADDRESS LINE NO.2         Suite 809       [17] STATE         (16) CITY       [16] ZIP CODE         Bala Cynwyd       [17] STATE         (19) DAYTME TELEPHONE NUMBER (include area code)       [20] COUNTRY CODE (if not in U.S.A.)         610-660-5610       FCC REGISTRATION NUMBER (FRN) REQUIRED         (21) APPLICANT (FRN)       [22] FCCUSE ONLY         0004434866       [22] FCCUSE ONLY         COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (23A) CALL SIGNOTHER ID       [24A] PAYMENT TYPE CODE         (27A) CALL SIGNOTHER ID       [27A] TOTAL FEE         \$700.00       \$700.00         (28A) FCC CODE I       [25A] CCC LISE ONLY         6382       [27B] TOTAL FEE         \$805.00       [27B] TOTAL FEE		FCC REGIST	RATION NUMBER (FRN) R	EQUIRED			
OU04054797         IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C) COMPLETE SECTION BELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (13) APPLICANT NAME         Entercom License, LLC         (14) APPLICANT ADDRESS LINE NO.1         401 E. City Avenue         (13) STREET ADDRESS LINE NO.2         Suite 809         (13) STREET ADDRESS LINE NO.2         Suite 809         (13) APPLICANT MORE TELEPHONE NUMBER (include area code)         (20) COUNTRY CODE (of not in U.S.A.)         FOR 660-5610         FCC REGISTRATION NUMBER (FRW) REQUIRED         (21) APPLICANT (FRN)         (22) FCC USE ONLY         OMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (23A) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE       (25A) QUANTITY         MMR       1         (24A) FOR USE FOR (PTC)       (27A) TOTAL FEE       FCC USE ONLY         STOD.00         (24B) PAYMENT TYPE CODE       (25B) QUANTITY         (24B) PAYMENT TYPE CODE       (25B) QUANTITY <td co<="" td=""><td>(11) PAYER (FRN)</td><td></td><td>(12) FCC USE</td><td>ONLY</td><td></td><td></td></td>	<td>(11) PAYER (FRN)</td> <td></td> <td>(12) FCC USE</td> <td>ONLY</td> <td></td> <td></td>	(11) PAYER (FRN)		(12) FCC USE	ONLY		
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)         COMPLETE SECTION BELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (13) APPLICANT NAME         Entercom License, LLC         (14) STREET ADDRESS LINE NO.1         (15) STREET ADDRESS LINE NO.2         Suite 809         (17) STATE         (18) ZIP CODE         PA         Bala Cynwyd         (17) STATE         (18) ZIP CODE         PA         (19) OTKET ELEPHONE NUMBER (include area code)         (20) COUNTRY CODE (if not in U.S. A.)         GOMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (23A) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE         (25A) QUANTITY         MMR         1         (25A) QUANTITY         KMBZ         (27A) TOTAL FEE         STOD.00         \$\$700.00         \$\$25 ONLY         (24B) PAYMENT TYPE CODE         (25B)	0004054797				人名法 计多定名		
(13) APPLICANT NAME         Entercom License, LLC         (14) STREET ADDRESS LINE NO.1         401 E. City Avenue         (15) STREET ADDRESS LINE NO.2         Suite 809         (16) GTTY         (17) STREET ADDRESS LINE NO.1         200         (19) DAYTME TELEPHONE NUMBER (include area code)         (10) DAYTME TELEPHONE NUMBER (include area code)         (20) COUNTRY CODE (if not in U.S.A.)         FCC REGISTRATION NUMBER (FRN) ERQUIRED         (21) APPLICANT (FRN)         0004434866         COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SILET         (23A) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE         (27A) COLL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE         (25A) CC CODE 1         (26A) FED DUE FOR (PTC)         (27B) CALL SIGN/OTHER ID         (24B) PAYMENT TYPE CODE         (25B) CALL SIGN/OTHER ID         (24B) PAYMENT TYPE CODE         (25B) CODE 1         (26A) FED DUE FOR (PTC)         (27B) TOTAL FEE         Storie         (26B) FEE DUE FOR (PTC)         (27B) TOTAL FEE         Storie         (26B) FEE DUE FOR (PTC)         (27B) TOTAL FEE	COMPLETE SE	IF MORE THAN ONE APPLI CTION BELOW FOR EACH SE	CANT, USE CONTINUATIO	N SHEETS (FORM	(159-C)		
EnterCom License, LLC         (1) STREET ADDRESS LINE NO.1         401 E. City Avenue         (15) STREET ADDRESS LINE NO.2         Suite 809         (16) CITY         Bala Cvnwyd         (19) DAYTME TELEPHONE NUMBER (include area code)         (20) COUNTRY CODE (if not in U.S.A.)         610-660-5610         FCC REGISTRATION NUMBER (RN) REQUIRED         (21) APPLICANT (FRN)         0004434866         COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (23A) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE         (25A) QUANTITY         KMBZ         MMR         1         (26A) FEE DUE FOR (PTC)         (27A) TOTAL FEE         \$700.00         (28A) FEE DUE FOR (PTC)         (27B) CALL SIGN/OTHER ID         (24B) PAYMENT TYPE CODE         (25B) QUANTITY         1         (26B) FEE DUE FOR (PTC)         (27B) CALL SIGN/OTHER ID         (24B) PAYMENT TYPE CODE         (25B) QUANTITY         (26B) FEE DUE FOR (PTC)         (27B) TOTAL FEE         \$805.00         (28B) FEE DUE FOR (PTC)         (27B) TOTAL FEE	(13) APPLICANT NAME			RENEEDED, USE	CONTINUATION SHEET		
(1) STREET ADDRESS LINE NO.1         (1) E. City Avenue         (1) STREET ADDRESS LINE NO.2         Suite 809         (1) COUNTRY         Bala Cvnwvd         (19) DAYTIME TELEPHONE NUMBER (include area code)         (10) GEO         (19) DAYTIME TELEPHONE NUMBER (include area code)         (10) GEO         (10) APPLICANT(FRN)         (20) APPLICANT(FRN)         (21) APPLICANT(FRN)         (23A) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE         (23A) CALL SIGN/OTHER ID         (24A) FEE DUE FOR (PTC)         (27A) TOTAL FEE         \$700.00         (29A) FCC CODE I         (23B) CALL SIGN/OTHER ID         (24B) PAYMENT TYPE CODE         (29A) FCC CODE I         (28A) FCC CODE I         (28B) CC CODE I         (28B) FCC CODE I <t< td=""><td>Cittercom License, LLC</td><td>1</td><td></td><td></td><td></td><td></td></t<>	Cittercom License, LLC	1					
(15) STREET ADDRESS LINE NO. 2         Suite 809         (16) CTTY         Bala Cvnwyd       (17) STATE         (19) DAYTIME TELEPHONE NUMBER (include area code)       (20) COUNTRY CODE (if not in U.S.A.)         610-660-5610       (20) COUNTRY CODE (if not in U.S.A.)         (21) APPLICANT(FRN)       (22) FCC USE ONLY         0004434866       (24A) PPLICANT(FRN)         (23A) CALL SIGN/OTHER ID       (24A) PAYMENT TYPE CODE         (23A) CALL SIGN/OTHER ID       (24A) PAYMENT TYPE CODE         (25A) FCC CODE I       (27A) TOTAL FEE         \$700.00       \$700.00         (25B) QUANTITY       1         (25B) QUANTITY       1         (25B) CODE I       (27A) TOTAL FEE         \$700.00       \$700.00         (25B) QUANTITY       1         (25B) QUANTITY       1         (25B) QUANTITY       1         (26A) FEE DUE FOR (PTC)       (27B) TOTAL FEE         \$805.00       (25B) QUANTITY         MOR       1         (26B) FCC CODE I       (29B) FCC CODE 2         (28B) FCC CODE I	401 E. City Avenue					· · · · · · · · · · · · · · · · · · ·	
Suite 809       (17) STATE       (18) ZIP CODE         (16) CITY       (17) STATE       (18) ZIP CODE         Bala Cynwyd       (17) STATE       (18) ZIP CODE         (19) DAYTIME TELEPHONE NUMBER (include area code)       (20) COUNTRY CODE (if not in U.S.A.)         610-660-5610       FCC REGISTRATION NUMBER (FRN) REQUIRED         (21) APPLICANT (FRN)       (22) FCC USE ONLY         0004434866       (23) CALL SIGN/OTHER ID         (24A) PAYMENT TYPE CODE       (25A) QUANTITY         KMBZ       MMR         1       (26A) FEE DUE FOR (PTC)         \$700.00       \$700.00         (23A) FCC CODE 1       (24B) PAYMENT TYPE CODE         G382       (24B) PAYMENT TYPE CODE         MOR       1         (26B) FEE DUE FOR (PTC)       (27B) TOTAL FEE         (27B) TOTAL FEE       \$805.00         (28B) FCC CODE 1       (27B) TOTAL FEE         \$805.00       \$805.00         (28B) FCC CODE 1       (29B) FCC CODE 2         6382	(15) STREET ADDRESS LINE NO. 2						
(10) CITY       (17) STATE       (18) ZIP CODE         PA       19004         (19) DAYTIME TELEPHONE NUMBER (include area code)       (20) COUNTRY CODE (if not in U.S.A.)         610-660-5610       FCC REGISTRATION NUMBER (FRN) REQUIRED         (21) APPLICANT (FRN)       (22) FCC USE ONLY         0004434866       (22) FCC USE ONLY         COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET         (23A) CALL SIGN/OTHER ID       (24A) PAYMENT TYPE CODE         (27A) TOTAL FEE       (25A) QUANTITY         KMBZ       MMR         1       (26A) FEE DUE FOR (PTC)         (27A) TOTAL FEE       FCC USE ONLY         (28A) FCC CODE 1       (24B) PAYMENT TYPE CODE         (33B) CALL SIGN/OTHER ID       (24B) PAYMENT TYPE CODE         (28A) FCC CODE 1       (29A) FCC CODE 2         (33B) CALL SIGN/OTHER ID       (24B) PAYMENT TYPE CODE	Suite 809						
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610-660-5610       FCC REGISTRATION NUMBER (FRN) REQUIRED       (21) APPLICANT(FRN)       (22) FCC USE ONLY       0004434866       (23A) CALL SIGN/OTHER ID       (24A) PAYMENT TYPE CODE       (25A) QUANTITY       MMR       (25A) QUANTITY       KMBZ       (27A) TOTAL FEE       FCC USE ONLY       (25A) QUANTITY       (25A) QUANTITY       (25A) FCC CODE 1       (25A) FCC CODE 1       (25A) FCC CODE 1       (25B) PCC CODE 1       (25B) PCC CODE 1       (25B) FCC CODE 1	(19) DAYTIME TELEPHONE NUMBI	ER (include area code)	(20) COUNTRY	CODE (if not in U.S.	19004		
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Interf     1       (26B) FEE DUE FOR (PTC)     (27B) TOTAL FEE     FCC USE ONLY       \$805.00     \$805.00     FCC USE ONLY       (28B) FCC CODE I     (29B) FCC CODE 2     6382       SECTION D - CERTIFICATION       CERTIFICATION STATEMENT       L	KMBZ         (26A) FEE DUE FOR (PTC)           \$700.00         (28A) FCC CODE I           6382         (23B) CALL SIGN/OTHER ID						
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SEE PUBLIC BURDEN ON REVERSE

FCC FORM 159

FEBRUARY 2003

## Plastic Card Sale Transaction

#### Thank you.

Your transaction has been successfully completed.

**Plastic Card Sale Confirmation** 

Transaction Information

Agency Application Name: U.S. Bank Lockbox for Federal Communications Commission (FCC) Pay.gov Tracking ID: 266IENU9 Agency Tracking ID: 75382611909 Account Holder Name: UNKNOWN Transaction Type: Plastic Card Sale Billing Address: 1005 C **Billing Address 2:** City: State/Province: **ZIP/Postal Code:** Country: USA Email: Phone: Card Type: AmericanExpress Plastic Card Number: \*\*\*\*\*\*\*\*1004 Payment Amount: \$1,505.00 Current Date and Time: 12/14/2017 08:19 EST Order ID: **Order Tax Amount:** Level 3 Data: Agency Memo: Note: Please avoid navigating the site using your browser's Back Button - this may lead to incomplete data being transmitted and pages being loaded incorrectly. Please use the links provided whenever possible.

Federal Communications Commission Washington, D. C. 20554

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Approved by OMB 3060-0627 Expires 01/31/98

FOR FCC USE ONLY

FOR COMMISSION USE ONLY

FILE NO. AA

BMML-20171214ABL

## FCC 302-AM

## **APPLICATION FOR AM**

**BROADCAST STATION LICENSE** 

(Please read instructions before filling out form.

SECTION I - APPLICANT FEE INFORMATION		************	
1. PAYOR NAME (Last, First, Middle Initial)			
Entercom License, LLC		- 	
MAILING ADDRESS (Line 1) (Maximum 35 characters) 401 E. City Avenue, Suite 809			
MAILING ADDRESS (Line 2) (Maximum 35 characters)			
CITY Bala Cynwyd	STATE OR COUNTRY (if fo	reign address)	ZIP CODE 19004
TELEPHONE NUMBER (include area code) 610-660-5610	CALL LETTERS KMBZ	OTHER FCC IDE 6382	NTIFIER (If applicable)
2. A. Is a fee submitted with this application?		I	✓ Yes No
B. If No, indicate reason for fee exemption (see 47 C.F.R. Section	· · · · ·		
Governmental Entity Noncommercial educ	cational licensee	ther (Please explain	):
C. If Yes, provide the following information:			
Enter in Column (A) the correct Fee Type Code for the service you a Fee Filing Guide." Column (B) lists the Fee Multiple applicable for thi	are applying for. Fee Type Co is application. Enter fee amou	odes may be found i nt due in Column (C	n the "Mass Media Services ).
(A) (B)	(C)		
FEE TYPE FEE MULTIPLE	FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	Ē	FOR FCC USE ONLY
M M R 0 0 1	\$ 700.00		
To be used only when you are requesting concurrent actions which res	sult in a requirement to list mor	e than one Fee Type	e Code.
(A) (B) MOR 0001	(C) \$ 805.00		FOR FCC USE ONLY
	L		
ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED	TOTAL AMOUNT REMITTED WITH TH APPLICATION \$ 1505.00	IS	FOR FCC USE ONLY
KEMITANCE.	1	I I	I

SECTION IL ADDU CAN				
1. NAME OF APPLICANT				
MAILING ADDRESS 401 E. City Avenue, Suite 8	09			
CITY Bala Cynwyd		STATE PA		ZIP CODE 19004
2. This application is for:	Commercial	Noncomr	nercial	
	AM Direc		Ion-Directional	
Call letters KMBZ	Community of License Kansas City, MO	Construction Permit File No. BP-20140729ACZ	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit 01/14/2018
3. Is the station n accordance with 47 C.F	ow operating pursuant .R. Section 73,1620?	to automatic program	test authority in	Yes 🗸 No
lf No, explain in an Exhi	bit.			Exhibit No. 1
4. Have all the terms construction permit been	s, conditions, and oblig n fully met?	ations set forth in the	above described	Yes No
If No, state exceptions in	n an Exhibit.			Exhibit No.
5. Apart from the change the grant of the under representation contained	ges already reported, has ying construction permit d in the construction perm	s any cause or circumsta which would result in a nit application to be now	ance arisen since any statement or incorrect?	Yes 🗸 No
If Yes, explain in an Exl	nibit.		•	Exhibit No.
6. Has the permittee file certification in accordance	ed its Ownership Report i ce with 47 C.F.R. Section	(FCC Form 323) or owne 73.3615(b)?	ership	✓ Yes No
If No, explain in an Exhib	bit.			Exhibit No.
7. Has an adverse findi or administrative body w criminal proceeding, bro felony; mass media re another governmental ur	ng been made or an adv ith respect to the applica ught under the provisions lated antitrust or unfair nit; or discrimination?	erse final action been ta nt or parties to the applic s of any law relating to th competition; frauduler	ken by any court cation in a civil or ne following: any nt statements to	Yes 🗸 No
If the answer is Yes, at involved, including an ide (by dates and file numb information has been e required by 47 U.S.C. Se of that previous submiss the call letters of the sta was filed, and the date of	ttach as an Exhibit a ful entification of the court of pers), and the disposition earlier disclosed in com- ection 1.65(c), the applica- tion by reference to the f ation regarding which the f filing; and (ii) the dispos	I disclosure of the pers r administrative body an n of the litigation. Wh nection with another a ant need only provide: (i) ile number in the case of application or Section ition of the previously rep	ons and matters d the proceeding ere the requisite pplication or as ) an identification of an application, 1.65 information ported matter.	Exhibit No.

FCC 302-AM (Page 2) August 1995

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\* \*

8. Does the applicant, or any party to the application, have a petition on file to migrate to the expanded band (1605-1705 kHz) or a permit or license either in the existing band or expanded band that is held in combination (pursuant to the 5 year holding period allowed) with the AM facility proposed to be modified herein?

If Yes, provide particulars as an Exhibit.

The APPLICANT hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because use of the same, whether by license or otherwise, and requests and authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended).

The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

#### CERTIFICATION

1. By checking Yes, the applicant certifies, that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. Section 1.2002(b).

2. I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Name	Signature	1
Andrew P. Sutor, IV	Al XIN	1
Title Executive Vice President	Date	Telephone Number 610-660-5610
	140117	

#### WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

Yes No

Exhibit No.

No Yes

SECTION III	- LICENSE APPLICATION ENGINEERING DAT	Α			
	icant				
Entercom	License, LLC				
PURPOSE OF	F AUTHORIZATION APPLIED FOR: (check one)				
×	Station License Direct Me	easurement of Power			
1. Facilities a	uthorized in construction permit				
Call Sign	File No. of Construction Permit Frequency	Hours of Operation	Power in kilowatts		
KMBZ	(if applicable)(kHz)BP-20140729ACZ980	Unlimited	Night Day 5.0 9.0		
2. Station loca	ation				
State		City or Town			
Missou	ıri	Kansas City			
3. Transmitter	rlocation				
State	County	City or Town	Street address		
MO	Jackson	Kansas City	6775 E. Coal Mine Road		
4. Main studio	olocation				
State	County	City or Town	Street address		
KS	Johnson	Mission	7000 Squibb Road		
5. Remote col	ntrol point location (specify only if authorized direction	onal antenna)			
State	County	City or Town	Street address		
KS	Johnson	Mission	7000 Squibb Road		
<ol> <li>6. Has type-ap</li> <li>7. Does the sa</li> </ol>	pproved stereo generating equipment been installed ampling system meet the requirements of 47 C.F.R.	? Section 73.68?	Yes X No		
			Not Applicable		
Attach as an	Attach as an Exhibit a detailed description of the sampling system as installed.				

See Engineering Report

5

\*

8. Operating constants:						-		
RF common point or antenna modulation for night system	F common point or antenna current (in amperes) without odulation for night system				RF common point or antenna current (in amperes) without modulation for day system			
	10.2				5			
Measured antenna or commo operating frequency	on point resistance (in	ohms) at	Measured ante	enna or common j Jency	point reactance (ir	ohms) at		
Night	Day		Night		Day			
52	171		-j8.5		+j320			
Antenna indications for direc	tional operation		-					
Towers	Antenna monitor Phase reading(s) in degrees		Antenna moi current i	Antenna monitor sample current ratio(s)		se currents		
	Night	Day	Night	Day	Night	Day		
1 (1034741)	0		1.0					
2 (1034739)	+26.0		0.376					
3 (1242370)	+44.1		0.520					
Manufacturer and type of ant	enna monitor: Poto	mac Instrum	nents AM-190	1				

#### **SECTION III - Page 2**

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9. Description of antenna system ((f directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator (5) Uniform cross-section guyed towers	Overall height in meters of radiator above base insulator, or above base, if grounded. 98.6	Overall height in meters above ground (without obstruction lighting) As shown in ASR	Overall height in meters above ground (include obstruction lighting) As shown in ASB	If antenna is either top loaded or sectionalized, describe fully in an Exhibit. Exhibit No.
Excitation	X Series	Shunt		N/A

Geographic coordinates to nearest second. For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North Latitude	39 <sup>°</sup>	2	25"	West Longitude	94	30	30
A				1			

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits.

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and

Exhibit No. Eng Rpt Exhibit No. Eng Rpt

10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

N/A

dimensions of ground system.

11. Give reasons for the change in antenna or common point resistance.

I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

Name (Please Print or Type) Thomas S. Gorton	Signatore (check appropriate box below)
Address (include ZIP Code)	Date
Hatfield & Dawson Consulting Engineers	October 24, 2017
Seattle WA 98103-3012	Telephone No. (Include Area Code)
	206-783-9151

Technical Director		x	Registered Professional Engineer	
Chief Operator			Technical Consultant	

FCC 302-AM (Page 5) August 1995

Other (specify)

Exhibit 1 FCC Form 302-AM November 2017

In response to Section II, Question 3, Applicant answered "No" as to whether the station is currently operating pursuant to automatic test authority in accordance with 47 C.F.R. § 73.1620. This application seeks to cover construction permit BP-20140729ACZ. The station is currently operating in accordance with § 73.1615. Program test authority is hereby requested.

ORIGINAL

-S LERMAN SENTER PLLC

1. X. X.

WASHINGTON. DC

LAURA M. BERMAN 202.416.6792 LBERMAN@LERMANSENTER.COM

December 12, 2017

#### VIA OVERNIGHT DELIVERY

Federal Communications Commission c/o U.S. Bank SL-MO-C2-GL 1005 Convention Plaza St. Louis, MO 63101 Attn: FCC Government Lockbox #979089

## Re: Application for License (FCC Form 302-AM); KMBZ(AM), Kansas City, MO (Facility ID No. 6382)

Dear Sir or Madam:

Enclosed are an original and two copies of an application on FCC Form 302-AM for Station KMBZ(AM), Kansas City, Missouri (Facility ID No. 6382). Also enclosed is a completed FCC Form 159 providing for the payment of the applicable license application filing fee of \$1,505.00.

Please date-stamp the enclosed "Return Copy" of this filing and return it in the selfaddressed, stamped envelope enclosed for that purpose.

If you have any questions, please contact me.

Respectfully submitted,

Laura M. Berman Counsel to Entercom License, LLC

Enclosures

2001 L Street NW. Suite 400 | Washington, DC 20036 Tel 202.429.8970 | Fax 202.293.7783 | WWW.Lermansenter.com



-----Please fold or cut in half------

SENDER'S RE Airbill#: To(Company): Federal Com Attn: FCC Go SL-MO-C2-G SAINT LOUI: United State Attention To: Phone#: Sent By: Phone#:	CEIPT 1Z0931F8NT97003430 munications Commission ov't Lockbox #979089 6L, 1005 Convention Plaza S,MO 63101 ss c/o U.S. Bank (202) 416-6792 Laura M. Berman 2024298970	Rate Estimate: Protection: Protection: Description: Weight: Dimensions: Ship Ref1: Ship Ref2: Service Level: Special Service: COD Amount:	40.91 Amount: \$ Value: \$ 0.00 (inclusive of all pkgs) 1 0 x0 x 0 LMB/2245.0001 Next Day Air
		Payment Options	S.
Date Printed:	2017-12-12	Bill Snipment To:	Sender
Ship Date:	2017-12-12	Bill To Account:	0931F8

UPS Signature (optional)

Route\_\_\_\_ Date\_\_\_\_ Time

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THOMAS M. ECKELS, PE Stephen S. Lockwood, PE David J. Pinion, PE Erik C. Swanson, PE

THOMAS S. GORTON, PE MICHAEL H. MEHIGAN, PE

JAMES B. HATFIELD, PE BENJAMIN F. DAWSON III, PE CONSULTANTS

PM ≫ 12

2017 DEC 19

## HATFIELD & DAWSON CONSULTING ELECTRICAL ENGINEERS 9500 GREENWOOD AVE. N. SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151 FACSIMILE (206) 789-9834 E-MAIL hatdaw@hatdaw.com

> MAURY L. HATFIELD, PE (1942-2009) PAUL W. LEONARD, PE (1925-2011)

## Application for License to Cover Construction Permit

#### and

## Method of Moments Proof of Performance

KMBZ(AM) Kansas City, Missouri Facility ID 6382

980 kHz

9 kW Day, 5 kW Night DA-N

Entercom License, LLC

October 2017

# APPLICATION FOR LICENSE RADIO STATION KMBZ(AM) Kansas City, MO 980 kHz 9 kW Day, 5 kW Night DA-N

## Purpose of Application

Item 1	Analysis of Tower Impedance Measurements to Verify Method of Moments Model
Item 2	Method of Moments Model Details for Towers Driven Individually
Item 3	Method of Moments Model Details for Directional Antenna Patterns
Item 4	Derivation of Operating Parameters for Directional Antenna
Item 5	Post Construction Array Geometry Statement
Item 6	Sampling System Measurements
Item 7	Reference Field Strength Measurements
Item 8	Direct Measurement of Power
Appendix A	KMBZ Construction Permit
Appendix B	FCC Form 302-AM

#### **Purpose of Application**

This engineering exhibit supports an application by Entercom License, LLC for a license to cover Construction Permit BP-20140729ACZ for radio station KMBZ(AM) Kansas City, MO. (Facility ID 6382). KMBZ currently operates unlimited time on 980 kHz with a power of 5 kW using a directional antenna for nighttime operation. The construction permit authorizes relocation of KMBZ to the five tower antenna array of KCCV(AM), 760 kHz, Overland Park, KS. KMBZ will operate at a power of 9 kW daytime using a non-directional antenna, and 5 kW nighttime using three of the five KCCV towers for directional night operation (DA-N).

Information is provided herein demonstrating that the directional antenna parameters for the pattern authorized by the construction permit have been determined in accordance with the requirements of section §73.151(c) of the FCC Rules. The system has been adjusted to produce antenna monitor parameters within +/- 5 percent in ratio and +/- 3 degrees in phase of the modeled values, as required by the Rules.

All measurements contained in this report were made by the undersigned engineer, with the exception of the Reference Point field strength measurements which were taken by KMBZ engineer Ken Wolf.

#### Item 1

## Analysis of Tower Impedance Measurements to Verify Method of Moments Model - KMBZ

Tower base impedance measurements were made at the locations of the sample system current transformers using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The other towers were open circuited at the same point where impedance measurements were made (the "reference points") for each of the measurements. The reference point measurements are listed in the table below.

Tower	Measured R	Measured X		
1	216.4	309.6		
· 2	261.6	294.7		
3	199.4	292.3		
4	243.4	313.7		
5	156.8	296.0		

#### KMBZ Measured "Reference Point" Impedances

Circuit calculations were performed to relate the method of moments modeled impedances at the tower base feed points to those at the measurement locations as shown in the diagram titled *Analysis of Tower Impedance Measurements to Verify Method of Moments Model*. The series/parallel equivalent impedance of  $X_{IC}$ ,  $X_{LC}$ ,  $X_{S}$  and  $X_{C}$  was used in the moment method model as a load at ground level (lumped load) for the open circuited towers.

#### Item 2

#### Method of Moments Model Details for Towers Driven Individually - KMBZ

The array of towers was modeled using Expert MININEC Broadcast Professional Version 14.0. One wire was used to represent each tower. The top and bottom wire end points were specified using electrical degrees in the geographic coordinate system, using the theoretical directional antenna specifications for tower spacing and orientation. Each tower was modeled using 19 wire segments. As the tallest tower in the KMBZ model is 128.5 electrical degrees in height, the maximum segment length is 6.8 electrical degrees.

Each tower's modeled height relative to its physical height falls within the required range of 75 to 125 percent of the actual tower height. The array consists of five uniform cross section towers having face widths of 18 inches. Towers 3 and 4 both have an STL antenna and associated isolation circuits.

Tower	Physical Height (Degrees)	Modeled Height (degrees)	Modeled Height (percent)	Modeled Radius (meters)	Modeled Radius (percent)
1	116.1	126.8	109.2	.22	100
2	116.1	128.5	110.7	.26	118.2
3	116.1	123.2	106.1	.22	100
4	116.1	124.2	107.0	.22	100
5	116.1	121.4	104.6	.19	86.4

**KMBZ Tower Dimensions - Physical and Modeled** 

Tower	Wire Number	Base Node Number		
1	1	1		
2	2	20		
3	3	39		
4	4	58		
5	5	77		

#### KMBZ MININEC Model Node and Wire Numbering

Towers 3 and 4 each have an STL receive antenna mounted near the top of the tower (one for KMBZ, the other for KCCV), with an isocoupler across the base insulator, although the two stations use different isocoupler types. The impedance values used for these isocouplers in the model were obtained from the manufacturer. The tower numbering scheme used is the same as that used by KCCV. KMBZ will operate daytime from tower 4, with tower 3 also equipped for non-directional operation. The nighttime directional antenna will consist of towers 2, 3, and 4. Towers 1 and 5 are not used by KMBZ, and are detuned by an inductor to ground at the tower base.

There have been no changes made to the ground system, the data on file remains accurate.

The following pages show the details of the method of moments model.

## KMBZ Tower 1 Driven, Other Towers Open Circuit at Current Transformer Location

GEOME	TRY										
Wire	coord	inates	in deg	rees;	other	dimer	sion	s in met	ers		
Envir	onment	: perf	ect gr	ound							
wiro	0200	Dieton	00	Angle		77			44.00		
wile 1	none	174.1	ice	298 -		0		2	2	sec 1	js a
		174.1		298.		126	. 8	* 60	-	. н.	
2	none	0		0		0		.2	6	1	9
		0		0		128	.5				
3	none	174.1		118.		0	~	.2	2	19	9
л	0000	175 1		118.		123	.2	2	2	1 (	<b>`</b>
7	none	175.1		73.4		124	2	. 2	2	1:	2
5	none	338.9		73.4		0		.1	9	19	)
		338.9		73.4		121	.4				
	-			_							
Numbe	r of v	vires	waalaa	= 5	-						
		urrent	nodes	- 9:							· ·
				minim	1m			ma	ximum		
Indiv:	idual	wires	W:	ire	value	:		wire	value		
segmei	nt ler	ngth	1	5	6.389	47		2	6.76316	5	
radius	5			5	.19			2	.26		
ELECTI	RTCAL	DESCRT	PTTON								
Freque	encies	(KHz)									
Ĺ	freque	ency			no.	of s	egme	nt lengt	h (wavele	ength	ns)
no. 1	Lowest		step		step	s m	inim	um	maximun	1	
1 9	980.		0		1	•	0177	485	.018786	6	
Source	20										
source	a node	se se	ctor r	nagnitu	ıde	ph	ase		type		
1	1	1	1	L.		Ō			voltage		
Lumpeo	i load	ls .									
load	nada	resi	stance	rea	ictanc	е	ind	uctance	capacita	nce	passive
1	20	0	5)	-34	1.950.		0	)	(ur)		O
2	39	ŏ		-3,	580.		ŏ		Õ .		õ
3	58	0		-2,	330.		0		0		0
4	77	0		-32	2,700.		0		0		0
~ \						1 1 10	0.0				
C: \AM\	(KMB2 )	KMB2-r	evs u	-19-20	11	11:49	:03				
IMPEDA	NCE										
nor	maliz	ation •	= 50.								
freq	re	sist	react	imp	ed	phas	е	VSWR	S11	S12	
(KHz)	(0	hms)	(ohms)	(oh	ums)	(deg	)		dB	dB	
source	e = 1	; node	l, sec	tor 1	0.0	E0 0		10 010	3 4400	~	1710
200.	<u>~</u> 1	0.94	200.02		. 90	52.9		17.019	-1.4489	-5.	4/18

Hatfield & Dawson Consulting Engineers

.

GEOME Wire Envir	TRY coordin onment:	ates in de perfect g	grees; othe round	r dimensior	ıs in met	ers		
wire 1	caps D none 1 1	istance 74.1 74.1	Angle 298. 298.	Z 0 126.8	ra .2	dius 2	segs 19	
2	none 0 0		0	0	.2	6	19	
3	none 1 1	74.1	118. 118.	0	.2	2	19	
4	none 1 1	75.1	73.4 73.4	0 124.2	.2	2	19	
5	none 3 3	38.9 38.9	73.4	0 121.4	.1	9	19	
Numbei	c of wi cu	res rrent node	= 5 s = 95					
Indivi segmer radius	ldual w nt leng	ires th	minimum wire valu 5 6.38 5 .19	ie 3947	ma wire 2 2	ximum value 6.76316 .26		
ELECTE Freque no. 1 1 9	RICAL D encies frequen lowest 980.	ESCRIPTION (KHz) cy step 0	no. ste 1	of segme ps minim .0177	nt lengt um 485	h (wavele maximum .018786	ngths) 6	
Source source 1	es node 20	sector 1	magnitude 1.	phase 0		type voltage		
Lumped	lloads	rocistopo	- roactar	an ind				
load 1 2 3 4	node 1 39 58 77	(ohms) 0 0 0 0	(ohms) -34,400 -3,580. -2,330. -32,700	(mH 0 0 0	)	Capacita (uF) 0 0 0 0	nce passiv circui 0 0 0 0	t
C:\AM\	KMBZ\KI	MBZ-rev3 (	7-19-2017	11:51:47				
IMPEDA nor	NCE malizat	tion = $50$ .						
freq (KHz) source	resi (ohr = 1;	ist react ns) (ohms node 20, s	imped (ohms) sector 1	phase (deg)	VSWR	S11 dB	S12 dB	
980.	259.	.77 279.4	<b>I3</b> 381.52	47.1	11.311	-1.5398	-5.2503	

KMBZ Tower 2 Driven, Other Towers Open Circuit at Current Transformer Location

GEOMETRY Wire coordinates in degrees; other dimensions in meters Environment: perfect ground wire caps Distance Angle Z radius segs 1 none 174.1 298. 0 .22 19 174.1 298. 126.8 2 none 0 0 0 .26 19 0 0 128.5 3 none 174.1 118. 0 .22 19 174.1 118. 123.2 4 none 175.1 73.4 0 .22 19 175.1 73.4 124.2 5 none 338.9 73.4 0 .19 19 338.9 73.4 121.4 Number of wires = 5 current nodes = 95 minimum maximum Individual wires wire value wire value segment length 5 6.38947 2 6.76316 radius 5 .19 2 . .26 ELECTRICAL DESCRIPTION Frequencies (KHz) no. of segment length (wavelengths) frequency no. lowest step steps minimum maximum 980. 0 1 .0177485 .0187866 1 Sources source node sector magnitude phase type 1 39 1 1. 0 voltage Lumped loads resistance reactance inductance capacitance passive load node (ohms) (ohms) (mH) (uF)circuit 1 1 0 -34,400. 0 0 0 -34,950. 2 0 0 0 20 0 3 58 0 -2,330. 0 0 0 -32,700. 4 77 0 0 0 0 C:\AM\KMBZ\KMBZ-rev3 07-19-2017 11:54:53 IMPEDANCE normalization = 50. resist VSWR freq react imped phase S11 S12 (KHz) (ohms) (ohms) (ohms) (deg) dB dB source = 1; node 39, sector 1 174.24 980. 260.3 313.23 56.2 11.462 -1.5195 -5

KMBZ Tower 3 Driven, Other Towers Open Circuit at Current Transformer Location

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## KMBZ Tower 4 Driven, Other Towers Open Circuit at Current Transformer Location

- 2

GEOMETRY Wire coordinates in degrees; other dimensions in meters Environment: perfect ground caps Distance wire Angle Z radius seqs none 174.1 / 1 298. 0 .22 19 174.1 298. 126.8 2 none 0 0 0 .26 19 0 128.5 0 3 118. none 174.1 0 .22 19 174.1 118. 123.2 4 none 175.1 73.4 0 .22 19 175.1 73.4 124.2 5 none 338.9 73.4 0 .19 19 338.9 73.4 121.4 Number of wires = 5 current nodes = 95 minimum maximum Individual wires wire value wire value segment length 5 6.38947 2 6.76316 radius 5 .19 2 .26 ELECTRICAL DESCRIPTION Frequencies (KHz) frequency no. of segment length (wavelengths) no. lowest step steps minimum maximum 980. 1 0 1 .0177485 .0187866 Sources source node sector magnitude phase type 1 58 1 1, n voltage Lumped loads resistance capacitance passive reactance inductance load node (ohms) (ohms) (mH) (uF)circuit 1 1 0 -34,400. 0 0 0 2 20 -34,950. 0 0 0 0 3 39 0 -3,580. 0 0 0 4 77 0 -32,700. 0 0 0 C:\AM\KMBZ\KMBZ-rev3 07-19-2017 11:57:31 IMPEDANCE normalization = 50. freq resist react imped phase VSWR S11 S12 (KHz) (ohms) (ohms) (ohms) (deg) dB dB source = 1; node 58, sector 1

# 980. **192.72 278.56** 338.73 55.3 12.084 -1.4409 -5.492

## KMBZ Tower 5 Driven, Other Towers Open Circuit at Current Transformer Location

GEOME	TRY		in des		nto bana a					
Envir	onment	: perf	ect gi	cound	other	ilmension	is in met	Lers		
wire 1	caps none	Distan 174.1	ce	Angle 298.		Z 0	ra .2	adius 22	segs 19	
2	none	0		0		128.5	- 2	26	19	
3	none	174.1		118. 118.		0	.2	22	19	
4	none	175.1 175.1		73.4 73.4		0 124.2	. 2	22	19	÷
5	none	338.9 338.9		73.4 73.4		0 121.4	. 1	19	19	
Numbe	r of w	vires current	nodes	= 5 = 9	5					
	a			minim	um		ma	iximum		
Indiv segme radiu	idual nt ler s	wires igth	W	vire 5 5	value 6.3894 .19	17	wire 2 2	value 6.76316 .26		
ELECT Frequ no. 1	RICAL encies freque lowest 980.	DESCRI (KHz) ncy	step 0		no. c steps 1	of segme minin .0177	ent lengt num 1485	h (wavele maximum .018786	ngths) 6	
Sourc	es									
sourc 1	e node 77	e sec 1	etor	magnitu 1.	ıde	phase 0		type voltage		
Lumpe	d load	ls	atango		atapag	i no	histores	assaits	naa na	·
load 1 2 3 4	node 1 20 39 58	(ohms 0 0 0 0	s)	(ol -34 -34 -3, -2,	nms) 4,400. 4,950. ,580. ,330.	(mH 0 0 0 0	I)	(uF) 0 0 0 0		lrcuit ) ) )
C:\AM	\KMBZ\	KMBZ-re	ev3 O	7-19-20	)17 1	1:59:40				
IMPED	ANCE	ation -	= 50		, <sup>6</sup>					
freq (KHz) source	re (0 e = 1	sist hms) ; node	react (ohms 77, s	imp ) (of ector 1	ped nms)	phase (deg)	VSWR	S11 dB	S12 dB	
980.	15	8.26	244.1	5 290	).96	57.	10.923	-1.5949	-5.12	:36

#### Item 3

#### Method of Moments Model Details for Directional Antenna- KMBZ

The array of towers was modeled using MININEC with the individual tower characteristics that were verified by the individual tower impedance measurements. Calculations were made to determine the complex voltage values for sources located at ground level under each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna patterns. In the schematic diagram on the following page,

 $X_c$  represents the capacitance between the tower and ground, including the base insulator  $X_s$  represents the series inductance of the feed line connecting the ATU to the tower  $X_{LC}$  represents the reactance of the tower lighting choke  $X_{LC}$  represents the reactance of the STL isocoupler

In all cases, the modeled impedance at the reference point is within one ohm of the measured reference point impedance.



## **KMBZ** Driven Array

ELECTRICAL DESCRIPTION

1

GEOMETRY Wire coordinates in degrees; other dimensions in meters Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	seqs
1	none	174.1	298.	0	.22	19
		174.1	298.	126.8		
2	none	0	0	0	.26	19
		0	0	128.5		
3	none	174.1	118.	0	.22	19
		174.1	118.	123.2		
4	none	175.1	73.4	0	.22	19
		175.1	73.4	124.2		
5	none	338.9	73.4	0	.19	19
		338.9	73.4	121.4		

Frequ	encies	(KHz)			
	frequent	су	no. o	f segment	length (wavelengths)
no.	lowest	step	steps	minimum	maximum
1	980.	0	1	.0177485	.0187866
Sourc	es				
sourc	e node	sector	magnitude	phase	type
1	20	. 1	2,022.07	65.1	voltage
2	39	1 1	246.223	129.3	voltage
3	58	1	908.024	146.7	voltage
Lumpe	d loads			· · · · ·	

		reprocance	reactance	inductance	capacitance	passive
load	node	(ohms)	(ohms)	(mH)	(uF)	circuit
1	1	0	395.	0	0	0
2	77	0	423.	0	0	0

IMPEDANCI	3						
norma	lization =	= 50.					
freq	resist	react	imped	phase	VSWR	S11	S12
(KHz)	(ohms)	(ohms)	(ohms)	(deg)		dB	dB
source =	1; node	20, secto	or 1				
980.	211.9	214.94	301.83	45.4	8.7196	-2.0011	-4.3274
	O	20					
source =	2; node	39, Secto	or L	00 4	01 050	00000	~ ~ ~ ~ ~ ~
900.	11.069	95.159	95.801	83.4	21.053	82576	-7.6157
eource	3. node	58 soots	· 1				
980	27 664	234 51	236 14	63 3	12 006	- 41275	10 426
200.	A	ساب است با ™ است.	200.14	00.0	22.090	41210	-10.420

CURREN	T rms						
Freque	ncy = 98	0 KHz					
Input	power = $5$ ,	000. watts					
Effici	ency = 10	0. %					
coordi	nates in c	learees					
curren	t	-		mag	phase	real	imaginary
no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	81.735	153.721	0	.609315	313.6	419984	44145
2	81.735	153.721	6.67368	.454669	313.6	.313609	329201
3 .	81.735	153.721	13.3474	.34578	313.8	.239198	249697
4	81.735	153.721	20.0211	.250836	314.2	.174793	179906
5	81.735	153.721	26.6947	.166046	315.2	.11772	117103
6	81.735	153.721	33.3684	.0903726	318.	.0671273	0605072
7	81.735	153.721	40.0421	.0248599	336.3	.022761	-1.E-02
8	81.735	153.721	46.7158	.0375946	114.2	0154134	.0342896
9	81.735	153.721	53.3895	.0862796	123.3	0473597	.0721196
10	81.735	153.721	60.0632	.126457	125.3	0730377	.103231
11	81.735	153.721	66.7368	.157384	126.	0924364	.127379
12	81.735	153.721	73.4105	.178848	126.2	105593	.144349
13	81.735	153.721	80.0842	.190755	126.2	112599	.153977
14	81.735	153.721	86.7579	.193099	126.	113601	.156148
15	81.735	153.721	93.4316	.185942	125.8	108796	.150791
10	81./35	153.721	100.105	.169383	125.5	0984157	.137858
10	81./35	153.721	105.//9	.143506	125.2	0826925	.117285
10	01.735	153.721	113.433	.108224	124.8	061//62	.0888607
FND	01.735	153.721	120.120	.0020200	124.4	0354836	.0518496
GND	01.133	133.721	120.0	U A 73004	10 7	4 46170	1 50600
21	0	0	6 76316	5 15034	12.5	4.401/9	1.39689
22	0	0	13 5263	5 61793	07	5 9/026	1.10330
23	0	0	20 2895	6 2711	5 0	5.04930	6/0122
24	0	0	27 0526	6 5245	3.3	6 51046	A27712
25	0	0	33.8158	6.68163	2	6 67766	230192
26	0	0	40.579	6.74378	.5	6.74355	.0557751
27	0	0	47.3421	6.71198	359.2	6.7113	0954292
28	0	0	54.1053	6.58763	358.1	6.58385	222994
29	0	0	60.8684	6.37289	357.1	6.36452	32644
30	0	0	67.6316	6.07072	356.2	6.05717	405376
31	0	0 ·	74.3947	5.68487	355.4	5.66626	459571
32	0	0	81.1579	5.21986	354.6	5.1969	488988
33	0	0	87.9211	4.68078	353.9	4.65466	493791
34	0	0	94.6842	4.07309	353.3	4.04538	474322
35	0	0	101.447	3.40216	352.7	3.37474	431039
36	0	0	108.211	2.67237	352.2	2.64742	36436
37	0	0	114.974	1.88497	351.6	1.86491	274286
38	0 .	0	121.737	1.03159	351.1	1.01922	159252
END	0	0	128.5	0	0	0	0 .
GND	-81.735	-153.721	0	1.81803	45.9	1.2644	1.30634
40	-81.735	-153.721	6.48421	1.91881	45.6	1.34332	1.37016
41	-81.735	-153.721	12.9684	1.97061	45.3	1.38494	1.40187
42	-81.735	-153.721	19.4526	1.9964	45.2	1.40716	1.41616
43	-01.735	-153./21	23.9368	1.99932	45.1	1.41243	1.41504
44	-01.735	-152.721	32.4211	1.90081	44.9	1.40187	1.39941
46	-01.735	-153.721	JO. 3033	1 00017	44.9	1.3/021	1.30992
47	-81 735	-153 721	51 8727	1 80574	11.0	1 20210	1.32/09
48	-81.735	-153,721	58 3579	1 71051	44 7	1 215210	1 20370
49	-81.735	-153.721	64.8421	1.59854	44.7	1.13601	1.12464

51         -81.735         -153.721         77.8105         1.32922         44.7         .944566         .935208           52         -81.735         -153.721         90.7789         1.00809         44.8         .715756         .709892           54         -81.735         -153.721         97.2631         .831348         44.8         .589833         .555865           55         -81.735         -153.721         103.747         .645173         .4419752         44.9         .318429         .317615           57         -81.735         -153.721         123.2         0         0         0         0           GND         50.024         -167.802         6.53684         3.10415         62.6         1.43226         2.75882           60         50.024         -167.802         21.96105         5.51305         61.7         1.66313         .09433           61         50.024         -167.802         22.6842         .6817         61.2         1.77197         3.2891           63         50.024         -167.802         3.2217         3.5626         60.7         1.74088         3.10945           64         50.024         -167.802         71.9318         3.6246         6	50	-81.735	-153.721	71.3263	1.47102	44.7	1.04547	1.03484
52         -81.735         -153.721         84.2947         1.17447         44.7         .83424         .82607           53         -81.735         -153.721         90.789         1.00809         44.8         .715756         .709892           54         -81.735         -153.721         103.747         .645173         44.9         .455094           55         -81.735         -153.721         110.232         .449752         44.9         .318429         .317615           57         -81.735         -153.721         12.2         0         0         0         0           6ND         50.024         -167.802         6.53684         3.10845         62.6         1.43226         2.75882           60         50.024         -167.802         13.0737         3.34466         61.5         1.73119         3.18429           63         50.024         -167.802         32.6842         3.6817         61.2         1.77197         3.22891           64         50.024         -167.802         32.2947         3.55266         60.7         1.74088         3.10835           67         50.024         -167.802         73.6507         60.9         1.77603         3.18956 <t< td=""><td>51</td><td>-81.735</td><td>-153.721</td><td>77.8105</td><td>1.32922</td><td>44.7</td><td>.944566</td><td>.935208</td></t<>	51	-81.735	-153.721	77.8105	1.32922	44.7	.944566	.935208
53         -81.735         -153.721         90.7789         1.00809         44.8         .715766         .709922           54         -81.735         -153.721         97.2631         .831348         44.8         .589833         .585865           55         -81.735         -153.721         110.747         .645173         44.9         .318429         .317615           57         -81.735         -153.721         123.2         0         0         0         0           GND         50.024         -167.802         6.53684         3.10845         62.6         1.43226         2.75882           60         50.024         -167.802         26.1474         3.62466         61.5         1.73119         3.18429           61         50.024         -167.802         26.1474         3.62466         61.5         1.73119         3.18429           63         50.024         -167.802         36.6133         61.2         1.77197         3.22891           64         50.024         -167.802         71.953         3.6507         60.9         1.74083         3.19856           66         50.024         -167.802         78.421         2.7438         60.3         1.4971         2.637	52	-81.735	-153.721	84.2947	1.17447	44.7	.834324	.826607
54         -81.735         -153.721         97.2631         .831348         44.8         .58933         .585865           55         -81.735         -153.721         110.232         .449752         44.9         .457315         .455094           56         -81.735         -153.721         110.232         .449752         44.9         .318429         .317615           57         -81.735         -153.721         123.2         0         0         0         0           GND         50.024         -167.802         6.53684         3.10845         62.6         1.43226         2.75882           60         50.024         -167.802         19.6105         3.51305         61.7         1.66513         3.09443           62         50.024         -167.802         32.6142         3.66317         61.5         1.77197         3.22818           64         50.024         -167.802         52.2947         3.56266         60.7         1.74088         3.10835           67         50.024         -167.802         78.4421         2.77438         60.3         1.37338         2.4106           71         50.024         -167.802         78.4421         2.77438         60.3         1.	53	-81.735	-153.721	90.7789	1.00809	44.8	.715756	.709892
55         -81.735         -153.721         103.747         .645173         44.9         .457315         .455094           56         -81.735         -153.721         110.232         .449752         44.9         .318429         .317615           57         -81.735         -153.721         112.716         .243005         45.         .171811         .17185           END         50.024         -167.802         0         0         0         0         0           60         50.024         -167.802         19.6105         3.51305         61.7         1.66313         3.09443           61         50.024         -167.802         22.64474         3.62446         61.5         1.77197         3.22891           64         50.024         -167.802         39.2211         3.69138         61.1         1.7663         3.18956           65         50.024         -167.802         52.2947         3.56266         60.7         1.74088         3.10835           67         50.024         -167.802         78.8217         60.5         1.6004         2.83033           69         50.024         -167.802         71.9053         3.0245         60.4         1.4971         2.63713 <td>54</td> <td>-81.735</td> <td>-153.721</td> <td>97.2631</td> <td>.831348</td> <td>44.8</td> <td>.589833</td> <td>.585865</td>	54	-81.735	-153.721	97.2631	.831348	44.8	.589833	.585865
56         -81.735         -153.721         110.232         .449752         44.9         .318429         .317615           57         -81.735         -153.721         112.71         .243005         45.         .171811         .17185           END         -81.735         -153.721         123.2         0         0         0         0           GND         50.024         -167.802         6.53684         3.10845         62.6         1.41274         .2.43273           59         50.024         -167.802         13.0737         3.34468         62.1         1.5555         2.95569           61         50.024         -167.802         22.6842         3.68317         61.2         1.77197         3.22891           63         50.024         -167.802         39.2211         3.69138         61.1         1.78664         3.2302           64         50.024         -167.802         58.8316         3.42893         60.6         1.68202         2.98804           68         50.024         -167.802         71.9053         3.03245         60.4         1.4971         2.63738           69         50.024         -167.802         71.9073         3.58728         60.2         1.230	55	-81.735	-153.721	103.747	.645173	44.9	.457315	.455094
57       -81.735       -153.721       116.716       .243005       45.       .171811       .17185         END       -81.735       -153.721       123.2       0	56	-81.735	-153.721	110.232	.449752	44.9	.318429	.317615
END         -81.735         -153.721         123.2         0         0         0         0         0         0           GND         50.024         -167.802         0         2.72005         63.4         1.21674         2.43273           60         50.024         -167.802         13.0737         3.34468         62.1         1.5655         2.95569           61         50.024         -167.802         26.1474         3.62446         61.5         1.7119         3.18429           63         50.024         -167.802         32.6842         3.68317         61.2         1.77197         3.22891           64         50.024         -167.802         39.2211         3.65138         61.1         1.78664         3.2302           65         50.024         -167.802         52.2947         3.56266         60.7         1.74088         3.10835           67         50.024         -167.802         71.9053         3.03245         60.4         1.4971         2.63713           70         50.024         -167.802         91.5158         2.15183         60.2         1.03058         2.15306           71         50.024         -167.802         91.5158         2.15183	57	-81.735	-153.721	116.716	.243005	45.	.171811	.17185
GND         50.024         -167.802         0         2.72005         63.4         1.21674         2.43273           59         50.024         -167.802         6.53684         3.10845         62.6         1.43226         2.75882           60         50.024         -167.802         13.0737         3.34468         62.1         1.5655         2.95569           61         50.024         -167.802         26.1474         3.62446         61.5         1.73119         3.18429           63         50.024         -167.802         32.6842         3.66317         61.2         1.77107         3.22891           64         50.024         -167.802         52.2947         3.56266         60.7         1.74088         3.10835           67         50.024         -167.802         71.9053         3.03245         60.4         1.6971         2.63713           70         50.024         -167.802         78.4421         2.77438         60.2         1.07009         1.86689           73         50.024         -167.802         19.5158         2.15183         60.2         1.07009         1.86689           73         50.024         -167.802         11.126         .988343         60.	END	-81,735	-153.721	123.2	0	0	0	0
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	GND	50.024	-167.802	0	2.72005	63.4	1.21674	2.43273
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	59	50.024	-167.802	6.53684	3.10845	62.6	1.43226	2.75882
61       50.024       -167.802       19.6105       3.51305       61.7       1.66313       3.09443         62       50.024       -167.802       22.61474       3.62446       61.5       1.73119       3.18429         63       50.024       -167.802       32.6842       3.68317       61.2       1.77197       3.22891         64       50.024       -167.802       39.2211       3.69138       61.1       1.78664       3.2302         65       50.024       -167.802       52.2947       3.55266       60.7       1.74088       3.10835         67       50.024       -167.802       53.864       3.25147       60.5       1.6004       2.83033         69       50.024       -167.802       78.4421       2.77438       60.3       1.37338       2.4106         71       50.024       -167.802       91.5158       2.15183       60.2       1.07009       1.8689         73       50.024       -167.802       91.5158       2.15183       60.       2.99725       .466343         74       50.024       -167.802       117.663       .538728       60.       .269725       .466343         75       50.024       -167.802       117.663	60	50.024	-167.802	13.0737	3.34468	62.1	1.5655	2.95569
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	61	50.024	-167.802	19.6105	3.51305	61.7	1.66313	3.09443
	62	50.024	-167.802	26.1474	3.62446	61.5	1.73119	3.18429
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	63	50.024	-167.802	32.6842	3.68317	61.2	1.77197	3.22891
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	64	50.024	-167.802	39.2211	3.69138	61.1	1.78664	3.2302
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	65	50.024	-167.802	45.7579	3.6507	60.9	1.77603	3.18956
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	66	50.024	-167.802	52.2947	3.56266	60.7	1.74088	3.10835
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	67	50.024	-167.802	58.8316	3.42893	60.6	1.68202	2.98804
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	68	50.024	-167.802	65.3684	3.25147	60.5	1.6004	2.83033
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	69	50.024	-167.802	71.9053	3.03245	60.4	1.4971	2.63713
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	70	50.024	-167.802	78.4421	2.77438	60.3	1.37338	2.4106
72 $50.024$ $-167.802$ $91.5158$ $2.15183$ $60.2$ $1.07009$ $1.86689$ 73 $50.024$ $-167.802$ $98.0526$ $1.79277$ $60.1$ $.893283$ $1.55437$ 74 $50.024$ $-167.802$ $104.59$ $1.40481$ $60.1$ $.701207$ $1.21729$ 75 $50.024$ $-167.802$ $111.126$ $.988343$ $60.$ $.494116$ $.855962$ 76 $50.024$ $-167.802$ $117.663$ $.538728$ $60.$ $.269725$ $.466343$ END $50.024$ $-167.802$ $124.2$ $0$ $0$ $0$ $0$ GND $96.8198$ $-324.776$ $0.38947$ $.0982384$ $112.5$ $0502896$ $.121217$ 78 $96.8198$ $-324.776$ $12.779$ $.0748016$ $112.4$ $0284596$ $.0691761$ 80 $96.8198$ $-324.776$ $19.1684$ $.0543506$ $112.2$ $0203739$ $.0503874$ 81 $96.8198$ $-324.776$ $31.9474$ $.0197137$ $108.8$ $-6.35E-03$ $.0186638$ 83 $96.8198$ $-324.776$ $31.9474$ $.0197137$ $108.8$ $-6.35E-03$ $.0186638$ 83 $96.8198$ $-324.776$ $51.1158$ $.0185565$ $301.4$ $-3.18E-04$ $5.42E-03$ 84 $96.8198$ $-324.776$ $57.5053$ $.0273821$ $299.6$ $.0135393$ $-0238005$ 87 $96.8198$ $-324.776$ $70.2842$ $.0390608$ $298.8$ $.0205107$ $-037248$ $99$ <td>71</td> <td>50.024</td> <td>-167.802</td> <td>84.9789</td> <td>2.47991</td> <td>60.2</td> <td>1.23058</td> <td>2.15306</td>	71	50.024	-167.802	84.9789	2.47991	60.2	1.23058	2.15306
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	72	50.024	-167.802	91.5158	2.15183	60.2	1.07009	1.86689
74 $50.024$ $-167.802$ $104.59$ $1.40481$ $60.1$ $.701207$ $1.21729$ $75$ $50.024$ $-167.802$ $111.126$ $.988343$ $60.$ $.494116$ $.855962$ $76$ $50.024$ $-167.802$ $117.663$ $.538728$ $60.$ $.269725$ $.466343$ END $50.024$ $-167.802$ $124.2$ $0$ $0$ $0$ $0$ GND $96.8198$ $-324.776$ $0$ $.131235$ $112.5$ $0502896$ $.121217$ $78$ $96.8198$ $-324.776$ $6.38947$ $.0982384$ $112.5$ $0375937$ $.0907607$ $79$ $96.8198$ $-324.776$ $12.779$ $.0748016$ $112.4$ $0284596$ $.0691761$ $80$ $96.8198$ $-324.776$ $12.779$ $.0748016$ $112.4$ $0203739$ $.0503874$ $81$ $96.8198$ $-324.776$ $25.579$ $.0360664$ $111.2$ $0130311$ $.0336299$ $82$ $96.8198$ $-324.776$ $31.9474$ $.0197137$ $108.8$ $-6.35E-03$ $.0186638$ $83$ $96.8198$ $-324.776$ $51.1158$ $.0185565$ $301.4$ $9.67E-03$ $0158391$ $84$ $96.8198$ $-324.776$ $57.5053$ $.0273821$ $299.6$ $.0135393$ $0228005$ $87$ $96.8198$ $-324.776$ $70.2842$ $.039068$ $298.8$ $.0188118$ $0342324$ $89$ $6.8198$ $-324.776$ $70.2842$ $.0390682$ $298.8$ $.0205107$ $037244$	73	50.024	-167.802	98.0526	1.79277	60.1	.893283	1.55437
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	74	50.024	-167.802	104.59	1.40481	60.1	.701207	1.21729
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	75	50.024	-167.802	111.126	.988343	60.	.494116	.855962
END50.024-167.802124.200000GND96.8198-324.7760.131235112.50502896.1212177896.8198-324.7766.38947.0982384112.50375937.09076077996.8198-324.77612.779.0748016112.40284596.06917618096.8198-324.77619.1684.05435061120203739.05038748196.8198-324.77625.5579.0360664111.20130311.03362998296.8198-324.77631.9474.0197137108.8-6.35E-03.01866388396.8198-324.77638.33685.43E-0393.4-3.18E-045.42E-038496.8198-324.77651.1158.0185565301.49.67E-0301583918696.8198-324.77657.5053.0273821299.6.013539302380058796.8198-324.77670.2842.0390608298.8.018811803423248996.8198-324.77676.6737.0418287298.8.020127203666799096.8198-324.77683.0632.0425189298.8.020510703724489196.8198-324.77689.4526.041122229901992780328599396.8198-324.776102.232.032038299.4.015724402791379496.8198-324.776<	76	50.024	-167.802	117.663	.538728	60.	.269725	.466343
GND96.8198-324.7760.131235112.50502896.1212177896.8198-324.7766.38947.0982384112.50375937.09076077996.8198-324.77612.779.0748016112.40284596.06917618096.8198-324.77619.1684.05435061120203739.05038748196.8198-324.77625.5579.0360664111.20130311.03362998296.8198-324.77631.9474.0197137108.8-6.35E-03.01866388396.8198-324.77638.33685.43E-0393.4-3.18E-045.42E-038496.8198-324.77651.1158.0185565301.49.67E-0301583918696.8198-324.77657.5053.0273821299.6.013539302380058796.8198-324.77670.2842.0390608298.8.018811803423248996.8198-324.77676.6737.0418287298.8.020127203666799096.8198-324.77689.4526.0411222299.2.01834520328599196.8198-324.77695.8421.0376332299.2.01834520328599396.8198-324.776102.232.032038299.4.015724402791379496.8198-324.776102.232.032038299.4.015724402791379496.8198<	END	50.024	-167.802	124.2	0	0	0	0
78 $96.8198$ $-324.776$ $6.38947$ $.0982384$ $112.5$ $0375937$ $.0907607$ $79$ $96.8198$ $-324.776$ $12.779$ $.0748016$ $112.4$ $0284596$ $.0691761$ $80$ $96.8198$ $-324.776$ $19.1684$ $.0543506$ $112.$ $0203739$ $.0503874$ $81$ $96.8198$ $-324.776$ $25.5579$ $.0360664$ $111.2$ $0130311$ $.0336299$ $82$ $96.8198$ $-324.776$ $31.9474$ $.0197137$ $108.8$ $-6.35E-03$ $.0186638$ $83$ $96.8198$ $-324.776$ $38.3368$ $5.43E-03$ $93.4$ $-3.18E-04$ $5.42E-03$ $84$ $96.8198$ $-324.776$ $51.1158$ $.0185565$ $301.4$ $9.67E-03$ $0158391$ $85$ $96.8198$ $-324.776$ $57.5053$ $.0273821$ $299.6$ $.0135393$ $0238005$ $87$ $96.8198$ $-324.776$ $63.8947$ $.0342343$ $299.$ $.016602$ $0299392$ $88$ $96.8198$ $-324.776$ $70.2842$ $.0390608$ $298.8$ $.0188118$ $0342324$ $89$ $96.8198$ $-324.776$ $83.0632$ $.0425189$ $298.8$ $.0205107$ $0372448$ $91$ $96.8198$ $-324.776$ $89.4526$ $.0411222$ $299.2$ $.0183452$ $032859$ $93$ $96.8198$ $-324.776$ $102.232$ $.032038$ $299.4$ $.0157244$ $0279137$ $94$ $96.8198$ $-324.776$ $102.232$ $.032$	GND	96.8198	-324.776	0	.131235	112.5	0502896	.121217
7996.8198-324.77612.779.0748016112.40284596.06917618096.8198-324.77619.1684.05435061120203739.05038748196.8198-324.77625.5579.0360664111.20130311.03362998296.8198-324.77631.9474.0197137108.8-6.35E-03.01866388396.8198-324.77638.33685.43E-0393.4-3.18E-045.42E-038496.8198-324.77651.1158.0185565301.49.67E-03-0.0583918596.8198-324.77657.5053.0273821299.6.013539302380058796.8198-324.77663.8947.034234329901660202993928896.8198-324.77670.2842.0390608298.8.018811803423248996.8198-324.77676.6737.0418287298.8.020127203666799096.8198-324.77683.0632.0425189298.8.020510703724489196.8198-324.77695.8421.0376332299.2.01834520328599396.8198-324.776102.232.032038299.4.015724402791379496.8198-324.776102.232.032038299.4.015724402791379496.8198-324.776108.621.0242793299.6.012005502110349596	/8	96.8198	-324.776	6.38947	.0982384	112.5	0375937	.0907607
80       96.8198       -324.776       19.1684       .0543506       112.      0203739       .0503874         81       96.8198       -324.776       25.5579       .0360664       111.2      0130311       .0336299         82       96.8198       -324.776       31.9474       .0197137       108.8       -6.35E-03       .0186638         83       96.8198       -324.776       38.3368       5.43E-03       93.4       -3.18E-04       5.42E-03         84       96.8198       -324.776       44.7263       7.9E-03       309.6       5.03E-03       -6.09E-03         85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0238005         86       96.8198       -324.776       63.8947       .0342343       299.       .016602      0299392         87       96.8198       -324.776       70.2842       .0390608       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         89       96.8198       -324.776       89.4526       .0411222       299.       .0199278      032859       .03265971 <t< td=""><td>19</td><td>96.8198</td><td>-324.776</td><td>12.779</td><td>.0748016</td><td>112.4</td><td>0284596</td><td>.0691761</td></t<>	19	96.8198	-324.776	12.779	.0748016	112.4	0284596	.0691761
81       96.8198       -324.776       25.5579       .0360664       111.2      0130311       .0336299         82       96.8198       -324.776       31.9474       .0197137       108.8       -6.35E-03       .0186638         83       96.8198       -324.776       38.3368       5.43E-03       93.4       -3.18E-04       5.42E-03         84       96.8198       -324.776       44.7263       7.9E-03       309.6       5.03E-03       -6.09E-03         85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0238005         86       96.8198       -324.776       63.8947       .0342343       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.6       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         89       96.8198       -324.776       89.4526       .0411222       299.2       .0183452      032859         90	80	96.8198	-324.776	19.1684	.0543506	112.	0203739	.0503874
82       96.8198       -324.776       31.9474       .0197137       108.8       -6.35E-03       .0186638         83       96.8198       -324.776       38.3368       5.43E-03       93.4       -3.18E-04       5.42E-03         84       96.8198       -324.776       44.7263       7.9E-03       309.6       5.03E-03       -6.09E-03         85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0158391         86       96.8198       -324.776       57.5053       .0273821       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      032859         92       96.8198       -324.776       102.232       .032038       299.2       .0183452      032859         93	81	96.8198	-324.776	25.5579	.0360664	111.2	0130311	.0336299
83       96.8198       -324.776       38.3368       5.43E-03       93.4       -3.18E-04       5.42E-03         84       96.8198       -324.776       44.7263       7.9E-03       309.6       5.03E-03       -6.09E-03         85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0158391         86       96.8198       -324.776       57.5053       .0273821       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94	82	96.8198	-324.776	31.9474	.019/13/	108.8	-6.35E-03	.0186638
84       96.8198       -324.776       144.7263       7.9E-03       309.6       5.03E-03       -6.09E-03         85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0158391         86       96.8198       -324.776       57.5053       .0273821       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      032859         93       96.8198       -324.776       102.232       .032038       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94	00	90.0198	-324.776	38.3368	5.436-03	93.4	-3.188-04	5.42E-03
85       96.8198       -324.776       51.1158       .0185565       301.4       9.67E-03      0158391         86       96.8198       -324.776       57.5053       .0273821       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.6       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       102.232       .032038       299.4       .0120055      0211034         95       96.8198       -324.776       108.621       .0242793       299.9       .0122055      0122701         94	04	90.0190	-324.770	44.7203	7.9E-03	309.6	5.03E-03	-6.09E-03
86       96.8198       -324.776       57.5053       .0273821       299.6       .0135393      0238005         87       96.8198       -324.776       63.8947       .0342343       299.6       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      035971         92       96.8198       -324.776       102.232       .032038       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END	00	90.0190	-324.770	51.1158	.0185565	301.4	9.676-03	0158391
87       96.8198       -324.776       03.0947       .0342343       299.       .016602      0299392         88       96.8198       -324.776       70.2842       .0390608       298.8       .0188118      0342324         89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      035971         92       96.8198       -324.776       102.232       .032038       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	97	90.0190	-324.170	62 0047	.02/3821	299.0	.0135393	0238005
89       96.8198       -324.776       76.6737       .0418287       298.8       .0201272      0366679         90       96.8198       -324.776       83.0632       .0418287       298.8       .0201272      0366679         91       96.8198       -324.776       83.0632       .0425189       298.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      035971         92       96.8198       -324.776       95.8421       .0376332       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	88	96.8198	-324.776	70 2942	.0342343	299.	.010002	0299392
90       96.8198       -324.776       83.0632       .0418287       298.8       .0201272      0366879         91       96.8198       -324.776       83.0632       .0421822       299.8       .0205107      0372448         91       96.8198       -324.776       89.4526       .0411222       299.       .0199278      035971         92       96.8198       -324.776       95.8421       .0376332       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	80	06 9109	-324.776	76 6737	.0390000	200.0	.0100110	0342324
91       96.8198       -324.776       89.4526       .0421222       299.       .0199278      035971         92       96.8198       -324.776       89.4526       .0411222       299.       .0199278      035971         93       96.8198       -324.776       102.232       .0376332       299.2       .0183452      032859         94       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	an	06 8108	-324.776	-83 0632	0425190	200.0	.0201272	03000/9
92       96.8198       -324.776       95.8421       .0376332       299.2       .0183452      032859         93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0	91	96 8198	-324.776	89 4526	0411222	290.0	.0203107	03/2440
93       96.8198       -324.776       102.232       .032038       299.4       .0157244      0279137         94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	92	96.8198	-324 776	95 8421	0376332	200 2	0183452	- 032850
94       96.8198       -324.776       108.621       .0242793       299.6       .0120055      0211034         95       96.8198       -324.776       115.011       .0141535       299.9       7.05E-03      0122701         END       96.8198       -324.776       121.4       0       0       0       0	93	96 8198	-324 776	102 232	032038	200.4	0157244	- 0270127
95 96.8198 -324.776 115.011 .0141535 299.9 7.05E-030122701 END 96.8198 -324.776 121.4 0 0 0 0	94	96.8198	-324.776	108.621	.0242793	299 6	0120055	- 0211024
END 96.8198 -324.776 121.4 0 0 0 0 0	95	96.8198	-324.776	115.011	.0141535	299.9	7 05E-03	- 0122701
	END	96.8198	-324.776	121.4	0	0	0	0

\*

CURRENT MOMENTS (amp-degrees) rms

Frequency = 980 KHz Input power = 5,000. watts

			vertical c	urrent moment
wire	magnitude	phase (d	leg) magnitude	phase (deg)
1	2.09822	40.8	2.09822	40.8
2	762.037	0.0	762.037	0.0
3	209.356	45.	209.356	45.
4	403.604	61.	403.604	61.
5	.371466	17.7	.371466	17.7

Medium wave array vertical current moment (amps-degrees) rms (Calculation assumes tower wires are grouped together. The first wire of each group must contain the source.)

tower	magnitude	phase	(deg)
1	2.09822	40.8	
2	762.037	0.0	
3	209.356	45.	
4	403.604	61.	
5	.371466	17.7	

Tower	Current Moment Magnitude	Current Moment Phase	Normalized Magnitude	Normalized Phase	Standard Pattern Ratio	Standard Pattern Phase
2	762.037	0.0	1.0	0.0	1.0	0.0
3	209.356	45.0	0.275	+45.0	0.275	+45.0
4	403.604	61.0	0.530	+61.0	0.530	+61.0

**Comparison of Current Moments with Theoretical Antenna Field Parameters** 

As shown in the tables above, the base voltages used in the Method of Moments computer model produce current moments in each of the towers that are identical to the field ratios and phases (+/- 0.1°) of the theoretical antenna parameters specified in the KMBZ construction permit.

#### Item 4

#### **Derivation of Operating Parameters for Directional Antennas - KMBZ**

The currents at the tower reference points have been calculated by using the computer circuit simulation program pspice. A pspice model has been made for each tower using the antenna base currents and base impedances calculated by MININEC and shown in the driven array model above, and the reactances listed previously in the table *Analysis of Tower Impedance Measurements to Verify Method of Moments Model*. The magnitude and phase of the current source in the pspice model was adjusted so that the current calculated in the output branch of the pspice model (the current through resistor  $R_L$ ) was the same as the base current for the tower calculated by MININEC. The current at the reference point is the current source in the pspice model. These calculated currents are then normalized to the reference tower to obtain the antenna monitor phase and ratio readings, as shown in the tables labeled Antenna Monitor Parameters, which follow the pspice data below.

#### ## KMBZ TOWER 2 NIGHT BASE MODEL

#### \*\*\*\* CIRCUIT DESCRIPTION

.OPT LIST NOPAGE NODE NOMOD .AC LIN 1 980kHz 980kHz

IIN	0	1 .	AC 4.728 20.05
LXs	1	2	2.761uH
LX1c	1	3	731uH
Rlc	3	0	.001ohms
CXc	2	0	40.6pF
LL	2	4	34.907uH
RL	4	0	211.9ohms

.PRINT AC IM(RL) IP(RL)

##.PROBE .END

****	AC ANALYSIS		TEMPERATURE =	27.000 DEG C
FREQ	IM(RL)	IP(RL)		
9.8001	E+05 4.739E+0	0 1.970E+01		

#### ## KMBZ TOWER 3 NIGHT BASE MODEL

\*\*\*\* CIRCUIT DESCRIPTION

.OPT LIST NOPAGE NODE NOMOD .AC LIN 1 980kHz 980kHz

IIN	0	1 AC 1.78	46.08
LXs	1	2	4.06uH
LX1c	1	3	731uH
Rlc	3	0	.001ohms
CXic	2	0	40.6pF
CXc	2	0	40.6pF
LL	2	4	15.454uH
RL	4	0	11.07ohms

- .PRINT AC IM(RL) IP(RL)
- ##.PROBE .END

****	AC 1	ANALYSIS		TEMPERATURE	 27.000	DEG	С
FREQ		IM(RL)	IP(RL)				

9.800E+05 1.818E+00 4.590E+01

#### ## KMBZ TOWER 4 NIGHT BASE MODEL

#### \*\*\*\* CIRCUIT DESCRIPTION

.OPT LIST NOPAGE NODE NOMOD .AC LIN 1 980kHz 980kHz

IIN	0	1	AC 2.459 64.16
LXs	1	2	3.735uH
LX1c	1	3	731uH
Rlc	3	0	.001ohms
CXic	2	0	65pF
CXc	2	0	40.6pF
LL	2	4	38.085uH
RL	4	0	27.660hms

#### .PRINT AC IM(RL) IP(RL)

##.PROBE .END

\*\*\*\* AC ANALYSIS

TEMPERATURE = 27.000 DEG C

FREQ IM(RL) IP(RL)

9.800E+05 2.720E+00 6.340E+01

Tower	Ref Point Current Magnitude	Ref Point Current Phase	Normalized Magnitude	Normalized Phase	
2	4.728	20.05	1.0	0	
3	1.780	46.08	0.376	+26.0	
4	2.459	64.16	0.520	+44.1	

#### Antenna Monitor Parameters - Night Pattern - KMBZ

#### Summary of Post Construction Certified Array Geometry - KMBZ

According to the survey on the following pages, the distance and bearing from the reference tower (Tower #2) to Tower #3 is 484.96 feet at a bearing of 117.97°. The difference between this point and the location specified in the construction permit is 0.482 feet (0.17°).

The surveyed distance from the reference tower to Tower #4 is 488.46 feet at a bearing of 73.34°, while the construction permit specifies 488.16 feet at a bearing of 73.4° The difference between this point and the location specified in the construction permit is 0.593 feet (0.21°).

# AYLETT SURVEY& ENGINEERING COMPANY, INC.

LAND SURVEYING ~ LAND PLANNING ~ CIVIL ENGINEERING 201 NW 72nd STREET ~ GLADSTONE, MO 64118-1821 Phone: (816) 436-0732 ~ Fax: (816) 436-0767

## www.sams-survey.com

## Sam A. Aylett P.L.S.

## Tower Location and Height Determination Survey 4725 E Coal Mine Road, Kansas City, MO

Field Work Completed on: 8-22-16, Sunny with average temperature of 78°

#### Datum:

The horizontal and vertical positions of each of the 5 towers are based on NAD83 State Plane Coordinates as generated using the Missouri Geographical Reference System. GPS Observations were made from 9:10AM to 10:10AM on 8-22-16 with a minimum of 6 minute sessions for each of the four primary control points. A second set of observations were made from 3:08PM to 3:55PM with a minimum of 6 minute sessions for each of the control points. These positions were then averaged for use in computing the tower positions.

#### Horizontal Position:

The centers of the towers were determined using horizontal angle measurements from two of the primary control points. The State Plane coordinates were then converted to Geodetic coordinate values.

#### Vertical Position:

The height of each of the key elements on each tower was computed using vertical angle measurement from two of the primary control points. The data points collected from each of the instrument setups was then averaged to determine the height of the structure. The Vertical Datum is NAVD88 and based on multiple GPS observations.

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#### Tower 1:

NAD83, State Plane Coordinate, West Zone "True North" N: 319009.28m E: 849024.34m EL: 762.14 (ground elevation)

NAD83, Geodetic Coordinates (Latitude and Longitude) Lat: N 39° 02'27.87" Long: W 94° 30'40.57"

Height:

337.3' (102.8m) Top of Beacon Light Ring

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Tower 2: <u>NAD83, State Plane Coordinate, West Zone "True North"</u> N: 318939.84m E: 849155.37m EL: 766.27 (ground elevation)

NAD83, Geodetic Coordinates (Latitude and Longitude) Lat: N 39° 02'25.62" Long: W 94° 30'35.12"

## Height:

334.0' (101.8m) Top of Beacon Light Ring

#### Tower 3:

NAD83. State Plane Coordinate, West Zone "True North" N: 318870.51m E: 849285.91m EL: 769.60 (ground elevation)

NAD83, Geodetic Coordinates (Latitude and Longitude) Lat: N 39° 02'23.37" Long: W 94° 30'29.69"

Height: 329.5' (100.4m) Top of Beacon Light Ring

Tower 4: <u>NAD83. State Plane Coordinate, West Zone "True North"</u> N: 318982.50m E: 849298.01m EL: 769.12 (ground elevation)

NAD83, Geodetic Coordinates (Latitude and Longitude) Lat: N 39° 02'27.01" Long: W 94° 30'29.12"

#### Height:

333.1' (101.5m) Top of Beacon Light Ring

#### Tower 5:

NAD83, State Plane Coordinate, West Zone "True North" N: 319022.49m E: 849431.39m EL: 771.16 (ground elevation)

NAD83, Geodetic Coordinates (Latitude and Longitude) Lat: N 39° 02'28.30" Long: W 94° 30'23.65"

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Height:

331.1' (100.9m) Top of Beacon Light Ring

#### Azimuth: Tower 1 to Tower 2

<u>Grid Azimuth:</u> 152° 04'49" (S62°04'49"E), 486.50' <u>Average Convergence Angle for each of the tower locations:</u> 0° 0'25" <u>Geodetic Azimuth:</u> 152° 05'14" (S62°05'14"E), 486.53'

#### Azimuth: Tower 2 to Tower 3

<u>Grid Azimuth:</u> 152° 01'41" (S62°01'41"E), 484.96' <u>Average Convergence Angle for each of the tower locations:</u> 0° 0'22" <u>Geodetic Azimuth:</u> 152° 02'03" (S62°02'03"E), 484.99'

#### Azimuth: Tower 3 to Tower 4

<u>Grid Azimuth:</u> 06° 09'46" (N06°09'46"E), 369.55" <u>Average Convergence Angle for each of the tower locations:</u> 0° 0'18" <u>Geodetic Azimuth:</u> 06° 09'28" (N06°09'28"E), 369.57'

#### Azimuth: Tower 4 to Tower 5

<u>Grid Azimuth:</u> 73° 18'46" (N73°18'46"E), 456.85' <u>Average Convergence Angle for each of the tower locations:</u> 0° 0'18" <u>Geodetic Azimuth:</u> 73° 18'28" (N73°18'128E), 456.88'

#### Azimuth: Tower 2 to Tower 4

Grid Azimuth: 73° 21'02" (N73°21'02"E), 488.46'

Average Convergence Angle for each of the tower locations: 0° 0'22"

Geodetic Azimuth: 73° 20'40" (N73°20'40"E), 488.49'

## **<u>Certification:</u>**

I, Sam A. Aylett, a Professional Land Surveyor in the State of Missouri do hereby certify that the Height Measurement Survey was completed for the above-described property on August 22, 2016 under my direct supervision and that the information provided in this letter is true and correct to the best of my knowledge.



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## Item 6 Sampling System Measurements - KMBZ

Impedance measurements were made of the antenna monitor sampling system using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The measurements were made looking into the antenna monitor ends of the sampling lines for two conditions – with and without the sampling lines connected to the sampling transformers at the antenna tuning units.

The sample lines are equal lengths of 1/2" Andrew LDF4-50A Heliax cable.

The following table shows the frequency closest to the carrier frequency where series resonance – zero reactance corresponding with low resistance – was found. As frequencies of resonance occur at odd multiples of 90 degrees electrical length, the sampling line length at the resonant frequency above carrier frequency – which is the closest one to the carrier frequency – was found to be 450 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by multiplying 450 degrees by the ratio of the carrier frequency (980 kHz) to the resonant frequency.

Tower	Tower Sample Line Open Circuited Resonant Frequency (kHz)		Measured Impedance at 980 kHz with Sample Transformer Connected	
2	1087.4	243.33	53.0 -j1.7	
3	1087.6	243.29	52.5 -j1.7	
4	1087.9	243.22	52.7 -j1.8	

#### Sample Line Measurements - KMBZ

The sample line lengths meet the requirement that they be equal in length to within 1 electrical degree.

In order to determine the characteristic impedance values of the sampling lines, open-circuited measurements were made with frequencies offset to produce +/- 45 degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where R1 +j X1 and R2 +j X2 are the measured impedances at the +45 and -45 degree offset frequencies, respectively:

## $Zo = ((R_1^2 + X_1^2)^{1/2} \times (R_2^2 + X_2^2)^{1/2})^{1/2}$

Tower	-45° Offset Frequency (kHz)	-45° Offset Measured Impedance	+45° Offset Frequency (kHz)	+45° Measured Impedance	Calculated Characteristic Impedance
2	906.167	3.0 -j50.4	1268.633	3.1 +j50.5	50.5
3	906.333	3.2 -j50.0	1268.867	4.9 +j49.9	50.1
4	906.583	3.2 -j50.1	1269.217	4.9 +j50.0	50.2

## KMBZ Sample Line Characteristic Impedance Calculations

The sample line measured characteristic impedances meet the requirement that they be equal within 2 ohms.

The sample current transformers were tested by feeding their outputs to the "A" and "B" inputs of the network analyzer, while feeding the output of the network analyzer through the sample transformers and into a resistive load. The transformers were in agreement with the reference tower transformer to within 0.2° of phase and 0.1% of ratio.

The antenna monitor calibration certificate is included on the next page of this report.



# Potomac Instruments. inc. 7309 Grove Rd UnitD Frederick, MD 21704 Phone 301-696-5550 Fax 301-696-5553

# Certificate of Calibration

For

Medium Wave Directional Antenna Monitor

Model: 1901-3

Serial Number: 941

Performed for: KMBZ

Address:

7000 Squibb Road Mission, KS 66202

Calibration Frequency: 980 kHz

Termination Impedance: 50  $\Omega$ 

Temperature: 72° F

Relative Humidity: 42%

Equipment Modifications from Standard: None

This document certifies that the above instrument has been tested and calibrated in accordance with factory calibration procedures under the conditions noted using standards that are traceable to the National Institute of Standards and Technology (NIST).

Approved By:

Zachary Babendreier

Calibration Date: 11/10/2016

Next Recommended Calibration: November 2019

# Item 7 Reference Field Strength Measurements - KMBZ

Reference field strength measurements were made along radials of minimum and maximum radiation for the directional pattern. The transmitter power was adjusted to 5.4 kW for the nighttime pattern measurements.

Measurements were made using a Potomac Instruments field strength meter, model PI4100, serial # 351. This meter was calibrated by the manufacturer in November 2015. All measurements were taken by KMBZ engineer Ken Wolf.

The measured field strengths and descriptions including GPS (NAD83) coordinates for the reference measurement points are shown on the following pages.

## **Reference Point Measurements - KMBZ - Night**

54.5° 4.31km 41.8 mV/m Manhole cover in front of 3300 S. Denton 39 3 45.3 94 28 4.3

54.5° 4.68 km 35.1 mV/m Fire hydrant across from 9812 E. Linwood Blvd 39 3 55.8 94 27 46.1

54.5° 5.24 km 32.6 mV/m Manhole cover in front of 10305 E 30<sup>th</sup> St 39 4 5.3 94 27 25.9

 126.5°
 1.03 km
 88.1 mV/m

 Fire hydrant at 7602 50<sup>th</sup>
 39 2 0.1 94 29 47.4
 50 th

126.5° 3.28 km 46 mV/m Manhole cover in yard of 5520 Hunter 39 1 21.3 94 28 42.1

126.5° 4.76 km 13.4 mV/m Fire hydrant in front of 9804 59<sup>th</sup> Terrace 39 0 53.6 94 27 51.8

199°5.02 km51.1 mV/mNorth end of parking lot of off-leash dog park, at gate (in Swope Park)38 59 51.2 94 31 37.2

 199°
 6.16 km
 32.6 mV/m

 Loading dock at 4530 E 75<sup>th</sup> Street
 38 59 19.0 94 32 2.3

199°6.87 km36.1 mV/mTurn out on west side of Blue River Road north of 87<sup>th</sup> by large power company box38 58 56.2 94 32 9.8

268° 3.88 km 152 mV/m SE corner of convenience store parking lot at SE corner of Swope Parkway & Prospect Ave 39 2 18.3 94 33 12.3

268° 4.47 km 89.1 mV/m Fire hydrant in front of 2021 E. 48<sup>th</sup> Street 39 2 21.1 94 33 37.1

268°4.97 km93.4 mV/mNorth edge of parking lot of Paseo Performing Arts Center parking lot at base of stairs39 2 18.4 94 33 57.7

#### **Spurious Emissions Measurements**

A computer program was used to generate a list of all first through third order intermodulation products generated by the combination of 760 kHz and 980 kHz, from 500-5000kHz. While both KCCV and KMBZ were operating in their respective daytime modes, each of these frequencies was measured with a Potomac Instruments FIM 4100 field strength meter, and the level of each of these was compared to the level of 760 kHz (which was the lower of the two stations at the measurement point). In most cases, those frequencies which were less than 80 dB below the level of KCCV were observed to have audio not related to KCCV or KMBZ, and were therefore deemed to be from another source. The signals which did not contain identifiable audio were checked by briefly interrupting the carrier of KMBZ. As all of these signals remained unchanged during the interruption of KMBZ, it was determined that they were not the result of intermodulation between KCCV and KMBZ.

#### **Direct Measurement of Power - KMBZ**

Common point impedance measurements were made using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The measurements were made at the phasor cabinet input jack adjacent to the common point current meter that is used to determine operating power. The common point impedance was adjusted such that the impedance at the transmitter output, as indicated on the Smith chart on the transmitters digital interface, was 50 j0. This resulted in an impedance at the location of the common point meter of 52 -j8.5.

The copy of Form 302 included in this application specifies non-directional daytime operation using tower #4 (ASR 1242370). Entercom requests that the new station license authorize use of tower #3 (ASR 1034739) as an alternate non-directional daytime antenna. The measured impedance of this tower is 184 +j292, therefore the base current for this tower for daytime operation is 7.0 amps.

Entercom also respectfully requests that the theoretical field parameters for the nighttime directional antenna contained in the CDBS be adjusted by reversing the order of the non-reference towers. This will result in the towers being listed in the CDBS in the same order as on the antenna monitor. The requested parameters are shown on the following page.

Entercom additionally requests authorization to determine operating power by use of the transmitter power output meter. The transmitter is a Nautel NX10.



¥ <sup>2</sup>

#### Certification

This Engineering Report has been prepared personally by the undersigned or under my immediate supervision, and all representations are true and correct to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission, I am an engineer in the firm of Hatfield & Dawson Consulting Engineers, LLC, and I am Registered as a Professional Engineer in the States of Washington and Oregon.

October 24, 2017



Thomas S. Gorton P.E.

APPENDIX A: Construction Permit BP-20140729ACZ



# United States of America FEDERAL COMMUNICATIONS COMMISSION AM BROADCAST STATION CONSTRUCTION PERMIT

Authorizing Official:

Official Mailing Address:

ENTERCOM LICENSE, LLC 401 E. CITY AVENUE SUITE 809 BALA CYNWYD PA 19004

Facility Id: 6382

Call Sign: KMBZ

Permit File Number: BP-20140729ACZ

Son Nguyen Supervisory Engineer Audio Division

Media Bureau

Grant Date: January 14, 2015

This permit expires 3:00 a.m. local time, 36 months after the grant date specified above.

This supersedes authorization of same date to remove special condition for KDMR. (JBS 3/4/15)

Subject to the provisions of the Communications Act of 1934, as amended, subsequent acts and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions set forth in this permit, the permittee is hereby authorized to construct the radio transmitting apparatus herein described. Installation and adjustment of equipment not specifically set forth herein shall be in accordance with representations contained in the permittee's application for construction permit except for such modifications as are presently permitted, without application, by the Commission's Rules.

Commission rules which became effective on February 16, 1999, have a bearing on this construction permit. See Report & Order, Streamlining of Mass Media Applications, MM Docket No. 98-43, 13 FCC RCD 23056, Para. 77-90 (November 25, 1998); 63 Fed. Reg. 70039 (December 18, 1998). Pursuant to these rules, this construction permit will be subject to automatic forfeiture unless construction is complete and an application for license to cover is filed prior to expiration. See Section 73.3598.

Equipment and program tests shall be conducted only pursuant to Sections 73.1610 and 73.1620 of the Commission's Rules.

Hours of Operation: Unlimited

Average hours of sunrise and sunset: Local Standard Time (Non-Advanced)

Jan.	7:30	AM	5:15	PM	Jul.	5:00	AM	7:45	PM
Feb.	7:15	AM	6:00	PM	Aug.	5:30	AM	7:15	PM
Mar.	6:30	AM	6:30	PM	Sep.	6:00	AM	6:30	PM
Apr.	5:45	AM	7:00	PM	Oct.	6:30	AM	5:45	PM
May	5:00	AM	7:30	PM	Nov.	7:00	AM	5:00	PM
Jun.	4:45	AM	7:45	PM	Dec.	7:30	AM	5:00	PM

Callsign: KMBZ

Permit No.: BP-20140729ACZ

Name of Permittee: ENTERCOM LICENSE, LLC

Station Location: KANSAS CITY, MO

Frequency (kHz): 980

Station Class: B

Antenna Coordinates:

Day

Latitude:	N	39 I	Deg	02	Min	25	Sec	
Longitude:	W	94 T	Dea	30	Min	30	Sec	

Night

Latitude:	N	39 Deg	02 Min	25 Sec
Longitude:	W	94 Deg	30 Min	30 Sec

Transmitter(s): Type Accepted. See Sections 73.1660, 73.1665 and 73.1670 of the Commission's Rules.

Nominal Power (kW): Day: 9.0 Night: 5.0

Antenna Mode: Day: ND Night: DA

(DA=Directional Antenna, ND=Non-directional Antenna; CH=Critical Hours)

Antenna Registration Number(s):

#### Day:

Tower	No.	ASRN	Overall	Height	(m)
	1	1034740			

#### Night:

Tower No. ASRN Overall Height (m) 1 1034741 2 1242370 3 1034739

Callsign: KMBZ	Permit No.:	BP-20140729ACZ
DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM		
Theoretical RMS (mV/m/km):	Night: 678.3	
Standard RMS (mV/m/km):	Night: 712.6	

Augmented RMS (mV/m/km):

Q Factor:

Night:

Night: 712.6

Theoretical Parameters:

Night Directional Antenna:

Tower No.	Field Ratio	Phasing (Deg.)	Spacing (Deg.)	Orientation (Deg.)	Tower Ref Switch *	Height (Deg.)
1	1.0000	0.000	0.0000	0.000	0	116.1
2	0.5300	61.000	175.1000	73.400	0	116.1
3	0.2750	45.000	174.1000	118.000	. 0	116.1

\* Tower Reference Switch

0 = Spacing and orientation from reference tower

1 = Spacing and orientation from previous tower

Non-Directional Antenna: Day Radiator Height: 98.6 meters; 116.1 deg Theoretical Efficiency: 322.51 mV/m/kw at 1km

Inverse Distance Field Strength: The inverse distance field strength at a distance of one kilometer from the above antenna in the directions specified shall not exceed the following values:

Night:		
Azimuth:	Radiation:	
54.5	344.9	mV/m
126.5	182.6	mV/m
268	725.8	mV/m

#### Callsign: KMBZ

Permit No.: BP-20140729ACZ

Special operating conditions or restrictions:

- The permittee must submit a proof of performance as set forth in either Section 73.151(a) or 73.151(c) of the rules before program tests are authorized. A proof of performance based on field strength measurements, per Section 73.151(a), shall include a complete nondirectional proof of performance, in addition to a complete proof on the (night) directional antenna system. The nondirectional and directional field strength measurements must be made under similar environmental conditions. The proof(s) of performance submitted to the Commission must contain all of the data specified in Section 73.186 of the rules. Permittees who elect to submit a moment method proof of performance, as set forth in Section 73.151(c), must use series-fed radiators. In addition, the sampling system must be constructed as described in Section 73.151(c) (2) (i).
- 2 Permittee shall install a type accepted transmitter, or submit application (FCC Form 301) along with data prescribed in Section 73.1660(b) should non-type accepted transmitter be proposed.
- Before program tests are authorized, sufficient data shall be 3 submitted to show that adequate filters, traps and other equipment has been installed and adjusted to prevent interaction, intermodulation and/or generation of spurious radiation products which may be caused by common usage of the same antenna system by Stations KMBZ and KCCV ID# 6491 and there shall be filed with the license application copies of a firm agreement entered into by the two stations involved clearly fixing the responsibility of each with regard to the installation and maintenance of such equipment. In addition, field observations shall be made to determine whether spurious emissions exist and any objectionable problems resulting therefrom shall be eliminated. Following construction, and prior to authorization of program test under this grant, both stations shall each measure antenna or common point resistance and submit FCC Form 302 as application notifying the return to direct measurement of power.
- 4 A license application (FCC Form 302) to cover this construction permit must be filed with the Commission pursuant to Section 73.3536 of the Rules before the permit expires.
- 5 Licensee shall be responsible for satisfying all reasonable complaints of blanketing interference within the 1 V/m contour as required by Section 73.88 of the Commission's rules.
- 6 Ground system consists of 120 equally spaced, buried, copper radials about the base of each tower, each 98.6 meters in length except where intersecting radials are shortened and bonded to a transverse copper strap between adjacent towers,

\*\*\* END OF AUTHORIZATION \*\*\*

FCC Form 351 August, 1997