TECHNICAL STATEMENT
IN SUPPORT OF APPLICATION FOR
MODIFICATION OF LICENSE
KWYY CHANNEL 238C
MIDWEST, WY.
FCC FACILITY 26300

This technical statement has been prepared on behalf of Townsquare Media Casper License, LLC, licensee of the above referenced FM Broadcast station.

Due to sustained damage to its main antenna, KWYY has been operating on an STA authorizing operation with reduced power.[1] This application also requests termination of said STA.

The licensee has now replaced its antenna with an ERI SHPX-10C-SP diplexed antenna.

This antenna is shared with Co-owned FM Station KRVK, FCC facility I.D. 88406, licensed to Vista West, WY.

An FCC Form 302FM for modification of license is being simultaneously filed for KRVK.

Exhibit -A- is a complete report showing the results of inter-modulation measurements produced by the subject antenna. These measurements were conducted by Mr. Richard Jones of RJ Engineering who is fully qualified and experienced in the making of such measurements.

The new antenna has been installed at the same center of radiation as that of the old antenna, thus the HAAT remains the same as presently authorized.[2]

Environmental Considerations

In as much as this application is solely for a change in antenna system, the only environmental consideration is that of RFR.

Exhibit –B- attached, shows the electrical specifications for the subject antenna.

Utilizing the OET's FM Model program and comparing power density radiated by the old antenna to that of the new antenna results in the following:

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[1] See BSTA-20130702ABP
[2] See BLH-20071101ABU

The old antenna, a Dielectric DCRM-10 bay with 0.91λ bay spacing shows a power density of 0.23 μw/cm² at two meters above ground at the base of the tower.[3]

The new antenna an ERI SHPX-10AC6-SP with 1.069λ bay spacing shows a power density of 2.54 μw/cm² two meters above ground at the base of the tower.[4]

The old antenna shows a maximum power density 2 meters above ground level of 3.77 μw/cm² occurring 41 meters from the base of the tower, or 1.9% of the MPE of 200 μw/cm² for un-controlled areas.

The new antenna shows a maximum power density 2 meters above ground level of 63.5 μw/cm² occurring 44.4 meters from the base of the tower, or 31.75% of the MPE of 200 μw/cm² for un-controlled areas.

There are two other FM Stations operating on the subject tower:

KRNK CH-242C2 Facility I.D. 7360 Licensed to Casper, WY.[5]

KTRS-FM CH-284C1 Facility I.D. 26301 Licensed to Casper, WY.[6]

Although the additional power density at two meters above ground level produced by the above two stations added to that produced by KWYY and KRVK is insignificant, Figure 1 attached is a matrix showing the sum of the power density produced by all four stations within a 100 meter radius of the tower and the percentage of the allowable MPE for both controlled and un-controlled areas as defined in OET Bulletin 65 edition 97-01.

The licensee is maintaining a protective fence around the tower with appropriate warning signs strategically placed.

The licensee in cooperation with other users of the site will either reduce power or cease operations altogether in order to protect workers while on the tower.

It is believed that this application either meets or exceeds all rules and regulations as set forth in 47CFR part 73.

Fred W. Greaves Jr.
Technical Consultant
December 19, 2013

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[3] 0.02% of the MPE of 1000 μw/cm² for controlled areas
[4] 0.25% of the MPE of 1000 μw/cm² for controlled areas
[5] See BLH-20110804ABG
[6] See BLH−20060927ANT

EXHIBIT -A-

KRVK-FM

Broadcast Transmissions Bandwidth Specifications
FCC Rules Part 73.317
Facility ID 88406

October 22, 2013

EXHIBIT -A-

KRVK-FM EMISSIONS REPORT

This report is to show compliance with part 73.317 of the FCC Rules for Broadcast Transmissions Bandwidth Specifications. Myself, Richard Jones license PG-13-5961, took the following measurements on October 22, 2013. All readings were taken under my direct supervision and are true and accurate to the best of my knowledge.

An Anritsu 2721B S/N 0716214 swept-frequency RF spectrum analyzer using a peak hold duration of several minutes, with no video filtering, was used for most of the tests. The signals were taken off a sample port on the transmission line of the transmitter. The harmonic measurements were taken from the same port and high pass filter to filter out the main carrier frequency from the spectrum analyzer. This prevents mixing and overload of the analyzer.

These measurements were taken after the installation of a new 10 bay ERI SHPX-10AC antenna system. This station KRVK and KWYY are combined into the new antenna using a Dielectric Combiner System.

Before measurements were taken, all transmitting equipment was checked to be certain it was operating in normal and proper conditions and that the transmitter was operating at full licensed power. Both stations, KRVK-FM and KWYY-FM, were at full power and operating under normal program conditions.

Sweep #4 shows the potential mix between this station and the combine station KWYY-FM on 95.5 mHz.

Sweep #5 is the 2nd harmonic. This and the other harmonic measurements were taken with a high pass filter to prevent mixing and harmonic generation within the analyzer.

Sweep #6 is the 3rd harmonic.

The station is shown to be in compliance with the FCC rules.

All spectrum analyzer measurements were taken on October 22, 2013.

All measurements taken are true and correct to the best of my knowledge.

Richard G. Jones Date:
KRVK-FM

§73.317 FM transmission system requirements.

(a) FM broadcast stations employing transmitters authorized after January 1, 1960, must maintain the bandwidth occupied by their emissions in accordance with the specification detailed below. FM broadcast stations employing transmitters installed or type accepted before January 1, 1960, must achieve the highest degree of compliance with these specifications practicable with their existing equipment. In either case, should harmful interference to other authorized stations occur, the licensee shall correct the problem promptly or cease operation.

(b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated at least 25 dB below the level of the unmodulated carrier. Compliance with this requirement will be deemed to show the occupied bandwidth to be 240 kHz or less.

(c) Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the unmodulated carrier.

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 + 10 Log10 (Power, in watts) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

(e) Preemphasis shall not be greater than the impedance-frequency characteristics of a series inductance resistance network having a time constant of 75 microseconds. (See upper curve of Figure 2 of §73.333.)

FM Occupied Bandwidth Measurements

Station Call Letters KRVK-FM Frequency 107.900 Mhz Date 10-22-13
Transmitter BE FM 4C Engineer Conducting Tests Richard Jones
Test Equipment Anritsu 2721B Analyzer, Microwave filter 5000V-9 High Pass Filter

Notes The high pass filter was used for harmonic measurements.

Measurements

Carrier Frequency: 107.9000 Carrier Level -10 dBm

Frequency	Limit	Measured Level
120 to 240 KHz	-25 DB	-30.0 dBm
240 to 600 KHz	-35 DB	-69.0 dBm
Greater than 600 KHz	See Chart	-84.0 dBm

Harmonics

Harmonic Frequency			Measured Level		Harmonic Frequency			Measured Level	
2nd	215.8	Mhz	-90.0	dBm	7th	755.3	Mhz	-90.0	dBm
3rd	323.7	Mhz	-90.0	dBm	8th	863.2	Mhz	-90.0	dBm
4th	431.6	Mhz	-90.0	dBm	9th	971.1	Mhz	-90.0	dBm
5th	539.5	Mhz	-90.0	dBm	10th	1,079.0	Mhz	-90.0	dBm
6th	647.4	Mhz	-90.0	dBm					

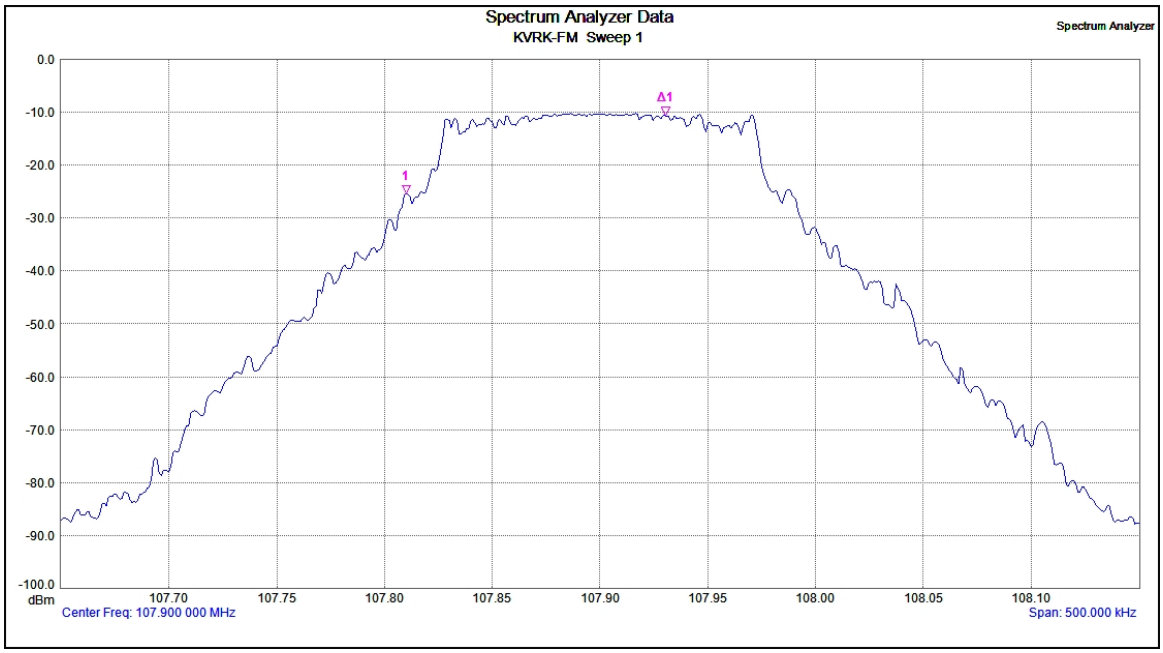
Spurious and Harmonic Levels

Spurious and harmonic radiation beyond 600 KHz from carrier must be suppressed below the limits listed below. 1 – 10 watt translators are allowed –60 DB. Formula = Power in watts Log X 10 + 43 = DB

250 Watts = -66.9 DB
500 Watts = -70.0 DB
1000 Watts = -73.0 DB
1500 Watts = -74.7 DB
2500 Watts = -77.0 DB
3500 Watts = -78.4 DB
5000 Watts = -80.0 DB

RJ Engineering

Prepared for: **Townsquare Media**
Location:
Date: Date: 10/22/2013 4:17:03 PM



Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Max Hold	Detection	Peak
Preamp	OFF	Center Frequency	107.900 000 MHz
Min Sweep Time	0.001 S	Start Frequency	107.650 000 MHz
Reference Level Offset	0 dB	Stop Frequency	108.150 000 MHz
Input Attenuation	10.0 dB	Frequency Span	500.000 000 kHz
RBW	3.0 kHz	Reference Level	0.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=17=03 PM

RJ Engineering

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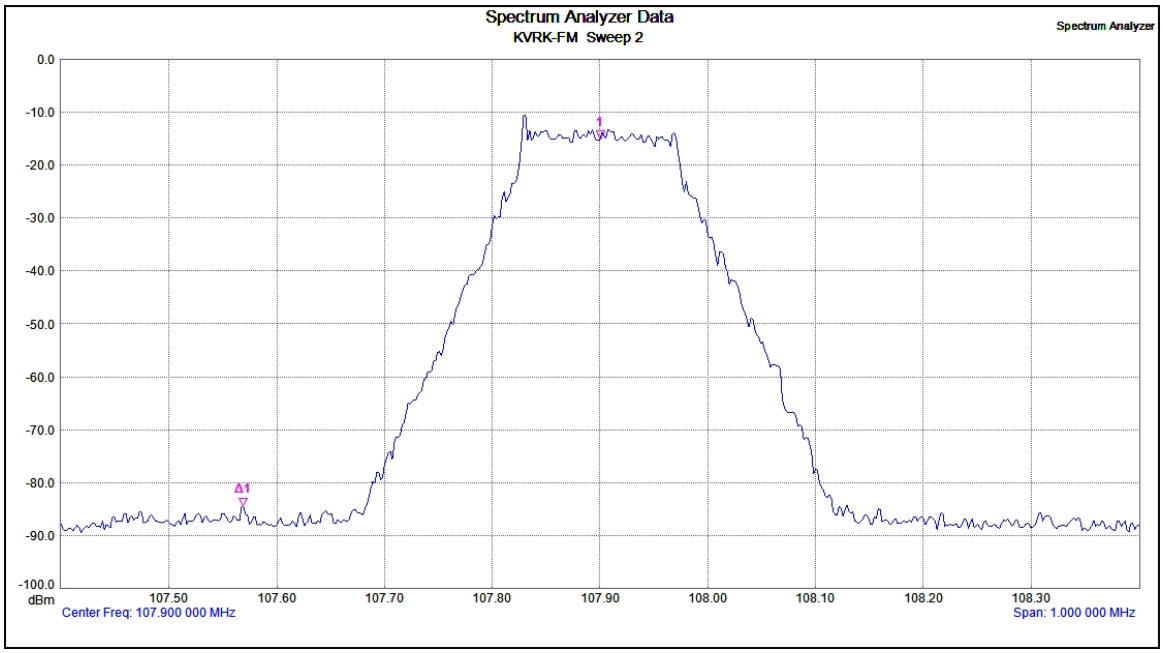

Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Max Hold	Detection	Peak
Preamp	OFF	Center Frequency	107.900 000 MHz
Min Sweep Time	0.001 S	Start Frequency	107.400 000 MHz
Reference Level Offset	0 dB	Stop Frequency	108.400 000 MHz
Input Attenuation	10.0 dB	Frequency Span	1.000 000 MHz
RBW	3.0 kHz	Reference Level	0.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=20=09 PM

RJ Engineering

Prepared for: **Townsquare Media**
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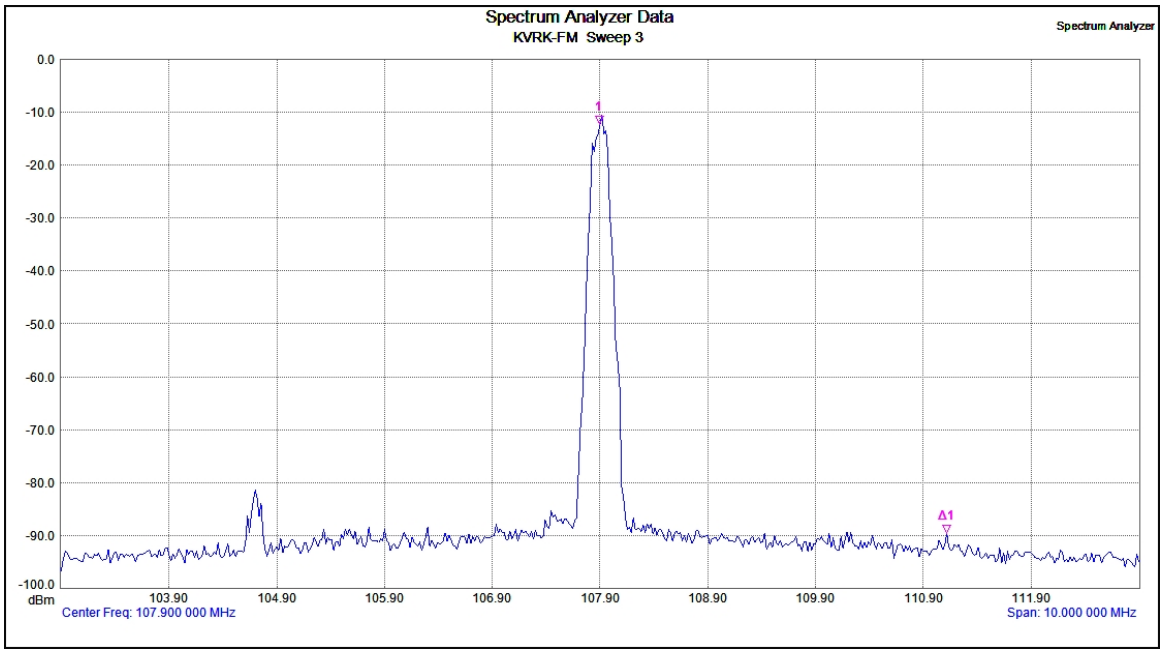

Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Max Hold	Detection	Peak
Preamp	OFF	Center Frequency	107.900 000 MHz
Min Sweep Time	0.001 S	Start Frequency	102.900 000 MHz
Reference Level Offset	0 dB	Stop Frequency	112.900 000 MHz
Input Attenuation	10.0 dB	Frequency Span	10.000 000 MHz
RBW	3.0 kHz	Reference Level	0.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=21=57 PM

RJ Engineering

Prepared for: **Townsquare Media**
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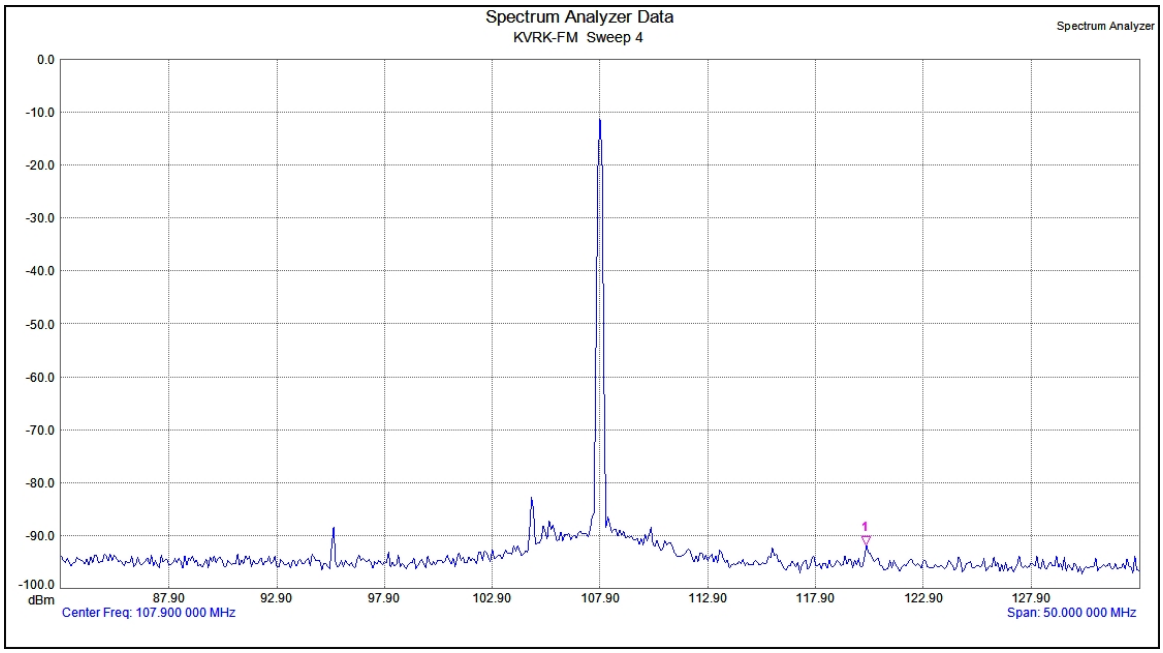

Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Max Hold	Detection	Peak
Preamp	OFF	Center Frequency	107.900 000 MHz
Min Sweep Time	0.001 S	Start Frequency	82.900 000 MHz
Reference Level Offset	0 dB	Stop Frequency	132.900 000 MHz
Input Attenuation	10.0 dB	Frequency Span	50.000 000 MHz
RBW	3.0 kHz	Reference Level	0.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=24=18 PM

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Prepared for: **Townsquare Media**
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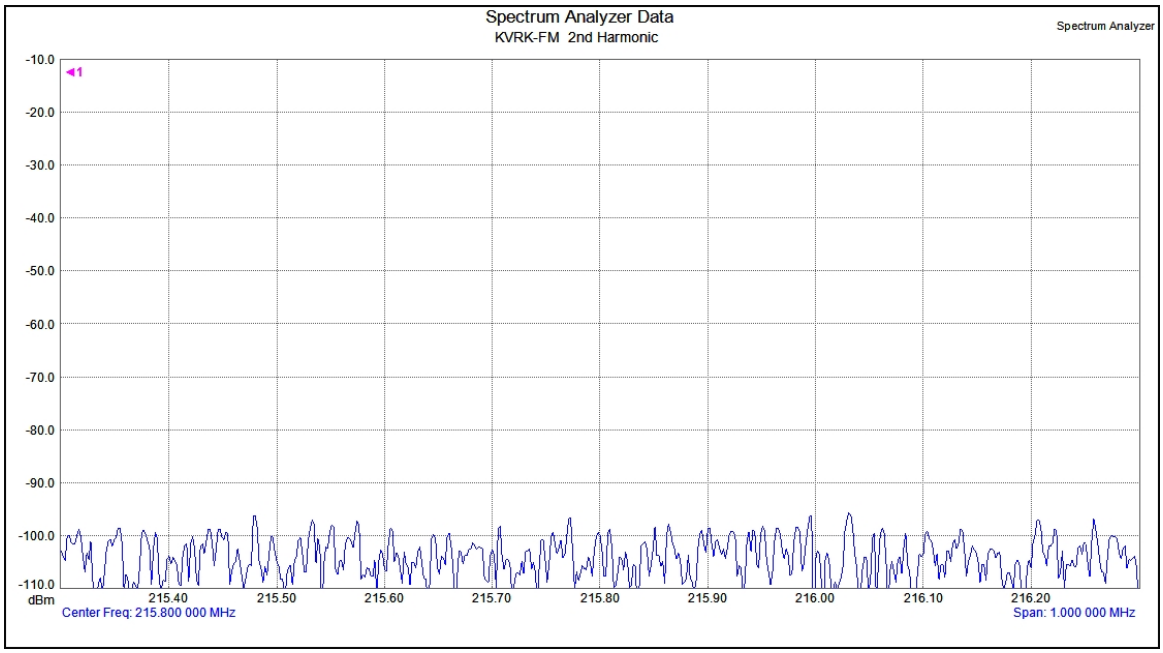

Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	215.800 000 MHz
Min Sweep Time	0.001 S	Start Frequency	215.300 000 MHz
Reference Level Offset	0 dB	Stop Frequency	216.300 000 MHz
Input Attenuation	10.0 dB	Frequency Span	1.000 000 MHz
RBW	3.0 kHz	Reference Level	-10.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=25=36 PM

RJ Engineering

Prepared for: Townsquare Media
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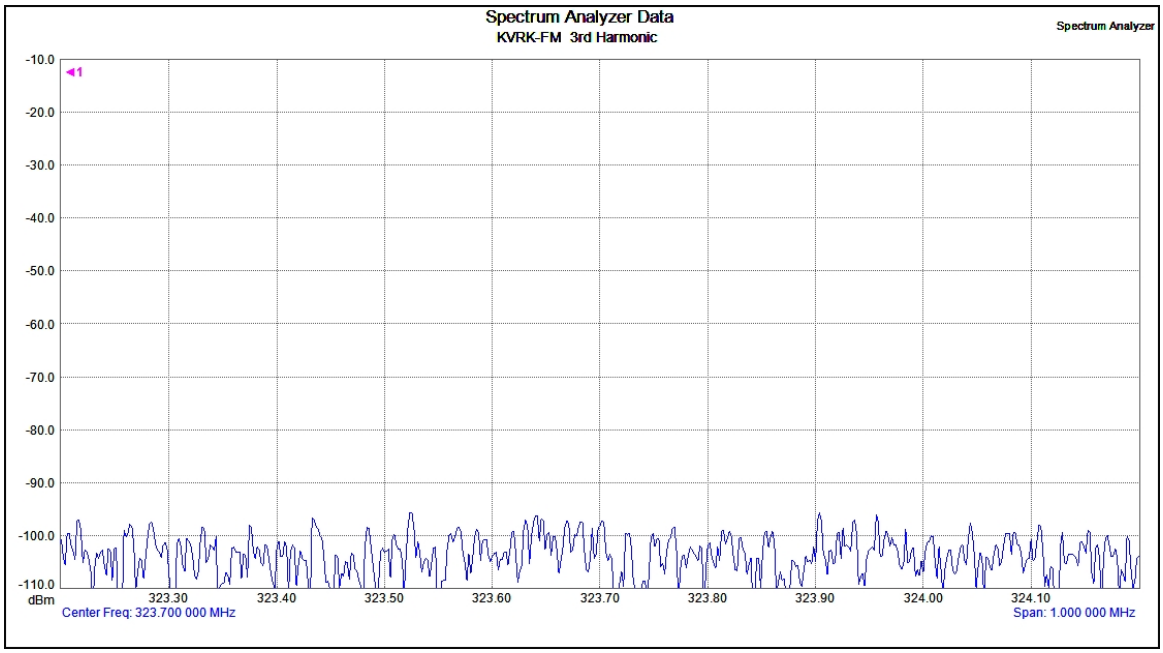

Measurement Summary			
Trace A data		VBW	3.0 MHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	323.700 000 MHz
Min Sweep Time	0.001 S	Start Frequency	323.200 000 MHz
Reference Level Offset	0 dB	Stop Frequency	324.200 000 MHz
Input Attenuation	10.0 dB	Frequency Span	1.000 000 MHz
RBW	3.0 kHz	Reference Level	-10.000 dBm

Device Summary			
Serial Number	716214	Model	MS2721B
Base Ver.	V4.32	Options	9, 19, 20, 25, 31
App Ver.	V5.73	Date	10/22/2013 4=26=30 PM

EXHIBIT -B-

TECHNICAL PROPOSAL
FOR
MIDWEST & VISTA WEST, WY.
ERI SHPX-10C-SP
DIPLEXED FM ANTENNA
AND
ERI "TEE" COMBINER

OPERATING FREQUENCIES: . . . . . 95.5 MHz. & 107.9 MHz.
LINE LENGTH AND TYPE ASSUMED: . . . . . 385.0 FT. 3-1/8" RIGID(1)
COMBINER: . . . . . "TEE" TYPE

ESTIMATED SYSTEM OPERATING PARAMETERS:

FREQUENCY (MHz.)	ERP (KW.)	POWER GAIN	LINE LOSS (dB.)	COMBINER LOSS (dB.)	TRANSMITTER OUTPUT(KW.)
95.5	100.0	5.077	-0.350	-0.3	22.87 KW.
107.9	15.5	4.828	-0.372	-0.3	3.75 KW.

ANTENNA SUMMARY:

ERI MODEL SHPX-10C-SP
[2 EACH 5 BAY ARRAYS COMBINED]
OPTIONAL RADOMES
115.625" BAY-TO-BAY SPACING
TYPICAL VSWR: 1.15:1 (MAX.) WITH MULTISLUG FIELD TUNING(1)
3-1/8" EIA 50 OHM INPUT FLANGE

COMBINER SUMMARY:

ERI MODEL TB83-3/80-3/3 "TEE" COMBINER
FORCED AIR COOLING ON HIGH POWER BRANCH (2)
OPTIONAL "U" CONFIGURATION
3-1/8" EIA 50 OHM INPUTS
3-1/8" EIA 50 OHM OUTPUT
TYPICAL INPUT VSWR <1.08:1(3)

Notes:
(1) For system reliability, multislug tuning and efficiency, 3-1/8" rigid line is specified.
(2)The combiner room ambient temperature should be maintained between 60 and 80 degrees Fahrenheit.
(3) With combiner output terminated with a 50 ohm test load.

EXHIBIT -B-

ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 1

----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD

10 ERI TYPE SHPX ROTOTILLER(TM) ELEMENTS
[2 EACH 5 BAY ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
12 PERCENT FIRST NULL FILL
15 PERCENT SECOND NULL FILL
POWER GAIN IS 5.077 IN THE HORIZONTAL PLANE(5.077 IN THE MAX.)

JUNE 12, 2013

95.5 MHz.

ELEMENT SPACING:
115.625 INCHES

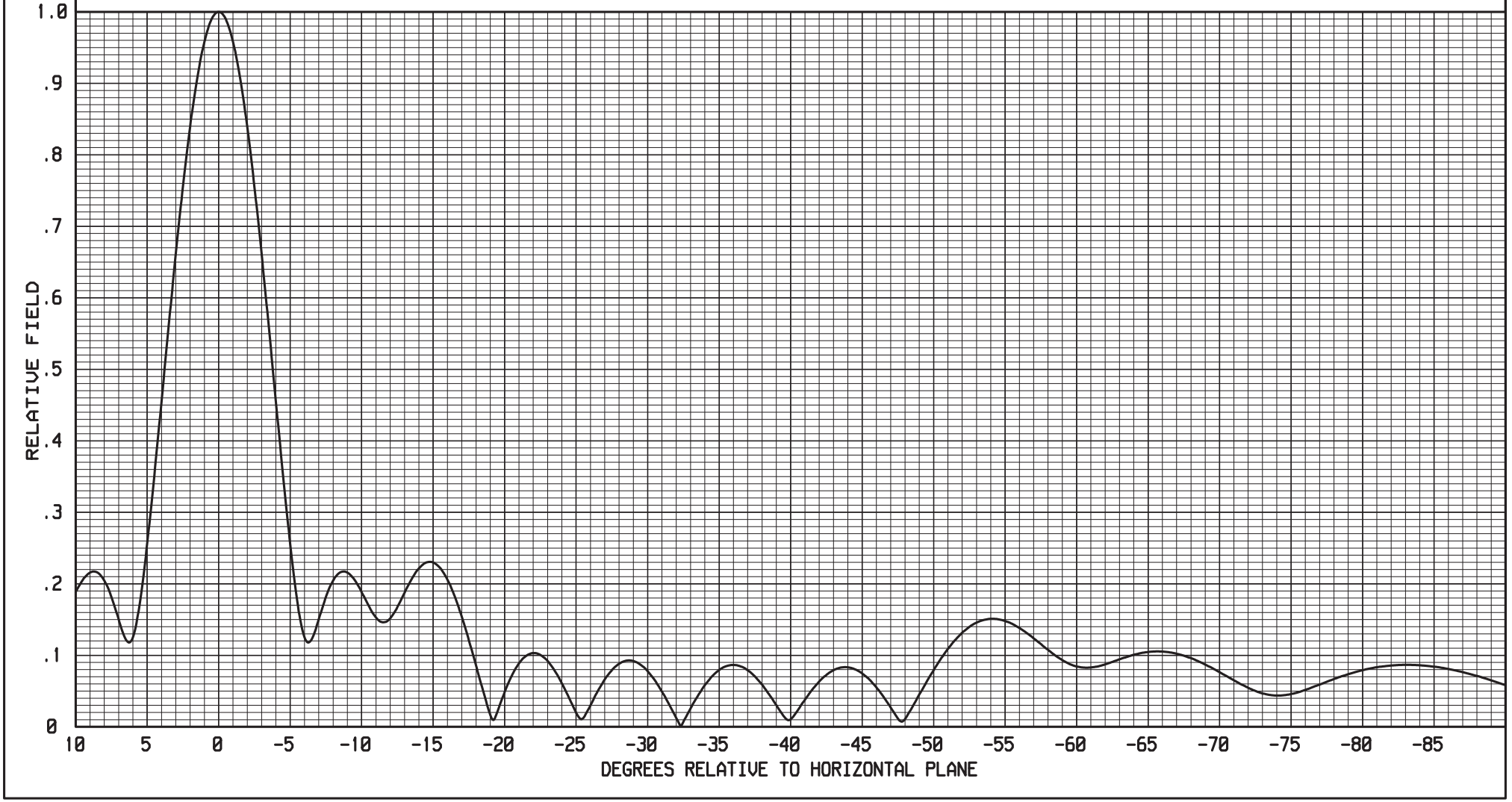

EXHIBIT -B-

ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 2

----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD

10 ERI TYPE SHPX ROTOTILLER(TM) ELEMENTS
[2 EACH 5 BAY ARRAYS COMBINED]
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
12 PERCENT FIRST NULL FILL
15 PERCENT SECOND NULL FILL
POWER GAIN IS 4.828 IN THE HORIZONTAL PLANE(4.828 IN THE MAX.)

JUNE 12, 2013

107.9 MHz.

ELEMENT SPACING:
115.625 INCHES

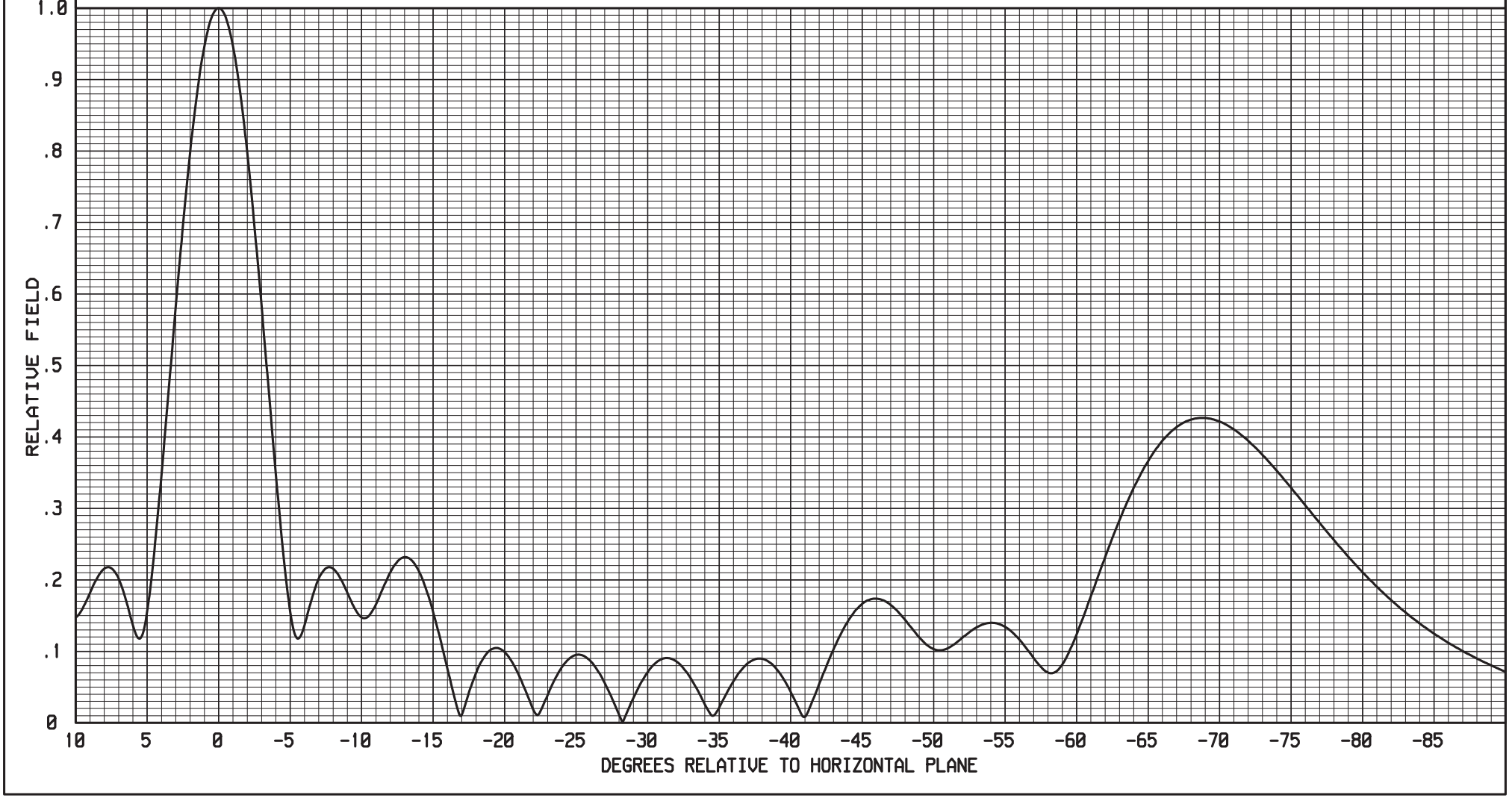

FIGURE 1

Power density within 100 meters

Distance Meters	KRVK µw/cm²	KWYY µw/cm²	KRNK µw/cm²	KTRS µw/cm²	Total µw/cm²	%MPE Controlled	%MPE Un-Controlled	
0	0.008	2.54	0.12	6.7	9.37	0.9%	4.7%	
2	0.008	2.57	0.12	6.9	9.61	1.0%	4.8%	
4	0.009	2.67	0.12	7.1	9.90	1.0%	5.0%	
6	0.010	2.84	0.12	7.3	10.27	1.0%	5.1%	
8	0.011	3.08	0.12	7.9	11.11	1.1%	5.6%	
10	0.013	3.52	0.11	8.9	12.55	1.3%	6.3%	
12	0.018	4.43	0.10	9.8	14.36	1.4%	7.2%	
14	0.023	5.61	0.09	10.8	16.52	1.7%	8.3%	
16	0.031	7.10	0.08	12.2	19.41	1.9%	9.7%	
18	0.040	8.98	0.06	13.6	22.68	2.3%	11.3%	
20	0.051	11.38	0.04	14.7	26.17	2.6%	13.1%	
22	0.065	14.42	0.02	15.8	30.31	3.0%	15.2%	
24	0.081	18.09	0.01	16.5	34.68	3.5%	17.3%	
26	0.098	22.41	0.00	**16.9**	39.41	3.9%	19.7%	
28	0.115	27.36	0.01	16.7	44.18	4.4%	22.1%	
30	0.132	32.76	0.03	15.9	48.82	4.9%	24.4%	
32	0.147	38.46	0.06	14.6	53.26	5.3%	26.6%	
34	0.157	44.27	0.11	12.9	57.44	5.7%	28.7%	
36	0.163	49.90	0.16	10.9	61.12	6.1%	30.6%	
38	0.163	54.97	0.22	8.7	64.05	6.4%	32.0%	
40	0.156	59.17	0.28	6.5	66.10	6.6%	33.1%	
42	0.142	62.20	0.32	4.4	**67.07**	**6.7%**	**33.5%**	**←Max**
44	0.122	**63.52**	0.36	2.7	66.70	6.7%	33.3%	
46	0.098	62.85	**0.37**	1.4	64.72	6.5%	32.4%	
48	0.071	60.10	0.36	2.4	62.94	6.3%	31.5%	
50	0.044	55.34	0.34	5.2	60.93	6.1%	30.5%	
52	0.022	49.13	0.30	3.8	53.25	5.3%	26.6%	
54	0.006	41.59	0.24	0.3	42.15	4.2%	21.1%	
56	0.000	33.27	0.19	0.8	34.26	3.4%	17.1%	
58	0.005	24.85	0.13	1.5	26.48	2.6%	13.2%	
60	0.021	17.00	0.08	2	19.10	1.9%	9.5%	
62	0.047	10.32	0.04	2.5	12.90	1.3%	6.4%	
64	0.081	5.23	0.01	2.9	8.22	0.8%	4.1%	
66	0.119	1.89	0.00	3	5.00	0.5%	2.5%	
68	0.156	0.25	0.00	2.9	3.31	0.3%	1.7%	
70	0.188	0.09	0.02	2.6	2.90	0.3%	1.5%	
72	0.211	1.01	0.05	2.3	3.57	0.4%	1.8%	
74	**0.221**	2.50	0.09	1.8	4.61	0.5%	2.3%	
76	0.218	4.09	0.12	1.3	5.73	0.6%	2.9%	
78	0.199	5.32	0.16	0.9	6.57	0.7%	3.3%	
80	0.170	5.95	0.19	0.5	6.81	0.7%	3.4%	
82	0.133	5.91	0.21	0.2	6.45	0.6%	3.2%	
84	0.094	5.25	0.22	0.06	5.63	0.6%	2.8%	
86	0.058	4.17	0.23	9.8	14.25	1.4%	7.1%	
88	0.028	2.89	0.22	4.3	7.44	0.7%	3.7%	
90	0.008	1.67	0.21	0.17	2.06	0.2%	1.0%	
92	0.000	0.72	0.19	0.35	1.26	0.1%	0.6%	
94	0.005	0.15	0.17	0.56	0.88	0.1%	0.4%	
96	0.021	0.00	0.14	0.78	0.95	0.1%	0.5%	
98	0.047	0.23	0.11	0.97	1.36	0.1%	0.7%	
100	0.047	0.72	0.08	1.2	2.05	0.2%	1.0%	