WTRJ-FM, Orange Park, FL
WCRJ, Jacksonville, FL
Environmental Considerations
May, 2012

The proposed custom designed panel antenna will be face mounted on an existing support structure owned by American Tower (FCC ASR 1020783). The new antenna will be shared by WTRJ-FM (91.7 MHz) and WCRJ (88.1 MHz). The existing American Tower and the other towers in close proximity to the American Tower are currently used by a number of transmission facilities. Therefore, the proposed site is considered a multiple use transmitter site.

Effective October 15, 1997, the FCC adopted its current guidelines and procedures for evaluating environmental effects of radiofrequency emissions. The current guidelines are generally based on recommendations by the National Council on Radiation Protection and Measurements (NCRP) in NCRP Report No. 86 (1986), and by the American National Standards Institute and the Institute of Electrical and Electronic Engineers, Inc. (IEEE) in ANSI/IEEE C95.1-1992 (IEEE C95.1-1991). The FCC guidelines provide a maximum permissible exposure (MPE) level for occupational or "controlled" situations, as well as "uncontrolled" situations that apply in cases that affect the general public. The FCC's Office of Engineering and Technology (OET) Commission issued a technical bulletin (OET Bulletin No. 65) entitled, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (Edition 97-01, August 1997), to aid in the determination of whether FCC-regulated transmitting facilities, operations or devices comply with limits for human exposure to radiofrequency electromagnetic fields as adopted by the Commission in 1996. The Bulletin contains updated and additional technical information for evaluating compliance with the current FCC policies and guidelines.

The FCC MPE level for "uncontrolled" environments is 200 microwatts per centimeter squared ($\mu W/cm^2$) for FM facilities. The MPE level for FM facilities in a "controlled" environment is 1,000 $\mu W/cm^2$.

The applicant proposes to install a custom designed Shively 6016-3/1 panel antenna on the existing structure such that the overall height of the tower in not impacted. In order to achieve the proposed directional antenna horizontal plane radiation pattern, the panel array will consist of three panels mounted on one level of the tower such that the antenna's center of radiation is 189 meters above ground level. Each panel contains four antenna elements, two horizontal elements and two vertical elements (See attached Shively Labs Technical Data Sheet). Because horizontal elements of the antenna are separated by one-half wavelength vertically and the vertical elements of the antenna are separated by one-half wavelength horizontally, the power density contribution for each must be considered and calculated separately. According to the

antenna manufacturer, in order to properly predict the power density for the proposed array, one may consider a single bay antenna for the vertical component of the power density and a 2-bay half-wave spaced antenna for the horizontal component of the power density.

Using the methodology described above, the maximum horizontal component of the combined WTRJ-FM (6.5 kW ERP – DA-MAX) and WCRJ (8.0 kW ERP DA-MAX) proposed power density was determined to be 1.17 µW/cm² at a distance of 382 meters which represents 0.59% of the FCC guideline value for "uncontrolled" environments. Similarly, the maximum vertical component of the proposed power density was determined to be 3.84 µW/cm² at a distance of 108 meters which represents 1.92% of the FCC guideline value for "uncontrolled" environments. Considered together, the two stations' combined power density at two meters above ground level represents only 2.5% of the FCC guideline value for "uncontrolled" environments. Pursuant to Section 1.1307(b)(3) of the FCC Rules, because the combined WTRJ-FM/WCRJ operation would contribute less than 5% of both the uncontrolled and controlled exposure limit at the multiple use site, the proposal's power density contribution is insignificant.

OCCUPATIONAL SAFETY

The applicant will cooperate/coordinate with other site users and reduce power and/or cease operation during times of service or maintenance of the transmission systems as necessary to avoid potentially harmful exposure to personnel.

In light of the above, the proposed facility should be categorically excluded from RF environmental processing under Section 1.1307(b) of the Commission's Rules.

Shively Labs®

Model 6016P FM Panel Antenna

True Circular Polarization

Broadband 87.5 - 108 MHz; Designed for Multistation Use

15 kW Average, 100 kW Peak Power Rating per Panel

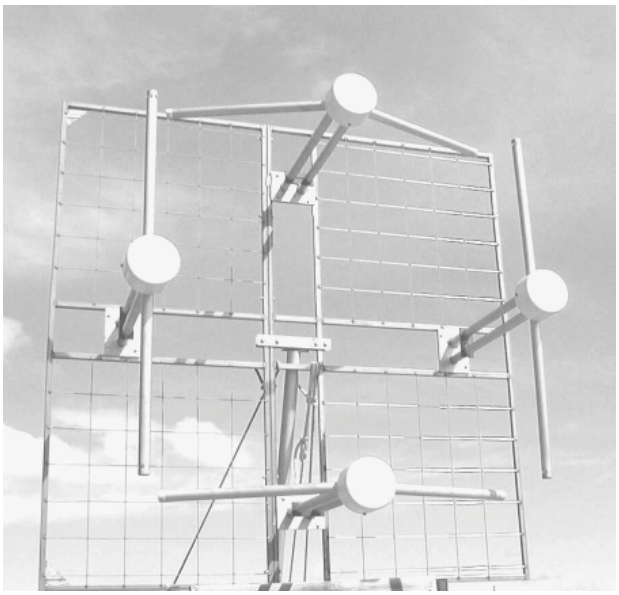
Designed for 4-Sided Towers

Omnidirectional ± 2 dB

Directional Versions Available

Minimum Maintenance

Stainless Steel Construction



Electrical Specifications (United States):

No. of Levels (4 panels each)	Gain		Power Rating	No. of Levels (4 panels each)	Gain		Power Rating
	Power	dB	kW		Power	dB	kW
1	0.7	-1.55	60	5	3.14	4.96	160
2	1.31	1.17	120	6	3.75	5.74	160
3	1.92	2.83	160	7	4.36	6.39	160
4	2.53	4.03	160	8	4.96	6.96	160

Electrical Specifications (Overseas: Gain = azimuth gain + elevation gain.)

No. of Levels (4 panels each)	Gain		Power Rating	No. of Levels (4 panels each)	Gain		Power Rating
	Power	dB	kW		Power	dB	kW
1	1.02	0.07	60	5	4.56	6.59	160
2	1.90	2.79	120	6	5.44	7.36	160
3	2.79	4.45	160	7	6.33	8.01	160
4	3.67	5.65	160	8	7.20	8.57	160

Performance Specifications:

Polarization: Right circular

VSWR: 1.1 : 1 over the FM band

Azimuth Pattern Circularity: Horizontal component ± 2 dB on a 5-ft triangular tower

Power Rating: 15 kW average per panel
100 kW peak per panel

Input: 6-1/8" EIA

Notes:

1. Our gain figures are derived from the computed directivity and include the losses in the antenna feed system. Gain is computed for 98 MHz and will vary across the band.

   Gain is provided for one polarization and is equal in circularly polarized antennas for both horizontal and vertical components. Gain will be reduced if special wavelength spacing is provided. Gain will increase in a directional array by the directivity of the azimuth pattern.

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A Division of Howell Laboratories, Inc., P. O. Box 389, Bridgton, Maine 04009 USA
(207) 647-3327 1-888-SHIVELY Fax: (207)647-8273
www.shively.com
sales@shively.com
An Employee-Owned Company
Certified to ISO-9001:2000

Model 6016P Size and Weight:

No. of Levels (4 panels each)	Vertical Tower Space		Weight			
	Antenna Radiation Aperture		without ice		with 1/2" (1.2 cm) radial ice	
	ft	m	lb	N	lb	N
1	10	3.3	1152	5138	2091	9326
2	20	6.6	2804	12506	4762	21239
3	30	9.8	3956	17644	6853	30564
4	40	13.1	5108	22782	8944	39890
5	50	16.4	6260	27920	11035	49216
6	60	19.7	7612	33950	13356	59568
7	70	23.0	8564	38195	15217	67868
8	80	26.2	9766	43556	17308	77194

Windload:

No. of Levels (4 panels each)	Revision 'C'				Revision 'F'			
	without ice		with 1/2" (1.2 cm) radial ice		without ice		with 1/2" (1.2 cm) radial ice	
	lb	N	lb	N	(ft2)	m2	(ft2)	m2
1	2425	10816	4450	19847	77	7.2	133	12.4
2	4850	21631	8900	39694	155	14.4	266	24.7
3	7275	32447	13350	59541	232	21.6	399	37.1
4	9700	43262	17799	79384	309	28.7	532	49.4
5	12125	54078	22249	99231	387	36.0	665	61.8
6	14550	64893	26699	119078	464	43.1	798	74.1
7	16975	75709	31149	138925	541	50.3	931	86.5
8	19400	86524	35599	158772	618	57.4	1064	98.8

Notes:

2. Vertical apertures are approximate, consisting of the distance between the top edge of the top panel to the bottom edge of the bottom panel. Contact us for the exact antenna aperture for your frequency.

   Please do not confuse vertical aperture with tower space needed for proper installation. Tower space required is greater. Contact us for details.

3. Windload and weight figures are approximate values and should be used for estimating purposes only. They assume a typical omnidirectional (4 panel per level) pattern. The figures include radiators, panels, panel hybrids, and a representative single input feed system. No values are included for mounts. The values for mounts, complex feed systems, and directional arrays may significantly affect these estimates. Please contact the factory for an estimate for a system to meet your specific requirements.

4. Antenna windloads are calculated for 112 mph (180 kph), using 50 psf (2400 N/m^2) for flats and 33 psf (1600 N/m^2) for rounds] per EIA standard RS-222-C and CSA standard S37-94. The surface area is calculated per EIA standard RS-222-F (C_aA_c).

5. Ask for technical assistance at Shively if you are planning to install antennas at altitudes over 3,000 ft AMSL.