TECHNICAL EXHIBIT

PREDICTED IMPACT OF FM TRANSLATOR
TRANSMITTING ANTENNA ON
NEARBY AM RADIO STATION WITH
DIRECTIONAL ANTENNA SYSTEM
TRANSLATOR W225CD
KINSTON, NORTH CAROLINA

October 3, 2014

CH 225 92.9 MHZ 0.25 KW 80 M (AGL)

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Executive Summary – W225CD

Information regarding a study of the potential impact of the new W225CD FM translator transmitting antenna, which is authorized by construction permit BPFT-20130930BOV, on the nighttime directional antenna pattern of nearby AM station WRNS is included herein. The non-directional daytime pattern of WRNS does not require study as the transmitter site is located at distance greater than 0.5 kilometers. Condition 3 of the construction permit addresses the requirements with regard to protecting WRNS from directional antenna pattern disturbances.

The FM antenna is to be side mounted on the base insulated tower employed as a nondirectional transmitting antenna by radio station WELS. The tower is detuned at the WRNS frequency, 960 kilohertz with a detuning network connected to ground with the appropriate filtering networks at its base. The detuned condition of the tower at 960 kilohertz will be maintained after the translator antenna is installed on it.

Construction Permit Condition 3

The before-after Method of Moments ("MoM") analysis presented herein demonstrates that the W225CD antenna will have no significant effect on the detuned condition of the tower insofar as the WRNS nighttime directional antenna system is concerned. The calculated unattenuated field strength levels at one kilometer are within the standard or modified standard values for the radial directions that are specified for monitoring of the nighttime antenna pattern in both the before and after cases.

MoM Modeling at 960 Kilohertz

To examine the situation with regard to the potential for effects on the WRNS far field radiation pattern, a Method of Moments computer study was run using a model of the nighttime array with voltage sources calculated to produce the authorized directional antenna pattern in accordance with the requirements of Section 1.30002(c) of the FCC Rules. The WRNS nighttime directional antenna model used the same assumptions as the recent MoM proof of performance that was performed on it and filed with the FCC in BMML20140324AFY. Two models were run – one with the existing tower having no antenna and another with the new W225CD FM translator antenna side mounted on it. The translator antenna, as modelled, should provide complete before and after analysis of its installation on the tower under worst case conditions.

To evaluate the effect of the FM antenna, the modeling considered the changes in far-field radiation in the specified monitor point directions of the WRNS license. This is in keeping with the radial azimuth specifications of Section 1.30002(f) of the FCC Rules when before-and-after field strength measurements are run. In order to have far-field radiation values that avoid significant array proximity effects, they were calculated at a distance of 100 kilometers and then converted to their corresponding values of unattenuated field strength at 1 kilometer to comport with the standard for defining directional antenna radiation

patterns. For worst-case radiation calculations, no ground loss was assumed for the modeled towers.

The modeling assumptions for the subject tower are within the range allowed for Method of Moments modeling in a directional antenna proof of performance – with the radius based directly on the 24 inch face width tower and the height based on its physical height assuming a velocity of propagation of 93.2% of free space velocity. The FM antenna was simulated by increasing the radius of the wire section representing the area where it will be side mounted on the tower to a value based on the equivalent horizontal plane area occupied by the tower plus the FM antenna. The total vertical length of the 4-bay antenna, which includes the space between the elements, was modeled with the increased wire radius to simulate worst case conditions. Other antennas on the tower were not simulated so as to allow conclusive analysis of the singular effects of adding the FM antennas in question without any masking effects. Expert MININEC Broadcast Professional Version 14.5 was used for the modeling.

As can be seen from the before-after tabulation and Method of Moments modeling details on the following pages, the installation of the new W225CD FM translator antenna will have no material impact on the directional antenna radiation patterns of WRNS. No radiation level increase capable of being proven with field strength measurements, given the rated accuracy of field strength meters, was found.

The study indicates that there is no adverse impact. The requirement of Section 1.30002(b) of the FCC Rules is met, as the total radiation including whatever small residual contribution comes from the detuned tower supporting the W225CD antenna is within the WRNS standard pattern requirements with and without the FM antenna on the detuned tower.

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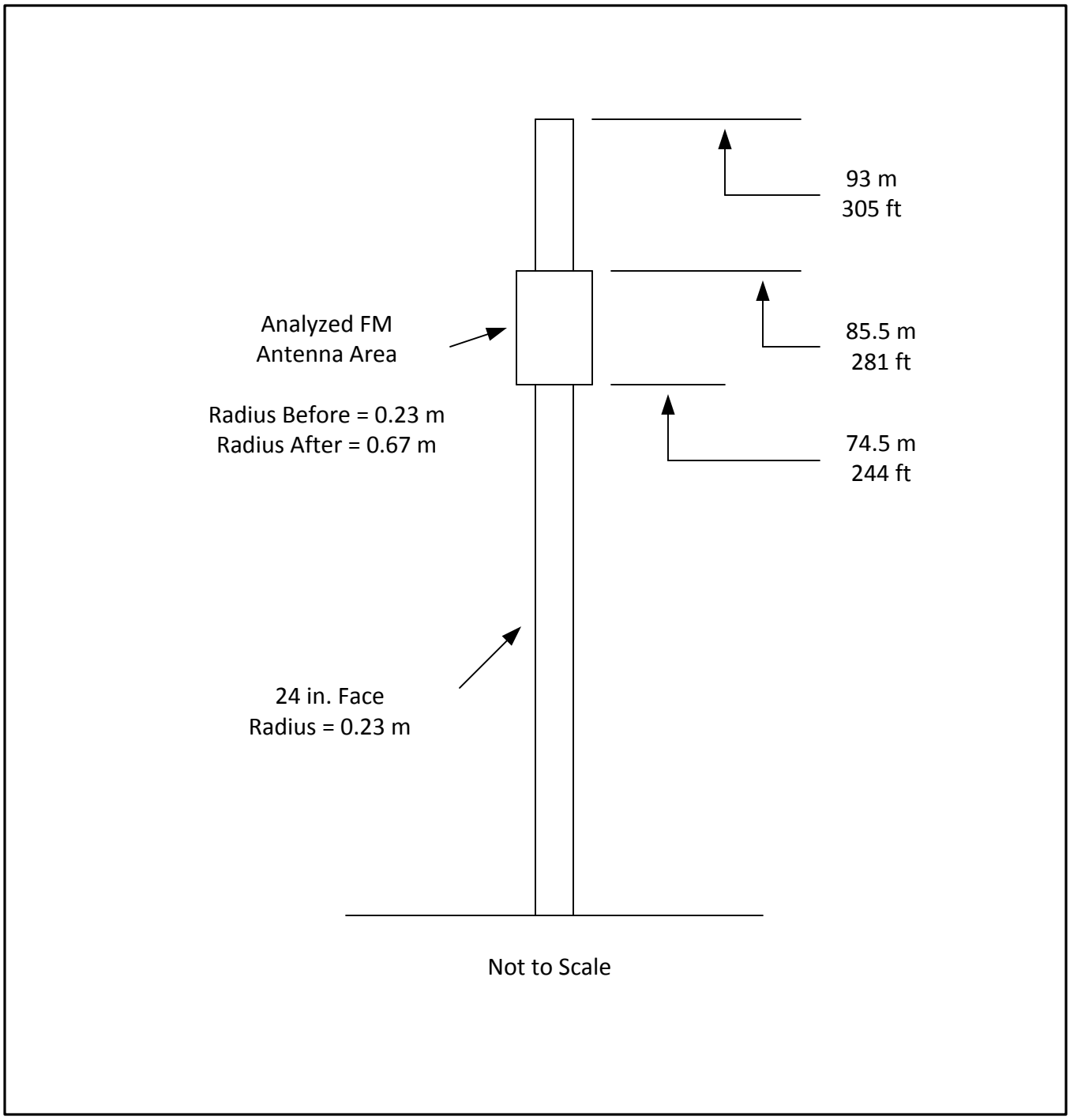
October 3, 2014

Item 1

Tabulation of Before and After Radial Field Strengths – W225CD

WRNS Night DA

Radial (Deg. T.)	Modified Standard (mV/m)	Before (mV/m)	After (mV/m)	Increase/Before		
				Ratio	Percent	dB
265	41.8	24.5	24.4	--	--	--
325	46.7	38.6	38.6	1.000	0.0	0.00
355	35.4	24.7	24.7	1.000	0.0	0.00



SKETCH SHOWING DETUNED TOWER MODELING ASSUMPTIONS

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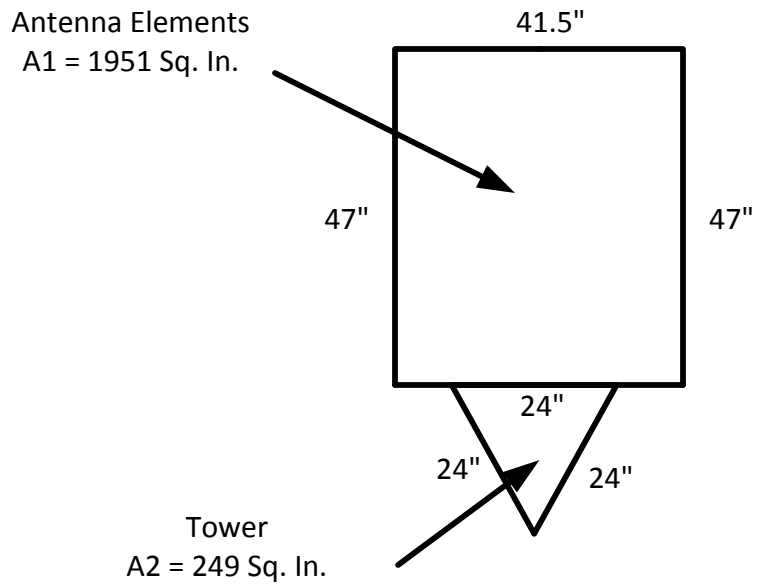

A1 + A2 = 2200 Sq. In.
Equivalent Circle Radius = 26.5 in. or 0.67 m

SKETCH SHOWING FM TRANSLATOR ANTENNA MODELING ASSUMPTIONS

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Method of Moments Model Details for WRNS Nighttime Directional Antenna
Before FM Translator Antenna Installation – W225CD

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WRNS Model with W225CD

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency =  960 KHz

       field ratio
tower  magnitude    phase (deg)
 1     1.           0
 2     .525         107.
 3     .525         -117.
 4     .001         0

VOLTAGES AND CURRENTS - rms
source voltage                   current
node   magnitude    phase (deg)  magnitude    phase (deg)
 1     501.915      70.8         2.90057      7.
 16    162.659      182.9        1.73828      109.8
 31    403.311      313.7        1.29984      255.5
 46    1.15916      45.7         .00678881    45.6
Sum of square of source currents = 26.2491
Total power = 1,000. watts
```

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters for the three towers of the directional radiation pattern with the fourth tower, on which the new antenna will be installed, detuned and without the new antenna. The following information is for the model without the new antenna for the "before" case.

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .218         15
           0            0            108.8
 2    none 100.         325.         0            .218         15
           100.         325.         107.2
 3    none 100.         145.         0            .218         15
           100.         145.         107.3
 4    none 1,301.       279.1        0            .23          15
           1,301.       279.1        115.

Number of wires          =  4
          current nodes  =  60
```

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	2	7.14667	4	7.66667
radius	1	.218	4	.23

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	960.	0	1	.0198519	.0212963

Sources

source	node	sector	magnitude	phase	type
1	1	1	709.815	70.8	voltage
2	16	1	230.035	182.9	voltage
3	31	1	570.368	313.7	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	46	0	260.	0	0	0

RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 100,000.
Frequency = 960. KHz
Input power = 1,000. watts
Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	E-theta phase (deg)	E-phi mag (mv/m)	E-phi phase
0	265.	.24451	176.7	0	0
0	325.	.386207	124.3	0	0
0	355.	.247312	173.9	0	0

NOTE: The radiation values were calculated for a distance of 100 kilometers, to minimize array element proximity effects, and must be multiplied by 100 to obtain their equivalent inverse distance unattenuated values at 1.0 kilometer.

Method of Moments Model Details for WRNS Nighttime Directional Antenna
After FM Translator Antenna Installation – W225CD

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WRNS Model with W225CD

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 960 KHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.525	107.
3	.525	-117.
4	.001	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	501.915	70.8	2.90057	7.
16	162.659	182.9	1.73828	109.8
31	403.311	313.7	1.29984	255.5
46	1.15916	45.7	.00678881	45.6

Sum of square of source currents = 26.2491
Total power = 1,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters for the three towers of the directional radiation pattern with the fourth tower, on which the new antenna will be installed, detuned without the new antenna. The following information is for the model with the new antenna installed on the tower and the same base voltage drives for the "after" case.

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.218	15
		0	0	108.8		
2	none	100.	325.	0	.218	15
		100.	325.	107.2		
3	none	100.	145.	0	.218	15
		100.	145.	107.3		
4	none	1,301.	279.1	0	.23	9
		1,301.	279.1	92.1		
5	none	1,301.	279.1	92.1	.67	3
		1,301.	279.1	105.7		
6	none	1,301.	279.1	105.7	.23	3

1,301. 279.1 115.

Number of wires = 6
current nodes = 60

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	6	3.1	4	10.2333
radius	1	.218	5	.67

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	960.	0	1	8.61E-03	.0284259

Sources

source	node	sector	magnitude	phase	type
1	1	1	709.815	70.8	voltage
2	16	1	230.035	182.9	voltage
3	31	1	570.368	313.7	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	46	0	260.	0	0	0

RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 100,000.
Frequency = 960. KHz
Input power = 1,000. watts
Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	E-theta phase (deg)	E-phi mag (mv/m)	E-phi phase
0	265.	.244486	176.7	0	0
0	325.	.386189	124.2	0	0
0	355.	.247326	173.9	0	0

NOTE: The radiation values were calculated for a distance of 100 kilometers, to minimize array element proximity effects, and must be multiplied by 100 to obtain their equivalent inverse distance unattenuated values at 1.0 kilometer.