# KFXX
# Portland, Oregon

## Report of Periodic Directional Antenna Performance Certification

## FCC Rule 73.155

**Prepared By**
**Boyd Broadcast Technical Services**

KFXX, Portland, Oregon, was licensed according to FCC Rule 73.151 (c), commonly referred to as "Moment Method Modeling". This report details measurements made to comply with FCC Rule 73.155, Periodic Directional Antenna Performance Certification.

The station utilized sampling loops and therefore section (3) of 73.155 applies. A copy of this FCC rule is shown on page five. Pertinent sections are highlighted.

Impedance measurements of the sample loops were made on November 9th, 2015. Measurements were made utilizing a Hewlett Packard 8751A Network Analyzer, serial number 3315J01580, along with an amplifier and a directional coupler in a calibrated measurement system. The original measurements were made with a similar model of network analyzer and test setup. The results of these measurements are detailed on page two.

KFXX operates with 50 kW daytime and 9 kW nighttime, DA2. Nighttime field strength measurements were made on November 8th, 2015, at the reference field strength measurement locations specified in the original proof of performance. Daytime field strength measurements were made on November 8th, 2015 and November 10th, 2015, at the reference field strength measurement locations specified in the original proof of performance. Data from these measurements is shown on page three for the daytime operation and on page four for the nighttime operation.

Field strength measurements were made with a Potomac Instruments PI 4100, serial number 312, last calibrated on February 18, 2014.

It is believed that KFXX is in full compliance with FCC Rule 72.155.

All measurements were made by the undersigned.

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# Sample Loop Impedance Measurements

All of the following sample loop impedance measurements were made with a calibrated test system consisting of a Hewlett-Packard 8751A network analyzer, amplifier and directional coupler. Measurements were made looking into the antenna monitor ends of the sampling lines.

| Tower | Original Proof: 1080 kHz Measured Impedance with Sample Loop Connected | Certification November 9, 2015: 1080 kHz Measured Impedance with Sample Loop Connected |
|---|---|---|
| 1 | 14.8 -j85.0 | 14.53 -j85.11 |
| 2 | 14.7 -j84.9 | 14.53 -j84.9 |
| 3 | 14.2 -j83.0 | 14.04 –j83.02 |

Certification values are within ±2 Ohms and ±4 percent of the resistance and reactance of the original proof values

# KFXX, 1080 kHz, Portland, OR
# Reference Field Strength Measurements – DA-D

| Radial Azimuth Degrees | Field mV/m | GPS Coordinates NAD 83 | Point Description |
|---|---|---|---|
| 48.5 | 64.3 | 45-34-45.3 / 122-26-56.9 | SW 6th Avenue, Camas, Washington |
| 48.5 | 44.8 | 45-35-6.8 / 122-26-21.8 | NW Fremont Street at NW McIntosh Road, Camas, WA. |
| 48.5 | 23 | 45-35-32.6 / 122-25-40.14 | South shoulder of NW Forest Home Road |
| 90 | 326 | 45-33-30.7 / 122-27-10.4 | North shoulder of NE Marine Drive |
| 90 | 163 | 45-33-30.4 / 122-26-2.7 | Middle of NE 223rd Avenue |
| 90 | 133 | 45-33-30.7 / 122-24-23.6 | Middle of road at NW Sundial Road |
| 131.5 | 618 | 45-33-6.7 / 122-28-18.8 | NE Portal Way at NE 185th Drive |
| 131.5 | 337 | 45-32-44.2 / 122-27-42.3 | North shoulder of NE Sandy Boulevard |
| 131.5 | 238 | 45-32-19.8 / 122-27-3.5 | Middle of street front of 20407 NE Thompson Street |
| 270 | 1260 | 45-33-30.2 / 122-30-32.8 | Mail box at 5031 NE 148th Avenue |
| 270 | 643 | 45-33-30.6 / 122-31-39.9 | Kiewit Columbia Shop sign on NE Whitaker Way |
| 270 | 436 | 45-33-30.9 / 122-32-46.6 | NE 112th Ave. across street from Baxter Auto Parts |

Comparisons of these field strength measurements to those in the original proof of performance are not required by FCC rule 73.155. No comparisons are shown here.

# KFXX, 1080 kHz, Portland, OR
# Reference Field Strength Measurements – DA-N

| Radial Azimuth Degrees | Field mV/m | GPS Coordinates NAD 83 | Point Description |
|---|---|---|---|
| 54.5 | 10.3 | 45-34-42.2 / 122-26-33.5 | North side of SW 6th Street, Camas, WA |
| 54.5 | 5.8 | 45-35-13.3 / 122-25-31.0 | West side of NW Norwood Street, Camas |
| 54.5 | 4.02 | 45-35-42.5 / 122-24-32.3 | Middle of NW 22nd Ave. near Division Street, Camas |
| 90 | 22 | 45-33-30.8 / 122-27-8.6 | North shoulder of NE Marine Drive |
| 90 | 46.7 | 45-33-30.4 / 122-26-2.7 | Middle of NE 223rd Avenue |
| 90 | 21.7 | 45-33-30.9 / 122-24-23.5 | Middle of NW Sundial Road |
| 125.5 | 91 | 45-33-18.7 / 122-28-33.4 | Across street from 18225 NE Riverside Parkway |
| 125.5 | 38.3 | 45-32-40.7 / 122-27-17.3 | SE Corner of CFN Cardlock Station on NE Sandy |
| 125.5 | 21.7 | 45-32-15.4 / 122-26-27 | Front of 710 San Rafael Street |
| 270 | 635 | 45-33-30.3 / 122-30-33 | Mail box at 5031 NE 148th Avenue |
| 270 | 317 | 45-33-30.1 / 122-31-40.1 | Kiewit Columbia Shop sign on NE Whitaker Way |
| 270 | 214 | 45-33-31 / 122-32-46.8 | NE 112th Ave. across street from Baxter Auto Parts |

Comparisons of these field strength measurements to those in the original proof of performance are not required by FCC rule 73.155. No comparisons are shown here.

**§73.155 Periodic directional antenna performance recertification.**

A station licensed with a directional antenna pattern pursuant to a proof of performance using moment method modeling and internal array parameters as described in [§73.151(c)] §73.151(c) shall recertify the performance of that directional antenna pattern at least once within every 24 month period.

(a) Measurements shall be made to verify the continuing integrity of the antenna monitor sampling system.

(1) For towers using base current or base voltage sampling derived at the output of the antenna coupling and matching equipment, the sampling devices shall be disconnected and calibrated by measuring their outputs with a common reference signal (a current through them or a voltage across them, as appropriate) and the calibration must agree with the manufacturer's specifications.

(2) For towers using base current or base voltage sampling derived at the output of the antenna coupling and matching equipment, sampling line measurements shall be made to verify the open-circuit resonant frequency closest to carrier frequency, to establish length, and also at frequencies corresponding to odd multiples of1/8wavelength immediately above and below the open-circuit resonant frequency closest to carrier frequency, while open circuited, to verify their characteristic impedance. The frequencies measured must be the same as were measured in the most recent proof of performance and must demonstrate that the sampling lines continue to meet the requirements of [§73.151(c)] §73.151(c) with regard to their length and characteristic impedance.

(3) For towers having sampling loops, measurements shall be made at carrier frequency or, if necessary, at nearby frequencies where the magnitude of the measured impedance is no greater than 200 ohms with the sampling loops connected. The frequencies measured must be the same as were measured in the most recent proof of performance and the measured impedances must agree within ±2 ohms and ±4 percent resistance and reactance of the proof values.

(b) Field strength measurements shall be made at the reference field strength measurement locations that were established by the most recent proof of performance. If locations have become inaccessible or their readings contaminated by localized electromagnetic environmental changes, new locations that meet the requirements of the moment method proof of performance rules in [§73.151(c)(3)] §73.151(c)(3) shall be established to replace them.

(c) The results of the periodic directional antenna performance recertification measurements shall be retained in the station's public inspection file.