

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of
Involuntary Modification of License
of Station KFWR(FM),
Jacksboro, Texas
File No. BLH-20130110AFG
Facility ID No. 31062

ORDER TO SHOW CAUSE

Adopted: March 23, 2015

Released: March 23, 2015

By the Chief, Audio Division, Media Bureau

I. INTRODUCTION

1. We have before us a Complaint filed by Lake Country Radio ("Lake"), licensee of station KCKL(FM), Malakoff, Texas ("KCKL"), against LKCM Radio Licenses, LLP ("LKCM"), licensee of KFWR(FM), Jacksboro, TX ("KFWR"). In its complaint, as supplemented, Lake alleges that LKCM intentionally installed a directional antenna designed to increase KFWR's signal toward KCKL, and that such operation is causing impermissible interference to KCKL within that station's protected service contour. LKCM has responded to Lake's allegations. For the reasons set forth herein, we conclude that Lake has established that station KFWR is not operating in accordance within its licensed parameters. We therefore issue this Order to Show Cause to LKCM, directing it to show why KFWR's operation should not be classified as directional and KFWR's license should not be modified to reduce the transmitter power output ("TPO") to a value that would correspond to the 100 kW effective radiated power ("ERP") specified on the station's license.

II. BACKGROUND

2. KCKL's current facilities were licensed on September 9, 1993, and the station has operated since then with the same Class A facilities on Channel 240. LKCM was granted a modified construction permit on May 29, 2012, to upgrade KFWR's licensed Class C1 facilities at Mineral Wells, Texas, to a Class C0 facility on Channel 240 at Jacksboro, Texas. KFWR's construction permit specified

1 In addition to Lake's July 25, 2013, complaint (hereafter "Lake Complaint"), Lake filed a March 14, 2014, response to LKCM's December 4, 2013, filing ("Lake Response"), and a September 22, 2014, response to LKCM's March 14, 2014, comments ("Lake Further Response").

2 LKCM filed a December 14, 2013, Response to Complaint (hereafter "LKCM Initial Response"), and a September 2, 2014, Response to Comments of Lake Country Radio ("LKCM Further Response").

3 File No. BLH-19921013KI.

4 File No. BMPH-20120329AHJ.

non-directional operation,<sup>5</sup> and specified a site fully spaced with respect to KCKL under Section 73.207 of the Commission's Rules.<sup>6</sup> LKCM constructed the KFWR facility and filed a license application on January 10, 2013,<sup>7</sup> which was granted on February 21, 2013.

3. Lake initially complained about KFWR on June 7, 2013,<sup>8</sup> alleging that KFWR had constructed a new antenna system that was not being operated in accordance with the Commission's Rules, thus causing interference to KCKL. The Media Bureau responded that KFWR's construction permit was granted in May 2012 without objection, that no contour overlap occurred between these two stations, and that the record, including low-resolution black-and-white photographs provided by Lake, did not demonstrate that KFWR was using a directional antenna or parasitic antenna elements.<sup>9</sup>

4. In its Complaint, Lake includes additional information in support of its interference allegations. Attached to the Lake Complaint are clear color photographs showing the KFWR tower and antenna and the use of vertical parasitic elements on the antenna. It also includes the "manufacturer sourced final pattern," under the letterhead of Electronic Research, Inc. ("ERI"), the KFWR antenna manufacturer. This antenna pattern plot shows a radiation pattern for KFWR that is far from non-directional.<sup>10</sup> The Lake Complaint also includes two contour plots, one using KFWR's licensed non-directional pattern and showing no contour overlap between KFWR and KCKL, and a second showing co-channel contour overlap created by the antenna pattern shown in the ERI documents.<sup>11</sup> The latter plot shows KFWR's actual 40 dB $\mu$  interfering contour overlapping the 60 dB $\mu$  protected service contour of KCKL, covering approximately 30 percent of KCKL's 60 dB $\mu$  service area toward the west. Lake urges the Commission to require KFWR to correct the conditions causing the alleged signal interference to KCKL.

5. With Lake's permission, on November 4, 2013, the staff forwarded the Lake Complaint to LKCM for comment.<sup>12</sup> LKCM filed its Initial Response on December 4, 2013. LKCM advises that the directional antenna pattern attached to the Lake Complaint was an interim pattern only, of unknown provenance, and was not the final pattern used.<sup>13</sup> LKCM contends that the second contour plot provided by Lake (showing contour overlap) would only be valid if KFWR had been authorized pursuant to the contour protection rule, Section 73.215,<sup>14</sup> which it was not. LKCM acknowledges that David Gates, Lake's president, had contacted LKCM officials and met with them, and that LKCM had "declined his

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<sup>5</sup> In the Commission's licensing terminology, FM antenna systems are permitted and licensed as either "directional" or "non-directional." A non-directional antenna pattern is one in which the energy radiated is essentially uniform along all azimuths. In some of the cases and pleadings cited herein, the term "omnidirectional" is used to describe a non-directional antenna pattern. For purposes of this Order, the terms "omnidirectional" and "non-directional" are used interchangeably.

<sup>6</sup> 47 C.F.R. § 73.207. That rule requires a minimum distance separation of 215 km between KFWR and KCKL; the actual spacing between the stations is 216.8 km.

<sup>7</sup> File No. BLH-20130110AFG.

<sup>8</sup> The initial complaint was transmitted to Congressman Jeb Hensarling of Texas, who forwarded the complaint to the Commission.

<sup>9</sup> *The Honorable Jeb Hensarling*, Letter (MB July 8, 2013). A copy of this letter is attached to the Lake Complaint.

<sup>10</sup> Lake Complaint at 12.

<sup>11</sup> *Id.* at 9-11.

<sup>12</sup> *Mr. Kevin Priegel, LKCM Radio Licenses, LP*, Letter (MB Nov. 4, 2013) ("*Staff Inquiry Letter*").

<sup>13</sup> Letter from Ross Stephen Campbell, P.E., to Marlene H. Dortch, Secretary, FCC (Dec. 3, 2013) ("*Campbell Letter*"), at 1 (attached to LKCM Initial Response).

<sup>14</sup> 47 C.F.R. § 73.215. See Lake Initial Response at 1.

requests.”<sup>15</sup> LKCM’s Chief Engineer further states that he “can certify that [the] KFWR transmitter has operated within the required TPO range to meet, and not exceed, Licensed ERP of 100 kW.”<sup>16</sup>

6. The LKCM Initial Response includes a statement from ERI’s president, Mr. Thomas Silliman, acknowledging that KFWR’s antenna “was mounted in a favorable direction, but . . . has not been directionalized and therefore is legal.”<sup>17</sup> Mr. Silliman adds that the custom lambda tower at the top of the new KFWR tower was specifically designed for operation at KFWR’s frequency of 95.9 MHz, and that the tower’s lattice structure is “repetitive at the half wave of the specified FM frequency.”<sup>18</sup> Thus, “if one picks a favorable mounting position on the tower, every element in the array sees the same favorable mounting result.”<sup>19</sup> Mr. Silliman also states that vertical parasitic elements are used to make the vertical radiation pattern “more circular” and reduce the vertically polarized gain to the east.<sup>20</sup> In a subsequent pleading, ERI elaborates that its computed values “are relative to an RMS measured field of 1.0.”<sup>21</sup> Mr. Silliman concedes that the mounting of the antenna on a certain tower face constitutes “pattern optimization,”<sup>22</sup> arguing later that this is a common practice used by all antenna manufacturers,<sup>23</sup> but states that it is the ERI’s policy “not [to] increase the directivity of the antenna pattern.”<sup>24</sup>

7. The LKCM Initial Response also includes the conclusions of a consulting engineer retained to evaluate the reported interference.<sup>25</sup> LKCM’s consulting engineer “detected no interference by KFWR to KCKL during five hours of listening tests undertaken on two separate days, under different weather conditions, driving throughout a wide area of countryside between the two stations.”<sup>26</sup> Finally, in response to the staff’s request that LKCM calculate the transmitter power output (“TPO”) in any direction (assuming an effective radiated power of 100 kW in any direction), LKCM explains that the “accepted practice” is that the “TPO is calculated using the RMS gain of the antenna determined by the antenna manufacturer” with power added to compensate for transmission system losses.<sup>27</sup>

8. In the Lake Response, Lake acknowledges LKCM’s statement that it has been common practice for licensees to take advantage of tower reflections created by side-mounted antennas, but argues that when the practice “is taken to such an extreme that the resulting radiation, clearly intentionally directionalized, creates interference within the protected contour of a station that is entitled to protection afforded a fully spaced station, an abuse of that ‘common practice’ has occurred.”<sup>28</sup> Lake points out that KFWR’s community of license, Jacksboro, TX, lies almost in the opposite direction from the maximum

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<sup>15</sup> *Id.* at 2.

<sup>16</sup> LKCM Initial Response, Supplemental Exhibit 6, at 1.

<sup>17</sup> LKCM Initial Response, Supplemental Exhibit 4 at 1.

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> LKCM Further Response, Attachment B (Aug.22, 2014, letter from Thomas B. Silliman, PE, President of ERI), at 2. The implications of this statement will be addressed in further detail below.

<sup>22</sup> LKCM Initial Response, Supplemental Exhibit 4 at 2.

<sup>23</sup> LKCM Further Response, Attachment B at 2.

<sup>24</sup> *Id.*

<sup>25</sup> LKCM Initial Response, Supplemental Exhibit 5 (Engineering Statement of J.S. Sellmeyer, P.E.).

<sup>26</sup> LKCM Initial Response at 1.

<sup>27</sup> Campbell Letter at 2.

<sup>28</sup> Lake Response at 2.

radiation of the KFWR antenna, which is oriented toward the much larger Dallas/Fort Worth market.<sup>29</sup> Lake's consulting engineer computes that KFWR is radiating a maximum of 262.4 kW ERP horizontally polarized and 274.5 kW vertically polarized in that direction, concluding that the current KFWR radiation pattern was not the unintentional result of side mounting but instead the result of a planned, "optimized" installation.<sup>30</sup> Robert R. Surette of Shively Labs, an antenna manufacturer, likewise opines that the KFWR "optimized pattern represents some of the best broadcast patterns that can be reasonably achieved for a formal FCC directional requirement."<sup>31</sup> Mr. Surette points out that while the "generally accepted limits on an omni-directional antenna are +/-2 dB," the "pattern optimized" KFWR antenna installation has a gain of 4.385 dB, "which represents almost the maximum gain that can be developed by a side-mount antenna."<sup>32</sup> Lake's engineering consultant Everist observes that the maximum-to-minimum power ratio for the KFWR antenna is 19.18 dB for the horizontally polarized component and 11.2 dB for the vertically polarized component, with a maximum relative field value of 1.62 for the horizontally polarized component and 1.657 for the vertically polarized component.<sup>33</sup>

9. In support of its position that the KFWR antenna should be regarded as directional, Lake cites to the Commission's September 14, 1984, *Public Notice*.<sup>34</sup> Paragraph 1 of the *FM Antenna Public Notice* states:

In making allotments and in issuing construction permits and licenses the Commission assumes that FM non-directional broadcast antennas have perfectly circular horizontal radiation patterns. Actual antenna patterns shall conform to the ideal as closely as is practicable. The use of any technique or means (including side mounting) which intentionally distorts the radiation pattern of what is nominally a non-directional antenna makes that antenna directional and it must be licensed as such.<sup>35</sup>

10. In its Further Response, LKCM dismisses what it terms a "30-year old Public Notice in which the Commission 'assume[d] that FM non-directional antennas have perfectly circular horizontal radiation patterns,'" stating that the FM Antenna Public Notice espouses a standard "that bears no relationship to the physics of FM signal propagation or the realities of today's practices in FM antenna design and implementation."<sup>36</sup> LKCM argues that variations in antenna pattern occur with every non-directional antenna installation, and that there are thousands of such antennas in use.<sup>37</sup> LKCM buttresses this conclusion with a survey of non-directional antenna installations across a range of antenna manufacturers.<sup>38</sup> Starting with different non-directional antennas with "natural variations" on the order of

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<sup>29</sup> *Id.* at 5.

<sup>30</sup> Lake Response, Attachment 2 (Engineering Statement of Donald G. Everist), at 1, 5, and attached Appendix A (Statement from Robert R. Surette, Shively Labs) at 1.

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> Lake Response, Attachment 2 at 2.

<sup>34</sup> *Criteria for Licensing of FM Broadcast Antenna Systems*, Public Notice, FCC 84-437 (rel. Sept. 14, 1984) ("*FM Antenna Public Notice*").

<sup>35</sup> *Id.*

<sup>36</sup> LKCM Further Response at 1-2.

<sup>37</sup> *Id.* at 2.

<sup>38</sup> LKCM Further Response, Attachment A (Statement of Clarence M. Beverage, Communications Technologies, Inc.) (comparing a number of antennas to show that, in fact, none are truly omnidirectional when mounted on a tower).

+/- 2 dB,<sup>39</sup> LKCM's consultant Beverage concludes that the signal distortions after side mounting are significantly greater, even for antennas that have not been "optimized."<sup>40</sup> He further states that the KFWR antenna exhibits minimum and maximum ERP gain values in line with those of other manufacturers' comparable antennas.<sup>41</sup> LKCM also argues that its KFWR antenna installation has been designed to "increase circularity" by moving the vertically polarized component closer to the shape of the horizontally polarized component.<sup>42</sup>

11. LKCM further argues that there is little or no legal guidance regarding the permissible characteristics of side-mounted non-directional FM antennas. It states there has been no case since the issuance of the *FM Antenna Public Notice* in which the Commission has declared a non-directional antenna to be directional; moreover, LKCM finds only two instances where the Commission has cited that *Public Notice*, the latest in 1992.<sup>43</sup> LKCM also cites two instances in which the Commission did not accept allegations that a licensee had employed a directional antenna for a non-directional operation.<sup>44</sup> It argues that no Commission rule, nor helpful precedent, defines what the maximum distortion of FM directional antenna patterns is for side-mounted antennas.<sup>45</sup>

12. Lake, in its Further Response, challenges LKCM's claim that no relevant case law supports Lake's requested relief. Lake notes that in *Rebecca Radio*, the Commission denied petitions for reconsideration where applicants proposed directional installations with maximum-to-minimum ratios exceeding 15 dB,<sup>46</sup> emphasizing LKCM's failure to dispute that the KFWR installation has a maximum-to-minimum ratio exceeds that value in the horizontal plane.<sup>47</sup> Lake also analogizes *Ettlinger Broadcasting Corp.*,<sup>48</sup> to the present situation, noting that in *Ettlinger* the Commission refused to grant a proposal where the antenna power gain was 3 dB (as compared to 4.389 dB here).<sup>49</sup> Lake restates its contention that LKCM deliberately chose to "push" the KFWR pattern" to "anything but an [omnidirectional] pattern,"<sup>50</sup> and renews its request for the Commission to act and provide the requested relief.

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<sup>39</sup> Beverage states that most non-directional FM antennas can vary up to +/- 2 dB even in a theoretical "free space" situation, that is, when mounted atop a non-metallic support. LKCM Further Response, Attachment A at 3.

<sup>40</sup> *Id.* at 4-6. Beverage claims that the goal of pattern optimization is to fill pattern nulls or obtain improved axial ratio. *Id.* at 8-9.

<sup>41</sup> *Id.* at 10.

<sup>42</sup> *LKCM Response* at page 4; see also Attachment B at 2 ("Initially, the antenna's vertical polarization had a pattern directivity of 14.32 dB . . . upon completion . . . the pattern directivity" for the vertically polarized component "was 10.91 dB . . . an improvement of 3.4 dB in pattern circularity." These figures were computed "relative to an RMS measured field of 1.0." See *infra* para. 15).

<sup>43</sup> LKCM Further Response at 2. The two cases cited are *Rebecca Radio of Marco*, Hearing Designation Order, 2 FCC Rcd 4053 (MMB 1987) ("*Rebecca Radio*") and *New Life Enterprises, Inc.*, Memorandum Opinion and Order, 7 FCC Rcd 843 (1992) ("*New Life*").

<sup>44</sup> *Id.* at 2-3 and n.6, citing *Duchossois Communications of Maryland*, Memorandum Opinion and Order, 10 FCC Rcd 6688 (1995) ("*Duchossois*") and *R&R Radio Corp.*, Letter, 23 FCC Rcd 16489 (MB 2008) ("*R&R*").

<sup>45</sup> *Id.* at 3.

<sup>46</sup> 47 C.F.R. § 73.316(b) states that "[a] directional antenna is an antenna that is designed or altered for the purpose of obtaining a non-circular radiation pattern." Section 73.316(b)(1) limits FM directional antennas to 15 dB in the horizontal plane.

<sup>47</sup> Lake Further Response at 1-2.

<sup>48</sup> Memorandum Opinion and Order, 53 R.R.2d 635 (1983) ("*Ettlinger*").

<sup>49</sup> Lake Further Response at 2-3.

<sup>50</sup> *Id.* at 3.

### III. DISCUSSION

13. At the heart of this case is the question: how far can an FM antenna pattern deviate from the ideal of a circular, perfectly non-directional pattern before it is considered to be directional? As LKCM argues, and Lake recognizes, it is impossible to mount any FM antenna on a metallic support structure without some pattern distortion occurring. The issue before us is whether the KFWR pattern is so distorted as to be in violation of the Commission's Rules, requiring a remedy in order to correct any potential or actual interference to co-channel station KCKL. As discussed below, we conclude that the KFWR antenna pattern is for all intents and purposes directional, and must be licensed accordingly.

14. The *Ettlinger* case provides the most useful guidance in this instance. In *Ettlinger*, a commercial FM applicant sought use of a non-directional but optimized antenna installation in order to meet its community of license coverage requirement while simultaneously serving a more populous area well to the north of that community.<sup>51</sup> The Commission first reiterated that, when a licensee specifies a non-directional pattern, an omni-directional or circular pattern is assumed.<sup>52</sup> It then pointed out that, irrespective of whether a directional or non-directional pattern has been proposed, "the maximum radiation for the particular class of station cannot be exceeded along any azimuth."<sup>53</sup> The Commission then noted that, while the applicant wished its antenna pattern to be considered non-directional, it nevertheless instructed the antenna manufacturer to design the antenna so that the signal strength over the community of license would be increased by approximately 3 dB $\mu$  (double the effective radiated power) over the permissible radiation that would result from omnidirectional operation.<sup>54</sup> In rejecting this operation, the Commission emphasized that the FM allocation rules are premised, not on actual interference studies, but rather on inter-station spacings determined by assuming the maximum ERP and antenna height for each station class.<sup>55</sup> In considering individual applications, then, the Commission assumes either non-directional (i.e., essentially circular) operation, or directional operation based on a showing that the proposed antenna pattern will not radiate in the maximum lobe any more than the prescribed upper power limit set forth in Section 73.211 of the Rules.<sup>56</sup> "The table of FM allocations, based on the same spacing requirements, is undermined by deviating from this very basic underlying premise."<sup>57</sup>

15. The holding in *Ettlinger* illuminates the shortcomings in LKCM's operation. In *Ettlinger* the Commission made it clear that, whether directional or non-directional, a station may not transmit power in any direction beyond the upper power limit set forth in Section 73.211(b).<sup>58</sup> Thus, KFWR may not broadcast with an ERP of over 100 kW in any direction.<sup>59</sup> However, LKCM, in describing the KFWR antenna pattern, states that its computed values "are relative to an RMS measured field of 1.0."<sup>60</sup> A true

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<sup>51</sup> *Ettlinger*, 53 R.R.2d at 636.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*, citing 47 C.F.R. § 73.211.

<sup>54</sup> *Ettlinger*, 53 R.R.2d at 636-37.

<sup>55</sup> *Id.* at 637 n.4.

<sup>56</sup> *Id.* See 47 C.F.R. § 73.211.

<sup>57</sup> *Ettlinger*, 53 R.R. 2d at 637 n.4.

<sup>58</sup> 47 C.F.R. § 73.211(b).

<sup>59</sup> KFWR is not one of the very few grandfathered stations that may continue to operate with an ERP in excess of the station class limit, that were authorized before the adoption of the 47 C.F.R. § 73.211 ERP maximums. See 47 C.F.R. § 73.211(c).

<sup>60</sup> LKCM Further Response, Attachment B at 2.

non-directional antenna pattern will have a relative field value of 1.0 at every azimuth, hence the root mean square (“RMS”) field will be 1.0 as well.<sup>61</sup> A licensed directional antenna has one or more azimuths with relative field values at 1.0 (corresponding to the maximum licensed power) while other azimuths will have relative field values of less than 1.0. Consequently, the RMS for such an antenna will be below 1.0. Under its definition of “pattern optimization” for non-directional antennas, however, ERI appears to consider an antenna as equivalent to non-directional – and thus allegedly rule-compliant – if its RMS value is 1.0, even if the relative field value along one or more azimuths is greater than 1.0. Under LKCM and ERI’s definition, then, an antenna should be considered non-directional even if the signal along certain azimuths exceeds the maximum permitted power, as long as the signal along enough other azimuths is sufficiently below the allowable power so as to make the average equal 1.0. ERI cites no Commission precedent in support of this proposition and, as noted above, such a definition of “non-directional” contradicts the holding of *Ettlinger* insofar as that case prohibits radiation greater than that set forth in Section 73.211 in any direction.

16. From the record, including LKCM’s showings, it is clear that KFWR exceeds those power limits. Using the pattern provided by ERI in the LKCM Initial Response (and again as Exhibit C – Figure 1 to the LKCM Further Response), it can be seen that the maximum relative field value for the KFWR antenna is 1.657 at 105 degrees True (using the larger vertically polarized component).<sup>62</sup> This equates to an ERP of 274.56 kW toward the 105 degree azimuth, or over twice the licensed 100 kW ERP in that direction.<sup>63</sup> The KFWR installation also results in a computed gain along that azimuth of 4.386 dB,<sup>64</sup> significantly higher than the 3 dB gain that the Commission in *Ettlinger* found to be unacceptable. Ultimately, *Ettlinger* instructs us that the Commission will not allow a non-directional permittee to construct an antenna in such a way that a directional antenna results, even if it is not formally acknowledged as directional. “Permittees should not conclude . . . that our recognition of [the fact that side mounting results in some degree of distortion from circularity] implies consent to any backdoor methodology whereby an applicant who was granted on the assumption that he would operate non-directionally introduces parasitic elements and constructs in such a fashion that a directional pattern

<sup>61</sup> For antenna patterns, where the pattern is defined by X number of evenly spaced relative field values covering the entire 360° of the pattern, the RMS value is defined by the formula

$$[(\text{relative field } 1)^2 + (\text{relative field } 2)^2 + (\text{relative field } 3)^2 + \dots + (\text{relative field } X)^2] / X = \text{RMS}$$

Under this equation, a truly circular (non-directional) pattern, which has relative field values of 1.0 at every azimuth, will have a resulting RMS value of 1.0.

<sup>62</sup> Compare the 1.657 relative field value to the maximum 1.0 relative field value for an FCC-licensed directional antenna.

<sup>63</sup> The ERP in a given direction is related to the corresponding relative field value by

$$\text{ERP in the given direction} = (\text{relative field in that direction})^2 * \text{ERP}$$

Thus, the KFWR ERP at 105 degrees = 1.657<sup>2</sup> \* 100 kW = 274.56 kW.

<sup>64</sup> Converting the KFWR ERP along the 105 degree azimuth to decibels (“dB”):

$$\text{dB} = 10 \log (274.56 \text{ kW}) = 24.386 \text{ dB}$$

Since 100 kW = 20 dB, the difference is

$$24.386 \text{ dB} - 20 \text{ dB} = 4.386 \text{ dB gain over the authorized 100 kW ERP value (values not rounded).}$$

Lake’s consultant computed a gain of 4.38 (to two decimal places) for the vertically polarized component) and 4.19 (to two decimal places) for the smaller horizontally polarized component. Lake Response at Attachment 2 (Engineering Statement), page 1; *see also* Lake Response at Appendix A, Robert Surette Statement at page 2 (4.189 dB gain for the horizontally polarized component, 4.385 dB for the vertically polarized component).

results.”<sup>65</sup> The *FM Antenna Public Notice* amplified this point, stating that the use of any technique or means (including side mounting) which intentionally distorts the radiation pattern of what is nominally a non-directional antenna makes that antenna directional and it must be licensed as such.<sup>66</sup>

17. The other cited cases do not disturb these conclusions. In *Duchossois*, the Commission found that petitioner’s evidence that the applicant intentionally directionalized its signal lacked crucial detail regarding the methodology used, whereas the applicant’s technical report paralleled the actual installation, and demonstrated that the installation was intended to, and did, result in an “essentially circular radiation pattern.”<sup>67</sup> *Duchossois* is thus distinguishable, as the Commission dismissed petitioner’s allegation for failing to establish a substantial and material question regarding pattern distortion.<sup>68</sup> Here, LKCM’s own evidence establishes the parameters of the KFWR antenna. Similarly, in *R&R* the staff dismissed opponent’s challenge to the applicant’s new antenna as “wholly speculative,” because among other things, the opponent made unwarranted assumptions about the model of antenna to be used, which is not the case here, where both LKCM and its antenna manufacturer have set forth the model of antenna to be used and its characteristics.<sup>69</sup> Additionally, while the applicant in *R&R* proposed an existing tower using lambda tower sections of the type proposed by LKCM here, those sections were tuned for another station already transmitting from that tower, rather than applicant’s frequency.<sup>70</sup> In the instant case, the lambda tower sections are tuned to KFWR’s frequency. Finally, the staff in *Rebecca Radio* upheld the dismissal of two applications for proposing directional antenna patterns with maximum-to-minimum ratios in excess of the 15 dB limit in Section 73.316 of the Rules,<sup>71</sup> but that fault was attributable to defective proposed directional antenna patterns, neither of which ever advanced to the stage of construction.<sup>72</sup>

18. We find that Lake, in its Complaint, as supplemented by the Lake Response, provides substantial evidence of a directional antenna installation by LKCM at KFWR. While LKCM takes great pains to avoid characterizing its licensed facility as directional, instead referring to “pattern optimization” and the fact that such optimization brought the vertically polarized component closer to the horizontally polarized component, the conclusion is inescapable that the KFWR antenna is, in fact, directional. Lake’s relative field patterns show that the radiation from the KFWR facility is predominantly southeastward with far lesser amounts north, west, and south, including in the direction of the community of license.<sup>73</sup> Lake has established (and the staff has corroborated) that the maximum gain of this antenna installation is

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<sup>65</sup> *Ettlinger*, 53 R.R.2d at 637 n.4. See also *Marr Broadcasting Co.*, Initial Decision, 1 FCC Rcd 691, 711 (ALJ 1986), a comparative renewal case in which the Administrative Law Judge (“ALJ”) stated in his initial decision that while the applicant was authorized only a non-directional antenna, it ordered a side-mounted directional antenna. Despite the fact that applicant’s engineer tried to produce the most omnidirectional pattern possible under the circumstances, the antenna produced 168 kW in the direction of Houston, greater than the authorized 100 kW, leading the ALJ to conclude that applicant Marr’s “antenna pattern was intentionally directionalized.”

<sup>66</sup> *FM Antenna Public Notice*. See also *New Life*, *supra* note 43, 7 FCC Rcd at 845 (citing both *Ettlinger* and the *FM Antenna Public Notice*).

<sup>67</sup> *Duchossois*, *supra* note 44, 10 FCC Rcd at 6692.

<sup>68</sup> *Id.* Additionally, the antenna in *Duchossois* was pole-mounted, which is generally recognized as introducing less pattern distortion than a side-mounted antenna, such as in the KFWR installation, due to the smaller cross-section of the pole mounting.

<sup>69</sup> *R&R*, *supra* note 44, 23 FCC Rcd at 16495.

<sup>70</sup> *Id.*

<sup>71</sup> 47 C.F.R. § 73.316.

<sup>72</sup> *Rebecca Radio*, *supra* note 43, 2 FCC Rcd at 4054.

<sup>73</sup> Indeed, the essential difference between the unauthorized ERI antenna pattern initially provided by Lake, and the subsequent pattern submitted by LKCM, is that the orientation of the antenna differs by approximately 15 degrees.

4.189 dB horizontally polarized and 4.386 dB vertically polarized above the 100 kW (20 dBk) level nominally authorized for KFWR.<sup>74</sup> This is well over the 3 dB value that was rejected in *Ettlinger*. Lake has also established that the maximum-to-minimum ratio for the antenna is 19.18 dB in the horizontal plane and 11.2 dB vertically polarized. Given that under Section 73.316(b)(1) of the Rules,<sup>75</sup> the greatest maximum-to-minimum ratio for a *directional* antenna routinely authorized by the Commission is 15 dB, it is difficult to credit LKCM's position that its facility should be considered non-directional. We therefore find that the KFWR facility is directional.

19. Similarly, there can be no question that the KFWR pattern distortion is intentional. The KFWR antenna is mounted on a frequency-matched lambda tower, and ERI performed pattern optimization studies in advance of construction. Clearly, ERI and LKCM knew in advance what the result would be. Specifically, that result is that KFWR, licensed to radiate a maximum of 100 kW in any direction, is presently radiating 262.4 kW horizontally polarized, and 274.5 kW vertically polarized, into the maximum lobe of its directional pattern.<sup>76</sup> LKCM contends that since that KCKL and KFWR are fully spaced under Section 73.207,<sup>77</sup> the Commission should not consider Lake's contour overlap analyses. We would agree with LKCM were it not for the fact that KFWR is radiating 2.75 times the ERP toward KCKL than is permitted by the FCC's rules. In this situation, we conclude that a contour overlap analysis is justified to predict the effects on KCKL.

20. The Lake Complaint includes a contour overlap analysis that shows that the 40 dB $\mu$  co-channel interfering contour of KFWR's facility (as built) overlaps approximately 30 percent of KCKL's 60 dB $\mu$  protected service contour. A comparison using KFWR's licensed parameters (100 kW ERP, omnidirectional antenna) shows that no contour overlap should exist.<sup>78</sup> This overlap analysis suggests that the KFWR directional operation may be having an adverse effect on reception of KCKL. Even if the overlap is only at the fringes of KCKL's service area, under Sections 73.207 and 73.212 of the Commission's Rules,<sup>79</sup> Lake has a reasonable expectation that KFWR shall not radiate more than the 100 kW maximum permitted ERP toward KCKL. Moreover, the quantity or quality of interference complaints is not a salient issue here. There is no requirement that Lake first demonstrate harmful interference before it can claim the protection to KCKL to which it is legally entitled under the Commission's Rules.

#### IV. CONCLUSION / ORDERING CLAUSES

21. The record herein establishes that LKCM's antenna installation is clearly and intentionally directional, and was specifically designed to be so. Given the excessive radiation from that facility, Lake is not barred from pursuing this complaint merely because KCKL and KFWR are fully

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<sup>74</sup> KFWR's licensed ERP of 100 kW is equal to 20 dBk. Using the relative field pattern data provided by Lake (and later LKCM), Lake has established that the maximum radiation is 262.4 kW ERP (24.189 dBk) in the horizontally polarized and 274.5 kW ERP (24.386 dBk) vertically polarized.

<sup>75</sup> 47 C.F.R. § 73.316(b)(1).

<sup>76</sup> LKCM takes note that KFWR is not operating at the maximum antenna height permitted for the station class (Class C0), so that it affords more protection to KCKL than would a maximum class facility. *LKCM Further Response* at Attachment C, page 3. However, this is not relevant, because Section 73.211 prohibits power in excess of the listed value no matter what the antenna height.

<sup>77</sup> 47 C.F.R. § 73.207.

<sup>78</sup> LKCM's engineering consultant suggests that the desired-to-undesired (D/U) method would provide a more realistic assessment of interference. *LKCM Further Response*, Attachment C at 3. We agree that it could be instructive to compare the size and location of predicted interference predicted by the U/D method with KFWR operating at the 100 kW maximum specified in the station license vs. the 274.5 kW maximum with which it is presently operating. However, LKCM did not provide any such analysis.

<sup>79</sup> 47 C.F.R. §§ 73.207, 73.212.

spaced under Section 73.207 of the Rules. Under the Rules, Lake has a reasonable expectation that KFWR shall not radiate more than 100 kW in any direction. Although we do not find evidence in the record that LKCM intentionally deceived the Commission about its constructed facility, we nonetheless conclude that we must take steps to correct the matter now that it has been documented.

22. IT IS THEREFORE ORDERED that, on or before **April 22, 2015**, LKCM Radio Licenses, LLP, SHALL SHOW CAUSE why its license for Station KFWR (FM), File No. BLH-20130110AFG, SHOULD NOT BE MODIFIED to define the antenna installation as directional, using the pattern supplied in LKCM's December 4, 2013, Response to Complaint. In addition, LKCM Radio Licenses, LLP, SHALL SHOW CAUSE why the KFWR license SHOULD NOT BE MODIFIED to indicate a reduction in transmitter power output from 25.0 kW to 9.1 kW, or such other value sufficient to limit the maximum radiation to 100 kW in any direction.<sup>80</sup> Any protest to this proposed license modification may be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th Street, SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. **Any filing that is not addressed to the Office of the Secretary will be treated as filed on the day it is received in the Office of the Secretary.**<sup>81</sup> **Accordingly, failure to follow the specified requirements may result in the treatment of a filing as untimely.** Additionally, a copy of any filing must be served on:

John Wells King, Esq.  
John Wells King, PLLC  
4051 Shoal Creek Lane East  
Jacksonville, FL 32225-4792

23. For further information concerning this proceeding, contact Dale Bickel, Media Bureau, at (202) 418-2706.

FEDERAL COMMUNICATIONS COMMISSION

Peter H. Doyle  
Chief, Audio Division  
Media Bureau

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<sup>80</sup> Because the vertically polarized component, at 274.5 kW ERP, is larger than the horizontal, it is the vertically polarized component that is used here to derive the new TPO value. We calculate that to achieve 100 kW ERP in the main lobe of the antenna, the TPO must be reduced to 9.1 kW.

<sup>81</sup> See 47 C.F.R. § 1.7.