

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

In the Matter of )
)
Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of ) WT Docket No. 10-4
the Commission's Rules to Improve Wireless )
Coverage Through the Use of Signal Boosters )
)
Wireless Telecommunications Bureau Seeks ) DA 14-304
Comment on ClearRF Request for Determination )
of Equivalent Protection )

ORDER

Adopted: April 16, 2014

Released: April 16, 2014

By the Chief, Mobility Division, Wireless Telecommunications Bureau:

1. In this Order, we address a request for determination of "equivalent protection" from ClearRF, pursuant to Section 20.21(e)(10) of the Commission's signal booster rules. As discussed below, we deny the request because it fails to sufficiently demonstrate that ClearRF's signal booster (Model Number WRE2710) provides equivalent protection to the Network Protection Standard (NPS) found in our rules.

I. BACKGROUND

2. The Commission's signal booster rules created a new regulatory framework to allow consumers to realize the benefits of using signal boosters while preventing, controlling, and, if necessary, resolving interference to wireless networks. An integral part of this new framework was the adoption of the NPS for Consumer Signal Boosters and two detailed technical specifications designed to meet the NPS and protect wireless networks from harmful interference. In order to promote future innovation in signal booster design, however, the Commission stated that any Consumer Signal Booster manufacturer which could not meet the technical parameters in Sections 20.21(e)(1)-(e)(9) of its rules could still satisfy the NPS if the manufacturer could demonstrate that the booster provided equivalent protections.

3. On February 26, 2014, ClearRF filed a request for determination of "equivalent protection" with the Wireless Telecommunications Bureau pursuant to Section 20.21(e)(10) of the Commission's rules (ClearRF Request or Request). ClearRF states that its wideband, direct-connect

1 Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters, Report and Order, 28 FCC Rcd 1663 (2013) (Report and Order).

2 The NPS is a flexible set of requirements for the design and manufacture of Consumer Signal Boosters, which couple signal booster innovation with sufficient safeguards to protect wireless networks from harmful interference. Report and Order, 28 FCC Rcd at 1682-91, ¶¶ 49-69.

3 The NPS includes one technical specification for Wideband Consumer Signal Boosters and a second for Provider-Specific Consumer Signal Boosters. Id. at 1690-91, ¶¶ 70-74. Certain requirements in the Wideband Consumer Signal Booster specification are at issue here.

4 Id. at 1691-92, ¶¶ 75-76; 47 C.F.R. § 20.21(e)(10).

5 ClearRF Request at 1.

Consumer Signal Booster, ClearRF Model Number WRE2710, does not meet Sections 20.21(e)(8)(i)(B) (Bidirectional Capability requirement) and 20.21(e)(8)(i)(C)(2)(iii) (Booster Gain Limits requirement) of the Commission's rules, but nonetheless provides protection equivalent to the Network Protection Standard.<sup>6</sup>

4. On March 5, 2014, the Wireless Telecommunications Bureau released a Public Notice seeking comment on the ClearRF Request.<sup>7</sup> Subsequently, in response to a request from CTIA – The Wireless Association (CTIA), the Commission extended the period for comments and replies on the ClearRF Request to March 27, 2014, and April 3, 2014, respectively.<sup>8</sup> Verizon Wireless (Verizon) and CTIA filed comments opposing the ClearRF Request. ClearRF did not file a reply.

## II. DISCUSSION

5. We find that ClearRF fails to demonstrate that its wideband, direct-connect Consumer Signal Booster, ClearRF Model Number WRE2710, provides protection equivalent to that specified in Sections 20.21(e)(8)(i)(B) and 20.21(e)(8)(i)(C)(2)(iii) of the Commission's rules. We note at the outset that the ClearRF Request lacks technical specificity regarding the proposed product.<sup>9</sup> For example, there is no indication of the bands of operation, air interface(s) supported, or types of Machine-to-Machine (M2M) devices which can be connected to the ClearRF booster.<sup>10</sup> Likewise, ClearRF provides no technical analysis or test data to support its Request.<sup>11</sup> In addition, as discussed further below, the Bidirectional Capability requirements and Booster Gain Limits in the NPS were included in the signal booster rules to mitigate certain types of interference to wireless networks and ClearRF fails to explain how its device protects against such interference. We thus deny ClearRF's equivalent protection request.

6. ClearRF fails to demonstrate equivalent protection with respect to the Commission's Bidirectional Capability requirement. Section 20.21(e)(8)(i)(B) of the Commission's rules requires all Wideband Consumer Signal Boosters to provide equivalent uplink and downlink gain.<sup>12</sup> The Office of Engineering and Technology (OET) determined that a Wideband Consumer Signal Booster will be deemed to meet this requirement if the booster's uplink and downlink gains are within 9 dB.<sup>13</sup> ClearRF's booster is designed to provide up to 25 dB of gain on the downlink and up to 10 dB on the uplink<sup>14</sup> (a difference of 15 dB) and thus does not comply with the Bidirectional Capability requirement. Verizon states that the Bidirectional Capability requirement was designed to prevent interference on the uplink and downlink in the form of (1) increased noise on the system uplink; (2) diminished system resources (*e.g.*, power limitations) that would lead to failed access attempts for both the booster user and other system users; (3) delays in data transmission; and (4) waste of system resources.<sup>15</sup> ClearRF states that its booster

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<sup>6</sup> *Id.*

<sup>7</sup> Wireless Telecommunications Bureau Seeks Comment on ClearRF Request for Determination of Equivalent Protection, WT Docket No. 10-4, *Public Notice*, DA 14-304 (Rel. Mar. 5, 2014).

<sup>8</sup> Wireless Telecommunications Bureau Extends Period to File Comments on ClearRF Request for Determination of Equivalent Protection, WT Docket No. 10-4, *Public Notice*, DA 14-366 (Rel. Mar. 18, 2014).

<sup>9</sup> *See* CTIA Comments at 4; Verizon Comments at 3.

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

<sup>11</sup> *See* Verizon Comments at 3.

<sup>12</sup> 47 C.F.R. § 20.21(e)(8)(i)(B).

<sup>13</sup> OET Knowledge Database Publication No. 935210 D03.

<sup>14</sup> ClearRF Request at 2.

<sup>15</sup> Verizon Comments at 6-7. Verizon explains that wireless systems assign modulation and power control resources based on the assumption that uplink and downlink channels have roughly equivalent gain. The system assigns uplink resources based on channel estimations derived from the downlink. When the uplink and downlink connections are unbalanced, the system will assign suboptimal modulation and power resources to the uplink,

(continued....)

provides “more protection to the network when only a minimal amount of gain is applied to the uplink,”<sup>16</sup> but does not otherwise explain how the potential for the types of interference described by Verizon will be mitigated by their device. Although ClearRF explains why it designed its booster with asymmetric gain on the uplink and downlink, it does not point to other features in the device which protect against potential interference due to unbalanced gain. ClearRF thus fails to demonstrate equivalent protection for the Bidirectional Capability requirement.

7. Similarly, ClearRF fails to demonstrate equivalent protection with respect to the Commission’s Booster Gain Limits requirement.<sup>17</sup> Section 20.21(e)(8)(i)(C)(2)(iii) of the Commission’s signal booster rules limit mobile booster maximum gain to 15 dB when directly connected (*e.g.*, boosters with a physical connection to the phone).<sup>18</sup> The ClearRF booster is designed to provide up to 25 dB of gain on the downlink (exceeding the limit by 10 dB) and thus does not comply with the Booster Gain Limits requirement. Verizon states that increasing the downlink signal strength beyond the 15 dB limit established in the rules would create harmful interference to wireless networks.<sup>19</sup> According to Verizon, when the booster and M2M device are in close proximity to network base stations, they would create excessive gain which would cause harmful interference by “making devices more sensitive to overload interference, increasing the noise floor of the devices, and reducing the dynamic range of devices connected to the booster.”<sup>20</sup> ClearRF explains that its booster requires 25 dB of gain in the downlink to “maximize the data rate and keep a solid lock on the base station signal.”<sup>21</sup> ClearRF states that “[t]he 25 dB of gain does not in any way affect the network or cause interference.”<sup>22</sup> Such explanations and assertions, however, fail to address the issues raised by Verizon and are insufficient to demonstrate how ClearRF’s device protects against interference created by gain levels above those specified in the Commission’s rules. ClearRF thus fails to demonstrate that its signal booster provides equivalent protection to the NPS and we deny the Request.

8. In addition, ClearRF appears to argue that because its signal booster is designed to be connected by coaxial cable to an M2M device, *e.g.*, cellular modem, router or module – and not a wireless phone – the Commission should apply different technical standards than those contained in the Commission’s signal booster rules.<sup>23</sup> We disagree. Part 20 of the Commission’s rules applies to all Consumer Signal Boosters regardless of the end user equipment employed with the signal booster.

9. Finally, we remind manufacturers that prior to operation of any Consumer Signal Booster, a subscriber must have the consent of his/her wireless provider and must register the booster with such provider.<sup>24</sup> While many wireless providers have voluntarily committed to allow their

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resulting in interference. Verizon further explains that the uplink channel is used for transmission control to confirm proper downlink data transmission. Because the uplink transmissions would not be reliable in an unbalanced gain scenario, the system would not receive the required responses from the device connected to the booster and would keep retransmitting to the device resulting in additional interference. *Id.*

<sup>16</sup> ClearRF Request at 1.

<sup>17</sup> *See* CTIA Comments at 5.

<sup>18</sup> 47 C.F.R. § 20.21(e)(8)(i)(C)(2)(iii).

<sup>19</sup> Verizon Comments at 7.

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

<sup>21</sup> ClearRF Request at 2.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.* at 1 (stating that the Commission’s rules “do not clearly account for signal boosters designed for use with M2M devices where the booster amplifier is directly cabled to the M2M device’s antenna port (not intended to be connected to a cell phone)”).

<sup>24</sup> 47 C.F.R. § 20.21(a).

subscribers to use Consumer Signal Boosters which comply with the NPS,<sup>25</sup> such commitments would not necessarily extend to a booster which received a determination of equivalent protection.<sup>26</sup> When seeking a determination of equivalent protection for Consumer Signal Boosters, we urge manufacturers to work with wireless providers to develop devices that improve wireless coverage for consumers and are determined to be safe for wireless networks.

### III. ORDERING CLAUSE

10. Accordingly, IT IS ORDERED pursuant to Sections 1, 4(i), 302, 303(f), and 303(r), of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 302, 303(f), and 303(r), and Sections 1.925 and 20.21(e)(10) of the Commission's Rules, 47 C.F.R. §§ 1.925, 20.21(e)(10), that the Request for Determination of Equivalent Protection filed by ClearRF IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION

Roger S. Noel  
Chief  
Mobility Division  
Wireless Telecommunications Bureau

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<sup>25</sup> *Report and Order*, 28 FCC Rcd at 1674, ¶ 27.

<sup>26</sup> *See, e.g., Ex Parte* Letter from Andre J. Lachance, Assistant General Counsel, Verizon, to Marlene Dortch, Secretary, Federal Communications Commission (Jan. 29, 2013) at 1 (limiting voluntary consent to “consumer boosters [that] meet one of the consumer booster safe harbor protection standards [in the NPS]”).