

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

In the matter of
Revision of Parts 2 and 15 of the Commission's
Rules to Permit Unlicensed National Information
Infrastructure (U-NII) devices in the 5 GHz band
ET Docket No. 03-122
RM - 10371

ORDER

Adopted: February 18, 2005

Released: February 23, 2005

By the Commission:

INTRODUCTION

1. By this Order and effective immediately, we extend for one year the transition periods, adopted in the 5 GHz U-NII Report and Order and described herein, for unlicensed National Information Infrastructure (U-NII) equipment operating in the 5.250-5.350 GHz band. This action will allow devices to continue to obtain equipment authorizations and to be marketed under the rules in effect prior to the adoption of the 5 GHz U-NII Report and Order pending the development of measurement procedures for evaluating such devices for compliance with the new rules.

BACKGROUND

2. Previously, U-NII devices were permitted to operate in 300 megahertz of spectrum in the 5.150-5.250 GHz, 5.250-5.350 GHz and 5.725-5.825 GHz bands under the FCC's Part 15 rules. Many of the devices operating under these rules are designed to meet an industry standard for wireless local area networks known as IEEE 802.11, sometimes also referred to as the Wi-Fi (Wireless-Fidelity) standard.

3. On November 12, 2003, the Commission adopted its 5 GHz U-NII Report and Order, which amended Part 15 of its rules to make an additional 255 megahertz of spectrum available in the 5.470-5.725 GHz band for unlicensed National Information Infrastructure (U-NII) devices, including Radio Local Area Networks (RLANs). This action aligned the frequency bands used by U-NII devices in the

1 47 C.F.R. § 15.37(l).

2 See Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band, ET Dkt No. 03-122, Report and Order, 18 FCC Rcd 24484 (2003) ("5 GHz U-NII Report and Order").

3 See 47 C.F.R. Part 15 Subpart E. The technical and operational requirements for each of these bands differ.

4 The term Wi-Fi was originally applied to unlicensed wireless devices operating in the 2.4 GHz region of the spectrum in accordance with the Institute of Electrical and Electronics Engineers (IEEE) 802.11(b) standard. More recently, the term has also been applied to unlicensed wireless devices operating in the 5 GHz region in accordance with IEEE 802.11(a). The Commission does not require devices operating in either the 2.4 GHz or 5 GHz bands to meet the IEEE standards.

5 See 47 C.F.R. Part 15 Subpart E - Unlicensed National Information Infrastructure Devices. U-NII devices are "[i]ntentional radiators operating in the frequency bands 5.15-5.35 GHz and 5.725-5.825 GHz that use wideband (continued...)

United States with bands in other parts of the world, thus decreasing development and manufacturing costs for U.S. manufacturers by allowing for the same products to be used in most parts of the world.

4. In addition to making more spectrum available for use by U-NII devices, the Commission took steps to minimize the potential for these devices to cause interference to existing operations. Specifically, it modified certain technical requirements for U-NII devices. The amendments made in the *5 GHz U-NII Report and Order* were generally consistent with the U.S. proposals for the World Radiocommunication Conference 2003 (WRC-03), and with the resolutions adopted at WRC-03, pertaining to these bands.<sup>6</sup>

5. *Dynamic Frequency Selection.* In the *5 GHz U-NII Report and Order*, the Commission required that U-NII devices operating in the 5.250-5.350 GHz and 5.470-5.725 GHz bands employ Dynamic Frequency Selection (DFS) at the threshold levels proposed in the *5 GHz U-NII Notice*.<sup>7</sup> DFS is a feature that dynamically instructs a transmitter to switch to another channel whenever a particular condition (such as, for example, a threshold value of the prevailing ambient interference level on a channel) is met. Prior to initiating and during a transmission, a U-NII device's DFS feature would monitor the available spectrum in which it could operate for a radar signal. If a signal is detected, the channel associated with the radar signal would either be vacated and/or flagged as unavailable for use by the U-NII device. The Commission agreed with commenters that DFS was a key element in enabling unlicensed U-NII devices to share spectrum with important U.S. Government radar operations, as well as an ITU accepted mechanism that would allow U-NII devices to be globally marketed. It also decided not to require U-NII devices to have bandwidths of 1 megahertz or greater.<sup>8</sup> In addition, it adopted its proposal to exempt remote devices that are under the control of a central controller from the DFS requirement.<sup>9</sup> The Commission further decided that codifying a standard for the minimum number of pulses to be detected and the observation time required to reliably detect the radar signals before the work on compliance testing procedures was completed could be overly burdensome and limit the flexibility for DFS implementations in particular devices. It therefore decided that these parameters would be addressed under the compliance test procedures.<sup>10</sup> The Commission also clarified the rules to indicate that radar

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digital modulation techniques and provide a wide array of high data rate mobile and fixed communications for individuals, businesses, and institutions.” 47 C.F.R. § 15.403(i).

<sup>6</sup> See U.S. Department of Commerce, National Telecommunications and Information Administration, “Agreement Reached Regarding U.S. Position on 5 GHz Wireless Access Devices,” (“WRC-03 Agreement”), rel. Jan. 31, 2003, (available at <http://www.ntia.doc.gov/ntiahome/press/2003/5ghzagreement.htm>.) WRC-03, which convened June 9 - July 4, 2003, in Agenda Item 1.5, considered spectrum allocations for the mobile, fixed, SRS, EESS, and the radiolocation service for the frequency range 5.150-5.725 GHz. See also, World Radiocommunication Conference Provisional Final Acts, Geneva, 2003, Part 1/2, pages 27-30 and Part 2/2, pages 493-496. (“WRC-03 Final Acts”).

<sup>7</sup> See *5 GHz U-NII Report and Order* at ¶ 29; *Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band*, ET Dkt No. 03-122, *Notice of Proposed Rulemaking*, 18 FCC Rcd 11581 (2003) (“*5 GHz U-NII Notice*”).

<sup>8</sup> See *5 GHz U-NII Report and Order* at ¶ 30. As an established policy, the FCC laboratory has been authorizing U-NII devices with a minimum data rate rating of 1 Mbps. This policy ensures the U-NII spectrum is used efficiently.

<sup>9</sup> See *5 GHz U-NII Report and Order* at ¶ 31. The exclusion of such “client” devices from the radar detection and DFS functions was an integral part of the industry/Government pre-WRC-03 agreement and also consistent with the final ITU Recommendation. See ITU Recommendation M.1652. The Commission did not, however, exempt controller devices or “masters” from the DFS requirement. With respect to *ad hoc* U-NII devices, the Commission decided that these devices should not be exempt from the DFS requirement in the 5.250-5.350 GHz and 5.470-5.725 GHz bands because no analyses had been performed to determine the impact on radio services in this spectrum.

<sup>10</sup> See *5 GHz U-NII Report and Order* at ¶ 32; see also ¶ 6, *infra*.

detection (sub-function) was part of the overall DFS function<sup>11</sup> and adopted rules to clarify DFS detection that required a master device and associated client devices to dedicate periods of no transmissions before, during, or after each packet or frame.<sup>12</sup>

6. *Test Procedures.* In order to allow the immediate implementation of U-NII devices in accordance with the rules adopted in the *5 GHz U-NII Report and Order*, the Commission provided an interim test procedure, drafted by a joint industry/U.S. Government 5 GHz Project Team, to be used in obtaining equipment certifications for U-NII devices.<sup>13</sup> Upon review, the Commission found that the provisions of this test procedure were adequate to provide satisfactory testing and certification of U-NII devices containing DFS capabilities but also recognized that the procedure may need to be modified as equipment was developed and as testing methodologies were refined. Therefore, consistent with existing practice, the *5 GHz U-NII Report and Order* stated that the Commission's Laboratory may issue updated measurement procedures in the future.<sup>14</sup>

7. *Transition Period.* In the *5 GHz U-NII Report and Order*, the Commission required that any product with the capability to operate in the new spectrum at the 5.470-5.725 GHz band, including equipment designed to operate in both the 5.250-5.350 GHz and 5.470-5.725 GHz bands, must meet all the rules, including the new DFS and transmit power control (TPC)<sup>15</sup> requirements, contained in the *5 GHz U-NII Report and Order* in accordance with the specified measurement procedures to obtain equipment certification. In addition, the Commission required that products that operate only in the 5.250-5.350 GHz band also comply with these rules. For devices operating in the 5.250-5.350 GHz band, the Commission provided for a transition period in order to minimize economic hardships on manufacturers. During the transition period, manufacturers are allowed to continue producing and selling existing equipment while modifying their products to meet the new requirements. The Commission adopted a cut-off date of one year from the date of publication of the *5 GHz U-NII Report and Order* in the Federal Register (*i.e.*, January 20, 2005) for applications for equipment certification of products that operate only in the 5.250-5.350 GHz band (*i.e.*, equipment designed to operate in only the 5.250-5.350 GHz band could continue to obtain certification without having DFS and TPC, so long as the application for equipment certification was filed prior to the cut-off date of one year).<sup>16</sup> After that time, all devices for which an initial application for equipment certification are filed for U-NII equipment operating in the 5.250-5.350 GHz band must meet the rules adopted in the *5 GHz U-NII Report and Order*. In addition, to prevent equipment without DFS and TPC requirements from being imported and marketed indefinitely, the Commission adopted a two-year cut-off date (*i.e.*, January 20, 2006) for the marketing and importation of equipment designed to operate in only the 5.250-5.350 GHz band.<sup>17</sup> Finally, the

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<sup>11</sup> See § 15.403(g) and § 15.407(h)(2).

<sup>12</sup> See *5 GHz U-NII Report and Order* at ¶ 32. During these listen periods, successive averaging periods, not to exceed 1 microsecond, would be used and any power level above the detection threshold found in any one of these averaging periods would trigger the DFS detection circuit. *Id.*

<sup>13</sup> See DFS Interim Test Procedure contained in Appendix C of the *5 GHz U-NII Report and Order*.

<sup>14</sup> See *5 GHz U-NII Report and Order* at ¶ 39.

<sup>15</sup> In the *5 GHz U-NII Report and Order*, the Commission required transmit power control (TPC) for U-NII devices operating in the 5.250-5.350 GHz and 5.470-5.725 GHz bands and at power levels higher than 500mW. TPC can generally be defined as a mechanism that regulates a device's transmit power in response to an input signal or a condition (*e.g.*, a command signal is issued by a controller when the received signal falls below a predetermined threshold). See *5 GHz U-NII Report and Order* at ¶¶ 35-36.

<sup>16</sup> See *5 GHz U-NII Report and Order* at ¶ 42.

<sup>17</sup> See § 15.37(1).

Commission noted that users who obtained equipment prior to any of the cut-off dates would be able to continue to use that equipment indefinitely.<sup>18</sup>

## DISCUSSION

8. The industry and the Federal Government have found the implementation of DFS to be more complex than originally envisioned. Considerable progress has been made on the testing methodologies for ensuring that DFS adequately protects most Federal Government radar systems. The testing methodologies for the remaining radar systems are currently being developed. As a result, measurement procedures for certifying U-NII devices containing DFS capabilities have not yet been finalized. Further, the Federal Government agencies will likely conduct tests to validate that the testing procedures respond as intended to protect radar systems. All parties are currently working together to reach an agreement and expect that remaining issues will be resolved shortly. The Commission's Laboratory will issue the updated measurement procedures for the certification of U-NII equipment containing DFS and TPC capabilities as soon as possible.

9. We note that the cut-off date for applications for equipment certification of products without DFS and TPC that operate in only the 5.250-5.350 GHz band is January 20, 2005, one year from the date of publication of the *5 GHz U-NII Report and Order* in the Federal Register. In order to allow sufficient time for an agreement on DFS implementation between the industry and the Federal Government to be reached and for equipment manufacturers to incorporate DFS into U-NII devices, we hereby extend by one year the cut-off date for applications for certification of U-NII equipment operating without DFS or TPC in the 5.250-5.350 GHz band. Therefore, effective January 20, 2006, all devices for which an initial application for equipment certification is filed for U-NII equipment operating in the 5.250-5.350 GHz band must meet the rules adopted in the *5 GHz U-NII Report and Order*. We also extend by one year the two-year cut-off date for marketing and importation of equipment designed to operate in only the 5.250-5.350 GHz band. Therefore, U-NII equipment operating in the 5.250-5.350 GHz band that are imported or marketed on or after January 20, 2007 must comply with the DFS and TPC requirements adopted in the *5 GHz U-NII Report and Order*. We note that users who obtained equipment prior to any of these cut-off dates would be able to continue to use that equipment indefinitely. Finally, because our action today temporarily relieves a restriction, *i.e.*, the cut-off dates for equipment authorizations and the marketing of U-NII equipment in the 5.250-5.350 GHz band, we make this *Order* effective upon release.<sup>19</sup>

## ORDERING CLAUSES

10. Accordingly, IT IS ORDERED that, pursuant to Sections 4(i), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(f), and 303(r), and Section 553(d) of the Administrative Procedure Act, 5 U.S.C. § 553(d), this Order is hereby adopted.

11. IT IS FURTHER ORDERED that Section 15.37(l), 47 C.F.R. § 15.37(l) IS MODIFIED, effective upon release of this Order.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch  
Secretary

<sup>18</sup> See *5 GHz U-NII Report and Order* at ¶ 42.

<sup>19</sup> See Section 553(d)(1) of the Administrative Procedure Act, 5 U.S.C. § 553(d)(1). The Commission also will not send a copy of this Order pursuant to the Congressional Review Act, 5 U.S.C. § 801(a)(1)(A).

**APPENDIX**  
**FINAL RULES**

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 C.F.R. part 15 as follows:

**PART 15 – RADIO FREQUENCY DEVICES**

1. The authority citation for part 15 continues to read as follows:

**AUTHORITY:** 47 U.S.C. 154, 302, 303, 304, 307 and 544A.

2. Section 15.37 is amended by modifying paragraph (l), to read as follows:

**§15.37 Transition provisions for compliance with the rules.**

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(l) U-NII equipment operating in the 5.25-5.35 GHz band for which applications for certification are filed on or after January 20, 2006 shall comply with the DFS and TPC requirements specified in Section 15.407 of this part. U-NII equipment operating in the 5.25-5.35 GHz band that are imported or marketed on or after January 20, 2007 shall comply with the DFS and TPC requirements in Section 15.407 of this part.

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