

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of )  
 )  
Modification of Parts 2 and 15 of the ) ET Docket No. 03-201  
Commission's Rules for unlicensed devices )  
and equipment approval )

**COMMENTS OF MOTOROLA, INC.**

Motorola, Inc. (Motorola) hereby submits these comments in response to the Commission's *Notice of Proposed Rulemaking* in the above-captioned proceeding initiated to update the FCC's rules for unlicensed devices authorized under Part 15 of its rules.<sup>1</sup>

In an effort to promote more efficient sharing of spectrum used by unlicensed devices and to remove unnecessary regulations, the *Notice* proposes to: 1) permit the use of advanced antenna technologies with spread spectrum devices in the 2.4 GHz band; 2) allow replacement antennas to be used without requiring recertification; 3) allow professional radio system installers to substitute technically equivalent components in systems that have been granted equipment authorization; 4) harmonize the procedures for measuring transmit power in various Part 15 frequency bands; 5) modify the channel spacing requirements for frequency hopping spread spectrum systems operating in the 2.4 GHz band; and 6) clarify the equipment authorization requirements for modular transmitters.<sup>2</sup> The *Notice* also seeks comment on

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<sup>1</sup> *Modification of Parts 2 and 15 of the Commission's Rules for unlicensed devices and equipment approval*, ET Docket No. 03-201, *Notice of Proposed Rulemaking*, FCC 03-223, 68 Fed. Reg. 68823 (2003) (*NPRM* or *Notice*).

<sup>2</sup> *Id.* at ¶ 1.

whether the Commission should consider adopting certain methods, such as a spectrum etiquette, to ensure efficient spectrum usage by unlicensed devices.<sup>3</sup>

In general, Motorola supports the FCC's proposals and urges their quick adoption, consistent with the further recommendations made herein. The FCC should be ever vigilant to ensure that its technical standards do not unnecessarily impede the deployment of new technologies. At the same time, clarifying the requirements for equipment authorization will allow manufacturers to respond more quickly to consumer demand for products that enable high-speed wireless connectivity. This will serve the public interest as Part 15 spread spectrum devices play an important role in improving this nation's broadband capabilities.

With regard to the specific proposals in the *Notice*, Motorola strongly supports allowing advanced antennas to be approved for use with 2.4 GHz spread spectrum devices. Sectorized and phased array antenna systems will provide for more efficient re-use of the spectrum while increasing the reliability and performance of unlicensed devices. Motorola also believes that the proposals to limit the aggregate power transmitted simultaneously on all beams to 8 dB above the limit for an individual beam and to require that the transmitter output power be reduced by 1 dB for each 3 dB that the directional antenna gain of the system exceeds 6 dBi strike an appropriate balance between increased design flexibility and minimized potential interference.<sup>4</sup> Motorola urges the FCC to implement these policies expeditiously.

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<sup>3</sup> *Id.* at ¶ 44.

<sup>4</sup> *Id.* at ¶ 12.

The Commission proposes to allow system integrators and consumers to replace the manufacturer-supplied antenna with any antenna of a similar type that does not exceed the antenna gain of the original antenna without further FCC authorization.<sup>5</sup> As proposed, replacing the original antenna with a different type (*i.e.*, replacing a “yagi” type antenna with a “horn” type antenna) or a higher gain antenna would require retesting and a new equipment authorization by either the Telecommunications Certification Body or the FCC.<sup>6</sup>

Motorola supports the intent of these proposals. Allowing for replacement antennas in this manner reduces testing burdens and is a consumer-friendly solution that could result in lower equipment prices through increased competition from equipment suppliers. However, Motorola does not believe that the Commission should limit antenna replacements to those of the same type. Antenna pattern characteristics vary more by gain than by type and, therefore, the FCC should simply require testing with the highest gain antenna to be used. Motorola therefore recommends that the FCC allow replacement with a different type of antenna as long as the gain falls within permissible parameters. With this modification, these rule modifications will adequately address concerns about increased interference potential and also minimize the number of antenna module combinations that would require testing with the initial application for equipment authorization. Finally, the Commission should reconsider the need to continue requiring non-standard connectors or electrical jacks on Part 15 intentional radiators.<sup>7</sup> This requirement imposes additional costs on manufacturers, and ultimately consumers, with little benefit.

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<sup>5</sup> *Id.* at ¶17.

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

<sup>7</sup> *See, e.g.*, Section 15.203 of the Commission’s Rules.

Motorola supports the proposal for frequency hopping systems to have hopping channel carrier frequencies separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channels, whichever is greater, provided the systems operate with an output power no greater than 125 mW.<sup>8</sup> However, Motorola believes that the Commission's proposal to limit such systems to fewer than 75 hopping channels is not warranted as reducing the number of hopping channels can, under some circumstances, make interference more likely due to the transmitted energy being concentrated in a smaller portion of the available 2.4 GHz spectrum. Also, the Commission's proposal raises compatibility issues because the current generation of Bluetooth systems employs 79 hopping channels. Limiting next generation Bluetooth systems to a maximum of 75 hopping channels will cause backward compatibility with existing products.

The *Notice* promises another major improvement in the equipment authorization processes by proposing to clarify and codify the requirements for obtaining modular transmitter approvals.<sup>9</sup> Providing manufacturers with greater flexibility to certify components of the radio device will provide for greater manufacturing economies of scale and lower costs to consumers. Manufacturers will be able to incorporate previously approved modules for use in numerous equipment platforms without sacrificing time and money on redundant equipment reviews.

With respect to the specific proposed requirements for modular approvals, Motorola supports the concept of a "reference platform" that manufacturers would build and submit for testing.<sup>10</sup> As envisioned, the reference platform would incorporate the radio front end and antenna into a device platform (*i.e.*, PDA, laptop) in which the firmware will operate. Future

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<sup>8</sup> *Notice* at ¶ 29.

<sup>9</sup> *Notice* at ¶¶ 35-41.

<sup>10</sup> *Id.* at ¶ 40.

changes to the radio front end or firmware would require re-testing on the pre-approved reference platform. This policy will provide for greater certainty in the design process and reduce the need to “re-invent the wheel” for similar products and designs. This will reduce cycle time for equipment evaluation and authorization and thus allow products to reach consumers in a timelier manner.

Finally, the Commission seeks comment on ways to improve spectrum sharing in the unlicensed bands and asks whether a “spectrum etiquette” should be considered for devices that operate on an unlicensed basis.<sup>11</sup> The concept is based on the rules for 1.9 GHz Unlicensed PCS devices that essentially require such devices to monitor the spectrum and to only transmit when no signal above a specified threshold is detected.<sup>12</sup>

Motorola does not support the establishment of any new spectrum etiquette for unlicensed devices operating in Part 15 bands outside of the Unlicensed PCS allocation. In Motorola’s opinion, the risk that a spectrum etiquette may stifle innovation and product development outweighs any apparent benefits. More specifically, Motorola does not believe that a spectrum etiquette is necessary in the 2.4 GHz band. While such an etiquette may be appropriate in future bands available for unlicensed operations, depending on the circumstances, the lack of an etiquette in current bands has allowed innovation and should not be altered at this time.

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<sup>11</sup> *Id.* at ¶ 44.

<sup>12</sup> *See, e.g.*, Section 15.323 of the Commission’s Rules.

Motorola applauds the FCC for proposing these changes to its Part 15 rules that will serve to enhance the capability of Part 15 devices while simplifying and expediting the equipment authorization process. The Commission should move quickly to adopt these proposals, consistent with these recommendations.

Respectfully Submitted,

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