

**Before the  
DEPARTMENT OF COMMERCE  
National Telecommunications and Information Administration  
Washington, D.C. 20230**

In the Matter of	
Rural Wireless Broadband Access in the 3650-3700 MHz Band	Docket No. 040116021-4021-01

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**COMMENTS OF MOTOROLA, INC.**

Motorola, Inc. (“Motorola”) submits these comments on the *Notice for Inquiry* in the above captioned proceeding.<sup>1</sup> Motorola believes that it is premature to fully determine any unlicensed requirements for the use of the 3650-3700 MHz band at this time because service rules for licensed services in this band have not been established.

The Federal Communications Commissions (*Commission*) has a pending *Notice of Inquiry (NOI)* seeking comments on the feasibility of permitting unlicensed devices to operate in the 3650-3700 MHz band.<sup>2</sup> In that *NOI* the Commission does not suggest either removing the licensed use or designating 3650-3700 MHz as an unlicensed band; instead, it merely asks whether the current prohibition on unlicensed operation in this band should be lifted to allow some use of unlicensed devices in conjunction with existing and future licensed uses. If the Commission decides to allow unlicensed operations in the presence of licensed fixed and mobile

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<sup>1</sup> Department of Commerce, National Telecommunications and Information Administration, Notice of Inquiry, Rural Wireless Broadband Access in 3560-3700 MHz band, Docket No. 040116021-421-01, Billing Code 3510-60-P.

<sup>2</sup> Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Notice of Inquiry, ET Docket No. 02-380, FCC 02-328, 17 FCC Rcd 25632 (2002); *see also* Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Docket No. 02-380, Order Granting Extension of Time, DA 03-1022 (rel. Mar. 31, 2003) (extending the comment filing deadline).

systems it will be difficult to find measures to ensure protection of the licensed applications, particularly for mobile operations.

Because the locations of mobile handsets are unpredictable, unlicensed use of licensed mobile spectrum presents unique difficulties in providing adequate safeguards to protect licensed operations from interference. As Motorola has discussed in previous comments and ex parte filings to the Commission, secondary unlicensed use of licensed spectrum may be feasible, in some cases, through the exploitation of “spectrum holes.”<sup>3</sup> However, such secondary use should be permitted only if unlicensed devices do not cause harmful interference to the primary licensed users. Fundamental obstacles to secondary unlicensed use are the problems presented by “hidden terminals” shadowing of unlicensed devices, and inability to predict future spectrum use.<sup>4</sup> In such circumstances, an unlicensed device may be unable to detect use of its transmitting frequency throughout the entire zone that is affected by its transmissions. Therefore, use of listen-before-talk protocols would be insufficient to prevent harmful interference from occurring.

These problems may be manageable in spectrum where licensed operations are exclusively fixed, and hence the locations of transmitters and receivers are known. As the *Notice of Inquiry* suggests, unlicensed devices could, in theory, incorporate global positioning system (“GPS”) capability and the technology to access databases so that they would know when they are operating within the vicinity of licensed operations.<sup>5</sup> In bands where the locations of licensed transmitters are fixed, such measures may allow unlicensed devices to operate without causing

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<sup>3</sup> See Comments of Motorola, Inc., ET Docket No. 02-135, Jan. 27, 2003, at 27 (“Motorola SPTF Comments”); Motorola, Inc., *A White Paper on the Exploitation of “Spectrum Holes” to Enhance Spectrum Efficiency*, ET Docket No. 02-135, Oct. 28, 2002 (“Motorola Spectrum Holes White Paper”).

<sup>4</sup> See Motorola SPTF Comments at 27; Motorola Spectrum Holes White Paper at 3-5 and figures 1 and 3.

<sup>5</sup> See *Notice of Inquiry* ¶¶ 13 & 16 n.39. There may be instances where a device is unable to obtain a GPS fix. If a device can not accurately determine its location it should not be permitted to transmit.

harmful interference to licensed users. Before permitting such secondary use, however, Motorola recommends that the Commission first ensure that unlicensed devices are able to determine their own location<sup>6</sup> and the locations of licensed facilities in their vicinity with a high degree of reliability. Motorola urges the NTIA in its role as the President's principal advisor on telecommunications and information policy matters consider not only the requirements to protect licensed Federal government users but also the requirements of licensed non-Federal government users.

Secondary unlicensed use is not feasible, at this time, in spectrum where licensed mobile operations are present. In general, the dense spectral reuse, area licensing with no database of individual base stations, dynamic spectrum use, and high degree of mobility for mobile and portable radios make it impractical for unlicensed devices to access a database. Therefore, unlicensed devices may not be able to determine whether they are in the vicinity of a receiver even if the unlicensed device has GPS capability.<sup>7</sup> An unlicensed device would not be able to determine in advance whether a transmission would interfere with licensed operations.<sup>8</sup> Therefore, due to the dynamic nature of mobile operations, there is no readily apparent technological solution that would enable unlicensed secondary use without causing harmful interference to licensed services.

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<sup>6</sup> GPS capability is not always available where unlicensed devices may operate.

<sup>7</sup> Such technology would be of particularly limited benefit with respect to licensed mobile-to-mobile operations, where such operations are not constrained to any specific locations.

<sup>8</sup> In fact, for many mobile services, this problem extends to base stations, because base station transmitters are not licensed or recorded in any FCC database.

**I. PERMITTING UNLICENSED USE OF THE 3650-3700 MHZ BAND WOULD BE PREMATURE BEFORE SERVICE RULES FOR LICENSED USERS HAVE BEEN ESTABLISHED**

The Commission's *Notice of Inquiry* seeks comments on the feasibility of permitting unlicensed devices to operate in the 3650-3700 MHz band and specifically requests information on methods to ensure the continued protection of Government agencies operating in that band. Motorola believes that amending Part 15 to allow unlicensed operation in this band would be premature at this time. Without the full picture of the protection requirements of Government services and non-Government services that will be operating in the 3650-3700 MHz band it is difficult, if not impossible to fully determine operation requirements for the unlicensed devices.

The Commission allocated the 3650-3700 MHz band for fixed and mobile (base stations) services on a primary basis in October 2000 and simultaneously instigated a rulemaking proceeding to consider licensing and service rules for this band.<sup>9</sup> That proceeding remains open and licenses have not yet been issued for new fixed and mobile services in the band.<sup>10</sup> Given the present state of flux in that proceeding, and the current lack of understanding with regard to what the technical and operating parameters would be for new licensed services in the 3650-3700 MHz band, it would be inappropriate to allow unlicensed operations to commence in this band.<sup>11</sup>

The Commission should instead focus on developing the licensing and service rules so that new licensed fixed and mobile services can be deployed in the 3650-3700 MHz band. Once these parameters are determined, it would be possible to determine whether unlicensed

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<sup>9</sup> Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band, ET Docket No. 98-237, First Report and Order and Second Notice of Proposed Rule Making, 15 FCC Rcd 20488 (2000).

<sup>10</sup> See *Notice of Inquiry* ¶ 18.

operations in this band would be feasible, given the requirement that licensed users of this spectrum must be fully protected from interference from unlicensed devices.

Although the extent of Government operations were established in the conditions under which this band was transferred to non-Government use, it would not be appropriate to establish sharing conditions with unlicensed devices until rules for all licensed operations, including non-Government, are known. Without this information it is not possible to understand the total radio environment, including the interplay between licensed services. However, some general observations of potential approaches to protect Government services can be discussed. Government operations are specified at three locations, a condition of the transfer of this band allows Government radiolocation stations to continue to operate indefinitely in the 3650 MHz band at three locations with a "radius of operation" of 80 kilometers (49.7 miles).<sup>12</sup>

To gain a full understanding if techniques such a Dynamic Frequency Selection (DFS) or systems with GPS capability enable co-existence, studies should be developed in three specific areas 1) the level of interference which both government and commercial primary services deem as acceptable, 2) the scenario use case and demand for additional unlicensed systems and 3) the methodology to estimate interference levels. All the questions posed by the NTIA address most of these areas but the only piece of this puzzle available is the government use of the band.

Once the aforementioned items are determined then the various potential mitigation techniques can be evaluated to determine the ability of unlicensed devices to co-exist without causing interference. For the purposes of unlicensed co-existence with the Federal Government systems NTIA is concerned with, it may be possible to determine requirements for systems that employ GPS location. For example, Motorola's Canopy™ System used primarily for outdoor

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<sup>12</sup> The three locations are Pascagoula, Mississippi; Pensacola, Florida; and Saint Inigoes, Maryland. Any operations in the 3650 MHz band would be required to protect Federal Government operations at these locations from interference.

point-to-point and point-to-multipoint broadband operations employs GPS in its access points. Since GPS is generally reliable in outdoor environments, Canopy™ can recognize when it would be inside of the 80 km protection zones for the three Federal government stations and could restrict its operations. As stated earlier, if protection is based on use of GPS, devices should only transmit when they are able to obtain a GPS location fix. Other mitigation techniques, such as DFS, cannot be applied without a detailed evaluation of the DFS threshold required to ensure protection, while DFS appears to resolve sharing issues with very high power radar systems at 5 GHz it is unknown if the parameters utilized at 5 GHz can permit sharing in the 3650-3700 MHz band.

## **II. CONCLUSION**

No decision regarding the use of the 3650-3700 MHz band by unlicensed devices can be made until the Commission decides on the technical rules for licensed non-Government use of the band. Without such rules it is not possible to ensure that existing and future licensed users of this spectrum can be fully protected from interference from unlicensed devices. Accordingly, Motorola urges the NTIA to recommend that the Commission fully develops the licensed use of the band and consider both Federal Governmental and non-Federal Governmental user requirements before considering unlicensed operations in the 3650-3700 MHz band.

Respectfully submitted,

/s/  
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