Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Additional Spectrum for Unlicensed Devices	)	
Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
	)	

REPLY COMMENTS OF QUALCOMM INCORPORATED

QUALCOMM Incorporated hereby submits these reply comments in response to the Commission's Notice of Inquiry ("*NOI*") ET Docket No. 02-380 (released December 20, 2002) seeking public comment on the possibility of permitting unlicensed devices to operate in additional frequency bands, namely in the TV broadcast spectrum below 900 MHz and in the 3 GHz band. QUALCOMM applauds the Commission for its leadership in initiating this and other proceedings to explore means to improve the way spectrum is used in the United States, including increasing flexibility and efficiency, and fostering the deployment of innovative technologies and applications.

QUALCOMM's reply comments will focus on the need for the Commission to proceed carefully with plans to introduce unlicensed devices given the regulatory and market uncertainty surrounding the use of the radio frequencies considered in this *NOI*. In particular, QUALCOMM will comment on the DTV transition and reallocation of the 698-806 MHz band (channels 52-69), which will result in the deployment of a wide variety of new fixed and mobile services. QUALCOMM will also discuss the need to study and test new interference mitigation technologies prior to the introduction of unlicensed devices. Finally, assuming that no harmful interference will occur, QUALCOMM suggests that unlicensed operations could be authorized in certain under-utilized bands within the broadcast spectrum.

1) Uncertainty of the regulatory environment in the TV broadcast spectrum below 900 MHz and in the 3 GHz band

QUALCOMM supports the Commission's objectives of encouraging new uses of spectrum by innovative and efficient technologies, including unlicensed devices. However the FCC should carefully consider the potential impact of unlicensed devices in portions of the TV broadcast spectrum. Due to the ongoing uncertainty of the DTV transition, as well as current and foreseen intensive use of the bands, the introduction of unlicensed devices could exacerbate the difficulties that TV broadcasters face in their move from analog to digital transmission. This is a particular concern for the 698-806 MHz bands (the non-core bands), which are in the process of being converted from traditional broadcast to other uses, including mobile services. As noted in the *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, some TV stations have both analog and digital channels in the non-core bands and may continue to operate throughout the transition period. Moreover, the Lower 700 MHz band (698-746 MHz) is significantly more encumbered with TV operations than the Upper 700 MHz band (746-806 MHz), making the transition in the lower 700 MHz more difficult.

Given these difficulties, QUALCOMM strongly supports Motorola's comments that the Commission should not authorize unlicensed operations in certain TV broadcast spectrum, especially in the 698-806 MHz bands. QUALCOMM also agrees with Motorola that increased opportunistic unlicensed operations in broadcast bands may be feasible, but that it will be very difficult in spectrum where new licensed services, such as mobile, will soon be operating. QUALCOMM also supports Cox Broadcasting's comments, which recommend that unlicensed devices should not be authorized in the TV broadcast bands until the end of the DTV transition. TV broadcasters continue to face difficulties in implementing digital services and the FCC should facilitate rather than hinder the rapid transition to digital and the vacating of the 700 MHz bands.

With regard to the 3650-3700 MHz band, QUALCOMM agrees with Motorola that, due to the fact that the Commission is still finalizing its rules to permit fixed and mobile services in the band, the Commission should not consider any amendment of Part 15 to allow unlicensed devices in this spectrum. In addition, QUALCOMM supports IEEE's comments that the 3.5 GHz band will soon be extensively used for fixed and/or mobile applications, including wireless Internet access, which could pose problems were unlicensed operations permitted in close proximity. The successful introduction of these new licensed applications will be dependant on

an interference-limited environment. Given these limitations, QUALCOMM considers it to be premature to allow unlicensed operations in the 3.5 GHz band.

2) Need to study and test new interference mitigation techniques and devices

QUALCOMM agrees with the Spectrum Policy Task Force ("SPTF") that ongoing advances in technology are an important consideration when reviewing opportunities for changes in spectrum management policy. QUALCOMM also agrees that, "advances in technology have significantly increased the diversity of service offerings and have also qualitatively improved existing services."[1] Recent developments in the commercial mobile radio service industry are an excellent example. Therefore, the Commission should carefully consider and investigate the availability of technologies and techniques to avoid interference as described in paragraphs 16 and 21 of the *NOI*.

For example the *NOI* refers to frequency agile equipment and to a "listen-before-talk" approach as being significant technological advancements that will enable more intensive spectrum usage by ensuring that no TV stations or other licensed devices are operating before an unlicensed device starts transmitting. QUALCOMM agrees with Motorola's comments that these techniques may solve interference issues where licensed operations are in *fixed* locations. However underlaying *mobile* licensed with unlicensed operations is far more challenging due to the ubiquitous nature of mobile devices.

In its previous comments to the SPTF, QUALCOMM discussed the potential ability of "smart" or "opportunistic" technologies that can dynamically react to its environment. It is true that radios able to sense their operating environment to determine the amount of traffic in a given frequency range exist. However, it is impossible with today's technology for an independent radio to sense the impact that its operations will have on the operations of another radio. Only through a system with a centralized clearinghouse can one radio predetermine its impact on another radio and modify its operations accordingly.

In addition, QUALCOMM strongly recommends that the Commission carefully consider the fact that the implementation of such "opportunistic" technology will add complexity, cost and power consumption to equipment. QUALCOMM suggests that there are alternative capabilities, including multi-mode and multi-band components, which are far less expensive to

[1] See SPTF Final Report at p. 12.

implement in wireless devices, yet will achieve the same or similar results. Moreover, QUALCOMM supports Ericsson's comments that numerous methods, including new protocols, spectrum use etiquettes, agreed conditions, soft regulations, etc, would also help to support the type of frequency sharing that the Commission proposes.

As many of the commenters in this proceeding mentioned, the use of these new techniques is still at an early stage and additional studies and testing should be conducted before new unlicensed services are authorized. Allowing unlicensed operations without such testing is likely to result in harmful interference and service degradation. Therefore, QUALCOMM recommends that the Commission refrain from permitting new unlicensed users in the proposed bands until the critical issues noted above can be resolved.

3) Unlicensed operations may be authorized in certain under-utilized bands within the broadcast spectrum assuming a non-interfering environment

QUALCOMM supports the Commission's effort to allocate spectrum for unlicensed devices where the spectrum is under-utilized. QUALCOMM agrees with Motorola that operations of unlicensed devices might be appropriate and feasible in specific portions of the TV spectrum where licensed operations are limited to fixed broadcast systems. Such authorization would only be appropriate in a non-interfering environment for the existing TV stations. As Cox Broadcasting stated in its comments to this *NOI,* the Commission should create a clear regulatory framework to minimize harmful interference, while enabling efficient usage of the spectrum by new innovative technologies.

Therefore, if appropriate technical rules and clear policies are established to protect incumbent broadcast services, the 76-216 MHz and 512-698 MHz frequency bands would represent the best spectrum option for unlicensed use among the radio frequencies proposed in the Commission's *NOI.*

In conclusion, QUALCOMM requests that the Commission carefully consider the impact of the introduction of unlicensed operations in licensed bands. In particular, QUALCOMM opposes allowing unlicensed operations in the 698-806 MHz bands, where new fixed and mobile services will soon be deployed. Other parts of the TV broadcast spectrum might be identified as more suitable for unlicensed use once thorough studies and tests of these new technologies and techniques are fully completed. Further studies will helps avoid any harmful interference to existing and future licensed services and encourage more efficient use of spectrum.

Respectfully submitted,

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