

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

In the Matter of)	
)	
Unlicensed Operation in the TV Broadcast Bands)	ET Docket No. 04-186
)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Bands)	ET Docket No. 02-380
)	

REPLY COMMENTS OF NEXTWAVE BROADBAND INC.

NextWave Broadband Inc. (“NextWave”) hereby replies to comments filed in response to the Federal Communications Commission’s (“FCC” or “Commission”) Further Notice of Proposed Rulemaking (“*FNRPM*”) in the above-captioned proceeding regarding the introduction of new low power devices in vacant broadcast television spectrum (“TV bands”).¹

NextWave supports the Commission’s efforts to make this valuable resource available for a wide range of new advanced wireless services. The Commission must now implement a licensing scheme for the unused TV bands that will enable rapid introduction of new equipment and advanced wireless services, while at the same time safeguard against harmful interference to incumbent users. NextWave believes that the hybrid licensing approach used for the 3.65 GHz band (*i.e.* nationwide, non-exclusive licenses requiring fixed base station registration and use of contention-based protocols) with modifications tailored to the TV bands is the most effective means to achieve these objectives. The streamlined licensing approach used in the 3.65 GHz band can easily be adapted to meet the requirements of the TV bands, and represents a

¹ *Unlicensed Operation in the TV Broadcast Bands*, First Report and Further Notice of Proposed Rulemaking, 21 FCC Rcd 12266 (2006) (“*FNRPM*”).

simplified, but effective approach that would obviate the need to pursue many of the other technical proposals under consideration in this proceeding.

Founded in 2005, NextWave develops WiMAX semiconductors, network components and complete wireless LAN/WAN network solutions. NextWave's PacketVideo subsidiary provides a wide range of multimedia software solutions to many of the leading wireless carriers and handset manufacturers worldwide. NextWave also recently acquired GO Networks Inc., a Mountain View, CA-based company that develops advanced mobile Wi-Fi network solutions for commercial and municipal applications.

NextWave has acquired a nationwide spectrum footprint in the United States covering 247 million people in the 2.3 GHz, 2.5 GHz and 1.7/2.1 GHz bands and also owns nationwide spectrum in the 3.5 GHz band in Germany through a majority-controlled joint venture. NextWave intends to partner with companies to deploy next-generation wireless broadband networks that utilize NextWave technologies in both licensed spectrum as well as in non-exclusively licensed bands, such as the 3.65 GHz band and the TV White Spaces.

I. THE COMMISSION SHOULD ADOPT A HYBRID LICENSING APPROACH FOR THE TV BANDS WITH LICENSING, SERVICE AND TECHNICAL RULES SIMILAR TO THOSE ADOPTED FOR THE 3.65 GHZ BAND

Rather than rely exclusively on traditional licensed or unlicensed schemes, given their well-known limitations,² NextWave believes the best licensing method for the TV white spaces is a hybrid approach, similar to that which the FCC has established for the 3.65 GHz band,³ modified, as necessary, to meet the unique requirements of the TV bands. In accordance with this approach, the FCC should issue nationwide, non-exclusive licenses that require:

² *FNPRM*, ¶ 27.

³ *Wireless Operations in the 3650-3700 MHz Band*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd 6502 (2005) (“3.65 GHz Order”).

1) registration of higher-powered fixed/access stations; 2) use of technologies that incorporate spectrum sensing and other contention-based protocols; 3) reception and decoding by a portable/mobile station of an enabling signal transmitted by a registered fixed/access station; and 4) recognition of a “smart beacon” transmitted when legally operated wireless microphones are in use, a requirement that is specific to the TV bands.

The hybrid method described above will enable efficient and widespread use of the unused TV bands and will serve as a safeguard to protect incumbent services from both higher-power fixed/access stations as well as from lower-power portable/mobile TV band devices. Implementation of the 3.65 GHz licensing, service and technical rules, adapted for the specific needs of the TV bands, will enable rapid, low-cost entry to new services and devices, while providing protection to incumbent users.

Like the 3.65 GHz band, the TV bands provide fertile ground for the introduction of new advanced wireless services, but are occupied by a variety of incumbent users that require protective measures in order for the bands to be shared effectively. With more favorable propagation characteristics than the 3.65 GHz band and the possibility of accessing spectrum in markets⁴ along the coasts, however, the TV bands have even greater potential to increase and improve access to broadband services throughout the United States.⁵ In its rulemaking proceeding for the 3.65 GHz band, the Commission found that “the public interest is best served by establishing minimal regulatory barriers to encourage multiple entrants [] and to stimulate the rapid expansion of broadband services.... At the same time, we must ensure that incumbent grandfathered satellite earth stations and the Federal Government radiolocation stations in this

⁴ 3.65 GHz devices are generally prohibited from operating within certain exclusion zones surrounding FSS earth stations located primarily along the east and west coasts. *See 3.65 GHz Order*, ¶ 17.

⁵ *FNPRM*, ¶ 13.

band are protected from harmful interference.”⁶ Similar conditions exist in the TV bands, providing an opportunity for the FCC and industry to leverage standards work underway in the context of 3.65 GHz to the TV white spaces.

NextWave applauds the Commission’s decision to allow fixed devices to operate in unused TV bands after February 17, 2009, subject to the development of final technical rules.⁷ NextWave also agrees with the Commission’s statements that the introduction of mobile devices in the TV bands is more complicated in terms of managing interference avoidance.⁸ Nevertheless, NextWave believes that the combination of base station registration and spectrum sensing together with base-station enabled mobile operations, described in greater detail below, will provide protection to the TV band incumbents from both fixed and mobile/portable TV band devices.

A. Establishment of a registration scheme that is integrated into the FCC Media Bureau TV Database for fixed/access stations will enable identification of available frequencies and facilitate coordination among users.

In its *FNPRM* the Commission requested comments on a variety of schemes that could be implemented to enable low power devices to operate in the TV bands without causing harmful interference to other authorized operations. Use of geo-location methods, professional installation and access to a database to identify vacant channels were all identified as potential solutions for fixed/access stations.⁹ Recognizing that a combination of solutions will be necessary to identify available frequencies and facilitate spectrum sharing, NextWave proposes that a registration scheme similar to that envisioned for the 3.65 GHz band be developed and

⁶ *3.65 GHz Order*, ¶ 15.

⁷ *FNPRM*, ¶ 13.

⁸ *FNPRM*, ¶ 17.

⁹ *FNPRM*, ¶¶ 23, 49-51.

integrated into the existing FCC Media Bureau TV Database. Protection zones around incumbent TV stations, based on Grade B contours, could be established akin to those developed for FSS earth stations at 3.65 GHz. Under this construct, successful registration of a fixed/access TV band device would be conditioned upon meeting the necessary geographic separation distances for specific frequencies and TV band device operating parameters. Requiring re-registration of fixed/access TV band devices on a periodic basis would help to maintain accuracy of the database, enable identification of changes in frequency availability, and eliminate the need for accessing the TV Database in real time.

As discussed in greater detail below, spectrum sensing could serve as an effective back-up to the registration process to ensure that any new TV stations (or other primary users) that are not accounted for in the most recent registration of local fixed/access devices are sensed by such devices and thus protected from interference. Finally, registration of fixed/access devices will facilitate identification of all new wireless operations in the TV bands, enable coordination among users, and allow for monitoring and usage of the spectrum – providing benefits to both licensees and to the public, as the Commission recognized in the 3.65 GHz proceeding.¹⁰

B. Use of spectrum sensing along with contention-based protocols will enable identification of available TV band frequencies and will facilitate sharing by new TV band devices.

The use of spectrum sensing together with contention-based protocols will assist the Commission with two of its goals for the TV bands, namely the identification of frequencies not in use by incumbent TV stations (inter-service interference avoidance), as well as frequency coordination among new users of the TV bands (intra-service interference avoidance).

¹⁰ 3.65 GHz Order, ¶ 29.

While registering the location of higher-power fixed/access stations should serve as the primary method by which available TV bands are identified for a given geographic area, NextWave agrees that spectrum sensing by fixed/access stations can and should be used to identify available channels as an additional safeguard. As described further below, NextWave believes that mobile/portable devices should not be required to use spectrum sensing to determine channel availability, but should instead be subject to the base-station enablement requirements established in the 3.65 GHz band.¹¹

While spectrum sensing will assist with inter-service interference avoidance between TV stations and new TV band devices, the use of contention-based protocols will facilitate sharing by new TV band devices. IEEE committees 802.11 and 802.16 are currently working to make changes to both the WiMAX and Wi-Fi standards to enable their operation and co-existence in non-exclusively licensed bands, such as 3.65 GHz. The development of contention-based protocols for the 3.65 GHz band can easily be expanded to facilitate operation in the TV bands.

C. Restricting low-power mobile/portable stations to transmitting only after receiving and decoding an enabling signal from a registered fixed/access station will protect incumbent users by limiting the area in which mobile/portable stations can operate.

In order to prevent harmful interference to TV band incumbents from the operation of mobile/portable devices, NextWave recommends that the Commission implement the same requirements for mobile/portable station operation as it has for the 3.65 GHz band. First, mobile/portable devices should be limited to low-power operation. Second, requiring a mobile/portable device “to positively receive and decode an enabling signal transmitted by a base station”¹² will limit the geographic area in which mobile/portable devices can operate to a

¹¹ 47 C.F.R. § 90.1333.

¹² 3.65 GHz Order, ¶ 51.

reasonable distance around a registered fixed/access station. Thus, as long as the fixed/access station is located sufficiently far enough away from the edge of the protected contour of the TV station, operation of the mobile/portable devices controlled by that fixed/access station also can be maintained sufficiently distant from protected incumbents (as determined by protection zones).

D. Smart beacon technology is being developed to protect authorized wireless microphones from TV band device operations.

NextWave agrees with commenters that the best away to protect authorized wireless microphones and other broadcast auxiliary services operating in the TV bands is to implement “smart beacon” technology to enable TV band devices to detect when these authorized operations are present.¹³ Use of beacon and spectrum sensing technology could provide an appropriate zone of protection around authorized wireless microphone and other broadcast auxiliary services. The IEEE 802.22 Task Group 1 is developing standards for a beacon signal detectable by broadband wireless systems, designed to protect wireless microphones operating in the TV bands. Wireless microphone detection has two inherent complications. First, wireless microphones are narrowband short range devices, whereas broadband wireless systems are designed for larger area coverage. Sensing the very low power of wireless microphones over the entire coverage range of a broadband base station is extremely difficult. Secondly, it appears that a large percentage of wireless microphone use is not properly authorized under the Commission’s rules. Smart beacons that can be limited to properly licensed users will allow the protection of those devices that deserve protection while not rewarding unauthorized use.

¹³ See, e.g., Comments of the American Federation of Television and Radio Artists at 2 (filed Dec. 20, 2006); Comments of Motorola, Inc. at 19-20 (filed Jan. 31, 2007); Comments of IEEE 802.18 Radio Regulatory Technical Advisory Group at 10 (filed Jan. 31, 2007); Comments of Sure Incorporated at 17 (filed Jan. 31, 2007).

II. OPERATION OF BOTH FIXED AND PORTABLE/MOBILE TV BAND DEVICES SHOULD BE ALLOWED ON CHANNELS 14-20 IN AREAS OF THE COUNTRY WHERE THEY ARE NOT BEING USED BY PLMRS/CMRS

In its *FNPRM* the Commission requested comments on whether fixed devices should be allowed to operate on channels 14-20 in areas where those channels are not used by public safety.¹⁴ NextWave agrees with commenters that channels 14-20 could be used in areas of the country where they are not being used for PLMRS/CMRS.¹⁵ Exclusion zones, similar to those developed for the 3.65 GHz FSS earth stations could be created to encompass areas in which these systems operate. By combining fixed/access station registration requirements with the requirement that mobile/portable stations must positively receive and decode enabling signals from registered fixed/access stations, areas in which there are PLMRS/CMRS operations can be protected while still allowing access to several channels of available spectrum by new TV band devices.

III. TECHNICAL STUDIES AND TESTING ARE NEEDED BEFORE SPECIFIC TECHNICAL OPERATING PARAMETERS CAN BE DETERMINED

As the Commission noted in its *FNPRM*, technical studies and testing are necessary to ensure that the technical operating parameters -- including but not limited to transmit power levels, out of band emission limits, and antenna requirements -- of new TV band devices will adequately protect incumbent users.¹⁶ NextWave is aware of ongoing technical studies of TV band devices and their impact on incumbent users, the results of which will enable a more thorough discussion of the specific technical rule proposals.

¹⁴ *FNPRM*, ¶ 56.

¹⁵ See, e.g., Comments of CTIA – The Wireless Association at 3-4 (filed Jan. 31, 2007); Comments of the Consume Electronics Association at 6 (filed Jan. 31, 2007); Comments of IEEE 802.18 Radio Regulatory Technical Advisory Group at 22 (filed Jan. 31, 2007).

¹⁶ *FNPRM*, ¶¶ 3, 15, 48, 60.

IV. CONCLUSION

NextWave applauds the Commission for its decision to make the unused TV bands available for new advanced wireless services and agrees with many of the Commission's initial findings in this proceeding. Rather than adopting either a traditional unlicensed or licensed scheme for these bands, NextWave encourages the Commission to implement the hybrid licensing approach adopted for the 3.65 GHz band (*i.e.* nationwide, non-exclusive licenses requiring fixed/access station registration, base-station enabled mobile/portable operations, and use of spectrum sensing as well as contention-based protocols). This hybrid approach is the most effective means to achieve the Commission's objectives for the TV bands, can easily be expanded to meet the TV band requirements, and will accelerate the introduction of new advanced wireless services by reducing regulatory hurdles and lowering entry costs for new advanced wireless services and devices.

Respectfully submitted,

/s/ Jennifer M. McCarthy
Jennifer M. McCarthy
Vice President, Regulatory Affairs
NextWave Broadband, Inc.
12670 High Bluff Dr.
San Diego, CA 92130

March 2, 2007

CERTIFICATE OF SERVICE

I, Aaron Eisenberg, certify on this 2nd day of March, 2007, a copy of the foregoing
REPLY COMMENTS OF NEXTWAVE BROADBAND INC. has been served by U.S. Postal
Service First Class Mail, postage pre-paid, to the following:

Kim Roberts Hedgpeth
National Executive Director
American Federation of Television and Radio
Artists
260 Madison Ave
New York, NY 10016

Brian E. Markwalter
Vice President, Technology & Standards
Julie M. Kearney, Senior Director and Regulatory
Counsel
Consumer Electronics Association
2500 Wilson Boulevard
Arlington, VA 22201

Steve B. Sharkey, Director, Spectrum and Standards
Strategy
Robert D. Kubik, Director, Telecom Relations
Global
Motorola, Inc.
1455 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20004

Michael Lynch, Chair
IEEE 802.18 Radio Regulatory Technical
Advisory Group
2221 Lakeside Blvd.
Richardson, TX 75082

Catherine Wang
Jeanne Stockman
Timothy Bransford
Bingham McCutchen LLP
3000 K Street, NW
Suite 300
Washington, DC 20007

Counsel for Shure Incorporated

Brian M. Josef, Director, Regulatory Affairs
Michael F. Altschul, Senior Vice President,
General Counsel
Christopher Guttman-McCabe, Vice President,
Regulatory Affairs
CTIA - The Wireless Association
1400 16th Street, NW
Suite 600
Washington, DC 20036

/s/ Aaron Eisenberg
Aaron Eisenberg