15 February 2018

To: Senior Director

Spectrum Licensing and Auction Operations, Innovation Science and Economic Development,

235 Queen Street, Ottawa, Ontario K1A 0H5

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Re: Consultation on the Technical and Policy Framework for White Space Devices

SMSE-018-17 Published November 2017.

6Harmonics is a dedicated manufacturer of TVWS radios and has 6 radios certified by FCC for use in the US. In business since 2010, 6Harmonics has sold thousands of radios globally.

As a Canadian company looking to be able to sell product in Canada, as well as the USA and the rest of world, we welcome this opportunity to express our thoughts on this consultation.

In respect of the above consultation we offer the following submission.

Q1. ISED is seeking comments on its proposal to harmonize with the U.S. framework

6Harmonics supports the proposal of ISED to harmonise with the US framework on channels 3 & 4.

Rationale:

(a) These are co-axial cable-based connections that operate indoors and are therefore in effect already protected from over the air signals on these frequencies. The risk of interference is very low.
(b) The content that is delivered over these legacy systems is in NTSC format-a format that has been abandoned for over the air transmissions. Using NTSC signals to watch content is unacceptable from a user perspective in today's HDTV world. There is little, if any, end-user need.

Q2. ISED is seeking comments on its proposal to harmonize with the U.S. framework regarding the operation of personal/portable white space devices in channels 14 to 20 (470-512 MHz).

6Harmonics supports the proposal to harmonise with the US framework.

Rationale:

(a) 6Harmonics agrees with the rationale explained in FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268, Paragraph 79 et seq.
(b) FCC concluded to allow operation of personal/portable white space devices in channels 14 to 20 (470-512 MHz) and also simultaneously concluded not to allow operation of personal/portable white space devices below channel 14 as a balanced approach.

Q3. ISED is seeking comments regarding its proposal to limit the use of white space devices to spectrum below 608 MHz at this time.

6Harmonics disagrees in the strongest possible terms with this proposal to limit the use of TVWS devices to below 608MHz. 6Harmonics believes that ISED should harmonise with the US framework without exception..[1]

Rationale:

The use of TVWS devices above 608MHz has been extensively reviewed and was then allowed in the FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268, Paragraph 163 et seq.

We offer the following further observations:

(a) FCC decided that the EIRP limit of TVWS devices in the 600MHz band will be 10W. This was because the only licensed users in the 600MHz post repacking will only be mobile carriers and as such 10W EIRP is warranted in unused 600MHz spectrum. The possibility of interference of TVWS devices with such mobile carrier signals outside the mobile service area is reduced as compared to TV broadcast signals because of the spectral mask rejection of the mobile carrier signal itself.
See below[2]:

- 600 MHz service band (allocated for new wireless services)
  - fixed white space devices operate up to 10 W and personal/portable devices up to 100 mW, at specified distances outside the wireless licensee's service areas

(b) In addition, the possibility of interference of TVWS devices with a mobile carrier signal outside the mobile service area is reduced as compared to TV broadcast signals because mobile wireless services operate at much, much, lower EIRP than broadcast services. Therefore, the protected areas are reduced, are more localised and well defined. Therefore, the total geographic area that needs protection from TVWS devices in the 600MHz band will likely be reduced once broadcast services are removed from the 600MHz band. The corollary of this is that the area outside mobile service areas that could utilise the unused 600MHz spectrum for rural broadband services could increase post 600MHz auction and TV repacking. Mobile carriers only deploy in an area if there is a business case or contiguous coverage (along a highway for example) is needed.

(c) It is therefore essential that unused 600MHz spectrum, including purchased but not yet utilised, should be made available via the database to TVWS devices wherever possible. A key purpose of the database is to address this issue and prevent "spectrum squatting". In particular, applying an arbitrary moratorium to a block of almost 80MHz spectrum that is ideal for rural broadband does not seem appropriate or considerate to the needs of rural Canadians. The technology exists today to implement such services, deployment is not a

[1] FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268, Paragraph 163 et seq.
[2] FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268, Executive Summary, Paragraph 6.

technical challenge, deployment is being limited by regulatory barriers. To repeat, the FCC has not only ensured the unused 600MHz spectrum will be available as noted above, FCC have allowed 10W EIRP to ensure that unused 600MHz spectrum can be utilised effectively to deliver services[3].

> 55. To ensure that new 600 MHz service licensees are similarly protected from interference, we define less congested areas as those same areas that are defined as less congested for the UHF-TV band. In all cases, white space devices will also need to meet the separation distances we are defining for 10 watt operation from the contour of the outer edge of the 600 MHz service licensee's facilities. We have included these distances in the co-channel and adjacent channel separation distance tables provided below.[117] Because white space device operations are controlled by the white space database in all bands, white space devices will be able to continue operating at higher power in less congested areas that will be allocated and assigned for 600 MHz service after the incentive auction, during and after the post-auction transition period. The database will be updated to include the required separation distances from base stations or other radio facilities deployed by the 600 MHz service licensees, and, after the licensees provide the polygonal shape encompassing those facilities, the database will be able to determine whether frequencies in the 600 MHz service band are available for white space use at the device's location. As television stations are repacked and 600 MHz service licensees commence operations, there may be a change in which areas are "less congested" and on which channels in those areas white space devices are permitted to operate with higher power, but those changes are transparent to the users.

(d) If such a transition cannot be managed by the data base it is questionable why the database should exist at all? The transition is being managed in the US as T Mobile rolls out its mobile service and 600MHz protection in the TVWS database started last December. (http://maps.spectrumgateway.com/t-mobile-600-mhz-band-71-deployment.html).

(e) The proposal implies that the rationale to consider a moratorium is spectrum certainty or more specifically "This moratorium will minimize potential changes to the number of channels available for white space systems which may be deployed between now and the release of decisions arising from this consultation". Again, a key point of the database is to manage such change. Given the projected timeline of the 600MHz auction and deployment by mobile operators a whole generation of TVWS devices could be deployed, used to provide service and fully amortized by rural ISPs before the spectrum is ever utilised by mobile operators. Indeed, it could be argued that making available unused spectrum via the database to rural ISPs would spur mobile (or other licensed operators) to deploy more rapidly and provide competitive services-to the benefit of Canadians. A moratorium will eliminate competitive pressure. As this is a blanket moratorium across the whole country-a country so vast that only a small fraction will ever be covered by 600MHz mobile services-it will immediately impede the scalability of rural broadband networks as well as future deployements. A moratorium by the regulator implies ***uncertainty*** not certainty, and this will consequently inhibit innovation by both the equipment vendor and the service provider.

To conclude, a moratorium will have the very opposite impact that ISED cites, it will create additional uncertainty and risk to the deployment of TVWS devices by rural ISPs.

[3] FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268 Paragraph 55

Q4. ISED is seeking comments on its proposal to continue to preclude the use of channel 37 (608-614 MHz) by white space devices.

6Harmonics believes channel 37 should be made available for TVWS devices under the same rules as determined in the FCC Report & Order Released August 11th, 2015 (ET Docket 14-165, GN Docket 12-268, Paragraph 193 et seq.

Rationale:

6Harmonics agrees with the rationale cited by FCC regarding the potential use of Channel 37 by TVWS devices. FCC concluded the use of channel 37 should be allowed[4].

- We permit white space devices to operate on channel 37:
  - Depending on whether TV or wireless downlinks are in adjacent channels, fixed devices operate from 40 mW to 4W and personal/portable devices operate from 40 mW to 100 mW
  - Subject to frequency and distance separations from TV, wireless medical telemetry service (WMTS) and radio astronomy service (RAS)

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[4] FCC Report & Order Released August 11th, 2015 ET Docket 14-165, GN Docket 12-268 Executive Summary, Paragraph 6.