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Radio Regulatory Technical Advisory Group (RR-TAG)

Proposed Response to the Colombia ANE's Consultation on 6 GHz Band Coexistence Study				
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This document drafts a proposed response to the Colombia ANE's consultation on 6 GHz band coexistence study.

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Re: Colombia ANE's consultation on 6 GHz band coexistence study

Dear National Spectrum Agency,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks Colombia's National Spectrum Agency (ANE) for issuing the call for comments on "Consultation on 6 GHz Band Coexistence Study" and for the opportunity to provide feedback.

IEEE 802 LMSC is a leading consensus-based open standards development committee for networking standards that are used by industry globally. It produces standards for networking devices, including wired and wireless local area networks ("LANs" and "WLANs"), wireless specialty networks ("WSNs"), wireless metropolitan area networks ("Wireless MANs"), and wireless regional area networks ("WRANs"). Technologies produced by implementers of our standards are a critical element for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and of Technical Activities, two of the Major Organizational Units of the IEEE. IEEE has about 400,000 members in over 160 countries and its core purpose is to foster technological innovation and excellence for the benefit of humanity. IEEE is also a major accredited standards development organization whose standards are recognized world-wide. In submitting this document, IEEE 802 LMSC acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole[1].

IEEE 802 LMSC follows Colombia's ANE regulatory activities regarding radio local area network (RLAN) and strongly supports ANE proceedings on enabling Standard Power (SP) for spectrum sharing with fixed communication systems operated in 5925 MHz to 7125 MHz.

Please find below the IEEE 802 LMSC's comments on this consultation.

General Comments

IEEE 802 LMSC recognizes ANE's consideration of a non-AFC based co-existence mechanism based on pre-determined exclusion zones while also considering the AFC based solution. Information related to availability of incumbent services database, required timeline of enablement and details of studies are not available to IEEE 802 LMSC. Considering that, while we respect the ANE's proactive co-existence approach based on the studies, we recommend ANE to also consider harmonization with other solutions globally to the maximum extent possible.

Recognizing ANE's effort to enable Wi-Fi outdoor operation, IEEE 802 LMSC would like to emphasize on the importance of Very Low Power (VLP) to enable outdoor (and indoor) peer-to-peer communications. Enabling unrestricted VLP at a much lower power level than SP is critical in enabling complementing use cases and industries to SP. IEEE 802 LMSC recommends to ANE to authorize the VLP mode harmonized with other regions such as Europe, Asia, and Africa at a

[1] This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association.

maximum transmit power of 14 dBm and a maximum power spectral density (PSD) of 1 dBm/MHz EIRP.

Question 8: Do you consider that the coexistence scenarios included in section 3 of the published document fully reflect the current use of the 6 GHz frequency band in Colombia? If not, justify your answer.
Answer: In US, Canada, and other regions and countries, co-existence studies and analysis for the SP mode in the 6 GHz band has been primarily focusing on co-existence with Fixed Satellite Services (FSS) and Fixed Services (FS), which are the focus of this published document. In addition to these two classes of incumbent services, incumbent Mobile Services, such as Broadcast or TV Relay services, have been also taken into the account by the other regulatory authorities in the decision for the frequency ranges of the SP mode in the 6 GHz band.

Question 9: Do you consider it appropriate to allow the operation of wireless access systems under the modality of free use of the radio spectrum outdoors in the entire 6 GHz frequency band? If not, justify your answer.
Answer: IEEE 802 LMSC supports authorization of the SP mode in the entire 6 GHz band (5925 MHz - 7125MHz). In order to protect incumbent FS links, segments of the spectrum will have to be excluded depending on the locations. In particular, this would be the case in urban areas or areas with concentration of these fixed links. Assuming that no special consideration is needed for incumbent Mobile Services, authorization of the entire 6 GHz band for the SP mode enables an effective deployment of the SP when the available spectrum and the number of wide channel bandwidth widths of 80 MHz/160 MHz and 320 MHz are maximized in various locations.

IEEE 802 LMSC believes that the first wave of SP deployments, in the regions that already authorized the mode, will be indoor to improve coverage and capacity performance of the indoor networks covering approximately 90% of Wi-Fi usage. IEEE 802 LMSC believes that ANE should also authorize operation of the SP mode indoor. Operation of indoor SP can be enabled by taking into the account Building Entry Loss (BEL) for Indoor Access Points (APs) for proper spectrum availability calculation.

Question 10: Do you consider it appropriate to allow the operation of wireless access systems under the modality of free use of the radio spectrum outdoors in the 6 GHz frequency band with a maximum Equivalent Isotropic Radiated Power (EIRP) of 36 dBm and power spectral density of 23 dBm/MHz, as identified in the public consultation document in section 1.1? If not, justify your answer.
Answer: Yes, IEEE 802 LMSC supports authorizing SP mode with s maximum EIRP power level of 36 dBm for APs and 30 dBm for Clients. IEEE 802 LMSC also supports a maximum PSD of 23 dBm/MHz EIRP for APs and 17 dBm/MHz EIRP for Clients. Allowing these maximum transmit power levels harmonize product requirements with those of other regions and countries such as US and Canada, and promote global harmonization of the devices.

Question 11: Do you consider that a 40 MHz guard band between wireless access systems under the modality of free use of the radio spectrum outdoors and fixed point-to-point radio links is adequate to ensure coexistence without harmful interference on fixed radio links in the band of 6 GHz frequencies, as mentioned in the public consultation document in section 3.1? If not, justify your answer.
Answer: IEEE 802 LMSC understands that the 40 MHz guard band is calculated considering no degradation of incumbent FS link performance when a Wi-Fi system is operated at a maximum

transmit power of 36 dBm. For a more optimized utilization of the spectrum, Wi-Fi system can operate at lower power level down to 21 dBm that can be automated and calculated when an AFC system is utilized.

Note that an AFC system can also perform adjacent channel protection calculations which would enable coexistence with Wi-Fi systems operating in adjacent frequencies to the licensed fixed links.

Question 12: Do you consider that a spatial separation of 100 m between the stations of wireless access systems under the modality of free use of the radio spectrum outdoors with omnidirectional antennas and the stations of fixed point-to-point radio links, operating with a lower guard band at 40 MHz, is adequate to ensure coexistence without harmful interference on fixed radio links in the 6 GHz frequency band, as mentioned in the public consultation document in section 3.1? If not, justify your answer.
Answer: IEEE 802 LMSC need detailed information about the simulation/study assumptions to provide comments.

Question 13: Do you consider that a deviation of at least 10 degree between the axes of the antennas of the stations of the wireless access systems under the modality of free use of the radio spectrum outdoors with directional antennas and the stations of the fixed point-to-point radio links, operating with a guard band less than 40 MHz, is adequate to ensure coexistence without harmful interference on fixed radio links in the 6 GHz frequency band, as mentioned in the public consultation document in section 3.1? If not, justify your answer.
Answer: IEEE 802 LMSC need detailed information about the simulation/study assumptions to provide comments.

IEEE 802 LMSC would like to bring to the attention of ANE that Wi-Fi Alliance AFC System to AFC Device Interface Specification[2] supports incorporating AFC Devices (SP APs) directional antenna in the calculation of frequency availability through Vendor Extension messaging. For more details, please refer to the Specification.

Question 14: Do you consider that additional restrictions to those specified in questions 9 to 13 should be defined to allow the operation of wireless access systems under the modality of free use of the radio spectrum outdoors in the 6 GHz frequency band? If yes, justify your answer.
Answer: No comments.

Question 15: Do you consider that wireless access systems under the modality of free use of the radio spectrum outdoors can coexist with fixed satellite radio links (Earth-space) in the 6 GHz frequency band without any type of restriction? If not, justify your answer.
Answer: IEEE 802 LMSC agrees with the results of the study that no special protection is required with regards to co-existence with Uplink FSS. IEEE 802 LMSC also supports harmonizing with other regulatory bodies, such as US and Canada, to limit the radiation to 21 dBm at elevation above 30 degrees for outdoor APs.

Question 16: Taking into account the future distributed interference control characteristics that the Wi-Fi 7 standard will have, do you consider it necessary to implement an Automatic Frequency Coordination (AFC) system to allow coexistence between wireless access systems under the

[2] https://www.wi-fi.org/file/afc-specification-and-test-plans

modality of free use of the radio spectrum outdoors and fixed point-to-point radio links in the 6 GHz frequency band? Justify your answer.
Answer: IEEE 802 LMSC understands that ANE studies consider the pre-determined exclusion zone-based co-existence method as a solution for enabling SP mode. IEEE 802 LMSC believes that SP operation under supervision of an AFC System can address optimization of guard bands and accommodate SP APs with directional antennas. In addition, AFC based solutions are scalable as AFC Systems can be automatically updated as incumbent FS links are added or otherwise modified. Of course, AFC based solutions require availability of a reliable incumbent database.

Having said that, IEEE 802 LMSC would like to comment on applications of AFC Systems as related to Wi-Fi 7. Two relevant features supported in Wi-Fi 7 are 320 MHz channels and Static Puncturing. Wi-Fi Alliance is currently working on updating AFC Compliance specifications[3] to include the two features. With regards to Static Puncturing, although the feature enables utilization of more efficient larger channel bandwidth in presence of incumbent channels, Static Puncturing is not required to utilize spectrum around incumbent channels. In Wi-Fi 6E, this is accomplished through usage of smaller channels.

Question 17: Do you consider that keeping a record of the devices of the wireless access systems under the modality of free use of the radio spectrum outdoors to know their location with respect to the fixed point-to-point radio links is necessary to ensure the correct coexistence between both systems in the 6 GHz frequency band while an AFC system is implemented or while Wi-Fi7 devices hit the market? Justify your answer.
Answer: IEEE 802 LMSC believes that in either approach, using pre-determined exclusion zones or an AFC based solution, the registration information is needed from a regulatory and operational perspective.

Conclusion

IEEE 802 LMSC supports ANE's expansion of the 6 GHz regulations enabling SP for spectrum sharing with fixed communication systems. We respectfully request ANE to initiate regulations for VLP operation and consider our comments listed in this response for SP mode. We hope that the new regulation will be enacted in a timely manner.

Respectfully submitted

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[3] https://www.wi-fi.org/file/afc-specification-and-test-plans