

Re: CEPT public consultation on draft ECC Report 355

Dear Ms. Doriana Guiducci,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks CEPT for the opportunity to comment on the draft version of the ECC Report 355 “Measurement-based compatibility studies assessing interference from Very Low Power (VLP) Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) operating in 5945 MHz to 6425 MHz to Communication Based Train Control (CBTC) systems operating in 5915 MHz to 5935 MHz”.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We also produce standards for wired Ethernet networks, and technologies produced by implementers of our standards are critical for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 400,000 members in over 160 countries. IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity. 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 whole¹.

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

General and Summary Comments

IEEE 802 LMSC closely follows CEPT regulatory activities regarding radio local area network (RLAN) and strongly supports the relaxation of the out-of-band (OOB) emissions of -45 dBm/MHz to -37 dBm/MHz without any additional mitigation techniques in the band below 5935 MHz for Very Low Power (VLP) RLAN devices operating in the band above 5945 MHz.

IEEE 802 LMSC recognizes that the draft ECC Report 355 intends to provide the required technical basis for the relaxation of OOB emissions without harmfully interfering with Communication Based Train Control (CBTC) systems based on the available information to date.

IEEE 802 LMSC notes also from the draft report that CBTC receiver performance is not standardised yet, and that at the time of writing of this Report, standardisation work for CBTC is still ongoing within ETSI.

Additional redundancy capabilities of IEEE Std 802.11a-1999 standards based CBTC systems

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

The CBTC systems considered in the draft ECC Report are based on the IEEE Std 802.11a-1999 standards technology operating in the frequency range 5915 MHz to 5935 MHz using a 5 MHz channel bandwidth. The CBTC systems operate in two redundant channels and deploy a dual receiver antenna for both channels.

In addition to these considered redundancy methods, the considered CBTC systems are using message repetition based on the IEEE Std 802.11a-1999 standards protocol which has not been considered in the statistical calculation. This message repetition operation is described in ETSI TR 103 580 V1.1.1²:

- “In addition, redundancy and several repetitions of each message are used to ensure the required level of transmission availability. With this system, **application data are sent as unicast messages** to/from each train”.

To reduce the potential delay caused by the repetition, the channel load of the system is kept well below the critical limits as stated in ETSI TR 103 580 V1.1.1²:

- “In order to balance the CSMA/CA drawbacks (in particular collisions due to the hidden node effect), **the channel load during operation is kept well below the maximum limits possible in a CSMA/CA system**”.

This message repetition can significantly improve the interference robustness of the system even in a potential degraded mode where only a single channel is available.

Potential optimization for the CBTC systems described in draft ECC Report

To further improve the robustness of the CBTC systems, several system improvements could be performed to reduce any potential co-channel and adjacent channel interference, reduce the probability of a degraded mode, and hence improve the signal reliability.

At critical positions in the Urban Rail network, such as train platforms, the access point density can be increased and thus the received signal strength can be improved. In addition, redundant access points could be installed at these critical positions to take over the operation in case of an access point failure.

The antennas of a train unit (TU) as depicted in the draft ECC Report could be shielded or installed at the outside of the passenger wagon, which increases the coupling loss between any potential interference inside the wagon and the TU receiver.

Network simulations in support of the draft findings

The basic findings of the interference probability included in the draft ECC Report are based on simple calculations using different single event probabilities. A more detailed analysis using a network simulation could support the further relaxation of the OOB requirements and the optimization of the CBTC system.

² ETSI TR 103 580 V1.1.1 (2019-08): “Urban Rail ITS and Road ITS applications in the 5,9 GHz band; Investigations for the shared use of spectrum”

Conclusion

Based on the results presented in draft ECC Report 355, IEEE 802 LMSC strongly supports the relaxation of the out-of-band (OOB) emissions of -45 dBm/MHz to -37 dBm/MHz without any additional mitigation techniques in the band below 5935 MHz for Very Low Power (VLP) RLAN devices operating in the band above 5945 MHz.

In addition, we respectfully invite CEPT to consider our comments on improvements to the CBTC systems that could be performed to reduce any potential co-channel and adjacent channel interference, reduce the probability of a degraded mode, and hence improve the signal reliability as listed in this response. We hope that the regulation update will be enacted in a timely manner.

Respectfully submitted

By: /ss/.

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