The following pages of this document contain a formal contribution to ITU-R Joint Rapporteurs Group (JRG) 8A-9B and Working Party 8A that is based on the minutes of the meeting contained in document 18-03-0078-00-0000_ RLAN_protection_criteria_minutes.doc as authorized by 802.18, 802.11, 802.15, 802.16, and the IEEE 802 Executive Committee by motions at their closing meetings at the November 2003 IEEE 802 Plenary in Albuquerque, New Mexico.

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RADIO LOCAL AREA NETWORK PROTECTION CRITERIA

This contribution was developed by IEEE Project 802, the Local and Metropolitan Area Network Standards Committee ("IEEE 802"), an international standards development committee organized under the IEEE and the IEEE Standards Association ("IEEE-SA")*.

The content herein was prepared by a group of technical and regulatory experts in IEEE 802 and was approved for submission by the IEEE 802.18 Radio Regulatory Technical Advisory Group, the IEEE 802.11 Working Group on Wireless LANS ("RLANs" in ITU-R terminology), the IEEE 802.15 Working Group on Wireless Personal Area Networks, the IEEE 802.16 Working Group on Wireless Metropolitan Area Networks, and the IEEE 802 Executive Committee, in accordance with the IEEE 802 Policies and Procedures, and represents the view of IEEE 802.

This contribution proposes to commence work on a "Working document towards a preliminary draft new Recommendation" outlining appropriate protection criteria for WAS/RLAN stations in the mobile service operating under the provisions of Resolution 229 (WRC-03) and provides some preliminary recommendations thereon for study and consideration. Whether this work is carried out in JRG 8A-9B or Working Party 8A may depend in part on future decisions regarding whether JRG 8A-9B will be maintained, or disbanded and its work on this subject passed to Working Party 8A.

It is recognized that Resolution 229 (WRC-03) specifies that WAS/RLAN stations operating in the subject allocations in the mobile service may not cause interference to, and may not claim protection from, certain other services with primary allocations in the same bands as allocated for WAS/RLAN stations by Resolution 229 (WRC-03).

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Introduction

With the adoption of Resolution 229 (WRC-03)[1], primary allocations were made to the mobile service in the bands 5 150-5 250 MHz, 5 250-5 350 MHz, and 5 470-5 725 MHz for the implementation of WAS, including RLANs, as described in Recommendation ITU-R M.1450. Therefore, WAS/RLAN stations in the mobile service in those bands are entitled to protection from services or applications with lower, or no, regulatory status.

However, no ITU-R Recommendation exists specifying the protection criteria for these stations at this time. This situation will obviously create problems in conducting sharing studies relative to operations, or proposed operations, by services or applications with lower, or no, regulatory status.

We also note that Document 8A-9B/6, a liaison statement from Task Group 1/8, recognizes that there is no established protection criteria for WAS/RLAN stations and that further studies are necessary to determine an appropriate protection criteria.

Discussion

As stated previously, the subject of developing appropriate protection criteria for WAS/RLAN stations in the mobile service was the topic of a meeting of a group of technical and regulatory experts at the recent IEEE 802 plenary session, held in Albuquerque, New Mexico, 10-14 November 2003.

This meeting was organized by the IEEE 802.18 Radio Regulatory Technical Advisory Group to bring together interested WAS/RLAN technical experts from IEEE 802 and promote discussion and preliminary analysis on what would constitute a reasonable protection criteria for WAS/RLAN stations operating in the mobile service according to the provisions of the ITU Radio Regulations.

It was explained to the WAS/RLAN technical experts that any proposal for a protection criteria had to be reasonable – that some limited degree of interference or interference potential must be tolerated – and that it would be unreasonable to attempt to assert that no interference whatsoever could be tolerated.

There was also some discussion of the nature of the protection criteria prescribed for other primary services under the ITU Radio Regulations, including the differentiation between safety of life and non-safety of life services.

All of the technical experts recognized and accepted the fact that some interference, or the potential therefore, must be accepted.

However, it was also noted that, as a primary user, WAS/RLAN systems operating under the provisions of Resolution 229 (WRC-03) are entitled to reasonable protection from interference from services or applications with lower, or no, regulatory status.

The preliminary consensus opinion/recommendations of the technical and regulatory experts within IEEE 802 is as follows:

- The development of an appropriate protection criteria for WAS/RLAN stations operating under the provisions of Resolution 229 (WRC-03) is desirable and appropriate.
- WAS/RLAN systems operating under the provisions of Resolution 229 (WRC-03) should not suffer significant data rate and range impairments as a result of interference from services or applications with lower, or no, regulatory status.

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[1] Formerly designated Resolution [COM5/16].

- In order to not suffer such unacceptable interference, a protection criteria of – 6 dB I/N worst case (aggregate or individual interferer) in the victim WAS/RLAN receiver's bandwidth should be tentatively proposed for discussion, subject to further study.
- Preliminary estimates indicate that this would result in approximately a 1 dB degradation in received SNR, which is expected to equate to approximately a 5% reduction in the range at which an IEEE 802.11a RLAN system could maintain its maximum link data rate of 54 Mb/s.
- This degree of interference is considered to be an acceptable compromise. However, larger degradations in range, or reductions in rate at range, would be considered unacceptable because they would represent too large an adverse impact on system performance.
- The proposed – 6 dB I/N figure is based on an interferer whose power spectral density is essentially flat across the victim WAS/RLAN receiver's bandwidth. Further study is required to determine the effects of narrowband interferers, pulsed interferers, or interferers with high peak to average power ratios.
- Because the technology of WAS/RLANs is planned to evolve to even higher data rates in the relatively near future, further studies will also be required to consider the required protection criteria for future WAS/RLAN systems that may operate in the same mobile service allocations in the future.

IEEE 802 hopes that this contribution will prove useful in stimulating productive discussion in WP 8A and/or JRG 8A-9B and it that will contribute in a positive way to the development of an appropriate protection criteria for WAS/RLAN systems operating under the provisions of Resolution 229 (WRC-03).