IEEE P802.11
Wireless LANs

Source: **ETSI BRAN Project -**

Title: **[Draft] Liaison Statement to CEPT WG-SE concerning the draft ERC Report prepared by SE24H**
(copies to CEPT SE24H, SE28, ITU-R JRG 8A-9B and ETSI TC-ERM, WINForum, IEEE 802.11)

References: **(1) Report to WG SE on Compatibility Studies Related to the Possible Extension Band for HIPERLAN at 5 GHz (SE24H (98)10- rev4)**
(2) ITU-R 8A-9B /63E, Spectrum Sharing of MSS and HIPERLANs

(3) BRAN HLUoB1a: Penetration Loss Measurement for HIPERLAN II (attached)

(4) HIPERLAN/MSS Spectrum Sharing: Measurement and Simulation of Building Shielding Loss at 5GHz (attached)

Introduction

The ETSI BRAN Project has reviewed reference 1 and is in general very pleased with the content and the presentation of the results. Given the difficulties of the subject, SE24H is to be commended on the innovative way that they have developed to address the issue.
The are a number of remaining issues that are addressed in this document so that WG-SE can come to an informed decision regarding the final report to be sent to WG-FM. These issues are: the composite range of frequencies identified as candidate spectrum for HIPERLANs, HIPERLAN/1 and HIPERLAN/2, the allowed RF power levels, the use of directional antennas, transmitter power control and, finally, the implementation of the "indoor restriction" regime.
This document was drafted in co-operation with IEEE 802.11 and the MMAC-PC

Issues

1) The composite range of frequencies facilitates sharing with incumbents

The composite range of frequencies proposed in (1) is 555 MHz which, together with the range 5150 to 5250 MHz addressed by the SE28 work, gives a total of 655 MHz. As noted in (1), this large range allows the "burden" of possible interference generated by the deployment of license exempt HIPERLANs to be spread over the whole frequency range and so reduce the effect on any given frequency correspondingly.
In addition, the sharing with terrestrial systems such as the Radio Location Service and Meteorological Radars as well as sharing with Road Transport Telematic systems is deemed feasible on the condition that HIPERLANs implement of dynamic avoidance of co-channel operation (by means of "Dynamic Frequency Selection) with these systems. In order for such an approach to be practical, the range of spectrum made available should be large enough to allow the avoidance mechanism to work.

2) HIPERLAN/1 and HIPERLAN/2

The work of SE24H included in its considerations both HIPERLAN/1 and HIPERLAN/2 systems. The characteristics of the former are known (the standard has been published) and assumptions were made concerning HIPERLAN/2, notably the absence of Low Bitrate Signalling and Contention Signalling. This reduces the interference potential of HIPERLAN/2 relative to HIPERLAN/1. No other major differences between the two systems in terms of spectrum utilisation aspects were assumed. This is consistent with the BRAN position that HIPERLAN/1 and /2 are similar in usage and deployment potential and that there is no need to distinguish between the two forms from a spectrum sharing and compatibility point of view. HIPERLAN/1 and HIPERLAN/2 are expected to operate in the same spectrum; this is made possible by the Dynamic Frequency Selection mechanism mentioned above.

We recommend that WG-SE does not distinguish between the two types of HIPERLANs in its Report and recommendations to WG FM. It is noted that in doing so, acceptance of the CEPT work on this subject in the ITU-R is facilitated as the ITU-R does not distinguish between different types of RLANs.

3) Building Shielding Effects

Recent work (3,4) by the University of Bristol on the measurement and statitistics of building shielding effects and (to be made publicly available), shows that the assumptions about building shielding effects in the SE24H and SE28 work on HIPERLAN sharing issues to be overly pessimistic. The large scale average – based on measurement and conservative assumptions about device location, materials, etc - is shown to be 15 to 18 dB. This is a lower bound that is much higher than the 11 dB figure used by SE28. Similar results were obtained by an earlier, independent study conducted by Telia Research (2).

This result indicates that there is an additional margin of 4 to 7 dB in previous sharing assessments.

4) RF power levels

We note that RF power levels proposed by (1) are defined in terms of Peak Envelope Power, consistent with the original CEPT Recommendation and ERC Decisions. However, this definition does not do justice to the more advanced complex modulations that are becoming practical and that promise much better spectral efficiency than single carrier modulation schemes. The spectrum of these new schemes – such as the OFDM scheme now being defined by ETSI BRAN, the IEEE and MMAC – is noise like and its average value is close to the peak envelope power for the GMSK modulation scheme used in HIPERLAN/1. In view of this fact we recommend that the RF power limits for HIPERLANs be expressed in terms of Mean Power (during transmission) rather than Peak Envelope Power.

The values given in (1) are 200 mW for the bands overlapping bands used by satellite based systems and 1 W for bands overlapping those used by the Radio Location Service. It is noted that the view has been expressed that the value of 200 mW may have to be reduced to 100mW for the bands shared with EESS and with FSS if the proposed number of channels is not available. We point out that different power levels for possibly adjacent bands creates a problem for users in that it limits their freedom in configuring their systems. Further, it creates a policing problem that will be difficult to solve.

5) Use of Directional Antennas

The reduction of allowed RF power causes a reduction in operating range for HIPERLANs and therefore it increases the cost of HIPERLAN systems (because more access points would be needed) and it reduces their ability to deal with “difficult” propagation environments. Directional antennas increase link budget and with proper design, this can be translated into a reduced emission towards satellite based receivers. This positive effect also benefits the deployment of HIPERLANs by increasing the operating range. Given the difficulty of implementing directional antennas on small and portable equipment, their use will be limited to the fixed Access Points of HIPERLAN systems. Therefore we ask WG-SE to allow the use of limited gain antennas of up to 6 dBi on HIPERLAN equipment.

The use of directional antennas – even with limited gain – allows and encourages the use of lower power transmitters. This further helps to increase the confidence that the tolerable levels of interference will not be exceeded.

It is noted that in case of interference seen by terrestrial systems, the Dynamic Frequency Selection mechanism that avoids co-channel operation will prevent the increased EIRP of directional antennas to cause increased interference to terrestrial systems.

6) Transmitter power control

For some types of use, the maximum RF power allowed may not be implemented and therefore, the overall average power of deployed HIPERLAN devices will be less than the allowed maximum. Where dynamic transmitter power control is advantageous, the means to achieve such reductions in transmitter power may differ with the environment and usage of HIPERLANs. In view of these differences, it is recommended that the methods for implementing transmitter power control are left to the discretion of the manufacturers.

Note: the majority of HIPERLAN devices will be used in portable, battery powered devices. In order to save scarce battery power, manufacturers are encouraged to design their products so that minimal RF power is used at all times.

7) Implementing the “Indoor” restriction

The sharing studies made by SE24H indicate that indoor operation is a major factor in achieving the desired level of protection margin. It has been argued by some that this requires a regime that prevents outdoor use by either physical or regulatory means.

On previous occasions, the BRAN project has argued that, due to the nature of HIPERLANs and their applications, outdoor use, even in case of public versions, will be very limited compared to indoor use – even if no restrictions were to be placed on outdoor use. However, in order to increase the confidence of the potential victims of HIPERLAN caused interference, it could be considered to restrict the use of frequencies for outdoor use to the presence of a signal from a fixed HIPERLAN device certified for operation at those frequencies.

In view of the above the following could be considered:

- Portable HIPERLAN devices will only operate at the frequency channels on which they receive the transmissions of access points.
- There will be no restrictions or markings put on portable devices and implementations.
- HIPERLAN Access Points capable of operating on the indoor frequencies only will be labeled “for indoor use only”.
- HIPERLAN Access Point capable of operation on both indoor and outdoor frequencies shall be labeled “If used outdoors, this device must be specifically configured”. The method of configuration shall be left to the manufacturer and clearly explained in the instructions. The configuration will ensure that frequencies reserved for indoor use, are not used outdoors.

This approach would restrict of use of portable devices to indoor areas and areas close to buildings and would not amount to 1%.