

ELECTRONIC COMMUNICATIONS COMMITTEE

ECC Decision
of 12 November 2004
on the harmonised use of the 5 GHz frequency bands
for the implementation of
Wireless Access Systems including
Radio Local Area Networks
(WAS/RLANs)

(ECC/DEC/(04)08)



EXPLANATORY MEMORANDUM

1 INTRODUCTION

This CEPT/ECC Decision addresses the designation of the frequency bands 5 150–5 350 MHz and 5 470–5 725 MHz for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs). These frequency bands have been allocated to the *mobile service except aeronautical mobile service* on a primary basis in all three regions by World Radiocommunication Conference 2003 (WRC-03), taking into account the need to protect primary services in these frequency bands. Furthermore WRC-03 adopted ITU-R Resolution 229 on "*Use of the bands 5 150–5 250, 5 250–5 350 MHz and 5 470–5 725 MHz by the mobile service for the implementation of Wireless Access Systems including Radio Local Area Networks*".

Wireless Access Systems (WAS) are broadband radio systems which can be deployed either inside or outside buildings, usually in geographically limited areas. Broadband RLANs (Radio Local Area Networks), a subset of WAS, are the major type equipment deployed today and are predominantly used inside buildings. Typical WAS/RLANs include public and private applications offered in homes, schools, hospitals, hotels, conference centres, railway stations, airports, shopping centres etc. These types of applications may thus be considered to fall into the ITU-R categories nomadic wireless access (NWA) or mobile wireless access (MWA). They are typically intended for connections between traditional business products such as PCs, laptops, workstations, servers, printers and other networking equipment as well as digital consumer electronic equipment in the wireless home network environment. RLANs thus remove the need for physical connection of the above devices. RLANs utilize low power levels because of the short distance nature of inside building operation. Most of the existing RLANs and similar broadband data transmission systems are currently operating in the ISM frequency bands. In order to ensure high reliability and higher data transfer rates RLANs, however, require a more predictable sharing environment. Therefore other frequency bands have been identified which are more suitable than the ISM bands for these kinds of services. More detailed Information regarding broadband RLAN applications which are used worldwide can be found in Recommendation ITU-R M.1450.

2 BACKGROUND

CEPT started its work on 5 GHz RLANs with the designation of the band 5 150–5 250 MHz in Recommendation T/R 22-06. An increased commitment towards harmonisation of this band resulted in ERC/DEC/(96)03 "on the harmonised frequency band to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs)", adopted on 7 March 1996. In 1998 the ERC (European Radiocommunications Committee) recognised the need to take into account spectrum requirements for advanced applications of HIPERLANs (Type 2) and the initiated compatibility studies led to the new Decision, ERC/DEC/(99)23 "on the harmonised frequency bands to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs)" of 29 November 1999. The designated frequency bands were 5 150–5 350 MHz and 5 470–5 725 MHz and specific conditions were stipulated to be applied to HIPERLANs operating in these bands. Consequently, ERC Decision (96)03 was withdrawn by ERC Decision (99)24 of 29 November 1999.

The results of detailed compatibility studies within CEPT taking into account the existing radio services can be found in ERC Report 67 (February 1999) and ERC Report 72 (May 1999). The outcome of these studies were also considered in the development of European telecommunication standard ETSI EN 301 893. As a consequence of these studies, the following bands were identified for use by RLANs under prescribed conditions:

- 5 150–5 350 MHz
Only indoor use, mean e.i.r.p.¹ limited to 200 mW, and use of dynamic frequency selection (DFS) as well as transmitter power control (TPC) are required above 5 250 MHz;
- 5 470–5 725 MHz
Indoor as well as outdoor use allowed, mean e.i.r.p.¹ limited to 1 W, use of dynamic frequency selection (DFS) and transmitter power control (TPC) required.

Indoor use is intended to mean inside a permanent domestic or commercial building which will typically provide the necessary attenuation to facilitate sharing with other services².

DFS and TPC are now mandated by the Radio Regulations (WRC-03) for those 5 GHz WAS/RLAN devices operating above 5 250 MHz. Additionally a spreading requirement is encouraged.

The e.i.r.p. density requirements are based on a basic service area of a single WAS/RLAN system. There are two system configurations in principle: Centralised systems (multiple devices connecting to a central device / access point) and non-centralised systems (multiple devices communicating directly in a small area on an ad hoc basis).

Broadband WAS/RLANs mostly have a point-to-multipoint architecture with fixed access points and mobile/portable user devices (PCs, PDAs, smart phones etc.). The access points typically employ sectored or pancake type antenna patterns with the highest gain in the horizontal direction. Office or indoor environments generally have small radio cells in the order of 50 m or less. Outdoor applications generally need larger cell radius, hence higher e.i.r.p. values are required to guarantee the high data rates at the larger range. This was the basis for the decision to allow up to 1 W e.i.r.p. for equipment in the frequency band 5 470-5 725 MHz and to allow outdoor operation. The use of the frequency band 5 150-5 350 MHz is restricted to indoor operation because of the protection requirements of satellite services.

Every WAS/RLAN, when operating in the frequency ranges 5 250–5 350 MHz and 5 470–5 725 MHz, shall employ a DFS mechanism with a Radar Interference Detection function to detect radar signals which have a level above the interference detection threshold as defined in Recommendation ITU-R M.1652.

With regard to DFS, a WAS/RLAN device shall operate in either Master Mode or Slave Mode. WAS/RLAN devices operating in Slave Mode (Slave Device) can only operate in a network controlled by a WAS/RLAN device operating in Master Mode (Master Device).

Every Master Device will use the Radar Interference Detection function in order to check for any co-channel radar signal prior to use a channel but also during normal operation. In addition to this Radar Interference Detection function, every Master Device shall also implement a channel selection mechanism to ensure a near uniform spread of the loading of available spectrum. The Slave Devices shall not transmit before having received an appropriate enabling signal from a Master Device. Slave Devices with a power level of 200 mW e.i.r.p. or above shall have their own Radar Interference Detection function.

Ad-hoc operation is not seen as an additional mode with regard to DFS. Devices operating in ad-hoc mode and in the frequency ranges 5 250–5 350 MHz and 5 470–5 725 MHz, need to use DFS. Devices operating in ad-hoc mode but only in the band 5 150–5 250 MHz, do not need DFS.

¹ The "mean e.i.r.p." refers to the e.i.r.p. during the transmission burst which corresponds to the highest power, if power control is implemented.

² Use of RLAN inside an aircraft is also considered to be an indoor use, due to the strong attenuation offered by the aircraft, their operational conditions, and taking account of the fact that the installation and use of RLAN equipment inside an aircraft is regulated by administrations due to the specific certification required from the relevant aviation authorities.

3 REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands for use by a service or system under specified conditions in CEPT member countries is laid down by law, regulation or administrative action. ECC Decisions are required to deal with the licence related matters and for the carriage and use of equipment throughout Europe. The harmonisation on an European basis would support the *Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity*. A commitment by CEPT member countries to implement an ECC Decision will provide a clear indication that the required frequency bands will be made available on time and on an European-wide basis.

The Radio Regulations make certain provisions related to the status of the mobile service in relation to services with existing allocations prior to WRC-03, i.e. footnotes 5.446B, 5.447F and 5.450A. This ECC Decision shall not be interpreted as any form of agreement to modify these arrangements between those Administrations which implement its provisions.

The ECC Rules of Procedure state that if an ECC Decision is amended, it has to be replaced and the old Decision has to be withdrawn. Therefore this Decision replaces ERC/DEC/(99)23.

**ECC Decision
of 12 November 2004**

**on the harmonised use of the 5 GHz frequency bands for the implementation of
Wireless Access Systems including Radio Local Area Networks (WAS/RLANs)**

(ECC/DEC/(04)08)

"The European Conference of Postal and Telecommunications Administrations,

considering

- a. that there is a need to harmonise spectrum for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs);
- b. that the frequency bands 5 150–5 350 MHz and 5 470–5 725 MHz have been allocated to the *mobile service except aeronautical mobile service* on a primary basis for the implementation of WAS/RLANs by WRC-03, taking into account the need to protect primary services in these frequency bands;
- c. that equipment must fulfil the essential requirements listed in the R&TTE Directive (1999/5/EC) for those countries which are legally bound by it;
- d. that the frequency band 5 000–5 250 MHz is allocated to the Aeronautical Radionavigation Service to be used for the Microwave Landing System (MLS) but there are no international plans for use of the frequency band 5 150–5 250 MHz by the aeronautical community;
- e. that the systems covered by this ECC Decision operate typically in a 20 MHz channel bandwidth, other values for the channel bandwidth are also feasible provided they comply with the relevant maximum mean e.i.r.p.¹ and the corresponding maximum mean e.i.r.p density limits;
- f. that compatibility studies and spectrum investigations have shown that sharing between WAS/RLANs and MSS feeder links in the band 5 150–5 250 MHz is feasible under certain conditions and that Administrations may monitor whether the relevant aggregate pfd levels have been or will be exceeded in the future;
- g. that in many countries there is an essential need for the operation of military and meteorological radars in the bands between 5 250 and 5 850 MHz and therefore protection from interference from the radiodetermination service cannot be requested by WAS/RLANs;
- h. that studies prior to WRC-03 had shown that there is a need to specify appropriate e.i.r.p. limits and operational restrictions for WAS/RLANs in particular in the frequency band 5 250–5 350 MHz in order to protect systems in the Earth exploration-satellite service (active) and space research service (active);
- i. that besides studies in ITU-R, compatibility studies and spectrum investigations performed within CEPT have shown that sharing between RLANS and other services is possible and practicable in the bands 5 150–5 350 MHz and 5 470–5 725 MHz under conditions specified in ERC Reports 67 and 72;
- j. that the implementation of transmitter power control (TPC) in WAS/RLANs in the bands 5 250–5 350 MHz and 5 470–5 725 MHz will significantly reduce the aggregate interference, in order to facilitate sharing with satellite services;
- k. that studies have shown that sharing between the radars in the radiodetermination service and WAS/RLANs in the frequency bands 5 250–5 350 MHz and 5 470–5 725 MHz is only feasible with the application of mitigation techniques such as dynamic frequency selection (DFS) for WAS/RLANs, as described in EN 301 893 and Recommendation ITU-R Recommendation M. 1652;
- l. that the DFS mechanism will also be required to provide, on average, a near-uniform spread of the loading of the available spectrum to facilitate sharing with the satellite services;

- m. That TPC and DFS have been included into the harmonised standard EN 301 893, compliance with which gives presumption of conformity with the requirements of the R&TTE Directive;
- n. That EN 301 893 will be maintained by ETSI so as to take account of practical experience. Administrations may continue studies on suitable test methods and procedures for the implementation of DFS also to support such maintenance;
- o. ITU-R Resolution 229 (WRC-03) recognises the need for further studies and the possibility of development of alternative technical/operational conditions for WAS, whilst still providing appropriate protection of other services. As a result it may be appropriate for the ECC to review this Decision in the future;

DECIDES

1. that this Decision designates the frequency bands 5 150–5 350 MHz and 5 470–5 725 MHz for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs). In EU/EFTA countries the use of such systems or networks shall comply with the R&TTE Directive and its Article 3(2) which may be demonstrated by compliance with harmonised standard EN 301 893 or equivalent technical specifications;
2. that in the frequency band 5 150–5 350 MHz, WAS/RLANs stations shall be restricted to indoor use with a maximum mean e.i.r.p.¹ of 200 mW. In addition, in the band 5 150–5 250 MHz the maximum mean e.i.r.p. density shall be limited to 0.25 mW/25 kHz in any 25 kHz band, and in the band 5 250–5 350 MHz the maximum mean e.i.r.p. density shall be limited to 10 mW/MHz in any 1 MHz band;
3. that in the frequency band 5 470–5 725 MHz, the indoor and outdoor use of WAS/RLANs stations shall be restricted to a maximum mean e.i.r.p.¹ of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band;
4. that, WAS/RLANs operating in the bands 5 250–5 350 MHz and 5 470–5 725 MHz shall either employ transmitter power control, which provides, on average, a mitigation factor of at least 3 dB on the maximum permitted output power of the systems; or, if transmitter power control is not in use, then the maximum permitted mean e.i.r.p.¹ and the corresponding mean e.i.r.p. density limits in *decides* 2 and 3 shall be reduced by 3 dB;
5. that, WAS/RLANs operating in the bands 5 250–5 350 MHz and 5 470–5 725 MHz shall use mitigation techniques complying with the detection, operational and response requirements described in Annex 1 of Recommendation ITU-R M. 1652 to ensure compatible operation with radiodetermination systems;
6. that, in addition to *decides* 5, the mitigation techniques shall ensure that the probability of selecting a given channel will be the same for all available channels. The intention is to provide, on average, a near-uniform spread of the loading of the spectrum;
7. that this Decision replaces the previous ERC Decision (99)23;
8. that this Decision shall enter into force on 12 November 2004;
9. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC chairman and the Office when the Decision is nationally implemented."

Note:

Please check the Office web site (<http://www.ero.dk>) for the up to date position on the implementation of this and other ECC decisions.