



CEPT Report 006

**Report from CEPT to the European Commission  
in response to the Mandate to:**

**HARMONISE TECHNICAL AND, IN PARTICULAR,  
OPERATIONAL CONDITIONS AIMING AT EFFICIENT  
SPECTRUM USE BY RLANS IN THE BANDS 5150-5350 MHZ  
AND 5470-5725 MHZ**

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Electronic Communications Committee (ECC)  
within the European Conference of Postal and Telecommunications Administrations  
(CEPT)



Harmonisation of technical and, in particular, operational conditions aiming at efficient spectrum use by RLANs in the bands 5150-5350 MHz and 5470-5725 MHz

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## 1 EXECUTIVE SUMMARY

This report, in conjunction with the [draft] ECC Decision (04)[JJ], provides the response to the EC Mandate to CEPT “to harmonise technical and, in particular, operational conditions aiming at efficient spectrum use by RLANs in the bands 5150 – 5350 MHz and 5470 – 5725 MHz”.

The Mandate asks four key questions which have been addressed as follows:

- *include guidance to administrations on the implementation of technical and operational conditions as well as how to monitor that mitigation techniques are applied;*

This report contains guidance on the harmonised implementation of technical and operational conditions, including the application of the indoor use restriction with particular reference to the RTTE Directive, and also includes an example of a national interface requirement. For further details see section 6 and Annex 1.

- *ensure any proposed regulation is technology neutral; notably by taking into account the provisions of the RTTE Directive;*

The CEPT believes that the [draft] ECC Decision (99)/[jj] maintains the principle of technology neutrality. In particular, questions have been raised as to whether DFS is actually technology neutral. It should be noted that the concept of DFS was developed within the CEPT and it is not a proprietary technique of any manufacturer. DFS is the only mitigation technique currently identified to meet the need to protect existing services, and is mandatory worldwide in the Radio Regulations. Nothing within the new Decision prevents its future revision, should an alternative mitigation technique to DFS be developed – however it should be recognised that revision of the Radio Regulations would not be a trivial issue. This issue is further elaborated in sections 5 and 6.

- *comment on the indoor/outdoor issue (potential regional differences, resulting problems, etc) relevant to the band 5250-5350 MHz;*

This report explains the background to the different national/regional approaches to the use of the band 5250 – 5350 MHz and provides the justification to maintain the indoor use restriction in Europe. The CEPT believes that the regional differences will not result in any significant problems. See section 4 for further details.

- *comment on the impact of the WRC-03 decision to make the bands 5150-5350 MHz and 5470-5725 MHz available for Wireless Access Systems (WAS) in general.*

The CEPT considers that as a result of the mobile allocation in the Radio Regulations, the potential scope of WAS/RLANs is limited to systems which would fall within the ITU categories nomadic wireless access and mobile wireless access, this reflects the



intent of the CEPT in the designation of this spectrum and the European proposals to WRC-03. See also section 5.1.

## 2 INTRODUCTION

This report, in conjunction with the [draft] ECC Decision (04)[JJ], provides the response to the EC Mandate to CEPT “to harmonise technical and, in particular, operational conditions aiming at efficient spectrum use by RLANs in the bands 5150 – 5350 MHz and 5470 – 5725 MHz”.

### 2.1 Background

The CEPT began its work on 5 GHz RLANs more than a decade ago, with the designation of the band 5150 – 5250 MHz for HIPERLAN in Recommendation T/R 22-06. A few years later, an increased commitment towards harmonisation of this band, resulted in ERC Decision (96)/03.

The technical and operational limits for RLANs in the band 5150 – 5250 MHz were revised to take account of the need to protect MSS feeder links operating in the band 5150 – 5250 MHz, following the allocation of this band to the fixed satellite service by WRC-95. This provided a valuable lesson of the importance of an allocation in the Radio Regulations for future stability.

The restrictions placed on the band 5150 – 5250 MHz, and the evolving requirements for RLANs for use for mobile internet and multi-media applications, lead to the designation of the additional bands 5250 – 5350 MHz and 5470 – 5725 MHz in ERC Decision (99)/23. Use of RLANs in the bands above 5250 MHz was only made possible by the development of dynamic frequency selection (DFS) which provides:

- a detection mechanism to avoid co-frequency operation with radar systems which are one of the primary users of this band;
- a spread of loading of the RLAN use across the available spectrum to facilitate sharing with satellite services.

The sharing between EESS (active) and RLAN in the band 5250-5350 MHz needed careful consideration. The result of studies reflected a delicate balance between the protection requirements of the space science services and the need for a primary allocation to the mobile service.

The CEPT worked in close co-operation with ETSI throughout the evolution of the 5 GHz band for RLAN use. A combination of the complexity of the sharing arrangements in these bands, and the long term importance being placed on this spectrum as the 2.45 GHz band became increasingly overcrowded, demonstrated the importance of securing long term stability via an allocation in the Radio Regulations. Administrations and industry worked in close co-operation over several years, including development of relevant European Common Proposals, to achieve a worldwide primary mobile allocation at WRC-03.



## 2.2 The Result of WRC-03

The outcome of WRC-03 Agenda items 1.5 and 1.6 is a complex compromise solution to meet the different needs of a number of administrations and regional groups. The detailed results of WRC-03 are summarised in Table 1. Although the Radio Regulations provide globally harmonised frequency allocations, they do not provide fully harmonised technical and operational conditions. consequently it is helpful to consider the degree of harmonisation on a band by band basis:

### 2.2.1 Harmonisation in the band 5150 – 5250 MHz

This band is effectively harmonised on a global basis, since there appears to be worldwide consensus on the limits to be applied.

### 2.2.2 Harmonisation in the band 5250 – 5350 MHz

The use of this band is not harmonised throughout the world.

Differences in application of the limits may arise as a consequence of:

- The WRC outcome allows for stations to operate with a maximum mean e.i.r.p. of 200 mW, and also to operate at powers between 200 mW and 1 Watt, subject to use of an e.i.r.p. elevation mask.
- Outdoor use of the band 5250 – 5350 MHz is permitted, although administrations are requested to take appropriate measures to ensure the predominant number of stations are operated indoors, and invited to adopt appropriate regulation if they intend to permit the operation of stations using the e.i.r.p. mask to ensure compliance.

Administrations are also permitted flexibility in adopting alternative mitigation techniques to achieve equivalent protection to the EESS (active) and SRS (active).

### 2.2.3 Harmonisation in the band 5470 – 5725 MHz

This band is very close to global harmonisation.

Flexibility is allowed for administrations with existing regulations in determining the transmitter power output – CEPT falls into this category since its existing regulations only specify a power limit in terms of radiated power.

## 2.3 WRC-03 Follow up activity

Following WRC-03, it was recognised that ERC Decision (99)/23 needed to be updated and JPT5G was mandated as a joint project team of the ECC Spectrum Engineering and Frequency Management Working Groups to carry out this task. In parallel, the EC developed a Mandate to CEPT on 5 GHz RLANs, a copy is attached at Annex 2 – at the WG FM meeting in January 2004, JPT5G were actioned to produce a response.

The key elements of the EC Mandate are “... to develop and adopt the measures necessary to ensure harmonised technical conditions and, in particular, operational conditions that would ensure a sustainable efficient use of the bands 5150 – 5350 MHz and 5470 – 5725 MHz for RLANs based on the outcome of WRC-2003.



The Mandate should:

- include guidance to administrations on the implementation of technical and operational conditions as well as how to monitor that mitigation techniques are applied;
- ensure any proposed regulation is technology neutral; notably by taking into account the provisions of the RTTE Directive;
- comment on the indoor/outdoor issue (potential regional differences, resulting problems, etc) relevant to the band 5250-5350 MHz;
- comment on the impact of the WRC-03 decision to make the bands 5150-5350 MHz and 5470-5725 MHz available for Wireless Access Systems (WAS) in general.”

The deliverables are this report, which addresses these questions, and the [draft] ECC Decision (04)[JJ].

### 3 DETAILED COMPARISON OF THE OUTCOME OF WRC-03 WITH ERC DECISION (99)/23

This section provides a band by band comparison of the existing CEPT arrangements with the outcome of WRC-03, Table 2 also provides a summary of this information.

DFS and TPC were mandated by ERC Decision (99)/23, including a spreading requirement over at least 330 MHz, or 255 MHz in the case of equipment only operating in the band 5470 – 5725 MHz.

#### 3.1 5150 – 5250 MHz

##### *ERC Decision (99)/23*

ERC Decision (99)/23 requires the use of DFS and TPC in this band, with an exemption for HIPERLAN/1.

Furthermore, DFS includes the requirement for spreading as described above

There is a power limitation of 200 mW maximum mean e.i.r.p. already given in the ERC Decision

The Fixed Satellite Service (for MSS feeder links) operating in this band has previously been treated by CEPT as having an equal status to RLANs

##### *Outcome of WRC-03*

According to the outcome of WRC-03, DFS and TPC are not required in this band, although a spreading requirement is encouraged rather than mandated.

In additional WRC-03 imposed an e.i.r.p. density limit of 10 mW/MHz in any 1 MHz band, or equivalently 0.25 mW/25 kHz in any 25 kHz band

WRC-03 placed a footnote in the Radio Regulations stating that stations in the Mobile Service shall not claim protection from Earth stations in the Fixed Satellite Service



ERC Decision (99)/23 should have been reviewed within 2 years of the date of entry into force in the light of market development of HIPERLANs – this provision was originally intended as a safeguard for MSS feeder links in case of a substantial growth in the number of RLANs

WRC-03 agreed that administrations may monitor whether the aggregate PFD limits given in Recommendation ITU-R S.1426 have been, or will be exceeded in the future, in order to enable a future competent conference to take appropriate action

### 3.2 5150 – 5250 MHz

The most significant differences between ERC Decision (99)/23 and the outcome of WRC-03 can be found in this band.

#### *ERC Decision (99)/23*

ERC Decision (99)/23 limits RLANs in this band to indoor use only.

ERC Decision (99)/23 specifies a power limit of 200 mW maximum mean e.i.r.p.

There is no e.i.r.p. density limit.

ERC Decision (99)/23 mandates DFS and TPC, but with a requirement to spread over at least 330 MHz of spectrum and with no provision to avoid the use of TPC.

#### *Outcome of WRC-03*

As a consequence of WRC-03, outdoor operation is permitted by the Radio Regulations, although administrations are requested to take measures that will result in the predominant number of stations being operated indoors.

The WRC-03 outcome allows power levels between 200 mW and 1 W provided an e.i.r.p. mask is used for e.i.r.p. levels above 200 mW, and administrations are invited to adopt appropriate regulation to ensure compliance.

The Radio Regulations also specify an e.i.r.p. density limit of 10 mW/MHz in any 1 MHz band

DFS and TPC are mandated by the Radio Regulations in this band, although a spreading requirement is encouraged rather than mandated. There is also a provision to operate without TPC with a proportional reduction in maximum power.



The Radio Regulations also allow administrations to exercise flexibility in this band in adopting other (unspecified) mitigation techniques provided they achieve an equivalent level of protection to the EESS (active) and the SRS (active).

The Radio Regulations specify that stations in the mobile service should not claim protection from the radiolocation service, EESS (active) or SRS (active). Footnote No. 5.43A does apply, however these services shall not impose more stringent protection criteria than stated in Recommendations ITU-R M.1638 and SA.1632.

### 3.3 5470 – 5725 MHz

There are a number of detailed differences in the arrangements for band 5470 – 5725 MHz defined at WRC-03, compared to ERC Decision (99)/23.

ERC Decision (99)/23

Outcome of WRC-03

ERC Decision (99)/23 only specifies a maximum e.i.r.p. limit of 1 Watt

The Radio Regulations define a maximum e.i.r.p. of 1 Watt and a maximum e.i.r.p. density of 50 mW/MHz in any 1 MHz band.

The Radio Regulations also define a maximum transmitter power of 250 mW, however flexibility is granted to administrations with existing regulations prior to WRC-03.

DFS is mandatory in this band in the ERC Decision (99)/23, and, as noted above, spreading is also required.

DFS is mandatory in this band in the result of WRC-03, although a spreading requirement is encouraged rather than mandated.

The ERC Decision mandates TPC.

The Radio Regulations require either the use of TPC, or alternatively the e.i.r.p. limit must be decreased by 3 dB.



## 4 DISCUSSION OF ISSUES ARISING FROM WRC-03

### 4.1 Indoor vs. outdoor in the band 5250 – 5350 MHz

It should be noted that the indoor restriction in the band 5 250 – 5 350 MHz was proposed as the result of extensive studies conducted and agreed first within CEPT and then within ITU, and which led to the Recommendation ITU-R SA.1632. It represents an essential element to achieve compatibility between RLAN and EESS (active).

However at the WRC-03, the North American administrations insisted that their existing regulations which permit outdoor operation up to 1 W, should not be precluded. As a consequence, the outcome of the WRC-03 contains a compromise which allows outdoor operation in this band; this is even though the ITU-R studies have shown that sharing between the EESS (active) and outdoor WAS based on these characteristics without additional mitigation techniques is not feasible.

The resulting regional differences should not create any significant difficulties, and do not prevent equipment being designed for the global market. Mobile (slave) terminals should derive their operating conditions from the access point (master device), which can be configured according to local regulations, and hence mobile terminals may roam freely worldwide without user intervention. Since the frequency bands, and the use of DFS, are globally harmonised the risk of interference from a small percentage of incorrectly configured access points is thought to be acceptable.

### 4.2 The use of the e.i.r.p. mask and the absence of alternative solutions in the band 5250 – 5350 MHz

An e.i.r.p. mask was introduced in the resolution as a mitigation technique to reduce interference to the EESS (active) from devices operating with an e.i.r.p. of more than 200 mW. There have been extensive discussions within the ITU-R about this technique. The European position was that the e.i.r.p. mask was not currently appropriate for a mobile device. Furthermore, European studies were input to ITU-R that questioned not only the feasibility of the implementation of such a mask, but also demonstrated that even with the use of the mask, compatibility with the EESS (active) could not be achieved for an outdoor WAS.

It is difficult to understand how *resolves 5* of ITU-R Resolution 229 (“that administrations may exercise some flexibility in adopting other mitigation techniques, provided that they develop national regulations to meet their obligations to achieve an equivalent level of protection to the EESS (active) and the SRS (active) based on their system characteristics and interference criteria as stated in Recommendation ITU-R SA.1632”) might be applied in practice, since no alternative mitigation techniques have been identified after several years of studies.



### **4.3 The European situation in the band 5250 – 5350 MHz**

Both regulators and industry are best served with a non-ambiguous regulation. For the band 5 250 – 5 350 MHz Europe has been consistently in line with ERC Decision (99)/23 for the sharing conditions between RLAN in the mobile service and EESS (active).

As the ITU-R Resolution 229 provides additional flexibility for this band, European administrations have to decide on harmonised regulation which would take account of all European interests. We also note that, as an additional benefit, given a clear European decision on the 5 GHz bands, many other administrations (outside Europe) are likely to follow our lead.

JPT5G has considered this, taking account of the previous work done in the ITU-R, the ERC Decision (99)23, and the various European interests, and have concluded that for the band 5 250 – 5 350 MHz, WAS/RLANs stations should continue to be restricted to indoor use with a maximum mean e.i.r.p. of 200 mW, TPC and DFS, in line with ERC Decision (99)/23.

### **4.4 Impact to EESS(active) in case of relaxation of the European arrangements**

Studies within CEPT and ITU-R show that if the European regulations are relaxed by allowing outdoor usage of WAS/RLANs in the band 5250-5350 MHz, measurements taken by the EESS(active) sensors could be subject to interference and made unusable for the many associated applications (e.g. hydrology, seismology, Digital Elevation Maps, disaster mitigation, damage assessments, cities terrain subsidence, terrain classification, etc...). An economical evaluation of the impact of non-availability of SAR images for these applications is obviously very difficult and always questionable, but it may run in the order of several billions of Euros. In addition it is to be noted that:

- More than 2 billion Euros has been invested so far in the development of satellites carrying 5 GHz Synthetic Aperture Radar operating in the band 5250-5350 MHz (ERS-1, ERS-2, Envisat).
- Plans are under evaluation for new generation SARs at 5 GHz.
- A large number of small enterprises are operating in Europe in the elaboration of the SAR raw data into high-level information to be sold to customers.
- Many scientific institutes in Europe use the ESA SAR data for their research in several fields.

### **4.5 Economic value of WAS/RLANs in Europe.**

WAS/RLANs provide an alternative platform for broadband access to information services, not only for business users but for public in general in a variety of locations, and the potential social and economic benefit of these systems is considerable.

The technical and operational limitations defined in [draft] ECC Decision (04)/[jj] are justified and proportionate, in view of the potential impact to other services, and will not have a negative impact on the development of WAS/RLANs.



#### **4.6 Transmitter power limit in the band 5470 – 5725 MHz**

The result of WRC-03 includes a 250 mW limit on transmitter output power in the band 5470 – 5725 MHz, with flexibility granted to administrations with existing regulations. The relevant existing regulation in Europe, ERC Decision (99)/23, does not specify any additional limit on transmitter power beyond the 1 W e.i.r.p. limit.

Consideration was given to introducing this transmitter power limit in the interests of global harmonisation. However, this limit is derived from existing North American regulations and previous European studies have not identified any need for an additional limit on transmitter power. It was therefore decided to maintain the existing European arrangements and leave the harmonisation issue to market forces to decide – recognising that manufacturers may prefer to produce a global product that complies with both limits.

### **5 THE REVISION OF ERC DECISION (99)/23**

The need for revision of ERC Decision (99)/23 was foreseen before WRC-03, as it contains a provision which specifies that it should be reviewed not later than 31 January 2002. Furthermore, the EC Mandate calls for the development of a new ECC Decision.

As a consequence, JPT5G reviewed the ERC Decision (99)23, the revision of which has been issued as a [draft] new ECC Decision. The draft document was sent for adoption by public consultation in May 2004. The main considerations in the development of this [draft] new Decision (04)/[jj], which replaces Decision (99)/23, are described in the following sections.

#### **5.1 Technology neutrality**

ERC Decision (99)/23 is restricted to HIPERLAN Type 1 and 2, which is further defined as “equipment complying with the relevant European Telecommunications Standards”. Although acceptable in 1999, such a restriction to specific technologies is not appropriate for an ECC decision today and so the new decision focuses only on the essential technical requirements to protect other services.

WRC-03 made an allocation to the mobile service in the 5 GHz bands “for the implementation of Wireless Access Systems (WAS) including RLANS”. WAS is a broad category of systems; however, within the scope of the mobile allocation this can be interpreted as covering the ITU-R categories: nomadic wireless access (NWA) and mobile wireless access (MWA). The new ECC decision has been aligned with this terminology to avoid any unnecessary constraint on technologies which may be deployed in the 5 GHz bands, whilst remaining consistent with the provisions of the Radio Regulations.

The new ECC Decision mandates certain technical and operational conditions which are essential to protect the existing users of the 5 GHz bands. These limits have been carefully determined, in consultation between the ECC, ETSI, and other relevant organisations, e.g. NATO and ESA, to provide a sustainable efficient use of the bands in a harmonised manner. It should be noted that DFS is the only mitigation technique



identified so far to protect certain existing services, and is mandated by the Radio Regulations. DFS is not a proprietary technique, and is defined only by the requirements necessary to protect other services, and as such does not contradict the principle of technology neutrality.

## **5.2 Alignment with the outcome of WRC-03**

As described in section 3, there are a number of detailed provisions in the Final Acts of WRC-03 which are not consistent with the provisions of the existing ERC Decision (99)/23. These inconsistencies have been removed from the new ECC Decision so that the CEPT provisions for the use of the 5 GHz bands are compliant with the provisions of the Radio Regulations. The new ECC Decision provides unambiguous, harmonised conditions, which fall within the broader framework given in ITU Resolution 229 (WRC-03).

It should be noted that the new decision contains explanatory text to indicate that it does not change the relative status of any of the services in the 5 GHz bands. This clarification is necessary to avoid the possible interpretation of the document as an agreement between those administrations which implement it to modify these conditions.

## **5.3 Future review**

Taking account of the factors below, it would be very difficult to predict when, how and under what circumstances, the new ECC Decision might need to be reviewed. Furthermore, it is always possible to initiate such a review within the ECC provided there is sufficient support from administrations. The document therefore does not contain any specific review date.

ERC Decision (99)/23 contains a review date which, at the time the document was produced, was viewed with great importance by the two sides to the debate of the feasibility of sharing between MSS feeder links and RLANs. In practice, this review date passed without action.

There is an argument for the use of ‘sunset clauses’ in those ECC Decisions that are intended to bring harmonisation, where the document automatically expires at some pre-determined date. However, the experience with the development of 5 GHz RLANs under the existing ERC Decision highlights the difficulty of predicting market development and selecting an appropriate date for such a provision.

The ITU Resolution 229 (WRC-03) recognises the need for further studies and the possibility of development of alternative technical/operational conditions for WAS, administrations are also invited to monitor aggregate PFD levels which suggests the possibility of the need to take some remedial action in the future.



## 6 IMPLEMENTATION OF THE TECHNICAL AND OPERATIONAL CONDITIONS

The technical and operational conditions defined for the 5 GHz bands present a number of new regulatory challenges; these are described in the following sections. Furthermore, an example of a national interface requirement is included in Annex 1.

### 6.1 The indoor use restriction in 5150 – 5350 MHz

The restriction to indoor use provides an essential mitigation factor to allow sharing with certain existing services.

Due to the mobility of RLAN devices, applying the indoor usage restriction to all devices can only be achieved in practice by enforcing the indoor restriction on the access points (master devices) rather than on the mobile (slave) terminals. This intended enforcement policy should not be understood as a means to circumvent the indoor use restriction given in ECC Decision (04)/[jj]

RLAN access points (master device) capable of operating across both bands would need various configurations or options to comply with the different regulatory environments. Equipment specifically designed for outdoor use only will be limited to the band 5 470 – 5 725 MHz when operating in Europe.

The current regulatory regime (R&TTE directive) describes the necessary provisions to ensure that products are used in accordance with the appropriate European regulations.

National administrations will define in their interface requirements the specific conditions for indoor and outdoor usage. The manufacturer has the obligation to inform the user on how to configure and use the equipment. Such information has to be provided inside the user manual and on the outside of the packaging.

Due to the availability of the band 5470 – 5725 MHz for outdoor applications, the indoor use restriction is not expected to pose an undue restriction on the usage of RLANs.

#### 6.1.1 Use on board aircraft

The case of use on board aircraft raises the issue of how to deal with different regulations existing at either end of international routes. The indoor use restriction could pose significant difficulty for the service provider; however, technical evaluation shows that this use does not pose any increased risk of interference.

Use of RLAN inside an aircraft is therefore 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



## 6.2 DFS

The operation of WAS/RLANs in the bands 5250 – 5350 MHz and 5470 – 5725 MHz is only possible with suitable mitigation to avoid interference to the civil and military radar systems which operate in these bands. Dynamic Frequency Selection (DFS) is the only mitigation measure currently identified which is capable of achieving this.

DFS achieves this mitigation by monitoring and avoiding those channels which are occupied by radar transmissions. DFS has been described in ITU-R Recommendation M.1652, and is being included in product standards in such a way that the equipment should be capable of detecting a range of radars with different characteristics. In addition, some administrations are conducting practical tests to ensure the efficiency of DFS.

Some administrations may not have such stringent requirements for DFS because of the types of radar actually deployed in their territory; however, in order to facilitate free movement of the equipment it is important to achieve a common performance level for DFS which takes account of the most stringent requirements.

It should be noted that the Radio Regulation footnotes 5.447F and 5.450A effectively make WAS/RLANs secondary to radar systems (although radars may not impose any more stringent protection criteria on WAS/RLANs than those contained in Recommendation ITU-R M.1638). Thus the requirement for DFS is ultimately to protect the current radar systems, e.g. through satisfactory practical testing, rather than to simply comply with a relevant standard.

## 6.3 Monitoring of aggregate Power Flux Density levels in the band 5150 – 5250 MHz

ITU-R Recommendation S.1426 specifies an aggregate PFD limit to protect satellite receivers in the band 5150 – 5250 MHz. ITU-R Resolution 229 (WRC -03) resolves that administrations may monitor whether these levels have been, or will be exceeded in the future, in order to enable a future competent conference to take action.

The actual measurement of these levels presents a great technical challenge and studies are continuing within the ITU-R towards the definition of measurement methods.

## 7 SUMMARY

This section presents a summary of the actions taken for each of the bands.

### 7.1 5150 – 5250 MHz

The requirement for DFS and TPC has been removed in the [draft] ECC Decision (04)/[jj], and a limitation on power density added, to be in line with the result of WRC-03. As a result, this band is harmonised at global level.



## 7.2 5250 – 5350 MHz

To ensure the protection of existing services, and also to provide sustainable efficient use of this band, CEPT has maintained similar arrangements to the existing ERC Decision (99)/23, in particular:

- WAS/RLANs are to remain restricted to indoor use with a maximum mean e.i.r.p. of 200 mW.

A limitation on power density has been added to [draft] ECC Decision (04)/[jj], and also the possibility to operate at lower power without TPC is included.

## 7.3 5470 – 5725 MHz

A limitation on power density has been added to [draft] ECC Decision (04)/[jj], and also the possibility to operate at lower power without TPC is included. CEPT has chosen to exercise flexibility on the transmitter output power limit in this band, leaving the decision between this flexible solution and global harmonisation to be decided by market forces.

## 7.4 Table of results

Tables 1 and 2 below show the results of WRC-03 under Agenda item 1.5 and 1.6, and the consequential changes to the ERC Decision (99)/23, respectively.

**Table 1: MOBILE allocations at WRC-03 under Agenda item 1.5 and 1.6 (RESOLUTION 229 (WRC-03))**

Frequency bands	Operational conditions	Technical limits	Notes	<b>8 FURTHER STUDY</b>
5150 – 5250 MHz	Indoor only	200 mW e.i.r.p. 10 mW/MHz in any 1 MHz 0.25 mW/25 kHz in any 25 kHz	Administrations may monitor compliance with aggregate PFD level.	Regulatory mechanisms and further mitigation techniques in relation to sharing between WAS/RLANs and MSS feeder links
5250 – 5350 MHz	Administrations are requested to take appropriate measures that will result in predominantly indoor use	For indoor systems: 200 mW e.i.r.p. 10 mW/MHz in any 1 MHz Where outdoor systems permitted – see notes. In all cases, shall either employ TPC, or the maximum e.i.r.p. shall be reduced by 3 dB. The equipment shall also implement DFS (as given in Annex 1 of ITU-R Recommendation M.1652).	Up to 200 mW, and from 200 mW to 1 W e.i.r.p. permitted with use of e.i.r.p. mask subject to appropriate regulation to ensure compliance. Alternative mitigation techniques permitted providing equivalent protection to EESS (active) as given by Rec. SA.1632	Further studies on protection of EESS from WAS/RLANs  Test methods and procedures for implementation of DFS
5470 – 5725 MHz	Indoor and outdoor	1 W e.i.r.p. 50 mW/MHz in any 1 MHz 250 mW Transmitter power In all cases, shall either employ TPC, or the maximum e.i.r.p. shall be reduced by 3 dB. The equipment shall also implement DFS (as given in Annex 1 of ITU-R Recommendation M.1652).	Flexibility for administrations with existing regulations on transmitter power, e.g: <ul style="list-style-type: none"> <li>• 200 mW in Japan</li> <li>• No limit in CEPT.</li> </ul>	



**Table 2: Comparison between ERC Decision (99)/23 and [draft] ECC Decision (04)[jj]**

Frequency band	ERC Decision (99)/23		ECC [draft] Decision (04)[jj]	
	Operational conditions	Technical limits	Operational conditions	Technical limits
5150 – 5250 MHz	Indoor use only	200 mW e.i.r.p. TPC (except HIPERLAN/1) DFS, including spreading over at least 330 MHz (except HIPERLAN/1) Equipment to comply with relevant ETSI HIPERLAN standards	Indoor use only	200 mW e.i.r.p. 0.25 mW/25 kHz in any 25 kHz band e.i.r.p. density Technology neutral Spreading is not required if only operating in this band.
5250 – 5350 MHz	Indoor use only	200 mW e.i.r.p. TPC DFS, including spreading over at least 330 MHz Equipment to comply with relevant ETSI HIPERLAN standards	Indoor use only	200 mW e.i.r.p. 10 mW/MHz in any 1 MHz band e.i.r.p. density TPC, or 3 dB reduction in power limits. DFS, including near uniform spreading over available channels. Technology neutral
5470 – 5725 MHz	Indoor and outdoor	1 W e.i.r.p. TPC DFS, including spreading over at least 330 MHz, or 255 MHz for equipment used only in this band. Equipment to comply with relevant ETSI HIPERLAN standards	Indoor and outdoor	1 W e.i.r.p. 50 mW/MHz in any 1 MHz band e.i.r.p. density TPC, or 3 dB reduction in power limits. DFS, including near uniform spreading over available channels. Technology neutral

Annex 1

**Example for a future  
Interface Regulation [XYZ]  
on  
Wireless Access Systems  
including Radio Local Area Networks  
(WAS/RLANs)  
in the frequency bands 5150 - 5350 MHz  
and 5470 - 5725 MHz**

98/34/EC Notification Number: [xxxxxx]

**Published** [xxxxxx]

**Radio Interface Regulation**

Frequency band (MHz)	Radiocommunications Service in accordance with the Table of Frequency Allocations of the Article S5 of the ITU-R Radio Regulations	Description of allowed application(s) within the frequency band	Licensing Regime	Maximum transmit power limit		Any other restrictions concerning the use of the band
				Maximum mean <sup>1</sup> e.i.r.p.	Maximum mean <sup>1</sup> e.i.r.p. density	
5150-5250	Mobile service except aeronautical mobile service	Devices associated with mobile/ Nomadic and Local Area Network applications	Licence exempt	200 mW	0.25 mW / 25 kHz in any 25 kHz band	Indoor use only
5250-5350	Mobile service except aeronautical mobile service	Devices associated with mobile/ Nomadic and Local Area Network applications	Licence exempt	200 mW	10 mW / 1 MHz in any 1 MHz band	Indoor use only Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC), see EN 301 893 for specific parameters.
5470-5725	Mobile service except aeronautical mobile service	Devices associated with mobile/ Nomadic and Local Area Network applications	Licence exempt	1 W	50 mW / 1 MHz in any 1 MHz band	Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC), see EN 301 893 for specific parameters.

**References**

ECC/DEC/(04)[jj]

ECC Decision of xx July 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)

ETSI EN 301 893 (latest version)

Broadband Radio Access Networks (BRAN); 5GHz High performance RLAN; Harmonised EN covering essential requirements of article 3.2 of the R&TTE Directive

<sup>1</sup> 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

Annex 2

**EUROPEAN COMMISSION**  
Information Society Directorate-General

The Director-General

Brussels, **23 X11 2003**  
DG INFSO/B4/ag/vs/D(2003)/445203

Dear Mr Chairman,

**Re: Mandate to CEPT to harmonise technical and, in particular, operational conditions aiming at efficient spectrum use by RLANs in the bands 5150-5350 MHz and 5470-5725 MHz**

*Considering Article 4 par. 2 of Radio Spectrum Decision 676/2002/EC of the European Parliament and of the Council, and the favourable opinion expressed by the Radio Spectrum Committee through an advisory opinion, which was given at the 6<sup>th</sup> meeting of the RSC on 10 December 2003, I am pleased to hereby issue to CEPT the attached mandate to harmonise technical and, in particular, operational conditions aiming at efficient spectrum use by RLANs in the bands 5150-5350 MHz and 5470-5725 MHz.*

Upon completion of this mandate, I would appreciate receiving from CEPT the deliverables called for in the mandate, along with an explanatory note on how the tasks have been accomplished.

Should you have any further queries, do not hesitate to contact Mr Niepold, Chairman of the Radio Spectrum Committee (++32.2.296 89 55).

Yours sincerely,

Fabio Colasanti

CC: Mr Chris van Diepenbeek, Chairman of ECC

Mr José Saraiva Mendes  
Chairman of the CEPT  
ANACOM  
National Communications Authority  
Av. José Malhoa, 12  
1099-017  
Lisboa

**Mandate to CEPT**  
**to harmonise technical and, in particular, operational conditions aiming at**  
**efficient**  
**spectrum use by RLANs in the bands 5150-5350 MHz and 5470-5725 MHz**

### ***1. Purpose***

To mandate CEPT to develop and adopt the measures necessary to ensure harmonised technical conditions and, in particular, operational conditions that would ensure a sustainable efficient use of the bands 5150-5350 MHz and 5470-5725 MHz for RLANs based on the outcome of WRC-2003.

### **2. Justification**

Pursuant to Article 4 of the Radio Spectrum Decision<sup>2</sup>, the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum; such mandates shall set the task to be performed and the timetable therefor.

In order to align European spectrum utilisation conditions with world-wide agreements reached at WRC-03 concerning the frequency bands to be used for Wireless Access Systems including RLANs, it is necessary to revisit existing CEPT positions on RLAN use at 5 GHz, with the aim of adjusting, where necessary, technical and operational conditions so as to achieve an efficient use of spectrum which is sustainable over time in an unlicensed environment.

### **3. Background**

The European Common Allocations Table (ECA) and, since WRC-03, also the Radio Regulations (RR) include a primary allocation to the Mobile Service in the bands 5150 - 5350 MHz and 5470-5725 MHz. Within the RR, Resolution [COM5/16] lays down the rules for Wireless Access Systems (WAS) including RLANs in the bands 5150-5350 MHz and 5470-5725 MHz.

It is noted that before WRC-03 CEPT had issued documents<sup>3</sup> both in terms of spectrum availability and technical constraints aimed at harmonising conditions across Europe. CEPT plans to review these documents in light of the WRC-03 results.

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<sup>2</sup> Decision 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community, OJ L 108 of 24.4.2002, p. 1.

<sup>3</sup> ERC/DEQ99)23 - ERC Decision of 29 November 1999 on the harmonised frequency bands to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs), and FM Working Group Guidance Document on 5 GHz RLANs (September 2002).

#### 4. Order and Schedule

CEPT is mandated to develop and adopt the measures necessary to ensure harmonised technical conditions and, in particular, operational conditions that would ensure a sustainable efficient use of the bands 5150-5350 MHz and 5470-5725 MHz for RLANs based on the outcome of WRC-2003. The mandate should:

- include guidance to administrations on the implementation of technical and operational conditions as well as how to monitor that mitigation techniques are applied;
- ensure any proposed regulation is technology neutral; notably by taking into account the provisions of the RTTE Directive;
- comment on the indoor/outdoor issue (potential regional differences, resulting problems, etc) relevant to the band 5250-5350 MHz;
- comment on the impact of the WRC-03 decision to make the bands 5150-5350 MHz and 5470-5725 MHz available for Wireless Access Systems (WAS) in general.

The deliverables of this Mandate will be a report, as well as an ECC Decision on harmonised usage conditions for RLANs in the 5 GHz bands with the following delivery dates.

- **April 2004:** Submission of a report to the RSC giving initial proposals or strategies, commenting on the progress of the work and highlighting any problems with the timing of the mandate.
- **June 2004:** Adoption of the ECC Decision for public consultation;
- **November 2004: Final report to the RSC and final approval of the ECC Decision by the ECC.**

The result of this mandate can be made applicable in the European Community pursuant to Article 4 of the Radio Spectrum Decision.

In implementing this mandate, the CEPT shall, where relevant, take the utmost account of Community law applicable.

\* \* \*