

**PCC.II/REC. 11(VI-05)<sup>1</sup>**

**TECHNICAL AND OPERATIONAL LIMITS FOR DEPLOYMENT OF WIRELESS ACCESS SYSTEMS INCLUDING RLANs IN THE 5 GHz RANGE**

The VI meeting of the Permanent Consultative Committee II: Radiocommunications including Broadcasting,

**CONSIDERING:**

- a) That there is a need to provide harmonized spectrum to the mobile services for wireless access systems including Radio Local Area Network (RLANs) operating in the bands 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz;
- b) That CITEL Administrations presented a common proposal on World Radiocommunication Conference WRC-2003 agenda items 1.5 and 1.6;
- c) That WRC-03 adopted changes to the table of allocation and also regulatory, technical and operational constraints (see Resolution 229 (WRC-03)) to facilitate use of 5 GHz wireless access services globally;
- d) That CITEL countries would benefit if common procedures could be developed for the use of the 5 GHz bands by RLANs;
- e) That there is a need to protect the existing primary services in the 5150-5350 MHz and 5470-5725 MHz bands;
- f) That the results of studies in the ITU-R indicate that sharing in the band 5150-5250 MHz between WAS, including RLANs, and the FSS is possible under specified conditions;
- g) That Resolution 229 (WRC-03) assumes outdoor WAS use in the 5250-5350 MHz band but to ensure protection to the earth exploration-satellite service (EESS) requests Administrations to take measures that result in predominantly indoor use in this band;
- h) That Resolution 229 (WRC-03) resolves 4 and 5 also provides some flexibility to Administrations in what mitigation techniques are used to protect EESS;
- i) That ITU studies identify RLAN load spreading over a large number of frequencies and using transmit power control (TPC) as factors that will lessen potential interference to EESS (see ITU-R SA.1632);
- j) That some RLAN devices capable of operating in the 5250-5350 MHz band may operate throughout segments of the band 5150-5725 MHz, yielding 455 MHz of usable spectrum, and some RLAN devices capable of operating in the 5250-5350 MHz band may operate throughout segments of the band 5250-5850 MHz, yielding 480 MHz of usable spectrum; in both cases spreading deployment densities over a large amount of spectrum;
- k) That studies have shown that sharing between the radiodetermination and mobile services in the

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<sup>1</sup> PCC.II-RADIO/doc. 871/05 cor.1

bands 5250-5350 MHz and 5470-5725 MHz is possible with the application of mitigation techniques such as dynamic frequency selection;

l) That the deployment density of WAS, including RLANs, will depend on a number of factors including intrasystem interference and the availability of other competing technologies and services which can have significant effect on protection of EESS.

**NOTING:**

a) That international spectrum allocations along with attendant regulatory, operational and technical frameworks for the use of 5 GHz spectrum were adopted by WRC-03;

b) That a number of Administrations have put into place, or are considering, regulations to certify equipment for use within the 5150-5725 MHz range;

c) That 5 GHz wireless systems may be used to provide effective, low-cost solution to providing broadband access and also for bridging the digital divide;

d) That bringing 5 GHz wireless broadband services to consumers would be accelerated if Administrations develop common spectrum use, regulatory and testing procedures;

e) That some Administrations also permit the use of similar, but higher powered, equipment in the 5725-5825 MHz band for fixed and mobile services;

f) That such use of the 5725-5825 MHz band could provide for longer distance links to provide – among other uses – backhaul to support “last-mile” broadband access operations at lower 5 GHz frequencies and, thus, may be considered for such use throughout the Region;

g) That the availability of the 5725-5825 MHz band could also relieve pressure to use 5 GHz bands lower in frequency for higher powered systems,

**RECOGNIZING:**

a) That a mitigation technique to protect radiodetermination systems is given in Recommendation ITU-R M.1652;

b) That there is a need for Administrations to ensure that WAS, including RLANs meet the required mitigation techniques, for example through equipment or standards compliance procedures;

c) That the vast majority of wireless access systems including RLANs will be authorized on a license exempt basis,

**RECOMMENDS:**

1. That CITEL Administrations adopt operational and technical limits for wireless access systems including RLANs operating in 5 GHz bands in accordance with the ITU Radio Regulations;

2. That CITEL Administrations ensure that technical or operational limits on wireless access systems including RLANs are:

- i) harmonized with other CITEL countries to the extent possible;
- ii) do not introduce limits in excess of those found in the ITU Radio Regulations;
- iii) provide protection to existing services to the equivalent level specified in the ITU Radio Regulations in bands where flexibility is afforded to Administrations.

3. That in the band 5150-5250 MHz, stations shall be restricted to indoor use. Stations that operate with a bandwidth equal to or greater than 1 MHz shall not exceed a maximum e.i.r.p. of 200 mW and a maximum e.i.r.p. density of 10 mW/MHz in any 1 MHz band. Stations that operate with a bandwidth of less than 1 MHz (where permitted) shall not exceed a maximum e.i.r.p. of  $10 \log(B)$  mW, where B is the bandwidth in MHz, as measured with a bandwidth equal to the emission bandwidth. It is permissible to use a measurement bandwidth less than the specified bandwidth provided the measured power is integrated to show total power over the specified bandwidth;

4. That CITEL Administrations in which WAS/RLAN devices are used in the 5150-5250 MHz band adopt measures to ensure that such devices are restricted to indoor use.

5. That in the band 5250-5350 MHz, stations in the mobile service shall be limited to a maximum mean e.i.r.p. of 200 mW and a maximum mean e.i.r.p. density of 10 mW/MHz in any 1 MHz band. Administrations are requested to take appropriate measures that will result in the predominant number of stations in the mobile service being operated in an indoor environment. Furthermore, stations in the mobile service that are permitted to be used either indoors or outdoors may operate up to a maximum mean e.i.r.p. of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band, and, when operating above a mean e.i.r.p. of 200 mW, these stations shall comply with the following e.i.r.p. elevation angle mask where  $\theta$  is the angle above the local horizontal plane (of the Earth):

-13	dB(W/MHz)	for	$0^\circ \leq \theta < 8^\circ$
$-13 - 0.716(\theta - 8)$	dB(W/MHz)	for	$8^\circ \leq \theta < 40^\circ$
$-35.9 - 1.22(\theta - 40)$	dB(W/MHz)	for	$40^\circ \leq \theta \leq 45^\circ$
-42	dB(W/MHz)	for	$45^\circ < \theta$ ;

6. That the 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.

Some CITEL Administrations have adopted the following rules utilizing the flexibility afforded by this Recommends:

That in the bands 5250-5350 MHz stations shall be restricted to a peak transmit power not to exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi;

7. That in the band 5470-5725 MHz, stations in the mobile service shall be restricted to a maximum transmitter power  $250 \text{ mW}^3$  with a maximum mean e.i.r.p. of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band;

8. That in the band 5250-5350 MHz and 5470-5725 MHz, stations shall either employ transmitter power control to provide, on average, a mitigation factor of at least 3 dB of the maximum average output power of the systems or, if transmitter power control is not used, the maximum mean e.i.r.p. shall be reduced by 3 dB;

9. That in the bands 5250-5350 MHz and 5470-5725 MHz, the mitigation measures found in Annex 1 to Recommendation ITU-R M.1652 shall be implemented by systems in the mobile service to ensure compatible operation with radiodetermination systems;

10. That in the band 5725-5825 MHz, stations be restricted to a peak transmit power not to exceed the lesser of 1 W or  $17 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1 MHz band. Appropriate limits may be set for point-to-point and point-to-multipoint systems using high gain directional antennas.

11. That in the relevant 5 GHz bands, peak emissions outside of frequency bands of operation be attenuated as follows:

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission e.i.r.p. limit of -27 dBm/MHz in the 5150-5250 MHz band.
- (3) For transmitters operating in the 5725-5825 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

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<sup>3</sup> Administrations with existing regulations prior to this Conference may exercise some flexibility in determining transmitter power limits.