

**Document IWG-2/006**  
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## **WRC-2003 ADVISORY COMMITTEE**

### **DRAFT PRELIMINARY VIEWS ON WRC-03**

**WRC-2003 Agenda Item: 1.15** – to review the results of studies concerning the radionavigation-satellite service in accordance with Resolutions 604 (WRC-2000), 605 (WRC-2000), and 606 (WRC-2000).

#### **ISSUES:**

**1. Resolution 604:** To determine whether an aggregate pfd value of  $-171$  dB ( $W/m^2$ ) in a 10 MHz bandwidth at any RA observatory site, which radionavigation satellite service (RNSS) space-to-Earth systems operating in the band 5010-5030 MHz cannot exceed for more than 2% of the time in the band 4990-5000 MHz, adequately protects radioastronomy in the 4990-5000 MHz band from detrimental interference.

**2. Resolution 605:** (a) To ensure the protection of aeronautical radionavigation service (ARNS), specifically including Distance Measuring Equipment (DME), from RNSS space-to-Earth transmissions in the 1164-1215 MHz band; and (b) To assess the need for an aggregate power flux-density limit on RNSS space-to-Earth transmissions, and if such a need exists to confirm or revise the provisional aggregate power flux-density limit adopted in **No. S5.328A** of the Radio Regulations.

**3. Resolution 606:** To ensure, through appropriate technical, operational, and regulatory studies (including the assessment of the need for a power flux-density limit on new RNSS (space-to-Earth) systems in the 1215-1300 MHz band), that the RNSS (space-to-Earth) will not cause harmful interference to the radionavigation and radiolocation services.

#### **BACKGROUND:**

##### **1. Resolution 604:**

WRC-2000 introduced new space-to-space and space-to-Earth allocations to the RNSS in the band 5010-5030 MHz. For use of the band 5010-5030 MHz by the RNSS (space-to-Earth), in order to protect MLS systems operating above 5030 MHz, an aggregate pfd value of  $-124.5$  dB ( $W/m^2$ ) in a 150 kHz bandwidth by all space stations of the RNSS service in the band 5030-5150 MHz is specified. To protect radioastronomy from detrimental interference, a provisional aggregate pfd value of  $-171$  dB ( $W/m^2$ ) in a 10 MHz bandwidth at any RA observatory site cannot be exceeded for more than 2% of the time in the band 4990-5000 MHz. Under Resolution **604 (WRC-2000)**, the ITU-R is to review the provisional  $-171$  dB ( $W/m^2/10$  MHz) pfd limit.

## 2. Resolution 605:

WRC-2000 introduced new allocations in the band 1164-1215 MHz for use by the radionavigation-satellite service (“RNSS”) (space-to-space) and (space-to-Earth) with an aggregate provisional pfd of  $-115$  dB (W/m<sup>2</sup>) in any 1 MHz produced at the Earth’s surface by all space stations within all RNSS systems and for all angles of arrival. It also stated in **No. S5.328A** of the Radio Regulations that the provisions of Resolution **605 (WRC-2000)** apply. There was extensive discussion at the WRC with regards to the need for a pfd limit and the value needed to protect ARNS (including Distance Measuring Equipment (DME)). Resolution **605** requests the ITU-R to study the technical, operational, and regulatory aspects of compatibility between RNSS and ARNS in the band 960-1215 MHz, including an assessment of the need for an aggregate pfd limit and if such need exists, to revise, if necessary the provisional pfd limit given in **No. S5.328A** concerning the operation of RNSS (space-to-Earth) systems in the frequency band 1164 – 1215 MHz.

## 3. Resolution 606:

WRC-2000 introduced allocations to the RNSS (space-to-Earth) in the 1260-1300 MHz band, and for RNSS (space-to-space) in the 1215-1300 MHz band. Where RNSS use of the 1164-1215 MHz band was made subject to a provisional aggregate pfd limits, RNSS use of the band 1215-1300 MHz band is the subject of studies to be conducted pursuant to Resolution **606 (WRC-2000)**. There are large numbers of GPS receivers operating in the band 1 215 – 1 260 MHz. The band 1 240 – 1 300 MHz is also allocated on a co-primary basis to ARNS and to radiolocation for use of long range primary radar systems. Among other things, Resolution **606** calls for studies of “the need for a power flux-density limit concerning the operation of radionavigation-satellite service (space-to-Earth) systems in the frequency band 1215 – 1300 MHz in order to ensure that the radionavigation-satellite service (space-to-Earth) will not cause harmful interference to the radionavigation and radiolocation services.”

Also in Resolution **606**, WRC-2000 resolved that no additional constraints are to be placed on RNSS systems operating in the 1215-1260 MHz band. The Global Positioning System (GPS), an RNSS system which operates on 1227.6 MHz (24 MHz bandwidth), has been in operation in the band 1215 – 1260 MHz since 1988. It provides positioning and navigation services from space. Currently, this signal is used for high precision GPS in high productivity applications, such as machine guidance in survey, construction, agriculture, and mining. With an expanding capability to receive an additional civilian GPS signal, other civilian and commercial sectors have yet to be explored. The existing signal will continue to be a low power signal in the 1215 – 1300 MHz band. This signal has been transmitted at its current power level for over 12 years and has not caused any interference to other users of the band. This has been accomplished without the need for power flux-density limits in the Radio Regulations. It is anticipated that in the future there will be requirements to improve upon the signal.

Studies are currently under way in ITU-R Working Party 8D to address these three resolutions.

## **PRELIMINARY VIEWS:**

### **1. Resolution 605:**

The United States of America has a strong need both for RNSS spectrum in the 1164-1215 MHz band and for the protection of DME systems in the ARNS. It is participating in ITU-R technical and regulatory studies that are expected to show how DME systems can be protected while not unduly constraining the aggregate power flux-density emissions of RNSS systems. Regardless of the mechanism that is used to provide the requisite protection to DMEs, it is noted that the ITU-R currently does not have a methodology that can be used to calculate the power flux-density produced by RNSS systems, along with appropriate regulatory provisions that ensure that the desired protection is provided effectively without unnecessarily delaying or hindering the implementation and provision of RNSS (space-to-Earth) services.

### **2. Resolution 606:**

The United States of America is of the view that there is no need for any power flux-density limit to be imposed in the 1215-1300 MHz band. RNSS systems have been successfully operating in the lower portion of the band (1215-1240 MHz) for more than 12 years with no resultant interference, and the band is not used by DME systems. Even if ITU-R studies show that radiolocation and/or ARNS systems require protection from new RNSS systems in the 1215-1240 MHz band or from RNSS (space-to-Earth) systems in the 1260-1300 MHz band, it will be necessary to consider means alternative to power flux-density limits for providing such protection.

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