



Report ITU-R M.2175
(07/2010)

**Simultaneous dual linear polarization
transmission technique using digital
cross-polarization cancellation
for MSS systems**

M Series
**Mobile, radiodetermination, amateur
and related satellites services**



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Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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***Note:** This ITU-R Report was approved in English by the Study Group under the procedure detailed in Resolution ITU-R 1.*

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(Question ITU-R 83-6/4)

(2010)

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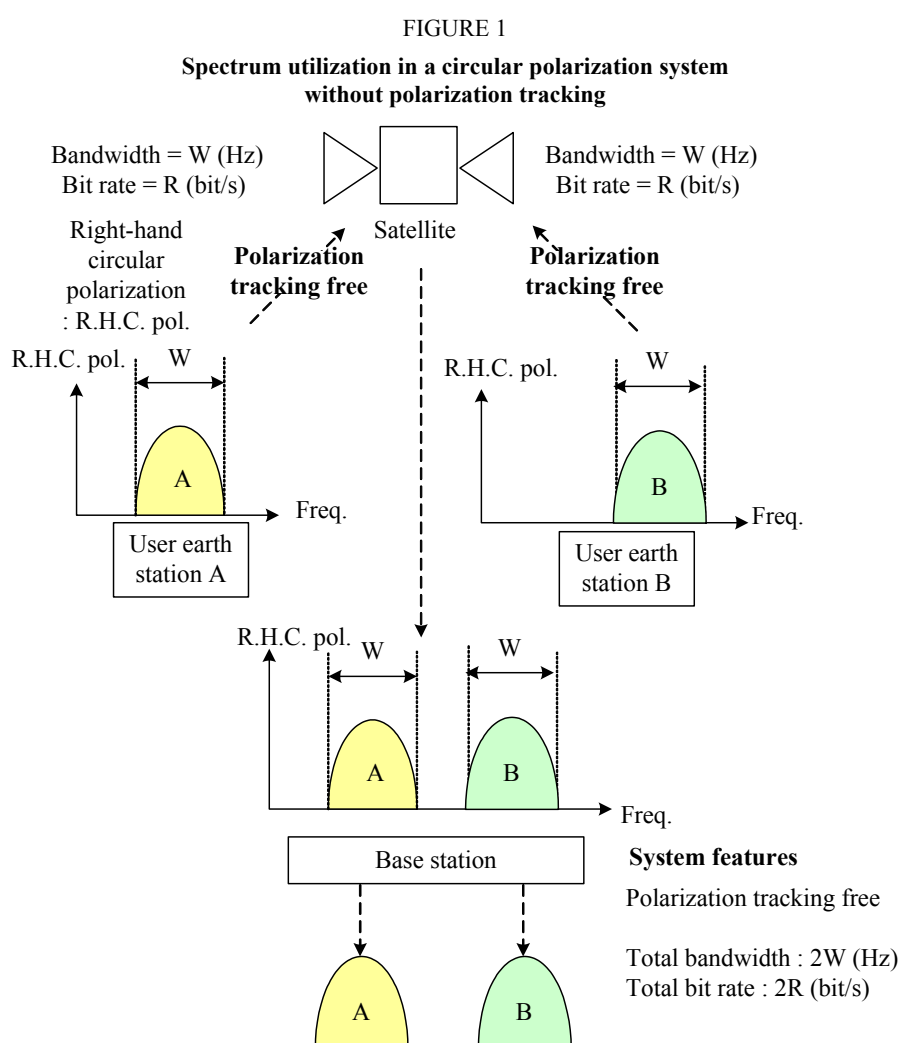
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* When submitting to the Radiocommunication Bureau a satellite network intended to be operated with the technique described in this Report, administrations need to take into account that both orthogonal polarisations have to be included in the submission, in order for them to be appropriately coordinated.

1 Introduction

Mobile-satellite communication services are now being offered all over the world. In order to share the limited frequency bandwidth among many MSS systems, a perpetual requirement is to improve the spectrum utilization efficiency. For this purpose, it is important to consider how to not only share the same frequency bandwidth between different systems but also improve spectrum utilization efficiency within an MSS system.

Figure 1 shows a typical MSS system that employs circular polarization. Circular polarization is mainly adopted due to its polarization-tracking-free nature, which makes it suitable for mobile services. In a typical system, right-hand circular polarization or left-hand circular polarization is selected. If a single user earth station sends at the bit rate of R (bit/s) with bandwidth of W (Hz) and user earth stations A and B make use of the satellite transponder, the total bit rate is $2R$ with the bandwidth of $2W$ in Fig. 1.



Another MSS system utilizes V/H dual linear polarization. Figure 2 shows an example of spectrum utilization in a V/H dual linear polarization system. Each user earth station communicates using either V or H polarization. In Fig. 2, V polarization is assigned to user earth station A and H polarization is assigned to user earth station B. Since user earth station A and user earth station B share the same frequency bandwidth with different polarization, polarization tracking is required at each user earth station so as to eliminate cross-polarization interference on the other user earth station. In Fig. 2, if each user earth station sends at the bit rate of R with bandwidth of W , the total bit rate, $2R$, is achieved with the bandwidth of W .