RECOMMENDATION ITU-R M.1388*

THRESHOLD LEVELS TO DETERMINE THE NEED TO COORDINATE BETWEEN SPACE STATIONS IN THE BROADCASTING-SATELLITE SERVICE (SOUND) AND PARTICULAR SYSTEMS IN THE LAND MOBILE SERVICE IN THE BAND 1 452-1 492 MHz

(Question ITU-R 106/8)

(1999)

Summary

Until such time as additional studies are complete, the power flux-density level specified in this Recommendation may be applied as coordination trigger threshold level to space stations in the broadcasting-satellite service (sound) operating in the frequency band 1 452-1 492 MHz to share this frequency band with particular land mobile systems.

The ITU Radiocommunication Assembly,

considering

a) that WARC-92 allocated the band 1 452-1 492 MHz on a primary basis in worldwide basis to the broadcasting-satellite service (sound) (BSS(S)), subject to the provisions of the Radio Regulations (RR) Nos. S5.342, S5.343, S5.344 and S5.347, and to Resolution 528 (WARC-92);

b) that the frequency band in a) is also allocated to the mobile service;

c) that there are a number of common characteristics and parameters among the various land mobile systems (LMS) now in operation;

d) that the protection criteria for LMS in general is yet to be determined;

e) that the performance objectives for the LMS in general are yet to be determined;

f) that land mobile service stations may receive interference caused by emissions from satellite transmitters in the BSS(S);

g) that this Recommendation does not negate the ability of administrations to seek coordination under Resolution 33 (WARC-79);

h) that there is already a coordination threshold between the mobile-satellite service and the land mobile service in No. S5.348A in the RR in the band 1 492-1 525 MHz;

j) that there are no appropriate coordination threshold levels to protect the land mobile service in the band 1 452-1 492 MHz;

k) that it is difficult to change technical parameters in the existing systems operating in the above band;

l) that the coordination threshold specified in Recommendation ITU-R F.1338 dealing with the interference from the BSS(s) to the fixed service may not be appropriate for this purpose;

m) that methods and techniques for effective coordination need to be established,

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* This Recommendation should be brought to the attention of Radiocommunication Study Group 10.

recommends

1 that for BSS(S) geostationary space stations, and until such time as further studies related to *considerings* d) and e) are completed, the following power flux-density (pfd) levels at the surface of the Earth may be applied as the coordination threshold with particular systems in the land mobile service operating in the band 1 452 to 1 492 MHz (see Notes 1 to 4):

–150 dB (W/m^2) in 4 kHz for all angles of arrival (Notes 5 and 6).

NOTE 1 – LMS technical parameters based on particular digital systems referred to in *recommends* 1 are given in Annex 1 to this Recommendation.

NOTE 2 – The pfd level set out in *recommends* 1 was derived using a deterministic analysis methodology for the mobile station at the service area boundary.

NOTE 3 – The use of a probabilistic analysis based on the acceptability of a marginal reduction in service availability within a small percentage of the total service area may lead to higher coordination trigger thresholds.

NOTE 4 – Administrations are encouraged to consider the sharing measures set out in Annex 2 to this Recommendation. In the specific case that coordination is necessary in the band used for repeater station receivers in LMS systems, § 2.2 of Annex 2 would be relevant as the measures described there may enhance the prospect of sharing.

NOTE 5 – Analogue LMS systems also operate in the shared band and until such time as sharing studies related to such a use of the LMS band are completed, the pfd trigger threshold in *recommends* 1 may be provisionally applied.

NOTE 6 – The reference bandwidth of 4 kHz may be reviewed in the actual coordination process.

ANNEX 1

Technical parameters of particular systems in the land mobile service

Table 1 gives technical parameters of a digital system in the land mobile service, which are already operating in the band 1 452 to 1 492 MHz in one country. The value in Table 1 represents the requirements around the edge of each service coverage area.

TABLE 1

Carrier level	dB (W/4 kHz)	–146.2
Thermal noise	dB (W/4 kHz)	–162.8
Total interference noise	dB (W/4 kHz)	–161.7
Antenna aperture	dB (m^2)	–22.8
Allowable pfd for inter-service interference	dB (W/m^2/4 kHz)	–148.9

ANNEX 2

Measures to facilitate inter-service sharing

1 Interference mitigation techniques

For land mobile systems, techniques such as diversity reception, digital modulation and channel coding, and code division multiple access would assist sharing with BSS(S) systems.

2 Implementation measures

When interference calculations are being made, worst case scenarios and deterministic methodologies are likely to be used which could tend to lead to the conclusion that co-frequency or co-channel sharing by different services cannot occur. Probabilistic methodologies based on reduced LMS availability may enhance the possibility of frequency sharing, however this issue requires further study.

Typical technical parameters are generally used to establish appropriate sharing criteria. Those parameters may not reflect the existing LMS usage of the band. Specifically in the case that the LMS band is divided into sub-bands and used for particular types of LMSs, each with their own particular set of operating characteristics, different revised sharing criteria may apply to each of them.

Where an administration wishes to establish a new system and appropriate sharing criteria have not been finalized, the measures outlined below should be considered to ensure that harmful interference is not caused to the existing service or the proposed new service.

2.1 Initially, geographical separation will be a consideration, but as adjacent border areas will be most affected, this option may be limited.

2.2 Where practicable it may be possible to identify spectrum for the proposed BSS(s) which takes advantage of the operational characteristics of particular types of LMS used in the shared band. For example, it may be possible to use the discrimination of certain types of LMS receive antennas towards the satellite orbit to gain additional protection of the LMS.

2.3 Where practicable methods such as interference cancellers, special screening, and adaptive antenna systems may be implemented (Recommendation ITU-R SM.856).

2.4 In the longer term, moves to the use of improved transmission techniques, such as spread spectrum (Recommendation ITU-R SM.1055), coding techniques, automatic power control, and energy dispersal, may further facilitate inter-service sharing.