



Recommendation ITU-R M.1461-2
(01/2018)

**Procedures for determining the potential for
interference between radars operating in
the radiodetermination service
and systems in other services**

M Series
**Mobile, radiodetermination, amateur
and related satellite 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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BS	Broadcasting service (sound)
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M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R M.1461-2*

**Procedures for determining the potential for interference
between radars operating in the radiodetermination
service and systems in other services**

(Question ITU-R 226/5)

(2000-2003-2018)

Scope

This Recommendation provides guidance and procedures for determining the potential for interference between radars operating in the radiodetermination service and systems in other services.

Keywords

Radar, procedure, interference, protection criteria

Abbreviations/Glossary

BPSK: Binary phase shift keying

CW: Continuous-wave

FDR: Frequency dependent rejection

LNA: Low noise amplifier

OFR: Off-frequency rejection

OTR: On-tune rejection

QPSK: Quadrature phase shift keying

The ITU Radiocommunication Assembly,

considering

- a) that antenna, signal propagation, target detection, and large necessary bandwidth characteristics of radar to achieve their functions are optimum in certain frequency bands;
- b) that the technical characteristics of radars operating in the radiodetermination service are determined by the mission of the system and vary widely even within a frequency band;
- c) that the radionavigation service is a safety service as specified by the Radio Regulations (RR) No. 4.10 and harmful interference to it cannot be accepted;
- d) that some ITU-R technical groups are considering the potential for the introduction of new types of systems (e.g. fixed wireless access and high-density fixed and mobile systems) or services in frequency bands between 420 MHz and 34 GHz used by radars in the radiodetermination service;
- e) that representative technical and operational characteristics of systems operating in frequency bands allocated to the radiodetermination service are required to determine the feasibility of introducing new types of systems;

* This Recommendation should be brought to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), the International Maritime Radio Committee (CIRM) and the World Meteorological Organization (WMO).

f) that procedures and methodologies are needed to analyse compatibility between radars operating in the radiodetermination service and systems in other services,

recommends

- 1 that the procedures in Annex 1 should be used to provide guidance for determining the potential for interference between radars operating in the radiodetermination service and systems in other services;
- 2 that those radar characteristics contained in appropriate ITU-R Recommendations should be used for the frequency band under study.

Annex 1

Procedures for determining the potential for interference between radars operating in the radiodetermination service and systems in other services

1 Introduction

Analysis procedures have been developed. Because of the high transmitter output power (50 kW to several MW) and antenna gain (30 to 45 dBi) of radars operating in the radiodetermination service (hereafter simply referred to as radars), compatibility between radars and systems in other services is largely determined by analysing the effects of the emissions from radars on receiving functions of other services. Therefore, this analysis procedure primarily addresses the methods to assess the potential for interference from radars. In addition, potential desensitization of radar receivers by emissions from modulated continuous-wave (CW) systems in other services is briefly discussed.

By the nature of the missions of radars, many are mobile and cannot be constrained to prescribed areas of operation. Also, the mission of radars often requires frequency agility and utilize the entire allocated band. But when radars are anticipated to operate in certain areas in proximity to other systems, the potential for interference can be assessed using the procedures contained in this Recommendation.

2 Interference from radars to systems of other services

Investigations of several interference cases have identified two primary electro-magnetic interference coupling mechanisms between high power radar systems and other services. These interference coupling mechanisms are receiver front-end overload and radar transmitter emissions coupled through the receiver IF passband. Discussion of the interference mechanisms are provided below.

2.1 Receiver front-end overload

This interference mechanism occurs when energy from the fundamental frequency (necessary emissions) of an undesired signal saturates the victim receiver front-end (low noise amplifier (LNA) in some systems), resulting in gain compression of the desired signal sufficient to degrade receiver performance. Receiver front-end overload is typically a result of inadequate RF selectivity in the front-end of the victim receiver.