



Recommendation ITU-R M.1746-1
(11/2019)

**Harmonized frequency channel plans for
the protection of property using
data communication**

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

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.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
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.

Electronic Publication
Geneva, 2019

© ITU 2019

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without written permission of ITU.

RECOMMENDATION ITU-R M.1746-1

**Harmonized frequency channel plans for the protection
of property using data communication**

(2006-2019)

Scope

This Recommendation addresses system interoperability and harmonized frequency channel plans for the protection of property using data communication.

Keywords

PPDR

Related ITU Recommendations, Reports

Report ITU-R M.2377 – Radiocommunication objectives and requirements for Public Protection and Disaster Relief

Report ITU-R M.2415 – Spectrum needs for Public Protection and Disaster Relief (PPDR)

The ITU Radiocommunication Assembly,

considering

- a) that technologies exist and are being developed which facilitate, through public protection radiocommunication systems, the protection of property;
- b) that the usefulness of public protection radiocommunication systems for the protection of property have been and continue to be demonstrated using data transmissions;
- c) that a common frequency or a common frequency band may be available within each country;
- d) that countries use a variety of frequency bands, technologies and applications for the protection of property;
- e) that several countries have implemented or are considering implementing protection of property systems;
- f) that many administrations wish to promote interoperability and interworking between systems used for public protection both nationally and for cross-border operations;
- g) that national spectrum planning for public protection radiocommunication systems need to have regard for cooperation and bilateral consultation with other concerned administrations, in order to facilitate greater levels of spectrum harmonization;
- h) that current public protection systems mostly require relatively low communications bandwidth, and may use either narrow-band communication systems supporting voice and low data-rate applications, typically in channel bandwidths of 25 kHz or less, or spread spectrum technology;
- i) that to facilitate system interoperability and/or interworking, it is desirable that systems for the protection of property be developed under an open architecture without releasing sufficient information to allow systems to be easily countered;
- j) that usage of the same frequencies of the same allocation in particular ITU regions will enable administrations to benefit from harmonization while continuing to meet national planning requirements;

k) that use of common frequencies within which radiocommunication equipment for the protection of property can operate, compatible technology, mutual cooperation and consultation will ease the radiocommunication system interoperability and/or interworking of protection of property systems,

recognizing

a) that Resolution **646 (Rev.WRC-15)** resolves to encourage administrations to use harmonized frequency ranges for PPDR to the maximum extent possible, taking into account the national and regional requirements and also having regard to any needed consultation and cooperation with other concerned countries;

b) that Report ITU-R M.2377 addresses the operational, technical, and functional objectives and requirements of systems supporting public protection,

noting

a) that many administrations use the same frequencies for narrow-band protection of property applications;

b) that such applications on these frequencies can provide good signal availability over large coverage areas;

c) that it is desirable to identify frequencies on a regional basis, which will permit spectrum channel harmonization for the protection of property;

d) that these property protection applications are achieved through data transmissions;

e) that data transmissions on harmonized spectrum will facilitate interoperability only with compatible technology;

f) that a description of radiocommunication systems providing protection of property is given in Annex 1,

recommends

1 that administrations should collaborate with each other in their respective region to achieve harmonized frequency channel plans for protection of property systems and/or applications;

2 that the frequency channel plans in Annex 2 should be considered for the protection of property using data communications;

3 that techniques for ensuring interoperability of different systems should be used.

Annex 1

Description of systems providing protection of property

1 Introduction

This Annex provides a description of systems which provide for the recovery of stolen or missing property, and which thereby act as a deterrent against theft or tampering. It provides a functional description of such systems, as well as functional characteristics. It also includes a description of the systems' radiocommunication parameters.

2 General system description

Property protection systems require communications between a centralized, typically fixed control network, and many remote transceivers located with or within assets being protected. The control network is responsible for allocating and controlling transceiver identifiers, and may poll the transceivers either regularly, or on demand, specifically when an asset is reported as having been stolen. The control network may be operated by national authorities or responsible agencies and organizations, and in either case may have arrangements for cooperation with other property protection systems operating within the same or different countries. The transceiver may be configured to only respond to messages received from the control network, or initiate communications when it detects tampering or theft, or a combination of these. Systems use a variety of communications, including fixed and mobile radio communications and private circuit and public telecommunications, depending on configuration and the mobility of the protected items. Transceivers may be configured to provide location information in their transmissions (e.g. derived from a satellite navigation system), or systems may rely on triangulation or searches using mobile control units. The communications for property protection are often configured to provide high levels of coverage in traditionally difficult to reach locations such as underground garages and metallic shipping containers to which stolen items may be taken for concealment or modification.

3 System function

How the different systems function depends on the system architecture.

The control centre maintains a database of asset information comprising transceiver configuration and unique system identifiers, information on who may receive reports or instigate activity, and procedures to be followed when an alert is raised. Communications within the property protection network and between the network and transceivers attached to the protected assets are automated and under computer control, though may be instigated manually, for example following a report of an asset being stolen.

In systems which rely on the control centre to initiate or control transceiver activity (either configuration commands or requesting status responses), the communication may be either made directly through telephone lines for fixed assets, or through a network of many radio transmitters for either fixed or mobile assets. In other systems, the transceiver located with or within the asset being protected may initiate communications if it detects that tampering or theft is taking place. The communication may once again be direct through the public telephone network, or by radio to one or more receiver sites configured to receive property protection messages and relay information back to the control centre. However the messages are instigated or communicated, the control centre will maintain a record, and as appropriate, involve or inform other organizations.

Radiocommunications may be used between the control centre and any remote transmitters and receivers belonging to the control network, in addition to those between the transceiver and the control network. Any such transmissions within the control network would resemble normal telemetry and are not covered by this Recommendation, which concentrates on the communication between the control network and the protected device. These communications may be arranged in a variety of ways such that the transceiver responds on the same channel on which it receives commands, an adjacent channel, or using an entirely different channel or technology, for example receiving commands on a dedicated property protection channel and responding either through a call on a cellular telephone network, or using a shared, short-range channel to receivers located with cellular base stations with which back-haul infrastructure is shared. It is normal for transceiver transmit power to be low, in order to minimize power drain and possible interference if the asset is taken outside of the coverage area of its own network, and this may encourage the use of different bands and technologies for the receive and transmit segments.

If assets may be moved across national boundaries, cooperation arrangements with property protection network operators in other countries are advantageous, as are commonly agreed or harmonized allocations and assignments. The situation can be further improved by having transceivers listen for messages on several channels, and possibly accept commands with configuration instructions on which channel or technology to use for responses.

Depending on the size and cost of the assets being protected, some transceivers may include location information (possibly derived from satellite navigation systems) in their transmissions, while other networks may rely on localization through the received signal, either by triangulation or “homing” with mobile receivers.

While the main use of property protection systems is expected to be for recovery of valuable, mobile items (vehicles, boats) following theft, property protection systems may also be used to monitor and report tampering in remote equipment (vending machines), track delivery vehicles to enhance security or provide better, up-to-date information on delivery schedules, or provide fall-back alert cover for emergency teams or shipments of money or other valuables. Each of these applications makes different demands on the property protection network, transceivers and communications, however a mixture can improve overall network utilization.

4 Radiocommunication characteristics

These systems often interface with the public switched telephone network, paging or public cellular networks, and with other radiocommunication equipment at remote device locations. They typically operate in a frequency range from HF and up to about 1 GHz depending upon the technology used, but many systems are operated in fixed and mobile service allocations in the range 100-900 MHz.

5 Interoperability

Through the use of systems as described above, i.e. operating on the same frequency and using compatible system devices, the property being protected through recovery can be easily located if it is in a country different from the one in which it was taken. Harmonization of frequencies for this type of application is particularly useful for interoperability between countries and to ease the burden of coordination for administrations. Presently in Region 1 such systems use 25 kHz or 12.5 kHz channels, or broader channels if spread spectrum technologies are employed. In certain countries of Region 2 and in Region 3 a 25 kHz channel is used to provide these services.

Annex 2

Frequency channel plans for the protection of property using data communications

The frequencies below have already been assigned or are being considered for assignment for protection of property radiocommunication systems:

In Region 1

Europe: Frequencies within the harmonized band 169.4-169.8125 MHz¹

Frequencies presently used in other bands including 138.625 MHz, 138.650 MHz, 149.025 MHz, 162.050 MHz and 164.175 MHz on a national or multinational basis with agreement between administrations.

Arab States: No frequency has been agreed upon yet.

Africa: One channel centred at 169.200 MHz in two countries.

In Region 2

CITEL has recommended frequencies within the range 173.0-173.3 MHz.

In Region 3

One channel centred at 163.475 MHz in some countries.

¹ In Europe, CEPT/ECC Decision (05)02 "*on the use of the frequency band 169.4-169.8125 MHz*" includes the harmonisation of predictable and reliable sharing arrangements for all SRD sharing the 169.4-169.8125 MHz frequency range. This also includes applications such as tracing and asset tracking systems and alarm systems.