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| **Radiocommunication Study Groups** |  |
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CHAPTER 1

Mobile and Amateur issues

(Agenda items 1.1, 1.2, 1.3, 1.4)

AGENDA ITEM 1.3

(**WP 5A** / **WP 5B, WP 5C, WP 5D**, (WP 1B), (WP 4A), (WP 4B), (WP 4C),
(WP 6A), (WP 7B), (WP 7C), (WP 7D))

*1.3 to review and revise Resolution* ***646******(Rev.WRC-12)*** *for broadband public protection and disaster relief (PPDR), in accordance with Resolution* ***648 (WRC-12)****;*

Resolution **648 (WRC-12)**: *Studies to support broadband public protection and disaster relief.*

# 1/1.3/1 Executive summary

For WRC-15 agenda item 1.3 there are three proposed methods. These methods can be summarized as follows:

• Method A proposes that no change will be made to Resolution **646 (Rev.WRC-12)**,other than editorial amendments to Footnote 1 of Resolution **646 (Rev.WRC-12)** and the text surrounding it, and updated references to ITU-R Reports. The broadband PPDR requirements will be addressed through ITU-R studies.

• Method B proposes that the requirements of broadband PPDR would be addressed in the revision of Resolution **646** **(Rev.WRC-12)** in accordance with Resolution **648 (WRC-12)**.

• Method C also proposes revision of Resolution **646** **(Rev.WRC-12)** and further proposes that all referenced frequency bands/ranges for PPDR operations from Resolution **646** **(Rev.WRC-12)** be removed and be replaced with a cross reference to the latest version of Recommendation ITU-R M.2015, which will contain the recommended regionally harmonised frequency bands/ranges for PPDR operations.

# 1/1.3/2 Background

Resolution **646 (Rev.WRC-12)** on Public Protection and Disaster Relief (PPDR), encourages administrations, for the purpose of achieving regionally harmonized frequency bands/ranges for advanced public protection and disaster relief solutions, to consider certain identified frequency bands/ranges or parts thereof when undertaking their national planning.

The benefits resulting from the use of regionally or internationally harmonized frequency bands have been well documented in the Resolution and in many studies and reports. These benefits include, among others, achieving economies of scale and expanded equipment availability, possibly increasing competition and improved spectrum management and planning.  In emergency and disaster relief situations, the benefits of harmonization also include enhanced cross-border circulation of equipment and increased potential for interoperability of communications when a country receives assistance from other nations.

Since the initial adoption of Resolution **646** in 2003, major technological developments in radiocommunications have taken place. Moreover, the use of PPDR data applications in certain countries has increased – a trend which continues to grow. New broadband mobile technologies, such as 3GPP’s Long-Term Evolution (LTE), have emerged, for which today there are already practical applications, and PPDR agencies increasingly recognize the importance of video and broadband to carry out their activities more efficiently. In addition, some countries have designated new frequency bands for broadband PPDR that are currently not identified in Resolution **646 (Rev.WRC-12)**.

It has also been recognized that, during disasters, wireless video systems are rolled out more rapidly than fibre or cable networks. In various parts of the world, governments and PPDR institutions are using high-speed wireless video networks to enhance the safety of officers and increase their effectiveness in saving lives. In this context, new scenarios of applications and demand for public safety communications have emerged. WRC-15, under agenda item 1.3, will review and revise, as appropriate, Resolution **646 (Rev.WRC-12)** for broadband PPDR in accordance with Resolution **648 (WRC-12)**.

# 1/1.3/3 Summary of technical and operational studies, including a list of relevant ITU-R Recommendations

*Region 1*

ECC Report 199, “User requirements and spectrum needs for future European broadband PPDR systems (Wide Area Networks) May 2013”. (<http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP199.PDF>)

*Region 2*

Phoenix Center Policy Bulletin No. 26, “Public Safety or Commercial Use? A Cost/Benefit Framework for the D Block” March 2011 (<http://www.phoenix-center.org/PolicyBulletin/PCPB26Final.pdf>).

Defence Research and Development Canada, “700 MHz Spectrum Requirements for Canadian

Public Safety Interoperable Mobile Broadband Data Communications” February 2011. (<http://cradpdf.drdc-rddc.gc.ca/PDFS/unc122/p535072_A1b.pdf>)

*Region 3*

APT Report on "PPDR Applications Using IMT-Based Technologies and Networks" April 2012. ([APT/AWG/REP-27](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWG-REP-27_APT_Report_PPDR_IMT_Based_Technologies.doc))

– This report provides the technical requirements for using IMT based technologies and networks in PPDR applications. The PPDR requirements of IMT-based technologies and networks are reviewed and some methods of adapting for PPDR application using IMT-based technologies and networks are addressed.

APT Report on "Technical Requirements for Mission Critical Broadband PPDR Communications" September 2013. ([APT/AWG/REP-38](http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWG-REP-38-APT_Report_on_PPDR.docx))

– This report provides an outline of the technical requirements of mobile wireless broadband communications systems to meet mission critical broadband PPDR requirements. It presents a high-level framework and broad rationale, along with a fundamental set of recommended operational and functional requirements that might be found useful to regional administrations for a variety of purposes.

TRPC “Public Protection and Disaster Relief (PPDR) Services and Broadband in Asia and the Pacific: A Study of Value and Opportunity Cost in the Assignment of Radio Spectrum” May 2013. (<http://trpc.biz/wp-content/uploads/PPDR-_Report_June-2013_FINAL.pdf>)

List of Relevant ITU-R Recommendations and Reports

Reports ITU-R M.2033[[1]](#footnote-1), M.[PPDR] and ITU-R M.2291

Recommendations ITU-R M.1826, M.2009 and M.2015

# 1/1.3/4 Analysis of the results of studies

The documents in section 1/1.3/3, in particular ECC Report 199, APT/AWG/Report 38 Appendix 4 and Report ITU-R M.[PPDR], summarise the studies carried out on PPDR broadband spectrum requirments. These studies, providing examples from China, Israel, CEPT, UAE, and Motorola Solutions indicate a strong need for harmonised spectrum. Broadband PPDR spectrum bandwidth requirements vary to a significant extent between countries, regardless of whether the PPDR network is owned/operated by a government PPDR agency, commercial entity or a hybrid commercial/government solution. These studies indicate a need for a spectrum bandwidth of
20 MHz (e.g.10+10 MHz) or more in some countries for broadband PPDR. Some other administrations may have differing bandwidth requirements.

Region 1

In accordance with their studies, CEPT is expecting that in some countries narrowband PPDR technology will continue to play an important role in the medium term (i.e. at least in the next
10-15 years), even when future broadband technologies may be capable of meeting mission critical voice requirements.

Region 3

APT Report 27 concludes that the mobile broadband PPDR systems based on IMT have a critical role to play in effectively and efficiently satisfying local, national, and international public safety objectives. PPDR organizations need to be able to communicate among themselves as well as with the community at large, many times across jurisdictional boundaries, in order to meet modern day challenges. There are several different approaches that PPDR organizations could take in relation to using IMT technologies for their broadband wireless needs, ranging from dedicated PPDR networks to operating as virtual private networks (VPNs), on a preferential basis, on commercial IMT networks. Regardless of the approach chosen, the availability of funds to deploy such infrastructure needs to be addressed as they may involve varying levels of expenditure. The effectiveness of such expenditure in providing PPDR organizations a broadband mobile capability through the use of IMT technologies will however be undermined if the pursuit of regional harmonization of spectrum bands for PPDR applications and the relevant technology standards are not continued.

APT Report 38 encourages administrations to adopt common technology, technical features and functional capabilities, as well as harmonized spectrum arrangements as far as practicable,
to maximize the potential for regional cooperation and cross-border inter-working. Further, pursuit of such harmonization is expected to lead to greater market size to the benefit of manufacturers/vendors, government agencies, and PPDR management and operational staff.

# 1/1.3/5 Methods to satisfy the agenda item

## 1/1.3/5.1 Method A: Editorial updating to Resolution 646 (Rev.WRC-12)

Under this method, no change will be made to Resolution **646 (Rev.WRC-12)**, other than editorial amendments to Footnote 1 of Resolution **646 (Rev.WRC-12)** and the text surrounding it, and updated references to ITU-R Reports. The broadband PPDR requirements will be addressed through ITU-R studies appropriately, as indicated in Section 1/1.3/6.1.

**Advantages**

− This method fulfills the objectives of review and revision of Resolution **646 (Rev.WRC-12**), as stated in Resolution **648 (WRC-12).**

− This method provides sufficient flexibility to administrations by addressing broadband PPDR requirements through ITU-R studies.

− This method maintains the approach agreed in the *resolves* part of Resolution **646 (Rev.WRC-12)** in which the requisite frequency bands/ranges are harmonized to the extent possible on the international/regional level for public protection and disaster relief applications.

**Disadvantages**

− This method will not fulfill the objective of Resolution **648 (WRC-12)**, which recognized that it is timely “to consider the future direction of spectrum needs of public safety and disaster management agencies” and called on WRC-15 to “take appropriate action with regard to revision of Resolution **646 (Rev.WRC-12)**”

− There will be no guidance to administrations and manufacturers to encourage regional/ international harmonization of frequency ranges for wide area mobile broadband PPDR.

− Additional regionally harmonized frequency ranges/bands for broadband PPDR will not be included for Region 1 and Region 3 in *resolves* 2 of Resolution **646 (Rev.WRC-12)**. In addition, *invites* *ITU-R* 2 of Resolution **646 (Rev.WRC-12)** specifically calls on ITU-R “to conduct further appropriate technical studies in support of possible additional identification of other frequency ranges to meet the particular needs of certain countries in Region 1”. Such identification will not be done unless Resolution **646
(Rev.WRC-12)** is suitably modified as called for in Resolution **648 (WRC-12)**.
In particular in Region 3, the band 746-806 MHz is included for some countries but this part of the APT 700 MHz band (698-806) is not part of the harmonized frequency range.

## 1/1.3/5.2 Method B: Modify Resolution 646 (Rev.WRC-12)

Under this method, requirements of broadband PPDR would be addressed in the revision of Resolution **646** **(Rev.WRC-12),** as indicated in Section 1/1.3/6.2.

Considering the growing use of mobile broadband communications, including mobile video applications, additional spectrum for PPDR mobile broadband is needed, so that administrations may assign RF spectrum for broadband PPDR. Spectrum below 1 GHz is suitable for such applications, despite the current broadcasting primary status throughout Region 1. Moreover, spectrum may also be needed for broadband PPDR at frequencies above 1 GHz bands, in order to combine RF spectrum with good coverage and penetration characteristics (below 1 GHz), together with RF spectrum (above 1 GHz) that adds capacity. Common RF spectrum will enable efficient deployment and will ease coordination and harmonization between different PPDR agencies and will advance international aid during disasters and major events. In addition to the benefits of scale production, regional harmonization will improve interoperability among first responders and will drive suitable devices and standards dedicated to broadband PPDR.

Advantages

− This method satisfies agenda item 1.3 and the *resolves* part of Resolution **648
(WRC-12)** to review and revise Resolution **646 (Rev.WRC-12)** for broadband public protection and disaster relief (PPDR). The method can also fulfil *invites ITU-R* 2 of Resolution **646 (Rev.WRC-12)** that specifically calls on ITU-R “to conduct further appropriate technical studies in support of possible additional identification of other frequency ranges to meet the particular needs of certain countries in Region 1”. Such identification can be done under this method by suitable modification of Resolution **646 (Rev.WRC-12)** as called for in Resolution **648 (WRC-12)**.

− This method can facilitate regional harmonization of frequency bands/ranges for broadband PPDR by identifying frequency bands/ranges that are suitable for the deployment of mobile broadband PPDR systems. As indicated in section 1/1.3/4, various studies in section 1/1.3/3, in particular ECC Report 199, APT/AWG/Report 38 and Report ITU-R M.[PPDR] indicate a strong need for harmonized spectrum to meet the needs of PPDR agencies.

− This method facilitates, through harmonized frequency bands/ ranges, the development of economies of scale for broadband PPDR equipment; and this will address the needs of developing countries for cost-effective PPDR equipment. Studies indicate that adoption of common technology, technical features and functional capabilities, as well as harmonized spectrum arrangements, can maximize the potential for regional cooperation and cross-border inter-working and lead to greater market scale to the benefit of PPDR agencies and increase the safety and security of the public.

Disadvantages

− Changes to the preferred frequency ranges may complicate the harmonization of broadband PPDR systems creating the potential for harmful interference situations to and from PPDR operations worldwide through global circulation of equipment.

− Resolution **646 (Rev.WRC-12)** already reflects the requisite preferred harmonized frequency bands/ranges for broadband PPDR applications requirements. Additional broadband PPDR requirements may be accomplished through ITU-R studies.

− Countries of Region1 planning to introduce PPDR mobile broad band services in the low end of the 700 MHz range may have to bilaterally coordinate with neighbouring countries still transmitting high power terrestrial broadcasting on Channel 48. Some countries in Region 2 have already planned and deployed broadband PPDR networks based on frequency ranges currently shown in Resolution **646 (Rev.WRC-12)**.

– Changes to these established frequency ranges may complicate the harmonization of broadband PPDR systems between administrations in cross-border regions as well as introduce issues of interoperability.

## 1/1.3/5.3 Method C: Modify Resolution 646 (Rev.WRC-12), excluding PPDR frequencies through non-mandatory reference to Recommendation ITU-R M.2015

Under this method, requirements of broadband PPDR would be addressed in the revision of Resolution **646** **(Rev.WRC-12)** appropriately, as indicated in Section 1/1.3/6.2.

Studies carried out by ITU-R in accordance with Resolution **648 (WRC-12)** led to the development of a new ITU-R Report. This Report ITU-R M.[PPDR] addresses relevant information on PPDR; either narrow-, wide- or broadband. It also contains information on the evolution of applications supported through the provision of broadband PPDR and may be subject to further revision.

Technical requirements from Report ITU-R M.[PPDR] supporting harmonization will be reflected in the revision of Resolution **646 (Rev.WRC-12)** through a non-mandatory referenceto Recommendation ITU-R M.2015.

In this method all referenced frequency bands/ranges for PPDR operations from Resolution **646** **(Rev.WRC-12)** will be removed and be replaced with a cross reference to the latest version of Recommendation ITU-R M.2015 which will contain the recommended regionally harmonised frequency bands/ranges for PPDR operations.

Advantages

− Satisfies the *invites ITU-R* parts of Resolutions **646 (Rev.WRC-12)** and **648 (WRC-12)** and also covers the *resolves* of Resolution **648 (WRC-12)** to review and revise Resolution **646 (Rev.WRC-12)** for broadband PPDR.

− Provides flexibility for each administration to choose related bands for their PPDR operations by keeping harmonization of common technology, technical features and functional capabilities, as well as harmonized spectrum arrangements.

− Streamlines the information needed for the future consideration of regulatory and technical details towards PPDR operation by placing relevant information in appropriate ITU-R deliverables.

Disadvantages

− Removal of the listed spectrum ranges from *resolves* 2 of Resolution **646 (Rev.WRC‑12)** would raise the potential for more frequent changes in identified spectrum ranges, leading to uncertainty for PPDR equipment manufacturers, PPDR system operators and incumbent spectrum users across multiple spectrum bands.
This method will remove the stability of the bands/ranges identified for PPDR as revisions to ITU-R Recommendations can be made anytime. This will discourage investment in the development of PPDR equipment for meeting the needs of PPDR agencies. This method is un-implementable as ITU-R working parties, on their own and without guidance from the Radio Regulations, cannot decide which band to develop frequency arrangements for broadband PPDR. This will therefore defeat the whole purpose of Resolution **646 (Rev.WRC-12)**.

− Resolution **648 (WRC-12)** only calls for revision of Resolution **646 (Rev.WRC-12)**to meet the needs of broadband PPDR. There is no provision in this agenda item for changing the bands/ranges for narrow band/wideband already identified in Resolution **646 (Rev.WRC-12)**. Any change to the bands/ranges contained in *resolves* 2 of Resolution **646 (Rev.WRC-12)** for PPDR applications other than broadband is outside the scope of agenda item 1.3 (WRC-15).

− This method removes the guidance to ITU-R working parties as to which frequency bands/ranges should be used to develop frequency arrangements for PPDR. It will result in the introduction of non-harmonized bands/ranges for PPDR and defeat the purpose of Resolution **646 (Rev.WRC-12)**.  It isolates into a single study group important decisions on spectrum usage that would affect spectrum bands and users across multiple radiocommunication services. It could lead to identification of additional preferred frequency ranges without appropriate technical studies, creating the potential for harmful interference situations to and from PPDR operations worldwide through global circulation of equipment.

# 1/1.3/6 Regulatory and procedural considerations

## 1/1.3/6.1 For Method A: Editorial updating to Resolution 646 (Rev.WRC-12)

MOD

RESOLUTION 646 (REV.wrc--15)

Public protection and disaster relief

The World Radiocommunication Conference (Geneva, 2015),

considering

…

*g)* that new technologies for wideband and broadband public protection and disaster relief applications are being developed in various standards organizations;

…

*m)* that the Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations (Tampere, 1998), an international treaty deposited with the United Nations Secretary-General and related United Nations General Assembly Resolutions
and Reports are also relevant in this regard1,

…

recognizing

*g)* that currently some bands or parts thereof have been designated for existing public protection and disaster relief operations; [[2]](#footnote-3)3

…

noting

*c)* that public protection and disaster relief agencies and organizations have a set of requirements, including but not limited to interoperability, secure and reliable communications, sufficient capacity to respond to emergencies, priority access in the use of non-dedicated systems, fast response times, ability to handle multiple group calls and the ability to cover large areas as described in Report ITU‑R M.[PPDR];

## 1/1.3/6.2 For Method B: Modify Resolution 646 (Rev.WRC-12)

MOD

RESOLUTION 646 (REV.wrc--15)

Public protection and disaster relief

The World Radiocommunication Conference (Geneva, 2015),

considering

*a)* that the term “public protection radiocommunication” refers to radiocommunications used by responsible agencies and organizations dealing with maintenance of law and order, protection of life and property and emergency situations;

*b)* that the term “disaster relief radiocommunication” refers to radiocommunications used by agencies and organizations dealing with a serious disruption of the functioning of society, posing a significant widespread threat to human life, health, property or the environment, whether caused by accident, natural phenomena or human activity;

*c)* the growing telecommunication and radiocommunication needs of public protection agencies and organizations, including those dealing with emergency situations and disaster relief, that are vital to the maintenance of law and order, protection of life and property, disaster relief and emergency response;

*d)* that many administrations wish to promote interoperability and interworking between systems used for public protection and disaster relief (PPDR), both nationally and for cross-border operations in emergency situations and for disaster relief;

*e)* that legacy public protection and disaster relief systems are mostly narrow-band supporting voice and low data-rate applications or wideband with data rates below 1 Mbit/s, typically for systems with a channel bandwidth between f 25 to 100 kHz or less;

*f)* that, although narrow-band and wideband systems continue to be used for meeting PPDR requirements, many PPDR agencies have stated a need for broadband applications with data rates in the order of 1-100 Mbit/s for systems requiring larger channel bandwidths of 5 MHz and above based on International Mobile Telecommunications (IMT) technologies;

*g)* that some administrations have started using IMT technologies such as LTE and LTE-Advanced to meet the needs of their PPDR agencies for data and multimedia capabilities; and considering that Report ITU-R M.2291 provides details of the capabilities of IMT technologies for meeting broadband PPDR requirements;

*h)* that continuing development of new technologies and systems, such as International Mobile Telecommunications (IMT) and Intelligent Transportation Systems (ITS), may be able to support or supplement advanced public protection and disaster relief applications;

*i)* that disasters and emergency events require response not only from PPDR agencies but also from humanitarian agencies;

*j)* that some commercial terrestrial and satellite systems are complementing the dedicated systems in support of public protection and disaster relief;

*k)* that Resolution 36 (Rev. Guadalajara, 2010) of the Plenipotentiary Conference urges Member States to the Tampere Convention to take all practical steps for the application of the Tampere Convention and to work closely with the operational coordinator as provided for therein;

*l)* that Recommendation ITU-R M.1637 offers guidance to facilitate the global circulation of radiocommunication equipment in emergency and disaster relief situations;

*m)* that some administrations may have different operational needs and spectrum requirements for public protection and disaster relief applications depending on the circumstances;

*n)* that some administrations are of the view that additional spectrum needs to be identified to meet the growing needs of mobile broadband PPDR, including mobile multimedia applications;

*o)* that some administrations are of the view that common RF spectrum will enable efficient deployment and will ease coordination and harmonization between different PPDR agencies and will advance international aid during disasters and major events; and considering that, in addition to the benefits of scale production, regional harmonization will improve interoperability among first responders and will drive suitable devices and standards dedicated to broadband PPDR;

*p)* that the Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations (Tampere, 1998), an international treaty deposited with the United Nations Secretary-General and related United Nations General Assembly Resolutions
and Reports are also relevant in this regard[[3]](#footnote-5)1,

*recognizing*

*a)* the benefits of spectrum harmonization such as:

– increased potential for interoperability;

– a broader manufacturing base and increased volume of equipment resulting in economies of scale and expanded equipment availability;

– improved spectrum management and planning; and

– enhanced cross-border coordination and circulation of equipment;

*b)* that the organizational distinction between public protection activities and disaster relief activities are matters for administrations to determine at the national level;

*c)* that national spectrum planning for public protection and disaster relief needs to have regard to cooperation and bilateral consultation with other concerned administrations, which should be facilitated by greater levels of spectrum harmonization;

*d)* the benefits of cooperation between countries for the provision of effective and appropriate humanitarian assistance in case of disasters, particularly in view of the special operational requirements of such activities involving multinational response;

*e)* the needs of countries, particularly the developing countries[[4]](#footnote-6), for low-cost communication equipment;

*f)* that the adoption of IMT should be encouraged for broadband PPDR because of the spectral and other operating efficiencies that these technologies offer;

*g)* that currently some bands or parts thereof have been designated for existing public protection and disaster relief operations[[5]](#footnote-7);

*h)* that in times of disasters, if most terrestrial-based networks are destroyed or impaired, amateur, satellite and other non-ground-based networks may be available to provide communication services to assist in public protection and disaster relief efforts;

*i)* that the amount of spectrum needed for public protection on a daily basis can differ significantly between countries, that certain amounts of spectrum are already in use in various countries for narrow-band applications, and that in response to a disaster, access to additional spectrum on a temporary basis may be required;

*j)* that some administrations are of the view that studies carried out by various user agencies in different countries indicate broadband PPDR spectrum bandwidth requirements vary to a significant extent between countries, regardless of whether the PPDR network is owned/operated by a government PPDR agency, commercial entity or a hybrid commercial/government solution, and considering that these studies indicate a need for a spectrum bandwidth of 20 MHz (e.g.10+10 MHz) or more in some countries for broadband PPDR; and considering that some other administrations may have differing bandwidth requirements;

*k)* that certain amounts of spectrum are already in use in various countries for narrow-band applications, and that in response to a disaster, access to additional spectrum on a temporary basis may be required for narrow-band PPDR operations;

*l)* that in order to achieve spectrum harmonization, an approach based on regional frequency ranges[[6]](#footnote-8) may enable administrations to benefit from harmonization while continuing to meet national planning requirements;

*m)* that not all frequencies within an identified common frequency range will be available within each country;

*n)* that the identification of a common frequency range within which equipment couldoperate may ease the interoperability and/or inter-working, with mutual cooperation and consultation, especially in national, regional and cross-border emergency situations and disaster relief activities;

*o)* that when a disaster occurs, the public protection and disaster relief agencies are usually the first on the scene using their day-to-day communication systems, but that in most cases other agencies and organizations may also be involved in disaster relief operations;

*p)* that some countries in Region 1 have identified certain parts of the frequency range 694 to 790 MHz for broadband PPDR deployments,

*noting*

*a)* that many administrations currently use frequency bands below 1 GHz for narrow-band public protection and disaster relief applications;

*b)* that applications requiring large coverage areas and providing good signal availability would generally be accommodated in lower frequency bands and that applications requiring wider bandwidths would generally be accommodated in progressively higher bands;

*c)* that, in lower frequency bands, e.g. below 300 MHz, it would be efficient to use the bands which are available by transition of terrestrial television broadcasting from analogue to digital;

*d)* that public protection and disaster relief agencies and organizations have a set of requirements, including but not limited to interoperability, secure and reliable communications, sufficient capacity to respond to emergencies, priority access in the use of non-dedicated systems, fast response times, ability to handle multiple group calls and the ability to cover large areas as described in Report ITU-R M.2033[[7]](#footnote-9)\*, Report ITU-R M.2291 and Report ITU-R M.[PPDR];

*e)* that many administrations have made significant investments in public protection
and disaster relief systems;

*f)* that flexibility must be afforded to disaster relief agencies and organizations to use current and future radiocommunications, so as to facilitate their humanitarian operations;

*g)* that broadband PPDR services can be realized and deployed in the frequency bands identified for IMT,

*emphasizing*

*a)* that the frequency bands identified in this Resolution are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations and are currently used intensively by the fixed, mobile, mobile satellite and broadcasting services;

*b)* that some administrations are of theviewthat only some of the frequency bands identified in this Resolution are suitable for broadband PPDR;

*c)* that flexibility must be afforded to administrations:

– to determine, at national level, how much spectrum to make available for public protection and disaster relief from the bands identified in this Resolution in order to meet their particular national requirements;

– to have the ability for bands identified in this Resolution to be used by all services having allocations within those bands according to the provisions of the Radio Regulations, taking into account the existing applications and their evolution;

– to determine the need and timing of availability as well as the conditions of usage of the bands identified in this Resolution for public protection and disaster relief in order to meet specific national situations,

*resolves*

1 to strongly recommend administrations to use regionally harmonized bands for public protection and disaster relief 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;

Option 1

2 to encourage administrations, for the purposes of achieving regionally harmonized frequency bands/ranges for advanced public protection and disaster relief solutions, to consider the following identified frequency bands/ranges or parts thereof when undertaking their national planning:

– in Region 1: 380-470 MHz as the frequency range within which the band 380-385/
390-395 MHz is a preferred core harmonized band for permanent public protection activities within certain countries of Region 1 which have given their agreement

 The frequency range 694-790 MHz is a preferred harmonized range for broadband public protection and disaster relief solutions in some countries in Region 1.

– in Region 2[[8]](#footnote-10): 746-806 MHz, 806-869 MHz, 4 940-4 990 MHz;

 in Region 3[[9]](#footnote-11): 406.1-430 MHz, 440-470 MHz, 806-824/851-869 MHz, 4 940‑4 990 MHz and 5 850-5 925 MHz;

Note: Some administrations are of the view that administration-specific frequency bands/ranges for public protection and disaster relief (PPDR) solutions should not be included in the “*resolves* 2” of Resolution **646 (Rev.WRC-12)** since the frequency bands/ranges in Resolution **646 (Rev.WRC-12)** were identified for the purpose of achieving “regionally harmonized” frequency bands/ranges for PPDR.  Instead, these should be moved to “*recognizing g)*” footnote 3.

Option 2

2 to encourage administrations, for the purposes of achieving regionally harmonized frequency bands/ranges for advanced public protection and disaster relief solutions, to consider the following identified frequency bands/ranges or parts thereof when undertaking their national planning:

– 2.1 in Region 1:

i) 380-470 MHz as the frequency range within which the band 380-385/ 390-395 MHz is a preferred core harmonized band for permanent public protection activities within certain countries of Region 1 which have given their agreement;

ii) the band 698-713 MHz/753-768 MHz within the frequency range 694-790 MHz and the band 791-801 / 832-842 MHz within the frequency range 790-862 MHz are the preferred bands for broadband PPDR within certain countries of Region 1 which have given their agreement;

– 2.2 in Region 25:

i) 746-806 MHz, 806-869 MHz, 4 940-4 990 MHz;

– 2.3 in Region 36:

i) 406.1-430 MHz, 440-470 MHz, 806-824/851-869 MHz, 4 940‑4 990 MHz and
5 850-5 925 MHz;

3 that the identification of the above frequency bands/ranges for public protection and disaster relief does not preclude the use of these bands/frequencies by any application within
the services to which these bands/frequencies are allocated and does not preclude the use of nor establish priority over any other frequencies for public protection and disaster relief in accordance with the Radio Regulations;

4 to encourage administrations, in emergency and disaster relief situations, to satisfy temporary needs for frequencies in addition to what may be normally provided for in agreements with the concerned administrations;

5 that administrations encourage public protection and disaster relief agencies and organizations to utilize both existing and new technologies, systems and solutions (satellite and terrestrial), to the extent practicable, to satisfy interoperability requirements and to further the goals of public protection and disaster relief;

6 that administrations encourage agencies and organizations to use broadband PPDR radiocommunications systems/applications taking into account *considering h)* and *j)* for providing complementary support to public protection and disaster relief;

7 to encourage administrations to facilitate cross-border circulation of radiocommunication equipment intended for use in emergency and disaster relief situations through mutual cooperation and consultation without hindering national legislation;

8 that administrations encourage public protection and disaster relief agencies and organizations to utilize relevant ITU-R Recommendations in planning spectrum use and implementing technology and systems supporting public protection and disaster relief;

9 to encourage administrations to continue to work closely with their public protection and disaster relief community to further refine the operational requirements for public protection and disaster relief activities;

10 that manufacturers should be encouraged to take this Resolution into account in future equipment designs, including the need for administrations to operate within different parts of the identified bands,

*invites ITU-R*

1 to continue its technical studies and to make recommendations concerning technical and operational implementation, as necessary, to meet the needs of public protection and disaster relief radiocommunication applications, taking into account the capabilities, evolution and any resulting transition requirements of the existing systems, particularly those of many developing countries, for national and international operations.

## 1/1.3/6.3 Method C: Modify Resolution 646 (Rev.WRC-12), excluding PPDR frequencies through non-mandatory reference to Recommendation ITU-R M.2015

RESOLUTION 646 (rev.WRC‑15)

Public protection and disaster relief

The World Radiocommunication Conference (Geneva, 2015),

considering

*a)* that Report ITU-R M.[PPDR] provides comprehensive details of systems and applications supporting public protection and disaster relief (PPDR) operations in narrow-, wide- and broadband use, including but not limited to

– requirements and demands

– spectrum needs

– terms and definitions

– promotion of interoperability and interworking

– evolution therof, especially on broadband solutions

– needs of developing countries

*b)* that Report ITU-R M.2291 provides details of the capabilities of International Mobile Telecommunications (IMT) technologies to meet requirements of systems and applications supporting broadband PPDR operations;

*c)* that the term “public protection radiocommunication” refers to radiocommunications used by responsible agencies and organizations dealing with maintenance of law and order, protection of life and property and emergency situations;

*d)* that the term “disaster relief radiocommunication” refers to radiocommunications used by agencies and organizations dealing with a serious disruption of the functioning of society, posing a significant widespread threat to human life, health, property or the environment, whether caused by accident, natural phenomena or human activity, and whether developing suddenly or as a result of complex, long-term processes;

*e)* the growing telecommunication and radiocommunication needs of public protection agencies and organizations, including those dealing with emergency situations and disaster relief, that are vital to the maintenance of law and order, protection of life and property, disaster relief and emergency response;

*f)* that current public protection and disaster relief systems are mostly narrow-band supporting voice and low data-rate applications;

*g)* that new technologies for wideband and broadband public protection and disaster relief applications are being developed in various standards organizations, e.g. IMT technologies supporting higher data rates and higher capacity in comparison to traditional PPDR networks;

*h)* that continuing development of new technologies such as International Mobile Telecommunications (IMT) and Intelligent Transportation Systems (ITS) may be able to further support or supplement advanced public protection and disaster relief applications;

*i)* that some commercial terrestrial and satellite systems are complementing the dedicated systems in support of public protection and disaster relief, that the use of commercial solutions will be in response to technology development and market demands and that this may affect the spectrum required for those applications and for commercial networks;

*j)* that Resolution 36 (Rev. Guadalajara, 2010) of the Plenipotentiary Conference urges Member States Parties to the Tampere Convention to take all practical steps for the application of the Tampere Convention and to work closely with the operational coordinator as provided for therein;

*k)* that Recommendation ITU‑R M.1637 offers guidance to facilitate the global circulation of radiocommunication equipment in emergency and disaster relief situations;*l)* that some administrations may have different operational needs and spectrum requirements for public protection and disaster relief applications depending on the circumstances;

*m)* that the Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations (Tampere, 1998), an international treaty deposited with the United Nations Secretary-General and related United Nations General Assembly Resolutions and Reports are also relevant in this regard,

recognizing

*a)* the benefits of spectrum harmonization such as:

– increased potential for interoperability;

– a broader manufacturing base and increased volume of equipment resulting in economies of scale and expanded equipment availability;

– improved spectrum management and planning; and

– enhanced cross-border coordination and circulation of equipment;

*b)* that the organizational distinction between public protection activities and disaster relief activities are matters for administrations to determine at the national level;

*c)* that national spectrum planning for public protection and disaster relief needs to have regard to cooperation and bilateral consultation with other concerned administrations, which should be facilitated by greater levels of spectrum harmonization;

*d)* the benefits of cooperation between countries for the provision of effective and appropriate humanitarian assistance in case of disasters, particularly in view of the special operational requirements of such activities involving multinational response;

*e)* the needs of countries, particularly the developing countries, for cost-efficient communication equipment;

*f)* that the adoption of IMT technologies for broadband PPDR should be encouraged because of the advantages and efficiencies that the standardisation of these technologies offer;

*g)* that the most recent version of Recommendation ITU-R M.2015 contains regionally harmonized frequency bands for public protection and disaster relief;

*h)* that in order to achieve spectrum harmonization, a solution based on regional frequency ranges[[10]](#footnote-15)1 may enable administrations to benefit from harmonization while continuing to meet national planning requirements; *i)* that in times of disasters, if most terrestrial-based networks are destroyed or impaired, amateur, satellite and other non‑ground-based networks may be available to provide communication services to assist in public protection and disaster relief efforts;

*j)* that the amount of spectrum needed for public protection on a daily basis differs significantly between countries, that certain amounts of spectrum are already in use in various countries, and that in response to a disaster, access to additional spectrum on a temporary basis may be required;*k)* that the identification of a common frequency range within which equipment could operate may ease the interoperability and/or inter-working, with mutual cooperation and consultation, especially in national, regional and cross-border emergency situations and disaster relief activities;

*l)* that not all frequencies within an identified common frequency range will be available within each country,

noting

*a)* that many administrations are currently using frequency bands below 1 GHz for narrow-band systems and applications supporting PPDR and may decide to use the same range for future PPDR systems;

*b)* that public protection and disaster relief agencies and organizations have an initial set of requirements, including but not limited to interoperability, secure and reliable communications, sufficient capacity to respond to emergencies, priority access in the use of non-dedicated systems, fast response times, ability to handle multiple group calls and the ability to cover large areas as described in Report ITU‑R M.[PPDR];

*c)* that, while harmonization may be one method of realizing the desired benefits, in some countries, the use of multiple frequency bands can contribute to meeting the communication needs in disaster situations;

*d)* that many administrations have made significant investments in public protection and disaster relief systems;

*e)* that flexibility must be afforded to disaster relief agencies and organizations to use current and future radiocommunications, so as to facilitate their humanitarian operations;

*f)* that IMT technologies offer a high degree of flexibility for supporting broadband PPDR applications, and there are a number of different approaches for using IMT technologies to meet the broadband communications needs of PPDR agencies, which are outlined in Report ITU-R M.2291,

emphasizing

*a)* that the frequency bands identified in the most recent version of Recommendation ITU-R M.2015 are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations and are currently used intensively by several different services;

*b)* that flexibility must be afforded to administrations to determine:

– at national level, the amount of spectrum to be used;

– the need and timing of availability as well as the conditions of usage of the bands identified in the most recent version of Recommendation ITU-R M.2015 for PPDR in order to meet specific regional or national situations;

*c)* that not all of the frequency bands listed in the most recent version of Recommendation ITU-R M.2015 may be suitable for every type of PPDR operation (narrowband, wideband or broadband),

resolves

1 to strongly recommend administrations to use regionally harmonized bands for public protection and disaster relief 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;

2 to encourage administrations, for the purposes of achieving regionally harmonized frequency bands/ranges for advanced public protection and disaster relief solutions, to consider the frequency bands/ranges or parts thereof when undertaking their national planning as listed in the most recent version of Recommendation ITU-R M.2015;

3 that the identification of the frequency bands/ranges for PPDR, as listed in the most recent version of Recommendation ITU-R M.2015, does not preclude the use of these bands/frequencies by any application within the services to which these bands/frequencies are allocated and does not preclude the use of nor establish priority over any other frequencies for PPDR in accordance with the Radio Regulations;

4 to encourage administrations, in emergency and disaster relief situations, to satisfy temporary needs for frequencies in addition to what may be normally provided for in agreements with the concerned administrations;

5 that administrations encourage PPDR agencies and organizations to utilize both existing and new technologies/solutions, to the extent practicable, to satisfy interoperability requirements and to further the goals of public protection and disaster relief;

6 to encourage administrations to facilitate cross-border circulation of radiocommu­nication equipment intended for use in emergency and disaster relief situations through mutual cooperation and consultation without hindering national legislation;

7 that administrations encourage public protection and disaster relief agencies and organizations to utilize relevant ITU‑R Recommendations and Reports in planning spectrum use and implementing technology and systems supporting public protection and disaster relief;

8 to encourage administrations to continue to work closely with their public protection and disaster relief community to further refine the operational requirements for public protection and disaster relief activities;

9 that manufacturers should be encouraged to take this Resolution and related ITU-R Recommendations and Reports into account in future equipment designs, including the need for administrations to operate within different parts of the identified bands in the most recent version of Recommendation ITU-R M.2015,

invites ITU‑R

1 to continue its studies and to make recommendations concerning technical and operational implementation, as necessary, for advanced solutions to meet the needs of public protection and disaster relief radiocommunication applications, taking into account the capabilities, evolution and any resulting transition requirements of the existing systems, particularly those of many developing countries, for national and international operations;

2 to conduct further appropriate technical studies in support of possible additional identification of other frequency bands/ranges, especially in order to meet the radiocommunication needs of public protection and disaster relief agencies.

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1. Depending on the results of Report ITU-R M.[PPDR], Report ITU-R M.2033 will be suppressed and would no longer be referenced in this section. [↑](#footnote-ref-1)
2. 1 A platform for coordination and to foster harmonized global Telecommunication for Disaster Relief (TDR) standards is the TDR Partnership Coordination Panel, which has been established under the coordination of ITU with participation of international telecommunication service providers, related government departments, standards development organizations, and disaster relief organizations.3 3-30, 68-88, 138-144, 148-174, 380-400 MHz (including CEPT designation of 380-385/
390-395 MHz), 400-430, 440-470, 764-776, 794-806 and 806-869 MHz (including CITEL designation of 821-824/866-869 MHz). [↑](#footnote-ref-3)
3. 1 The Working Group on Emergency Telecommunications (WGET), convened by the United Nations Office for Humanitarian Affairs (OCHA), is an open forum to facilitate the use of telecommunications in the service of humanitarian assistance comprising United Nations entities, major non-governmental organizations, the International Committee of the Red Cross (ICRC),
ITU and experts from the private sector and Academia. [↑](#footnote-ref-5)
4. Taking into account, for example, the ITU-D Handbook on disaster relief. [↑](#footnote-ref-6)
5. 3-30, 68-88, 138-144, 148-174, 380-400 MHz (including CEPT designation of 380-385/
390-395 MHz), 400-430, 440-470, 764-776, 794-806 and 806-869 MHz (including CITEL designation of 821-824/866-869 MHz), 791-801/832-842 MHz (Qatar), and 806-824/851-869 MHz (Israel). [↑](#footnote-ref-7)
6. In the context of this Resolution, the term “frequency range” means a range of frequencies over which a radio equipment is envisaged to be capable of operating but limited to specific frequency band(s) according to national conditions and requirements. [↑](#footnote-ref-8)
7. \* Depending on the results of Report ITU-R M.[PPDR], Report ITU-R M.2033 will be suppressed and would no longer be referenced in this noting. [↑](#footnote-ref-9)
8. Venezuela has identified the band 380-400 MHz for public protection and disaster relief applications. [↑](#footnote-ref-10)
9. [↑](#footnote-ref-11)
10. Some countries in Region 3 have also identified the bands 174-205 MHz, 380-400 MHz and 698-806 MHz for public protection and disaster relief applications. Some administrations have concerns with changing the 746-806 MHz band to 698-806 MHz.1 In the context of this Resolution, the term “frequency range” means a range of frequencies over which a radio equipment is envisaged to be capable of operating but limited to specific frequency band(s) according to national conditions and requirements. When different national PPDR networks use a common technical standard, the frequency range includes the possibility of using any number of bands that the technology can use. [↑](#footnote-ref-15)