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| **Recommendation ITU-R SM.2104-0**  **(08/2017)** |
| **Guidelines for narrow-band wireless home networking transceivers  Specification of spectrum related components** |
| **SM Series**  **Spectrum management** |

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 Annex 1 of 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.

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| 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 |

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| ***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 SM.2104-0

Guidelines for narrow-band wireless home networking transceivers   
Specification of spectrum related components

(2017)

Scope

This Recommendation provides guidelines pertaining to spectrum usage of Narrow-Band Wireless Home Networking (NWHN) transceivers complying with Recommendation ITU-T G.9959 which contains the system architecture, physical (PHY) layer and medium access control (MAC) layer specifications for Recommendation ITU-T G.9959 compliant transceivers.

Keywords

Short range devices, narrow-band wireless home networking

Abbreviations (see also Annex 1)

SRD: short range device

NWHN: narrow-band wireless home networking

MAC layer: medium access control layer

PHY layer: PHYsical layer

The ITU Radiocommunication Assembly,

considering

*a)* that allocation of frequency bands to the radio services or designation to the radiocommunication systems of the frequencies falls into the responsibility of ITU-R;

*b)* that ITU-R has not yet considered suitable frequencies to be designated and used by NWHN transceivers;

*c)* that Recommendation ITU-T G.9959 – Short range narrowband digital radiocommunication transceivers – PHY & MAC layer specifications, was published by ITU-T in 2012;

*d)* that Recommendation ITU-T G.9959 does not list frequencies where G.9959 devices should operate;

*e)* thatITU-T Study Group 15 has developed a proposal for a draft Recommendation ITU‑R G.WNB-FREQ to cover the frequency usage issues related to NWHN transceivers and has sent this draft recommendation to ITU-R,

*recommends*

**1** that the guidelines provided in Annex 1 to this Recommendation may be considered for the use of spectrum by Narrow-Band Wireless Home Networking (NWHN) transceivers operating in line with Recommendation ITU-T G.9959.

Annex 1

# 1 References

The following ITU Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Guidelines document. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T and ITU-R Recommendations is regularly published.

[1] Recommendation ITU-T G.9959 – Short range narrowband digital radiocommunication transceivers – PHY & MAC layer specifications

[2] Recommendation ITU-R SM.1896 – Frequency ranges for global or regional harmonization of short-range devices (SRDs)  
This Recommendation, which is subject to regular updates, could be considered as a possible home for the frequencies to be used and regionally or globally harmonised for NWHN.

[3] Report ITU-R SM.2153 – Technical and operating parameters and spectrum use for short-range radiocommunication devices   
This Report is a kind of database for frequencies used for SRDs in many countries, and it can also be considered for presenting any frequency used by NWHN.

# 2 Definitions

This Recommendation uses the following definitions:

Channel:A transmission path between nodes. One channel is considered to be one transmission path. Logically a channel is an instance of the communications medium used for the purpose of passing data between two or more nodes.

Node: Any network device that contains a G.9959 transceiver. In the context of this Recommendation, use of the term ‘node’ without a qualifier means ‘G.9959 node’.

# 3 Abbreviations

This Recommendation uses the following abbreviations:

AL Always Listening

FL Frequently Listening

ISM Industrial, Scientific and Medical

MAC medium access control

PHY physical

R1 Type 1 of supported data rate, i.e. 9.6 kbit/s

R2 Type 2 of supported data rate, i.e. 40 kbit/s

R3 Type 3 of supported data rate, i.e. 100 kbit/s

RF Radio Frequency

# 4 Frequencies and bandwidths

Recommendation ITU-T G.9959 defines the PHY and MAC layer specifications for short range narrowband digital radiocommunication transceivers, however it does not list frequencies where G.9959 devices operate.

Recommendation ITU-R SM.1896 [2] and Report ITU-R SM.2153 [3] provide the bands at which the short range devices operate on a regional or global basis. Some of these frequencies may be considered for the NWHN devices.

A compliant G.9959 node can also operate in the license exempt, un-protected RF bands such as the frequencies designated in the Radio Regulations for ISM applications. The possible regional and national frequency designations and bandwidth requirements are described in Table 1 below. A G.9959 transceiver supports 1, 2 or 3 channels (each channel is associated with a centre frequency) depending on the availability of channels in the specific region or country. Table 1 is related to the Tables 7-1 and A.1 of Recommendation ITU-T G.9959.

Table 1 is also consistent with tables given in references [2] and [3]. Specific references are provided in the Table.

TABLE 1

Centre frequency and bandwidth requirements in different geographical areas

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Geographical area | Centre frequency | | Data rate | Channel width | Regulatory reference |
| G.9959 | MHz | G.9959 | kHz |
| Australia, New Zealand  See Annex 2/[2] See Table 11/[3] | fANZ1 | 919.80 | R3 | 400 | AS/NZS 4268 |
| fANZ2 | 921.40 | R2 | 300 |
| R1 | 300 |
| Brazil  See Annex 2/[2] See Table 11/[3] | fANZ1 | 919.80 | R3 | 400 | ANATEL Resolution 506 |
| fANZ2 | 921.40 | R2 | 300 |
| R1 | 300 |
| El Salvador, Paraguay, Peru, Uruguay  See Annex 2/[2] See Table 11/[3] | fANZ1 | 919.80 | R3 | 400 |  |
| fANZ2 | 921.40 | R2 | 300 |
| R1 | 300 |
| China  See Annex 2/[2] See Row 14, Appendix 9, Annex 2/[3] | fCN1 | 868.30 | R3 | 400 |  |
| R2 | 300 |
| R1 | 300 |
| Armenia, Egypt, European Union, French Guiana (French Department of), Indonesia, Kazakhstan, Lebanon, Libya, Mauritius, Nigeria, Qatar, Saudi Arabia, UAE, Yemen  See Annex 2/[2] See Table 11/[3] | fEU1 | 869.85 | R3 | 400 | ETSI EN 300 220 |
| fEU2 | 868.40 | R2 | 300 |
| R1 | 300 |
| Jordan  See Annex 2/[2] See Table 11/[3] | fEU1 | 869.85 | R3 | 400 | ETSI EN 300 220  Note: Approval certificate expires on May 11, 2017. |
| fEU2 | 868.40 | R2 | 300 |
| R1 | 300 |
| Singapore  See Annex 2/[2] See Table 11/[3] | fEU1 | 869.85 | R3 | 400 | ETSI EN 300 220, TS SRD |
| fEU2 | 868.40 | R2 | 300 |
| R1 | 300 |

TABLE 1 (*end*)

Centre frequency and bandwidth requirements in different geographical areas

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Geographical area | Centre frequency | | Data rate | Channel width | Regulatory reference |
| G.9959 | MHz | G.9959 | kHz |
| South Africa  See Annex 2/[2] See Table 11/[3] | fEU1 | 869.85 | R3 | 400 | ETSI EN 300 220, ICASA |
| fEU2 | 868.40 | R2 | 300 |
| R1 | 300 |
| Hong Kong (China)  See Annex 2/[2] See Appendix 9, Annex 2/[3] | fHK1 | 919.80 | R3 | 400 | HKTA 1035 |
| R2 | 300 |
| R1 | 300 |
| India  See Annex 2/[2] See Table 11/[3] | fIN1 | 865.20 | R3 | 400 | CSR 564 (E) |
| R2 | 300 |
| R1 | 300 |
| Israel  See Annex 2/[2] See Table 11/[3] | fIL1 | 916.00 | R3 | 400 |  |
| R2 | 300 |
| R1 | 300 |
| Costa Rica  See Annex 2/[2] See Table 11/[3] | fJP1 | 922.50 | R3 | 400 |  |
| fJP2 | 923.90 | R3 | 400 |
| fJP3 | 926.30 | R3 | 400 |
| Japan  See Annex 2/[2] See Table 11/[3] | fJP1 | 922.50 | R3 | 400 | ARIB T96, ARIB STD-T108 |
| fJP2 | 923.90 | R3 | 400 |
| fJP3 | 926.30 | R3 | 400 |
| Korea (Republic of)  See Annex 2/[2] See Row 15 Table 19/[3] | fKR1 | 920.90 | R3 | 400 | Clause 2, Article 58-2  of Radio Waves Act |
| fKR2 | 921.70 | R3 | 400 |
| fKR3 | 923.10 | R3 | 400 |
| Malaysia  See Annex 2/[2] See Row 14, Appendix 9, Annex 2/[3] | fMY1 | 868.10 | R3 | 400 | ETSI EN 300 220, SKMM WTS SRD |
| R2 | 300 |
| R1 | 300 |
| Russian Federation  See Annex 2/[2] See Table 33/[3] | fRU1 | 869.00 | R3 | 400 | ETSI EN 300 220, GKRCh |
| R2 | 300 |
| R1 | 300 |
| Argentina, Bahamas, Barbados, Bermuda, Bolivia, British Virgin Islands, Canada, Cayman Islands, Chile, Colombia, Ecuador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Kitts & Nevis, Suriname, Trinidad & Tobago, Turks & Caicos Islands, USA  See Annex 2/[2] See Table 11/[3] | fUS1 | 916.00 | R3 | 400 | FCC CFR47 Part 15.249 |
| fUS2 | 908.40 | R2 | 300 |
| R1 | 300 |

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