Pursuant to Article 39, Paragraph 1 and Article 32, Paragraph 3, in conjunction with Article 31 and Article 37, Paragraph 1, Items a) and c) of the Law on Communications BiH (“Official Gazette of BiH”, No. 31/03, 75/06, 32/10 and 98/12) and Rule 86/2018 Plan of Allocation and Utilization of the Radiofrequency Spectrum in Bosnia and Herzegovina (“Official Gazette BiH”, No.46/2018) the Council of the Communications Regulatory Agency at its 41st session held on 20th March 2019 adopted the following:

**Rule 91/2019**

on the use of radiofrequency bands for point-to-point links in the fixed service in Bosnia and Herzegovina

PART ONE – INTRODUCTORY REMARKS

**Article 1**

**(Subject)**

This Rule prescribes the radiofrequency bands for point-to-point links in the fixed service in Bosnia and Herzegovina and technical requirements for their utilisation.

**Article 2**

**(Terms and definitions)**

For the purpose of this Rule, the terms and abbreviations used have the following meaning:

1. **Portable „backbone“ link:** High capacity link that connects two points of the transmission network;
2. **Infrastructure link:** Small, medium or high capacity link in the infrastructure networks (transmitting network between base stations in mobile networks, base stations in broadband wireless access network, etc.).
3. **Access link:** Link from the user terminal or server to the access point of the operator’s network;
4. **Connection quality:** A set of parameters defining faults at the transport network level, the degree of degradation, i.e. the number of incorrectly transferred bits in time;
5. **Availability of connection:** It refers to the concept of availability ratio, i.e. part of the time in which the connection is available during the observed period;
6. **HDFS** (High Density Fixed Service): High density fixed service;
7. **XPIC** (Cross Polarization Interference Canceller): Functionality that allows the transmission of vertically and horizontally polarised waves on the same frequency channel;
8. **ATPC** (Automatic Transmit Power Control): Automatic control of power transmitted;
9. **XPD** (Cross Polarization Discrimination): The ratio of energy received with the desired transfer polarisation relative to the one received with orthogonal polarisation;
10. **FDD** (Frequency Division Duplex mode): Frequency Division Duplex mode;
11. **TDD** (Time Division Duplex mode): Time Division Duplex mode;
12. **PMSE** (Programme Making and Special Events): Programme Making and Special Events.

**PART TWO – RADIOFREQUENCY BANDS FOR POINT-TO-POINT LINKS IN THE FIXED SERVICE**

**Article 3**

**(Bands, reference channel arrangement and typical transmission capacities)**

1. Radiofrequency bands for point-to-point links in the fixed service are set out in Table 1 annexed to this Rule forming its composite part.
2. Certain bands from Table 1 of the Annex are shared with other services, including the fixed satellite service, as stipulated in the Plan of Allocation and Utilization.
3. The utilisation of point-to-point links in bands 24.5-26.5 GHz and 27.5-29.5 GHz shall be licenced outside blocks allocated for access systems prescribed by the rules on the utilization of radiofrequency bands 24.5-26.5 and 27.5-29.5 GHz
4. The use of high capacity systems with dual polarisation can be considered in cases when this is permitted by the features of the devices used (availability of XPIC functionality with the preferred ATPC functionality) with the use of dual polarised ultra high-performance antennae with a very high XPD.
5. In the multi-use conditions of the same route with mixed devices with and without XPIC functionality, alternating single polarisation shall be used on adjacent channels.
6. The conjuction of adjacent channels with a maximum width defined in Table 1 of the Annex shall be carried out in line with the instructions from the reference recommendation on the central frequency of the cahnnel derivative from adjacent channels and may be used only according to the licence issued by the Communications Regulatory Agency (hereinafter: RAK).

**Article 4**

**(PMSE links)**

1. In individual cases for the purpose of service in radio and TV broadcasting and programme making (PMSE applications) other bands outside the ranges listed in Table 1 of the Annex can be allocated to temporary and portable audio-video links in line with the Plan of Allocation and Utilization and CEPT documents ERC/REC 25-10, ECC REP 204, ECC REP 002, ERC REP 038, ERC REP 042
2. In line with the provisions of the ERC/REC 25-10 Recommendation, temporary video links that are asigned frequencies from the bands intended for fixed services according to Table 1 of the Annex use the same channel arrangement as the classic fixed links.
3. Fixed analogue and digital links for the programme transmission of radio and TV broadcasting stations do not pertain to the category of PMSE links and are used within the bands from Table 1 of the Annex.

**PART THREE –REQUIREMENTS FOR THE USE OF RADIO EQUIPMENT AND ANTENNAE**

**Article 5**

**(Basic requirements)**

1. Radio equipment should meet the basic requirements from Article 34 of the Law on Communications and essential requirements set out in the relevant part of the ETSI Standard EN 302 217 series.
2. The clarifications of equipment and antennae parameters identified as relevant in terms of the essential requirements are provided in ETSI standards TR 101 506, TR 101 036 and EG 201 399

**Article 6**

**(Technical requirements for equipment and antennae use)**

1. Special limitations of use according to CEPT and ITU Regulations and the relevant reference standards are set out in Table 2 of the Annex.
2. Apart from the minimum antennae requirements from Table 2 of the Annex, the use of Class 2 antennae is permitted in geographic areas with lesser number of radio spectrum assignments as well as in access and low capacity links; in cases of interference to other systems, such user shall be requested to adjust his antennae system.

**Article 7**

**(Maximum power limit)**

1. In bands for which CEPT documents and ETSI standards do not prescribe limitations for maximum power and/or EIRP, the limitations defined in the provisions of Radio Regulations shall apply for specific cases of joint resources between fixed and other services, as specified in table 2 of the Annex.
2. RAK licence for fixed station in a point-to-point microwave link prescribes the maximum permitted transmitter power.
3. Data on the typical maximum transmitter power (at the RF filter output, branching) provided in Table 2 of the Annex are informational data on the real equipment in the market according to the ETSI TR102243 Standard without being strictly limiting.

**Article 8**

**(Connection availability and quality)**

1. Connection (system) quality and availability norms are defined in ITU Recommendations ITU-T G.826, ITU-T G.827, ITU-T G.828, ITU-T G.829, ITU-R F.1668, ITU-R F.1703 and ITU-R F.2113 depending on the type of connection (link in the international part of network or access, short and long link inside a national part) and quality class (standard or high).
2. The minimum availability permitted in the designing and dimensioning of the system:
3. For connections in bands below 3 GHz: 99.95%,
4. For connections in bands above 3 GHz (backbone and infrastructure links): 99.98%,
5. For connections in bands above 3 GHz (access link): 99.95%.
6. Propagation effects on the connection quality and availability are predicted using parameters and prediction methods from the Recommendation ITU-R P.530, unavailability caused by rain according to the Recommendations ITU-R P.838, ITU-R P.837, ITU-R P.841 and unavailability due to multipath fading in line with ITU-R P.453.

**Article 9**

**(Application unharmonized with reference recommendation)**

The process of harmonising the currently unharmonized, actively exploited links with the defined reference recommendation, RAK shall be implementing gradually, in line with the principles of efficient utilisation of the radiofrequency spectrum.

**Article 10.**

**(Declaration of conformity and marking of equipment)**

1. For any new model of equipment imported to the BiH market, the Applicant must submit a statement from the manufacturer on the conformity with the harmonised standards of series EN 302 217 for the European Union Area (EC Declaration of Conformity).
2. Equipment shall be marked with a CE label in line with Article 35, Paragraph 1 of the Law on Communications.

**PART FOUR – ASIGNMENT OF RADIOFREQUENCY CHANNELS AND SUBMISSION OF APPLICATION**

**Article 11.**

**(Allocation method)**

1. Radiofrequency channel asignment for point-to-point links is carried out by licensing links per individual routes in order of arrival of incoming application, and the right of use is awarded via a Licence for Fixed Station in Point-to-Point Microwave Link, in line with the Rule on Licenses in Radiocommunications.
2. The allocation of channels for TDD systems is considered after the submitted request, based on the availability of the spectrum.

**Article 12**

**(Migration of links from bands with modified allocation)**

1. Migration of links from bands that are not allocated to point-to-point fixed systems, according to the CEPT and ITU regulations on the specific allocation of certain frequency bands, agreements and adopted utilization plans in BiH, shall include the existing links:
2. Uni-directional analogue links for programming feed of radio and TV transmitters in UHF band up to 400 MHz (harmonized NATO band) in accordance with RAK-EUFOR agreement on the normalisation of radio spectrum resource coordination in BiH (2002);
3. Links in bands in the 3400-3600 MHz and 3600-3800 MHz bands outside of blocks assigned by the RAK Mobile / Fixed Communications Network (MFCN) License in accordance with the Rule on the utilisation of 3400-3600 MHz and 3600-3800 MHz bands for the MFCN
4. Links in bands 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz in line with the Rule on the utilisation of bands for IMT-2000/UMTS systems;
5. Links in bands 1980-2010 MHz and 2170-2200 MHz in line with the Resolution 716 (WRC-95) on the non-allocation of fixed services in these bands.
6. The migration of point-to-point links from paragraph (1) of this Article shall be conducted in accordance with the time limits specified in the utilization plans for bands with the modified allocation or to the specific RAK decisions.
7. The migration of point-to-point links from Paragraph (1), Item b) of this Article shall not apply to links within the band 3600-3800 MHz that are used by the governmental security agencies in BiH. This shall be used in line with the agreements signed with RAK.
8. Applications for licenses in bands that are not specified in Table 1 of the Annex, shall not be taken into consideration.

**Article 13**

**(Applying and fees)**

1. The Rule on Applying for Licence in Radiocommunications sets out the method for submitting an applcation for the issuance of licence for point-to-point microwave link fixed station, as well as the content of the necessary documents.
2. Prior consultation with RAK on the possibility of using a specific band on the requested route is strongly advised to applicants before submition of an application.
3. Fees for licensing and usage of the radiofrequency spectrum are detailed in the Rule on License Fees and the Decision of the Council of Ministers BiH on the Usage Fee for Radiofrequency Spectrum.

**PART FIVE – FINAL PROVISIONS**

**Article 14**

**(Amendments)**

This Rule may be amended in cases when this is provided by the Law on Communications in line with the competencies of RAK to ensure efficient usage and govern of the radiofrequency resources, in line with regulations relating radiocommunications and international agreements signed by Bosnia and Herzegovina.

**Article 15**

**(Harmonisation of the Rule with the Acquis Communautaire of the European Union and international regulations)**

(1) The provisions of this Rule are partially harmonised with the Acquis Communautaire of the European Union and international recommendations:

1. CEPT decisions
2. ERC/DEC/(00)07 – ERC Decision from 4 March 2016 on the shared use of the band 17.7-19.7 GHz by the fixed service and earth stations of the fixed-satellite service (space-to-Earth)
3. ERC/DEC/(00)08 – ERC Decision of 19 October 2000 on the use of the band 10.7 – 12.5 GHz by the fixed service and Earth stations of the broadcasting-satellite and fixed-satellite service (space-to-Earth);
4. ECC/DEC/(05)01 – ECC Decision of 18 March 2005 on the use of the band 27.5-29.5 GHz by the fixed service and uncoordinated Earth stations in the fixed-satellite service (Earth-to-space), amended n 8 March 2013;
5. ERC/DEC/(00)02 – ERC Decision of 27 March 2000 on the use of the band 37.5 - 40.5 GHz by the fixed service and Earth stations of the fixed - satellite service (space-to-Earth)
6. ECC/DEC/(10)01 – ECC Decision of 12 November 2010 on sharing conditions in the 10.6-10.68 GHz band between the fixed service, mobile service and Earth exploration satellite service (passive).
7. CEPT recommendations
8. REC T/R 13-01 E – preferred channel arrangements for fixed service systems operating in the frequency range 1 - 2.3 GHz;
9. ERC/REC 12-08 E – harmonised radio frequency channel arrangements and block allocations for low, medium and high capacity systems in the band 3600 MHz to 4200 MHz;
10. ERC/REC 14-01 – Radio-frequency channel arrangements for high capacity analogue and digital radio-relay systems operating in the band 5925 to 6425 MHz;
11. ERC/REC 14-02 – Radio-frequency channel arrangements for high, medium and low capacity digital fixed service systems operating in the band 6425 to 7125 MHz;
12. ECC/REC/(02)06 – Channel arrangements for digital fixed service systems operating in the frequency range 7125-8500 MHz;
13. ERC/REC 12-05 E – Harmonised radio frequency channel arrangements for digital terrestrial fixed systems operating in the band 10.0 - 10.68 GHz;
14. ERC/REC 12-06 E – Preferred channel arrangements for fixed service systems operating in the frequency band 10.7 - 11.7 GHz;
15. ERC/REC 12-02 E – Harmonised radio frequency channel arrangements for analogue and digital terrestrial fixed systems operating in the band 12.75 GHz to 13.25 GHz;
16. ERC/Rec 12-07 E – Harmonised radio frequency channel arrangements for digital terrestrial fixed systems operating in the bands 14.5 - 14.62 GHz paired with 15.23 - 15.35 GHz;
17. ERC/REC 12-03 E – Harmonised radio frequency channel arrangements for digital terrestrial fixed systems operating in the band 17.7 GHz to 19.7 GHz;
18. T/R 13-02 – Preferred channel arrangements for fixed service systems in the frequency range 22.0 - 29.5 GHz;
19. ECC/REC/(02)02 – Preferred channel arrangements for digital fixed service systems operating (point-to-point, point-multipoint) in the frequency band 31.0-31.3 GHz;
20. ERC/Rec/(01)02 – Preferred channel arrangements for digital fixed service systems operating in the frequency band 31.8-33.4 GHz;
21. ECC/REC/(11)01 – Guidelines for assignment of frequency blocks for fixed wireless systems in the bands 24.5-26.5 GHz, 27.5-29.5 GHz and 31.8-33.4 GHz;
22. REC T/R 12-01 E – Preferred channel arrangements for fixed service systems operating in the frequency band 37-39.5 GHz;
23. ECC/REC/(01)04 – Recommended guidelines for the accommodation and assignment of multimedia wireless systems (MWS) and point-to-point (P-P) fixed wireless systems in the frequency band40.5-43.5 GHz;
24. ERC/Rec 12-11 – Radio-frequency channel arrangements for Fixed Service systems operating in the bands 48.5-50.2 GHz / 50.9-52.6 GHz;
25. ERC/Rec 12-12 – Radio-frequency channel, arrangement for Fixed Service Systems operating in the band 55.78-57.0 GHz;
26. ECC/REC/(09)01 – Use of the 57 - 64 GHz frequency band for point-to-point fixed wireless systems;
27. ECC/REC/(05)02 – Use of frequency bands 64-66 GHz for fixed services;
28. ECC/ReC/(05)07 – Radio-frequency channel arrangements for fixed service systems operating in the bands 71-76 GHz and 81-86 GHz;
29. ECC/ReC/(01)05 –List of parameters of digital fixed point-to-point radio links used in national planning;
30. ERC/REC 25-10 – Frequency ranges for the use of terrestrial audio and video Programme Making and Special Events (PMSE) applications;
31. ECC/ReC/(18)01 – Radio-frequency channel/block arrangements for Fixed Service systems operating in the bands 130-134 GHz, 141-148.5 GHz, 151.5-164 GHz and 167-174.8 GHz;
32. ECC/ReC/(18)02 – Radio-frequency channel/block arrangements for Fixed Service systems operating in the bands 92-94 GHz, 94.1-100 GHz, 102-109.5 GHz and 111.8-114.25 GHz.
33. CEPT reports
34. ECC REP 173 – Fixed Service in Europe, Current use and future trends post-2016;
35. ECC REP 002 – SAP/SAB (including ENG/OB) use of spectrum and future requests;
36. ERC REP 010 – Compatibility between DECT and radio relay systems in the 2 GHz band;
37. ECC REP 017 – Sharing between EESS (Passive) and video SAP/SAB links in the band 10.6-10.68 GHz;
38. ERC REP 047 – Compatibility study between the fixed service and motion sensors at 10.5 GHz;
39. ECC REP 046 – Immunity of 24 GHz automotive SRRs operating on a non-interference and non-protected basis from emissions of the primary Fixed Service operating in the 23 GHz and 26 GHz frequency bands;
40. ERC REP 016 – Analysis of sharing between terrestrial fixed service and space research/EES (S - E) at 38 GHz;
41. ERC REP 045 – Sharing between the Fixed and Earth Exploration Satellite (passive) Services in the band 50.2 - 66 GHz;
42. ECC REP 019 – Guidance material for assessing the spectrum requirements on the Fixed Service to provide infrastructure to support the UMTS/IMT-2000 networks;
43. ECC REP 054 – Analysis of increasing the EIRP of Terrestrial Fixed Links at around 58 GHz;
44. ECC REP 114 – Compatibility studies between multiple GIGABIT wireless systems in the frequency range 57-66 GHz and other services and systems (except it's in 63-64 GHz);
45. ECC REP 080 – Enhancing harmonisation and introducing flexibility in the spectrum regulatory framework;
46. ECC REP 124 – Coexistence between Fixed Service operating in 71-76 / 81-86 GHz and the passive services;
47. ECC REP 132 – Light Licensing, Licence-Exempt and Commons;
48. ECC REP 163 – The usage of the 7125-8500 MHz band within the CEPT for the elaboration of the revision of the ECC/REC/(02)06 from version 2002 to version 2011;
49. ERC REP 038 – Handbook on radio equipment and systems video links for ENG/OB use;
50. ERC REP 042 – Handbook on radio equipment and systems radio microphones and simple wideband audio links;
51. ECC REP 204 – Spectrum use and future requirements for PMSE;
52. ECC REP 211 – Technical assessment of the possible use of asymmetrical point-to-point links;
53. ECC REP 258 – Guidelines on how to plan LoS MIMO for Point-to-Point Fixed Service Links;
54. ECC REP 282 – Point-to-Point Radio Links in the Frequency Ranges 92-114.25 GHz and 130-174.8 GHz.
55. ETSI standards
56. ETSI EN 302 217 – Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas (302 217-1 Overview, common characteristics and system-dependent requirements; 302 217-2 Digital systems operating in frequency bands from 1 GHz to 86 GHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU, 302 217-2-1 System-dependent requirements for digital systems operating in frequency bands where frequency co-ordination is applied, 302 217-2-2 Digital systems operating in frequency bands where frequency co-ordination is applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; 302 217-3 Equipment operating in frequency bands where both coordinated or uncoordinated frequency deployment might be applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; 302 217-4 Antenna);
57. ETSI TR 101 506 – Fixed Radio Systems; Generic definitions, terminology and applicability of essential requirements covering article 3.2 of Directive 2014/53/EU to Fixed Radio Systems;
58. ETSI TR 101 036 – Fixed Radio Systems; Generic wordings for standards on DFRS (Digital Fixed Radio Systems) characteristics;
59. ETSI TR 102 243-1 – Fixed Radio Systems; Representative values for transmitter power and antenna gain to support inter- and intra-compatibility and sharing analysis; Part 1: Digital point-to-point systems;
60. ETSI EG 201 399 – Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the Radio & Telecommunication Terminal Equipment Directive 1999/5/EC (R&TTE) and a first guide on the impact of the Radio Equipment Directive 2014/53/EU (RED) on Harmonized Standards.
61. ITU recommendations
62. ITU-T G.826 – End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections;
63. ITU-T G.827 – Availability performance parameters and objectives for end-to-end international constant bit-rate digital paths;
64. ITU-T G.828 – Error performance parameters and objectives for international, constant bit-rate synchronous digital paths;
65. ITU-T G.829 – Error performance events for SDH multiplex and regenerator sections;
66. ITU-R F.1668 – Error performance objectives for real digital fixed wireless links used in 27 500 km hypothetical reference paths and connections;
67. ITU-R F.1703 – Availability objectives for real digital fixed wireless links used in 27500 km hypothetical reference paths and connections;
68. ITU-R F.2113 – Error performance and availability objectives and requirements for real point-to-point packet-based radio links;
69. ITU-R P.530 – Propagation data and prediction methods required for the design of terrestrial line-of-sight systems;
70. ITU-R P.838 – Specific attenuation model for rain for use in prediction methods;
71. ITU-R P.837 – Characteristics of precipitation for propagation modelling;
72. ITU-R P.841 – Conversion of annual statistics to worst-month statistics;
73. ITU-R P.453 – The radio refractive index: its formula and refractivity data;
74. ITU-R F.382 – Radio-frequency channel arrangements for fixed wireless systems operating in the 2 and 4 GHz bands;
75. ITU-R F.383 – Radio-frequency channel arrangements for high-capacity fixed wireless systems operating in the lower 6 GHz (5 925 to 6 425 MHz) band;
76. ITU-R F.384 – Radio-frequency channel arrangements for medium- and high- capacity digital fixed wireless systems operating in the 6 425-7 125 MHz band;
77. ITU-R F.385 – Radio-frequency channel arrangements for fixed wireless systems operating in the 7 110-7 900 MHz band;
78. ITU-R F.386 – Radio-frequency channel arrangements for fixed wireless systems operating in the 8 GHz (7 725 to 8 500 MHz) band;
79. ITU-R F.746 – Radio-frequency arrangements for fixed service systems;
80. ITU-R F.387 – Radio-frequency channel arrangements for fixed wireless systems operating in the 10.7-11.7 GHz band;
81. ITU-R F.497 – Radio-frequency channel arrangements for fixed wireless systems operating in the 13 GHz (12.75-13.25 GHz) frequency band;
82. ITU-R F.636 – Radio-frequency channel arrangements for fixed wireless systems operating in the 14.4-15.35 GHz band;
83. ITU-R F.595 – Radio-frequency channel arrangements for fixed wireless systems operating in the 17.7-19.7 GHz band;
84. ITU-R F.637 – Radio-frequency channel arrangements for fixed wireless systems operating in the 21.2-23.6 GHz band;
85. ITU-R F.747 – Radio-frequency channel arrangements for fixed wireless systems operating in the 10.0-10.68 GHz band;
86. ITU-R F.748 – Radio-frequency arrangements for systems of the fixed service operating in the 25, 26 and 28 GHz bands;
87. ITU-R F.1520 – Radio-frequency arrangements for systems in the fixed service operating in the band 31.8-33.4 GHz;
88. ITU-R F.749 – Radio-frequency arrangements for systems of the fixed service operating in sub-bands in the 36-40.5 GHz band;
89. ITU-R F.1496 – Radio-frequency channel arrangements for fixed wireless systems operating in the band 51.4-52.6 GHz;
90. ITU-R F.1497 – Radio-frequency channel arrangements for fixed wireless systems operating in the band 55.78-66 GHz;
91. ITU-R F.2006 – Radio-frequency channel and block arrangements for fixed wireless systems operating in the 71-76 and 81-86 GHz bands.

The sole purpose of the list from Paragraph (1) of this Article is to track and provide information on the harmonisation of Acquis Communautaire of the European Union with the BiH legislation pursuant to the Decision on Procedures for Harmonisation of the Legislation of Bosnia and Herzegovina with the Acquis Communautaire of the European Union (“Official Gazette of BiH” numbers 75/16 and 2/18) and they shall not be directly applied in the legislation of Bosna and Herzegovina.

**Article 16**

**(Cessation of validity)**

On the date of entry into force of this Rule, Rule 63/2012 on the use of radiofrequency bands for point-to-point links in the fixed service of Bosnia and Herzegovina (“Official Gazette of BiH,” No. 61/12) shall cease to be valid.

**Article 17**

**(Entry into force)**

This Rule shall enter into force on the eighth day following its publication in the “Official Gazette of BiH.”

Number: 05-02-2-899-1/19 Chairman of the Council of RAK

20 March 2019

Sarajevo Plamenko Čustović

**Annex**

**Table 1: List of bands for fixed service point-to-point links, channel arrangements, transmitting capacities**

| **RF range** | **CEPT or ITU-R reference recommendation** | **RF channels** | | | | **Typical transmission capacities for given channel bandwidth (PDH, SDH, Ethernet, other interfaces)** | **Typical route length, link type, typical use in BiH** | **Reference ETSI standards, reference CEPT documents** | **Notes** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Width (MHz)** | **Number of channels** | | **Tx/Rx spacing (MHz)** |
| **1.4 GHz**  (1427-1452) MHz  (1492-1517) MHz | CEPT T/R 13-01E Annex B  CEPT T/R 13-01E Annex A | 3.5  2  1  0.5  0.25  3.5  2  1  0.5  0.25 | | 6  12  24  48  96  6  12  24  48  96 | -  - | 9.6 kbit/s – 4 x 2 Mbit/s  9.6 kbit/s – 4 x 2 Mbit/s | 5 – 50 km  Access, infrastructure  BiH:  Uni-directional links for RTV transmitters programming feed    BiH:  Uni-directional links for RTV transmitters programming feed | EN 302 217  ECC REP 173 | Allocation of simplex channels. The same channel arrangement used according to recommendation ITU-R F.1242 rec2.  Allocation of simplex channels. The same channel arrangement used according to recommendation ITU-R F.1242 rec1. |
| **2 GHz**  (2070-2110/  2245-2290) MHz | CEPT T/R 13-01E Annex C | 14  7    3.5    1.75 | | 2  n=4, 5  5  n=7...11  11  n=13...23  21  n=27...47 | 175 | ≤16 x 2 Mbit/s, 2 x 8 Mbit/s, 34 Mbit/s | 20 – 60 km  infrastructure  PMSE  BiH:  Uni-directional and alternating links in the transmission RR system of Public Broadcasting Services (until the band is vacated) and private broadcasting stations | EN 302 217  ECC REP 173  ERC REP 010 |  |
| **4 GHz**  (3800–4200) MHz | CEPT  ERC/REC 12-08 E Annex B  Part 1 | 29 | | 6 | 213 | ≤ 112 x 2 Mbit/s, 215 Mbit/s | 20 – 80 km  long transmission  BiH:  Links in the transmission RR system of Public Broadcasting Services | EN 302 217  ECC REP 173 | The use of the band for commercial users apart from Public Broadcasting services shall be considered after the implementation of a digital transmission system of Public Broadcasting Services of BiH.  The same channel arrangement used according to recommendation ITU-R F.382-8 rec1. |
| **L6 GHz**  (5925-6425) MHz | CEPT  ERC/REC 14-01 Annex 1 | 29.65 | | 8 | 252.04 | ≤ 112 x 2 Mbit/s, 215 Mbit/s | 20 – 80 km  long portable  BiH:  transmission links on main RR routes | EN 302 217  ECC REP 173 | The same channel arrangement used according to recommendation ITU-R F.383-9 rec 1-6. |
| **L6 – inside guard band and central gap** | CEPT  ECC/REC/(14)06 | 3.5  1.75  0.5  0.25  0.025 | | 3  6  21  42  420 | 254.808 | ≤ 4 x 2 Mbit/s, 8 Mbit/s | narrowband links | ECC REP 173 | The same channel arrangement used according to recommendation ITU-R F.746. |
| **U6 GHz**  (6425–7125) MHz | CEPT  ERC/REC 14-02 Annex 1 | 40  30  20 | | 8  11  16 | 340 | ≤ 160 x 2 Mbit/s, 308 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 20 – 80 km  long transmission  BiH:  Transmission links on main RR routes | EN 302 217  ECC REP 173 | The same channel arrangement for channels with bandwidths of 40, 30 and 20 MHz is used as recommended by ITU-R F. 384-11 rec 1-4. |
| **U6 – inside guard band and central gap** | CEPT  ECC/REC/(14)06 | 3.5  1.75  0.5  0.25  0.025 | | 4 (2)\*  8 (4)\*  28 (14)\*  56 (28)\*  560 (280)\* | 342.5 (340) | ≤ 4 x 2 Mbit/s, 8 Mbit/s | narrowband links | ECC REP 173 | \* The number of narrowband channels within guard bands and central gap for frequency channel arrangement with bandwidth 40 MHz, and/or 30 MHz in the basic U6 band.  The same channel arrangement used according to recommendation ITU-R F.746. |
| **7 GHz**  (7125-7425) MHz  (7425-7725) MHz | CEPT  ECC/REC/(02)06 Annex 1 (1.1)  CEPT  ECC/REC/(02)06 Annex 1 (1.1) | 28  14  7  3.5  28  14  7  3.5 | | 5  10  20  40  5  10  20  40 | 154  154 | ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤56 x 2 Mbit/s, 107 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤56 x 2 Mbit/s, 107 Mbit/s | 20 – 80 km  long transmission  BiH:  Priority, a network of links in the transmission RR system of the Ministry of Defence    BiH:  Priority, a network of links in the transmission RR system of state institutiions | EN 302 217  ECC REP 173 | Assignments in the bands 7250-7300 MHz (channels 1 and 5, bandwidth 28 MHz, as per CEPT recommendation) shall not be licensed to civilian users.  Certain number of links is in line with ITU-R F.385-10 rec 1, 2, 3, 4 (Tx/Rx spacing 161 MHz), see Article 9 of the Regulations. |
| **8 GHz**  (7725-8275) MHz  (8275-8500) MHz | ECC/REC/(02)06 Annex 1 (1.2.2)  ECC/REC/(02)06 Annex 1 (1.3) | 29.65  28  14  7 | | 8  3  6  12 | 311.32  119  119  126 | ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤56 x 2 Mbit/s, 107 Mbit/s  ≤21 x 2 Mbit/s, STM-0, 39 Mbit/s | 20 – 80 km  long transmission (7.7-8.2 GHz),  access/infrastructure (8.2-8.5 GHz) | EN 302 217  ECC REP 173  ECC REP 163 | Allocation of channel bandwidth 28 MHz as recommended by ECC/REC/(02)06 Annex 1 (1.2.1) shall be optionally considered in the future.  When assignment uses channel bandwidth of 28 MHz in the band 8275-8500 MHz, channels of central frequencies of even channels 2,4 and 6 from the 14 MHz channel arrangement, shall be used as the preference channels |
| **10 GHz**  (10.15-10.3/  10.5-10.65) GHz | CEPT  ERC/REC 12-05 E Annex A | 28  14  7  3.5 | | 5  10  20  42 | 350 | ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤56 x 2 Mbit/s, 107 Mbit/s  ≤21 x 2 Mbit/s, STM-0, 39 Mbit/s | < 50 km  access/infrastructure PMSE | EN 302 217  ECC/DEC/(10)01  ECC REP 173  ECC REP 017  ERC REP 047 | The same channel arrangement used according to recommendation ITU-R F.747-1, Annex 3. |
| **11 GHz**  (10.7-11.7) GHz | CEPT  ERC/REC 12-06 E  rec1, Annex A  rec2, Annex B | 40  28  40  28 | | 11  16  12  17 | 530  490 | ≤ 160 x 2 Mbit/s, 308 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 160 x 2 Mbit/s, 308 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 10 – 50 km  long transmission | EN 302 217  ERC/DEC/(00)08  ECC REP 173 | In line with the Decision ERC/DEC/(00)08, the use of links is limited to high capacity transmission links, i.e., the number of direct access links shall not be increased in the future.  In order to protect uncoordinated fixed satellite-terrestrial stations, the minimum antennae gain of 40 dBi is requested for fixed links.  The use of Tx/Rx spacing of 530 MHz is preferred.  The same channel arrangement recommended by ITU-R F.387-12 rec1.1 NOTE 2 is used for Tx/Rx spacing 530 MHz.  The same channel arrangement recommended by ITU-R F.387-12 rec 1.2 is used for Tx/Rx spacing 490 MHz. |
| **13 GHz**  (12.75-13.25) GHz | CEPT  ERC/REC 12-02 E Annex A | 28  14  7  3.5 | | 8  16  32  64 | 266 | ≤ 112 x 2 Mbit/s, 215 Mbit/s | 5 – 35 km  Short transmission, infrastructure | EN 302 217  ECC REP 173 | The same channel arrangement used according to recommendation ITU-R F.497-7, rec1. |
| **15 GHz**  (14.5-14.62/  15.23-15.35) GHz | CEPT  ERC/REC 12-07 E Annex A | 56  28  14  7  3.5 | | 2  4  8  16  32 | 728 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 5 – 30 km  access/infrastructure | EN 302 217  ECC REP 173 |  |
| **18 GHz**  (17.7-19.7) GHz | CEPT  ERC/REC 12-03 E Annex A | 55  27.5 13.75  7  3.5 | | 17  35  70  138  278 | 1010 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 56 x 2 Mbit/s, 107 Mbit/s | 4 – 25 km  access/infrastructure  BiH:  Priority, access links in public mobile commercial networks | EN 302 217  ERC/DEC/(00)07  ECC REP 173 | The same channel arrangement used according to recommendation ITU-R F.595-10, rec 1.1.3, 1.1.4.  To reduce interference with fixed satellite service, the ATPC shall be applied, as well as the other provisions of Decision ERC / DEC / (00) 07, Annex 1 |
| **23 GHz**  (22.0-22.6/  23.0-23.6) GHz | CEPT T/R 13-02 Annex A.1 | 56  28  14  7  3.5 | | 10  20  41  83  168 | 1008 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 56 x 2 Mbit/s, 107 Mbit/s | 3 – 20 km  access/infrastructure  BiH:  Priority, access links in public mobile commercial networks | EN 302 217  ECC REP 173  ECC REP 046 | The same channel arrangement used according to recommendation ITU-R F.637-4 rec2, Annex 2.  A certain number of links is in line with the Recommendation ITU-R F.637-4 Annex 1 (Tx / Rx 1232 MHz), see Article 9 of this Rule. |
| **26 GHz**  (part of the band  24.5-26.5) GHz | CEPT T/R 13-02 Annex B | 56  28  14  7  3.5 | | 5  n=12...16  10  n=23...32  20  n=45...64  40  n=89...128  80  n=177...256 | 1008 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 56 x 2 Mbit/s, 107 Mbit/s | 2 - 15 km  access/infrastructure | EN 302 217  ECC/REC/(11)01  ECC REP 173  ECC REP 046 | Joint band: point-to-point and point-multipoint systems.  Licencing individual point-to-point links are carried out in the band: 25.165-25.445 / 26.173-26.453 GHz (channels n=23...32 bandwidth 28 MHz per reference CEPT recommendation), outside of blocks of fixed access systems defined by Rule 44/2009 for fixed wireless access systems in band 24.5-26.5 GHz.  The same channel arrangement used according to recommendation ITU-R F.748-4, Annex 1. |
| **28 GHz**  (27.8285-27.9405) GHz | CEPT T/R 13-02 Annex C | 56  28  14  7  3.5 | | 2  n=6, 7  4  n=11...14  7  n=22...28  13  n=44...56  25  n=88...112 | - | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s  ≤ 56 x 2 Mbit/s, 107 Mbit/s | 2 - 12 km  access/infrastructure | EN 302 217 ECC/DEC/(05)01  ECC/REC/(11)01  ECC REP 173 | Joint band: point-to-point and point-multipoint systems.  According to Decision ECC/DEC/(05)01, licensing of Uni-directional point-to-point links is limited to band 27.8285-27.9405 GHz due to the protection of fixed satellite service. The paired band 27.9405-28.4445 / 28.9485-29.4525 GHz is allocated for fixed access systems in line with the Rule 45/2009 for fixed wireless access systems in band 27.5-29.5 GHz. |
| **31 GHz**  (31.0-31.3) GHz | CEPT  ECC/REC/(02)02 Annex, part B) | 28  14  7  3.5 | | 4  8  16  32 | 140 | ≤ 112 x 2 Mbit/s, 215 Mbit/s | 1 - 10 km  access/infrastructure | EN 302 217  ECC REP 173 | Joint band: point-to-point and point-multipoint systems.  The same channel arrangement for FDD systems is used per recommendation ITU-R F.746-10, Annex 6, § 2.  Channel arrangement for TDD systems is given in recommendation ECC/REC/(02)02, Annex part A), i.e. recommendation ITU-R F.746-10, Annex 6, § 1. |
| **32 GHz**  (31.8-33.4) GHz | CEPT  ERC/REC/(01)02 Annex | 56  28  14  7  3.5 | | 12  27  54  108  216 | 812 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 1 - 10 km  access/infrastructure | EN 302 217  ECC/REC/(11)01  ECC REP 173 | Joint band: point-to-point and point-multipoint systems (HDFS).  The same channel arrangement used according to recommendation ITU-R F.1520-3, Annex 1. |
| **38 GHz**  (37.0-37.618/  38.248-38.878) GHz | CEPT T/R 12-01 E Annex A | 56  28  14  7  3.5 | | 10  20  40  80  160 | 1260 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 1 - 6 km  infrastructure | EN 302 217  ERC/DEC/(00)02  ECC REP 173  ERC REP 016 | The same channel arrangement used according to recommendation ITU-R F.749-3 rec2, Annex 1.  Interference criteria in reference to satellites in geostationary orbit are defined in the recommendation ITU-R F.1669-1. |
| **42 GHz**  (40.5-43.5) GHz | CEPT  ECC/REC/(01)04 rec2, Annex 5 | 56  28  14  7 | | 25  50  101  202 | 1500 | ≤ 224 x 2 Mbit/s, 431 Mbit/s  ≤ 112 x 2 Mbit/s, 215 Mbit/s | 1 - 3 km  infrastructure | EN 302 217  ECC REP 173 | Joint band: MWS systems (Multimedia Wireless Systems) and point-to-point  Band segmentation for flexible use of MWS block frequencies and conventional allocation of point-to-point links will be performed in accordance with rec3 (Annex 6) of the reference recommendations.  The same channel arrangement used according to recommendation ITU-R F.2005.  Interference criteria in terms of satellites in geostationary orbit are defined in the recommendation ITU-R F.1669-1. |
| **50 GHz**  (48.5-50.2) GHz | CEPT  ERC/REC 12-11 Annex 2 | 56  28  14  7  3.5 | | 13  28  56  112  224 | 884 | ≤ 64 x 2 Mbit/s, STM-1, 128 Mbit/s | < 2 km  access/infrastructure | EN 302 217  ECC REP 173 | The same channel arrangement used according to recommendation ITU-R F.746-10. |
| **52 GHz**  (51.4-52.6) GHz | CEPT  ERC/REC 12-11 Annex 1 | 56  28  14  7  3.5 | | 9  18  36  72  144 | 616 | ≤ 64 x 2 Mbit/s, STM-1, 128 Mbit/s | < 2 km  access/infrastructure | EN 302 217  ECC REP 173  ERC REP 045 | HDFS links.  The same channel arrangement used according to recommendation ITU-R F.1496-1 rec1, Annex 1. |
| **55 GHz**  (55.78-57.0) GHz | CEPT  ERC/REC 12-12 Annex 1 | 56  28  14 | | 20  40  80 | - | ≤ 64 x 2 Mbit/s, STM-1, 128 Mbit/s | < 1 km  access/infrastructure | EN 302 217  ECC REP 173  ERC REP 045  ECC REP 019 | HDFS links.  The same channel arrangement used according to recommendation ITU-R F.1497-2 rec1, Annex 1, § 1.  Channel arrangement for FDD systems is provided in the recommendation CEPT/ERC/REC 12-12 Annex 2, i.e. recommendation ITU-R F.1497-2 rec2, Annex 1, § 2. |
| **(57.0-59.0) GHz** | CEPT  ECC/REC/(09)01 | 50 | | 40 | - | ≤ 280 Mbit/s for bandwidth 50 MHz (depending on spectral efficiency) | < 1 km  access/infrastructure | EN 302 217  ECC/REC/(01)05  ECC REP 173  ECC REP 054  ERC REP 045ECC REP 114  ECC REP 080  ECC REP 132 | HDFS point-to-point links.  Channels within 57.0-57.1 GHz  are used for temporary allocations or adjustments of equipment and propagation tests.  The same channel arrangement used according to recommendation ITU-R F.1497-2 rec3, Annex 2. |
| **(61.0-64.0) GHz** | CEPT  ECC/REC/(09)01 | 50 | | 60 | - | ≤ 280 Mbit/s for bandwidth 50 MHz (depending on spectral efficiency) | < 1 km  access/infrastructure | EN 302 217  ECC/REC/(01)05  ECC REP 173  ERC REP 045  ECC REP 113  ECC REP 114  ECC REP 080  ECC REP 132 | HDFS point-to-point links.  The same channel arrangement used according to recommendation ITU-R F.1497-2 rec3, Annex 2. |
| **(64.0-66.0) GHz** | CEPT  ECC/REC/(05)02 | 50 | | 39 | - | ≤ 280 Mbit/s for bandwidth 50 MHz (depending on spectral efficiency) | < 1 km  infrastructure | EN 302 217  ECC/REC/(01)05  ECC REP 173  ERC REP 045  ECC REP 114  ECC REP 080  ECC REP 132 | HDFS point-to-point links.  Basic arrangement of 39 slots of 50 MHz is valid for both work operation methods (TDD, FDD). Guard band at the limit of 64 GHz is not applied due to the utilisation of same systems in band below 64 GHz.  The same channel arrangement used according to recommendation ITU-R F.1497-2 rec4, Annex 3. |
| **70, 80 GHz**  (74.0-76.0/  84.0-86.0) GHz | CEPT  ECC/REC/(05)07, Annex 3, Annex 4 | 250 | | 7 | 10000 | ≤ 1400 Mbit/s for bandwidth 250 MHz (depending on spectral efficiency) | 1-3 km  infrastructure | EN 302 217  ECC/REC/(01)05  ECC REP 173  ECC REP 124  ECC REP 080  ECC REP 132 | The same channel arrangement used according to recommendation ITU-R F.2006, rec5, Annex 2. |
| **92-114.25 GHz**  (92.0-94.0 GHz  94.1-100.0 GHz  102.0-109.5 GHz  111.8-114.25 GHz) | CEPT  ECC/REC/(18)02 Annex 2 | 250  250 | | 7  14  8  8 | 12000  11550  14200  - | multi Gbit/s systems | 1-2 km  infrastructure | ECC/REC/(01)05  ECC REP 173  ECC REP 211  ECC REP 258  ECC REP 282 | Possible use of point-multipoint system.  Band 94.0-94.1 GHz is not allocated to fixed systems.  Unpaired blocks 8 x 250 MHz are defined within the band: 102.125-104.125 GHz.  To protect the Satellite Earth Exploration Service (EESS) in adjacent bands, fixed transmitters’ emission limits are applied according to the Annex 4 of the Reference Recommendation |
| **130-174.8 GHz**  (130.0-134.0 GHz  141.0-148.5 GHz  151.5-164.0 GHz  167.0-174.8 GHz) | CEPT  ECC/REC/(18)01 Annex 3 | 250  250  250  250 | | 15  29  5  30 | 21500  15500  -  - | multi Gbit/s systems | < 1 km  infrastructure | ECC/REC/(01)05  ECC REP 211  ECC REP 258  ECC REP 282 | Possible use of point-multipoint system.  Unpaired blocks are defined in bands: 155.375-156.625 GHz (5 x 250 MHz) and 167.125-174.625 GHz (30 x 250 MHz).  To protect the Satellite Earth Exploration Service (EESS) in adjacent bands, fixed transmitters’ emission limits are applied according to the Annex 5 of the Reference Recommendation. |

**Table 2: Radio equipment and antennae requirements**

| **RF range** | **Reference equipment requirement standards** | **Typical maximum transmitter power (ETSI TR 102 243-1)** | **Special limitations of maximum power and/or EIRP** | **Minimum antennae requirements (EN 302 217-4)** |
| --- | --- | --- | --- | --- |
| **1.4 – 2.6 GHz** | EN 302 217-2, Annex B | +33 dBm |  | Class 2 |
| **3.5 – 11 GHz (bandwidth do 30 MHz and 56/60 MHz)** | EN 302 217-2, Annex C | +27 dBm (PDH, STM-0, do 100 Mbit/s)  +32 dBm (SDH, > 100 Mbit/s) | 10.6-10.68 GHz: power at antenna port -3 dBW (Radio Regulations, Article 5, footnote 5.482) | Class 3  11 GHz: Minimum gain +40 dBi |
| **U6, 11 GHz (bandwidth 40 MHz)** | EN 302 217-2, Annex D | +32 dBm |  | Class 3  11 GHz: Minimum gain +40 dBi |
| **13, 15, 18 GHz** | EN 302 217-2, Annex E | +25 dBm ÷ +27 dBm | 18 GHz: ATPC ERC/DEC/(00)07 Annex 1;  18.6-18.8 GHz: power at antenna port -3dBW (Radio Regulations, Article 5, footnote 5.522A) | Class 3 |
| **23 – 42 GHz** | EN 302 217-2, Annex F | 23, 26, 28 GHz: +25 dBm  31, 32, 38, 42 GHz: +23 dBm | 31 GHz: maximum power at antenna port 0 dBW (CEPT  ECC/REC/(02)02) | Class 3 (do 30 GHz)  Class 3B (30-42 GHz) |
| **50 – 55 GHz** | EN 302 217-2, Annex G | +15 dBm | 55.78-56.26 GHz: maximum transmitter power density  -26 dBW/MHz (Radio Regulations, Article5, footnote 5.557A) | Class 3B |
| **57-64 GHz** | EN 302 217-2, Annex H | +10 dBm | EIRP: +55 dBm; maximum transmitter power for bandwidth systems greater than 100 MHz:  +10 dBm and -10 dBm/MHz | Class 3B  Minimum gain: +30 dBi |
| **64-66 GHz** | EN 302 217-2, Annex H | +15 dBm |  | Class 3B |
| **71-86 GHz** | EN 302 217-2, Annex J | +18 dBm |  | Class 3 |
| **92-114.25 GHz** | - | - | limiting unwanted emissions to adjacent bands in accordance with CEPT ECC / REC / (18) 02, Annex 4 | - |
| **130-174.8 GHz** | - | - | limiting unwanted emissions to adjacent bands in accordance with CEPT ECC / REC / (18) 01, Annex 5 | - |