Pursuant to Article 3 paragraph 1) and 2), Article 9 paragraph 3.6), Article 10 paragraph 11) and 12), Article 45 paragraph 1) and 2), and Article 79 paragraph 1) and 2) of the Law on Electronic Communications (hereinafter - the Law or LEC) and the National Plan on Allocation of the Radio Frequency Spectrum, the Board of the Regulatory Authority of Electronic and Postal Communications (hereinafter; RAEPC or Authority) by the Decision No. Xxx (dt. Xx.xx.2018) adopted the commencement of the public consultation process for;

**PLAN ON ALLOCATION AND USE OF RADIO FREQUENCY BANDS 880-915 & 925-960MHZ FOR GSM, UMTS, LTE, WiMAX and IoT TERRESTRIAL MOBILE SYSTEMS**

1. GENERAL CONDITIONS

This Plan defines the allocation of 880-915 & 925-960 MHz frequency bands for radio communication mobile services, technical details on division method and the possibility of granting the right to use frequency resources for GSM, UMTS, LTE, WiMAX and IoT terrestrial mobile systems in this band. Local legislation in force and international documents that define planning, technical parameters, and conditions of frequency resources allocation and use, to this band for mobile services are provided as follows:

- (ERC/DEC/(94)01) - ERC Decision of 23 October 1994 on the frequency bands to be designated for the coordinated introduction of the GSM digital pan-European communications system
- (ERC/DEC/(97)02 - ERC Decision of 21 March 1997 on the extended frequency bands to be used for the GSM Digital Pan-European Communications System)
- “ECC Decision of 01 December 2006, Amended 2 March 2018, on designation of the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz for terrestrial UMTS, LTE, WiMAX and IoT mobile systems.”
- “ECC/REC (05)08 Recommendation amended on 27 February 2017 on Frequency planning and cross-border coordination between GSM Land Portable Systems (GSM 900, GSM 1800, and GSM-R).”
- “ECC/REC (08)02 Recommendation amended on 27 April 2012 Frequency planning and frequency coordination for GSM/UMTS/LTE/WiMAX Land Portable systems operating within the 900 and 1800 MHz band”.
- CEPT Report 40 of 12 November 2010 “Compatibility study for LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900/1800 MHz bands)”
- CEPT Report 66 of 02 March 2018, “to review the harmonized technical conditions for use of the 900 MHz and 1800 MHz frequency bands for terrestrial wireless broadband electronic communications services in support of the Internet of Things in the Union”

- ECC-REPORT 266 of 02 March 2018 on “The suitability of the current ECC regulatory framework for the usage of Wideband and Narrowband M2M in the frequency bands 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.6 GHz”

- “EC – Decision (2011/251/EU) of 18 April 2011 amending Decision (2009/766/EC) on the harmonization of the 900 MHz and 1 800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community”

- National Frequency Spectrum Allocation Plan, as approved by the Kosovo Assembly, according to the Decision no. 04-V-93, dt. 23 June 2011 (The Kosovo Table of Frequency Allocation and Utilisations);

- Plan for use of Radio frequencies in the Republic of Kosovo, as approved by RAEPIC, according to Decision No. 321 (ART Prot. No. 321/B/12, dated 28 February 2013).
2. ALLOCATION AND USE OF FREQUENCY RESOURCES IN THE 900 MHz BAND

2.1 The frequency band 880-915/925-960 MHz in Kosovo is used by mobile radio communication services GSM, and according to the Decision ECC/DEC (06)13 amended on 2 March 2018, this band has also been allocated for terrestrial mobile systems UMTS, LTE, WiMAX and IoT.

2.2 The frequency band 880-915 & 925-960 MHz includes the frequency capacity of 2x35 MHz and has been foreseen to be used with a Frequency Division Duplex - FDD. The 880-915 MHz frequency band is used for the Uplink, while the band 925-960 MHz is used for downlink. The difference between transmission and receiving of frequencies for Base Stations (FB) and Portable Stations (ML) is 45 MHz.

2.3 The frequency band 915-925 MHz represents the duplex gap between the defined bands for the downlink and uplink of the GSM, UMTS, LTE, WiMAX, and IoT systems.

<table>
<thead>
<tr>
<th>880MHz</th>
<th>915 MHz</th>
<th>925 MHz</th>
<th>960MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
</tr>
<tr>
<td>5 MHz</td>
<td>5 MHz</td>
<td>5 MHz</td>
<td>5 MHz</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 1** – Graphic representation of frequency band allocation 880-915 MHz / 925-960 MHz, with frequency block of 5 MHz.

2.4 The **880-915 & 925-960MHz** frequency band for mobile radio communication services is allocated in 7 paired radio frequency blocks at a width of 2x5 MHz, while frequency block limits of 5 MHz are as follows:
Table 1 - Radio-frequency block limits of 5 MHz bandwidth

<table>
<thead>
<tr>
<th>Marking of frequency blocks</th>
<th>Radio-frequency block limits of 900 MHz band in IMT services</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>f1 – f1’ 880-885 / 925-930 MHz</td>
</tr>
<tr>
<td>B2</td>
<td>f2 - f2' 885-890 / 930-935 MHz</td>
</tr>
<tr>
<td>B3</td>
<td>f3 - f3' 890-895 / 935-940 MHz</td>
</tr>
<tr>
<td>B4</td>
<td>f4 - f4' 895-900 / 940-945 MHz</td>
</tr>
<tr>
<td>B5</td>
<td>f5 – f5' 900-905 / 945-950 MHz</td>
</tr>
<tr>
<td>B6</td>
<td>f6 - f6' 905-910 / 950-955 MHz</td>
</tr>
<tr>
<td>B7</td>
<td>f7 - f7' 910-915 / 955-960 MHz</td>
</tr>
</tbody>
</table>

2.5 General conditions of the Plan on defining channels (transmitters) of these bands are set up according to the Table 2.

<table>
<thead>
<tr>
<th>Frequency band (MHz)</th>
<th>Space of use</th>
<th>Communication systems</th>
<th>Raster</th>
<th>Frequency bandwidth (MHz)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>880-915/925-960</td>
<td>The Republic of Kosovo</td>
<td>GSM</td>
<td>200 kHz</td>
<td>200 kHz</td>
<td>[3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UMTS</td>
<td>200 kHz</td>
<td>Nominal 5 MHz</td>
<td>[1],[3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LTE</td>
<td>100 kHz</td>
<td>1.4; 3; 5; 10; 15; 20 MHz</td>
<td>[2],[3]</td>
</tr>
</tbody>
</table>

Table 2 - General conditions of the Plan on defining channels (carriers) of the 900 MHz band

[1] - the use of a carrier with a frequency of 882.4 MHz in the uplink and of 927.4 MHz in the downlink is not allowed
[2] - the minimal frequency distance between GSM-R and LTE channel edge is 200 kHz;
[3] - the distance between of GSM, UMTS, or LTE channel edges between two operators, is not required when coordination has not been achieved
NH - the distance between channel edges of GSM, UMTS or LTE between operators is not mandatory in the method of uncoordinated use, but in conformity and harmonization of conditions provided for in European recommendations and decisions and in ETSI standards as well.
Based on European Decisions and Recommendations, the ETSI and 3GPP documents also reflect the sequences of radio frequency blocks that may be allowed for the use of radio frequencies.

- The GSM transmitter's central frequency is defined by multiplying the bandwidth of 200 kHz with an integer, starting at 880,2 / 925,2 MHz and finishing at 914,8 / 959,8 MHz, as described below:

  Uplink:
  \[ f_{UL,n} \text{[MHz]} = 890,0 + 0,2 \times (ARFCN-1024) \text{ MHz}, \] where ARFCN\(^4\) [975, 1023],
  \[ f_{UL,n} \text{[MHz]} = 890,0 + 0,2 \times \text{ARFCN}, \] where ARFCN \([0, 124]\),

  Downlink:
  \[ f_{DL,n} \text{[MHz]} = 935,0 + 0,2 \times (ARFCN-1024), \] where ARFCN \([975, 1023]\),
  \[ f_{DL,n} \text{[MHz]} = 935,0 + 0,2 \times \text{ARFCN}, \] where ARFCN \([0, 124]\).

- The UMTS transmitter's central frequency is determined by multiplying the 200 kHz bandwidth with an integer, starting at 882,4 / 927,4 MHz and finishing at 912,6 / 957,6 MHz, as described below:

  Uplink: \[ f_{UL,n} \text{[MHz]} = 340,0 + 0,2 \times \text{UARFCN}, \] where UARFCN\(^5\) [2712, 2863],
  Downlink: \[ f_{DL,n} \text{[MHz]} = 340,0 + 0,2 \times \text{UARFCN}, \] where UARFCN \([2937, 3088]\).

- The frequency of the LTE and WiMAX channels' final edge are determined by multiplying the bandwidth by 100 kHz with an integer, starting at 880,0 / 925,0 MHz and finishing at 914,9 / 959,9 MHz, as described below:

  Uplink: \[ f_{UL,n} \text{[MHz]} = f_{UL,n} \text{[MHz]} = 880,0 + 0,1 \times (\text{EARFCN}-3450), \] where EARFCN\(^6\) [3450, 3799],
  Downlink: \[ f_{DL,n} \text{[MHz]} = 925,0 + 0,1 \times (\text{EARFCN}-21450), \] where EARFCN \([21450, 21799]\).

---

4 ARFCN – Absolute Radio-Frequency Channel Number
5 UARFCN – UTRA Absolute Radio-Frequency Channel Number
6 EARFCN – E-UTRA Absolute Radio-Frequency Channel Number

3. OTHER CONDITIONS FOR GRANTING THE RIGHT TO USE RADIO FREQUENCY
3.1 During the granting for use of frequency resources in 900 MHz band, blocks with a 2 x 5 MHz width will be determined without being limited, in specific cases, in smaller blocks, in compliance with technical criteria set out in this plan.

3.2 During the granting for use of frequency resources, one or more successive radio frequency blocks are usually allocated according to the planning set out in point 2.4 of this document.

3.3 The assignment of transmitting frequencies for bandwidth of 5 MHz, in the abovementioned frequency bands, may be based on arrangements given by the Technical Specifications of 3GPP (3rd Generation Partnership Project) defined in 3GPP TS 25.104. V9.5.0 (2010-09), etc., and ETSI recommendations as well.

3.4 Radio frequencies from the 880-915/925-960 MHz band, are granted for exclusive use throughout the entire territory of Kosovo for realization of public mobile electronic communications networks, except in cases of designations that oblige agreements at the international level or when the authority has foreseen otherwise in specific cases.

3.5 The right to use radio frequencies from 880-915/925-960 MHz in order to carry out public mobile electronic communications networks of IMT’s advanced systems including GSM, UMTS, LTE, WiMAX, and IoT, is allocated in compliance with defined conditions in the Law on Electronic Communications and the secondary legislation adopted by RAEPC.

3.6 The implementation of this plan and national and international documents listed in this document, which describe and determine the right to use frequency resources in 900 MHz bands represents the mandatory conditions in technology implementation and network co-existence with the purpose of effectively and efficiently using frequency resources.

4. TECHNICAL CONDITIONS FOR MOBILE COMMUNICATION NETWORK REALIZATION AND ADVANCED IMT

4.1 Pursuant to conditions of the Decision ECC/DEC(06)13 of 01 December 2006 amended on 2 March 2018, ECC recognizes that a harmonized implementation of UMTS, LTE, WiMAX, and IoT mobile systems shall bring a greater benefit for operators, manufacturers, as well as for users of electronic communication services and shall facilitate successful establishment of these systems.

a) Pursuant to conditions of the Decision ECC/DEC (06)13, the successful establishment of UMTS, LTE, and WiMAX mobile technology has been determined, and described in Annex 1.

b) Pursuant to conditions of the Decision ECC/DEC (06)13 has been defined the successful establishment of IoT mobile systems, described in Annex 2.
c) Regulatory administration in compliance with the Decision ECC/DEC (06)13 shall define the necessary measures to ensure continuous protection and operation of GSM systems in 900 MHz band.

d) Through the Decision ECC/DEC(06)13 is described and clarified that the frequency band 880-915/925-960 MHz has been allocated to UMTS, LTE, WiMAX, and IoT systems, subject to market demand and national authorization scheme on the right to use the frequency resources in these bands.

e) Pursuant to decisions, reports, and recommendations marked in this document and national authorization schemes and granting the right to use frequency resources, necessary measures shall be taken in order to ensure co-existence of GSM, UMTS, LTE, WiMAX and IoT mobile systems in the band of 900 MHz;

4.2 In order to enable the operation of GSM 900 networks and GSM, UMTS, LTE, WiMAX, and IoT systems without harmful interferences, the following conditions must be met:

- UMTS900/1800 networks can co-exist with other UMTS900/1800 networks in the same geographical area with a carrier separation of 5 MHz the recommended carrier separation between two uncoordinated UMTS networks is 5 MHz or more.
- UMTS900/1800 networks and GSM900/1800 networks are in uncoordinated operation, the recommended carrier separation between UMTS carrier frequency and the nearest GSM carrier frequency is 2.8 MHz or more.
- Frequency separation between carriers (channels) edge of the GSM/DCS1800 and LTE channel edge of neighbouring GSM/DCS 18000 and LTE networks must not be under 200 kHz.
- No frequency separation is required between the UMTS carrier’s edge and LTE channel edge of neighbouring UMTS and LTE networks.
- No frequency separation is required between LTE channel edge of two LTE neighbouring networks;
- Frequency separation between GSM carrier’s edge and WiMAX channel edge of GSM and WiMAX neighbouring networks must not be less than 200 kHz.
- No frequency division space is required between UMTS carriers edge and WiMAX channel edge of UMTS and WiMAX neighbouring networks;
- No frequency division space is required between WiMAX channel edges of two WiMAX neighbouring networks.

4.3) The use of radio frequencies of 900 MHz band for GSM and for terrestrial mobile systems of GSM/UMTS/LTE/WiMAX in border area with neighbouring countries, is coordinated in accordance with recommendations CEPT/ECC ECC/REC (05) 08 of ECC/REC (08) 02.

7. UMTS transmitter channel width is 5 MHZ.
8. GSM transmitter channel width is 200 kHz, while that of UMTS is 5 MHz.
9. This limit applies also to GSM-R networks operating on the 876-880/921-925 MHz band

**ANNEX 1. Description for GSM, UMTS, LTE, and WiMAX (except - IoT mobile systems)**
<table>
<thead>
<tr>
<th>Technology</th>
<th>Terminology in ITU-R M.1457 [21] Recommendation</th>
<th>Standard Development Organization (SDO)</th>
<th>Terms used by SDO</th>
<th>Applicable standards of ETSI</th>
<th>Other commonly used terms</th>
</tr>
</thead>
</table>

(1) This radio interface includes an option using OFDM module (orthogonal frequency-division multiplexing).
(2) This radio interface supports FDD.
SDO – Standard Development Organizations
ANNEX 2. DESCRIPTION AND TECHNICAL CONDITIONS OF IoT MOBILE SYSTEMS

The following technical conditions, as defined by ECC/DEC (06)13 shall be applied as a basic component necessary to ensure co-existence between neighbouring networks. The operators may agree, on a bilateral or multilateral basis, for different technical parameters, provided that they continue to be in conformity with applicable technical conditions on protecting other services, applications, or networks and with their cross border obligations as well.

Table 2: Description and Technical Conditions for IoT Mobile Systems

<table>
<thead>
<tr>
<th>Technology</th>
<th>Applicable standards of ETSI</th>
<th>Technical conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC-GSM-IoT</td>
<td>EN 301 502 [22] EN 301 511 [23] EN 301 908-18 [24]</td>
<td>No specific requirements except GSM (Note 1) and applicable harmonised standards</td>
</tr>
</tbody>
</table>
A frequency division of 200 kHz or more, between the independent NB-IoT channel edge of a network and UMTS/LTE channel edge of a neighbouring network.  
A frequency division of 200 kHz or more, between the independent NB-IoT channel edge of a network and GSM channel edge of a neighbouring network.  
In the band modality:  
No specific requests except LTE (Note 2) and application of harmonised standards  
Protective band modality  
Frequency division of 200 kHz or more, between NB-IoT channel edge and operator block edge, considering the existing protective bands between operator block edge or operating band edge (together with other services). |

Note 1; Requests on frequency allocation in GSM as defined in the ECC 266 Report  
Note 2; Requests on frequency allocation in LTE as defined in the ECC 266 Report  
Note *; IoT – Internet of Things
Terms used in this allocation plan shall have the following meaning:

- GSM/DCS1800 system is an electronic communication network in compliance with GSM standards published by ETSI, in particular EN 301 502 and EN 301 511;

- TRA-ECS, (Terrestrial Radio Applications Capable of Providing Electronic Communications) systems, for the purpose of this allocation plan, include UMTS, LTE, and WiMAX systems as well;

- UMTS (IMT-2000/UMTS or W-CDMA) system is an electronic communication network, in compliance with UMTS standards published by ETSI, in particular EN 301908-1, EN 301908-2, EN 301908-3, and EN 301908-11. In the recommendation ITU-R M.1457, the UMTS system is referred to the term IMT-2000 CDMA – Direct spread;

- IMT-2020 is a term developed by the Radio Communication Sector of ITU in 2012 for development of the "IMT 2020 and beyond" vision. The ITU has set a deadline requiring for the standard to be completed in 2020. In addition, the name IMT-2020 follows the same naming structure as IMT-2000 (3G) and IMT-Advanced (4G). The IMT-2020 capacities have been identified, which are aimed at making it more flexible, credible, and more secure than the previous IMT, when providing various services to target use scenarios, including extension of mobile broadband services (eMBB), low-latent communications (URLLC), and mMTC - massive machine type communications

- LTE system - Long-Term Evolution, is a standard of high speed wireless communication for mobile devices and data terminals, based on GSM/EDGE and UMTS/HSPA technologies, respectively an electronic communication network in accordance with LTE standards published in the ETSI document, EN 301908-1, EN 301908-13, EN 301908-14, and EN 301908-11. In the Recommendation ITU-R M.1457, the LTE system is referred to the IMT-2020 CDMA term Direct Spread (E UTRAN) 2;

- The WiMAX system is an electronic communication network in accordance with the WiMAX standards published by ETSI, particularly EN 301908-1, EN 301908-21, and EN 301908-22. In the Recommendation ITU-R M.1457, the WiMAX system is referred to the term IMT-2000 OFDMA TDD WMAN3.

- 3GPP - 3rd Generation Partnership Project unites (seven) standard telecommunication development organizations (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC), known as "Organizational Partners" and provides their members a sustainable environment to produce reports and specifications determining 3GPP technologies.

**E-UTRAN (Evolved Terrestrial Radio Access Network)** Universal Terrestrial Radio Access Network is a radio technology used between portable terminals and base stations of 3GPPTM systems, widely known as "Universal Access Terrestrial Radio" (UTRA) and the access network as "Universal Terrestrial Radio Access Network" (UTRAN)

**IoT** is an abbreviation for Internet of Things. The Internet of Things refers to the ever growing network of physical objects presented with features of an IP address for internet connection and communication that occurs between these objects and abilities of other devices or systems connected to internet. IoT in general is referred to the multiple devices networks or technology platforms that communicate with one another through IP protocols and without direct action of people.