

CONTENTS

III. MANAGEMENT OF SCARCE RESOURCES	109
1. Radio frequency spectrum	109
1.1. Allocation, planning, granting, and efficient use of the radio frequency spectrum	110
1.2. National and international coordination	115
1.3. Electromagnetic compatibility	116
2. Numbers and addresses	116

III. MANAGEMENT OF SCARCE RESOURCES

1. Radio frequency spectrum

The National Radio Frequency Spectrum Allocation Plan is a basic normative act related to the spectrum management. The National Plan is prepared by the National Radio Frequency Spectrum Council (NRFSC) in accordance with documents of international organizations and/or their competent authorities and with proposals of interested administrations and agencies for harmonization and efficient use of frequency resources. The plan shall allocate radio spectrum frequencies, frequency bands and radio services for civil purposes, for the purposes of government departments and agencies related to the national security, and for their shared use. In accordance with the LEC, CRC manages the frequency spectrum allocated for civil purposes complying with the principles of statutory, predictability, transparency, publicity, consulting, non-discrimination, proportionality, neutrality towards the used technologies and/or services provided, and restricting the regulatory intervention to the minimum required.

In 2008, the CRC adopted a regulatory policy for the management of radio spectrum for civil purposes, which respects the electronic communications trends in global and European scale. It is prepared in accordance with the Government policy on planning and allocation of spectrum, ITU Radio Regulations, decisions and recommendations of the European Commission and the Electronic Communications Committee of the European Conference of Postal and Telecommunications Administrations (CEPT). The regulatory policy sets out the main objectives, mechanisms and approaches for management of radio spectrum for civil purposes by the end of 2010.

The specific allocation of frequency bands and the terms and conditions of their use, including technical parameters and characteristics of radio equipment, are specified in the technical requirements for operation of electronic communications networks by different radio services and relevant equipment, the General requirements for the provision of public electronic communications, the Regulation on performance of electronic communications for private purposes by means of radio equipment, using radio spectrum that doesn't need to be individually assigned, and the List of radio equipment using harmonized EU frequency bands, and of electronic communications terminal equipment.

CRC follows the European Community policy on the management of radio spectrum for civil purposes, and depending on the national peculiarities, provides conditions for implementing the Commission decisions on the harmonized use of spectrum in the Community. A flexible and neutral radio frequency regulation is applied to radio frequency spectrum, where possible, in accordance with the opportunities for liberalized use of the frequency resource, introduced by the LEC. The adoption of the Rules on procedures for the transfer of authorizations for use of individually assigned scarce resource favoured the emergence of a secondary spectrum market in Bulgaria. The undertakings may transfer their authorizations issued for the utilization of individually assigned radio frequency, or part of the rights and the respective duties contained therein, upon prior permission of CRC.

The convergence of electronic communications networks and services, the rapid penetration of the new wireless technologies on the market, and the need to ensure conditions for a flexible and neutral use of radio frequency spectrum are a precondition for implementing new approaches to the frequency resources management. Providing a rapid and easy access to radio resources, reducing regulatory intervention to the minimum required, and applying the principle of technological neutrality lead to optimizing the economic benefits of the spectrum use.

Market penetration of new wireless applications raises the question of how old and new applications can work together without interfering each other. As a result of the technological and economic development, the demand of radio frequency resource worldwide is growing steadily, so that availability of spectrum in certain frequency bands is increasingly reduced. The CRC provides conditions for optimal and efficient management of radio frequency spectrum, in order to avoid the possibility that the lack of radio frequency resource may impede the new communications services and technologies from market entry, and may prevent innovations and competition development to detriment of the consumers and of the European single market competitiveness. The optimal management of the radio frequency spectrum and its effective use are preconditions for economic growth in the electronic communications sector, for meeting the business and population needs of advanced, technologically efficient and quality communications and information services.

1.1. Allocation, planning, granting, and efficient use of the radio frequency spectrum.

In accordance with its legal competence, CRC allocates, plans and grants individual rights of use for radio frequency spectrum. The authorizations granted specify the conditions, the specific technical characteristics and the parameters of the electronic communications networks that undertakings should observe, in order to ensure efficient and non-interfered use of the frequency resource provided to them.

Undertakings, using radio frequency spectrum, which doesn't need to be individually assigned, observe the conditions, the technical characteristics and parameters defined in the General requirements for the provision of public electronic communications, the Regulation for performance of electronic communications for private purpose by means of radio equipment using radio frequency spectrum that doesn't need to be individually assigned and the List of Radio Equipment using harmonized EU frequency bands, and of electronic communications terminal equipment.

With the amendments to the General requirements in the Bulgarian legislation, Commission Decision 2008/294/EC on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft in the Community and the Commission Recommendation 2008/295/EC on authorisation of mobile communication services on aircraft in the European Community have been transposed. Thus, the airline passengers were allowed to use public communications networks during flight without establishing direct connections to terrestrial mobile networks. The conditions for using frequency bands 10.70-12.75 GHz, 19.70-20.20 GHz, 14.00-14.25 GHz, and 29.50-30.00 GHz by satellite terminals, performing digital electronic communications through satellites in geostationary orbit were facilitated.

Commission Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband (UWB) technology in a harmonised manner in the Community has been transposed by the adoption of the List of Radio Equipment using harmonized EU frequency bands, and of electronic communications terminal equipment. Through the transposition of this decision the frequency bands for these devices have been determined in the List, as well as the technical requirements related to the use of the radio frequency spectrum on non-interference basis and to the provision of protection against interference to networks of undertakings with granted right to use individually assigned radio frequency spectrum. More efficient use of the radio spectrum was ensured with the introduction of conditions for use of radio frequency resource by UWB devices.

Bulgaria has also transposed the Commission Decision 2008/411/EC on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community and Decision 626/2008/EC of the European Parliament and the Council on the selection and authorisation of systems providing mobile satellite services. The opportunity was analyzed and steps were taken towards the implementation of Decision 2008/432/EC amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and Decision 2008/671/EC on the harmonised use of radio spectrum in the 5875-5905 MHz frequency band for safety-related applications of Intelligent Transport Systems.

The Bulgarian request for derogation to Decision 2008/477/EC on the harmonisation of the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community was granted by the Commission on 16 December 2008 (Decision 2009/1/EC granting a derogation requested by the Republic of Bulgaria pursuant to Decision 2008/477/EC). The transition period for the implementing of the Decision is until end of 2010.

Upon the allocation and planning of the radio frequency spectrum, an analysis is performed on the usage of the frequency resource in Bulgaria, as well as the extent of its effective allocation and use. A study of the global electronic communications sector is carried out, including the emergence of new applications and technologies that use frequency resource. In 2008, the current Decisions and Recommendations of the Electronic Communications Committee, concerning the use of radio frequency spectrum have been reviewed and analyzed regarding their possible implementation in Bulgaria, which resulted in sending the necessary information on their implementation in Bulgaria to the European Radio Office.

Taking into account the national peculiarities regarding the use of radio frequency spectrum, the CRC made the specific allocation of the spectrum for civil purposes, and the frequency planning in accordance with the ITU Recommendations, the Decisions and the Recommendations of the Electronic Communications Committee of the CEPT and the Decisions of the European Commission. The CRC grants rights of use for radio frequency spectrum upon examination the technical feasibility for the provision of electronic communications through the appropriate electronic communications networks on case-by-case basis, testing the electromagnetic compatibility and biological protection, national and, if necessary, international coordination.

The National Radio Frequency Spectrum Allocation Plan has not been updated since 2006; therefore it is still not fully harmonized with the European frequency allocations, both in terms of radio services, and users. The reason is the refusal of the Ministry of Finance to reconcile financial statement for the amendment and supplement of the Plan. In this regard, CRC continues to encounter difficulties concerning the provision of frequency resource for introducing new technologies and applications rendering advanced and quality services, which in turn hinders the development of a competitive communications sector and the increase of social and economic benefits arising from the radio spectrum usage. This evolves from the fact that a significant part of the frequency resource is used by state authorities and its release for civil purposes depends on the provision of targeted funds in the state budget for modernization of the existing communication means of state authorities and agencies, as well as purchasing new ones. Therefore, for example, Bulgaria has not yet implemented the provisions of Decision 2005/928/EC on the harmonisation of the 169,4-169,8125 MHz frequency band (EX-ERMES band) as amended by Decision 2008/673/EC.

Mobile Radio Service (MRS)

After conducting public consultations regarding the opportunities for use of the available scarce resource radio frequency spectrum in 900 MHz frequency band, CRC provided an additional frequency resource (2x1,8 MHz) in 900 MHz band to each of the three undertakings, providing electronic communications through mobile terrestrial networks – GSM, for extension, modernization and development of their networks.

In 2008, as a result of the frequency spectrum planning in 1800 MHz band, a frequency resource for assignment to public electronic communications operators of mobile terrestrial network - GSM with national coverage, was determined.

CRC announced its intention to grant authorization for individually assigned scarce resource - radio spectrum for providing public electronic communications through mobile terrestrial network - GSM, with national coverage, for 20-year period of use of 2x5 MHz in 1800 MHz band. The procedure was initiated on the basis of an application for radio frequency spectrum use, made by MAX TELECOM OOD. After receiving the applications of 12 undertakings, CRC announced secret bidding tender with a starting auction price of BGN 38 million. Only one undertaking applied within the legal defined deadline, but because of its non-admission CRC terminated the tender procedure without a winner.

After conducting public consultations regarding the opportunities for use of the available scarce resource - spectrum in 1800 MHz frequency band, CRC announced 2 secret bidding tenders for the granting of 1 authorization for individually assigned scarce resource – radio frequency spectrum for providing public electronic communications through mobile terrestrial network - GSM, with national coverage, for 20-year period of use of 2x15 MHz and one authorization for usage of 2x10 MHz. Due to the lack of submitted applications, CRC terminated both tenders.

As a result of the phased digitalization of the network of Bulgarian Telecommunication Company AD, which has authorization to use an individually assigned scarce resource - radio frequency spectrum for providing public electronic communications through a mobile terrestrial network - NMT/CDMA, in 2008, frequency resource was released for the introduction of digital technologies in the 460 MHz band - CDMA-PAMR. The introduction of digital technology in that band creates conditions for development and modernization of existing mobile terrestrial networks, efficient use of already assigned radio frequency spectrum, and provides the opportunity for voice and data transmission or only data at high speeds and introducing of advance and more diverse end-user services.

In 2008, the CRC issued a temporary authorization for individually assigned scarce resource - radio frequency spectrum for providing electronic communications for private purposes through mobile terrestrial network - GSM-R, to the National Railway Infrastructure Company.

Fixed Radio Service (FRS)

In 2008, various undertakings were granted frequencies for 2746 radio relay links, and thus their total number exceeded 11800. The upward trend in the number of radio relay links continued, and respectively, an acute spectrum shortage was registered in fixed radio service,

especially in the 10 GHz frequency bands, which enable the establishment of long distance radio links. Over the year, authorizations were granted for individually assigned radio frequency spectrum in bands below 10 GHz for building of point-to-point networks with total digital capacity up to 1244 Mbit/s in one direction. Such high tech radio relay links require strict observation of the requirement for effective use of the radio frequencies and the Technical requirements for operating electronic communications networks of fixed radio service and the relevant equipment.

Compared to 2007, the relative share of radio relay links in the strategic band for broadband transmission 6 GHz has increased from 1.9 percent to 2.7 percent of the total number of radio relay links, as there are built digital systems with synchronous digital hierarchy (SDH) with a capacity of 155 Mbit/s and nx155 Mbit/s.

A growing part of the transmission is made through radio relay links, using a spectrum of high-frequency bands. 18 GHz band has sustained 27 percent share of the total radio relay link number. The development of electronic communications networks with high density of electronic communications in high-frequency bands continued. Over the year, the radio relay links in the bands 26 GHz, 28 GHz and 38 GHz, with authorization for radio spectrum usage, exceeded the number of all existing radio relay links in 2001. In percentage terms, this represents 25.4 percent of the total number of authorized radio relay links. This accelerated growth was due to the energy peculiarity of the high-frequency bands.

The definite predominance of the time division duplex (TDD) technologies and the predominance of IP technology with its 5MHz frequency allocation called for consolidating spectrum assigned to undertakings, authorized to provide electronic communications through the point-to-multipoint electronic communications networks in the band 3.4-3.6 GHz. In 2008, the CRC allowed a second exchange of the assigned frequency blocks between two operators with granted spectrum 2x10.5 MHz in that band, as a result of this the new frequency blocks were extended to 21 MHz continuous spectrum, which facilitated the networks planning according the selected by the undertakings technology WiMax.

Satellite Radio Services

In regulating the use of radio frequency spectrum by satellite radiocommunication services, the trend has been maintained toward providing less restrictive conditions for use of radio frequency spectrum and introducing simplified procedures for spectrum resource access aimed at development of satellite electronic communications and services delivered to the end-user.

With the amendment and supplement of the General requirements for provision of public electronic communications, Decisions ECC/DEC/(06)02 and ECC/DEC/(06)03 of the Electronic Communications Committee on Exemption from Individual Licensing of high Equivalent Isotropic Radiated Power (e.i.r.p.) Satellite Terminals (HEST) and low e.i.r.p. satellite terminals, operating within the frequency bands 10.70-12.75 GHz or 19.70-20.20 GHz (Space-to-Earth) and 14.00-14.25 GHz or 29.50-30.00 GHz (Earth-to-Space) have been implemented. Thus, the procedures for access to frequency resource were simplified and the conditions for using the radio frequency spectrum of satellite terminals, performing digital electronic communications through satellites in geostationary orbit were facilitated. Conditions for the development of electronic communications satellite services were created, which in turn is a precondition for market penetration of new satellite technologies and

expansion of the scope, quality and marketing of the services, carried by the satellite electronic communications networks.

Broadcasting

Analogue broadcasting

In 2008, CRC assigned 3 frequency channels to undertakings providing electronic communications through terrestrial analogue television broadcasting networks with national coverage for expanding and improving the network coverage and 1 frequency to an undertaking providing electronic communications through terrestrial analogue radio broadcasting network with national coverage. In view of radio-frequency interference registered on the networks, CRC assigned 2 new-planned frequencies to undertakings authorized to use the individually assigned scarce resource - radio frequency spectrum for provision of electronic communications through an electronic communications terrestrial analogue radio broadcasting network with local coverage. An inquiry was held, under CEM request, that provided information on the availability of 8 frequency assignments, including technical parameters, power allowed, stations coordinates and further technical information for the cities Silistra, Gotse Delchev, Pazardzhik and Devin.

76 technical characteristics of electronic communications terrestrial analogue radio broadcasting networks were examined and analyzed, as 36 of them were of undertakings, authorized for individually assigned scarce resource - radio frequency spectrum for provision of electronic communications through electronic communications terrestrial analogue broadcasting networks with national coverage, and 40 – to undertakings, authorized for individually assigned scarce resource - radio frequency spectrum for provision of electronic communications through electronic communications terrestrial analogue broadcasting network with local coverage. Another 31 technical characteristics of undertakings, authorized for individually assigned scarce resource - radio frequency spectrum for provision of electronic communications through electronic communications terrestrial analogue television broadcasting network were examined, as 22 of them were of undertakings providing of electronic communications services with national coverage, and 9 of them – of undertakings providing electronic communications with local coverage.

Digital broadcasting

The adoption of the Plan for the introduction of terrestrial digital terrestrial television broadcasting (DVB-T) in the Republic of Bulgaria by Council of Ministers, in early 2008, was the first step to launching the process of transition from analogue terrestrial television broadcasting to digital terrestrial television broadcasting and introducing new technologies in the field of radio and television broadcasting. Actually, the transition to digital terrestrial television broadcasting is expected to start with the amendment of the legislative framework that will enable the competitive selection procedures for undertakings that may receive authorizations for individually assigned scarce resource - radio frequency spectrum for provision of electronic communications through terrestrial digital broadcasting networks. With the introduction of digital terrestrial television broadcasting significantly higher efficiency of radio frequency spectrum use is achieved, wherefore, after completion of the transition period, a release of frequency resource, the so-called "digital dividend", is expected. This will enable the released radio frequency spectrum to be used by new advanced digital technologies and wireless broadband applications, ensuring the provision of a variety of quality services and public access to advanced digital services in remote and rural areas. The opportunity for using the digital dividend can be achieved, provided that the radio frequency spectrum used by the Ministry of Defence in IVth and Vth TV bands will be released for civil purposes.

The transition to terrestrial digital television will be, in its own way, difficult in view of the belated preliminary preparation in Bulgaria and the fact that an essential part of the radio frequency spectrum is used by the State for other purposes.

After studies and technical analyses, carried out to determine the technical parameters and the operational conditions and requirements, BNR was granted a temporary authorization for individually assigned scarce resource - radio frequency spectrum for provision of terrestrial digital radio broadcasting in the shortwave range, based on the DRM (Digital Radio Mondiale) technology.

1.2. National and international coordination

National coordination and agreement with all state authorities, institutions and services concerned is carried out with the aim of ensuring aeronautical and maritime navigation safety and protection of national security, and of efficient use of the radio frequency spectrum. In 2008, in the Advisory council for national coordination and agreement to the CRC, 2386 radio frequencies and radio frequency bands were coordinated and agreed.

Upon requests received from foreign administrations, international coordination of radio frequency assignments of 28 foreign VHF-FM radio stations with the appropriate technical parameters, in accordance with the Regional Agreement relating to the Use of the Band 87.5 - 108 MHz for VHF-FM (FM) sound broadcasting, Geneva, 1984 (Geneva, 1984), was carried out. Objections were made to 4 frequency assignments in order to protect the Bulgarian broadcasting stations from interference.

In accordance with the Regional Agreement for the introduction of terrestrial digital radio and television broadcasting in the frequency bands 174-230 MHz and 470-862 MHz, Geneva, 2006 (Geneva, 2006), 52 frequency assignments and the appropriate technical parameters of the terrestrial digital television broadcasting (DVB-T) upon foreign administrations' requests were coordinated. Objections were made to 4 frequency assignments.

All two-week circulars for 2008 of the ITU Radiocommunication Bureau (ITU-R) related to the international information on frequencies BR IFIC (BR International Frequency Information Circular) for terrestrial radio services were processed and analyzed. In this respect, 260 frequency assignments to foreign administrations were coordinated under Geneva-1984, 42 under Geneva-2006 and 1 under the Regional agreement concerning the Use by the Broadcasting Service of Frequencies in the Medium Frequency Bands in Regions 1 and 3 and in the Low Frequency Bands in Region 1 (Geneva, 1975).

Part of the internationally coordinated, for Republic of Bulgaria, radio frequency allocations were converted into radio frequency assignments for the relevant allotments. As a result, in the digital broadcasting plan Geneva 2006, radio frequency assignments and corresponding technical parameters of 153 Bulgarian DVB-T transmitters were recorded.

The frequency assignments for satellite networks or earth stations of all two-week BR IFIC circulars for the space radio services were processed and analyzed. As a result of the technical studies and calculations carried out, correspondence with ITU and concerned foreign administrations was conducted, in order to protect Bulgarian assignments for terrestrial, satellite and space radio services from interference.

1.3. Electromagnetic compatibility

In 2008, electromagnetic compatibility analyses of 121 Bulgarian and 267 foreign VHF-FM broadcasting stations with the aeronautical navigation systems ILS, VOR and COM were carried out.

Towards the provision of the on-site electromagnetic compatibility and the radio services electromagnetic compatibility, 76 technical characteristics of radio broadcasting stations and 31 technical characteristics of television broadcasting stations were examined and analyzed.

In order to solve the problem with cross-border interference, a power increase of some of the broadcasting stations in border regions was allowed. In this regard, in October 2008, with the view of ensuring the aeronautical safety, joint measurements were made with representatives of Directorate General of Civil Aviation, of CRC and of State Agency for National Security, for determining the levels of harmful emissions in the navigation and communication frequency channels in terms of increased power of the VHF-FM broadcasting stations for Varna city.

Due to the identified possible interference while carrying out electromagnetic compatibility analysis with aeronautical radio services, 9 measurements were made under the Methodology for measuring of A1 type intermodulation products, generated by the operation of closely situated VHF-FM radio broadcasting stations.

2. Numbers and addresses

The CRC is responsible for the management of National Numbering Plan (NNP). It is related to analysis of the use of all types of numbers and codes, establishing and implementing a policy that ensures the efficient use of the numbering resource and capabilities for identifying bands of numbers for new services and networks.

In accordance with the LEC provisions, **Ordinance No. 7 of 1 July 2008, regarding the rules of allocation and the procedures of primary and secondary assignment for use, reservation and withdrawal of numbers, addresses and names** was adopted. In order to improve efficiency in the scarce resource use, the minimum group of geographic numbers, which can be assigned to an operator, was reduced to 100 numbers. As a result, the number of requested numbers by operators decreased, and alternative operators have renounced the use of a total of 36 300 geographic numbers.

In accordance with Art.107 of the LEC, the granting of authorizations for individually assigned scarce resource - numbers, started, as authorizations of 8 operators were set up in accordance with LEC. Authorizations and respectively assigned numbers to 2 new companies have been granted.

Over the past year, the alternative undertakings, providing fixed telephone service, have been provided with 172 900 geographic numbers and 136 addresses (135 national and 1 international signalling point codes).

Number 116111 was assigned to the State Agency for Child Protection, which is a European harmonized number for provision of harmonized service of social value “child helpline”.

Alternative undertakings continue to develop their networks and increase the number of their subscribers, which is confirmed by the numbering resource assigned to them, in 2008. This is a precondition for expansion of the competition and provides the potential for successful

introduction of number portability in fixed networks. Despite that trend, their share in the fixed voice services market is still low.

Table No. 19

Year	Assigned numbers to alternative undertakings
2003	145 000
2004	207 000
2005	242 000
2006	166 000
2007	324 000
2008	172 900
Total:	1 256 900

As a result of the digitalization process of the fixed telephone network of BTC AD and improved efficiency of utilization of scarce resources – numbers, in 2008:

- resource of total **3 163 000** numbers in different geographic regions in the country was released;
- **52** geographic regions were dropped out of the list of regions with insufficient numbering resource;
- a total of **332 000** numbers have changed from incomplete to full length of the national significant number;

Moreover, 10 short numbers for access to services with first digit 1, as well as number 13000 - national fault reporting service telephone number, were released.

An increase was also observed in the number of the million groups, used by the operators providing services through terrestrial mobile networks, as in 2008 additional 2.000.000 numbers were assigned, as follows:

Table No. 20

GSM operator	Used numbers by the end of 2008
MOBILTEL	12 000 000
COSMO BULGARIA MOBILE	10 000 000
BTC MOBILE	5 000 000
Total:	27 000 000

Number portability

As a result of the CRC efforts and those of the operators, the disputes in the procedure for implementing of portability were overcome and number portability in mobile networks was launched on 11 April 2008. The CRC periodically required operators' information on the number of ported numbers, problems alongside the portability, and complaints by end-users. By December 2008, subscribers to the three mobile operators, who took the opportunity to keep their number when changing operator, were approximately 24 000, which was less than 1 percent of the subscribers of mobile operators.

One of the main priorities in the CRC activity, in 2008, was the start of the number portability in fixed networks. There were prepared and published Functional Specifications for Fixed Number Portability, when changing the fixed telephone service operator or changing the address within a National Destination Code. The operators started negotiations for preparing of Procedures on the fixed numbers portability, which included the CRC in the role of mediator. In order to facilitate subscribers and companies participating in the portability, following lists have been prepared and published on the website of the Commission: *List of Geographical Area Codes, where portability is possible, and operators who have provided numbers in the appropriate geographical area codes* and *List of geographical area codes, where numbers portability is possible in and outside the BTC AD network*.

Portability of mobile numbers was another major task in the CRC activity, in 2008. CRC Decision of 19 December adopted the Functional Specifications for the implementation of mobile numbers portability when changing the mobile service operator.