



Czech Telecommunication Office
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On the basis of public consultations, in compliance with the Act No. 500/2004 Coll., the Administrative Procedure Code, as subsequently amended, under Section 130 of the Act 127/2005 Coll., on electronic communications and on amendment to certain related acts (the Electronic Communications Act), as subsequently amended (hereinafter “the Act”) and on the basis of decision of the Council of the Czech Telecommunication Office (hereinafter the “Office”) under Section 107(9)(b)(2) of the Act and in order to implement Sections 9 and 12 of the Act, the Office as the appropriate state administration body under Section 108(1)(b) of the Act hereby issues this Measure of General Nature

General Authorization No. VO-R/14/12.2012-17
for the use of radio frequencies and for the operation of equipment in the 10 GHz band.

Article 1
Introductory provisions

The apparatus operating conditions^{1),2)} relating to the use of radio frequencies and to the operation of transmitting radio equipment of the fixed service used for transmission of signals in the 10 GHz band (hereinafter the “stations”) by natural persons or legal entities (hereinafter the “operator”) are laid down in the Act and in this General Authorization under Section 10(1) of the Act.

Article 2
Factual common conditions

The factual conditions related to Section 10(1)(m) are as follows:

- a) radio frequencies may be used by operator of the station without individual authorization for the use of radio frequencies (hereinafter the “General Authorization”);
- b) stations can be a part of the fixed point-to-point radio systems only;

¹⁾ Sections 73 and 74 of the Act.

²⁾ European harmonized standard ČSN EN 302 217 – Fixed radio systems – Characteristics and requirements for point-to-point equipment and antennas.

c) stations use these frequencies:

Channel No.	Channel centre rated frequency [MHz]	Maximum occupied bandwidth [MHz]
0	10 308	14
1	10 322	28
1a	10 336	14
2	10 350	28
2a	10 364	14
3	10 378	28
3a	10 392	14
4	10 406	28
7	10 490	28
7a	10 504	14
8	10 518	28
8a	10 532	14
9	10 546	28
9a	10 560	14
10	10 574	28

d) for transmission of signal which does not require full occupied bandwidth, the station may use additional channels whose centre frequencies are derived from frequencies of above mentioned channels by the following formulas:

$$f = f_n \pm 7 \text{ MHz} \quad \text{for maximum occupied bandwidth 14 MHz}$$

or

$$f = f_n \pm 3.5 \text{ MHz} \quad \text{for maximum occupied bandwidth 7 MHz,}$$

where f is rated centre frequency of additional channels [MHz] and f_n is rated centre frequency of channel [MHz] listed in table under letter c), whereas the channel with rated centre frequency 10 301 MHz shall not be used;

- e) the frequency difference of used frequency shall not be greater than 10^{-4} ;
- f) the mean power³⁾ delivered by the station into antenna feeder shall not exceed 2 mW;
- g) the station shall be set to a fixed frequency; the function of the automatic selection of the transmitting radio channel is prohibited;
- h) the spectral power density at state border shall not exceed value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$;
- i) the station shall use horizontal or vertical linear polarisation of the electric component of the electromagnetic field; this is not valid in case of the cross polarisation. Emissions of antenna at angles greater than 10° from axis of the emissions shall be suppressed to at least 20 dB;
- j) the use of radio frequencies by operator of the station has not ensured protection from harmful interference caused by the use of radio frequencies within a primary radiocommunication service on the basis of individual authorization and in the same time it shall not cause harmful interference to users using radio frequencies in a primary radiocommunication service on the basis of individual authorization. Possible harmful interference between the stations of the operators using radio frequencies on the basis of General Authorization is settled by natural persons and legal entities by mutual agreement. If agreement is not reached, the procedure under Section 100 of the Act applies.
- k) the station may be neither electrically nor mechanically modified.

³⁾ Mean power is average power delivered by station under normal operational conditions into antenna feeder for sufficiently long period in comparison with the lowest modulation frequency.

Article 3 **Final provision**

Also considered as a station complying with the Government Order No. 426/2000 Coll., laying down the technical requirements for radio equipment and telecommunication terminal equipment, as amended, is any station for which the Office decided to approve the radio equipment in accordance with Section 10 of the Act No. 151/2000 Coll., on telecommunications and on amendment to related acts, as amended, provided that such a station was placed to the market before 1 April 2003.

Article 4 **Repealing Provisions**

This is to repeal General Authorization No. VO-R/14/06.2012-8 for the use of radio frequencies and for operating of equipment in the 10 GHz band, ref.: 69 371/2012-613, of 21 June 2012, published in Issue 8/2012 of the Telecommunication Bulletin.

Article 5 **Effect**

The General Authorization is effective from 15 January 2013.

Explanatory Memorandum

To implement Sections 9 and 12 of the Act, the Office issues Measure of General Nature by which is issued the General Authorization No. VO-R/14/12.2012-17 for the use of radio frequencies and operation of equipment in the 10 GHz band (hereinafter the "General Authorization").

The General Authorization is based on the principles set out in the Act, on the frequency plans and harmonisation objectives of the European Union and it replaces previous general authorization repealed by Article 4 of the General Authorization.

Article 2 contains conditions for operation of fixed transmitting radio equipment serving for transmission of signals in the 10 GHz band. These conditions are based on the Directive No. 1999/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity and on the requirements resulting from exercising radio spectrum management.

In 10 GHz frequency band the fixed service has exclusive use in the Czech Republic and sharing of spectrum between users of another radiocommunication service does not exist. In respect of many stations operated in this frequency band which are not equipped by function of the automatic selection of free channel, which means that operation of existing stations could be disrupted by devices with automatic selection of free channel, working merely on principle of the automatic changeover of the transmitting radio frequency, the Office after issuing of the General Authorization No. VO-R/14/06.2012-8, on the basis of initiatives of the experts and on the basis of its own findings, concluded that function of the automatic changeover of the transmitting radio frequency which is used with some devices accessible on market may cause harmful interference. The limit of unwanted emissions set down by harmonized standards is thus exceeded during automatic selection of a free channel. The prohibition of the function of the automatic changeover of radio frequency is nevertheless desirable also in case of this limit would not been exceeded since using this function, the links in entire sub-band of spectrum are interfered until the moment when mutually seeking devices will have tuned up free channel or the connection with opposite station.

Furthermore the Office on the basis of its survey and on the basis of Certificate No. 8551-

PT-R0167-12 of ČMI TESTCOM laboratory with comment of Authorized person AO 250 (NB1383) concluded that rigorous restriction of the polarization to horizontal or vertical which was set down newly in VO-R/14/06.2012-8, in case of the cross polar diversity is not justifiable due to the fact that equipment using polarization diversity in case of horizontal / vertical polarization, would cause harmful interference to links with horizontal or vertical polarization and could be itself much more interfered than in case of the use of tilted polarizations. On that account the condition of the limitation of the polarization was modified.

For this reason in this General Authorization, the Office carried out, in sense of Section 12 of the Act, from hereinbefore reasons, these changes compared to the General Authorization No. VO-R/14/06.2012-8:

- In article 2, new letter g) was added. It sets down that the station shall be set to a fixed frequency; the function of the automatic selection of the transmitting radio channel is prohibited.
- In article 2, letter h), (letter i) anew), the demand for linear polarization of the electric component of the electromagnetic field, horizontal or vertical was completed with statement “it is not valid in case of cross polarisation”.

Article 3 sets down the possibility of the operation of equipment placed to the market before 1 April 2003.

Article 4 repeals the General Authorization No. VO-R/14/06.2012-8.

Article 5 sets down the effect of the General Authorization according to Section 124(2) of the Act.

On the basis of Section 130 of the Act and in accordance with the Czech Telecommunication Office's Rules for consultation at the discussion site, the Office published on 12 September 2012 draft of the Measure of a general nature which issues the General Authorization No. VO-R/14/XX.2012-Y for the use of radio frequencies and for the operation of equipment in the 10 GHz band, and an invitation for submitting comments at the discussion site.

Within 1. round of public consultation, the Office received comments in accordance with Rules from three subjects which addresses partly requirement of possibility to use frequencies in FDD mode exclusively (Frequency Division Duplex) and designation of the minimal class of the spectral efficiency of the transmitting radio equipment and partly requirements of the implementation of European harmonization directives. Wording of these comments and their settlement is published in the table of settlement on the discussion site.

The comment addresses repeatedly the requirement of implementation European harmonization directives was also accepted by the Office even though it was received after the public consultation was closed.

The comment focused on exclusive utilization of frequencies in FDD mode was not possible to accept since such change could result in reasonless change of conditions, which are in force since 1994, in this frequency band.

It was not possible also to accept the comment related to the minimal class of the spectral efficiency of transmitting radio equipment. The Office receives frequently the requirements of applicants on granting individual authorization to use radio frequencies provided that the transmitting equipment has maximal class of spectral efficiency lower than class 5. The applicant has important reasons for choice of this transmitting equipment (i.e. price of the equipment, redundancy in excessive capacity of link, and the like). Furthermore, arguments related to the possibility of the use of the specific types of channel arrangements, in case of classes 5 or higher, they were incorrect. And so, it is not desirable to set down such requested limitation.

It was not possible to meet the requirement on strict implementation of European harmonization directives (namely the requirement of implementation CEPT Recommendation

CEPT/ERC/REC 12-05 –*Harmonized radio frequency channel arrangements for digital terrestrial fixed systems operating in the band 10–10.68 GHz*). The international treaties do not prescribe any obligation to implement CEPT recommendations thus the implementation of recommendation in question it would cause incompatibility between existing intensive use by the fixed service and new channel arrangement which is set down in recommendation in question. On this account, the Office did not use the implementation of this recommendation. With respect to the comment addresses allocation of the frequency sub-band 10.36–10.37 GHz to the amateur radiocommunication service on a secondary basis, it can be pronounced merely that the frequency sub-band 10–10.5 GHz has been already allocated to this service on a secondary basis according to relevant part No. PV-P/13/12.2007-15 of the Radio Spectrum Utilization Plan for frequency band 10–12.5 GHz.

Beyond scope of the mentioned comments, the Office received 13 standpoints and opinions (hereinafter only “contributions”). Part of the contributions related to the requirement for more precise formulation of letter i). “*The station can use linear polarization of the electric component of electromagnetic field, horizontal or vertical*”, it was set down in former, and still valid, wording of the general authorization. The word “may” was replaced by “shall”, due to prevention of the possible ambiguity of the explanation of formulation.

Some other comments were connected with option of the polarization, in particular to make possible horizontal or vertical linear polarisations only. On the basis of already issued information in this explanatory memorandum, the Office, after consideration of comments, enables to use so called “slant” polarizations, however only in case of the use of the cross polarization. The slight turn of the plane of polarization is not possible when only one polarization is used.

One of the comments also raised concern about the fact that on the basis of the present wording of the General Authorisation it would be expected the use of frequency band, in the question, for example by equipment for detecting movement, level probing meters, speed trap devices etc., that could comply with ETSI EN 302 217 standard. The comment contained the draft of completion that the frequency band in question is designated for transmission of the digital data. This request was not accepted by the Office since in conditions of the use of radio frequencies (Article 2), there is clearly indicated for what purposes the radio frequencies can be used (the point-to-point fixed radio systems) and furthermore, in relevant part of Radio spectrum utilisation plan is stated the scope of used radiocommunication service (fixed radiocommunication service). Aforementioned level probing meters and equipment for detecting movement do not belong into category of fixed radiocommunication service.

Another comment addresses the effectiveness of spectrum utilization in connection with spectral effectivity. This issue (demand for designation of the minimal class of spectral effectivity of transmitting radio equipment) is explained in the table of the settlement of comments at discussion’s site.

On the basis of Section 130 of the Act and in accordance with the Czech Telecommunication Office’s Rules for consultation, the Office published on 6 November 2012 second draft the General Authorization No. VO-R/14/XX.2012-Y and call for comments at discussion site. Once more the Office sent draft the General Authorization into public consultation (2. round of the public consultation) due to implementation of modifications in the pronouncement part of the General Authorization, namely after 1. round of the public consultation was finished. The time limit for consultation according to Section 130, paragraph 6 of the Act was reduced for 10 days due to prevention of delay releasing the General Authorization. The draft of General Authorization includes compared to existing version in force the specification of new conditions (e.g. aforementioned prohibition of function the automatic selection of transmitting radio frequency), namely due to prevention of harmful interference. This reduction of time limit of the public consultation was desirable when in addition the conditions has been already consulted within 1. round of the public consultation.

Within 2. round of the public consultation, the Office received comment from one subject. The comment referred to demand for insertion text into the General Authorisation which would recommend not to use particular parts of radio spectrum in favour other users of radio spectrum. The approval of this demand would lead to the support of the use of radio frequencies within a secondary radiocommunication service to the exclusion of the radio

frequencies in the framework of the fixed service in a primary radiocommunication service. The Office presents repetitively that use of the radio frequencies in the framework of the radio-amateur service shall not cause harmful interference in relation to the use in the framework of the fixed service and at the same time such utilization shall not claim protection.

In the framework of 2. round of the public consultation beyond framework of the Rules, a few comments was also received. Two comments from radio-amateur community had identical views in term of contents.

Another comment was received from subject which has already submitted comments in 1. round of the public consultation. In contribution the subject indicated that the Office did not settle not a single one from items submitted by company KPE s.r.o. Furthermore it is mentioned that ETSI EN 302 217-3 standard is determined for higher frequency bands only and explanation of the Office is mistaken. It is stated to this argument that the standard can be used basically also for 10 GHz frequency band and in addition it can be used also for other frequency bands under condition that frequency coordination is not performed (in accordance with definition *Frequency band where frequency co-ordination is not applied*, cited in ETSI EN 302 217-1 standard). The Office asked the chairman of ETSI ATTM TM4 for explanation whether the interpretation of the standard is correct according to the Office. The Chairman ETSI ATTM TM4 said that the interpretation of the Office is correct on principle but it is necessary to take into consideration also that in ETSI EN 302 317-3 is not defined 10 GHz band hence the framework technical parameters would be specified in relevant national regulative document (for this case thence in general authorization). This has been already fulfilled by the Office in the past when the basic technical parameters for sharing the frequency band in question were set down. For example the maximal level of power supplied to the antenna and maximal e.i.r.p. are set by Article 21 of Radio Regulations of ITU unless stated in other relevant document (ECC Recommendation, standard etc. as a rule). In case of the General Authorization, the Office set down maximal power supplied to the antenna at 3 dBm. The function *RF channel selection* is also applicable in general since the decisive levels proceed from common formula described in annex UD (*Rationale for the interference limit formula*) part 1.2 (*Theoretical background*) of ETSI EN 302 217-3 (version 1.3.1) standard, namely "*The following discussion is tailored to equipment in 58 GHz band, however the principles might be used in any band when frequency co-ordination is not applied*". Much like the Office set down condition of the frequency stability ((see letter e) of Article 2 of the General Authorization) and other parameters such as the width of the occupied band, or more precisely a formation of national channel arrangement. The definition of the width of occupied band is presented in Frequency Band Allocation Plan and was adopted from Radio Regulations. In this case the common definition is thought. For example Recommendation ITU-R F.1191 (*Necessary and occupied bandwidth and unwanted emissions of digital fixed service systems*) more explains this definition in relation to fixed service systems. The Office also set down basic parameters relates to antennas. The limits of spurious emission and its explanation is described in relevant ITU-R or CEPT Recommendations, namely e.g. Recommendation ITU-R SM.1539 and CEPT/ERC/ Recommendation 74-01 on which among others the standard ETSI EN 302 217-3 refers itself. The framework technical parameters of sharing of radio frequencies thus were set down and more specific parameters for particular technologies are presented in relevant CEPT, ITU-R or ITU-T Recommendations. However, matter of a comment, submitted within 1. round of the public consultation was to allow only FDD type of communication. Much like in the past the Office informed that it would cause unjustified change of the current conditions of the use of radio frequencies and privileging one type of communication, namely FDD. On that account, the Office did not approach this change.

In nowadays ETSI put the draft of version 2.0.0 of ETSI EN 302 217-2-2 standard to the public consultation. This version of standard will be applicable for digital radio equipment of point-to-point fixed links only using frequency duplex and not time duplex as subject mentioned itself. By all means, the subject did not mention the essential matter that version in question of this standard addresses those frequency bands in which frequency coordination is performed. This fact results from part Scope (General background) of the draft version 2.0.0 of ETSI EN 302 217-2-2 standard. Much like, in the past the Office several times mentioned that in 10 GHz band, the frequency coordination is not performed i.e. this frequency band can't be considered as coordinated. Received comments and demands are moreover inconsistent with fact that the

subject, at its own web pages www.pojitko.cz of 22 November 2012, adverts to its development of transmitting radio equipment based on principle of TDD (Time Division Duplex), namely in accordance with ETSI EN 302 217-2-2 standard.

Identically, the statement of the subject is not correct in matter of fact that ETSI EN 302 217-2-2 standard is the successor of ETSI EN 301 751 standard. As stated in remark of finished work item REN/TM-04126 about ETSI EN 301 751 standard of version 1.2.1, the successor standard is "family" of ETSI EN 302 217 standards ("*This deliverable has been replaced and superseded by the EN 302 217 series*"). The subject informs moreover that until 2012 in band in question, the transmitting radio equipment in FDD mode was operated only. This declaration is purposive since archived information is not accessible to approve this allegation as obligation to announce the use of radio frequencies in this frequency band and it has not been set down yet and according to the conditions which were set down in former general authorizations, the use of radio frequencies by radio transmitting equipment in TDD mode was not and may not be excluded.

The response of subject in terms of the settlement of comment demanding determination of minimal class 5 of the spectral efficiency; the Office as an administrator of radio spectrum carries out the frequency coordination of point-to-point fixed links in many frequency bands of the fixed service every day. The Office often receives applications for granting individual authorization for the use of radio frequencies where requested transmitting radio equipment is device with maximal class of the spectral efficiency lower than class 5. They are transmitting radio devices which are not able to reach such level of RIC (Radio Interference Capacity) which reflects the particular class of the spectral efficiency of radio devices (e.g. the class 5 requested by the subject) and applicant has important reasons (i.e. price of equipment, an uselessness in excessive capacity of link etc.) for choice such transmitting radio device. The Office is in agreement with statement that transmitting radio equipment of the class of spectral efficiency e.g. 5A enables as usual also option possibility to use modulation with lower number of levels such as 4-QAM. Much like, the principle of the adaptive modulations (in terminology of ETSI EN 302 217-1 standard so called *mixed-mode (adaptive) system*) is recognized by the Office. Naturally, this does not change the fact that as long as the transmitting radio equipment has the maximal class of spectral efficiency 4H, it won't meet on principle condition of class 5A which is demanded by the subject and justified by argument that ACCP channel arrangement (Adjacent Channel Co-Polarized) or CCDP (Co-Channel Dual-Polarization) might be used by trendy equipment. In detailed study of draft new version 2.0.0 of ETSI EN 302 217-2-2 it is possible to come to the conclusion that also transmitting radio equipments of the class of spectral efficiency 2, 3 or 4 can use ACCP channel arrangement or even CCDP channel arrangement (see Part 1 – Scope, part 1.2: *All classes up to class 4H, for any CS, and classes 5L, 5H, 6L, 6H, 7 and 8, for CS < 27.5 MHz, are intended suitable for ACCP operation and, in principle, whenever appropriate, also expandable to CCDP*). Thus the argument of the subject is not true and is misleading. On the contrary, according to the mentioned standard there is an evident fact that for larger occupied bandwidth e.g. the classes of the spectral efficiency 5LA, 7A, 8A, do not provide fulfillment of ACCP or CCDP channel arrangement automatically but it is valid for ACAP (Adjacent Channel Alternate-Polarized) only. Naturally, this is the opposite of the argumentation of the subject. For example from draft version 2.0.0 of the standard in question, for class of spectral efficiency 8A for frequency band 18 GHz, CS 110 MHz, the category of ACAP channel arrangement is presented, i.e. equipment is efficient in sense of spectrum utilization, nevertheless in case of the deployment of parallel link is necessary to choose an adjacent channel with reversed polarization. Spectral efficiency expresses amount of bits transferred within definite occupied bandwidth, whereas channel arrangement determines by which modus can be frequencies used and whether is possible in case of parallel radio connection to use e.g. two adjacent channels with the same polarization and the like. Setting any limits is therefore undesirable. Furthermore, as already stated in case of the General Authorization, ETSI EN 302 217-1 standard is applicable, term the class of the spectral efficiency addresses ETSI EN 302 217-2-2 standard only (ETSI EN 302 217-1 standard defines the class of the spectral efficiency as "*formal subdivision of increasing modulation efficiency introduced in EN 302 217-2-2 [i.34] as major parameter for the identification of the radio equipment use and relevant requirements*"). Matter of evaluation it

would be determination of the minimal class of spectral efficiency in case of larger occupied bandwidth (56 MHz typically and more), but it is not matter of the General Authorization.

Concerning contribution of another subject which included allegation that the Office did not take, the comment of Authorized person AO 250 (NB 1383) to Report on measurement No. 8551-PT-R016712 of ČMI-TESTCOM laboratory, into consideration, it may be noted that the comment is not correct since on the basis of measurement carried out by this Authorized person it was found that in case of established connection between two stations, the levels unwanted products meet limit but in mode when the connection starts the limit is oversized considerably (by 50 dB approximately). For this reason, the Office set down the condition of prohibition of the automatic selection of transmitting radio frequency. Furthermore, from viewpoint of ČMI did not follow incompatibility of systems in FDD and TDD mode but possibility of the origin of harmful interference is expressed only. This conclusion of ČMI is nevertheless the outcome of non-fulfilment of the masks of emission and furthermore exceeding of levels of unwanted products, not from itself nature of TDD communication mode. It may be also noted that the fixed links in FDD mode can cause harmful interference to each other. This statement is indisputably correct but it does not mean that systems in FDD mode can be prohibited automatically from this reason. From viewpoint of ČMI do not result fundamental and binding conclusion.

Next comment of another subject related to the formulation of letter i) of Article 2 of the General Authorization and allegation of the Office from controlled favouring of specific technology. The Office by letter i) determines that it is possible to use vertical or horizontal component of linear polarization only. This condition does not apply only in case of the use of the cross polarization only i.e. the use of two orthogonal polarization planes. This formulation do not prefer neither FDD nor TDD technologies. The use of the cross polarization is possible in case of both systems in FDD mode and TDD mode. The Office set down this provision due to fact that in case of the cross polarization with application of vertical and horizontal polarization, both polarization planes are affected in any case, in particular the vertical and the horizontal. A certain antenna discrimination is achieved by slight turn of the polarization planes hence the risk of harmful interference is reduced in relation to the systems using vertical or horizontal polarization only. In cases when the radio frequencies wouldn't be used any more with the cross polarization (vertical or horizontal only), the probability of possibility of the use of radio frequencies can be increased by slight turn of the polarization planes. The possibility applies for both systems in FDD mode and TDD mode. Statement that the Office prefers specific technology is incorrect completely.

The settlement of all comments from both 1. and 2. round of the public consultations was published by the Office in the table of settlement at discussion site.

On behalf of the Council of the Czech
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Chairman of the Council
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