HELLENIC TELECOMMUNICATIONS & POST COMMISSION

PUBLIC CONSULTATION REGARDING THE INVESTIGATION TO GRANT RIGHTS OF USE FOR RADIO FREQUENCIES IN THE 2.6 GHz BAND

Maroussi, February 2008

Hellenic Telecommunications and Post Commission

HELLENIC TELECOMMUNICATIONS & POST COMMISSION

PREFACE

This Public Consultation document has been prepared by the Hellenic Telecommunications and Post Commission (abbreviated as EETT in Greek) according to its purview by right of the Greek Law N.3431/2006 and concerns matters pertaining to the award of rights of use for radio frequencies for terrestrial electronic communication services systems in the 2.6 GHz band, in accordance with the Decision of the Commission of the European Communities 2008/477/EC of 13 June 2008.

Through this public consultation process EETT aims to gather views and comments from the market of electronic communication network and service providers, and all other interested parties, in connection with the possibility to grant rights of use for radio frequencies for the provision of terrestrial wireless electronic communication services in the 2.6 GHz band.

The interested parties are invited to answer to the document questions. If there are views or comments that are not covered by the present Public Consultation document, you are requested to include them in your response.

The responses should be submitted stating the author's details and affiliation, in the Greek language, both in printed and electronic format, no later than 6 April 2009 at 13:00 p.m. Greek time. The responses should be submitted to the following address:

EETT,
60 Kifissias Avenue,
15125 Maroussi, Athens,
Greece
Electronic mail address: 2.6GHz@eett.gr

Anonymous responses will not be taken into consideration. The responses will be published unedited, stating the author's details and affiliation. In case that the responses contain confidential elements, they should be placed in a special Annex, so that they will not be published.

The responses to the Public Consultation Paper should be marked as follows:

"PUBLIC CONSULTATION REGARDING THE INVESTIGATION TO GRANT RIGHTS OF USE FOR RADIO FREQUENCIES IN THE 2.6 GHz BAND"

During the Public Consultation process, possibly explanatory answers will be provided by EETT in response to interested parties' questions. These questions should be submitted only through the electronic mail address: 2.6GHz@eett.gr and should contain the author's details and affiliation.

This Public Consultation paper does not commit EETT for the content of the regulation to follow.

HELLENIC TELECOMMUNICATIONS & POST COMMISSION

1. Introduction

The Hellenic Telecommunications and Post Commission (abbreviated as EETT in Greek) within the scope of its purview according to the Greek Law N.3431/2006, grants rights of use for radio frequencies aiming at the technically and economically effective and unbiased radiofrequency spectrum usage, the avoidance of harmful interference and the availability of spectrum to a wide variety of users and applications. Within this scope, EETT examines, in a given radiofrequency band, whether to limit the number of rights of use for radio frequencies, so that the benefit for the users is maximized and the development of the competition is facilitated, especially, when the demand is expected to exceed the spectrum availability.

On June 13, 2008 the Commission of the European Communities decided (2008/477/EC) to harmonize the use of the 2.6 GHz band (2 500-2 690 MHz) at a European Union level, so that this band can be made available for the deployment of terrestrial systems capable of providing electronic communications services according to the parameters that are reported in the Annex of Decision 2008/477/EC.

Although Decision 2008/477/EC determines a six month period as the maximum time period within which the harmonisation in the band usage has to be achieved in the Member States, it leaves to the Regulatory Authorities the determination of the appropriate way and time whereby the 2.6 GHz band will be made available. Our country has already harmonised the band usage according to the recent revision of the National Frequency Allocation Table (Greek National Gazette 1979/B/24-9-08).

According to Greek Law N.3431/2006 (Article 25) and the "Regulation of Use and Granting the Rights of Use for Radio Frequencies Under a General Authorization Regime for the Provision of Network and/or Electronic Communication Services" (Greek National Gazette 750/B/21-6-06), the number of rights of use for radio frequencies can be limited if it is necessary for the safeguard of effective spectrum use. In a preliminary stage, the present consultation document aims to make an inquiry into the possibility to grant rights of use for radio frequencies in the 2.6 GHz band, mainly with respect to the manner and point in time where such a grant should take place, taking into consideration the views of the market and other interested parties.

Q1. Do you deem that there is interest for the acquisition of rights of use for radio frequencies in the 2.6 GHz band and the subsequent network development that will provide (broadband) electronic communication services?

Q2. Which type of services and applications you deem that will be developed in the case that rights of use for radio frequencies in the 2.6 GHz band will be granted?

2. European and International Harmonization Measures

According to the results of the ITU World Radio Conference of 2000 (ITU WRC-2000), the band 2 500 – 2 690 MHz was identified on a global level for the deployment of International Mobile Telecommunications - 2000 (IMT-2000) family of systems, in accordance with Resolution 223 (WRC -2000). At that specific period in time the IMT-2000 family contained five different system technologies. In October 2007, the ITU Radio Assembly decided the incorporation of WiMAX technology into the IMT-2000 family which is called IMT henceforth.

At CEPT level the first relative deliverable on the 2.6 GHz band was ECC Decision (02)06 (ECC/DEC/(02)06), determining that the frequency band 2 500 – 2 690 MHz should be designated to UMTS/IMT-2000 systems and that this band should be made available from the 1st of January 2008, taking into consideration market demand and national licensing schemes. The subsequent Decision ECC/DEC/(05)05 determines a specific channel plan, as well as the distribution of the band between FDD (2 ×70 MHz) and TDD (50 MHz) types of systems. The Decisions of CEPT, although having an important role in the harmonisation of spectrum usage across Europe, are not binding for the CEPT member states.

At a European Union level the competent body for the uptake of regulatory decisions relative to the use of radiofrequency spectrum is the Radio Spectrum Committee (RSC). The Decisions that Radio Spectrum Committee prepares and the European Commission approves, are binding for all EU Member States. The Radio Spectrum Decision[1] fixes the processes for the planning and effectuation of policy on matters of radiofrequency spectrum within the EU. According to the Radio Spectrum Decision, CEPT undertakes the obligation to respond to Mandates of the European Commission and to provide the essential assistance in technical matters to the Radio Spectrum Committee. In this respect, the CEPT, responding to a relative Mandate from the European Commission for the development of least restrictive technical conditions for frequency bands addressed in the context of WAPECS (Wireless Access Policy for Electronic Communications Services), with the 2.6 GHz band being part the WAPECS bands, issued CEPT Report 19. This report constituted the basis in terms of technical parameters for the European Commission Decision 2008/477/EC, according to which the band in 2.6 GHz should be made available in the EU countries for the development terrestrial systems capable of providing electronic communication services, within six months from its publication.

[1] Decision No. 676/2002/EC of the European Parliament and of the Council of 7 March 2002

3. Existing Uses

Uses in band 2 500-2 690 MHz

The Radio Services that are allowed for the 2.6 GHz band (2 500-2 690 MHz) according to the National Frequency Allocation Table (abbreviated as ΕΚΚΖΣ in Greek) (Greek National Gazette 399/B/3-4-06) as it is in effect revised (Greek National Gazette 197 9/B/24-9-08), are presented in the Table that follows.

Table 1. Extract from the National Frequency Allocation Table

Band limits (MHz)	Allocation to Services	User	Uses	Standard	Notes
2500-2520	FIXED 5.409, 5.410, 5.411 MOBILE except aeronautical mobile MOBILE SATELLITE (space to Earth) 5.351A, 5.403 5.414		IMT-2000/UMTS terrestrial broadband electronic communication services		ECC/DEC (02) 06 ECC REC 03-03
2520-2655	SATELLITE BROADCASTING FIXED 5.409, 5.410, 5.411 MOBILE except for aeronautical mobile 5.339, 5.403, 5.417D, 5.418B, 5.418C		Defence systems Fixed Radio links IMT-2000/UMTS terrestrial broadband electronic communication services SAP/SAB	EN 301 751	ERC REC T/R 13-01 ECC DEC (02)06 ECC REC 03-03 ERC/REC 25-10
2655-2670	FIXED 5.409, 5.410, 5.411 MOBILE except Aeronautical Mobile Satellite exploration of Earth (passive) Radio Astronomy Space research (passive) 5.149, 5.420		Fixed Radiolinks IMT-2000/UMTS terrestrial broadband electronic communication services SAP/SAB Radio astronomy applications	E 301 751	ERC REC T/R 13-01 ECC DEC (02)06 ECC REC 03-03 ERC/REC 25-10
2670-2690	FIXED 5.409, 5.410, 5.411 MOBILE except Aeronautical Mobile MOBILE SATELLITE (Earth to space) 5.351A Satellite exploration of Earth (passive) Radio Astronomy Space research (passive) 5.149, 5.419, 5.420		Satellite systems (civil) IMT-2000/UMTS terrestrial broadband electronic communication services Radio Astronomy		ECC DEC (02)06 ECC REC 03-03

As it is evident from the above table, in all sub-bands of the 2.6 GHz band, both Fixed and Mobile Services are allowed on a primary basis. The Satellite Broadcasting (2 520-2 655 MHz) Service has not been licensed in Greece and there is no prediction for such a use in Europe in the future. Moreover, the use of Mobile Satellite Service in the bands 2 500-2 520 MHz and 2 670-2 690 MHz has been abrogated by the publication of Decision ECC/DEC/(05)05. Finally, in the 2.6 GHz band there also are passive services but on a secondary basis.

In the band 2 520-2 670 MHz the incumbent (Hellenic Telecommunications Organization, OTE) possessed an Individual Licence for the operation of legacy Subscribing Rural Radio systems. This Individual Licence has expired on 31/12/2006. As far as the licensed uses are concerned, there are no valid rights of use for radio frequencies in Greece, in the 2.6 GHz band.

Uses in adjacent bands

According to National Frequency Allocation Table the followings Radio Services are allowed for the radiofrequency bands that neighbour on the lower part of the 2.6 GHz band.

Table 2. Extract from the National Frequency Allocation Table for bands that are adjacent to the 2.6 GHz band (downwards).

Band limits (MHz)	Allocation to Services	User	Uses	Standard	Notes
2400-2450	FIXED MOBILE Amateur Amateur satellite 5.150, 5.282, E12, E43, E44		ISM Radio amateur applications and Radio amateur satellite applications Systems of train recognition - AVI SRD Movement sensors RFID WAS/RLAN	EN 55011 EN 301 783 EN 300 761 EN 300 440 EN 300 440 EN 300 440 EN 300 328	 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03
2450-2483,5	FIXED MOBILE 82B Radiolocation 5.150, E12, E43, E44		ISM Systems of train recognition - AVI Non specific SRD Movement Detection SRD RFID WAS/RLAN	EN 55011 EN 300.761 EN 300 440 EN 300 440 EN 300 440 EN 300 328	 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03 ERC/REC 70-03
2483,5-2500	FIXED MOBILE MOBILE SATELLITE (space to		Radiolinks ISM	EN 301 751 EN 55011	ERC/rec T/R 13-01

	Earth) 5.351A Radiolocation 5.150, 5.371, 5.398, 5.399, 5.402, E36		Mobile applications Mobile satellite applications	 EN 301 441 EN 301 473	ERC DEC (97) 03 ERC REC 25-10

The band 2 400-2 483.5 MHz has been allocated to the Fixed and Mobile Service on a primary basis. The band is used primarily for ISM applications and short range devices (WLAN, RFID, etc) in Greece. The band 2 483.5-2 500 MHz has been allocated to Fixed, Mobile and Mobile Satellite Service on a primary basis. The satellite system Globalstar operates in this band on a global basis.

The radiofrequency bands that neighbour the upper part of the 2.6 GHz band are allocated to the following Radio Services according to the National Frequency Allocation Table:

Table 3. Extract from the National Frequency Allocation Table for bands that are adjacent to the 2.6 GHz band (upwards)

Band limits (MHz)	Allocation to Services	User	Uses	Standard	Notes
2690-2700	SATELLITE EXPLORATION OF EARTH (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340		Passive sensors (satellite)		
2700-2900	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423	HCAA	Primary radars Weather radar		

Any transmission is prohibited within the band 2 690-2 700 MHz, while the band 2 700-2 900 MHz is used exclusively for radionavigation applications by the Hellenic Civil Aviation Authority (HCAA).

4. Licensing in CEPT countries

The existing situation at an international and/or regional level should always be taken into consideration when important regulatory decisions are to be taken. The uptake of new technologies is facilitated, leading to economically successful investments, when there exist appropriate economies of scale. This is the aim of the harmonisation efforts at CEPT and EU level. Therefore, it is important to make note of the current licensing regime in the 2.6 GHz band reported in the CEPT countries as presented in the Table that follows.

Table 4. Present situation of the 2.6 GHz band in CEPT countries[2]

Country	Situation
Austria	The band is available and designated to be used by IMT systems The allocation procedure is scheduled for the first quarter of 2009
Germany	From the beginning 2008 the band is allocated for IMT technologies The terms of auction were announced in April 2008 The channel plan of Decision ECC/DEC/(05)05 will be followed The auction is expected to take place within 2009
Denmark	A consultation took place in July 2007 The band was decided to be made available via an auction The auction is expected to take place in late 2009
United Kingdom	The band is expected to be made available on a technological and service neutral basis. The band is expected to be distributed via auction The licenses will be national and for an indefinite period of time The auction will not take place before March 2009
Norway	The band was auctioned in November 2007 on a technological and service neutral basis The licenses are regional with a duration of 15 years Additional spectrum was given (beyond that of Decision ECC/DEC/ (05)05) for non-paired spectrum technologies
The Netherlands	The band usage will be technologically neutral The auction of the band is expected to be announced from March 2009 onwards
Poland	A public consultation process was issued in October 2008 regarding the licensing of the band for broadband wireless access networks
Sweden	The band was auctioned in May 2008 The licenses are national in scope and their duration is 15 years The channel plan of Decision ECC/DEC/(05)05 was followed

5. The Greek environment

EETT, within the scope of its competence, grants rights of use for radio frequencies aiming to promote an efficient spectrum management, spectrum availability for a wide variety of users and the development of the Greek market of electronic communication services. When the demand for a given radiofrequency band is expected to exceed the available spectrum, a limitation in the number of rights of use for radio frequencies can be imposed, followed by a competitive process in order to grant them. The EETT has awarded via a competitive process, inter alia, rights of use for radio frequencies for GSM / DCS technology in the 900

[2] Source: WiMAX Forum

and 1800 MHz bands, UMTS technology in the 2.1 GHz band and for Fixed Wireless Access systems in 3.5 and 25 GHz bands.

In order to better evaluate the possibilities and opportunities that emerge via the expected award of rights of use for radio frequencies in the 2.6 GHz band, rights that have already been granted in "neighbouring" frequency bands, where corresponding services could be provided, should be taken into consideration. These bands are:

- The 900 MHz band
- The 1800 MHz band
- The 2.1 GHz band
- The 3.5 GHz band

It is worthy to underline the fact that although broadband communications services could be provided in all of the above mentioned bands, resulting into some type of “substitution” for radiofrequency bands, the very laws of physics that govern the propagation of electromagnetic waves, infuse with different characteristics each one of them, rendering some of these more appropriate for the development of specific applications. For example, it is commonly acceptable that frequency bands below 1 GHz are more appropriate for the coverage of wide geographical regions or for coverage inside buildings. Therefore, a different value is attributed to each radiofrequency band, depending on the application that is expected to be deployed, a fact that should be taken into consideration by the network providers while setting up their business plans.

In the next section, the existing situation in the Greek market, as regards the rights of use for radio frequencies that have already been granted in the aforementioned bands, is presented.

2nd Generation (2G) Mobile Networks

During the years 2001 and 2002, EETT granted Individual Licenses (later renamed as rights of use for radio frequencies) for the expansion of GSM / DCS networks, following the initial grants that had been awarded by Ministerial Decree before the year 2000. According to Ministerial Decisions a limitation in the number of Individual Licenses was imposed for the deployment of 2G networks in the frequency bands 885-915 MHz paired with 930-960 MHz and 1710-1785 MHz paired with 1805-1880 MHz. All the rights of use for radio frequencies currently in force in the 900 and 1800 MHz bands are presented in Tables 5 and 6 below.

Table 5. Rights of use for radio frequencies for 2G systems in the 900 MHz band (GSM)

Provider	Spectrum Downlink (MHz)	Spectrum Uplink (MHz)	Start Date of Right of Use	Expiry Date of Right of Use
COSMOTE	930-935	885-890	09-09-2002	08-09-2017
WIND	935-945	890-900	29-09-1992	29-09-2012

VODAFONE	950-960	90 5 -915	29-09-1992	29-09-2012
VODAFONE	945-950	900-9 0 5	06-08-2001	05-08-2016

Table 6. Rights of use for radio frequencies for 2G systems in the1800 MHz band (DCS)

Provider	Spectrum Downlink (MHz)	Spectrum Uplink (MHz)	Start Date of Right of Use	Expiry Date of Right of Use
WIND	1825-1830	1730-1735	06-08-2001	05-08-2016
WIND	1830-1840	1735-1745	06-08-2001	05-08-2016
VODAFONE	1840-1855	1745-1760	06-08-2001	05-08-2016
COSMOTE	1855-1880	1760-1785	05-12-1995	04-12-2020

3rd Generation (3G) Mobile Networks

EETT granted three Individual Licenses (later renamed as rights of use for radio frequencies) at the year 2001, for the development of 3rd Generation mobile telephony networks. According to a Ministerial Decision, a limitation in the number of Individual Licenses was imposed for the deployment of 3G networks in the frequency bands 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz. All the rights of use for radio frequencies currently in force in the 2.1 GHz band are presented in the table that follows.

Table 7. Rights of use for radio frequencies for 3G systems

Provider	Spectrum Downlink (MHz)	Spectrum Uplink (MHz)	Start Date of Right of Use	Expiry Date of Right of Use
VODAFONE	2110,3- 2130,3	1920,3–1940,3	06-08-2001	05-08-2021
VODAFONE	1915,1-1920,1 (TDD)		06-08-2001	05-08-2021
WIND	2130,3- 2140,3	1940,3– 1950, 3	06-08-2001	05-08-2021
WIND	1910,1-1915,1 (TDD)		06-08-2001	05-08-2021
COSMOTE	2140,3- 2155,3	1950,3– 1965,3	06-08-2001	05-08-2021
COSMOTE	1905,1-1910,1 (TDD)		06-08-2001	05-08-2021

Fixed Wireless Access in the 3.5 GHz band

At the end of 2000, EETT held a competitive process (auction) in order to grant Individual Licenses for Fixed Wireless Access (FWA) systems in the 3.5 GHz and 25 GHz bands. As regards the 3.5 GHz band, three Licenses were initially granted. Spectrum (2×14 MHz) that was not awarded during the initial auction was granted in a separate award process in 2006. All the rights of use for radio frequencies currently in force in the 3.5 GHz band are presented in Table 8 that follows.

Table 8. Rights of use for radio frequencies for FWA systems in the 3.5 GHz band

Provider	Spectrum Downlink (MHz)	Spectrum Uplink (MHz)	Start Date of Right of Use	Expiry Date of Right of Use
CRAIG	3410,0-3438,0	3510,0-3538,0	22-01-2001	21-01-2016
OTE	3441,5-3455,5	3541,5-3555,5	11-12-2000	10-12-2015
COSMOLINE	3459,0-3473,0	3559,0-3573,0	16-08-2006	15-08-2016
WIND	3476,5-3497,5	3576,5-3597,5	22-01-2001	21-01-2016

Q3. Do you believe that the networks that will be deployed in the 2.6 GHz band will operate competitively, complementarily or as substitutes against the existing networks? Will they provide the same types of services, or are they expected to be differentiated in some terms? What could be their main competitive advantage?

Q4. Do you believe that the networks that will be developed in the 2.6 GHz band will be commercially viable, taking into account the late entry into the market, compared with other providers that are already active with networks operating in frequency bands where similar services can be provided?

6. Technical Issues

Technological Neutrality

The term "Technological Neutrality" is reported as one of the five underlying principles that form the foundation of the Electronic Communications regulatory framework in the European Union[3]. With the term "Technological Neutrality" is meant that legislation should define the objectives to be achieved, and should neither impose, nor discriminate in favour of, the use of a particular type of technology. Moreover, the term “service neutrality” is often used in order to denote the freedom of allowing any type of electronic communications service, without reference to a specific network topology, in a given radiofrequency band. The technological and service neutrality constitute fundamental principles of the WAPECS electronic communications framework[4] that has been adopted by the EU and includes specific radiofrequency bands.

EETT applies technological neutrality by avoiding to impose specific technologies in the rights of use for radio frequencies that it grants. Furthermore, EETT works towards the elimination of any technological restrictions in radiofrequency spectrum usage that were imposed before the common European regulatory framework for Electronic Communications came into force.

[3] Directive 2002/21/EC, on a common regulatory framework for electronic communications networks and services (Framework Directive)

[4] Final Opinion on WAPECS - document RSP05-102

In this context, EETT has already considered the need to eliminate technological restrictions that had been included in awarded rights of use for radio frequencies, aiming to maximise the efficiency of spectrum usage for the benefit of the society. In particular:

- **900 and 1800 MHz Bands**. EETT completed a first round of consultation with the market and the interested parties, in connection with the investigation of the possibility to modify existing rights of use for radio frequencies, so that the deployment of mobile network technologies beyond GSM can be allowed.
- **3.5 GHz Band**. No specific technology has been prescribed within the rights of use for radio frequencies that EETT has granted in this band. Moreover, according to the recent Decision of the Commission of the European Communities (2008/411/EC), the 3.5 GHz band can also be used for mobile services. Currently, within the framework of the revision of the regulation for the Terms of Use of Radiofrequencies, EETT has made a proposal in the relative public consultation document to allow the provision of mobile services in the 3.5 GHz.

Spectrum Packaging

EETT, recognizing and encouraging technological and service neutrality, does not intend to specify any particular technology and type of service to be used in the 2.6 GHz band. However, in an effort to achieve the best possible harmonisation, it is desirable to identify possible uses for the 2.6 GHz band. Most likely uses that are expected for the 2.6 GHz band, without excluding possible others, are:

- Advanced mobile telephony services using 3G technologies and its evolutions (UMTS FDD, HSPA and Long Term Evolution), which are optimised for the distribution of voice and data with high transmission speed.
- Broadband wireless services having WiMAX technology (2005/revision e especially) as a basis, or 3G family (UMTS TDD) variants. These applications could support data transmission at high speeds to fixed, nomadic or mobile terminals.

Having the above as a basis, two distinct technological categories for the 2.6 GHz band can be identified:

- Systems using Frequency Division Duplex (FDD)
- Systems using Time Division Duplex (TDD)

The FDD technology uses two different frequency blocks for its operation and a spectral distance, which is called "duplex spacing", should generally exist between these two blocks. The network base stations transmit towards the user terminals using the one block (downlink) and respectively, the user terminals transmit to the base stations using the other block (uplink). The TDD technology on the other hand, uses only one frequency block for its operation. The network base stations transmit and receive at the same frequency. Similarly,

the user terminals transmit and receive at the same frequency as the network base stations. The ability of transmission and reception at the same frequency is made possible by placing the transmission and reception signals at different time slots.

According to Decision ECC/DEC/(05)05 and Decision 2008/477/EC the 2.6 GHz band should be apportioned in 5 MHz blocks. For FDD operation in the 2.6 GHz band, a duplex spacing of 120 MHz should be used, while the user terminals should transmit in the lower part of band (uplink) and the network base stations in the upper part of band (downlink). According to Decision ECC/DEC/(05)05 the 2 570-2 620 MHz sub-band is allocated exclusively for TDD systems, and the rest of the band exclusively for FDD systems (Figure 1). In this way, 50 MHz (10 unpaired blocks) are allocated to TDD systems and 2×70 MHz (14 paired blocks) to FDD systems. However, the Decision 2008/477/EC follows a more liberal approach as regards the partitioning of the spectrum between the two technologies (FDD and TDD) and leaves this task to the hands of the competent national regulatory authorities, with the precondition that the upper and the lower part of band will be allocated similarly. In the case that additional spectrum may result for TDD technologies, the band allocation can be done in the way that is described in Figure 2, where, for example, it has been considered that four additional FDD (paired) blocks have been converted to TDD use, resulting in eight additional TDD (unpaired) blocks (four below the 2 570 MHz limit and four at the upper edge of the band).

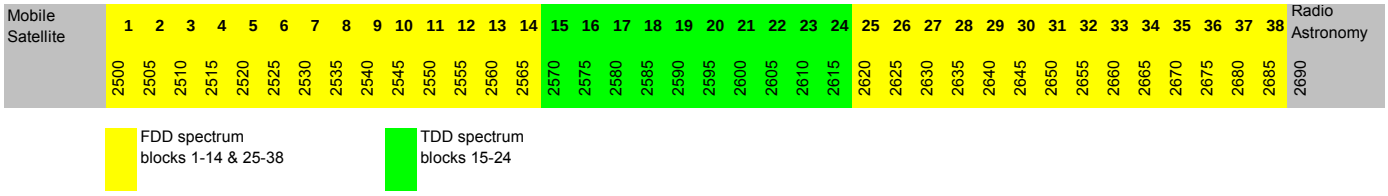

Figure 1. Channel plan and allocation of the 2.6 GHz band according to ECC/DEC/(05)05

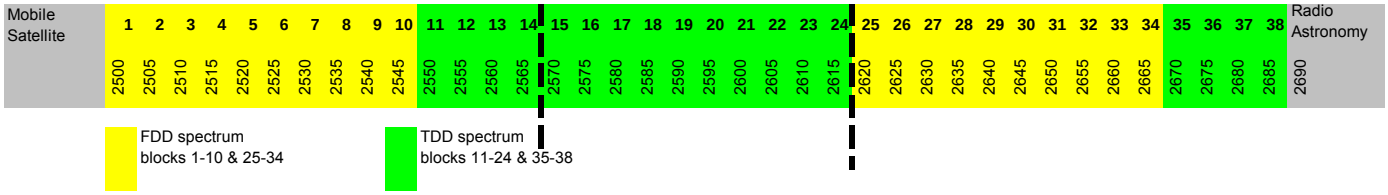

Figure 2. Channel plan and allocation of the 2.6 GHz band with extra channels for TDD technology

Q5. Do you agree with the most likely 2.6 GHz band uses as they are identified by EETT? Are there any other uses or technologies that should be reported?

Q6. How much spectrum (in MHz) you deem that serves your business plans for the 2.6 GHz band (a) for TDD technology and (b) for FDD technology?

Q7. What is in your opinion the advisable spectral quantity for each awarded Right in the 2.6 GHz band, so that the probability of market success is maximized while ensuring the necessary competition?

Q8. What is in your opinion the appropriate allocation of 2.6 GHz band apart from the 2 570-2 620 MHz sub-band?

i. **The channel plan of Decision ECC/DEC/(05)05 should be followed**
ii. **Spectrum for TDD technology – in addition to the already allocated 50MHz – should be made available (determine the necessary additional spectrum)**
iii. **The market should decide if there is any real need for additional spectrum for TDD technology (possibly via a competitive award process)**

Q9. Do you believe that the right holders should be given the possibility to modify (while the right is in force) the way of operation (FDD or TDD) in accordance with predefined, agreed rules?

7. Market Elements

Development and penetration of mobile telephony market (2G and 3G)

The consolidation of TIM HELLAS and Q TELECOMMUNICATIONS (by take-over) in January 2006[5] [1] had as a result the creation of three Mobile Network Operators (MNO) in the mobile market from July 2006 in Greece, particularly: WIND (former TIM HELLAS) which was founded in 1992, VODAFONE, which was founded in 1993 and COSMOTE, which was founded in 1998. Q TELECOM was founded in 2002 and continued its course until 2006 when TIM HELLAS acquired Q TELECOM.

It should be noted that according to EETT Decision 433/22/3-05-2007, EETT approved the consolidation of the Companies "TIM HELLAS Telecommunications Industrial and Commercial S.A." and "Q-Telecommunications S.A.", whereas the latter was acquired by the former.

[5] According to EETT Decision 368/39/22-12-2005, the acquisition of joint control of Q TELECOM was approved, through the purchase of the 100% of its share capital by a subsidiary of TIM HELLAS. The merger was approved by the Commission with the Decision No. SG-Greffe (2006) D/200119, Brussels 13-1-2006 EC. The Commission's market investigation revealed that even though the transaction would lead to a reduction in the number of market players from four to three, overall the market remains at least as competitive as it was before, TIM Hellas remaining the third largest supplier but, following the merger, in a stronger position to compete with the two main players, Cosmote and Panafon-Vodafone.

All current MNOs received 3G Licenses in 2001, and began to offer 3G services from January 2004 (WIND), May 2004 (COSMOTE) and August 2004 (VODAFONE).

The evolution through time of MNO shares in the Greek market, on the basis of the total number of subscribers, is presented in the table below:

	Oct 2007	Jan 2007	Jan 2006	Jan 2005	Jan 2004
COSMOTE	38,6%	37,6%	37,3%	37,5%	37,9%
VODAFONE	33,5%	35,7%	35,7%	34,9%	35,3%
WIND	27,9%	20%	19,4%	21%	23,3%
Q - TELECOM		6,7%	7,6%	6,5%	3,5%

The Greek mobile telephony market has developed considerably, both in terms of SIM card and network traffic, during the last years.

Particularly, according to the data for both the total number and the number of active subscribers, the SIM cards penetration in the Greek market has developed considerably.

In the following tables, figures in connection with the market development (total subscribers, number of active subscribers, active subscribers percentage) as well as the penetration in the population for the 2nd and 3rd Generation mobile telephony are presented.

2nd Generation Mobile Telephony

	31/12/2007	31/12/2006	31/12/2005	31/12/2004
Total number of subscriptions	**15.100.636**	**13.455.121**	**12.218.936**	**11.038.789**
Number of Active Subscriptions	**11.198.273**	**10.688.605**	**10.025.632**	**9.300.295**
Active subscriptions Percentage with respect to total number of subscriptions	74,2%	79,4%	82,0%	84,3%

Population	11.170.000	11.125.000	11.110.000	11.073.000
Subscriptions penetration in the population	135,2%	120,9%	110,0%	99,7%
Active subscriptions penetration in the population	100,3%	96,1%	90,2%	84,0%

3rd Generation Mobile Telephony

	31/12/2007	31/12/2006	31/12/2005	31/12/2004
Total number of subscriptions	**1.126.039**	**419.553**	**229.537**	**18.813**
Number of Active Subscriptions	**1.096.639**	**408.910**	**217.763**	**18.597**
Active subscriptions Percentage with respect to total number of subscriptions	97,4%	97,5%	94,9%	98,9%

Population	11.170.000	11.125.000	11.110.000	11.073.000
Subscriptions penetration in the population	10,1%	3,8%	2,1%	0,2%
Active subscriptions penetration in the population	9,8%	3,7%	2,0%	0,2%

TABLE OF THE ENTIRE MOBILE TELEPHONY MARKET

TOTALS	**31/12/2007**	**31/12/2006**	**31/12/2005**	**31/12/2004**
Total number of subscriptions	**16.226.675**	**13.874.674**	**12.448.473**	**11.057.602**
Number of Active Subscriptions	**12.294.912**	**11.097.515**	**10.243.395**	**9.318.892**
Active subscriptions Percentage with respect to total number of subscriptions	75,8%	80,0%	82,3%	84,3%

Population	11.170.000	11.125.000	11.110.000	11.073.000
Subscriptions penetration in the population	145,3%	124,7%	112,0%	99,9%
Active subscriptions penetration in the population	110,1%	99,8%	92,2%	84,2%

In the following graph, the market development with respect to the mobile telephony penetration is represented.

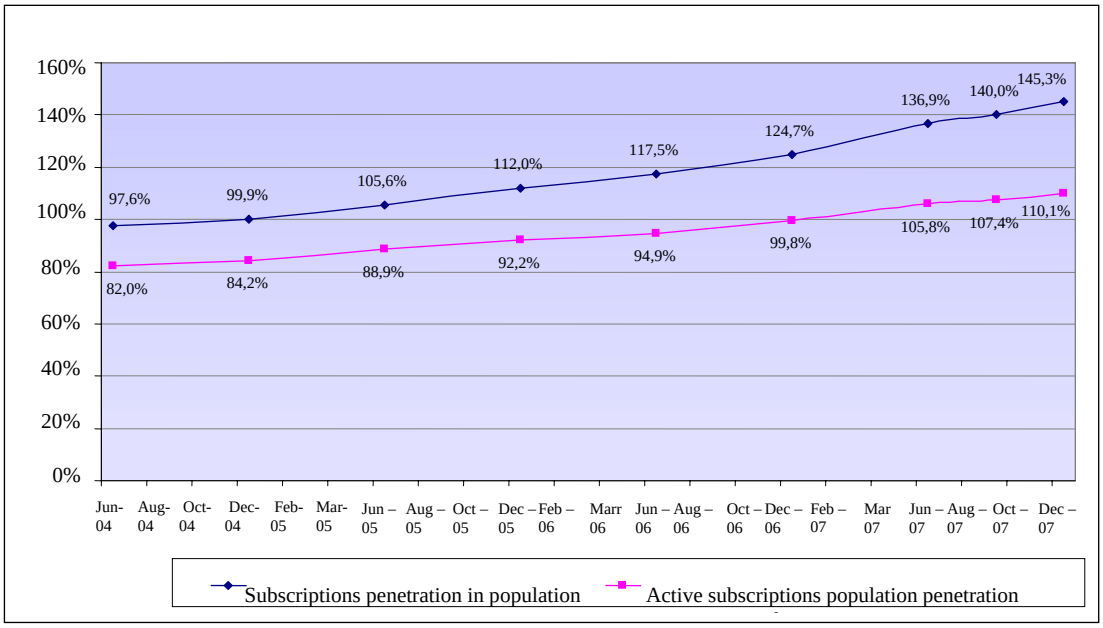

Figure 3. Market development with respect to the mobile telephony penetration

Market figures for broadband lines xDSL and other alternative broadband technology (FWA lines, optical fibre, leased and satellite lines) are hereupon presented.

	DEC-2008	DEC-2007	DEC-2006	DEC-2005	DEC-2004
Total broadband DSL lines	1.500.354	1.012.804			
Total of other lines	6.260	4.671			
Total broadband lines	1.506.614	1.017.475	488.179	160.113	51.455

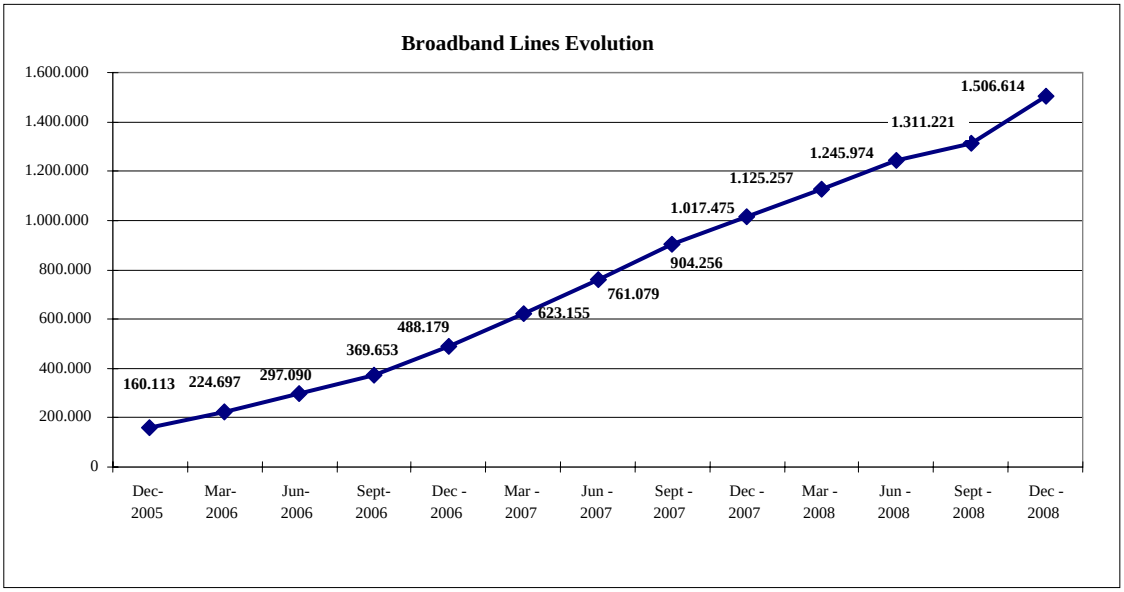

Figure 4. Evolution of broadband lines

8. Expediency and time planning

EETT believes that the 2.6 GHz band should be made available for the deployment of electronic communication networks, to the extent that this can contribute to the optimum utilisation of the radiofrequency spectrum, promote the innovation in technologies and services and enhance the competition in the electronic communications market for the benefit of the consumer. The timing for the award of rights of use for radio frequencies in the 2.6 GHz band is a major factor that can influence decisively the success of this undertaking. Various factors can be taken into account while trying to identify the optimum timing for the award, among them: the present usage of the band, the advantages that are expected to result from granting the rights of use for radio frequencies, the costs but also the potential benefits that can result from a probable delay in the timing of the award, the market maturity, other economical, regulatory and technological factors.

At present, the 2.6 GHz band remains unused in Greece. This fact is very important by itself, because it is directly related with the advantages that could possibly result if there was some form of utilisation of the aforementioned band. Moreover, among the reasons that strongly favour an immediate award in the 2.6 GHz band, is the apparent significant demand that has been expressed for the band, particularly at an international level. This is argued by the following findings:

- The size of participation as well as the answers that were received in relative consultations abroad including the one that was transacted by EU[6].
- The investments made by the industry for the development of relative technical standards for technologies that are intended to operate in the 2.6 GHz band.
- Inquiries coming from the Greek market, as well as the recent (2006) auction result for a single right of use for radio frequencies in the 3.5 GHz band.

On the other hand, there are reasons that could prescribe the provisional postponement of the 2.6 GHz band award. These reasons are mainly related with the need for better information that the interested stakeholders should have, in order to evaluate more accurately their placement with respect to the spectrum that may become available and their subsequent decisions. One of the crucial factors that should be taken into account is the availability of "substitute" spectrum, that is to say spectrum that can be used for the same type of services in other radiofrequency bands. The 900 and 1800 MHz bands where, at present, the use of 2G technologies is allowed exclusively, presents an illustrative example. EETT, within the scope of its competence, has transacted a public consultation concerning the possibility of relaxation of the technological restrictions in the aforementioned band. In any case, the use of the specific technology is binding for all member states of EU[7] at least for the 900 MHz band.

Q10. Do you believe that the award of the 2.6 GHz band will contribute to the further development of electronic communication services in Greece and the enhancement of competition?

Q11. Do you believe the 2.6 GHz band should de made available immediately for the deployment of electronic communications services or should its award be delayed (determine the time horizon) and why?

[6] RSCOM05-44rev1http://forum.europa.eu.int/Public/irc/infso/radiospectrum/library?l=/public_documents_2005/rsc13_october_2005/rscom05-44rev1_imt-2000p/_EN_1.0_&a=d

[7] Directive 87/372/EEC of 25 June 1987 "On the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community"

Q12. What is the expected time scale for the return on investment related to the development of networks and services in the 2.6 GHz band?

Q13. Do you believe that the EETT should take measures that will accompany the award of the 2.6 GHz band and which should these be?

9. Non Technical Regulatory Issues

Geographical scope

Up to date all spectrum awards that were carried out by EETT by means of a competitive process (2G, 3G, FWA) were issued for the whole Greek territory. Limiting the geographical scope of the rights of use for radio frequencies at a regional scale, could presumably enhance the development of networks in the rural areas and assist in closing the gap of the digital divide. However, the award of regional rights of use for radio frequencies may well present significant drawbacks, such as that of the creation of geographical areas of non-coverage, that may be necessary in order to avoid interference between neighbouring operators.

Q14. What is in your opinion the optimum geographical scope of the rights of use for radio frequencies in the 2.6 GHz band, national or regional and why?

Q15. Under which preconditions do you deem that the award rights of use for radio frequencies in the 2.6 GHz band, can have a positive effect for the reduction of digital divide for the regions where broadband access does not currently exist?

Roll-out obligations

Network development obligations (roll-out obligations) are usually considered necessary for the reassurance of the effective spectrum use and the prevention of spectrum hoarding practices. Up to now, roll-out obligations have been incorporated in all rights of use for radio frequencies that have been awarded by EETT. However, other views claim that the use of market mechanisms, such the auctions for awarding the rights of use for radio frequencies and the possibility for secondary spectrum trading can, by itself, assure the effective use of spectrum.

Q16. Do you believe that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by roll-out obligations and if yes, which should these be?

Q17. Do you deem that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by coverage obligations for regions that are deprived today from other types of broadband access services?

Q18. Do you believe that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by additional obligations (apart from the roll-out obligations) and relative terms, so that the competition is protected?

Q19. What should be the appropriate procedure for the award of the rights of use for radio frequencies in the 2.6 GHz band?

APPENDIX A

Summary of Consultation Document Questions

Q1. Do you deem that there is interest for the acquisition of rights of use for radio frequencies in the 2.6 GHz band and the subsequent network development that will provide (broadband) electronic communication services?

Q2. Which type of services and applications you deem that will be developed in the case that rights of use for radio frequencies in the 2.6 GHz band will be granted?

Q3. Do you believe that the networks that will be deployed in the 2.6 GHz band will operate competitively, complementarily or as substitutes against the existing networks? Will they provide the same types of services, or are they expected to be differentiated in some terms? What could be their main competitive advantage?

Q4. Do you believe that the networks that will be developed in the 2.6 GHz band will be commercially viable, taking into account the late entry into the market, compared with other providers that are already active with networks operating in frequency bands where similar services can be provided?

Q5. Do you agree with the most likely 2.6 GHz band uses as they are identified by EETT? Are there any other uses or technologies that should be reported?

Q6. How much spectrum (in MHz) you deem that serves your business plans for the 2.6 GHz band (a) for TDD technology and (b) for FDD technology?

Q7. What is in your opinion the advisable spectral quantity for each awarded Right in the 2.6 GHz band, so that the probability of market success is maximized while ensuring the necessary competition?

Q8. What is in your opinion the appropriate allocation of 2.6 GHz band apart from the 2 570-2 620 MHz sub-band?

i. The channel plan of Decision ECC/DEC/(05)05 should be followed
ii. Spectrum for TDD technology – in addition to the already allocated 50MHz – should be made available (determine the necessary additional spectrum)
iii. The market should decide if there is any real need for additional spectrum for TDD technology (possibly via a competitive award process)

Q9. Do you believe that the right holders should be given the possibility to modify (while the right is in force) the way of operation (FDD or TDD) in accordance with predefined, agreed rules?

Q10. Do you believe that the award of the 2.6 GHz band will contribute to the further development of electronic communication services in Greece and the enhancement of competition?

Q11. Do you believe the 2.6 GHz band should de made available immediately for the deployment of electronic communications services or should its award be delayed (determine the time horizon) and why?

Q12. What is the expected time scale for the return on investment related to the development of networks and services in the 2.6 GHz band?

Q13. Do you believe that the EETT should take measures that will accompany the award of the 2.6 GHz band and which should these be?

Q14. What is in your opinion the optimum geographical scope of the rights of use for radio frequencies in the 2.6 GHz band, national or regional and why?

Q15. Under which preconditions do you deem that the award rights of use for radio frequencies in the 2.6 GHz band, can have a positive effect for the reduction of digital divide for the regions where broadband access does not currently exist?

Q16. Do you believe that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by roll-out obligations and if yes, which should these be?

Q17. Do you deem that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by coverage obligations for regions that are deprived today from other types of broadband access services?

Q18. Do you believe that the rights of use for radio frequencies in the 2.6 GHz band should be accompanied by additional obligations (apart from the roll-out obligations) and relative terms, so that the competition is protected?

Q19. What should be the appropriate procedure for the award of the rights of use for radio frequencies in the 2.6 GHz band?