

**Liberalization of the use of 900
MHz and 1800 MHz spectrum
bands and assignment of the relevant
rights of use**

Public Consultation Brief

**Maroussi, January 2011
Hellenic Telecommunications & Post Commission**

1. Introduction

The public consultation paper has been prepared by the Hellenic Telecommunications and Post Commission (EETT) and refers to:

- a) The procedure for the release of technological restrictions on the use of radio spectrum in the 900 MHz and 1800 MHz bands.
- b) The procedure for allocation of rights of use for the radio frequencies in the 900 MHz, which had been granted to VODAFONE S.A. and WIND S.A. and expire in September 2012.

These procedures are consistent with the requirements of the European Union (EU) on the harmonization of frequency bands of 900 MHz and 1800 MHz for GSM and UMTS systems and other terrestrial systems capable of providing electronic communications services that can coexist with GSM systems.

Disclaimer: This document has been published for informative purposes only. It is not a formal translation, nor should be deemed to replace the "Public Consultation on the liberalization of the use of 900 MHz and 1800 MHz spectrum bands and assignment of the relevant rights of use" document which is available only in Greek.

2. Spectrum Allocation

The current spectrum allocation in Greece, regarding 2G mobile communication services in the 900 MHz band is comprised of the 885-915 MHz sub-band paired with the 930-960 MHz sub-band, while the 1800 MHz band is comprised of the 1710-1785 MHz sub-band paired with the 1805-1880 MHz band. The spectrum for 3G mobile communications is in 1920-1980 MHz band paired with the band of 2110-2170 MHz for FDD systems technology and the 1900-1920 MHz band for TDD systems technology. The 900 MHz, 1800 MHz, and 2100 MHz spectrum rights have been issued to the operators as follows:

	Operator	Spectrum Assignment Downlink (MHz)	Spectrum Assignment Uplink (MHz)	License Start Date	License Expiry Date
GSM	COSMOTE 1	930-935	885-890	09-09-2002	08-09-2017
	WIND 1	935-945	890-900	1990	29-09-2012
	VODAFONE 1	950-960	905-915	1990	29-09-2012
	VODAFONE 2	945-950	900-905	06-08-2001	05-08-2016
DCS	WIND 2	1825-1830	1730-1735	06-08-2001	05-08-2016
	WIND (ex Q-TELECOM)	1830-1840	1735-1745	06-08-2001	05-08-2016
	VODAFONE 2	1840-1855	1745-1760	06-08-2001	05-08-2016
	COSMOTE 1	1855-1880	1760-1785	05-12-1995	04-12-2020

UMTS	VODAFONE 3	2110,3- 2130,3	1920.3 – 1940.3	06-08-2001	05-08-2021
		1915,1-1920,1 (TDD)		06-08-2001	05-08-2021
	WIND 3	2130,3- 2140,3	1940.3 – 1950.3	06-08-2001	05-08-2021
		1910,1-1915,1 (TDD)		06-08-2001	05-08-2021
	COSMOTE 2	2140,3- 2155,3	1950.3 – 1965.3	06-08-2001	05-08-2021
		1905,1-1910,1 (TDD)		06-08-2001	05-08-2021

Table1.Spectrum Allocation






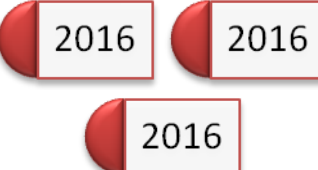



Spectrum	COSMOTE	VODAFONE	WIND
GSM 900			
DCS 1800			
UMTS 2100			
TOTAL	9.5 sections of 2×5 MHz	10.5 sections of 2×5 MHz	7.5 sections of 2×5 MHz

Table2. Spectrum awarded to mobile network operators in Greece for 2G and 3G services (2×5 MHz).

3. Award Process

3.1. Spectrum Cap

EETT is considering imposing a restriction in the maximum amount of spectrum in the band of 900 MHz per operator (spectrum cap), in order to ensure optimal use of spectrum and foster competition in the Greek telecommunications market to the benefit of consumers. The proposed spectrum cap per operator, by EETT, is specified in the range of 2×15 MHz, while its duration, EETT is proposing to maintain for a period of five years, i.e. from 2012 until

2017, so as to be in force until the expiry date and restoration of the rest of rights to use frequencies in the 900 MHz band.

EETT proposes to revise the aforementioned spectrum cap in the spectrum band of 900 MHz, only if during the above period, 2012-2017, spectrum in the 800 MHz band becomes available for use. In this case, a common maximum bandwidth per provider for both 800 MHz and 900 MHz bands needs to be evaluated in terms of efficiency.

3.2. Liberalization of Remainder Spectrum in 900 MHz and 1800 MHz

The liberalization of spectrum use in the bands of 900 MHz and 1800 MHz will be effective in 2012, and specifically in 30/09/2012, i.e. the following day from the validity of the existing rights of use in the 900 MHz band. The liberalization of the remaining rights of spectrum use in the bands of 900 MHz and 1800 MHz, that expire in 2016 or 2017, will be feasible through the submission of the relevant request to EETT and the payment of a specific fee that will be determined by the outcome of the auction for the granting of rights to use frequencies ending in 2011.

The proposed fee for the release of a section of 2×5 MHz in the band of 900 MHz will be set equal to the *difference between the **average purchase price per 2×5 MHz in the auction that will take place**, and the reserve price per 2×5 MHz of the 2001 auction*, (for granting 3G licenses in Greece) taking into account the time remainder of the specific right.

In accordance, the proposed fee to be paid for the release of a section of 2×5 MHz in the 1800 MHz band will be set equal to the *difference between the **average purchase price per 2×5 MHz in the auction to be held, divided by a factor of 1.3**, and the reserve price per 2×5 MHz of the 2001 auction*, taking into account the time remainder of the specific right. The factor 1.3 reflects the ratio of the reserve price in between the 900 MHz to the reserve price in the 1800 MHz band in the 2001 auction, for granting 3G licenses in Greece.

3.3. Proposed Award Process

EETT has the following proposal regarding the process of awarding the 900 MHz band spectrum:

- Spectrum rights that expire in 2012 will be awarded through an open auction process.
- Spectrum rights that expire in 2016 and 2017 will be awarded through a new auction procedure in 2015. Expiration date will be set accordingly, in order for these rights to expire within the same period with those expired in 2012. Any spectrum caps imposed will be the same in both cases.

Regarding the auction procedure, EETT is considering the following alternative approaches:

a) First alternative

The spectrum is divided into 4 sections of 2×5 MHz, and an auction is conducted through multiple rounds at an increasing price, where each successful bidder shall pay the maximum price offered.

b) Second alternative

The spectrum is divided into 4 sections of 2x5 MHz and the auction is conducted in two phases.

In the first phase, an auction with one sealed bids round is conducted, in which only the existing 2G service providers whose rights expire in 2012, have the right to participate, and a restriction applies, so that each provider after the first phase should not have more than one (1) section of 2x5 MHz at the 900 MHz band.

In the second phase, the remaining sections of 2x5 MHz will be available to both incumbent providers and new comers, through a multiple rounds auction at an increasing price, where each successful bidder shall pay the maximum price offered.

3.4. Proposed Reserve Price

EETT concludes that the determination of the starting price should prevent collusion behaviours, and must be sufficiently balanced to eliminate both the risk to "strangle" demand (too high price) and the risk of frivolous bidders participating (too low price). Additionally, the starting price should determine a reasonable return to the state for the use of this finite natural resource of spectrum and to reflect, as realistically as possible, the true economic value to its user, i.e. the mobile network operators.

The estimation of the reserve price for the 900 MHz band was derived by the published study of the dot • econ consulting company, on behalf of the Irish national regulatory agency ComReg, and adapting it to Greek data. This study uses the method of benchmarking to calculate the mean price of spectrum per MHz, per population, based on historical data of past spectrum auctions. For this purpose, dot • econ created a database of licensing procedures for the award of 114 auctions in 28 countries around the world, covering 5,969 licensed for both 2G and 3G use.

The study developed different sub-samples of types of licenses, to derive the benchmarked average price per MHz, per population for each sample. In doing so, the study normalized the historical values of the different groups of samples, by converting prices into a common currency (USD), deflating them (through US Inflation), adjusting the price for a permit of 15 years and finally converting them to Euro final price based on historical purchasing power parity Euro-USD. The calculated average price per MHz per population for a range of 2x5 MHz is then adjusted to the population of Greece (11.305.118 by Eurostat - Total Population EU area est. Jul 2010) and multiplied by 10 (the minimum size of 2x5 MHz spectrum piece for disposal). The results appear below:

Benchmark Group	Mean price per MHz per population	Estimated value of 2x5 MHz for Greece
All mobile licenses sold in an auction	€ 0,691	€ 78,118
All mobile licenses sold in an auction in	€ 0,546	€ 61,726

Europe

All GSM licenses	€ 0,790	€ 89,310
All 3G licenses	€ 0,800	€ 90,441

Table3. Benchmarking – Average Price of 2×5 MHz (2010 – in € millions)

This method of the average auction price estimates the value of a piece of 2x5 MHz 900 MHz ranging from **€61.7 million to €90.4 million**. The method presented is based on historical data, adjusted to current euro prices, for a 15-year license period, without taking into account that the liberalization of the use of 900 MHz will result in providing advanced UMTS services with lower network deployment costs. Specifically, the study underestimates the value of the UMTS 900, as it derives its value from past contests of GSM 900, GSM 1800, and competitions in 3G bands 2.1 GHz and 2.6 GHz. This range of higher frequency has reduced transmission characteristics compared to 900 MHz, and is valued at a lower level. Therefore, EETT estimates that this price may be an understatement of the final price for a section of 2x5 MHz UMTS 900 MHz. ComReg, the national regulatory authority in Ireland, as the recipient of this study, concludes that the result of benchmarking past competitions of GSM 900, GSM 1800 and 3G 2.1 GHz and 2.6 GHz poses a potential underestimation of the value range of UMTS 900 MHz. For these reasons, EETT believes that the results of the relevant study adapted to the Greek data may be used as indicators of the minimum value of the UMTS 900 MHz spectrum, with relative safety.

The payment of the proposed fees for the rights to use 900 MHz spectrum to be allocated may be done in the following ways:

- By paying the entire fees once-off. The successful bidders will be required to pay the full amount within a short period after the finalization of the award process.
- By paying a percentage of the fees upon completion of the tender and the remainder amount to be paid in subsequent years (annual instalments), taking into account an appropriate interest rate.

Questions:

1. Do you agree with the proposed procedure regarding the licensing of the spectrum rights in the 900MHz band that expire in 2012? Please justify your answer
2. Do you agree with EETT view on imposing a premium fee for the release of technological restrictions of the existing spectrum rights in the 900 MHz and 1800 MHz bands that expire beyond 2012? Please justify.
3. Do you agree with EETT view on imposing spectrum caps in the 900MHz band? Please justify accordingly.
4. Do you agree with the proposed methodology for calculating the premium fee that should be imposed for the release of technological restrictions of the existing spectrum rights in the 900 MHz and 1800 MHz bands that expire after 2012? Please justify.

5. Which of the alternative approaches proposed in the document for awarding the spectrum rights that expire in 2012 do you consider more appropriate?
6. Which should be the minimum financial requirements that a company should fulfil in order to be allowed to participate in the tender?
7. Which should be the minimum technical criteria (e.g. experience) that a company should fulfil in order to be allowed to participate in the tender?
8. Should the final bid be paid once-off, or should the successful bidder be given the option of paying in predetermined annual instalments. In the latter, what should be, in your opinion, the total period given for redemption?
9. What should be in your opinion the reserve price per 2×5MHz segment in the 900MHz band?
10. What should be the most appropriate validity period for the spectrum rights that will be granted?
11. What should be the minimum roll out obligations for the new spectrum rights in terms of geographical and population coverage, as well as the time period within which the network should be operational?
12. Do you believe that the minimum required types of services and their respective quality measures defined in the existing spectrum rights are appropriate or should further/alternative measures be taken?
13. In order to promote site sharing between operators aiming to minimize the number of new antenna masts, do you believe that collocation between operators should be compulsory?