

## Assignment Process for Additional Spectrum for Wireless Broadband

*Consultation Document*

### Consultation Document

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## 1. INTRODUCTION

The availability of adequate spectrum is critical to the deployment of mobile technologies particularly with respect to high-speed wireless data connections that enable the deployment of innovative services. Such developments have a direct effect on the quality of life of the citizens both in terms of bridging the digital divide as well as in making healthcare, education and other essential elements more accessible.

At present mobile wireless technology can be deployed in a number of bands particularly the 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.5 GHz bands. In Malta the 900 MHz and 2.1 GHz bands are fully assigned, as well as 45 MHz of paired spectrum in the 1800 MHz band.

The Authority, in line with the European Commission's Radio Spectrum Policy Programme, is now planning to make the 800 MHz band available. This band provides 60 MHz of spectrum with considerable reach and penetration characteristics and is considered a prime candidate for the deployment of Long Term Evolution (LTE).

Malta has one channel in the 800 MHz band allocated for broadcasting and is currently in the process of co-ordinating a replacement channel. Once this process is successfully completed, a migration process will commence in order to clear the 800 MHz band and make it available for assignment for wireless mobile services.

Given the complementary nature of the above-mentioned spectrum bands, it is likely that demand for the 800 MHz band will simultaneously trigger interest for spectrum in the other bands. It is in this context that this consultation deals not only with the 800 MHz band but also considers the 1800 MHz and 2.5 GHz bands.

This document puts forward for public consultation the proposed term and conditions linked to the rights of use of all the available spectrum and the assignment process that the Authority intends to adopt.

This document also outlines compatibility issues resulting from the operation of broadcasting and LTE in adjacent bands, as is the case for the 800 MHz band, and puts forward the Authority's proposed mitigation approach.

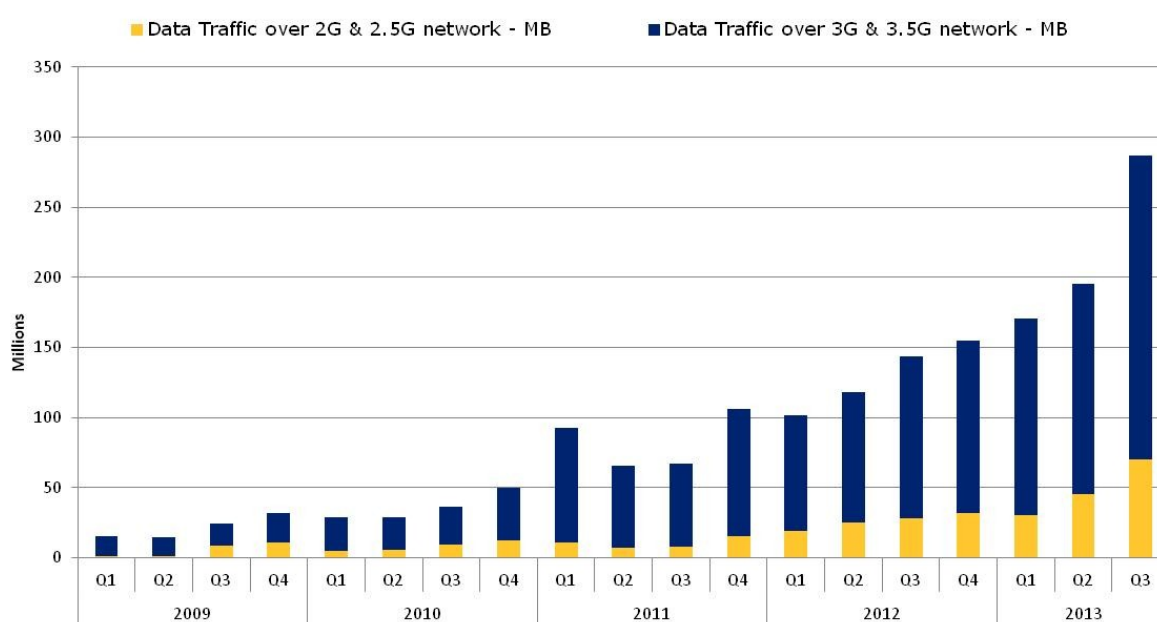
Furthermore in Section 6 of this document the Authority is consulting on behalf of Government on the proposed spectrum pricing.

## 2. LOCAL SITUATIONAL ANALYSIS

### Current Market Overview

As at June 2013, the mobile penetration rate in Malta stood at 132%<sup>1</sup>, which is up by 3.3 percentage points since the end of June 2012.

Since the launch of UMTS services in 2006, particularly with the introduction of flat rates, local mobile operators experienced an increased uptake of data services. This is confirmed by market data as indicated in the graph below, which shows the continuous growth in data traffic.



**FIGURE 1: MOBILE DATA TRAFFIC IN MALTA**

Based on the 2013 Digital Agenda Scoreboard, the mobile broadband penetration in Malta stood at 35.2%. This represented an increase of 14 percentage points year on year though still 19.3 percentage points below the EU average penetration level.

This augurs well for the future of the mobile market in Malta, as operators are further developing their services and more innovative applications are created.

In fact late last year the first local LTE network was launched. It is expected that as LTE becomes a more mainstream technology, spectrum will be required to provide more capacity and ensure better penetration levels. Thus spectrum such as the 800 MHz and 2.5 GHz bands will become an important component in an operator's spectrum mix.

<sup>1</sup> [http://www.mca.org.mt/sites/default/files/attachments/reports/2013/cmr\\_fh\\_2013\\_update.pdf](http://www.mca.org.mt/sites/default/files/attachments/reports/2013/cmr_fh_2013_update.pdf)

### **Using the 800 MHz band for mobile services**

In order to be in a position to make this band available for mobile services, it has to be cleared of any broadcasting services. However, currently one of the channels allocated to Malta for broadcasting falls within the 800 MHz band. Malta is therefore in the process of co-ordinating an alternate broadcasting channel with neighbouring countries. Once this process is successfully concluded, current broadcast transmissions will be migrated unto this new channel. This process is dependent on third parties and therefore timelines cannot be guaranteed.

Moreover the deployment of mobile services in the 800 MHz band, based on experience in other countries, is expected to interfere with the broadcasting services offered in the adjacent band. These interference issues could slow down the deployment process, particularly in the initial stages when all the players involved would be going through a learning curve. These issues, if not handled correctly, could stimulate a negative perception in the general public, which might, for example, hinder the deployment of new sites.

### **Objectives for new licensing regime**

The main objective of the proposed licensing regime is the maximisation of overall economic and consumer benefit, through an approach that stimulates effective and efficient use of spectrum.

The proposed implementation aims to address the identified issues and strives to mitigate possible negative outcomes associated with this process, so as to contribute towards a sustainable future for this market.

### 3. PROPOSED ASSIGNMENT PROCESS

In establishing the proposed assignment process and the terms and conditions to be attached to the rights of use, account has been taken of the principles of transparency, proportionality, objectivity and non-discrimination laid out in the Electronic Communication (Regulations) Act and the situational analysis carried out.

#### 3.1 SPECTRUM ASSIGNMENT BLOCK

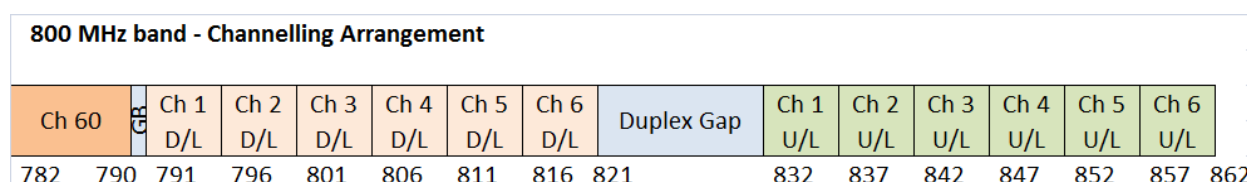
##### 3.1.1 CHANNELLING PLAN

The channel bandwidth and a paired/unpaired allocation could affect the technology adopted and therefore the services offered by the successful applicants. In establishing the preferred channel bandwidths and mode of operation (i.e. FDD vs. TDD) consideration is given to the services being implemented, as well as the capabilities of the equipment available now and foreseen for the future.

A number of studies were carried out by the European Conference of Postal and Telecommunications Administrations ('CEPT') analysing the technologies that can be deployed in these bands. The results of these studies were later adopted by the European Commission as Spectrum Harmonisation Decisions.

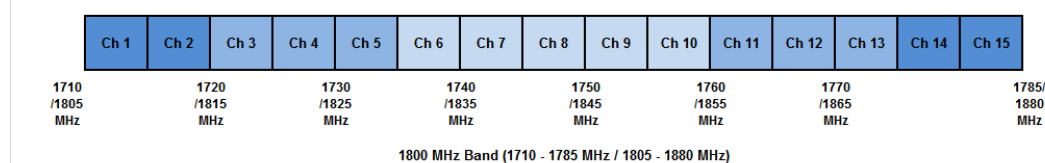
In view of this, and in order to maximise flexibility in spectrum usage by the operators, the Authority is putting forward the following proposals:

**The 800 MHz Band:** The Authority proposes to adopt the channelling arrangement established in 2010/276/EU.



**FIGURE 2: PROPOSED CHANNELLING PLAN FOR THE 800 MHz BAND**

**The 1800 MHz Band:** In line with the 2010 Policy, the channelling arrangement established in the 2009/766/EC will be retained.



**FIGURE 3: CHANNELLING PLAN FOR THE 1800 MHz BAND**



**The 2.5 GHz Band:** In this case the Authority proposes to adopt the preferred channelling arrangement established in 2008/477/EC. This results in a combination of paired (FDD) and unpaired (TDD) channels, which in both instances are based on a channel bandwidth of 5 MHz.

5 MHz Channels FDD Uplink														5 MHz Channels TDD or FDD Downlink (External)										5 MHz Channels FDD Downlink																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	12	13	14														
2500														2570										2620														2690													

**FIGURE 4: PROPOSED CHANNELLING PLAN FOR THE 2.5 GHz BAND**

### 3.1.2 LOT DEFINITION

A ‘lot’ is the minimum amount of spectrum an interested party could apply for and is defined in terms of its size and its technical characteristics.

The technical characteristics of the lot are primarily defined by the spectrum band and additional technical conditions that might be applied to specific channels, if any. Lots with different technical characteristics would be classified in separate lot categories.

The lot size directly influences the efficient use of spectrum. Too small a lot size could either result in unassigned spectrum, as a single lot doesn’t have any value on its own, or else could create a situation whereby the successful applicant does not have sufficient spectrum to deploy the technology of choice. On the other hand, too large a lot size could result in successful applicants having to acquire more spectrum than they actually need.

The considerations in this case are also tightly linked to the assignment methodology being adopted. As explained in Section 3.2.2, the proposed assignment methodology will be based on package bidding and will guarantee contiguous spectrum assignments.

#### Paired Spectrum

On the basis of this, the Authority is of the view that the assignment process should be designed in a way that interested parties can apply for the individual 5 MHz channels.

#### Unpaired Spectrum

In the case of unpaired spectrum one also has to consider that, to achieve compatibility, a separation of 5 MHz is needed between the edges of spectrum blocks used for unrestricted TDD (time division duplex) and FDD operation (frequency division duplex)<sup>2</sup>. This also applies in the case of two unsynchronised networks operating in TDD mode. This separation can be achieved by either leaving these 5 MHz channels unused as guard blocks or by operating these 5 MHz channels using

<sup>2</sup> 2008/477/EC

more restrictive technical conditions (restricted channels). Therefore in this case in defining the lot size one has to strike a balance between flexibility and spectrum efficiency.

## Proposal

In view of this the Authority proposes the following:

**800 MHz Band:** Each 5 MHz paired channel will be considered a single lot, six lots in total. In this case some of the channels might be subject to greater technical constraints than others (see Section 5.5.1). Should this be the case then the lots in this band will be classified under two distinct lot categories depending on the applicable technical conditions.

**1800 MHz Band:** Each 5 MHz paired channel will be considered a single lot. Since there are six unassigned channels and all channels are subject to the same technical conditions, in total there will be six lots in one lot category.

**2.5 GHz Band (Paired spectrum):** Each 5 MHz paired channel will be considered a single lot, fourteen lots in total. Since all channels are subject to the same technical conditions, all lots will be classified in one lot category.

**2.5 GHz Band (Unpaired spectrum):** In order to avoid creating the need for a large number of restricted channels, the Authority is considering assigning the unpaired spectrum either as a single 50 MHz lot or as two 25 MHz lots. In the latter case each lot will be classified in a distinct lot category<sup>3</sup>.

### 3.1.3 SPECTRUM CAPS

Spectrum is a scarce resource and needs to be appropriately managed. Therefore the spectrum made available has to strike the right balance between the need to promote competition by allowing as many operators in the market as may be interested while at the same time providing the industry with adequate resources to effectively deploy reliable services.

In this context, the Authority is proposing to introduce spectrum caps during the assignment process.

**800 MHz Band:** The Authority is cognisant of the limited spectrum in the 800 MHz band and of this band's characteristics, and therefore it proposes that a cap of three (3) 5 MHz paired channels will apply in this band.

**1800 MHz Band:** In order to ensure a level playing field with current assignments, the Authority proposes to retain the spectrum cap established in the 2010 Policy i.e. A spectrum cap of eight (8) 5 MHz-channels inclusive of any channels already assigned in the 900 MHz band.

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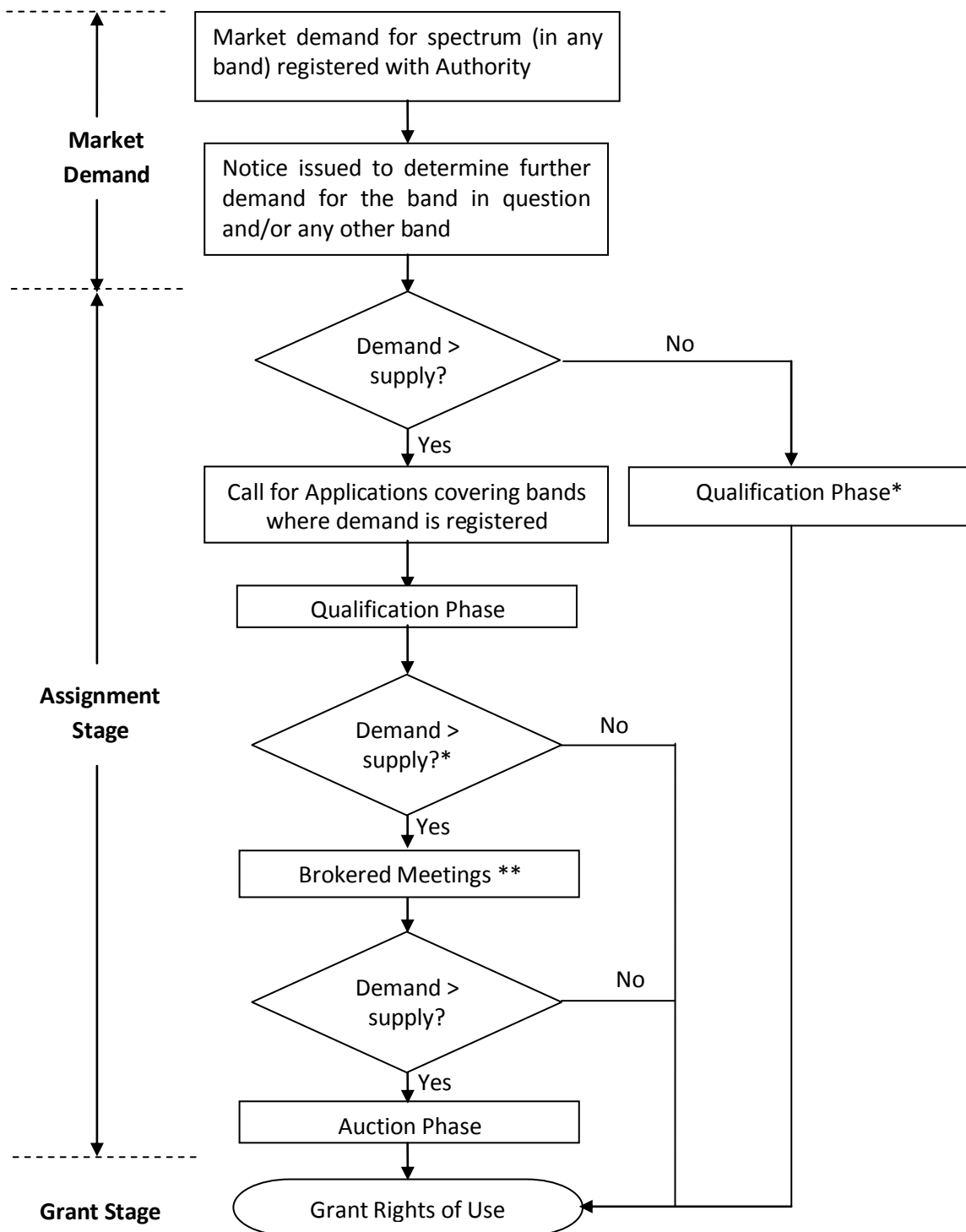
<sup>3</sup> One of the lots will have only one restricted channel as an interface to the adjacent FDD operation (i.e. Channel 1 of TDD), whilst the other will have two as an interface to the adjacent TDD and FDD operations (i.e. Channels 6 and 10 of TDD).

**2.5 GHz Band:** The Authority proposes not to apply a specific spectrum cap. On the other hand, the Authority proposes to establish an overall spectrum cap of 210 MHz. This overall cap will be calculated over the 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.5 GHz bands, including any unpaired spectrum, and will take account of the applicant's spectrum holdings at the time of the call of applications.

For the purposes of the spectrum cap calculation or spectrum already assigned, a paired 5 MHz channel will be considered as 10 MHz.

### 3.2 PROCESS OVERVIEW

The Authority proposes to adopt the following assignment process.



**FIGURE 5: PROPOSED ASSIGNMENT METHODOLOGY**

\* Subject to a successful completion of the co-ordination process, unless no demand for spectrum in the 800 MHz band is registered

\*\* The Brokered Meetings will be held at the Authority’s discretion.

The Authority intends to initiate the assignment process in case of market demand. The Authority further proposes to divide the assignment process into two main stages i.e. the Assignment stage and the Grant stage.

The **Assignment Stage** will establish the number and type (i.e. in which lot category) of lots to be assigned to each successful applicant.

The **Grant Stage** will establish the specific lots that will be awarded to the successful applicants and will be concluded with the issuance of the rights of use documents.

### 3.2.1 MARKET DEMAND

The Authority intends to initiate the assignment process if it receives a formal request for spectrum<sup>4</sup>. This request could cover any of the bands under consideration in this document.

At this point the Authority proposes to publish a notice announcing the receipt of this request and requesting any other interested parties to come forward within a given timeframe. Moreover, considering that the spectrum bands being considered in this document are complementary and substitutable, the Authority will also request the interested parties to indicate any demand for spectrum in any of the other bands.

If on the expiry of this timeframe it results that there is excess demand in any band, then the Authority intends to issue a formal Call for Applications. This will put on offer all the available spectrum in the bands for which market demand was registered. Otherwise the Authority will proceed to a direct assignment.

### 3.2.2 ASSIGNMENT STAGE

#### 3.2.2.1 Call for Applications

It is proposed that the call for applications will include:

- a non-refundable application fee;
- an appropriate bid bond/performance guarantee. The bid bond would be intended to ensure an applicant's commitment to the assignment process, lasting up to the award of a grant of rights of use. In the case of unsuccessful applicants the bid bond would be released at the end of the assignment process and once the successful applicants have been announced. In the case of successful applicants the bid bond would be maintained as a performance guarantee. The performance guarantee would serve as evidence of good faith, to guarantee that the licensee will honour the winning bids and will abide by the licence conditions; and
- an appropriate deposit which will be reflective of the first year spectrum fees and the applicant's spectrum requirements.

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<sup>4</sup> <http://www.mca.org.mt/sites/default/files/pageattachments/Formal%20Request%20for%20Spectrum.pdf>

The Authority further proposes that applicants will not apply for specific frequencies in the different bands but for a number of lots in each lot category, as established in Section 3.1.2. Applicants would also need to state the maximum number of lots in each lot category that they may eventually apply for throughout the course of the process ('Maximum Interest').

In addition applicants would be required to state their preferred combination of lots in the different lot categories ('Preferred Option'). The overall demand for lots in each of the different lot categories would be determined by the Authority on the basis of the Preferred Option submitted by all the applicants.

In addition to the Preferred Option, applicants would be required to indicate alternative options that would suit their needs in the case that demand for the spectrum exceeds supply ('Alternative Options'). This information would be used in confidence by the Authority in the event that brokered meetings need to be held.

In expressing both their Preferred and Alternative Options, the applicants would be required to abide by the spectrum caps mentioned in Section 3.1.3 and the Maximum Interest declared by them as mentioned above. Any application containing an option that exceeds either of these limits would be disqualified.

### 3.2.2.2 Qualification Phase

The Authority proposes to carry out a qualification process to assess whether applicants have the necessary standing to fulfil the licence obligations should they be successful in acquiring the spectrum rights. This process will not rank applicants. The outcome of this phase will be a pass/fail result based on a set of criteria including but not be limited to:

- The applicant's credentials;
- The applicant's experience in the establishment, operation and commercialisation of similar electronic communications networks;
- The applicant's business plan; and
- Access to adequate financing for the venture.

In this case, it is important to point out that, as outlined earlier on in this document, the spectrum assignment in the 800 MHz band is dependent on the successful completion of the frequency co-ordination process. However, for the sake of expediting the process, the Authority is considering the co-ordination and assignment processes as two distinct work streams that can run in parallel. In view of this the Authority is proposing to introduce the following safeguards in the assignment process.

In the case of a successful co-ordination outcome, at the end of the Qualification Phase an assessment of the demand for spectrum by the qualifying applicants would be carried out. If demand in each lot category (as expressed in the applicants' Preferred Options) does not exceed supply, then the rights of use of spectrum will be granted directly to the applicants in line with the process outlined in Section 3.2.3 below.

If by the time the qualification process is completed successful co-ordination has not yet been achieved, the Authority proposes to retain the right, at its discretion, to halt the assignment process

for a maximum period of six months. Should a successful co-ordination be achieved during this period, then the Authority proposes to proceed as outlined above. Should no successful co-ordination be achieved by this time the assignment process will be aborted unless a further extension is agreed to by all parties.

In case the process is aborted, all the material related to the individual submissions will be returned to the respective applicants.

### 3.2.2.3 Brokered Meetings

In the event that demand exceeds the availability of spectrum in any of the lot categories, the Authority proposes to reserve the right, at its own discretion and without binding itself to do so, to carry out a set of brokered meetings with the qualifying applicants. The objective of these meetings would be to reach an agreement on an assignment plan that addresses the requirements of all the qualifying applicants. In order to protect commercial interests, the meetings would be held separately with each qualifying applicant.

In developing the proposals cognisance would be taken of the spectrum requests put forward by the applicants, the preferences indicated, their business and technical plans and the outcome of the discussions during the meetings.

If the proposal so developed is accepted by all the parties then the Authority would proceed with the granting of rights of use in accordance with the agreement reached.

In the absence of a full agreement being reached at the end of the brokered meetings, the Authority proposes to reserve the right to attempt to reach agreement to assign parts of the spectrum, whereby only the remaining channels would be auctioned.

Any proposed solution reached between the Authority and each of the qualifying applicants would be binding on the individual applicants but not on the Authority in view of the fact that the Authority would first have to ensure that the proposed solution reached fits within an overall solution acceptable to all the qualifying applicants.

In the event that no agreement (whether full or partial) is reached between the qualified applicants and the Authority, or should the Authority decide not to hold brokered meetings, then the Authority proposes that all the spectrum in the bands under consideration in the Call would be auctioned.

### 3.2.2.4 Auction

The Authority proposes that the auction design will take due account of the complementary and substitutable characteristics of the bands in question and will provide for:

- package bidding: applicants would be required to simultaneously bid for lots in all the bands<sup>5</sup>. All combination bids submitted by each applicant at any stage of the auction would

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<sup>5</sup> For sake of clarity it is being emphasised that applicants will apply and eventually bid for “a number” (quantity) of channels in each lot category and not for specific (identified) channels in each band

- need to be in line with its expressed “maximum interest”, the spectrum caps mentioned above and any other criteria that would be established in the Auction Rules ; and
- avoidance of default by bidders: measures such as deposit top-ups would be in place, as the case may be.

The Authority will retain the option to publish the auction rules only if, following the qualification phase, demand exceeds supply. In this case the Authority will publish the said Rules prior to the Brokered Meetings and the applicants will be given the opportunity to withdraw their applications at that stage.

The Authority proposes that qualifying applicants would be obliged to take part in at least the first round of the auction stage. Failure to do so would result in a forfeit of the bank guarantee.

### 3.2.3 GRANT STAGE

The Authority proposes that it would have the sole and unlimited discretion to award the particular channels in the way it deems best in the interest of spectrum efficiency.

This notwithstanding, as part of their submissions to the Call, interested parties would be invited to indicate their ranked preferences for particular frequency channels in a given band/s and provide a justification for such preference. However, this in no way would tie down the Authority to assign the frequencies in accordance with the expressed preferences of applicants.

Once the outcome of the assignment stage<sup>6</sup> is known, the Authority would proceed to the award of the specific contiguous swathes of spectrum to each successful applicant. Should there be no way to easily reconcile the applicants’ preferences, then the Authority proposes that a lottery would be used to determine the band assignments.

### 3.2.4 FUTURE OF UNASSIGNED SPECTRUM

In the event that any spectrum remains unassigned, the Authority proposes that this will become available to any interested party under the established conditions. Any request will be published and should further interest be expressed this will trigger the above outlined process.

## 3.3 OTHER CONSIDERATIONS

The Authority would be pleased to receive comments and proposals on any other aspects that may be deemed relevant for the purposes of this consultation.

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<sup>6</sup> The **Assignment Stage** establishes the number of lots in each lot category awarded to each successful applicant.



## 4. CO-EXISTENCE ISSUES FOR MOBILE SERVICES IN THE 800 MHz BAND

Studies and experience in other jurisdictions indicate that the deployment of mobile services in the 800 MHz band will give rise to issues of co-existence with both terrestrial broadcasting services operating below the 800 MHz band<sup>7</sup> as well as cable services. Microphones operating in the 800 MHz band are also liable to be affected by an LTE deployment in this band.

These issues and their respective mitigation measures are discussed in further detail in the following subsections. This analysis also considers who will bear the costs involved in mitigating the identified problems. In this respect the Authority proposes to adopt the principle of cost causality whereby the cost of mitigating any interference generated by this change in allocation should be borne by the beneficiaries, in this case the operators that will acquire spectrum in this band. However, such liability should not be extended to other issues which come to the fore after the change in use of spectrum, but where the underlying cause is not directly related to such change of use.

### 4.1 EXPERIENCE IN OTHER EUROPEAN STATES

Without exception, in all states where the 800 MHz band assignment has already been carried out, the issue of co-existence was a prime area of concern with different, sometimes rather divergent, solutions being proposed by the respective governments/authorities.

In most cases the cable operator was deemed responsible for the resolution of any interference on its network, on the basis that it has an obligation to retain a certain level of quality in its network deployment. On the other hand, in the Netherlands the mobile and cable operators have agreed on their own accord to jointly tackle these issues.

With respect to the rate of incidence and severity of interference due to the mobile uplink, this has in most cases been discounted as negligible.

With respect to the protection of broadcasting services operating in the 470 – 790 MHz band, almost all countries adopted the technical parameters established in the 2010/267/EU decision, with the exception of Denmark where stricter conditions were applied. However, in those instances where the said decision offers an element of flexibility, for example by establishing a range of possible operating power levels, different countries opted for different values. Also some countries applied different technical parameters to the various 800 MHz channels, whilst others mandated a similar set of technical conditions for the entire band.

In addition, most countries have established a mechanism whereby the 800 MHz band licensees fund the costs related to any mitigation measures required to ensure that the affected digital terrestrial television (DTTV) installations are guaranteed access to broadcasting services. Ireland is the most notable exception where it was decided that these costs should be borne by the broadcasting operators.

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<sup>7</sup> In Malta's case this comprises GO's DTTV Platform and eventually the GIO network as well.

## 4.2 CO-EXISTENCE WITH CABLE SERVICES

In the cable network the shielding of the coaxial cabling allows the cable network to operate over a wide range of frequencies, despite the fact that these are allocated to other services including terrestrial radio and broadcasting services.

Studies in foreign jurisdictions have shown that in most cases the underlying cause for interference issues with mobile systems operating in the 800 MHz band is either poor and/or aging cabling, resulting in poor or defective shielding. In this respect, the cable operator has an obligation to retain a certain level of quality in its network deployment. Therefore, it is considered that any interference problems on the cable network should be handled directly by the cable operator, with any costs being borne by the said operators.

## 4.3 INTERFERENCE DUE TO THE MOBILE UPLINK

Since the UHF band was originally intended for broadcasting services, TV sets and set top boxes (STBs) were designed to operate on the 800 MHz band. The same also applies for cable modems.

Therefore the digital TV receiver of television units and STB, or a cable modem, can pick up a signal generated by a mobile device<sup>8</sup> (operating in the 800 MHz band) within close proximity, causing interference to the TV or data service. The problem is further amplified if an in-house picocell is deployed.

It should however be noted that in other jurisdictions where rollout has already taken place the rate of incidence and severity of interference due to mobile upload has in most cases been discounted and it is therefore proposed that no specific measures be considered in this respect.

## 4.4 COEXISTENCE ISSUES WITH MICROPHONES

CEPT Report 50 deals specifically with the technical conditions for the use of the bands 821-832 MHz (800 MHz duplex gap) and 1785-1805 MHz for wireless radio microphones, including the technical conditions which can contribute to facilitate the use of PMSE equipment<sup>9</sup> for EU-wide operations. In addition a supplemental report to CEPT Report 50 addresses the usability of these bands for PMSE audio applications taking into account the results from CEPT Report 50, including an additional assessment of the potential interference from mobile networks to PMSE equipment operating in the considered bands.

These reports recommend that the band 821-823 MHz is retained as a guard band because of adjacent band compatibility issues. For the band 823-832 MHz, various studies have shown that separation distances are required between PMSE and mobile network applications. The most critical case occurs when mobile user equipment and PMSE equipment operate in close vicinity (e.g. same room scenario).

A mitigation measure identified is to avoid using 800 MHz indoor cells.

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<sup>8</sup> Ex. the mobile phone or USB stick

<sup>9</sup> PMSE equipment: wireless radio microphones and cordless video-cameras

## 4.5 COEXISTENCE WITH DTTV INSTALLATIONS

The deployment of mobile services in the 800 MHz band is expected to affect the reception of the DTTV services in certain areas. This interference is expected to mainly manifest itself as:

- **Overload:** A DTTV receiver becomes saturated when the power of the signals at its input exceeds a certain threshold. In this case the DTTV receiver stops functioning and reception of all DTTV services is lost.
- **Signal to Noise Ratio (SNR) Degradation:** A DTTV receiver experiences SNR degradation when an unwanted signal raises the noise level. If the SNR falls below a certain threshold in a given channel, then the DTTV receiver will not operate correctly.

A number of mitigation measures are available.

### Technical Parameters

The Commission Decision 2010/267/EU establishes the relevant technical parameters for the operation of mobile services in the 800 MHz band. In particular it makes specific provisions for the protection of broadcasting services operating in the 470 – 790 MHz band. In this respect the Authority proposes that these parameters will form an integral part of the license conditions for spectrum in the 800 MHz band. To further protect the broadcasting services operating below the 800 MHz band, the Authority proposes that the most stringent conditions possible (within the framework of the EU decision) are applied to Channel 1 (the channel closest to the broadcasting channels). Further information on this point can be found in Section 5.5.1.

### Filter Installations

However these technical restrictions could sometimes prove insufficient. In this case one could opt to re-orient the rooftop antenna towards a different DTTV transmitter, though this might not always be possible. Alternatively, filters could be included in the affected TV installations. Both a filter before the set-top box and/or a filter prior to a mast head amplifier could be required. As a measure of last resort the affected installation would need to be migrated to an equivalent service offered over an alternative TV platform.

These issues are a direct consequence of the change in spectrum allocation. Hence the 800 MHz band licensees, as the prime beneficiaries of this change, should make good for the costs involved in solving these interference issues.

### Establishment of a Fund

The Authority proposes to establish a fund between the 800 MHz band licensees to make good for the costs related to the mitigation measures.

This fund will cover the costs related to:

- Filters and associate installations; and
- The migration of affected installations to an alternative TV platform, in case the filter installations fail to solve the problem.

Holders of rights of use in the 800 MHz band will be required to contribute to this fund in proportion with the number of assigned channels, irrespective of their individual rollout and coverage plans for the band.

For example consider that two licensees acquire rights of use in this band. Licensee A gets the rights for 3 channels and Licensee B gets the rights for 1 channel. Then Licensee A will fund 75% of the costs and Licensee B 25%.

If not all channels are assigned simultaneously and a subsequent assignment of spectrum in the 800 MHz band takes place, there will be a recalculation of the maximum contribution due by each licensee.

In order to minimise the financial impact of this fund, and given that the exact quantum of the required outlay is unknown, the licensees in question will not be required to carry out the full fund instalment immediately. Instead a system of periodic instalments is being proposed.

The fund will be operative for the entire duration of the 800 MHz rights of use or up to such time that the fund is exhausted. However, the Authority reserves the right to terminate it earlier, for example as a result of technical developments which render it redundant.

Once the fund is terminated any residual funds will be redistributed amongst the contributing licensees, pro-rata on the basis of their contribution.

This fund will be capped to cover only the costs for any interference issues suffered by DTTV installations<sup>10</sup> that were already in place as at the date of completion of the 800 MHz band clearance.

Thereafter it will be the obligation of the DTTV network operator to ensure that new TV installations take into consideration the changed operating environment. In the case of free-to-air installations it will be the users' responsibility to ensure that new installations have the necessary filters in place to avoid any problems.

On the basis of the subscriber information currently in hand it is proposed that the fund is capped at €4.5 million. Further information on the fund cap calculation is provided in Annex B of this consultation paper. The exact figure will be established once the process is concluded to reflect any changes in the number of subscribers. However, it is not expected that this will result in substantial changes to this figure.

The 800 MHz band licensees will be given a period of three months from the date of award to present a fund management plan. In this respect the Authority would specify a priori a number of aspects that would need to be addressed in this plan such as, but not limited to:

- Consumer complaint handling process including the resolution timeframes;
- Payment terms of the periodic fund tranches;
- Auditory measures to ensure proper administration of the fund.

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<sup>10</sup> Both those owned by GO's DTTV subscribers and those owned by free-to-air network viewers

In these cases, the Authority will remain an escalation point to resolve any outstanding issues. In this respect the Authority will retain the right to take any measures it deems appropriate for the case.

Should the 800 MHz licensees fail to present an adequate management plan within the stipulated timeframes, the Authority reserves the right to manage the fund (or outsource it) on their behalf. In this case, the relevant costs would be borne by the licensees in question in addition to the €4.5 million fund cap and the licence fees.

Furthermore it should be noted that the proper establishment of the fund, including the deposit of the first fund tranche, will be a precondition for the licensees to start using their 800 MHz spectrum holdings.

The first LTE deployments in the 800 MHz band will constitute a learning experience for all the parties involved. The Authority will therefore be requiring a staggered and managed rollout in the initial period. This will help all the stakeholders gain a better understanding of the issues involved and the respective resolution measures.

## 5. CONDITIONS OF RIGHTS OF USE

### 5.1 LICENCE DURATION

The licence duration should not be too long so as to ensure that, national resources are returned to Government in due time and do not constrain potential developments in the market. On the other hand, the duration must be proportional to the investment made so as to ensure that the licensees have an adequate return on investment; too short a duration could lead to instability and inhibit investment particularly towards the end of the licence term.

The Authority proposes that the spectrum is assigned for a licence term of fifteen (15) years. This proposal is in line with the terms applied in recent spectrum assignments and European best practice.

In the case of the 800 MHz band, the licence duration would commence from the grant date or the date when the band becomes available for mobile services, whichever comes latest.

### 5.2 TECHNOLOGY NEUTRALITY

In line with the principles established in the Framework Directive (2002/21/EC as amended by 2009/140/EC) the Authority proposes that this spectrum is assigned on a technology neutral basis. Therefore licensees will be free to deploy any technology as long as they comply with the relevant EU spectrum harmonisation decisions namely, 2010/267/EU for the 800 MHz band, 2011/251/EU for the 1800 MHz band and 2008/477/EC for the 2.5 GHz band.

### 5.3 SERVICE NEUTRALITY

Independently from the technology of choice, it is possible to deploy a number of services.

Therefore the Authority, in line with the principles established in the Framework Directive (2002/21/EC as amended by 2009/140/EC), is of the view that any rights of use for spectrum in any of the bands under consideration should not include any constraints on the type of services that are offered over the resulting networks.

### 5.4 ROLLOUT AND COVERAGE OBLIGATIONS

The Authority considers that, to ensure maximum benefits for all the users, licensees should make any service they offer available on a nationwide basis. This obligation should be complied with within a period of 24 months from the date of assignment.

This period is sufficiently long to give licensees adequate time to deploy a nationwide network. It is in line with the experience of local operators who launched nationwide UMTS services in less than 2 years, as well as with timeframes stipulated in recently awarded licences.

In the case of licences which include spectrum in the 800 MHz band, the 24 month timeframe would commence from the grant date or the date when the band becomes available for mobile services, whichever comes latest.

It should be noted that for the purpose of this provision, a distinction will be made between mobile data services depending on the level of speeds offered. Thus two sub-categories will be created with services capable of offering speeds in excess of 100 Mbps being classified as very high speed mobile data services.

## 5.5 INTERFERENCE MITIGATION CONDITIONS

All wireless network operators are legally bound to ensure that their networks do not create any undue interference to other networks. There are several methods used to control the unwanted emissions.

One of the most straightforward methods is the establishment of guard bands. This implies that useful spectrum is left unassigned to act as a buffer between different undertakings operating in the same band. By its very nature this has negative implications in terms of spectrum efficiency.

On the other hand, techniques, such as the use of Block Edge Masks (BEM), are available that enable operators to minimise interference through effective and flexible management of their own spectrum assignment.

In view of these techniques, which have also been effectively implemented in other bands, and in order to ensure that all available spectrum is utilised, the Authority proposes that where Block Edge Masks can be used these are adopted instead of guard bands.

### 5.5.1 THE 800 MHz BAND

As outlined in Section 4, the deployment of mobile services in the 800 MHz band is bound to give rise to interference to the DTTV service. As a result the Authority proposes to include the following mitigation measures in the rights of use.

#### **Technical conditions included in rights of use**

The Authority proposes to adopt the harmonised technical conditions for the deployment of electronic communication services in the 790 – 862 MHz band established in the European Commission decision 2010/267/EU.

The Authority proposes that:

- The in-block EIRP for Channel 1 is set at 56 dBm/5 MHz, whilst for the other channels it is set at 60 dBm/5 MHz.
- The baseline requirements for the base station BEM out-of-block EIRP limits over frequencies below 790 MHz will be those established under Case A in Table 4 of the said EU decision.

This notwithstanding the Authority reserves the right to relax these technical conditions at any point throughout the licence duration, particularly in case of material changes in the local terrestrial broadcasting scenario.

Furthermore, the Authority proposes that the licensees will also have the possibility to negotiate less stringent EIRP limits with the DTTV operator.

The outcome of the co-ordination process might include any technical restrictions that would need to be adhered to so as to ensure co-existence of the local 800 MHz mobile services with the broadcasting services operated in neighbouring countries. Should this be the case these technical conditions will form an integral part of the licence.

### **800 MHz Fund**

The licence will also include provisions related to the coexistence issues and the 800 MHz fund as discussed in Section 4.5 of this document.

### **Siting conditions**

As outlined in Section 4.4 in order to minimise the possibility of interference with PMSE operating in the 800 MHz duplex band, the Authority proposes that licensees will not be authorised to deploy indoor cells operating on the 800 MHz band.

## **5.5.2 THE 1800 MHz BAND**

In order to ensure consistency with the rights of use already in place, the Authority proposes that the conditions established in the EU decision on the harmonisation of the 900 MHz and 1800 MHz bands (2011/251/EC) are retained.

## **5.5.3 THE 2.5 GHz BAND**

The Authority proposes to adopt the technical conditions established in the EU decision on the harmonisation of the 2500 – 2690 MHz band (2008/477/EC).

## **5.6 SANCTIONS**

The Authority proposes that clear sanctions are included in the rights of use in the event of non-compliance with any obligations stipulated therein. It is proposed that these sanctions include ‘use it or lose it’ clauses.



## 6. SPECTRUM PRICING

Government is aware that spectrum pricing should be such that on the one hand supports sustainable investment whilst at the same time reflects the real value of the spectrum.

In determining the base price for the various spectrum bands, cognisance has therefore been taken of the fees paid for other bands capable of offering similar services which were assigned in recent years, the physical characteristics of the bands under consideration as well as fees charged in other jurisdictions.

It should be noted that in the event of an auction, applicants will be required to bid up on their first year spectrum fees. In this case, the successful applicants will be obliged to pay the difference in price between the base price (i.e. the first year spectrum fees) and the final bid price immediately upon conclusion of the auction.

In addition to the above, the successful applicants would have to pay the applicable annual spectrum fees on a quarterly basis for the entire duration of the licence for the rights of use of the spectrum awarded to them.

Taking into account the principles outlined above, Government proposes the following spectrum fees for the bands under consideration.

### 6.1 THE 800 MHz BAND

Considering experience in other jurisdictions, as well as the similar propagation characteristics enjoyed by the 800 MHz and 900 MHz bands, Government proposes that the spectrum fee for the 800 MHz band is equal to that for spectrum in the 900 MHz band:

- € 224,000 for each paired 5 MHz channel.

### 6.2 THE 1800 MHz BAND

The current spectrum fee for spectrum in the 1800 MHz band is established in the Eight Schedule of the Electronic Communications Networks and Services (General) Regulations under the Electronic Communications (Regulations) Act through LN 335 of 2011.

In this respect Government proposes to retain the said spectrum fee i.e. € 224,000 for each paired 5 MHz channel.

### 6.3 THE 2.5 GHz BAND

Taking into account the fees paid in other jurisdictions, Government is proposing an annual spectrum fee of:

- €24,000 for each paired 5 MHz channel; and
- €5,500 for each unpaired 5 MHz channel.

## 7. INDICATIVE TIMELINES

With respect to the assignment process, the Authority plans to publish the final decision in Q2 2014, following which the spectrum will be available on the market.

Any assignment decision in the 800 MHz band will however need to be preceded by the successful completion of the co-ordination process for a replacement channel for the broadcasting transmissions currently using this band.

Moreover, the commencement date of the rights of use for spectrum in the 800 MHz band will need to coincide with the clearing of the said band from broadcasting services.

## 8. CONSULTATION QUESTIONS

1. Do you agree with the channelling arrangements proposed by the Authority in Section 3.1.1? Justify in case of a negative position.
2. Do you agree with the lot definitions proposed by the Authority in Section 3.1.2? Justify.
3. Which of the lot structures proposed in Section 3.1.2 do you prefer for the 2.5 GHz unpaired spectrum? Justify.
4. Do you agree with the concept of spectrum caps as outlined in Section 3.1.3? Please provide your views on the proposed spectrum caps.
5. Do you agree with the assignment process proposed in Section 3.2? Justify.
6. Do you have any comments on the considerations presented in Section 4?
7. Do you agree with the licence conditions stipulated in Section 5? Justify.
8. What are your views on the spectrum fees proposed by Government in Section 6? Justify.

The Authority would be pleased to receive comments and proposals on any other aspects that may be deemed relevant for the purposes of this consultation.

For the sake of clarity and ease of understanding, the Authority encourages stakeholders to structure their comments in order and in line with the section numbers and sub-section numbers used throughout this document.

## 9. SUBMISSION OF RESPONSES

In accordance with its obligations under Article 4A of the Malta Communications Authority Act [Cap. 418 of the Laws of Malta], the Authority welcomes written comments and representations from interested parties and stakeholders during the consultation period which shall run from the 20/03/2014 to the 05/05/2014.

The Authority appreciates that respondents may provide confidential information in their feedback to this consultation document. This information is to be included in a separate annex and should be clearly marked as confidential. Respondents are also requested to state the reasons why the information should be treated as confidential.

For the sake of openness and transparency, the Authority will publish a list of all respondents to this consultation on its website, up to three days following the deadline for responses. The Authority will take the necessary steps to protect the confidentiality of all such material in accordance with the Authority's confidentiality guidelines and procedures<sup>11</sup>. Respondents are however encouraged to avoid confidential markings wherever possible.

All responses should be submitted to the Authority, in writing by no later than 12:00 hrs on 05/05/2014 and addressed to:

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Chief of Spectrum Management and Technology

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Extensions to the consultation deadline will only be permitted in exceptional circumstances and where the Authority deems fit. The Authority reserves the right to grant or refuse any such request at its discretion. Requests for extensions are to be made in writing within the first ten (10) working days of the consultation period.

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<sup>11</sup> [http://www.mca.org.mt/sites/default/files/articles/confidentialityguidelinesFINAL\\_0.pdf](http://www.mca.org.mt/sites/default/files/articles/confidentialityguidelinesFINAL_0.pdf)

## ANNEX A: CURRENT SPECTRUM ASSIGNMENTS AND PRICING REGIMES

### A.1 CURRENT ASSIGNMENTS

A number of bands are earmarked for potential LTE deployment namely the 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.5 GHz bands. The following subsections provide an overview of the spectrum availability in these bands.

#### The 800 MHz Band

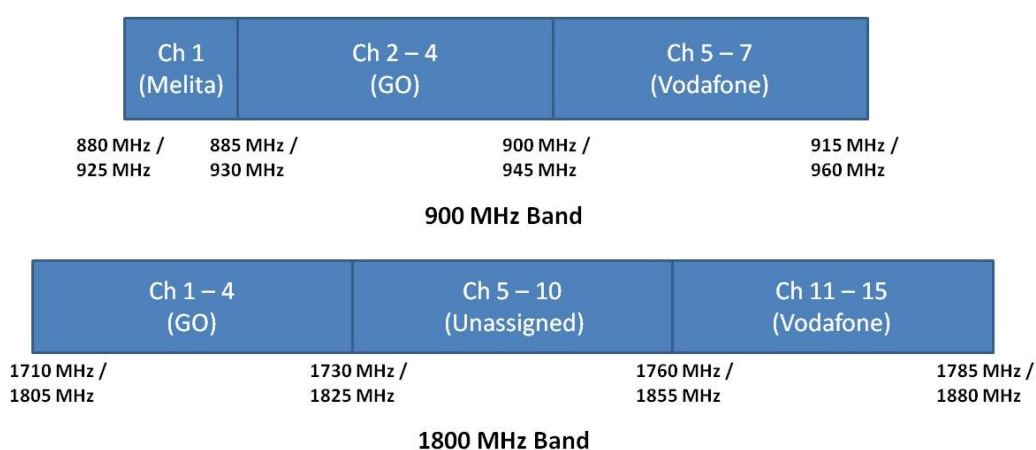
Traditionally the UHF Band (470 – 862 MHz) was solely reserved for broadcasting services. One of the channels assigned to Malta, in 2006 during the Regional Radiocommunications Conference (RRC-06), falls within the 800 MHz band.

In order to be in a position to make the 800 MHz band available for mobile services, this band has to be cleared of any broadcasting services. The solution is to co-ordinate another broadcasting channel with neighbouring countries and subsequently migrate the broadcasting transmissions currently using the 800 MHz band unto this new channel. Once the migration is completed the 800 MHz band will be completely available.

#### The 900 MHz Band

In 2009 in preparation for the upcoming termination of the 900 MHz and 1800 MHz spectrum licences, the Authority initiated a re-assignment process for the spectrum. In 2010 the Authority published 'The Future of the 900 MHz and 1800 MHz Bands'<sup>12</sup> policy document ('2010 Policy') which established the framework for this re-assignment process.

This process was concluded in August 2011 and spectrum was assigned to Melita Mobile Ltd ('Melita'), Mobisle Communications Ltd ('GO') and Vodafone Malta Ltd ('Vodafone') as follows:



**FIGURE 6: CURRENT SPECTRUM ASSIGNMENTS IN THE 900 MHz AND 1800 MHz BANDS**

<sup>12</sup> MCA/10/44/D

These rights of use are technology neutral in line with 2011/251/EU and enabled the launch of the first LTE network in Malta.

### **The 1800 MHz Band**

As shown in Figure 3 above following the 2011 re-assignment process, there are still six unassigned channels in this band.

### **The 2.1 GHz Band**

In 2005 the Authority granted the rights of use of spectrum in the 2.1 GHz band for the deployment of UMTS Networks to Mobisle Communications Limited<sup>13</sup> and Vodafone Malta Limited<sup>14</sup>. The third licence in this band was awarded in August 2007 to 3G Telecommunications Limited<sup>15</sup>. These rights of use have a 15-year duration.

The first local UMTS network was launched in summer 2006 followed a few months later by the second network. These deployments have enabled customers of both licensees to start enjoying the new services made possible by this technology. A third UMTS network was subsequently launched in 2009.

### **The 2.5 GHz Band**

In January 2008 the Authority published a consultation paper<sup>16</sup> on a number of issues related to a potential assignment of spectrum in this band.

Subsequently in November of that year the Authority published its response to consultation and preliminary position<sup>17</sup>.

To date no request for spectrum was received by the Authority and the 2.5 GHz band is currently entirely unassigned.

## **A.2 CURRENT SPECTRUM PRICING REGIME**

In 2005 Government established the spectrum fees for rights of use in the 2.1 GHz band at € 5.8 million (Lm 2.5 million), for 15 years, for 20 MHz of paired spectrum and 5 MHz of unpaired spectrum.

The spectrum fees for rights of use in the 900 MHz and 1800 MHz band were established through LN 335 of 2011. This legal notice amended the Eighth Schedule of the Electronic Communications Networks and Services (General) Regulations, ('ECNSR') (Chapter 399.28 of the Laws of Malta) and, amongst others, established an annual fee of € 224,000 for each paired 5 MHz channel.

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<sup>13</sup> [http://www.mca.org.mt/sites/default/files/pageattachments/3G\\_Licence\\_-\\_GoMobile%5B1%5D.pdf](http://www.mca.org.mt/sites/default/files/pageattachments/3G_Licence_-_GoMobile%5B1%5D.pdf)

<sup>14</sup> [http://www.mca.org.mt/sites/default/files/pageattachments/3G\\_Licence\\_-\\_VFM%5B1%5D.pdf](http://www.mca.org.mt/sites/default/files/pageattachments/3G_Licence_-_VFM%5B1%5D.pdf)

<sup>15</sup> [http://www.mca.org.mt/sites/default/files/pageattachments/3G\\_Telecoms\\_licence.pdf](http://www.mca.org.mt/sites/default/files/pageattachments/3G_Telecoms_licence.pdf)

<sup>16</sup> <http://www.mca.org.mt/sites/default/files/attachments/consultations/2012/2-5-ghz-spectrum-consultation-final%281%29.pdf>

<sup>17</sup> <http://www.mca.org.mt/sites/default/files/attachments/decisions/2012/final-position-2-5.pdf>

## ANNEX B: FUND CAP CALCULATION

The fund cap calculation covers the costs for:

- The filter installations; and
- The migration of affected installations to an alternative TV platform, in case the filters prove insufficient.

The fund cap has been calculated on a worst case scenario whereby it was assumed that all DTTV installations<sup>18</sup> would be affected by interference and should therefore represent the maximum exposure for the licensees.

In establishing this figure the following has been taken into account:

- 62,461 DTTV subscribers as at Q3 2013;
- An assumption that 4.2% of these subscribers have a second TV unit;
- 4924 users using the free-to-air service for their primary TV unit, based on a Digital Switchover (DSO) Survey carried out in May 2011;
- 6083 users using the free-to-air service for their secondary unit, based on the above-mentioned DSO Survey;
- An estimate that 20% of digital terrestrial TV installations comprise a mast-head amplifier. In this case the costs taken into account assume that the filter is installed by a technician;
- An estimate that 20% of digital terrestrial TV installations could experience severe interference which is not solved by installing a filter thereby requiring a migration to a broadly equivalent TV service over an alternative platform;
- an indoor filter costs €15;
- an outdoor filter costs €20;
- a technician call costs €30;
- a contingency factor of 25% on the total costs of filters and installations to cater for possible market price fluctuations over time; and
- In the case of a migration to an alternative platform the fund will cover the installation costs and the difference in monthly rental fees for the first two years. This is estimated to amount to around € 212 per installation.

This resulted in an estimated fund cap of €4.5 million.

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<sup>18</sup> Both those of GO's DTTV subscribers and those of the free-to-air network viewers