TEA

The Family of Business Case Analysis Tools

Input Gathering Form

User Guide

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1 Introduction

As part of their submission to the 'Call for Applications - Leading to access to rights of use of radio frequencies in the 900 MHz and 1800 MHz bands in Malta', Applicants will be required to input relevant information in the TEA Input Gathering Form which can be downloaded as part of the Call for Application pack.

The Input Gathering Form template caters for both 2G and 3G networks. Applicants need to create separate project files, one customised for 2G networks and the other for 3G, as the case may be.

For the purpose of this exercise, if the Applicant has both a 2G and 3G network, he needs to, where applicable, take into account the proportion of costs and revenues directly imputable to 2G (in the case of the 2G business case) or 3G (in the case of the 3G business case). Furthermore in the case of the 3G business case, the Applicant must also apportion the relevant cost and revenues between its 2.1GHz operation and the prospective 900 MHz / 1800 MHz one.

This information will then be used by the Malta Communications Authority to evaluate the Applicants' business plans.

The TEA tool allows taking into account all critical aspects (market, technical, economic and financial) ensuring an alignment between business and technology strategies.

Note: This user manual is common for both the 2G and 3G Input Gathering Forms.

2 Installing the Input Gathering Form

The TEA Input Gathering Form runs on a standard PC environment. Basic system requirements are:

- **Minimum Processor:** Pentium III.
- **Memory:** 2 GB of RAM.
- **Disk Space:** 100 MB available hard drive space.
- **Display:** Super VGA (800 x 600) or higher-resolution monitor.
- **Operating System:** Microsoft® Windows® XP with Service Pack 2 or Microsoft® Windows® Vista™ Home Premium, Business, Ultimate, or Enterprise (certified support for 32-bit editions). In both Windows® XP and Windows® Vista™, the TEA Input Gathering Form requires Microsoft .NET Framework version 2.0 or higher to run. If this component is not already installed, update your computer at http://www.microsoft.com/downloads/en/default.aspx:

    1. searching for the *Microsoft .NET Framework Redistributable Package* and
    2. installing the package following the instructions provided in the download page.

- **Recommended Browser:** Mozilla Firefox
- **PDF publisher:** We recommend to install PDFCreator version 0.9.6 or higher, freely available at http://www.pdfforge.org/products/pdfcreator.

2.1 Installer

To install the TEA Input Gathering Form on your PC, make sure you have Administrator rights then download and unpack the software in a temporary directory. Double click on the TEA Input Gathering Form installer and perform the steps indicated in the wizard.

2.1.1 For Windows Vista™ Users Only - Disabling UAC

To run the TEA Input Gathering Form on Microsoft® Windows® Vista™, you will have to disable UAC (User Account Control) as described below.

1. Open the *Control Panel*.

2. Under *User Account and Family Safety* settings click on *Add or remove user accounts*.
3. Under your user account click on the *Go to the main User Account page* link.
4. Under *Make changes to your user account* click on the *Change security settings* link.
5. In the *Turn on User Account Control (UAC) to make your computer more secure,* click to unselect the *Use User Account Control (UAC) to help protect your computer* and then click on the *OK* button.
6. You will be then prompted to reboot your computer. Do so when ready.
7. Once Windows Vista™ has been restarted, launch the TEA Input Gathering Form.

3 Running the Input Gathering Form

3.1 Starting the Input Gathering Form

Double click on the TEA MCA icon on *Start menu → All programs → TEA MCA* to launch the TEA Input Gathering Form.

The other icons in the menu give access to the following:

- *Export Data:* Allows exporting the database of the project. After having clicked on *Export Data*, save the Notepad file by using as project name <CompanyName_2G> in the case of the 2G business case and <CompanyName_3G> in the case of the 3G business case.
- *TEA MCA:* Allows starting the application.
- *TEA MCA EULA:* Displays the End User License Agreement (EULA) in PDF format.
- *TEA MCA User Guide:* Displays this document in PDF format.
- *Uninstall:* Uninstalls all the application components from the PC.

3.2 Main Modules and Sub-modules of the Input Gathering Form

The TEA Input Gathering Form is made up of three main modules, and each module is constituted by different sub-modules. A summary of the main functions of each module and sub-module is provided below.

- ***Market Analysis:*** Aims at properly collecting all data in order to evaluate the potential market for 2G/3G services and to make reliable revenue forecasts for the 2G/3G services to be offered.
  - ***Territorial Analysis:*** To characterise each Region, the percentage of the geographical extension and the percentage of inhabitants, households and micro/small/medium/large enterprises to be covered by the network have to be set.
  - ***Service Profile:*** To estimate correctly the revenues, each service profile has to be characterised in terms of technical features and pricing policies.
  - ***Market Forecast:*** To evaluate the market size properly, the broadband penetration rate and the churn impact have to be set per each year of the analysis period and for each Region***.***
  - ***Revenues:*** To estimate properly the revenues, additional revenues have to be set per each year of the analysis period.

- ***Technical Analysis:*** Has the purpose of gathering all data in order to define the required bill of quantities related to the access and backhauling network.
  - ***Equipment:*** Up to six types of BTS/NodeB and six types of User Equipments can be configured.
  - ***Performance:*** To carry out a complete link budget analysis, margins have to be set. The Okumura-Hata Model is taken into account on the 900 MHz band, whilst the Cost 231 - Hata Model is taken into consideration on the 1800 MHz band.
  - ***Capacity Demand:*** To estimate the capacity required by the users located in each Region to be served, the average usage per user has to be characterised.
  - ***Network Dimensioning:*** As for network sizing, the current situation and other relevant parameters have to be set.
  - ***Roll-out:*** As for network roll-out, the additional number of BTS/NodeBs, TRX/Carriers and radio links have to be configured.
- ***Economic & Financial Analysis:*** Aims at collecting all data both to calculate CAPEX and OPEX, and to estimate some key indicators, such as Earnings before Interest Tax Depreciation and Amortisation (EBITDA), Net Income, Net Present Value (NPV), Payback Period (PBP) and Internal Rate of Return (IRR).
  - ***Personnel:*** The personnel costs have to be set considering all the typical roles in an operator company (executive staff, technical ops, sales, marketing, general & administrative people) and defining their salary and benefits.
  - ***CAPEX and OPEX:*** To forecast expenditures, all the main CAPEX and OPEX figures for the 2G/3G initiative have to be defined.
  - ***Depreciation & Amortization:*** To evaluate the depreciation and amortisation breakdown, some relevant parameters have to be configured.
  - ***Statements:*** To produce the Profit & Loss, Cash Flow and Balance Sheet statements, some relevant parameters have to be configured.

3.3 Home Page

To start gathering your business case inputs, you need first to configure the following parameters to set the environment:

- ***Service Profiles:*** To establish the number of service profiles to be used during the analyses (up to 6 profiles). The name of each service profile can be edited (maximum length: 12 characters).
- ***BTS/NodeB:*** To establish the number of types of BTS/NodeB to be used during the analyses (up to 6 types). The name of each type of BTS/NodeB can be edited (maximum length: 12 characters).
- ***User Equipment:*** To establish the number of types of user equipment to be used during the analyses (up to 6 types). The name of each type of user equipment can be edited (maximum length: 11 characters).

4 Market Analysis

4.1 Territorial Analysis

For the purpose of this exercise, the Maltese Islands have been divided in three Regions:

- Eastern Region
- North Western Region
- Gozo & Comino

Information on these regions is found in the Google Earth file which is included in the zip file made available with the Call for Applications. Further information can be found in Annex A of this document.

Note: In order to ensure a common basis for the submissions, Applicants are requested to base their business case calculations on the demographic data provided in the aforementioned file.

4.1.1 Territory

For each Region the following parameters can be configured:

- ***Target Percentage* [%]:** This column denotes the percentage of territory to be served for each of the following scenarios: *Dense Urban*, *Urban, Suburban and Rural.* A definition of these terms is found in Annex A.

4.1.2 Demography

For each Region the following parameters have to be configured:

- ***Target Percentage [%]:*** This column denotes the percentages of the key Market Segments - *Population, Households, Micro, Small, Medium* and *Large Enterprises* - that will be covered by the network (i.e. Users Passed[1]). Note this is distinct from users served which is denoted by the penetration rate and will be input as part of the Market Forecast data (see Section 4.3). The Market Segment definitions are as follows:

[1] *This is the potential number of users to which an operator has capability to connect in a service area, but the users may or may not be subscribed to the network.*

- ***Population:*** Denotes inhabitants that live in the analysed region. These are considered as *Individuals* in the *Market Analysis* and are usually the target of personal services.
- ***Households:*** Denotes nuclear families that live in the analysed region. They are usually the target of home Internet/voice services.
- ***Enterprises:*** Denotes enterprises[2] located in the analysed region. They are usually the target of office Internet/voice services. *Enterprises* are classified as *Micro, Small, Medium* and *Large*, depending on the number of employees:
  - ***Micro*****:** from 1 to 9 employees
  - ***Small*****:** from 10 to 49 employees
  - ***Medium*****:** from 50 to 249 employees
  - ***Large*****:** more than 250 employees

4.2 Service Profile

4.2.1 Characterization

For each Service Profile the following parameters have to be configured:

- ***Minutes of Voice Call (Y1 – Annual Variation [%]):*** Allows setting the minutes of voice calls that are included in the bundle of the 'flat-fee service'[3]. It is characterised by the minutes of voice calls at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model[4] and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero.
- ***Minutes of Video Call (Y1 – Annual Variation [%]):*** Allows setting the minutes of video calls that are included in the bundle of the 'flat-fee service'. It is characterised by the minutes of video calls at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation

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2 In accordance with NSO statistics, one Enterprise is equivalent to one Legal Unit (one administrative registration). Therefore enterprises that have a number of outlets across the islands are considered to constitute one enterprise. The location of this enterprise would be considered to be its registered office.

3 In this case the user subscribes to a given bundle of service/s ex. 100 minutes of voice calls for a fixed monthly fee. Additional voice call minutes would be charged separately.

*4 The annual variation has a linear model. The value in the n^{th} year is equal to the value in the $(n-1)^{th}$ year increased/decreased by a percentage equal to the annual variation. For example if the annual variation is taken to be 5% then the value in year 2 would be equal to - Minutes of Voice Call (Y1) * 1.05.*

has a linear model and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero.

- ***Number of SMS (Y1 – Annual Variation [%]):*** Allows setting the number of SMS that are included in the bundle of the 'flat-fee service'. It is characterised by the number of SMS at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero.
- ***Number of MMS (Y1 – Annual Variation [%]):*** Allows setting the number of MMS that are included in the bundle of the 'flat-fee service'. It is characterised by the number of MMS at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero.
- ***Internet Traffic [MB] (Y1 – Annual Variation [%]):*** Allows setting the number of Mbytes of Internet data usage (total of both downloaded and uploaded data) that are included in the bundle of the 'flat-fee service'. It is characterised by Mbytes of Internet at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero.
- ***PIR [Mbps] – Internet:*** Denotes the *Peak Information Rate (PIR)*, that is, the maximum allowable data rate that a user may experience in both the Down- and Up-Link directions during non-busy hours. This field has to be set for both 'non-bundle services' and 'flat-fee service'.
- ***CIR [Mbps] – Internet:*** Denotes the *Committed Information Rate (CIR),* that is the minimum bandwidth that is guaranteed at any time in both the Down- and Up-Link directions; i.e. at any time the bandwidth should not fall below this limit. This field has to be set for both 'non-bundle services' and 'flat-fee service'.
- ***Annual Variation [%] – Internet:*** Denotes the annual variation of the PIR and CIR in Down- and Up- Link. The annual variation has a linear model and can be either positive (increase) or negative (decrease). This field has to be set for both 'non-bundle services' and 'flat-fee service'.

- ***Monthly Service Fee (Y1 – Annual Variation [%]):*** Allows setting the monthly fee for the selected "flat-fee service". The fee is characterised by the monthly cost at the first year of the analysis period and by an annual variation as a percentage on the monthly cost. The annual variation has a linear model and can be either positive (increase) or negative (decrease). In the case of 'non-bundle services' this field has to be set equal to zero***.***
- ***Monthly ARPU (Y1 – Annual Variation [%]):*** Allows setting the *average monthly revenue per user* for the selected 'non-bundle service' and for additional revenues from 'flat-fee service'[5]. The fee is characterised by the monthly cost at the first year of the analysis period related to *Voice Call, Video Call, SMS, MMS, Internet* and by the annual variation as a percentage on the monthly cost. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***One Time – Activation Fee (Y1 – Annual Variation [%]):*** Denotes the one-time fees to activate the selected service profile with each type of user equipment, as applicable. Each fee is characterised by the cost at first year of the analysis period and an annual variation as percentage on it. The annual variation has a linear model and can be either positive (increase) or negative (decrease). This field has to be set for both 'non-bundle services' and 'flat-fee service'.
- ***Monthly*** **– Lease Fee *(Y1 – Annual Variation [%]):*** Denotes the monthly fees to lease each type of user equipment for the selected service profile, as applicable. Each fee is characterised by the cost at first year of the analysis period and the annual variation as percentage on it. The annual variation has a linear model and can be either positive (increase) or negative (decrease). This field has to be set for both 'non-bundle services' and 'flat-fee service'.

4.2.2 Distribution Rates

For each Market Segment (*Individuals, Households, Micro, Small, Medium and Large Local Units*) the following parameters have to be configured:

- ***Service Profile Distribution [%]:*** This column denotes the service profile distribution related to the selected market segment. Example, for the

[5] In the case of flat-fee services, this field would include the additional revenue from the customers as a result of for example sending additional SMS to those included in bundle.

Individuals market segment 30% would be on Service Profile 1, 20% on Service Profile 2 and the remaining 50% on Service Profile 3. **Note**: the total of this column should be 100%.

- ***User Equipment Distribution [%]:*** This row denotes the user equipment distribution related to the selected market segment for each service profile. Example, for the Individuals market segment out of the 30% using Service Profile 1, 10% would use User Equipment 1 and the remaining 90% would use User Equipment 2. On the other hand all the users of Service Profile 2 will use User Equipment 3 and all the users of Service Profile 3 will use User Equipment 4. **Note**: the total of this row should be 100%.

Note: the examples denoted above would result in the following input scheme:

	Service Profile [%]	User Equipment 1 [%]	User Equipment 2 [%]	User Equipment 3 [%]	User Equipment 4 [%]
Service Profile 1	30	10	90		
Service Profile 2	20			100	
Service Profile 3	50				100

4.3 Market Forecast

4.3.1 Customer Base

For each Region the following parameters have to be configured:

- ***Number of Users:*** This column denotes the customer base at June 2010 related to the selected Market Segment for each Service Profile. All current service profiles need to be mapped in the planned service profiles, defined in the section 4.2.

4.3.2 Penetration Rate

For each Region the following parameters have to be configured:

- ***Penetration Rate [%]:*** This row denotes the number of new users per Market Segment (irrespective of churn, which effect will be determined by setting the specific parameter – see section 4.3.3) as a percentage of the target Users Passed defined in section 4.1.2 above, for each year of the

analysis period. If an operator has both a 2G and 3G network, he needs to take into account the penetration rate related to 2G (in the case of the 2G business case) or 3G (in the case of the 3G business case).

4.3.3 Churn Rate

For each Region the following parameters have to be configured:

- ***Churn Rate [%]:*** This row denotes the percentage of acquired users per Market Segment that are forecasted to discontinue their use of service for each year of the analysis period. If an operator has both a 2G and 3G network, he needs to take into account the churn rate related to 2G (in the case of the 2G business case) or 3G (in the case of the 3G business case).

4.4 Revenues

The following parameters are meant to capture any other sources of revenues and have to be configured, as applicable:

- ***Roaming Revenues:*** Denotes the total annual revenues due to fees charged to other operators for roaming traffic.
- ***Termination Revenues:*** Denotes the total annual revenues due to wholesale fees charged to other operators for terminating calls on the network.
- ***User Line Revenues:*** Denotes the total annual revenues due to wholesale fees charged to MVNOs, as applicable.
- ***Other Revenues:*** Denotes other possible total annual incomes related to the network operation. Therefore revenues due from for example sale of end user devices (not included in price plans) and end user accessories (e.g. mobile phone skins) should not be included.

5 Technical Analysis

5.1 Equipment

5.1.1 BTS/NodeB

For each type of BTS/NodeB[6] the following parameters have to be configured:

- ***Max Transmit Power [dB]:*** Denotes the maximum transmit power by BTS/NodeB.
- ***Antenna Gain [dBi]:*** Denotes the gain of the BTS/NodeB antenna.
- ***Other Gains [dB]:*** Denotes any other gain at BTS/NodeB side, such as diversity, accounted for in the calculation of the EIRP.
- ***Cable Losses [dB]:*** Denotes all the losses due to cables and connectors at BTS/NodeB side.
- ***Feeder Losses [dB]:*** Denotes the losses occurring in the cable connecting the antenna to the electronics in the BTS/NodeB.
- ***Other Losses [dB]:*** Denotes any other loss at BTS/NodeB side, such as isolators, combiners and filters, accounted for in the calculation of the EIRP.
- ***Max EIRP [dBm]:*** Denotes the maximum value of the *Equivalent Isotropic Radiated Power (EIRP),* defined as the power of the transmitter plus antenna gain minus transmission losses at BTS/NodeB side.
- ***LNA Gain [dB]:*** Provides the Low Noise Amplifier Gain (LNA*).* This is an effective method to improve the cell coverage in Up Link direction. This is achieved by amplifying the received signal by LNA before the receiver losses. For this reason, the amplifier is placed just after the receiving antenna.
- ***Minimum Sensitivity [dB]:*** Denotes the minimum input signal required to produce a specified Signal-to-Noise (S/N) ratio at the output port of the BTS/NodeB.
- ***Number of TRX/Carrier per Sector:*** In the case of 2G equipment, this figure denotes the number of TRX for each sector of the BTS; whilst in the case of 3G equipment, this figure denotes the number of carriers for each sector of the NodeB.

[6] *In the case of the 2G business case the BTSs have to be configured, whilst in the case of the 3G business case the NodeBs have to be configured.*

- ***Number of Sector:*** Denotes the number of logical sectors with which the BTS/NodeB is equipped.
- ***Utilisation Factor:*** Denotes the real utilisation of the BTS/NodeB, for example due to the vendor designated maximum utilisation.
- ***Supported Frequency:*** Denotes the frequency at which the BTS/NodeB equipment operates (only 900 MHz, only 1800 MHz, both 900 and 1800 MHz). Depending on this parameter, the number of BTS/NodeB related to each frequency is estimated. Therefore if the same type of BTS/NodeB operates in various combinations (only 900 MHz, only 1800 MHz, both 900 and 1800 MHz), the Applicant needs to configure three (3) different profiles.

5.1.2 User Equipment

For each type of User Equipment the following parameters have to be configured:

- ***Max Transmit Power [dBm]:*** Denotes the maximum power that the User Equipment transmitter produces at its output.
- ***Antenna Gain [dBi]:*** Denotes the gain of the User Equipment antenna.
- ***Other Gains [dB]:*** Denotes other gains at the User Equipment side.
- ***Cable Losses [dB]:*** Denotes the losses due to cables and connectors at User Equipment side.
- ***Other Losses [dB]:*** Denotes other loss at the User Equipment side.
- ***Max EIRP [dB]:*** Denotes the maximum value of the *Equivalent Isotropic Radiated Power (*EIRP*),* defined as the power of the transmitter plus antenna gain minus transmission losses at the User Equipment side.
- ***Minimum Sensitivity [dB]:*** Denotes the minimum input signal required to produce a specific Signal-to-Noise (S/N) ratio at the output port of the User Equipment.
- ***Body Losses [dB]:*** Denotes the margin due to penetration of RF into the human body and to absorption from the head, if applicable.

5.2 Performance

5.2.1 Maximum Path Loss

For each type of Scenario the following parameters have to be configured:

- ***Cell Edge Coverage Probability [%]***: Denotes the probability that a User Equipment would experience a signal above a certain threshold at the cell edge.
- ***Lognormal Shadowing SD [dB]***: Denotes the standard deviation of Log Normal distribution. It should take into account also the standard deviation due to indoor penetration.
- ***Penetration Losses [dB]:*** Denotes the losses which the signal undergoes due to penetration into buildings. This is dependent on the frequency (900 MHz and 1800 MHz) and the type of building material. In this case an average value is required.
- ***Fast Fading Margin [dB]:*** Denotes the planned margin to compensate for fast fading effects.
- ***Interference Margin [dB]***: Denotes the margin for degradation due to intense high traffic and frequency reuse in Down-Link and Up-Link.

5.2.2 Path Loss Model

For each type of Scenario the following parameters have to be configured:

- ***BTS/NodeB Height [m]:*** Denotes the height of each BTS/NodeB type, i.e. the height of the centre of the antenna associated with the BTS/NodeB measured above the terrain level.
- ***UE Height [m]:*** Denotes the height of each User Equipment type, i.e. the height at which the User Equipment is located.

5.3 Capacity Demand

5.3.1 Average Usage

For each Service Profile the following parameters have to be configured:

- ***Minutes of Voice Call (Average Usage Y1 – Annual Variation [%]):*** Allows setting the monthly average minutes of voice calls (from and to mobile) per user. It is characterised by the monthly average minutes of voice calls at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Minutes of Video Call (Average Usage Y1 – Annual Variation [%]):*** Allows setting the monthly average minutes of video calls (from and to mobile) per user. It is characterised by the monthly average minutes of video calls at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Number of SMS (Average Usage Y1 – Annual Variation [%]):*** Allows setting the monthly average number of SMS (from and to mobile) per user. It is characterised by the monthly average number of SMS at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Number of MMS (Average Usage Y1 – Annual Variation [%]):*** Allows setting the monthly average number of MMS (from and to mobile) per user. It is characterised by the monthly average number of MMS at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Internet Traffic (Average Usage Y1 – Annual Variation [%]):*** Allows setting the total monthly average Mbytes of both downloaded and uploaded Internet data (from and to mobile) per user. It is characterised by the monthly average Mbytes of Internet data at the first year of the analysis period and by an annual variation as a percentage of it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).

5.3.2 Other

The following parameters have to be configured:

- ***Non Conversation Holding Time [%]:*** Permits taking into account minutes of non conversation for voice and video calls. It is a percentage of the monthly average minutes of voice and video call per user.
- ***Roaming Capacity from 3G to 2G [%]:*** Permits taking into account the roaming 3G traffic in areas where 3G coverage is not complete. In the case of 2G this field is positive (additional capacity), whilst in the case of 3G this field is negative (subtracted capacity).
- ***Additional Capacity [%]:*** Permits taking into account any additional capacity required, such as the roaming subscriber and MVNO subscriber traffic, for each type of service (*voice, video, SMS, MMS, internet traffic*). This field is positive (additional capacity).

5.4 Network Dimensioning

5.4.1 Current Situation

For each Region, Scenario and type of BTS/NodeB the following parameters have to be configured:

- ***BTS/NodeB Number:*** Denotes the total amount of BTS/NodeB at June 2010.
- ***TRX/Carrier Number:*** In the case of the 2G business case denotes the total amount of TRX as at June 2010; whilst in the case of the 3G business case denotes the total amount of carriers as at June 2010.
- ***2G/3G Sharing [%]:*** Denotes the percentage of sites (estimated on the total amount of BTS/NodeB, as the case may be) that are shared between the 2G and the 3G network as at June 2010.

For each Region and for each Scenario the following parameters have to be configured:

- ***Radio Link Number:*** Denotes the total amount of radio links used for the 2G or 3G network (as the case may be) as at June 2010.

- ***2G/3G Sharing [%]:*** Denotes the percentage of radio links (estimated on the total amount of radio links) that are shared between the 2G and the 3G network as at June 2010.

  Example 1: Consider an operator that has a total of 40 sites, 20 sites are used solely for 2G, 10 sites are used solely for 3G and the remaining 10 sites are shared between 2G and 3G. This would translate in the following input:

	2G Business Case	3G Business Case
BTS/NodeB Total Number	30	20
2G/3G Sharing [%]	33	50

  Example 2: Consider the above operator has a radio link per site. This would result in the following input:

	2G Business Case	3G Business Case
Radio Link Total Number	30	20
2G/3G Sharing [%]	33	50

5.4.2 Radio Access Network

The following parameters have to be configured:

- ***Blocking Probability:*** Denotes the probability of blocking on the air interface. It is the statistical probability that a connection cannot be established due to insufficient radio resources in the network. It is expressed as a percentage of calls blocked by network congestion during the busy hour.
- ***Spectrum Required:*** Denotes the number of 5 MHz channels that are required in each band (900 MHz and 1800 MHz). This information will amongst other things be used to estimate the spectrum fees payable by the operator.

5.4.3 Backhauling Network

For each Scenario the following parameters have to be configured:

- ***BTS/NodeB With Wireless Backhaul - Factor [%]:*** Denotes the percentage of the required BTS/NodeB that need to be linked through a wireless connection to the backhaul network.
- ***Multihop - Factor [%]:*** Denotes the factor that takes into account the possibility that a BTS/NodeB needs to relay signal through one or more intermediary site to reach the core network.

5.5 Roll–out

5.5.1 BTS/NodeB Roll-out Plan

For each Region, Scenario and type of BTS/NodeB, the following parameters have to be configured:

- ***2G/3G Sharing - Number of New BTS/NodeB:*** Denotes the additional number[7] of BTS/NodeB planned to be deployed on a new site, shared between 2G and 3G network, for each year of the analysis.
- ***No 2G/3G Sharing - Number of New BTS/NodeB:*** Denotes the additional number of BTS/NodeB planned to be deployed on a new site, not shared between 2G and 3G network, for each year of the analysis.
- ***Number of New TRX/Carrier:*** Denotes the total (both shared and not shared between 2G and 3G network) additional number of TRX/Carrier planned to be deployed on a new site for each year of the analysis.
- ***2G/3G Sharing - Number of Upgraded BTS/NodeB:*** Provides the additional number of BTS/NodeB planned to be upgraded, deployed on a site shared between 2G and 3G network, for each year of the analysis.
- ***No 2G/3G Sharing - Number of Upgraded BTS/NodeB:*** Provides the additional number of BTS/NodeB planned to be upgraded, deployed on a site not shared between 2G and 3G network, for each year of the analysis.
- ***Number of Upgraded TRX/Carrier:*** Denotes the total (both shared and not shared between 2G and 3G network) additional number of TRX/Carrier planned to be upgraded for each year of the analysis.

[7] *In addition to those deployed in the previous years.*

- ***2G/3G Sharing - Number of Decommissioned BTS/NodeB:*** Provides the additional number of BTS/NodeB planned to be decommissioned, deployed on a site shared between 2G and 3G network, for each year of the analysis.
- ***No 2G/3G Sharing - Number of Decommissioned BTS/NodeB:*** Provides the additional number of BTS/NodeB planned to be decommissioned, deployed on a site not shared between 2G and 3G network, for each year of the analysis.
- ***Number of Decommissioned TRX/Carrier:*** Denotes the total (both shared and not shared between 2G and 3G network) additional number of TRX/Carrier planned to be decommissioned for each year of the analysis.

5.5.2 Radio Link Roll-out Plan

For each Region and Scenario, the following parameters have to be configured:

- ***2G/3G Sharing - Number of New Radio Links:*** Denotes the additional number of new radio links, shared between 2G and 3G network, for each year of the analysis.
- ***No 2G/3G Sharing - Number of New Radio Links:*** Denotes the additional number of new radio links, not shared between 2G and 3G network, for each year of the analysis.
- ***2G/3G Sharing - Number of Decommissioned Radio Links:*** Denotes the additional number of decommissioned radio links, shared between 2G and 3G network, for each year of the analysis.
- ***No 2G/3G Sharing - Number of Decommissioned Radio Links:*** Denotes the additional number of decommissioned radio links, not shared between 2G and 3G network, for each year of the analysis.

5.5.3 Internet Traffic Split Plan

In the case of the 2G business case, for each Region and Scenario, the following parameters have to be configured:

- ***Over GSM/GPRS:*** Denotes the percentage of Internet Traffic over GSM/GPRS.

- ***Over GSM/EDGE:*** Denotes the percentage of Internet Traffic over GSM/EDGE.

Note: for each year of the analysis the sum of the percentage of Internet Traffic over GSM/GPRS and GSM/EDGE should be 100%.

In the case of the 3G business case, for each Region and Scenario, the following parameters have to be configured:

- ***Over UMTS:*** Denotes the percentage of Internet Traffic over UMTS.
- ***Over HSPA 3.6:*** Denotes the percentage of Internet Traffic over HSPA 3.6.
- ***Over HSPA 7.2:*** Denotes the percentage of Internet Traffic over HSPA 7.2.
- ***Over HSPA 14.4:*** Denotes the percentage of Internet Traffic over HSPA 14.4.
- ***Over HSPA 28.8:*** Denotes the percentage of Internet Traffic over HSPA 28.8.

Note: for each year of the analysis the sum of the percentage of Internet Traffic over UMTS, HSPA 3.6, HSPA 7.2, HSPA 14.4 and HSPA 28.8 should be 100%.

6 Economic and Financial Analysis

For the purpose of the following sections, if the Applicant has both a 2G and 3G network, he needs to, where applicable, take into account the proportion of costs directly imputable to 2G (in the case of the 2G business case) or 3G (in the case of the 3G business case).

6.1 Personnel

For each Group (*Executive Staff, Technical Ops, Sales and Other*) the following parameters have to be configured:

- **Headcount**: Denotes the total number of employees.
- ***Salary (Y1 [€] – Annual Variation [%]):*** Denotes the average annual remuneration at first year of the analysis period and the average annual variation as percentage on it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Benefit As Salary Percentage [%]:*** Denotes the average annual benefit evaluated as percentage of annual remuneration.

6.2 CAPEX

6.2.1 BTS / NodeB

For each type of BTS/NodeB, the following parameters have to be configured:

- ***TRX/Carrier (Y1 [€] - Annual Variation [%]):*** Denotes the TRX/Carrier unit costs defined at first year of the analysis period and the annual variation as percentage on it. The annual variation can be either positive (increase) or negative (decrease). This field will only be used for new BTS/NodeB.
- ***Update [€]:*** Denotes the upgrade cost related per TRX/Carrier (HW, SW, services, etc.). This field will only be used for upgraded BTS/NodeB.

The following parameters have to be configured separately in "2G/3G sharing" and "No 2G/3G Sharing" scenarios[8]:

- ***Site Acquisition [€]:*** Denotes the one-time costs related to the acquisition of the site where each type of BTS/NodeB is located. This field will only be used for new BTS/NodeB.
- ***Site Equipping [€]:*** Denotes the one-time costs related to the equipping of the site where each type of BTS/NodeB is located. This field will only be used for new BTS/NodeB.
- ***Equipment [€]:*** Denotes the total costs of the passive components (e.g. antennas, cables, etc.) and networking elements (e.g. router, switch, UPS, etc.) for each type of BTS/NodeB. This field will only be used for new BTS/NodeB.
- ***Services [€]:*** Denotes the cost related to various implementation services (*Site equipping, Civil Works, Project, Installation and Commissioning* and *Test Activities*) for each type of BTS/NodeB. This field will only be used for new BTS/NodeB.
- ***Other [€]:*** Denotes any other CAPEX costs not included above for each type of BTS/NodeB. This field will only be used for new BTS/NodeB.

6.2.2 User Equipment

For each type of User Equipment, the following parameters have to be configured:

- ***Device (Y1 [€] – Annual Variation [%]):*** Denotes the device unit costs defined at first year of the analysis period and annual variation as percentage on it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Installation & Commissioning [€]:*** Denotes the installation and commissioning costs for one single device.
- ***Other [€]:*** Denotes any other CAPEX costs for each type of User Equipment considered in the analysis.

8 *"2G/3G Sharing" scenario refers to sites that are shared between 3G and 2G network. In this case the Applicant needs to take into account the proportion of costs directly imputable to 2G (in the case of the 2G business case) or 3G (in the case of the 3G business case). "No 2G/3G Sharing" scenario refers to sites that are not shared between 3G and 2G network.*

6.2.3 Backhauling

Wireless Backhaul

The following parameters have to be configured separately in "2G/3G sharing" and "No 2G/3G Sharing" scenarios:

- ***Equipment (Y1 [€] – Annual Variation [%]):*** Denotes the hardware costs to implement a single radio link at first year of the analysis period and annual variation as percentage on it, for each type of radio link. The annual variation has a linear model and can be either positive (increase) or negative (decrease). This field will only be used for new links.
- ***Project [€]:*** Denotes the project costs related to a single radio link, for each type of radio link. This field will only be used for new links.
- ***Installation and commissioning [€]:*** Denotes the installation and commissioning costs related to a single radio link, for each type of radio link. This field will only be used for new links.
- ***Test Activities [€]:*** Denotes the test activity cost related to a single radio link, for each type of radio link. This field will only be used for new links.
- ***Other [€]:*** Denotes any other CAPEX costs, for each type of radio link. This field will only be used for new links.

Wired Backhaul

The following parameters have to be configured separately in "2G/3G sharing" and "No 2G/3G Sharing" scenarios:

- ***Activation Cost per BTS/NodeB [€]:*** Denotes the one-time costs related to the activation of the connectivity for a single BTS/NodeB.
- ***Other [€]:*** Denotes the other CAPEX costs related to connectivity.

6.2.4 Other CAPEX

Remaining RAN Elements

The following parameters have to be configured:

- ***Update (Y1 – Annual Update [%]):*** Denotes the upgrade costs related to the BSC/RNC[9] defined at first year of the analysis period. The user can define an annual update percentage to consider possible further system upgrades.
- ***Other:*** Denotes any other CAPEX costs related to the BSC/RNC.

Core Network

The following parameters have to be configured:

- ***Update (Y1 – Annual Update [%]):*** Denotes the upgrade costs related to the *Core Network* defined at first year of the analysis period. The user can define an annual update percentage to consider possible further system upgrades.
- ***Other [€]:*** Denotes any other CAPEX costs related to the *Core Network*.

Other CAPEX

- ***Other CAPEX:*** Denotes any other annual CAPEX costs for each year of the analysis period. This field could for example take into account costs related to roaming traffic, termination traffic and MVNO traffic.

6.3 D&A

The following parameters have to be configured:

- ***Years to Depreciate/Amortize:*** Denotes the number of years to depreciate costs for each CAPEX item (*BTS/NodeB, User Equipment, Wireless Backhaul, Wired Backhaul, Remaining RAN Elements, Core Elements, Other CAPEX*). A straight-line depreciation and amortisation is applied.

[9] As the case may be i.e. for the 2G business case the costs related to the BSC have to be included, whilst for the 3G business case the costs related to the RNC have to be included.

6.4 OPEX

6.4.1 Cost of Service

BTS / NodeB

The following parameters have to be configured separately in "2G/3G sharing" and "No 2G/3G Sharing" scenarios:

- ***Site Lease & Utilities – Annual [€]:*** Denotes the annual costs for BTS/NodeB site lease and utilities.
- ***Maintenance & Spare – Annual [€]:*** Denotes the annual costs for BTS/NodeB maintenance and spare parts.
- ***Technical Support – Annual [€]:*** Denotes the annual costs for BTS/NodeB technical support.
- ***Quality & Assurance – Annual [€]:*** Denotes the annual costs for BTS/NodeB quality and assurance.
- ***Operation – Annual [€]:*** Denotes the annual operational costs.
- ***Other – Annual [€]:*** Denotes any other annual costs related to BTS/NodeB.

User Equipment

For each type of User Equipment, the following parameters have to be configured:

- ***Maintenance & Spare – Annual [€]:*** Denotes the annual costs for User Equipment maintenance and spare parts.
- ***Other – Annual [€]:*** Denotes any other annual operational costs for User Equipments.

Backhauling

Wireless Backhaul

The following parameters have to be configured separately in "2G/3G sharing" and "No 2G/3G Sharing" scenarios:

- ***Maintenance & Spare – Annual [€]:*** Denotes the annual costs for wireless backhaul maintenance and spare parts, for each type of wireless backhauling considered in the analysis.
- ***Technical Support – Annual [€]:*** Denotes the annual costs for wireless backhaul technical support, for each type of wireless backhauling considered in the analysis.
- ***Quality & Assurance – Annual [€]:*** Denotes the annual costs for wireless backhaul quality and assurance, for each type of wireless backhauling considered in the analysis.
- ***Operation – Annual [€]:*** Denotes the annual costs for wireless backhaul operation, for each type of wireless backhauling considered in the analysis.
- ***Other – Annual [€]:*** Denotes any other operational annual costs, for each type of wireless backhauling considered in the analysis.

Wired Backhaul

The following parameters have to be configured:

- ***Cost per Mbps (Y1 – Annual Variation [%]):*** Denotes the annual connectivity costs per Mbps evaluated at first year of the analysis period. The annual variation can be either positive (increase) or negative (decrease).

Other COS

Remaining RAN Elements

The following parameters have to be configured:

- ***Maintenance & Spare – Annual [€]:*** Denotes the annual costs for BSC/RNC maintenance and spare parts.

- ***Technical Support – Annual [€]:*** Denotes the annual costs for BSC/RNC technical support.
- ***Quality & Assurance – Annual [€]:*** Denotes the annual costs for BSC/RNC quality and assurance.
- ***Operation – Annual [€]:*** Denotes the annual costs for BSC/RNC operation.
- ***Other – Annual [€]:*** Denotes any other annual operational costs for BSC/RNC.

Core Network

The following parameters have to be configured:

- ***Maintenance & Spare – Annual [€]:*** Denotes the annual costs for *Core Network* maintenance and spare parts.
- ***Technical Support – Annual [€]:*** Denotes the annual costs for *Core Network* technical support.
- ***Quality & Assurance – Annual [€]:*** Denotes the annual costs for *Core Network* quality and assurance.
- ***Operation – Annual [€]:*** Denotes the annual costs for *Core Network* operation.
- ***Other – Annual [€]:*** Denotes any other annual operational costs for *Core Network.*

Spectrum License – Wireless Backhaul

The following parameters have to be configured:

- ***Spectrum License – Wireless Backhaul – Annual [€]:*** Denotes the annual cost related to spectrum license for radio links.

Other COS

The following parameters have to be configured:

- ***Other COS:*** Denotes any other annual cost of service (excluding salaries and spectrum license[10] costs) for each year of the analysis period. This field could take into account costs related to roaming traffic, termination traffic and MVNO traffic.

6.4.2 Sales, General & Administrative

G&A, MKT, Sales

The following parameters have to be configured:

- ***General & Administrative - As Revenues Percentage [%]:*** Denotes the general and administrative costs (excluding salaries) evaluated as percentage of revenues, for each year of the analysis period.
- ***Marketing - As Revenues Percentage [%]:*** Denotes the marketing costs (excluding salaries) evaluated as percentage of revenues, for each year of the analysis period.
- ***Sales - As Revenues Percentage [%]:*** Denotes the sales costs (excluding salaries) evaluated as percentage of revenues, for each year of the analysis period.

Customer Acquisition & Care

The following parameters have to be configured:

- ***Customer acquisition (Cost per user (Y1 [€] – Annual Variation [%]):*** Denotes the one-time customer acquisition costs (excluding salaries) evaluated at first year of the analysis period and annual variation as percentage on it. The annual variation has a linear model and can be either positive (increase) or negative (decrease).
- ***Customer Care - As Revenues Percentage [%]:*** Denotes the customer care costs (excluding salaries) evaluated as percentage of revenues, for each year of the analysis period.

[10] *Fees for spectrum in the 900 MHz and 1800 MHz band will be calculated automatically by the tool based on the input in Section 5.4.2*

Other SG&A

The following parameters have to be configured:

- ***Billing Cost per user - Annual [€]:*** Denotes the annual billing cost per user.
- ***Bad Debts and Churn - As Revenues Percentage [%]:*** Denotes the bad debts and churn impact costs evaluated as percentage of revenues, for each year of the analysis period.
- ***Other SG&A:*** Denotes any other annual sales, general and administrative costs, for each year of the analysis period.

6.5 Statements

The following parameters are required to be entered:

- ***Expense Interest Rate [%]:*** Denotes the average interest rate that a company pays to bondholders, banks or private lenders, as the case may be.
- ***Income Interest Rate [%]:*** Denotes the average interest rate that a company earns for business and short-term deposit investments, as the case may be.
- ***Accounts Receivable [Days]:*** Denotes the measure of the average time customers take to pay for purchases.
- ***Accounts Payable [Days]:*** Denotes the measure of the average time the company takes to pay suppliers.
- ***Equity:*** Denotes the capital injected or obtained by the company in the referring year.
- ***Financing*:**
  - ***Debt Value:*** Denotes the amount of loan money obtained by the company in the referring year.
  - ***Annual Interest Rate [%]:*** Denotes the annual interest rate applied to debt value obtained in the referring year.
  - ***Years to Pay Off:*** Denotes the years in which the loan obtained in the referring year will be paid off.

7 Report

The TEA Input Gathering Form can generate automatically a report containing all data. To generate the report, click on the Report link in the footer of the page.

The report will be published in the form of web pages, a page for each one of the main sections. To move from a page to another one, select it from the menu on the top of the page.

If you have a PDF publisher, each main section of the report can be saved as a separate PDF file by first clicking on *File* in the menu bar in the upper left corner of the page and then clicking on *Page Setup*.

Annex A – Territorial Characterization

The territory of Malta has been divided in three Regions:

- ***Eastern Region (Malta Xlokk), including the following Districts:***
  - Southern Harbour
  - South Eastern
- ***North Western Region (Malta Majjistral), including the following Districts:***
  - Northern Harbour
  - Western
  - Northern
- ***Gozo and Comino.***

Information on each Region is provided in the Google Earth File[11] which is included in the zip file made available with the Call for Applications. It has been defined according to the data provided by the NSO and the MEPA. For each Region the following data is included:

- ***Territory***
  - ***Area:*** Extension of the analysed Region, measured in square kilometres, and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios[12].
- ***Demography***
  - ***Population:*** Inhabitants that live in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.
  - ***Households:*** Nuclear families that live in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.
  - ***Micro Enterprises:*** Enterprises[13] with less than 9 employees located in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.

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11 To open the Google Earth File, the Applicant needs to download the Google Earth application on his own PC. Google Earth is freely available at http://earth.google.com/.

12 The characterization of scenarios is based on population density:

- Urban area: a population density superior to 500 inhabitants/km²,
- Suburban area: a population density superior to 100 inhabitants/km² and inferior to 500 inhabitants/km²,
- Rural area: a population density inferior to 100 inhabitants/km².

- ***Small Enterprises:*** Enterprises with 10-49 employees located in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.
- ***Medium Enterprises:*** Enterprises with 50-249 employees located in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.
- ***Large Enterprises:*** Enterprises with more than 250 employees located in the analysed Region and related distribution among *Dense Urban, Urban, Suburban* and *Rural* scenarios.

Further information on the above information on a local council level can be found in the file 'Further Information on Region Characterisation', which is also included in the zip file made available with the Call for Applications.

[13] *In accordance with NSO statistics, one Enterprise is equivalent to one Legal Unit (one administrative registration). Therefore enterprises that have a number of outlets across the islands are considered to constitute one enterprise. The location of this enterprise would be considered to be its registered office.*

Annex B – Acronyms

2G	Second Generation
3G	Third Generation
ARPU	Average Revenue Per User
BSC	Base Station Controller
BTS	Base Transceiver Station
CAPEX	CApital EXPenditures
CE	Channel Element
CIR	Committed Information Rate
COS	Cost Of Service
dB	Decibel
dBi	Decibel isotropic
dBm	Decibel referenced to one milliwatt
D&A	Depreciation & Amortization
DL	Down Link
E&F	Economic & Financial
EIRP	Equivalent Isotropic Radiated Power
G&A	General & Administrative
HH	Household
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
HSUPA	High Speed Uplink Packet Access
HW	Hardware
IP	Internet Protocol
ISD	Inter-Site Distance
LNA	Low Noise Amplifier
LU	Local Units
Mbps	Mega bits per second
MKT	Marketing
MMS	Multimedia Messaging Service
MVNO	Mobile Virtual Network Operator
OPEX	OPerational Expenditures
PIR	Peak Information Rate
RNC	Radio Network Controller
SG&A	Sales, General & Administrative

sq Km/mi	Square Kilometre/mile
SMS	Short Message Service
S/N	Signal To Noise
SW	Software
TEA	Technical and Economic Analysis
TRX	Transceiver
UE	User Equipment
UL	Up Link
UMTS	Universal Mobile Telephone System
VAT	Value Added Tax