Application Form for Existing 900MHz and 1800MHz GSM License Extension

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1 Introduction

1.1 Background

The Dutch Ministry of Economic Affairs, Agriculture and Innovation ("The Ministry") is currently involved in the process of organising and scheduling a multi-band auction for spectrum. The licenses that are on offer include the present licenses for mobile communications in the 900 MHz and 1800 MHz bands. These licenses are held by three mobile operators, KPN, Vodafone and T-Mobile and will expire by 26th February 2013. The auction is scheduled for the end of October 2012 and is expected to run until the end of November 2012.

As a consequence, the time-frame between issuing new licenses, and the expiration date of the licenses currently in use, will be approximately three months. There is likely to be a consequent issue that this transition period will not be long enough for transition to the new licenses and therefore may impact the continuity of current end-user services.

A possible solution is a temporary renewal of the operators' current licences. The Ministry is now prepared to grant such licences subject to a successful application by the three current licence holders (Verlengbaarheidsbesluit GSM-vergunningen 2013).

1.2 Objectives of this document

This Document sets out the format of response for operators to make a compliant application.

The Ministry requires operators to submit a quantified, evidenced and reasoned application to determine the duration for licence prolongation.

This document sets out a series of tables that require completion. These tables represent a breakdown of the major work categories and key assumptions the Ministry expects the operators to have considered in developing their plans in arriving at their license prolongation request.

1.3 Methodology

Operators will be required to develop in their application a quantified, evidenced and reasoned plan in their estimates of the time needed for transition to a new frequency allocation from their existing allocation, while maintaining GSM service continuity. This plan should at a minimum include the following methodological steps:

- Determine the transition measures, allocate these into work categories and then estimate the number of affected sites per work category
- Estimate time/staffing requirement for transition actions at each affected site
- Decide on the amount of staff/resources available to complete the work
- Estimate any work category dependencies and include in a project Gantt chart
- Calculate estimated transition duration

An overview of the methodology is shown in Figure 1.

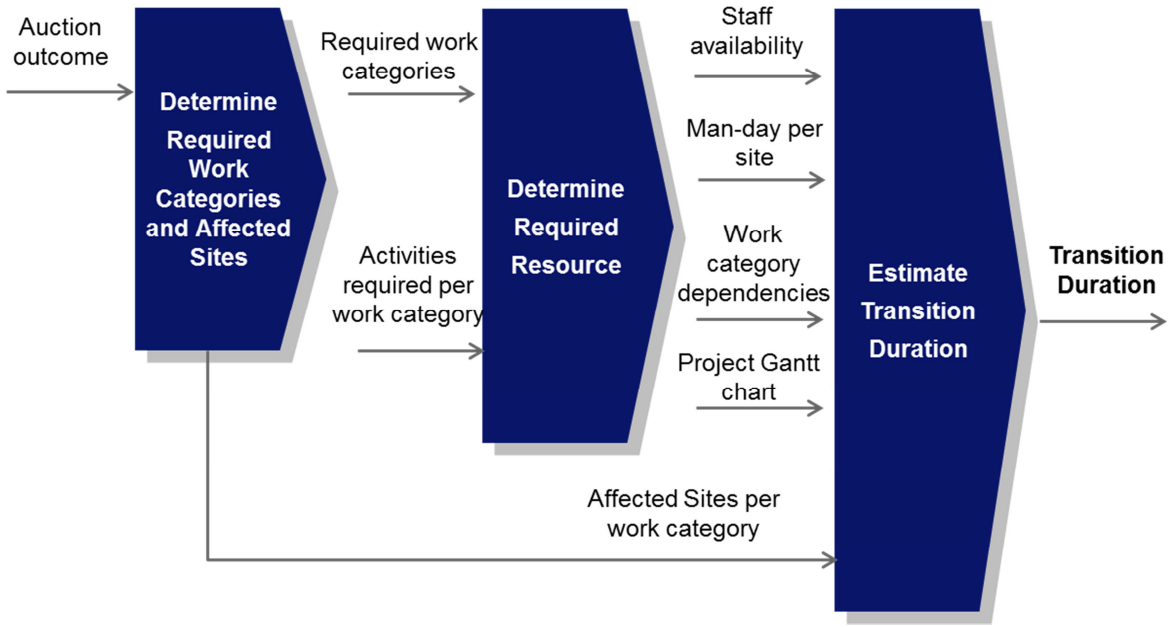

Figure 1: Overview of the Methodology for Estimation of Transition Duration

The steps of this methodology are described in further detail as follows:

Determine transition measures, categorise these and estimate sites affected in each category

Given the auction outcomes, e.g. a reduction in the number of GSM 900/1800 MHz frequency channels available to an operator, this step determines a number of transition measures that should be deployed to fill any resulting coverage and capacity gaps. These measures may include rolling out new sites, adapting existing dual-mode GSM sites to be single-mode or adding extra capacity in existing single-mode sites. The sites affected by the transition measures can be grouped into several mutually exclusive work categories. We have provided a non-exhaustive list of transition work categories in section 2.1.

For each of the work categories, the number of affected sites should also be estimated. For example, the number of 900 MHz single mode sites that need to be adapted to operate at 1800 MHz band instead, should be estimated for work category C.

Determine resource and project plan

This step takes the determined work categories as input and determines the required resource to plan and execute the work categories, which should form the basis of a transition project Gantt chart. This step is expected to cover the following actions:

- Estimate time/staffing requirement for transition actions at each affected site:

  Based on the activities entailed in each work category and the number of sites, operators should estimate the required time and level of resource (man days) for each category of site.
- Decide on the amount of staff/resources available to complete the work:

  The operator should declare the level of resources they will apply to this task by each main activity area. These resources can be expected to be drawn from current internal resources, contractors as well as the resource levels supplied by vendors.
- Estimate any work category dependencies and include a project plan:

The operator needs to also consider the extent to which work categories have interdependencies as well as where dependencies exist with other operators for the purposes of enacting a transition.

Calculate estimated transition duration

This step takes the transition activities, the number of affected sites per work category, estimated resource requirements (e.g. man-days per activity), the availability of resources assumptions and the project plan to estimate the requisite transition duration to ensure GSM end-user service continuity.

2 Tables for completion by operators

Operators are required to provide quantified, evidenced and reasoned plans as justification for their request for license extension. Section 2 of this Document, outlines the key information that operators must include in their applications in this regard.

The bullet-points below list the three high-level pieces of information that operators are required to provide in their application:

- the network and activities for transition
- resources to enable this transition and
- a project plan description and Gantt chart

Applications must include this information, using the format prescribed in this section. Tables in Sections 2.2 - 2.6 and Appendix A, denote information that must be included by operators in their applications, as well as the format in which it should be presented in their application.

The following tables (from these sections) must be completed and included in an application for license extension: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22.

Our expectation is that an application would be in document form, and not exceed 30 pages, which includes all completed operator response tables listed above, as well as a project plan description and associated Gantt chart.

2.1 Definitions of work categories and dependencies

This section defines the post auction work categories and dependencies which operators should use when describing their transition plans in their application for license extension.

2.1.1 Work categories

Post auction work categories describe the activities an operator may carry out to mitigate the impact of any changes to its current 900/1800 MHz spectrum holdings, and ensure the continuity of its end-user services. Sites affected by the transition activities should be mapped into mutually exclusive groups which are identified by the corresponding work categories. The following is a non-exhaustive list of work categories (labelled A - F) that should cover most of the transition activities:

Category A: Deployment of new sites

This category of work concerns rolling out new sites post-auction. The new sites may be rolled out, for example, to fill the coverage and capacity gap caused by reduction in the current spectrum holdings, to off-load traffic on some existing cells, or to deal with increased interference as a result of new frequency plan/frequency reuse factor.

Category B: Dual-mode to Single-Mode Conversion

This category of work concerns converting existing 900/1800 MHz dual-mode sites into a single-mode site. For example, replacement of 900MHz carriers with 1800MHz ones in the scenario of less 900MHz spectrum holdings, or vice versa in the case of having less 1800 MHz, as a result of the auction.

Category C: Single-Mode Sites Adaptation

This category of work concerns adapting existing single-mode GSM (e.g. 900MHz only or 1800 MHz only) sites to operate in a different GSM band post auction. For example, adapting 900MHz only sites to become 1800MHz single-mode sites in the scenario of significantly less 900MHz spectrum holdings or loss of border frequencies, or vice versa in the case of having significantly less 1800 MHz, as a result of the auction.

Category D: UMTS sites GSM top-up

This category of work concerns the addition of a GSM layer (900/1800 MHz) onto existing sites that operate on UMTS spectrum only. This could be in addition of 1800MHz cabinets (including any necessary changes to the antenna) on existing UMTS only sites to fill the GSM coverage cap as the result of significant reduction in 900MHz spectrum holdings or loss of border frequencies post auction. In the case of significant reduction in 1800 MHz frequency channels, existing UMTS sites can also be utilized to provide 1800 MHz capacity (e.g. in support of 1800 cell-split) in some circumstances.

Category E: Single-Mode Sites Capacity Top-up

This category of work concerns adding capacity onto the existing single-mode sites using frequency channels from the other GSM band. For example this can be to add 1800MHz carriers onto the existing 900MHz-only sites in order to fill the GSM capacity gap as the result of a reduction in 900MHz spectrum holdings post auction.

In the scenario of having less 1800 MHz spectrum post auction, existing 1800 MHz only sites can have its capacity topped up using 900 MHz TCH carriers (and possibly with the help of 900 MHz frequency re-planning) in some circumstances.

Category F: GSM sites Frequency Plan Reconfiguration

This category of work concerns reconfiguration of channel frequencies (BCCH/TCH) on existing GSM sites excluding those that have been covered by the Category A - E works. This work category

('Category F') may be required by the need to introduce a new national/regional frequency plan for new spectrum allocations post auction.

The categories of workstreams are intended to cover all the work necessary to enact a transition at a sufficient level for planning purposes. Clearly, depending on the auction outcome, some of these work categories might not apply in practice.

An illustration of how these categories of work might map to an auction outcome is shown in the diagram below. This diagram is related to an auction outcome where one operator needs to deal with less 900 and 1800 MHz spectrum holdings, in addition to a significant shift in its current channel allocations. The illustration shows how the work categories apply to the different types of sites in the network and the mutually exclusive nature among the corresponding groups of sites

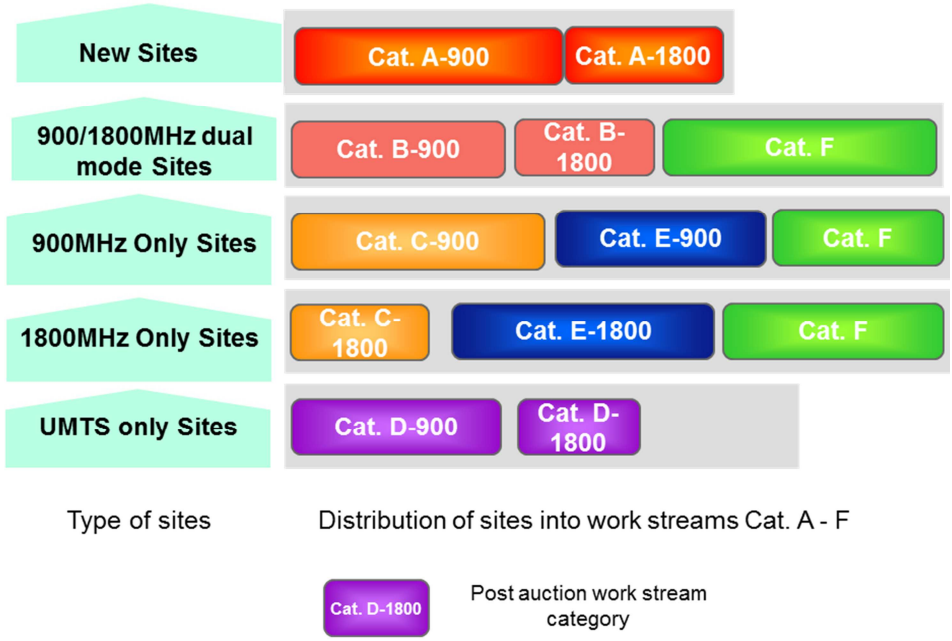

Figure 2: An illustration of work category mapping to an auction outcome

The operator response tables also include an "other" work category in order to allow operators to describe transition activities that cannot be mapped into any of the aforementioned categories and to give their estimates of affected sites in the self-defined category.

2.1.2 Transition dependencies

In addition to the transition work categories, operators will also need to consider in determining the transition duration, any delays from the dependencies related to the release of required frequency band, e.g. the dependencies between work categories in different bands or between transition works of different operators. The following are the dependencies that an operator may experience:

Inter-operator Transition Dependency (Dependency A)

The inter-operator transition dependency corresponds to the time delay that one operator will experience in their transition work flow post-auction while waiting for another operator to complete execution of new GSM 900/1800 MHz frequency plan and releasing unused frequency channels.

Inter-band Transition Dependency (Dependency B)

The inter-band transition dependency corresponds to the time delay that one operator will experience in their transition work categories for one GSM band while waiting for the completion of executing new frequency plan/reuse factor for the other GSM band, e.g. to wait for the completion of a new 1800MHz frequency plan before completing 900-to-1800 MHz transition post-auction.

2.2 Required Application Input 1: Affected sites

This section explains the requirement of operators to provide information on their current network, as well as estimates of affected sites in the planned work for transition to their new spectrum holding.

The information requirement tables are grouped by the work categories and Dependencies described in the preceding section. The "other" category is provided for operators to fill in description of workloads that cannot be mapped to any of the Categories A-F and the corresponding estimates of affected sites.

It is recognised that the auction outcome, which was not known at the time of publication of this Application Form Document, may make some of these work categories irrelevant. As such operators should only complete those work category questions relevant to their application.

Current network

	Information Requirement	Operator Response
2.2.1.1	Total number of GSM sites (including 900, 1800, and 900/1800 dual mode sites)	sites
2.2.1.2	Among the GSM sites as specified in 2.2.1.1, number of 900MHz-only Sites	sites
2.2.1.3	Among the GSM sites as specified in 2.2.1.1, number of 1800MHz Sites (including 1800MHz only and dual-mode sites)	sites
2.2.1.4	Percentage of 1800 MHz sites that co-locate with 900 MHz	%
2.2.1.5	Number of Existing UMTS Sites	sites
2.2.1.6	Percentage of UMTS sites that are UMTS only	%
2.2.1.7	Number of 900MHz-only Sites that are located in the Rural area[1]	sites
2.2.1.7	Number of 1800MHz-only Sites that are located in the Rural area	sites
2.2.1.8	Frequency reuse factor at 900 MHz	N/A
	Rural areas	#
	Non-Rural areas (Urban/Suburban)	#
2.2.1.9	Frequency reuse factor at 1800 MHz	N/A
	Rural areas	#
	Non-Rural areas (Urban/Suburban)	#

Table 1 Required inputs on current network

[1] Definition of Rural Area: Low population density area, rural-quasi open propagation, channel utilization of less-than-or-equal-to 50%

Deployment of new sites for 900 MHz (Category A)

	Information Requirement	Operator Response
2.2.2.1	Total number of new sites to be rolled out post auction to fill the coverage and capacity gap caused by reduction in 900MHz spectrum holdings	sites
2.2.2.2	Breakdown of the new site build target as specified in 2.2.2.1	N/A
	1800MHz sites in-fill to deal with the loss in 900 MHz channels that were used for coverage (and no alternative 900 MHz channels can be found)	sites
	900MHz Cell split to reduce load per cell	sites
	900/1800MHz cell split to deal with increased interference as a result of new frequency plan/frequency reuse factor	sites
	new 900/1800MHz sites to cover the hot spots on "ring"[2] (also refer to questions 2.2.2.14 and 2.2.2.15)	sites
	Any other purposes not covered above (please give details):	sites
2.2.2.3	Among the planned new sites as specified in 2.2.2.1, number of sites will be rolled out in the border areas[3]	sites
2.2.2.4	Among the planned new sites as specified in 2.2.2.1, number of sites would operate on 900 MHz	sites
2.2.2.5	Among the planned new sites as specified in 2.2.2.1, number of sites would operate on 1800 MHz	sites

Table 2 Required inputs related to work category A for 900 MHz

Dual-mode to Single-Mode Conversion for 900 MHz (Category B)

	Information Requirement	Operator Response
2.2.2.6	Number of existing 900/1800 dual mode sites that need to be adapted to operate with 1800MHz carriers only	sites
2.2.2.7	Among the sites specified in 2.2.2.6, number of sites that are located in the border areas	sites
2.2.2.8	Among the sites specified in 2.2.2.6, percentage of sites that require a site visit to accomplish the conversion	%

[2] "Ring" is referred to the difference in coverage between the 900 MHz cells and 1800 MHz cells on the same site.

[3] Border areas are referred to the Netherland/Germany border, Netherland/Belgium border and Netherland/Germany/Belgium border.

Table 3 Required inputs related to work category B for 900 MHz

Single-Mode Sites Adaptation for 900 MHz (Category C)

	Information Requirement	Operator Response
2.2.2.9	Number of 900MHz-only sites need to be adapted to support 1800MHz and become 1800MHz-only	sites
2.2.2.10	Among the sites specified in 2.2.2.8, number of sites that are located in the border areas	sites
2.2.2.11	Among the sites specified in 2.2.2.9, percentage of sites that require a site visit to accomplish the adaptation	%

Table 4 Required inputs related to work category C for 900 MHz

UMTS sites GSM top-up for 900 MHz (Category D)

	Information Requirement	Operator Response
2.2.2.12	Number of Existing UMTS Sites that need to be adapted to provide 1800MHz coverage post auction	sites
2.2.2.13	Among the sites specified in 2.2.2.12, number of sites that are located in the border areas	sites

Table 5 Required inputs related to work category D for 900 MHz

Single-Mode Sites Capacity Top-up for 900 MHz (Category E)

	Information Requirement	Operator Response
2.2.2.14	Number of 900MHz-only Sites that need to be adapted to add 1800MHz carriers to maintain capacity	sites
2.2.2.15	Percentage of the 900MHz-only Sites getting 1800MHz-layer as specified in 2.2.2.14 that requires extra work to deal with the traffic hotspot on the remaining "Ring"	%
2.2.2.16	Breakdown of sites specified in 2.2.2.153	N/A
	Percentage of these sites can be dealt with by further sectorization of current cells	%
	Percentage of these sites can be dealt with by further increasing antenna height	%
	Percentage of these sites can be dealt with through frequency re-planning (e.g. a higher frequency reuse factor for 900MHz TCH), allowing more 900Mhz carrier to be added	%
	Percentage of these sites can be dealt with by changing the down-tilt of the site antenna, or those of the neighbouring sites	%

	Percentage of these sites can be dealt with by building new sites to cover the traffic of the hot spots (e.g. adding micro cells or cell-split)[4]	%
	Any other purposes not covered above (please give details):	%

Table 6 Required inputs related to work category E for 900 MHz

Inter-band dependency in 900 MHz transition (Dependency B)

	Information Requirement	Operator Response
2.2.2.17	Total number of 1800MHz sites need to be re-tuned for new frequency plan/reuse factor before transition work on the depending 900MHz sites can start	sites

Table 7 Required inputs related to Dependency B for 900MHz transition

Deployment of new sites for 1800 MHz (Category A)

	Information Requirement	Operator Response
2.2.3.1	Total number of new sites to be rolled out post auction to fill the coverage and capacity gaps caused by reduction in 1800MHz spectrum holdings	sites
2.2.3.2	Number of the new sites as specified in 2.2.3.1 would operate on 900 MHz	sites
2.2.3.3	Number of new sites as specified in 2.2.3.1 would operate on 1800 MHz	sites
2.2.3.4	Breakdown of the new site build target as specified in 2.2.3.1	N/A
	New 900MHz sites to deal with the loss of 1800MHz only sites	sites
	900MHz Cell split to reduce traffic load per cell	sites
	1800MHz Cell split to deal with increased interference as a result of new frequency plan/frequency reuse factor	sites
	Any other purposes not covered above (please give details):	sites
2.3.3.5	Among the planned new sites as specified in 2.2.3.1, number of sites will be rolled out in the border areas	sites

[4] Affected sites corresponding to response to this question should have been covered by the response for 2.2.2.2

Table 8 Required inputs related to work category A for 1800 MHz

Dual-mode to Single-Mode Conversion for 1800 MHz (Category B)

	Information Requirement	Operator Response
2.2.3.6	Number of existing 900/1800 dual mode sites that need to be adapted to operate with 900 MHz carriers only	sites
2.2.3.7	Among the sites specified in 2.2.3.6, number of sites that are located in the border areas	sites
2.2.3.8	Among the sites specified in 2.2.3.6, percentage of sites that require a site visit to accomplish the conversion	%

Table 9 Required Inputs related to work category B for 1800 MHz

Single-Mode Sites Adaptation for 1800 MHz (Category C)

	Information Requirement	Operator Response
2.2.3.9	Number of 1800MHz-only sites that need to be adapted to support 900MHz and become 900MHz-only	sites
2.2.3.10	Among the sites specified in 2.2.3.9, number of sites that are located in the border areas	sites
2.2.3.11	Among the sites specified in 2.2.2.9, percentage of sites that require a site visit to accomplish the adaptation	%

Table 10 Required Inputs related to work category C for 1800 MHz

UMTS sites GSM top-up for 1800 MHz (Category D)

	Information Requirement	Operator Response
2.2.3.12	Number of Existing UMTS Sites that need to be adapted to provide 900MHz coverage post auction	sites
2.2.3.13	Among the sites specified in 2.2.3.12, number of sites that are located in the border areas	sites

Table 11 Required inputs related to work category D for 1800 MHz

Single-Mode Sites Capacity Top-up for 1800 MHz (Category E)

	Information Requirement	Operator Response
2.2.3.14	Number of 1800MHz-only Sites that need to be adapted to add 900MHz carriers to maintain capacity	sites

Table 12 Required inputs related to work category E for 1800 MHz

Inter-band dependency in 1800 MHz transition (Dependency B)

	Information Requirement	Operator Response

2.2.3.15	Number of 900MHz sites need to be retuned for new frequency plan/reuse factor so that transition work on the depending 1800MHz sites can start	sites

Table 13 Required inputs related to Dependency B for 1800MHz transition

GSM sites Frequency Plan Reconfiguration (Category F)

	Information Requirement	Operator Response
2.2.4.1	Number of 900/1800MHz sites that need to be reconfigured to operate in the new frequency plans as a result of shifting spectrum holdings post auction, excluding those that have been covered by 2.2.2.1 - 2.2.2.16 and 2.2.3.1 - 2.2.3.14.	sites
2.2.4.2	Number of 900/1800MHz sites that need to be reconfigured to operate in the new frequency plans as a result of implementing new 900/1800MHz frequency reuse factor, excluding those that have been covered by 2.2.2.1 - 2.2.2.16, 2.2.3.1 - 2.2.3.14 and 2.2.4.1	sites

Table 14 Required inputs related to work category F

Other

	Description	Operator Response: Affected Sites
2.2.5.1		sites
2.2.5.2		sites

Table 15 Required inputs related to the "other" work categories

2.3 Required Application Input 2: Transition activities

Operators applying for license renewal are required to include descriptions of all works to be undertaken in order to complete transition.

This section details the requirement for operators to include information on the activities required for transition.

Operators' plans should consider their activities in two phases:

- Start-up activities: Activities necessary to start-up the transition programme; i.e. those activities that occur before any site activities commence.
- Post start-up activities: Work category activities (commence after the completion of the start-up activities).

2.3.1 Start-up

Table 16 lists the main activities involved in transition start-up. Operators are required to state (for each start-up activity the total number of man-days required to complete each activity/task listed.

	Start-up Activity	Operator Response: Total workload (man-days)
2.3.1.1	Programme and project initialisation	
2.3.1.2	Vendor engagement and procurement	
2.3.1.3	Field trials	
2.3.1.4	Planning	
2.3.1.5	Other Start-Up Activities[5]	

Table 16 Transition start-up activities

[5] All activities allocated to 'Other start-up activities' must be listed and described.

2.3.2 Post start-up

Table 17 lists each work category, and displays the information that operators must provide for each with regards to the activity required:

- **Number of cell-sites affected by transition**: Operators are required to list the number of cell-sites that are affected (requiring of activity) in the transition. This information must be provided for each work category.
- **Effort per site (man-days)**: This is the amount of man-days required to complete the activities/tasks for that work category, for a single site.
- **Total workload (man-days)**: The total number of man-days required to complete all activities/tasks for the work category. It is calculated by multiplying the number of affected sites of that work category, by the amount of required effort per site, for that work category.

Work Category			Operator Response: Number of sites affected by transition	Operator Response: Effort per site (man-days)	Operator Response: Total workload (man-days)
2.3.2.1	**Category A**	Deployment of new sites			
2.3.2.2	**Category B**	Dual-mode to single mode conversion			
2.3.2.3	**Category C**	Single-mode site adaption			
2.3.2.4	**Category D**	UMTS sites GSM top-up			
2.3.2.5	**Category E**	Single mode sites capacity top-up			
2.3.2.6	**Category F**	Frequency plan re-configuration			
2.3.2.7	**Other**[6]	Other site categories not covered above			

Table 17 Post start-up activities required for transition

The information from Table 17 corresponds to additional information operators are required to provide with regards to activity breakdowns for each work category. This additional information requirement is addressed in Appendix A.

[6] All activities allocated to 'Other work categories' must be listed and described.

2.4 Required Application Input 3: Resources for transition activities

Operators will be required to state the number of current in-house resources, planned new in-house resources, and externally sourced (outsourced or 3rd party) resources that will work on the requisite transition activities. The resources must be shown for each set of activities; start-up activities, and post start-up (work category) activities.

Table 18 and 20 list the activity-groups and work categories and the information relating to each that operators will be required to include in their applications. Operators are required to state:

- **Number of Current (in-house) resources**: This is the number of current in-house full time (equivalent) resources expected to work on the transition programme. This is calculated by taking the total number of man-days of effort available in a 5-day (work-week) period, and dividing by 5[7].
- **Number of planned new (in-house) resources**: This is the number of planned new full time (equivalent) in-house resources expected to work on the transition programme. This is calculated in the same was as the number of current in-house resources.
- **Number of outsourced or third party resources**: This is the total number of outsourced or third party full time (equivalent) resources expected to work on the transition programme.
- **Total resources**: This is the total number of full time (equivalent) resources expected to work on the transition programme.

2.4.1 Start-up

Start-up Activity		Number of Current (in-house) resources	Number of Planned New (in-house) resources	Number of outsourced (or 3rd party) resources	Total resources
2.4.1.1	Programme and project initialisation				
2.4.1.2	Vendor engagement and procurement				
2.4.1.3	Field trials				
2.4.1.4	Planning				
2.4.1.5	Other start-up activities				

Table 18 Resources for transition start-up activities

[7] Full-time equivalent resources is equal to the total man-hours of resource per 5 day work-week, divided by 5; for example, if over a 5-day work week there are 97 days of resources available, the number of resources would be: 97 / 5 = 19.4

This can also be calculated by taking the number of full-time employees and adding in part-time employees in magnitudes of full-time (5-day working) employees; for example if there are 13 full time employees (working 5-days per week); and 3 part-time employees each working 2 days per week, the number of (full-time equivalent) resources would be: 13 + 3*(2/5) = 14.2

2.4.2 Post start-up

Work Category			Number of Current (in-house) resources	Number of Planned New (in-house) resources	Number of outsourced (or 3rd party) resources	Total resources
2.4.2.1	**Category A**	Deployment of new sites				
2.4.2.2	**Category B**	Dual-mode to single mode conversion				
2.4.2.3	**Category C**	Single-mode site adaption				
2.4.2.4	**Category D**	UMTS sites GSM top-up				
2.4.2.5	**Category E**	Single mode sites capacity top-up				
2.4.2.6	**Category F**	Frequency plan re-configuration				
2.5.2.6	**Other**	Other site categories not covered above				

Table 19 Resources for post start-up activities

2.5 Required Application Input 4: Transition project Gantt chart

Operators are required to include in their application, a comprehensive transition project Gantt chart. The transition project Gantt chart should cover:

- Time required for start-up activities
- Timeline for execution of each work category, including the total duration of network transition post auction
- For each work category in the project plan, describe whether it is for 900 MHz transition or 1800 MHz transition
- The duration of each main activity while indicating timing dependencies between main activities of the same work category
- Sequential/parallel execution of different work categories while indicating the dependencies between activity-groups of different work categories, if any

Operators will need to state (using the format of the table below) any expected delays in the project plan that are related to the dependency of the transition work categories on the release of required frequency band, i.e. the inter-operator or inter-band dependency.

	Type of delay in the transition process		Operator Response: Total duration (work-weeks)
2.5.1	**Dependency A**	Inter-operator transition dependency	
2.5.2	**Dependency B**	Inter-band transition dependency	

Table 20 Delays in the transition process due to dependencies on the release of required frequency band

The project Gantt chart should be legible when printed onto a single sheet of A3 paper.

Together with the project Gantt chart, operators should provide a description on the scheduling of activities that will need to take place in different regions of the Netherland, covering:

- Allocation of teams to regions
- Sequential/parallel execution of the same activity in different regions

2.6 Required Application Input 5: Transition duration

In conjunction with the transition project plan, operators are required to summarise (in tabular form) their estimates of the duration of network transition post auction, in the form specified in the table below.

	Transition Duration Breakdown	Operator Response: Duration (work-weeks)
2.6.1	**Start-up Activities**	
2.6.2	**Total 900 MHz Transition**	
2.6.3	**Total 1800 MHz Transition**	
2.6.4	**Overall Transition Duration**	

Table 21 A summary of transition duration

Appendix A: Work category activity breakdown

Appendix A outlines the more detailed information that operators will be required to include in their applications for license extension, with regards to activities for each work category.

For each work category (including 'Other'), operators are required to include in their application:

- **Effort per site (man-days) [EpS]**: This is the amount of man-days required to complete the activity for that work category, for a single cell-site.
- **Sites per week [SpW]**: This is the number of sites that you plan to be able to work on in a single working week (assuming a working week of 5-days). The total number of ('affected') sites divided by the number of 'Sites per week' will give you the total duration (in weeks) for the activity.

When an activity is not relevant for a particular work category, please enter '0' for the 'Effort per Site'. All additional activities that do not cross over with any of A.1 - A.6 in Table 22, should be added to 'Other' (A.7), and must be described.

	Work Category:	A		B		C		D		E		F		Other	
	Activity	EpS	SpW	EpS	SpW	EpS	SpW	EpS	SpW	EpS	SpW	EpS	SpW	EpS	SpW
A.1	Solution design and planning														
A.2	Preparation for new-site construction														
A.3	New-site construction														
A.4	Preparation for site configuration/re-configuration														
A.5	Site configuration/re-configuration														
A.6	Acceptance testing and optimization														
A.7	Other (Please detail)														

Table 22 Activity breakdowns for each work category

Appendix B: Glossary

The table below lists a number of words and phrases used in this document along with corresponding definition.

Word/Phrase	Definition
Acceptance testing and optimisation	Activities related to performance monitoring, drive testing, network optimisation and any necessary remedial site visits to ensure the key performance indicators (KPI) targets are eventually achieved.
BCCH	Broadcast Control Channel
Border area	The Netherland/Germany border, Netherland/Belgium border or Netherland/Germany/Belgium border.
Cell	Cell is the basic service area in a GSM network. Each cell uses a different set of frequencies from neighbouring cells. A base station could serve multiple cells at the same time through sectorization.
Cell design and planning	Carrying out cell design, e.g. using a simulation tool to design the location of the new site, Local signal propagation conditions is used as an input, and RF planning to determine the detailed site solution (e.g. antenna height and tilt).
Cell-site	A site where the mobile network electronic communications equipment is placed (such as antennas).
Construction/Installation	Civil works to construct the site and equipment/cabling installation.
Dual mode site	Sites that support two frequency bands e.g. both GSM 900MHz and 1800MHz.
End-user services	Services provided by the operator applicant to end-users, either at a retail or wholesale level.
Field trials	Pre-upgrade testing of transition solutions in the field.
Frequency reuse factor	The rate at which the same channel frequency can be reused across different cells of the same GSM network.
In-house resources	Employees of the operator applicant.
Man-day	The labour-input of a single employee working a full working-day of 8 hours.
New site construction	The activities involved in the physical building on new cell-sites.
Non-rural area	Urban and suburban areas where the coverage of a cell is typically capacity limited.
Planning	The activities involved in organising and planning for all cell-site activities (activities on work categories).
Program initialization	Strategic program level planning, management assignment, resource assignment, timeline planning, inter-operator coordination, risk aversion plan.
Project initialization	Network planning (e.g. developing new 1800MHz frequency plan), project scope definition (e.g. network rollout, upgrade for one region, site relocation, corresponding core network expansion, etc.), management and resource assignment, prioritization, and determine project checkpoint and timeline.
Preparation for site configuration and re-configuration	The activities involved in preparing/authorising to visit a specific site for configuration or re-configuration purposes.

Ring	the difference in coverage between the 900 MHz cells and 1800 MHz cells on the same site.
Rural area	Low population density area, RF propagation environment is typically rural-quasi open, TCH traffic load is less-than-or-equal-to 50% most of the time.
Single mode site	Sites that support only a single frequency band i,e. GSM 900MHz only, or GSM 1800 MHz only.
Site	The Base station tower where antennas and BTS cabinets are housed in order to create one or several adjacent cells in a cellular network.
Site configuration & re-configuration	Transition activities related to configuration/re-configuration of a site, which may include on-site equipment (cabinets or transceiver), parts (antenna, filter, and combiner/diplexer) swaps, and reconfiguration of BTS settings (e.g. further sectorization, reassignment of frequency channels and hopping mode), etc…
Site search & acquisition	Select candidate site around the location chosen; negotiate acquisition contracts with landlords.
Solution design and planning	Activities related to design of transition solutions, such as location planning for new site, RF planning to determine the detailed site configuration (e.g. antenna height and tilt), and re-arrangement of carrier frequencies, etc…
TCH	Traffic Channel
Technical site survey	Site survey in order to collect physical information required by TX planning, civil works and equipment installation. This may include line of sight checking, detailed RF environment survey, and civil survey.
TX Planning	Design and planning of TX solutions to get the BTS on site connected to the core network. This may include assignment of Ethernet or E1 ports, or Microwave backhaul solution planning.
Vendor engagement and procurement	The activities involved in procuring the cell-site infrastructure, including the initial vendor engagement process and securing a contract.
Verification/Test	Close network monitoring and drive testing. Network optimisation activities and any necessary site visits to ensure the KPI targets are eventually achieved.
Work category	A category of work associated with a set of cell-sites defined by the cellular frequency and technology type.
Working days	Days of full work i.e. excluding weekends and statutory holidays.
Work-week	Five (5) working days.

Table 23 Glossary table

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