

TECHNICAL COOPERATION ABSTRACT (TC-ABSTRACT)

REGIONAL

I. BASIC INFORMATION

Country/Region: Mexico

TC Name: Development of recommendations for the efficient use of the spectrum

TC Number: ME-T1267

Team Leader/Members: Felix Gonzalez Herranz, Team Leader (IFD/ICS); Lorena Cano (IFD/ICS); Enrique Iglesias (IFD/ICS); Mario Sangines (IFD/ICS); and Cecilia Bernedo (IFD/ICS).

Date of TC Abstract authorization: May, 2014

TC Taxonomy: Client Support (CS)

Reference Letter: [IDBdocs# 38788382](#)

Donors providing funding: TBD

Beneficiary: Instituto Federal de Telecomunicaciones (IFT)

Executing Agency and contact name: Institutional Capacity of the State (IFD/ICS); Felix Gonzalez Herranz.

IDB Funding Requested:	IDB:	US\$ 400,000
Local counterpart funding	Local:	US\$ 0
	Total:	US\$ 400,000

Execution period: 12 months **Disbursement period:** 15 months

Required start date: June, 2014

Types of consultants: Firm

Prepared by Unit: Institutional Capacity of the State (IFD/ICS)

Unit of Disbursement Responsibility: IFD/ICS

TC Included in Country Strategy: Yes

TC included in CPD: No

GCI-9 Sector Priority: The current Sector Strategy: “Institutions for Growth and Social Welfare” identifies improving innovation and productivity as a major area where the Bank can help the Region overcome the challenges that hinder growth and social welfare. To this end, the IDB will work towards strengthening institutions, and has specifically recognized the need to improve policies and governmental action in the ICT sector (par.5.21 of the referred Sector Strategy). It is also worth remarking that the Sector Strategy: “Support Competitive Global and Regional Integration”, identifies bridging the digital divide as one of the Bank’s priorities to promote integration, placing specific emphasis on promoting broadband infrastructure. Consistent with these Strategies, the Bank has been working in the design and implementation of a Broadband Platform to accelerate the penetration rate and usage of broadband services in the Region.

II. OBJECTIVE AND JUSTIFICATION

- 2.1 The importance of mobile broadband in the development of societies and economies, its scarcity and the exponential increase in the end user demand pose a challenge around how to manage spectrum¹ efficiently. This involves a comprehensive set of actions among which calculating the optimal channel spectrum width is a must. Usually spectrum is assigned to mobile operators to promote competition (e.g. a portion of spectrum of 20 MHz can be divided in 4 segments of 5 MHz to be assigned to 4 operators). However, this assignment does not necessarily consider factors such as the predicted patterns of Internet traffic, the potential capacity of radio base stations or the corruptive nature of the wireless channel.
- 2.2 The case of Mexico illustrates this necessity. The Telecommunications Constitutional Reform has promulgated the deployment of a Wholesale Mobile network that covers the majority of the Mexican territory and that is open to any Internet service provider, with the goal of fostering competition. The Constitutional Reform mandates to guarantee the optimal use of the 2.5GHz band under universal access and non-discriminatory principles.
- 2.3 **Objective.** The objective of this technical cooperation will be to complete an analytical study in which, among others, the aforementioned factors are taken into account in order to identify the optimal channel width to create guidelines for the regulator to efficiently assign spectrum for future mobile broadband networks. The statistical study will provide a model or set of models to estimate the amount of contiguous spectrum to conform wireless channels, in order to optimally provide broadband services.
- 2.4 On top of that, an additional set of recommendations on how to manage the spectrum more efficiently and effectively in Mexico will be provided.

III. DESCRIPTION OF ACTIVITIES/ COMPONENTS AND BUDGET

- 3.1 **Component 1: Analysis of the current spectrum management in Mexico.** This component will finance an assessment of the strengths and weaknesses of the current spectrum management in Mexico. As a result of the analysis, needs in terms of spectrum management will also be provided.

Main outputs	Main results
Study assessing the current situation of spectrum in Mexico	Clear understanding of how spectrum is managed today in Mexico

- 3.2 **Component 2: Development of a methodology to determine the optimal channel spectrum width.** Taking as input the results of component 1, this component will

¹ Spectrum is the range of radio frequencies available.

finance the development of a methodology to calculate the optimal channel spectrum width. It will include the following activities:

Activities	Main outputs	Main results
Literature survey: of the state of the art in the field of wireless network performance and optimization.	Report containing the status, trends, and analytical and simulations tools which can be used in this TC.	More accurate calculation of the spectrum width for licensing or other regulatory purposes led by the Instituto Federal de Telecomunicaciones (IFT)
Theoretical and simulation methods: selection of statistical approaches and simulation tools will be selected.	Report containing the statistical approaches and simulation tools selected and the rationale for their selection.	
Internet traffic model: a statistical model for forecasting future Internet traffic pattern, taking into account among other variables: (i) population income level; (ii) population density (low, medium, high); and (iii) geography. A report describing this and any assumptions made during the analysis will be produced	Report containing: (i) a statistical model for forecasting internet traffic along with the assumptions; and (ii) an estimation of the demand per type of region (e.g., urban, semi-urban, rural) and then, per state	
Statistical model of the wireless system: The channel and the radio base statistical models will be developed. The developed traffic model will be used as an input to the system. This theoretical analysis will take into account, among other factors, congestive and wireless losses as well as potential error correction mechanisms and coding techniques	Report with the statistical model of the wireless system taking as input the results of the previous activity.	
Validation of analytical results: The analytical results given by the statistical model will be validated through network simulation tools	A report validating the theoretical results through simulations.	
Optimal wireless channel bandwidth: the development of the specific methodology to identify the optimal spectrum channel width	A report containing the methodology to be applied for the identification of the optimal wireless channel bandwidth	

3.3 **Component 3: Development of additional recommendations for the efficient management of the spectrum.** Taking as an input the finding of Component 1, this component will finance the development of additional recommendations for the

efficient management of the spectrum other than determining the optimal spectrum channel width.

Main outputs	Main results
Study containing recommendations for the efficient management of spectrum in Mexico.	More efficient and effective management of spectrum in Mexico.

3.4 **Component 4: Dissemination of the results.** This component will finance the activities to disseminate the results of the project. The activities will include a publication and an event in Mexico.

Main outputs	Main results
Publication with the outputs of Components 1, 2, and 3.	Better understanding of spectrum management by telecom stakeholders in Mexico.
Event to present the results.	

Table 3.2: Indicative Budget

Activity/Component	Description	IDB/Fund Funding US\$	Counterpart Funding	Total Funding US\$
Component 1	Analysis of the current spectrum management in Mexico	50,000	-	50,000
Component 2	Development a methodology to determine the optimal channel spectrum width	220,000	-	220,000
Component 3	Development of additional recommendations for the efficient management of the spectrum	100,000	-	100,000
Component 4	Dissemination of the results	30,000	-	30,000
	TOTAL	400,000	-	400,000

IV. EXECUTING AGENCY AND EXECUTION STRUCTURE

4.1 As per the request of the Instituto Federal de Telecomunicaciones (IFT), the technical cooperation will be executed by the Institutional Capacity of the State Division (IFD/ICS), which will operate in coordination with the staff of the IFT (the telecommunications and broadcasting regulatory body in Mexico and main counterpart). The request from the IFT to have the Bank as the executing agency is due to two reasons. First, to leverage the outreach that the Bank has internationally especially for the benchmark exercise where not only a literature review is necessary but also specific interviews and direct contacts are desirable.

Secondly, to ensure that the Bank's knowledge in broadband spectrum management is also brought along the entire project lifecycle.

V. PROJECT RISKS AND ISSUES

- 5.1 There are two main risks associated to this project. The first one is the lack of coordination and communication with the IFT. This will be mitigated by the establishment of a project committee with personnel from both institutions and from the hired firm. The second risk is project implementation delays. This will be mitigated by establishing concrete results and outputs at the beginning of the project and maintaining a close and constant supervision by the project committee.

VI. EXCEPTIONS TO BANK POLICY

- 6.1 There are no exceptions to Bank policy.

VII. ENVIRONMENTAL AND SOCIAL CLASSIFICATION

- 7.1 Given the characteristics of the TC which revolves around a study, there are no social or environmental risks associated with it. This operation is classified as a Category "C" according to the classification toolkit of the Bank (see link: [IDBdocs# 38793780](#)).