



Telecommunications Authority of Trinidad and Tobago

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Spectrum Plan for Accommodation of Mobile Communications Services

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1 Objectives

- 1.1 This document discusses the factors considered for the development of a spectrum band plan to accommodate the provision of terrestrial mobile communications services in Trinidad & Tobago, and defines the spectrum bands to be allocated for such systems.
- 1.2 The purpose of this document is to provide guidelines for operators seeking to provide mobile communications services about the spectrum bands to be used exclusively for mobile services, and consequently, the remaining spectrum that can be used for deployment of other systems and applications.
- 1.3 This plan focuses upon the spectrum to be used for provision of mobile communications services, and the justification of the spectrum identified. This document does not speak of licensing terms and conditions, competition policies, and other regulatory matters associated with competitive mobile services, nor of the selection and licensing framework to be used to assign the spectrum, which will be covered in separate and related documents.

2 The Present Environment

- 2.1 The incumbent operator, Telecommunications Services of Trinidad & Tobago (TSTT), presently has assignments in the 800MHz band, in which they operate a Time Division Multiple Access (TDMA) cellular system, and the 1800MHz band, in which they operate a Global System for Mobile (GSM) communications network.
- 2.2 Presently in the 800MHz band, TSTT operates in the entire band available for cellular services, and in the 1800MHz band, TSTT is licensed to operate in two non-contiguous portions of the band. However, 12.5MHz of spectrum in the 800MHz band will be available by December 31st 2004, while the spectrum in the 1800MHz band has been rationalized into one contiguous portion.
- 2.3 Various systems exist in the 900MHz bands that are used to license Region 1 cellular systems. These include Studio to Transmitter Auxiliary Links for Broadcasting Services, paging networks, low powered telemetering systems and the Industrial, Scientific and Medical (ISM) applications and systems.

3 Relevant Considerations

- 3.1 The International Telecommunications Union (ITU) has broadly identified the spectrum bands 806 – 960MHz and 1710 – 2200MHz for provision of mobile communications services, traditionally offering voice, but recently providing data services as well.
- 3.2 Generally, there exists two predominant spectrum plans globally; that of North America and that of the European Union. Administrations worldwide develop spectrum plans that either adhere completely with one of these spectrum plans, or use a blend of both designations for accommodations of mobile services within their jurisdiction due to availability of the relevant systems. North America has operated mobile communications systems in the 800MHz (824 – 849/869 – 894MHz) and 1900MHz (1850 – 1910/1930 – 1990MHz) spectrum bands, whereas their counterpart systems in Europe operate in the 900MHz (880 – 915/925 – 960MHz) and 1800MHz (1710 – 1785/1805 – 1880MHz) bands.
- 3.3 The blend of spectrum plans and consequently, systems from Europe and North America presents its own challenges, due to the inability of radio equipment designed for one market to coexist in the same environment as those designed for another market, causing potential quality degradation and interference occurrence. A blend of spectrum plans requires extraordinary steps to engineer adjacent systems generally resulting in inefficient use of spectrum, supporting the position to adopt a spectrum plan that conforms to only one of the available plans.
- 3.4 Trinidad & Tobago belongs to ITU Region 2, and imports a significant portion of equipment from North America. It is advisable that Trinidad & Tobago adopts spectrum band plans that conform to North American markets to ensure equipment availability, and in particular handset availability. Additional factors requiring consideration include compatibility of international and regional cross-border systems such as mobile-satellite communications systems and coexistence with widely available radiocommunications systems, such as Industrial, Scientific and Medical (ISM) applications, which operate in the band 902 – 928MHz.
- 3.5 The largest proportion of international travelers entering Trinidad & Tobago in 2003 has come from North America (45%) as compared with travelers from Europe and Africa (19%)¹, as shown in Appendix I. Furthermore, travelers from the eastern hemisphere of the globe venturing to this hemisphere typically equip themselves with appropriate handsets that allow roaming into North American markets, further suggesting the adoption of a plan that conforms with North America, and the majority of Latin America.

¹ Source: Central Statistical Office

- 3.6 The predominant second generation mobile communications technologies are Code Division Multiple Access (CDMA), Global System for Mobile (GSM) Communications and its variants such as Enhanced Data rates for GSM Evolution (EDGE). Third generation systems have generally been based upon Wideband CDMA. All of these technologies are available at this time within the North American spectrum allocations, while a European spectrum allocation will eliminate the accommodation of second generation CDMA deployments.

4 Practice in the Caribbean

- 4.1 A review of spectrum allocation and assignments in the Caribbean was performed to determine the patterns emerging among Caribbean countries. Some Caribbean countries have adopted a blend of the Region 1 and Region 2 mobile services allocations, while others have ensured that they have remained compliant to one particular regional band plan. This review is summarized in Appendix II.

5 The Trinidad & Tobago Spectrum Band Plan

- 5.1 The Government of Trinidad & Tobago will be offering the following spectrum to new entrants wishing to provide public mobile communications services. The spectrum in the 1900MHz band will be assigned based on the North American Personal Communications Services (PCS) block designation. In the 800MHz band, the spectrum has been divided into blocks as shown.

Band	Spectrum/MHz		
800MHz	824 – 825	869 – 870	A''
	825 – 830	870 – 875	A _L
	830 – 835	875 – 880	A _U
	845 – 846.5	890 – 891.5	A'
1900 MHz	1870 – 1885	1950 – 1965	B
	1885 – 1890	1965 – 1970	E
	1890 – 1895	1970 – 1975	F
	1895 – 1910	1975 – 1990	C

- 5.2 The following spectrum bands will be made available for the incumbent operator for accommodation of their existing systems. The spectrum in the 1800MHz band will be assigned based on demonstrated need.

Band	Spectrum/MHz		
800MHz	835 – 845	880 – 890	B
	846.5 – 849	891.5 – 894	B'
1800 MHz	1740 – 1755	1835 – 1850	

- 5.3 To accommodate the incumbent migrating to a band plan in conformance with ITU Region 2 administrations, the following spectrum will not be available for licensing at this time. As the incumbent requests spectrum in this band, spectrum assigned in the 1800MHz band will be revoked accordingly. Spectrum in this band will be assigned initially from the PCS A block. Spectrum not used by the incumbent by January 2008 may become available for licensing to new or existing operators at that time.

Band	Spectrum/MHz		
1900MHz	1850 – 1865	1930 – 1945	A
	1865 – 1870	1945 – 1950	D

- 5.4 Figure 1 illustrates the proposed band plan.

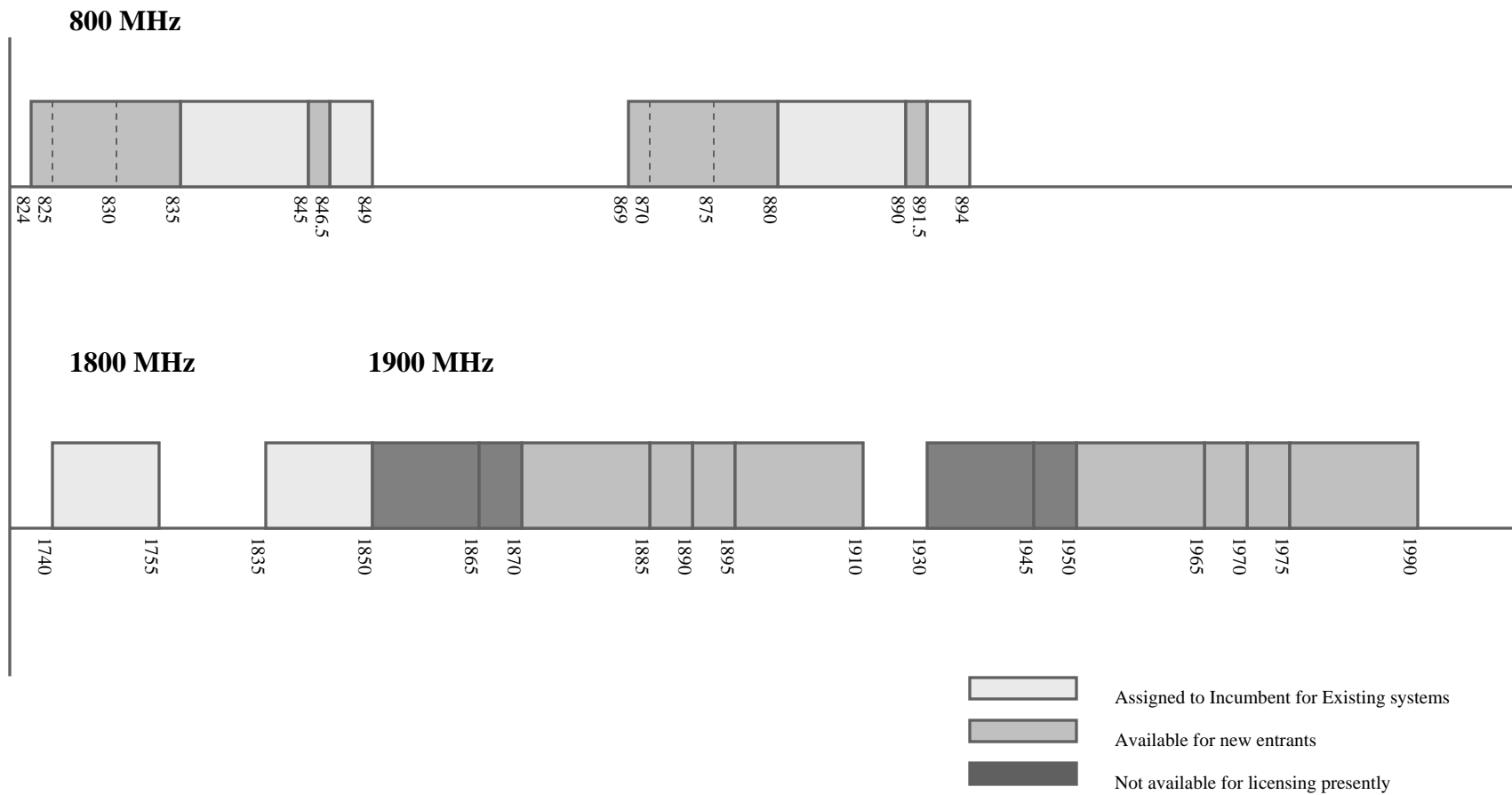


Figure 1 – Public Mobile Communications Spectrum Plan

6 Spectrum for Mobile Auxiliary systems

- 6.1 The following spectrum bands will be used initially for accommodation of auxiliary systems for providing mobile communications services, such as backhaul and backbone microwave systems:

Band	Spectrum/GHz
7GHz	7.125 – 7.425
11GHz	10.7 – 11.7
13GHz	12.75 – 13.25
15GHz	14.5 – 15.35

- 6.2 Each microwave must be licensed prior to installation and operation. Operators establishing additional microwave links that plan to reuse frequency channels or require additional channels can apply to amend their license, which will include the additional microwave systems being established.
- 6.3 This spectrum band has been allocated to support the operation of fixed, directional point-to-point systems. These systems must comply with the technical guidelines and channeling plans established by the Telecommunications Authority of Trinidad and Tobago to maximize the number of systems that can be accommodated within these bands.

Appendix I - Nationality of arrived visitors to Trinidad & Tobago

2002			2003 (Jan to Sep' 03)		
Country			Country		
	<u>Total</u>	<u>% of total</u>		<u>Total</u>	<u>% of total</u>
Total	384,212		Total	303,841	
Europe	71,133	18.51%	Europe	58,210	19.16%
Cen/Eastern Europe	326		Central/Eastern Europe	254	
Northern Europe	56,115	14.61%	Northern Europe	45,391	14.94%
Southern Europe	1,977		Southern Europe	1,379	
Western Europe	12,504		Western Europe	11,039	
East\Med Europe	211		East\Med Europe	147	
Africa	997	0.26%	Africa	740	0.24%
Eastern Africa	178		Eastern Africa	102	
Middle Africa	27		Middle Africa	33	
Northern Africa	26		Northern Africa	12	
Southern Africa	386		Southern Africa	288	
Western Africa	380		Western Africa	305	
Americas	308,018	80.17%	Americas	241,141	79.36%
Caricom	81,278	21.15%	Caricom	64,878	21.35%
Other Caribbean	10,514		Other Caribbean	8,243	
Central America	1,433		Central America	1,191	
Caricom	280		Caricom	286	
Other Central America	1,153		Other Central America	905	
Northern America	175,873	45.77%	Northern America	136,979	45.08%
South America	38,920		South America	29,850	
Caricom	24,643		Caricom	19,304	
Other Southern America	14,277		Other Southern America	10,546	
Asia/Pacific	3,834	1.00%	Asia/Pacific	3,542	1.17%
Northeastern Asia	1,123		Northeastern Asia	925	
Southeastern Asia	496		Southeastern Asia	316	
Southern Asia	1,164		Southern Asia	847	
Australasia	1,005		Australasia	1,423	
Melanesia	16		Melanesia	11	
Micronesia	26		Micronesia	18	
Polynesia	4		Polynesia	2	
Middle East	219	0.06%	Middle East	175	0.06%
Middle East	219		Middle East	175	
Not Stated	11	0.00%	Not Stated	33	0.01%

Source: Central Statistical Office

Appendix II – Mobile Technologies used in the Caribbean and environs

		Region 2			Region 2			Region 1	
		TDMA800	CDMA 800	GSM 850	TDMA1900	CDMA1900	GSM1900	GSM 900	GSM 1800
Anguilla	Region 2	✓							
Antigua	Region 2	✓					✓		
Aruba	Region 1, 2	✓					✓	✓	✓
Barbados	Region 1, 2	✓					✓	✓	✓
British Virgin Isles	Region 2	✓			✓				
Cayman Isles	Region 2	✓		✓		✓			
Costa Rica	Region 1, 2	✓							✓
Cuba	Region 1, 2	✓					✓		
Dominica	Region 2	✓							
Grenada	Region 1, 2	✓		✓			✓	✓	
Guyana	Region 2	✓							
Haiti	Region 2	✓	✓						
Jamaica	Region 1, 2	✓	✓				✓	✓	✓
Martinique	Region 1						✓	✓	
Netherlands Antilles	Region 1, 2	✓					✓		
Puerto Rico	Region 2	✓	✓			✓			
St. Kitts & Nevis	Region 2	✓		✓			✓		
St. Lucia	Region 1, 2	✓					✓	✓	
St. Vincent & the Grenadines	Region 1, 2	✓					✓	✓	
US Virgin Isles	Region 2	✓				✓			
Venezuela	Region 1, 2	✓					✓		