



PRINCIPLE 7—Ensuring efficient use, and effective allocation of scarce resources

Efficient use and Effective allocation of Scarce Resources

The statements provided in this document will be kept under review and amended as appropriate in light of further experience and developing law, practice, market conditions and any change to the Authority's powers and functions.

These comments provide the Authority's general view of ensuring efficiency in the utilisation and effective allocation scarce resources and do not have binding legal effect.

Legislative Mandate

The Authority encourages efficiency in utilisation and allocation of scarce resources i.e. numbering and spectrum, based on the legislative mandates to do so, which include the following:

The Telecommunications Act Chap 47:31:

Numbering: Section 18 (1) (j) and Section 44 of the Telecommunications Act Chap 47:31

Spectrum: Section 18 (1) (l), Sections 36,37, 38, 39, 40,41, 42 and 43 of Telecommunications Act Chap 47:31

Section 18 (1) (i):

“Subject to the provisions of this Act, the Authority may exercise such functions and powers as are imposed on it by this Act and in particular – Plan, supervise, regulate and manage the use of the radio frequency spectrum, including-

- (i) the licensing and registration of radio frequencies and call signs to be used by all stations operating in Trinidad and Tobago or on any ship, aircraft or other vessel or satellite registered in Trinidad and Tobago;*
- (ii) the allocation, assignment and reallocation or reassignment of frequency bands where necessary;”*

Sections 36 – 44:

These deal with issues relating to Licences and Spectrum Management particularly Sections 41, 42 and 43.

Section 41:

- (1) The Authority shall regulate the use of the spectrum in order to promote the economic and orderly utilization of frequencies for the operation of all means of telecommunications and to recover the cost incurred in the management of the spectrum.*
- (2) The Authority shall develop a spectrum plan in order to regulate the use of the spectrum.*
- (3) The National Spectrum Plan shall be made available to the public in the manner prescribed by the Authority.*
- (4) The National Spectrum Plan shall state how the spectrum shall be used and the procedures for licensing frequency bands.*

(5) The procedures referred to in subsection (4) may include, but are not limited to-

- (a) procedures for licensing frequency bands by auction;*
- (b) procedures for licensing frequency bands by tender;*
- (c) procedures for licensing frequency bands at a fixed price; or*
- (d) procedures for licensing frequency bands on stated criteria.*

Section 42:

(1) Subject to subsection (2), the Authority may, in accordance with the spectrum plan allocate and reallocate frequency bands.

(2) In the allocation or assignment and reallocation or reassignment of frequency bands by the Authority priority shall be given to the needs of the State in respect of matters of national security.

Section 43:

“The Authority, in exercising the functions under Sections 36 to 42, shall take into account-

- a) the objects of the Act;*
- b) the impact of the spectrum plan on existing and future use;*
- c) the efficient use of the spectrum;*
- d) the Convention;*

Section 44:

(1) The Authority shall develop a plan for the numbering of telecommunications services and shall administer and manage such numbers.

(2) Subject to subsection (5), numbers shall be made available to providers of telecommunications services on an equitable basis.

(3) The numbering plan may establish procedures by which providers of telecommunications services may assign or reassign telephone numbers to users.

(4) The numbering plan shall be made available to the public in the manner prescribed by the Authority.

(5) In developing the numbering plan referred to in subsection (1), the Authority shall preserve to the extent feasible, the assignment of numbers made before the commencement of this Act.

(6) The Authority shall notify all service providers of any new numbering assignments made.

Frameworks and Regulatory Instruments

A selection of the Authority's frameworks and regulatory instruments which advance this Principle include:

- Spectrum Management Policy
- Draft Telecommunication (Spectrum Management) Regulations
- Spectrum Plan for the Accommodation of Broadband Wireless Access Services
- Spectrum Plan for the Accommodation of Land Mobile Radiocommunications Systems
- Spectrum Plan for the Accommodation of Point-to-Point Radiocommunications Systems
- Spectrum Plan for the Accommodation of Public Mobile Telecommunications Services
- Trinidad and Tobago Frequency Allocation Table (9KHz to 1000GHz)
- Authorisation Framework for Amateur Radio Services
- Authorisation Framework for Aeronautical Radio Services
- Authorisation Framework for Maritime Radio Services
- National Numbering Plan: Central Office (CO) Codes and Home Network Identifiers (HNIs)
- Draft Telecommunications (Numbering) Regulations
- CO Code Exhaust Methodology and Report

The Spectrum Management Policy at a glance

- Uses of Radio Frequency Spectrum
- Allocation of Spectrum
- Efficiency in use of Spectrum
- Sharing and Trading of Spectrum
- Pricing
- Licensing
- Compliance and Monitoring of Spectrum Use
- Radiocommunication Standards

The Spectrum Management Policy

Radio frequency spectrum is a scarce national resource that is essential to the provision of a wide range of activities, including national defense, public safety, air, land and sea transportation, broadcasting and commercial telecommunications services. Careful management of the radio spectrum is essential to ensure that the unique social and economic benefits that it provides are fully realized.

According to the Spectrum Management Policy, 2005, the Authority supports the view that radio frequency spectrum, as a scarce resource will be used in the 'public good' and the facilitate the GoRTT's public policy and socio-economic objectives.

The Policy is aimed at, amongst other things, providing an effective framework for the management of the radio frequency spectrum in order to:-

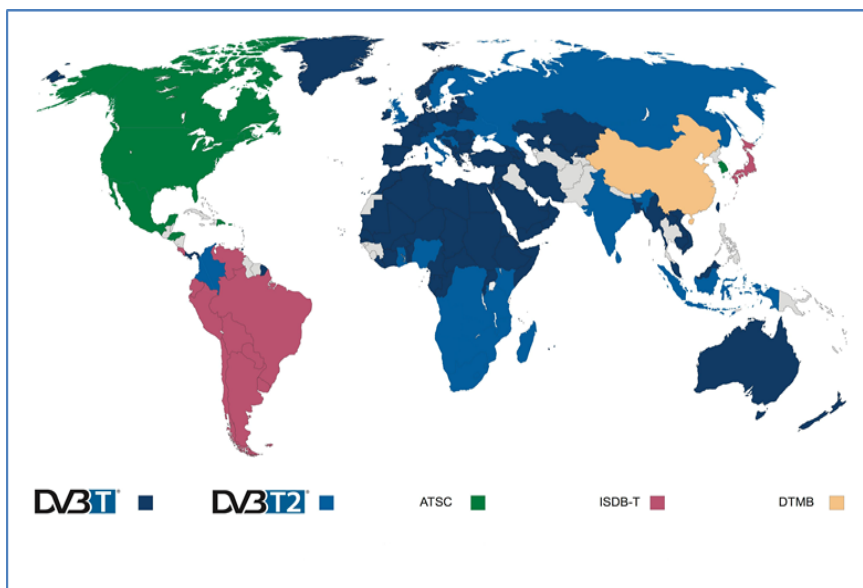
- derive an effective mechanism for the management of the spectrum in the era of converged technologies and telecommunications services so that a wide range of services can be made available to the public
- provide a responsive, effective and flexible approach to meeting the needs of users of spectrum
- promote the economic and orderly utilization of spectrum for the operation of all means of telecommunications
- allocate radio spectrum resources for the provision of telecommunications services in an effective and efficient manner
- recover the cost incurred in the management of spectrum and to realize an adequate economic benefit to the country for the use of spectrum resources
- provide an efficient, equitable and transparent system for the establishment of the fee regime for the use of spectrum, taking into account both the commercial and non-commercial use of spectrum.

Planning for the Efficient Use of Spectrum

One example of the Authority's on-going efforts in improving the efficient use of spectrum becomes evident in the Authority's current involvement in "the digital switchover" (DSO), which is the movement from analogue to digital transmission for free to air television services. Digital Terrestrial Television (DTT) is the technological evolution of analogue broadcast television which uses land-based (terrestrial) signals. The impetus for DTT, similar to digital versus analogue in other platforms such as cable, satellite, and telecommunications, predominantly include:

- greater spectrum efficiency due to associated digital coding techniques
- the release and optimized use of scarce spectrum resource, which, give rise to "digital dividend" with further national economic benefits
- higher video and audio quality (HDTV) and potentially lower operating costs for broadcasters

In order to be strategic in achieving digital switchover, the Authority has adopted a policy driven approach where the transition is guided by established processes and plans that have been agreed upon by all stakeholders.



Worldwide deployment of DTT technologies (as of February 2012)
Source: The Digital Video Broadcasting Project (DVB) www.dvb.org

Efficient Pricing for Spectrum and Numbers

The structure for licence fees and associated usage charges for the use of spectrum and numbers are in accordance with the requirements of Sections 41 and 44 of the Telecommunications Act, respectively, which states:

"The Authority shall regulate the use of spectrum in order to promote the economic and orderly use of frequencies... and to recover the cost incurred to manage the spectrum" and

"The Authority shall develop a plan known as the National Numbering Plan for the numbering of public telecommunications networks and services and shall administer and manage such numbers including requiring the payment of fees and require information from authorised providers as prescribed by the Authority for allocation, re-allocation, assignment and re-assignment of such numbers."

The Authority has developed a Fee Structure and Regulations which identify the fee and charges structure for authorisations. The Authority's efforts in this regard results in charges which:

- a) Reflect the market value of spectrum and numbers, used in a manner which:
 - (i) encourages investment and offers end users reasonable prices for quality resources,
 - (ii) ensures ubiquitous access to telecommunications and broadcasting resources in the country; and
- b) Do not place unreasonable barriers to entry into the market by businesses and entrepreneurs;
- c) Ensure that the costs of the Authority are recovered.

Spectrum Monitoring System

The Authority has acquired a Spectrum Monitoring System (SMS) as a tool to improve its effectiveness in the monitoring of spectrum.

The SMS can monitor frequencies from 30 MHz to 3000 MHz and locate the source of such frequencies using its directional finding capability. This SMS is a network of two (2) fixed spectrum monitoring, located in North and Central Trinidad, along with two (2) mobile monitoring stations. The current system allows the Authority to monitor and locate frequencies and the transmitting source.

The Authority is currently expanding the capability of its SMS by increasing the monitoring range to 30 MHz to 8000 MHz and establishing a new fixed monitoring site in Tobago.

Monitoring of Spectrum



On-going monitoring by the Authority

Spectrum Monitoring serves as an important component of the Spectrum Management function of the Authority. Monitoring of the spectrum is an imperative step towards determining the quantum of spectrum that can be made planned and, thereafter, assigned. Additionally, spectrum monitoring forms an integral part in the resolution of complaint of harmful interference, by individuals and entities already assigned spectrum.

The Authority exercises this function through the use of trained staff, comprising Engineers and Technical Officers, along with specialized spectrum monitoring tools, such as a spectrum monitoring system and handheld spectrum analyzers. These specialized tools, in addition to the techniques employed by personnel, affords the Authority the ability to achieve this aspect of its mandate.

Spectrum monitoring for the purpose of spectrum planning and assignment allows the Authority greater confidence in its appreciation of the spectrum usage landscape, which is then utilized to inform the manner in which it will plan the use of said spectrum. For example, spectrum monitoring of new frequency bands for cellular mobile services is performed before said frequency bands are included in the Spectrum Plan for Public Mobile Telecommunications Services.

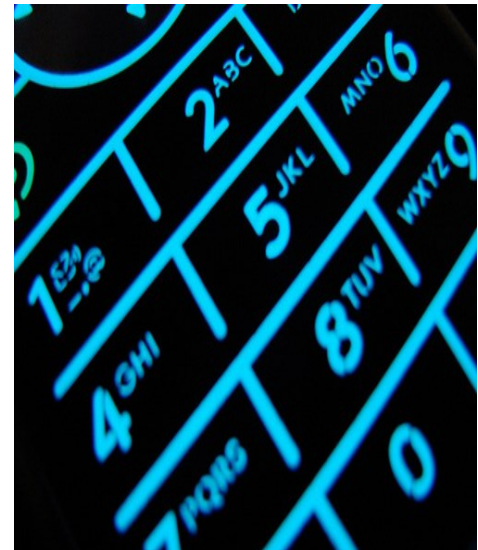
Spectrum monitoring for the purpose of treatment of a complaint of harmful interference is the primary mechanism used to valid that the harmful interference has arisen from an external source and, subsequently, proceed to locate the source of the external harmful interference. For example, spectrum monitoring is used to located the source of an unwanted signal that harmfully interfered with a land mobile frequency assigned to a Licensee.

Planning for the Efficient Use of Numbers

Telecommunication numbers are an indispensable means for identifying subscribers and directing calls and connections through interconnected public telecommunications networks to ultimately access a party or service. Numbers are critical for the provision of public telecommunications services.

Similar to the planning of spectrum, the telecommunications numbers administered by the Authority are planned, in order to promote efficient and effective assignment to Concessionaires. Also, similar to spectrum, there is a finite quantity of telecommunications numbers for which the Telecommunications Sector can utilize, thus planning the use of numbers allows for the fair and transparent administration of this resource.

For example, the National Numbering Plan: Central Office Codes and Home Network Identifiers allows the Authority the effectively and efficiently administer numbers that are used towards the assignment of a telephone number to a mobile subscriber and a code to identify the Cellular Mobile Operator of that subscriber, respectively.



Numbering Administration

The Authority's policy considerations in relation to the regulation of numbering are set out in the **National Numbering Plan: Central Office (CO) Codes and Home Network Identifier (HNI)**.

This Plan outlines the principles and guidelines which the Authority proposes to employ in the administration of Central Office (CO) Codes and Home Network Identity (HNI) assignments.

In particular, this plan:

1. Identifies the Numbering Scheme that will be employed for the allocation of CO codes to telecommunications service types (e.g. fixed (wired/wireless) service, mobile service).
2. Outlines the principles and guidelines that will be employed in the administration of CO codes, and by extension, the Numbering Plan Area (NPA).
3. Identifies any obligations that will apply to concessionaires assigned CO codes (e.g. number conservation methods).
4. Outlines the principles and guidelines that will be employed in the administration of HNI assignments.

This Plan captures the procedures and criteria the Authority utilises in the assignment of these numbering resources to Concessionaires.

**Telecommunica-
tions Authority of
Trinidad and Toba-
go**

Please also see
“Guiding Principles
on Regulatory Deci-
sion Making”

The Telecommunications Authority of Trinidad and Tobago

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Document Last Updated: 18th August 2015

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