Spectrum
MANAGEMENT
AUTHORITY

ANNUAL REPORT

2014 - 2015

Mission Statement

To ensure the efficient management of Jamaica's radio frequency spectrum in keeping with international best practices and in the interest of social, economic and technological development.

Contents

CORPORATE INFORMATION

Registered Office
13 - 19 Harbour Street, Kingston

Auditors
KPMG
6 Duke Street, Kingston

Bankers

- **First Global Bank Ltd.**
  28 Barbados Avenue, Kingston 5

- **National Commercial Bank Ja. Ltd.**
  1-7 Knutsford Boulevard,
  Kingston 5

Company Secretary

Ms. Ida-Gaye Warburton
Spectrum Management Authority
13-19 Harbour Street
Kingston

Corporate Profile

The **Spectrum Management Authority ("SMA" or "the Authority")** is mandated by virtue of the Telecommunications Act, 2000 as the regulatory body charged with the management of the Radio Frequency Spectrum in Jamaica, on behalf of the Government and people of Jamaica.

Consistent with its Mission Statement detailed herein, SMA's management of the spectrum entails the following:

- Managing access to the radio frequency spectrum through band planning, frequency assignment and licensing;
- Monitoring compliance with licensing agreements to protect all legal spectrum users;
- Identifying, investigating and facilitating the resolution of cases of interference;
- Identifying and eliminating illegal use of the spectrum;
- Fulfilling Jamaica's international obligations with respect to spectrum management;
- Fulfilling its statutory obligation as the advisory body to the Minister with portfolio responsibility for telecommunications, currently the ***Minister of Science, Technology, Energy and Mining,*** on spectrum policy and related legal matters.

Spectrum Management Authority was in accordance with the Companies Act incorporated as a limited liability company on 1st February 2000 and became operational in April 2001. As at 2009 December 21, the registered office of the company is 13 - 19 Harbour Street, Kingston, Jamaica**.**

The statutory obligations and the operational principles of the Authority are in accordance with, and fulfil Jamaica's international commitments to the World Trade Organization's (WTO) telecommunication agreement, and the policy objectives enunciated by the Government of Jamaica (GOJ) with respect to the liberalization of the telecommunication sector.

The Authority is financed through a cost-recovery mechanism, whereby licensed spectrum users are required to pay Regulatory fees. The fee mechanism was developed in consultation with spectrum users and is constituted in **The Telecommunications (Spectrum Regulatory Fees) Regulations 2003, Jamaica Gazette Supplement Number 33, in April 2003**.

As aforestated in carrying out its mandate, the Authority operates within the legislative framework as established by the **Telecommunications Act, 2000** and the **Radio and Telegraph Control Act, 1973**. Internationally, SMA is also guided by the rules and regulations of the International Telecommunications Union (ITU). ITU is the leading United Nations agency for information and communication technologies. As the global focal point for governments and the private sector, ITU's role in helping the world communicate spans 3 core sectors: radiocommunication, standardization and development.

The SMA collects Spectrum licence fees on behalf of the GOJ, which is remitted to the Consolidated Fund.

There are various categories of radio systems that are licensed by the Authority, namely:

- Terrestrial (land-based) radio systems - including fixed services (such as networks providing data transfer services) and mobile services (such as cellular services as well as 2-way radios);

- Satellite systems - for large earth stations and VSATs (very small aperture terminals);

- Maritime radio systems - this facilitates radio communication for ships, yachts, boats; and,

- Aeronautical radio systems - facilitates communication by airplanes and air-traffic controllers.

The Authority also acts in a certifying capacity in respect of the following licences:

- *Certificate of Competence in Radio Telephony/Global Maritime Distress and Safety System (GMDSS)* – This certification authorizes the holder to carry out the radiotelephone service of any Ship Station;

- *Radio Technician Licence – There are 2 classes for this category of licence*: Class "A" and Class "B" Licences. A licence issued under Class "A" category authorizes the Licensee to install and maintain radio transmitting apparatus; and, the Class "B" category authorizes the Licensee to install and maintain radio transmitting apparatus with a radio frequency power not exceeding 1,000 watts;

- *Type Approval Certificate* – This certification is issued to manufacturers of radio communication equipment after the Authority ensures that it conforms to appropriate standards and principles of product safety and will not interfere with other equipment or networks.

The SMA represents Jamaica in several telecommunications related international fora and participates on a committee level on selected bodies as indicated:

- International Telecommunications Satellite Organization (ITSO) - the Authority is currently the Chairman of the ITSO Advisory Committee, and has been a member representing the Caribbean region since 2001;

- Caribbean Telecommunications Union (CTU);

- Inter-American Telecommunications Commission (CITEL); and,

- International Telecommunications Union (ITU).

BOARD OF DIRECTORS

Front Row, L-R: Ms. Olivia Leigh Campbell, Mr. Christopher Honeywell (Chairman), Ms. Shynelle Anderson, Mr. Pierre Shirley, Mr. Desmond Palmer.
Back Row, L-R: Dr. Densil Williams, Mr. Andrew Geohagen, Ms. Marlene DeMercado, Mr. Henry Batson (Acting Managing Director), Mr. Mario Mitchell.
Missing: Mr. Christopher Burgess, Ms. Kaydian Smith, and Ms. Latoya Thomas.

BOARD OF DIRECTORS' COMMITTEES

Human Resources:
- Marlene DeMercado
- Andrew Geohagen
- Mario Mitchell

Technical Operations:
- Christopher Honeywell
- Christopher Burgess
- Olivia Leigh Campbell
- Pierre Shirley

Audit:
- Densil Williams
- Latoya Thomas
- Shynelle Anderson

Finance:
- Desmond Palmer
- Daniella Hickling
- Christopher Honeywell
- Christopher Burgess

ATTENDANCE RECORD OF BOARD AND COMMITTEE MEETINGS

For the 2014/15 fiscal year, the SMA scheduled twelve (12) meetings of the Board of Directors. Details of the attendance of Directors at meetings of the Board and its Committees for the FY are outlined in the table below:

	BOARD [1]		AUDIT		FINANCE	
	12 MEETINGS		6 MEETINGS		11 MEETINGS	
	Eligible	*Attended*	*Eligible*	*Attended*	*Eligible*	*Attended*
Shynelle Anderson	12	7	6	6	3	3
Christopher Burgess [2] [3]	5	5			2	2
Olivia Leigh Campbell	12	9	-	-	-	-
Marlene DeMercado	12	12	-	-	-	-
Andrew Geohagen	12	11	-	-	-	-
Daniella Hickling [4]	5	5	-	-	6	6
Christopher Honeywell	12	12	-	-	11	6
Mario Mitchell	12	9	-	-	-	-
Desmond Palmer	12	10	-	-	11	11
Pierre Shirley	12	11	-	-	-	-
Latoya Thomas	12	8	6	6	-	-
Kadian Smith [5]	9	6	-	-	-	-
Densil Williams	12	8	6	5	-	-

Please note that the Board does not convene during the months of August and December. Committee meetings are convened as necessary. Two (2) special Board meetings were held during the year.

1. Special Board of Directors' meetings were held in November and December 2014.
2. Became a member of the Board of Directors in November 2014.
3. Became a member of the Finance Committee in February 2015.
4. Resigned from the Board of Directors in September 2014.
5. Became a member of the Board of Directors in July 2014.

BOARD OF DIRECTORS' REPORT

In the 2014/2015 fiscal year (FY), the Spectrum Management Authority (SMA) continued to effectively carry out its mandate to manage the nation's spectrum efficiently. In fulfilling its mandate the SMA was able to contribute meaningfully in helping the Government of Jamaica (GoJ) to make strides in realizing Jamaica's Vision 2030 plans, in particular the outcome of creating a technology-enabled society and further reduce the digital divide.

During the period, the global and local communications industries continued to be dominated by the expansion of wireless communications systems and the accompanying increase in demand for spectrum, as the spectrum increasingly becomes the preferred medium of communication. As such, the services provided by the SMA sought to facilitate further investment in the industry, particularly in advanced wireless technologies.

Against this background, the SMA's Board of Directors (the Board) is pleased with the SMA's management of the radio frequency spectrum during the FY, and with the role the organization continues to play in the development of wireless communication systems and information access across Jamaica. The FY for the SMA was characterized by a vigourous thrust towards achieving operational efficiencies, investment in technology, participation in the leadership of industry associations, and, prudent fiscal management.

Corporate Performance

With the Board's guidance, the SMA was able to effectively perform its core operational functions of licensing (new and renewal), interference management, band planning and financial management. As such, we are pleased to report that the SMA's performance in the 2014/15 FY provides a platform to ensure ongoing growth in the Communications industry. Overall, the SMA was able to exceed the FYs Key Performance Indicators (KPIs) established prior to the beginning of the year. Of significance is the quality standards established by the SMA that are comparable to international best practice, which forms the basis for the SMA's established KPIs.

Licensing

New Applications

Applications received and granted during the 2014/15 FY amounted to 246 and 241, respectively. This represents a significant increase from the 167 and 156 received and granted respectively, for the 2013/14 FY. This performance was due primarily to increase applications for Marine licences, and is well above the average of approximately 113 and 101 for total applications received and granted, for the past 5 years, a clear indication of the increase in activity within the sector, which naturally increases the demand for the radio frequency spectrum. ***The table below compares the number of applications received for the different categories of licences, for the 2013/14 and 2014/15 FYs.***

	Number of Applications Received		
Category	2013/14	2014/15	Variance
Private Radio	38	31	-7
Marine	86	169	83
Alien Amateur	16	16	0
Amateur	1	4	3
Aeronautical	3	3	0
Technician	1	2	1
GMDSS	17	14	-3
VSAT	2	2	0
Citizens Band	3	5	2
TOTAL	**167**	**246**	**79**

Of the 241 licences granted, 235 or approximately 98 per cent (98%) were processed within their respective established processing time. *The table below lists the standard processing times for processing of applications.*

KPI	Target		Performance
80% of new applications granted within time	**Licence Type**	**Processing Time**	98%
	Aeronautical	15	
	Amateur and Alien Amateur	15	
	Citizen Band	15	
	Private Radio	30	
	VSAT	25	
	Maritime (**Non-MAJ**)	15	
	Maritime (Perm)	3	
	Maritime (Temp)	1	
	GMDSS	10	

Renewal Licences

A total of 395 licences were originally targeted for renewal; however, during the period, 23 licences were reinstated upon the respective clients' request whilst 27 licensees relinquished their licences. This resulted in a minus 4 net effect on the original target of 395 renewable licences, adjusting it to 391. Of the 391 licences that were renewable, 365, **or 93% were renewed.** The performance rate was above the Authority's **KPI of 85% for the number of licences renewed.** Note that licences are only renewed after receipt of payment.

Of the 365 licences renewed, 358 or approximately 98% were processed within the established processing standard. **The KPI is ninety (90) percent**.

Monitoring & Interference Management

Monitoring

The SMA conducts monitoring exercises as part of the strategy to reduce cases of interference. Monitoring of this nature is carried-out prior to the assignment of spectrum, and for auditing of the spectrum, to ensure compliance by licensed users and reduce or eradicate the level of illegal use of the spectrum. During the FY, the SMA conducted 9 monitoring exercises for audit purposes. These audits were conducted in 12 different parishes in total, and resulted in the identification of 4 incidents of non-compliance. As at the end of the FY all offending parties had regularized their operations.

Interference Management

As the SMA seeks to maximise the value that society gains from the spectrum and the demand for the spectrum grows, the need for effective management to avoid interference between users becomes more pertinent, and highly challenging. However, notwithstanding the efforts of a spectrum manager, users of the radio frequency spectrum at times still experience interference on their systems. This may be due to technical problems with the equipment of the user or may emanate from other users, licensed and unlicensed. In the event of an interference case, the SMA works with the relevant users to ensure that the case is resolved completely and in a timely manner.

During the FY, the SMA investigated 16 cases of interference reports. Of the 16 cases investigated, 15 were resolved, and were completed within their respective standard resolution time[1]. There is 1 case still being investigated at year end. The performance rate for cases resolved within the standard resolution time is 100%, compared to the KPI of 90%.

Band Planning

Activities within this department were centered on efficient planning and assignment of the spectrum. This included a proactive assignment process which seeks to prevent rather than resolve interferences and to look at the licensing of specific frequencies to clients. Other activities carried out included the following:

- Filing Notices with the Radiocommunication Bureau (BR) of the ITU to update the Master International Frequency Registry (MIFR);
- Leading Jamaica's participation in the Harmonized Caribbean Spectrum Planning and Management Project (HCSPMP);
- Responding to international Administrations with respect to satellite network requests; and;
- Filing Space/Terrestrial notifications to the ITU.

[1] Resolution times ranges from 15 to 75 days.

BOARD OF DIRECTORS' REPORT

Financial Management

Income

For the FY ending 2015 March 31, the SMA targeted total income of approximately $271.58M to be booked. As at that period, $298.73M, or approximately 110 percent of the targeted amount was booked. The result was primarily influenced by revenue earned relating to processing fees, which was above expectations as the number of new applications rose significantly. Additionally, the SMA realized interest income which was notably above that which was projected since savings were realized from certain expenditures and then others were deferred to the new FY.

The actual vs. KPI (95% of Budget) for each category of income are as follows:

Income	Budget	KPI (95%)	Actual
	$'M	$'M	$'M
Regulatory Fees	252.44	239.82	263.27
Processing Fees	4.68	4.45	9.49
Interest Income	14.42	13.70	25.11
Other Income	0.04	0.04	0.86
TOTAL	271.58	258.01	298.73

Expenditure

In light of the continued tight fiscal policies being employed by the GoJ, the SMA in incurring expenditures during the FY sought to secure cost efficiencies, which is part of the two pronged approach – combining cost efficiency drives with innovation - adopted by the organisation. As a result of the above mentioned, actual expenditure for the FY amounted to $231.13M, or approximately 13% below the budgeted amount of $266.82M. Whilst obtaining cost efficiencies, the SMA remained resolute in our efforts, to maintain customer oriented service to all our clients.

Collection of Spectrum Licence Fees

The SMA collected $2,018.37M in spectrum licence fees for the FY, which included instalment payments relating to the granting of new and renewal licences for mobile service in 2014 March, as per the payment agreement. The fees remitted to the Consolidated Fund amounted to $2,031.97M, which includes $18.79M b/f from the previous FY. It is the SMA's policy to remit funds collected for the Consolidated Fund, in the month following, unless otherwise directed by the GoJ.

Training and Development

Training and development of human capacity is a very important and critical element in the SMA's thrust to effectively manage the spectrum and is therefore high on the list of priorities. As the industry continues to change and the demand for the spectrum increases, the SMA has to explore and adopt innovative ways of managing the spectrum, as alluded to earlier. With this

necessary requirement, the SMA continuously seeks to maintain a cadre of highly skilled professionals in order to fulfil its mandate.

Training opportunities accessed by staff during the FY included the following:

- *Practical Applications for Spectrum Management;*
- *Legal Framework for ICT's – Building Capacity and Implementing Regulation;*
- *Certificate Course in Forensic Accounting - ICAJ;*
- *Radio Spectrum Monitoring Techniques and Procedures;*
- *Competition Policy for Telecommunications – OAS/Citel;*
- *Mobile Communication, Fostering the Deployment of Broadband;*
- *Enterprise Risk Mgt and Business Continuity Mgt;*
- *Understanding Spectrum Management;*
- *USTTI's Laboratory Techniques in Support of Equipment Authorisation Programme;*
- *Spectrum Masterclass;*
- *LTE Network Design Optimisation Boot Camp; and,*
- *ISO 27001 – Information Security ISMS Seminar.*

Legal, Policy and Regulatory

During the FY, the SMA executed its mandate with respect to legal, policy and regulatory issues through, *inter alia*, the following activities:

- *Caribbean Telecommunications Unions (CTU)*

The SMA participated on the Spectrum Management Task Force (SMTF) committee that was integrally involved in the Harmonized Caribbean Spectrum Planning and Management (HCSP&M) project, with technical cooperation support from the Inter-American Development Bank (IDB) and Compete Caribbean. Together, their financial support of the project enabled the participation of fourteen (14) CTU member countries, while making provision for other Caribbean countries to benefit from the work. The primary objective of the Project is to deepen the harmonization of spectrum planning and management policies and practices across the Caribbean Region.

- *Expressions of Interest*

The SMA issued an invitation for Expression of Interest (EOI) in 2013 November with respect to the proposed licensing of spectrum in the 1800 MHz, 1900 MHz, 1700/2100 MHz and 2.5/2.6 GHz bands. On 2014 June 13, the Minister directed the SMA to licence the spectrum available in the respective bands, on a first come first serve basis, (based on the results of the study), and that the Spectrum Pricing Policy dated 2014 March 31 should be applied. Additional spectrum was subsequently assigned.

- *TV White Space*

To facilitate achievement of Jamaica's 2030 vision statement, "***Jamaica the place of choice to live, work, raise families, and do business,"*** the GOJ, represented by the Universal Service Fund, in collaboration with the United States Agency for International Development (USAID) and NetHope Global Broadband Alliance, launched an initiative to expand the delivery and adoption of broadband into rural communities, with a specific focus on, but not limited to, providing support for education through access to the Internet in schools. This initiative titled the TV White Space Project, seeks to utilize vacant frequencies located between broadcast TV channels in the UHF band. The availability and unique qualities of the white-space frequencies promise to make broadband faster, less expensive and more widely available, especially in rural areas, where TV white space is more abundant. During the FY, the SMA participated in meetings and workshop to facilitate the launch of TV white space technology in Jamaica. Additionally, upon the directives of the Minister with responsibility for Telecommunications, spectrum has been assigned to the Universal Service Fund (USF) to facilitate the pilot project.

- *Converged Regulator*

Continuing from the previous FY, the SMA provided support and participated in consultative sessions with the MSTEM and a consortium of Regulaid BV and Jacobs, Cordova and Associates, in relation to the creation of a Converged Regulator (the Regulator) for the communications industry, to strengthen Jamaica's legal and regulatory framework. Comments aligned to international best practices were provided to the MSTEM in relation to reports submitted by the consortium regarding the establishment of the Regulator.

Local, Regional and Global Obligations

The SMA actively participated in local, regional and global organisations and committees during the FY. These included:

- Caribbean Telecommunications Union (CTU) – Attended CTU Spectrum Management Task Force meetings and workshops, as well as facilitated the HCSP&M project as mentioned before;
- Inter-American Telecommunication Commission (CITEL) – Attended the 24th and 25th meetings of the Permanent Consultative Committee II (PCC.II) in preparation for the World Radiocommunications Conference (WRC-15) in 2015 November.
- International Telecommunications Satellite Organization (ITSO) – Represented Jamaica at the 36th Meeting of the ITSO Assembly of Parties meeting (AP-36) held 2014 May 20-23 in Washington D.C. Additionally, Jamaica, which is represented at the ITSO Advisory Committee (IAC) meetings by the SMA, represents Barbados, Haiti, Trinidad & Tobago and the Bahamas as a member of Region A. In 2015 February SMA's representative, Ida-Gaye Warburton, was elected the Chairman of the IAC.

Strategic Acquisitions

In drafting the 2014 – 2017 Corporate Strategic Plan document, the SMA indicated the need for all industry players (including the regulator) to adapt new technologies and techniques as part of the solution to the increasing demand for spectrum. As such, during the FY, the SMA invested in new equipment, which included the acquisition of a Cellular Drive Test & Post Processing (CDT&PP) tool and an Engineering Analysis Tool. These acquisitions represent part of the SMA's strategy in managing the spectrum more effectively, based on the demands of the environment.

Cellular Drive Test & Post Processing Tool (CDT&PP)

The CDT&PP tool (the tool) is a specialized equipment used to resolve interference on cellular networks. The SMA acquired the tool in 2015 March and looks forward to the derived benefits in the 2015/16 FY. The tool will facilitate the SMA having first-hand knowledge of signal activities (mobile, data, voice, Wi-Fi) within the spectrum. It has the capability to support analysis of several wireless technologies including: GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, HSPA+, CDMA, EVDO, LTE (Cat3), and Wi-Fi. Further, it includes various software applications capable of running on Android Operating System devices, tracing and displaying information in real time and recording all data to files for later post processing analysis. As a result, the SMA is now positioned to further reduce the time taken to resolve interference cases, which is beneficial to our clients, and by extension the people of Jamaica.

Engineering Analysis Tool

The SMA acquired an engineering analysis tool – ICS Telecom – late in the 2013/14 FY, however training to utilize the tool was completed in 2014 April. The ICS Telecom is a planning tool, which is a key element of effective band planning. It enables extensive and efficient analyses of various communications networks, taking into account all facets of network design and operations. With the ICS Telecom, the SMA is better able to more accurately perform the following:

- Field strength calculations and coverage predictions for the required network.
- Display field strength contours of one or more transmitters simultaneously (with contours being distinguishable for each transmitter).
- Produce detailed geographical display of the region of concern including terrain information.
- Detailed interference analyses of single transmitters/receivers as well as networks.
- Design and permit viewing of multiple network technologies on the same network.
- Enable scenario-based planning to enable management of several scenarios concurrently; allow the consideration/comparison of various designs.

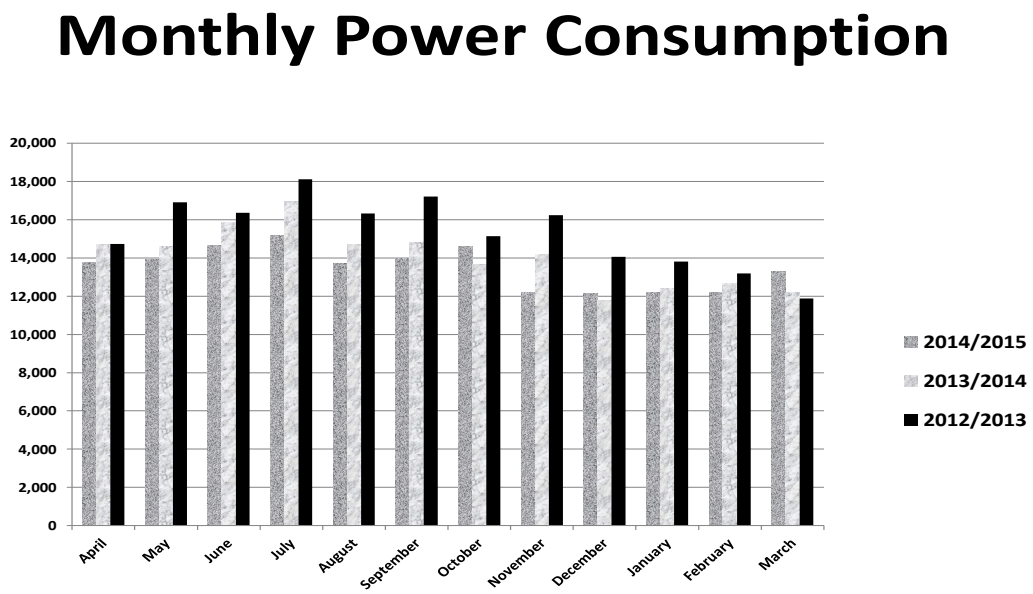
As a result, band planning becomes a more efficient process, reducing the instances of possible overcompensating to prevent interferences, in assigning the spectrum. Utilizing the ICS Telecom

in the band planning/assignment process allows for more spectrum to be available for assignment.

Energy Conservation

In an effort to fulfil its mandate, the SMA's Energy Efficiency and Conservation Committee, focused on effecting energy conservation primarily by behaviour modification during the 2014/15 FY. Members of staff were encouraged to turn off lights, air conditioning units, computers, etc. when not in use. The operating times of the larger air conditioners (including the central unit) were reduced throughout the days. In addition, equipment that was not capital-intensive, such as electronic timers and occupancy sensors were installed strategically throughout the facility.

These initiatives resulted in significant reductions in the level of power consumption, and attendant savings in the cost of energy. For the period April 2014 to March 2015 the SMA used 6,780 kWh less than for the corresponding period, the year before (a 4% reduction), resulting in gross savings of $323,489 in energy costs for the 2014/15 FY. Approximately $163,000 was however spent on energy saving activities for the same period, giving a net savings of $161,000. Significantly, it should be noted that the SMA in 2013/14 utilized 19,564 kWh less energy, when compared to the base year; hence the reduction in kWh less energy used to date when compared with the base year is 26,344 kWh. For the 2015/16 FY the SMA will strive to further reduce its consumption of energy. *Below is a chart of the SMA's monthly power consumption over 3 years, from 2012/13 (base year) to 2014/15.*



BOARD OF DIRECTORS' REPORT

Corporate Social Responsibility

The SMA is committed to making a positive impact on the economic and social well-being of the people of Jamaica, and as such makes contributions to organizations and missions advancing these efforts. During the FY, organizations that benefitted from the SMA's contributions included, the Jamaica Cancer Society, Restoration Outreach Ministries International, Multicare Foundation, and Karen Peart Memorial Scholarship Foundation.

Science in the Park Expo

In support of the National Science and Technology month, the SMA participated in the grand exposition of Science, Technology and Innovation (STI) entitled "Science in the park" at the Emancipation park, on 2014 November 27. For its part, the SMA used the opportunity to facilitate a promotional quiz competition, which featured questions about the SMA. For their efforts visitors at the expo won tokens courtesy of the SMA, for correctly answered questions. During the day, staff also fielded questions from visitors to the SMA's booth. A total of 51 visitors were documented on register, to have visited the booth.

Going Forward

The Board of Directors is cognisant of the challenges of managing the spectrum in a dynamic environment, however, with the continued cohesive management approach between senior management and the Board, plus the dedication of the staff, the SMA is well placed to fulfil its mandate.

In the 2015/16 FY, the SMA will continue to access and acquire more specialized equipment; upgrade and enhance existing equipment; and increase its monitoring as well as human capacity. These efforts, coupled with continued prudent management of the organization, will increase the capability of the SMA to manage the spectrum more efficiently and effectively to the benefit of the people of Jamaica.

BOARD OF DIRECTORS' REPORT

The planned activities of the SMA for the FY will include *inter-alia*:

- Pursuing the core functions of, licensing spectrum users, resolution of interference complaints according to established standards, monitoring and inspection to ensure the legitimate and efficient use of the spectrum, and collection of fees as targeted.
- Ensuring good corporate governance and statutory compliance within/by the Authority.
- Fulfillment of Local, Regional and International obligations, (particularly with respect to ITU's WRC-15).
- Performance Monitoring in order to achieve established targets and ensuring compliance with all statutory obligations.

Summary of Principal Performance Targets for 2015/16

	Target	Key Performance Indicator (KPI)
Revenues	$293.86M	95% of target
Spectrum licence fees Collected	$682.12M	80% of target
Spectrum licence fees Remitted	$682.12M	Remit all fees collected up to Feb. 2015
Expenditure	$285.38M	Within Target
Number of licences to be Renewed*	285 Reg Fees 404 Spec Fees	85% of target
Number of Interference Cases resolved	All reported cases	85% of target

** Please note that not all licensees pay regulatory fees, however they all pay spectrum license fees.*

Budgetary Proposal for Financial Year 2015/16

For the FY 2015/16, the SMA proposed a budget of $480.97M as follows:

Capital Expenditure	$195.59M
Operating Expenditure	$285.38M

Closing Remark

The Board of Directors of the Spectrum Management Authority in closing, takes this opportunity to thank our clients for their continued cooperation and support over the years; we further recognize the support of the MSTEM in our efforts to fulfil our mandate; and, most importantly, we thank all members of staff for their priceless contribution, which made the 2014/15 FY a success.

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Christopher Honeywell
Board Chairman

BOARD OF DIRECTORS' COMPENSATION

SPECTRUM MANAGEMENT AUTHORITY							
BOARD OF DIRECTORS' COMPENSATION							
Position of Director	Board		Committees		Fees	Travelling Allowance	**Total**
	Chairman	Member	Chairman	Member			
	$	$	$	$	$	$	**$**
MEMBER - 01 - CHAIRMAN	175,000		-	24,500	199,500	12,502	212,002
MEMBER - 02		60,000	35,000	-	95,000	-	95,000
MEMBER - 03		60,000	7,000	17,500	84,500	-	84,500
MEMBER - 04		105,000	-	-	105,000	15,980	120,980
MEMBER - 05		45,000	-	-	45,000	-	45,000
MEMBER - 06		90,000	-	-	90,000	10,246	100,246
MEMBER - 07		52,500	-	21,000	73,500	-	73,500
MEMBER - 08		90,000	-	-	90,000	44,556	134,556
MEMBER - 09		75,000	77,000	-	152,000	60,160	212,160
MEMBER - 10		90,000	-	-	90,000	79,336	169,336
MEMBER - 11		90,000	-	-	90,000	-	90,000
MEMBER - 12		75,000	-	21,000	96,000	9,212	105,212
MEMBER - 12		45,000	-	7,000	52,000	-	52,000
MEMBER - 13		-		7,000	7,000	-	
MEMBER - 14		-		7,000	7,000	-	
Total	**175,000**	**877,500**	**119,000**	**105,000**	**1,276,500**	**231,992**	**1,442,492**

SENIOR EXECUTIVES / KEY MANAGEMENT COMPENSATION

SPECTRUM MANAGEMENT AUTHORITY							
SENIOR EXECUTIVES/ KEY MANAGEMENT COMPENSATION							
Position of Senior Executive/ Key Management	Salary	Gratuity or Performance Incentive	Travelling Allowance or Value of Assigned Motor Vehicle	Other Allowances	**Total Remuneration**	Non-Cash Allowance	**Total**
	$	$	$	$	**$**	$	**$**
Senior Executive							
Managing Director (Acting), and Director - Spectrum Engineering	5,280,958	342,547	-	2,338,401	**7,961,906**	110,833	**8,072,740**
Director - Finance & Administration	4,200,566	1,244,612	975,720	176,843	**6,597,741**	-	**6,597,741**
Director - Legal Affairs	4,083,839	1,266,180	975,720	833,537	**7,159,276**	-	**7,159,275**
Director - Policy & Strategic Management	3,964,284	1,513,454	975,720	176,843	**6,630,301**	-	**6,630,301**
Sub-total - Senior Executive	**17,529,647**	**4,366,794**	**2,927,160**	**3,525,624**	**28,349,225**	**110,833**	**28,460,057**
Key Management							
Manager - Human Resource **(Apr2014_Mar2015)**	2,485,081	738,512	514,500	220,579	**3,958,673**	-	**3,958,673**
Sub-total - Key Management	**2,485,081**	**738,512**	**514,500**	**220,579**	**3,958,673**	**-**	**3,958,673**
Total	**20,014,728**	**5,105,306**	**3,441,660**	**3,746,203**	**32,307,897**	**110,833**	**32,418,731**

NB:

Non-Cash Allowance refers to the taxable benefit for assigned motor vehicle

TECHNOLOGY HIGHLIGHTS

SPECTRUM SHARING

Over the last two years, several jurisdictions have announced their intentions to investigate the opportunities and challenges which are connected to spectrum sharing in a bid to satisfy the increasing demands for the spectrum. It has been noted that there are a variety of sharing approaches, which are expected to help alleviate the challenges in meeting the spectrum demands; with some types already being implemented, while others are still being developed. Industry experts have however sought to classify spectrum sharing under four broad categories: Geographic, Temporal, Coordinated, and Uncoordinated Rule-based (*Bazelon & McHenry, 2014*).

Geographic Sharing

Geographic sharing (exclusion zones), which is perhaps the simplest type is where a given spectrum user's transmissions are limited to a predefined service area. Therefore, no two similar systems operate simultaneously in the same area.

Temporal Sharing – Predictable and Random

Another commonly employed sharing arrangement is *Temporal Sharing*. In this type, two users share access to the same band of spectrum in the same geographic area, but during different time intervals. There are two general methods by which a temporal sharing arrangement might be carried out – *predictable* and *random*. Under the predictable temporal sharing method, one user agrees not to transmit during particular predefined times to accommodate the other user's services. Such sharing might vary by incidence and regularity. The random temporal sharing occurs when the secondary user may have to stop using the specific spectrum on short notice or without warning.

Coordinated Sharing

Coordinated sharing refers to sharing arrangements where multiple users are using the same band of spectrum in the same geographic area at the same time. To prevent interference, coordinated sharing requires that users detect what devices are operating in the same geographic area and on the same frequencies, and then respond accordingly. Two primary mechanisms for coordinated sharing are *Geolocation Databases* and *Cognitive Radios*. The Cognitive Radio (CR) method refers to a class of radios capable of "sensing", which involves detecting whether radios are already present at that frequency, securing an open frequency, and switching to the vacant frequency.

It perhaps useful to note that the term CR is sometimes used synonymously with dynamic spectrum access (DSA). CR however is a term that describes intelligence built into the radio itself so that it can react to the environment around it. Therefore, one possible use of the CR

technology is to allow for DSA. In contrast, a geolocation database, such as those now being developed to access TV white spaces, indicates via a database query what TV channels are available for data communication based on the geographical location of the radio.

Uncoordinated Rule-Based Sharing

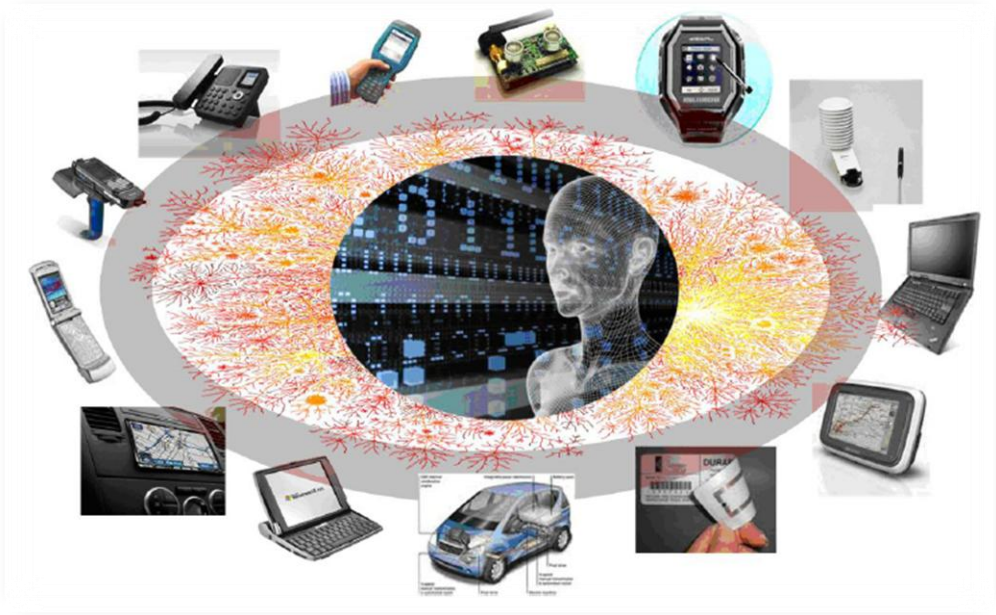
Uncoordinated Rule-Based sharing refers to situations where rules of use are designed to prevent harmful interference. Uncoordinated sharing typically occurs where multiple distinct systems operate in the same spectrum band on an unlicensed basis in the same relative area, provided that they meet a particular set of criteria. Since this type of sharing is rule-based, as long as all users follow the rules for the band, unlike in the case of cognitive sharing, there is no further need for coordination among the users. Examples of this type of sharing include low power devices, such as baby monitors, Bluetooth systems, walkie-talkies, wireless microphones, Wi-Fi, and even radio astronomy.

Authorized Shared Access/Licensed Shared Access and Licence-Exempt Access

Notwithstanding the above, from a regulatory perspective, sharing may be approached from the perspective of being "*Authorized Shared Access(ASA)/Licensed Shared Access(LSA)*" or "*Licence-Exempt Access(LEA)"*. LSA is a spectrum sharing approach in which the spectrum management system is one that combines elements of traditional "command and control" (hands-on regulation) spectrum management system with geolocation technology. On the other hand, LEA is a largely unregulated approach by which all parties use a band of spectrum as a common and shared resource without need for a licence. (GSMA, 2014).

CONCLUSION

Irrespective of the perspective (regulatory, operator or common user), it is commonly accepted, that the radio frequency spectrum is not just powering the wireless revolution; it is transforming economies and the demand for it will only increase in the coming years. In recognition of this and to facilitate a technology enabled society, some of the spectrum sharing approaches mentioned earlier have been introduced in the local communications industry. The approaches employed are the simplier types, which do not require large capital outlays for implementation, such as Geographic and Uncoordinated Rule-based Sharing. However, in light of the various emerging technologies that increases the demand for spectrum, thereby promoting the need for spectrum efficiency, Jamaica eventually may need to explore coordinating sharing approaches. This approach holds greater promise for spectral efficiency, but requires more capital investment for implementation. Notwithstanding Jamaica's financial challenges, it is hoped that the country will be able to benefit sooner than later from the timely investments in new and innovative spectrum technologies, which are essential for growth and competitiveness in the global market.



Source: Overview of The Internet of Things – Zhang, 2013, www.cse.ust.hk/~qianzh

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