
Stakeholder Consultation and Information Session

Friday October 14, 2011

Revising RURA Spectrum Fees



Rwanda Utilities Regulatory Agency

Presentation Outline

- Introduction and Purpose of the Consultation and Information Session
- Background Information
- RURA Responsibilities and Policy Direction
- Spectrum Fee Study
 - Overview of Current Fee Schedule
 - International Best Practice
 - Regional Experience
 - Recommendations
- Rationale for Change
- What will change - Service Examples
- Questions from RURA
- Opportunity for Feedback
- Next steps and Schedule
- Summary

Background

- RURA conducted commenced an internal review and benchmarking of the Current Fee Schedule in 2009
- In 2010 RURA requested assistance from the ITU to conduct a study of the Fees Schedule and to make recommendations.
- International Expert engaged by the ITU in 2011. Two missions in Q1, 2011.
- Report prepared and reviewed by RURA April-June, 2011.
- Initial consultation with stakeholders planned for October 2011.

Purpose for the Consultancy

- The overall purposes for public consultancy and stakeholder involvement:
 - To inform and explain the rationale guiding RURA in the decision to revise Spectrum Fees;
 - To obtain public and stakeholder's views on key issues in the design of revised Spectrum Fees;
 - and to obtain information that will assist the RURA in progressing the renewal of the fee regime.
- The purpose of this presentation is to provide you with a summary of the main points and encourage discussion

RURA's Responsibilities in Spectrum Management

- Telecommunication Law of Rwanda. Chapter VI, Articles 32-36 deal with Radiocommunication:
 - **Article 32** - empowers RURA to manage radio frequencies according to the National Plan which solely governs radio allocations in Rwanda. Government users are exempt from the application of the Telecom Law;
 - **Article 33** - establishes the requirement to have a license to use or operate a radio station or network. *Where demand is excessive RURA is required to conduct a Public Auction for spectrum.* Spectrum assignments can be withdrawn by RURA immediately in the case of national security and otherwise once 2 years notice has been given;
 - **Article 34** - governs licence term and conditions. Licence conditions can be changed at anytime by RURA. **Spectrum Fees are determined by Ministerial Decree based on recommendations from RURA. Fees may be initial application and annual fees;**
 - **Article 35** - governs prohibitions on causing interference;
 - **Article 36** - restricts any person or organization from leasing, unauthorized interception of radio signals, divulging private information or endangering public safety through the use of radiocommunication equipment

RURA's Approach

- RURA's approach and direction are to better reflect spectrum market values in spectrum fees paid by licensees. Fees will increase to better reflect scarcity, promote efficiency, fund growth and enhance cost recovery of spectrum management activities.
- RURA has taken a principled approach, based on best practice and has been attentive to rebalancing where necessary and will proceed with efforts to ensure all users pay.
- RURA is also conducting a consultation to obtain comments and input. RURA will respond to stakeholders and reflect reasonable contributions.



SPECTRUM FEE STUDY

Current Fee Schedule - Issues

- The price of cellular spectrum in terms of price per MHz is significantly lower in comparison to other countries within the region;
- Fee model does not adjust for differences in:
 - coverage/densities, location,
 - exclusive vs. Non-exclusive assignments,
 - and technological being used more efficient vs. less efficient.
- Generally, lacking in incentives to promote better utilization, spectrum sharing, and the roll-out of services in underserved areas.
- The methodology should take into account parameters such as:
 - geographical location, population coverage and the amount of assigned spectrum actually utilized.
- Spectrum sharing and use of more efficient technologies should be promoted.
 - The formulas should differentiate between shared and exclusive use of bands.

Review of Current Methodology

Service	Amount in RWF	% of Total
Fixed Links Point to Point	47,916,000	4.26
Fixed Links Point to Multi Point	506,400,000	45.04
Broadcast Radio	86,640,000	7.71
Broadcast TV	29,760,000	2.65
Terrestrial Satellite	148,840,000	13.24
Cellular	304,800,000	27.10
Government Users	0	0
Total	1,124,356,000	100 %

The formula used by RURA to administratively determine spectrum user fees is a very simplified modified version of the Universal System Performance Model. It can be generally shown as:

$$SP = (RF)(UnitFee)$$

International Best Practice

Best Practice

Core objectives for spectrum include:

- Planning for future meeting legislative and public policy objectives and international agreements;
- Improving the efficient and optimum use of the spectrum resource through increased use of market-based;
- Ensuring flexibility, adaptability and ease of access to the spectrum resource;
- Spectrum fees, user charges and spectrum prices are necessary means of ensuring spectrum management costs are recovered, a fair return is derived from the use of a scarce resource, and users are encouraged to use spectrum efficiently. These fees, rents and prices should be based on the extent of spectrum use, the scarcity of available and assignable frequencies and the physical properties of different spectrum bands (i.e. propagation);
- Next page continues.....

Best Practice

- Support initiatives by communities and public institutions by ensuring accessible, sufficient and low cost spectrum availability including unlicensed spectrum;
- Special consideration should be given to promote use of spectrum in rural and remote areas, to support the achievement of affordable universal access;
- Increase private investment in the radio based services and support and promote local manufacturing of radio based systems.

Best Practice

- Protecting national interests and strive for global harmonization of spectrum:
 - coordinated spectrum policies and utilization working with regional and international organizations;
 - compliance with treaty obligations, including those of the ITU;
- Supporting and promote innovation, research and development in radiocommunication techniques and spectrum-based services and applications;
- Establishing well balanced national spectrum and radiocommunication policies and plans:
 - widely consult with all interested parties and the general public;

Significant Trends in Spectrum Management

- Major trends in spectrum around the world:
 - Greater reliance on Markets
 - Users are permitted more flexibility in how they use spectrum
 - Technology and Service Neutrality.
- The results are:
 - Spectrum prices increase as demand increases
 - Greater emphasis on spectrum planning - IMT, DSO, BWA
 - Convergence in services
 - Infrastructure and Spectrum Sharing
 - Great use and value of unlicensed spectrum

Importance of Spectrum Prices

- Optimizing radio spectrum use requires appropriate price signals sent to users/investors ensuring the greatest benefits to the economy are obtained through access to adequate amounts of radio spectrum.
- *The most effective signals are those based on prices determined in markets.*
- If markets cannot determine prices the next best approach is to use administrative prices.

Administrative Price Methodology

- Spectrum fees can be formulated from a number of separate elements based on any or all of various criteria such as the amount of spectrum used, number of channels or links used degree of congestion, efficiency of radio equipment, transmitter power/coverage area, geographical location.
- The basic principle underlying this approach is to identify various technical parameters in order to measure the spectrum volume used or define the “pollution area” of a radio system as a common basis for establishing spectrum fees.
- A general model for spectrum price determination based on system performance has been developed and is described in more detail below. See ITU-R Spectrum Fee Guidelines Document 2/167E

$$P = \frac{V}{M} \times \frac{K_f K_s}{K_m} \times C_s \times K_p$$

Administrative Price Methodology

- **Examples of Administrative Pricing**
- Lebanon: Telecommunication Regulatory Authority Commission - an example of the system performance model with forecasts of spectrum costs and congestion factors;
- Thailand: National Telecommunication Commission - an example of a simplified system performance model including application and band factors;
- Canada: Industry Canada - license renewal fees using a simplified system performance model for a single transmitter and several repeaters including transmitter and receiver frequencies.
- New Zealand: Ministry of Economic Development - an example of a simplified financial and statistical model used to determine broadcast licensing fees.

Leading Regulators Using the Administrative System Performance Methodology

- ACMA-Australia
- IC-Canada
- ANE-Columbia
- OFTA-Hong Kong
- RSM-New Zealand
- IDA-Singapore
- TRAI-India
- KCC-Kenya
- ICTA-Mauritius
- NCC-Nigeria
- ICASA-South Africa
- UCC-Uganda
- ZICTA-Zambia

Regional Practices

Regional Practice

	Rwanda	Kenya	Tanzania	Uganda
Price (RF) /MHz pop. Unadjusted	1,200,000	5,391,295	12,850,000	10,688,945
Price (RF) /MHz pop. Adjusted for PPP	1,200,000	3,706,514	4,760,000	10,998,614
ARPU (RF)/MTH	2198	2,477	2,975	2,975
GDP (RF)/Capita	654,400	952,000	833,000	635,640

Price Per MHz. Pop is the price in Rwanda Francs of one MHz. of duplex spectrum divided by total covered population. It is a standard measure used in comparing spectrum prices

These amounts have been adjusted to reflect coverage and Purchasing Power Parity to provide a more reasonable basis for comparison. For example in Kenya actual rates are 5,391,295 RWF per MHz compared to Rwanda 1,191,987, however cellular penetration in Kenya is not quite 50% while national incomes are 1.5 times those in Rwanda. Spectrum prices are relatively much higher in Kenya on a comparable (adjusted) basis: Rwanda -1,195,987 and Kenya - 3,706,515.

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Benchmark Cell Rates

Price per 300 minutes of calling and 60 SMS	Total Cost in Rwanda Francs (RF)
Rwanda – MTN per second billing	21,000 RF
Kenya - ZAIN Yuka	9,769 RF
Kenya – Zain KoolMax	23,218 RF
Uganda - MTN	20,373 RF
Algeria – Orascom Classic Djezzy	23,287 RF
USA - Virgin	21,000 RF
Denmark	22,025 RF

Recommendations

Recommendations

- Shift focus of Administrative Fees to cost recovery and spectrum usage.
- Rebalance fees. Some users don't pay at all, other not enough.
- Introduce geographic location factor to provide incentive for rural deployment.
- Introduce specific band factors - exclusive assignments, specific bands.
- Introduce technology factors to promote use of more efficient technologies.
- Increase fees overall especially in lower bands.
- Introduce all user pay policy and phase in over time.

Example Fees Schedule Changes Proposed by RURA

Example Revised Cellular Fees

Cellular		
Location factor		
Urban Kigali		1.1
semi urban - Taba		0.6
Remote - Kinigi		0.4
Band unit fee		transmitter unit fee
GSM 900	RWF 3,000,000	RWF 25,000
GSM 1800	RWF 2,000,000	RWF 20,000
UMTS	RWF 2,500,000	RWF 20,000
CDMA	RWF 1,750,000	RWF 15,000

- **Revised spectrum fees Formula:**

$$FF = (RF * \text{Band Unit Fee}) + \sum(N * \text{Transmitter Unit Fee}) * \text{Location Factor}$$

Example Revised Fixed Wireless Access

Fixed Wireless access

Location Factor

LF ¹ Urban =	1.00
LF ² Rural =	0.55
LF ³ Remote =	0.35

Band		Spectrum Fee		Link fee
2.3 GHz	RWF	2,500,000	RWF	75,000
2.5 GHz	RWF	2,000,000	RWF	75,000
3.5 GHz	RWF	1,500,000	RWF	35,000

- Revised spectrum fees Formula:

- $FF = \sum (N * \text{Link Fee} + RF * \text{Spectrum Fee}) * \text{location factor}$

Broadcast TV

$$FF = \sum (N * RF^{ERP}) * \text{Location Factor}$$

N = the number of transmitters

RF^{ERP} = the utilized band and transmitter Eirp

Location Factor	LF ¹ Urban =	1.0
	LF ² Rural =	0.4
	LF ³ Remote =	0.3

Broadcast Radio

$$FF = \sum (N * RF^{ERP}) * \text{Location Factor} * \text{Coverage Factor}$$

N = the number of transmitters

RF^{ERP} = the utilized band and transmitter ERP

Location Factor	LF ¹ Urban =	1.1
	LF ² Rural =	0.5
	LF ³ Remote =	0.3

ii
iii
iiii

PAL is the analogue television system used primarily in Europe. It was developed largely to improve upon deficiencies observed in using NTSC for colour TV and in conjunction with the SECAM is the analogue television used in France, Russia and former CIS countries and in parts of West Africa
NTSC is the analogue television system used in most of North America, most countries in South America, Myanmar, Republic of Korea, Japan, Philippines, and some Pacific island nations

Table 1.1: Typical Spectrum Bands for Radio and Television Broadcast

Band	Region 1	Region 2	Region 3
LF and MF 3 kHz – 3000 kHz			
AM Radio	148.5-283.5 kHz 526.5-1606.5 kHz	– 525-1705 kHz	– 526.5-1606.5 kHz
HF 3.0 MHz – 30 MHz			
Short-wave Radio	Various	Various	Various
VHF 30 MHz – 300 MHz			
FM Radio	87.9-107.9 MHz	87.9-107.9 MHz	87.5-107.9 MHz 76-90 MHz (Japan only)
Television	Western Europe: 40-88 and 174-230 MHz Eastern Europe: 48-100 and 174-230 MHz	North and South America: 54-88 and 174-216 MHz	Asia: PRC – 48-92 and 166-223 MHz Japan – 90-108 and 170-222 MHz Australia/New Zealand – 54-88 and 174-230 MHz
UHF 300 MHz – 3.0 GHz			
Television	Europe: PAL 470-890 MHz France: Secam Africa: PAL and SECAM 470-862 MHz	North America: NTSC 470-608, 624-890 MHz South America: NTSC and PAL 470-890 MHz	Asia: NTSC, PAL, SECAM PRC 470-862 MHz Japan 470-890 MHz
<p><i>Note: For a detailed description of spectrum bands 460-890 and the current allocation to services, see the ITU Radio Regulations 2006 (RR5-54). For reference notes also refer to the ITU RRs.</i></p> <p><i>Source: McLean Foster & Co. based on the ITU Radio Regulations 2006.</i></p>			

Current and Revised Fees - Cellular Example

Cellular	Formula	Fee for a single BS 900, 1800, UMTS, CDMA
Current	$FF = \sum (N * RF \text{ (Unit Spectrum Fee/MHz)})$	1,200,000
Revised	$FF = (RF * \text{Band Unit Fee}) + \sum (N * \text{Transmitter Unit Fee}) * \text{Location Factor}$	<p>900 = 3,000,000 + 27,500 900 = 3,000,000 + 15,000 900 = 3,000,000 + 10,000</p> <p>1800 = 2,000,000 + 22,000 1800 = 2,000,000 + 12,000 1800 = 2,000,000 + 8,000</p>

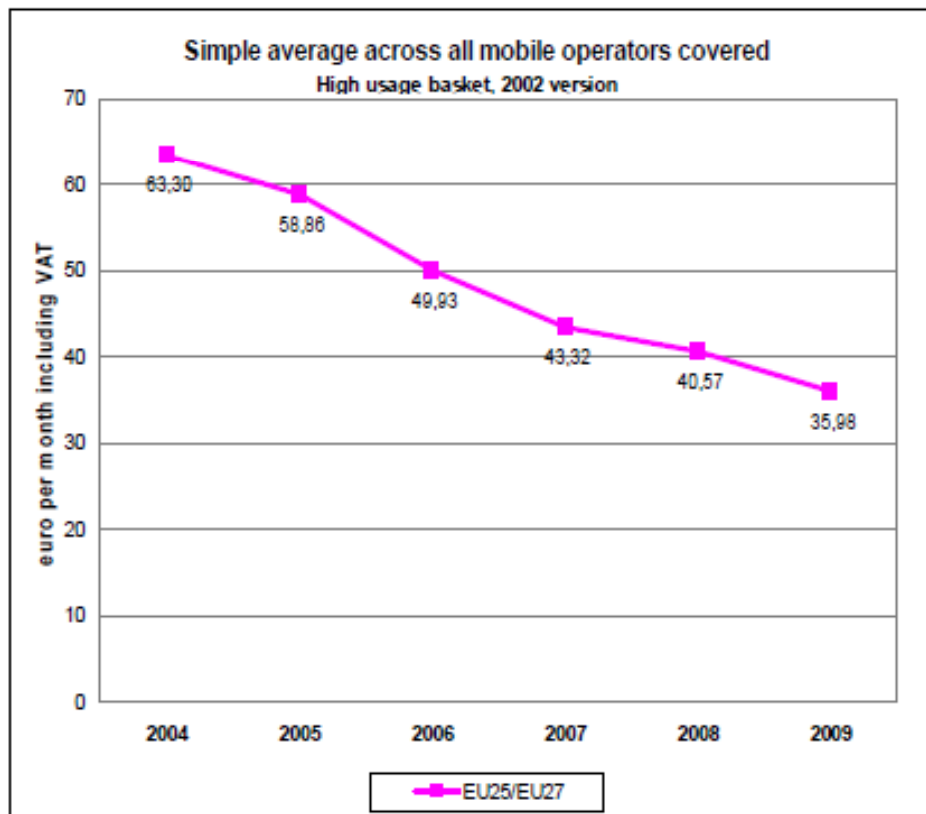
Retail Prices

Increased Spectrum Prices and Impact on Consumer Prices

- What do the Studies Show?
 - OECD Study on Telecom 2009 - telecom expenditures as a % of household disposable income is steady at 2% and in some cases declining. Getting more for less.
 - Several regulators monitor post auction consumer prices - ACMA and Ofcom have seen no impact.
 - Independent Study - based on analysis of retail prices in different regions with different underlying spectrum, license costs show prices are not different and there is no statistical correlation between spectrum auction prices and retail prices.

Spectrum Prices and Tariffs

- EU Telecoms Market Study - in a period of rising spectrum prices, retail prices have fallen.



Questions and Next Steps

Questions

- RURA is seeking your input.
- What additional factors should be considered?
- What changes to the factors should RURA consider?

Submitting Questions to RURA

- Please submit your questions, in written form, to RURA by October 28th, 2011.
- Questions for RURA can be sent in an attachment by email to:
 - SpectrumReview@rura.gov.rw

Next Steps

- Consultation on October 14, 2011
- Questions submitted to RURA by October 28, 2011
- RURA to respond to Q&A with written responses posted on the RURA website by November 4, 2011
- Validation of Spectrum Fee Proposals November 18, 2011
- Coming into Force

Thank You

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