

Spectrum pricing for upcoming awards in Botswana

Article by EICON | 21 May 2024

BOCRA, the telecom regulator in Botswana, recently issued an EoI invitation¹, for spectrum licenses in the 700, 2300, and 2600 MHz bands. The aim is to address connectivity demand, and QoS issues, whereby the three incumbent operators, namely: Mascom, Orange, and BTC mobile were invited to participate in the award process, as well as new entrants.

Spectrum in the 800/900/1800/2100/2300/2600/3500 MHz bands was allocated to operators over the years, for 2G, 3G, and 4G services, as depicted in Figure 1. It is also known² that BOCRA was seeking a new operator, back in October 2021, where a tender for a 15-year IMT licence was on offer, on the 450MHz, 800MHz, 2100MHz, 2600MHz, and 3500MHz bands.

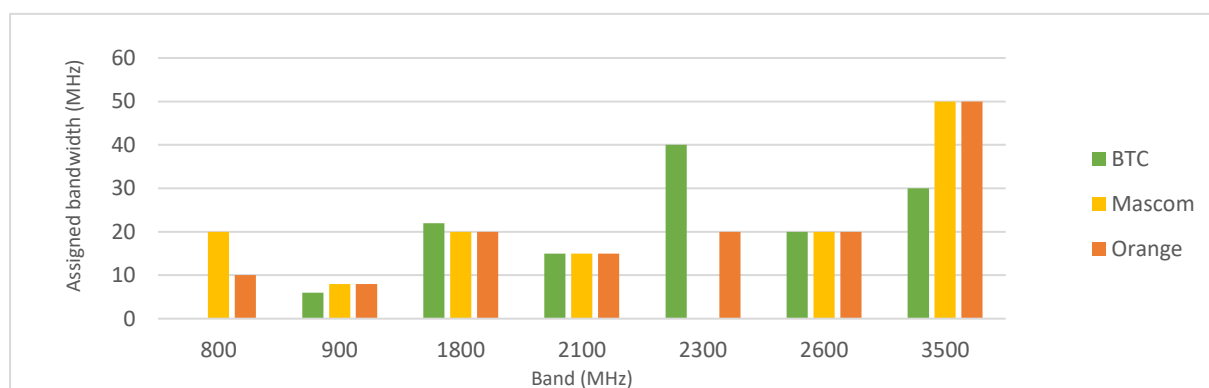


Figure 1: Assignments per operator

In line with its published roadmap, BOCRA is planning to release more spectrum, in the bands 700, 2300 and 2600MHz. These, together with their bandwidth, are presented in Table 1. Moreover, BOCRA is also planning to release 2600MHz in a number of regional (rural) areas, but details are yet to be announced.

Frequency Band (MHz)	Available bandwidth (MHz)	Assignment Package
700	30 FDD	3x10 MHz National coverage
2 300	40 TDD	2x20 MHz National coverage
2 600	30 TDD	30x1 MHz Regional coverage

Table 1: Spectrum on offer during the upcoming award process

Based on the outcome of the EoI invitation, BOCRA will decide, whether licenses are to be awarded through a competitive/bidding process, or through administrative assignment.

In this article, we present price benchmarks for the bands to be released, which could form the basis on which licenses are priced.

Methodology

Benchmarking is based on the use of license prices awarded internationally and, preferably, under similar country conditions. Our analysis makes use of **SPECTRE**³, Eicon's Spectrum Pricing software, which includes over 4000 awards, as well as friendly-user interfaces for adjustments, and easy-to-use calculation processes.

In order to obtain indicative market values, awards used in the analysis of prices for Botswana, are limited to those issued over the past ten years, or five years, as available, with the later providing better indicative market values. Differences in license duration, economic conditions, inflation, and PPP, are accounted for, and prices are adjusted accordingly.

¹ EoI for Radio Frequency Spectrum in the Frequency bands 700MHz, 2 300 MHz, 2 600 MHz

² https://www.bocra.org.bw/sites/default/files/ITA_IMT_Spectrum.pdf

³ SPECTRE: web based tool for spectrum pricing, with database of awards, and automated calculation processes www.spectre-me.com

Spectrum pricing is not an exact science, being dependent on many factors, including: auction dynamics, demand, regulator policy, year of issue, and economic conditions in the country at the time of issue, as well as other factors. As such, prices can vary, and some skewed high values (outliers) may appear. Similarly, some prices may be low due to non-competition, or in cases where the spectrum on offer exceeds demand. To that end, we use auto-filtering, a method developed by Eicon (included in the SPECTRE App), to identify and remove outliers from the analysis.

Valuation is then based on three methods: (1) arithmetic mean of unit prices in \$/MHz/pop; (2) arithmetic mean of prices in \$/MHz/pop/GDP, and (3) regression analysis. While method (1) is clear, method (2) removes the possible dependency of price on economic factors, by normalising all prices by the GDPc (GDP/capita) of the country. Method (3), on the other hand correlates spectrum prices to the GDP/capita of countries where licenses were awarded, hence seeks a best fit for the series of values. Both methods, (2) and (3), are usually preferred when benchmarks span over a wide range of GDPc values.

We also perform one-to-one comparison of prices of specific countries, and scale their values to Botswana's GDP/capita value, to get better indications of the market values of the bands. This method is called "scaling".

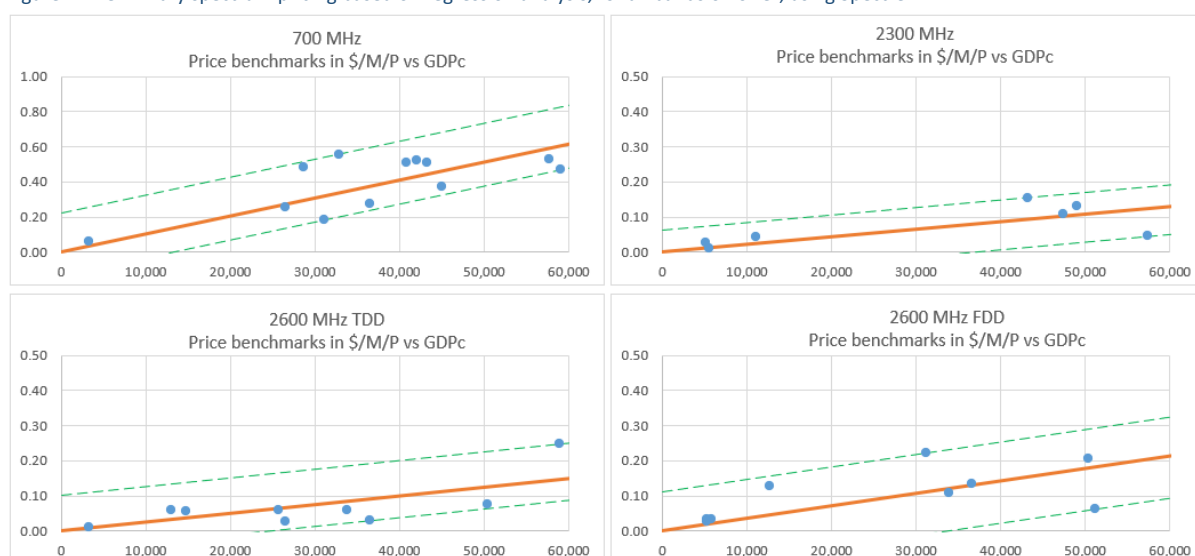
Pricing Results

Here, we present 'approximate' estimations of price ranges for each band, as in Table 2, which could form the basis on which licenses are priced. Regression analyses for the bands are shown in Figure 2.

Table 2: Summary of various analysis methods used, and price ranges for each band

Band	Available Awards	Regression, Mean \$/MHz/pop	Mean \$/MHz/pop/GDPc	Scaling comparisons	Other indicators	Price range, \$/MHz/pop
700	44 (10 years) 22 (5-years)	✓	✓	Tanzania (2022)	(800MHz) Kenya (2018) Namibia (2023) South Africa (2022)	0.202-0.361
2300	12 (10 years) 7 (5 years)	✓	✓	Tanzania (2022) Nigeria (2014) UK (2018) Saudi Arabia (2019)		0.043-0.146
2600 TDD	19 (10 years) 12 (5 years)	✓	✓	Tanzania (2022) South Africa (2022)	2600MHz FDD 36 awards, 10Y 18 awards, 5Y	0.048-0.077

Figure 2: Preliminary spectrum pricing based on regression analysis, for all bands on offer, using Spectre



A study that includes thorough assessment of analyses, scenarios, and recommendations, on the best indicative benchmark price for each band, can be provided upon request.

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