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RUSSIAN TOWER MARKET

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1. Introduction

Much like elsewhere in the world there is a new class of independent passive infrastructure companies emerging in Russia. Furthermore, for quite some time the tower companies and the leading mobile network operators (MNOs) have been talking about possible large scale deals whereby the former can acquire passive infrastructure from the latter. Vimpelcom pioneered with the idea back in 2012. At that time one of the three largest mobile service providers was believed to offer 7,000 towers for sale with the following lease-back. The towers were expected to be acquired by ESN, a powerful diversified financial and industrial group. The parties, however, failed to agree on the fair value of the asset in question. In late 2015 Vimpelcom resumed its attempts to identify a prospective investor for passive infrastructure assets and put them to a competitive tender. According to Bloomberg, Vimpelcom were to sell some 12,000 ground based towers (GBTs) for as much as US\$ 800 mln. and Russian Towers, being the most probable candidate among potential bidders. At the end of 2016 Russian Towers were indeed named as a successful bidder in a number of mass media publications. The deal was meant to be closed by the end of 2Q2017. However, in May the both parties expressed their doubt that the transaction could be completed. The deal-breaker was allegedly the fair value of the assets and more specifically – an unusually high weighted average cost of capital implied by abnormally high interest rates in Russia. All other efforts to spin-off and sell passive infrastructure by mobile operators in Russia were also in vain. For instance, Tele2 could not thus far attract any firm bid for their towers from independent infrastructure operators.

Why all potential deals fall through? Why Russia is not in the mainstream of infrastructure market evolution? Shall we at all expect any large scale tower deals in Russia? What is the outlook for GBT market in Russia?

This report is meant to address the above questions. It presents the estimates and extrapolations built by AC&M, based on various publicly available disclosures and proprietary data, accumulated by AC&M over the last several years. Among other things it features the results of the expert poll, conducted by AC&M in 2017 with the view to establish the average monthly rent charged to the tenants by GBT owners.

AC&M hope that the report may become an important step towards bringing more transparency into the GBT business in Russia, which has apparently lacked any reference info with respect to total GBT numbers, let alone unbiased estimates of the addressable market for passive infrastructure operators.

2. Executive Summary

- Russia is the sixth largest market worldwide by the number of standalone ground based towers (GBTs) deployed for mobile communications networks. As of 1 July 2017 there were around 68 thousand GBTs built in Russia. GBT combined portfolio expands by 4% y-o-y. While MNOs increase their portfolio of GBTs by merely 1%, independent infrastructure operators add 13% to their existing array of towers.
- Average monthly rent for a typical tower is estimated to have reached RUR 24,000¹ per month in Russia. However, the rate demonstrates considerable variation: from RUR 42,000 in Moscow license area to less than RUR 20,000 in Ekaterinburg, Novosibirsk, Chelyabinsk and Samara.
- Most of independent infrastructure operators have presence limited to specific local markets: Vertical operates in Moscow and partially – Moscow oblast, Service Telecom – exclusively in Moscow oblast, Link Development in the North-West, Sotka-Vysotok – in Tatarstan. The only independent tower company of a truly federal caliber is Russian Towers, who have their portfolio in 54 administrative units of Russian federation
- Unlike on other geographic markets, where MNOs already sold tens of thousands GBTs to specialized infrastructure companies with a lease-back arrangement, there has been no large scale deals of the kind in Russia. Chances are, Russian market will never see a massive tower purchase from MNOs, and instead independent infrastructure operators will gradually increase their share of the market through organic growth.
- Consolidation is inevitable among passive infrastructure companies, whereby the largest independent tower owners should acquire smaller companies with hundreds or even tens of GBTs. In order to be competitive, GBT owners must achieve very high cost efficiency, which is only feasible if the entire portfolio of GBTs is consolidated in the hands of one or two largest players.
- Next generation wireless technologies may require significant “densification” of networks. A considerable amount of roof-top sites and existing towers (designed for 2G and 3G) will turn virtually useless for 5G deployment in EHF bandwidth. Even if 5G deployed in 3.5 GHz band, the transmitters are likely to migrate

¹ US\$ 417 as of 6 September 2017

from roof-tops to 11 and 29 meter poles and onto street furniture, as well as in-door and underground.

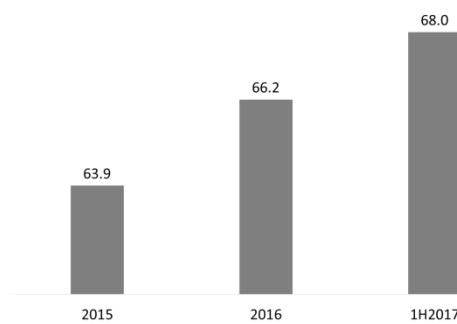
- Changing network set-up will reshuffle entire market landscape: the demand for 11m polls in downtown metropolitan areas will soar, while many toll GBTs in scarcely populated remote areas will become virtually useless for potential tenants. In other words a poll in downtown Moscow, where 5G and 4G traffic is very intense, should turn out to be a far more valuable asset compared to expensive 50m toll tower in a remote rural area.
- No matter how preposterous it may sound, but visibly massive legacy GBT portfolio, owned by MNOs, may come on par in terms of perceived value with considerably smaller arrays of metropolitan GBT installations built over time by independent infrastructure operators.

3. Russian Tower Market

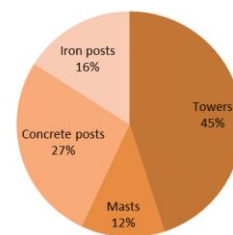
Size and Incremental Growth

Russia is the sixth largest GBT (Ground Based Tower) market worldwide. As of 1 July 2017 the combined number of GBTs in operation totaled 68 thousand. Notwithstanding the fact that MNOs have almost completed 2G/3G footprint and reportedly have 80% population under 4G coverage, the number of GBTs commissioned by all market participants keeps increasing steadily at about 4% y-o-y.

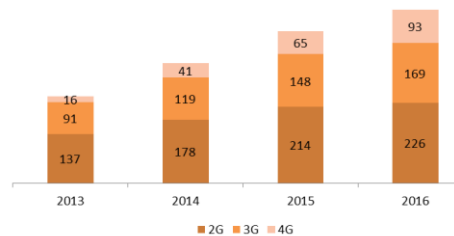
Number of towers (thsd.)



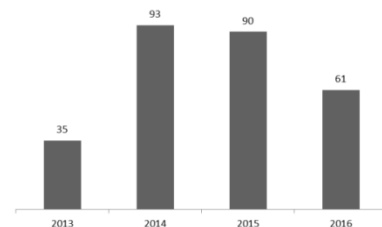
Tower market decomposition



Number of base stations in Russia (thsd.)



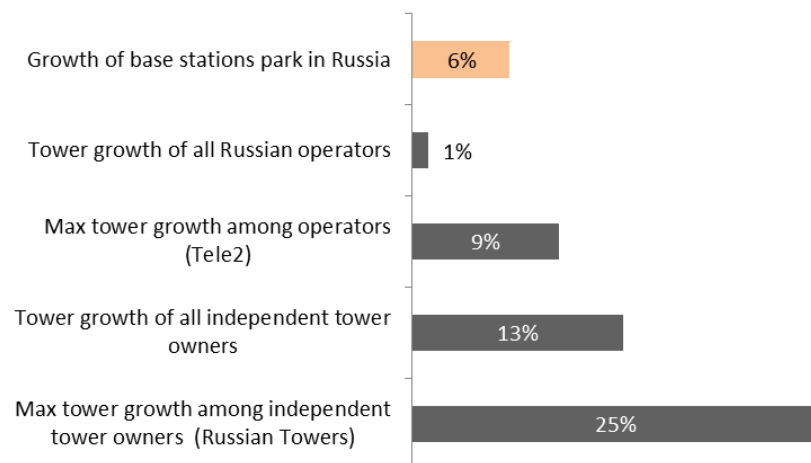
Base stations growth (thsd.)



Source: company data, Roskomnadzor, AC&M

Incremental growth demonstrated by independent infrastructure companies was particularly impressive. In 1H2017 they commissioned at least 800 GBTs and as of 1 July 2017 had about 8,200 different GBTs on offer to potential tenants. AC&M estimates that in 2017 their combined portfolio of GBTs should expand at 16-17% to reach 10,000.

Annual growth of towers and base stations in 2017/2016



Source: AC&M

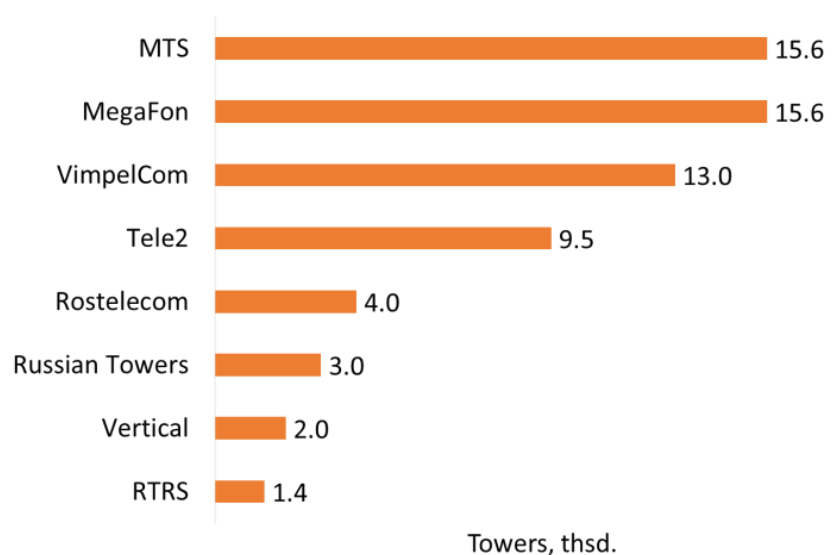
There is one important trend that manifests itself in 2016-2017: Although the number of new base stations (all standards 2G, 3G, 4G) deployed by MNOs declines from about 90,000 in 2014 and 2015 to 60,000 in 2016 and further to merely 35,000-40,000 in 2017, annual passive infrastructure increment unfailingly exceeds 3,000 new GBTs per annum. It must be mentioned, however, that the lion's share of incremental GBTs should be attributed to the category of concrete and iron polls (11m and 29m), while proper towers and ground based masts account for a miniscule share of new installations.

Such a break-down of new commissions reflects the general shift in demand from potential tenants. While MNOs were busy building initial footprint in GSM and UMTS, toll towers for macro-sites could ensure high enough average tenancy ratio. At the moment the focus of MNOs is on supplying adequate network capacity in densely populated urban areas, where mobile data traffic surge results in a deficit of legible 4G sites. It is not accidental that 72% of all newly commissioned GBTs built by independent infrastructure companies over the last 5 years (a total of 5,900 installations) are located in Moscow license area. It must be mentioned that most of tower companies limit their activities to a specific geographic area: Vertical has majority GBTs in Moscow and Moscow oblast; Service Telecom – is exclusively in Moscow oblast, while Link Development has its installed base in the North-West; Sotka Vysotok is based in Tatarstan. The only infrastructure operator with pan-Russian span is Russian Towers, who operate GBTs in 54 regions.

Market Structure

Mobile network operators still own and operate the largest portfolio of GBTs. Apart from the Big Four operators², who collectively own about 54 thousand polls, masts and towers, there is considerable amount of GBTs owned by Rostelecom and Russian Broadcast Corporation (RTRS). It must be mentioned, however, that only a part of their portfolio is suitable for RAN (radio access network) deployment, as both Rostelecom and RTRS operate many sites specifically designed for broadcast or microwave backbone hops. A significant share of the GBTs in operation belong to independent infrastructure companies, who develop passive infrastructure with a view to lease it out to MNOs and other interested parties (LP WAN networks, fixed-wireless networks, government agencies, etc.). The two largest market players among the tower companies are Russian Towers Group and Vertical

Largest tower owners in Russia, 1H2017



Source: company data, AC&M

Apart from the leaders there are almost two dozen smaller infrastructure operators within the group of independent tower companies, each operating a few hundred or even a few dozen GBTs. One of such small operators sports a very conspicuous name: “Hundred of Towers” (Sotka vysotok).

² MTS, Vimpelcom, MegaFon, Tele2

Less well-known independent passive infrastructure owners (towercos) in Russia

Company	Estimated tower count (Jun-17)
Service-Telecom	463
Link Development	350
Agropromsoyuz	250
Sotka vysotok	100
Grand	65
MIR IT	60

Source: company data, AC&M estimates

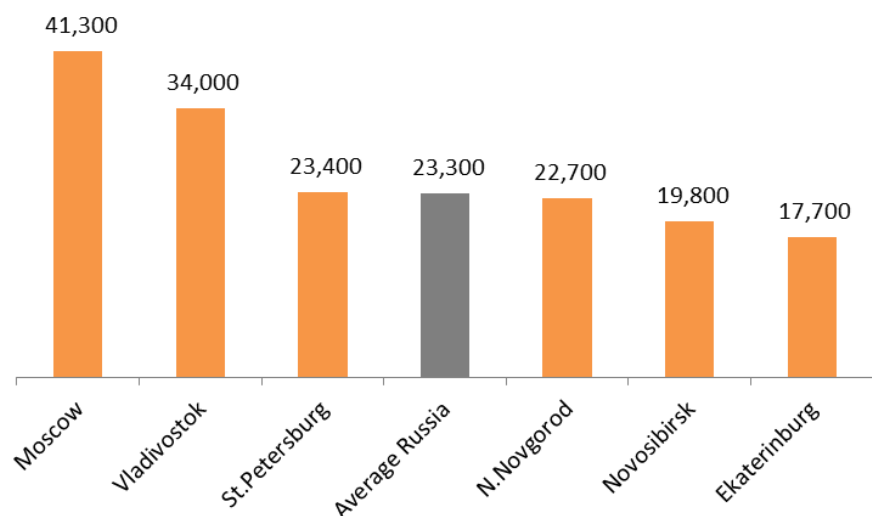
Rates and Revenues

Russian passive infrastructure market is far from being transparent – the owners of GBTs rarely disclose the actual size of their respective portfolios, to say nothing of the breakdown into polls, masts and towers of different height. Once MegaFon and Vimpelcom span-off their GBTs into separate wholly owned subsidiaries: “First Tower Company” and “National Tower Company” respectively, market observers at least can get some sort of first hand disclosure from time to time. As far as the rates and revenues are concerned, none of the market participants ever disclosed any data in the public domain.

AC&M attempted to establish at least the basic market metrics through an expert poll of 18 industry insiders. Below are the principal findings and estimates.

Russian passive infrastructure market is far from being transparent. The owners of GBTs rarely disclose the actual size of their portfolios, leasing rates and respective revenues

Average tower lease rates in different regions of Russia (RUR/month)



Source: AC&M estimates

Average rent paid by a mobile network to GBT operator in Russia is estimated to be within the ballpark of RUR 24,000 per month in 2016. There is a significant variation in average rates from region to region: in Moscow license area it is estimated to reach RUR 42,000, while in Yekaterinburg, Novosibirsk, Chelyabinsk and Samara it does not exceed RUR 20,000 per month.

Therefore, assuming tenancy ratio at 1.8, annual revenue by Russian Towers should be estimated at about RUR 1.4 bln. Second largest independent operator – Vertical – who have a slightly lower tenancy ratio are estimated to generate between RUR 800 mln and 900 mln in 2016.

Overall, if one does not take into account nominal rates charged between themselves by MNOs for cross lease of GBT sites as well as outright barter deals, the total GBT business was estimated to generate RUR 3.5-4.0 bln worth of lease payments in 2016.

In the meantime, it is hardly feasible to build scientific estimates of the revenues generated by the likes of First Tower Company and National Tower Company. One of the reasons why is that they oftentimes use nominal rates and quasi-barter arrangements to accommodate radio infrastructure by fellow MNOs. That does not allow accurate estimates of the total market capacity and extrapolations. It is also must be stressed that the very definition of “ground based tower” and “tenant” may be interpreted in very different way by various market participants. Some of the infrastructure companies recognize as operational only those GBTs that do generate revenue from tenants within any given period of time. Other refer to physical infrastructure units in existence regardless of the tenancy and current revenue flow. It also must be taken into consideration that tower companies accommodate different types of tenants: some generating relative lease revenue well below the average rate (local fixed wireless networks, government agencies, broadcasters).

In any event, if 70% of all deployed GBTs in Russia had been owned by independent tower companies (as it is the case on the most advanced markets) the total annual revenue in the segment should have been between RUR 19 and 20 bln, assuming the blended tenancy ratio of 1.2 and the average rate of RUR 24,000 per month.

4. Outlook

Thus far neither Vimpelcom, nor Tele2 managed to reach agreement with potential suitors for their tower assets (although both expended considerable effort since 2015 to try and divest from passive infrastructure). AC&M believes that Russian market does not necessarily have to produce any large scale transactions of the kind. Instead, the evolution of the Russian tower market might take an alternative path. The trouble is that potential investors are likely to become less enthusiastic about prospective buy-out, regardless of the decrease in interest rates. The chances to achieve tenancy ratio in the whereabouts of 2.0 on existing GBTs become slimmer every quarter as Tele2 moves towards completing 2G and 3G footprint and already operates ~10,000 own GBTs. Not surprisingly, in the eye of the potential investors, the existing GBTs on sale cannot generate good enough revenue flow to justify high average ask price per tower. Alternative scenario for passive infrastructure industry may include consolidation around market leaders and organic growth with a view to capitalize on future bumper demand in largest metropolitan areas. Indeed, if, for instance, Russian Towers acquire Vertical, the joint operation will instantly become an important player, while combined portfolio should be large enough to achieve high cost efficiency.

There is a new initiative worth mentioning in the context: Russian Towers are happy to take third party GBTs under management and lease them out to MNOs. In a sense, Russian Towers become a sales representative of the GBT owner and take the dirty work. Reportedly MTS is among other potential clients for that type of service. Should MNOs outsource GBT related business to infrastructure operator without selling the portfolio per se, it should also contribute to market consolidation with very little capital expenditure on the side of tower companies and very little risk on the side of GBT title owner.

Provided there are no macroeconomic disasters over the next 4-5 years, current trends in the tower market are likely to hold. Mobile operators and independent infrastructure companies will commission from 2,500 to 4,000 GBTs per annum. Nevertheless, after 2020 we can witness radical surge in both demand and supply of GBTs. Existing GBT portfolio was meant to carry 2G, 3G and to an extent 4G radio access equipment. Introduction of 5G is likely to require a far denser network. In this new market environment the anticipated lease payments from 2-3 thousand street polls in Moscow may very well match or exceed the revenue to be collected by the owners of mixed GBT portfolio in a remote and scarcely populated area. Consequently, the perceived fair value of different GBT portfolios might change. Relative value of GBTs should be based on expected compound lease payments rather than cost of construction (replacement). Although it may sound unthinkable at the moment, but existing GBT portfolios owned by MNOs may come on par in value terms with smaller arrays of GBTs built by independent tower companies as a part of generic expansion.