Advanced Communications & Media
11/2a Armyansky pereulok
Moscow 101000, Russia
Tel/fax: +7 495 623-5480

RUSSIAN TOWER MARKET

2017-2018

November 2018

Contents

1. Introduction

Last year AC&M undertook the first attempt to compile all available information (public and non-public) on the Russian passive infrastructure market. The research resulted in the report, published by AC&M at the end of 3Q2017 whereby we offered independent estimates of the total GBT[1] portfolio in Russia. The report featured estimated total number of ground-based towers (polls, masts and classic cellular towers) as of the end 2016 and end of 2Q2017. Besides, the report by AC&M explored historic portfolio expansion trends in Russia and provided forecast based on extrapolation.

One year from the publication of the report, AC&M returns to the subject with a view to get a new slice of the market and either revisit the longer term forecast or endorse it, based on the most recent market intelligence. Apart from the pragmatic task to build up-to-date inventory of Russian passive infrastructure market in 2018, the new edition of AC&M report is meant to highlight the most recent trends observed within the tower business in Russia and on comparable geographic markets.

Finally, there was yet another purpose for the current update – to look into the possible implications for the passive infrastructure market from the 5G roll-out to take place in Russia sometime after 2020.

AC&M had to analyze and reconcile data from multiple sources including but not limited to:

- Annual reports, quarterly presentations and other disclosures by Russian mobile network operators;
- Information released by regulatory bodies on incremental cellular base-stations of different standards (2G, 3G, 4G).;
- Presentations and announcements by industry executives at various professional symposia and conferences. Press releases and disclosures by infrastructure companies(Russian Towers, Service-Telecom, Vertical, RTRS);
- Interview with industry insiders;
- Key metrics and ratios from global markets as well as estimates by independent market observers such as Ovum or Tower Exchange.

In order to establish the average and median pricing points, AC&M conducted expert poll among 14 industry insiders in charge of passive infrastructure built-up or site acquisition. Among other questions

[1] GBT – ground based towers

addressed, the respondents were asked to share their subjective perception of the current pricing trend, namely – if the average monthly rent changed since 1st July 2017 and if so, to what extent. Obviously, the feed-back does not offer enough data to prove statistically significant trend in average or median pricing. Still it offers a valuable cognitive picture of the pricing variation and overall trend over the last 12 months.

Another attempt to accurately evaluate total demand for GBT from all potential tenants once again brings about the issue of comparability. The industry, in AC&M opinion, requires a coherent set of covenants and market metrics for all participants (defining revenue recognition in this dynamically changing market sector). The need for harmonization is even more urgent as the population of potential tenants expands in 2018 far beyond several cellular networks and already includes many government and municipal corporations, let alone a variety of commercial enterprise customers.

2. Executive summary

- Russia remains the sixth largest passive infrastructure market in the world (measured by the number of ground based towers). **There were over 73 thousand ground based cellular towers (GBTs) in Russia as of 1st July 2018**. Total GBT portfolio in Russia expands by 3-5% per annum. Independent infrastructure companies increase their GBT portfolios at double-digit rate.

- **Notwithstanding the decline in the combined number of new base stations installed by Russian mobile operators, the number of incremental GBTs in 2018 remains on the level with 2017**. Infrastructure market may find a second breath when 5G roll-out begins some time in 2020-2021, upgrade in technology that will require a significantly denser network of sites in metropolitain areas. Besides, 5G implementation is likely to trigger a massive replacement of roof-top installations with alternative sites.

- **Two companies stand out among independent infrastructure operators Russian Towers and Vertical. Together with the third largest tower company – Service-Telecom they account for 85% of Russian GBT portfolio** outside direct or indirect ownership by four nation-wide mobile operators. As operators chose to install base stations on rented GBTs instead of building passive infrastructure themselves, the share of independent tower companies tends to increase gradually. Already in 2017 and 2018 independent tower companies commissioned as many new GBTs as mobile operators put together.

- Thus far only one of the three largest independent infrastructure operators, Russian Towers, has built tangible presence outside Moscow and St.Petersburg license areas. Regional expansion is likely to become the main theme for tower companies within the next 2-3 years. This process is likely to set in motion M&A activities as one or two leading tower operators consolidate smaller GBT portfolios.

- Although average monthly rent does not increase materially in 2017-2018, save only for 5-6% adjustment to CPI, **the revenue collected by independent tower companies increased at a higher rate than the physical expansion of their respective portfolios.** It was achieved thanks to improved tenancy ratio. Apart from cellular operators, there is a wide range of enterprise and municipal users, who can potentially become the tenants on the GBTs in operation. Diversification of tenant target group requires a new approach to market metrics from industry insiders and outside analysts (particularly taking into account that the rent paid by non-cellular tenants may differ from the average monthly rate by factor of 10.

- **The plans by the Big Four to divest from their passive infrastructure operations failed to materialize so far.** Practice does prove AC&M prediction that Russian market may take a slightly different evolution path from USA, Europe or South-East Asia. Market leader may emerge not as a result of a massive GBT buy-out transaction with one or two MNOs, but through a longer term competition between independent rival companies, who shall make it is sure that renting becomes a better option for MNOs, rather than a green-field GBT construction.

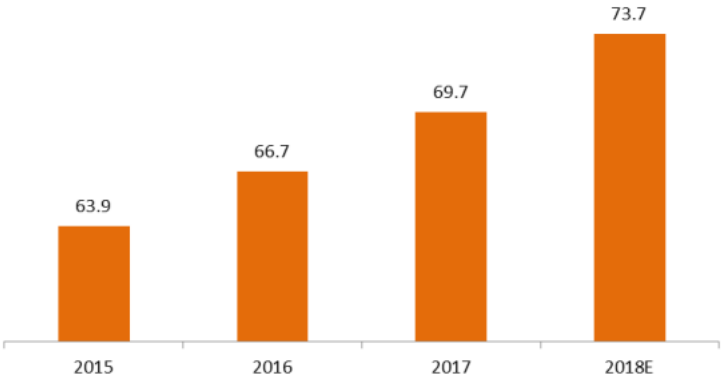
3. Market size and dynamics

Russia remains the sixth largest passive infrastructure market in the world (measured by the number of GBTs in operation). Only China, India, Japan, USA and Indonesia can boast larger total portfolios of ground based installations, designed to house cellular sites. It is expected that Russia will proudly hold its place in TOP 6 within the next 2-3 years. However in the longer run, Russian may find itself further down the list and lagging behind large European countries where 5G roll-out begins at some time after 2020 (for instance, Germany or Great Britain), or even dynamically expanding South American (Brazil) and Asian (Vietnam) markets.

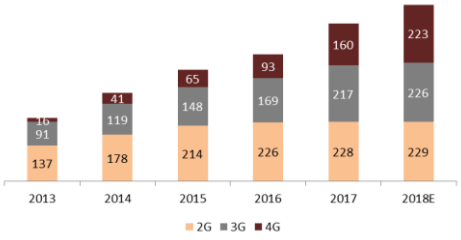
As of the end 2017 there were over 70 thousand GBTs in Russia including proper (aka classic) towers, masts and poles of different kinds. Towards the end of 2018 combined Russian GBT portfolio is likely to exceed 74 thousand units. Therefore Russian GBT domain keeps expanding at 3-5% per annum, despite the fact that the majority of MNOs completed the initial 4G roll-out (to say nothing of 2G and 3G).

There are over 73 thousand ground based cellular towers (GBTs) in Russia. Total GBT portfolio expands steadily at 5% per annum. Only five geographic markets China, USA, India, Japan and Indonesia have more GBTs than Russia

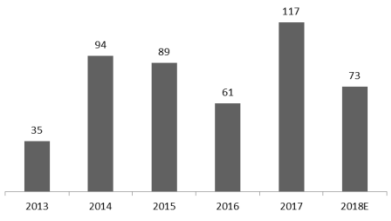
Number of ground based towers (GBTs), 000s



Number of BSs, 000s



Incemental BSs, 000s
on new and existing sites



Source: company data, Roskomnadzor, AC&M estimates

Notwithstanding seemingly stable and gradual positive pace of the Russian GBT market, we must identify several trends (not apparent ones) that manifested themselves in 2018 for the first time and might potentially re-shape the entire sector within 3-5 years.

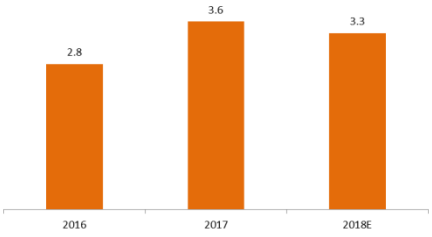
Expansion rates on GBT market

In 2018 the absolute incremental number of GBTs in operation remains virtually unchanged compared to 2017. Although 4G coverage has been largely completed by at least 3 out of 4 nation-wide MNOs, mobile operators must increase network density in order to accommodate incremental traffic as well as to improve coverage at the edges of the footprint. Many market participants complained about the extraordinary factors they had to deal with in 2018: (i) in 11 regions all construction activity was effectively adjourned in summer due to FIFA 2018 and unprecedented migrations of domestic and international fans; (ii) the very end of the short construction period was also disrupted for good 2-3 weeks because of the local election campaigns in Russia. Even these extraordinary factors did not turn around the positive trend – the demand for incremental ground based sites has been increasing not just because of the footprint expansion, but largely due to exponential traffic surge in densely populated metropolitan areas of largest cities across Russia.

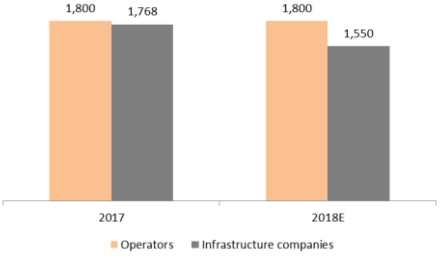
Increment in GBT portfolio in 2017 and 2018 has been delivered to a very large extent by independent passive infrastructure operators - Russian Towers, Vertical, Service-Telecom. From 3.4 thousand new GBTs commissioned in 2018 only about 1.8 thousand (approximately 50%) should be credited to mobile network operators. Taking this into consideration, **it does not seem surprising at all that the leader among independent tower companies – Russian Towers – demonstrate 20% increase in GBT portfolio y-o-y, while total number of GBTs in Russia grew only 3-5% per annum in 2017 and 2018.**

Independent passive infrastructure operators account for almost half of all newly commissioned GBTs in Russia in 2017 and 2018

Incremental GBTs 000s

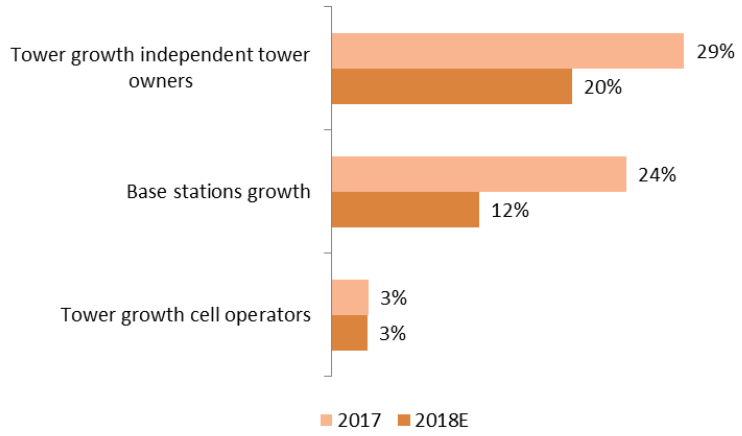


Who commissioned incremental GBTs in 2017-2018



Source: AC&M estimates

Growth rates 2017-2018



Source: Roskomnadzor, AC&M estimates

Independent tower companies demonstrate double digit growth rates

It is important to mention that **only a few market leaders among independent tower companies can realistically sustain high growth rates**. Small and medium sized infrastructure operators (most of them typically dwell on exclusive relations with local construction authorities in a particular region) can hardly maintain impressive growth rates after they exhaust the immediate potential on the home turf and reach the level of 100-300 GBTs under operation.

Tenants

Apart from the size of GBT portfolio, one of the key metrics of the passive infrastructure market are: the average tenancy ratio; and the absolute number of tenancy contracts. In 2018 average tenancy ratio increased visibly (it is particularly the case with independent infrastructure operators, where average tenancy ratio already is within 1.6-2.0 range.[2]).

Tenancy ratio in Russia tends to increase gradually with the aging of the GBT portfolio. Instead of building green-field sites mobile network operators now first explore the feasibility of housing their radio access nodes at existing sites and GBTs (own or offered for rent by other parties). Total portfolio of GBTs available for rent in Russia has been developed to the scale whereby cellular operators of all kinds are far

[2] This are the so called blended tenancy ratios, calculated based on the entire portfolio of GBTs, owned by a particular operator. Certain portfolio segment have much higher tenancy ratio – up to 2.9 (for instance in the North West part of Russia, including St. Petersburg)

more likely to identify an appropriate existing site for installation of a new base station, than embark on a green-field project. It is very symptomatic that the operator, who commissioned more base stations in 2018 than any of its competitors (Vimpelcom[3]) barely built any of its own new GBTs. It is not exactly the case with MTS, MegaFon or Tele2, but the share of base stations deployed on existing sites increased significantly compared to 2016 and 2017.

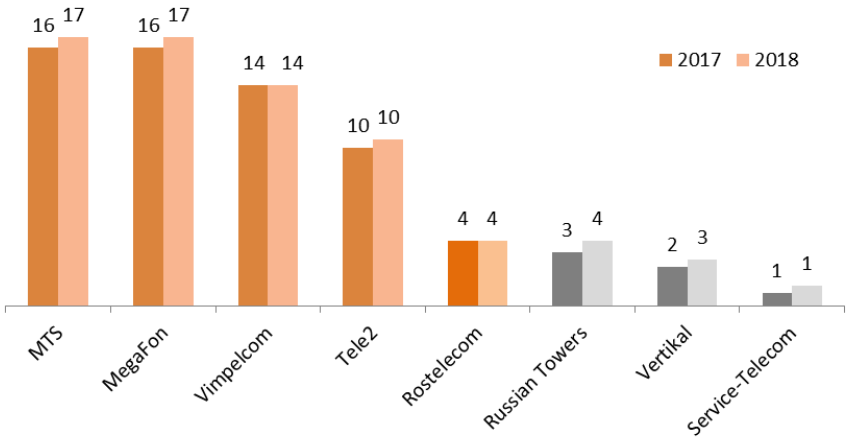
Strictly speaking, the tenancy ratio increases also thanks to non-telecom tenants, or rather non-3GPP tenants. It happens as digital transformation comes to various industries, transportation, public health, utilities and in general – urban environment. Existing GBTs are widely used to deploy emergency information systems and environment monitoring devices, traffic and public security cameras. Obviously, mobile networks remain by far the most important tenants (from the average monthly rent standpoint). Still, other clients generate certain additional revenue flow for passive infrastructure companies. This makes market observers review many fundamental covenants and definitions (including the category of "tenant" itself, which previously was almost exclusively used in the context of cellular networks). In a competitive environment where every tenth or even a few hundredth in tenancy ratio make a lot of difference. On the market where average monthly rate is in the range RUR 25,000-40,000 (US$ 375 - 600) a few thousand non-cellular devices housed at at a monthly rate of RUR 1,000-2,000 can help a tower company improve its top line revenue by 5-10%.

[3] According to Roskomnadzor data for 9M2018, Vimpelcom increased the number of base stations by 18% or 21,000; runner up is Tele2 (14,000 new deployed base stations representing 11% growth).

4. Market structure

Mobile network operators and "tower companies" span-off the core mobile business own the largest portfolios of GBTs in Russia. Nevertheless independent infrastructure companies already built a critical mass of sites - at least 10,000 GBTs. Three largest independent operators are Russian Towers, Vertical and Service Telecom

Largest GBT portfolios in 2017-2018, 000s



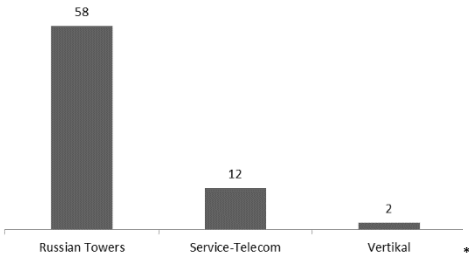
Source: company data, AC&M estimates

Apart from market leaders, there are two dozen small companies in the sector, each having less than 300 GBTs in operation (as a rule these small companies operate within a single region or 2-3 neighboring administrative units of Russian Federation).

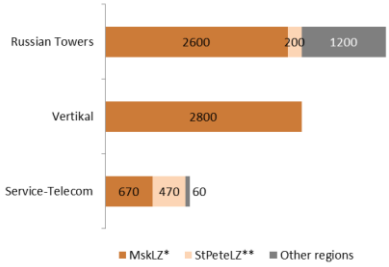
- RTRS
- Tattelecom
- Motiv
- Agropromsoyuz
- Bashinformsvyaz
- Sputnik-telecom
- VO RTK
- Sotka Vysotok
- Grand
- MIR IT
- Promtex

Russian Towers is the only infrastructure company who has a rather diversified geographic span – essentially pan-Russian coverage. The remaining two companies in the trio of independent leaders also have been experimenting with regional expansion, but currently have presence in only few regions outside their core markets.

Number of regions where independent tower companies have presence[4]



"Capital city" vs. "regional" GBT assets owned by independent tower companies



* Moscow license zone (Moscow city + region)

** St.Petersburg license zone (St.Pete + Leningrad region)

Source: company data, AC&M estimates

Since the last review of the Russian tower market, we have witnessed first signs of consolidation process within the sector: Service-Telecom merged with Link, while Russian Towers acquired several smaller market players (for example, ZAO Sector). Consolidation of assets in the passive infrastructure business is likely to continue and market leaders among independent tower companies are expected to actively explore opportunities for non-organic growth. There are a number of factors facilitating M&A activity in the sector:

- Smaller tower companies can hardly achieve the level of efficiency and professional expertise demonstrated by the larger independent infrastructure companies. A consolidated portfolio of GBTs will have a higher chance to secure additional tenants (second and possibly even third), increase tenancy ratio and guarantee reasonable margins, compared to isolated regional portfolios.;
- Independent tower companies are very keen to expand geographically and thus increase the scale of their operations. In order to establish presence in new regions, infrastructure companies do not only have to be efficient and professional – they also need local expertise (particularly in respect with regulatory approvals and initial site acquisition).
- Since it does not seem to be feasible at the moment to acquire GBT portfolios by the MNOs, mergers and acquisitions of

[4] Moscow and St. Petersburg license areas are accounted for as two license areas rather than four regions (as it is the case in official administrative decomposition of Russian Federation).

independent infrastructure companies appears to be the only option for non-organic growth for the likes of Russian Towers or Service Telecom.

Transactions with small and medium-sized passive infrastructure portfolios in Russia are rarely transparent and offer sufficient information in terms of valuation multiples. Nevertheless, one can assume that the majority of the small and fragmented portfolios can be acquired on valuations of around 50 average monthly rent rates (pending on individual parameters of portfolio in question as well as geographic position). In case whereby the sites to be acquired can theoretically carry one or two additional tenants, the transaction will be accretive for any of the largest independent tower companies. It is even more so in the regions, where site acquisition or regulatory approval process for green-field rollout requires extra effort. Theoretically, mobile network operators and their own tower companies could also consolidate small regional portfolios. However, it would have been against their overall strategy to buy and keep non-core assets when they all are striving for capital resources.

There is an ongoing consolidation of small and medium-sized passive infrastructure portfolios in Russia.

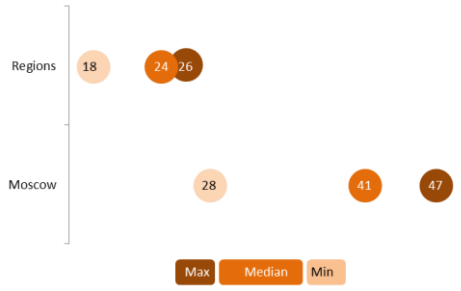
One can assume that majority of small and fragmented portfolios can be acquired on valuations of around 50 average monthly rent rates.

As far as divestment from passive infrastructure is concerned, much as predicted by AC&M a year ago, there has been not a single deal whereby MNO could sell GBT portfolio to an independent tower company. We must conclude that Russian market is now firmly on the evolution curve which is very different from US or certain South-East Asian markets. This does not rule out a possibility for MNO in Russia to get rid of non-core assets some time further down the line. However, under current market conditions such transactions seem highly unlikely.

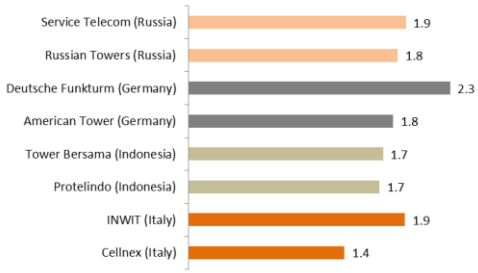
5. Revenue

While there is certain objective info on the total number of GBTs operated by the key market players[5], one can hardly obtain any public info on the effective pricing for tenants and consequently – actual rent proceeds. The only instrument for an outside observer to probe into the pricing situation remains an expert poll among industry insiders, whereby median monthly rent and general trends in pricing could be established with certain accuracy. Expert poll conducted in 2018 (involving 14 industry insiders) suggests that very little if any change took place in average monthly rent since 2017. Much as in 2017, monthly rent in Moscow license area was estimated to be in the range from RUR 28,000 to RUR 47,000, while in the regions - from RUR 18,000 to RUR 26,000. In fact rent rates remain virtually unchanged (save only for a 5-6% adjustment built-into most of the long-term rent contracts between MNOs and tower companies to offset inflation). **Although effective rent rate remains unchanged, independent tower companies apparently manage to increase their revenue at a rate exceeding the pace of physical GBT portfolio expansion**. That has been achieved awing to increasing tenancy ration.

Average monthly rate for GBT sites 2018 (RUR 000s)



Tenancy ratio (selected markets and operators) 2018



Source: company data, TowerExchange, AC&M estimates

One can estimate that the increase in tenancy ratio be merely 0.1% for existing portfolio of GBTs (in the hands of independent tower companies) produces effect on the revenue comparable with their current annual portfolio expansion (assuming that newly commissioned GBTs

[5] AC&M used one-off disclosures by MNOs and their affiliated tower companies as well as the figures kindly disclosed by some independent market players. In addition to that AC&M used publicly available data on the sites and GBTs offered by infrastructure companies (such as, for example, Service Telecom)

cannot realistically exceed 1.2 tenancy ratio within the first 12 months from the launch).

There are several drivers behind gradual improvement of the tenancy ratio by independent tower companies:

- **"Aging" of existing portfolio and critical mass build-up.** Let us take as a case study a new GBT just built by a tower company, who already have one particular potential tenant in mind and hope to bring another one or two. Even if the tower company immediately starts marketing new site and conveys the message to all potential tenants right after GBT is properly registered, the MNOs who may find the new site suitable can realistically put it into roll-out plan for next year only. Therefore, other conditions being equal, a "younger" GBT portfolio is likely to have lower tenancy ratio. The absolute size of available portfolio also makes a lot of difference: the probability that large "federal" mobile operator can find 100 suitable positions in a portfolio of 5000 GBT sites is considerably higher than the probability to find 10 attractive sites in a portfolio of 500 GBTs.
- **Fewer built-to-suit projects.** At the dawn of independent infrastructure business future leaders were very keen to take any available project (including built-to-suit). Now the tower companies are far choosier and make a thorough feasibility for each new site with a focus on potential additional tenants. For instance, independent tower companies demonstrate selective approach to potential "classic" sites for Tele2 (i.e. additional towers 40 plus meters toll). Tele2 oftentimes has to seek additional sites on the geographic spots where Big Three mobile operators already have their own GBTs. Big Three are still reluctant to lease sites to Tele2 in places where the fourth operator can visibly improve the footprint. Independent GBT providers do no longer jump on the opportunity either – with Big Three base stations already installed in the immediate vicinity; chances to get a second tenant for a "classic" tower are very slim. As a result, in 2018 Tele2 had to build unusually large number of tall classic towers on their own.
- **New types of tenants** thus far do not generate tangible incremental revenue for tower companies, but having stated this, any 0.05 addition to existing tenancy ratio may visibly improve return on investment. Even a very modest contribution from non-cellular tenants produces the same effect as marginal increase in tenancy ratio. We have to acknowledge that neither independent tower companies, nor mobile network operators have really untapped this incremental growth potential.

It must be mentioned that even the best performers among the independent tower companies can further improve tenancy ratio (taking into account the best practice cases on both advanced and emerging

markets). In Russia the best blended tenancy ratio in 2018 was in the range of 1.8-1.9. If independent infrastructure companies should keep expanding their portfolios by 15-20% per annum and simultaneously improve tenancy metrics for the existing "aged" portfolio, resulting revenue growth will be maintained at 25-30% per annum at least in the short and medium term.

At the moment, it is next to impossible to scientifically estimate the total market capacity in monetary terms, because MNOs have been renting sites from each other through barter deals or charge each other token price. **The combined revenue by the independent tower operators in 2018 is estimated to exceed RUR 4.1 bln. (about US$ 62 mln).**

6. Outlook

Overall, the results of the current research endorse the medium term forecast released 12 months ago – Russian GBT portfolio should keep expanding by 2,000-3,000 units per annum. The main driver for incremental growth in GBT portfolio will be the "densification" of mobile networks in the largest metropolitan areas where average distance between the 4G base stations should reduce gradually and the existing inventory of sites should become insufficient to ensure quality coverage. It must be mentioned, however, that in 2019-2020 Moscow license area might turn out to be relatively saturated, making regional markets the centers of GBT construction activity. A kind of a low period in Moscow license are, nevertheless, should not take long – 5G roll-out will require both additional GBTs to increase the density of the network and more sites to migrate roof-top installations closer to the pedestrian and automobile high-street traffic. Almost half of existing rooftop sites is likely to become irrelevant, particularly if 5G were to take 24-26 GHz spectrum. Even the most conservative estimates of the additional site requirements for 5G deployment compared to 3G and 4G assume manifold increase in the number of sites. Taking that into consideration, one can expect that the demand for additional GBT sites in Moscow license area should not wither in the longer run.

As incremental GBT in Moscow license area slows down a little (before massive 5G deployment begins), independent tower companies are likely to turn their eyes to the regions. Taking into consideration the challenges associated with "invading" new regions and building relations with local authorities, the likes of Russian Towers, Service-Telecom and probably – Vertical, will inevitably consider acquiring small local tower companies and individual GBT portfolios. Consolidation of assets in the sector will continue and probably even speed-up.

Another promising growth strategy for independent tower companies is migration from strictly passive infrastructure offering to a more sophisticated business model, whereby customer operators are offered turn-key solutions for footprint expansion both outdoor and indoor (indoor connectivity within large commercial buildings and underground facilities, coverage along highways, special solutions for self-driven vehicles, etc.). Russian Towers already pioneered with such projects in Russia.

Independent infrastructure companies have been experimenting with new categories of potential tenants (non-cellular). The potential in this area is far from exhausted. In fact passive infrastructure by independent tower companies may become the backbone for such

projects as smart municipal environment (housing various smart devices: sensors, cameras, etc.)

In the longer run, incremental revenue promises to be generated through business models, whereby tower companies not simply lease out their GBTs but rather monetize their unique positioning and presence (own sensors, cameras, automated meteo-stations, various control devices) in the key geographic points: within urban landscape, along principal roads and lines, within scarcely populated areas where “digital presence” on the ground does not exist beyond a few populated settlements.