<https://gadgets.ndtv.com/telecom/features/the-history-of-telecom-spectrum-in-india-the-900mhz-auctions-827495>

* One of the first bands of telecom spectrum that was auctioned off, the 900MHz frequency band was used to deploy [2G networks in India](http://cis-india.org/telecom/resources/spectrum-management) in the 90s, and continues to be used today, as operators now [look to using it for 3G services](https://gadgets.ndtv.com/telecom/news/900MHz-base-price-should-be-the-same-as-800MHz-gsm-operators-596662). [As we've explained before](https://gadgets.ndtv.com/telecom/features/tech-101-what-is-spectrum-and-why-is-it-being-auctioned-824721), It's also obviously more energy efficient than higher frequency bands; the higher the frequency, the lower the wavelength, and thus the more energy that's required to cover the same distance.

<https://gadgets.ndtv.com/telecom/features/tech-101-what-is-spectrum-and-why-is-it-being-auctioned-824721>

* Commonly used bands for cellular communication are 800MHz, 900MHz, 1800MHz, 2100MHz, and 2300MHz.
* [New norms in 2011](http://www.ndtv.com/india-news/new-telecom-policy-to-delink-spectrum-from-licenses-452696) delinked the spectrum from the license, so now when telecom operators ask to renew their licenses, they pay separately for frequencies.
* While 2G services were launched in India ver 900MHz (and later 1800MHz, which is also being used for 4G), 3G services ran on [both 900MHz and 2100MHz](https://en.wikipedia.org/wiki/List_of_UMTS_networks) in India.

<http://www.thehindubusinessline.com/info-tech/telecom-market-heading-towards-duopoly/article10010319.ece>

* With RJio signing definitive binding agreements with RCom for buying spectrum, towers, fibre and media convergence node, it will have more access to the 800 MHz and 900 MHz spectrum, considered the best to deploy 4G and 2G, respectively. RJio would have 496.75 MHz of spectrum in these bands as compared to 368 MHz for Bharti Airtel and 283 MHz for Vodafone-Idea.

<http://www.newindianexpress.com/opinions/2018/jan/10/end-of-frenzy-in-telecom-sector-1749328.html>

* The spectrum could be crucial for Jio in the time to come. Its network is built on 2,300 Mhz, while most of the network it acquired from RCom is in the 900 Mhz and 2100 Mhz bands.
* As data consumption increases, telcos across the globe face the challenge of providing good in-building coverage

<https://economictimes.indiatimes.com/tech/internet/trai-plans-to-remove-50-limit-on-telecom-spectrum-holdings/articleshow/61552968.cms>

* Trai officials are of the view that removing the 50% cap on airwaves within a band could lead to more spectrum at the disposal of a telco that could use it for multiple purposes, besides boosting efficiency, said the people cited above.
* As things stand, a Vodafone-Idea merged entity will breach the spectrum cap in Maharashtra, Gujarat, Kerala, Haryana and UP West in the 900 MHz band, and in Maharashtra and Gujarat circles in the 2500 MHz band, according to a Credit Suisse report. The Swiss brokerage house estimated that the merged entity would have to return or sell excess spectrum worth Rs 7,600 crore.

<http://www.business-standard.com/article/companies/jio-licence-fee-spectrum-charges-among-lowest-117082400048_1.html>

* [Telecom operators](http://www.business-standard.com/search?type=news&q=telecom+operators)pay 8 per cent of their adjusted gross revenue as licence fee and spectrum charges are in the range of 3-6 per cent for different operators depending on the type of air waves they have.

<http://www.downtoearth.org.in/coverage/all-about-mobile-spectrum-33106>

<https://www.quora.com/How-does-VoLTE-work-What-is-the-difference-between-VoLTE-and-VoWiFi>

Normally, telcos use CS networks for their voice business – and the biggest hindrance to th LTE is that Circuit Switches are absent in this type of network. Hence, companies have to fall back on 2g and 3g based CS Networks for providing voice services.

To remove this fallback issue, a technology clled the VoLTE has emerged. This uses an additional netwrom called the IMS which provides the infrastructure for voice as well

**Q2’FY18 Concall highlights**

* Talks about a few gaps in spectrum in the western circles
* Mentions that the company has 780mn gb of data compared to 470mn gb in q1 - also mentions that since the heavy capex in terms of the spectrum is in place, what the company basically needs to do Is invest in maintenance capex which involves fiber networks, modular and all of that
* In terms of this modular capex, this volatility will persist foor another 12 to 15 months and then things should stabilize. Also says that only one thing matters as of now and that is growing market share
* Mentions that bigger telecom players are sitting at 4-4.5x net debt to ebitda
* Talks about revamping the airtel tv APP
* Mentions the fact that more and more customers are moving onto the bundled packs offered
* In the short term, the company has more than adequate spectrum as it hasn’t rolled out 4G across all its circles optimally, YET
*But in the shorter term, I think the need for spectrum will be lower, because we still have not deployed TDD LTE across the country*
* In the telecom business, the number 1 player makes a significant proportion of the disproportainetly higher EBITDA