

## **4 Traffic Trend**

### **4.1 General**

This chapter provides an analysis of the latest communication traffic trends. For the past years, considerable increase of communication traffic has been observed and several estimation studies consistently forecast that the increase would be continued to the next decade. In addition, new traffic nature different from ever happened one could come in considering new traffic types generated in variety of use cases with variety of ‘connected things’ or ‘connected services’.

As the consequence, it could be concluded that 5G mobile communications system should handle these enormous increasing communication traffics as well as new traffic nature due to new traffic types in proper and efficient manner.

### **4.2 Communication traffic growth and traffic nature trend**

#### **4.2.1 Communication traffic growth**

The general trends up to the year 2014 were analyzed in [1]. The data collected consisted of the details on communication traffic including, wired (or fixed) communications. Figure 4.2.1-1 represents communication traffic growth in Japan since the year 2015 [2]. As can be seen, downstream fixed communication traffic has shown enormous growth in recent years. Upstream fixed communication traffic has also relatively increased. Mobile communication traffic, both upstream and downstream, has also shown a large increase in recent years. A certain portion of mobile communication traffic has come at the expense of fixed communication traffic.

The increasing rate of communication traffic within the last twelve month period is depicted in Figure 4.2.1-2. Increase of mobile communication traffics, both upstream and downstream, has become rather stable without having lost the three-fold increase in growth over the previous three years. Fixed communication traffic also shows an increase in demand.

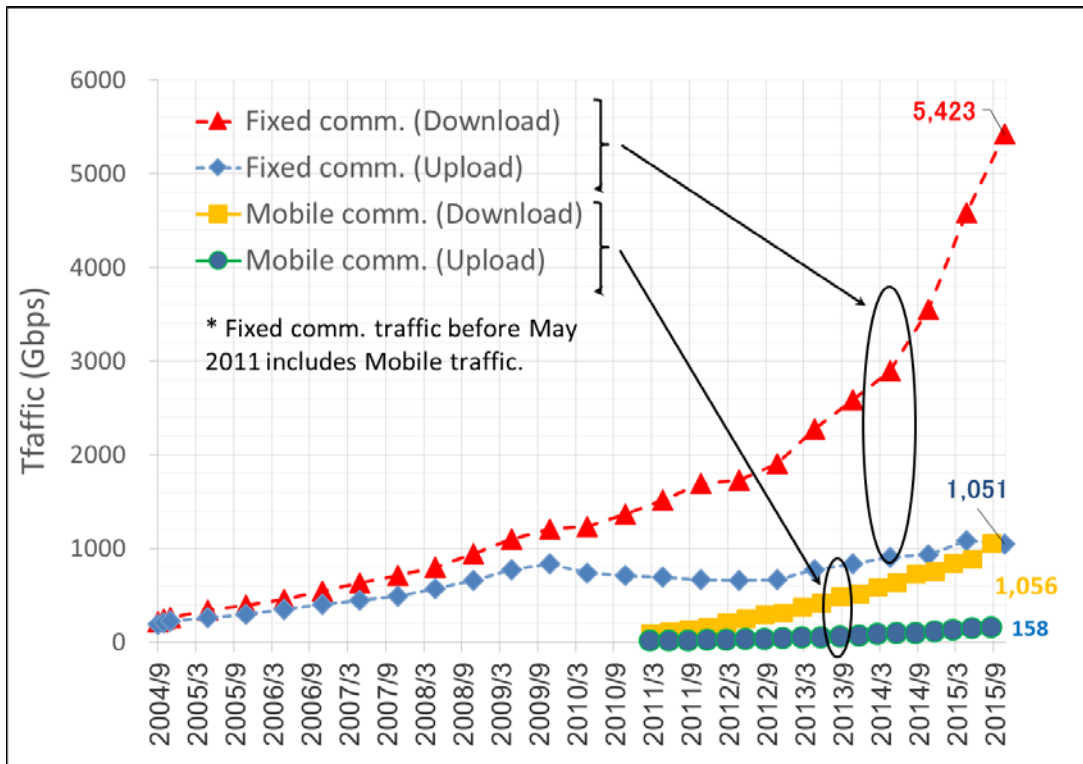


Figure 4.2.1-1 Communication traffic growth in Japan [2][3]

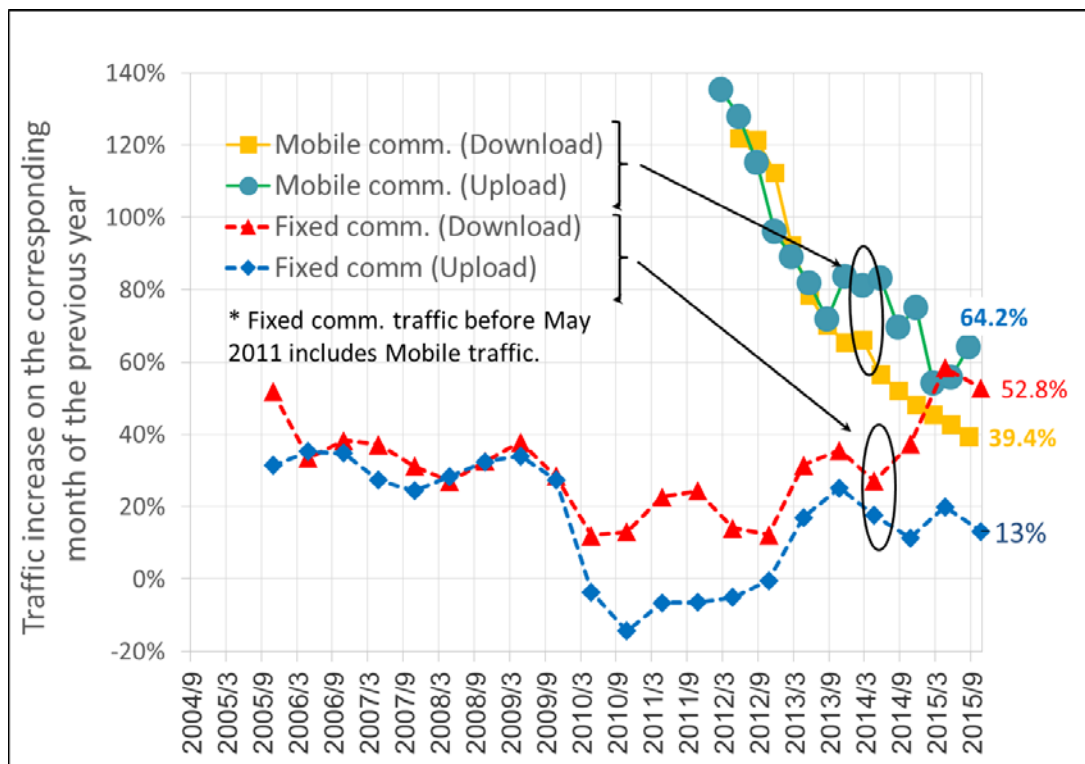


Figure 4.2.1-2 Communication traffic growth rates in Japan [2][3]

Global (IMT) traffic estimation to 2030 was captured in [4] in which three estimation results from different entities were summarized. As an example, a chart in its chapter 5.3, representing the cumulative compound annual growth rate (CAGR) relative to 2010, is shown in Figure 4.2.1-3. The chart forecasts considerable increase of communication traffic towards year of 2030. Similar estimation or observation for global traffic trends can be found in other documents such as [5].

Although this increase in the rate of communication traffic may be affected by a variety of economic or social factors though, the fundamental trend will be generally maintained over the next decade. Thus 5G mobile communications system should be prepared to handle this enormous increase in communication traffic properly.

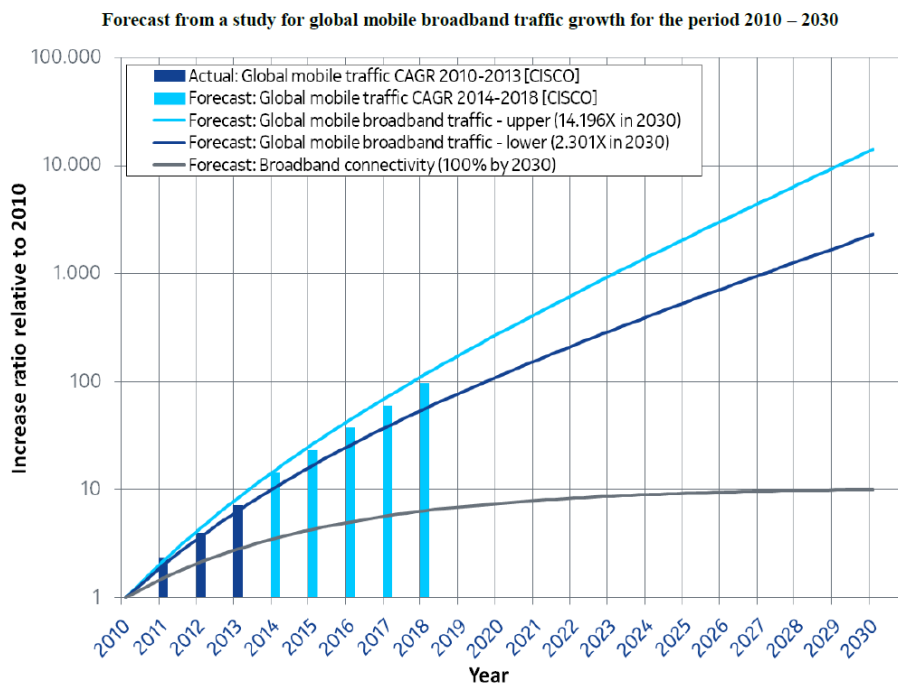


Figure 4.2.1-3 A global traffic estimation to 2030 (in [4], involving original data in [6])

#### 4.2.2 Communication traffic nature

In terms of the types of communication traffic being handled, ordinary voice communication traffic has been relatively stable, even as it gradually decreases, as shown in Figure 4.2.2-1 [7]. On the other hand, data traffic between objects directly, e.g. IoT traffic, has been drastically increasing. (Figure 4.2.2-2 [8])

As has been discussed in the previous section on quantitative increase of communication traffic, nature of communication traffic will also be changing as a variety of use cases related to ‘connected things’ increases.

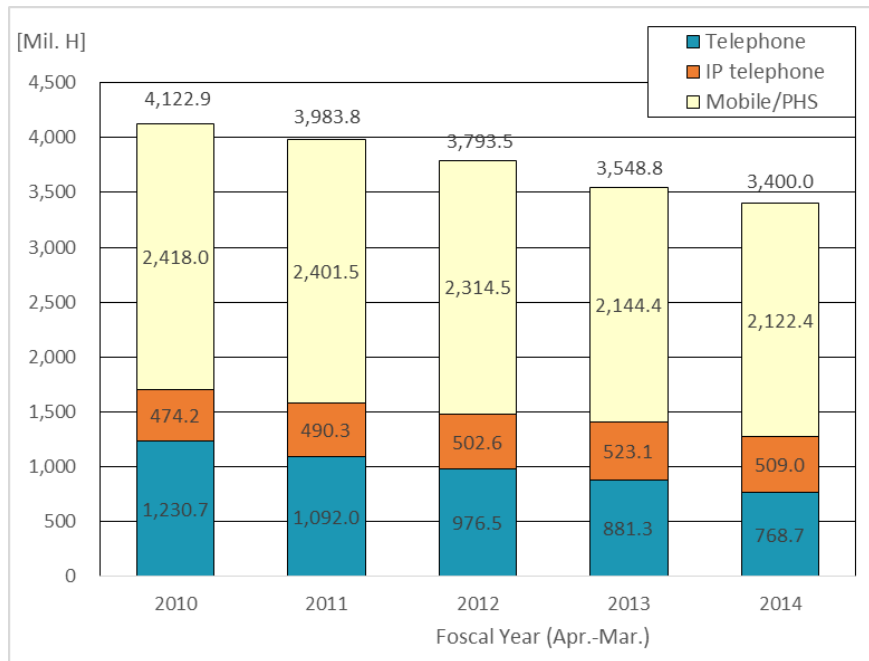


Figure 4.2.2-1 Voice communication traffic trend [7]

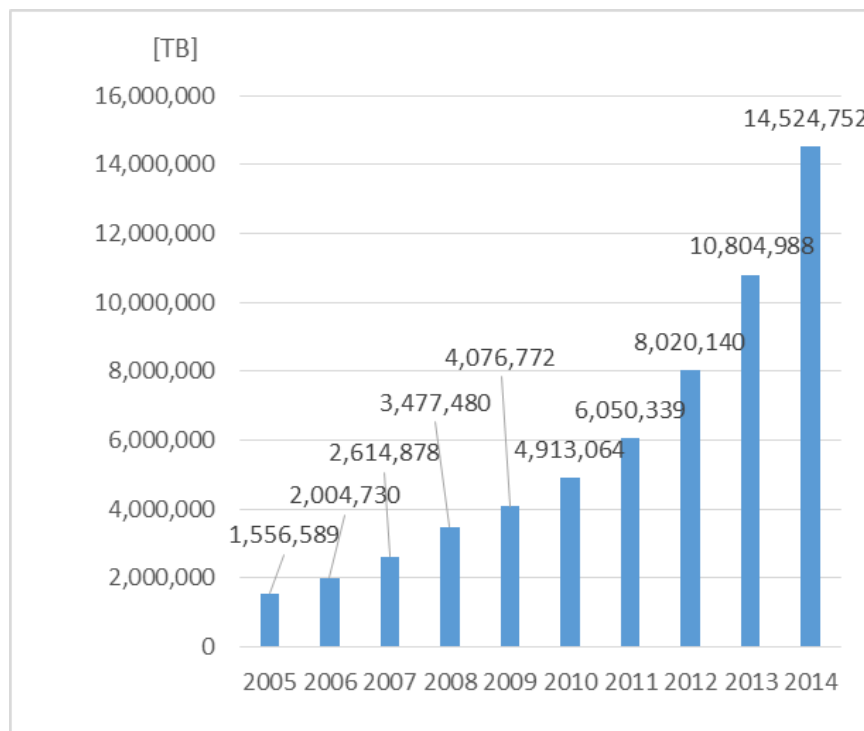


Figure 4.2.2-2 Data traffic (Service industry, ICT, transport, real estate, money & securities, commercial services, utilities, construction and manufacturing) [8]

## References

- [1] "Mobile Communications Systems for 2020 and beyond," ARIB 2020 and Beyond Ad Hoc Group White Paper, Oct.2014.
- [2] "Status of the mobile communications traffic of Japan (Sep. 2015)," Information and Communications Statistics Database, Ministry of Internal Affairs and Communications of Japan, Nov. 2015.
- [3] "Aggregation and Provisional Calculation of Internet Traffic in Japan (as of Nov., 2015)," Ministry of Internal Affairs and Communications of Japan, Mar. 2016.
- [4] "IMT Traffic estimates for the years 2020 to 2030," ITU-R Report M.2370-0, July 2015. (<http://www.itu.int/pub/R-REP-M.2370>)
- [5] "Ericsson mobility report," Ericsson AB 2015. (<http://www.ericsson.com/res/docs/2015/mobility-report/ericsson-mobility-report-nov-2015.pdf>)
- [6] "Global Mobile Data Traffic Forecast Update," Cisco Virtual Networking Index, February 2015. ([http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white\\_paper\\_c11-520862.html](http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html))
- [7] "Voice communication traffic trends," Ministry of Internal Affairs and Communications of Japan, Dec. 2015.
- [8] "Traffic of big data flow estimation and investigations on usage of the big data," Ministry of Internal Affairs and Communications of Japan, 2015.