

# Alleviating the strain on the 5G supply chain with BASF

The 5G Revolution has long begun, and it is a game-changer. Designed to have faster speeds, larger capacity and reduced latency, 5G is expected to be a trailblazing innovation for tomorrow's future. Imagine attending video conferences without any technical difficulties or lags. How about being able to always get fast and guaranteed network service on your phones and laptops without any bandwidth capacity?

Every iteration of technology creates a better future for us, and 5G is one of those innovations. The increased speed, capacity, bandwidth, and essentially mission-critical connectivity will open a wide range of opportunities from public safety, the way businesses operate to even the way we live. It is transformation in the highest digital age.

In recent years, 5G adoption and deployment has been very much viewed as a race—the first ones labeled as “winners”. However, unlike a marathon, 5G is, in fact, a puzzle, made up of many parts—its infrastructure, the components of its infrastructure, the price of building that infrastructure and the list goes on. Clearly the 5G specifications have grown in richness and capabilities. However, this richness of capabilities could also present some difficulties. Aside from the large investments, companies are also resource-strained.

One does not need a crystal ball to realize that the global pandemic has resulted in heavy consequences on supply chains across all industries and sectors. In the two years since the Coronavirus hit, the 5G network infrastructure supply chain experienced a screeching halt followed by skyrocketing supply prices. Although the global economy is currently on a road to recovery, it is, without a doubt, going to be quite a long and winding journey. And the longer the economy takes to recover, the heavier toll the pandemic will have on the chain of suppliers that provide crucial gear and components for telecommunications networks. Despite its ground-breaking benefits, it is no wonder that vendors who were projecting stability amid unprecedented calamity and uncertainty ended up facing bottlenecks in access, production, and distribution.

## **Supply Issues Stemming from Pressure to Diversify from China**

In 2003, during the SARS epidemic, China accounted for 4% of global output, but in the late 2010s, China accounted for 16%, four times as much<sup>1</sup>, and that number was continuously rising until the pandemic happened. Globalization has increased since then and so has our dependence on China.

Most 5G network operators rely on equipment from Huawei, Nokia, and Ericsson, despite the rise of open radio access networks (RAN). However, there has been an immense pressure to

diversify and move away from China as far as manufacturing goes. Fortunately, or not, the exodus of companies leaving China had been happening for a while, but it was amplified by COVID-19. It now costs manufacturers \$6.50 per labour hour in China, which is \$1.50 higher than in 2016 and over twice that of Vietnam<sup>1</sup>. With other ASEAN countries such as Thailand, Cambodia, Indonesia and Vietnam investing in infrastructure and developing economic incentive zones, it has now become more cost effective to access the ASEAN free trade area without relying on a Chinese manufacturing base.

As more and more countries compete for components from the same small group of manufacturers, the pressure builds. Furthermore, there are companies outside of the telecommunications industry moving into 5G. With this increased demand, this definitely puts an increasing pressure on the supply of 5G components.

### **Existing Strain on Current Networks with WFH or Flexi-work Arrangements**

COVID-19 has transformed the working and education world. Even as life returns to 'almost' normalcy, employees are prioritizing hybrid work arrangements of flexi-work arrangements with their employers. Schools and higher education institutions are also sticking with having hybrid learning environments such as providing the option of Home-Based Learning (HBL) days.

With most people working and learning from home, there is additional strain on networks. According to the latest Ericsson Mobility Report<sup>2</sup>, nine out of 10 consumers surveyed increased their internet use during pandemic lockdowns. One-fifth of global users participated in new online activities, such as conferencing. On top of this, there was also a massive increase in online shopping.

There is a real need for 5G, and the increasing demand for it is overpowering its existing supply of components, hampering not just its rollout, but the prices of building the entire network infrastructure.

### **The BASF Collaboration for an innovative 5G future**

With these inevitable strain on the 5G supply strain, telecommunications organizations and other companies looking to deploy 5G networks have to continuously look for a way out.

BASF's Creation Centers are all about empowering customers in Asia. With a broad suite of material competencies and offerings, BASF offers a lifeline to companies experiencing a supply bottleneck. From Polyamide (PA), Polyethylene-phthalate (PBT), Polyoxymethy-lene (POM), Thermoplastic Polyurethane (TPU) and Polyurethane Systems, BASF anchors itself on innovation and continuous product development that can potentially ease the supply chain strain.

With BASF, there is a wide variety and methods of applications such as a macro site, wireless connections, small cell, data centres, medical environments and most definitely, smart manufacturing scenarios.

#### 5G-Heat Dissipation Products (PA & PBT)

- Various kinds of materials to meet different needs such as being electrically conductive, electrically insulative
- Balanced mechanical and thermal properties
- Good surface and low warpage
- Availability of TC and FR

#### 5G Empowering Industry: Dielectric Product (Transmission)

- Lower Dk/Df1
- Laser weldable
- High flowability and low warpage
- Good impact strength
- Hydrolysis resistance
- Chemical resistance
- Excellent cost-performance ratio
- Further function and integration possible

#### 5G Base Station: Lightweight and Dielectric Product (Transmission)

- Lightweight (more than 50% weight reduction)
- High wave transmission
- Good impact performance
- Design flexibility through customized mechanical, transmission and appearance

#### 5G Dielectric Product (EMI Shielding)

- Various kinds of materials to meet different needs
- EMI Shielding efficiency
- Hydrolysis resistance of 85 degree celsius or 85% RH)
- Good mechanical performance
- Absorptive material to prevent signal interference

#### ULTRASIM® Technology for Thermal Management

- Thermal transfer to convection
- Positional relation with surroundings
- Natural or forced air cooling
- Computational fluid behavior

#### 5G Empower Industry: Dielectric Product (Absorbing)

- Tailor made PB materials to block waves in the range of 75-80GHz
- Working with the same shielding performance at high frequencies of 120 GHz
- Up to more than 80% wave absorption in two directions

- Effective lowest wall thickness down to approximately 1mm
- Available for both reinforced and unreinforced grades

#### PPA Compound with Optimized Dielectric Properties

- High temperature resistance HDT > 245 degrees celsius
- SMT suitable
- Low dielectric constant Dk = 3.0 @ 2.5–5.0 GHz
- Low dielectric loss Df less than 0.01 @ 2.5–5.0 GHz
- Bonding strength to metals of 45 MPa
- Excellent dimensional stability

#### Flame Retardant Plastics (PA, PBT)

- Halogen-free-flame-retardant systems
- Outstanding long-term heat aging resistance
- Highest electrical insulation
- Excellent stiffness and toughness
- Excellent flowability
- Ultramid® with metal coating for excellent EMI-shielding

#### Cable with Elastollan®

- Excellent low temperature resistance and flexibility
- Good wear and tear propagation resistance
- Good environment resistance (humidity, microbes, ozone)
- Very good flexural fatigue strength

#### FOC with Ultradur®

- High line speeds (over 400m/minute)
- Reduced wastage with stable product quality
- Excellent tube stiffness and surface finish
- Maintains tube ovalness
- Better durability and lifetime

5G has so much potential to create booming vertical industries. There are so many pieces to this large puzzle, and more often than not, finishing these large puzzles need a helping hand. A partnership with BASF benefits not only the future today, but also the generations of tomorrow.

<sup>1</sup> 3. How Coronavirus could Impact the Global Supply Chain, 2020 at:

<https://hbr.org/2020/02/how-coronavirus-could-impact-the-global-supply-chain-by-mid-march>

<sup>2</sup> Ericsson Mobility Report, " Ericsson, November 2020 <https://www.ericsson.com/en/mobility-report>