



## 5G – Frequently Asked Questions

### **When do you expect to see R16, and would you be able to test those?**

Release 16 was frozen in July 2020. It generally takes 14 to 16 months after the standard is frozen for new products to make it on the market. This is because of the time needed for the network to become compatible with the release and for products to be designed and tested.

### **There is much discussion over the web on SAR testing for 5G. Can you explain this?**

Yes. As of now, specific absorption rate (SAR) standards are only applicable up to 6 GHz so SAR testing is only applicable to FR1 devices. New standards to extend SAR up to 10 GHz are slated for adoption in the near future.

Above 6 GHz power density measurements are required for RF Exposure.

UL has been doing SAR tests for decades and have been using the isotropic near-field probe systems necessary to measure portable device RF Exposure up to 110 GHz for over 2 years, so we are already set up to test both FR1 and FR2 phones for RF Exposure.

### **5G band n258 covers 24.25 to 27.5 GHz. Why does the FCC have a gap between 24.45 and 24.75 GHz and not cover the part above 25.25 GHz?**

Other services were already allocated to these frequency bands and the FCC determined that there would be too much of an interference potential so those services could not coexist with 5G.

### **Please elaborate on making measurements in the far field of the transmitting or receiving antenna.**

For fundamental and out-of-band emissions the signal is known to be radiated by the transmitting antenna and the dimensions of this antenna are known, so the measurement distance is based on the far field boundary of the device antenna and the far field boundary of the measurement antenna, whichever far field boundary distance is larger.

For spurious emissions the transmitting antenna structure is generally not known, for example such an emission could leak out of a gap in an enclosure seam or radiate from a random wire, so the measurement distance is based only on the far field boundary distance of the measurement antenna.

### **Why are two different coordinate systems shown for the TRP tests?**

Device and antenna dimensions are easy to measure as rectangular coordinates.

Since all the measurements for a total radiated power (TRP) test must be performed at the same distance, it is easier to use spherical coordinates to describe the orientation of an emission, the measurement cuts and the measurement points.

Note that it is easy to convert from Theta and Phi to Azimuth and Elevation; Azimuth corresponds directly to Phi while Elevation corresponds to 90 degrees minus Theta.

### **What UL locations have 5G testing capabilities?**

Fremont, California, and Research Triangle Park (RTP), North Carolina in the U.S., United Kingdom, Japan, South Korea.

### **Does UL support SAR FR2 testing?**

Yes, we cover FR1 SAR and FR2 near field power density testing.

We have the required near field probes for FR2 and have been using them for almost two years.

### **What are the 5G difference between EU RED and FCC testing?**

Fundamental power, out-of-band and spurious emissions limits are generally similar. However, EU has more stringent spurious requirements below 1 GHz, as well as additional spurious requirements near protected bands.

### **Do countries follow similar testing? The EU has a few different limits. Do most of the countries across the globe follow either FCC or EU rules?**

In general, many countries accept testing from FCC and/or EU. However, Japan and China historically tend to have their own standards.

In the specific case of 5G FR2, and because of the unique frequency allocation for the different countries (allocation of spectrum is still an ongoing activity), there can be specific testing for specific countries based on the frequency bands, but this is still to be determined.

FR2 is not widely adopted yet (USA, South Korea are pioneers in this area).