

RAIN Alliance Recommendations on use of Upper European band

RAIN RFID (UHF RFID) is one of the most important new technologies of the 21st century. RAIN RFID has become the de facto method for identifying objects in logistics, manufacturing, freight and counterfeit-detection, to name a few. 28 billion UHF RFID tags have been shipped in 2021 alone, which is more than 4 tags per human in one year. The projected growth is strong with more than 50 billion predicted for 2025.¹

For RAIN RFID the global UHF radio spectrum was historically spread from 860 to 960 MHz, when passive UHF RFID started around 20 years ago. Since then there was global interest to narrow the global band in order to make product design and global shipment easier. In many regions and countries it was possible to get UHF RFID bands in the 900 – 930 MHz range.

Europe set up a frequency band for UHF RFID in the so-called GSM-gap from 915 – 921 MHz. This so-called upper European band provides several benefits:

40% more
read range

Easier global
product design

Easier reader and
system design to
support low power,
long range tags

Double
communication
speed

¹ <https://rainrfid.org/rain-rfid-market-research-report/>

Benefits of upper European band

The following table summarized the technical details on the benefits of the upper European band:

Parameter	Lower Band	Upper Band	Benefits Upper Band
Frequency	865-868 MHz	915-921 MHz	Global frequency range Easier global product design
Reader transmit power	2 W erp	4 W erp	40% more read range
Transmit channel width	200 kHz	400 kHz	Double communication speed reader → tag
Reader channel spacing	600 kHz	1200 kHz	Double communication speed tag → reader Less interference
Number of reader transmit channels	4 (2 pairs)	3 (3 distant)	Less interference
Tag backscatter power allowance	10 µW	100 µW	Less challenge on reader receiver sensitivity

The RAIN Alliance has an experienced team that put together additional documentation, and which may be consulted for questions and recommendations.

More details and background information are available in the RAIN RFID System Design Guidelines, Air Interface and Protocol Considerations V2.0 – in particular chapter 2.6 – at rainrfid.org/resources.

Questions and comments may be issued to the RAIN Alliance though rainrfid.org/contact-us.