Meeting of the Caribbean Spectrum Management Task Force

Car Connectivity Applications and Spectrum Requirements

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May 21, 2026

Car Connectivity Consortium

The Car Connectivity Consortium

The trusted source for defining how vehicles interact with devices and the world to improve the consumer experience.

31

Countries

Our member companies represent many countries around the globe.

300+

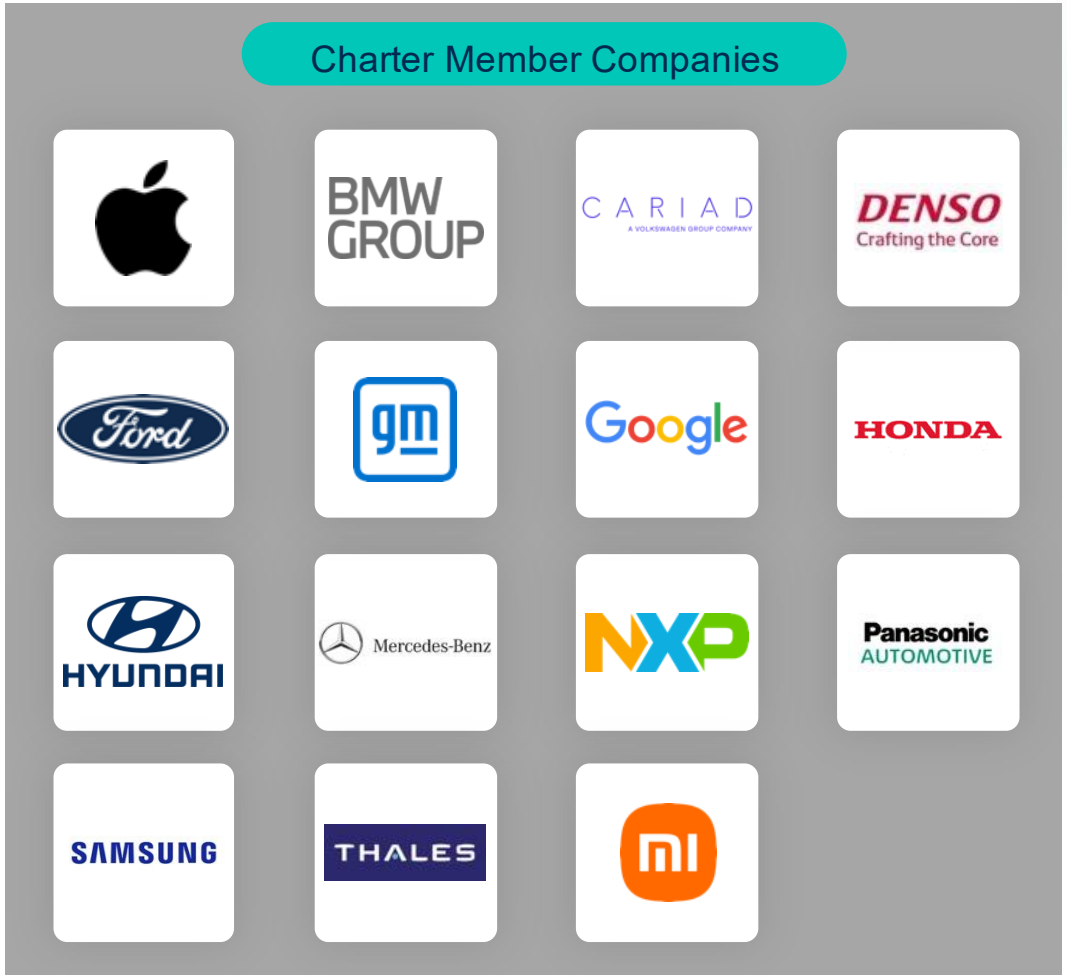
Member Companies

Over 300 global member companies from automotive, smart device, and technology industries.

2011

Founded

The CCC was founded to develop global standards and solutions for vehicle connectivity.



A full list of the CCC membership can be found in https://carconnectivity.org/our-members/member-list/

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UWB Technology Overview

- Low-power, wideband technology enabling secure, reliable device-to-device communication in dynamic environments
- Centimeter-level ranging accuracy through precise time-of-flight measurements
- Very low emissions (~ -41.3 dBm/MHz) make UWB highly sensitive to high-power IMT interference
- Unique secure-ranging capabilities not replicable by other wireless technologies
- Standardized, globally deployed solutions (e.g., Digital Key) widely adopted across automotive and mobile ecosystems

UWB Supports global interoperability and scalable innovation through harmonized spectrum framework and has been proven to be reliable and highly secure.

UWB channel 9:
8GHz +/- 250MHz

UWB channel 5:
6.5GHz +/- 250MHz

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UWB Global Socioeconomic Value

Global	2026	2030
Total Economic Impact	17,336	36,576
GDP Impact	3,737	6,553
Producer Surplus	6,354	12,682
Consumer Surplus	7,245	14,944

US million $

Source: Katz, R., Callorda, F., and Valencia, R. (2025). An assessment of socio-economic value of Ultra-Wideband. New York: Telecom Advisory Services, January. All contents, including its conclusions, represent the independent findings of the analysis conducted solely by the authors, and Telecom Advisory Services.

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Global UWB jobs created (2022-2030)

Category	Definition	Amount
Direct jobs	Technical staff and manufacturing of the required equipment and software to develop, distribute and serve the hardware and required used cases	159,670
Indirect jobs	Upstream buying and selling of inputs required to develop and manufacture equipment and software	90,677
Induced jobs	Household spending based on the income generated from the direct and indirect jobs creates induced employment	37,450
Total		287,800

Note: A job-year refers to one full-time held for a single year, as derived from input-output analysis. Each additional unit of output generated by UWB adoption translates into incremental labor demand, which, when aggregated, is expressed in job-years.

Source: Telecom Advisory Services based on input/output matrices for specific countries under study.

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UWB Mobility Use Case: CCC Digital Key™

Standardized at the Car Connectivity Consortium (CCC)

- CCC Digital Key™ allows millions of consumers to use their mobile devices easily and confidently, regardless of manufacturer or operating system, to access vehicles
- CCC Digital Key™ is a standardized ecosystem that enables mobile devices to store, authenticate, and share digital keys for vehicles in a secure, private manner that works everywhere, even when the phone battery is low
- CCC Digital Key™ uses a combination of NFC, Bluetooth® Low Energy, and UWB
- UWB is responsible for the secured distance measurement and final authentication of the mobile device

Illustration of a CCC Digital Key™ UWB solution.
This use case is mainly outdoor but could be indoor garage.

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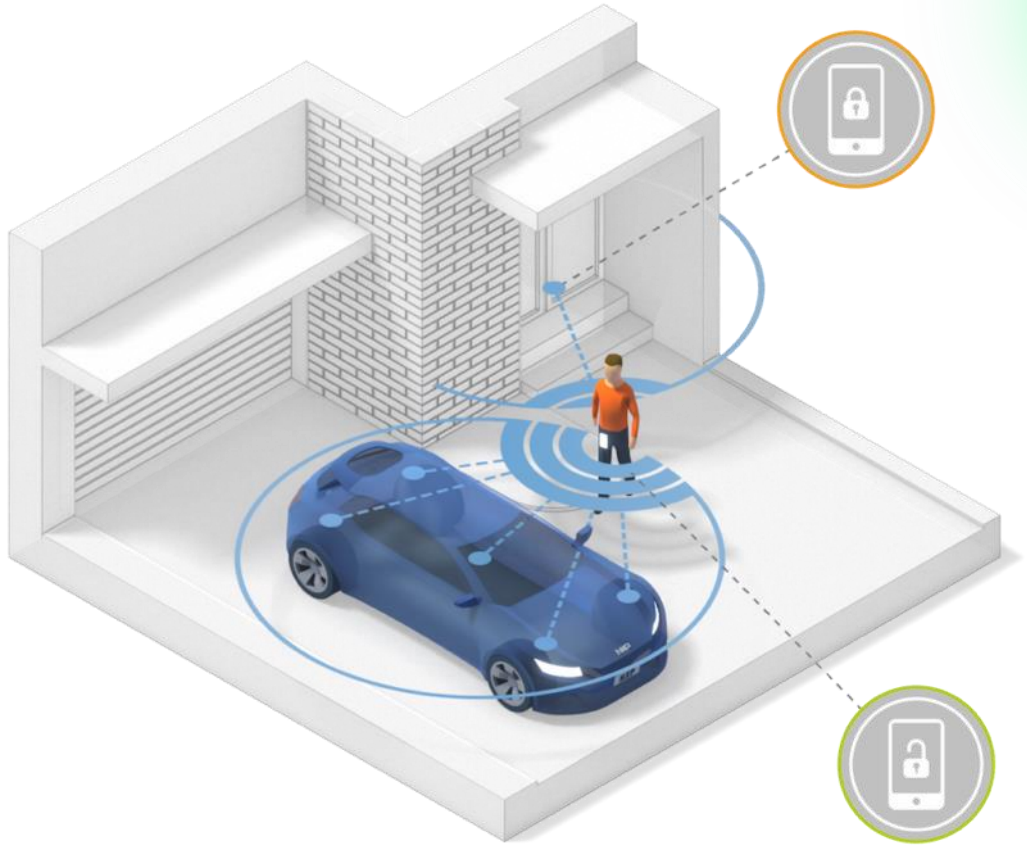
UWB Mobility Use Case: CCC Digital Key™

- The CCC Digital Key™ is a standardized technology that enables mobile devices to store, authenticate, and share digital keys for vehicles in a secure, privacy-preserving way that works everywhere.
- CCC Digital Key features hands-free, location aware keyless access and location-aware features for an improved user-friendly experience. This has been achieved using Ultra-Wideband (UWB).
- UWB time-of-flight measurement locates the mobile device close by the car – known as ‘secure distance bounding’.
- This combats cyber-attacks of the secure Bluetooth connectivity for example the ‘relay attack’.



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Automotive UWB Channel 9 Measurement Under IMT Interference

Insights Gained

- Significant failures occur even at moderate network load (50%)
- IMT interference poses a real and practical risk to digital keyless vehicle access
- If UWB receivers pick up too much noise from other wireless signals, their accuracy drops immediately; even small amounts of interference can matter.
- Urban mobile networks are loud in spectrum terms. Study shows that in many cases their interference was strong enough to impact UWB performance.

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Automotive UWB Channel 9 Measurement Under IMT Interference

Overview

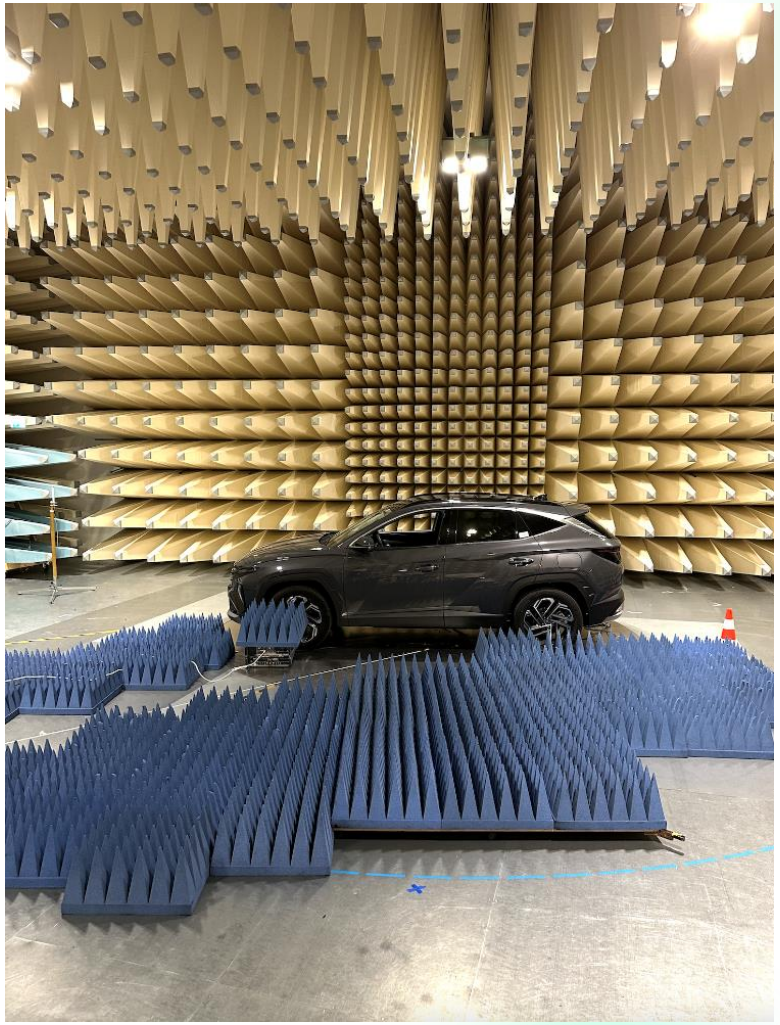
- Study endorsed by the German Federal Network Agency (BNetzA)
- Conducted in an accredited EMC laboratory in Kolberg, Germany
- Measurements performed under direct regulatory supervision

Objective

- Assess the impact of co-channel IMT (TDD macrocell) interference on automotive UWB Channel 9 systems.

Key Findings:

- Measured based on evidence of IMT disruptive interference into the automotive UWB channel 9, resulting in total failure of “unlock”, “start engine”, and “lock” functionality, and possible erratic behavior of digital keyless entry functionality.
- Results confirmed under German regulatory oversight



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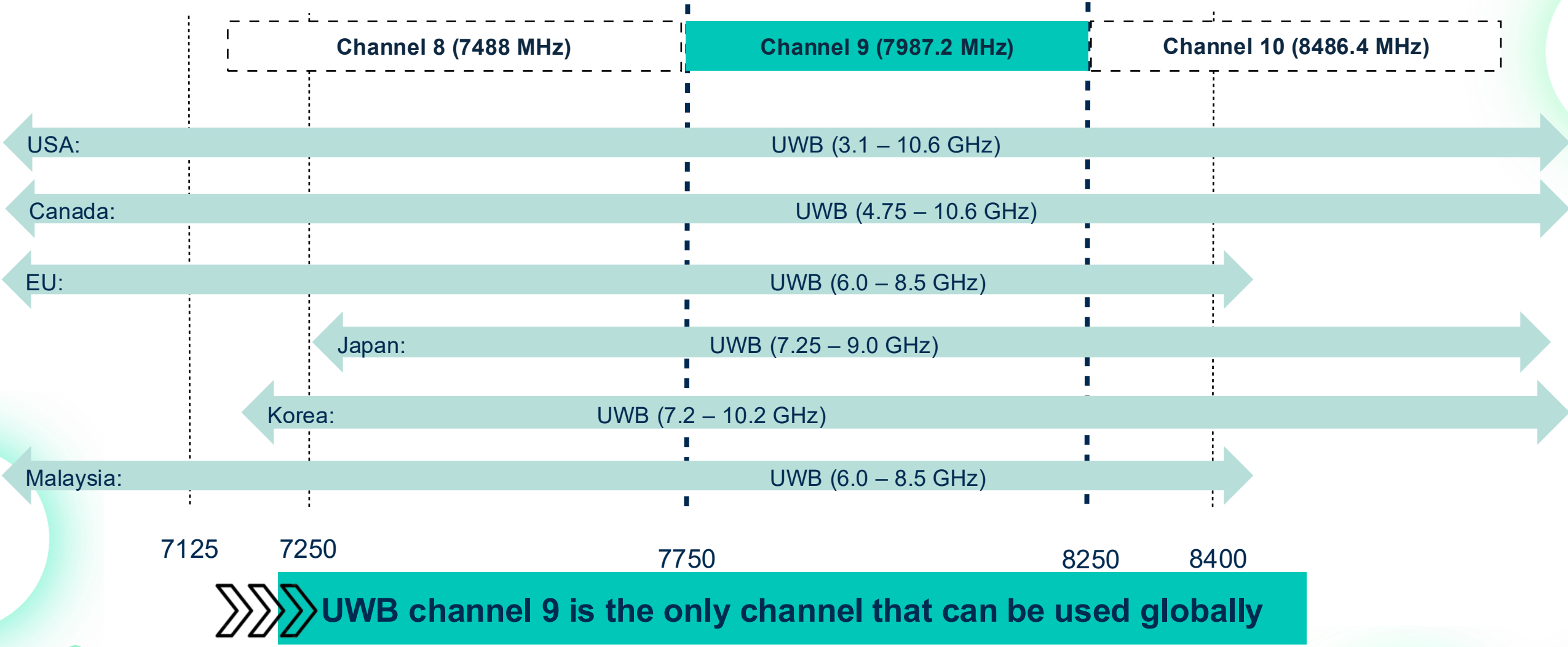
UWB Global Spectrum Harmonization



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WRC-27 Agenda Item 1.7

- Resolution 256 (WRC-23): To consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4400 – 4800 MHz, 7125 – 8400 MHz (or parts thereof), and 14.8 – 15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23)

- To date, there are 109 sharing and compatibility studies in the frequency range 7125-8400 MHz submitted to the ITU Working Party 5D between IMT and ~8 incumbent services, including ”reverse studies” (Potential interference from incumbent services into IMT).

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WRC-27 Agenda Item 1.7 (Incumbent Services)

Service	Direction	Frequency (MHz)
Fixed service	–	7 125–8 400
Space research service	Earth-to-space	7 145–7 235
	Space-to-Earth	8 400–8 500
Space operation service	Earth-to-space	7 100–7 155, 7 190–7 250
Fixed satellite service	Space-to-Earth	7 250–7 750
	Earth-to-space	7 900–8 400
Mobile satellite service	Space-to-Earth	7 250–7 375
	Earth-to-space	7 900–8 025
Meteorological satellite service	Space-to-Earth	7 450–7 550, 7 750–7 900
	Earth-to-space	8 175–8 215
Earth exploration satellite service	Space-to-Earth	8 025–8 400
	Earth-to-space	7 190–7 250
Maritime mobile satellite service	Space-to-Earth	7 375–7 750

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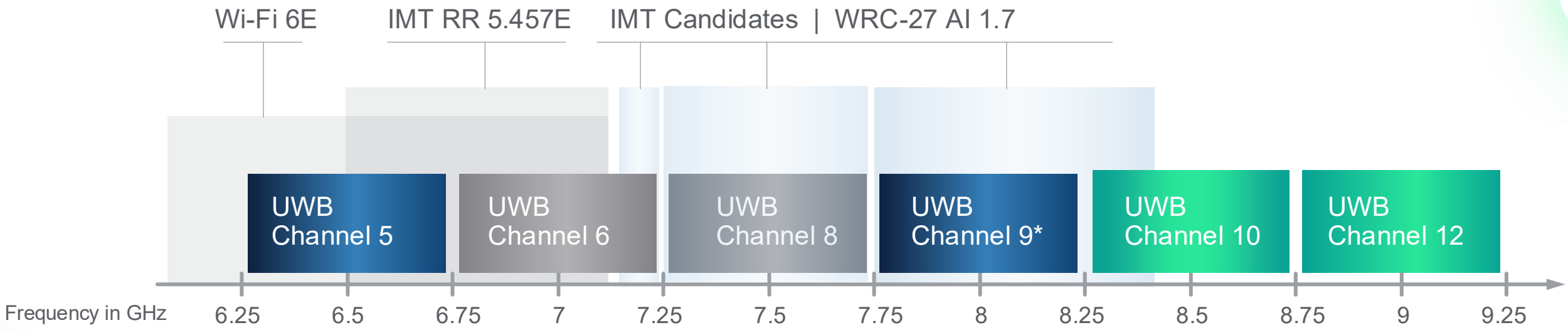
UWB Channels overview & WRC-27 AI 1.7



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Thank you!

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