



**UWB for „Child Presence Detection“
and vehicular use cases with same technology**


Presentation for CEPT CG on UWB (Dec 2021)

Abstract

- › Regulation update includes vehicular applications
 - › „Vehicular applications“ should cover „Child Presence Detection“ and other vehicular use cases based on the same technology
- › This presentation provides information on
 - › the use cases,
 - › technical parameters and
 - › the mounting locations of UWB equipment at vehicles

Use Case “Child Presence Detection” (CPD)

also: “Child Left Behind”

Use case	System Description
Child Presence Detection	<p>Euro NCAP Safety function</p> <ul style="list-style-type: none">(a) Engine off + car closure detection(b) Detection of child without adult in the cabin(c) Action : alarm within 10 sec. 

„Child Presence Detection“ becomes mandatory by 2025

driven by Euro NCAP

equivalent regulations in other countries

There are different technology approaches how to solve it

Camera, WiFi, Ultrasonic, Infrared, Radar (e.g. 60 GHz)

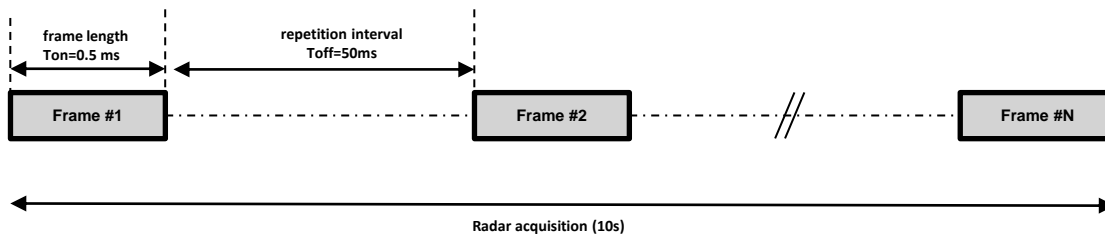
UWB sub 10 GHz → robust in all environments, good material penetration, HW re-use

UWB technology for CPD

Technical Parameters

- › Technology is using radar principle and evaluates the reflected UWB signal at objects
- › Main technical parameters:

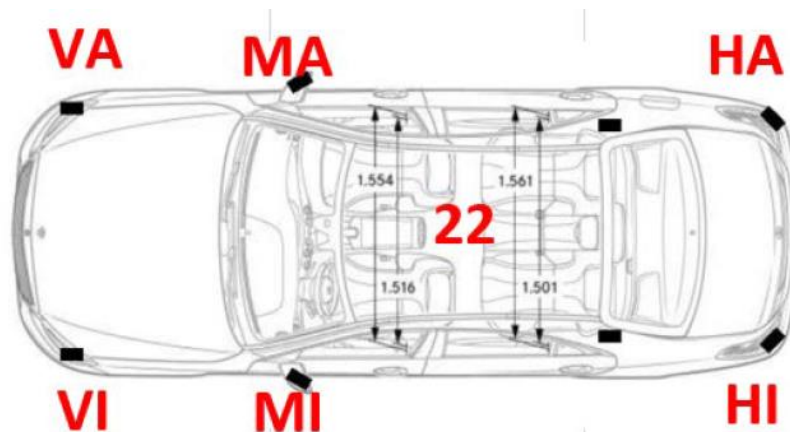
Frequency Range	6.0 – 8.5 GHz
Operation Bandwidth	500MHz < BW < 1 GHz
Pulse Repetition Frequency	typ. 128 MHz
Tx and Rx Range	4m or less
Frame length	typ. 0.5 ms
Repetition interval	5 ... 50 ms (smaller interval improves fast movement detection)
Activity Factor	<0.005% (similar to vehicular access)



UWB equipment

Possible locations „mounted at vehicle“

- › UWB equipment will be mounted
 - › in the cabin
 - › dashboard, ceiling, trunk, ...
 - › at the car body
 - › bumper, side mirror, C-pillar, ...
- › Intended radiation is towards vehicle **interior** and/or **exterior**
- › Preferred embodiment: CPD shares UWB equipment with vehicular access
(→ additional UWB equipment is avoided)



*Examples for mounting locations at car body
(from **ECC report 278**, Annex2.3, Figure 74)
UWB equipment for vehicular access, which is already on
the market, is using such positions.*

Same technology approach can be used for further functions



Child Presence Detection



Driver-vital signs monitoring



Gesture recognition
(screen control, navigation, volume control)

in-cabin



Multi modal Kick Sensor



Intruder Detection



Obstacle Detection

exterior

Request

- › Clarify scope of „vehicular applications“ in the regulation update
 - › should cover „Vehicular Access“, „Child Presence Detection“ and vehicular use cases with same or similar technology
- › Clarify „mounted at vehicle“
 - › should address all mounting locations, in-cabin as well as at the exterior car-body
 - › intended radiation pattern depends on use case is not necessarily directed towards vehicle interior (e.g. Vehicular Access)