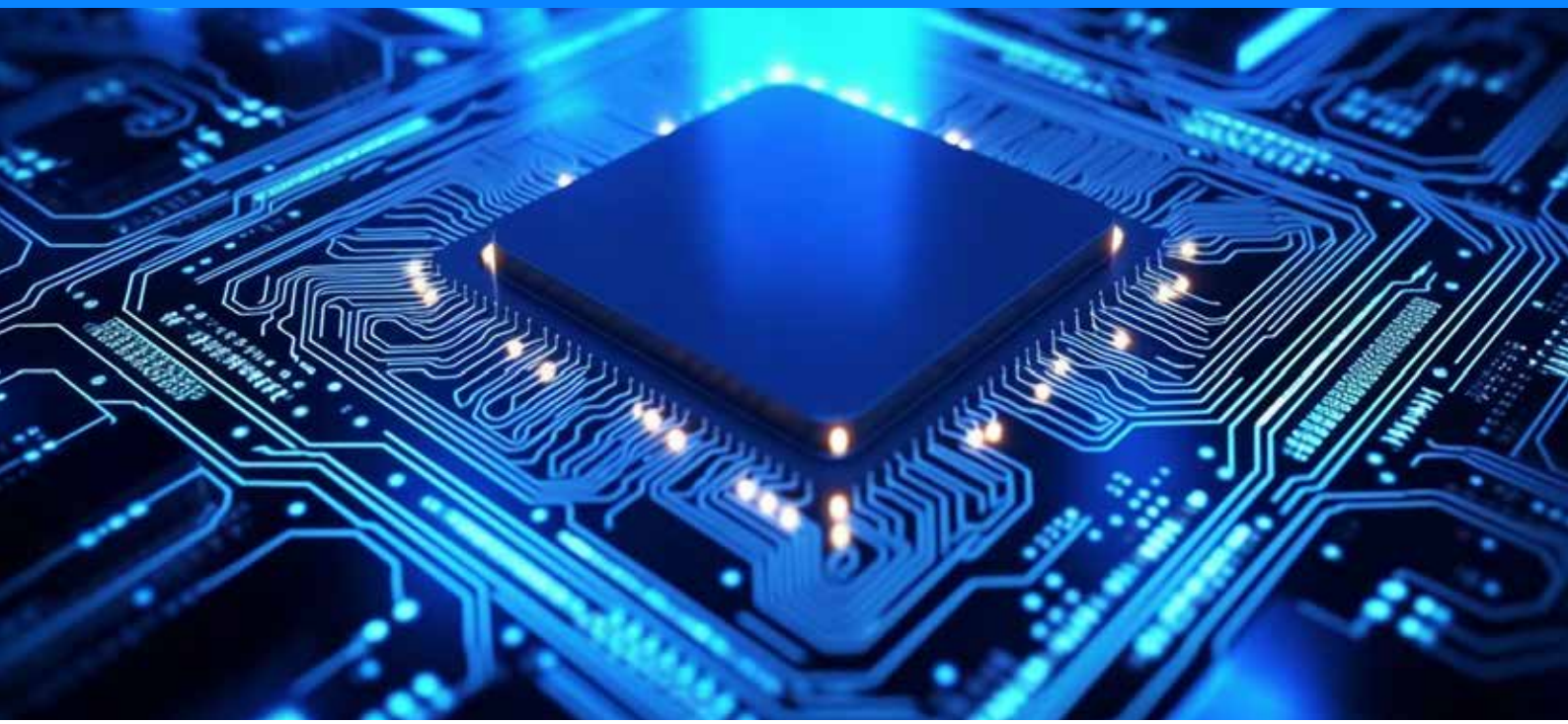
COMARCH

CASE STUDY

FiRa® 2.0



Project overview

In response to rapidly changing market demand, the FiRa Consortium has enhanced and expanded its existing MAC Certification Program by defining new methods of fine ranging.

At Comarch, we believe in UWB technology's capability to transform connectivity experiences. Therefore, as a FiRa test tool vendor we have decided to continue developing our MAC Conformance and Interoperability Test solutions with the latest ranging methods and conformance test cases in accordance with latest FiRa test specification.

Our mission is to help certification labs and device manufacturers improve the certification process, speed time to market and reduce the overall cost of certification.

Goals

Deliver new version of MAC Certification Test Tool and Interoperability Test Tool in order to support latest fine ranging methods based on the FiRa 2.0 Technical Specification

FiRa UWB Certification Benefits:
Global Interoperability and Market Success

Foundation for Development:

The certification builds a strong foundation for the continued development of UWB-based location services, fostering innovation and advancements in this technology.

Interoperability Assurance:

The program guarantees interoperability among certified devices from different vendors, promoting seamless communication and compatibility in diverse UWB ecosystems.

Security Enhancement:

The certification program includes security standards, enhancing the overall security posture of UWB devices and protecting against unauthorized access and cyber threats.

International Recognition and Market Viability:

FiRa certification ensures international recognition and compliance with global UWB standards, enhancing market trust and adoption in the mass-scale market.

Challenges during project execution

- **Dealing with changes in requirements during tool development** – development of the MCTT 2.0 and ITT 2.0 tools in line with the Technical Specifications development cycle was challenging due to frequent specification changes. However, it was managed by applying a predictive approach to software and firmware architecture design, along with close collaboration with FiRa staff members.

- **Handling parallel firmware development paths** – the FiRa Consortium required the timely delivery of updated test tools releases incorporating new test cases within a demanding schedule of Test Events. At the same time the new FiRa Test Specifications introduced new set of mandatory test cases with HPRF transmission mode requirement, which for Comarch meant necessity to update tools hardware platform. Our engineering team worked simultaneously on the development of new ranging methods and firmware for the dedicated hardware of all Comarch UWB Test Tools. This involved strategic decisions to redesign the existing MCTT MAC implementation, making it independent of the hardware on which it operates.

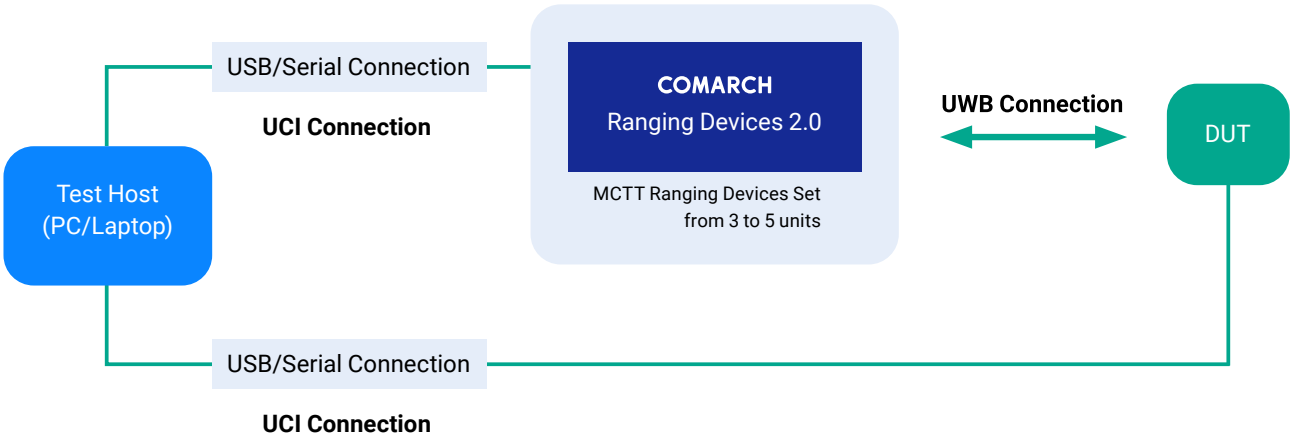
Success factors

- Cooperation with FiRa members with a proactive approach in Specifications analysis.
- Cooperation with UWB modules manufacturers who are implementing their MAC layer in parallel to identify potential issues in our implementation of FiRa test cases.
- Participating and test event hosting - conducting live testing with end-users during subsequent development stages.
- Experienced development team and management that was able to anticipate difficulties and avoid problems.
- Innovative approach to firmware architecture – platform independent, optimized for quick code execution.

Solution

FiRa 2.0 Certification Test Tools – MCTT 2.0 and ITT 2.0 are both Windows Applications based on Comarch's Automated Test Framework. They work in conjunction with our UWB enabled devices which allow the Test Tools to communicate with and test the FiRa UWB MAC layer implementations of the DUT.

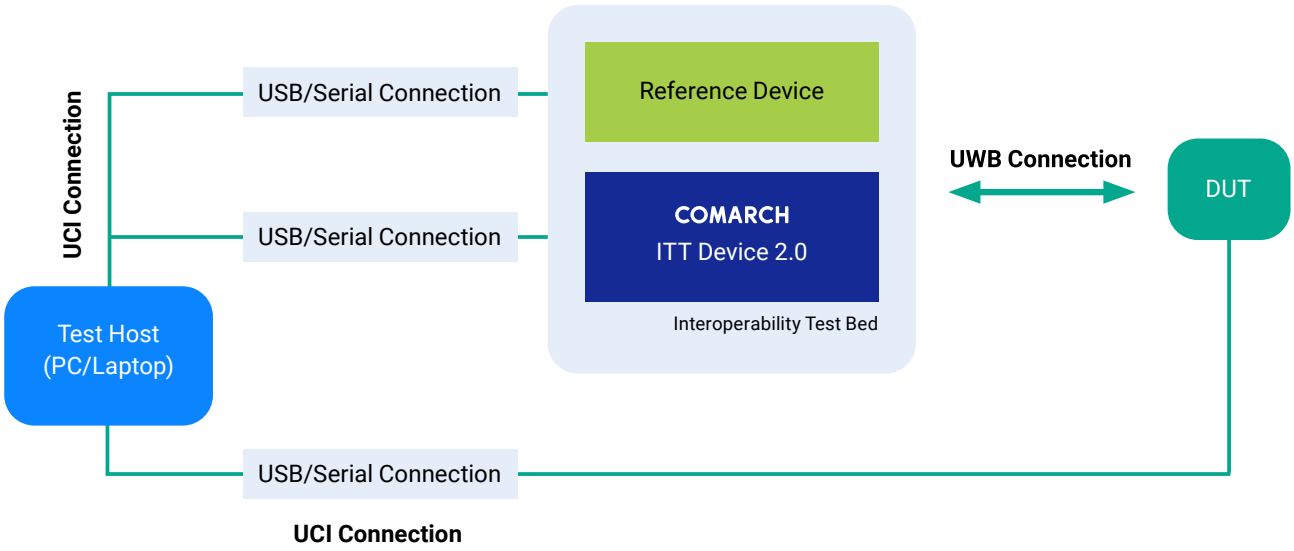
MCTT 2.0 Physical connections scheme



MCTT operates on a traditional PC/laptop with a USB connection to a set of Comarch MCTT Ranging Devices 2.0. According to the latest FiRa MAC Test Specification 2.0, the required number of MCTT Ranging 2.0 is between 3 and 5 units. Communication between MCTT Ranging Devices 2.0 and the Device Under Test (DUT) is carried over UWB.

To help Authorized Test Labs (ATLs) prepare for FiRa certification, we have also developed the Sample Device Set 2.0 The set includes two devices: a gold device and a red device, both simulating the DUT (device under test) in the FiRa test environment. The gold device represents the 'ideal' device, capable of passing all MCTT tests. In contrast, the red device is designed to exhibit invalid behavior of FiRa MAC that leads to failures of MCTT and ITT tests. By analyzing the results obtained from the gold and red devices, you can verify your product and expedite the development process to achieve FiRa compliance.

ITT 2.0 Physical connections scheme



Physical connection for ITT is similar like in the MCTT. This is a plug-and-play solution. The interoperability testbed is made up of the IOP Test Tool (one unit of ITT Device 2.0) and from 1 to 8 reference devices.

The IOP Test Tool will use the UCI to configure the DUT and each reference device for each test case. The DUT vendor should provide instructions for how to use the UCI to set all of the parameters.

The ITT Device is not an active participant in the UWB session. However, it will capture some of the UWB messages sent by the DUT and the reference device(s) so it can make an accurate judgment about whether or not the DUT meets the expected results of each test case.

Comarch offers the Comarch FiRa Device 2.0 as an alternative to an officially approved Reference Device in the IOP Test Tool. By executing IOP tests with the Comarch FiRa Device 2.0, you can validate your product's interoperability, expediting development to achieve FiRa compliance.

Test Tools features:

- Offers all the functionalities required for FiRa MAC 2.0 Certification and FiRa IOP 2.0 Certification.
- Includes a sequencer responsible for managing, selecting, and running test cases written in Python 3 scripts. It allows running single tests, groups of selected tests and all tests.
- Its modular architecture allows easily adding the further segments.
- Possibility of running tests from system console.
- Detects any changes that might be applied to the original test scripts for certification test runs, while simultaneously permitting licensed users to add their own test scripts for internal testing.

Benefits for users:

Easily navigate the evolving FiRa program with Comarch's tools, ensuring a smooth and reliable certification process.

Expedite your product launching by conducting MAC and IOP tests using Comarch tools

Stay updated with newest official Test Tools versions as well as the latest engineering versions of software, including the latest test cases dedicated to product development

Get dedicated support of the Comarch's experts throughout the development process as part of the comprehensive support package

Utilize Comarch FiRa Device 2.0 for IOP tests as a reliable reference device during testing phase of your implementation

Benefits for authorized test LABS (ATLs):

Get the status of Authorized Test Labs for the FiRa UWB standard, enhancing credibility and recognition.

Get support from Comarch for on-site assessment while becoming an Authorized Test Lab for the FiRa standard.

Gain valuable knowledge from the on-going development stages of the FiRa certification process.

Offer MAC 2.0 and IoP 2.0 certification services based on the new hardware version, which will be integrated into the next generation of UWB technology test tools developed by Comarch.

Utilize Sample Devices 2.0 for pre-testing MAC FiRa 2.0 standard and Comarch FiRa Device 2.0 for pre-testing IoP FiRa 2.0 standard.

For more information about our advanced solutions or to request a customized proposal tailored to your unique needs, please feel free to contact Comarch at technologies@comarch.com. To find out more about our services visit our website: technologies.comarch.com