7layers

A Bureau Veritas Group Company

Engineering, testing and certification
for smart automotive devices and services

7LAYERS
SOLUTIONS FOR WIRELESS
AUTOMOTIVE DEVICES & SERVICES

Test House | Systems House | Software House

Succeed in the emerging landscape of wireless automotive devices and applications with 7layers as your partner.

Vehicle-to-everything or "V2X" communication has the power to change the way we experience transportation today. Besides vehicle-to-vehicle, vehicle-to-pedestrian and vehicle-to-infrastructure applications, which basically operate peer-to-peer, V2X also comprises of vehicle-to-network applications, which are longer range.

V2X communication not only has the potential to master road safety and critical environment issues. V2X will considerably enhance the experience of transportation for drivers and passengers alike, thanks to improved in-cart connectivity.
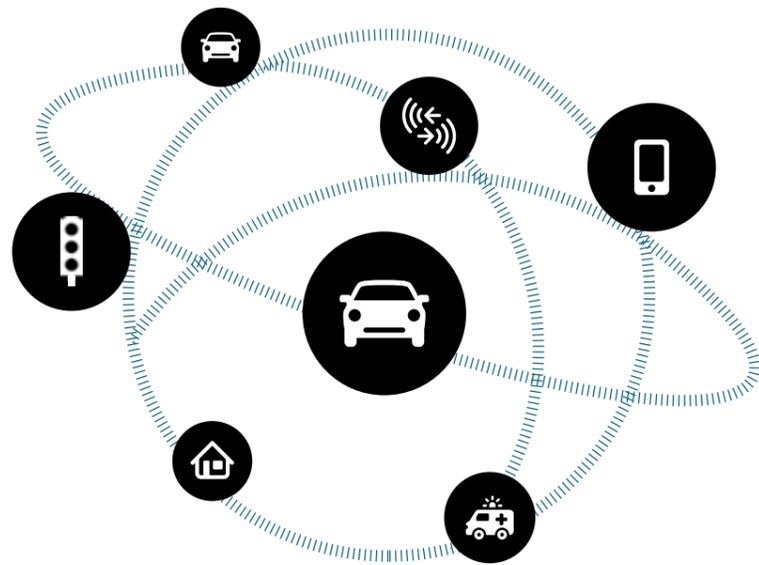
RELY ON 7LAYERS FOR A FAST AND SAFE TRACK TO THE GLOBAL MARKET

Whilst the use cases for vehicle-to-X (V2X) communication are compelling, it is vital to fulfill requirements such as performance quality, interoperability and backward compatibility to ensure end-2-end connectivity. It is expected that both cellular-V2X technology and IEEE 802.11p-based technology will co-exist using frequency ranges of 5,8655 GHz to 5,925 GHz in the USA, Europe or Korea and the 700MHz band in Japan.

As a service provider for leading automotive industry suppliers and OEM's, 7layers has years of experience in providing test and certification services for factory-fitted and aftermarket wireless connected automotive devices. We support the growing number of V2X services with extensive know-how in developing verifcation & validation programs and customized test set-ups, offering authorized test processes and providing global market access services.

SERVING AUTOMOTIVE DEVICES AND V2X APPLICATIONS

As a specialist in wireless communication technologies, 7layers supports the validation and market access processes of automotive devices and V2X applications in areas such as

- Advanced driver assistance systems (ADAS)
  - Blind spot detection, lane assist, collision warning
  - DSRC (Dedicated short range communication for V2X)
  - Autonomous driving
- In-car content and services
  - Navigation
  - Smartphone integration
  - Infotainment & Entertainment
  - Emergency call (ERA GLONASS, eCall...)
- Telematics
  - Pay as/how you drive
  - Fleet management
- Vehicle relationship management
  - Short range devices such as immobilizers, GPS tracking, remote diagnostics

TECHNOLOGY KNOW-HOW

- 2G, 3G, 4G (LTE), 5G
- CDMA
- TETRA
- Bluetooth®
- GNSS
- LPWAN
- WLAN 802.11p
- DSRC
- ZigBee
- Wireless Power Charging (Qi certification)
- NFC technologies such as RFID and others
- Other short range technologies
- Radar technology
- Application Enabler Technologies

plus many years' experience in Radio/EMC testing

MEMBERSHIPS

7layers participates in organizations with a special interest in connected vehicles (ETSI, ISO TCO24, IEEE, SAE, WiFi Alliance, Bluetooth® SIG etc.) and also those that are explicitly engaged in promoting V2X systems like

- OmniAir Consortium
- Connected Vehicle Trade Association
- Car-2-Car Communication Consortium
- CCC (Car Connectivity Consortium for MirrorLink)

Working together with the numerous connected vehicle organizations puts us into the position to support the development of specifications and to gain valuable insights into upcoming requirements. By combining these with our engineering capabilities, we are even able to offer test services at an early stage, before their release as official standards.

ABOUT US

Founded in 1999, 7layers is an international group of engineering and test centers, working in close cooperation with the wireless and automotive industries.

Due to the expanding deployment of wireless connectivity in the automotive sector, 7layers is not only supporting the development and market access processes of automotive devices, modules and applications, but also the integration, validation and maintenance of vehicle-2-X services.

PARENT COMPANY

7layers became part of the Bureau Veritas Group in 2013. As such we have easy access to the group's extensive portfolio of conformity assessment and certification services, with which they also support all players in the automotive value chain.

AUTOMOTIVE EXPERIENCE

7layers has provided test & certification services for wireless connected automotive devices of leading industry suppliers for many years.

We were also actively involved in the development of vehicle-to-X (V2X) services: For the US Department of Transportation (US DOT) 7layers and partners successfully developed the Connected Vehicle Next Stage Certification Environment. As partner in the Telematics Initiative NRW in Germany, 7layers developed an integrated test concept for a telematics services demonstrator. For a leading road toll collector we are working on verification & validation concepts and services.

ACCREDITATIONS AND LISTINGS

DAkkS & A2LA (ISO/IEC 17025), CTIA, FCC, ISED Canada, CNAS, Omniair authorized test lab for DSRC-V2X, CCC (MirrorLink), LoRa, Bluetooth® SIG, BSI (TETRA BOS), GCF, PTCRB etc, plus network operator approvals and manufacturer recognitions.

SMART AUTOMOTIVE SERVICES
# CONSULTING & ENGINEERING

7layers

Due to the trend towards V2X communication, vehicles will be fully integrated into their environment via wireless connectivity in future. To make such fully connected vehicles and the array of smart automotive services they can support a matter of course, it will be necessary to develop new business models that take into account new business partners, new technological pre-conditions and a wider scope of market access requirements. 7layers offers technical consulting & engineering services to support the development, verification and lifecycle managment of smart automotive services.

TECHNICAL CONSULTING

Our consulting services aim to enhance the set-up and running of automotive services such as fleet management, pay-as-you drive etc.

- **Initial survey**
  We use our SODA® model to provide an initial overview of the many aspects that need to be taken into consideration when developing an automotive service. The aim is to get a well structured picture of the planned set-up, including stakeholders and essential market access requirements.

7LAYERS SODA MODEL
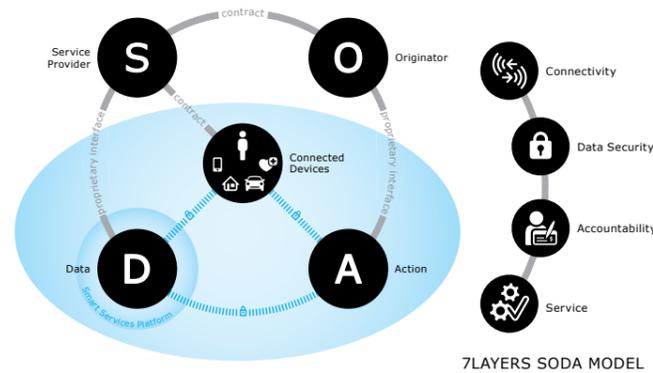
- **Analysis of suitable technologies**
  After collecting requirements and restrictions, we deliver a clear decision matrix to define the most suitable technologies.
- **Essential requirements**
  We structure the essential requirements according to
      - Automotive services components
          - Connected devices
          - Data platform
          - Action / application
          - Full automotive service
      - Requestors
          - Regulatory bodies (e.g. US DOT)
          - Industry interest groups (e.g. CCC)
          - Suppliers to market (e.g. insurance company)
          - Private quality policy (e.g. car manufacturer)

Our evaluation process helps to focus on key issues for business success such as strength, weaknesses and completeness.

- **Benchmarking**
  We compare appropriate technologies, suppliers and competitors, regarding their advantages and disdvantages.
- **Measures**
  Should issues arise, we propose and define methods that give IoT services the desired confidence level.

ENGINEERING SERVICES

- **Requirements capturing**
  The objective is to create a full description of an IoT service or its elements. Requirements are captured by reviewing conceptual papers, interviewing stakeholders, analyzing existing devices or services etc. After classification, they are described and documented using formal description techniques.

- **IoT services/products specifications**
  Based on established requirements, we help define the basic service or product design. It should be documented in a complete, consistent, correct, unambiguous and testable way.

- **Requirements and specification management**
  Requirements and specifications evolve during the lifecycle of an IoT service or its elements. The respective feedback into the process is managed via supportive systems such as Interlab EVO.

- **Test specifications & test cases**
  Requirements are analyzed and test specifications, including one or more test cases, are defined by (in-)formal descriptions.

- **Quality policy development**
  Quality policies help to ensure that IoT services processes and their elements adhere to pre-defined requirements. If existing official certification policies are insufficient, we develop technical quality policies that match the needs of IoT services providers, suppliers, private enterprises or industry interest groups.

- **Test solution development & test case implementation**
  7layers develops test solutions for complex wireless test set-ups. Experience we can build on when creating customized solutions. After the initial analysis and development phase, the test solutions and implemented test cases go through validation and documentation processes to verify that they adhere to the initial requirements and specifications.

VERIFICATION & VALIDATION

The connected devices, applications, data platforms as well as the complete IoT services must go through official and/or private verification & validation processes. In certain cases this is followed by certification or type approval. 7layers helps you to navigate through these processes as smoothly as possible.

INTERLAB EVO SUPPORTING TOOL

With Interlab EVO from 7layers the verification lifecycle management process of complete IIoT processes can be supported.

EXAMPLE OF AN AUTOMOTIVE SERVICE
IN-VEHICLE EMERGENCY CALL

Automated emergency-call systems for vehicles shall provide professional help more quickly, thus saving lives and/or reducing the negative consequences of accidents. In-vehicle emergency call systems can either be private systems - provided by car manufacturers or other smart services providers - or public services - required by the government.

In any case, such services can be regarded as typical "smart IoT services", relying on wireless communications technologies, using in-vehicle sensors to send data about an accident to public safety answering point, which will – after the appropriate data analysis - initiate the necessary actions, e.g. send the required emergency vehicles to the accident site.

In our SODA model of the EU 112 eCall system, the European Union can be seen as the Originator of this smart emergency call system. The EU member states in this case are the Service Providers. The Public Safety Answering Points (PSAP) receive and analyze the minimum set of data (MSD) a vehicle sends out after a crash. Depending on the analysis, the PSAP then trigger the appropriate action, which can be the sending out of a rescue vehicle.

THE ECALL SYSTEM
ILLUSTRATED VIA OUR SODA MODEL
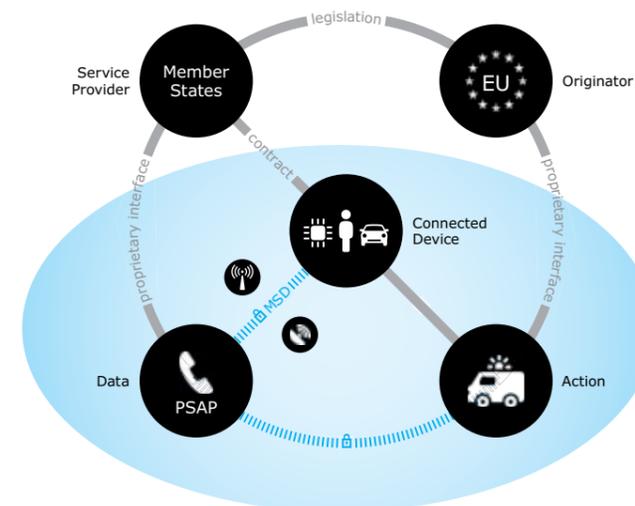
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7layers supports the development of such smart in-vehicle services, based on its consulting, engineering and test capabilities. In the EU, the 112 based "eCall system" will become mandatory from March 2018 onwards for all new types of vehicles up to 3.5 tons (i.e. "normal" cars and small delivery vans). Under eCall, the coexistence with other 3rd party systems (e.g. offered by car manufacturers) which provide additional functionalities, has been safeguarded.

In Russia, the "ERA GLONASS" system is already mandatory since 1st January 2017, for new vehicles such as cars, vans, lorries, busses etc. ERA GLONASS is harmonized with the eCall system for enhanced interoperability between both systems.

EU TYPE-APPROVAL OF A 112-BASED ECALL
IN-VEHICLE SYSTEM COMPONENT

eCall distinguishes between three categories of stakeholders that should adhere to either a subset or all eCall regulations for in-vehicle system (IVS) verification. These are the vehicle manufacturers, the manufacturers of separate technical units (e.g. the connectivity box) and the providers of technical components (e.g. chipsets).

EU 112 eCall in-vehicle systems must

- be crash resistance
- provide automatic and manual triggering
- warn if eCall system is unavailable
- successfully transmit a minimum set of data (MSD) to a public safety answering point (PSAP)
- determine an up-to-date timestamp for an incident
- determine up-to-date vehicle location via Galileo and EGNOS satellites
- connect and transmit data via mobile networks
- comply with EU data protection and privacy rules (data must be deleted after the emergency, system not subject to constant tracking etc.)

TESTING REQUIREMENTS FOR IN-VEHICLE
ERA GLONASS EMERGENCY CALL SYSTEM

- EMC, environmental and mechanical resistance testing
- Functionality testing of in-vehicle emergency call system and data transfer protocols
- Hands-free audio quality testing in a vehicle
- Wireless communication module testing
- Navigation module testing of in-built connectivity box
- Crash detection feature testing

7layers handles the required test projects for emergency call systems with experienced, dedicated project managers.

ENGINEERING SERVICES
RF CONSULTING FOR AUTOMOTIVE DEVICES

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Maximize the RF performance of your wireless automotive devices for reliability and best performance. Our formalized RF consulting packages support customers in enhancing the radio performance of their wireless connected automotive devices, so that they run smoothly through the required OTA antenna test and certification processes. Should problems occur during the test & certification process, or should any engineering changes be required, 7layers can provide you with expert know-how to successfully address such issues.

PRODUCT DEVELOPMENT PACKAGES

DEVELOPMENT SUPPORT
If you start the development or already have first prototypes available and want to know whether the planned product will meet the requirements, 7layers will review the design and support the antenna integration. We conduct a small set of spot checks to provide confidence in the early development phase, including such activities as design review, antenna integration and characterization as well as pre-evaluation.

DESIGN REVIEW
Our RF experts ensure that your device starts out on the proper path. 7layers provides an in-depth design review even before you have your first prototype available. This includes the identification of potential problems to help improve RF performance at a very early stage.

ANTENNA INTEGRATION
7layers supports the integration of the antenna into your product. The evaluation of the antenna's key performance parameters and our recommendation on how to correctly integrate the antenna into the product will result in the best possible OTA performance.

ANTENNA CHARACTERIZATION
Identifying the antenna that performs best together with your device can be a challenge. Through comprehensive antenna measurements, our experts will help you find the right antenna that meets your particular needs.

PRE-EVALUATION
Make sure you are ready to begin the certification process, by taking advantage of our pre-evaluation testing services. We conduct a small set of spot checks to provide confidence before going through full certification. We are also able to run this quick evaluation of your product in the early development phase in order to establish relevant data points or to facilitate the comparison of two different product designs.

FAILURE ANALYSIS PACKAGE

7layers can help evaluate any RF design problems that are causing performance degradations or even testing failure. We are able to identify the root cause of these phenomena by conducting a design review or spot checks and offering suggestions to alleviate the problem. This includes such activities as diagnostics, design review and pre-evaluation.

PRODUCT CHANGE EVALUATION PACKAGE

If you need to know how your engineering change will affect the device performance and how it will impact your device's certification, 7layers is able to evaluate and benchmark the change to the overall device performance. This means that you are prepared for alterations in performance and effects on the certification requirements resulting from your next engineering change.
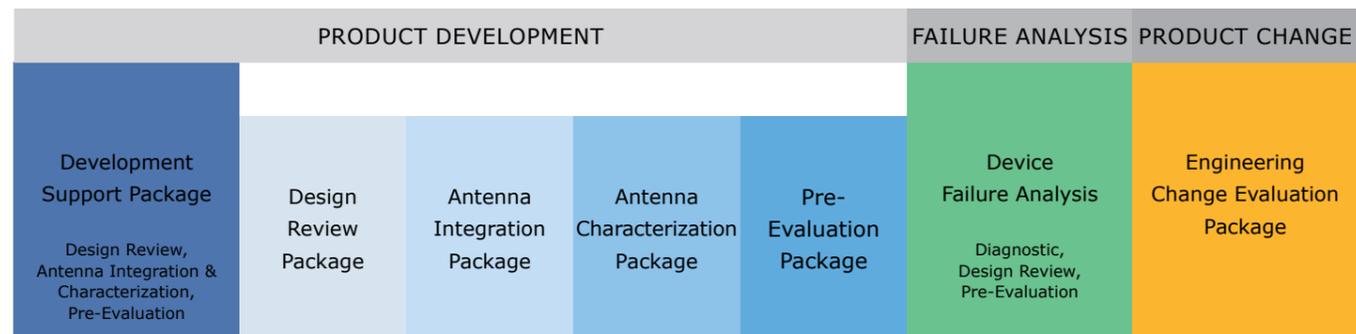
V2X TEST SERVICES

Vehicle-2-X technologies will enable all connected vehicles and infrastucture systems to communicate with one another, exchange information and initiate actions. That way traffic flows shall be optimized, congestion and emissions reduced and accidents cut in numbers.

To fullfill the demanding market expectations of retailers and consumers and at the same time meet the growing requirements of governmental bodies, automotive devices must be tested carefully. 7layers has years of experience in bringing wireless connected devices to the global market. Not only do we handle the respective test processes, we also provide consulting, R&D testing and engineering services to help you meet market requirements. This is followed by global type approval handling and certification services.

TEST PROJECT HANDLING

7layers accredited engineering & test centers in Germany, Asia and North America are able to provide development testing and product validation in accordance with leading certification and regulatory requirements. If required, we extend our portfolio with the extensive test facilities of Bureau Veritas, our parent company, or other experienced partners.

Testing takes place in accredited laboratories with a wide range of test equipment from various manufacturers. Our state-of-the-art laboratories are managed via the Interlab EVO test management system which automates test plan generation, test execution and test report generation, to ensure traceable and exactly reproducible results.

Projects are accompanied by a dedicated 7layers project manager to ensure that your project is handled efficiently and with a high level of confidentiality.

R&D TESTING

To detect faults at an early stage in the product development process, 7layers offers a variety of pre-testing services.
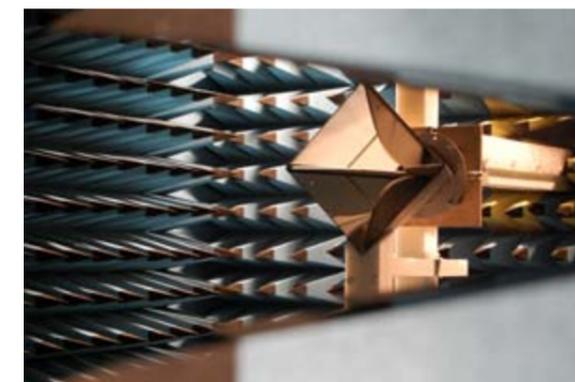
For reliable pre-testing results we use the same test equipment and the same test procedures as we do in our accredited laboratories for the final certification process. Pre-testing can be combined with expert analysis and support to help speed up product development.

To check the product behavior, 7layers offers pre-testing services for

- RED / FCC / ISED Canada regulatory requirements
- EMC
- Radiated spurious emiision
- RF (radio frequency)
- Interoperability and field pre-tests in real live networks

CERTIFICATION TESTING

7layers distinguised between certification testing for industry interest groups and certifcation testing & type approval, required by official regulatory bodies. Thanks to a great array of accreditatiosn and authorizations we can fulfill a large number of market access requirements.

PRODUCT DEVELOPMENT					FAILURE ANALYSIS	PRODUCT CHANGE
Development Support Package Design Review, Antenna Integration & Characterization, Pre-Evaluation	Design Review Package	Antenna Integration Package	Antenna Characterization Package	Pre-Evaluation Package	Device Failure Analysis Diagnostic, Design Review, Pre-Evaluation	Engineering Change Evaluation Package

V2X TEST SERVICES
TEST & CERTIFICATION ACCORDING TO INDUSTRY INTEREST GROUPS

Manufacturers, retailers, operators and smart IoT services providers are concerned that devices with wireless connectivity are safe to use, interoperable and in accordance with their requirements. For certain applications and/or technologies they organize themselves in industry interest groups to define the respective specifications and certification requirements.

7layers is authorized to handle a large variety of test & certification services according to those industry interest groups that are playing an important role in the wireless connected world. For the automotive industry the follwing services are especially important.

IN-CAR CONNECTIVITY WITH MIRRORLINK®

MirrorLink is an open standard developed by the Car Connectivity Consortium (CCC). It enables drivers to easily access their smartphone's applications via a car's in-built navigation screen or steering wheel buttons. MirrorLink uses well established, non-proprietary technologies such as Bluetooth®, USB and Wi-Fi, Universal Plug and Play (UPnP™) and Virtual Network Computing (VNC™). 7layers has been actively involved with the CCC from an early start and is world's most experienced MirrorLink test lab group worldwide.

MIRRORLINK® DEVICE CERTIFICATION

MirrorLink Device Certification is based on conformance and client/server interoperability testing. The complete certification process, including maintenance of already certified products, is described in the CCC's Program Management Document. Smartphones and infotainment systems are evaluated accordign to MirrorLink specifications.

DEVICE CERTIFICATION SERVICES

- Pre-testing and preperation
- Certification services
  - Consulting
  - Accredited lab environment
  - Reporting to CCC

MIRRORLINK® APP CERTIFICATION

The CCC provides a common application programming interface that optimizes apps for in-car use and ensures they work with any MirrorLink compliant smartphone or head unit. It offers two certification levels: Base-certified apps can be used when the car is stationary. Drive-certified apps may be used while driving. The apps also have to adhere to region specific driver distraction guidelines.

APP CERTIFICATION SERVICES

- Preperation workshop and pre-testing
- Base-level certification
- Drive-level certification
  - for European Union (ESoP)
    - no driver workload tests required
  - for North American market (AAM and NHTSA)
    - driver workload tests required
  - for Global Market access, based on European, North American and Japanese requirements
    - driver workload tests required

BLUETOOTH® TESTING & QUALIFICATION

Bluetooth® technology is of growing importance for the automotive industry. Bluetooth hands-free calling systems are being integrated in millions of new vehicles and the latest Bluetooth developments can lead to new applications, which are monitoring and controlling mechanical and electrical systems, or even a driver's biometrics.

7layers has outstanding experience with the Bluetooth technology. We were deeply involved in the development of early Bluetooth Qualification Programs and Test Specifications. Today 7layers has two officially recognized Bluetooth Qualification Test Facilities (BQTF's) and three experienced Bluetooth Qualification Consultants (BQC's). We also offer the world's most successful test solution for Bluetooth technology: Our Interlab® Test Solution Bluetooth RF covers all required Bluetooth RF tests.

The 7layers BQTF's cover all core specifications from version 2.0 up to 5.0, including Bluetooth Low Energy. Due to larger broadcasting capabilities, longer range, improved speed and improved interoperability features, Bluetooth 5.0 is supporting evolving IoT applications. Our Bluetooth services encompass:

BLUETOOTH PRE-QUALIFICATION SERVICES

By testing some critical factors, you gain valuable knowhow about product behavior during the R&D phase.

BLUETOOTH INTEROPERABILITY SERVICES

Evaluate how automotive devices connect to Smartphones from various manufacturers via Bluetooth and how stable the connections are.

LISTING STRATEGIES

We develop efficient listing strategies for your comprehensive product portfolio, thus reducing test time and qualification costs.

BLUETOOTH QUALIFICATION SERVICES

In our BQTFs, 7layers provides all Bluetooth test services needed for qualification. Our BQEs handle the complete qualification process and help ensure your products meet the requirements.

WIRELESS POWER CHARGING

Charging mobile devices simply by placing them on specially prepared charging pads is a useful application also in the automotive world. Further use cases are on the horizon, such as "charging roads" that charge electrical cars as they drive. Behind this are technologies that enable wireless power charging via specially designed transmitters and receivers.

The Wireless Power Consortium (WPC) is developing the universal "Qi"standard for devices with wireless power charging technology. Any phone or other device carrying the Qi logo will work with any Qi charging surface.

7layers offers Qi testing and certification via the WPC authorized test laboratory of its mother company Bureau Veritas in Korea, encompassing:

- Low Power testing (5W) and certification
- Qi compliance and/or pre-compliance testing
- IOP testing and/or pre-IOP verification
- Debugging support
- Issuing of Qi certificate and test report
- Medium Power testing and certification

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7layers offers a large variety of test services for connected automotive devices to achieve international market access with testing and type approval handling for certifications such as CE, FCC, ISED Canada etc., required by regulatory bodies.

EMC TESTING

7layers conducts EMC test services for wireless modules and automotive devices according to regulatory requirements (RED, EMC Directive for automotive). We provide the necessary radio test expertise in combination with our EMC test capabilities and other test facilities.

Via our Bureau Veritas laboratory in Nuremberg, which is a notified technical service of the German Federal Motor Transport authority (KBA), 7layers also handles OEM requirements regarding EMC testing of vehicles and integrated wireless equipment. Depending on your target market we provide you with both the neccessary e-marking and/or E-marking.

RADIO TESTING (RF CONDUCTED)

Safe and effective use of radio frequency is crucial for wireless connected devices. 7layers laboratories are accredited for testing in accordance with many regulatory and industry interest group requirements. Radio testing for the automotive industry includes V2X devices and intelligent transport systems implementations.

OTA (OVER-THE-AIR) TESTING

Our accredited, high-tech laboratories are continuously updated in accordance with the latest antenna testing requirements for the wireless industries.

INTEROPERABILITY AND FIELD TESTING

7layers interoperability and field testing services are based on years of experience with wireless communications technologies and products. Depend on our reliable and reproducible results thanks to an experienced, well trained and certified staff and systematic, automated test processes. Due to our global set-up, 7layers is able to arrange field testing in almost all important cellular networks worldwide. Interoperability test services are suited for Onboard units and Roadside equipment.

PROTOCOL TESTING

Protocol testing is critical due to the highly complex protocols used in mobile communications devices. 7layers is one of world's leading experts in protocol testing.

ELECTRICAL SAFETY

Our services include: Safety testing of electrical appliances. Consulting during the development phase and regarding general safety issues. Creation of globally recognized CB reports. Monitoring production via inspections.

EXPLOSION PROTECTION

In the laboratories of our parent company Bureau Veritas we conduct risk analysis as well as testing & certification of electrical and non-electrical devices according to ATEX, IECEx, USA/Canada and other international requirements.

EMERGENCY CALLS SYSTEMS

ECALL REGULATORY APPROVAL

To achieve EU type-approval for an 112-based eCall in-vehicle system component, vehicle manufacturers, the manufacturers of separate technical units (e.g. the connectivity box) and the providers of technical components (e.g. chipsets) must ensure their products adhere to eCall regulations of the EU.

ERA GLONASS EMERGENCY CALL SYSTEM

Test requirements for in-vehicle ERA GLONASS emergency call systems encompass test services such as EMC, environmental, mechanical resistance, functionality, in-vehicle emergency call system, data transfer protocols, audio quality, wireless communication module, navigation module, crash detection feature.

7layers organizes and handles the regulatory test projects for eCall, ERA GLONASS and private emergency call systems with its experienced and dedicated project managers.

DSRC V2X CERTIFICATION

As one of the developers of the Connected Vehicle Next Stage Certification Environment of the US Department of Transportation (USDOT), 7layers has been the first OmniAir authorized test laboratory worldwide to conduct testing and certifcation according to the OmniAir certification program.

The OmniAir Certification program is based on SAE and IEEE specifications using the 5.9 GHz DSRC radio spectrum. It defines the requirements V2X devices must meet to prove compliance to the USDOT ITS program.

RADAR SENSOR TESTING

In motor vehicles radar technology is playing a leading role, supporting automatic cruise control with "long range radar" and anti-collision systems with "short range radar". From the perspecitve of regulatory bodies, radar sensores are radio devices that must adhere to standards specified by ETSI (for Europe), FCC (for USA), ISED Canada etc. 7layers offers radar sensor testing for V2X applications operating at 24.05 - 24.5 GHZ, 76-77 GHz and 77 - 81 GHz, thus covering the requirements of the RED, the FCC and the ISED Canada. Testing takes place in our newly equipped fully-anechoic-rooms and antenna test chambers.

CERTIFICATION & TYPE APPROVAL SERVICES FOR AUTOMOTIVE DEVICES

Wireless automotive devices and their applications tend to have an extended lifetime, in comparison to other wireless products. This is compounded by the fact that often pre-certified modules are implemented in the connected automotive device and that over-the-air software updates are still far from the norm. For this reason manufacturers and suppliers have to ensure that they follow the best possible life-cycle strategy over a period of years.

As a service provider for leading suppliers of the German automotive industry, 7layers has developed an outstanding level of experience in developing suitable lifecycle strategies for factory-fitted and/or aftermarket automotive devices and applications.

Due to the dynamics of the communications technologies, market access requirements for devices with integrated wireless connectivity are changing constantly. To ensure that we provide you with the correct information, we keep track of these changes and update our respective data bases continuously.

Our certification and regulatory type approval services cover:

PRODUCT LIFE-CYCLE STRATEGIES

Based on years of experience and up-to-date knowledge of certification, regulatory and other market access requirements, we start every project by developing a customized strategy to reduce test time as well as certification, qualification and type approval handling costs.

CERTIFICATION

7layers accredited laboratories offer a large variety of certification services for wireless devices required by industry interest groups. In certain cases the capabilities of our labs are extended with the huge portfolio of our parent company Bureau Veritas. For the automotive industry our offerings encompass:

- Bluetooth® SIG qualification
- MirrorLink (Car Connectivity Consortium)
- Qi certification (wireless power charging)
- Mobile network operator assessments
- PTCRB (USA) & GCF (Europe, Asia) certification and many more

REGULATORY TYPE APPROVAL - WORLDWIDE

Our international team of type approval experts offers consultancy and support regarding rules and regulations for wireless connected devices in all countries worldwide. As a provider of such services we have built up specific experiences in this field. Our well established, international network supports us and our clients reliably, in case in-country testing and/or the introduction of local agencies is necessary. Our services cover the requirements of the

- RED Directive
- EMC Directive for automotive
- Electrical safety (CE, e-mark, E-mark)
- Explosion protection (Ex)
- FCC
- ISED Canada and many others worldwide
- Emergency call (ERA GLONASS, eCall, ...)
- DSRC V2X certification

WORLDWIDE NETWORK OF	
Experienced type approval consultants 7layers accredited laboratories BV & partner laboratories	
Up-to-date know-how Years of experience	Realistic time schedules
Knowledge base for more than 200 countries	Fixed pricing for most countries
Participation in review boards & committees	Strategies for product families & variants
Provision of inside knowledge	Distribution of all necessary subcontracting

CERTIFICATION AND TYPE APPROVAL MAINTENANCE

Connected automotive devices are often built by implementing chipsets or certified modules. This speeds up market access of the end-product but can lead to complications if modules have to be updated. 7layers analyses the impact of module updates on the certification status of the automotive end-product and establishes a process to optimize the handling of module updates. We also keep an eye on changes regarding type approval and certification regulations and inform our customers accordingly.

![7layers logo]

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