



Press release

The BMW Group at the Mobile World Congress 2018.

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1. Summary.

The focus on the customer and their requirements underpins the BMW Group's presentation of the next steps on the road to digital and intelligent connectivity between the driver and vehicle at this year's Mobile World Congress (MWC) in Barcelona, taking place from 26 February – 1 March.

- Another handy digital service will be introduced in 2018 to further facilitate seamless connectivity. The **BMW Digital Key** will make it possible to unlock a BMW using a smartphone. What's more, up to five digital copies of the key can be shared with other users.
- Widespread connectivity will also be an essential requirement for autonomous driving in the future. In view of this, the outdoor area of the BMW Group stand will feature a BMW i3 in action as part of a **showcase** designed to demonstrate that **autonomous driving (Level 5)** is set to become a reality in the not-too-distant future.
- A new technological approach to full connectivity between smartphones and vehicles will also be on show. The **eSIM** will soon make it possible to incorporate the vehicle into the user's existing mobile phone contract, paving the way for a whole range of different functions.

BMW Group location: Outside area in front of Hall 5 / Booth OA3B. 140.

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2. The BMW Connected experience. With smart access for more flexibility.

In Barcelona, the BMW Group is exhibiting a new function that takes integration of the car into the BMW driver's digital lifestyle a step further. Today, customers already have the ability to use digital and personalised services from a wide variety of sources while planning their trip – including smartphones, Google Assistant, Apple Watches and Amazon Alexa – before they get into their BMW. Once inside the vehicle, the seamless connectivity continues in the form of features such as access to email accounts (Microsoft 360), integration of Skype for Business and the ability to import a destination address from a smartphone straight into the car's navigation system. The next logical step will now see smartphones turn into car keys.

The **BMW Digital Key** allows the vehicle to be unlocked and locked again with just a smartphone. Once in the car, the engine can be started with the help of the Wireless Charging Pad. But that's not all, as digital services will form the basis for greater personalisation and flexibility in every respect. For instance, the Digital Key will allow vehicle owners to select up to five other people with whom they wish to share their car key. When it is first launched, the Digital Key will be accessible from smartphones via BMW Connected, and will initially be available for all Samsung smartphones (with NFC capability).

The BMW Digital Key will be made available from July 2018. In future, a software upgrade facility will enable the over-the-air transfer of new functions and digital services to the user's vehicle.

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3. The BMW Personal CoPilot experience. Autonomous driving (Level 5) showcase with a BMW i3.

Progressing from assisted driving to fully automated and autonomous driving.

Over recent years, the BMW Group has demonstrated the key underpinnings for autonomous driving at various events and will do so again at this year's Mobile World Congress. As long ago as 2006, a BMW 3 Series was lapping the Hockenheim race circuit by itself. In 2014, an automated prototype from the BMW Group drifted its way around the Las Vegas Speedway for the first time, proving that even driving at the limits of performance without driver intervention is within the realms of possibility. Through its acquisition of a stake in HERE in 2014 and collaborations with Intel, Mobileye (since 2016) and other partners, the BMW Group has initiated the development of the BMW iNext for series production. When it is launched in 2021, the new vehicle will set fresh benchmarks with its electric, highly automated and fully connected concept.

The roadmap to autonomous driving – from Level 0 to Level 5.

Level 0 describes a car that moves without any form of assistance functions. The responsibility for the task of driving lies entirely with the driver at all times.

Level 1.

This refers to the first ever assistance systems aiding safe and comfortable driving, with functions such as cruise control, which keeps the vehicle moving at a set speed.

Level 2 (today).

Driver assistance systems provide a preliminary stage of automated driving. The driver is responsible for the task of driving at all times.

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Level 3 (starting in 2021 with BMW iNext).

Once Level 3 is reached, it will be possible for the driver and vehicle to share responsibility for controlling the vehicle. During highly automated driving in traffic that is moving in the same direction and is segregated from oncoming traffic, drivers will be able to perform secondary activities on in-vehicle media for longer periods of time or simply relax (eyes off). They must, however, still be in a position to take over the task of driving again within a reasonable amount of time (a few seconds) when prompted by the system.

Level 4 (starting in 2021 with technical provisos, BMW iNext).

Fully automated driving in urban traffic and – in a version with extended functionality – in traffic that is moving in the same direction and is segregated from oncoming traffic. The driver can sleep during long-distance journeys if necessary. The key difference compared to Level 3: the timespan for taking over control again is far longer (mind off).

Level 5 (developments in parallel to Level 3 and 4, expected to be possible post-2020 in the form of pilot projects).

Autonomous driving. Passengers sit in the vehicle without any involvement in the task of driving; no driving licence is required (driver off). Assuming the vehicle is fitted with pedals and a steering wheel, the driver may take over control if they wish, but will not be obliged to do so at any time.

The showcase at the MWC Barcelona 2018.

The Autonomous Driving showcase presented by the BMW Group at the MWC 2018 in Barcelona takes a look ahead to the functionality of and interaction with Level 4 and Level 5 vehicles. A BMW i3 gives an impressive demonstration of how fully automated driving technology can transform the future face of personal mobility. In the showcase, a BMW i3 sets off (with nobody aboard), having been summoned via a smartphone app by its owner – in this case a visitor to the show – to pick them up. The vehicle can be sent to a selected pickup point, with the smartphone used for access authorisation once it

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arrives. Another authentication option illustrated as part of the showcase is the prototype exterior display, which even greets the show visitor by name. This display makes it possible to unlock the car doors by touch control, as an alternative to using the smartphone app. As it will no longer be necessary (in the Level 5 scenario) for any of the occupants to be directly involved in the task of driving, a Rear Seat Entertainment System with a prototype design initiates the journey. The destination address is transferred to the vehicle beforehand via the smartphone app. The driver's seat stays empty. Thanks to the safety mechanisms implemented, the journey can only begin once all occupants have fastened their seat belts.

As no further intervention is required throughout the fully automated journey, show visitors can spend their time aboard the vehicle as they please or explore the Entertainment System, which can also be used to initiate stops en route. It is also possible to control vehicle functions (this is illustrated at the show stand by the horn, headlight flasher, and door locking/unlocking). Once the destination has been reached, the show visitor locks the car using the exterior display, and it then parks itself automatically.

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4. Connectivity technology.

A glimpse into the future: BMW eSIM technologies and the road to 5G connectivity.

By upgrading the vehicle with a second eSIM, the BMW Group is providing a valuable insight into the future development of connected driving and the technological possibilities it will open up.

The built-in eSIM card included as standard in all BMW models since 2016 already enables a BMW car to switch provider depending on reception (e.g. when driving in a different country), and so guarantees continuous availability of BMW Connected Drive services. The advances made with the communications control unit and the addition of a second eSIM mean customers will also be able to benefit from this flexibility of use in future. This technology will, for instance, allow the BMW to be linked to the user's existing mobile phone contract, meaning that the vehicle will then have two active SIM cards that can be used simultaneously.

The advantage of integrating the vehicle into a mobile phone contract is that it allows selected functions to run via the second eSIM instead of the mobile device. Calls could be received directly by the car, for example, and the connection established via the built-in eSIM and the BMW's aerial, resulting in flawless reception.

Customers can already book extra data allowance for their BMW's integral WiFi hotspot easily and straight from their vehicle. The second eSIM will give them the flexibility of being able to use this data allowance or other options from their existing contract in their BMW. In other words, the eSIM will act as an electronic variant of the multi-SIM option already offered by providers.

An example of future eSIM technology will be demonstrated at the BMW stand. The eSIM prototype on display has been co-developed with Telekom, AT&T,

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G&D and Intel. The partners' show stands provide further insights into this technology.

Cooperative Intelligent Transport Systems (C-ITS) can help make traffic much more efficient and reduce the number of accidents significantly through the sharing of information relevant to road safety. The BMW Group now has around ten million connected cars on the road. Since the launch of the new BMW 7 Series in 2015, the correspondingly equipped vehicles come with a variety of sensors for detecting services like hazard warnings and broadcasting this safety information in real time via BMW Connected Drive.

The BMW Group started the rollout of C-ITS services back in 2013, with live information on charging stations, filling stations and parking information. Today, BMW drivers receive all sorts of traffic information, such as hazard warnings, speed limits, accident warnings, wrong-way driver alerts, on- and off-street parking information and far more besides.

From mid-2019, the BMW Group will begin to offer yet more connectivity and information services, including information on roadworks, requests from the authorities to form emergency vehicle corridors, and warning messages re. dynamic speed limits. By providing these services, BMW is fully supporting the scope of the EU's 2010 ITS directive, whose additional services are slated for introduction in 2019.

One of the objectives of the BMW Group is connected and cooperative automated driving. The company is therefore already concentrating on the development and implementation of cooperative use cases and services. Bi-directional communication between road users is a key aspect in the future of mobility, which is why the BMW Group is working on the implementation of the LTE-based, wireless Cellular Vehicle-to-Everything (C-V2X) technology offering unrivalled benefits for the development of the **5G ecosystem**.

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The BMW Group already leads the way in implementing traffic safety messages based on backend-supported mobile technology (LTE), such as warnings of hazards, accidents, banks of fog and heavy rain, to name just a few. These will be complemented within the next few months by the rollout of C-V2X direct communication technology in the allotted frequency range, enabling time-sensitive traffic messages.

The technological neutrality of usage rights for the 5.9GHz frequency band is the key enabler for connected, cooperative and automated mobility that is potentially able to reduce the number of accidents and increase efficiency across the entire transport sector.

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The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 31 production and assembly facilities in 14 countries; the company has a global sales network in more than 140 countries.

In 2017, the BMW Group sold over 2,463,500 passenger vehicles and more than 164,000 motorcycles worldwide. The profit before tax in the financial year 2016 was approximately € 9.67 billion on revenues amounting to € 94.16 billion. As of 31 December 2016, the BMW Group had a workforce of 124,729 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

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