Datasheet

CableFree Emerald Cellular Product Range (4G/LTE)

Custom SIM cards for Private 4G & 5G LTE

Overview

About Wireless Excellence

Founded in 1996 and with headquarters in Oxford UK, Wireless Excellence Limited is a leading designer and supplier of outdoor and indoor Broadband Wireless communication products.

With a complete range of Wireless solutions including Radio, Microwave, Millimeter-Wave, 4G/5G/LTE, Free Space Optics and Carrier WiFi, customers in over 80 countries have chosen CableFree as the "one stop shop" brand of choice for dependable wireless networking.

About 4G/LTE Solutions

Using the latest Software Defined Radio and RF technology, our cellular 4G/LTE solutions operate in all the common cellular bands from 380MHz-5925MHz, including Base Station and CPE devices for high performance mission-critical applications.
Our advanced Cellular CPE platform with IP/Ethernet interfaces also supports VOIP with analogue RJ11 connections to ensure simplicity of installation. Flexibility, performance and low cost of ownership are ensured.

Note: Due to policy of continuous product improvement, product specifications may change without notice

Custom SIM cards for Private 4G/5G LTE Networks

Custom SIM cards are available for operators using CableFree LTE equipment. SIM cards can be customised with operator branding and specific information. A compatible SIM card is required in all LTE networks to enable the User Equipment (UE), CPE device to connect to the LTE network.

For Private LTE networks, the SIM cards are programmed with suitable data to enable access just by relevant devices and users.

Customisable Branding for SIM cards

The Front and Rear of the SIM cards are customisable with branding and user instructions.

The IMSI number and any other required customer/user-specific identifiers can be printed on the card also. Shown above is a unique IMSI number.

CableFree Custom SIM cards

SIM card Data

The various data stored on the SIM card include the IMSI, Ki and OPc which are required to connect the device to the LTE Network. These are specific to each LTE network and are specified by the Network Operator.

IMSI

The International Mobile Subscriber Identity or IMSI is used to identify the user of a cellular network and is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network. It is also used for acquiring other details of the mobile in the home location register (HLR) or as locally copied in the visitor location register.

Authentication key (Ki)

The Ki is a 128-bit value used in authenticating the SIMs on a GSM mobile network (for USIM network, you still need Ki but other parameters are also needed). Each SIM holds a unique Ki assigned to it by the operator during the personalization process. The Ki is also stored in a database (termed authentication center or AuC) on the carrier's network.

SIM card Security

CableFree SIM cards feature the latest in security.

The COMP128 algorithms are implementations of the A3 and A8 algorithms defined in the GSM standard. The A3 algorithm is used to authenticate the mobile station to the network. The A8 algorithm is used to generate the session key used by A5 to encrypt the data transmitted between the mobile station and the BTS.

Several COMP128 algorithms were designed and are in use:

COMP128-1 – original algorithm with known weaknesses

COMP128-2 – stronger algorithm which still clears the 10 rightmost bits of Kc

COMP128-3 – same algorithm as COMP128-2 with all 64 bits of Kc generated

COMP128-4 – based on the 3GPP (3rd Generation Partnership Project) algorithm "Milenage", which uses AES

Privacy and Roaming

SIM cards provided by CableFree are typically dedicated to work just to the user network where roaming on/off the network is deliberately not supported. This is because the customer networks are often "closed" in nature and there is no support for billing of users who roam into the network.

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Physical Sizes

SIM cards have been made smaller over the years; functionality is independent of format. Full-size SIM were followed by mini-SIM, micro-SIM, and nano-SIM. SIM cards are also made to be embedded in devices.

For most Outdoor, Desktop and MiFi LTE CPE devices, mini-SIM (2FF) is most popular. In the samples above, the 2FF format can be "snapped out" by the user when installing. Optionally, smaller outline SIMs are available. Mini-SIM (or 2FF), Micro-SIM (or 3FF), Nano-SIM (or 4FF)

CableFree: Wireless Excellence offers high performance 4G/LTE CPE solutions for a wide variety of applications. Covering all common 4G/LTE bands of the base stations which enables great flexibility of operation and future upgrade path.

4G/LTE networks using CableFree Emerald CPEs enjoys great flexibility, high performance as well as very low cost of operation and ownership. "Stand Alone" operation is possible which enables the 4G Base station to connect remote terminals without need for external network elements.. This is ideal for closed network type applications such as CCTV, campus sites and disaster recovery scenarios, where there is no centralised infrastructure or Network Operations Centre.

SIM card sizes

SIM card	Introduced	Standard reference	Length (mm)	Width (mm)	Thickness (mm)	Volume (mm3)
Full-size (1FF)	1991	ISO/IEC 7810:2003, ID-1	85.60	53.98	0.76	3511.72
Mini-SIM (2FF)	1996	ISO/IEC 7810:2003, ID-000	25.00	15.00	0.76	285.00
Micro-SIM (3FF)	2003	ETSI TS 102 221 V9.0.0, Mini-UICC	15.00	12.00	0.76	136.80
Nano-SIM (4FF)	early 2012	ETSI TS 102 221 V11.0.0	12.30	8.80	0.67	72.52
Embedded -SIM (eSIM)		JEDEC Design Guide 4.8, SON-8 ETSI TS 103 383 V12.0.0 GSMA SGP.22 V1.0	6.00	5.00	<1.00	<30.00

For Further Information

Please Contact Us for more information on our exciting range of solutions using LTE technology

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