TIA-102 Interfaces

What standard interfaces do P25 systems have?

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Acknowledgement of Country

NSW Telco Authority acknowledges, respects and values Aboriginal peoples as the Traditional Custodians of the lands on which we live, walk and work. We pay our respects to Elders past and present. We recognise and remain committed to honouring Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships, and continuing connection to their lands, waters and seas. We acknowledge their history here on these lands and their rich contribution to our society. We also acknowledge our Aboriginal employees who are an integral part of our diverse workforce, and recognise the knowledge embedded forever in Aboriginal and Torres Strait Islander custodianship of Country and cultures.

The 'Connecting Communities' artwork used here is by

Alison Williams, a proud Gumbaynggirr woman.

NSW Telco Authority

Contents

Introduction	**5**
Selected Definitions	**6**
Common Air Interface (CAI)	**7**
Mobile Data Peripheral Interface	**8**
Inter-RF Subsystem Interface (ISSI)	**9**
Telephone Interconnect Interface	**10**
Console Subsystem Interface (CSSI)	**11**
Fixed Station Subsystem Interface (FSSI)	**12**

Contents

Data Host Network Interface	**13**
Network Management Interface	**14**
Key Fill Device – Mobile Radio (KFD-MR) Interface	**15**
Inter-Key Management Facility Interface (IKI)	**16**
Copyright	**17**

Introduction

Most TIA-102 standards are approved as P25 standards.

The standards are voluntary. Manufacturers aren't required to implement every service the standards define on each interface, and they often don't.

You must ask the manufacturer which TIA-102 services their product supports on which interfaces. Manufacturers often use their own names for these services.

Manufacturers also add their own proprietary services and features, in addition to the standard ones.

This information is based on the Project 25 TIA-102 Documentation Suite Overview (TSB-102-D) document.

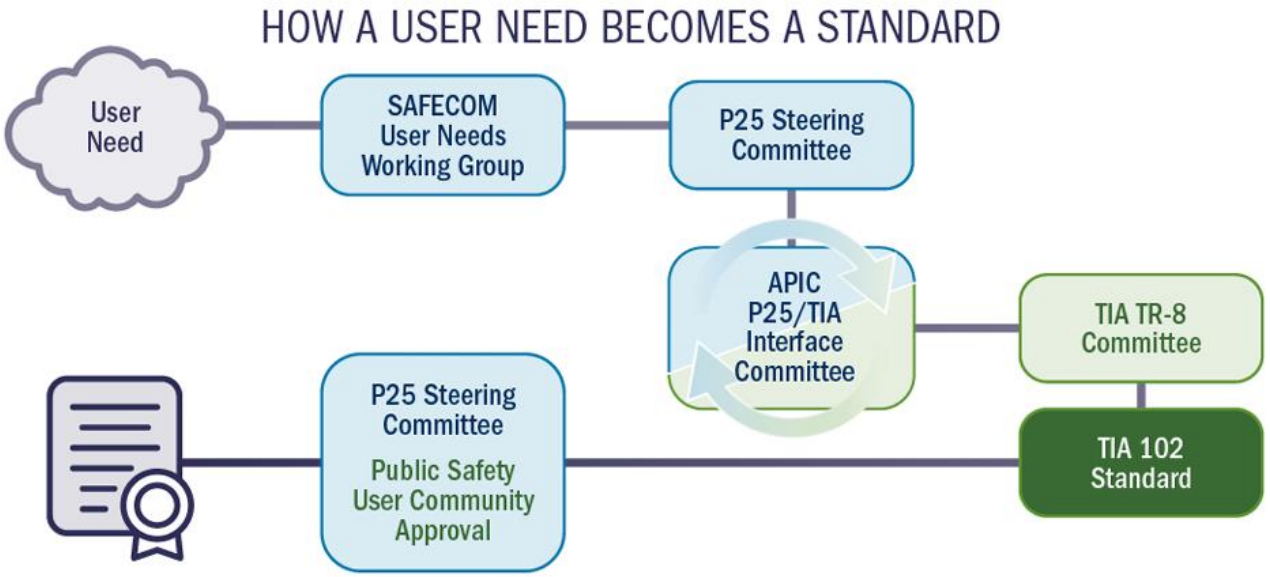


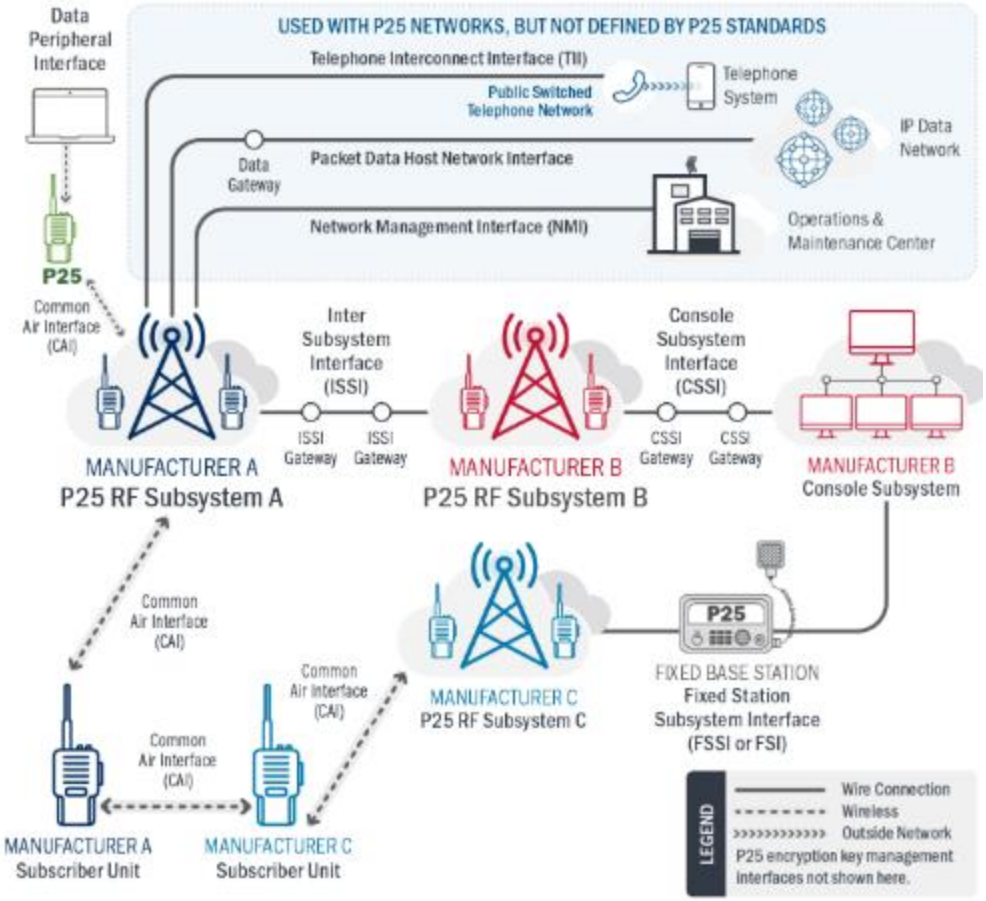
Figure 2 from P25 Steering Committee Representative Handbook

Selected Definitions

RFSS: Radio Frequency (RF) Subsystem. Fixed infrastructure that provides TIA-102 services. RFSS can be combined to create a System. Systems can be combined to create a Wide Area Communications Network (WACN).

SU: Subscriber Unit. A portable (handheld) or mobile (vehicle mounted) radio.

DHN: Data Host Network. A data network external to the RFSS but connected to it using the Data Host Network Interface (E_d Interface).



P25 System Model from Statement of P25 User Needs (SPUN)

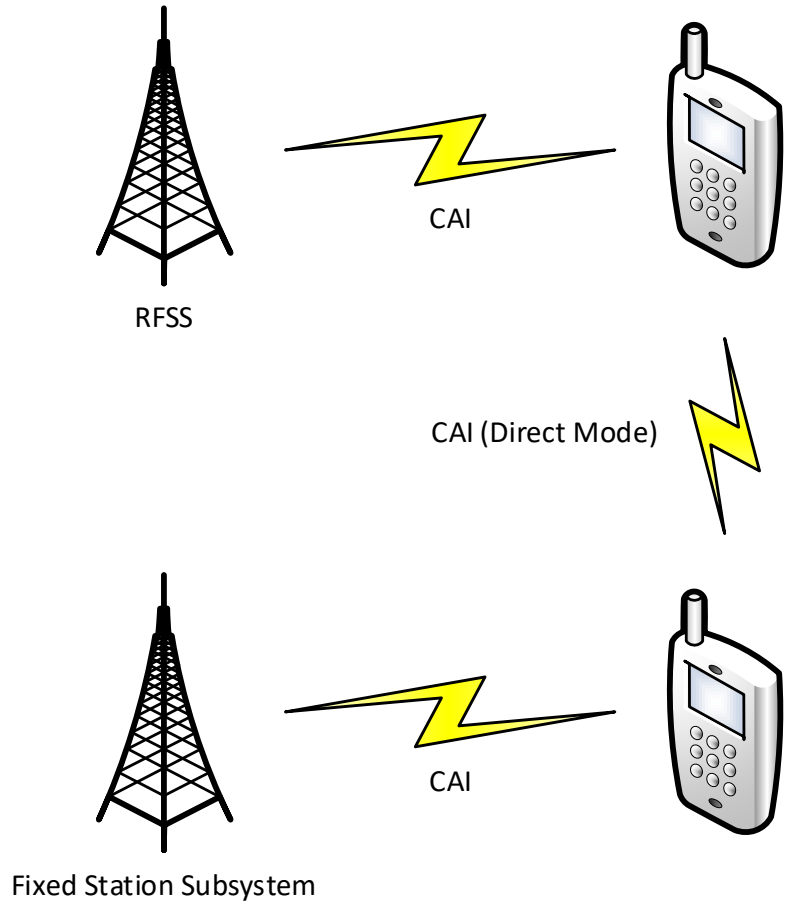
Common Air Interface (CAI)

With FDMA, this is the "U_m Interface".
With Two-Slot TDMA, this is the "U_{m2} Interface".

The Common Air Interface (CAI) is the wireless radiofrequency (RF) interface between:

- Subscriber Units (SU) and Radio Frequency Subsystems (RFSS)
- SU and other SU (Direct Mode)
- SU and Fixed Station Subsystems

The CAI is the primary P25 interface, and it allows SU made by one manufacturer to work with RFSS, SU, and Fixed Station Subsystems made by a different manufacturer.



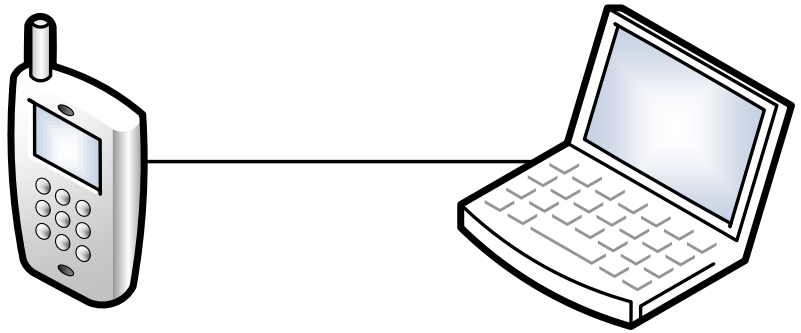
Mobile Data Peripheral Interface

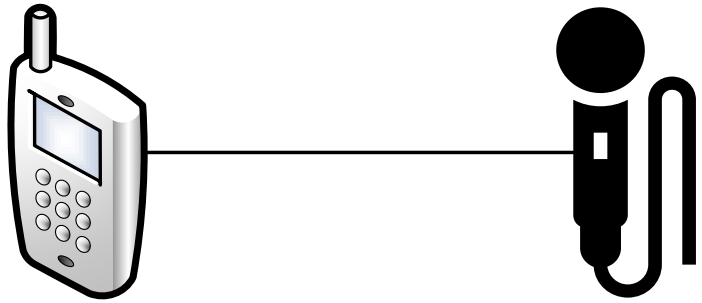
This is the “A Interface”.

Mobile Data Peripheral Interface is the interface between Subscriber Units (SU) and Mobile Data Peripherals (MDP).

Examples of MDP include:

- Laptops
- Terminals
- Remote Speaker Microphones (RSM)
- Heartbeat Sensors
- Gun Holster Sensors





Inter-RF Subsystem Interface (ISSI)

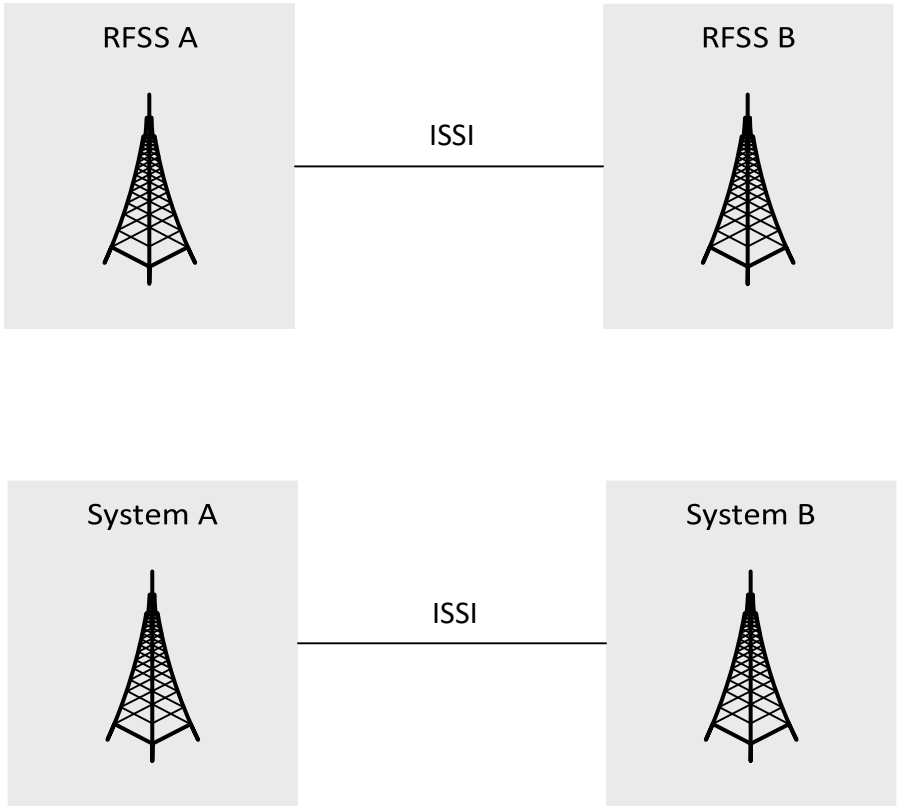
This is the “G Interface”.

The Inter-RF Subsystem Interface (ISSI) is the wireline interface between Radio Frequency Subsystems (RFSS).

ISSI can be used to connect one or more RFSS to create a System. ISSI can also be used to connect Systems to create a Wide Area Communication Network (WACN).

Some manufacturers sell Systems with multiple RFSS using proprietary connections; however, it may still be possible to connect such Systems to other Systems using ISSI.

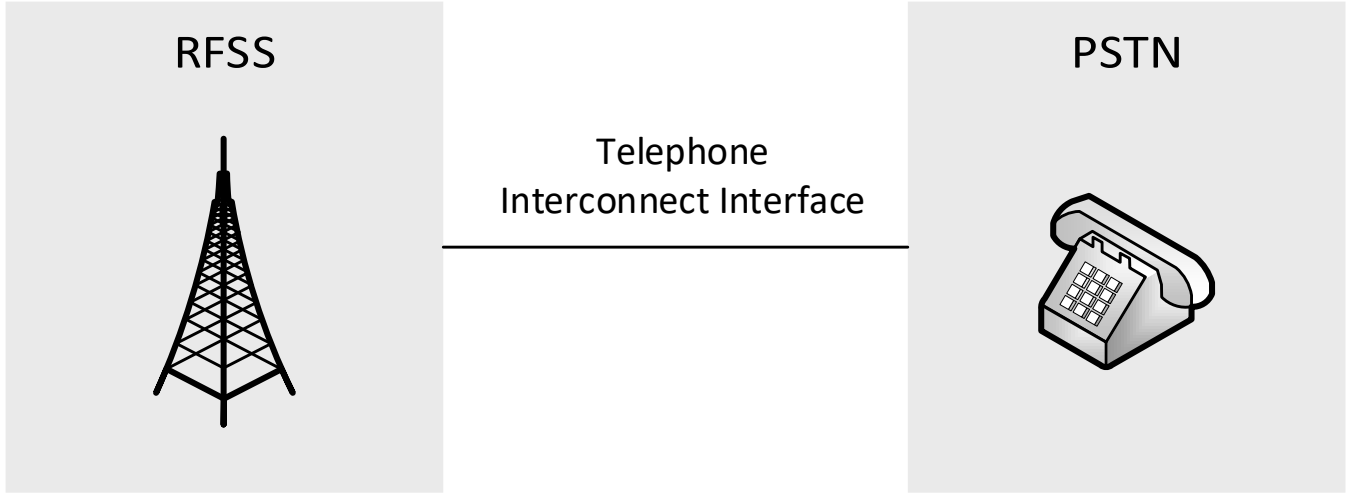
ISSI is no longer used only to connect RFSS and Systems. It’s now used for a variety of different types of foreign systems, such as broadband Interworking Function (IWF).



Telephone Interconnect Interface

This is the "E_t Interface".

The Telephone Interconnect Interface is the wireline interface between a Radio Frequency Subsystem (RFSS) and the Public Switched Telephone Network (PSTN).



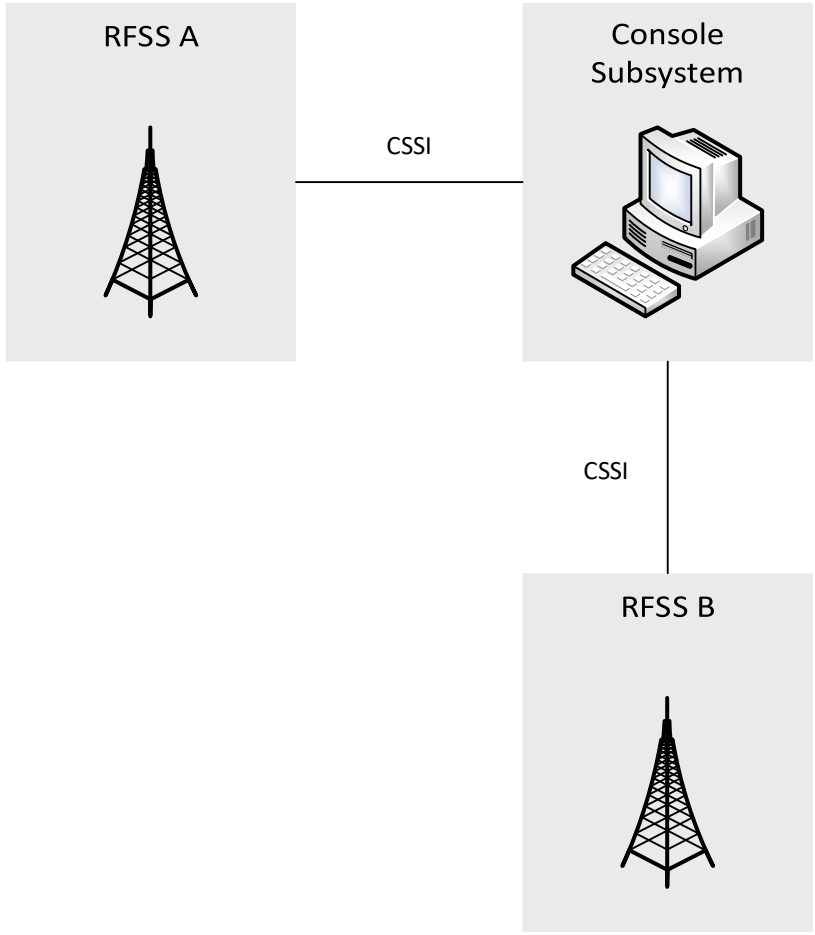
Console Subsystem Interface (CSSI)

This is the "E_c Interface".

The Console Subsystem Interface (CSSI) is the wireline interface between Radio Frequency Subsystem (RFSS) and Console Subsystems.

RFSS can be connected to multiple Console Subsystems, and each Console Subsystem can be connected to multiple RFSS.

Manufacturers also sell Console Subsystems that are inside the RFSS using proprietary connections, and these Console Subsystems may support proprietary services and features that Console Subsystems connected via CCSI do not.



Fixed Station Subsystem Interface (FSSI)

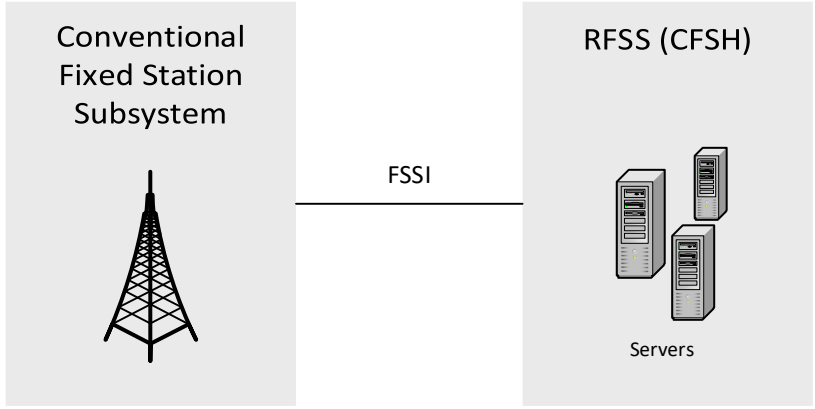
This is the "E_f Interface".

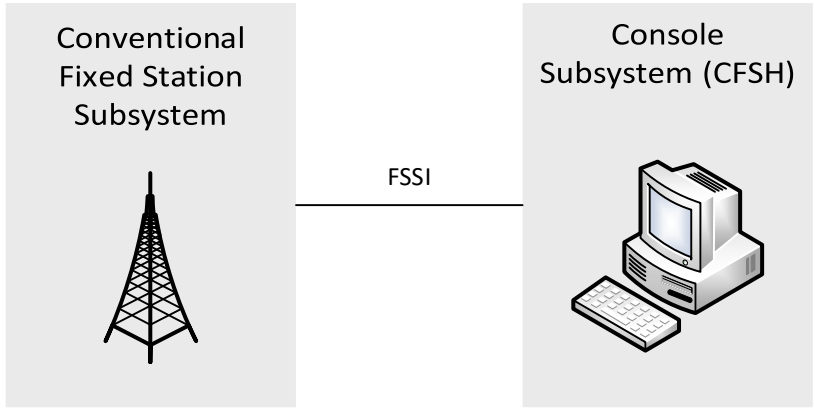
Also known as Fixed Station Interface (FSI).

The Fixed Station Subsystem Interface (FSSI) is the wireline interface between a conventional Fixed Station Subsystem and a Conventional Fixed Station Host (CFSH).

The CFSH can be Console Subsystem or a Radio Frequency Subsystem (RFSS).

FSSI can be implemented as either a Digital Fixed Station Interface (DFSI) or an Analog Fixed Station Interface (AFSI); however, in both cases, only conventional operation is supported. Trunked operation is not supported for FSSI, and trunked stations are always inside the RFSS.





Data Host Network Interface

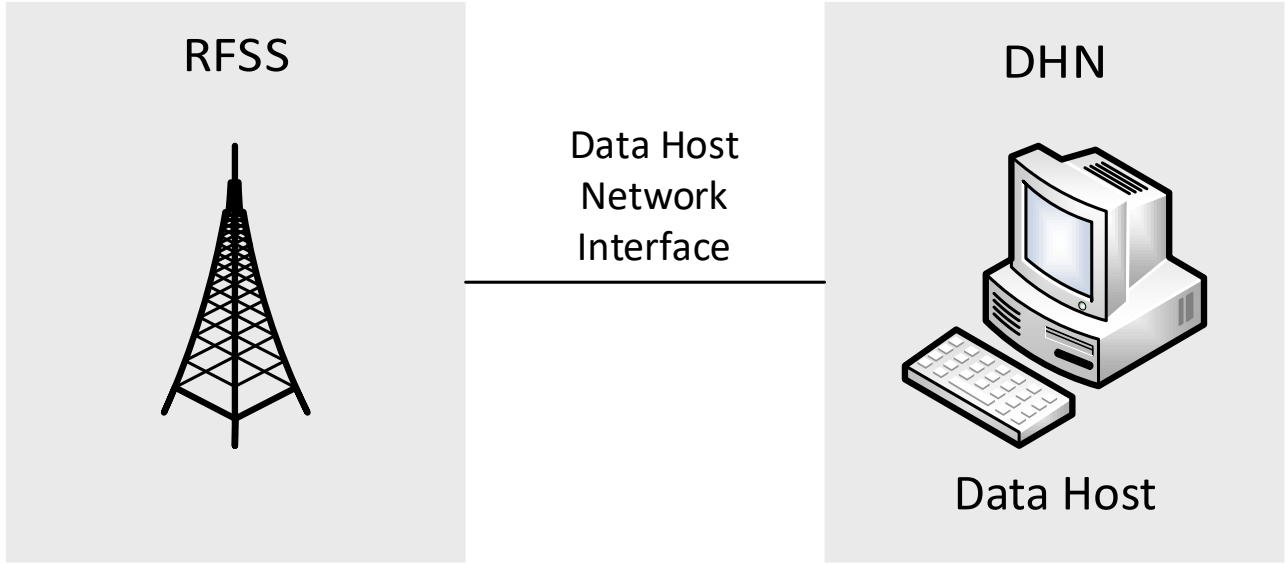
This is the "E_d Interface".

Also known as the Data Interface.

The Data Host Network Interface is the interface between a Radio Frequency Subsystem (RFSS) and an external Data Host Network (DHN).

Manufacturers often use their own terminology for DHN. For example, they may use something like "Enterprise Network", "Customer Network", or "Private Network".

One example of a Data Host that may be inside a DHN is a Key Management Facility (KMF). Another example is a Location Services Host System (LSHS).



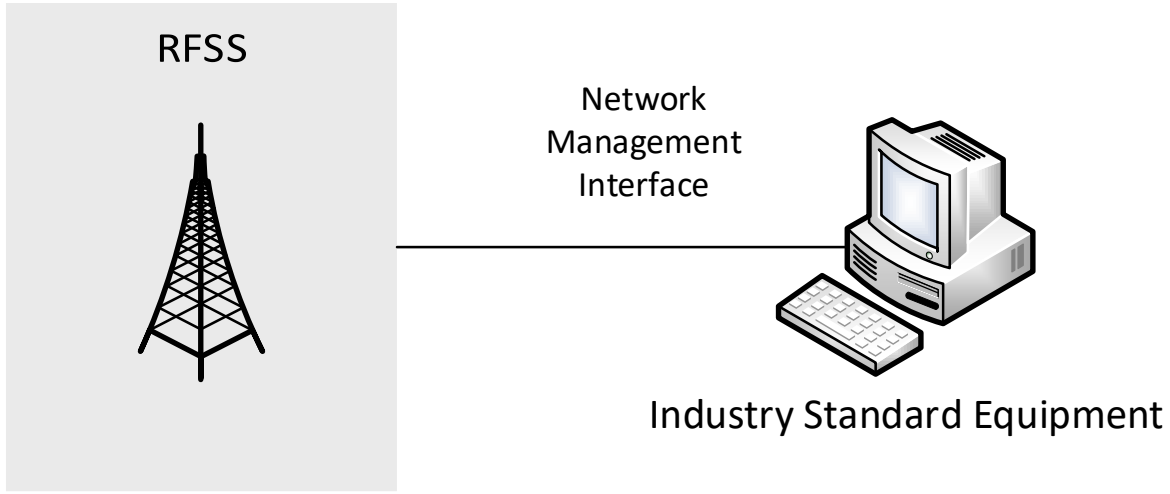
Network Management Interface

This is the "E_n Interface".

The Network Management Interface is the interface between a Radio Frequency Subsystem (RFSS) and an operations and maintenance center.

The goal of this interface is to allow a variety of different industry standard equipment to be used to manage RFSS using industry standard protocols.

Manufacturers may instead require network management to be done using proprietary equipment within the RFSS.



Key Fill Device – Mobile Radio (KFD-MR) Interface

The Key Fill Device – Mobile Radio (KFD-MR) Interface is the interface between:

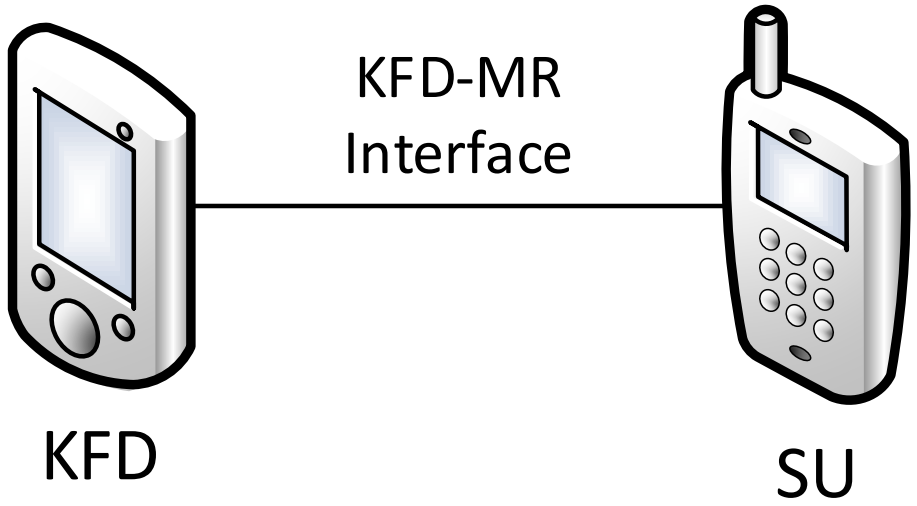
- Subscriber Unit (SU) and Key Fill Device (KDF)
- KFD and KFD

KFD are used to manually provision or load SU with encryption keys and other key related data, as well as to manually rekey.

KFD may also be able to communicate with a central Key Management Facility (KMF) located in a Data Host Network (DHN) or elsewhere.

The standards also define Over the Air Rekeying (OTAR) as an alternative to manual rekeying.

Manufacturers often use their own terminology for KFD.

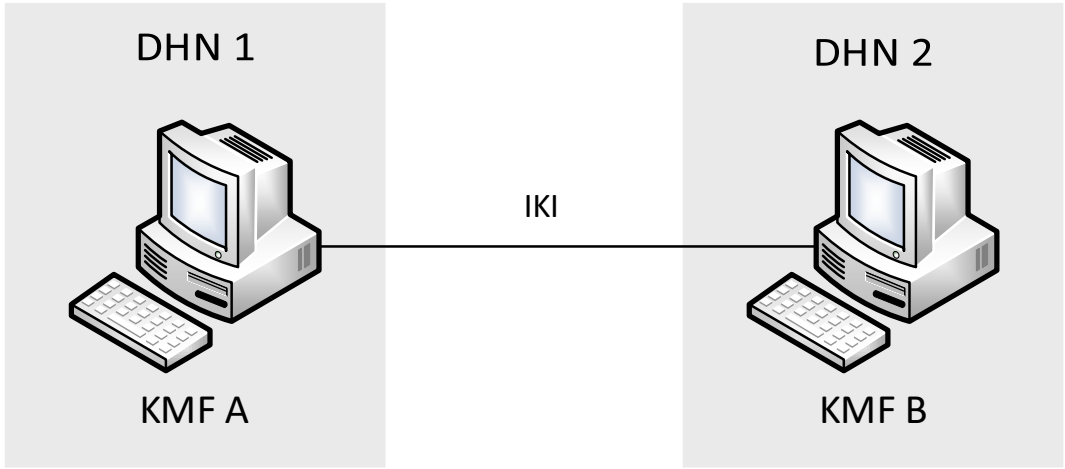


Inter-Key Management Facility Interface (IKI)

The Inter-Key Management Facility Interface (IKI) is the interface between one Key Management Facility (KMF) and another KMF.

The goal of this interface is to enable secure exchange of keys between different KMF.

These could be two KMF owned and operated by the same organization, or it could be KMF owned and operated by different organizations, each for a different RFSS or System connected to each other via ISSI.



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