TECHNICAL FOLDER

TECHNICAL REQUIREMENTS

SMARTLINK 3

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1. DOCUMENT INTENDED PURPOSE AND READERS

This document lists the minimal environmental requirements (Hardware, Operating Systems, Networking, …) to be set up to install and run SmartLink 3 and its components.

This document purpose is to provide useful information to communicate or check the SmartLink 3 operating environment in order to market the product, install and give technical support.

Concerned readers of this document are sales, marketing, technical operators involved in SmartLink projects, commercial offers, installation and maintenance, the customers and anybody involved in the supply, installation and maintenance of SmartLink, including the persons responsible of the infrastructures hosting SmartLink or used by SmartLink for communication purposes.

From now on, in this document, the word “SmartLink” will refer to “SmartLink 3” and to its components.

2. GENERAL INFORMATION

2.1 Proprietary Information

This document contains proprietary information, which is protected by copyright.

2.2 Manufacturer

Software Team Srl
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20099 Sesto San Giovanni
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2.3 Trademarks

Trademarks, trade names and company names used in this document are for identification purposes only and are the property of their respective owners.

2.4 Contents changes

This document and its contents are subject to change without notice. Software Team shall not be liable for errors contained in this document or for consequences due to these errors.

2.5 Printing History

New revisions of this document will include updates since the previous revision. The last revision date indicates the current revision. The revision number and date change when a new revision is issued.

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3. DOCUMENT CHANGE MANAGEMENT

Revision	Date	Description	Author	Approved
01	05 Apr 2018	First issue.	TEC – CC	DIG – RM
02	08 Jan 2019	Layout revision and added network requirements info	RGQ	DIG – RM
03	18 Jan 2019	Revised contents in terms of requirements/recommendations	RGQ	DIG – RM
04	06 Nov 2019	More detailed supported operating systems, supported web browsers for the SmartLink server, more detailed supported Android versions, support for Zebra industrial smartphones	RGQ	DIG – RM
05	03 Feb 2020	Added new assessed Zebra smartphones	RGQ	DIG – RM
06	15 Oct 2020	Added new supported protocol converters (chapters 8.4.2, 8.4.3), Added Ascom Myco models to the supported smartphones (chapter 11)	R&D/SVI	DIG – RM
07	9 Nov 2020	Updated the Network Requirements table and added Bluetooth column (chapter 8.1), added more options to the “Connection to data and alarms sources (chapter 8.4.2), added more recent Team Viewer versions for remote support (chapter 8.4.5), updated the list of the supported server operating systems (chapter 9.1), better specified the need of a clean machine even for SmartLink upgrades (chapter 9.1), updated the Main Alarm Station requirements (chapter 10)	R&D	DIG - RM
08	16 Nov 2020	Fixed table of contents numbering	R&D	DIG - RM
09	23 Nov 2020	Type corrections	RGQ	DIG – RM
10	29 Mar 2022	Certified smartphones table updated	R&D	DIG-RGQ
11	30 Mar 2022	Certified smartphones table updated	R&D	DIG-RGQ
12	31 Mar 2022	Certified smartphones table updated	R&D	DIG-RGQ
13	03 Jun 2022	Certified smartphones table updated	R&D	DIG-RGQ

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4. NOTICE

The listed requirements are intended as minimal requirements.

In the following tables:

- “<undefined>” means that there's no need for a special brand or model or feature,
- “Not allowed” means that the feature must not be present (possible malfunctioning),
- “<not used>” means that the feature can be installed but will not be used by SmartLink 3,
- “Required” means that the compliance with the requirement is mandatory,
- “Recommended” means that the compliance with the requirement will improve the efficiency and/or the reliability of the installation,
- “Not-applicable” means that the feature/requirement cannot be applied in the selected condition,
- “Supported” means that the feature/condition is managed by SmartLink,
- “Not supported” means that the feature/condition is not managed by SmartLink.

Other features have not been listed since they either don't affect any internal test result or are not clearly related to possible interferences with SmartLink 3 operation.

5. PERMISSION TO USE SMARTLINK

IMPORTANT NOTICE:

The contents of this document apply, from the date of this document on, to:

- all the new SmartLink installations;
- upgrades of existing installations from previous SmartLink versions to SmartLink 3;
- updates of existing SmartLink 3 installations to new subversions.

Unless noted otherwise, the listed requirements are intended as minimal features/performances REQUIRED, NOT SUGGESTED to use SmartLink.

In case of non-compliance with these minimal requirements, SmartLink must not be used (except for testing or demonstration).

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On behalf of Software Team, in case of non-compliant configurations there will be no permission or allowance to use SmartLink.

Users that despite of this information will run and use SmartLink in a non-compliant configuration will be the only responsible of any possible direct or indirect consequence of malfunctioning, including injuries to the patients.

6. HOW TO READ THIS DOCUMENT

The document gives information about the environmental, network, hardware, operating systems, and other requirements, needed for the installation and for a good and secure operation of SmartLink and its components.

All the contents of this documents are important.

We recommend designing the SmartLink installation following the sequence of chapters 7 to 11 of this document:

7. Environmental requirements

8. Network requirements

    8.1 – General Network Requirements

    8.2 – Wired Network

    8.3 – Wireless network

        8.4.2 – Connection of the data and alarms sources (bedside devices)

        8.4.3 – Connection to hospital ADT, CIS, HIS systems

        8.4.4 – Connection to third party systems

        8.4.5 – Remote access for maintenance

9. SmartLink Server

    9.1 – General Requirements for Physical and Virtual Servers

10. Main Alarms Station

11. Pagers

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If existing, separate documents will contain more requirements/recommendations for the SmartLink application to specific brands data sources (monitoring systems or other bedside devices or medical devices).
These additional documents list the requirements, the compatibilities to be checked, the cautions to use SmartLink with the data sources the documents refer to.
These additional documents, if existing, are part of the SmartLink technical requirements and will be provided by Software Team for all the installations where the data/alarm sources include the devices of the brand the documents refer to.

7. ENVIRONMENTAL REQUIREMENTS

The SmartLink server system and the active network devices (including Wi-Fi infrastructures) involved in the SmartLink/SmartPager operation must be protected against AC power interruptions, to guarantee working continuity and to avoid malfunctioning or loss of data.

The active network components, the servers and in general all the active components must be protected with Uninterruptible Power Supplies (UPS) and, when possible, with redundant power supplies.

In addition, these components must be power supplied by the emergency hospital backup power.

Network equipment rooms must meet environmental conditions as specified by device manufacturers for stable operation of equipment.

The environmental conditions of these components must comply with the respective manufacturer's specifications.

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8. NETWORK REQUIREMENTS

8.1 – GENERAL NETWORK REQUIREMENTS

GENERAL NETWORK REQUIREMENTS				
Description	**Wired Network**	**WiFi Network**	**GSM Network**	**Bluetooth**
Monitoring of the usage of the network trunks shared by SmartLink and other systems/packages	Recommended	Recommended	Not-applicable	Not-applicable
DHCP server for the SmartPager network (see Note 1)	Supported	Supported	Not-applicable	Not-applicable
Connection between SmartLink server and the hospital network	1000 Mbps	Not allowed	Not allowed	Not allowed
Connection between the data/alarm sources and the SmartLink server	Dedicated connection 1000 Mbps certified	Supported	Supported	Supported
Connection between SmartLink server and SmartLink Main Alarm Station	1000 Mbps (It is recommended, if applicable, that the SmartLink server and the Main Alarm Station are connected to the same LAN/VLAN). (to connect from the outside of the hospital, a VPN connection is recommended)	Supported	Supported	Not allowed
Communication ports to be opened for the SmartLink operation (see note 3)	Ports from 20001 to 20010, Port 61613, Port 25 (see note 2)	Ports from 20001 to 20010, Port 61613, Port 25 (see note 2)	Ports from 20001 to 20010, Port 61613, Port 25 (see note 2)	Not-applicable
Connection between the paging devices and SmartLink server	Not allowed	1 Mbps	Download speed > 300 Kbps Upload speed > 50 Kbps	Not allowed

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Note 1:
In case of missing or unreachable or wrong DHCP server, the paging devices may not obtain an IP address and therefore may not communicate with the SmartLink server or will communicate in an unstable condition.

Note 2:
Communication port 25 must be opened to allow SmartLink to send emails with the technical status of the installed system. These emails are sent, to the SmartLink technical staff only, even in case of issues detected by the system itself.

Note 3:
The specified communication ports must be opened in both directions for the TCP and UDP traffic.

8.2 - WIRED NETWORK

WIRED NETWORK REQUIREMENTS		
Feature	**Requirement**	**Required**
Cabling	Cat 5e or better	Required

8.3 - WIRELESS NETWORK

WIRELESS NETWORK REQUIREMENTS		
Feature	**WiFi Network**	**GSM Network**
5GHz band (802.11a/n/ac)	Supported	Not-applicable
2.4GHz band (802.11bg)	Supported	Not-applicable
RSSI	-65 dBm or better	Not-applicable
Minimum SNR	25 dB or better	Not-applicable
Co-Channel Separation	20 dB or better	Not-applicable
Dedicated SSID	Recommended	Not-applicable
Broadcast SSID	Recommended	Not-applicable
WPA2-PSK	Recommended	Not-applicable
Separate VLAN for SmartPager	Recommended	Not-applicable
GSM communication level	Not-applicable	3G or better
WLAN network speed	1Mbps	Download > 300 Kbps Upload > 50 Kbps
Notes		

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WIRELESS NETWORK REQUIREMENTS		
Feature	**WiFi Network**	**GSM Network**

• The specified WiFi network speed is enough to support up to 10 paging devices at the same time. If there are more than 10 paging devices, add 100 Kbps of speed for each added device.
• The specified GSM network speeds are enough for one paging device or one alarms source connected through the GSM network.
• The WiFi network must be set up and configured to guarantee, in the entire coverage area where SmartPager will be used (ward, rooms, aisles, ...):
  ○ The WiFi network virtualization to eliminate the need of roaming and guarantee a seamless connection of the SmartPager smartphones (In this case the WiFi network controller will actively monitor and "listen" to all access points (APs) on the network, selecting the best one for transmitting data to the client. Roaming will be eliminated because the client will see all APs as a single AP). This feature is made available by the main professional WiFi active devices manufacturers. WiFi networks requiring roaming performed by the device (smartphone) are not suitable for the SmartPager operation, because the disconnection time during roaming can be reduced but not eliminated.
  ○ A signal strength of -65dBm or better.
  ○ No cross-interferences between the WiFi channels used by the network SmartPager is connected to and other WiFi channels in use.		

Received Signal Strength measurement

Can be done during a site survey and verified using one SmartPager smartphone during a ward walk-through.

Co-channel Separation check

Co-channel Separation Measurement Procedure:
The RF received signal level from any other AP, that can be received on the same channel in the coverage area of the AP under measurement, must be at least 20dB less than the received signal from the AP under measurement.

Wireless Capacity

A WiFi connection bandwidth usage (peak value) under 50% is recommended to ensure that all the SmartLink paging devices can communicate correctly with the SmartLink server. Casual traffic peaks over 50% are acceptable.

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8.4 - CONNECTION TO DATA AND ALARMS SOURCES, ADT, CIS, HIS SYSTEMS, THIRD-PARTY SYSTEMS

8.4.1 – IMPORTANT INTEROPERABILITY NOTICE

A separate document is available with the list of the “Available SmartLink Connections”.
Please ask Software Team for the document or for non-listed devices or connections.
To better define the time for a listed device-connection availability for installation, ask Software Team before planning it, for these reasons:

- The devices/systems manufacturers frequently improve their products releasing new software versions, updating existing versions of software/firmware. There are no commitments by law and/or standard ways to be informed on time of these improvements.
- To guarantee a full operational and reliable installation of the devices/systems connection drivers, Software Team checks with the manufacturers the current compatibility of the devices in use by the customer and, if needed, updates the SmartLink software driver and makes the functional tests and assessment required due to the SmartLink medical device certification.
- Updates or upgrades might be required by the manufacturers on the devices/systems to be connected, to allow them to interoperate with SmartLink. Software Team will support you in finding this information.

8.4.2 - CONNECTION TO DATA AND ALARMS SOURCES (bedside devices)

This connection can be made through:

- Ethernet wired network
- Wi-fi network
- Bluetooth connection

In case the hospital has a separate network for the medical devices, a bridge between this network and the SmartLink network is needed. A separate network card on the SmartLink server or an added network (IP class/subnet) on the SmartLink virtual server can be suitable for this. This connection must be agreed with the IT responsible of the hospital.

In case of sources equipped with serial communication ports, a protocol converter must be used (here below the list of supported converters).

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SUPPORTED PROTOCOL CONVERTERS	
Brand	**Model**
Lantronix	EDS-MD8
Lantronix	EDS-MD16
Lantronix	EDS-8PS
Lantronix	EDS-16PS
MOXA	NPORT 5100 series (NPORT 5110 fir single RS232 port)
Sollae Systems	Device server CSE - ATEN USB – Wired version
Sollae Systems	Device server CSW - ATEN USB – Wireless version

NOTICE:

If existing, separate documents will contain more requirements/recommendations for the SmartLink application to specific brands data sources (monitoring systems or other bedside devices or medical devices).

These additional documents list the requirements, the compatibilities to be checked, the cautions to use SmartLink with the data sources the documents refer to.

These additional documents, if existing, are part of the SmartLink technical requirements and will be provided by Software Team for all the installations where the data/alarm sources include the devices of the brand the documents refer to.

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8.4.3 - CONNECTION TO HOSPITAL ADT, CIS, HIS SYSTEMS

This connection is made connecting the SmartLink network to the hospital network and installing the proper software drivers.

CONNECTION TO HOSPITAL ADT, CIS, HIS SYSTEMS	
Requirement	**Note**
Added dedicated network card on the SmartLink server	Recommended
Added separate network configuration (IP address class / subnet) on the SmartLink server network card.	Supported. As alternate solution to a dedicated network card. This might be necessary in case of server virtualization.

Notes:

1) Once realized the physical/logical connection to the hospital systems, SmartLink will not be ready to interoperate with these systems. Specific software communication drivers must be supplied by Software Team and installed for each application to be connected.

2) Updates or upgrades might be required on the hospital systems to allow them to interoperate. For these updates please contact the hospital system manufacturer/supplier.

8.4.4 - CONNECTION TO THIRD-PARTY SYSTEMS

This connection can be made done through Wired or Wireless Ethernet network.

In case of third-party systems equipped with serial communication ports, a protocol converter must be used (see here below the list of supported converters).

SUPPORTED PROTOCOL CONVERTERS	
Brand	**Model**
MOXA	NPORT 5100 series (NPORT 5110 fir single RS232 port)
Sollae Systems	Device server CSE - ATEN USB – wired version
Sollae Systems	Device server CSW - ATEN USB – wireless version

Notes:

1) Once realized the physical/logical connection to the third-party system, SmartLink will not be ready to interoperate with these systems. Specific software communication drivers must be supplied by Software Team and installed for each third-party system to be connected.

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2) Updates or upgrades might be required on the third-party system to allow it to interoperate. For these updates please contact the third-party system manufacturer/supplier.

Connection drivers for ESPA 4.4.4 and ESPA-X systems are already available, to send the alarm messages to these systems.

See the following table for the supported ESPA systems.

SMARTLINK SUPPORTED ESPA SYSTEMS		
ESPA system manufacturer/name	**Used ESPA protocol**	**Notes**
Ascom Unite	ESPA 4.4.4	For alarm messages forwarding. A protocol converter is required.
Mobicall	ESPA 4.4.4	For alarm messages forwarding. A protocol converter is required.
Unify	ESPA 4.4.4	For alarm messages forwarding. A protocol converter is required.
Siemens OSKAR	ESPA-X	For alarm messages forwarding. A protocol converter is required. Communication port 20018 must be opened.

Notes:

1) To connect the SmartLink server to an ESPA 4.4.4 system a protocol converter (serial to ethernet) is required.
2) In case of ESPA systems not listed in the “SmartLink supported ESPA systems” table, a compatibility assessment must be made before releasing the integration. This assessment test must be made by Software Team in cooperation with the new ESPA system manufacturer/supplier.
3) For new ESPA systems (not listed in the table) some software driver modifications could be necessary to support communication features and contents typical of the new ESPA system.
4) In case of ESPA-X communication the port 20018 must be opened on the network.

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8.4.5 - REMOTE ACCESS FOR MAINTENANCE

This is required to guarantee the highest level of safety and security of the SmartLink systems, during the installation and configuration and once the system is made operational.

The remote access is used, by Software Team technicians and by Software Team authorized technicians, to:

- Access SmartLink to identify and fix issues
- Allow SmartLink to send emails to the Software Team technical support with information of the correct operation of the system
- Allow SmartLink to send emails in case of issues identified by SmartLink itself (these emails are automatic support requests)
- Install, during controlled sessions, SmartLink updates and upgrades of the system and check the SmartLink system operation after running the updates/upgrades.

The following table lists the standard remote access solution adopted by Software Team:

SMARTLINK STANDARD REMOTE ACCESS SOLUTION		
Solution name/tool and version	**Type of remote connection**	**Notes**
TeamViewer v.9 and above	Through Internet – TeamViewer managed connection Or TeamViewer direct network connection with a VPN access.	The TeamViewer v.9 and above instance on the SmartLink server can be configured to require a new password for each remote connection.

In case the customer uses a TeamViewer version different than the supported ones, the customer must provide to Software Team a valid TeamViewer license or licensed access for the used version.

In case of VPN connection, the customer must provide to Software Team the VPN client with a valid client license and a configuration file to be loaded to setup the VPN access. The VPN access account details (User, Password, other) must be provided too.

Other remote access solutions can be agreed with the customer. In this case the customer must provide to Software Team all the required software packages, software licenses and technical support for activating the remote access.

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9. SMARTLINK SERVER REQUIREMENTS

9.1 - GENERAL REQUIREMENTS FOR PHYSICAL AND VIRTUAL SERVERS

These requirements are for a single server machine.
One server machine is required per each ward using SmartLink.
In case of multi-ward installations, ask Software Team to define the required server configuration.

Physical Server and Virtual Server have basically the same configuration.
In case of more than one SmartLink virtual server installed on the same physical machine, the required RAM size can be reduced (but never under 4GB) per each SmartLink virtual machine. The RAM size reduction must be accompanied by a SmartLink performance test.

Automatic Windows Updates must be disabled. Windows updates installation must be agreed with Software Team and followed by a SmartLink operation test. These operation tests require a remote access to the SmartLink server by the Software Team technicians.

SMARTLINK SERVER REQUIREMENTS	
Feature	**Requirement**
RAM	8 GB or more
CPU	Intel Core i5
Total free hard disk space	80 GB or more
Operating System for SmartLink	Windows 10 Pro Windows Server 2008 R2 Standard Windows Server 2012 Windows Server 2016 Windows Server 2019 **IMPORTANT NOTICES (First installation and upgrades to version 3):** SmartLink server software must be installed on “clean” machines, that means computers with a fresh new installation of the operating system followed by all the available operating system updates, before running the SmartLink installation package.
Network Card	1000 Mbps or more
Virtualization	VMware virtual machines. Other Virtualization systems: ask Software Team.
Automatic Windows Updates	Disabled
Internet Browser	Google Chrome required on the SmartLink server only to access the configuration wizard

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10. MAIN ALARM STATION REQUIREMENTS

SMARTLINK CLIENT COMPUTER		
Feature	**Minimum Requirements**	
	Without remote patient video surveillance support	**With remote patient video surveillance support**
RAM	4 GB	16 GB
CPU	Intel Core i5	Intel Core i7
Total free hard disk space	50 GB	500 GB
Operating System	Windows 10	Windows 10
Network Card	1000 Mbps	1000 Mbps
Video Card	Standard	Ask SWT **(the video card will depend on the used video systems)**
Display resolution	1920 x 1080	1920 x 1080
Display orientation	Horizontal	Horizontal
Virtualization	Supported	**Not Allowed**

11. PAGERS REQUIREMENTS

SmartLink uses common Android smartphones as paging devices.

The certified smartphones suitable to be used with SmartLink (and its paging component named SmartPager), are listed in the following table:

SMARTLINK CERTIFIED SMARTPHONES		
Model	**Android version**	**SmartLink version**
Ascom Myco 2	5.1	2
Ascom Myco 3	8.x	3
Athesi Professional E5SL	9	3
Samsung Galaxy Xcover 3	5.x	2
Samsung Galaxy Xcover 4	9.x	3
Samsung Galaxy Xcover 4S	9.x	3
Samsung Galaxy S7 / S7 edge	8.x	3

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SMARTLINK CERTIFIED SMARTPHONES		
Model	**Android version**	**SmartLink version**
Zebra TC20	8.x	3
Zebra TC 21	10 Q	3
Zebra TC 26	10 Q	3
Zebra TC51	10 Q	3
Zebra TC56	10 Q	3

IMPORTANT NOTICE:

The table "SmartLink Certified Smartphones" lists all the allowed combination of Smartphone/Android_Version/SmartLink_Version to be used with SmartLink/SmartPager.

The last certified Android version for SmartPager is "Version 11".

In case the operating system of the smartphones is at a lower version, before installing SmartLink 3 or before upgrading to SmartLink 3, update the smartphone software to reach the required Android version.

If the customer needs to use a smartphone with a different configuration combination than the ones listed in the table "SmarLink Certified SmartPhones", two units of the smartphone must be sent to Software Team for the execution of the required assessment tests. The smartphones to be assessed must have an Android version less or equal to "Version 11".

The tests are made by Software Team without any charge.

The shipping costs and the risks bound to the shipment (damages, theft, …) are in charge of the customer.

If the assessment tests succeed, the smartphone (and/or Android version) will be added to the list of the SmartLink certified smartphones, otherwise the smartphone will not be suitable for usage with SmartLink.

The smartphones must be used for professional purposes (personal smartphones are not allowed) and must be protected using a customer provided MDM system against any possible configuration change, including the set of installed applications.

In case the customer needs to install on the same SmartPager smartphone other applications for professional use (phone, interphone, nurse call, CIS or HIS mobile interfaces, other) an assessment test of non-interference must be done by Software Team in conjunction with the customer and/or the supplier of the application. In case of successful assessment, the application can be installed and used on the same SmartPager smartphone.

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