System Requirement Specification

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Maik Allgöwer	Signed	2022-10-20 20:36
ack ack ack ack ack ack ack nack		
Maximilian Kreutmeier	Signed	2022-10-20 20:30
My name is Kreuter and thats why I drink!		
Michael Mezger	Signed	2022-10-20 20:29
ok		

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1 Introduction

1.1 Purpose

BS-509, ⓘ - System Requirement Specification - Purpose

The System Requirement Specification (SysRS) describes what the system's sponsor expects the system to do, the system's expected environment, the system's usage profile, its performance parameters, and its expected quality and effectiveness. The SysRS is a structured collection of information that embodies the requirements of the system. The SysRS completely describes all inputs, outputs, and required relationships between inputs and outputs. **[✔]**

1.2 Scope

BS-510, ⓘ - System Requirement Specification - Scope

This document contains the system requirements of the *Bianco Sfera* project. The following diagram displays the system's scope and its scope boundaries:

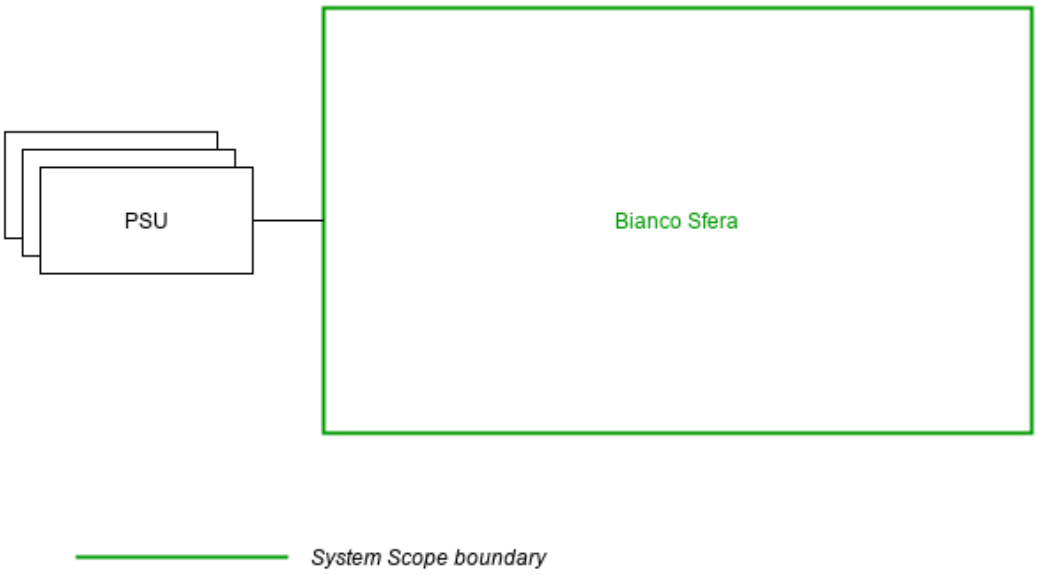

Figure 1 Bianco Sfera - System Scope

[✔]

1.3 References

BS-511, ⓘ - System Requirement Specification - References

Following documents are referenced in the system requirement specification:

Reference_ID	Name and Link of referenced document	Version
[0]	LoRa™ Modulation Basics	2
[1]	Glossary & Abbreviations	0.1
[2]	CERN Open Hardware Licence	2

[✔]

2 General Overview

BS-544, ⓘ - Glossary Hint

This document may contain terms and abbreviations that are not familiar to the reader of this specification. For a clarification a project wide is referred to this specification: [1] Glossary & Abbreviations. This document is going to be maintained during the complete project development life cycle. **[✔]**

BS-598, ⓘ - System Requirements Specification - Used Work Item Types

Following work item types are used in this specification:

- ⓘ: Information
- : System Function
- : System Requirement

[✔]

2.1 Project Overview

BS-512, ⓘ - Bianco Sfera - Project Description

The *Bianco Sfera* project is an biancoSolution development project and shall serve as an internal introduction into the LoRa technology.

The project's main functionality implements a simple communication system, whose requirements are specified in the chapters below. **[✔]**

BS-514, ⓘ - Bianco Sfera - Project Team

The project's team consists out of following roles and members:

Project role	Member
Project Lead / Manager	Jan Weiß
SW Co-Lead / Engineer	Maik Allgöwer
SW Co-Lead / Engineer	Michael Mezger
HW Lead / Engineer	Maximilian Kreutmeier
Testing Lead / Engineer	Jan Weiß
Quality Manager	Maximilian Kreutmeier

[✔]

BS-513, ⓘ - Bianco Sfera - Development Model

The project is developed with a V-model approach (see following diagram).

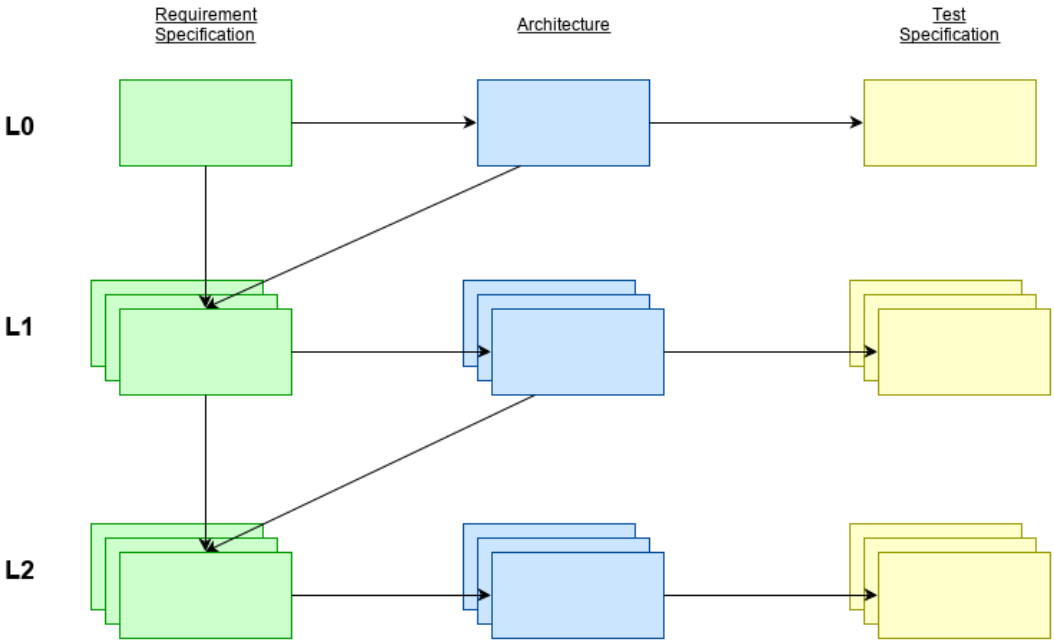

Figure 2 Bianco Sfera - Development Model

[✔]

BS-516, ⓘ - Bianco Sfera - Document Approvals

The creation of the projects documents may only start if all work items of its predecessor and the predecessor document itself is approved.

All documents' stakeholders must approve the document in order to continue with the further refinement / specification. **[✔]**

BS-517, ⓘ - Bianco Sfera - Work Item Approvals

The work items status follow the approach outlined in the diagram below. As no external stakeholders are known at the project's starting time, no status for the external review is required.

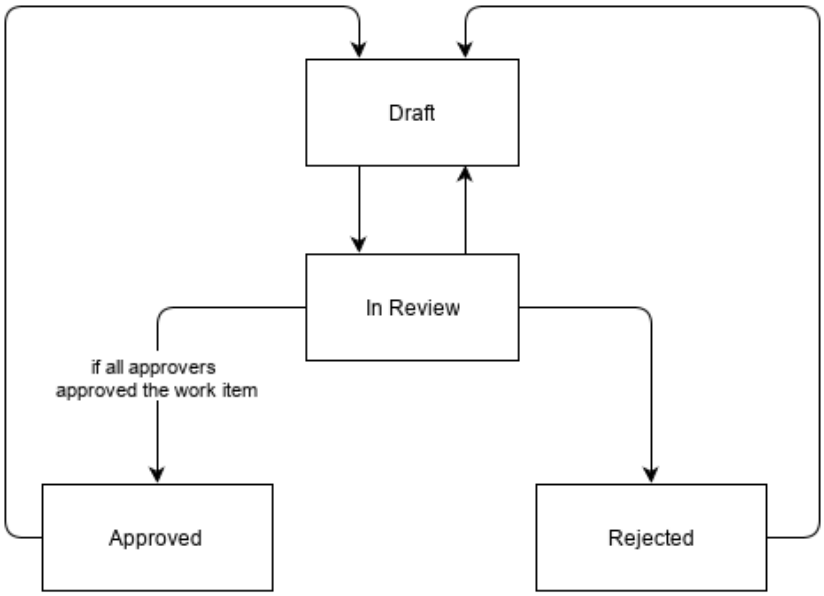

Figure 3 Bianco Sfera - Work Item Workflow

[✔]

3 Functional Requirements

3.1 Feature - Local Range Request

BS-521, - System Function - Local Range Request

When triggering a local range request, only a predefined (paired) device is notified about the request. **[ ]**

3.1.1 Local Range Request Requirements

BS-522, - Local Range Request: User Input

The system shall provide an interface, which allows the user to trigger a local range request. **[** Approved **]**

BS-526, - Local Range Request: Paired Device Configuration

The system shall provide the possibility to configure a paired device. **[** Approved **]**

BS-525, - Local Range Request: Paired Device Notification

The system shall provide an optical interface, which notifies the user about an incoming local range request. **[** Approved **]**

BS-593, - Local Range Request: Paired Device Notification - Timeout

The system shall stop the local range request user notification after 2 h. **[** Approved **]**

3.2 Feature - Local Range Response

BS-549, - System Function - Local Range Response

When getting a local range request, the notified user can send a positive or negative response to the requester. **[ ]**

3.2.1 Local Range Response Requirements

BS-555, - Local Range Response: Positive User Input

The system shall provide an interface, which allows the user to send a positive local range response. **[** Approved **]**

BS-553, - Local Range Response: Negative User Input

The system shall provide an interface, which allows the user to send a negative local range response. **[** Approved **]**

BS-554, - Local Range Response: Requester Notification (Positive Response)

The system shall provide an optical interface, which notifies the requester about an incoming positive local range response. **[** Approved **]**

BS-557, - Local Range Response: Requester Notification (Negative Response)

The system shall provide an optical interface, which notifies the requester about an incoming negative local range response. **[** Approved **]**

BS-596, - Local Range Response: Requester Notification - Timeout

The system shall stop the local range response notification after 2 h. **[** Approved **]**

3.3 Feature - Wide Range Request

BS-523, - System Function - Wide Range Request

When triggering a wide range request, all devices that are currently connected to the network are notified about the request. **[ ]**

3.3.1 Wide Range Request Requirements

BS-524, - Wide Range Request: User Input

The system shall provide an interface, which allows the user to trigger a wide range request. **[** Approved **]**

BS-527, - Wide Range Request: Device Notification

The system shall provide an optical interface, which notifies all connected users about an incoming wide range request. **[** Approved **]**

BS-595, - Wide Range Request: Paired Device Notification - Timeout

The system shall stop the wide range request user notification after 12 h. **[** Approved **]**

3.4 Feature - Wide Range Response

BS-556, - System Function - Wide Range Response

When getting a wide range request, the notified users can send a positive or negative response to the requester. **[ ]**

3.4.1 Wide Range Response Requirements

BS-551, - Wide Range Response: Positive User Input

The system shall provide an interface, which allows the users to send a positive wide range response. **[** Approved **]**

BS-547, - Wide Range Response: Negative User Input

The system shall provide an interface, which allows the users to send a negative wide range response. **[** Approved **]**

BS-548, - Wide Range Response: Requester Notification (Positive Response)

The system shall provide an optical interface, which notifies the requester about an incoming positive wide range response. **[** Approved **]**

BS-546, - Wide Range Response: Requester Notification (Negative Response)

The system shall provide an optical interface, which notifies the requester about an incoming negative wide range response. **[** Approved **]**

BS-594, - Wide Range Response: Response Notification - Timeout

The system shall stop the local range response notification after 12 h. **[** Approved **]**

4 Non-functional Requirements

4.1 System Design Restrictions

BS-529, - System Design Restrictions

Following chapter defines system design restrictions and the corresponding restriction justifications. **[ ]**

4.1.1 System Design Restrictions Requirements

BS-530, - System Design Restriction: Communication Technology Standard

The system's physical layer shall be based on the LoRa implementation ([0] LoRa™ Modulation Basics).

Justification:

This system design restriction origins in the project's main goal; the introduction of the LoRa technology into the biancoSolutions work group. **[** Approved **]**

BS-545, - System Design Restriction: Minimum Communication Range

The system's minimum communication coverage shall include the offices of group's members (at the state of 01.12.2022)

Justification:

No justification required. **[** Approved **]**

BS-597, - System Design Restriction: Power Supply Voltage

The system's devices shall be powered with 5 V.

Justification:

This is a default for USB powered devices. **[** Approved **]**

BS-531, - System Design Restriction: Power Supply Source

The system's devices shall be powered via a USB-C connector.

Justification:

The biancoSolutions work group favors the standardization of the USB-C connector of as many electrical devices as possible. This way connectors may be reused via a broad range of devices, thus minimizing the environmental impact. **[** Approved **]**

BS-558, - System Design Restriction: SW Licensing

The system's software design and source code shall be licensed under the MIT license.

Justification:

The biancoSolutions work group favors the open source approach and wants to provide a contribution to the open source community. **[** Approved **]**

BS-559, - System Design Restriction: HW Licensing

The system's hardware design shall be licensed under the [2] CERN Open Hardware Licence.

Justification:

The biancoSolutions work group favors the open source approach and wants to provide a contribution to the open source community. **[** ✔ Approved **]**

BS-560, - System Design Restriction: Expandability

The system shall be expandable, i.e. the number of devices in one network shall be dynamic and configurable, up to 35 devices.

Justification:

As the biancoSolutions working group may expand in the future, the number of devices in one system must not be static. **[** ✔ Approved **]**

BS-561, - System Design Restriction: Federal Compliance

The system shall comply with federal regulation regarding radio emission according to Bundesnetzagentur.

Justification:

No justification required. **[** ✔ Approved **]**

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