WIZE GUIDELINES

V1.2

Version	Modifications	Date
1.0	First draft document	2021-07-08
1.1	Add channel and modulation use recommendation	2021-10-20
1.2	Complement on channel usage and LD modulations	2025/06/03

Summary

This document specifies GUIDELINES for an optimized use of the allocated bandwidth between the different applications and users.

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Tables and figures

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Introduction

Standard documents

Reference	Document	Version
N[1]	WIZE - 01 LAN Protocol	v1.4
N[2]	WIZE - 02 Regional Parameters	v1.2
N[3]	WIZE - 03 Common Application Layers	v1.3
N[4]	EN 13757-4 Communication systems for meters – Part 4: Wireless M-Bus	2018
N[5]	ERC Recommendation 70-03	2019

Table 1: References

Abbreviations

Transmission Duty Cycle

[3] WIZE protocol includes in its scope metering applications with battery operated devices and potentially high density of end points. Being a radio communication network, it is therefore very important that the bandwidth sharing is optimized.

[4] The EN 300 220-4 standard states that authorized duty cycle for the 169MHz frequency band shall not exceed 10%, this allows for a 6mn transmission over an hour. This allocation of duty cycle is only used under WIZE protocol in case of firmware updates which are by nature seldomly used. WIZE protocol recommends that. For all radio transmission, WIZE ALLIANCE proposes some scheduling rules in order to meet the expected high performance rates of data transmission which will be detailed here below.

First of all, a 4 hours period is daily reserved for potential maintenance operations (for instance firmware updates), data transmission is thus achieved over the remaining 20 hours of each day.
The 20 hours period can be splitted into several windows, in the following example 5 windows of 4 hours, which will allow for an optimized transmission schedule including a potential redundant data frame emission. This is detailed in the following figure:
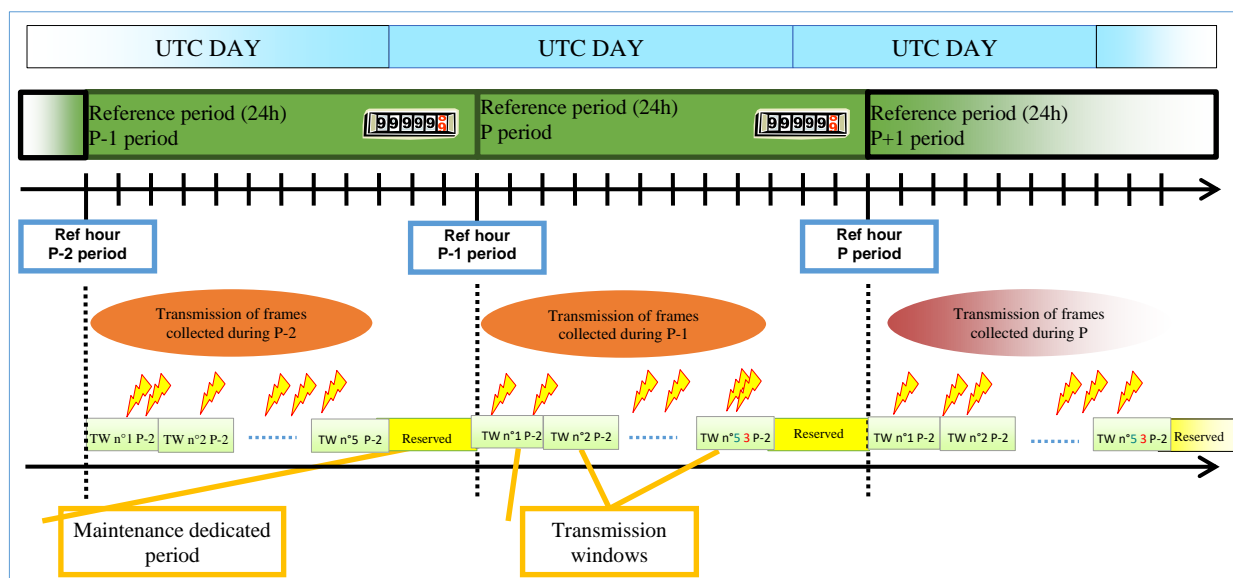

Table 2 : Frame scheduling example

Note: one reference period begins each day at "Reference Time" which is one parameter of the WIZE protocol (can be 00h00 UTC).

In order to avoid excessive bandwidth occupation which might result in excessive collision occurrence, the following limitation are proposed:

- Consider an average of the transmitters/usecases on the network (ex: if only 1% of the transmitters need an extended duty cycle it shall be included in the calculation with 1% weight over total number of transmitters)
- 0.01% duty cycle calculated over one hour, allowing for a 108 bytes data frame to be transmitted at 2400bps (including 30 bytes of WIZE protocol overhead)
- 0.0025% bandwidth occupation calculated over one transmission window of 4 hours – same 108 bytes limitation
- Transmission date of each data frame within one transmission window randomly calculated

One redundant transmission of the data is highly recommended, first transmission occurring in transmission window n and redundant transmission occurring in window n+x.

It shall be noted that battery operated transmitters with long life duration expectations will natively meet those bandwidth sharing rules as the energy availability limitation shall of course impact directly the communication duration.

In case of very low density application (<100 devices/km^2), it will of course be possible to derogate to the rules detailed above, however an 0.02% duty cycle (over 1h) limitation shall then apply in order to avoid other application disturbances. The 4 hours window over 24h reserved for network maintenance shall be preserved in any case.

Channel mapping and modulations

Channel dispatch shall be managed in order to achieve an optimized use of the bandwidth, for example when multiple channels are possible, the channel affected by default to one transmitter might be linked with its serial number (A_Field).

The recommended channel mapping is the following:

EN13757-4 / v :2018 Table 21	WIZE - 02 - Regional parameters Table 2	Modulation (WIZE naming)	Usage limitation for dense use case (>100devices/km^2)
A1/A3, n=0	Channel 100	WM2400 / WM6400	20% (for WM2400)
A1, n=1	Channel 110	LD1200 WM2400 (for existing applications only),	
A1, n=2	Channel 120	Downlink Communication only (recommended)	
A1, n=3	Channel 130	WM2400 / LD2400 / SUEZ-1G	30%
A1, n=4	Channel 140	WM2400 / LD2400	20%
A1, n=5	Channel 150	WM2400 / LD2400	30%

When device density is lower than 100 devices per Km^2 any of the 5 channels used for uplink communication can be used, for higher density it is recommended to respect the % repartition of the above table.

When possible, high performance modulation LD2400 should be used rather than WM2400 as it provides a significantly improved sensitivity with same channel usage.

NB: WM4800 modulation should not be used unless very specific need requires it, as the WM6400 modulation provides the same sensitivity, lower processing requirements and improved bit rate.

Recommended channel management with an increasing order of complexity :
1. Dispatch devices homogeneously over several channel (LD2400 or WM2400 modulation)
2. Use the power lowering command through radio downlink command when transmission success rate allows for it
3. Manually set the Transmitter parameters in order to use LD1200 modulation when required (downlink is supposed to be unavailable when this solution is required)
4. Implement a dynamic process in the transmitter in order to automatically switch to WM6400 modulation depending on the situation and based on RSSi measures
5. Open 3 channels for WM6400 modulation in case of extremely high density use case

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