

ISO/IEC JTC 1/SC 6/WG 1 "Physical and data link layers"
Convenorship: **SAC**
Convenor: **Huang Zhenhai Mr**



Status Report and PWI Proposal on the ISO/IEC NP 13925 (PHY specification based on licensed narrowband in field area network for Smart Grid)

Document type	Related content	Document date	Expected action
General document / Other		2022-06-15	INFO

Replaces: N 326 Status of Report of ISO/IEC PWI 13925 (PHY specification based on licensed narrowband in field area network for Smart Grid)

Description

Source: KNB

This document will be reviewed at the WG 1 meeting in June 2022.

Status Report and PWI Proposal on the ISO/IEC NP 13925

(PHY specification based on licensed narrow-
band in field area network for Smart Grid)

Source: Korean NB

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1. Needs for Proposed Standard

2. Status Report

3. Proposals

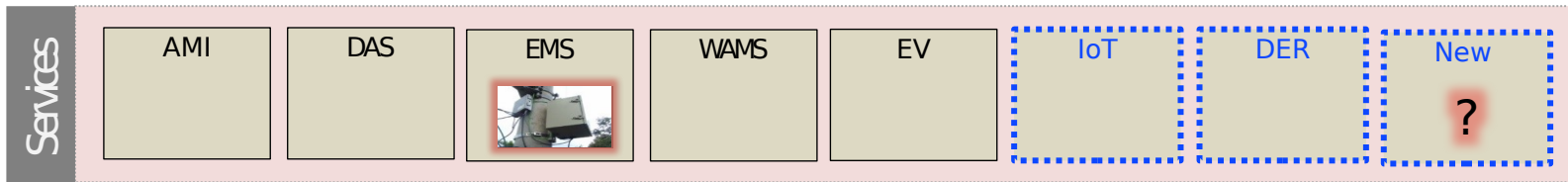
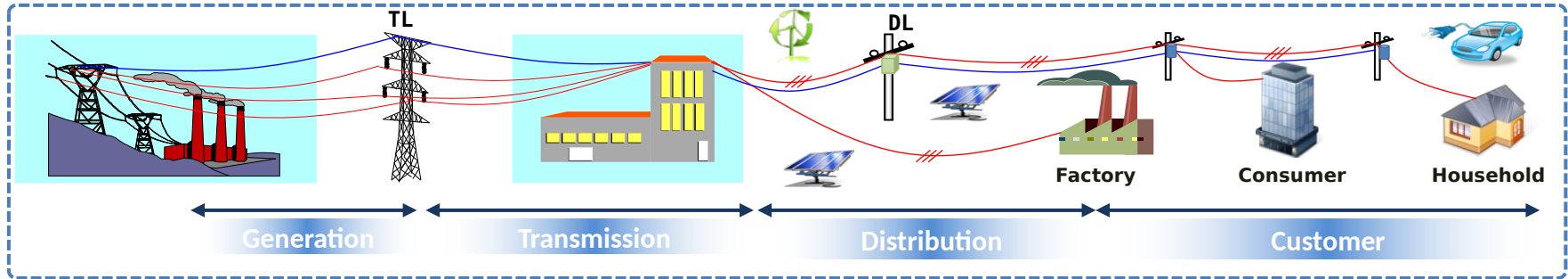
4. Conclusion

Q&A

1. Needs for Proposed Standard

Use cases

Smart Grid



Requirements for Smart Grid

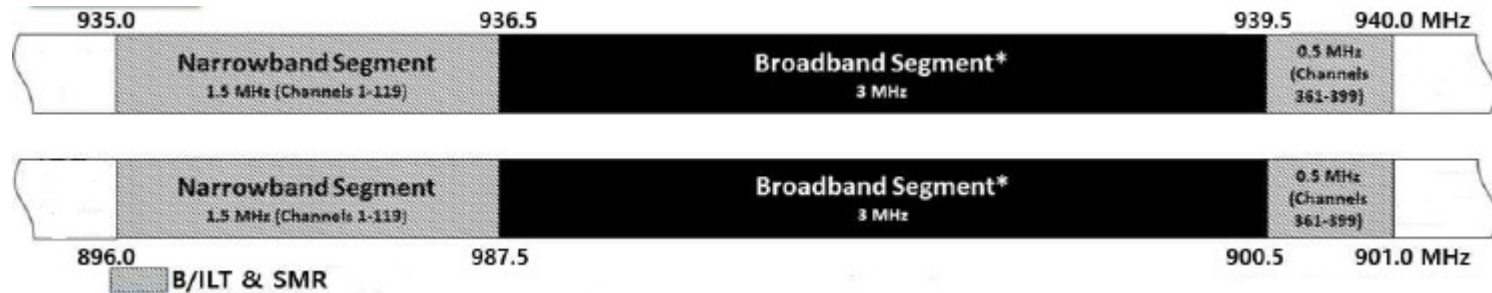
Application	Network Requirements (Ref. by Department of Energy)			
	Throughput	Latency	Reliability	Security
SmartGrid	10 ~ 100kbps per node	20ms ~ 15s	99~99.999%	High

1. Needs for Proposed Standard

Considering Spectrums for Smart Grid

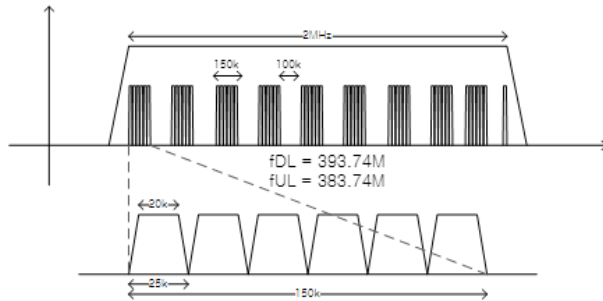
Spectrum policy(Industrial licensed band)

- USA FCC: 12.5kHz bandwidth for 900MHz spectrums

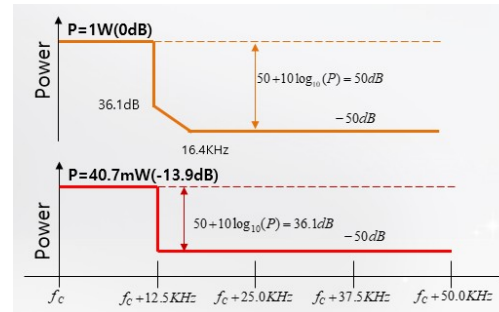


USA 900Mhz spectrums (from FCC)

- Korea: 25kHz bandwidth for 300/800/900MHz spectrums (380MHz band is allocated for KEPCO)



Korea 380MHz spectrums



Spectrums Regulation

- UK Ofcom: 12.5kHz/25kHz bandwidth for 123/420MHz spectrums
- Ireland ComReg: 12.5kHz bandwidth for 156/450MHz spectrums
- Hongkong COMS: 12.5kHz/25kHz bandwidth for 70/460MHz spectrums
- QATAR MOTC: 12.5kHz bandwidth for 30/150/360MHz spectrums

1. Needs for Proposed Standard

Candidate RAT to support Smart Grid (narrowband technology)

Bandwidth and peak rate for current narrowband technology

- No technology satisfies 100kbps peak rate with bandwidth \leq 25kHz in current narrowband technology for industry licensed frequency band

Technology	TRS APCO P25	TRS TETRA	3GPP LTE-M	3GPP NB-IoT
Occupied Bandwidth	12.5kHz, 6.252kHz	25kHz	1.08MHz	180KHz
Peak Rate	9.6Kpbs	36Kpbs	1Mbps	200Kpbs
Licensed/Unlicensed	Licensed band	Licensed band	Licensed band	Licensed band

Requirements for current narrowband technology

Method for Digital TBS	APCO P25	TETRA
Standardization	Phase 2	Phase 2
Frequency spectrums (MHz)	120~300, 360~512, 800~941	380~400, 410~430, 450~470, 870~888, 915~933
Occupied bandwidth	12.5kHz(C4FM), 6.252kHz(CQPSK)	25KHz (4 slots)
Multiple access scheme	FDMA	TDMA
Peak rate	9.6Kpbs	36Kpbs

Requirements for TRS technology

	Release 8	Release 8	Release 12	Release 13	Release 13
	Cat. 4	Cat. 1	Cat. 0	"Cat. 1.4MHz"	"Cat. 200kHz"
Downlink peak rate	150 Mbps	10 Mbps	1 Mbps	1 Mbps	200 kbps
Uplink peak rate	50 Mbps	5 Mbps	1 Mbps	1 Mbps	144 kbps
Number of antennas	2	2	1	1	1
Duplex mode	Full duplex	Full duplex	Half duplex	Half duplex	Half duplex
UE receive bandwidth	20 MHz	20 MHz	20 MHz	1.4 MHz	200 kHz
UE transmit power	23 dBm	23 dBm	23 dBm	20 dBm	23 dBm
Modem complexity	100%	80%	40%	20%	<15%

Requirements for 3GPP LTE technology

1. Needs for Proposed Standard

Candidate RAT to support Smart Grid (narrowband technology)

Bandwidth and peak rate for current narrowband technology

- No technology satisfies 100kbps peak rate with bandwidth \leq 25kHz in current narrowband technology for industry licensed frequency band

Technology	IEEE Wi-Sun	LoRa	SigFox
Occupied Bandwidth	180KHz	125KHz	0.1kHz
Peak Rate	50Kpbs	5Kpbs	100bps
Licensed/Unlicensed	Unlicensed band	Unlicensed band	Unlicensed band

Requirements for current narrowband technology

Purpose of this proposal

Providing robust PHY technology based on licensed narrowband in field area network for Smart Grid

- With satisfying 1) **maximum 100kbps throughput** per node on 2) **12.5kHz/25kHz** 3) **licensed narrow bandwidth**
- Further providing relevant technologies to satisfy requirement of minimum 20ms for latency and minimum 99% for reliability

2. Status Report of NP balloting on ISO/IEC 13925

- **ISO/IEC JTC 1/SC 6/WG 1 N 219 (Korean NB contribution of New Work Item Proposal on New Radio Access Technology in Field Area Network for Smart Grid)**

- This document was presented for review and consideration at the JTC 1/SC 6/WG 1 virtual meeting in **October 2020 as a candidate New Work Item Proposal.**

- **NP balloting was circulated from January to April 2022 as below.**

SC 6 N17653: Form 4 - ISO/IEC 13925 (ed1), PHY specification based on licensed narrowband in field area network for Smart Grid

SC6 N17654: Proposed initial WD text of ISO/IEC 13925, "PHY specification based on licensed narrowband in field area network for Smart Grid"

Proposal (to be completed by the proposer, following discussion with the committee leadership).

Title of the proposed deliverable

English title

Telecommunications and information exchange between systems — PHY specification based on licensed narrowband in field area network for Smart Grid

French title (if available)

[Click here to enter text.](#)

(In the case of an amendment, revision or a new part of an existing document, include the reference number and current title)

Scope of the proposed deliverable

This standard specifies radio access technology in field area network for Smart Grid by development of robust wireless sensor network based on licensed narrowband. It focuses on physical layer (PHY) technology for smart utility applications such as metering infrastructure and energy storage/management systems using industry licensed frequency band.

This standard includes a PHY design to satisfy maximum 100kbps throughput per node with Filtered Multi-Tone (FMT) on 12.5kHz/25kHz narrow licensed bandwidth. Furthermore, this standard specifies relevant technologies to satisfy robust reliability (>99%), to reduce latency in minimum 20ms, to reduce PAPR (Peak to Average Power Ratio), and to support relay for coverage hole.

ISO/IEC #####-#:####(E)

ISO/IEC JTC 1/SC 6/WG 1

Secretariat: KATS

**Telecommunications and information exchange between systems
- PHY specification based on licensed narrowband in field area
network for Smart Grid**

2. Status Report of NP balloting on ISO/IEC 13925

- There are 5 positive voting from China, Kazakhstan, Spain, Ukraine and Korea with 83.3% P-Members Approving.
- It was failed to take 5 experts participation. Finally, this NP was not accepted.
 - There are 3 experts participating experts from China, Spain and Korea (Spain NB sent e-mail to SC 6 CM for offering an expert after NP Voting within 2 weeks).

Member responses - Votes by members																	
Country (Member body)	Status*	1a. Agree to add to work programme							Market relevance	1b. Stakeholders consultation		2. Relevant documents		3. Comments		4. Participation	
		Yes			No			Abs*		Yes	No	Yes	No	Yes	No	Yes	No
		20.00	30.00	40.00	PWI: Yes	PWI: No	NC	Exp									
Austria (ASI)	P							X		X		X		X		X	
Belgium (NBN)	P							X			X		X		X		
Canada (SCC)	P							X		X		X		X		X	
China (SAC)	P	X								X		X		X	X		
Denmark (DS)	P							X			X		X		X		
Finland (SFS)	P							X		X		X		X		X	
Germany (DIN)	P							X		X		X		X		X	
India (BIS)	P							X		X		X		X		X	
Japan (JISC)	P					X			X		X		X		X		
Kazakhstan (KAZMEMST)	P	X								X		X		X		X	
Korea, Republic of (KATS)	S	X								X		X		X	X		
Netherlands (NEN)	P							X		X		X		X		X	
Russian Federation (GOST R)	P							X			X		X		X		
Spain (UNE)	P	X								X		X		X		X	
Sweden (SIS)	P							X		X		X		X		X	
Switzerland (SNV)	P							X		X		X		X		X	
Ukraine (DSTU)	P	X									X		X		X		
United Kingdom (BSI)	P							X		X		X		X		X	
United States (ANSI)	P							X		X		X		X		X	
Sub-Total Question 1a		5	0	0	0	1	1	12									
Totals		5			1		13		1	14	5	0	19	0	19	2	17

* Status P for P-Member, O for O-Member and S for Secretariat

* Abs: NC for lack of National Consensus, Exp for lack of Expert Input

2. Status Report of NP balloting on ISO/IEC 13925

- **There was only 1 technical comment from Japan.**
 - Ballot comments on NP 13925 are in the below table.
 - Regarding Japan's technical comment, it was already explained in NP that our proposal is different technology from 3GPP or other candidate RAT to support Smart Grid (No technology satisfies 100kbps peak rate with bandwidth≤25kHz in current narrowband technology for industry licensed frequency band)
 - There was no other technical issue on the NP balloting results.

Comments from voters		
Member	Comment	Date
China (SAC) Wu, Xiaona Ms	Comment to Q.7: Guoqiang Zhang, e-mail: guoqiang.zhang@iwncomm.com	2022-03-31
Japan (JISC) Teruyama, Katsuyuki Mr	Comment to Q.1: This proposal is based on the communication requirements for smart grid published by US Department of Energy in 2010, but there is no description of requirements in other countries. There is also no description about reasons why 12.5 kHz and 25 kHz of band width are used. Wireless communication standards for smart grid have already developed for individual use cases in each country and region, such as 3GPP. Wireless communication systems are being studied and implemented in various countries, regions and companies, including KEPCO (Korea Electric Power Corporation), which is introducing LTE and 5G. Wi-SUN (IEEE 802.15.4g and .4e) is one example widely deployed in Japan. It is unclear how this proposal is related to IEC 61850, which is the core standard for smart grid. Under these circumstances, there is no explanation as to where this proposal is envisioned to be applied. For these reasons, usefulness of this proposal is questionable.	2022-03-25
Korea, Republic of (KATS) Jung, Bo Mr	Comment to Q.7: Younghyun Kim (younghyun.kim@kepco.co.kr) Sungjun Yoon (yoon.sungjun@gooditl.com)	2022-04-01

3. Proposals – Establishment of PWI for further studying

- **Following the NP voting results, Korean NB propose to establish PWI on ISO/IEC 13925 for further studying.**
 - **Review and further clarify the gaps among relevant standardization work which issue was raised during NP voting.**
 - **Develop Draft Text on the candidate NP based on the proposed WD text, SC6 N17654.**
 - **Seeking expert participation for the candidate NP.**
- **Upon successful completion of PWI project, it is anticipated to go forward a new NP.**
- **Time Plans of PWI project:**

2022.06.

- **Establishment of PWI 13925**
- **Review and further clarify the gaps**
- **Develop updated text on the candidate NP**
- **Seeking expert participation**

2023.03.

- **Report PWI project results to SC 6**

2023.06.

- **Initiate a New NP on PWI 13925 (by SC 6 or Korean NB)**



4. Conclusion

- **Korean NB sure that the proposed technology is urgent from requirements in Field Area Network for Smart Grid, especially relevant industries require an expeditious establishment of international standardization.**
- **From PWI project, it needs to proceed a new NP rapidly by additional study and updates of proposed initial WD.**
- **JTC1/SC6 really need each NC's additional expert participation and kind consideration!**

**THANK YOU
VERY MUCH**

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