

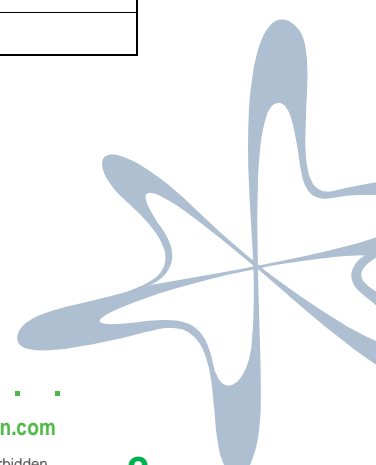


## List of distribution

Entity	Recipient

## Historical Modification Tracking

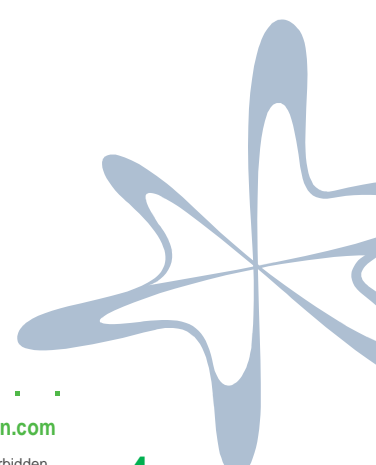
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# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>5</b>
1.1	Object .....	5
1.1.1	Context .....	5
1.1.2	Description.....	5
1.2	Document organisation .....	6
1.3	Glossary.....	6
1.4	References.....	6
<b>2</b>	<b>CONCEPTION PHASE .....</b>	<b>8</b>
2.1	Hardware requirements .....	8
2.1.1	Electronic architecture .....	8
2.1.2	Man Machine Interface .....	8
2.1.3	Clock.....	8
2.1.4	Radio frequency Input / Output .....	8
2.1.4.1	ZigBee.....	9
2.1.4.2	KNX.....	9
2.2	Electromagnetic compatibility requirements .....	9
2.2.1	Radio Standards.....	9
2.2.1.1	For KNX .....	9
2.2.1.2	For ZigBee .....	10
2.2.2	EMC Standard.....	10
2.2.2.1	For KNX .....	10
2.2.2.2	For ZigBee .....	10
2.3	Automation context requirements .....	10
<b>3</b>	<b>NOMINAL USE PHASE .....</b>	<b>11</b>
3.1	Data processing .....	11
3.1.1	For KNX.....	11
3.1.1.1	For the historical physical layer:.....	11
3.1.1.2	For the standard physical layer:.....	13
3.1.2	For ZigBee.....	17
3.1.2.1	For the historical physical layer .....	17
3.1.2.2	For the standard physical layer.....	19
3.2	Reception.....	22
3.2.1	Reception at power on.....	23
3.2.1.1	Historical physical layer, Single Phase and Three-Phase: .....	23
3.2.1.2	Standard physical layer, Single Phase and Three-PHASE: .....	23
3.2.2	Reception on update.....	25
3.2.2.1	Historical physical layer, Single phase and Three-Phase .....	25
3.2.2.2	Standard physical layer, Single Phase and Three-PHASE: .....	26
3.2.3	Reception on request.....	27
3.2.3.1	Historical physical layer, Single Phase and Three-Phase: .....	28
3.2.3.2	Standard physical layer, Single Phase and Three-Phase .....	29
3.2.4	Reception on configured demand.....	33
3.2.4.1	Initialisation of data to receive on configured demand. ....	33
3.2.4.1.1	Historical physical layer.....	33
3.2.4.1.2	Standard physical layer, Single Phase and Three-Phase.....	34
3.2.4.2	Reception of data on configured demand .....	35
3.2.5	Reception of alarms.....	35
3.3	Emission .....	35
3.3.1	Emission of the list of data to be sent on configured demand.....	35
3.3.2	Emission of requests for specific data .....	36

<b>4</b>	<b>CONFIGURATION (ADDITION AND REMOVAL OF DEVICES)</b>	<b>37</b>
4.1	ZigBee	37
4.2	KNX	38
4.2.1	Existing PB 1.0 procedure	39
4.2.2	Standard Security	40
4.2.3	Enhanced Security	41
4.3	Set-up procedure with the two levels of security	44
4.3.1	Standard security	44
4.3.2	Enhanced security	45
4.3.2.1	ZigBee	45
4.3.2.2	KNX	46
<b>5</b>	<b>SPECIAL EVENTS</b>	<b>47</b>
5.1	The owner of the meter contract is modified	47
5.2	Change of energy supplier	47
5.3	A new firmware is downloaded on the ERL	47



## 1 INTRODUCTION

### 1.1 Object

The specification of the radio transmitter Linky and downstream interface is a partnership project between EDF and IGNES sponsored by Smart Lyon project accompanied by ADEME as part of the program Development of the Digital Economy - Action Smart Grid for Future Investments

#### 1.1.1 Context

Behavior in terms of power consumption change due to:

- The guidance of public authorities to more energy sobriety
- The energy policies driven by the territories
- The more fundamental changes in lifestyles.

Intelligent electrical systems, in particular through the deployment of smart meters, will provide the public with energy data easily accessible and understandable by all.

This evolution will give rise to the development of new products and services which themselves can influence consumer behaviors and allow living the energy more simply.

The market for smart grids is at the heart of the green economy with a high growth potential including the international market.

#### 1.1.2 Description

This specification is intended to be used by manufacturers of downstream equipment for the radio interface with the ERL device.

The ERL is an electronic device whose function is to broadcast to downstream equipment, under a two-way radio protocol (KNX, Zigbee), the information transmitted via the customer teleinformation (TIC) by the Linky meter.

The ERL is intended for being plugged into the Linky smart meters which will have, under their cover, a location for this insertion.

To be able to communicate properly with the ERL, the downstream equipment must have some particular specification.

This document is a reference for the common behavior that all downstream equipment should have.

## 1.2 Document organisation

This document is organised by life cycles of the product to realize: conception, nominal mode, configuration, special events. It is formulated with requirements in order to be able to follow every item between its specifications to its validation.

## 1.3 Glossary

ERL	Emetteur Radio Linly (Radio Transmitter Linky)
ZB	ZigBee
ZTC	ZigBee Trust Center
ZR	ZigBee Routeur
ZED	ZigBee End Device
LRZR	Linky Ready ZigBee Routeur
LRZED	Linky Ready ZigBee End Device
IC	Install code
TC Link Key	Key used by TC for encryption of network key
MMI	Man Machine Interface
DPT	KNX datapoint

## 1.4 References

Number	Designation	Reference
1	Sorties de télé-information client des appareils de comptage électroniques utilisés en généralisation par ERDF	ERDF-NOI-CPT_54E
2	Spécification technique EDF HN 44-S-81, 2 <sup>ième</sup> édition, mars 2007, Sortie de télé-information client des appareils de comptage électroniques utilisés par le Distributeur EDF.	EDF HN 44-S-81, 2 <sup>ième</sup> édition, mars 2007
3	KNX Handbook Vol 03 Chap 05 part 03. System Specifications; Management; Configuration procedures	KNX 03_05_03 Configuration Procedures v01.05.02 AS
4	KNX Handbook Vol 03 Chap 07 part 05. KNX System Specifications Interworking	KNX 03_07_02 Datapoint Types v01.08.02 AS Version 1.08.02

	Data point types	
5	KNX Handbook Vol 03 Chap 02 part 05. System Specifications; Communication Media; Radio Frequency	KNX 03_02_05 Communication Medium RF v1.6.01 AS
6	KNX Handbook Vol 08 Chap 02 part 05. KNX System Conformance Testing ; Medium Dependant Layers tests; RF Physical and Data Link Layer Tests	KNX 8_2_5 RF_2_2_AS
7	ZigBee Home Automation Public Application Profile Home Automation Public Application Profile	ZigBee Profile: 0x0104 Revision 29, Version 1.2 ZigBee Document 05-3520-29
8	ZigBee Over-the-air Upgrading cluster	Revision 18, Version 1.0, March 14, 2010
9	KNX data security	AN158 v02 KNX Data security
10	KNX RF S mode device profile	AN160 v01 RF S-Mode device Profiles

## 2 CONCEPTION PHASE

### 2.1 Hardware requirements

#### 2.1.1 Electronic architecture

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CON-SUE-HDW-FC-001	<b>Implement following specific characteristics for CPU</b>	1.0
The downstream interface must have a wireless chip that fully supports at least one the following solutions: - ZigBee Pro 2012; ZigBee will operate in 2.4 GHz radio band. - or KNX RF Multi with Fast Link Acknowledgement (frequency band 868 MHz)		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

#### 2.1.2 Man Machine Interface

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CON-SUE-HDW-FC-002	<b>Allow manual equipment configuration</b>	1.0
The downstream interface must have at least a Push Button or any kind of MMI to launch creating a link with the ERL.		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

#### 2.1.3 Clock

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On the ERL, there is no clock to manage the periodic send of data based on real hours.

The historical TIC does not give the hour.

In order to manage this kind of data reception, it is recommended but not mandatory to implement a RTC in the downstream equipment.

#### 2.1.4 Radio frequency Input / Output

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A downstream interface must **satisfy at least one of the two following requirements:**



### 2.1.4.1 ZigBee

CON-ERL-PTC-FC-001	<b>Adapt to the automation network using the ZigBee protocol.</b>	1.0
<p>The ZigBee downstream interface must be able to communicate with the ERL using the ZigBee protocol as following :</p> <p>ZigBee Pro 2012 must be used.</p> <p>ZigBee will operate in 2.4 GHz radio band.</p> <p>It must be compatible with the ZHA1.2 and later versions.</p> <p>Refer to document ref (7)</p>		
Class : Non-functional		Verif. level : verification
Upstream Requirement(s) : Derived		

### 2.1.4.2 KNX

CON-ERL-PTC-FC-002	<b>Adapt to the automation network using the KNX protocol.</b>	1.0
<p>The KNX downstream interface must be able to communicate with the ERL using the KNX protocol as following :</p> <p>The standard KNX to use is the KNX RF Multi with Fast Link Acknowledgement (frequency band 868 MHz KNX RF1.M)</p> <p>Refer to document <a href="#">ref (5)</a></p>		
Class : Non-functional		Verif. level : verification
Upstream Requirement(s) : Derived		

## 2.2 Electromagnetic compatibility requirements

In order to comply with R&TTE directives to get the CE marking, the following standards must be respected.

### 2.2.1 Radio Standards

#### 2.2.1.1 For KNX

CON-CPT-ELM-FC-001	<b>Respect radio standard for KNX emission.</b>	1.0
<p>The KNX downstream equipment must respect the radio standard for KNX emission EN 300220-1 et EN 300220-2</p>		
Class : Non-functional		Verif. level : verification
Upstream Requirement(s) : Derived		

### 2.2.1.2 For ZigBee

CON-CPT-ELM-FC-002	<b>Respect radio standard for ZigBee emission.</b>	1.0
The ZigBee downstream equipment must respect the radio standard for ZigBee emission EN 300328.		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

### 2.2.2 EMC Standard

#### 2.2.2.1 For KNX

CON-CPT-ELM-FC-003	<b>Respect CEM standard for KNX.</b>	1.0
The KNX downstream equipment must respect the EMC standard for KNX EN 301 489-1 et EN 301 489-3.		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

#### 2.2.2.2 For ZigBee

CON-CPT-ELM-FC-004	<b>Respect CEM standard for ZigBee.</b>	1.0
The ZigBee downstream equipment must respect the EMC standard for ZigBee EN 301 489-1 et EN 301 489-17.		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

## 2.3 Automation context requirements

CON-CTX-DOM-FC-001	<b>Respect the security and performance of automation equipment</b>	1.0
The downstream interface must be ZigBee or KNX RF Multi certified.		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

## 3 NOMINAL USE PHASE

This is the main mode of use, installation of network done, without any addition or removal of device on the network.

NOM-TRF-INF-FP-001	<b>Retrieve information from the ERL device</b>	1.0
The downstream equipment is responsible for retrieving information from the ERL		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) :	Derived	

### 3.1 Data processing

This paragraph gives the format for all information gathered in the TIC and sent to the downstream equipment for every RF mode.

#### 3.1.1 For KNX

##### 3.1.1.1 For the historical physical layer:

TIC ERDF Labels	Information TIC	DPT
ADCO	Meter's address	16.000
OPTARIF	Chosen pricing plan	16.000
ISOUSC	Purchased current	14.019
BASE	Basic option index	235.001
		xxx.001 (235.001+ DateTime)
HCHC HCHP	Off-Peak Hours Full Hours	235.001
		xxx.001 (235.001+ DateTime)
EJPHN EJPHPM	EJP option Index Normal hours Moving Peak Hours	235.001
		xxx.001 (235.001+ DateTime)
BBRHCJB BBRHPJB BBRHCJW BBRHPJW BBRHCJR BBRHPJR	Tempo option Index : Off peak hours blue days Peak hours blue days Off peak hours white days Peak hours white days Off peak hours red days Peak hours red days	235.001
		xxx.001 (235.001+ DateTime)

TIC ERDF Labels	Information TIC	DPT
PEJP	Start EJP prior notice (30 min)	225.003
PTEC	Current billing period	5.006
DEMAIN	Tomorrow's color	225.003
PAPP	Apparent power	14.080 Static change of value =500VA Dynamic mode: DPT_start 1.010 Dynamic change of value =50VA Dynamic mode duration = 15min
HHPHC	Peak Hour Off-Peak Hour Schedule	4.001
MOTDETAT	Meter's status word	16.000
IINST (*)	Instant current in Amperes	14.019
ADPS (*)	Purchased Power Exceeding Warning	14.019
IMAX (*)	Maximum capacity used	14.019
IINST1 (**)	Instant current Phase 1	xxx.019
IINST2 (**)	Instant current Phase 2	xxx.019
IINST3 (**)	Instant current Phase 3	xxx.019
ADIR1 (**)	Alert of current exceeding subscribed value per phase	xxx.019
ADIR2 (**)	Alert of current exceeding subscribed value per phase	xxx.019
ADIR3 (**)	Alert of current exceeding subscribed value per phase	xxx.019
IMAX1 (**)	Maximum capacity used Phase1	xxx.019
IMAX2 (**)	Maximum capacity used Phase2	xxx.019
IMAX3 (**)	Maximum capacity used Phase3	xxx.019
PMAX (**)	Three phase maximal power reached	14.056
PPOT (**)	Voltage presence	6.021

### 3.1.1.2 For the standard physical layer:

TIC ERDF Labels	Information TIC	DPT
Bits 10 to 13 of STGE	Current price on supply contract	5.006
NTARF	Current Index Number	5.006
EAST	Total active power drawn	13.010
Bits 24 & 25 of STGE	Color of the day for the time history contract.	5.006
Bits 26 & 27 of STGE	Colour of the following day for the historical contract TEMPO	225.003
ADSC	Meter's Secondary address	16.000
VTIC	Version of the TIC	16.000
DATE	Current date and time	19.001
NGTF	Name of the supplier pricing grid	28.001
LTARTF	Current supplier pricing label	28.001
Bits 14 et 15 de STGE	Current tariff on the network contract.	5.006
EASF01 EASF02 EASF03 EASF04 EASF05 EASF06 EASF07 EASF08 EASF09 EASF10	Supplier active power drawn index01 index 02 index 03 index 04 index 05 index 06 index 07 index 08 index 09 index 10	235.001 xxx.001 (235.001+ DateTime)
EASD01 EASD02 EASD03 EASD04	Distributor active power drawn index01 index 02 index 03 index 04	235.001 xxx.001 (235.001+ DateTime)

TIC ERDF Labels	Information TIC	DPT
IRMS1(*)	Effective current phase 1	14.019
IRMS1(**)	Effective current phase 1	xxx.019
IRMS2 (**)	Effective current phase 2	
IRMS3 (**)	Effective current phase 3	
URMS1(*)	Effective voltage phase 1	14.027
URMS1(**)	Effective voltage phase 1	xxx.027
URMS2 (**)	Effective voltage phase 2	
URMS3 (**)	Effective voltage phase 3	
PREF	Apparent ref. power	xxx.080
Bit 7 de STGE	Reference power exceeded	xx.005
PCOUP	Apparent cutoff power	14.080
SINSTS (*)	Apparent instant drawn power	14.080 Static change of value =500VA Dynamic mode activation: DPT_start 1.010 Dynamic change of value =50VA Dynamic mode duration = 15min
SINSTS1 (**)	Apparent instant drawn power phase 1	xxx.080 Static change of value =500VA Dynamic mode activation: DPT_start 1.010 Dynamic change of value =50VA Dynamic mode duration = 15min
SINSTS2 (**)	Apparent instant drawn power phase 2	
SINSTS3 (**)	Apparent instant drawn power phase 3	
SMAXSN (*)	Maximal apparent power extracted + timestamp	xxx080
SMAXSN1(**)	Instantaneous apparent power phase 1 + timestamp	xxx.080
SMAXSN2(**)	Instantaneous apparent power phase 2 + timestamp	
SMAXSN3(**)	Instantaneous apparent power phase 3 + timestamp	

TIC ERDF Labels	Information TIC	DPT
<b>SMAXSN-1(*)</b>	Instantaneous apparent power phase 1 + timestamp n-1	<b>xxx.080</b>
<b>SMAXSN1-1(**)</b>	Instantaneous apparent power phase 1 + timestamp n-1	<b>xxx.080</b>
<b>SMAXSN2-1(**)</b>	Instantaneous apparent power phase 2 + timestamp n-1	
<b>SMAXSN3-1(**)</b>	Instantaneous apparent power phase 3 + timestamp n-1	
<b>CCASN</b>	Point n on the active load drawn curve + timestamp	<b>xxx.056</b>
<b>CCASN-1</b>	Point n-1 on the active load drawn curve + timestamp	<b>xxx.056</b>
<b>UMOY1(*)</b>	Mean phase 1 + timestamp	<b>14.080</b>
<b>UMOY1(**)</b>	Mean phase 1 + timestamp	<b>xxx.080</b>
<b>UMOY2(**)</b>	Mean phase 2 + timestamp	
<b>UMOY3(**)</b>	Mean phase 3 + timestamp	
<b>Bits 28 &amp; 29 STGE</b>	Moving peak prior notices	<b>xxx.024</b>
<b>Bits 30 &amp; 31 STGE</b>	Moving peak (PM)	<b>20.025</b>
<b>DPM1</b>	Start of Moving Peak 1 + timestamp	<b>xxx.001</b>
<b>FPM1</b>	End of Moving Peak 1 + timestamp	<b>xxx.001</b>
<b>DPM2</b>	Start of Moving Peak 2 + timestamp	<b>xxx.001</b>
<b>FPM2</b>	End of Moving Peak 2 + timestamp	<b>xxx.001</b>
<b>DPM3</b>	Start of Moving Peak 3 + timestamp	<b>xxx.001</b>
<b>FPM3</b>	End of Moving Peak 3 + timestamp	<b>xxx.001</b>
<b>MSG1</b>	Short message	<b>xxx.001</b>
<b>MSG2</b>	Ultrashort message	<b>xxx.001</b>
<b>PRM</b>	Point of measurement report	<b>16.000</b>
<b>Bits 0 STGE</b>	State of dry contact	<b>1.001</b>
<b>RELAIS</b>	State of 8 relays	<b>1.001</b>

TIC ERDF Labels	Information TIC	DPT
NJOURF	Number of the current day in the calendar	5.010
NJOURF+1	Number of the next day in the calendar	5.010
PJOURF+1	Next day profile	xxx.001
PPOINTE	Next high day profile	xxx.001
Bits 1 to 3 STGE	Breaker state	20.021
Bit 4 STGE	State of the DNO (Distribution Network Operator) cover terminal	x.009
Bit 6 STGE	Excess voltage on one of the phases	x.005
Bit 8 STGE	Producer/consumer operation	1.025
Bit 9 STGE	Active power direction	x.012
Bit 16 STGE	Downgraded clock mode (loss of the internal clock's timestamp)	x.005
Bit 17 STGE	State of the remote-information output	20.020
Bits 19 & 20 STGE	State of output of communication Euridis	xxx.022
Bits 21 & 22 STGE	Status CPL	xxx.023
Bit 23 STGE	CPL synchronization	x.005
EAIT(***)	Total active power injected	13.010
ERQ1(***)	Total reactive power Q1	13.012
ERQ2(***)	Total reactive power Q2	13.012
ERQ3(***)	Total reactive power Q3	13.012
ERQ4(***)	Total reactive power Q4	13.012
STINSTI(***)	Apparent instant power injected	14.080
SMAXIN(***)	Maximal apparent power injected n	xxx.080
SMAXIN-1(***)	Maximal apparent power injected n-1	xxx.080
CCAIN(***)	Point n on the active load drawn curve	xxx.056



TIC ERDF Labels	Information TIC	DPT
CCAIN-1(***)	Point n-1 on the active load drawn curve	xxx.056

(\*): only single phase  
(\*\*): only three-phase  
(\*\*\*): only producer mode

### 3.1.2 For ZigBee

#### 3.1.2.1 For the historical physical layer

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
ADCO	Meter's address	Metering Cluster	0x0702	MeterSerialNumber	
ISOUSC	Purchased current	Meter Identification Cluster	0x0b01	AvailablePower	
BASE	Basic option index	Metering Cluster	0x0702	CurrentSummationDelivered/Current Tier1SummationDelivered	
HCHC HCHP	Off-Peak Hours Full Hours	Metering Cluster	0x0702	CurrentTier1SummationDelivered CurrentTier2SummationDelivered	
EJPHN EJPHPM	EJP option Index Normal hours Moving Peak Hours	Metering Cluster	0x0702	CurrentTier1SummationDelivered CurrentTier2SummationDelivered	

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
BBRHCJB BBRHPJB BBRHCJW BBRHPJW BBRHCJR BBRHPJR	Tempo option Index : Off peak hours blue days Peak hours blue days Off peak hours white days Peak hours white days Off peak hours red days Peak hours red days	Metering Cluster	0x0702	CurrentTier1SummationDelivered CurrentTier2SummationDelivered CurrentTier3SummationDelivered CurrentTier4SummationDelivered CurrentTier5SummationDelivered CurrentTier6SummationDelivered	
PAPP	Apparent power	Electrical Measurement Cluster	0x0b04	ApparentPower	
IINST(*)	Instant current in Amperes	Electrical Measurement Cluster	0x0b04	RMSCurrent	Unsigned 16-bit integer
IMAX(*)	Maximum capacity used	Electrical Measurement Cluster	0x0b04	RMSCurrentMax	
IINST1(**)	Instant current Phase 1	Electrical Measurement Cluster	0x0b04	RMSCurrent	Unsigned 16-bit integer
IINST2(**)	Instant current Phase 2	Electrical Measurement Cluster	0x0b04	RMSCurrentB	Unsigned 16-bit integer
IINST3(**)	Instant current Phase 3	Electrical Measurement Cluster	0x0b04	RMSCurrentC	Unsigned 16-bit integer
IMAX1(**)	Maximum capacity used Phase1	Electrical Measurement Cluster	0x0b04	RMSCurrentMax	

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
IMAX2(**)	Maximum capacity used Phase2	Electrical Measurement Cluster	0x0b04	RMSCurrentMaxB	
IMAX3(**)	Maximum capacity used Phase3	Electrical Measurement Cluster	0x0b04	RMSCurrentMaxPhC	
PMAX(**)	Three phase maximal power reached	Electrical Measurement Cluster	0x0b04	ActivePowerMax	

### 3.1.2.2 For the standard physical layer

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
ADSC	Meter's Secondary address	Metering Cluster	0x0702	MeterSerialNumber	
VTIC	Version of the TIC	Meter Identification Cluster	0x0b01	SoftwareRevision	
DATE	Current date and time	TIME cluster	0x000A	Time + DstShift + DstStart + DstEnd	string of characters
EAST	Total active power drawn	Metering Cluster	0x0702	CurrentSummationDelivered	
EASF01 EASF02 EASF03 EASF04 EASF05 EASF06 EASF07 EASF08 EASF09 EASF10	Supplier active power drawn index 01 index 02 index 03 index 04 index 05 index 06 index 07 index 08 index 09	Metering Cluster	0x0702	In consumer mode: CurrentTier1SummationDelivered CurrentTier2SummationDelivered CurrentTier3SummationDelivered CurrentTier4SummationDelivered CurrentTier5SummationDelivered CurrentTier6SummationDelivered .....	

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
	index 10				
IRMS1	Effective current phase 1	Electrical Measurement Cluster	0x0b04	RMSCurrent	
IRMS2(**)	Effective current phase 2	Electrical Measurement Cluster	0x0b04	RMSCurrentPhB	
IRMS3(**)	Effective current phase 3	Electrical Measurement Cluster	0x0b04	RMSCurrentPhC	
URMS1	Effective voltage phase 1	Electrical Measurement Cluster	0x0b04	RMSVoltage	
URMS2(**)	Effective voltage phase 2	Electrical Measurement Cluster	0x0b04	RMSVoltagePhB	
URMS3(**)	Effective voltage phase 3	Electrical Measurement Cluster	0x0b04	RMSVoltagePhC	
PREF	Apparent ref. power	Meter Identification Cluster	0x0b01	AvailablePower	
Bit 7 de STGE	Reference power exceeded	Electrical Measurement Cluster	0x0b04		Unsigned 16-bit integer
PCOUP	Apparent cutoff power	Meter Identification Cluster	0x0b01	PowerThreshold	
SINSTS(*)	Apparent instant drawn power	Electrical Measurement Cluster	0x0b04	ApparentPower	Unsigned 16-bit integer

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
SINSTS1(**)	Apparent instant drawn power phase 1	Electrical Measurement Cluster	0x0b04	ApparentPower	Unsigned 16-bit integer
SINSTS2(**)	Apparent instant drawn power phase 2	Electrical Measurement Cluster	0x0b04	ApparentPowerPhB	Unsigned 16-bit integer
SINSTS3(**)	Apparent instant drawn power phase 3	Electrical Measurement Cluster	0x0b04	ApparentPowerPhC	Unsigned 16-bit integer
SMAXSN(*)	Maximal apparent power extracted + timestamp	Electrical Measurement Cluster	0x0b04	ActivePowerMax	
SMAXSN1(**)	Instantaneous apparent power phase 1 + timestamp	Electrical Measurement Cluster	0x0b04	ActivePowerMax	
SMAXSN2(**)	Instantaneous apparent power phase 2 + timestamp	Electrical Measurement Cluster	0x0b04	ActivePowerMaxPhB	
SMAXSN3(**)	Instantaneous apparent power phase 3 + timestamp	Electrical Measurement Cluster	0x0b04	ActivePowerMaxPhC	
MSG1	Short message	Cluster messaging	0x0703	command 0 : display message	

TIC ERDF Labels	Information TIC	Cluster	Cluster ID	Attribute	type
MSG2	Ultrashort message	Cluster messaging	0x0703	command 0 : display message	
PRM	PRM Delivery point	Metering Cluster	0x0702	SiteID	
Bits 0 de STGE	State of dry contact	Cluster ON/OFF	0x0006	client commands 00 and 01	
RELAIS	State of 8 relays	Cluster ON/OFF	0x0006	client commands 00 and 01	
Bit 4 de STGE	State of the DNO (Distribution Network Operator) cover terminal	Metering Cluster	0x0702	Status (bit 2)	
EAIT(***)	Total active power injected	Metering Cluster	0x0702	CurrentSummationReceived	
ERQ1(***)	Total reactive power Q1	Linky : VARh ZigBee: KWh			
ERQ2(***)	Total reactive power Q2	Linky : VARh ZigBee: KWh			
ERQ3(***)	Total reactive power Q3	Linky : VARh ZigBee: KWh			
ERQ4(***)	Total reactive power Q4	Linky : VARh ZigBee: KWh			

(\*): only single phase

(\*\*): only three-phase

### 3.2 Reception

### 3.2.1 Reception at power on

NOM-ERL-MEE-FC-001	Receive data when ERL is started in consumer mode	1.0
The downstream interface must be able to receive the following data at the start of the ERL (excepted if the meter associated is a producer meter).		
Class :	Non-functional	Verif. level :
Upstream Requirement(s) : Derived		

#### 3.2.1.1 Historical physical layer, Single Phase and Three-Phase:

TIC ERDF Labels	Information TIC
OPTARIF	Chosen pricing plan
ISOUSC	Purchased current
PTEC	Current billing period
ADPS (*)	Purchased Power Exceeding Warning
ADIR1 (**)	Alert of current exceeding subscribed value per phase
ADIR2 (**)	Alert of current exceeding subscribed value per phase
ADIR3 (**)	Alert of current exceeding subscribed value per phase

(\*) : single phase only

(\*\*): three phases only

#### 3.2.1.2 Standard physical layer, Single Phase and Three-PHASE:

TIC ERDF Labels	Information TIC
VTIC	Version of the TIC
Bits 10 à 13 de STGE	Current price on supply contract
PREF	Apparent ref. power
Bit 7 de STGE	Reference power exceeded
PCOUP	Apparent cut-off power
Bits 28 & 29 de STGE	Moving peak prior notices
Bits 30 & 31 de STGE	Moving peak (PM)
Bits 0 de STGE	State of dry contact
RELAIS	State of 8 relays
NJOURF	Number of the current day in the calendar
NJOURF+1	Number of the next day in the calendar
Bit 4 de STGE	State of the client terminal-hider
Bit 6 de STGE	Excess voltage on one of the phases
Bit 8 de STGE	Producer/consumer operation
Bit 9 de STGE	Active power direction
Bit 16 de STGE	Downgraded clock mode (loss of the internal clock's timestamp)
Bit 17 de STGE	State of the remote-information output
Bits 19 & 20 de STGE	Euridis communication output state
Bits 21 & 22 de STGE	Status CPL
Bit 23 de STGE	CPL synchronization
Bits 24 & 25 de STGE	Colour of the day for the time history contract.



TIC ERDF Labels	Information TIC
Bits 26 & 27 de STGE	Colour of the following day for the historical contract TEMPO

### 3.2.2 Reception on update

NOM-ERL-MEE-FC-002	Receive data when they are updated	1.0
The downstream interface must be able to receive some specific data, on change of value. The list of these data is below.		
Class :	Non-functional	Verif. level :
Upstream Requirement(s) :	Derived	

#### 3.2.2.1 Historical physical layer, Single phase and Three-Phase

TIC ERDF Labels	Information TIC
ADCO	Meter's address
PEJP	Start EJP prior notice (30 min)
PTEC	Current billing period
DEMAIN	Tomorrow's color
ADPS (*)	Purchased Power Exceeding Warning
ADIR1 (**)	Alert of current exceeding subscribed value per phase
ADIR2 (**)	Alert of current exceeding subscribed value per phase
ADIR3 (**)	Alert of current exceeding subscribed value per phase
PPOT (**)	Voltage presence

(\*) : single phase only

(\*\*): three phases only

### 3.2.2.2 Standard physical layer, Single Phase and Three-PHASE:

TIC ERDF Labels	Information TIC
ADSC	Meter's Secondary address
VTIC	Version of the TIC
NGTF	Name of the supplier pricing grid
LTARTF	Current supplier pricing label
Bits 10 à 13 de STGE	Current price on supply contract
NTARF	Number of the current tariff index
Bits 14 et 15 de STGE	Current tariff on the network contract.
PREF	Apparent ref. power
Bit 7 de STGE	Reference power exceeded
PCOUP	Apparent cutoff power
Bits 28 & 29 de STGE	Moving peak prior notices
Bits 30 & 31 de STGE	Moving peak (PM)
DPM1	Start of Moving Peak 1 + timestamp
FPM1	End of Moving Peak 1 + timestamp
DPM2	Start of Moving Peak 2 + timestamp
FPM2	End of Moving Peak 2 + timestamp
DPM3	Start of Moving Peak 3 + timestamp
FPM3	End of Moving Peak 3 + timestamp

TIC ERDF Labels	Information TIC
MSG1	Short message
MSG2	Ultrashort message
Bits 0 de STGE	State of dry contact
RELAIS	State of 8 relays
NJOURF	Number of the current day in the calendar
NJOURF+1	Number of the next day in the calendar
PJOURF+1	Next day profile
PPOINTE	Next high day profile
Bits 1 à 3 de STGE	State of the breaker
Bit 4 de STGE	State of the client terminal-hider
Bit 6 de STGE	Excess voltage on one of the phases
Bit 9 de STGE	Active power direction
Bit 16 de STGE	Downgraded clock mode (loss of the internal clock's timestamp)
Bit 17 de STGE	State of the remote-information output
Bits 19 & 20 de STGE	Euridis communication output state
Bits 21 & 22 de STGE	Status CPL
Bits 24 & 25 de STGE	Color of the day for the time history contract.
Bits 26 & 27 de STGE	Colour of the following day for the historical contract TEMPO

### 3.2.3 Reception on request

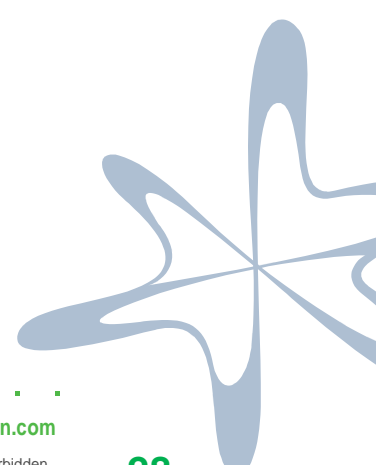
NOM-ERL-MEE-FC-003	Receive data requested	1.0
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The downstream interface can ask some data by request.		
Class :	Non-functional	Verif. level :
Upstream Requirement(s) :	Derived	

NOM-ERL-AER-FC-001	<b>Manage the data asked on request and not available in the frame sent by ERL</b>	1.0
<p>A data asked by the downstream equipment can be absent from the teleinformation because it depends on another kind of contract. In this case, the value of this data is a value meaning "not available".</p> <p>If all the data asked on request are "not available", an error must be reported, using the MMI to the user. It could be because the teleinformation is not received by the ERL.</p>		
Class :	Non-functional	Verif. level :
Upstream Requirement(s) :	Derived	

### 3.2.3.1 Historical physical layer, Single Phase and Three-Phase:

TIC ERDF Labels	Information TIC
ADCO	Meter's address
OPTARIF	Chosen pricing plan
ISOUSC	Purchased current
BASE	Basic option index
HCHC HCHP	Off-Peak Hours Full Hours
EJPHN EJPHPM	EJP option Index Normal hours Moving Peak Hours
BBRHCJB BBRHPJB BBRHCJW BBRHPJW BBRHCJR BBRHPJR	Tempo option Index : Off peak hours blue days Peak hours blue days Off peak hours white days Peak hours white days Off peak hours red days Peak hours red days
PEJP	Start EJP prior notice (30 min)
PTEC	Current billing period



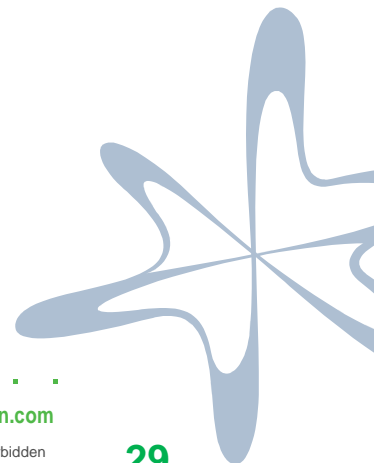
TIC ERDF Labels	Information TIC
DEMAIN	Tomorrow's color
PAPP	Apparent power
HHPHC	Peak Hour Off-Peak Hour Schedule
MOTDETAT	Meter's status word
IINST (*)	Instant current in Amperes
IMAX (*)	Maximum capacity used
IINST1 (**)	Instant current Phase 1
IINST2 (**)	Instant current Phase 2
IINST3 (**)	Instant current Phase 3
IMAX1 (**)	Maximum capacity used Phase1
IMAX2 (**)	Maximum capacity used Phase2
IMAX3 (**)	Maximum capacity used Phase3
PMAX (**)	Three phase maximal power reached
PPOT (**)	Voltage presence

(\*) : single phase only

(\*\*): three phases only

### 3.2.3.2 Standard physical layer, Single Phase and Three-Phase

TIC ERDF Labels	Information TIC
ADSC	Meter's Secondary address
VTIC	Version of the TIC
DATE	Current date and time
NGTF	Name of the supplier pricing grid
LTARTF	Current supplier pricing label



TIC ERDF Labels	Information TIC
Bits 10 à 13 de STGE	Current price on supply contract
NTARF	Number of the current tariff index
Bits 14 et 15 de STGE	Current tariff on the network contract.
EAST	Total active power drawn
EASF01 EASF02 EASF03 EASF04 EASF05 EASF06 EASF07 EASF08 EASF09 EASF10	Supplier active power drawn index01 index 02 index 03 index 04 index 05 index 06 index 07 index 08 index 09 index 10
EASD01 EASD02 EASD03 EASD04	Distributor active power drawn index01 index 02 index 03 index 04
IRMS1	Effective current phase 1
IRMS2 (**)	Effective current phase 2
IRMS3 (**)	Effective current phase 3
URMS1	Effective voltage phase 1
URMS2 (**)	Effective voltage phase 2
URMS3 (**)	Effective voltage phase 3
PREF	Apparent ref. power
PCOUP	Apparent cutoff power
SINSTS (*)	Apparent instant drawn power
SINSTS1 (**)	Apparent instant drawn power phase 1

TIC ERDF Labels	Information TIC
SINSTS2 (**)	Apparent instant drawn power phase 2
SINSTS3 (**)	Apparent instant drawn power phase 3
SMAXSN (*)	Apparent max. power drawn + timestamp
SMAXSN1 (**)	Instantaneous apparent power phase 1 + timestamp
SMAXSN2 (**)	Instantaneous apparent power phase 2 + timestamp
SMAXSN3 (**)	Instantaneous apparent power phase 3 + timestamp
SMAXSN-1 (*)	Apparent max. power drawn n-1 + timestamp
SMAXSN1-1 (**)	Maximal apparent power extracted n-1 phase 1 + timestamp
SMAXSN2-1 (**)	PuMaximal apparent power extracted n-1 phase 2 + timestamp
SMAXSN3-1 (**)	Maximal apparent power extracted n-1 phase 3 + timestamp
CCASN	Point n on the active load drawn curve + timestamp
CCASN-1	Point n-1 on the active load drawn curve + timestamp
UMOY1	Mean phase 1 + timestamp
UMOY2 (**)	Mean phase 2 + timestamp
UMOY3 (**)	Mean phase 3 + timestamp
Bits 28 & 29 de STGE	Moving peak prior notices
Bits 30 & 31 de STGE	Moving peak (PM)
DPM1	Start of Moving Peak 1 + timestamp
FPM1	End of Moving Peak 1 + timestamp

TIC ERDF Labels	Information TIC
DPM2	Start of Moving Peak 2 + timestamp
FPM2	End of Moving Peak 2 + timestamp
DPM3	Start of Moving Peak 3 + timestamp
FPM3	End of Moving Peak 3 + timestamp
MSG1	Short message
MSG2	Ultrashort message
PRM	PRM Delivery point
Bits 0 de STGE	State of dry contact
RELAIS	State of 8 relays
NJOURF	Number of the current day in the calendar
NJOURF+1	Number of the next day in the calendar
PJOURF+1	Next day profile
PPOINTE	Next high day profile
Bits 1 à 3 de STGE	State of the breaker
Bit 4 de STGE	State of the client terminal-hider
Bit 6 de STGE	Excess voltage on one of the phases
Bit 8 de STGE	Producer/consumer operation
Bit 9 de STGE	Active power direction
Bit 16 de STGE	Downgraded clock mode (loss of the internal clock's timestamp)
Bit 17 de STGE	State of the remote-information output
Bits 19 & 20 de STGE	Euridis communication output state
Bits 21 & 22 de STGE	Status CPL
Bit 23 de STGE	CPL synchronization
Bits 24 & 25 de STGE	Color of the day for the time history contract.
Bits 26 & 27 de STGE	Colour of the following day for the historical contract TEMPO



TIC ERDF Labels	Information TIC
EAIT	Total active power injected
ERQ1	Total reactive power Q1
ERQ2	Total reactive power Q2
ERQ3	Total reactive power Q3
ERQ4	Total reactive power Q4
SINSTI	Apparent instant power injected
SMAXIN	Apparent max. injected power n
SMAXIN-1	Apparent max. injected power n-1
CCAIN	Point n on the active load drawn curve
CCAIN-1	Point n-1 on the active load drawn curve

(\*) : single phase only

(\*\*): three phases only

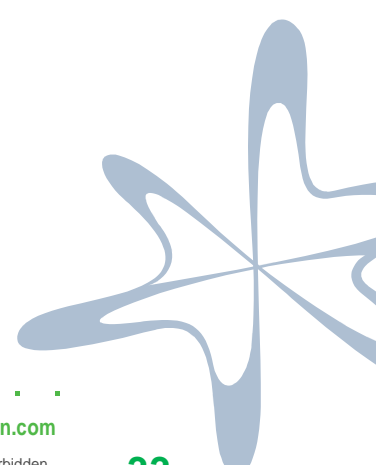
### 3.2.4 Reception on configured demand

#### 3.2.4.1 Initialisation of data to receive on configured demand.

NOM-ERL-MEE-FC-004	Receive data configured on demand	1.0
The data asked in this mode must belong to the following lists.		
Class : Non-functional		Verif. level :
Upstream Requirement(s) : Derived		

#### 3.2.4.1.1 Historical physical layer

TIC ERDF Labels	Information TIC
BASE	Basic option index
HCHC	Off-Peak Hours Full Hours



TIC ERDF Labels	Information TIC
HCHP	
EJPHN EJPHM	EJP option Index Normal hours Moving Peak Hours
BBRHCJB BBRHPJB BBRHCJW BBRHPJW BBRHCJR BBRHPJR	Tempo option Index : Off peak hours blue days Peak hours blue days Off peak hours white days Peak hours white days Off peak hours red days Peak hours red days
PAPP	Apparent power

### 3.2.4.1.2 Standard physical layer, Single Phase and Three-Phase

TIC ERDF Labels	Information TIC
EASF01 EASF02 EASF03 EASF04 EASF05 EASF06 EASF07 EASF08 EASF09 EASF10	Supplier active power drawn index01 index 02 index 03 index 04 index 05 index 06 index 07 index 08 index 09 index 10
EASD01 EASD02 EASD03 EASD04	Distributor active power drawn index01 index 02 index 03 index 04
SINSTS (*)	Apparent instant drawn power
SINSTS1 (**)	Apparent instant drawn power phase 1
SINSTS2 (**)	Apparent instant drawn power phase 2
SINSTS3 (**)	Apparent instant drawn power phase 3
SINSTI	Apparent instant drawn power injected

(\*) : single phase only

(\*\*): three phases only

### 3.2.4.2 Reception of data on configured demand

If the data asked is not available (depending on the type of contract, meter...), it is not sent.  
The frame received includes only data available (belonging to the list of data and used with the current configuration of the meter and the contract)

### 3.2.5 Reception of alarms

When the alarm "exceeding power contract" is raised in the TIC, ERL sends this information to all devices interested in as soon as possible (The alarm is sent in less than 2 seconds).  
All current processing must be completed. No new processing started before emission of the alarm.

## 3.3 Emission

### 3.3.1 Emission of the list of data to be sent on configured demand

NOM-ERL-PTI-FC-001	<b>Send the list of data to receive from ERL on configured demand</b>	1.0
<p>The downstream equipment must send the list of data to receive from ERL on configured demand. The data asked in this mode must belong to the lists of § 3.2.4 If the data asked is not available (depending on the type of contract, meter..), it is not sent.</p>		
Class : Non-functional		Verif. level :
Upstream Requirement(s) : Derived		

### 3.3.2 Emission of requests for specific data

NOM-ERL-PTI-FC-002	Ask the value of specific data needed in the lists below	1.0
<p>The downstream equipment can ask the value of some specific value at any moment. These data are listed in § 3.2.3.          Data not in the list below cannot be asked.          If the data asked is not available (depending on the contract, nature of meter...), it is sent with the value "Not Available"</p>		
Class : Non-functional		Verif. level :
Upstream Requirement(s) : Derived		

## 4 CONFIGURATION (ADDITION AND REMOVAL OF DEVICES)

ADR-NTW-ZIG-FC-001	<b>Respect the ZigBee Home Automation profile 1.2</b>	1.0
The utilisation of ZigBee must be compliant with the ZigBee Home Automation profile 1.2 <a href="#">ref (10)</a>		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) : Derived		

ADR-NTW-ZIG-FC-002	<b>Respect the KNX Home Automation profile</b>	1.0
The utilisation of KNX must be compliant with the <a href="#">KNX Home Automation profile ref (11)</a>		
Class :	Non-functional	Verif. level : verification
Upstream Requirement(s) : Derived		

ADR-ERL-NTZ-FC-001	<b>Implement the possibility to create a link with ERL</b>	1.0
To be able to create a KNX or a ZigBee link with the ERL, the downstream equipment must have a push button or any MMI equivalent to launch the association procedure.		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) : Derived		

### 4.1 ZigBee

ADR-ERL-NTZ-FC-002	<b>Implement enhanced ZigBee security</b>	1.0
The downstream equipment interface must implement security in order to control the authorization of the devices and frame protection. Security must be managed using : <ul style="list-style-type: none"> <li>An install code to input into the trust centre device in order to encrypt the frames</li> </ul>		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) : Derived		

The trust centre can be the downstream equipment to be binded with the ERL or any equipment already present.

ADR-ERL-NTZ-FC-003	<b>Implement ZigBee security</b>	1.0
<p>The two ZigBee security types are :</p> <ul style="list-style-type: none"> <li>• Standard security : A Push Button on the downstream device and a Push Button on the ERL (Push button realized by remote control)</li> <li>• Enhanced security: an action on the trust centre device and the frames encrypted using the install code as an encryption key.</li> </ul> <p>The downstream equipment interface must implement the two levels of security. For the Push Button procedure, refer to <a href="#">ref (7)</a></p>		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) : Derived		

## 4.2 KNX

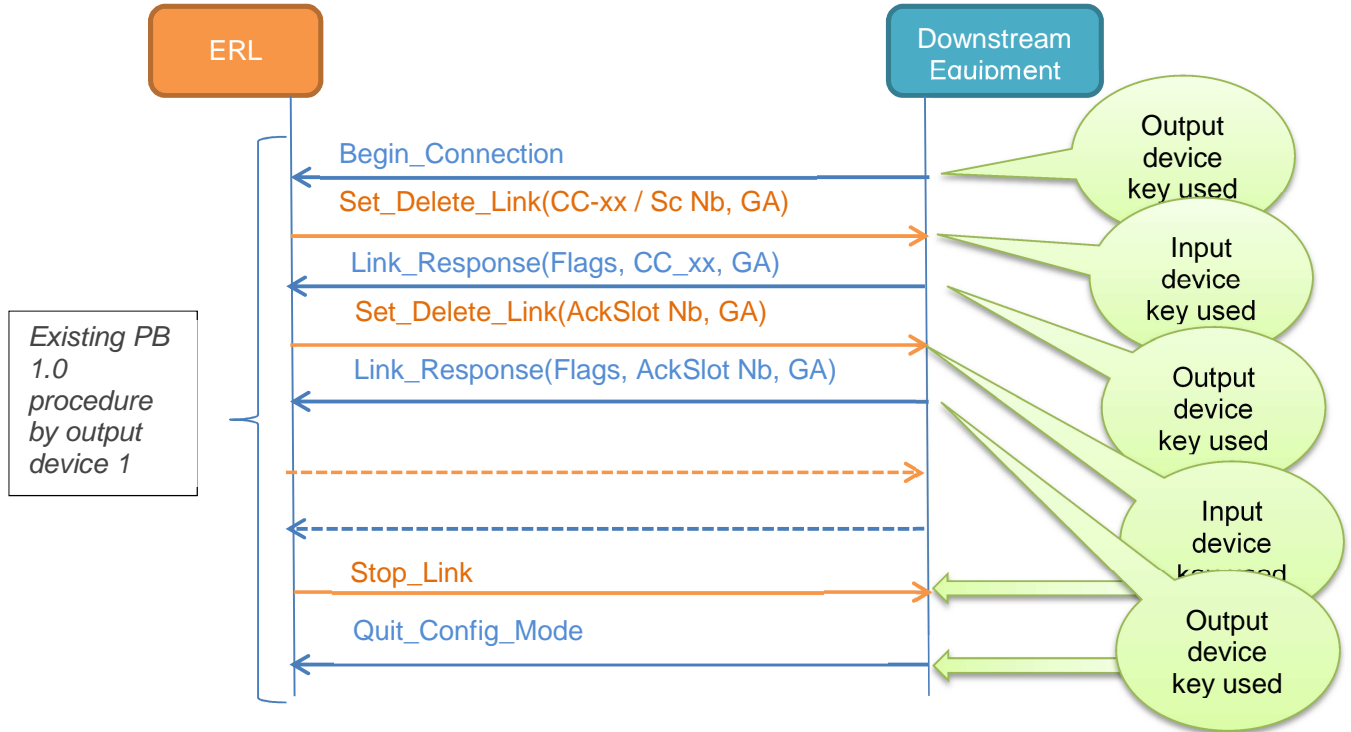
The description of the association procedure is below.

ADR-ERL-NTK-FC-002	<b>Implement enhanced KNX security</b>	1.0
<p>The downstream equipment interface may implement enhanced security in order to control the authorization of the devices and frame protection. It must be possible to enter the ERL install code into the downstream device MMI in order to encrypt the frames.</p>		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) : Derived		

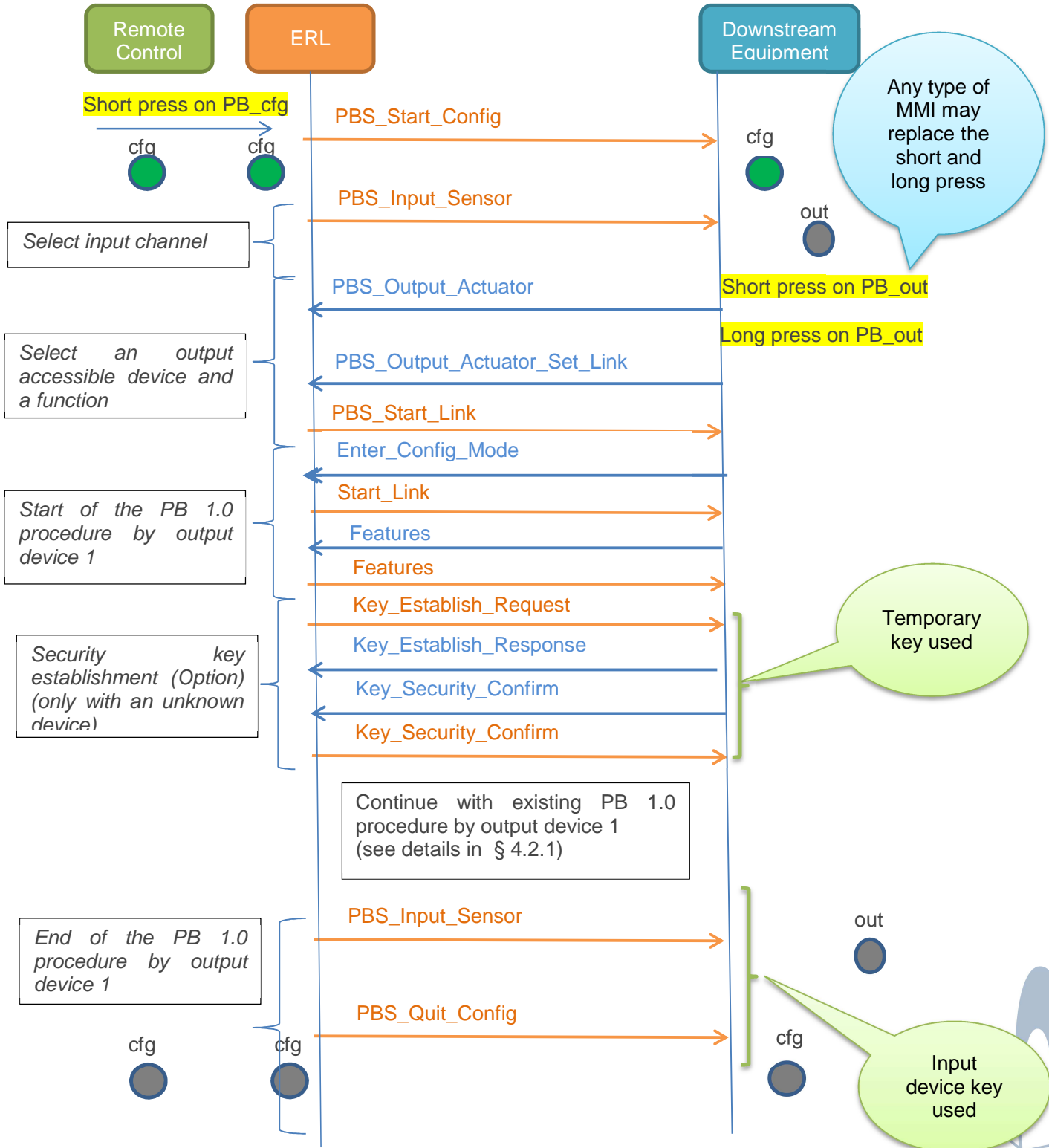
ADR-ERL-NTK-FC-003	<b>Implement KNX security</b>	1.0
<p>The two KNX security types are :</p> <ul style="list-style-type: none"> <li>• Standard security : A Push Button on the downstream device and a Push Button on the ERL (Push button realized by remote control)</li> <li>• Enhanced security: an action on the downstream device and the frames encrypted using the install code as an encryption key.</li> </ul> <p>The downstream equipment interface must implement at least the standard security or may implement the two levels of security. For the Push Button procedure, refer to <a href="#">ref (3)</a> For security, refer to <a href="#">ref (9)</a> see diagrams below.</p>		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) : Derived		

### 4.2.1 Existing PB 1.0 procedure

The diagram below is common to both procedures (standard and enhanced security).  
It is used and indicated in a square inside the diagrams of each kind of security.



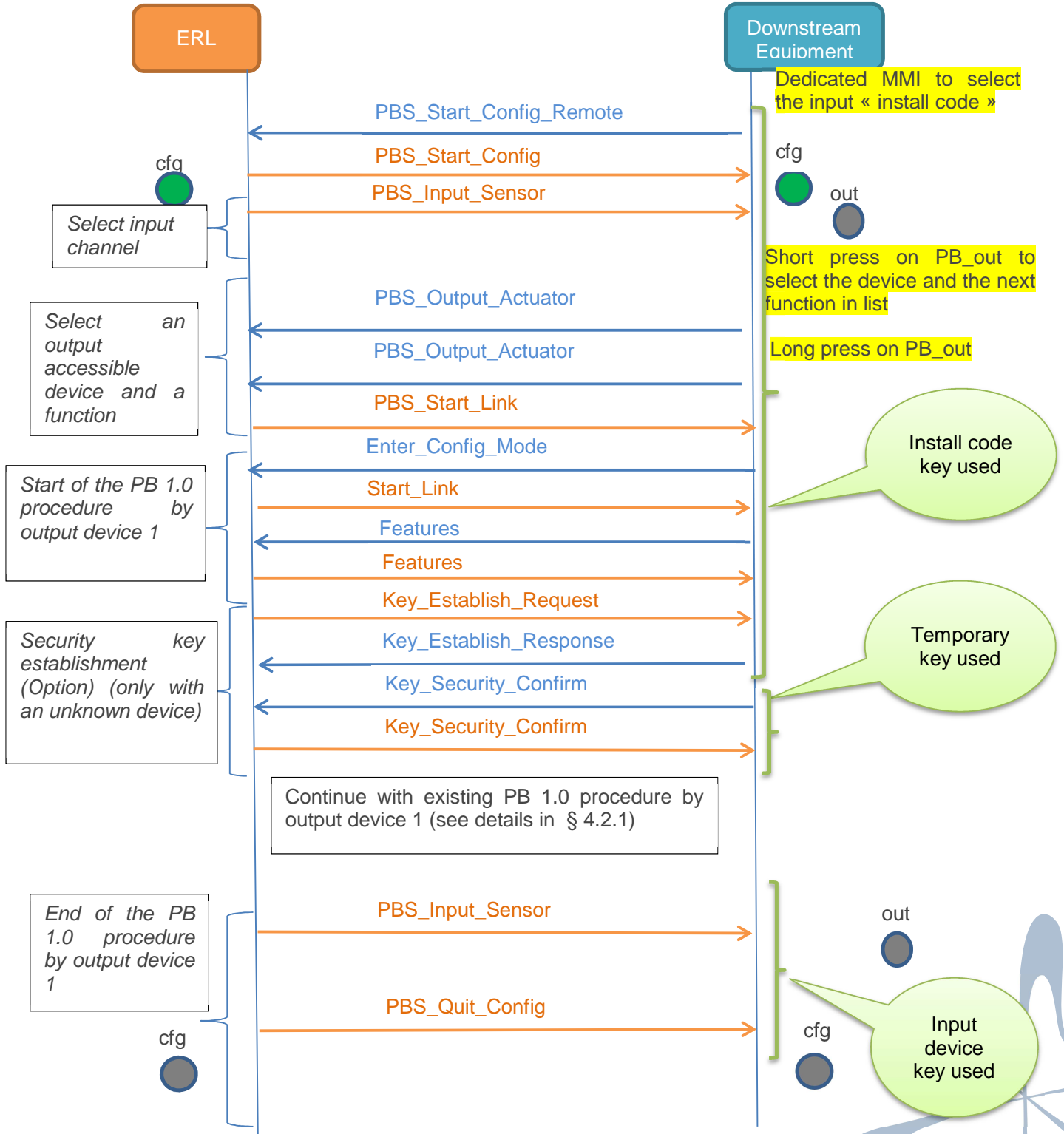
4.2.2 Standard Security





### 4.2.3 Enhanced Security

In this mode and for KNX, the remote control is not used. No push of button to do on the ERL



Details of frames:

E-Mode Device Object (type = 18)		Data									
	RF Header	11	12	13	14	15	16	17	18	...	
PID_PBS_Start_Config_Remote (66h)	NS	Input Secure id									
PID_PBS_Start_Config (5Ah)	NS	Manuf Code			DevId		PB hager protocol Version				
PID_PBS_Input_Sensor (5Bh)	NS	Protocol Version	Factory Reset Counter	FixedV ar INx	Function	Nb Of Link	Nb Of non acc. devices				
PID_PBS_Output_Actuator (5Ch)	NS	DeviceID		Protocol Version + INx	OUTx	Function	Factory Reset Counter				
PID_PBS_Output_Actuator_Set_Link (5Dh)	NS	DeviceID		Protocol Version + INx	OUTx	Function	Factory Reset Counter				
PID_PBS_Start_Link (60h)	NS	reserved		INx	OUTx	Function	Nb of NA output channel				
PBS_Quit_Config (62h)	NS	reserved									

PBS_Na_Output_Actuator (5Eh)	NS	reserved		INx	OUTx	Function	Nb Of non access devices			
PBS_Na_Output_Actuator_Nb (5Fh)	NS	Device ID		Reserve c	Nb of ch. in NA. Device					
PBS_Na_Output_Actuator_Nb_Resp (64h)	NS	reserved		SN[3]	SN[4]	SN[5]	allocate number of first channel NA device			
PBS_Stop_Link (61h)	NS	reserved		Status + Inx	OUTx	Function	Nb of NA output channel			
PBS_Input_Sensor_Set_Link (65h)	NS	reserved		INx	OUTx	Function	Nb Of non access devices			
PBS_Delete_Channel (63h)	NS	Device ID		Channel Nb	reserve d	Nb of NA output channel				

Device Object (type = 0)

PID_PB_CONFIG (59)						
	RF Header	Data				
		11	12	13	14	
Enter_Config_Mode	NS	10h	01h	00h	00h	
Start_Link	NS	20h +Flags + Subfunc.	Manuf code		Nb of GO to link	
Channel_Function_Actuator	NS	30h				
Channel_Function_Sensor	NS	40h	Channel code		00h	
Set_Channel_Param	NS	50h + Flags	Channel code		00h	
Channel_Param_Response	NS	60h + Flags	Param. Index	value	Value	
Begin_Connection	NS	70h	00h	00h	00h	
Set_Delete_Link	NS	80h + Subfunction	CC or Sc Nb or AckSlot Nb	Group Address		To be adapted if security on datapoint level
Link_Response	NS	90h + Flags	CC or AckSlot Nb	Group Address		To be adapted if CC needs to be on two bytes
Stop_Link	NS	A0h + Flags	00h	00h	00h	
Quit_Config_Mode	NS	B0h	00h	00h	00h	
Reset_Installation	NS	C0h	00h	00h	00h	
Features	NS	D0h + SubFunc.	Physical Req	Security	reserved	

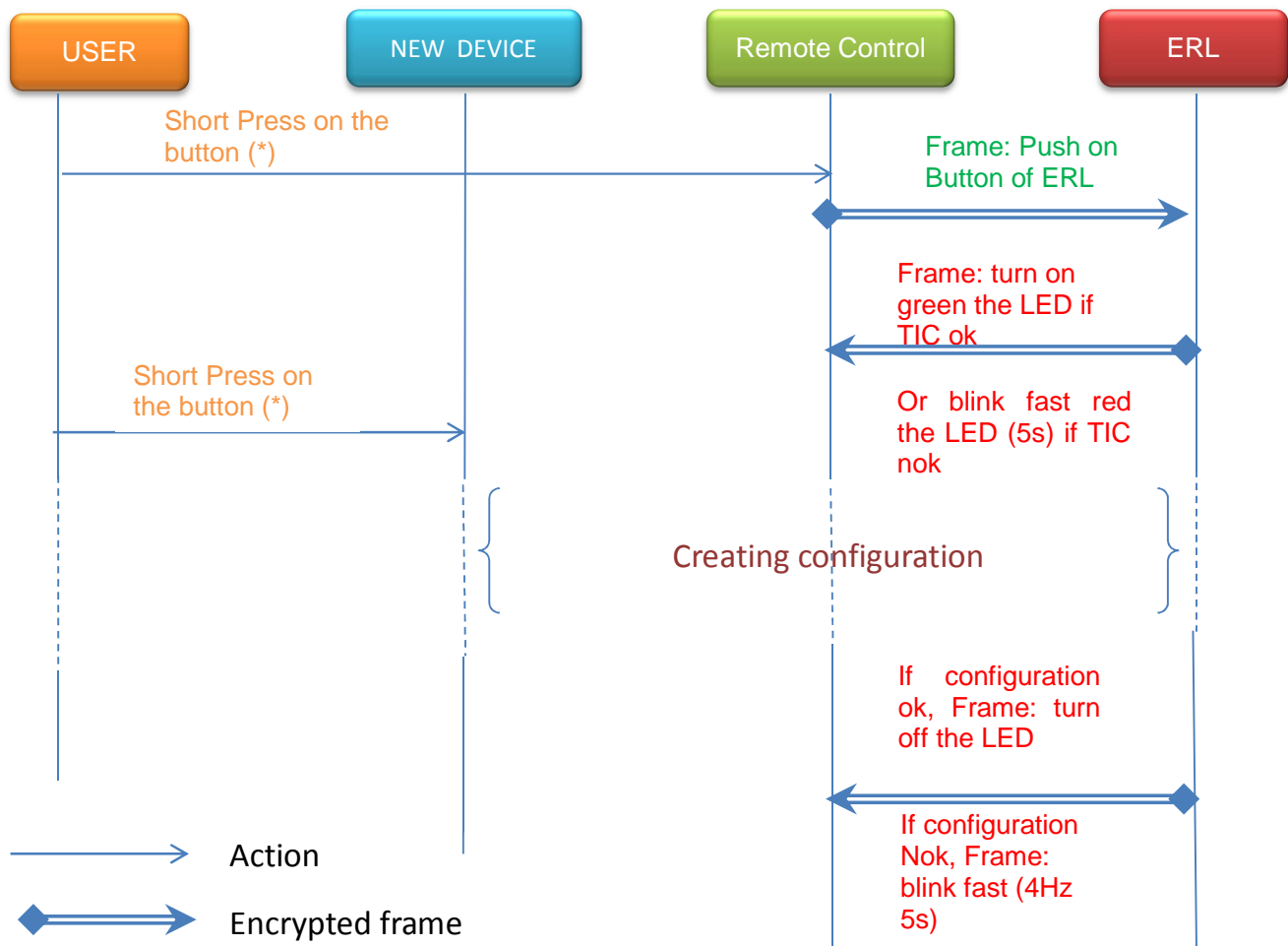
### Security Object (type = 17), 3 new properties

PID_PB_Key_Establish_Request (46h)	NS	A on 35 bytes (recommended by DHEC Report, sect283k1)
PID_PB_Key_Establish_Response (47h)	NS	B on 35 bytes (recommended by DHEC Report, sect283k1)
PID_PB_Security_Confirm (48h)	NS	device key

### 4.3 Set-up procedure with the two levels of security

#### 4.3.1 Standard security

ADR-NTW-CNF-FC-001	Implement the standard security association.	1.0
The downstream interfaces must implement the standard security association.		
Class :	Non-functional	Verif. level : Test
Upstream Requirement(s) :	Derived	

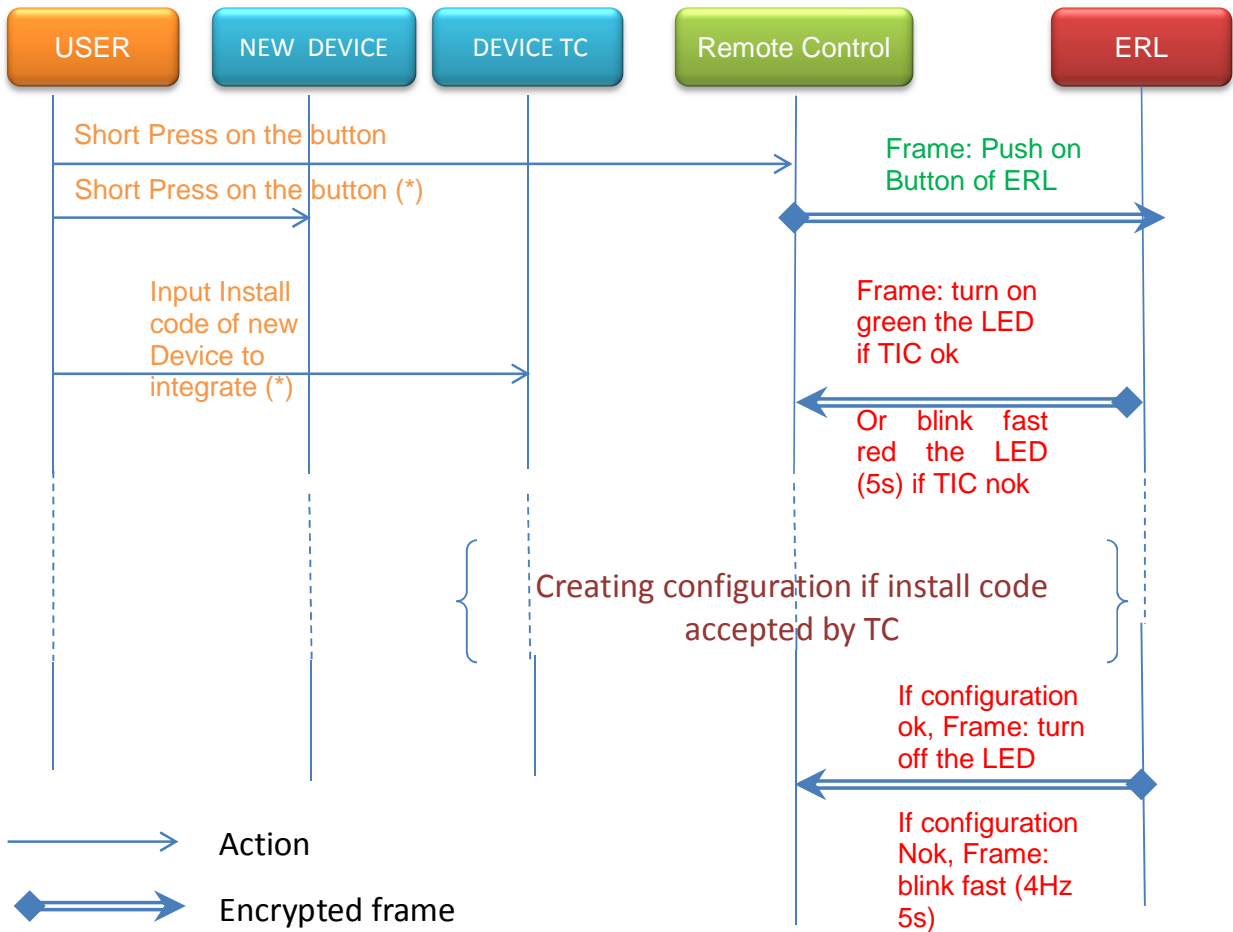


\*: with ZigBee protocol, there no priority for doing the two "Short Press on the button" actions. With KNX, the first action "Short Press on the button" must be done on the remote

### 4.3.2 Enhanced security

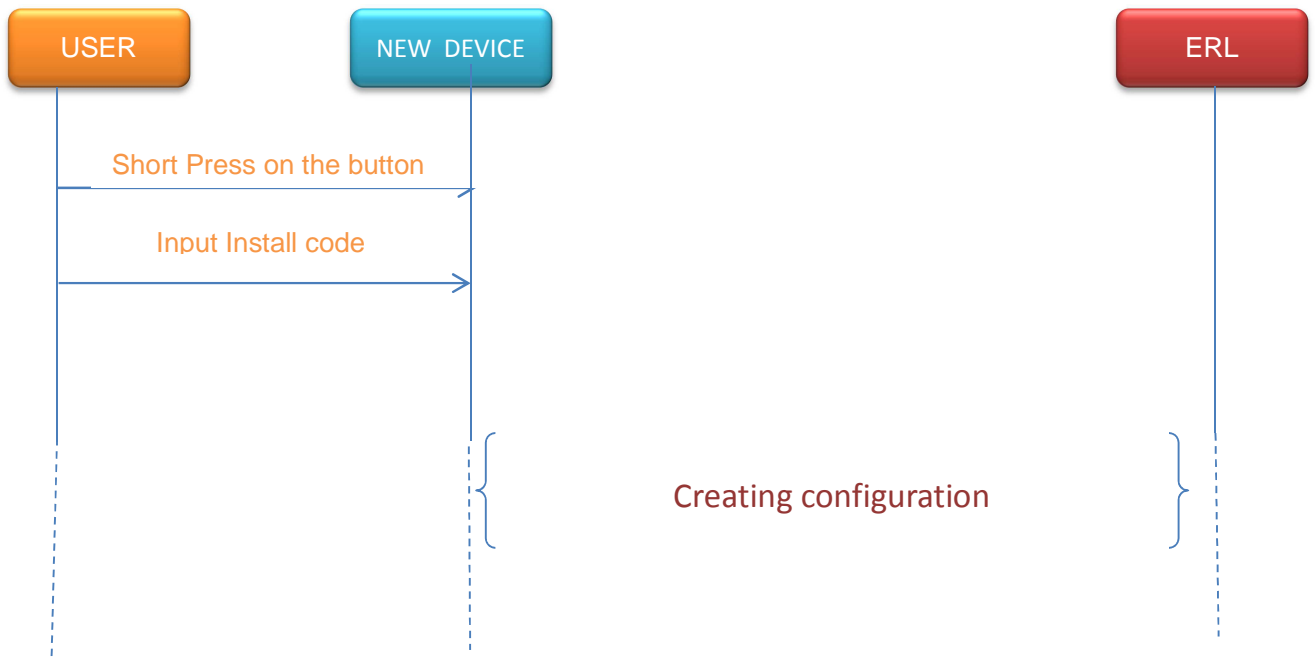
#### 4.3.2.1 ZigBee

ADR-NTW-CNF-FC-002	Implement the ZigBee enhanced security association.	1.0
The downstream interfaces must implement the ZigBee enhanced security association as described below.		
Class :	Non-functional	Verif. level : Test
Upstream Requirement(s) : Derived		

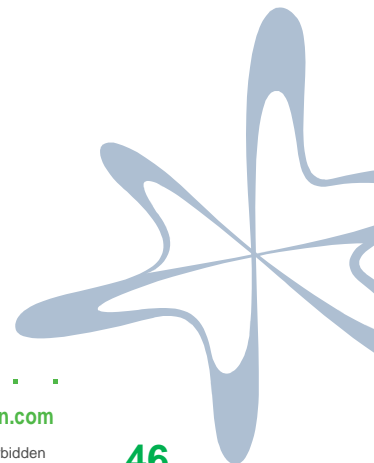


4.3.2.2 KNX

ADR-NTW-CNF-FC-003	Implement the KNX enhanced security association.	1.0
The downstream interfaces must implement the KNX enhanced security association as described below. For KNX enhanced security, no need of the remote control for the association.		
Class :	Non-functional	Verif. level : Test
Upstream Requirement(s) : Derived		



→ Action



## 5 SPECIAL EVENTS

### 5.1 The owner of the meter contract is modified

ADR-ERL-OWN-FC-001	<b>Adapt the downstream equipment to the modification of the owner of the meter contract</b>	1.0
In case of modification of the owner of the meter contract, the downstream equipment storing the consumption data must be able to erase all the information stored, on customer action.		
Class :	Non-functional	Verif. level : tests
Upstream Requirement(s) :	Derived	

### 5.2 Change of energy supplier

The downstream interfaces shall adapt automatically to a new contract.

### 5.3 A new firmware is downloaded on the ERL

During a firmware download of the ERL, all transmissions are stopped between ERL and the downstream equipment.

Before starting the download of a new firmware, all the downstream equipment will be notified (data "overflow of subscribed power" is set).

At the end of the upgrade, the ERL restarts automatically.