Solution to redmine 5961

 sCtl16 add LocSta to match table B.1

November 30, 2022

Comment Thierry:

1) If LocSta is not present then the device does not make a difference between remote and station operation. LocSta has been introduced to enhance the switching hierarchy by differentiating operations originated in the station from operations originated in the control center.

2) There is no default value for LocSta - if it is not present, operation from station and remote are treated the same - with regard to the Loc switching hierarchy.

3) Ct29 is needed, because usage of 1 (bay-control), 4 (automatic-bay) can be verified and limited by the implementaton: Local HMI (1) is done locally not over communication, Automatic bay (4) - Logic is done locally not over communication.

When XCBR/XSWI.Loc is true, then even CSWI can not operate the switching equipment. Since sCtl16 is using CSWI for switching operation, then sCtl16 can only be performed with XCBR/XSWI.Loc = false

Richard:

Some devices have LocSta others don’t. We better clarify that if LocSta is present it shall be F, so at SBOes step 3 with orCat=3 the SelectWithValue shall succeed.

Clarify change “DUT to Local” as follows: CSWI/XCBR/XSWI.Loc=True

Move "if supported" from test description to requirement condition table A4.2

PIXIT; we keep Ct29 as is

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| Ct29 | Amd1 | Does the IED support XCBR/XSWI.Loc=False and LLN0/CSWI.Loc=TrueWhen yes, does the IED accept the control when orCat=1 or 4 Local | DOns: Y/N, orCat 1-4: Y/NSBOns: Y/N, orCat 1-4: Y/NDOes: Y/N, orCat 1-4: Y/NSBOes: Y/N, orCat 1-4: Y/N |



For the last steps XCBR/XSWI.Loc=False while CSWI.Loc=T; orCat Bay = allowed.

Table A.4.2; update condition to CSWI.Loc. XCBR/XSWI.Loc is mandatory

| 12: Control general | sCtl5, sCtl8, sCtl9, sCtl10, sCtl11, sCtl25 | SCL-Operate time reasonably large: sCtl14PIXIT-Sr5 Behaviour=off: sCtl15SCL-CSWI.Loc: sCtl16SCL-LocSta: sCtl17 |
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Updated sCtl16:

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| **sCtl16 DOns** | **Control an object when the IED is in Local operation** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 20.5.2.6, Table 54 IEC 61850-7-4 Table B.1IEC 61850-8-1 Subclause 20.6, 20.7 and 20.8PIXIT: Ct13, Ct20, Ct21, Ct29  |
| Expected result      1.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends an Operate response +. If orCat 1 or 4 are NOT allowed over the communication, DUT sends an Operate response – with optional AddCause “Not-supported”      2., 4.  DUT sends Operate response- with optional AddCause “Blocked-by-switching-hierarchy” 3.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends an Operate response – with optional AddCause “Blocked-by-switching-hierarchy”,  If orCat 1 or 4 are NOT allowed over the communication, DUT sends an Operate response – with optional AddCause “Not-supported”  |
| Test descriptionTest engineer changes the DUT to “Local”; CSWI.Loc=True and XCBR/XSWI.Loc=False and LocSta=False if supported, and LLN0.MltLev = false if supported 1.   The matching client sends Operate request with orCat = 1, 42.   The matching client sends Operate request with orCat = 2, 3, 5, 6 When supported, the test engineer changes XCBR/XSWI.Loc from False to True, keep LLN0/CSWI.Loc=True and perform steps 33.   The matching client sends Operate request with orCat = 1, 44. The matching client sends Operate request with orCat = 2, 3, 5, 6 |
| CommentNote: “matching” client means a client that is allowed by the server to issue controlWhile in CSWI.Loc = Frue and Xxxx.Loc = False, orCat =1, 4 are accepted when local operation over communication are allowed (PIXT Ct29). |

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| **sCtl16 DOes** | **Control an object when the IED is in Local operation** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
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| Expected result      1.   DUT behaves according to the PIXIT  If orCat 1 or 4 are allowed over the communication, DUT sends an Operate response +. If orCat 1 or 4 are NOT allowed over the communication, DUT sends an Operate response – with AddCause “Not-supported”     2.,4.   DUT sends Operate response- with AddCause “Blocked-by-switching-hierarchy” 3. DUT behaves according to the PIXIT  If orCat 1 or 4 are allowed over the communication, DUT sends an Operate response – with AddCause “Blocked-by-switching-hierarchy”. If orCat 1 or 4 are NOT allowed over the communication, DUT sends an Operate response – with AddCause “Not-supported”. |
| Test descriptionTest engineer changes the DUT to “Local”; CSWI.Loc=True and XCBR/XSWI.Loc=False and LocSta=False if supported, and LLN0.MltLev = false if supported 1.   The matching client sends Operate request with orCat = 1, 42.   The matching client sends Operate request with orCat = 2, 3, 5, 6 When supported, the test engineer changes XCBR/XSWI.Loc from False to True, keep LLN0/CSWI.Loc=True and perform steps 33.   The matching client sends Operate request with following values of orCat = 1, 44.   The matching client sends Operate request with following values of orCat = 2, 3, 5, 6 |
| CommentNote: “matching” client means a client that is allowed by the server to issue controlWhile in CSWI.Loc = Frue and Xxxx.Loc = False, orCat =1, 4 are accepted when local operation over communication are allowed (PIXT Ct29). |

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| **sCtl16 SBOns** | **Control an object when the IED is in Local operation** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
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| Expected result      1.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends a Select response +, and an Operate response+. If orCat 1 or 4 are NOT allowed over the communication, DUT sends a Select response- or a Select response+ and an Operate response – with optional AddCause “Not-supported”  2.,13. DUT sends Select response- or DUT sends (a Select reponse+ and an Operate response- with optional AddCause “Blocked-by-switching-hierarchy”) 4. DUT sends a Select response+ 6, 7 DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends a Operate response+. If orCat 1 or 4 are NOT allowed over the communication, DUT sends an Operate response – with optional AddCause “Not-supported”  8., 9., 10, 11. DUT sends an Operate response – with optional AddCause “Blocked-by-switching-hierarchy”      12.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends a Select response+, and an Operate response- with optional AddCause “Blocked-by-switching-hierarchy”, or a Select response-. If orCat 1 or 4 are NOT allowed over the communication, DUT sends a Select response- or a Select response+ and an Operate response – with optional AddCause “Not-supported”  |
| Test descriptionTest engineer changes the DUT to “Local”; CSWI.Loc=True and XCBR/XSWI.Loc=False and LocSta=False if supported, and LLN0.MltLev = false if supported 1. The matching client sends Select request, on respond+ Client sends Operate with following values of orCat = 1, 4
2. Repeat 1. for orCat = 2, 3, 5, 6
3. Test engineer changes CSWI.Loc to False, keep XCBR/XSWI.Loc to False
4. The matching clients send a Select request
5. Test engineer changes CSWI.Loc to True, keep XCBR/XSWI.Loc to False
6. The matching client sends Operate with following value of orCat = 1
7. Repeat 3,4,5,6 with orCat = 4
8. Repeat 3,4,5,6 with orCat = 2
9. Repeat 3,4,5,6 with orCat = 3
10. Repeat 3,4,5,6 with orCat = 5
11. Repeat 3,4,5,6 with orCat = 6

When supported the test enginer changes XCBR/XSWI.Loc from False to True, keep LLN0/CSWI.Loc=True and perform step 12.1. Repeat step 1 with orCat = 1, 4 with a matching client
2. Repeat step 1 with orCat = 2, 3, 5, 6 with a matching client
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| Comment Note: “matching” client means a client that is allowed by the server to issue controlWhile in CSWI.Loc = Frue and Xxxx.Loc = False, orCat =1, 4 are accepted when local operation over communication are allowed (PIXT Ct29).In comparison to Direct Control, additional steps are added to verify that when CSWI.Loc changes from False (during select) to True (during operate), the operation from station/remote fails, while the Operation from local (when allowed over the communication) succeds. |

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| **sCtl16 SBOes** | **Control an object when the IED is in Local operation** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 20.5.2.6, Table 54 IEC 61850-7-4 Table B.1IEC 61850-8-1 Subclause 20.6, 20.7 and 20.8PIXIT: Ct13, Ct20, Ct21, Ct29  |
| Expected result      1.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends SelectWithValue response+ and Operate response+. If orCat 1 or 4 are NOT allowed over the communication, DUT sends a SelectWithValue response- with AddCause “Not-supported”  2. DUT sends SelectWithValue response- or (SelectWithValue response+ and Operate response-) with AddCause “Blocked-by-switching-hierarchy” 4., 7 DUT behaves according to the PIXIT If orCat 1 or 4 are allowed over the communication, DUT sends a SelectWithValue response- with AddCause “Blocked-by-switching-hierarchy” (reason CSWI.Loc=False, local operation not allowed) If orCat 1 or 4 are NOT allowed over the communication, DUT sends a SelectWithValue response- with AddCause “Not-supported” 8. DUT sends a SelectWithValue response- ~~and an Operate response~~ – with an AddCause “Blocked-by-switching-hierarchy”  (reason: orCat = Station NOT allowed while LocSta=F or missing and MltLev=F or missing, row 4 in table B.1) 9. ~~If (LLN0.LocSta && LLN0.MltLev) is supported, DUT sends a SelectWithValue response - with an AddCause “Blocked-by-switching-hierarchy”~~ ~~(reason: orCat = 3 and 6 are not allowed while LocSta is True)~~ ~~If (LLN0.LocSta && LLN0.MltLev) is NOT supported, DUT sends a SelectWithValue response+ and an Operate response – with an AddCause “Blocked-by-switching-hierarchy”~~ ~~(reason: orCat = 3 and orCat 6 are not allowed while CSWI.Loc is True)~~Change to: DUT sends a SelectWithValue response+ and an Operate response– with an AddCause “Blocked-by-switching-hierarchy” (reason: orCat = Remote allowed while LocSta=F or missing and MltLev=F or missing, row 4 in table B.1      10.  DUT behaves according to the PIXIT.  If orCat 1 or 4 are allowed over the communication, DUT sends a SelectWithValue response+, and an Operate response-, or a SelectWithValue response- with optional AddCause “Blocked-by-switching-hierarchy”. If orCat 1 or 4 are NOT allowed over the communication, DUT sends a SelectWithValue response- with AddCause “Not-supported” (reason: No control succeeds while XCBR.Loc is true) 11. DUT sends SelectWithValue response- or DUT sends (a SelectWithValue response+ and an Operate response- with AddCause “Blocked-by-switching-hierarchy”) (reason: No control succeeds while XCBR.Loc is true) |
| Test descriptionTest engineer changes the DUT to “Local”; CSWI.Loc=True and XCBR/XSWI.Loc=False and LocSta=False if supported, and LLN0.MltLev = false if supported 1. Client sends SelectWithValue request, on respond+ Client sends Operate with orCat=1, repeat for orCat = 4
2. Client sends SelectWithValue request, on respond+ Client sends Operate with orCat=2, repeat for orCat = 3, 5,6
3. Test engineer changes CSWI.Loc to False, keep XCBR/XSWI.Loc to False
4. The matching clients send a SelectWithValue request with orCat = 1, on response+ perform 5, 6
5. Test engineer changes CSWI.Loc to True, keep XCBR/XSWI.Loc to False
6. The matching client sends Operate with following value of orCat = 1
7. Repeat 3,4,5,6 with orCat = 4
8. Repeat 3,4,5,6 with orCat = 2 and 5
9. Repeat 3,4,5,6 with orCat = 3 and 6

When supported, the test engineer changes XCBR/XSWI.Loc from False to True, keep LLN0/CSWI.Loc=True and perform steps 31. Repeat step 1 with orCat = 1, 4 with a matching client

11. Repeat step 1 with orCat = 2, 3, 5, 6 with a matching client |
| Comment Note: “matching” client means a client that is allowed by the server to issue controlWhile in CSWI.Loc = Frue and Xxxx.Loc = False, orCat =1, 4 are accepted when local operation over communication are allowed (PIXT Ct29).In comparison to Direct Control, additional steps are added to verify that when CSWI.Loc changes from False (during select) to True (during operate), the operation always fails because the orCat checks fails either during the SelectWithValue request, or during the Operate request. |