
Title*: PoC#8 Test Plan

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input for ENI

Committee*:

Contribution **For***

Decision	
Discussion	X
Information	

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Decision/action requested:	Discussion
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ABSTRACT: *This contribution is proposed to report PoC project in stage 3.*

1 PoC Project Details

1.1 PoC Project

PoC Number (assigned by ETSI): PoC #8.

PoC Project Name: “Intent-based user experience optimization”.

PoC Project Host: China Telecom, Huawei.

Short Description: the PoC project will demonstrate the use of intent policy in the wireless domain as defined in GS ENI 002 [2] and GR ENI 008 [3]. In particular, the PoC aims to verify that when the network state changes, the intent requirements of the user can still be satisfied by the ENI system. Automatic closed-loop management and intra-RAN autonomy can be achieved through intent policy translation and maintenance.

1.2 PoC Project Stages/Milestones

PoC Milestone	Stages/Milestone description	Target Date	Additional Info
P.S	PoC Project Submission	12/2019	Baseline Demo
P.TP.1	PoC User Story finalization	03/2020	Finalization of the high-level description of the scenario described In Section 2.
P.TP.1	PoC Test Plan	07/2020	Initial phase 2 Verification.
P.D1	PoC Demo 2 for PoC Project Goal #2	09/2020	Demo at an ENI plenary meeting.
P.R	PoC Report	11/2020	PoC-Project-End Feedback
P.E	PoC Project End	12/2020	presented to ISG ENI for information

This document will describe the test plan of PoC Stage 3.

2 PoC Test Plan

2.1 Test scenario configuration

2.1.1 Environment information

Network information: Huawei LTE TDD 4T4R Environment (2 Cells), Huawei EPC, EMS (e.g. Huawei U2020).

Terminal: one LTE UE (e.g. Huawei Honor 6 smartphone) as an access terminal.

Business type: full buffer data stream from test-server.

2.1.2 Environment information and endpoints selection



Figure 2-1 Environment map

Environment:

- 2 Buildings for cells
 - Main test-Cell;
 - Interference-Cell.
- 2 Test Places
 - Place1: for weak coverage scene;
 - Place2: for high load scene.

2.2 Test Cases Design

This clause will make a more detailed test process which is designed for the three scenarios defined in stage2.

2.2.1 Scenario1: basic intent translation and execution

- Precondition:
UE connects to the LTE network, and receives data stream from the test server.
- Verification:
Verify the procedure of translation and execution for the intent.

2.2.1.1 Step1: UE accesses and starts the data stream business

UE accesses to the main-test cell where the RSRP value is -90dbm, and then starts the data stream business: 15Mbps data stream business.

Monitor the performance data of the main-test cell from EMS like follows Table 2-1:

Table 2-1 performance data example

Object	Period (minute)	Start Time	CCE_USEAGER	PDSCH_IBLER	DL_PRB_RATE	THROUGHPUT
Cell ID=1	1	19:54:00	0.191	0.1	0.781	21.751
Cell ID=1	1	19:55:00	0.194	0.098	0.786	21.283
.....

Include the following performance data:

- CCE_USEAGER,
- PDSCH_IBLER,
- DL_PRB_RATE,
- THROUGHPUT.

2.2.1.2 Step2: Send and implement intent

- Create intent with the front-end page:

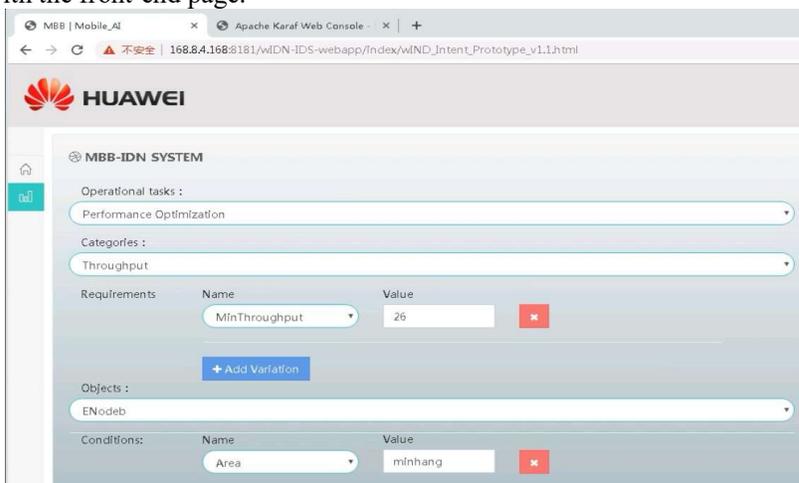


Figure 2-2 front-end page for creating intent

First, create a throughput assurance intent on the webpage: “ensure that the LTE cell throughput rate of minhang area is not less than 26Mbps”.

Then, send the intent to Intent-System, as shown in figure 2-2.

- Print intent processing information:

```

Northband intent_interface ImplementIntent () :
Implement_intentServlet receives Intent_object: {"IntentDrivenAction_
Name": "NRCell", "IntentDrivenObject_properties": [{"areaname": "minhang"
Intent_Num1

Get info from IKB:
Init Database_IKB
Succeeded connecting to the Database
STEP1_IKB_SQL, Get keyword_expression: <IDAName>_<IDOName>_<Type>
STEP2_IKB_SQL, Get Keyword: PerformanceOptimization_NRCell_throughput
STEP3_IKB_SQL, Get intentId_info: {constraint_id=602, property_parame
STEP4_IKB_SQL, Get intentFullmentCreterion: {MinThroughput={relat
STEP5_IKB_SQL, Get constraint_id: [{kpi_value=0.005, kpi_name=Decreas
eter_value_map_id=710, conjuct_no=1, operator=<>}, {kpi_value=0.001, kp
), parameter_value_map_id=712, conjuct_no=1, operator=<>}, {kpi_value=0
STEP6%7*8_Get IntentOperation:
Get IntentOperation_Condition_Name: 607
Get IntentOperation_ExecutionCondition: {PRB. Usagee={'relation': '>'}, 'v
Get IntentOperation_Operation: [MOD CELLALCOSWITCH: LocalCellId=%p1, Em
eferenceSignalPwr=22, ,]
Get info from NIB:
Init Database_IKB
Succeeded connecting to the Database
SELECT * FROM managed_element_information where location="minhang"
eNB_ID: 82034, Cell_ID: 1
MML_Instruction_Execution_Response.curScenario:VPM_Default
MML_Instruction_Execution_Response.executionMML:null
eNB: 82034, Cell_ID: 1, MML_commands: [MOD PDSCHCFG: LocalCellId=0, Refer
MML_Instruction_Execution_Response.executionResult:Intent executing...
Target eNB_IP: 172.162.34.200, 端口号: 6000

Target eNB_Username: admin, Password: hwbs@com
Target eNB_Info: LGI:OP="admin", PWD="hwbs@com";
    
```

Figure 2-3 intent processing information

After intent received, intent system will print the key information while processing the intent (translation & execution), as shown in figure 2-3:

- Parse intent information;
 - Obtain KPI values and optimization commands by querying the intent knowledge repository;
 - Obtain the target base station information by querying intent information repository;
 - Send commands to the target base station for execution.
- Monitor performance data from EMS:

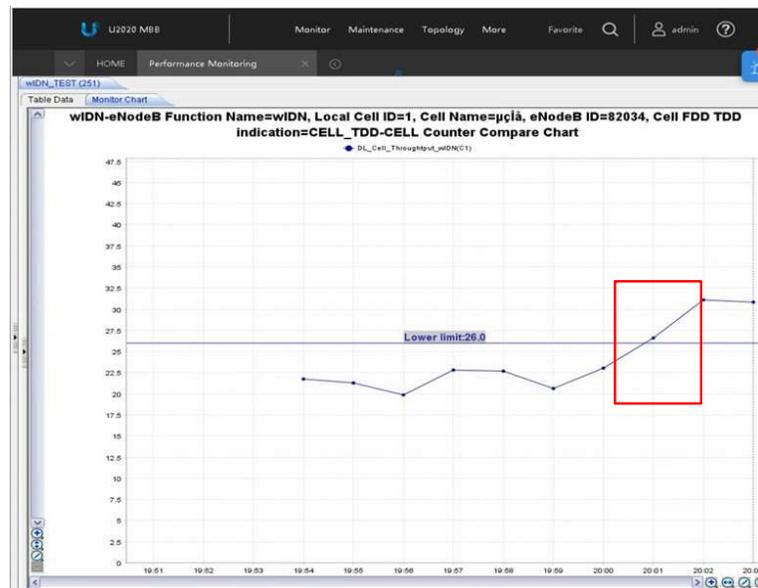


Figure 2-4 monitor of EMS

After the commands being distributed, monitor the throughput from the EMS, as shown in figure 2-4.

2.2.2 Scenario2: Intent maintenance under weak coverage

- Precondition:
After scenario1, the intent policy has been satisfied successfully.
- Verification:

Verify the maintenance function of the intent under weak coverage.

2.2.2.1 Step1: Build weak coverage scene

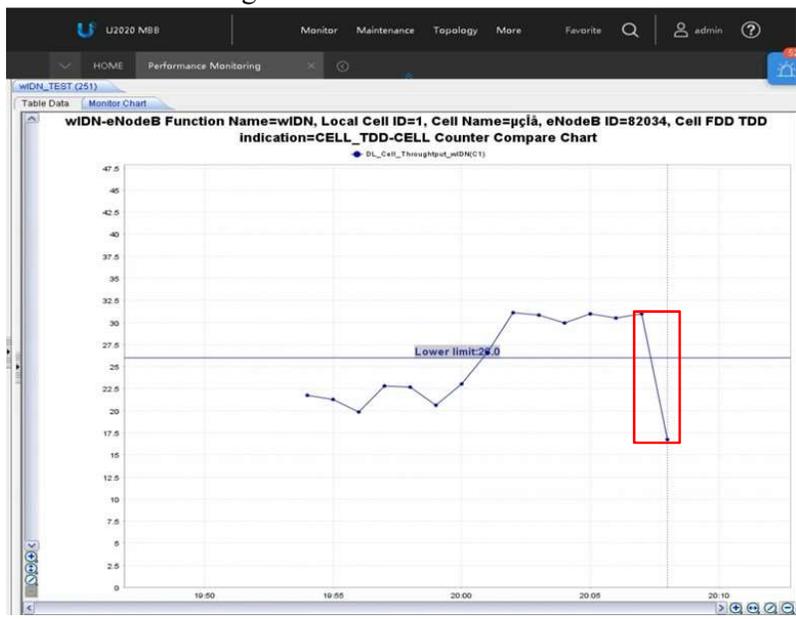


Figure 2-5 monitor of EMS

To build a weak coverage scene, move UE to weak coverage point as shown in figure 2-1.

After a while, the throughput of the main-test cell is going to drop down through the KPI monitor of EMS, as shown in figure 2-5, the intent is not satisfied.

2.2.2.2 Step2: Intent maintenance under weak coverage

```

time : 2019-11-22 20:06:56

#Checking if Intent : 1 is achieved
Cell1KPI_name : MinThroughput Value : 30.501; Achieve_condition :
MinThroughput>26
eNB : 82034, Cell : 1, Intent is achieved

Begin Intent maintenance...
Time : 2019-11-22 20:08:59

#Checking if Intent : 1 is achieved
Cell1KPI_name : MinThroughput Value : 16.748; Achieve_condition :
MinThroughput>26
eNB : 82034, Cell : 1, Intent is not achieved, Rematching scene...
Area_info : eNB_ID : 82034 , Cell_ID : 1
Identified scenario : VPM_Weakcoverage
Optimized operations :
MML_commands : [MOD ENODEBALGOSWITCH:
LocalCellId=1,CompatibilityCtrlSwitch=null,; MOD CELLDLSCHALGO:
LocalCellId=1,MinUserMcsThreshold=21,; MOD PDSCHCFG:
LocalCellId=1,ReferenceSignalPwr=52,]
    
```

Figure 2-6 alarm from back-end

The intent maintenance function of the intent system detects changes and feeds back to the front page, as shown in figure 2-6.

Intent system collects performance data (e.g. PDSCH_IBLER_wIDN), compares value with the threshold value of weak coverage scene, if matched, intent system will get the particular commands from Intent knowledge repository and execute them to maintain the intent policy.

The commands can be as following:

```

MOD CELLALGOSWITCH: DISchSwitch = DIRetxTbsIndexAdjOptSwitch-
1;CELLDLCOVERENHANCESWITCH=AdptCellEdgePwrAllocSw-1;
MOD CELLDLSCHALGO: LOWIBLERTARGETTBSIDXTHLD=255;
    
```

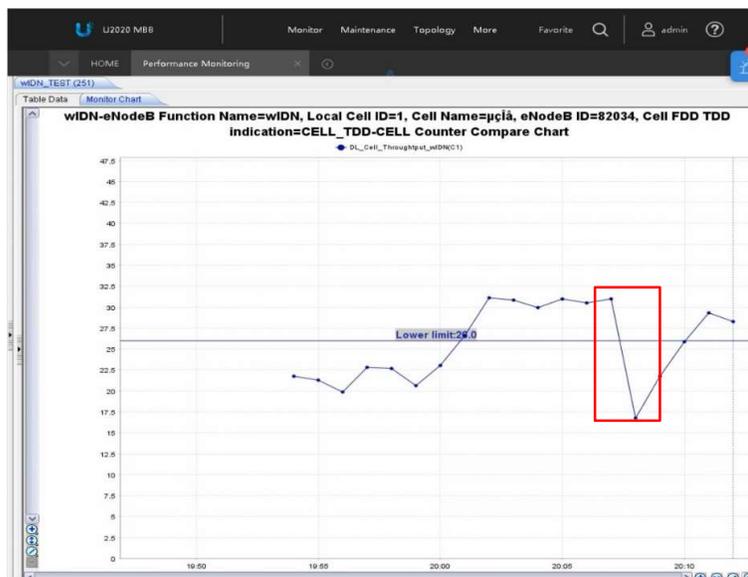


Figure 2-7 monitor of EMS

After a few minutes, the intent may be satisfied again, as shown in figure 2-7.

2.2.3 Scenario3: Intent maintenance under high loading

- Precondition: After scenario2, the intent policy has been satisfied successfully.
- Verification: Verify the maintenance function of the intent under high loading.

2.2.3.1 Step1: Build high loading scene

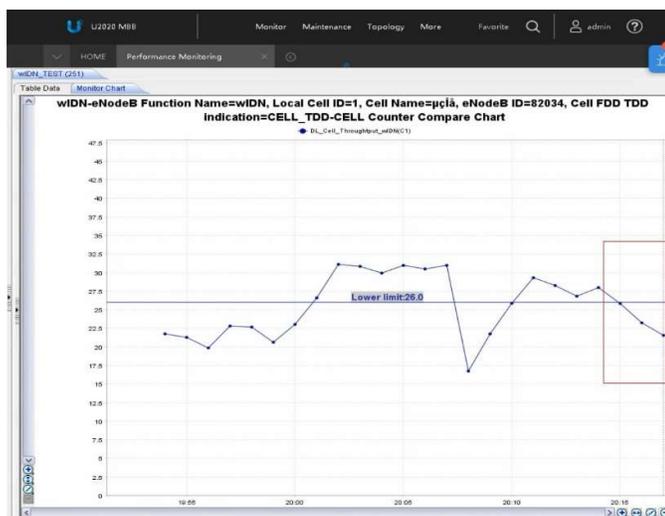


Figure 2-8 monitor of EMS

To build a high loading scene, move UE to the high load point shown in figure 2-1. After a while, the throughput of the main-test cell is going to drop down through the KPI monitor of EMS, as shown in figure 2-8, the intent is not satisfied.

2.2.3.2 Step2: Intent maintenance under high loading

```

time : 2019-11-22 20:14:58

#Checking if Intent : 1 is achieved
Cell1KPI_name : MinThroughput Value : 27.99; Achieve_condition :
MinThroughput>26
eNB : 82034, Cell : 1, Intent is achieved

Begin Intent maintenance...
Time : 2019-11-22 20:17:00

#Checking if Intent : 1 is achieved
Cell1KPI_name : MinThroughput Value : 25.848; Achieve_condition :
MinThroughput>26
eNB : 82034, Cell : 1, Intent is not achieved, Rematching scene...
Area_info : eNB_ID : 82034 , Cell_ID : 1
Identified scenario : VPM_HighCapacity
Optimized operations :
MML_commands : [MOD CELLALGOSWITCH:
LocalCellId=1,EmimoSwitch=EmimoFbaSwitch-1,; MOD
CELLMIMOPARACFG: LocalCellId=1,MimoAdaptiveSwitch=CL_ADAPTIVE,;
MOD PDSCHCFG: LocalCellId=0,ReferenceSignalPwr=22,;]
    
```

Figure 2-9 alarm from back-end

The intent maintenance function of the intent system detects changes and feeds back to the front page, as shown in figure 2-9.

Intent system collects performance data (e.g. DL_PRB_RATE_wIDN), compares value with the threshold value of high loading scene, if matched, intent system will get the particular commands from Intent database and execute them to maintain the intent policy.

The commands can be as following:

- MOD CELLALGOSWITCH** EmimoSwitch=EmimoFbaSwitch-1; UIPcAlgoSwitch =PucchPcDtxSinrSwitch-1;
- MOD CELLMIMOPARACFG** MimoAdaptiveSwitch = CL_ADAPTIVE,
- MOD PUCCHCFG:** Format1ChAllocMode =RANDOMMODE;
- MOD CELLPCALGO:** PucchPcPeriod=1, PucchPcTargetSinrOffset =9, PucchCloseLoopPcType =USE_P0NOMINALPUCCH;
- MOD CELLULPCCOMM:** P0NominalPUCCH = -110;

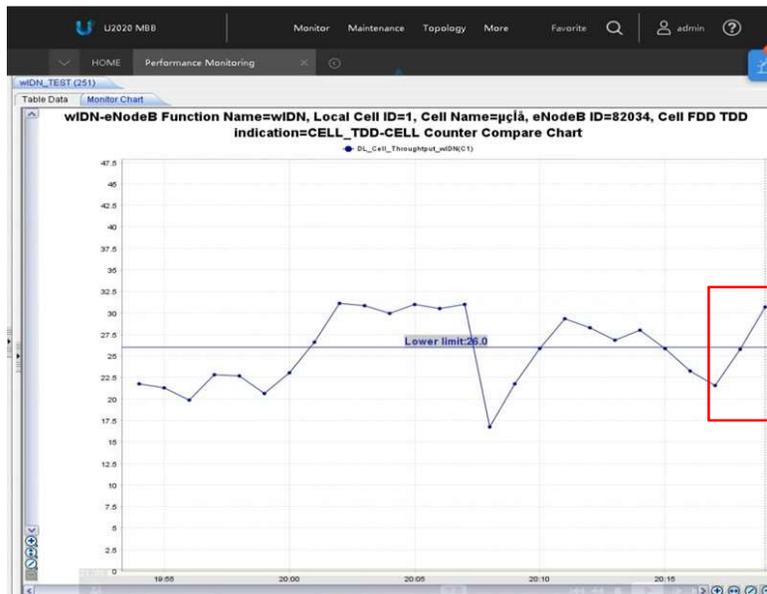


Figure 2-10 monitor of EMS

After a few minutes, the intent should be fulfilment again, as shown in figure 2-10.

2.3 Conclusion

With designing test plan for three scenarios in this document, it makes the next phase of verification more efficiently.