



TM Forum

ANLAV Report

Zain Kuwait

Scenario: GB1523A – RAN Fault Management

Maturity Level: General Availability (GA)

Version 3.0.0

Date 23/06/2026

Region: Kuwait

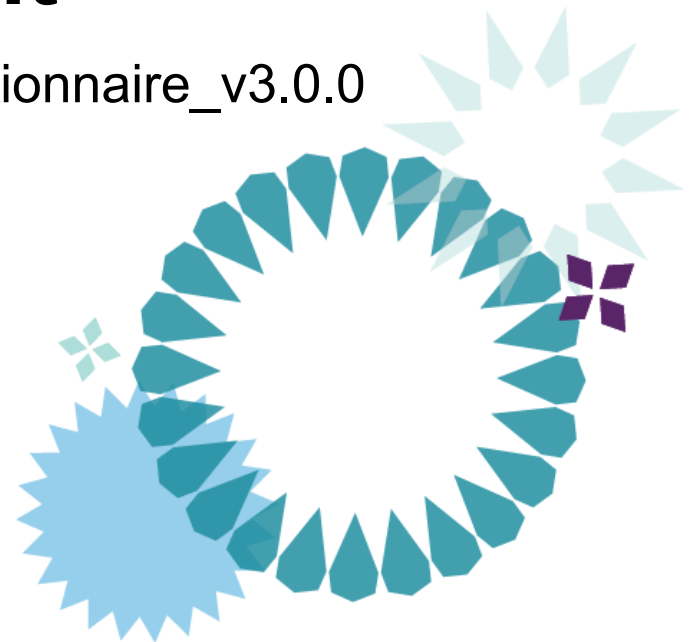
Network: National LTE & NR (4G/5G)

Score: 3.9 (3.93) (validated)



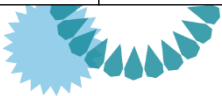
Kuwait Zain RAN Fault Management ANL Assessment

GB1523A_RAN_Fault_Management_Questionnaire_v3.0.0



Overall Score

Cognitive Activity (IAADE)	Service Capability	Weight	Sub-Scenario Answer (refers to 3GPP TS 28.111)				Overall Score
			Equipment	Processing Error	Communications	Environmental	
			29.7%	2.1%	49.8%	18.1%	
Intent	Intent-driven	10%	A	A	B	A	3.93
Awareness	Data collection & Alarm correlation	10%	A	A	A	A	
	Fault Prediction	15%	A	A	A	A	
Analysis	Fault identification & Impact analysis	15%	A	A	A	A	
	Demarcation & Locating	20%	A	A	A	A	
	Solution generation	10%	A	A	A	A	
Decision	Evaluation and decision-making	10%	A	A	A	A	
Execution	Solution implementation	10%	A	A	A	A	



Intent-driven

Service Capability	Weight	Question	√ Option A	Option B	Option C	Option D
Intent-driven	10%	How does the wireless network fault management system generate fault management task targets, policies and evaluate the implementation effect based on intent? Note: The Fault management intent can be declarative intent (e.g, the proportion of pre-event trouble tickets) or natrua language intent. The examples of fault management policy can be redundancy backup policies.	The system automatically generates fault management task targets and policies based on intent by using intelligent model. Fault management targets and policies need to be manually confirmed. The system automatically evaluates the implementation effect.	The system automatically generates fault management task targets based on predefined rules. Fault management targets and policies need to be manually defined. The effect is manually evaluated after the intent is implemented.	Fault management task targets and policies are manually defined based on expertise. Manually evaluate the effect after the intention is implemented, assisted by tools and system.	Manually set fault management task targets and evaluate the effect.



Intent-driven

Processing Error

< RAN FMEMate

2026-06-04 09:11:54

Intent

is a key area. During the event, significant increase in the UE traffic volume may cause service congestion. Ensure that the UE access success rate is greater than 99%.

2026-06-04 09:12:30

The system analyzes the alarms and configuration data in the area. It is found that because a large number of UEs access cells suddenly, congestion occurs on base stations multiple times, and the UE access success rate is lower than 80%.

Recommended policy: When the number of UEs increases by more than 300% suddenly, run the following commands within 5 minutes to delay UE access to cells:

```
MOD CELLALGOSWITCH:
LocalCellId=xx, AcBarAlgoSwitch
=ACBAR_SWITCH_STATIC;
MOD CELLACBAR: LocalCellId=xx,
AcBarringInfoCfgInd=CFG,
AcBarringForMoDataCfgInd=CFG,
AcBarringFactorForCall=P70,
AcBarTimeForCall=ACCESS_BARRING
G_TIME_S4,
AcBarringForMoSigCfgInd=CFG,
AcBarringFactorForSig=P70,
AcBarTimeForSig=ACCESS_BARRING
_TIME_S4;
```

Does the policy meet the requirements?

Yes. Issue the policy.

☆ Querying Other Sites ★ FAQs

Start typing...

The content is AI-generated. Verify the content.

< RAN FMEMate

2026-06-04 09:12:45

Recommended policy: When the number of UEs increases by more than 300% suddenly, run the following commands within 5 minutes to delay UE access to cells:

```
MOD CELLALGOSWITCH:
LocalCellId=xx, AcBarAlgoSwitch
=ACBAR_SWITCH_STATIC;
MOD CELLACBAR: LocalCellId=xx,
AcBarringInfoCfgInd=CFG,
AcBarringForMoDataCfgInd=CFG,
AcBarringFactorForCall=P70,
AcBarTimeForCall=ACCESS_BARRING
G_TIME_S4,
AcBarringForMoSigCfgInd=CFG,
AcBarringFactorForSig=P70,
AcBarTimeForSig=ACCESS_BARRING
_TIME_S4;
```

Does the policy meet the requirements?

Yes. Issue the policy.

☆ Querying Other Sites ★ FAQs

Start typing...

The content is AI-generated. Verify the content.

< RAN FMEMate

2026-06-04 09:12:45

AcBarTimeForSig=ACCESS_BARRING_TIME_S4;

Does the policy meet the requirements?

Yes. Issue the policy.

Automatically evaluates

The intent fulfillment in the Jaber Al-Ahmad International Stadium area is as follows:

On June 8, a large number of UEs suddenly accessed six cells in the area. The number of accessed UEs increased by 480%. Commands were executed within 5 minutes to delay the UE access. The UE access success rate was 99.43%.

☆ Querying Other Sites ★ FAQs

Start typing...

The content is AI-generated. Verify the content.

< RAN FMEMate

2026-06-11 22:30:00

Ahmad International Stadium area is as follows:

On June 8, a large number of UEs suddenly accessed six cells in the area. The number of accessed UEs increased by 480%. Commands were executed within 5 minutes to delay the UE access. The UE access success rate was 99.43%.

The intent fulfillment in the Jaber Al-Ahmad International Stadium area is as follows:

On June 11, a large number of UEs suddenly accessed three cells in the area. The number of accessed UEs increased by 329%. Commands were executed within 5 minutes to delay the UE access. The UE access success rate was 99.17%.

☆ Querying Other Sites ★ FAQs

Start typing...

The content is AI-generated. Verify the content.

The system understands user intents based on intelligent models and generates targets and policies.

The system automatically collects network data after policy execution and evaluates the implementation effect of the intent without requiring manual intervention.

Intent-driven

Environmental

< RAN FMEMate

2026-06-06 09:25:48

Intent

Severe power failures occurred in the [redacted] area. Ensure that the traffic loss in this area is reduced by more than 10%.

2026-06-06 09:26:10

The system analyzes the alarms and configuration data in the Salem area. It is found that the mains supply failures frequently occur with base station out-of-service alarms generated. The mains supply failures cannot be completely resolved. Recommended policy: Enable the intelligent service keepalive feature in the [redacted] area within two days. When base stations are confirmed to be out of service, adjust neighboring cell parameters within 15 minutes to absorb traffic, ensuring that the traffic loss is reduced.

Does the policy meet the requirements?

☆ Querying Other Sites ☆ FAQs

Start typing...

The content is AI-generated. Verify the content.

< RAN FMEMate

base station out-of-service alarms generated. The mains supply failures cannot be completely resolved. Recommended policy: Enable the intelligent service keepalive feature in the [redacted] area within two days. When base stations are confirmed to be out of service, adjust neighboring cell parameters within 15 minutes to absorb traffic, ensuring that the traffic loss is reduced.

Does the policy meet the requirements?

Policy generation

2026-06-06 09:26:23

Yes. Issue the policy.

2026-06-06 09:26:25

The system starts daily periodic evaluation.

☆ Querying Other Sites ☆ FAQs

Start typing...

The content is AI-generated. Verify the content.

< RAN FMEMate

Yes. Issue the policy.

2026-06-06 09:26:25

The system starts daily periodic evaluation.

Automatically evaluates

The intent fulfillment in the [redacted] area is as follows: Or [redacted] the intelligent service keepalive feature was enabled for all sites in the [redacted] area. On June 7, the system detected that the base stations were out of service for four times due to power failures, and adjusted neighboring cell parameters within 15 minutes. According to the comparison and analysis of historical traffic data, the traffic loss was reduced by 13.7% on average.

☆ Querying Other Sites ☆ FAQs

Start typing...

The content is AI-generated. Verify the content.

The system understands user intents based on intelligent models and generates targets and policies.

The system automatically collects network data after policy execution and evaluates the implementation effect of the intent without requiring manual intervention.

Intent-driven

Communications

The figure displays four sequential screenshots of a chat application titled "RAN FMEMate", illustrating an intent-driven workflow for network management.

- Screenshot 1 (Left):** A user message (highlighted in blue) states: "The system area is a key commercial area. Ensure that intermittent disconnections on fronthaul links are reduced by more than 50%." A red label "Intent" points to this message. The system response (highlighted in blue) explains the problem and formulates a policy: "The system analyzes the alarms and configuration data of sites in the [redacted] area. It is found that multiple sites in this area frequently report the alarm indicating CPRI interface errors. The alarm causes unstable fronthaul links, resulting in intermittent disconnection and access failures of cells. Based on the user intent as well as the fronthaul networking, fiber length, and number of hops on the live network, the following policy is formulated: The receive optical power of faulty sites in this area is low. Therefore, the SLA policy for tickets needs to be changed to ensure that the connectors for the [redacted] links whose receive optical power is lower than -13 dBm are cleaned up every week. If the receive optical power of a link is lower than -13 dBm, and that the cleanup must be completed within three hours." A red label "Policy generation" points to this response.
- Screenshot 2:** The user asks: "Does the policy meet the requirements?". The system responds: "The system starts daily periodic evaluation."
- Screenshot 3:** The system provides a detailed report: "The intent fulfillment regarding intermittent disconnections on fronthaul links in the [redacted] as follows: On June 2, the receive optical power of fronthaul links was lower than -13 dBm at five sites, and the cleanup was completed within three hours. The system detected that the number of sites where the receive optical power was lower than -13 dBm was reduced from 7 to 2. On June 2, 11 intermittent disconnections on fronthaul links occurred at two sites. On June 1, 35 intermittent disconnections on fronthaul links occurred at five sites. A 68.5% decrease was achieved." A red label "Automatically evaluates" points to this response.
- Screenshot 4 (Right):** The system provides a summary: "The intent fulfillment regarding intermittent disconnections on fronthaul links in the [redacted] as follows: On June 3, the receive optical power was lower than -13 dBm at two sites, and the cleanup was completed within three hours. The system detected that the number of sites where the receive optical power was lower than -13 dBm was reduced from 2 to 0. On June 3, 4 intermittent disconnections on fronthaul links occurred at one site. On June 2, 11 intermittent disconnections on fronthaul links occurred at two sites. A 63.6% decrease was achieved."

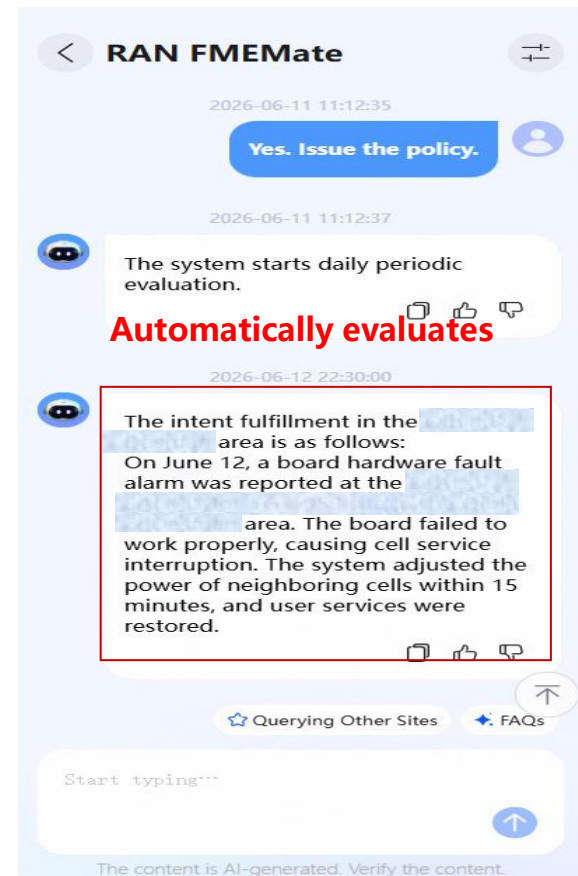
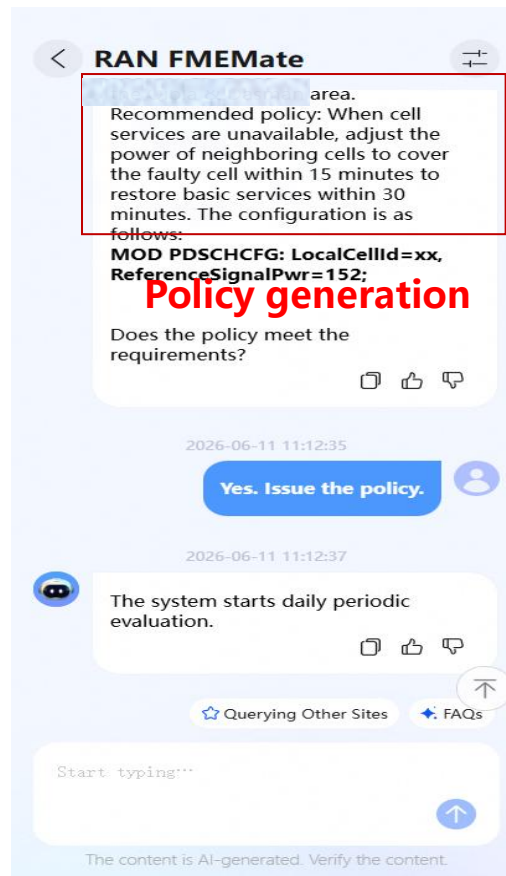
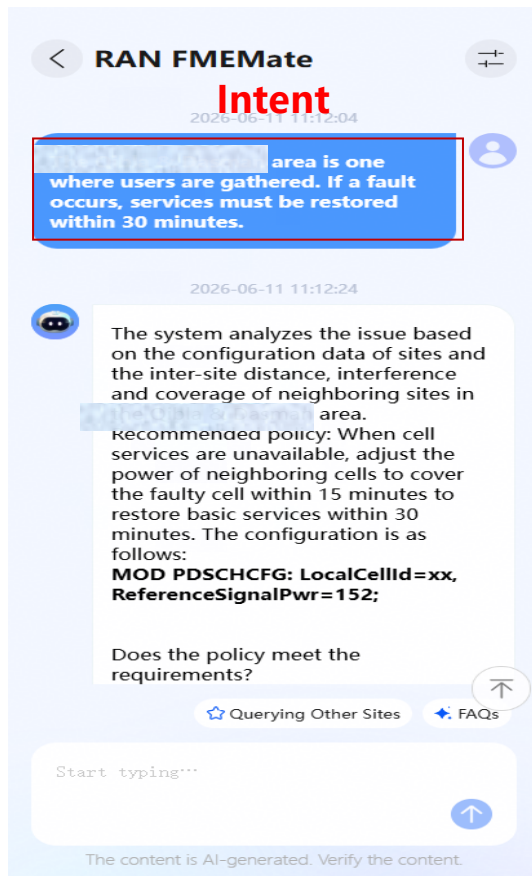
Each screenshot includes a bottom bar with "Start typing...", "Querying Other Sites", "FAQs", and a confirmation message: "The content is AI-generated. Verify the content."

The system understands user intents based on intelligent models and generates targets and policies.

The system automatically collects network data after policy execution and evaluates the implementation effect of the intent without requiring manual intervention.

Intent-driven

Equipment



The system understands user intents based on intelligent models and generates targets and policies.

The system automatically collects network data after policy execution and evaluates the implementation effect of the intent without requiring manual intervention.

Data collection & Alarm correlation

Service Capability	Weight	Question	✓ Option A	Option B	Option C	Option D
Data collection & Alarm correlation	10%	How does the wireless network fault management system support automatic data collection & alarm correlation in various fault scenarios?	The system automatically collects data (alarm, configuration, and performance data etc.), and correlates alarms. All data required are automatically collected, no need for additional manually collected data.	The system collects data (alarm, configuration, and performance data etc.), and correlates alarms based on manually defined rules	Manually selects and uses the system to collect data and correlate alarms.	

Alarm data

Equipment

Filter

Auto Refresh ☐

AcknowledgeUnacknowledgeClearExport

☐	Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self-Healing S...	Self-Healing ...
>	☒	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 17:13:18	Diagnosis succeed...	Unrepairable	-
>	☒	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 14:25:32	Diagnosis succeed...	Unrepairable	-
>	☒	RF Unit Fault	RF Unit Temperature Abnormal-RF Unit Temperature Unacceptable		2026-05-06 10:50:09	Diagnosis succeed...	Unrepairable	-
✓	☒	RF Unit Fault	RF Unit Hardware Abnormal-RF Unit Hardware Fault		2026-05-04 23:55:20	Diagnosis succeed...	Repairable	RST BRDPWRO...

Description: RF Unit Hardware Abnormal-RF Unit Hardware Fault: Cabinet No.=0, Subrack No.=68, Slot No.=0, Board Type=MRRU, Specific Problem=Other, AFFECTED_RAT: L

AlarmsRoot CausesComments

Severity	Alarm ID	Name	Source Object Name	Occurred On	Description	Operation
Major	26532	RF Unit Hardw...		2026-05-04 23:55:20	Cabinet No.=0, Subrack No.=68, Slot No.=0, Board Type=MRRU, Specific Problem=Other	

Total records: 1

Processing Error

☒ Operation

Category

Incident Name

NE Name

Occurred

☒ Antenna Feeder Sy... Antenna Circuit Abnormal-RF Unit ALD Current Out of Range

2026-05-1

Description: Antenna Circuit Abnormal-RF Unit ALD Current Out of Range: Cabinet No.=0, Subrack No.=4, Slot No.=4, Antenna Port No.=ANT A, Board Type=MRFU, ALD Working Current (mA)=187, Specific Problem=Overcurrent, AFFECTED_RAT: L

Alarms/IncidentsRoot CausesComments

Severity	ID	Name	Source Object Name	Occurred On	Description	Operation
Minor	26530	RF Unit ALD Curre...		2026-05-10 00:50:18	Cabinet No.=0, Subrack No.=4, Slot No.=4, Antenna Port No.=ANT A, Board Type=MRFU, ALD Wo...	

Total records: 1

Data collection & Alarm correlation

Alarm data

Communications

Category	Incident Name	Occurred On	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:56:19	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:54:45	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:31:34	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 09:50:24	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-BBU CPRI Interface Error	2026-05-10 09:36:32	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error	2026-05-10 09:33:41	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 07:52:55	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 06:58:12	Diagnosis

Description: Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure: Cabinet No.=0, Subrack No.=71, Slot No.=0, Board Type=MRRU, Specific Problem=Other, AFFECTED_RAT: L

Severity	Alarm ID	Name	Source Object Name	Occurred On	Description	Operation
Major	26235	RF Unit Maintenance		2026-05-10 06:58:12	Cabinet No.=0, Subrack No.=71, Slot No.=0, Board Type=MRRU, Specific Problem=Other	

Total records: 1

Communications

Category	Incident Name	Occurred On	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:56:43	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:56:19	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:54:45	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 10:31:34	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure	2026-05-10 09:50:24	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-BBU CPRI Interface Error	2026-05-10 09:36:32	Diagnosis
Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error	2026-05-10 09:33:41	Diagnosis

Description: Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error: Cabinet No.=0, Subrack No.=4, Slot No.=4, Port No.=Port 1(East), Sub Port No.=NULL, Board Type=MRRU, Specific Problem=CPRI Interface Reception Error, AFFECTED_RAT: G

Severity	Alarm ID	Name	Source Object Name	Occurred On	Description	Operation
Major	26504	RF Unit CPRI Inter		2026-05-10 09:35:18	Cabinet No.=0, Subrack No.=4, Slot No.=4, Port No.=Port 1(East), Sub Port No.=NULL, Board Typ...	
Major	26504	RF Unit CPRI Inter		2026-05-10 09:33:41	Cabinet No.=0, Subrack No.=4, Slot No.=2, Port No.=Port 1(East), Sub Port No.=NULL, Board Typ...	

Total records: 2

Environmental

Operation

Category

Incident Name

NE Name

Occurred On

Self-Healing Co...

Description

Clearance Status

Acknowledgment ...

Self-Healing Log

>

Peripheral and ...

Device Power S...

2026-05-10 22:01:01

Diagnosis succeed...

Unrepairable

-

Device Power Supply Fault-Mains Input Out of Ra...

Cleared

Acknowledged

-

>

Backhaul Netw...

eNodeB_X2 Int...

2026-05-10 15:21:26

Diagnosis succeed...

Unrepairable

-

eNodeB_X2 Interface & Link Fault-X2 Interface Fa...

Cleared

Acknowledged

-

✓

Backhaul Network Fault

Device Power S...

2026-05-10 15:17:59

Diagnosis succeed...

Unrepairable

-

Device Power Supply Fault-Mains Input Out of Ra...

Cleared

Acknowledged

-

Description: Device Power Supply Fault-Mains Input Out of Range: Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Alarms

Root Causes

Comments

Severity

Alarm ID

Name

Source Object Name

Occurred On

Description

Operation

Major

26108

Mains Input O...

2026-05-10 15:17:59

Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Total records: 1

<

1

>



Data collection & Alarm correlation

Performance data (KPI Alarm list)

	Synthetic Ri	DC Rule Res	Transient Ri	Network Ty	Site ID	Alarm Source	Alarm ID	Alarm Name	Duration(h)	First Occurred On	Last Occurr	Cleared On	Alarm Occu	Alarm Locat	Summary	Alarm Sever	Dom
☐	Normal	Normal	Normal	2G			21820	GSM KPI Exceed Threshold	00:22:05	2026-04-30 10:24:13	2026-04-3...		1	Subrack N...	Subrack N...	Major	RA
☐	Normal	Normal	Normal	2G			21820	GSM KPI Exceed Threshold	01:18:27	2026-04-30 09:27:51	2026-04-3...		1	Subrack N...	Subrack N...	Major	RA
☐	Normal	Normal	Normal	2G			21820	GSM KPI Exceed Threshold	00:45:00	2026-04-30 08:24:13	2026-04-3...	2026-04-3...	1	Subrack N...	Subrack N...	Major	RA
☐	Normal	Normal	Normal	2G			21820	GSM KPI Exceed Threshold	00:15:00	2026-04-30 06:24:13	2026-04-3...	2026-04-3...	1	Subrack N...	Subrack N...	Major	RA

Configuration data

Resource Maintenance

- Space
 - Region
 - Site
- Customer Resources
 - Enterprise Info
 - Service Info
 - NE Maintenance
- Network Resources
 - Common NEs
 - Common Board
 - Common Port
 - Common Link
 - Domain
 - Network Type

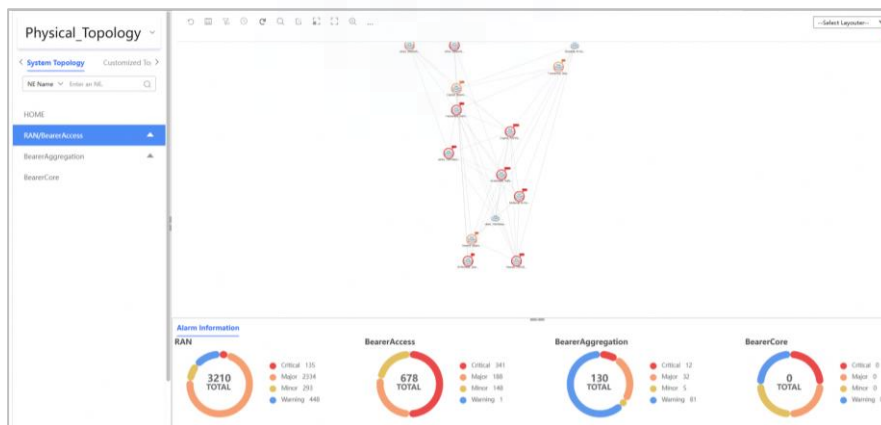
Common NEs

Filter Options Filter Clear

Export

	name	NE Type	NMS Ne ID	Network T...	Serial Num...	NE Site Na...	Level 1	Level 2	Level 3	Domain	Device Type	Manufactu...	Running St...
☐		eNodeB		4G		3091	Al-Ahmadi	Al-Zour		Ran	eNodeB	HUAWEI	
☐		BTS3900		Multi-Mode...		921	Hawalli	Zahra		Ran	Multi-Mode...	HUAWEI	
☐		BTS5900		Multi-Mode...		4872	Farwaniya	West Abdull...		Ran	Multi-Mode...	HUAWEI	
☐		BTS3900		Multi-Mode...		577	Jahra	West Jahra		Ran	Multi-Mode...	HUAWEI	
☐		BTS3900		Multi-Mode...		1716	Mubarak Al...	Wista		Ran	Multi-Mode...	HUAWEI	
☐		BTS5900		Multi-Mode...		1166	Jahra	Waha		Ran	Multi-Mode...	HUAWEI	
☐		BTS5900 5G		Multi-Mode...		4973	Al-Ahmadi	Wafra Farms		Ran	Single-Mod...	HUAWEI	
☐		FGRTS		2G		4916	Al-Ahmadi	Wafra Farms		Ran	eGRTS	HUAWEI	

Topology data



Collector – Resource Probe

OWS Console IP-RAN CMBD CMBD Device Data Common Query Model Data Query SOAP Send Log Collector Management ZhaoKun

Enter a Node Name Search

Collector Configuration

Master Collector Backup Collector Probe Management Network Interface Group

Probe ID Probe Name JRE Version Search Create Refresh

Batch Upgrade Batch Rollback Batch Restart

Rollback all probes that can be rolled back. To view all probes that can be rolled back, click on the 'Rollback' button.

No.	Probe Name	Probe Package	Status	Connec...	Collect...	Backha...	Start Ti...	JRE Ver...	Conn...	Operation
1	Probe-0...	Wireless_U2020	Running	Not che...	Not che...	Not che...	2026-02...	JRE8	In Eff...	
2	Probe-0...	IP-RAN_NCE_TOPO	Running	Not che...	Not che...	Not che...	2026-02...	JRE8	In Eff...	
3	Probe-0...	RAN_TOPO	Stopped	Not che...	Not che...	Not che...	2026-05...	JRE8	In Eff...	
4	Probe-0...	IP-RAN_NCE_TOPO	Running	Not che...	Not che...	Not che...	2026-05...	JRE8	In Eff...	
5	Probe-0...	IP-RAN_NCE_TOPO	Stopped	Not che...	Not che...	Not che...	2026-05...	JRE8	In Eff...	
6	Probe-0...	IP-RAN_UFAD_TO...	Stopped	Not che...	Not che...	Not che...	2026-05...	JRE8	In Eff...	
7	Probe-0...	SEM_Nokia	Stopped	Not che...	Not che...	Not che...	2026-05...	JRE8	In Eff...	
8	Probe-0...	Microwave_NCE...	Running	Not che...	Not che...	Not che...	2026-11...	JRE8	In Eff...	
9	Probe-0...	Datacom_NCE-IP	Running	Not che...	Not che...	Not che...	2026-11...	JRE8	In Eff...	
10	Probe-0...	Natcoo_Power	Running	Not che...	Not che...	Not che...	2026-11...	JRE8	In Eff...	

Total 21 10/page 1 2 3 Go to 1

Fault Prediction

Service Capability	Weight	Question	✓ Option A	Option B	Option C	Option D
Fault Prediction	15%	How does the wireless network fault management system support fault prediction in various fault scenarios? Note: For example, the system predict the bit error rate and link interruption of fronthaul and predict the aging and damage of board.	The system identifies potential risks and predicts the fault occurrence time based on intelligent models without the need for human intervention.	The system identifies potential risks based on intelligent models, but cannot predict the fault occurrence time.	The system identifies potential risks based on manually defined rules. For example, the system can identify potential risks of fronthaul optical modules based on preset optical power thresholds.	Potential risks need to be manually identified based on expertise.

Communications

The screenshot shows a network management system interface. At the top, there's a 'Filter' button and a 'Basic Information' tab. Below this, a table lists incidents with columns for Operation, Category, Incident Name, NE Type, NE Name, Description, Handling Suggestions, Occurred On, and Clear@. A detailed view of an incident is shown on the right, including fields for Category, Incident Name, NE Type, NE Name, Description, Handling Suggestions, Occurred On, Clearance Status, Created On, Arrive On, Acknowledgment Status, Acknowledged On, Serial Number, Business Impact Analysis, Priority, and Domain.

Optical link risk prediction based on time series optical loss deviation

Massive data training

- Alarm
- Traffic
- statistics
- Optical power
- Temperature
- wavelength
-

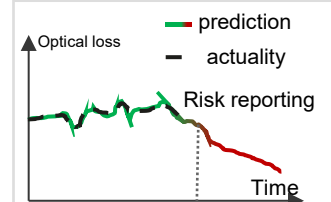
Key technologies

1
time series model

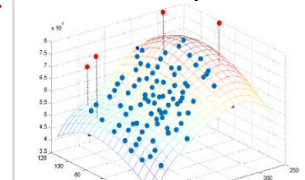
2
High-dimensional benchmark surface model, online learning of risk thresholds

3
Optical loss calculation formula based on optical fiber connectors

Typical Application



Predicting risky optical links based on the optical loss



Identify risky optical modules based on High-dimensional benchmark surface model

Fault Prediction

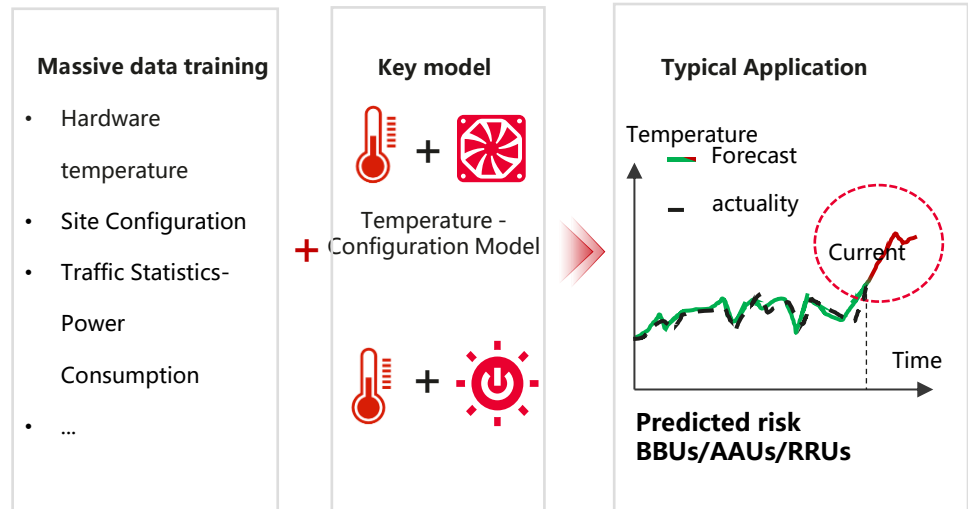
Service Capability	Weight	Question	✓ Option A	Option B	Option C	Option D
Fault Prediction	15%	How does the wireless network fault management system support fault prediction in various fault scenarios? Note: For example, the system predict the bit error rate and link interruption of fronthaul and predict the aging and damage of board.	The system identifies potential risks and predicts the fault occurrence time based on intelligent models without the need for human intervention.	The system identifies potential risks based on intelligent models, but cannot predict the fault occurrence time.	The system identifies potential risks based on manually defined rules. For example, the system can identify potential risks of fronthaul optical modules based on preset optical power thresholds.	Potential risks need to be manually identified based on expertise.

Equipment

The screenshot displays a network management system interface. On the left, there's a list of incidents under the 'Equipment' category. A detailed view of an incident is shown on the right, including the following information:

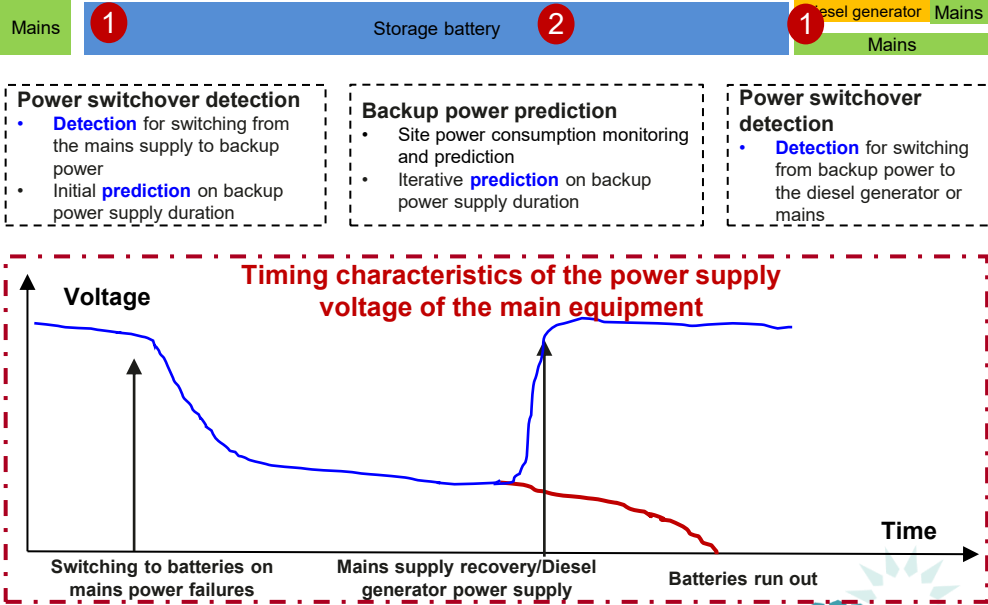
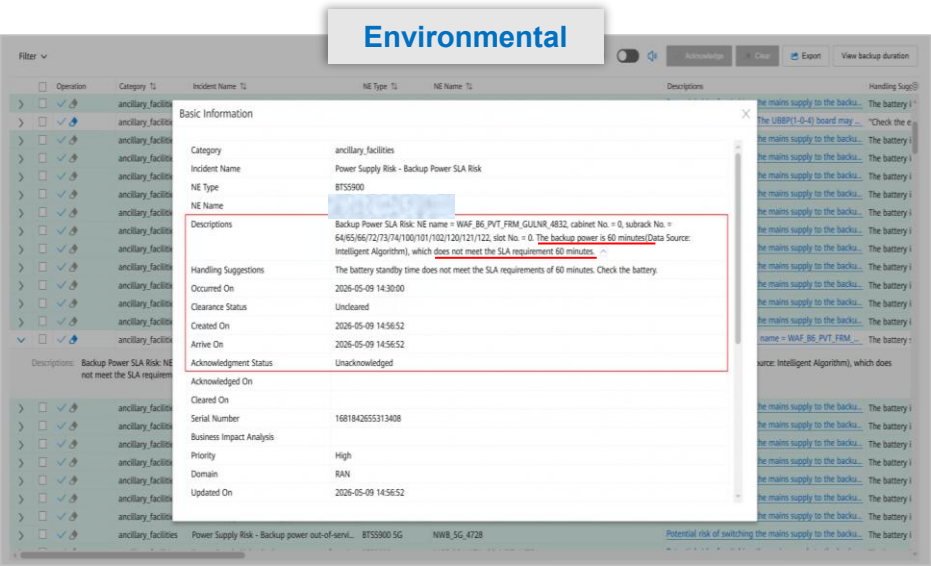
- Category:** ancillary_facilities
- Incident Name:** High Temperature Risks - BBU High Temperature Fault Prediction
- NE Type:** BTS3900
- NE Name:** [Redacted]
- Descriptions:** [sudden high temperature]The VWSBP(0-0-5) board may have a high temperature risk.1. The air conditioner in the equipment room is faulty. 2. Electrical faults occur. 3. The fan board in the BBU is faulty. 4. The board is faulty.
- Handling Suggestions:** "Check the equipment room environment. For example, check whether the air conditioner is running properly, whether the equipment room door is closed, and whether there are too many BBUs stacked."
- Occurred On:** 2026-05-09 20:30:00
- Clearance Status:** Uncleared
- Created On:** 2026-05-09 21:09:02
- Arrive On:** 2026-05-09 21:09:02
- Acknowledgment Status:** Unacknowledged
- Acknowledged On:** [Redacted]
- Cleared On:** [Redacted]
- Serial Number:** 1682029972930049
- Business Impact Analysis:** [Redacted]
- Priority:** High
- Domain:** RAN
- Updated On:** 2026-05-09 22:09:28

Predict risks in advance based on the ARIMA high-temperature-configuration-power consumption model, and ensure user experience not loss.



Fault Prediction

Service Capability	Weight	Question	✓ Option A	Option B	Option C	Option D
Fault Prediction	15%	How does the wireless network fault management system support fault prediction in various fault scenarios? Note: For example, the system predict the bit error rate and link interruption of fronthaul and predict the aging and damage of board.	The system identifies potential risks and predicts the fault occurrence time based on intelligent models without the need for human intervention.	The system identifies potential risks based on intelligent models, but cannot predict the fault occurrence time.	The system identifies potential risks based on manually defined rules. For example, the system can identify potential risks of fronthaul optical modules based on preset optical power thresholds.	Potential risks need to be manually identified based on expertise.



Fault Prediction

Processing Error

EMS can identify whether a script has high-risk impacts in advance

The screenshot displays the EMS interface with a top navigation bar and a main content area. The main content area shows a task execution summary for 'Export incremental scripts' with a status of 'Succeeded'. Below this, a detailed view of the task execution is shown, including a table of results. The table has columns for 'Type', 'NE Name', 'Operation', 'Information', 'File', 'Affect S...', 'Affect O...', and 'Risk Level'. A row is highlighted with a red box, indicating a 'High-Risk' operation. The 'Information' column for this row contains a warning message: 'ST_NCELL_IDENT_SW: If this option is deselected, frequent changes in the neighboring cell information about the cell serving speed turbo UEs increase the CPU load and cause link congestion. As a result, flow control is triggered, causing service exceptions.'

Type	NE Name	Operation	Information	File	Affect S...	Affect O...	Risk Level
High-Risk	SHW-PRT_MEW_SG_1114	Released MOC Update: NCellAlgoSwitch(hcCellid="0") Risky parameter(s): SpeedTurboSw	ST_NCELL_IDENT_SW: If this option is deselected, frequent changes in the neighboring cell information about the cell serving speed turbo UEs increase the CPU load and cause link congestion. As a result, flow control is triggered, causing service exceptions.	MAE_SHW-PRT_MEW_SG_1114_Active_2026 0616104033.xml	YES	NO	Warning

Below the table, there is a section for 'High-Risk operation NE statistics' and 'High-Risk operation level statistics'. The 'High-Risk operation NE statistics' shows a count of 1 for 'High-Risk operation NE' and 0 for 'Reset risk NE' and 'Disconnection risk NE'. The 'High-Risk operation level statistics' shows a count of 0 for 'Critical', 0 for 'Major', and 1 for 'Warning'. At the bottom, there is a section for 'High-Risk operation object statistics' and a table with columns for 'Operation type' and 'Statistics'.

1. EMS can identify various high-risk information present in scripts

2. The LSTM algorithm is used to accurately predict the traffic volume in the next week based on historical traffic data, identify whether the configuration is risky in traffic fluctuation scenarios, and generate warnings in advance.

3. When the user triggers the script deployment, the script risk is prompted again, and the script can only be deployed after the user confirms.



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Processing Error

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Business Impact Analysis
☐ Operation ☒ NE Disconnection & Out of Service		eNodeB Out of Service-eNodeB Out		2026-05-13 14:50:48	Diagnosis succeeded	15.00; Traffic loss 0.749 GB, user loss 0.351; 16.00; Traffic loss 0.681 GB, user loss 0.495; 17.0

Description: eNodeB_X2 Interface & Link Fault-X2 Interface Fault: eNodeB Function Name=SRQ_81_CBX_PRRX_CO-MPT_3164, Neighboring Base Station Type=eNodeB, Specific Problem=Lower-layer link fault, AFFECTED: RAT: L

Alarms Root Causes Comments

Root Causes

1.Configuration:The alarm threshold is improper

NE Name=SRQ_81_CBX_PRRX_CO-MPT_3164(Cabinet No.=0, Subrack No.=68, Slot No.=0, TX Channel No.=0, Board Type=MRRU, VSWR Alarm Threshold (0.1)=15, VSWR(0.1)=15, Output Power (0.1 dBm)=366, RF Port=NULL, ESN=2102311TBD10M1000010, BOM Code=02311TBD

Handling Suggestions

For root cause 1: Modify the RF unit VSWR threshold.

Environmental

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Business Impact Analysis
NE Disconnection & Out of Service	eNodeB Out of Service-eNodeB Out...		2026-05-13 14:41:45	Diagnosis succeeded	15:00: Traffic loss 0.995 GB, user loss 0.553; 16:00: Traffic loss 0.771 GB, user loss 0.728; 17:00: ...	

Description: eNodeB_X2 Interface & Link Fault: eNodeB Function Name=Sub-PW-ST-CO-MPT-3052, Neighboring Base Station Type=gNodeB, Specific Problem=Lower-layer link fault, AFFECTED_RAT:L

Alarms Root Causes Comments

Root Causes

1.Power and environment - Power supply AAU(RRU)/RRU power failure
 NE Name=Sub-PW-ST-CO-MPT-3052,RRU(Cabinet No.=0, Subrack No.=0, Slot No.=3, Port No.=4, ESN=21035751510K9013898, BOM Code=03057155), RRU(Cabinet No.=0, Subrack No.=71, Slot No.=0)

Handling Suggestions

For root cause 1: 1. Check whether the mains supply is interrupted. If yes, consider dispatching a diesel generator. 2. If the mains supply is not interrupted, check the power supply circuit onsite.



Demarcation & Locating

Service Capability	Weight	Question	✓ Option A	Option B	Option C	Option D
Demarcation & Locating	20%	How does the wireless network fault management system support root cause diagnosis and fault locating in various fault scenarios? Note1: The root cause diagnosis and fault locating shall require the ability to locate smallest field replaceable unit, upgradable software modules and connectors so that a repair solution can be quickly determined. e.g, Optical module, fiber optic cable and optical connectors.	The system demarcates and locates faults based on intelligent models without the need for human intervention.	The system demarcates the fault or locates multiple causes based on intelligent models, but the human intervention is required.	The system demarcates and locates faults based on manually defined rules (such as experience-based fault trees and troubleshooting processes) and needs human intervention.	Fault diagnosis needs to be manually performed based on expertise.

Equipment

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self Healing	Self Healing
✓	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 17:13:18	Diagnosis succeed...	Unrepairable	-
✓	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 14:25:32	Diagnosis succeed...	Unrepairable	-
✓	RF Unit Fault	RF Unit Temperature Abnormal-RF Unit Temperature Unacceptable		2026-05-06 10:50:09	Diagnosis succeed...	Unrepairable	-
✓	RF Unit Fault	RF Unit Hardware Abnormal-RF Unit Hardware Fault		2026-05-04 23:55:20	Diagnosis succeed...	Repairable	RST BRDPWRO...

Description: RF Unit Hardware Abnormal-RF Unit Hardware Fault: Cabinet No.=0, Subrack No.=8, Slot No.=0, Board Type=MRRU, Specific Problem=Other, AFFECTED_RAT: L

Alarms **Root Causes** Comments

Root Causes

1. Hardware - RF module/RF Unit Hardware Fault:
Ne Name=SF_R3_MoD_CO-MPT_1298,BBU(Cabinet No.=0, Subrack No.=0, Slot No.=2), RRU(Cabinet No.=0, Subrack No.=8, Slot No.=0), Board Type=MRRU, Specific Problem=Other, ESN=2102311NCV101000375, BOM Code=02311NCV1

Handling Suggestions

For root cause 1: 1. Remotely reset the device. If the fault persists, replace the device.
Reference MML Command for Self-Healing:
MML: RST BRDPWROFF: CN=0, SRN=68, SN=0;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialized the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 1200s.

Communications

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self Healing	Self Healing
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 18:56:43	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 18:56:19	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 18:54:45	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 18:31:34	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 09:50:24	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 09:36:32	Diagnosis...	-	-
✓	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error		2026-05-10 09:33:41	Diagnosis...	-	-

Description: Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error: Cabinet No.=0, Subrack No.=4, Slot No.=4, Port No.=Port 1(East), Sub Port No.=NULL, Board Type=MRRU, Specific Problem=CPRI Interface Reception Error, AFFECTED_RAT: G

Alarms **Root Causes** Comments

Root Causes

1. Fronthaul link(RRU/RRU/RRU) cascading optical fiber fault
Ne Name=BBU-SLD_BRM_CO-MPT_800,Cabinet No.=0, Subrack No.=4, Slot No.=2, ESN=2102310QMT100004833, BOM Code=02310QMT1
Ne Name=BBU-SLD_BRM_CO-MPT_800,Cabinet No.=0, Subrack No.=4, Slot No.=4, ESN=2102310QMT100004849, BOM Code=02310QMT1

Handling Suggestions

For root cause 1: 1. Check the fiber fault point and rectify the fault.

Processing Error

Operation	Category	Incident Name	NE Name	Occurred On
✓	Antenna Feeder Sy		RRR_MOB_CO-MPT_997	2026-05-1

Description: Antenna Circuit Abnormal-RF Unit ALD Current Out of Range: Cabinet No.=0, Subrack No.=4, Slot No.=4, Antenna Port No.=ANT A, Board Type=MRRU, ALD Working Current (mA)=187, Specific Problem=Overcurrent, AFFECTED_RAT: L

Alarms/Incidents **Root Causes** Comments

Root Causes

1. Configuration - incorrect configuration:The antenna hardware and AISG cable connection are abnormal or the threshold is not properly set
Ne Name=RRR_MOB_CO-MPT_997,ANTENNAPORTCN=0SRN=4(SN=ANT A)

Handling Suggestions

For root cause 1: 1. Run the MML command MOD ANTENNAPORT or MOD RETPORT to modify the ALD current alarm threshold of the RF unit according to the configuration plan. 2. Check the feeder and antenna device on site.
Reference MML Command for Self-Healing:
MML: RST BRDPWROFF: CN=0, SRN=4, SN=4;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialized the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 960s.

Environmental

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self Healing	Self Healing
✓	Peripheral ...	Device Power		2026-05-10 22:01:01	Diagnosis succeed...	Unrepairable	-
✓	Backhaul Netw...	eNodeB_X2 I		2026-05-10 15:21:26	Diagnosis succeed...	Unrepairable	-
✓	Peripheral ...	Device Power		2026-05-10 15:17:59	Diagnosis succeed...	Unrepairable	-

Description: Device Power Supply Fault-Mains Input Out of Range: Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Alarms **Root Causes** Comments

Root Causes

1. Power and environment - Power supply - Faulty external power supply/AC input Power Failure
Ne Name=VIP_WAFBA_SmallCell_8010,Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Handling Suggestions

For root cause 1: Check the AC input power cable. If the AC input power cable is aged or damaged, replace the cable. If the AC input power cable is not properly connected, reconnect the cable.



Solution generation

Service Capability	Weight	Question	√ Option A	Option B	Option C	Option D
Solution generation	10%	How does the wireless network fault management system support generation of fault recovery solutions in various scenarios? Note1: Fault recovery solutions includes: the executable commands/ scripts for the remote faults that can be remotely recovered; or, On-site repair operation instructions for faults that require on-site handling. Note: 2: The examples of the fault recovery solutions can be the remote recovery solution, neighboring cell RF compensation recovery solution.	The system generates one or multiple possible fault recovery or fault rectification solutions based on intelligent model without the need for human intervention.	The system generates multiple possible fault recovery or rectification solutions based on intelligent model, but need human intervention.	The system generates one or multiple possible fault recovery or rectification solutions based on manually defined rules and need human intervention.	Fault recovery or rectification solutions needs to be manually generated based on expertise.

Evaluation and decision-making

Service Capability	Weight	Question	√ Option A	Option B	Option C	Option D
Evaluation and decision-making	10%	How does the wireless network fault management system support evaluation and decision-making in various scenarios?	The system evaluates multiple possible recovery or rectification solutions and determines the optimal recovery or fault rectification solution based on intelligent models without the need for human intervention.	The system evaluates multiple possible recovery or rectification solutions and determines the optimal recovery or fault rectification solution based on intelligent models, but need human intervention.	The system evaluate and decide the fault recovery or fault rectification solution based on manually defined rules and need human intervention.	The fault recovery or fault rectification solution is manually evaluated and decided.



Solution generation & Evaluation and decision-making

Equipment

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self-Healing S...	Self-Healing ...
> ☒  ...	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 17:13:18	Diagnosis succeed...	Unrepairable	-
> ☒  ...	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 14:25:32	Diagnosis succeed...	Unrepairable	-
> ☒  ...	RF Unit Fault	RF Unit Temperature Abnormal-RF Unit Temperature Unacceptable		2026-05-06 10:50:09	Diagnosis succeed...	Unrepairable	-
> ☒  ...	RF Unit Fault	RF Unit Hardware Abnormal-RF Unit Hardware Fault		2026-05-04 23:55:20	Diagnosis succeed...	Repairable	RST BRODPWRO...

Description: RF Unit Hardware Abnormal-RF Unit Hardware Fault: Cabinet No=0, Subrack No=68, Slot No=0, Board Type=MRRU, Specific Problem=Other, AFFECTED_RAT: L

Alarms Root Causes Comments

Root Causes

1. Hardware - RF module:RF Unit Hardware Fault
Ne Name=SF_R2_MOD_CO-MPT_1296(BBU)(Cabinet No=0, Subrack No=2, Slot No=2), RRU(Cabinet No=0, Subrack No=68, Slot No=0, Board Type=MRRU, Specific Problem=Other, ESN=21023111NCV1011000375, BOM Code=023111NCV)

Handling Suggestions

For root cause 1: 1. Remotely reset the device. If the fault persists, replace the device.
Reference MML Command for Self-Healing:
MML: RST BRODPWROFF: CN=0, SRN=68, SN=0;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialize the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 1200s.

For faults that can be remotely rectified, MML commands are automatically generated and execute.

Processing Error

Operation	Category	Incident Name	NE Name	Occurred
> ☒  ...	Antenna Feeder Sy...	Antenna Circuit Abnormal-RF Unit ALD Current Out of Range		2026-05-1

Description: Antenna Circuit Abnormal-RF Unit ALD Current Out of Range: Cabinet No=0, Subrack No=4, Slot No=4, Antenna Port No=ANT A, Board Type=MRPU, ALD Working Current (mA)=187, Specific Problem=Overcurrent, AFFECTED_RAT: L

Alarms/Incidents Root Causes Comments

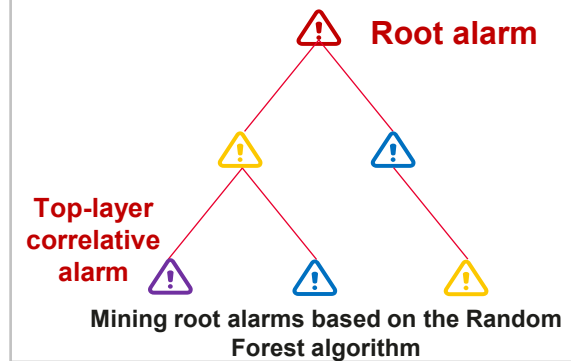
Root Causes

1. Configuration - Incorrect configuration:The antenna hardware and AISG cable connection are abnormal or the threshold is not properly set
Ne Name=8RR_MOB_CO-MPT_987,ANTENNAPORT(CN=0,SRN=4,SN=4,PN=ANT A)

Handling Suggestions

For root cause 1: 1. Run the MML command MOD ANTENNAPORT or MOD RETPORT to modify the ALD current alarm threshold of the RF unit according to the configuration plan. 2. Check the feeder and antenna device on site.
Reference MML Command for Self-Healing:
MML: RST BRODPWROFF: CN=0, SRN=4, SN=4;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialize the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 960s.

Root alarm identification



- ✓ Perform causal analysis based on the associated alarms reported for the fault to determine the root cause.



Solution generation & Evaluation and decision-making

Communications

Operation	Category %	Incident Name %	NE Name %	Occurred On	Diagnosis %
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 10:56:43	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 10:56:19	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 10:54:45	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 10:31:34	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 09:50:24	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit Maintenance Link Failure		2026-05-10 09:36:32	Diagnosis
> ☒	Fronthaul Network...	Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error		2026-05-10 09:33:41	Diagnosis

Description: Fronthaul Optical Path Abnormal-RF Unit CPRI Interface Error: Cabinet No.=0, Subrack No.=4, Slot No.=4, Port No.=Port 1(East), Sub Port No=NULL, Board Type=MRFU, Specific Problem=CPRI Interface Reception Error, AFFECTED_RAT: G

Alarms **Root Causes** Comments

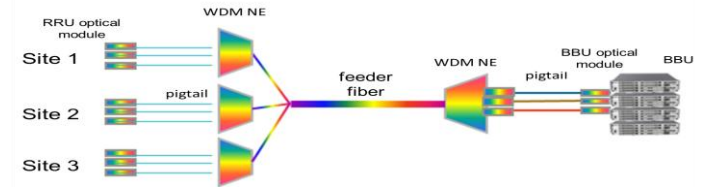
Root Causes

1. Fronthaul link(RRU/RHUB/pRRU) cascading optical fiber fault
Ne Name=BUB-ISLD_8KM_CO-MPT_800,Cabinet No.=0, Subrack No.=4, Slot No.=2, ESN=2102310QMT10G9004833, BOM Code=02310QMT
Ne Name=BUB-ISLD_8KM_CO-MPT_800,Cabinet No.=0, Subrack No.=4, Slot No.=4, ESN=2102310QMT10G9004849, BOM Code=02310QMT

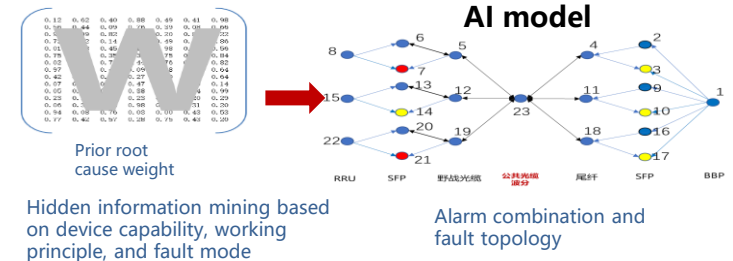
Handling Suggestions

For root cause 1: 1. Check the fiber fault point and rectify the fault.

Fronthaul topology restoration



Probability fusion decision



Environmental

Environmental

Operation	Category %	Incident Name %	NE Name %	Description	Clearance Status	Acknowledgment ...	Self Healing Log
>	Peripheral and ...	Device Power S...		2026-05-10 22:01:01	Diagnosis succeed...	Unrepairable	-
>	Backhaul Netw...	eNodeB_X2 Int...		2026-05-10 15:21:26	Diagnosis succeed...	Unrepairable	-
>	Peripheral and ...	Device Power S...		2026-05-10 15:17:59	Diagnosis succeed...	Unrepairable	-

Device Power Supply Fault-Mains Input Out of Range: Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Alarms

Root Causes

Comments

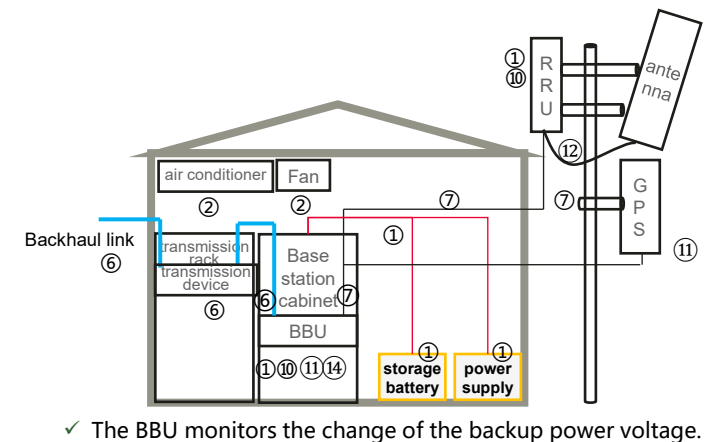
Root Causes

1. Power and environment - Power supply - Faulty external power supply/AC Input Power Failure

Ne Name=VP_WAFBA_SmallCell_6010,Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=BRU, Specific Problem=AC Failure

Handling Suggestions

For root cause 1: Check the AC input power cable. If the AC input power cable is aged or damaged, replace the cable. If the AC input power cable is not properly connected, reconnect the cable.



Solution implementation

Service Capability	Weight	Question	√ Option A	Option B	Option C	Option D
Solution implementation	10%	How does the wireless network fault management system support automatic execution of: 1) Repair commands/ scripts for the faults that can be remotely recovered; 2) On-site repair instruction for the faults that on-site handling is necessary (such as power supply failure, board fault, fiber cut) to enable the human: - to query the recommended checklists to repair the fault. - to check the fault resolution effect and generate the fault repair report .	1) The system automatically executes the commands/ scripts for the fault that can be remotely recovered. 2) The system support intelligent on-site instruction for the faults that on-site handling is necessary, including support of: - Human leverages natural language to guide Copilot in query optimal troubleshooting checklists. - Human leverages natural language to guide Copilot to automatically verify that the fault is resolved and alarms are cleared, generate the fault repair report (including fill out the trouble ticket record).	Humans use the system to execute instructions. 1)The system executes commands/ scripts for the fault that can be remotely recovered with human confirmation. 2)The on-site handling are assisted by tool,but still requires assistance from NOC.	The recovery solution needs to be manually implemented 1) The recovery solution need to be manually implemented. 2) On-site handling is guided by NOC.	



Solution implementation

Automatic execution

Processing Error

The system automatically generates and executes MML commands.

Operation Category Incident Name NE Name Occurred

Antenna Feeder Sy... Antenna Circuit Abnormal-RF Unit ALD Current Out of Range 2026-05-1

Description: Antenna Circuit Abnormal-RF Unit ALD Current Out of Range: Cabinet No.=0, Subrack No.=4, Slot No.=4, Antenna Port No.=ANT A, Board Type=MRFU, ALD Working Current (mA)=187, Specific Problem=Overcurrent, AFFECTED_RAT: L

Alarms/Incidents Root Causes Comments

Root Causes

1. Configuration - Incorrect configuration:The antenna hardware and AISG cable connection are abnormal or the threshold is not properly set
Ne Name=8RR_MOB_CO-MPT_997,ANTENNAPORT{CN=0,SRN=4,SN=4,PN=ANT A}

Handling Suggestions

For root cause 1: 1. Run the MML command MOD ANTENNAPORT or MOD RETPORT to modify the ALD current alarm threshold of the RF unit according to the configuration plan. 2. Check the feeder and antenna device on site.
Reference MML Command for Self-Healing:
MML: RST BRDPWROFF: CN=0, SRN=4, SN=4;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialize the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 960s.

Equipment

The system automatically generates and executes MML commands.

Operation	Category	Incident Name	NE Name	Occurred On	Diagnosis Status	Self-Healing S...	Self-Healing ...
>	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 17:13:18	Diagnosis succeed...	Unrepairable	-
>	RF Unit Fault	RF Unit Running Error-RF Out of Service		2026-05-06 14:25:32	Diagnosis succeed...	Unrepairable	-
>	RF Unit Fault	RF Unit Temperature Abnormal-RF Unit Temperature Unacceptable		2026-05-06 10:50:09	Diagnosis succeed...	Unrepairable	-
>	RF Unit Fault	RF Unit Hardware Abnormal-RF Unit Hardware Fault		2026-05-04 23:55:20	Diagnosis succeed...	Repairable	RST BRDPWRO...

Description: RF Unit Hardware Abnormal-RF Unit Hardware Fault: Cabinet No.=0, Subrack No.=68, Slot No.=0, Board Type=MRRU, Specific Problem=Other, AFFECTED_RAT: L

Alarms Root Causes Comments

Root Causes

1. Hardware - RF module:RF Unit Hardware Fault
Ne Name=SF_B2_Mod_CO-MPT_1298,BBU(Cabinet No.=0, Subrack No.=0, Slot No.=2, Port No.=2), RRU(Cabinet No.=0, Subrack No.=68, Slot No.=0, Board Type=MRRU, Specific Problem=Other, ESN=2102311NCV1011000375, BOM Code=02311NCV)

Handling Suggestions

For root cause 1: 1. Remotely reset the device. If the fault persists, replace the device.
Reference MML Command for Self-Healing:
MML: RST BRDPWROFF: CN=0, SRN=68, SN=0;
Impact: Resetting a board through power-off will cause the services carried on the board to be lost and reinitialize the board. Before the initialization is complete, the board is unavailable.
Recovery duration: 1200s.

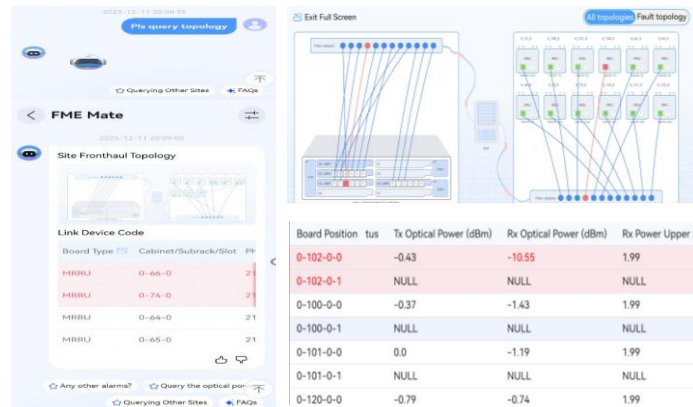


Solution implementation

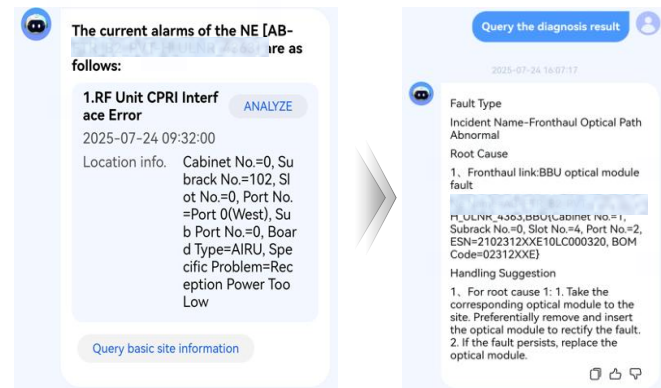
On-site instruction

Key Capabilities of FMEMate in Kuwait Zain

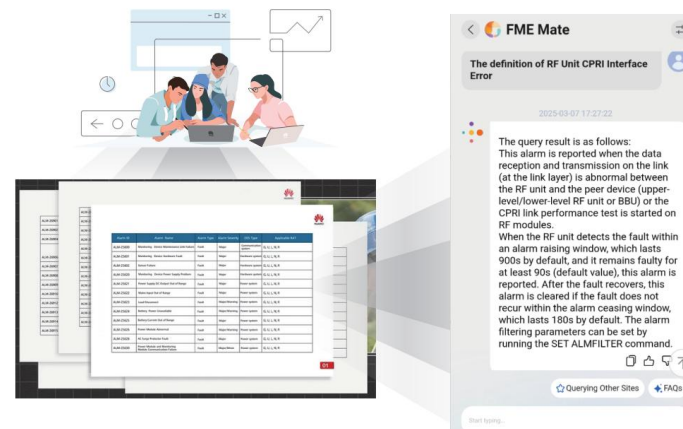
Fault Topology Visualization



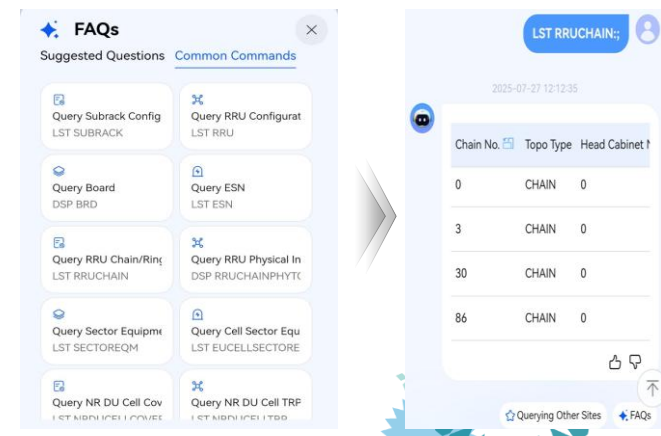
Auxiliary Troubleshooting



Maintaining knowledge Q&A



Common Query Commands



Onsite repair instructions for these sub-scenarios can be provided by FMEMate (copilot)

Solution implementation

On-site instruction

FME Mate Use Case

Receiving Ticket

Fault Locating and Analysis

Site Visit

Onsite Repair

Ticket Closure

Clock Fault

WO: CM-20250722-

00000006

WO description:

4454_26264-System Clock

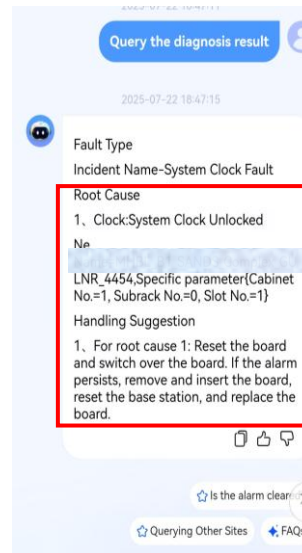
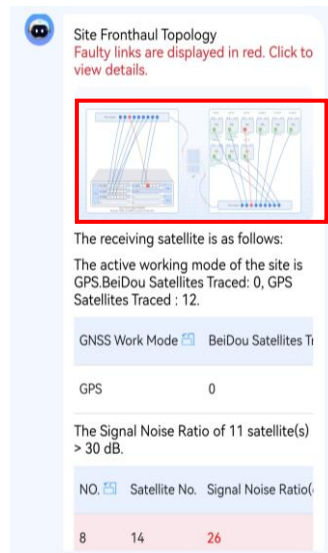
Unlocked_2025-07-18

16:56:18

Alarm Name: 26264-

System Clock Unlocked

1. Query alarm information through FME Mate and diagnose the fault. FME Mate provides the root cause of the fault and the solution.



2. Board fault, prepare spare board in advance before going on site.

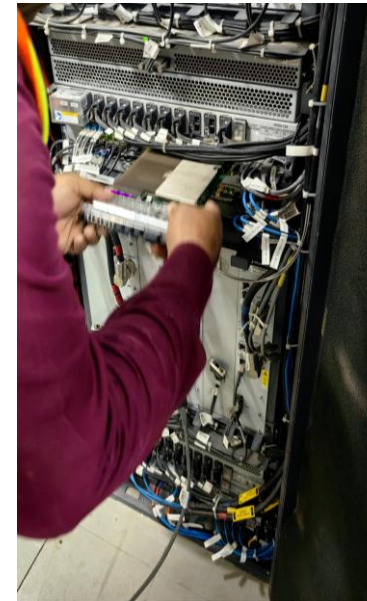
AS-IS: (28min)

1. Query alarm and board info(8min)
2. Analyze cause of the fault(10min)
3. Remote reset the board(10min)
4. First on-site check(GPS and Board)

AS-IS: (12min)

1. Root Cause Diagnosis(2min)
2. Remote reset the board(10min)

1. Replace the UBBP board(1-0-1). Confirm whether the alarm has been cleared and if there are any other alarms.

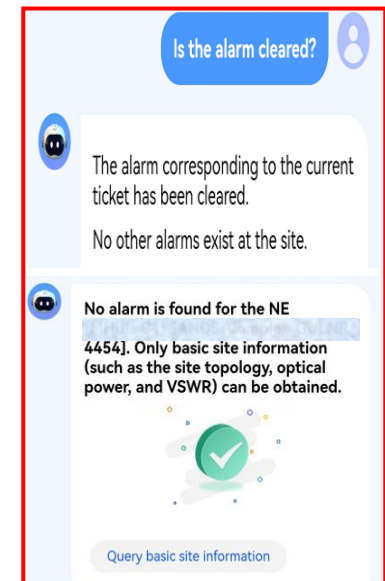


AS-IS: (45min)

1. Check GPS cable (10 min)
2. Check UMPT cable (5 min)
3. Remove and insert board(10 min)
4. Replace the board(20 min)

AS-IS: (30min)

1. Remove and insert board(10 min)
2. Replace the board (20 min)



Solution implementation

On-site instruction

Communications

RAN FMEMate

2026-04-18 15:43:31

The following tickets are to be handled.

NE Name: [redacted]

Alarm Name: BBU CPRI Interface Error

Location info.: Cabinet No.=0, Subrack No.=0, Slot No.=5, Port No.=2, Sub Port No.=0, Board Type=UBBP, Specific Problem=Receive No Signal

Occurred At: 2026-05-19 15:38:26

Suggested Questions

Help me analyze this ticket

How to solve this alarm?

Querying Other Sites

FAQs

Start typing...

All Skills

RAN FMEMate

2026-04-18 15:44:15

Help me analyze this ticket

Site Fronthaul Topology

Faulty links are displayed in red. Click to view details.

Faulty Port

Faulty NE Name Uplink Port Up

0-0-5-2 NL

Is the alarm cleared?

Any other alarm?

Querying Other Sites

FAQs

Start typing...

All Skills

RAN FMEMate

2026-04-18 15:46:15

Query the optical power

Ports with abnormal Rx optical power: 0

Port Status

Board Position	Wavelength (nm)
0-0-5-2	NULL
0-0-5-3	1310

Help me analyze this ticket

Querying Other Sites

FAQs

Start typing...

All Skills

RAN FMEMate

2026-04-18 15:47:30

Query the diagnosis result

The root causes are as follows:

Query MAE information, preliminary diagnosis result of current fault

Fault Type

Fronthaul Optical Path Abnormal

Root Cause

1. Power and environment - Power supply:AAU/RRU/RHUB power failure

Cabinet No.=0, Subrack No.=0, Slot No.=5, Port No.=2, RRU(Cabinet No.=0, Subrack No.=132, Slot No.=0)

2. Fronthaul link:Fronthaul

Is the alarm cleared?

Querying Other Sites

FAQs

Start typing...

All Skills

RAN FMEMate

2026-04-18 16:35:07

Is the alarm cleared?

The alarm corresponding to the current ticket has been cleared. No alarms exist at the site.

Port Status

Board Position	Wavelength (nm)
0-0-5-2	NULL
0-0-5-3	1310

Go to site information

Start typing...

All Skills

RAN FMEMate

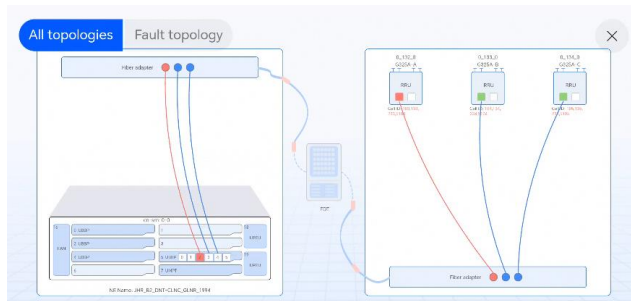
No alarm is found for the NE

Only basic site information (such as the site topology, optical power, and VSWR) can be obtained.

Go to site information

Personnel guide Copilot through natural language to query the optimal fault troubleshooting checklist.

Personnel use natural language to guide Copilot in automatically verifying whether the fault has been resolved, whether the alarm has been cleared



bmcc Helix ITSM Dashboard Console Calendar Smart Recorder Create New Helix Dashboards More

Incidents 100%

RAN-4G-JHR_B2-DNT-CLNC_GLNR_1994:Equipment Alarm:BBU CPRI Interface Error

Created: 04/18/2026 1:05:02 PM Status: Resolved

Updated: 04/20/2026 11:03:25 AM Status reason: No Further Action Required

Resolution note: Alarm cleared after health check completed

Related DWP request: 212650

Customer: Austin AutoTT

Incident type: Infrastructure Event

Reported date: 04/18/2026 1:05:02 PM

Urgency: 4-Low

Impact: 4-Minor/Localized

Reported source: Other

Classification: None set

Service: CI

None set

OSIS

Activity

New note

Start typing to add a note. @ search people or assets.

Records from 1 to 5 of 5

Status marked: "Resolved" by Austin Sequences with reason "No Further Action Required"

04/20/2026 11:03:41 AM

Status marked: "In Progress" by Yang Tiesheng

04/18/2026 1:05:02 PM

Austin AutoTT added a note

QWS ticket PKC-03260418-00000348 has closed

04/18/2026 7:14:03 PM

Austin AutoTT added a note

Alarm 0324-BBU CPRI Interface Error-2026-04-18 1:05:02 is correlated with the...

QWS ticket PKC-03260418-00000348

Fill out the trouble ticket record

Solution implementation

On-site instruction

Equipment

The figure displays a series of eight screenshots from a mobile application interface, showing a user's interaction with a chatbot named "RAN FME Mate". The interface includes a chat window with a blue header, a search bar, and a list of tickets. The chatbot's responses are in blue bubbles, and the user's inputs are in white bubbles. The chatbot uses icons to represent different types of information: a ticket icon for tickets, a site icon for site information, a power icon for power queries, a diagnosis icon for diagnosis results, an alarm icon for alarm clearing status, and a site information icon for site information.

Screenshot 1: The chatbot displays a list of tickets. The user asks, "The following tickets are to be handled." The chatbot responds with a list of tickets, including "Cabinet No.=0, Subrack No.=0, Slot No.=0, Board Type=UBBP, Current Board Temperature (C/F)=90/194, Specific Problem=Temperature too High".

Screenshot 2: The user asks, "Help me analyze this ticket". The chatbot responds with a diagram of the "Site Fronthaul Topology".

Screenshot 3: The user asks, "Query the optical power". The chatbot displays a table of "Ports with abnormal Rx optical power: 1" and "Port Status".

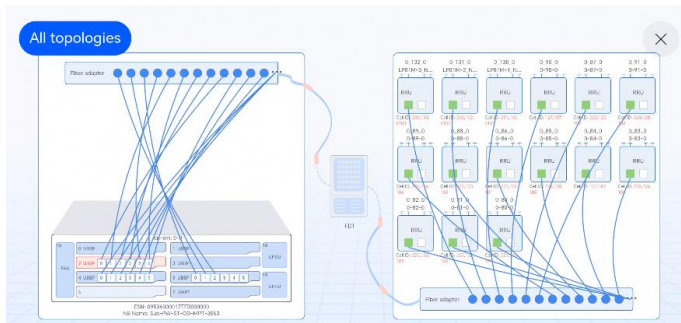
Screenshot 4: The user asks, "Query the diagnosis result". The chatbot displays the "root causes are as follows: Query MAE information, preliminary diagnosis result of current fault".

Screenshot 5: The user asks, "Is the alarm cleared?". The chatbot responds with "The alarm corresponding to the current ticket has been cleared. No alarms exist at the site."

Screenshot 6: The user asks, "Go to site information". The chatbot responds with "No alarm is found for the NE [Sub-site information (such as the site topology, optical power, and VSWR) can be obtained."

Screenshot 7: The user asks, "Is the alarm cleared?". The chatbot responds with "The alarm corresponding to the current ticket has been cleared. No alarms exist at the site."

Screenshot 8: The user asks, "Go to site information". The chatbot responds with "No alarm is found for the NE [Sub-site information (such as the site topology, optical power, and VSWR) can be obtained."



The screenshot displays the BMC Helix console interface. At the top, navigation tabs include 'Incidents', 'Calendar', 'Smart Recorder', 'Create New', 'Helix Dashboards', and 'More'. The main header shows the incident ID 'INC0277423' with a green status indicator.

RAN-4G-SW-Pub-ST-CO-MPT-3053:Environmental Alarm:Board Temperature Unacceptable

Created	05/05/2026 11:11:20 AM	Status	Resolved -	Major Incident	No
Updated	05/13/2026 5:13:23 PM	Status reason	No Further Action Required		
		Resolution note	Alarm cleared and now the link is stable.		

A timeline bar shows the incident's progress from 'Unacknowledged' to 'Acknowledged' at 05/13/2026 5:15:11 PM.

Related DMP request: 224140

Customer: Austin AutoTT
Contact: watin.auto@watin.com

Incident type	Reported date	Operational category
Infrastructure Event	05/05/2026 11:11:20 AM	RADIO > Others > Others
Reported source	Urgency	Product category
Other	Low	Miscellaneous > Technical Service > Application Service
Description	Impact	Resolution category
Name set	4 Minors/Located	Alarm Cleared > Alarm Cleared > Alarm Cleared
		Resolution product category
		Miscellaneous > Technical Service > Application Service

Service	CI
Name set	None set

At the bottom left, there are links for 'View Details' and 'Add Comment'.

The right sidebar contains sections for 'Activity' (with a search bar), 'Resources', and 'Records' (showing 1 to 6 of 6 records).

Activity Log:

- 05/13/2026 5:15:11 PM: Status marked "Resolved" by aldundak ACPHufen with reason "No Further Action Required"
- 05/13/2026 5:15:11 PM: Auto AlertTT added a note: CWS ticket INC-30260505-00000335 has Closed
- 05/05/2026 7:22:04 PM: Auto AlertTT added a note: Alarm 26104_Board temperature unacceptable,2026-05-05 08:43:55 is correlated with the CWS ticket INC-30260505-00000335
- 05/05/2026 11:46:55 AM: Status marked "In Progress" by tong Tienheng

An 'Activate Windows' watermark is visible in the bottom right corner.

Solution implementation

On-site instruction

Environmental

The screenshot displays the RAN FMEcate application interface. At the top, there's a header bar with a back arrow icon on the left and the title "RAN FMEcate" in bold black font. Below the header, the word "alarm?" is displayed in a light blue box. The main content area shows a timestamp "2026-04-19 15:53:07". A red circular notification badge with the number "5" is positioned next to a bold heading "The following tickets are to be handled.". Below this heading, four fields are listed: "NE Name:" followed by a blurred blue box; "Alarm Name:" followed by the text "RF Unit DC Input Power Failure"; "Location info : Cabinet No.=0, Subrack No.=100, Slot No.=0, Board Type=AirU"; and "Occurred At:" followed by the timestamp "2026-04-18 17:36:01". Underneath these fields is a section titled "Suggested Questions" in bold. This section contains two blue buttons: "Help me analyze this ticket" and "How to solve this alarm?". At the bottom of the screen, there is a search bar with the placeholder text "Start typing...". Below the search bar is a row of three icons: a star icon labeled "Querying Other Sites", a plus icon labeled "FAQs", and a trash can icon. At the very bottom, there is a blue button labeled "All Skills" with a downward arrow, and a blue circular button with a white upward arrow.


RAN FME Mate

2026-04-19 15:15:06

Query the diagnosis result

2026-04-19 15:15:11

The root causes are as follows:
 Query MAE information,
 preliminary diagnosis result of
 current fault
Fault Type
 Fronthaul Power Supply Failure
Root Cause
 1. Power and environment -
 Power supply: AAU/RRU/RH-UB
 power failure

No.=0, Subrack No.=0, Slot No.=0,
 Port No.=0, RRU/Cabinet No.=0,

☆ is the alarm cleared!

☆ Querying Other Sites FAQs

Start typing...

All Skills

<

RAN FMEMate

preliminary diagnosis result of current fault

Fault Type

Fronthaul Power Supply Failure

Root Cause

1. Power and environment –
Power supply:AAU/RRU/RHUB
power failure

No.=0, Subrack No.=0, Slot No.=0,
Port No.=0, RRU/Cabinet No.=0,
Subrack No.=100, Slot No.=0)

Handling Suggestion

1. For root cause 1: 1. Check whether the mains supply is interrupted. If yes, consider dispatching a diesel generator. 2. If the mains supply is not interrupted, check the power supply circuit onsite.

☆ Is the alarm cleared?

☆ Querying Other Sites

★ FAQs

Start typing...

All Skills

↑

A screenshot of a WhatsApp chat conversation. At the top, there is a header bar with a back arrow icon and the text "RAN FMEMate". The chat history shows a message from the contact "RAN FMEMate" (profile picture of a person with glasses) dated "2026-04-19 16:34:07" with the text "Is the alarm cleared?". Below this, a message from the user (profile picture of a person with glasses) dated "2026-04-19 16:34:16" contains the text "The alarm corresponding to the current ticket has been cleared. No alarms exist at the site. Port Status" followed by a screenshot of a web page. The web page shows a table with two columns: "Board Position" and "Wavelength (nm)". The first row has "0-80-0-0" and "850". The second row has "0-0-0-0" and "NULL". Below the table, there are two links: "Back to Ticket" and "Querying Other Sites". At the bottom of the chat, there is a text input field with the placeholder "Start typing..." and a button labeled "All Skills".

< RAN FMEMate

No alarm is found for the NE

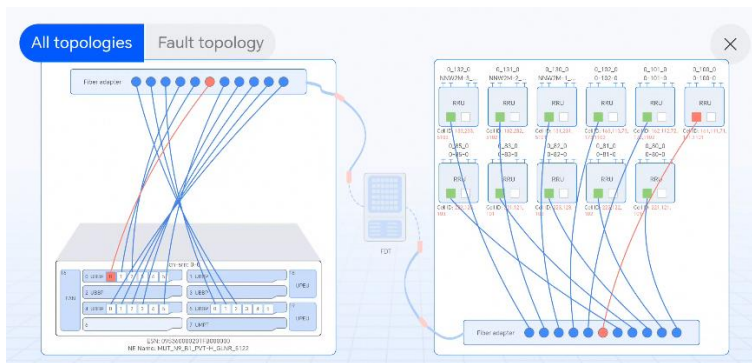
Only basic site information (such as the site topology, optical power, and VSWR) can be obtained.



[Go to site information](#)

↑

↓



The screenshot displays the BMC Helix ITSM console interface. At the top, navigation tabs include Dashboard, Console, Calendar, Smart Recorder, Create New, Helix Dashboards, and More. The main header shows the incident ID INC5000151 and its status as Resolved.

RAN-SG-MUT_N9_B1_PVT-H_GLN_R_5122:Equipment Alarm:RF Unit DC Input Power Failure

Created:	04/16/2024 9:46:19 PM	Status:	Resolved	Major Incident:	No
Updated:	04/20/2024 11:05:23 AM	Status reason:	No Further Action Required		
		Resolution note:	Alarm cleared after health check completed		

A progress bar at the bottom indicates the incident lifecycle stages: Reported, In Progress, and Resolved (highlighted).

Related CMDB request: 212807

Customer: Austin AutoTT
Contact: austin.auto@kayash.com

Incident type	Reported date	Operational category
Infrastructure Event	04/16/2024 9:46:19 PM	BAD0 > Others > Others
Reported source: Other	Urgency: 4 Low	Product category: Miscellaneous > Technical Service > Application Service
Description: None set	Impact: 4 Minor/Localized	Resolution category: Alarm Cleared > Alarm Cleared > Alarm Cleared
Service: None set		Resolution product category: Miscellaneous > Technical Service > Application Service

Activity Log:

- 04/20/2024 11:00:41 AM: Status marked "Resolved" by **julin.sequerra** with reason "No Further Action Required"
- 04/20/2024 11:00:41 AM: **Austin AutoTT** added a note: CMDB ticket INC-20240418-00000524 has Closed
- 04/16/2024 15:04:40: **Austin AutoTT** added a note: Alarm 38564_RF Unit DC Input Power Failure_2024-04-16 18:46:25 is correlated with the CMDB ticket INC-20240418-00000524
- 04/16/2024 04:26 PM: New INC5000151 by **Austin AutoTT**

Buttons for "Activate Windows" and "Go to Settings to activate Windows" are visible at the bottom right.

fill out the trouble ticket record

