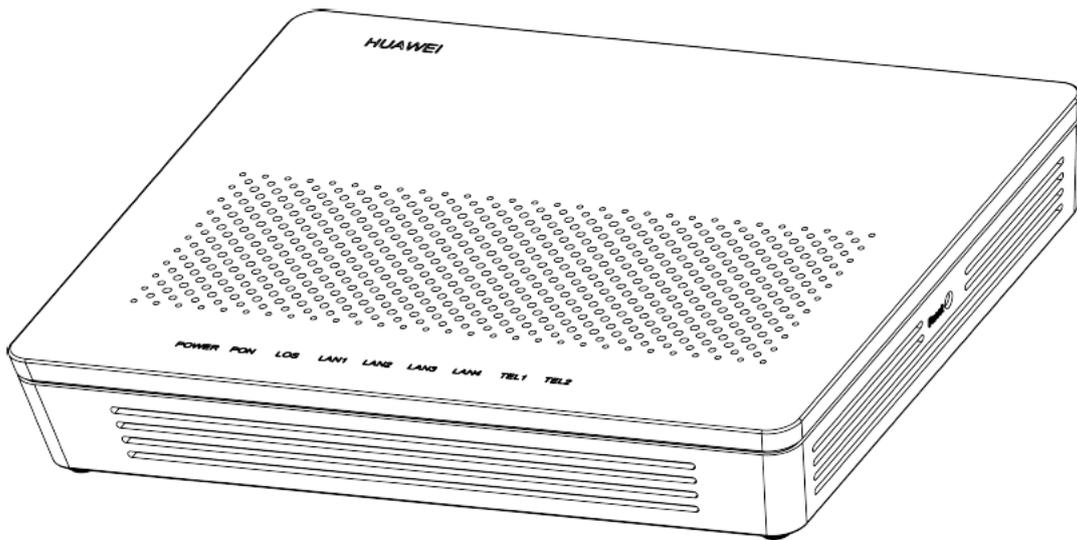


Ultrafast Fibre Limited

UFB Self Diagnostic Service



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1. Objective

The UFB Self Diagnostic Service (SDS) can be used to obtain a status snapshot of an ONT which is connected to the Ultrafast Fibre (UFF) network. The objective of this service is to provide Retail Service Providers (RSPs) with the ability to quickly self-diagnose any service issues so that they can be resolved as quickly as possible.

When the UFB SDS receives a request it scans the configuration of the ONT and network to report on the configuration, thereby eliminating any inconsistency with the logical inventory systems.

2. Self Diagnostic service outputs

The SDS provides a significant amount of data for RSP fault agents to utilise in troubleshooting a GPON service with UFF. Detailed definitions of the outputs can be found in the glossary.

Through the standard query, the following data will be provided in the output:

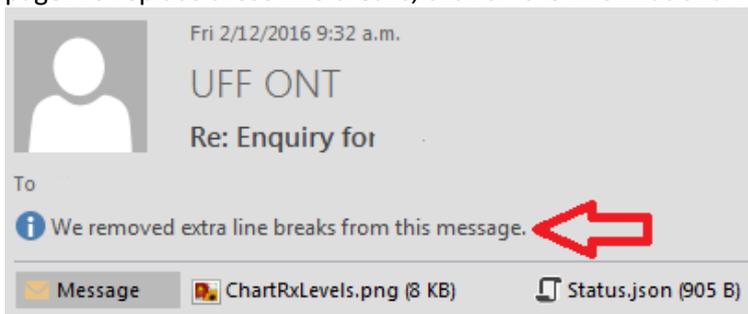
1. ONT status including date and testing results of original commissioning
2. Port Status
3. MAC address tracing table
4. HOP tracing table
5. Service configuration status including profile, port configured and PIID
6. Voice profile
7. ONT serial number, software version and model
8. Query history log for service
9. JSON attachment outlining a subset of the results that are within the email, to facilitate some automated parsing functionality at the recipient end
10. Reference string returned in body of email

A custom query can be made to monitor upstream and downstream traffic, for a nominated period of time – between one and 24 hours. An acknowledgement will be provided confirming the monitoring is in place, and the final output will be provided on completion of the nominated monitoring period. This output will provide a graph of traffic to assist in troubleshooting.

A further custom query also can be made to provide a full history of enquiry results requested against a specific service.

If configured, the SDS tool will automatically send a copy of all outputs to a nominated generic address as well as the address of the original query. If you would like to configure this for your service provider, please contact UFF at assurance@ultrafast.co.nz

The results of the SDS tool is provided in a plain text email format. In some email clients such as Microsoft Outlook, the email is automatically reformatted to remove line breaks which can distort the layout on the page. To replace these line breaks, click on the informational message shown in the figure below.



3. Procedure

Ultrafast Fibre uses an email interface to make the SDS easy to use from any device. Follow the appropriate steps below to receive the required query output.

a) Standard SDS query

1. Open a new email in your email client
2. Type UFFONT@ultrafast.co.nz in the 'to' field
3. Type the product instance id (PIID) in the 'subject' field
4. If you have a ticket reference you would like returned with the output, you will need to include the reference in the body of your query, e.g. *ref:_TT-20161116-000045:ref*. NB: It will need to be between an opening *ref:* and terminating *:ref* for the SDS to recognise that this reference needs to be returned as a part of the output.

You will receive the email output within minutes about the ONT associated with the PIID provided. There are 6 primary outputs:

1. Service is cancelled: *"There was a problem finding the equipment on the network from the order number provided. This service has been relinquished."*
2. Service is held by another service provider: *"Product instance ID XXX is not formatted correctly or belongs to another ISP."*
3. Invalid email address – your email domain has not been authorised to query UFF Bitstream services: *"The email address abc@xxx.com is not a recognised email address. (Subject = UFFXXXHM1234567)."*
4. Installation of service is not yet completed: *"The ONT has been configured but not yet active on the network."*
5. Service is installed and provisioned with Broadband and voice services.
6. Service is installed and provisioned with Broadband services.

Outputs four, five, and six will provide you with information on the status of the ONT, ports including identification of active Ethernet and voice ports, MAC address tracing, service packages including the provisioned speed, VAS profile, ONT serial number, and software version. For further detail on the information provided in the outputs, please refer to the glossary.

In the event a query is made against an ONT with multiple services, the output will show your services, but will mask identifying details of the services not associated with the requesting RSP.

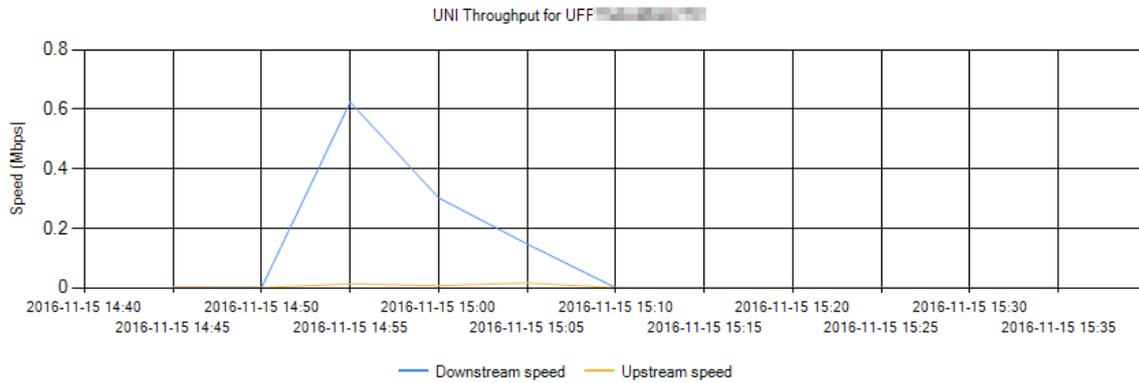
If you have included a reference in the body of your email, this will be located under the query history section of the output.

b) Custom traffic monitoring query

1. Open a new email in your email client
2. Type UFFONT@ultrafast.co.nz in the 'to' field
3. Type the product instance id (PIID) in the 'subject' field, followed by a space, then '-t -e -p [number from 1-24]'.
The number noted after p above will set the period for which the port will be monitored and is specified in integer hours.

In the event a query is made against an ONT with multiple services, the output will show the traffic on the nominated service only.

On completion of the nominated monitoring period, the requestor will receive an email with the traffic attached as a graph, example below:



c) Custom history query

1. Open a new email in your email client
2. Type UFFONT@ultrafast.co.nz in the 'to' field
3. Type the product instance id (PIID) in the 'subject' field, followed by a space, then '-h'

In the event a query is made against an ONT with multiple services, the output will provide history of the nominated service only.

The requestor will receive one output, with the previous outputs attached and viewable:

UFF ONT

Re: Enquiry for UFF [redacted]

Message	Attachment	Attachment
	UFF [redacted]_18-08-2016_1-26-24_p.m..eml (38 KB)	UFF [redacted]_26-08-2016_11-03-07_a.m..eml (62 KB)
	UFF [redacted]_12-09-2016_10-35-07_a.m..eml (39 KB)	UFF [redacted]_15-11-2016_1-10-17_p.m..eml (42 KB)
	UFF [redacted]_15-11-2016_1-11-33_p.m..eml (42 KB)	UFF [redacted]_15-11-2016_1-12-35_p.m..eml (43 KB)
	UFF [redacted]_15-11-2016_3-40-03_p.m..eml (26 KB)	UFF [redacted]_16-11-2016_3-16-00_p.m..eml (43 KB)

Results history for Product Instance Identifier (PIID) UFF [redacted]

NOTE: The information contained in this report is for test purposes only.

This report is a supplementary service which Ultrafast Fibre Limited (UFF) provides free-of-charge. Accordingly:

- (i) the results recording this report may change without notice;
- (ii) the terms of the UFF Reference Offer do not apply to this report;
- (iii) UFF makes no guarantees, warranties or representations (express or implied) as to the completeness, accuracy or reliability of any information contained in this report; and
- (iv) UFF is not liable for providing any support services in addition to this report.

4. Common non-UFF faults logged with UFF and how the SDS tool can help

a) RGW patched into wrong ETH port

If the end-user reports no service, but RGW is fully powered up, the RSP is to review the results and confirm what port the service package is associated with:

OVC Status	OVC Num	Port Num	Service Package	SVLAN	CVLAN	CE-VLAN	DHCP82	PPPoE IA	Remote ID	Tagging Seen MACs
0	ETH 1	Bitstream 2 Ultra 100/20.2.5/2.5				10	Enable	Enable	UFF	---
V	POTS 1						Enable	Enable	UFF	---

Note:
 - Only the first 5 MAC addresses are shown for each OVC.
 - Only the CE-VLAN is checked for MAC addresses and there may be addresses on other VLANs.

If a MAC address is not listed against the applicable port, the RSP will need to request the end-user plug the cable between the RGW and the ONT into the correct port (in this case 1), and initiate an internet session. This may require several minutes to allow for services to stand up again.

Alternatively, if the RGW is plugged in (the status is active in the diagram below), then there may be a VLAN mismatch between the RGW and the ONT. Typically the RGW has been set to pass untagged traffic which will not be accepted by the ONT if the ONT is setup for a tagged interface port.

Port Num	Status	Default VLAN	Duplex	Speed	Downstream (kps)	Upstream (kps)
1	Active	1	AUTO-FULL	AUTO-1000	00	00
2	Activating	1	AUTO	AUTO	00	00
3	Activating	1	AUTO	AUTO	00	00
4	Activating	1	AUTO	AUTO	00	00

Note:
 - Default VLAN refers to the VLAN assigned to untagged traffic and is not always the CE-VLAN
 - Default VLAN may be translated to a different CVLAN for presentation to the ISP

b) ONT Powered off

If the end-user reports no service but states RGW is on, the RSP is to review the query results and confirm the run status:

ONT Status: Active (The ONT has been configured on the network)
 ONT Run Status: Up
 ONT Admin Status: Up
 ONT Last Up Time: 10/09/2016 11:06:22 a.m. (NZ Time) ONT Last Down Time: 10/09/2016 11:01:30 a.m. (NZ Time)
 ONT Last Down Cause: Dying-gasp (The power to the ONT was turned off.)
 ONT GPON RX optical power: -15.65 dBm (The power should be greater than -23.5 dBm.)
 ONT GPON TX optical power: 1.86dBm
 ONT Activated on: 17/08/2016 12:10:38 p.m.
 ONT GPON RX optical power (commissioning): -15.78 dBm ONT GPON TX optical power (commissioning): 2dBm

If the ONT run status is 'Down', check the last down cause. Should this be 'Dying-gasp', the end-user will need to verify that the power cord is plugged into the ONT and the wall, the power point at the wall is turned on, and the ONT itself is powered on. Once all points of failure for power have been verified, end-

user is to initiate an internet session. This may require several minutes to allow for services to stand up again.

c) Speed configuration mismatch

If the end-user states they are experiencing poor speeds, RSP is to review the service package noted in the applicable configuration application, and in the query results:

OVC Status

OVC Num	Port Num	Service Package
1	ETH 1	Bitstream 2 Ultra 100/20 2.5/2.5
V	POTS 1	

If there is a mismatch, the RSP will need to verify the service package ordered originally. If the incorrect service package was ordered, the RSP will be required to place a change order with UFF to change the service to the correct speed profile. If the correct speed profile was ordered, the RSP will need to log a fault with UFF to rectify.

d) Voice not working: patched to wrong POTS port or internal house wiring

If the end-user reports no service, but phone is fully powered up, the RSP is to review the query results and confirm what port voice is associated with:

OVC Status

OVC Num	Port Num	Service Package
0	ETH 1	Bitstream 2 Ultra 100/20 2.5/2.5
V	POTS 1	

Note:

- Only the first 5 MAC addresses are shown for each OVC.
- Only the CE-VLAN is checked for MAC addresses and there may be addresses on other VLANs.

POTS Port Status

Port Num	Connection Status	Username	Password
1	OFF-HOOK	[REDACTED]	[REDACTED]
2	DEACTIVED	--	

VoIP IP Address = [REDACTED]

VAS Profile [REDACTED]

The end-user will need to confirm that their handset or wiring integration is plugged into the applicable port (in this case POTS 1), and initiate a call session. This may require several minutes to allow for services to stand up again. Should this not work via the wiring integration cable, the end-user will need to plug the handset directly into the correct voice port; should this resolve the fault state this will confirm the fault state is due to the copper wiring in the house. UFF does not own fault repair for copper wiring, this will need to be repaired by the RSP’s own copper contractors.

In the example below, the checks that should be made are:

- 1) That there is a VoIP address. If there is no IP address, then the problem may be in the VLAN configuration or the RSP's DHCP server has not authenticated the user
- 2) The connection status should be 'IDLE' or 'OFF-HOOK' to show that it is ready to receive a call. If it shows 'REGISTERING' then the username and/or password may be incorrect.

POTS Port Status

Port Num	Connection Status	Username	Password
1	OFF-HOOK		
2	DEACTIVED		

VoIP IP Address = [REDACTED]

VAS Profile: [REDACTED]

e) Voice service is in conflict with end-user home alarm system

Each RSP will have a small range of VAS profiles to customise voice services according to the end-users needs. If the end-user reports beeping tones on the line during calls, they may have a monitored security or medical alarm.

POTS Port Status

Port Num	Connection Status	Username	Password
1	OFF-HOOK		
2	DEACTIVED		

VoIP IP Address = [REDACTED]

VAS Profile: [REDACTED]

The RSP will need to review the VAS profile that is noted the query response and ensure that the profile listed is appropriate to the end-user's needs. If the incorrect VAS profile was ordered, the RSP will be required to place a change order with UFF to change this to the correct VAS profile. If the correct profile was ordered, the RSP will need to log a fault with UFF to rectify.

f) UNI tagging (VLAN tagging) mismatch

If there is mismatch in UNI tag configuration, you may find that the ONT is registering traffic, but the end user is unable to use their broadband service. By default, UFF will configure GPON service with UNI tagging enabled, as VLAN 10. If the RGW in use does not have the corresponding tag, it will not recognise the tag and allow the traffic through. The tagging configuration will can be found in the ONT MAC address table, and in the OVC status table highlighted below:

ONT MAC Address Table

MAC Address	Port	Port num	CE-VLAN	Visible on OLT GPON Port
[REDACTED] ETH	1	10		True

OVC Status						
OVC Num	Port Num	Service Package		SVLAN	CVLAN	CE-VLAN
0	ETH 1	Bitstream 2 Ultra 100/20 2.5/2.5		15	105	10
V	POTS 1		15	78	13	Enable

UNI tagging mismatch can be identified by reviewing and matching the CE-VLAN seen via the ONT MAC address table against the CE-VLAN configured on the service in the OVS status table.

5. Faults

In the event you experience delays or failures in the receipt of SDS outputs, please log a job with the UFF NOC: 0800 833 622 option 3 or faults@ultrafast.co.nz outlining the nature of the issue experienced, and repair and restoration of the SDS will be initiated.

In the event a fault state is still under repair, you will receive an automated response from the service indicating this when SDS is queried.

6. Glossary

a) General terms

RGW: residential gateway, modem or router

PIID: product instance ID e.g. UFFXXXXX1234567

RSP: retail service provider

ONT: optical network terminal

LOSI: loss of signal input

VAS: value added service, generally referring to a voice profile.

HOP: Handover port

b) ONT status

Active: ONT has been configured on the Network

Activating: the ONT has not been configured or is not yet active on Network

Run status: UP the ONT is active and communicating with the UFF Network

Run Status: DOWN the ONT is not reachable by the UFF network

Last up time date and time stamp of when the ONT last came back on line

Last down time date and time stamp of when the ONT most recently went off line.

Last down cause: Reset the end-user has reset the ONT

Last down cause: Dying gasp power supply was cut off to the ONT.

Last down cause: LOSI The fibre to the ONT was broken or unplugged

Note that if network status changes while off line, the ONT will not be able to tell you this, for example if the user powers it off then a fibre breaks, the tool will only know that there was a power outage.

c) Port status terms

Activating: nothing is plugged into this port

Active: a device has been plugged into this port and the port is connected.

Auto the port is configured to automatically default the connection settings.

Auto – full the port is configured to automatically default the connection settings and has negotiated full duplex

FULL – the port has been forced to Full duplex

Auto – Half the port is configured to automatically default the connection settings and has negotiated half duplex

Auto - 1000 the port is configured to automatically default the connection settings and has negotiated a 1 Gbps connection

Auto - 100 the port is configured to automatically default the connection settings and has negotiated a 100 Mbps connection

d) OVC status terms

This will list services configured over this ONT including VOF

OVC num this is a temporary number to aid the layout of the results. It may change with subsequent diagnostic requests. VOF will be denoted by a “v” rather than a number.

ETH Ethernet port type. There are four Ethernet ports

POTS (Plain Old Telephone Service) refers to the voice port, can be 1 or 2.

Service package speed the service is configured under and should match what was ordered. If this does not match what is provisioned in the applicable RSP configuration application, there will be speed issues.

DHCP 82 indicates that DHCP option 82 insertion has been enabled to provide the Remote ID and Circuit ID within the DHCP request.

PPOe IA indicates that PPPOE Intermediate Agent insertion has been enabled to provide the Remote ID and Circuit ID within the PPOE request.

Remote ID this refers to the PIID or UFF service ID. If there are multiple OVC lines listed, please double check this as it will confirm what ETH port the RGW should be plugged in to.

CVLAN should match the [CVLAN] in the applicable RSP configuration application

CE VLAN should match the [CE VLAN] in applicable RSP configuration application

Tagging Seen Macs this will show the MAC address of any RGW's currently connected to that ETH port. If you cannot see a MAC address, verify with the end-user the RGW is patched into the correct ETH port and has the correct VLAN tagging.

a) POTS port status terms

No configuration detected no voice services have been configured on this ONT. VOF will not work.

OFF HOOK voice port is configured and idle, ready for call.

DEACTIVED voice port is not active, and any phones or RGW plugged in will not work.

VAS profile ONT setting for Voice port. Where customer does not have VOF, the profile will read 'HG8240_Generic.' RSP's may have multiple VAS profiles and will need to consult internally to ensure the profile noted here matches the profile required by end users.

7. Switch Parameters explained

The SDS accepts a number of optional switches after the PIID to obtain additional information about that PIID. An example of the email subject line with these switches is:

UFFXXXXX1234567 -t -e -p12

The tables below describe the use of these switches.

First level switch	Action
(no switch)	A snapshot of the configuration is provided
-t	Additional test information is required
-h	The enquiry history is to be provided as attachments to the responding email. No analysis of the current state of the ONT is undertaken Previous requests for the history of enquiries is not included in this request

Second level switch	Mandatory first level switch	Action
-v	-t	The voice service associated with this PIID is to be tested
-e	-t	The data service associated with this PIID is to be tested. The UNI port that will be used is the port defined in UFF's configuration database. No discovery of the appropriate UNI port from reverse engineering the current configuration is undertaken.

Third level switch	Mandatory second level switch	Action
-p	-e	The throughput of the data service will be sampled every five minutes. The switch must have an integer suffix which is the number of hours to sample for. Valid values are from 1 to 24 e.g. -p12