



XSRACK

Switch SHDSL

USER GUIDE

The product family XSRACK is designed and manufactured by

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DECLARATION OF CONFORMITY

The manufacturer, ETIC Telecom – 13 chemin du vieux chêne – 38240 Meylan – France, Hereby declares under sole responsibility that the listed products conform to

- the Electromagnetic Compatibility (EMC) Directive 2014/30/UE ,
- the Low Voltage Directive (LVD) 2014/35/UE ,
- the Restriction of the use of certain Hazardous Substances (RoHS) Directive 2011/65/UE.

Type of product: SHDSL switch

Models:

XSRACK-1260

The harmonized standards to which these products comply are:

Standard	Title
EN 61000-6-2 2006	Immunity: EN61000-4-2 Electrostatic Discharge EN61000-4-3 RF Radiated Immunity EN61000-4-4 EFT/Burst Immunity EN61000-4-5 Surge Immunity EN61000-4-6 RF Conducted Immunity EN61000-4-8 Power Frequency Magnetic Field Immunity
EN 61000-6-4 2007 A1/2011	Emission: EN55022 Radiated and conducted emission
EN 60950-1/A2 2014	Safety and Health

Date : 16th August 2021

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OVERVIEW	7
1 Purpose of this manual	7
2 Specifications.....	7
3 EMC & Environment compliances.....	9
4 Product overview	11
INSTALLATION	13
1 Description	13
1.1 Dimensions	13
1.2 Front panel	13
1.3 Rear panel	13
1.4 Connectors.....	14
1.5 Push-buttons.....	14
1.6 LED indicators.....	15
2 Safety instructions	16
3 Installation dans une baie informatique	16
4 Cooling.....	16
5 Isolation and earthing	16
6 Preparing and checking the line.....	17
6.1 Type of cable	17
6.2 Crosstalk interference	17
6.3 Shield earthing	17
6.4 Protecting the SHDSL switch from lightning	18
7 Connecting the XSRACK to the line	18
7.1 General precautions	18
7.2 Point to point connection using two, three or four twisted pairs.....	18
PREPARING THE SETUP	19
1 Connecting a PC for configuration	19
1.1 Overview.....	19
1.2 First configuration	20
1.3 Changing the configuration later	20
2 Temporary return to the factory settings	21
3 Restoring the factory settings.....	21
4 Protecting the access to the administration server.....	22
5 Configuration steps	22
ANNEX 1 : SHDSL data rate versus distance	23

OVERVIEW

1 Purpose of this manual

The present user guide describes the features and the installation of the SHDSL switch XSRACK-1260.

In the rest of the document the term " XSRACK " is also used to designate the product.

2 Specifications

General characteristics	
Dimensions	With feet: 50 X 435 X 280 mm (h, w, d) W/O feet: 44 X 435 X 280 mm (h, w, d)
Weight	3.5 kg
Casing	Metallic IP20 – IEC60529 19 inches 1U rack
Temperature	Non-operating: - 40°/ + 85°C Operating : - 20°/ + 55°C
Humidity	5 à 95 % relative (non-condensing)
Power supply	110 à 230 VAC Internal dual power supply
Consumption	30 W
MTBF	150 600
Hazardous substances	2011/65/UE (RoHS) REACH

SHDSL	
Number of ports	12
Modulation	ITU-T G.991.2, 802.3ah : 2BaseTL (EFM)
Data rate	192 kb/s to 15,2 Mb/s
Emission power	Annex A : 13.5 dBm (22 mW) Annex B : 14.5 dBm (28 mW)
Voltage of the emitted signal	6 to 8 V peak to peak on 135 Ohms
Signal spectrum	< 3 MHz à 15 Mb/s
Isolation	1500 V
Connection time	45 s typical
Plug & play	Auto-negotiation STU-C / STU-R Automatic adaptation of the data rate
Latency	Frame transmission delay from one Ethernet port of an XSRACK to the Ethernet port of an XSLAN through an SHDSL link : 2 ms at 5.6 Mb/s

PRESENTATION

ETHERNET & IP	
Ethernet	6 ports - 10/100 Mb/s Half/Full duplex Auto MDI/MDIX
Switch	Store and forward - 1024 MAC addresses
Redundancy	RSTP - IEEE 802.1D / 802.1Q
VLAN	IEEE 802.1Q
IP address	IPv4 et IPv6
IP router	Multicast and broadcast filtering Static routes RIP V2
QOS	RFC 2474, 2475, 2597, 2598 « Differentiated services » Traffic prioritization and bandwidth reservation

Misc.	
SNMP	Supported MIBs: RFC1213-MIB (MIB-2) HDSL2-SHDSL-LINE-MIB HOST-RESOURCES-MIB / IF-MIB IP-MIB BRIDGE-MIB RSTP-MIB Traps SNMP
Date and time	NTP client and server
Configuration	Web serveur
Log	Log with timestamp of the last 300 events Syslog
Management	Save and restore configurations Reset product to return to factory configuration

3 EMC & Environment compliances

EMC Immunity, EN61000-6-2			
Norme	critère	Port	Level pass
EN61000-4-2 ESD	B	Enclosure	+/-4kv contact +/-8kv air discharge
EN61000-4-3 Radiated	A	Enclosure	10V/M AM @ 1khz 80Mhz to 3Ghz
EN61000-4-4 Burst	B	SHDSL	+/- 2kv
		Power supply	+/- 2kv
		Ethernet	+/- 2kv
EN61000-4-5 Surge	B	SHDSL	+/- 5kv common mode (Normal and Telecom surge)
	B	Power supply	+/- 0,5kV common mode
			+/- 0,5kV differential mode
		Ethernet	+/- 4kv direct shield coupling
EN61000-4-6 RF conducted	A	SHDSL	10VAM 80% 1khz, 150khz to 80Mhz
		Power supply	
		Ethernet	
EN61000-4-8 Magnetic	A	Enclosure	30 A/M at 50hz/60hz
EN61000-4-18 Damped wave	A	Power supply	+/- 0,5kV differential
	B		+/- 1kV common mode
	A	Ethernet	+/- 1kV common mode
	B	SHDSL	+/- 1kV common mode

EMC Immunity, ITU -T-K21			
Norme	Critère	Port	K44 Test N°
Lightning voltage, special test protector	A	SHDSL	2.1.2a +/- 5kV transverse mode (Basic level)
			2.1.2b +/- 5kV port to earth (Basic level)

EMC Emissions, EN61000-6-4		
Emission test	Port	Limits
conducted Disturbance	Power supply	EN55032, Class A: 150khz to 30Mhz
	SHDSL	
	Ethernet	
Radiated emission	Enclosure	EN55032, Class A: 30Mhz to 1Ghz

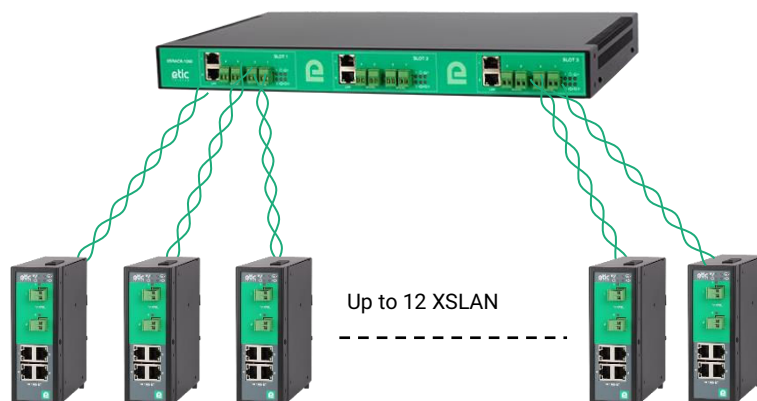
PRESENTATION

Climatic		
Standard	Testy	Level
EN 60068-2-1 Cold	Ab	-40 °C - 16 hours – Non-operating - TBD
	Ad	-20 °C - 16 hours – Operating - TBD
EN 60068-2-2 Dry heat	Bb	+85 °C - 16 hours – Non-operating - TBD
	Bd	+55 °C - 16 hours – Operating - TBD
EN 60068-2-14 Change of temperature	Na	-25 °C to +70 °C – Non-operating - TBD 5 cycles of 2 hours
	Nb	-20 °C to +55 °C – Operating - TBD 3 °K/mn - 5 cycles of 2 hours
EN 60068-2-30 Damp heat	Db Variante 2	+25 °C à 55 °C – Operating - TBD 2 cycles

4 Product overview

The XSRACK is a 19-inch, 1U rack-mount industrial Ethernet switch that provides 12 SHDSL ports to extend Ethernet transmission over several kilometers using any existing copper pair.

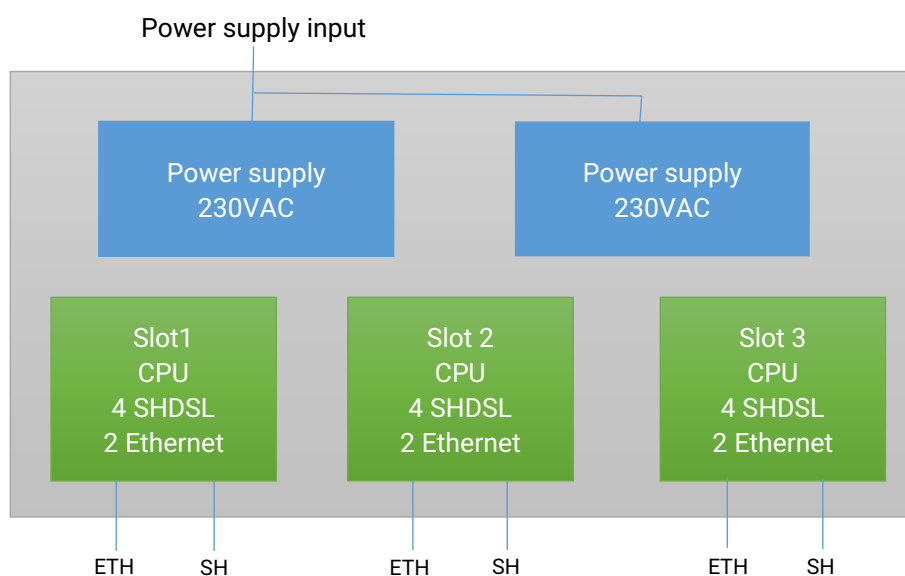
The data rate on each port is up to 5,7 Mb/s on 3,7 Km and 15 Mb/s on 0,7 Km (see table in Annex 1).



The XSRACK consists of 3 independent slots. Each slot provides 4 SHDSL ports and 2 Ethernet ports and has its own configuration and operation interface. The slots are not hot-swappable.

The XSRACK has two redundant power supplies. Power supplies are often the most unreliable part of equipment. The XSRACK is equipped with 2 230V/24V power supplies. Each slot has 2 internal 24V power inputs.

If a power supply is faulty, the SHDSL connections are maintained. The LEDs on the front panel or the SNMP protocol are used to detect this failure.



PRESENTATION

The XSRACK can interwork with any switch in the XSLAN family. For example, it is possible to connect one line to an XSLAN-1100 and another line to an XSLAN+2220.

The XSRACK also offers advanced features. These functions are configured using a Web browser:

- **IP routing and filtering**
The XSRACK can remove the broadcast frames on the SHDSL link by routing the IP frames, and thus limiting the unwanted traffic on the SHDSL link.
- **VLAN**
The XSRACK features VLAN:
It is useful, for example, to separate the flows on the SHDSL link from those for the administration of the switch.
- **RSTP redundancy**
The XSRACK can fit into a complex topology including redundant links and devices from different manufacturers. The Rapid Spanning Tree Protocol (RSTP) removes loops and prevent broadcast storms.
- **Quality of service DiffServ**
The XSRACK can manage different IP traffics with different priorities.
- **SNMP**
The XSRACK can be monitored by an SNMP manager and supports the main MIB of an Ethernet switch and the SHDSL MIB.

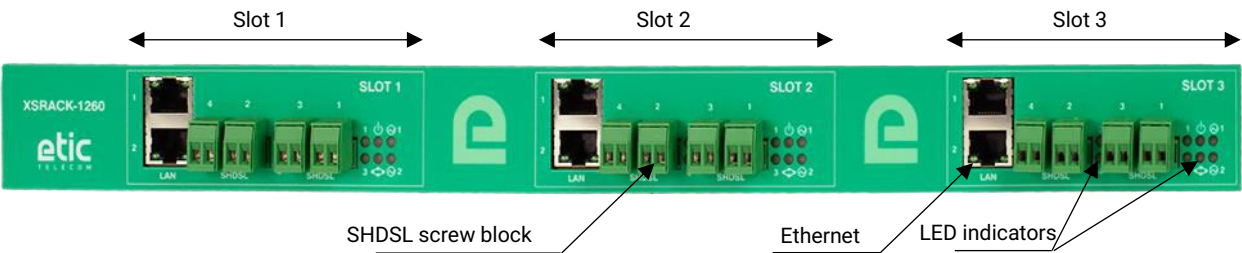
INSTALLATION

1 Description

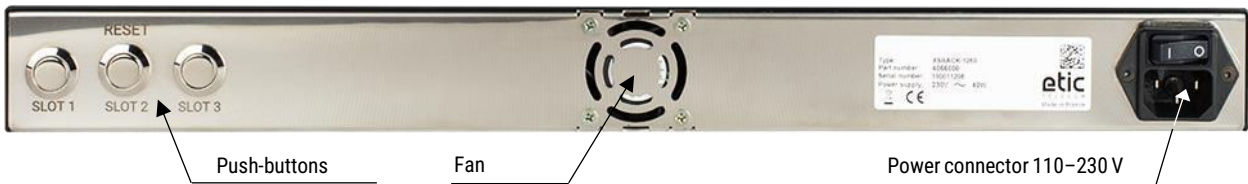
1.1 Dimensions



1.2 Front panel



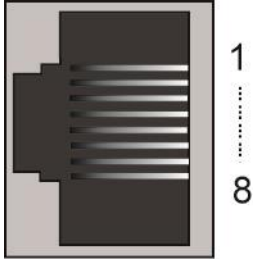
1.3 Rear panel




INSTALLATION

1.4 Connectors





2 positions screw terminal: SHDSL		
Position	Signal	Function
1	Line	SHDSL line conductor
2	Line	SHDSL line conductor

Ethernet RJ45 connector			
Position	Signal	Function	RJ45
1	Tx +	Emission polarity +	
2	Tx -	Emission polarity -	
3	Rx +	Reception polarity +	
4	N.C	-	
5	N.C	-	
6	Rx -	Reception polarity -	
7	N.C.	-	
8	N.C.	-	

1.5 Push-buttons

Push-button SLOT1 SLOT2 SLOT3		
Pressing the PB	LED 	Function
During operation	Flashing red	Temporary return to the factory configuration. (IP address 192.168.0.128) The current configuration is not lost.
During power-up	Flashing red	Return to the factory configuration. The current configuration is deleted except if it has been saved into a file.

1.6 LED indicators

LED indicators		
Function	LED	Description
Power 1		Steady green: The supply voltage 1 is present
Power 2		Steady green: The supply voltage 2 is present
Run		Off Power off Steady green The unit is ready Slow blinking green The unit is busy Steady red Startup (30s) – Otherwise product failure Fast blinking red Firmware download in progress
Ring		Steady green: The fail safe ring is established Steady red: Fail safe ring failure Off: Fail safe ring disabled
SHDSL 1 SHDSL 2 SHDSL 3 SHDSL 4	1 to 4	green: Port disable Off Connection in progress Blinking Connection established On Traffic on the link Flashing

INSTALLATION

2 Safety instructions

The product shall be installed in a fire electrical resistant cabinet by a qualified operator.

The product must be connected only to equipment that complies with the IEC60950-1 or IEC62368-1 standards and that meets the following classifications:

- IEC60950-1 : Limited power circuits and SELV type – §2.2 and 2.5
- IEC62368-1 : ES1 & PS2



To avoid any risk of burns, it is strongly recommended to wear gloves to handle the product in operation when the ambient temperature exceeds 30 °C.

3 Installation dans une baie informatique

The XSRACK is designed to be installed in a 19 inch computer bay. It can be placed on a tray or fixed using the mounting brackets provided.

When the mounting brackets are used it is possible to remove the self-adhesive feet under the case.

4 Cooling

The XSRACK has a fan which ensures a low temperature difference between the outside and the inside. This lowers the operating temperature of electronic components and thus improves MTBF.

However, in the event of a fan failure, the XSRACK continues to function normally. Make sure to reserve a sufficient space of at least 1 cm above and below the box to facilitate the flow of heat.

5 Isolation and earthing

The enclosure of the XSRACK is metallic ; For safety and EMC reasons, it must be connected to the protective earth of the installation with its power cord.

Ethernet and SHDSL signals are isolated through transformers. Consequently, the products is electrically isolated from the outside up to a common mode voltage of 1500 V;

6 Preparing and checking the line

6.1 Type of cable

Twisted pair cable

The XSRACK is designed to be connected to one or several telephone grade twisted pairs.

The conductor diameter must be included between 0.4 mm and 1 mm.

A cable may be composed of several twisted pairs.

Each pair can usually be used for a different SHDSL transmission if necessary. However, care must be taken to ensure that crosstalk between pairs is not excessive.

Cable made of quads

It often happens that the twisted pairs of the same cable are wound in groups of two pairs; a group of two pairs rolled into each other is called a quad.

This type of cable is suitable. However, we will try to use only one pair per quad to avoid crosstalk (see below 6.2).

Shielded cable

It is better to use a shielded cable.

The shield must be connected to the earth at one of its ends.

The shield decreases the influence of the electromagnetic ambient noise on the SHDSL signal.

Moreover, the shield protects the XSRACK against lightning.

Electrical power cable

Two power conductors can be used instead of a twisted pair to set an SHDSL connection.

However, because the two wires are not twisted, the ambient electrical noise may disturb the transmission.

Compared to the transmission over a twisted pair, the maximum distance between two SHDSL switches is decreased.

6.2 Crosstalk interference

If the cable is made of several pairs, a signal transmitted in one pair may disturb the signal transmitted in another one, and, in some cases, may decrease the effective data rate of the SHDSL connection.

The closer the pairs, the greater the crosstalk. Thus, the risk of crosstalk is higher between two pairs of the same quad.

This is why, if the cable is made up of quads, it is advisable to avoid using the two pairs of the same quad.

6.3 Shield earthing

A shielded cable provides better noise immunity and surges protection during thunderstorms.

The best protection is provided when the shield is earthed at each end of the line.

However, there may be a large potential difference between the connection points to the earth, especially when the line is long.

Therefore, to avoid a large current flowing in the shield, it is recommended to connect the shield to the earth at only one end of the cable.

INSTALLATION

6.4 Protecting the SHDSL switch from lightning

The XSRACK is coupled to the line by a transformer which provides isolation between the circuit board and the line. Moreover, the XSRACK is equipped with internal protections against overvoltage.

However, if the line is vulnerable to thunderstorms, for example if it is an air line, or if it is several kilometers long, or if the installation is in a very exposed area, it is recommended to protect each XSRACK with a surge protector connected to the earth.

7 Connecting the XSRACK to the line

7.1 General precautions

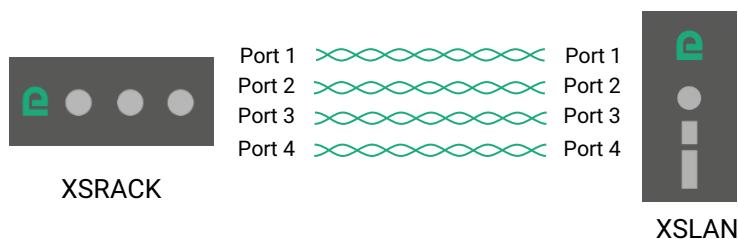
The SHDSL signal is not polarized; the two wires of the twisted pair can be interchanged. Check that the shield, if any, is properly earthed.

7.2 Point to point connection using two, three or four twisted pairs

An aggregated link is a link between two SHDSL switches that uses two or three or four twisted pairs to multiply the total throughput.

Aggregation is only possible for pairs in the same slot.

When performing a point to point link to doubled or tripled or quadrupled the data rate, it is recommended to wire pairs in an orderly way, as shown below, to make the configuration and the diagnostic easier.




PREPARING THE SETUP

1 Connecting a PC for configuration

1.1 Overview

Each slot of an XSRACK is configured using a PC with an HTML browser. No additional software is required.

Online help :

For most pages of the administration server an help page is available by clicking  located at the top right of the page.

Administration server address :

When the product is delivered, the IP address of the administration web server is 192.168.0.128.

First setup :

For the first configuration, we advise to connect the PC directly to the LAN interface of the each slot. Subsequent changes can be made remotely.

Restoring the factory IP address :

The factory IP address 192.168.0.128 can be restored by pressing the push button on the rear of the product (see page 13)

Restricted access to the administration server :

If you do not have access to the administration server, it is probably that access has been restricted for security reasons or for other reasons.

Network IP address :

Later in the text, we often speak of “network IP address”. We mean the lowest value of the addresses of the network.

For instance, if the netmask of a network is 255.255.255.0, the network IP address of that network is terminated by a zero (X.Y.Z.0.).

Characters allowed

Accented characters are not supported.

PREPARING THE SETUP

1.2 First configuration

Step 1 : Create or modify the PC TCP/IP connection

Assign to the PC an IP address different but consistent with the factory IP address of the XSRACK slot
For the first configuration, assign for instance 192.168.0.1 to the PC.

Step 2 : Connect the PC to the XSRACK

Connect the PC directly to a slot of the XSRACK with any Ethernet cable (straight or cross-wired);

Step 3 : Launch the web browser

Launch the web browser and then enter the IP address of the slot : 192.168.0.128

The Home page of the administration server is displayed.



Note : Access to the administration server is not protected when configuring the slot for the first time.


1.3 Changing the configuration later

Thereafter, the administration server of an XSRACK slot is accessible from the Ethernet interface or remotely through the SHDSL line at the IP address assigned to the product.

- Open the html browser and enter the IP address of the administration server of the slot
- Enter, if any, the username and password that protect the access to the administration server.

2 Temporary return to the factory settings

If the IP address of the XSRACK slot could not be founded, or if it is impossible to access the administration server, for example, following a bad VLAN configuration, it is possible to restore the factory settings without losing the current configuration.

- Press the push-button located on the rear pannel
- Keep the push-button pressed for about 3 seconds;
- The LED  blinks red rapidly
- The administration server becomes accessible at the factory IP address (192.168.0.128), in HTTP without a password. The factory configuration is temporarily running. However, the current configuration is not lost and it is the one that is still displayed in the pages of the Administration Server.
- After reading the IP address or changing some parameters, press again the push button or reboot the product.
- The product can be reached at the registered IP address.

Note :

If the IP address of the XSRACK slot is unknown, the software tool **EticFinder** can be used.


This software detects all ETIC branded products on a local network. After starting the software, click on the "Search" button, and when the product list is displayed, double-click on the product address to access the html server.

3 Restoring the factory settings

It is possible to restore the factory configuration permanently using the push button on the rear panel, or by using the administration server. In this case, the current configuration will be lost unless it has been saved to a file.

To restore the factory settings using the push button,

- Power off the XSRACK,
- Press the push button corresponding to the chosen slot,
- Power on the XSRACK, while keeping the push-button pressed at least 10 s.

The LED  turns red ; the XSRACK slot boots and the factory configuration is restored.

Note : The factory configuration can also be restored via the menu **Maintenance > Configurations management** of the administration server.

PREPARING THE SETUP

4 Protecting the access to the administration server

- In the menu, choose **Setup > Security > Administration rights**
- Enter a user name and password to protect the administration server.
- Tick the **Password protect the web site access** checkbox

If the username and password to access the administration server are lost, you have to [temporarily return to the factory settings](#); access to the administration server is then free.

5 Configuration steps

To configure the product, we advise to proceed as follows:

- Set up the LAN interface
- Set up the SHDSL connections
- Set up VLAN
- Set up SNMP
- Set up QoS
- Set up the routing functions

For detail about the configuration and the diagnostics, refer to the XSLAN-1100 / XLAN+ / XSMIL Setup Guide:
Reference : "DOC_DEV_XS_Setup guide"

ANNEX 1 : SHDSL data rate versus distance

The table below shows the data rate which is possible to get on a SHDSL link depending on the wire diameter and the distance.

These values are indicative in noise free environment.

Data rate	192Kb/s	1,2Mb/s	2,3Mb/s	5,7 Mb/s	6.7 Mb/s	10 Mb/s	12 Mb/s	15 Mb/s
Distance (Ø 0.9 mm) *	13 km	8 km	6 km	3.7 km	2.5 km	1.5 km	1 km	0.7 km
Distance (Ø 0.4 mm) *	7 km	4 km	3 km	2 km	1.3 km	0.9 km	0.6 km	0.4 km



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