



VELOX Network SCALABLE INDOOR AND OUTDOOR PORTABLE PRIVATE 5G NETWORK



TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





Set up a temporary private 5G network in a wink

VELOX Pop-Up can be easily transported to bring reliable and secure wireless connectivity where it is most needed. It is perfect for connecting assets during a temporary event or on a temporary location such as a construction site, a festival, a concert in the countryside, or a pop-up warehouse during peak season.



Enable seamless connection at temporary event sites for your personnel, such as festivals and outdoor sports events. Securely connect cash registers, barcode scanners, smartphones, and PCs, whatever the crowd concentration



Secure construction sites with wireless cameras, connect vehicles, and connect your staff even in the most remote locations



Easily connect temporary warehouses during peak periods in minutes to enable seamless WMS connection and tracking by your team



Connect civil security personnel during natural disaster events in the most remote areas when public networks are down. Connect smartphones, drones, and tablets in a very secure and robust manner in all terrain



Ensure reliable communication for research expedition teams, collect and transmit data, collaborate in real-time with colleagues, and upload research data quickly, even in the most remote locations (requires a backhaul network, e.g. satellite)

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





VELOX Wave Pop-Up

Mobile outdoor and large indoor up to 100 MHz private 5G network with a smartphone and a SIM card, for temporary wireless connectivity

Set up a temporary private 5G network in a wink

VELOX Pop-Up can be easily transported to bring reliable and secure wireless connectivity where it is most needed. It is perfect for connecting assets during a temporary event or on a temporary location such as a construction site, a festival, a concert in the countryside, or a pop-up warehouse during peak season.

VELOX Pop-Up can be used to connect smartphones, tablets, industrial routers, cameras, smart tools, barcode readers, AGVs / AMRs and any other 5G devices in your warehouse, your factory or in a campus.

It is offered in 3 different flavors: low power, mid-power or high power, according to your coverage needs.

What you get

VELOX Wave Pop-Up is composed of:

- 5G Core Network Server with TTG Int.LTD Network Management System
- Low-Power, Mid-Power or High-power gNodeB
- High-gain omnidirectional or sector antenna
- Telescopic mast
- GPS antenna for time synchronization
- Inverter, to cope with temporary power shortage
- Robust fight case on wheels

Support with guaranteed response time

TTO	Look a sure		- 1	LTD
ПG	Intern	ation	aı	LID

Proprietary & Confidential

VELOX Technical Specifications

Reşadiye Mah. Reşadiye Cad. No:110/1 Çekekoy 34799 İstanbul -TurkeyTel: 90 (0) 850 800 0884Pbx Fax: +90 216 4295749http://www.ttgint.comTTG Uluslararası LTD / Registered Office: as above / Registered Number in Turkey 461414-408996





VELOX Wave Pop-Up comes with support & maintenance from TTG Int.LTD's team of experts, that you can access from your own dedicated support page. Quarterly releases TTG Int.LTD publishes software releases 4 times a year, with new features, enhancements and bug corrections. You can

upgrade your software version from TTG Int.LTD's online repository using a simple command.

As long as you are subscribed TTG to Int.LTD's Support & Maintenance, you will get access to TTG Int.LTD's latest software releases. Manage your 5G network as an IT administrator TTG Int.LTD Network Management System is an intuitive role-based user interface that enables IT administrators to operate their Private 5G network without requiring deep knowledge of 5G. They can view the status of their

Top 10 Interfaces by Utilization						Top 10 Interfaces by Traffic			
Node	Interface	Receive	Tr	ansmit		Node	Interface	Receive	Transmit
RT_KANDILererjisa.local	GigabitEtherret0/1		65%	- 6	0%	ICK7750-48F Router	10GigabitEthemet1/1/45	389 Mbps	5 Gbps
SARAN_HOLDING_SW_SW2	Ethernet0/0/2		62%	6	2%	ICX7750-48F Router ICX7750-48F Router	 10GigabitEthemet1/1/17 10GigabitEthemet1/1/10 	4 Gbps 342 Mbps	48 Mbps 198 Mbps
BURGAN KAYSERI	GigabitEthernet0/0		40%	7	15	 1X8_OPC_DC1_SW2_0045 	TenGigabitEthernet1/1/4	124 Mbps	346 Mbps
BURGAN KAYSERI	GigabitEthernet0/0		40%	7	15	OGM-TT-ME-SW	Ten-GigabitEthernet1/0/14	105 Mbps	340 Mbps
RT_MENGE_energisa.local	GigabitEthernet0/1					GGM-TT-ME-SW	Bridge-Aggregation1	103 Mbps	337 Mbps
RANPET TOMUK RT	Ethernet0					DEVLET_ARSIV_ISTANBUL_KAGTHAN	GigabitEthernetU/11 GigabitEthernetU/11	400 Mbps 189 Mbps	39 Mbps
				4		 IST34200_ISTANBUL_KAMU_HASTANE BRS16003_BURSA_KAMU_HASTANELER 	GigabitEthemett)/0/0 GigabitEthemett)/0/3	189 Mbps 276 Mbps	231 Mbps 137 Mbps
RANPET_TOMUK_RT	Ethernet0.15		99% 1	4	%	OGM-TT-ME-SW	Ten-GigabitEthernet1/0/1	288 Mbps	51 Mbps
BURGAN_BALGAT	GigabitEtherret0/0		66%	3	7%				
TEIAS_652186_18.BOLGE_MERSIN_G	Atm0/0/0	_	93% =	1	0%				
RT_HACININOGLU.enerjisa.local	GigabitEtherret0/1	nterface Details	17%	8	6%				
Note © 101 CAREEROORS, SARRES, SARR © 101 CAREERS, SARRAM, EXT © 201 CAREERS, SARRAM, EXT © 201 CAREERS, SARRAM, EXT © 201 CAREERS, SARRAM © 201 CAREERS, SARRAM	Memory load 95.2 95.1 95.1 94.7 94.3 94.3 94.2 94.2 94.2 94.2 94.2 94.2 94.2 94.2	164 Spin Survivo 1894 1895 1895 1895 1895 1995	- 		7120 anter 2				
 SHARFENDE SAMUURFA, KAMIHASTA 	915	w/bithme and 35 #Simplified 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.		• • • •	e Disaeth				

VELOX Wave Pop-Up, the downlink and uplink bitrate, the number of connected devices. TTG Int.LTD Network Management System also allows you to provision SIM and e-SIM cards for your devices and configure the Quality of Service (QoS) required for each type of stream.

Pop-Up flavors

Pegasus Pop-Up is available in the following flavours:

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





	POWER	BIT RATE	Countries	Coverage
Low Power	2 x 250mW	DL:800 Mbps	USA, Brasil, Netherlands,	30 - 100 m
N48/N77/N78		UL : 80 Mbps	Sweden, Australia, France, UK, Belgium, Norway, Canada	
LOW POWER N79	2 x 250mW	DL : 800 Mbps	Japan, South Korea, Taiwan	30 - 100 m
		UL : 80 Mbps		
MID POWER N38	4 x 5W	DL: 320 Mbps	France (40 MHz)	300 - 1000 m
		UL : 32 Mbps		
MID POWER N40	4 x 5W	DL : 160 Mbps	Finland (20 MHz), Spain (20	300 - 1000 m
		UL:16 Mbps	MHz)	
MID POWER N77	4 x 2W	DL:800 Mbps	Australia, France, UK, Belgium,	300 - 1000 m
		UL:80 Mbps	Norway, Canada	
MID POWER N78	4 x 2W	DL:800 Mbps	Netherlands, Croatia, Poland,	300 - 1000 m
	or	UL:80 Mbps	Germany, Sweden,	
	4 x 5W		Netherlands, Switzerland	
HIGH POWER N38	2 x 20W	DL: 320 Mbps	Germany, Sweden,	1 – 5 km
		UL : 32 Mbps	Netherlands	

Note: 5G spectrum usage rights must be acquired from the country's frequency regulator.

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





Technical Specifications

Hardware

5G Core Network Server	
Dimensions H × W × D / weight	1U half-depth chassis (44 x 482 x 540.5 mm) / 7 kg
CPU	Intel Core i9 2.4 GHz
RAM	64 GB
Storage	SSD 500 GB
Network connectivity	1 x 2.5 GbE
	Intel NIC 710 with 4x SFP+ 10 GbE slots
Power supply voltage input	100 - 240V AC
Operating system	Linux Ubuntu 20.04 LTS with 5.4.0-126-lowlatency kernel

5G Radio Access Network Server				
Dimensions H × W × D / weight	1U half-depth chassis (44 x 482 x 540.5 mm) / 7 kg			
CPU	Intel Core i9 2.4 GHz			
RAM	64 GB			
Storage	SSD 500 GB			
Network connectivity	1 x 2.5 GbE, 4x SFP+ 10 GbE Intel NIC 710 with 4x SFP+ 10 GbE slots SFP+ CPRI interface with embedded GPS receiver 1x 10GbE SFP+ multimode transceiver			
Power supply voltage input	100 - 240V AC			
Operating system	Linux Ubuntu 20.04 LTS with 5.4.0-126-lowlatency kernel			
Synchronisation	GPS			
Active Users	32			

Low Power all-in-one Radio Unit				
Dimensions H × W × D / weight 250 mm x 250 mm x 65 mm / 2.5 kg				
Frequency bands	n77 (3550–4200 MHz), n78 (3550–3800 MHz) or n48 (3550–3700 MHz)			
Bandwidth	N48: 20/30/40MHz N77: 40/50/60/70/80/90/100MHz N78: 20/30/40/50/60/70/80/90/100MHz			
Max transmitted power	2 x 250 mW			
Operating temperature range	-5 ℃ to +50 ℃			
IP rating	IP 50			
Regulatory	CE (Europe), ROHS, WEEE, REACH (UK)			
Antenna	2x integrated omnidirectional antennas / 2 ports for external antennas			
Power supply	DC 12V or POE++			
Power consumption	<40 W			
Active users	32			
3GPP release	Release 15			
Features	All-in-One BBU + Radio Unit, NG/Xn Handover			
Installation	Wall/Ceiling mount			
Synchronisation	GPS or PTP			

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





Mid Power Radio Unit (Panther)	
Dimensions H × W × D / weight	370 mm x 369.2 mm x 91.3 mm / 15 kg
Frequency bands	n78 (3400–3800 MHz)
Bandwidth	100 MHz
Transmission Modes (downlink)	SISO, MIMO 2x2, MIMO 4x4
Typical consumption	250W
Max transmitted power	4 x 2W
Operating Temperature Range	−40 °C to +55 °C
IP Rating	IP 66
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)
Antenna Ports	4x N Female

Mid Power Radio Unit (Neo)	
Dimensions H × W × D / weight	72.5 mm x 369.2 mm x 404.6 mm / 7 kg
Frequency bands	n38 (2575~2615 MHz), n40 (2300-2400 MHz) n77 (3800-4100 MHz) or n78 (3400-3800
	MHz)
Bandwidth	40/60/80/100 MHz
Transmission Modes (downlink)	SISO, MIMO 2x2, MIMO 4x4
Typical consumption	100W
Max transmitted power	4 x 5W (n38, n40, n78), 4 x 2W (n77)
Operating Temperature Range	-40 °C to +55 °C
IP Rating	IP 65
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)
Antenna ports	4x 4.3/10 DIN Female

High Power Radio Unit	
Dimensions H × W × D / weight	148 mm x 200mm x 295 mm / 12 kg
Frequency bands	n38 (2570-2620 MHz)
Bandwidth	up to 50 MHz SISO 1x1 and MIMO 2x2
Max transmitted power	2 x 20W
Operating Temperature Range	-40 °C to +55 °C
IP Rating	IP 67
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)
Antenna ports	2x 4.3/10 DIN Female

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications





Antenna - omni (bands n78, n79)				
Dimensions / weight	850 mm (33.5″) x 220 mm (8.6″) x 40 mm (1.57″) / 6.5 kg			
Band / Gain	3300-4200MHz : 11dBi			
Туре	omnidirectional			
Capability	MIMO 4x4			
Operating Temperature Range	-40 °C to +70 °C			
Fixing	Mounting bracket (included)			
Ports	4x 4.3-10 Female			

Antenna - sector (bands n78, n79)				
Dimensions / weight 750 mm (29.5") x 280 mm (11") x 85 mm (3.3") / 4.3 kg				
Band / Gain	3300-4200MHz : 18dBi			
Туре	sector (beamwidth : 65°)			
Capability	MIMO 4x4			
Operating Temperature Range	-40 °C to +70 °C			
Fixing	Mounting bracket with variable tilt (included)			
Ports	4x 4.3-10 Female			

Antenna - omni (bands n38, n40)				
Dimensions H × diameter / weight	500 mm x Ø70mm / 1.6 kg			
Band / Gain	1425 - 2700MHz : 4dBi			
Туре	omnidirectional			
Capability	MIMO 2x2			
Operating Temperature Range	-40 °C to +65 °C			
Fixing	Mounting bracket (included)			
Ports	2x 4.3-10 Female			

Software

5G Core Network software	
Network functions	SMF, AUSF, UDM, UDR, AMF, UPF, NSSRF, NRF, PCF
Container platform	Docker

5G Radio Access Network software		
Frequency bands	n38 (2600MHz) / n40 (2300MHz) / n77 (3700MHz) / n78 (3500MHz) / n79 (4800 MHz)	
Bandwidth	40/100 MHz	
Transmission Modes (downlink)	SISO, MIMO 2x2	
Modulation schemes	Up to 256 QAM	
Subcarrier spacing	30 kHz	
Active users	32	

TTG International LTD	Proprietary & Confidential	VELOX Technical Specifications





5G Network Management System software		
Dashboard	Core & Cell status, global number of active / connected devices, global downlink & uplink bit rate / resource consumption, detailed list of cells	
Cell metrics	Downlink & uplink bit rate / resource consumption, number of connected devices	
SIM management	Add SIM, device status (online, offline)	
User management	Add, remove, manage user profiles (Standard, Expert, Admin)	
QoS management	Priority configuration of streams (IP / port range)	
Logs	User connections	

TTG International LTD

Proprietary & Confidential

VELOX Technical Specifications