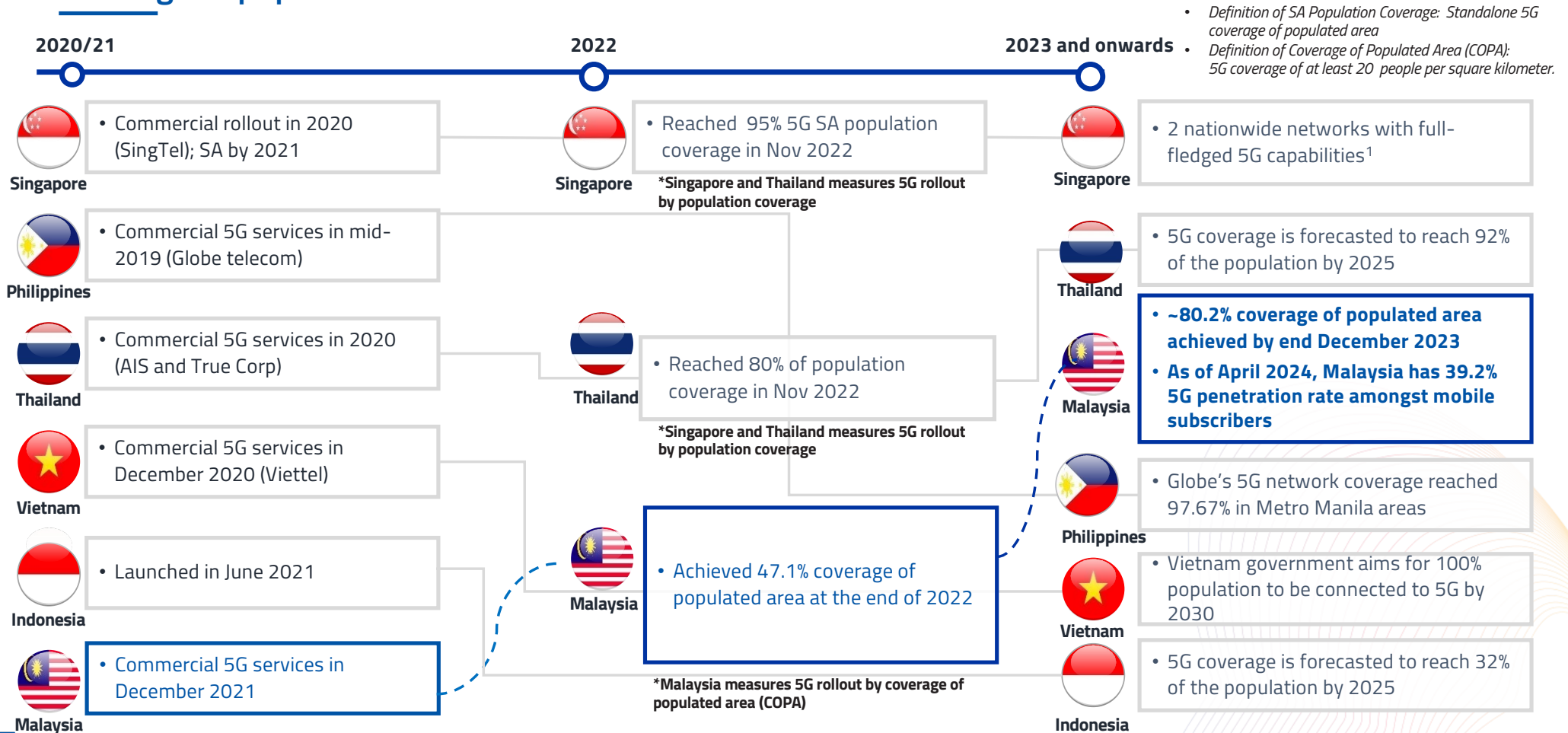# Malaysia's Unique Approach on 5G Network Rollout

June 2024

Lagging earlier, Malaysia has narrowed the 5G availability gap by achieving 80.2% coverage of populated area in December 2023

- *Definition of SA Population Coverage:* Standalone 5G coverage of populated area
- *Definition of Coverage of Populated Area (COPA):* 5G coverage of at least 20 people per square kilometer.

2020/21

Singapore
- Commercial rollout in 2020 (SingTel); SA by 2021

Philippines
- Commercial 5G services in mid-2019 (Globe telecom)

Thailand
- Commercial 5G services in 2020 (AIS and True Corp)

Vietnam
- Commercial 5G services in December 2020 (Viettel)

Indonesia
- Launched in June 2021

Malaysia
- Commercial 5G services in December 2021

2022

Singapore
- Reached 95% 5G SA population coverage in Nov 2022

Singapore and Thailand measures 5G rollout by population coverage

Thailand
- Reached 80% of population coverage in Nov 2022

Singapore and Thailand measures 5G rollout by population coverage

Malaysia
- Achieved 47.1% coverage of populated area at the end of 2022

Malaysia measures 5G rollout by coverage of populated area (COPA)

2023 and onwards

Singapore
- 2 nationwide networks with full-fledged 5G capabilities[1]

Thailand
- 5G coverage is forecasted to reach 92% of the population by 2025

Malaysia
- **~80.2% coverage of populated area achieved by end December 2023**
- **As of April 2024, Malaysia has 39.2% 5G penetration rate amongst mobile subscribers**

Philippines
- Globe's 5G network coverage reached 97.67% in Metro Manila areas

Vietnam
- Vietnam government aims for 100% population to be connected to 5G by 2030

Indonesia
- 5G coverage is forecasted to reach 32% of the population by 2025

2

In 2021, the Government decided on the Single Wholesale Network (SWN) model by DNB to accelerate the implementation of 5G network in Malaysia

SWN refers to the **provision of 5G coverage**, delivered via **one common network,** to which all MCMC licensees in Malaysia can **seek equal access on a wholesale basis.**

SWN Benefits

1	Implementation is accelerated and inclusive
2	Efficient use of existing infrastructure and resources
3	Lower costs for telcos and customers
4	Enables service competition and encourages innovation
5	Enabling national security controls and financial benefits for the Government

The Government of Malaysia established Digital Nasional Berhad (DNB) as a Special Purpose Vehicle (SPV) fully owned by the Government, to implement a single 5G network nationwide.

DNB is subject to the conditions and rules set by the MCMC to ensure that the 5G network can be developed with:

- ✓ Accelerated deployment
- ✓ Lower cost
- ✓ Access to capacity and network is open and fair
- ✓ The wholesale price of the services provided can be controlled

DNB was established in March 2021 with the key objectives to accelerate (i) 5G deployment and (ii) 5G adoption to drive Malaysia's digital economy

4G DEPLOYMENT ISSUES

4G deployment led to inefficient spectrum optimisation, high cost passthrough, high CAPEX incurred by Telcos, and a lack of focus in bridging urban rural divide

DNB OBJECTIVES

	DNB's Objectives	Deliverables
1	Accelerate deployment of 5G network in Malaysia	80% national coverage within 3 years to catch up with countries in region
2	Ensure lower cost of capacity to accelerate 5G adoption	Benefit from scale to reduce cost of 5G capacity
3	Optimise use of existing infrastructure & scarce resources	Sufficient spectrum allocation to enhance efficiency and lower cost
4	Realise the potential of 5G in Malaysia to stimulate economic activity	5G expected to generate RM650 Billion GDP uplift with 750k new high-income jobs over next 10 years*
5	Promote service-based competition within the communications industry	Facilitating Telcos to innovate on services

Source: Ernst & Young, Estimating the economic impact of the Single Wholesale 5G Network in Malaysia, November 2021

Challenges faced and lesson learnt to implement 5G network nationwide

| Challenges	Solutions
Each Telcos had their own complex networks DNB had to manage six separate networks, and six distinct sets of systems and processes DNB had to ensure that the SLA requirements of each network was met without any conflict Software upgrades and new rollouts had to maintain total network availability and integrity A multi-operator core network of this nature had never been built before	DNB deployed a shared 5G network based on Multi Operator Core Network (MOCN) model. The model minimizes duplication and enable dynamic resource sharing for more flexible, efficient and fair usage of capacity
DNB was a startup, had to begin from the ground up	Qualified and experienced staff
Lengthy approval processes from local authorities	Close collaborations and support from local and state authorities

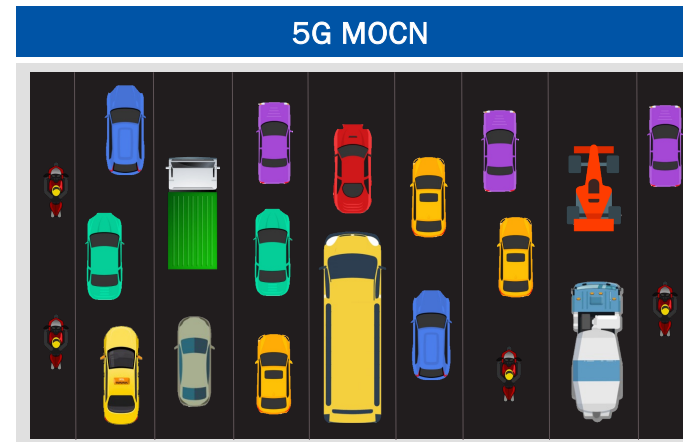# DNB deployed a shared 5G wholesale network based on the Multi-Operator Core Network (MOCN)

4G: each operator build and operate their own network

CURRENT

Telco 1	Telco 2	Telco 3	Telco 4	Telco 5	Telco 6
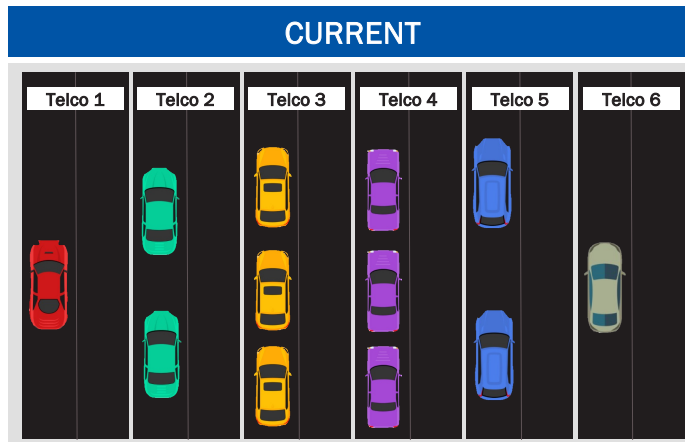
DNB's 5G MOCN: single network, shared with multiple operators

5G MOCN

Multi-Operator Core Network

MOCN technology enables:
1. More efficient use of spectrum
2. Avoiding infrastructure duplication then reduces implementation costs
3. Fair and equal access to the accumulated spectrum

MOCN technology is used for spectrum efficiency and to lower the cost of 5G

# Malaysia's DNB 5G network deployment meets the requirements for enterprises and rapid consumer adoption of 5G

DNB Deployment Considerations	NSA & SA Architecture	Rationale

DNB's supply-led model takes into account customer needs to fund aggressive rollout timeline

Based on Telcos engagements & MCMC

Current User Equipment readiness

EPC
(Telcos' EPC)

L700 NR3.5
NSA RAN

Transitional state

Time-to-Market

Telcos only have NSA-ready networks available. Therefore, deployment of SA-ready networks is dependent on Telcos' readiness

Device Compatibility

Most consumer 5G User Equipment in the market are **NSA compatible at time of launch;** new consumer models launched supports SA

SA architecture will be required to drive enterprise use cases

5GC

NR700 NR3.5
SA RAN

True 5G Capabilities

SA will be able to **deliver wider range of use cases** via uRLLC, mMTC capabilities for enterprises, and **provide true 5G capabilities**

DNB has offered 5G SA Core as a Service to accelerate the adoption of enterprise use cases. However, Telcos prefer to deploy its own SA Core to be integrated into DNB's 5G Radio Access Network ("RAN")

True 5G Capabilities availability critical for enterprises is dependent on the Telcos

In Dec 2023, DNB has met the accelerated target of 80% coverage of populated area, in just 2 years since the launch of 5G network services

End - 2022 : 47.1% COPA

End - 2023 : 80.2% COPA

Legend
- DU (red)
- U (yellow)
- SU (green)
- R (blue)
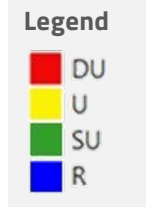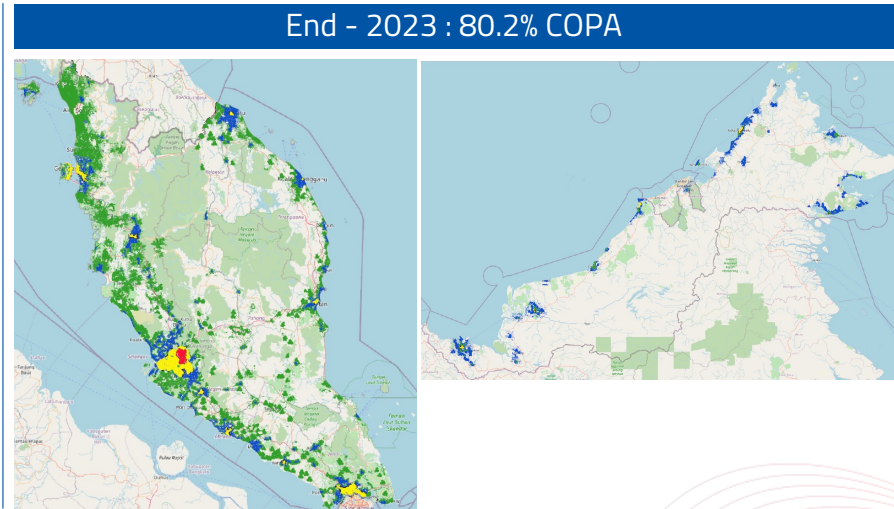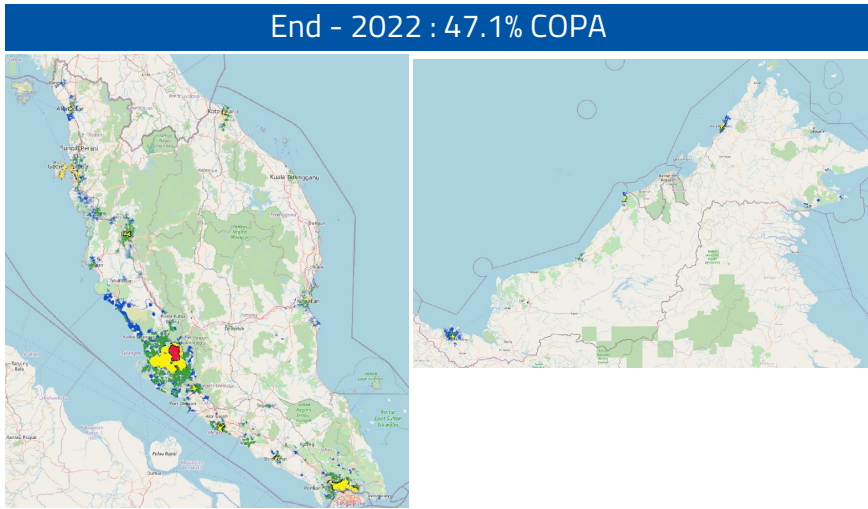
	Actual					
Year	**2021**		**2022**		**December 2023**	
Coverage of Populated Areas	**COPA %[1]**	**No of Sites**	**COPA%**	**No of Sites**	**COPA%**	**No of Sites**
Dense Urban (DU)	n/a	408	5.0%	700	5.1%	734
Urban (U)	n/a	87	22.3%	1,716	28.2%	2,487
Suburban (SU)	n/a	5	16.1%	1,310	35.5%	2,854
Rural (R)	n/a	-	3.7%	180	11.4%	842
Overall COPA% / Sites	**5.8%**	**500**	**47.1%**	**3,906**	**80.2%**	**6,917**
Total Number of Population	1.58 mil		12.8 mil		26.2 mil	
Total Potential 5G Handsets	~650K		2 – 3 mil		8 – 10 mil	

Note:
[1]COPA reporting by morphology to MCMC effective 2022

MCMC definition COPA - coverage that must be provided in areas of at least 20 persons per sq km

As of end April 2024, 81.5% coverage of populated area has been achieved

Target						
COPA (%)	Site Count	State	Integrated Sites[1]	Integrated COPA (%)	Onboarded Sites[2]	On-Boarded COPA (%)
-	-	FEDERAL TERRITORIES	897		892	
97.7%	763	WP KUALA LUMPUR	749	97.7%	746	97.6%
97.3%	108	WP PUTRAJAYA	108	97.3%	108	96.3%
97.3%	42	WP LABUAN	40	94.4%	38	94.0%
-	-	SEMENANJUNG (exlude FT)	5088		4943	
96.3%	1845	SELANGOR	1653	96.0%	1601	95.9%
83.0%	926	JOHOR	918	83.9%	911	83.8%
89.5%	215	MELAKA	208	88.6%	204	88.1%
77.8%	233	NEGERI SEMBILAN	227	77.5%	221	76.5%
94.4%	449	PULAU PINANG	414	90.8%	392	90.3%
77.2%	503	PERAK	472	79.2%	460	78.9%
80.5%	385	KEDAH	378	80.0%	374	79.3%
91.4%	44	PERLIS	44	91.4%	42	91.4%
64.2%	361	PAHANG	338	65.2%	330	65.0%
73.8%	223	TERENGGANU	215	72.7%	206	71.3%
71.0%	232	KELANTAN	221	65.7%	202	63.4%
-	-	SABAH / SARAWAK	1080		958	
64.8%	596	SABAH	552	68.5%	509	64.6%
59.6%	584	SARAWAK	528	61.8%	449	55.0%
80.0%	7509	Grand Total	7065	81.5%	6793	80.2%

Note:
[1] 75% of all integrated sites are fiberized
[2] 76% of all onboarded sites are fiberized
[3] Dense Urban, Urban and Sub-Urban prioritized aligned to Telcos current customer demand for 5G services

Integrated Sites By Morphology[3]			
Dense Urban	Urban	Sub-urban	Rural
Sites 730	2539	2927	869
% Completed 98.1%	92.3%	94.6%	94.2%

Onboarded Sites By Morphology[3]			
Dense Urban	Urban	Sub-urban	Rural
Sites 727	2448	2803	815
% Completed 97.7%	89.0%	90.6%	88.4%

5G rollout in Malaysia by DNB is one of the fastest in the world

5G Population Coverage (%)

- 5.8%
- 14.8%
- 27.0%
- 35.0%
- 47.1%
- 57.8%
- 64.70%
- 70.20%
- 80.2%

Legend:
- South Korea Opr#2
- Thailand Opr#1
- Philippine Opr#1
- US Opr#1
- China Opr#1
- UK Opr#1
- Singapore Opr#1
- Thailand Opr#2
- DNB Actual (COPA)

X-axis: Launch, 1Q, 2Q, 3Q, 4Q, 5Q, 6Q, 7Q, 8Q, 9Q, 10Q, 11Q, 12Q, 13Q, 14Q, 15Q

Source: DNB and Ericsson analysis
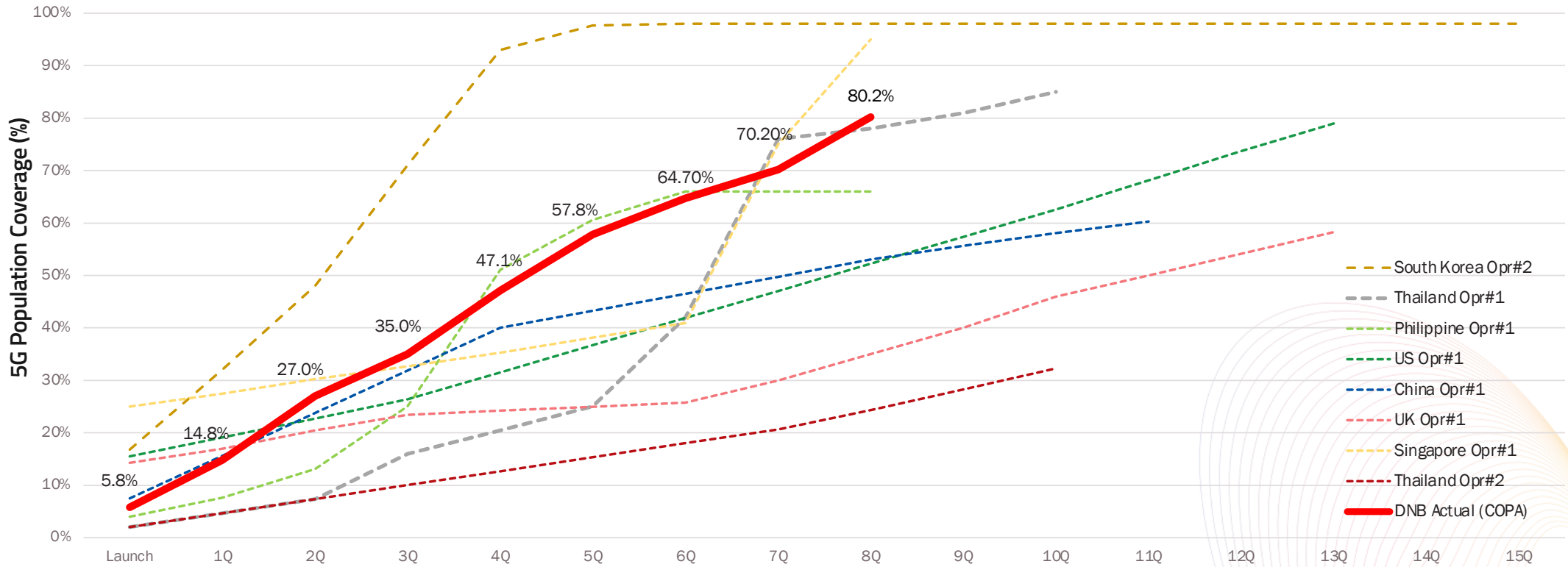
Malaysia's 5G is now one of the world's best, thanks to the unconventional SWN

"I used to read GSMA reports. At the time, there was **no country in the world that rolled out 5G the way we do**. There were very few people who thought we could make it and I'm sure many perhaps wanted to be naysayers for various reasons, **yet we have proved all of them wrong**."

YB Fahmi Fadzil, Minister of Communications, 26 Feb 2024

As a result of this innovative SWN approach, Malaysia have achieved an impressive **80% coverage of populated areas (COPA) in just two years.**

Since its launch more than two years ago, Malaysia's 5G network has consistently performed well, making it **one of the best-performing 5G networks worldwide.**

According to Ookla's Speedtest Intelligence® Q4 2023 data, **Malaysia continues to outperform other Southeast Asian countries** in 5G network performance.

Malaysia's 5G network performance has been globally recognised

Malaysia Mobile records a median Download 91Mbps Rank #27 – best ever, fuel by 5G migration

March 2024 Mobile

	India	Singapore	Malaysia	Taiwan	Thailand	Indonesia
Rank	#16	#23	#27	#34	#64	#103
	vs last year Rank 65 (+49)	vs last year Rank 23 (+0)	vs last year Rank 46 (+19)	vs last year Rank 29 (-5)	vs last year Rank 54 (-10)	vs last year Rank 102 (-1)
Download	105Mbps	97Mbps	91Mbps	82Mbps	44Mbps	25Mbps
	vs last year 33Mbps (+72Mbps)	vs last year 76Mbps (+21Mbps)	vs last year 47Mbps (+44Mbps)	vs last year 71Mbps (+11Mbps)	vs last year 40Mbps (+4Mbps)	vs last year 21Mbps (+4Mbps)

Monthly Speedtest Global Index Trending | Rank & Download

Proprietary & Confidential

● Degrade ● Improve ● Status Quo

OOKLA

- 5G helped Malaysia to climb **59 places in the Ookla Speedtest Intelligence Global Index** ranking for mobile services across all technologies, from number 86 in September 2021, to **27th as of March 2024**.

- Malaysia is **ahead of neighboring countries**, **as well as some developed markets**, including the United Kingdom, Japan, and Germany

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OOKLA SPEEDTEST

Malaysia's 5G Consistency Score for Q4 2023 is the global winner amongst countries which had successfully launched 5G commercially

Malaysia's median 5G speed is at 451.79 Mbps, ranking us the **fourth fastest in the world** and the **fastest in Southeast Asia as of Q4 2032**
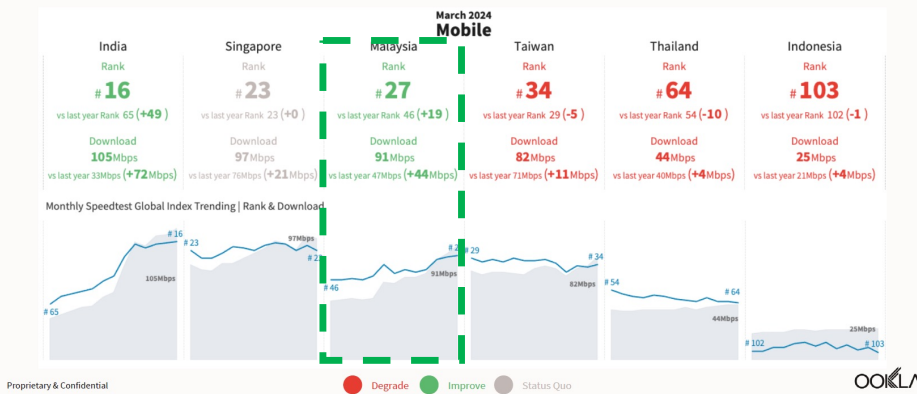

OPENSIGNAL

Malaysian mobile operators are amongst the **highest ranked mobile operators globally for all categories in 5G Global Awards 2023**

Malaysia's 5G speed is recorded at 322.7 Mbps in Q2 2023, ranking us at **number 4 globally**, and **one of 7 markets** with speeds higher than 300 Mbps

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GLOTEL AWARDS

Glotel Awards 2023
Category: Managed Services Mastery
Winner: Ericsson and DNB - Data Driven Cognitive Operation Multi-Operator Core Network Environment

Glotel Awards 2022
Category: Best Vendor 5G Innovation
Winner: Ericsson and DNB - Multi-Operator Core Network and Dynamic Resource Partitioning for the Nationwide Wholesale 5G Network

5G subscription and traffic have grown rapidly since 2023

5G Subscription in Malaysia [1]

- 5G Penetration Rate
- # of 5G Subscribers

24%

	Dec-22	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24
Penetration Rate	1.0%	3.1%	4.7%	5.5%	4.2%	4.4%	7.4%	9.1%	10.8%	13.7%	24.6%	29.9%	33.2%	35.4%	39.2%
Subscribers	0.3 m	1.0 m	1.6 m	1.8 m	1.4 m	1.5 m	2.6 m	3.1 m	3.6 m	4.6 m	8.2 m	10.1 m	11.2 m	11.9 m	13.2 m
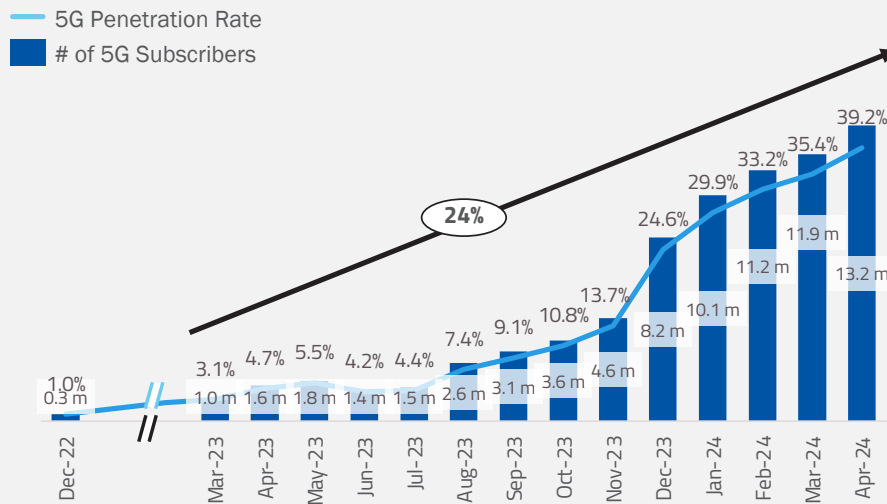
- Malaysia has around 13.2 million 5G users as at end-April 2024, representing a 39.2% penetration rate
- This 11-fold increase from March 2023 to April 2024 represents an average of 24% growth per month

Nationwide 5G Data Consumed [2]

- Nationwide 5G Data Consumed (TB)

+22%

	Jan'23	Feb'23	Mar'23	Apr'23	May'23	Jun'23	Jul'23	Aug'23	Sep'23	Oct'23	Nov'23	Dec'23	Jan'24	Feb'24	Mar'24	Apr'24
Data (TB)	9,538	12,399	18,654	21,547	26,125	25,791	39,026	47,204	57,806	72,386	88,686	106,341	120,172	131,306	159,538	160,782
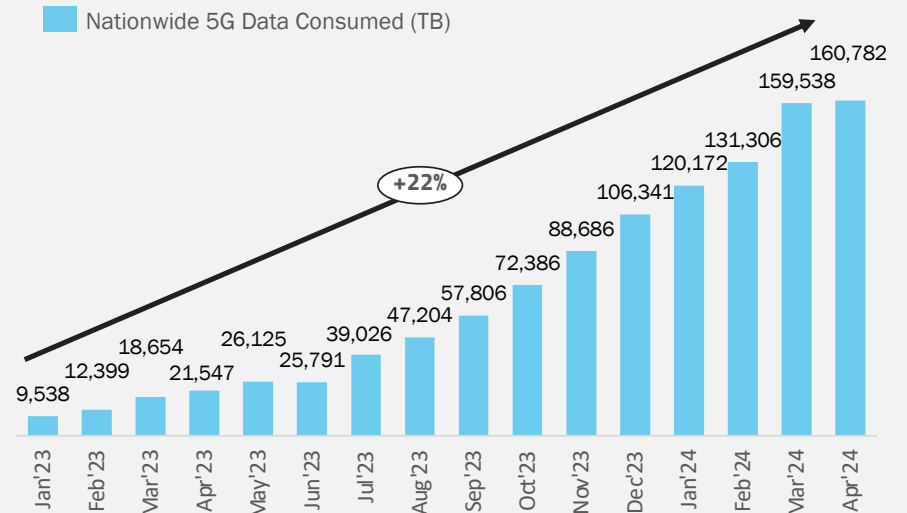
- Nationwide 5G data consumption has grown at a rate of 22% per month for the period of January 2023 to April 2024

In May 2023, Government announced that the 5G network to transition to Dual Network model

On 3 May 2023, Government announced that the 5G network in Malaysia:

1. will continue to be implemented through Digital Nasional Berhad (DNB) until 80% coverage of populated area (COPA) is achieved by end 2023; and

2. after which it will transition to a dual network model.

Communications and Digital Minister Fahmi Fadzil holding a press conference on 5G in Malaysia, May 3, 2023. — Picture by Choo Choy May.

The decision is taken to **address the perception of monopoly** and **for a more transparent communication policy direction**. The government ensures that this new model will result to **no worse-off situation to consumers** in terms of **price** and **performance**.

Acceleration of 5G availability will drive significant economic benefits for Malaysia

Digital Nasional — Future Connected | **MY 5G**

Takeaway

STIMULATING ECONOMIC ACTIVITY

Malaysia's implementation of 5G technology will provide various economic, social, and technological benefits to the country's citizens and businesses

GDP uplift
RM650 billion ($137 B) GDP uplift between 2022 – 2030

Drive FDIs
Driving FDI and foreign companies to invest in Malaysia

JOB Creation
750,000 high value jobs created

Higher INCOME
Average salary per capita will increase when high-income jobs are created

Creating Unicorns
Solid connectivity infrastructure will provide a platform for creating Unicorns

Adoption of 5G Use Cases will generate positive impact on all Economic Sectors

Logistics and Transportation
7.7% increase in GDP
(RM 19.0 billion incremental GDP)

50,000
(+4.0%) net increase in jobs
(124,000 created,
74,000 lost/avoided).

Manufacturing
6.5% increase in GDP
(RM 36.8 billion incremental GDP)

154,000
(+4.8%) net increase in jobs
(231,000 created,
77,000 lost/avoided).

Retail and Entertainment
6.0% increase in GDP
(RM 30.2 billion incremental GDP)

25,000
(+0.5%) net increase in jobs
(250,000 created,
225,000 lost/avoided).

Banking and Finance
4.8% increase in GDP
(RM 17.3 billion incremental GDP)

27,000
(+1.6%) net increase in jobs
(41,000 created,
14,000 lost/avoided).

Public Sector and Government
3.2% increase in GDP
(RM 7.9 billion incremental GDP)

7,000
(-0.9%) net decrease in jobs
(23,000 created,
7,000 lost/avoided).

Construction
3.1% increase in GDP
(RM 3.3 billion incremental GDP)

15,000
(-0.9%) net decrease in jobs
(29,000 created,
44,000 lost/avoided).

Agriculture
2.6% increase in GDP
(RM 3.5 billion incremental GDP)

68,000
(-5.4%) net decrease in jobs
(38,000 created,
106,000 lost/avoided).

Utilities
0.8% increase in GDP
(RM 0.5 billion incremental GDP)

10,000
(-5.4%) net decrease in jobs
(1,000 created,
11,000 lost/avoided).

There are 5 verticals and smart cities that are being focused on to drive 5G enterprise adoption

Manufacturing

Healthcare

Transportation

Agriculture

Energy

Smart Cities

Ongoing enterprise initiatives that leverage on transformational capabilities of 5G

	Manufacturing	Healthcare	Transportation	Agriculture	Energy	Smart Cities
Company	Clarion	KPJ Healthcare	Transocean	Sime Darby Plantation	Petronas	• Putrajaya • Ampang Jaya
Scope	Digitalised maintenance for optimal production	Innovative and optimized medical services	Effective logistics management	Improving productivity for higher yield	Autonomous onshore/ offshore operations	Enhanced urban living
Use Cases	› Video analytics to inspect on any defects › Intelligent Storage Rack › Automated Counter Machine › Automated Guided Vehicle	› Hololens to display information, used by the medical practitioners during training or live operation	› Container vision application for defect inspection	› Smart crop management › Real time precise fertilization spraying with 5G drone › Smart workforce	› Drone for surveillance and inspection › Robotics for field remote operation › Head mounted tablet for video monitoring	› Autonomous transportation › Smart surveillance › Smart traffic management

On 3 May 2024, DNB and Ericsson signed series of MOUs to kickstart digitalization initiative to drive new telecommunications solutions

	Intel	Scania	SKF	eMooVit
	Assembly and test manufacturing	*Fleet Management and enabling wireless connectivity with Assembly & Maintenance Center*	*Smart Factory with Wireless Digitalization*	*Autonomous Vehicle Exploration*
Industry	Technology, Software and Analysis Provisioner	Transportation/ Assembly & Maintenance Center	Manufacturing	Transportation
Scope	› Asset and operation optimization	› Fleet management › Removing fiber from Assembly & Maintenance Center	› Smart factory › Removing fiber from manufacturing floor	› 5G Autonomous bus pilot
Tentative Use Cases	› Asset and operation optimization › Control optimization and autonomy › Condition monitoring › Energy monitoring and management	› Tracking and tracing of fleet assets › Smart dashcam › Fuel management	› Data shower and analysis › Video sensor monitoring and data capture	› Real-time 360 live streaming › V2X communication

Establishment of "My5G Portal" - DNB's 5G Experience Centre – will augment 5G adoption by enterprises

Partnering with local and international solution partners to showcase 5G-enabled use cases across multiple industries

ERICSSON · aerodyne · AINQA · avanade · AXIS COMMUNICATIONS

Aye · Capgemini engineering · alhua TECHNOLOGY · ELSA · intel

KUKA · MEDIATEK · mediawave · OMRON · OPPO

Propick · Rokid · SAMSUNG · one · Sumavision

TDTECH · Tencent Cloud · TERAS · tp-link · Vector InfoTech

Signify · Weston Robot · XTRIKE ROBOTICS

My5G Portal

a **state-of-the-art interactive centre** that offers a unique space showcasing over **50 use cases** cutting across **12 industry verticals**

Objectives

- Venue for companies, public services, academia and public to **embrace, understand** and **discover 5G solutions**
- Platform to **attract and nurture the next generation of talent** in developing 5G applications
- **Conducive environment for talent and ideas to thrive**, and to ensure that Malaysia remains at the forefront of the digital revolution

Partners

30

Thank You

www.digital-nasional.com.my