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**Test Report on 26 GHz and 28 GHz Bands**

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**NTT Com Asia Limited**

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Version 2.0

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## 1. Introduction

NTT Com Asia Limited has set up a 5G Standalone (SA) infrastructure with indoor mmWave site inside its campus area in NTT office in TKO industrial estate, for conducting a field trial of the 27.95-28.35GHz (26/28 GHz) frequency bands radio characteristics.

Temporary Permit (Permit No. T00766) was granted by CA to NTT Com Asia Limited for the network field trial under 26/28 GHz band from 5 May to 4 Nov 2023.

This test report details the setup and trial result of test during the said period.

## 2. Scope of Test

### 2.1 Test Equipment

#### 2.1.1 Edgencstar NR equipment

Items	Details
5G Frequency	FR2: n257 (28GHz)
Technology	2T2R Cell
Radio angle	$\geq \pm 50^\circ$ (H) $\geq \pm 20^\circ$ (V)
QAM	64/128/256/512 QAM uplink/downlink
Tx Power	Max. 42.0dbm EIRP
Carrier Bandwidth	2 x 400 MHz



Figure 1 NR model: EMP250

#### 2.1.2 CPE Equipment

MeiG, Model SRT853L with Qualcomm X65 chipset.



- 5G mmWave/5G sub6 , downlink up to 10Gbps
- 10 Gbps Ethernet POE
- Waterproof IP65
- TR069 FOTA

	Parameters
Frequency Spectrum	N257/N258 N1/N3/N5/N28/N40/N41/N77/N78/N79
MIMO	Support DL 4T4R
EIRP	5G mmWave 40dBm 5G sub6 28dBm
BLE	Support (for device configure)
USIM	1*4FF SIM (nano card)
Power consumption	<45W
Ethernet	10G LAN
Power	POE (non-standard default)
Antenna	Internal 5G/4G*5 QTN547*2
Operating environment	IP65 / -40 °C ~ +50 °C / 5%~ 95%

Figure 2 CPE Equipment Specification

## 2.2 Test Location

Address: NTT Com Asia Limited, 6 Chun Kwong St, Tseung Kwan O Industrial Estate, N.T.



Figure 3 Test Location

Testing Area: Lobby, NTT office  
Private 5G site type: Indoor



Figure 4 Test Location

## 2.3 Test Configuration and Set-up

### 2.3.1 Test Setup

5G Standalone (SA) architecture is deployed for this testing, which does not require a current 4G LTE network as an “anchor” for the control signal. The configuration is a pure private environment, as depicted in Figure 5.

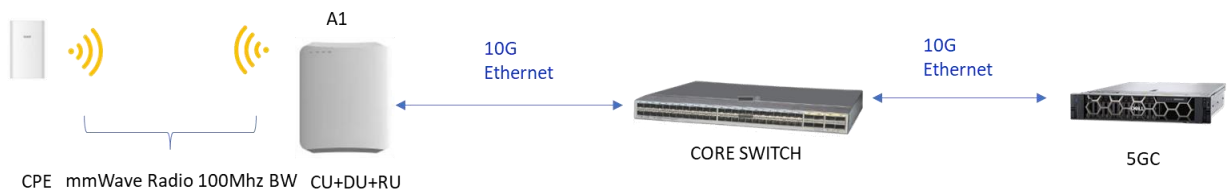


Figure 5 5G SA Architecture

One 5G mmWave gNB is installed at the lobby area near the glass wall (under the ceiling area as shown below, about 4 meters above local ground).

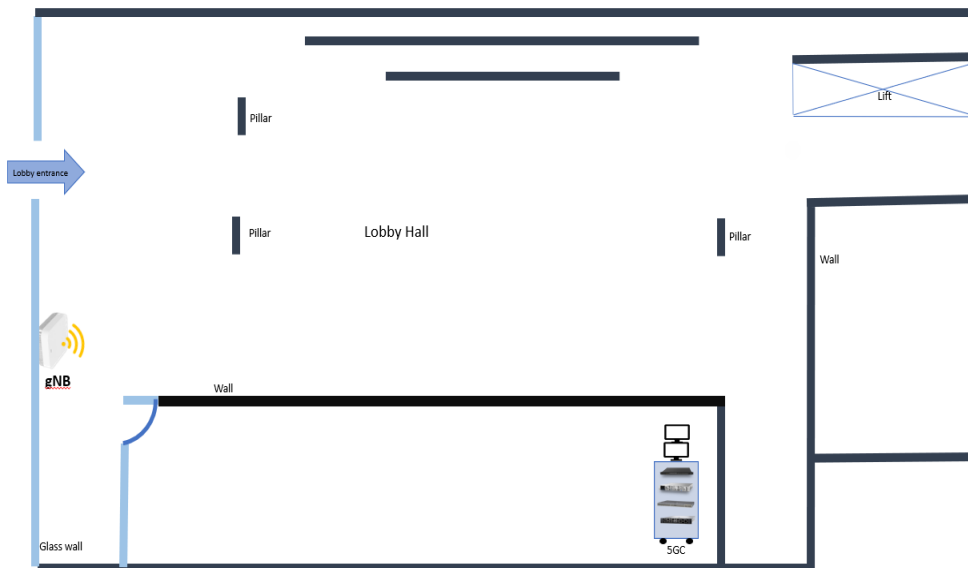


Figure 6 Equipment Setup

## 2.3.2 NR Cell Setting

Content	NR Cell Setting
ARFCN DL	2079451 (n257)
Centre Frequency	28.017GHz
Bandwidth	100MHz
Subcarrier Spacing (Khz)	120
Frameset	DDSU



### 2.3.3 Test Procedure

Coverage and throughput measurement was taken with CPE at different locations (positions P1~P5)

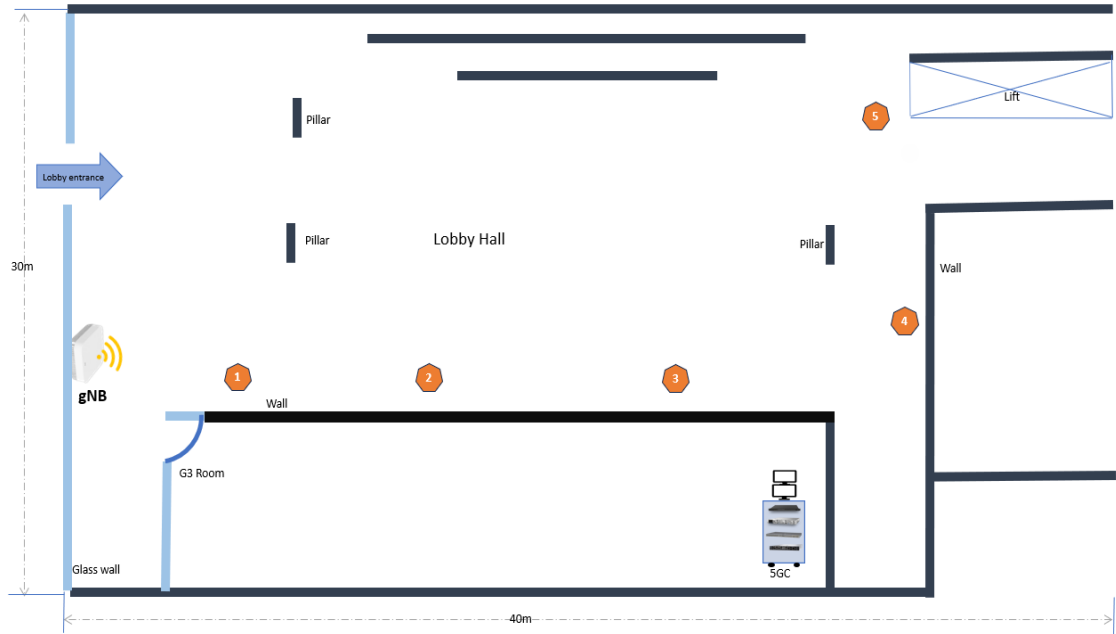


Figure 7 Testing points

### 3. Test Result

#### Coverage and throughput

Position	Distance (meter)	RSRP (dBm)	SNR (dB)	Uplink (Mbps)*	Downlink (Mbps)*	Latency(ms)
P1	5	-68	24	225	905	5
P2	10	-73	19	129	630	6
P3	20	-87	15	84	436	8
P4	25	Lost	Lost	N/A	N/A	N/A
P5	30	Lost	Lost	N/A	N/A	N/A

The signal strength was dropped significantly and finally lost at P4 and P5 at non line-of-sight (NLOS) locations.

\*Note:

1. Speed test is done by internal FTP server.

## 4. Conclusion

The 5G Standalone (SA) architecture with 27.95-28.35GHz (26/28 GHz) mmWave indoor site is successfully deployed and tested at NTT office, and the measurement results are verified with the coverage and throughput.

The benefits of 5G mmWave includes high speed, large capacity and low latency, but it also comes with the limitation of pathloss and low penetration, which is demonstrated at NLOS position at our test result.

With more chipset and device supporting 26/28GHz in the future, enterprise can leverage the 5G mmWave technology and build their own private 5G network to deploy latest technologies, like A.I. or other innovative applications, with high security, fast speed and ultra-low latency.