



**ZHEJIANG HANGCHA IMP. & EXP. CO., LTD.**

**Factory site:** 666 Xiangfu Road,  
Hangzhou, Zhejiang, China (311305)

Tel: +86-571-88926735 88926755  
Fax: +86-571-88926789 88132890

sales@hcforklift.com  
www.hcforklift.com



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ISO14001:2015



ISO9001:2015



HANGCHA trucks conform  
to the European Safety  
Requirements.

2020 VERSION 2

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## A Series 3-W Electric Forklift Truck with EPS System

with capacities of 1,300 to 2,000kg

*The World of Hangcha*





# Characteristics and Advantages

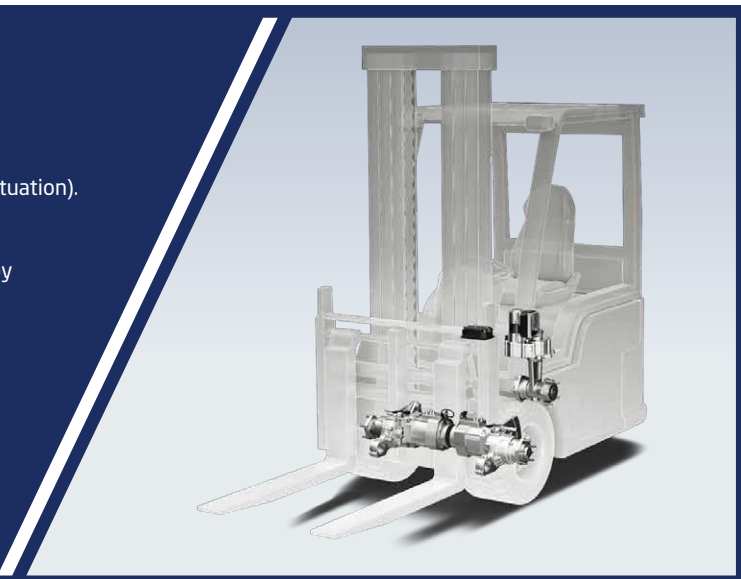
- / Compact design offering all components required for the steering.
- / 13% energy saving in VDI cycle thanks to power-on-demand technology.
- / Transmission with automotive gearing guarantees an extremely low noise level.
- / Omission of all hydraulic components, therefore no assembly costs incur for the currently used hydraulic steering (valves, tubes, hoses).
- / Maintenance free.
- / Ease service due to self test routine.
- / Harmonized system components (transmission, steering motor and-controller, steering angle sensor).
- / Easy-to-assemble design.





# EPS3

- ▶ Excellent driving ergonomics (e.g. steering ratio adjusted to actual driving situation).
- ▶ Steering parameters matched to customer specifications.
- ▶ New features via software modification (e.g. signaling straight-line driving by modifying the steering resistance).
- ▶ ZF-tested interaction of all system modules.
- ▶ 100% EOL tested.
- ▶ ZF's system responsibility.
- ▶ Certified according to UL583E.
- ▶ Functional system safety approved by the Technical Control Board (TÜV Süd) according to DIN EN 13849,PL d conformity.



## Technical Data EPS3:

| Technical data            | EPS 3                                                 |
|---------------------------|-------------------------------------------------------|
| Max. static wheel load    | 1900kg                                                |
| Transmission type         | 3-stage helical gear transmission with grease filling |
| Steering ratio            | 1:176                                                 |
| Max. steering torque      | 700Nm                                                 |
| Wheel dimension           | Solid Tire 15x4.5-8                                   |
| Steering angle            | max.+/-135°                                           |
| Supply voltage            | 48V                                                   |
| Motor power (53-70%)      | 400W                                                  |
| Ambient temperature range | -30...+40°C                                           |
| Protection class          | IP65                                                  |

## Energy Savings Result of Customer Measurements

EPS 3 - basis of comparison: VDI 2198 cycle (determination of consumption data)

| Example                                    | Hydrost. Steering | Electric Power Steering |
|--------------------------------------------|-------------------|-------------------------|
| Average lap time (sec)                     | 60                | 60                      |
| Total energy used (kWh)                    | 5.96              | 5.19                    |
| Energy used per lap (kWh)                  | 0.099             | 0.0865                  |
| E-steer energy savings                     | 0.77kWh           |                         |
| E-steering energy percent difference saved | 12.9%             |                         |

## E-Steering vs. Hydrostatic Steering Motivation for Development

| Hydrostatic Steering |                                        | Electric Power Steering                                                            |                    |
|----------------------|----------------------------------------|------------------------------------------------------------------------------------|--------------------|
| Energy Consumption   | Hydraulic circle always active         | Only active during steering maneuver                                               | Energy Consumption |
| Environment          | Oil circuit Necessary                  | No oil circuit for steering                                                        | Environment        |
|                      | Risk of oil leakage                    |                                                                                    |                    |
|                      | Hydro motor loud and constantly active | Quiet transmission with automotive gears in short-term operation (Power on demand) |                    |
| Comfort              | Fix steering regime                    | Programmable driver profile                                                        | Comfort            |
|                      | Functionality fixed                    | New features per software modification                                             |                    |
|                      | Complex, decentral system              | Compact, ready-to-go, EOL tested                                                   |                    |

## Standard Specification

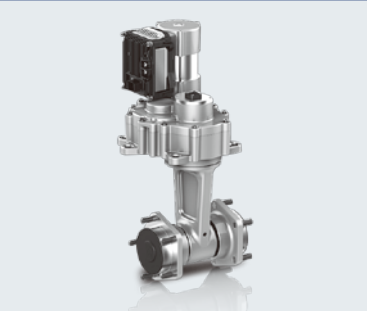
- / High efficiency AC driving motor AC pump motor
- / Multi-functions instrument
- / Front dual driving motors GP21(ZF)
- / Rubber floor mat
- / Solid tyre
- / Emergency disconnect switch
- / 2-valve inside chassis
- / LED headlight
- / Rear combination LED light
- / Panoramic rearview mirror (in the middle position of the overhead guard)
- / 3 meters duplex wide view mast
- / Adjustable steering column
- / Full electronic controlled travelling, lifting and steering
- / Horn and reversing buzzer
- / ZAPI controller
- / CAN-BUS system
- / Low noise gear pump (Brand: Shimadzu, Made in Japan)
- / EPS3 (ZF) steering system
- / Soft landing system
- / Non suspension seat: Grammer GS12 with switch
- / ZF reducer and SCHABMULLER traveling motor

## Options

- / 3rd or 4th hydraulic function
- / 2.5-4.5 meters duplex mast
- / 4.3-6.5 meters triplex mast
- / Rear working LED light
- / Reversing assist grip with horn button
- / Integrated sideshifter
- / Other attachments
- / Other dimension forks
- / Special carriage and backrest
- / Big capacity battery
- / Non-marking tyre
- / Battery charger
- / Battery side roll-out (Using pallet truck or trolley)
- / Fingertip control on the adjustable armrest
- / Cold store protection
- / Suspension seat
- / Full closed cabin
- / Socket for other equipment
- / Blue spot light
- / OPS system



ZF GP21 dual traction motor



EPS3 steering system



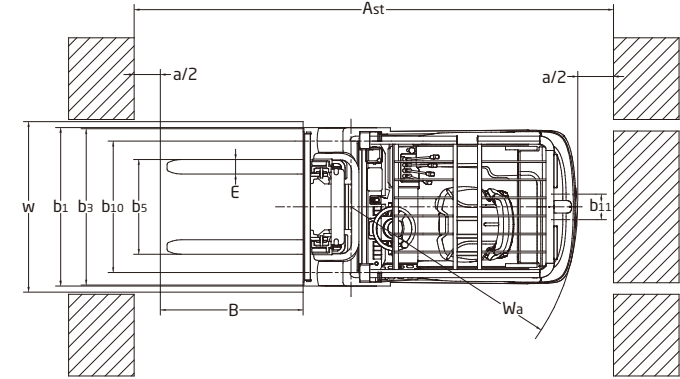
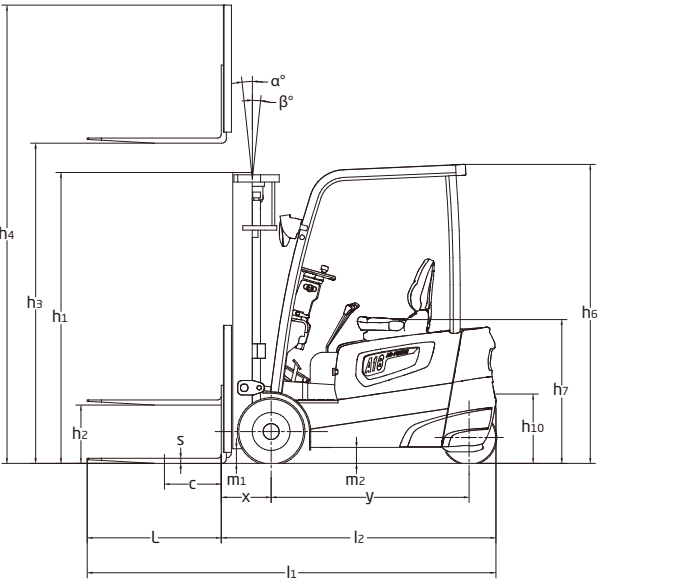
Steering angle display can help improving safety during driving



The small turning radius is suitable for narrow channel

A Series 3-W Electric Forklift Truck with EPS System

| Distinguishing mark | 1.1    | Manufacturer                                                    |            | HANGCHA GROUP CO.,LTD. |               |               |               |               |  |
|---------------------|--------|-----------------------------------------------------------------|------------|------------------------|---------------|---------------|---------------|---------------|--|
|                     | 1.2    | Manufacturers type designation                                  |            | CPDS13-AZ6-ES          | CPDS15-AZ6-ES | CPDS16-AZ6-ES | CPDS18-AZ6-ES | CPDS20-AZ6-ES |  |
|                     | 1.3    | Drive: electric (battery or mains), diesel, petrol, fuel gas    |            | Electric               | Electric      | Electric      | Electric      | Electric      |  |
|                     | 1.4    | Operator type: hand, pedestrian, standing, seated, order-picker |            | Seated                 | Seated        | Seated        | Seated        | Seated        |  |
|                     | 1.5    | Load capacity/rated load                                        | Q (kg)     | 1300                   | 1500          | 1600          | 1800          | 2000          |  |
|                     | 1.6    | Load centre distance                                            | c (mm)     | 500                    | 500           | 500           | 500           | 500           |  |
|                     | 1.8    | Load distance, centre of drive axle to fork                     | x (mm)     | 355                    | 355           | 355           | 360           | 360           |  |
|                     | 1.9    | Wheelbase                                                       | y (mm)     | 1250                   | 1250          | 1358          | 1358          | 1466          |  |
|                     | 2.1    | Service Weight                                                  | kg         | 2860                   | 2980          | 3120          | 3240          | 3470          |  |
| Weight              | 2.2    | Axle loading, laden front/rear                                  | kg         | 3600/560               | 3890/590      | 4100/620      | 4350/690      | 4750/720      |  |
|                     | 2.3    | Axle loading, unladen front/rear                                | kg         | 1350/1510              | 1350/1630     | 1440/1680     | 1440/1800     | 1530/1940     |  |
|                     | 3.1    | Tyres: solid rubber, superelastic, pneumatic, polyurethane      |            | solid                  | solid         | solid         | solid         | solid         |  |
| Tyres, chassis      | 3.2    | Tyre size, front                                                |            | 18x7-8                 | 18x7-8        | 18x7-8        | 18x7-8        | 200/50-10     |  |
|                     | 3.3    | Tyre size, rear                                                 |            | 15x4.5-8               | 15x4.5-8      | 15x4.5-8      | 15x4.5-8      | 15x4.5-8      |  |
|                     | 3.5    | Wheels, number front rear (x = driven wheels)                   |            | 2x/2                   | 2x/2          | 2x/2          | 2x/2          | 2x/2          |  |
| Dimensions          | 3.6    | Tread, front                                                    | b10 (mm)   | 910                    | 910           | 910           | 910           | 915           |  |
|                     | 3.7    | Tread, rear                                                     | b11 (mm)   | 175                    | 175           | 175           | 175           | 175           |  |
|                     | 4.1    | Tilt of mast/fork carriage forward/backward                     | α/β(°)     | 6/6                    | 6/6           | 6/6           | 5.5/6         | 5.5/6         |  |
|                     | 4.2    | Height, mast lowered                                            | h1 (mm)    | 1995                   | 1995          | 1995          | 1995          | 1995          |  |
|                     | 4.3    | Free lift                                                       | h2 (mm)    | 145                    | 145           | 145           | 145           | 145           |  |
|                     | 4.4    | Lift                                                            | h3 (mm)    | 3000                   | 3000          | 3000          | 3000          | 3000          |  |
|                     | 4.5    | Height, mast extended                                           | h4 (mm)    | 3945                   | 3945          | 3945          | 3945          | 3945          |  |
|                     | 4.7    | Height of overhead guard STD.                                   | h5 (mm)    | 2040                   | 2040          | 2040          | 2040          | 2040          |  |
|                     | 4.9    | Seat height/stand height                                        | h7 (mm)    | 1000                   | 1000          | 1000          | 1000          | 1000          |  |
|                     | 4.12   | Coupling height                                                 | h10 (mm)   | 500                    | 500           | 500           | 500           | 500           |  |
|                     | 4.19   | Overall length                                                  | l1 (mm)    | 2710                   | 2710          | 2818          | 2823          | 2930          |  |
|                     | 4.20   | Length to face of forks                                         | l2 (mm)    | 1790                   | 1790          | 1898          | 1903          | 2010          |  |
|                     | 4.21   | Overall width                                                   | b1 (mm)    | 1086                   | 1086          | 1086          | 1086          | 1120          |  |
|                     | 4.22   | Fork dimensions                                                 | s/e/l (mm) | 35/100/920             | 35/100/920    | 35/100/920    | 35/100/920    | 40/122/920    |  |
|                     | 4.23   | Fork carriage DIN 15 173 --- ISO 2328, class/type A,B           |            | ISO2328 2A             | ISO2328 2A    | ISO2328 2A    | ISO2328 2A    | ISO2328 2A    |  |
|                     | 4.24   | Fork-carriage width                                             | b3 (mm)    | 1000                   | 1000          | 1000          | 1000          | 1000          |  |
|                     | 4.25   | Distance between fork-arms                                      | b5 (mm)    | 200/1000               | 200/1000      | 200/1000      | 240/1000      | 240/1000      |  |
|                     | 4.31   | Ground clearance, laden, below mast                             | m1 (mm)    | 100                    | 100           | 100           | 100           | 100           |  |
|                     | 4.32   | Ground clearance, centre of wheelbase                           | m2 (mm)    | 110                    | 110           | 110           | 110           | 110           |  |
|                     | 4.34.1 | Aisle width for pallets 1000 x 1200 crossways                   | Ast (mm)   | 3134                   | 3134          | 3237          | 3237          | 3342          |  |
|                     | 4.34.2 | Aisle width for pallets 800 x 1200 lengthways                   | Ast (mm)   | 3257                   | 3257          | 3360          | 3360          | 3465          |  |
| Performance Data    | 4.35   | Turning radius                                                  | Wa (mm)    | 1452                   | 1452          | 1555          | 1555          | 1660          |  |
|                     | 4.36   | Internal turning radius                                         | b13 (mm)   | 620                    | 620           | 680           | 730           | 730           |  |
|                     | 5.1    | Travel speed, laden/unladen                                     | km/h       | 16/16                  | 16/16         | 16/16         | 16/16         | 15/15         |  |
|                     | 5.2    | Lift speed, laden/unladen                                       | m/s        | 0.400/0.470            | 0.390/0.470   | 0.380/0.470   | 0.370/0.450   | 0.350/0.450   |  |
|                     | 5.3    | Lowering speed, laden/unladen                                   | m/s        | 0.460/0.440            | 0.460/0.440   | 0.460/0.440   | 0.460/0.420   | 0.470/0.420   |  |
|                     | 5.5    | Drawbar pull, laden/unladen                                     | N          | 3500 /4000             | 3400 /3950    | 3300/3900     | 3200/3800     | 3050/3700     |  |
|                     | 5.6    | Max. Drawbar pull, laden/unladen                                | N          | 12000/12000            | 12000/12000   | 11600/11500   | 11500/11400   | 11200/11000   |  |
|                     | 5.7    | Gradeability, laden/unladen                                     | %          | 16/18                  | 16/18         | 16/18         | 15/17         | 13/15         |  |
|                     | 5.8    | Max. gradeability, laden/unladen                                | %          | 20/20                  | 20/20         | 20/20         | 18/20         | 15/18         |  |
|                     | 5.9    | Acceleration time, laden/unladen (0-10m)                        | s          | 4.5/4.1                | 4.6/4.2       | 4.7/4.3       | 4.8/4.4       | 4.9/4.5       |  |
|                     | 5.10   | Service brake                                                   |            | Hydraulic              | Hydraulic     | Hydraulic     | Hydraulic     | Hydraulic     |  |
| Electric engine     | 5.11   | Parking brake                                                   |            | Mechanical             | Mechanical    | Mechanical    | Mechanical    | Mechanical    |  |
|                     | 6.1    | Drive motor rating S2 60 min                                    | kw         | 4.8x2 AC               | 4.8x2 AC      | 4.8x2 AC      | 4.8x2 AC      | 4.8x2 AC      |  |
|                     | 6.2    | Lift motor rating at S3 15%                                     | kw         | 9.5 AC                 | 9.5 AC        | 9.5 AC        | 9.5 AC        | 9.5 AC        |  |
|                     | 6.3    | Steering motor                                                  | w          | 400                    | 400           | 400           | 400           | 400           |  |
|                     | 6.4    | Battery acc. to DIN 43 531/35/36 A,B,C, no                      |            | DIN43531 A             | DIN43531 A    | DIN43531 A    | DIN43531 A    | DIN43531 A    |  |
|                     | 6.5    | Battery voltage, nominal capacity K5                            | V/Ah       | 48/400                 | 48/500        | 48/500        | 48/500        | 48/600        |  |
|                     |        | Battery weight                                                  | kg         | 700                    | 700           | 920           | 920           | 1000          |  |
|                     | 6.6    | Battery dimensions                                              | l/b/h(mm)  | 830×522×627            | 830×522×627   | 830×630×627   | 830×630×627   | 830×738×627   |  |
| Addition data       |        | Min. battery weight                                             | kg         | 610                    | 610           | 850           | 850           | 900           |  |
|                     |        | Max. battery weight                                             | kg         | 750                    | 750           | 1000          | 1000          | 1100          |  |
|                     | 8.1    | Type of drive control                                           |            | MOSFET/AC              | MOSFET/AC     | MOSFET/AC     | MOSFET/AC     | MOSFET/AC     |  |
|                     | 9.1    | Manufacturer                                                    |            | ZAPI                   | ZAPI          | ZAPI          | ZAPI          | ZAPI          |  |
|                     | 10.1   | Operating pressure for attachments                              | bar        | 140                    | 150           | 150           | 150           | 150           |  |
|                     | 10.2   | Oil volume for attachments                                      | l/min      | 35                     | 35            | 35            | 35            | 35            |  |
|                     | 10.3   | Hydraulic Tank - capacity (drain & refill)                      | liter      | 24                     | 24            | 26            | 26            | 29            |  |
|                     | 10.7   | Sound level at the driver's ear according to EN / DIN 12 053    | dB (A)     | 72                     | 72            | 73            | 73            | 74            |  |
|                     | 10.8   | Towing coupling, type DIN                                       |            | Φ24 Pin                | Φ24 Pin       | Φ24 Pin       | Φ24 Pin       | Φ24 Pin       |  |



a=200mm safety clearance  
Ast=a+Wa+√(X+B)<sup>2</sup>+ (W/2)<sup>2</sup>  
X: Load distance  
B: Length of load or forks which is longer

1.3-2.0t Mast Specification:

| NO. | Type                           | Model | Lifting height | Lowered overall height | Overall height |                  | Free lifting height |                  | Tilting range |          | Capacity          |      |      |      |      |
|-----|--------------------------------|-------|----------------|------------------------|----------------|------------------|---------------------|------------------|---------------|----------|-------------------|------|------|------|------|
|     |                                |       |                |                        | With backrest  | Without backrest | With backrest       | Without backrest | Forward       | Backward | Load center@500mm |      |      |      |      |
|     |                                |       |                |                        |                |                  |                     |                  |               |          | 1.3t              | 1.5t | 1.6t | 1.8t | 2.0t |
|     |                                |       |                |                        |                |                  |                     |                  |               |          |                   |      |      |      |      |
| 1   | Duplex wide view mast          | M250  | 2500           | 1745                   | 3445           | 3065             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 2   |                                | M270  | 2700           | 1845                   | 3645           | 3265             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 3   |                                | M300  | 3000           | 1995                   | 3945           | 3565             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 4   |                                | M330  | 3300           | 2145                   | 4245           | 3865             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 5   |                                | M350  | 3500           | 2245                   | 4445           | 4065             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 6   |                                | M360  | 3600           | 2295                   | 4545           | 4165             | 145                 | 145              | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 7   |                                | M400  | 4000           | 2545                   | 4945           | 4565             | 145                 | 145              | 3.5           | 5        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 8   |                                | M430  | 4300           | 2710                   | 5245           | 4865             | 145                 | 145              | 3.5           | 5        | 1200              | 1450 | 1600 | 1700 | 1950 |
| 9   |                                | M450  | 4500           | 2820                   | 5445           | 5065             | 145                 | 145              | 3.5           | 5        | 1100              | 1400 | 1500 | 1700 | 1900 |
| 1   | Duplex full-free lifting mast  | U250  | 2500           | 1745                   | 3455           | 3095             | 800                 | 1160             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 2   |                                | U270  | 2700           | 1845                   | 3655           | 3295             | 900                 | 1260             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 3   |                                | U300  | 3000           | 1995                   | 3955           | 3595             | 1050                | 1410             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 4   |                                | U330  | 3300           | 2145                   | 4255           | 3895             | 1200                | 1560             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 5   |                                | U350  | 3500           | 2245                   | 4455           | 4095             | 1300                | 1660             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 1   | Triplex full-free lifting mast | U360  | 3600           | 2295                   | 4555           | 4195             | 1350                | 1710             | 5.5           | 6        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 2   |                                | U400  | 4000           | 2545                   | 4955           | 4595             | 1600                | 1960             | 3.5           | 5        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 3   |                                | N400  | 4000           | 1910                   | 4955           | 4595             | 965                 | 1325             | 3.5           | 5        | 1300              | 1500 | 1600 | 1800 | 2000 |
| 4   |                                | N430  | 4300           | 2010                   | 5255           | 4895             | 1065                | 1425             | 3.5           | 5        | 1200              | 1400 | 1550 | 1700 | 1900 |
| 5   |                                | N450  | 4500           | 2075                   | 5455           | 5095             | 1130                | 1490             | 3.5           | 5        | 1100              | 1350 | 1500 | 1600 | 1800 |
| 6   |                                | N480  | 4800           | 2175                   | 5755           | 5395             | 1230                | 1590             | 3.5           | 5        | 1000              | 1300 | 1450 | 1600 | 1700 |
| 7   |                                | N500  | 5000           | 2240                   | 5955           | 5595             | 1295                | 1655             | 3.5           | 5        | 900               | 1250 | 1400 | 1500 | 1600 |
| 8   |                                | N550  | 5500           | 2410                   | 6455           | 6095             | 1465                | 1825             | 3.5           | 5        | 800               | 1150 | 1250 | 1300 | 1500 |
| 9   |                                | N600  | 6000           | 2625                   | 6955           | 6625             | 1680                | 2010             | 3.5           | 5        | 700               | 1000 | 1100 | 1200 | 1300 |
| 10  |                                | N650  | 6500           | 2840                   | 7455           | 7170             | 1895                | 2180             | 3.5           | 5        | 530               | 800  | 900  | 1000 | 1100 |

