# Market Report Summary
# 2024-2025 Cellular Broadband Device & Module Market

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# About the Market Report

**Report Title:** “2024-2025 Cellular Broadband Device & Module Market”

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**Research Items**

- Mobile Broadband Devices : USB data card, Mobile Hotspot
- Cellular CPE
- Cellular Laptop/ Tablet
- Cellular Industrial/ Automotive Module
- Cellular Consumer Wearable
- Unlicensed Band LPWA Device (Sigfox, LoRa)
- Cellular Modem Chipset

Sample report with table of contents is available.
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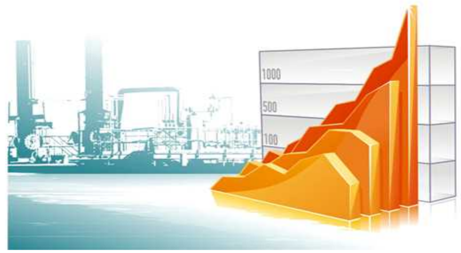


# 2024 Market Summary and Topics

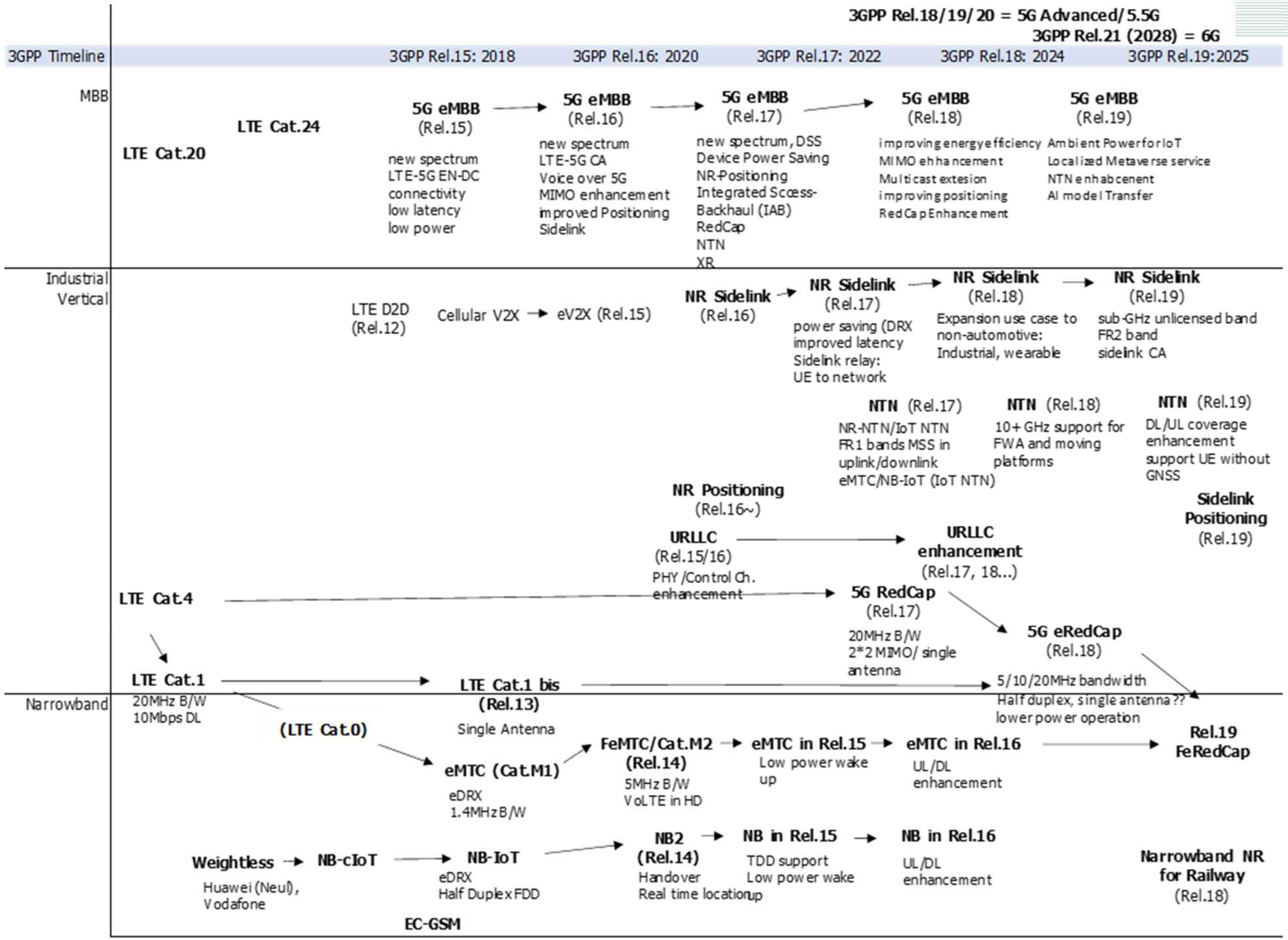
Different market trend by geography.

- China: low end mobile router market expand, strong recovery in Industrial M2M. Driving new market, new technology by low price.
- India: 5G FWA (CPE) and industrial M2M (Smart meter, GPS tracking…) market grow
- N.America: Weak industrial module demand, 5G CPE shipment decreased by inventory
- Europe: Weak industrial module, 4G to 5G migration is slow in FWA.

- Geopolitical impact to supply chain: no China/less China in part of M2M (infrastructure, security and safety, government relations…), PC WWAN modules, automotive in the USA, India, part of Europe… the policy differs by MNOs.
- USA automotive ruled not to use China software and tech for OEM telematics.
- Quectel and Fibocom gains market share in the USA, India, Europe… no significant impact in revenue so far.
- Chinese cellular chip suppliers gradually expand footprint outside China through module and device suppliers.

- LTE (Cat.1 bis) will continue long term, as a successor of 2G and 3G. Hard for low end 5G (RedCap, eRedCap) suppliers to make chipset as price-competitive as LTE. Availability of 5G SA network is another challenge for low end 5G.

# 1. Cellular Standard Evolution




*New standards in 3GPP Rel.17/18*

***RedCap***

***eRedCap***

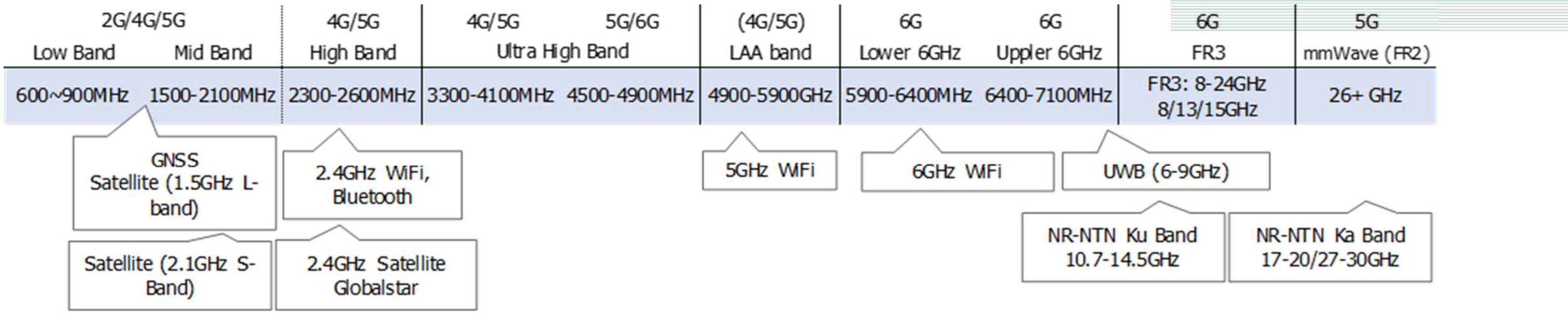
***IoT-NTN/ NR-NTN (Satellite)***

*NR-V2X/ Sidelink*

*NR Positioning*

- **RedCap: long term migration path from LTE Cat.4/6**
- **eRedCap: long term migration path from LTE Cat.1**
- IoT-NTN (Rel .17): for consumer, automotive and IoT applications, small messaging
- NR-NTN: smartphone and broadband service. Commercial after 2027-2028?
- 3GPP Rel. 18/19/20 (5G-Advanced) and 6G focus on improving latency, coverage and spatial use efficiency.

# 2. Consideration on Spectrum Band




6G band allocation by Area

| | 6-7GHz | 8GHz | 13GHz | 15GHz |
|---|---|---|---|---|
| APAC (ex-China) | 6.4-7.1GHz | ***V*** | | ***V*** |
| China | ***V*** | | | ***V*** |
| N. America | No | Under study | ***V*** | ***V*** |
| Europe | 6.4-7.1GHz | | | ***V*** |

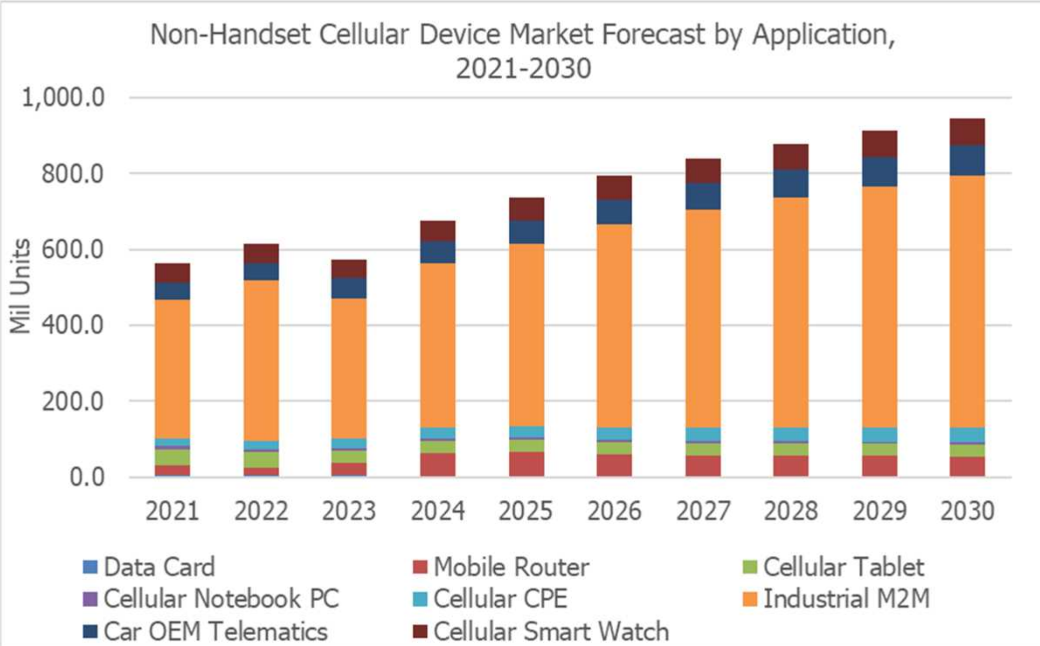
2nd Phase of deployment?

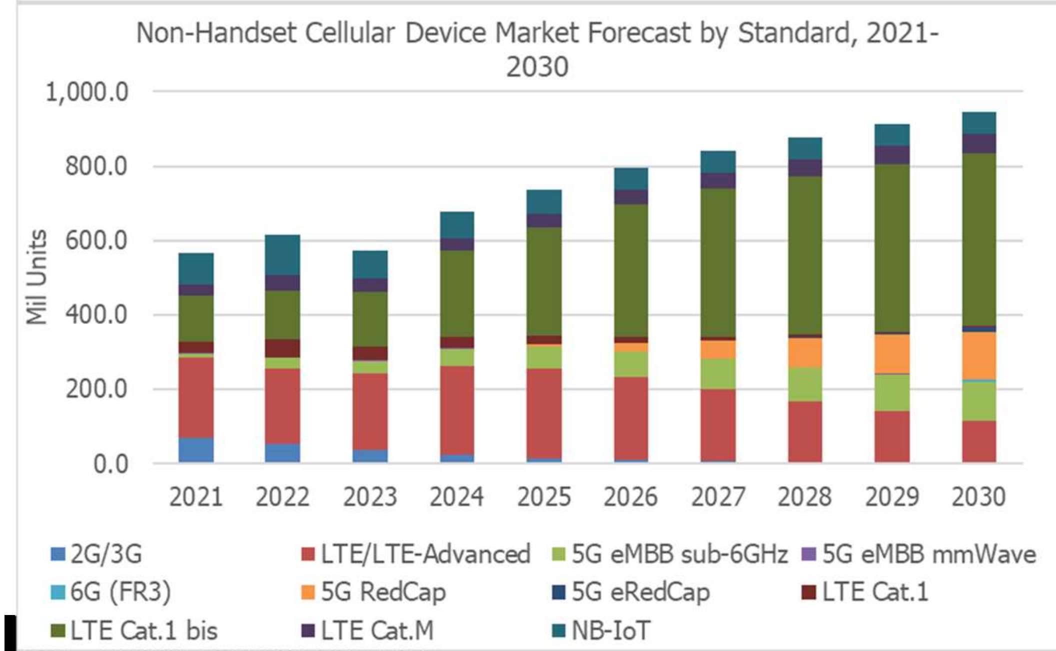
FR1-like RFFE architecture

FR1-like or AiFEM (Antenna in FEM) RFFE architecture?

- 6G spectrum band: different band allocation by area. 6-7GHz in China, 13GHz in the USA. Upper 6GHz or 8GHz in other countries?
- Increasing demand for mmWave for "data consuming" FWA use case in the USA, India(??) and other developing countries. RF/Ant cost is the challenge in developing countries.
- NTN uses L-band/S-band for service link. No additional RF parts necessary for IoT-NTN. Additional RFFE (PA/LNA) may be required for voice and data service (NR-NTN).

# 3. Non-handset Cellular Modem Market Forecast



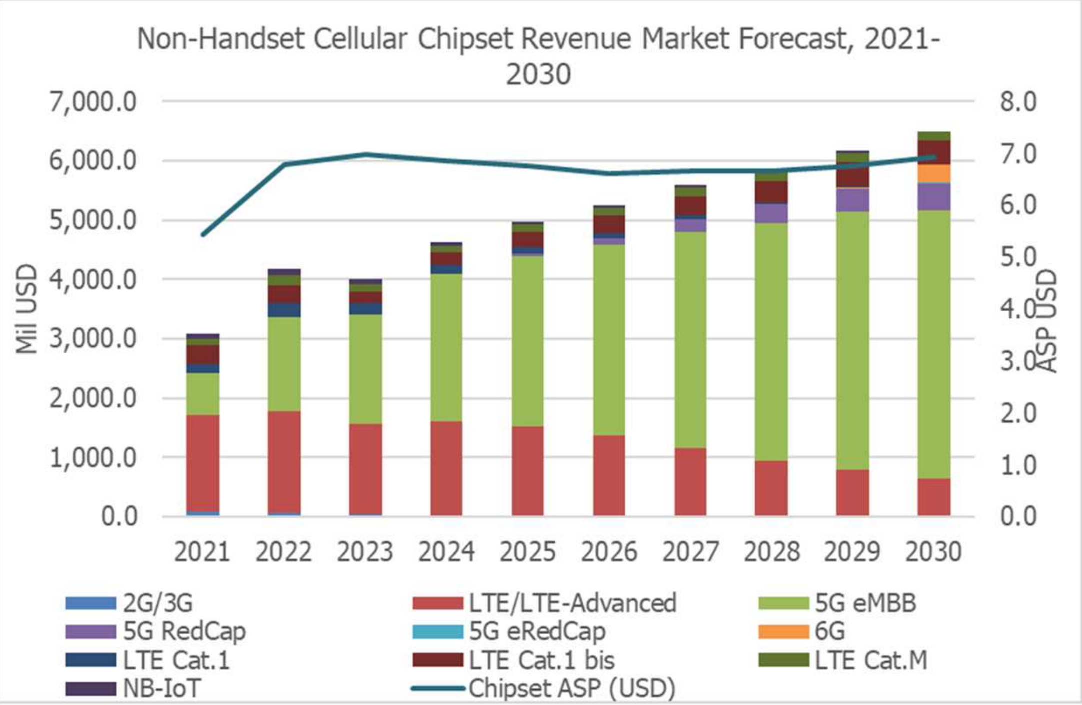




- 2024 significant rebound, +17.9% YoY growth. The growth came from China mobile router, China Industrial IoT, China consumer wearable, and India FWA. Outside China industrial IoT module market remains weak.
- 2025 cellular non-handset market: high single digit (8.8%) growth. China IoT module market growth normalize, non-China IoT rebound, India FWA continue growth, USA FWA market rebound.

- Significant growth of LTE Cat.1 bis market, market share up from 25% to 35% in 2023-2024. LTE market share stable (36% to 35%), 5G slightly increase from 6% to 7%. Cellular LPWA (LTE Cat.M + NB-IoT) share down from 20% to 15%.
- LTE Cat.1 bis will keep growing share, reaching 49-50% in 2028-2030. Cellular LPWA shrink to 11-12% in 2028-2030.

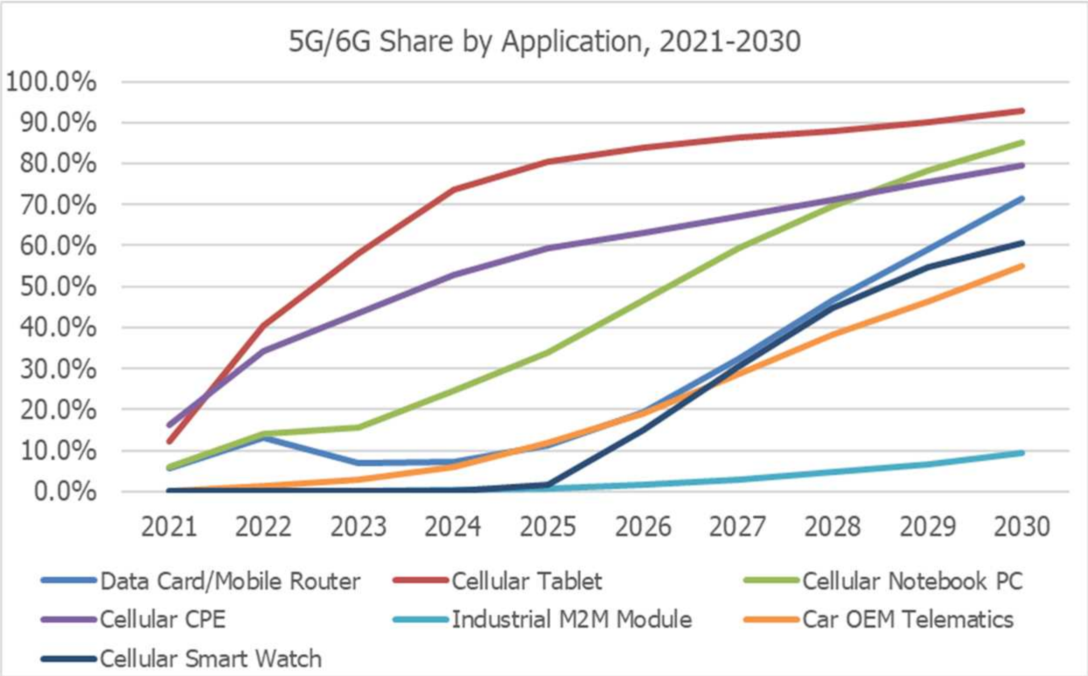
- 5G eMBB grow in broadband and telematics applications, market share grow to 11% in 2029-2030.
- 5G Redcap: market start growing from 2026 in China driven by low-cost Chinese chipset. 5G RedCap market will also grow for wearables from 2026.
- 5G eRedCap: start of mass production in late 2028-2029, small share by 2030. USA and China will be the early adaptor. LTE Cat.1 is mature and low price, MNOs may need to subsidize to push Cat.1 to eRedCap migration.

# 4. Non-Handset Cellular Chipset Revenue Forecast



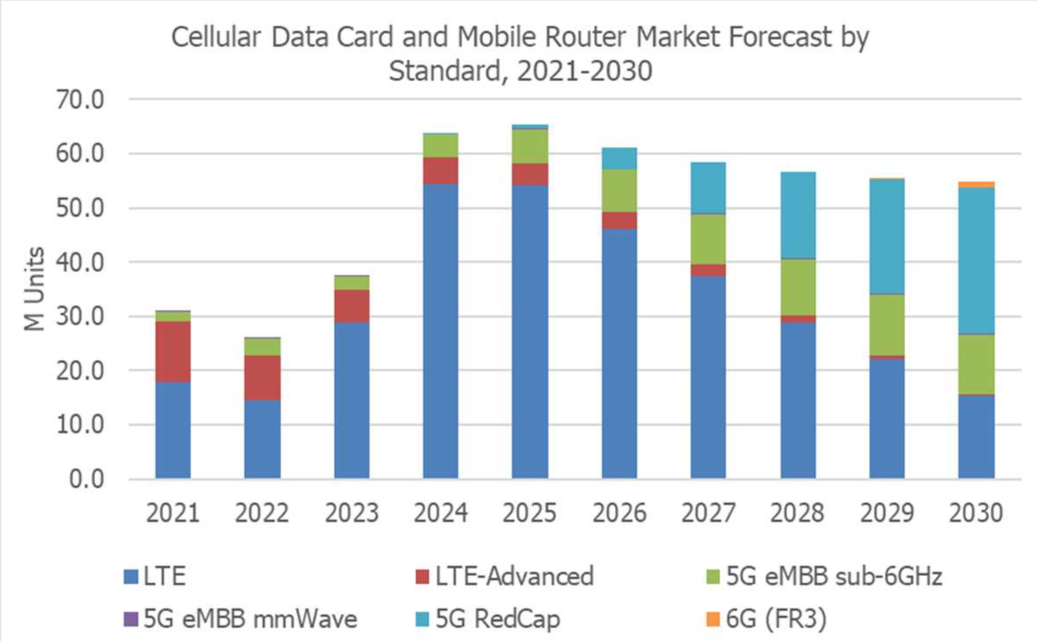

- Non-handset cellular chipset market is estimated about 4.7Bil USD in 2024. it will grow to 6.55 Billion USD in 2030.
- Broadband chipset (LTE + 5G eMBB + 5G RedCap + 6G) keeps major market share, about 88-90% in revenue base. 5G eMBB accounts 54% share in 2024, followed by LTE/LTE-Advanced (34%). 5G eMBB + 6G will account 74% share in 2030.
- LTE Cat.1 bis will count 5-6% of market share from 2024 to 2030. Despite the volume growth, LTE Cat.1 bis market share decrease in 2023.
- Cellular LPWA accounts only 4% share in 2024, decrease to 3% by 2030.

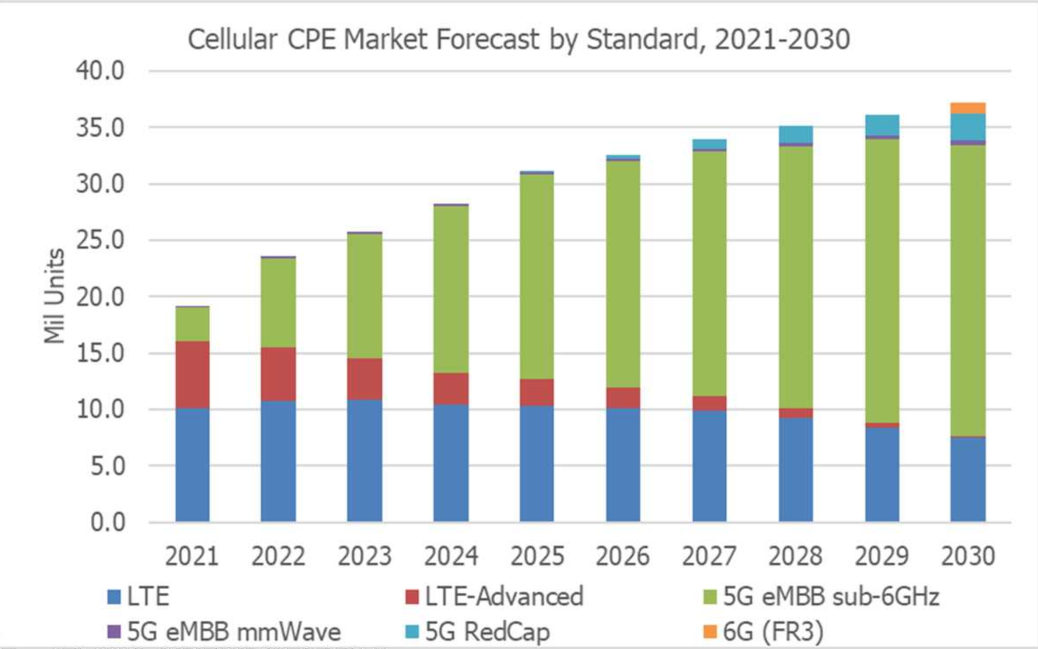
# 5. 5G/6G Adoption Ratio Forecast




- High 5G adoption ratio in cellular tablet and CPE.
- Tablet: smartphone OEMs deploy mature, low price 5G smartphone platform for tablet.
- CPE: strong demand for broadband. CPE cost is the matter in developing countries and EU.
- Cellular notebook PC: no strong demand for multi-gigabit data throughput, but 5G ratio gradually increase for marketing. AI PC also could boost 5G adoption ratio.
- Mobile Router/ Data Card: 5G is popular in developed countries, MNO channel market. No strong demand for multi-gigabit data throughput from business users. 5G Redcap could increase in China to replace low-cost LTE.
- Industrial M2M/IoT: Few applications which requires broadband + low latency communication. 5G adoption increase from 2025 with availability of low-cost RedCap module in China, for electric meters, industrial gateway, security camera…
- Car OEM Telematics: 5G adoption ratio start picking up in 2024-2025, reaching over 50% by 2030. China leads in 5G adoption.
- Cellular smart watch: 5G (Redcap) adoption start in 2025, for taking advantages of low power operation. Apple and Chinese OEMs will be the early adaptor.

# 6. MBB/ CPE Market Forecast



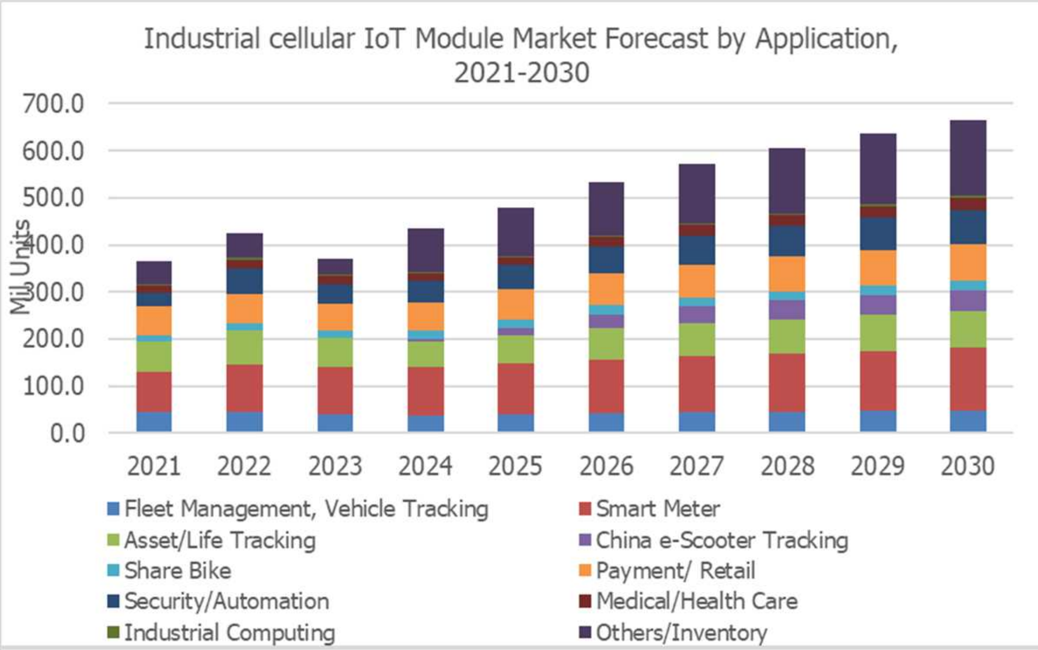



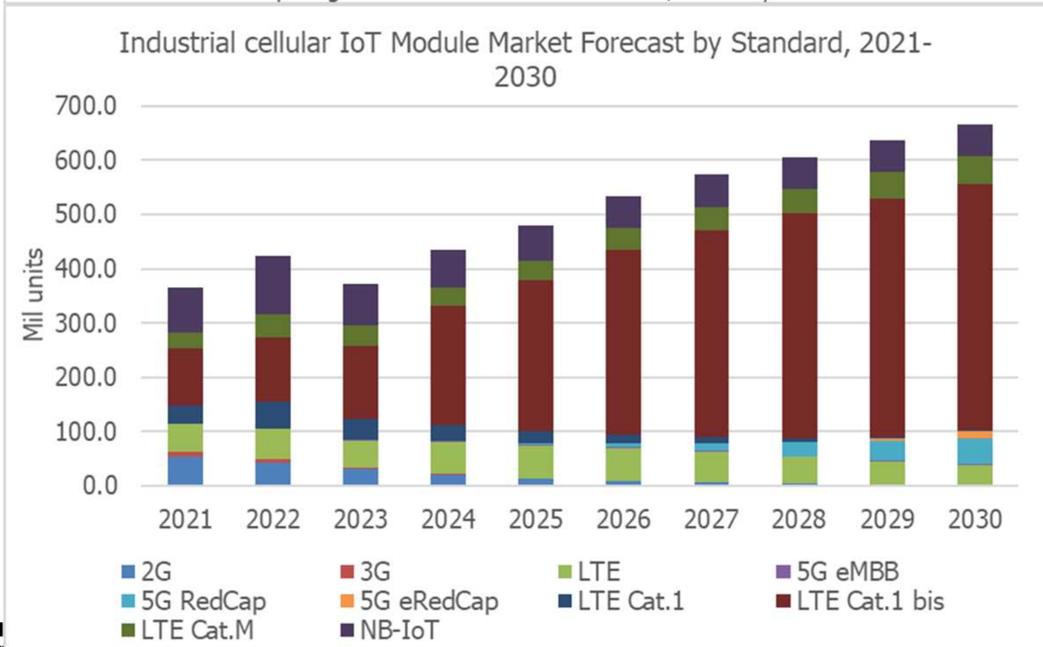

MBB (Mobile Broadband Device): Mobile Router and USB Data card.
Cellular CPE = LTE/5G broadband gateway.

- MBB device shipment decrease in 2022, rebound from remote work/remote school demand. Demand remains low outside-China market, though China ultra low price ($3-4) mobile router market suddenly expand in 2023-2024. China low price mobile router market is estimated about 40-50 million units in 2024.
- LTE Cat.4 is dominant in China low-end market, though 5G mobile router (eMBB, RedCap) has been introduced in 2024.
- 5G RedCap mobile router will increase in 2025-2026 in China and USA market.

- Cellular CPE: India 5G CPE market expand, while shipment decrease in N.America and Japan in 2024. 5G share passed 50% in 2024, reaching 59% in 2025.
- 5G CPE shipment expected to grow in India, N.America, and MEA in 2025.
- mmWave 5G attract attention in the N.America and India market for sub-6GHz data offloading. Challenges in signal propagation, building infrastructure, cost of antenna modules.
- 5G RedCap gains interest from developing countries as low-cost 5G FWA solution for indoor deployment.

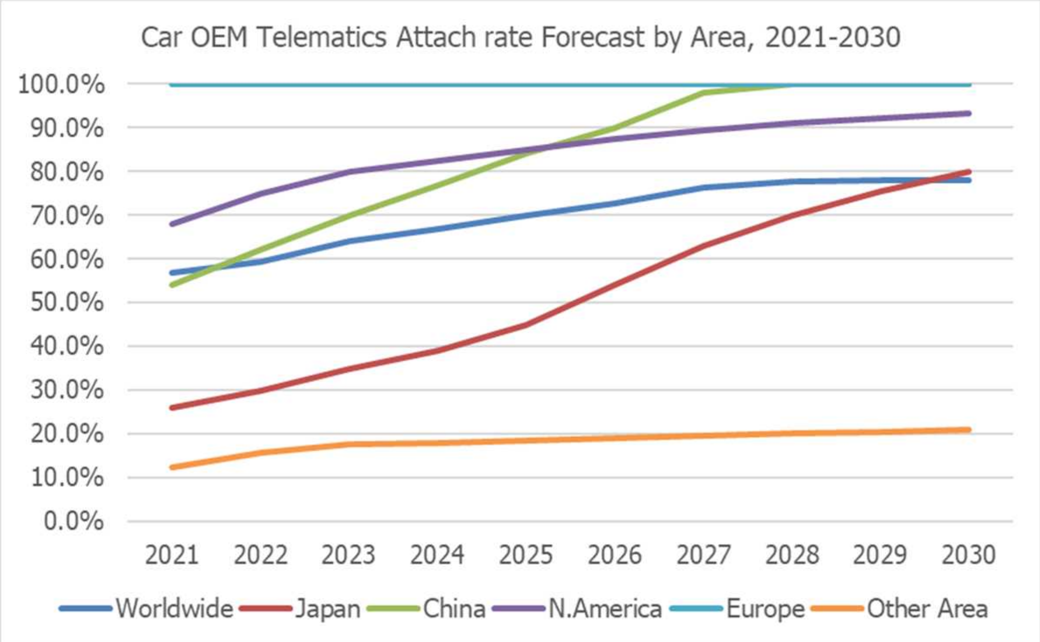
# 7. Industrial M2M Market Forecast (excluding Car OEM Telematics)

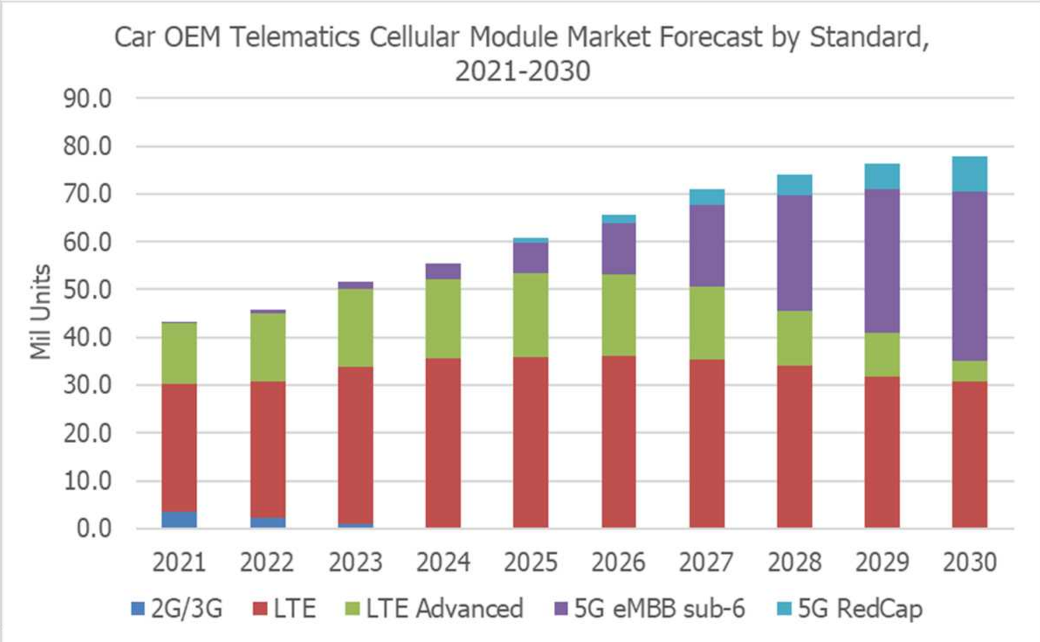



- 2023: weaken demand, inventory digestion. -12% YoY down to 371Mil units. 2024: +17% strong growth (435Mil units) thanks to China market rebound. China got +33% strong growth in 2024. Outside China: weak demand, inventory correction continues: -5% YoY.
- Smart utility metering, GPS tracking, and finance/ payment are the main volume applications. Smart meter market grows steadily thanks to the new deployments (India, USA, Korea, Japan…)
- New/ emerging applications: electric scooter/ bike tracking, bike computer, solar battery, EV, e-bike charging pile…
- LTE Cat.1 bis expands from China to global market. LTE Cat.1 bis taking major standard for IoT in the EU, India, SEA and Middle east, as a successor of 2G and 3G. USA and Japan start to adopt Cat.1 bis in 2024-2025. Cat.1 bis accounts 51% in 2024, grow to 67-69% in 2027-2030.
- Cellular LPWA (Cat.M + NBIoT) market decrease in 2023-2024. Cellular LPWA lose market share from 30% (2023) to 16% (2030)
- Industrial 5G market start to pick up in 2026-2028 with low cost 5G RedCap module, reaching 9% market share in 2030.

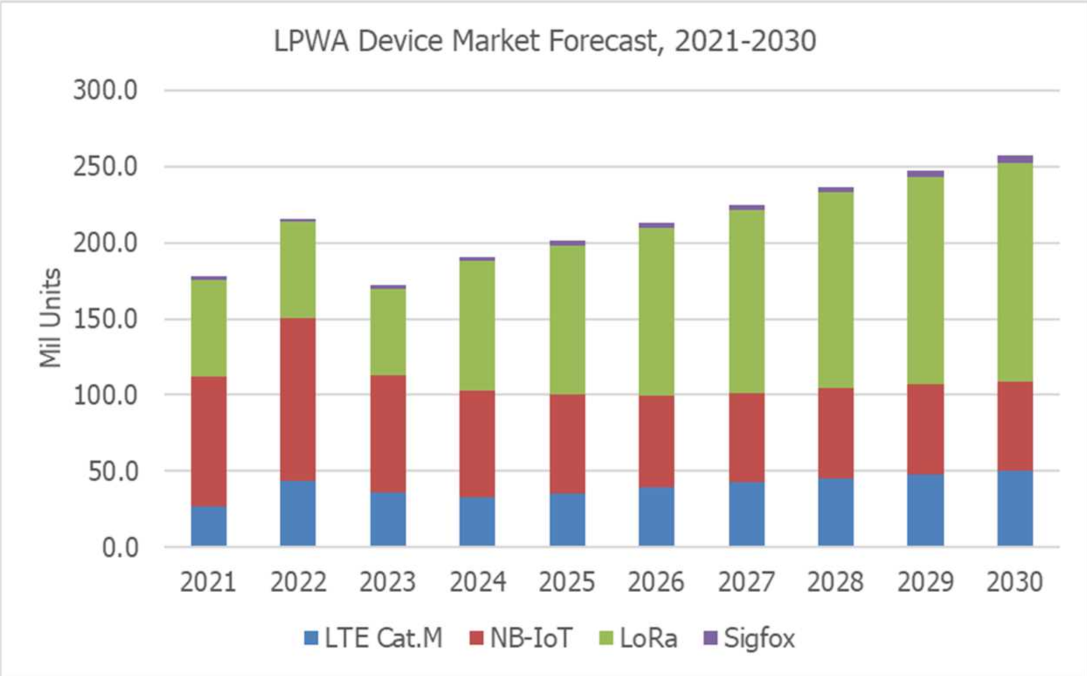
# 8. Automotive Telematics Market Forecast




- Telematics adoption ratio grows in China and Japan. Saturating in EU and N.America.
- 4G to 5G migration: 5G share 6% in 2024, 12% in 2025… to 55% (including RedCap: 9.5%) in 2030.
- 5G eMBB application: FOTA, V2X for autonomous driving.
- China 5G adoption increase faster than other countries. 5G adoption start to pick up in N.America and EU in 2024-2025, Japan in 2025-2026.
- 5G RedCap: dedicatedly used in China market by 2029-2030, because of the maturity of 5G SA network, low cost 5G Redcap chipset supply chain in China market.

# 9. LPWA Device Market Forecast




- LPWA major applications: Smart meter (electric, gas, water), security and automation (building, factory…), GPS tracking (asset, life…), and remote field monitoring (smart city, agriculture, infrastructure, environment…).

- Cellular LPWA: market shrink through 2022-2025. no big growth in the future. Legacy LTE (Cat.1 bis) + low power technology (eDRx) replace part of cellular LPWA applications in several countries.
- Network coverage/ investment to base station is the challenge in cellular LPWA market expansion.

- Unlicensed LPWA (LoRa, Sigfox): LoRa market rebound in China (proprietary LoRa) for smart city and metering applications. Sigfox will remain niche market.
- LoRaWAN develops new specificatrion for low-power, low-cost gateway, aims to develop smarty home (neighbor network).

- Besides, 45-50 Mil units /year of low-power, sub-GHz RF (WiSUN, Wireless MBUS, Wirepas, MIoTy, Weightless-P…) are shipped mainly for smart metering application.

# 10. Main Suppliers by Market Segment

| Application 2024 | Mobile Router/Data Card<br>64Mil units (China low cost: 45Mil)<br>Device | Mobile Router/Data Card<br>Chipset | Cellular CPE<br>28Mil Units<br>Device | Cellular CPE<br>Chipset | Industrial/Automotive/PC Module<br>509M units<br>Module | Industrial/Automotive/PC Module<br>Chipset |
|---|---|---|---|---|---|---|
| Market Share 20+ % | | ASR Micro<br>Sanechips | ZTE | Qualcomm | Quectel | Qualcomm<br>ASR Micro |
| 10-20% | | Qualcomm<br>UNISOC | Huawei | HiSilicon<br>MediaTek<br>Sanechips | CMCC IoT<br>Fibocom | EigenComm<br>UNISOC |
| less 10% | ZTE<br>TCL<br>Huawei<br>Franklin<br>Obic<br>Inseego<br>NetGear<br>NEC<br>GreenPacket<br>Compal<br>TP-Link<br>Tenda | HiSilicon | Arcadyan<br>Sercomm<br>WNC<br>Foxconn<br>Nokia<br>Gemtek<br>Askey<br>ZyXEL<br>TCL<br>Sharp<br>Sagemcom<br>Vantiva | ASR Micro<br>GCT | SunSea<br>Lierda<br>Telit-Cinterion<br>Neoway<br>MeiG<br>Rolling Wireless<br>LGInnotek<br>LG Electronics<br>MobileTek<br>Luat<br>Sierra Wireless<br>Unionman<br>Goldcard | Xinyi<br>MediaTek<br>Sony<br>HiSilicon<br>Intel<br>Sanechips<br>AICXTek<br>Sequans<br>Nordic<br>u-blox<br>Innochip |
| Few/New Entry | Haier<br>Sharp | MediaTek<br>GCT<br>Sequans | Greenpacket<br>Dasan | UNISOC<br>Sequans | WNC<br>u-blox<br>ZTE<br>Kyocera<br>Foxconn<br>Cavli<br>Nordic<br>TaiyoYuden | Mlink<br>Xinsheng<br>Goodix<br>Cygnus<br>Innobase<br>Bluewave<br>CMind |

China low cost, white brand Mobile Router
2023: 45%, 2024: 68%
chipset: ASR, Sanechips, UNISOC

Chinese OEM:
Tozed, Asiatel, MeiG, Zowee, TD-Tech, KZ Broadband, Smawave...

- Mobile router suppliers focus more on CPE business.
- ZTE and TCL gains market share in mobile router market outside-China.
- ASR, Sanechips and UNISOC provides cellular chipset to ultra low-cost mobile router.
- CPE: Taiwanese ODM suppliers (Arcadyan, WNC, Sercomm, Askey, Foxconn…) accounts major share in the USA and India market. ZTE, Nokia… taking major share in EU and rest of world. Huawei main market is MEA, Southeast Asia, Latin… non-USA associated countries.
- Qualcomm share grows in cellular CPE market due to the dominance in growing India market.
- Cellular module: Despite the geopolitical headwinds, Quectel gains the share in Industrial and auto segment, taking 40+% market share. Several Chinese module suppliers also grow in 2024 thanks to the industrial module market growth in China.
- Due to the market share concentration, consolidation in supply chain is expected. u-blox announced to close cellular module business in Jan 2025.
- There are many chip suppliers for cellular module, but top-4 suppliers accounts about 80% share and growing in cellular module chipset market.

# 11. 5G Modem Chipset Trend

| | ~2020 | 2021 | 2022 | 2023 | 2024- |
|---|---|---|---|---|---|
| High end eMBB | ***Qualcomm x55***<br>***Samsung Exy5123***<br>***HiSilicon B5000***<br>sub6 GHz & mmWave<br>up to 7.5Gbps DL<br>7nm | ***Qualcomm x65***<br>3GPP Rel.16<br>sub6GHz & mmWave<br>up to 10Gbps DL<br>sub6+mmW<br>sub6 300MHz<br>Samsung 4nm<br>MediaTek<br>M80 Modem Core | Qualcomm<br>x70 modem Core<br>**Qualcomm x75**<br>CPE, MiFi SoC<br>3GPP Rel.17/18<br>sub6+mmW CA<br>TSMC 4nm<br>**Samsung Exy5300**<br>3GPP Rel.16<br>10G DL/3.87G UL<br>sub-6+ mmW CA<br>Samsung 4nm<br>**MediaTek T830**<br>CPE, MiFi SoC<br>5G Modem+AP SoC<br>3GPP Rel.16<br>sub-6+ mmW CA<br>up to 7.6Gbps DL<br>TSMC 4nm | | **Qualcomm x80**<br>3GPP Rel.17/18<br>sub6+mmW CA<br>TSMC 4nm<br>(MediaTek M85/T900)<br>**GCT GDM7259X**<br>8CCA, 8nm |
| Mid end eMBB | **MediaTek T700**<br>sub 6GHz, 200MHz<br>up to 4.7Gbps DL<br>TSMC 7nm<br>**MediaTek T750**<br>M70 Modem Core<br>CPE SoC (AP+Modem)<br>WiFi + Ethernet | ***Qualcomm x62***<br>3GPP Rel.16<br>sub 6GHz, 200MHz<br>up to 4.4Gbps DL<br>Samsung 4nm | **Qualcomm x72**<br>CPE, MiFi SoC<br>3GPP Rel.17/18<br>TSMC 4nm | | **GCT GDM7275X**<br>4CCA, 8nm |
| Low end eMBB | **UNISOC V510**<br>sub6GHz, 100MHz<br>~2.5Gbps DL<br>12nm | **UNISOC V516**<br>3GPP Rel.16<br>sub 6GHz, 100MHz DL<br>SUL support<br>12nm | | **UNISOC V517**<br>12nm | **Sanechips S1**<br>**UNISOC V620**<br>6nm |
| 5G RedCap | | | | **Qualcomm x35/x32**<br>20MHz,<br>220Mbps DL/100M UL<br>FDD/TDD, HD-FDD<br>**HiSilicon**<br>SMIC 14nm? | **MediaTek M60/T300**<br>227M DL/122M UL, 6nm<br>**ASR 1903, 12nm?**<br>**Eigencomm**<br>**Xinsheng CM9610**<br>**AICX GX51x**<br>**Innochip Luminesce800**<br>**Innobase IM2501**<br>**Bluewave U560**<br>**Cygnus Everthink 6610**<br>**UNISOC**<br>**Sequans Tauras 5G RedCap**<br>**GCT GDM7272x** |
| Application Specific | **Qualcomm SA515**<br>based on x55<br>Automotive<br>5G + C-V2X<br>**HiSilicon B5000** | **Qualcomm 315**<br>based on x55<br>Industrial Module<br>Low data rate<br>Dedicated I/F | **Qualcomm SA525/522**<br>Automotive 5G<br>3GPP Rel.16<br>**MediaTek MT2735/2737**<br>Automotive 5G<br>3GPP Rel.16 | | **M-Link MK8520**<br>5G RedCap+LPHAP<br>Precise location, 28nm |

- 2024-2025: non-Qualcomm/non-MediaTek suppliers join the competition: UNISOC (eMBB), HiSilicon (eMBB/RedCap), ASR (RedCap), Sanechips (eMBB), GCT (eMBB), Sequans (RedCap). Price competition expected in low-end 5G eMBB, China 5G RedCap.
- Mid/High end eMBB: Qualcomm and MediaTek keeps major market share. GCT will join in the USA market in 2025.
- 5G RedCap: Chinese suppliers dominate in China market. Several start-up joins the market in 2025. Chipset price expected to fall below $5 by 2026.
- Qualcomm keeps dominant share in 5G Telematics. MediaTek start to MP in 2024. HiSilicon and ASP will be used in China 5G telematics after 2025.
- Sony and Sequans are expected to introduce 5G eRedCap chipset in 2026-2027.