



Experience Centric Transformation in 5G Era

Amr Farouk
Chief Technical Expert Services & Software



Contents

01

Global 5G Trend Insight

02

New Challenges for CEM In 5G

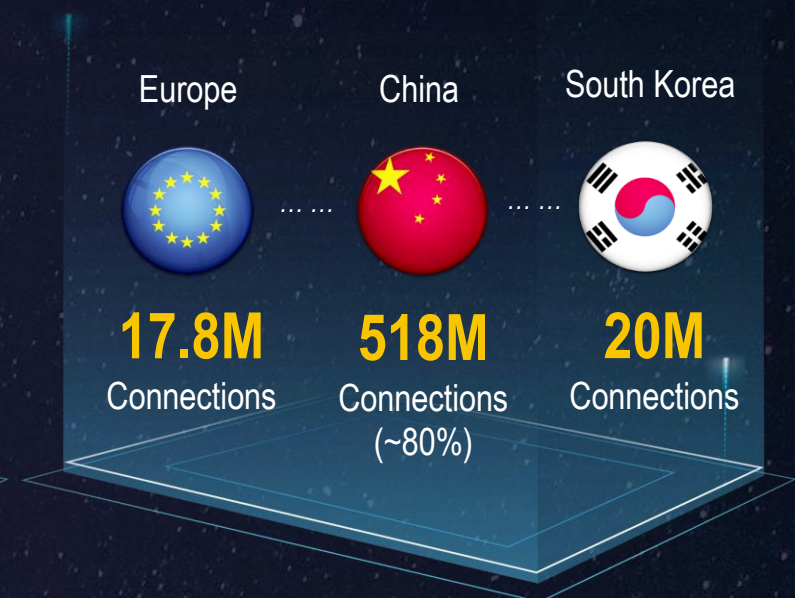
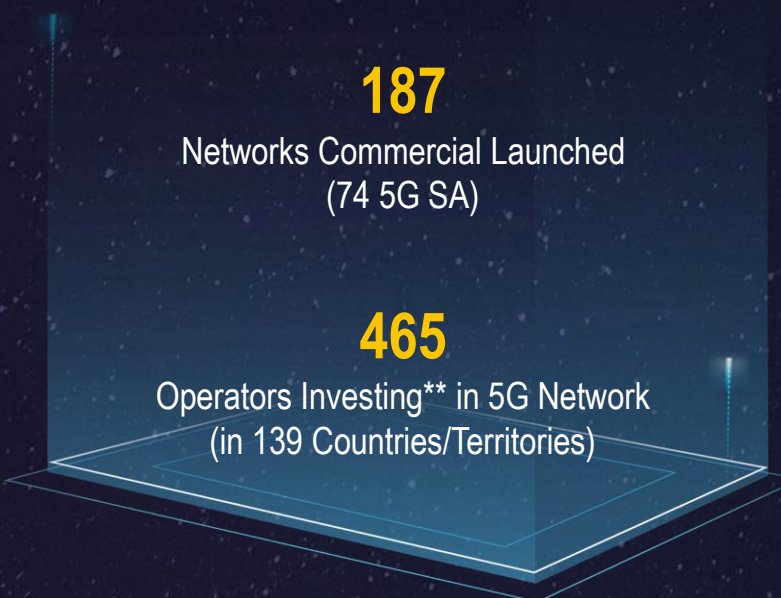
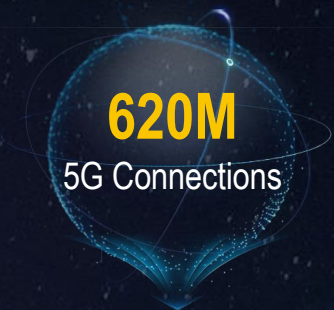
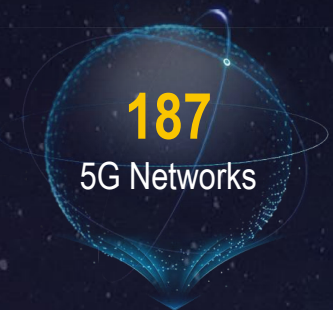
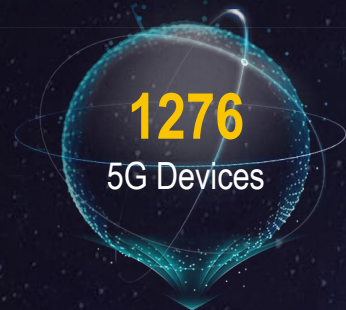
03

Customer Experience Transformation in 5G Era

04

CEM 5G Use Cases

5G is Developing Faster than We Expected



**Incl. Tests, Trials, Pilots, Planned and Actual Deployments

Source: GSA 5G Reports, GSMA Intelligence, by Jan. 2022

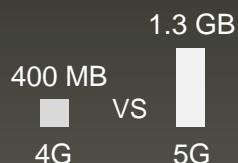
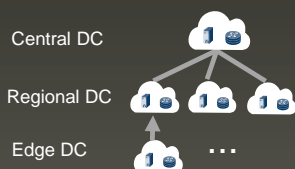
New Challenges for Customer Experience in 5G

New network

NSA SA MEC Slicing

NE x 100

Traffic x 3



Greatly reduced user data analysis efficiency

Network Complexity

E-Planning Model

New services

VR FWA uRLLC mMTC



AR & VR



Video Surveillance



4K/8K UHD Video



Cloud Gaming

difficulty in assurance of differentiated experience

Service Experience Diversity

Service Experience Modeling (Cloud VR)

New Business

Industrial Automation Video Backhaul Industrial Park



Industrial Automation



Self-driving Vehicles



Remote Manufacturing



Ultra-reliable applications

difficulty to guarantee 2B SLA

Business Model

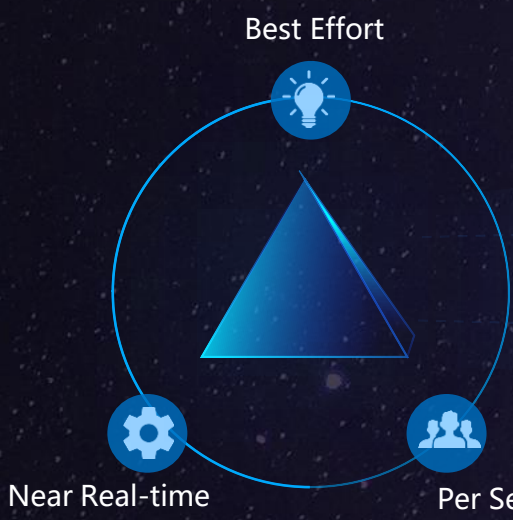
2B E2E QOS SLA Assurance



HUAWEI

Experience Centric Transformation in 5G

Current CEM



Experience → **Experience + Data** Driven

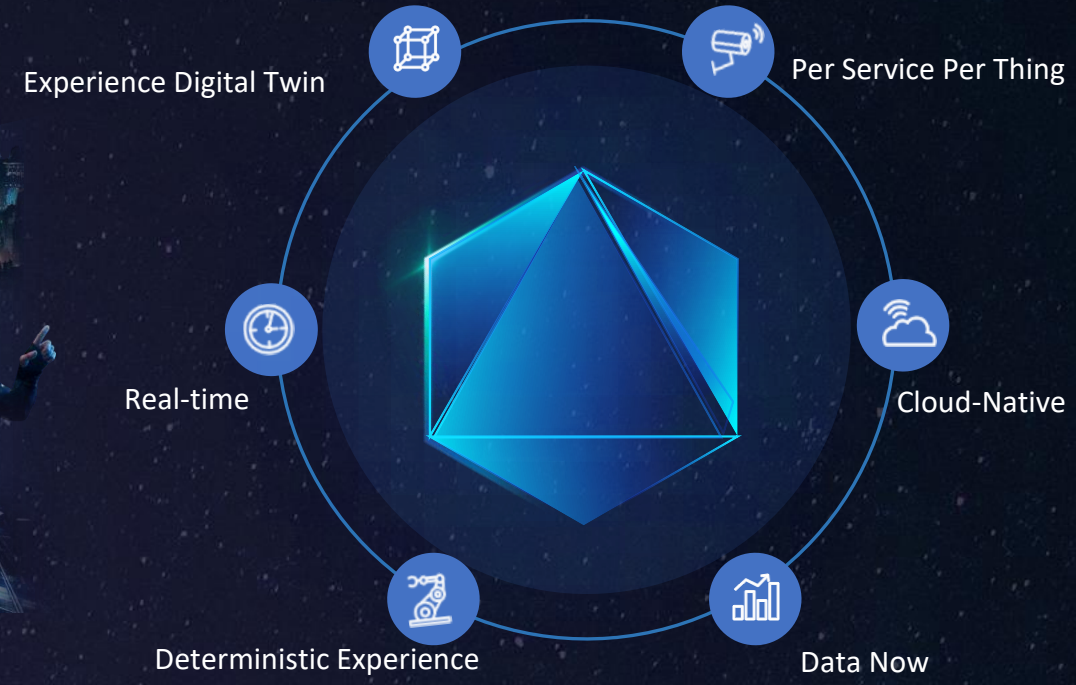
4G → **5G**

User → **User + Things**

- Lifestyle
- Demographic
- Digital Twin
- VR
- 8K UHD
- HD Video
- Drones
- V2V
- Precise locating
- PLC
- Watch
- Camera
- Industry 4.0



Next-generation CEM



New Network- 5G Service Experience-based Network Planning Criteria

Three-layer mapping from 5G Service to Network Capabilities



Completed 12 Types of E-Planning Model for Planning Criteria

1st release: 5G service experience-based network planning criteria



View and download

5G Service Experience-based Network Planning Criteria White Paper

from Huawei official website

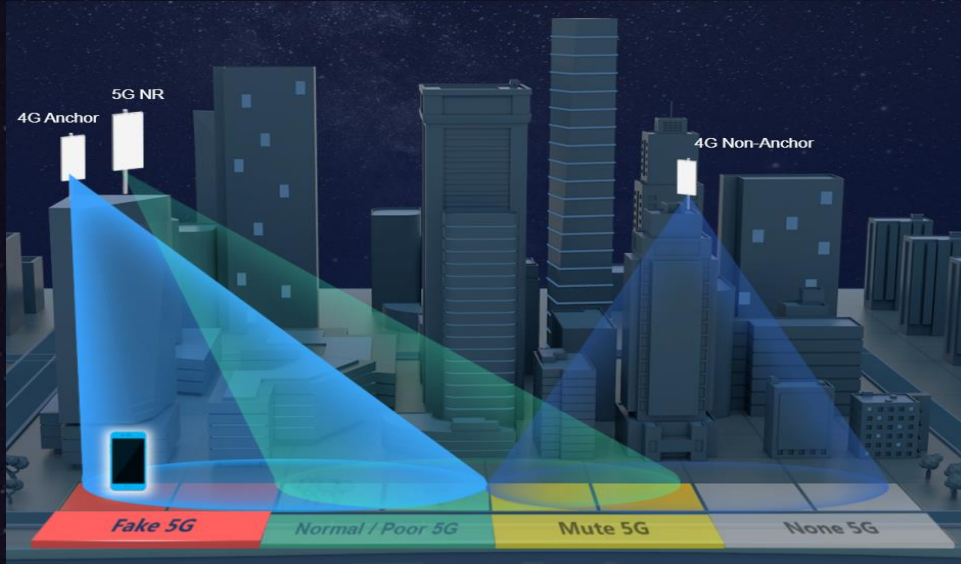
More service planning criteria are under development

Service Scenario		Network Planning Criteria				
Scenario	Typical Application	Throughput		Delay	C band (100Mhz)	
		DL	UL		CSI RSRP	CSI SINR
2C	3K Cloud VR (Game)	100 Mbps	3 Mbps	RTT<25ms	-108 dBm	2 dB
2B	Surveillance/UAV backhaul (1080p)	0.5 Mbps	5 Mbps	RTT<50ms	-105 dBm	3 dB

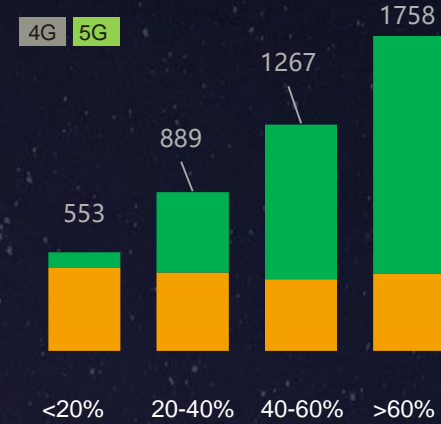


New Network - 5G initial experience improve 5G camping ratio and strength 5G brand image

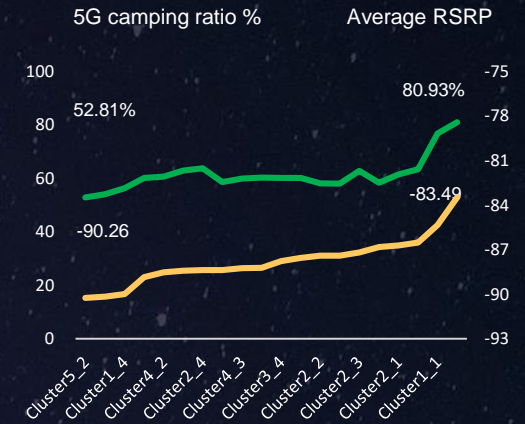
Fake/Mute/None 5G Affecting User Experience



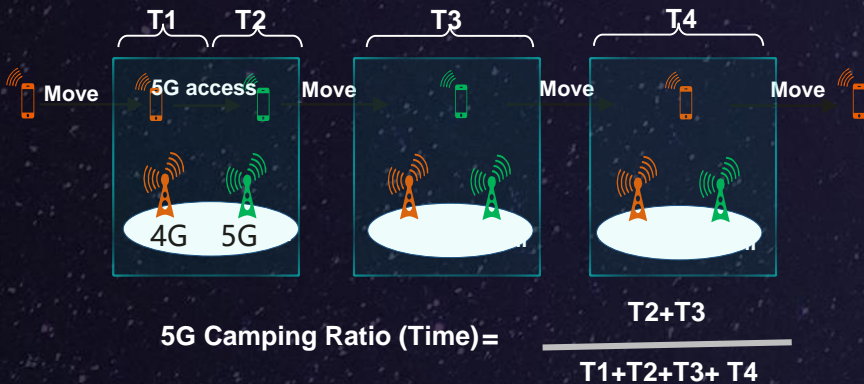
DoU increase with camping ratio



Coverage - 5G Camp Ratio highly correlated



Key Finding

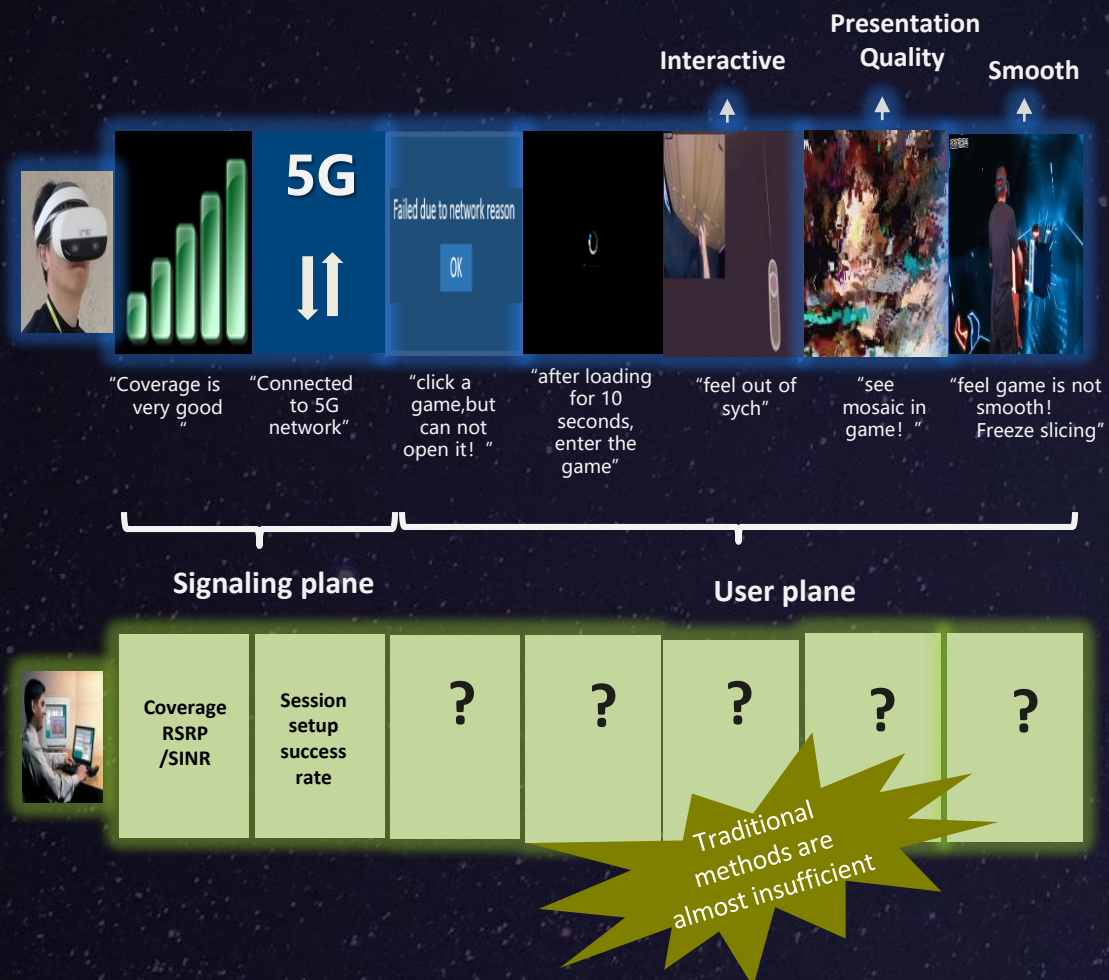


1dB on 5G
1dB RSRP Increase \gg +1~2%
Camping Ratio

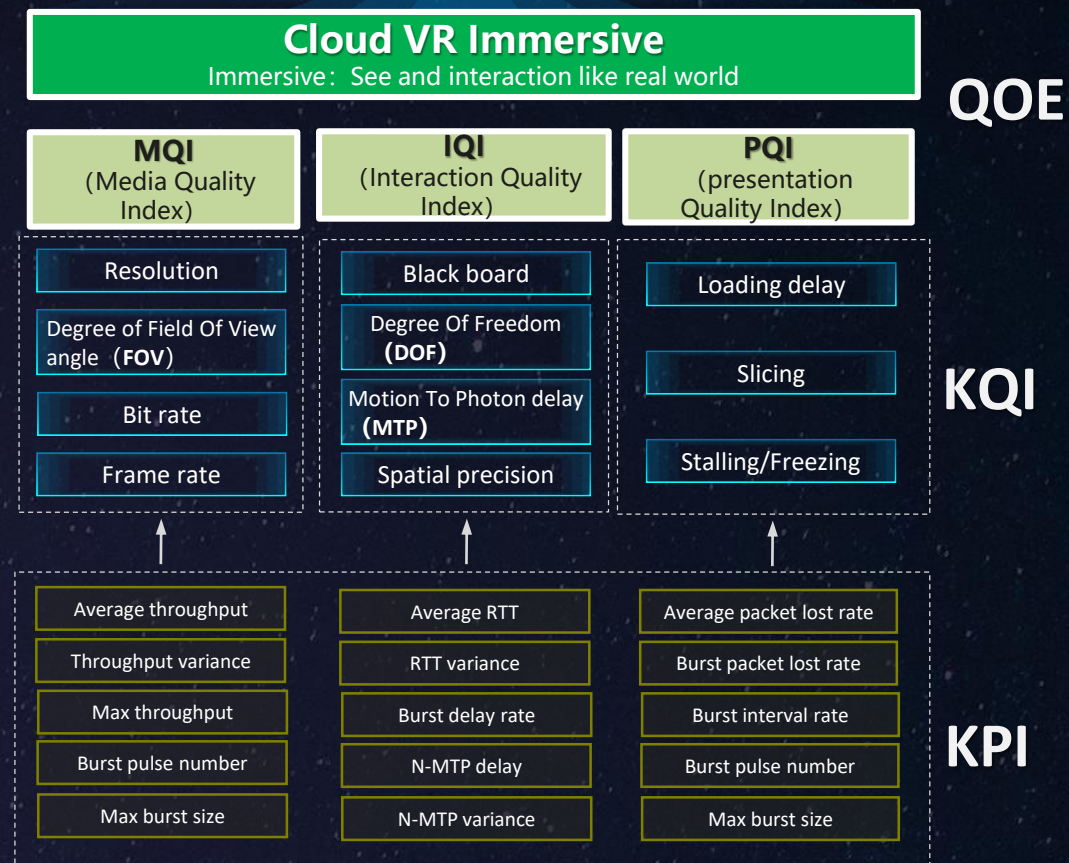
1% on 5G
Camp Ratio Increase \gg +15~20MB
DOU per day/User

New Service- Cloud VR (Gaming) Experience Modeling

How to measure Cloud VR Customer Experience?



CEM: KQI criteria for Cloud VR



New Business- How to assure E2E QoS SLA for different 5G 2B Scenarios

Industry scenarios



5G Application



E2E QoS Guarantee

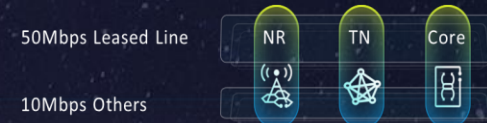
Prioritized Access for SME when Congesting



Guaranteed Bit Rate for SME



E2E Slicing for SME with QoS



View and download
5G B2B Service Experience
Standards White Paper
from Huawei official website



HUAWEI

Bandwidth

Reliability

Latency

Link Level

- VPN/IPsec
- BFD

NE level

- Active/Standby Board/Ports
- N-way & 64x Flow Control

Network Level

- E2E Slicing
- Hybrid Pool

NR-RAN

- Mini-slot
- Grant Free

Transport

- FlexE
- Channelized Sub Interface

5GC

- CP/UP Split
- MEC

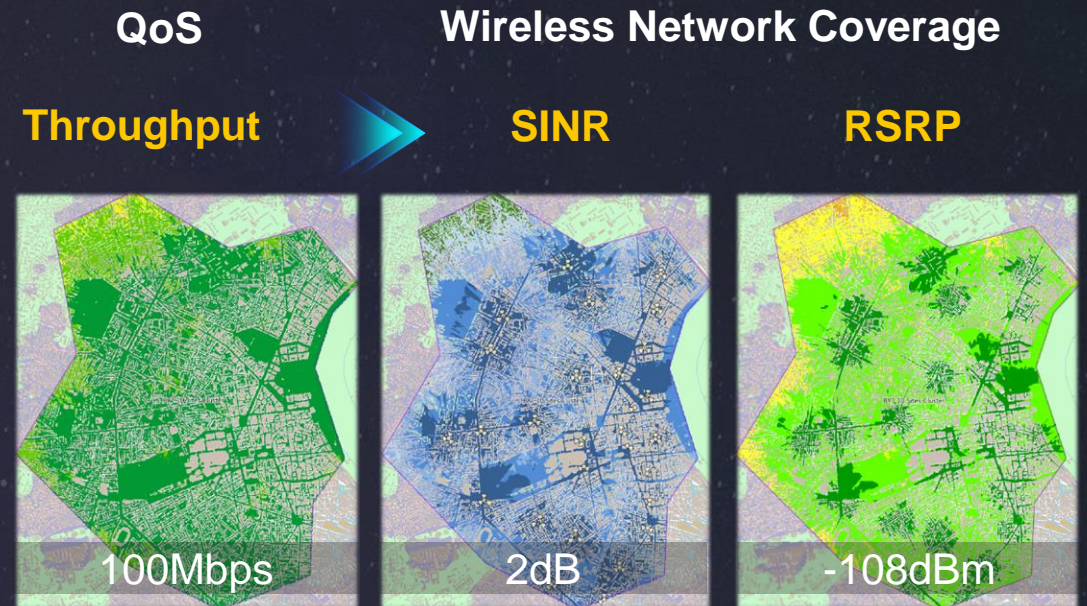
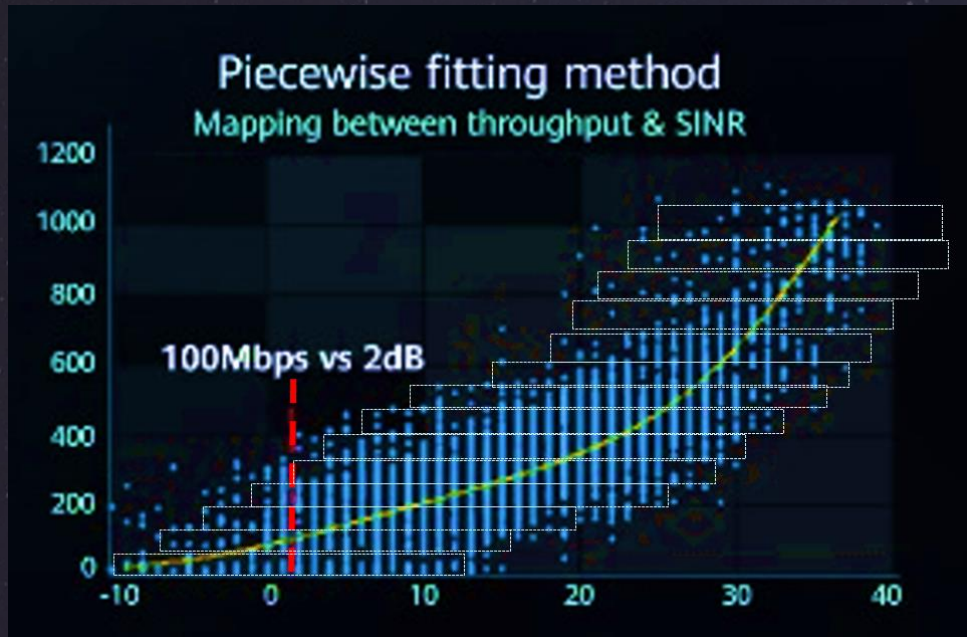
Call to Action

1. Design 5G **Network** based on **E-Planning Model Criteria**
2. Improve 5G initial Experience to improve 5G Camping ratio and 5G Brand Image
3. Define **new QoS metrics** to assure **new 5G Service Quality**(AR/VR...)
4. Assure **QoS 2B Committed SLA** for more 5G 2B Business Growth

Thank You!



A Relationship Case Study from QoS to Network KPIs



Data Source: test samples in live 5G network with low load (PRB usage < 20%) from Huawei eLab

A throughput value corresponds to a range of SINR values. to obtain the mapping curve between the throughput and SINR.

Remarks: PRB-Physical Resource Block; SINR-Signal to Interference plus Noise Ratio; RSRP-Reference Signal Received Power