

5G security

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Security problems caused by 5G requirements

Increasing security threats that are already emerging

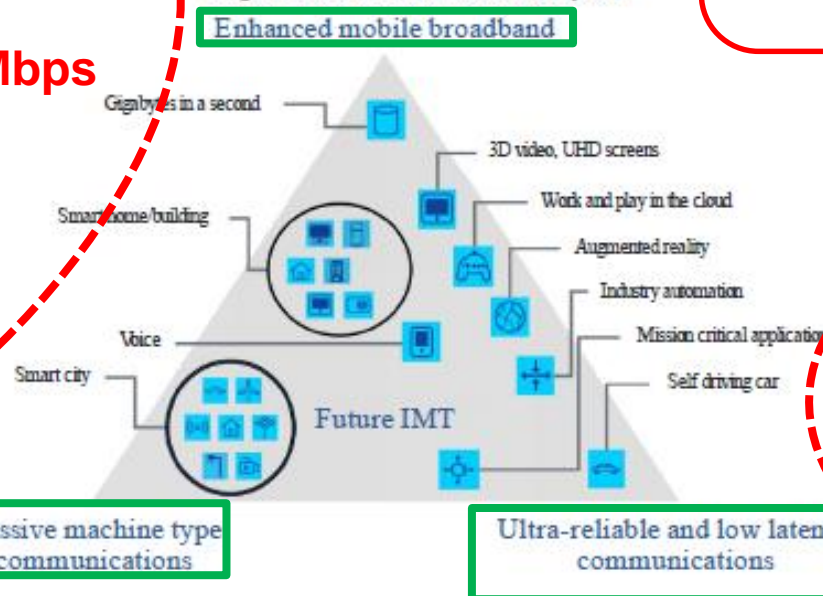
- Smartphones, IoT malwares
- Powerful attacks from bot networks
- Signalling DoS

Enhanced Mobile Broadband
Peak: 20Gbps
User experience: 100Mbps

Massive Machine Type Comm.
One million devices/km²

Massive machine type communications

FIGURE 2
Usage scenarios of IMT for 2020 and beyond



Requirements that are difficult balance with security

- Overhead of security processing (including cryptography)
- Edge computing and security

Ultra-reliable and Low Latency Comm.
< 1ms

IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond, ITU-R Rec. M.2083-0, Spt. 2015.

Technologies	Merits (Security Aspects)	Problems
5G radio access		<ul style="list-style-type: none">• Jamming• Physical layer security
Network slicing	<ul style="list-style-type: none">• Support on different security requirements using slice separation• Partial security damage	<ul style="list-style-type: none">• Secure slice separation• Attacks to slice management function• Management between slice communication
Virtualization (NFV/SDN)	<ul style="list-style-type: none">• Enhancement to countermeasures of cybersecurity (DoS mitigation, Virtual Firewall, etc.)	<ul style="list-style-type: none">• Secure slice separation• Attacks to orchestrator/controller• Trust (NFVI, 3rd Party VNF)
Edge computing	<ul style="list-style-type: none">• Offload of security functions (From devices to edges)	<ul style="list-style-type: none">• Low security capability compared with core equipment (Risk of cryptographic key leakage, fraud on charging, etc.)

Standardization body	Activities
3GPP SA3	<ul style="list-style-type: none">• Threat analysis, Requirements on security, Security architecture and protocol specifications• Definition of 17 security domains(Architecture, Authentication, RAN security, Key Management, etc.)
ETSI ISG NFV	<ul style="list-style-type: none">• Security monitoring and administration for NFV• Security assessment for NFV platform• etc.
GSMA	<ul style="list-style-type: none">• 5G trust model, etc.
NGMN	<ul style="list-style-type: none">• 5G security requirements (DoS protection, Network slicing, MEC)
Others	<ul style="list-style-type: none">• IETF (5GIP, NETSLICING, etc.)• ONF(Open Networking Foundation) – SDN related security

