HFR Company Profile

July 2020

Future Digital Infrastructure Builder
Mobile Access
Broadband Access
Private 5G & Services

Create the Resonant Networking

Networking should include not only providing connectivity tools, but also providing the necessary services. Networking, like nature, will be always staying next to us.

HFR, Inc.
for Mobile Internet

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for Mobile Internet

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Who We Are

HFR, Inc.
for Mobile Internet

Company in Brief

Company	HFR, Inc.
Established	Jan. 5th, 2000
Business Type	ICT Equipment and Service Platform Builder
Main Products	Mobile and Broadband Networks
IPO	2018 (KOSDAQ 230240)
Homepage	www.hfrnet.com

Subsidiary and Affiliates

Company	Main Business	Location	Shares
allRadio	Telecom equipment maker	Korea	100%
ZPsys	Telecom equipment maker	Korea	53.45%
nTels	ICT service platform provider	Korea	19.34%
ccWell	On-premise ICT service provider	Korea	100%
HFR Networks	Telecom equipment provider	USA	98.75%
HFR K-Access Vina	ICT equipment developer	Vietnam	100%

As of July in 2020

Business Areas

Mobile Access	Broadband Access	Private 5G & Services
4G/5G xHaul: WDM & Packet RAN Transport	10 Gigabit FTTx	5G SA vCore/vRAN
Indoor & Outdoor Cellular Radio Units	Wi-Fi Access Point & Controller	5G Business Platform

Shareholder List

43.2 Other Individuals

34.25 Founder

11.55 Other minor companies

5.94 Financial Investors

2.69 2019 KIF-Stonebridge IT

As of July in 2020

Who We Are
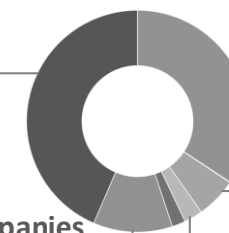
Founder / Rep. Director

Jongmin Cheong

HFR has been growing as a leading company in the Telecom and IT sector in South Korea - an IT-powered nation.

Within a rapidly changing industry, HFR continuously devises ways to technologically advance - faster than any other telecommunications firm in the world. From broadcasting transmission devices to multimedia solutions, HFR continues to be a leader of next generation services in every part of the telecommunication market.

HFR's vision statement is "**creating the resonant networking**" and the strategy is to reshape its portfolio from manufacturing to a more focused ICT service. The pace and intensity of change means it's all the more important that people and enterprises are at the center of the digital future.

HFR will be able to play a greater role in the digital lives of people and enterprises with the networking service. Also HFR will accelerate and enrich the development of its portfolio of open transformation initiatives, which it deems essential to compete in the digital infrastructure.

BOD Members

Jongmin Cheong
- Ph.D (KAIST)
- SK Telecom

Yoonjae Shin
- Head of Domestic Business
- Soongsil University
- 26 years of Broadband Experience

Beumgeun Cho
- Head of Production Unit
- Keumoh N.I.T
- 25 years of Industry Experience

Jaemin Park
- Professor of Kunkuk University
- Ohio State University

Geunchang Lee
- Independent Lawyer
- KAIST

Corporate Committees

Corporate Strategy, HR Committee
- Head: Jongmin Cheong

Information Management
- Head: Sunghyun Han

Technology Strategy
- Head: Jongmin Kim

Audit Committee
- Head: Jungwon Ahn

System/Process Improvement
- Head : Enuha Cho

Who We Are

HFR will be the company that builds "Future Digital Infrastructure"

Industry Digital Transformation

eHealth   Smart Factory   Autonomous Vehicle   Machine Vision   Video Surveillance   Smart Hotel

HFR as a Future Digital Infrastructure Builder

mMTC

eMBB

uRLLC

5G Radio

Open RU
(ORAN 7.2x)

Applications (my5G marketplace)

Biz Platform (BSS)

5G Network Automation Platform

Virtualized 5G SA Network

5G vRAN   5G vCore   Edge Computing

SMF   NSSF   UDM

AMF   NRF   PCF

DU   CU   UPF   App

Virtualization Layer: Docker   Kubernetes
Compute   Network   Storage

On-Premise Platform

IoT Server

Drone control

AI Video Analytics

VR Streaming

Robot control

AVG control server

Edge computing

Why HFR is an Attractive Bet

Return on Investment

- Positioned as a leading 5G company with visionary strategy
- Continued growth with 20 years of continuous operating profit

Revenue trend (Unit: M USD)

CAGR +25.8%

180
160
140
120
100
80
60
40
20
-

Including Subsidiaries and Affiliates, IFRS Separate
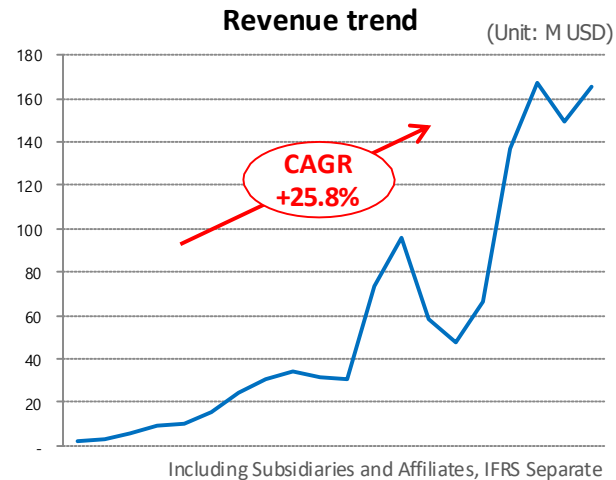
Competitive Advantage

- Network Agility for automation and orchestration
- Digital Diversity Management for managing the explosion of diverse digital technologies
- Global Infrastructure Enablement to span global customers and suppliers to deliver "infrastructure everywhere"

Emerging Vertical Markets

Digital Hospitality

Digital Government

Industry Digital Transformation

Digital Healthcare

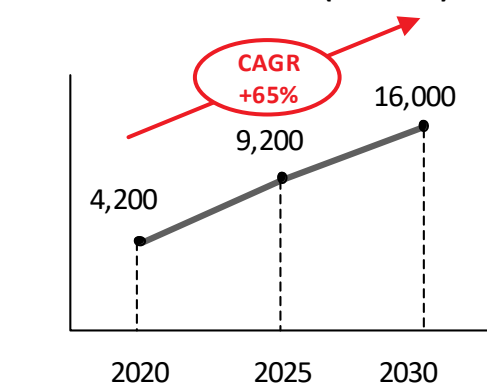Digital Transportation

Digital Education
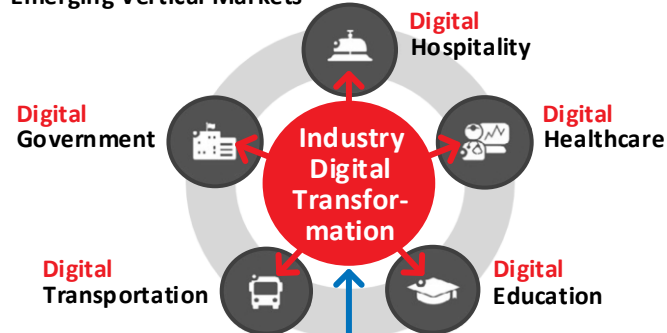
HFR's Future Digital Infrastructure

Upside Market Growth

- Governments Support for the recovery from COVID-19
- 5G Market Growth for automation and orchestration
- Global Private 5G Market will be exponentially growing in US, Japan and Europe

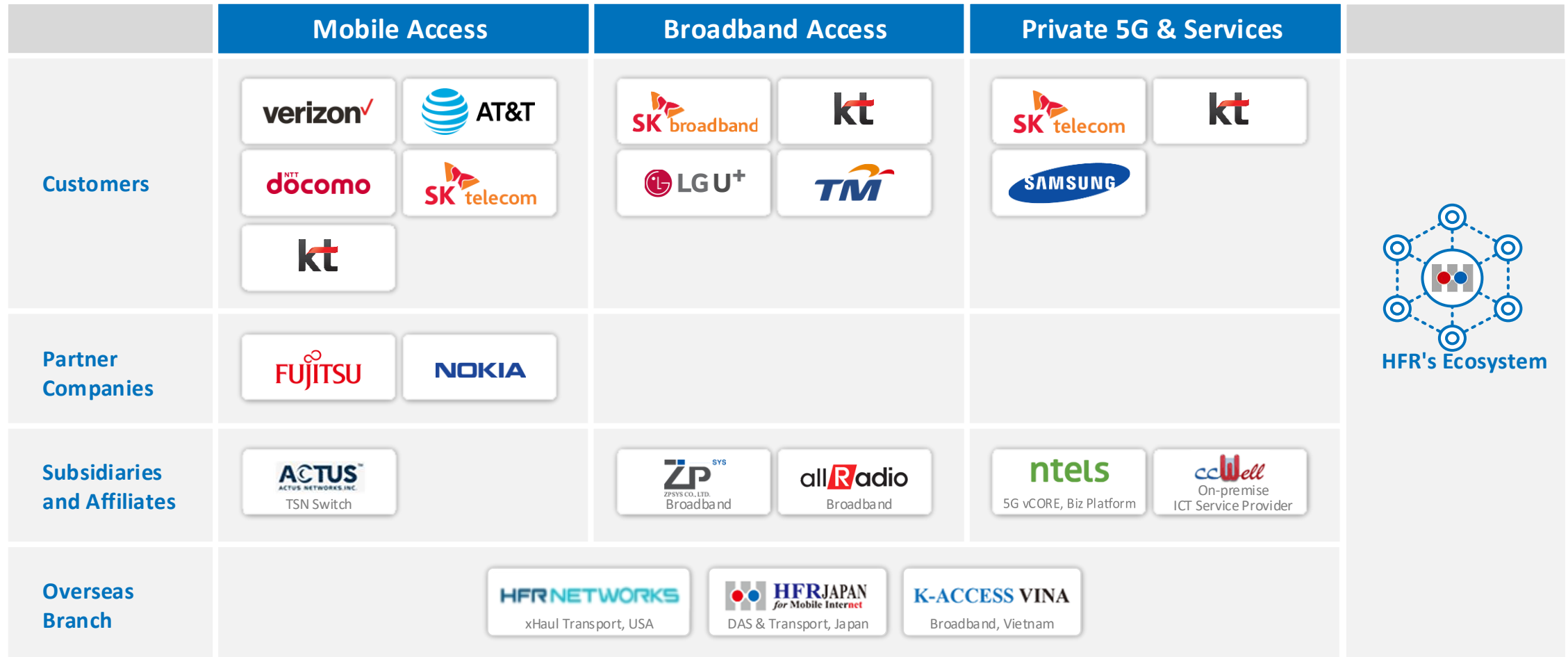**Private 5G Market (USD $M)**

CAGR +65%

16,000
9,200
4,200

2020   2025   2030
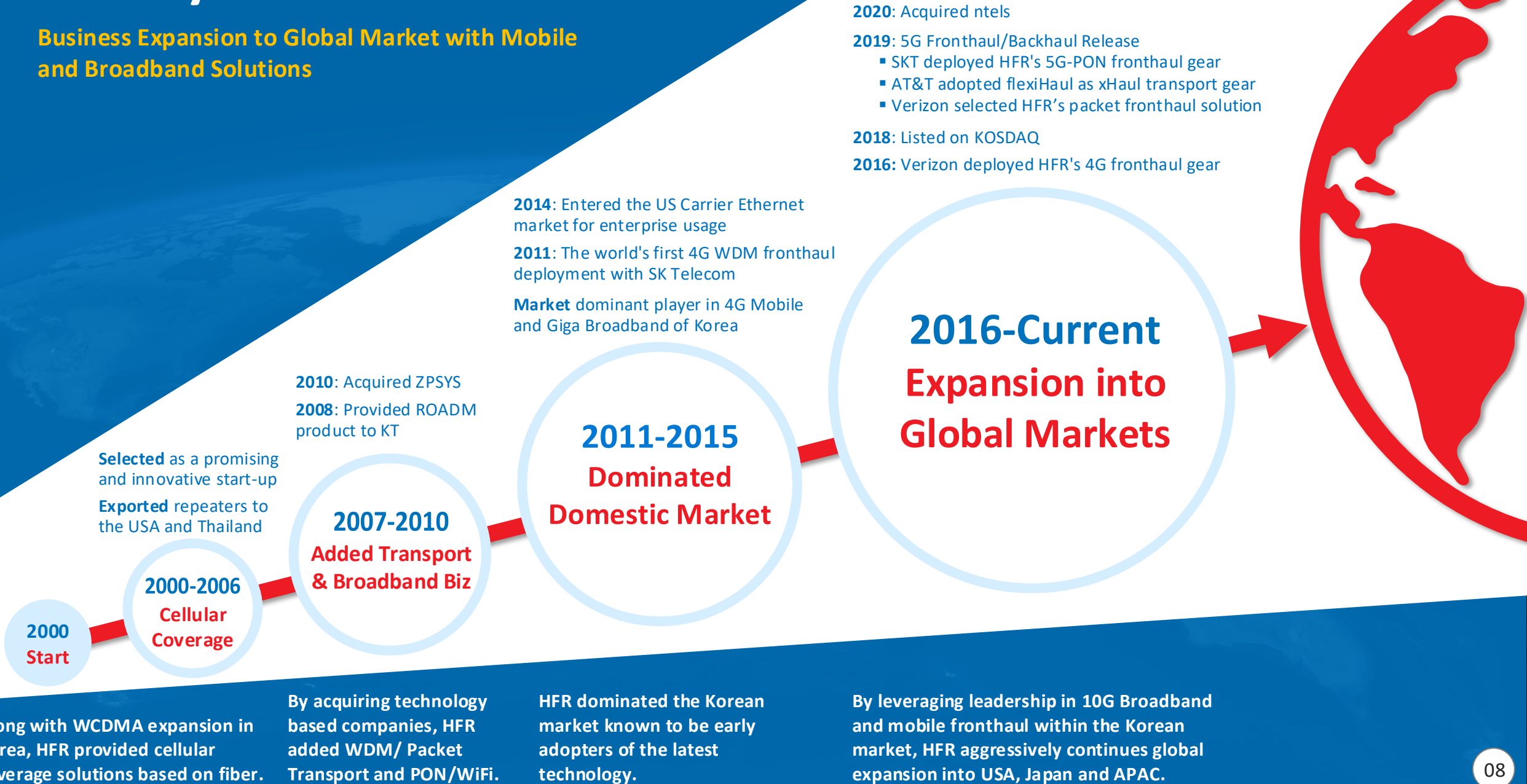
Source: SNS Telecom & IT

HFR's Ecosystem

HFR and its ecosystem are vital links in an innovation value chain, creating a family of companies empowered to achieve vital advancements through their combined technical synergies.

	Mobile Access		Broadband Access		Private 5G & Services		
Customers	verizon✓	AT&T	SK broadband	kt	SK telecom	kt	
	NTT docomo	SK telecom	LG U+	TM	SAMSUNG		
	kt						HFR's Ecosystem
Partner Companies	FUJITSU	NOKIA					
Subsidiaries and Affiliates	ACTUS ACTUS NETWORKS, INC. TSN Switch		ZP SYS ZPSYS CO., LTD. Broadband	allRadio Broadband	ntels 5G vCORE, Biz Platform	ccWell On-premise ICT Service Provider	
Overseas Branch		HFR NETWORKS xHaul Transport, USA	HFR JAPAN for Mobile Internet DAS & Transport, Japan	K-ACCESS VINA Broadband, Vietnam			

History

Business Expansion to Global Market with Mobile and Broadband Solutions

2020: Acquired ntels

2019: 5G Fronthaul/Backhaul Release
- SKT deployed HFR's 5G-PON fronthaul gear
- AT&T adopted flexiHaul as xHaul transport gear
- Verizon selected HFR's packet fronthaul solution

2018: Listed on KOSDAQ

2016: Verizon deployed HFR's 4G fronthaul gear

2014: Entered the US Carrier Ethernet market for enterprise usage

2011: The world's first 4G WDM fronthaul deployment with SK Telecom

Market dominant player in 4G Mobile and Giga Broadband of Korea

2010: Acquired ZPSYS

2008: Provided ROADM product to KT

2016-Current
Expansion into Global Markets

Selected as a promising and innovative start-up

Exported repeaters to the USA and Thailand

2011-2015
Dominated Domestic Market

2007-2010
Added Transport & Broadband Biz

2000-2006
Cellular Coverage

2000
Start

Along with WCDMA expansion in Korea, HFR provided cellular coverage solutions based on fiber.

By acquiring technology based companies, HFR added WDM/ Packet Transport and PON/WiFi.

HFR dominated the Korean market known to be early adopters of the latest technology.

By leveraging leadership in 10G Broadband and mobile fronthaul within the Korean market, HFR aggressively continues global expansion into USA, Japan and APAC.

Accomplishments & Future Leaps

Leveraging our current leadership within the 5G mobile access and 10G broadband access markets, HFR's future growth is focused on achieving leadership within the "Private 5G" market by delivering integrated managed services on an IoT platform.

Private 5G & Services

Future Digital Infrastructure Builder

- Managed Service Provider (On-Site Private 5G Network & Services)
- Development of Private 5G Total Solution

5G SA vCore	5G vRAN, RU	Biz Plaform

Broadband Access

- 10G Gigabit Internet Commercialization in Korea
- Dominant Player in Korea's Wired Access G-PON Market
- The World's 1st 2-Pair Giga Ethernet Switch Commercialization

G-PON	2-Pair Ethernet	10G-EPON	XGS-PON

Mobile Access

- Packet Fronthaul (RoE, TSN) Development
- The 1st Korean Company to Enter the US Fronthaul Market
- The World's 1st C-RAN Fronthaul Commercialization

In-Building Cellular	4G WDM Fronthaul	4G/5G WDM xHaul	4G/5G Packet xHaul

Recent Highlights in 2020

Mobile Access

Selected as a Verizon 5G fronthaul provider
Acquired supply rights to Verizon, followed by 4G and 5G fronthauls (next-generation packet fronthaul supporting eCPRI)

Supplied 5G fronthaul & IBW to SK Telecom
WDM-based 5G fronthaul solution (5G-PON)

Selected as an AT&T CRAN HUB provider
Acquired supply right of AT&T CRAN HUB (Picocell fronthaul) enabled by Semi-active technology and Smart tunable optics

Selected as a DAS Provider to Japan
Multi-carrier/multi-frequency DAS that responds to all carriers in Japan as a common operator equipment
Equipment capable of responding to ORAN in the future

Broadband Access

Developed 5G FWA (5G Router)
5G Fixed Wireless Access (FWA) gateway with Wi-Fi and UTP ports

Supplied 10G broadband service equipment for SK Broadband
XGS-PON OLT/ONU/ONT, Wi-Fi AP

Wi-Fi 6 Supplier to SK Group & KT
Wi-Fi 6 Home AP and Zone AP
SKT Wi-Fi 6 WBA Industry Award
(Best Consumer-Centric Wireless Service Innovation)

Private 5G & Services

Supplied Local 5G Solution to Japan
Local 5G SA End-to-End Solution including vRAN (vCU/DU/RU), vCore, Biz Platform

Acquired nTels listed in KOSDAQ
Expand business area by acquiring Ntels, a business platform company. Expected to create synergy to enter the private 5G service market in the future.

Established subsidiary company, ccWell
Established a company to provide corporate telecom services using Private 5G solutions

QoS Monitoring & SLA Management Services, FYDENA
Developing reliable and efficient E2E QoS monitoring and SLA management services based on blockchain technologies.

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HFR's Business Areas

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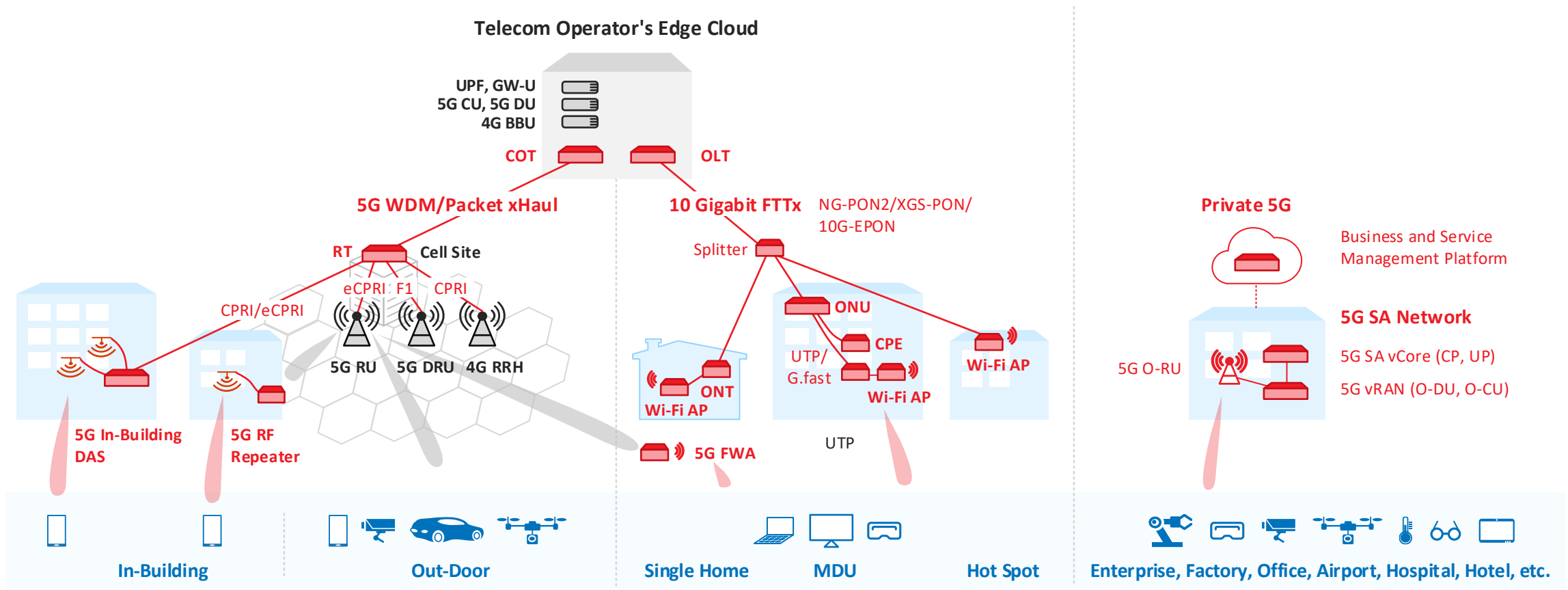| Mobile Access	Broadband Access	Private 5G & Services
▪ 4G/5G xHaul (WDM & Packet RAN Transport) ▪ Indoor & Outdoor Cellular Radio Units	▪ 10G Gigabit Internet (FTTx) ▪ Wi-Fi Access Point & Controller	▪ 5G SA Network (5G vCore, vRAN, RU) ▪ 5G Business Platform

Telecom Operator's Edge Cloud

UPF, GW-U
5G CU, 5G DU
4G BBU

COT   OLT

5G WDM/Packet xHaul   **10 Gigabit FTTx**   NG-PON2/XGS-PON/
10G-EPON

RT   Cell Site   Splitter   Private 5G

eCPRI F1 CPRI   ONU   Business and Service
Management Platform

CPRI/eCPRI   CPE   **5G SA Network**

5G RU 5G DRU 4G RRH   UTP/   Wi-Fi AP   5G O-RU   5G SA vCore (CP, UP)
G.fast   5G vRAN (O-DU, O-CU)

ONT   Wi-Fi AP
Wi-Fi AP

5G In-Building   **5G RF**   UTP
DAS   **Repeater**   **5G FWA**

In-Building   **Out-Door**   **Single Home** **MDU** **Hot Spot**   **Enterprise, Factory, Office, Airport, Hospital, Hotel, etc.**

HFR   Connecting human and device to content, data and applications   HFR

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HFR's Innovative Solutions

HFR offers innovative solutions in Mobile Access, Broadband Access and Private 5G.


1 Mobile Access
flexiHaul Solution

HFR provides mobile RAN transport and indoor & outdoor cellular to help operators save CAPEX/OPEX investments.
HFR delivers both WDM solution and a packet-based solution for mobile fronthaul and backhaul services with U.S., Korean and Japanese markets.
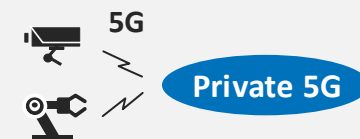
4G/5G

xHaul
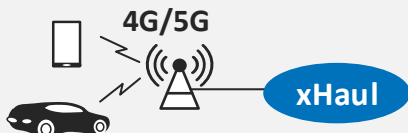
2 Broadband Access
Broadband Access Solution

HFR provides home broadband access solutions for 1G/2.5G/5G/10G to the home. HFR is currently providing all three broadband solutions - FTTH , FTTB + LAN, and FTTB + G.fast, allowing telecom operators to deliver ultra-high speed Internet for any residential environment.

10Gbps

BB Access
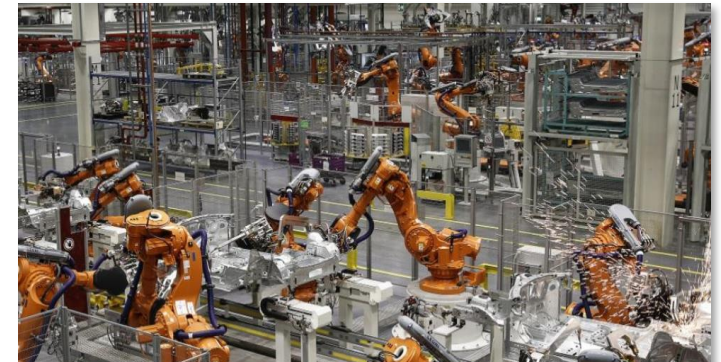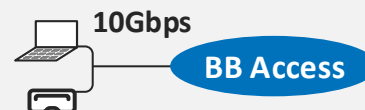
3 Private 5G & Services
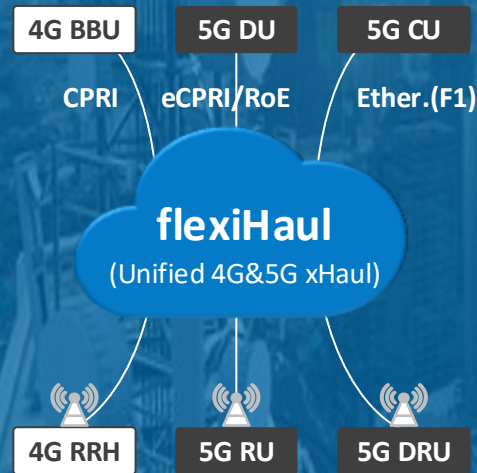**my5G Solution**

HFR is developing private network solutions for public institutes and enterprise customers for the 5G era. Our fully virtualized 5G SA end-to-end solution, includes 5G vRAN, 5G vCore and Business Platform.

5G

Private 5G

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HFR, Inc.
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flexiHaul Solution

Converged Transport of All Mobile Traffic to save Operator's CAPEX/OPEX for 4G & 5G Services

- Provides fronthaul/midhaul for 4G (CPRI) and 5G (F1, eCPRI) traffic
- Available as a WDM or packet-based solution
- RAN vendor-neutral

4G BBU **5G DU** **5G CU**

CPRI   eCPRI/RoE   Ether.(F1)

flexiHaul
(Unified 4G&5G xHaul)

4G RRH **5G RU** **5G DRU**

WDM Fronthaul Solution

- Optimize services over limited fiber assets for better economics and improved time to market
- Cost-effective, highly flexible family of scalable transport units that delivers a broad range of xHaul (fronthaul, midhaul and backhaul) services.
- Configurable as point-to-point, linear chain, point-to-multipoint, or ring network topologies and also Active to Active, Active to Passive configuration.
- WDM xHaul platform has an integrated transponder, controller and WDM filter. It offers a variety of performance, quality measurement and monitoring.
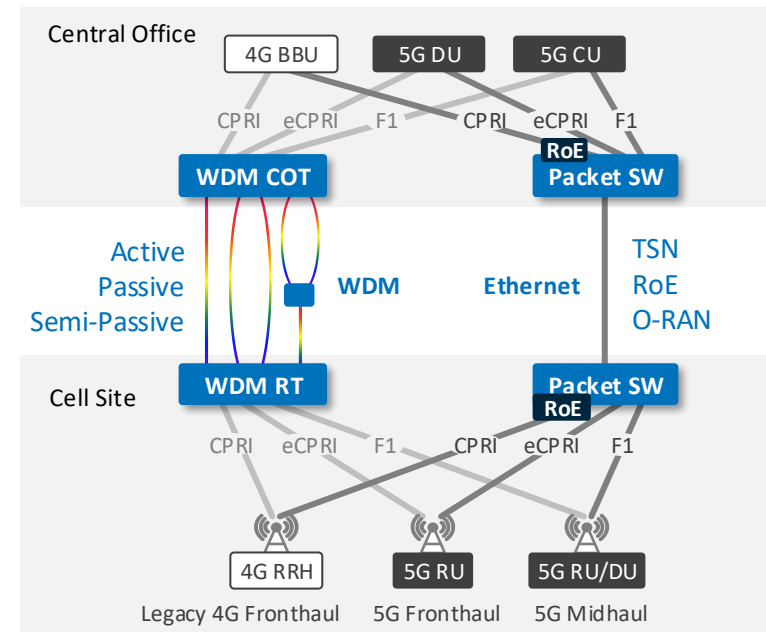
Packet Fronthaul Solution

- TSN switch optimized for xHaul supports CPRI, eCPRI and Ethernet
- The network migrating into Packet Radio Access Network for the future Function Split and software centric Radio Access Network.
- HFR's packet-based fronthaul platform supports 4G / 5G centralized and cloud-based RAN architectures by leveraging next-generation Packet RAN access technology.
- Time-Sensitive Networking (TSN) aggregation and transport switch supports interfaces for CPRI, eCPRI and Ethernet services.

Central Office
4G BBU   5G DU   5G CU
CPRI   eCPRI   F1   CPRI   eCPRI   F1
RoE
WDM COT   **Packet SW**

WDM Solution
CPRI + eCPRI +Ethernet over WDM

Active
Passive
Semi-Passive

WDM   **Ethernet**

TSN
RoE
O-RAN

Packet Solution
CPRI(RoE) + eCPRI + Ethernet over TSN Ethernet

HSN8000NA
5G-PON

Cell Site   **WDM RT**   **Packet SW** RoE

M6424

CPRI   eCPRI   F1   CPRI   eCPRI   F1

4G RRH   5G RU   5G RU/DU

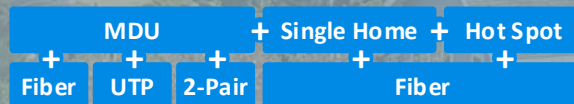Legacy 4G Fronthaul   5G Fronthaul   5G Midhaul

With HFR's solution, 5G overlay is not needed on existing 4G transport networks, helping to reduce total costs and speed time to market of lucrative new 5G services

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Broadband Access Solution

1G/2.5G/5G/10G to the Home

HFR is currently providing all three broadband solutions- FTTH, FTTB + LAN and FTTB + G.fast, allowing telecom operators to deliver ultra-high speed internet (1/2.5/5/ 10Gbps) to users for any residential environment.

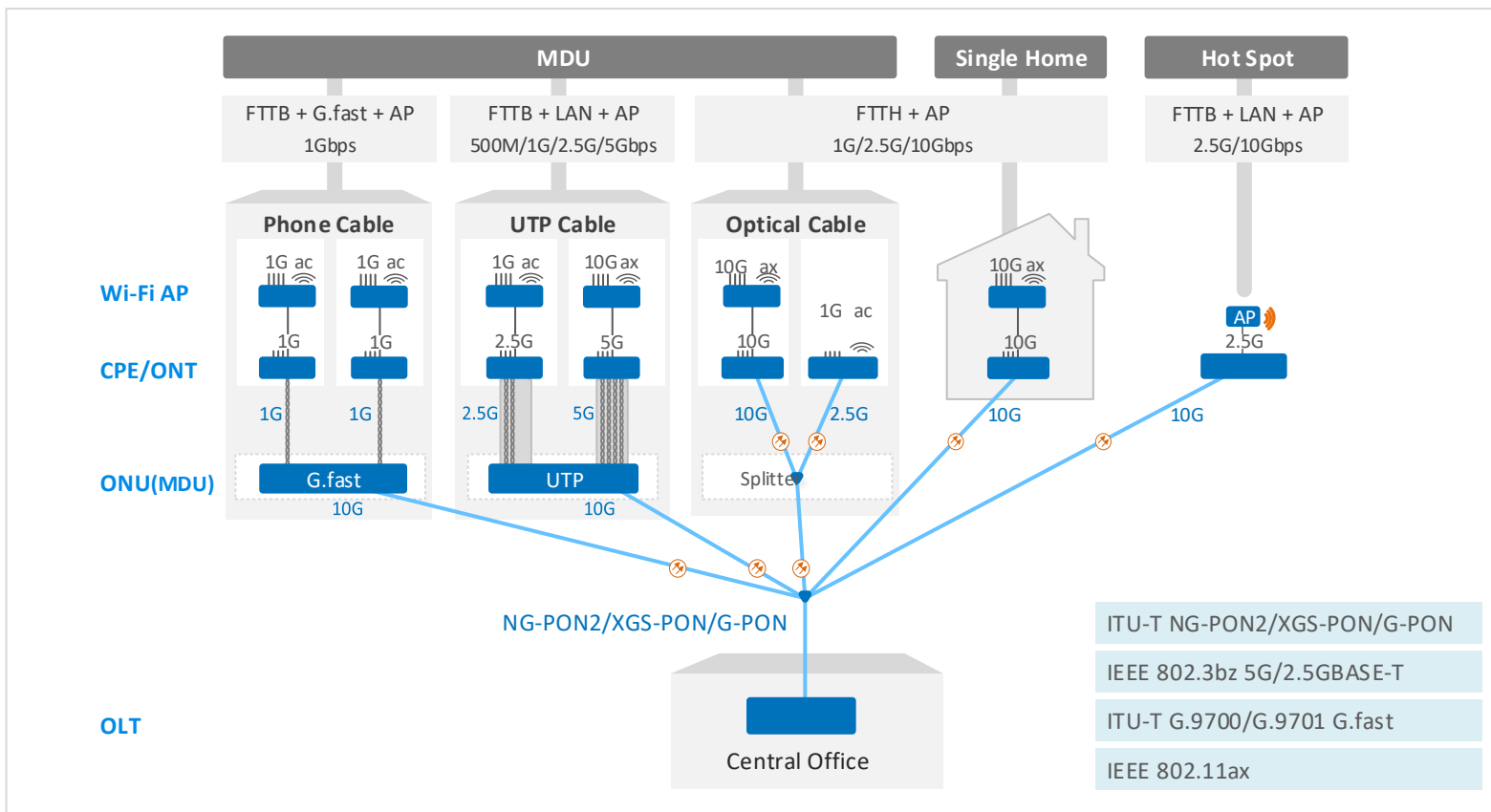### HFR's Broadband Access Solution

Any Residential Environment

MDU	+ Single Home + Hot Spot
+ **+** **+**	**+** **+**
Fiber UTP 2-Pair	Fiber

True Turnkey Solution

Wi-Fi AP: 4.8Gbps
+
CPE/ONT: 1G/2.5G/5G/10Gbps
+
ONU(MDU): UTP 4-Pair/2-Pair
+
OLT: NG-PON2/XGS-PON/10G-EPON/G-PON

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10 Gigabit Internet Solution: XGS-PON and 10G-EPON

- XGS-PON lead fiber access technology for delivering residential, business, and mobile backhaul services.
- HFR to provide 10 Gigabit Internet service (2.5G/5G/10G to the home) for any residential environment
- Wired terminals up to 10G service and wireless terminals for 4.8G services
- End-to-end 10 Gigabit Internet solutions from OLT to ONU, ONT, CPE, and Wi-Fi access points.
- Multi-Gigabit Ethernet and G.fast provide the optimal solution for MDU/MTU services.

Wi-Fi Access Point

- HFR is shipping an estimated 1M Wi-Fi access points to Korean operators every year.
- All of latest Wi-Fi 6 have been shipped from 2019 together with the access point controller.

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MDU			Single Home	Hot Spot
FTTB + G.fast + AP 1Gbps	FTTB + LAN + AP 500M/1G/2.5G/5Gbps	FTTH + AP 1G/2.5G/10Gbps		FTTB + LAN + AP 2.5G/10Gbps

Phone Cable / UTP Cable / Optical Cable

Wi-Fi AP — 1G ac, 1G ac, 1G ac, 10G ax, 10G ax, 1G ac, 10G ax, AP

CPE/ONT — 1G, 1G, 2.5G, 5G, 10G, 10G, 2.5G

ONU(MDU) — G.fast 10G / UTP 10G / Splitter

NG-PON2/XGS-PON/G-PON

OLT — Central Office

ITU-T NG-PON2/XGS-PON/G-PON

IEEE 802.3bz 5G/2.5GBASE-T

ITU-T G.9700/G.9701 G.fast

IEEE 802.11ax

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my5G Solution

Our End-to-End Private 5G Solution, my5G includes 5G SA vCore, O-RAN based 5G vRAN and Business Platform.

HFR is transforming into a Private 5G solution provider delivering BSS/OSS, vCore, vRAN and vertical applications for digital transformation in enterprise and industry.

my5G Solution

=

HFR Biz & Service Mgt Platform

+

HFR NaaS Platform (Fydena)

+

HFR Cloud Native 5G SA vCore

+

HFR Open vRAN (O-CU, O-DU)

+

HFR Radio Unit (O-RU)

Radio Unit

- Support O-RAN function split 7-2 / eCPRI
- Auto Configuration and Self-Diagnostic Function
- Flexible Configuration for Multi-vendors, Multi-frequency Environment
- CBRS Alliance certified radio units have been commercially available and under large scale field testing.
- Strand mount, outdoor attach, indoor type radio units are ready

Fydena

- Is a business platform for Network as a Service (NaaS) using Blockchain technology
- Ensures trustworthy and cost-efficient business transactions among NaaS providers, buyers, and platform providers
- Enables SLA(service level agreement)-based offerings to meet the needs and requirements of NaaS buyers.
- Enlarges and secures business opportunities for NaaS providers with reduced costs.

5G SA vRAN

- Compact and fully virtualized CU, DU solution
- Various RU portfolios commercially proven supporting CPRI, eCPRI, low power, high power, Sub-6Ghz and mmWave
- Flexibility, adaptability and modular design deliver economical solution whether deployed with existing infrastructure or in a greenfield location
- Enterprise-class architecture with carrier-class performance and security features
- Capable of deploying in the cloud or on premises
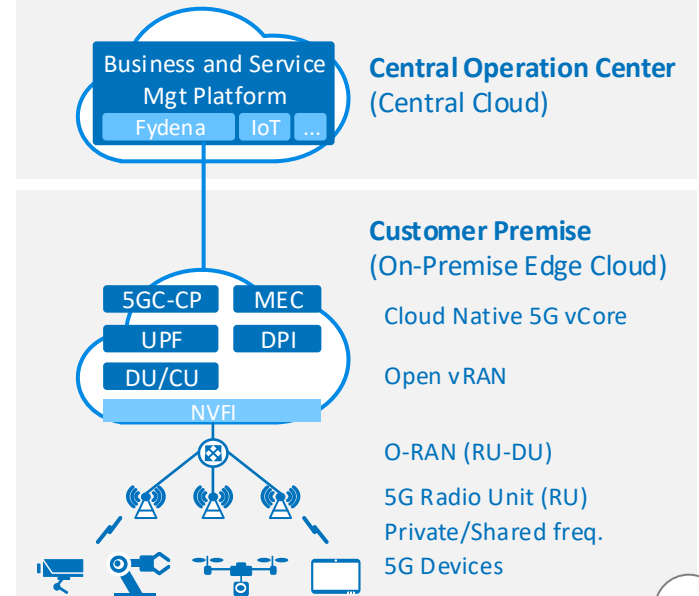- Supports multiple MNO networks

Biz & Service Mgt Platform

- Customer Portal
- Partner Portal
- Integrated BSS
- Fydena
- OSS/Orchestration
- Analytics
- IoT Platform
- Enterprise ICT Application Services

5G SA vCORE

- Compact and fully virtualized 5G vCore is standards-based solution
- Integrated 3GPP core elements: AMF, SMF, UPF, NRF, NSSF, PCF, CHF, etc.
- Supports small cells and macro cells
- Scalable from embedded single channel devices to several thousands of simultaneous media sessions.
- Supports network slicing features

HFR's E2E Private 5G Solution

Business and Service Mgt Platform
Fydena | IoT | ...

Central Operation Center (Central Cloud)

5GC-CP | MEC
UPF | DPI
DU/CU
NVFI

Customer Premise (On-Premise Edge Cloud)

Cloud Native 5G vCore

Open vRAN

O-RAN (RU-DU)

5G Radio Unit (RU) Private/Shared freq.

5G Devices

Contents

Financial Metrics (I)

Sales

(Unit: M USD)

CAGR 11.8%

Year	Value
2016	93.6
2017	109.0
2018	112.5
2019	130.6

Asset / Cash

(Unit: M USD)

CAGR 9.4%

Year	Asset	Cash
2016	87.0	12.0
2017	85.8	4.0
2018	106.7	16.8
2019	113.8	28.4

Financial Metrics (II)

Mobile Access / Broadband Access

(Unit: %)

	2016	2017	2018	2019
Broadband Access	64.6%	63.7%	65.3%	35.2%
Mobile Access	35.4%	36.3%	34.7%	64.8%
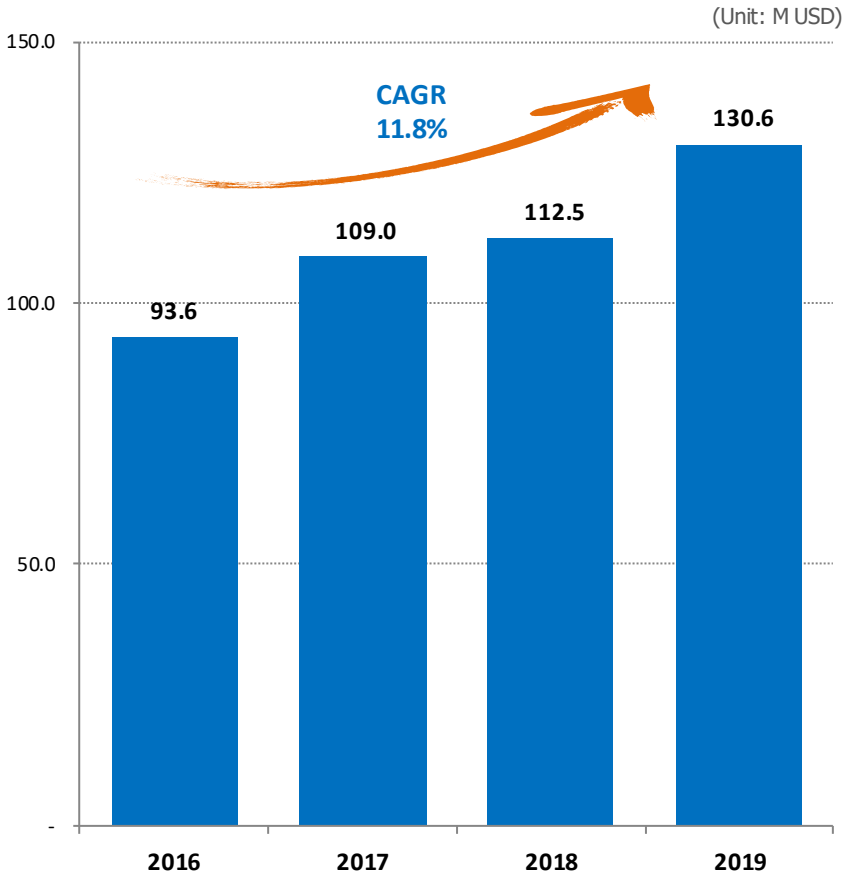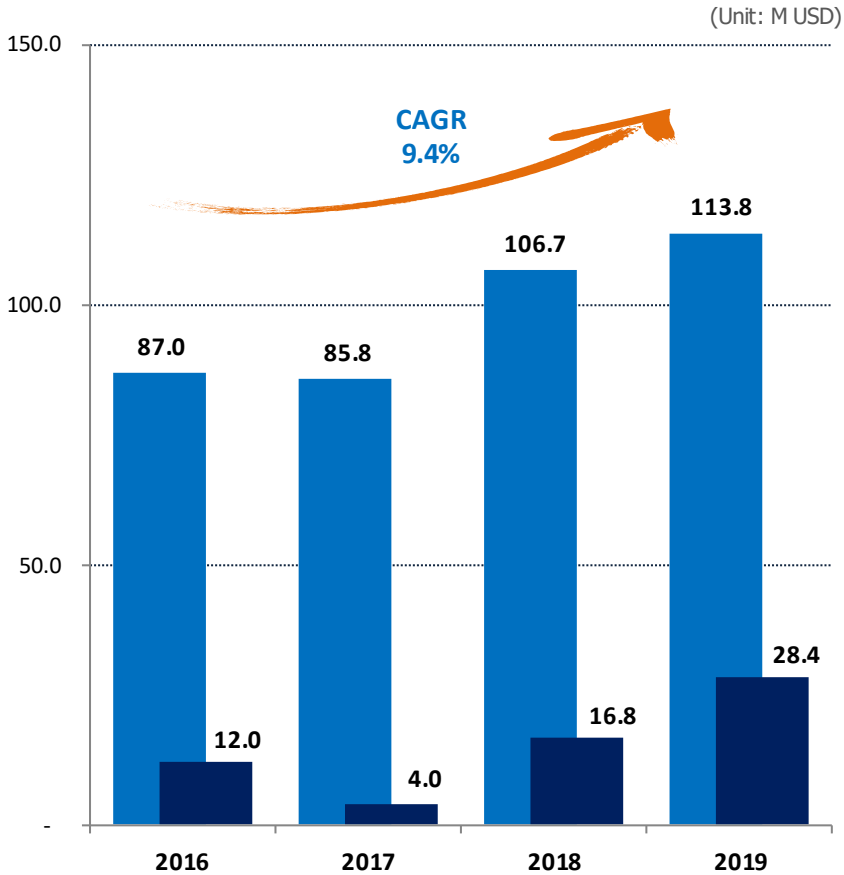
■ Mobile Access ■ Broadband Access

Domestic / Overseas

(Unit: M USD, %)

	2016	2017	2018	2019
Total	93.6	109.0	112.5	130.6
Overseas	28.6 (30.6%)	27.0 (24.8%)	18.9 (16.8%)	19.3 (14.8%)
Domestic	65.0 (69.4%)	82.0 (75.2%)	93.6 (83.2%)	111.3 (85.2%)

■ Domestic ■ Overseas

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Analyst's Report on HFR

2020

Date	Securities Firm	Title	Rating	Target Price [KRW]
05/18	Hanwha Investment & Securities	COVID-19 Impact inevitable, growth potential valid	BUY	41,000
04/06	Hanwha Investment & Securities	David of Korea against Goliath	BUY	45,000
03/14	KTB Investment & Securities	The biggest beneficiary of global 5G	BUY	43,000
02/27	Hana Financial Investment	4Q earnings are unfortunate, but the direction remains unchanged	BUY	57,700
02/26	Hanwha Investment & Securities	Pay attention to potential as a global first mover	BUY	45,000
02/13	Hana Financial Investment	You must buy the next leading stock in the 5G market	BUY	57,700
01/30	Hanwha Investment & Securities	Now it is a 5G total solution company	BUY	36,500
01/13	Hana Financial Investment	Acquisition of Entels, a great opportunity to buy	BUY	35,000

2019

Date	Securities Firm	Title	Rating	Target Price [KRW]
11/20	Hana Financial Investment	Q4 peak season has entered, and overseas momentum has already begun	BUY	35,000
11/04	Hanwha Investment & Securities	In 2020, HFR will be leading stock	BUY	36,500
10/07	Hana Financial Investment	Enter peak season + various momentum + valuation attractiveness!	BUY	35,000
09/18	Hanwha Investment & Securities	Accelerated 5G deployment competition in Japan: Expect to expand Upside in 2020	BUY	36,500
09/03	Hanwha Investment & Securities	A reasonable upward trend	BUY	36,500
08/29	Hana Financial Investment	Falling stock prices are an opportunity to buy more. The repeater market is just beginning	BUY	35,000
08/26	Hanwha Investment & Securities	Why you shouldn't hesitate to buy more	BUY	36,500
08/16	Hana Financial Investment	Directionality is good. Expectation as the next leading stock!	BUY	35,000
07/15	Hanwha Investment & Securities	The spring day of the fronthaul + optical repeater is coming	BUY	31,000
05/31	Hanwha Investment & Securities	Let's look forward to the Big-Cycle that we have not experienced	BUY	31,000
05/27	Hanwha Investment & Securities	Get on the clear path	BUY	31,000
04/03	Hanwha Investment & Securities	Now it's time to buy, not to sell	BUY	(4,000)

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Factory, Certification & IPRs

Production Facility

K Factory

- Location: Anyang
- Space: 1,431 m²
- Assembly, Packaging, Reliability Test, RMA
- Integrated MES for In-house and Outsourced Production
- Upgrade for the Future: Advanced assembly line and packaging, and full automation test

Verification & Certification Center

Overseas Certifications

IEC International Electrotechnical Commission

NEBS LEVEL 3 CERTIFIED

TÜV SUD

UL

KC

FC

VCI

CE

Validation Test

- System & Functional Test
- Regression Test
- Acceptance Test
- Performance & Stress Test
- Customer Benchmark Test
- Official Release

Validation Test

- Approximately 1,600 test equipment are available.
- Having four Temperature & Humidity Chambers.
- Use of various measuring equipment (about 400)
  - IP, CPRI, Optic, RF etc.
- Using Self-Developing Test Automation System

Certification & Reliability Test

- EMI (KC, CE, VCCI, FCC …)
- IEC61000-4-2,3,4,5,6,8,11
- Inrush current
- IEC60950-1 (UL)
- Environmental Tests (Temperature)
- Earthquake_R10
- (Un)packing& Transportation vibration
- Free Drop Test
- Attitude Test
- Acoustic Noise
- Salt Fog Test (Outdoor Type)

HFR's Verification & Certification Center

Qualified Management System for Global Business
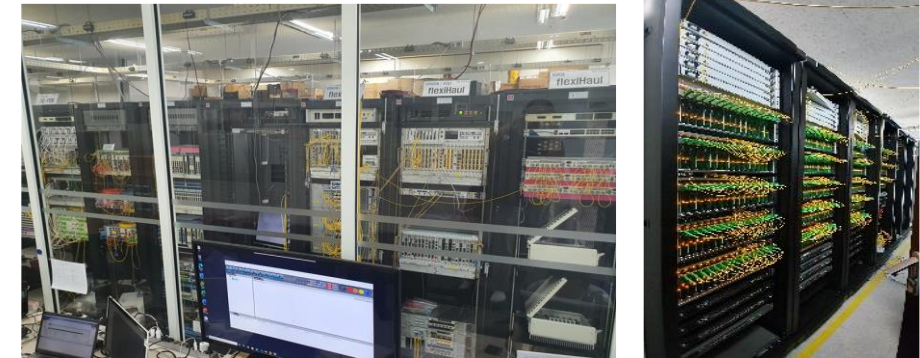
System Management and Process

- Adopted HFR System Management in 2007
- Run "Innovation/Improvement proposal" program every month
- Regularly updated every year

Quality Certifications

- TL 9000 / ISO 9001
- ISO 140001
- NEBS Level 3
- EcoVadis for sustainable growth

Assessment by Customers

- Supplier process audited and proved by global vendors and telecom customers

Patents List

Year	Domestic		Overseas		Total	
	Application	Registration	Application	Registration	Application	Registration
2018 - Present	8	1	3	-	11	1
2017	8	6	1	-	9	6
2016	7	1	5	1	12	2
2015	5	3	-	-	5	3
2014	2	1	2	-	4	1
2013	5	5	-	-	5	5
2012	7	3	1	-	8	3
2011	2	2	-	-	2	2
2000 - 2010	36	24	1	-	37	24
Patent Right	80	46	13	1	93	47
Trademark Right	9	9	2	1	11	10
Copyright	2	-	-	-	2	-

No.	Registration date	Name of an Invention	Application No.	Registration No.
1	04/21/2020	Apparatus and Method for Detecting Transmission and Reception Timing Synchronous Signal in TDD Wireless Communication System	1020180076830	1021049120000
2	11/20/2019	Method and Apparatus for Operating In-building Relay based on mmWave	1020170155674	1020487510000
3	11/20/2019	Method and Optical Network System for Obtaining Line Information at Passive RN	1020170081430	1020487450000
4	09/04/2019	Method and Apparatus for Detecting a Disconnected Optic Fiber Line and a Location of Disconnection in Ring Optical Network System	1020170100309	1020205780000
5	08/29/2019	System and Method for Providing Interoperability devices	1020170098495	1020182440000
6	05/28/2019	Method and Optical Network System for Monitoring Passive RT in WDM System	1020160151844	1019852300000
7	05/10/2019	In-Building Distributed Network System for PIM Avoidance	1020170177909	1019792590000
8	08/22/2018	Method for Frequency Band Switching In Wireless Local Access Network	1020170081436	1018925380000
9	08/25/2017	Access Point and Antenna Device Capable of Adjusting Radiation Pattern	1020150178631	1017735720000
10	07/17/2017	Optical and Electrical Hybrid Connector and Adapter	1020150060065	1017602900000
11	12/22/2014	Method for Sharing Optical Fiber for Cloud Based Network, System And Apparatus Therefor	1020120081043	1014771690000
12	06/08/2007	System, Set-Top Box and Method for Providing QualityInformation of TV Service for Use in Internet ProtocolNetworks	1020050055258	1007286220000

Strongly tied with Global Standard Bodies

HFR is a tech-centric company with innovative DNA, HFR employs many experts who actively participate in global standard bodies such as CBRS, ORAN, IEEE and SCTE ISBE.

Global Standard Bodies

CBRS Alliance	O-RAN Alliance	IEEE 1914.3	SCTE ISBE	TIP
Support the common interests of members, implementers and operators for the development, commercialization, and adoption of LTE solutions for the US 3.5 GHz Citizens Broadband Radio Service.	Leading the industry towards open, interoperable interfaces and RAN virtualization.	IEEE Standard for Radio over Ethernet Encapsulations and Mappings	SCTE•ISBE is the applied science leader for cable telecommunications.	An engineering-focused, collaborative methodology for building and deploying global telecom network infrastructure

Contact HFR

HFR Headquarters

www.hfrnet.com
Hana EZ tower 5F, 10, Seongnam-daero 43beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea, 13636
Tel   +82 31-712-7768
Fax   +82 31-712-7948
General   resonant@hfrnet.com
Sales   sales@hfrnet.com

KUBtel

www.ktl.kubtel.com
G41, Persiaran Laman Seri Business Park, Seksyen 13, 40100 Shah Alam, Selangor, Malaysia
Tel   +60 3-5514-3800
Sales   info@kubtel.com

HFR Networks, Inc.

www.hfrnetworks.com
740 E. Campbell Road, Suite 900, Richardson, TX 75081 USA
Tel   +1 972-803-5703
Sales   info@hfrnetworks.com

HFR Japan

100-6005 Kasumigaseki Building 5F L-07, 3-2-5 Kasumigaseki, Chiyoda-ku, Tokyo, Japan
Tel   +81 03-3519-8352
E-mail   junosong@hfrnet.com