

Press Release		
Korea Fair Trade Commission	Date of Distribution: Wednesday, Dec. 28, 2016	Anti-Monopoly Bureau Anti-Monopoly Division
	This press release may be used for reports starting from the morning paper of Thursday, Dec. 29, 2016. Broadcasting and internet media may start using this press release from Wednesday, Dec. 28, 2016 12PM.	Responsible Manager: Sang-Min Song (044-200-4484)
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		Anti-Monopoly Bureau Knowledge Industry Division
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Strict Sanctions on Qualcomm's Abuse of Cellular SEPs

- Imposed the largest surcharge in the KFTC's history, KRW 1 trillion 30 billion and the orders to rectify the unfair business model -

- **Korea Fair Trade Commission** (Chaired by Jae-Chan Jeong) ("KFTC") decided in the full-commission hearing on Wednesday, December 21, 2016 to **impose remedial orders and a surcharge of KRW 1 trillion 30 billion** on the global modem chipset company/patent license company, Qualcomm Incorporated (QI)* and its two affiliates** (the three companies together as "Qualcomm") for abuse of market dominance.

* QI is Qualcomm's U.S. headquarters and is engaged in **patent licensing business**.

Qualcomm Technologies Inc. (QTI) and Qualcomm CDMA Technologies Asia-Pacific PTE (QCTAP) are engaged in cellular **modem chipset business.

- Qualcomm holds **standard essential patents** ("SEPs") for which it has made **FRAND commitments*** to global SSOs such as ITU and ETSI in regards to cellular communication standard technologies such as CDMA, WCDMA and LTE, and at the same time, Qualcomm is a **vertically integrated monopolistic enterprise** that manufactures and sells modem chipsets. In violation of the FRAND commitment, Qualcomm engaged in the following acts:

* FRAND commitment: SEP holder's commitment to license patent users on fair, reasonable, non-discriminatory terms

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- (1) Despite requests by competing **modem chipset companies**, Qualcomm has **refused to license**, or **imposed restrictions on the license** for, the cellular SEPs that are necessary for the manufacture and sale of chipsets.

- (2) By linking the chipset supply with patent license agreements, Qualcomm has **coerced** the execution and performance of unfair **license agreements** by using its chipset supply as leverage, while circumventing FRAND commitment.
- (3) Qualcomm has provided handset companies with **only comprehensive portfolio licenses** and coerced unilaterally determined royalty terms without conducting a procedure to calculate fair compensation, while **coercing unfair agreements**, e.g., demanding handset companies to license their patents for free.
- The KFTC concluded its investigation regarding the above violations and **sent the Examiner's Report ("ER")** to Qualcomm on November 13 of last year. Since July of this year, the KFTC held **7** full-commission hearings in total, including hearings regarding the consent decree process, and **conducted an in-depth review** of the case.
 - Particularly, the KFTC reviewed this case from various angles through, for instance, **participation in the hearings by** not only Korean companies such as Samsung Electronics and LG Electronics, but also **global ICT enterprises** such as Apple, Intel, Nvidia (all U.S.), MediaTek (Taiwan), Huawei (China), and Ericsson (Sweden).
- This case is meaningful in that the KFTC is the **first** to rectify Qualcomm's **unfair business model**, under which Qualcomm has **refused to license** competing chipset companies while coercing unilateral license terms on handset companies in order to **strengthen its monopolistic power** in the patent license market and the chipset market.
 - Particularly, the measures are expected to change the *exclusionary ecosystem in which Qualcomm is the exclusive beneficiary* to return to the *open ecosystem in which any industry participant enjoys its own innovation incentives*, and will serve as the trigger to restore **fair competition** in the **cellular communication industry**.

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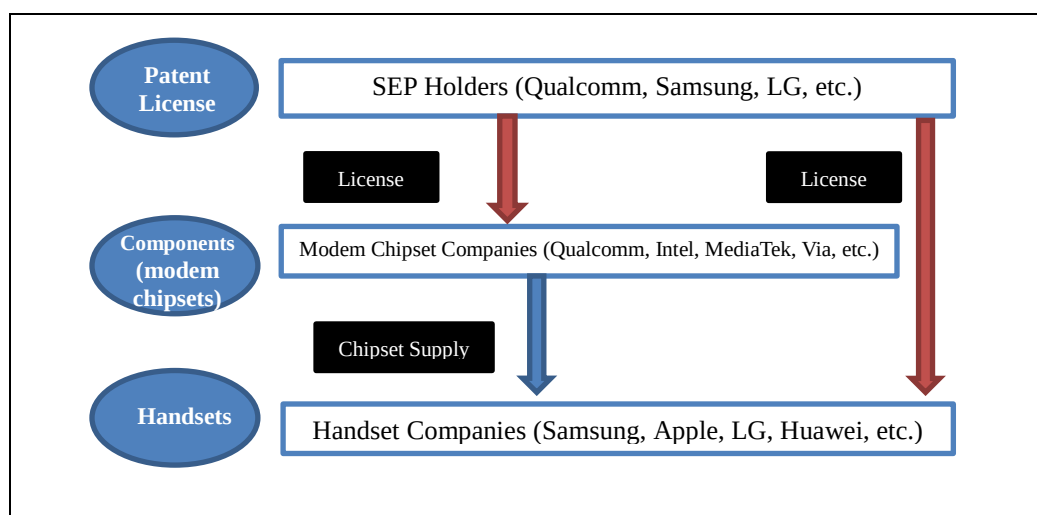
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Market Structure and Current Status

1. Market Structure

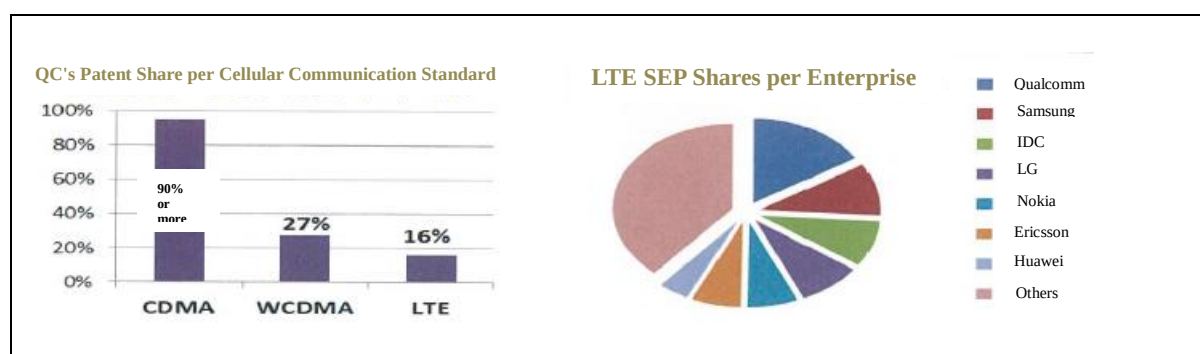
- The **cellular communication** industry is largely comprised of the **patent license** market, the components, including **modem chipsets**, market, the handset market, the cellular communication service market, etc.
 - Qualcomm is a **vertically integrated monopolistic enterprise** that operates business in the patent license market and the modem chipset market, which are **upstream** markets in the overall market structure.

<Overview of the Overall Market Structure of the Cellular Communication Industry>



2. Relevant Markets and Market Dominance

- **(Cellular SEP license market)** Qualcomm holds the largest number of SEPs over the cellular communication generations of 2G (CDMA), 3G (WCDMA), and 4G (LTE).
 - As SEPs cannot be replaced by other technologies, a SEP holder gains complete **monopolistic power** by holding even a single SEP.
 - ✂ Unlike CDMA, of which Qualcomm held most SEPs, Qualcomm's share significantly decreased for the WCDMA standard (27%) and the LTE standard (16%).



* Based on 2015 public data on ETSI website

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- **(Modem chipset market)** Qualcomm holds a monopolistic position in the CDMA modem chipset market, and has **long maintained its market dominance** in the WCDMA and LTE markets.
 - Even today with the spread of LTE technology, Qualcomm still **exclusively supplies** multimode CDMA-LTE chipsets that are backward compatible with CDMA.
 - * **Backward Compatibility:**
Evolution of cellular communication does not simultaneously change communication

standards at once because there are still users of handsets using the old standard and it takes substantial time to replace base stations. Therefore, modem chipsets and handsets have to support not only new standards but also the old standards.

- In addition, Qualcomm holds an unrivaled position for the high-end premium products.

**<Qualcomm's Market Share Trend in Modem Chipset Market per Standard
(Based on Revenues)>**

	Yr 2008	Yr 2009	Yr 2010	Yr 2011	Yr 2012	Yr 2013	Yr 2014	Yr 2015
LTE	-	-	34.2%	58.8%	94.5%	96.0%	84.8%	69.4%
CDMA	98.4%	97.6%	96.4%	94.3%	92.4%	93.1%	91.6%	83.1%
WCDMA	38.8%	47.4%	45.7%	55.0%	50.4%	53.9%	48.8%	32.3%

* Source: Strategy Analytics

3. Current Status of Qualcomm's Revenues

- Qualcomm's annual global modem chipset revenue and patent royalty revenue amount to approximately **USD 25.1 billion** (as of 2015).

<Status of Qualcomm's Global Revenues (USD million)>

	Yr 2013	Yr 2014	Yr 2015
Patent Royalty (QTL)	7,554	7,569	7,947
Modem Chipset Sales (QCT)	16,715	18,665	17,154
Total	24,269	26,234	25,101

* Based on Qualcomm's 10-K for Year 2015

- Among such revenues, the revenues derived from the Korean market slightly differ from year to year, but are **approximately 20%** of the total global revenues.

* The Proportion of the Korean Market per Year (2013: 20%; 2014: 23%; 2015: 16%)

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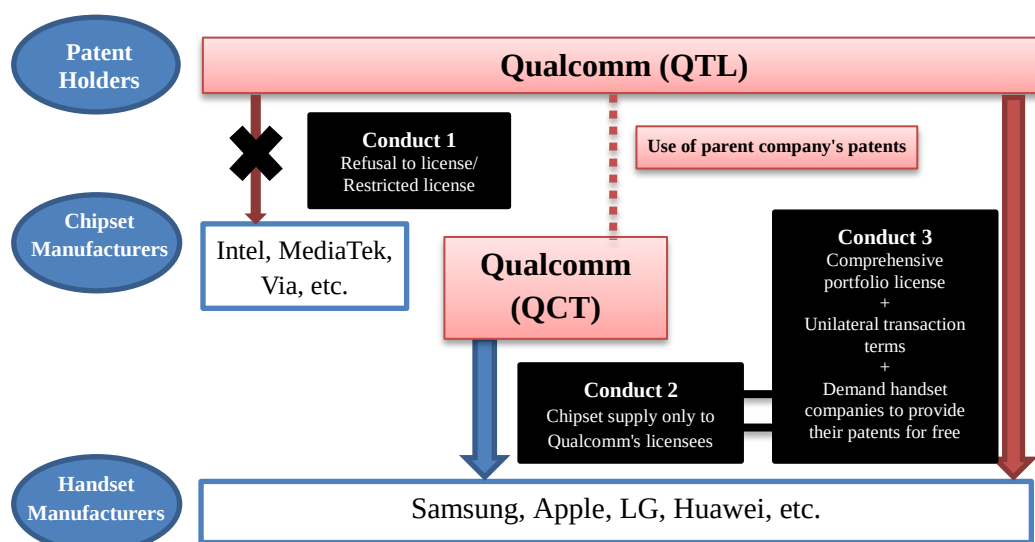
Conducts in Violation

- **(Overview of Qualcomm's business model)** As the monopoly enterprise in both the cellular SEP market and the modem chipset market, Qualcomm has established a business model that skips the chipset level and licenses at the handset level.
 - To do so, Qualcomm has (1) **refused** to license or **imposed restrictions on the license** for SEPs to **competing chipset companies**;
 - (2) by linking the chipset supply with patent license agreements, Qualcomm has **coerced** the execution and performance of unfair **license agreements** by using its chipset supply as leverage, while circumventing FRAND commitment; and then
 - (3) Qualcomm has provided handset companies with **only comprehensive portfolio licenses** and coerced unilaterally determined royalty terms without

conducting a procedure to calculate fair compensation, while demanding handset companies to **cross-license** their patents for **free**.

<Overview of Qualcomm's Business Structure>

- Qualcomm has divided and is currently operating its **license business (QTL)** and **modem chipset business (QCT)** as **separate corporate entities** (QI and QTI).
- (1) QTL does not provide licenses to any chipset companies.
- (2) While selling modem chipsets to handset companies, QCT demands the execution and performance of license agreements with QTL. In other words, even after dividing the corporate entities, Qualcomm has still linked its businesses.
- (3) As a result, QTL can easily coerce unilateral license agreement terms on handset companies, and through such, Qualcomm is able to obtain cross-licenses on handset companies' patents, which in turn, allows QCT and customers of QCT to use them for free.



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1. Refusal/Restriction of Cellular SEP Licenses to Competing Chipset Makers

- Qualcomm **made the FRAND commitment** to international SSOs such as ITU and ESTI so that Qualcomm's cellular technologies would be selected as the industry standard.
- However, in violation of the FRAND commitment, Qualcomm **refused or restricted** the provision of **cellular SEP licenses** that are essential for the chipset manufacture and sales, despite requests from chipset makers.
 - Samsung, Intel, and VIA, among others, requested license agreements for cellular SEPs, but Qualcomm **refused**.*

- * Determined that if Qualcomm provides licenses to competing chipset companies, it would be difficult to maintain model where Qualcomm receives royalties from handset companies
- Although competing chipset companies such as MediaTek requested complete patent license agreements, the agreement entered into was an **incomplete agreement*** that restricts the rights subject to the license.
- * Representative examples are restrictions on to whom competing chipset companies can sell or the right to use the modem chipset. Also, Qualcomm requested reports about sensitive business information such as competing chipset companies' sales amount by product model, product model, name of customers, etc.

2. Coercing Patent License Agreements to Handset Companies While Holding Hostage the Supply of Chipsets

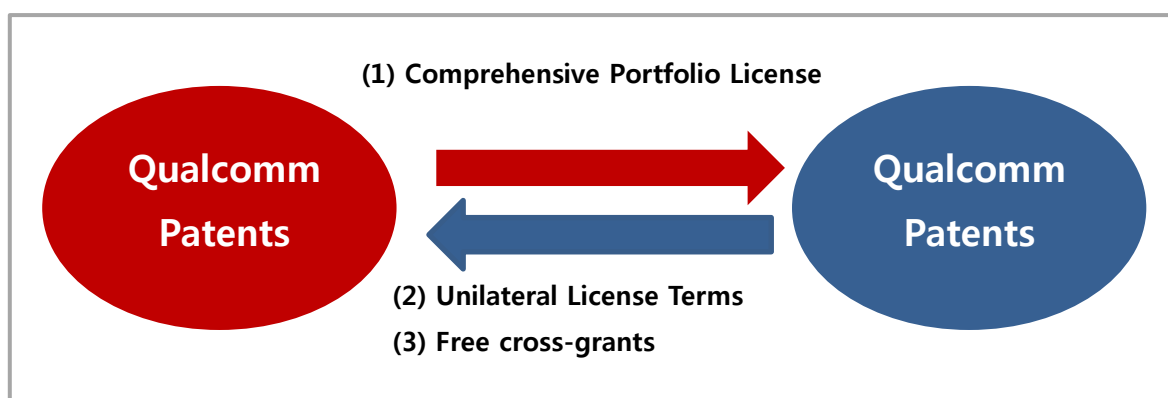
- ☐ Qualcomm established and strictly implemented a **business policy** where Qualcomm does not supply modem chipsets to handset companies that are not licensed by Qualcomm.
- Incorporating the business policy into its modem chipset supply agreement, Qualcomm prescribed that Qualcomm can, at any time, **refuse/stop the supply of chipsets** when a handset company does not execute or perform a license agreement.
- Qualcomm actually used the threat of terminating the supply of modem chipsets as **negotiation leverage** in the process of license negotiations with handset companies.

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3. Portfolio Licensing All of Qualcomm's Patents Comprehensively, Unilaterally Coercing Licensing Terms Without a Process for Calculating Fair Compensation, and Requiring Free Cross-Licenses, etc. from Handset Companies

- ☐ Providing only comprehensive portfolio licenses of all of Qualcomm's patents at once, instead of distinguishing between cellular SEPs practiced by the chipsets and other patents, or distinguishing by cellular standards such as 2G/3G/4G (**comprehensive portfolio license**)
- ☐ Coercing **unilaterally** determined license terms without offering handset companies the opportunity to properly evaluate the value of Qualcomm's patents (**unilateral license terms**)
- ☐ While licensing its patents to around 200 handset companies, requiring them to cross-license without providing fair compensation for the patents held by the counterparty handset companies (**royalty-free cross-grant**)

<Cross-License Structure between Qualcomm and Handset Companies>



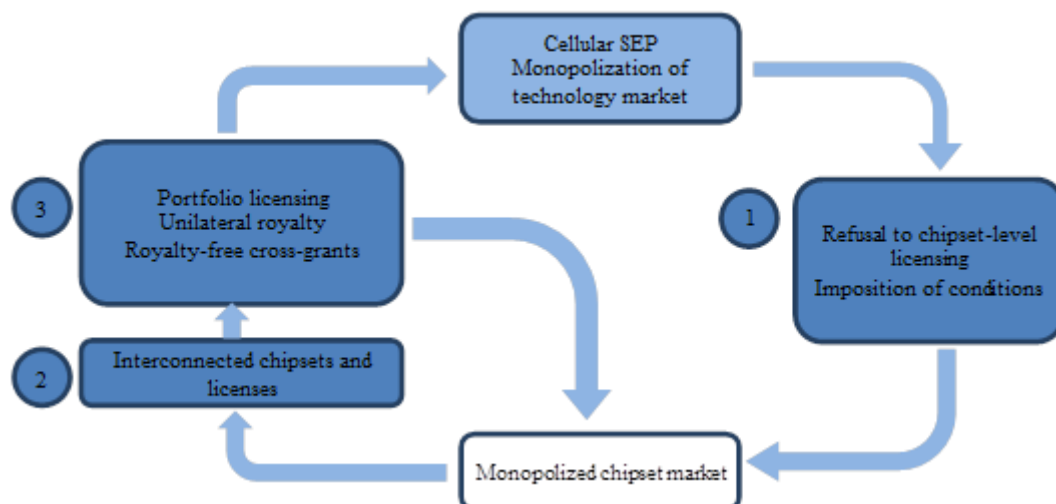
4. Each of the Conducts Organically Combines Together to Form One Unfair Business Model.

- ☐ The 3 conducts above organically connect to complete Qualcomm's overall **anticompetitive** business model.
 - Qualcomm **monopolizes** the **chipset market** by refusing or restricting the provision of licenses to competing chipset companies and forming competition conditions that are unfavorable to competitors, and
 - Qualcomm increases its **negotiating power** in the license market by **evading the FRAND commitment** through the use of its control over the chipset market that if a handset company does not enter into or perform a license agreement, Qualcomm restricts the chipset supply.

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- Subsequently, Qualcomm uses this increased power to **impose** various **unfavorable terms**, such as unilateral license terms and the term requiring free cross grants.
- And then, by once again using the above as a means to, for example, make its chipsets more favorable than competitors' chipsets (patent umbrella), Qualcomm forms a **feedback structure** to maintain and strengthen its monopoly power in the **chipset market** and **patent license market**.

<Structure of Qualcomm's Organic Feedback Business Model>



3 Anticompetitive Effects by Relevant Market

- ☐ Due to Qualcomm's illegal conducts, **anticompetitive effects** arise in the modem chipset market and the cellular SEP license market. Also, Qualcomm's illegal conducts harm other enterprises' R&D activity and distorts competition on R&D for cellular technologies.

A. Modem Chipset Market

- ☐ Qualcomm has maintained an **inconsistent position** where it receives licenses from other patent holders such as handset companies but never licenses competitors (**double standard**).
 - Accordingly, **Qualcomm's chipsets** become **products safe** from patent attacks while **competitors' chipsets** become **flawed products** without patent licenses. Thus, this creates a competition structure absolutely favorable to Qualcomm (**un-level playing field**).

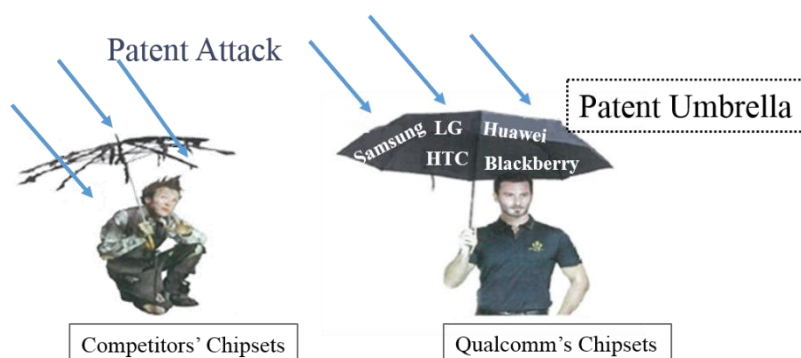
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- ☐ The "**free cross-grants**" that Qualcomm acquired from handset companies and others provide "**patent umbrella**," which offers protection from patent infringement attacks only to Qualcomm's chipset customers. As a result, this allows Qualcomm to easily gain competitive advantage.
 - When a handset company purchases chipsets from Qualcomm, it can benefit from the **patent umbrella** effect whereby it is **exempted from having to pay royalties** to around 200 other patent holders.
 - * Qualcomm itself has publicized that handset companies can save their 'IP costs,' (i.e., royalties payable to other patent holders) significantly reduced by purchasing

Qualcomm's chipsets. (Qualcomm has publicized this for more than 240 times in the format of a white paper since 2004.)

- On the other hand, if a handset company **purchases chipsets from Qualcomm's competitors**, then the handset company has to **pay royalties** for the patents of other handset companies. In effect, the competing chipset companies are unable to compete on the merit.

<Exclusionary Effect of Free Cross-Grants (Patent Umbrella)>



- Qualcomm's practice of refusing to license to competing chipset companies has **limited the competitors' customers** and has created a structure in which **Qualcomm can intervene** in the transactions between the competitors and their respective customers.
- A competing chipset company that sells chipsets to either handset companies that have not entered into license agreements with Qualcomm or that have disputes with Qualcomm is subject to unexpected **patent attacks**.
 - Therefore, since competing chipset companies can only sell to handset companies that have entered into license agreements with Qualcomm, it is **difficult** for the competing chipset companies to **actively develop new customers**.
- In addition, Qualcomm has made it possible for itself to **unfairly intervene** in the transactions between its competitors and handset companies by taking advantage of the fact that the handset companies have no choice but to execute and perform patent license agreements with itself.

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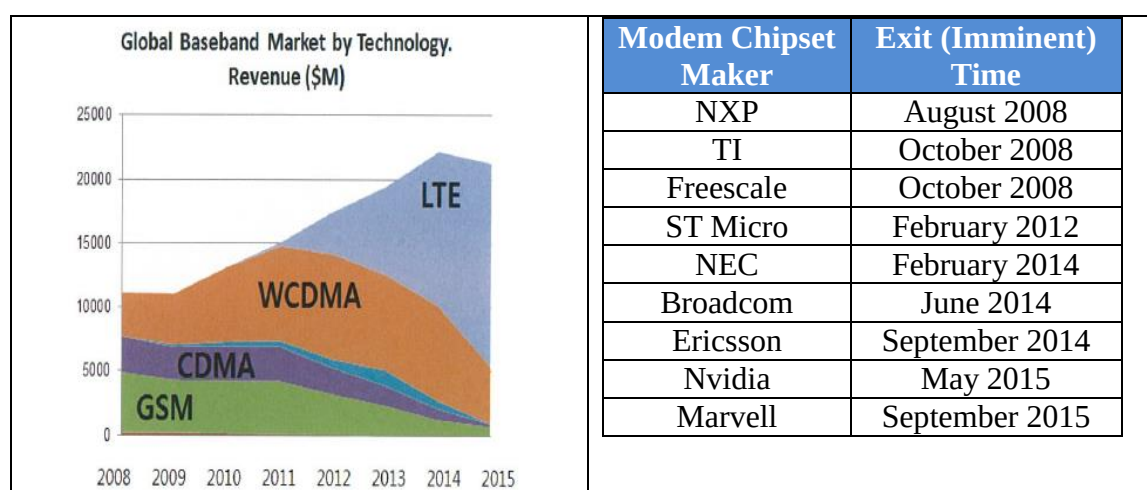
- When a handset company attempts to purchase chipsets from Qualcomm's competitors, Qualcomm can **interfere** with the competitors' chipset sales by, for example, **conducting strict royalty audit** on the handset company.
 - Qualcomm can **attract competitors' customers** by, for example, providing conditional rebates to those handset companies that purchase chipsets from Qualcomm.
- The anticompetitive effect in the modem chipset market can indeed be verified through

several indexes.

① **Market exits** by major competing chipset makers and **restrictions on new market entry**

- Among the 11 major chipset companies selected by Deutsche Bank in 2008, 9 companies have **exited the market**
 - * EONEX, the only small and medium-sized modem chipset maker in Korea, also exited the market in 2009.
- Although the size of the entire modem chipset market has grown by more than twice the market size in 2008, due to Qualcomm's refusal to license and other practices, no significant competitor has newly entered the market.

<Market Growth Trend in the Modem Chipset Market and Market Exit by Major Chipset Companies>

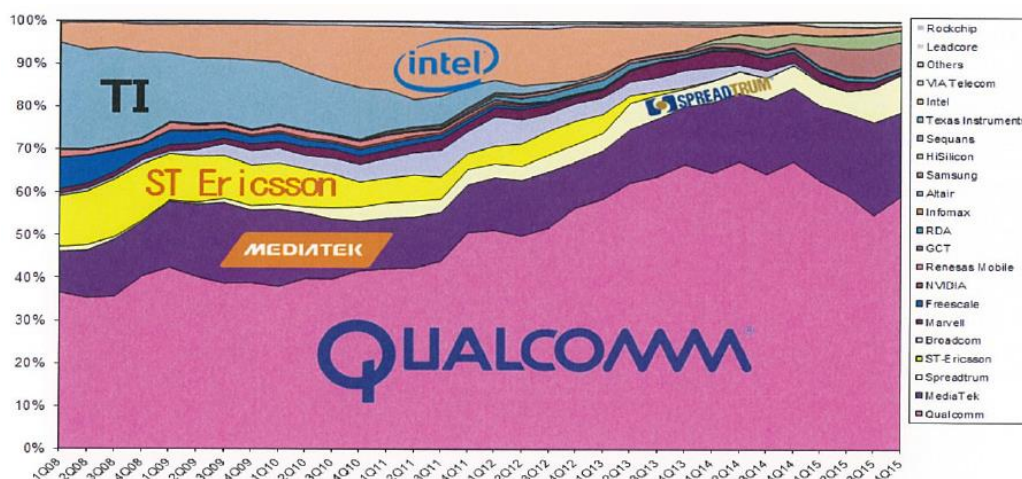


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② **Qualcomm's market share** and **market concentration** in the modem chipset market has steadily **increased**

- Despite the decrease in the importance of the CDMA standard and the market evolution that has transformed the market to a 4G LTE chipset-centric market, Qualcomm's market share in the entire chipset market has continued to be on the rise.
- The HHI, which shows the market concentration, has also significantly increased from 2,224 in 2008 to 4,670 in 2014.

Changes of Market Shares in Worldwide Modem Chipset Market (2008~2015)



B. Cellular SEP License Market

- The process of setting a standard artificially **grants monopoly power** by selecting specific technologies as standards and excluding competing technologies through the agreements reached by enterprises on the basis of FRAND commitments.
 - **FRAND commitments** require the SEP holders to make **promises** to license on fair, reasonable, and non-discriminatory terms to anyone in order to prevent abuse of monopoly power by SEP-holders.
 - Therefore, if a SEP-holder fails to comply with the FRAND commitments, it will harm the standard setting process and **distort competition among technologies** as the standard technologies become exclusive properties of a small minority of enterprises or patent-owners.

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- As Qualcomm coerces the execution and performance of patent license agreements by using modem chipset supply as a weapon, **FRAND commitment** that restrains abuse of dominance in the SEP license market is in effect debilitated (**FRAND commitment is rendered meaningless**).
 - As handset companies that cannot but use Qualcomm chipsets have to accept the terms demanded by Qualcomm, they cannot negotiate SEP license terms on an equal footing.
 - It is a structure under which handset companies have to bite the bullet and accept Qualcomm's license terms, even if they are unfair, because if the modem chipset supply is suspended, handset companies would face the **risk** of their **entire business** shutting down.
 - Major competition authorities* view the act of **seeking an injunction** in courts based on a patent infringement claim against willing licensees itself as **violation of competition laws**.

- * For example, the USFTC *Google-Motorola* case (2013), EC *Motorola-Samsung* case (2014)
- However, under Qualcomm’s structure, even without going through the process of a private lawsuit in courts, Qualcomm uses **as negotiation leverage** the means to **immediately suspend** handset companies’ businesses based on its own discretion.

<Comparison of Injunction and Refusal / Suspension of Chipset Supply>

	Injunction	Refusal / Suspension of Chipset Supply
Determining Body	Neutral institution, e.g., courts	Qualcomm itself
Determination Standard	Relevant laws, agreement terms, etc.	Arbitrary determination
Point at which It Is Effective	After the final decision	Immediately effective
Scope of Effects	Limited within jurisdiction	Entire scope of business

- ☐ Unfair patent agreements that actually violate FRAND commitment are executed (**patent holdup**).
- ☐ As Qualcomm provides only comprehensive **portfolio licenses** for its SEPs and non-SEPs, even handset companies that wish to use only cellular SEPs unavoidably license other unnecessary patents from Qualcomm.

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- ☐ Despite that Qualcomm SEPs’ level of **contribution** has declined as the standards developed from 2G → 3G → 4G, Qualcomm has kept the same **royalty rate** by coercing comprehensive portfolio licenses during the long-term or perpetual agreement period.
- ☐ Qualcomm ignored the value of patents held by handset companies and allowed Qualcomm as well as its modem chipset customers to **use** such patents **for free**.

C. **Distortion of Competition on R&D Innovation**

- ☐ As Qualcomm demanded and received **free cross-grants** from handset companies, the incentive for such handset companies to make **investments in R&D** has **significantly decreased**.
- ☐ From handset companies’ perspective, they cannot receive fair compensation for their investments because even if they make active investments in R&D and thereby obtain multiple cellular SEPs, they would be licensed for free to Qualcomm.
- ☐ As Qualcomm imposes royalty based on unilateral standards irrelevant to the contents of the patented inventions, **the incentive** for the handset companies and chipset companies **to develop technology has decreased**.

- Today, a smartphone is a comprehensive IT device that integrates various technologies developed by handset companies, component companies such as modem chipset companies, SW and application developers, etc.
- However, the current structure is that if the above companies create **new demands** and increase **value added**, then Qualcomm **collects** a **significant portion** of such achievements.

4

Applicable Laws & Remedial Measures

A. Applicable Laws

- Abuse of Market Dominance & Unfair Trade Practice (both provisions may apply)
 - Article 3-2(1) of the Monopoly Regulation and Fair Trade Act (“MRFTA” or the “Act”), Article 5(3) of the Enforcement Decree of the MRFTA (“Enforcement Decree”) (Abuse of Market Dominance: Unfair interference with another’s business activities)
 - Article 23(1)(4) of the MRFTA, Article 36(1) of the Enforcement Decree (Unfair Trade Practice: Abuse of Superior Trading Position)

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B. Remedial Orders

<Main Remedial Orders>

1. Upon modem chipset companies' request, Qualcomm shall engage in **good-faith negotiations** for patent license agreements.
 - In executing license agreements with modem chipset companies, Qualcomm shall **not** demand **unfair restrictive terms**, such as a limitation on chipset customers, restriction on the use right of chipsets.

<Negotiation Process>

- Upon modem chipset companies' request for cellular SEP licenses, Qualcomm shall send a draft license agreement, including royalty calculation method, etc., to the chipset companies.
- Under the common industry practices and good faith, the parties sufficiently negotiate for a period, the length of which is agreed upon by the parties, and draft the final license agreement.
- If the parties do not reach an agreement regarding the execution of the agreement, the parties shall request an independent third party to make a determination and follow such determination.

2. Qualcomm shall not coerce the execution of patent **license** agreements by using the

modem chipset supply as leverage, and shall amend or delete relevant provisions in agreements.

* However, an exception applies to handset companies that are clearly confirmed to be unwilling licensees that, for instance, refuse to engage in good-faith negotiations for license terms.

3. In executing a patent license agreement with handset companies, Qualcomm shall not **coerce unfair agreement terms*** on handset companies, and upon handset companies' request, Qualcomm **shall re-negotiate** existing patent license agreements.

* For example, a term regarding comprehensive portfolio licensing without any distinction between SEPs and non-SEPs, or standards per generation and a term unilaterally demanding cross-licenses without conducting a procedure calculating fair compensation

4. Qualcomm shall **notify** modem chipset companies and handset companies the fact that the **remedial orders** have been imposed on Qualcomm, and **report** to the KFTC if Qualcomm newly executes or amends agreements or deletes provisions in accordance with the remedial orders.

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<Scope of Remedial Orders>

- ☐ Considering the efficacy of the measures, principle of proportionality, international comity, etc., **the scope of the remedial orders** covers transactions with the following enterprises, which have effects in Korea.

Handset Companies	(1) Handset manufacturers headquartered in Korea (2) Handset manufacturers / sellers that sell handsets in Korea (3) Enterprises that supply handsets to a handset company that sells handsets in Korea
Modem Chipset Companies	(A) Chipset manufacturers headquartered in Korea (B) Enterprises that supply modem chipsets to a handset company that falls under (1)~(3) above

※ If in the future, a foreign competition authority or court makes a decision that conflicts with these remedial orders and thus makes it impossible to comply with both at the same time, Qualcomm may request for a reconsideration of these remedial orders.

<Surcharge>

- ☐ **KRW 1 trillion and 30 billion** (*Can change later in the process of determining the relevant revenue amount)

- This Qualcomm case underwent **in-depth reviews** through a total of 7 **oral hearings**,* which included 5 hearings focusing on main issues by the fields, such as economics, law, and patents, and 2 hearings on Qualcomm's application for the consent decree, since the first full-session hearing was held last July.
 - * The full-session hearings for this case were held on the following dates: 1st hearing on July 20; 2nd hearing on August 17; 3rd hearing on September 5; 4th hearing on November 9, 5th hearing on December 21. Qualcomm submitted an application for the commencement of the consent decree process last November 18, but the application was ultimately dismissed after 2 hearings (on December 5 and December 14).
- This case required, in addition to analysis of the legal principles of abuse of market dominance in the traditional competition law and economics, review and determination of highly **specialized and technical issues** such as major issues in patent law, analysis of communication technology, and international comity.
- In addition, around 5 months of time for hearings was spent to conduct sufficient discussions, which included guarantee of due process such as Qualcomm's **right of defense** and **attendance by interested parties*** from the cellular industry from **various countries** around the world.

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- * Not only Korean handset companies such as Samsung Electronics and LG Electronics but also main ICT companies around the world such as Apple · Intel · Nvidia (all U.S.), MediaTek (Taiwan); Huawei (China); Ericsson (Sweden) directly and indirectly cooperated in the KFTC's investigation or participated in the hearings.
- This case is meaningful in that it **fundamentally remedies** the business model that made it possible for Qualcomm to unfairly maintain and expand its **dominance** for an extended period of time in the cellular SEP license and modem chipset markets.
 - Competing modem chipset companies, such as MediaTek and Intel, will obtain the proper right to use the patents, such as for chipset manufacture, sale and use.
 - This will allow competing modem chipset companies to take part in **competition on the merits**, based on technical skills, price, quality, etc., while competing on an equal footing with Qualcomm.
 - Also, it is expected that handset companies will actually be guaranteed the opportunity to **negotiate** on FRAND license terms in an **equal position** as Qualcomm without any concern regarding Qualcomm chipset supply.
- In addition, the KFTC's measures in this case are measures to change the *exclusionary ecosystem where Qualcomm is the exclusive beneficiary* to return to an *open ecosystem where any industry participant can enjoy the incentives of the innovation that it has accomplished*.

[Unofficial Translation]

- The measures restore fair competition on **technological innovations** in the cellular industry through **fair compensation** for handset and chipset companies' R&D innovation achievements.
- The measures remedy the acts of restricting competition in the product market through license policies that violate the FRAND commitment and **exclusively enjoying** the profits from being selected as the standard in the SEP licensing market.
- In the future, the KFTC will actively encourage the fair exercise of IPRs, but the KFTC plans **to respond strictly** to conducts that unfairly restrict competition and harm consumer welfare such as abuse of SEPs.

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<Annex 1> Progress of Case Investigation and Examination at Hearing

<Annex 2> Explanatory Materials on Standard Technologies, Standard-Setting Organizations and FRAND Commitments

<Annex 3> Explanatory Materials on Mobile Communication Standard, Modem Chipsets and Internal Structure of Handset

<Annex 4> Surcharge Sizes in Major Cases in the KFTC's History

<Annex 5> Trends in Antitrust Investigations on Qualcomm by Major Competition Authorities

Annex 1	Progress of Case Investigation and Examination at Hearing
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- **(Commencement of Investigation)** Through the press and industry meeting, [the KFTC] became aware of Qualcomm's suspected restriction of competition based upon abusing its cellular-SEPs and dominance in the modem chipset market, and the KFTC subsequently commenced an investigation in earnest (from August 2014).
 - To identify the underlying facts, such as refusal/restriction of licenses to modem chip companies and free cross-grants, etc., [the KFTC] issued a Request for Information ("RFI") to Qualcomm (August 2014).
 - For efficient and systematic investigation and reaction, [the KFTC] formed an **ICT Taskforce** from February 2015 and commenced its investigation in earnest (from February 2015).
 - [The KFTC] conducted an on-site investigation of Qualcomm Korea (March 16 to March 18) and secured digital evidentiary materials worth eight hard disks through a digital forensic investigation.
 - [The KFTC] augmented its reasoning through documentary investigation of and interviews with major interested parties, both in Korea and overseas, including Samsung, LG, Intel, Apple and Huawei.
 - After concluding the examiner-level investigation, [the KFTC] issued its **Examiner's Report** ["ER"] on November 13, 2015.
 - [The KFTC] reviewed tens of thousands of pages of relevant materials and thousands of pages of legal opinions and legal doctrine memoranda for the present case. The main text of the ER alone was approximately 400 pages and the ER exceeded approximately 3,200 pages including the attached materials.
 - After extending the due date for submission of the response opinion three times, Qualcomm finally submitted its response opinion in late May (May 27, 2016).
- **(Case Examination)** Since July 2016, a total of seven full-commission hearings were held, including five hearings for the review on the merits of the present case and two hearings to decide whether to commence a consent decree process.

- Unlike most of the other cases where the hearing process is concluded after one or two hearings, the present case involved a total of five full-commission hearings, which included in-depth analyses and reviews through listening to opinions of multiple expert witnesses from each field and from industry personnel.
 - The hearing was held by classifying the issues by each field (i.e., law, economics, patent laws, patent technologies and international comity, etc.). Additionally,

renowned academics and experts from Korea and overseas engaged in heated arguments on behalf of the Examiner and Qualcomm.

- In addition to the Korean companies, i.e., Samsung and LG, interested parties such as Apple, Intel, NVIDIA (USA), MediaTek (Taiwan) and Huawei (China) also participated in the examination, directly or indirectly, and provided explanations on the anticompetitive effects caused by Qualcomm's business model in detail.
- Meanwhile, Qualcomm applied for a consent decree after the fourth hearing on the merits of the case. However, though the commencement of the consent decree process was discussed at two full-commission hearings, Qualcomm's application was ultimately rejected by the KFTC.
- * Application for commencement of consent decree process by Qualcomm (November 18) → Issuance of examiner's report on whether to commence the consent decree process by the Examiner (November 24) → Hearing held to review whether to commence the consent decree process (December 5) → Hearing continued following Qualcomm's announcement of additional proposed improvements (December 14) → Final decision to reject the application

<Major Participants in the Case Examination for Examiner (Expert Witnesses)>

Classification	Field	Affiliation	Name
Examiner	Competition Law Expert	Myungji Univ. Law School	Prof. Myung-Su Hong
	Economic Expert	Sungshin Women's Univ. Dept. of Economics	Prof. Yang-Su Jin
		Ewha Women's Univ. Dept. of Economics	Prof. Se-Hoon Bang
	Patent Law Expert	Sungkyunkwan Univ. Law School	Prof. Cha-Ho Jeong
		Seoul National Univ. Law School	Prof. Young-Taek Shim
		KAIST MIP Adjunct Professor	Prof. Jung-Joong Kim
		Patent Law Firm Yi-Sang	Jae-Gwan Lee, Patent Attorney
	Mobile Communication Technology Expert	Inha Univ. Dept. of Electronic Engineering	Prof. Kyung-Hee Chang
		Gwangwoon Univ. Dept. of Electronic Engineering	Prof. Hyuck-Jun Oh

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<Major Participants in the Case Examination for Qualcomm (Expert Witnesses)>

Classification	Field	Affiliation	Name
Qualcomm	Patent Law Expert	Hannam Univ. Law School	Prof. Gwan-Sik Kim
		George Washington Univ. School of Law	Prof. John Whealan
	Economic Expert	Seoul National Univ. Dept. of Economics	Prof. In-Ho Lee
		Kookmin Univ. Dept. of	Prof. Jong-Min Kim

		Economics	
		Univ. of Pennsylvania Dept. of Economics (Former) Assistant Sec. of U.S. Dept. of Justice	Prof. Aviv Nevo
		Linley Group Principal Analyst	Linley Gwennap
	Patent Technology Expert	(Former) Ericsson IPR and License Division Executive	Eric Stasik
		KAIST Dept. of Electrical and Electronic Engineering	Prof. Hwang-Soo Lee
		Sangmyung Univ. Dept. of Information Comm. Engineering	Prof. Han-Ho Wang
	International Commerce Expert	USC School of Law	Andrew Guzman
		Univ. of Int'l Business and Economics (China)	Dong Ling

<Major Interested Parties Participating in the Case Examination>

Classification	Interested Parties	Expert	Business Size (As of 2015)
Modem Chipset Makers	Intel Inc.	Prof. Matthew C. Valenti of Univ. of West Virginia (Former) Texas Instrument Senior VP, Richard C. Donaldson	Total Revenue: USD 55.4 billion Modem Chipset: USD 600 million (1.6%, 6 th)
	MediaTek Inc.*	-	Total Revenue: USD 6.6 billion Modem Chipset: USD 4.1 billion (19.4%, 2 nd)
Handset Makers	Samsung	Prof. Sang-Seung Yi of Seoul National Univ.	Total Revenue: KRW 200 trillion (approx. USD 166 billion) Modem Chipset: USD 1.2 billion (5.9%, 3 rd) Handset: 390 million units (20.7%, 1 st)
	Apple Inc.*	-	Total Revenue: USD 234 billion Handset: 230 million units (12.3%, 2 nd)

- * Although Apple and MediaTek did not have expert witnesses give presentations by directly participating in the case examination, they had their respective executives (or legal counsels) that participated in the hearing give presentations of the results of their preparation of opinions collected from the employees who participated in the license negotiations with Qualcomm and external experts.

Annex 2

Explanatory Materials on Standard Technologies, Standard-Setting Organizations and FRAND Commitments

- The term “standard technologies” generally refers to the technologies adopted as standards by standard-setting organizations (“SSOs”) to prevent overlapping investments in certain technical fields and to promote technological developments in the relevant fields.
- SSOs are joint organizations formed around interested parties in the relevant industry to discretionarily establish a specific standard.
 - The International Telecommunication Union (“ITU”), the Institute of Electrical and Electronics Engineers (“IEEE”), the European Telecommunications Standards Institute (“ETSI”) and the Telecommunications Industry Association (“TIA”) in the U.S. are some of the representative SSOs in the mobile communication field. The Telecommunications Technology Association (“TTA”) of Korea is also included in the foregoing list of SSOs.

<Key Standardization Areas of Major Telecommunication SSOs>

Classification	International		Region (Europe)	USA	Japan	China
	ITU	ISO/IEC JTC 1	ETSI	ATSI (T1)/TIA	TTC/ARB	CCSA
Telecommunication	Network performance, Fees and billing, Telecommunication management, Electromagnetic protection, Outdoor installation, Cable network, TV and voice transmission, Signal method, Service quality, Next-generation communication network, Optical transmission network, Multimedia device, Information protection and SW, Wireless communication network	(N/A)	Connection/Device Legal monitoring Power line communication Railway communication Next generation communication network Transmission Electromagnetic effect protection Smart transport system	Network performance /Service quality Network interface Communication network management Wireless communication technology Optical transmission Optical fiber Multimedia access In-home communication demands In-home communication cabling Installation Telematics	Next generation network Information transmission Signal control Network management DSL Corporate network Next generation home network Wireless communication network management IP based 3G network	Network/Switching Transmission network (NGN) IP/Multimedia Network management Powerline communication Network security Electromagnetic effect protection Home network
Radiowave Broadcast	Spectrum management Radiowave Satellite service Broadcast service Fixed base station	-	Broadband wireless connection network Broadcast Wireless communication Digital wireless communication Fixed base station 3G Wireless communication Disaster	Mobile/Private wireless Point-to-point communication Satellite equipment/system Mobile/Private communication system Ground	3G Wireless communication Frequency resources Fixed communication Air & Ocean Radiowave environment Broadcast, Space	Wireless communication Mobile IP

			communication Ground radiowave	wireless multimedia cast Telematics	communicatio n	
Information Technology	-	Character code Information exchange technology SW Card and identification Programming language Digital storage media Computer graphics Information device interconnectio n Information security Business machine Multimedia codification Auto- identification and data collection Data management and exchange Document processing language User interface Educational information technology Biometrics	Information Technology(ECM A) GRID Data security Electronic signature Smart card Dialogue processing /transmission	-	Media codification	-
Others	-	-	Environment, Human factors, Test method e-Health	e-health	-	Environment Protection

* Source: TTA, “Telecommunication Standardization Handbook”, 2008 at 31.

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- ☐ Standard Essential Patent (“SEP”) refers to a patent needed to realize the standard technology, the license of which is essential for manufacturing a specific product or supplying certain services.
 - In other words, it is technologically impossible to manufacture, sell and use a product that embodies a standard technology without infringing on a SEP.
- ☐ The FRAND commitment refers to the commitment by a SEP holder to guarantee a license for its SEP to a patent user on fair, reasonable and non-discriminatory terms.
 - Prior to the adoption of a standard, SSOs demand a FRAND commitment to a SEP holder and, if such demand is rejected, SSOs generally exclude the relevant technology from the standard.

<Competition Law Significance of FRAND Commitment>

- ✧ Based on the fact that a standard-setting process is a practice of selecting a specific technology as the standard upon joint agreement among enterprisers and of forcing other competing technologies out of the market, it naturally entails the concern of restricting competition if a SEP holder were to abuse its patents.
- ✧ The FRAND commitment requires the SEP holder to commit to license its SEP to any willing licensee that uses its standard technology on fair, reasonable and non-discriminatory terms in order to dispel such anticompetitive concern.
- ✧ If a SEP holder discriminates or selects its counterparty without complying with the initial FRAND commitment, the standard technology would become an exclusive property of a few enterprisers or the patent holder alone. In such case, since competition may likely be impeded, intervention under the competition law is demanded.

- Among the patents, those that are not directly relevant to the standard are termed “Non-SEPs” to distinguish them from SEPs.
 - Non-SEPs refer to the patents that are either not essential to the realization of the standard or replaceable in their functionalities through design-around or avoidance design.
 - Therefore, unlike SEPs, Non-SEPs entail no obligation to license on FRAND terms.

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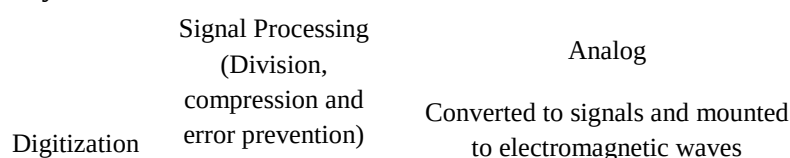
Annex 3

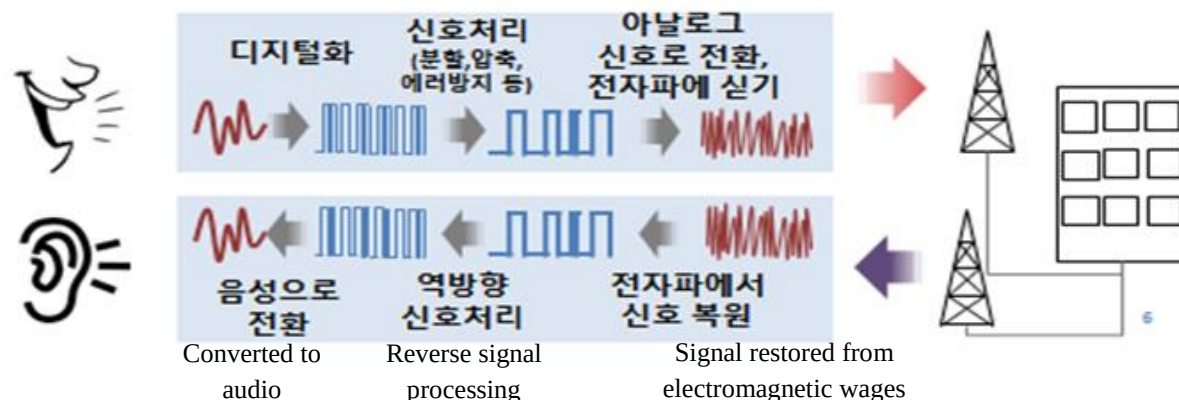
Explanatory Materials on Mobile Communication Standard, Modem Chipsets and Internal Structure of Handset

- Operational mechanism of mobile communication and development of communication standard

Process of Mobile Communication

- (1) After audio and/or data signals are **processed in accordance with certain rules in my handset** and such signals are sent to the base station in the vicinity,
 - (2) **Such base station** will receive such signals and retransmit them to the base station in the vicinity of the user at the other end of the communication, and
 - (3) The **handset of the user at the other end of the communication** will receive the signals and **restore them to the original audio and data signals**
- ◆ In order to change such information to signals and restore such signals to the original information, a “**standard**” that causes different handsets to follow the **same promised rules** is necessary





Advancement in Mobile Communication

- ◆ With a constant increase in the number of mobile communication users and the amount of data, mobile communication technology has advanced for more efficient utilization of limited frequency band and more expeditious processing of data, which has, in turn, led to the evolution of mobile communication standards.

U.S. and Korea, etc.	1G	2G	3G	4G	
미국, 한국 등	아날로그 방식 (AMPS 등)	CDMA	CDMA2000	LTE, LTE-A	신호 처리 속도 향상 Improvement in speed of signal processing
유럽 등 Europe, etc.	Analog Method (AMPS, etc.)	GSM	WCDMA		

- ◆ Evolution of mobile communication does not necessarily **spark simultaneous conversion of communication standards**.
 - Since subscribers for older generation handsets remain, the older standard service has to be maintained for some time. Additionally, simultaneous replacement of base stations in all areas is difficult for mobile carriers.
- ◆ Therefore, not only the new mobile communication standard, 4G LTE, but also the older standards 2G CDMA and 3G WCDMA also still hold important positions in mobile communications.

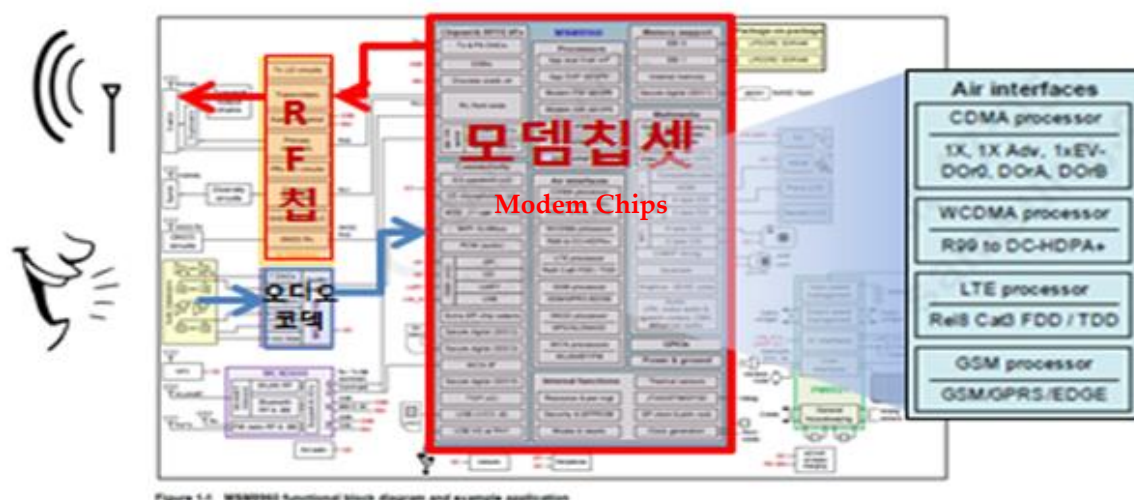
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- Mobile Communications and Mobile Communications Chipsets (Modem Chipset)

Modem Chipsets are Key Components of Mobile Communication

Modem chipsets play a key role in processing data pursuant to the mobile communication standards and converting them back to original data.

- ◆ “Multi-mode” chips, which supports both the new standard (LTE) and the old standards (CDMA and WCDMA),” are the general modem chips available.



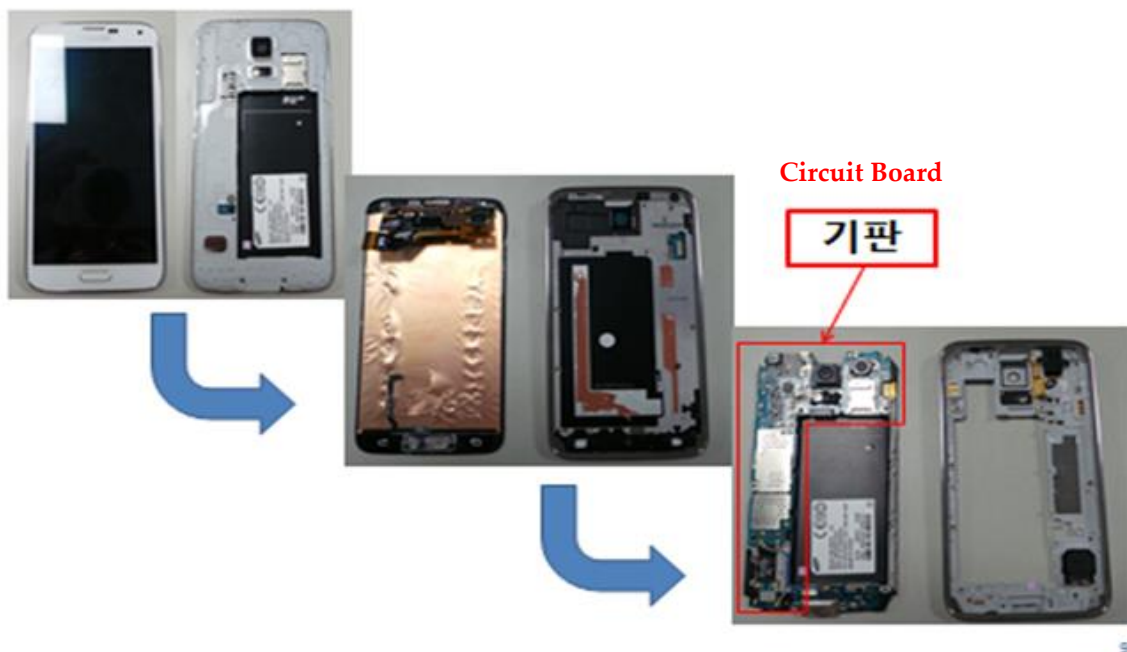
Structure of Handsets and Changes in Modem Chipsets

- ◆ Handsets in the past effectively only had the function as a cellular phone and the key functions of mobile communications were concentrated in the modem chipsets.
- ◆ However, the smartphones of late are much more than just a telephone, and, rather, it is a multi-functional IT device incorporating various components, including not only modem chipsets for mobile communications, but also functions as a camera, computer and multimedia devices.



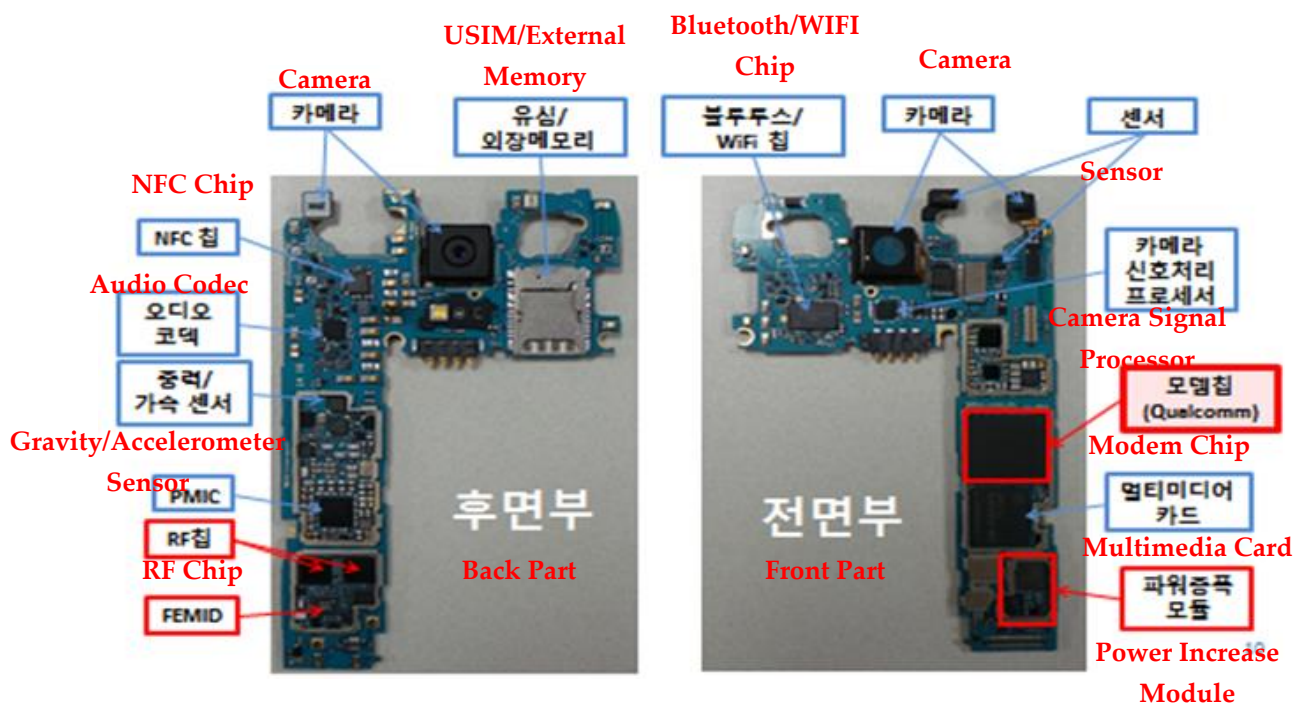
□ Internal Structure of Handset and Modem Chipsets

Structure of Handsets



Structure of Handsets – Main Components

- ◆ Among the main components of a smartphone, the components in red are mobile communication-related components



Annex 4 Surcharge Sizes in Major Cases in the KFTC's History

- ☐ Major cases in the KFTC's history and size of surcharges imposed

No.	Case Name	Surcharge	Year	Litigation Status
1	Case concerning abuse of market dominance by Qualcomm Incorporated and others	Approx. 1 trillion and 30 billion (Tentative)	Dec. 2016	-
2	Case concerning a cartel among six LPG suppliers	KRW 668.9 billion	Apr. 2010	Partial Win
3	Case concerning a cartel among 28 enterprisers participating in the bidding for lowest bid-wins type construction for 13 areas of Honam High Speed Railroad, including No. 2-1 Area new roadbed and other constructions	KRW 347.8 billion	Sept. 2014	Win
4	Case concerning abuse of market dominance by Qualcomm Inc., Qualcomm Korea Co., Ltd. and Qualcomm CDMA Technologies Korea	KRW 273.1 billion	Dec. 2009	Pending in Supreme Court
5	Case concerning a cartel among seven cement manufacturers	KRW 199.2 billion	Mar. 2016	Pending in High Court

* The above amounts are based on the initial decisions and some have been modified in the process of objection applications and litigations.

Annex 5 Trends in Antitrust Investigations on Qualcomm by Major Competition Authorities

- ☐ The Chinese NDRC ordered Qualcomm to remedy the excessive royalties charged to handset OEMs and patent tie-in sales and imposed a **fine of approximately KRW 1 trillion** (February 2015)

<Comparison of Measures by Chinese NDRC and Measures by KFTC>

	Measures by Chinese NDRC	Measures by KFTC
Remedial Measures for Modem Chipset Companies	(N/A)	▷ Upon competing modem chipset companies' request, [QC] shall engage in good-faith negotiations to execute a license agreement and will refrain from demanding unfair restrictive conditions

Remedial Measures for Handset Companies	▷ Calculate royalties based on 65% of the handset price ▷ Provide list of patents when executing a license agreement and refrain from imposing royalties on expired patents ▷ Refrain from demanding free cross-licenses ▷ Refrain from tie-in sale of cellular-SEPs and other patents	▷ Refrain from linking modem chipset purchase and patent license agreement ▷ Upon handset companies' request, amend or remove provision that links licensing to supply of modem chipset from the modem chipset supply agreement ▷ Refrain from coercing patent license terms that were unilaterally decided - Comprehensive portfolio license - Free Cross-grant - Coercion of unilateral license terms without the procedure of calculating fair compensation ▷ Upon handset companies' request, engage in renegotiation of existing license agreement
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- ☐ The **JFTC** took measures to correct Qualcomm's practice of demanding free cross-grants from handset OEMs (September 2009; formal objection procedure pending)
- ☐ The **FTC** and the **Taiwanese FTC** are also currently conducting investigations on Qualcomm's patent abuse.
- ☐ The **EU** is currently investigating Qualcomm's practice of excluding competitors through the provision of conditional rebates (similar to the KFTC's measures in 2009) and establishment of modem chipset prices below cost.

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