UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Facebook, Inc., Instagram LLC
Petitioners

v.

Skky, LLC
Patent Owner

U.S. Patent No. 9,203,956

TITLE: MEDIA DELIVERY PLATFORM

DECLARATION OF TAL LAVIAN, PH.D.

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I, Tal Lavian, Ph.D., declare as follows:

I. INTRODUCTION AND QUALIFICATIONS

A. Qualifications and Experience

1. I have more than 25 years of experience in the networking, telecommunications, Internet, and software fields. I received a Ph.D. in Computer Science, specializing in networking and communications, from the University of California at Berkeley in 2006 and obtained a Master's of Science ("M.Sc.") degree in Electrical Engineering from Tel Aviv University, Israel, in 1996. In 1987, I obtained a Bachelor of Science ("B.Sc.") in Mathematics and Computer Science, also from Tel Aviv University.

2. I am employed by the University of California at Berkeley and was appointed as a lecturer and Industry Fellow in the Center of Entrepreneurship and Technology ("CET") as part of UC Berkeley College of Engineering. I have been with the University of California at Berkeley since 2000 where I served as Berkeley Industry Fellow, Lecturer, Visiting Scientist, Ph.D. Candidate, and Nortel's Scientist Liaison. I have taught several classes on wireless devices and smartphones. Some positions and projects were held concurrently, while others were held sequentially.

3. I have more than 25 years of experience as a scientist, educator and technologist, and much of my experience relates to telecommunication, data communications, and computer networking technologies. For eleven years from 1996 to 2007, I worked for Bay Networks and Nortel Networks. Bay Networks was in the business of making and selling computer network hardware and software. Nortel Networks acquired Bay Networks in 1998, and I continued to work at Nortel after the acquisition. Throughout my tenure at Bay and Nortel, I held positions including Principal Scientist, Principal Architect, Principal Engineer, Senior Software Engineer, and led the development and research involving a number of networking technologies. I led the efforts of Java technologies at Bay Networks and Nortel Networks. In addition, during 1999-2001, I served as the President of the Silicon Valley Java User Group with over 800 active members from many companies in the Silicon Valley.

4. Prior to that, from 1994 to 1995, I worked as a software engineer and team leader for Aptel Communications, designing and developing wireless technologies, mobile wireless devices and network software products. I worked on development of two-way wireless OFDM technology, in the 915 MHz band, under the FCC part 15. The technology was a continuation of military research for low power, wideband OFDM to reduce wireless transmission detectability.

5. From 1990 to 1993, I worked as a software engineer and team leader at Scitex Ltd., where I developed system and network communications tools (mostly in C and C++).

6. I have extensive experience in communications technologies including wireless technologies, routing and switching architectures and protocols, including Multi-Protocol Label Switching Networks, Layer 2 and Layer 3 Virtual Private Networks, and Pseudowire technologies. Much of my work for Nortel Networks (mentioned above) involved the research and development of these technologies. For example, I wrote software for Bay Networks and Nortel Networks switches and routers, developed network technologies for the Accelar 8600 family of switches and routers, the OPTera 3500 SONET switches, the OPTera 5000 DWDM family, and the Alteon L4-7 switching product family. I wrote software for Java-based device management, including a software interface for device management and network management in the Accelar routing switch family's network management system. I have also worked on enterprise Wi-Fi solutions, wireless mobility management, and wireless infrastructure.

7. I am named as a co-inventor on more than 100 issued patents and I co-authored more than 25 scientific publications, journal articles, and peer-reviewed papers. Furthermore, I am a member of a number of professional affiliations,

including the Association of Computing Machinery ("ACM") and the Institute of Electrical and Electronics Engineers ("IEEE") (senior member). I am also certified under the IEEE WCET (Wireless Communications Engineering Technologies) Program, which was specifically designed by the IEEE Communications Society (ComSoc) to address the worldwide wireless industry's growing and ever-evolving need for qualified communications professionals.

8. From 2007 to the present, I have served as a Principal Scientist at my company TelecommNet Consulting Inc., where I develop network communication technologies and provide research and consulting in advanced technologies, mainly in computer networking and Internet technologies. In addition, I have served as a Co-Founder and Chief Technology Officer (CTO) of VisuMenu, Inc. from 2010 to the present, where I design and develop architecture of visual IVR technologies for smartphones and wireless mobile devices in the area of network communications.

9. I have worked on wireless and cellular systems using a variety of modulation technologies including time-division multiple-access (TDMA), code-division multiple-access (CDMA), and orthogonal frequency-division multiplexing (OFDM). I have additionally worked on various projects involving the transmission and streaming of digital media content.

10. The above outline of my experience with communications systems is not comprehensive of all of my experience over my years of technical experience. Additional details of my background are set forth in my curriculum vitae, attached as **Exhibit A** to this Declaration, which provides a more complete description of my educational background and work experience.

11. I am being compensated for the time I have spent on this matter at the rate of $400 per hour. My compensation does not depend in any way upon the outcome of this proceeding. I hold no interest in the Petitioners (Facebook, Inc. and Instagram LLC) or the Patent Owner (Skky, LLC).

B. Materials Considered

12. The analysis that I provide in this Declaration is based on my education and experience in the telecommunications and information technology industries, as well as the documents I have considered, including U.S. Patent No. 9,203,956 ("'956" or "'956 patent") **[Ex. 1001]**, which states on its face that it issued from an application filed on March 31, 2014, in turn claiming priority back to an earliest application filed on June 27, 2001. For purposes of this Declaration, I have assumed June 27, 2001 as the effective filing date for the '956 patent. I have cited to the following documents in my analysis below:

Exhibit No.	Title of Document
1001	U.S. Patent No. 9,124,956 to John Mikkelsen et al.
1003	U.S. Patent No. 7,065,342 to Devon A. Rolf
1004	Ben Forta et al., *WAP Development with WML and WMLScript*, Sams Publishing (September 2000)
1005	Alan Gatherer et al., *DSP-Based Architectures for Mobile Communications: Past, Present and Future*, IEEE Communications Magazine (January 2000)
1006	U.S. Patent No. 5,726,978 to Carl Magnus Frodigh et al.
1060	U.S. Patent No. 8,996,698 to James P. Tagg
1061	Bob O'Hara et al., *802.11 Handbook: A Designer's Companion*, IEEE Press (1999)
1069	Scot Hacker, *MP3 The Definitive Guide* (March 2000)
1070	U.S. Patent No. 5,815,811 to Patrick Pinard et al.
1073	U.S. Patent No. 6,693,236 to Eric J. Gould et al., "User Interface for Simultaneous Management of Owned and Unowned Inventory"

13. I have also read the "Declaration of William H. Beckmann, Ph.D.," dated June 14, 2016, in support of the Petition for Covered Business Method (CBM) Review of U.S. Patent No. 9,037,502 ("'502 patent") ("'502 Beckmann Declaration"). I am informed that the '502 Beckmann Declaration was submitted by counsel for Facebook and Instagram in connection with a separate petition on the '502 patent, which I understand shares an identical specification with the '956 patent, as well as the same earliest claimed priority date. I have also read the "Declaration of William H. Beckmann, Ph.D." dated October 13, 2016, in support of the Petition for Covered Business Method (CBM) Review of the '956 patent

("'956 Beckmann Declaration"). Collectively, I will refer to the prior submissions as the "Beckmann Declarations." Although I agree with the opinions provided by Dr. Beckmann, I will provide my own discussion to emphasize points that I find pertinent to my analysis of the claims and the prior art addressed in this Declaration. To the extent the analysis in the Beckmann Declarations is informative or applicable to my opinions, I will refer to or incorporate it in my analysis below.

II. PERSON OF ORDINARY SKILL IN THE ART

14. Part III of the Beckmann Declarations includes a discussion of a person of ordinary skill in the art. I agree with the points made by Dr. Beckmann, but I will provide my own discussion to emphasize points that I find pertinent to my analysis of the claims and the prior art addressed in this Declaration.

15. I understand that an assessment of claims of the '956 patent should be undertaken from the perspective of a person of ordinary skill in the art as of the earliest claimed priority date, which I understand is June 27, 2001. In my opinion, a person of ordinary skill in the art as of June 2001 would have possessed at least a bachelor's degree in computer science, computer engineering, or electrical engineering (or equivalent degree or experience) with at least four years of

experience with wireless communications systems and at least two years of experience with the communication of digital media.

16. My opinions regarding the level of ordinary skill in the art are based on, among other things, my over 25 years of experience in computer science and network communications, my understanding of the basic qualifications that would be relevant to an engineer or scientist tasked with investigating methods and systems in the relevant area, and my familiarity with the backgrounds of colleagues, co-workers, and employees, both past and present.

17. Although my qualifications and experience exceed those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '956 patent have been based on the perspective of a person of ordinary skill in the art as of June 2001.

III. RELEVANT TECHNOLOGY BACKGROUND

18. Part IV of the Beckmann Declarations includes an overview of the underlying technology of the '502 patent and the '956 patent, which I understand share the same specification. Although I agree with Dr. Beckmann's summary, I will provide my own overview to emphasize points that I find pertinent to my analysis of the claims and the prior art addressed in this Declaration.

19. The ’956 patent, entitled “Media Delivery Platform,” purports to disclose and claim a system and method for delivering digital media files to an electronic device. (’956, Abstract.) In this section, I provide a brief background discussion on technologies pertinent to the ’956 patent prior to June 2001.

A. Cellular Telephones

20. Cellular phones (also known as “cell phones”) were well known prior to June 2001. The ’956 patent itself recognizes the existence of “commercially available cellular phone[s].” (’956, 14:27-28.) Cell phones included transmitters and receivers for transmitting and receiving over-the-air signals (e.g., radio frequency waves), which allowed cell phones to communicate wirelessly.

21. The first commercial cellular service was launched in 1979 in Japan, over 20 years before the earliest filing date to which the ’956 patent could claim priority. By the 1980s, cell phones were in widespread commercial use. For example, the Motorola “DynaTAC” cell phone was launched in the United States as early as 1983. Typical of early cell phones, the Motorola DynaTAC was designed to communicate over “1G” or “first generation” networks known as the Advanced Mobile Phone System (AMPS). Similar cellular phones and networks were also deployed in other countries throughout the 1980s.

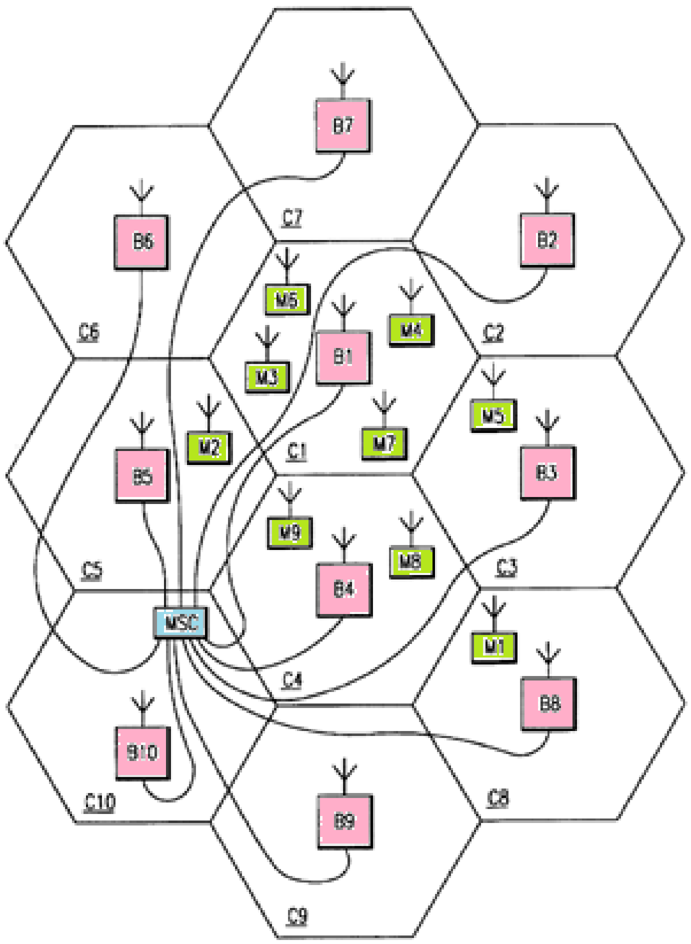


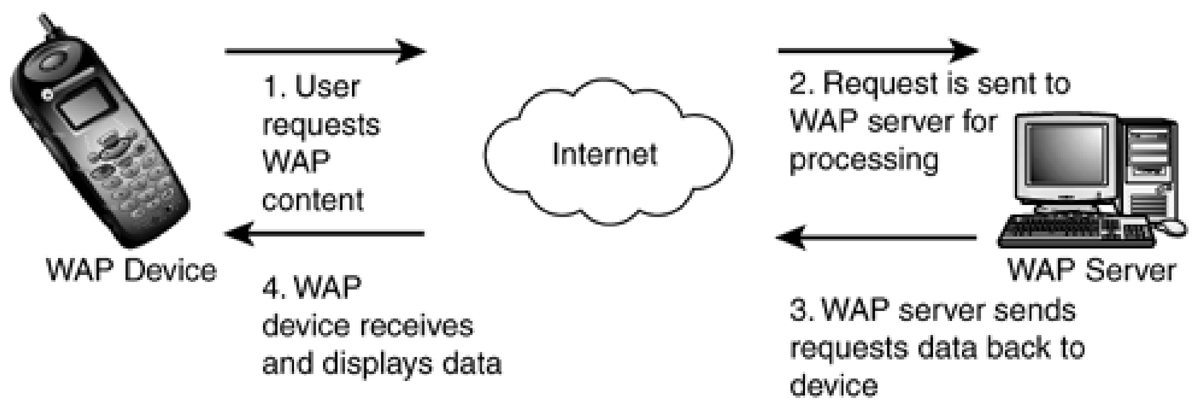
FIG. 1

22. Networks designed for cell phones, such as AMPS mentioned above, are referred to as "cellular" networks because they utilize the concept of "cells." A "cell" is a geographical region within which wireless coverage is provided by a corresponding base station or access point. Accordingly, the base station or access point enables wireless communication between a cell phone (within the corresponding cell) and the rest of the world. This is shown in Figure 1 of U.S. Patent No. 5,726,978 to Carl Magnus Frodigh et al. ("Frodigh") **[Ex. 1006]**, reproduced above. (Frodigh, Fig. 1 (highlighting added).) As shown, "[a]ssociated with and located within each of the cells **C1-C10** is a base station designated as a corresponding one of a plurality of base stations **B1-B10**," highlighted in pink above. (*Id.*, 5:64-66.) The base stations include equipment enabling wireless communication with mobile stations (shown in green) within

their respective cells. (*Id.*, 5:66-6:1, 6:15-16.) Because a single base station may communicate with more than one mobile station at any given time, as shown in cells **C1** and **C4** above, "multiple access" techniques are employed that allow a base station's communication bandwidth to be shared among multiple mobile stations. (*See id.*, 7:51-63; Fig. 2.)

23. Moreover, as shown in Figure 1 above, each base station is connected to a mobile station switching center (MSC) (shown in blue), which couples the cellular network to other networks (e.g., PSTN) via communication links such as cables or radio communication. These communication links can be based on PSTN services, ISDN, and other radio links. (*Id.*, 6:33-47.) As Frodigh makes clear, the cellular phone and networking technique discussed above were "well known" prior to June 2001. (*Id.*, 6:1, 6:42.) Various methods for providing "multiple access," such as TDMA, CDMA, and OFDM, were also well known. (EP 1039683 A2 **[Ex. 1007]**, at ¶¶ 0002-08; U.S. Patent No. 5,815,488 **[Ex. 1008]**, 1:12-16, 3:38-42; *see also* Cheong Yui Won et al., *A Real-time Sub-carrier Allocation Scheme for Multiple Access Downlink OFDM Transmission*, IEEE (1999) **[Ex. 1009]**; Wonjong Rhee et al., *Increase in Capacity of Multiuser OFDM System Using Dynamic Subchannel Allocation*, IEEE (2000) **[Ex. 1010]**.)

24. Although cell phones were originally designed for voice communications, techniques were developed to allow them to transmit and receive non-voice data. For example, the Wireless Application Protocol (WAP) was known, which is an industry standard for delivery of Web content to cell phones. Cell phones that supported WAP technology typically included a special browser that issued requests for Web content and displayed the received content on the phone's display. These techniques are described in Ben Forta, *WAP Development with WML and WMLScript*, Sam Publishing (Sep. 2000) ("Forta") **[Ex. 1004]**, and is generally shown in Figure 1.1, reproduced below.



(Forta, at p. 12, Fig. 1.1.) Indeed, by June 2001 well-known Web companies such as Amazon and Yahoo! were using WAP to make their websites accessible to cell phones. (*Id.*, at p.316 ("This is the Amazon.com site that is written explicitly for phones with a WAP browser in them."), p.317 ("Clearly, Yahoo! has done some considerable work here to build a powerful wireless site that works as a companion to its HTML site."); *see also id.*, at pp.316, 317, Figs. 13.3 & 13.5.)

25. It was also well-known that cell phones could be used to download and playback digital media. For example, the Background Art section of the '717 patent acknowledges the existence of cell phones that can play music in a compressed format such as MP3. ('502, 1:34-40.) Cell phones with media download and playback features are also discussed in prior art publications including EP 1033894 A2 **[Ex. 1011]**, U.S. Patent No. 6,423,892 **[Ex. 1012]**, U.S. Patent No. 7,065,342 to Devon A. Rolf ("Rolf) **[Ex. 1003]**, and Alan Gatherer, *DSP-Based Architectures for Mobile Communications: Past, Present and Future*, IEEE Communications (Jan. 2000) ("Gatherer") **[Ex. 1005]**. I discuss Rolf and Gatherer in detail in **Parts V.A** and **V.B.1** below.

B. Compression of Digital Media

26. It was well known before June 2001 that digital media (e.g., audio and video) could be stored and transmitted in compressed form. Compression techniques enabled media files to be stored at a fraction of their original size, which provided advantages by allowing for more efficient use of storage mediums (e.g., computer hard drives) and network bandwidth.

27. Indeed, the '956 patent acknowledges the existence of "MP3" ('956, 1:38, 24:1, 29:63), which is a standardized technique for compressing digital audio.

(John Hedtke, *MP3 and the Digital Music Revolution* (1999) **[Ex. 1013]**, at p. 1.) By 1999, MP3 had already become "enormously popular for distributing and exchanging songs and music." (*Id.* (underlining added).) "The most popular way of finding MP3 files [was] through MP3 web sites. There [were] hundreds of MP3 web sites in existence that distribute[d] MP3 files, software, news bulletins about MP3, and provide[d] a forum for discussions by MP3 users." (*Id.*, at p. 37 (under "Getting MP3 Files from Web Sites").)

C. Optimization of Digital Media

28. Optimization is the process of enhancing the perceived quality of digital media content in the face of real-world constraints. For example, an audio file containing a musical song may include defects that hamper the quality of the audio as perceived by the listener. As explained in U.S. Patent No. 6,560,577 to Jay G. Gilbert et al. (filed Mar. 2000) ("Gilbert") **[Ex. 1074]**, "[s]uch defects may arise from the reproduction of the information on the analog medium and may include scratch noises, clicks, pops, hissing, etc." (*Id.*, 4: 15-18.) Gilbert explains that "techniques to identify and compensate for certain defects" were "well known in the art" (*id.*, 4:18-20 (underlining added)):

> These techniques include searching for certain values of the digital audio information that are beyond a normal range to identify and correct specific audio defects. Other techniques include: applying

> high-pass filters to remove low frequency noise, normalizing extreme or inconsistent volume levels to an average value, adjusting the playback pitch, and comparing adjacent data to adjust inconsistent values (i.e., removing blips by averaging the values of adjacent data in a linear fashion).

(*Id.*, 4:20-29.)

29. As disclosed in the ’956 patent, optimization can also arise in the context of compression. (’956, 23:62-24:9.) Compression can create a tension between reducing the size of the file that stores the audio content, and the quality of the audio content as perceived by the user. Generally speaking, increasing the reduction in file size achieved by compression can reduce the perceived quality of the audio. One of the key considerations in any system that handles digital audio, therefore, is to implement optimization techniques to achieve a desirable balance between performance and audio quality. As explained in Scot Hacker, *MP3: The Definitive Guide* (2000) (“Hacker”) **[Ex. 1069]**, techniques and tools that can be used to “optimize the quality” of compressed MP3 files (*id*., at p.161), include normalization, sampling, resampling, bitrates, etc. (*Id*., at pp.163-170.)

D. Digital Signal Processors

30. A digital signal processor, or “DSP,” is a specialized microprocessor. It can be programmed to perform a wide variety of computations, and is

particularly suited for functions related to digital signal processing including numerical operations. Off-the-shelf DSPs including NEC's µPD7720, TI's TMS32010, and Motorola's DSP56000 had been available since at least the early 1980s. And by the turn of the century, DSPs had become immensely popular. As explained in Gene Frantz, *Digital Signal Processor Trends*, IEEE Micro (2000) **[Ex. 1014]** ("Frantz"):

> The mass-storage industry depends on DSPs to produce hard-disk drives and digital versatile disc players. Ever-increasing numbers of digital subscriber line and cable modems, line cards, and other wired telecommunications equipments are based on DSPs. Digital still cameras, hearing aids, motor control, consumer audio gear such as Internet audio are just some of the many mass market applications in which DSPs are routinely found today. More specialized DSP applications include image processing, medical instrumentation, navigation, and guidance.

(*Id.*, at p. 52, left column.)

31. The popularity of DSPs was driven by a number of factors, including their favorable size, performance, power consumption, and price. (*Id.*, at p. 55, left column ("[I]n the 1990s, DSPs were entering the realm of price, performance, and power consumption making them appropriate for high-volume applications."); Gatherer, at p. 86, left column ("Architecture design, and process enhancements

are producing new generations of processors that provide high performance while maintaining the low power dissipation necessary for battery-powered applications.”).) Like many other computer technologies, DSPs only got better – and were expected to continue to get better – with time. (Gatherer, Figs. 3 & 4.) This is succinctly summarized in Table 1 in Frantz below.

Table 1. Two decades of DSP market integration (typical DSP figures).

	1982	1992	2002
Die size (mm)	50	50	50
Technology size (microns)	3	0.8	0.18
MIPS	5	40	5,000
MHz	20	80	500
RAM (words)	144	1,000	16,000
ROM (words)	1,500	4,000	64,000
Price (dollars)	150	15	1.50
Power dissipation (mW/MIPS)	150	12.5	0.1
Transistors	50,000	500,000	5 million
Wafer size (inches/mm)	3 / 75	6 / 150	12 / 300

(Frantz, at p. 55, Table 1.)

32. By the time of the alleged invention, DSPs were standard components in cell phones. As explained in Frantz, “<u>the entire digital wireless industry operate[d] with DSP-enabled handsets</u>.” (*Id.*, at p. 52, left column.) Gatherer

likewise described the presence of DSPs in cell phones as "pervasive." (Gatherer, at p. 84, left column.) DSPs provided much of the processing required, such as modulation/demodulation and speech coding/decoding. (*Id.*, at p.85, Fig. 1.) And as their processing power improved, DSPs were also considered for newer features provided by cell phones, including the processing of "audio and visual entertainment." (*Id.*, at p. 89, left column; *see also id.*, Fig. 7.) Moreover, it was well known that DSPs were designed and optimized to process signals transmitted using modulation techniques, including orthogonal frequency-division multiplexing (OFDM), which I explain below. (E. Lawrey, *Multiuser OFDM*, Fifth International Symposium on Signal Processing and its Applications (Aug. 1999) **[Ex. 1015],** at p. 761, left column ("[A] test hardware solution is presented using SHARC® Digital Signal Processors (DSP) demonstrating the feasibility of a simple multiuser OFDM system."); U.S. Patent No. 5,732,113 (published Mar. 1998) **[Ex. 1016]**, 4:26-44 ("DSP 100 performs a variety of operations on the in-phase and quadrature samples of the received OFDM signal."); U.S. Patent No. 6,711,221 (filed Feb. 2000) **[Ex. 1017]**, 3:33-48.)

E. Orthogonal Frequency-Division Multiplexing (OFDM)

33. Orthogonal frequency-division multiplexing, or "OFDM," is a particular type of frequency-division multiplexing ("FDM"), which refers to a

technique in which discrete signals can be combined within a shared frequency band used for communication.

34. The basic concept of FDM can be explained using the familiar concept of FM radio, in which a user turns a radio receiver to a particular frequency (e.g. 97.1 MHz) to listen to a radio broadcast. FDM divides up an available frequency band (characterized by a particular "bandwidth") into a number of frequency "sub-bands," sometimes referred to as "sub-channels." To reduce interference, these sub-bands usually do not overlap. To use the FM radio example, FM radio stations use a frequency band that ranges from 87.5 to 108 MHz of the radio spectrum. By dividing the available bandwidth into sub-bands, FDM allows multiple signals to be transmitted simultaneously because each sub-band can carry a distinct signal. This is essentially how "frequency division multiplexing" gets its name. FDM was used with the telegraph more than a century ago and continues to be used in numerous applications including, as noted, radio signals broadcast over the air.

35. OFDM is a more advanced variant of FDM. In broad overview, OFDM differs from ordinary FDM in that OFDM uses frequency sub-bands that overlap, but are centered at precise intervals and result in an "orthogonal" property, in which the electromagnetic waves have reduced interference with each other.

The basic difference between conventional FDM and OFDM is illustrated in Figure 1.10 of Richard Van Nee et al., *OFDM for Wireless Multimedia Communications* (2000) **[Ex. 1018]** ("Van Nee"):

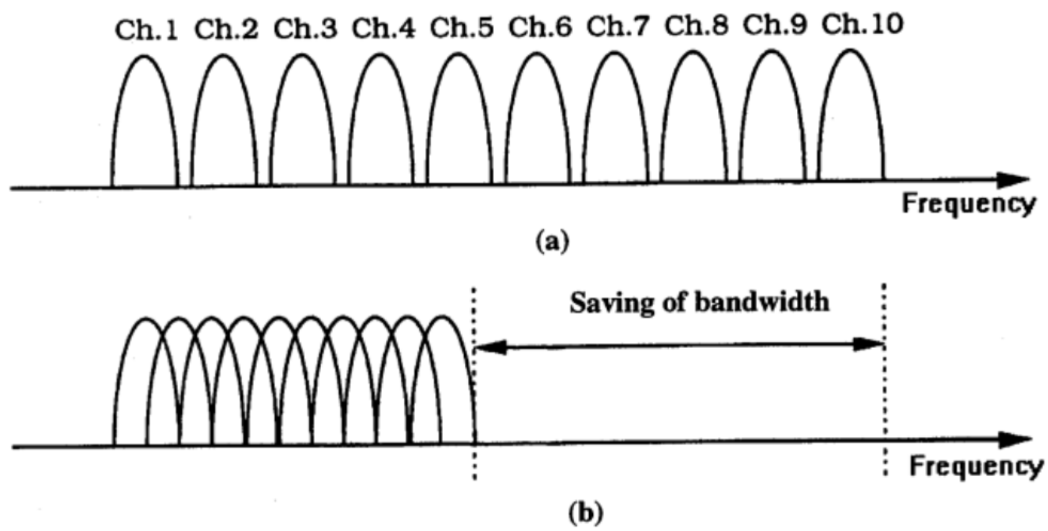


Figure 1.10 Concept of OFDM signal: (a) Conventional multicarrier technique, and (b) orthogonal multicarrier modulation technique.

(Van Nee, at p.22, Fig. 1.10.) The top portion **(a)** of Figure 1.10 shows a conventional FDM arrangement in which each signal channel occupies a distinct frequency sub-band. The sub-bands in this example do not overlap because sub-band is separated by what is known as a "guard band," an unused portion of the bandwidth designed to reduce interference between neighboring channels.

36. The bottom portion **(b)** of Figure 1.10 shows an OFDM arrangement. As shown, the sub-bands in OFDM overlap, eliminating the need for a guard band and thus resulting in a more efficient use of the available bandwidth. The spacing

between the center frequencies of each sub-band is precisely chosen such that the frequencies are "orthogonal" to each other, a characteristic that reduces interchannel interference notwithstanding the overlapping nature of the sub-bands.

37. Because the sub-bands overlap in OFDM, a mathematical method known as the fast Fourier transform ("FFT") is performed at the receiver to "demodulate" the OFDM signal to recover the individual signals carried within each sub-band. (Van Nee, at p.47 ("[T]he basic OFDM signal is formed using the IFFT, adding a cyclic extension and performing windowing to get a steeper spectral rolloff. . . . In the receiver, the subcarriers are demodulated by an FFT, which performs the reverse operation of an IFFT.").) As I noted above, digital signal processors are well-suited for mathematical operations, such as the FFT.

38. OFDM dates back as far as 1966 to a patent and technical paper by Bell Labs inventor, Robert W. Chang. (U.S. Patent No. 3,488,445 entitled "Orthogonal Frequency Multiplex Transmission System" **[Ex. 1019]**; Chang, R.W., *Synthesis of band-limited orthogonal signals for multi-channel data transmission*, Bell Labs Technical Journal, no. 45, pp.1775-1796 (Dec. 1966) **[Ex. 1020]**.) By June 2001, the OFDM technique was well known to those skilled in the art. In fact, in 1996, the University of Hamburg began hosting an annual conference known as the International OFDM Workshop, which, as its name

suggests, was specifically dedicated to OFDM technology. [**Ex. 1021**; **Ex. 1022**; **Ex. 1023**.]

39. OFDM is well-suited to a shared frequency band such as the radio spectrum used for wireless communication (approximately 3 Hz to 3 THz), which includes frequency bands used by various cellular systems. Because OFDM allows communication bandwidth to be shared by multiple signals (e.g., sent to different cell phones), OFDM was known by 2000 as one of a number of "multiple access" techniques that can be employed in cellular systems. (Rainer Grünheid et al., *Adaptive Modulation and Multiple Access for the OFDM Transmission Technique*, Wireless Personal Communications (May 2000) **[Ex. 1024]**, Abstract ("Since in OFDM the total bandwidth is divided into a large number of subcarriers, it can be flexibly shared among all the users."); *see also*:

- EP 1039683 A2 **[Ex. 1007]**, at ¶¶ 0001, 0008;
- Cheong Yui Won et al., *A Real-time Sub-carrier Allocation Scheme for Multiple Access Downlink OFDM Transmission*, IEEE (1999) **[Ex. 1009]**;
- Wonjong Rhee et al., *Increase in Capacity of Multiuser OFDM System Using Dynamic Subchannel Allocation*, IEEE (2000) **[Ex. 1010]**.)

40. OFDM was deployed in a number of wireless systems prior to June 2001. For example, the ubiquitous wireless LAN technology commercially known as "Wi-Fi" uses OFDM. The OFDM air interface was standardized for use in Wi-Fi networks in 1999 in the IEEE 802.11a standard. (IEEE Std 802-11a-1999, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: High-speed Physical Layer in the 5 GHz Band **[Ex. 1026]**, at p.4 ("This subclause describes the PHY services provided to the IEEE 802.11 wireless LAN MAC by the 5 GHz (bands) OFDM system.").) The commercial Digital Audio Broadcasting and Digital Video Broadcasting systems also used OFDM for wireless transmission. (U.S. Patent No. 6,125,124 **[Ex. 1027]**, 1:19-23; *see also* U.S. Patent No. 7,133,352 **[Ex. 1028]**, 1:36-45; U.S. Patent No. 6,108,810 **[Ex. 1029]**, 1:31-53.) As explained in Ahmad R.S. Bahai, *Multi-Carrier Digital Communications* (1999) **[Ex. 1030]**: "OFDM has been particularly successful in numerous wireless applications, where its superior performance in multi-path environments is desirable." (*Id.*, at p. 14 (underlining added).)

41. As mentioned above, it was well-known that OFDM could be employed in cellular environments, and that there would be advantages to do so. Beyond its superior performance in multi-path environments, OFDM allows the allocated communication bandwidth (e.g., of a particular cell) to be shared among

multiple cell phone users. The prior art before June 2001 is replete with references describing the use of OFDM in cellular systems:

- Leonard J. Cimini, Jr., *Analysis and Simulation of a Digital Mobile Channel Using Orthogonal Frequency Division Multiplexing*, IEEE Trans. Commun., Vol. 33, No. 7, pp.665-675 (July, 1985) **[Ex. 1031]**;
- Giovanni Santella, *Performance Evaluation of Broadband Microcellular Mobile Radio in M-QAM OFDM Systems*, IEEE (1996) **[Ex. 1032]**;
- H. Rohling et al., *Performance of an OFDM-TDMA Mobile Communication System*, IEEE (1996) **[Ex. 1033]**;
- Antti Toskala et al., *Cellular OFDM/CDMA Downlink Performance in the Link and System Levels*, IEEE (1997) **[Ex. 1034]**;
- Fredrik Tufvesson et al., *Pilot Assisted Channel Estimation for OFDM in Mobile Cellular Systems*, IEEE (1997) **[Ex. 1035]**;
- Branimir Stantchev et al., *An Integrated FSK-signaling Scheme for OFDM-based Advanced Cellular Radio*, IEEE (1997) **[Ex. 1036]**;
- J. C-I Chuang, *An OFDM-based System with Dynamic Packet Assignment and Interference Suppression for Advanced Cellular Internet Service*, IEEE (1998) **[Ex. 1037]**;

- Branimir Stantchev et al., *Burst Synchronization for OFDM-based Cellular Systems with Separate Signaling Channel*, IEEE (1998) **[Ex. 1038]**;
- Kevin L. Baum, *A Synchronous Coherent OFDM Air Interface Concept for High Data Rate Cellular Systems*, IEEE (1998) **[Ex. 1039]**;
- Li Ping, *A Combined OFDM-CsDMA Approach to Cellular Mobile Communications*, IEEE Transactions on Communications, Vol. 47, No. 7, pp. 979-982 (July 1999) **[Ex. 1040]**;
- Justin Chuang et al., *High-Speed Wireless Data Access Based on Combining EDGE with Wideband OFDM*, IEEE Communications, Vol. 37, No. 11, pp. 92-98 (Nov. 1999) **[Ex. 1041]**;
- Justin Chuang et al., *Beyond 3G: Wideband Wireless Data Access Based on OFDM and Dynamic Packet Assignment*, IEEE Communications Magazine (July 2000) **[Ex. 1042]**;
- Chi-Hsiao Yih et al., *Adaptive Modulation, Power Allocation and Control for OFDM Wireless Networks*, IEEE (2000) **[Ex. 1043]**;
- Fumilhide Kojima et al., *Adaptive Sub-carriers Control Scheme for OFDM Cellular Systems*, IEEE (2000) **[Ex. 1044]**; and

- Chi-Hsiao Yih et al., *Power Allocation and Control for Coded OFDM Wireless Networks*, IEEE (2000) **[Ex. 1045]**.

42. By the late 1990s, in fact, key players in the wireless industry including Ericsson, Nokia and Sony were publishing technologies and filing patent applications on ways to use OFDM over cellular networks. These include:

- Ericsson's U.S. Patent No. 5,726,978 **[Ex. 1006]**, filed in June 1995 and issuing in March 1998 (*see id.*, 2:38-41);
- Nokia's U.S. Patent No. 5,828,650 **[Ex. 1046]**, filed in July 1996 and issuing in October 1998 (*see id.*, 4:26-30);
- Sony's EP 0786890 A2 **[Ex. 1047]**, filed in January 1997 and published in July 1997 (*see id.*, 4:7-9; 5:28-31; *see also id.*, 3:20-21);
- Telia's WO 1997030531 A1 **[Ex. 1048]**, filed in January 1997 and published in August 1997 (*see id.*, 3:21-32, 9:15-17);[1]
- US 6,188,717 **[Ex. 1049]**, filed November 17, 1997 and published February 13, 2001 (*see id.*, Abstract, 1:51-55, 11:15-17 (Claim 17));

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[1] The Telia reference specifically notes that "[t]he design and implementation of OFDM systems are well known to those skilled in the art of telecommunications." (Ex. 1048, 9:27-29.)

- Flarion's (a spin-off from Lucent) U.S. 6,711,120 **[Ex. 1050]**, filed March 11, 1999 (*see id.*, Abstract, 8:2-4);
- Flarion's U.S. 6,553,019 **[Ex. 1051]**, filed December 23, 1999 (*see id.*, 7:7-9);
- Lucent's U.S. 6,922,388 **[Ex. 1052]**, filed February 11, 2000 (*see id.*, 1:24-26);
- Flarion's EP 1039683 A2 **[Ex. 1007]**, filed February 28, 2000 and published September 27, 2000 (*see id.*, ¶ 0009); and
- Toshiba's U.S. 2001/0021182 **[Ex. 1053]**, filed February 26, 2001 (*see id.* ¶¶ 0003, 0018, 0021).

43. As demonstrated by the numerous prior art publications and patent applications listed above, the communications industry had been actively developing systems for cellular communication using OFDM since at least the mid-1990s, and this continued unabated right up to the time of the alleged invention in 2001. In fact, by 2001, commercialization of cellular systems that use OFDM was already underway. (Laurie Ann Toupin, *Flash-OFDM 'Hops' Wireless Data Communications into the Main Stream* **[Ex. 1054]**.)

IV. THE ’956 PATENT

A. The Specification

44. Part V of the Beckmann Declarations provides an overview of the specifications of the ’502 patent and the ’956 patent, which I understand share the same specification. To the extent applicable, I have adopted portions of Dr. Beckmann’s analysis, but provided my own overview to emphasize points that I find pertinent here.

45. The ’956 patent purports to describe a system and method for delivering digital media files to an electronic device. (’956, Abstract.) In one embodiment, the patent describes a server (**206**) for storing digital media files. (’956, 15:6-7; *see also id.*, 12:56-57.) The server can store the media files in a database, which may be associated with a website. (’956, 13:48-52.) The website can provide the stored media files for download. (’956, 3:36-38.)

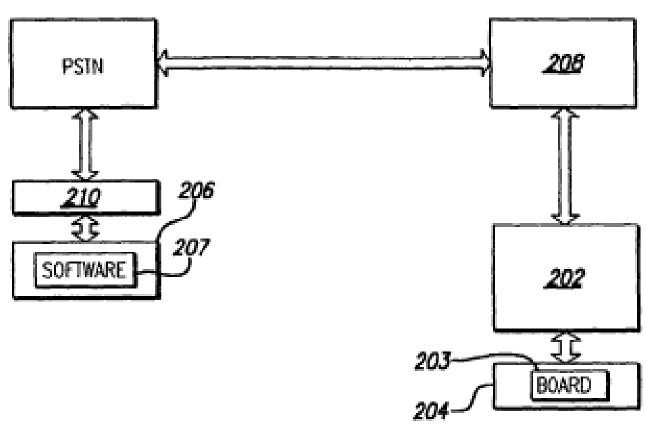

FIG. 2

46. The basic architecture is shown in Figure 2, reproduced at right. The right side of the figure shows a cell phone **202** (on the right) that communicates with a cellular service provider **208**. (’956, 14:14-

19, 14:36-38.) On the left side is a server **206**, which includes server software **207**. ('956, 14:25-26.) Above server **206** is a voice adapter **210** that exchanges audio (sound) signals with a public switched telephone network (PSTN), which in turn communicates with the cellular service provider **208**. ('956, 18:28-36.)

47. The specification explains that the server can receive requests from the phone ('956, 12:36-57), "which may be given through user voice commands or commands using the phone keys." ('956, 12:57-59.) If the user requests to download a particular digital media file, the server allows for the file to be transmitted to the cell phone for storage and playback. ('956, 12:47-52, 12:65-13:3, 13:34-35, 14:53-63, 15:31-46.) This is shown in Figure 2 above.

48. The '956 patent discloses that "[a]n orthogonal frequency-division multiplex (OFDM) modulation scheme" can be used for data transmission. ('956, 16:57-58.) Further, in one embodiment, the digital media file can be "compressed into an MPEG Layer 3 bit stream." ('956, 25:34-35; *see also id.*, 14:66-15:1, 22:31-44 (discussing "buffers" within the device memory for holding sound fragments).)

B. The Claims of the '956 Patent

49. This Declaration addresses claims 1-3. Claim 1 is the sole independent claim.

1. A method of wirelessly delivering a compressed digital audio and/or visual file to a cell phone over a cellular network, the method comprising:

providing a library with a visual image associated with the compressed digital audio and/or visual file for selection of the compressed digital audio and/or visual file;

receiving a first request from the cell phone for the visual image, said cell phone including a receiver and digital signal processor configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation; providing for the transmission of the visual image to the cell phone based on the received first request;

receiving a second request from the cell phone selecting from the library the compressed digital audio and/or visual file; and

providing for the transmission of the compressed digital audio and/or visual file to the cell phone using orthogonal frequency-division multiplex (OFDM) modulation based on the received second request,

wherein the compressed digital audio and/or visual file comprises at least one of a full, partial, or segment of: a song, a musical score, a musical composition, a ringtone, a video or video segment, a movie or movie segment, a film or film segment, an image clip, a picture, a clip, an image, a

> photograph, a television show, a human voice recording, a personal recording, a cartoon, an animation, an audio advertisement, a visual advertisement, or combinations thereof.

('956, 32:62-33:23 (Claim 1).) I will address the other claims in the '956 patent in my detailed analysis in **Part V** below.

V. APPLICATION OF THE PRIOR ART TO THE CLAIMS

50. I have reviewed and analyzed the prior art references and materials listed in **Part I.B** above. In my opinion, the claims of the '956 patent are invalid based on the following two grounds: (a) each limitation of claims 1-2 is disclosed and rendered obvious by the teachings in Rolf (Ex. 1003), Forta (Ex. 1004), Gould (Ex. 1073), Gatherer (Ex. 1005), and Frodigh (Ex. 1006); and (b) each limitation of claim 3 is disclosed and rendered obvious by the teachings in Rolf (Ex. 1003), Forta (Ex. 1004), Gould (Ex. 1073), Gatherer (Ex. 1005), Frodigh (Ex. 1006), and Hacker (Ex. 1069).

51. I have also provided two alternative grounds below which substitute the Frodigh (Ex. 1006) reference with O'Hara, Tagg, and Pinard (Exs. 1061, 1060, and 1070) for purposes of disclosing the cellular network and OFDM recitations in claim 1. Under this alternative, in my opinion, the claims of the '956 patent are invalid based on the following two grounds: (a) each limitation of claims 1-2 is disclosed and rendered obvious by the teachings in Rolf (Ex. 1003), Forta (Ex.

1004), Gould (Ex. 1073), Gatherer (Ex. 1005), in further view of O'Hara, Tagg, and Pinard (Exs. 1061, 1060, and 1070); (b) each limitation of claim 3 is disclosed and rendered obvious by the teachings of Rolf (Ex. 1003), Forta (Ex. 1004), Gould (Ex. 1073), Gatherer (Ex. 1005), in further view of O'Hara, Tagg and Pinard (Exs. 1061, 1060, and 1070), and in further view of Hacker (Ex. 1069).

52. I understand that each of the references cited in the four grounds identified above qualifies as prior art vis-à-vis the claims of the '956 patent. I am informed that Rolf, Gould, and Tagg qualify as prior art to the '956 patent at least because they are U.S. patents that issued from applications filed before June 27, 2001, the filing date of the earliest application to which the '956 patent could claim priority. I am also informed by counsel that Forta, Frodigh, O'Hara, and Gatherer qualify as prior art to the '956 patent because they were published before June 27, 2001. I will provide a brief summary of these references before applying them to the claims.

A. Brief Description and Summary of the Prior Art

1. Brief Summary of Rolf [Ex. 1003]

53. **Rolf**, U.S. Patent No. 7,065,342, entitled "System and Mobile Cellular Telephone Device for Playing Recorded Music," describes a "system and method for wirelessly transmitting encoded music, via a wireless communications link, to a

portable or mobile communications device which includes a player for playing the music or audio." (Rolf, Ex. 1003, 1:17-21.) This is generally shown in Figure 1, reproduced below.

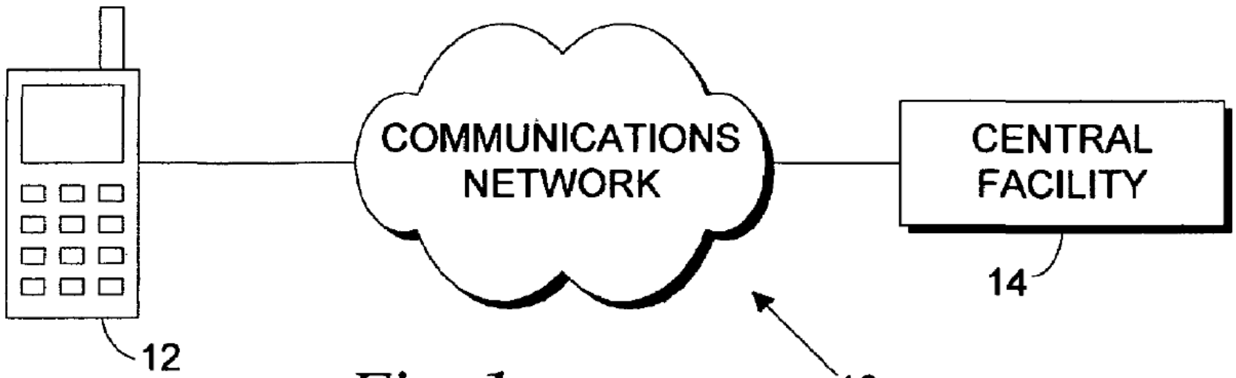

Fig. 1.

(*Id.*, Fig. 1.) This Declaration relies on Rolf as the primary reference that discloses the majority of the limitations of the claims.

54. As shown in Figure 1 above, the communications device (labeled **12**) can be a "cellular telephone." (*Id.*, 1:27-28, 5:21-22.) Rolf explains that "a user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone. In particular, the selected music recording(s) is/are transmitted via a wireless data communications link to the cellular telephone." (*Id.*, 1:28-35.) Rolf further explains that the central facility, labeled **14** in the figure above, is a set

of hardware and software components connected to a communications network (*id.*, 8:56-9:18, Fig. 5), and can include a Web server. (*Id.*, 3:10-16 ("an identifier, such as a server address, associated with the remote central facility"); 5:32-35 ("The remote storage facility may, for example, be at an address on the world wide web, ..."); 12:52-55 ("[T]he facility **14** has a uniform resource locator (URL) on a global communications network (such as the world-wide web), and device **12** accesses the facility **14** via a server in the communications network.").)

55. Finally, Rolf teaches that the music can be "encoded by a compression algorithm into an encoded (such as <u>MP3</u> or other) format." (*Id.*, 1:35-38 (underlining added); *see also id.*, 5:37-39; 8:63-9:6.) Further details about Rolf are provided in my detailed analysis of the claim limitations below.

<u>The Rolf Provisional</u>

56. Even though I understand that Rolf is, on its own, prior art to the '956 patent, I have also been asked to examine U.S. Provisional Patent Application No. 60/167,179 ("Rolf Provisional") **[Ex. 1071]**, in case Patent Owner should attempt to swear behind Rolf in some way. On its face, Rolf claims priority to the Rolf Provisional, which appears to have been filed on November 23, 1999. (Rolf, 1:8-11.) I understand that for Rolf to be considered prior art to the '956 patent as of the earlier filing date of the Rolf Provisional (rather than simply the filing date of

the non-provisional application from which Rolf issued), (1) portions of Rolf cited for invalidity must be supported by disclosure in the Rolf Provisional, and (2) at least one claim issued in Rolf must be supported by disclosure in the Rolf Provisional. It is my opinion that the Rolf Provisional satisfies these requirements.

57. First, I note that the text of the Rolf Provisional and Rolf are substantively identical apart from the title, abstract, the claim language, and four paragraphs where some language was added in the non-provisional application. I have created an exhibit comparing the textual contents of Rolf and the Rolf Provisional. ("Rolf Redline") **[Ex. 1072].** The exhibit shows differences between the two documents with blue indicating the matter added or deleted from the Rolf Provisional. As can be seen from the few differences, much of the added language appears to be non-substantive.

58. Even the figures of Rolf and the Rolf Provisional are the same, despite being hand-drawn in the provisional and formally rendered in the issued patent. (*Compare* Rolf, Figs. 1-10 *with* Rolf Provisional, Figs. 1-10.) In terms of its substantive disclosure, the Rolf Provisional has been entirely carried forward (with the exception of its title and claims) into the later non-provisional application that gave rise to Rolf.

59. In this Declaration, to the extent I cite language from Rolf that is not literally contained verbatim in the Rolf Provisional, I have included cites to substantially similar language that is contained in the Rolf Provisional and provides adequate support for the same proposition. All citations to Rolf made in this Declaration are supported by disclosures from the Rolf Provisional, as shown in **Exhibit B** to this Declaration.

60. Second, I have determined that there is sufficient description and support within the Rolf Provisional for at least one of the claims that issued in Rolf, such that a person of ordinary skill would have understood and been able to practice that claim. In fact, I performed the analysis for eight exemplary claims for the avoidance of any doubt that the claims of Rolf are adequately supported by the Rolf Provisional. The chart in **Exhibit C** to this Declaration contains a listing of exemplary issued claims of Rolf (claims 1-3) with corresponding support from the Rolf Provisional. I have included exemplary support, but I will provide additional detail should it be required to address any arguments made by Patent Owner in response.

2. Brief Summary of Forta [Ex. 1004]

61. **<u>Forta</u>** is a 2000 book, entitled *WAP Development with WML and WMLScript*, that describes an industry standard known as Wireless Application

Protocol (WAP). Independent claim 1 requires a "**visual image associated with the compressed digital audio and/or visual file for selection of the compressed digital audio and/or visual file**." This Declaration relies on Forta to disclose well-known technologies for providing Web content, including visual images and menu options for selection, to cell phones.

62. As Forta explains, "WAP is the Wireless Application Protocol, a communications protocol (based on HTTP) designed specifically for wireless communication and managed by the WAP Forum. WAP is the transport used to communicate between devices (phones initially, but other devices eventually) and servers." (Forta, at p.1.) Thus, "WAP does for wireless devices what HTTP does for Web browsers—it allows them to become clients in an Internet-based client/server world." (*Id.*, at p.10.)

63. Forta discloses that by the time of its publication in September 2000, well-known companies such as Amazon and Yahoo! were already using WAP to provide their websites to cell phone users. (*Id.*, pp.316, 317, Figs. 13.3 & 13.5.) Figure 13.3 (shown at right) shows "the Amazon.com site that is written explicitly for phones with a WAP browser in them."

(*Id.*, at p.316.) Forta teaches, in detail, how to design and provide a website for mobile e-commerce. (*Id.*, at pp.429-63 ("Chapter 18. E-Commerce").) Forta also discloses that visual images can be associated with menu options to be displayed on a cell phone (*id.*, at p.136; Fig. 6.5 (shown to the right)), and teaches how custom images can be created and placed on a "Web server" for subsequent delivery to the cell phone. (*Id.*, at pp.128-29.)

3. Brief Summary of Gould [Ex. 1073]

64. **<u>Gould</u>**, U.S. Patent No. 6,693,236, entitled "User Interface for Simultaneous Management of Owned and Unowned Inventory" describes a simple user interface for managing inventory, such as purchased and unpurchased music recordings. (Gould, 1:7-14, 3:16-30.) Claim 1 of the '956 patent recites a "**visual image**" associated with a compressed digital audio and/or visual file. This Declaration also relies on Gould to disclose limitations regarding the visual image. As I explain below, Gould discloses a menu-based user interface that displays album cover graphics for a song and buttons to sample and buy the song. (*Id.*, 5:51-60, Fig. 4 (excerpt at right).)

4. Brief Summary of Gatherer [Ex. 1005]

65. **Gatherer**, entitled "DSP-Based Architectures for Mobile Communications: Past, Present and Future," is an article appearing in the January 2000 issue of the IEEE Communications Magazine. The independent claims of the '956 patent recite a cell phone that includes a "**digital signal processor**." This Declaration cites Gatherer to confirm that digital signal processors, and their use in cell phones, was known prior to June 2001.

66. Gatherer confirms that DSPs were "pervasive" in cell phones at the time of the alleged invention (Gatherer, at p. 84, left column), and that one of ordinary skill in the art would have been motivated to program a DSP to perform a variety of functions provided by the cell phone. (*Id.*, at p. 84, right column ("[O]nce the DSP was included a certain amount of 'mission creep' started to occur. As DSPs became more powerful, they started to take on other physical layer 1 tasks until all the functions in the 'DSP functions' box in Fig. 1 were included."), Fig. 1; *see also id.*, at p. 85, left column ("After 1994, a single DSP was powerful enough to do all the DSP functions, making the argument for a DSP-only solution for the baseband even more compelling.").

5. Brief Summary of Frodigh [Ex. 1006]

67. **Frodigh**, U.S. Patent No. 5,726,978, entitled "Adaptive Channel Allocation in a Frequency Division Multiplexed System" describes a method and system for cellular communication using OFDM. Claim 1 of the '956 patent recites the transmission of data to a cell phone using "orthogonal frequency-division multiplex modulation." This Declaration relies on Frodigh to disclose the OFDM transmission technique and its use with cell phones.

68. As Frodigh explains, "Frequency division multiplexing (FDM) is a method of transmitting data that has application to cellular systems. Orthogonal frequency division multiplexing (OFDM) is a particular method of FDM that is particularly suited for cellular systems." (*Id.*, 1:59-2:18.) Frodigh describes the use of OFDM modulation to transmit voice and data to a "mobile station"[2] in a cellular system. (*Id.*, 7:51-63; Fig. 2.) Frodigh also discloses a receiver that can be implemented in the mobile station to receive data transmitted by OFDM

2 A person of ordinary skill in the art would have understood that the term "mobile station" includes a cellular phone. (Frodigh, 1:13-16 ("In a cellular telecommunications system the user of a mobile station communicates with the system through a radio interface while moving about the geographic coverage area of the system.").)

modulation. (*Id.*, 8:1-9 ("In the downlink the receiver **330** is located in the mobile station … The link receiver **330** and link transmitter communicate over RF channel **380** using a subset of M of the available subcarriers."), 8:10-14, 8:33-63, Fig. 3C.)

6. Brief Summary of O'Hara [Ex. 1061], Tagg [Ex. 1060], and Pinard [Ex. 1070]

69. As I explained above, I have relied upon Frodigh (Ex. 1006) for its disclosures of transmitting information to a cell phone using OFDM. I have also provided an alternative ground in which, instead of Frodigh, I have relied on the teachings of O'Hara, Tagg and Pinard to show the OFDM and cellular network recitations in the claims.

70. Just about anyone who has used a cellular phone or a laptop computer would be familiar with IEEE 802.11 wireless networking, commercially referred to as "WiFi." IEEE 802.11 refers to a series of international standards initially published in the late 1990s by the Institute of Electrical and Electronics Engineers (IEEE). Generally speaking, IEEE 802.11 describes a series of technical standards for providing wireless networking services through one or more wireless "access points" (APs). IEEE 802.11 is a wildly popular technology that has spawned a number of variants, including IEEE 802.11a and 802.11b, the early variants published in the late 1990s, and later variants such as 802.11g, 802.11n, and 802.11ac. IEEE 802.11 is important to my analysis because IEEE 802.11**a** – one

of the earlier variants of 802.11 published in the late 1990s – transmits information to mobile devices using OFDM.

71. I have cited O'Hara because, as I explain below, it discloses and confirms that IEEE 802.11a wireless networking involves the transmission of digital information to mobile devices using OFDM. I have cited to Tagg because it discloses that it was known, prior to the alleged invention, to incorporate IEEE 802.11 functionality into a cell phone. It therefore would have been obvious to adapt the cellular phone **12** of Rolf to receive digital audio and/or visual files wirelessly using IEEE 802.11a, thus disclosing transmission of digital audio and/or visual files using OFDM as recited in the challenged claims.

72. **<u>O'Hara</u>**, published in 1999, provides "a guide for those who will implement interoperable IEEE 802.11 2.4 GHz and 5GHz LAN (WLAN) product." (O'Hara, at p.v (under "Acknowledgment").) O'Hara explains that wireless LANs "are exploding in popularity." (*Id.*, at p.viii.) "One of the key drivers of this new market expansion," according to O'Hara, "is the IEEE 802.11 standard." (*Id.*) O'Hara confirms that the IEEE 802.11a variant used OFDM. (*Id.*, at p.143 ("In July of 1998, the IEEE 802.11 Working Group adopted OFDM modulation as the basis for IEEE 802.11a."); *id.* at p. 139 ("The IEEE 802.11a PHY is one of the physical layer (PHY) extensions of IEEE 802.11a and is referred to as the

orthogonal frequency division multiplexing (OFDM) PHY. The OFDM PHY provides the capability to transmit PSDU[3] frames at multiple data rates up to 54 Mbps for WLAN networks where transmission of multimedia content is a consideration.”).)

73. **<u>Tagg</u>**, entitled “Cooperative Network for Mobile Internet Access,” discloses a technique for allowing a mobile device (such as a cellular phone) to communicate over the Internet using a number of IEEE 802.11 access points. I have relied on Tagg for the simple proposition that a cellular phone, such as cell phone **12** in Rolf, could incorporate IEEE 802.11 wireless networking capability, and use that technology (instead of connections with traditional cell towers) to receive data files. Figure 1 of Tagg provides a basic overview of the system:

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[3] The term “PSDU” refers to a PLCP data unit, a basic unit of data for transmission over an IEEE network. (O’Hara, at p.174 (explaining PSDU acronym), *id.* at p.141 (Fig. 7-1, showing OFDM header and PSDU).)

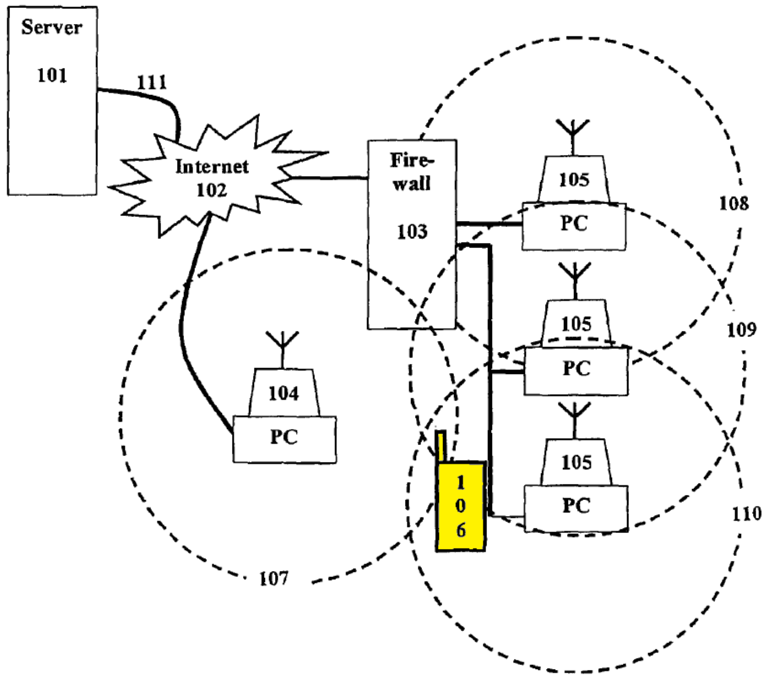


Fig. 1

(Tagg, Fig. 1.) Mobile roaming device **106**, shown highlighted in yellow, may be a "mobile computer, PDA, <u>cellular telephone</u>, or home appliance." (*Id.*, 7:63-66 (underlining added).) The circles shown in Figure 1 (**107-110**) show the range of wireless network access provided by fixed devices **104** and **105**. (*Id.*)

74. The gist of the Tagg reference is the ability of the mobile device **106** to switch between a number of available wireless technologies that will provide the best connectivity. As explained in Tagg, "[t]he mobile device determines the connection methodologies available to it and their relative merits and then connects to the host using the best available standards." (*Id.*, 6:67-7:2.) Although Tagg discloses Cooperative Tunneling Agent (CTA) software for evaluating available

networks and performing a handoff from one wireless network to another, those details go far beyond the requirements of the challenged claims. I have cited Tagg for the more pedestrian proposition that a cell phone (such as the one in Rolf) can incorporate IEEE 802.11 wireless networking – a proposition that Tagg clearly confirms. In one embodiment in Tagg, for example, a cellular phone can determine when a suitable IEEE 802.11 wireless network is available, and then switch to that network to access the Internet or carry out voice telephone calls. (*Id.*, 5:22-34, 11:20-46 & 11:60-12:26 (describing handoff process from cellular to 802.11 networks), Fig. 9.)

75. Tagg confirms that allowing a cellular phone to alternatively switch to IEEE 802.11 wireless networks has distinct and obvious advantages. For example, Tagg explains that some cellular networks often provided limited potential connection speeds (*Id.*, 11:24-28 ("9.6 Kbps")), and the greater network throughput provided by alternative wireless networks allows mobile users to take advantage of "high bandwidth services such as MP3 files and movies." (*Id.*, 5:27-29.) The cost savings are, of course, obvious. It was well-known that use of cellular services provided by traditional carriers (such as AT&T), including cellular data services, was potentially costly. Tagg explains, however, that "[a] cell phone located within 100 feet of a fixed host device can connect to the Internet

through that device, obtaining phone calls at a fraction of the cost of a regular cellular connection." (*Id.*, 5:31-33; *see also id.*, 5:64-66 ("Our technology sits between the user and the Internet constantly negotiating the most cost effective means by which they can gain access.").)

76. I note that claim 1 further recites, in the preamble, "wirelessly delivering a compressed digital audio and/or visual file to a cell phone over a **cellular network**," for which I have cited the **Pinard** reference (to the extent the preamble is limiting). The term "cellular network" is often equated by the lay public with large scale commercial cellular telephone providers such as AT&T, T-Mobile, and Sprint. But the term "cellular network" has a more precise and technical definition. As I explained in **Part III.A** above, a cellular network is a network in which wireless communications are provided through a series of "cells," each cell providing network access for a particular geographic area. *See also:*

- *Webster's New Dictionary of the English Language* (2001), **[Ex. 1055]**, at p. 84, (definition of "cellular" as "of, relating to, or being a radiotelephone system in which a geographical area is divided into small sections each served by a transmitter of limited range");

- *The Dictionary of Multimedia Terms & Acronyms* (1997), **[Ex. 1056]**, at p. 38 ("Describes a means of dividing an area into regions, or cells, so that each region becomes a network in which every point exists within the range of a central transmission facility");
- *Encarta World English Dictionary* (1999), **[Ex. 1057]**, at p. 294 ("organized as a system of cells, especially for radio communication");
- *Modern Dictionary of Electronics* (1999), **[Ex. 1058]**, at p. 106 ("Type of mobile telephone service in which the geographic serving area is divided into subregions (cells), each with its own antenna and switching node");
- *The Oxford American Desk Dictionary* (1998), **[Ex. 1059]**, at p. 91 ("system of mobile radiotelephone transmission with an area divided into 'cells,' each served by its own transmitter");
- *Merriam-Webster's Collegiate Dictionary* (1996), **[Ex. 1067]**, at p. 184 ("of, relating to, or being a radiotelephone system in which a geographical area (as a city) is divided into small sections each served by a transmitter of limited range so that any available radio channel can be used in different parts of the area simultaneously");

- *McGraw-Hill Illustrated Telecom Dictionary* (2000), **[Ex. 1068]**, at p. 116 ("A wireless local telephone service that operates by dividing a geographical area into sections (*cells*). Each cell has its own transmitter/receiver that tracks and operates with cellular telephones within its area. The dimensions of a cell can range from several hundred feed to several miles.").

77. The term "cellular network" under its broadest reasonable construction, therefore, is not limited to a particular type of wireless networking technology, or technology that provides the same type of wireless range as a commercial cellular carrier.

78. In this regard, I have cited **<u>Pinard</u>** for the simple proposition that a "cellular network" can be built based on IEEE 802.11 wireless access points. Pinard states that it "relates generally to preemptive roaming among cells in a cellular network. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points." (Pinard, 1:21-24.)

79. More specifically, Pinard discloses a technique for improving the way in which a mobile unit selects the access point with which it will associate for purposes of wireless communication. (*Id.*, 2:16-22.) "Each mobile unit may select

a group of eligible access points and select the most eligible access point from that group." (*Id.*, 2:45-47.) The selection may be based on the signal strength of the access points and the number of mobile units connected to each access point (the "loading factor"). (*Id.*, 2:30-50.) Pinard expressly confirms that "[t]he cellular communications network may comprise a 1 Mbps frequency-hopping spread spectrum wireless LAN conforming to the IEEE 802.11 draft specification." (*Id.*, 2:50-53.) Pinard refers to the "IEEE 802.11 <u>draft</u> specification" because the standard had not yet been finalized when Pinard was filed in 1995.

80. A person of ordinary skill in the art by June 2001 would have understood "IEEE 802.11," as referenced in Pinard, to include the wider range of IEEE 802.11 technologies available by the time the standard was published, including IEEE 802.11a and its higher bit rates.

81. As I will explain in **Part V.C** below, the OFDM and cellular network recitations of the challenged claims would have been obvious over O'Hara, Tagg, and Pinard.

7. Brief Summary of Hacker [Ex. 1069]

82. <u>**Hacker**</u> is a 2000 book, entitled *MP3 The Definitive Guide*, that describes various techniques for creating, downloading, and building collections of audio files compressed using MP3. (Hacker, at p.vii (Preface).)

83. Dependent claim 3 recites "**<u>optimizing</u> the digital audio and/or visual file according to an optimization scheme**." This Declaration relies on Hacker to disclose the claimed optimization.

84. Hacker discloses a number of techniques for maximizing sound quality of MP3 files while maintaining acceptable levels of compression. Hacker explains that, generally speaking, the more the audio is compressed, the more degraded the audio quality can be. (*Id.*, at p.161 ("The more you throw away, the worse your files will sound and the smaller your MP3 files will be. The more you keep, the better they'll sound and the larger the resulting files will be. Only you can decide where on this spectrum you want to sit.").) In a section entitled, "***Pre-encoding optimizations***," Hacker asks, "what can you do prior to encoding to <u>optimize the quality of the final results</u>?" (*Id.* (underlining added).) Hacker provides several answers, including "any necessary equalization, de-hissing, de-popping, and de-scratching." (*Id.*, at p.162.) Also, "[y]ou can cut the silent bits off the beginning and end of your files, add effects, alter the levels, and more." (*Id.*)

B. Claims 1-3

1. Independent Claim 1

85. I have reproduced independent claim 1 below, and divided up the limitations using bracketed notations (e.g. "[a]," "[b]," etc.) to facilitate easier identification of the limitations in my analysis below:

1. A method of wirelessly delivering a compressed digital audio and/or visual file to a cell phone over a cellular network, the method comprising:

[a] providing a library with a visual image associated with the compressed digital audio and/or visual file for selection of the compressed digital audio and/or visual file;

[b] receiving a first request from the cell phone for the visual image, said cell phone including a receiver and digital signal processor configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation;

[c] providing for the transmission of the visual image to the cell phone based on the received first request;

[d] receiving a second request from the cell phone selecting from the library the compressed digital audio and/or visual file; and

[e] providing for the transmission of the compressed digital audio and/or visual file to the cell phone using orthogonal frequency-division multiplex (OFDM) modulation based on the received

second request,

[f] wherein the compressed digital audio and/or visual file comprises at least one of a full, partial, or segment of: a song, a musical score, a musical composition, a ringtone, a video or video segment, a movie or movie segment, a film or film segment, an image clip, a picture, a clip, an image, a photograph, a television show, a human voice recording, a personal recording, a cartoon, an animation, an audio advertisement, a visual advertisement, or combinations thereof.

('956, 32:62-33:23 (Claim 1).) Each limitation of claim 1 is disclosed and rendered obvious by Rolf in view of Forta, Gould, Gatherer, and Frodigh.

86. The preamble of claim 1 recites, "**[a] method of wirelessly delivering a compressed digital audio and/or visual file to a cell phone over a cellular network**." Assuming the preamble of claim 1 provides a claim limitation, it is fully disclosed by Rolf.

87. Rolf describes a "system and method for wirelessly transmitting encoded music, via a wireless communications link, to a portable or mobile communications device which includes a player for playing the music or audio." (Rolf, Ex. 1003, 1:18-21.) This is generally shown in Figure 1, reproduced below.

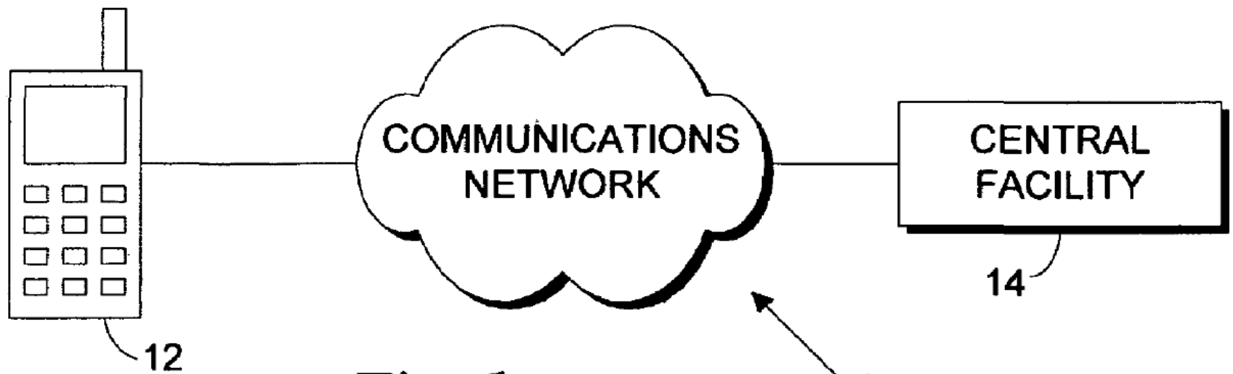


Fig. 1.

(*Id.*, Fig. 1.) As shown, the mobile communications device, labeled **12** in the figure above, can be a "cellular telephone." (*Id.*, 1:27-28, 5:21-22.) "[A] user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone. In particular, the selected music recording(s) is/are transmitted via a wireless data communications link to the cellular telephone." (*Id.*, 1:28-35.) Rolf explains that the central facility, labeled **14** in the figure above, is a set of hardware and software components connected to a communications network (*id.*, 5:30-32, 8:56-9:18, Fig. 5), and can include a Web server. (*Id.*, 3:10-16 ("an identifier, such as a server address, associated with the remote central facility"), 12:52-55 ("[T]he facility **14** has a uniform resource locator (URL) on a global communications network (such as the world-wide web), and device **12** accesses the facility **14** via a server in the communications network.”).)

88. Rolf further makes clear that the music recordings wirelessly delivered to the cell phone are *compressed digital* audio files. In particular, Rolf discloses that the music can be “encoded by a compression algorithm into an encoded (such as MP3 or other) format.” (*Id.*, 1:35-38 (underlining added); *see also id.*, 5:37-39; 8:63-9:6.)[4] One of ordinary skill in the art would have understood that “MP3” refers to a compression technique for digital audio files—as the ’956 patent itself confirms. (*See, e.g.*, Andy Rathbone, *MP3 for Dummies* (1999), Ex. 1075, at p. 1 (“MP3 is simply another boring, compression mechanism – a pair of computerized vice-grips for sound. MP3 squeezes music files down to roughly one-tenth of their size while preserving their near-CD-quality sound.”); ’956, 18:38-44 (referring to “MPEG audio format” as a “digital data form”), 24:1 (referring to “MPEG audio layer 3 (MP3) compression”), 25:34-46 (referring to “MPEG Layer 3 bit stream”).) Rolf therefore discloses “**[a] method of wirelessly delivering a compressed digital audio and/or visual file to a cell phone**.”

[4] Rolf also expressly notes that its teachings with respect to music files are “applicable to recordings of other types, such as video recordings.” (Rolf, 14:57-58.)

89. Rolf further explains that "the wireless communications link established between the wireless communications device and the central facility is a cellular communications link." (*Id.*, 3:17-21 (underlining added).) One of ordinary skill in the art would have understood that, where a "cellular communications link" is used for wireless communication with the cell phone, the delivery of the digital audio file occurs "**over a cellular network**."[5] Rolf therefore discloses "[a] method of wirelessly delivering a compressed digital audio and/or visual file to a cell phone over a cellular network," as recited in the preamble.

[5] To the extent there is any question as to whether Rolf discloses delivery over a cellular network, it would have been obvious to combine Rolf's system and method for delivering music with the cellular network disclosed in Frodigh (which uses OFDM), as I explain in claim 1[b] (**Part V.B.1.b**) below. (*See* Frodigh, Ex. 1006, 1:61-63 ("Orthogonal frequency division multiplexing (OFDM) is a particular method of FDM that is particularly suited for cellular systems."), 5:29-30 ("FIG. 1 illustrates a cellular telecommunications network within which the present invention may be implemented;"), Fig. 1.)

a. "providing a library with a visual image associated with the compressed digital audio and/or visual file for selection of the compressed digital audio and/or visual file" (Claim 1[a])

90. As I explained above, Rolf discloses that "a user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone." (Rolf, 1:28-33.) Rolf explains that a collection of compressed digital audio files, such as MP3 files, is cataloged and stored in a database at the remote facility:

> The remote storage facility [**14**] may, for example, be at an address on the world wide web, and includes a data base having a plurality of music recordings therein. Preferably, the music recordings are categorized by a plurality of selectable fields, such as "title", "artist", "album or CD type", "recording label", etc. Additionally, the music recordings are preferably encoded in an encoded format, such as MP3 (Mpeg-1 Audio layer 3).

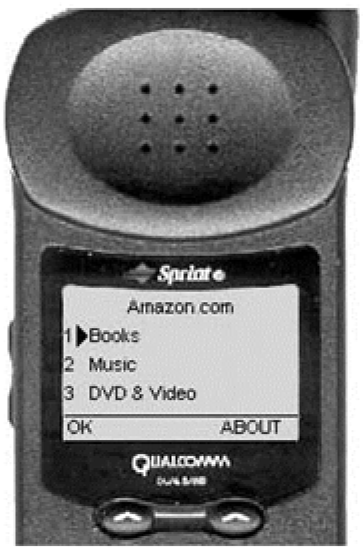
(*Id.*, 5:32-39; *see also id.*, 9:4-6 ("[T]he music recording stored within data base memory **52** may be stored in an encoded/compressed manner, …").) Thus, one of ordinary skill in the art would have understood that Rolf discloses providing a "**library**" of compressed digital audio files, as claimed. (Random House

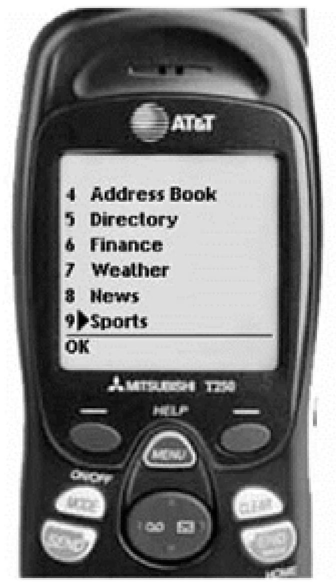
Webster's College Dictionary (1999), Ex. 1076, p. 764 ("**library** [:] **1. a.** a place, as a building or set of rooms, containing books, recordings, or other reading, viewing, or listening materials arranged and cataloged in a fixed way. … **3**. any set of items resembling a library in appearance, organization, or purpose: *a library of computer software*.").)

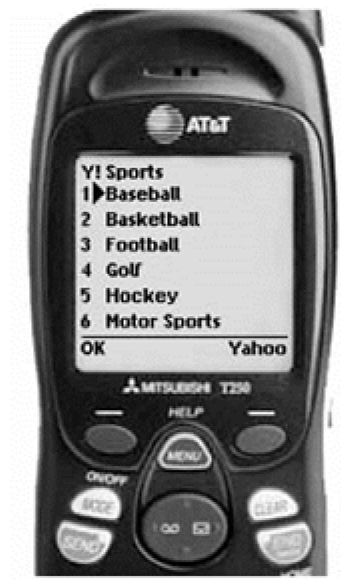
91. Rolf further discloses that a particular compressed digital audio file can be "**select[ed]**" from the library for download. In particular, Rolf discloses that "the wireless communications device **12** can be utilized to select [sic] recording via a menu or listing of recordings" (Rolf, 9:10-15), and this selection can be made using the keypad and input on the cell phone **12**. (*Id*., 5:49-53; *see also id*., 1:39-41, 5:63-66, 9:10-15.) One of ordinary skill in the art would have understood and found it obvious that the Web server in facility **14** (*id*., 3:11, 12:54) would present this menu or listing of recordings as part of a website where selection is made using the "keypad and input" of the cell phone (*e.g.* as opposed to "voice commands"). (*Id*., 5:49-50; *see also id*., 1:39-41.)

92. While Rolf does not expressly disclose providing a library "**with a visual image associated with the compressed digital audio … file**" for selection of the compressed digital audio file, this would have been obvious in view of Forta and Gould.

93. As I explained in **Part V.A.2** above, Forta describes a technique for providing websites to cell phones called "Wireless Application Protocol," or "WAP" for short. (Forta, Ex. 1004, at p.1.) Forta discloses that these websites can have a visually displayed interface that presents a menu or listing of options to the user for selection, as shown below.







(*Id.*, at pp.316, 317, Figs. 13.3 (screen on the left), 13.5 (screens in the middle and on the right); *see also id.*, at p.317 ("Since Sports was option 9 on the main Yahoo! page, I had to scroll down to find it. When I select option 9, I am presented with a meaningful menu to choose from.").)

94. Forta additionally discloses "**visual images associated with**" WAP menu items made available on a cellular phone. (*See e.g., id.*, at p.136; Fig. 6.5 (shown to the right).) As can be seen in figure 6.5, Forta discloses a menu with four options ("Email, "Content Se" [sic], "CustCare," and "Bookmarks"), each associated with a visual image. For example, an image of an envelope is associated with the "EMail" menu option. Forta explains that WAP applications and webpages can include visual images, such as those shown in figure 6.5, that are provided in wireless bitmap (WBMP) format. (*Id.*, at p.128.) A variety of images can be used in a WAP webpage, and Forta describes how custom images can be created "using a drawing tool you are comfortable with," and placed on a "Web server" for subsequent delivery. (*Id.*, at pp.128-29.) Thus, it would have been obvious in view of Forta that visual images can be stored with the library of compressed music recordings in the "remote storage facility" of Rolf. (Rolf, 5:32-39; *see also id.*, 9:4-6.)

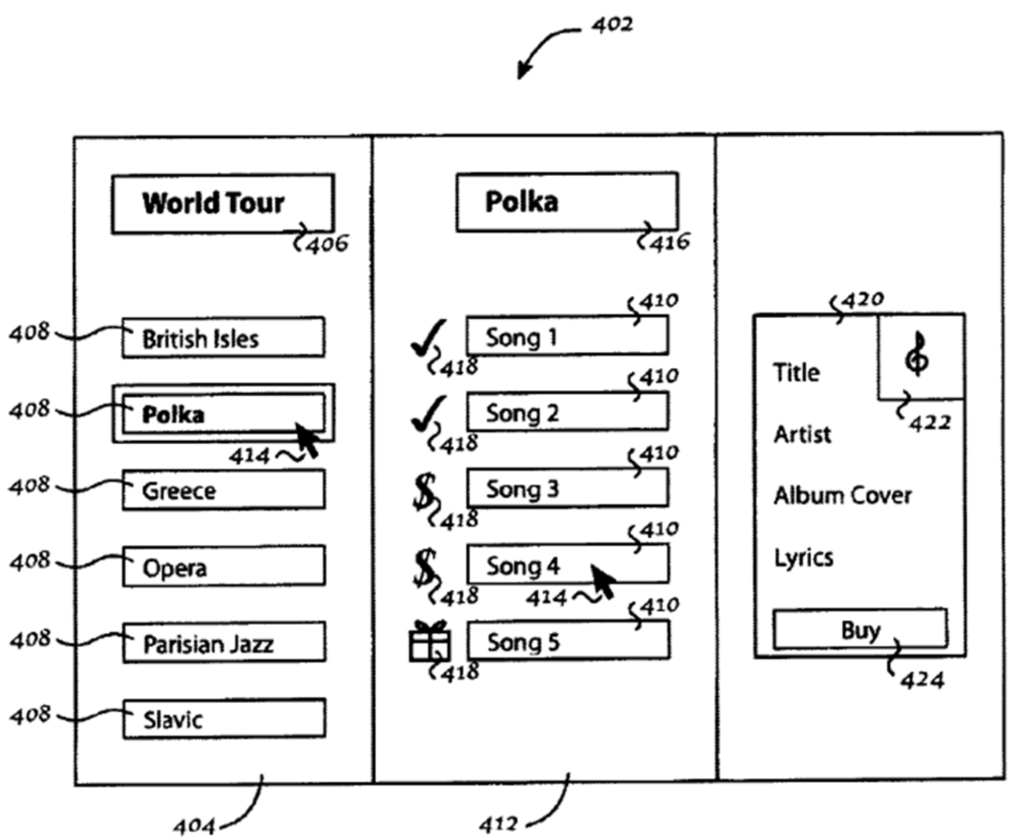
95. Forta further explains that the WML code for image display has both a "src" and a "localsrc" attribute to specify the location of an image to display:

> The actual WML code to use images is simple, straightforward, and nearly identical to HTML: <img alt="text" <u>src="url"</u> <u>localsrc="icon"</u> align="alignment" height=" n" width=" n" vspace=" n" hspace=" n"/>

(Forta, at p.129 (underlining added).) The "src" attribute is "required" and specifies the uniform resource identifier (URI), which can include a uniform resource locator (URL), for the visual image to be displayed on the WAP application or webpage. (*Id.*, at p.130.) The "localsrc" attribute is "optional" and represents the URI of a locally stored image to be displayed on the WAP application, if the image identified by "src" cannot be found. (*Id.*) As the description of this WML code suggests, one of ordinary skill in the art would have been very familiar with this method of specifying visual images on a webpage, as it is "nearly identical to HTML." (*Id.*) As such, one of ordinary skill would have understood and found it obvious that, when applied to selection menus disclosed in Rolf and elsewhere in Forta, the visual image display techniques taught in Forta could <u>associate visual images with menu options, including the selectable music recordings ("compressed digital audio files") in the menu of Rolf</u>. (Rolf, 9:10-15.) Forta further discloses that an image itself may serve as a link that can be selected. (Forta, at p.53 ("WML links are very similar to their HTML counterparts. The text (or <u>image</u>) to be linked is enclosed within <a> and tags, and the browsers uses some indicator (usually underlining) to indicate that it can be selected." (underlining added)).)

96. While Forta makes clear that it would have been obvious to a person of ordinary skill in the art to associate a visual image with a compressed digital audio file for selection of the compressed digital audio file, Gould provides additional disclosures confirming the applicability of such a practice to the music-recording-based system of Rolf.

97. Gould discloses a simple menu-based user interface that allows a user to manage music recordings, as shown below:



(Gould, Fig. 4.) Gould explains that in region **404**, a selection of lists is displayed. (*Id.*, 5:4-5.) Each list is represented in the region **404** by a list icon **408**. (*Id.*, 5:8-9.) Gould explains that the user can select one of the lists **408**, which will cause items **410** contained in that list to be displayed in region **412**. (*Id.*, 5:28-31.) A title status icon **418** appears next to each listed title **410**, which indicates the status of the item in the list. (*Id.*, 5:41-44.) "For example, a check mark might appear next to an item to indicate that the item is already in possession of the user. Another icon, for example a dollar sign, might appear next to items which have not yet been purchased." (*Id.*, 5:44-47.) Gould explains that selecting one of the title icons **410** will initiate various activities depending on the status of the item:

> For example, if a title has not yet been purchased, selecting the title will cause information regarding the title, such as artist, record label, and <u>album cover graphics</u>, etc., to be displayed in the title description window **420**. A "sample" icon **422** will be displayed which will initiate a sample play of the music, and a "buy" icon **424** will also be displayed, selection of which will initiate a purchase of the title.

(*Id.*, 5:53-60 (underlining added).) Gould makes clear that the music presented to the user can take the form of *compressed digital* audio files available for download. (*Id.*, 6:1-3 ("The present embodiment can be used with music which can be downloaded directly from a network such as the Internet using MP3 or similar technology.").)

98. Gould therefore provides multiple independent examples that disclose the ability to associate a "**visual image**" with a compressed audio recording. First, the "visual image" could take the form of album cover graphics shown in title description window **420**, in response to the selection of a recording in center region **412**. Second, the "visual image" can take the form of a status icon **418** in the center region **412** accompanying a listed recording.[6]

99. Accordingly, Rolf, Forta, and Gould disclose and render obvious the claim limitation "providing a library with a visual image associated with the compressed digital audio and/or visual file for selection of the compressed digital audio and/or visual file."

100. ***Rationale and Motivation to Combine***: It would have been obvious to a person of ordinary skill in the art to combine Forta and Gould with Rolf, with

[6] As I explained above in the text, Forta discloses that the visual image itself may serve as a link that can be selected. (Forta, at p. 53 ("WML links are very similar to their HTML counterparts. The text (or image) to be linked is enclosed within <a> and tags, and the browsers uses some indicator (usually underlining) to indicate that it can be selected.") (underlining added).)

no change in their respective functions, predictably resulting in the system of Rolf providing a library with visual images associated with compressed music recordings for selection of a particular music recording, as taught by Forta and Gould.

101. Forta provides an express motivation to combine by explaining that WAP "promises to be one of the most important protocols and standards ever developed," and stating that the Forta book is intended for any developer who "want[s] to learn how to generate content for wireless devices…." (Forta, at p.1.) As such, one of ordinary skill in the art would have naturally consulted Forta to ascertain the details involved in providing content, including menus and visual images, to a cell phone.

102. Forta provides several other express motivations to combine. It states that WAP and its associated technologies were "created to address the display, bandwidth, and memory limitations of mobile and wireless devices, such as cellular phones." (Forta, at p.20.) Forta further explains that "WAP will succeed because it is being supported by almost every major hardware, software, device, data carrier, and telecom vendor. And with that kind of muscle behind a common goal, anything is possible." (Id., at p.1.) Thus, one of ordinary skill in the art would have appreciated that the WAP techniques described in Forta are

particularly suitable for the cell phone in Rolf, and would have appreciated the advantages of using such a widely adopted technology, including the advantages of interoperability with other existing systems and technologies.

103. Forta further emphasizes that its techniques present the user with a "meaningful menu to choose from" compared to alternative methods. (Forta, at p.317; *see also id*. ("In the wireless version of Yahoo, the Sports link is presented on the first page, and my sports choices are immediately available. Two clicks and I'm in.").) A person of ordinary skill in the art would have found it obvious to display the library of music recordings in Rolf through interactive menus as described in Forta.

104. Moreover, one of ordinary skill in the art would have understood the advantages of providing visual images or icons as part of Web content presented to a user. Forta confirms what one of ordinary skill would have known of the desirability of such visual images:

> One of the most compelling features of the Internet is the ability to convey messages using images. Images not only make a site more interesting, but they convey messages and information much more efficiently than is possible with pure text. Graphics give your site a unique look and feel, allow you to brand your site, and can bridge language barriers simply. Today on the Web it is not unusual to

> encounter pages that are composed solely of single or multiple images.

(*Id*., at p.128.)

105. A person of ordinary skill in the art would have also appreciated the applicability and benefits of using the interface disclosed in Gould, and in particular, the interface for displaying album cover art for a music recording along with the ability to sample or purchase the recording. Gould and Rolf are a natural combination. Gould explains that the user interface can be "used with music which can be downloaded directly from a network such as the Internet using MP3 or similar technology." (Gould, 6:1-3.) Rolf is similarly directed to a system for downloading music recordings over a network such as the Internet. (Rolf, 3:17-21.) Rolf and Gould both further disclose a menu or listing-based interface, and the ability of a user to initiate a purchase of a recording from the interface. (Rolf, e.g., 3:64-4:6, 6:53-59, 9:10-15; Gould, 3:23-30, 5:57-60, Fig. 4.) A person of ordinary skill in the art would have been motivated to improve the interface of Rolf by incorporating the display of album cover graphics taught in Gould in order to provide a richer, more informative visual experience.

106. Finally, Rolf, Forta, and Gould are analogous references in the same field of e-commerce. Forta specifically notes that "[e]-commerce is a highly practical and exciting application for mobile users" (Forta, at p.462), and devotes

an entire chapter to this topic. (*Id.*, at pp.429-63 ("Chapter 18. E-Commerce").) Rolf and Gould, for their part, describe methods of purchasing digital music for download. (Rolf, 6:53-7:23; Gould, 3:26-31.) The analogous nature of these references is confirmed by the fact that they each recognized that mobile devices can be used as instruments of e-commerce. (Forta, at p.462 ("E-commerce is a highly practical and exciting application for mobile users."); Rolf, 6:53-7:23; Gould, 4:46-50 ("While the invention has been described in terms of use a personal computer, those skilled in the art will recognize that the present invention can be used in connection with other similar electronic equipment such as <u>a hand held device, a laptop computer</u>, etc.") (underlining added).) The Rolf, Forta, and Gould references therefore make for a natural combination.

b. "receiving a first request from the cell phone for the visual image, said cell phone including a receiver and digital signal processor configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation;" (Claim 1[b])

107. In light of the length of this claim limitation, I will divide it into pieces to ensure that I cover all of its elements.

"receiving a first request from the cell phone for the visual image"

108. As noted, Rolf discloses that "one or more selected music recordings may be retrieved from the storage facility **14**, for transmission, via wireless

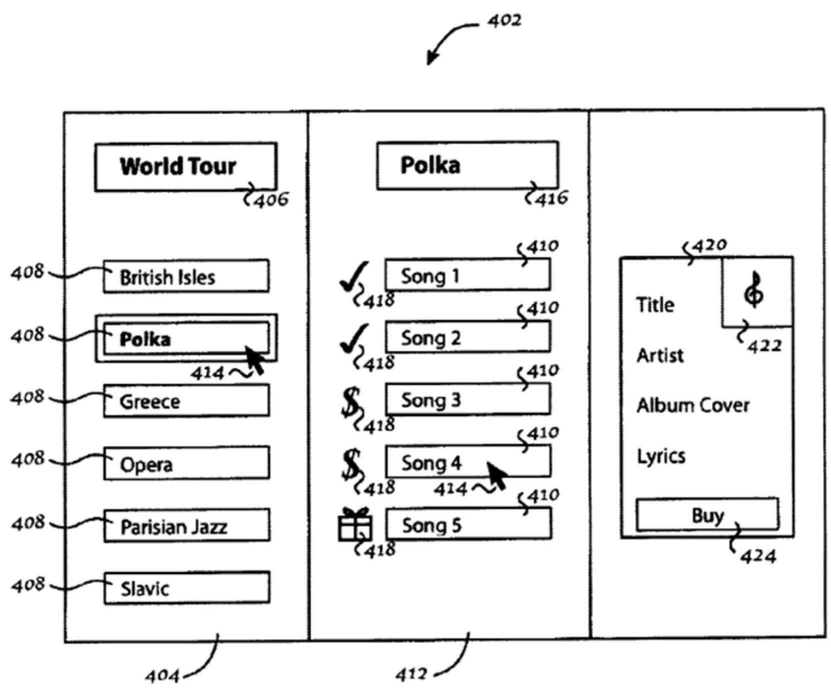
communications link, to the device **12**." (Rolf, 5:49-53.) As further noted, the device **12** can be a "cellular telephone." (*Id.*, 1:27-28, 5:21-22.)

109. Rolf explains that the download process begins "when wireless communications device **12** accesses the central facility **14** via the communications network for purpose of retrieving one or more selected recordings." (*Id.*, 8:63-66 (underlining added).) Subsequently, "processor **50** [of the facility **14**] invokes application software for providing a menu driven system to wireless communications device **12**, such that the wireless communications device **12** can be utilized to select [sic] recording via a menu or listing of recordings." (*Id.*, 9:11-12; *see also id.*, 8:56 ("[A] central facility **14** has a processor **50**").) Because the "menu or listing of recordings" is provided to the cell phone after the cell phone "accesses the central facility **14** via the communications network for purpose of retrieving one or more selected recordings" (*id.*, 8:63-9:15), one of ordinary skill in the art would have understood that the facility **14** in Rolf "**receiv[es] a first request from the cell phone**" for the menu or listing of recordings.[7] This is

[7] The request for the menu or listing of recordings in Rolf corresponds to the claimed "**first**" request because it is different from, and occurs prior to, a selection for a particular music recording made via the menu or listing, which corresponds to the claimed "**second**" request, as I explain in **Part V.B.1.d** below.

consistent with Forta, which confirms that content is provided to a cell phone using WAP in response to a request. (Forta, at p.12, Fig. 1.1 (showing the receipt of a request for WAP content from a cell phone), 128 (WAP content includes visual images).)

110. The "**first request**" limitation is also disclosed and obvious in further view of Gould. For reference, Figure 4 of Gould is shown again below:



(Gould, Fig. 4.) As I explained in the preceding claim limitation, the claimed "**visual image**" can either take the form of the album cover graphics for a recording shown in title description window **420** (on the right), or a status icon **418** accompanying a recording in the list of window region **412** (in the middle).

111. Gould discloses that, in either scenario, the visual image is provided to the user in response to a request by the user. (*Id.*, 5:28-31 ("With continued reference to FIG. 4, the user can select one of the lists **408**, in which case a selection of items **410** contained in that list will be displayed in a second window region **412**."), 5:51-57 ("With continued reference to FIG. 4, selecting one of the title icons **410** will initiate various activities depending upon the status of the item. For example, if a title has not yet been purchased, selecting that title will cause information regarding that title, such as artist, record label, and album cover graphics, etc., to be displayed in a title description window **420**.") (underlining added).) Gould therefore discloses "**receiving a first request . . . for the visual image**."

112. As I explained above, it would have been obvious in view of Forta and Gould to present a visual image (e.g., album cover graphics or icons) associated with a music recording to the cell phone of Rolf. Forta and Gould, as I noted above, further confirm that it would have been obvious to provide this visual image in response to a request from the cell phone of Rolf. The rationale and motivation to combine Rolf with Forta and Gould has been discussed in the preceding claim limitation, and applies equally here. Rolf, Forta and Gould thus

render obvious the step of "receiving a first request from the cell phone for the visual image," as recited in the claim.

"cell phone including a receiver"

113. As I noted above, Rolf discloses a "wireless communications device **12**, such as a cellular telephone." (Rolf, 5:21-22.) A block diagram of this cell phone is shown in Figure 4, reproduced below. (*Id.*, 4:65-67, 7:49-50.)

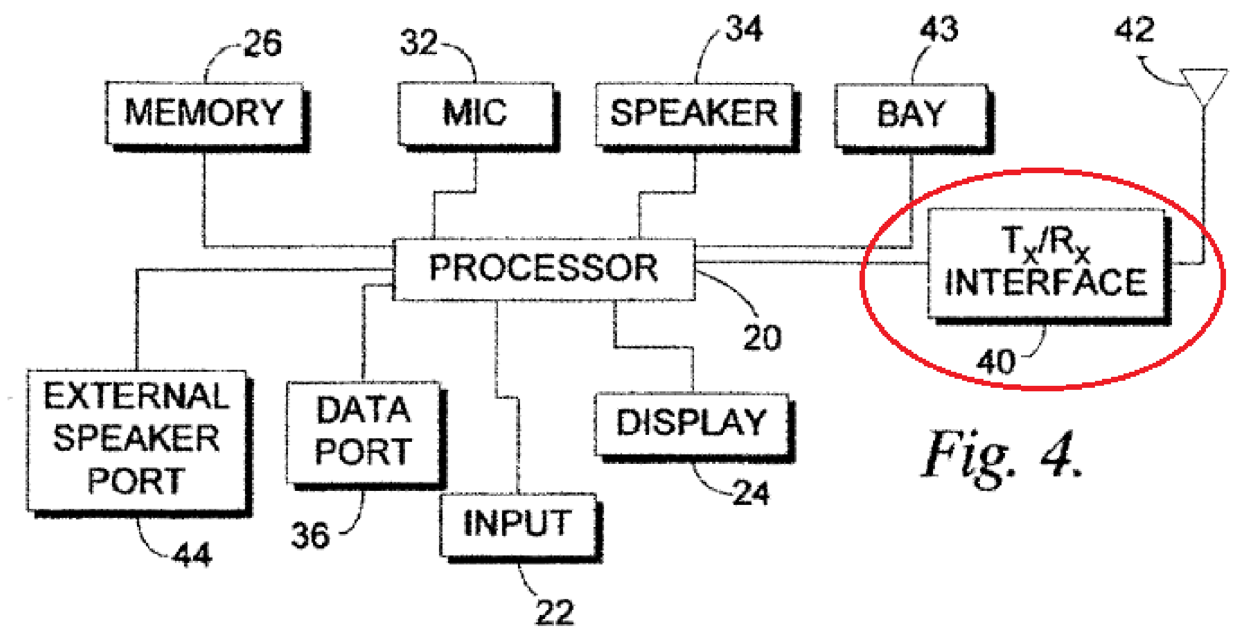


Fig. 4.

(*Id.*, Fig. 4 (red circle added).) As shown, the cell phone includes a "transceiver **40**." (*Id.*, 7:54.) One of ordinary skill in the art would have understood that a "transceiver" serves as a receiver. (*Comprehensive Dictionary of Electrical Engineering*, Ex. 1025, at p. 647 ("transceiver [:] a device that can serve as both a transmitter and receiver.).) Indeed, box **40** (circled in red) in Figure 4 above is labeled as a "Tx/Rx Interface" (Transmitter/Receiver), thus expressly disclosing that the transceiver **40** serves as a receiver. Rolf therefore discloses that the cell phone includes a claimed "**receiver**."

"cell phone including a . . . digital signal processor"

114. As shown in Figure 4 above, the cell phone includes a processor **20**. Rolf explains that the processor **20** performs functions including processing data packets received by the cell phone and outputting information to be displayed. (Rolf, 10:45-46, 13:39-40.)

115. Rolf does not appear to expressly disclose that the cell phone includes a "**digital signal processor**." However, it was well-known to persons of ordinary skill in the art that cell phones of the sort disclosed in Rolf could include one or more digital signal processors, which were advantageously used for functions such as speech coding and noise suppression. Thus, one of ordinary skill in the art would have understood and found it obvious that the cell phone in Rolf could include a digital signal processor. To the extent there is any question, this detail is confirmed and expressly disclosed by Gatherer.

116. As Gatherer explains, "[p]rogrammable digital signal processors (DSPs) are pervasive in the wireless handset market for digital cellular telephony." (Gatherer, at p.84, left column (underlining added).) In fact, according to

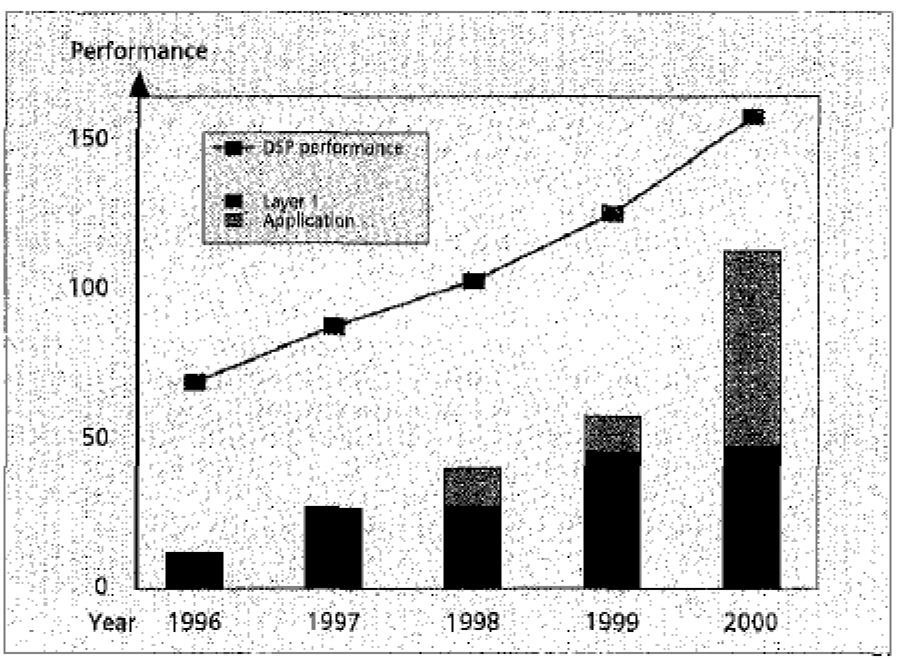
Gatherer, one historical approach to the implementation of cell phones had "emphasize[d]" programmable DSPs. (*Id.*, at p.84, left column.) For example, as I mentioned above, "[t]he voice coder is the part of the architecture that most engineers agree should be done on a DSP." (*Id.*, at p.84, right column (underlining added).) Gatherer also discloses that digital signal processors were widely used in cell phones for a variety of other functions. (*Id.*, p.85, Figs 1 & 2 (showing DSP functions as including vocoding, speech coding, noise suppression, echo cancellation, speech recognition, equalizing, interleaving, channel coding, ciphering, burst formatting, demodulating, equalizing, and PCA).)

117. ***Rationale and Motivation to Combine:*** It would have been obvious to a person of ordinary skill in the art to combine Rolf with Gatherer, predictably resulting in a cell phone that included one or more digital signal processors. Rolf and Gatherer are analogous references in the same field of describing features of cellular phones. In fact, like Rolf, Gatherer recognized that cell phones can be used to provide "[a]udio and visual entertainment . . . delivered wirelessly to mobile subscribers." (*Id.*, at p.89, left column.) A person of ordinary skill in the art implementing the cell phone of Rolf would naturally have consulted Gatherer in ascertaining the features and components of cell phones, and would have

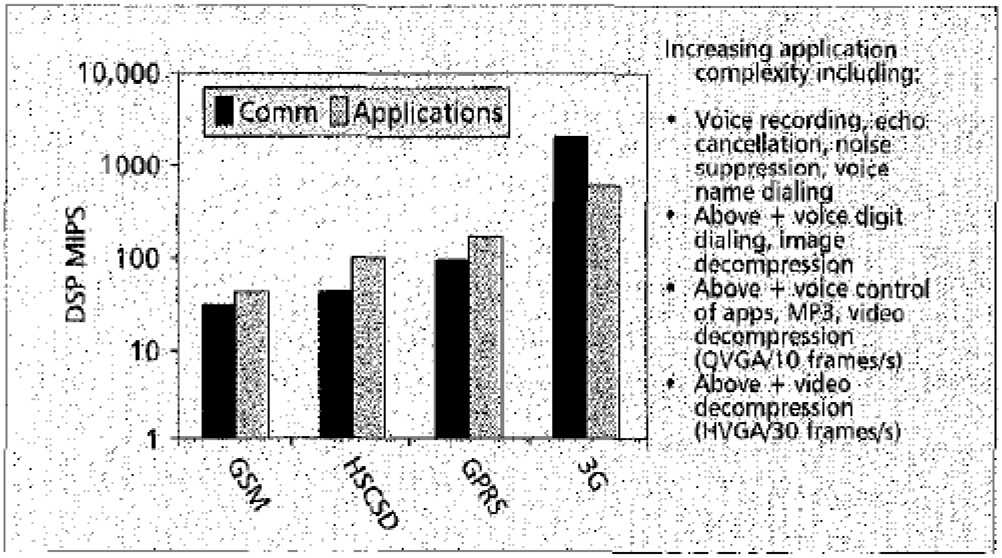
understood that the two references pertain to the same technology area and are readily combinable.

118. Gatherer also provides express motivations to combine in the manner described above. Gatherer explains that relying on DSPs rather than application-specific integrated circuits (ASICs) to perform the processing required by cell phones provides flexibility because DSPs are programmable. (*Id.*, at p.84, left column ("We summarize some of the up and coming applications for the new third-generation wireless personal assistants to show that, if anything, flexibility is becoming more of an issue, and therefore the programmability offered by DSPs is even more desirable."); *id.*, at p.85, left column ("[E]ach generation of phone had a slightly different physical layer from the previous one, and upgrades to ASIC-based solutions became costly and difficult. Because DSPs were now being designed with low-power wireless applications in mind, the power savings to be had from ASIC implementation of DSP functions was not significant enough that system designers were willing to live with the lack of flexibility.") (underlining added).) As such, "programmable DSPs [were] **essential** to provide a cost-effective, flexible upgrade path for the variety of evolving standards." (*Id.*, at p.85, right column – p.86, left column (emphasis added).)

119. The advantages provided by DSPs were not limited to their flexibility. Gatherer notes that DSPs were known for their ever-increasing performance (measured in "MIPS"), and as such, were well suited for applications beyond traditional voice functionality. (*Id.*, at p.85, left column ("It is also true that as GSM phones have evolved, they have gradually moved beyond the simple phone function, and this has led to an increase in the fraction of the DSP MIPS used by something other than physical layer 1. <u>This evolution is shown in Fig. 3. With the advent of wireless data applications and the increased bandwidth of 3G, we expect this trend to accelerate.</u>") (underlining added); *id.*, at Figs. 3, 7 (reproduced below).)



■ **Figure 3.** *Layer 1 and application MIPS with time.*



■ **Figure 7.** *Applications drive DSP MIPS.*

120. Accordingly, the advantages offered by DSPs in terms of flexibility and processing power would have motivated a person of ordinary skill in the art to implement the cell phone in Rolf using a digital signal processor. Indeed, Gatherer explicitly predicted that the "power-efficient media processing" and "flexibility and upgradeability" provided by digital signal processors would secure their place in "future data-centric mobile devices." (*Id.*, at p.89, right column.)

121. One of ordinary skill in the art would also have been motivated to make the proposed combination by the widespread availability of off-the-shelf DSPs. In fact, using DSP for such wireless applications was mainstream in the cellphone industry, and not using DSP could be considered as out of the mainstream, and in some cases even awkward. As Gatherer explains, "because of the growing importance of the wireless market (more than 400 million units

projected for 2000), there [were] [then] several DSPs on the market that have been designed with wireless applications in mind, for instance, the Lucent 16000 series and the ADI21xx series. This level of effort by several companies [was] a sign that the collective wisdom of the marketplace has chosen to bet on a programmable DSP future for wireless technology." (*Id.*, at p.86, right column.) This environment would have motivated a person of ordinary skill in the art to incorporate one or more digital signal processors into the cell phone described in Rolf.

"configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation (OFDM)"

122. As I explained above, Rolf discloses a cell phone that is configured to receive music files transmitted over a wireless communication network. (Rolf, 1:28-35, 5:46-53, 6:23-26, Fig. 1; *see also id.*, 5:64-66.) Rolf further discloses that the cell phone can "play" the music files received. (*Id.*, 1:20, 5:19, 6:21.) Rolf therefore discloses that the cell phone is "**configured for receiving and processing files**."

123. While the music files in Rolf are not disclosed as being "**transmitted by orthogonal frequency-division multiplex modulation**," this would have been obvious in view of Frodigh. As I discussed in **Part V.A.5** above, Frodigh

describes a data transmission technique called "orthogonal frequency division multiplexing," or "OFDM" for short. (Frodigh, 1:61.) As Frodigh explains:

> Frequency division multiplexing (FDM) is a method of transmitting data that has application to cellular systems. Orthogonal frequency division multiplexing (OFDM) is a particular method of FDM that is **particularly suited for cellular systems**. An OFDM signal consists of a number of subcarriers multiplexed together, each subcarrier at a different frequency and each modulated by a signal which varies discretely rather than continuously. … Generally, N serial data elements modulate N subcarrier frequencies, which are then frequency division multiplexed. …

(*Id.*, 1:59-2:18 (emphasis added).) Frodigh goes on to describe the use of OFDM modulation to transmit voice and data to a mobile station over a cellular network. (*Id.*, 7:51-63, Fig. 2; *see also id.*, 5:29-30, Fig. 1.) In particular, Frodigh describes a "receiver **330**" that can be implemented in the mobile station to receive and process data transmitted by OFDM modulation. (*Id.*, 8:1-9 ("In the downlink the receiver **330** is located in the mobile station … The link receiver **330** and link transmitter communicate over RF channel **380** using a subset of M of the available subcarriers."), 8:10-14, 8:33-63, Fig. 3C.) Frodigh therefore discloses receipt and processing of digital information transmitted by OFDM.

124. ***Rationale and Motivation to Combine:*** It would have been obvious to a person of ordinary skill in the art to combine Rolf with Frodigh, predictably resulting in a cell phone configured to receive and process data files such as music recordings, as disclosed in Rolf, in which the data files are transmitted to the cell phone by OFDM modulation. Rolf and Frodigh are analogous references in the same field of cellular communication. Further confirming their analogous nature is the fact that like Rolf, Frodigh recognized that "data," in addition to "voice," can be received by a mobile device over a cellular connection. (Frodigh, 7:58-59 ("Voice and data to be transmitted on each link are modulated onto a number (M) subcarriers.") (underlining added).) As such, one of ordinary skill in the art would have found the OFDM transmission technique in Frodigh to be a natural combination with the cell phone of Rolf.

125. Frodigh also provides express motivations to combine in the manner described above. As noted, Frodigh teaches that OFDM modulation is "particularly suited for cellular systems." (Frodigh, 1:62-63.) Indeed, Frodigh explains in detail the advantages of using OFDM in a cellular system:

> OFDM offers several advantages that are desirable in a cellular system. In OFDM the orthogonality of the subcarriers in the frequency spectrum allows the overall spectrum of an OFDM signal to be close to rectangular. This results in efficient use of the bandwidth

> available to a system. OFDM also offers advantages in that interference caused by multipath propagation effects is reduced. Multipath propagation effects are caused by radio wave scattering from buildings and other structures in the path of the radio wave. Multipath propagation may result in frequency selective multipath fading. In an OFDM system the spectrum of each individual data element normally occupies only a small part of the available bandwidth. This has the effect of spreading out a multipath fade over many symbols. This effectively randomizes burst errors caused by the frequency selective multipath fading, so that instead of one or several symbols being completely destroyed, many symbols are only slightly distorted. Additionally, OFDM offers the advantage that the time period T may be chosen to be relatively large as compared with symbol delay time on the transmission channel. This has the effect of reducing intersymbol interference caused by receiving portions of different symbols at the same time.[8]

(*Id.*, 2:38-60 (underlining added).) One of ordinary skill in the art would have been motivated by the advantages described in Frodigh to use the OFDM modulation technique to transmit data files such as compressed music to cellular phones.

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[8] I note that the mitigation of intersymbol interference is a benefit of OFDM that the ’956 patent itself acknowledges. (’956, 16:59-60.)

126. Moreover, as I noted in **Part III.E** above, OFDM was one of a finite number of known techniques for enabling "multiple access," a requisite feature of cellular networks. As further noted, the communications industry – including telecom heavyweights Ericsson and Nokia – had actively developed cellular systems employing OFDM for over a decade, and commercialization of such systems was already underway. Under these circumstances, a person of ordinary skill in the art would have had every expectation of success in combining Frodigh with Rolf in the manner described above.

127. I acknowledge that the claim presents an ambiguity as to which recited element must be "configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation." For context, claim 1 recites a "<u>cell phone including a receiver and digital signal processor</u> configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation." There are two reasonable ways to interpret this limitation. First, it could be that the "**cell phone**" is configured as recited. Second, the claim could be interpreted to require that the "receiver and digital signal processor" be configured, respectively, for receiving and processing files, as recited.

128. In my opinion, it does not matter which interpretation is employed, as neither would give rise to a meaningful distinction over the prior art. Even if the

claim requires that the "receiver and digital signal processor" (and not just the cell phone itself) be "configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation," this would nevertheless have been obvious, as I explain below.

Receiver

129. Any requirement that the receiver be configured for receiving and processing files transmitted by OFDM is disclosed in Frodigh. As I mentioned above, Frodigh teaches a "receiver **330**" that can be implemented in a mobile station to receive data transmitted by OFDM modulation. (Frodigh, 8:2-9 ("In the downlink the receiver **330** is located in the mobile station … The link receiver **330** and link transmitter communicate over RF channel **380** using a subset of M of the available subcarriers.").) This receiver is shown in Figure 3C, reproduced below.

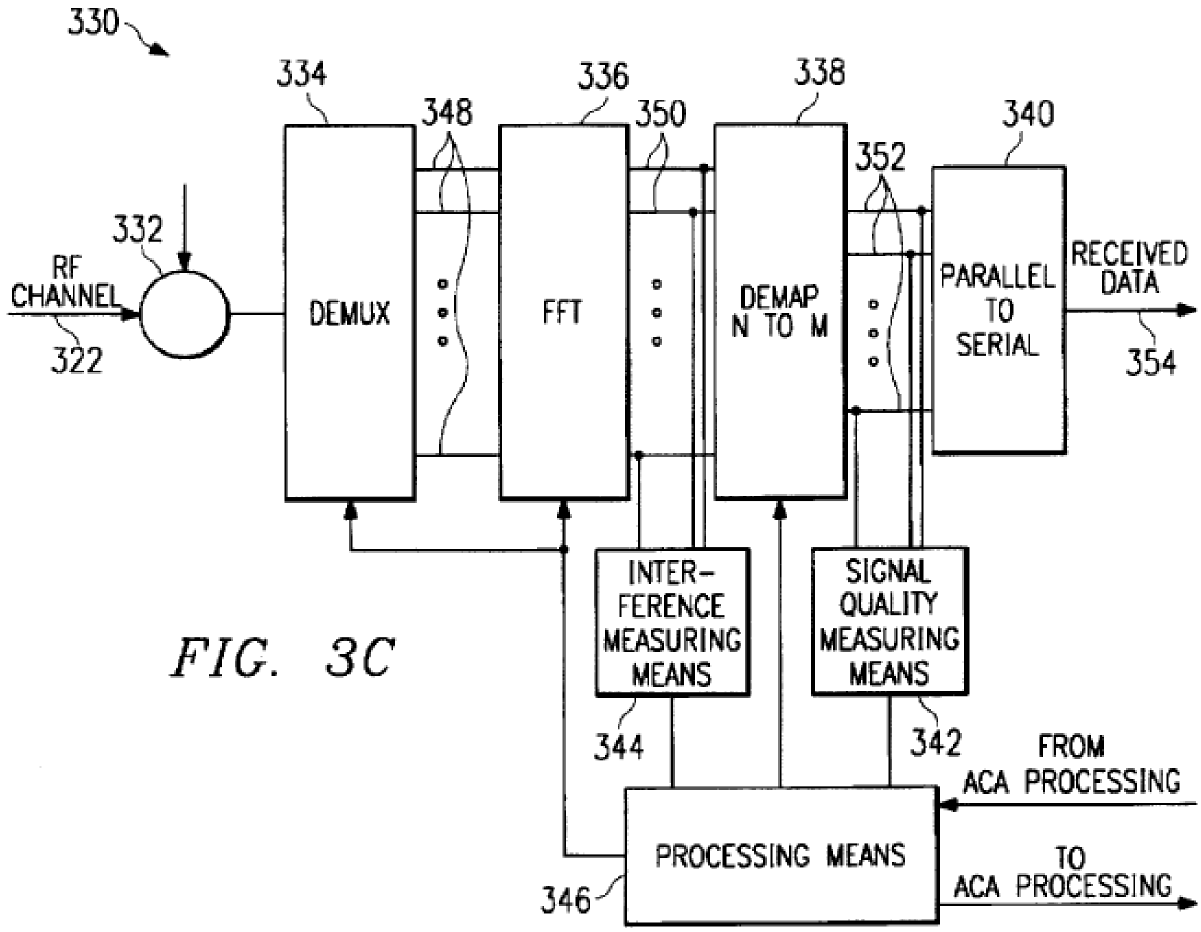

FIG. 3C

(*Id.*, Fig. 3C; *see also id.*, 8:10-14.)

130. As Frodigh explains, "[r]eceiver **330** includes demodulator **332**, frequency demultiplexer (DEMUX) **334**, fast fourier transform (FFT) circuitry **336**, de-mapping circuitry (DEMAP) **338**, a parallel to serial converter **340**, interference measuring means **344**, signal quality measurement means **342** and processor **346**." (*Id.*, 8:33-38.) Frodigh describes in detail how the receiver **300** receives and processes data transmitted by OFDM modulation:

In receiver operation, the system RF carrier is received on the system

> RF channel **322** and then demodulated at demodulator **332**, and demultiplexed at DEMUX **334** to obtain N samples **348** of the signal containing, the M multiplexed subcarriers. A fast fourier transform (FFT) is then performed by FFT circuitry **336** with the N samples **348** as inputs to generate data signals **350** containing any modulating data that was transmitted on each subcarrier. The N subcarriers demodulated and subjected to the FFT are determined by parameters input to DEMUX **334** and FFT circuitry **336** from processor **346**. … The N received data signals **350** are then input to the de-mapping block **338** where the M data signals **352** received on the M subcarrier frequencies currently assigned to link communications are de-mapped from the N data signals **350**. The de-maping is done according to parameters input to DEMAP block **338** from processor **346**. The M de-mapped data signals **352** are then input to the parallel to serial converter **340** and converted into serial received data **354**. …

(*Id.*, 8:38-63.)

131. As noted, Frodigh makes clear that the data received and processed by the receiver **300** can include non-voice data. (*Id.*, 7:58-59 ("Voice and data to be transmitted on each link are modulated onto a number (M) subcarriers.") (underlining added).) Frodigh therefore discloses a receiver "configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation," to the extent this is required by the claim. The rationale

and motivation for adapting the OFDM receiver of Frodigh to the cell phone in Rolf is provided above.

Digital Signal Processor

132. Any requirement that the digital signal processor be configured for receiving and processing files transmitted by OFDM is also satisfied by the prior art. As I explain below, it would have been obvious in view of Gatherer that a digital signal processor included in the cell phone could process data transmitted by OFDM modulation, thus satisfying any requirement imposed by the claim that the digital signal processor be configured for "receiving and processing files transmitted by orthogonal frequency-division multiplex modulation."

133. As I mentioned above, Gatherer discloses that a desirable feature of digital signal processors is their programmability. (Gatherer, at p.84, left column ("[F]lexibility is becoming more of an issue, and therefore the programmability offered by DSPs is even more desirable.").) Gatherer further explains that as digital signal processors became more powerful, they were used to implement a growing number of functions performed by cell phones. (*Id.*, at p.84, right column ("[O]nce the DSP was included a certain amount of 'mission creep' started to occur. As DSPs became more powerful, they started to take on other physical layer 1 tasks until all the functions in the 'DSP functions' box in Fig. 1 were included."),

id., at p.85, Fig. 1 (showing that DSP functions include GSM vocoder, channel codec, interleaving/deinterleaving, ciphering/deciphering, burst formating, demodulator, and equalizer); *see also id.*, at p.85, left column ("After 1994, a single DSP was powerful enough to do all the DSP functions, making the argument for a DSP-only solution for the baseband even more compelling.").) As such, one of ordinary skill in the art would have understood and found it obvious that, when included in a cell phone that receives files transmitted by OFDM modulation, the digital signal processor could process the OFDM signals.

134. One of ordinary skill in the art would have had ample motivations to implement functions of the OFDM receiver, as described in Frodigh, using a digital signal processor. To begin with, it was well known that DSPs could be programmed to receive and process OFDM signals. (E. Lawrey, *Multiuser OFDM*, Fifth International Symposium on Signal Processing and its Applications (Aug. 1999), Ex. 1015, at p.761, left column ("[A] test hardware solution is presented using SHARC® Digital Signal Processors (DSP) demonstrating the feasibility of a simple multiuser OFDM system."); U.S. Patent No. 5,732,113 (published Mar. 1998), Ex. 1016, 4:26-44 ("DSP 100 performs a variety of operations on the in-phase and quadrature samples of the received OFDM signal. …"); *see also* U.S. Patent No. 6,711,221 (filed Feb. 2000), Ex. 1017, 3:33-48.)

135. In fact, a person of ordinary skill in the art would have been motivated to use a DSP to perform the functions of the OFDM receiver described in Frodigh because she would have appreciated that DSPs can efficiently implement the mathematical algorithms involved in the processing of OFDM signals, such as the Fast Fourier Transform (FFT). (Frodigh, 8:34-35.) Indeed, Gatherer provides express suggestions for doing so. (Gatherer, at p.86, right column ("Another strategy used by DSP designers is to add instructions that, although fairly generic in themselves, allow efficient implementation of algorithms important to wireless applications.").)

136. Gatherer provides additional express motivations for implementing functions of the OFDM receiver using a digital signal processor. Gatherer explains that DSPs have traditionally performed tasks of the "physical layer" in cell phones. (*Id.*, at p.84, right column ("As DSPs became more powerful, they started to take on other physical layer 1 tasks until all the functions in the 'DSP functions' box in Fig. 1 were included."); *see also id.*, at p.85, Fig. 1.) Because the receipt and processing of OFDM signals would be a physical layer task in cell phones, one of ordinary skill in the art would have found DSPs to be a natural candidate for performing functions of the OFDM receiver. Moreover, as Gatherer explains, "[a] DSP-based baseband approach can cope better with different radio frequency (RF)

and mixed-signal offerings which occur due to technology improvements and market changes." (*Id.*, at p.85, right column.) One of ordinary skill in the art would therefore have appreciated that DSPs are well-suited for evolving OFDM technologies developed for cellular systems, discussed at length in **Part III.D** above. Accordingly, it would have been obvious to configure a digital signal processor included in a cell phone to receive and process files transmitted by OFDM modulation.

137. A person of ordinary skill in the art would also have been motivated to implement functions of the music player using a digital signal processor. As Gatherer explains, digital signal processors "can provide power-efficient media processing." (*Id*., at p.89, right column (underlining added).) Gatherer specifically discloses in Figure 7 (shown below) that DSPs can be also used in cell phones for MP3 decompression.

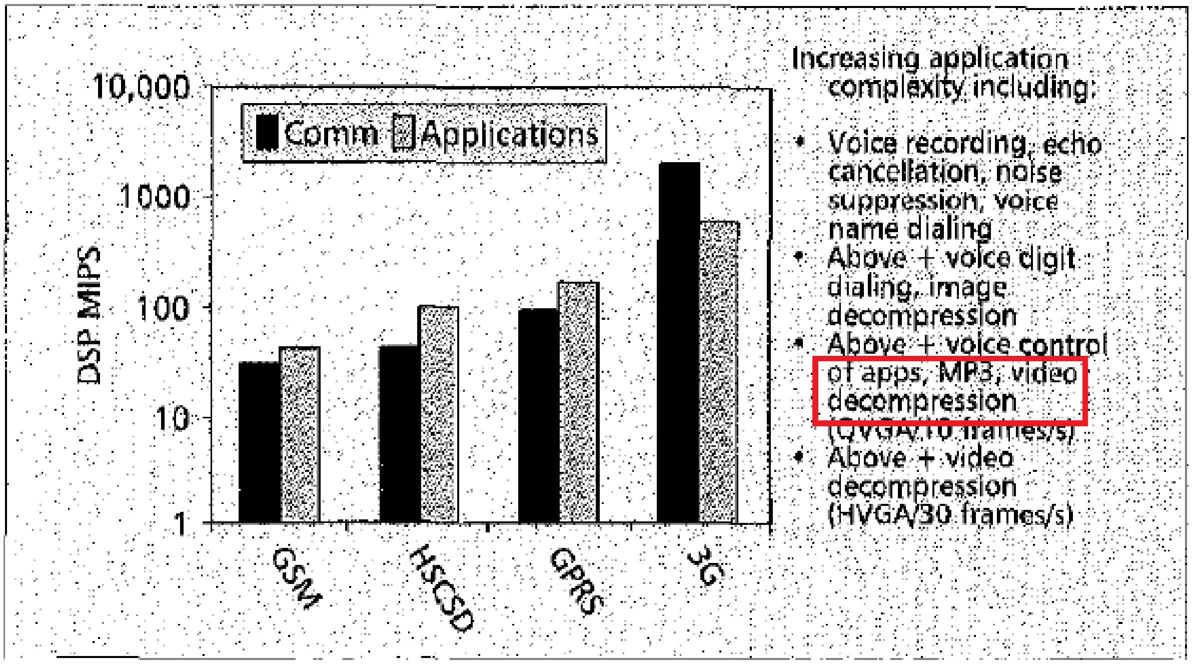

Figure 7. *Applications drive DSP MIPS.*

(*Id*., Fig. 7 (red emphasis added).) It would therefore have been obvious that the digital signal processor could be configured to receive and process for playback the music files that were transmitted to the cell phone by OFDM modulation.

138. Accordingly, the prior art satisfies the limitation "said cell phone including a receiver and digital signal processor configured for receiving and processing files transmitted by orthogonal frequency-division multiplex modulation," as recited in the claim.

c. "providing for the transmission of the visual image to the cell phone based on the received first request" (Claim 1[c])

139. As I discussed above, Rolf explains that "when wireless communications device **12** accesses the central facility **14** via the communications network for purpose of retrieving one or more selected recordings, . . . processor **50** [of the facility **14**] invokes application software for providing a menu driven system to wireless communications device **12**, such that the wireless communications device **12** can be utilized to select recording via a menu or listing of recordings." (Rolf, 8:63-9:15.) Rolf therefore discloses "**providing for the transmission of**" menu information "**to the cell phone based on the received first request**."

140. Moreover, as I explained in claim 1[a] (**Part V.B.1.a)** above, it would have been obvious in view of Forta and Gould that the menu of music recordings in Rolf could include visual images (e.g., album cover graphics) associated with the music recordings. One of ordinary skill in the art would have understood that, where the menu of music recordings to be displayed on the cell phone includes a visual image, the menu information transmitted to the cell phone would include "**the visual image**." And as I discussed, Forta and Gould expressly disclose that the visual images are provided to the user in response to a request. (Forta, at p.12,

Fig. 1.1 (showing the transmission of WAP content based on a request from the cell phone), p.128 (WAP content includes visual images); Gould, 5:28-31, 5:51-57.)

141. I have explained the rationale or combining Rolf with Forta and Gould above. Rolf in view of Forta and Gould thus render obvious the step of "providing for the transmission of the visual image to the cell phone based on the received first request," as recited in the claim.

d. "receiving a second request from the cell phone selecting from the library the compressed digital audio and/or visual file" (Claim 1[d])

142. As I explained in **Part V.B.1.a** above, the claimed "**library**" corresponds to a collection of compressed music recordings cataloged and stored in a database at the facility **14**. (Rolf, 5:32-39; *see also id.*, 9:4-6.) As discussed previously, Rolf discloses "providing a menu driven system to wireless communications device **12**, such that the wireless communications device **12** can be utilized to <u>select [a] recording via a menu or listing of recordings</u>." (*Id.*, 9:10-15 (underlining added); *see also id.*, 5:21-22 ("a wireless communications device **12**, such as a cellular telephone").) One of ordinary skill in the art would have understood and found it obvious that the "menu or listing of recordings" allows the user to select from a library of music recordings.

143. Rolf further explains that the selection can be made "using a keypad and input on the wireless communications device," and accordingly, "one or more selected music recordings may be retrieved from the storage facility **14**, for transmission, via wireless communications link, to the device **12**." (*Id.*, 5:49-53 (underlining added); *see also id.*, 1:39-41 ("Using an input of the cellular telephone, a user may select one or more recordings for transmission to the cellular telephone."); 5:64-66 ("[A] wireless communications device **12** communicates with a central facility **14** for retrieval of one or more stored music recordings.").) Because a particular compressed music recording from the library is retrieved from the facility **14** for transmission in response to a selection made from the cell phone, one of ordinary skill in the art would have understood that the facility **14** "**receiv[es] a second request from the cell phone selecting from the library the compressed digital audio and/or visual file**," as recited in the claim.

e. "providing for the transmission of the compressed digital audio and/or visual file to the cell phone using orthogonal frequency-division multiplex (OFDM) modulation based on the received second request." (Claim 1[e])

144. This limitation is disclosed by and obvious over Rolf and Frodigh.

145. As I discussed in the previous limitation, Rolf discloses that "using a keypad and input on the wireless communications device, . . . one or more selected

music recordings may be retrieved from the storage facility **14**, for transmission, via wireless communications link, to the device **12**." (Rolf, 5:49-53 (underlining added); *see also id.*, 1:39-41; 5:64-66; 9:10-15; 8:56-59 ("[A] central facility **14** has a processor **50**. Connected to the processor **50** are a data base memory **52** and a interface **54** (such as a transceiver or modem) for transmitting and receiving communications signals.") (underlining added).) And as noted, device **12** can be a cell phone. (*Id.*, 5:21-22.) Rolf therefore discloses "**providing for the transmission of the compressed digital audio and/or visual file to the cell phone . . . based on the received second request**."

146. Rolf does not disclose transmission "**using orthogonal frequency-division multiplex (OFDM) modulation**," but I as explained above for claim 1[b] (**Part V.B.1.b**), this would have been obvious in view of Frodigh. The disclosures of Frodigh with respect to OFDM and the rationale for combining are explained at length above, and apply equally here.

f. "wherein the compressed digital audio and/or visual file comprises at least one of a full, partial, or segment of: a song, a musical score, a musical composition, a ringtone, a video or video segment, a movie or movie segment, a film or film segment, an image clip, a picture, a clip, an image, a photograph, a television show, a human voice recording, a personal recording, a cartoon, an animation, an audio advertisement, a visual advertisement, or combinations thereof." (Claim 1[f])

147. As I discussed at length above, Rolf generally describes a "system and method for wirelessly transmitting encoded music, via a wireless communications link, to a portable or mobile communications device which includes a player for playing the music or audio." (Rolf, 1:18-21 (underlining added).) "[T]he music recordings are encoded and transmitted in packets, and may particularly be encoded by a compression algorithm into an encoded (such as MP3 or other) format." (*Id.*, 1:35-38 (underlining added).) One of ordinary skill in the art would have understood and found it obvious that the compressed "music recordings" in Rolf can include at least "**songs**," "**musical scores**," and "**musical compositions**."

148. As I previously noted, Rolf further explains that its teachings with respect to music recordings are "applicable to recordings of other types, such as video recordings." (*Id.*, 14:57-58 (underlining added).) The "video recording" in Rolf qualifies at least as a "**video or video segment**," and thus provides an additional basis for satisfying claim 1[f].

2. Dependent Claim 2: "The method of claim 1, further comprising storing at least a portion of the compressed digital audio and/or visual file on the cell phone."

149. Claim 2 depends from claim 1 and recites "[t]he method of claim **1**, further comprising storing at least a portion of the compressed digital audio and/or visual file on the cell phone." As I explained above, claim 1 is disclosed by and obvious over Rolf, Forta, Gould, Gatherer, and Frodigh. The additional limitations added by claim 2 are disclosed by Rolf, as I explain below.

150. Rolf discloses that a music recording received wirelessly can be stored in a memory within the wireless device:

> [T]he wireless communications device **12** may be utilized to establish a communications link with the remote storage facility **14**. Then, using a keypad and input on the wireless communications device, . . . one or more selected music recordings may be retrieved from the storage facility **14**, for transmission, via wireless communications link, to the device **12**. . . . <u>[T]he retrieved music recording or recordings may be stored in a memory within the communications device **12**</u> . . . .

(Rolf, 5:46-56 (underlining added); *see also id.*, 13:20-23 ("Once an encoded music recording is stored in memory **26**, or on a memory cartridge, of the wireless communications device **12**, the input **22** may be utilized to control the player to play the recording").) As noted, the wireless device can be a cell phone. (*Id.*, 1:64-67, 5:22-24.) Accordingly, claim 2 would have been obvious in view of the prior art.

3. Dependent Claim 3: "The method of claim 1, further comprising optimizing the digital audio and/or visual file according to an optimization scheme."

151. As explained above for claim 1, Rolf discloses that digital audio files, such as MP3 files, are stored at central facility **14** for downloading. (Rolf, *e.g.*, 1:18-21, 1:25-28, 1:35-38, 5:32-39, 5:46-53, 8:63-9:6.) But Rolf does not appear to disclose the additional step of optimizing the MP3 files "according to an optimization scheme."

152. In my opinion, this step provides no meaningful distinction over the prior art and is disclosed by **Hacker [Ex. 1069]**. Hacker, entitled "MP3: The Definitive Guide," is a textbook that discloses a number of techniques for maximizing the sound quality of MP3 files while maintaining acceptable levels of compression. Hacker discloses optimizing the digital audio MP3 file according to an optimization scheme, as recited in the claim, in several different ways.

153. First, Hacker confirms that the process of converting audio data into a compressed MP3 file includes optimization of the digital audio according to an optimization scheme. When creating an MP3 audio file, MP3 "provides a means of analyzing patterns in an audio stream and comparing them to models of human

hearing and perception," which "preserve[s] only the data absolutely necessary to reproduce an intelligible signal." (Hacker, at p.2.) This model is referred to as a "psychoacoustic" model, which guides the compression based on the idiosyncrasies of how human beings hear and perceive sounds. As explained in Hacker, during the MP3 encoding process:

> The frequency spread for each frame is compared to mathematical models of human psychoacoustics, which are stored in the codec as a reference table. From this model, it can be determined which frequencies need to be rendered accurately, since they'll be perceptible to humans, and which ones can be dropped or allocated fewer bits, since we wouldn't be able to hear them anyway. Why store data that can't be heard.

(*Id.*, at p.26.)

154. This process discloses the step of "optimizing the [MP3] file according to an optimization scheme," as recited in the claim. The process described above optimizes the audio signal based on the frequencies that are most perceptible to humans. The "optimization scheme" includes the psychoacoustic models, "which are stored in the codec as a reference table." (*Id.*)

155. As a second and separate basis for disclosing the claimed optimization, Hacker explains that creating an MP3 compressed audio file requires that the user consider the trade-off between compression performance and audio

quality. (Hacker, at p.161 ("The more you throw away, the worse your files will sound and the smaller your MP3 files will be. The more you keep, the better they'll sound and the larger the resulting files will be.").) Hacker explains that "[o]nly you can decide where on this spectrum you want to sit." (*Id.*)

156. For example, the user can specify a "samplerate" that measures how many times per second the audio signal is digitally represented by the final stream. (*Id.*, at p.163.) A lower sample rate, therefore, generally means a smaller file size but poorer audio quality. (*Id.*) For example, "[y]ou might want much smaller file sizes at the expense of fidelity when working with the spoken word—for encoding class lectures." (*Id.*) Hacker therefore discloses optimization according to an optimization scheme because, in compressing audio data into MP3 files, the user can decide how to balance audio quality and file size to achieve the optimum balance ("optimization scheme"). (*Id.*, at p. 2 ("The amount of data preserved is configurable by the person doing the compressing, so an optimal balance between file size and quality can be achieved.").)

157. This is consistent with the written description of the '956 patent, which explains that "[t]he server audio data optimization and compression element **1205**, utilizes a music compression algorithm outlined in FIG. 15, <u>which converts common music files into compressed files in order to reduce the audio clip size for</u>

minimizing its download time, while maintaining predetermined audio quality." ('956, 23:55-60 (underlining added).) The step of compressing the audio file based on a user-selected balance between file size and audio quality entails optimization "according to an optimization scheme," as recited in the claim.

158. Third, in a section entitled, "***Pre-encoding optimizations***," Hacker asks, "what can you do prior to encoding to optimize the quality of the final results?" (Hacker, at p.161 (bold italics in original; underlining added).) Hacker provides several answers, including "any necessary equalization, de-hissing, de-popping, and de-scratching." (*Id.*, at p. 162.) Also, "[y]ou can cut the silent bits off the beginning and end of your files, add effects, alter the levels, and more." (*Id.*) Any one of these processes would disclose the claimed optimization. In specifying what optimizations to perform on the audio data, *e.g.* equalization, de-hissing, altering levels, etc., optimization is performed according to an optimization scheme.

159. ***Rationale and Motivation to Combine***: It would have been obvious to a person of ordinary skill in the art to combine Rolf with Hacker, with no change in their respective functions. This would have predictably resulted in the system of Rolf in which MP3 files are created for storage on the central facility **14**, with an optimization being performed as part of the process of creating the MP3 file.

160. A person of ordinary skill in the art would have found the combination of these references straightforward for a simple reason – Rolf specifically discloses that audio files can be stored in MP3 compressed format. (Rolf, 5:35-39.) A person of ordinary skill in the art would have naturally consulted Hacker to provide further details into the very MP3 compression technique that Rolf uses for storage of compressed audio files.

161. Hacker provides several express motivations to combine by explaining that the optimizations discussed above are specifically designed to achieve an optimal balance between storage efficiency and audio quality. With respect to the psychoacoustic models, for example, Hacker explains that it can achieve more effective compression by eliminating audio frequencies that are not human perceptible. (Hacker, at p.26 ("Why store data that can't be heard?").) Similarly, Hacker explains that a user can achieve smaller file size by reducing the MP3 encoding samplerate. (*Id.*, at p.163.) A person of ordinary skill in the art implementing the system of Rolf would have appreciated that storage space and network bandwidth are finite resources, and thus, would have been motivated to optimize the digital files according to the optimization schemes discussed above to increase storage efficiency while maintaining good audio quality.

C. Alternative Ground Based on O'Hara, Tagg, and Pinard

162. In Part **V.B.1** above, I explained why the claims of the '956 patent are invalid based on the combinations with the primary reference Rolf, and I cited Frodigh for its disclosure of how to send digital information to a cell phone using OFDM. I have also been asked to opine on whether the claims of the '956 patent would have been obvious if I were to rely on O'Hara, Tagg and Pinard instead of Frodigh with respect to OFDM and the delivery of data over a cellular network. In my opinion, the claims would have been obvious to a person of ordinary skill in the art based on this alternative combination.

163. As I explained in **Part V.A.6** above, I have cited O'Hara, Tagg and Pinard for three straightforward propositions: that (1) prior art IEEE 802.11a wireless networking transmits digital information to mobile devices using OFDM (O'Hara), (2) IEEE 802.11 wireless networking functionality can be incorporated into a cell phone (Tagg), and (3) a "cellular network," as recited in the preamble of claim 1, can be built based on IEEE 802.11 wireless networking technology (Pinard).

164. With respect to the first proposition, O'Hara clearly confirms that at least the IEEE 802.11a variant of IEEE 802.11 uses OFDM to wirelessly transmit data. (O'Hara, at p.143 ("In July of 1998, the IEEE 802.11 Working Group

adopted OFDM modulation as the basis for IEEE 802.11a.”), *id.* at p. 139 (“The IEEE 802.11a PHY is one of the physical layer (PHY) extensions of IEEE 802.11a and is referred to as the orthogonal frequency division multiplexing (OFDM) PHY. The OFDM PHY provides the capability to transmit PSDU[9] frames at multiple data rates up to 54 Mbps for WLAN networks where transmission of multimedia content is a consideration.”).) O’Hara further teaches an 802.11a receiver that can be implemented in mobile devices to receive OFDM signals. (*Id.*, at p.144 (“At the receiver, the carrier is converted back to a multicarrier lower data rate form using an FFT. The lower data subcarriers are combined to form the high rate PPDU[10]. An example of an IEEE 802.11a OFDM PMD[11] is illustrated in Figure 7-2.”).) This is shown in Figure 7-2, reproduced in relevant part below.

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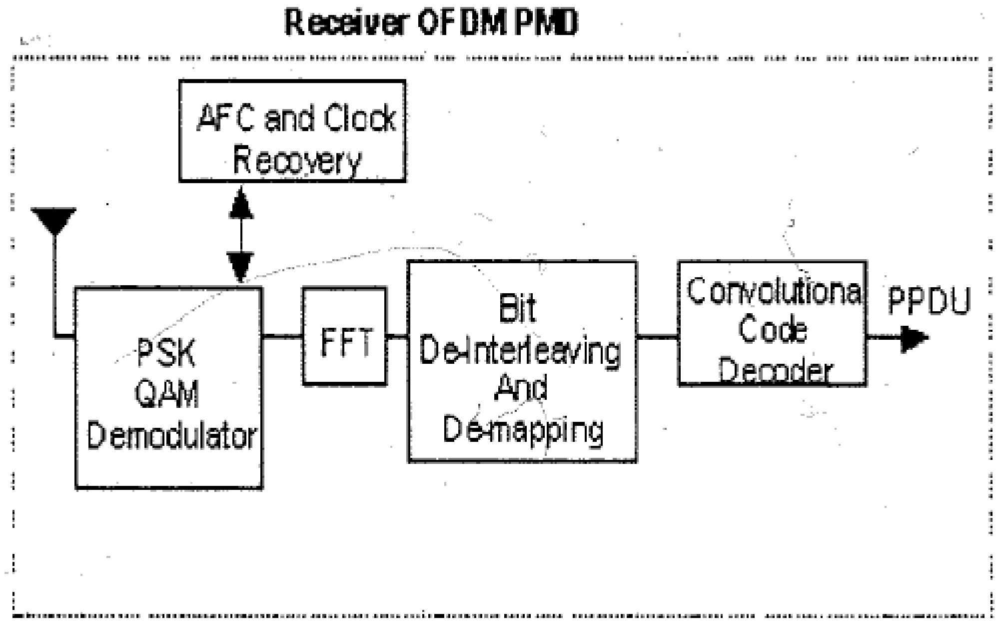
[9] The term “PSDU” refers to a PLCP data unit, a basic unit of data for transmission over an IEEE network. (O’Hara, at p.174 (explaining PSDU acronym), *id.* at p.141 (Fig. 7-1, showing OFDM header and PSDU).)

[10] The term “PPDU” refers to a PLCP protocol data unit, a unit of data that includes a preamble and header. (O’Hara, at p.174 (explaining PPDU acronym); *id.* at p.141 (Fig. 7-1, showing OFDM PPDU).)

[11] The term “PMD” refers to “Physical Medium Dependent,” which is a



(*Id.*, p. 175, Fig. 7-2.)[12]

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description of the details of transmission and reception of individual bits on a physical medium. (O'Hara, at p.174 (explaining PMD acronym).)

[12] O'Hara thus satisfies any requirement that the <u>receiver</u> be configured for receiving and processing files transmitted by OFDM modulation. Any requirement that the <u>digital signal processor</u> be configured for receiving and processing files transmitted by OFDM modulation would also have been obvious in view of Gatherer, as I explained in **Part V.B.1.b** above.

165. With respect to the second proposition, as I explained in detail in **Part V.A.6** above, Tagg discloses a cell phone that can send and receive data using IEEE 802.11. Figure 1 of Tagg provides a basic overview of the system:

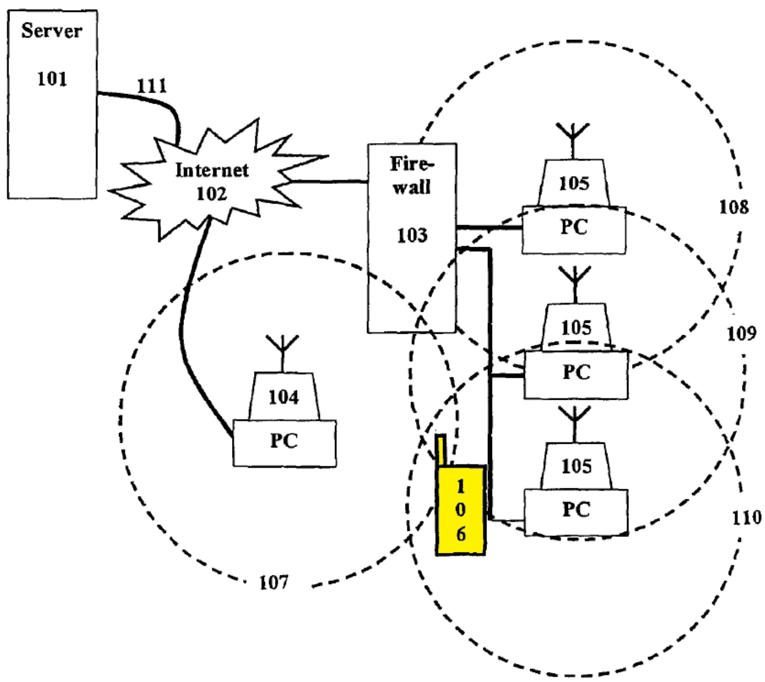

Fig. 1

(Tagg, Fig. 1.) Mobile roaming device **106**, shown highlighted in yellow, may be a "mobile computer, PDA, cellular telephone, or home appliance." (*Id.*, 8:53-66 (underlining added).) The circles shown in Figure 1 (**107-110**) show the range of wireless network access provided by fixed devices **104** and **105**. (*Id.*, 7:53-66.)

166. Tagg confirms that the mobile device **106** can switch between a number of available wireless technologies. As explained in Tagg, "[t]he mobile device determines the connection methodologies available to it and their relative

merits and then connects to the host using the best available standards." (*Id.*, 6:67-7:2.) An example of how this might work is illustrated in Figure 9:

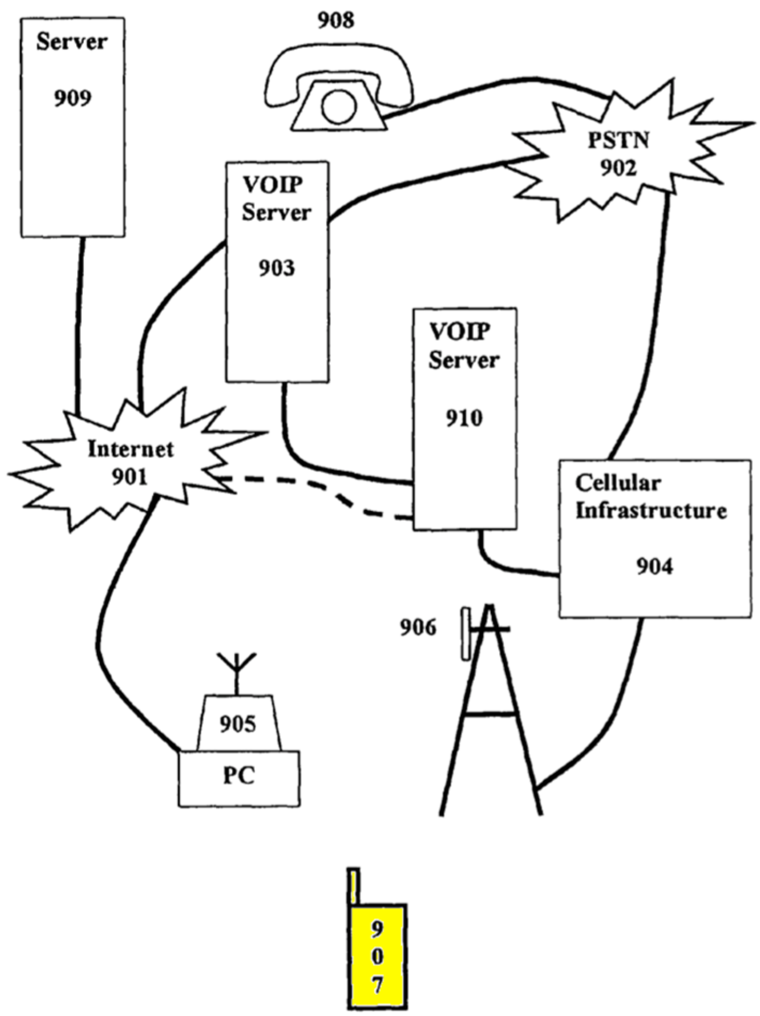

Fig. 9

167. Figure 9 above shows a cellular phone **907**, highlighted in yellow, and illustrates "the handoff between a fixed wireless, Internet based, VOW [voice over WLAN] system and a cellular system. A mobile user **907** is within range of two

methods for placing a call; a PC running our cooperative networking service and a cellular tower. The call might preferentially be placed to either unit based on the user[']s pre-set preferences or based on the current situation." (*Id.*, 11:60-66.) "In the case of connection made over the Internet voice packets are sent over the air using a wireless link such as Bluetooth or IEEE802.11 to the host **905**[.] These packets are routed thru [sic] the Internet **901** to a VOW server **903**. The VOW server converts IP packets to a form suitable for use over the PSTN and handles making and breaking the connection to users." (*Id.*, 11:67-12:6.)

168. Although the example above involves use of voice-over-IP (VOIP), Tagg makes clear that an IEEE 802.11 network can also be used to transmit digital data instead of voice. (*Id.*, 5:22, 5:27-29 ("The link can transport either data or voice. . . The software allows the user to access the Internet, send and receive e-mail and obtain high bandwidth services such as MP3 files and movies.").)

169. As I noted previously, the details of the handoff, and the Cooperative Tunneling Agent (CTA) software for evaluating available networks and performing a handoff from one wireless network to another, is not relevant to my analysis. The disclosures above simply confirm the more basic point that a cell phone can incorporate IEEE 802.11 wireless networking, and use that capability to receive data such as digital audio and/or visual files.

170. Finally, with respect to the third proposition, as I explained above in **Part V.A.6**, Pinard teaches that an IEEE 802.11 wireless network is a cellular network. I explained previously that the term "cellular network" simply refers to a network in which wireless communications are provided through a series of "cells," each cell providing network access for a particular geographic area. The term "cellular network" under its broadest reasonable construction, therefore, is not limited to a particular type of wireless networking technology, or technology that provides the same type of wireless range as a commercial cellular carrier.

171. In this regard, I have cited **Pinard** for the simple proposition that a "cellular network" can be built based on IEEE 802.11 wireless technology. Pinard states that it "relates generally to preemptive roaming among cells in a cellular network. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points." (Pinard, 1:21-24.)

172. More specifically, Pinard discloses a technique for improving the way in which a mobile unit selects the access point with which it will associate. (*Id.*, 2:16-22.) "Each mobile unit may select a group of eligible access points and select the most eligible access point from that group." (*Id.*, 2:45-47.) The selection may be based on the signal strength of the access points and the number of mobile units

connected to each access point (the "loading factor"). (*Id.*, 2:30-50.) Pinard expressly confirms that "[t]he cellular communications network may comprise a 1 Mbps frequency-hopping spread spectrum wireless LAN conforming to the IEEE 802.11 draft specification." (*Id.*, 2:50-53 (underlining added).) Pinard therefore confirms that a "cellular network" can be built from IEEE 802.11 access points.

173. As noted previously, Pinard refers to the "IEEE 802.11 draft specification" because as of the filing of Pinard in 1995, IEEE 802.11 was still in draft form. It is common for persons of ordinary skill in the art to describe implementations using then-available "draft" standards, with the understanding that the final standard will be used when it becomes available. Accordingly, a person of ordinary skill in the art by June 2001 would have understood the reference to IEEE 802.11 in Pinard to include at least the full range of IEEE 802.11 technologies available by the time the standard was published by 2001, including IEEE 802.11a and its higher bit rates.

174. ***Rationale and Motivation to Combine:*** It would have been obvious to a person of ordinary skill in the art to combine Rolf with O'Hara and Tagg, predictably resulting in a cell phone **12** of Rolf configured to receive and process music files in which the files are transmitted to the cell phone by use of IEEE 802.11a networking, thus using OFDM modulation. Moreover, to the extent the

claim requires that the transmission using OFDM occur "over a cellular network," as recited in the preamble, it would have been obvious to further combine with Pinard, predictably resulting in transmission over an IEEE 802.11a cellular network. As noted previously, Pinard expressly confirms that a "cellular communications network" can be built from IEEE 802.11 access points. And Tagg, as noted, specifically discloses the ability to incorporate IEEE 802.11 wireless networking technology into a cell phone, and discloses two basic and fundamental reasons why such a combination would be desirable: (a) speed and (b) cost.

175. **<u>Speed</u>**: It was well-known to persons of ordinary skill in the art in June 2001 that IEEE 802.11 wireless networks were capable of much greater network performance than existing cellular data networks provided by traditional carriers (e.g., AT&T). For example, Tagg describes a scenario in which a user switches to a traditional cellular data connection, causing performance to drop to just 9.6 kilobits per second (Kbps). (Tagg, 11:24-28.) But O'Hara confirms that IEEE 802.11a (using OFDM[13]) could transmit digital multimedia content at up to

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[13] One of ordinary skill in the art would have also appreciated that the use of OFDM offers the advantages explained in Frodigh and discussed above, including reduced intersymbol interference. (*See* O'Hara, at p.143 ("The basic principal of

54 megabits per second (54 Mbps), which is more than 5000 times faster than the 9.6 Kbps data rate reported in Tagg. (O'Hara, at p.139 ("The OFDM PHY provides the capability to transmit PSDU frames at multiple data rates up to 54 Mbps for WLAN networks where transmission of multimedia content is a consideration.").) It is therefore no surprise that O'Hara suggests use of short-range wireless networks, such as IEEE 802.11, to allow mobile users to take advantage of "high bandwidth services" such as "MP3 files" (Tagg, 5:27-29), precisely the use case contemplated in Rolf. Accordingly, a person of ordinary skill in the art would have been amply motivated to incorporate IEEE 802.11 wireless networking into a cell phone (as disclosed in Tagg) to achieve the dramatically improved network performance for multimedia content (as disclosed in O'Hara), which could have reduced download times for selected MP3 files and significantly improved user experience.

176. **Cost**: It was also well-known to persons of ordinary skill in the art that cellular data services provided by traditional carriers (e.g., AT&T) in June 2001 could be costly, with users potentially having to pay based on the amount of

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operation first divides a high-speed binary signal to be transmitted into a number of lower data rate subcarriers. . . . Intersymbol interference is generally not a concern for lower speed carrier, ...").)

time or amount of bandwidth consumed. Tagg makes clear that these types of cellular connection charges can be dramatically reduced by allowing the cell phone to switch a short-range wireless network such as IEEE 802.11. For example, Tagg explains that "[a] cell phone located within 100 feet of a fixed host device can connect to the Internet through that device, obtaining phone calls at a fraction of the cost of a regular cellular connection." (*Id.*, 5:31-33; *see also id.*, 5:64-66 ("Our technology sits between the user and the Internet constantly negotiating the most cost effective means by which they can gain access.").) A person of ordinary skill in the art would have understood that the same rationale for voice telephone calls would also apply to data transmissions, such as downloads of MP3 files from a server.

177. The dual motivations – speed and cost – are also interrelated. Because of the more limited bandwidth of a traditional cellular data connection as compared to IEEE 802.11, the time it would take to download MP3 files over a traditional cellular data connection could be considerable, resulting in even higher connection time charges and an even greater cost disparity. A person of ordinary skill in the art would have been motivated to incorporate IEEE 802.11 into the cell phone **12** of Rolf to obtain these performance and cost benefits. Moreover, a person of ordinary skill in the art would have been motivated to build an IEEE

802.11-compliant cellular network because she would have appreciated that using multiple access points to provide wireless communication for a series of "cells" (as opposed to a single access point) enables wider geographical coverage. The benefit of expanded coverage, in turn, allows the benefits of speed and cost to be enjoyed by more users, more of the time.

178. Tagg does not explicitly disclose that the IEEE 802.11 wireless network uses OFDM, but it was well-known and understood that IEEE 802.11**a**, one of the two variants of IEEE 802.11 introduced in the late 1990s, used OFDM. This point was expressly confirmed by O'Hara.

179. It would therefore have been obvious to a person of ordinary skill in the art to incorporate IEEE 802.11a wireless networking into the cell phones of Tagg and Rolf, predictably resulting in those devices receiving compressed digital audio and/or visual files using OFDM. Although Tagg does not disclose any particular variant of IEEE 802.11 (it simply refers to "802.11" without any "a" or "b" suffix), a person of ordinary skill in the art would have readily understood that IEEE 802.11a was one of a finite number of potential variants of IEEE 802.11. Nothing in Tagg limits IEEE 802.11 to one particular variant or would otherwise prevent the use of IEEE 802.11a.

180. Moreover, a person of ordinary skill in the art would have appreciated that because IEEE 802.11a enabled data rates of up to 54 Mbps (compared to 1Mbps and 2Mbps for the original IEEE 802.11-1997,[14] or 11 Mbps for IEEE 802.11b), the 802.11a variant would have provided enormous advantages in terms of speed, which I explained at length above. (*See* O'Hara, at p.139 ("In October 1997 the IEEE 802 Executive Committee approved two projects to for higher rate physical layer (PHY) extensions to IEEE 802.11. The first extension, IEEE 802.**11a**, defines requirements for a PHY operating in the 5.0 GHz U-NII frequency and data rates ranging from 6 Mbps to 5,4 Mbps. The second extension, IEEE 802.**11b**, defines a set of PHY specifications operating in the 2.4 GHz ISM frequency band up to 11 Mbps.").) Finally, by September 2000, inexpensive chipsets for implementing IEEE 802.11a were already commercially available and designed for incorporation into existing IEEE 802.11 products. (Bryan E. Braswell, *Modeling Data Rate Agility in the IEEE 802.11a Wireless Local Area Networking Protocol*, Ex. 1064, at pp.8-9.)

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[14] In addition to 802.11a and 802.11b, the original 802.11-1997 defined two variants of the IEEE 802.11 standard, one having a data rate of 1 Mbps and one having a data rate of 2 Mbps.

VI. ENABLEMENT OF THE PRIOR ART

181. I am informed that in an *inter partes* review, the petitioning party does not have a burden to show that the prior art is enabling. Nevertheless, in my opinion, the Rolf, Forta, Gould, Gatherer, Frodigh, Hacker, O'Hara, Tagg and Pinard references provide sufficient detail to enable a person of ordinary skill in the art to practice the limitations of the claims to which they apply without undue experimentation. To begin with, I am informed that, for purposes of assessing the prior art, the disclosures in issued U.S. patents (such as Rolf, Frodigh, Tagg and Pinard) are presumed enabling, and that this presumption extends to claimed and unclaimed material.

182. Nevertheless, the disclosures in these references are enabling regardless of whether they are issued patents. As I have explained in **Part III** above, the technological underpinnings of the challenged '956 patent claims were firmly in place well before June 2001. Cell phones with digital signal processors were well-known and in use by millions of users. (Gatherer, Ex. 1005, at p.89.) The '956 patent itself acknowledges that "[t]he cellular telephone **202** may be any commercially available cellular phone." ('956, 14:34-35.) As I discussed above, commercially available cell phones were also capable of accessing the Internet and downloading digital content. In fact, by June 2001, there existed industry

standards for providing websites to cell phones (e.g., WAP), and well-known companies such as Amazon and Yahoo! were specifically designing their websites to be accessible to cell phones. (Forta, Ex. 1004, at pp.314-18.)

183. Orthogonal frequency-division multiplexing (OFDM) was also a well-known transmission technology. (*See* **Part III.E**.) As I explained in **Part III.E** above, the use of OFDM in cellular systems was well known before 2001. Indeed, as I noted, telecom heavyweights such as Ericsson and Nokia were developing technologies and systems for using OFDM in cellular networks.

184. Rolf, Forta, Gould, Frodigh, Gatherer, and Hacker all pre-date the ’956 patent, and those references themselves treat cell phones, digital signal processors, Web content, and OFDM as firmly in the prior art. As I explained above, a person of ordinary skill in the art would have been motivated to combine their teachings and could have done so, due maturity of those technologies. Additionally, IEEE 802.11 wireless networking described in O’Hara, Tagg and Pinard was well-known and well-documented by the late 1990s, and by June 2001, a person of ordinary skill in the art would have been able to implement an IEEE 802.11-compliant network without undue experimentation. (O’Hara, at p.viii (“By the time you read this, you will be able to purchase an IEEE 802.11-compliant, 11

Mbps consumer WLAN adapter for $99 or less.”).) Pinard confirms, in fact, that IEEE 802.11 was available in draft form no later than 1995. (Pinard, 2:50-53.)

185. The ability to add media selection, download, and playback to commercially available cell phones was also known. This is confirmed by Rolf, which predates the earliest possible priority date of the ’956 patent by more than six months and claims priority to the Rolf Provisional, which in turn predates the ’956 by more than a year and a half. Rolf describes in detail a system enabling a cell phone user to wirelessly select, download, and play music, using standard equipment. (E.g., Rolf, Abstract, 1:25-42.) In my opinion, the system described in Rolf could have been implemented using well-known hardware, networking, and software techniques familiar to persons of ordinary skill in the art.

186. In short, by June 2001, each aspect of the disclosures that I have cited from Rolf, Forta, Gould, Frodigh, Gatherer, Hacker, O’Hara, Tagg and Pinard was already well-known and was the subject of extensive public documentation. A person of ordinary skill in the art would not have required disclosures any more detailed than the disclosures in the prior art to apply the prior art teachings in the manner described in this Declaration.

VII. Conclusion

187. In signing this Declaration, I recognize that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in this proceeding. If required, I will appear for cross-examination at the appropriate time. I reserve the right to offer opinions relevant to the invalidity of the '956 patent claims at issue and/or offer testimony in support of this Declaration.

188. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

Dated: January 10, 2017

Respectfully submitted,

Tal Lavian
1/10/2017

Tal Lavian, Ph.D.
Sunnyvale, California

EXHIBIT A

Tal Lavian, Ph.D.

http://telecommnet.com
http://cs.berkeley.edu/~tlavian
tlavian@telecommnet.com

1640 Mariani Dr.
Sunnyvale, CA 94087
(408)-209-9112

Research and Consulting:Telecommunications,Network Communications, and Mobile Wireless Technologies

Scientist, educator, and technologist with over 25years of experience; co-author on over 25 scientific publications, journal articles, and peer-reviewed papers; named inventor on over 100 issued and filed patents; industry fellow and lecturer at UC Berkeley Engineering–Center for Entrepreneurship and Technology (CET)

EDUCATION

- **Ph.D.**, Computer Science specializing in networking and communications, UC Berkeley
- **M.Sc.**, Electrical Engineering, Tel Aviv University
- **B.Sc.**, Mathematics and Computer Science, Tel Aviv University

EXPERTISE

Network communications, telecommunications, Internet protocols, and mobile wireless:

- **Communication networks:** Internet protocols; TCP/IP suite; TCP; UDP; IP; VoIP; Ethernet; network protocols; network software applications; data link, network, and transport layers (L2, L3, L4)
- **Internet software:** Internet software applications; distributed computing; cloud computing; Web applications; FTP; HTTP; Java; client server; file transfer; multicast; streaming media
- **Routing/switching:** LAN; WAN; VPN; routing protocols; RIP; BGP; MPLS; OSPF; IS-IS; DNS; QoS; switching; packet switching; network infrastructure; network communication architectures
- **Mobile wireless:** wireless LAN; 802.11; cellular systems; mobile devices; smartphone technologies

ACCOMPLISHMENTS

- Selected as principal investigator for three US Department of Defense (DARPA) projects
- Directed research project on networking computation for the US Air Force Research Lab (AFRL)
- Led and developed the first network resourcescheduling service for grid computing
- Administered wireless research project for an undisclosed US federal agency
- Managed and engineered the first demonstrated transatlantic dynamic allocation of 10Gbs Lambdas as a grid service
- Spearheaded the development of the first demonstrated wire-speed active network on commercial hardware
- Invented over 100 patents; over 50 prosecuted *pro se* in front of the USPTO
- Created and chaired Nortel Networks' EDN Patent Committee

PROFESSIONAL EXPERIENCE

University of California, Berkeley, Berkeley, California 2000-Present
Berkeley Industry Fellow, Lecturer, Visiting Scientist, Ph.D. Candidate, Nortel's Scientist Liaison
Some positions and projects were concurrent, others sequential

- Serves as an industry fellow and lecturer at the Center for Entrepreneurship and Technology (CET).
- Studied network services, telecommunication systems and software, communications infrastructure, and data centers
- Developed long-term technology for the enterprise market, integrating communication and computing technologies
- Conducted research projects in data centers (RAD Labs), telecommunication infrastructure (SAHARA), and wireless systems (ICEBERG)
- Acted as scientific liaison between Nortel Research Lab and UC Berkeley, providing tangible value in advanced technologies
- Earned a Ph.D. in Computer Science with a specialization in communications and networking

TelecommNet Consulting, Inc.(Innovations-IP) Sunnyvale, California 2006-Present
Principal Scientist

- Consults in the areas of network communications, telecommunications, Internet protocols, and smartphone mobile wireless devices
- Provides architecture and system consultation for projects relating to computer networks, mobile wireless devices, and Internet web technologies
- Acts as an expert witness in network communications patent infringement lawsuits

VisuMenu, Inc., Sunnyvale, California 2010-Present
Co- Founder and Chief Technology Officer (CTO)

- Designs and develops architecture and system of visual IVR technologies for smartphones and wireless mobile devices in the area of network communications
- Designs crawler/spider system for IVR / PBX using Asterisk, SIP, and VoIP
- Deploys the system as cloud networking and cloud computing utilizing Amazon Web Services

Ixia, Santa Clara, California 2008 - 2008
Communications Consultant

- Researched and developed advanced network communications testing technologies:
  • IxNetwork/IxN2X — tested IP routing and switching devices and broadband access equipment. Provided traffic generation and emulation for the full range of protocols: routing, MPLS, layer 2/3 VPNs, carrier Ethernet, broadband access, and data center bridging
  • IxLoad — quickly and accurately modeled high-volume video, data, and voice subscribers and servers to test real-world performance of multiservice delivery and security platforms
  • IxCatapult — emulated a broad range of wireless access and core protocols to test wireless components and systems that, when combined with IxLoad, provides an end-to-end solution for testing wireless service quality
  • IxVeriWave — employed a client-centric model to test Wi-Fi and wireless LAN networks by generating repeatable large-scale, real-world test scenarios that are virtually impossible to create by any other means

• Test automation — provided simple, comprehensive lab automation to help test engineering teams create, organize, catalog, and schedule execution of tests

Nortel Networks, Santa Clara, California 1996 - 2007
Originally employed by Bay Networks, which was acquired by Nortel Networks
Principal Scientist, Principal Architect, Principal Engineer, Senior Software Engineer

- Held scientific and research roles at Nortel Labs, Bay Architecture Labs, and in the office of the CTO

Principal Investigator for US Department of Defense (DARPA) Projects

- Conceived, proposed, and completed three research projects: active networks, DWDM-RAM, and a networking computation project for Air Force Research Lab (AFRL)
- Led a wireless research project for an undisclosed US federal agency

Academic and Industrial Researcher

- Analyzed new technologies to reduce risks associated with R&D investment
- Spearheaded research collaboration with leading universities and professors at UC Berkeley, Northwestern University, University of Amsterdam, and University of Technology, Sydney
- Evaluated competitive products relative to Nortel's products and technology
- Proactively identified prospective business ideas, which led to new networking products
- Predicted technological trends through researching the technological horizon and academic sphere
- Designed software for switches, routers, and network communications devices
- Developed systems and architectures for switches, routers, and network management
- Researched and developed the following projects:
  - Data-Center Communications: network and server orchestration 2006-2007
  - DRAC: SOA-facilitated L1/L2/L3 network dynamic controller 2003-2007
  - Omega: classified wireless project for undisclosed US Federal Agency 2006-2006
  - Open platform: project for the US Air Force Research Laboratory (AFRL) 2005-2005
  - Network resource orchestration for Web services workflows 2004-2005
  - Proxy study between Web/grids services and network services 2004-2004
  - Streaming content replication: real-time A/V media multicast at edge 2003-2004
  - DWDM-RAM: US DARPA-funded program on agile optical transport 2003-2004
  - Packet capturing and forwarding service on IP and Ethernet traffic 2002-2003
  - CO2: content-aware agile networking 2001-2003
  - Active networks: US DARPA-funded research program 1999-2002
  - ORE: programmable network service platform 1998-2002
  - JVM platform: Java on network devices 1998-2001
  - Web-based device management: network device management 1996-1997

Technology Innovator and Patent Leader

- Created and chaired Nortel Networks' EDN Patent Committee
- Facilitated continuous stream of innovative ideas and their conversion into intellectual property rights
- Developed intellectual property assets through invention and analysis of existing technology portfolios

Aptel Communications, Netanya, Israel 1994-1995

Software Engineer, Team Leader

Start-up company focused on mobile wireless CDMA spread spectrum PCN/PCS

- Developed a mobile wireless device using an unlicensed band [Direct Sequence Spread Spectrum (DSSS)]
- Designed and managed a personal communication network (PCN) and personal communication system (PCS), which are the precursors of short text messages (SMS)
- Designed and developed network communications software products (mainly in C/C++)
- Brought a two-way paging product from concept to development

Scitex Ltd.,Herzeliya, Israel 1990-1993

Software Engineer, Team Leader

Software and hardware company acquired by Hewlett Packard (HP)

- Developed system and network communications (mainly in C/C++)
- Invented Parallel SIMD Architecture
- Participated in the Technology Innovation group

Shalev, Ramat-HaSharon, Israel 1987-1990

Start-up company

Software Engineer

- Developed real-time software and algorithms (mainly in C/C++ and Pascal)

PROFESSIONAL ASSOCIATIONS

- IEEE senior member
- IEEE CNSV co-chair, Intellectual Property SIG (2013)
- President Next Step Toastmasters (an advanced TM club in the Silicon Valley) (2013-2014)
- Technical co-chair, IEEE Hot Interconnects 2005 at Stanford University
- Member, IEEE Communications Society (COMMSOC)
- Member, IEEE Computer Society
- Member, IEEE Systems, Man, and Cybernetics Society
- Member, IEEE-USA Intellectual Property Committee
- Member, ACM, ACM Special Interest Group on Data Communication (SIGCOM)
- Member, ACM Special Interest Group on Hypertext, Hypermedia, and Web (SIGWEB)
- Member, IEEE Consultants' Network (CNSV)
- Global Member, Internet Society (ISOC)
- President Java Users Group – Silicon Valley Mountain View, CA,1999-2000
- Toastmasters International

ADVISORY BOARDS

- Quixey –search engine for wireless mobile apps
- Mytopia – mobile social games
- iLeverage – Israeli Innovations

PROFESSIONAL AWARDS

- Top Talent Award – Nortel
- Top Inventors Award – Nortel EDN
- Certified IEEE-WCET - Wireless Communications Engineering Technologies
- Toastmasters International - Competent Communicator (twice)
- Toastmasters International - Advanced Communicator Bronze

Patents and Publications

(Not an exhaustive list)

Patents Issued

US 9,184,989	Grid proxy architecture for network resources	Link
US 9,083,728	Systems and methods to support sharing and exchanging in a network	Link
US 9,021,130	Photonic line sharing for high-speed routers	Link
US 9,001,819	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,949,846	Time-value curves to provide dynamic QoS for time sensitive file transfers	Link
US 8,929,517	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,903,073	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,898,274	Grid proxy architecture for network resources	Link
US 8,880,120	Device and method for providing enhanced telephony	Link
US 8,879,703	System method and device for providing tailored services when call is on-hold	Link
US 8,879,698	Device and method for providing enhanced telephony	Link
US 8,867,708	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,787,536	Systems and methods for communicating with an interactive voice response system	Link
US 8,782,230	Method and apparatus for using a command design pattern to access and configure network elements	Link
US 8,762,963	Translation of programming code	Link
US 8,762,962	Methods and apparatus for automatic translation of a computer program language code	Link
US 8,745,573	Platform-independent application development framework	Link
US 8,731,148	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,688,796	Rating system for determining whether to accept or reject objection raised by user in social network	Link
US 8,619,793	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link
US 8,572,303	Portable universal communication device	Link
US 8,553,859	Device and method for providing enhanced telephony	Link

US 8,548,131	Systems and methods for communicating with an interactive voice response system	Link
US 8,537,989	Device and method for providing enhanced telephony	Link
US 8,341,257	Grid proxy architecture for network resources	Link
US 8,161,139	Method and apparatus for intelligent management of a network element	Link
US 8,146,090	Time-value curves to provide dynamic QoS for time sensitive file transfer	Link
US 8,078,708	Grid proxy architecture for network resources	Link
US 7,944,827	Content-aware dynamic network resource allocation	Link
US 7,860,999	Distributed computation in network devices	Link
US 7,734,748	Method and apparatus for intelligent management of a network element	Link
US 7,710,871	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link
US 7,580,349	Content-aware dynamic network resource allocation	Link
US 7,433,941	Method and apparatus for accessing network information on a network device	Link
US 7,359,993	Method and apparatus for interfacing external resources with a network element	Link
US 7,313,608	Method and apparatus for using documents written in a markup language to access and configure network elements	Link
US 7,260,621	Object-oriented network management interface	Link
US 7,237,012	Method and apparatus for classifying Java remote method invocation transport traffic	Link
US 7,127,526	Method and apparatus for dynamically loading and managing software services on a network device	Link
US 7,047,536	Method and apparatus for classifying remote procedure call transport traffic	Link
US 7,039,724	Programmable command-line interface API for managing operation of a network device	Link
US 6,976,054	Method and system for accessing low-level resources in a network device	Link
US 6,970,943	Routing architecture including a compute plane configured for high-speed processing of packets to provide application layer support	Link
US 6,950,932	Security association mediator for Java-enabled devices	Link
US 6,850,989	Method and apparatus for automatically configuring a network switch	Link

US 6,845,397	Interface method and system for accessing inner layers of a network protocol	Link
US 6,842,781	Download and processing of a network management application on a network device	Link
US 6,772,205	Executing applications on a target network device using a proxy network device	Link
US 6,564,325	Method of and apparatus for providing multi-level security access to system	Link
US 6,175,868	Method and apparatus for automatically configuring a network switch	Link
US 6,170,015	Network apparatus with Java co-processor	Link
US 8,687,777	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,681,951	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,625,756	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,594,280	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,548,135	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,406,388	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,345,835	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,223,931	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,160,215	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,155,280	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,054,952	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,000,454	Systems and methods for visual presentation and selection of IVR menu	Link
EP 1,905,211	Technique for authenticating network users	Link
EP 1,142,213	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link
EP 1,671,460	Method and apparatus for scheduling resources on a switched underlay network	Link
CA 2,358,525	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link

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(Not an exhaustive list)

US 20150058490	Grid Proxy Architecture for Network Resources	Link
US 20150010136	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20140379784	Method and Apparatus for Using a Command Design Pattern to Access and Configure Network Elements	Link
US 20140105025	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20140105012	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20140012991	Grid Proxy Architecture for Network Resources	Link
US 20130080898	Systems and Methods for Electronic Communications	Link
US 20130022191	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20130022183	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20130022181	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20120180059	Time-Value Curves to Provide Dynamic QOS for Time Sensitive File Transfers	Link
US 20120063574	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20110225330	Portable Universal Communication Device	Link
US 20100220616	Optimizing Network Connections	Link
US 20100217854	Method and Apparatus for Intelligent Management of a Network Element	Link
US 20100146492	Translation of Programming Code	Link
US 20100146112	Efficient Communication Techniques	Link
US 20100146111	Efficient Communication in a Network	Link
US 20090313613	Methods and Apparatus for Automatic Translation of a Computer Program Language Code	Link
US 20090313004	Platform-Independent Application Development Framework	Link
US 20090279562	Content-aware dynamic network resource allocation	Link
US 20080040630	Time-Value Curves to Provide Dynamic QoS for Time Sensitive File	Link

	Transfers	
US 20070169171	Technique for authenticating network users	Link
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US 20060075042	Extensible Resource Messaging Between User Applications and Network Elements in a Communication Network	Link
US 20050083960	Method and Apparatus for Transporting Parcels of Data Using Network Elements with Network Element Storage	Link
US 20050076339	Method and Apparatus for Automated Negotiation for Resources on a Switched Underlay Network	Link
US 20050076336	Method and Apparatus for Scheduling Resources on a Switched Underlay Network	Link
US 20050076173	Method And Apparatus for Preconditioning Data to Be Transferred on a Switched Underlay Network	Link
US 20050076099	Method and Apparatus for Live Streaming Media Replication in a Communication Network	Link
US 20050074529	Method and apparatus for transporting visualization information on a switched underlay network	Link
US 20040076161	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20020021701	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
WO 2006/063052	Method and apparatus for network immunization	Link
WO 2007/008976	Technique for authenticating network users	Link
WO2000/0054460	Method and apparatus for accessing network information on a network device	Link
US 20140156556	Time-variant rating system and method thereof	Link
US 20140156758	Reliable rating system and method thereof	Link

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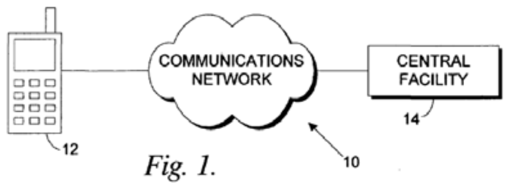
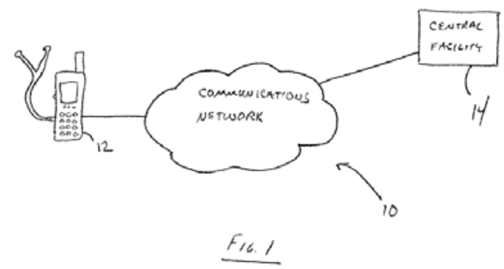
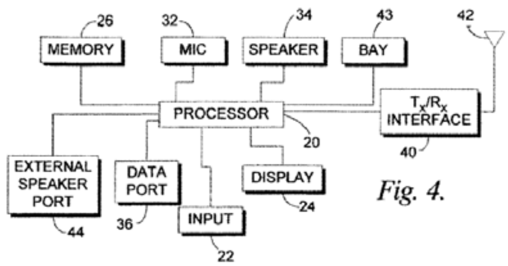
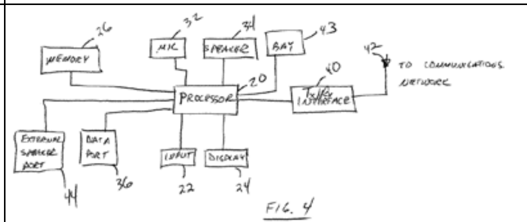
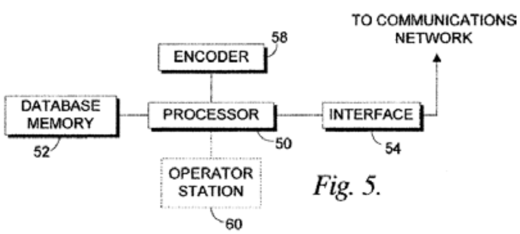
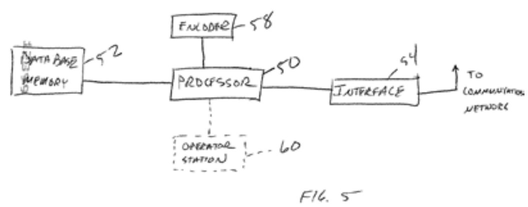
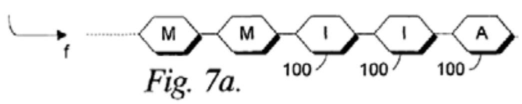
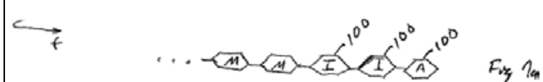
- Lambda Data Grid: An Agile Optical Platform for Grid Computing and Data-intensive Applications.
- Web Services and OGSA
- WINER Workflow Integrated Network Resource Orchestration.
- Technology & Society
- Abundant Bandwidth and how it affects us?
- Active Content Networking(ACN)
- DWDM-RAM:Enabling Grid Services with Dynamic Optical Networks
- Application-engaged Dynamic Orchestration of Optical Network Resources
- A Platform for Data Intensive Services Enabled by Next Generation Dynamic Optical Networks
- Optical Networks
- Grid Optical Network Service Architecture for Data Intensive Applications
- Optical Networking & DWDM
- OptiCal Inc.
- OptiCal & LUMOS Networks
- Optical Networking Services
- Business Models for Dynamically Provisioned Optical Networks
- Business Model Concepts for Dynamically Provisioned Optical Networks
- Optical Networks Infrastructure
- Research Challenges in agile optical networks
- Services and Applications' infrastructure for agile optical networks
- Impact on Society
- TeraGrid Communication and Computation
- Unified Device Management via Java-enabled Network Devices
- Active Network Node in Silicon-Based L3 Gigabit Routing Switch
- Active Nets Technology Transfer through High-Performance Network Devices
- Programmable Network Node: Applications
- Open Innovation via Java-enabled Network Devices
- Practical Considerations for Deploying a Java Active Networking Platform
- Open Java-Based Intelligent Agent Architecture for Adaptive Networking Devices

- Java SNMP Oplet
- Open Distributed Networking Intelligence: A New Java Paradigm
- Open Programmability
- Active Networking On A Programmable Networking Platform
- Open Networking through Programmability
- Open Programmable Architecture for Java-enabled Network Devices
- Integrating Active Networking and Commercial-Grade Routing Platforms
- Programmable Network Devices
- To be smart or not to be?

EXHIBIT B

EXHIBIT B

Cite	Rolf	Rolf Provisional
Fig. 1		
Fig. 4		
Fig. 5		
Fig. 7a		
1:17-21	"The present invention is generally directed to a system and method for wirelessly transmitting encoded music, via a wireless communications link, to a portable or mobile communications device which includes a player for playing the music or audio."	"The present invention is generally directed to a system and method for wirelessly transmitting encoded music, via a wireless communications link, to a portable or mobile communications device which includes a player for playing the music or audio." P. 1
1:25-38	"In one embodiment, the present invention is a system for transmitting encoded music from a remote, central facility to a wireless communications device, such as a cellular telephone or personal	"In one embodiment, the present invention is a system for transmitting encoded music from a remote, central facility to a wireless communications device, such as a cellular telephone or personal

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	digital assistant. In particular, a user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone. In particular, the selected music recording(s) is/are transmitted via a wireless data communications link to the cellular telephone. Preferably, the music recordings are encoded and transmitted in packets, and may particularly be encoded by a compression algorithm into an encoded (such as MP3 or other) format.”	digital assistant. In particular, a user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone. In particular, the selected music recording(s) is/are transmitted via a wireless data communications link to the cellular telephone. Preferably, the music recordings are encoded and transmitted in packets, and may particularly be encoded by a compression algorithm into an encoded (such as MP3 or other) format.” P. 1
1:39-42	“Using an input of the cellular telephone, a user may select one or more recordings for transmission to the cellular telephone. The selected music recordings, upon receipt by the cellular telephone, are stored in a memory.”	“Using an input of the cellular telephone, a user may select one or more recordings for transmission to the cellular telephone. The selected music recordings, upon receipt by the cellular telephone, are stored in a memory.” P. 1
1:64-67	“Additionally, the wireless communications device is preferably a cellular communications device and, in particular, is a cellular voice communications device, such as a cellular telephone.”	“Additionally, the wireless communications device is preferably a cellular communications device and, in particular, is a cellular voice communications device, such as a cellular telephone.” P. 2
2:1-6	“In accordance with yet an additional aspect of the present invention, the wireless	“In accordance with yet an additional aspect of the present invention, the wireless

Cite	Rolf	Rolf Provisional
	communications device of the present invention (whether it be handheld or installed within a vehicle) retrieves recorded music from a personal storage unit of the user."	communications device of the present invention (whether it be handheld or installed within a vehicle) retrieves recorded music from a personal storage unit of the user." P. 2
2:52-57	"It should be understood that the transmittal of the recording to the personal storage account may embody transmitting only a portion of the recording, such as the title and memory (e.g., address) storage location of the recording, such that the personal storage account serves as a directory or index for retrieval of acquired or accumulated recordings."	"In accordance with an additional aspect of the present invention, information pertaining to the music recording, such as the artist, title of the recording, an album from which the recording came, the date of the recording, etc. is also transmitted with the recorded music, such that the informational data is displayed on a display of, or associated with, the wireless communications device when the particular recording is being played. Additionally, it is an aspect of the present invention that an identifier, such as a server address, associated with the remote central facility is encoded along with the transmitted data, such that a selected input on (or associated with) the wireless communications device may be pressed for automatically reconnecting with the central facility or personal storage unit." PP. 3-4 "In accordance with an aspect of the invention, information relating to a music recording is preferably transmitted along with music recording data for storage in memory 26. For example, data

Cite	Rolf	Rolf Provisional
		indicative of the artist, the title of the recording, the album or CD from which the recording came, the recording label, the date of the recording, or any other desired information may be stored along with the recording at storage facility 14, and transmitted for storage in memory 26. Preferably, the informational data is stored as a header (e.g., in one or more integrally transmitted data packets) (See Fig. 1), such that processor 20 outputs the information to display 24." P. 22
2:62-67	"Upon access to the personal storage account by the account holder (via a communications device), and after entry of any required passwords, the user may select one or more recordings for streaming or download, whereupon the recording(s) will be retrieved."	"A plurality of recordings may be stored in the personal storage unit. The personal storage unit is accessible via a wireless communications link from the wireless communications device, to thereby enable the retrieval of selected music from the user's own storage facility. Additionally, such a system permits the user to easily mix recordings from a number of different recordings from his or her own storage unit." PP. 2-3 "In accordance with one aspect of the invention, personal storage unit 16 may also be a memory storage location at the central facility 14, or other remote site. In this way, a user of device 12 may have a personal account for storing pure based recordings, such that the account (e.g., personal storage unit

Cite	Rolf	Rolf Provisional
		16) is accessible via device 12 and other devices (such as a personal computer).” P. 16 “In accordance with yet an additional object of the present invention, the music recordings transmitted to the wireless communications device from the central storage facility, or from the personal storage unit of the user, may be transmitted in a real, or substantially real, time basis. In other words, rather than downloading one or more recordings to a memory within the wireless communications device, encoded music may be streamed directly from its source, for input into a buffer within the communications device, and for play at the communications device, without being otherwise stored in the device. In other words, the music is played as it is streamed from the central storage facility or personal storage unit of the user.” P. 4 “In making the purchase, the user may select whether to have the sound recording or its associated album downloaded to the wireless communications device (if memory space permits), or to a remote personal storage unit or account of the user, or to have the sound recording or album stored on a

Cite	Rolf	Rolf Provisional
		storage medium and transmitted to an address of the user by mail or courier." PP. 5-6 "In summary, the wireless communications device may be used to download selected, encoded music recordings and played via the vehicle speakers., or to stream a real time encoded broadcast." P. 25
3:11-12	"Additionally, it is an aspect of the present invention that an identifier, such as a server address, associated with the remote central facility is encoded along with the transmitted data..."	"Additionally, it is an aspect of the present invention that an identifier, such as a server address, associated with the remote central facility is encoded along with the transmitted data..." P. 4
3:17-21	"In preferred embodiments of the present invention, the wireless communications link established between the wireless communications device and the central facility is a cellular communications link and, more particularly, is an Internet link."	"In preferred embodiments of the present invention, the wireless communications link established between the wireless communications device and the central facility is a cellular communications link and, more particularly, is an Internet link." P. 4
3:64-4:3	"For example, when a music recording is being played at the wireless communications device, data indicative of that recording may be displayed on the display, and, additionally, a selected key on the wireless communications device may be pressed to transmit a signal to the source of the stream that the user of wireless communications device wishes to purchase the music recording."	"For example, when a music recording is being played at the wireless communications device, data indicative of that recording may be displayed on the display, and, additionally, a selected key on the wireless communications device may be pressed to transmit a signal to the source of the stream that the user of wireless communications device wishes to purchase the music recording." P.

Cite	Rolf	Rolf Provisional
		5
4:65-67	"FIG. **4** is a block diagram of a conventional wireless communications device utilized in accordance with the principles of the present invention;"	"FIG. 4 is a block diagram of a conventional wireless communications device utilized in accordance with the principles of the present invention;" P. 7
5:1-2	"FIG. **5** is a block diagram of a central facility of the present invention;"	"FIG. 5 is a block diagram of a central facility of the present invention;" P. 7
5:18-22	"With reference initially to FIG. **1**, a system of the present invention for playing encoded music on a wireless communications device is denoted generally by reference numeral **10**. In particular, system **10** has a wireless communications device **12**, such as a cellular telephone."	"With reference initially to FIG. 1, a system of the present invention for playing encoded music on a wireless communications device is denoted generally by reference numeral 10. In particular, system 10 has a wireless communications device 12, such as a cellular telephone." PP. 7-8
5:30-39	"A communications link may be established between wireless communications device **12** and a remote storage facility, denoted by reference numeral **14**. The remote storage facility may, for example, be at an address on the world wide web, and includes a data base having a plurality of music recordings therein. Preferably, the music recordings are categorized by a plurality of selectable fields, such as 'title', 'artist', 'album or CD type', 'recording label', etc. Additionally, the music recordings are preferably encoded in an encoded format, such as MP3 (Mpeg-1 Audio layer 3)."	"A communications link may be established between wireless communications device 12 and a remote storage facility, denoted by reference numeral 14. The remote storage facility may, for example, be at an address on the world wide web, and includes a data base having a plurality of music recordings therein. Preferably, the music recordings are categorized by a plurality of selectable fields, such as 'title', 'artist', 'album or CD type', 'recording label', etc. Additionally, the music recordings are preferably encoded in an encoded format, such as MP3 (Mpeg-1 Audio layer 3)." P. 8

Cite	Rolf	Rolf Provisional
5:46-53	"As will become apparent from the detailed discussion below, the wireless communications device **12** may be utilized to establish a communications link with the remote storage facility **14**. Then, using a keypad and input on the wireless communications device, or by voice commands, one or more selected music recordings may be retrieved from the storage facility **14**, for transmission, via wireless communications link, to the device **12**."	"As will become apparent from the detailed discussion below, the wireless communications device 12 may be utilized to establish a communications link with the remote storage facility 14. Then, using a keypad and input on the wireless communications device, or by voice commands, one or more selected music recordings may be retrieved from the storage facility 14, for transmission, via wireless communications link, to the device 12." P. 8
5:63-66	"In the embodiment of the present invention illustrated in FIG. **2**, a wireless communications device **12** communicates with a central facility **14** for retrieval of one or more stored music recordings. "	"In the embodiment of the present invention illustrated in FIG. 2, a wireless communications device 12 communicates with a central facility 14 for retrieval of one or more stored music recordings. " P. 9
6:20-30	"In accordance with yet an additional aspect of the invention, a music recording desired to be played on wireless communications device **12** need not be fully stored within the device **12**. In this regard, for example, a music recording stored in central facility **14** or personal storage unit **16** may be streamed to the wireless device **12** via an established communications link. In such an instance, data packets are streamed through a buffer for play by a player each of which are in a memory **26** (see FIG. **4**), such that, as one data	"In accordance with yet an additional aspect of the invention, a music recording desired to be played on wireless communications device 12 need not be fully stored within the device 12. In this regard, for example, a music recording stored in central facility 14 or personal storage unit 16 may be streamed to the wireless device 12 via an established communications link. In such an instance, data packets are streamed through a buffer for play by a player each of which are in a memory 26 (see FIG. 4), such that, as one data

Cite	Rolf	Rolf Provisional
	packet is played within the buffer, and then exits the buffer, an additional data packet is streamed into the buffer."	packet is played within the buffer, and then exits the buffer, an additional data packet is streamed into the buffer." PP. 9-10
6:53-7:7	"In accordance with a particular aspect of the present invention, at least a portion of that informational data is associated with a selected input on communications device **12**, such that upon activation of the input, the user of communications device **12** may order (for purchase) an authorized copy of the recording, or the album upon which the recording is placed. In this regard, upon activation of the key associated with the informational data, in one embodiment, while pressing the key associated with the selected information, data indicating that the user desires to make a purchase is transmitted to the station/source **17** or other facility. It should also be understood that the informational data may be retained at the server which is sourcing the recording, such that activation of a selected input causes a signal to be transmitted to the server, the receipt of which is matched with the information pertaining to the recording being transmitted. In any case, the purchase can be effected via the station/source **17** or other site, such as indicated by music storage source **19**, either through appropriate inputs on the	"In accordance with a particular aspect of the present invention, at least a portion of that informational data is associated with a selected input on communications device 12, such that upon activation of the input, the user of communications device 12 may order (for purchase) an authorized copy of the recording, or the album upon which the recording is placed. In this regard, upon activation of the key associated with the informational data, in one embodiment, while pressing the key associated with the selected information, data indicating that the user desires to make a purchase is transmitted to the station/source 17 or other facility. It should also be understood that the informational data may be retained at the server which is sourcing the recording, such that activation of a selected input causes a signal to be transmitted to the server, the receipt of which is matched with the information pertaining to the recording being transmitted. In any case, the purchase can be effected via the station/source 17 or other site, such as indicated by music storage source 19, either through appropriate inputs on the

Cite	Rolf	Rolf Provisional
	communications device **12**, or by establishment of a voice communications link with the central facility **14**."	communications device 12, or by establishment of a voice communications link with the central facility 14." PP. 10-11
7:8-18	"In addition to the user having a choice of whether to buy the single being played, or the entire album on which the single is located, the user also has the opportunity to select the manner in which the purchased recording or album will be distributed to the user. For example, the purchased recording or album may be downloaded to the wireless communications device **12** (if memory space suffices) or, alternatively, may be downloaded to the user's personal storage unit **16**. Alternatively, the user can select to have a storage medium upon which the music is recorded (such as a CD, for example) mailed to a selected address of the user."	"In addition to the user having a choice of whether to buy the single being played, or the entire album on which the single is located, the user also has the opportunity to select the manner in which the purchased recording or album will be distributed to the user. For example, the purchased recording or album may be downloaded to the wireless communications device 12 (if memory space suffices) or, alternatively, may be downloaded to the user's personal storage unit 16. Alternatively, the user can select to have a storage medium upon which the music is recorded (such as a CD, for example) mailed to a selected address of the user." P. 11
7:19-23	"Accordingly, the present invention provides a very unique feature for the distribution and purchasing of music recordings, by allowing an individual to make a purchase of a recording and/or its associated album upon hearing the recording."	"Accordingly, the present invention provides a very unique feature for the distribution and purchasing of music recordings, by allowing an individual to make a purchase of a recording and/or its associated album upon hearing the recording." P. 11
7:49-55	"With additional reference to FIG. **4**, wireless communications device **12** has a processor **20**. Connected to processor **20** are an input (such as a keypad **22**), a display **24**, a	"With additional reference to FIG. 4, wireless communications device 12 has a processor 20. Connected to processor 20 are an input (such as a keypad 22), a display 24, a

Cite	Rolf	Rolf Provisional
	memory **26**, a microphone **32**, a speaker **34**, and a port **36**. Additionally, a DTMF encoder/decoder (or just an encoder, if desired) **38**, and a transceiver **40**, and antenna **42** are connected as shown."	memory 26, a microphone 32, a speaker 34, and a port 36. Additionally, a DTMF encoder/decoder (or just an encoder, if desired) 38, and a transceiver 40, and antenna 42 are connected as shown." P. 12
8:54-55	"With reference initially to FIG. **5**, a block diagram of the central facility **14** is illustrated and described."	"With reference initially to FIG. 5, a block diagram of the central facility 14 is illustrated and described." P. 14
8:56-9:18	"In particular, a central facility **14** has a processor **50**. Connected to the processor **50** are a data base memory **52** and a interface **54** (such as a transceiver or modem) for transmitting and receiving communications signals. In addition, the central facility **14** may also have an encoder **58** and an operator station **60**. The encoder **58** is a set of processing instructions stored in a memory for encoding music recordings stored within data base memory **52**. In particular, when wireless communications device **12** accesses the central facility **14** via the communications network for purpose of retrieving one or more selected recordings, the encoder **58** may be utilized to encode the music, according to any preferred encryption and/or compression algorithm (such as mp3, liquid audio, etc.), for transmission of the encoded recording(s) to the wireless	"In particular, a central facility 14 has a processor 50. Connected to the processor 50 are a data base memory 52 and a interface 54 (such as a transceiver or modem) for transmitting and receiving communications signals. In addition, the central facility 14 may also have an encoder 58 and an operator station 60. The encoder 58 is a set of processing instructions stored in a memory for encoding music recordings stored within data base memory 52. In particular, when wireless communications device 12 accesses the central facility 14 via the communications network for purpose of retrieving one or more selected recordings, the encoder 58 may be utilized to encode the music, according to any preferred encryption and/or compression algorithm (such as mp3, liquid audio, etc.), for transmission of the encoded recording(s) to the wireless

Cite	Rolf	Rolf Provisional
	communications device **12**. Alternatively, the music recording stored within data base memory **52** may be stored in an encoded/compressed manner, such that the encoder **58** is not necessary. While the operator station **60** is not necessary, it may be provided for allowing the user of wireless communications device **12** to have a voice conversation with an operator employed at the operator station **60**. As will be appreciated, in the absence of an operator, processor **50** invokes application software for providing a menu driven system to wireless communications device **12**, such that the wireless communications device **12** can be utilized to select recording via a menu or listing of recordings. Alternatively, the central facility **14** may be equipped with a voice response system, such that an individual at wireless communications device **12** makes necessary entries/selections via voice commands."	communications device 12. Alternatively, the music recording stored within data base memory 52 may be stored in an encoded/compressed manner, such that the encoder 58 is not necessary. While the operator station 60 is not necessary, it may be provided for allowing the user of wireless communications device 12 to have a voice conversation with an operator employed at the operator station 60. As will be appreciated, in the absence of an operator, processor 50 invokes application software for providing a menu driven system to wireless communications device 12, such that the wireless communications device 12 can be utilized to select recording via a menu or listing of recordings. Alternatively, the central facility 14 may be equipped with a voice response system, such that an individual at wireless communications device 12 makes necessary entries/selections via voice commands." PP. 14-15
9:39-42	"Alternatively, it should be understood and appreciated that the encoded music received by the personal storage unit **16** may be stored in an encoded fashion, such that the decoder/encoder is unnecessary."	"Alternatively, it should be understood and appreciated that the encoded music received by the personal storage unit 16 may be stored in an encoded fashion, such that the decoder/encoder is unnecessary." PP. 15-16
10:6-20	"In particular, with reference to FIG. **7a**, data is transmitted in a	"In particular, with reference to FIG. 7 a, data is transmitted in a

Cite	Rolf	Rolf Provisional
	plurality of data packets **100**. In particular, for example, the first set of data packets, including one or more packets **100**, may include information pertaining to an identifier or address associated with a source of the streamed data. In the example of FIG. **7a**, the packet is marked with a ‘A’, and is an initially transmitted packet. Additional packets may contain information pertaining to a music recording being transmitted, and as illustrated in FIG. **7a**, any such packets are designated by a ‘I’. The remainder of the packets include data indicative of the music recording being transmitted, and are labeled ‘M’. In the example of FIG. **7a**, the address identifier and the information pertaining to the music recording are transmitted first, and thus serve as a header.”	plurality of data packets 100. In particular, for example, the first set of data packets, including one or more packets 100, may include information pertaining to an identifier or address associated with a source of the streamed data. In the example of FIG. 7 a, the packet is marked with a ‘A’, and is an initially transmitted packet. Additional packets may contain information pertaining to a music recording being transmitted, and as illustrated in FIG. 7 a, any such packets are designated by a ‘I’. The remainder of the packets include data indicative of the music recording being transmitted, and are labeled ‘M’. In the example of FIG. 7a, the address identifier and the information pertaining to the music recording are transmitted first, and thus serve as a header.” P. 16
10:44-48	“For example, data packets received by wireless communications device **12** are processed by processor **20**, and passed through at least one buffer.”	“For example, data packets received by wireless communications device 12 are processed by processor 20, and passed through at least one buffer.” P. 17
10:57-59	“As illustrated, each of the buffers **102**, **104** have corresponding buffer locations, indicated as Bdn, for streaming data packets...”	“As illustrated, each of the buffers 102, 104 have corresponding buffer locations, indicated as Bdn, for streaming data packets...” P. 17
11:48-51	“In accordance with an aspect of the present invention, data indicative of a site at which the	“In accordance with an aspect of the present invention, data indicative of a site at which the

Cite	Rolf	Rolf Provisional
	particular music recording is being played (and/or it associated album or video) can be ordered is transmitted and associated with a particular input…”	particular music recording is being played (and/or it associated album or video) can be ordered is transmitted and associated with a particular input…” P. 19
11:54-57	“Accordingly, while listening to the music recording, an individual may activate the order key and be connected with a source for ordering that particular music recording.”	“Accordingly, while listening to the music recording, an individual may activate the order key and be connected with a source for ordering that particular music recording.” P. 19
11:61-12:2	“Additionally, upon activation of the order key, either a data, a voice, or a combined voice/data link may be established with the source at which the music recording is to be purchased, and the purchase may be conducted in a purely electronic fashion, or by speaking with an operator. Preferably, such a link terminates the link with the streaming source, although terminating the initial link may not be necessary if there is sufficient bi-directional bandwidth available.”	“Additionally, upon activation of the order key, either a data, a voice, or a combined voice/data link may be established with the source at which the music recording is to be purchased, and the purchase may be conducted in a purely electronic fashion, or by speaking with an operator. Preferably, such a link terminates the link with the streaming source, although terminating the initial link may not be necessary if there is sufficient bi-directional bandwidth available.” P. 19
12:4-12	“For example, purchase may be made such that a complete copy of the sound recording (or its associated album) is downloaded to the memory **26** within wireless communications device **12**. Alternatively, the user can specify, either by input, or through a previously established account with the source at which the recording is being purchased, to have the music	“For example, purchase may be made such that a complete copy of the sound recording (or its associated album) is downloaded to the memory 26 within wireless communications device 12. Alternatively, the user can specify, either by input, or through a previously established account with the source at which the recording is being purchased, to have the music

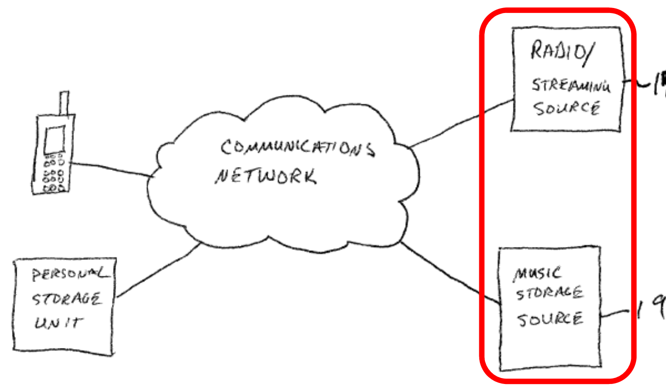
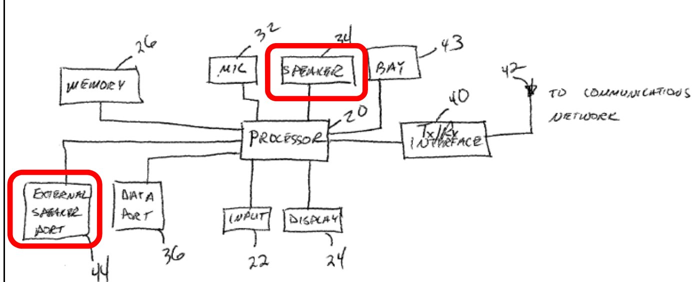
Cite	Rolf	Rolf Provisional
	recording downloaded to a remote, personal storage unit...”	recording downloaded to a remote, personal storage unit...” PP. 19-20
12:49-55	“In use, a user of communications device **12** may establish a communications link via the communications network with the remote storage facility **14**. In a preferred embodiment, the facility **14** has a uniform resource locator (URL) on a global communications network (such as the world-wide web), and device **12** accesses the facility **14** via a server in the communications network. “	“In use, a user of communications device 12 may establish a communications link via the communications network with the remote storage facility 14. In a preferred embodiment, the facility 14 has a uniform resource locator (URL) on a global communications network (such as the world-wide web), and device 12 accesses the facility 14 via a server in the communications network. “ P. 21
13:5-13	“As described, the personal storage unit **16** may be a memory storage location at an address on the global communications network and, indeed, may be located at the remote storage facility **14**. In such an instance, when a communications link with a remote storage facility **14** is established with wireless communications device **12**, the user can select whether he or she wishes to select new recordings, or enter his or her personal storage unit account for retrieval of recordings that have already been purchased.”	“As described, the personal storage unit 16 may be a memory storage location at an address on the global communications network and, indeed, may be located at the remote storage facility 14. In such an instance, when a communications link with a remote storage facility 14 is established with wireless communications device 12, the user can select whether he or she wishes to select new recordings, or enter his or her personal storage unit account for retrieval of recordings that have already been purchased.” PP. 21-22
13:38-41	“Preferably, the informational data is stored as a header (e.g., in one or more integrally transmitted data packets) (See FIG. **1**), such that processor **20** outputs the information to display **24**.”	“Preferably, the informational data is stored as a header (e.g., in one or more integrally transmitted data packets) (See FIG. 1), such that processor 20 outputs the information to display 24.” P. 22

Cite	Rolf	Rolf Provisional
14:35-53	"However, in accordance with an additional aspect of the invention, a concert schedule of the artist or group that recorded the song being played may be accessed at the source, for the purpose of buying concert tickets. Accordingly, upon hearing a particular song, a user of communications device **12** can activate a single input and establish a communications link with a source for purchasing concert link may be a voice communications link or, alternatively, may be a voice and/or data communications link, such that the tickets may be purchased electronically. In particular, while the concert information may be available at the described source, it should be understood and appreciate that additional data may be encoded in the data stream, and associated with a different input, such that activation of a first input establishes a communications link with a first source at which the music recording may be purchased, while activation of a second input establishes a communications link with a second source at which concert tickets may be purchased."	"However, in accordance with an additional aspect of the invention, a concert schedule of the artist or group that recorded the song being played may be accessed at the source, for the purpose of buying concert tickets. Accordingly, upon hearing a particular song, a user of communications device 12 can activate a single input and establish a communications link with a source for purchasing concert link may be a voice communications link or, alternatively, may be a voice and/or data communications link, such that the tickets may be purchased electronically. In particular, while the concert information may be available at the described source, it should be understood and appreciate that additional data may be encoded in the data stream, and associated with a different input, such that activation of a first input establishes a communications link with a first source at which the music recording may be purchased, while activation of a second input establishes a communications link with a second source at which concert tickets may be purchased." PP. 24-25
14:55-58	"It should also be understood that, while the invention has been described with respect to music or sound recordings, various features of the invention are applicable to	"In particular, the data stream is a stream of data packets which are streamed through a buffer of the wireless communications device

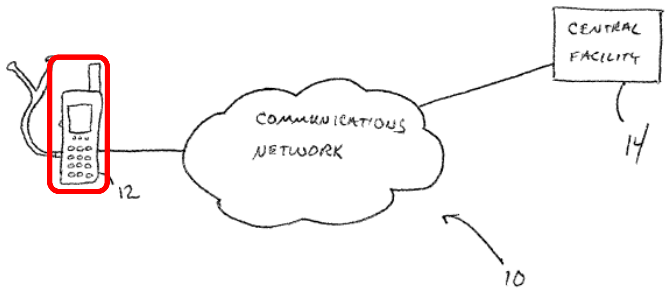
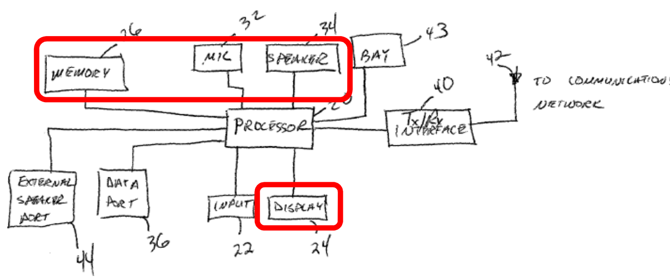
Cite	Rolf	Rolf Provisional
	recordings of other types, such as video recordings."	for decoding and play." P. 5 "In accordance with an aspect of the present invention, data indicative of a site at which the particular music recording is being played (and/or it associated album or video) can be ordered is transmitted and associated with a particular input, as evidenced by 'order' on the display at which location is associated with a particular keypad input on the wireless communications device." P. 19

EXHIBIT C

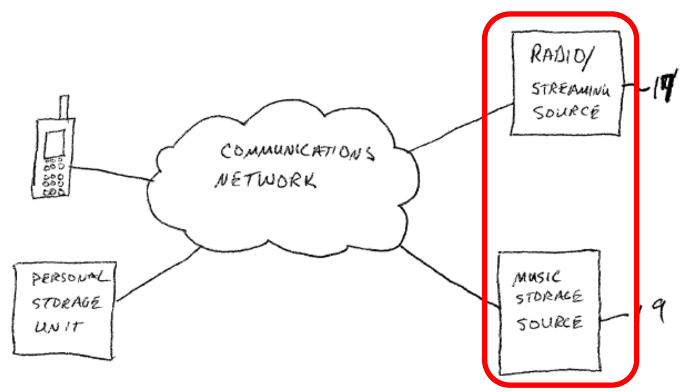
EXHIBIT C

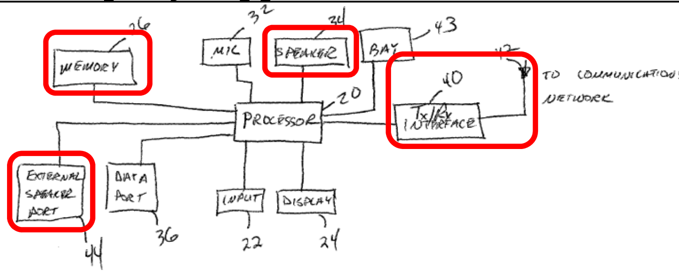
Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	Note: The entirety of the Rolf Provisional would have been understood by a person of ordinary skill to disclose the support for the issued claims in Rolf. I intend this chart simply to highlight exemplary portions, not to be an exhaustive mapping of all support.
Claim 1	
A system for playing prerecorded music, said system comprising:	A person of ordinary skill would have understood that the Rolf Provisional describes a system for playing music, including the ability to download and stream music for replay that has been previously recorded. *See, e.g.*:  Fig. 3 (annotated). Showing two sources of prerecorded music available for download and playback.  Fig. 4 (annotated). Showing the internals of a cellular phone, having both internal speaker

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	and external speaker port for playing prerecorded music. “The present invention is generally directed to a system and method for wirelessly transmitting encoded music, via a wireless communications link, to a portable or mobile communications device which includes a player for playing the **music or audio**.” P. 1 (emphasis added). “Using an input of the cellular telephone, **a user may select one or more recordings for transmission to the cellular telephone.** The selected music recordings, upon receipt by the cellular telephone, are stored in a memory. In one embodiment, the memory is an internal memory. Alternatively, the memory may be a separate cartridge or memory stick (such as a flash memory cartridge) for movable installation in a bay on the telephone. **A player within the cellular telephone may then be initiated to play the music recordings, for output on a speaker.** In particular, the speaker may include earphones or earplugs connected to a port on the cellular telephone. Alternatively, the player may output the music through an internal speaker of the cellular telephone.” PP. 1-2 (emphasis added).
a portable, handheld wireless cellular telephone having a memory, a display[,] a player, a microphone for voice communications, and a speaker; and	A person of ordinary skill would have understood that the Rolf Provisional describes a cellular telephone with the components and features claimed in this limitation. *See, e.g.*: “In particular, system 10 has a **wireless communications device 12, such as a cellular telephone**. Preferably, wireless

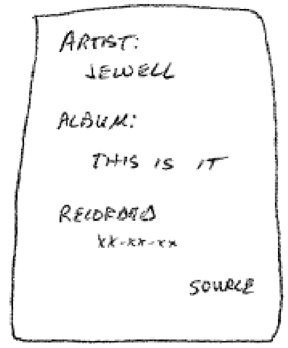
Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	communications device 12 is a digital, cellular communications device, and is **portable and handheld**." P. 8 (emphasis added).  Fig. 1 (annotated). Showing a portable, handheld wirless cellular telephone.  Fig. 4 (annotated). Showing the internals of the cellular telephone, including a memory, a display, a microphone, and a speaker. The cellular telephone also has a player: "The present invention is generally directed to a system and method for wirelessly transmitting encoded music, via a wireless communications link, to **a portable or mobile communications device which includes a player for playing the music or audio**." P. 1 (emphasis added). The microphone component is used to facilitate voice communication:

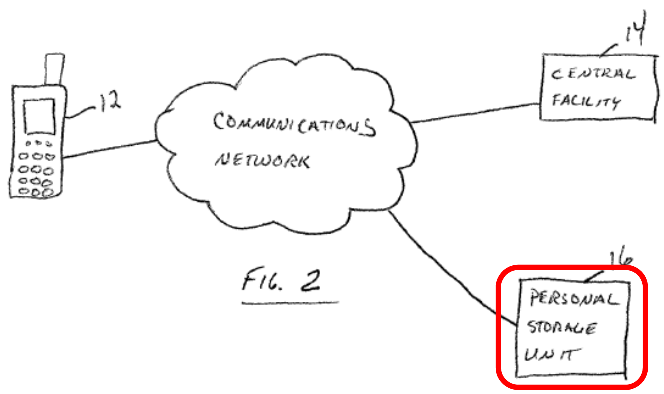
Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	"Additionally, the wireless communications device is preferably a cellular communications device and, in particular, is a **cellular voice communications device**, such as a cellular telephone." P. 9 (emphasis added). "In this regard, and in accordance with an aspect of the invention, a user of communications device 12 **may establish a communications link** with a central facility, such as storage facility 14, and utilizing inputs on the device, such as a keypad, **or a microphone (where the inputs are by voice)**, make appropriate selections for retrieving an encoded player for storage in the communications device 12." P. 13 (emphasis added). "Preferably, the wireless communications device is also a **voice communications** device, such that **voice connections** may be made with the device, as well." P. 25 (emphasis added).
a remote storage facility, wherein said remote storage facility stores a plurality of music recordings,	A person of ordinary skill would have understood that the Rolf Provisional describes a remote storage facility that stores multiple music recordings. *See, e.g.*:  Fig. 1 (annotated). Showing a central facility that is remote from the cellular telephone.

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	This is where music recordings are stored. "In use, a user of communications device 12 may establish a communications link via the communications network with the **remote storage facility 14**." P. 21 (emphasis added). The remote storage facility stores multiple music recordings:  Fig. 3 (annotated). Showing two categories of music recordings stored at the remote storage facility for both streaming and full download. "As will by now be appreciated in view of the foregoing, the communications device 12 may also be used for retrieving **one or more music recordings from a remote storage facility 14**…" P. 21 (emphasis added).
wherein said wireless cellular telephone is used to wirelessly select and retrieve from said remote storage facility at least one of said music recordings for complete storage of said music recording in said memory, and for playback through said speaker by said player,	A person of ordinary skill would have understood that the Rolf Provisional describes a wireless cellular telephone selecting and retriving at least one music recording for storage and playback on the cellular phone. *See, e.g.*:

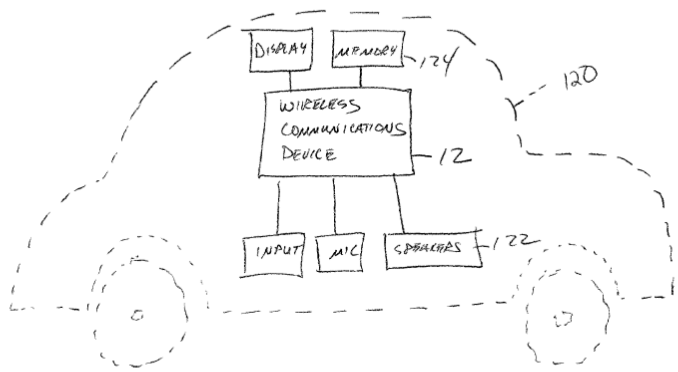
Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	 Fig. 4 (annotated). Showing the internals of the cellular telephone, including a memory where music recordings are stored, an internal speaker, an external speaker port for playback, and a wireless transciever and antenna. The cellular phone wirelessly selects and retrieves music recordings and stores them in its internal memory: "In particular, a user of the cellular telephone (for example) may use the telephone to establish a wireless communications link with the remote, central facility, and then **wirelessly download one or more selected music recordings for storage in a memory of the cellular telephone**." P. 1 (emphasis added). "**Using an input of the cellular telephone, a user may select one or more recordings for transmission to the cellular telephone**. The selected music recordings, upon receipt by the cellular 20 telephone, are **stored in a memory**." P. 1 (emphasis added). The player within the cellular telephone then plays back the music recording stored in the memory of the cellular telephone through the speaker (either internal or external):

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	"Once an encoded **music recording is stored in memory 26, or on a memory cartridge, of the wireless communications device 12**, the input 22 may be utilized to control the **player to play the recording**. In this regard, when a music recording is retrieved from memory for play, the player decodes the encoded data packet according to conventional steaming techniques in the buffer. **The player outputs the music via speaker 34** or, in the event earplugs or headphones are connected to port 44 of communications device 12, then **the music is outputted via the headphones or earplugs**." P. 22 (emphasis added).
wherein at least one of a name of an artist who recorded said selected music recording and a title of said music recording is wirelessly transmitted from said storage facility in conjunction with said music recording and is displayed on said display of said cellular telephone in conjunction with playback of said music recording, and	A person of ordinary skill would have understood that the Rolf Provisional describes transmitting artist name and title corresponding to a music recording to the cellular telephone for display during playback of the music recording. *See, e.g.*: "In accordance with an additional aspect of the present invention, **information pertaining to the music recording, such as the artist, title of the recording**, an album from which the recording came, the date of the recording, etc. **is also transmitted with the recorded music, such that the informational data is displayed on a display** of, or associated with, the wireless communications device **when the particular recording is being played**." PP. 3-4 (emphasis added).

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	 Fig. 9a. Showing a display on the user's cellular telephone of artist name and title associated with a music recording (in this case a collection of individual songs within an album by the artist Jewell).
wherein said storage facility further comprises a personal account associated with at least one of said cellular telephone and a user of said cellular telephone,	A person of ordinary skill would have understood that the Rolf Provisional describes a storage facility with personal accounts associated with particular cellular telephones and/or users. *See, e.g.*: "For example, **a user may have** a CD tower, flash memory unit, etc. in his or her home or apartment, or may have **a personal storage account at a central facility**." P. 2 (emphasis added). "The personal storage unit may comprise a personal computer or an entertainment center, including such components as a display screen (e.g., TV or information TV), stereo, speakers, etc, or as stated, **an account at a storage location**." P. 3 (emphasis added). "In accordance with one aspect of the invention, personal storage unit 16 may also be a memory storage location at the central facility 14, or other remote site. In this way, a

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	user of device 12 may have a personal account for storing pure based recordings, such that the account (e.g., personal storage unit 16) is accessible via device 12 and other devices (such as a personal computer)." P. 16 (emphasis added).
wherein at least a title of said selected and retrieved music recording is stored in said personal account.	A person of ordinary skill would have understood that the Rolf Provisional describes the system storing at least a title of the selected and retrieved music recording in the personal account. *See, e.g.*: The Rolf Provisional describes embodiments where the personal account is comprised of a personal storage unit at a storage location within the central facility or another location:  Fig. 2 (annotated). Showing remote personal storage unit. "**The personal storage unit may comprise** a personal computer or an entertainment center, including such components as a display screen (e.g., TV or information TV), stereo, speakers, etc, or as stated, **an account at a storage location**." P. 3 (emphasis added). "In accordance with one aspect of the

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
	invention, **personal storage unit 16 may also be a memory storage location at the central facility 14, or other remote site**. In this way, a user of device 12 may have a personal account for storing pure based recordings, such that **the account (e.g., personal storage unit 16)** is accessible via device 12 and other devices (such as a personal computer)." P. 16 (emphasis added). The Rolf Provisional describes that information such as the title of a music recording is transmitted along with the music and stored together at both the storage facility and in the cellular telephone: "In accordance with an additional aspect of the present invention, information pertaining to the music recording, such as the artist, **title of the recording**, an album from which the recording came, the date of the recording, etc. is also transmitted with the recorded music…" P. 3 (emphasis added). "For example, data indicative of the artist, **the title of the recording**, the album or CD from which the recording came, the recording label, the date of the recording, or any other desired information **may be stored along with the recording at storage facility 14, and transmitted for storage in memory 26**." P. 22 (emphasis added). A person of ordinary skill would have understood that the Rolf Provisional describes embodiments where the title of music recordings could be stored along with the music recordings themselves in a personal storage unit or personal account.

Issued Claims in Rolf	Exemplary Support in Rolf Provisional
Claim 2	
The system as set forth in claim 1, in combination with a vehicle, wherein said wireless cellular telephone is installed in said vehicle.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 combined with and installed in a vehicle. *See, e.g.*:  Fig. 10. Showing the system described in my analysis of claim 1 above, as combined with and installed in a vehicle, in this case an automobile. "In an alternate embodiment, the wireless communications device is **utilized in combination with a vehicle**, and a player, a memory for storing the music, and at least one speaker, are **located within the vehicle, such that selected recordings may be retrieved from the remote central facility, and played in the vehicle**." P. 2 (emphasis added).
Claim 3	
The system as set forth in claim 1, wherein a selected music recording is wirelessly transmitted from said remote storage facility in data packets.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 where wireless transmission is carried out using data packets. *See, e.g.*: "In particular, the data stream is **a stream of data packets** which are streamed through a

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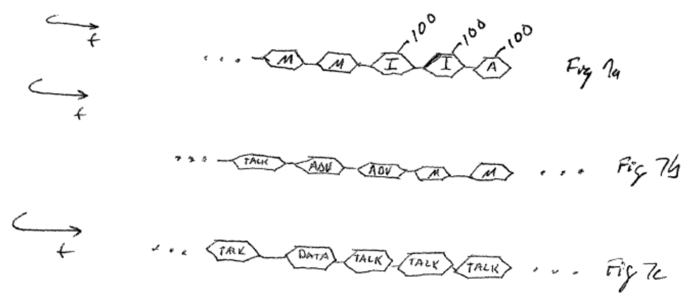
	buffer of the wireless communications device for decoding and play." P. 5 (emphasis added).  Figs. 7a, 7b, 7c. Showing packetization of transmissions of music recordings. "With reference now to Fig. 7, a representative example of how **data packets** are transmitted in accordance with a protocol of the present invention is illustrated. In particular, with reference to Fig. 7a, data is transmitted in a plurality of **data packets** 100." P. 16 (emphasis added).
Claim 4	
The system as set forth in claim 3, wherein said data packets are transmitted via a third generation network.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 3 where the data packets are transmitted through a third generation network. *See, e.g.*: "In preferred embodiments of the present invention, the wireless communications link established between the wireless communications device and the central facility is a cellular communications link and, more particularly, is an Internet link. In other words, the encoded music and/or informational data is preferably transmitted via a packet switch network, and particularly is preferably transmitted at transmission

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	speeds greater than 50 KHz, such as by a next- or **third-generation wireless communications network**." P. 4 (emphasis added). "In accordance with a preferred aspect of the present invention, the music recordings are encoded in **data packets for transmission via a packet switched network**. In particular, it is preferred that the wireless communications network be a next or **third generation network**, such that data transmissions are at sufficiently high speeds, and preferably greater than 50 KHz." P. 22 (emphasis added).
Claim 5	
The system as set forth in claim 1, wherein said retrieved music recording is encoded in mp3 format.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 where the music recording is encoded in mp3 format. *See, e.g.*: "Preferably, the music recordings are encoded and transmitted in packets, and may particularly be **encoded by a compression algorithm into an encoded (such as MP3 or other) format**." P. 1 (emphasis added). "Additionally, the music recordings are preferably **encoded in an encoded format, such as MP3 (Mpeg-1 Audio layer 3)**." P. 8 (emphasis added).
Claim 6	
The system as set forth in claim 1, wherein said at least one music recording stored in said memory can be played without the need to establish and maintain a communications link with said	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 where music recordings can be played without the need to establish and maintain communication links with the remote storage facility. *See, e.g.:*

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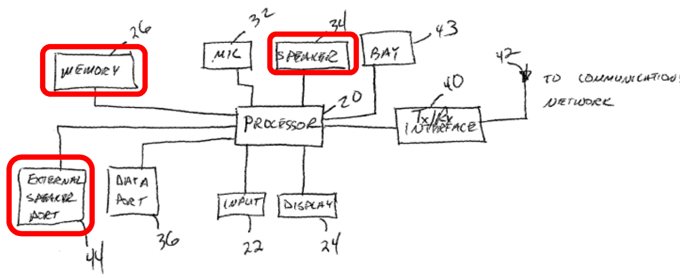
remote storage facility.	The most obvious situation where a music recording can be played without a communications link to the remote storage facility is where the music recording was transmitted to and stored on the cellular telephone itself (i.e. not streamed). The Rolf Provisional discloses this:  Fig. 4 (annotated). Showing the internals of the cellular telephone, including an internal memory, internal speaker, and external speaker port for playback. "Once an encoded **music recording is stored in memory 26, or on a memory cartridge, of the wireless communications device 12**, the input 22 may be utilized to control the **player to play the recording**. In this regard, when a music recording is retrieved from memory for play, the player decodes the encoded data packet according to conventional steaming techniques in the buffer. **The player outputs the music via speaker 34** or, in the event earplugs or headphones are connected to port 44 of communications device 12, then **the music is outputted via the headphones or earplugs**." P. 22 (emphasis added). A person of ordinary skill would have understood from this disclosure that music

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	stored on internal memory could later be replayed without the need for a communications link to a remote storage facility.
Claim 7	
The system as set forth in claim 1, wherein said system further makes said selected and retrieved music recording available for download to a personal computer associated with a user of said cellular telephone.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 making the music recording available for download to a personal computer associated with a cellular telephone user. *See, e.g.*: The Rolf Provisional discloses an embodiment where the personal storage unit itself, which is associated with the user, is a personal computer: "**The personal storage unit may comprise a personal computer** or an entertainment center, including such components as a display screen (e.g., TV or information TV), stereo, speakers, etc, or as stated, an account at a storage location." P. 3 (emphasis added). "**In this embodiment, when a user selects one or more recordings from the central facility**, rather than the recordings being transmitted to the wireless communications unit directly via a wireless communications link, **they are rather transmitted to the personal storage unit of the user.**" P. 3 (emphasis added). The Rolf Provisional also discloses an embodiment where the personal account is accessible via a personal computer: "In accordance with one aspect of the invention, personal storage unit 16 may also

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	be a memory storage location at the central facility 14, or other remote site. In this way, a user of device 12 may have a personal account for storing pure based recordings, **such that the account (e.g., 5 personal storage unit 16) is accessible via device 12 and other devices (such as a personal computer)**.” P. 16 (emphasis added). A person of ordinary skill would have understood from this disclosure that the personal computer in either embodiment could download music recordings.
Claim 8	
The system as set forth in claim 1, wherein said selected and retrieved music recording is purchased from said remote storage facility.	A person of ordinary skill would have understood that the Rolf Provisional describes the system of claim 1 where the music recording is purchased from the remote storage facility. *See, e.g.*: “Alternatively, the signal may be transmitted to a **remote music storage facility for effecting a purchase of the recording** or its associated album. In this regard, the purchase can be conducted in an electronic input mode or, alternatively, a **link may be established for transmitting voice communications to and from the source or music storage facility (as the case may be) at which the sound recording or its associated album is to be purchased**.” P. 5 (emphasis added). “As such, the **purchase** can be effected via the station/source 17 or other site, such as indicated by music storage source 19, either through appropriate inputs on the communications device 12, or **by establishment of a voice communications link with the central facility 14**.” P. 11

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	(emphasis added). "In such an instance, when a communications link with a **remote storage facility 14** is established with wireless communications device 12, **the user can select whether he or she wishes to select new recordings, or** enter his or her personal storage unit account **for retrieval of recordings that have already been purchased.**" PP. 21-22 (emphasis added).