

Plaintiffs Uniloc 2017 LLC and Uniloc Licensing USA LLC (collectively “Uniloc”), by and through the undersigned counsel, hereby bring this action and makes the following allegations of patent infringement relating to U.S. Patent Nos. 6,901,272, 6,519,005, and 7,016,676 against Defendants AT&T Inc., AT&T Corporation, AT&T Services, Inc., AT&T Mobility LLC, and AT&T Communications, LLC (collectively “AT&T”) and allege as follows upon actual knowledge with respect to themselves and their own acts, and upon information and belief as to all other matters:

NATURE OF THE ACTION

1. This is an action for patent infringement. Uniloc alleges that AT&T infringes U.S. Patent Nos. 6,901,272 (the “272 patent”), 6,519,005 (the “005 patent”), and 7,016,676 (the “676 patent”), copies of which are attached as Exhibits A-C, respectively (collectively “the Asserted Patents”).

2. Uniloc alleges that AT&T directly and indirectly infringes the Asserted Patents by importing, making, offering for sale, selling and operating (1) applications such as the AT&T Smart Home Manager, (2) devices that practice a method for motion coding an uncompressed digital video data stream such as AT&T U-verse, and (3) AT&T’s network, base stations, and controllers that provide shared network access to LTE-LAA and Wi-Fi capable devices over at least one common frequency band. AT&T also induces and contributes to the infringement of others. Uniloc seeks damages and other relief for the AT&T’s infringement of the Asserted Patents.

THE PARTIES

3. Uniloc 2017 LLC is a Delaware corporation having places of business at 1209 Orange Street, Wilmington, Delaware 19801, 620 Newport Center Drive, Newport Beach,

California 92660 and 102 N. College Avenue, Suite 303, Tyler, TX 75702.

4. Uniloc Licensing USA LLC is a Delaware corporation having places of business at 1209 Orange Street, Wilmington, Delaware 19801, 620 Newport Center Drive, Newport Beach, California 92660 and 102 N. College Avenue, Suite 303, Tyler, TX 75702.

5. Uniloc holds all substantial rights, title and interest in and to the Asserted Patents.

6. Upon information and belief, Defendant AT&T Inc. is a Delaware corporation with a place of business at 208 S. Akard St., Dallas, Texas 75202 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

7. Upon information and belief, Defendant AT&T Corporation is a New York corporation with a place of business at One AT&T Way, Bedminster, New Jersey, 07921 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

8. Upon information and belief, Defendant AT&T Services, Inc. is a Delaware corporation with a place of business at 175 E. Houston, San Antonio, Texas 78205 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201

9. Upon information and belief, Defendant AT&T Mobility LLC is a Delaware limited liability company with a of business at 1025 Lenox Park Blvd NE, Atlanta, Georgia 30319 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

10. Upon information and belief, Defendant AT&T Communications, LLC is a Delaware limited liability company with a place of business at 208 S. Akard St., Dallas, Texas 75202 and a registered agent for service of process at The Corporation Trust Company, 1209

Orange St., Wilmington, Delaware 19801.

11. Upon information and belief AT&T has at least the following regular and established places of business in this District: 4757 S. Broadway Ave., Tyler Texas 75703; 2028 Southeast Loop 323, Tyler, Texas 75701; 8922 S. Broadway Ave., Tyler, Texas 75703.

JURISDICTION AND VENUE

12. This action for patent infringement arises under the Patent Laws of the United States, 35 U.S.C. § 1 et. seq. This Court has original jurisdiction under 28 U.S.C. §§ 1331 and 1338.

13. This Court has both general and specific personal jurisdiction over AT&T because they have committed acts within the Eastern District of Texas giving rise to this action and have established minimum contacts with this forum such that the exercise of jurisdiction over AT&T would not offend traditional notions of fair play and substantial justice. AT&T, directly and through subsidiaries and intermediaries (including distributors, retailers, franchisees and others), has committed and continues to commit acts of infringement in this District by, among other things, making, using, testing, selling, licensing, importing, and/or offering for sale/license products and services that infringe the Asserted Patents.

14. Venue is proper in this district and division under 28 U.S.C. §§ 1391(b)-(d) and 1400(b) because AT&T has committed acts of infringement in the Eastern District of Texas and has multiple regular and established places of business in the Eastern District of Texas.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 6,901,272

15. The allegations of paragraphs 1-14 of this Complaint are incorporated by reference as though fully set forth herein.

16. The '272 patent titled, "Ergonomic System For Control of Devices Through

Portable Wireless Terminals,” issued on May 31, 2005. A copy of the ’272 patent is attached as Exhibit A.

17. Pursuant to 35 U.S.C. § 282, the ’272 patent is presumed valid.

18. Invented by Koninklijke Philips Electronics, N.V., the inventions of the ’272 patent were not well-understood, routine or conventional at the time of the invention. At the time of invention of the ’272 patent, embedded systems were used to perform specific real-world applications like controlling complex broadcast systems, reading bar codes, printing postage stamps, or routing data over the Internet. ’272 patent at 1:11-20. At the time it was desirable to provide remote access to these systems, to allow them to be “unmanned.” *Id.* at 1:21-23. Prior art methods for providing remote access included using dial-up connections, Ethernet connections, and other wired connections. *Id.* at 1:47-2:32. While most remote access methods require the operator to be wired to the equipment, some forms of access, especially emergency system access, may be better served by a wireless connection. *Id.* at 2:33-36. At the time of the ’272 patent, wireless methods to remotely access embedded equipment were available, but were limited due to the complexity of a two-way radio link, and the size limitations of typical mobile control devices. *Id.* at 2:36-38. Prior art wireless remote access techniques also lacked the features enjoyed by wired access. *Id.* at 2:51-53. For example, wireless control devices tended to be custom-built and limited in operating range from the facilities to which they have access. *Id.* at 2:53-55. The control interfaces of those devices were also limited in terms of how easily they may be upgraded and expanded in terms of functionality. *Id.* at 2:55-57. Above all, the cost of such systems is usually prohibitive since these devices do not approach the mass-market volumes required for favorable pricing. *Id.* at 2:61-63. Consequently, the most widely used wireless remote access solution involves calling another operator at the facility with a cell phone.

Id. at 2:64-66. That did not satisfactorily address situations where access is impossible due to geographic or weather isolation, and especially crisis situations where the facility must be evacuated. *Id.* at 2:66-3:2.

19. The inventive solution of the claimed inventions of the '272 patent provides a paradigm shift in user interfaces for remote control of portable terminals. *Id.* at 3:4-6. The invention provides a method and interface that is particularly suitable for remote access to an embedded system using the capabilities available on data-capable wireless phones. *Id.* at 3:6-8. The controlling device may be a consumer grade digital cell phone. *Id.* at 3:8-9. The wireless data services they connect to are readily available nationwide from several providers. *Id.* at 3:9-12. An intuitive, fast, and ergonomic user interface permits an operator to not only assess the status of the remote device, but also directly control the equipment of interest. *Id.* at 3:12-15.

20. A person of ordinary skill in the art reading the '272 patent and its claims would understand that the patent's disclosure and claims are drawn to solving a specific, technical problem arising in the field of remote control entry of commands using portable wireless devices to control embedded systems, such as Internet routers. *Id.* at 1:8-16. Moreover, a person of ordinary skill in the art would understand that the claimed subject matter of the '272 patent presents advancements in the field of remote control entry of control commands through portable wireless devices to embedded systems, and more particularly to controlling a base device from a wireless terminal connected to receive data from a wireless server. *Id.* at 12:28-41.

21. AT&T makes, uses, offers for sale and sells in the United States and imports into the United States applications, such as the AT&T Smart Home Manager, that practice a method of controlling a base device from a wireless terminal connected to receive data from a wireless server (collectively the "Accused Infringing Applications").

22. Upon information and belief, the Accused Infringing Applications infringe claim 6 of the '272 patent by practicing a method in the exemplary manner described below.

23. The Accused Infringing Applications provide a method of controlling a base device from a wireless terminal connected to receive data from a wireless server. The Accused Infringing Applications, such as the AT&T Smart Home Manager, enable the control of an AT&T Wi-Fi gateway (i.e., base station server) from a wireless terminal. AT&T and others practice the method of claim 6 by way of the AT&T Smart Home Manager.



We're giving you more ways to simplify your home Wi-Fi experience with the **AT&T Smart Home Manager**¹. As an AT&T Internet customer you can now personalize your home Wi-Fi network from your smart phone, tablet or computer through myAT&T. The tool gives you a dashboard with a complete view of your home Wi-Fi network.

What else can you do with this new tool?

- **Set up a guest network**² and easily invite guests with a text or email — no more writing down your Wi-Fi password!
- **See who is connected to your Wi-Fi Network and personalize device names** – This makes for easy management later on
- **Easily view and update your Wi-Fi network name and password as often as you would like.**

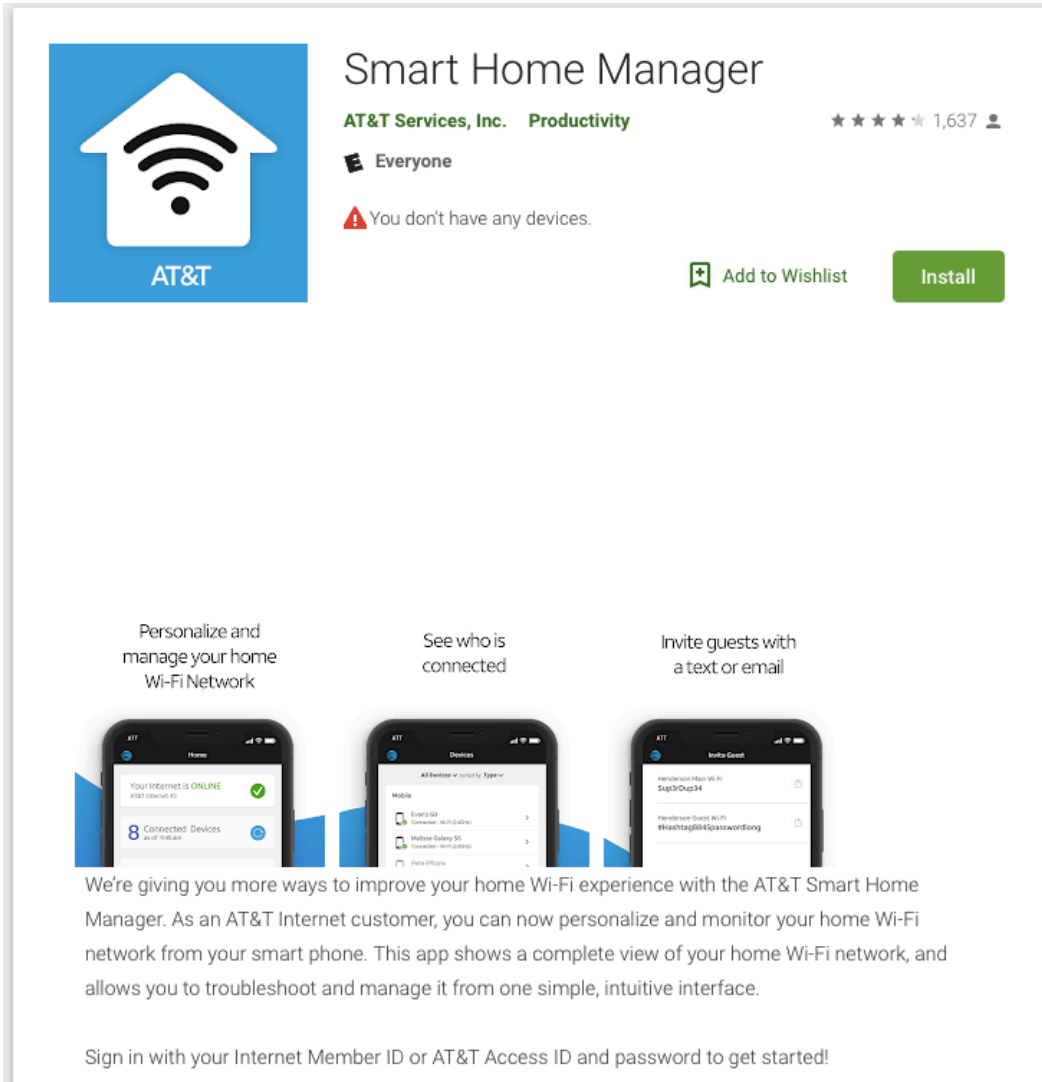
This dashboard lets you easily manage all connected devices from one simple, intuitive interface.

1AT&T Smart Home Manager is available to AT&T Internet service customers with a compatible AT&T Wi-Fi Gateway. Limited to home Wi-Fi network.

2 Set up a specific guest network feature is compatible with the following AT&T Wi-Fi Gateways: 3600HGV, 5031NV-030, NVG589, NVG599, 5268AC and BGW210

Source: http://about.att.com/inside_connections_blog/simplify_home_wifi

24. The AT&T Smart Home Manager can be installed on a wireless device using a wireless Internet connection.



The image shows the Google Play Store listing for the "Smart Home Manager" app by AT&T Services, Inc. The app is categorized under "Productivity" and has a rating of 4.5 stars from 1,637 reviews. The age rating is "Everyone". A warning icon indicates that the user does not have any devices connected. There are buttons for "Add to Wishlist" and "Install". Below the app card, three smartphone screens illustrate the app's features: "Personalize and manage your home Wi-Fi Network", "See who is connected", and "Invite guests with a text or email". A paragraph of text describes the app's functionality, and a final line of text instructs users to sign in with their Internet Member ID or AT&T Access ID and password.

Smart Home Manager
AT&T Services, Inc. Productivity ★★★★★ 1,637
Everyone
⚠️ You don't have any devices.
Add to Wishlist Install

Personalize and manage your home Wi-Fi Network See who is connected Invite guests with a text or email

We're giving you more ways to improve your home Wi-Fi experience with the AT&T Smart Home Manager. As an AT&T Internet customer, you can now personalize and monitor your home Wi-Fi network from your smart phone. This app shows a complete view of your home Wi-Fi network, and allows you to troubleshoot and manage it from one simple, intuitive interface.

Sign in with your Internet Member ID or AT&T Access ID and password to get started!

Source: https://play.google.com/store/apps/details?id=com.att.shm&hl=en_US

25. The Accused Infringing Applications provide a method for displaying on a first screen first and second link controls permitting modification of respective first and second parameters of said base device. The AT&T Smart Home Manager application allows a user of a wireless terminal to modify first and second parameters of the base station (e.g., AT&T Wi-Fi gateway), including for example, enabling/disabling access for specific devices connected to a particular network.

The Smart Home Manager gives you easy access to all the home network information you need. You can:

- View devices connected to your network
- Invite guests to connect to your network via email
- **Disconnect devices from your network (with some Wi-Fi gateways)**
- View your Wi-Fi network information
- Change your Wi-Fi network name or password

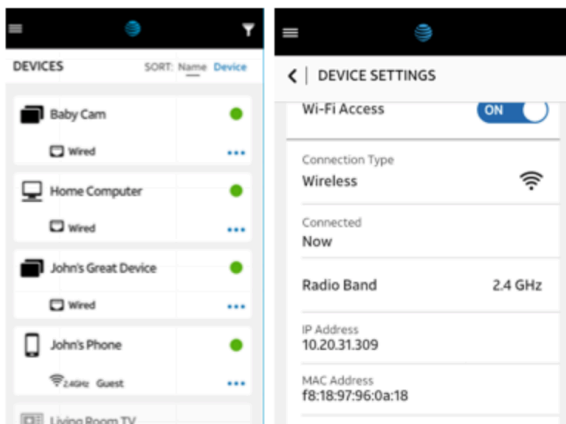
Note: Smart Home Manager is only available in select areas and features vary by Wi-Fi gateway model.

Device Page

The device page shows all the devices connected to your network. The devices highlighted with green dots are currently connected to the network. The devices that are grayed out are not showing on the network currently.

From here, you can select each device to find out more about it.

On select gateways, you will be able to enable/disable the WiFi access for that device



Source: <https://forums.att.com/t5/AT-T-Internet-Equipment/Smart-Home-Manager-Learn-How-To-Personalize-Your-Network/td-p/5153126>

26. The Accused Infringing Applications provide a method for displaying on said first screen respective current values of said first and second parameters. The current values of the first and second parameters are displayed on the screen (first screen) of the AT&T Smart Home Manager application. For example, on a first screen a number of devices are shown including their connected status to the network (e.g., by way of a green dot.)

View devices connected to your business network

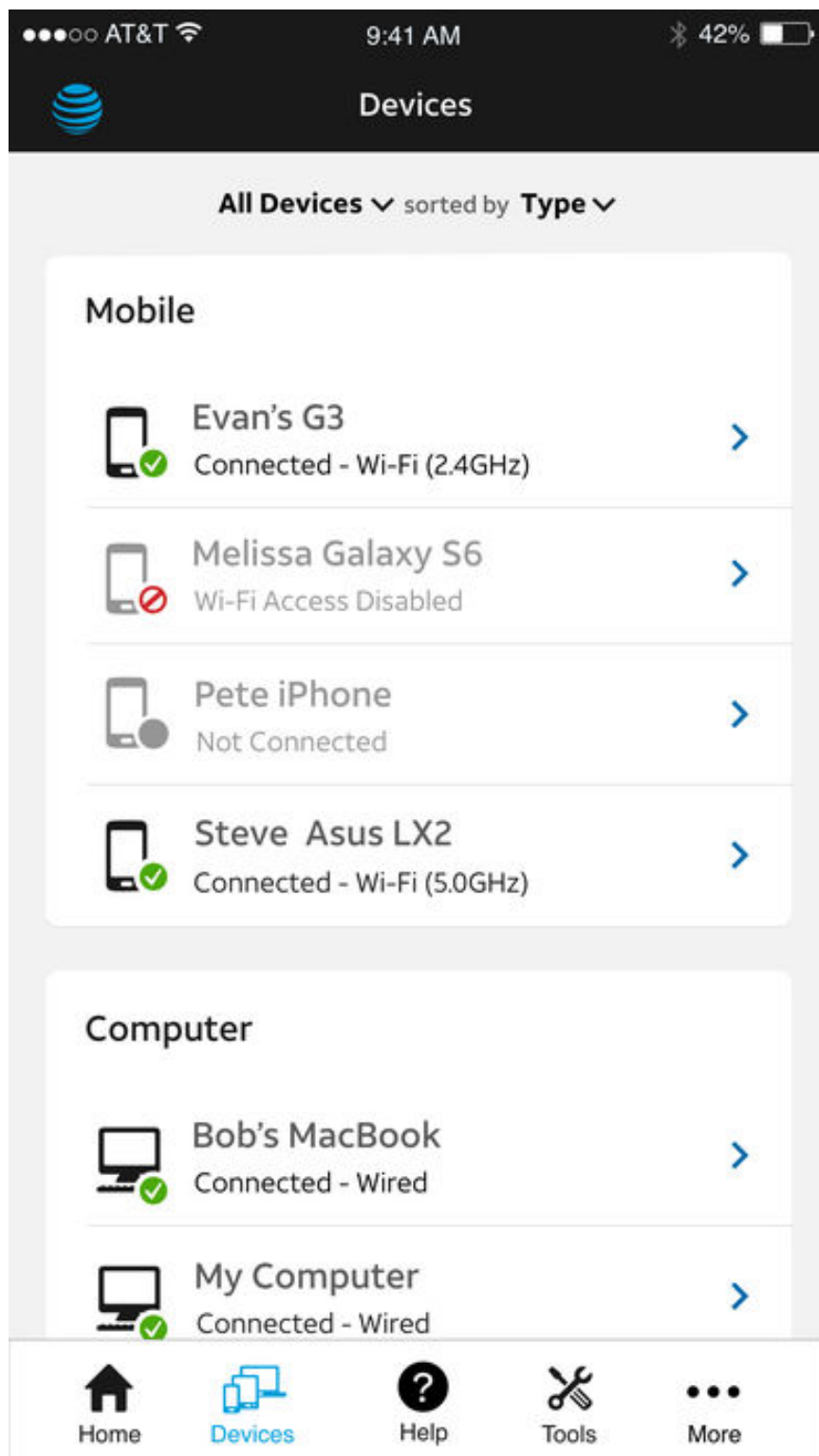
Note: AT&T Smart Home Manager is only available in select areas.

The AT&T Smart Home Manager home screen displays the number and type of devices that connect to your Wi-Fi business network.

To view device-specific information:

1. Select **Devices**. A list of all devices in your network will display.
2. Select the specific **device** you wish to view. The device connection information displays including whether the device is connected, the connection type, and more.

Source: <https://www.att.com/esupport/article.html#!/smb-internet/KM1237605>



Source: <https://apps.mfcbox.com/app/1258654743/smart-home-manager>

27. The Accused Infringing Applications provide a method for in response to a selection of a first link control, displaying on a second screen a data control permitting modification of said first parameter. For example, when a specific device is selected on the device screen of the AT&T Smart Home Manager application, the second screen is displayed. The second screen provides modification of the first parameter (e.g., the connected status (“Wi-Fi access” of the selected device.)

Manage Wi-Fi access

Turn Wi-Fi access on or off for individual devices

Note: This feature is not available for all Wi-Fi gateways.

1. From **Devices**, select the **device** that you wish to change Wi-Fi access.
2. Select **Wi-Fi Access** to toggle the Wi-Fi **On** or **Off** for that device. In order for a connection to work, the device must also have Wi-Fi turned **On**. When Wi-Fi is turned off for the device, it can still access wireless networks.

Source: <https://www.att.com/esupport/article.html#!/smb-internet/KM1237605>



Source: <https://forums.att.com/t5/AT-T-Internet-Equipment/Smart-Home-Manager-Learn-How-To-Personalize-Your-Network/td-p/5153126>

28. The Accused Infringing Applications provide a method for displaying on said second screen said current value of said first parameter. For example, the second screen also displays the Wi-Fi access parameter for each device on the network as it is toggled “On” or “Off.”

Manage Wi-Fi access

Turn Wi-Fi access on or off for individual devices

Note: This feature is not available for all Wi-Fi gateways.

1. From **Devices**, select the **device** that you wish to change Wi-Fi access.
2. Select **Wi-Fi Access** to toggle the Wi-Fi **On** or **Off** for that device. In order for a connection to work, the device must also have Wi-Fi turned **On**. When Wi-Fi is turned off for the device, it can still access wireless networks.

Source: <https://www.att.com/esupport/article.html#!/smb-internet/KM1237605>



Source: <https://forums.att.com/t5/AT-T-Internet-Equipment/Smart-Home-Manager-Learn-How-To-Personalize-Your-Network/td-p/5153126>

29. AT&T has infringed, and continues to infringe, at least claim 6 of the '272 patent in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Applications in violation of 35 U.S.C. § 271(a).

30. AT&T also has infringed, and continues to infringe, at least claim 6 of the '272 patent by actively inducing others to use, offer for sale, and sell the Accused Infringing Applications. AT&T's users, customers, agents or other third parties who use those devices in accordance with AT&T's instructions infringe claim 6 of the '272 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs customers to infringe through training videos, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport; <https://forums.att.com/t5/AT-T-Internet-Equipment/Smart-Home-Manager-Learn-How-To-Personalize-Your-Network/td-p/5153126>; <https://www.att.com/esupport/article.html#!/smb-internet/KM1237605>. AT&T is thereby liable for infringement of the '272 patent under 35 U.S.C. § 271(b).

31. AT&T also has infringed, and continues to infringe, at least claim 6 of the '272 patent by offering to commercially distribute, commercially distributing, or importing the Accused Infringing Applications which are used in practicing the processes, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Applications to be especially made or especially adapted for use in infringement of the '272 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the '272 Patent under 35 U.S.C. § 271(c).

32. AT&T is on notice of infringement of the '272 patent by no later than the filing and service of this Complaint. By the time of trial, AT&T will have known and intended (since

receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 6 of the '272 patent.

33. Upon information and belief, AT&T may have infringed and continues to infringe the '272 patent through other software and devices utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Applications.

34. AT&T's acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T's wrongful acts in an amount subject to proof at trial.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 6,519,005

35. The allegations of paragraphs 1-14 of this Complaint are incorporated by reference as though fully set forth herein.

36. The '005 patent titled, "Method Of Concurrent Multiple-Mode Estimation for Digital Video," issued on February 11, 2003. A copy of the '005 patent is attached as Exhibit B.

37. Pursuant to 35 U.S.C. § 282, the '005 patent is presumed valid.

38. Invented by Koninklijke Philips Electronics N.V., the inventions of the '005 patent were not well-understood, routine or conventional at the time of the invention. At the time of invention of the '005 patent, different compression algorithms had been developed for digitally encoding video and audio information (hereinafter referred to generically as "digital video data stream") in order to minimize the bandwidth required to transmit this digital video data stream for a given picture quality. '005 patent at 1:12-17. Several multimedia specification committees established and proposed standards for encoding/compressing and decoding/decompressing audio and video information. The most widely accepted international standards have been proposed by the Moving Pictures Expert Group (MPEG). *Id.* at 1:17-22

Video coding, such as MPEG coding, involves a number of steps. In general, in accordance with the MPEG standards, the audio and video data comprising a multimedia data stream (or “bit stream”) are encoded/compressed in an intelligent manner using a compression technique generally known as “motion coding.” *Id.* at 1:41-45. More particularly, rather than transmitting each video frame in its entirety, MPEG uses motion estimation for only those parts of sequential pictures that vary due to motion, where possible. *Id.* at 45-48. In general, the picture elements or “pixels” of a picture are specified relative to those of a previously transmitted reference or “anchor” picture using differential or “residual” video, as well as so-called “motion vectors” that specify the location of a 16-by-16 array of pixels or “macroblock” within the current picture relative to its original location within the anchor picture. *Id.* at 1:48-55. Computation of the motion vector(s) for a given macroblock involves an exhaustive search procedure that is very computationally intensive. *Id.* at 3:25-39. It was desirable at the time of the invention to improve this process. *Id.* at 3:40-67.

39. The inventive solution of the claimed inventions of the '005 patent provides a system and method for digital video compression, and, more particularly, to a motion estimation method and search engine for a digital video encoder that is simpler, faster, and less expensive than prior art technology, and that permits concurrent motion estimation using multiple prediction modes. *Id.* at 1:6-11.

40. A person of ordinary skill in the art reading the '005 patent and its claims would understand that the patent's disclosure and claims are drawn to solving a specific, technical problem arising in the field of digital video compression. *Id.* Moreover, a person of ordinary skill in the art would understand that the claimed subject matter of the '005 patent presents advancements in the field of digital video compression, and more particularly to a motion

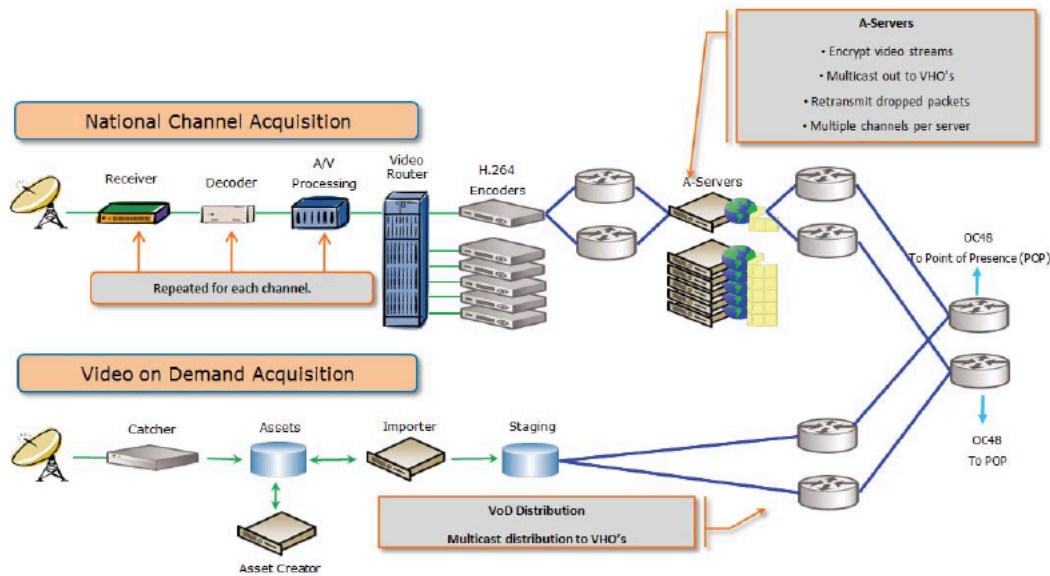
estimation method and search engine for a digital video encoder that is simpler, faster, and less expensive than prior art technology, and that permits concurrent motion estimation using multiple prediction modes. *Id.*

41. AT&T makes, uses, offers for sale and sells in the United States and imports into the United States electronic devices such as U-verse, that practice a method for motion coding an uncompressed digital video data stream (collectively the “Accused Infringing Devices”).

42. Upon information and belief, the Accused Infringing Devices infringe claim 1 of the ’005 patent by practicing a method in the exemplary manner described below.

43. The Accused Infringing Devices provide a method for motion coding an uncompressed digital video data stream. The Accused Infringing Devices receive input video streams which are then encoded and/or transcoded using at least the H.264 standard. The H.264 standard is a widely used video compression format with decoder support on web browsers, TVs and other consumer devices. The H.264 standard uses motion compressor and estimator for motion coding video streams. The Accused Infringing Devices encode video streams using H.264 encoders.

Linear Network Overview and Content Flows



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Source: AT&T U-verse Overview, Ahmad Ansari, Director of U-verse STB and Home Networking Design (March 13, 2015), p. 4

Linear Ingest:

- Linear channels are encoded using H.264 video compression and Dolby Digital Plus (DD+) converted to AC-3 by the STB or AAC audio, and contained within an MPEG-2 transport stream
- When ingested into Mediaroom, the channels are encrypted and encapsulated as RTP streams via the Acquisition Servers (A-servers), and distributed via multicast to the local VHOs
- Linear channels are also acquired by a Distribution Server (D-server), which is at the VHO and used for instant channel change

Source: AT&T U-verse Overview, Ahmad Ansari, Director of U-verse STB and Home Networking Design (March 13, 2015), p. 5

VOD Creation:

- VOD assets are encoded using H.264 video and AC-3 audio, and contained within an MPEG-2 transport stream
- When ingested into Mediaroom, the assets are encrypted, encapsulated as an RTP stream, then distributed and stored at the local VHOs on VOD Servers (V-servers)

Source: AT&T U-verse Overview, Ahmad Ansari, Director of U-verse STB and Home Networking Design (March 13, 2015), p. 6

- The Microsoft Mediaroom DRM is used for content protection on AT&T U-verse STBs with an embedded secure SOC
- U-verse is offered to third party devices such as smart phones (iOS, Android), tablets, PCs and laptops through AT&T U-verse applications. PlayReady DRM is used for content protection on these devices

Source: AT&T U-verse Overview, Ahmad Ansari, Director of U-verse STB and Home Networking Design (March 13, 2015), p. 2

0.6 Overview of the design characteristics

This subclause does not form an integral part of this Recommendation | International Standard.

The coded representation specified in the syntax is designed to enable a high compression capability for a desired image quality. With the exception of the transform bypass mode of operation for lossless coding in the High 4:4:4 Intra, CAVLC 4:4:4 Intra, and High 4:4:4 Predictive profiles, and the I_PCM mode of operation in all profiles, the algorithm is typically not lossless, as the exact source sample values are typically not preserved through the encoding and decoding processes. A number of techniques may be used to achieve highly efficient compression. Encoding algorithms (not specified in this Recommendation | International Standard) may select between inter and intra coding for block-shaped regions of each picture. Inter coding uses motion vectors for block-based inter prediction to exploit temporal statistical dependencies between different pictures. Intra coding uses various spatial prediction modes to exploit spatial statistical dependencies in the source signal for a single picture. Motion vectors and intra prediction modes may be specified for a variety of block sizes in the picture. The prediction residual is then further compressed using a transform to remove spatial correlation inside the transform block before it is quantised, producing an irreversible process that typically discards less important visual information while forming a close approximation to the source samples. Finally, the motion vectors or intra prediction modes are combined with the quantised transform coefficient information and encoded using either variable length coding or arithmetic coding.

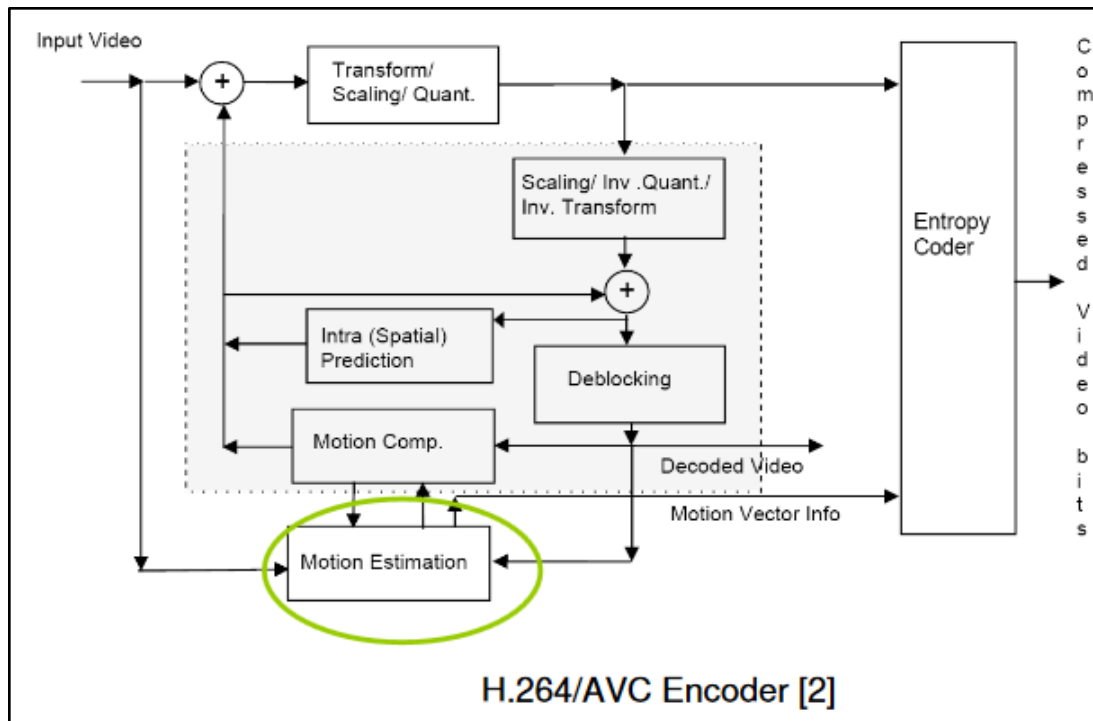
0.6.1 Predictive coding

This subclause does not form an integral part of this Recommendation | International Standard.

Because of the conflicting requirements of random access and highly efficient compression, two main coding types are specified. Intra coding is done without reference to other pictures. Intra coding may provide access points to the coded sequence where decoding can begin and continue correctly, but typically also shows only moderate compression efficiency. Inter coding (predictive or bi-predictive) is more efficient using inter prediction of each block of sample values from some previously decoded picture selected by the encoder. In contrast to some other video coding standards, pictures coded using bi-predictive inter prediction may also be used as references for inter coding of other pictures.

The application of the three coding types to pictures in a sequence is flexible, and the order of the decoding process is generally not the same as the order of the source picture capture process in the encoder or the output order from the decoder for display. The choice is left to the encoder and will depend on the requirements of the application. The

Source: H.264 Standard (03-2010) at pp. 3-4

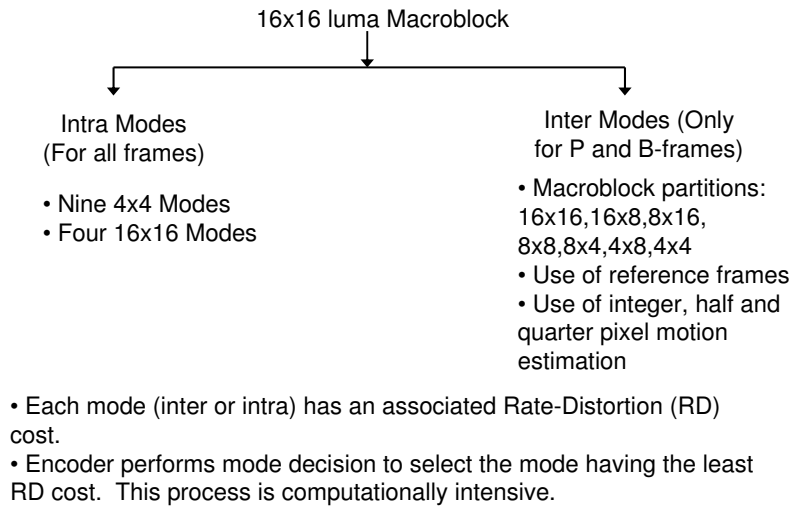


Source: <https://courses.cs.washington.edu/courses/csep590a/07au/lectures/rahullarge.pdf>

44. The Accused Infringing Devices provide a method for comparing pixels of a first pixel array (e.g., a macroblock) in a picture currently being coded with pixels of a plurality of second pixel arrays in at least one reference picture and concurrently performing motion estimation for each of a plurality of different prediction modes in order to determine which of the prediction modes is an optimum prediction mode. The H.264 standard uses different motion estimation modes in inter-frame prediction. These modes are commonly referred to as inter-frame prediction modes, or inter modes. Each inter mode involves partitioning the current Macroblock into a different combination of sub blocks, and selecting the optimum motion vector for the current Macroblock based on the partition. The inter-frame prediction modes, or inter modes, can be further categorized by the number and position of the reference frames, as well as the choice of integer pixel, half pixel and quarter pixel values in motion estimation. The Accused Infringing Devices' H.264 encoders concurrently perform motion estimation of a

Macroblock for all inter-modes and select the most optimum prediction mode with least rate distortion cost.

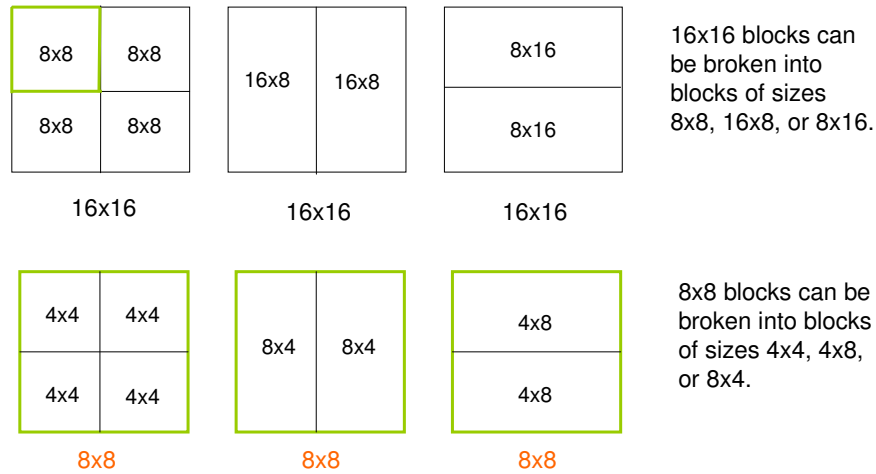
Mode Decision



Source: <https://courses.cs.washington.edu/courses/csep590a/07au/lectures/rahullarge.pdf>, p. 30

45. H.264 provides a hierarchical way to partition a Macroblock, with the available partitions shown in the following two figures. An exemplary inter-frame prediction mode, or inter mode, can be for a Macroblock to be partitioned to encompass a 16x8 sub block on the left, and two 8x8 sub blocks on the right.

Macroblock Partitions



Source: <https://courses.cs.washington.edu/courses/csep590a/07au/lectures/rahullarge.pdf>, p. 4

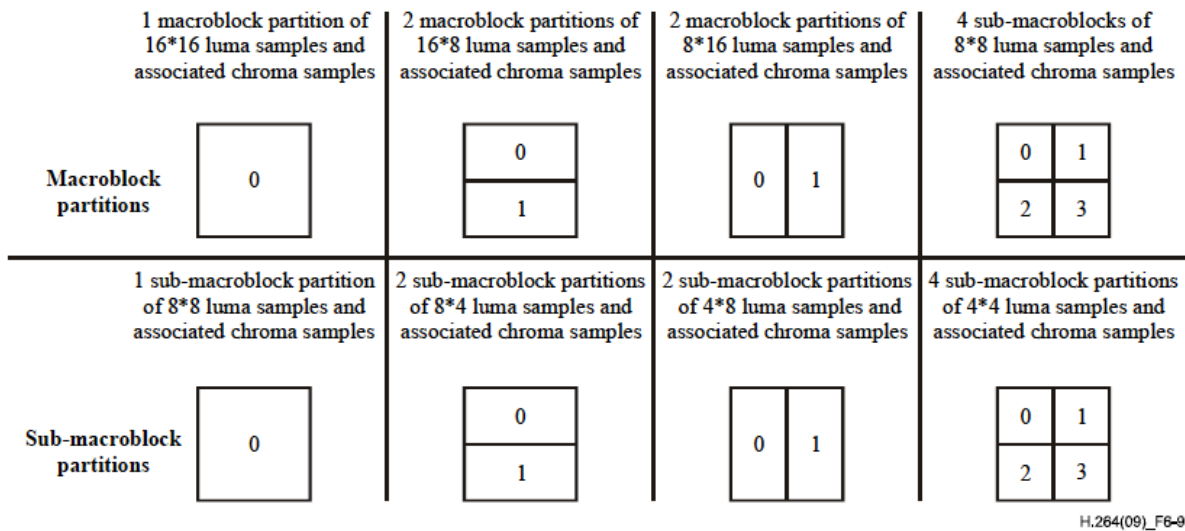


Figure 6-9 – Macroblock partitions, sub-macroblock partitions, macroblock partition scans, and sub-macroblock partition scans

Source: H.264 Standard (03-2010) at p. 26

46. The optimum prediction mode as chosen for the current Macroblock is embedded in the compressed bit stream of H.264, as shown in the following two syntaxes.

7.3.5.1 Macroblock prediction syntax

	C	Descriptor
<code>mb_pred(mb_type) {</code>		
<code> if(MbPartPredMode(mb_type, 0) == Intra_4x4 </code>		
<code> MbPartPredMode(mb_type, 0) == Intra_16x16) {</code>		
<code> if(MbPartPredMode(mb_type, 0) == Intra_4x4)</code>		
<code> for(luma4x4BlkIdx=0; luma4x4BlkIdx<16; luma4x4BlkIdx++) {</code>		
<code> prev_intra4x4_pred_mode_flag[luma4x4BlkIdx]</code>	2	u(1) ae(v)
<code> if(!prev_intra4x4_pred_mode_flag[luma4x4BlkIdx])</code>		
<code> rem_intra4x4_pred_mode[luma4x4BlkIdx]</code>	2	u(3) ae(v)
<code> }</code>		
<code> intra_chroma_pred_mode</code>	2	ue(v) ae(v)
<code> } else if(MbPartPredMode(mb_type, 0) != Direct) {</code>		
<code> for(mbPartIdx = 0; mbPartIdx < NumMbPart(mb_type); mbPartIdx++)</code>		
<code> if((num_ref_idx_l0_active_minus1 > 0 </code>		
<code> mb_field_decoding_flag) &&</code>		
<code> MbPartPredMode(mb_type, mbPartIdx) != Pred_L1)</code>		
<code> ref_idx_l0[mbPartIdx]</code>	2	te(v) ae(v)
<code> for(mbPartIdx = 0; mbPartIdx < NumMbPart(mb_type); mbPartIdx++)</code>		
<code> if((num_ref_idx_l1_active_minus1 > 0 </code>		
<code> mb_field_decoding_flag) &&</code>		
<code> MbPartPredMode(mb_type, mbPartIdx) != Pred_L0)</code>		
<code> ref_idx_l1[mbPartIdx]</code>	2	te(v) ae(v)
<code> for(mbPartIdx = 0; mbPartIdx < NumMbPart(mb_type); mbPartIdx++)</code>		
<code> if(MbPartPredMode(mb_type, mbPartIdx) != Pred_L1)</code>		
<code> for(compIdx = 0; compIdx < 2; compIdx++)</code>		
<code> mvd_l0[mbPartIdx][0][compIdx]</code>	2	se(v) ae(v)
<code> for(mbPartIdx = 0; mbPartIdx < NumMbPart(mb_type); mbPartIdx++)</code>		
<code> if(MbPartPredMode(mb_type, mbPartIdx) != Pred_L0)</code>		
<code> for(compIdx = 0; compIdx < 2; compIdx++)</code>		
<code> mvd_l1[mbPartIdx][0][compIdx]</code>	2	se(v) ae(v)
<code> }</code>		
<code> }</code>		
<code>}</code>		

Source: H.264 Standard (03-2010) at p. 57

7.3.5.2 Sub-macroblock prediction syntax

	C	Descriptor
sub_mb_pred(mb_type) {		
for(mbPartIdx = 0; mbPartIdx < 4; mbPartIdx++)		
sub_mb_type[mbPartIdx]	2	ue(v) ae(v)
for(mbPartIdx = 0; mbPartIdx < 4; mbPartIdx++)		
if((num_ref_idx_l0_active_minus1 > 0 mb_field_decoding_flag) && mb_type != P_8x8ref0 && sub_mb_type[mbPartIdx] != B_Direct_8x8 && SubMbPredMode(sub_mb_type[mbPartIdx]) != Pred_L1)		
ref_idx_l0[mbPartIdx]	2	te(v) ae(v)
for(mbPartIdx = 0; mbPartIdx < 4; mbPartIdx++)		
if((num_ref_idx_l1_active_minus1 > 0 mb_field_decoding_flag) && sub_mb_type[mbPartIdx] != B_Direct_8x8 && SubMbPredMode(sub_mb_type[mbPartIdx]) != Pred_L0)		
ref_idx_l1[mbPartIdx]	2	te(v) ae(v)
for(mbPartIdx = 0; mbPartIdx < 4; mbPartIdx++)		
if(sub_mb_type[mbPartIdx] != B_Direct_8x8 && SubMbPredMode(sub_mb_type[mbPartIdx]) != Pred_L1)		
for(subMbPartIdx = 0; subMbPartIdx < NumSubMbPart(sub_mb_type[mbPartIdx]); subMbPartIdx++)		
for(compIdx = 0; compIdx < 2; compIdx++)		
mvd_l0[mbPartIdx][subMbPartIdx][compIdx]	2	se(v) ae(v)
for(mbPartIdx = 0; mbPartIdx < 4; mbPartIdx++)		
if(sub_mb_type[mbPartIdx] != B_Direct_8x8 && SubMbPredMode(sub_mb_type[mbPartIdx]) != Pred_L0)		
for(subMbPartIdx = 0; subMbPartIdx < NumSubMbPart(sub_mb_type[mbPartIdx]); subMbPartIdx++)		
for(compIdx = 0; compIdx < 2; compIdx++)		
mvd_l1[mbPartIdx][subMbPartIdx][compIdx]	2	se(v) ae(v)
}		

Source: H.264 Standard (03-2010) at p. 58

47. The Accused Infringing Devices provide a method for determining which of the second pixel arrays (e.g., macroblock) constitutes a best match with respect to the first pixel array (e.g., macroblock) for the optimum prediction mode.

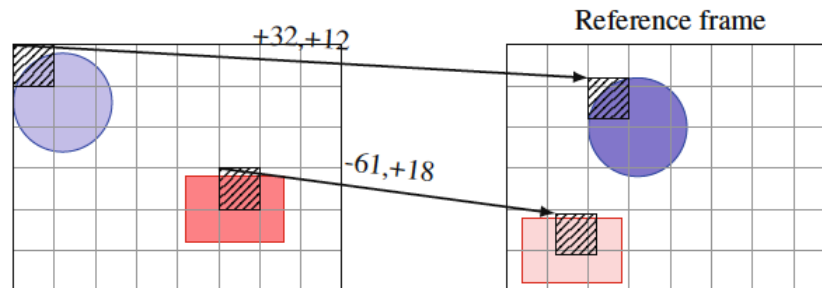


Fig. 2.4: Motion estimation. For each MB the best matching block in the reference frame is found. The encoder codes the differences (errors) between the MBs and their best matching blocks. Arrows indicate motion vectors and are labeled by the vector coordinates. In this example the shapes are identical but their colors are slightly larger/darker.

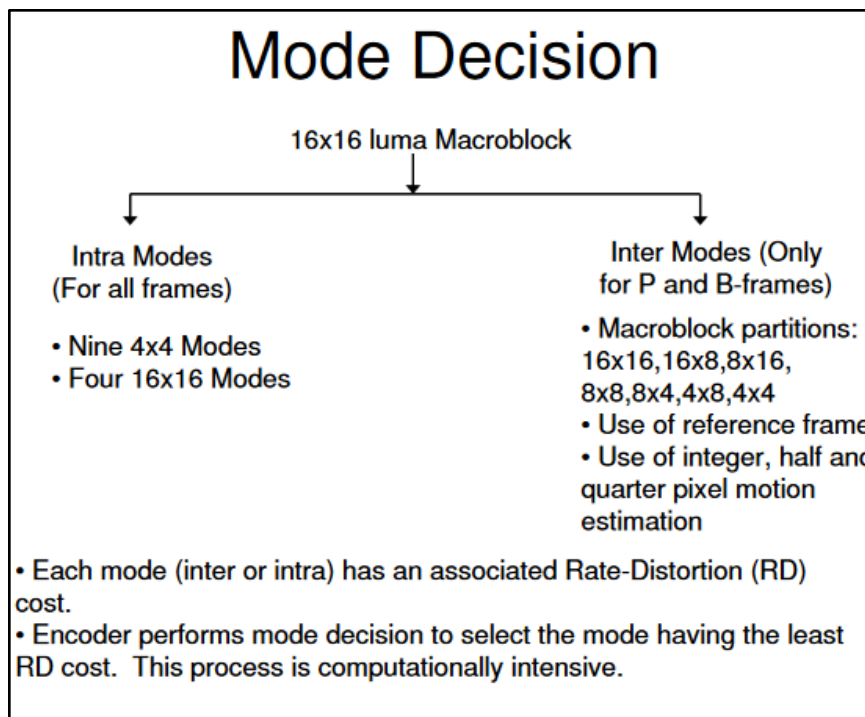
Source: B. Juurlink et al., Scalable Parallel Programming Applied to H.264, Chapter 2: Understanding the Application: An Overview of the H.264 Standard, p. 12

48. For example, the encoder performs mode decision to select the most optimum prediction mode with least rate distortion cost.

The following semantics are assigned to the macroblock types in Table 7-13:

- P_L0_16x16: the samples of the macroblock are predicted with one luma macroblock partition of size 16x16 luma samples and associated chroma samples.
- P_L0_L0_MxN, with MxN being replaced by 16x8 or 8x16: the samples of the macroblock are predicted using two luma partitions of size MxN equal to 16x8, or two luma partitions of size MxN equal to 8x16, and associated chroma samples, respectively.
- P_8x8: for each sub-macroblock an additional syntax element (`sub_mb_type[mbPartIdx]` with `mbPartIdx` being the macroblock partition index for the corresponding sub-macroblock) is present in the bitstream that specifies the type of the corresponding sub-macroblock (see subclause 7.4.5.2).
- P_8x8ref0: has the same semantics as P_8x8 but no syntax element for the reference index (`ref_idx_10[mbPartIdx]` with `mbPartIdx = 0..3`) is present in the bitstream and `ref_idx_10[mbPartIdx]` shall be inferred to be equal to 0 for all sub-macroblocks of the macroblock (with indices `mbPartIdx = 0..3`).
- P_Skip: no further data is present for the macroblock in the bitstream.

Source: H.264 Standard (03-2010), p. 100



Source: <https://courses.cs.washington.edu/courses/csep590a/07au/lectures/rahullarge.pdf>, p. 30

49. The Accused Infringing Devices provide a method for generating a motion vector for the first pixel array in response to the determining step. The encoder calculates the appropriate motion vectors and other data elements represented in the video data stream.

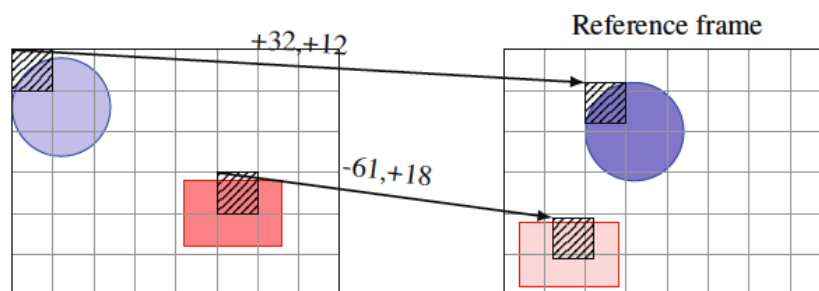


Fig. 2.4: Motion estimation. For each MB the best matching block in the reference frame is found. The encoder codes the differences (errors) between the MBs and their best matching blocks. Arrows indicate motion vectors and are labeled by the vector coordinates. In this example the shapes are identical but their colors are slightly larger/darker.

Source: B. Juurlink et al., Scalable Parallel Programming Applied to H.264, Chapter 2: Understanding the Application: An Overview of the H.264 Standard, p. 12

1. The derivation process for motion vector components and reference indices as specified in subclause 8.4.1 is invoked.

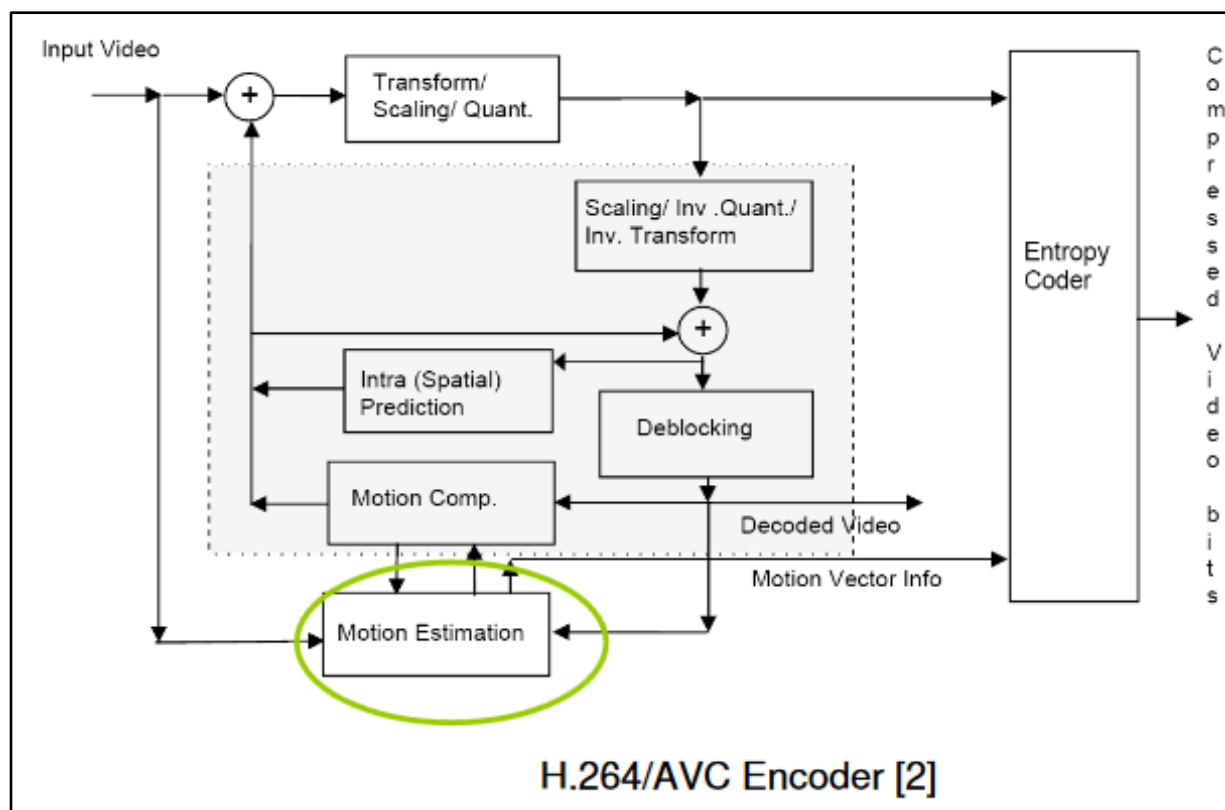
Inputs to this process are:

- a macroblock partition `mbPartIdx`,
- a sub-macroblock partition `subMbPartIdx`.

Outputs of this process are:

- luma motion vectors `mvL0` and `mvL1` and when `ChromaArrayType` is not equal to 0, the chroma motion vectors `mvCL0` and `mvCL1`
- reference indices `refIdxL0` and `refIdxL1`
- prediction list utilization flags `predFlagL0` and `predFlagL1`
- the sub-macroblock partition motion vector count `subMvCnt`.

Source: H.264 Standard (03-2010), p. 151



Source: <https://courses.cs.washington.edu/courses/csep590a/07au/lectures/rahullarge.pdf>, p. 2

50. AT&T has infringed, and continues to infringe, at least claim 1 of the '005 patent

in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

51. AT&T also has infringed, and continues to infringe, at least claim 1 of the '005 patent by actively inducing others to use, offer for sale, and sell the Accused Infringing Devices. AT&T's users, customers, agents or other third parties who use those devices in accordance with AT&T's instructions infringe claim 1 of the '005 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs customers to infringe through training videos, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport; . AT&T is thereby liable for infringement of the '005 patent under 35 U.S.C. § 271(b).

52. AT&T also has infringed, and continues to infringe, at least claim 1 of the '005 patent by offering to commercially distribute, commercially distributing, or importing the Accused Infringing Devices which devices are used in practicing the processes, or using the systems, of the '005 patent, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Devices to be especially made or especially adapted for use in infringement of the '005 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the '005 Patent under 35 U.S.C. § 271(c).

53. AT&T is on notice of its infringement of the '005 patent by no later than the filing and service of this Complaint. By the time of trial, AT&T will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 1 of the '005 patent.

54. Upon information and belief, AT&T may have infringed and continues to infringe

the '005 patent through other software and devices utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

55. AT&T's acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T's wrongful acts in an amount subject to proof at trial.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 7,016,676

56. The allegations of paragraphs 1-14 of this Complaint are incorporated by reference as though fully set forth herein.

57. The '676 patent titled, "Method, Network And Control Station For the Two-Way Alternate Control of Radio Systems Of Different Standards In The Same Frequency Band," issued on March 21, 2006. A copy of the '676 patent is attached as Exhibit C.

58. Pursuant to 35 U.S.C. § 282, the '676 patent is presumed valid.

59. Invented by Koninklijke Philips Electronics, N.V., the inventions of the '676 patent were not well-understood, routine or conventional at the time of the invention. At the time of invention of the '676 patent, a national regulation authority determined on what frequencies, with what transmission power and in accordance with what radio interface standard a radio system was allowed to transmit. '676 patent at 1:12-15. There was provided so-called ISM frequency bands (Industrial Scientific Medical) where radio systems can transmit in the same frequency band in accordance with different radio interface standards. *Id.* at 1:15-18. One example of this is the US radio system IEEE 802.11a and the European ETSI BRAN HiperLAN/2. *Id.* at 1:18-20. The two radio systems transmit in the same frequency bands between 5.5 GHz and 5.875 GHz with approximately the same radio transmission method, but different transmission protocols. *Id.* at 1:20-23. In the event of interference, prior art systems

were implemented for active switching to another frequency within the permitted frequency band, for controlling transmission power and for adaptive coding and modulation to reduce interference. *Id.* at 1:23-28. These prior art systems suffered from drawbacks. *Id.* at 1:65-2:10. For example, prior art system and methods did not make optimum use and spreading possible of the radio channels over the stations which transmit in accordance with different standards. *Id.* The guarantee of the service quality necessary for the multimedia applications is impossible in the case of interference caused by their own stations or stations of outside systems. *Id.* at 2:5-8. In the case of alternating interference, the prior art systems did not work efficiently and occupy a frequency channel even at low transmission rates. *Id.* at 2:8-10.

60. The inventive solution of the claimed inventions of the '676 patent provides an interface control protocol method that overcomes one or more problems of the prior art and makes efficient use of radio transmission channels. *Id.* at 2:11-22. For example, the invention provides a method that controls alternate use of the common frequency band to provide certain predefined time intervals for the use of the first and second radio interface standard and allocate the frequency band alternately to the first radio interface standard and then to the second radio interface standard in a type of time-division multiplex mode. *Id.* at 2:51-57. According to the claimed invention, a control station controls the access to the common frequency band for stations working in accordance with the first radio interface standard and—renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band. *Id.* at 6:29-36. The common radio channel can then be utilized more effectively particularly when the demand for transmission capacity in accordance with the first and the second radio interface standard varies. *Id.* at 2:58-62.

61. A person of ordinary skill in the art reading the '676 patent and its claims would understand that the patent's disclosure and claims are drawn to solving a specific, technical problem arising from the evolution of radio communications standards that are designed to operate over the same frequency band. Moreover, a person of ordinary skill in the art would understand that the claimed subject matter of the '676 patent presents advancements in the field of radio communications standards, such as 802.11 ("Wi-Fi"), and, more particularly, alternate control of radio systems of different standards in the same frequency band. Indeed, the time of invention is roughly three years after the 802.11 standard was first released in June of 1997. And, as detailed by the specification, the prior art interference control systems suffered drawbacks such that a new and novel interface-control protocol method was required. The inventions of the '676 patent do not and cannot apply to human behavior and are indigenous to the then nascent field of alternate control of radio systems of different standards in the same frequency band.

62. AT&T makes, uses, offers for sale and sells in the United States and imports into the United States a network, base stations, and network controllers (collectively the "Accused Infringing Devices") that provide shared network access to LTE-LAA and Wi-Fi capable devices over at least one common frequency band.

63. Upon information and belief, the Accused Infringing Devices infringe claim 1 of the '676 patent by practicing a method in the exemplary manner described below.

64. The Accused Infringing Devices perform the claimed method. In particular, AT&T's Network, base stations, and network controllers perform an interface control method that provides for alternate use of the 5 GHz frequency band, which is used by a first (Wi-Fi) and second (LTE-LAA) interface standard.

AT&T Reaches Wireless Speeds of More than 750 Mbps with LTE Licensed Assisted Access (LTE-LAA) Field Trials

Initial LTE-LAA Rollout Planned by End of Year

AT&T and Ericsson conduct one of the first-ever live LTE-LAA field trials, reaching initial wireless speeds of more than 750 megabits per second (Mbps) in downtown San Francisco.

LTE-LAA technology is expected to play a key role as we aim to reach theoretical peak speeds of up to 1 gigabit per second (Gbps) at some small cell sites by the end of the year. It's also one of the technologies we're using to enhance the network and boost speeds in our [5G Evolution](#) markets.

While 5G standards are still being finalized, we're laying the foundation for tomorrow's faster wireless speeds today with 5G Evolution and also with technologies like LTE-LAA. This is a major step on our [journey](#) to deliver state-of-the-art 5G speeds as early as late 2018.

LTE-LAA combines unlicensed spectrum with licensed spectrum through carrier aggregation to increase network capacity— providing faster speeds and a better customer experience. It is designed to exist in harmony with other unlicensed spectrum technologies such as Wi-Fi. This is done through a feature called “listen before talk”, which ensures fair coexistence between LTE-LAA and Wi-Fi.

Source: http://about.att.com/story/lte_licensed_assisted_access_field_trials.html



COMPANY

INVESTORS

VALUES

CAREERS

NEWS

AT&T Debuts Commercial LTE Licensed Assisted Access (LTE-LAA) Technology in Indianapolis

Initial Deployments in Select Downtown Areas, Expanded Rollout Planned by Year End

AT&T* deployed Commercial LTE-Licensed Assisted Access (LTE-LAA) technologies in select parts of downtown Indianapolis. We plan to expand LTE-LAA coverage in more areas of downtown Indianapolis by the end of the year.

This technology is another step in our evolution to 5G. We're working closely with the City of Indianapolis to deploy the upgrades needed to support future technologies, like 5G.

"We're excited to be the first carrier to commercially deploy LTE-LAA technology for our customers in parts of Indianapolis," said Bill Soards, President AT&T Indiana. "Demand continues to grow at a rapid pace on our network. That's why offering customers the latest technologies and increased wireless capacity by combining licensed and unlicensed spectrum is an important milestone."

LAA is expected to play a key role as we aim to reach theoretical peak speeds of up to 1 gigabit per second (Gbps). In previous field tests of this technology, we were one of the first carriers to observe actual peak wireless speeds of 979 megabits per second (Mbps).

With the Samsung Galaxy Note8, AT&T wireless customers in select areas within Indianapolis can take advantage of the experience this technology offers.

Source: http://about.att.com/story/commercial_lte_licensed_assisted_access_indianapolis.html

Samsung Galaxy Note8 ★★★★★ 4.7 | 550 reviews

Overview Specs Q&A Top

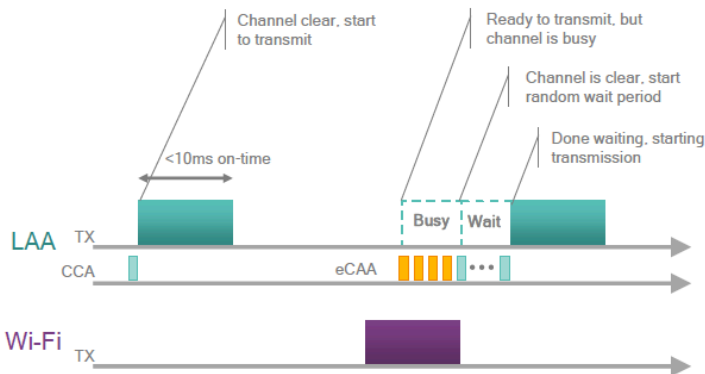
Wireless Technology

4G LTE	Bands 1, 2, 3, 4, 5, 7, 8, 12, 20, 28, 29, 30, 38, 39, 40, 41, 66, and LAA Band 46 ⁸
4G	HSPA+ with enhanced backhaul
3G - UMTS	850/900/1900/2100MHz
GSM/GPRS/EDGE	850/900/1800/1900MHz
World phone	Quad-band
HD Voice capable	✓
Wi-Fi Calling capable	✓
AT&T Video call capable	✓
Wi-Fi connectivity	802.11a/b/g/n/ac/l/r
Wi-Fi-capability	2.4GHz & 5GHz

Source: <https://www.att.com/cellphones/samsung/galaxy-note8.html#specs>

LBT ensures fair sharing in unlicensed 5 GHz

LBT is standardized in ETSI EN 301 893



ED - Energy Detect Threshold

Introducing¹ a more sensitive threshold that is common for all technologies when sensing each other.

CCA - Clear channel assessment

If no signal is sensed based on ED threshold, then go ahead with transmission right away.

eCCA - Extended CCA

If channel is busy (CCA), then wait for it to become clear. Once it is clear, wait for a random number of additional CCAs indicating that the channel has remained clear before starting transmission.

Designed for fair sharing of 5 GHz

Meets global regulations

Same rule for everyone¹, including Wi-Fi and LTE

1) Proposed in next release of ETSI EN 301 893 with a target release mid 2016.

Source: <https://www.qualcomm.com/documents/progress-laa-and-its-relationship-lte-u-and-multifire>

65. AT&T's Network, base stations and network controllers operate with products with integrated LTE-LAA and Wi-Fi functionality and can operate using a first interface standard (Wi-Fi) and/or second interface standard (LTE-LAA), such as smartphones, tablets, hotspots and other devices. AT&T's Network includes base stations, network controllers and

access points that communicate with these devices.

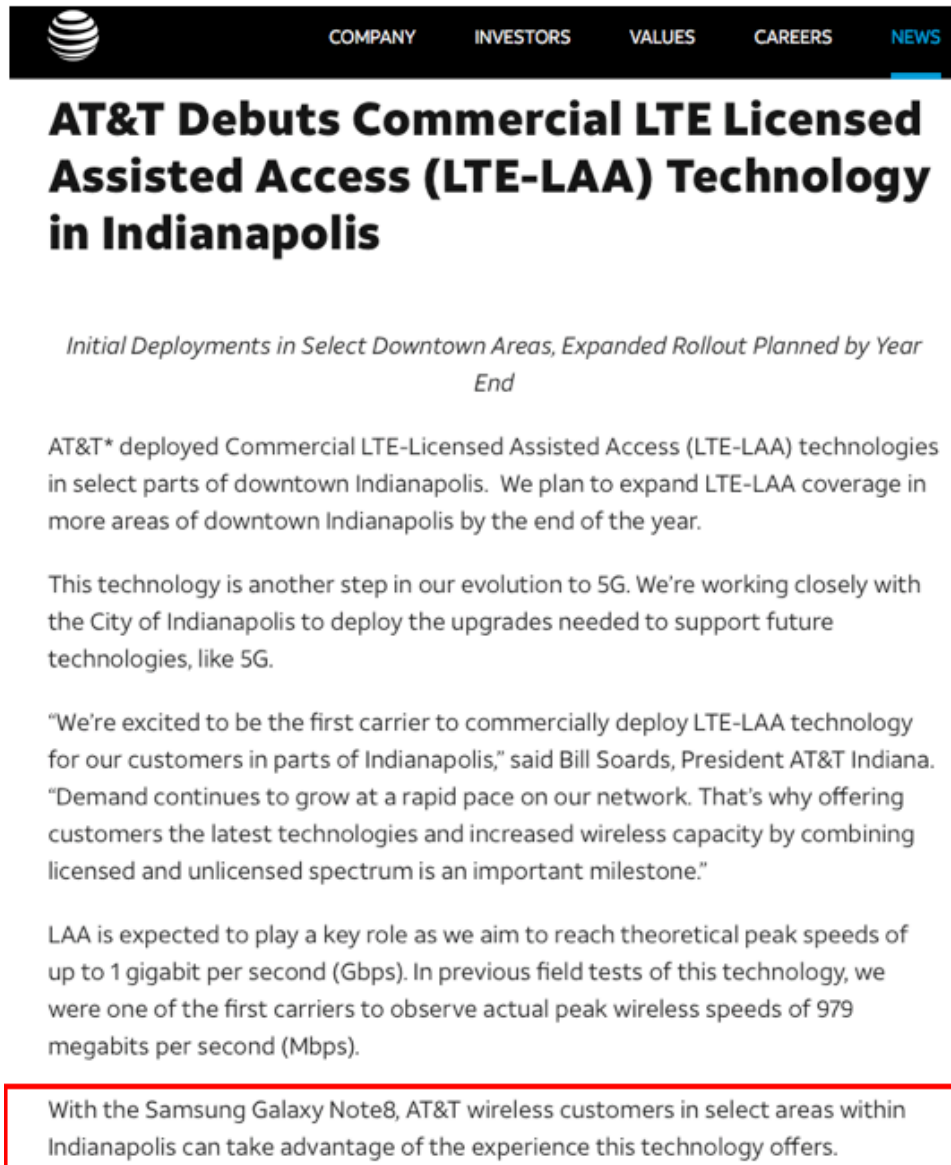
Samsung Galaxy Note8 ★★★★★ 4.7 | 550 reviews Overview Specs Q&A Top

Wireless Technology

4G LTE	Bands 1, 2, 3, 4, 5, 7, 8, 12, 20, 28, 29, 30, 38, 39, 40, 41, 66, and LAA Band 468
4G	HSPA+ with enhanced backhaul
3G – UMTS	850/900/1900/2100MHz
GSM/GPRS/EDGE	850/900/1800/1900MHz
World phone	Quad-band
HD Voice capable	✓
Wi-Fi Calling capable	✓
AT&T Video call capable	✓
Wi-Fi connectivity	802.11a/b/g/n/ac/i/r
Wi-Fi-capability	2.4GHz & 5GHz

Source: <https://www.att.com/cellphones/samsung/galaxy-note8.html#specs>

66. AT&T's Network includes control stations (e.g., LTE-LAA base stations) that control the alternate use of the 5 GHz frequency band.



The image is a screenshot of an AT&T news article. At the top, there is a black navigation bar with the AT&T logo on the left and the words 'COMPANY', 'INVESTORS', 'VALUES', 'CAREERS', and 'NEWS' in white text on the right. Below the navigation bar is the main headline in large, bold, black font: 'AT&T Debuts Commercial LTE Licensed Assisted Access (LTE-LAA) Technology in Indianapolis'. Underneath the headline is a sub-headline in a smaller, italicized font: 'Initial Deployments in Select Downtown Areas, Expanded Rollout Planned by Year End'. The main body of the article consists of several paragraphs of text. The first paragraph states that AT&T* deployed Commercial LTE-Licensed Assisted Access (LTE-LAA) technologies in select parts of downtown Indianapolis and plans to expand coverage by the end of the year. The second paragraph explains that this technology is a step towards 5G and is being deployed in partnership with the City of Indianapolis. The third paragraph is a quote from Bill Soards, President of AT&T Indiana, expressing excitement about being the first carrier to commercially deploy LTE-LAA technology and highlighting the demand for faster wireless speeds. The fourth paragraph discusses the role of LAA in reaching theoretical peak speeds of up to 1 gigabit per second (Gbps). At the bottom of the article, there is a red-bordered box containing a specific detail: 'With the Samsung Galaxy Note8, AT&T wireless customers in select areas within Indianapolis can take advantage of the experience this technology offers.'

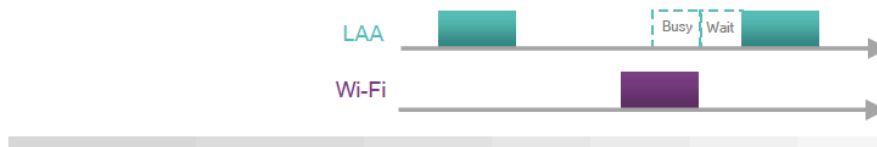
Source: http://about.att.com/story/commercial_lte_licensed_assisted_access_indianapolis.html

LAA is designed to protect Wi-Fi

Select clear channel: Dynamically avoid Wi-Fi



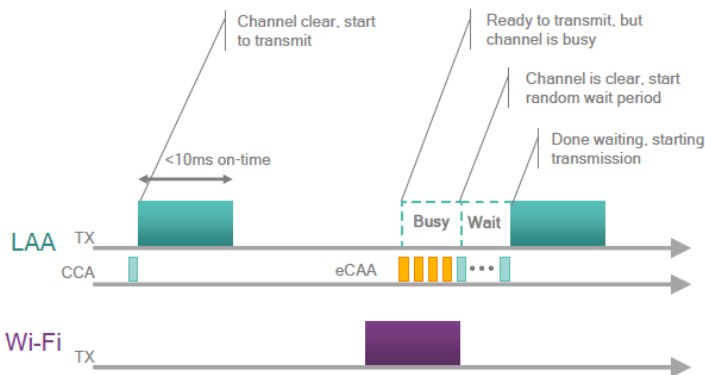
Sharing the channel fairly: "Listen before talk" (LBT)



Release unlicensed channel at low traffic

LBT ensures fair sharing in unlicensed 5 GHz

LBT is standardized in ETSI EN 301 893



ED - Energy Detect Threshold

Introducing¹ a more sensitive threshold that is common for all technologies when sensing each other.

CCA - Clear channel assessment

If no signal is sensed based on ED threshold, then go ahead with transmission right away.

eCCA - Extended CCA

If channel is busy (CCA), then wait for it to become clear. Once it is clear, wait for a random number of additional CCAs indicating that the channel has remained clear before starting transmission.

Designed for fair sharing of 5 GHz

Meets global regulations

Same rule for everyone¹, including Wi-Fi and LTE

1) Proposed in next release of ETSI EN 301 893 with a target release mid 2016.

Source: <https://www.qualcomm.com/documents/progress-laa-and-its-relationship-lte-u-and-multifire>

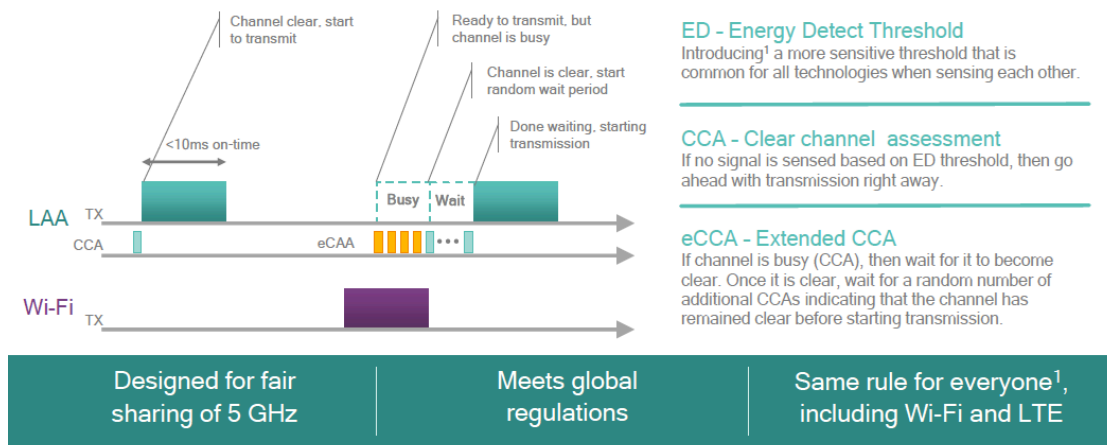
67. AT&T's Network LTE-LAA base stations and network controllers control access to the 5 GHz frequency band, which is used by wireless devices with integrated LTE-LAA and Wi-Fi functionality, such as smartphones, tablets, hotspots and other devices.

68. The base stations control access to the frequency band for stations (e.g.,

smartphones, tablets, hotspots, etc.) working in accordance with the first radio interface standard (e.g., Wi-Fi), for example, by controlling access to the band by other stations (e.g., smartphones, tablets, hotspots, etc.) that are communicating via the second radio interface standard (e.g., LTE-LAA). The base stations render the frequency band available for access by the stations working in accordance with the second radio interface standard (LTE-LAA) when stations working in accordance with the first radio interface standard (Wi-Fi) do not request access to the frequency band. The AT&T base stations accomplish this using a “listen before talk” method.

LBT ensures fair sharing in unlicensed 5 GHz

LBT is standardized in ETSI EN 301 893



1) Proposed in next release of ETSI EN 301 893 with a target release mid 2016.

Source: <https://www.qualcomm.com/documents/progress-laa-and-its-relationship-lte-u-and-multefire>

3.4. Proposed Coexistence and Coordination Techniques

3.4.1. LTE LAA Approach

Towards a coexistence technique that respects the regional regulations, 3GPP announced the LTE LAA standards in Release 13, including the description of a Listen Before Talk (LBT) procedure (also known as CCA) [15]. Initially, LTE LAA is scheduled to operate within the 5-GHz unlicensed spectrum and for DL traffic only, but in a later phase, it is expected to be extended to the 2.4-GHz unlicensed band, as well as for both DL and UL traffic. Initially, an eNB will be able to activate and deactivate a secondary cell operating in the unlicensed spectrum. Through this cell, only data traffic (via the PDSCH) can be sent, while the LTE control signals and the UL traffic (PUSCH) will be transmitted via the licensed anchor. The eNB must perform the LBT procedure and sense the channel

prior to a transmission in the unlicensed spectrum. When the channel is sensed as busy, the eNB must defer its transmission by performing an exponential backoff. If the channel is sensed to be idle, it performs a transmission burst with a duration from 2–10 ms, depending on the channel access priority class. The authors in [16] analytically describe the LTE LAA procedure. They provide an overview of the LAA mechanism including the motivation and use cases where it can be applied. Additionally, they present a coexistence evaluation methodology and results, which have been contributed by 3GPP. Figure 5 shows the LTE LAA and Wi-Fi coexistence in the same channel in the unlicensed spectrum.

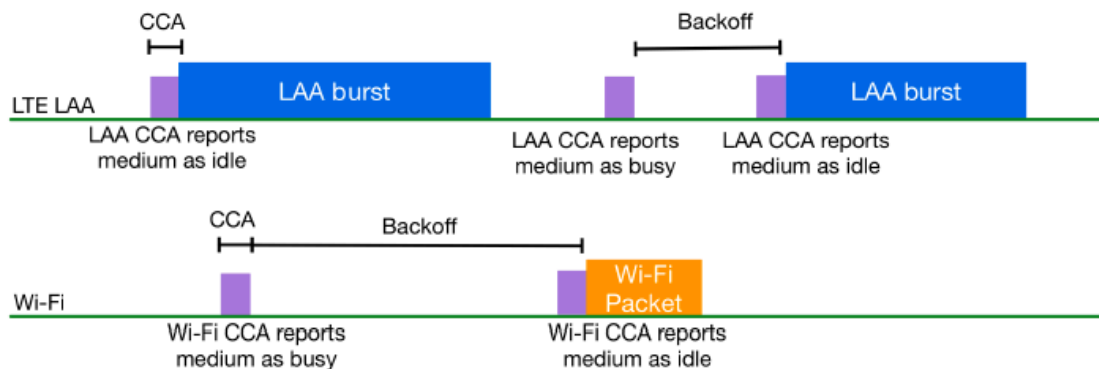


Figure 5. LTE Licensed-Assisted Access (LAA) and Wi-Fi coexistence.

Source: V. Maglogiannis, et al, Cooperation Techniques between LTE in Unlicensed Spectrum and Wi-Fi towards Fair Spectral Efficiency, www.mdpi.com/sensors (2017)

69. AT&T has infringed, and continues to infringe, at least claim 1 of the '676 patent in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

70. AT&T also has infringed, and continues to infringe, at least claim 1 of the '676 patent by actively inducing others to use the Accused Infringing Devices. AT&T's users, customers, agents or other third parties who use wireless devices (e.g., smartphones, tablets, hotspots, etc.) with the Accused Infringing Devices in accordance with AT&T's instructions infringe claim 1 of the '676 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs its customers to infringe through support information, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport. AT&T is thereby liable for infringement of the '676 patent under 35 U.S.C. § 271(b).

71. AT&T also has infringed, and continues to infringe, at least claim 1 of the '676 patent by offering to commercially distribute, commercially distributing, or operating the Accused Infringing Devices which are used in practicing the processes, or using the systems, of the '676 patent, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Devices to be especially made or especially adapted for use in infringement of the '676 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the '676 Patent under 35 U.S.C. § 271(c).

72. AT&T is on notice of its infringement of the '676 patent by no later than the filing and service of this Complaint. By the time of trial, AT&T will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 1 of the '676 patent.

73. Upon information and belief, AT&T may have infringed and continues to infringe the '676 patent through other network technology utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

74. AT&T's acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T's wrongful acts in an amount subject to proof at trial.

PRAYER FOR RELIEF

WHEREFORE, Uniloc 2017 LLC and Uniloc Licensing USA LLC pray for the following relief:

A. A judgment that AT&T has infringed one or more claims of the '272 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

B. A judgment that AT&T has infringed one or more claims of the '005 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

C. A judgment that AT&T has infringed one or more claims of the '676 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

D. That for each Asserted Patent this Court judges infringed by AT&T this Court award Uniloc its damages pursuant to 35 U.S.C. § 284 and any royalties determined to be appropriate;

E. That this be determined to be an exceptional case under 35 U.S.C. § 285 and that Uniloc be awarded enhanced damages up to treble damages for willful infringement as provided by 35 U.S.C. § 284;

F. That this Court award Uniloc prejudgment and post-judgment interest on its damages;

G. That Uniloc be granted its reasonable attorneys' fees in this action;

H. That this Court award Uniloc its costs; and

I. That this Court award Uniloc such other and further relief as the Court deems proper.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Uniloc demands a trial by jury for all issues so triable.

Date: August 29, 2018

/s/ M. Elizabeth Day
M. Elizabeth Day

M. Elizabeth Day (SBN 177125) *Admitted to Practice*

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