

T-Mobile^{1,2,3}
U.S. Patent No. 5,659,891⁴

Appendix C

Claim 1	T-Mobile
<p>1. A method of operating a plurality of paging carriers in a single mask-defined, bandlimited channel comprising the step of</p>	<p>Although the preamble to Claim 1 does not limit the scope of the claim, the T-Mobile’s wireless networks and related devices, as outlined below.</p> <p>T-Mobile makes, uses, sells, or offers to sell wireless network services and equipment that operates according to standards, including 3G UMTS, 3G EV-DO, LTE, 4G LTE-Advanced, and IEEE 802.11 a, b, g, n, and ac (“T-Mobile wireless technologies are standardized by bodies, such as 3GPP and IEEE, and rely on specific frequencies to transmit voice and data. These networks implement methods of operating paging carriers in a single mask-defined, bandlimited channel.</p> <p>The following is a non-exhaustive list of exemplary Accused Products: all devices implementing IEEE 802.11n/ac that implement multiple subcarriers, including:</p> <p>the Alcatel OneTouch Fierce (7024W) & OneTouch Evolve (5020T); the Apple iPhone (A1475), iPad mini (A1454 & A1455), iPad mini with Retina display (A1489 & A1303), iPhone 4 (A1332 & A1349), iPhone 4s (A1387), iPhone 5 (A1428 & A1532), & iPhone 5s (A1453 & A1533); the Blackberry Curve 9315 (RFE71UV) & Z10(STL-100-3 (RFK121LW & RFF91LW)); the Dell Streak 7 (FCC ID: A78200); the Garmin-ASUS Garminfone (1000846); the Google Nexus 4 (LG-E960), Nexus 7 (ME370T, ME370TG, K008, & K009), 2013 Nexus 7 (NEXUS7 ASUS-2B32-</p>


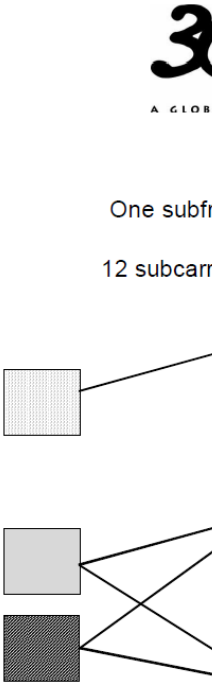
¹ MTel’s use of “T-Mobile” includes to T-Mobile USA, Inc., and T-Mobile US, Inc.

² MTel provides these infringement contentions for T-Mobile. These contentions contain diagrams, screenshots, and other documents by way of example and not by way of limitation. The contentions are based in part on publically available information in the absence of evidence to the contrary. T-Mobile as to all of the relevant and material facts, MTel reserves the right to amend these infringement contentions as discovery progresses.

³ T-Mobile operates under several registered trademarks including “T-Mobile” (Registration No. 2282432, registered on October 1, 2003), “GoT-Mobile” (Registration No. 2865446, registered on July 20, 2004 and related trademarks Registration No. 2865446 and Registration No. 4482281 (Registration No. 4306851, registered on March 19, 2013), “GoSmart” (Registration No. 4322281, registered on April 16, 2013). See Exhibit 2; U.S. Patent No. 5,659,891, filed on Jun 7, 1995, entitled “Multicarrier Techniques in Bandlimited Channels.”

Claim 1	T-Mobile
	<p>the Google-Motorola Moto X (XT1053); the HTC One LTE (PN07130), C (PN06B160), Radar 4G (PI06110, PI06100, & PI06130), Sensation 4G (PG58130), Windows Phone 8X (PM23200, PM23300, & PM23220); the Huawei Valiant (Y301-A1), & Vitria (Y301-A2); the Kyocera Hydro XTRM (C6522, C6523), LG G2 (D801), G Flex (D959), Optimus F3 (P659), Optimus F3 (MS659), Optimus F6 (D500 & MS500), Optimus L9 (P769 & MS769), Motion 4 (L70(MS323), Optimus L90 (D415), Connect 4G (MS840), & Spirit 4G (MS8521 (RM-917), Lumia 710 (RM-809), Lumia 810 (RM-878), Lumia 925 (RM-810), Samsung Galaxy SII (T989 & TM1796), Galaxy SIII (T999: SGH-T999NBATMB, SCH-R530RWBMT), Galaxy SIII LTE (SGH-T999L), M919RWATMB), Galaxy S 4G (T959), Galaxy S5 (G900T), Galaxy Note (SGH-T889TSATMB), Galaxy Note II (SGH-T889TSATMB), Galaxy Note 3 (SM-N900TZKETMB), Galaxy Note 4 (SM-N910V), Galaxy Tab (T849), Galaxy Tab 7.0 Plus (T869), Galaxy Tab 2 10.1 (T779), Galaxy Tab 3 (T770), Galaxy Exhibit (T599 & T599N), Galaxy Exhibit 4G (T399), Galaxy S Blaze 4G (T769), Galaxy S Relay 4G (SGH-T699DABTMB), Galaxy S Relay 4G (SCH-R940), Galaxy Mega (SGH-M819ZKATMB), Sidekick 4G (T839), LTE (V100T); the Sony Xperia Z1 or Xperia Z 4G LTE (C6606BK) & Xperia Z1S (C6606X); the Huawei Springboard (S7-303u), myTouch Q (U8730), 4G Mobile Hotspot (UM8730), LG myTouch Q (LG-C800), myTouch (E739), G-Slate (LG-V909), & G2X (LG-V909); the HTC myTouch 4G (PD15100) & myTouch 4G Slide (PG59100); the T-Mobile Concord II (Z730), Sonic 2.0 Mobile HotSpot LTE (MF96), & Sonic 4G Mobile HotSpot (MF96).</p> <p>T-Mobile's 3G UMTS, 3G EVDO, 3G HSPA+, 4G LTE, and 4G LTE-Advanced networks, and those deployed under its network modernization initiative, and 802.11 (version 802.11n) access points sold by T-Mobile, such as the T-Mobile Sonic 2.0 Mobile HotSpot, use orthogonal frequency division multiplexing (OFDM). OFDM, for example, divides data from the base station and sends it over many parallel sub-carriers, which are spaced at different frequencies all within one assigned channel. These OFDM sub-carriers are the paging carriers. In addition, channels, such as the Physical Downlink Shared Channel (PDSCH) in the LTE specification, carry paging messages to mobile devices to alert them of incoming calls or messages.</p>

⁵ See Exhibit 3; <https://support.T-Mobile.com/docs/DOC-5304> (last visited Feb. 20, 2014).

Claim 1	T-Mobile
	<p data-bbox="586 743 1349 772">data can be spread and transmitted over several subcarriers.</p> <div data-bbox="696 800 1624 1625" style="border: 1px solid black; padding: 10px;"> <p data-bbox="716 869 1284 911" style="color: red; font-weight: bold;">Downlink data transmission</p> <p data-bbox="704 995 1214 1079">  Physical Downlink Shared Channel (PDSCH) </p> <ul data-bbox="760 1100 1230 1562" style="list-style-type: none"> • Carries user data, broadcast system information, paging messages • Transmission resources are assigned dynamically by PDCCH <ul style="list-style-type: none"> • Localised (suitable for frequency domain scheduling) or • distributed (suitable for maximising frequency diversity) <div data-bbox="1247 806 1624 1486" style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p data-bbox="1247 1192 1398 1262">Data for UE1: (localised)</p> <p data-bbox="1247 1352 1398 1421">Data for UE2: (distributed)</p> <p data-bbox="1247 1436 1398 1465">Data for UE3:</p> </div>  </div> <p data-bbox="711 1583 1349 1612" style="background-color: #90EE90; padding: 2px;">REV-090003r1 IMT-Advanced Evaluation Workshop 17 – 18 December, 2009, Beijing</p> </div> <p data-bbox="586 1675 1624 1816">The Federal Communications Commission (FCC) regulates the use of radio frequency the electromagnetic spectrum by a spectrum management process called frequency allocation to maximize efficiency and prevent interference. Bands are further divided into channels. Carrier channel numbers represent the actual RF locations—center frequencies—</p>

⁶ See Exhibit 4; “LTE-Advanced Physical Layer REV-090003r1 IMT-Advanced Evaluation Workshop” at 15; Dec. 17, 2009, http://www.3gpp.org/ftp/workshop/2009-12-17_ITU-R_IMT-Adv_eval/docs/pdf/REV-090003-r1.pdf (last visited Feb. 17, 2013).

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	<p>that are used for voice and data services.</p> <p>Wireless operators, including T-Mobile, must operate their radio equipment in accordance with FCC requirements. The FCC requires, for example, that the waveform output of transmitters conform to emission masks, which are intended to reduce adjacent-channel interference. Moreover, the FCC requires spectral density to be attenuated at the band edge.</p> <p>T-Mobile makes, uses, sells, or offers to sell wireless networks and wireless network equipment that operates according to standards, including 3G UMTS, 3G EVDO, 3GPP LTE, 3GPP LTE-Advanced, and 802.11 Wi-Fi versions a, g, and n.</p>

Claim 1	T-Mobile
	<div data-bbox="787 745 1624 1606" style="border: 1px solid black; padding: 5px;"> <p data-bbox="816 766 1260 795">T-Mobile network & coverage details</p> <p data-bbox="800 821 963 842">T-Mobile 4G LTE</p> <p data-bbox="800 850 1624 896">T-Mobile's advanced 4G LTE network is smoking fast! With incredible speed, you can do more using our nationwide 4G LTE network. Check our 4G LTE markets to see if you're covered.</p> <ul data-bbox="820 919 1624 1016" style="list-style-type: none"> <li data-bbox="820 919 1624 961">• T-Mobile's 4G LTE network uses 1700 MHz and 2100 MHz frequencies. You'll need a phone that supports 1700 MHz and 2100 MHz frequencies. Check Tech Specs to view your phone's capabilities. <li data-bbox="820 970 1624 1016">• Once you're registered on our 4G LTE network, you can take advantage of incredibly fast download speeds, and even use voice and data services at the same time. <p data-bbox="800 1052 1003 1073">T-Mobile 4G (HSPA+)</p> <ul data-bbox="820 1087 1624 1239" style="list-style-type: none"> <li data-bbox="820 1087 1469 1108">• With 4G, theoretical maximum download speeds range from 21 Mbps up to 42 Mbps. <li data-bbox="820 1117 1624 1184">• Our 4G network operates on the 1700 MHz and 2100 MHz frequencies. We use 1700 MHz and 2100 MHz frequencies to use voice and data services. You'll need a phone that supports 1700 MHz and 2100 MHz to connect to our 4G network. <li data-bbox="820 1192 1624 1239">• Once you're registered on our 4G network, you can take advantage of incredibly fast download speeds, and use voice and data services at the same time. <p data-bbox="800 1274 992 1295">T-Mobile 3G (HSPA)</p> <ul data-bbox="820 1310 1624 1411" style="list-style-type: none"> <li data-bbox="820 1310 1230 1331">• With 3G, theoretical maximum download of 14 Mbps. <li data-bbox="820 1339 1624 1381">• Our 3G network operates on the 1700 MHz and 2100 MHz frequencies. You'll need a phone that supports 1700 MHz and 2100 MHz to connect to our 3G network. <li data-bbox="820 1390 1377 1411">• On our 3G network, you can use voice and data services simultaneously. <p data-bbox="800 1446 992 1467">T-Mobile 2G (EDGE)</p> <ul data-bbox="820 1482 1624 1583" style="list-style-type: none"> <li data-bbox="820 1482 1539 1503">• EDGE, our enhanced 2G service, delivers a theoretical maximum download speed of 236 kbps. <li data-bbox="820 1512 1624 1554">• GPRS, our 2G service, delivers a theoretical maximum download speed of 114 kbps. Typical speeds are between 35 kbps and 45 kbps. <li data-bbox="820 1562 1425 1583">• Voice and data services cannot work simultaneously when on GPRS or EDGE. </div>

⁷ See Exhibit 6; "About T-Mobile coverage" available at <http://support.T-Mobile.com/docs/DOC-4988> (last visited 1/25/14).

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