

## ATSC 3.0 Patent Portfolio License Cross-Reference Chart

(The following chart shows illustrative essential claims for each patent below. Other claims may also be essential and/or other portions of the Standard may be covered.)

Ctry.	Patent	CI	Standards / Sections
CA	2,773,716	1, 9, 10	A/322:2021, Secs. 4.2, 6.4, 6.4.1, 7.2.7.4, 9.3.4, 9.3.5, Figs. 4.1, 4.3, 4.4, 6.14, 6.15, 7.18-7.22, Table 9.22 A/324:2021, Sec. 4.8, Fig. 4.2, Annex A.1
CN	101563951	1	A/322:2021, Secs. 1.1, 7.2.1, 7.2.2.1, 7.2.5, Fig. 7.10
CN	101584144	1	A/322:2021, Secs. 5.2.1, 5.2.2, 7.2.2.1, 7.2.5, 9, 9.3, 9.3.4 A/330:2019, Secs. 1, 4, 5, 5.1.2.3, 7.1.1, 7.1.2, Table 5.6
CN	103384966	1, 9	A/338:2021, Secs. 3.4, 5.3, 5.4, 5.7, 5.7.3, 5.8.2, 14.4.2.1, 14.4.2.2.2, Fig. 5.1, Table 5.2
CN	105007146	1	A/321:2016, Secs. 5.4, 5.4.1, Figs. 5.4, 5.5
CN	105009591	1	A/300:2021, Sec. 2.1, Annexes A.1.1.1, A.1.1.2 A/331:2019, Secs. 2.1, 4.1 ISO/IEC 23008-1:2017, Figs. C.3, C.11, C.12, Table C.8, Annexes C.1, C.2.1, C.2.3, C.5.2, C.5.3, C.6.3
CN	105024791	1	A/321:2016, Secs. 5.4, 5.4.1, Figs. 5.4, 5.5
CN	105794134	3	A/322:2021, Secs. 4.1, 4.2, 5.2.1, 6, 6.3, 6.3.1, 6.5.1, 6.5.2.1, 6.5.2.11, 7.2.1, 7.2.2.1, 7.2.5, 7.2.5.2, 9, Figs. 4.1, 6.1, 6.5, 6.8, 6.9, Table 6.17, Annex C.1
CN	107070462	1	A/322:2021, Secs. 6, 6.1.3.2, 6.2, 6.2.1, 6.2.2, 6.2.3.2, 6.3, Figs. 6.1, 6.5, 6.8, 6.9, Table 6.11
CN	107104678	1	A/322:2021, Secs. 1, 4.2, 6, 6.1.3.2, 6.2.1, 6.2.2, 6.2.3.2, 6.3, Figs. 4.1 6.1, 6.8, 6.9, Table 6.11
CN	107104679	1	A/322:2021, Secs. 6, 6.1.1, 6.1.3.2, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.3.2, 6.3, 6.3.3, 6.3.4.2, Figs. 6.1, 6.5, 6.6, Tables 6.11, 6.14, B.2.3
CN	107733567	1	A/322:2021, Secs. 6, 6.1.1, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.3.2, 6.3, 6.3.3, 6.3.4.2, Figs. 6.1, 6.6, 6.8, 6.9, Tables 6.11, 6.14
CN	109617846	1	A/321:2016, Secs. 5.4, 5.4.1, 5.4.2, Figs. 5.4, 5.5, 5.6
JP	5,238,069	1	A/300:2021, Sec. 2.1 A/331:2021, Secs. 7.2.1.1, 7.2.3.2.1 ISO/IEC 14496-15:2019, Secs. 9.6.1.1, 9.6.1.2, 9.6.1.3
JP	5,562,408	1	A/344:2021, Secs. 4.2, 5.2.5, 9.7.2, Fig. 4.1
KR	1,159,432	33	A/300:2021, Annex A.1.1.1 A/331:2021, Secs. 1, 2.1, 4.1, 8.1, 8.1.2.5 ISO/IEC 23008-1:2017, Secs. 3.1.33, 3.1.34, Fig. C.3, Annexes C, C.1, C.3
KR	1,431,233	1	A/330:2019, Secs. 1.4, 4.1.1.2, 5, 5.1.2.3, 5.2, 5.2.1.7, Figs. 4.1, 5.1, 5.5, 5.6, B.1.4, B.1.5, Tables 5.6, 5.11, 5.13, 5.14, Annex B.1.3
KR	1,620,776	9	A/331:2021, Secs. 1, 4.1, 8.1.2, 8.1.2.3 ISO/IEC 23008-1:2017, Secs. 1, 3.1.1, 5, 6.4, 7, 7.1, 10, 10.1, 10.5, 10.5.2.1, Fig. 1 ISO/IEC 14496-12:2015, Secs. 3, 8.16.3, 8.16.3.1, 8.16.3.2, 8.16.3.3
KR	1,691,709	1, 16	A/337:2019, Secs. 2.1, 4.2, 4.4, 4.5.1, 4.5.2, 4.5.2.2, Table 4.6 ISO/IEC 23009-1:2014, "emsg"

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Ctry.	Patent	CI	Standards / Sections
KR	1,812,218	1, 8	A/300:2021, Sec. 2.1, Annex B.1.1.1 A/331:2021, Secs. 2.1, 4.1, 8.1.2.5 ISO/IEC 23008-1:2017, Figs. C.11, C.12, Annexes C.1, C.3, C.5, C.5.2, C.5.3
KR	1,908,349	1	A/322:2021, Secs. 6.2, 6.2.1, 6.2.2, 6.2.3.1, Figs. 6.5, 6.6, 6.7
KR	1,942,891	1	A/322:2021, Secs. 6.2, 6.2.1, 6.2.2, 6.2.3.2, 6.3.3, 6.3.4.2, Figs. 6.5, 6.6, 6.8, Tables 6.2, 6.11, 6.14, B.2.3
KR	2,041,761	2	A/331:2021, Secs. 1, 6.4, 8.1.2, 8.1.2.1.1, 8.1.2.1.3, 8.1.2.3, Figs. 8.5, B.4.2, Table 6.7, Annexes B.4, E.3 A/336:2019, Secs. 1, 5.4.3
KR	2,048,221	1	A/321:2016, Secs. 1, 4, 4.1, 5.4, 5.4.2, Figs. 4.1, 5.6
KR	2,114,362	3	A/322:2021, Secs. 1, 4.2, 5.2.1, 6.6.1, 6.3, 6.3.1, 6.3.3, 6.3.4.2, 6.5, 6.5.1, 6.5.2, 6.5.2.1, 6.5.2.5, 6.5.2.11, 7, 7.1, 7.2, 7.2.1, 7.2.2, 7.2.2.1, Figs. 4.1, 6.1, 6.18, 7.1, 7.10, Tables 6.14, 6.17, C.1.2, C.1.3
KR	2,197,545	1	A/322:2021, Secs. 1, 4.2, 6, 6.1.3.2, 6.2, 6.2.1, 6.2.2, 6.3, 6.3.1, 6.3.4.3, Figs. 4.1, 6.1, 6.5, 6.6, C.2.6, Tables B.1.6, C.1.10, C.1.11, C.3.3, C.3.4
KR	2,234,307	1	A/321:2016, Secs. 1, 4, 4.1, 5.4, 5.4.2, Figs. 4.1, 5.6
KR	2,359,850	1	A/322:2021, Secs. 4.1, 6.3, 7, 7.1, 7.2, 7.2.1, 8, Figs. 4.1, 7.1, 8.1, L.1.1, L.1.2, L.5.2, Annexes L.1, L.4.1, L.5, L.5.2, L.6, L.7
KR	2,359,983	1	A/322:2021, Secs. 4.1, 6.3, 7, 7.1, 7.2, 7.2.1, 8, Figs. 4.1, 7.1, 8.1, L.1.1, L.1.2, L.5.2, Annexes L.1, L.4.1, L.5, L.5.2, L.6, L.7
US	8,233,532	31, 32	A/300:2020, Sec. 2.1 A/331:2021, Secs. 2.1, 4.1, 8.1.2.5, Annex B.1.1.1 A/341:2021, Sec. 6.3.1 ISO/IEC 23008-1:2017, Secs. 3.1.33, Fig C.3, Annexes C.1, C.2.1, C.2.3, C.4
US	8,335,962	1, 21	A/322:2021, Secs. 7, 7.1.5.5, 7.2.2.1, 7.3, 8, Figs. 6.2, 6.3, 7.5, 7.7(b), 7.8, Tables 6.1, 6.14, 7.4
US	8,902,928	1	A/330:2019, Secs. 1, 4, 5, 7, 7.1.2, Figs. 5.1, A.1.4, A.1.5, Tables 5.6, 7.3, Annex A.1.3
US	9,078,140	1	A/322:2021, Secs. 1.1, 7.2.1, 7.2.2.1, 7.2.5, 7.2.5.1, Figs. 7.10, 7.11, Annex L.11.1
US	9,253,428	1	A/322:2021, Secs. 7.2.1, 7.2.2.1
US	9,392,325	1	A/332:2017, Secs. 2.1, 3.4, 5.1, 5.2.2.1.6, 5.5.1, 5.5.2, Table 5.5 OMA "Service Guide for Mobile Broadcast Services," V.1.0.1:2013, Secs.5.1.1, 5.4.1.5.1, 5.4.1.5.2, 5.4.2, 5.4.3, Appendix D
US	9,438,459	1	A/322:2021, Secs. 4.1, 4.2, 7.2, 8.3, 9, 9.2.3, 9.3.3, Figs. 4.1, 7.10, Tables 8.9, 9.10
US	9,479,826	1, 9, 10	A/322:2021, Secs. 4.2, 6.4, 6.4.1, 7.2.7.4, 9.3.4, 9.3.5, Figs. 4.1, 4.3, 4.4, 6.14, 6.15, 7.18-7.22, Table 9.22 A/324:2021, Sec. 4.8, Fig. 4.2, Annex A.1
US	9,521,432	1	A/331:2021, Secs. 3.4, 7, 7.1.7, 8.3, 8.3.3
US	9,628,590	1	A/331:2021, Secs. 2.1, 3.4, 4.1, 8.1.2, 8.1.2.1.2, 8.1.2.3, Figs. 4.1, B.1.2 ISO/IEC 23008-1:2017, Secs. 3.1.1, 5, 6.4, 7.1, 10.1, 10.5.2.1, Figs. 1, 2, 7 ISO/IEC 14496-12:2015, Secs. 3, 8.8.4.1, 8.16.3, Fig. K.1, Annex K.2.1
US	9,762,347	13, 14	A/321:2016, Secs. 1.1, 4.1, 5.2, 5.2.2, 5.2.3, 5.3.1, 5.3.2, 5.3.3, Figs. 4.1, 5.1, 5.3
US	9,769,476	1, 18	A/322:2021, Secs. 6.3, 6.3.4, 7.1, 7.1.2, 7.1.5, Fig. 4.1

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Ctry.	Patent	CI	Standards / Sections
US	9,794,958	1	A/322:2021, Secs. 4.2, 7.2.1, 7.2.2.1, 7.2.6, 7.2.6.6, 7.2.6.7, 7.2.7, 7.2.7.2, 7.2.7.3, 9.3.8, Figs. 4.1, 7.10, 7.15, 7.16, 7.17, Tables 7.7, 7.8
US	9,853,851	7	A/322:2021, Secs. 1.1, 7.2.2.1, 7.2.5.2, 8.3, 8.5.1, Figs. 4.2, 7.10, 7.11, 8.4
US	9,866,421	1	A/322:2021, Secs. 1.1, 7.2.2.1, 7.2.5.2, 8.3, 8.5.1, Figs. 4.2, 7.10, 7.11, 8.1, 8.4
US	9,935,890	1	A/322:2021, Secs. 3.4, 6, 7, 7.1, 7.1.1, 7.1.5, 7.1.5.1, 7.1.5.5, Figs. 6.1, 6.3, 6.6, 7.1, 7.4, 7.8
US	9,942,364	2	A/331:2021, Secs. 2.1, 3.4, 4.1, 8.1.2, 8.1.2.1.2, 8.1.2.3, Figs. 4.2, B.1.2, Annexes B.1, E.3 ISO/IEC 23008-1:2017, Secs. 3.1.1, 7, 10.1, 10.5.2.1, Fig. 7 ISO/IEC 14496-12:2015, Secs. 6.2.3, 8.6.1.3.1
US	10,009,078	1	A/322:2021, Secs. 4.1, 6.3, 7, 7.1, 7.2, 7.2.1, 8, Figs. 4.1, 7.1, 8.1, L.1.1, L.1.2, L.5.2, Annexes L.1, L.4.1, L.5, L.5.2, L.6, L.7
US	10,033,566	1,7	A/322:2021, Secs. 1, 3.3, 4.1, 4.2, 7.2.1, 7.2.2.1, 7.2.4.2, 8.3, 8.7, 9, 9.2.3, 9.3.3, Figs. 4.1, 7.10, Tables 8.8, 8.9, 9.10, Annex N.2.2
US	10,079,708	1	A/321:2016, Secs. 1.1, 3.5, 4.2, 5.2, 5.2.1, 5.2.2, 5.2.4, Figs. 5.1, 5.2
US	10,116,973	1	A/322:2022, Secs. 4.1, 7.2.2.1, 7.2.6.1, 7.2.6.6, 7.2.6.7, 7.2.6.8, 7.2.7, 7.2.7.6, 9.3.8, Figs. 7.10, 7.15, 7.25, Table 7.10
US	10,158,518	26-28	A/321:2016, Secs. 4.1, 5.4, 5.4.1, 5.4.2, Figs. 4.1, 5.4, 5.5, 5.6
US	10,194,196	7	A/331:2021, Secs. 4, 4.1, 5.1, 6.4, 8.1.2.3, Fig. 4.1, Table 6.7 A/336:2019, Sec. 5.4.3
US	10,205,619	4	A/321:2016, Secs. 4.1, 5.1, 6.1.1.1, Fig. 4.1 A/322:2021, Secs. 1.1, 7.2.2.1, 8.3, Figs. 4.2, 7.10, 8.1
US	10,305,573	2	A/322:2021, Secs. 4.1, 7.2, 7.2.1, 7.2.4, 7.2.4.1, Figs. 4.1, 7.10
US	10,389,569	1	A/322:2021, Secs. 1, 1.1, 4.2, 7.2, 9, Figs. 4.1, 7.10 A/331:2021, Secs. 6.5, 6.5.2, Table 6.9
US	10,396,884	7	A/322:2021, Secs. 4.1, 4.2, 7.2.4, 8.1.3, 8.1.3.1, 8.1.7, 8.1.7.1, Figs. 4.1, 7.10, E.1.1, Annex E
US	10,411,929	1	A/321:2016, Secs. 5.3.1, 5.4, 5.4.1, 5.4.2, 6, Figs. 5.5, 5.6 A/327:2020, Secs. 6.1, 6.1.1, 6.1.1.1, 6.1.1.1.1, Fig. 6.1
US	10,560,299	9	A/322:2021, Secs. 1, 4.2, 8.3, Figs. 4.1, 4.2, 7.10 A/331:2021, Secs. 1.1, 4.1, 5, 5.1, 7.2.3, 7.2.3.2.5, 8.1.2.2, Figs. 5.1, 8.8, Annex E.2
US	10,574,500	1	A/322:2021, Secs. 1.1, 7.2.1, 7.2.2.1, 7.2.7.5, 8.3, Figs. 4.2, 7.24, 8.1, Table 7.9
US	10,602,204	15	A/322:2021, Secs. 4.2, 7.2.1, 7.2.2.1, 7.2.6, 7.2.6.6, 7.2.6.7, 7.2.6.8, 7.2.7, 9.3.4, 9.3.8, Figs. 4.1, 4.3, 7.10, 7.15, 7.25, Table 7.10
US	10,630,411	1	A/321:2016, Secs. 1.1, 4.2, 5.2, 5.2.1, 5.2.2, 5.3.3, Figs. 4.1, 5.1
US	10,631,037	3	A/331:2021, Secs. 6.4, 8.1.2, 8.1.2.1.1, 8.1.2.1.3, 8.1.2.3, Figs. 8.5, B.4.2, Table 6.7, Annexes B.4, E.3 A/336:2019, Sec. 5.4.3
US	10,637,539	1	A/322:2021, Secs. 1, 1.1.7, 7.2.2.1, 7.2.5, 9.1, Figs. 7.10, 8.1, L.1.1, Annexes L.4.1, L.4.2, L.5.3, L.9.1
US	10,666,385	2	A/322:2021, Secs. 1, 5.2, Figs. 5.2, 6.1, K.1.1, K.1.2, K.3.1, Annexes K.1, K.3
US	10,666,387	1	A/322:2021, Secs. 7.1, 7.2, 7.2.5, 9.2, 9.3, Figs. 7.10, L.1.1, L.1.2, L.6, Annex L

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Ctry.	Patent	CI	Standards / Sections
US	10,693,497	1	A/331:2021, Secs. 5.1, 8.1.2.2, Figs. 5.1, E.3.1, Annex E.3 A/322:2021, Fig. 4.1, Table 6.1
US	10,693,502	1	A/322:2021, Secs. 6.3, 6.3.4, 6.3.4.1, 6.3.4.2, 6.5.1, 6.5.2, 6.5.2.4, 6.5.2.5, 6.5.2.6, 6.5.2.9, 6.5.2.11, Figs. 6.19, 6.21, 6.26, Table 6.19
US	10,721,006	1	A/331:2021, Sec. 6.5, Fig. G.1.2, Tables 5.5, 6.9
US	10,756,845	1	A/322:2021, Secs. 6.1.1, 6.1.2.1, 6.1.3.1, 6.1.3.2, 6.2, 6.3.1, 6.3.4.2.1, 6.5.2.3, 6.5.2.5, 6.5.2.11, 6.6.1, 7.2.5.2, 9, Figs. 4.1, 6.1, 6.4, 6.5, 6.10, 6.12, 6.18, 6.19, 7.11, Tables 6.1, 6.17, C.1.2, C.1.2, Annex C.1
US	10,886,946	1	A/322:2021, Secs. 4.2, 6.2.1, 6.2.3.2, 6.3, 6.3.4.2, Figs. 4.1, 6.1, 6.8, 6.9, Tables 6.11, 6.13, 6.14, B.2.3
US	10,917,673	10	A/322:2021, Secs. 4.1, 4.2, 7.2.1, 7.2.2.1, 7.2.6, 7.2.6.6, 7.2.6.7, 7.2.6.8, 7.2.7, 7.2.7.5, 7.2.7.6, 8.1.1, 9.2.3, 9.3.8, Figs. 4.1, 4.3, 7.10, 7.15, 7.25, Table 7.10
US	10,931,313	1	A/322:2021, Secs. 1, 4.2, 6, 6.2.2, 6.3, Figs. 4.1, 6.1, 6.5, 6.6, 6.8, 6.9
US	10,931,494	1	A/321:2016, Secs. 4.1, 5.4, Figs. 5.5, 5.6 A/322:2021, Secs. 4.1, 6.5.2.11, Figs. 4.1, 7.10
US	10,938,735	3	A/322:2021, Secs. 7.1, 7.1.5.4, 7.1.5.5, Figs. 7.4, 7.7, 7.8
US	11,012,275	1	A/321:2016, Secs. 5.4, 5.4.2, Figs. 5.4, 5.6
US	11,012,282	9,15	A/321:2016, Secs. 4.1, 5.2, 5.2.3, 5.2.4, Figs. 4.1, 5.1, 5.3
US	11,063,805	1	A/322:2021, Secs. 8, 8.2.1, Figs. 8.1, 8.3, Tables J.1.1, J.1.2
US	11,070,236	1	A/322:2021, Secs. 6.1.3.2, 6.1, 6.2.1, 6.2.2, 6.2.3.2, 6.3, Figs. 6.1, 6.5, 6.6, 6.8, 6.9, Tables 6.11, 6.14, B.2.1
US	11,082,277	1	A/322:2021, Secs. 4.2, 8.3, Fig. 4.1, 7.10 A/331:2021, Secs. 1.1, 4.1, 5, 5.1, 7.2.3, 7.2.3.2, 8.1.2.2, Figs. 5.1, 8.8, B.5.2, B.9.2, Annexes B.5, E.1, E.2, E.3
US	11,115,060	1	A/322:2021, Secs. 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.3.2, 6.3, 6.3.3, 6.3.4.2, Figs. 6.5, 6.6, 6.8, 6.9, 6.10, 6.11, Tables 6.2, 6.11, 6.14, B.2.3
US	11,146,437	1	A/322:2021, Secs. 7.2.1, 7.2.2.1, 7.2.5.2, 8.3, 9.2, 9.3, Figs. 4.2, 7.10, 7.11, Tables 9.2, 9.8