

APEX STANDARDS

Redefining FRAND Evaluation: From Patent Counts to TDoc-Informed Strategies

Integrating TDoc importance metrics into the discourse on Standard Essential Patents (SEPs) and Fair, Reasonable, and Non-Discriminatory (FRAND) terms provides a fresh perspective for fostering equity and fairness in the landscape of intellectual property and innovation, especially in the telecommunications sector. By moving beyond the traditional method of calculating SEP royalties, which typically depends on patent counts, a more scientific approach is necessary. This approach acknowledges the varied significance of individual patents, while underscoring the role of Temporary Documents (TDoc) in the standard-setting process. TDocs offer in-depth insights into the innovation that simple patent counts fail to capture, suggesting their evaluation through methods such as citation network analysis, their temporal influence, and engagement within the community. This perspective leads to a contribution-based assessment of FRAND terms, emphasizing the foundational support TDocs—and consequently, the patents they underpin—provide based on their essential contributions to a standard's functionality.

To evaluate the true influence and importance within the SEP landscape, we explore beyond conventional metrics such as patent counts and TDoc tallies. This approach calls for scientific methodologies, including citation reliance analysis and longitudinal studies, which offer a more nuanced understanding of performance metrics. TDoc citations, akin to citations in scholarly papers or patents, demand an analytical approach. Citation counts, while informative, are susceptible to manipulation; thus, normalization methods are introduced to distill genuine insights **Figure 1**. The analysis differentiates between self-citations and external citations, where the latter, especially from diverse entities, indicates broader knowledge dissemination **Figure 2**. The timing of citations distinguishes between the nature of research efforts: older, foundational work signals exploratory pursuits, whereas recent citations reflect incremental, exploitative efforts aimed at current or newly frozen features under commercialization. According to **Figure 3**, Ericsson's recent trend shows a tendency to cite TDocs nearly a year old, suggesting a focus on established research. In contrast, InterDigital exhibits a lower average citation interval, averaging 50 days in 2019 and 35 days in 2023, indicating a strategic focus on leveraging incremental research, closely aligned with the regular cadence between 3GPP meetings.

Incorporating TDoc metrics into SEP FRAND consideration promotes a balanced ecosystem, ensuring that innovation is proportionately recognized and incentivized, promoting a fair and innovation-centric standardization process.

This introduction offers a preview into Apex Standards' analysis key to strategic planning at a macro level. It delves into innovation consultancy, delivering a technical breakdown and an assessment of company strategies within critical sectors. It scrutinizes the ripple effects of collaboration and competition, discerns industry trends, and anticipates future developments, with a keen eye on strategic investments aimed at long-term success. The complete report, rich in specifics and actionable insights, is available for acquisition.

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		TDoc References Received																			
		APPLE	CATT	CHINA MOBILE	ERICSSON	HUAWEI	INTEL	INTERDIGITAL	LGE	MEDIATEK	NOKIA	NTT DOCOMO	OPPO	PANASONIC	QUALCOMM	SAMSUNG	SHARP	SONY	VIVO	XIAOMI	ZTE
Prior TDoc References Made	APPLE	3308	165	276	464	438	336	15	23	445	458	63	198	5	519	334	6	17	549	112	111
	CATT	174	12178	531	1727	2081	717	52	169	466	1015	357	332	52	983	692	43	127	484	124	572
	CHINA MOBILE	244	340	7498	1038	1030	336	39	33	291	539	102	107	3	344	253	21	12	323	55	400
	ERICSSON	584	1165	988	66294	8024	1644	43	332	1104	3224	1525	476	45	3221	1526	130	176	906	125	1394
	HUAWEI	573	1504	857	8260	73976	1526	65	367	1020	3738	1222	513	32	2679	1575	85	151	864	193	1748
	INTEL	140	474	388	1744	1637	14943	30	177	479	661	306	256	36	1271	877	30	104	377	50	248
	INTERDIGITAL	43	77	29	169	154	38	1078	61	50	127	3	96	0	60	36	8	26	98	14	23
	LGE	44	76	41	260	264	70	16	2026	64	79	30	60	1	146	74	8	7	48	15	44
	MEDIATEK	172	222	226	912	792	393	25	79	6195	407	137	229	28	563	325	5	67	280	80	213
	NOKIA	321	661	484	3053	2986	998	62	112	603	31509	644	368	30	1657	1106	64	133	705	133	763
	NTT DOCOMO	57	506	365	1627	1555	693	5	254	345	437	7264	57	27	779	855	53	105	133	21	539
	OPPO	176	293	228	652	628	321	63	95	270	452	120	3611	12	461	351	59	65	502	112	117
	PANASONIC	0	13	22	49	27	16	0	0	20	21	8	28	617	49	33	0	0	17	0	8
	QUALCOMM	250	708	427	2691	2728	1337	47	178	773	1591	610	416	44	20821	949	84	165	648	98	957
	SAMSUNG	125	398	242	1329	1310	603	36	110	393	765	268	186	18	939	15129	38	53	346	87	347
	SHARP	1	17	24	102	65	31	0	1	17	56	41	40	6	37	108	545	4	35	9	23
	SONY	13	80	66	296	276	204	4	28	118	144	52	57	4	279	183	11	1204	91	15	89
	VIVO	327	394	280	911	915	493	24	87	434	543	163	417	17	712	508	40	80	6823	98	197
	XIAOMI	82	115	101	192	228	145	6	24	170	140	40	104	0	177	180	10	12	165	1080	47
	ZTE	214	559	519	2003	2096	528	20	115	404	1149	565	163	8	869	793	27	79	347	72	14979

Figure 1 TDoc Dependence Matrix illustrates the interconnectivity among the top 20 private companies based on their contribution volumes from 2015 to 2023, focusing on references made within "sole-sourced" TDoc data. Viewed horizontally, for example, Ericsson made 66,294 self-citations, as well as, external citations to Huawei (8,024 times), Nokia (3,224 times), Qualcomm (3,221 times), and Intel (1,644 times), indicating a relative reliance on prior TDocs. Viewed vertically, Ericsson's TDocs are widely cited by others, by Huawei (8,260 times), suggesting the reciprocal knowledge exchange, followed by Nokia (3,053 times), Qualcomm (2,691 times), and ZTE (2,003 times). The visualization uncovers a network of references, illustrating the technological interdependencies and also suggests promising avenues for future collaborations and joint authorship among top firms.

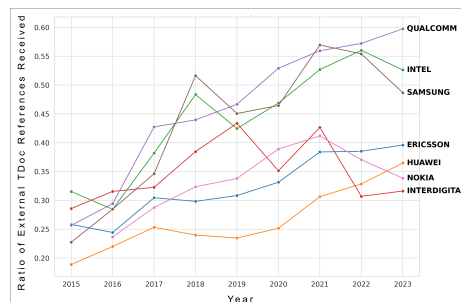


Figure 2 External Citation Analysis calculates the influence of a company's TDocs through a ratio: external citations received over total annual citations by year. A general rising trend suggests growing inter-company reliance. Among the major 3GPP delegation teams, Qualcomm emerges as the frontrunner, with Intel, despite its relatively mid-sized delegation team, delivering competitive performance right behind. At its peak (2023), out of all Qualcomm TDoc cited, 60% originate from external companies.

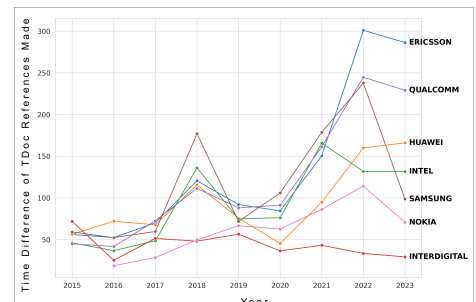


Figure 3 Citation Recency Analysis tracks the average number of days between a company's TDocs and their cited prior TDocs. Longer times suggest reliance on older work. Between 2016-2018, the gap widened generally, indicating a continuation based on matured work. However, this trend reversed with the finalization of 3GPP Rel-15 in June 2018, marking the completion of the first phase of 5G specifications, leading to shorter citation intervals as companies focused on existing commercial features. The gap widened again in 2020 as exploration shifted to new 5G-Advanced features.