

# APEX STANDARDS

## ETSI Listserv / 3GPP Email Reflector & TDoc Tracking System

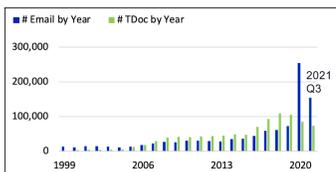
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Each 3GPP meeting is jammed with action items; many more happen in between meetings. A corporation must plan for the contribution of TDocs prior to a meeting. This process entails iterating with colleagues in Research and Development (R&D) to determine the best solution or recommendable strategy to satisfy a technical requirement. This entails consulting with product or manufacturing colleagues to determine the time and cost effectiveness of the solution. This also entails consulting with colleagues in the Intellectual Property Rights (IPR) department to determine whether the company's licensing position changes in the event that patentable subject matter is identified, or, even better, if the company owns relevant patents that have the potential to become essential to a new standard. During a meeting, a company's delegates must present their TDocs and defend their positions. After a meeting, a company summarizes the previous meeting week and brainstorming about follow-up and new action items for the next one. The same cycle repeats itself for between ten to twelve times every year.

A substantial chunk of time is spent developing arguments and supporting materials that can be used to persuade the other companies at the next meeting. Strategically, but cautiously, a company surfaces its interest in advance to garner community attention, identify other companies who may potentially share a similar position in order to collaborate (and co-source) on a TDoc, and to assist it in anticipating possible objections that may better be addressed prior to 3GPP formally considering the idea in a written-up TDoc. Before a delegate travels around the globe, email reflectors act as a medium for organizations to communicate differences and address less critical yet not-too-controversial issues offline. This provides the company with advance leverage when a topic takes shape. Another scenario is that when agenda items or issues remain unresolved at the end of the meeting week, organizations turn to the email reflector, which provides more time to thrash out a solution that may finally appear acceptable to all parties.

### E Meeting: the Combined Experience of being Offline and Online

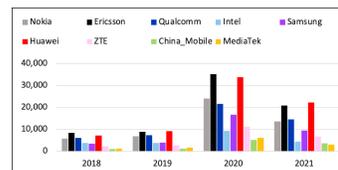
The role of email reflectors expanded dramatically after Electronic Meetings (E Meeting) replaced Face-to-Face (F2F) meetings as a result of the global pandemic (Covid-19) that rendered any travel dangerous. The E Meetings have been held since Feb 2020, when Balázs Bertényi, then-3GPP RAN Chairman, announced the changeover. F2F remains elusive amid Covid-19 at the time of this writing.



### Extensive Documentation beyond TDoc for the First Time

Email reflectors were used to communicate less technical and less sensitive differences, or as formality or endorsement in a paper trail when a feature's standardization was nearing completion; they were not intended to convey serious thoughts or outstanding issues. Unprecedented, 3GPP had to pivot, by moving all discussions to email exchanges, which otherwise took place in gigantic convention centers (or an isolated, casino desert town) with thousands of delegates congregating and debating. On the positive side, however, the email threads document negotiation details, reasoning, and logical thinking behind written-up TDocs, therefore providing evidence to trace back how discussions were navigated and how decisions were made when necessary. To see the whole picture, Apex Standards researchers investigate the ETSI Listserv database (1999-Sep 30, 2021), which holds 3GPP email reflectors. Our analysis follows.

The total number of emails in 2020 quadrupled that of 2019, considerably exceeding any year's TDocs count. In 2021, the figure is lower, but by year's end, we expect a comparable number of email counts to that of 2020. Put into perspective, RAN 1 alone witnessed 9,564 emails for R1-106-e in Aug 2021. On average, a RAN 1 delegate reviews 308 emails every day, or 13 emails per hour. If the delegate is assigned to follow multiple WGs, that number grows.



Ericsson, Huawei, Nokia, Qualcomm, and Samsung sent in the most emails, followed by ZTE, China Mobile, and MediaTek, all of whom are long-time 3GPP veterans.



Compared within national research institutes, Germany's Fraunhofer leads the pack, followed by China's CAICT, South Korea's ETRI, and Taiwan's ITRI.

### 5G & 6G: New Opportunities and New Challenges Demand New Vertical Discussions

Between 2018 and 2021, a total of 117 new entities join email discussions for the first time, with the U.S. accounting for 25%, China 15%, Germany 9%, France 8%, and Japan 4%. By industry, Satellite/NTN accounts for 16%, Security 15%, followed by Multimedia, IoT, Mission Critical, and Automotives. They symbolize the dissemination of companies' efforts to have new opinions heard beside a TDoc submission, as well as, a new route for serious exchanges that extend beyond water testing.

Nation	Entity	Vertical	TSG/WG
<b>New Email Discusssants in 2018 (sorted by # of emails)</b>			
China	Unisoc Technologies Co., Ltd (formerly Spreadtrum, 紫光展锐科技有限公司)	Semiconductor	RP, R1, R2
Canada	Omsh Networks Inc.	R&D	RP, R2, R3, S1
France	IDEMIA Identity and Security France SAS	Security	C1, C6, S1, S3
U.S.	Alphabet Inc. (Google)	Multimedia	R2, R3
U.S.	Alphabet Inc. (Google)	Multimedia	RP, R4
South Korea	Harman International Industries, Incorporated (subsidiary of Samsung)	Multimedia	S1
Germany	Sennheiser Electronic GmbH & Co KG	Security	S3
Sweden	Forsvars Radioanstalt (FRA, National Defense Radio Establishment)	Comm. Equipment	RP, S2
U.K.	British Broadcasting Corporation (BBC)	Broadcasting	RP, S1, S2
China	Tencent Holdings Ltd. (腾讯控股有限公司)	Multimedia	RP, S1, S2
France	Fondation de Coopération Scientifique B-Cem	IoT	RP, S1
U.S.	Hughes Network Systems, LLC (subsidiary of EchoStar)	Satellite	RP, R1
U.S.	Globalstar, Inc.	Satellite	RP, R4
China	Hisense Co., Ltd. (海信集团有限公司)	Comm. Component	RP, R1
U.S.	NSI MI Technologies LLC	Antenna & RF	R4
Israel	Softil Innovative Communications Ltd. (סופטיל)	Mission Critical	C1, S6
U.K.	Novamint Ltd	IoT	R1, S1
Germany	Adare GmbH	Communication Protocol	R5
U.S.	Casa Systems, Inc.	Comm. Equipment	RP, R3
Luxembourg	SES S.A.	Satellite	RP, S1
China	Academy of Broadcasting Science (ABS, 国家广播电影电视总局广播电影电视科学研究院)	R&D	R1
Italy	Leonardo S.p.A.	Satellite	RP
Belgium	Public Safety Communication Europe (PSCOE)	Public Safety Comm.	S1
China	Shanghai Jiao Tong University (上海交通大学)	R&D	R1
Turkey	Asetlan A.Ş.	Satellite	R2
France	Atos Societas Europaea	Mission Critical	S6
Germany	Audi Aktiengesellschaft	Automotive	RP
U.K.	Avanti Communications Group plc	Satellite	RP
France	Centre National d'Etudes Spatiales (CNES, National Centre for Space Studies)	Satellite	RP
U.S.	Comtech Telecommunications Corp.	Satellite	S2
France	Eutelsat Societe Anonyme	Satellite	RP
South Korea	Hyundai Motor Group (현대자동차그룹)	Automotive	R2
Japan	Inhat Patent Firm (インフット国際特許事務所)	IPR Consultancy	R2
U.S.	Perspecta Labs Inc.	Defense Comm.	S1
Israel	Runtel (RMT) Ltd. (רונטל)	Consultancy	RP
Italy	Telespazio S.p.A.	Satellite	RP
<b>New Email Discusssants in 2019 (sorted by # of emails)</b>			
Taiwan	Hon Hai Precision Industry Co., Ltd. (鴻海精密工業股份有限公司)	Info & Comm Tech (ICT)	R1, R2
Spain	GMV Innovating Solutions SL	Satellite	RP, R1, R2
U.S.	Loon LLC (subsidiary of Alphabet Inc. / Google)	High Altitude Platform (HAPS)	RP
India	Sankhya Labs Private	Satellite	RP
Japan	CLAP-N-CLANK, Inc. (株式会社 CLAP-N-CLANK)	Consultancy	C1
U.S.	Swath Navigation Inc.	Process Positioning	RP, R2
U.S.	QoSound, Inc.	Audio Quality	S4
Netherlands	Digital Forensisch Onderzoek (DFO) Nederlandse Ministerie van Justitie (Dutch Ministry of Justice)	Security	S3
U.S.	IntelSat Corporation	Satellite	RP, SP
China	AsaInfo Technologies Ltd. (亞信科技有限公司)	IoT Software	S5
Japan	Rakuten Group, Inc. (楽天グループ株式会社)	Security	S3
China	China Broadcasting Network Co. Ltd. (中国广播网络有限公司)	Broadcasting	RP, R4
Sweden	ENE A Aktiebolag	Security	C4
Germany	Damler Aktiengesellschaft	Automotive	SA
China	OnePlus Technology Co., Ltd. (深圳市万普拉斯科技有限公司)	UE	RP, R4
Spain	Satelio IoT Services, S.L. (Satelio)	Satellite IoT	RP
China	Asia Satellite Telecommunications Holdings Ltd. (亞洲衛星控股有限公司)	Satellite	RP
Saudi Arabia	Comm. & Information Technology Commission (CITC, هيئة الاتصالات و تقنية المعلومات)	Regulatory	R4
U.S.	Teeco Corporation	Optimization Consultancy	R5
Germany	Deutsches Zentrum für Luft- und Raumfahrt (DLR, German Aerospace Center)	Satellite	RP
Israel	Inno Networks Ltd. (אינו نتורקס)	IoT	C1
Norway	Nasjonal kommunikasjonssjansmyndighet (Nkom, Norwegian Comm. Authority)	Regulatory	SP
India	Tejas Networks Ltd.	Info & Comm Tech (ICT)	RP
France	Union internationale des chemins de fer (UIC, International Union of Railways)	Railway	S1
Germany	Ulmaco GmbH	Security	S3
U.S.	Yaana Technologies LLC	Security	S3
<b>New Email Discusssants in 2020 (sorted by # of emails)</b>			
U.S.	Blomax Software, Inc.	Infrastructure	CP, C1, SP, S2
Germany	Kontron S&T Aktiengesellschaft	IoT	C1, RP, S6
China	Gigahit Data Networks Technology Co., Ltd. (高鸿数据网络科技股份有限公司)	Infrastructure	R1
China	Quectel Wireless Solutions Co., Ltd. (上海移远通信技术股份有限公司)	IoT	R1, R2
Australia	Softel Systems Pty Ltd	Security	S3
U.S.	MITRE Corporation	Security	S3
China	Shenzhen Vspacetrace Technology (深圳辰行科技股份有限公司)	Infrastructure	S5
France	ATEME S.A.	Multimedia	RP, S4
Germany	Polizei Niedersachsen (Police of Lower Saxony)	Security	S3
U.S.	Facebook Inc.	Multimedia	RP
Finland	WE Certification Oy	Certification	R5
Norway	Politeks Tjenestere (Police Services Norway)	Security	S3
New Zealand	Spook New Zealand Limited (Telecom New Zealand)	Operator	RP, R4
U.S.	Yaman LLC	Infrastructure	R4
Brazil	VB Telecom Psi e Telecomunicacoes Ltda. (VB Telecom)	Operator	R5
France	Broadspak	Multimedia	S2
China	Shanghai Langto Communication Technology Ltd. (上海朗拓通信技术有限公司)	IoT	R1
Germany	Bundeskriminalamt (BKA: Federal Criminal Police Office)	Security	S3
Germany	Probus GmbH	Certification	R5
U.S.	Molex Electronic Solutions	Healthcare IoT	R2
U.S.	One Media, LLC	Broadcasting	RP
U.K.	Spectrum Insight Ltd	Consultancy	R4
Portugal	Alice Labs, S.A. Aveiro	Info & Comm Tech (ICT)	S5
U.S.	The Center for Internet Security, Inc. (CIS)	Security	S3
U.S.	Ford Motor Company	Automotive	R1
China	Guangdong Comm. and Networks Institute (GDCNI, 广东省新一代通信与网络创新研究院)	R&D	R1
Japan	Murata Manufacturing Co., Ltd. (株式会社村田製作所)	High Frequency Comm.	R4
Luxembourg	IQ Technology	Satellite IoT	R1
Taiwan	Cyber Security Technology Institute (CSTI, 資訊工業策進會 - 資安科技研究所)	Security	S3
France	Agence nationale de la sécurité des systèmes d'information (ANSSI, Natl Cybersecurity Agency)	Security	S3
U.K.	The Critical Communications Association (TCCA)	Critical Communication	SP
Germany	Verband Deutscher Maschinen- und Anlagenbau (VDMA, Mechanical Eng. Industry Assoc.)	Standard Development	SP
Finland	Teknologian tutkimuskeskus VTT Oy (VTT Technical Research Center of Finland)	R&D	RP
<b>New Email Discusssants in 2021 (sorted by # of emails)</b>			
U.S.	Zhejiang Lab (浙江杭州之江实验室, 浙江省人民政府, 浙江大学, 阿里巴巴集团)	R&D	R1
U.S.	Eierbridge, Inc.	Critical Communication	C1, S6
China	Eransson (深圳传音控股股份有限公司)	User Equipment	RP
U.S.	Johns Hopkins University Applied Physics Laboratory	Security	S3
U.S.	Department of Defense - National Security Agency (NSA)	Security	S3
China	Baiceles (北京佰才邦网络技术有限公司)	Base Station	R1
Japan	DENSO Corporation (株式会社デンソー)	Automotive Components	R2
South Korea	Kyonggi University (경기도대학교)	Mission Critical	S1, S6
Australia	NBN Co Limited	Infrastructure	R4
U.S.	Anterix Inc.	Critical Communication	RP
U.S.	Pulnix Inc.	IoT	RP, R4
Denmark	GateHouse SatCom A/S	Satellite	RP, R2
Canada	Keppler Communications, Inc.	Satellite	RP
U.S.	Peralon Labs (Applied Communication Sciences)	R&D	C1
Switzerland	Perey Research & Consulting	Consultancy	S4
U.S.	Pivotal Commware, Inc.	Antenna, Smart Repeater	R4
Switzerland	SG Media Action Group (SG-MAG)	Multimedia	RP
U.S.	Department of Homeland Security - Cybersecurity and Infrastructure Security Agency (CISA)	Security	S3
China	Beijing Commnet Technology Development Co. Ltd. (北京九天微星科技有限公司)	Satellite	R2
Russia	JSRPC Kryptolite (Научно-производственная компания Криптолит)	Security	S3
Sweden	Hexagon Aktiebolag	Automotive	R2