APEX STANDARDS TECHNICAL RESEARCH REPORT

3GPP ISAC 市場應用、四構面成熟度與台灣上市櫃供應鏈影響分析

基於 381 筆 approved / agreed 3GPP TDoc corpus、Rel-20/Rel-21 標準時程、IMT-2030 使用情境與台灣供應鏈公開資料

本報告為技術研究分析稿，採用可審閱、可追溯、可引用的研究結構：先由 3GPP 標準進程建立事實基礎，再以四構面 readiness 評估市場、技術、標準化與政策/法規成熟度，最後映射至台灣上市櫃供應鏈與產品技術機會。

核心結論。 ISAC 的標準成熟度高於商業成熟度；B2G/B2B vertical 成熟度高於 consumer；UAV/低空經濟、工業私網、智慧交通、公共安全與 OAM/SMO/RIC 是較可操作的短中期切入點。

381	4	9	15
TDoc corpus	readiness dimensions	ISAC verticals	Taiwan supplier names

本報告以「市場成熟度、技術成熟度、標準化成熟度、政策/法規成熟度」四構面建立分析框架，再將分數轉化為細條水平長條圖、原因表、供應鏈分層與產品路線圖。分數為 1-5 analyst estimates，用於產品策略與標準參與排序，不代表投資評等。

ISAC 從標準證據到產品垂直與供應鏈機會的分析框架

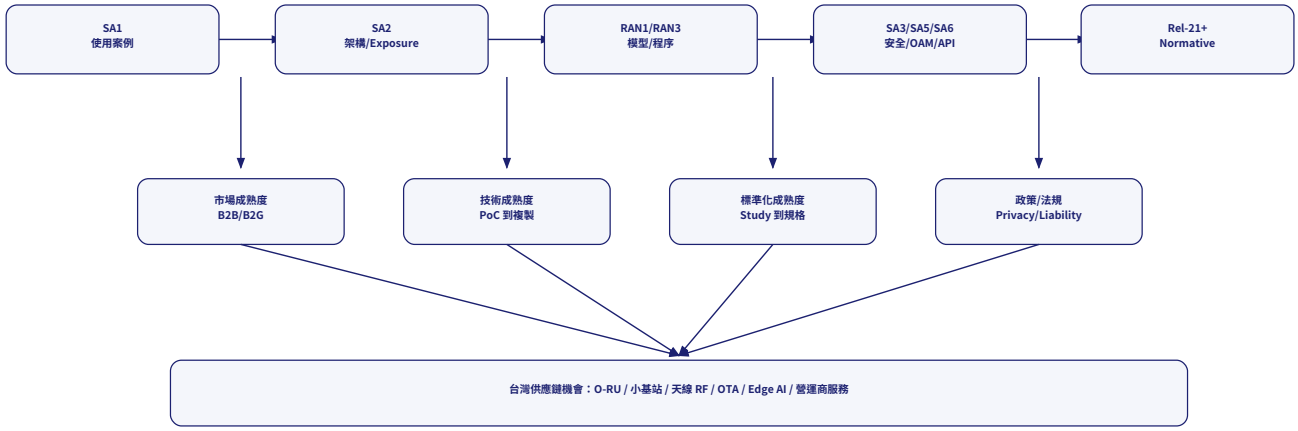

圖 1：ISAC 從標準證據到四構面成熟度與供應鏈機會的分析架構
本圖呈現由 3GPP 標準證據至產品與供應鏈機會的推論路徑。

圖 1 應被理解為本報告的推論骨架，而不是單純流程圖。ISAC 的商用化通常不會由單一工作組、單一產品或單一 demo 直接推動，而是由 use case、architecture、radio procedure、security、OAM 與 application enablement 逐步疊加。當 SA1 將需求轉化為服務目標，SA2 將需求轉為 system function 與 exposure 架構，RAN1/RAN3 再將感測能力落到 channel model、gNB 行為、procedure 與 interface，ISAC 才從概念變成可被產品團隊、測試團隊與營運團隊引用的工程條件。

這個框架也說明為什麼市場成熟度與標準成熟度常常不同步。以 UAV 為例，市場痛點可能已經很強，政府與機場需要低空監管與無人機偵測；但若 gNB-SF 連接、sensing result exposure、OAM 告警、責任歸屬與資料權限仍未收斂，營運商仍難以把它包裝成穩定服務。反過來，某些技術項目在 RAN 或 SA2 文件中很活躍，但若 vertical buyer 不清楚、資料權利不清楚，商業成熟度仍然偏低。

對台灣供應鏈而言，圖 1 的重點在於「由標準證據推導產品規格」。O-RU、小基站、天線 RF、OTA 測試、edge AI、SMO/RIC、電信營運商並不需要等待完整 6G 商用才開始準備。真正的前置工作包括：建立 sensing-ready RF calibration、支援 sensing metadata export、設計 gNB-SF 或 OAM 介接假設、準備 vertical PoC 場景，以及把 TDoc agreement 轉化為產品 road map 的 traceability matrix。這些都是硬體大量出貨前就會出現的服務與工具機會。

一、研究範圍、資料來源與讀法

資料基礎與判讀邊界

本報告將 ISAC 視為 3GPP 由通訊能力走向網路級感測服務能力的制度化過程，而不是單一 PHY 或單一設備功能。分析主線由 approved / agreed TDoc corpus 出發，追蹤 SA1 use case、SA2 architecture、RAN1/RAN3 radio 與 procedure、SA3 security/privacy、SA5 OAM、SA6 application enablement 與 CT charging/interface work 的相互銜接。

為使讀者能直接判斷產品與供應鏈含義，本報告將市場應用、成熟度評分、vertical 細分與結論整合為主體章節。每一項 readiness 分數皆搭配標準證據、市場痛點、技術 gate 與政策/法規 gate 解釋，以避免只用單一指標高估或低估 ISAC 的商用時點。

分析的第一個出發點是 3GPP 文件。approved / agreed TDoc corpus 顯示，ISAC 已經不是單一 WG 的早期概念，而是跨 SA2 架構、RAN3 procedures、SA3 security/privacy、SA5 OAM、SA6 application enablement 多線推進。這種跨工作組擴散通常代表 topic 已從單點技術問題，轉為 network capability、service exposure 與營運管理問題。

第二個出發點是市場應用。ISAC 目前的市場狀態可定義為「標準快速成形、技術 PoC 活躍、商業模式仍在驗證」。它已不是純 academic concept，但也不是成熟 commercial deployment。較接近早期商業落地的不是一般消費者應用，而是政府、低空經濟、公共安全、智慧交通、工業 private network 與 critical infrastructure monitoring 等 B2B / B2G 場景。

第三個出發點是產品供應鏈。對台灣上市櫃公司而言，短期關鍵不是誰已經有「ISAC 成品」，而是誰的既有產品能從 connectivity-ready 升級為 sensing-ready。這牽涉 O-RU、小基站、天線 RF、OTA 測試、edge server、SMO/RIC/OAM 與電信營運商 vertical service。

因此，本報告的讀法不是單線預測，而是四層推理：先看 3GPP 標準進度，再判斷 vertical 市場需求，再看技術可複製性，最後把政策與供應鏈落點放入同一張成熟度地圖。這也是為什麼本報告採用四構面 readiness，而不是只給一個單一市場分數。

公開資訊與可驗證來源說明。本報告之公司與產業供應鏈分析採用「產品相鄰性」與「標準相鄰性」判讀，來源包括 3GPP/ITU 官方標準資料、使用者提供之 approved / agreed TDoc corpus、台灣上市櫃公司公開年報/公司官網產品資訊、以及公開可驗證之產業資料。除非公司財務報告明確揭露，本報告不推論特定公司之 ISAC 營收貢獻、訂單或投資價值；所有上市櫃公司敘述均應以公開資訊觀測站、公司年報與公司正式公告為準。

國際地緣戰略背景

2026 年的 ISAC 不宜只被視為 6G 無線電技術題目，而應被理解為「下一代通訊基礎設施是否能同時成為國土、產業與城市感知基礎設施」的標準化競爭。各國對 6G 的期待已由高速傳輸延伸到定位、感測、AI 原生網路、低空經濟、公共安全與關鍵基礎設施韌性。當基地台、O-RU、小基站與私有網路開始具備感知能力，電信網路的價值就不再只來自連線訂閱，而可能延伸到事件偵測、周界監控、工安告警、數位雙生更新與政府治理。

此一轉變也改變了產業競爭的中心。過去行動通訊供應鏈的差異化多集中在吞吐量、功耗、成本、整合度與製造效率；ISAC 則要求供應商同時證明其 RF/天線校準能力、感測資料可信度、OAM 管理能力、API 暴露能力、隱私合規與跨場域部署可重複性。換言之，未來的競爭不只是誰能生產硬體，而是誰能把硬體、標準、資料、AI 與 vertical workflow 串成可被採購的解決方案。

從標準角力來看，ISAC 的主要競爭焦點在 Rel-20 study 到 Rel-21 normative 的過渡。Rel-20 的 TDoc 與 TR/pCR 會決定問題邊界與架構假設；Rel-21 之後的 normative work 則會將介面、程序、能力暴露、管理與安全要求逐步定型。對台灣供應鏈而言，這段窗口期尤其重要，因為它決定既有 O-RAN、small cell、RF、OTA、edge AI 與 private 5G 產品，能否在國際規格尚未完全鎖定前先建立 sensing-ready 的工程語言與客戶試驗模板。

進一步結論：ISAC 的標準成熟度目前高於商業成熟度；B2G/B2B vertical 成熟度高於 consumer；UAV、工業私網、智慧交通與公共安全是短中期主軸；OAM、SMO/RIC、邊緣 AI、security/privacy 與測試驗證，則是更早能產品化的工具層與服務層。

二、為什麼要拆成四構面 readiness

四構面框架的必要性

原始補充內容提出三個核心問題：營運商是否能用 sensing 形成新的 monetization model？vertical customers 是否願意為 network-based sensing 付費？ISAC 在 accuracy、latency、coverage、privacy、security、OAM、liability 上是否能達到可商用等級？這三個問題橫跨市場、技術、標準與政策，因此不能只用「技術可行」或「標準已討論」來判斷成熟度。

衡量 buyer、痛點、預算、場域與可付費成果是否清楚。ISAC 的市場需求不是從 telecom 內部自然產生，而是由外部 vertical problem 推動：低空經濟需要 drone detection / tracking；智慧交通需要 road hazard / pedestrian / vehicle sensing；工業場域需要 robot / AGV / human safety sensing；城市治理需要 digital twin / public safety monitoring。

衡量 PoC 是否已可行，以及能否從 demonstration 走向可複製 deployment。ISAC 仍受 sensing accuracy 與 communication performance trade-off、NR signal 是否足以支援 sensing KPI、multi-cell sensing 複雜度、clutter/reflection、硬體同步、資料 freshness 與 confidence level 影響。

衡量 3GPP 是否已有穩定工作項、TR/TS、pCR、agreed procedure 與 WG 分工。ISAC 目前已進入多 WG 協同，但仍以 Rel-20 study / draft TR / pCR 為主，尚未完全進入 Rel-21 normative specification，因此標準方向明確，但仍在 study-to-normative 過渡期。

衡量 public-space sensing、隱私、資料權限、責任、audit 與政府採購是否足以支撐商用。UAV 與公共安全受政策牽引較強，但 healthcare、consumer、indoor sensing 涉及敏感個資與同意問題，政策成熟度較低。

Readiness 構面	平均成熟度	洞察
市場成熟度	3.3	UAV、工業私網、公共安全需求最清楚；consumer 與 healthcare 偏早期，商業付費模型仍在驗證。
技術成熟度	2.9	PoC 可行性已出現，但 accuracy、clutter、同步、資料品質、多系統融合與可複製部署仍是 gate。
標準化成熟度	3.2	Rel-20 多 WG study 已展開；Rel-21 normative work 尚未完成，因此屬明確但未定型的過渡期。
政策／法規成熟度	2.6	低空經濟與公共安全有政策牽引，但 privacy、liability、資料治理、公共空間授權仍是主要限制。

平均分數與落地風險

表格呈現的是平均狀態，而不是各 vertical 的真實排序。平均政策分數偏低，代表即使某些場景在技術與標準上前進很快，也可能被 privacy、liability、資料保留、公共空間感測與監管授權卡住。這也是為什麼本報告將政策/法規獨立成第四構面，而不是把它隱含在市場成熟度裡。

市場成熟度

衡量的不是技術想像力，而是 buyer、痛點、預算、採購流程與可交付成果是否存在。UAV 與公共安全得分較高，是因為機場、港口、軍事基地、能源設施與政府單位已面臨無人機侵入、周界監控與低空治理壓力；工業私網得分也高，是因為工廠、物流園區與港口已經習慣用 automation、safety、private network 與 edge AI 形成投資案。相對地，consumer sensing 雖可被想像成室內手勢、零售行為或家用互動，但目前缺乏清楚 killer app、可持續付費模型與大規模部署動機。

衡量 PoC 是否能越過可複製部署的鴻溝。ISAC 的 PoC 可以展示 drone detection、passive object sensing 或環境重建，但商用部署還要回答 accuracy 與 communication performance 的取捨、clutter/reflection 的處理、multi-cell sensing 的協同、硬體時序同步、資料新鮮度與置信度，以及誤報/漏報對業務流程的影響。例如在工廠內，false alarm 可能造成產線停機；在機場周邊，漏報或誤報則會影響安全與責任歸屬。

衡量 3GPP 是否已建立可被產品、測試與專利引用的穩定語言。SA1 讓 use case 進入 6G requirements；SA2 建立 Sensing Function、Sensing Entity、exposure 與授權架構；RAN1/RAN3 逐步處理 channel model、procedure、Nx/gNB-SF interaction；SA3/SA5/SA6 則補上安全、OAM 與 application enablement。這代表 ISAC 已不是單點研究題目，而是跨工作組的系統工程。

是商業化的最終否決權。公共空間 sensing、人體活動推論、低空治理、醫療/長照、資料保存、執法使用、跨機關分享與責任歸屬，皆可能使某些技術上可行的應用無法快速商用。因此本報告將政策/法規獨立列為第四構面；它不只是風險註腳，而是決定營運商、政府與 vertical customer 是否願意簽約採購的關鍵條件。

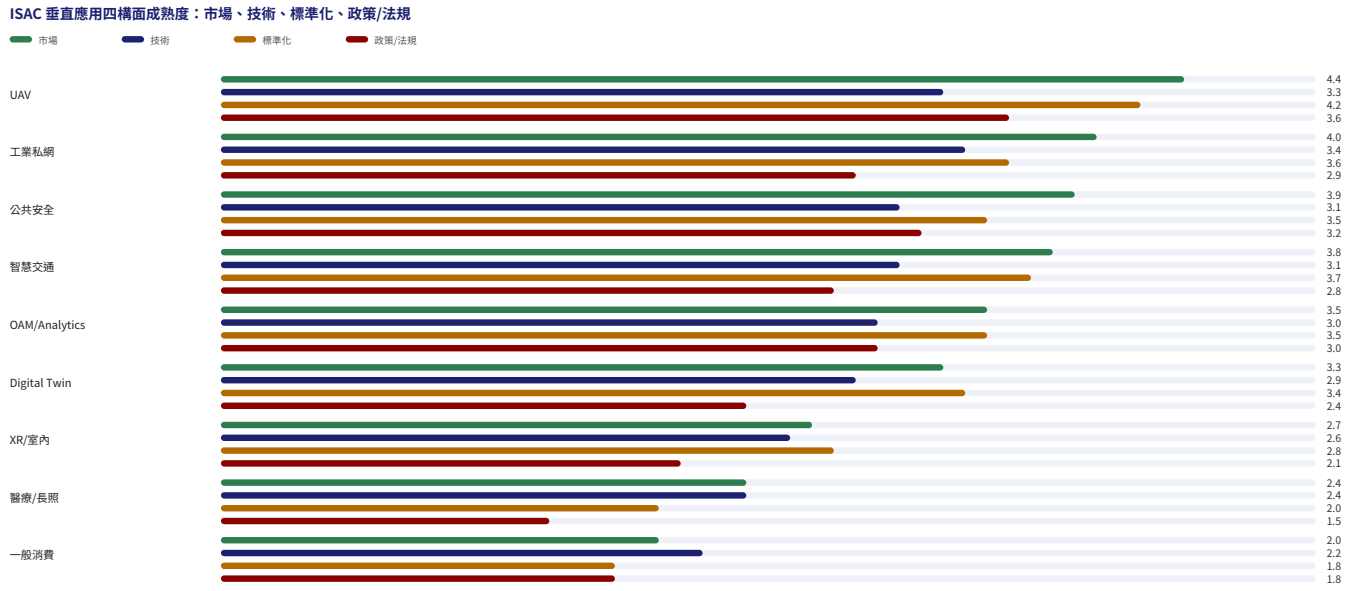

圖 2：ISAC 垂直應用四構面成熟度
四構面分數為 1-5 analyst estimates；數值用於比較成熟度與部署優先順序。

圖 2 的讀法是先看曲線形狀，而不是只看整體分數。UAV 的市場分數最高，代表 buyer 與痛點最明確；但政策/法規分數低於市場與標準，代表其商用節奏仍取決於低空域治理、公共空間監控邊界與政府採購制度。工業私網的市場與技術分數較均衡，因為封閉場域可降低公共隱私爭議，且台灣供應鏈在 IPC、工控、private 5G 與 edge AI 上有相鄰優勢。

智慧交通與 critical infrastructure 的共同特徵是需求真實但整合複雜。道路、港口、能源、鐵路與公共安全場景都需要廣域感知，但 ISAC 很少會單獨取代 camera、lidar、radar 或既有安全系統；更合理的定位是成為「network sensing layer」或「廣域補強層」，與既有感測器、V2X、HD map、OAM、SOC 與事件管理平台融合。這會拉長商用週期，但也提高系統整合與資料分析價值。

XR、醫療與一般消費得分較低，不代表沒有技術可能性，而是 buyer、合規與部署密度不足。尤其醫療/長照場景對臨床證據、醫療器材認證、誤判責任、敏感個資與照護流程整合要求較高；若以 3GPP cellular ISAC 為切入點，短期不宜作為優先評估場景。這也是本報告建議先把資源配置在 UAV、工業私網、critical infrastructure 與 OAM/analytics 工具的原因。

圖 2 重要的訊息不是哪一個 vertical 的單一分數最高，而是四條成熟度曲線是否平衡。UAV 的標準化與市場分數同時高，代表它不只是概念上吸引人，也在 3GPP 文件中有相對清楚的 use case 與 RAN/SA2 銜接；但政策/法規分數仍低於市場，表示低空監管、公共空間 sensing、資料保存與執法使用邊界仍會影響商用節奏。這就是典型的 B2G 機會：需求強，付費方明確，但部署前需要制度設計。

工業私網則呈現另一種成熟路徑。它不一定是最受公眾政策關注的場景，但 buyer、場域控制權與 ROI 較清楚。工廠可以在自有場域內部署 private 5G、edge server、camera/lidar/radar 與 ISAC sensing，資料權限比公共空間簡單，PoC 也較容易封閉驗證。因此工業私網的商業邏輯是「安全與自動化效率」，而不是大眾市場規模。台灣供應鏈若要先建立 reference deployment，此場景比一般 consumer sensing 更可操作。

智慧交通與 critical infrastructure 介於上述兩者之間。道路、港口、機場、能源設施都有真實需求，但涉及 public agency、既有感測系統、legacy platform 與長採購週期。ISAC 在這裡比較像是廣域補強層，而不是取代 camera、lidar 或雷達。商業提案若只強調「6G sensing」會過於抽象；若改成 road hazard detection、perimeter monitoring、airport drone alert、traffic digital twin update，反而更容易被客戶理解。

圖 2 的讀法是：同一 vertical 中四條線越一致，代表市場、技術、標準與政策之間較平衡；若某一條明顯偏低，代表該構面是下一階段的 gate。例如 UAV 的市場與標準化分數高，但政策仍低於市場，說明需求強但資料權限與公共空間監管仍需清楚化。醫療與一般消費的政策分數偏低，代表短期不宜作為優先評估場景。

三、ISAC verticals：成熟度矩陣與逐項解釋

垂直市場排序邏輯

UAV / 低空經濟是目前可優先評估的應用方向。原因有四個：第一，3GPP TDoc 中 UAV sensing target 反覆出現；第二，政府、機場、港口、critical infrastructure 對 drone detection 有明確需求；第三，gNB-based sensing 的 coverage 優勢適合低空監控；第四，這類應用的 buyer 不是普通消費者，而是有預算的 B2G / B2B 客戶。

智慧交通與車聯網是第二大機會。它可以支援道路障礙物偵測、車輛/行人感知、路側基礎設施 sensing、交通事件偵測與 digital road twin。但這個場景需要與 V2X、camera、lidar、radar、HD map、traffic management platform 整合。ISAC 不會單獨取代既有感測系統，而是成為廣域 sensing layer。

工業 private network 是高價值應用，但客戶不會單買 ISAC。他們會買 private network + safety + automation + analytics package。可能應用包括 AGV/AMR tracking、robot-human collision avoidance、factory digital twin、gesture recognition、equipment monitoring、hazard detection。台灣供應鏈在此場景具備較高相鄰度。

Digital Twin / Mapping 願景強，但資料產品化尚早。ISAC 可以幫助建立環境重建、高精度地圖、城市 digital twin、室內空間更新，但困難在於 sensing data 的精度、更新頻率、data ownership、fusion with non-3GPP sensors 與商業價值轉換。

Public Safety / Critical Infrastructure 高價值但採購週期長。這類場景包括港口、機場、能源設施、鐵路、邊境、災害現場與大型活動。它們需要 coverage、reliability、security、auditability，適合營運商與系統整合商包裝成 B2G/B2B service。

XR、indoor navigation、gesture recognition、retail analytics 皆是可想像應用，但短期商業成熟度較低，主要障礙是 device support、indoor deployment density、privacy concern 與 consumer willingness to pay。Healthcare / remote monitoring 有社會需求，但政策與醫療合規要求最高，不宜當作早期商用主軸。

2026-2028 年可驗證場景

在 vertical portfolio 的排序上，重要的不是「哪一個場景最酷」，而是「哪一個場景能在 2026-2028 年形成可驗證、可採購、可擴張的試驗」。UAV/低空經濟具備政策牽引、公共安全壓力與高預算買方，因此是最容易形成首波戰略市場的應用。工業私網雖然外部聲量較低，但 ROI、場域控制權與系統整合條件反而更成熟，是台灣供應鏈最容易從既有產品延伸的相鄰優勢領域。

智慧交通與 digital twin 則屬於長期高價值場景。前者需要和道路主管機關、車廠、V2X、HD map、路側設備、camera/lidar/radar 形成複雜生態；後者需要解決 sensing data 的更新頻率、資料所有權、空間資料授權、資料品質與長期維護責任。這些場景一旦成熟，市場規模可能大於單一工廠或單一機場，但導入節奏會受到跨機關治理與系統整合複雜度限制。

因此，若以產品策略角度排序，應採三層佈局：第一層為近期可賣的 standard intelligence、simulation、testing、OAM dashboard、security/privacy impact assessment；第二層為 UAV、工業私網與 critical infrastructure 的 PoC / trial package；第三層才是更大規模的 sensing-as-a-service、smart city digital twin 與 consumer/healthcare application。

垂直應用	市場	技術	標準化	政策/法規	整體	市場成熟度理由
UAV／低空經濟／無人機偵測	4.4	3.3	4.2	3.6	3.9	B2G/B2B 痛點清楚，機場、公共安全、低空經濟與周界監控皆有可付費需求。
工業私網／AGV／AMR／協作機器人	4.0	3.4	3.6	2.9	3.6	工廠、港口、物流園區已有 private 5G、AIoT 與自動化預算，可包裝為 safety / productivity solution。
Critical Infrastructure／公共安全／周界感測	3.9	3.1	3.5	3.2	3.5	能源、港口、機場、鐵路、災防與大型活動安全具有高價值 B2G / B2B 需求。
智慧交通／道路危險物偵測／V2X 輔助	3.8	3.1	3.7	2.8	3.4	道路安全、交通事件偵測、車流/行人感知與 V2X 輔助具長期公共建設需求。
OAM／SMO／RIC／Sensing Analytics	3.5	3.0	3.5	3.0	3.3	不是終端 vertical，但所有商用 ISAC 都需要管理、監控、品質、告警與責任界面；適合工具化產品。
Digital Twin／高解析地圖／環境重建	3.3	2.9	3.4	2.4	3.1	智慧城市、工業園區、map provider 具需求，但付費模型、資料權利與更新責任尚未穩定。
XR／室內導航／手勢感測	2.7	2.6	2.8	2.1	2.6	敘事豐富，但 consumer 付費意願、場館部署密度與 enterprise ROI 尚未清楚。
醫療／長照／居家感測	2.4	2.4	2.0	1.5	2.1	長照與無接觸監測有需求，但 healthcare buyer 對合規、臨床證據、認證與責任要求高。
General Consumer Sensing／零售與一般消費	2.0	2.2	1.8	1.8	2.0	短期缺乏清楚 killer app 與可持續付費模型。

分數加權與投資順序

上表的「整體」不是簡單平均，而是加權估計：市場 30%、技術 25%、標準化 25%、政策/法規 15%、台灣供應鏈相鄰度 5%。這樣設計是因為產品策略首先需要 buyer 和 use case，其次才是技術與標準，但政策/法規足以成為否決門檻，因此也需要保留獨立權重。

四、各 vertical 的四構面理由

以下表格把原本分散在附錄與前文中的分析理由完整展開。市場理由回答「誰會買、為什麼買」；技術理由回答「能不能做成可複製產品」；標準理由回答「3GPP 是否正在建立可引用的規格語言」；政策理由回答「是否可以在公共空間、企業場域或敏感資料情境中被合法且可追溯地部署」。

這樣的拆解可以避免常見誤判：例如某場景技術上可行，但若買方不明確或政策風險過高，商業成熟度仍低；反過來，某場景標準仍未完全完成，但若痛點強烈且可在 private network 場域試點，仍可先形成 PoC 與工具服務。

垂直應用	市場成熟度原因	技術成熟度原因	標準化成熟度原因	政策/法規成熟度原因
UAV／低空經濟／無人機偵測	B2G/B2B 痛點清楚，機場、公共安全、低空經濟與周界監控皆有可付費需求。	gNB monostatic sensing 與 drone detection PoC 最接近，但真實場域 clutter、false positive、告警責任與多基地台協同仍需驗證。	TR 38.765、RAN3、SA2、SA3 中 UAV sensing target 與 gNB-based sensing 反覆出現，標準牽引較高。	低空治理與公共安全政策牽引強，但資料權限、公共空間監控邊界與執法使用場景仍需制度化。
工業私網／AGV／AMR／協作機器人	工廠、港口、物流園區已有 private 5G、AIoT 與自動化預算，可包裝為 safety / productivity solution。	private network、edge AI、AGV/AMR 整合可行，但須和既有機器視覺、TSN、工控系統、工安流程融合。	SA1/SA6 use case 明確，SA5 OAM 可支撐 sensing management；RAN normative 還未成熟。	企業場域法規壓力低於公共空間，但員工隱私、工安責任、資料保留與事故追溯仍需設計。
Critical Infrastructure／公共安全／周界感測	能源、港口、機場、鐵路、災防與大型活動安全具有高價值 B2G / B2B 需求。	需要可靠覆蓋、告警可信度、抗干擾、邊緣分析、既有安全系統串接與 audit trail。	SA1/SA3/SA5 的 use case、security/privacy 與 OAM 皆與此場景高度相關。	政府採購與安全審查可推動導入，但同時拉高 audit、責任、隱私與跨機關資料流要求。
智慧交通／道路危險物偵測／V2X 輔助	道路安全、交通事件偵測、車流/行人感知與 V2X 輔助具長期公共建設需求。	需和 camera、lidar、radar、HD map、RSU 與交通平台整合，系統複雜度高且責任分工不易。	6G use case 與 ISAC channel model 可支撐，但實際 road-side deployment 尚需更多試驗。	涉及公路主管機關、事故責任、資料分享與公共空間感測治理，政策成熟度低於 UAV。
OAM／SMO／RIC／Sensing Analytics	不是終端 vertical，但所有商用 ISAC 都需要管理、監控、品質、告警與責任界面；適合工具化產品。	可先從 dashboard、simulation、test automation、xApp/rApp 原型與 sensing KPI pipeline 切入。	TR 28.895 與 SA5 將 sensing management、sensing entity selection、analytics 納入標準研究。	可內建授權、資料品質、privacy logging，成為法規合規與營運責任的控制面。
Digital Twin／高解析地圖／環境重建	智慧城市、工業園區、map provider 具需求，但付費模型、資料權利與更新責任尚未穩定。	精度、更新頻率、資料融合、non-3GPP sensor integration 與長期資料治理是主要瓶頸。	SA1/SA6 use case 清楚，但 sensing result exposure 到應用層尚未進入成熟商用規格。	環境資料可能涉及公共空間、私域替代資料、跨平台資料權利與商業授權。
XR／室內導航／手勢感測	敘事豐富，但 consumer 付費意願、場館部署密度與 enterprise ROI 尚未清楚。	需要高密度室內網路、低延遲定位、device support、人體活動推論與隱私保護。	與 6G immersive communication / sensing use cases 相鄰，但短期不是 3GPP ISAC 優先評估場景。	人體活動與室內空間感測容易觸及隱私、同意、資料保存與告知義務。
醫療／長照／居家感測	長照與無接觸監測有需求，但 healthcare buyer 對合規、臨床證據、認證與責任要求高。	Wi-Fi sensing adjacency 較明顯；3GPP cellular ISAC 的短期牽引較弱。	目前 ISAC corpus 的標準重心不在醫療照護，與 SA6/應用層關聯仍早。	高度敏感個資、醫療器材認證、照護責任與誤判風險，使政策成熟度最低。
General Consumer Sensing／零售與一般消費	短期缺乏清楚 killer app 與可持續付費模型。	可行技術很多，但需要終端支援、App ecosystem、資料授權與 privacy-by-design。	與 3GPP cellular ISAC 的直接標準牽引較弱。	公共/私人空間感測與 consumer consent 問題尚未成熟。

五、3GPP 各工作組進程與標準化 readiness

工作組分工與規格鎖定

SA1 的角色是建立 use case 與 service requirements。SA1 讓 ISAC 不只是「基地台感測」的工程想法，而是進入 6G service requirements、vertical application、digital twin、UAV、robotics 與智慧交通等服務語境。這一層的成熟度較高，因為 use case 與需求語言已經相對清楚。

SA2 將需求轉為 Stage-2 architecture。這包括 Sensing Function、Sensing Entity、sensing service request、result exposure、authorization、reference points 與 AF / RAN / CN 之間的功能切分。SA2 的成熟度高於應用層，但尚未完全變成 Rel-21 normative 的穩定規格。

RAN1/RAN3 將架構轉化為 radio、channel model、protocol stack、RAN-CN procedures、Nx interface、gNB-SF 互動與 sensing operation。RAN3 對產品實作影響最大，因為一旦 procedure 與 interface 方向固定，就會影響 RU、小基站、gNB、OAM 與測試儀器規格。

SA3、SA5、SA6 決定 ISAC 是否能商用。SA3 處理 active sensing attacks、privacy、UAV sensing target 等安全/隱私問題；SA5 將 OAM、sensing entity selection、sensing analytics 納入管理；SA6 則推動 application enablement 與 sensing data exposure。這些層級若沒有成熟，ISAC 即使 radio 可行，也難以形成可賣服務。

從 use case 到可營運服務

3GPP 各工作組的分工也反映出國際標準話語權的競爭。SA1 決定 use case 的合法性與需求語言；SA2 決定系統架構與功能切分；RAN1/RAN3 決定 radio 與 network procedure；SA3 決定安全與隱私；SA5 決定如何被營運管理；SA6 決定如何被 application layer 取用。任何供應商若只跟蹤 RAN1，很容易錯過 SA5 OAM、SA6 API 與 SA3 privacy 這些真正影響商用 packaging 的規格。

對台灣硬體供應鏈而言，RAN3 的重要性尤其高。RAN3 一旦對 gNB-SF、Nx interface、RAN-CN procedure、sensing modification、configuration update 或 gNB selection 形成穩定共識，O-RU、小基站、gNB、測試儀器與 OAM 平台就需要相應調整。這些改變會從 TDoc language 轉化為 engineering checklist：支援哪些 measurement export、哪些 metadata schema、哪些 timing/synchronization、哪些 management event 與哪些 conformance/performance test。

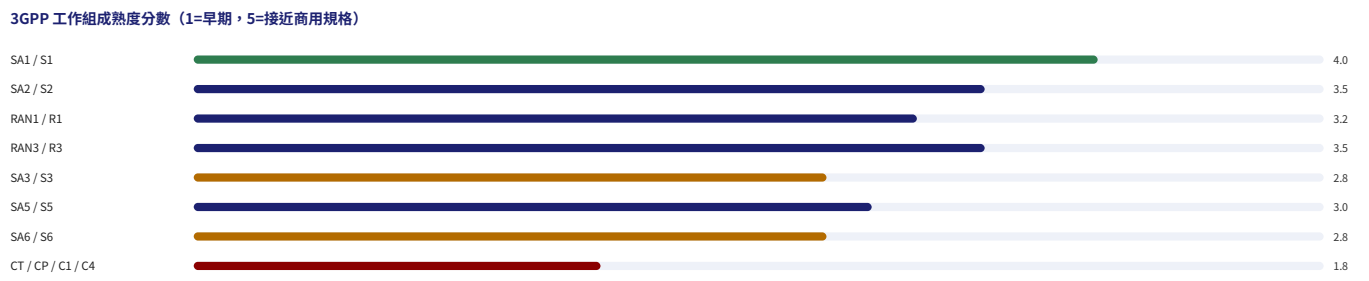

圖 3：3GPP 工作組成熟度分數
此圖不代表各 WG 的重要性排序，而是代表本報告判斷其 ISAC 工作已接近可引用規格/產品影響的程度。

對台灣供應鏈的規格含義

圖 3 與表格共同顯示：ISAC 的標準化成熟度並非只集中在 RAN1，而是呈現「SA1 需求明確、SA2/RAN3 架構與程序收斂、SA3/SA5/SA6 補足商用治理」的順序。對台灣供應鏈而言，較直接的規格壓力會出現在 RAN3、SA5 與 SA6：RAN3 決定 gNB-SF / Nx / signaling，SA5 決定 OAM readiness，SA6 決定 application API 與 vertical exposure。

工作組 / 層級	成熟度	判讀
SA1 / S1	4.0	Use case 與 service requirements 最先成形；TR 22.870／TS 22.270 承接 ISAC、digital twin、UAV 與垂直應用。
SA2 / S2	3.5	Sensing Function、Sensing Entity、reference points、service exposure、authorization 與 Stage-2 架構進入收斂。
RAN1 / R1	3.2	Channel model、sensing KPI、reference signal / waveform feasibility；Rel-19 TR 38.901 已有 ISAC CM 修正。
RAN3 / R3	3.5	RAN-CN procedures、Nx interface、gNB-SF、protocol stack 與 TR 38.765 pCR 最貼近實作。
SA3 / S3	2.8	TR 33.777 聚焦 security/privacy、active sensing attacks、UAV sensing target；仍屬早期風險框架。
SA5 / S5	3.0	TR 28.895 使 OAM、management、sensing entity selection、sensing analytics 成為商用前提。
SA6 / S6	2.8	Application enablement、non-3GPP sensing data 與 digital twin value-add 正在形成。
CT / CP / C1 / C4	1.8	目前更多是 potential follow-up；若 Nx/new AP 或 exposure API normative 化，後續重要性會提高。

六、TDoc corpus 量化觀察

381 筆 corpus 的量化分布顯示，Rel-20 是 ISAC 與 6G early study 的優先評估場景。SA1、SA2、SA5、RAN1、RAN3 的分布密度，說明 ISAC 正由 use case 走向 architecture、RAN procedure 與 OAM management。未指定 release 的項目多為會議報告、agenda、內部程序或跨項目文件，不宜直接解讀為非 ISAC。

這些數字的意義不是「哪個 WG 筆數最多就重要」，而是用來建立 evidence density。若同一議題同時出現在 SA2、RAN3、SA3、SA5、SA6，代表它已經從單點技術進入跨層服務能力。這也是本報告判斷 ISAC 已進入標準成形期，而非純早期概念期的主要原因。

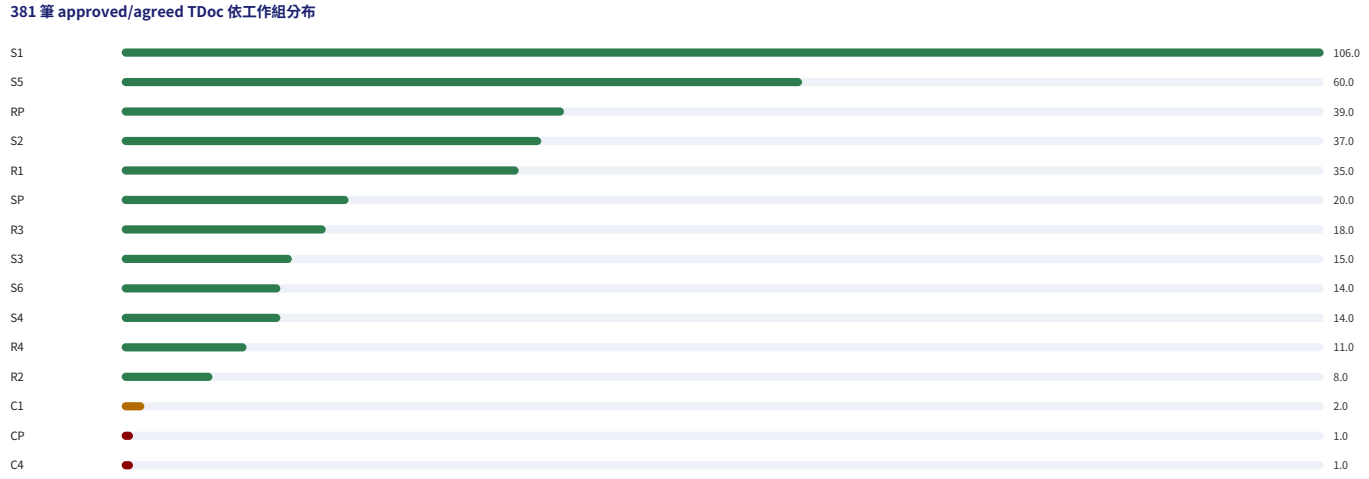

圖 4：TDoc 依 WG/TSG 前綴分布
以解析後 381 筆 corpus 產生；用於判斷 evidence density，而非價值排序。

從 TDoc corpus 量化觀察，Rel-20 是 ISAC 早期研究的優先評估場景，因為它承接 5G-Advanced 的研究延伸，也為 Rel-21 6G normative work 建立前置基礎。這意味著 2026 年的標準文件不只是技術討論紀錄，而是供應商判斷未來產品規格、專利佈局與客戶 trial 方向的重要訊號。若某一工作項在多個會議中連續出現 agreed / approved pCR、draft TR 或 meeting report reference，通常代表該議題已經從 isolated proposal 進入收斂狀態。

這種標準證據對市場分析也有實際價值。例如 SA5 TR 28.895 的 management aspects 代表 ISAC 不能只靠 radio algorithm 商用，還需要 sensing entity selection、sensing service monitoring、analytics、capability exposure、configuration 與 direct gNB-SF transmission 管理。SA3 TR 33.777 的 security/privacy study 則代表 ISAC 商用時需要處理 active sensing attacks、UAV privacy 與未授權 sensing request。這些都會形成未來測試、稽核、OAM 軟體與法規文件的需求。

因此，本報告將 TDoc 不是當成 citation list，而是當成產品路線圖的早期 evidence stream。它能幫助企業判斷何時投資 prototype、何時建立 test package、何時申請專利、何時與營運商或政府建立 trial。這也是 APEX Standards 工具化分析的核心價值：把龐大的標準會議文件轉化成產品、專利與市場行動。

表 1：依 Release 分布

Release	筆數	占比
Rel-20	210	55.1%
N/A	140	36.7%
Rel-19	28	7.3%
Rel-21	3	0.8%

表 2：依決議狀態分布

狀態	筆數	占比
approved	281	73.8%
agreed	99	26.0%
partially approved	1	0.3%

表 3：主要 Work Item 分布

WI	筆數	占比
N/A	161	42.3%
FS_6G_REQ	73	19.2%
FS_Sensing_CH	22	5.8%
FS_Sensing_ARC	16	4.2%
FS_6G_OAM	14	3.7%
FS_Sensing_NR	12	3.1%
FS_Sensing_OAM	11	2.9%
FS_Sensing_NR_bis	11	2.9%
FS_Sensing_SEC	9	2.4%
FS_ACAPI	7	1.8%
FS_SOBOT	6	1.6%
FS_6G_APP	6	1.6%
FS_6G-REQ	6	1.6%
FS_6G_RAN_Scen_Req	5	1.3%
FS_6G_MED	4	1.0%
FS_6G_ARC	4	1.0%
6G-REQ	3	0.8%
Sensing-ARC	2	0.5%

表 4：文件類型分布

Type	筆數	占比
pCR	153	40.2%
report	89	23.4%
agenda	41	10.8%
draft TR	28	7.3%
other	24	6.3%
SID new	11	2.9%
CR (F)	7	1.8%
SID revised	7	1.8%
CR pack	6	1.6%
LS out	4	1.0%
WID new	4	1.0%
Work Plan	3	0.8%
draft TS	2	0.5%
CR (B)	1	0.3%
TS or TR cover	1	0.3%

七、台灣上市櫃供應鏈與產品技術影響

產品相鄰性與公開資料邊界

台灣目前沒有明確的「純 ISAC 上市櫃公司」，但有高度相鄰的供應鏈。較直接的是 O-RAN RU、小基站、天線 RF、OTA 測試與 private 5G；第二層是 edge server、AI inference、SMO/RIC/OAM、digital twin；第三層是營運商與 vertical solution integrator；長期相鄰層則包括 cellular modem、CPE、Wi-Fi sensing 與 connectivity chipset。

第一波產品技術影響是 sensing-ready upgrade：RU / small cell 需要支援 sensing measurement export、high-precision synchronization、RF/antenna calibration、gNB-SF interface readiness、OAM/SMO/RIC integration、sensing coverage report。這會讓天線、RF、OTA、校準與 OAM software 的價值提高。

第二波影響是 edge AI 與 sensing analytics。ISAC 的價值不在「偵測到目標」本身，而在能否把 sensing result 轉成告警、決策、digital twin update、工安流程、低空監管或交通事件。這使 Advantech、QCT、Delta、電信營運商與系統整合商不一定直接做 radio sensing，仍可能成為商業化的重要角色。

第三波影響是營運商服務化。中華電信、遠傳、台灣大等不會只賣 3GPP feature，而會把 ISAC 包裝成 UAV 偵測、智慧工廠安全、critical infrastructure monitoring、smart transportation trial 或 network API。這些服務化能力決定 ISAC 是否能從標準能力轉成營收模型。

從硬體能力到可管理服務

台灣沒有單一「純 ISAC 上市櫃公司」，但這不代表台灣與 ISAC 無關。相反地，台灣的優勢正位於 ISAC 商用所需的相鄰供應鏈：O-RAN RU、小基站、私有 5G、天線/RF、OTA 測試、IPC、edge server、AI inference、SMO/RIC/OAM 與電信營運商 B2B 解決方案。ISAC 對台灣的衝擊不是創造一個全新產業，而是迫使既有網通與工控產品升級為 sensing-ready infrastructure。

第一層衝擊會落在 RAN/O-RU/小基站與 RF 測試。未來客戶不只會要求 throughput、EVM、ACLR、interoperability，也會問 sensing measurement 是否可匯出、beam / timing metadata 是否可追溯、RF/天線校準是否足以支援角度/距離/速度估計，以及是否能在 UAV、工廠、道路或周界場景中重複驗證。這對啟碁、中磊、明泰、鴻海、光寶、耀登與穩懋等相鄰供應鏈都有產品規格升級含義。

第二層衝擊會落在 edge AI、OAM 與 private 5G system integration。ISAC 的價值不在於「偵測到一個點」，而在於把 sensing result 轉成工安告警、AGV 停止指令、drone alert、traffic incident、perimeter breach 或 digital twin update。這使研華、廣達/QCT、台達、光寶與電信營運商可在 trial package、factory safety、critical infrastructure monitoring 與 sensing analytics dashboard 中尋找高附加價值機會。

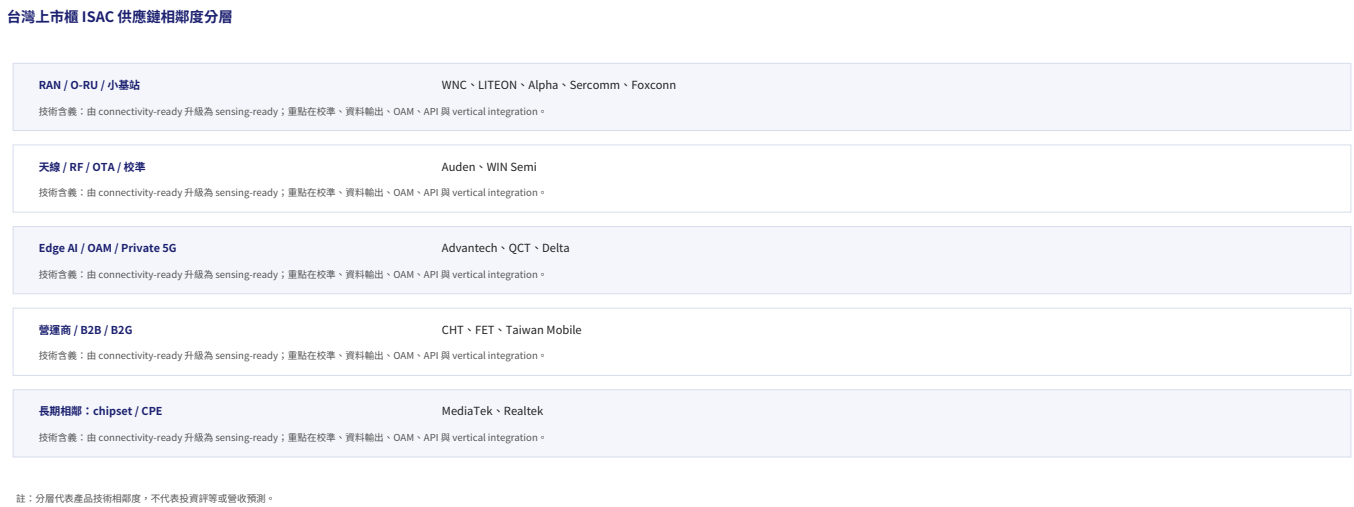

圖 5：台灣上市櫃 ISAC 供應鏈相鄰度分層
分層代表產品技術相鄰度，不代表股票評等或營收預測。

採購節奏與供應鏈分層

圖 5 的 supply-tier 視角也可用來解釋採購節奏。最早出現的商機往往不是大型 6G 網路採購，而是標準情報、測試驗證、PoC planning、RF/OTA calibration、OAM dashboard、edge analytics 與 vertical consulting。這些項目在標準尚未完全定稿前就有價值，因為客戶需要理解「下一代產品要改什麼」、「哪些場景值得 trial」、「哪些 TDoc agreement 可能影響產品規格」。

從台灣角度看，最具操作性的早期組合是三種：第一，O-RAN / small cell 廠商與 RF/OTA 測試廠合作，建立 sensing-ready radio validation package；第二，工業電腦、edge server 與 private 5G 供應商合作，建立 factory safety / AGV sensing PoC；第三，電信營運商與系統整合商合作，建立 UAV / low-altitude monitoring 或 critical infrastructure perimeter sensing trial。這些組合都比單純等待 6G handset 或 consumer sensing 更務實。

長期來看，若 Rel-21 normative work 將 sensing exposure、gNB-SF interface、OAM management 或 application enablement 推向更具體規格，台灣供應鏈的競爭焦點會從「能不能做 5G/O-RAN 硬體」轉向「能不能提供可證明、可校準、可管理、可被 vertical 使用的 sensing service chain」。這是硬體規格、軟體管理與服務包裝三者同時升級的問題。

圖 5 的重點是：最接近 ISAC 的台灣公司，未必是最終營運 sensing service 的公司；而最終能對客戶收費的公司，也未必直接製造 radio hardware。這種分工意味著標準情報、測試驗證、reference design、OAM dashboard 與 vertical solution package，會在硬體大量出貨前先形成需求。

公司	代號	供應鏈層級	直接度	可能技術路徑
啟碁 WNC	6285	RAN / small cell / O-RU	4.4	sensing-ready O-RU、小基站、system management、private 5G integration
光寶科 LITEON	2301	5G O-RAN / SMO / RIC	4.3	O-RAN + AIO small cell + 自有 SMO/RIC，可承接 sensing OAM / closed-loop analytics
中華電信 CHT	2412	operator / Open RAN lab / enterprise service	4.2	可把 ISAC 包裝成 UAV、公共安全、工廠、critical infrastructure sensing service
耀登 Auden	3138	antenna / RF / OTA / OTIC	4.1	5G FR2 / Sub-6 antenna array、O-RAN test、OTA calibration 對 ISAC readiness 重要
明泰 Alpha Networks	3380	O-RAN RU / network access	3.8	O-RU 與網通 ODM，受 sensing calibration、metadata export、interoperability testing 影響
鴻海 Hon Hai / Foxconn	2317	O-RU / manufacturing / system integration	3.7	O-RAN O-RU 認證與大型製造能力，可切入公網/專網 sensing hardware
中磊 Sercomm	5388	small cell / CPE / FWA	3.6	small cell、private cellular、FWA gateway 可轉向 enterprise sensing-ready node
研華 Advantech	2395	edge server / private 5G / IIoT	3.6	private 5G + edge AI + industrial analytics，承接工業 ISAC PoC / trial
遠傳 FET	4904	operator / smart factory service	3.6	企業專網、智慧工廠與 AIoT solution，適合 vertical pilot
穩懋 WIN Semi	3105	GaAs / GaN RF foundry	3.4	PA/LNA/front-end linearity、phase stability、mmWave/5G infrastructure 對 sensing performance 間接受益
廣達／雲達 QCT	2382	edge cloud / private 5G platform	3.2	MEC、AI server、private 5G、digital twin data plane
台灣大 Taiwan Mobile	3045	operator / enterprise private network	3.2	5G private network 與企業服務，後續可承接 sensing service API
台達電 Delta	2308	smart factory / automation	3.1	工廠自動化、AGV/AMR、安全與 digital twin；偏 vertical adopter / integrator
聯發科 MediaTek	2454	chipset / CPE / Wi-Fi sensing adjacency	2.7	cellular modem / CPE / Wi-Fi sensing adjacency；短期較間接，長期看 UE/CPE sensing
瑞昱 Realtek	2379	connectivity chipset	2.3	Wi-Fi / Ethernet / gateway adjacency；與 3GPP cellular ISAC 的直接度較低

八、產品與商業機會路線圖

近期最適合產品化的是標準情報與工具

這包括 ISAC TDoc agreement tracker、standard maturity dashboard、patent opportunity map、channel model / scenario simulation package、security/privacy impact report、OAM readiness report，以及 UAV / 工業 / 交通 vertical business case package。這些產品不需要等待 6G 商用，因為標準參與者、設備商、營運商與研究機構在 Rel-20/Rel-21 過渡期已經需要。

當 Rel-20 studies 更接近 Rel-21 normative work，市場會需要 drone detection PoC design、gNB-SF / Nx procedure emulator、sensing service request / result exposure emulator、sensing data analytics dashboard、private network sensing trial package 與 smart transportation scenario simulator。這些工具可服務 equipment vendor、operator、政府研究單位、產業園區與系統整合商。

長期產品會走向 sensing-as-a-service、network-based drone monitoring、digital twin sensing data service、industrial sensing private network add-on、critical infrastructure sensing platform 與 operator network API for sensing result exposure。這類服務需要標準更穩定、場域試驗更多、責任分工更清楚。

重要的策略含義是：不要等待 6G 完全商用才進場。ISAC 的早期收益會先出現在標準情報、測試驗證、simulation、OAM/security、產品規格升級與 vertical pilot。台灣供應鏈若能把既有 O-RAN/private 5G/edge AI 能力升級為 sensing-ready solution，會比單純等待 telecom capex 更主動。

從專利與標準參與角度看，較值得早期佈局的不是單純 sensing algorithm，而是 interface、procedure、OAM lifecycle、security authorization、sensing result exposure、data-quality indication、confidence level reporting 與 vertical-specific service template。這些領域更容易與標準文本、TDoc agreement 與產品規格形成可追蹤關係。

九、利害關係人視角：readiness 分數如何轉成行動

設備商與測試端行動

對設備商而言，重要的行動不是立即宣稱推出 ISAC 產品，而是建立 sensing-ready engineering checklist。這份 checklist 應包括 RF/antenna calibration、timing / synchronization、measurement export、metadata schema、gNB-SF interface assumptions、OAM event model、field test scenario 與 3GPP TDoc traceability。設備商若能把這些能力納入下一代 O-RU、小基站或 private 5G solution，就能在客戶提出 trial 需求時快速回應。

對營運商而言，readiness 分數應轉化為 vertical portfolio 優先順序。UAV、critical infrastructure、工業私網與智慧交通應列為較早探索的 B2G/B2B 場景；XR、醫療與一般消費 sensing 則應保留為中長期研究。營運商需要回答的不只是技術可行性，而是誰付費、誰承擔責任、誰保存資料、如何告知與授權、如何把 sensing result 轉成 SLA 或 managed service。

對 OAM / SMO / RIC 與 edge AI 供應商而言，ISAC 是把 telecom management 從 connectivity KPI 擴展到 sensing KPI 的機會。傳統 OAM 關心 coverage、throughput、fault、handover 與 configuration；ISAC 需要新增 sensing area、target type、confidence level、freshness、coverage gap、false alarm、missed detection、data lineage 與 privacy policy。這些項目若能被軟體化，就會形成高毛利的管理與分析層。

對 RF/antenna/測試驗證公司而言，ISAC 會把測試從 communication conformance 擴展到 sensing performance verification。未來客戶可能不只問 EVM、ACLR、beamforming 與 throughput，也會問 range accuracy、angle accuracy、velocity estimation、clutter handling、UAV target profile、indoor multipath、calibration repeatability 與 report traceability。這使測試規格、場景庫與 automation script 成為可產品化資產。

對政府與 regulator 而言，ISAC 的價值在於低空監管、公共安全、交通治理與 critical infrastructure protection，但風險在於公共空間感測、個資推論、資料保存與責任歸屬。政策端若能先建立 trial sandbox、資料最小化、用途限制、audit log、public notice 與 procurement template，將有助於把高需求場景從 PoC 推向可採購服務。

對標準情報、專利與策略服務提供者而言，ISAC 是高價值分析題目，因為其關鍵權利不只存在於 PHY 演算法，也存在於 interface、procedure、management、authorization、exposure、security 與 vertical orchestration。最值得追蹤的不是單一 headline TDoc，而是 revision chain、merged pCR、posterior reference、chair notes 與跨 WG 引用路徑。這些細節通常比公開新聞更早揭露未來產品方向。

對網通硬體與設備商

最務實的行動不是立即宣稱「已完成 ISAC 產品」，而是建立 sensing-ready 工程檢核表。檢核表至少應包含 RF/天線校準、時序同步、測量資料匯出、metadata schema、OAM event model、field trial scenario、TDoc traceability 與測試報告格式。這些文件會比行銷語言更能說服營運商、政府研究單位與垂直客戶。

應避免把 ISAC 包裝成抽象 6G 願景，而應選擇三個可採購場景：UAV/低空監控、工業私網工安感測、critical infrastructure 周界監控。每個 trial 都要先定義 buyer、SLA、資料保存、告警責任、privacy notice、OAM dashboard、維運流程與升級路徑。若沒有這些 business operations design，radio PoC 很難變成可收費服務。

ISAC 會創造新的 test asset 市場。除了傳統 RF conformance，還需要 UAV target simulation、indoor multipath/clutter model、range/angle/velocity accuracy、confidence level、false alarm、calibration repeatability、data freshness 與 sensing service lifecycle testing。越早把這些測試腳本產品化，越容易成為 Rel-21 前後的 supply chain gatekeeper。

ISAC 的公共價值需要制度化沙盒，而不是完全交給市場自發。政策沙盒應包含資料最小化、用途限制、稽核軌跡、公共告知、場域授權、責任歸屬與政府採購模板。若能先在低空經濟、公共安全與關鍵基礎設施建立試驗框架，台灣可把既有 ICT 供應鏈轉化為 6G sensing infrastructure 的示範場域。

十、結論：從 ISAC 技術敘事到供應鏈策略

從標準證據到可交付產品

ISAC 的標準成熟度已明顯高於商業成熟度；UAV、工業私網、智慧交通與公共安全成熟度高於 consumer/XR；OAM/security/privacy 是下一波工具與專利機會；台灣上市櫃公司最有利的位置，並不是「已經有 ISAC 成品」，而是「能否把 O-RAN、小基站、RF/天線、edge AI、private 5G 與營運商 vertical service 轉成 sensing-ready product stack」。

因此，本報告的核心判斷是：ISAC 對台灣供應鏈的第一波影響，是產品技術規格與解決方案敘事的升級；第二波才是 PoC / trial；第三波才是長期商用營收。若要在標準形成期取得主動權，應立即建立 TDoc-to-product、TDoc-to-patent、TDoc-to-testcase 的工具化能力。

這也解釋為什麼本報告把 readiness 拆成四個構面。若只看技術，會高估 XR、consumer 與 healthcare；若只看市場，會忽略標準未定型與 OAM/security 缺口；若只看標準，則會誤以為所有 3GPP topic 都能快速形成採購。四構面矩陣能更接近真實商業路徑：先找 buyer，再檢查 technical replicability，再對照 standardization timing，最後確認 policy/regulatory gate。

就產品規劃而言，最可操作的短期策略是把 ISAC 拆成可交付的工程模組，而不是一次推出完整「6G sensing」敘事。第一個模組是標準情報與 agreement tracking，用來回答哪些 TDoc 已形成共識、哪些 pCR 被合併、哪些 reference chain 可能影響後續規格。第二個模組是測試與校準，用於驗證 antenna array、RF chain、beam、timing 與 sensing KPI。第三個模組是 OAM / analytics，用於把 sensing result 轉為可監控、可告警、可審計的營運資料。

就市場進入順序而言，B2G 與 B2B private-domain 場景應優先於 general consumer。UAV、critical infrastructure、工業私網與智慧交通的共通點，是痛點清楚、風險成本高、可用專案制採購、且能接受 PoC-to-trial 的採購節奏。相反地，consumer sensing、retail analytics 或 healthcare monitoring 即使想像空間大，也容易受到隱私、同意、醫療責任與設備普及度限制，較適合作為中長期觀察項目。

就台灣上市櫃供應鏈而言，真正的分水嶺在於能否把既有 connectivity product 升級成 sensing-ready solution。O-RAN RU 與小基站廠商需要思考 measurement export、同步與校準；RF/antenna/OTA 測試廠需要建立 sensing performance verification；edge server 與工業電腦廠商需要把 sensing data pipeline 與 AI inference 放進 private network；營運商則需要把技術能力包裝成 vertical managed service，而不是只提供連線。

就專利與標準策略而言，ISAC 的機會不應只看 waveform 或 sensing algorithm。更可能形成長期價值的區域包括 sensing service request、authorization、Sensing Function / Sensing Entity 關係、gNB-SF interaction、Nx 或其他 interface procedure、sensing result exposure、OAM management、security threat mitigation、privacy policy enforcement 與 vertical orchestration。這些項目橫跨 SA2、RAN3、SA3、SA5 與 SA6，正是多工作組 topic 的權利佈局窗口。

就政策與風險治理而言，應在 PoC 階段就納入 privacy-by-design 與 audit-by-design。低空監管、公共安全與工業場域可能都有真實價值，但 sensing data 的用途、保存期間、第三方存取、目標識別、錯誤告警責任與跨場域資料流通，需要在 early trial 中被文件化。否則技術展示越成功，反而越可能引發監管、法務與社會接受度問題。

因此，本報告的最終建議不是等待 6G 完整規格完成，而是在 Rel-20 到 Rel-21 的窗口期建立三種能力：第一，標準證據鏈能力，能把 TDoc agreement 轉成產品與專利假設；第二，場域驗證能力，能用 UAV、工業私網、智慧交通與 critical infrastructure 形成可展示 PoC；第三，商業包裝能力，能把 sensing-ready hardware、OAM dashboard、edge AI 與 vertical workflow 組合成客戶能理解的服務。

若以一句話概括：ISAC 的下一階段競爭，不是誰最早說出「通感一體化」，而是誰能最早把標準證據、工程可驗證性、政策可接受性與 vertical ROI 串成一條可交付的產品鏈。對台灣供應鏈而言，這正是從 ODM/OEM、網通硬體、私網整合與 edge computing 走向高附加價值標準服務與系統方案的機會。

綜合上述分析，ISAC 的下一階段競爭已不再是誰能最先提出「通感一體化」概念敘事，而是誰能把標準證據、工程可驗證性、政策可接受度與 vertical ROI 串成可交付產品。這對台灣而言是一個從硬體代工走向標準價值鏈上游的窗口：以 O-RAN、RF/天線、private 5G、edge AI、SMO/RIC/OAM 與電信服務整合為基礎，建立 sensing-ready product stack。

重要的戰略轉換，是從「低成本硬體交付」轉向「標準對齊的系統設計與驗證服務」。當客戶要求 UAV 偵測、工廠安全、周界監控或 digital twin 更新時，他們真正需要的不是單一硬體，而是一套能回答 accuracy、confidence、latency、privacy、auditability、OAM、SLA 與責任歸屬的完整交付鏈。台灣供應鏈若能提前把這些能力包裝成工程檢核表、測試報告、trial kit 與 vertical reference design，就能在 Rel-21 normative work 成形前建立戰略位置。

十一、補充參考資料：標準、產業與公司公開來源

本節補充列示支撐本報告之外部公開來源。標準化事實以 3GPP 與 ITU 官方資料為優先；公司產品相鄰性以公司官網、正式新聞稿、年報或公開資訊觀測站資料為主；產業脈絡則採用可公開驗證之標準組織、公司與技術文件。此處的公司列示只代表其公開產品或能力與 ISAC 可能供應鏈有相鄰性，不代表其已揭露 ISAC 專案、訂單、營收或投資價值。

編號	類別	公開來源與用途	URL
R1	3GPP	3GPP Release 20 官方時程與 Stage freeze 背景。	https://www.3gpp.org/specifications-technologies/releases/release-20
R2	3GPP	3GPP TR 38.765 官方規格頁：Study on Integrated Sensing And Communication (ISAC) for NR。	https://www.3gpp.org/dynareport/38765.htm
R3	3GPP	3GPP 38-series 官方索引，用於確認 TR 38.765 與 NR 相關 TR/TS 的系列位置。	https://www.3gpp.org/dynareport/38-series.htm
R4	ITU	ITU IMT-2030 使用情境，列示 ISAC 為 6G usage scenario 之一。	https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2030/Pages/default.aspx
F1	台灣公開資訊	公開資訊觀測站 / TWSE MOPS，作為上市櫃公司正式公告與年報之查核入口。	https://emops.twse.com.tw/server-java/t58query
C1	公司年報	WNC 2024 Annual Report，支撐上市櫃公司基本揭露與公司資訊。	https://www.wnc.com.tw/uploads/files/shares/annual-reports/2024_WNC_Annual_Report_EN.pdf
C2	公司產品	WNC 5G private network / O-RAN product family，說明 indoor/outdoor RU、SmartNIC、servers 與 management software。	https://www.wnc.com.tw/en/news/wnc-to-showcase-at-mwc2024/detail
C3	公司產品	LITEON 5G Total Solution，說明 5G-SA O-RAN、AIO small cell、SMO 與 RIC。	https://www.liteon.com/en/product/networking-and-surveillance/networking-solutions/5g-total-solution
C4	公司產品	Alpha Networks O-RAN Radio Unit / 5G RU 產品與 O-RAN 介面標準敘述。	https://www.alphanetworks.com/en/news/756923d230b70e81
C5	公司產品	Sercomm 官方產品線：small cell、FWA CPE、mobile module、IoT monitoring/safety/security。	https://www.sercomm.com/en
C6	公司產品/測試	Auden O-RAN / 5G FR2 / Sub-6 antenna array module 與 O-RAN 測試能力說明。	https://www.auden.com.tw/en/o-ran-e/
C7	半導體	WIN Semiconductors GaN process for high-power mmWave applications and 5G infrastructure。	https://www.winfoundry.com/en-US/News/news_content/3836
C8	工業私網	Advantech private 5G / Open RAN / MEC / industrial IoT solution brief。	https://campaign.advantech.online/en/Cloud-IoT/5G/
C9	電信與測試	Chunghwa Telecom Laboratories 5G Open RAN Lab，multi-vendor integration / interoperability testing。	https://www.cht.com.tw/en/home/cht/messages/2025/0116-1500
C10	私網案例	ASE、Chunghwa Telecom、Qualcomm 5G mmWave smart factory 案例，作為工業私網場域參考。	https://www.cht.com.tw/en/home/cht/messages/2020/1216-1330en
O1	O-RAN	O-RAN ALLIANCE 官方說明：Open, Intelligent, Virtualized and Fully Interoperable RAN。	https://www.o-ran.org/

十二、名詞縮寫與台灣繁體中文對照

本名詞表採四欄格式：英文縮寫、English terminology、台灣繁體中文用語、以及本報告中的讀法。目的在於降低標準文件、產品規格與市場分析之間的語義落差，讓讀者可在閱讀 TDoc appendix、公司產品敘述與成熟度矩陣時維持一致解讀。

縮寫	English terminology	台灣繁體中文	本報告用語說明
3GPP	Third Generation Partnership Project	第三代合作夥伴計畫	全球行動通訊規格制定合作組織。
ISAC	Integrated Sensing and Communication	通感一體化／整合感知與通訊	以通訊基礎設施同時支援資料傳輸與環境/目標感知。
IMT-2030	International Mobile Telecommunications 2030	國際行動通訊 2030／6G 願景	ITU 對 6G 系統情境與能力的框架。
Rel-20	3GPP Release 20	3GPP 第 20 版	5G-Advanced 與 6G studies 的重要過渡版本。
Rel-21	3GPP Release 21	3GPP 第 21 版	預期承接 6G normative work 的版本。
TDoc	Temporary Document	3GPP 臨時文件／會議提案文件	3GPP 會議提案、報告、CR、SID/WID 等文件。
TR	Technical Report	技術報告	Study 階段常見文件，通常非正式規範要求。
TS	Technical Specification	技術規範	具規範性之技術文件。
pCR	Pseudo Change Request	準變更請求	Study TR 或草案中用於提議文字修改的文件。
SID	Study Item Description	研究項目描述	定義研究項目的範圍、工作目標與參與工作組。
WID	Work Item Description	工作項目描述	定義進入規範化工作項目的內容。
SA1	Service and System Aspects WG1	服務需求工作組	負責 service requirements 與 use cases。
SA2	Service and System Aspects WG2	系統架構工作組	負責 Stage 2 架構與功能切分。
SA3	Service and System Aspects WG3	安全工作組	負責安全、隱私與威脅模型。
SA5	Service and System Aspects WG5	營運管理工作組	負責 OAM、management、charging 與 network management。
SA6	Service and System Aspects WG6	應用賦能工作組	負責 application enablement 與垂直服務支援。
RAN1	Radio Access Network WG1	無線實體層工作組	負責 radio layer 1、channel model、KPI 等。
RAN3	Radio Access Network WG3	RAN 架構與介面工作組	負責 RAN-CN procedures、interface 與 protocol aspects。
gNB	Next Generation NodeB	5G/NR 基地台	5G NR 無線接取節點。
SF	Sensing Function	感知功能	處理或協調感知服務之系統功能。
SE	Sensing Entity	感知實體	可執行或支援感知能力的網路實體。
Nx	Nx Interface	Nx 介面	ISAC 架構中 gNB 與 SF 等實體間可能使用的介面名稱。
OAM	Operations, Administration and Maintenance	營運、管理與維護	網路維運、監控、組態與效能管理。
SMO	Service Management and Orchestration	服務管理與協調	O-RAN 架構中的服務管理與協調功能。
RIC	RAN Intelligent Controller	RAN 智慧控制器	O-RAN 中支援 RAN 控制與最佳化的控制器。
O-RU	Open Radio Unit	開放式無線電單元	O-RAN 架構中的 radio unit。
DU/CU	Distributed Unit / Centralized Unit	分散式單元／集中式單元	RAN 架構拆分後的功能單元。
MEC	Multi-access Edge Computing	多接取邊緣運算	部署於邊緣的運算能力。
UAV	Unmanned Aerial Vehicle	無人機	低空經濟與公共安全的重要感知目標。

縮寫	English terminology	台灣繁體中文	本報告用語說明
V2X	Vehicle-to-Everything	車聯網	車輛與車輛、路側、網路及行人互通。
AGV/AMR	Automated Guided Vehicle / Autonomous Mobile Robot	自動導引車／自主移動機器人	工業私網與智慧工廠的重要應用。
OTA	Over-the-Air	空中介面測試	以無線方式進行設備與天線性能測試。
RF	Radio Frequency	射頻	無線電頻率與前端元件相關技術。
KPI	Key Performance Indicator	關鍵績效指標	用於衡量感知或通訊效能的指標。
PoC	Proof of Concept	概念驗證	驗證技術可行性的早期試驗。
B2G/B2B	Business-to-Government / Business-to-Business	企業對政府／企業對企業	ISAC 早期較可行的付費與採購模式。

附錄 A：主要 3GPP 規格與官方參考文件

#	參考項目	說明	URL
1	3GPP Release 20	3GPP, Release 20 page, Stage-1/2/3 freeze timeline and Rel-20 studies.	https://www.3gpp.org/specifications-technologies/releases/release-20
2	3GPP TR 38.765	3GPP specification page: Study on Integrated Sensing And Communication (ISAC) for NR, Draft, initial planned Release 20.	https://www.3gpp.org/dynareport/38765.htm
3	3GPP TR 23.700-14	3GPP specification page: Study on Integrated Sensing and Communication; Stage 2.	https://www.3gpp.org/dynareport/23700-14.htm
4	ITU IMT-2030	ITU, IMT-2030 usage scenarios including Integrated sensing and communication (ISAC).	https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2030/Pages/default.aspx
5	3GPP FS_Sensing_NR_bis WI	3GPP Work Item details for Study on Integrated Sensing And Communication (ISAC) for NR, Rel-20.	https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=1080070
6	WNC O-RU / small cell	WNC O-RU and small-cell public product / news pages.	https://www.wnc.com.tw/en/network-access/network-infrastructure/o-ru
7	LITEON 5G total solution	LITEON private 5G, O-RAN, AIO small cells, SMO/RIC public product page.	https://www.liteon.com/en/product/networking-and-surveillance/networking-solutions/5g-total-solution
8	Sercomm small cell	Sercomm small-cell / private cellular network solution page.	https://www.sercomm.com/en/solutions/product/1/0/1
9	Foxconn O-RAN O-RU	Hon Hai press release on O-RAN OTIC outdoor O-RU certification.	https://www.foxconn.com/zh-tw/press-center/press-releases/latest-news/1061
10	Auden O-RAN / FR2	Auden public O-RAN testing and 5G FR2/Sub-6 antenna-array pages.	https://www.auden.com.tw/en/o-ran-e/
11	WIN Semiconductors GaN	WIN Semiconductors public release on GaN process for high-power mmWave and 5G infrastructure.	https://www.winfoundry.com/en-US/News/news_content/3836?page=1&year=2019
12	Advantech private 5G	Advantech private 5G / Open RAN / MEC solution page.	https://campaign.advantech.online/en/Cloud-IoT/5G/
13	QCT private 5G	QCT private 5G and AIoT smart park / enterprise 5G public cases.	https://blog.qct.io/qcts-private-5g-network-enables-taiwans-first-cultural-heritage-site-turned-smart-park/
14	CHT Open RAN Lab	Chunghwa Telecom 5G Open RAN Lab public statement.	https://www.cht.com.tw/en/home/cht/messages/2025/0116-1500
15	ASE / CHT / Qualcomm private 5G	Chunghwa Telecom, ASE and Qualcomm 5G mmWave smart factory press release.	https://www.cht.com.tw/en/home/cht/messages/2020/1216-1330en
16	FET / Delta / Microsoft smart factory	Far Eastern Magazine public announcement on FET, Delta and Microsoft 5G intelligent factory.	https://magazine.feg.com.tw/magazine/en/magazine_detail.aspx?id=12087
17	Taiwan Mobile private 5G	Taiwan Mobile enterprise private network public release / enterprise service page.	https://english.taiwanmobile.com/about/news/pressReleases_20210604_150348.html

附錄 B：精選 3GPP approved / agreed ISAC 相關 TDoc reference table

下表選自完整 381 筆 corpus，優先納入 FS_Sensing_NR、FS_Sensing_NR_bis、FS_Sensing_ARC、FS_Sensing_SEC、FS_Sensing_OAM、FS_6G_APP、FS_6G_REQ、6G-REQ 等與 ISAC 市場／標準化最相關文件。

TDoc	WG	Rel	WI	Decision	Date	Source	Title
S1-232521	S1	Rel-19	FS_SOBOT	agreed	2023-08-27	LG Electronics	Use Case 5.x Mining A group of autonomous robots and tele-operated robots
S1-232596	S1	Rel-19	FS_SOBOT	agreed	2023-09-05	Rapporteur (LGE)	TR 22.916v0.5.0 Study on Network of Service Robots with Ambient Intelligence
S1-233362	S1	Rel-19	FS_SOBOT	agreed	2023-11-20	other	Fig. 5.1.2-1 of 3GPP TR 22.847.
S1-233358	S1	Rel-19	FS_SOBOT	agreed	2023-11-20	LG Electronics	Proposed text for Related features and aspects from existing studies/works
S1-233354	S1	Rel-19	FS_SOBOT	agreed	2023-11-20	LG Electronics	SOBOT 5.8 Use case update - Addressing terminology and EN
S1-240002	S1			approved	2024-03-04	SA1 Chair	1st Draft Agenda for SA1#105
S1-241005	S1			agreed	2024-07-05	ETSI	Minutes of previous SA1 meeting
S1-242005	S1			agreed	2024-08-26	ETSI	Minutes of previous SA1 meeting
S1-244913	S1	Rel-20	FS_6G-REQ	agreed	2024-11-26	China Mobile, Huawei	Use case on low-altitude UAV supervision
S1-244914	S1	Rel-20	FS_6G-REQ	agreed	2024-11-26	Huawei	Use case on environment object reconstruction
S1-244921	S1	Rel-20	FS_6G-REQ	agreed	2024-11-26	TNO, KPN, Telefonica, Orange, China Unicom, China Mobile	Seamless Immersive Reality in Education
S1-244869	S1	Rel-20	FS_6G-REQ	agreed	2024-11-26	Nokia	Pseudo-CR on applicability of existing ISAC use cases and requirements to 6G
S1-244876	S1	Rel-20	FS_6G-REQ	agreed	2024-11-26	Xiaomi	new use case: High-resolution topographical maps
S1-244748	S1			approved	2024-11-26	SA1 Chairperson	Report 6G Sensing + Verticals
S1-244002	S1			agreed	2024-11-28	SA1 Chair	Agenda for SA1#108
S1-244696	S1	Rel-20	FS_6G-REQ	agreed	2024-12-09	Rapporteur (China Mobile, TMobile-USA)	TR 22.870v0.1.0 Study on 6G Use Cases and Service Requirements
S1-244005	S1			approved	2025-01-07	ETSI MCC	Minutes of previous SA1 meeting
S1-250011	S1	Rel-20	FS_6G_REQ	agreed	2025-01-27	T-Mobile USA Inc.	Editorial Update draft TR 22.870
S1-250669	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Huawei	Update of Use Case 7.5
S1-250553	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Nokia	Use case on security control enhancement with NDT in 6G network
S1-250745	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Nokia	Use case on security control enhancement with NDT in 6G network
S1-250873	S1			agreed	2025-02-24	Drafting Chairperson	Report for 6G Sensing + Immersive
S1-250970	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Siemens, TNO, KPN, Fraunhofer IIS, Airbus, Robert Bosch GmbH	New use case on Cooperating Mobile Robots
S1-250971	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Nokia, TNO, KPN, Telefonica, Orange, Siemens, nvidia, Vodafone	New use case on Realtime Digital Twins
S1-250973	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Airbus, Deutsche Telekom, Ericsson, Fraunhofer IIS (TBD)	Use cases on high-rate aircraft communication services in 6G
S1-250975	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	CATT	Use Case on Assisted Airspace Management of UAV and UAM Aircrafts
S1-250991	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Qualcomm	Pseudo-CR Use case on Enhanced XR User Navigation
S1-250993	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Rakuten Mobile, NIST, Nokia	Use case on 6G AI Agent Collaboration with Third-Party AI using LLM
S1-250999	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	vivo	Use case on home robot
S1-251003	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	Nokia, Rakuten Mobile, NIST	Network knowledge as part of Retrieval Augmented Generation for
S1-251007	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	InterDigital	Collaborative Robots Using Digital Twinning
S1-251012	S1	Rel-20	FS_6G_REQ	agreed	2025-02-24	KDDI, CATT	Use case on holographic communication
S1-250002	S1			agreed	2025-02-26	SA1 Chair	Agenda for SA1#109
S1-250869	S1	Rel-20	FS_6G_REQ	agreed	2025-03-10	Rapporteur (China Mobile, TMobile-USA)	TR 22.870v0.2.0 Study on 6G Use Cases and Service Requirements
S1-250005	S1			agreed	2025-04-03	ETSI MCC	Minutes of previous SA1 meeting
S1-252156	S1	Rel-20	FS_6G_REQ	agreed	2025-05-09	6G Study Rapporteurs	Clause 9 (Immersive) Editorial clean up
S1-252432	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	6G Study Rapporteurs	Updated Acronym List (3.3)
S1-252445	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	Nokia, TIM, Rakuten Mobile, NTT DOCOMO, Orange, AT&T, DSIT	pCR on TR 22.870 Key Value to sustainability update
S1-252463	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	6G Rapporteurs	Pseudo-CR Clause 7 (ISAC) Editorial Clean up
S1-252487	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	China Unicom, China mobile, Huawei, ZTE, vivo, CATT, OPPO	Updated Smart life for aging population with immersive real-time communication
S1-252537	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	China Mobile	pCR new use case of Multi-Sensor Fusion based sensing for UAV takeoff
S1-252538	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	Samsung	TR 22.870 pCR Use Case on Enabling Non-3GPP Sensing Services
S1-252540	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	TNO	New use case on Safe & Economic UAV Transport
S1-252587	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	OPPO, Toyota	Use case on Autonomous Driving based on Network-assisted Sensing
S1-252589	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	InterDigital, Xiaomi, Qualcomm	Personalized Interactive Immersive Guided Tour
S1-252628	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	Hytera Communications Corp.	Seamless connectivity for 6G-enabled Mission crtical service
S1-252680	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	vivo,OPPO	Use case on computing service for XR game acceleration
S1-252736	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	China Mobile, CAICT	Enhancement of Short Message Service
S1-252863	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	China Mobile, Telefonica, Telecom Italia, China Unicom, Huawei	Use case on Intelligent Calling Services
S1-252893	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	CATT	Use Case on 6G Local Area Network
S1-252896	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	CEWiT, Nokia, Reliance Jio, vivo	Pseudo-CR on Enhanced Exposure
S1-252903	S1			agreed	2025-05-26	Drafting Session Chair	Drafting group report for Sensing + Immersive
S1-252936	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	Xiaomi	pCR to UC 7.3 High-resolution topographical maps
S1-252957	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	NEC	Resiliency for 6G
S1-252969	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	Samsung, EUTC, MinistÃ¨re d'Ã©conomie et des finances, DSIT, NIST, FirstNet, SyncTechno, BMWK	TR 22.870 pCR on Regulated Services Resiliency in Disaster Conditions
S1-252971	S1	Rel-20	FS_6G_REQ	agreed	2025-05-26	LG Electronics	New Use case on cooperative networking under extreme conditions
S1-252682	S1	Rel-20	FS_6G_REQ	agreed	2025-05-27	NEC	Computing service in Operator managed data network
S1-252934	S1	Rel-20	FS_6G_REQ	agreed	2025-05-27	NEC	Computing service in Operator managed data network
S1-252005	S1			agreed	2025-05-28	ETSI	Minutes of previous SA1 meeting
S1-253053	S1	Rel-20	FS_6G_REQ	approved	2025-08-11	FirstNet	Pseudo-CR on Correcting Reference from TR to TS in 11.13.5
S1-253122	S1	Rel-20	FS_6G_REQ	approved	2025-08-14	China Mobile	Pseudo-CR on update 6.12
S1-253089	S1	Rel-20	FS_6G_REQ	approved	2025-08-14	6G study Rapporteurs	Rapporteurs Editorial Corrections on 22870-031
S1-253649	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	Siemens, OTE, InterDigital	New use case on Gesture Recognition in Industrial Environments
S1-253650	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	InterDigital, Turk Telekom, OTE	New use case on Smart Shopping Tracker
S1-253616	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	ZTE, China Telecom, China Unicom	Use case on service robots for power grid
S1-253629	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	Samsung	22.870 pCR Update of Use Case on Enabling Non-3GPP Wireless
S1-253536	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	LG Electronics	Update on UC 11.12 Cooperative networking under extreme conditions
S1-253545	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	China Mobile, Lenovo, Motorola Mobility	Pseudo-CR on update 5.5.4 6G Security requirements
S1-253570	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	LG Electronics	Update on UC 11.12 Cooperative networking under extreme conditions
S1-253612	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	China Telecom, Huawei	New use case on AI agent management
S1-253506	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	Xiaomi	pCR to UC 7.3 High-resolution topographical maps
S1-253507	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	Huawei, China Mobile	Update of clause 7.5 use case on environment object reconstruction
S1-253377	S1			approved	2025-09-01	Drafting Session Chair	Report of Sensing + Immersive Drafting Sessions
S1-253456	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	Hytera, China Mobile, China Telecom, China Unicom	Update of use case on Seamless Connectivity for 6G-enabled Mission Critical
S1-253401	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	OTD_US	Clarification regarding Lawful Interception for 6G TR
S1-253453	S1	Rel-20	FS_6G_REQ	approved	2025-09-01	ZTE, CSCN	Pseudo-CR to resolve ENs in clause 8.11
S1-253515	S1	Rel-20	FS_6G_REQ	approved	2025-09-05	Qualcomm France	Use Case on UAV Detection, Classification and Counting
S1-253614	S1	Rel-20	FS_6G_REQ	approved	2025-09-05	Qualcomm France	Use Case on UAV Detection, Classification and Counting
S1-254350	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	KPN, TNO, Telefonica, Philips, Thales	New Use Case on critical communication infrastructure

S1-254354	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	LG Electronics	Additional requirement(s) for 5.3 Support of non-3GPP access
S1-254396	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	Siemens, OTE, InterDigital	New Use Case on Robots Collaborating in Sensing in Smart Factories Re-submission
S1-254399	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	LG Electronics	Proposed Clarification on sensing-based positioning
S1-254401	S1			approved	2025-11-25	Drafting Session Chair	Report Sensing drafting sessions
S1-254402	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	Siemens, OTE, InterDigital	Use case on Gesture Recognition in Industrial Environments Update
S1-254420	S1	Rel-20	FS_6G_REQ	agreed	2025-11-25	TNO, China Mobile, Erillisverkot	Update UC 9.5 to clean editor s notes
S1-254430	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	6G Study Rapporteurs	Proposed Text for Clause 4 (Overview)
S1-254431	S1	Rel-20	FS_6G_REQ	approved	2025-11-25	6G Study Rapporteurs	Proposed Text for Clause 4 (Overview)
S1-261002	S1			approved	2026-02-17	SA1 Chair	Agenda for SA1#113
S1-261010	S1			approved	2026-02-17	ETSI	Final Minutes of SA1#112
S1-261011	S1			approved	2026-02-17	ETSI	Final Minutes of SA1#112e ad-hoc
S1-261125	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	Nokia	Add system and operational aspects in the consolidation structure
S1-261207	S1			approved	2026-02-17	SA1 Vice Chair	Agenda Drafting Sensing + Immersive
S1-261225	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	LG Electronics	Pseudo-CR on terminology/abbreviations (3.3, 5.7.3)
S1-261329	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	Nokia, Orange, EDF, Ericsson, Telecom Italia, NTT DOCOMO	Considerations on sustainability
S1-261372	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-261375	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-253370	S1	Rel-20	FS_6G_REQ	agreed	2026-02-17	InterDigital, Turk Telekom, OTE (DT Group), Deutsche Telekom, Xiaomi, Samsung	Resolve EN in clause 7.25.6
S1-261403	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	InterDigital, Turk Telekom, OTE (DT Group), Deutsche Telekom, Xiaomi, Samsung	Resolve EN in clause 7.25.6
S1-261412	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-261413	S1	Rel-20	FS_6G_REQ	approved	2026-02-17	Nokia (ISAC KPI moderator)	Pseudo-CR on consolidated ISAC KPI table
S1-262041	S1	Rel-21	6G-REQ	approved	2026-04-15	6G WI Rapporteurs	TS 22.270 (6G-REQ) v.0.1.0
S1-262188	S1	Rel-19	LTR_MA	agreed	2026-05-06	China Telecom	Rel-19 Clean-up of requirements on LTR_MA
S1-262215	S1	Rel-19	MultiRelay	agreed	2026-05-07	China Telecom	Rel-19 Cleanup MultiRelay
S1-262570	S1	Rel-21	6G-REQ	approved	2026-05-26	6G WI Rapporteurs	Proposed initial baseline for Clause 3.1 (Terms) merger doc
S1-262367	S1			approved	2026-05-26	other	Agenda breakout for ISAC SA1#114
S1-262370	S1	Rel-21	6G-REQ	approved	2026-06-04	6G WI Rapporteurs	TS 22.270v0.2.0 6G Service Requirements
S2-2500003	S2			approved	2025-01-07	ETSI MCC	Minutes of previous SA1 meeting
S2-2502780	S2	Rel-20		approved	2025-02-21	Xiaomi (Moderator of ISAC)	New SID on Study on Architecture Enhancement to support Integrated Sensing and Communication.
S2-2502791	S2			approved	2025-03-20	RAN1 Chair	Draft Agenda of RAN1#120bis meeting
S2-2504048	S2	Rel-20	FS_Sensing_ARC	approved	2025-04-10	Apple, Xiaomi	TR Scope for FS_Sensing_ARC .
S2-2504330	S2	Rel-20	FS_Sensing_ARC	approved	2025-04-11	Sony, OPPO, Samsung, China Mobile Com. Corporation, Nokia, Nokia Shanghai Bell, NTT DOCOMO, CEWiT, Futurewei, DT	Key Issue for WT#6 Configuration parameter provisioning .
S2-2504326	S2	Rel-20	FS_Sensing_ARC	approved	2025-04-11	Qualcomm Incorporated, Futurewei, China Telecom, Xiaomi, vivo, Apple, Samsung, NTT DOCOMO, ETRI, ZTE, InterDigital, Nokia, Nokia Shanghai Bell. Huawei, HiSilicon, CEWiT	TR 23.700-14: FS_Sensing-ARC new key issues.
S2-2504328	S2	Rel-20	FS_Sensing_ARC	approved	2025-04-11	OPPO, ZTE, Xiaomi, ETRI, Lenovo, Intel, NTT Docomo, Futurewei, Nokia, Nokia Shanghai Bell, CATT, Huawei, HiSilicon, CEWiT	23.700-14: Key issue X: Sensing data and the associated information collection and transport.
S2-2504329	S2	Rel-20	FS_Sensing_ARC	approved	2025-04-11	China Mobile, CATT, Apple, Nokia, Nokia Shanghai Bell, Huawei, HiSilicon, Samsung, ZTE, vivo, InterDigital, ETRI, NTT DOCOMO, Futurewei, CEWiT, Xiaomi, Lenovo	Key Issue 5: Sensing result exposure.
S2-2505409	S2	Rel-20	FS_Sensing_ARC	approved	2025-05-09	Xiaomi, Apple (Rapporteurs)	Revised SID on Study on Stage 2 for Integrated Sensing and Communication
S2-2506061	S2	Rel-20	FS_Sensing_ARC	approved	2025-05-22	Qualcomm Incorporated	TR 23.700-14: FS_Sensing_ARC new solutions on sensing service operations
S2-2507769	S2	Rel-20	FS_Sensing_ARC	approved	2025-08-29	Apple, Xiaomi	FS_Sensing_ARC: TR and SID scope alignment.
S2-2507779	S2	Rel-20	FS_Sensing_ARC	approved	2025-08-29	Nokia, KDDi	Solution - Sensing service request and result exposure.
S2-2507770	S2	Rel-20	FS_Sensing_ARC	approved	2025-08-29	Xiaomi	Update term Sensing Entity .
S2-2507811	S2	Rel-20	FS_Sensing_ARC	approved	2025-08-29	Tejas Networks Limited	P-CR: New Solution for gNB based sensing .

附錄 C：完整 381 筆 approved / agreed TDoc Reference Table

此表由 TDoc 匯出文字解析而成；因原始資料為網頁/CSV 混合格式，會議欄位與來源欄位在部分非核心列可能保留原始摘要格式。標題、TDoc ID、WG 前綴、WI、decision 與 date 為本報告主要引用欄位。

TDoc	WG	Rel	WI	Type	Decision	Date	Source	Title
C1-261451	C1			report	approved	2026-04-17	MCC	Draft CT1#159 meeting report for approval
C1-262009	C1			report	approved	2026-05-11	MCC	Draft CT1#160 meeting report for approval
C4-262275	C4	Rel-20		WID new	agreed	2026-05-21	Xiaomi	New WID on CT aspects for Integrated Sensing and Communication
CP-261274	CP	Rel-20		WID new	approved	2026-06-09	CT4	CT aspects for Integrated Sensing and Communication
R1-2400000	R1			agenda	approved	2024-02-19	RAN1 Chair	Draft Agenda of RAN1#116 meeting
R1-2401935	R1			agenda	approved	2024-04-05	RAN1 Chair	Draft Agenda of RAN1#116bis meeting
R1-2401937	R1			report	approved	2024-04-09	ETSI MCC	Report of RAN1#116 meeting
R1-2403820	R1			agenda	approved	2024-05-07	RAN1 Chair	Draft Agenda of RAN1#117 meeting
R1-2403821	R1			report	approved	2024-05-10	ETSI MCC	Report of RAN1#116bis meeting
R1-2405780	R1			agenda	approved	2024-08-05	RAN1 Chair	Draft Agenda of RAN1#118 meeting
R1-2405782	R1			report	approved	2024-08-14	ETSI MCC	Report of RAN1#117 meeting
R1-2407585	R1			agenda	approved	2024-10-01	RAN1 Chair	Draft Agenda of RAN1#118bis meeting
R1-2407587	R1			report	approved	2024-10-04	ETSI MCC	Report of RAN1#118 meeting
R1-2409340	R1			agenda	approved	2024-10-24	RAN1 Chair	Draft Agenda of RAN1#119 meeting
R1-2409341	R1			report	approved	2024-11-12	ETSI MCC	Report of RAN1#118bis meeting
R1-2500003	R1			report	approved	2025-01-31	ETSI MCC	Report of RAN1#119 meeting
R1-2500138	R1			agenda	approved	2025-01-31	RAN1 Chair	Draft Agenda of RAN1#120 meeting
R1-2501680	R1			agenda	approved	2025-03-20	RAN1 Chair	Draft Agenda of RAN1#120bis meeting
R1-2501682	R1			report	approved	2025-04-01	ETSI MCC	Report of RAN1#120 meeting
R1-2503200	R1			agenda	approved	2025-05-07	RAN1 Chair	Draft Agenda of RAN1#121 meeting
R1-2503201	R1			report	approved	2025-05-15	ETSI MCC	Report of RAN1#120bis meeting
R1-2505100	R1			agenda	approved	2025-08-05	RAN1 Chair	Draft Agenda of RAN1#122 meeting
R1-2505102	R1			report	approved	2025-08-19	ETSI MCC	Report of RAN1#121 meeting
R1-2506700	R1			agenda	approved	2025-09-29	RAN1 Chair	Draft Agenda of RAN1#122bis meeting
R1-2506702	R1			report	approved	2025-09-29	ETSI MCC	Report of RAN1#122 meeting
R1-2508301	R1			report	approved	2025-11-04	ETSI MCC	Report of RAN1#122bis meeting
R1-2509000	R1			agenda	approved	2025-11-06	RAN1 Chair	Draft Agenda of RAN1#123 meeting
R1-2600406	R1			agenda	approved	2026-01-23	RAN1 Chair	Draft Agenda of RAN1#124 meeting
R1-2600003	R1			report	approved	2026-02-04	ETSI MCC	Report of RAN1#123 meeting
R1-2601750	R1			agenda	approved	2026-03-23	RAN1 Chair	Draft Agenda of RAN1#124bis meeting
R1-2601752	R1			report	approved	2026-04-08	ETSI MCC	Report of RAN1#124 meeting
R1-2603480	R1			agenda	approved	2026-04-27	RAN1 Chair	Draft Agenda of RAN1#125 meeting
R1-2603481	R1			report	approved	2026-05-15	ETSI MCC	Report of RAN1#124b meeting
R1-2505006	R1	Rel-19	FS_Sensing_NR	CR (B)	agreed	2025-06-04	Xiaomi, AT&T	CR to introduce channel model for ISAC
R1-2506577	R1	Rel-19	FS_Sensing_NR	CR (F)	agreed	2025-08-29	Xiaomi, AT&T	CR to incorporate new agreementsÂ on ISAC CM
R1-2508093	R1	Rel-19	FS_Sensing_NR	CR (F)	agreed	2025-10-15	Xiaomi, AT&T	CR to incorporate new agreementsÂ on ISAC CM
R1-2509526	R1	Rel-19	FS_Sensing_NR	CR (F)	agreed	2025-11-21	Xiaomi, AT&T	CR to incorporate new agreementsÂ on ISAC CM
R1-2601601	R1	Rel-19	FS_Sensing_NR	CR (F)	agreed	2026-02-12	Xiaomi, T-Mobile USA Inc., OPPO	CR to incorporate new agreements on ISAC CM
R1-2603370	R1	Rel-19	FS_Sensing_NR	CR (F)	agreed	2026-04-15	OPPO	CR on ISAC reference channel model
R2-2507703	R2			report	approved	2025-10-21	Session chair (ZTE)	Report from session on NES, NR NTN and IoT NTN
R2-2600002	R2			report	approved	2026-01-30	MCC	RAN2#132 Meeting Report
R2-2601401	R2			agenda	approved	2026-04-03	Chair	Agenda for RAN2#133bis
R2-2601402	R2			report	approved	2026-04-03	MCC	RAN2#133 Meeting Report
R2-2602623	R2			report	approved	2026-04-17	Session chair (ZTE)	Report from Break-out session on NR-NTN and IoT-NTN
R2-2602901	R2			agenda	approved	2026-05-08	Chairman	Agenda for RAN2#134
R2-2602902	R2			report	approved	2026-05-08	MCC	RAN2#133bis Meeting Report
R2-2604183	R2			report	approved	2026-05-21	Session chair (ZTE)	Report from Break-out session on NR-NTN and IoT-NTN
R3-256501	R3			agenda	approved	2025-10-01	RAN3 Chair	RAN3#129-bis Meeting Agenda
R3-258002	R3	Rel-20		report	approved	2025-11-04	ETSI-MCC	RAN3#129-bis Meeting Report
R3-258001	R3			agenda	approved	2025-11-04	RAN3 Chair	RAN3#130 Meeting Agenda
R3-260002	R3	Rel-20		report	approved	2026-01-23	ETSI-MCC	RAN3#130 Meeting Report
R3-260001	R3			agenda	approved	2026-01-27	RAN3 Chair	RAN3#131 Meeting Agenda
R3-261001	R3			agenda	approved	2026-04-03	RAN3 Chair	RAN3#131-bis Meeting Agenda
R3-262002	R3	Rel-20		report	approved	2026-05-04	ETSI-MCC	RAN3#131-bis Meeting Report
R3-262001	R3			agenda	approved	2026-05-07	RAN3 Chair	RAN3#132 Meeting Agenda
R3-257325	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2025-10-22	ZTE Corporation, Huawei, Xiaomi, Nokia, Nokia Shanghai Bell, NEC, Ericsson, China Telecom, Samsung, LG Electronics, CATT, InterDigital	(TP to BL pCR to 38.765) Network Architecture
R3-258867	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2025-11-21	Huawei, CATT, Xiaomi, Nokia, Nokia Shanghai Bell, LG Electronics, CMCC, Ericsson, ZTE, NEC, Samsung, China Telecom	(TP for pCR) RAN-CN procedures and signaling for ISAC
R3-258820	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2025-11-21	Xiaomi, Huawei, CATT, LG Electronics, CMCC, Ericsson, NEC, ZTE, Samsung, China Telecom	(TP to pCR 38.765) ISAC general aspects and protocol stacks
R3-260808	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-02-20	Ericsson, China Telecom, Huawei, LG Electronics, Xiaomi, Nokia, NEC, OPPO, CATT, Samsung, AT&T, KPN, ZTE	(TP for pCR) RAN-CN procedures and signaling for ISAC
R3-261600	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-04-19	Xiaomi, Lenovo, Ericsson, ZTE, OPPO, Nokia, NEC, Huawei, China Telecom, CATT, Ofinno, Samsung, KPN, LG Electronics, TNO, CEWiT, AT&T, InterDigital, Qualcomm	(TP to pCR 38.765) Sensing procedures and signalling
R3-261599	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-04-19	China Telecom, Xiaomi, LG Electronics, OPPO, ZTE, NEC, Ericsson, Nokia, Lenovo, Huawei, CATT, Ofinno, TNO, Samsung, KPN, AT&T, InterDigital, T-Mobile, Tejas Networks, Seoul National University, Qualcomm	(TP to pCR 38.765) Network Architecture and Protocol Aspects for ISAC
R3-262571	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-05-24	Ericsson, Xiaomi, Huawei, China Telecom, ZTE, LG Electronics, OPPO, Ofinno, Samsung, CATT	ISAC TR Conclusions
R3-262555	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-05-24	China Telecom, Ericsson, Huawei, NOKIA, Xiaomi, ZTE, LG Electronics, Lenovo, OPPO, Canon, Ofinno, Samsung, CATT, BUPT, CEWiT, KPN, TNO	(TP to pCR 38.765) ISAC procedures and signaling
R3-262554	R3	Rel-20	FS_Sensing_NR_bis	other	agreed	2026-05-24	Huawei, Xiaomi, China Telecom, ZTE, Ericsson, Lenovo, LG Electronics, OPPO, Ofinno, Samsung, CATT, CEWit, KPN, TNO, AT&T, NEC	(TP to pCR 38.765) Network architecture for ISAC
R3-261002	R3	Rel-20	TEI	report	approved	2026-04-02	ETSI-MCC	RAN3#131 Meeting Report
R4-2514091	R4	Rel-20		other	approved	2025-10-03	NTT DOCOMO, China Mobile, AT&T, Vodafone	Workplan for Rel-20 Study of 6GR
R4-2514641	R4			other	approved	2025-10-20	Huawei	WF on [116bis][101] 6G system parameter
R4-2514645	R4			other	approved	2025-10-20	Mediatek	WF on 6G demod
R4-2520000	R4			report	approved	2025-10-31	ETSI MCC	RAN4#116bis Meeting Report
R4-2522426	R4			other	approved	2025-11-24	Mediatek	WF on [117][106] 6G Demod
R4-2522450	R4			other	approved	2025-11-24	Huawei	WF on [117][101] 6G system parameter
R4-2600000	R4			report	approved	2026-01-22	ETSI MCC	RAN4#117 Meeting Report
R4-2602307	R4			other	approved	2026-02-16	Feature lead (Huawei)	WF on [118][101-A] 6G system parameter (part I)
R4-2604702	R4			report	approved	2026-04-12	ETSI MCC	RAN4#118 Meeting Report
R4-2605201	R4			report	approved	2026-05-14	ETSI MCC	RAN4#118-bis Meeting Report
R4-2607742	R4			other	approved	2026-05-24	ZTE	Way Forward for [119][362] 6G_Sensing_coex_test_req
RP-232703	RP			agenda	approved	2023-11-10	RAN chair (Qualcomm)	Revised agenda for meeting RAN #102 held 11.12.-15.12.2023 in Edinburgh, Scotland
RP-234069	RP	Rel-19		SID new	approved	2023-12-15	Nokia (moderator)	New SID: Study on channel modelling for Integrated Sensing And Communication (ISAC) for NR
RP-233955	RP			report	approved	2023-12-17	ETSI MCC	Report of meeting RAN #101 held 11.09.-15.09.2023 in Bangalore, India
RP-240036	RP			agenda	approved	2024-03-10	RAN chair (Qualcomm)	Revised agenda for meeting RAN #103 held 18.03.-21.03.2024 in Maastricht, Netherlands
RP-240798	RP			report	approved	2024-03-24	ETSI MCC	Report of meeting RAN #102 held 11.12.-15.12.2023 in Edinburgh, Scotland
RP-241122	RP			agenda	approved	2024-06-05	RAN chair (Qualcomm)	Revised agenda for meeting RAN #104 held 17.06.-20.06.2024 in Shanghai, China

RP-241601	RP			report	approved	2024-07-03	ETSI MCC	Report of meeting RAN #103 held 18.03.-21.03.2024 in Maastricht, Netherlands
RP-241730	RP			agenda	approved	2024-09-08	RAN chair (Qualcomm)	Revised agenda for meeting RAN #105 held 09.09.-12.09.2024 in Melbourne, Australia
RP-242347	RP			report	approved	2024-09-16	ETSI MCC	Report of meeting RAN #104 held 17.06.-20.06.2024 in Shanghai, China
RP-242416	RP			agenda	approved	2024-10-17	RAN chair (Qualcomm)	Agenda for meeting RAN #106 held 09.12.-12.12.2024 in Madrid, Spain
RP-243259	RP			report	approved	2024-12-15	ETSI MCC	Report of meeting RAN #105 held 09.09.-12.09.2024 in Melbourne, Australia
RP-250637	RP			agenda	approved	2025-03-01	RAN Vice-Chair (AT&T)	Revised agenda for meeting RAN #107 held 12.03.-14.03.2025 in Incheon, Korea
RP-250772	RP			report	approved	2025-03-17	ETSI MCC	Report of meeting RAN #106 held 09.12.-12.12.2024 in Madrid, Spain
RP-251759	RP			agenda	approved	2025-06-06	RAN Chair (Samsung)	Revised agenda for meeting RAN #108 held 09.06.-13.06.2025 in Prague, Czech Republic
RP-251861	RP	Rel-20		SID new	approved	2025-06-12	A&T (moderator)	New SI: Study on Integrated Sensing And Communication (ISAC) for NR
RP-251804	RP			report	approved	2025-06-15	ETSI MCC	Report of meeting RAN #107 held 12.03.-14.03.2025 in Incheon, Korea
RP-251911	RP			agenda	approved	2025-09-05	RAN Chair (Samsung)	Revised agenda for meeting RAN #109 held 15.09.-18.09.2025 in Beijing, China
RP-252864	RP			report	approved	2025-09-22	ETSI MCC	Report of meeting RAN #108 held 09.06.-13.06.2025 in Prague, Czech Republic
RP-252970	RP			agenda	approved	2025-10-27	RAN Chair (Samsung)	Agenda for meeting RAN #110 held 08.12.-11.12.2025 in Baltimore, USA
RP-253798	RP			report	approved	2025-12-21	ETSI MCC	Report of meeting RAN #109 held 15.09.-18.09.2025 in Beijing, China
RP-260040	RP			agenda	approved	2026-02-20	RAN Chair (Samsung)	Revised agenda for meeting RAN #111 held 09.03.-12.03.2026 in Fukuoka, Japan
RP-260784	RP			LS out	agreed	2026-03-11	RAN	DRAFT Reply LTI to ITUR_WP5D_TEMP_405rev1 = RP-253009 on the schedule for updating Recommendation ITU-R M.2012 to revision 8 (to: SA; cc: -; contact: Novamint)
RP-260785	RP			LS out	agreed	2026-03-11	RAN	DRAFT Reply LTI to ITUR_WP5D_TEMP_404rev1 = RP-253008 on the schedule for updating Recommendation ITU-R M.2150 to revision 4 (to: SA; cc: -; contact: Novamint)
RP-260762	RP			report	approved	2026-03-12	ETSI MCC	Report of meeting RAN #110 held 08.12.-11.12.2025 in Baltimore, USA
RP-252946	RP	Rel-20	FS_6G_RAN_Scen_Req	LS out	agreed	2025-09-18	RAN	Draft Reply LS to ITU-R_WP5D_TEMP_167 = RP-243202 on Minimum requirements related to technical performance for IMT-2030 radio interface(s) (to: SA; cc: -; contact: CMCC)
RP-252947	RP	Rel-20	FS_6G_RAN_Scen_Req	pCR	approved	2025-09-18	CMCC (moderator)	pCR for 38.914 on Key performance indicators for 6G
RP-252882	RP	Rel-20	FS_6G_RAN_Scen_Req	draft TR	agreed	2025-09-18	CMCC	TR 38.914 v0.2.0 for Study on 6G Scenarios and requirements
RP-253750	RP	Rel-20	FS_6G_RAN_Scen_Req	draft TR	agreed	2025-12-12	CMCC	TR 38.914 v0.3.0 on Study on 6G Scenarios and Requirements; capturing agreements of RAN #101
RP-253869	RP	Rel-20	FS_6G_RAN_Scen_Req	pCR	approved	2025-12-12	CMCC	pCR to TR 38.914 v0.2.0 with RAN #110 results for key performance indicators
RP-251566	RP	Rel-19	FS_NR_7_24GHz_CHmod	CR pack	approved	2025-06-05	RAN1	Introduction of Rel-19 7-24 GHz channel model enhancements
RP-252867	RP	Rel-20	FS_NR_AIML_NGRAN_Ph3	SID revised	approved	2025-09-16	ZTE Corporation, NEC	Revised SI: Study on Artificial Intelligence (AI)/Machine Learning (ML) for NG-RAN Phase 3
RP-240799	RP	Rel-19	FS_Sensing_NR	SID revised	approved	2024-03-20	Xiaomi, AT&T	Revised SID: Study on channel modelling for Integrated Sensing And Communication (ISAC) for NR
RP-242348	RP	Rel-19	FS_Sensing_NR	SID revised	approved	2024-09-11	Xiaomi, AT&T	Revised SID: Study on channel modelling for Integrated Sensing And Communication (ISAC) for NR
RP-251567	RP	Rel-19	FS_Sensing_NR	CR pack	approved	2025-06-05	RAN1	Introduction of Rel-19 channel model for ISAC
RP-252623	RP	Rel-19	FS_Sensing_NR	CR pack	approved	2025-09-11	RAN1	CR to incorporate new agreementsÂ on ISAC channel model
RP-253012	RP	Rel-19	FS_Sensing_NR	CR pack	approved	2025-12-05	RAN1	Corrections on ISAC CM
RP-260166	RP	Rel-19	FS_Sensing_NR	CR pack	approved	2026-02-27	RAN1	CR to incorporate new agreementsÂ on ISAC channel model
RP-252819	RP	Rel-20	FS_Sensing_NR_bis	SID revised	approved	2025-09-16	Xiaomi, China Telecom	Revised SID: Study on Integrated Sensing And Communication (ISAC) for NR
RP-253246	RP	Rel-20	FS_Sensing_NR_bis	SID revised	approved	2025-12-01	Xiaomi, China Telecom	Revised SID: Study on Integrated Sensing And Communication (ISAC) for NR
S1-240002	S1			agenda	approved	2024-03-04	SA1 Chair	1st Draft Agenda for SA1#105
S1-241005	S1			report	agreed	2024-07-05	ETSI	Minutes of previous SA1 meeting
S1-242005	S1			report	agreed	2024-08-26	ETSI	Minutes of previous SA1 meeting
S1-244748	S1			report	approved	2024-11-26	SA1 Chairperson	Report 6G Sensing + Verticals
S1-244002	S1			agenda	agreed	2024-11-28	SA1 Chair	Agenda for SA1#108
S1-244005	S1			report	approved	2025-01-07	ETSI MCC	Minutes of previous SA1 meeting
S1-250873	S1			report	agreed	2025-02-24	Drafting Chairperson	Report for 6G Sensing + Immersive
S1-250002	S1			agenda	agreed	2025-02-26	SA1 Chair	Agenda for SA1#109
S1-250005	S1			report	agreed	2025-04-03	ETSI MCC	Minutes of previous SA1 meeting
S1-252903	S1			report	agreed	2025-05-26	Drafting Session Chair	Drafting group report for Sensing + Immersive
S1-252005	S1			report	agreed	2025-05-28	ETSI	Minutes of previous SA1 meeting
S1-253377	S1			report	approved	2025-09-01	Drafting Session Chair	Report of Sensing + Immersive Drafting Sessions
S1-254401	S1			report	approved	2025-11-25	Drafting Session Chair	Report Sensing drafting sessions
S1-261002	S1			agenda	approved	2026-02-17	SA1 Chair	Agenda for SA1#113
S1-261010	S1			report	approved	2026-02-17	ETSI	Final Minutes of SA1#112
S1-261011	S1			report	approved	2026-02-17	ETSI	Final Minutes of SA1#112e ad-hoc
S1-261207	S1			report	approved	2026-02-17	SA1 Vice Chair	Agenda Drafting Sensing + Immersive
S1-262367	S1			report	approved	2026-05-26	other	Agenda breakout for ISAC SA1#114
S1-262041	S1	Rel-21	6G-REQ	draft TS	approved	2026-04-15	6G WI Rapporteurs	TS 22.270 (6G-REQ) v.0.1.0
S1-262570	S1	Rel-21	6G-REQ	pCR	approved	2026-05-26	6G WI Rapporteurs	Proposed initial baseline for Clause 3.1 (Terms) merger doc
S1-262370	S1	Rel-21	6G-REQ	draft TS	approved	2026-06-04	6G WI Rapporteurs	TS 22.270v0.2.0 6G Service Requirements
S1-244913	S1	Rel-20	FS_6G-REQ	pCR	agreed	2024-11-26	China Mobile, Huawei	Use case on low-altitude UAV supervision
S1-244914	S1	Rel-20	FS_6G-REQ	pCR	agreed	2024-11-26	Huawei	Use case on environment object reconstruction
S1-244921	S1	Rel-20	FS_6G-REQ	pCR	agreed	2024-11-26	TNO, KPN, Telefonica, Orange, China Unicom, China Mobile	Seamless Immersive Reality in Education
S1-244869	S1	Rel-20	FS_6G-REQ	pCR	agreed	2024-11-26	Nokia	Pseudo-CR on applicability of existing ISAC use cases and requirements to 6G
S1-244876	S1	Rel-20	FS_6G-REQ	pCR	agreed	2024-11-26	Xiaomi	new use case: High-resolution topographical maps
S1-244696	S1	Rel-20	FS_6G-REQ	draft TR	agreed	2024-12-09	Rapporteur (China Mobile, TMobile-USA)	TR 22.870v0.1.0 Study on 6G Use Cases and Service Requirements
S1-250011	S1	Rel-20	FS_6G_REQ	draft TR	agreed	2025-01-27	T-Mobile USA Inc.	Editorial Update draft TR 22.870
S1-250669	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Huawei	Update of Use Case 7.5
S1-250553	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Nokia	Use case on security control enhancement with NDT in 6G network
S1-250745	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Nokia	Use case on security control enhancement with NDT in 6G network
S1-250970	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Siemens, TNO, KPN, Fraunhofer IIS, Airbus, Robert Bosch GmbH	New use case on Cooperating Mobile Robots
S1-250971	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Nokia, TNO, KPN, Telefonica, Orange, Siemens, nvidia, Vodafone	New use case on Realtime Digital Twins
S1-250973	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Airbus, Deutsche Telekom, Ericsson, Fraunhofer IIS (TBD)	Use cases on high-rate aircraft communication services in 6G
S1-250975	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	CATT	Use Case on Assisted Airspace Management of UAV and UAM Aircrafts
S1-250991	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Qualcomm	Pseudo-CR Use case on Enhanced XR User Navigation
S1-250993	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Rakuten Mobile, NIST, Nokia	Use case on 6G AI Agent Collaboration with Third-Party AI using LLM
S1-250999	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	vivo	Use case on home robot
S1-251003	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	Nokia, Rakuten Mobile, NIST	Network knowledge as part of Retrieval Augmented Generation for
S1-251007	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	InterDigital	Collaborative Robots Using Digital Twinning
S1-251012	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-02-24	KDDI, CATT	Use case on holographic communication
S1-250869	S1	Rel-20	FS_6G_REQ	draft TR	agreed	2025-03-10	Rapporteur (China Mobile, TMobile-USA)	TR 22.870v0.2.0 Study on 6G Use Cases and Service Requirements

S1-252432	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	6G Study Rapporteurs	Updated Acronym List (3.3)
S1-252445	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	Nokia, TIM, Rakuten Mobile, NTT DOCOMO, Orange, AT&T, DSIT	pCR on TR 22.870 Key Value to sustainability update
S1-252463	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	6G Rapporteurs	Pseudo-CR Clause 7 (ISAC) Editorial Clean up
S1-252487	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	China Unicom, China mobile, Huawei, ZTE, vivo, CATT, OPPO	Updated Smart life for aging population with immersive real-time communication
S1-252537	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	China Mobile	pCR new use case of Multi-Sensor Fusion based sensing for UAV takeoff
S1-252538	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	Samsung	TR 22.870 pCR Use Case on Enabling Non-3GPP Sensing Services
S1-252540	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	TNO	New use case on Safe & Economic UAV Transport
S1-252587	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	OPPO, Toyota	Use case on Autonomous Driving based on Network-assisted Sensing
S1-252589	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	InterDigital, Xiaomi, Qualcomm	Personalized Interactive Immersive Guided Tour
S1-252628	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	Hytera Communications Corp.	Seamless connectivity for 6G-enabled Mission crtical service
S1-252680	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	vivo,OPPO	Use case on computing service for XR game acceleration
S1-252736	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	China Mobile, CAICT	Enhancement of Short Message Service
S1-252863	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	China Mobile, Telefonica, Telecom Italia, China Unicom, Huawei	Use case on Intelligent Calling Services
S1-252893	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	CATT	Use Case on 6G Local Area Network
S1-252896	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	CEWiT, Nokia, Reliance Jio, vivo	Pseudo-CR on Enhanced Exposure
S1-252936	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	Xiaomi	pCR to UC 7.3 High-resolution topographical maps
S1-252957	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	NEC	Resiliency for 6G
S1-252969	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	Samsung, EUTC, MinistÃ¨re d'Ã©conomie et des finances, DSIT, NIST, FirstNet, SyncTechno, BMWK	TR 22.870 pCR on Regulated Services Resiliency in Disaster Conditions
S1-252971	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-26	LG Electronics	New Use case on cooperative networking under extreme conditions
S1-252682	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-05-27	NEC	Computing service in Operator managed data network
S1-252934	S1	Rel-20	FS_6G_REQ	draft TR	agreed	2025-05-27	NEC	Computing service in Operator managed data network
S1-253053	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-08-11	FirstNet	Pseudo-CR on Correcting Reference from TR to TS in 11.13.5
S1-253122	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-08-14	China Mobile	Pseudo-CR on update 6.12
S1-253089	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-08-14	6G study Rapporteurs	Rapporteurs Editorial Corrections on 22870-031
S1-253649	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	Siemens, OTE, InterDigital	New use case on Gesture Recognition in Industrial Environments
S1-253650	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	InterDigital, Turk Telekom, OTE	New use case on Smart Shopping Tracker
S1-253616	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	ZTE, China Telecom, China Unicom	Use case on service robots for power grid
S1-253629	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	Samsung	22.870 pCR Update of Use Case on Enabling Non-3GPP Wireless
S1-253536	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	LG Electronics	Update on UC 11.12 Cooperative networking under extreme conditions
S1-253545	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	China Mobile, Lenovo, Motorola Mobility	Pseudo-CR on update 5.5.4 6G Security requirements
S1-253570	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	LG Electronics	Update on UC 11.12 Cooperative networking under extreme conditions
S1-253612	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	China Telecom, Huawei	New use case on AI agent management
S1-253506	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	Xiaomi	pCR to UC 7.3 High-resolution topographical maps
S1-253507	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	Huawei, China Mobile	Update of clause 7.5 use case on environment object reconstruction
S1-253456	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	Hytera, China Mobile, China Telecom, China Unicom	Update of use case on Seamless Connectivity for 6G-enabled Mission Critical
S1-253401	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	OTD_US	Clarification regarding Lawful Interception for 6G TR
S1-253453	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-01	ZTE, CSCN	Pseudo-CR to resolve ENs in clause 8.11
S1-253515	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-05	Qualcomm France	Use Case on UAV Detection, Classification and Counting
S1-253614	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-09-05	Qualcomm France	Use Case on UAV Detection, Classification and Counting
S1-254350	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	KPN, TNO, Telefonica, Philips, Thales	New Use Case on critical communication infrastructure during a power outage situation
S1-254354	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	LG Electronics	Additional requirement(s) for 5.3 Support of non-3GPP access
S1-254396	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	Siemens, OTE, InterDigital	New Use Case on Robots Collaborating in Sensing in Smart Factories Re-submission
S1-254399	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	LG Electronics	Proposed Clarification on sensing-based positioning
S1-254402	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	Siemens, OTE, InterDigital	Use case on Gesture Recognition in Industrial Environments Update
S1-254420	S1	Rel-20	FS_6G_REQ	pCR	agreed	2025-11-25	TNO, China Mobile, Erillisverkot	Update UC 9.5 to clean editor s notes
S1-254430	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	6G Study Rapporteurs	Proposed Text for Clause 4 (Overview)
S1-254431	S1	Rel-20	FS_6G_REQ	pCR	approved	2025-11-25	6G Study Rapporteurs	Proposed Text for Clause 4 (Overview)
S1-261125	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	Nokia	Add system and operational aspects in the consolidation structure
S1-261225	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	LG Electronics	Pseudo-CR on terminology/abbreviations (3.3, 5.7.3)
S1-261329	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	Nokia, Orange, EDF, Ericsson, Telecom Italia, NTT DOCOMO	Considerations on sustainability
S1-261372	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-261375	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-253370	S1	Rel-20	FS_6G_REQ	other	agreed	2026-02-17	InterDigital, Turk Telekom, OTE (DT Group), Deutsche Telekom, Xiaomi, Samsung	Resolve EN in clause 7.25.6
S1-261403	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	InterDigital, Turk Telekom, OTE (DT Group), Deutsche Telekom, Xiaomi, Samsung	Resolve EN in clause 7.25.6
S1-261412	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	6G Study Rapporteurs	Proposed CPRs for Agreement Satellite Comms/Immersive Comms
S1-261413	S1	Rel-20	FS_6G_REQ	pCR	approved	2026-02-17	Nokia (ISAC KPI moderator)	Pseudo-CR on consolidated ISAC KPI table
S1-232521	S1	Rel-19	FS_SOBOT	pCR	agreed	2023-08-27	LG Electronics	Use Case 5.x Mining A group of autonomous robots and tele-operated robots
S1-232596	S1	Rel-19	FS_SOBOT	draft TR	agreed	2023-09-05	Rapporteur (LGE)	TR 22.916v0.5.0 Study on Network of Service Robots with Ambient Intelligence
S1-233362	S1	Rel-19	FS_SOBOT	pCR	agreed	2023-11-20	other	Fig. 5.1.2-1 of 3GPP TR 22.847.
S1-233358	S1	Rel-19	FS_SOBOT	pCR	agreed	2023-11-20	LG Electronics	Proposed text for Related features and aspects from existing studies/works
S1-233354	S1	Rel-19	FS_SOBOT	pCR	agreed	2023-11-20	LG Electronics	SOBOT 5.8 Use case update - Addressing terminology and EN
S1-262188	S1	Rel-19	LTR_MA	CR (F)	agreed	2026-05-06	China Telecom	Rel-19 Clean-up of requirements on LTR_MA
S1-262215	S1	Rel-19	MultiRelay	CR (F)	agreed	2026-05-07	China Telecom	Rel-19 Cleanup MultiRelay
S2-2306264	S2			report	approved	2023-05-12	SA WG2 Secretary	Draft (Auto-Generated) Report of SA WG2 meeting #156-e Keywords:
S2-2308268	S2			report	approved	2023-05-12	SA WG2 Secretary	Draft (Auto-Generated) Report of SA WG2 meeting #156-e Keywords:
S2-2313228	S2			report	approved	2023-05-12	SA WG2 Secretary	Draft (Auto-Generated) Report of SA WG2 meeting #156-e Keywords:
S2-2400002	S2			report	approved	2024-01-15	SA WG2 Secretary	Draft Report of SA WG2 meeting #159 Keywords:
S2-2500003	S2			report	approved	2025-01-07	ETSI MCC	Minutes of previous SA1 meeting
S2-2502780	S2	Rel-20		SID new	approved	2025-02-21	Xiaomi (Moderator of ISAC)	New SID on Study on Architecture Enhancement to support Integrated Sensing and Communication.
S2-2502791	S2			report	approved	2025-03-20	RAN1 Chair	Draft Agenda of RAN1#120bis meeting
S2-2504485	S2			report	approved	2025-05-10	SA WG2 Secretary	Draft Report of SA WG2 meeting #168 Keywords:
S2-2506106	S2			report	approved	2025-08-12	SA WG2 Secretary	Draft Report of SA WG2 meeting #169 Keywords:
S2-2509267	S2			report	approved	2025-10-13	SA WG2 Secretary	Draft Report of SA WG2 meeting #170 Keywords:
S2-2509840	S2			report	approved	2025-11-07	SA WG2 Secretary	Draft Report of SA WG2 meeting #171 Keywords:
S2-2511308	S2			other	approved	2025-11-24	SA WG2	Detailed FS_6G_ARC Work Task scopes.
S2-2600003	S2	Rel-20		report	approved	2026-01-30	Xiaomi, Apple (Rapporteurs)	WID on Integrated Sensing and Communication.
S2-2600957	S2	Rel-20		WID new	approved	2026-01-30	Xiaomi, Apple (Rapporteurs)	WID on Integrated Sensing and Communication.
S2-2601552	S2	Rel-20		other	approved	2026-02-12	Vivo	Sensing Function Discovery and Selection.
S2-2601555	S2	Rel-20		other	approved	2026-02-13	InterDigital Inc.	High Level Description on Sensing Result Exposure.
S2-2601722	S2			report	approved	2026-03-23	RAN1 Chair	Draft Agenda of RAN1#124bis meeting
S2-2603540	S2			report	approved	2026-05-08	MCC	RAN2#133bis Meeting Report

S2-2511201	S2	Rel-20	FS_6G_ARC	pCR	approved	2025-11-20	Apple, MediaTek Inc., LG Electronics, CEWiT, Tejas Networks Limited, CATT, Interdigital, China Telecom, TNO, Ericsson, ETRI, NTT DOCOMO, Futurewei, KPN, OPPO, vivo, Xiaomi, Deutsche Telekom, Lenovo, CableLabs, Huawei, HiSilicon, ZTE, NEC, Nokia	[WT#4] WT and KI for Integrated Sensing and Communication.
S2-2603350	S2	Rel-20	FS_6G_ARC	pCR	approved	2026-04-17	Qualcomm Incorporated, Xiaomi, Ericsson - (Penholders)	[KI#20, bullet#1] Penholder input for KI#20 bullet#1 SA WG2#174.
S2-2605495	S2	Rel-20	FS_6G_ARC	pCR	approved	2026-05-21	Qualcomm Incorporated, Xiaomi, Ericsson - (Penholders)	23.801-01: [KI#20, bullet#1] Penholder input for SA WG2#175.
S2-2504048	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-04-10	Apple, Xiaomi	TR Scope for FS_Sensing_ARC .
S2-2504330	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-04-11	Sony, OPPO, Samsung, China Mobile Com. Corporation, Nokia, Nokia Shanghai Bell, NTT DOCOMO, CEWiT, Futurewei, DT	Key Issue for WT#6 Configuration parameter provisioning .
S2-2504326	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-04-11	Qualcomm Incorporated, Futurewei, China Telecom, Xiaomi, vivo, Apple, Samsung, NTT DOCOMO, ETRI, ZTE, InterDigital, Nokia, Nokia Shanghai Bell. Huawei, HiSilicon, CEWiT	TR 23.700-14: FS_Sensing-ARC new key issues.
S2-2504328	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-04-11	OPPO, ZTE, Xiaomi, ETRI, Lenovo, Intel, NTT Docomo, Futurewei, Nokia, Nokia Shanghai Bell, CATT, Huawei, HiSilicon, CEWiT	23.700-14: Key issue X: Sensing data and the associated information collection and transport.
S2-2504329	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-04-11	China Mobile, CATT, Apple, Nokia, Nokia Shanghai Bell, Huawei, HiSilicon, Samsung, ZTE, vivo, InterDigital, ETRI, NTT DOCOMO, Futurewei, CEWiT, Xiaomi, Lenovo	Key Issue 5: Sensing result exposure.
S2-2505409	S2	Rel-20	FS_Sensing_ARC	SID revised	approved	2025-05-09	Xiaomi, Apple (Rapporteurs)	Revised SID on Study on Stage 2 for Integrated Sensing and Communication
S2-2506061	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-05-22	Qualcomm Incorporated	TR 23.700-14: FS_Sensing_ARC new solutions on sensing service operations
S2-2507769	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-08-29	Apple, Xiaomi	FS_Sensing_ARC: TR and SID scope alignment.
S2-2507779	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-08-29	Nokia, KDDi	Solution - Sensing service request and result exposure.
S2-2507770	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-08-29	Xiaomi	Update term Sensing Entity .
S2-2507811	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-08-29	Tejas Networks Limited	P-CR: New Solution for gNB based sensing .
S2-2509826	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-10-16	Ericsson, Huawei, HiSilicon, China Mobile, Samsung, Nokia, NTT Docomo, InterDigital, ZTE, Xiaomi, vivo, OPPO, Tejas Network Limited, BUPT, Toyota Motor Corporation, LGE, China Telecom	Interim agreements and further considerations for KI#4.
S2-2509825	S2	Rel-20	FS_Sensing_ARC	pCR	approved	2025-10-19	Qualcomm Incorporated, Nokia, NTT DoCoMo, Tejas Networks Limited, CEWiT, Samsung, Apple, ZTE, Ericsson, vivo, LG Electronics, Xiaomi, Intel, Lenovo, OPPO, Sony, Futurewei, ETRI, InterDigital, BUPT, Toyota Notor Corporation, China Telecom, CATT, Huawei, Hi	Interim agreements for FS_Sensing_ARC KI#3 .
S2-2511056	S2	Rel-20	FS_Sensing_ARC	TS or TR cover	approved	2025-11-26	Xiaomi, Apple	Presentation of TR 23.700-14 to TSG SA for approval, Version 1.1.0
S2-2603492	S2	Rel-20	Sensing-ARC	pCR	approved	2026-04-17	Qualcomm Incorporated, vivo, Apple, OPPO, Samsung, KDDI, NTT DoCoMo, LGE, BUPT, Toyota, KPN, TNO, ZTE, Xiaomi, Ericsson, CATT, ETRI, China Mobile, China Telecom	Sensing_ARC: Clause 4 on General Concept, Architecture and Reference points.
S2-2605572	S2	Rel-20	Sensing-ARC	pCR	approved	2026-05-21	InterDigital Inc., NTT DOCOMO, Deutsche Telekom, VIVO	Update on Sensing Performance Parameters.
S3-234986	S3			report	approved	2023-11-12	MCC	Report from SA3#112
S3-252501	S3	Rel-20		report	approved	2025-08-29	Xiaomi Technology	New SID on security and privacy aspects of Integrated Sensing and Communication
S3-252963	S3	Rel-20		SID new	agreed	2025-08-29	Xiaomi Technology	New SID on security and privacy aspects of Integrated Sensing and Communication
S3-253101	S3			report	approved	2025-10-17	MCC	Report from SA3#123
S3-254001	S3			report	approved	2025-11-21	MCC	Report from SA3#124
S3-260101	S3			report	approved	2026-02-13	ETSI MCC	Report from last SA5 meeting SA5 #164, held 17-21.11.25 in Dallas, USA
S3-253357	S3	Rel-20	FS_Sensing_SEC	pCR	approved	2025-10-06	Xiaomi Technology	Scope update
S3-253352	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2025-10-06	Xiaomi EV Technology	Endorsed Draft TR for ISAC Security
S3-253728	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2025-10-27	Xiaomi	Draft TR 33.777
S3-254603	S3	Rel-20	FS_Sensing_SEC	pCR	approved	2025-11-21	Huawei, HiSilicon	Sensing scope alignment
S3-254538	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2025-11-28	Xiaomi	Draft TR 33.777
S3-260952	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2026-02-20	Xiaomi	Draft TR 33.777
S3-261659	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2026-04-24	Xiaomi	Draft TR 33.777
S3-262527	S3	Rel-20	FS_Sensing_SEC	pCR	approved	2026-05-22	NTT DOCOMO INC.	Pseudo-CR on TR33.777 on active sensing attacks
S3-262522	S3	Rel-20	FS_Sensing_SEC	draft TR	approved	2026-05-28	Xiaomi	Draft TR 33.777
S4-250216	S4			other	agreed	2025-02-11	Fraunhofer IIS	[FS_ACAPI] Codec support in WebRTC libraries
S4-251896	S4			other	agreed	2025-11-19	Fraunhofer IIS	Editor's version of TR 26.858 v0.8.0-draft
S4-252142	S4	Rel-20		SID new	agreed	2025-11-21	3GPP TSG SA WG4	New Study on Media Aspects for 6G System
S4-260317	S4	Rel-20	FS_6G_MED	Work Plan	agreed	2026-02-12	Qualcomm Incorporated (Rapporteur)	[FS_6G_MED] Work Plan for Media Aspects for 6G System
S4-260837	S4	Rel-20	FS_6G_MED	pCR	agreed	2026-04-17	InterDigital Canada	[FS_6G_MED] pCR on updates to WT#3 on Sensing Keywords:
S4-260547	S4	Rel-20	FS_6G_MED	Work Plan	agreed	2026-04-17	Qualcomm Incorporated (Rapporteur)	[FS_6G_MED] Work Plan for Media Aspects for 6G System
S4-261374	S4	Rel-20	FS_6G_MED	Work Plan	agreed	2026-05-15	Qualcomm Incorporated (Rapporteur)	[FS_6G_MED] Work Plan for Media Aspects for 6G System
S4-250387	S4	Rel-19	FS_ACAPI	draft TR	agreed	2025-02-20	Fraunhofer IIS (Rapporteur)	[FS_ACAPI] draft TR 26.858 v0.2.0
S4-250920	S4	Rel-19	FS_ACAPI	draft TR	agreed	2025-05-21	Fraunhofer IIS (Rapporteur)	[FS_ACAPI] draft TR 26.858 v0.5.0
S4-251499	S4	Rel-19	FS_ACAPI	draft TR	agreed	2025-05-21	Fraunhofer IIS (Rapporteur)	[FS_ACAPI] draft TR 26.858 v0.5.0
S4-252037	S4	Rel-19	FS_ACAPI	draft TR	agreed	2025-11-21	Fraunhofer IIS	TR 26.858 v0.8.0
S4-260324	S4	Rel-19	FS_ACAPI	draft TR	agreed	2025-11-21	Fraunhofer IIS	TR 26.858 v0.8.0
S4-260463	S4	Rel-19	FS_ACAPI	draft TR	agreed	2026-02-12	Fraunhofer IIS	TR 26.858 v0.8.0 Keywords:
S4-261366	S4	Rel-20	FS_ACAPI	draft TR	agreed	2026-05-21	Fraunhofer IIS (Rapporteur)	TR 26.858 v1.1.1
S5-252202	S5			report	approved	2025-05-12	MCC	Report from last SA5 meeting
S5-253217	S5			other	agreed	2025-08-28	SWG Vice Chair (Huawei Tech.(UK) Co.. Ltd)	Collection of useful contributions and external communication documents in CH
S5-254202	S5			report	approved	2025-10-04	MCC	Report from last SA5 meeting
S5-255000	S5			agenda	approved	2025-10-23	WG Chair (Huawei)	Agenda for SA5 #164
S5-255039	S5			report	approved	2025-11-21	ETSI MCC	Draft Report from last SA5 meeting SA5 #163 held 13-17.10.25 in Wuhan, China
S5-255692	S5	Rel-20		SID new	agreed	2025-11-21	China Unicom	New SID on 5GA Charging Aspects of integrated sensing and communications
S5-255707	S5	Rel-20		SID new	agreed	2025-11-21	ZTE Corporation, China Unicom	New SID on Management aspects of Integrated Sensing and Communication
S5-260045	S5			report	approved	2026-02-13	ETSI MCC	Report from last SA5 meeting SA5 #164, held 17-21.11.25 in Dallas, USA
S5-261002	S5			report	approved	2026-02-22	ETSI MCC	Draft Report from last SA5 meeting SA5 #165, held 13-17.2.26 in Goa, India
S5-261902	S5			report	approved	2026-05-07	ETSI MCC	Draft Report from last SA5 meeting
S5-262786	S5	Rel-20	FS_6G_CH	pCR	approved	2026-05-25	Ericsson	Rel-20 pCR TR 32.801-02 Topic 2 use case 2.4 update
S5-262803	S5	Rel-20	FS_6G_CH	pCR	approved	2026-05-25	China Unicom	Rel-20 pCR TR 32.801-02 Add Use case of Charging for 6G ISAC
S5-260766	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-02-12	ZTE Corporation, AT&T	Pseudo-CR on TR 32.801-01 Add Clause Structure
S5-260767	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-02-12	China Mobile	PCR on TR 32.801-01 Add the use case on 6G network digital twin
S5-260836	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-02-13	CMCC	pCR TR 32.801-01 consolidated-Category 2 Autonomous agent within 3GPP management system
S5-261585	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-04-18	AT&T, ZTE Corporation	pCR TR 32.801-01 Rapporteurs Cleanup
S5-261729	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-04-18	Moderator (Huawei), ZTE, NEC, China Mobile, CATT, Rakuten Mobile, Samsung, Verizon, HIPE IP Inc., ETRI, Nokia, FiberCop, China Unicom, Orange, Ericsson	pCR TR 32.801-01 Autonomous Agents-Agents collaboration and management
S5-261738	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-04-18	Orange, Huawei, China Mobile	PCR on TR 32.801-01 Enhance the use case on 6G network digital twin
S5-261824	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-04-18	Moderator (Nokia), Ericsson, Huawei, Rakuten Mobile, Samsung, ZTE, Verizon	pCR TR 32.801-01 Autonomous Agents-Concepts exposure and integration
S5-261825	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-04-18	Moderator (Ericsson), China Mobile, Rakuten Mobile, Huawei, Samsung, Verizon, ZTE	pCR TR 32.801-01 Autonomous Agents-Agents for specific OAM functionality
S5-262120	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-05-07	AT&T, ZTE Corporation	pCR TR 32.801-01 Rapporteurs cleanup for clause 5 and 6
S5-262469	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-05-25	Nokia, Samsung, Asiainfo, Ericsson, NEC, ETRI, Huawei, Nokia, China Mobile, Hipe-ip	AA1- Management scenarios and requirements for management agent
S5-262470	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-05-25	Ericsson, Nokia, Huawei, China Mobile, Samsung, Verizon, NEC	AA2- Concept, KIs and solutions for management agent functional capabilities and consumption capabilities
S5-262555	S5	Rel-20	FS_6G_OAM	pCR	approved	2026-05-25	AT&T, ZTE Corporation	pCR 32.801-01 TR Structure Update

S5-262415	S5	Rel-20	FS_6G_OAM	draft TR	approved	2026-06-02	ZTE	Draft TR 32.801-01 v0.3.0 Study on 6G Management and Orchestration
S5-261689	S5	Rel-20	FS_SBMA_Ph4	draft TR	approved	2026-04-30	ZTE	TR 32.801-01 v0.2.0
S5-260572	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	China Unicom	Pseudo-CR Rel-20 28.893 Add scope
S5-260573	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	Huawei	Rel-20 pCR TR 28.893 Add the background of ISAC
S5-260574	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	Nokia UK	Rel-20 28.893 pCR Sensing Use Case #1
S5-260575	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	Nokia UK	Rel-20 28.893 pCR Sensing Use Case #2
S5-260576	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	Nokia UK	Rel-20 28.893 pCR Sensing Use Case #3
S5-260585	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-02-13	Nokia UK	Rel-20 28.893 pCR Sensing Charging Topic #1
S5-261621	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Huawei	Rel-20 pCR TR 28.893 Update the background of ISAC
S5-261622	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Nokia	Rel-20 pCR 28.893 Key Issues and Charging Requirements for Private Network Slice
S5-261623	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Nokia	Rel-20 pCR 28.893 Key Issues and Charging Requirements for Private Network Slice
S5-261624	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Nokia	Rel-20 pCR 28.893 Key Issues and Charging Requirements for UAV
S5-261625	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Huawei, China Unicom	Rel-20 pCR on TR 28.893 Add solution for charging based on sensing result
S5-261626	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-18	Huawei, China Unicom	Rel-20 pCR on TR 28.893 Add solution for charging based on sensing service request
S5-261603	S5	Rel-20	FS_Sensing_CH	draft TR	approved	2026-04-30	China Unicom	TR 28.893 v0.2.0 email approval
S5-262751	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-04-30	China Unicom	TR 28.893 v0.2.0 email approval
S5-262752	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Nokia	Rel-20 pCR TR 28.893 SMF Solution
S5-262753	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Nokia	Rel-20 pCR TR 28.893 SeMF Solution
S5-262754	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Nokia	Rel-20 pCR TR 28.893 SeMF Solution
S5-262755	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Huawei	Rel-20 pCR TR 28.893 Add use case of converged charging based on sensing performance
S5-262757	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Huawei	Rel-20 pCR TR 28.893 Add the UC about converged charging based on the sensing data
S5-262759	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Huawei	Rel-20 pCR TR 28.893 Add the UC about Converged charging for the service request cancelling
S5-262762	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	Huawei	Rel-20 pCR TR 28.893 Update the sensing architecture
S5-262765	S5	Rel-20	FS_Sensing_CH	pCR	approved	2026-05-25	China Unicom	pCR on TR 28.893 Add use case of SLA-based charging for sensing service
S5-260752	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-02-12	ZTE Corporation, Samsung	Pseudo-CR on TR 28.895 Add reference architecture for the management of sensing service
S5-260750	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-02-13	ZTE Corporation, China Unicom	pCR on TR 28.895 Add a new clause structure
S5-261432	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-04-03	ZTE Corporation	Pseudo-CR on TR 28.895 Rapporteur cleanup
S5-261716	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-04-18	China Unicom	Pseudo-CR 28.895 Add use case on Sensing Data analytic for management scenarios
S5-261786	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-04-18	China Unicom	Pseudo-CR 28.895 Add scope
S5-261811	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-04-18	Huawei	pCR 28.895 Update reference management architecture for sensing service
S5-261828	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-04-18	China Unicom	Pseudo-CR 28.895 Add use case on unified Sensing Management Architecture
S5-261692	S5	Rel-20	FS_Sensing_OAM	draft TR	approved	2026-04-30	China Unicom	TR 28.895 v0.2.0
S5-262487	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-05-25	China Unicom	Pseudo-CR 28.895 Add Use Case on Management Enhancement for Direct gNB-SF Sensing Transmission
S5-262495	S5	Rel-20	FS_Sensing_OAM	pCR	approved	2026-05-25	ZTE Corporation, Samsung	Pseudo-CR on TR 28.895 Terminology Alignment
S5-262421	S5	Rel-20	FS_Sensing_OAM	draft TR	approved	2026-06-02	China Unicom	Draft TR 28.895 v0.3.0 Study on Management aspects of Integrated Sensing and Communication
S6-254003	S6			agenda	approved	2025-10-17	SA6 Chair	SA6 Meeting #69 - Agenda with Tdocs allocation at start of the meeting
S6-255007	S6			report	approved	2025-11-10	MCC	SA6 Meeting 69 Report
S6-260003	S6			agenda	approved	2026-02-15	SA6 Chair	SA6 Meeting #71 - Agenda with Tdocs allocation at start of the meeting
S6-261008	S6			report	approved	2026-04-02	MCC	SA6 Meeting 71 Report
S6-261003	S6			agenda	approved	2026-04-11	SA6 Chair	SA6 Meeting #72 - Agenda with Tdocs allocation at start of the meeting
S6-262006	S6			report	approved	2026-05-10	MCC	SA6 Meeting 72 Report
S6-262003	S6			agenda	approved	2026-05-17	SA6 Chair	SA6 Meeting #73 - Agenda with Tdocs allocation at start of the meeting
S6-261572	S6	Rel-20	FS_6G_APP	pCR	approved	2026-04-18	InterDigital, Ericsson, KPN N.V. Samsung	KI on enablement of non-3GPP sensing
S6-261594	S6	Rel-20	FS_6G_APP	pCR	approved	2026-04-18	HUAWEI TECHNOLOGIES Co. Ltd.	Pseudo-CR on ISAC use case on vertical application and requirement
S6-261607	S6	Rel-20	FS_6G_APP	pCR	approved	2026-04-18	ZTE Corporation, KPN N.V., Xi'an Zhongxing	Pseudo-CR on use case of Digital Twin for Vertical Application
S6-262429	S6	Rel-20	FS_6G_APP	pCR	approved	2026-05-24	CATT	Update KI#4.6.2
S6-262433	S6	Rel-20	FS_6G_APP	pCR	approved	2026-05-24	HUAWEI TECHNOLOGIES Co. Ltd.	Pseudo-CR on key issue on vertical services from 6G sensing
S6-262595	S6	Rel-20	FS_6G_APP	pCR	approved	2026-05-24	CATT	General clause for WT#6 on ISAC aspects
S6-262328	S6	Rel-20	FS_MCX_MC	pCR	approved	2026-05-24	AT&T Labs, Inc	Expansion to table A-1
SP-231206	SP			report	approved	2023-12-05	TSG SA Secretary	Draft report of TSG SA meeting #101
SP-240002	SP			report	approved	2024-03-12	TSG SA Secretary	Draft report of TSG SA meeting #102
SP-240520	SP			report	approved	2024-06-10	TSG SA Secretary	Draft report of TSG SA meeting #103
SP-241022	SP			report	approved	2024-09-02	TSG SA Secretary	Draft report of TSG SA meeting #104
SP-241426	SP			report	approved	2024-12-03	TSG SA Secretary	Draft report of TSG SA meeting #105
SP-250422	SP			report	approved	2025-06-03	TSG SA Secretary	Draft report of TSG SA meeting #107
SP-251255	SP			LS out	approved	2025-09-18	TSG SA	[DRAFT] Reply LS to Draft Reply LS to ITU-R_WP5D on Minimum requirements related to technical performance for IMT-2030 radio interface(s)
SP-251242	SP			SID new	approved	2025-09-18	SA WG3	New Study on Security and Privacy Aspects of Integrated Sensing and Communication
SP-251652	SP	Rel-20		SID new	approved	2025-12-10	SA WG4 Chair	Study on Media Aspects for 6G System
SP-251665	SP	Rel-20		SID new	approved	2025-12-11	SA WG5	New SID: Study on 5GA Charging Aspects of integrated sensing and communications
SP-251668	SP	Rel-20		SID new	approved	2025-12-11	SA WG5	New SID: Study on Management aspects of Integrated Sensing and Communication
SP-260002	SP			report	approved	2026-03-02	TSG SA Secretary	Draft report of TSG SA meeting #110
SP-260297	SP			WID new	approved	2026-03-11	SA WG2	New WID on Stage 2 of Integrated Sensing and Communication.
SP-260362	SP			report	approved	2026-06-02	TSG SA Secretary	Draft report of TSG SA meeting #111
SP-260467	SP			CR pack	partially approved	2026-06-02	TSG SA Secretary	Draft report of TSG SA meeting #111
SP-251634	SP	Rel-20	FS_6G_ARC	other	approved	2025-12-10	SA WG2 Chair	Detailed FS_6G_ARC Work Task scopes
SP-260246	SP	Rel-20	FS_6G_REQ	draft TR	approved	2026-02-17	InterDigital, Turk Telekom, OTE (DT Group), Deutsche Telekom, Xiaomi, Samsung	Resolve EN in clause 7.25.6
SP-231399	SP	Rel-19	FS_SOBOT	draft TR	approved	2023-11-20	LG Electronics	SOBOT 5.8 Use case update - Addressing terminology and EN
SP-250833	SP	Rel-20	FS_Sensing_ARC	SID revised	approved	2025-06-12	SA WG2	Revised SID on Study on Stage 2 for Integrated Sensing and Communication
SP-260110	SP	Rel-20	FS_Sensing_ARC	draft TR	approved	2026-03-03	SA WG2	Presentation of Report to TSG: TR 23.700-14: Study on Stage 2 for Integrated Sensing and Communication. Version 2.1.0