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# Structured Review of Electromagnetic Emission Measurement Methodologies for EMC Verification of UAV Avionics Systems

**Lalu Aan Sasaka Akbar[1], Romie Oktovianus Bura[2], Dwi Mandaris[3]**

[1,2] Faculty of Defense Engineering and Technology, Indonesian Defense University, IPSC Sentul Complex, Jl. Anyar, Sukahati, Citeureup District, Bogor Regency 16810, West Java, Indonesia
[1,3] National Research and Innovation Agency, 8 M.H. Thamrin Street, Central Jakarta 10340, Jakarta Special Capital Region, Indonesia
Corresponding Author: lalu.akbar@tp.idu.ac.id

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**Abstract**
*Electromagnetic emissions in unmanned aerial vehicle (UAV) avionics are increasingly critical because power, flight control, navigation, communication, and payload subsystems are integrated within compact compartments and dense wiring harnesses, increasing internal electromagnetic interference risk. This study aims to synthesize measurement methodologies for UAV electromagnetic emissions and compare their facilities, observed parameters, and applicable standards. A qualitative structured literature review was conducted on 10 core studies selected from IEEE Xplore, ScienceDirect, SpringerLink, MDPI, and Scopus using relevance, recency, technical comparability, and standards-based criteria. The review identifies four recurring methodological clusters: chamber based radiated emission testing, conducted-path and cable-coupling analysis, receiver and sensor performance-based assessment, and simulation with near field pre-compliance evaluation. The findings show that cable routing, grounding-bonding quality, shielding-filtering practice, test distance, and polarization strongly influence emission levels, operational degradation, and pass/fail outcomes. The review concludes that the most robust strategy is a staged workflow from simulation and pre-compliance screening to controlled verification and installation-level mitigation validation, enabling a more efficient EMC path with lower redesign and certification risk.*

Keywords: UAV, avionics, EMC, radiated emissions, conducted emissions.

## 1. Introduction

Advances in unmanned aerial vehicles (UAVs) for mapping, surveillance, logistics, inspection, and defense missions have accelerated the integration of autopilot, GNSS, datalink, sensor payload, motor-control, and power-distribution functions into increasingly confined spaces. This integration increases cable density, switching noise, and electromagnetic coupling between subsystems, which means that electromagnetic interference (EMI) can directly affect reliability, operational safety, and airworthiness in avionics systems [1], [2], [7]. Exposure to external fields from high-power wireless devices and infrastructure further elevates electromagnetic compatibility (EMC) from a secondary design concern to a core verification requirement [3]-[6].

In small and medium UAV platforms, interference can originate from both external and internal sources. Internally, electronic speed controllers, serial communication lines, power buses, LTE/5G devices, and closely routed wiring harnesses can inject unwanted noise into communication, navigation, and flight-control paths [1], [3], [8]-[10]. Several studies have reported self-jamming in cellular communication modules [24], interference in cabling systems [1], onboard-line emissions [21], and strong electromagnetic exposure that degrades datalink, GPS, or control performance [22], [23], [25]. These findings demonstrate that UAV EMC problems are strongly conditioned by installation details and cannot be assessed adequately by isolated subsystem intuition alone.

State-of-the-art EMC evaluation in aerospace and UAV applications currently relies on a combination of chamber-based radiated tests, conducted-path assessment, near-field scanning, receiver-performance monitoring, and electromagnetic simulation. Chamber tests provide repeatable verification against standards and emission limits, while simulation and pre-compliance approaches support earlier design iteration at lower cost [10], [14], [16], [23]. Performance-oriented indicators such as bit error rate (BER), block error rate (BLER), loss-of-lock, or sensor-data deviation are increasingly used to complement spectral measurements because a small spectral signature may still be operationally critical in navigation or communication chains [22]-[25].

Despite these advances, literature remains fragmented. Many studies emphasize a specific subsystem, laboratory setup, or interference mechanism, but fewer papers synthesize how radiated and conducted emission methodologies differ in tools, procedures, frequency coverage, observed parameters, and standards applicability in the UAV-avionics context [1], [3], [14], [21], [24]. As a result, designers and researchers still lack a concise methodological map that links measurement choice to development stage, installation configuration, and verification objective.

In response to this gap, this article presents a structured qualitative review of electromagnetic emission measurement methodologies for UAV avionics systems. The aims are to: (1) identify the most frequently used measurement approaches, (2) compare facilities, parameters, and standards across the selected studies, and (3) formulate a staged verification workflow that is applicable from pre-compliance screening to system-level EMC validation. The contribution of this review lies in shifting the discussion from EMI phenomena alone toward a methodological synthesis that supports more practical EMC decision-making during UAV development.

## 2. Methods

### 2.1 Review design and study dataset

This study uses a qualitative structured literature-review approach. The dataset of the study is not a set of experimental samples, but a body of scientific publications that report electromagnetic emission measurement practices relevant to UAV avionics. The final analytical dataset consists of 10 core articles representing variation in radiated tests, conducted-path analysis, simulation-based assessment, receiver performance evaluation, and system level EMC validation [1],[4],[10],[14], [21]-[26].

The review is qualitative because it does not calculate a pooled numerical effect or perform meta-analysis. Instead, it extracts and compares methodological elements across studies, including the test object, measurement procedure, frequency range, main technical parameters, and standards or performance references used in each case.

### 2.2 Data collection

The literature search was conducted through IEEE Xplore, ScienceDirect, SpringerLink, MDPI, and Scopus. The search terms included combinations of “electromagnetic interference in UAV”, “radiated emission test”, “conducted emission measurement”, “UAV avionics EMC”, and “self-jamming in UAV”. Priority was given to journal articles, conference proceedings, and technical documents from the last 10 years that reported comparable technical information such as frequency range, field level, measurement equipment, laboratory setup, operating scenario, and referenced standards.

These databases were selected because they provide strong coverage of aerospace, EMC, electronics, and instrumentation publications. The search strategy was intended to capture both formal compliance-oriented studies and engineering-oriented investigations that describe measurement or simulation workflows relevant to UAV avionics verification.

### 2.3 Screening and selection criteria

Figure 1 summarizes the review workflow used in this study, starting from topic selection and literature search through screening, data extraction, synthesis, interpretation, and conclusion development.

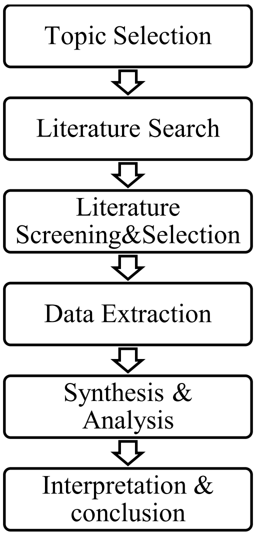


**Figure 1. Review workflow used in the study.**

The screening process prioritized topic relevance, publication quality, recency, technical comparability, and the presence of a clear evaluation benchmark. Studies discussing EMI only in general terms without describing the test setup, observed parameter, or UAV-avionics context were excluded from the main analytical dataset. The inclusion and exclusion criteria are summarized in Table 1. The literature criteria used are as follows:

**Table 1. Literature selection criteria**

| Aspect | Inclusion criteria | Exclusion criteria | Selection purpose |
|---|---|---|---|
| Topic | Addresses EMI/EMC in UAVs or unmanned-aircraft avionics | General discussion without UAV or avionics context | Ensure direct relevance to the review focus |
| Source type | Journal articles, conference proceedings, or scientific technical documents | Popular articles, opinions, or sources without technical review | Ensure source quality |
| Time span | Publications from the last 10 years | Older publications that no longer represent | Maintain a current evidence base |
| Technical data | Contains frequency, field level, tools, setup, or test parameters | Does not provide comparable technical information | Support methodological comparison |
| Study output | Explains measurement results, system response, or mitigation | Only mentions interference without test results | Enable evaluation of methodological effectiveness |
| Standards /Reference | Refers to RTCA, MIL-STD, IEC, 3GPP, or equivalent benchmarks | No clear evaluation reference | Facilitate cross-study comparison |

### 2.4 Data extraction and qualitative analysis

After screening, the selected studies were extracted into a comparison matrix comprising four analytical dimensions: (1) test object and measurement procedure, (2) frequency range and observed parameters, (3) standards or performance references, and (4) the main findings related to emission sources, susceptibility mechanisms, or mitigation strategies. Table 2 lists the 10 core reviewed articles.

A qualitative comparative synthesis was then performed to identify recurring methodological patterns, strengths, limitations, and practical implications for UAV EMC verification. The analysis specifically examined when a method is most useful during the development cycle, how it relates to real installation conditions, and whether it supports compliance verification, troubleshooting, or early-stage design optimization.

**Table 2. Core reviewed articles included in the synthesis**

| Vol/Year | Article | Journal |
|---|---|---|
| Vol. 40/2022 | Research on Airworthiness Test Technology of Radiation Emission in Civil Aircraft Flight Control Electronic System [14] | Journal of Northwestern Polytechnical University |
| Vol. 65 No. 3/2020 | Electromagnetic Interference Emission from Communication Lines of Onboard Equipment of an Unmanned Aerial Vehicle [21] | Journal of Communications Technology and Electronics |
| Vol. 10 No. 6/2021 | A Survey of Electromagnetic Influence on UAVs from an EHV Power Converter Stations | Electronics |

| | | |
|---|---|---|
| | and Possible Countermeasures [22] | |
| Vol. 13 No. 2/2024 | Strong Electromagnetic Interference and Protection in UAVs [23] | Electronics |
| Vol. 12/2024 | Electromagnetic Interference with the Mobile Communication Devices in Unmanned Aerial Vehicles and Its Countermeasures [24] | IEEE Access |
| Vol. 14/2024 | Unconsidered but Influencing Interference in Unmanned Aerial Vehicle Cabling System [1] | International Journal of Electrical and Computer Engineering |
| Vol. 22 No. 6/2022 | Review of Intentional Electromagnetic Interference on UAV Sensor Modules and Experimental Study [25] | Sensors |
| Vol. 14/2025 | Radio Frequency Interference, Its Mitigation and Its Implications for the Civil Aviation Industry [10] | Electronics |
| Vol. 10/2021 | Experiments on Magnetic Interference for a Portable Airborne Magnetometry System Using a Hybrid UAV [26] | Geoscientific Instrumentation, Methods and Data Systems |
| Vol. 14 .4332/2025 | Investigation on Electromagnetic Immunity of Unmanned Aerial vehicles in Electromagnetic Environment [4] | Electronics |

## 3. Results and Discussion

### 3.1 Overview of the selected literature

The 10 selected articles represent a methodologically diverse yet complementary evidence base. Although the papers do not all address the same UAV class or subsystem, they collectively cover the main experimental and analytical pathways used to investigate electromagnetic emissions and EMC-related operational degradation in avionics platforms. As shown in Table 2, the reviewed studies span 2020-2025 and include aeronautical EMC, UAV communication lines, cabling systems, sensor modules, strong-field exposure, and aviation RFI contexts.

This diversity is useful because UAV EMC problems often emerge at the intersection of platform integration, wiring architecture, receiver sensitivity, and environmental exposure. The selected literature therefore supports comparison not only across test facilities but also across measurement objectives, ranging from formal limit verification to early troubleshooting and design optimization.

### 3.2 Main methodological patterns

The main synthesized findings are summarized in Table 3. Across the reviewed studies, measurement methodologies can be grouped into four dominant clusters: chamber based radiated testing, conducted-path and cable coupling analysis, receiver or sensor-performance based assessment, and numerical simulation or near field pre-compliance evaluation.

These results show that UAV avionics EMC assessment is not limited to a single measurement output. In addition to electric-field magnitude or spectral level, the selected studies evaluate BER, BLER, receiver sensitivity, loss-of-lock, induced interference power, video distortion, magnetic-noise signatures, and sensor anomalies. This finding indicates that a method is most meaningful when the measured quantity can be connected to operational avionics performance.

### 3.3 Discussion

The main insight emerging from Table 3 indicates that the most dependable measurement strategy for UAV avionics is a staged verification sequence rather than a single stand-alone test. Numerical methods such as FDTD, FEM, FIT, or MoM are valuable in early design because they help predict coupling paths, shielding weaknesses, and cable or PCB hotspots before hardware is frozen [21], [23]. Near field inspection and pre-compliance setups then allow faster and less expensive troubleshooting before the platform is taken to an anechoic or semi-anechoic chamber [1], [11], [20].

Formal radiated and controlled-environment tests remain essential because they offer repeatability and direct alignment with standards such as RTCA DO-160, MIL-STD-461/464, and IEC 61000-4-3 [4], [10], [14], [23]. However, the reviewed studies also show that pass/fail outcomes can change significantly with cable routing, harness length, antenna separation, grounding-bonding quality, shielding continuity, test distance, and polarization [1], [14], [24]. Consequently, chamber results are strongest when the installation configuration realistically represents the actual platform architecture.

**Table 3. Synthesis of electromagnetic emission measurement methodologies in UAV avionics**

| No | Journal | Study focus | Measurement method | Main parameters | Standards |
|---|---|---|---|---|---|
| 1 | [14] | Civil aircraft flight-control electronics | Anechoic chamber, ground plane, harness routing, measurement antenna, spectrum analyzer | 100 MHz-6 GHz; emission/RF noise level versus limits | FAR-25.1353; RTCA DO-160G |
| 2 | [21] | UAV onboard communication lines | EMI modeling and simulation on RS-485, RS-232, PWM, and power lines | 0.4-1.5 GHz; E-field and interference on the antenna-feeder path | MIL-STD-461 |
| 3 | [22] | Influence of EHV power converter stations on UAVs | Survey of continuous-wave irradiation, lost-lock, and countermeasure tests | 80-1000 MHz and 1000-2750 MHz; SNR/BER, video distortion, GPS accuracy | Literature-based |
| 4 | [23] | Strong EMI in UAVs | Irradiation, injection, and FDTD/FIT/FEM/MoM simulation | 200 MHz-10 GHz up to 0-18 GHz; E-field, BER, control response | IEC 61000-4-3; MIL-STD-461/464; RTCA DO-160 |
| 5 | [24] | LTE self-jamming in UAVs | Anechoic chamber, BLER sensitivity test, noise spectrum, PCB probing | LTE 800/1800/2100 MHz; sensitivity degradation and in-band noise | 3GPP |
| 6 | [1] | Interference in UAV cabling systems | Semi-anechoic chamber, dipole antenna, CST Cable Studio | 905 MHz; transmit power, distance, polarization, induced interference power | Near/Fresnel/far-field analysis |
| 7 | [25] | IEMI in UAV sensor modules | Near-field scan and experiments on IMU, camera, and optical-flow modules | 30 MHz-3 GHz; IMU data, video quality, optical-flow anomaly | Laboratory setup |
| 8 | [10] | RFI in civil aviation | Spectrum analyzer, RF signal generator, network analyzer, EMC chamber | 118-137 MHz and 300 MHz-3 GHz; 5G issue at 3.7-4.0 GHz | RTCA DO-160; MIL-STD-461 |
| 9 | [26] | Magnetic interference in hybrid UAVs | Static magnetic-signature test and flight test | nT, RMI, fourth difference, maneuver-induced noise | Aeromagnetic industry practice |
| 10 | [4] | Electromagnetic immunity of UAVs | Anechoic chamber, RF signal generator, transmitting antenna | GSM-900, GSM-1800, LTE-2100, LTE-2600; 10-30 V/m | IEC 61000-4-3; MIL-STD-461G |

Another important finding is that system-performance indicators are often more operationally meaningful than emission magnitude alone. Metrics such as BER, BLER, sensitivity degradation, loss-of-lock, or sensor-data anomalies reveal whether electromagnetic disturbances compromise avionics functionality [22]-[25]. For UAV applications, this is critical because a disturbance that appears moderate in spectral terms may still be unacceptable if it affects datalink integrity, positioning, flight stability, or sensor trustworthiness.

## 3.4 Comparative implications of the reviewed approaches

Figure 2 and table 4 compare the practical strengths, limitations, and preferred use stage of the four dominant methodological clusters identified in this review.

The comparison in Table 4 and Figure 2 clarifies that each method answers a different engineering question. Chamber tests answer whether the platform or subsystem satisfies controlled EMC limits. Conducted or cable-path studies answer where coupling is taking place and what installation details should be changed. Performance-based assessments answer whether the disturbance affects mission-relevant functions. Simulation and near-field methods answer how the design can be improved before expensive formal testing is attempted.

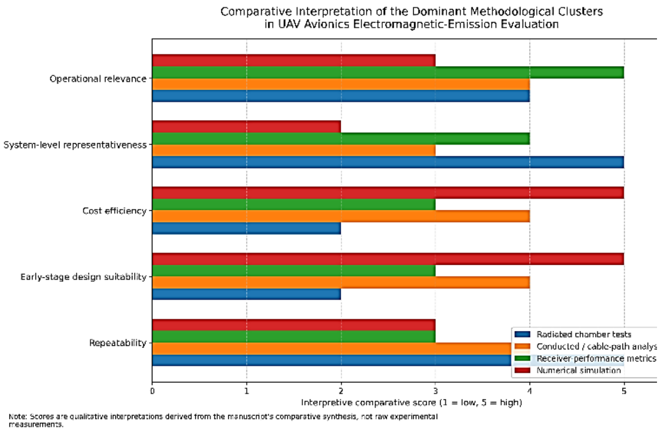


**Figure 2. Comparative interpretation of the dominant methodological clusters.**

**Table 4. Comparative interpretation of the dominant methodological clusters**

| Approach | Main strength | Main limitation | Most suitable stage |
|---|---|---|---|
| Chamber-based radiated testing | High repeatability and direct comparison with emission or immunity limits | Costly, setup-sensitive, and less efficient for rapid iteration | Formal compliance, system validation, and final verification |
| Conducted-path and cable-coupling analysis | Reveals interference routes in wiring and power networks | May not fully represent the installed system if configuration control is weak | Subsystem diagnosis and targeted pre-compliance work |
| Receiver- and sensor-performance-based assessment | Links electromagnetic disturbance directly to avionics functionality | Results depend on the selected performance metric and mission scenario | Mission-critical receiver, datalink, navigation, and sensor validation |
| Simulation and near-field pre-compliance | Low iteration cost and useful for early hotspot prediction and design optimization | Strongly dependent on model fidelity and calibration against controlled tests | Early design, troubleshooting, and mitigation planning |

This comparison is consistent with the broader EMC literature, which shows that laboratory infrastructure alone does not guarantee reliable verification unless the chosen method matches the technical question under investigation [8], [12], [16]. Therefore, the most effective UAV verification workflow is sequential: simulation and near-field screening for early design, conducted-path and subsystem checks for targeted troubleshooting, chamber-based radiated testing for repeatable verification, and installation-level mitigation validation before final certification or deployment. Figure 3 translates this staged logic into a practical UAV verification workflow.

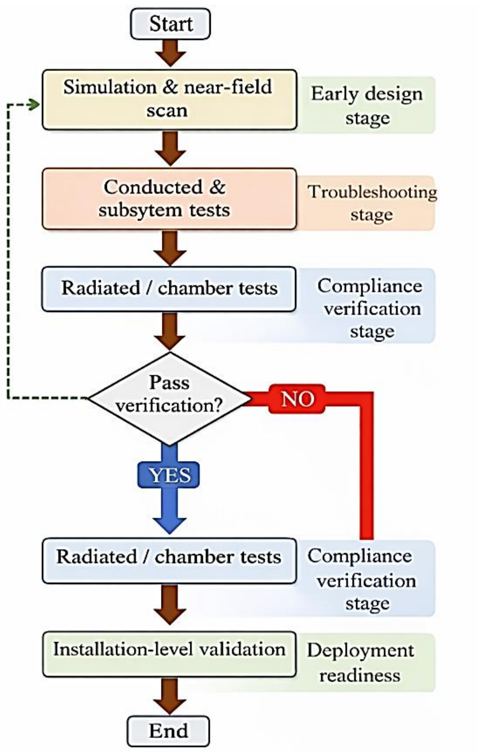


**Figure 3. Effective UAV verification workflow derived from the staged methodological synthesis.**

## Conclusion

This article aimed to identify, compare, and interpret electromagnetic emission measurement methodologies relevant to UAV avionics systems. Based on a qualitative structured review of 10 core studies, the main finding is that the most informative methodologies fall into four complementary clusters: chamber-based radiated testing, conducted-path and cable-coupling analysis, receiver- and sensor-performance-based assessment, and numerical simulation or near-field pre-compliance evaluation.

The review shows that electromagnetic-emission evaluation in UAV avionics is strongly influenced by integration details such as harness routing, grounding-bonding quality, shielding-filtering effectiveness, subsystem proximity, test distance, and polarization. No single method is sufficient for robust UAV EMC verification. A staged workflow that begins with simulation and pre-compliance screening, continues with conducted or radiated controlled testing, and ends with mitigation validation under representative installation conditions is the most defensible strategy for reducing EMC-related redesign and operational risk.

Future work should expand the evidence base with a broader systematic review, compare method performance across UAV classes and payload architectures, and develop more standardized UAV-specific test templates that link measurement procedures to certification and mission-level reliability requirements.

**References**

[1] I. T. Setyadewi, Y. Prabowo, P. Wibowo, and P. S. Priambodo, “Unconsidered but influencing interference in unmanned aerial vehicle cabling system,” International Journal of Power Electronics and Drive Systems/International Journal of Electrical and Computer Engineering, vol. 14, no. 1, p. 22, Nov. 2023, doi: 10.11591/ijece.v14i1.pp22-30.

[2] B. Chen, L. Huang, K. Zhang, J. Hu, and W. Zhu, “Magnetic Interference Analysis and Compensation Method of Airborne Electronic Equipment in an Unmanned Aerial Vehicle,” Applied Sciences, vol. 13, no. 13, p. 7455, Jun. 2023, doi: 10.3390/app13137455.

[3] I. Bennageh and H. Mahmoudi, “Identification of New EMC Factors of UAV FHSS Datalink in the Pre-Compliance Test Phase,” Journal of Engineering Science and Technology Review, vol. 16, no. 3, p. 109, Jan. 2023, doi: 10.25103/jestr.163.14.

[4] R. Kubacki, R. Przesmycki, M. Bugaj, and D. Laskowski, “Investigation on Electromagnetic Immunity of Unmanned Aerial Vehicles in Electromagnetic Environment,” Electronics, vol. 14, no. 21, p. 4332, Nov. 2025, doi: 10.3390/electronics14214332.

[5] Y. Wu, Q. Ma, and P. Xu, “Progress of Electromagnetic Compatibility Design for Unmanned Aerial Vehicles,” MATEC Web of Conferences, vol. 316, p. 4008, Jan. 2020, doi: 10.1051/matecconf/202031604008.

[6] R. Kubacki, R. Przesmycki, M. Bugaj, and D. Laskowski, “Investigation on Electromagnetic Compatibility of Unmanned Aerial Vehicles in Electromagnetic Environment,” Preprints.org, Sep. 2025, doi: 10.20944/preprints202509.2161.v1.

[7] J. Jung, C. A. Ippolito, C. Rogers, R. J. Kerczewski, A. N. Downey, and K. Matheou, “Small unmanned aircraft electromagnetic interference (EMI) initial assessment,” Apr. 2018, doi: 10.1109/icnsurv.2018.8384835.

[8] P. Mathur and S. Raman, “Electromagnetic Interference (EMI): Measurement and Reduction Techniques,” Journal of Electronic Materials, vol. 49, no. 5, p. 2975, Feb. 2020, doi: 10.1007/s11664-020-07979-1.

[9] İ. Doğruer, A. Mete, E. Yesirci, and H. Akbıyık, “Investigation of the effect of different altitude environmental conditions on the transmission of avionics system data to ground control stations,” Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi, vol. 14, no. 4, p. 1421, Oct. 2025, doi: 10.28948/ngumuh.1578862.

[10] A. I. Malik and M. Rao, “Radio Frequency Interference, Its Mitigation and Its Implications for the Civil Aviation Industry,” Electronics, vol. 14, no. 12, p. 2483, Jun. 2025, doi: 10.3390/electronics14122483.

[11] S. Serpaud, “Application of the near-field emission measurement method to improve the design and investigation of EMC non-compliance at electronic board level,” HAL (Le Centre pour la Communication Scientifique Directe), Feb. 2023, Accessed: Oct. 2025. [Online]. Available: https://theses.hal.science/tel-04048170

[12] M. Pywell and M. Midgley-Davies, “Aircraft-sized anechoic chambers for electronic warfare, radar and other electromagnetic engineering evaluation,” The Aeronautical Journal, vol. 121, no. 1244, p. 1393, Sep. 2017, doi: 10.1017/aer.2017.89.

[13] T. Soeun, “Electromagnetic modeling of the penetration of electromagnetic field in a shielded electronic box,” HAL (Le Centre pour la Communication Scientifique Directe), Sep. 2021, Accessed: Apr. 2025. [Online]. Available: https://tel.archives-ouvertes.fr/tel-03511995

[14] K. Lu, A. Li, L. Linxiao, T. Wang, and W. Jianyuan, “Research on airworthiness test technology of radiation emission in civil aircraft flight control electronic system,” Xibei Gongye Daxue Xuebao/Journal of Northwestern Polytechnical University, vol. 40, no. 2, p. 337, Apr. 2022, doi: 10.1051/jnwpu/20224020337.

[15] M. D. R.-C. Nuñez et al., “Numerical Assessment in Aeronautics for Electromagnetic Environmental Effects,” in Advances in computer and electrical engineering book series, IGI Global, 2018, p. 153. doi: 10.4018/978-1-5225-5415-8.ch005.

[16] K. Stanieć, Z. Jóskiewicz, J. M. Janukiewicz, and T. Więckowski, “Review of Applications of the Laboratory for Electromagnetic Compatibility Infrastructure,” International Journal of Electronics and Telecommunications, p. 107, Jan. 2020, doi: 10.24425/ijet.2020.131852.

[17] L. L. Bars, “Contribution to the analysis and the optimization of the performance of electromagnetic reverberation chambers in low or moderate modal overlap regime,” HAL (Le Centre pour la Communication Scientifique Directe), Jun. 2022, Accessed: Aug. 2025. [Online]. Available: https://theses.hal.science/tel-04274776

[18] F. Kiefer, K. Holste, P. J. Klar, Y. Rover, U. Probst, and C. Volkmar, “Reverberation chamber for electromagnetic compatibility testing of electric thrusters,” Journal of Electric Propulsion, vol. 2, no. 1, Mar. 2023, doi: 10.1007/s44205-023-00038-x.

[19] A. Kouassi, “Uncertainty propagation in EMC. Application to reliability and sensitivity analyzes of transmission lines and antennas,” HAL (Le Centre pour la Communication Scientifique Directe), Dec. 2017, Accessed: Jan. 2025. [Online]. Available: https://theses.hal.science/tel-01787676

[20] S. Serpaud, “Application of the near field emission measurement method to assist in the design and investigation of EMC non-conformities of electronic boards,” HAL (Le Centre pour la Communication Scientifique Directe), Feb. 2023, Accessed: Aug. 2025. [Online]. Available: https://hal.laas.fr/tel-04040531

[21] R. R. Gaynutdinov and S. F. Chermoshentsev, “Electromagnetic Interference Emission from Communication Lines of Onboard Equipment of an Unmanned Aerial Vehicle,” Journal of Communications Technology and Electronics, vol. 65, no. 3, p. 221, Mar. 2020, doi: 10.1134/s1064226920020059.

[22] Y. Li, Q. Ding, K. Li, S. Valtchev, S. Li, and L. Yin, “A Survey of Electromagnetic Influence on UAVs from an EHV Power Converter Stations and Possible Countermeasures,” Electronics, vol. 10, no. 6, p. 701, Mar. 2021, doi: 10.3390/electronics10060701.

[23] Z. Zhang, Y. Zhou, Y. Zhang, and B.-L. Qian, “Strong Electromagnetic Interference and Protection in UAVs,” Electronics, vol. 13, no. 2, p. 393, Jan. 2024, doi: 10.3390/electronics13020393.

[24] K. Watanabe et al., “Electromagnetic Interference with the Mobile Communication Devices in Unmanned Aerial Vehicles and Its Countermeasures,” IEEE Access, vol. 12, p. 11642, Jan. 2024, doi: 10.1109/access.2024.3351216.

[25] S.-G. Kim, E. Lee, I. Hong, and J. Yook, “Review of Intentional Electromagnetic Interference on UAV Sensor Modules and Experimental Study,” Sensors, vol. 22, no. 6, p. 2384, Mar. 2022, doi: 10.3390/s22062384.

[26] J. Jirigalatu, V. Krishna, E. L. S. da Silva, and A. Døssing, “Experiments on magnetic interference for a portable airborne magnetometry system using a hybrid unmanned aerial vehicle (UAV),” Oct. 2020, doi: 10.5194/gi-2020-29.