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St Denis & Washington, 6 August 2021

**Minutes of EUROCAE WG-82 (Meeting #51) / RTCA Special Committee SC-223
 (Plenary #45) Joint Meeting
 “AeroMACS Standards”**

Date	July 20th, 2021
Time	9am – Noon EDT, 3pm – 6pm CET
Hosted by	Virtual Meeting
Venue	For Webex, Contact Rebecca or Anna Guegan
Contact	<p>Rebecca Morrison, Program Director, RTCA (202) 330-0654 or rmorrison@rtca.org</p> <p>Anna Guegan, Technical Programme Manager, EUROCAE anna.guegan@eurocae.net</p>

Attendees:

Name	Role	Affiliation
Graefe, Jonathan	Member	COLLINS AEROSPACE
Guegan, Anna	Technical Programme Manager	EUROCAE
Hawkins, Richard	Member	WIMAX FORUM
Jain, Ravi	Member	FEDERAL AVIATION ADMINISTRATION (FAA)
Ishii, Hideyuki	Member	JAPAN RADIO AIR NAVIGATION SYSTEMS ASSOCIATION
Kilbourne, Todd	Member	MOSAIC ATM
Ladron, Daniel	Observer	THE BOEING COMPANY
Malaga, Alfonso	Member	ACES, INC.
Morrison, Rebecca	Manager	RTCA, INC.
Ntombela, Nkululeko	Guest	ATNS, SOUTH AFRICA
Mthombeni, Orefile	Guest	ATNS, SOUTH AFRICA
Pelleschi, Stephane	Member	COLLINS AEROSPACE
Phillips, Brent	Government Authorized Representative	FEDERAL AVIATION ADMINISTRATION (FAA)
Popescu, Liviu	Member	
Roy, Aloke	SC-223 Chair	HONEYWELL INTERNATIONAL, INC.
Schlereth, Armin	WG-82 Chair	DFS DEUTSCHE FLUGSICHERUNG GMBH
Segers, Robert	Member	FEDERAL AVIATION ADMINISTRATION (FAA)
Zeng, Dongsong	SC-223 Secretary	THE MITRE CORPORATION

Agenda Items 1. Welcome address. Meeting Organizational Issues

Aloke Roy, SC-223 Chair, and Armin Schlereth, WG-82 Chair, welcomed the participants.

Agenda Item 2. Administrative Remarks

Rebecca Morrison, Program Director, RTCA, and Anna Guegan, Technical Programme Manager, EUROCAE, presented the RTCA/EUROCAE antitrust, proprietary and membership policy statements. All participants agreed on the statements and no issue were raised.

Agenda Item 3. Approval of the Agenda

The group reviewed and approved the meeting agenda.

Agenda Item 4. Review Minutes and Action Items from Previous SC-223/WG-82 Meeting

Dongsong Zeng, SC-223 Secretary, went through the previous meeting minutes and updated the status of action items. The group reviewed and approved the previous meeting notes.

Agenda Item 5. Discussion of Requested Changes to DO-346/ED-223

Alfonso Malaga, ACES Corp., presented slides titled “DO-346 MOPS Missing Requirements & Recommended Updates,” which makes the following recommendations:

- AeroMACS MOPS Section par. 2.2.8.4.14.2 should add a table with adjacent and non-adjacent channel rejection for QPSK and 16-QAM with rate 1/2 and rate 3/4 convolutional coding and for 64-QAM with rate 1/2, 2/3 and 3/4 convolutional coding
- From reverse engineering of the IEEE 802.16-2009 requirements for adjacent and non adjacent channel requirements for 16-QAM and 64-QAM with rate 3/4 convolutional coding, it can be shown that requirements for all modulation/coding satisfy:
 - Adjacent Channel Rejection = 29 dB – SNR_{rx} – 5 dB Implementation Loss
 - Non-adjacent Channel Rejection = 48 dB - SNR_{rx} – 5 dB Implementation Loss
- AeroMACS MOPS Section 3.2 should add a par. 3.2.3 Radiated Power (MS) that specifies the maximum EIRP of MS installations as follows:
 - The Mobile Station maximum effective isotropic radiated power (EIRP) shall not exceed 30 dBm
- AeroMACS MOPS Section 3 should add a Section with Base Station Installed Performance Requirements, including EIRP and Antenna Polarization requirements that replicate the SARPS requirements
 - It would also be highly desirable to specify that BS installations intended to provide services to Mobile Users shall employ dual vertically spaced antennas with orthogonal polarizations in order to support Space Time Coding (STC) Transmit Diversity per par. 2.2.8.4.8.1.2
 - Non-use of STC with Matrix A encoding may result in poor service and inefficient use of spectrum

- All AeroMACS Base Stations operating in the same airport should employ the same Frame duration and ratio of Uplink to Downlink Subframe duration to avoid interference
 - If not, it would be a problem for sector BS antennas installed on same tower
 - Note: All suppliers of AeroMACS Base Station equipment should support the same Frame Duration and one or more common ratios of Uplink to Downlink Subframe duration
- Recommendations: Update MOPS par. 2.2.6.3.7.2 to add following requirements
 - AeroMACS Base Stations shall employ 5 ms TDD Frame Duration
 - AeroMACS Base Stations shall support the following configurable ratios of Uplink to Downlink Subframe durations
 - List ratios that must be supported by all suppliers
 - The ratio of Uplink to Downlink Subframe duration of any AeroMACS Base Station shall not be changed adaptively but it may differ between airports

The group discussed the recommendations, made one decision, and assigned two action items.

Decision 1. The group agreed to add EIRP requirement for mobile (30 dBm, SARPS).

Action 1. Review the recommendations on slide #4 dealing with channel rejection.

Action 2. Review the need for additional emission requirements for ground stations.

Agenda Item 6. Future Meetings

Next joint SC-223/WG-82 meeting is scheduled for 9:00 AM-12:00 PM EDT, August 24th, 2021

Agenda Item 7. Any Other Business of Interest

No other business topics were brought up during the meeting.

Agenda Item 8. Adjourn

The meeting was adjourned around 12:00 pm EST, July 20th, 2021.

List of Action Items

Action Item #	Action Content	Responsible	Due Date	Status
P39-1	Reach out to AeroMACS manufacturers for their real product emission data	Simona Pierattelli, Giulio Vivaldi, and Ishii Hideyuki	Nov. 25, 2020	2020-12-02: Closed. Richard Hawkins will reach out to WiMAX and AeroMACS manufacturers for measurement data.
P39-2	Recalculate and verify the unit conversion of various emission masks.	Dongsong Zeng and Alfonso Malaga	Nov. 25, 2020	2020-12-02: Closed.
P39-3	Draft SC-223/WG-82 TOR revision proposal	Aloke Roy and Armin Schlereth	Dec. 2, 2020	2021-2-10: Closed.
P40-1	Provide absolute AeroMACS spurious emission levels required by SC-228	Alfonso Malaga	Feb. 3, 2021	2021-2-10: Closed.

P40-2	Flesh out Decision 1 in the draft SC-223 TOR revision proposal and share it with Armin for WG-82 TOR update	Aloke Roy	Feb. 3, 2021	2021-2-10: Closed.
SG-1	Continue coordination with WiMAX forum to receive technical inputs from AeroMACS manufacturers as well as their stances on the emission mask change	Richard Hawkins	May 4, 2021	2021-5-11: Closed. The inputs from WiMAX are available in the plenary meeting.
SG-2	Coordinate with FAA spectrum and certification offices on their AeroMACS TSO activities to understand (1) whether they still need MOPS revision for the TSO update; and (2) whether they have issues with the current SC-223/WG-82 schedule	Brent Phillips and Ravi Jain	May 4, 2021	2021-5-11: Closed. Ravi - FAA still needs MOPS revision. TSO will be revised. Cancelling the current AeroMACS TSO might help and wait for revision later. Schedule wise, the sooner the better.
P43-1	Siemens and Leonardo will validate Decision 1.	Anders Randahl, Lior Shimonovuch, and Giulio Vivaldi	July 13, 2021	2021-7-20: keep open. Richard will coordinate with manufacturers.
P43-2	Alfonso Malaga will write a problem statement of UL/DL ratio and distribute to the group; and Lior Shimonovuch will investigate into different UL/DL ratios.	Alfonso Malaga and Lior Shimonovuch	July 13, 2021	2021-7-20: keep open. Al provided his investigation results. Still waiting for Lior's inputs.
P45-1	Review the recommendations on slide 4 dealing with channel rejection.	All members	August 17, 2021	
P45-2	Review the need for additional emission requirements for ground stations.	All members	August 17, 2021	

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Dongsong Zeng
Secretary

CERTIFIED as a true and accurate summary of the meeting.

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Aloke Roy
SC-223 Chairman

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Armin Schlereth
WG-82 Chairman