Fall 2023 SLS-RFM Working Group Meeting Minutes

Issue 1.0
November 28, 2023

1. Introduction

The Fall 2023 RFM WG meeting took place on Tuesday November 7, 2023 in Den Haag, Netherlands. It was a hybrid meeting with both in-person and remote participants.

A joint meeting with the C&S working group was held on Wednesday (Nov 8), followed by another joint meeting on with the C&S and SLP WGs on Thursday (Nov 9). The minutes for the joint meetings are included in this document, following the RFM minutes.

2. Meeting Participants

There was a total of 16 participants in the Fall 2023 RFM WG meeting, representing 5 agencies (CNES, DLR, ESA, NASA, and EUMETSAT). The list of the attendees is shown below.

Table 1. Fall 2023 CCSDS RFM WG Meeting Participants (07 Nov)

	Name	Agency
1	Clement Dudal	CNES
2	Jean-Luc Issler	CNES
3	Antonio Miraglia	ESA
4	Ignacio Aguilar Sanchez	ESA
5	Richard Morgan-Owen	ESA
6	Nicola Maturo	ESA
7	Manuela Ariagno (virtual)	ESA
8	Gunther Sessler	ESA
9	Jorge Quintanilla Sanchez	ESA
10	Xavier Enrich	EUMETSAT
11	Victor Sank	NASA
12	Wing Lee (virtual)	NASA
13	Dennis Lee	NASA
14	Wai Fong	NASA
15	Shannon Rodriguez	NASA
16	Amanuel Geda	DLR

3. Meeting Agenda

The RFM meeting agenda for Fall 2023, as shown in Annex 1, was approved by the WG.

CCSDS SLS-RFM WG MEETING
Fall 2023 Meeting, 07-09 November 2023

4. Action Item Review

The action items from the previous RFM meeting were reviewed. There were 6 action items from the Spring 2023 RFM meeting. Two of the action items have been closed, while four remain open. The status of the RFM action items from the previous meeting is shown below.

Table 1. Action Items from Previous RFM Meeting

AI #	AI description	Actionee	Status
AI_21-05	Review the draft rec 4.1.8 and provide comments (including addition of amplitude/phase imbalance)	All WG members	Open
AI_23-01	Provide final version of material regarding GMSK receiver tracking performance to be inserted into the 413.1-G-2 Green Book Annex (based on inputs SLS-RFM_22-02, SLS-RFM_22-06, SLS-RFM_21, SLS-RFM_21-21, and SLS-RFM_21-22)	M. Lanucara and W. Fong	Closed with inter-meeting emails
AI_23-02	Incorporate GMSK tracking performance material into 413.1-G-2 Green Book, and verify notation, Figure/Table numbering, references, etc. are consistent with the rest of the document	D. Lee	Open; SLS-RFM_23-15 input
AI_23_03	Provide outcomes of SFCG 2023 meeting about the definition of channels (frequency assignments and polarizations) in S-Band (and possible in K-Band) for Proximity-1 extension	D. Lee	Closed with SLS-RFM_23-17
AI_23-04	Provide pink sheets for update of 415.1 CDMA Blue Book to include non-regenerative ranging and lunar relay	V. Sank/S. Rodriguez	Open; SLS-RFM_23-09 input
AI_23-05	Draft white recommendation for low data rate MFSK communications	J. Quintanilla, D. Lee	Open

5. Discussion of Input documents

5.1 Update of Proximity-1 Physical Layer Blue Book

Input document **SLS-RFM_23-10** was briefed by R. Morgan-Owen (ESA) since the original author (B. Dellandrea, ESA) was not available to present until the joint RFM/CS/SLP meeting on Thursday. The document identified gaps in the Prox-1 physical layer blue book that needed to be filled in order to support ESA lunar relay satellites such as Lunar Pathfinder and the Moonlight program. Questions were raised by NASA regarding the bandwidth for the hailing channel, the need for two hailing channels, and the max Doppler and Doppler rates in the document. Some answers to the questions were deferred until the joint meeting when the original author would be available.

Input document **SLS-RFM_23-11** was presented by S. Rodriguez (NASA). This document identified gaps between the existing 401.0 Blue Book recommendations and what is needed for the S-band forward and return lunar proximity links as defined by the LNIS version 5 and Gateway

specifications. NASA noted that there was potential interest in including PCM/PM/NRZ as an option in the LNIS specification for symbol rates between 150 ksps and 2 Msps, and they requested feedback from the RFM WG on the feasibility of adding PCM/PM/NRZ to the 401 Blue Book in the future. CNES and DLR did not have any objections to study of PCM/PM/NRZ for inclusion in 401.0, but ESA requested more time to consider. Action item **AI_23-06** was assigned to ESA to provide this feedback by early December. SLS-RFM_23-11 also pointed out that the 401.0 Blue Book placed a number of symbol rate limits on the telecommand signals that were too restrictive for the symmetric bi-directional proximity links envisioned at the Moon.   The document also recommended that a range of bit rates for the forward link would be more appropriate instead of specifying "telecommand" bit rates only in multiples of 2.

Action item **AI_23-07** was assigned to D. Lee (NASA) to provide a draft paragraph for the 414.1 PN Ranging Blue Book with guidance on selection of the chip rate when PN ranging is used simultaneously with data transmission.

SLS-RFM_23-11 was briefed by D. Lee since the original author (F. Davarian) was not available. The document presented some preliminary FER and throughput test results of a S-band Proximity-1 radio being developed by NASA for a lunar lander mission. The test was conducted using 64 ksps PCM/PM/Bi-phase-L with LDPC rate 2/3 (6144,4096) and using USLP.

SLS-RFM_23-17 was provided for information to the WG regarding the new provisional SFCG Recommendation on the frequency channel plan for in-situ lunar data relay satellites. Provisional SFCG recommendations are subject to a 1-year review cycle, and may be subject to additional changes.

5.2   Realignment of 401.0 Blue Book

SLS-RFM_23-13 was presented by D. Lee. This document noted that the 401.0 Blue Book was originally envision as consisting of two parts. The first part would cover links between earth stations and space stations, while Part 2 would cover recommendations for data relay satellites. Part 2 was never developed. The input document presented 4 different options for reorganizing the 401.0 Blue Book to accommodate a number of pending space-to-space and data relay recommendations. After considerable discussion, the RFM WG agreed to create a 401.0 Part 2 Blue Book for space-to-space links. In order to speed up development of the Part 2 Blue Book, it will follow the structure and format of the existing Part 1 book. Action item **AI-23_08** was assigned to D. Lee to create a new project in CWE to begin development of the 401.0 Part 2 Blue Book.

SLS-RFM_23-14 was provided for information to the RFM WG. It contained the pink sheets for new Recommendations 2.2.9, 2.2.10, and 2.4.23, and revised Recommendation 2.4.7A, which had been previously approved by the RFM WG for agency review. Given the agreed upon realignment of the 401.0 Blue Book, Recommendations 2.2.10 and 2.4.23 will now go into the Part 2 book, while Recommendations 2.2.9 and 2.4.7A will go into Part 1 Blue Book.

5.3   Update to 413.1 Green Book

The latest draft of the 413.1 Green Book was presented in **SLS-RFM_23-15**. The two contributions from ESA and NASA with analysis of the GMSK+PN tracking performance under high Doppler

conditions have been merged into Annex B. Some additional editorial work to fix the figure and table numbering is needed and will be completed by the WG chair.

5.4   Update of 415.1 Blue Book

SLS-RFM_23-09 was presented by V. Sank (NASA) with draft updates to the 415.1 Blue Book to add non-regenerative ranging and to increase the scope of the recommendation to include data relays around the Moon. For non-regenerative ranging, a new modulation mode was introduced on the forward link where the non-regenerative PN ranging code is transmitted on the Q channel and data is simultaneously transmitted unspread on the I channel. During the discussion, it was noted that the appropriate power ratio between the ranging and data signals needed to be studied to avoid self-interference, as well as study of the spectrum lines of the combined signal including any intermodulation products. Action item **AI-23_09** was assigned to the RFM WG to review the draft updates to 415.1 and provide feedback to V. Sank. Action item **AI-23_10** was also assigned to ESA to check if they could provide independent verification of the proposed non-regenerative capability in the revised 415.1 standard.

6.   Review of RFM Charter

The RFM charter was updated to include development of the 401.0 Part 2 Blue Book and additional time for completion of the 415.1 Blue Book update.

7.   Resolutions

The WG agreed to creation of a new project for the 401.0 Part 2 Blue Book. The WG also agreed to request publication of the 413.1 Green Book once the editorial corrections have been completed.

8.   Action Items for Next RFM Meeting

The action item list for the next RFM meeting (Spring 2024) is shown below.

Table 1. Action Items for Spring 2024 RFM Meeting

AI #	AI description	Actionee	Due Date
AI_21-05	Review the draft rec 4.1.8 and provide comments (including addition of amplitude/phase imbalance)	All WG members	(1)
AI_23-02	Incorporate GMSK tracking performance material into 413.1-G-2 Green Book, and verify notation, Figure/Table numbering, references, etc. are consistent with the rest of the document	D. Lee	12/31/2023
AI_23-04	Provide pink sheets for update of 415.1 CDMA Blue Book to include non-regenerative ranging and lunar relay	V. Sank/S. Rodriguez	(1)
AI_23-05	Draft white recommendation for low data rate MFSK communications	J. Quintanilla, D. Lee	(1)
AI_23-06	Provide feedback on feasibility of including PCM/PM/NRZ in 401.0 Blue Book for symbol rates between 150 ksps and 2 Msps	G. Sessler	12/15/2023

AI_23-07	Provide guidance in 414.1 Blue Book on the selection of the chip rate when PN ranging is used simultaneously with data transmission	D. Lee	(1)
AI_23-08	Create a new project in CWE to begin development of the 401.0 Part 2 Blue Book.	D. Lee	12/31/2023
AI_23-09	Review the proposed draft updates to 415.1 Blue Book in document SLS-RFM_23-09 and provide comments to V. Sank	All RFM WG members	12/31/2023
AI_23-10	ESA to check if they can support independent verification of proposed non-regenerative ranging in 415.1 book as described in document SLS-RFM_23-09	A. Modenini	12/31/2023

(1) 2 weeks prior to Spring 2024 RFM Meeting

9. Joint RFM + C&S Meeting

The joint RFM + C&S meeting took place on November 8. There were 17 participants from 5 agencies.

List of Participants – Joint RFM + C&S Working Group Meeting (08 Nov)

	Name	Agency
1	Clement Dudal	CNES
2	Antonio Miraglia	ESA
3	Ignacio Aguilar Sanchez	ESA
4	Richard Morgan-Owen	ESA
5	Nicola Maturo	ESA
6	Manuela Ariagno (virtual)	ESA
7	Gunther Sessler	ESA
8	Jorge Quintanilla Sanchez	ESA
9	Marguerite Arvis	ESA
10	Ferris Gomez Jose David	ESA
11	Xavier Enrich	EUMETSAT
12	Ken Andrews (virtual)	NASA
13	Wing Lee (virtual)	NASA
14	Dennis Lee	NASA
15	Wai Fong	NASA
16	Shannon Rodriguez	NASA
17	Amanuel Geda	DLR

9.1 Discussion of Input Documents

9.1.1 VCM Green Book

SLS-CS_23-09 was presented by M. Arvis. The document described an ACM testbed developed by ESA which included a SCCC transmitter, channel emulator, and SCCC receiver. A draft concept paper on CWE for development of a new VCM Green Book was also presented. This Green Book would focus on VCM system level performance particularly for LEO missions with high data return requirements, as opposed to the existing 131.11 and 131.12 Green Books which focus exclusively on physical layer performance.   The ESA testbed could be used to provide end-to-end system level test results for the proposed Green Book. Action item **AI_23-11** was assigned to ESA to send out a Table of Contents for the proposed Green Book, so that the scope of the project could be better understood. After review of the ToC, the RFM and C&S WG will then provide feedback on approval to proceed with the new GB project (action item **AI_23-12**).

9.1.2   Link Budget Data Exchange

SLS-CS_23-09 was presented by A. Miraglia (ESA). This document describes a data exchange format for link budgets based on XML. This data exchange format would enable easier and more reliable exchange of link budget parameters between agencies (or with commercial vendors) for link budget comparison and validation. Agencies would need to develop their own tools to import the XML data into their link budget software. ESA proposed to develop an Orange Book based on this link budget

data exchange format, with the intention of providing a draft by the Spring CCSDS meeting (action item **AI_23-13**). The joint meeting agreed to the Orange Book approach proposed by ESA.

9.1.3   High Order Modulation Recommendations

SLS-CS_23-16 was presented by J.D. Ferris (ESA). The document identified a number of upcoming ESA Category A X-band space research missions which will require high order modulations (above 8PSK) to meet their downlink data rate requirements in the 8450-8500 MHz band. ESA proposed the addition of 16APSK/32APSK/64APSK modulations to Recommendation 2.4.17A, in order to support these and other similar upcoming missions.   In addition, they proposed to include specification of the minimum carrier suppression for the high order modulations to be added to Rec. 2.4.17A. Action item **AI_23-14** was assigned to ESA to provide analysis or measurements of the link performance degradation as a function of the carrier suppression for 16APSK/32APSK/64APSK modulations, and to provide a draft revision of Rec 2.4.17A at the next meeting based on the analysis (action item **AI_23-15**).

9.2   Joint RFM + C&S Action Items

The action item list for the next joint RFM + C&S meeting (Spring 2024) is shown below.

Table 1. Action Items for Spring 2024 Joint RFM + C&S Meeting

AI #	AI description	Actionee	Due Date
AI_23-11	Provide draft Table of Contents for the proposed new VCM Green Book	A. Modenini	12/31/2023
AI_23-12	Review draft VCM GB Table of Contents and provide feedback to C&S Chair on whether to proceed with development of the GB	All	1/31/2024
AI_23-13	Provide draft Orange Book on link budget data exchange format	A. Modenini, A.Miraglia	(1)
AI_23-14	Provide analysis or measurements of the link performance degradation as a function of the carrier suppression for 16APSK/32APSK/64APSK modulation	A. Modenini	(1)
AI_23-15	Provide draft revision of Recommendation (401) 2.4.17A to include high order modulations	A. Modenini	(1)

(1) 2 weeks prior to Spring 2024 RFM Meeting

10. Joint RFM + C&S + SLP Working Group Meeting

The joint RFM + C&S + SLP meeting took place on November 9th. There were 20 participants from 7 agencies.

List of Participants – Joint RFM + C&S + SLP Working Group Meeting (09 Nov)

	Name	Agency
1	Jean Luc Issler	CNES
2	Antonio Miraglia	ESA
3	Ignacio Aguilar Sanchez	ESA
4	Richard Morgan-Owen	ESA
5	Nicola Maturo	ESA
6	Manuela Ariagno (virtual)	ESA
7	Gunther Sessler	ESA
8	Jorge Quintanilla Sanchez	ESA
9	Daniel Pettitt	ESA
10	Xavier Enrich	EUMETSAT
11	Ken Andrews (virtual)	NASA
12	Wing Lee (virtual)	NASA
13	Dennis Lee	NASA
14	Wai Fong	NASA
15	Shannon Rodriguez	NASA
16	Jon Hamkins	NASA
17	Greg Kazz	NASA
18	Amanuel Geda	DLR
19	Matt Cosby	UKSA
20	Donghao Zheng	CLTC/BITTT

10.1 Discussion of Input Documents

10.1.1   Proximity-1 Session Control and Directives

The SLP chair (G. Kazz) presented document **SLS-SLP_23-01** containing a proposed Annex to the 211.0 Proximity-1 Data Link Layer Blue Book specifying the default session access control parameters for UHF, S-band, and Ka-band Prox-1 links. Many of the parameters for Ka-band are still TBD. The joint meeting recommended that the hailing antenna polarization should be RCP, using the same polarization for Mars and the Moon. The joint meeting also noted that the profile should accommodate additional coding and modulation options. An action item **AI_23-16** was assigned to D. Lee (NASA) to liaise to the SFCG that the hailing channel in SFCG Rec 42-1 should be clearly specified as a frequency rather than a frequency range.

SLS-SLP_23-02 was presented by G. Kazz with the definition of the directive fields to be used in lunar Prox-1 links. The joint meeting recommended that the frequency channel field be expanded to 5 bits, for up to 32 channels. The joint meeting also agreed that the modulation and coding fields should be split into two fields; the modulation field with 4 bits and the coding field with 6 bits. There was a proposal to increase the symbol rate field to 24 bits, with some members arguing that was too many. ESA and NASA agreed to work offline to determine the appropriate bit length of the

symbol rate field in order to provide sufficient granularity and data rate range to accommodate Prox-1 links in the future.

10.1.2   Alignment of LNIS and Prox-1 Blue Books

SLS-RFM_23-10 was presented by B. Dellandrea (ESA). The document highlighted areas in the existing CCSDS Prox-1 Blue Books which need to amended to support the Lunar Pathfinder (LPF) and the Lunar Communication and Navigation Services (LCNS). Both LPF and LCNS are elements of the ESA Moonlight program. The document proposed additional S-band frequency channels to be used with Prox-1, and an additional hailing channel. In response to a question from the joint meeting, the author was of the opinion that the hailing channel bandwidth should be at least 500 kHz. He also recommended that the Prox-1 standard be modified to allow for a user selectable range of modulation indices.

The joint meeting agreed that **SLS-RFM_23-11** did not need to be presented, as it had already been presented in the RFM WG meeting.

10.1.3   Extension of the Prox-1 Blue Books

SLS-RFM_23-08 was presnted by N. Maturo. The document provided ESA feedback on the SLP Prox-1 directives and provided a list of MODCODs to be used with lunar S-band Prox-1.

SLS-RFM_23-13 with updates to the 211.2 Prox-1 Coding and Synchronization Sublayer Blue Book was presented by N. Maturo. During the ensuing discussion, action item **AI_23-17** was assigned to N. Maturo to modify the text in the draft 211.2 book to explicitly indicate that slicing is used, instead of partitioning as stated in the current draft.

SLS-RFM_23-12 with updates to the 211.1 Prox-1 Physical Layer Blue Book was presented by N. Maturo. There was discussion there were questions from the joint meeting regarding how hailing would be done for the Ka-band Prox-1 link, and what antenna polarization should be used for hailing. Also, an action item **AI_23-18** was assigned to the RFM WG to investigate the mod index values that should be recommended for use in Prox-1 S-band and Ka-band links. Another action item (**AI_23-19**) was issued to N. Maturo to include filtering of the bi-phase signal in the draft update of 211.1-B based on the pink Recommendation 2.4.7A.

An action item **AI_23-20** was assigned to W. Lee (NASA) to perform analysis to determine if the Prox-1 S-band phase noise mask in Figure 5-2 of the draft 211.1 book is appropriate for low symbol rates. Action item **AI_23-21** was assigned to N. Maturo to update the spurious emissions mask in Figure 5-3 to be inline with the spurious lines resulting from filtering of the bi-phase signal.   A final action item **AI_23-22** was issued to ESA to confirm the S-band Doppler frequency range and rate in Section 5.2.5. N. Maturo indicated that he plans to have the final updates to 211.1 and 211.2 books done and ready for WG approval for agency review before the Spring 2024.

During the joint meeting, there was also discussion on the need to add S-band PN ranging to the Prox-1 standard. The decision agreed upon during the joint meeting was that PN ranging was not needed with Prox-1. However during the SLS plenary, NASA noted that some members of the NAV working group had communicated the need for PN ranging on the lunar proximity links. ESA raised

the question of how PN ranging on the Prox-1 link would be used, since there are already plans for a GPS-like radio-navigation satellite service around the Moon. In addition, defining the appropriate PN ranging parameters for the Prox-1 standard is not be possible without know the ranging scenario and associated performance requirements. A virtual meeting will be scheduled to discuss these issues before agreeing to add PN ranging to the Prox-1 standard.

10.2 Joint RFM + C&S + SLP Action Items

The action item list for the next joint RFM + C&S + SLP meeting (Spring 2024) is shown below.

Table 1. Action Items for Spring 2024 Joint RFM + C&S + SLP Meeting

AI #	AI description	Actionee	Due Date
AI_23-16	Liaise to the SFCG that the hailing channel in SFCG Rec 42-1 should be specified as a frequency rather than a frequency range.	D. Lee	Next SFCG meeting in June 2024
AI_23-17	Modify text in the draft 211.2 Prox-1 Data Link Layer Blue Book to explicitly indicate that slicing will be used, instead of partitioning as stated in the current draft.	N. Maturo	(1)
AI_23-18	Consider the number of mod indices that should be recommended for Prox-1 S-band and Ka-band.	RFM WG members	(1)
AI_23-19	Include specification of the filtering of the bi-phase signal in the draft update of 211.1 Prox-1 Physical Layer Blue Book based on the pink Recommendation 2.4.7A	N. Maturo	(1)
AI_23-20	Perform analysis to determine if the Prox-1 S-band phase noise mask in Figure 5-2 of the draft 211.1 Prox-1 Physical Layer Blue Book is appropriate for low symbol rates.	W. Lee	(1)
AI_23-21	Update the spurious emissions mask in Figure 5-3 of the draft 211.1 Prox-1 Physical Layer Blue Book to be in-line with the spurious lines resulting from filtering of the bi-phase signal	N. Maturo	(1)
AI_23-22	Confirm the S-band Doppler frequency range and rate in Section 5.2.5	N. Maturo	(1)

(1) 2 weeks prior to Spring 2024 Meeting

CCSDS SLS-RFM WG MEETING
Fall 2023 Meeting, 07-09 November 2023

Annex 1 – Fall 2023 RFM and Joint Meetings Agenda

Date	Item		Input Papers
Nov 07 AM **08:45 – 12:30 (UTC + 1:00)**	1	Action items review	Minutes of meeting
	2	Update of Proximity-1 Physical Layer Blue Book	SLS-RFM_23-10 SLS-RFM_23-11 SLS-RFM_23-12 SLS-RFM_23-17
	3	Realignment of 401.0 Blue Book	SLS-RFM_23-13 SLS-RFM_23-14
Nov 7 PM **13:30 – 17:30 (UTC + 1:00)**	4	Update to 413.0-G	SLS-RFM_23-15
	5	Update of CCSDS 415.1-B-1 for Non-regenerative Ranging and Lunar Relay	SLS-RFM_23-09
	6	Review of WG Charter	RFM Charter
Nov 08 AM **08:45 – 12:30 (UTC + 1:00)**	8	**Joint RFM/C&S meeting**	
	8.1	VCM Green Book	SLS-C&S_23-09
	8.2	Link Budget Standard	SLS-C&S_23-10
	8.3	High Order Modulation Recommendations	SLS-RFM_23-16
Nov 9 **08:45 – 12:30 (UTC + 1:00)** **13:30 – 17:30 (UTC + 1:00)**	9	**Joint RFM/C&S/SLP meeting**	
	9.1	Prox-1 Session Control and Directives	SLS-SLP_23-01 [*] SLS-SLP_23-02 [**]
	9.2	Alignment of LNIS and Prox-1 Blue Books	SLS-RFM_23-10
	9.3	Extension of Prox-1 Blue Books and Prototypes	SLS-CS_23-08 SLS-CS_23-12 SLS-CS_23-13

[*] *Default Session Access Control Parameters for Space Enterprises_Oct_22_2023.docx*
[**] *Lunar_Prox1_directives_Oct_22_2023.docx*

RFM and Joint Meeting Input Papers are available at:
https://cwe.ccsds.org/sls/docs/Forms/AllItems.aspx?RootFolder=%2Fsls%2Fdocs%2FSLS%2DRFM%2FMeeting%20Materials%2F2023%2FFall

Document No.	Paper Title	Available/ Distributed	Author
SLS-RFM_23-XX	**RFM WG Meeting**		
09	Draft Pink CCSDS 415.1-B-1 to Include Lunar and Non-Regenerative Ranging	Y/Y	V. Sank, S. Rodriguez
10	CCSDS Prox-1 Gap Analysis – Lunar Pathfinder and LCNS	Y/Y	B. Dellandrea
11	Gaps between CCSDS 401.0 and the LNIS v5 and Gateway Specifications	Y/Y	J. Long, S. Rodriguez
12	Preliminary Test Data Using Revised S-band Lunar Proximity Protocol	Y/Y	F. Davarian
13	Potential Realignment of the 401.0 Blue Book for Data Relay and Space-to-Space Links	Y/Y	D. Lee
14	Pink Sheets 401.0 RFM Blue Book (for information)	Y/Y	D. Lee
15	Revision of 413.1 Green Book	Y/N	D. Lee
17	Provision SFCG Recommendation on Frequency Channel Plan for In-Situ Lunar Data Relay Satellite (for information)	Y/Y	D. Lee
SLS-CS_23-XX	**Joint RFM – C&S Meeting**		
09	VCM Green Book Project and ESA Prototype	Y/Y	A. Modenini, M. Arvis
10	Link Budget Digitalization: Sharable Link Budget Format for TT&C and PDT	Y/Y	A. Miraglia, A. Modenini, N. Maturo
11 (also SLS-RFM_23-16)	Enabling the Use of High-Order Modulations for Scientific Missions	Y/Y	A. Modenini, J.D. Ferris
	Joint RFM – SLP – C&S WG Meeting		
SLS-SLP_23-01	Default Session Access Control Parameters for Space Enterprises	Y/Y	G. Kazz
SLS-SLP_23-02	Lunar Prox-1 Directives	Y/Y	G. Kazz
SLS-CS_23-08	C&S Input to SLP for Proximity-1 Extension	Y/Y	N. Maturo

SLS-CS_23-12	Draft of the Updated Proximity-1 RFM Blue Book	Y/Y	N. Maturo
SLS-CS_23-13	Draft of the Updated Proximity-1 C&S Blue Book	Y/Y	N. Maturo