***Jean-Luc Issler’s answer:***

*The proposed changes consist of supressing very important requirements for the adopters. The initial text submited to CESG is appropriate, and result from most of the discussions having taking place during the 883 Agency Review with the participation of Dr Shames by E-mail, with a consensus which has been then reached for this subject. The spectrum content is appropriate because, as mentioned in RID SEA-001-883:*

***The Physical Layer frequencies that the source standards have adopted may, in many cases, not be suitable for use in space***

*There are also other CCSDS bleue books mentioning spectrum contents when needed.*

*The 883 standard, for the first time of CCSDS history, would be a CCSDS standard specifying commercial standards which are likely to be not compatible with ITU Radio Regulation in the SZM, related ITU-RECs, SFCG RECs, and protection of Radio Astronomy on the Shielded Zone of the Moon, for an important number of cases of the source standards. That is also why in this new situation for CCSDS, our spectrum text is valid, also to better protect CCSDS and favor smooth adoptions.*

*The mentioned Physical Layer frequencies may not be suitable for space (and in particular on the Moon) due to key requirments contained in SFCG and ITU RECs, as well as in the Radio Regulation. To not provide these key requirements to the direct knowledge of the adopters in the CCSDS 883 standard would reduce too much the normative part and consequently the efficiency of this standard.*

*The spectrum text proposed to be removed is also essential for the adopter’s true awareness about protection of Radio Astronomy in the Shielded Zone of the Moon, which is a key design criteria of lunar wireless links.*

*That is why some specific requirements shall be provided to the adopter, a more detailed paragraph than the too simplified and reduced proposed one.*

*I consider that the parts underlined* ***in green*** *are mandatory to keep in 883 CCSDS standard to consider major CNES RIDS made during the agency review to still have disposition. These parts are added bellow to the paragraph proposed by Dr Shames for the said paragraph to be considered as acceptable for me.*

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CESG POLL ITEM DISPOSITION (PID) INITIATION FORM

AREA PID NUMBER: SEA-883x0r0-010

SUBMITTING AREA: SEA

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REVIEWER'S NAME: Peter Shames

E-MAIL ADDRESS: peter.m.shames@jpl.nasa.gov

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DOCUMENT NUMBER: CCSDS 883.0-B-0

DOCUMENT NAME: SOIS High Data Rate Wireless Proximity Network

Communications

DATE ISSUED: August 2021

PAGE NUMBER: 3-3 PARAGRAPH NUMBER: 3.3.5 in its entirety

PID SHORT TITLE: Inappropriate RFM content in link layer document

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DESCRIPTION OF REQUESTED CHANGE: (Use From: "..." To "..." format)

From:

**3.3.5 IEEE 802.11 CHANNEL PLAN**

**3.3.5.1** All infrastructure implementations shall use channel assignments conforming to the respective IEEE 802.11 standards, while respecting guard bands defined by SFCG (reference [33]).

1. Rationale: This Recommended Standard intends that infrastructures operating in space should support commercially available terrestrial client devices, including those with pre-integrated Wi-Fi. The IEEE 802.11 standards (IEEE 802.11-2020, IEEE 802.11ax Draft 6) generally define standard channels in an annex E, Country elements and operating classes. This Recommended Standard is not requiring a specific terrestrial regional channel set.
2. by the responsible bodies (which can include the SLS RFM WG).

**3.3.5.2** In any case, radiated voluntary emissions (in allocated channels) and involuntary emissions (from corresponding spurious) made by Wireless transmitting devices of all types, … (to end of this section) **that is:**

**… including IEEE 802.11, in the lunar or Martian environment, which would cause frequency**

**overlaps with the lunar and Martian communication orbit to surface bands of 2483.5–2500**

**MHz (references [33] and [42]) shall not be permitted. The related SFCG lower guard band**

**(reference [33]) protecting this orbit-to-surface band shall not be overlapped. The adopter**

**should also define an upper guard band to protect this orbit-to-surface band.**

**NOTES**

**1 The SFCG 2483.5–2500 MHz lunar and Mars orbit-to-surface communications band**

**(references [33] and [42]) need protection with an SFCG guard band, which is 3.5**

**MHz. The 2.4–2.5 GHz ISM band Wi-Fi devices with wanted and unwanted**

**emissions above 2.480 GHz have a high potential for interference with the SFCG**

**band and its guard bands. This impacts the lunar and Mars region use of 2.4–2.5 GHz**

**ISM spectrum for Wi-Fi, with channels 13 and 14 having a high potential for**

**emissions inside the lunar and Mars communications band. North American**

**regulatory domain-certified Wi-Fi systems do not operate on these channels, but**

**some other Wi-Fi systems operating in the 2.4–2.5 GHz ISM band certified outside**

**the North American regulatory domains have the potential to generate interference**

**with the SFCG lunar and Mars communications band and cannot be used with the**

**recommendations in this book for lunar or Mars service if emissions in the SFCG**

**band cannot be avoided by wireless device programming. Missions requiring**

**international interoperability may want to implement Wi-Fi infrastructure in the**

**generally shorter-range 5.8 GHz bands but should be cognizant that many small**

**instrument-level Wi-Fi solutions only support the 2.4–2.5 GHz ISM band, and thus**

**may not be supported by such infrastructure. It is important to note that the majority**

**of Wi-Fi Direct® Soft AP (peer-to-peer) solutions do not provide for the ability to**

**restrict channels on a fine-scale level, and thus the majority of non-North American**

**regulatory domain-certified configured Wi-Fi Direct® Soft AP solutions may not be**

**usable with the recommendations in this book because of to emissions in the 2483.5–**

**2500 MHz SFCG lunar communication band, its lower 3.5 MHz guard band, and its**

**possible 3.5 MHz upper guard band. There is therefore here a choice criteria for the**

**selection of the Wi-Fi Direct® Soft AP solution to use in order not to overlap the**

**2483.5–2500 MHz band and its guard bands. As a reminder, the allocated SFCG**

**wireless lunar surface band in the 2.4–2.5 GHz range is 2400–2480 MHz**

**(reference [33]).**

**2 The 300 MHz to 2 GHz range is recommmended to be reserved for radio astronomy**

**observations (reference [38]).**

**3 Because of the specific radio regulation applicable in the SZM, a transmission in that**

**zone should be declared to the ITU and coordinated previously with Radio**

**Astronomy representatives, including when declared on a non-interference basis (reference [38]).**

To:

**33.3.5 IEEE 802.11 CHANNEL PLAN**

**3.3.5.1** This Recommended Standard intends that infrastructures operating in space should support commercially available terrestrial client devices. However, all infrastructure implementations are required to use channel assignments conforming to the respective IEEE 802.11 standards, and to respect all SFCG spectrum allocations and other applicable frequency band constraints.

**3.3.5.2** In any case, radiated voluntary emissions (in allocated channels) and involuntary emissions (from corresponding spurious) made by Wireless transmitting devices of all types, **including IEEE 802.11, in the lunar or Martian environment, which would cause frequency**

**overlaps with the lunar and Martian communication orbit to surface bands of 2483.5–2500**

**MHz (references [33] and [42]) shall not be permitted. The related SFCG lower guard band**

**(reference [33]) protecting this orbit-to-surface band shall not be overlapped. The adopter**

**should also define an upper guard band to protect this orbit-to-surface band.**

**NOTES**

**1 The SFCG 2483.5–2500 MHz lunar and Mars orbit-to-surface communications band**

**(references [33] and [42]) need protection with an SFCG guard band, which is 3.5**

**MHz. The 2.4–2.5 GHz ISM band Wi-Fi devices with wanted and unwanted**

**emissions above 2.480 GHz have a high potential for interference with the SFCG**

**band and its guard bands. This impacts the lunar and Mars region use of 2.4–2.5 GHz**

**ISM spectrum for Wi-Fi, with channels 13 and 14 having a high potential for**

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**some other Wi-Fi systems operating in the 2.4–2.5 GHz ISM band certified outside**

**the North American regulatory domains have the potential to generate interference**

**with the SFCG lunar and Mars communications band and cannot be used with the**

**recommendations in this book for lunar or Mars service if emissions in the SFCG**

**band cannot be avoided by wireless device programming. Missions requiring**

**international interoperability may want to implement Wi-Fi infrastructure in the**

**generally shorter-range 5.8 GHz bands but should be cognizant that many small**

**instrument-level Wi-Fi solutions only support the 2.4–2.5 GHz ISM band, and thus**

**may not be supported by such infrastructure. It is important to note that the majority**

**of Wi-Fi Direct® Soft AP (peer-to-peer) solutions do not provide for the ability to**

**restrict channels on a fine-scale level, and thus the majority of non-North American**

**regulatory domain-certified configured Wi-Fi Direct® Soft AP solutions may not be**

**usable with the recommendations in this book because of to emissions in the 2483.5–**

**2500 MHz SFCG lunar communication band, its lower 3.5 MHz guard band, and its**

**possible 3.5 MHz upper guard band. There is therefore here a choice criteria for the**

**selection of the Wi-Fi Direct® Soft AP solution to use in order not to overlap the**

**2483.5–2500 MHz band and its guard bands. As a reminder, the allocated SFCG**

**wireless lunar surface band in the 2.4–2.5 GHz range is 2400–2480 MHz**

**(reference [33]).**

**2 The 300 MHz to 2 GHz range is recommmended to be reserved for radio astronomy**

**observations (reference [38]).**

**3 Because of the specific radio regulation applicable in the SZM, a transmission in that**

**zone should be declared to the ITU and coordinated previously with Radio**

**Astronomy representatives, including when declared on a non-interference basis (reference [38]).**

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CATEGORY OF REQUESTED CHANGE:

Technical Fact \_X\_ Recommended \_\_\_ Editorial \_\_\_

NOTES:

TECHNICAL FACT: Major technical change of sufficient magnitude as to

render the Recommendation inaccurate and unacceptable if not

corrected. (Supporting analysis/rationale is essential.)

RECOMMENDED: Change of a nature that would, if incorporated, produce

a marked improvement in document quality and acceptance.

EDITORIAL: Typographical or other factual error needing correction.

(This type of change will be made without feedback to submitter.)

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SUPPORTING ANALYSIS:

The issue, and rationale, for requiring coordination for spectrum allocation has been pointed out in the revised sec 2.4.3. It is not appropriate to address this RFM subject further in this link layer document and there is no value in repeating this same information here.

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DISPOSITION: