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To: HELLENIC TELECOMMUNICATIONS & POST COMMISSION ("EETT")
Spectrum Division
Division of Spectrum Management
60, Kifissias Avenue
151 25 Maroussi
Athens, Greece
Tel.: +30 210 6151000
Email: spectrum_terms@eett.gr

Subject: Public Consultation Regarding the Operation of Ancillary Terrestrial Components of the Mobile Satellite Service in the 2483.5 - 2495 MHz Radio Spectrum Band

NON - CONFIDENTIAL VERSION

Dear Sirs,

We are pleased to forward you our response on the subject.
GLOBALSTAR's European and Greek regulatory teams remain at your disposal for any further clarification you may need.

[redacted]

Date 22.09.2023

Globalstar

[redacted]

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Globastar's responses to EETT´s questions raised in the "Public Consultation Regarding the Operation of Ancillary Terrestrial Components of the Mobile Satellite Service in the 2483.5 - 2495 MHz Radio Spectrum Band"

Globalstar has reviewed the text of the Public Consultation of EETT and would like to raise the following comments.

Question 1. Please provide your views on any impact on Medical Equipment operating in the 2483.5 2500 MHz band from the operation of the ATCs, taking into account that a designated 5MHz band (2495- 2500 MHz) will not be used. We particularly request your informed views in case you consider that the restrictions mentioned in the text are not sufficient for the uninterrupted operation of Medical Equipment, in particular Medical Equipment related to sensitive uses.

In general, we note that, studies conducted by CEPT highlight the low risks of interference of ATCs with other services operating in the band. In particular, ECC Report 325 examines the operation of many other radiocommunication services, inter alia MSS, RDSS, PMSE, MBAN, LP-AMI, E-UTRA, ISM/WLAN and RAS, in the same geographical area that Globalstar's terrestrial component will operate and concludes that there is a need to observe variable separation distances, according to services and scenarios studies under their specific assumptions of worst case parameters.

With regard to Medical Equipment, the two related Short-Range Devices (SRD) which operate in the 2.4 GHz mobile satellite service frequency band in a number of EU countries are the Medical Body Area Network System (MBANS) devices and the Low-Power Active Medical Implants (LP-AMI) devices.

MBANS and LP-AMI operations must coexist with other services. In particular, MBANS and LP-AMI are required by European Standards to employ additional interference mitigation mechanisms such as Listen-Before-Transmit and Adaptive Frequency Selection (LBT/AFS). In addition to facilitating coexistence with other services, the LBT/AFS will be also helpful in ensuring intra-service coexistence of MBANS and LP-AMI devices at a same location, (e.g., where more than one LP-AMI or MBANS devices are used in close proximity to each other).

Given that the use of MBANS and LP-AMI devices is license exempt which means that access to the radio spectrum is provided on a non-interference and non-protection basis as well as that the band 2483.5 - 2500 MHz is allocated to several services, consistent with similar allocations at an ITU level, medical devices operating in this band have taken into consideration potential interference from the Fixed service, Mobile service, Mobile Satellite Service, Radiodetermination service and Radiolocation service. In this way, the medical devices operating in the band have implemented mitigation measures to mitigate any harmful interference from emissions from all other services using the band. Those mitigation measures are indicated in the corresponding European Standards, as mentioned by the ERC Recommendation 70-03 (EN 301 559).

Additionally, MBANS and LP-AMI devices are restricted to indoor use at healthcare facility, elderly care houses, and similar institutions. Globalstar does not intent to deploy ATCs in such indoor environments.

Finally, we note that the probability of harmful interference with both types of short-range devices is negligible and purely theoretical since **it is impossible for ATC operations even operating at 100% duty cycle over its 10 MHz to starve MBANS from available frequencies on the 100 MHz spectrum available.** Similarly, with regard to LP-AMI equipment, ECC Report149 on LP-AMI defines the probability of interference of the LP-AMI with the ATCs (in-band sharing) to be 0.1%. **ATC will hence not interfere with LP-AMI**.

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Conclusions on coexistence.

The location and purpose of usage for the short-range devices provides mitigation of interference from other users of the same bands that are, in the case of ATC, used predominantly outdoors and/or at industrial sites.

Furthermore, MBANS and LP-AMI operations must coexist with all other users. This means that MBANS and LP-AMI employ additional interference mitigation mechanisms such as LBT/AFS.

Natural shielding and mitigation mechanisms should be enough to ensure MBANS and LP-AMI can coexist with Globalstar's ATC when deployed nearby.

Consequently, **the probability of harmful interference is negligible and purely theoretical, as explained above, for both types of short-range devices.**

In conclusion, we firmly believe that the restrictions mentioned in the text **are sufficient** for the uninterrupted operation of Medical Equipment, in particular related to sensitive uses.

Question 2. Please provide your views on whether the development of the ATC, under the terms proposed in this Public Consultation, raises any regulatory issue with regard to the market that should be considered by EETT, beyond what has already been mentioned in this document.

The ATC deployment authorisation in the band 2485-2495 MHz does not pose regulatory issues.
It is not considered necessary to impose any other regulatory measures on the types of services to be provided with the support of ATC.

To note that in Greece, there is already a precedent in authorisation for the deployment of an ATC of the mobile satellite service.

It is also considered that, as the FM Group of the CEPT has shown, harmonisation at European level is not mandatory for the deployment of the ATC network in the band 2485-2495 MHz.

[redacted] there are other authorised operators in the similar S-band (1980-2010 MHz band), and there are also other satellite network operators that have notifications submitted to the ITU for the provision of mobile satellite services[redacted]

It should be taken into account that the deployment of an ATC is not intended to provide a continuous terrestrial mobile service throughout the geography[redacted] It can in no way be considered as a homogeneous service throughout the territory or service of the same size or characteristics of typical nation-wide electronic communications services, which are authorised to be deployed in the whole territory, with associated radio protection against interference, continuously throughout the territory or in certain geographical areas with wide coverage.

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The deployment of an ATC network is not comparable to or competitive towards other typical electronic communications services but provides other solutions that can be more closely assimilated to the operation of commonly used devices (ISM).

It is considered in any case that the authorisation for the deployment of the ATC network cannot be granted under exclusivity or under guaranteed conditions of technical operation, given that the band 2485-2495 MHz is allocated to several services including devices in common use, and protection against interference cannot be guaranteed to users of the ATC network. Nevertheless, it is also considered that the authorisation for the deployment of an ATC network will not create harmful interference to other primary radiocommunication services and will not claim protection against harmful interference from such other primary services.

On the basis of the above, we consider that the development of the proposed ATC does not raise regulatory issues.

Question 3. Do you consider that there are risks of technical incompatibility of the ATC network, including the Satellite Network terminals with other services and applications provided in the adjacent spectrum bands, which should be taken into account by EETT in order for any additional protection measures to be taken? Please justify your answer, taking into account ECC Report 325.

A. Considerations with respect to adjacent band services in the lower adjacent band

The adjacent band below the band 2483.5-2,500 MHz, i.e. 2450 to 2483.5 MHz band is intended for industrial, scientific and medical (ISM) applications, local area networks and data, low-power devices for motion detection and surveillance, short-range video links, RFID applications, radars for sounding floors and walls and in general generic short-range devices based on Commission Decision (EU) 2019/1345 amending Decision 2006/771/EC and updating the harmonised technical conditions for the use of radio spectrum by short-range devices. All said applications are in common use and are deployed on a non-protection and non-interference basis with respect to other authorised services.

CEPT has reported on two studies (ECC Report 325) where it has been found that the level of interference to services below 2483.5 MHz that would be generated by the ATC network operation would not be different from the interference received from existing services that also operate below 2483.5 MHz. The first study conducted in 2018 showed that the impact of the ATC network TD-LTE operation on Wi-Fi channel 11 is no different than the impact of another Wi-Fi channel 6 on Wi-Fi channel 11. The second study conducted by BNetzA in 2020 and also documented in ECC Report 325 has shown that the impact of unwanted TD-LTE (ATC) emissions in the ISM band is not dominant. It should be also noted that RLANs in this band are not protected against interference from other applications, such as microwave ovens or other application within the same environment.

Therefore, it is not considered that there are risks of technical incompatibility between ATC network operations and services in the lower adjacent band, since in addition to the filtering of ATC emissions, there is additional guard band. This protection is duly reported in ECC Report 325 in the sense that even without the proposed guard band, the level of out-of-band emissions of the terrestrial component of the entire band of the mobile-satellite service would be lower than the level of emissions generated in the band by other services operating in that adjacent band.

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B. Considerations with respect to adjacent band services in the upper adjacent band

The adjacent upper band 2500 to 2690 MHz band (2.6 GHz band) is intended for terrestrial systems capable of providing electronic communications services in accordance with Commission Decision 2008/477/EC dated 13 June 2008 on the harmonisation of the frequency band 2,500-2,690 MHz and Commission Decision (EU) 2020/636 dated 8 May 2020 amending Commission Decision 2008/477/EC. There are no risks of technical incompatibility between ATC network operations and services in the upper adjacent band, since in addition to the filtering of ATC emissions, there is additional guard band, although it might be appropriate to set a maximum level of out-of-band emissions for the ATC network.

In order to provide certainty on the level of out-of-band emissions of the ATC network, considering that a guard bandwidth of 5 MHz will be available with respect to the edge of the band (2500 MHz), it is considered that the provision of a maximum emission requirement of the ATC network over the adjacent band, will provide greater margin to guarantee the technical compatibility with services operating in the 2500 MHz band. This maximum value is set to an out-of-band signal spectral density that is less than-45 dBm/MHz. This value is consistent with the studies carried out by CEPT (CEPT Report 19) as well as with the limits established in the Commission Decision dated 13 June 2008 (limits applicable to the concept of Block Edge Mask (BEM)) avoiding the need for coordination of frequency assignments in a similar way as it is avoided for the deployment of base stations of the electronic communications service.

It is noted that the same operating conditions applying to services operating above 2500 MHz may be required for emissions from ATCs. In this way, Globalstar's ATC operation is compatible with mobile services in adjacent Band 7 FDD and Band 38 TDD, so that ATC emissions can be limited to the level defined in the CEPT Report 19 and Commission Decision dated 13 June 2008, based on the BEM concept, to a maximum of-45 dBm/MHz. This limit allows the deployment of ATC base stations without the need for coordination agreements. If other out-of-band emission values are used, coordination between ATC base stations and mobile service base stations operating above 2500 MHz would be necessary.

On the basis of the abovementioned, we do not consider that there are risks of technical incompatibility of the ATC network with other services and applications provided in the adjacent spectrum bands, which should be taken into account by EETT in order for any additional protection measures to be taken.

Question 4. Do you consider the conditions set out in section 12 to be sufficient and appropriate for the use and operation of the ATCs? If not, please give reasons for your answer.

Regarding the proposed conditions as indicated in section 12 of the consultation text, the following comments are raised for consideration by EETT. Most of the proposed conditions seem reasonable and applicable, except conditions 3b, 5 and 15 which risk introducing unnecessary burden to the user terminals.

	Condition	Comment
1	Non-interference and non-protection basis.	OK
2	a. Provision of mobile satellite services under a General Authorisation regime.	OK

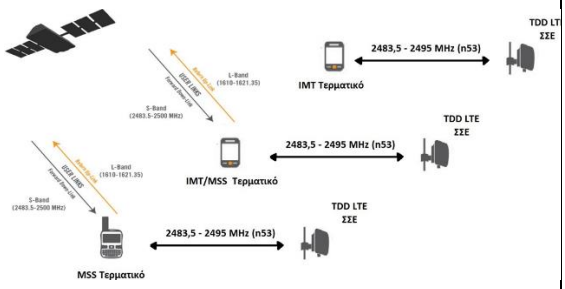
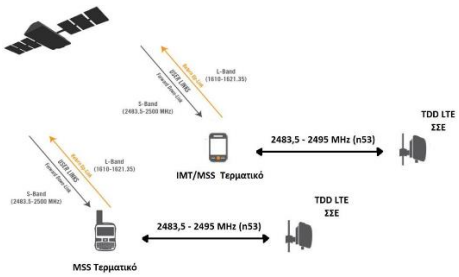
[redacted]

	b. Registration in the Registry of electronic communications network and service providers operating under a General Authorisation.	OK
	c. Declaration of location of the ATC base stations and their characteristics.	OK
3	a. STBs operate in accordance with TDD 3GPP TR 36.791, with a maximum power at the antenna input of 1W and EIRP as 4W.	OK
	b. ATCs to operate only outdoors.	Contradictory requirement. [redacted] This requirement should not be included, as the main restriction for the ATC operation is to be within the limited reach of a typical ATC BS coverage.
	c. Microcells with a standard radius of 200 to 1500 m.	OK
	d. The deployment of microcells will allow to increase the capacity of the network at the local level, or in areas with difficult satellite coverage.	OK
4	The maximum capacity per cell can reach up to 100 Mbps on the downlink and 25 Mbps on the uplink.	The maximum capacity would be related to the number of users connected and the type of traffic, as there will be a shared access to the resource. It could be indicated that the reference capacity per cell can reach the values indicated in the question.
5	Each ATC may communicate with a mobile satellite terminal device and/or a mobile IMT terminal device which (terminal devices) will be able to connect with both the satellites and the ATC, i.e. they will have a dual function.	The wording of this requirement is confusing. One of the scenarios for the need of deploying ATC network is when there is no line of sight and / or visibility from the satellite to the user terminal. This scenario happens usually in indoor areas. For example, in the case of terminals such as mobile terminals, which are used within certain areas, there would not be a need of connectivity with the satellite as the area

[redacted]

		would not be served by satellite. [redacted] Therefore, because the ATC will be deployed also in scenarios where there will be no line of visibility with the satellite, it would not make sense to impose a condition on terminals connecting with the ATC to also be able to communicate with the satellite. [redacted] If the intention of the requirement is to make mandatory the connectivity of the ATC Base station with its user terminals and also with the satellite, constituting the ATC a sort of Mobile Earth Stations capable of communicating with the satellite and also with the user terminals, then, it would be possible to request such dual mode connectivity for the ATC Base station. The user terminals configuration would depend upon the market, the technology, etc, and may have connectivity with the

[redacted]

		satellite or not, depending upon their location. Also, communications should not be restricted to using IMT type terminals. IoT terminals for data communications could be also used.
	The proposed Hybrid terrestrial/satellite Mobile Satellite Service Network structure will be as follows: [Figure 3]	Following from our comment under point 5, Figure 3 should be identical to Figure 2. Note as seen below that the upper right part of the drawing of Figure 2 is missed in Figure 3.  Figure 2  Figure 3 Additionally, Globalstar considers that its proposal for a Mobile Satellite System which consists of both a satellite and a terrestrial component falls under the definition of an

		"Integrated mobile satellite system" (further discussed under Question 6).
6	ATC are an integral part of a mobile satellite system and are controlled by the satellite resource and network management mechanism.	OK
7	ATCs are installed within the footprint of the satellites of the orbital planes.	OK
8	No limitation on the number of Mobile Satellite Service Providers.	Correct. Radio Regulations procedures apply
9	In case of use of ATCs by two or more Mobile Satellite Service Providers, measures, agreed between the Mobile Satellite Service Providers, shall be taken to avoid interference.	Correct, operation of ATC by several operators would be governed by the coordination agreements of the corresponding MSS umbrella services
10	No interference to services operating in the band or adjacent bands. NOC prepared to react immediately.	OK
11	The ATCs shall operate on a non-interference and non-protection basis, with regard to systems of neighbouring countries operating on the radio services of the International Radio Regulations, within and outside the 2483,5- 2500 MHz radio spectrum band. Under the responsibility of the provider, all necessary measures shall be taken to protect the stations of neighbouring countries as described in ECC Report 325. In particular, for the protection of IMT base stations in the 2500- 2620 MHz (E-UTRA Band 7) band of neighbouring countries, the ATCs shall be installed at a distance greater than that predicted by the calculation using the Free Space Path Loss (FSPL) electromagnetic propagation model from the country's border, as described in ECC Report 325.	As indicated in the responses to Questions above, no technical compatibility issues are expected to be raised originated by the operation of ATC. However, should EETT require further guarantees, suggestion is made to require the application of BEM to guarantee no interference to any users of the adjacent band in the country and obviously to neighbour countries.
12	Medical equipment is protected from harmful interference within healthcare facilities (e.g. hospitals), and to ensure installation at distances at least those indicated in ECC Report 325.	OK, as discussed in our answer under Question 1.
13	Protect IMT base stations operating in the 2500-2620 MHz radio spectrum band (E-UTRA Band 7) within the Greek territory.	OK. Suggestion to apply requirement of BEM.

[redacted]

	Requirement to observe separation distance as per the ECC Report325 or coordinate with IMT network operator.	OK. Suggestion to apply requirement of BEM.
14	Greek Laws applicable (Law 4635/2019, etc.) with regard to the antenna licensing.	OK
15	In the case of the use of the RDSS/RNSS service by satellite systems such as the GALILEO system, the operating conditions of the ATCs may be reviewed.	This is a confusing requirement. Some clarification would be desirable on the reasons for the potential impact of Galileo. The ECC Report 325, which succeeds ECC Report 165 referred to under section 10 of the public consultation concludes that the coexistence of ATC and RDSS would be similar to the coexistence of ATC and MSS and would not represent a major challenge, nor a more difficult situation as with respect to other services operating in the band. Should future RDSS/RNSS services be implemented in the future, it is expected that those networks will be governed by the normal regulatory procedures applicable by ITU, [redacted]
16	ATC for fixed or Mobile Service may cause review of authorisation. In the case of the use of the fixed and mobile service in the 2483.5-2500 MHz band, the operating conditions of the ATCs may be reviewed.	OK
17	In case of updates in the CEPT and/or EU framework, the operating conditions of the ATCs may be reviewed review of the authorisation.	OK

Question 5. Do you agree with the proposed annual fees per ATC in Section 13? If you disagree, please provide reasoned alternatives.

[redacted]

With regard to the fact that EETT has used as a basis for the calculation of the amount of fee per ATC the EETT Decision 799/8/16.02.2017 "*Modification of EETT Decision 276/49/14.2.2003 "Regulation on the Determination*

[redacted]

of Spectrum Usage Fees and Radio Frequency Assignment Fees" (B' 256)" B' 898" which regulates fees for aeronautical ATCs in the 1980-2010 MHz/2170-2200 MHz band and in particular fees for ATCs in this band intended for the provision of broadband telecommunications services, we would like to note that, [redacted]

[redacted]

Question 6. Please provide any additional views and/or comments that you consider appropriate/necessary regarding the use of ATCs in the 2483.5- 2495 MHz band.

[redacted]

Other general points for consideration

With reference to page 11 of the public consultation text (where it is stated that "according to Globalstar the satellite network and the ATCs constitute a Hybrid terrestrial/satellite MSS" as well as that "the form of the requested Hybrid terrestrial/satellite MSS is the following (…)", it is clarified that Globalstar does not consider that the satellite network and the ATCs form a hybrid Satellite/Terrestrial mobile satellite system but rather an integrated MSS system (see also pages 28, 31 of the submitted Technical Report to which we refer). In particular, Globalstar would like to clarify that Globalstar's ATC network of its mobile satellite system constitutes indeed an Integrated MSS system rather than a Hybrid Satellite/Terrestrial, because Globalstar's ATCs enhance the quality of communications in certain areas or environments and constitute an integral part of the mobile satellite system. It is noted that Globalstar's control center will control both the satellite and the terrestrial component. Obviously, both the satellite and the terrestrial component will use the same spectrum range (2485-2495 MHz band), however the satellite component will use the whole spectrum band 2483.5 – 2500 MHz. The ITU definitions of the Integrated MSS and Hybrid Satellite/Terrestrial Service which justify our above

[redacted]

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interpretation are reproduced below, thus evidencing the similarity of Globalstar ATC architecture to the definition of the Integrated MSS System:

1. Integrated MSS System: "An integrated MSS system is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system. In such systems the ground component is controlled by the satellite resource and network management system. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system.

2. Hybrid Satellite/Terrestrial System: "System employing satellite and terrestrial components where the satellite and terrestrial components are interconnected, but operate independently of each other. In such systems the satellite and terrestrial components have separate network management systems and do not necessarily operate in the same frequency band.

[redacted]