DRAFT REVISION OF ERC/DEC/(99)06
PUBLIC CONSULATION

COMMENTS OF ORBCOMM Inc.

Administration/Company/Entity: ORBCOMM Inc. (USA)

Name of contributor: Walter H. Sonnenfeldt, Vice President Regulatory Affairs
E-Mail: sonnenfeldt.walter@orbcomm.com
Tel: (+1) 585 461 3018

ORBCOMM Inc. ("ORBCOMM" (www.ORBCOMM.com)) respectfully submits these Public Consultation comments regarding the **Draft revision of ERC/DEC/(99)06 (Annexes 1 & 2)** "*ERC Decision of 10 March 1999 on the harmonised introduction of satellite personal communication systems operating in the bands below 1 GHz (S-PCS<1GHz)*".

About ORBCOMM

ORBCOMM, a public corporation organized under the laws of the state of Delaware, USA, is the owner and operator of the ORBCOMM (ITU and CEPT name 'LEOTELCOM-1") non-geostationary mobile satellite service system (the "ORBCOMM System"). ORBCOMM was an active participant in the process of developing and implementing the policies and procedures for the harmonized entry of S-PCS < 1 GHz satellite systems in the CEPT countries. The ORBCOMM System was one of the first candidate S-PCS < 1 GHz satellite systems approved more than twenty years ago for entry in Annex 2 of ERC Decision 99(06). Since that time, the ORBCOMM System has been in full worldwide commercial operation. ORBCOMM provides innovative low-cost two-way narrowband packet data communication (non-voice only) services and solutions for monitoring, tracking and controlling remote industrial assets. ORBCOMM's market leading offerings have come to be known as falling under the Internet of Things ("IoT") and Machine-to-Machine ("M2M") categories of services. ORBCOMM services are utilized throughout Europe and the entire world by thousands of public and private sector customers in various industrial segments. Customers deploy customized ORBCOMM IoT and M2M solution offerings that can involve thousands, and often tens of thousands, remote assets.

The Swarm Satellite System Does Not Meet the Requirements for Inclusion in Annex 2 of ERC/DEC/(99)06

COMMENT ORBC/001 At this time, the Swarm Technologies, Inc. satellite system (the "Swarm System") does not meet the requirements for inclusion in Annex 2 of ERC/DEC/(99)06. Accordingly, the Swarm System should be deleted from Annex 2 of the Draft revision of ERC/DEC/(99)06 as a condition of finalizing the proposed ERC/DEC/(99)06 revision.

Among other things, there are significant unresolved issues regarding the Intra-Service compatibility of the proposed Swarm System. Unless and until these matters can be resolved, the Swarm System clearly does not meet the requirements of 'Decides 5' of ERC/DEC/(99)06, and thus, is not eligible for inclusion in Annex 2. These matters are more

fully discussed in ORBCOMM's comments submitted in the Draft ECC Report 322 Public Consultation (attached hereto as Appendix 1, and incorporated herein by reference).

ORBCOMM stands ready to take all reasonable efforts to consider feasible solutions for frequency sharing with the proposed Swarm System. However, as currently architected according to the specifications provided in Draft ECC Report 322, the proposed Swarm System uplink band operations are likely to cause unacceptable interference to long standing ORBCOMM uplink operations throughout Europe (which are conducted in accordance with ERC Decision 99(06)), as well as in surrounding regions.

DRAFT ECC REPORT 322
PUBLIC CONSULATION

COMMENTS OF ORBCOMM Inc.

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E-Mail: sonnenfeldt.walter@orbcomm.com
Tel: (+1) 585 461 3018

ORBCOMM Inc. ("ORBCOMM" (www.ORBCOMM.com)) respectfully submits these Public Consultation comments regarding Draft ECC Report 322 "*Compatibility Analysis (inter-service and intra-service) for S-PCS Below 1 GHz*". ORBCOMM, a public corporation organized under the laws of the state of Delaware, USA, is the owner and operator of the ORBCOMM (ITU and CEPT name 'LEOTELCOM-1") non-geostationary mobile satellite service system (the "ORBCOMM System").

About ORBCOMM

ORBCOMM was an active participant in the process of developing and implementing the policies and procedures for the harmonized entry of S-PCS < 1 GHz satellite systems in the CEPT countries. The ORBCOMM System was one of the first candidate S-PCS < 1 GHz satellite systems approved more than twenty years ago for entry in Annex 2 of ERC Decision 99(06). Since that time, the ORBCOMM System has been in full worldwide commercial operation. ORBCOMM provides innovative low-cost two-way narrowband packet data communication (non-voice only) services and solutions for monitoring, tracking and controlling remote industrial assets. ORBCOMM's market leading offerings have come to be known as falling under the Internet of Things ("IoT") and Machine-to-Machine ("M2M") categories of services. ORBCOMM services are utilized throughout Europe and the entire world by thousands of public and private sector customers in various industrial segments. Customers deploy customized ORBCOMM IoT and M2M solution offerings that can involve thousands, and often tens of thousands, remote assets.

The Conclusions in Draft ECC Report 322 Regarding Swarm System Intra Service Sharing Feasibility Are Not Correct

ORBCOMM supports competitive entry in the S-PCS < 1 GHz service in accordance with the terms and conditions of the ERC Decision 99(06) and all other applicable CEPT regulatory policies. However, as explained more fully below, the conclusions in Section 3.2 of the current version of Draft ECC Report 322 regarding the feasibility of 'Intra-Service' spectrum sharing between the ORBCOMM System and the currently proposed Swarm Technologies, Inc. satellite system (the "Swarm System) are, without question, incorrect. These matters clearly require further study, and thus, should be referred back to WG SE 40 for additional review and consideration.

Among other things, these conclusions are based on inaccurate information regarding ORBCOMM System spectrum utilization rights in the CEPT countries. Furthermore, the proposed Swarm System, as currently architected, is not capable of co-frequency sharing with the ORBCOMM System without causing unacceptable interference to ORBCOMM operations.

Furthermore, it should be noted that Swarm has filed an application with U.S. Federal Communications Commission ("FCC") (*see*, FCC Application File Nos. SAT-MOD-20200501-00040 and SAT-AMD-20200504-00041) proposing very significant changes to the Swarm System, including doubling the number of proposed Swarm spacecraft, and at least doubling the Swarm System spectrum occupancy requirements. Accordingly, the information provided in Draft ECC Report 322 does not provide an accurate description of the technical characteristics of the Swarm System as currently proposed by Swarm.

FCC Licensing Decisions Regarding Specific Uplink Frequency Assignments Are Not and Should Not Be Binding on CEPT Administrations

Section 3.2 of Draft ECC Report 322 incorrectly claims that the recent Swarm System uplink frequency assignment licensing decisions of the FCC are somehow applicable and binding in the CEPT countries. The FCC has no jurisdiction or authority to render decisions regarding satellite uplink frequency assignments that are binding on CEPT countries, or any Administration other than the United States. ERC Decision 99(06) sets out the CEPT policies and procedures for identifying S-PCS < 1 GHz frequency assignments, and for determining the feasibility of spectrum sharing between existing systems and new system entrants. Frequency assignments approved for Hamonised Introduction of S-PCS < 1 GHz systems, are set forth in Annex 2 of ERC Decision 99(06). Concluding that that inter-system sharing is or is not feasible based on the frequency assignment decisions of the FCC is clearly not appropriate under the applicable CEPT S-PCS < 1 GHz policies.

The Interference Avoidance Techniques Currently Proposed for the Swarm System Could Cause Unacceptable Interference to ORBCOMM Operations

For various reasons, the mobile earth station-based ("MES") "listen-before-talk" uplink spectrum sharing technology proposed for the Swarm System is not a viable S-PCS < 1 GHz intra-service interference avoidance technology solution. Although user-terminal-based "listen-before-talk" technology can provide an effective means of spectrum sharing for some types of radio systems, it would clearly be ineffective as an uplink band intra-service interference avoidance solution.

This is because an MES can only receive interfering signals in the uplink band from other very nearby interfering transmitters – at most, only those that are located within the unblocked line-of-sight radius of the subject MES. However, the intended satellite uplink receiver is susceptible to harmful interference from a transmitter located anywhere in that satellite's receive antenna footprint (which in the case of an ORBCOMM satellite is a land area of approximately 5,100 km in diameter). Consequently, Swarm's proposed MES-based "listen-before-talk" uplink channel assignment interference avoidance system would be ineffective because it would be extremely susceptible to various co-frequency harmful interference scenarios (both interference to other systems ***and*** self-interference) including: interference to unintended satellite receivers (both intra-system, and inter-system); duplicative intra-system MES channel assignments that would jam the intended satellite

receiver; and interference to the intended satellite receiver on the selected channel from foreign (other system) transmitters located in the satellite footprint but not within the reception radius of the intended Swarm transmitting MES.

ORBCOMM stands ready to take all reasonable efforts to consider feasible solutions for frequency sharing with the proposed Swarm System. However, as currently architected, the proposed Swarm System uplink band operations are likely to cause unacceptable interference to long standing ORBCOMM uplink operations throughout Europe (which are conducted in accordance with ERC Decision 99(06), as well as in surrounding regions. ORBCOMM believes that co-frequency sharing in the same service area between the ORBCOMM system and another properly architected S-PCS < 1 GHz system may be possible. Band segmentation should only be considered as a measure of last resort – not as the first solution. Among other things, it would constrain and impede ORBCOMM operations, and would be the least spectrally efficient means of intra-service sharing.

If Draft ECC Report 322 is to be issued following the Public Consultation, all Sections of the Report Relating to the Swarm System Should be Deleted

COMMENT ORBC/001 Given the fact that Swarm has filed an application with the FCC for authorization to *significantly* modify Swarm's FCC space segment license to double the size of the proposed Swarm System, all reference to the Swarm System in Draft ECC Report 322 should be deleted. Entries in the Report regarding the Swarm System should be revised and updated accordingly. Although FCC decisions regarding the specific particulars of satellite system uplink spectrum assignments in the United States are clearly not binding in the CEPT countries, FCC licensing decisions regarding authorized space segment (*e.g.*, number of spacecraft, orbit parameters, and spectrum occupancy requirements) clearly have a significant material impact on decisions regarding introduction of a satellite system in the CEPT countries.

If Draft ECC Report 322 is to be finalized issued following the Public Consultations, at a minimum, the following revisions should be made:

- **COMMENT ORBC/002** A clear statement describing the significant proposed alterations of the Swarm System design recently proposed by Swarm should be included in the description of the Swarm System technical characteristics.

- **COMMENT ORBC/003** All references to FCC licensing decisions regarding specific uplink frequency assignments or designated uplink 'subbands' for the Swarm System or the ORBCOMM System should be deleted. FCC licensing decisions regarding specific satellite uplink frequency assignments are not and should not be binding in the CEPT countries, or any Administration other than the United States. Any text in the sections of the Report describing the Swarm System (*e.g.*, Table 14) describing the uplink operations of the ORBCOMM System in CEPT countries should be revised to show the correct harmonized frequency use parameters for the ORBCOMM System as set forth in Annex 2 of ERC Decision 99(06). The reference to ORBCOMM uplink 'subbands' in the current draft document is without question incorrect. There is not, nor

should there be, any such CEPT restriction on ORBCOMM uplink operations.

- **COMMENT ORBC/004** The current draft text of Section 3.2 should be deleted and replaced with text indicating that further study is required to determine if there is a feasible means of inter-system sharing between the ORBCOMM System and the Swarm System.