	Proposed topics for sub-activities		Description	Outcome	Key words
1	**C-band uplink sharing for low data rate services**		The main core is to conduct a study using measurements and experiments to determine which portions of the C-band uplink for fixed satellite service (FSS) are suitable and the conditions under which they are available (such as EIRP, duty cycle, and antenna patterns) for low data rate and low power Internet of Things (IoT) communications, considering the coexistence with Wi-Fi 6 and International Mobile Telecommunications (IMT), e.g., 5G networks deployments in these bands.	Measurements Prototype Technical note Webcast for ARTES Industry	Spectrum monitoring Coexistence of mobile systems Study
2	**CBRS-for satellite**		Cybersecurity (CBRS) techniques and solutions applied in SATCOM links should be updated to reflect recent advancements. Security in SATCOM systems could be defined by two main branches, i.e., physical-layer security and cryptography schemes. The prototype should demonstrate mainly cryptography schemes (anti-jamming strategies and anti-spoofing schemes	Program Simulator Demonstator Webcast for ARTES Industry	Cryptography Satellite systems Quantum technology

			should be excluded). Specifically, authentication, key agreement, and key distribution approaches shall be addressed.		
3	**GNU Radio contributions**		Demonstrate the capabilities of cognitive radio (CR) technology by building and utilizing GNU Radio blocks. The system shall be able to perform spectrum sensing, spectrum management, spectrum decision making, and data transmission.	Contributions to GNU Radio Software	GNU Radio Signal processing Cognitive radio
4	**2.4 GHz, ISM or IMT bands for Satcom**		One way to facilitate communications between equipment on the ground and satellites in orbit is through shared terrestrial wireless technology such as WiFi, LoRaWAN or LTE, GSM, or 5G. This approach involves using equipment on the ground that transmits data using these bands, which is then received by satellite assets specifically designed to pick up these transmissions.	Demonstrator Webcast for ARTES Industry	ISM bands
5	**Future MSS S-band sharing mechanisms**		Multiple Small Satellite (MSS) networks often rely on frequency band segmentation to avoid co-channel frequency sharing. This approach divides the frequency band into smaller segments, each allocated to a specific MSS system. The goal is to create a prototype that emulates the	Demonstrator Webcast for ARTES Industry	MSS networks

			sharing of air capacity among multiple low-power, low-data-rate satellite systems that utilize the 2010-2025 MHz bands for uplink transmissions. Using frequency band segmentation, MSS networks can avoid interference and ensure reliable communication between the satellites and ground stations. Additionally, this approach allows for greater flexibility in allocating resources and managing the network's overall capacity.		
6	**Very Low Frequencies for Satcom**		The statement describes the development of tools and demonstration of a specific frequency range (54-72 MHz) for low-power and low-data-rate satellite communications while acknowledging the need to share the frequency with existing users. The reference to Weak Signal Propagation Reporting (WSPR).	Demonstrator Instrument demonstration Webcast for ARTES Industry	WSPR Satellite communication
7	**Ground station downlink sharing**		This statement describes a plan to collect data on a specific frequency range for satellite downlinks using two measurement stations, one located near a known ground station and the other in an area with minimal radio interference. The data collected from this	Report (measurement campaign) Webcast for ARTES Industry	Radio interference Measurement

			campaign could provide valuable information on the usage of this frequency range and facilitate further sharing scenarios.		
8	**Beamforming solutions**		The statement describes the plan to create a prototype of novel or low-cost antenna beamforming solutions that support spectrum-sharing concepts, specifically by demonstrating improvements in spectrum sharing with incumbents in the S-band downlinks in the 2200-2290 MHz frequency range. Beamforming is a signal processing technique used in wireless communication systems to control the directionality of the signal emitted by an antenna array to enhance the desired signal and reduce interference. Therefore, it could be a valuable tool for facilitating spectrum sharing.	Demonstator Webcast for ARTES Industry	Beamforming
9	**Tools**		The development of electrically steerable UHF antenna arrays involves advanced technologies such as microelectronics, digital signal processing, and software-defined radio systems. The arrays are designed to operate in the UHF frequency range, which is commonly used for a	Antenna array Webcast for ARTES Industry	UHF Antenna array

			variety of applications, including wireless communication, satellite communication, and radar systems. The development process typically involves the use of advanced simulation and design tools, as well as extensive testing and verification to ensure that the antenna arrays meet the desired performance specifications. Overall, electrically steerable UHF antenna array development has the potential to significantly impact the performance and efficiency of a wide range of communication systems and is a crucial area of research and development in the field of antenna technology.		
10	**Cloud-enabled demostration of spectrum sharing**		Cloud-enabled demonstration of spectrum sharing refers to the use of cloud technology to enable the sharing of spectrum among multiple users. In traditional spectrum sharing, users are assigned a specific frequency band for their communication needs. However, this approach can result in inefficient spectrum use, as some frequency bands may need to be more utilized while others are congested. Cloud-enabled spectrum sharing	Demonstrator of cloud technology Webcast for ARTES Industry	Cloud-enabled spectrum sharing

			addresses this issue by allowing multiple users to dynamically share the same frequency band based on their current needs and spectrum availability. The demonstration of cloud-enabled spectrum sharing typically involves using cloud-based platforms and algorithms to manage the spectrum allocation among different users in real time. The demonstration may also include using software-defined radios (SDRs) or other flexible radio technologies that can dynamically adapt to changing spectrum conditions. Additionally, the demonstration shall highlight the benefits of cloud-enabled spectrum sharing, such as increased capacity, and it should improve reliability and reduce costs. Overall, the cloud-enabled demonstration of spectrum sharing provides a valuable opportunity to showcase the potential of this technology and its impact on the future of spectrum management. One possible solution can be using GNU Radio in the Azure environment.		
11	**Edge-AI demonstration of spectrum sharing**		The edge AI should be understood as implementing decision-making processes and	Webcast for ARTES Industry	Edge-AI device Spectrum sharing

			inferencing capabilities at remote earth stations or small gateway stations. This allows these devices to function more independently and efficiently use the available spectrum resources. To achieve this, machine learning approaches should be employed in developing edge AI. Machine learning methods such as supervised and unsupervised learning, deep learning, and reinforcement learning can improve the performance of these edge devices and enhance the overall spectrum-sharing process.		
12	**Starlink spectrum monitoring**		The goal is to construct a low-cost Starlink beacon monitoring system, for example, using low-noise block downconverters (LNBs). While it may be challenging to extract more advanced information from the system, it is still expected to be able to correlate the measurements with two-line element sets (TLEs). TLEs are a standard format for representing the orbital parameters of satellites and are commonly used in satellite tracking and prediction. By correlating the measurements from the Starlink beacon monitoring system with	Demonstrator Monitoring systém Webcast for ARTES Industry	Starlink TLE Monitoring system

			TLEs, it will be possible to understand better these satellites' behaviour and their impact on the space environment. This information will be valuable for various applications, including satellite tracking and prediction, space debris monitoring, and more.		
13	**EESS and MSS sharing in UHF and L-band**		The meteorological frequency ranges, including the 401-403 MHz band for data collection and the L-band for data dissemination, are valuable and essential for meteorological applications. The extent of the threat will depend on the specific location and the intensity of the interference. The statement that the sub-activity will develop prototypes to show that these bands can be used more efficiently under interference conditions is a positive aspect. Improving the efficiency of using these bands can help mitigate the impact of interference and increase the throughput of data collection systems. Frequency coordination and spectrum management may also be necessary to ensure the continued availability of these bands for meteorological applications	Demonstrator Webcast for ARTES Industry	