



Resolution SFCG 24-2

**USE OF THE ALLOCATION FOR EESS (ACTIVE)
IN THE BAND 94 – 94.1 GHz**

The SFCG

CONSIDERING

- a) that there is a large scientific interest for using active sensors to map cloud profiles in the band 94 – 94.1 GHz, as well as for astronomical observations of cosmic radio sources in this band and in adjacent bands;
- b) that, in order to address this need, the Earth exploration-satellite (active) and space research (active) services have a primary allocation in the band 94 – 94.1 GHz, the use of which has been limited to spaceborne cloud radars per RR No. **5.562**;
- c) that, in order to address this need, the radio astronomy service has a secondary allocation in the band 94 – 94.1 GHz, and primary allocations in the adjacent bands 92 – 94 GHz and 94.1 – 95 GHz;
- d) that transmissions in the band 94 – 94.1 GHz from space stations of the EESS (active) that are directed into the main beam of a radio astronomy antenna have the potential to severely damage some radio astronomy receivers;
- e) that, in order to protect the radio astronomy service operations in the band 94 – 94.1 GHz, RR No. **5.562A** states that “Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible.”;
- f) that there is a potential for detrimental interference from transmissions in the band 94 – 94.1 GHz from space stations of the EESS (active) to radio astronomy observations in the adjacent bands 92 – 94 GHz and 94.1 – 95 GHz;
- g) that, in order to protect the radio astronomy service operations in the adjacent bands 92 – 94 GHz and 94.1 – 95 GHz, RR No. **5.149** urges administrations “to take all practicable steps to protect the radio astronomy service from harmful interference”;

RECOGNIZING

1. that avoidance of transmissions by EESS (active) missions in the band 94 – 94.1 GHz in case of main-to-main beam coupling with radio astronomy stations observing in the band 94-94.1 GHz may be necessary to avoid damage to radio astronomy receivers;
2. that not all currently planned EESS (active) missions in the band 94 – 94.1 GHz will be able to switch off their transmissions;
3. that avoidance of radio astronomy observations in the band 94 – 94.1 GHz in case of main beam-to-main beam coupling with an EESS (active) mission transmitting in the band 94 – 94.1 GHz may be necessary to avoid damage to radio astronomy receivers;
4. that avoidance of radio astronomy observations in the adjacent bands 92 – 94 GHz and 94.1 – 95 GHz when in line of sight of an EESS (active) mission transmitting in the band 94 – 94.1 GHz may be necessary to avoid detrimental interference to radio astronomy observations;
5. that the free and open availability of advanced operational schedule information on each and every EESS (active) mission in the band 94 – 94.1 GHz would facilitate the protection of the radio astronomy service;
6. that more than 30 radio astronomy telescopes worldwide (see Annex 2 for a non-exclusive list) will be potentially involved in observations in these bands, which are generally planned long (weeks to months) in advance;

RESOLVES

1. that the SFCG will provide the free and open means for member agencies to make advanced operational schedule information available and up-to-date via the official SFCG Web Site;
2. that member agencies submit such operational schedule information on intended spaceborne active sensing missions that will use the primary allocation in the 94 – 94.1 GHz band to the SFCG Web Coordinator;
3. that member agencies with active missions keep such operational schedule information up-to-date;
4. that member agencies and IUCAF use the mutual planning procedure given in Annex 1 to ensure the protection of radio astronomy service operations in the band 94 – 94.1 GHz.

ANNEX 1

Mutual planning procedure for EESS (active) cloud radar operations with radio astronomy service observations in the band 94 – 94.1 GHz

This mutual planning activity shall be carried out as follows:

1. The Space agency responsible for the operation of the EESS (active) sensor (EESS Agency) shall provide all relevant information via the SFCG Website (<http://www.sfcgonline.org>) sufficiently in advance of the launch of the satellite. This information will include all the orbital elements that are necessary to allow the avoidance of radio astronomy observations during line-of-sight transmissions from the EESS (active) sensor and the identification of the designated contact person.
2. Before the launch or during any time of the operation of EESS active sensor, if there is any change in the planned operation of EESS active sensor (in terms of time and duration of operation and area of operation), the EESS Agency shall provide this information.
3. IUCAF will inform the radio observatories that are potentially concerned of planned EESS missions and provide them with instructions on the use of the information available on the SFCG Website that will allow the planning of observations avoiding line-of-sight transmissions from the EESS (active) sensor.
4. During any stage of this mutual planning procedure, the EESS Agency and IUCAF shall ensure the availability of their designated contact persons.

ANNEX 2

Given below is a non-exhaustive list of radio observatories that will operate in the band 94 – 94.1 GHz during the next few years, as well as in the adjacent bands 92 – 94 GHz and 94.1 – 95 GHz.

List of radio observatories in the band 94 – 94.1 GHz

Radio observatory	Geographical coordinates
Bordeaux, France	E -00°31'37" N 44°50'10"
Kayseri, Turkey	E 36°17'58" N 38°59'45"
Metsähovi, Finland	E 24°23'17" N 60°13'04"
Onsala, Sweden	E 11°55'35" N 57°23'45"
Pico Valeta, Spain	E -03°23'34" N 37°03'58"
Plateau de Bure, France	E 05°54'26" N 44°38'01"
Sardinia, Italy	E 09°14'40" N 39°29'50"
Yebes, Spain	E -03°05'22" N 40°31'27"
ALMA, Chile	E -67°45' N -23°02'
Crawford Hill, NJ, USA	E -74°11'12" N 40°23'30"
FCRAO, MA, USA	E -72°20'42" N 42°23'30"
Green Bank, WV, USA	E -79°49' N 38°26'
Haystack, MA, USA	E -71°29'18" N 42°37'24"
Itapetinga, Brazil	E -46°33'28" N -23°11'5"
Owens Valley, CA, USA	E -118°16'56" N 37°14'03"
Steward, AZ, USA	E -111°36'53" N 31°57'12"
Brewster, WA, USA	E -119.68° N 48.13°
Fort Davis, TX, USA	E -103.94° N 30.63°
Hancock, NH, USA	E -71.98° N 42.93°
Kitt Peak, AZ, USA	E -111.61° N 31.96°
Los Alamos, NM, USA	E -106.25° N 35.78°
Mauna Kea, HI, USA	E -155.46° N 19.81°

Radio observatory	Geographical coordinates
North Liberty, IA, USA	E -91.57° N 41.77°
Owens Valley, CA, USA	E -118.28° N 37.23°
Pie Town, NM, USA	E -108.12° N 34.30°
St. Croix, VI, USA	E -64.58° N 17.76°
ATCA, Australia	E 149°32'56" N -30°18'52"
Tamna, Korea	E 126°27'43" N 33°17'18"
Ulsan, Korea	E 129°15'04" N 35°32'33"
Yonsei, Korea	E 126°56'35" N 37°33'44"
MOPRA, Australia	E 149°05'58" N -31°16'04"
Nobeyama, Japan	E 138°28'32" N 35°56'29"
Purple Mountain, China	E 97°44' N 37°22'
Seoul, Korea	E 126°57'19" N 37°27'15"
Taejon, Korea	E 127°22'18" N 36°23'54"