Resolution SFCG A35-1

INTER-AGENCY COORDINATION OF EESS (ACTIVE) OPERATIONS FOR PROTECTION OF RNSS RECEIVERS OPERATING IN THE 1 215-1 300 MHZ FREQUENCY BAND

The SFCG,

CONSIDERING

a) that the RNSS (space-to-Earth) and (space-to-space) is allocated on a primary basis in the 1 215-1 300 MHz frequency band,

b) that, in regards to the RNSS, EESS (active) is allocated on a secondary basis in the 1 215 – 1 260 MHz band segment and on a primary basis in the 1 260 – 1 300 MHz band segment,

c) that in the 1 215 – 1 300 MHz band the EESS (active) operations are subject to the limitations of RR Nos. **5.332** (for the band segment 1215-1260 MHz) and **5.335A** (for the band segment 1260-1300 MHz),

d) that aggregate interference effects are difficult to resolve under the coordination procedures defined in the ITU Radio Regulations, which are based on bilateral discussions,

e) that all EESS (active) operators, both current and future, are expected to be members of the SFCG and, therefore, the SFCG can provide an effective forum to address protection of RNSS from potential aggregate radio frequency interference (RFI) from EESS (active) sensors,

f) that information on the proposed EESS (active) sensor operations will facilitate the development of contributions by SFCG members seeking to examine the impact of the simultaneous illumination on RNSS receivers,

g) that successful discussion among EESS (active) operators to protect RNSS receivers from potential aggregate RFI from EESS (active) sensors will reduce the risk of EESS (active) operators from having to cease sensor transmissions found to cause interference to RNSS receivers,

h) that nevertheless the provisions of Article **9** of the Radio Regulations provide the formal coordination mechanism to be used between administrations when applicable;

NOTING

a) that Recommendation ITU-R RS.1347 recommends that sharing be considered feasible between RNSS and EESS SAR operations in the band segment 1 215 – 1 260 MHz and although a revision of this recommendation has been undertaken, it is not known with certainty what will appear in its *recommends*,

b) that Recommendation ITU-R M.2030 and Report ITU-R M.2220 provide information that can be used in the assessment of the potential aggregate radio frequency interference by EESS (active) systems into RNSS receivers,

c) that Report ITU-R M.2305 provides results of a simultaneous illumination impingement study focusing on two EESS (active) systems,

d) that the RNSS operators are concerned regarding the potential aggregate interference into RNSS receivers from multiple EESS (active) sensors;

RESOLVES

1. that SFCG members planning to operate EESS (active) sensors in the 1 215-1 300 MHz frequency band submit its technical information in the form of the Annex to this Resolution to the SFCG meeting at least eighteen (18) months in advance of their planned bringing into use,

2. that the SFCG members identified in *resolves* 1 should also provide information on the parameters of their sensors' operation, as described in the Annex, to the other SFCG members who operate EESS (active) sensors in the 1 215-1 300 MHz frequency band,

3. that the SFCG members identified in *resolves* 1 and 2 provide contributions to the SFCG for the purpose of assessing the aggregate interference due to simultaneous illumination of RNSS receivers from multiple EESS (active) sensors resulting from the proposed operations of the SFCG member identified in *resolves* 1 in combination with the existing operations of the SFCG members identified in *resolves* 2,

4. that the SFCG members indicated in *resolves* 1 and 2 take all actions necessary to protect RNSS receivers from aggregate interference,

5. that the results of the actions taken in accordance with *resolves* 3 may be used, where relevant, by the administration of an SFCG member identified in *resolves* 1 for the purposes of discussions, including coordination discussions under Article **9** of the Radio Regulations.

Annex

Relevant EESS (active) sensor parameters necessary for studies concerning the potential interference into RNSS from multiple EESS (active) sensors

Note: If the EESS sensor employs multiple modes of operation, parameters need to be provided for each mode.

Table 1

GENERAL EESS SENSOR PARAMETERS	Reference	Notes
Sensor type	SAR or Scatterometer	
Orbit Parameters:		
Type of orbit	Such as: circular or elliptical, sun-synchronous (SSO) or non-sun-synchronous (NSS)	
Altitude, km	The height above the mean sea level	
Inclination, deg	Angle between the equator and the plane of the orbit	
Ascending/Descending Node LST	The local solar time (LST) of the ascending or descending node, as applicable, is that local solar time for which the ascending/descending orbit of the spacecraft crosses the equator	In case that orbits other than sun-synchronous orbit is planned, appropriate orbit information to determine the relative satellite positions should be provided.
Eccentricity	The ratio of the distance between the foci of the (elliptical) orbit to the length of the major axis	
Repeat period, days	The time for the footprint of the antenna beam to return to (approximately) the same geographic location. This is alternately known as the revisit time of the sensor.	
Sensor Antenna Parameters:		
Polarization	Specification of linear (H or V) or circular polarization (RHCP or LHCP).	
Azimuth scan rate, rpm (Scatterometers)	The azimuth scan rate is the number of 360 degree revolutions per minute that the antenna scans in azimuth.	In case that EESS(active) sensors has no rotating function, this information is not mandatory.
Antenna beam look angle, deg	The antenna beam look angle, α, is the angle between the antenna boresight axis and nadir, sometimes called the off-nadir pointing angle. Some systems provide instead the information of the incident angle, i. They are the angle α and i, as shown in Fig. 1.	Off-axis angle with respect to sub-satellite direction. In case of steerable beam, the range should be provided.

Antenna beam azimuth angle, deg	The antenna beam azimuth angle is the angle between the antenna boresight axis and velocity vector in the plane defined by the velocity vector and the negative orbit normal vector. (see Figure 2)	In case of steerable in azimuth direction, the range should be provided.
Sensor antenna pattern	Antenna gain as a function of off-axis angle.	Antenna radiation pattern with which potential excess area of the power level of -129 dBW (NOTE) on the Earth's surface can be identified.
Transmit Pulse Parameters:		
RF Center Frequency, MHz	The RF center frequency is that frequency about which the bandwidth of the transmitted signal is centered.	In case that frequency hopping or switching frequency functions are implemented, such information should also be noted.
RF Bandwidth, MHz (chirp-width)	The RF bandwidth is the -3 dB bandwidth of the transmitted signal. For compatibility analysis, this is also typically used as the receiver bandwidth.	Occupied bandwidth should be provided.
Transmit Pk pwr, W	The transmit peak power is the peak power of the envelope of the transmitted waveform.	
Pulsewidth, μsec	The pulsewidth is the half power duration of the transmitted pulse.	NOTE
Pulse Repetition Frequency (PRF), Hz	The pulse repetition frequency is the frequency of the transmitted pulse waveforms.	NOTE
Transmit duty cycle, %	The transmit duty cycle is the product of the transmitted pulsewidth and the pulse repetition frequency.	NOTE

NOTE: If a modulation other than Linear Frequency Modulation (LFM) is used then that modulation should be provided.

FIGURE 1

Scanning configuration

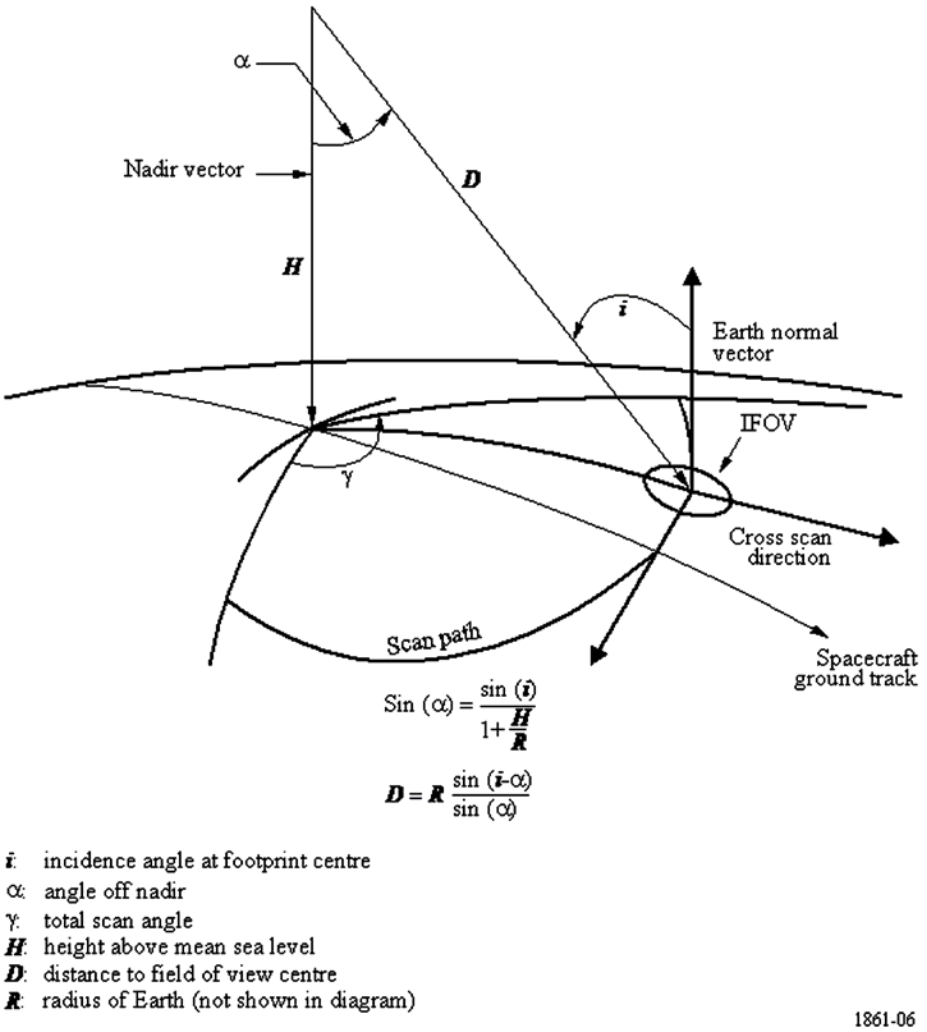

FIGURE 2

Plane defined by Velocity Vector and Negative Orbit Normal Vector