

## Note for the ITU Bureau

### **1. Published as Received – please do not publish**

Due to the sensitive nature of the project we request the Bureau, if possible, we ask the Bureau not to publish these CINNAMON-217 and CINNAMON-937 filings submitted until the bureau determines that it is fully receivable. We are concerned that if some assignments fail (like for ANTON-1N0) other operators may copy our ideas and submit filings before us.

### **2. New API Filings**

Following the proposal of the CR/C database of ANTON-1N0 submitted on 20 August 2021, the Bureau determined that most of the assignments did not require coordination under Section/II of Article 9.

We have now created two API databases of which take care of these assignments, i.e., named:

- CINNAMON-217
- CINNAMON-937

These are based on ANTON-1N0, and have some modification (adding orbital shells and increasing the number of satellites) on the orbital shells, and also include additional assignment in other frequency bands.

Hence, as most of the assignments in the ANTON-1N0 CRC database were not accepted by the Bureau, because Section II of the Article 9 is not applicable, we ask the Bureau to apply the date of receipt of 20 August at least for those frequency assignments submitted on 20 August that were not accepted.

These filings are explained below.

### **3. API FILING CINNAMON-937**

#### **3.1 Validation**

With then new updated version of the SPACECAP the validation ran successfully. And the Fail errors which we cannot address are addressed below. We hope that the Bureau can fix these errors for us.

#### **3.2 Orbit structure**

The following orbit structure applies for this API.

An orbital shell is here defined as the set of orbits with the same inclination. There are 27 of such orbital shells. Each orbital shell, except the equatorial shell made of one single plane, has a total of 12,960 satellites. The 27 orbital shells comprise of 327,320 satellites.

The Table below provide a summary of the orbital shells in this API.

Plane Inclination (deg)	No. of Planes	Satellites per plane	Satellites per Orbit Shell	Shell height range (km)
0	1	360	360	550
24	36	360	12960	550.1-553.6
27	36	360	12960	553.7-557.2
30	36	360	12960	557.3-560.8
33	36	360	12960	560.9-564.4
36	36	360	12960	564.5-568.0
39	36	360	12960	568.1-571.6
42	36	360	12960	571.7-575.2
45	36	360	12960	575.3-578.8
48	36	360	12960	578.9-582.4
51	36	360	12960	582.5-586.0
54	36	360	12960	586.1-589.6
57	36	360	12960	589.7-593.2
60	36	360	12960	593.3-596.8
63	36	360	12960	596.9-600.4
66	36	360	12960	600.5-604.0
69	36	360	12960	604.1-607.6
72	36	360	12960	607.7-611.2
75	36	360	12960	611.3-614.8
78	36	360	12960	614.9-618.4
81	36	360	12960	618.5-622.0
84	36	360	12960	622.1-625.6
87	36	360	12960	625.7-629.2
90	36	360	12960	629.3-632.8
93	36	360	12960	632.9-636.4
96	36	360	12960	636.5-640.0
98	36	360	12960	640.1-643.6

**Table 1: Orbit Parameters of API CINNAMON-937**

### 3.3 Allocations/Frequencies in this API

The following Table provides a summary of the frequency allocations for which the assignments have been applied for in this API (CINNAMON-217).

f_min (MHz)	f_max (MHz)	Service	Direction
7900	8400	Fixed Satellite	Earth-to-space
7250	7750	Fixed Satellite	space-to-Earth
1427	1429	Space Operations	space-to-Earth
2025	2110	Space Operations	space-to-Earth
2200	2290	Space Operations	Earth-to-space
267	272	Space Operations (secondary)	space-to-Earth
272	273	Space Operations	space-to-Earth
272	273	Space Operations	Earth-to-space No. 8.4/No. 4.4
267	272	Space Operations	Earth-to-space No. 8.4/No. 4.4
71000	76000	Fixed Satellite	space-to-Earth
81000	86000	Fixed Satellite	Earth-to-space
59300	71000	Inter-Satellite	-

**Table 2: Frequency Table of API CINNAMON-937 and CINNAMON-217**

The **center frequency**, or the **frequency of the assignment**, and **emission designations** provided in the API, is an example, and there can be many of such assignments in the frequency ranges corresponding to that assignment provided.

We note the following items:

- **Space Operations in VHF**
  - a. for the frequency ranges **267-272** and **272-273 MHz**, there is no **space operation** allocation in the Earth-to-space direction.
  - b. We have highlighted that the use of these frequency ranges are on a Non-Interference basis under **No. 4.4**. We will endeavor not to cause harmful interference to other services in these allocations.
- **Inter-satellite links**
  - a. For the **59.3-71 GHz** range, for the **Inter-Satellite** allocation we are not sure why the validation results in **Fails**, most are due to missing Earth Station parameter, which are not provided. We didn't think that the Earth Station parameters are necessary. We request the Bureau to fix this.
  - b. Also, the validation fails for the **Service Area** for such ISL assignment. We didn't think that this is required for the ISL.

#### **4. API FILING CINNAMON-217**

The API filing of **CINNAMON-217**, is a subset of the **CINNAMON-937**. As described below.

It has the same beams and assignments as **CINNAMON-937**, but the orbital characteristics are different, it has only 7 orbital shells as described below.

##### **4.1 Validation**

The Validation of **CINNAMON-217** resulted successful run and returned Fail and Warning items. The assignments of **CINNAMON-217** have the same validation issues as what we described in the **section 3** above.

We wish the ITU to help us resolve also some of the issues in this database.

##### **4.2 Orbit structure**

The following orbit structure applies to **CINNAMON-217**, which has 7 orbital shells.

Each orbital shell, except the equatorial shell made of one single plane, has a total of 8,640 satellites. The 7 orbital shells comprise of 52,080 satellites.

The Table below provide a summary of the orbital shells in this API.

Orbital Shell	Plane Inclination (deg)	No. of Planes	Satellites per plane	Satellites per Orbit Shell	Shell height range (km)
1	0	1	240	240	579.8
2	33	36	240	8640	580 - 587
3	54	36	240	8640	587.2 - 594.2
4	66	36	240	8640	594.4 - 601.4
5	72	36	240	8640	601.6 - 608.6
6	89	36	240	8640	608.8 - 615.8
7	98	36	240	8640	616 - 623

**Table 3: Orbit Parameters of API CINNAMON-217**

#### **4.3 Allocations/Frequencies in this API**

The assignments and allocations are the same given in **Section 3.3** above (see **Table 2**).

For the frequency assignments of CINNAMON-217, the same proposals and comments given for CINNAMON-937 in **Section 3.3** apply here.

#### **5. Additional information for both API filings**

If and where required **Article 21** limits will be complied with.