

The Forbidden Emission –Part 2*

Results

The frequencies in question (6,500 KHz; 11,178 KHz; 13,250 KHz; 22,545 KHz; and 250 MHz) have been checked following the procedure described in the previous section (ITC Journal N° 41). The results obtained for each frequency are shown next.

6,500 KHz

In Table 4 we can see that 6,500 KHz is located in the bandwidth that spans 6,200 KHz to 6,525 KHz, this is aimed at maritime mobile service in the three world regions allocated by the RR. We will focus on the national allocation where in the three regions it covers the same service, maritime mobile. In accordance with what has been said in the procedure, the next step is to take into account the observations, in this specific case, the following:

- S5.109: Frequencies 2,187.5 KHz, 4,207.5 KHz, 6,312 KHz, 8,414.5 KHz, 12,577 KHz and 16,804.5 KHz are international distress frequencies for selective digital calls. The terms of use for these frequencies are described in article S31.

- S5.110: Frequencies at 2,174.5 KHz, 4,177.5 KHz, 6,268 KHz, 8,376.5 KHz, 12,520 KHz and 16,695 KHz are international help frequencies for narrowband direct printing telegraphy. The terms of use for these frequencies are described at article S31.

- S5.130: The terms of use of carrier frequencies of 4,125 KHz and 6,215 KHz.

- S5.132: Frequencies 4,210 KHz, 6,314 KHz, 8,416.5 KHz, 12,579 KHz, 16,806.5 KHz, 19,680.5 KHz, 22,376 KHz and 26,100.5 KHz are international frequencies for the transmission of information relative to maritime safety (MSI).

Table 4

ATTRIBUTION OF SERVICES according to RR de la UIT		
5450 - 7100 kHz		
Region 1	Region 2	Region 3
5450 - 5480 FIXED AERONAUTICAL MOBILE (OR) TERRESTRIAL MOBILE	5450 - 5480 AERONAUTICAL MOBILE (R)	5450 - 5480 FIXED AERONAUTICAL MOBILE (OR) TERRESTRIAL MOBILE
5480 - 5680	AERONAUTICAL MOBILE (R) S5.111 S5.115	
5680 - 5730	AERONAUTICAL MOBILE (OR) S5.111 S5.115	
5730 - 5900 FIXED TERRESTRIAL MOBILE	5730 - 5900 FIXED MOBILE, except aeronautical mobile (R)	5730 - 5900 FIXED MOBILE, except aeronautical mobile (R)
5900 - 5950	BROADCASTING SERVICE S5.134 S5.136	
5950 - 6200	BROADCASTING SERVICE	
6200 - 6525	MARITIME MOBILE S5.109 S5.110 S5.130 S5.132 S5.137	
6525 - 6685	AERONAUTICAL MOBILE (R)	
6685 - 6765	AERONAUTICAL MOBILE (OR)	
6765 - 7000	FIXED Terrestrial Mobile S5.139 S5.138	
7000 - 7100	HAM RADIO HAM RADIO BY SATELLITE S5.140 S5.141	

Table 4 continued

NATIONAL ATTRIBUTION	OBSERVATIONS	USES
5450 - 7100 kHz		
5450 - 5480 FIXED AERONAUTICAL MOBILE (OR) TERRESTRIAL MOBILE	UN - 0	M M Rx
5480 - 5680 AERONAUTICAL MOBILE (R)	S5.111 S5.115	Rx
5680 - 5730 AERONAUTICAL MOBILE (OR)	S5.111 S5.115 UN - 0	Rx
5730 - 5900 FIXED TERRESTRIAL MOBILE	UN - 0	M M
5900 - 5950 BROADCASTING	S5.134 S5.136	Rx
5950 - 6200 BROADCASTING		Rx
6200 - 6525 MARITIME MOBILE	S5.109 S5.110 S5.130 S5.132 S5.137 UN - 0	M
6525 - 6685 AERONAUTICAL MOBILE (R)		Rx
6685 - 6765 AERONAUTICAL MOBILE (OR)	UN - 0	Rx
6765 - 7000 FIXED Terrestrial Mobile	S5.138	M M
7000 - 7100 HAM RADIO HAM RADIO BY SATELLITE		E E

Table 5

ATTRIBUTION OF SERVICES according to RR de la UIT		
10003 - 13410 kHz		
Region 1	Region 2	Region 3
10003 - 10005	STANDARD FREQUENCY & TIME SIGNALS Space research	
10005 - 10100	S5.111 S5.111	AERONAUTICAL MOBILE (R)
10100 - 10150	FIXED HAM RADIO	
10150 - 11175	FIXED MOBILE, except aeronautical mobile (R)	
11175 - 11275	AERONAUTICAL MOBILE (OR)	
11275 - 11400	AERONAUTICAL MOBILE (R)	
11400 - 11600	FIXED	
11600 - 11650	S5.146	BROADCASTING S5.134
11650 - 12050	S5.147	BROADCASTING
12050 - 12100	S5.146	BROADCASTING S5.134
12100 - 12230	FIXED	
12230 - 13200	S5.145	MARITIME MOBILE S5.109 S5.110 S5.132
13200 - 13260	AERONAUTICAL MOBILE (OR)	
13260 - 13360	AERONAUTICAL MOBILE (R)	

Table 5 continued

NATIONAL ATTRIBUTION	OBSERVATIONS	USES
10003 - 13410 kHz		
10003 - 10005 STANDARD FREQUENCY & TIME SIGNALS Space research	S5.111	R R
10005-10100 AERONAUTICAL MOBILE (R)	S5.111	Rx
10100 - 10150 FIXED Ham radio		M E
10150 - 11175 FIXED MOBILE, except aeronautical mobile (R)		M M
11175 - 11275 AERONAUTICAL MOBILE (OR)	UN - 0	Rx
11275 -11400 AERONAUTICAL MOBILE (R)		Rx
11400 - 11600 FIXED		M
11600 - 11650 BROADCASTING	S5.134 S5.146	Rx
11650 - 12050 BROADCASTING	S5.147	Rx
12050 - 12100 BROADCASTING	S5.134 S5.146	Rx
12100 - 12230 FIXED	UN - 0	M

- S5.137: Exceptionally, and on condition that it will not cause interference harmful to the maritime mobile service, bands 6,200-6,213.5 KHz and 6,220.5-6,525 KHz could be used by fixed service stations communicating only within national frontiers and whose mean power does not exceed the value of 50W. When the frequencies notification is issued, the Office will be informed of these dispositions.

- UN 0: Those bands affected by this note or part of them thereof are aimed at preferential or exclusive use by the Government in the indicated services, according to the content of the National Frequency Agreement (ANAF).

From the observations presented in Table 4 for the bandwidth that we are concerned with, we must highlight S5.137 of Article S5 of the RR. Therein it is specified that the bandwidth of 6,220.5 - 6,525 KHz where our frequency is located, will be allowed the use by fixed service stations communicating solely inside national borders and whose mean power does not exceed the value of 50W.

Finally, for this frequency we only need to check the use given to the bandwidth under consideration in Table 4; we can see that it is codified as M. If we look up the meaning of M in Table 2 (opposite), we see that code M involves codes R and P, so it is used by the State for Government and Public Agencies. This is the case of the bandwidth (6,220.5-6,525 KHz) which we are interested in; if we follow observation S5.137 the author of this report understands that exclusive use applies to the remaining frequencies found in the band under study.

11,178 KHz

In Table 5 we confirm that this frequency is located in the bandwidth 11,175-11,275 KHz, which is assigned to the aeronautical mobile service (OR) in the three world regions allocated by the RR. Table 3 (see Journal nº41) shows that the service is reserved to guarantee communications, including those relating to flight coordination, mainly out of the national and international routes for civilian aviation. As in the previous case we will focus only on the

national allocation, which is the same as the international one.

Next we check the observations for this bandwidth, which are shown next:

- **UN 0:** Bands affected by this note or part of them are aimed at preferential or exclusive use by the State for the indicated services, according to the content of the National Frequency Agreement (ANAF).

Finally, we focus on the use at a national level, which is coded by the symbol Rx which, according to Table 2, means that its use is reserved for the State.

Code	Use
C	Common use.
E	Special use.
P	Private use.
RX	Use by the state.
R	For use by the State for Government and Public Agencies
M	Mixed use that comprises R and P.

Table 2

13,250KHz

If we examine the last two sections on the left of Table 5 we can confirm that the frequency that we are looking for is in the bandwidth 13,200-13,260 KHz which is assigned to aeronautical mobile service (OR). As we saw in Table 3, the service is reserved for assuring [aircraft] communications, including those related to flight coordination, mainly outside the national and international routes for civil aviation.

There is no national allocation for this bandwidth, there are no remarks, nor uses, therefore it is understood that this bandwidth is assigned to a single service at an international level.

Table 6

ATTRIBUTION OF SERVICES according to RR de la UIT		
19800 - 23350 kHz		
Región 1	Región 2	Región 3
19800 - 19990	FIXED	
19990 - 19995	STANDARD FREQUENCY & TIME SIGNALS Space research S5.111	
19995 - 20010	STANDARD FREQUENCY & TIME SIGNALS (20000 kHz) S5.111	
20010 - 21000	Mobile	FIXED
21000 - 21450	HAM RADIO HAM RADIO BY SATELLITE	
21450 - 21850	BROADCASTING	
21850 - 21870	S5.155	FIXED S5.155A
21870 - 21924	FIXED S5.155B	
21924 - 22000	AERONAUTICAL MOBILE (R)	
22000 - 22855	MÓVIL MARÍTIMO S5.132 S5.156	
22855 - 23000	S5.156	FIXED
23000 - 23200	FIXED MOBILE, except aeronautical mobile (R) S5.156	

Table 6 continued

NATIONAL ATTRIBUTION	OBSERVATIONS	USES
19800 - 23350 kHz		
19800 - 19990 FIXED		M
19990 - 19995 STANDARD FREQUENCY & TIME SIGNALS Space research	S5.111	R R
19995 - 20010 STANDARD FREQUENCY & TIME SIGNALS (20000 kHz)	S5.111	R
20010 - 21000 FIXED Mobile		M M
21000 - 21450 HAM RADIO HAM RADIO BY SATELLITE		E E
21450 - 21850 BROADCASTING	RESOLUTION 8 RR	R _x
21850 - 21870 FIXED		M
21870 - 21924 FIXED	S5.155B	R _x
21924 - 22000 AERONAUTICAL MOBILE (R)		R _x
22000 - 22855 MARITIME MOBILE	S5.132 RESOLUTION 8 RR UN - 0	M

22,545 KHz

In Table 6 we can confirm that the frequency that we are looking for is located in the bandwidth 22,000-22,855 KHz which is assigned to the maritime mobile service in the three world regions allocated by the RR. This service is assigned to mobile service between coastal stations and boat stations, between boat stations, or between associated onboard communication stations; we can also consider included in this service the boat stations or distress devices and wreck location radiobeacon stations. In the same way as we have been doing until now, we will consider only the national allocation assigned to that same service as used internationally.

Inside the national allocation we focus on the remarks indicated for this bandwidth next.

- S5.132: Frequencies 4,210 KHz, 6,314 KHz, 8,416.5 KHz, 12,579 KHz, 16,806.5 KHz, 19,680.5 KHz, 22,376 KHz y 26,100.5 KHz are the international frequencies for information transmission regarding the maritime safety (MSI) (see appendix S17).

- UN 0: The bands or parts thereof affected by this note are assigned to preferential or exclusive use by the State on the services indicated, according to the content of the National Agreement on Frequencies (ANAF).

Finally it remains for us to consider the use that is given to this band. This comes with the code M, which according to Table 2 refers to codes R and P; the first is assigned to the use by the state for Government and Public Agencies and the second to private - 'exclusive use'.

250 MHz

We can locate this frequency on Table 7 in the bandwidth 235-267 MHz which is assigned to the fixed-mobile service in the three world regions by the RR. As in previous cases we will focus only on the national allocation used for that same service as used internationally.

And here we examine the remarks:

- S5.111: Carrier frequencies 2,182 KHz, 3,023 KHz, 5,680 KHz, and 8,364 KHz and frequencies 121.5 MHz, 156.8 MHz, and 243 MHz can also be used in accordance with in-force procedures for terrestrial radiocommunication services, in searching operations and rescue of manned space vehicles.

The requirements for the use of these frequencies are set in article S31. and appendix S13. The 10,003 KHz, 14,993 KHz and 19,993 KHz frequencies can also be used, although in this case the emissions must be limited to a bandwidth of 3 KHz around said frequencies.

- S5.199: Bands 121.45-121.55 MHz and 242.95-243.05 MHz are also assigned to the satellite mobile service for the reception aboard satellites of the emissions from wreck location radiobeacons transmitting on 121.5 MHz and 243 MHz (see Appendix S13).

- S5.254: Bands 235-322 MHz and 335.4-399.9 MHz can be used by the satellite mobile service, provided a permit has been granted (S9.21), and on condition that the stations used for this service do not produce harmful interference for those of other services that are or will be operated in accordance with the present Chart.

- S5.256: The frequency of 243 MHz will be used in this band by boat stations or rescue devices, as well as by the teams assigned to rescue operations (see Appendix S13).

- UN 28: The frequency band of 235-399.9 MHz is assigned to exclusive use by the State, as it appears in the ANAF, with the exception of frequencies sub-bands 380-385 MHz and 390-395 MHz which are assigned to security networks for State law enforcement bodies and emergency networks throughout the national territory.

To finish the study of this frequency we check the use given to the bandwidth this frequency is located in, which, as can be seen in Table 7, is coded as Rx that, according to Table 2, means it is for use by the State.

Table 7

ATTRIBUTION OF SERVICES according to RR de la UIT		
225 - 322 MHz		
Región 1	Región 2	Región 3
	225 - 235 FIXED MOBILE	
230 - 235 FIXED MOBILE S5.247 S5.251 S5.252		230 - 235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION S5.250
235 - 267	FIXED MOBILE S5.111 S5.199 S5.252 S5.254 S5.256	
267 - 272	FIXED MOBILE Space operations (Space - Earth) S5.254 S5.257	
272 - 273	SPACE OPERATIONS (Space - Earth) FIXED MOBILE S5.254	
312 - 315	FIXED MOBILE Mobile through satellite (Earth - Space) S5.254 S5.255	
273 - 312	FIXED MOBILE S5.254	
315 - 322	FIXED MOBILE S5.254	

Table 7 continued

NATIONAL ATTRIBUTION	OBSERVATIONS	USES
225 - 322 MHz		
230 - 235 FIXED MOBILE	UN - 27 UN - 73 * Uses Rx y P (according to notes UN)	* *
235 - 267 FIXED MOBILE	S5.111 S5.199 S5.254 S5.256 UN - 28	Rx Rx
267 - 272 FIXED MOBILE Space operations (Space - Earth)	S5.254 S5.257 UN - 28	Rx Rx Rx
272 - 273 SPACE OPERATIONS (Space - Earth) FIXED MOBILE	S5.254 UN - 28	Rx Rx Rx
273 - 312 FIXED MOBILE	S5.254 UN - 28	Rx Rx
312 - 315 FIXED MOBILE Mobile through satellite (Earth - Space)	S5.254 S5.255 UN - 28	Rx Rx Rx
315 - 322 FIXED MOBILE	S5.254 UN - 28	Rx Rx

Conclusions

This report arises from my personal interest in Dr. Anabela Cardoso's case, as due to my ignorance of the subject I had the rather naive idea that everything could be either a fraud or a misunderstanding.

When I thought of the phenomenon, my initial, confused idea was that the voices received by Dr. Anabela Cardoso originated from the emissions of ham operators. This possibility vanished rapidly when I verified that ham operators have a limited band-width that does not comprise any of the frequencies [described in the text]. Furthermore, there was another doubt – how could the voices hear the questions put by Dr. Anabela Cardoso, and reply to her questions, when she has no radio transmitter?

My fraud hypothesis was based upon the reasoning that there was the possibility that there could be somebody in one of the rooms of the house who could hear the questions put by Dr. Anabela and transmit the replies to her questions through a radio transmitter. This reasoning collapsed quickly when I verified the frequencies that her radios were tuned to, since the use of the latter was forbidden by law to ham operators' radio emissions. Therefore, it seemed really odd that the institution in charge of the control of the radio-electric spectrum would issue somebody with an emission licence in a frequency reserved for State use, to commit a fraud.

Besides all this data there is still one more element that breaks the logic of the communication as we understand it. The first thing we study in a discipline related to communication is that in such a process there has to be an emitter, who is the person wanting to transmit the message, and a receiver, who is the person in charge of receiving it. In the case of radio communications the emission is realized in such a way that the emitter transmits in a frequency to which everybody who tunes to the emission frequency can listen. Can you imagine that in your homes the radio announcer will reply to your questions?

When the radio communication is produced as radio-listening the communication only acquires sense if the emitter sends the

message and the receiver receives it. It is totally impossible for the emitter to reply to questions put by the receiver since the receiver is technically incapable of transmitting. But this is not my only reason that makes of the direct voices an extraordinary case. Furthermore, the voices jump from one into another frequency within the values cited in Table 1 while they emit the message. This is the same as if a person listening to a radio transmission would hear a sentence of the radio announcer in a certain frequency and would have to tune into a different frequency to hear the next sentence of the same announcer.

All the above reasons make of this event an extraordinary case from the technical point of view, and they discount the possibility of fraud or misunderstanding. If we add the content of the messages to what has been said we can also reject the human origin of the transmissions unless somebody is able to prove to the contrary.

* Translated from Spanish by Yanis Arencibia Esperanza
(continued from ITC Journal No 41)