

October 2014

Spectrum Control Plan for Rio 2016 Olympic and Paralympic Games



Preparation	Verification	Approval
Elmano Rodriques Pinheiro Filho Marcel Fleury Pinto Marcelo Lucena de Medeiros Rodrigo Vieitas Sarruf de Almeida Yroá Robledo Ferreira	Rafael Pinto Prata Simone de Oliveira Brandão	Marcus Vinicius Paolucci
		Deliberative Instrument

Table of Contents

1. Introduction	6
Legislative Act n° 12,035 – Olympic Act	6
2. Purpose.....	6
3. Scope.....	7
4. Governance, Command and Control Structure, and Anatel Interfaces – Rio 2016....	7
5. Infrastructure	8
6. Work Processes.....	10
7. Incidents Management.....	10
8. Solution of harmful interferences	12
Classification of Incidents regarding Interferences	13
Response and Solution Time	14
Considerations about Solutions of Harmful Interferences	15
9. Spectrum Monitoring.....	15
10. Testing and Tagging (T&T).....	17
General Considerations about T&T	18
11. Risk Management.....	19
12. Human Resources.....	19
13. Final Considerations	20
14. Communications Plan	20
15. List of Annexes	20

1. Introduction

1.1 Since 2007, Brazil has been the seat of major international events, comprising the Pan-American Games, the World Military Games, the Rio+20 Conference, the World Youth Day 2013 and the FIFA 2014 World Cup. In addition to these, big events are performed every year, such as the Formula 1 Brazilian Grand Prix and the Carnival. These experiences, linked to information acquired from other countries, make evident the growing demand for the use of telecommunication resources and, particularly, the spectrum of radio-frequencies culminating, for the performance of the FIFA 2014 World Cup, in the authorization for 19,110 stations to operate in 7,146 frequencies distributed over the places related to the holding of the event.

1.2 Telecommunications systems are fundamental elements for the integration of the various sectors that compose the physical and operational structure of major, international sporting events. In this sense, a high degree of planning and cooperation is necessary among the entities involved so as the spectrum can be utilized in a proper way regarding the needs of the event as well as rendering services, in general, to the public interest.

1.3 The planning of the actions is a work that must be performed in a joint way, having the determination of functions for each party and clearly showing, in a detailed manner, the necessary infrastructure, the set of activities, and the responsibilities of each entity.

1.4 In this sense, the Ministry of Sports, the Olympic Public Authority (APO), the Ministry of Communications, the National Agency of Telecommunications (Anatel) and the Rio 2016 Organizing Committee (Rio 2016) work towards the construction of a consistent and strong planning that makes viable so as the resources of the spectrum are utilized with efficiency and security.

Legislative Act n° 12,035 – Olympic Act

1.5 The Brazilian Government, by means of the Act n° 12,035, of October 1st, 2009, established the Olympic Act, within the ambit of the Federal Public Administration, having the purpose of assuring the candidature of the Rio de Janeiro City to be the seat of the Rio 2016 Olympic and Paralympic Games and to determine special rules for its performance, conditioning the application of this Legislative Act to the confirmation of the selection regarding the aforementioned City by the International Olympic Committee (IOC).

1.6 The section 13 of this Legislative Act assures making available all frequency and broadcasting spectrum necessary for the organization and the performance of the Rio 2016 Olympic and Paralympic Games, securing its allocation, management and control during the period covered from July 5th up to September 25th, 2016.

1.7 Aiming at complying with this obligation, the Radiofrequency Spectrum Management Plan, regarding the Rio 2016 Olympics and Paralympics, was approved, establishing a joint action plan to make viable the efficient management of the spectrum resources.

2. Purpose

2.1 This Spectrum Control Plan configures the MS_M2 2975 milestone of the Frequency Coordination Plan for the Rio 2016 Olympic and Paralympic Games and it has, as purpose, to establish the procedures for monitoring and control of the spectrum, observing the definitions of the Radiofrequency Spectrum Management Plan.

2.2 The purpose of this document is to present the structure of the Spectrum Control Plan, covering aspects of infrastructure, human resources, risks, procedures and responsibilities.

3. Scope

3.1 The process of spectrum monitoring and control, during the Rio 2016 Games, has the following purposes:

- Securing the observance of the currently-in-force national legislation and regulations;
- Taking actions, in a preventive way, by means of monitoring the spectrum and controlling the access of radiofrequency emitting equipment to the places where the event will be performed, inclusively through Testing and Tagging procedures;
- Assuring the effective management of harmful interferences along the Rio 2016 Games, guaranteeing to the users a quality spectrum.

4. Governance, Command and Control Structure, and Anatel Interfaces – Rio 2016

4.1 Complying with its obligations, Anatel shall have to allocate the services of employees in order to perform the following activities:

4.1.1 GENERAL COORDINATION – responsible for the top management of the Agency works and the institutional interface;

4.1.2 EXECUTIVE COORDINATION – responsible for the support to the activities performed by the General Coordinator;

4.1.3 COORDINATION AT THE TOC – responsible for the coordination of the Agency performance at the Technology Operations Center (TOC), working, in conjunction with the Local Coordinators, to determine priorities for the demands;

4.1.4 COORDINATIONS AT THE VENUES – responsible for the control of Anatel's performance at each Venue or in the cities where football games will occur. They are responsible for the interface between the Technology Manager of the Rio 2016 Organizing Committee (VTM) and Anatel;

4.1.5 FIXED MONITORING – responsible for the remote operation of the radiofrequency monitoring systems available at the Venues;

4.1.6 MOBILE NETWORK MONITORING (DRIVE TEST) – responsible for equipment operation for the network quality analysis of the mobile operators, to work at the interest places;

4.1.7 TESTING AND TAGGING (T&T) – responsible for the testing and tagging of the telecommunications equipment that will be utilized by the authorized entities during the event and they will be based at the Spectrum Desks that will be available at the Venues;

4.1.8 SOLUTION OF INCIDENTS – responsible for the surveillance in the internal and external areas of the Venues, having the purpose of handling radio interference cases;

4.1.9 TOC TEAM – responsible for receiving the demands by the Service Desk and for sending the appropriate teams, following up the response and solution times, and communicating to the TOC Coordinator in cases when the services are not rendered.

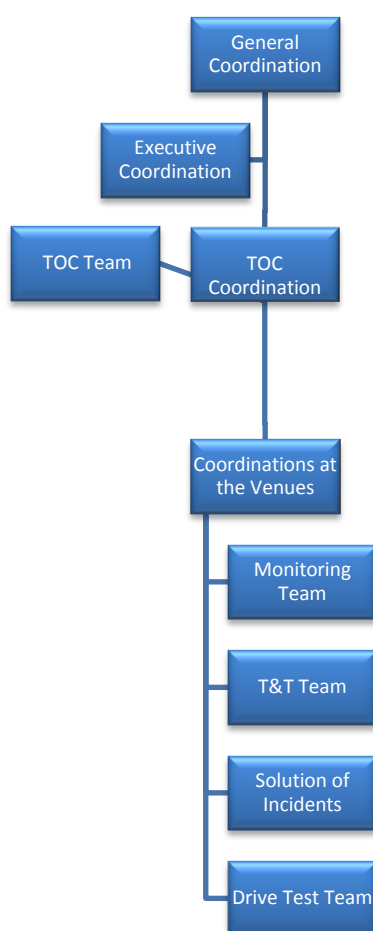


Figure 1: Anatel Organization Chart for the Rio 2016 Games

5. Infrastructure

5.1 The infrastructure to serve, in an appropriate way, the demands and the needs involved in the performance of major events, is herein described as a matrix of essential responsibilities for the compliance with the obligations assumed by the Federal Government. The definitions of the generic functions and requirements are presented on the following table.

Process	Description	Anatel	Rio 2016
Spectrum Monitoring – Fixed Stations	Equipment	Making available the spectrum analyzers and stations for radiomonitoring	

	Installation sites	Proposing installation sites, pointing out the restrictions for the operation of the system	Evaluating and approving / rejecting the installation sites at the Venues
	Installation Schedule	Presenting the proposal for the installation schedule	Evaluating the proposal and allowing access to the facilities with reasonable antecedence as per the schedule as agreed upon
	Installation	Physically installing the equipment, including tests regarding connection and remote operation	Providing infrastructure of electric power and connectivity, according to the specifications as contained on the Annexes I and II
Spectrum Monitoring – Mobile Stations	Radioelectric spectrum monitoring equipment	Making available the spectrum monitoring equipment to be installed at vehicles (25MHz to 6GHz)	Making available parking spaces as per the following quantities: - Olympic Park: 3; - Deodoro: 2; - Engenhão, Maracanã, Copacabana and football stadiums in other cities: 1 for each one of them Providing security at the parking areas
	Definition of the routes	Presenting proposal for routes and needs of access to the areas controlled by the Committee	Evaluating the proposal
Testing and Tagging	Spectrum Desk	Making available servers as per the adequate quantity for each desk, according to the Human Resources Management Plan. Presenting proposal for dimensioning the adequate infrastructure for the performance of the activities	Making available places and offices for the Anatel employees, in accordance with the Annex I. Evaluating the proposal for the structure
	Equipment for the performance of the tests	Making the equipment available	Providing infrastructure of electric power and connectivity, according to the Annex II
	Tags	Making available tags as per the adequate quantity	Controlling the entry of radiocommunication

Solutions of incidents		and the defined models	equipment at the Venues
	Storing equipment	Controlling the access to, and the utilization of the lockers	Making available lockers with keys in order to keep the equipment
	Equipment	Making available the spectrum analyzers and direct finding equipment	
	Access	Informing the places where the authorized access is required	Granting the requested authorizations for accesses
	Area for conditioning the equipment	Informing the dimensioning and the minimum conditions to assure the integrity of the equipment	Evaluating, approving and making available the area to keep the equipment, having exclusive access for the Anatel employees
	Communication System	Utilizing own 3G and 4G mobile phones and modems	Supplying HT (TETRA)

Table 1: Processes and Responsibilities

6. Work Processes

6.1 The structure of this Plan is composed of the following processes:

- Incidents Management;
- Solutions of harmful interferences;
- Spectrum Monitoring;
- Testing and Tagging (T&T).

7. Incidents Management

7.1 The structure for Incidents Management is based on the proposal presented for the Rio 2016. It must be clarified that incidents are events referred to harmful interferences, which make difficult or prevent the operation of other systems of telecommunications, or the irregular or non-authorized use of the spectrum resources. Summing up, the proposal gives guidelines in order that the management of incidents be operated by a channel of communications controlled by the Coordination that will stay within the TOC.

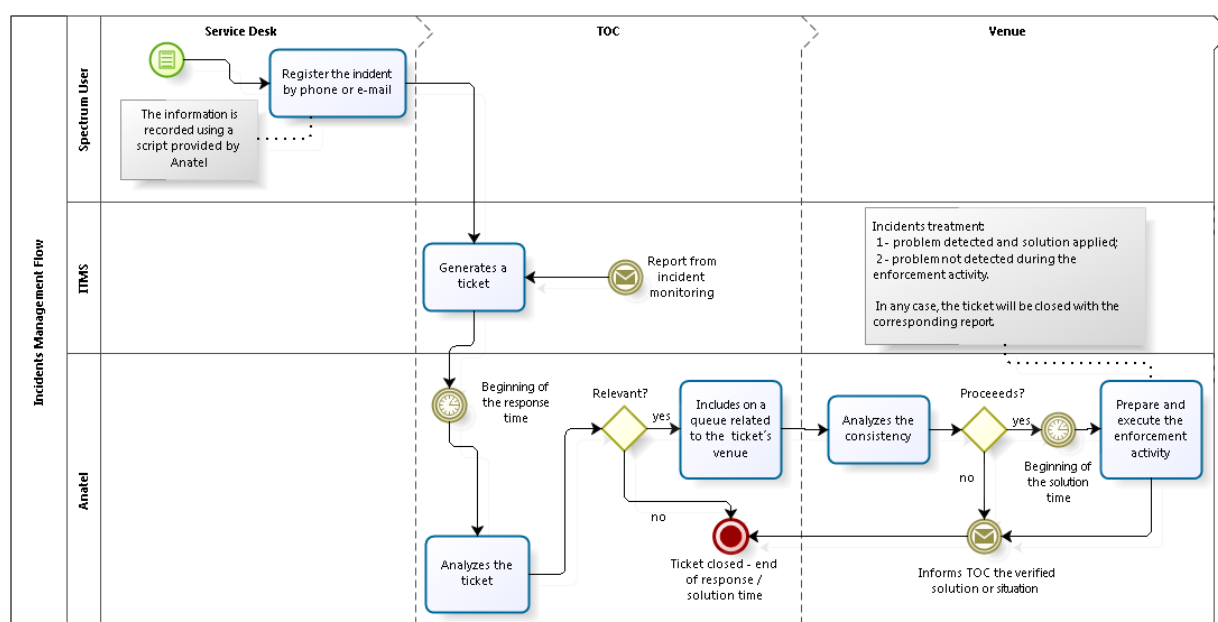


Figure 2: Incidents Management Flow

7.2 The treatment and the performance of the surveillance activities will be monitored and controlled by the Anatel Coordinations allocated at the TOC and the Venues. Anatel will utilize the system for Management of Incidents adopted by Rio 2016 (ITMS), which records the incidents and attributes to each one of them a common identification called “ticket”.

7.3 After the recording at the Service Desk by the interested person, the ITMS system generates the code of the ticket and sends the registration to the TOC, where it will be treated by the Coordination of Anatel, which will classify the type of interference and they will attribute the degree of risk.

7.4 The Anatel Coordinator, at the TOC, analyzes the recording as regards to its pertinence and, being relevant, sends it to the Coordination of the Venue linked to the ticket. About this point, it is worth clarifying that the analysis of the pertinence solely belongs to the competence of the Anatel.

7.5 The Coordination of the Venue receives the demand and initially evaluates the criterion of justification or, that is to say, if the reported facts constitute evidence consistent with the scenario at the Venue at that time.

7.6 In the case of relevance, the Coordinator of the Venue asks the involvement of the field team corresponding to the reported place, transmitting the recorded information and giving directions regarding the necessary actions for the solution of the problem. At that time, the Coordinator must inform about the related levels of service (SLA), according to what is analyzed on the subsequent section.

7.7 Based on this information, the field team prepares and performs the surveillance activity. The expected results for each activity are: solution of the incident or not finding out the problem. The solution of the incident comprises various actions that cover the interruption of the

operating station up to performing adjustments, in order to determine the operational regularity of the station.

7.8 The response time by Anatel is the one elapsed from the moment, when the recording at the Service Desk of the information about the incident is sent, up to the completion of the evaluation by the Anatel Coordinator at the TOC, which occurs after the transmission of the recording to the queue of the Venue or the closing of the ticket.

7.9 The solution time is the one elapsed from the moment when actions are requested by the field team and the closing of the ticket, which will be performed after the delivery of the report about the incident.

7.10 Aiming at having more agility in the processing of the tickets, it is important that the ITSM can also be accessed by the Venues. Moreover, the lack of that resource will have an impact over the operational risks.

8. Solution of harmful interferences

8.1 This section presents the sequence of actions that are performed by the Anatel regarding the solutions of incidents as from receiving the ticket from the Venue.

8.2 After the evaluation of the pertinence, the Coordinator of the Venue puts in action the field team and/or requests monitoring actions by using the network of RFEye sensors for geolocation or frequency bands monitoring. Initially, the field team evaluates the coverage and the technical parameters involved in the context of the recording. After that evaluation, equipment and resources are allocated to search for the solution of the incident.

8.3 At that point, it is important to emphasize that the access to various places is crucial in order to assure the service rendering by the field teams because, normally, the identification of interference sources occurs at places beyond where the incident was found out, resulting in the need of displacement of teams through more than a *Venue*.

8.4 If the field team identifies the access need to areas not covered by the authorization granted for the team, the Coordinator of the activity must get in touch with the VTM of the Venue to request the accompanying or the temporary change in the authorization of the employee so as he/she can have access to the restricted area.

8.5 The solution time, for the purposes of rendering services as per the SLA, will be interrupted up to the time when the access is authorized or the Enforcement Agent is accompanied by the competent person.

8.6 Spectrum Users that go in person to the Spectrum Desks or to Anatel's Technology Rooms in order to communicate any incident of interference, will be given directions to utilize the Service Desk, starting the flow for the service rendering.

8.7 In case of acknowledgement by the Agency itself or claim by Rio 2016 about harmful interferences, the necessary measures will be adopted for the immediate solution of the problem, considering that such interferences could jeopardize the security or even the performance of the event. In that case, the generation of the ticket will be directly performed by the Coordinator of the TOC.

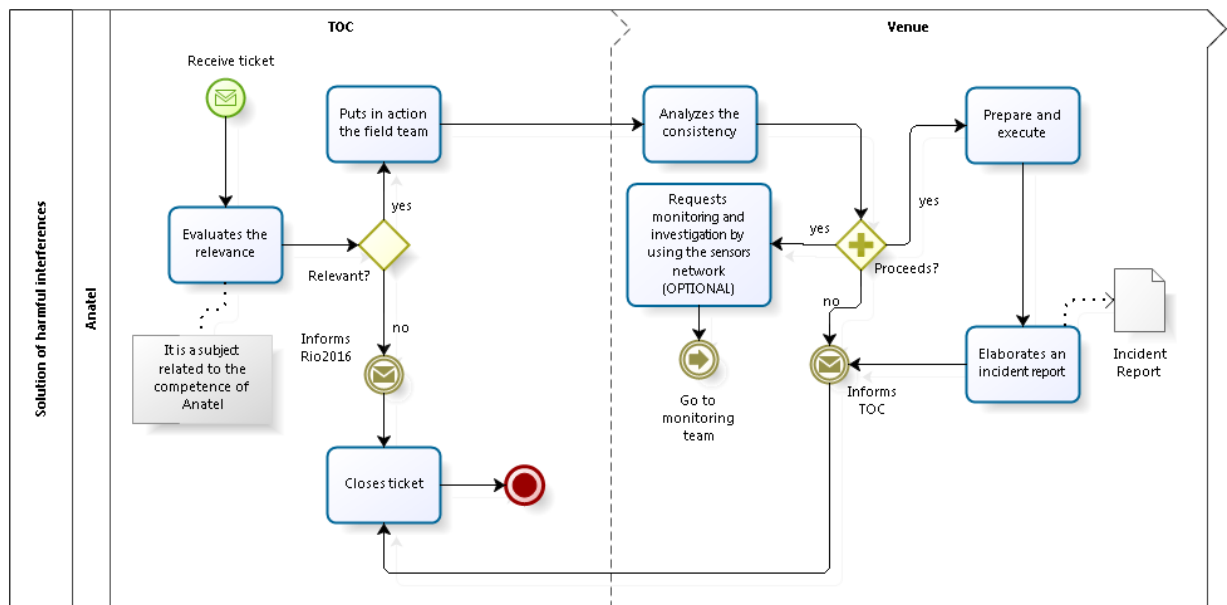


Figure 3: Solution of harmful interferences flow

8.8 The completion of the surveillance activity occurs when the Report on the Incident is delivered; this is a digital document, in Portuguese language, that presents, in a succinct and organized way, the solution that was implemented.

Classification of Incidents regarding Interferences

8.9 As soon as the interference incidents are received at the TOC, they must be classified according to the scale of priorities that follows, having been defined as the function of the interference impact over the security or the performance of the event:

Type of Interference	Risks	Degree of Priority
<ul style="list-style-type: none"> • Radiocommunication of the Public Security Forces, the Armed Forces, the Ambulances, the Fire Brigade and the Aeronautical Radio-navigation • Unmanned Aerial Vehicles – UAV • Telemetry and radiocommunication equipment utilized for the performance of the event itself (for example, electronic points of referees, control of electronic poster bills, HT radios of the organization and the companies of private security) 	<ul style="list-style-type: none"> • Non-rendering services for medical emergencies • Jeopardizing the security of the public and the organization of the event • Losses or paralyzation of aeronautical communications at local airports • Interruption of sporting competitions • Alterations in results • Endangering the organization and the security of the event 	One
<ul style="list-style-type: none"> • Equipment and frequencies utilized for the coverage and the transmission of the event by radio and television broadcasting stations and/or other means of communications (for instance, wireless cameras, wireless microphones, satellite uplinks, etc.) 	<ul style="list-style-type: none"> • Loss of quality or interruption of the event transmissions 	Two
<ul style="list-style-type: none"> • Collective interest service stations (Mobile Network, Specialized Mobile Service, Multimedia Communication Service, etc.) 	<ul style="list-style-type: none"> • Loss of quality or interruption of the services being rendered • Losses for the companies that utilize wireless, electronic means of payment (portable devices of debit/credit cards) and regarding users in general 	Three
<ul style="list-style-type: none"> • Authorized entities for the restricted interest services (communication radios of illumination companies, logistics support, maintenance, cleaning, etc.) 	<ul style="list-style-type: none"> • Impact over the performance of their activities in the events 	Four

Table 2: Classification of incidents referred to interferences

8.10 The list of Interference Types, as presented, does not exclude the possibility of inclusion of new types of interferences with the linked risks and degrees of priorities. The addition depends upon the official request to be submitted by Rio 2016.

8.11 Interferences in Wi-Fi networks, utilized by the organizers of the event or made available by the authorized renderers of telecommunication services, will not be the purpose of Anatel surveillance, and the research and the solutions of the problems shall be in charge of their responsible persons.

Response and Solution Time

8.12 The response and solution times are defined according to the degrees of priorities as presented on the preceding section. The following table shows a matrix of times, breaking down the times as per non-critical and critical periods. The critical periods refer to the period of the competitions.

Degree of Priority	Response Time		Solution Time	
	Non-Critical Period	Critical Period	Non-Critical Period	Critical Period
One	5 min	5 min	4 hours	1 hour
Two	15 min	5 min	6 hours	2 hours
Three	1 hour	30 min	2 workdays	4 hours
Four	2.5 hours	1 hour	3 workdays	6 hours

Table 3: Response and solution time

Considerations about Solutions of Harmful Interferences

8.13 Urgent provisional measures may be adopted for the solution of the problem being verified, such as the interruption of the emissions and the legal sealing and/or the seizure of irregular or clandestine equipment, in addition to the criminal imputation by the competent authorities.

8.14 Aiming at the security and the effective result of the surveillance activities and the interruption of irregular or non-authorized emissions, the Enforcement Agents will be allowed to request the support of the security teams, devoted to the event, or the police force. Taking into account the specificity of the event, the initial approach shall have to be (preferably) performed by the team of the Rio 2016, after putting into action the VTM by the Coordinator of the Venue. In last instance, in an exceptional way, if the VTM could not be put to action, Anatel Enforcement Agents will be allowed to get directly in touch with the irregular entity.

8.15 Activities of technical surveillance at all of the stations of telecommunications and radiobroadcasting installed at the event will be performed, such as SNG (Satellite News Gathering) stations, microwave links, wireless cameras and portable radio-communicators (HT), among others.

8.16 Every radiocommunication equipment, liable to homologation in Brazil, which has no identification of homologation registration, shall have to get authorization for temporary use of the spectrum in order to operate. In the contrary case, the equipment will receive the tag of non-authorized use.

8.17 In the hypothesis of contumacy, the equipment will be seized and it will be given back only at the end of the activities at the Venue. The information about the equipment and the owner will be gathered by the Enforcement Agents for posterior analysis and charging.

9. Spectrum Monitoring

9.1 During the Rio 2016 Olympic and Paralympic Games, it will be implemented a network of radio frequency sensors that utilizes the techniques of Time Difference of Arrival (TDoA), Angle of Arrival (AOA) and Power of Arrival (POA), allowing the localization of the telecommunication stations being monitored in a more precise and effective way.

9.2 The monitoring activities aim at assuring the right utilization of the radioelectrical spectrum during the Rio 2016 Olympic and Paralympic Games, securing its use, in a rational and harmonic way, among all of the authorized entities, both public and private ones.

9.3 The monitoring of the spectrum comprises evaluation actions of the available spectrum, the occupation rate of the spectrum, the identification of emissions and the efficient

use. In specific cases, the activities of monitoring will cover localization routines of interferential sources. The activities will be planned and performed according to the schedule to be submitted by Anatel, up to February of 2015.

9.4 Regarding the monitoring of the transmission by satellites during the event, a terrestrial station will be utilized, installed at Rio de Janeiro City, having latest generation resources for the monitoring of the scarce resources utilized by geostationary satellites, aiming at the follow up and the surveillance, what will mainly assure: (i) the capacity to immediately react in the cases of harmful interferences; (ii) independent operation and solution of conflicts among operators; (iii) the analysis of occupation of the satellites; (iv) the monitoring of transmissions performed by means of SNG (Satellite News Gathering) trucks; (v) the identification of the localization region of emission sources; (vi) the appraisal of technical parameters established as per the entities authorized by Anatel.

9.5 It is important to point out that, as from the terrestrial station, it will be possible to monitor the spectrum of frequencies, at the downlink, regarding the transmissions performed by geostationary satellites all over Brazil. Other surveillance teams of Anatel will work at the uplinks by means of field activities, getting in touch with the responsible persons for the transmission stations.

9.6 The following figure presents the main flow to be utilized in order to coordinate the surveillance activities of the spectrum. Initially, the monitoring activities shall have to be aligned with the interests of the Rio 2016, which are recorded in the Spectrum Management Plan.

9.7 The monitoring of new frequency bands might be demanded by the Rio 2016 and Anatel Coordinators at the Venues in order to support the activities referred to solutions of incidents. In the cases of requests by the Rio 2016, Anatel will evaluate the viability and the availability of the band and the pertinence of the study. Regarding the performance of the support activities for the solutions of incidents, the actions must observe the required Solution Time.

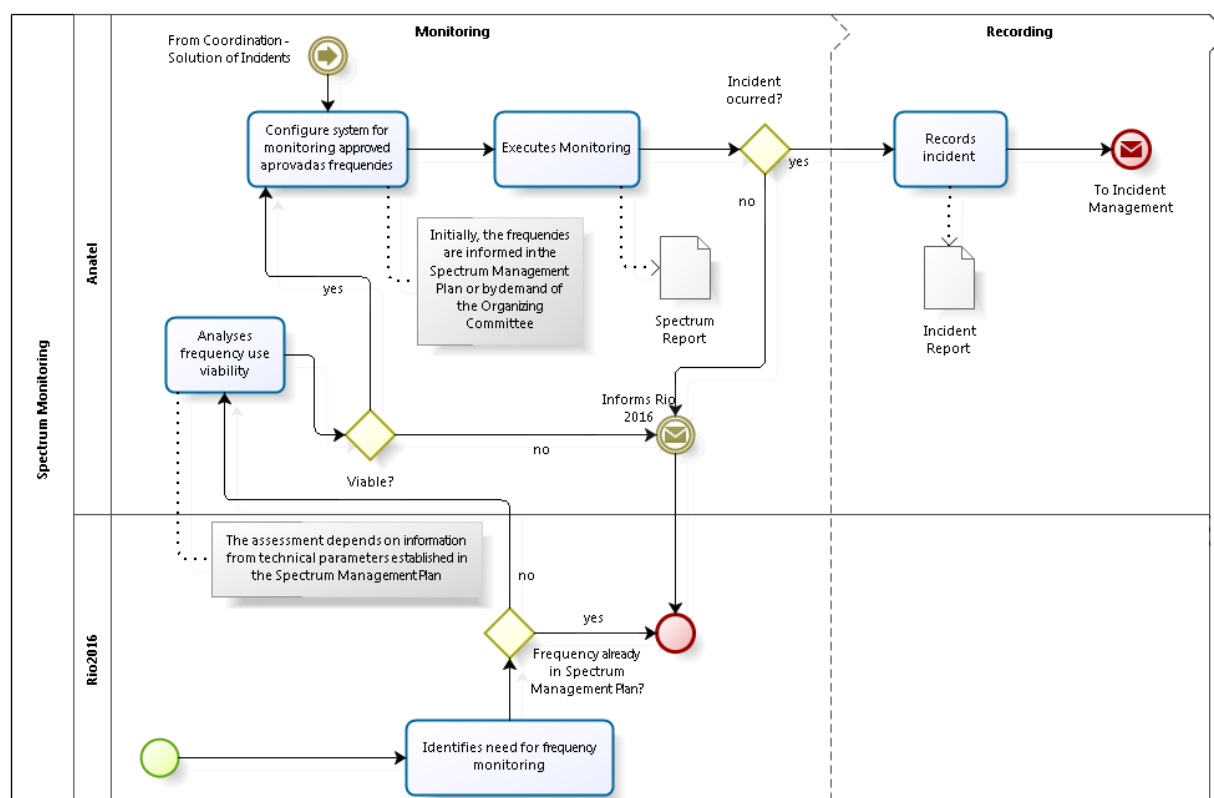


Figure 4: Spectrum monitoring flow

9.8 The monitoring activities also comprise the bands devoted to the Public Security Forces, the Armed Forces and the entities that will perform the coverage and the transmission of the images.

9.9 The activities referred to localization of emissions of non-modulated, sporadic, short duration and broadband signals will be allowed to be performed according to the demands by the Rio 216.

10. Testing and Tagging (T&T)

10.1 The activity of Testing and Tagging (T&T) was performed in various countries, which held major events last years, such as South Africa (FIFA 2010 World Cup) and England (London 2012 Olympic and Paralympic Games). In Brazil, this activity occurred, for the first time, at the 2013 Confederations Cup and it was repeated at the FIFA 2014 World Cup, generating excellent results as a very low quantity of cases of interferences was recorded, what had a positive effect over the expected spectrum management results.

10.2 The T&T procedure consists in the identification of regularly authorized equipment by means of authorizations issued by Anatel, using tags that allow having agility regarding the identification of the right use of the equipment regarding its area of operation.

10.3 This procedure allows having the previous knowledge about the equipment and the radio frequencies to be utilized by the various companies that participate in the event, in addition to helping the planning of the monitoring and surveillance actions during the performance of the event, avoiding the entrance of equipment that were not inspected and/or authorized at the Venues.

10.4 It is essential that the users of radiofrequency emitting equipment, comprising short range equipment homologated by Anatel, to be utilized at the Venues, request the authorization for the temporary use of the spectrum, in order to assure the utilization of the spectrum being free from interferences.

10.5 The flow, as presented on the figure here below, shows the stages and the functions to be performed by users and Anatel.

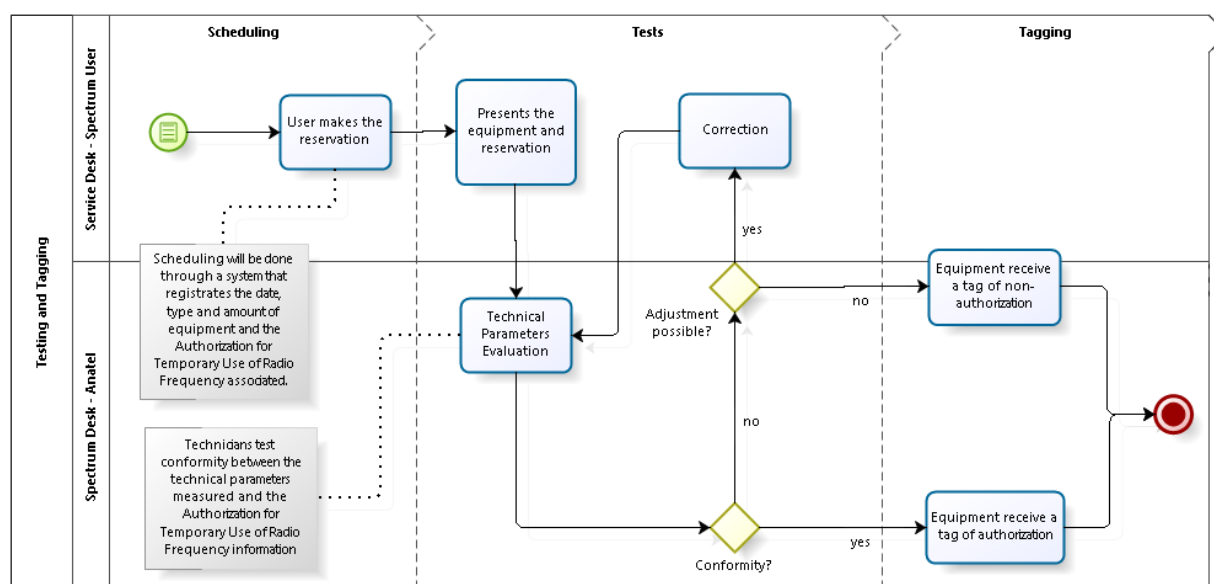


Figure 5: Testing and Tagging flow

10.6 Initially, the user shall make the reservation via Service Desk. The necessary information are:

- User Identification;
- Number of the Authorization for Temporary Use of Radio Frequency;
- Quantity and type of equipment to be submitted to the T&T procedure.

10.7 On the day of the reservation, the user will submit the equipment and the Authorization Act in order to get the T&T procedure performed. Anatel representative will verify the conformity among the technical parameters and the Authorization Act presented. Any equipment that is not in conformity will be allowed to be adjusted, if it is the case, by the user, so as the non-conformity is solved. In case that it is not possible, the equipment will receive a tag of non-authorized use, which will identify that the respective equipment can not operate.

10.8 After the tests the equipment that are in conformity will receive tags with the identification of the corresponding Cluster/Venue.

General Considerations about T&T

10.9 The T&T procedure will be performed by Anatel at the Spectrum Desks located at the following strategic places: IBC, MPC, Fort Copacabana, Maracanã Stadium, Olympic Stadium, Marina da Gloria, Olympic and Paralympic Village, Riocentro, Lagoa Stadium, Pontal and Deodoro. In addition to this, there will be a Spectrum Desk at each one of the football

stadiums in the cities where football games will be played (Brasilia, Sao Paulo, Belo Horizonte and Salvador).

10.10 The T&T procedure will exclusively be performed by employees of Anatel.

10.11 The T&T activities will be allowed to be performed outside the Spectrum Desks by Anatel team, preferably before the start of the games, as long as it is verified the impossibility, by the authorized user, to take out the equipment from the facilities where there is not a desk for this purpose. However, such solution will be conditioned to a previous reservation and to the existence of the appropriate resources (electric power, network, equipment having the possibility to operate) for the performance of the tests.

10.12 Equipment from OBS, Rio 2016 Organizing Committee and other essential partners for the operations of the Rio 2016 Games, due to the importance and the need of anticipated utilization, will be tagged in advance in relation to the other users.

10.13 The following equipment will be set free from the use of tags: mobile phones, portable computers, tablets and receiving only equipment. As per the criteria of Anatel and by means of specific authorizations, other radio frequency emitting equipment might be released from authorization for temporary use of radio frequency and from the T&T procedure, including equipment that operate with confined transmission means.

10.14 It is forbidden the entry at any Venue of equipment that are blockers of signals (Jammers) and Wi-Fi routers, with the exception, in the latter case, of the pieces of equipment authorized by the Rio 2016, being duly tagged. The pieces of equipment not allowed to be used shall have to be turned off by the security teams as per the coordination by the Rio 2016.

10.15 The security teams shall have instructions to block the entry of equipment having non-authorized tags for the respective Venue or not having tags. In those cases, the users shall have to be given directions in order to get in touch with the Service Desk.

11. Risk Management

11.1 A Risk Management Plan will be prepared aiming at identifying possible scenarios that might endanger the fulfillment of Anatel responsibilities during the performance of the Games, in order to make viable the activities of the Agency regarding the solution and the mitigation of incidents related to the use of the spectrum. The Plan shall have to establish procedures, responsibilities and necessary actions to solve contingent cases, having a higher probability of occurrence, in order to assure the minimum, acceptable conditions for the performance of the surveillance activities of the Agency at the places related to the event.

12. Human Resources

12.1 Anatel strategy of Human Resources allocation to the Rio 2016 Olympic and Paralympic Games aims at assuring that the dimensioning of the personnel needs is enough to secure the appropriate use of the radio frequency spectrum being necessary for the organization and the performance of the Games.

12.2 Anatel will prepare a document having the dimensioning of the necessary personnel for the fulfillment of its activities, comprising the monitoring and the control of radio frequencies for the Games. This document will detail the functions to be performed, the number of employees, the involved teams and their allocations and work shifts, in addition to other pertinent information.

13. Final Considerations

13.1 By this Spectrum Control Plan, it is intended to systematize the surveillance performance of Anatel at the Rio 2016 Olympic and Paralympic Games, which is the fundamental element for the assurance of an infrastructure of communications and broadcasting at the Venues that meets the necessary quality requirements for the performance of the event.

13.2 Anatel will perform the monitoring and the control of frequencies at the Test Events that will occur before the Rio 2016 Olympic and Paralympic Games, having the purpose of training the surveillance teams with the defined procedures.

13.3 The doubts about the application of the various documents that compose this Plan shall have to be clarified by the General Coordinator.

14. Communication Plan

14.1 A Communication Plan will be submitted having the purpose of making public, in a standardized way and as per unique flow, information about the activities referred to the planning and Anatel operations and the relations with the other entities.

14.2 The purpose of the Plan is to assure that the gathered information is released to have guidance, to be known and to take measures, when being the case, by the institutional players and the Rio 2016 Committee, aimed at making viable the efficient management of the various elements that compose the Spectrum Management Plan and the Spectrum Control Plan.

15. List of Annexes

15.1 Annex I: Equipment.

15.2 Annex II: Infrastructure of electric power and connectivity.