

# GNSS Spectrum Protection, Interference Detection and Mitigation (IDM) Activities in China

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1. Background
2. National RNSS spectrum allocations
3. Regulations regarding non-licensed emission limits from RF emitters and non emitters
4. Existing or planned laws regarding GNSS jammers
5. Domestic efforts to detect and mitigate GNSS interferences



# Background – UN COPUOS Agenda Item on Spectrum Protection and IDM (Recommendation 10A.2)

- **UN COPUOS, based on a presentation to the Science & Technology Subcommittee (STSC), recommend to establish a multi-year agenda item focused on National Efforts to protect RNSS Spectrum, and pursue GNSS Interference Detection and Mitigation in member states.**
- **Under this agenda item, Member States will be asked to report on:**
  - National RNSS spectrum allocations and the consistency with ITU allocations
  - Regulations regarding Non-licensed emission limits from RF emitters and non emitters
  - Planned or existing Laws and Regulations related to the manufacture, sale, export, import, purchase, ownership, and use of GNSS jammers
  - Domestic efforts to detect and mitigate GNSS interference

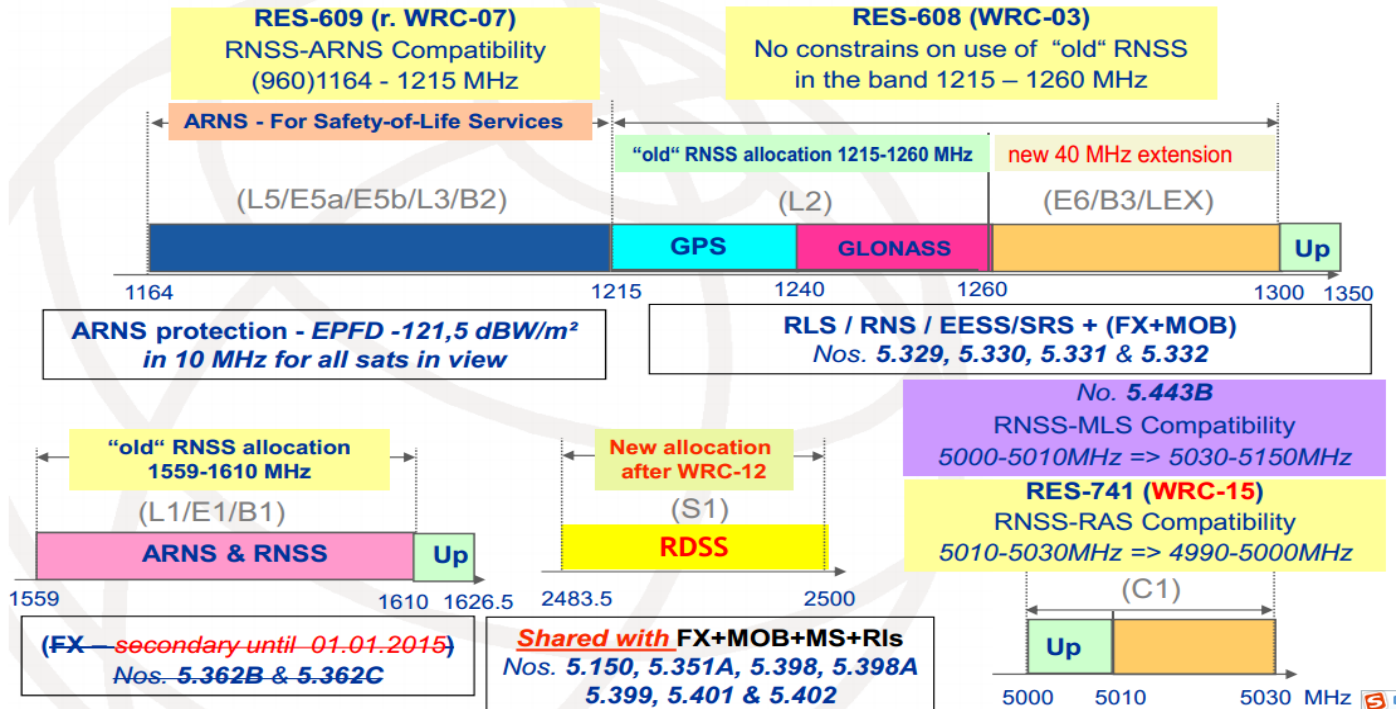




# National RNSS Spectrum Allocations and the Consistency with ITU Allocations

## ITU-Radio rules(RNSS frequency band)

### *RNSS Regulatory situation summary*



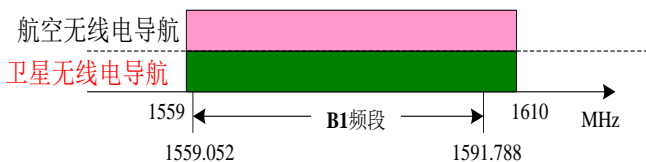
ITU spectrum allocations, cited from Attila Matas, "Radio Navigation Satellite Service and the ITU Radio Regulations".



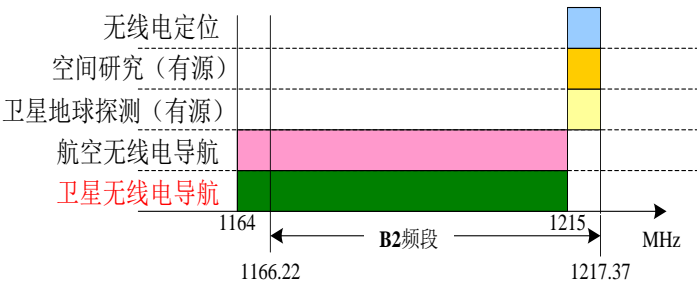


# Radio Frequency Allocation Regulations for BDS RNSS Bands

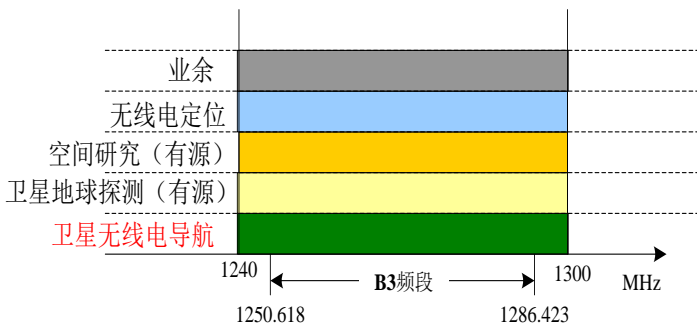
B1



B2

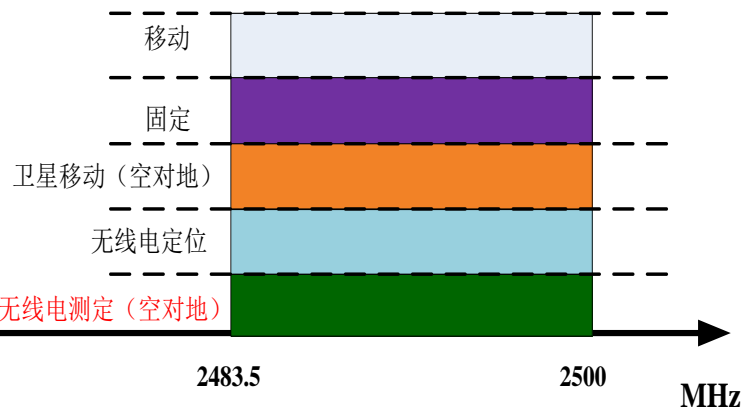


B3



RNSS □ □ □ □ □ □

Bs



RDSS □ □ □ □ □ □ □ □

## BDS RNSS frequency Allocations





# Comparison between BDS Frequency Allocations and ITU Allocation Regulations

BDS Frequency Bands	Frequency allocation of P.R.C.	Frequency allocation of ITU
B1 Frequency Band	RNSS and ARNS	RNSS and ARNS
B2 Frequency Band	RNSS, ARNS, RLS, EESS and SRS	RNSS, ARNS, RLS, EESS and SRS
B3 Frequency Band	RNSS, RLS, EESS and SRS	RNSS, RLS, EESS and SRS
Bs Frequency Band	RDSS, FX, MOB, MS and RLS	RDSS, FX, MOB, MS and RLS

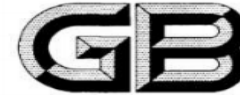
**For the BDS frequency bands, the frequency allocations in China and the ITU regulations are exactly the same.**





# Regulations regarding Non-licensed Emission Limits from RF Emitters and non Emitters

ICS 33.100  
L 06



中华人民共和国国家标准

*National standard of the People's  
Republic of China*

GB 4824-2004  
代替 GB 4824-2004

工业、科学和医疗(ISM)射频设备  
骚扰特性 限值和测量方法

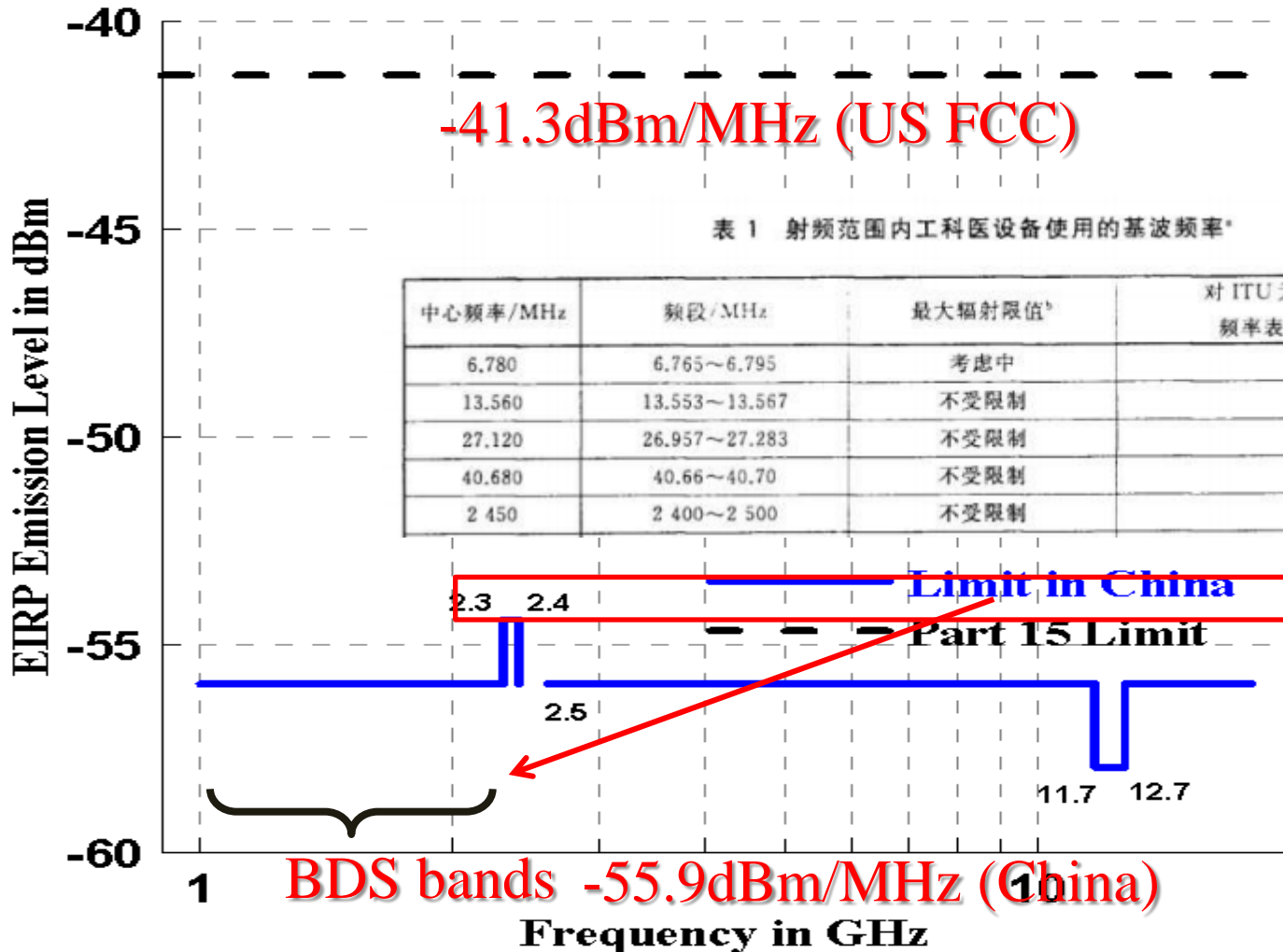
Industrial, scientific and medical (ISM) radio-frequency equipment—  
Disturbance characteristics—Limits and methods of measurement

(IEC/CISPR 11:2010, IDT)

***Taking the CISPR (international special commission on radio interference) 11 as reference, a National Standard of China has been released – “Industrial, scientific and medical (ISM) radio-frequency equipment - Disturbance characteristics - Limits and methods of measurement”***







***Emission limits of ISM equipment in each band***







## In summary,

- Unlicensed equipment are not allowed to operate in the RNSS bands.
- The transmitting limits of ISM equipment was  $-55.9\text{dBm/MHz}$  up to 2.4 GHz which is much more strict than FCC part 15.
- There is no transmitting limits in the band of 2.4~2.5 GHz.





# Planned or Existing Laws and Regulations

Main Chinese regulations related to GNSS jammers include:

- Radio Regulations of the PRC
- Prevention of interference to BSS, RNSS, MSS by Micro-Power (Short-Range) Radio Equipment
- Criminal Law of the PRC
- Law of the PRC on Penalties for Administration of Public Security
- Provision concerning punishment for the Radio Administration







# GNSS Jammers – National Legal Status

Jammers	US	RU	China	EU
manufacture	illegal	illegal	illegal	Nation-by-nation
sell	illegal	illegal	illegal	illegal
export	illegal	illegal	illegal	Nation-by-nation
purchase	Undefined(consumer import illegal)	illegal	illegal	illegal
own	legal	no restrictions	undefined	legal
use	illegal	illegal	illegal	Illegal

Import of GNSS jammers are illegal.

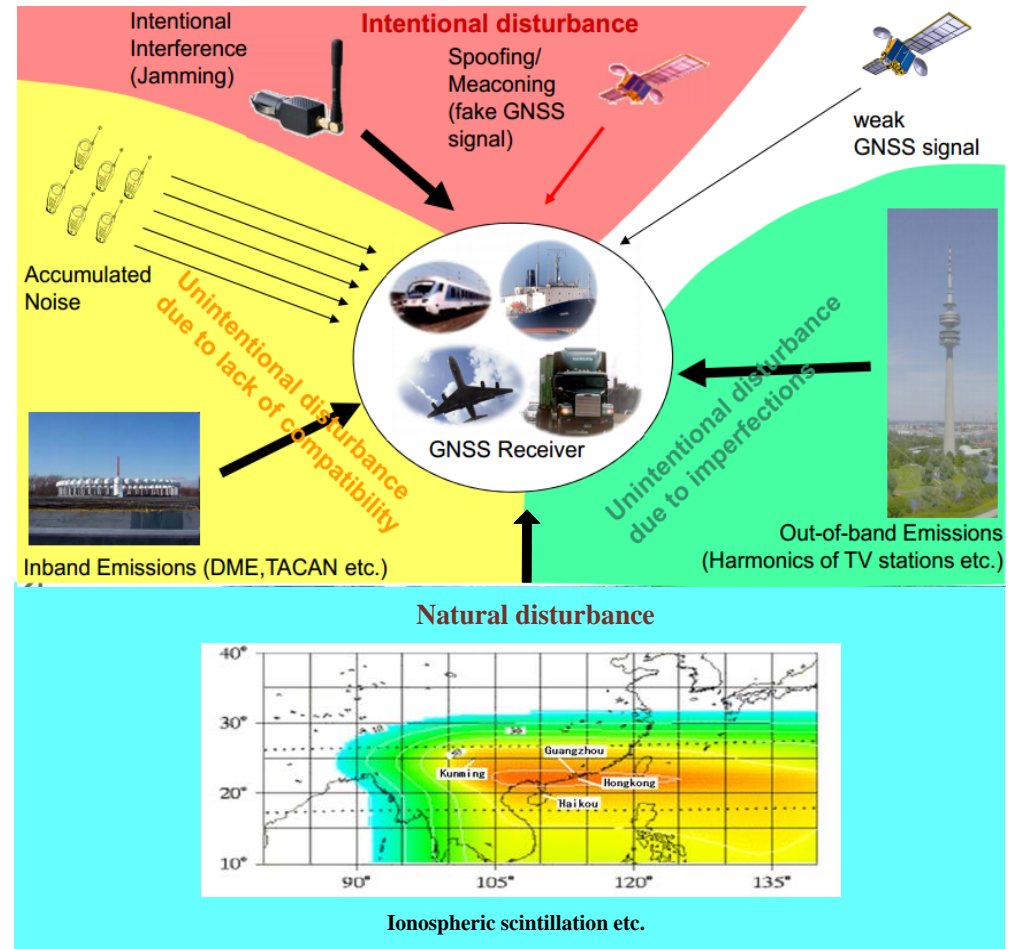




# Domestic Efforts to Detect and Mitigate GNSS Interferences

The effective analysis of interferences (including the ionospheric scintillation) in various infrastructure sectors.

- Transportation sector
- Communication sector
- Electricity sector
- Precision agriculture sector
- ...







# Ideas in IDM system construction and research in interference detection technologies

## ● System construction

- IDM system structure design and function analysis
- Work procedures of IDM data center design
- Reporting forms of interference information formulation

## ● Interference detection technologies

- Studies on RF interference detection technique
- Crowd sourcing technique
- Development of the ionospheric scintillation monitoring technique







At ICG-11, China Satellite Navigation Office announced that an IDM system will be established in China.





## Policy of Development

### 5. Protecting the Utilization of Radio-Navigation Satellite Frequency Spectrum

- Protecting the radio-navigation satellite frequency spectrum has been listed in BeiDou project.
- A monitoring network for IDM will be established and the corresponding database will be also constructed.
- China prohibits the production, sale and use of illegal interference devices, investigates and punishes in accordance with the law any hostile interference actions which affect the system operations and services.



Eleventh Meeting of the International Committee on Global Navigation Satellite Systems  
6-11 November 2016 Sochi, Russian Federation



China Satellite Navigation Office



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China Satellite Navigation Office



The 54<sup>th</sup> STSC Meeting  
February 2017, Vienna, Austria



China Satellite Navigation Office



## Other Efforts

- The first legal rule in China for satellite navigation industries has been in planning: “Satellite navigation regulation of PRC”
- Intensity of punishment on use of illegal radio transmitters has been greatly increased in the recently modified “RADIO REGULATIONS OF THE PEOPLES REPUBLIC OF CHINA”.



A satellite with a gold-colored body and large solar panels is shown in orbit above the Earth. The Earth's surface is visible with blue oceans and white clouds. The text "THANK YOU!" is written in large, bold, yellow capital letters across the center of the image.

**THANK YOU!**

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