ICG Workshop on GNSS Spectrum Protection and Interference Detection and Mitigation, Changsha, China 17 May 2016

Updates of IDM situation

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1. Background

2. Comparison between Beidou RNSS frequency and ITU allocation rules

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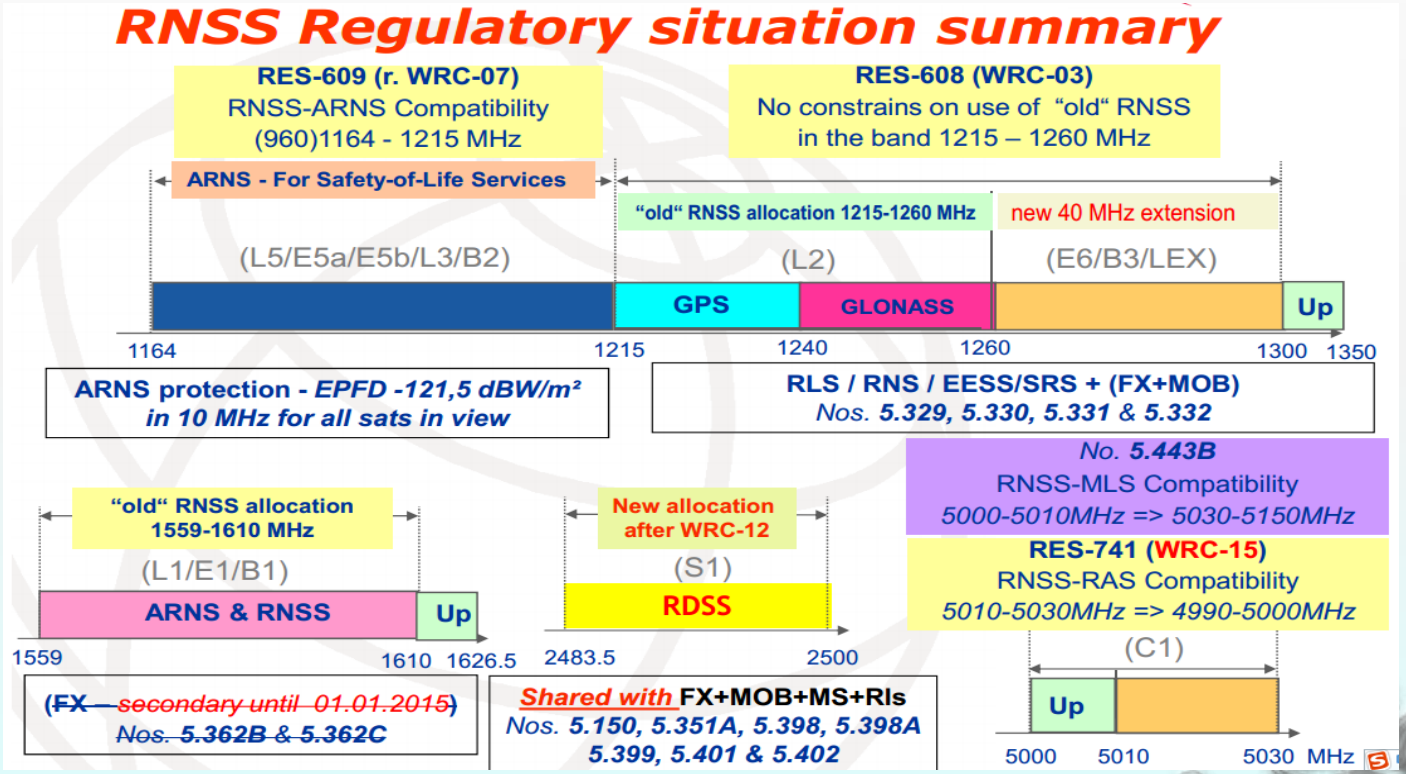
1: Background
---UN COPUOS agenda item on spectrum protection and IDM (Recommendation 10A.2)

- UN COPUOS, based on a presentation to the Science & Technology Subcommittee (STSC), should 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 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

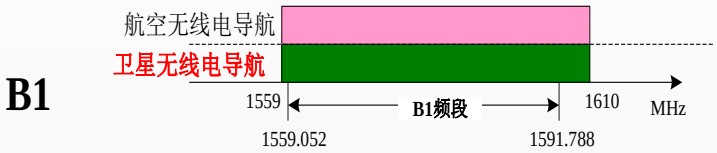
2. Comparison between Beidou RNSS frequency and ITU allocation regulations

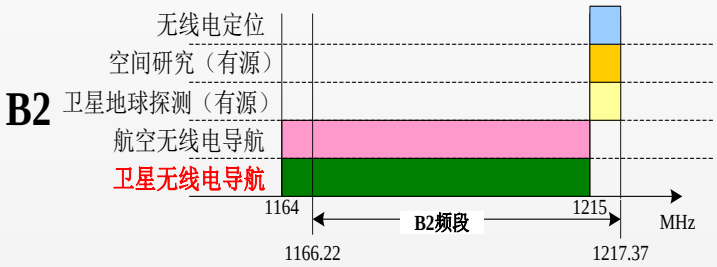
ITU-Radio rules(RNSS frequency band)

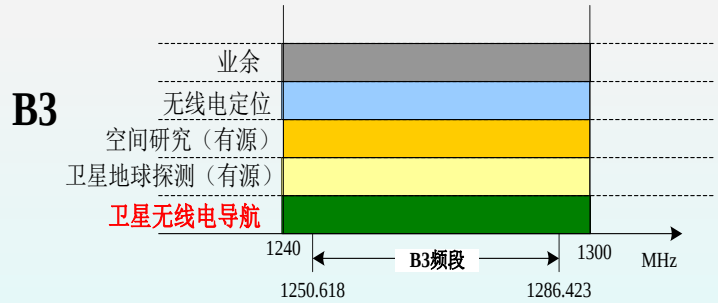


ITU spectrum allocation, cited from Attila Matas <Radio Navigation Satellite Service and the ITU Radio Regulations>.

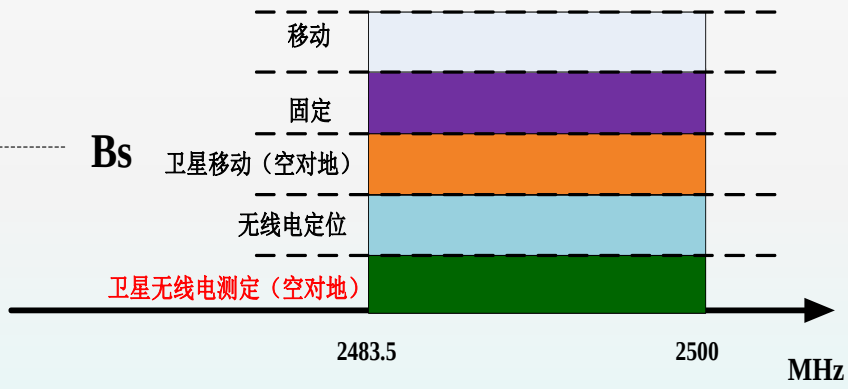
Radio frequency allocation regulations of PRC (Beidou frequency):







RNSS下行导航链路



RDSS下行卫星至用户链路

RNSS frequency allocation of Beidou

(1) Comparison between Beidou RNSS frequency and ITU allocation regulations

Frequency Band of Beidou	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

Inside the Beidou frequency band, the frequency allocation in China and the ITU regulations are exactly the same.

(2) Regulations of the unintentional interference threshold

ICS 33.100
L 06

GB

中华人民共和国国家标准

National standard of the People's Republic of China

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

表 7　工作频率在 400 MHz 以上，
产生波动连续骚扰的 2 组 B 类工科医设备的电磁辐射骚扰峰值限值

频段/GHz	场强/dB/(μV/m)，测量距离 3 m
1～2.3	92
2.3～2.4	110
2.5～5.725	92
5.875～11.7	92
11.7～12.7	73
12.7～18	92

注 1：为了保护无线电业务，国家有关部门可能要求满足更低的限值。
注 2：峰值测量采用 1 MHz 分辨率带宽和不小于 1 MHz 的视频信号带宽。
注 3：本表限值已考虑到波动骚扰源，如磁控管驱动的微波炉。

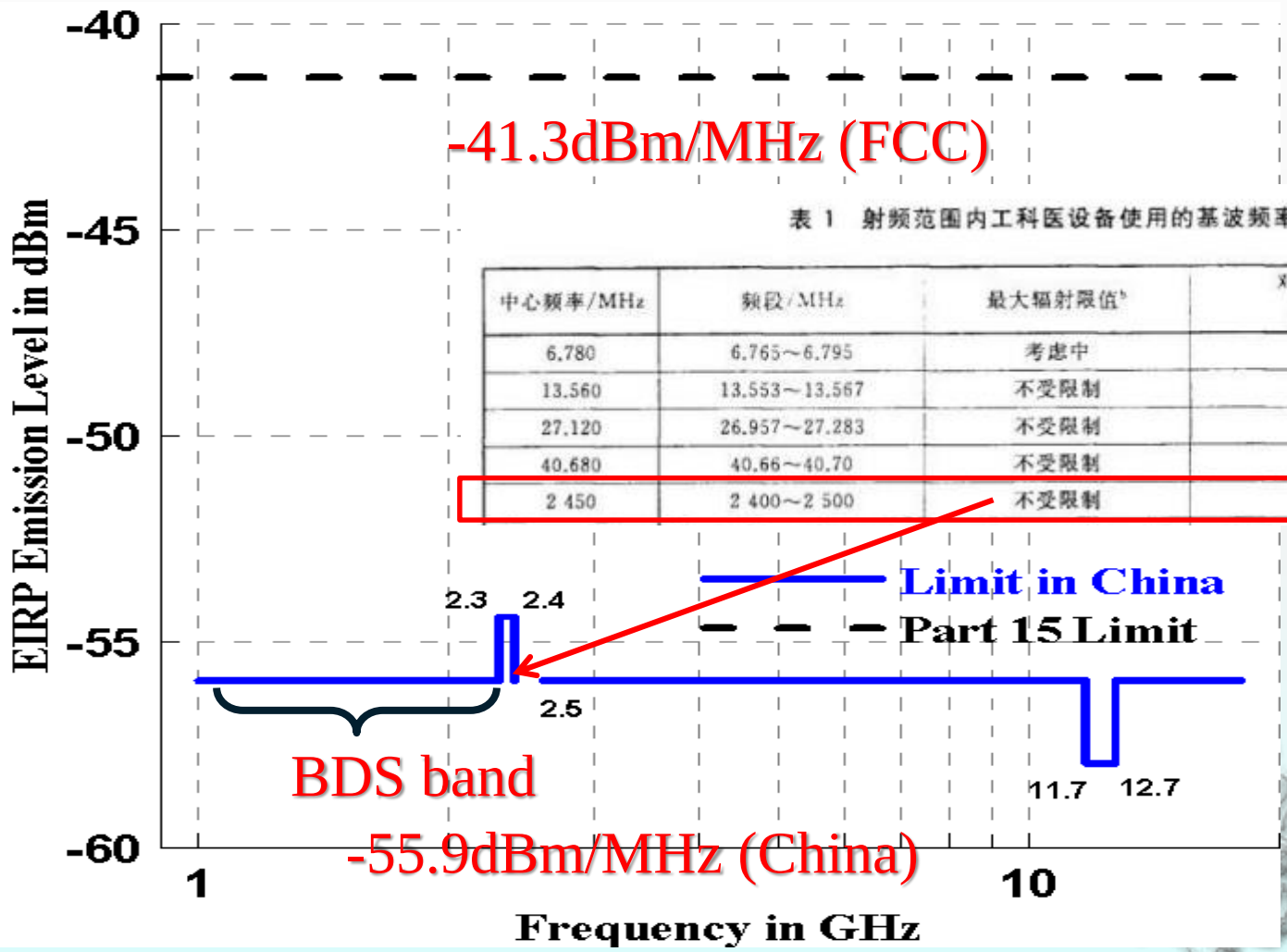
frequency

field strength

The relationship between power and field strength can be defined as:

$$\frac{PG}{4\pi D^2} = \frac{E^2}{120\pi}$$

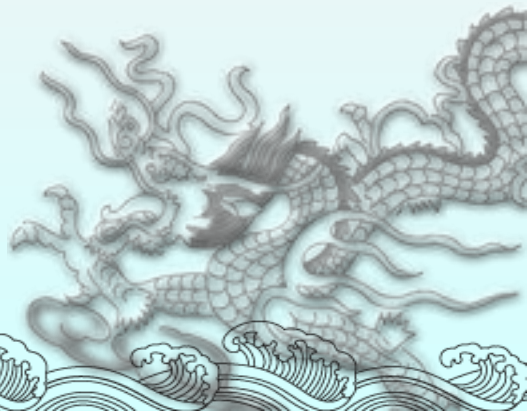
P: transmitting power in Watts
D: measuring distance in meters
E: field strength in Volts/meter
G: the numerical gain of transmitting antenna



Emission limits of ISM equipment in each band

Conclusion:

- ***Unlicensed equipment are not allowed to operate in RNSS band.***
- ***The transmitting limits of ISM equipment was -55.9dBm/MHz up to 2.3 GHz which is much more strict than FCC part 15.***
- ***There is no transmitting limits in the band of 2.4~2.5 GHz.***



（3）Laws and regulations on GNSS jammer

Main regulations related with GNSS jammer in China:

- 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 Radio Administration


Relevant Laws and Regulations
1) State Administra
Regulations of th
China)
Article 25: The R
protected the radi
law from harmfi
Article 26.2
procedure on
radio transi
Relevant Laws and Regulations
Article 44: In the situ
a) / establishes and
approval;
b) / develops, ma
equipment in vio
the state radio r
(here) / any of
confiscation
revenue
Relevant Law
2014 Radio Re
Republic of
Furth
dev
Relevant Law
2) MIIT: Prevent
RNSS, MSS
Radio F
Int
Range) Radio Equip
Relevant L
3) Criminal Law
China
Article 288: W
without autho
station, or wi
refuses to st
disturbs th
shall, if se
fixed-terr
crimina
or independently be sentenced to a
Relevant Law
4) Law of the PRC on
of Public Security
Article 28: A perso
intentionally interfe
the normal operat
effective measur
relevant comp
detained for
the circum
than 10 days but not more than
Administration
Chapter 6, 7,8: Penalty for use, develop, produce,
import of unauthorized transmitter.
Relevant Laws and Regulations
5) Provision concerning punishment for Radio
Administration

On the ICG-9 meeting, the conclusion on GNSS jammer has been made.

GNSS Jammers – National Legal Status

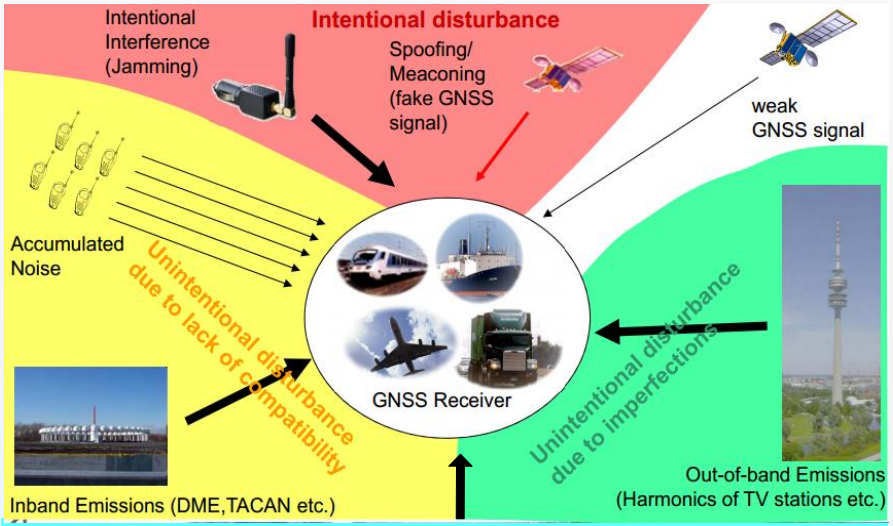
Jammers	US	RU	China	EU
manufacture	illegal	illegal	illegal	Nation-by-nation
sell	illegal	illegal	illegal	illegal
export	illegal	illegal	illegal	Nation-by-nation
purchase	Undefined(consumer import illegal)	illegal	illegal	illegal
own	legal	no restrictions	undefined	legal
use	illegal	illegal	illegal	Illegal

Import illegal also!

3. Our work in GNSS interference

（1）The effect analysis of interference (including the ionospheric scintillation) to infrastructure sectors.

- Mainly in the following area
  - Transportation sector
  - Communication sector
  - Electricity sector
  - Precision agriculture sector



（2）Ideas in IDM system construction and research in interference detection technique

- System construction
  - IDM system structure and function
  - Work procedure of IDM data center design
- Interference detection technique
  - Study of kinds of RF interference detection technique
  - Crowd sourcing technique
  - Develop the ionospheric scintillation monitoring equipment

Thank you!