

|  |
| --- |
| **ITU-R BS.1615-1 建议书**  **(05/2011)** |
| **30 MHz以下频率数字声音广播 的“规划参数”** |
| **BS 系列**  **广播业务(声音)** |

# 前言

无线电通信部门的职责是确保卫星业务等所有无线电通信业务合理、平等、有效、经济地使用无线电频谱，不受频率范围限制地开展研究并在此基础上通过建议书。

无线电通信部门的规则和政策职能由世界或区域无线电通信大会以及无线电通信全会在研究组的支持下履行。

**知识产权政策（IPR）**

ITU-R的IPR政策述于ITU-R第1号决议的附件1中所参引的《ITU-T/ITU-R/ISO/IEC的通用专利政策》。专利持有人用于提交专利声明和许可声明的表格可从<http://www.itu.int/ITU-R/go/patents/en>获得，在此处也可获取《ITU-T/ITU-R/ISO/IEC的通用专利政策实施指南》和ITU-R专利信息数据库。

|  |  |
| --- | --- |
| ITU-R系列建议书  （也可在线查询 <http://www.itu.int/publ/R-REC/en>） | |
| **系列** | 标题 |
| **BO** | 卫星传送 |
| **BR** | 用于制作、存档和播出的录制；电视电影 |
| **BS** | 广播业务（声音） |
| **BT** | 广播业务（电视） |
| **F** | 固定业务 |
| **M** | 移动、无线电定位、业余和相关卫星业务 |
| P | 无线电波传播 |
| **RA** | 射电天文 |
| **RS** | 遥感系统 |
| **S** | 卫星固定业务 |
| **SA** | 空间应用和气象 |
| **SF** | 卫星固定业务和固定业务系统间的频率共用和协调 |
| **SM** | 频谱管理 |
| **SNG** | 卫星新闻采集 |
| **TF** | 时间信号和频率标准发射 |
| **V** | 词汇和相关问题 |

|  |
| --- |
| **说明：**该ITU-R建议书的英文版本根据ITU-R第1号决议详述的程序予以批准。 |

电子出版  
2011年，日内瓦

© ITU 2011

版权所有。未经国际电联书面许可，不得以任何手段复制本出版物的任何部分。

ITU-R BS.1615-1建议书

30 MHz以下频率数字声音广播的“规划参数”

（2003-2011年）

国际电联无线电通信全会

考虑到

a) 国际电联无线电通信部门（ITU-R）正在紧急研究30 MHz以下划分给广播业务的频段内数字广播调制发射的发展问题；

b) ITU-R BS.1514建议书描述了适合于30 MHz以下频段广播的数字系统；

c) 考虑到b)中所述建议书并未包括适用于有用和无用模拟和数字发射所有相关组合的射频保护比数值；

d) 考虑到b)中所述建议书并未包括有用数字发射的最小可用场强值；

e) 模拟发射将继续在低频（LF）、中频（MF）和高频（HF）频段中存在一段时间；

f) 提供统一的“规划参数”将有助于在这些频段引入数字发射，

做出建议

**1** 附件1中给出的相关最小可用场强值[[1]](#footnote-1)应作为在30 MHz以下频段内引入数字广播的导则；

**2** 本建议书附件2和附件3中给出的相关射频保护比可作为在做出建议1中所述频段内引入数字广播业务的导则，

请ITU-R

**1** 开发适于在低频、中频和高频频段引入数字广播发射的计算机软件，同时考虑本建议书附件所涵盖的“规划参数”并积极参与此开发进程。

附件 1  
  
30 MHz以下频率数字声音广播（DSB）  
（数字世界广播（DRM）系统）的最小可用场强

# 1 引言

本附件中与最小可用场强有关的信息依赖于采用DRM系统进行的测量。在适用本附件附录1所述的程序后，从信噪比（*S/N*）结果获得了数值。已在评估*S/N*值时考虑了系统参数及不同频段传播条件变化的影响。

注 1 – ITU-R BS.2144报告研究了在30 MHz以下频段引入数字声音广播的原因并探讨了相关技术。

# 2 相关发射参数

## 2.1 DRM强健模式

在DRM规范中，定义了低频、中频和高频频段中各种传播条件下的四种不同参数（副载波数量和间隔、有用符号和保护间隔长度等）正交频分复用（OFDM）传输方式的强健模式（见表1）。

表 1

DRM强健模式

|  |  |  |
| --- | --- | --- |
| 强健模式 | 典型传播条件 | 优选频段 |
| A | 地波信道，略有衰减 | LF, MF |
| B | 时间和频率选择性信道，具有更长的时延扩展 | MF, HF |
| C | 与强健模式B相同，但具有更大的多普勒扩展 | 仅HF |
| D | 与强健模式B相同，但具有更严重的时延和多普勒扩展 | 仅HF |

## 2.2 频谱占用类型

对于每种强健模式，占用信号带宽可根据频段和所需应用而变化。所述的频谱占用类型示于表2。

表 2

DRM各种强健模式组合的带宽（kHz）

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 强健模式 | 频谱占用类型 | | | | | |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
| **A** | 4.208 | 4.708 | 8.542 | 9.542 | 17.208 | 19.208 |
| **B** | 4.266 | 4.828 | 8.578 | 9.703 | 17.203 | 19.266 |
| **C** |  |  |  | 9.477 |  | 19.159 |
| **D** |  |  |  | 9.536 |  | 19.179 |
| 标称带宽 (kHz) | 4.5 | 5 | 9 | 10 | 18 | 20 |

表2最后一行中的带宽为DRM信号各自频谱占用类型的标称带宽且从A行到D行为不同强健模式组合的实际信号带宽。

## 2.3 调制和保护等级

音频业务在DRM复用的主业务信道（MSC）中进行传输。对于各种强健模式，为MSC定义了两种不同的调制方法（16-或64-QAM），可分别与两种(16-QAM)或四种(64-QAM)保护等级共同使用。

每种保护等级以两种(16-QAM)或三种(64-QAM)卷积编码器的特定参数集为特征，在调制器中生成整个多层编码过程的特定平均码速率。对于16-QAM保护等级，0对应着0.5的平均码速率；第1对应着0.62的平均码速率。对于64-QAM保护等级，0至第3对应着0.5、0.71和 0.78的平均码速率。

# 3 计算最小可用场强

要获得DRM数字音频业务质量足够高的业务，需要大约1 × 10–4的误码率（BER）。除系统参数外，接收机输入端要实现此BER的所需*S/N*也取决于不同频段的传播条件。相关细节可见本附件附录2和3。

在这些*S/N*值的基础上，可应用本附件附录1的程序计算最小可用场强。相关结果可见表3至表6。对于低频和中频频段（表3至表5），仅包含了DRM强健模式A的结果。如果准备在这些频段采用其它的强健模式，可根据本附件附录2中给出的这些模型的*S/N*值计算对应的场强值。

表 3

DRM强健模式A在频谱占用类型为0或2 (4.5或9 kHz)的情况下，要实现1 × 10–4的BER时的最小可用场强（dB(µV/m)）（取决于低频频段的调制方法和保护等级）（地波传播）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方式 | 保护等级 | 平均码速率 | 强健模式/频谱占用类型 | |
| A/0 (4.5 kHz) | A/2 (9 kHz) |
| 16-QAM | 0 | 0.5 | 39.3 | 39.1 |
| 1 | 0.62 | 41.4 | 41.2 |
| 64-QAM | 0 | 0.5 | 44.8 | 44.6 |
| 1 | 0.6 | 46.3 | 45.8 |
| 2 | 0.71 | 48.0 | 47.6 |
| 3 | 0.78 | 49.7 | 49.2 |

表 4

DRM强健模式A在不同频谱占用类型的情况下，要实现1 × 10–4的BER时的最小可用场强（dB(µV/m)）（取决于中频频段的调制方法和保护等级）（地波传播）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方式 | 保护等级 | 平均码速率 | 强健模式/频谱占用类型 | |
| A/0 (4.5 kHz), A/1 (5 kHz) | A/2 (9 kHz), A/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | 33.3 | 33.1 |
| 1 | 0.62 | 35.4 | 35.2 |
| 64-QAM | 0 | 0.5 | 38.8 | 38.6 |
| 1 | 0.6 | 40.3 | 39.8 |
| 2 | 0.71 | 42.0 | 41.6 |
| 3 | 0.78 | 43.7 | 43.2 |

表 5

DRM强健模式A在不同频谱占用类型的情况下，要实现1 × 10–4的BER时的最小可用场强（dB(µV/m)）（取决于中频频段的调制方法和保护等级）（地波+天波传播）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方式 | 保护等级 | 平均码速率 | 强健模式/频谱占用类型 | |
| A/0 (4.5 kHz), A/1 (5 kHz) | A/2 (9 kHz), A/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | 34.3 | 33.9 |
| 1 | 0.62 | 37.2 | 37.0 |
| 64-QAM | 0 | 0.5 | 39.7 | 39.4 |
| 1 | 0.6 | 41.1 | 40.8 |
| 2 | 0.71 | 44.2 | 43.7 |
| 3 | 0.78 | 47.4 | 46.5 |

表 6

DRM强健模式B在频谱占用类型为1或3（5或10 kHz）的情况下，要实现1 × 10–4的  
BER时的最小可用场强范围（dB(µV/m)）（取决于高频频段的  
调制方法和保护等级）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方式 | 保护等级 | 平均码速率 | 强健模式/频谱占用类型 | |
| B/1 (5 kHz) | B/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | 19.2-22.8 | 19.1-22.5 |
| 1 | 0.62 | 22.5-25.6 | 22.2-25.3 |
| 64-QAM | 0 | 0.5 | 25.1-28.3 | 24.6-27.8 |
| 1 | 0.6 | 27.7-30.4 | 27.2-29.9 |

注 1 – 表3至表6数值的推导基于本附件附录1最后一行给出的数字接收机固有内禀噪声的等级。但是，当外部噪声的影响大于接收机固有内禀噪声时，外部噪声值应取代本附件附录1中相应的固有内禀噪声值。可随后采用本附件附录1中所述程序进行表3至表6最小可用场强值的变更。

目前，场强计算中未考虑的是天线设计和整合到现代接收机时的所有变化（也参见本附件附录1）。

表6显示了在高频信道采用强健模式B时，要获得BER目标所需的最小可用场强范围。该范围给出了各种变化的传播信道条件所造成的结果扩展情况（系统性能评估有关的详情，见本附件附录2）。至于低频和中频频段，其他强健模式的场强值可根据本附件附录2给出的*S/N*值进行计算。由于在OFDM参数中缺乏强健性（副载波的保护间隔长度和频率间隔），仅模式A不适用于高频发射。

由于甚至在更高*S/N*也会出现弱误差保护产生的比特误差本底，与表3至表5的条目相比，表6未包括高频频段保护等级2和3以及64-QAM的结果。因此，这些保护等级不建议用于强时间和/或频率选择性行为信道的高频传输（见本附件附录2和附录3）。

# 4 进一步说明

在DRM实地测试中，还认识到数字宽带OFDM信号的衰落度明显小于相同传播条件下的模拟调幅（AM）传输（主要为载波）。在预测中值场强的算法（ITU-R P.533建议书）或通过修改相应衰减余量计算传输可靠性（ITU-R P.842建议书）时需要考虑此事实。此外，ITU-R P.842建议书“计算高频无线电系统的可靠性和兼容性”进行了简化假定，这些假定不太可能适用于特定的数字调制。

附件1的  
附录1  
  
估算最小可用场强的程序

**1** 根据ITU‑R BS.703建议书“用于规划目的的调幅声音广播参考接收机的特性”的规定，接收机采用内置天线进行接收。

# 2 接收机灵敏度

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | 双边带 (DSB) (AM) | | 数字 | |
| 1 要求的接收质量 | | 声音频率*S/N*： 26 dB  30% (−10.5 dB)的调制(ITU‑R BS.703建议书) | | BER = 1 × 10–4 | |
| 2 上述质量的要求*C/N* (dB) | | 26 + 10.5 = 36.5 | | x | |
| 3 接收机中频带宽(kHz) | | 8 | | 10  (接收机固有内禀噪声比DSB高1 dB) | |
| 4 上述*C/N*的接收机灵敏度(dB(μV/m)) | LF | 66 | ITU‑R BS.703建议书的要求 | 30.5 + x | (接收机固有内禀噪声以上x dB) |
| MF | 60 | 24.5 + x |
| HF | 40 | 4.5 + x |
| 5 对于上述灵敏度，与场强有关的接收机固有内禀噪声(dB(μV/m)) | LF | 29.5 | (灵敏度以下36.5 dB (*C/N*)) | 30.5 | (比DSB高1 dB) |
| MF | 23.5 | 24.5 |
| HF | 3.5(1) | 4.5 |
| (1) 3.5 dB(μV/m)的该值也述于ITU‑R BS.560建议书的附件4。  注 1 – 对于数字接收机，应采用*S/N*的表达式，而不是*C/N*，后者用于模拟DSB接收机。  注 2 – 参考DSB的固有内禀噪声可按照灵敏度以下36.5 dB计算。  注 3 – 由于中频带宽的差异，参考数字接收机的固有内禀噪声估计比DSB约高1 dB且x dB *S/N*的参考数字接收机的灵敏度按照上述x dB进行计算。X值取自于表 8。  注 4 – 采用小尺寸内置天线的任意接收机的天线损耗的增加直接增加了与场强有关的接收机固有内禀噪声，这应考虑在内。 | | | | | |

# 3 其他需要考虑的因素

需要考虑外部噪声电平（不断增加的人为噪声）和某些外部噪声的脉冲属性。ITU-R P.372建议书涉及无线电噪声，包括脉冲噪声的某些信息。这提供了一些数字系统所遇到噪声电平的说明。也包括了遥远雷雨的积分效应且对振幅概率密度函数的统计特性进行了建模。适用信息的方法述于ITU-R P.372建议书。

附件1的  
附录2  
  
DRM接收的所需信噪比

# 1 引言

在ITU-R BS.1514建议书中，建议DSB在30 MHz以下的广播频段采用DRM系统。为了使通过此系统传输的数字声音节目获得足够高的业务质量，需要约为1 × 10–4的BER。以下给定了相关频段内典型传播条件下获得此BER所需的*S/N*比值。数值通过在近期欧洲电信标准协会（ETSI）于 2001年9月作为TS 101 980 (V1.1.1)公布的现有DRM规范基础上开发的接收机设备测试获得。根据这些*S/N*值，可采用附件1附录1所述的程序计算对应的最小可用场强。

# 2 低频/中频频段的*S/N*值

附件1的附录3详细叙述了用来评估系统性能的传输信道模型。第1信道模型代表着低频和中频频段白天地波传播下的传输信道典型性能。表7中，给出了在此信道内获得1 × 10–4的BER，在不同强健模式及其典型频谱占用类型（模式A为2，即标称信道带宽为9 kHz；其他模式为3，即10 kHz）所需的*S/N*。

对于地波传播基础上的实际传输，由于更高的可获取业务数据速率，仅建议了强健模式A。其他模式的数值包括在表7中，仅供参考。与模式A相比，其*S/N*性能的退化可用各模式之间数据数量和导频副载波之比不断变化这一事实来说明。有了模式的强健性之后，与数据副载波相比功率增强的导频副载波的数量也在增加，因此，其余数据副载波的平均可用功率则在下降。

表 7

所有频谱占用类型为2或3（9或10 kHz，取决于第1信道模型调制方法和保护等级）  
的DRM 强健模式要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 强健模式/频谱占用类型 | | | |
| A/2  (9 kHz) | B/3 (10 kHz) | C/3 (10 kHz) | D/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | 8.6 | 9.3 | 9.6 | 10.2 |
| 1 | 0.62 | 10.7 | 11.3 | 11.6 | 12.1 |
| 64-QAM | 0 | 0.5 | 14.1 | 14.7 | 15.1 | 15.9 |
| 1 | 0.6 | 15.3 | 15.9 | 16.3 | 17.2 |
| 2 | 0.71 | 17.1 | 17.7 | 18.1 | 19.1 |
| 3 | 0.78 | 18.7 | 19.3 | 19.7 | 21.4 |

对于标称信道带宽为9或10 kHz的联播应用，DRM频谱占用类型0和1是合适的。仅强健模式A和B提供了此特征。第1信道模式的对应*S/N*值见表8。

表 8

频谱占用类型为0或1（4.5或5 kHz，取决于第1信道模型调制方法和保护等级）  
的DRM强健模式A和B要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 强健模式/频谱占用类型 | |
| A/0  (4.5 kHz) | B/1  (5 kHz) |
| 16-QAM | 0 | 0.5 | 8.8 | 9.5 |
| 1 | 0.62 | 10.9 | 11.5 |
| 64-QAM | 0 | 0.5 | 14.3 | 14.9 |
| 1 | 0.6 | 15.8 | 16.2 |
| 2 | 0.71 | 17.5 | 17.9 |
| 3 | 0.78 | 19.2 | 19.5 |

对于频谱占用类型1或3的强健模式A或者对于频谱占用类型0或2的强健模式B的应用，还建议了表7和表8中的*S/N*值，因为性能的差异小于0.1 dB。

与第1信道模式相比，第2信道模式代表着除地波以外，包括延时的天波在内的中频夜间的波传播模型。该信道所需的*S/N*见表9。只给定了相关强健模式A和B的结果（以及更低的频谱占用类型）。

表 9

不同频谱占用类型（取决于第12道模型调制方法和保护等级）的DRM  
强健模式A和B要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 强健模式/频谱占用类型 | | | |
| A/0  (4.5 kHz) | A/2 (9 kHz) | B/1  (5 kHz) | B/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | 9.8 | 9.4 | 10.3 | 10.2 |
| 1 | 0.62 | 12.7 | 12.5 | 13.2 | 13.1 |
| 64-QAM | 0 | 0.5 | 15.2 | 14.9 | 15.8 | 15.6 |
| 1 | 0.6 | 16.6 | 16.3 | 17.3 | 16.9 |
| 2 | 0.71 | 19.7 | 19.2 | 20.4 | 19.7 |
| 3 | 0.78 | 22.9 | 22.0 | 22.8 | 22.3 |

与纯地波传播相比，由于不断增加的频率选择性以及特别是由于天波造成的时间选择性信道的缓慢性能，系统性能退化。数值显示了信道编码强度和*S/N*衰减之间的相关性，即随着编码速率的增加，衰减也在增加。但要正确分析结果，就需要认为，在假定地波传播的噪声功率相同的情况下，额外的天波功率将导致接收的信号功率大约增加1dB，即这种情况下导致的衰减是少量的，至少对于所采用的足够强大的纠错方法是这样（保护等级0和1）。

# 3 高频频段的*S/N*值

表10至表13给定了第3至第6信道模型适用于高频传输的三种强健模式的*S/N*值。模型A不适用于高频，因其在OFDM参数（保护间隔的长度和副载波的频率间隔）中缺乏强健性。在模式B的情况下，包括了频谱占用类型1和3的结果。仅强健模式D也适用于第6信道模型特长路径时延和多普勒扩展的信道，这是热带接近垂直入射天波传播的典型示例。

对于16-QAM调制以及带有强力误差保护的64-QAM（保护等级0和1），强健模式B获得了最佳性能，即实现最高质量音频传输所需的*S/N*值最小。在第5信道模型上，两个路径的快速衰减占主导地位，由于同步和信道评估而造成的模型C和D的更好强健模式在编码强度降低的情况下发挥着越来越重要的作用。

尽管如此，保护等级2和3与64-QAM综合在一起的结果显示出由于甚至在更高*S/N*也出现比特误差本底而造成的性能不断退化。因此，不建议将这些保护等级用于像信道模型3至6的、带有很强时间和/或频率选择性性能信道的高频传输。也应铭记，不同表中给出的结果可代表高频传输的典型恶劣情况，但不一定是最差情况。高频和中频天波传播的*S/N*值需视为获取所需业务质量的一个有用量度，但不能在所有情况下保证其的实现。

表 10

频谱占用类型为1的DRM 强健模式B（取决于信道模型3至6的调制方法和保护等级）  
要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 信道模型编号 | | | |
| 3 | 4 | 5 | 6 |
| 16-QAM | 0 | 0.5 | 18.3 | 16.2 | 14.7 | – |
| 1 | 0.62 | 21.1 | 19.3 | 18.0 | – |
| 64-QAM | 0 | 0.5 | 23.8 | 21.5 | 20.6 | – |
| 1 | 0.6 | 25.9 | 23.7 | 23.2 | – |
| 2 | 0.71 | 29.0(1) | 27.0(1) | 29.4(1) | – |
| 3 | 0.78 | 31.2(1) | 30.0(1) | – | – |
| (1) 不建议用于具有严重时间和频率选择性衰减的高频传播条件的保护等级。 | | | | | | |

表 11

频谱占用类型为3的DRM 强健模式B（取决于信道模型3至6的调制方法和保护等级）  
要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 信道模型编号 | | | |
| 3 | 4 | 5 | 6 |
| 16-QAM | 0 | 0.5 | 18.0 | 16.0 | 14.6 | – |
| 1 | 0.62 | 20.8 | 19.0 | 17.7 | – |
| 64-QAM | 0 | 0.5 | 23.3 | 21.3 | 20.1 | – |
| 1 | 0.6 | 25.4 | 23.5 | 22.7 | – |
| 2 | 0.71 | 28.3(1) | 26.8(1) | 27.0(1) | – |
| 3 | 0.78 | 30.9(1) | 29.7(1) | – | – |
| (1) 不建议用于具有严重时间和频率选择性衰减的高频传播条件的保护等级。 | | | | | | |

表 12

频谱占用类型为3的DRM 强健模式C（取决于信道模型3至6的调制方法和保护等级）  
要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 信道模型编号 | | | |
| 3 | 4 | 5 | 6 |
| 16-QAM | 0 | 0.5 | 18.0 | 16.5 | 14.6 | – |
| 1 | 0.62 | 20.9 | 19.1 | 17.6 | – |
| 64-QAM | 0 | 0.5 | 23.6 | 21.3 | 20.2 | – |
| 1 | 0.6 | 25.6 | 23.7 | 22.3 | – |
| 2 | 0.71 | 29.0(1) | 26.8(1) | 26.4(1) | – |
| 3 | 0.78 | 32.3(1) | 29.6(1) | 33.3(1) | – |
| (1) 不建议用于具有严重时间和频率选择性衰减的高频传播条件的保护等级。 | | | | | | |

表 13

频谱占用类型为3的DRM 强健模式D（取决于信道模型3至6的调制方法和保护等级）  
要实现1 × 10–4BER的*S/N* (dB)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 编号 | 平均码速率 | 信道模型编号 | | | |
| 3 | 4 | 5 | 6 |
| 16-QAM | 0 | 0.5 | 18.5 | 16.9 | 15.3 | 16.0 |
| 1 | 0.62 | 21.2 | 19.9 | 18.3 | 19.2 |
| 64-QAM | 0 | 0.5 | 24.2 | 22.2 | 20.8 | 22.1 |
| 1 | 0.6 | 26.3 | 24.5 | 22.9 | 25.2 |
| 2 | 0.71 | 29.2(1) | 27.6(1) | 27.2(1) | 29.3(1) |
| 3 | 0.78 | 32.1(1) | 31.7(1) | 35.5(1) | 32.5(1) |
| (1) 不建议用于具有严重时间和频率选择性衰减的高频传播条件的保护等级。 | | | | | | |

附件1的  
附录3  
  
30 MHz以下频率DSB无线电波传播的预测和建模

# 1 引言

要引入DSB，就需要考虑低频、中频和高频频段无线电信道对接收质量的影响。原则上，所有三种均为多路径信道，因为电磁波传播机制中涉及到了地球表面和电离层。在本附录的以下部分，描述了预测和仿真多路径概况的方法。

# 2 预测高频天波传播

对于天波传播，ITU-R P.533建议书“预测高频电路性能的方法”在方法中提供了波参数模式和场强的参数。此建议书预测的、最远至7000公里距离的单个波传播模式的时延，由下式给定：



其中：

*p*′: 实际倾斜距离（公里）

*c*: 光速（公里/秒）

根据ITU-R P.533建议书第5.1.3节程序所决定的每个单独模式的时延数值可与各种模式的预测场强联合使用，以给出中值时延图，由此预测多路径时间扩展。

当单一传播模式（如一跳F）工作时，传播可最多包括四个多径部分，因为在靠近最大可用频率（MUF）的频率上，可能会有O和X（磁离子极化部分）以及大角和小角射线。当工作频率/MUF之比超过0.9时，磁离子部分是可溶的且有两到四个同等相对功率的射线，总时间色散为0.3至0.6毫秒。随着当工作频率/MUF之比降到0.9以下且O和X模式合并及大角度射线的散焦和消失，各种距离以及工作频率与即时路径MUF比例的最大多路径扩展的典型数值示于图1。

图 1

多径延迟时间



这些数值可能不适用于日落之后穿越赤道（低磁倾角）地区或电离层扰动期间的极光区域的路径。在这些情况下，时间扩散可能增加至最大约4毫秒。在赤道电离层不规则的主要期间（即3-4月、6月、9-10月），这种情况可能最为严重。

作为测定模式结构和高频天波信号多模式衰减的协助，每种模式可近似用Rice-Nakagami分布进行描述，其中k因子将描述层的反射与漫反射之比。

# 3 预测中频地波和天波传播

关于中频，建议将ITU-R P.1321建议书“影响低频和中频采用数字调制方法的系统的传播因素”的简化方法用于地波和天波预测。

# 4 传播信道的建模

方法是采用静态统计数字的随机时变模型并通过选取一般模型的适当参数来定义良好、中等和恶劣条件的模型。这些带有可变参数的模型中，一个就是广义平稳非相关散射（WSSUS）模型。不同参数集的静止模型的理由是真实信道的结果导致了仿真在最好情况和最坏情况之间的误码率曲线。

根据以下公式生成信道模型，其中e(t)和s(t)分别为输入和输出信号的复包络：

 (1)

这是一个分支延迟线，其中：

ρk: 第k号路径的衰减（列于表 14）

Δk: 第k号路径的相对时延（列于表 14）。

时变抽头加权{ck(t)}为零平均复值静止高斯随机程序。数值|ck(t)|为雷利分布且相位Φ(t)为均匀分布。

对于每个加权{ck(t)}，都有一个随机过程，其特征是其方差及其功率密度谱（PDS）。方差是通过此路径接收的平均信号功率的度量，并由相对衰减ρk定义且PDS决定时间上变化的平均速度。PDS的宽度由数字进行量化并称为该路径的多普勒扩展Dsp（列于表14）。

也可能存在一个PDS非零中心频率，它可理解为平均频率偏移或多普勒偏移Dsh, （列于表14）。

通过过滤白噪声（即采用不变的PDS）对PDS进行建模，其等于：

 (2)

H( *f* ) 为滤波器的传递函数。然后，属于每个独立路径的随机过程变为雷利过程（Rayleigh processe）。对于电离层路径，已证明高斯型对于实际观测是一种十分优秀的方法。

然后，每个路径*k*上的多普勒图定义为：

 (3)

多普勒扩展规定为双边且包含68%的功率：

 (4)

表 14

传输信道模型集

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第1信道模型 （加性白高斯噪声） | | 良好：  典型/中等：  恶劣： | LF, MF, HF  *S/N*可变的LF | |
|  | 路径 1 |  |  |  |
| 延迟，Δ*k* (ms) | 0 |  |  |  |
| 路径增益，均方根，ρ*k* | 1 |  |  |  |
| 多普勒偏移，*Dsh* (Hz) | 0 |  |  |  |
| 多普勒扩展，*Dsp* (Hz) | 0 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第2信道模型 （地波+天波） | | 良好：  典型/中等：  恶劣： | MF, HF | |
|  | 路径1 | 路径2 |  |  |
| 延迟，Δ*k* (ms) | 0 | 1 |  |  |
| 路径增益，均方根，ρ*k* | 1 | 0.5 |  |  |
| 多普勒偏移，*Dsh* (Hz) | 0 | 0 |  |  |
| 多普勒扩展，*Dsp* (Hz) | 0 | 0.1 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第3信道模型 | | 良好：  典型/中等：  恶劣： | HF MF | |
|  | 路径1 | 路径2 | 路径3 | 路径4 |
| 延迟，Δ*k* (ms) | 0 | 0.7 | 1.5 | 2.2 |
| 路径增益，均方根，ρ*k* | 1 | 0.7 | 0.5 | 0.25 |
| 多普勒偏移，*Dsh* (Hz) | 0.1 | 0.2 | 0.5 | 1.0 |
| 多普勒扩展，*Dsp* (Hz) | 0.1 | 0.5 | 1.0 | 2.0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第4信道模型 | | 良好：  典型/中等：  恶劣： | HF | |
|  | 路径1 | 路径2 |  |  |
| 延迟，Δ*k* (ms) | 0 | 2 |  |  |
| 路径增益，均方根，ρ*k* | 1 | 1 |  |  |
| 多普勒偏移，*Dsh* (Hz) | 0 | 0 |  |  |
| 多普勒扩展，*Dsp* (Hz) | 1 | 1 |  |  |

表 14（完）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第5信道模型 | | 良好：  典型/中等：  恶劣： | HF | |
|  | 路径1 | 路径2 |  |  |
| 延迟，Δ*k* (ms) | 0 | 4 |  |  |
| 路径增益，均方根，ρ*k* | 1 | 1 |  |  |
| 多普勒偏移，*Dsh* (Hz) | 0 | 0 |  |  |
| 多普勒扩展，*Dsp* (Hz) | 2 | 2 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 第6信道模型 （热带地区接近垂直入射） | | 良好：  典型/中等：  恶劣： | HF | |
|  | 路径1 | 路径2 | 路径3 | 路径4 |
| 延迟，Δ*k* (ms) | 0 | 2 | 4 | 6 |
| 路径增益，均方根，ρ*k* | 0.5 | 1 | 0.25 | 0.0625 |
| 多普勒偏移，*Dsh* (Hz) | 0 | 1.2 | 2.4 | 3.6 |
| 多普勒扩展，*Dsp* (Hz) | 0.1 | 2.4 | 4.8 | 7.2 |

附件 2  
  
30 MHz以下频率DSB（DRM系统）的射频保护比

# 1 引言

DRM规范允许采用几种DRM信号的强健模式（A至D）和频谱占用类型（0至5）。本附件中仅采用了强健模式（A至D）和频谱占用类型（0至5）的某些组合。所使用模式组合的参数，即OFDM信号中各自的副载波数量和对应的副载波间隔形成了表15中行A至行D的带宽。

表 15

DRM模式组合的带宽(kHz)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 强健模式 | 频谱占用类型 | | | | | |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
| **A** | 4.208 | 4.708 | 8.542 | 9.542 | 17.208 | 19.208 |
| **B** | 4.266 | 4.828 | 8.578 | 9.703 | 17.203 | 19.266 |
| **C** |  |  |  | 9.477 |  | 19.159 |
| **D** |  |  |  | 9.536 |  | 19.179 |
| 标称带宽(kHz) | 4.5 | 5 | 9 | 10 | 18 | 20 |

表15最后一行中的带宽为DRM信号各频谱占用的标称带宽且行A至D中给出的数值为不同模式组合的实际信号带宽。

# 2 射频保护比

频谱占用类型和强健模式的组合形成了几种发射机射频谱，这产生了不同的干扰，因此需要不同的射频保护比。采用的计算方法述于本附件的附录2。不同DRM强健模式的保护比差异相当小。因此，以下表格中所示的射频保护比限于强健模式B。本附件附录1包含了计算结果的更多信息。

表16显示了调幅受到数字干扰的结算结果，表17显示了数字受到调幅干扰的计算结果。这些结果是根据高压缩的调幅信号计算的。数字受到数字干扰的射频保护比给定在表18中。采用不同调制方法和保护比的DRM接收校正值给定在表19中。

表16至表18中的数值代表相对射频保护比*ARF\_relative*。对于纯调幅的情况，相对保护比为有用和无用发射机载波频差为Δf Hz时的保护比与这些发射机的载波具有相同频率时的保护比两者之间的差异（dB）（ITU‑R BS.560建议书），即同频射频保护比*ARF*，它对应着音频（AF）保护比*AAF*。在数字信号的情况下，其标称频率为决定频差的相关值，而不是载波频率。对于频谱占用类型2和3，标称频率对应着OFDM块的中心频率；对于类型0和1，中心频率各自在标称频率以上偏移2.2和2.4 kHz。由于干扰信号的频谱有别于模拟调幅的音频频谱，同频干扰情况下的相对射频保护比数值不等于零。

要将表表16调整至给定的调幅规划情形下，需将相关AF保护比相加到表中的数值上，以获得所需的射频保护比（见本附件附录2）。可在考虑以下因素的情况下决定相关数值：

– 对于高频中调幅受调幅干扰的情况，1987年广播业务划分频段规划的世界无线电行政大会采用了17dB 的AF保护比；

– 对于低频和中频中调幅受调幅干扰的情况，1区和3区低频和中频区域性行政广播大会（1975年，日内瓦）采用了30dB的AF保护比。

将DRM作为有用信号，音频保护比作为业务质量的一个参数，需用获得特定误码率所需的信干比（*S/I*）替换。计算假定了1 × 10–4 的误码率门限（见附件1）。表17和18中的保护比数值基于64-QAM调制和保护等级1。对于其他组合，需将表19中的校正值加到表中的*S/I*值上。

表 16

30 MHz以下广播系统之间相对射频保护比 (dB)  
数字干扰调幅

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用 信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *AAF*(1),(2)(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| AM | DRM\_B0(3) | –50.4 | –50.4 | –49 | –35.5 | –28.4 | 6.4 | 6.6 | –30.9 | –46.7 | –48.2 | –50.4 | –50.4 | –50.4 | 4.5 | – |
| AM | DRM\_B1(4) | –51 | –50.5 | –47.6 | –32 | –23.8 | 6 | 6 | –31.1 | 45.7 | 47.4 | –51 | –51 | –51 | 5 | – |
| AM | DRM\_B2 | –48.8 | –46.9 | –43.5 | –34.4 | –29.7 | 3.4 | 6.5 | 3.4 | –29.7 | –34.4 | –43.5 | –46.9 | –48.8 | 9 | – |
| AM | DRM\_B3 | –47.2 | –45.3 | –41.9 | –32 | –25.9 | 3 | 6 | 3 | –25.9 | –32 | –41.9 | –45.3 | –47.2 | 10 | – |
| AM | DRM\_B4 | −35.3 | −27.4 | −1.3 | 3.4 | 3.4 | 3.4 | 3.4 | 0.3 | −27.4 | −32.9 | −39.2 | −41.9 | −43.3 | 18 |  |
| AM | DRM\_B5 | −29.3 | −14.6 | 0.1 | 3 | 3 | 3 | 3 | 0.1 | −22.5 | −28.8 | −38.2 | −40.9 | −42.2 | 20 |  |
| *BDRM*： DRM信号的标称带宽。  DRM\_B0： DRM信号，强健模式B，频谱占用类型0。  (1) 数字干扰调幅的射频保护比可根据给定的规划情形，向表中数值增加一个合适的音频保护比进行计算。  (2) 此表所示数值指高调幅压缩的特定情况。为与表17保持一致，为调幅信号假定了相同的调制深度，即与高压缩有关的深度。为了向普通等级（如附件2附录1所述）的调幅信号提供足够的保护，表中每个数值均应增加，以适应普通和高压缩之间的差异。  (3) DRM\_B0传输的中心频率偏移至标称频率以上约2.2kHz。  (4) DRM\_B1传输的中心频率偏移至标称频率以上约2.4kHz。 | | | | | | | | | | | | | | | | |

表 17

30 MHz以下广播系统之间相对射频保护比 (dB)   
调幅干扰数字（64-QAM, 保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B0(1) | AM | –57.7 | –55.5 | –52.2 | –46.1 | –45 | –36.2 | 0 | –3.5 | –30.9 | –41.1 | –46.9 | –50.6 | –53 | 4.5 | 4.6 |
| DRM\_B1(2) | AM | –57.4 | –55.2 | –51.9 | –45.9 | –44.7 | –36 | 0 | –0.2 | –22 | –37.6 | –46 | –49.6 | –52 | 5 | 4.6 |
| DRM\_B2 | AM | –54.6 | –52.4 | –48.8 | –42.8 | –33.7 | –6.4 | 0 | –6.4 | –33.7 | –42.8 | –48.8 | –52.4 | –54.6 | 9 | 7.3 |
| DRM\_B3 | AM | –53.9 | –51.5 | –48 | –39.9 | –25 | –3.1 | 0 | –3.1 | –25 | –39.9 | –48 | –51.5 | –53.9 | 10 | 7.3 |
| DRM\_B4 | AM | −53.8 | −52.2 | −48.6 | −42.7 | −36.7 | −7.6 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| DRM\_B5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| *S/I*：误码率为1 × 10–4的信噪比。  (1) DRM\_B0传输的中心频率偏移至标称频率以上约2.2kHz。  (2) DRM\_B1传输的中心频率偏移至标称频率以上约2.4kHz。 | | | | | | | | | | | | | | | | |

表 18

30 MHz以下广播系统之间相对射频保护比 (dB)   
数字干扰数字（64-QAM, 保护等级1）

| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B0 | DRM\_B0 | –60 | –59.9 | –60 | –55.2 | –53.2 | –40.8 | 0 | –40.8 | –53.2 | –55.2 | –60 | –59.9 | –60 | 4.5 | 16.2 |
| DRM\_B0 | DRM\_B1 | –60.1 | –60 | –59.5 | –52.5 | –50.4 | –37.4 | 0 | –40 | –51.6 | –53.6 | –59.8 | –60 | –60.1 | 5 | 15.7 |
| DRM\_B0 | DRM\_B2 | –57.4 | –55.7 | –52.9 | –46.7 | –45.1 | –36.6 | 0 | –0.8 | –35.6 | –38.4 | –47.7 | –51.5 | –53.6 | 9 | 13.2 |
| DRM\_B0 | DRM\_B3 | –55.2 | –53.6 | –50.7 | –44.5 | –42.9 | –33.1 | 0 | –0.1 | –13.6 | –36.2 | –45.5 | –49.3 | –51.4 | 10 | 12.6 |
| DRM\_B0 | DRM\_B4 | −41.30 | −39.20 | −38.00 | −0.90 | 0.00 | 0.00 | 0.00 | −0.80 | −30.20 | −26.80 | −41.00 | −43.90 | −45.50 | 18.00 | 10.30 |
| DRM\_B0 | DRM\_B5 | −38.80 | −36.20 | −30.80 | 0.00 | 0.00 | 0.00 | 0.00 | −0.20 | −13.00 | −27.50 | −39.40 | −42.30 | −43.80 | 20.00 | 9.80 |
| DRM\_B1 | DRM\_B0 | –59.4 | –59.5 | –59.5 | –55 | –53 | –40.8 | 0 | –37.9 | –51.7 | –53.9 | –59.4 | –59.5 | –59.4 | 4.5 | 16.2 |
| DRM\_B1 | DRM\_B1 | –60 | –60 | –59.5 | –52.8 | –50.8 | –37.8 | 0 | –37.8 | –50.8 | –52.8 | –59.5 | –60 | –60 | 5 | 16.2 |
| DRM\_B1 | DRM\_B2 | –57.1 | –55.4 | –52.6 | –46.4 | –44.9 | –36.4 | 0 | –0.1 | –13.7 | –36.8 | –46.6 | –50.5 | –52.7 | 9 | 13.2 |
| DRM\_B1 | DRM\_B3 | –55.5 | –53.8 | –51 | –44.8 | –43.3 | –33.5 | 0 | –0.1 | –8.1 | –35.2 | –45 | –48.9 | –51.1 | 10 | 13.2 |
| DRM\_B1 | DRM\_B4 | −41.30 | −39.30 | −38.10 | −1.40 | −0.40 | 0.00 | 0.00 | −0.40 | −13.70 | −27.60 | −40.40 | −43.30 | −45.00 | 18.00 | 10.90 |
| DRM\_B1 | DRM\_B5 | −39.00 | −36.60 | −31.30 | −0.10 | 0.00 | 0.00 | 0.00 | −0.10 | −7.90 | −31.30 | −39.10 | −41.90 | −43.60 | 20.00 | 10.40 |
| DRM\_B2 | DRM\_B0 | –57 | –56.8 | –54.8 | –43.4 | –39.1 | –0.7 | 0 | –40.6 | –52.2 | –53.9 | –57 | –57 | –57 | 4.5 | 15.9 |
| DRM\_B2 | DRM\_B1 | –56.9 | –56.1 | –52.7 | –40.2 | –14.1 | –0.1 | 0 | –39.7 | –50.8 | –52.5 | –56.9 | –57 | –57 | 5 | 15.4 |
| DRM\_B2 | DRM\_B2 | –55.1 | –53.1 | –49.5 | –40.7 | –38.1 | –3.7 | 0 | –3.7 | –38.1 | –40.7 | –49.5 | –53.1 | –55.1 | 9 | 15.9 |
| DRM\_B2 | DRM\_B3 | –52.9 | –51 | –47.4 | –38.6 | –16.6 | –3.2 | 0 | –3.2 | –16.6 | –38.6 | –47.4 | –51 | –52.9 | 10 | 15.4 |
| DRM\_B2 | DRM\_B4 | −37.20 | −32.80 | −5.10 | −0.40 | 0.00 | 0.00 | 0.00 | −3.70 | −32.80 | −29.40 | −42.50 | −45.20 | −46.80 | 18.00 | 13.40 |
| DRM\_B2 | DRM\_B5 | −32.60 | −32.60 | −3.60 | 0.00 | 0.00 | 0.00 | 0.00 | −3.60 | −37.50 | −32.10 | −43.10 | −45.80 | −47.30 | 20.00 | 12.90 |

表 18 (完)

| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B3 | DRM\_B0 | –56.4 | –56.2 | –53.8 | –41.1 | –14.1 | –0.1 | 0 | –37.7 | –50.9 | –52.8 | –56.4 | –56.4 | –56.4 | 4.5 | 15.9 |
| DRM\_B3 | DRM\_B1 | –56.8 | –55.7 | –52.1 | –38.2 | –8.2 | –0.1 | 0 | –37.6 | –50.1 | –51.9 | –56.7 | –57 | –57 | 5 | 15.9 |
| DRM\_B3 | DRM\_B2 | –54.3 | –52.3 | –48.6 | –39.3 | –16.7 | –3.1 | 0 | –3.1 | –16.7 | –39.3 | –48.6 | –52.3 | –54.3 | 9 | 15.9 |
| DRM\_B3 | DRM\_B3 | –52.7 | –50.7 | –47 | –37.7 | –11.1 | –3.1 | 0 | –3.1 | –11.1 | –37.7 | –47 | –50.7 | –52.7 | 10 | 15.9 |
| DRM\_B3 | DRM\_B4 | −40.80 | −37.90 | −5.00 | −0.40 | 0.00 | 0.20 | 0.00 | −3.80 | −37.90 | −31.50 | −42.70 | −45.50 | −46.90 | 18.00 | 13.70 |
| DRM\_B3 | DRM\_B5 | −34.40 | −8.00 | −3.10 | 0.00 | 0.00 | 0.00 | 0.00 | −3.10 | −10.90 | −33.80 | −40.70 | −43.50 | −44.90 | 20.00 | 13.40 |
| DRM\_B4 | DRM\_B0 | −54.00 | −53.90 | −52.90 | −43.90 | −44.80 | −1.10 | 0.00 | 0.00 | −0.30 | −1.50 | −45.20 | −51.10 | −53.10 | 4.50 | 16.60 |
| DRM\_B4 | DRM\_B1 | −54.60 | −54.20 | −52.00 | −41.60 | −19.60 | −0.90 | 0.00 | 0.00 | −0.80 | −2.00 | −45.50 | −50.70 | −52.80 | 5.00 | 16.60 |
| DRM\_B4 | DRM\_B2 | −54.00 | −52.40 | −49.10 | −41.40 | −41.80 | −4.00 | 0.00 | 0.20 | 0.00 | −0.50 | −5.40 | −41.80 | −43.60 | 9.00 | 16.40 |
| DRM\_B4 | DRM\_B3 | −52.40 | −50.70 | −47.30 | −41.90 | −19.70 | −3.60 | 0.00 | 0.40 | 0.00 | −0.50 | −4.80 | −19.70 | −49.40 | 10.00 | 16.20 |
| DRM\_B4 | DRM\_B4 | −40.6 | −37.7 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37.7 | −40.6 | 18 | 16.4 |
| DRM\_B4 | DRM\_B5 | −35.20 | −14.70 | −6.30 | −2.90 | −2.50 | −1.00 | 0.00 | −1.30 | −2.90 | −3.40 | −7.40 | −20.80 | −42.90 | 20.00 | 15.90 |
| DRM\_B5 | DRM\_B0 | −53.40 | −53.40 | −52.00 | −41.70 | −19.50 | −0.30 | 0.00 | 0.00 | 0.00 | 0.00 | −47.30 | −48.30 | −51.40 | 4.50 | 16.60 |
| DRM\_B5 | DRM\_B1 | −54.00 | −53.40 | −51.10 | −44.60 | −9.40 | −0.40 | 0.00 | 0.00 | 0.00 | −0.30 | −46.40 | −47.90 | −51.00 | 5.00 | 16.60 |
| DRM\_B5 | DRM\_B2 | −53.20 | −51.70 | −48.30 | −42.40 | −19.80 | −3.30 | 0.00 | 0.00 | 0.00 | 0.00 | −3.40 | −11.80 | −43.30 | 9.00 | 16.60 |
| DRM\_B5 | DRM\_B3 | −52.00 | −50.30 | −46.80 | −41.10 | −12.10 | −3.30 | 0.00 | 0.20 | 0.20 | 0.00 | −3.40 | −8.60 | −42.10 | 10.00 | 16.40 |
| DRM\_B5 | DRM\_B4 | −43.50 | −21.30 | −7.50 | −3.40 | −2.90 | −1.30 | 0.00 | −1.10 | −2.50 | −2.90 | −6.40 | −14.70 | −35.40 | 18.00 | 16.60 |
| DRM\_B5 | DRM\_B5 | −39.1 | −11.5 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.5 | −39.1 | 20 | 16.4 |

表 19

表17和18中用于其他调制方法和保护等级  
组合的信噪比校正值

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 | 平均码速率 | DRM  强健模式/频谱占用类型的校正值(dB) | |
| B/0 (4.5 kHz), B/1 (5 kHz) | B/2 (9 kHz), B/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | –6.7 | –6.6 |
| 1 | 0.62 | –4.7 | –4.6 |
| 64-QAM | 0 | 0.5 | –1.3 | –1.2 |
| 1 | 0.6 | 0.0 | 0.0 |
| 2 | 0.71 | 1.7 | 1.8 |
| 3 | 0.78 | 3.3 | 3.4 |

# 3 降低DSB的射频功率

要在现有环境下引入数字调制信号，须确保此新信号不会对其他调幅信号产生比数字调制信号所取代的调幅信号更大的干扰。当调幅干扰调幅以及数字干扰调幅的射频保护比已知时，可轻易找到满足此要求所需的功率降低数值。

射频保护比为有用和无用信号之间的所需功率差异，它确定着一种规定的质量（或者是模拟音频，或者是数字*S/N*）。当有用音频质量可与调幅干扰调幅以及数字干扰调幅比较时，射频保护比的差异即为所需的功率降低。

ITU-R BS.560建议书包含了调幅干扰调幅的相对射频保护比（见表20）。

表 20

调幅干扰调幅的相对射频保护比

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用 信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | |
|
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| AM | AM | –55.4 | –53.3 | –49.5 | –35.5 | –29.0 | –2.5 | 0.0 | –2.5 | –29.0 | –35.5 | –49.5 | –53.3 | –55.4 |

如此，不同DRM模式的所需功率降低可作为表23和表20的差异进行计算。结果见表21。

表21中，可以看出，对于某些模型，特定频率间隔上，为限制对调幅传输的干扰而所需的功率降低要稍微大于同频的数值。在那种情况下，需要考虑数字调制的信号是否在某处出现，干扰这些频率间隔中的一个且它是否是最强的干扰。如果是这样，就需要考虑更高的数值。

表 21

所需的功率降低

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 被替代 信号 | 新信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *AAF*(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| AM | DRM\_A0 | 5 | 2.9 | 0.4 | –0.1 | 0.5 | 9 | 6.6 | –28.6 | –17.9 | –12.8 | –0.9 | 2.9 | 5 | 4.5 | – |
| AM | DRM\_A1 | 4.5 | 2.7 | 1.6 | 3 | 4.5 | 8.6 | 6.1 | –28.8 | –17 | –12.2 | –1.4 | 2.4 | 4.5 | 5 | – |
| AM | DRM\_A2 | 6.5 | 6.3 | 5.9 | 1 | –0.8 | 5.9 | 6.6 | 5.9 | –0.8 | 1 | 5.9 | 6.3 | 6.5 | 9 | – |
| AM | DRM\_A3 | 8 | 7.8 | 7.4 | 3.1 | 2.5 | 5.6 | 6.1 | 5.6 | 2.5 | 3.1 | 7.4 | 7.8 | 8 | 10 | – |
| AM | DRM\_B0 | 5 | 2.9 | 0.5 | 0 | 0.6 | 8.9 | 6.6 | –28.4 | –17.7 | –12.7 | –0.9 | 2.9 | 5 | 4.5 | – |
| AM | DRM\_B1 | 4.4 | 2.8 | 1.9 | 3.5 | 5.2 | 8.5 | 6 | –28.6 | –16.7 | –11.9 | –1.5 | 2.3 | 4.4 | 5 | – |
| AM | DRM\_B2 | 6.6 | 6.4 | 6 | 1.1 | –0.7 | 5.9 | 6.5 | 5.9 | –0.7 | 1.1 | 6 | 6.4 | 6.6 | 9 | – |
| AM | DRM\_B3 | 8.2 | 8 | 7.6 | 3.5 | 3.1 | 5.5 | 6 | 5.5 | 3.1 | 3.5 | 7.6 | 8 | 8.2 | 10 | – |
| AM | DRM\_C3 | 7.9 | 7.7 | 7.3 | 2.9 | 2.3 | 5.6 | 6.1 | 5.6 | 2.3 | 2.9 | 7.3 | 7.7 | 7.9 | 10 | – |
| AM | DRM\_D3 | 8 | 7.8 | 7.3 | 3.1 | 2.5 | 5.6 | 6.1 | 5.6 | 2.5 | 3.1 | 7.3 | 7.8 | 8 | 10 | – |

附件2的  
附录1  
  
30 MHz以下频率DSB（DRM系统）  
的计算射频保护比

# 1 引言

本附录给定了有关调幅和DRM接收所需的计算射频保护比的更多信息。射频保护比根据本附件附录2第1段给出的参数，采用同一附录第2段所述的计算方法获得。

# 2 计算参数

## 2.1 模拟信号

调幅发射机

– 截止（Cut-off）频率或带宽： Ftx = 4.5 kHz, 即B = 9 kHz

– 低通音频滤波器： −60 dB/倍频程，从Ftx的0 dB开始

（见本附件附录2的图6）

– 谐波畸变： *k*2 = 0 *k*3 = 0.7% (−43 dB)

– 互调： *d*3 = −40 dB

– 噪声本底： −60.3 dBc/kHz

根据以上参数，计算的射频频谱符合ITU-R SM.328建议书所包括的频谱掩模。

调幅调制

– 无用信号的调制信号： 根据ITU‑R BS.559建议书的彩色噪声

– 调制深度： *mr.m.s.*= 25% (对应着普通压缩的节目信号)

– 高压缩： 将普通压缩的边带功率增加6.5 dB

调幅接收机

– 选择性曲线： *Baf* = 2.2 kHz，斜率= 35 dB/倍频程，见图2和图3

– 音频信号评估： 均方根用于信号评估[[2]](#footnote-2)

– 音频保护比： 所需值。

## 2.2 DRM信号

DRM规范允许采用几种DRM信号的强健模式（A至D）和频谱占用类型（0至5）。本附件中仅采用了强健模式（A至D）和频谱占用类型（0至3）的某些组合。所使用模式组合的参数，即OFDM信号中各自的副载波数量和对应的副载波间隔形成了表22中行A至行D的带宽。

表 22

DRM模式各种组合的带宽(kHz)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 强健模式 | 频谱占用类型 | | | | | |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
| **A** | 4.208 | 4.708 | 8.542 | 9.542 | 17.208 | 19.208 |
| **B** | 4.266 | 4.828 | 8.578 | 9.703 | 17.203 | 19.266 |
| **C** |  |  |  | 9.477 |  | 19.159 |
| **D** |  |  |  | 9.536 |  | 19.179 |
| 标称带宽 (kHz) | 4.5 | 5 | 9 | 10 | 18 | 20 |

表22最后一行中的带宽为DRM信号各频谱占用的标称带宽且行A至D中给出的数值为不同模式组合的实际信号带宽。

数字信号发射机

– 带宽： 见表22

– 频谱掩模： 根据ITU-R SM.328建议书、附件1第6.3.3节，采用表22的实际带宽*F*计算。这包括±0.53 *F*处的30 dB衰减，在此点以外，有着–12 dB/倍频程比–60 dB的斜率。图2和图3给定了频谱占用类型1（5 kHz）和3（10 kHz）的掩模示例（也包括调幅和数字接收机的滤波曲线）。

数字信号的接收机/解调器

– 带宽： 见表 22

– 突出部分（Shoulder）距离：52 dB[[3]](#footnote-3)

– 额外IF滤波器： BIF = 标称DRM带宽 + 6 kHz，斜率 = 35 dB/倍频程4

– 选择性曲线： 见图2和图3

– 误码率= 1 × 10–4的所需信干比（*S/I*）： 适用于64-QAM、保护等级1

# 3 射频保护比

频谱占用类型和强健模式的组合形成了几种发射机射频谱，这产生了不同的干扰，因此需要不同的射频保护比。采用的计算方法述于本附件的附录2。

表23显示了调幅受到数字干扰的结算结果，表24显示了数字受到调幅干扰的计算结果。这些结果是根据高压缩的调幅信号计算的。表25给定了数字受到数字干扰的各种数字模式组合的射频保护比，但只针对相同模式组合对，如数字模式B3（强健模式B，频谱占用类型3）受数字B3干扰。表26显示了相同和不同频谱占用类型之间的射频保护比，但只针对强健模式B。采用不同调制方法的校正因子给定在表27至表29中。

图 2

DRM强健模式B和频谱占用类型1（5 kHz）的  
发射机频谱掩模和接收机/解调器选择性曲线



图3

DRM强健模式B和频谱占用类型3（10 kHz）的  
发射机频谱掩模和接收机/解调器选择性曲线



表 23

30 MHz以下广播系统之间相对射频保护比（dB）数字干扰调幅

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *AAF*(1),(2)(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| AM | DRM\_A0 | –50.4 | –50.4 | –49.1 | –35.6 | –28.5 | 6.5 | 6.6 | –31.1 | –46.9 | –48.3 | –50.4 | –50.4 | –50.4 | 4.5 | – |
| AM | DRM\_A1 | –50.9 | –50.6 | –47.9 | –32.5 | –24.5 | 6.1 | 6.1 | –31.3 | –46 | –47.7 | –50.9 | –50.9 | –50.9 | 5 | – |
| AM | DRM\_A2 | –48.9 | –47 | –43.6 | –34.5 | –29.8 | 3.4 | 6.6 | 3.4 | –29.8 | –34.5 | –43.6 | –47 | –48.9 | 9 | – |
| AM | DRM\_A3 | –47.4 | –45.5 | –42.1 | –32.4 | –26.5 | 3.1 | 6.1 | 3.1 | –26.5 | –32.4 | –42.1 | –45.5 | –47.4 | 10 | – |
| AM | DRM\_A4 | −35.3 | −27.4 | −1.3 | 3.5 | 3.5 | 3.5 | 3.5 | 0.3 | −27.4 | −32.9 | −39.3 | −41.9 | −43.4 | 18 | – |
| AM | DRM\_A5 | −29.3 | −14.5 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.1 | −22.8 | −29.3 | −38.4 | −40.8 | −42.3 | 20 | – |
| AM | DRM\_B0 | –50.4 | –50.4 | –49 | –35.5 | –28.4 | 6.4 | 6.6 | –30.9 | –46.7 | –48.2 | –50.4 | –50.4 | –50.4 | 4.5 | – |
| AM | DRM\_B1 | –51 | –50.5 | –47.6 | –32 | –23.8 | 6 | 6 | –31.1 | –45.7 | –47.4 | –51 | –51 | –51 | 5 | – |
| AM | DRM\_B2 | –48.8 | –46.9 | –43.5 | –34.4 | –29.7 | 3.4 | 6.5 | 3.4 | –29.7 | –34.4 | –43.5 | –46.9 | –48.8 | 9 | – |
| AM | DRM\_B3 | –47.2 | –45.3 | –41.9 | –32 | –25.9 | 3 | 6 | 3 | –25.9 | –32 | –41.9 | –45.3 | –47.2 | 10 | – |
| AM | DRM\_B4 | −35.3 | −27.4 | −1.3 | 3.4 | 3.4 | 3.4 | 3.4 | 0.3 | −27.4 | −32.9 | −39.2 | −41.9 | −43.3 | 18 | – |
| AM | DRM\_B5 | −29.3 | −14.6 | 0.1 | 3 | 3 | 3 | 3 | 0.1 | −22.5 | −28.8 | −38.2 | −40.9 | −42.2 | 20 | – |
| AM | DRM\_C3 | –47.5 | –45.6 | –42.2 | –32.6 | –26.7 | 3.1 | 6.1 | 3.1 | –26.7 | –32.6 | –42.2 | –45.6 | –47.5 | 10 | – |
| AM | DRM\_C5 | −29.7 | −14.6 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.1 | −22.7 | −29.4 | −38.3 | −40.9 | −42.3 | 20 | – |
| AM | DRM\_D3 | –47.4 | –45.5 | –42.2 | –32.4 | –26.5 | 3.1 | 6.1 | 3.1 | –26.5 | –32.4 | –42.2 | –45.5 | –47.4 | 10 | – |
| AM | DRM\_D5 | −29.9 | −15 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.2 | −22.3 | −28.8 | −38.3 | −40.7 | −42.2 | 20 | – |
| *AAF*： 音频保护比。  DRM\_ A0： DRM信号，强健模式A，频谱占用类型0。  (1) 数字干扰调幅的射频保护比可根据给定的规划情形，向表中的数值增加一个合适的音频保护比进行计算。  (2) 此表所示数值指高调幅压缩的特定情况。为与表25保持一致，为调幅信号假定了相同的调制深度，即与高压缩有关的深度。为了向普通等级（如附件2附录1所述）的调幅信号提供足够的保护，表中每个数值均应增加，以适应普通和高压缩之间的差异。 | | | | | | | | | | | | | | | | |

表 24

30 MHz以下广播系统之间相对射频保护比（dB）  
调幅干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_A0 | AM | –57.7 | –55.5 | –52.2 | –46.2 | –45 | –36.7 | 0 | –3.5 | –31.2 | –41.1 | –47 | –50.7 | –53 | 4.5 | 4.2 |
| DRM\_A1 | AM | –57.5 | –55.2 | –52 | –45.9 | –44.8 | –36.6 | 0 | –0.6 | –22.8 | –38.4 | –46.1 | –49.8 | –52.2 | 5 | 4.2 |
| DRM\_A2 | AM | –54.7 | –52.4 | –48.8 | –42.9 | –34 | –6.5 | 0 | –6.5 | –34 | –42.9 | –48.8 | –52.4 | –54.7 | 9 | 6.7 |
| DRM\_A3 | AM | –54 | –51.7 | –48.1 | –40.6 | –25.8 | –3.6 | 0 | –3.6 | –25.8 | –40.6 | –48.1 | –51.7 | –54 | 10 | 6.7 |
| DRM\_A4 | AM | −54.4 | −52.2 | −48.6 | −42.7 | −36.7 | −7.5 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| DRM\_A5 | AM | −53.8 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| DRM\_B0 | AM | –57.7 | –55.5 | –52.2 | –46.1 | –45 | –36.2 | 0 | –3.5 | –30.9 | –41.1 | –46.9 | –50.6 | –53 | 4.5 | 4.6 |
| DRM\_B1 | AM | –57.4 | –55.2 | –51.9 | –45.9 | –44.7 | –36 | 0 | –0.2 | –22 | –37.6 | –46 | –49.6 | –52 | 5 | 4.6 |
| DRM\_B2 | AM | –54.6 | –52.4 | –48.8 | –42.8 | –33.7 | –6.4 | 0 | –6.4 | –33.7 | –42.8 | –48.8 | –52.4 | –54.6 | 9 | 7.3 |
| DRM\_B3 | AM | –53.9 | –51.5 | –48 | –39.9 | –25 | –3.1 | 0 | –3.1 | –25 | –39.9 | –48 | –51.5 | –53.9 | 10 | 7.3 |
| DRM\_B4 | AM | −53.8 | −52.2 | −48.6 | −42.7 | −36.7 | −7.6 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| DRM\_B5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| DRM\_C3 | AM | –54 | –51.7 | –48.1 | –40.9 | –26.1 | –3.8 | 0 | –3.8 | –26.1 | –40.9 | –48.1 | –51.7 | –54 | 10 | 7.7 |
| DRM\_C5 | AM | −53.2 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.9 | −20.3 | −41.7 | 20 | 7.4 |
| DRM\_D3 | AM | –54 | –51.7 | –48.1 | –40.7 | –25.8 | –3.6 | 0 | –3.6 | –25.8 | –40.7 | –48.1 | –51.7 | –54 | 10 | 8.6 |
| DRM\_D5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −5.1 | −20.5 | −41.8 | 20 | 7.4 |

表 25

30 MHz以下广播系统之间相对射频保护比（dB）数字（相同的强健模式和频谱占用类型）  
干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_A0 | DRM\_A0 | –60.1 | –60 | –60 | –55.4 | –53.4 | –41.2 | 0 | –41.2 | –53.4 | –55.4 | –60 | –60 | –60.1 | 4.5 | 15.8 |
| DRM\_A1 | DRM\_A1 | –60 | –60 | –59.7 | –53.3 | –51.3 | –38.4 | 0 | –38.4 | –51.3 | –53.3 | –59.7 | –60 | –60 | 5 | 15.8 |
| DRM\_A2 | DRM\_A2 | –55.1 | –53.1 | –49.6 | –40.8 | –38.3 | –3.8 | 0 | –3.8 | –38.3 | –40.8 | –49.6 | –53.1 | –55.1 | 9 | 15.3 |
| DRM\_A3 | DRM\_A3 | –53 | –51 | –47.3 | –38.1 | –12.1 | –3.2 | 0 | –3.2 | –12.1 | –38.1 | –47.3 | –51 | –53 | 10 | 15.3 |
| DRM\_A4 | DRM\_A4 | −40.3 | −37 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37 | −40.3 | 18 | 16.4 |
| DRM\_A5 | DRM\_A5 | −37 | −11.8 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.8 | −37 | 20 | 16.4 |
| DRM\_B0 | DRM\_B0 | –60 | –59.9 | –60 | –55.2 | –53.2 | –40.8 | 0 | –40.8 | –53.2 | –55.2 | –60 | –59.9 | –60 | 4.5 | 16.2 |
| DRM\_B1 | DRM\_B1 | –60 | –60 | –59.5 | –52.8 | –50.8 | –37.8 | 0 | –37.8 | –50.8 | –52.8 | –59.5 | –60 | –60 | 5 | 16.2 |
| DRM\_B2 | DRM\_B2 | –55.1 | –53.1 | –49.5 | –40.7 | –38.1 | –3.7 | 0 | –3.7 | –38.1 | –40.7 | –49.5 | –53.1 | –55.1 | 9 | 15.9 |
| DRM\_B3 | DRM\_B3 | –52.7 | –50.7 | –47 | –37.7 | –11.1 | –3.1 | 0 | –3.1 | –11.1 | –37.7 | –47 | –50.7 | –52.7 | 10 | 15.9 |
| DRM\_B4 | DRM\_B4 | −40.6 | −37.7 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37.7 | −40.6 | 18 | 16.4 |
| DRM\_B5 | DRM\_B5 | −39.1 | −11.5 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.5 | −39.1 | 20 | 16.4 |
| DRM\_C3 | DRM\_C3 | –53.2 | –51.1 | –47.5 | –38.3 | –12.6 | –3.2 | 0 | –3.2 | –12.6 | –38.3 | –47.5 | –51.1 | –53.2 | 10 | 16.3 |
| DRM\_C5 | DRM\_C5 | −36.5 | −12.1 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12.1 | −36.5 | 20 | 16.4 |
| DRM\_D3 | DRM\_D3 | –53 | –51 | –47.4 | –38.1 | –12.2 | –3.2 | 0 | –3.2 | –12.2 | –38.1 | –47.4 | –51 | –53 | 10 | 17.2 |
| DRM\_D5 | DRM\_D5 | −37.2 | −12 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12 | −37.2 | 20 | 16.4 |

表 26

30 MHz以下广播系统之间相对射频保护比（dB）  
数字干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B0 | DRM\_B0 | –60 | –59.9 | –60 | –55.2 | –53.2 | –40.8 | 0 | –40.8 | –53.2 | –55.2 | –60 | –59.9 | –60 | 4.5 | 16.2 |
| DRM\_B0 | DRM\_B1 | –60.1 | –60 | –59.5 | –52.5 | –50.4 | –37.4 | 0 | –40 | –51.6 | –53.6 | –59.8 | –60 | –60.1 | 5 | 15.7 |
| DRM\_B0 | DRM\_B2 | –57.4 | –55.7 | –52.9 | –46.7 | –45.1 | –36.6 | 0 | –0.8 | –35.6 | –38.4 | –47.7 | –51.5 | –53.6 | 9 | 13.2 |
| DRM\_B0 | DRM\_B3 | –55.2 | –53.6 | –50.7 | –44.5 | –42.9 | –33.1 | 0 | –0.1 | –13.6 | –36.2 | –45.5 | –49.3 | –51.4 | 10 | 12.6 |
| DRM\_B0 | DRM\_B4 | −41.30 | −39.20 | −38.00 | −0.90 | 0.00 | 0.00 | 0.00 | −0.80 | −30.20 | −26.80 | −41.00 | −43.90 | −45.50 | 18.00 | 10.30 |
| DRM\_B0 | DRM\_B5 | −38.80 | −36.20 | −30.80 | 0.00 | 0.00 | 0.00 | 0.00 | −0.20 | −13.00 | −27.50 | −39.40 | −42.30 | −43.80 | 20.00 | 9.80 |
| DRM\_B1 | DRM\_B0 | –59.4 | –59.5 | –59.5 | –55 | –53 | –40.8 | 0 | –37.9 | –51.7 | –53.9 | –59.4 | –59.5 | –59.4 | 4.5 | 16.2 |
| DRM\_B1 | DRM\_B1 | –60 | –60 | –59.5 | –52.8 | –50.8 | –37.8 | 0 | –37.8 | –50.8 | –52.8 | –59.5 | –60 | –60 | 5 | 16.2 |
| DRM\_B1 | DRM\_B2 | –57.1 | –55.4 | –52.6 | –46.4 | –44.9 | –36.4 | 0 | –0.1 | –13.7 | –36.8 | –46.6 | –50.5 | –52.7 | 9 | 13.2 |
| DRM\_B1 | DRM\_B3 | –55.5 | –53.8 | –51 | –44.8 | –43.3 | –33.5 | 0 | –0.1 | –8.1 | –35.2 | –45 | –48.9 | –51.1 | 10 | 13.2 |
| DRM\_B1 | DRM\_B4 | −41.30 | −39.30 | −38.10 | −1.40 | −0.40 | 0.00 | 0.00 | −0.40 | −13.70 | −27.60 | −40.40 | −43.30 | −45.00 | 18.00 | 10.90 |
| DRM\_B1 | DRM\_B5 | −39.00 | −36.60 | −31.30 | −0.10 | 0.00 | 0.00 | 0.00 | −0.10 | −7.90 | −31.30 | −39.10 | −41.90 | −43.60 | 20.00 | 10.40 |
| DRM\_B2 | DRM\_B0 | –57 | –56.8 | –54.8 | –43.4 | –39.1 | –0.7 | 0 | –40.6 | –52.2 | –53.9 | –57 | –57 | –57 | 4.5 | 15.9 |
| DRM\_B2 | DRM\_B1 | –56.9 | –56.1 | –52.7 | –40.2 | –14.1 | –0.1 | 0 | –39.7 | –50.8 | –52.5 | –56.9 | –57 | –57 | 5 | 15.4 |
| DRM\_B2 | DRM\_B2 | –55.1 | –53.1 | –49.5 | –40.7 | –38.1 | –3.7 | 0 | –3.7 | –38.1 | –40.7 | –49.5 | –53.1 | –55.1 | 9 | 15.9 |
| DRM\_B2 | DRM\_B3 | –52.9 | –51 | –47.4 | –38.6 | –16.6 | –3.2 | 0 | –3.2 | –16.6 | –38.6 | –47.4 | –51 | –52.9 | 10 | 15.4 |
| DRM\_B2 | DRM\_B4 | −37.20 | −32.80 | −5.10 | −0.40 | 0.00 | 0.00 | 0.00 | −3.70 | −32.80 | −29.40 | −42.50 | −45.20 | −46.80 | 18.00 | 13.40 |
| DRM\_B2 | DRM\_B5 | −32.60 | −32.60 | −3.60 | 0.00 | 0.00 | 0.00 | 0.00 | −3.60 | −37.50 | −32.10 | −43.10 | −45.80 | −47.30 | 20.00 | 12.90 |

表26（完）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *ƒunwanted – ƒwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B3 | DRM\_B0 | –56.4 | –56.2 | –53.8 | –41.1 | –14.1 | –0.1 | 0 | –37.7 | –50.9 | –52.8 | –56.4 | –56.4 | –56.4 | 4.5 | 15.9 |
| DRM\_B3 | DRM\_B1 | –56.8 | –55.7 | –52.1 | –38.2 | –8.2 | –0.1 | 0 | –37.6 | –50.1 | –51.9 | –56.7 | –57 | –57 | 5 | 15.9 |
| DRM\_B3 | DRM\_B2 | –54.3 | –52.3 | –48.6 | –39.3 | –16.7 | –3.1 | 0 | –3.1 | –16.7 | –39.3 | –48.6 | –52.3 | –54.3 | 9 | 15.9 |
| DRM\_B3 | DRM\_B3 | –52.7 | –50.7 | –47 | –37.7 | –11.1 | –3.1 | 0 | –3.1 | –11.1 | –37.7 | –47 | –50.7 | –52.7 | 10 | 15.9 |
| DRM\_B3 | DRM\_B4 | −40.80 | −37.90 | −5.00 | −0.40 | 0.00 | 0.20 | 0.00 | −3.80 | −37.90 | −31.50 | −42.70 | −45.50 | −46.90 | 18.00 | 13.70 |
| DRM\_B3 | DRM\_B5 | −34.40 | −8.00 | −3.10 | 0.00 | 0.00 | 0.00 | 0.00 | −3.10 | −10.90 | −33.80 | −40.70 | −43.50 | −44.90 | 20.00 | 13.40 |
| DRM\_B4 | DRM\_B0 | −54.00 | −53.90 | −52.90 | −43.90 | −44.80 | −1.10 | 0.00 | 0.00 | −0.30 | −1.50 | −45.20 | −51.10 | −53.10 | 4.50 | 16.60 |
| DRM\_B4 | DRM\_B1 | −54.60 | −54.20 | −52.00 | −41.60 | −19.60 | −0.90 | 0.00 | 0.00 | −0.80 | −2.00 | −45.50 | −50.70 | −52.80 | 5.00 | 16.60 |
| DRM\_B4 | DRM\_B2 | −54.00 | −52.40 | −49.10 | −41.40 | −41.80 | −4.00 | 0.00 | 0.20 | 0.00 | −0.50 | −5.40 | −41.80 | −43.60 | 9.00 | 16.40 |
| DRM\_B4 | DRM\_B3 | −52.40 | −50.70 | −47.30 | −41.90 | −19.70 | −3.60 | 0.00 | 0.40 | 0.00 | −0.50 | −4.80 | −19.70 | −49.40 | 10.00 | 16.20 |
| DRM\_B4 | DRM\_B4 | −40.6 | −37.7 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37.7 | −40.6 | 18 | 16.4 |
| DRM\_B4 | DRM\_B5 | −35.20 | −14.70 | −6.30 | −2.90 | −2.50 | −1.00 | 0.00 | −1.30 | −2.90 | −3.40 | −7.40 | −20.80 | −42.90 | 20.00 | 15.90 |
| DRM\_B5 | DRM\_B0 | −53.40 | −53.40 | −52.00 | −41.70 | −19.50 | −0.30 | 0.00 | 0.00 | 0.00 | 0.00 | −47.30 | −48.30 | −51.40 | 4.50 | 16.60 |
| DRM\_B5 | DRM\_B1 | −54.00 | −53.40 | −51.10 | −44.60 | −9.40 | −0.40 | 0.00 | 0.00 | 0.00 | −0.30 | −46.40 | −47.90 | −51.00 | 5.00 | 16.60 |
| DRM\_B5 | DRM\_B2 | −53.20 | −51.70 | −48.30 | −42.40 | −19.80 | −3.30 | 0.00 | 0.00 | 0.00 | 0.00 | −3.40 | −11.80 | −43.30 | 9.00 | 16.60 |
| DRM\_B5 | DRM\_B3 | −52.00 | −50.30 | −46.80 | −41.10 | −12.10 | −3.30 | 0.00 | 0.20 | 0.20 | 0.00 | −3.40 | −8.60 | −42.10 | 10.00 | 16.40 |
| DRM\_B5 | DRM\_B4 | −43.50 | −21.30 | −7.50 | −3.40 | −2.90 | −1.30 | 0.00 | −1.10 | −2.50 | −2.90 | −6.40 | −14.70 | −35.40 | 18.00 | 16.60 |
| DRM\_B5 | DRM\_B5 | −39.1 | −11.5 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.5 | −39.1 | 20 | 16.4 |

表27

表24和25中用于其他调制方法和保护等级组合的信噪比校正值

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 | 平均码速率 | DRM强健模式/频谱占用 类型的校正值（dB） | |
| A/0 (4.5 kHz), A/1 (5 kHz) | A/2 (9 kHz), A/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | –7.0 | –6.7 |
| 1 | 0.62 | –4.9 | –4.6 |
| 64-QAM | 0 | 0.5 | –1.5 | –1.2 |
| 1 | 0.6 | 0.0 | 0.0 |
| 2 | 0.71 | 1.7 | 1.8 |
| 3 | 0.78 | 3.4 | 3.4 |

表28

表24、25和26中用于其他调制方法和保护等级组合的信噪比校正值

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 | 平均码速率 | DRM强健模式/频谱占用 类型的校正值（dB） | |
| B/0 (4.5 kHz), B/1 (5 kHz) | B/2 (9 kHz), B/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | –6.7 | –6.6 |
| 1 | 0.62 | –4.7 | –4.6 |
| 64-QAM | 0 | 0.5 | –1.3 | –1.2 |
| 1 | 0.6 | 0.0 | 0.0 |
| 2 | 0.71 | 1.7 | 1.8 |
| 3 | 0.78 | 3.3 | 3.4 |

表 29

表24和25中用于其他调制方法和保护等级组合的信噪比校正值

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 调制方法 | 保护等级 | 平均码速率 | DRM强健模式/频谱占用 类型的校正值（dB） | |
| C/3 (10 kHz) | D/3 (10 kHz) |
| 16-QAM | 0 | 0.5 | –6.7 | –7.0 |
| 1 | 0.62 | –4.7 | –5.1 |
| 64-QAM | 0 | 0.5 | –1.2 | –1.3 |
| 1 | 0.6 | 0.0 | 0.0 |
| 2 | 0.71 | 1.8 | 1.9 |
| 3 | 0.78 | 3.4 | 4.2 |

表23至表26中的数值代表相对射频保护比*ARF\_relative*。对于纯调幅的情况，相对保护比为有用和无用发射机载波频差为Δ*f* Hz时的保护比与这些发射机的载波具有相同频率时的保护比两者之间的差异（dB）（ITU‑R BS.560建议书），即同频射频保护比*ARF*，它对应着音频（AF）保护比*AAF*。在数字信号的情况下，其标称频率为决定频差的相关值，而不是载波频率。对于频谱占用类型2和3，标称频率对应着OFDM块的中心频率；对于类型0和1，中心频率各自在标称频率以上偏移2.2和2.4 kHz。由于干扰信号的频谱有别于模拟调幅的声频谱，同频干扰情况下的相对射频保护比数值不等于零。

要将表23调整至给定的调幅规划情形下，需将相关AF保护比增加到表中的数值上，以获得所需的射频保护比（见本附件附录2）。可在考虑以下因素的情况下决定相关数值：

– 对于高频中调幅受调幅干扰的情况，1987年广播业务划分频段规划的世界无线电行政大会采用了17dB 的AF保护比；

– 对于低频和中频中调幅受调幅干扰的情况，1区和3区低频和中频区域性行政广播大会（1975年，日内瓦）采用了30dB的AF保护比。

将DRM作为有用信号，音频保护比作为业务质量的一个参数，需用获得特定误码率所需的*S/I*替换。计算假定了1 × 10–4 的误码率门限（见附件1）。表24和25中的保护比数值基于64-QAM调制和保护等级1。对于其他组合，需将表26中的校正值加到表中的*S/I*值上。

附件2的  
附录2  
  
测量和确定射频保护比的方法

# 1 ITU-R BS.559建议书的测量方法

## 1.1 计算方法

决定应采用本附录第2节所述的计算方法确定射频保护比。

## 1.2 射频功率关系调幅/数字

调幅信号的射频功率为调幅载波的功率，而数字信号的射频功率为有用信号带宽内的总功率。

## 1.3 接收机特性

### 1.3.1 调幅接收机选择性曲线

决定将现代调幅接收机（音频带宽= 2.2 kHz；斜率 = 35 dB/倍频程）的选择性曲线作为射频保护比的计算。该决定的进一步理由是预期对预测的影响较小且后者的选择性曲线并不过分乐观。

### 1.3.2 数字接收机：所需的信干比

要计算射频保护比，数字系统的测量信干比应与各自的保护比一起使用和说明。由此，所提供的数值可随后进行评估，同时考虑未来的发展。

## 1.4 DRM频谱掩模的使用

因为数字信号不得产生比调幅传输更高的干扰，因此决定采用测量的DRM频谱掩模，用于计算射频保护比是合适的。

## 1.5 频率间隔

应给出以下频率间隔的射频保护比：

– 9 kHz信道间隔： 0 kHz、9 kHz、18 kHz

– 10 kHz信道间隔： 0 kHz、5 kHz、10 kHz、15 kHz、20 kHz。

# 2 确定30 MHz以下广播频段DSB的射频保护比

## 2.1 引言

要在现有环境下引入DRM，须确保此数字调制的信号不会对其他调幅信号产生比数字调制信号所取代的调幅信号更大的干扰。另一方面，来自现有调幅台站的干扰需足够低，以实现数字信号的可靠接收。因此，需要以下四种情况的保护比：

– 调幅传输干扰调幅接收(AM-AM)。

– 数字调制信号干扰调幅接收(AM-DIG)。

– 调幅传输干扰数字调制信号的接收(DIG-AM)。

– 数字调制信号干扰数字调制信号的接收(DIG-DIG)。

可采用ITU-R BS.559建议书所述方法直接测量射频保护比，或采用一种修整的方法，同时考虑不同的调制特性，或者可以进行计算。ITU-R BS.560建议书中的现行保护比曲线涵盖了上述第一种情况(AM-AM)。为了限制复杂测量的数量，并且只要存在一些数字调制接收机，计算其他情况的射频保护比就是有益的。计算保护比还有所采用系统参数可轻易改变的优点。

为确定保护比，在计算调幅传输系统射频保护比的计算方法以及ITU-R BS.559建议书的基础上开发了一个计算模型。在进行某些假定的情况下，采用这种模型得出了与ITU-R BS.560建议书中给定的保护比相当类似的保护比。计算的调幅-调幅数值与国际电联保护曲线之间的差异小到可以忽略不计（表30，最后两列Δ*ARI*/dB）。因此，此模型也可用于计算DRM干扰调幅的射频保护比并获得足够的精确度。

也可采用该模型计算调幅或DRM干扰DRM情况下的射频保护比，但存在着更大的不确定性，因为人们对DRM接收机的性能以及调幅载波对DRM接收的影响还没有很深的认识。

## 2.2 计算模型

### 2.2.1 计算方法

通过仿真有用和无用信号的发射机并将其信号按照不同的信道间隔馈送到模型接收机中计算射频保护比（见图4）。然后，所需射频保护比为无用信号和有用信号的相应差异。

通过求无用信号边带所产生干扰以及射频载波（调幅信号的情况下）所产生干扰的幂和来计算所需信号的总干扰。

此计算得出相对射频保护比。采用以下公式，通过加上所需的音频保护比（见第3.4节）得到保护现有调幅业务所需的绝对射频保护比：

 (5)

通过类似的方法得出DRM的射频保护。对于规定的误码率，考虑所需的信干比（见第3.7节），而不是音频保护比：

 (6)

## 2.3 发射机模型

用于计算的完整参数集给定在第3节中。

对于调幅传输的情况，假定了按照ITU‑R BS.559建议书的彩色噪声调制（见第3.3节），因为这是针对测量调幅保护比建议的。辐射信号的谱分布由调制信号、谐波畸变、互调、发射机滤波器和噪声本底构成（参加第3.1和3.2节）。

对于数字调制发射机，采用DRM发射机的测量谱或一个满足带外发射要求的理论频谱（参加第3.1、3.5和3.6节）。

图4

计算和/或测量射频保护比测试的结构



## 2.4 接收机模型

用于计算的完整接收机参数集给定在第3节中。

为验证调幅接收的计算方法，采用了具有带通滤波器（MBF）的测量接收机的特性（参见第3.4节和图11a）。进入通带的谱分量根据ITU-R BS.468建议书（见图12）进行加权，求其功率之和（或者作为有用信号，后者作为无用信号）。

数字调制信号接收机的特性通过其选择性进行描述（参见第3.1和3.7节）。落入其通带的所有谱分量的功率进行求和（或者作为有用信号，后者作为无用信号）。

## 2.5 计算模型的未来扩展

也许需要扩展计算模型，以便允许计算联播发射的射频保护比，这会导致五种额外的干扰情况：

– 联播传输干扰调幅接收（AM-SIM）。

– 联播传输干扰数字调制信号的接收（DIG‑SIM）。

– 调幅传输干扰联播的接收（SIM-AM）。

– 数字调制信号干扰联播的接收（SIM-DIG）。

– 联播的发射干扰联播的接收（SIM-SIM）。

# 3 假定的系统参数

## 3.1 频谱掩模

调幅传输的频谱掩模基于考虑发射机非线性失真和/或调制信号以及特定噪声本底的模型。对于调幅发射机，二级和三级谐波畸变包括在计算模型中。对于数字调制发射机，采用测量或假定的谱。

采用具有第3.2节给定参数的低带通滤波器进行调幅发射机的频谱整形（见图5、6和7）。调幅接收机的选择性给定在以下第3.4节中。

为调幅发射机选择第3.2、3.3和3.4节给定的参数是因为这些参数通常用于调幅传输且在调幅干扰调幅的情况下，可得出ITU-R BS.560建议书的射频保护比。

从以下章节所规定参数得出的接收机选择性曲线和频谱掩模在图8、9、10和11中以图表方式进行了介绍。

## 3.2 调幅发射机（图5至图8）

– 边带功率： *Nsb* = *Nc* \* m2/2

– 总功率： *Ntotal* = *Nc* \* (1 + m2/2)

– 截止频率或边带： *Ftx* = 4.5 kHz，即，B = 9 kHz

– 低带通音频滤波器斜率： 60 dB/倍频程，在*Ftx*从0 dB开始（见图6）

– 谐波畸变： *k*2 = 0 k3 = 0.7% (−43 dB)

– 互调： *d*3 = −40 dB

– 噪声本底： −60.3 dBc/kHz。

基于上述参数，调幅信号的计算射频谱符合ITU-R SM.328建议书中包含的频谱掩模。

## 3.3 调幅调制（图5至图7）

– 调制信号： 与ITU‑R BS.559建议书相一致的彩色噪声

– 调制深度： *mr.m.s.* = 25%（对应着普通压缩的节目信号）

– 高压缩： 比调制信号功率大6.5 dB（可通过15 dB压缩增益和2:1压缩比的压缩器实现此指标）

## 3.4 调幅接收机（图11a和11b）

– 选择性曲线： 与MBF相同，或*B* = 4.4 kHz, 斜率= 35 dB/倍频程的调幅接收机[[4]](#footnote-4)

– 音频信号测量： r.m.s.[[5]](#footnote-5)

– 音频保护比： 所需值。

## 3.5 数字信号发射机

– 边带功率： *Nsb* = *Ntotal*

– 载波功率： *Nc* = 0

– 带宽： B = 9 kHz或10 kHz。

## 3.6 数字调制（图9a和9b）

– 频谱： 由被测发射机信号或所需的频谱掩模定义。

## 3.7 数字信号接收机（图9a）

– 带宽： B = 9 kHz或10 kHz

– 选择性曲线： 接收机频谱（图2和图3）

– 所学信干比： 实现1 × 10–4 的误码率所需的信干比，取决于强健模式、频谱占用类型、调制方法和保护等级。

图 5

噪声整形滤波器的特性



图 6

调幅传输的低通滤波器



图 7

调幅的调制信号



图 8

与有色噪声调制的调幅信号



图 9a

DRM合成器信号 (64-QAM, 9 kHz)



图 9b

DRM 合成器信号(64-QAM, 9 kHz)和国际电联频谱掩模



图 10a

调幅信号干扰调幅信号



图 10b

DRM信号干扰调幅信号



图 11a

MBF接收机的选择性曲线



图 11b

现代调幅接收机的选择性曲线



图 12

噪声滤波器的信号整形



图 13

包括选择性曲线和噪声滤波器在内的接收机响应



# 4 计算方法的验证

在调幅干扰调幅的情况下（AM‑AM），采用开放的计算模型和第3节的系统参数以及30 dB可得出表30以及图14和图15所示的结果。对于普通和高压缩的传输调幅信号，给定了最高频率间隔为20 kHz的计算射频保护比。在图14中，仅在此图中画出了相对射频保护比数值。

表 30

调幅的计算射频保护比*ARF*，国际电联数值*AITU*以及调幅发射的计算误差∆*ARI*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 有用：调幅 | | 无用：调幅 | | | *AAF*: 30 dB | | |
| Δ*f*/kHz | *ARF*/dB | | *AITU*/dB | | | Δ*ARI*/dB | |
| 0 | 30 | 30 | 30 | 30 | | 0 | 0 |
| 5 | 32.4 | 27 | 33 | 27.5 | | –0.6 | –0.5 |
| 9 | 4.7 | 1.4 | 5 | 1 | | –0.3 | 0.4 |
| 10 | –2.4 | –5.4 | –2 | –5.5 | | –0.4 | 0.1 |
| 15 | –19.6 | –19.7 | –19 | –19.5 | | –0.6 | –0.2 |
| 18 | –23.3 | –23.3 | –23.3 | –23.3 | | 0 | 0 |
| 20 | –25.6 | –25.7 | –25.4 | –25.4 | | –0.2 | –0.3 |
|  | 普通压缩 | 高压缩 | 普通压缩 | 高压缩 | | 普通压缩 | 高压缩 |

计算的数值与BS.560建议书射频保护比两者之间的比较表明，计算误差小于0.6 dB。

图 14

调幅干扰调幅的相对射频保护比



# 5 数字调制信号的应用

在调幅干扰调幅的情况下确定射频保护比的细微计算误差表明，此方法也可用于计算数字调制信号干扰调幅的保护比并具有足够的精确性，前提是已知产生干扰的数字信号的频谱。

对于调幅或数字调制信号干扰数字调制信号的情况，需要知道接收机的选择性曲线和调制特性。因此，该方法只能在具有局限性的情况下采用，如在已知测量结果的基础上研究不同谱的影响。

# 6 摘要

所述的计算模型一直用于确定30 MHz以下广播频段DSB的射频保护比。获得的精确度足以用于规划。计算应基于满足带外发射要求所需的测量发射机频谱或频谱掩模。计算结果仅在需要时才用测量结果进行检验和完善。

图 15

调幅干扰调幅的射频保护比的计算误差



附件2的  
附录3  
  
30 MHz以下频率采用18和20 kHz带宽的  
DSB（DRM系统）的计算射频保护比

# 1 背景情况

起初，2003年无线电通信全会（RA-03）批准了ITU-R BS.1615建议书并提供了带宽为  
4.5 kHz、5 kHz、9 kHz和10 kHz的DRM信号的射频保护比信息。

但是，2001年和2002年初，ITU-R的6/7任务组草拟的新建议书草案初稿（PDNR）（PDNR-2001）提供了带宽为4.5 kHz、9 kHz、10 kHz、18 kHz和20 kHz的DRM信号的射频保护比信息。在6/7任务组2002年的工作中，删除了18 kHz和20 kHz的带宽。

本附录描述了用来在ITU-R BS.1615建议书中包括带宽为18 kHz和20 kHz的DRM信号的保护比数值的方法。

# 2 基本参数 – 提示

## 2.1 DRM带宽

表 31

指定的DRM模式组合的带宽（F）（Hz）

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 模式 | 0 | 1 | 2 | 3 | 4 | 5 |
| **A** | 4 208 | 4 708 | 8 542 | 9 542 | 17 208 | 19 208 |
| **B** | 4 266 | 4 828 | 8 578 | 9 703 | 17 203 | 19 266 |
| **C** |  |  |  | 9 477 |  | 19 159 |
| **D** |  |  |  | 9 536 |  | 19 179 |
| ***BDRM* (kHz)** | 4.5 | 5 | 9 | 10 | 18 | 20 |

**备注：**应注意到，情况A4、A5、B4、B5、C5、D5的确切带宽并不是情况A2、A3、B2、B3、C3、D3的两倍。例如：

A2 = 8 542 Hz 2 × A2 = 17 084 Hz A4 = 17 208 Hz

A3 = 9 542 Hz 2 × A3 = 19 084 Hz A5 = 19 208 Hz

B3 = 9 703 Hz 2 × B3 = 19 406 Hz B5 = 19 266 Hz

C3 = 9 477 Hz 2 × C3 = 18 954 Hz C5 = 19 159 Hz

D3 = 9 536 Hz 2 × D3 = 19 072 Hz D5 = 19 179 Hz

## 2.2 频谱掩模

2001年，根据ITU-R SM.328-11建议书第6.3.3节，采用表31的确切带宽F计算发射机频谱掩模的特性。这包括在±0.57 F处的35 dB衰减，此点以外斜率为–12 dB/倍频程与–60 dB之比。

图16给定了频谱占用类型 2（9 kHz）的掩模（也包括调幅和数字接收机的滤波器曲线）。

2002年，变更了频谱掩模的特性。带宽（F）± 0.50和± 0.53之间的DRM信号的衰减为30dB，而不是在±0.57 F处的35 dB。± 0.53F以上和以下，直至–60 dB，斜率可假定为–12 dB/倍频程。

图17给定了频谱占用类型3 (10 kHz)的掩模（也包括调幅和数字接收机的滤波器曲线）。

DRM频谱± 0.5和± 0.53 F之间更陡的斜率对相邻信道内DRM接收的射频保护比影响很大。

图 16

2001年的频谱掩模



图 17

ITU-R BS.1615建议书的频谱掩模



## 2.3 DRM信号

BW = 9 kHz

Fc

|  |  |
| --- | --- |
| 4.5 | 4.5 |

BW = 10 kHz

Fc

|  |  |
| --- | --- |
| 5 | 5 |

BW = 18 kHz

Fc

|  |  |  |  |
| --- | --- | --- | --- |
| 4.5 | 4.5 | 4.5 | 4.5 |

BW = 20 kHz

Fc

|  |  |  |  |
| --- | --- | --- | --- |
| 5 | 5 | 5 | 5 |

**备注：**所谓的“中心或参考频率F”并非实际存在。但是，用其来规定带宽为9 kHz和10 kHz的DRM信道的中心频率。

对于18 kHz和20 kHz带宽，“参考频率F”的位置与9 kHz和10 kHz相同。也就是说，  
18 kHz和20 kHzDRM信号的“参考”频率并不位于带宽的中间。

## 2.4 保护比的真实值和相对值

下一段将会提到提供保护比“真实数值”的表格（PDNR\_2001中）或保护比“相对数值”的表格（ITU‑R BS.1615建议书）。

对于DRM干扰调幅的情况，通过采用以下公式，增加有用的音频保护比（*AAF*）得出保护现有调幅业务所需的绝对射频保护比：



相反地， *ARF\_ relative = ARF – AAF*

对于调幅干扰DRM的情况，通过类似的计算得出DRM的射频保护。考虑的是具体误码率的信干比，而不是音频保护比：



相反地， *ARF\_ relative = ARF – S/I*

给出了无用信号和有用频率之间各种频率间隔的保护比，从−20 kHz扩展至+20 kHz。

在“DRM干扰调幅”的表格中，*funwanted – fwanted*= **Δ** 具有以下含义：

如果频率间隔为Δ = −10 kHz，那么*fDRM* 低于*fwanted* 10 kHz

如果频率间隔为Δ = +15 kHz，那么*fDRM* 高于*fwanted* 15 kHz

# 3 获得18和20 kHz的DRM信号保护比的方法

− 将6/7 任务组2001年制定的最后表格用于18和20 kHz的带宽和在±0.57 F处提供35 dB衰减的频谱掩模。

− 从这些表格获得相对保护比（*AAF* = 17 dB）。

− 采用ITU‑R BS.1615建议书中为在±0.57 F处提供35 dB衰减的频谱掩模而制定的最后表格。

− 计算对于高至10 kHz 带宽的DRM信号，2001年计算的相对保护比和ITU‑R BS.1615建议书中数值之间的差异。

− 将这些差异应用到2001年确定的数值上，同时考虑无用信号和有用信号的位置以及相似性。

无用（DRM）和有用（AM）信号的位置 – 相似性

**Δ =** *funwanted – fwanted*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  | **相似性** | |  |
|  |  |  |  |  |  |  |  |  | DRM\_A5 | DRM\_A3 |  |
|  |  |  |  |  | Fam |  |  |  |  |  |  |
| *FDRM* |  |  |  |  |  |  |  |  | **Δ** = −20 | **Δ** = −10 |  |
|  |  |  |  | Fam |  |  |  |  | **Δ** = −18 | **Δ** = −9 |  |
| *FDRM* |  |  |  |  |  |  |  |  | **Δ** = −15 | **Δ** = −5 |  |
|  |  |  | Fam |  |  |  |  |  |  |  |  |
| *FDRM* |  |  |  |  |  |  |  |  | **Δ** = −10 | **Δ** = 0 |  |
|  |  |  |  |  |  |  |  |  | **Δ** = −9 | **Δ** = 0 |  |
| *FDRM* |  | Fam |  |  |  |  |  |  | **Δ** = −5 | **Δ** = 0 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | **相似性** | |  |  |  |  |  |  |  |  |  |
|  | DRM\_A3 | DRM\_A5 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Δ** = +5 | **Δ** = +5 |  |  |  |  |  | Fam | *FDRM* |  |  |
|  | **Δ** = +9 | **Δ** = +9 |  |  |  |  |  |  |  |  |  |
|  | **Δ** = +10 | **Δ** = +10 |  |  |  |  | Fam |  | *FDRM* |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Δ** = +15 | **Δ** = +15 |  |  |  | Fam |  |  | *FDRM* |  |  |
|  | **Δ** = +18 | **Δ** = +18 |  |  |  |  |  |  |  |  |  |
|  | **Δ** = +20 | **Δ** = +20 |  |  | Fam |  |  |  | *FDRM* |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

相似性：考虑到DRM信号的位置，DRM\_A3和DRM\_A5之间存在相似性。

假定Δ = *funwanted – fwanted*

Δ = −20 kHz/18 kHz时，DRM\_A5等于Δ = −10 kHz/9 kHz 时的DRM\_A3

Δ = −15 kHz时，DRM\_A5等于Δ = −5 kHz时的DRM A3

Δ = −10 kHz/9 kHz时，DRM\_A5等于Δ = 0 kHz时的DRM\_A3

Δ = −5 kHz时，DRM\_A5等于Δ = 0 kHz时的DRM\_A3

Δ = 0 kHz时，DRM\_A5等于Δ = 0 kHz时的DRM\_A3

Δ = +5 kHz时，DRM\_A5等于Δ = +5 kHz时的DRM\_A3

Δ = +10 kHz/9 kHz时，DRM\_A5等于Δ = +10 kHz/9 kHz时的DRM\_A3

Δ = +15 kHz时，DRM\_A5等于Δ = +15 kHz时的DRM\_A3

Δ = +20 kHz/18 kHz时，DRM\_A5等于Δ = +20 kHz/18 kHz时的DRM\_A3

## 3.1 DRM干扰调幅

在2001年6/7任务组制定的表格和ITU-R BS.1615建议书中，将考虑DRM\_A2、A3、B2、B3、C3和D3。

方法：

**第1步：**2001年PDNR\_01的原始表格

**第2步：**ITU‑R BS.1615建议书中的最后表格

**第3步：**将PDNR\_01中的真实保护比值转化为DRM干扰调幅的相对数值，同时考虑公式：*ARF\_ relative = ARF – AAF*

**第4步：**计算ITU‑R BS.1615建议书给定的相对保护比和PDNR\_01给定的保护比之间的差异“**d**”

**3.1.1** 情形：模式A\_9 kHz和模式A\_18 kHz。

对于18 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

**3.1.2** 情形：模式A\_10 kHz和模式A\_20 kHz。

对于20 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

**3.1.3** 情形：模式B\_9 kHz和模式B\_18 kHz。

对于18 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

**3.1.4** 情形：模式B\_10 kHz和模式B\_20 kHz。

对于20 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

**3.1.5** 情形：模式C\_10 kHz和模式C\_20 kHz。

对于20 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

**3.1.6** 情形：模式D\_10 kHz和模式D\_20 kHz。

对于20 kHz带宽，将“**d**”适用于PDNR\_01的相对保护比，同时考虑相似性。

第1步

表 1 (PDNR\_2001)

30 MHz以下广播系统之间的射频保护比(dB)，64‑QAM，保护等级1  
DRM干扰调幅

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| 0 | AM | AM | −38.4 | −36.3 | −32.5 | −18.5 | −12.0 | 14.5 | 17.0 | 14.5 | −12.0 | −18.5 | −32.5 | −36.3 | −38.4 | 9 |  | 17 |
| 1 | AM | DRM\_A0 | −33.5 | −33.5 | −32.3 | −18.4 | −10.9 | 23.3 | 23.4 | −13.6 | −30.2 | −31.6 | −33.5 | −33.5 | −33.5 | 4.5 |  | 17 |
| 2 | AM | DRM\_A1 | −34.0 | −33.8 | −31.2 | −15.0 | −6.7 | 23.0 | 23.0 | −13.8 | −29.3 | −31.0 | −34.0 | −34.0 | −34.0 | 5 |  | 17 |
| 3 | AM | DRM\_A2 | −32.2 | −30.3 | −26.9 | −17.3 | −11.5 | 20.3 | 23.4 | 20.3 | −11.5 | −17.3 | −26.9 | −30.3 | −32.2 | 9 |  | 17 |
| 4 | AM | DRM\_A3 | −30.8 | −28.9 | −25.5 | −14.6 | −7.1 | 19.9 | 22.9 | 19.9 | −7.1 | −14.6 | −25.5 | −28.9 | −30.8 | 10 |  | 17 |
| 5 | AM | DRM\_A4 | −18.1 | −9.1 | 15.6 | 20.3 | 20.3 | 20.3 | 20.3 | 17.2 | −9.1 | −15.7 | −22.6 | −25.2 | −26.7 | 18 |  | 17 |
| 6 | AM | DRM\_A5 | −11.5 | 5.1 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 16.9 | −3.4 | −11.5 | −21.7 | −24.2 | −25.7 | 20 |  | 17 |
| 7 | AM | DRM\_B0 | −33.6 | −33.6 | −32.3 | −18.3 | −10.8 | 23.3 | 23.4 | −13.4 | −29.9 | −31.5 | −33.6 | −33.6 | −33.6 | 4.5 |  | 17 |
| 8 | AM | DRM\_B1 | −34.1 | −33.8 | −30.9 | −14.5 | −5.9 | 22.9 | 22.9 | −13.5 | −29.1 | −30.7 | −34.1 | −34.1 | −34.1 | 5 |  | 17 |
| 9 | AM | DRM\_B2 | −32.2 | −30.2 | −26.9 | −17.2 | −11.4 | 20.3 | 23.4 | 20.3 | −11.4 | −17.2 | −26.9 | −30.2 | −32.2 | 9 |  | 17 |
| 10 | AM | DRM\_B3 | −30.6 | −28.6 | −25.3 | −14.2 | −6.2 | 19.8 | 22.8 | 19.8 | −6.2 | −14.2 | −25.3 | −28.6 | −30.6 | 10 |  | 17 |
| 11 | AM | DRM\_B4 | −18.1 | −9.1 | 15.6 | 20.3 | 20.3 | 20.3 | 20.3 | 17.2 | −9.1 | −15.7 | −22.6 | −25.2 | −26.7 | 18 |  | 17 |
| 12 | AM | DRM\_B5 | −11.5 | 5.1 | 16.9 | 19.8 | 19.8 | 19.8 | 19.8 | 16.9 | −2.8 | −11.0 | −21.6 | −24.1 | −25.6 | 20 |  | 17 |
| 13 | AM | DRM\_C3 | −30.9 | −28.9 | −25.6 | −14.8 | −7.4 | 19.9 | 22.9 | 19.9 | −7.4 | −14.8 | −25.6 | −28.9 | −30.9 | 10 |  | 17 |
| 14 | AM | DRM\_C5 | −11.9 | 4.7 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 16.9 | −3.4 | −11.6 | −21.7 | −24.2 | −25.7 | 20 |  | 17 |
| 15 | AM | DRM\_D3 | −30.8 | −28.9 | −25.5 | −14.7 | −7.1 | 19.9 | 22.9 | 19.9 | −7.1 | −14.7 | −25.5 | −28.9 | −30.8 | 10 |  | 17 |
| 16 | AM | DRM\_D5 | −12.2 | 4.4 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 17.0 | −2.9 | −11.1 | −21.6 | −24.1 | −25.6 | 20 |  | 17 |
| AM： 调幅信号  DRM\_A0： DRM信号，强健模式A，频谱占用类型 0 | | | | | | | | | | | | | | | | | | |

第2步

表 2 （ITU-R BS.1615建议书）

30 MHz以下广播系统之间的射频保护比（dB）  
数字干扰调幅

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *AAF*(1), (2)(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| AM | DRM\_A0 | –50.4 | –50.4 | –49.1 | –35.6 | –28.5 | 6.5 | 6.6 | –31.1 | –46.9 | –48.3 | –50.4 | –50.4 | –50.4 | 4.5 | – |
| AM | DRM\_A1 | –50.9 | –50.6 | –47.9 | –32.5 | –24.5 | 6.1 | 6.1 | –31.3 | –46 | –47.7 | –50.9 | –50.9 | –50.9 | 5 | – |
| AM | DRM\_A2 | –48.9 | –47 | –43.6 | –34.5 | –29.8 | 3.4 | 6.6 | 3.4 | –29.8 | –34.5 | –43.6 | –47 | –48.9 | 9 | – |
| AM | DRM\_A3 | –47.4 | –45.5 | –42.1 | –32.4 | –26.5 | 3.1 | 6.1 | 3.1 | –26.5 | –32.4 | –42.1 | –45.5 | –47.4 | 10 | – |
| AM | DRM\_B0 | –50.4 | –50.4 | –49 | –35.5 | –28.4 | 6.4 | 6.6 | –30.9 | –46.7 | –48.2 | –50.4 | –50.4 | –50.4 | 4.5 | – |
| AM | DRM\_B1 | –51 | –50.5 | –47.6 | –32 | –23.8 | 6 | 6 | –31.1 | –45.7 | –47.4 | –51 | –51 | –51 | 5 | – |
| AM | DRM\_B2 | –48.8 | –46.9 | –43.5 | –34.4 | –29.7 | 3.4 | 6.5 | 3.4 | –29.7 | –34.4 | –43.5 | –46.9 | –48.8 | 9 | – |
| AM | DRM\_B3 | –47.2 | –45.3 | –41.9 | –32 | –25.9 | 3 | 6 | 3 | –25.9 | –32 | –41.9 | –45.3 | –47.2 | 10 | – |
| AM | DRM\_C3 | –47.5 | –45.6 | –42.2 | –32.6 | –26.7 | 3.1 | 6.1 | 3.1 | –26.7 | –32.6 | –42.2 | –45.6 | –47.5 | 10 | – |
| AM | DRM\_D3 | –47.4 | –45.5 | –42.2 | –32.4 | –26.5 | 3.1 | 6.1 | 3.1 | –26.5 | –32.4 | –42.2 | –45.5 | –47.4 | 10 | – |
| *AAF*： 音频保护比  DRM\_A0： DRM信号，强健模式A，频谱占用类型0  (1) 数字干扰调幅的射频保护比可根据给定的规划情形，向此表中的数值增加一个合适的音频保护比进行计算。  (2) 此表所示数值指高调幅压缩的特定情况。为与表25保持一致，为调幅信号假定了相同的调制深度，即与高压缩有关的深度。为了向普通等级（如附件2附录1所述）的调幅信号提供足够的保护，表中每个数值均应增加，以适应普通和高压缩之间的差异。 | | | | | | | | | | | | | | | | |

第3步 + 第4步（见以下表格）

DRM干扰调幅  
30 MHz以下广播系统之间的射频保护比（dB），64-QAM，保护等级1

### 3.1.1 DRM\_A2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 3 | AM | DRM\_A2 | −32.2 | −30.3 | −26.9 | −17.3 | −11.5 | 20.3 | 23.4 | 20.3 | −11.5 | −17.3 | −26.9 | −30.3 | −32.2 | 9 |  | 17 |
| 3a | AM | A2/AREL | −49.2 | −47.3 | −43.9 | −34.3 | −28.5 | 3.3 | 6.4 | 3.3 | −28.5 | −34.3 | −43.9 | −47.3 | −49.2 | 9 |  | 17 |
| 3b | AM | DRM\_A2  ITU‑R BS.1615建议书 | −48.9 | −47 | −43.6 | −34.5 | −29.8 | 3.4 | 6.6 | 3.4 | −29.8 | −34.5 | −43.6 | −47 | −48.9 | 9 |  | 17 |
| 差异 | AM | d | 0.3 | 0.3 | 0.3 | −0.2 | −1.3 | 0.1 | 0.2 | 0.1 | −1.3 | −0.2 | 0.3 | 0.3 | 0.3 | 9 |  | 17 |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[3b-3a]之差相加。

DRM\_A4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 5 | AM | DRM\_A4 | −18.1 | −9.1 | 15.6 | 20.3 | 20.3 | 20.3 | 20.3 | 17.2 | −9.1 | −15.7 | −22.6 | −25.2 | −26.7 | 18 |  | 17 |
| 5 | AM | A4/AREL | −35.1 | −26.1 | −1.4 | 3.3 | 3.3 | 3.3 | 3.3 | 0.2 | −26.1 | −32.7 | −39.6 | −42.2 | −43.7 | 18 |  | 17 |
|  |  | d 相似 | −0.2 | −1.3 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | −1.3 | −0.2 | 0.3 | 0.3 | 0.3 |  |  |  |
| 新 5 | AM | A4/AREL | −35.3 | −27.4 | −1.3 | 3.5 | 3.5 | 3.5 | 3.5 | 0.3 | −27.4 | −32.9 | −39.3 | −41.9 | −43.4 | 18 |  | 17 |

### 3.1.2 DRM\_A3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 4 | AM | DRM\_A3 | −30.8 | −28.9 | −25.5 | −14.6 | −7.1 | 19.9 | 22.9 | 19.9 | −7.1 | −14.6 | −25.5 | −28.9 | −30.8 | 10 |  | 17 |
| 4a | AM | A3/*AREL* | −47.8 | −45.9 | −42.5 | −31.6 | −24.1 | 2.9 | 5.9 | 2.9 | −24.1 | −31.6 | −42.5 | −45.9 | −47.8 | 10 |  | 17 |
| 4b | AM | DRM\_A3 ITU‑R BS.1615 建议书 | −47.4 | −45.5 | −42.1 | −32.4 | −26.5 | 3.1 | 6.1 | 3.1 | −26.5 | −32.4 | −42.1 | −45.5 | −47.4 | 10 |  | 17 |
| 差异 | AM | **d** | *0.4* | *0.4* | *0.4* | *−0.8* | *−2.4* | *0.2* | *0.2* | *0.2* | *−2.4* | *−0.8* | *0.3* | *0.4* | *0.4* |  |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[4b-4a]之差相加。

DRM\_A5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 6 | AM | DRM\_A5 | −11.5 | 5.1 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 16.9 | −3.4 | −11.5 | −21.7 | −24.2 | −25.7 | 20 |  | 17 |
| 6 | AM | A5/*AREL* | −28.5 | −12.1 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | −0.1 | −20.4 | −28.5 | −38.7 | −41.2 | −42.7 | 20 |  | 17 |
|  |  | d 相似 | *−0.8* | *−2.4* | *0.2* | *0.2* | *0.2* | *0.2* | *0.2* | *0.2* | *−2.4* | *−0.8* | *0.3* | *0.4* | *0.4* |  |  |  |
| **新*6*** | ***AM*** | ***A5/AREL*** | ***−29.3*** | ***−14.5*** | ***0.1*** | ***3.1*** | ***3.1*** | ***3.1*** | ***3.1*** | ***0.1*** | ***−22.8*** | ***−29.3*** | ***−38.4*** | ***−40.8*** | ***−42.3*** | ***20*** |  | ***17*** |

### 3.1.3 B2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 9 | AM | DRM\_B2 | −32.2 | −30.2 | −26.9 | −17.2 | −11.4 | 20.3 | 23.4 | 20.3 | −11.4 | 17.2 | −26.9 | −30.2 | −32.2 | 9 |  | 17 |
| 9a | AM | B2/*AREL* | −49.2 | −47.2 | −43.9 | −34.2 | −28.4 | 3.3 | 6.4 | 3.3 | −28.4 | −34.2 | −43.9 | −47 | −49.2 | 9 |  | 17 |
| 9b | AM | DRM\_B2 ITU‑R BS.1615 建议书 | −48.8 | −46.9 | −43.5 | −34.4 | −29.7 | 3.4 | 6.5 | 3.4 | −29.7 | −34.4 | −43.5 | −46.9 | −48.8 | 9 |  | 17 |
| 差异 | 9a-9b | **d** | *0.4* | *0.3* | *0.4* | *−0.2* | *−1.3* | *0.1* | *0.1* | *0.1* | *−1.3* | *−0.2* | *0.4* | *0.3* | *0.4* |  |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[9b-9a]之差相加。

B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 11 | AM | DRM\_B4 | −18.1 | −9.1 | 15.6 | 20.3 | 20.3 | 20.3 | 20.3 | 17.2 | −9.1 | −15.7 | −22.6 | −25.2 | −26.7 | 18 |  | 17 |
| 11 | AM | B4/*AREL* | −35.1 | −26.1 | −1.4 | 3.3 | 3.3 | 3.3 | 3.3 | 0.2 | −26.1 | −32.7 | −39.6 | −42.2 | −43.7 | 18 |  | 17 |
|  |  | d 相似 | −0.2 | −1.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | −1.3 | −0.2 | 0.4 | 0.3 | 0.4 |  |  |  |
| **新*11*** | ***AM*** | ***B4/AREL*** | *−****35.3*** | *−****27.4*** | *−****1.3*** | ***3.4*** | ***3.4*** | ***3.4*** | ***3.4*** | ***0.3*** | *−****27.4*** | *−****32.9*** | *−****39.2*** | *−****41.9*** | *−****43.3*** | ***18*** |  | ***17*** |

### 3.1.4 B3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 10 | AM | DRM\_B3 | −30.6 | −28.6 | −25.3 | −14.2 | −6.2 | 19.8 | 22.8 | 19.8 | −6.2 | −14.2 | −25.3 | −28.6 | −30.6 | 10 |  | 17 |
| 10a |  | B3/*AREL* | −47.6 | −45.6 | −42.3 | −31.2 | −23.2 | 2.8 | 5.8 | 2.8 | −23.2 | −31.2 | −42.3 | −45.6 | −47.6 | 10 |  | 17 |
| 10b | AM | DRM\_B3 ITU‑R BS.1615 建议书 | −47.2 | −45.3 | −41.9 | −32 | −25.9 | 3 | 6 | 3 | −25.9 | −32 | −41.9 | −45.3 | −47.2 | 10 |  | 17 |
| 差异 | 10a-10b | **d** | *0.4* | *0.3* | *0.4* | *−0.8* | *−2.7* | *0.2* | *0.2* | *0.2* | *−2.7* | *−0.8* | *0.4* | *0.3* | *0.4* |  |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[10b-10a]之差相加。

B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 12 | AM | DRM\_B5 | −11.5 | 5.1 | 16.9 | 19.8 | 19.8 | 19.8 | 19.8 | 16.9 | −2.8 | −11.0 | −21.6 | −24.1 | −25.6 | 20 |  | 17 |
| 12 | AM | B5/*AREL* | −28.5 | −11.9 | −0.1 | 2.8 | 2.8 | 2.8 | 2.8 | −0.1 | −19.8 | −28 | −38.6 | −41.1 | −42.6 | 20 |  | 17 |
|  |  | d 相似 | **−**0.8 | **−**2.7 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | **−**2.7 | **−**0.8 | 0.4 | 0.2 | 0.4 |  |  |  |
| **新*12*** | ***AM*** | ***B5/AREL*** | ***−29.3*** | ***−14.6*** | ***0.1*** | ***3*** | ***3*** | ***3*** | ***3*** | ***0.1*** | ***−22.5*** | ***−28.8*** | ***−38.2*** | ***−40.9*** | ***−42.2*** | ***20*** |  | ***17*** |

### 3.1.5 DRM\_C3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 13 | AM | DRM\_C3 | −30.9 | −28.9 | −25.6 | −14.8 | −7.4 | 19.9 | 22.9 | 19.9 | −7.4 | −14.8 | −25.6 | −28.9 | −30.9 | 10 |  | 17 |
| 13a | AM | C3/*AREL* | −47.9 | −45.9 | −42.6 | −31.8 | −24.4 | 2.9 | 5.9 | 2.9 | −24.4 | −31.8 | -42.6 | −45.9 | −47.9 | 10 |  | 17 |
| 13b | AM | DRM\_C3 ITU‑R BS.1615 建议书 | −47.5 | −45.6 | −42.2 | −32.6 | −26.7 | 3.1 | 6.1 | 3.1 | −26.7 | −32.6 | -42.2 | −45.6 | −47.5 | 10 |  | 17 |
| 差异 | AM | **d** | 0.40 | 0.30 | 0.40 | −0.80 | −2.30 | 0.20 | 0.20 | 0.20 | −2.30 | −0.80 | 0.40 | 0.30 | 0.40 | 10 |  | 17 |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[13b-13a]之差相加。

DRM\_C5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 14 | AM | DRM\_C5 | −11.9 | 4.7 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 16.9 | −3.4 | −11.6 | −21.7 | −24.2 | −25.7 | 20 |  | 17 |
| 14 | AM | C5/*AREL* | −28.9 | −12.3 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | −0.1 | −20.4 | −28.6 | −38.7 | −41.2 | −42.7 | 20 |  | 17 |
|  |  | d 相似 | −0.8 | −2.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.20 | −2.30 | −0.80 | 0.40 | 0.30 | 0.40 |  |  |  |
| **新 *14*** | ***AM*** | ***C5/AREL*** | −29.7 | −14.6 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.1 | −22.7 | −29.4 | −38.3 | −40.9 | −42.3 | 20 |  | 17 |

### 3.1.6 DRM\_D3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 15 | AM | DRM\_D3 | −30.8 | −28.9 | −25.5 | −14.7 | −7.1 | 19.9 | 22.9 | 19.9 | −7.1 | −14.7 | −25.5 | −28.9 | −30.8 | 10 |  | 17 |
| 15a | AM | D3/*AREL* | −47.8 | −45.9 | −42.5 | −31.7 | −24.1 | 2.9 | 5.9 | 2.9 | −24.1 | −31.7 | −42.5 | −45.9 | −47.8 | 10 |  | 17 |
| 15b | AM | DRM\_D3 ITU‑R BS.1615建议书 | −47.4 | −45.5 | −42.2 | −32.4 | −26.5 | 3.1 | 6.1 | 3.1 | −26.5 | −32.4 | −42.2 | −45.5 | −47.4 | 10 |  | 17 |
| 差异 | AM | **d** | 0.40 | 0.40 | 0.30 | −0.70 | −2.40 | 0.20 | 0.20 | 0.20 | −2.40 | −0.70 | 0.30 | 0.40 | 0.40 | 10 |  | 17 |

要获得ITU-R BS.1615建议书中的ARF\_REL，将6-7/21号文件中的ARF\_REL与[15b-15a]之差相加。

DRM\_D5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 16 | AM | DRM\_D5 | −12.2 | 4.4 | 16.9 | 19.9 | 19.9 | 19.9 | 19.9 | 17.0 | −2.9 | −11.1 | −21.6 | −24.1 | −25.6 | 20 |  | 17 |
| 16 | AM | D5/*AREL* | −29.2 | −12.6 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | 0 | −19.9 | −28.1 | −38.6 | −41.1 | −42.6 | 20 |  | 17 |
|  |  | d 相似 | −0.70 | −2.40 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | −2.40 | −0.70 | 0.30 | 0.40 | 0.40 |  |  |  |
| **新 *16*** | ***AM*** | ***D5/AREL*** | −29.9 | −15 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.2 | −22.3 | −28.8 | −38.3 | −40.7 | −42.2 | 20 |  | 17 |

## 3.2 DRM干扰DRM，相同模式

本节我们将采用与第3节所述相同的方法，同时虑及应充分地调整相似性。

源值取自于2001年PDNR\_01的原始表格（见表3）以及ITU‑R BS.1615建议书的最后一个表格（见表4）。

在以下章节中描述了相关计算：

**3.2.1** DRM\_A4\_18 kHz的新数值源于DRM\_A2\_9 kHz的分析

**3.2.2** DRM\_A5\_20 kHz的新数值源于DRM\_A3\_10 kHz的分析

**3.2.3** DRM\_B4\_18 kHz的新数值源于DRM\_B2\_9 kHz的分析

**3.2.4** DRM\_B5\_20 kHz的新数值源于DRM\_B3\_10 kHz的分析

**3.2.5** DRM\_C5\_20 kHz的新数值源于DRM\_C3\_10 kHz的分析

**3.2.6** DRM\_D5\_20 kHz的新数值源于DRM\_D3\_10 kHz的分析

表 3 (PDNR\_2001)

30 MHz以下广播系统之间的射频保护比（dB）  
64-QAM，保护等级1  
DRM干扰DRM（相同模式）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| 0 | AM | AM | −38.4 | −36.3 | −32.5 | −18.5 | −12.0 | 14.5 | 17.0 | 14.5 | −12.0 | −18.5 | −32.5 | −36.3 | −38.4 | 9 |  | 17 |
| 33 | DRM\_A0 | DRM\_A0 | −43.6 | −43.5 | −43.6 | −39.2 | −37.2 | −24.8 | 16.4 | −24.8 | −37.2 | −39.2 | −43.6 | −43.5 | −43.6 | 4.5 | 16.4 |  |
| 34 | DRM\_A1 | DRM\_A1 | −43.6 | −43.6 | −43.4 | −37.0 | −35.0 | −10.2 | 16.4 | −10.2 | −35.0 | −37.0 | −43.4 | −43.6 | −43.6 | 5 | 16.4 |  |
| 35 | DRM\_A2 | DRM\_A2 | −38.9 | −36.9 | −33.4 | −24.2 | −8.9 | 12.8 | 16.4 | 12.8 | −8.9 | −24.2 | −33.4 | −36.9 | −38.9 | 9 | 16.4 |  |
| 36 | DRM\_A3 | DRM\_A3 | −36.8 | −34.8 | −31.1 | −7.9 | 5.5 | 13.4 | 16.4 | 13.4 | 5.5 | −7.9 | −31.1 | −34.8 | −36.8 | 10 | 16.4 |  |
| 37 | DRM\_A4 | DRM\_A4 | −23.7 | −7.6 | 8.2 | 12.9 | 13.4 | 15.1 | 16.4 | 15.1 | 13.4 | 12.9 | 8.2 | −7.6 | −23.7 | 18 | 16.4 |  |
| 38 | DRM\_A5 | DRM\_A5 | −6.8 | 5.8 | 10.3 | 13.4 | 13.9 | 15.2 | 16.4 | 15.2 | 13.9 | 13.4 | 10.3 | 5.8 | −6.8 | 20 | 16.4 |  |
| 39 | DRM\_B0 | DRM\_B0 | −43.6 | −43.6 | −43.6 | −38.9 | −36.9 | −24.2 | 16.4 | −24.2 | −36.9 | −38.9 | −43.6 | −43.6 | −43.6 | 4.5 | 16.4 |  |
| 40 | DRM\_B1 | DRM\_B1 | −43.6 | −43.6 | −43.2 | −36.6 | −34.5 | −5.7 | 16.4 | −5.7 | −34.5 | −36.6 | −43.2 | −43.6 | −43.6 | 5 | 16.4 |  |
| 41 | DRM\_B2 | DRM\_B2 | −38.8 | −36.8 | −33.3 | −23.9 | −8.1 | 12.9 | 16.4 | 12.9 | −8.1 | −23.9 | −33.3 | −36.8 | −38.8 | 9 | 16.4 |  |
| 42 | DRM\_B3 | DRM\_B3 | −36.5 | −34.4 | −30.8 | −4.9 | 6.3 | 13.5 | 16.4 | 13.5 | 6.3 | −4.9 | −30.8 | −34.4 | −36.5 | 10 | 16.4 |  |
| 43 | DRM\_B4 | DRM\_B4 | −23.8 | −7.7 | 8.2 | 12.9 | 13.4 | 15.1 | 16.4 | 15.1 | 13.4 | 12.9 | 8.2 | −7.7 | −23.8 | 18 | 16.4 |  |
| 44 | DRM\_B5 | DRM\_B5 | −6.3 | 5.9 | 10.3 | 13.4 | 13.9 | 15.2 | 16.4 | 15.2 | 13.9 | 13.4 | 10.3 | 5.9 | −6.3 | 20 | 16.4 |  |
| 45 | DRM\_C3 | DRM\_C3 | −36.9 | −34.9 | −31.3 | −9.1 | 5.2 | 13.4 | 16.4 | 13.4 | 5.2 | −9.1 | −31.3 | −34.9 | −36.9 | 10 | 16.4 |  |
| 46 | DRM\_C5 | DRM\_C5 | −7.3 | 5.7 | 10.2 | 13.4 | 13.8 | 15.2 | 16.4 | 15.2 | 13.8 | 13.4 | 10.2 | 5.7 | −7.3 | 20 | 16.4 |  |
| 47 | DRM\_D3 | DRM\_D3 | −36.8 | −34.8 | −31.1 | −8.0 | 5.5 | 13.4 | 16.4 | 13.4 | 5.5 | −8.0 | −31.1 | −34.8 | −36.8 | 10 | 16.4 |  |
| 48 | DRM\_D5 | DRM\_D5 | −7.1 | 5.7 | 10.2 | 13.4 | 13.8 | 15.2 | 16.4 | 15.2 | 13.8 | 13.4 | 10.2 | 5.7 | −7.1 | 20 | 16.4 |  |
| AM： 调幅信号  DRM\_A0：DRM信号，强健模式A，频谱占用类型 0 | | | | | | | | | | | | | | | | | | |

表 4（ITU-R BS.1615建议书）

30 MHz以下广播系统之间的射频保护比（dB）数字（相同的强健模式和频谱占用类型）  
干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/N* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_A0 | DRM\_A0 | –60.1 | –60 | –60 | –55.4 | –53.4 | –41.2 | 0 | –41.2 | –53.4 | –55.4 | –60 | –60 | –60.1 | 4.5 | 15.8 |
| DRM\_A1 | DRM\_A1 | –60 | –60 | –59.7 | –53.3 | –51.3 | –38.4 | 0 | –38.4 | –51.3 | –53.3 | –59.7 | –60 | –60 | 5 | 15.8 |
| DRM\_A2 | DRM\_A2 | –55.1 | –53.1 | –49.6 | –40.8 | –38.3 | –3.8 | 0 | –3.8 | –38.3 | –40.8 | –49.6 | –53.1 | –55.1 | 9 | 15.3 |
| DRM\_A3 | DRM\_A3 | –53 | –51 | –47.3 | –38.1 | –12.1 | –3.2 | 0 | –3.2 | –12.1 | –38.1 | –47.3 | –51 | –53 | 10 | 15.3 |
| DRM\_B0 | DRM\_B0 | –60 | –59.9 | –60 | –55.2 | –53.2 | –40.8 | 0 | –40.8 | –53.2 | –55.2 | –60 | –59.9 | –60 | 4.5 | 16.2 |
| DRM\_B1 | DRM\_B1 | –60 | –60 | –59.5 | –52.8 | –50.8 | –37.8 | 0 | –37.8 | –50.8 | –52.8 | –59.5 | –60 | –60 | 5 | 16.2 |
| DRM\_B2 | DRM\_B2 | –55.1 | –53.1 | –49.5 | –40.7 | –38.1 | –3.7 | 0 | –3.7 | –38.1 | –40.7 | –49.5 | –53.1 | –55.1 | 9 | 15.9 |
| DRM\_B3 | DRM\_B3 | –52.7 | –50.7 | –47 | –37.7 | –11.1 | –3.1 | 0 | –3.1 | –11.1 | –37.7 | –47 | –50.7 | –52.7 | 10 | 15.9 |
| DRM\_C3 | DRM\_C3 | –53.2 | –51.1 | –47.5 | –38.3 | –12.6 | –3.2 | 0 | –3.2 | –12.6 | –38.3 | –47.5 | –51.1 | –53.2 | 10 | 16.3 |
| DRM\_D3 | DRM\_D3 | –53 | –51 | –47.4 | –38.1 | –12.2 | –3.2 | 0 | –3.2 | –12.2 | –38.1 | –47.4 | –51 | –53 | 10 | 17.2 |

### 3.2.1 DRM\_A2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 35 | DRM\_A2 | DRM\_A2 | −38.9 | −36.9 | −33.4 | −24.2 | −8.9 | 12.8 | 16.4 | 12.8 | −8.9 | −24.2 | −33.4 | −36.9 | −38.9 |  |  |  |
| 35a | A2 | A2/*AREL* | −55.3 | −53.3 | −49.8 | −40.6 | −25.3 | −3.6 | 0 | −3.6 | −25.3 | −40.6 | −49.8 | −53.3 | −55.3 | 9 |  |  |
| 35b | DRM\_A2 Rec. ITU‑R BS.1615 | DRM\_A2 ITU‑R BS.1615建议书 | −55.1 | −53.1 | −49.6 | −40.8 | −38.3 | −3.8 | 0 | −3.8 | −38.3 | −40.8 | −49.6 | −53.1 | −55.1 | 9 | 15.3 |  |
| 差异 | **d** | **d** | 0.2 | 0.2 | 0.2 | −0.2 | −13 | −0.2 | 0 | −0.2 | −13 | −0.2 | 0.2 | 0.2 | 0.2 | 9 |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[35b-35a]之差相加。

DRM\_A4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 37 | DRM\_A4 | DRM\_A4 | −23.7 | −7.6 | 8.2 | 12.9 | 13.4 | 15.1 | 16.4 | 15.1 | 13.4 | 12.9 | 8.2 | −7.6 | −23.7 | 18 | 16.4 |  |
| 37 | A4 | A4/*AREL* | −40.1 | −24 | −8.2 | −3.5 | −3 | −1.3 | 0 | −1.3 | −3 | −3.5 | −8.2 | −24 | −40.1 | 18 | 16.4 |  |
|  |  | d 相似性 | −0.2 | −13 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −13 | −0.2 |  |  |  |
| **新 *37*** | ***A4*** | ***A4/AREL*** | −40.3 | −37 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37 | −40.3 | 18 | 16.4 |  |

### 3.2.2 DRM\_A3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 36 | DRM\_A3 | DRM\_A3 | −36.8 | −34.8 | −31.1 | −7.9 | 5.5 | 13.4 | 16.4 | 13.4 | 5.5 | −7.9 | −31.1 | −34.8 | −36.8 | 10 | 16.4 |  |
| 36a | A3 | A3/*AREL* | −53.2 | −51.2 | −47.5 | −24.3 | −10.9 | −3 | 0 | −3 | −10.9 | −24.3 | −47.5 | −51.2 | −53.2 | 10 | 16.4 |  |
| 36b | DRM\_A3 Rec. ITU‑R BS.1615 | DRM\_A3 ITU‑R BS.1615建议书 | −53 | −51 | −47.3 | −38.1 | −12.1 | −3.2 | 0 | −3.2 | −12.1 | −38.1 | −47.3 | −51 | −53 | 10 | 15.3 |  |
| 差异 | **d** | **d** | 0.2 | 0.2 | 0.2 | −13.8 | −1.2 | −0.2 | 0 | −0.2 | −1.2 | −13.8 | 0.2 | 0.2 | 0.2 | 10 |  |  |

要获得ITU-R BS.1615建议书中的ARF\_REL，将6-7/21号文件中的ARF\_REL与[36b-36a]之差相加。

DRM\_A5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 38 | DRM\_A5 | DRM\_A5 | −6.8 | 5.8 | 10.3 | 13.4 | 13.9 | 15.2 | 16.4 | 15.2 | 13.9 | 13.4 | 10.3 | 5.8 | −6.8 |  |  |  |
| 38 | A5 | A5/*AREL* | −23.2 | −10.6 | −6.1 | −3 | −2.5 | −1.2 | 0 | −1.2 | −2.5 | −3 | −6.1 | −10.6 | −23.2 | 20 | 16.4 |  |
|  |  | d 相似性 | −13.8 | −1.2 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −1.2 | −13.8 | 10 |  |  |
| **新 *38*** | ***A5*** | ***A5/AREL*** | −37 | −11.8 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.8 | −37 | 20 | 16.4 |  |

### 3.2.3 DRM\_B2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 41 | DRM\_B2 | DRM\_B2 | −38.8 | −36.8 | −33.3 | −23.9 | −8.1 | 12.9 | 16.4 | 12.9 | −8.1 | −23.9 | −33.3 | −36.8 | −38.8 |  |  |  |
| 41a | B2 | B2/*AREL* | −55.2 | −53.2 | −49.7 | −40.3 | −24.5 | −3.5 | 0 | −3.5 | −24.5 | −40.3 | −49.7 | −53.2 | −55.2 | 9 | 16.4 |  |
| 41b | DRM\_B2 Rec. ITU‑R BS.1615 | DRM\_B2 ITU‑R BS.1615建议书 | −55.1 | −53.1 | −49.5 | −40.7 | −38.1 | −3.7 | 0 | −3.7 | −38.1 | −40.7 | −49.5 | −53.1 | −55.1 | 9 | 15.9 |  |
| 差异 | **d** | **d** | 0.1 | 0.1 | 0.2 | −0.4 | −13.6 | −0.2 | 0 | −0.2 | −13.6 | −0.4 | 0.2 | 0.1 | 0.1 | 9 |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[41b-41a]之差相加。

DRM\_B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情况 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 43 | DRM\_B4 | DRM\_B4 | −23.8 | −7.7 | 8.2 | 12.9 | 13.4 | 15.1 | 16.4 | 15.1 | 13.4 | 12.9 | 8.2 | −7.7 | −23.8 |  |  |  |
| 43 | B4 | B4/*AREL* | −40.2 | −24.1 | −8.2 | −3.5 | −3 | −1.3 | 0 | −1.3 | −3 | −3.5 | −8.2 | −24.1 | −40.2 | 18 | 16.4 |  |
|  |  | d 相似性 | −0.4 | −13.6 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −13.6 | −0.4 | 9 |  |  |
| **新 *43*** | ***B4*** | ***B4/AREL*** | −40.6 | −37.7 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37.7 | −40.6 | 18 | 16.4 |  |

### 3.2.4 DRM\_B3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 42 | DRM\_B3 | DRM\_B3 | −36.5 | −34.4 | −30.8 | −4.9 | 6.3 | 13.5 | 16.4 | 13.5 | 6.3 | −4.9 | −30.8 | −34.4 | −36.5 |  |  |  |
| 42a | B3 | B3/*AREL* | −52.9 | −50.8 | −47.2 | −21.3 | −10.1 | −2.9 | 0 | −2.9 | −10.1 | −21.3 | −47.2 | −50.8 | −52.9 | 10 | 16.4 |  |
| 42b | DRM\_B3 Rec. ITU‑R BS.1615 | DRM\_B3 ITU‑R BS.1615建议书 | −52.7 | −50.7 | −47 | −37.7 | −11.1 | −3.1 | 0 | −3.1 | −11.1 | −37.7 | −47 | −50.7 | −52.7 | 10 | 15.9 |  |
| 差异 | **d** | **d** | 0.2 | 0.1 | 0.2 | −16.4 | −1 | −0.2 | 0 | −0.2 | −1 | −16.4 | 0.2 | 0.1 | 0.2 | 10 |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[42b-42a]之差相加。

DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 44 | DRM\_B5 | DRM\_B5 | −6.3 | 5.9 | 10.3 | 13.4 | 13.9 | 15.2 | 16.4 | 15.2 | 13.9 | 13.4 | 10.3 | 5.9 | −6.3 |  |  |  |
| 44 | B5 | B5/*AREL* | −22.7 | −10.5 | −6.1 | −3 | −2.5 | −1.2 | 0 | −1.2 | −2.5 | −3 | −6.1 | −10.5 | −22.7 | 20 | 16.4 |  |
|  |  | d 相似性 | −16.4 | −1 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −1 | −16.4 | 10 |  |  |
| **新 *44*** | ***B5*** | ***B5/AREL*** | −39.1 | −11.5 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.5 | −39.1 | 20 | 16.4 |  |

### 3.2.5 DRM\_C3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 45 | DRM\_C3 | DRM\_C3 | −36.9 | −34.9 | −31.3 | −9.1 | 5.2 | 13.4 | 16.4 | 13.4 | 5.2 | −9.1 | −31.3 | −34.9 | −36.9 |  |  |  |
| 45a | C3 | C3/*AREL* | −53.3 | −51.3 | −47.7 | −25.5 | −11.2 | −3 | 0 | −3 | −11.2 | −25.5 | −47.7 | −51.3 | −53.3 | 10 | 16.4 |  |
| 45b | DRM\_C3 Rec. ITU‑R BS.1615 | DRM\_C3 ITU‑R BS.1615建议书 | −53.2 | −51.1 | −47.5 | −38.3 | −12.6 | −3.2 | 0 | −3.2 | −12.6 | −38.3 | −47.5 | −51.1 | −53.2 | 10 | 16.3 |  |
| 差异 | **d** | **d** | 0.1 | 0.2 | 0.2 | −12.8 | −1.4 | −0.2 | 0 | −0.2 | −1.4 | −12.8 | 0.2 | 0.2 | 0.1 | 10 |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[45b-45a]之差相加。

DRM\_C5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 46 | DRM\_C5 | DRM\_C5 | −7.3 | 5.7 | 10.2 | 13.4 | 13.8 | 15.2 | 16.4 | 15.2 | 13.8 | 13.4 | 10.2 | 5.7 | −7.3 |  |  |  |
| 46 | C5 | C5/*AREL* | −23.7 | −10.7 | −6.2 | −3 | −2.6 | −1.2 | 0 | −1.2 | −2.6 | −3 | −6.2 | −10.7 | −23.7 | 20 | 16.4 |  |
|  |  | d 相似性 | −12.8 | −1.4 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −1.4 | −12.8 | 10 |  |  |
| **新 *46*** | ***C5*** | ***C5/AREL*** | −36.5 | −12.1 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12.1 | −36.5 | 20 | 16.4 |  |

### 3.2.6 DRM\_D3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 47 | DRM\_D3 | DRM\_D3 | −36.8 | −34.8 | −31.1 | −8 | 5.5 | 13.4 | 16.4 | 13.4 | 5.5 | −8 | −31.1 | −34.8 | −36.8 |  |  |  |
| 47a | D3 | D3/*AREL* | −53.2 | −51.2 | −47.5 | −24.4 | −10.9 | −3 | 0 | −3 | −10.9 | −24.4 | −47.5 | −51.2 | −53.2 | 10 | 16.4 |  |
| 47b | DRM\_D3 Rec. ITU‑R BS.1615 | DRM\_D3 ITU‑R BS.1615建议书 | −53 | −51 | −47.4 | −38.1 | −12.2 | −3.2 | 0 | −3.2 | −12.2 | −38.1 | −47.4 | −51 | −53 | 10 | 17.2 |  |
| 差异 | **d** | **d** | 0.2 | 0.2 | 0.1 | −13.7 | −1.3 | −0.2 | 0 | −0.2 | −1.3 | −13.7 | 0.1 | 0.2 | 0.2 | 10 |  |  |

要获得ITU-R BS.1615建议书中的*ARF\_REL*，将6-7/21号文件中的*ARF\_REL*与[47b-47a]之差相加。

DRM\_D5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 48 | DRM\_D5 | DRM\_D5 | −7.1 | 5.7 | 10.2 | 13.4 | 13.8 | 15.2 | 16.4 | 15.2 | 13.8 | 13.4 | 10.2 | 5.7 | −7.1 |  |  |  |
| 48 | D5 | D5/*AREL* | −23.5 | −10.7 | −6.2 | −3 | −2.6 | −1.2 | 0 | −1.2 | −2.6 | −3 | −6.2 | −10.7 | −23.5 | 20 | 16.4 |  |
|  |  | d 相似性 | −13.7 | −1.3 | −0.2 | −0.2 | −0.2 | −0.2 | 0 | −0.2 | −0.2 | −0.2 | −0.2 | −1.3 | −13.7 | 10 |  |  |
| **新 *48*** | ***D5*** | ***D5/AREL*** | −37.2 | −12 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12 | −37.2 | 20 | 16.4 |  |

## 3.3 调幅干扰DRM

### 3.3.1 建议方法

对于调幅干扰DRM的情况，预期DRM发射机频谱掩模的修改不会影响到数字系统的保护比，因为该保护比取决于数字接收机的特性，而不是发射机。通过比较PDNR（老的DRM发射机掩模，例如见表5的情形17）和ITU-R BS.1615建议书（新掩模，见表6的第一行，从相对值转换为绝对值之后）调幅干扰DRM相同模式的数值，可以对此进行验证。以下所示为此比较。

a) PDNR（绝对保护比，表5）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| 17 | DRM\_A0 | AM | −52.8 | −50.6 | −47.3 | −41.2 | −40.1 | −31.7 | 5.0 | 1.4 | −26.2 | −36.1 | −42.0 | −45.7 | −48.1 | 4.5 | 16.4 |  |

b) ITU-R BS.1615建议书（相对保护比，以下表 6）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | BDRM (kHz) | S/I (dB) |
| DRM\_A0 | AM | −57.7 | −55.5 | −52.2 | −46.2 | −45 | −36.7 | 0 | −3.5 | −31.2 | −41.1 | −47 | −50.7 | −53 | 4.5 | 4.2 |

c) ITU-R BS.1615建议书（绝对保护比）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRM\_A0 | AM | −53.5 | −51.3 | −48 | −42 | −41.8 | −32.5 | 4.2 | 0.7 | −27 | −36.9 | −42.8 | −46.5 | −48.8 |  |  |

PDNR数值与ITU-R BS.1615建议书数值的差异

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRM\_A1 | AM | 0.8 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 |  |  |

我们从此比较注意到，PDNR [a行]和ITU-R BS.1615建议书[c行] 保护比绝对值的差异约在0.8 dB或0.7 dB。此差异可能源于两个掩模中载波的位置并不完全相同（±0.57 F和±0.53 F）且电平也不相同。因此，频谱掩模更窄的信号（如ITU-R BS.1615建议书中的信号）更为强健且使得∆*F* = 0 更好的保护比。

### 3.3.2 计算

采用表5和表6给定的数值应用该方法。

表 5 (PDNR\_2001)

30 MHz以下广播系统之间的射频保护比（dB），64‑QAM，保护等级1  
调幅干扰DRM

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| 0 | AM | AM | −38.4 | −36.3 | −32.5 | −18.5 | −12.0 | 14.5 | 17.0 | 14.5 | −12.0 | −18.5 | −32.5 | −36.3 | −38.4 | 9 |  | 17 |
| 17 | DRM\_A0 | AM | −52.8 | −50.6 | −47.3 | −41.2 | −40.1 | −31.7 | 5.0 | 1.4 | −26.2 | −36.1 | −42.0 | −45.7 | −48.1 | 4.5 | 16.4 |  |
| 18 | DRM\_A1 | AM | −52.5 | −50.3 | −47.0 | −41.0 | −39.8 | −31.6 | 5.0 | 4.4 | −17.9 | −33.4 | −41.2 | −44.8 | −47.2 | 5 | 16.4 |  |
| 19 | DRM\_A2 | AM | −46.7 | −44.4 | −40.8 | −34.9 | −26.0 | 1.4 | 8.0 | 1.4 | −26.0 | −34.9 | −40.8 | −44.4 | −46.7 | 9 | 16.4 |  |
| 20 | DRM\_A3 | AM | −46.0 | −43.7 | −40.1 | −32.7 | −17.8 | 4.4 | 8.0 | 4.4 | −17.8 | −32.7 | −40.1 | −43.7 | −46.0 | 10 | 16.4 |  |
| 21 | DRM\_A4 | AM | −46.4 | −44.2 | −40.6 | −34.7 | −28.7 | 0.5 | 8.0 | 8.0 | 8.0 | 8.0 | −4.8 | −28.7 | −35.9 | 18 | 16.4 |  |
| 22 | DRM\_A5 | AM | −45.8 | −43.5 | −40.0 | −33.5 | −19.9 | 3.4 | 8.0 | 8.0 | 8.0 | 8.0 | 3.4 | −12.0 | −33.5 | 20 | 16.4 |  |
| 23 | DRM\_B0 | AM | −52.7 | −50.5 | −47.2 | −41.2 | −40.0 | −31.2 | 5.0 | 1.5 | −26.0 | −36.1 | −42.0 | −45.7 | −48.0 | 4.5 | 16.4 |  |
| 24 | DRM\_B1 | AM | −52.4 | −50.2 | −46.9 | −40.9 | −39.7 | −31.1 | 5.0 | 4.8 | −17.1 | −32.6 | −41.0 | −44.7 | −47.1 | 5 | 16.4 |  |
| 25 | DRM\_B2 | AM | −46.7 | −44.4 | −40.8 | −34.9 | −25.7 | 1.5 | 8.0 | 1.5 | −25.7 | −34.9 | −40.8 | −44.4 | −46.7 | 9 | 16.4 |  |
| 26 | DRM\_B3 | AM | −45.9 | −43.6 | −40.0 | −31.9 | −17.0 | 4.8 | 8.0 | 4.8 | −17.0 | −31.9 | −40.0 | −43.6 | −45.9 | 10 | 16.4 |  |
| 27 | DRM\_B4 | AM | −46.4 | −44.2 | −40.6 | −34.7 | −28.7 | 0.4 | 8.0 | 8.0 | 8.0 | 8.0 | −4.8 | −28.7 | −35.9 | 18 | 16.4 |  |
| 28 | DRM\_B5 | AM | −45.8 | −43.5 | −39.9 | −33.2 | −19.1 | 3.7 | 8.0 | 8.0 | 8.0 | 8.0 | 3.4 | −12.0 | −33.5 | 20 | 16.4 |  |
| 29 | DRM\_C3 | AM | −46.1 | −43.7 | −40.2 | −32.9 | −18.2 | 4.2 | 8.0 | 4.2 | −18.2 | −32.9 | −40.2 | −43.7 | −46.1 | 10 | 16.4 |  |
| 30 | DRM\_C5 | AM | −45.8 | −43.5 | −40.0 | −33.5 | −19.9 | 3.4 | 8.0 | 8.0 | 8.0 | 8.0 | 3.1 | −12.3 | −33.7 | 20 | 16.4 |  |
| 31 | DRM\_D3 | AM | −46.0 | −43.7 | −40.1 | −32.7 | −17.9 | 4.4 | 8.0 | 4.4 | −17.9 | −32.7 | −40.1 | −43.7 | −46.0 | 10 | 16.4 |  |
| 32 | DRM\_D5 | AM | −45.8 | −43.5 | −39.9 | −33.2 | −19.1 | 3.7 | 8.0 | 8.0 | 8.0 | 8.0 | 2.9 | −12.5 | −33.8 | 20 | 16.4 |  |
| AM： 调幅信号  DRM\_A0：DRM信号，强健模式A，频谱占用类型0 | | | | | | | | | | | | | | | | | | |

表 6（ITU-R BS.1615建议书）

30 MHz以下广播系统之间的射频保护比（dB）  
调幅干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_A0 | AM | –57.7 | –55.5 | –52.2 | –46.2 | –45 | –36.7 | 0 | –3.5 | –31.2 | –41.1 | –47 | –50.7 | –53 | 4.5 | 4.2 |
| DRM\_A1 | AM | –57.5 | –55.2 | –52 | –45.9 | –44.8 | –36.6 | 0 | –0.6 | –22.8 | –38.4 | –46.1 | –49.8 | –52.2 | 5 | 4.2 |
| DRM\_A2 | AM | –54.7 | –52.4 | –48.8 | –42.9 | –34 | –6.5 | 0 | –6.5 | –34 | –42.9 | –48.8 | –52.4 | –54.7 | 9 | 6.7 |
| DRM\_A3 | AM | –54 | –51.7 | –48.1 | –40.6 | –25.8 | –3.6 | 0 | –3.6 | –25.8 | –40.6 | –48.1 | –51.7 | –54 | 10 | 6.7 |
| DRM\_B0 | AM | –57.7 | –55.5 | –52.2 | –46.1 | –45 | –36.2 | 0 | –3.5 | –30.9 | –41.1 | –46.9 | –50.6 | –53 | 4.5 | 4.6 |
| DRM\_B1 | AM | –57.4 | –55.2 | –51.9 | –45.9 | –44.7 | –36 | 0 | –0.2 | –22 | –37.6 | –46 | –49.6 | –52 | 5 | 4.6 |
| DRM\_B2 | AM | –54.6 | –52.4 | –48.8 | –42.8 | –33.7 | –6.4 | 0 | –6.4 | –33.7 | –42.8 | –48.8 | –52.4 | –54.6 | 9 | 7.3 |
| DRM\_B3 | AM | –53.9 | –51.5 | –48 | –39.9 | –25 | –3.1 | 0 | –3.1 | –25 | –39.9 | –48 | –51.5 | –53.9 | 10 | 7.3 |
| DRM\_C3 | AM | –54 | –51.7 | –48.1 | –40.9 | –26.1 | –3.8 | 0 | –3.8 | –26.1 | –40.9 | –48.1 | –51.7 | –54 | 10 | 7.7 |
| DRM\_D3 | AM | –54 | –51.7 | –48.1 | –40.7 | –25.8 | –3.6 | 0 | –3.6 | –25.8 | –40.7 | –48.1 | –51.7 | –54 | 10 | 8.6 |

采用与上述相同的方法，计算所有DRM模式的差异，得出：

差异(PDNR\_001) – (ITU-R BS.1615建议书)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_A0 | AM | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 |
| DRM\_A1 | AM | 0.8 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 |
| DRM\_A2 | AM | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.3 | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| DRM\_A3 | AM | 1.3 | 1.3 | 1.3 | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.3 | 1.3 | 1.3 |
| DRM\_B0 | AM | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 |
| DRM\_B1 | AM | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 |
| DRM\_B2 | AM | 0.6 | 0.7 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 0.6 |
| DRM\_B3 | AM | 0.7 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 |
| DRM\_C3 | AM | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 |
| DRM\_D3 | AM | −0.6 | −0.6 | −0.6 | −0.6 | −0.7 | −0.6 | −0.6 | −0.6 | −0.7 | −0.6 | −0.6 | −0.6 | −0.6 |
|  | 平均差异 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

PDNR和ITU-R BS.1615建议书各种普通模式的差异计算平均值为0.6 dB。我们选择用该值，通过应用下式，从PDNR的对应数值计算ITU-R BS.1615建议书中大带宽（18和20 kHz）的保护比：

保护比（BS.1615-绝对值）= 保护比（PDNR-绝对值）– 0.6

据此，下表给定了ITU-R BS.1615建议书中18和20 kHz的DRM信号带宽的最终计算值：

ITU-R BS.1615建议书绝对保护比的新数值

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I*  (dB) |
| DRM\_A4 | AM | −47 | −44.8 | −41.2 | −35.3 | −29.3 | −0.1 | 7.4 | 7.4 | 7.4 | 7.4 | −5.4 | −29.3 | −36.5 | 18 |  |
| DRM\_A5 | AM | −46.4 | −44.1 | −40.6 | −34.1 | −20.5 | 2.8 | 7.4 | 7.4 | 7.4 | 7.4 | 2.8 | −12.6 | −34.1 | 20 |  |
| DRM\_B4 | AM | −46.4 | −44.8 | −41.2 | −35.3 | −29.3 | −0.2 | 7.4 | 7.4 | 7.4 | 7.4 | −5.4 | −29.3 | −36.5 | 18 |  |
| DRM\_B5 | AM | −45.8 | −44.1 | −40.5 | −33.8 | −19.7 | 3.1 | 7.4 | 7.4 | 7.4 | 7.4 | 2.8 | −12.6 | −34.1 | 20 |  |
| DRM\_C5 | AM | −45.8 | −44.1 | −40.6 | −34.1 | −20.5 | 2.8 | 7.4 | 7.4 | 7.4 | 7.4 | 2.5 | −12.9 | −34.3 | 20 |  |
| DRM\_D5 | AM | −45.8 | −44.1 | −40.5 | −33.8 | −19.7 | 3.1 | 7.4 | 7.4 | 7.4 | 7.4 | 2.3 | −13.1 | −34.4 | 20 |  |

从表可以得出结论，表格中所有研究的模式的信干比为7.4 dB，这对应着绝对保护比。由此可通过下式计算相对保护比：

保护比（BS.1615-相对）= 保护比（BS.1615-绝对） – 7.4

下表给定了结果。这些数值可作为新的行增加到ITU-R BS.1615建议书的表24中。

ITU-R BS.1615建议书相对保护比的新数值

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
|  | −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 新21 | DRM\_A4 | AM | −54.4 | −52.2 | −48.6 | −42.7 | −36.7 | −7.5 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| 新22 | DRM\_A5 | AM | −53.8 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| 新27 | DRM\_B4 | AM | −53.8 | −52.2 | −48.6 | −42.7 | −36.7 | −7.6 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| 新28 | DRM\_B5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| 新30 | DRM\_C5 | AM | −53.2 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.9 | −20.3 | −41.7 | 20 | 7.4 |
| 新32 | DRM\_D5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −5.1 | −20.5 | −41.8 | 20 | 7.4 |

## 3.3 数字干扰数字（64-QAM，保护等级1）

本节中我们采用第3节所述的方法，同时虑及应充分调整相似性。

源数字取自于2001年的原始PDNR\_01（表7A和7B）以及ITU‑R BS.1615建议书的最后一个表格（表8）。

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 目标配置 | | |  | 参考配置 | | |
|  | 情形 | 有用信号 | 无用信号 |  |  | 有用信号 | 无用信号 |
| 章节 |  |
|  |  |
| 3.3.1 | 新 53 | DRM\_B0 | DRM\_B4 |  | 51 | DRM\_B0 | DRM\_B2 |
| 3.3.2 | 新 54 | DRM\_B0 | DRM\_B5 |  | 52 | DRM\_B0 | DRM\_B3 |
| 3.3.3 | 新 59 | DRM\_B1 | DRM\_B4 |  | 57 | DRM\_B1 | DRM\_B2 |
| 3.3.4 | 新 60 | DRM\_B1 | DRM\_B5 |  | 58 | DRM\_B1 | DRM\_B3 |
| 3.3.5 | 新 65 | DRM\_B2 | DRM\_B4 |  | 63 | DRM\_B2 | DRM\_B2 |
| 3.3.6 | 新 66 | DRM\_B2 | DRM\_B5 |  | 64 | DRM\_B2 | DRM\_B3 |
| 3.3.7 | 新 71 | DRM\_B3 | DRM\_B4 |  | 69 | DRM\_B3 | DRM\_B2 |
| 3.3.8 | 新 72 | DRM\_B3 | DRM\_B5 |  | 70 | DRM\_B3 | DRM\_B3 |
| 3.3.9 | 新 73 | DRM\_B4 | DRM\_B0 |  | 61 | DRM\_B2 | DRM\_B0 |
| 3.3.10 | 新 74 | DRM\_B4 | DRM\_B1 |  | 62 | DRM\_B2 | DRM\_B1 |
| 3.3.11 | 新 75 | DRM\_B4 | DRM\_B2 |  | 63 | DRM\_B2 | DRM\_B2 |
| 3.3.12 | 新 76 | DRM\_B4 | DRM\_B3 |  | 64 | DRM\_B2 | DRM\_B3 |
| 3.3.13 | 新 78 | DRM\_B4 | DRM\_B5 |  | 64 | DRM\_B2 | DRM\_B3 |
| 3.3.14 | 79 | DRM\_B5 | DRM\_B0 |  | 67 | DRM\_B3 | DRM\_B0 |
| 3.3.15 | 80 | DRM\_B5 | DRM\_B1 |  | 68 | DRM\_B3 | DRM\_B1 |
| 3.3.16 | 81 | DRM\_B5 | DRM\_B2 |  | 69 | DRM\_B3 | DRM\_B2 |
| 3.3.17 | 82 | DRM\_B5 | DRM\_B3 |  | 70 | DRM\_B3 | DRM\_B3 |
| 3.3.18 | 83 | DRM\_B5 | DRM\_B4 |  | 69 | DRM\_B3 | DRM\_B2 |

以下节描述了相关计算。

表 7A (PDNR\_2001)

30 MHz以下广播系统之间的射频保护比（dB）64‑QAM，保护等级1  
DRM干扰DRM（相同和不同的频谱占用类型）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔  *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| 0 | AM | AM | –38.4 | –36.3 | –32.5 | –18.5 | –12.0 | 14.5 | 17.0 | 14.5 | –12.0 | –18.5 | –32.5 | –36.3 | –38.4 | 9 | – | 17 |
| 49 | DRM\_B0 | DRM\_B0 | –43.6 | –43.6 | –43.6 | –38.9 | –36.9 | –24.2 | 16.4 | –24.2 | –36.9 | –38.9 | –43.6 | –43.6 | –43.6 | 4.5 | 16.4 | – |
| 50 | DRM\_B0 | DRM\_B1 | –44.1 | –44.1 | –43.7 | –36.8 | –34.7 | –5.9 | 15.8 | –23.0 | –35.9 | –37.8 | –44.0 | –44.1 | –44.1 | 5 | 16.4 | – |
| 51 | DRM\_B0 | DRM\_B2 | –44.2 | –42.5 | –39.7 | –33.5 | –31.9 | –14.4 | 13.3 | 12.8 | –8.2 | –24.5 | –34.5 | –38.2 | –40.4 | 9 | 16.4 | – |
| 52 | DRM\_B0 | DRM\_B3 | –42.6 | –40.9 | –38.1 | –31.9 | –30.3 | –2.8 | 12.8 | 12.8 | 2.3 | –14.9 | –32.9 | –36.6 | –38.8 | 10 | 16.4 | – |
| 53 | DRM\_B0 | DRM\_B4 | –31.1 | –29.0 | –18.8 | 9.4 | 10.3 | 10.3 | 10.3 | 9.8 | –5.8 | –15.9 | –30.8 | –33.6 | –35.3 | 18 | 16.4 | – |
| 54 | DRM\_B0 | DRM\_B5 | –29.2 | –26.6 | –3.5 | 9.8 | 9.8 | 9.8 | 9.8 | 9.7 | –0.1 | –9.2 | –29.8 | –32.6 | –34.2 | 20 | 16.4 | – |
| 55 | DRM\_B1 | DRM\_B0 | –43.1 | –43.1 | –43.1 | –38.7 | –36.8 | –24.2 | 16.5 | –6.5 | –35.5 | –37.6 | –43.1 | –43.1 | –43.1 | 4.5 | 16.4 | – |
| 56 | DRM\_B1 | DRM\_B1 | –43.6 | –43.6 | –43.2 | –36.6 | –34.5 | –5.7 | 16.4 | –5.7 | –34.5 | –36.6 | –43.2 | –43.6 | –43.6 | 5 | 16.4 | – |
| 57 | DRM\_B1 | DRM\_B2 | –43.8 | –42.2 | –39.3 | –33.2 | –31.6 | –14.4 | 13.6 | 13.4 | 2.6 | –16.7 | –33.4 | –37.3 | –39.5 | 9 | 16.4 | – |
| 58 | DRM\_B1 | DRM\_B3 | –42.2 | –40.6 | –37.7 | –31.6 | –30.0 | –2.7 | 13.4 | 13.3 | 6.3 | –4.9 | –31.8 | –35.7 | –37.9 | 10 | 16.4 | – |
| 59 | DRM\_B1 | DRM\_B4 | –30.8 | –28.7 | –18.8 | 9.5 | 10.5 | 10.9 | 10.9 | 10.4 | –0.1 | –10.2 | –29.9 | –32.8 | –34.5 | 18 | 16.4 | – |
| 60 | DRM\_B1 | DRM\_B5 | –28.8 | –26.3 | –3.5 | 10.3 | 10.4 | 10.4 | 10.4 | 10.3 | 3.5 | –4.0 | –28.9 | –31.7 | –33.4 | 20 | 16.4 | – |
| 61 | DRM\_B2 | DRM\_B0 | –40.6 | –40.5 | –38.5 | –27.1 | –16.2 | 15.8 | 16.5 | –24.0 | –36.0 | –37.6 | –40.6 | –40.6 | –40.6 | 4.5 | 16.4 | – |
| 62 | DRM\_B2 | DRM\_B1 | –41.0 | –40.2 | –37.0 | –24.3 | 3.8 | 15.9 | 16.0 | –22.7 | –35.0 | –36.8 | –41.0 | –41.1 | –41.1 | 5 | 16.4 | – |
| 63 | DRM\_B2 | DRM\_B2 | –38.8 | –36.8 | –33.3 | –23.9 | –8.1 | 12.9 | 16.4 | 12.9 | –8.1 | –23.9 | –33.3 | –36.8 | –38.8 | 9 | 16.4 | – |
| 64 | DRM\_B2 | DRM\_B3 | –37.2 | –35.2 | –31.7 | –14.7 | 2.4 | 12.9 | 15.9 | 12.9 | 2.4 | –14.7 | –31.7 | –35.2 | –37.2 | 10 | 16.4 | – |
| 65 | DRM\_B2 | DRM\_B4 | –23.4 | –5.8 | 8.5 | 13.0 | 13.4 | 13.4 | 13.4 | 9.9 | –5.8 | –15.6 | –29.3 | –31.9 | –33.5 | 18 | 16.4 | – |
| 66 | DRM\_B2 | DRM\_B5 | –9.6 | 4.9 | 10.0 | 12.9 | 12.9 | 12.9 | 12.9 | 10.0 | 0.0 | –9.1 | –28.3 | –30.9 | –32.4 | 20 | 16.4 | – |
| AM： 调幅信号  DRM\_B0： DRM信号，强健模式B，频谱占用类型0 | | | | | | | | | | | | | | | | | | |

表 7B (PDNR\_2001)

30 MHz以下广播系统之间的射频保护比（dB）64‑QAM，保护等级1  
DRM干扰DRM（相同和不同的频谱占用类型）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
| *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| 0 | AM | AM | –38.4 | –36.3 | –32.5 | –18.5 | –12.0 | 14.5 | 17.0 | 14.5 | –12.0 | –18.5 | –32.5 | –36.3 | –38.4 | 9 | – | 17 |
| 67 | DRM\_B3 | DRM\_B0 | –40.0 | –39.8 | –37.5 | –24.9 | 4.1 | 16.4 | 16.6 | –6.5 | –34.7 | –36.5 | –40.0 | –40.0 | –40.0 | 4.5 | 16.4 | – |
| 68 | DRM\_B3 | DRM\_B1 | –40.4 | –39.4 | –35.9 | –10.1 | 8.7 | 16.4 | 16.5 | –5.7 | –33.8 | –35.7 | –40.4 | –40.6 | –40.6 | 5 | 16.4 | – |
| 69 | DRM\_B3 | DRM\_B2 | –38.1 | –36.0 | –32.4 | –16.5 | 2.6 | 13.5 | 16.6 | 13.5 | 2.6 | –16.5 | –32.4 | –36.0 | –38.1 | 9 | 16.4 | – |
| 70 | DRM\_B3 | DRM\_B3 | –36.5 | –34.4 | –30.8 | –4.9 | 6.3 | 13.5 | 16.4 | 13.5 | 6.3 | –4.9 | –30.8 | –34.4 | –36.5 | 10 | 16.4 | – |
| 71 | DRM\_B3 | DRM\_B4 | –19.5 | –0.1 | 9.3 | 13.3 | 13.7 | 13.9 | 13.7 | 10.5 | –0.1 | –10.2 | –28.5 | –31.3 | –32.8 | 18 | 16.4 | – |
| 72 | DRM\_B3 | DRM\_B5 | –4.6 | 6.4 | 10.5 | 13.4 | 13.4 | 13.4 | 13.4 | 10.5 | 3.5 | –4.0 | –27.5 | –30.2 | –31.7 | 20 | 16.4 | – |
| 73 | DRM\_B4 | DRM\_B0 | –37.5 | –37.5 | –36.5 | –27.5 | –21.8 | 15.5 | 16.6 | 16.6 | 16.3 | 15.1 | –28.5 | –34.8 | –36.7 | 4.5 | 16.4 | – |
| 74 | DRM\_B4 | DRM\_B1 | –38.1 | –37.7 | –35.7 | –25.1 | –1.1 | 15.7 | 16.6 | 16.6 | 15.8 | 14.6 | –27.9 | –34.3 | –36.5 | 5 | 16.4 | – |
| 75 | DRM\_B4 | DRM\_B2 | –37.7 | –36.1 | –32.9 | –24.6 | –11.8 | 12.6 | 16.4 | 16.6 | 16.4 | 15.9 | 11.2 | –11.8 | –26.8 | 9 | 16.4 | – |
| 76 | DRM\_B4 | DRM\_B3 | –36.4 | –34.6 | –31.3 | –17.7 | –0.4 | 12.8 | 16.2 | 16.6 | 16.2 | 15.7 | 11.6 | –0.4 | –25.2 | 10 | 16.4 | – |
| 77 | DRM\_B4 | DRM\_B4 | –23.8 | –7.7 | 8.2 | 12.9 | 13.4 | 15.1 | 16.4 | 15.1 | 13.4 | 12.9 | 8.2 | –7.7 | –23.8 | 18 | 16.4 | – |
| 78 | DRM\_B4 | DRM\_B5 | –11.3 | 4.3 | 9.8 | 13.2 | 13.6 | 15.1 | 15.9 | 14.8 | 13.2 | 12.7 | 8.7 | –1.8 | –19.0 | 20 | 16.4 | – |
| 79 | DRM\_B5 | DRM\_B0 | –37.0 | –37.0 | –35.7 | –25.5 | –1.3 | 16.2 | 16.6 | 16.6 | 16.6 | 16.6 | –16.1 | –32.1 | –35.1 | 4.5 | 16.4 | – |
| 80 | DRM\_B5 | DRM\_B1 | –37.5 | –37.0 | –34.8 | –16.4 | 7.6 | 16.2 | 16.6 | 16.6 | 16.6 | 16.3 | –14.4 | –31.5 | –34.7 | 5 | 16.4 | – |
| 81 | DRM\_B5 | DRM\_B2 | –37.0 | –35.4 | –32.1 | –19.6 | –0.5 | 13.3 | 16.6 | 16.6 | 16.6 | 16.6 | 13.2 | 7.5 | –20.5 | 9 | 16.4 | – |
| 82 | DRM\_B5 | DRM\_B3 | –35.8 | –34.0 | –30.6 | –8.3 | 5.3 | 13.3 | 16.4 | 16.6 | 16.6 | 16.4 | 13.2 | 8.8 | –9.3 | 10 | 16.4 | – |
| 83 | DRM\_B5 | DRM\_B4 | –20.7 | –2.0 | 9.1 | 13.2 | 13.7 | 15.3 | 16.6 | 15.5 | 14.1 | 13.7 | 10.2 | 4.6 | –12.6 | 18 | 16.4 | – |
| 84 | DRM\_B5 | DRM\_B5 | –6.3 | 5.9 | 10.3 | 13.4 | 13.9 | 15.2 | 16.4 | 15.2 | 13.9 | 13.4 | 10.3 | 5.9 | –6.3 | 20 | 16.4 | – |
| AM： 调幅信号  DRM\_B3：DRM信号，强健模式B，频谱占用类型3 | | | | | | | | | | | | | | | | | | |

表 8（ITU-R BS.1615建议书）

30 MHz以下广播系统之间的射频保护比（dB）  
数字干扰数字（64-QAM，保护等级1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B0 | DRM\_B0 | –60 | –59.9 | –60 | –55.2 | –53.2 | –40.8 | 0 | –40.8 | –53.2 | –55.2 | –60 | –59.9 | –60 | 4.5 | 16.2 |
| DRM\_B0 | DRM\_B1 | –60.1 | –60 | –59.5 | –52.5 | –50.4 | –37.4 | 0 | –40 | –51.6 | –53.6 | –59.8 | –60 | –60.1 | 5 | 15.7 |
| DRM\_B0 | DRM\_B2 | –57.4 | –55.7 | –52.9 | –46.7 | –45.1 | –36.6 | 0 | –0.8 | –35.6 | –38.4 | –47.7 | –51.5 | –53.6 | 9 | 13.2 |
| DRM\_B0 | DRM\_B3 | –55.2 | –53.6 | –50.7 | –44.5 | –42.9 | –33.1 | 0 | –0.1 | –13.6 | –36.2 | –45.5 | –49.3 | –51.4 | 10 | 12.6 |
| DRM\_B1 | DRM\_B0 | –59.4 | –59.5 | –59.5 | –55 | –53 | –40.8 | 0 | –37.9 | –51.7 | –53.9 | –59.4 | –59.5 | –59.4 | 4.5 | 16.2 |
| DRM\_B1 | DRM\_B1 | –60 | –60 | –59.5 | –52.8 | –50.8 | –37.8 | 0 | –37.8 | –50.8 | –52.8 | –59.5 | –60 | –60 | 5 | 16.2 |
| DRM\_B1 | DRM\_B2 | –57.1 | –55.4 | –52.6 | –46.4 | –44.9 | –36.4 | 0 | –0.1 | –13.7 | –36.8 | –46.6 | –50.5 | –52.7 | 9 | 13.2 |
| DRM\_B1 | DRM\_B3 | –55.5 | –53.8 | –51 | –44.8 | –43.3 | –33.5 | 0 | –0.1 | –8.1 | –35.2 | –45 | –48.9 | –51.1 | 10 | 13.2 |
| DRM\_B2 | DRM\_B0 | –57 | –56.8 | –54.8 | –43.4 | –39.1 | –0.7 | 0 | –40.6 | –52.2 | –53.9 | –57 | –57 | –57 | 4.5 | 15.9 |
| DRM\_B2 | DRM\_B1 | –56.9 | –56.1 | –52.7 | –40.2 | –14.1 | –0.1 | 0 | –39.7 | –50.8 | –52.5 | –56.9 | –57 | –57 | 5 | 15.4 |
| DRM\_B2 | DRM\_B2 | –55.1 | –53.1 | –49.5 | –40.7 | –38.1 | –3.7 | 0 | –3.7 | –38.1 | –40.7 | –49.5 | –53.1 | –55.1 | 9 | 15.9 |
| DRM\_B2 | DRM\_B3 | –52.9 | –51 | –47.4 | –38.6 | –16.6 | –3.2 | 0 | –3.2 | –16.6 | –38.6 | –47.4 | –51 | –52.9 | 10 | 15.4 |
| DRM\_B3 | DRM\_B0 | –56.4 | –56.2 | –53.8 | –41.1 | –14.1 | –0.1 | 0 | –37.7 | –50.9 | –52.8 | –56.4 | –56.4 | –56.4 | 4.5 | 15.9 |
| DRM\_B3 | DRM\_B1 | –56.8 | –55.7 | –52.1 | –38.2 | –8.2 | –0.1 | 0 | –37.6 | –50.1 | –51.9 | –56.7 | –57 | –57 | 5 | 15.9 |
| DRM\_B3 | DRM\_B2 | –54.3 | –52.3 | –48.6 | –39.3 | –16.7 | –3.1 | 0 | –3.1 | –16.7 | –39.3 | –48.6 | –52.3 | –54.3 | 9 | 15.9 |
| DRM\_B3 | DRM\_B3 | –52.7 | –50.7 | –47 | –37.7 | –11.1 | –3.1 | 0 | –3.1 | –11.1 | –37.7 | –47 | –50.7 | –52.7 | 10 | 15.9 |

### 3.3.1 B4\_18 kHz 干扰DRM\_B0\_4.5 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 51 | DRM\_B0 | DRM\_B2 | –44.20 | –42.50 | –39.70 | –33.50 | –31.90 | –14.40 | 13.30 | 12.80 | –8.20 | –24.50 | –34.50 | –38.20 | –40.40 |  |  |
| 51a | DRM\_B0 /REL | DRM\_B2  /REL | –57.50 | –55.80 | –53.00 | –46.80 | –45.20 | –27.70 | 0.00 | –0.50 | –21.50 | –37.80 | –47.80 | –51.50 | –53.70 | 9.00 | 13.30 |
| 51b | DRM\_B0 ITU‑R BS.1615建议书 | DRM\_B2 ITU‑R BS.1615建议书 | –57.40 | –55.70 | –52.90 | –46.70 | –45.10 | –36.60 | 0.00 | –0.80 | –35.60 | –38.40 | –47.70 | –51.50 | –53.60 | 9.00 | 13.20 |
| 差异 |  | **d = 51a‑51b** | –0.10 | –0.10 | –0.10 | –0.10 | –0.10 | 8.90 | 0.00 | 0.30 | 14.10 | 0.60 | –0.10 | 0.00 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 53 | DRM\_B0 | DRM\_B4 | –31.10 | –29.00 | –18.80 | 9.40 | 10.30 | 10.30 | 10.30 | 9.80 | –5.80 | –15.90 | –30.80 | –33.60 | –35.30 | 18.00 |  |
| 53 | DRM\_B0 /REL | DRM\_B4 /REL | –41.40 | –39.30 | –29.10 | –0.90 | 0.00 | 0.00 | 0.00 | –0.50 | –16.10 | –26.20 | –41.10 | –43.90 | –45.60 | 18.00 | 10.30 |
|  |  | d 相似 | –0.10 | –0.10 | 8.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 14.10 | 0.60 | –0.10 | 0.00 | –0.10 |  |  |
| **新 *53*** | DRM\_B0 ITU‑R BS.1615建议书 | DRM\_B4 ITU‑R BS.1615建议书 | –41.30 | –39.20 | –38.00 | –0.90 | 0.00 | 0.00 | 0.00 | –0.80 | –30.20 | –26.80 | –41.00 | –43.90 | –45.50 | 18.00 | 10.30 |

### 3.3.2 B5\_20 kHz 干扰DRM\_B0\_4.5 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 52 | DRM\_B0 | DRM\_B3 | –42.60 | –40.90 | –38.10 | –31.90 | –30.30 | –2.80 | 12.80 | 12.80 | 2.30 | –14.90 | –32.90 | –36.60 | –38.80 | 10.00 |  |
| 52a | DRM\_B0  /REL | DRM\_B3 /REL | –55.40 | –53.70 | –50.90 | –44.70 | –43.10 | –15.60 | 0.00 | 0.00 | –10.50 | –27.70 | –45.70 | –49.40 | –51.60 | 10.00 | 12.80 |
| 52b | DRM\_B0  ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –55.20 | –53.60 | –50.70 | –44.50 | –42.90 | –33.10 | 0.00 | –0.10 | –13.60 | –36.20 | –45.50 | –49.30 | –51.40 | 10.00 | 12.60 |
| 差异 |  | **d = 52a‑52b** | –0.20 | –0.10 | –0.20 | –0.20 | –0.20 | 17.50 | 0.00 | 0.10 | 3.10 | 8.50 | –0.20 | –0.10 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 54 | DRM\_B0 | DRM\_B5 | –29.20 | –26.60 | –3.50 | 9.80 | 9.80 | 9.80 | 9.80 | 9.70 | –0.10 | –9.20 | –29.80 | –32.60 | –34.20 | 20.00 |  |
| 54 | DRM\_B0 /REL | DRM\_B5 /REL | –39.00 | –36.40 | –13.30 | 0.00 | 0.00 | 0.00 | 0.00 | –0.10 | –9.90 | –19.00 | –39.60 | –42.40 | –44.00 | 20.00 | 9.80 |
|  |  | d 相似 | –0.20 | –0.20 | 17.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 3.10 | 8.50 | –0.20 | –0.10 | –0.20 |  |  |
| **新 *54*** | DRM\_B0 ITU‑R BS.1615 建议书 | DRM\_B5 ITU‑R BS.1615 建议书 | –38.80 | –36.20 | –30.80 | 0.00 | 0.00 | 0.00 | 0.00 | –0.20 | –13.00 | –27.50 | –39.40 | –42.30 | –43.80 | 20.00 | 9.80 |

### 3.3.3 B4\_18 kHz 干扰DRM\_B1\_5 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 57 | DRM\_B1 | DRM\_B2 | –43.80 | –42.20 | –39.30 | –33.20 | –31.60 | –14.40 | –3.60 | 13.40 | 2.60 | -16.70 | –33.40 | –37.30 | –39.50 | 9.00 |  |
| 57a | DRM\_B1 /REL | DRM\_B2  /REL | –57.40 | –55.80 | –52.90 | –46.80 | –45.20 | –28.00 | 0.00 | –0.20 | –11.00 | –30.30 | –47.00 | –50.90 | –53.10 | 9.00 | 13.60 |
| 57b | DRM\_B1 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –57.10 | –55.40 | –52.60 | –46.40 | –44.90 | –36.40 | 0.00 | –0.10 | –13.70 | –36.80 | –46.60 | –50.50 | –52.70 | 9.00 | 13.20 |
| 差异 |  | **d = 57a‑57b** | –0.30 | –0.40 | –0.30 | –0.40 | –0.30 | 8.40 | 0.00 | –0.10 | 2.70 | 6.50 | –0.40 | –0.40 | –0.40 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 59 | DRM\_B1 | DRM\_B4 | –30.80 | –28.70 | –18.80 | 9.50 | 10.50 | 10.90 | 10.90 | 10.40 | –0.10 | –10.20 | –29.90 | –32.80 | –34.50 | 18.00 |  |
| 59 | DRM\_B1 /REL | DRM\_B4 /REL | –41.70 | –39.60 | –29.70 | –1.40 | –0.40 | 0.00 | 0.00 | –0.50 | –11.00 | –21.10 | –40.80 | –43.70 | –45.40 | 18.00 | 10.90 |
|  |  | d 相似 | –0.40 | –0.30 | 8.40 | 0.00 | 0.00 | 0.00 | 0.00 | –0.10 | 2.70 | 6.50 | –0.40 | –0.40 | –0.40 |  |  |
| **新 *59*** | DRM\_B1 ITU‑R BS.1615 建议书 | DRM\_B4 ITU‑R BS.1615 建议书 | –41.30 | –39.30 | –38.10 | –1.40 | –0.40 | 0.00 | 0.00 | –0.40 | –13.70 | –27.60 | –40.40 | –43.30 | –45.00 | 18.00 | 10.90 |

### 3.3.4 B5\_20 kHz 干扰DRM\_B1\_5 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 58 | DRM\_B1 | DRM\_B3 | –42.20 | –40.60 | –37.70 | –31.60 | –30.00 | –2.70 | 13.40 | 13.30 | 6.30 | –4.90 | –31.80 | –35.70 | –37.90 | 10.00 |  |
| 58a | DRM\_B1 /REL | DRM\_B3 /REL | –55.60 | –54.00 | –51.10 | –45.00 | –43.40 | –16.10 | 0.00 | –0.10 | –7.10 | –18.30 | –45.20 | –49.10 | –51.30 | 10.00 | 13.30 |
| 58b | DRM\_B1 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –55.50 | –53.80 | –51.00 | –44.80 | –43.30 | –33.50 | 0.00 | –0.10 | –8.10 | –35.20 | –45.00 | –48.90 | –51.10 | 10.00 | 13.20 |
| 差异 |  | **d = 58a‑58b** | –0.10 | –0.20 | –0.10 | –0.20 | –0.10 | 17.40 | 0.00 | 0.00 | 1.00 | 16.90 | –0.20 | –0.20 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 60 | DRM\_B1 | DRM\_B5 | –28.80 | –26.30 | –3.50 | 10.30 | 10.40 | 10.40 | 10.40 | 10.30 | 3.50 | –4.00 | –28.90 | –31.70 | –33.40 | 20.00 |  |
| 60 | DRM\_B1 /REL | DRM\_B5 /REL | –39.20 | –36.70 | –13.90 | –0.10 | 0.00 | 0.00 | 0.00 | –0.10 | –6.90 | –14.40 | –39.30 | –42.10 | –43.80 | 20.00 | 10.40 |
|  |  | d 相似 | –0.20 | –0.10 | 17.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 16.90 | –0.20 | –0.20 | –0.20 |  |  |
| **新 *60*** | DRM\_B1 ITU‑R BS.1615 建议书 | DRM\_B5 ITU‑R BS.1615 建议书 | –39.00 | –36.60 | –31.30 | –0.10 | 0.00 | 0.00 | 0.00 | –0.10 | –7.90 | –31.30 | –39.10 | –41.90 | –43.60 | 20.00 | 10.40 |

### 3.3.5 B4\_18 kHz 干扰DRM\_B2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 63 | DRM\_B2 | DRM\_B2 | –38.80 | –36.80 | –33.30 | –23.90 | –8.10 | 12.90 | 16.40 | 12.90 | –8.10 | –23.90 | –33.30 | –36.80 | –38.80 | 9.00 |  |
| 63a | DRM\_B2 /REL | DRM\_B2 /REL | –55.20 | –53.20 | –49.70 | –40.30 | –24.50 | –3.50 | 0.00 | –3.50 | –24.50 | –40.30 | –49.70 | –53.20 | –55.20 | 9.00 | 16.40 |
| 63b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –55.10 | –53.10 | –49.50 | –40.70 | –38.10 | –3.70 | 0.00 | –3.70 | –38.10 | –40.70 | –49.50 | –53.10 | –55.10 | 9.00 | 15.90 |
| 差异 |  | **d = 63a‑63b** | –0.10 | –0.10 | –0.20 | 0.40 | 13.60 | 0.20 | 0.00 | 0.20 | 13.60 | 0.40 | –0.20 | –0.10 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 65 | DRM\_B2 | DRM\_B4 | –23.40 | –5.80 | 8.50 | 13.00 | 13.40 | 13.40 | 13.40 | 9.90 | –5.80 | –15.60 | –29.30 | –31.90 | –33.50 | 18.00 |  |
| 65 | DRM\_B2 /REL | DRM\_B4 /REL | –36.80 | –19.20 | –4.90 | –0.40 | 0.00 | 0.00 | 0.00 | –3.50 | –19.20 | –29.00 | –42.70 | –45.30 | –46.90 | 18.00 | 13.40 |
|  |  | d 相似 | 0.40 | 13.60 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 13.60 | 0.40 | –0.20 | –0.10 | –0.10 |  |  |
| **新 *65*** | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B4 ITU‑R BS.1615 建议书 | –37.20 | –32.80 | –5.10 | –0.40 | 0.00 | 0.00 | 0.00 | –3.70 | –32.80 | –29.40 | –42.50 | –45.20 | –46.80 | 18.00 | 13.40 |

### 3.3.6 B5\_20 kHz 干扰DRM\_B2\_9 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 64 | DRM\_B2 | DRM\_B3 | –37.20 | –35.20 | –31.70 | –14.70 | 2.40 | 12.90 | 15.90 | 12.90 | 2.40 | –14.70 | –31.70 | –35.20 | –37.20 | 10.00 |  |
| 64a | DRM\_B2 /REL | DRM\_B3 /REL | –53.10 | –51.10 | –47.60 | –30.60 | –13.50 | –3.00 | 0.00 | –3.00 | –13.50 | –30.60 | –47.60 | –51.10 | –53.10 | 10.00 | 15.90 |
| 64b | DRM\_B2 ITU‑R BS.1615建议书 | DRM\_B3 ITU‑R BS.1615建议书 | –55.10 | –53.10 | –49.50 | –40.70 | –38.10 | –3.70 | 0.00 | –3.70 | –38.10 | –40.70 | –49.50 | –53.10 | –55.10 | 10.00 | 15.90 |
| 差异 |  | **d = 64a‑64b** | 2.00 | 2.00 | 1.90 | 10.10 | 24.60 | 0.70 | 0.00 | 0.70 | 24.60 | 10.10 | 1.90 | 2.00 | 2.00 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 66 | DRM\_B2 | DRM\_B5 | –9.60 | 4.90 | 10.00 | 12.90 | 12.90 | 12.90 | 12.90 | 10.00 | 0.00 | –9.10 | –28.30 | –30.90 | –32.40 | 20.00 |  |
| 66 | DRM\_B2 /REL | DRM\_B5 /REL | –22.50 | –8.00 | –2.90 | 0.00 | 0.00 | 0.00 | 0.00 | –2.90 | –12.90 | –22.00 | –41.20 | –43.80 | –45.30 | 20.00 | 12.90 |
|  |  | d 相似 | 10.10 | 24.60 | 0.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 24.60 | 10.10 | 1.90 | 2.00 | 2.00 |  |  |
| **新 *66*** | DRM\_B2 ITU‑R BS.1615建议书 | DRM\_B5 ITU‑R BS.1615建议书 | –32.60 | –32.60 | –3.60 | 0.00 | 0.00 | 0.00 | 0.00 | –3.60 | –37.50 | –32.10 | –43.10 | –45.80 | –47.30 | 20.00 | 12.90 |

### 3.3.7 B4\_18 kHz 干扰DRM\_B3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 69 | DRM\_B3 | DRM\_B2 | –38.10 | –36.00 | –32.40 | –16.50 | 2.60 | 13.50 | 16.60 | 13.50 | 2.60 | –16.50 | –32.40 | –36.00 | –38.10 | 9.00 |  |
| 69a | DRM\_B3 /REL | DRM\_B2 /REL | –54.70 | –52.60 | –49.00 | –33.10 | –14.00 | –3.10 | 0.00 | –3.10 | –14.00 | –33.10 | –49.00 | –52.60 | –54.70 | 9.00 | 16.60 |
| 69b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B2 BS.1615 建议书 | –55.10 | –53.10 | –49.50 | –40.70 | –38.10 | –3.70 | 0.00 | –3.70 | –38.10 | –40.70 | –49.50 | –53.10 | –55.10 | 9.00 | 15.90 |
| 差异 |  | **d = 69a‑69b** | 0.40 | 0.50 | 0.50 | 7.60 | 24.10 | 0.60 | 0.00 | 0.60 | 24.10 | 7.60 | 0.50 | 0.50 | 0.40 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 71 | DRM\_B3 | DRM\_B4 | –19.50 | –0.10 | 9.30 | 13.30 | 13.70 | 13.90 | 13.70 | 10.50 | –0.10 | –10.20 | –28.50 | –31.30 | –32.80 | 18.00 |  |
| 71 | DRM\_B3 /REL | DRM\_B4 /REL | –33.20 | –13.80 | –4.40 | –0.40 | 0.00 | 0.20 | 0.00 | –3.20 | –13.80 | –23.90 | –42.20 | –45.00 | –46.50 | 18.00 | 13.70 |
|  |  | d 相似 | 7.60 | 24.10 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 24.10 | 7.60 | 0.50 | 0.50 | 0.40 |  |  |
| **新 *71*** | DRM\_B3 BS.1615 建议书 | DRM\_B4 BS.1615 建议书 | –40.80 | –37.90 | –5.00 | –0.40 | 0.00 | 0.20 | 0.00 | –3.80 | –37.90 | –31.50 | –42.70 | –45.50 | –46.90 | 18.00 | 13.70 |

### 3.3.8 B5\_20 kHz 干扰DRM\_B3\_10 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 70 | DRM\_B3 | DRM\_B3 | –36.50 | –34.40 | –30.80 | –4.90 | 6.30 | 13.50 | 16.40 | 13.50 | 6.30 | –4.90 | –30.80 | –34.40 | –36.50 | 10.00 |  |
| 70a | DRM\_B3 /REL | DRM\_B3 /REL | –52.90 | –50.80 | –47.20 | –21.30 | –10.10 | –2.90 | 0.00 | –2.90 | –10.10 | –21.30 | –47.20 | –50.80 | –52.90 | 10.00 | 16.40 |
| 70b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.70 | –50.70 | –47.00 | –37.70 | –11.10 | –3.10 | 0.00 | –3.10 | –11.10 | –37.70 | –47.00 | –50.70 | –52.70 | 10.00 | 15.90 |
| 差异 |  | **d = 70a‑70b** | –0.20 | –0.10 | –0.20 | 16.40 | 1.00 | 0.20 | 0.00 | 0.20 | 1.00 | 16.40 | –0.20 | –0.10 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 72 | DRM\_B3 | DRM\_B5 | –4.60 | 6.40 | 10.50 | 13.40 | 13.40 | 13.40 | 13.40 | 10.50 | 3.50 | –4.00 | –27.50 | –30.20 | –31.70 | 20.00 |  |
| 72 | DRM\_B3 /REL | DRM\_B5 /REL | –18.00 | –7.00 | –2.90 | 0.00 | 0.00 | 0.00 | 0.00 | –2.90 | –9.90 | –17.40 | –40.90 | –43.60 | –45.10 | 20.00 | 13.40 |
|  |  | d 相似 | 16.40 | 1.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 1.00 | 16.40 | –0.20 | –0.10 | –0.20 |  |  |
| **新 *72*** | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B5 ITU‑R BS.1615 建议书 | –34.40 | –8.00 | –3.10 | 0.00 | 0.00 | 0.00 | 0.00 | –3.10 | –10.90 | –33.80 | –40.70 | –43.50 | –44.90 | 20.00 | 13.40 |

### 3.3.9 B0\_4.5 kHz 干扰DRM\_B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 61 | DRM\_B2 | DRM\_B0 | –40.60 | –40.50 | –38.50 | –27.10 | –16.20 | 15.80 | 16.50 | –24.00 | –36.00 | –37.60 | –40.60 | –40.60 | –40.60 | 4.50 |  |
| 61a | DRM\_B2 /REL | DRM\_B0 /REL | –57.10 | –57.00 | –55.00 | –43.60 | –32.70 | –0.70 | 0.00 | –40.50 | –52.50 | –54.10 | –57.10 | –57.10 | –57.10 | 4.50 | 16.50 |
| 61b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B0 ITU‑R BS.1615 建议书 | –57.00 | –56.80 | –54.80 | –43.40 | –39.10 | –0.70 | 0.00 | –40.60 | –52.20 | –53.90 | –57.00 | –57.00 | –57.00 | 4.50 | 15.90 |
| 差异 |  | **d = 61a‑61b** | –0.10 | –0.20 | –0.20 | –0.20 | 6.40 | 0.00 | 0.00 | 0.10 | –0.30 | –0.20 | –0.10 | –0.10 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 73 | DRM\_B4 | DRM\_B0 | –37.50 | –37.50 | –36.50 | –27.50 | –21.80 | 15.50 | 16.60 | 16.60 | 16.30 | 15.10 | –28.50 | –34.80 | –36.70 | 4.50 |  |
| 73 | DRM\_B4 /REL | DRM\_B0 /REL | –54.10 | –54.10 | –53.10 | –44.10 | –38.40 | –1.10 | 0.00 | 0.00 | –0.30 | –1.50 | –45.10 | –51.40 | –53.30 | 4.50 | 16.60 |
|  |  | d 相似 | –0.10 | –0.20 | –0.20 | –0.20 | 6.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | –0.30 | –0.20 |  |  |
| **新 73** | DRM\_B4 ITU‑R BS.1615 建议书 | DRM\_B0 ITU‑R BS.1615 建议书 | –54.00 | –53.90 | –52.90 | –43.90 | –44.80 | –1.10 | 0.00 | 0.00 | –0.30 | –1.50 | –45.20 | –51.10 | –53.10 | 4.50 | 16.60 |

### 3.3.10 B1\_5 kHz 干扰DRM\_B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 62 | DRM\_B2 | DRM\_B1 | –41.00 | –40.20 | –37.00 | –24.30 | 3.80 | 15.90 | 16.00 | –22.70 | –35.00 | –36.80 | –41.00 | –41.10 | –41.10 | 5.00 |  |
| 62a | DRM\_B2 /REL | DRM\_B1 /REL | –57.00 | –56.20 | –53.00 | –40.30 | –12.20 | –0.10 | 0.00 | –38.70 | –51.00 | –52.80 | –57.00 | –57.10 | –57.10 | 5.00 | 16.00 |
| 62b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B1 ITU‑R BS.1615 建议书 | –56.90 | –56.10 | –52.70 | –40.20 | –14.10 | –0.10 | 0.00 | –39.70 | –50.80 | –52.50 | –56.90 | –57.00 | –57.00 | 5.00 | 15.40 |
| 差异 |  | **d = 62a‑62b** | –0.10 | –0.10 | –0.30 | –0.10 | 1.90 | 0.00 | 0.00 | 1.00 | –0.20 | –0.30 | –0.10 | –0.10 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 74 | DRM\_B4 | DRM\_B1 | –38.10 | –37.70 | –35.70 | –25.10 | –1.10 | 15.70 | 16.60 | 16.60 | 15.80 | 14.60 | –27.90 | –34.30 | –36.50 | 5.00 |  |
| 74 | DRM\_B4 /REL | DRM\_B1 /REL | –54.70 | –54.30 | –52.30 | –41.70 | –17.70 | –0.90 | 0.00 | 0.00 | –0.80 | –2.00 | –44.50 | –50.90 | –53.10 | 5.00 | 16.60 |
|  |  | d 相似 | –0.10 | –0.10 | –0.30 | –0.10 | 1.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | –0.20 | –0.30 |  |  |
| **新 *74*** | DRM\_B4 ITU‑R BS.1615 建议书 | DRM\_B1 ITU‑R BS.1615 建议书 | –54.60 | –54.20 | –52.00 | –41.60 | –19.60 | –0.90 | 0.00 | 0.00 | –0.80 | –2.00 | –45.50 | –50.70 | –52.80 | 5.00 | 16.60 |

### 3.3.11 B2\_9 kHz 干扰DRM\_B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 63 | DRM\_B2 | DRM\_B2 | –38.80 | –36.80 | –33.30 | –23.90 | –8.10 | 12.90 | 16.40 | 12.90 | –8.10 | –23.90 | –33.30 | –36.80 | –38.80 | 9.00 |  |
| 63a | DRM\_B2 /REL | DRM\_B2 /REL | –55.20 | –53.20 | –49.70 | –40.30 | –24.50 | –3.50 | 0.00 | –3.50 | –24.50 | –40.30 | –49.70 | –53.20 | –55.20 | 9.00 | 12.90 |
| 63b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –55.10 | –53.10 | –49.50 | –40.70 | –38.10 | –3.70 | 0.00 | –3.70 | –38.10 | –40.70 | –49.50 | –53.10 | –55.10 | 9.00 | 15.90 |
| 差异 |  | **d = 63a‑63b** | –0.10 | –0.10 | –0.20 | 0.40 | 13.60 | 0.20 | 0.00 | 0.20 | 13.60 | 0.40 | –0.20 | –0.10 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 75 | DRM\_B4 | DRM\_B2 | –37.70 | –36.10 | –32.90 | –24.60 | –11.80 | 12.60 | 16.40 | 16.60 | 16.40 | 15.90 | 11.20 | –11.80 | –26.80 | 9.00 |  |
| 75 | DRM\_B4 /REL | DRM\_B2 /REL | –54.10 | –52.50 | –49.30 | –41.00 | –28.20 | –3.80 | 0.00 | 0.20 | 0.00 | –0.50 | –5.20 | –28.20 | –43.20 | 9.00 | 16.40 |
|  |  | d 相似 | –0.10 | –0.10 | –0.20 | 0.40 | 13.60 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 13.60 | 0.40 |  |  |
| **新 *75*** | DRM\_B4 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –54.00 | –52.40 | –49.10 | –41.40 | –41.80 | –4.00 | 0.00 | 0.20 | 0.00 | –0.50 | –5.40 | –41.80 | –43.60 | 9.00 | 16.40 |

### 3.3.12 B3\_10 kHz 干扰DRM\_B4\_18 kHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 64 | DRM\_B2 | DRM\_B3 | –37.20 | –35.20 | –31.70 | –14.70 | 2.40 | 12.90 | 15.90 | 12.90 | 2.40 | –14.70 | –31.70 | –35.20 | –37.20 | 10.00 |  |
| 64a | DRM\_B2 /REL | DRM\_B3 /REL | –53.10 | –51.10 | –47.60 | –30.60 | –13.50 | –3.00 | 0.00 | –3.00 | –13.50 | –30.60 | –47.60 | –51.10 | –53.10 | 10.00 | 15.90 |
| 64b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.90 | –51.00 | –47.40 | –38.60 | –16.60 | –3.20 | 0.00 | –3.20 | –16.60 | –38.60 | –47.40 | –51.00 | –52.90 | 10.00 | 15.40 |
| 差异 |  | **d = 64a‑64b** | –0.20 | –0.10 | –0.20 | 8.00 | 3.10 | 0.20 | 0.00 | 0.20 | 3.10 | 8.00 | –0.20 | –0.10 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 76 | DRM\_B4 | DRM\_B3 | –36.40 | –34.60 | –31.30 | –17.70 | –0.40 | 12.80 | 16.20 | 16.60 | 16.20 | 15.70 | 11.60 | –0.40 | –25.20 | 10.00 |  |
| 76 | DRM\_B4 /REL | DRM\_B3 /REL | –52.60 | –50.80 | –47.50 | –33.90 | –16.60 | –3.40 | 0.00 | 0.40 | 0.00 | –0.50 | –4.60 | –16.60 | –41.40 | 10.00 | 16.20 |
|  |  | d 相似 | –0.20 | –0.10 | –0.20 | 8.00 | 3.10 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 3.10 | 8.00 |  |  |
| **新 *76*** | DRM\_B4 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.40 | –50.70 | –47.30 | –41.90 | –19.70 | –3.60 | 0.00 | 0.40 | 0.00 | –0.50 | –4.80 | –19.70 | –49.40 | 10.00 | 16.20 |

### 3.3.13 B5\_20 kHz干扰DRM\_B4\_18 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 64 | DRM\_B2 | DRM\_B3 | –37.20 | –35.20 | –31.70 | –14.70 | 2.40 | 12.90 | 15.90 | 12.90 | 2.40 | –14.70 | –31.70 | –35.20 | –37.20 | 10.00 |  |
| 64a | DRM\_B2 /REL | DRM\_B3 /REL | –53.10 | –51.10 | –47.60 | –30.60 | –13.50 | –3.00 | 0.00 | –3.00 | –13.50 | –30.60 | –47.60 | –51.10 | –53.10 | 10.00 | 15.90 |
| 64b | DRM\_B2 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.90 | –51.00 | –47.40 | –38.60 | –16.60 | –3.20 | 0.00 | –3.20 | –16.60 | –38.60 | –47.40 | –51.00 | –52.90 | 10.00 | 15.40 |
| 差异 |  | **d = 64a‑64b** | –0.20 | –0.10 | –0.20 | 8.00 | 3.10 | 0.20 | 0.00 | 0.20 | 3.10 | 8.00 | –0.20 | –0.10 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 78 | DRM\_B4 | DRM\_B5 | –11.30 | 4.30 | 9.80 | 13.20 | 13.60 | 15.10 | 15.90 | 14.80 | 13.20 | 12.70 | 8.70 | –1.80 | –19.00 | 20.00 |  |
| 78 | DRM\_B4 /REL | DRM\_B5 /REL | –27.20 | –11.60 | –6.10 | –2.70 | –2.30 | –0.80 | 0.00 | –1.10 | –2.70 | –3.20 | –7.20 | –17.70 | –34.90 | 20.00 | 15.90 |
|  |  | d 相似 | 8.00 | 3.10 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 3.10 | 8.00 |  |  |
| **新 *78*** | DRM\_B4 ITU‑R BS.1615 建议书 | DRM\_B5 ITU‑R BS.1615 建议书 | –35.20 | –14.70 | –6.30 | –2.90 | –2.50 | –1.00 | 0.00 | –1.30 | –2.90 | –3.40 | –7.40 | –20.80 | –42.90 | 20.00 | 15.90 |

### 3.3.14 B0\_4.5 kHz 干扰DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 67 | DRM\_B3 | DRM\_B0 | –40.00 | –39.80 | –37.50 | –24.90 | 4.10 | 16.40 | 16.60 | –6.50 | –34.70 | –36.50 | –40.00 | –40.00 | –40.00 | 4.50 |  |
| 67a | DRM\_B3 /REL | DRM\_B0 /REL | –56.60 | –56.40 | –54.10 | –41.50 | –12.50 | –0.20 | 0.00 | –23.10 | –51.30 | –53.10 | –56.60 | –56.60 | –56.60 | 4.50 | 16.60 |
| 67b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B0 ITU‑R BS.1615 建议书 | –56.40 | –56.20 | –53.80 | –41.10 | –14.10 | –0.10 | 0.00 | –37.70 | –50.90 | –52.80 | –56.40 | –56.40 | –56.40 | 4.50 | 15.90 |
| 差异 |  | **d = 67a‑67b** | –0.20 | –0.20 | –0.30 | –0.40 | 1.60 | –0.10 | 0.00 | 14.60 | –0.40 | –0.30 | –0.20 | –0.20 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 79 | DRM\_B5 | DRM\_B0 | –37.00 | –37.00 | –35.70 | –25.50 | –1.30 | 16.20 | 16.60 | 16.60 | 16.60 | 16.60 | –16.10 | –32.10 | –35.10 | 4.50 |  |
| 79 | DRM\_B5 /REL | DRM\_B0 /REL | –53.60 | –53.60 | –52.30 | –42.10 | –17.90 | –0.40 | 0.00 | 0.00 | 0.00 | 0.00 | –32.70 | –48.70 | –51.70 | 4.50 | 16.60 |
|  |  | d 相似 | –0.20 | –0.20 | –0.30 | –0.40 | 1.60 | –0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 14.60 | –0.40 | –0.30 |  |  |
| **新 *79*** | DRM\_B5 ITU‑R BS.1615 建议书 | DRM\_B0 ITU‑R BS.1615 建议书 | –53.40 | –53.40 | –52.00 | –41.70 | –19.50 | –0.30 | 0.00 | 0.00 | 0.00 | 0.00 | –47.30 | –48.30 | –51.40 | 4.50 | 16.60 |

### 3.3.15 B1\_5 kHz 干扰DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 68 | DRM\_B3 | DRM\_B1 | –40.40 | –39.40 | –35.90 | –10.10 | 8.70 | 16.40 | 16.50 | –5.70 | –33.80 | –35.70 | –40.40 | –40.60 | –40.60 | 5.00 |  |
| 68a | DRM\_B3 /REL | DRM\_B1 /REL | –56.90 | –55.90 | –52.40 | –26.60 | –7.80 | –0.10 | 0.00 | –22.20 | –50.30 | –52.20 | –56.90 | –57.10 | –57.10 | 5.00 | 16.50 |
| 68b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B1 ITU‑R BS.1615 建议书 | –56.80 | –55.70 | –52.10 | –38.20 | –8.20 | –0.10 | 0.00 | –37.60 | –50.10 | –51.90 | –56.70 | –57.00 | –57.00 | 5.00 | 15.90 |
| 差异 |  | **d = 68a‑68b** | –0.10 | –0.20 | –0.30 | 11.60 | 0.40 | 0.00 | 0.00 | 15.40 | –0.20 | –0.30 | –0.20 | –0.10 | –0.10 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 80 | DRM\_B5 | DRM\_B1 | –37.50 | –37.00 | –34.80 | –16.40 | 7.60 | 16.20 | 16.60 | 16.60 | 16.60 | 16.30 | –14.40 | –31.50 | –34.70 | 5.00 |  |
| 80 | DRM\_B5 /REL | DRM\_B1 /REL | –54.10 | –53.60 | –51.40 | –33.00 | –9.00 | –0.40 | 0.00 | 0.00 | 0.00 | –0.30 | –31.00 | –48.10 | –51.30 | 5.00 | 16.60 |
|  |  | d 相似 | –0.10 | –0.20 | –0.30 | 11.60 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.40 | –0.20 | –0.30 |  |  |
| **新 *80*** | DRM\_B5 ITU‑R BS.1615 建议书 | DRM\_B1 ITU‑R BS.1615 建议书 | –54.00 | –53.40 | –51.10 | –44.60 | –9.40 | –0.40 | 0.00 | 0.00 | 0.00 | –0.30 | –46.40 | –47.90 | –51.00 | 5.00 | 16.60 |

### 3.3.16 B2\_9 kHz干扰DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 69 | DRM\_B3 | DRM\_B2 | –38.10 | –36.00 | –32.40 | –16.50 | 2.60 | 13.50 | 16.60 | 13.50 | 2.60 | –16.50 | –32.40 | –36.00 | –38.10 | 9.00 |  |
| 69a | DRM\_B3 /REL | DRM\_B2 /REL | –54.70 | –52.60 | –49.00 | –33.10 | –14.00 | –3.10 | 0.00 | –3.10 | –14.00 | –33.10 | –49.00 | –52.60 | –54.70 | 9.00 | 16.60 |
| 69b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –54.30 | –52.30 | –48.60 | –39.30 | –16.70 | –3.10 | 0.00 | –3.10 | –16.70 | –39.30 | –48.60 | –52.30 | –54.30 | 9.00 | 15.90 |
| 差异 |  | **d = 69a‑69b** | –0.40 | –0.30 | –0.40 | 6.20 | 2.70 | 0.00 | 0.00 | 0.00 | 2.70 | 6.20 | –0.40 | –0.30 | –0.40 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 81 | DRM\_B5 | DRM\_B2 | –37.00 | –35.40 | –32.10 | –19.60 | –0.50 | 13.30 | 16.60 | 16.60 | 16.60 | 16.60 | 13.20 | 7.50 | –20.50 | 9.00 |  |
| 81 | DRM\_B5 /REL | DRM\_B2 /REL | –53.60 | –52.00 | –48.70 | –36.20 | –17.10 | –3.30 | 0.00 | 0.00 | 0.00 | 0.00 | –3.40 | –9.10 | –37.10 | 9.00 | 16.60 |
|  |  | d 相似 | –0.40 | –0.30 | –0.40 | 6.20 | 2.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.70 | 6.20 |  |  |
| **新 *81*** | DRM\_B5 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –53.20 | –51.70 | –48.30 | –42.40 | –19.80 | –3.30 | 0.00 | 0.00 | 0.00 | 0.00 | –3.40 | –11.80 | –43.30 | 9.00 | 16.60 |

### 3.3.17 B3\_10 kHz干扰DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 70 | DRM\_B3 | DRM\_B3 | –36.50 | –34.40 | –30.80 | –4.90 | 6.30 | 13.50 | 16.40 | 13.50 | 6.30 | –4.90 | –30.80 | –34.40 | –36.50 | 10.00 |  |
| 70a | DRM\_B3 /REL | DRM\_B3 /REL | –52.90 | –50.80 | –47.20 | –21.30 | –10.10 | –2.90 | 0.00 | –2.90 | –10.10 | –21.30 | –47.20 | –50.80 | –52.90 | 10.00 | 16.40 |
| 70b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.70 | –50.70 | –47.00 | –37.70 | –11.10 | –3.10 | 0.00 | –3.10 | –11.10 | –37.70 | –47.00 | –50.70 | –52.70 | 10.00 | 15.90 |
| 差异 |  | **d = 70a‑70b** | –0.20 | –0.10 | –0.20 | 16.40 | 1.00 | 0.20 | 0.00 | 0.20 | 1.00 | 16.40 | –0.20 | –0.10 | –0.20 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | BDRM (kHz) | *S/I* (dB) |
| 82 | DRM\_B5 | DRM\_B3 | –35.80 | –34.00 | –30.60 | –8.30 | 5.30 | 13.30 | 16.40 | 16.60 | 16.60 | 16.40 | 13.20 | 8.80 | –9.30 | 10.00 |  |
| 82 | DRM\_B5 /REL | DRM\_B3 /REL | –52.20 | –50.40 | –47.00 | –24.70 | –11.10 | –3.10 | 0.00 | 0.20 | 0.20 | 0.00 | –3.20 | –7.60 | –25.70 | 10.00 | 16.40 |
|  |  | d 相似 | –0.20 | –0.10 | –0.20 | 16.40 | 1.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 1.00 | 16.40 |  |  |
| **新 *82*** | DRM\_B5 ITU‑R BS.1615 建议书 | DRM\_B3 ITU‑R BS.1615 建议书 | –52.00 | –50.30 | –46.80 | –41.10 | –12.10 | –3.30 | 0.00 | 0.20 | 0.20 | 0.00 | –3.40 | –8.60 | –42.10 | 10.00 | 16.40 |

### 3.3.18 B4\_18 kHz干扰DRM\_B5\_20 kHz模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 69 | DRM\_B3 | DRM\_B2 | –38.10 | –36.00 | –32.40 | –16.50 | 2.60 | 13.50 | 16.60 | 13.50 | 2.60 | –16.50 | –32.40 | –36.00 | –38.10 | 9.00 |  |
| 69a | DRM\_B3 /REL | DRM\_B2 /REL | –54.70 | –52.60 | –49.00 | –33.10 | –14.00 | –3.10 | 0.00 | –3.10 | –14.00 | –33.10 | –49.00 | –52.60 | –54.70 | 9.00 | 16.60 |
| 69b | DRM\_B3 ITU‑R BS.1615 建议书 | DRM\_B2 ITU‑R BS.1615 建议书 | –54.30 | –52.30 | –48.60 | –39.30 | –16.70 | –3.10 | 0.00 | –3.10 | –16.70 | –39.30 | –48.60 | –52.30 | –54.30 | 9.00 | 15.90 |
| 差异 |  | **d = 69a‑69b** | –0.40 | –0.30 | –0.40 | 6.20 | 2.70 | 0.00 | 0.00 | 0.00 | 2.70 | 6.20 | –0.40 | –0.30 | –0.40 |  |  |

如下所示，要获得ITU-R BS.1615建议书中相关配置的新数值，从6-7/21号文件对应图中进行相似性的调整之后，减去差异“d”：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 83 | DRM\_B5 | DRM\_B4 | –20.70 | –2.00 | 9.10 | 13.20 | 13.70 | 15.30 | 16.60 | 15.50 | 14.10 | 13.70 | 10.20 | 4.60 | –12.60 | 18.00 |  |
| 83 | DRM\_B5 /REL | DRM\_B4 /REL | –37.30 | –18.60 | –7.50 | –3.40 | –2.90 | –1.30 | 0.00 | –1.10 | –2.50 | –2.90 | –6.40 | –12.00 | –29.20 | 18.00 | 16.60 |
|  |  | d 相似 | 6.20 | 2.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.70 | 6.20 |  |  |
| **新 *83*** | DRM\_B5 ITU‑R BS.1615 建议书 | DRM\_B4 ITU‑R BS.1615 建议书 | –43.50 | –21.30 | –7.50 | –3.40 | –2.90 | –1.30 | 0.00 | –1.10 | –2.50 | –2.90 | –6.40 | –14.70 | –35.40 | 18.00 | 16.60 |

# 4 摘要

## 4.1 DRM干扰调幅

这些表格总结了DRM\_A4、DRM\_A5、DRM\_B4、DRM\_B5、DRM\_C5和DRM\_D5的新相对保护比(AREL)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 情形 | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | | |
|  |  |  |  | | | | | | | | | | | | | *BDRM* (kHz) | *S/N* (dB) | *AAF*(dB) |
| −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |

DRM\_A4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | AM | A4/AREL | −35.1 | −26.1 | −1.4 | 3.3 | 3.3 | 3.3 | 3.3 | 0.2 | −26.1 | −32.7 | −39.6 | −42.2 | −43.7 | 18 |  | 17 |
| **新 5** | **AM** | **A4/AREL** | **−35.3** | **−27.4** | **−1.3** | **3.5** | **3.5** | **3.5** | **3.5** | **0.3** | **−27.4** | **−32.9** | **−39.3** | **−41.9** | **−43.4** | **18** |  | **17** |

DRM\_A5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | AM | A5/AREL | −28.5 | −12.1 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | −0.10 | −20.4 | −28.5 | −38.7 | −41.2 | −42.7 | 20 |  | 17 |
| **新 6** | **AM** | **A5/AREL** | **−29.3** | **−14.5** | **0.1** | **3.1** | **3.1** | **3.1** | **3.1** | **0.1** | **−22.8** | **−29.3** | **−38.4** | **−40.8** | **−42.3.** | **20** |  | **17** |

DRM\_B4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | AM | B4/AREL | −35.1 | −26.1 | −1.4 | 3.3 | 3.3 | 3.3 | 3.3 | 0.2 | −26.1 | −32.7 | −39.6 | −42.2 | −43.7 | 18 |  | 17 |
| **新 11** | **AM** | **B4/AREL** | **−35.3** | **−27.4** | **−1.3** | **3.4** | **3.4** | **3.4** | **3.4** | **0.3** | **−27.4** | **−32.9** | **−39.2** | **−41.9** | **−43.3** | **18** |  | **17** |

DRM\_B5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | AM | B5/AREL | −28.5 | −11.9 | −0.1 | 2.8 | 2.8 | 2.8 | 2.8 | −0.1 | −19.8 | −28 | −38.6 | −41.1 | −42.6 | 20 | 17 |
| **新 *12*** | **AM** | **B5/AREL** | **−29.3** | **−14.6** | **0.1** | **3** | **3** | **3** | **3** | **0.1** | **−22.5** | **−28.8** | **−38.2** | **−40.9** | **−42.2** | **20** | **17** |

DRM\_C5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | AM | C5/AREL | −28.9 | −12.3 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | −0.1 | −20.4 | −28.6 | −38.7 | −41.2 | −42.7 | 20 | 17 |
| **新 *14*** | ***AM*** | ***C5/AREL*** | −29.7 | −14.6 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.1 | −22.7 | −29.4 | −38.3 | −40.9 | −42.3 | 20 | 17 |

DRM\_D5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | AM | D5/AREL | −29.2 | −12.6 | −0.1 | 2.9 | 2.9 | 2.9 | 2.9 | 0 | −19.9 | −28.1 | −38.6 | −41.1 | −42.6 | 20 | 17 |
| **新 *16*** | ***AM*** | ***D5/AREL*** | −29.9 | −15 | 0.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.2 | −22.3 | −28.8 | −38.3 | −40.7 | −42.2 | 20 | 17 |

## 4.2 DRM干扰DRM，相同模式

这些表格总结了DRM\_A4、DRM\_A5、DRM\_B4、DRM\_B5、DRM\_C5和DRM\_D5的新相对保护比（*AREL*）。

DRM\_A4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 37 | A4 | A4/AREL | −40.1 | −24 | −8.2 | −3.5 | −3 | −1.3 | 0 | −1.3 | −3 | −3.5 | −8.2 | −24 | −40.1 | 18 | 16.4 |
| **新 *37*** | ***A4*** | ***A4/AREL*** | −40.3 | −37 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37 | −40.3 | 18 | 16.4 |

DRM\_A5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 38 | A5 | A5/AREL | −23.2 | −10.6 | −6.1 | −3 | −2.5 | −1.2 | 0 | −1.2 | −2.5 | −3 | −6.1 | −10.6 | −23.2 | 20 | 16.4 |  |
| **新 *38*** | ***A5*** | ***A5/AREL*** | −37 | −11.8 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.8 | −37 | 20 | 16.4 |  |

DRM\_B4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 43 | B4 | B4/AREL | −40.2 | −24.1 | −8.2 | −3.5 | −3 | −1.3 | 0 | −1.3 | −3 | −3.5 | −8.2 | −24.1 | −40.2 | 18 | 16.4 |  |
| **新 *43*** | ***B4*** | ***B4/AREL*** | −40.6 | −37.7 | −8.4 | −3.7 | −3.2 | −1.5 | 0 | −1.5 | −3.2 | −3.7 | −8.4 | −37.7 | −40.6 | 18 | 16.4 |  |

DRM\_B5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 44 | B5 | B5/AREL | −22.7 | −10.5 | −6.1 | −3 | −2.5 | −1.2 | 0 | −1.2 | −2.5 | −3 | −6.1 | −10.5 | −22.7 | 20 | 16.4 |  |
| **新 *44*** | ***B5*** | ***B5/AREL*** | −39.1 | −11.5 | −6.3 | −3.2 | −2.7 | −1.4 | 0 | −1.4 | −2.7 | −3.2 | −6.3 | −11.5 | −39.1 | 20 | 16.4 |  |

DRM\_C5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 46 | C5 | C5/AREL | −23.7 | −10.7 | −6.2 | −3 | −2.6 | −1.2 | 0 | −1.2 | −2.6 | −3 | −6.2 | −10.7 | −23.7 | 20 | 16.4 |  |
| **新 *46*** | ***C5*** | ***C5/AREL*** | −36.5 | −12.1 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12.1 | −36.5 | 20 | 16.4 |  |

DRM\_D5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 48 | D5 | D5/AREL | −23.5 | −10.7 | −6.2 | −3 | −2.6 | −1.2 | 0 | −1.2 | −2.6 | −3 | −6.2 | −10.7 | −23.5 | 20 | 16.4 |  |
| **新 *48*** | ***D5*** | ***D5/AREL*** | −37.2 | −12 | −6.4 | −3.2 | −2.8 | −1.4 | 0 | −1.4 | −2.8 | −3.2 | −6.4 | −12 | −37.2 | 20 | 16.4 |  |

## 4.3 调幅干扰DRM

这些表格总结了DRM\_A4、DRM\_A5、DRM\_B4、DRM\_B5、DRM\_C5和DRM\_D5的新相对保护比。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
|  | −20 | −18 | −15 | −10 | −9 | −5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 | *BDRM* (kHz) | *S/I* (dB) |
| 新 21 | DRM\_A4 | AM | −54.4 | −52.2 | −48.6 | −42.7 | −36.7 | −7.5 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| 新 22 | DRM\_A5 | AM | −53.8 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| 新 27 | DRM\_B4 | AM | −53.8 | −52.2 | −48.6 | −42.7 | −36.7 | −7.6 | 0 | 0 | 0 | 0 | −12.8 | −36.7 | −43.9 | 18 | 7.4 |
| 新 28 | DRM\_B5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −4.6 | −20 | −41.5 | 20 | 7.4 |
| 新 30 | DRM\_C5 | AM | −53.2 | −51.5 | −48 | −41.5 | −27.9 | −4.6 | 0 | 0 | 0 | 0 | −4.9 | −20.3 | −41.7 | 20 | 7.4 |
| 新 32 | DRM\_D5 | AM | −53.2 | −51.5 | −47.9 | −41.2 | −27.1 | −4.3 | 0 | 0 | 0 | 0 | −5.1 | −20.5 | −41.8 | 20 | 7.4 |

## 4.4 DRM干扰DRM，不同模式

下表总结了不同模式的DRM干扰DRM的新相对保护比，以便纳入到ITU-R BS.1615建议书的表26中。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 有用信号 | 无用信号 | 频率间隔 *funwanted – fwanted* (kHz) | | | | | | | | | | | | | 参数 | |
| *BDRM* (kHz) | *S/I* (dB) |
| –20 | –18 | –15 | –10 | –9 | –5 | 0 | 5 | 9 | 10 | 15 | 18 | 20 |
| DRM\_B0 | DRM\_B4 | –41.30 | –39.20 | –38.00 | –0.90 | 0.00 | 0.00 | 0.00 | –0.80 | –30.20 | –26.80 | –41.00 | –43.90 | –45.50 | 18.00 | 10.30 |
| DRM\_B0 | DRM\_B5 | –38.80 | –36.20 | –30.80 | 0.00 | 0.00 | 0.00 | 0.00 | –0.20 | –13.00 | –27.50 | –39.40 | –42.30 | –43.80 | 20.00 | 9.80 |
| DRM\_B1 | DRM\_B4 | –41.30 | –39.30 | –38.10 | –1.40 | –0.40 | 0.00 | 0.00 | –0.40 | –13.70 | –27.60 | –40.40 | –43.30 | –45.00 | 18.00 | 10.90 |
| DRM\_B1 | DRM\_B5 | –39.00 | –36.60 | –31.30 | –0.10 | 0.00 | 0.00 | 0.00 | –0.10 | –7.90 | –31.30 | –39.10 | –41.90 | –43.60 | 20.00 | 10.40 |
| DRM\_B2 | DRM\_B4 | –37.20 | –32.80 | –5.10 | –0.40 | 0.00 | 0.00 | 0.00 | –3.70 | –32.80 | –29.40 | –42.50 | –45.20 | –46.80 | 18.00 | 13.40 |
| DRM\_B2 | DRM\_B5 | –32.60 | –32.60 | –3.60 | 0.00 | 0.00 | 0.00 | 0.00 | –3.60 | –37.50 | –32.10 | –43.10 | –45.80 | –47.30 | 20.00 | 12.90 |
| DRM\_B3 | DRM\_B4 | –40.80 | –37.90 | –5.00 | –0.40 | 0.00 | 0.20 | 0.00 | –3.80 | –37.90 | –31.50 | –42.70 | –45.50 | –46.90 | 18.00 | 13.70 |
| DRM\_B3 | DRM\_B5 | –34.40 | –8.00 | –3.10 | 0.00 | 0.00 | 0.00 | 0.00 | –3.10 | –10.90 | –33.80 | –40.70 | –43.50 | –44.90 | 20.00 | 13.40 |
| DRM\_B4 | DRM\_B0 | –54.00 | –53.90 | –52.90 | –43.90 | –44.80 | –1.10 | 0.00 | 0.00 | –0.30 | –1.50 | –45.20 | –51.10 | –53.10 | 4.50 | 16.60 |
| DRM\_B4 | DRM\_B1 | –54.60 | –54.20 | –52.00 | –41.60 | –19.60 | –0.90 | 0.00 | 0.00 | –0.80 | –2.00 | –45.50 | –50.70 | –52.80 | 5.00 | 16.60 |
| DRM\_B4 | DRM\_B2 | –54.00 | –52.40 | –49.10 | –41.40 | –41.80 | –4.00 | 0.00 | 0.20 | 0.00 | –0.50 | –5.40 | –41.80 | –43.60 | 9.00 | 16.40 |
| DRM\_B4 | DRM\_B3 | –52.40 | –50.70 | –47.30 | –41.90 | –19.70 | –3.60 | 0.00 | 0.40 | 0.00 | –0.50 | –4.80 | –19.70 | –49.40 | 10.00 | 16.20 |
| DRM\_B4 | DRM\_B5 | –35.20 | –14.70 | –6.30 | –2.90 | –2.50 | –1.00 | 0.00 | –1.30 | –2.90 | –3.40 | –7.40 | –20.80 | –42.90 | 20.00 | 15.90 |
| DRM\_B5 | DRM\_B0 | –53.40 | –53.40 | –52.00 | –41.70 | –19.50 | –0.30 | 0.00 | 0.00 | 0.00 | 0.00 | –47.30 | –48.30 | –51.40 | 4.50 | 16.60 |
| DRM\_B5 | DRM\_B1 | –54.00 | –53.40 | –51.10 | –44.60 | –9.40 | –0.40 | 0.00 | 0.00 | 0.00 | –0.30 | –46.40 | –47.90 | –51.00 | 5.00 | 16.60 |
| DRM\_B5 | DRM\_B2 | –53.20 | –51.70 | –48.30 | –42.40 | –19.80 | –3.30 | 0.00 | 0.00 | 0.00 | 0.00 | –3.40 | –11.80 | –43.30 | 9.00 | 16.60 |
| DRM\_B5 | DRM\_B3 | –52.00 | –50.30 | –46.80 | –41.10 | –12.10 | –3.30 | 0.00 | 0.20 | 0.20 | 0.00 | –3.40 | –8.60 | –42.10 | 10.00 | 16.40 |
| DRM\_B5 | DRM\_B4 | –43.50 | –21.30 | –7.50 | –3.40 | –2.90 | –1.30 | 0.00 | –1.10 | –2.50 | –2.90 | –6.40 | –14.70 | –35.40 | 18.00 | 16.60 |

附件3  
  
中频IBOC（带内同频）DSB系统的  
测量射频保护比

# 1 引言

IBOC DSB系统工作在两种模式下：混合模式和全数字模式。它旨在现有的模拟频谱内进行操作，并因此设计为可根据现有的干扰电平进行操作。IBOC DSB系统的性能主要受限于现有模拟传输的干扰且功率受到限制，以便保护相邻信道的广播。

如图18所示，“混合”（hybrid）一词指模拟DSB信号与数字信号同时传输。该图显示了各种低功率数字组成部分。这些构成了DSB信号中心频率±10至15 kHz的频段内的“核心”组成部分以及“核心”信号以外的“增强”组成部分。在信噪比许可时，后者提高音频信号的质量。

图 18

混合中频IBOC DSB功率谱密度



“全数字”一词指只有数字信号，其功率电平和频谱构成见图19。

图 19

全数字中频IBOC DSB功率谱密度



# 2 射频保护比

表31至33源于采用第2代IBOC激励器和参考接收机的实验室测量。干扰方为混合传输，其模拟部分由处理后的脉冲噪声调制至+125、–99%的调制深度。

有用/无用比表示为核心和增强的音频质量。增强音频的有用/无用比表示混合模式和全数字模式中核心音频的转换点。核心音频的有用/无用比表示混合模式的转换点以及全数字模式中的故障点。

表 31

射频保护比  
混合模式干扰混合模式的数字部分

|  |  |  |
| --- | --- | --- |
| 混合干扰源 | 核心音频 (dB) | 增强音频 (dB) |
| 同频 | 9.2 | 11.0 |
| 第一邻信道 | −14.5 | 6.8 |
| 第二邻信道(1) | −62.5 | −44.0 |
| (1) 在第二邻信道性能的情形中，数字核心音频故障的主要源头是前端过载。 | | |

表 32

射频保护比  
全数字模式干扰混合模式的数字部分

|  |  |  |
| --- | --- | --- |
| 混合干扰源 | 核心音频 (dB) | 增强音频 (dB) |
| 同频 | 1.75 | 1.5 |
| 第一邻信道 | −14.25 | 7.0 |
| 第二邻信道(1) | −62.5 | −44.5 |
| (1) 在第二邻信道性能的情形中，数字核心音频故障的主要源头是前端过载。 | | |

表 33

射频保护比  
全数字模式干扰全数字模式

|  |  |  |
| --- | --- | --- |
| 数字干扰源 | 核心音频 (dB) | 增强音频 (dB) |
| 同频 | 12 | 12 |
| 第一邻信道(1) | −23/–29 | −23/−29 |
| 第二邻信道(2) | – | – |
| (1) 当第一邻信道干扰大于−23 dB时，系统难以捕获。但是，一旦捕获后，干扰可在发生故障前增至−29 dB。  (2) 在第二邻信道性能的情形中，数字核心音频故障的主要源头是前端过载。 | | |

# 3 信道间隔

本建议书中的保护比基于10 kHz的信道间隔。当实验室测量完成后，将发布其他信道间隔的修正保护比。

# 4 夜间和天波保护的考虑

本建议书中的保护比代表着稳定的状态条件，可很好地用于日间规划。各主管部门也可考虑一个额外的系数，以补偿天波衰减条件下的衰减条件。

# 5 结论

同频和邻信道性能下的系统性能表明了系统的可靠性及其在现有模拟环境下工作的能力。

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 就附件1中与与热带广播频段有关的最小可用场强值而言，这些数值为第一近似值，需要用实地实验加以验证。 [↑](#footnote-ref-1)
2. 根据ITU‑R BS.468建议书的加权。 [↑](#footnote-ref-2)
3. 选择这些参数是为了将计算的射频保护比近似于测量值。 [↑](#footnote-ref-3)
4. 作为现代调幅接收机，采用了音频带宽为2.2 kHz且斜率为35 dB/倍频程的选择性曲线的接收机。这在5 kHz频率间隔上获得了大约41.5 dB的衰减（见图11b）。选择此类接收机是基于1989年和1997年期间“Deutsche Welle”对27个调幅接收机进行的测量。 [↑](#footnote-ref-4)
5. 按照ITU‑R BS.468建议书的噪声计加权。 [↑](#footnote-ref-5)