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Subject: Question ITU-R 4-2/6

**Document 6A/163-E**  
**20 April 2009**  
**English only**

### **North American Broadcasters Association**

REVISIONS TO THE DRAFT NEW RECOMMENDATION ITU-R BT.[SHARE]

#### **Requirements for the protection of the terrestrial broadcasting service (BS) from interference**

The North American Broadcasters Association (NABA, [www.nabanet.com](http://www.nabanet.com)) is an association of broadcasters in Canada, Mexico, and the United States, and the NABA Technical Committee is its standing technical body. NABA is thus in a position to present the technical viewpoints of the most authoritative association of professional North American Broadcasters in television and sound programme production, post-production, and distribution for terrestrial, satellite, and cable broadcasting.

NABA is a Sector Member of ITU-R and a long-time participant in ITU-R Study Groups, Working Parties, Task Groups, Rapporteur groups, etc. NABA numbers among its members Chairmen, Vice-Chairmen and members of the above groups. NABA also participates widely in the ITU work on radio, television and multimedia services and has a strong interest in spectrum management studies including spectrum engineering techniques, spectrum management fundamentals, spectrum monitoring, and inter-service sharing, interference and compatibility.

NABA notes that the October 2008 meeting of WP 6A developed the draft new Recommendation ITU-R BT.[SHARE] and submitted it to Study Group 6 for its adoption (Document 6/116). The DNR was returned by the Study Group 6 Chairman to allow more time for consultations and with annotations for improvements of the text (Document 6A/131). NABA also notes that Italy has contributed significant improvements to the text in Document 6A/151. NABA fully supports these enhancements which clarify the objective and language of the DNR.

NABA has further considered the above mentioned documents and offers additional revisions to the DNR in Document 6A/151 including an Annex establishing the precedent for the proposed protection requirement.

## Annex

### [PROPOSED] REVISION TO DRAFT NEW RECOMMENDATION ITU-R BT.[SHARE]

#### Requirements for the protection of the terrestrial broadcasting service (BS) from interference

##### Summary

Recommendation ITU-R BT.1786 provides a protection criterion for broadcasting services from emissions of non-broadcasting radiocommunication devices which do not have status or a corresponding frequency allocation in the Radio Regulations. This Recommendation provides requirements for protection of the broadcasting service also from those services that do have a status in the Radio Regulations.

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##### Scope

This Recommendation provides a guideline for the limit for total interference to the terrestrial broadcasting services that may result from the emissions of radiocommunication devices that share spectrum with the broadcasting service.

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The ITU Radiocommunication Assembly,

*considering*

a) that terrestrial broadcasting services are operated in the bands assigned by Art. 5 of the RR as a primary service;

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b) that the terrestrial broadcasting service is often planned on a noise-limited basis;

c) that radiocommunication services may exist with emissions from applications having a corresponding frequency allocation in the RR, that may share in the frequency bands allocated to the broadcasting services;

d) that protection requirements have been studied for interservice and intraservice interference between broadcasting and other relevant services<sup>1</sup>, and they have been submitted to relevant ITU Conferences to help them in making their decisions;

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e) that the planning of broadcasting services has been and is being carried out taking into account decisions of relevant WRCs, which did not contemplate emissions of radiocommunication devices not having a status in the RR, nor emission of radiocommunication services that may now be called upon to share spectrum with broadcasting services;

e) that there is an established protection criterion in Report ITU-R BT.2075 for terrestrial broadcasting services restricting interference caused by emissions from broadcasting-satellite systems and networks;<sup>¶</sup>

f) that protection requirements have been established in Recommendation ITU-R BT.1786 for interference from non-broadcasting radiocommunication devices not having a corresponding frequency allocation in the RR;

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<sup>1</sup> See for instance Recommendation ITU-R BT.1368 and Report ITU-R BT.2075.

g) that in order to preserve the same broadcasting service quality, the same protection requirements mentioned in *considering* f) should also be applicable to those services that do have a status in the RR and share broadcasting spectrum,

*recognizing*

a) that the broadcasting service is considered by the ITU as one of the preferred media to ensure communications in cases of disaster prevention, mitigation and relief as provided in Resolutions 644 (WRC-07), 646 (WRC-03), 647 (WRC-07), 53 (RA-07) and 55 (RA-07), and it is thus particularly important that it should be suitably protected,

*recommends*

1 that beyond the BS-to-BS intraservice protection requirement as prescribed in Recommendation ITU-R BT.1368 mentioned in *considering* d) above, the total interference contribution arising from shared use of the spectrum should cause a degradation in the C/N margin equal to or less than 0.5 dB or that the minimum usable field strength is not increased by more than 0.5 dB.

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## Annex to the Annex

### Introduction

Since the frequency spectrum is such a limited resource, the ITU-R has studied protection requirements for inter-service and intra-service interference between broadcasting and other relevant services. These requirements have been submitted to appropriate ITU Conferences to help them in making their decisions. The result has been numerous ITU-R Recommendations, Reports, and Agreements which provide for frequency sharing such that interference levels are permitted while maintaining quality by the affected service. This Recommendation draws on the experience of the ITU-R in establishing the protection requirement of 0.5 dB provided in the *recommends*. It is noted that Recommendation ITU-R BT.1786 provides a protection criterion for broadcasting services from emissions of non-broadcasting radiocommunication devices which do not have status or a corresponding frequency allocation in the Radio Regulations. This Recommendation, on the other hand, provides requirements for protection of the broadcasting service from those services that do have a status in the Radio Regulations. This Annex tabulates some examples of those Agreements, Reports, and Recommendations that utilize 0.5 dB as a protection requirement for both intra-service and inter-service.

### Precedent for a 0.5 dB protection requirement

The following ITU-R Agreements, Reports, and Recommendations utilize a 0.5 dB protection requirement:

#### Geneva 1975 Agreement – Final Acts of the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3)

Article 4 states: “3.2.5 any assignment may be considered affected when its usable field strength is increased by a value equal to or greater than 0.5 dB as a consequence of the proposed modification to the Plan”.

#### Geneva 1984 Agreement – Final Acts of the Regional Administrative Conference for the Planning of VHF Sound Broadcasting (Region 1 and Part of Region 3) – Regional Agreement relating to the Use of the Band 87.5-108 MHz for FM Sound Broadcasting (Region 1 and Part of Region 3)

Article 4 states: “4.3.7.1 a sound broadcasting station, it should normally accept an increase in the usable field strength at the transmitter site, provided that ... the resulting usable field strength ... is increased by 0.5 dB or less compared with the usable field strength resulting from the Plan”.

Also: “4.3.7.2 a television station, it should normally accept an increase in the usable field strength at the transmitter site, provided that ... the resulting usable field strength ... is increased by 0.5 dB or less compared with the usable field strength resulting from the Plan”.

**Geneva 2006 Agreement – Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz (RRC-06)**

Section II of Annex 4 states: “Section 3.1 Field Strength Calculations”.

In case the field strengths from several signal sources need to be aggregated the power sum method is used. The individual field strengths obtained at the calculation points from all transmitting stations of an allotment are processed in decreasing order. The power sum is obtained as follows:

- starting from the highest, the power values equivalent to the interfering field strengths are added, one after the other;
- at each summation, the result is compared to the previous one;
- if the increase in power is greater than or equal to 0.5 dB, the summation process continues;
- if the increase in power would be less than 0.5 dB, the summation process is stopped and 0.5 dB is added, giving the result of the power sum.

**Report ITU-R BT.2075 – Protection requirements for terrestrial television broadcasting services in the 620-790 MHz band against potential interference from GSO and non-GSO broadcasting-satellite systems and networks**

During discussion under Agenda item 1.11 of WRC-07, there was an agreement in that beyond the protection ratio required for BS-BS intra-service interference, interference contributions arising from inter-service sharing (between BS and interference from other services) need to be 10 dB lower than noise level to ensure that degradation in the C/N margin is limited to 0.5 dB of the available margin.

**Recommendation ITU-R S.671-3 – Necessary protection ratios for narrow-band single channel-per-carrier transmissions interfered with by analogue television carriers**

Provides an interference scenario using “an equivalent thermal noise increase of 0.5 dB (referred to as “C/N degradation”)”.

**Recommendation ITU-R F.1706 – Consideration on separation distance to protect P-P FWS from interference caused by NWS sharing the same frequency band in the 4 to 6 GHz range**

Recommends that the protection criteria for P-P FWS sharing the same frequency bands with NWS should be as follows: – the maximum aggregate interference from the NWS including base station and terminal stations should be such that the degradation to an FWS receiver threshold does not exceed 0.5 dB under free space propagation conditions.

**Conclusion**

The use of a protection requirement of 0.5 dB is not without precedent as is shown above. It is, therefore, appropriate to recommend that the total interference contribution arising from shared use of the spectrum should cause a degradation in the C/N margin equal to or less than 0.5 dB or that the minimum usable field strength is not increased by more than 0.5 dB.