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| **Radiocommunication Study Groups** |  |
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| **6 August 2020** |
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| Annex 14 to Working Party 5C Chairman’s Report | |
| WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT REVISION of RECOMMENDATION ITU-R F.1777-2[[1]](#footnote-1)\* | |
| System characteristic of television outside broadcast, electronic news gathering and electronic field production in the fixed service for use in sharing studies | |

(Question ITU-R 252/5)

(2007-2015-2018)

Scope

This Recommendation, dealing with system characteristics of television outside broadcast (TVOB), electronic news gathering (ENG) and electronic field production (EFP) in the fixed service for use in sharing studies contains the typical system parameters and operational requirements for these broadcast auxiliary services (BAS)[[2]](#footnote-2), which are required for sharing studies between the analogue and digital BAS in the fixed service and other radiocommunication services.

Keywords

Electronic news gathering (ENG), system characteristics

The ITU Radiocommunication Assembly,

considering

*a)* that some administrations operate extensive terrestrial broadcast auxiliary services (BAS) under fixed service (FS) allocations;

*b)* that administrations who operate analogue terrestrial BASunder FS allocations are likely to continue for a reasonable amount of time into the future;

*c)* that some administrations are migrating from analogue to digital terrestrial BAS under FS allocations;

*d)* that many administrations are likely to operate both terrestrial analogue and digital electronic news gathering (ENG) and television outside broadcast (TVOB) equipment under FS allocations for a reasonable amount of time in the future;

*e)* that the frequency bands used for these BAS including TVOB, ENG and electronic field production (EFP)are, in many cases, shared by the FS and other services;

*f)* that system characteristics for BAS including TVOB, ENG and EFP are different from those of typical fixed wireless systems (FWSs) as originally found in Recommendation ITU‑R F.758;

*g)* that it is desirable to identify the system parameters and operational characteristics for BAS applications including TVOB, ENG and EFP for efficient sharing studies with other services,

noting

*a)* Report ITU-R BT.2069 – Tuning range and operational characteristics of terrestrial electronic news gathering systems (ENG), provides specifications on TVOB, ENG and EFP;

*b)* Recommendation ITU-R M.1824 – System characteristics of television outside broadcast, electronic news gathering and electronic field production in the mobile service for use in sharing studies;

*c)* Recommendation ITU-R F.758 – System parameters and considerations in the development of criteria for sharing or compatibility between digital fixed wireless systems in the fixed service and systems in other services and other sources of interference;

*d)* that as digital terrestrial BAS is the more sensitive service, successful sharing studies conducted with digital BAS assume that analogue BAS will be protected,

recommends

**1** that the description of the user requirements and key characteristics of analogue and digital terrestrial BAS in Annexes 1 and 2 be used by administrations seeking to operate these applications in the frequency bands allocated to the FS sharing with other services;

**2** that the parameters described in Annex 2 should be used for sharing studies between digital BAS and other services;

**3** that, for typical sharing considerations including development of criteria for these applications, the basic principles provided in Recommendation ITU-R F.758 should be used.

Annex 1  
  
System characteristics and user requirements for BASs  
including TVOB, ENG and EFP

*[Editor’s Note: There is no proposed change to Annex 1]*

Annex 2  
  
Digital FS system parameters for BAS

The following system characteristics of BAS, including TVOB, ENG and EFP are intended for use in sharing studies between these BAS in the FS and other radio services.

Table 1 provides system parameters for digital BAS systems. Whilst in practice a range of operating parameters may be employed, this example provides a representative sample of the system parameters developed to date.

TABLE 1

Digital FS system parameters for BAS Video Systems

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency band (GHz) | 0.770 < *f* < 0.806 | 1.240 < *f* < 1.300 2.330 < *f* < 2.370 | | 2.025 ( *f* < 2.110) 2.200 ( *f* < 2.290) 2.500 ( *f* < 2.690) 3.400 ( *f* < 3.600) | | | 5.850 < *f* < 8.500 10.250 < *f* < 13.250 | | | | | | 41.000 < *f* < 42.000 | |
| Modulation | QPSK-OFDM 16-QAM-OFDM 32-QAM-OFDM | QPSK-OFDM 16-QAM-OFDM 32-QAM-OFDM 64-QAM-OFDM | | QPSK | 64-QAM | 16-QAM | QPSK-OFDM 16-QAM-OFDM 32-QAM-OFDM 64-QAM-OFDM | | QPSK-OFDM 16-QAM-OFDM 32-QAM-OFDM 64-QAM-OFDM 256-QAM-OFDM 1024-QAM-OFDM 4096-QAM-OFDM | | 64-QAM | QPSK 16-QAM 32-QAM 64-QAM | QPSK-OFDM 16QAM-OFDM 32-QAM-OFDM 64-QAM-OFDM 8-PSK 16-QAM | |
| Capacity (Mbit/s) | Up to 16 | Up to 30 | Up to 60 | Up to 10.556 | Up to 31.668 | Up to  64.51 | Up to 30 | Up to 60 | Up to   154(16) | Up to   313(16) | Up to 40 | Up to 66 | Up to  401(16) | Up to   803(16) |
| Channel spacing (MHz) | 9 | 9 | 18 | 8 | 8 | 24 | 9 | 18 | 9 | 18 | 9 | 18 | 62.5 | 125 |
| Maximum Rx antenna gain (dBi) | 15 | 19 | 19 | 27 | 27 | 27 | 35 | 35 | 35 | 35 | 45 | 35 | 40 | 40 |
| Feeder/multiplexer loss (minimum) (dB) | Tx 1 Rx 1 | Tx 1 Rx 1 | Tx 1 Rx 1 | Tx 0.5 Rx 0.2 | Tx 0.5 Rx 0.2 | Tx 0.5 Rx 0.2 | Tx 1 Rx 1 | Tx 1 Rx 1 | Tx 1  Rx 1 | Tx 1  Rx 1 | Tx 1 Rx 1 | Tx 1 Rx 1 | Tx 0.1 Rx 0.1 | Tx 0.1 Rx 0.1 |
| Antenna type (Tx and Rx) | Colinear/ Yagi | Colinear/ Yagi | Colinear/ Yagi | Various | Various | Various | Parabolic | Parabolic | Parabolic | | Parabolic | Parabolic | Various | Various |
| Maximum Tx antenna gain (dBi) | 10 | 19 | 19 | 25 | 25 | 25 | 35 | 35 | 35 | 35 | 45 | 35.24 | 40 | 40 |
| Maximum Tx output power (dBW)(1) | 7 | 11(4) 13(5) | 14(4)  16(5) | 6 | 6 | 6 | 4 | 7 | 4(17) | 7(17) | 3 | 1.76 | 0(17) | 0(17) |
| e.i.r.p. (maximum) (dBW)(2) | 16 | 29(4) 31(5) | 32(4) 34(5) | 32.5 | 32.5 | 32.5 | 38 | 41 | 38(17) | 41(17) | 47 | 36 | 39.9(17) | 39.9(17) |
| Receiver IF bandwidth (MHz) | 9 | 9 | 18 | 8 | 8 | 24 | 9 | 18 | 9 | 18 | 9 | 18 | 62.5 | 125 |
| Adjacent channel selectivity (dB) | –40(6) | –40(6) | –40(7) | –75 | –75 | –75 | –40(6) | –40(7) | –40(6) | –40(7) | –50(8) | –40(9) | –20(10) | –20(11) |
| Adjacent channel guard band (MHz) | Not specified | Not specified | Not specified | ≥ 5 | | | Not specified | Not specified | Not specified | | Not specified | Not specified | Not specified | Not specified |
| Receiver noise figure (dB) | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | 4 | 4 | 4 | 4 | 4 | 4 | 10 | 10 |

TABLE 1 (*end*)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency band (GHz) | 0.770 < *f* < 0.806 | 1.240 < *f* < 1.300 2.330 < *f* < 2.370 | | | | 2.025 ( *f* < 2.110) 2.200 ( *f* < 2.290) 2.500 ( *f* < 2.690) 3.400 ( *f* < 3.600) | | | 5.850 < *f* < 8.500 10.250 < *f* < 13.250 | | | | | | 41.000 < *f* < 42.000 | |
| Receiver thermal noise (dBW) | –130.5 | –130.5 | | –127.4 | | –132.3 | –132.3 | –127.6 | –130.5 | –127.4 | −130.5 | −127.4 | –131.5 | –127.4 | –116.0 | –113.0 |
| Nominal Rx input level (dBW) | –88 | SISO(12) | MIMO(13) | SISO(12) | MIMO(13) | –85 | –70 | –75 | –88 | –85 | −88 | −85 | –88 | –91 | –92.8 | –90.2 |
| –93 | –103 | –97 | –100 |  |
| Rx input level for  1 × 10–3 BER (dBW) | –120 –113 –110.7 | –119.6(14) –113.0(14) –110.0(14) –107.2(14) | –121.5(14) –111.5(14) – – | –116.5(14) –109.9(14) –106.9(14) –104.1(14) | –118.4(14) –108.4(14) – – | –125 | –112 | –115 | –120 –113 –110.7 –108.2 | –116.9 –109.9 –107.6 –105.1 | –121.1(15) –114.8(15) –111.8(15) –109.3(15) –104.0(15) –98.7(15) –93.4(15) | –118.0(15) –111.7(15) –108.7(15) –106.2(15) –100.9(15) –95.6(15) –90.3(15) | –104(14) | –116.9 –109.9 –107.6 –105.1 | –106.0(14) –98.8(14)–94.6(14)  –91.3(14)  –102.5(14)  –98.8(14) | –103.0(14)  –95.8(14)  –91.6(14)  –88.3(14)  –99.5(14)  –95.8(14) |
| Nominal long-term interference (dBW)(3) | –140.5 | –140.5 | | –137.4 | | –142.3 | –142.3 | –137.6 | –140.5 | –137.4 | −140.5 | −137.4 | –141.5 | –137.4 | –126.0 | –123.0 |
| Spectral density (dB(W/MHz)) | –146.0 | –150.0 | | –150.0 | | –147.3 | –147.3 | –147.3 | –146.0 | –146.0 | −150.0 | −150.0 | –151.0 | –146.0 | –144.0 | –144.0 |
| (1) For the band 10.6-10.68 GHz, which is shared with the Earth exploration-satellite service (passive), there are the restrictions on maximum transmitter power as –3 dBW and maximum e.i.r.p. as 40 dBW, except some countries in accordance with No. **5.482** of the Radio Regulations (RR).  (2) For the band 10.6-10.68 GHz, which is shared with the Earth exploration-satellite service (passive), there are the restrictions on maximum transmitter power as –3 dBW and maximum e.i.r.p. as 40 dBW, except some countries in accordance with RR No. **5.482**.  (3) Based on an *I*/*N*-th criterion of –10 dB. *I*/*N*-th = –6 dB is applicable to cases where the sharing with the terrestrial co-primary services with an interference affecting a limited portion of service area.  (4) For the band 1.215 GHz-1.300 GHz.  (5) For the band 2.300 GHz-2.450 GHz.  (6) Filter characteristic of a receiver at 6.75 MHz from channel centre frequency.  (7) Filter characteristic of a receiver at 13.5 MHz from channel centre frequency.  (8) Filter characteristic of a receiver at 6.7 MHz from channel centre frequency.  (9) Filter characteristic of a receiver at 14.0 MHz from channel centre frequency.  (10) Filter characteristic of a receiver at 62.5 MHz from channel centre frequency.  (11) Filter characteristic of a receiver at 125 MHz from channel centre frequency.  (12) SISO stands for Single Input Single Output system.  (13) MIMO stands for Multiple Input Multiple Output system.  (14) Rx input level for 1 × 10-4 BER.  (15) Rx input level for 1 × 10-7 BER.  (16) In the case of MIMO transmission with 2 Tx antennas.  (17) Total value of outputs in the case of MIMO transmission. | | | | | | | | | | | | | | | | |

1. \* This Recommendation should be brought to the attention of Radiocommunication Study Group 6. [↑](#footnote-ref-1)
2. The term “BAS” also known as services ancillary to broadcasting (SAB) is defined in Report ITU‑R BT.2069. [↑](#footnote-ref-2)