



Recommendation ITU-R M.1824-2
(02/2022)

**System characteristics of television outside
broadcast, electronic news gathering and
electronic field production in the mobile
service for use in sharing studies**

M Series
**Mobile, radiodetermination, amateur
and related satellite services**



Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R M.1824-2*

System characteristics of television outside broadcast, electronic news gathering and electronic field production in the mobile service for use in sharing studies

(Questions ITU-R 1/5 and ITU-R 7/5)

(2007-2015-2022)

Scope

This Recommendation, dealing with system characteristics of television outside broadcast (TVOB), electronic news gathering (ENG) and electronic field production (EFP) in the mobile service to assist sharing studies, contains the typical operational and technical characteristics of broadcast auxiliary services (BAS)¹, which are required for sharing studies both between the BAS in the mobile service and other radiocommunication services and between mobile broadband networks used for ENG applications in the mobile service and other radiocommunication services.

Keywords

ENG, BAS, SAB, Mobile broadband

Abbreviations

AM	Amplitude modulation
BAS	Broadcast auxiliary services
BER	Bit error ratio
BPSK	Binary phase shift keying
BS	Base station
BWA	Broadband wireless access
CNR	Carrier to noise ratio
EFP	Electronic field production
e.i.r.p.	equivalent isotropically radiated power
ENG	Electronic news gathering
FM	Frequency modulation
IF	Intermediate frequency
LTE	Long Term Evolution
MIMO	Multiple-input multiple-output
MS	Mobile station
OB	Outside broadcasting

* This Recommendation should be brought to the attention of Radiocommunication Study Group 6.

¹ The term “BAS”, also known as services ancillary to broadcasting (SAB), is defined in Report ITU-R BT.2069.

OFDM	Orthogonal frequency division multiplex
PSK	Phase shift keying
QAM	Quadrature amplitude modulation
QPSK	Quaternary phase shift keying
Rx	Receiver
RZ-SSB	Real zero single sideband
SISO	Single-input single-output
SSB	Single sideband
TVOB	Television outside broadcast
Tx	Transmitter

The ITU Radiocommunication Assembly,

considering

- a) that some administrations operate extensive terrestrial broadcast auxiliary services (BAS) under mobile service allocations;
- b) that some administrations are migrating from analogue to digital terrestrial BAS under mobile allocations;
- c) that many administrations are likely to operate BAS including both terrestrial analogue and digital electronic news gathering (ENG) and television outside broadcast (TVOB) equipment in the mobile allocations for a reasonable amount of time;
- d) that the frequency bands used for these BAS including TVOB, ENG and electronic field production (EFP) are, in many cases, shared by the mobile service and other services;
- e) that the technical and operational characteristics of terrestrial BAS deployed under the mobile service are different from those systems deployed under the fixed service;
- f) that several types of antennas are used by the BAS operated in various vehicles, and those antennas are controlled in elevation and azimuth during their operation to establish reliable links to the studio;
- g) that it is desirable to identify the system parameters and operational characteristics to facilitate sharing with other services;
- h) that ENG applications require low latency and high quality of service transmission of high-definition video and audio streams for live programmes;
- i) that ENG applications require reliable connectivity even in the event of a disaster,

recognizing

- a) that Resolution ITU-R 59 resolves to carry out studies on availability of frequency bands and/or tuning ranges for worldwide and/or regional harmonization and conditions for their use by terrestrial electronic news gathering systems,

noting

- a) that mobile broadband networks can be used for ENG applications when it is advantageous to do so;

- b) that Recommendation ITU-R F.1777 provides system characteristics of TVOB, ENG and EFP in the fixed service for use in sharing studies;
- c) that Report ITU-R BT.2069 addresses spectrum usage and operational characteristics of terrestrial ENG, TVOB and EFP systems;
- d) that Report ITU-R BT.2299 – Broadcasting for public warning, disaster mitigation and relief, provides a compilation of supporting evidence that terrestrial broadcasting plays a critically important role in disseminating information to the public in times of emergencies,

recommends

- 1 that the operational and technical characteristics described in Annex 1 should be used for sharing studies between BAS deployed in the mobile service and other services;
- 2 that the operational and technical characteristics provided in Annex 2 should be used for sharing studies between mobile broadband networks used for ENG applications in the mobile service and other services.

Annex 1

Operational and technical characteristics of BAS systems deployed in the mobile service

1 Operational characteristics of BAS systems in the mobile service

Broadcasters use several frequency bands and several types of antennas depending on the situation where terrestrial crews send and receive live images. Figures 1 and 2 are examples of link situations. These systems are used for reporting the events of national disasters, contents production outside studio, etc. noting that the timing and location of national disaster events cannot be predicted.

Moreover, since broadcasters need to send the live video of national disasters and the contents which are needed in programme production; the geographical relation between the ENG equipment and collecting station or relay station installed on the helicopter or vehicular cannot be predicted. As a consequence, the antennas of ENG equipment need to point to any azimuth and elevation angle.

Figure 1 shows the example operation for transmitting live video to the collecting station, in order to broadcast the events which occur at the suburban area. In this case, the terrestrial video engineer who controls the microwave equipment points the antenna to the relay station installed on helicopter to avoid terrestrial obstacles. The relay station on the helicopter relays the live video to the collecting station which sends it to the broadcasting studio. The return link is also necessary to allow the terrestrial video engineers to collect information from the broadcasting studio.

Figure 2 shows the example of operation for transmitting live video to the collecting station, in order to broadcast the events which occur at the urban area. In this case, there are several ways to make a microwave link to the collecting station. The camera crew riding on the motorcycle takes the live video and transmits it to the relay station installed on the vehicle which is also running in front of the motorcycle. In some cases, the relay station installed on the helicopter picks up the video which is transmitted by the camera crew riding on the motorcycle. A low gain antenna is usually used in these cases. The relay station installed on the vehicle also transmits live video to the helicopter which relays it to the collecting station, or directly transmits it to the collecting station by using a high gain antenna.