

INTERNATIONAL AMATEUR RADIO UNION REGION 1

# VHF MANAGERS HANDBOOK



2006, IARU Region 1, CH-6330 CHAM ZG, Switzerland

## 6.2 OPERATING PROCEDURES FOR METEOR SCATTER QSO'S (Davos 2005)

### 6.2.1 INTRODUCTION

The goal of the procedures described is to enable valid contacts to be made by meteor scatter (MS) reflection as quickly and easily as possible. Meteor scatter is unlike most other propagation modes, in that neither station can hear the other until an ionised meteor trail exists to scatter or reflect the signals. As the reflections are often of very short duration the normal QSO procedure is not readily applicable and specialised operating techniques must be taken to ensure that a maximum of correct and unmistakable information is received. The two stations have to take turns to transmit and receive information in a defined format, following the procedures as detailed below. Some meteor showers are strong enough to make some of these measures unnecessary but to encourage use of all generally listed showers there is no reason why the suggested procedures should not always be used. As with operating procedures in general, the virtues of the MS operating procedures are mainly that they are standard and are widely understood throughout IARU Region 1.

### 6.2.2 2. SCHEDULED AND RANDOM CONTACTS

Two types of MS contacts, arranged in different ways, may be distinguished:

a. A scheduled contact, where two interested stations arrange in advance the frequency, timing, transmission mode, e.g. Telegraphy, SSB or MGM and call signs to be used. Scheduling may be carried out by exchange of letters or e-mail, by radio via the European VHF Net on 14,345 MHz, by Internet chat-rooms, packet-radio etc.

b. A non-scheduled contact, where a station calls CQ or responds to a CQ call, are called "random contacts". Random contacts are far more difficult and because you are starting entirely from scratch, it is particularly important for both stations to follow the standard meteor scatter QSO procedures described in this document.

### 6.2.3 TIMING

Prior to any MS activity it is absolutely vital that clocks need to be set to better than 1 second of standard time. Any clock inaccuracy will result in wasted time. Accurate timing of transmit and receive periods is important for two reasons: 1) to maximise the chances of hearing the other station, and 2) to avoid interference between local stations. Accurate timing can be accomplished for example by checking against the time-ticks on standard frequency transmissions, TV Teletext, telephone 'speaking-clock', GPS time signals or the Internet.

The recommended time periods for the different modes are:

- Telegraphy: 2.5 minutes periods.
- SSB: 1 minute periods.
- MGM: 30 seconds periods.

This practice gives quite satisfactory results. However developing technology make it possible to use much different periods and amateurs may wish to arrange 1 minute periods for Telegraphy and shorter periods for SSB and MGM especially during major showers. If non-recommended time periods are used the first priority is to avoid causing interference to local stations that are using the recommended periods. Even though the recommended period for SSB contacts is 1 minute periods a quick-break procedure making a break every 10-15 seconds, in case the QSO can be completed within one long burst, are encouraged during major meteor showers.

#### 6.2.4 TRANSMIT PERIODS

In order to minimise the overall interference with other stations standard transmit periods are recommended. Station in central and western Europe should use second period. All MS operators living in the same area should, as far as possible, agree to transmit simultaneously in order to avoid mutual interference.

#### 6.2.5 QSO DURATION

Every uninterrupted QSO period must be considered as a separate trial. This means that it is not permissible to break off and then continue the contact at a later time.

#### 6.2.6 FREQUENCIES

##### Scheduled contacts

These contacts may be arranged on any frequency, taking into consideration the mode and band plan. Scheduled contacts must not use known popular frequencies and the random MS frequencies. Special care should be applied on the frequency selection to avoid interference when using reverse transmit periods according to your location.

##### Random contacts

The frequency used for CQ calls for random contacts should be according to the IARU Region 1 bandplans.

#### 6.2.7 QSY FREQUENCIES FOR MGM

To avoid -interference, which results from a large number of stations attempting to complete contacts on the various MS calling frequencies, a QSY method is recommended. During the CQ the caller indicates on which frequency he/she will listen for a reply and carry out any subsequent QSO. The procedure for moving a beginning QSO off the calling frequency without losing contact is as follows. If an operator wants to call CQ the following QSY procedure should be used:

- 1) Select the frequency to be used for a QSO by checking whether it is clear of traffic and QRM.
- 2) In the CQ call, immediately following the letters "CQ", kHz is inserted to indicate the frequency that will be used for reception when the CQ call finishes.
- 3) During the receiving period the receiver should be tuned to the frequency indicated by the letter used in the CQ call.
- 4) When the caller receives a signal on the receiving frequency indicated during the call and identifies the reply as an answer on his CQ, the transmitter is moved to the same receiving frequency and the whole QSO procedure takes place there.

If an operator instead of calling CQ wishes to listen for a CQ call the following QSY-procedure should be used:

- 1) Listen on a random contact frequency.
- 2) When a CQ call is received, note the kHz-frequency, which follows the letters "CQ" in the call. From this find the correct receiving frequency which the calling station will use for receiving replies.
- 3) QSY the transmitter to the receiving frequency, and transmit a reply during the appropriate period. The format for the reply can be found in section 8.
- 4) As the QSO will take place on this frequency, continue to transmit and to listen, during the appropriate

periods, on this frequency. It may be that the station calling CQ will not hear your first reply, but may do so during one or more subsequent periods. Hence there is no need to return to the calling frequency.

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The QSY frequencies should take place in the segment according to the IARU Region 1 bandplans.

a. MGM, kHz-frequency

Users of MGM indicate the frequency they intend to carry out the QSO by adding the three digits of the absolute frequency, i.e. the kHz-frequency. For example CQ383 indicates that the station will listen on 144,383 MHz for a subsequent contact.

Example: G4ASR wishes to try a random MS experiment on MGM and wants to start with calling CQ. He first checks his receiver in the MGM range of 144,360 MHz to 144,397 MHz and finds a clear frequency on 144,394 MHz. He calls CQ on 144,370 MHz, and he must now add the kHz-frequency to his CQ call to indicate on which frequency he intends to listen. In this example he will therefore call "CQ394" in his CQ call.

Example: Your receive PA2DW who is calling "CQ274" on the 50 MHz random frequency. This tells you that PA2DW will listen on exactly 50,274 MHz.

b. CW/SSB

This proposal does not describe any procedures for QSY operation on CW/SSB anymore.

### 6.2.8 QSO PROCEDURE

All modes use the same MS-QSO procedure.

When attempting random SSB contacts, speak the letters clearly, using phonetics where appropriate.

a. Calling

The contact starts with one station calling the other by sending both call signs.

b. Reporting system

The report consists of two numbers:

First number (burst duration)	Second number (signal strength) S-units S/N
2 : up to 0,5 s	6 : below S2 or below 5 dB
3 : 0,5 - 1 s	7 : from S2 to S3 or from 5 dB to 10 dB
4 : 1 - 5 s	8 : from S4 to S5 or from 10 dB to 15 dB
5 : longer than 5 s	9 : above S5 or above 15 dB

Note that the number "1" is not used as the first number/burst duration.

Maximum duration of a ping (Underdense Reflection):

Band	Duration
50 MHz	1000 ms
70 MHz	500 ms
144 MHz	100 ms
432 MHz	13 ms

This means that the duration of bursts (Overdense Reflections) are longer than the above ping durations.

c. Reporting procedure

A report is sent when the operator has positive evidence of having received the correspondent's or his own callsign or parts of one of them. The report should be sent twice between each set of call signs. The report must not be changed during a contact even though signal strength or duration might well justify it.

d. Confirmation procedure

1) As soon as either operator copies both call signs and a report he may start sending a confirmation. This means that all letters and figures have been correctly received.

The message can be pieced together from fragments received over several bursts and pings, but it is up to the operator to ensure that it is done correctly and unambiguously. Confirmation is given by inserting an R before the report.

2) When one operator receives a confirmation message, such as "R27", and all required information is complete he must confirm with a string of R's, inserting his own call sign after at least 3 R's. When the other operator has received the R's, the contact is complete and he may respond in the same manner.

e. Requirements for a complete QSO

Both operators must have copied both callsigns, the report and a confirmation that the other operator has done the same. This confirmation can either be an "R" preceding the report or a string of minimum three consecutive "RRR".

#### 6.2.9 VALID CONTACTS

A valid contact is one where both operators have copied both callsigns, the report and an unambiguous confirmation. However no recourse should be made during the contact to obtain the required information, change of frequency, antenna direction, etc. via other methods such as the DX Cluster, talk-back on another band, etc. Such secondary methods invalidate the meteor scatter contact.

In essence: if anything concerning the ongoing QSO attempt is agreed through other means than the QSO attempt frequency a new start is required.

#### 6.2.10 DOCUMENT HISTORY:

This procedure was adopted at the IARU Region 1 Conference in Miskolc-Tapolca (1978), later slightly amended at the IARU Region 1 Conference in Noordwijkerhout (1987), Torremolinos (1990), de Haan (1993), San Marino (2002) and Vienna (2004).