



UEM : 2011

SOUND CONTROL AND SOUND LEVELS

THE 2 METRE MAX METHOD

(The new test method to verify the sound levels in Motocross, Supermoto, Enduro and Track racing).

In order to pursue the measures taken to reduce the sound level in favour of the environment and in the framework of the "RIDE QUIET" campaign, a new method for measuring the sound levels called "2 metre max", will progressively be applied as from 2010 in all "all-terrain" disciplines (more specifically in Motocross, Enduro and Track Racing).

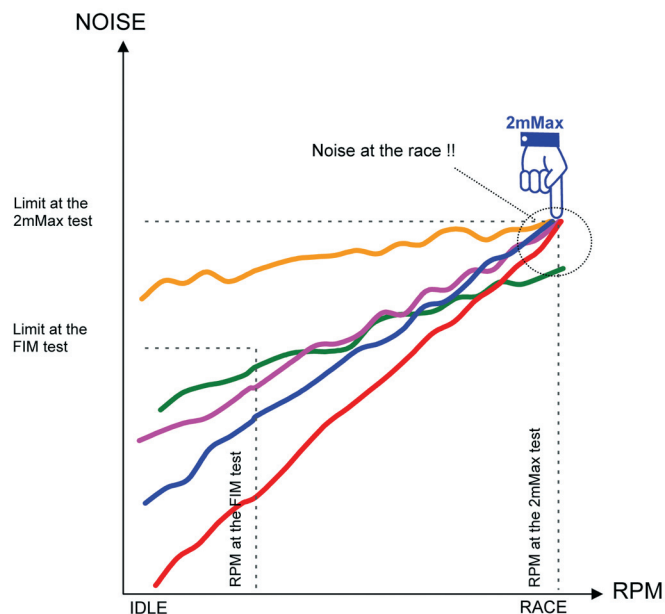
WHAT DOES IT CONSIST OF?

The 2 metre max method shows a very good correlation between the sound power level (LwA) issued by motorcycles under full acceleration, and the maximum sound pressure levels measured at proximity of the same motorcycles, with engines at idle and quickly taken to their maximum rotational speeds.

The technical specifications and the resources to initiate the application of this new method, for the use of the Technical Stewards and Officials are mentioned in these Technical Regulations. This article will detail the "2 metre max" method, the sound levels, the indispensable tools, but also the tolerances applied in 2011 - use of the old method as default, etc.)

Only the sound levels measured with the "2 metre max" method will be considered by the technical stewards and the jury of the event to decide whether the motorcycle is in conformity with the maximum sound levels authorised.

THE 2 METER MAX METHOD - IN FOCUS



THE OPERATING PROCEDURE

The '2 metre max' method will consist in quantifying not only the sound level produced by the silencer of the exhaust, but also the maximum global sound level achieved by the motorcycle when the engine rpm's are raised to the maximum engine speed, limited by :

- natural regulation for 2T, or
- rev limiter for 4T.

For 500cc - 4 stroke engines used in Speedway, Long track and Ice speedway, without rev limiter, it would be advisable to limit the full open the throttle to 1 or 2 seconds maximum.

THE PREPARATION OF THE SOUND METER

- ◆ Calibrate the sound meter at 93,5 dB or 113.5 dB to take into account the incidence of the wind foam ball
- ◆ Position the wind foam ball on the microphone
- ◆ Activate the "A" weighing
- ◆ "FAST" time weighting must be activated
- ◆ Select range Hi 80~130 dB
- ◆ Activate the function MAX MIN - set on MAX

THE SET UP OF THE SOUND METER AND THE MOTORCYCLE

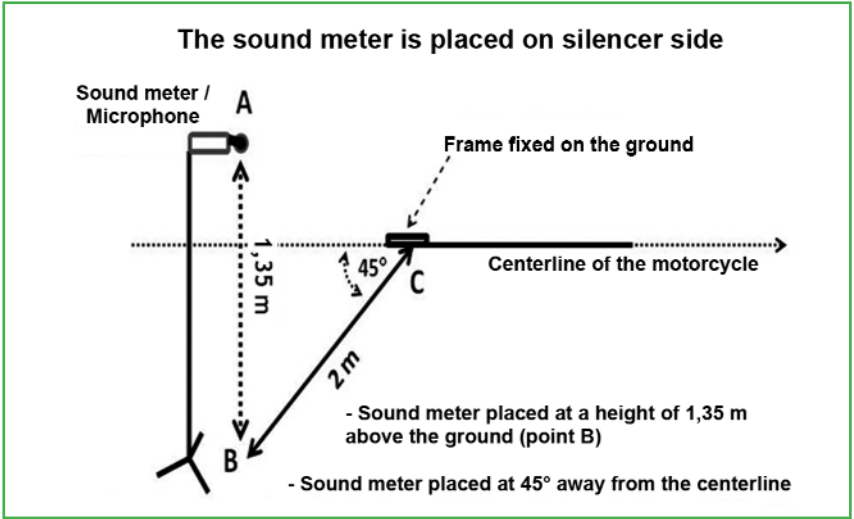
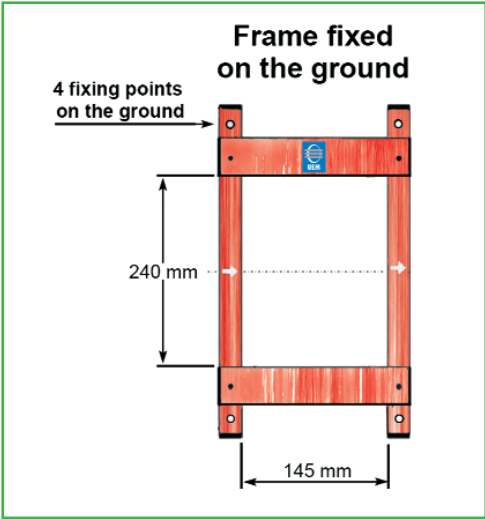
- ◆ The sound levels will be measured with the sound meter/microphone fixed on a tripod, in the horizontal position, at the rear of the motorcycle.
- ◆ The sound meter will be positioned at a distance of 2 metre behind the motorcycle, with an angle of 45° away from the centerline, on the exhaust side and at a height of 1.35 metre above the ground.
- ◆ The 2 metre distance is measured from the point where the centre of rear tyre touches the ground.
- ◆ It is preferred to make the tests on soft ground, not reverberating, i.e. grass or fine gravel.
- ◆ The ambient sound level must remain lower than 100 dB/A.

THE POSITIONING OF THE MOTORCYCLE

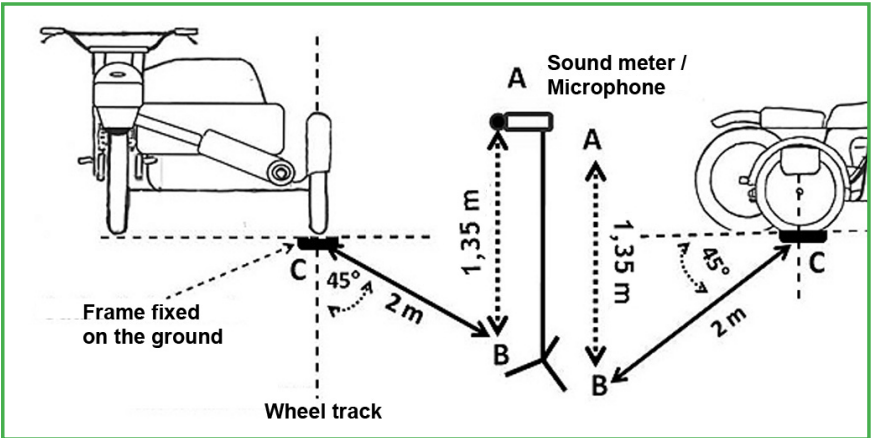
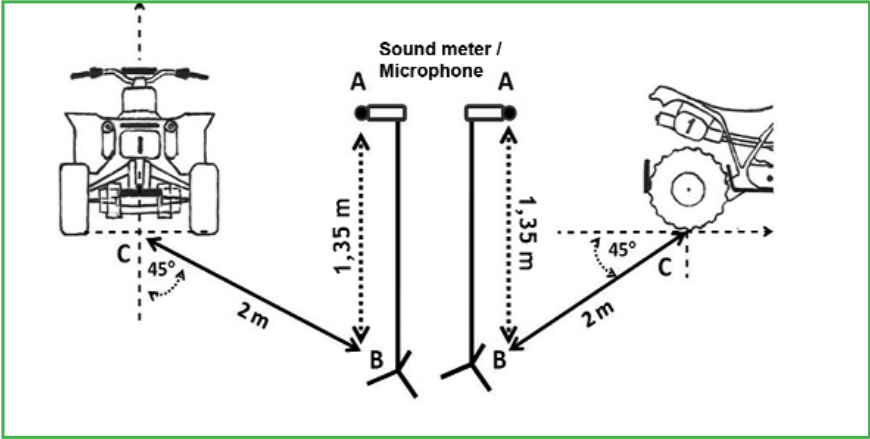
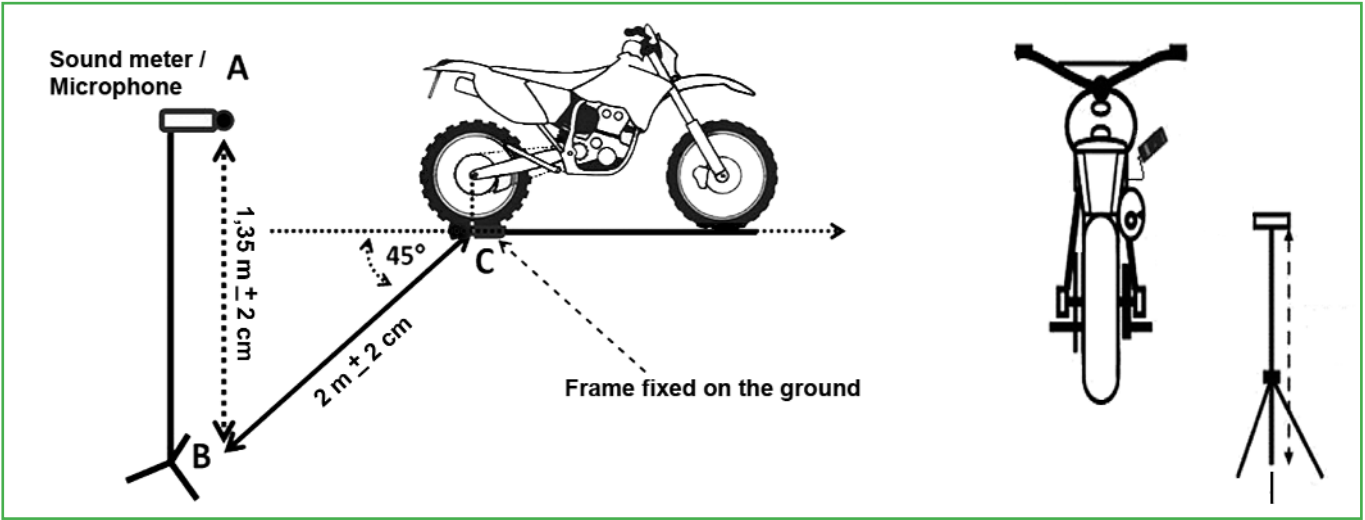
The reference points:

- ◆ For a motorcycle: the contact point of the rear wheel on the ground.
- ◆ For motorcycles fitted with 2 exhaust outputs, the measurement will be made on the side of the air intake. If a central positioned air intake is used, both sides will be tested.
- ◆ For a Side-car: the contact point of the side wheel on the ground.
- ◆ For a Quad vehicle: the vertical line to the ground from the centre point of the rear axle.
- ◆ For Quad vehicles with exhaust outlet moved by the median axis, the measurement will be made offset side.

To make repetitive measurements, all motorcycles can be positioned into a small frame fixed on the ground (inside dimensions of the frame : 145 x 240 mm)



POSITION OF THE SONOMETER IN RELATION TO THE MOTORCYCLE



THE OPERATION - PROTECT YOUR HEARING - USE EAR PROTECTION

- ◆ The measurement is made with motorcycle on its wheels, in neutral, with a hot engine.
- ◆ The Technical Steward takes place besides the motorcycles, opposite to the microphone, or in front of the handlebars near the front wheel, not to screen or stand in between the bike and the microphone.
- ◆ If a 2nd Steward is permanently attending the sound level checks, it is strongly advised for him to use earplugs, a headset or ear protectors as well.
- ◆ The Inspector shall open the throttle as fast as possible until full open throttle (instantly, within 0.3 seconds) and keep the engine at max "rpm" (at rpm limiter) at least 1 second, until the appearance of the first signs of engine speed regulation (by the rpm limiter). In practical circumstances, the moment to close the throttle is as soon as the engine rpm limiter activates. To end, release the throttle quickly.
- ◆ In case of the result exceeded the limit, inspector shall test again the motorcycle maximum 2 times more.
- ◆ A solution to avoid post combustion in the silencer could be a progressive relaxation of the throttle.
- ◆ For motorcycles equipped with an engine rpm limiter, opening the throttle will be made immediately (instantly, within 0.3 seconds) and kept open until at least 1 second has evolved and/or there is an audible sign of over-revving the engine.
- ◆ For motorcycles without an engine rpm limiter, the opening of the throttle will have to be lower than 2 seconds.
- ◆ If the engine tends to suffocate, close the throttle slightly and re-opening the throttle.
- ◆ If detonations appear, the measurement must be started again. After 3 measurements, detonations will be included in the final result.

To read the maximum sound level and to check, in case of doubt, if the "max rpm" obtained is over the "rpm" defined by the manufacturer, it shall not to be rounded down.

For the place and position of the motorcycle, ensure that there are no solid obstacles within 10 meters around the microphone.

For the sound level measurement, it is limited that the Inspector himself opens the throttle in order to minimize the influence by another operator (for that, it is helpful to have the microphone equipped with an extension cable to the sound meter).

THE MEASUREMENT - RECORDING OF THE SOUND LEVEL

- ◆ When the measurement is considered acceptable, write down the result, then reset (push on the sideline) the MAX MIN setting until the disappearance of the previously displayed value.
- ◆ Push again on the sideline MAX MIN to arm the sound level meter.
- ◆ The sound level meter is then ready for the following measurement.

A noticeably lower engine speed is detected easily by hearing. If doubt, control of the value of the rpm limiter with a tachometer.

Even the machine has been accepted at the noise test, if there is a doubt (e.g. obviously louder by riding) the machine could be checked again deeply.

Sound control during and after the competition

In a competition which requires a final examination of machines before the results are announced, this examination must include a sound control measurement of the first 3 riders and at least three machines chosen at the discretion of the Clerk of the Course in co-operation with the Chief Technical Steward.

GUIDELINES FOR USE OF SOUND LEVEL METERS

The Sound Control Officer (NCO) must arrive in sufficient time for discussions with the Clerk of the Course and other Technical Officials in order that a suitable test site and testing policy can be agreed.

Sound level measuring equipment must include a compatible calibrator, which must be used immediately before testing begins and always just prior to a re-test if a disciplinary sanction may be imposed.

Two sets of equipment must be available in case of failure of tachometer, sound level meter or calibrator during technical control.

Before testing, the NCO should if possible liaise with a maximum of two holders of FIM Entrant's or Manufacturer's licences, or team managers, who have sound test equipment including calibrators, in order to agree the accuracy of the official sound level meter. Also calibrators have to be checked regularly.

Machines considered excessively noisy must be individually tested if conditions allow.

In case of moderate wind, machines should face forward in the wind direction (mechanical sound will blow forward, away from microphone).

Sound level test values will not be "rounded down". Influences on the test method are included in the values for corrections (see precision included in the table below).

Corrections

- Class 1 (Type 1) sound meter: deduct 1 dB/A
- Class 2 (Type 2) sound meter: deduct 2 dB/A

Precision of the method (tolerances)

All corrections are accumulative.

Action and decisions will depend on the Sporting Discipline concerned, and decisions taken during prior discussions with the FIM Technical Director and/or the Chief Technical Steward.

FIM - SOUND LEVELS AS FROM 2011:

DISCIPLINE	Max sound limit	Comments
MOTOCROSS Checks before the race	115 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
Checks after the race	116 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
ENDURO Checks before the race	112 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
Checks after the race	113 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
CROSS COUNTRY RALLIES Checks before the race	115 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
Checks after the race	116 dB/A	Usual precision Class 1: add 1 dB/A Class 2: add 2 dB/A
TRACK RACING	Following present system for homologated Silencers. Homologation test: Max 115 dB/A	In case of control during the season Class 1: add 1 dB/A Class 2: add 2 dB/A
TRIAL No change (old FIM method)		EC Directives
All Disciplines: No rounding down of figures.		

The admissible sound levels for the neighboring inhabitants and environment will be the following (equivalent to 115 dB/A in Motocross and 112 dB/A in Enduro, measured with 2m Max method):

- ◆ For Motocross and Track Racing: **81 dB/A at 100m**
- ◆ For Enduro: **78 dB/A at 100m**

In 2011, the old FIM "static method" will be used for the other disciplines (Trial, Road Racing,...).

SOUND CONTROL

For the initial sound control and technical inspection, a rider (or his mechanic) shall present only one spare silencer per machine.

Other spare silencers may be presented after all participants have presented their motorcycles, or on the following days of the event.

For the main article, refer to the General section.

A motorcycle which does not comply to the indicated maximum sound limits, may be presented several times for inspection before the race.

For the "2 metre max" method, the "FAST", "A-Weight" and "80-130 dB range" setting must always be used and the measuring method on "MAX".

For the FIM "static" method, the "SLOW", "A-Weight" and "80-130 dB range" setting must always be used.