
2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] 3GPP Technical Specification 3G TS 26.132: "Narrow-band speech telephony terminal acoustic characteristics - test methods"
- [2] ITU-T Recommendation B.12 (1988): "Use of the decibel and the neper in telecommunications"
- [3] ITU-T Recommendation G.103 (1998): "Hypothetical reference connections".
- [4] ITU-T Recommendation G.111 (1993): "Loudness ratings (LRs) in an international connection".
- [5] ITU-T Recommendation G.121 (1993): "Loudness ratings (LRs) of national systems".
- [6] ITU-T Recommendation G.122 (1993): "Influence of national systems on stability, talker echo, and listener echo in international connections".
- [7] ITU-T Recommendation G.711 1988: "Pulse code modulation (PCM) of voice frequencies".
- [8] ITU-T Recommendation P.11 (1993): "Effect of transmission impairments".
- [9] ITU-T Recommendation P.38 (1993): "Transmission characteristics of operator telephone systems (OTS)".
- [10] ITU-T Recommendation P.50 (1993): "Artificial voices".
- [11] ETSI 0358 601 (TR101110) Digital Cellular Telecommunications System (Phase 2+) Characterisation test methods and quality assessment for hands-free mobiles.
- [12] IEC Publication 60651 "Sound Level Meters"

5.1.3 Setup for hands-free terminals

5.1.3.1 Vehicle mounted hands-free

Vehicle mounted hands-free may be measured either in a vehicle or in an anechoic room. For both of these two types of test environments, the setup will depend on whether HATS or a discrete artificial mouth and discrete microphone are used as the acoustic test equipment.

For in-vehicle measurements, if HATS test equipment is used, it should be positioned in the car as per ITU-T Recommendation P. 581. If in-vehicle measurements are made with a discrete microphone and discrete artificial mouth, they should be positioned in the car as per Figure 1 and Figure 2, respectively. The artificial mouth should comply with ITU-T Recommendation P. 51. The microphone should be a pressure-field microphone complying with IEC 60651. ~~If in-vehicle measurements are made with a discrete artificial mouth and discrete microphone, they should be positioned in the car as per Figure 1 below, respectively. The artificial mouth should comply with ITU-T Recommendation P. 51. The artificial mouth should be positioned with the lipring in the position as indicated in Figure 1. The microphone should be a pressure field microphone~~

complying with IEC 618. The microphone should preferably be fitted with a random incidence corrector. A vehicle simulator may be used instead of an actual car. A standard vehicle simulator is described in ETSI 0358 601 (TR101110) Digital Cellular Telecommunications System (Phase 2+) Characterisation test methods and quality assessment for hands-free mobiles.

The hands-free equipment is mounted in the car as specified by the manufacturer.

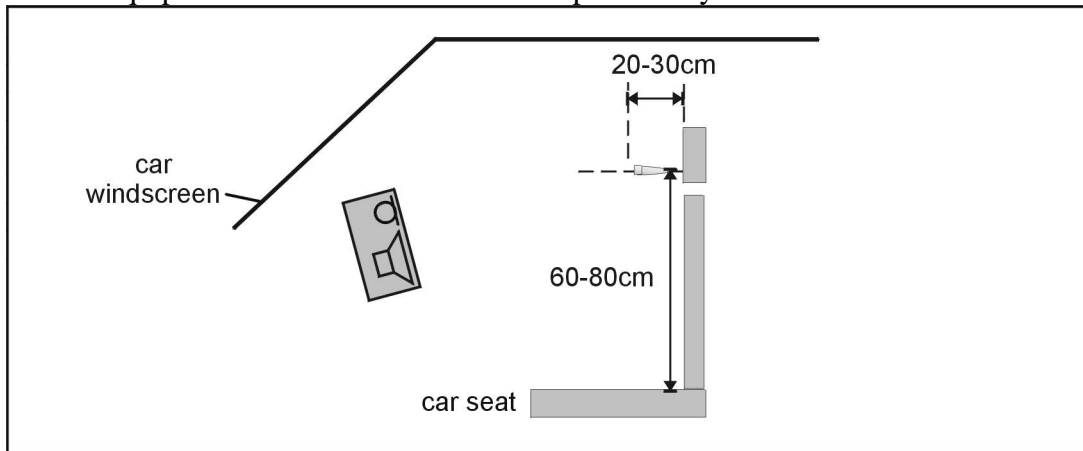


Figure 1: Test Configuration for Vehicle mounted hands-free, receiving characteristics, with discrete measurement microphone.

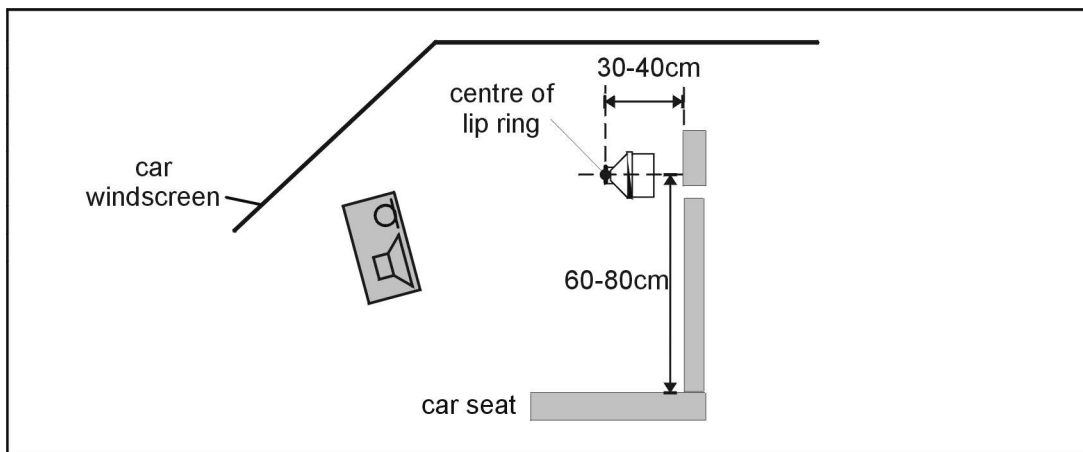


Figure 2: Test Configuration for Vehicle mounted hands-free, sending characteristics, with discrete P. 51 artificial mouth.

Specification testing of vehicle-mounted hands-free equipment in an anechoic room is for further study.

5.1.3.2 Desktop operated hands-free

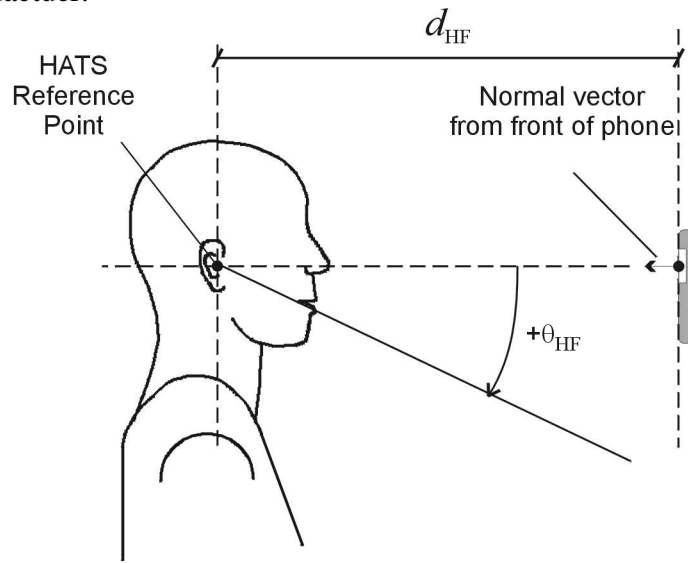
For HATS test equipment, definition of hands-free terminals and setup for desktop hands-free terminals can be found in ITU-T Recommendation P.581. Measurement setup using a free field microphone and a discrete P.51 artificial mouth for desktop hands-free terminals can be found in ITU-T Recommendation P.340.

5.1.3.3 Handheld hands-free

Either HATS or a free-field microphone with a discrete P. 51 artificial mouth may be used to measure Hand-Held Hands-free type UE.

If HATS measurement equipment is used, it should be configured to the Hand-Held Hands-free UE according to ~~Figure 2~~ Figure 3. The HATS should be positioned so that the HATS Reference Point

is at a distance d_{HF} from the centre point of the visual display of the Mobile Station. The distance d_{HF} is specified by the manufacturer. A vertical angle θ_{HF} may be specified by the manufacturer.
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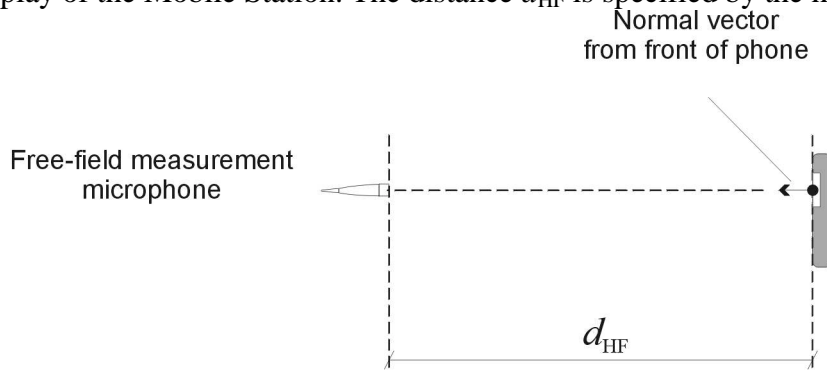


~~(change text in figure to read 'with front of handset facing the user)~~

~~(an additonal verticle angle to be added to figure. Angle should be labelled θ_{HF})~~

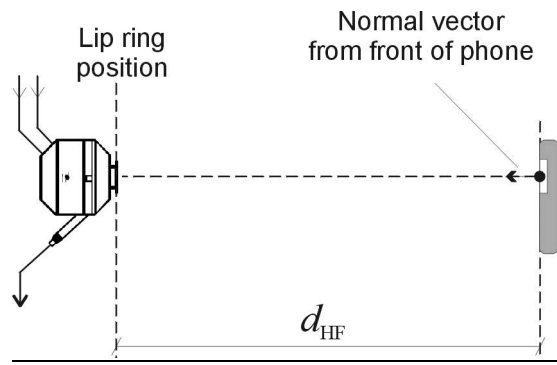
Figure 3: Configuration of Hand-Held Hands-free UE relative to the HATS.

If a free-field microphone with a discrete P. 51 mouth are used, they should be configured to the Hand-Held Hands-free UE as per Figure 4 for receiving measurements and for sending measurements. The measurement instrument should be located at a distance d_{HF} from the centre of the visual display of the Mobile Station. The distance d_{HF} is specified by the manufacturer.



~~(change text in figure to read 'with front of handset facing the user)~~

Figure 4: Configuration of Hand-Held Hands-free UE, free-field microphone for receiving measurements.



(change text in figure to read 'with front of handset facing the user')

Figure 4 Figure 5: Configuration of Hand-Held Hands-free UE, discrete P. 51 artificial mouth for sending measurements.