CTIA Phantom Hand Family

"Monoblock" phone grip IXB-050R & L

"Fold" phone grip IXB-051R & L
"Narrow data" grip IXB-052R & L
"PDA" grip IXB-053R & L
For assessing the performance of mobile terminals in OTA test systems

IXB-050 'Monoblock' grip

IXB-051'Fold' grip

- **Meets CTIA v 3.1 (July 2010) Test Plan requirements**
- **Wide frequency range 300MHz – 3(6)GHz**
- **Stable, elastic material with optimised stiffness**
- **Positioning spacer with graduation marks**
- **x 4 versions to 'grip' most handset types**
- **Left or right hands available**
- **Optional fixing mounts & SAM assembly for most major OTA test systems (ETS, SATIMO, Howland), custom also possible.**

The energy absorbed from a handset by the hand is an important issue as it can alter the radiation pattern and cause considerable degradation of phone performance. Real human hands are inhomogeneous exist in a wide range of sizes and can assume an almost limitless range of shapes.

IndexSAR has worked closely with the CTIA 'Head and hands working group', and collaborated with a number of major handset manufacturers to develop first, a standard hand and, secondly, a range of phantom hands with 'grips' to meet the varying requirements of a wide range of wireless handsets and handheld devices and their specific applications.

Hands are manufactured from silicone with carbon powder as the predominant lossy material to give the required dielectric properties over the wide frequency range of 700MHz to 6GHz.

The IXB-05XR & L phantom hands have been formed from a standard Hand whose dimensions have been based on a number of studies of human hands, the hand model shape and dimensions are based on the anthropomorphic data of the average male + female 50th percentile adult hand dimensions as published by the US Army [Gorden et al., 1989]. Primarily "Hand Anthropometry of US Army Personal, Thomas M. Greiner; Army Natick Research Development and Engineering Center, 1991

The 'grip' shapes have been developed using human studies holding various generic handsets.

For positional repeatability the IXB-5X&L and meet the standards requirement for stiffness, it also allows some flexibility to cater for varying sized DUT's inside the overall limits.

Positioning accuracy and repeatability are of key importance, and with the unique air spacer/ platform, repeatability +/- 0.1dB has been achieved in OTA tests.

IXB-052 ‘Narrow data’ Grip

IXB-053 ‘PDA’ Grip

Air Spacer/positioning platforms IXBS-05XR & L

An important part of the hand development program has been the design of a detachable low loss ‘air’ spacer and phone positioner, IXBS-05XR & L, that fits, and can be fixed to the palm of hand, this allows the phone to be held as shown in the human studies and, most importantly, be able to be position the handset with repeatability. The hand spacers and mounts are formed from an SLA plastic made hollow with a wall thickness of 1mm to minimize their RF effects. The IXBS spacers have been produced from the original hand data files, being equivalent to the volume of air from the back plane of the phone to the palm of the hand. The DUT is fixed to the spacer using 3M ‘Dual Lock’ strip for easy device holding, giving virtually no lateral movement. The spacer has number graduations to permit easy positioning. OTA tests have shown excellent repeatability. (within +/- 0.1dB).

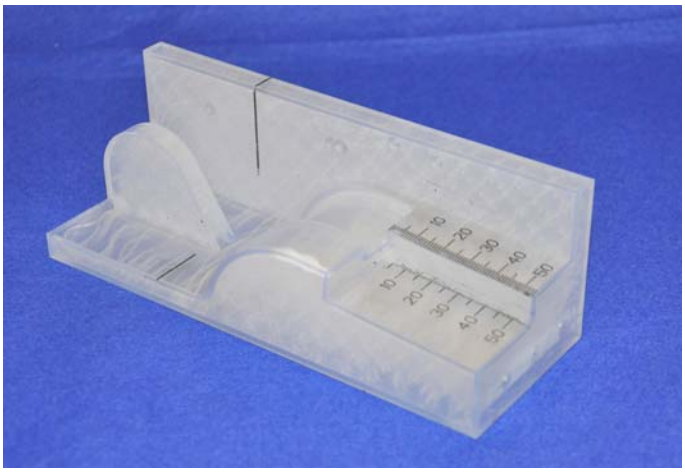
IXBS-050R for ‘Monoblock’

IXBS-052R for ‘narrow data’

IXBS-053R for ‘PDA’

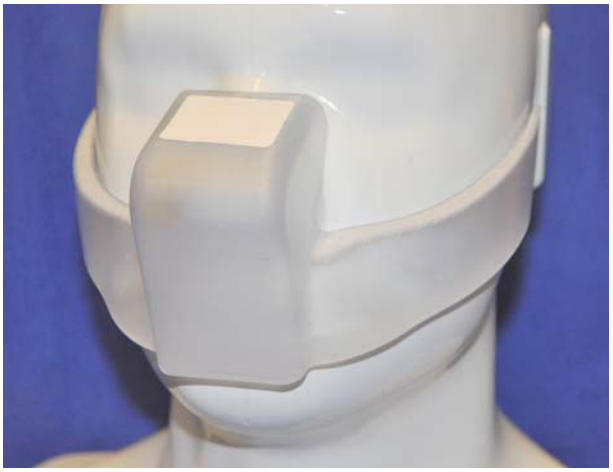
IXBS-051R for ‘Fold’

Alignment Jigs



IXJ-030 Phone alignment tool ‘B’ for ‘Fold’ handsets

IXJ-020 Phone alignment tool ‘A’ for ‘Monoblock’ handsets



IXJ-011 Full SAM face mask (Option) for left or right hand testing

IXJ-010 (Standard) SAM cheek face mask as specified in CTIA test plan v 3.1 right hand testing only

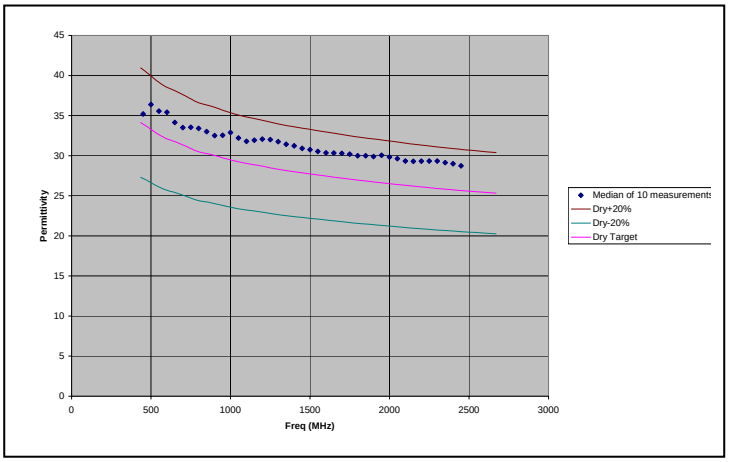
Composition and weight

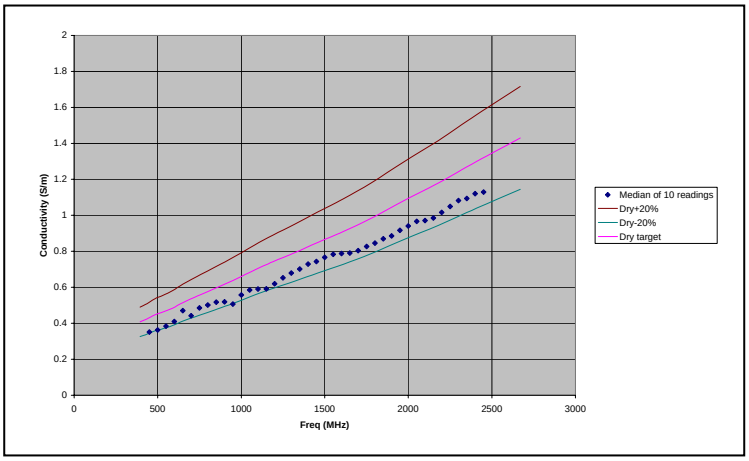
Hand Material formulation	Weight with fixing plug No spacer
35% carbon powder 65% Silicone+ hardener	IXB-05XR & L approx 480g

Typical Spacer performance @ 2GHz

Permittivity	3.18
Loss tangent	0.011

Typical Property hand material measurements





Permittivity **Conductivity**

Carry Case IXC-010

A complete ‘CTIA hand kit hands, spacers, and alignment jigs, “***all together”***.

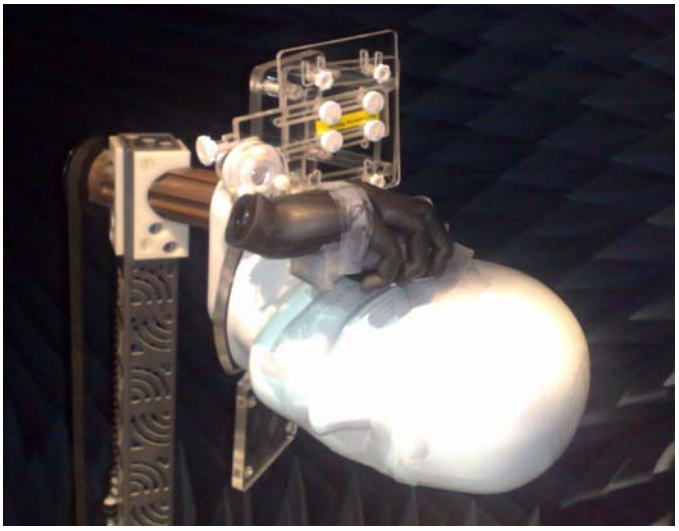
Fixtures

CTIA head and Hand fixture IXBH-060

Designed for both ‘conical cut’ and ‘roll over azimuth OTA systems

This fixture has been designed to give maximum flexibility and simple re-positioning and fix to existing platforms. Using finger knobs ease adjustment. When measured in an OTA chamber, fixture effects have been shown to be in the order of 0.1- 0.2dB.

Data hand free space fixture IXBH-090(ETS) for ETS-Lindgren ‘MAPS’ OTA system



IXBH-060(ETS) fixture with PDA hand on ETS MAPS

Version 3.1 CTIA SAM head tissue simulant liquid upgrade 800MHz - 6GHz

IXBH-090(SAT) fixture for SATIMO OTA systems

Compact drive test system IXDT-010

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