

## 20. Experiments with Kobitone Mic and Speaker

UFO Doctor, Jan 7<sup>th</sup>, 2012

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### 1. Introduction


The Kobitone Mic (R) and Speaker (T) with the dimensions of D10x7.2 mm are much smaller than the UST 40 (D16 x 12) and less expensive.

The allowable power is 200 mW, the capacity 1800 pF.

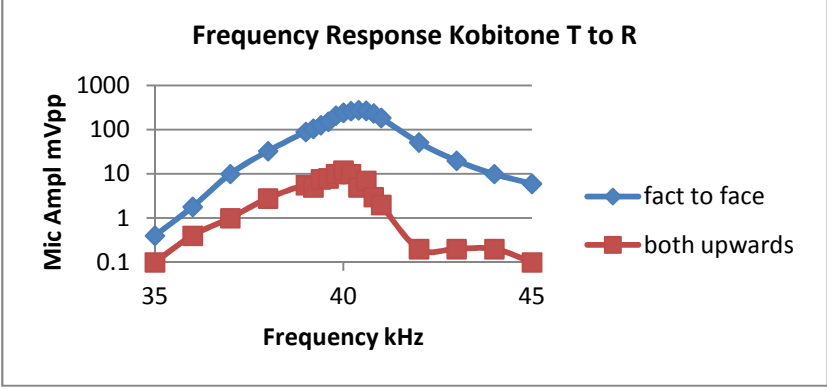
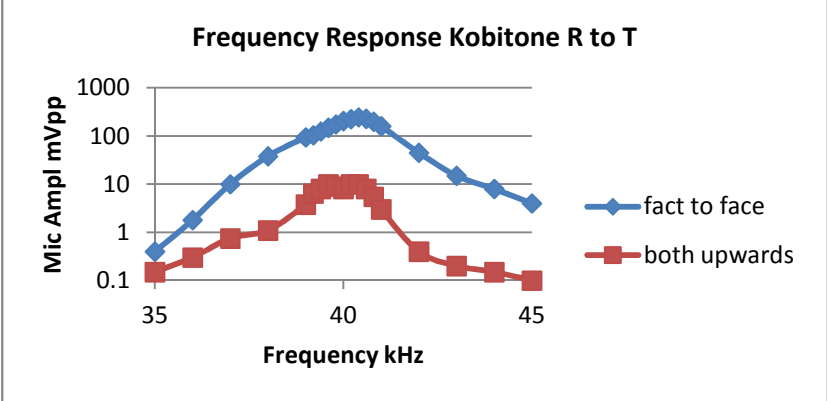
Supplied by sinus 20 Vpp the estimated power amounts to about 22mW

Check: The digital power buffer supplied by 10V, (creates 20 Vpp square signals) consumes a current of 5 mA, thus the input power is in the order of 50 mW

### 2. Test conditions and Setup

	<p>Fig. 1. Setup for acoustic test</p> <p>1: Speaker (T) 2: Mic (R) 3: Soft wall with 30 degrees inclination. Acoustic absorber: soft blanket.</p> <p>Test Distance: 0.5 m Speaker Input Voltage: Sinus 20 Vpp</p>
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### 3. Frequency Response T to R and R to T

	<p>Fig. 2a. T at signal generator, R at scope:</p> <p>Transmission loss if both R and T are looking upwards: 26dB @ 40 kHz: (compared with face to face condition)</p>
	<p>Fig. 2b. R at signal generator T at scope:</p> <p>Transmission loss if both T and R are looking upwards: 28dB @ 40 kHz: Transmission between T-R and R-T: are more or less the same!</p>

#### 4. Directivity test (approximate only, by acoustic lab is far from being perfect!)

<p>Test 1 T angle variable</p>	<p>Fig. 3a. Speaker T was rotated, R was faced to T</p> <p>(0 degree = face to face)</p> <p>The relative minimum is about -15 dB</p>
<p>Test 2 R angle variable</p>	<p>Fig. 3b. Mic R was rotated T was faced to R</p> <p>(0 degree = face to face)</p> <p>The relative minimum is about -20 dB</p>

#### 5. Experiment with modified UST as speaker, Kobitone as receiver

<p>Frequency Response UST-T to Kobitone R</p>	<p>Fig. 5. T= UST Speaker with radial radiator, upwards R= Kobitone:</p> <p>R to face and both upwards:</p> <p>Additional loss: 13.4 dB @ 40 kHz</p>
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<p>Test 3 R angle variable</p>	<p>Fig. 6. T= UST Speaker with radial radiator upwards R= Kobitone rotated (0 degree = face to face to speaker) Relative max. loss: 22 dB @ 40 kHz</p>
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#### 6. Discussion

The Kobitone Speaker T and Mic R are best for our short range omnidirectional application. If both Kobitone transducers (non-modified!) are looking upwards, the transmission loss compared with face to face communication is about 28 dB, but we get still a receiving signal >10mV@ 20 Vpp Input, 0.5 meter distance.