

## **Flex5000 Remote Voice Measurements**

### ***Equipment***

Laptop Medion Centrino 1,7GHz, 100MHz LAN

Gbit LAN 2 Switches

FLex5k remote

FlexPC: Asus Pundit P1 4,5GHz, 100MHz LAN

Scope: Velleman PCSU1000

Generator: Velleman PCGU1000

Testwaveform (unless otherwise noted): burst 8Cycles of about 1kHz triangle, 1sec 0V, repetitive

### ***Additional Comments:***

During test I found, that some phoneprogramms have some distortions; some have clicks, some others do not transmit noise or quite bad). A comment on distortion is added.

During testing mumble there was the comment, that the problem would be the onboard soundcard. This could not be verified; differences were minimal.

The 2way mumble internal delay should be 200ms.

Figure of configurable delay of VAC repeater function is not exact

### ***Conclusion:***

Voicequality (clicks) are quite heavy with ipvoice, so it is more or less not usable (even if the delay is best.

Mumble is the best for transmit, but agc and noise reduction is unacceptable for rx.

Because mixing of mumble tx and xlite for rx crashes the panadapter, it leaves me with xlite.

### ***Distortions***

Alignment:

Flex meter is set to 0 dbm with sinus signal. All Flex sliders are fix, Generator is 1kHz, 0.1Vpp

mixer flexmic phonemic phonespeaker phonemic nosignal

xlite 3,3 70 100 50 -25dB level nearly not dependent on ponemic slider

ipvoicegsm 3,3 70 10 - -22dB clicks independent of buffer

ipvoice44k 3,3 70 10 - -22dbm no clicks vcery long delay

ipvoice22k 3,3 70 10 - -2dBm slight noise few slightclicks slight hum

ipvoice8k 3,3 70 10 - - heavy clicks

mumble 3.3 70 100 100 -25 difficult to get 0dBm due to agc clicks each second

### ***1. Test: Soundcardtest***

Generator sinus -> Mic in -> speaker out

Level:

in: 1.2V

out: 5Vpp with clipping

delay <100us

Quality: ok before clipping

Comment: Signal inverted independent of frequency. Signal seems to be fed through analog, no figure about the digital path delay

## 2. Test: Sound

Gen -> Mic in ->VAC repeater function -> speaker out

Level:

in: 0.1V

out:

VAC repeater function connected to soundcard for in and out (44.1kHz) (output via wave, others disabled)

delay:

VAC parameters modified

Total buffers/ms	Buffers	delay/ms (cable)	delay/ms (VAC)
50	8	distorted	
100	8	65	
200	8	135	
400	8	250	
100	1	distorted	
100	2	Ca 75distorted	
100	4	67	
100	7	55	
100	8(def)	65	
100	12	65	
100	20	65	

Comment: 2way soundcard delay is less than 45ms. Lower max input values proves, that test 1 is analog feed through only

## 3. Test: Radiotest

Generator -> headphone -> Mic -> IC7400 ->antenna -> IC7000 ->ACC Jack -> Transformer -> Scope

2,7kHz Bandwidth, 10m distance between antennas

Level: adjusted for proper display; not tested

Delay:

Tx :SSB 2.7kHz

RX:SSB all Bandwidth: 5ms

Rx:CW 1.1KHz: 5ms

Rx: CW 470Hz: 9ms

RX:CW 250Hz: 14ms

Comment: meets theory: there is a basic delay (of 5ms) and additional delay for bandwidth < 1kHz

## 4. Test: IP-VOICE Test

Generator-> ipvoice -> FlexPC -> Audio out/front mic in -> ip-voice -> Laptop -> audio out -> Scope

Level:

in: 0.1V

out:

Delay :

Codec	Buffer	Delay/ms (cable)	Delay/ms (VAC)
8kHz GSM	10	570	
8kHz uLaw<	10	560-570	
11kHz PCM mono	10	470-500	
16kHz PCM mono	10	560-600	
22kHz PCM mono	10	570	
44kHz PCM stereo	10	520-550	
11kHz PCM mono	5	370-400	

5. Test: Skype Test  
as 4. test but with skype  
Level in: 0.1V  
Level out:  
Delay: 450-500 ms

6. Test: Mumble  
Test as 4. test but with mumble  
Level in: 0.1V  
Level out:  
Delay: 400-420 ms  
Comment: Not easy to adjust audio; too many automatics

7. Test: xlite  
Test as 4. test but with xlite  
Level in: 0.1V  
Level out:  
AGC, echocancelling etc: off  
Delay: 400-420ms