

February 14, 2002

American Telecommunications Certification Body, Inc.  
6731 Whittier Avenue  
Suite C110  
McLean, VA 22101  
Attn: Bill Graff

**SUBJECT: Withus IT Co., Ltd.**  
**FCC ID: POQWCE-200**  
**EMC Report Amendment**

Dear Bill,

On behalf of Withus IT Co., Ltd. is an amendment in response to your e-mail dated 2/8/02 requesting additional information for the subject application.

1. Please see the attached revised test procedure for Audio Frequency Response (page 2). The 0dB reference point was taken at 20% modulation at 1kHz per §2.1047(a).
2. The Audio Response measurements were taken with the compandor on. Please see the attached revised measurement graph indicating the compandor was on (page 9).
3. Please see the attached revised RF power measurement description (page 3) for both CDMA and FM.
4. Please see the attached revised page 4 of the EMC report showing necessary bandwidth calculations for F8W and F1D.
5. Please see the attached revised Modulation Limiting measurement graph (page 7) with legend identifying the corresponding curves and audio tones. Also listed on revised page 7 is the audio level used for 0dB reference at 1kHz.
6. Please see the attached revised Modulation Limiting (page 7) with a table of measured deviation levels per 22.915(b).
7. The CDMA and AMPS receiver spurious test plots are spurious emissions that are amplified in the receiver and appear at the receiver's antenna terminals. Please see the attached revised page 3 of EMC report describing the measurements per §22.917(f).
8. This filing is for WCE-200 model only. We have uploaded the revised RF exposure warning page on 2/8/02.

If you have any further questions or comments concerning the above, please contact the undersigned.

Sincerely,



Shawn McMillen  
General Manager  
Celltech Research Inc.  
Testing & Engineering Lab

cc: Withus IT Co., Ltd.

## **2.1 MEASUREMENT PROCEDURES**

### **2.2 TRANSMITTER AUDIO FREQUENCY RESPONSE - §2.1047(a)**

The frequency response of the audio modulating circuit over the frequency range 300-3000 Hz is measured. The audio signal generator is connected to the audio input circuit/microphone of the EUT. The audio signal input is adjusted to obtain 20% modulation at 1kHz and this point is taken as the 0dB reference. With the input held constant and below the limit at all frequencies, the audio signal generator is varied from 300 to 3000 Hz.

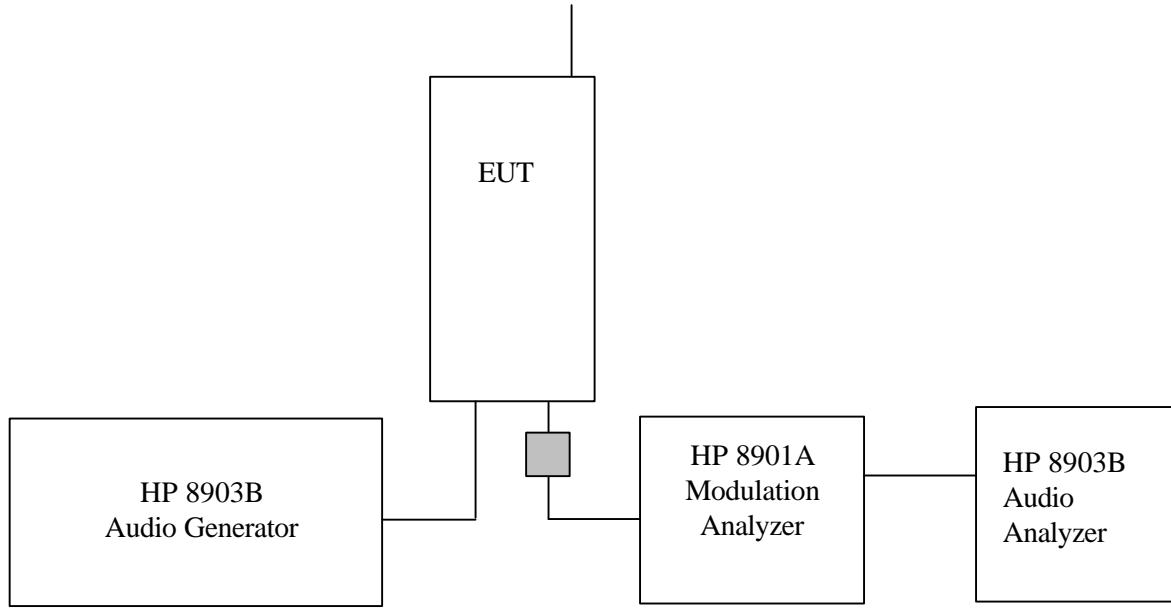
### **2.3 AUDIO LOW PASS FILTER FREQUENCY RESPONSE - §22.915(d)**

The response in dB relative to 1kHz is measured using the HP8901 Modulation Analyzer. For the frequency response of the audio low-pass filter, the audio input is connected at the input to the modulation limiter and the modulated stage. The audio output is connected at the output of the modulated stage.

### **2.4 MODULATION LIMITING - §2.1047(b), §22.915(b)**

The audio signal generator is connected to the audio input circuit/microphone of the EUT. The modulation response is measured for each of the three modulating frequencies (300Hz, 1000Hz, and 3000Hz), and the input voltage is varied from 30% modulation ( $\pm 3.6\text{kHz}$  deviation) to at least 20dB higher than the saturation point. Measurements of modulation and test plots are attached. Measurements were performed for ST, SAT, and wide-band data modulations.

Note: ST, SAT, & Wide-Band data were internally generated by the EUT.

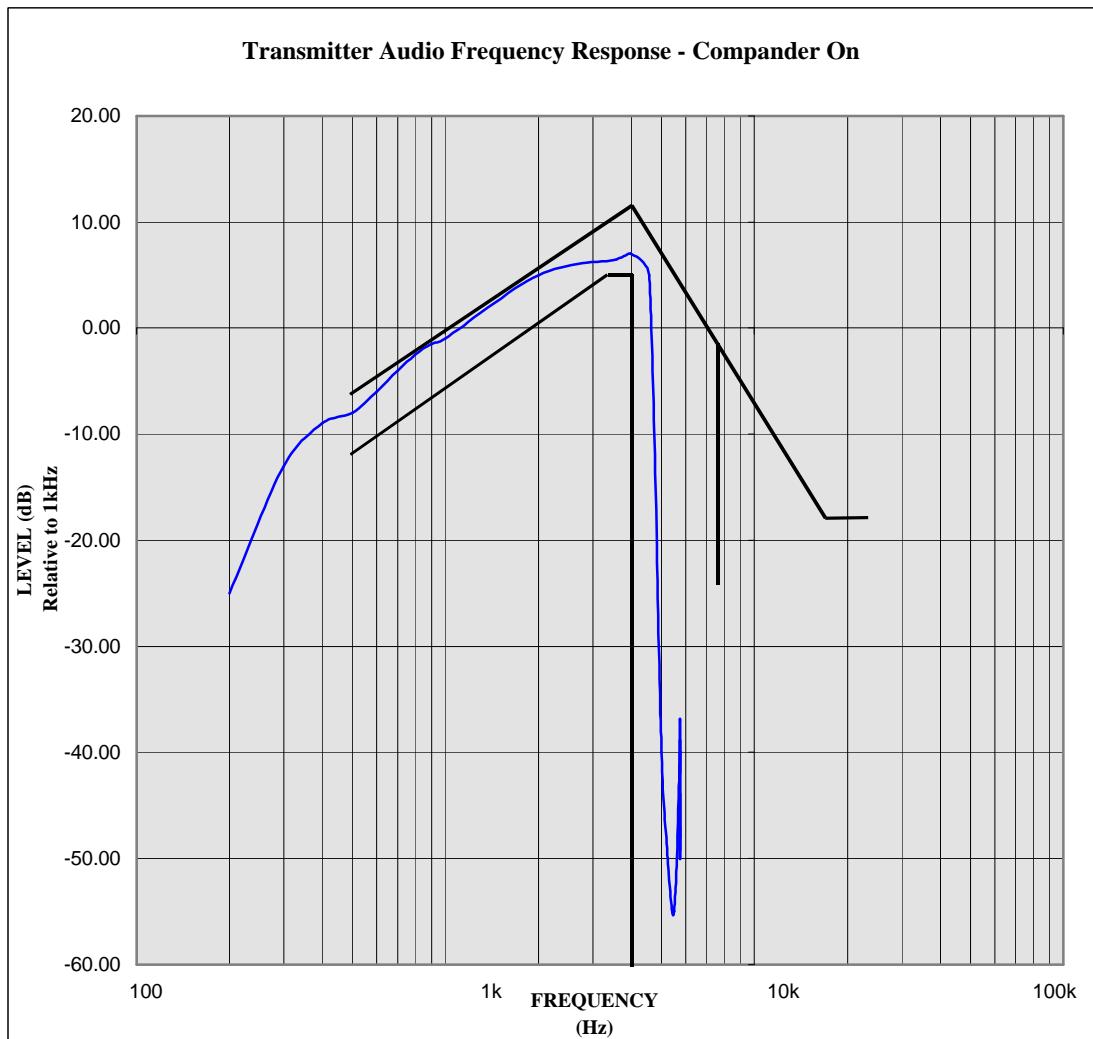


Transmitter Audio Frequency & Tone Modulation Test Setup

#### 4.4 TRANSMITTER AUDIO FREQUENCY RESPONSE - §2.1047(a)

Test Date: 01/07/02  
FCC ID: POQWCE-200  
Model: WCE-200  
Mode: AMPS (Analog)

REFERENCE: 1 kHz = 0 dB



## **2.5 RF OUTPUT POWER - §2.1046**

The conducted power was measured with a Gigatronics 8650A Universal Power Meter using modulated average power (MAP) mode for CDMA and CW for AMPS mode. An offset was entered into the power meter to correct for the losses of the attenuator and cable installed before the sensor input. The transmitter terminal was coupled to the power meter and the EUT was placed into test mode via keypad access or a base station simulator. For CDMA modulations a full data rate in the “always up” power control mode was used. All subsequent tests were performed using the same tune up procedures.

## **2.6 OCCUPIED BANDWIDTH - §2.1049(c), §22.917**

The antenna output terminal of the EUT was connected to the input of a  $50\Omega$  spectrum analyzer through a matched 30dB attenuator. The radio transmitter was operating at maximum output power. 100% of the in-band modulation was below the specified mask per §22.917.

Specified Limits:

- (a) On any frequency removed from the assigned carrier frequency by more than 20kHz, up to and including 45kHz, the sideband was at least 26dB below the carrier.
- (b) On any frequency removed from the assigned carrier frequency by more than 45kHz, up to and including 90kHz, the sideband was at least 45dB below the carrier.
- (c) On any frequency removed from the assigned carrier frequency by more than 90kHz, up to the first multiple of the carrier frequency, the sideband was at least 60dB below the carrier of  $40 + \log_{10}$  (mean power output in Watts) dB, whichever was the smaller attenuation.

## **2.7 SPURIOUS EMISSIONS AT ANTENNA TERMINAL - §2.1051, §22.917**

The level of the carrier and the various conducted spurious frequencies were measured by means of a calibrated spectrum analyzer. The spectrum was scanned from 10MHz to 20GHz. The antenna output terminal of the EUT was connected to the input of a  $50\Omega$  spectrum analyzer through a matched 30dB attenuator and coaxial cable.

## **2.8 FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053**

Radiated and harmonic emissions were measured on a 3-meter outdoor site. The EUT was placed on the turntable with the transmitter transmitting into a non-radiating load. A receiving antenna located 3 meters from the turntable received any signal radiated from the transmitter and its operating accessories. The receiving antenna was varied in height from 1 to 4 meters and the polarization was varied (horizontal and vertical) to determine the worst-case emission level.

## **2.9 RECEIVER SPURIOUS EMISSIONS - §22.917(f)**

Conducted spurious emissions were measured at the antenna terminal of the EUT using a spectrum analyzer. The transmitter of the EUT was placed into full power and the frequency span of the spectrum analyzer was set to the receiving band of the device. The recorded spurious emissions at the antenna terminal must be attenuated to a level not to exceed -80dBm.

### 3.0 NECESSARY BANDWIDTH & EMISSION BANDWIDTH - §2.202

a) Emission Designator: 1M25F9W

Calculation:  $2M + 2DK$   
CDMA BW = 1.25 MHz  
F = Frequency Modulation  
9 = Composite Digital Info  
W = Combination (Audio/Data)

b) Emission Designator: 40K0F8W

Calculation: Voice + SAT  
Modulation: Voice is 2.5 kHz and SAT is 6 kHz - maximum modulation is  $M = 6$  kHz  
Deviation: Voice is 12 kHz and SAT is 2 kHz - maximum deviation is  $D = 12+2 = 14$  kHz  
 $Bn = 2xM+2xDK$  with  $K = 1$   
 $Bn = 40$  kHz

Calculation: Signaling Tone (ST) + SAT  
Modulation: ST is 10 kHz and SAT is 6 kHz - maximum modulation is  $M = 10$  kHz  
Deviation: ST is 8 kHz and SAT is 2 kHz - maximum deviation is  $D = 8+2 = 10$  kHz  
 $Bn = 2xM+2xDK$  with  $K = 1$   
 $Bn = 40$  kHz

c) Emission Designator: 40K0F1D (wide Band Data)

Calculation: Voice + SAT  
Modulation: Wideband Data is 10 kHz and SAT is 6 kHz - maximum modulation is  $M = 10$  kHz  
Deviation: Wideband Data is 8 kHz and SAT is 2 kHz - maximum deviation is  $D = 8+2 = 10$  kHz  
 $Bn = 2xM+2xDK$  with  $K = 1$   
 $Bn = 40$  kHz

## 4.1 TEST DATA

### **4.2 MODULATION LIMITING - §2.1047(b), §22.915(b)**

Test Date: 01/07/02  
FCC ID: POQWCE-200  
Model: WCE-200  
Mode: AMPS (Analog)  
0 dB REFERENCE: 1 kHz, 126 mV at Input 8.0 kHz Deviation

Audio Input Level (db)	FM Deviation (kHz Peak)		
	Modulation Frequency		
	3 kHz	1 kHz	300 Hz
-33.979	8.99	6.5	2.76
-27.959	10.07	10.51	3.994
-24.437	10.13	11.77	5.62
-21.938	10.22	12.21	7.02
-20	10.21	11.66	8.7
-18.416	10.23	11.76	10.29
-17.077	10.22	11.84	10.66
-15.918	10.22	12.14	10.86
-14.895	10.17	12.2	10.96
-13.979	10.2	12.39	10.83
-13.152	10.22	12.35	10.51
-12.396	10.2	12.42	10.33
-11.701	10.24	12.37	10.18
-11.057	10.22	12.49	10.06
-10.458	10.24	12.41	10
-9.897	10.23	12.5	9.98
-9.37	10.29	12.4	10.43
-8.874	10.24	12.51	10.84
-8.404	10.21	12.41	11.18
-7.959	10.29	12.53	11.4
-7.535	10.22	12.44	11.55
-7.131	10.23	12.53	11.66
-6.745	10.25	12.35	11.77
-6.375	10.24	12.58	11.86
-6.021	10.22	12.4	11.95
-5.68	10.24	12.33	12.09
-5.352	10.22	12.44	12.06
-5.036	10.24	12.36	12.08
-4.731	10.26	12.43	12.14
-4.437	10.25	12.63	12.16
-4.152	10.26	12.38	12.24
-3.876	10.23	12.34	12.25
-3.609	10.27	12.42	12.31
-3.35	10.25	12.5	12.26
-3.098	10.27	12.45	12.33
-2.853	10.27	12.21	12.35
-2.615	10.26	12.42	12.35
-2.384	10.24	12.52	12.4
-2.158	10.28	12.47	12.39
-1.938	10.25	12.38	12.39
-1.724	10.28	12.42	12.43
-1.514	10.3	12.58	12.46
-1.31	10.26	12.42	12.46
-1.11	10.26	12.61	12.47
-0.915	10.24	12.39	12.52
-0.724	10.27	12.35	12.51
-0.537	10.26	12.41	12.49
-0.355	10.29	12.37	12.5
-0.175	10.29	12.4	12.54
0	10.26	12.38	12.53

