1) Please provide details of the device configuration and how 3G issues were accounted for to assure results were representative of typical usage.

This device was tested under the CDMA2000 configuration: Service Option 3, Radio Configuration 1. Under this radio configuration, 1/8 rate gating is exhibited while the microphone MUTE=ON. This generates a worst-case condition for T-coil measurements due to the gating noise, as compared to a full-rate mode that does not exhibit gating noise (see below).

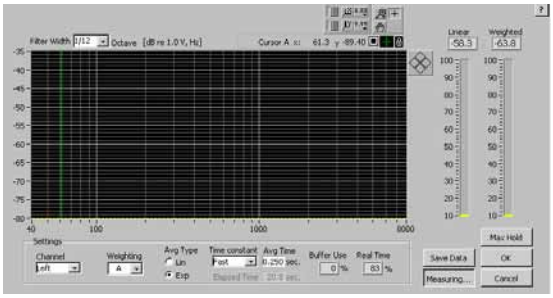


Figure A
Full-Rate Magnetic Response

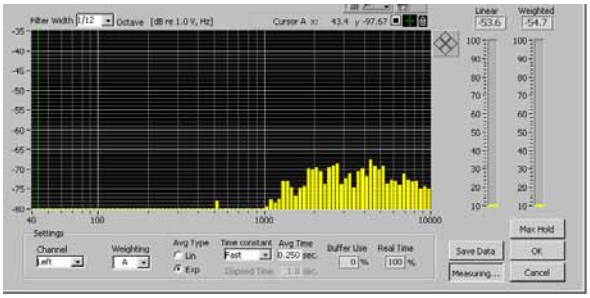


Figure B
1/8th Rate CDMA Magnetic Response

2) Please provide power conditions of the device.

The device is configured to "All Up" power control bits for maximum power via a base station simulator.

3) In addition to S+N/N information please include the ABM2 result.

Please see below data table with ABM2 results:

Table I
Data Results

	Volume	Cellular Band								
		Axial			RadialH			RadialV		
		1013	384	777	1013	384	777	1013	384	777
Freq. Response Margin	Maximum	2.0	1.8	2.0	2.0	1.9	2.0	2.0	2.0	2.0
ABM1, dBA/m		7.1	7.1	7	-0.2	-0.2	-0.5	-2.8	-2.4	-2.3
ABM2 (HBI, A)		-49.9	-49.9	-49.9	-53.7	-55.2	-55.1	-57	-56.8	-57
S+N/N		57	57	56.9	53.5	55	54.6	54.2	54.4	54.7
S+N/N per orientation		56.9			53.5			54.2		
	Volume	PCS Band								
		Axial			RadialH			RadialV		
		25	600	1175	25	600	1175	25	600	1175
Freq. Response Margin	Maximum	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ABM1, dBA/m		7.2	7.1	7.3	-0.6	-0.4	-0.7	-0.2	-0.3	-0.3
ABM2 (HBI, A)		-49.7	-49.8	-49.6	-55.2	-55.1	-55.2	-55.5	-55.6	-56.3
S+N/N		56.9	56.9	56.9	54.6	54.7	54.5	55.3	55.3	56
S+N/N per orientation		56.9			54.5			55.3		

4) Please clarify the frequency range for the ambient noise check in II 1 a ii. Noise for each measurement including broadband ABM2 is relevant.

The measurement range for the ambient noise check in II 1 a ii was the same as the ABM2 frequency range of 100 Hz – 10 kHz.

5) Please detail how the 1 A/M validation field was "measured" as stated in II 1 b i.

The magnetic field at the center of the Helmholtz coil is given by the equation (per Annex D.9.1):

$$H_c = \frac{NI}{r\sqrt{1.25^3}} = \frac{N(\frac{V}{R})}{r\sqrt{1.25^3}}$$

Where Hc = magnetic field strength in amperes per meter
N = number of turns per coil

For the Hemholtz Coil used for verification, N=20; r=0.08m; R=10.193Ω and V=57mV:

$$H_c = \frac{20 \cdot (\frac{0.057}{10.193})}{0.08 \cdot \sqrt{1.25^3}} = 1.0003 A/m$$

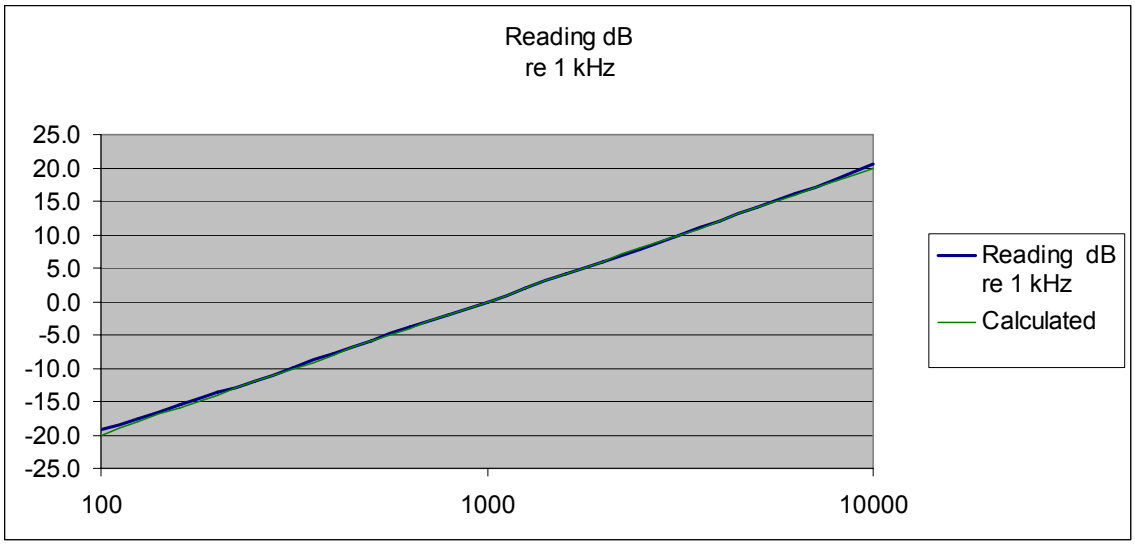
Therefore a voltage was applied into the coils such that 57 mV was observed across the 10 Ω resistor. This generated an expected field of 1 A/m in the center of the Helmholtz coil which was used in system validation.

6) Please include a demonstration that the probe/system complies with the frequency and linearity response requirements in C63.19 Annex C.5.

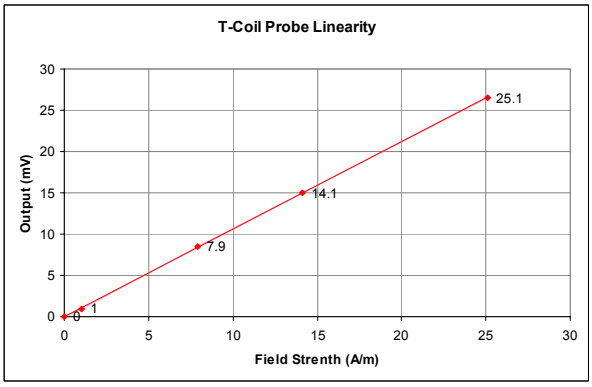
Please see below for frequency and linearity response tests of the probe/system:

Frequency Response Characterization

Freq Hz	Reading dB (mV)	Reading dB re 1 kHz	Delta to Calculated
100	13.38	-19.2	0.8
125	14.94	-17.7	0.4
160	17.06	-15.5	0.4
200	18.90	-13.7	0.3
250	20.73	-11.9	0.2
315	22.72	-9.9	0.1
400	24.76	-7.8	0.1
500	26.68	-5.9	0.1
630	28.68	-3.9	0.1
800	30.74	-1.9	0.1
1000	32.60	0.0	0.0
1250	34.51	1.9	0.0
1600	36.62	4.0	-0.1
2000	38.54	5.9	-0.1
2500	40.48	7.9	-0.1
3150	42.51	9.9	-0.1
4000	44.61	12.0	0.0
5000	46.59	14.0	0.0
6300	48.69	16.1	0.1
8000	50.91	18.3	0.2
10000	53.21	20.6	0.6



Linearity Response Characterization



F/S (A/m)	Output (mV)
25.1	26.52
14.1	14.99
7.9	8.48
1.0	0.94
0	0

7) Please provide additional details of how the P50 signal was used to verify the frequency response in II 1 b iii.

Please see below processing steps used to verify system frequency response using ITU P.50:

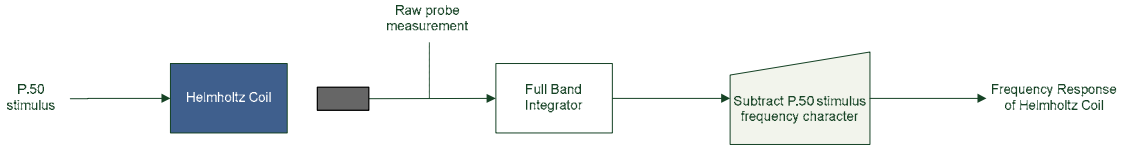


Figure C
ITU-T P.50 Signal Processing Block Diagram (Frequency Response Valdiation)

8) Please provide full details of the P50 input signal including a spectral plot. Also, include additional details of how the signal was input to the network and how the level was set. Please demonstrate that this signal is limited to a single 1/3 octave band to use 6.3 procedures. 6.4 procedures apply for broad band signals. Please update as necessary.

Please see below P.50 spectral plot.

Figure D
ITU-P.50 Spectral Plot

For Rohde & Schwarz CMU200, an input voltage of 0.05Vrms = 0 dBm0 at the SPEECH connector.

Since dBm0 is relative to 775mV (1mW relative to a 600Ω load), a dBV equivalent must be found for measurement purposes through the SPEECH connector.

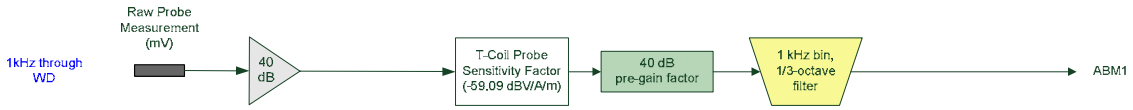
0 dBm0 = 20*log (0.05V/0.775V) = -23.8 dBV

Therefore, a -18dBm0 measurement is equivalent to -23.8 – 18 = **-41.8 dBV** at the SPEECH input connector of the CMU200. The ITU-T P.50 input level was adjusted to such a signal level of -41.8 dBV. Since P.50 is a broadband signal, 6.4 procedures applied (for frequency response measurements only).

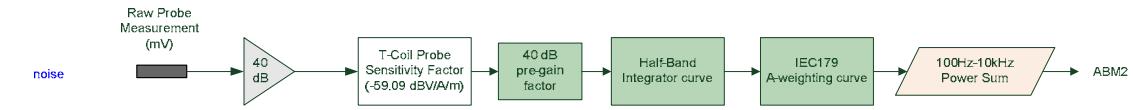
9) Please provide full details of all math used and probe correction/factors applied for ABM1 and ABM2 measurements. Please demonstrate that they are implemented correctly.

Please see below updated block diagram illustrating ABM1 and ABM2 processing chain.

ABM1 Measurement Block Diagram:



ABM2 Measurement Block Diagram:



Calculation for ABM1:
(sine tone stimulus)
$RTA^{R10,1kHz}$ (Raw + 59.09 sensitivity - 40 dB pre-gain) = ABM1 (*in dBA/m*)

An input level of -18 dBm0 was outside of the noise-attenuation region of the EUT's vocoder (i.e. no pure tone suppression at -18 dBm0). See **Error! Reference source not found.**.

Calculation for ABM2:
(broadband noise)
Power $Sum^{1/3\ octave,0.1\text{-}10kHz}$ ($RTA^{0.1\text{-}10kHz}$(Raw + 59.09 sensitivity - 40 dB pre-gain) + HBI curve + A-weighting curve) = ABM2

10) Please demonstrate that RF emissions from the phone do not effect the T-coil measurements.

Please see below comparison between conducted and radiated T-coil measurements showing RF emissions from the phone do not affect the T-coil measurements (data from axial configuration).

Table II
Conducted vs. Radiated Measurements

	Cellular Band	
	cond.	radiated
	384	384
Freq. Response Margin	1.80	1.77
ABM1, dBA/m	7.1	7
ABM2 (HBI, A)	-49.9	-49.7
S+N/N	57	56.7
	PCS Band	
	cond.	radiated
	600	600
Freq. Response Margin	2.0	2.0
ABM1, dBA/m	7.1	7.2
ABM2 (HBI, A)	-49.8	-49.3
S+N/N	56.9	56.5

11) Please include a discussion of the RF emission rating relative to the T-coil measurement.

The RF emission rating is an “M3”, whereas the T-Coil Rating is a “T4”.

12) Please clarify the term "3x measurement time" in II 3 c. The P50 elsewhere is said to be 20 seconds long.

The male and female ITU-T P.50 signal is looped. The measurement timeframe is a multiple of three full cycles of P.50, which is 20.95 x 3 = 62.85 seconds. The three times sampling allows for sufficient repeatable capturing of the frequency spectrum. Before the frequency spectrum is measured, the P.50 stimulus is allowed to pass through the vocoder over a single cycle period for any transient vocoder effects.

13) Please explain the use of 5 second measurement time for ABM2 in II4ci. Please provide a spectral plot.

Five seconds for the noise measurement was used as a standard noise measurement time interval for acoustic noise tests (i.e. IEEE 269, etc.).

Please see below for the ABM2 spectral plot:

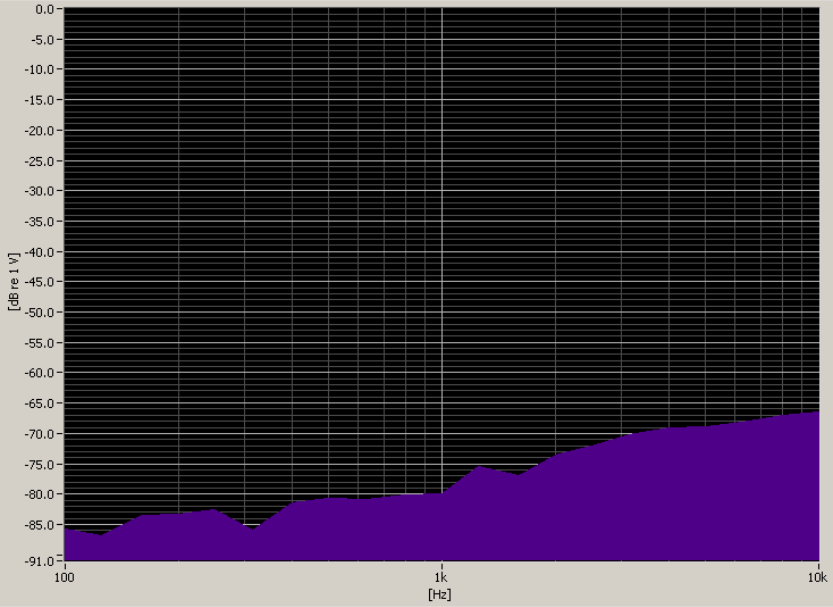


Figure E
ABM2 Spectrum Plot

14) Please explain how the TEM software/hardware relates to the Listen software/hardware.

The TEM software/hardware operates independently from the LISTEN software/hardware. The TEM positioning system software is used to scan the device and locate the maximum field above the EUT in the TEM positioner. The LISTEN software is used to acquire and calculate ABM1, ABM2, S+N/N and Frequency Response measurements at the final field locations above the WD. Both systems are equipped with Real-Time Analyzers for T-coil measurements.

15) What was the step size of the course scan in II 3 a.

The step size was 2mm.

16) Please explain the probe calibration certificates. Two are included but one seems to be duplicate. Please explain the application to use without the mentioned meters. Please compare the frequency response to those expected/required. The response given in the calibration certification seems to include some equalization please detail and demonstrate that C63.19 requirements are met for all measurements.

The calibrations with magnetometer were inadvertently submitted. Please find attached certificate sheets for the probes used for the testing.

FYI
Please provide ambient noise for ABM2 at each measurement location/orientation.

Please see Table I for ABM2 measurements for each location/orientation.