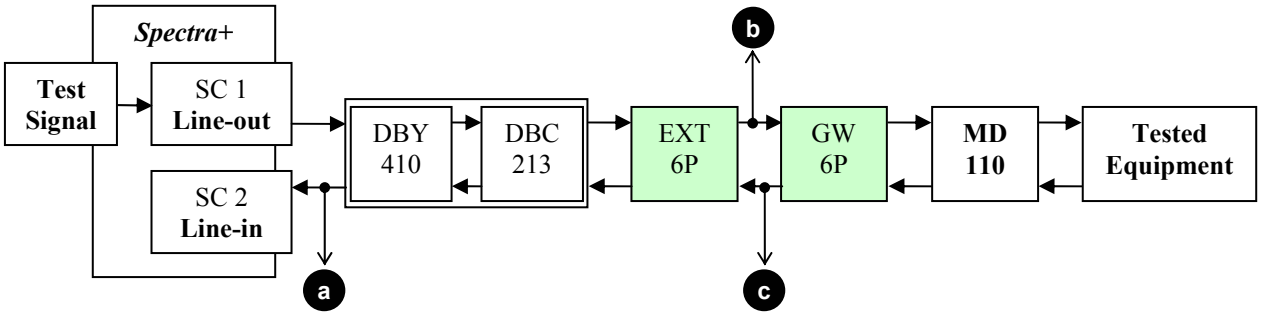
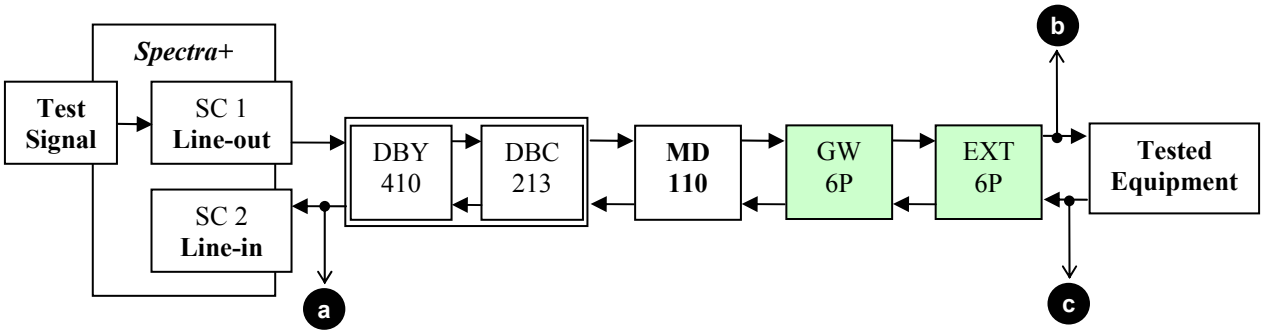
Setup A – Signal generation at EXT side with tested equipment at GW side



Setup B – Signal generation at GW side with tested equipment at EXT side



Notes:

- Signal trace at point (a) is analogue.
- Signal traces at points (b) and (c) are digital PCM.

Test signal: Chirp segment (f=0–4kHz, T=10s) followed by two white noise segments (T=1s)

Contents

Hands-free / IDLE Mode Noise Measurements

All signal measurements are done on B-channel digital traces recorded at GE6P extension side.

Commont parameters:

- Hands-free / IDLE mode
- A-law converted to 16-bit linear PCM (subtract 18.06 dB for A-law dyn. range)

Test Configurations:

- **Setup B** – DTS connected to GE6P EXT with GE6P power feed

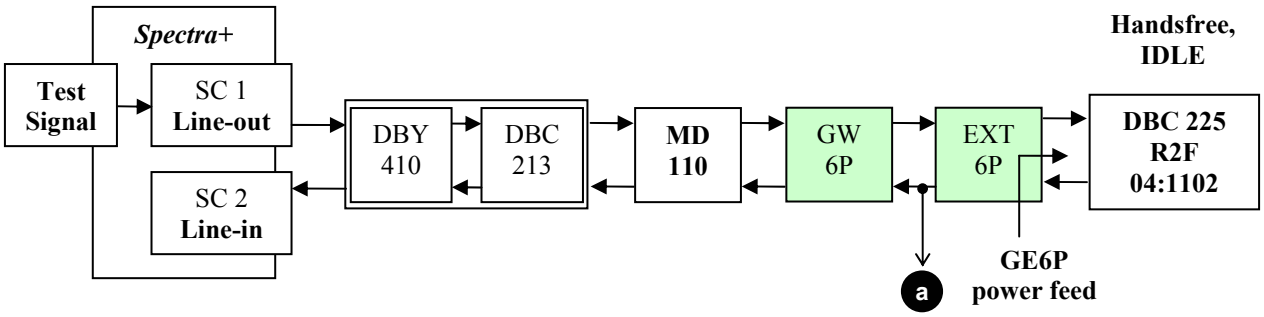
- **Modified Setup B** – DTS connected to GE6P EXT with ELU28 power feed
  (i.e. with jump cable from ELU28 directly to Upo transformer)

- **Setup A**

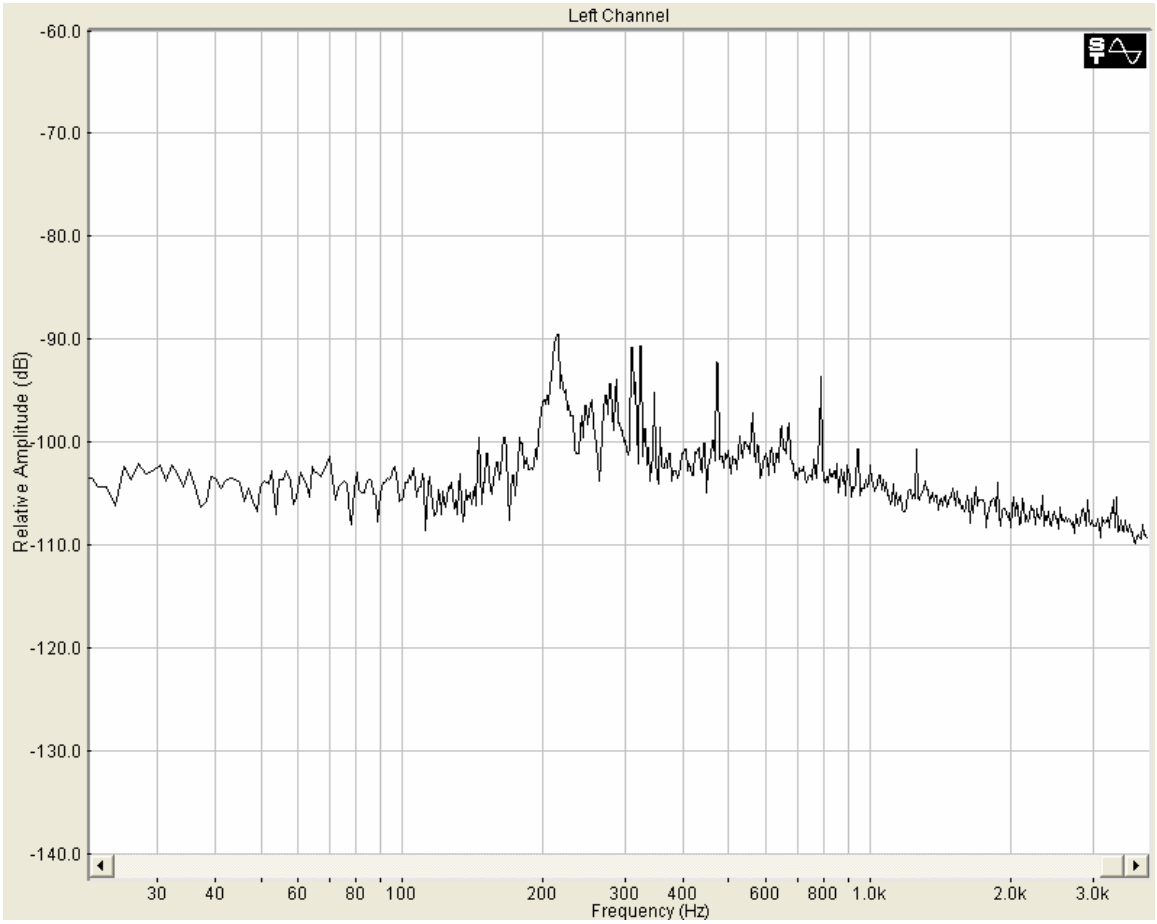
Tested equipment GE6P with following DTSs:

- DBC 225 R2F 2004-04-13 (akustik 04:1102)
- DBC 225 R2F 2004-04-13 (got earlier)
- DBC 225 R2A 2003-04-13
- DBC 223 R3A 2004-04-09

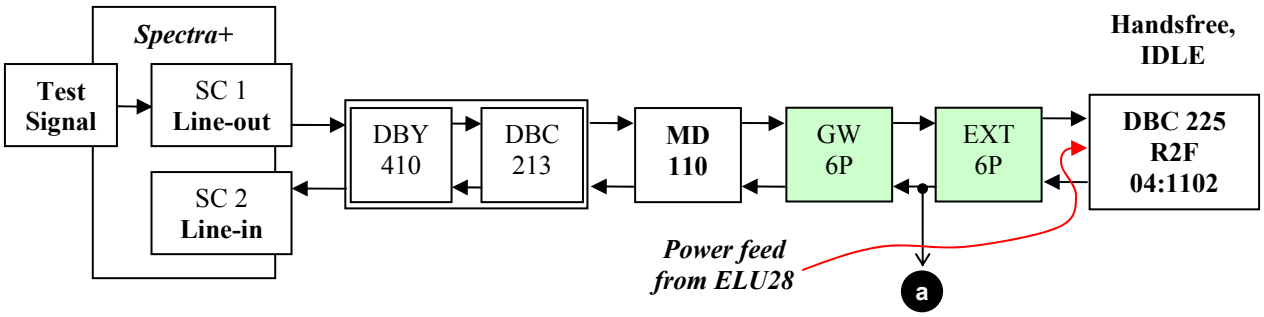
N1: DBC 225 R2F akustik 04:1102, Hands-free / idle (Setup B)



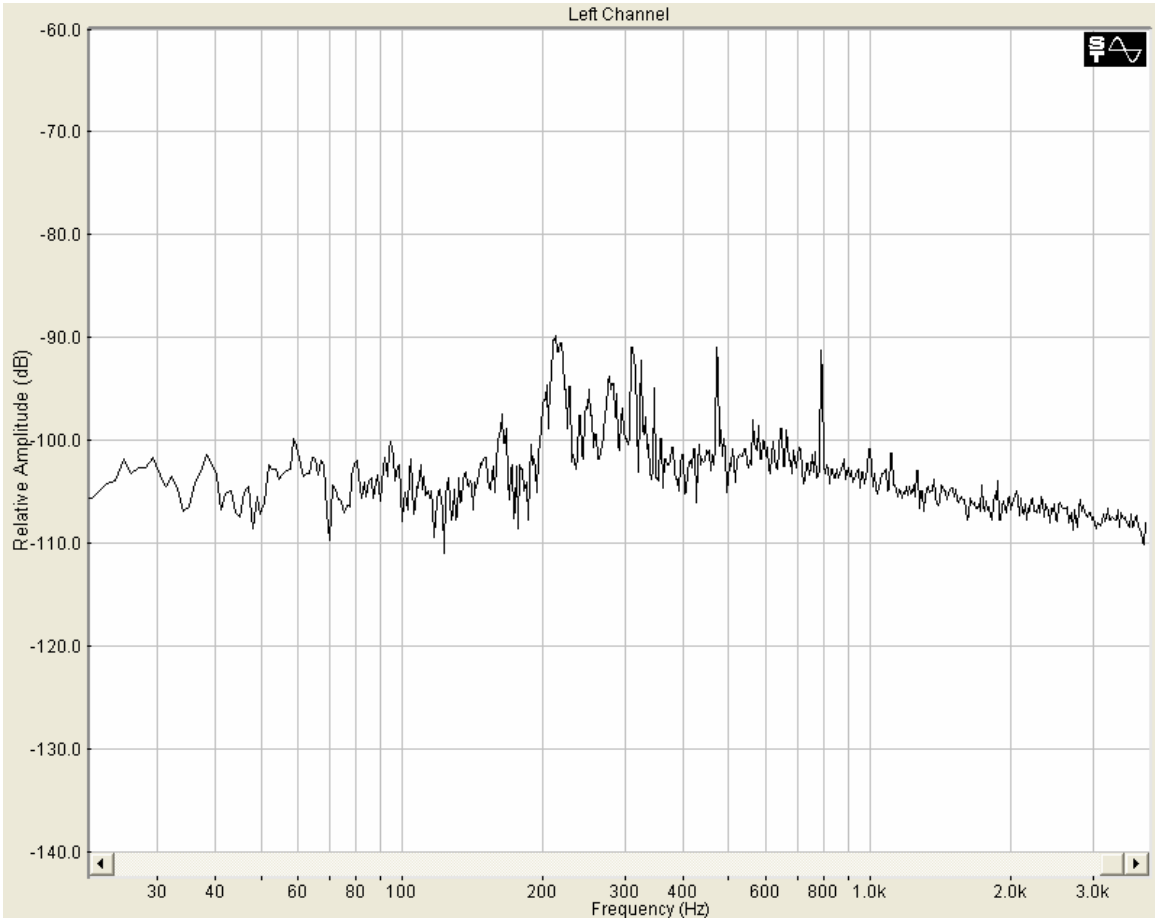
Peak -89.4 dB + 18.06 dB = **-71.34 dB @ 213.87 Hz**



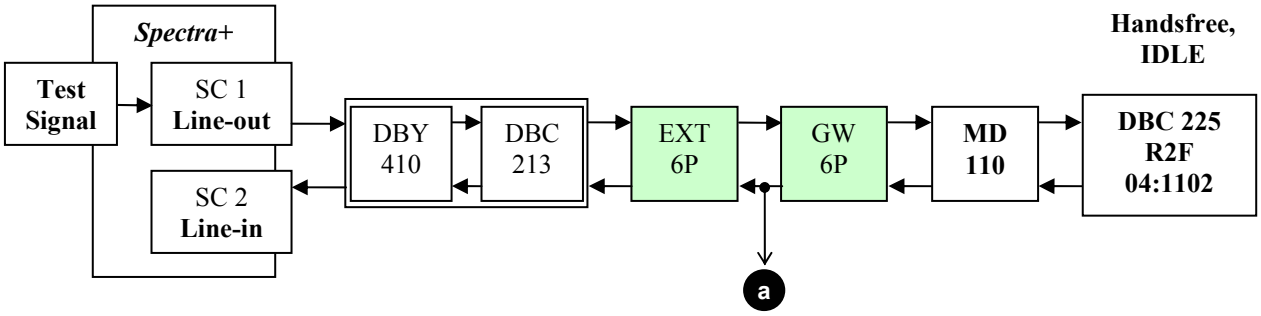
N2: DBC 225 R2F akustik 04:1102, Hands-free / idle (Modified Setup B)



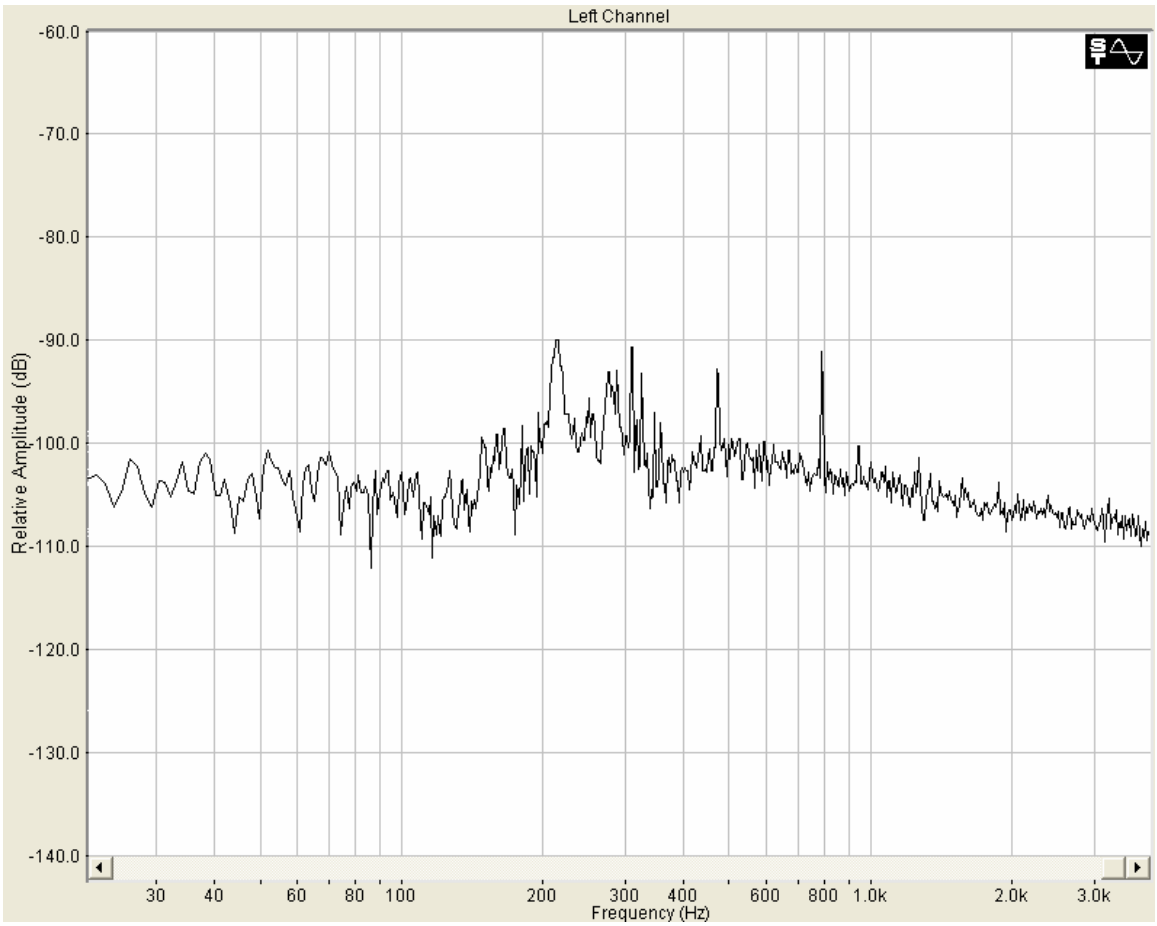
Peak -89.65 dB + 18.06 dB = **-71.59 dB @ 212.89 Hz**



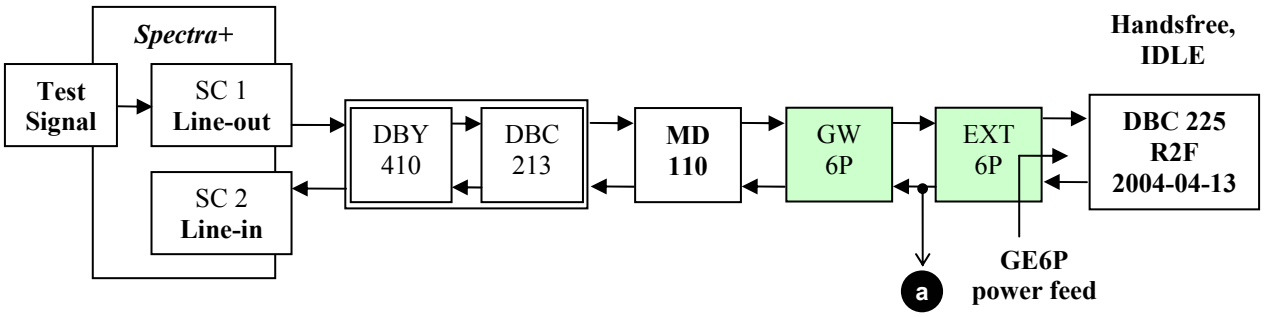
N3: DBC 225 R2F akustik 04:1102, Hands-free / idle (Setup A)



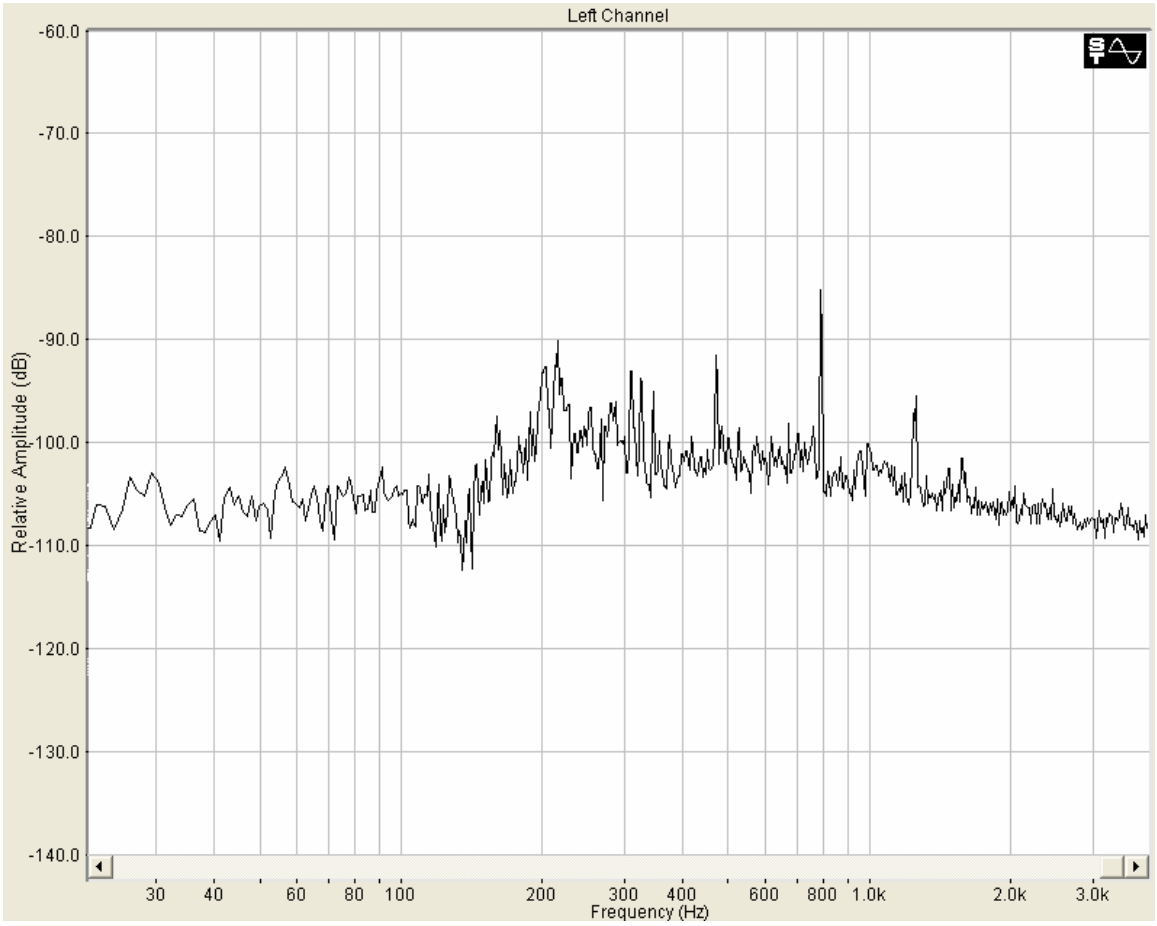
Peak -89.84 dB + 18.06 dB = **-71.78 dB @ 212.89 Hz**



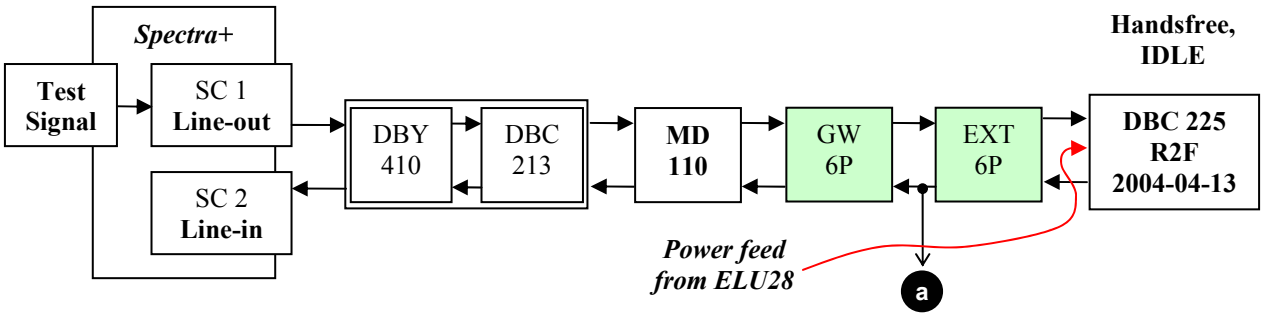
N4: DBC 225 R2F 2004-04-13, Hands-free / idle (Setup B)



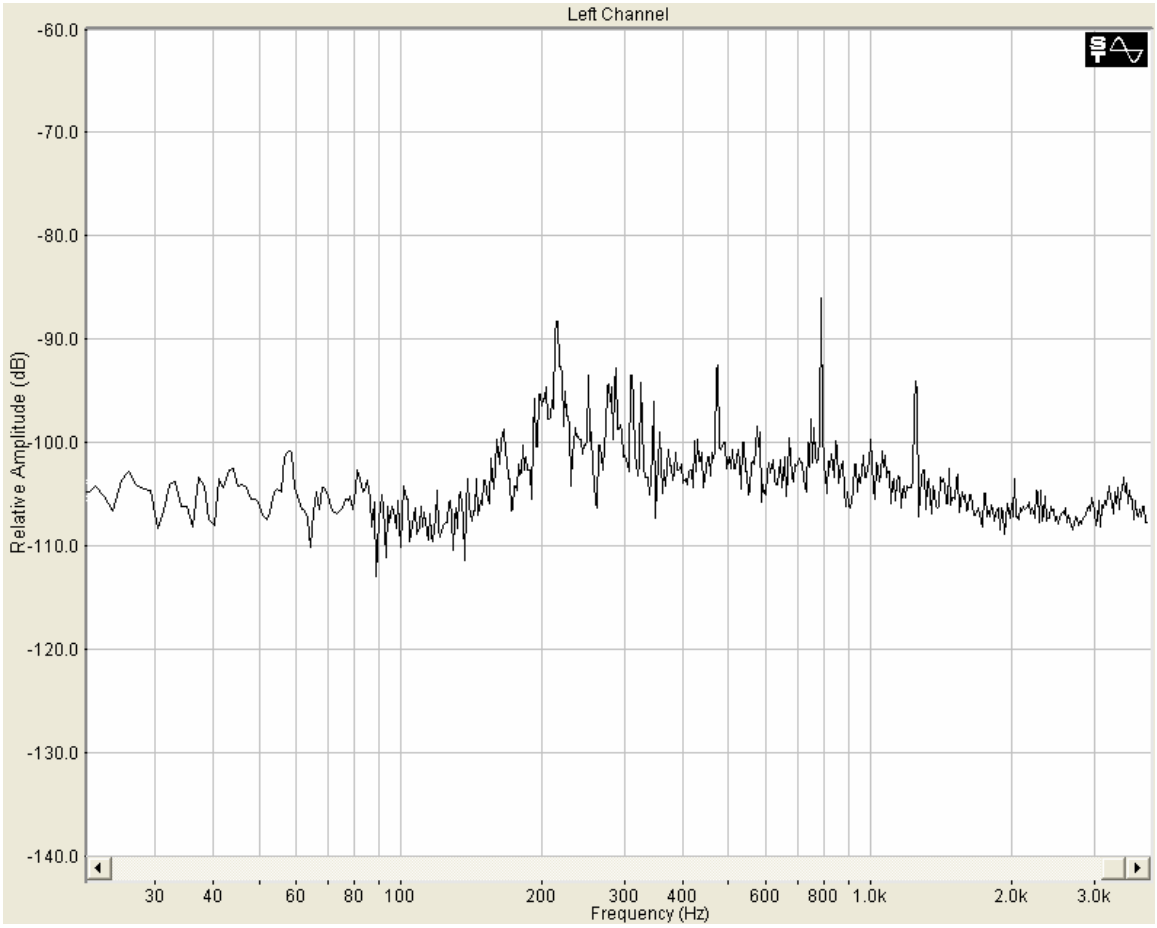
Peak -85.01 dB + 18.06 dB = **-66.95 dB @ 783.20 Hz** (=3x 261 Hz)



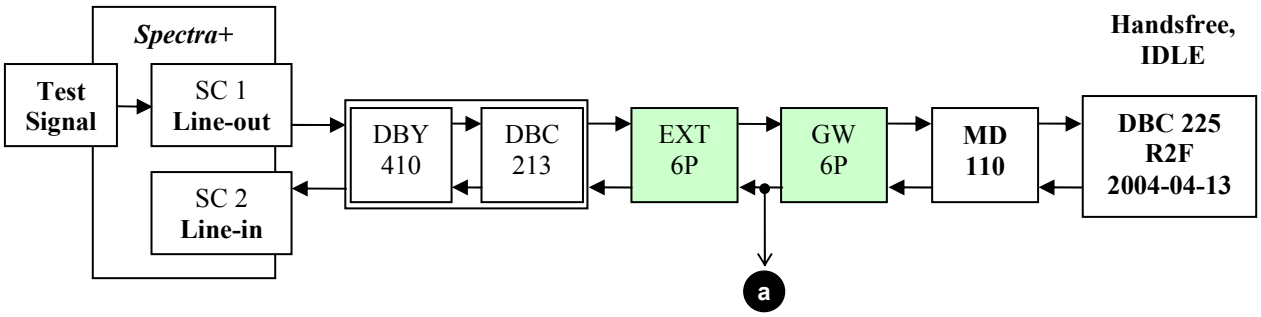
N5: DBC 225 R2F 2004-04-13, Hands-free / idle (Modified Setup B)



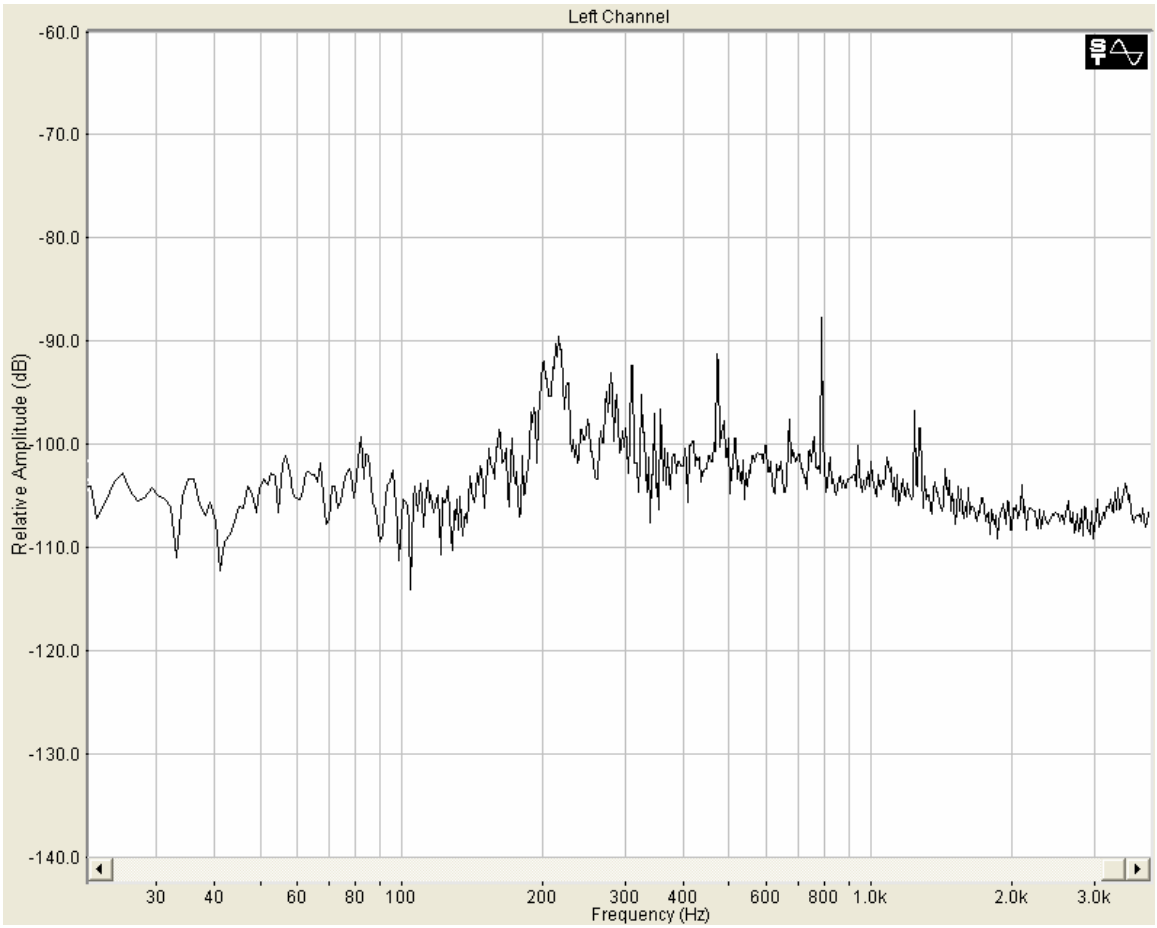
Peak -85.9 dB + 18.06 dB = **-71.84 dB @ 781.25 Hz** (=3x 260 Hz)



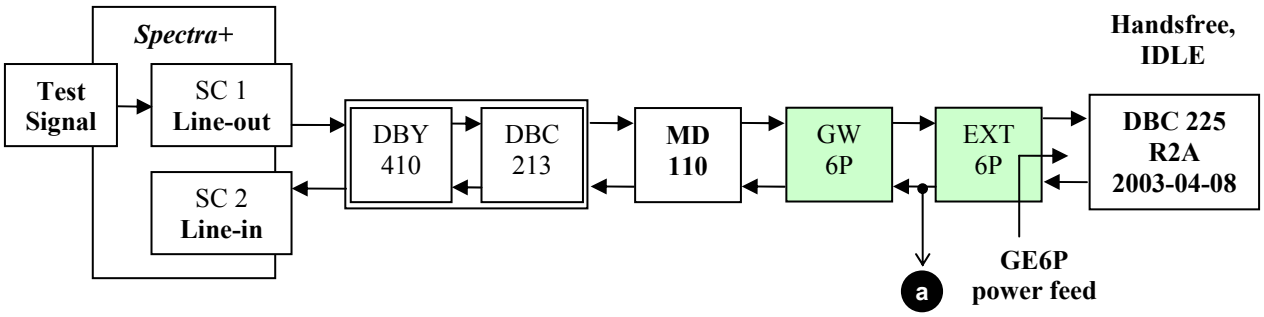
N6: DBC 225 R2F 2004-04-13, Hands-free / idle (Setup A)



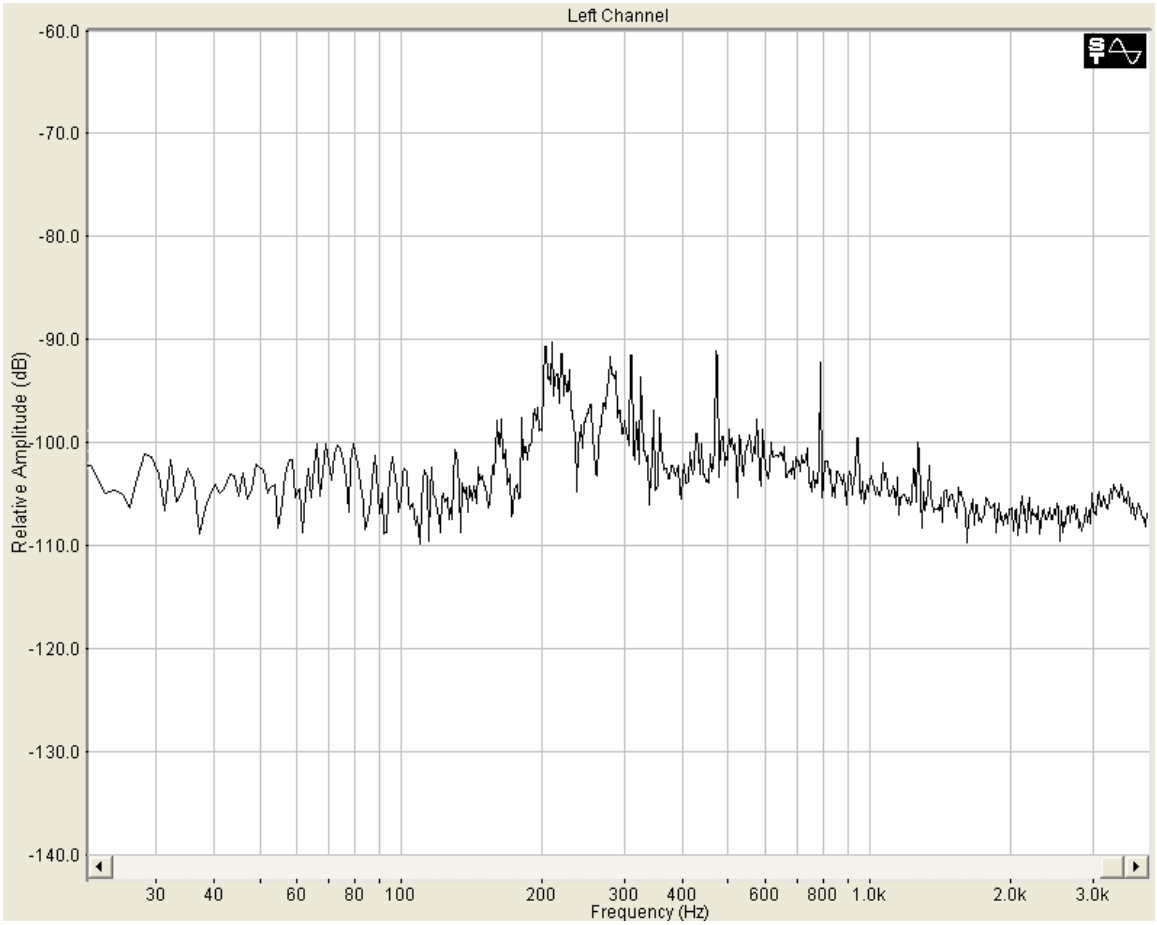
Peak -87.64 dB + 18.06 dB = **-69.58 dB @ 781.25 Hz** (=3x 260 Hz)



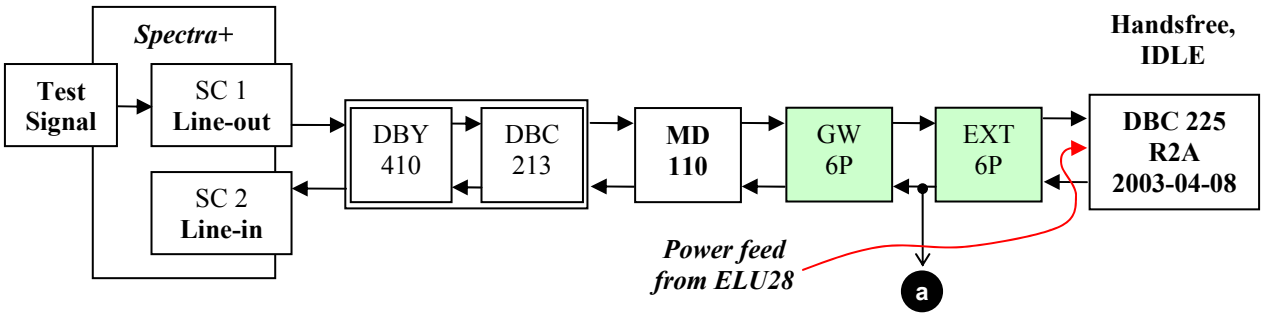
N7: DBC 225 R2A 2003-04-08, Hands-free / idle (Setup B)



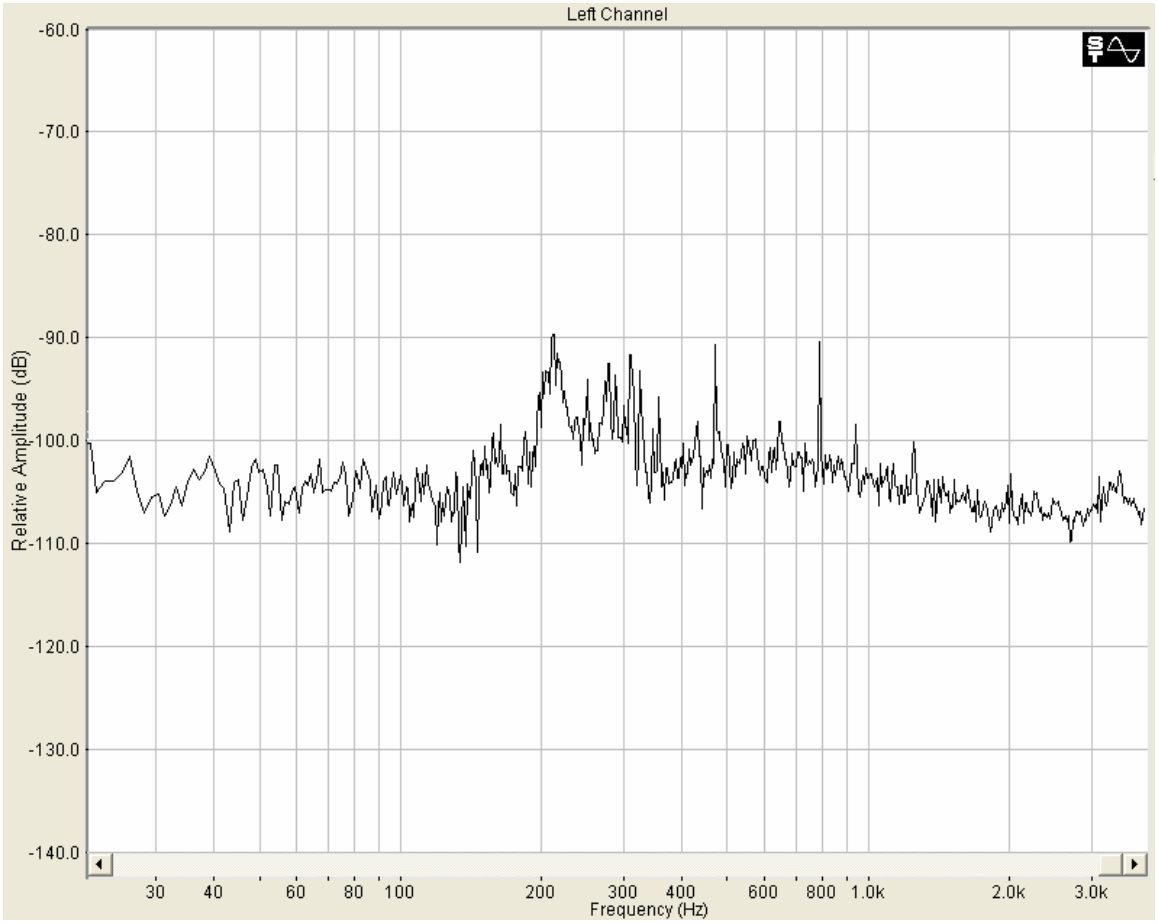
Peak -90.11 dB + 18.06 dB = **-71.52 dB @ 208.98 Hz**



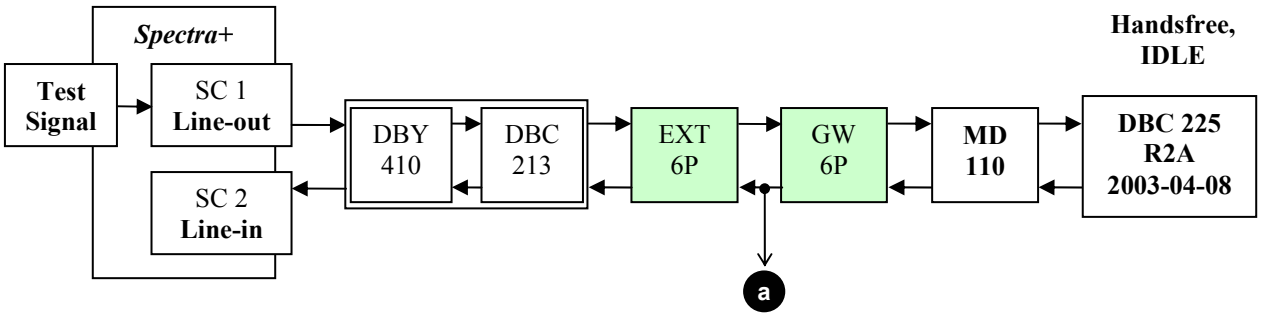
N8: DBC 225 R2A 2003-04-08, Hands-free / idle (Modified Setup B)



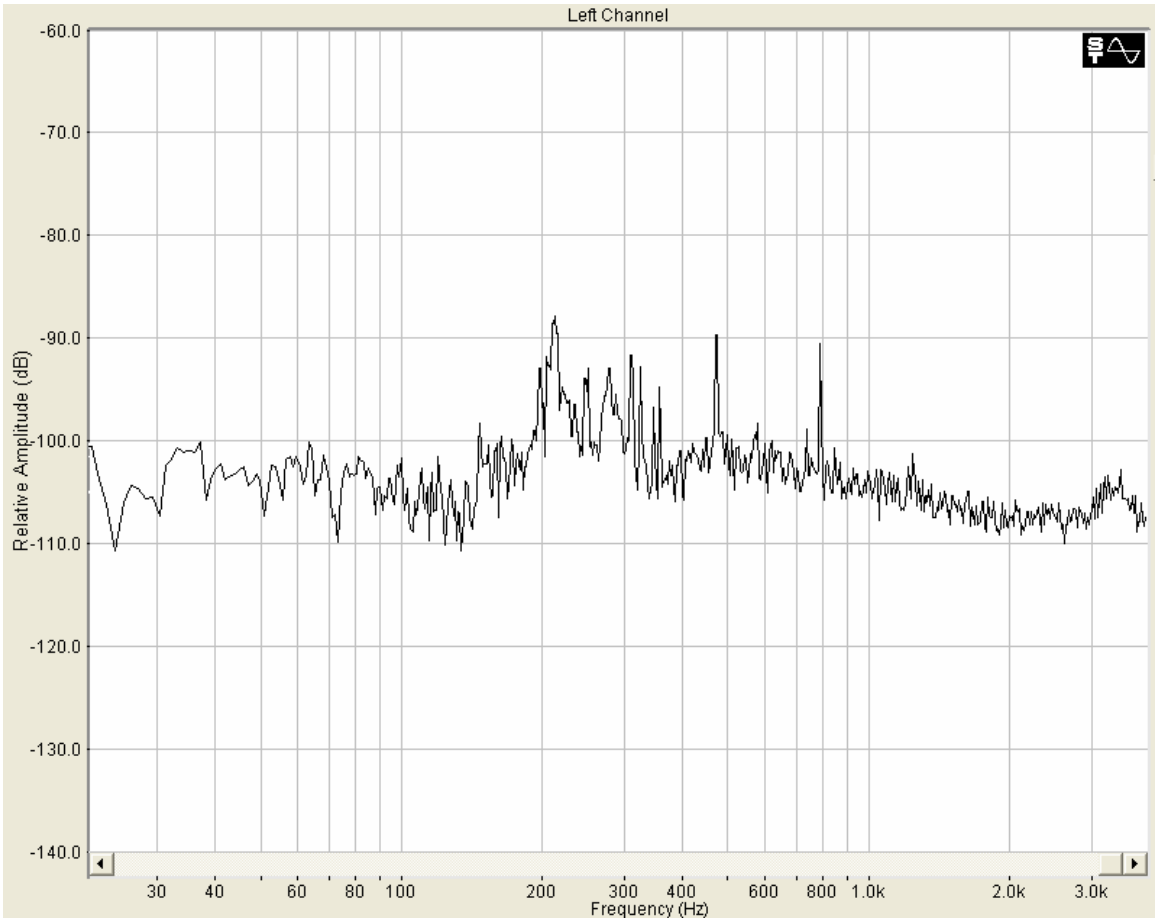
Peak -89.58 dB + 18.06 dB = **-71.84 dB @ 210.94**



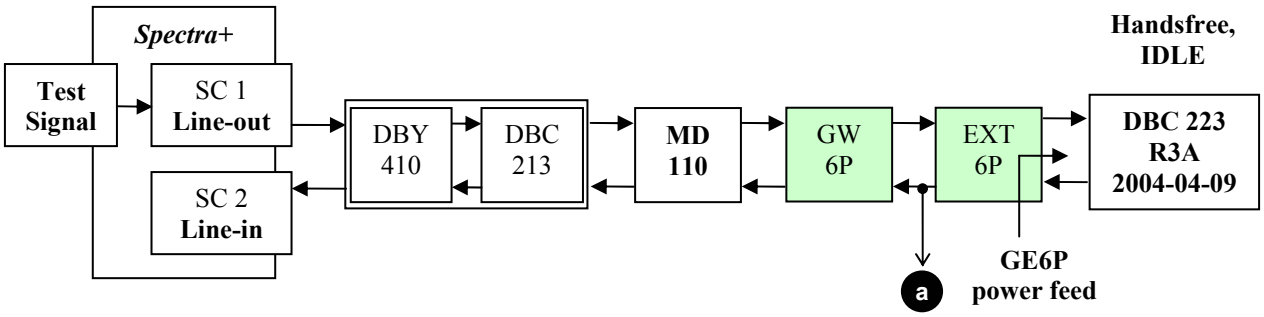
N9: DBC 225 R2A 2003-04-08, Hands-free / idle (Setup A)



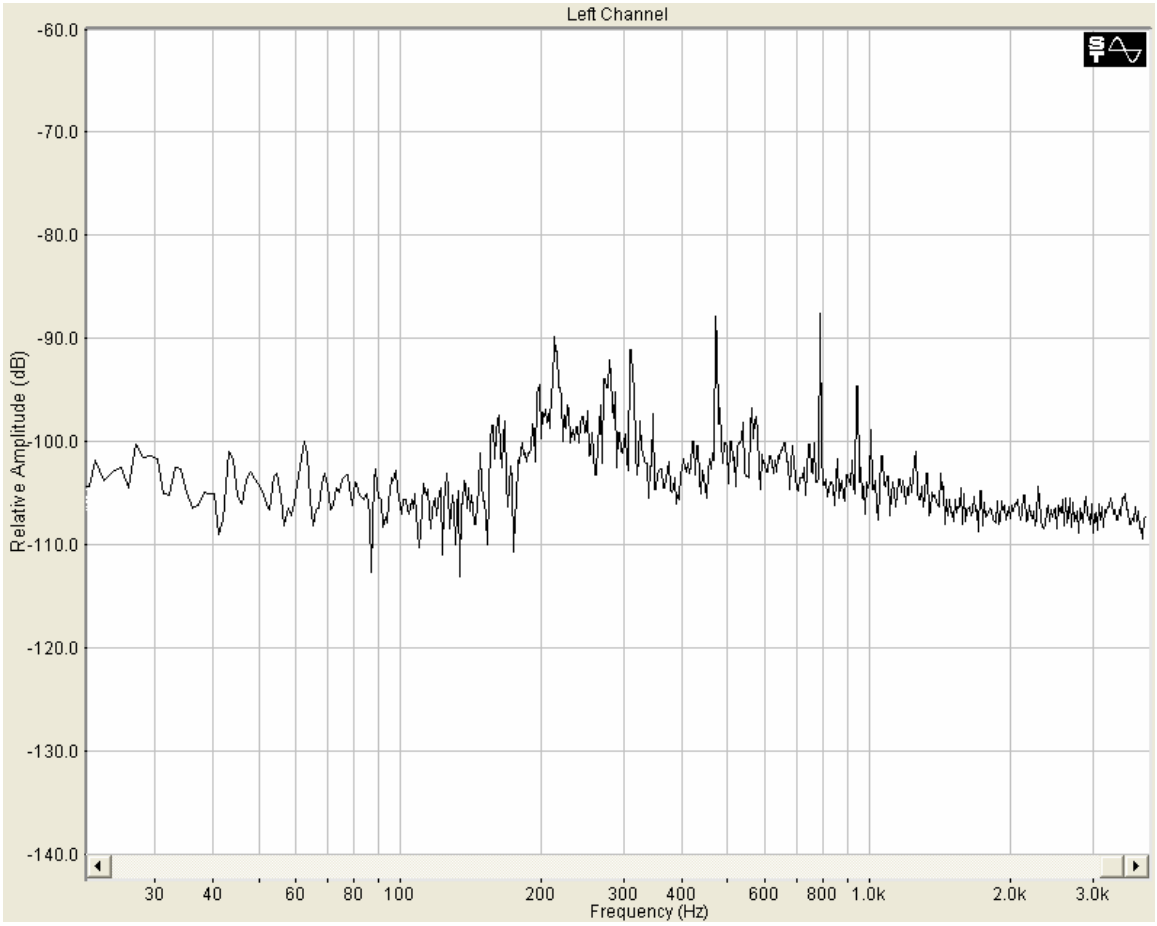
Peak -87.65 dB + 18.06 dB = **-69.59 dB @ 211.91 Hz**



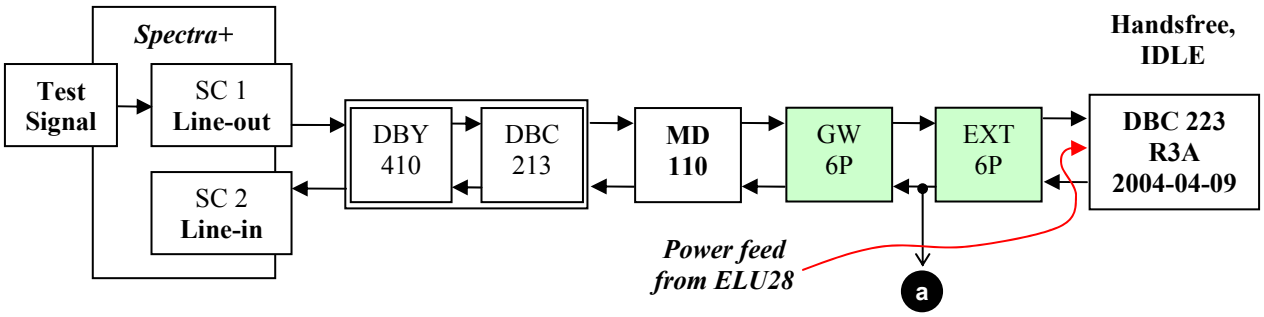
N10: DBC 223 R3A 2004-04-09, Hands-free / idle (Setup B)



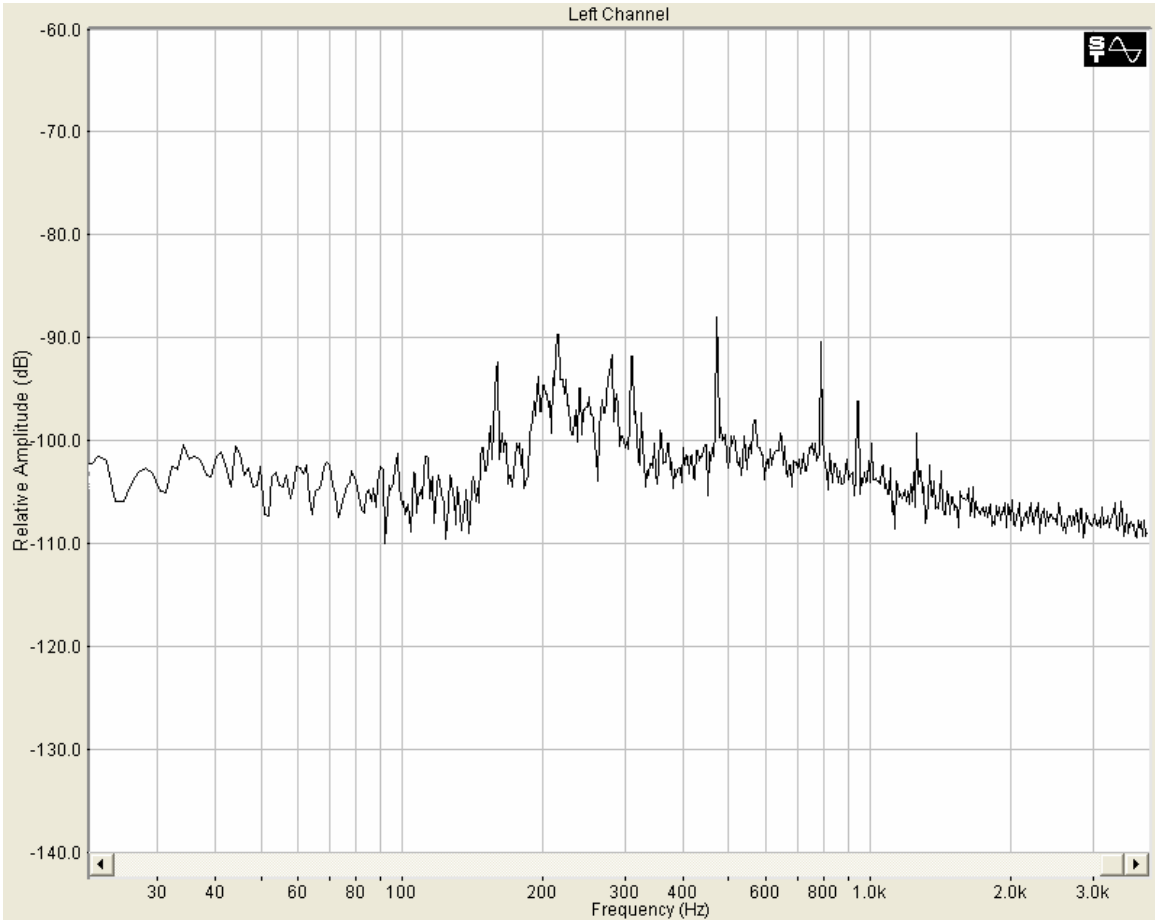
Peak -87.5 dB + 18.06 dB = **-69.44 dB @ 781.25 Hz** (=3x 260 Hz)



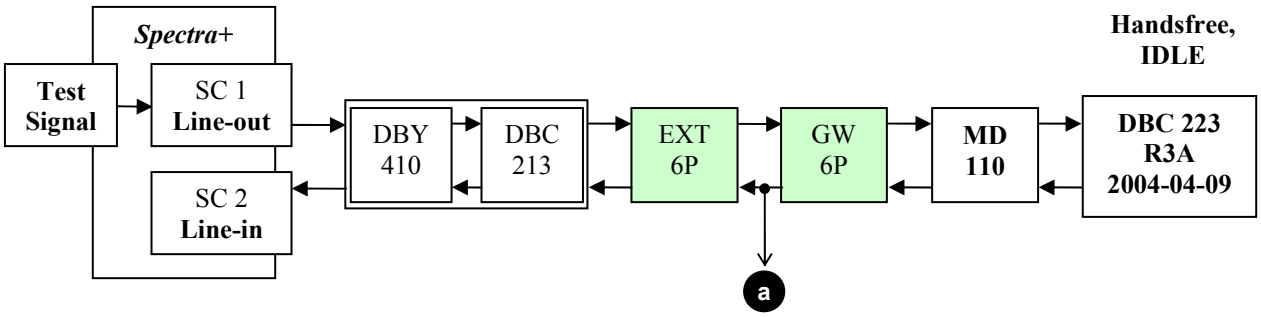
N11: DBC 223 R3A 2004-04-09, Hands-free / idle (Modified Setup A)



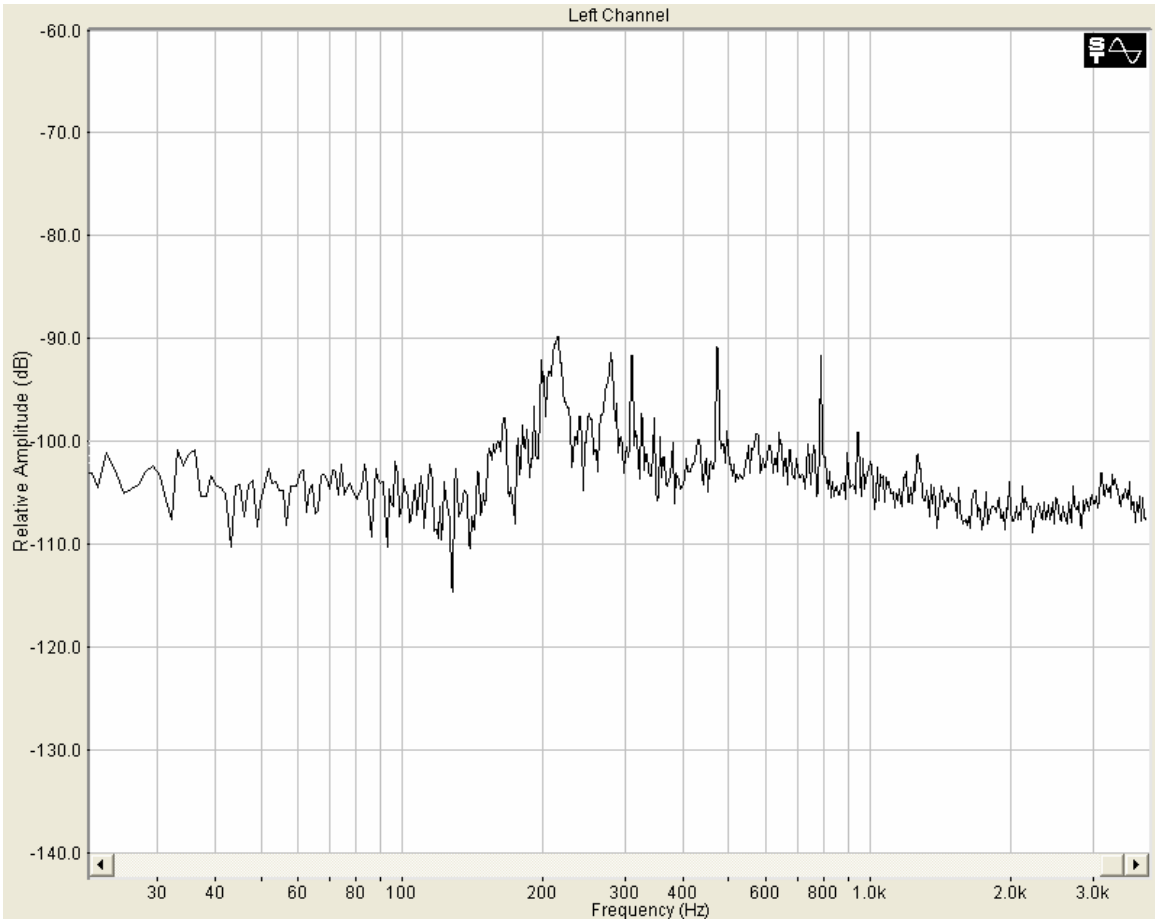
Peak -87.86 dB + 18.06 dB = **-69.8 dB @ 468.75 Hz** (=2x 243.75 Hz)



N12: DBC 223 R3A 2004-04-09, Hands-free / idle (Setup B)



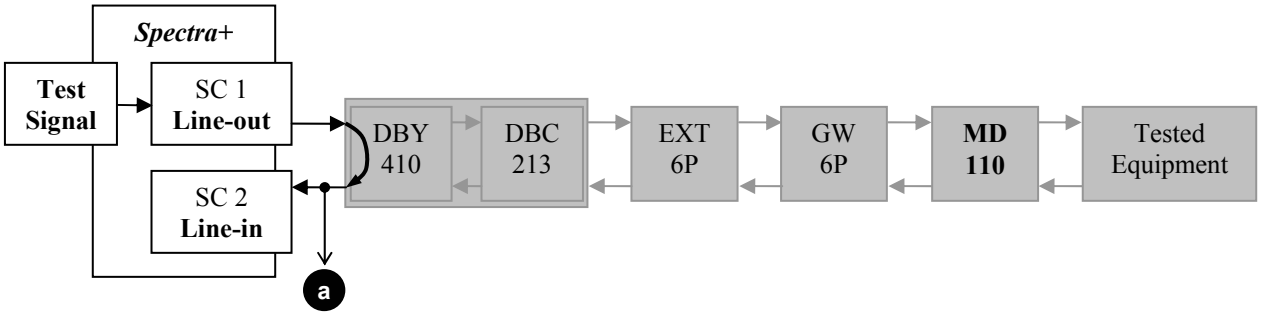
Peak -89.7 dB + 18.06 dB = **-71.64 dB @ 213.87 Hz**



Test Equipment Transfer characteristics

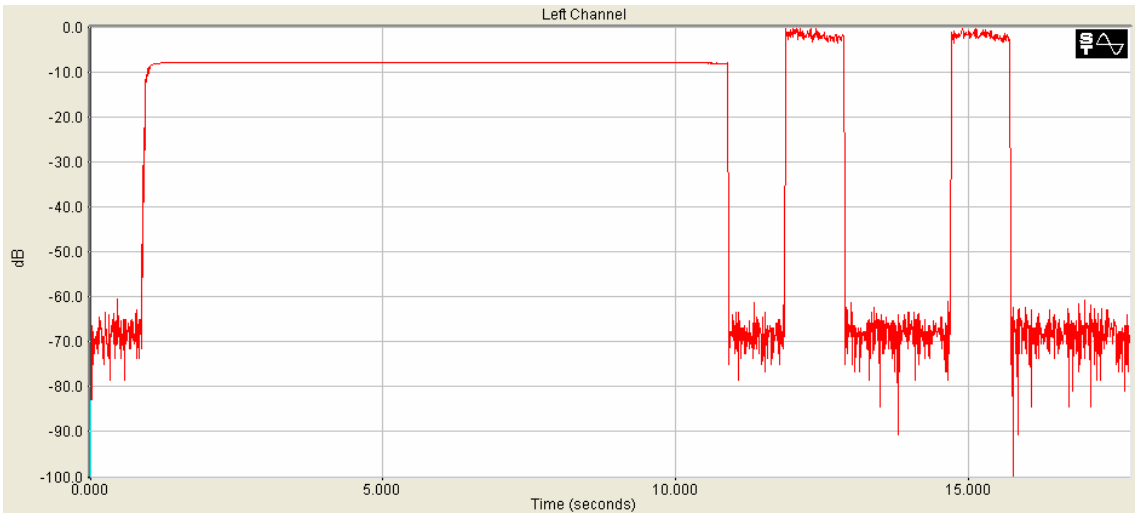
M1 – Test Equipment Loopback (SC1 to SC2)

Purpose: To determine transfer characteristics of the test equipment.



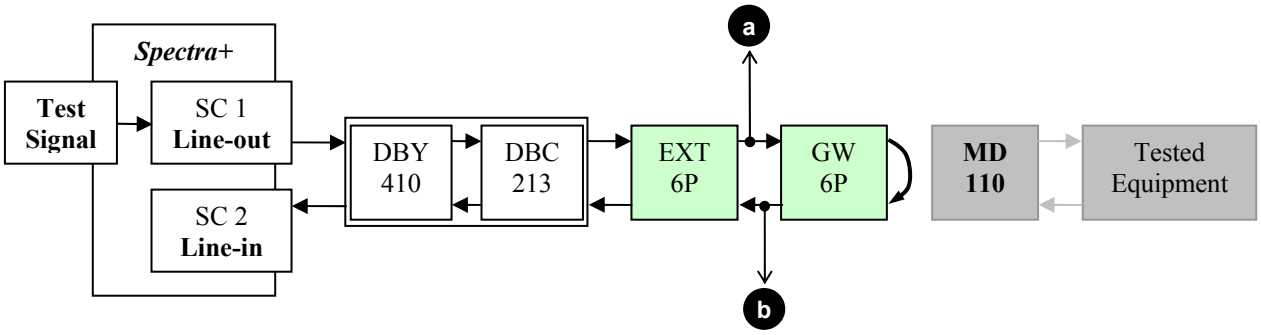
Test Signal: Vpp chirp = 500mV

Measurement at (a):


Left Channel
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
dB
0.000
5.000
10.000
15.000
Time (seconds)

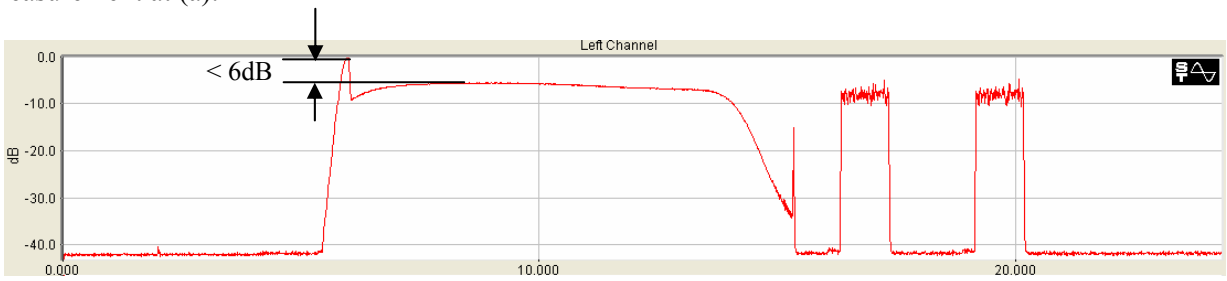
M2 – B-channel Loopback At VoIP Gateway Side (Setup A)

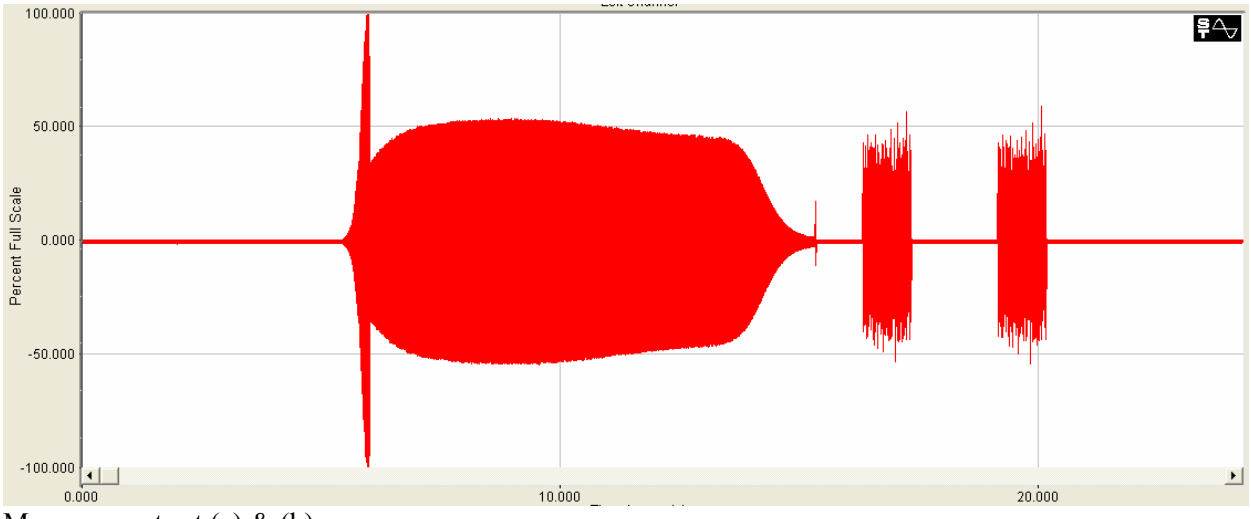
Purpose: Delay measurement and transfer characteristics of the DBY 410 when DBC 213 is connected to Extender.



Test Signal: Vpp chirp = 1500mV

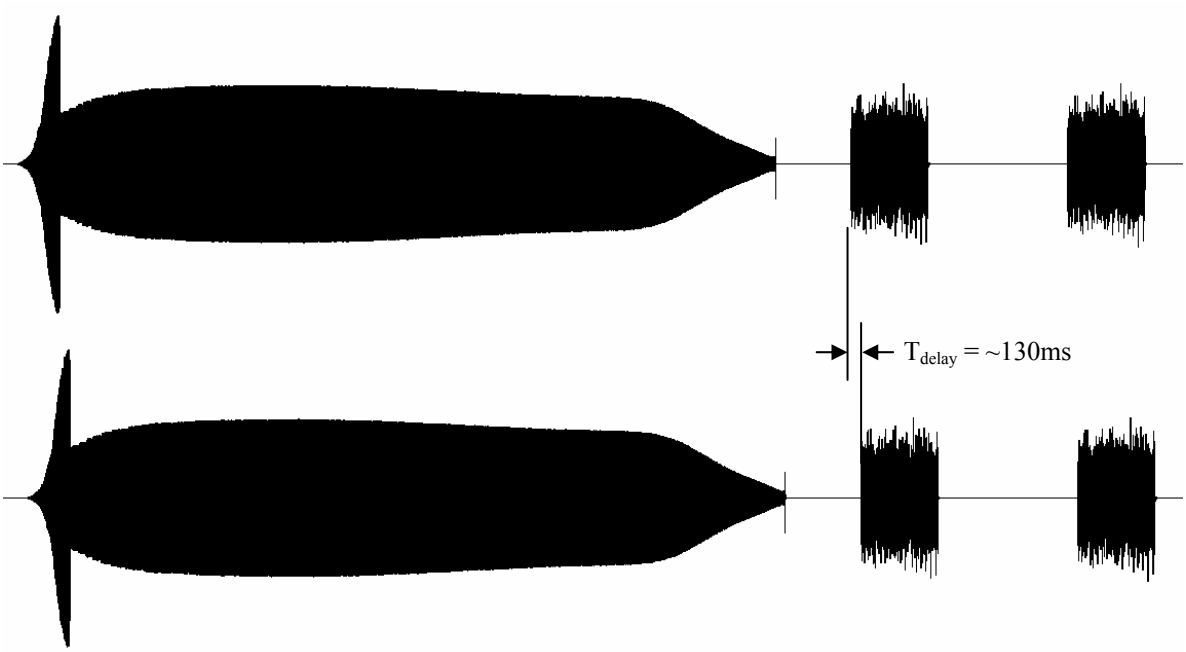
Measurement at (a):





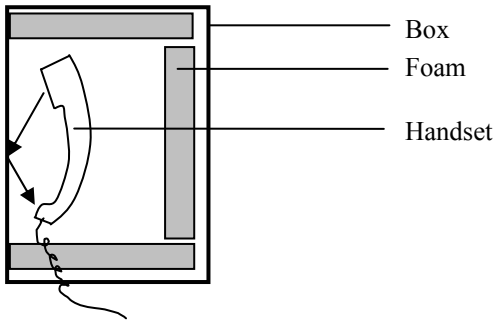
Measurements at (a) & (b):

Calculated one-way delay: 20ms send buffer + 2x 5ms network + 100ms jitter buffer



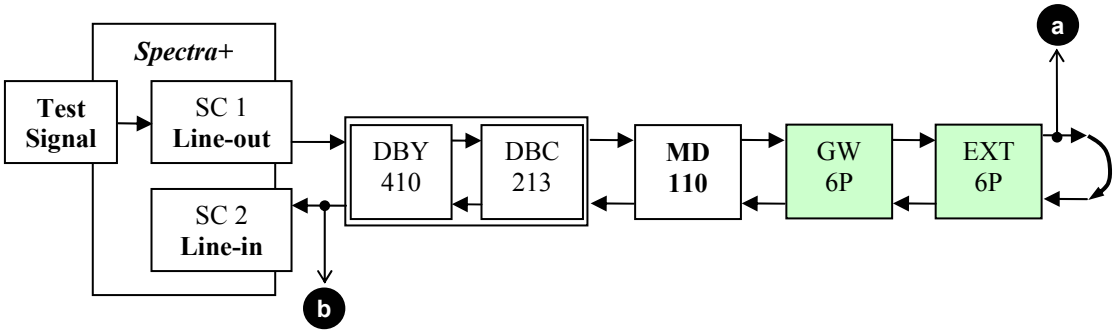
Echo Measurements

All handset echo measurements are done with handset placed in a silent room in a box surrounded by the dumping foam on 5 sides, facing one reflection side at approx distance of 5 cm.



M3 – B-channel Loopback At VoIP Extension Side (Setup B)

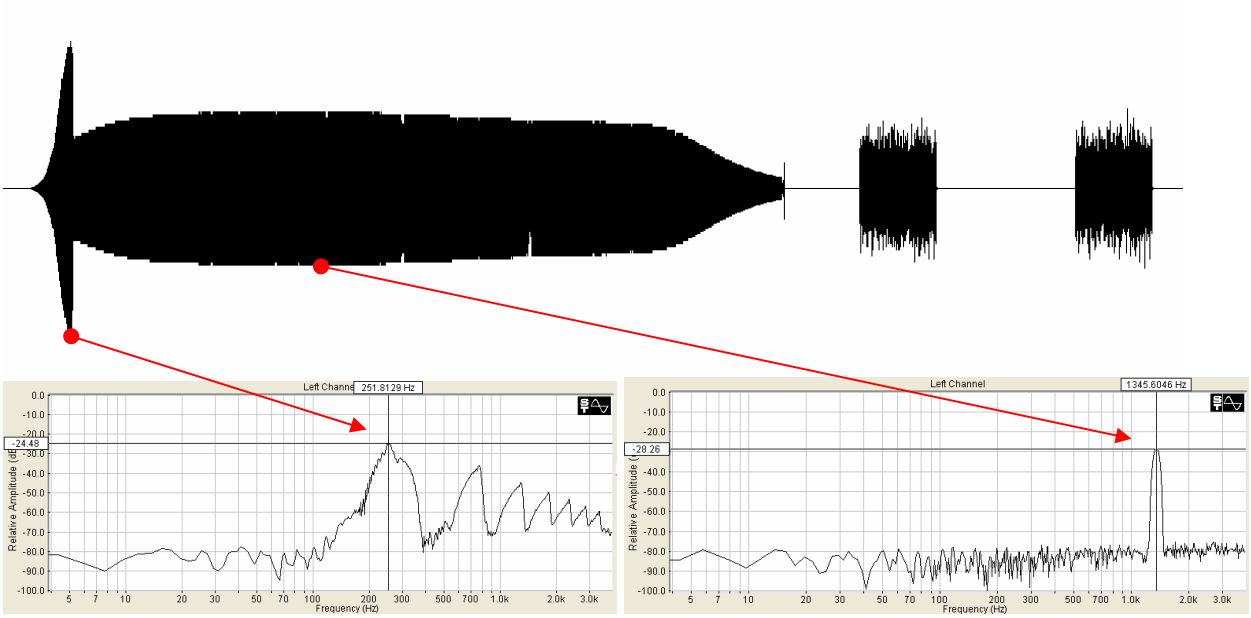
Purpose: Transfer characteristics of the DBY 410 when DBC 213 is connected to ELU28.



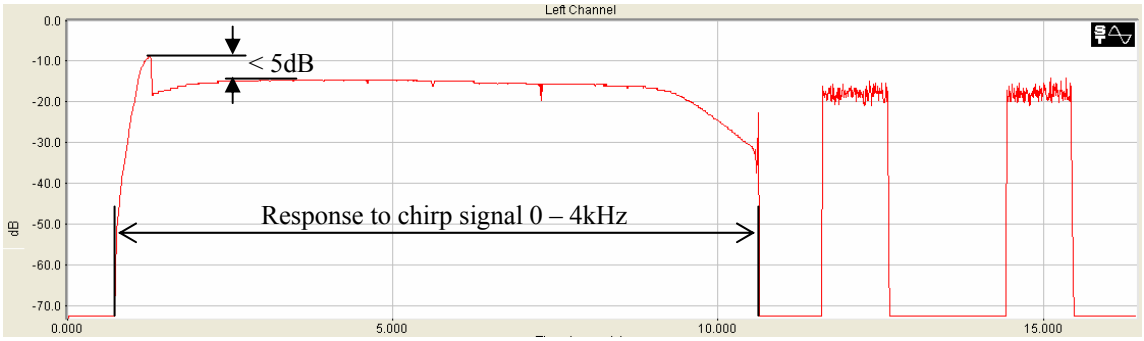
Test Signal: Vpp chirp = 1500mV

Measurement at (a):

Linear view (amplitude) of time series:

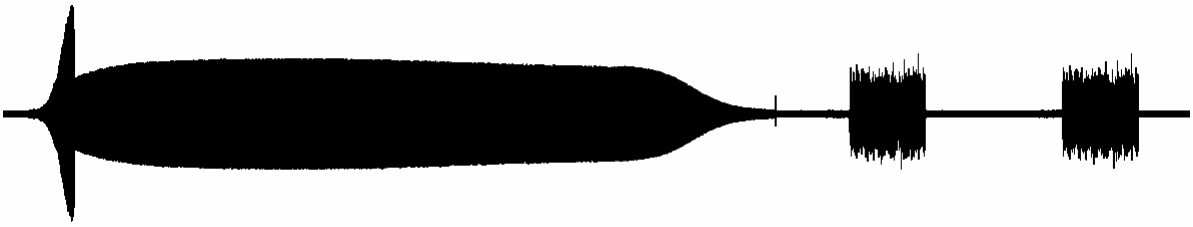


Logarithmic view (energy) of time series:

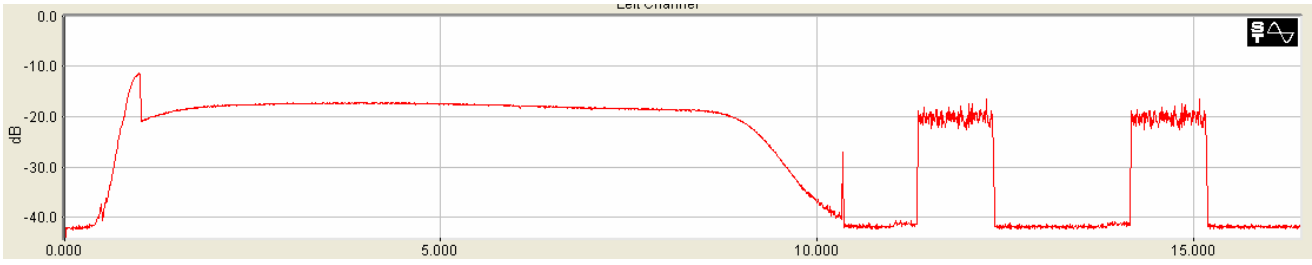


Measurement at (b):

Linear view (amplitude) of time series:



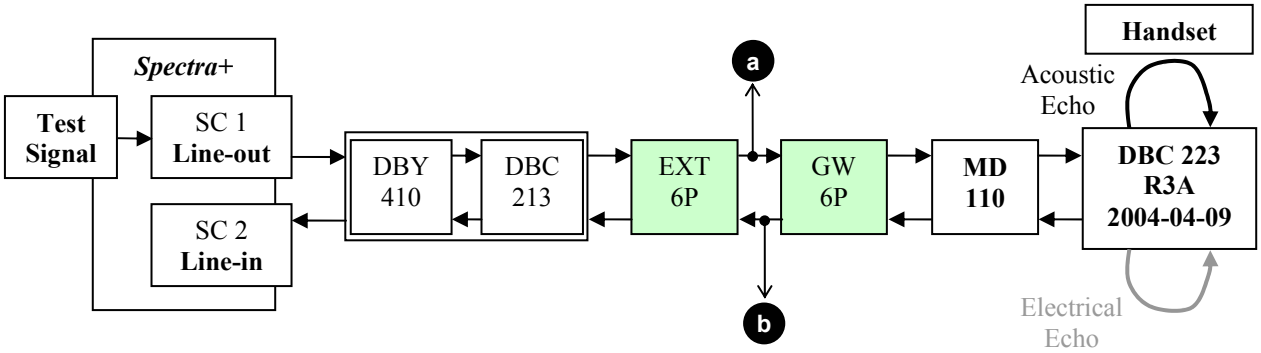
Logarithmic view (energy) of time series:



M4 – DBC 223 R3A 2004-04-09 Handset Echo (Setup A)

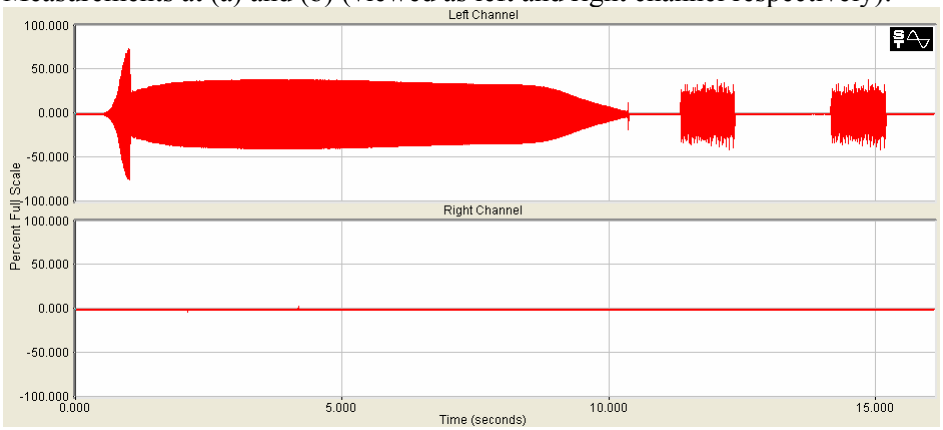
Purpose: Handset acoustic echo measurement.

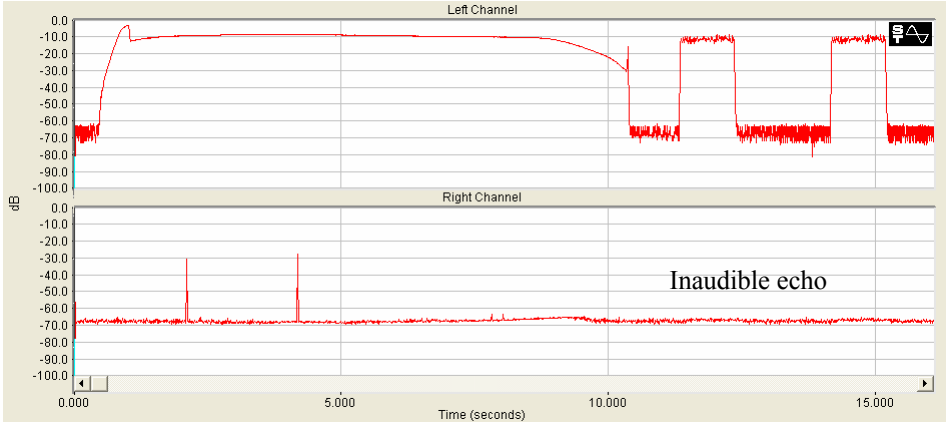
Note that this test also measures internal DTS electrical echo (e.g. non-filtered power supply from the speaker amplifier to microphone power supply).



Test Signal: Vpp chirp = 1500mV

Measurements at (a) and (b) (viewed as left and right channel respectively):

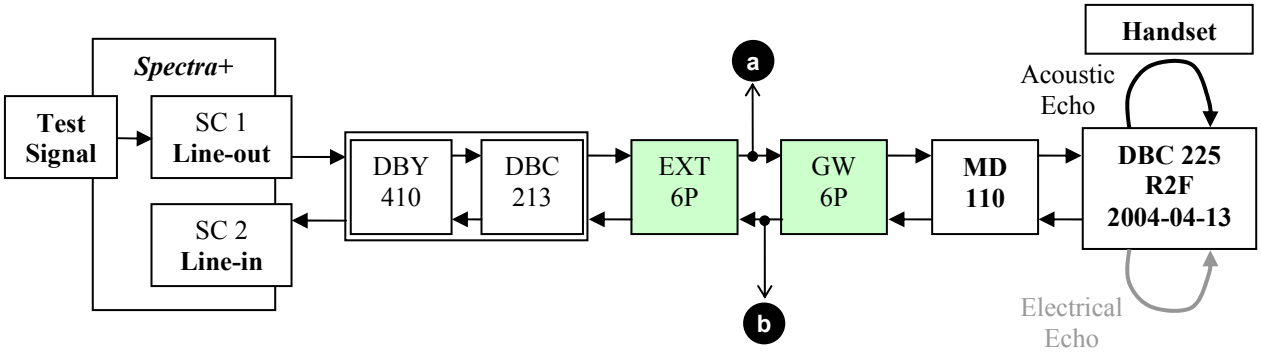




M5 – DBC 225 R2F 2004-04-13 Handset Echo (Setup A)

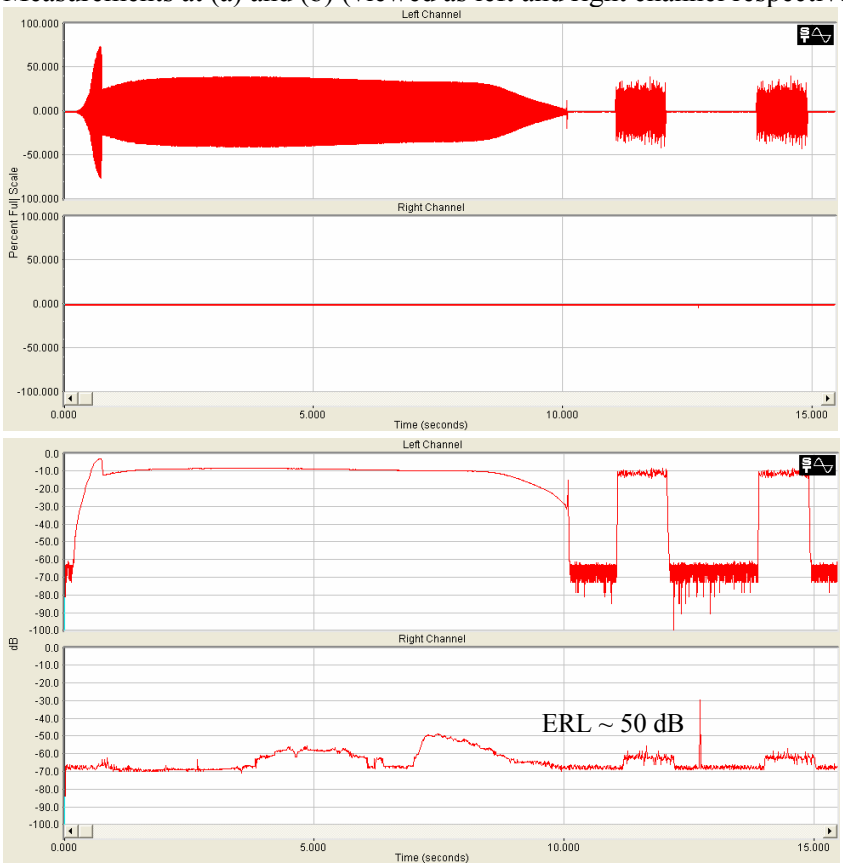
Purpose: Handset acoustic echo measurement.

Note that this test also measures internal DTS electrical echo (e.g. non-filtered power supply from the speaker amplifier to microphone power supply).



Test Signal: Vpp chirp = 1500mV

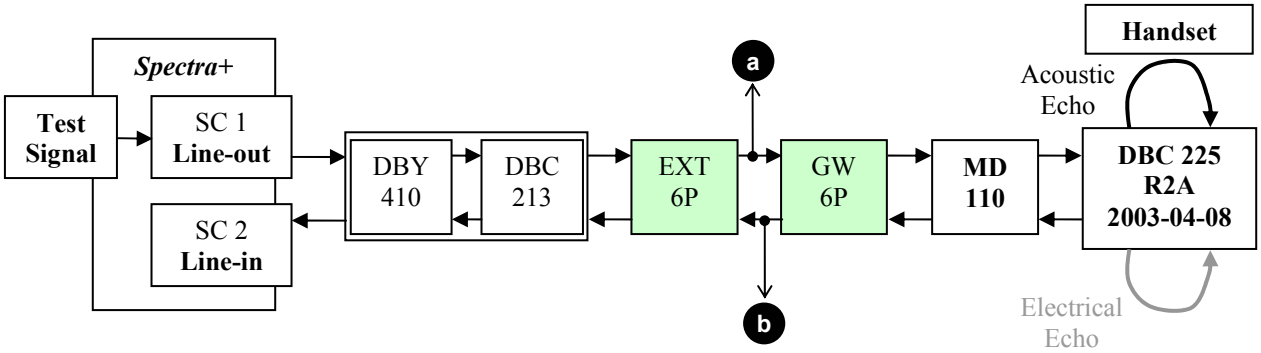
Measurements at (a) and (b) (viewed as left and right channel respectively):



M6 – DBC 225 R2A 2003-04-08 Handset Echo (Setup A)

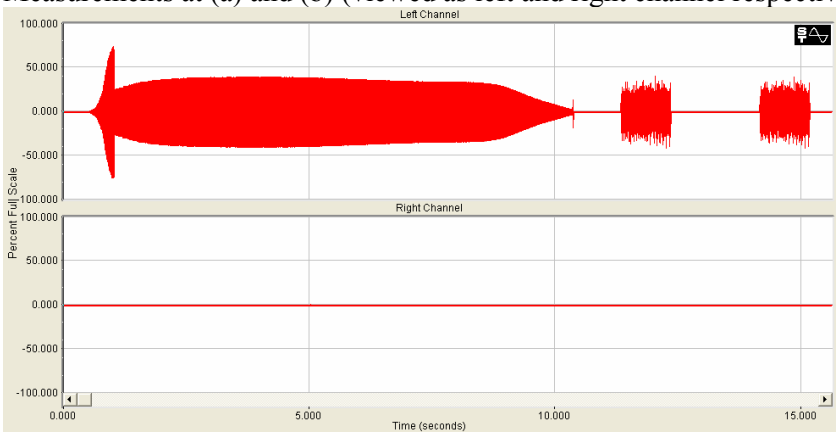
Purpose: Handset acoustic echo measurement.

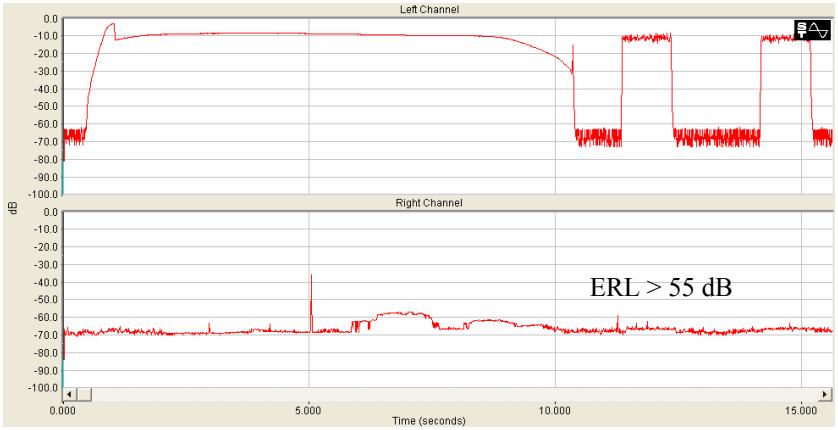
Note that this test also measures internal DTS electrical echo (e.g. non-filtered power supply from the speaker amplifier to microphone power supply).



Test Signal: Vpp chirp = 1500mV

Measurements at (a) and (b) (viewed as left and right channel respectively):

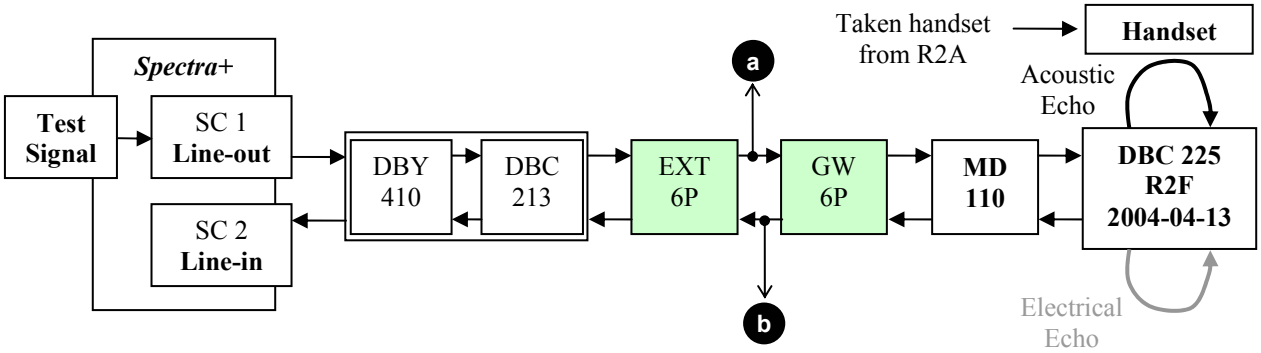




M7 – DBC 225 R2F 2004-04-13 with R2A 2004-04-08 Handset Echo (Setup A)

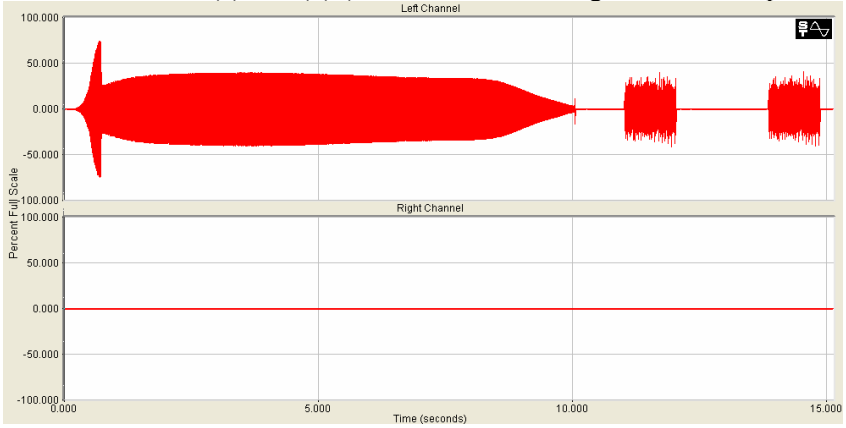
Purpose: Handset acoustic echo measurement. This tests new R2F DTS with old R2A handset.

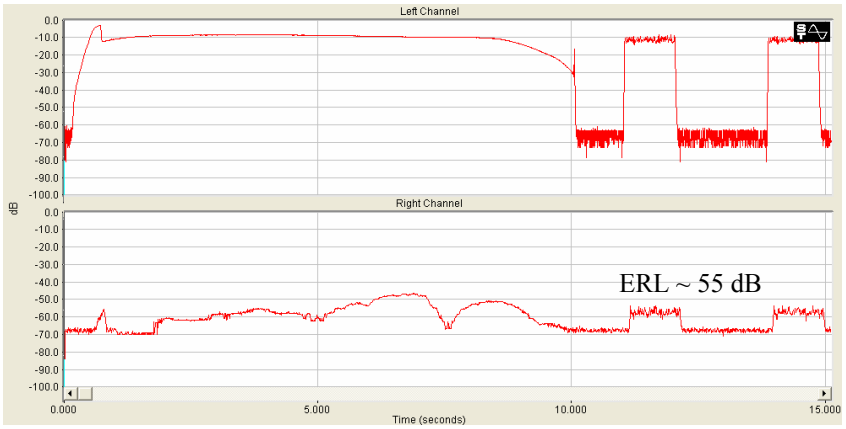
Note that this test also measures internal DTS electrical echo (e.g. non-filtered power supply from the speaker amplifier to microphone power supply).



Test Signal: Vpp chirp = 1500mV

Measurements at (a) and (b) (viewed as left and right channel respectively):

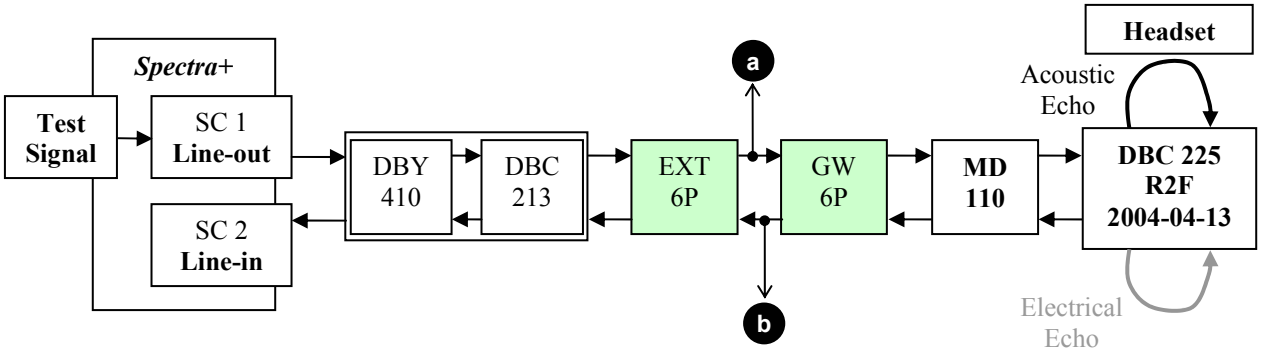




M8 – DBC 225 R2F 2004-04-13 Headset Echo (Setup A)

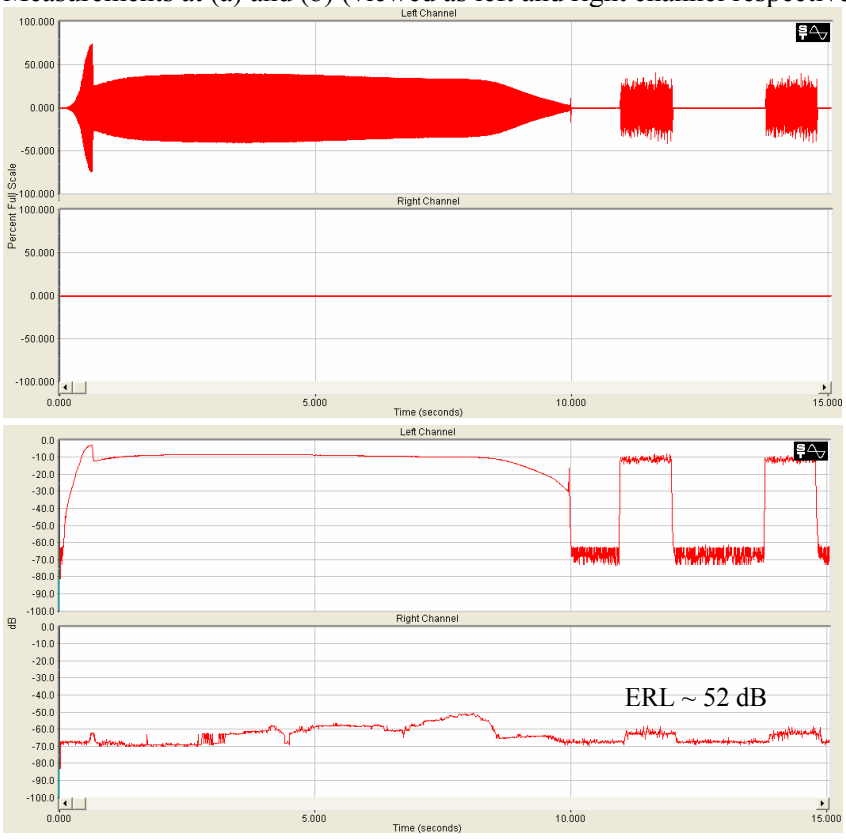
Purpose: Headset acoustic echo measurement.

Note that this test also measures internal DTS electrical echo (e.g. non-filtered power supply from the speaker amplifier to microphone power supply).



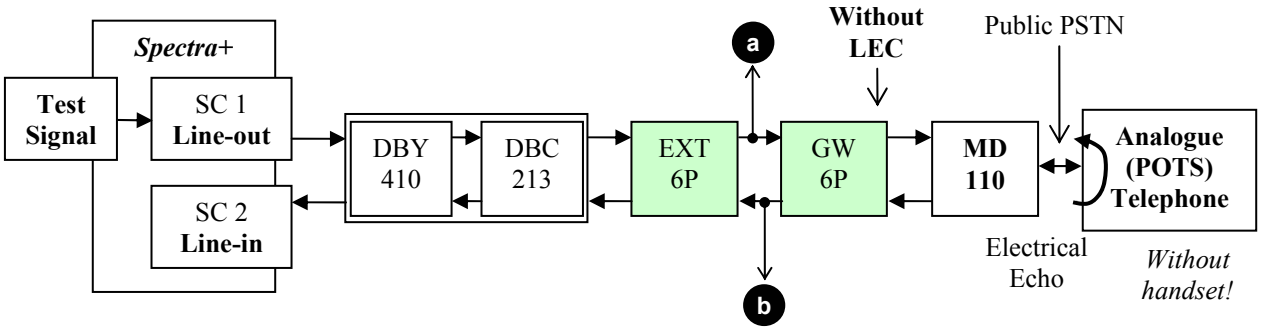
Test Signal: Vpp chirp = 1500mV

Measurements at (a) and (b) (viewed as left and right channel respectively):

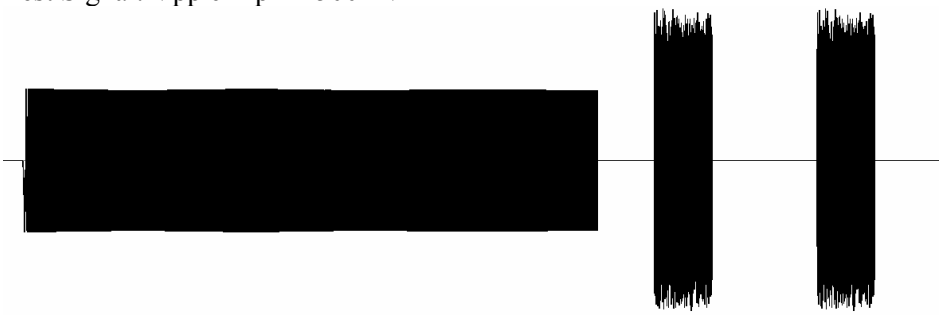


M9 – POTS (Analog) Telephone with LEC disabled (Setup A)

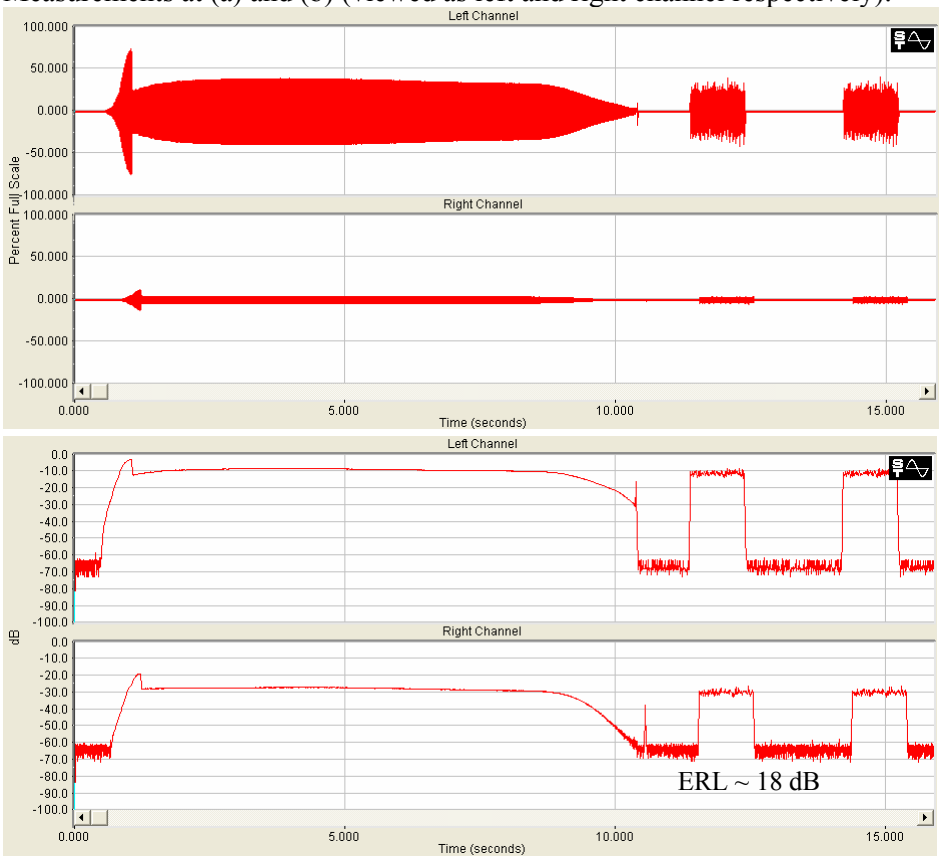
Purpose: Line (electrical) echo measurement at POTS hybrid, without line echo canceller at VoIP gateway.



Test Signal: Vpp chirp = 1500mV

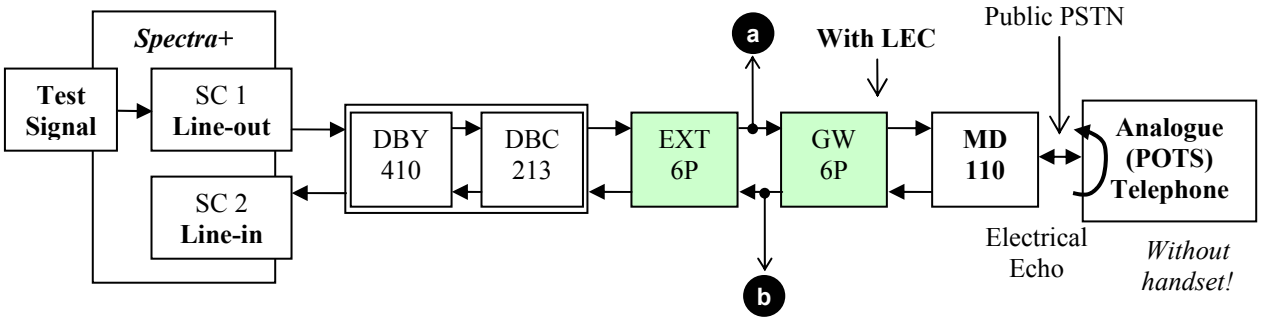


Measurements at (a) and (b) (viewed as left and right channel respectively):

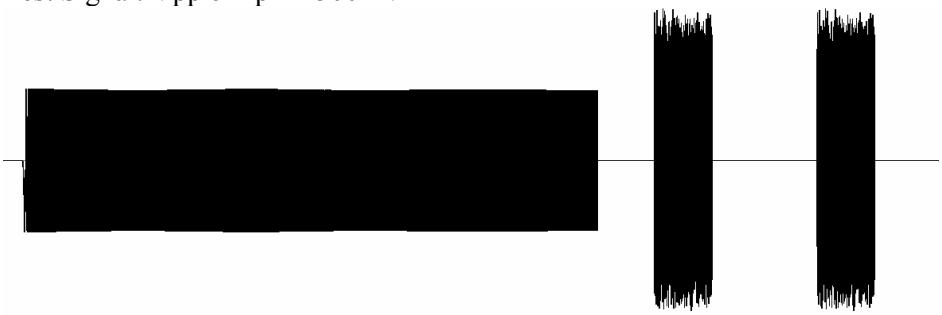


M10 – POTS (Analog) Telephone and LEC Enabled (Setup A)

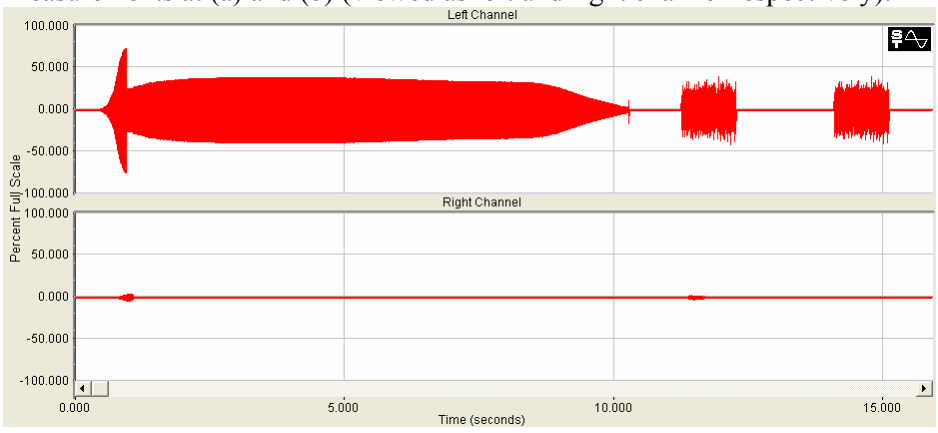
Purpose: Line (electrical) echo measurement at POTS hybrid, with line echo canceller enabled on gateway (for up to 64 ms echo tail).



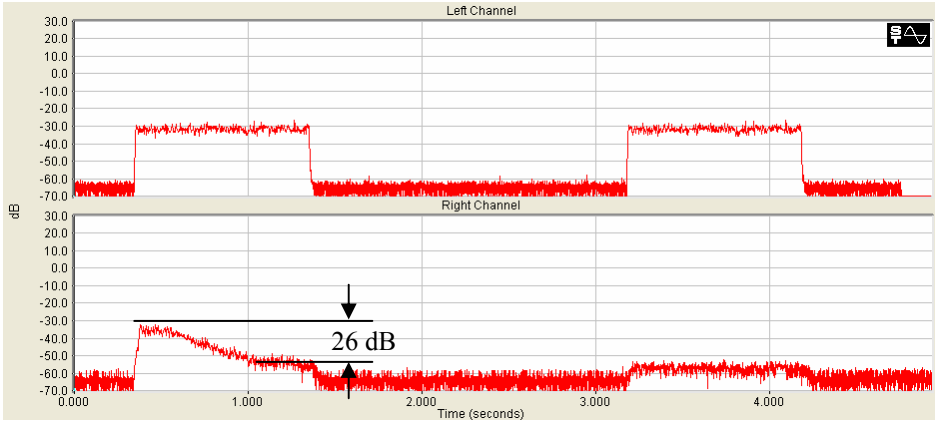
Test Signal: Vpp chirp = 1500mV

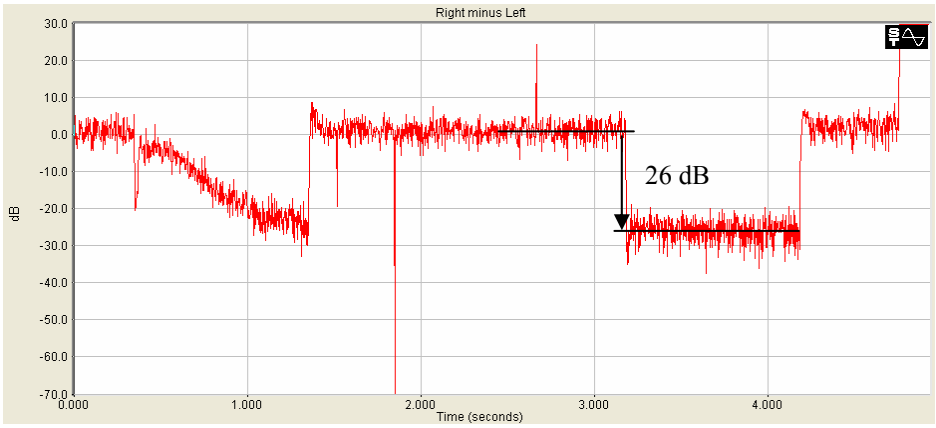


Measurements at (a) and (b) (viewed as left and right channel respectively):



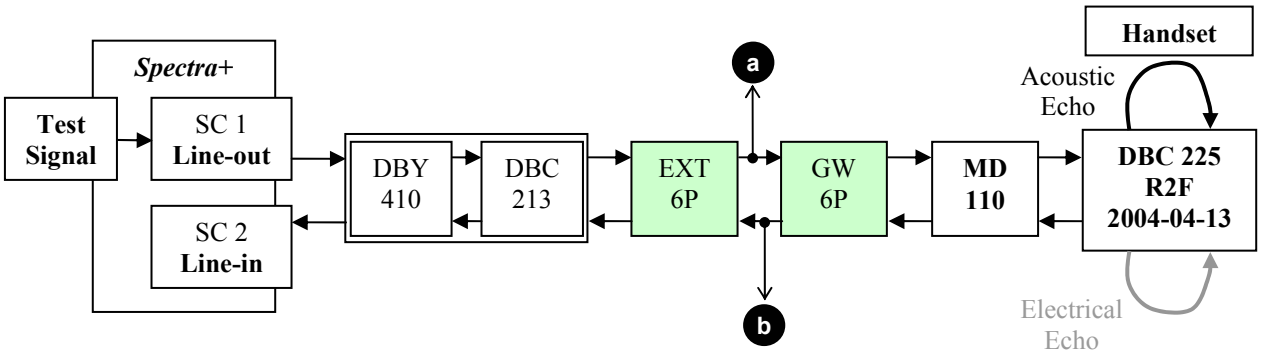
Line echo (M9) vs. suppressed line echo (M10); Left channel = w/ echo, Right channel = w/ LEC:





M11 – DBC 225 R2F akustik 04:1102 Handset Echo (Setup A)

Purpose: Handset acoustic echo measurement.



Test Signal: Vpp chirp = 1500mV