Memo

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No EMV2003 Datalink 01

From Hans-Peter Schaer
Date 2003-12-01

To G. Schwaerzler - 3894, A. Jaeger - 3512
Copy to H. Zudrell - 3560

Subject **Electromagnetic Compatibility Datalink for GPS System 1200:**
Leica Geosystems GFU14 (Satelline 3AS radio modem)
Leica Geosystems GFU17 (Siemens MC45 mobile phone)
Leica Geosystems GFU18 (Sony / Ericsson DM25 TDMA)

1 EMC Measurements with 3 Datalink Modules for GPS System 1200:

1.1 Emission

Standard: EN55022 Class B: 2000

1.1.1 Date, Lab and present Persons:

Date:	2003-11-28
Lab:	montena emc sa at Fribourg (CH)
Present Persons:	
montena emc sa	J. Ding
Leica Geosystems AG	H.-P. Schär / 3563

1.1.2 Test Equipment:

Radiated electromagnetic field 30 - 1000 MHz

Test site:	☐	anechoic chamber (foam)		☐	open test site		
	☒	anechoic chamber (ferrites)		☐	.....		
Distance:	☐	30 m	☒ 10 m	☐	3 m	☐	.....

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision: ± 6 dB (30 - 300 MHz) / ± 5.4 dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured from 30 to 1000 MHz using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding the limits are remeasured manually giving quasi-peak values and average values using a receiver and these measurements are indicated under the graph. The limit must be respected in quasi-peak values (QP).

☒ Spectrum analyser		☐ 88-14	☐ 90-26	☒ 03-45		
☒ Receiver		☐ 85-04	☐ 90-43	☒ 94-35		
☒ Preamplifier		☐ 88-05	☐ 90-01	☒ 90-42	☐ 95-86	
☐ Antenna	(biconical)	☐ 82-02	☐ 87-05	☐ 87-16	☐ 91-05	☐ 94-37
☐ Antenna	(log-per)	☐ 88-20	☐ 90-30	☐ 91-35	☐ 94-64	
☒ Antenna	(bilog)	☒ 94-03	☐			
☐ Antenna	(horn)	☐ 90-24	☐ 90-29	☐ 98-12	☐ 98-13	☐ .....
☐		.....				

1.1.3 Product (EUT):

GPS Sensor GX1230 S/N 450004
Terminal RX1210T S/N 100002
GPS Antenna AT502
Satelline 3AS Datalink Module modem, 433.525 MHz Leica Geosystems Type: GFU14
Siemens MC45 mobile phone, Leica Geosystems Type: GFU17
Sony / Ericsson DM25 TDMA, Leica Geosystems Type: GFU18

1.1.3.1 *Configuration:*

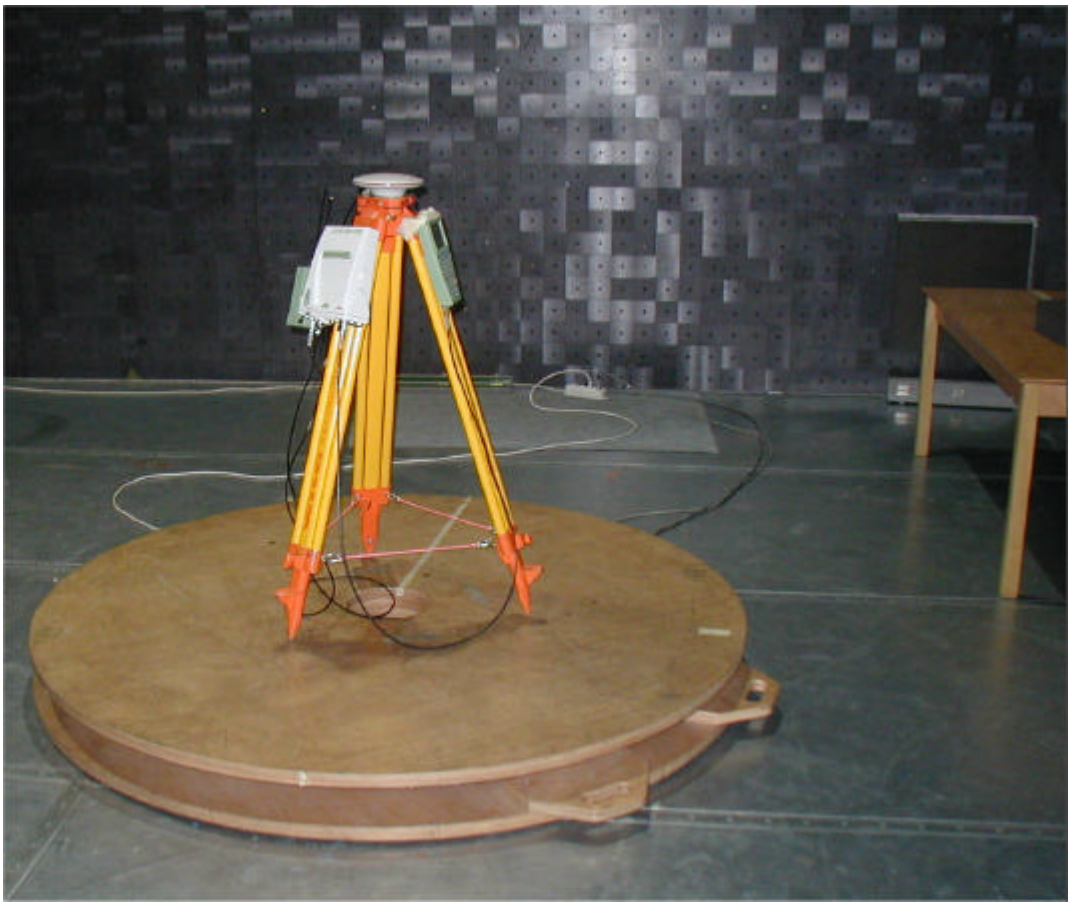
GPS System on Leica Geosystems tripode
Sensor GX1230 with 2 internal Batteries,
External Battery GEB171 with cable to Sensor
GPS Antenna AT502 with HF Cable connected to Sensor
3 different Datalink Modules clipped directly to the Sensor GX1230

1.1.3.2 Function:

Rover Tracking (Sensor tracks GPS Satellites)
each Datalink Module in receiving mode

1.1.4 Test Setup:

System on rotating Table



1.1.5 Modification:

no modifications

1.1.6 Test Results:

Pass

1.1.6.1 Rotated Emission GFU14

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0-360°
Antenna Height :	1-4 m
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004 with internal and external battery with RX1210T S/N 100002 and AT502, GFU 14

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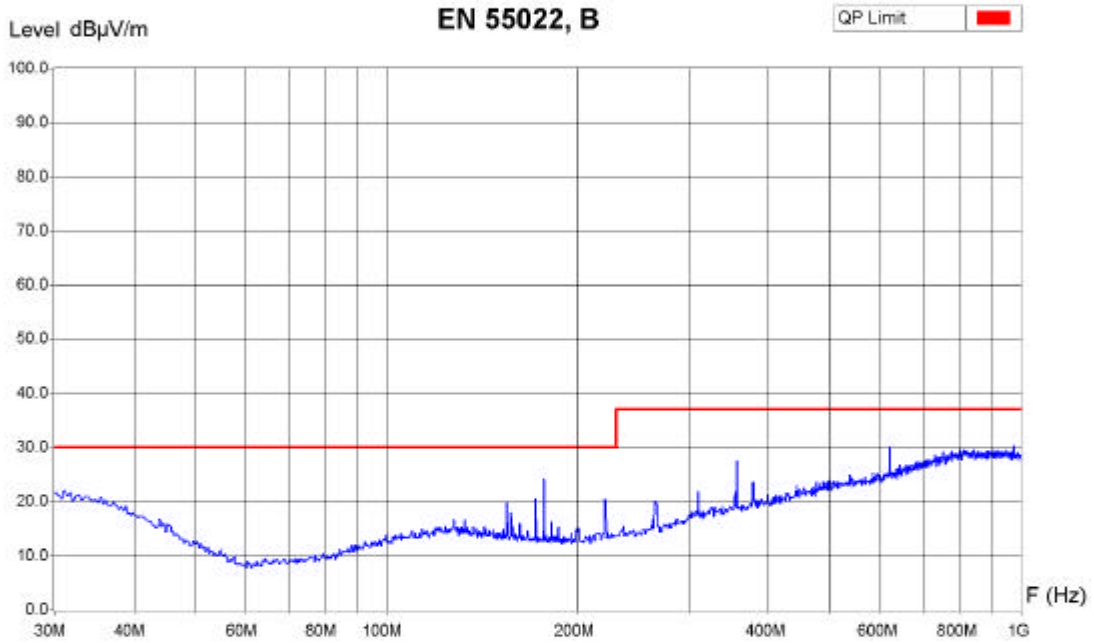

Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Operator: Ding
Date/Time: 28.10.03 17:57
Filename: GX1230_06.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0-360°
Antenna Height :	1-4 m

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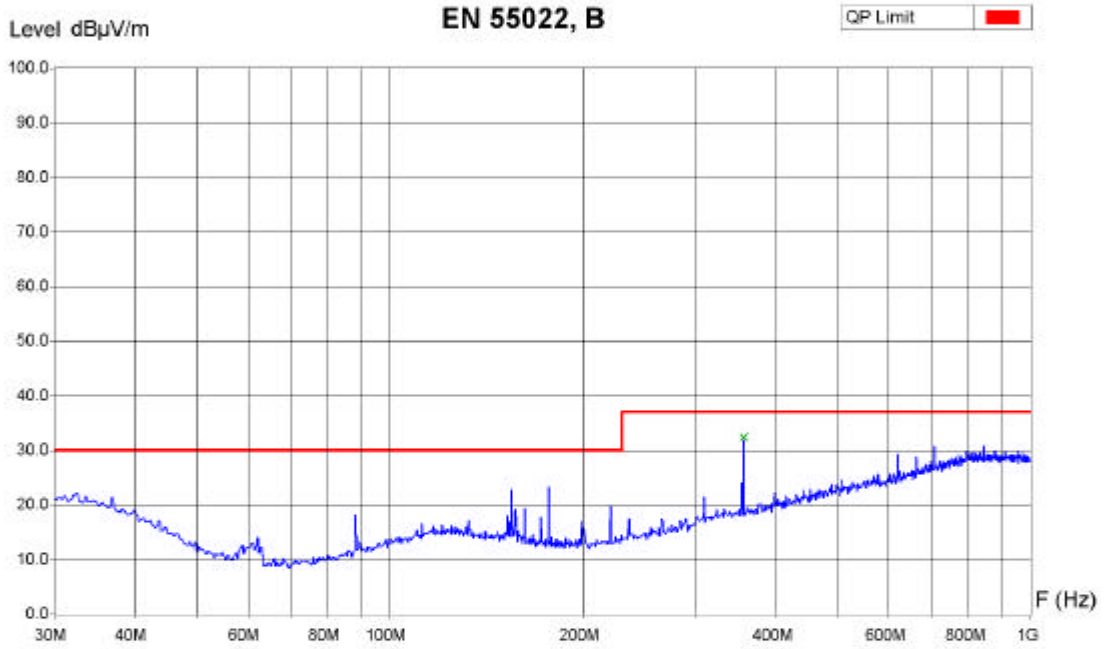
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004 with internal and external battery with RX1210T S/N 100002 and AT502, GFU 14



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
355.97 MHz	32.6 dBµV/m	32.5 dBµV/m	31.9 dBµV/m	4.5 dB

Operator Ding
Date/Time 28.10.03 17:48
Filename
GX1230_05.png/.txt

1.1.6.2 Rotated Emission GFU17

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0-360°
Antenna Height :	1-4 m
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004 with internal and external battery with RX1210T S/N 100002 and AT502, GFU 17

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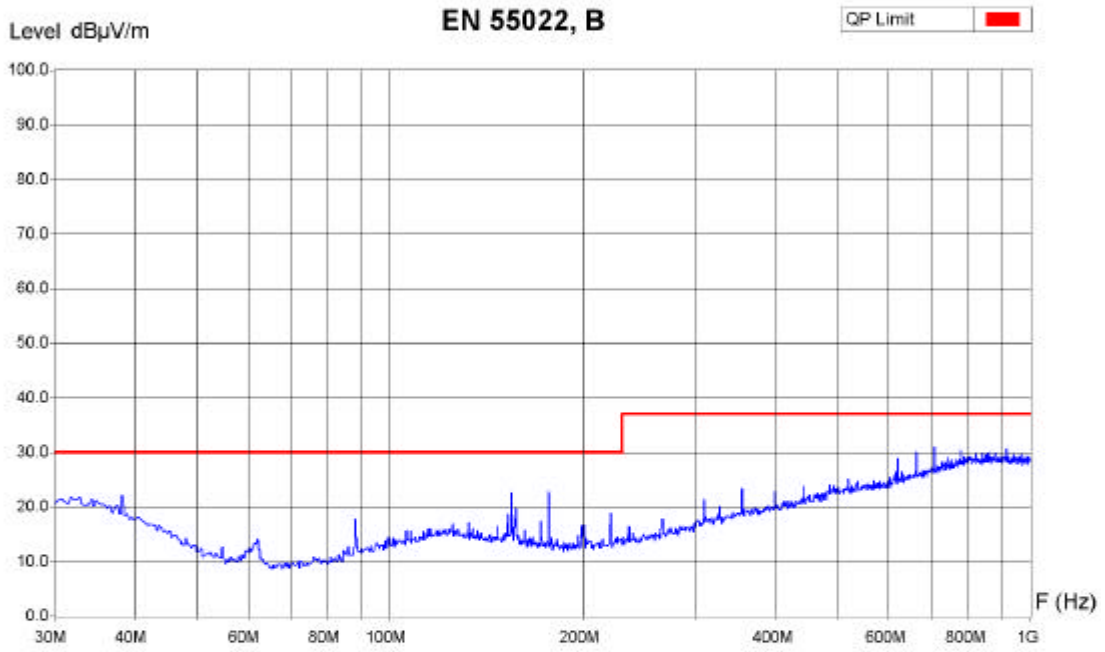

Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Operator Ding
Date/Time 28.10.03 17:39
Filename
GX1230_04.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0-360°
Antenna Height :	1-4 m

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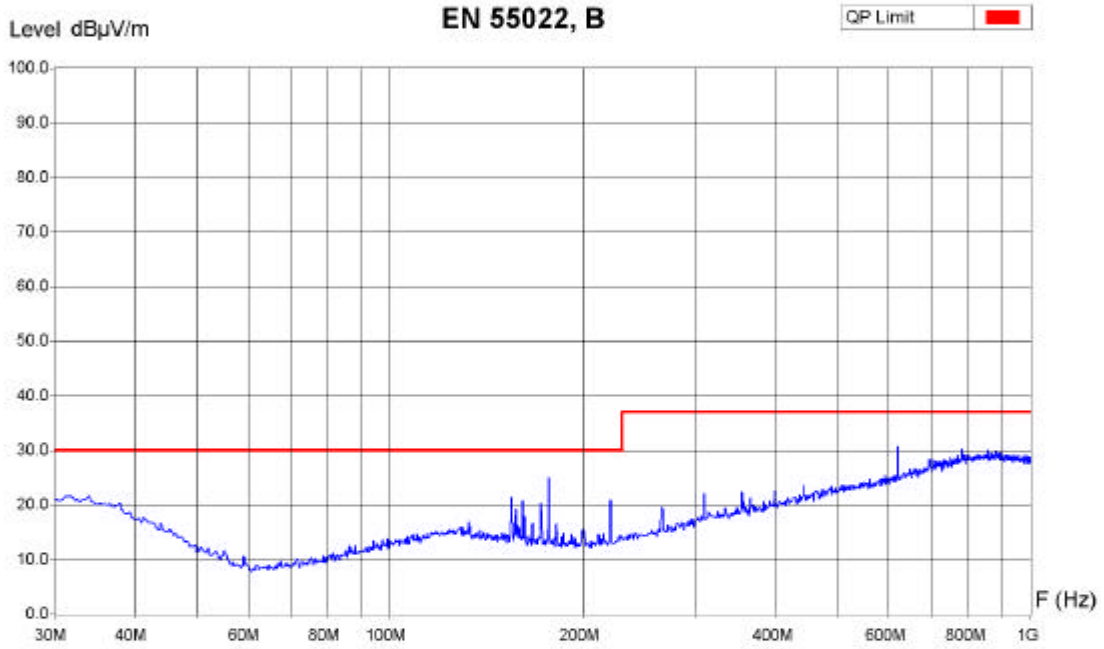
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004 with internal and external battery with RX1210T S/N 100002 and AT502, GFU 17



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Operator: Ding
Date/Time: 28.10.03 17:30
Filename:
GX1230_03.png/.txt

1.1.6.3 Rotated Emission GFU18

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0-360°
Antenna Height :	1-4 m

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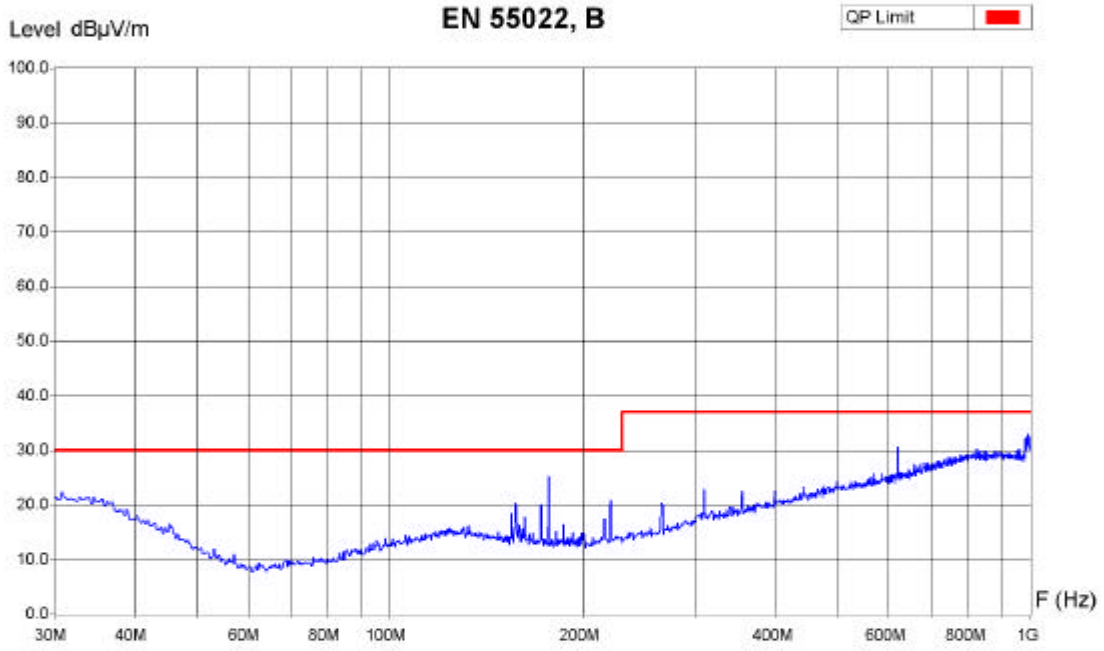
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004
	with internal and external battery
	with RX1210T S/N 100002 and AT502, GFU 18



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Operator: Ding
Date/Time: 28.10.03 17:12
Filename:
GX1230_02.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0-360°
Antenna Height :	1-4 m

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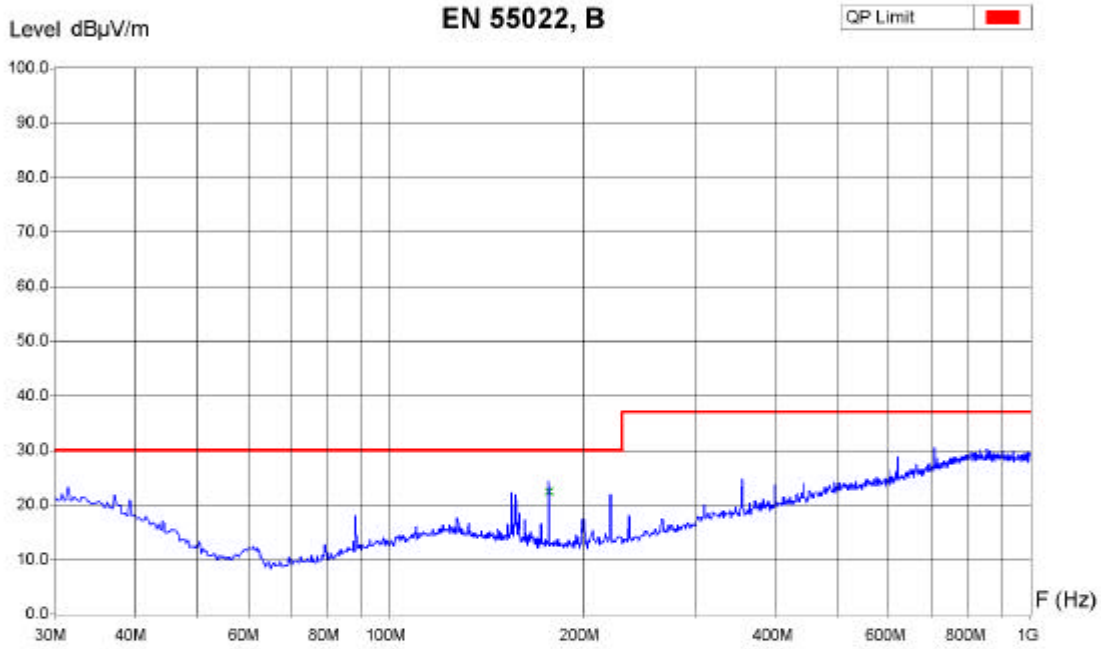
Equipment Under Test :	GX1230
Set-Up :	s. photo, on tripode
Operating Conditions :	Rover traking
Remarks :	S/N 450 004 with internal and external battery with RX1210T S/N 100002 and AT502, GFU 18



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	0 s	0 s

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
176.97 MHz	26.4 dBµV/m	22.4 dBµV/m	16.6 dBµV/m	7.6 dB

Operator Ding
Date/Time 28.10.03 17:00
Filename
GX1230_01.png/.txt

2 Summary:

According to the measurements the Datalink Modules comply with following Standards:

2.1 Emission:

2.1.1 EN55022 Class B: 1998 +A1: 2000: Pass

3 FCC Compliance:

The Test Lab „montena emc“ is FCC listed, so the measurements are also accepted for FCC compliance (FCC Part 15 Class B: 2000).
www.emc.montena.com

The Testlab “montena emc sa” is a national accredited Testlab (Accr. No.: SCS086). The Testlab is accredited by Swiss Accreditation Service.

Released by H.-P. Schär - 3563
2003-12-01