

1 TEST REPORT

1.1 System test configuration

1.1.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it).

The typical customer configuration chosen was:

- CDRom LiteOnLTN-485S
- DVDRom Panasonic SR-8585-B
- 100 Mb Zip Drive HP PN: D9794-60301
- Alps Floppy drive HP PN D2035-60293
- Lan board HP PN: 5064-9746
- Elsa Gloria II video card
- AAA131 Adaptec SCSI card
- Quatum HDD 9.1 Gb HP PN: D6463-60103
- Memory Extension Card HP PN: 50652526

The SCSI port was loaded with a real device (Sure store 2000 Tape) during compliance testing.

The USB port was loaded with a real device (INTEL Camera) during compliance testing.

The audio ports were loaded with headphone, loudspeaker and microphone during compliance testing.

According to FCC Part 15, Subpart A, paragraph 15.33, the upper frequency measurement range has been extended to 5GHz

1.1.2 EUT Exercise software

The EUT exercise program (WINRFI under Windows NT4.0) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The test software has been designed in order to exercise each part of the product involved in a typical use.

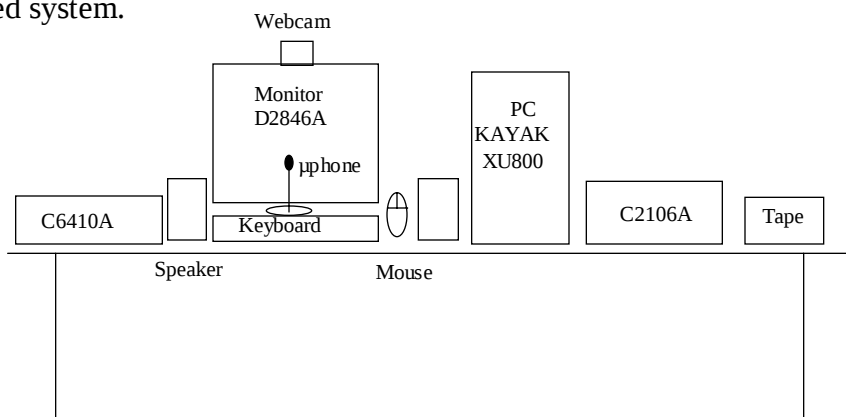
1.1.3 Special accessories

As shown in Figure 3.1, all interfaces cables used for compliance testing are shielded as normally supplied (except Lan Cable which is unshielded). All these cables are normally recommended to be used with the product.

1.1.4 Equipment modifications

No equipment modification has been necessary during testing to achieve compliance to Class B levels. The unit tested was a production unit.

1.1.5 Configuration of tested system.



1.2 Conducted emission data

1.2.1 Test procedure

The product has been tested according to ANSI C63.4-1992, CISPR22-1993/A1:1995/A2:1996 and EN55022:1994/A1:1995/A2:1997.

The product has been tested with 120V / 60Hz power line voltage and compared to the CISPR22 Class B limits. Measurement bandwidth was 9KHz from 150 KHz to 30 MHz.

Measurement was initially made with an HP-8591EM Spectrum Analyzer in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement with the Rohde & Schwarz ESH3 receiver for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

The Peak data are shown on the following plots. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured.

Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

Test equipment :

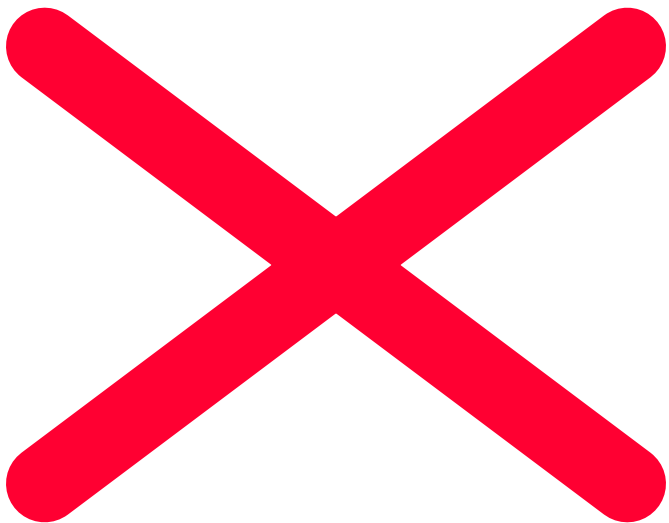
HP 8591EM Spectrum Analyzer

Rhode & Schwarz ESH3 Receiver

EMCO 3810/2SH LISN N°1

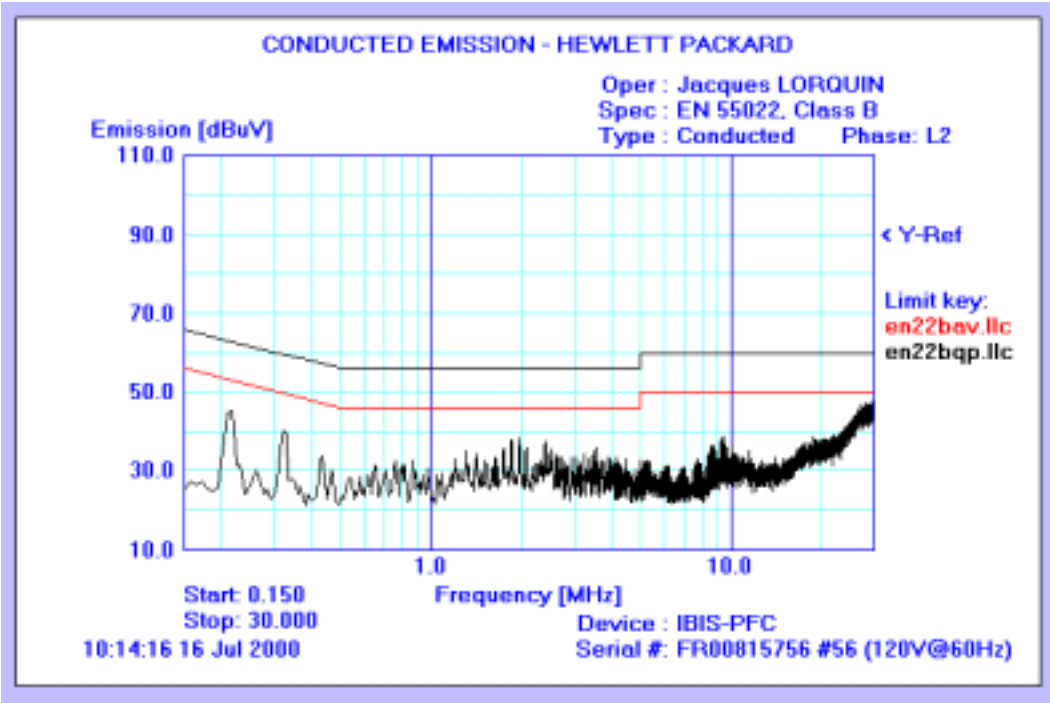
TELEMETER NNB-2/16L LISN N°2

1.2.2 Neutral conducted emission data on KAYAK XU-800



Num.	Freq.	Peak	Q-Peak	QP limit	<i>QP delta</i>	Average	AVG Limit	<i>AVG Delta</i>
	[MHz]	[dBµV]	[dBµV]	[dBµV]	[dBµV]	[dBµV]	[dBµV]	[dBµV]
1	0.210	41.42	40.19	62.00	21.81	39.52	52.00	12.48
2	29.73	49.69	45.52	60.00	14.48	38.58	50.00	11.42

1.2.3 Line conducted emission data on KAYAK XU-800



Num.	Freq. [MHz]	Peak [dBuV]	Q-Peak [dBuV]	QP limit [dBuV]	QP delta [dBuV]	Average [dBuV]	AVG Limit [dBuV]	AVG Delta [dBuV]
1	0.220	46.00	45.06	62.00	16.94	44.72	52.00	7.28
2	0.320	41.18	40.00	58.00	18	39.66	48.00	8.34
3	29.94	47.36	41.65	60.00	18.35	34.95	50.00	15.05

1.3 RADIATED EMISSION DATA

1.3.1 Test Procedure

The product has been tested according to ANSI C63.4-1992, CISPR22-1993/A1:1995/A2:1996 and EN55022:1994/A1:1995/A2:1997.

The product has been tested with 230V / 50Hz power line voltage, at a distance of 10 meters from the antenna (until 1GHz, and 3 metr above) and compared to the CISPR 22 Class B limits. Measurement bandwidth was 120 KHz from 30 MHz to 1 GHz and 1 MHz upon 1 GHz.

Antenna height search was performed from 0.9m to 4m for both horizontal and vertical polarization. Continuous linear turntable azimuth search was performed with 360 degrees range.

Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

Test Equipment: HP-8574A E.M.I Receiver
(HP-8568B Analyzer + HP-85650 Quasi-Peak adapter + HP-85685A RF Preselector).
HP 8546A 9KHz - 6.5GHz EMI receiver
EMCO 3104C Biconical Antenna & EMCO 3146 Log Periodic Antenna
EMCO-1050, 6 meters height antenna mast & EMCO-1060, 3 meters diameter Turntable.
EMCO 3115, 1GHz - 18GHz Horn Antenna

1.3.2 Radiated emission data

Final result 30-1000 MHz**Graph abstract - 30-1000MHz**

Frequency (MHz)	QPeak Lmt (dB μ V/m)	QPeak (dB μ V/m)	QPeak-Lmt (dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)
160.02	30.00	25.1	-4.9	28	V	107	17.5
161.17	30.00	25.4	-4.6	166	H	292	17.5
166.21	30.00	24.8	-5.2	273	H	384	17.9
195.70	30.00	25.9	-4.1	102	H	267	19.7
199.99	30.00	24.1	-5.9	91	H	243	19.9
232.66	37.00	18.0	-19.0	72	V	107	14.4
299.22	37.00	20.4	-16.6	294	H	298	16.7
365.67	37.00	20.8	-16.2	265	V	107	18.3
498.16	37.00	24.3	-12.7	234	H	127	22.0
625.07	37.00	26.6	-10.4	3	V	394	24.0
875.09	37.00	32.8	-4.3	346	V	323	27.7
960.14	37.00	32.7	-4.3	15	V	179	28.9

Final result 1-5 GHz

Frequency (MHz)	Brut value (dB μ V/m)	Antenna Factor (dB μ V)	Cable factor (dB μ V)	Corrected value (CV – dB μ V/m)	Pol. (H/V)	Average limit* (AL – dB μ V/m)	<i>Delta</i> (AL-CV - dB)
1.0640	16.5	25.9	1.0	43.4	V	54.0	10.6
1.3296	24.6	25.4	1.1	51.1	V	54.0	2.9
1.3963	13.7	25.4	1.1	40.2	H	54.0	13.8
1.4958	18.1	26.9	1.2	46.2	V	54.0	7.8
1.5955	16.1	27.2	1.3	44.0	H	54.0	10
1.7265	18.7	28.5	1.3	48.5	V	54.0	5.5
1.7918	17.0	28.6	1.3	46.9	V	54.0	7.1
1.9928	15.8	29.5	1.4	46.7	V	54.0	7.3
2.0923	17.1	29.6	1.4	48.1	H	54.0	5.9
2.6606	19.0	31.0	1.5	51.5	H	54.0	2.5
2.6935	12.5	31.6	1.6	45.7	V	54.0	8.3
3.3225	10.2	32.7	2.4	45.3	V	54.0	8.7
3.9880	11.4	34.4	2.0	47.8	V	54.0	6.2

* Average limit is 500 μ V/m = 54.0 dB μ V/m

1.3.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow :

$$FS = RA + AF + CF - AG$$

Where
 FS = Field Strength
 RA = Receiver Amplitude
 AF = Antenna Factor
 CF = Cable Factor
 AG = Amplifier Gain

Assume a receiver reading of 52.5dB μ V is obtained. The antenna factor of 7.4 and a cable factor of 1.1 is added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}.$$