

DATE: 23 February 2004

I.T.L. (PRODUCT TESTING) LTD.

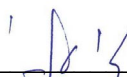
CE EMC Test Report
for
Vcon Ltd.

Equipment under test:

Video Conference System
HD 3000

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1. General Information

1.1 Administrative Information

Manufacturer:	Vcon Ltd.
Manufacturer's Address:	22 Maskit St. Herzelia Israel Tel: +972-9-9590000 Fax: +972-9-9563611
Manufacturer's Representative:	Iris Bener
Equipment Under Test (E.U.T):	Video Conference System
Equipment Model No.:	HD 3000
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	21.01.2004
Start of Test:	21.01.2004
End of Test:	28.01.2004
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	See Section 2

1.2 Abbreviations and Symbols

The following abbreviations and symbols are applicable to this test report:

A/m	ampere per meter
AC	alternating current
AM	amplitude modulation
ARA	Antenna Research Associates
Aux	auxiliary
Avg	average
CDN	coupling-decoupling network
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
db μ V	decibel referred to one microvolt
db μ V/m	decibel referred to one microvolt per meter
DC	direct current
EFT/B	electrical fast transient/burst
EMC	electromagnetic compatibility
ESD	electrostatic discharge
E.U.T.	equipment under test
GHz	gigahertz
HP	Hewlett Packard
Hz	Hertz
kHz	kilohertz
kV	kilovolt
LED	light emitting diode
LISN	line impedance stabilization network
m	meter
mHn	millihenry
MHz	megahertz
msec	millisecond
N/A	not applicable
per	period
QP	quasi-peak
PC	personal computer
RF	radio frequency
RE	radiated emission
sec	second
V	volt
V/m	volt per meter
VRMS	volts root mean square

1.3 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

2. Applicable Documents

- 2.1 **EN 55022: 1998** *Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.*
- 2.2 **EN 55024: 1998**
Amendment A1: 2001 *Information Technology Equipment –Immunity Characteristics – Limits and Methods of Measurement*
- 2.3 **EN 61000-3-2: 2000** *Electromagnetic Compatibility (EMC), Part 3: Limits Section 2-Limits for Harmonic Currents Emissions (equipment input current ≤ 16 A per phase)*
- 2.4 **EN 61000-3-3: 1995**
Amendment A1: 2001 *Electromagnetic Compatibility (EMC), Part 3: Limits Section 3: Limitation of Voltage Fluctuations and Flicker in low-voltage supply systems for equipment with rated current ≤ 16 A*
- 2.5 **IEC 61000-4-2: 1995** *Electromagnetic Compatibility (EMC)- Part 4: Testing and Measurement Techniques-Section 2: Electrostatic discharge immunity tests: - Basic EMC publication.*
- 2.6 **IEC 61000-4-3: 1995** *Electromagnetic Compatibility (EMC),- Part 4: Testing and Measurement Techniques- Section 3: Radiated, radio frequency, electromagnetic field immunity test – Basic EMC Publication.*
- 2.7 **IEC 61000-4-4: 1995** *Electromagnetic compatibility (EMC), - Part 4. Testing and measurement techniques - Section 4: Electrical fast transient /burst immunity test - Basic EMC Publication.*
- 2.8 **IEC 61000-4-5: 1995** *Electromagnetic Compatibility (EMC), - Part 4: Testing and Measurement Techniques - Section 5: Surge immunity test – Basic EMC Standard.*
- 2.9 **IEC 61000-4-6: 1996** *Electromagnetic Compatibility (EMC), - Part 4: Testing and Measurement Techniques- Section - 6:Immunity to conducted disturbances induced by radio-frequency fields.*
- 2.10 **IEC 61000-4-11: 1994** *Electromagnetic Compatibility (EMC) - Part 4: Testing and Measurement Techniques - Section 11: Voltage dips, short interruptions and voltage variations. Immunity tests.*

- 2.11 **CISPR 16-1: 1999** *Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods, Part 1. Radio Disturbance and Immunity Measuring Apparatus.*
- 2.12 **CISPR 16-2: 1999** *Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods, Part 2. Methods of measurement of disturbances and immunity.*

3. Test Site Description

3.1 Location

The Electromagnetic Compatibility Test Facility of I.T.L. (PRODUCT TESTING) LTD. is located at Kfar Bin Nun, Israel 99780

Telephone: + 972-8-9797799, Fax: + 972-8-9797702

3.2 Shielded Room

A Modular Shielded Room, Type S81, manufactured by Rayproof, consisting of a Main Room and a Control Room.

The dimensions of the Main Room are: length: 7.4 m, width: 4.35 m, height: 3.75 m.

The dimensions of the Control Room are: length: 3.12 m, width: 2.5 m, height: 2.5 m.

The shielding performance is:

magnetic field: 60 dB at 10 kHz rising linearly to 100 dB at 100 kHz,

electric field: better than 110 dB between 50 MHz and 1 GHz,

plane wave: 110 dB between 50 MHz and 1 GHz.

All the power lines entering both shielded rooms are filtered.

3.3 Open Test Site

Consists of 3 meter and 10 meter ranges, using a 7x14 meter solid metal ground plane, a remote controlled turntable and an antenna mast. The turntable and the tested equipment that is placed on it are environment protected. All the power, control and signal lines are routed under the ground plane.

3.4 Antenna Mast

Type AAM-4/A, manufactured by Antenna Research Associates (ARA). The antenna position and polarization are remotely controlled via Fibre Optical Link using ARA Dual Controller Type ACU-2/5, and pressurized air.

The antenna position is adjustable between 1-4 meters.

3.5 Turntable

Type ART-1001/4, manufactured by ARA. The position of the turntable is remotely controlled via a Fibre Optic Link, using ARA Dual Controller Type ACU-2/5. The turntable is mounted in a pit and its surface is flush with the Open Site Ground Plane.

3.6 EMI Receiver

Type HP8542E, including HP85420E R.F. filter manufactured by Hewlett-Packard, being in full compliance with CISPR 16 requirements.

3.7 Test Equipment

See details in Section 6.

4. Summary of Test Results

Test	Results
<p>Conducted Emissions EN 55022: 1998 Class A</p>	<p>The E.U.T met the performance requirements of the specification.</p> <p>The margin between the emission levels and the specification limit was, in the worst case, 19.9 dB for the phase line at 10.00 MHz and 19.8 dB for the neutral line at 10.00 MHz.</p>
<p>Conducted Emissions From telecommunication Lines EN 55022: 1998 Class A</p>	<p>The E.U.T met the performance requirements of the specification.</p> <p>The margin between the emission levels and the specification limit is, in the worst case, 1.7 dB at 0.32 MHz for the LAN Port.</p>
<p>Radiated Emissions EN 55022: 1998 Class A</p>	<p>The E.U.T met the performance requirements of the specification.</p> <p>The margin between the emission level and the specification limit was 2.6 dB in the worst case at the frequency of 108.00 MHz, vertical polarization.</p>
<p>Harmonic Emissions EN 61000-3-2: 2000</p>	<p>N/A See Section 11.3</p>

Summary of Test Results (cont'd.)

Test	Results
<p>Voltage Fluctuations EN 61000-3-3: 1995 Amendment A1: 2001</p>	<p>The E.U.T met the performance requirements of the specification.</p>
<p>ESD IEC 61000-4-2: 1995 Air Discharge, 8kV Contact Discharge, 4kV</p>	<p>The E.U.T met the performance requirements of the specification. (See *NOTE on following page).</p>
<p>Radiated Immunity (80-1000 MHz) IEC 61000-4-3: 1995 3 V/m, 80% A.M. by 1kHz</p>	<p>The E.U.T met the performance requirements of the specification.</p>
<p>EFT/B IEC 61000-4-4: 1995 1kV Power leads 0.5kV Signal leads</p>	<p>The E.U.T met the performance requirements of the specification.</p>
<p>Conductive Surges IEC 61000-4-5: 1995 Common mode; 2kV Differential mode; 1kV</p>	<p>The E.U.T met the performance requirements of the specification.</p>
<p>Conducted Disturbances (0.15-80 MHz) IEC 61000-4-6: 1996 3 VRMS, 80% A.M. by 1kHz</p>	<p>The E.U.T met the performance requirements of the specification.</p>

Summary of Test Results (cont'd.)

Test	Results
<p>Voltage Dips and Short Interruptions IEC 61000-4-11: 1994 Voltage reduction: 1) >95%, 2) 30%, 3) >95% Duration: 1) 0.5 period, 2) 25 periods, 3) 250 periods</p>	<p>The E.U.T met the performance requirements of the specification.</p>

*NOTE – Initially the EUT failed to meet the requirements of the specification.

The manufacturer took the following corrective action:

The screws connecting the chassis of the camera module were tightened to enable the chassis pins of the camera module to be in contact with the case.

5. Equipment Under Test (E.U.T.) Description

To be described by the manufacturer.

6. List of Test Equipment

6.1 Immunity Tests

Equipment indicated below by an “X” used in Tests IEC 61000-4:-2,-3,-4,-5,-6,-8,-11.

Test equipment calibration is in accordance with ITL Q.A. Procedure PM 110, "Calibration Control Procedure", which complies with ISO 9002 and ISO/IEC Guide 17025.

Instrument	Manuf.	Model	Serial No.	Used in Test IEC 61000-4:						
				-2	-3	-4	-5	-6	-8	-11
Transient Generator	CDI	EFT/B	439			X				
E-Field Meter	Holiday	HI-4433-HSE	85252							
Signal Generator	Marconi	2022D	119196015		X			X		
Spectrum Analyzer	HP	8591E	3414U01226							
ESD Simulator	CDI	ESD 2000i	426	X						
Receiver	HP	85420E/85422E	3427A00103/ 34							
Power Amplifier	IFI	SMX100	1194-4537		X			X		
Antenna - Biconical	ETS	3109	0002-3244		X					
Antenna Log-Periodic	ARA	LPD-2010/A	1038							
Antenna Log-Periodic	ARA	LPD-2010/A	1037		X					
Oscilloscope	HP	54110D	2616A00470							
Oscilloscope Probe	HP	54003A	N/A							
CDN Network	FCC	FCC-801-M3-25	90					X		
RF Current Probe	FCC	F-120-9	105					X		
Transient Wave- form Monitor	CDI	TWM-100	3233				X			
Phase Control Amplifier	CDI	PCA-1000	3217				X			
Single Phase Isolated Backfilter	CDI	CDI-1kVA	3221				X			
Surge Generator	CDI	CDI-1000i	3153				X			
AC Power Source	Behlman	ACP								X
Power Analysis System	Xitron	2503A	2005							
Current Generator	FCC	F-1000-4-8-125A	9838							
Magnetic Loop	FCC	F-1000-4-8/9/10-L-1M	9836							

6.2 Emission Tests

The equipment indicated below by an “X” was used for testing Conducted Emission (CE), Radiated Emission (RE), and IEC 61000-3-2;3

Test equipment calibration is in accordance with ITL Q.A. Procedure PM 110 "Calibration Control Procedure", which complies with ISO 9002 and ISO/IEC Guide 17025.

Instrument	Manufacturer	Model	Serial No.	Used in Test			
				CE	RE	-2	-3
Dipole Antenna Set	CDI	A100	597				
Signal Generator	Marconi	2022D	119196015				
LISN	Fischer	FCC-LISN-2A	127	X			
LISN	Fischer	FCC-LISN-2A	128	X			
Spectrum Analyzer	HP	8591E	3414U01226				
RF Amplifier	HP	8447F	3113A04961				
Close Field Probe	HP	HP11941A	2807A03046				
Close Field Probe	HP	HP11940A	2650A04587				
Receiver	HP	85420E/85422E	3427A00103/34	X	X		
Antenna - Biconical	ARA	BCD-235/B	1041		X		
Antenna - Log Periodic	ARA	LPD-2010/A	1037				
Antenna - Log Periodic	ARA	LPD-2010/A	1038		X		
Antenna Mast	ARA	AAM-4A			X		
Turntable	ARA	ART-1001/4			X		
Mast & Table Controller	ARA	ACU-2/5	1001		X		
Standard Impedance Network	Xitron	2520	7002			X	X
Power Analysis System	Xitron	2503A	2005			X	X
AC Power Source	Behlman	ACP				X	X
CDN Network	FCC	FCC-801-T4	64	X			
CDN Network	FCC	FCC-801-T2	60	X			
Current probe	FCC	F42		X			

7. E.U.T. Performance Verification

7.1 Mode of Operation

All tests performed while HD3000 was in Loop Back Call using Radvision Call Testing Software. Local and Remote Video were seen on TV. Audio that received from microphone heard on TV Speaker.

HD3000 was connected directly to TV.

Terminations used for VCR connections.

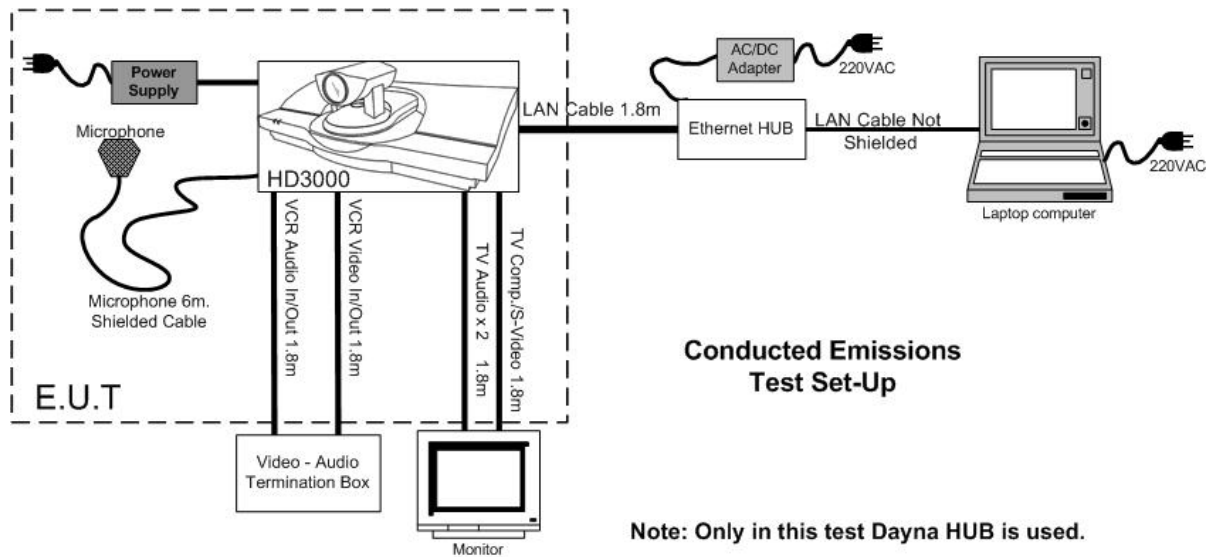


Figure 1. Conducted Emission Test Set-up

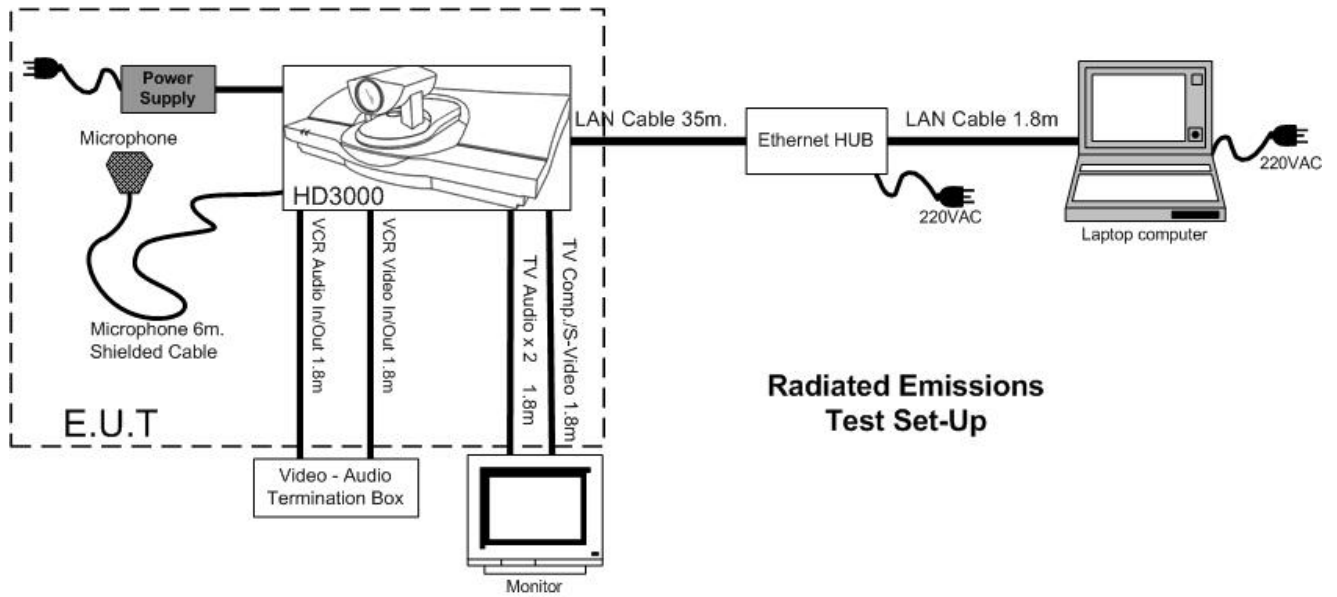


Figure 2. Radiated Emission Test Set-up

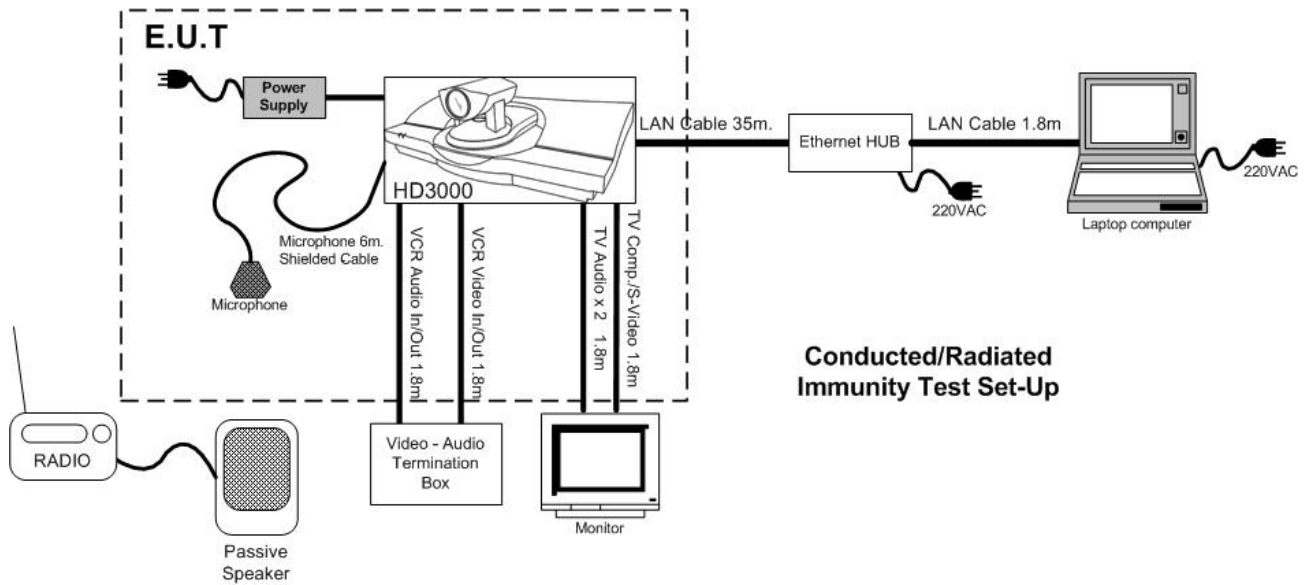


Figure 3. Immunity Tests Set-up

16 Port Ethernet HUB	OEM 802.3 10BaseT Hub	Mfgr S/N: 9802060092
MiniHUB 8 Ports	DAYNA DH0811	S/N G04574
PC LAPTOP	COMPAQ Armada 1750 6300/T/4000/D/01	VCON S/N: 239
Power Supply	LAMBDA DT60PW201	Mfgr S/N: PW6849899
Monitor	Samsung SMP-150	Mfgr S/N:S3MJ200005
HD3000 PAL	VCON PCB PCA00011	S/N 14030009
Remote Control	VCON P/N ACC0007K, Model RC-FIP	S/N E2446462
Microphone	VCON P/N AUD10001, Model PHM6513 II	N/A

7.2 Monitoring of E.U.T.

The screen of the auxiliary laptop was observed. The speaker of the auxiliary laptop was listened to.

7.3 Definition of Failure

1. For radiated immunity and conducted disturbances tests:
 - a. Disappearance of the sound message during the test.
 - b. Corruption of the sound message to a non-understandable level during the test.
 - c. Disappearance of the picture or the stopping of picture movement during the test.
2. For all other immunity tests:
 - a. Disconnection without self-recovery to standby mode.
 - b. Disappearance of the picture or stopping of picture movement without self-recovery to normal operation.
 - c. Disappearance of sound or disturbance of the sound message without self-recovery to normal operation after the cessation of the disturbances.

8. Conducted Emission

8.1 Test Specification

0.15-30 MHz, EN 55022: 1998, CLASS A

8.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 7.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T (table-top) placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 230 V AC / 50 Hz via 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in the photograph, *Figure 31. Conducted Emission Test.*

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying to CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

8.3 Test Results

The E.U.T met the requirements of the EN 55022: 1998, Class A specification.

The margin between the emission levels and the specification limit is, in the worst case, 19.9 dB for the phase line at 10.00 MHz and 19.8 dB at 10.00 MHz for the neutral line.

The details of the highest emissions are given in *Figure 4* to *Figure 9*.

Conducted Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998, Class A
 Lead: Phase
 Detectors: Peak, Average, Quasi-peak

Frequency (MHz)	Peak Amplitude (dB μ V)	Quasi-peak Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.16	54.7	53.2	79.0	Pass	-25.8
0.20	48.9	47.2	79.0	Pass	-31.8
0.24	45.0	43.7	79.0	Pass	-35.3
7.97	54.1	44.2	73.0	Pass	-28.8
10.00	60.6	53.1	73.0	Pass	-19.9
20.00	54.7	49.1	73.0	Pass	-23.9
27.00	41.1	39.9	73.0	Pass	-33.1

Figure 4. Detectors: Peak, QUASI-PEAK


Frequency (MHz)	Peak Amplitude (dB μ V)	Average Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.16	54.7	41.1	66.0	Pass	-24.9
0.20	48.9	34.5	66.0	Pass	-31.5
0.24	45.0	35.9	66.0	Pass	-30.1
7.97	54.1	29.7	60.0	Pass	-30.3
10.00	60.6	24.3	60.0	Pass	-35.7
20.00	54.7	34.2	60.0	Pass	-25.8
27.00	41.1	37.9	60.0	Pass	-22.1

Figure 5. Detectors: Peak, AVERAGE

Conducted Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998, Class A
 Lead: Phase
 Detectors: Peak, Average, Quasi-peak

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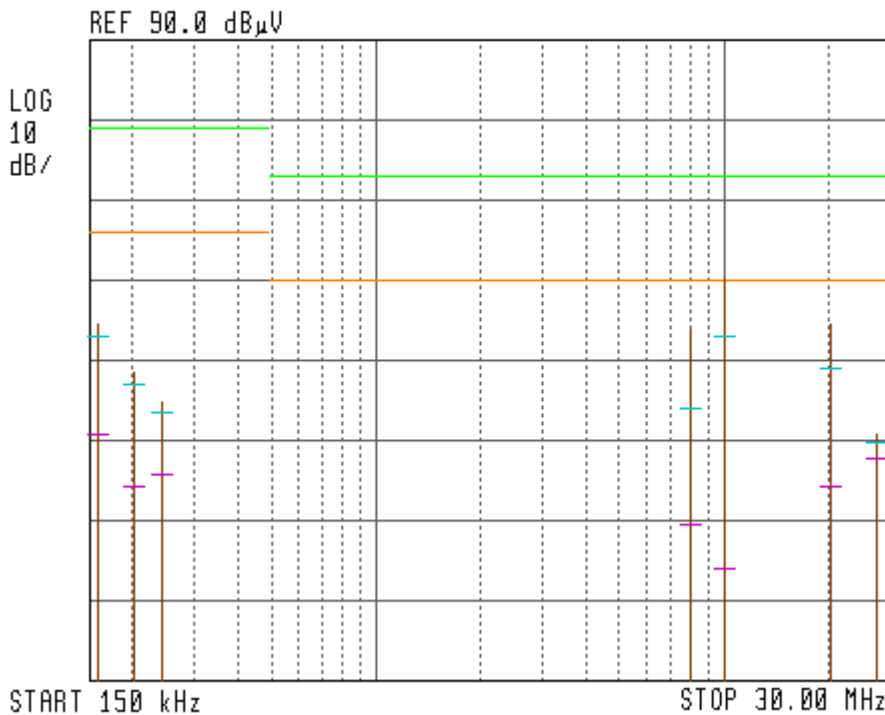


Figure 6. Detectors: Peak, Average, Quasi-peak

Notes:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μV).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.
5. Average detection is designated by the second dash mark (from the top) of each vertical line.

Conducted Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998, Class A
 Lead: Neutral
 Detectors: Peak, Average, Quasi-peak

Frequency (MHz)	Peak Amplitude (dB μ V)	Quasi-peak Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.16	52.9	51.3	79.0	Pass	-27.7
0.24	42.4	40.5	79.0	Pass	-38.5
0.97	40.2	38.0	73.0	Pass	-35.0
7.90	53.2	42.7	73.0	Pass	-30.3
10.00	60.9	53.2	73.0	Pass	-19.8
20.00	55.0	49.6	73.0	Pass	-23.4
27.00	41.0	39.9	73.0	Pass	-33.1

Figure 7. Detectors: Peak, QUASI-PEAK

Frequency (MHz)	Peak Amplitude (dB μ V)	Average Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.16	52.9	39.7	66.0	Pass	-26.3
0.24	42.4	32.3	66.0	Pass	-33.7
0.97	40.2	24.1	60.0	Pass	-35.9
7.90	53.2	36.6	60.0	Pass	-23.4
10.00	60.9	23.7	60.0	Pass	-36.3
20.00	55.0	34.5	60.0	Pass	-25.5
27.00	41.0	38.0	60.0	Pass	-22.0

Figure 8. Detectors: Peak, AVERAGE

9. Conducted Emission From Telecommunication Lines

9.1 Test Specification

0.15-30 MHz, EN 55022: 1998, CLASS A

9.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 7.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T (table-top) placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. Floor-standing E.U.T. was placed on the horizontal ground plane.

The emissions on the telecommunication lines were measured using the method of EN 55022: 1998 Annex C (Current Probe Method).

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in the photograph, *Figure 32. Conducted Emission From Telecommunication Lines Test.*

The signals from the current probe were measured using a computerized receiver, complying to CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

9.3 Test Results

The E.U.T met the requirements of the EN 55022: 1998 Class A specification.

The margin between the emission levels and the specification limit is, in the worst case, 1.7 dB at 0.32 MHz for the LAN Port.

The details of the highest emissions are given in *Figure 10* to *Figure 12*.

Conducted Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998, Class A
 Lead: LAN Port
 Detectors: Peak, Average, Quasi-peak

Frequency (MHz)	Peak Amplitude (dB μ V)	Quasi-peak Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.26	34.7	32.9	48.6	Pass	-15.7
0.32	33.3	32.9	46.6	Pass	-13.7
0.39	31.0	29.3	45.2	Pass	-15.9
0.68	28.3	26.2	46.1	Pass	-19.9
0.81	28.4	26.7	43.0	Pass	-16.3
0.94	27.6	25.6	43.0	Pass	-17.4
27.00	18.7	17.8	44.0	Pass	-26.2

Figure 10. Detectors: Peak, QUASI-PEAK


Frequency (MHz)	Peak Amplitude (dB μ V)	Average Amplitude (dB μ V)	Specification (dB μ V)	Pass/Fail	Margin (dB)
0.26	34.7	29.3	35.5	Pass	-6.2
0.32	33.3	31.9	33.6	Pass	-1.7
0.39	31.0	26.2	32.0	Pass	-5.8
0.68	28.3	22.2	30.0	Pass	-7.8
0.81	28.4	22.1	30.0	Pass	-7.9
0.94	27.6	22.9	30.0	Pass	-7.1
27.00	18.7	15.5	30.0	Pass	-14.5

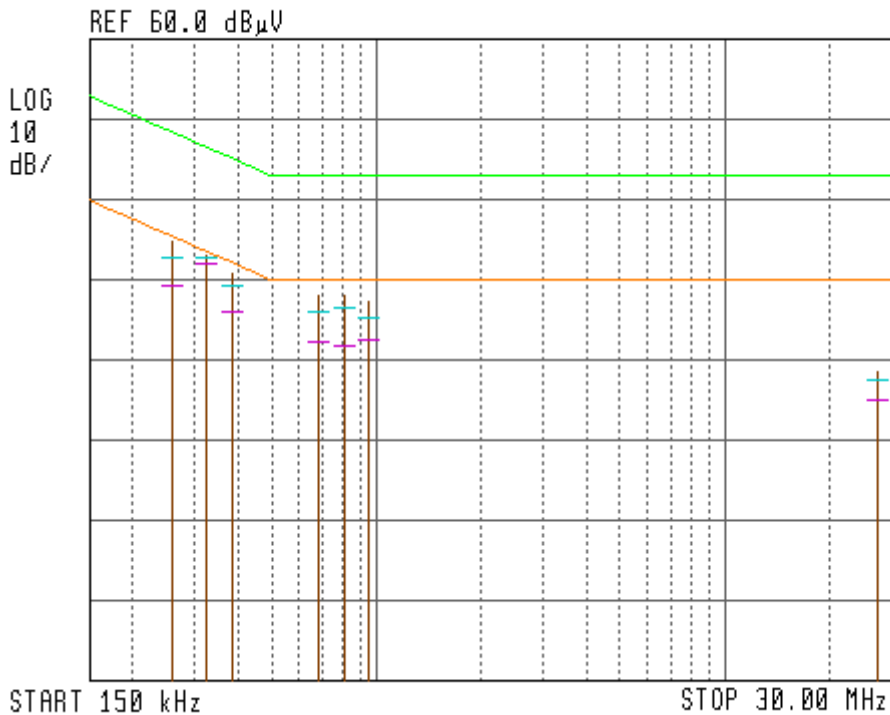
Figure 11. Detectors: Peak, AVERAGE

Conducted Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998, Class A
 Lead: LAN Port
 Detectors: Peak, Average, Quasi-peak

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**Figure 12 Conducted Emission:
 Detectors: Peak, Average, Quasi-peak**

Notes:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μV).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.
5. Average detection is designated by the second dash mark (from the top) of each vertical line.

10. Radiated Emission

10.1 Test Specification

30-1000 MHz, EN 55022: 1998, CLASS A

10.2 Test Procedure

The E.U.T operation mode and test set-up are as described in section 7.1.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. For table-top products, the E.U.T was placed on a non-metallic table, 0.8 meters above the ground. For floor-standing products, the E.U.T. was placed directly on the horizontal ground plane, but was separated from metallic contact with the ground plane by up to 15 cm of insulation. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.. The configuration tested is shown in the photograph *Figure 33. Radiated Emission Test.*

The frequency range 30-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

- Turning the E.U.T on and off.

- Using a frequency span less than 10 MHz.

- Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The emissions were measured at a distance of 3 meters.

10.3 Test Results

The E.U.T met the requirements of the EN 55022: 1998, Class A specification.

The margin between the emission level and the specification limit is 2.6 dB in the worst case at the frequency of 108.00 MHz, vertical polarization.

The details of the highest emissions are given in *Figure 13* to *Figure 20*.

Radiated Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Horizontal
 Antenna: 3 meters distance

Frequency range: 30 MHz to 300 MHz
 Detectors: Peak, Quasi-peak

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
54.00	44.5	40.1	11.1	50.5	-10.4
121.50	45.5	40.6	13.7	50.5	-9.9
135.00	42.2	40.4	14.2	50.5	-10.1
162.00	44.1	42.1	15.3	50.5	-8.4
189.00	47.0	41.4	16.6	50.5	-9.1
216.00	44.4	42.5	18.4	50.5	-8.0
243.00	54.3	52.7	19.9	57.5	-4.8

**Figure 13. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.


Radiated Emission

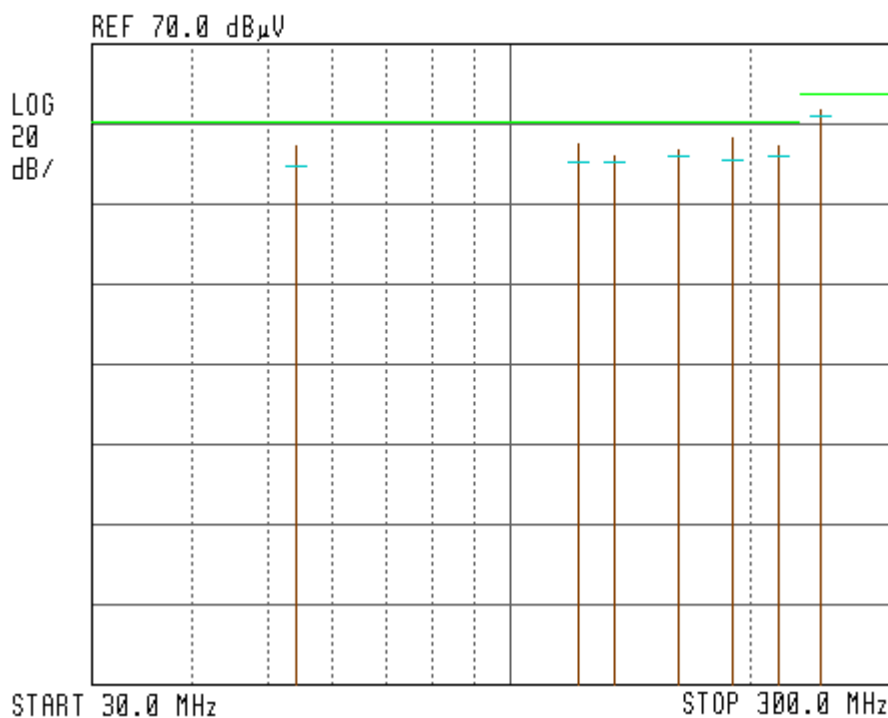
E.U.T Description: Video Conference System
 Type: HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class A

Antenna Polarization: Horizontal
 Antenna: 3 meters distance

Frequency range: 30 MHz to 300 MHz
 Detectors: Peak, Quasi-peak

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**Figure 14. Radiated Emission. Antenna Polarization: HORIZONTAL
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB $\mu V/m$).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Horizontal
 Antenna: 3 meters distance

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
378.00	50.4	49.1	17.7	57.5	-8.4
405.00	49.3	46.9	18.6	57.5	-10.6
432.00	46.7	44.5	18.9	57.5	-13.0
567.00	47.1	45.1	21.4	57.5	-12.4
580.50	52.3	47.9	21.8	57.5	-9.6
594.00	51.2	49.6	22.1	57.5	-7.9
809.99	51.7	49.3	25.7	57.5	-8.2

**Figure 15. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.


Radiated Emission

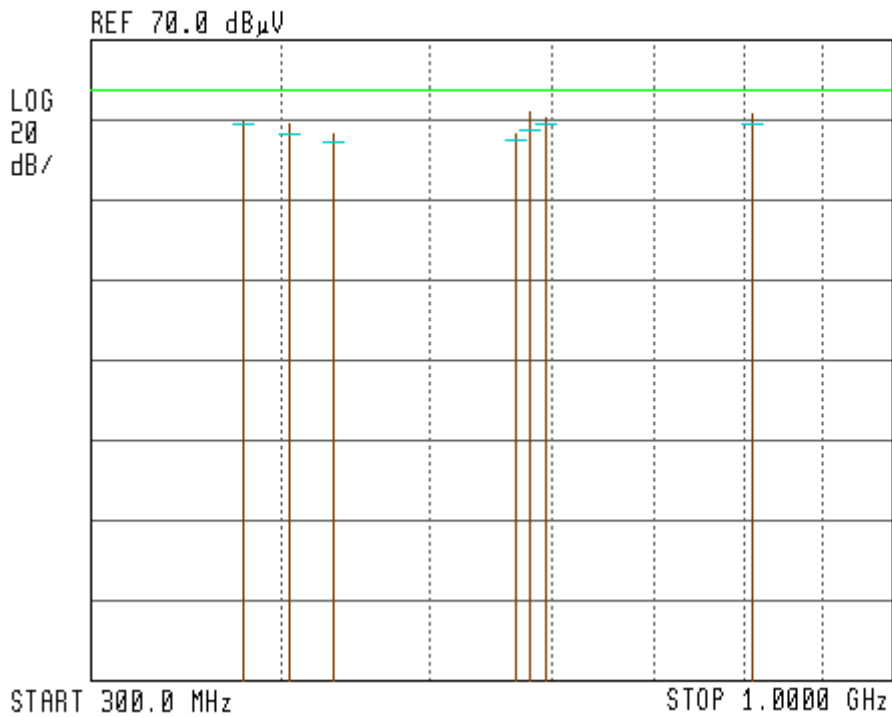
E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class A

Antenna Polarization: Horizontal
 Antenna: 3 meters distance

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak

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**Figure 16. Radiated Emission. Antenna Polarization: HORIZONTAL
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Vertical
 Antenna: 3 meters distance

Frequency range: 30 MHz to 300 MHz
 Detectors: Peak, Quasi-peak

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
108.00	50.2	47.9	12.9	50.5	-2.6
121.50	46.7	42.7	13.7	50.5	-7.8
135.00	48.1	46.6	14.1	50.5	-3.9
162.00	45.6	42.3	15.3	50.5	-8.2
189.00	47.6	45.5	16.6	50.5	-5.0
216.00	46.0	44.5	18.4	50.5	-6.0
243.00	54.3	52.1	19.9	57.5	-5.4

**Figure 17. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Vertical
 Antenna: 3 meters distance

Frequency range: 30 MHz to 300 MHz
 Detectors: Peak, Quasi-peak

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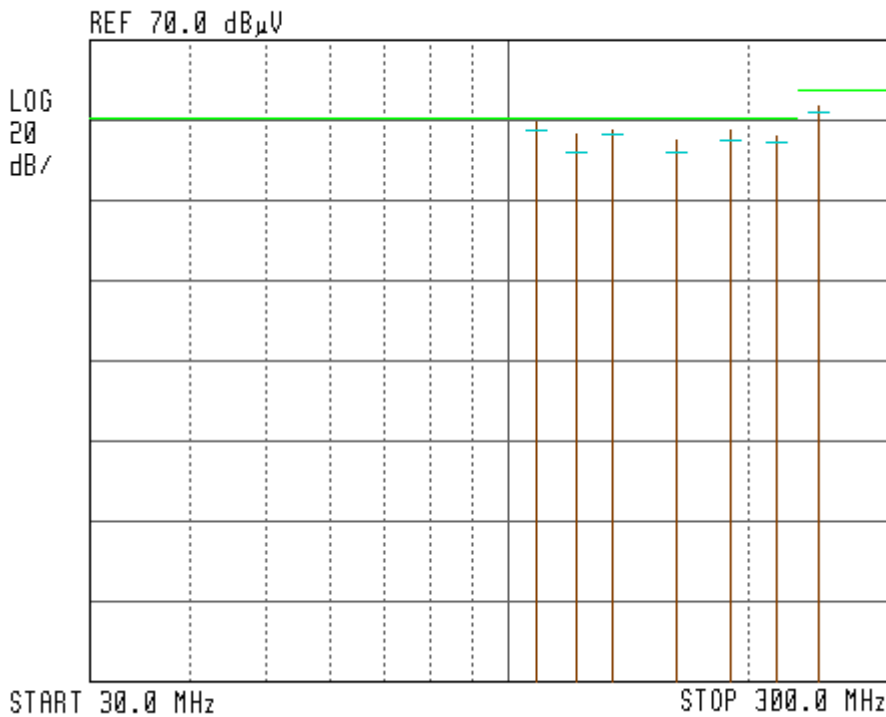


Figure 18. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB $\mu V/m$).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Vertical
 Antenna: 3 meters distance

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
351.00	48.8	47.3	16.7	57.5	-10.2
378.00	47.2	45.7	17.7	57.5	-11.8
540.67	50.0	47.0	20.8	57.5	-10.5
553.50	50.6	48.7	21.1	57.5	-8.8
580.50	50.0	46.5	21.8	57.5	-11.0
594.00	50.9	49.2	22.0	57.4	-8.2
809.99	48.2	46.2	25.6	57.6	-11.4

**Figure 19. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

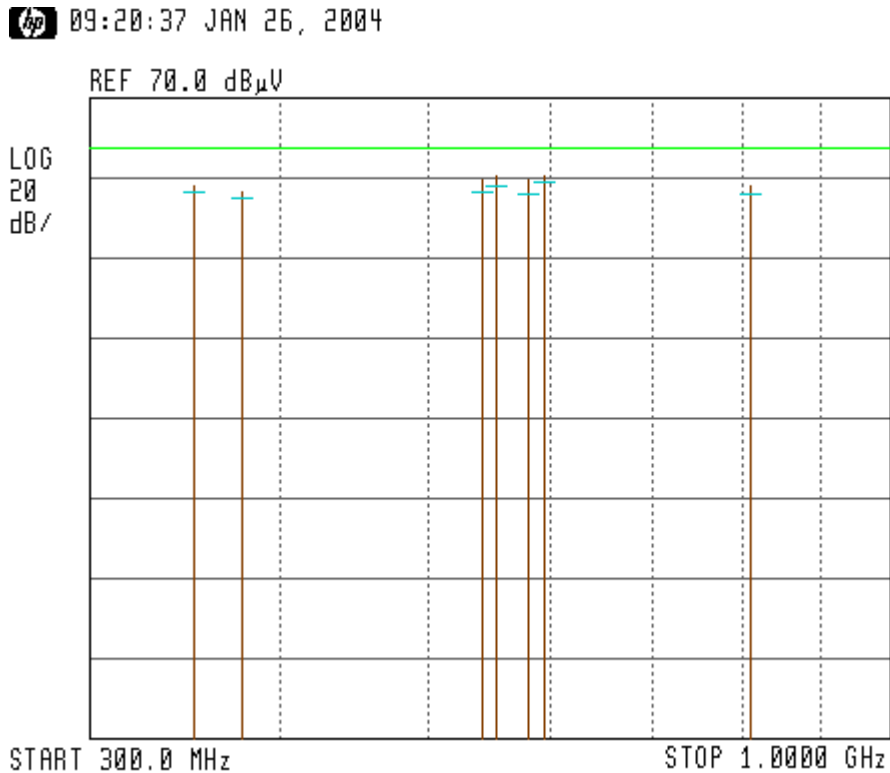
Radiated Emission

E.U.T Description	Video Conference System
Type	HD 3000
Serial Number:	Not designated

Specification: EN 55022: 1998 Class **A**

Antenna Polarization: Vertical
 Antenna: 3 meters distance

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak



**Figure 20. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB μ V/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

11. Harmonics Emissions On Power Lines

11.1 Test Specification

EN 61000-3-2: 2000

11.2 Test Procedure

The test was performed at 230 V AC / 50Hz, with the E.U.T operating as described in Section 7.

The active power input was measured by the power analyzer.

If applicable, the steady state and fluctuating current Harmonics emitted by the E.U.T. were measured. Each Harmonic was compared to the specification limit.

The configuration tested is shown in the photograph, *Figure 34 Harmonics Emissions Test*.

11.3 Tests Results

Steady State Test:

N/A

Fluctuating State Test:

N/A

Note: The active consumption power of the E.U.T. was 27.7 W, therefore based on Section 7.4 of EN 61000-3-2: 2000, no testing of harmonics is required.

12. Voltage Fluctuations on Power Lines

12.1 Test Specification

EN 61000-3-3: 1995 , Amendment A1: 2001

12.2 Test Procedure

The test was performed at 230 VAC/ 50 Hz. The mode of operation was as described in section 7.

The following parameters were measured:

Pst (Short Term Flicker)

Plt (Long Term Flicker)

Dc (Relative Steady State Voltage Change)

Dmax (Maximum Relative Voltage Change)

D(t) (Relative Voltage Change Characteristic)

For Pst measurement, 10 minutes observation was used.

For Plt measurement, 120 minutes observation was used.

The test set-up utilized for this specification is shown in the photograph, *Figure 35 Voltage Fluctuations Test*.

12.3 Test Results

The E.U.T met the requirements of EN 61000-3-3: 1995 and Amendment A1: 2001. Additional details are given in *Figure 21*.

Voltage Fluctuations on Power Lines

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: EN 61000-3-3: 1995

Parameter	Result	Specification
Pst	0.100	<1
Plt	0.103	< 0.65
Dc (%)	+0.00%	<3%
Dmax (%)	0.00%	<4%
D(t) (%)	+0.01%	<3%

Figure 21. Voltage Fluctuations

13. Immunity to Electrostatic Discharge

13.1 Test Specification

IEC 61000-4-2: 1995

13.2 Test Procedure

In the case of tabletop equipment, the E.U.T. was set up on a wooden table 0.8m high on an insulating support 0.5 mm thick above the reference ground plane. In the case of floor-standing equipment, the EUT and cables were set up on an insulating support 0.1m above the reference plane. The test setup is illustrated in the photograph, *Figure 36. Immunity to Electrostatic Discharge Test.*

Photographs in *Figure 22 to Figure 26* show the locations of test points.

12.2.1 Air Discharge

Potentials of 2, 4 and 8 kV were applied near each applicable test point. At places where discharge occurred, the potential was applied twenty times; ten times negative and ten times positive. The E.U.T.'s performance during the test was verified as detailed in Section 7.

12.2.2 Contact Discharge

Potentials of 2 and 4 kV were applied to each applicable test point. In places where discharge occurred, the potential was then applied twenty times; ten negative and ten positive discharges. To 3 test points, out of the total test points, 150 discharges were applied, 50 to each of the 3 test points. The E.U.T.'s performance during the test was verified as detailed in Section 7.

12.2.3 Indirect Discharge (vertical and horizontal coupling plane)

Potentials of 2 and 4 kV were applied to the center of the vertical edge of the coupling plane at a distance of 0.1 meters from the outer casing of the E.U.T. to each applicable test point.

The potential was applied 10 times for each polarity, to each location of the coupling plane. All four faces of the E.U.T. were completely illuminated.

An ESD of the same characteristics as for the vertical coupling plane was applied to the horizontal coupling plane, at each side of the E.U.T., at a distance of 0.1 meter from it's outer casing. To 1 test point, 50 discharges were applied to the center of the front edge of the horizontal coupling plane.

Additional details are shown in Figure 5 of IEC 61000-4-2: 1995.

The E.U.T.'s performance during the test was verified as detailed in Section 7.

13.3 Test Results

The E.U.T met the requirements of specification IEC 61000-4-2: 1995

NOTE – Initially the EUT failed to meet the requirements of the specification.

The manufacturer took the following corrective action:

The screws connecting the chassis of the camera module were tightened to enable the chassis pins of the camera module to be in contact with the case.

Immunity to Electrostatic Discharge

E.U.T Description	Video Conference System
Type	HD 3000
Serial Number:	Not designated

Specification: IEC 61000-4-2: 1995

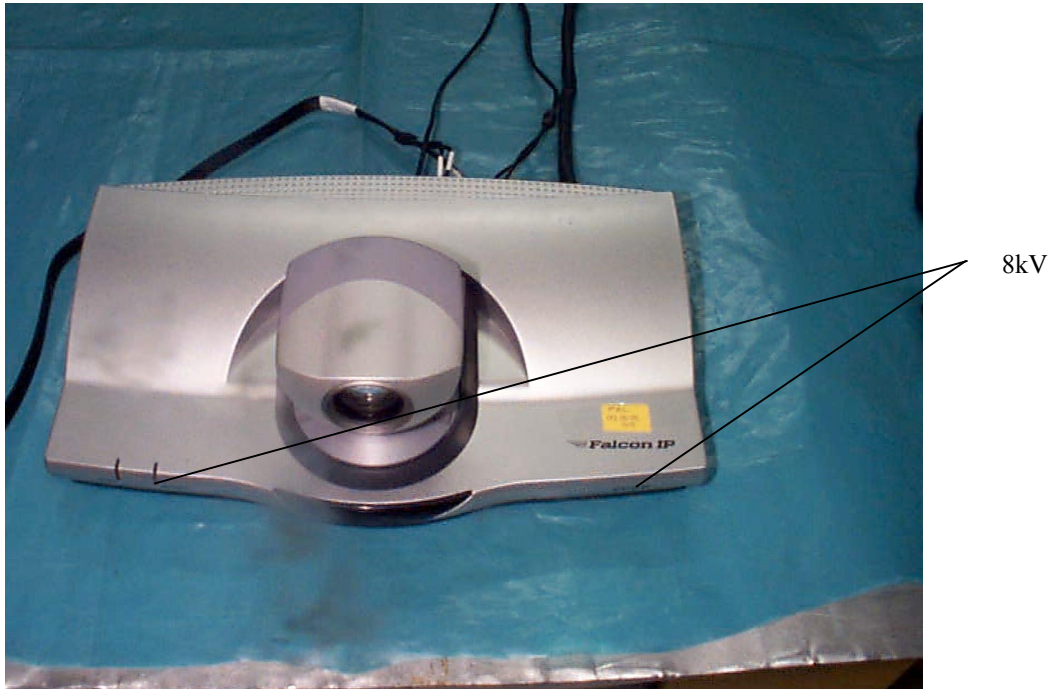


Figure 22. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description Video Conference System
Type HD 3000
Serial Number: Not designated

Specification: IEC 61000-4-2: 1995

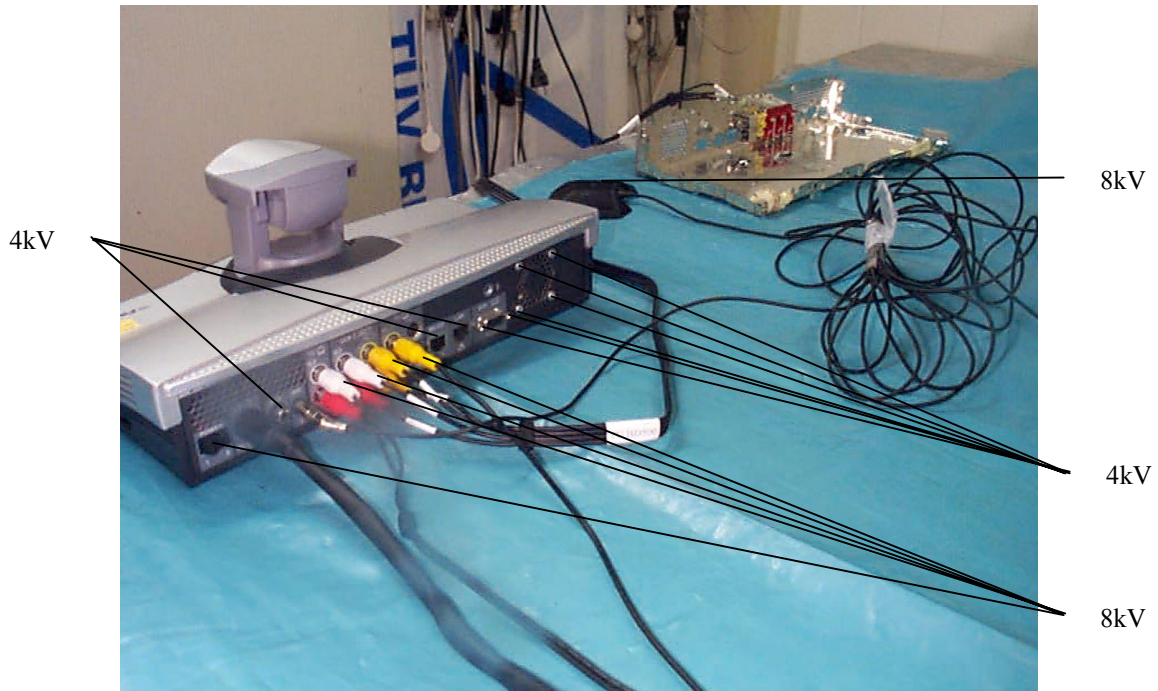


Figure 23. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Video Conference System
Type	HD 3000
Serial Number:	Not designated

Specification: IEC 61000-4-2: 1995

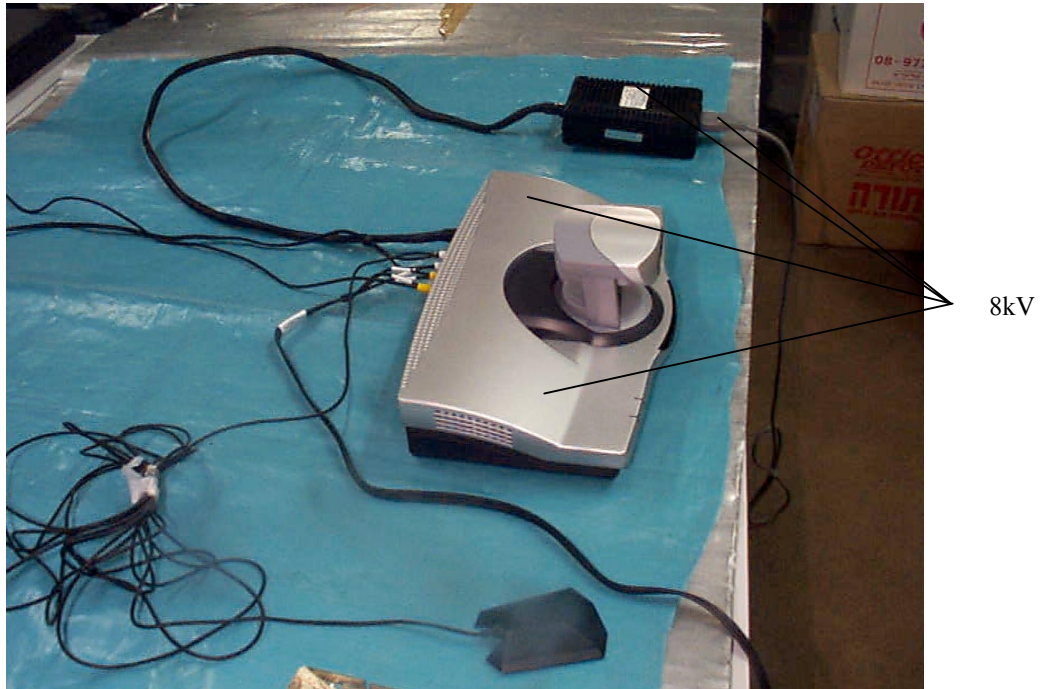


Figure 24. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Video Conference System
Type	HD 3000
Serial Number:	Not designated

Specification: IEC 61000-4-2: 1995



Figure 25. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Video Conference System
Type	HD 3000
Serial Number:	Not designated

Specification: IEC 61000-4-2: 1995



Figure 26. ESD Test Points

14. Immunity to Radiated Field

14.1 Test Specification

IEC 61000-4-3: 1995

14.2 Test Procedure

The E.U.T. was subjected to a field of 3V/m, amplitude modulated 80% by a 1KHz sinusoidal signal.

The Radiated Field was applied in vertical and horizontal polarization using Biconical and Log Periodical antennas in the frequency range of 80-1000 MHz.

The Radiated Field was calibrated and tested for uniformity in accordance with Section 6.2 of IEC 61000-4-3.

The calibration values for the driver signal generator were based on the data given in I.T.L. "Radiated Immunity Calibration Test Report" No. PM-112R-IMM.

The frequency was swept using discrete increments having a value less than 1% of the fundamental frequency.

The performance of the E.U.T. was verified during the test as described in Section 7.

The test setup is illustrated in the photograph, *Figure 37. Immunity to Radiated Field Test.*

14.3 Test Results

The E.U.T. passed the Radiated Immunity Tests as required by specification:
IEC 61000-4-3: 1995

For additional information see *Figure 27.*

Radiated Immunity

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: IEC 61000-4-3: 1995, 80-1000 MHz Amplitude Modulation: 80% AM by 1 kHz					
Frequency (MHz)		Antenna Polarity	Specification (V/m)	PASS / FAIL	Immunity Threshold (V/m)
<u>From</u>	<u>To</u>				
80	250	Horizontal	3.0	Pass	
80	250	Vertical	3.0	Pass	
250	1000	Horizontal	3.0	Pass	
250	1000	Vertical	3.0	Pass	

Figure 27. Immunity to Radiated Field

15. Immunity to Electrical Fast Transient / Burst

15.1 Test Specification

IEC 61000-4-4: 1995

15.2 Test Procedure

In case of table top equipment, the E.U.T. was placed on non-metallic table 0.8m above the ground plane.

In case of floor mounted equipment, the E.U.T. was placed 0.1 m above a reference ground plane.

The EFT/B generator was placed on, and grounded to, this ground plane. See the photograph, *Figure 38. Immunity to Electrical Fast Transient / Burst Test.*

A test signal having the waveform described in *Figure 39. Transient Waveforms* was applied to the phase neutral and ground lines of the E.U.T mains input, at a distance of 1 meter from the E.U.T. The test signal voltage was 1 kV and it was applied for 1 minute to each line, in negative and positive polarities.

The same test signal was applied to the signal lines, control and DC lines (as applicable), that are connected to the E.U.T. The voltage level was 0.5 kV in this case. Applicable signal and control lines should have a length greater than 3m.

15.3 Test Results

The E.U.T. passed the immunity to electrical fast transients / bursts requirements as detailed by specification IEC 61000-4-4: 1995

Additional details are given in *Figure 28.*

Electrical Fast Transient / Burst

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: IEC 61000-4-4: 1995

Positive Polarity

Negative Polarity

TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (kV)	THRESHOLD (kV)
Phase	Pass	No anomaly	1.0	
Neutral	Pass	No anomaly	1.0	
Ground	Pass	No anomaly	1.0	
CAPACITIVE CLAMP				
TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (kV)	THRESHOLD (kV)
Microphone In Port	Pass	No anomaly	0.5	
Microphone Out Port	Pass	No anomaly	0.5	
LAN Port	Pass	No anomaly	0.5	

Figure 28. Immunity to Electrical Fast Transient / Burst

16. Immunity to Conductive Surges

16.1 Test Specification

IEC 61000-4-5: 1995

16.2 Test Procedure

The E.U.T. was subjected to transient signals of the form of double exponential waves with a rise time of 1.2 μ s and a pulse width of 50 μ s (open circuit). The short circuit waveform is an 8 x 20 μ s double exponential. See *Figure 40. Open Circuit Waveform (1.2 x 50 μ s double exponential)*. The surges were applied to the E.U.T. AC power lines in common and differential modes. The differential (between phase and neutral) voltages were 0.5 and 1 kV. The common mode (phase to ground and neutral to ground) voltage were 0.5, 1.0, and 2kV.

The surge generator output impedance was (10 + 2) ohm.

The surges were injected in both positive and negative polarities in to the AC line, at phase angles of 0°, 90°, 180°, 270° and 360°; both peak and zero crossings.

At least five surges were applied at each polarity. The surge repetition rate was kept to not more than one per minute.

DC power lines were tested at 0.5 kV (when applicable).

The performance of the E.U.T. was verified during the test as described in section 7.

The test setup is shown in the photograph, *Figure 41. Immunity to Conductive Surges*.

15.3 Test Results

The E.U.T. passed the immunity to surges requirements as detailed by specification: IEC 61000-4-5: 1995

Additional details are given in *Figure 29*.

Immunity to Conductive Surges

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: IEC 61000-4-5: 1995

TEST POINT	Polarity	0°/360°	90°	180°	270°	Specified Level	Remarks
Phase to Earth	+	P	P	P	P	2 kV	
	-	P	P	P	P	2 kV	
Neutral to Earth	+	P	P	P	P	2 kV	
	-	P	P	P	P	2 kV	
Phase to Neutral	+	P	P	P	P	1 kV	
	-	P	P	P	P	1 kV	

Figure 29. Immunity to Conductive Surges

NOTE: Each test was executed at least five times.

17. Immunity to Conducted Disturbances

17.1 Test Specification

IEC 61000-4-6: 1996

17.2 Test Procedure

The E.U.T. was subjected to conducted disturbances in the frequency range 0.15 - 80 MHz, 3 VRMS, 1KHz, 80% AM modulation.

The disturbance signal was applied to the AC power lines using a Coupling Decoupling Network (CDN) or RF Current Injection Probe for Signal Lines.

The driver signal generator levels used are based on calibration that was performed in accordance with Section 6.4 and Annex A of IEC61000-4-6, I.T.L. Procedures PM-111-CDN/M and PM-111-C.P. 105.

The frequency was swept using discrete increments having a value less than 1% of the fundamental frequency.

The performance of the E.U.T. was verified during the test as described in Section 7.

The test setup is illustrated in the photograph *Figure 42. Conducted Disturbances*.

17.3 Test Results

The E.U.T. passed the Conducted Disturbances immunity tests as required by specification IEC 61000-4-6: 1996

Additional details are given in *Figure 30*.

Immunity to Conducted Disturbances

E.U.T Description Video Conference System
 Type HD 3000
 Serial Number: Not designated

Specification: IEC 61000-4-6: 1996
 Tested at 1 KHz 80% AM Modulation

Using CDN Network

TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (VRMS)	THRESHOLD (kV)
AC Power Port (Phase, Neutral, Ground)	Pass	No anomaly	3	

Signal Lines Using Injection Probe

TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (VRMS)	THRESHOLD (kV)
LAN Port	Pass	No anomaly	3	
Microphone Out Port	Pass	No anomaly	3	
Microphone In Port	Pass	No anomaly	3	

Figure 30. Immunity to Conducted Disturbances

18. Voltage Dips and Short Interruptions

18.1 Test Specification

IEC 61000-4-11: 1994

18.2 Test Procedure

The E.U.T. was operated from 230VAC, 50Hz

The following voltage dips and interruptions were applied:

1. Voltage dip: 0.5 period , reduction of $> 95\%$ of U_t (rated voltage)
2. Voltage dip: 25 periods, reduction of 30% of U_t .
3. Voltage interruptions: 250 periods, reduction of $> 95\%$ of U_t .

Each test was carried out 3 times, using equipment and test methods prescribed in IEC 61000-4-11: 1994

The test setup is shown in the photograph, *Figure 43. Voltage Dips and Short Interruptions.*

18.3 Test Results

The E.U.T. passed the immunity to voltage dips and short interruptions requirements as detailed by specification IEC 61000-4-11: 1994.

19. Set Up Photographs



Figure 31. Conducted Emission Test



Figure 32. Conducted Emission From Telecommunication Lines Test



Figure 33. Radiated Emission Test



Figure 34 Harmonics Emissions Test



Figure 35 Voltage Fluctuations Test



Figure 36. Immunity to Electrostatic Discharge Test

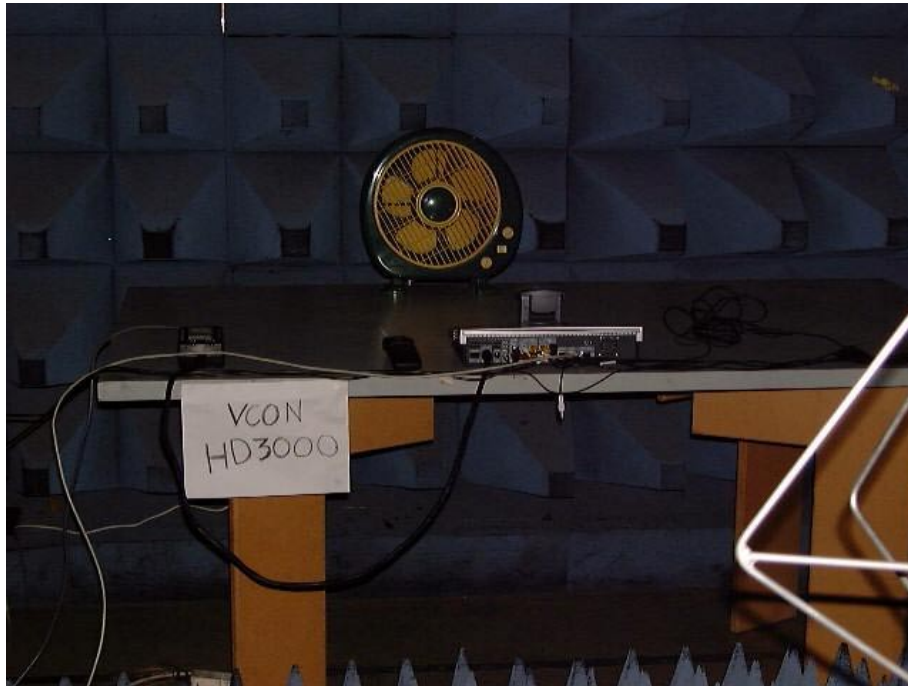


Figure 37. Immunity to Radiated Field Test

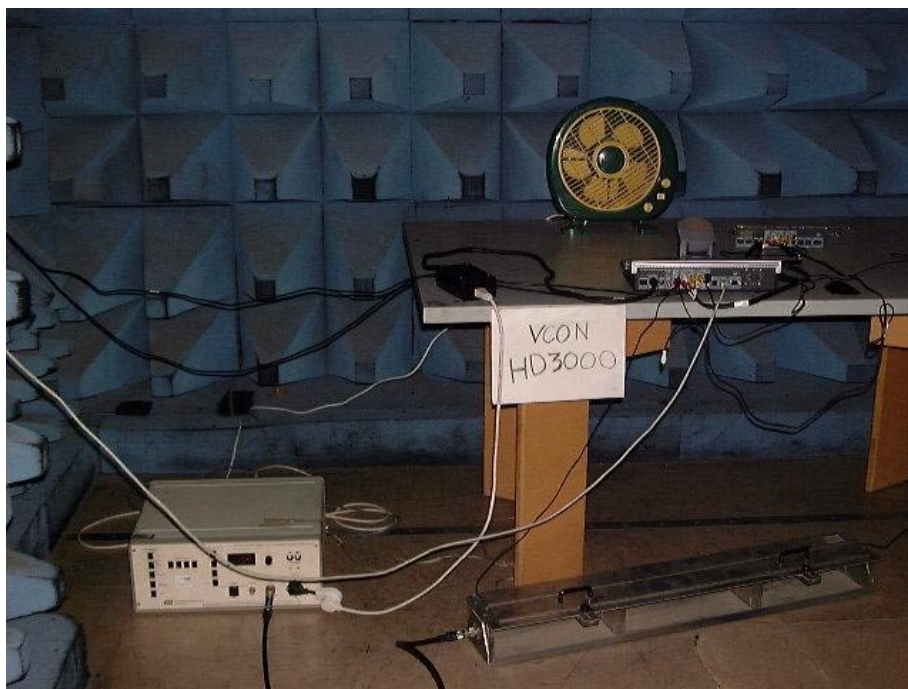


Figure 38. Immunity to Electrical Fast Transient / Burst Test

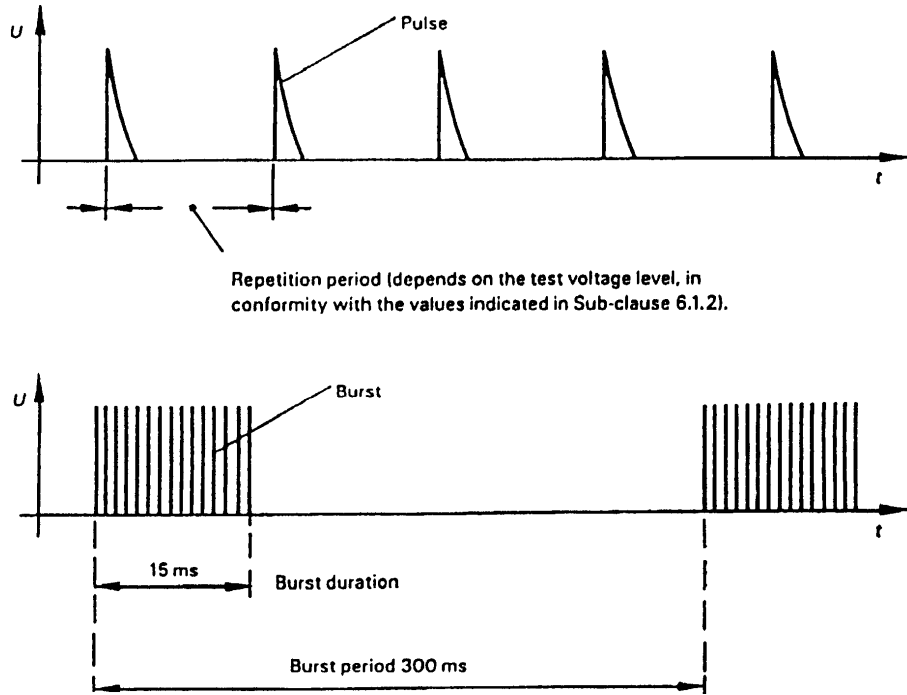
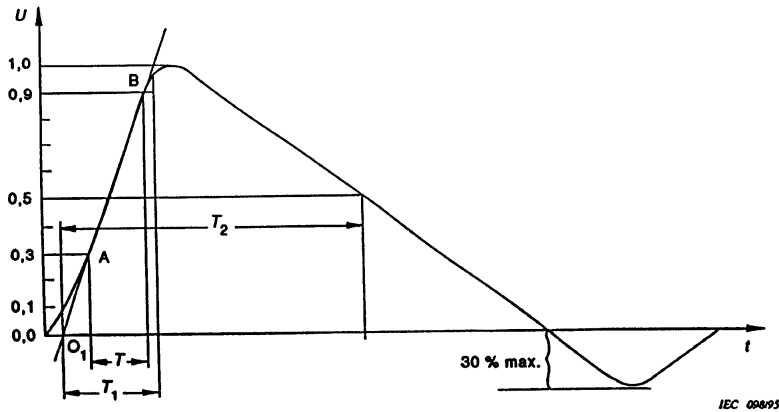


Figure 39. Transient Waveforms



Front time: $T_1 = 1,67 \times T = 1,2 \mu s \pm 30 \%$
 Time to half-value: $T_2 = 50 \mu s \pm 20 \%$.

Figure 2 – Waveform of open-circuit voltage (1,2/50 μs)
 (waveform definition according to IEC 60-1)

Figure 40. Open Circuit Waveform (1.2 x 50 μs double exponential)



Figure 41. Immunity to Conductive Surges



Figure 42. Conducted Disturbances

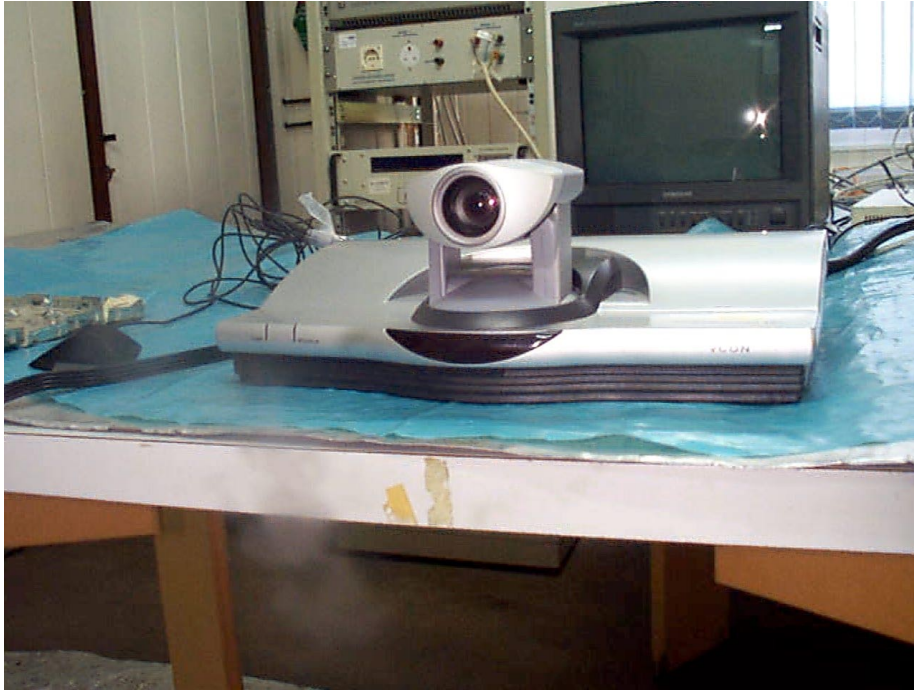




Figure 43. Voltage Dips and Short Interruptions

20. Signatures of the E.U.T's Test Engineers

Test	Test Engineer Name	Signature	Date
Conducted Emissions	Y. Mordukhovitch		07.03.04
Conducted Emissions From Telecommunication Lines	Y. Mordukhovitch		07.03.04
Radiated Emissions	Y. Mordukhovitch		07.03.04
Harmonics Emissions	Y. Mordukhovitch		07.03.04
Voltage Fluctuations	Y. Mordukhovitch		07.03.04
ESD	I. Raz		08.03.04
Radiated Immunity	Y. Mordukhovitch		07.03.04
EFT/B	Y. Mordukhovitch		07.03.04
Conductive Surges	Y. Mordukhovitch		07.03.04

Conducted Disturbances	Y. Mordukhovitch		07.03.04
Voltage Dips and Short Interruptions	Y. Mordukhovitch		07.03.04

21. APPENDIX A - CORRECTION FACTORS

21.1 Correction factors for

CABLE

from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.5	1200.0	7.5
20.0	0.7	1400.0	8.2
30.0	1.0	1600.0	9.0
40.0	1.2	1800.0	9.6
50.0	1.3	2000.0	10.7
60.0	1.5	2300.0	11.1
70.0	1.6	2600.0	11.8
80.0	1.7	2900.0	12.8
90.0	1.8		
100.0	1.9		
150.0	2.4		
200.0	2.7		
250.0	3.0		
300.0	3.3		
350.0	3.7		
400.0	4.0		
450.0	4.3		
500.0	4.7		
600.0	4.9		
700.0	5.4		
800.0	5.8		
900.0	6.3		
1000.0	6.7		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

21.2 Correction factors for

CABLE

**from EMI receiver
to test antenna
at 5.5 meters**

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.1
20.0	0.1
30.0	0.2
40.0	0.2
50.0	0.2
60.0	0.2
70.0	0.3
80.0	0.3
90.0	0.3
100.0	0.3
150.0	0.4
200.0	0.4
250.0	0.4
300.0	0.5
350.0	0.6
400.0	0.6
450.0	0.6
500.0	0.7
600.0	0.8
700.0	0.8
800.0	1.0
900.0	1.1
1000.0	1.1

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	1.4
1400.0	1.5
1600.0	1.5
1800.0	1.7
2000.0	1.7
2300.0	2.0
2600.0	2.1
2900.0	2.2

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 5.5 meters.

21.3 Correction factors for

CABLE

**from EMI receiver
to test antenna
at 10 meter range.**

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.6
20.0	1.1
30.0	1.3
40.0	1.6
50.0	1.7
60.0	1.9
70.0	2.0
80.0	2.2
90.0	2.3
100.0	2.4
150.0	3.1
200.0	3.6
250.0	4.2
300.0	4.5
350.0	4.8
400.0	5.2
450.0	5.5
500.0	6.2
600.0	6.4
700.0	7.0
800.0	7.5
900.0	8.1
1000.0	8.6

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	9.7
1400.0	10.5
1600.0	11.5
1800.0	12.6
2000.0	13.5
2300.0	14.3
2600.0	15.5
2900.0	16.4

NOTES:

1. *The cable type is RG-214.*
2. *The overall length of the cable is 34 meters.*
3. *The above data is located in file 34MI0MO.CBL on the disk marked "Radiated Emissions Tests EMI Receiver".*

21.4 Correction factors for

LOG PERIODIC ANTENNA

Type LPD 2010/A

at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	11.4
400.0	14.5
500.0	15.2
600.0	17.3
700.0	19.0
850.0	20.1
1000.0	22.2

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.2
400.0	14.4
500.0	15.2
600.0	17.2
700.0	19.0
850.0	20.1
1000.0	22.1

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".

**21.5 Correction factors for BICONICAL ANTENNA
Type BCD-235/B,
at 3 meter range**

FREQUENCY (MHz)	AFF (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10MI.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

21.6 Correction factors for BICONICAL ANTENNA

**Type BCD-235/B,
10 meter range**

FREQUENCY (MHz)	AFE (dB/m)
30.0	12.1
40.0	10.6
50.0	10.6
60.0	8.9
70.0	8.5
80.0	9.6
90.0	9.4
100.0	9.6
110.0	10.3
120.0	10.7
130.0	12.6
140.0	12.7
150.0	12.7
160.0	13.8
170.0	13.7
180.0	14.9
190.0	13.4
200.0	13.1
210.0	14.0
220.0	14.5
230.0	15.8
240.0	16.0
250.0	16.6
260.0	16.7
270.0	18.3
280.0	18.5
290.0	19.3
300.0	20.9

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 41BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

**21.7 Correction factors for BICONICAL ANTENNA
Type 3109,
1.0 meter range**

FREQUENCY (MHz)	APE (dB/m)
20.0	11.1
30.0	12.0
40.0	12.0
50.0	11.4
60.0	10.3
70.0	10.7
80.0	8.3
90.0	9.0
100.0	10.0
110.0	11.6
120.0	13.6
130.0	14.2
140.0	13.5
150.0	12.7
160.0	12.7
170.0	13.6
180.0	15.3
190.0	14.6
200.0	14.7
210.0	15.3
220.0	15.8
230.0	17.0
240.0	18.0
250.0	18.1
260.0	18.0
270.0	17.5
280.0	18.2
290.0	19.7
300.0	21.8

NOTES:

- 1. Antenna serial number is 3244.*
- 2. The above list is located in file 44BIC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"*

**21.8 Correction factors for BICONICAL ANTENNA
Type 3109,
3 meter range**

FREQUENCY (MHz)	APE (dB/m)
20.0	18.4
30.0	14.0
40.0	12.3
50.0	10.6
60.0	8.3
70.0	8.7
80.0	7.2
90.0	8.6
100.0	10.1
110.0	11.2
120.0	11.8
130.0	12.3
140.0	12.7
150.0	12.5
160.0	12.4
170.0	12.1
180.0	12.2
190.0	12.8
200.0	13.7
210.0	14.5
220.0	15.4
230.0	15.9
240.0	16.3
250.0	16.7
260.0	17.1
270.0	17.2
280.0	17.5
290.0	18.1
300.0	18.9

NOTES:

- 1. Antenna serial number is 3244.*
- 2. The above list is located in file 44BIC3MI.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"*

22. APPENDIX B - MEASUREMENT UNCERTAINTY

22.1 *Radiated Emission*

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2001. In accordance with Paragraph 5.4.6.1 of this standard this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

22.2 *Conducted Emission*

The uncertainty for this test is ± 2 dB.