SK TECH CO., LTD.

FCC-Certificate of Compliance

Test Report No.:	**SKTFCE-060410-037**		
NVLAP CODE :	**200220-0**		
Applicant:	**Hanyang Digitech Co., Ltd.**		
Applicant Address:	103 Banwol-dong, Hwaseong-si, Kyungki-do, 445-330, Korea		
Manufacturer :	**Hanyang Digitech Co., Ltd.**		
Manufacturer Address:	103 Banwol-dong, Hwaseong-si, Kyungki-do, 445-330, Korea		
Product:	**Multimedia Terminal Adaptor**		
FCC ID:	**T79HYC-G302**	**Model No.:**	**HYC-G302**
Receipt No.:	SKTEU06-0093	**Date of receipt:**	Feb. 16, 2006
Date of Issue:	Apr. 10, 2006		
Testing location:	**SK TECH CO., LTD.** 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Standards:	**ANSI C63.4 / 2003**		
Rule Parts:	**FCC part 15 Subpart B, CISPR 22**		
Equipment Class :	**Class B Digital Device Peripheral**		
Other Aspects :	**This Class B Digital apparatus complies with Canadian IECS-003**		
Test Result:	The above mentioned product has been tested and passed.		

Prepared by: *S.Y.Ye*	**Tested by**:*S.H.Yoon/Engineer*	**Approved by**: *D.H.Kang /Manager& Chief Engineer*
Signature *Date*	*Signature* *Date*	*Signature* *Date*

Other Aspects :	
Abbreviations :	**· OK, Pass = passed · Fail = failed · N/A = not applicable**

☞
- **This test report is not permitted to copy partly without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of one sample of the above mentioned.**
- **This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.**
- **We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.**

NVLAP®

NVLAP Lab. Code: 200220-0

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH Co., Ltd. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is recognized as a Conformity Assessment Body(CAB) for CAB's, Designation Number: **KR0007** by FCC, is accredited by NVLAP for NVLAP Lab. Code : **200220-0** and DATech for DAR-Registration No.:**DAT-P-076/97-0.**

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

- **Conducted Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	835871/002	09.2006
Artificial Mains Network	ESH3-Z5	836679/018	08.2006

- **Radiated Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESIB40	100277	02.2007
Amplifier	8447F	3113A05153	08.2006
Log Periodic Antenna	UHALP9107	1819	11.2006
Biconical Antenna	BBA9106	91031626	11.2006
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A

2.3 Test Date

Date of Application : Feb. 16, 2006

Date of Test : Apr. 05, 2006 ~ Apr. 06, 2006

2.4 Test Environment

See each test item’s description.

3. Description of the tested samples

The EUT is a Multimedia Terminal Adaptor.

3.1 Rating and Physical Characteristics

ITEM	SPEC
Power Adapter	Input : AC 100V~240V, 50Hz/60Hz
	Output : DC+5V/2A
Consumptions	Max 11W
Size	130mm(D)x140mm(W)x30mm(H)
Weight	314g
Temperature	0~40℃
Humidity	10~90%

3.2 Submitted Documents

N/A

4. Measurement Conditions

Operating voltage of the EUT is AC120V, 60Hz.

4.1 Modes of Operation

The EUT is connected to Note PC by LAN interface cable.

The Note PC sends the ping signal via the EUT.

4.2 List of Peripherals

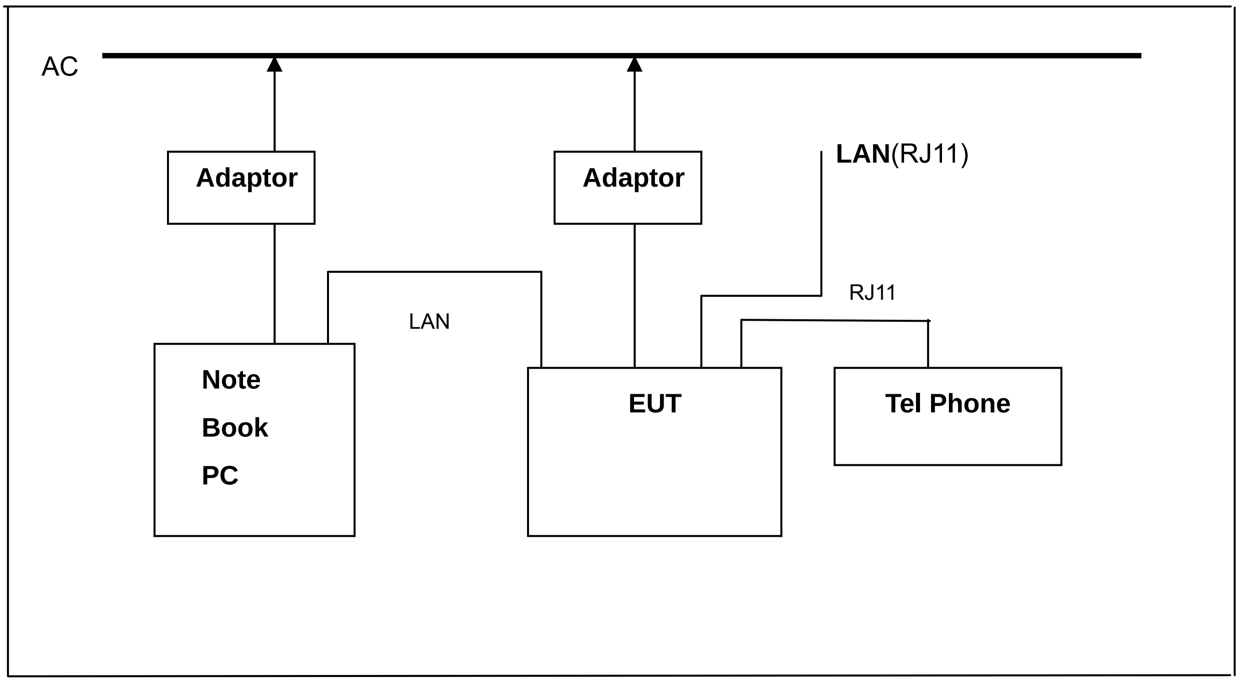
Equipment	Manufacturer	Model Name	Serial No.
Adaptor (For EUT)	DVE	DSA-0101F-05UP	N/A
Note Book PC	LG IBM	2681	FX-P2816
Adaptor (For Note PC)	ASTEC ELECTRONICS	08K8202	11S08K8202Z1Z6LR3 8F053
Tel Phone	LG	GS-460	60106381

4.3 Type of Used Cables

Equipment	Manufacturer	M/N	S/N	Cables &connectors
EUT(Power cable for Adaptor)	Hanyang Digitech Co., Ltd.	HYC-G302	N/A	1.5m unshielded Power cable
EUT (RJ45 cable for Note PC)	Hanyang Digitech Co., Ltd.	HYC-G302	N/A	1.0m unshielded RJ45 cable
Note Book PC (Power cable for Adaptor)	LG IBM	2681	FX-P2816	1.5m shielded Power cable
EUT(Power cable for Adaptor)	Hanyang Digitech Co., Ltd.	HYC-G302	N/A	1.5m shielded Power cable
EUT(RJ11 cable for Telephone)	Hanyang Digitech Co., Ltd.	HYC-G302	N/A	1.8m unshielded RJ11 cable

4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.



[System Block Diagram of Test Configuration]

4.5 Uncertainty

1) Radiated disturbances from 30 MHz to 1000 MHz at a distance of 3m and 10 m

Input quantity	Xi	Probability distribution function
Receiver reading	Vr	Rectangular √3
Attenuation: antenna-receiver	Lc	k=1
Amplifier Error	Ae	k=2
antenna factor	Lac	k=2
Receiver corrections:		
Sine wave voltage	dVsw	Rectangular √3
Pulse amplitude response	dVpa	Rectangular √3
Pulse repetition rete response	dVpr	Rectangular √3
Mismatch: antenna-receiver	dM	k=1
Antenna corrections:		
AF frequency interpolation	dAFf	Rectangular √3
AF height deviations	dAFh	Rectangular √3
Directivity difference	dAdir	3 m: Rectangular √3, 10 m: Rectangular √3
Phase centre location	dAph	3 m: Rectangular √3, 10 m: Rectangular √3
Cross-polarisation	dAcp	Rectangular √3
Balance	dAbal	Rectangular √3
Site corrections:		
Site imperfections	dSA	Rectangular √6
Separation distance	dd	3 m: Rectangular √3, 10 m: Rectangular √3
Table height	dh	3 m: k=2, 10 m: k=2
Expanded Uncertainty		4.60(Vertical)/4.59(Horizontal) k=2 (Level of confidence)

Expanded Uncertainty

U = k * Uc(xi) = 2 * 2.3 = 4.60dB

The coverage factor k =2 yields approximately a 95% level of confidence.

2) Conducted disturbance from 150 KHz to 30 MHz using a 50 Ω/50 uH AMN

Input quantity	Xi	Probability distribution function
Receiver reading	Vr	Rectangular √3
Attenuation: AMN-receiver	Lc	k=1
AMN voltage division factor	Lamn	k=2
Receiver corrections:		
Sine wave voltage	dVsw	Rectangular √3
Pulse amplitude response	dVpa	Rectangular √3
Pulse repetition rate response	dVpr	Rectangular √3
Mismatch: AMN-receiver	dM	U-shape √2
AMN impedance	dZ	Triangular √6
Expanded Uncertainty		3.99 k=2 (Level of confidence)

Expanded uncertainty

U= k * Uc(xi) = 2 * 1.96 = 3.92dB

The coverage factor k =2 yields approximately a 95% level of confidence.

5. EMISSION Test

5.1 Conducted Emissions

Result: PASS

The line-conducted facility is located inside a 2.6M x 3.6M x 7.0M shielded enclosure.
The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05.
A 1 m x 1.5 m wooden table 80 cm high is placed 40 cm. away from the vertical wall and 1.5 m away from the side wall of the shielded room. ROHDE & SCHWARZ Model ESH3-Z5 (10 kHz-30 MHz) 50 ohm/50 uH Line-Impedance Stabilization Networks(LISNs) are bonded to the shielded room.
The EUT is powered from the ROHDE & SCHWARZ LISN and the support equipment is powered from the ROHDE & SCHWARZ LISN. Power to the LISNs are filtered by a high-current high-insertion loss Lindgren enclosures power line filters (100dB 14 kHz-10 GHz).
The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.
All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".
If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the ROHDE & SCHWARZ LISN.
All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150 kHz to 30 MHz with 100msec. sweep time.
The frequency producing the maximum level was reexamined using EMI/field Intensity Meter (ESHS 10) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode.
The bandwidth of the receiver was set to 10 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by: switching power lines; varying the mode of operation or resolution;clock or data exchange speed; if applicable; whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of conducted test.
Each EME reported was calibrated using self-calibrating mode.

Table 2: Test Data, Conducted Disturbance

<Quasi-Peak>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.160	50.42	N	0.12	0.01	50.55	65.46	14.91
0.165	51.33	L	0.13	0.01	51.47	61.92	10.45
0.245	39.73	L	0.13	0.02	39.88	61.59	21.71
0.255	39.29	L	0.13	0.02	39.44	61.59	22.15
3.170	32.71	L	0.18	0.11	33.00	56.00	23.00
3.205	32.81	N	0.15	0.11	33.07	56.00	22.93

<Average>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.160	33.70	N	0.12	0.01	33.83	55.46	21.63
0.165	35.95	L	0.13	0.01	36.09	55.21	19.12
3.040	21.82	L	0.18	0.11	22.11	46.00	23.89
3.105	21.29	L	0.18	0.11	21.58	46.00	24.42
3.205	20.03	N	0.15	0.11	20.29	46.00	25.71
3.235	20.16	L	0.18	0.11	20.45	46.00	25.55

▶ NOTE

*** C/F = Correction Factor**

*** C/L = Cable Loss**

*** LINE : L = Line-PE, N = Neutral-PE**

*** Margin Calculation**
Margin(Q.P) = Limit - Actual
[Actual(Q.P)= Reading(Q.P) + C/F + C/L]

Figure 1: Spectral Diagram, LINE – PE

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CONDUCTED DISTURBANCE

EUT:	HYC-G302
Manuf:	
Op Cond:	
Operator:	
Test Spec:	
Comment:	LINE-PE
Result File:	G302L.dat : New Measurement
Scan Settings	(1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	1sec
Peaks:	8
Acc Margin:	35 dB

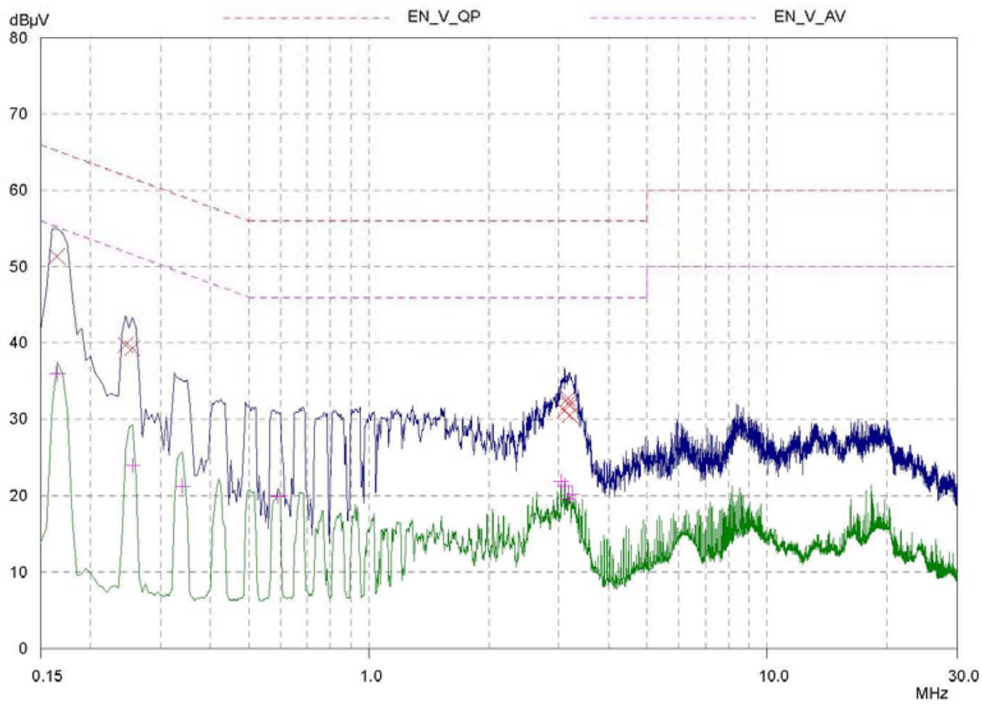

Figure 2: Spectral Diagram, NEUTRAL – PE

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CONDUCTED DISTURBANCE

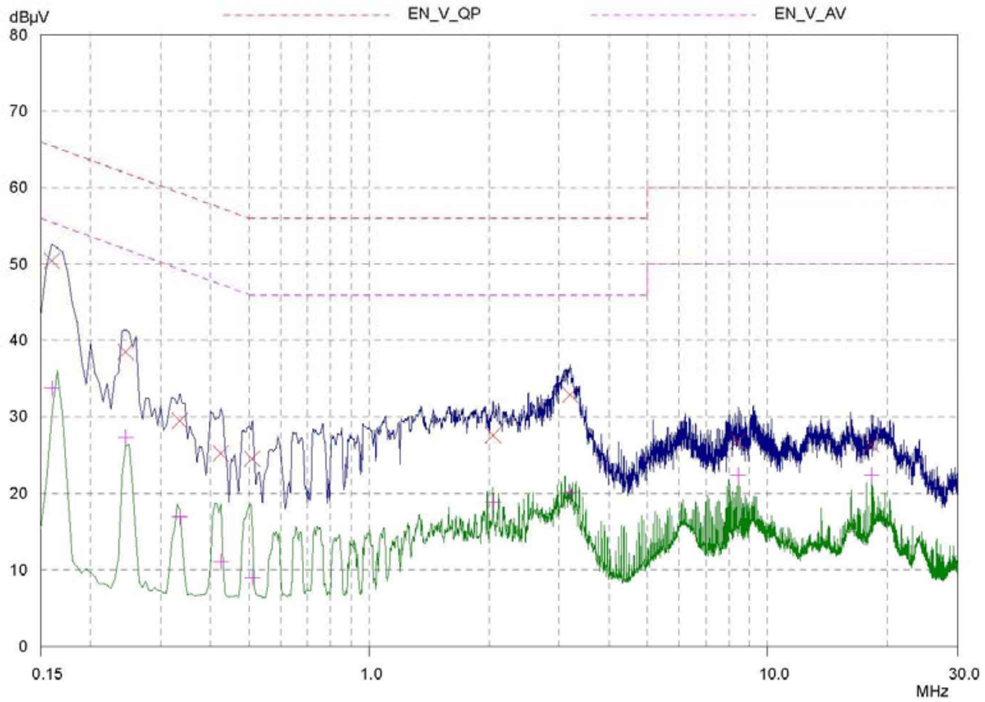
EUT: HYC-G302
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: NEUTRAL-PE

Result File: G302N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 35 dB



5.2 Radiated Emissions

Result : **PASS**

Preliminary measurements were made indoors at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.
Final measurements were made outdoors at 3-meter test range using SCHWARZBECK dipole antennas.
The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with FRP.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter(ESVS 10) and Quasi-Peak Adapter.
The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100 kHz or 1 MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non- metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.
Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Radiated Emissions

Frequency [MHz]	Pol.	Height [m]	Real Reading	Correction Factor		T-Fact [dB]	Data [dBuV/m]	Limits [dBuV/m]	Margin [dB]
				Antenna	Cable				
250.03	H	1.0	3.4	17.5	1.3	18.8	22.2	37.0	14.8
299.89	H	4.0	8.6	16.4	1.6	18.0	26.6	37.0	10.4
400.00	H	1.0	11.5	18.3	1.7	20.0	31.5	37.0	5.5
600.00	H	1.2	7.1	21.0	2.2	23.2	30.3	37.0	6.7
900.01	H	4.0	4.2	25.2	2.6	27.8	32.0	37.0	5.0

Table. Radiated Measurements at 10-meters

NOTES:

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR Quasi-peak mode.
5. H = Horizontal, V = Vertical Polarization
6. Data = Real Reading + T - Fact(Antenna+Cable)
7. Margin = Limits - Data