

Nemko Korea Co., Ltd.

300-2, Osan-Ri, Mohyun-Myun, Cheoin-Gu, Yongin-City, Gyeonggi-Do, KOREA

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FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

D&T Inc.

Daedeok Valley, 59-9, Jang Dong, Yuseong Gu,

Daejeon, 305-343 Korea

Attn : Mr. Kyutae Park

Dates of Issue : June 16, 2011

Test Report No. : NK-11-E-359

Test Site : Nemko Korea Co., Ltd.

EMC site, Korea

FCC ID

THCFS-S5501F

Brand Name

CISCO

Contact Person

D&T Inc.

Daedeok Valley, 59-9, Jang Dong, Yuseong Gu,

Daejeon, 305-343 Korea

Mr. Kyutae Park

Telephone No. : + 82 42 360 8000

Applied Standard:

Part 15 & 2

Classification :

FCC Class B Device

EUT Type:

55" Color TFT LCD Monitor for building-in

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



June 16. 2011

Tested By : Kyounghoon Lee

Engineer



June 16. 2011

Reviewed By : Hyunho Kim

Manager & Chief Engineer

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SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.

Responsible Party :	D&T Inc.
Contact Person :	Mr. Kyutae Park Tel No.: + 82 42 360 8000
Manufacturer :	D&T Inc. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, 305-343 Korea
Factory :	D&T Inc. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, 305-343 Korea

- FCC ID: THCFS-S5501F
- Model: FS-S5501F
- EUT Type: 55" Color TFT LCD Monitor for building-in
- Electric Rating: a.c. 100-240 V, 50-60 Hz, 2.5 A MAX.
- Test Voltage: a.c. 120 V, 60 Hz
- Port/Connector: HDMI 1, HDMI 2, RS-232 Input, Speaker Input
- Classification: FCC Class B
- Applied Standard: FCC Part 15 & Part 2
- Test Procedure(s): ANSI C63.4 (2003)
- Dates of Test: May 16, 2011 to June 10, 2011
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK-11-E-359

INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from **D&T Inc.**

FCC ID : **THCFS-S5501F, 55" Color TFT LCD Monitor for building-in.**

These measurement tests were conducted at **Nemko Korea Co., Ltd. EMC Laboratory.**

The site address is 67-1 & 300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea

The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.

It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.

The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on 2003.



Nemko Korea Co., Ltd.
TEST SITE
67-1 & 300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea, 449-852
Tel) + 82 31 330 1700
Fax) + 82 31 330 1702

Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.

TEST CONDITIONS & EUT INFORMATION

Operating During Test

The EUT was connected to the PC and it displayed continuously an “H” pattern on the screen.
The EUT was set to 1920 x 1080 video resolution, with 60 Hz vertical refresh rate.

Support Equipment

55” Color TFT LCD Monitor for building-in (EUT)	D&T Inc. FCC ID : THCFS-S5501F3 0.9 m & 1.8 m shielded HDMI cable 1.5 m shielded RS-232 cable 1.8 m unshielded AC power cable	S/N: N/A
PC	SAMSUNG Model : DM-V200 1.8 m unshielded AC power cable	FCC DOC S/N: ZSWU9WAZB 00217H
Keyboard	Dongguan Model : GP-K8700 1.7 m unshielded PS/2 cable	FCC DOC S/N : CNBA590267 2B5E380O71961
Mouse	DONGGUAN PRIMAX ELECTRONICS LTD Model : LXHMOAFUO USB 1.6 m shielded USB cable	FCC DOC S/N : N/A
Printer	HEWLETT PACKARD COMPANY. Model : C6429A 1.2 m shielded parallel cable 1.8 m unshielded AC power cable	FCC DOC S/N: N/A

EUT Information

Clock	27.00 MHz (Y1, Y2), 7.3728 MHz(Y3)
Chipset(s)	U29(ATmega88V-10AU), U10(IT6603), U14(K4H561638H-UCCC), U15(K4H561638H-UCCC), U7(THC63LVD1027), U4(CAT6353X)
LCD Panel Type	A-si TFT Active matrix
Screen size	138.8 cm (Diagonal)
Maximum Resolution	1920 x 1080 @ 60 Hz
Pixel pitch	0.63 (H) mm x 0.36 (V) mm
Display colors	16.7 M (RGB 8-bit data)
Contrast Ratio(Typ.)	4000:1
Viewing Angle(Typ.)	89/89/89/89
Response Time(Typ.)	10 ms
Luminance(Typ.)	350 cd/m2
Synchronization	Horizontal Frequency : 76.5 kHz Vertical Frequency : 60 Hz
Power Consumption	Maximum : 250 W
Port(s)	HDMI 1, HDMI 2, RS-232 Input, Speaker Input
Size and weight	1261.8 x 170 x 949 / 52 kg

EUT System

Equipment	Model	Manufacturer	Serial Number
Panel	LTI550HJ05	Samsung Electronics or S-LCD	N/A
Main Board	LB506B Main Board	D&T Inc.	N/A
I/O Board	LB506B IO Board	D&T Inc.	N/A
SMPS	DT-PB260W	D&T Inc.	N/A

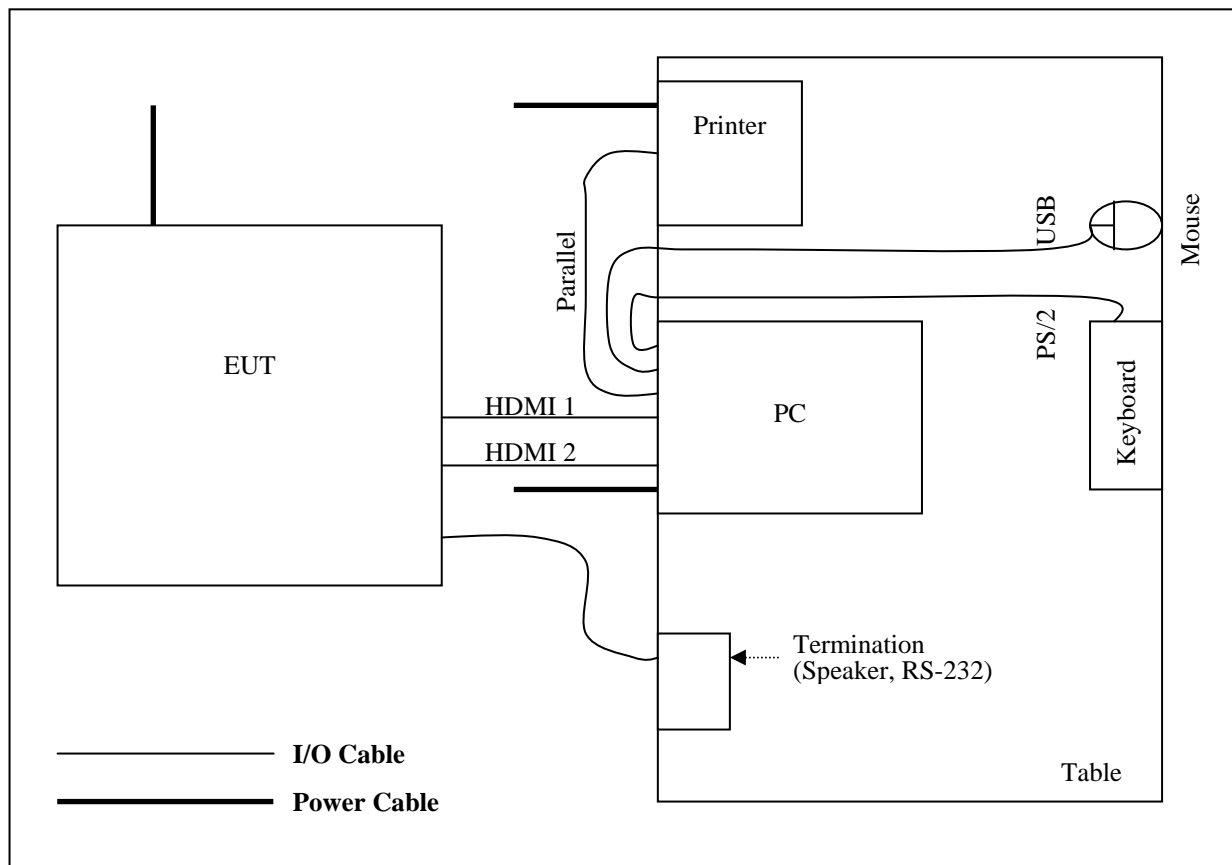
Description of Test Modes

The EUT was pre-tested under the following resolutions mode:

1. 640 X 480 (60 Hz / 29.5 kHz) : Clock 23.625 MHz
2. 800 X 600 (60 Hz / 37 kHz) : Clock 35.5 MHz
3. 1280 X 1024 (60 Hz / 64 kHz) : Clock 108 MHz
4. 1600 X 1200 (60 Hz / 74 kHz) : Clock 130.375 MHz
5. 1920 X 1080 (60 Hz / 76.5 kHz) : Clock 148.5 MHz

The worst emission level was found when the EUT was tested under 1920 x 1080 resolution, therefore, the test data of this mode was recorded in the report.

Setup Drawing



SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	Paragraph No.	Result	Remark
Conducted Emission	15.107(a)	Complies	
Radiated Emission	15.109(g)	Complies	Below 1 GHz
Radiated Emission	15.109(a)	Complies	Above 1 GHz

RECOMMENDATION/CONCLUSION

The data collected shows that the **D&T Inc.**

FCC ID : **THCFS-S5501F, 55" Color TFT LCD Monitor for building-in.**

The highest emission observed was at **0.73 MHz** for conducted emissions with a A.V margin of **6.1 dB**, at **742.56 MHz** for radiated emissions with a margin of **6.5 dB**.

SAMPLE CALCULATION

$$\text{dB } \mu V = 20 \log_{10} (\mu V/m)$$

$$\mu V = 10^{(\text{dB } \mu V/20)}$$

EX. 1.

@165.0 MHz

Class B limit = 30.0 dB $\mu V/m$

Reading = 38.2 dB μV (calibrated level)

Antenna factor + Cable Loss + Amplifier Gain = -12.9 dB

Total = 25.30 dB $\mu V/m$

Margin = 30.0 – 25.30 = 4.70

4.70 dB below the limit

DESCRIPTION OF TESTS

Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 m shielded enclosure.

It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.

A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 0.5 m away from the side of wall of the shielded room

Rohde & Schwarz (ESH2-Z5) and Rohde & Schwarz (ESH3-Z5) of the 50 ohm / 50 uH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.

The EUT is powered from the Rohde & Schwarz (ESH3-Z5) LISN and the support equipment is powered from the Rohde & Schwarz (ESH2-Z5) LISN.

Power to the LISN s are filtered by high-current high insertion loss power line filters.

The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ".

If d.c. power 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 LISNs,

All interconnecting cables more than 1 m were shortened by non inductive bundling (serpentine fashion) to a 1 m length.

Sufficient time for 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 20 ms sweep time.

The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30).

The detector functions were set to CISPR quasi-peak mode & average mode.

The bandwidth of receiver was set to 9 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; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; which ever determined the worst case emission.

Each EME reported was calibrated using the R&S signal generator.

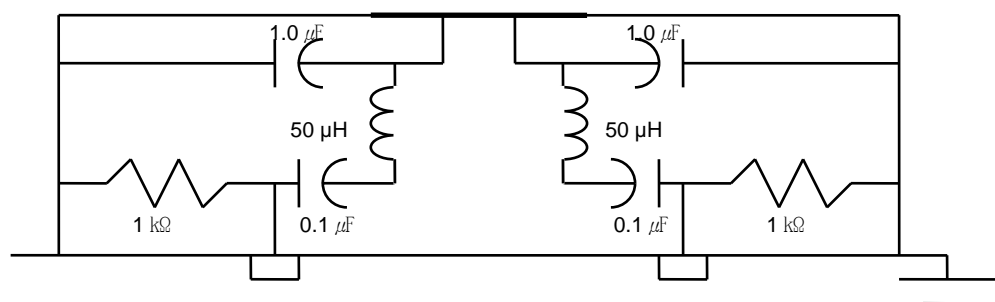


Fig. 2. LISN Schematic Diagram

DESCRIPTION OF TESTS

Radiated Emissions

Preliminary measurement were made indoors at 3 meter using broad band 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 Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found. The spectrum was scanned from 30 to 1000 MHz using Biconical log Antenna(ARA, LPB-2520/A). Above 1 GHz, Horn Antenna (SCHWARTZBECK, BBHA9120A) was used. Final Measurements were made outdoors at 10 m test range using Trilog-Broadband Antenna (Shwarzbeck, VULB9168) and Above 1 GHz, at 3 m test range using a Horn Antenna(SCHWARTZBECK, BBHA9120A) in fully anechoic chamber.

The test equipment was placed on a wooden table.

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 reexamined and investigated using EMI test receiver. (ESCS30) & (FSP40)

The detector function were set to CISPR quasi-peak and peak mode and the bandwidth of the receiver were set to 120 kHz and 1MHz 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 setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic 1.0 x 1.5 meter table.

The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.

The turn table containing the Technology was rotated; the antenna height was varied 1 to 4 meter and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by : switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; which ever determined the worst case emission.

Each EME reported was calibrated using the R/S signal generator.

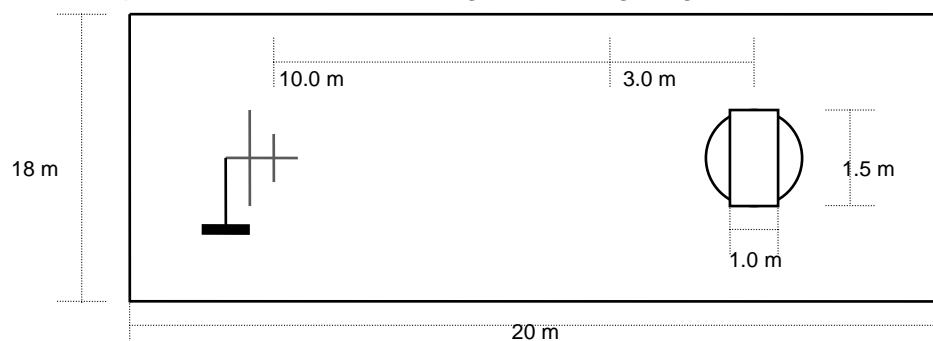


Fig. 3. Dimensions of Outdoor Test Site

TEST DATA

Conducted Emissions

FCC ID : THCFS-S5501F

Frequency (MHz)	Level(dB μ V)		*)Factor (dB)	**) Line	Limit(dB μ V)		Margin(dB)	
	Q-Peak	Average			Q-Peak	Average	Q-Peak	Average
0.20	47.6	46.4	0.2	L	63.6	53.6	16.0	7.2
0.26	44.1	44.0	0.2	L	61.4	51.4	17.3	7.4
0.40	43.5	41.1	0.2	L	57.9	47.9	14.4	6.8
0.73	42.0	39.9	0.1	L	56.0	46.0	14.0	6.1
2.00	41.5	39.4	0.2	L	56.0	46.0	14.5	6.6
14.48	47.4	34.8	1.0	L	60.0	50.0	12.6	15.2

Table 1. Line Conducted Emissions Tabulated Data

NOTES:

1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission are reported. See attached Plots.
3. LINE : L =Line , N = Neutral
4. The limit for Class B device is on the FCC Part section 15.107(a).



Tested by : **Kyounghoon Lee**

TEST DATA

Radiated Emissions

FCC ID : THCFS-S5501F

► 30 MHz ~ 1 GHz

Frequency (MHz)	Reading (dB μ V/m)	Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
49.73	39.9	V	100	6	-20.2	19.7	30.0	10.3
213.76	34.2	V	115	192	-15.4	18.8	30.0	11.2
355.92	41.4	V	100	112	-13.8	27.6	37.0	9.4
384.58	39.5	V	100	321	-13.8	25.7	37.0	11.3
445.49	39.2	V	100	60	-11.3	27.9	37.0	9.1
742.56	35.7	H	215	327	-5.2	30.5	37.0	6.5

Table 3. Radiated Measurements at 10 meters (1920 x 1080, 60 Hz)

► 1 GHz ~ 2 GHz

Frequency (MHz)	Reading (dB μ V)		Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Limit (dB μ V/m)		Margin (dB)	
	Peak	Average					Peak	Average	Peak	Average
1063.75	43.5	31.1	V	130	135	-6.1	74.0	54.0	30.5	22.9
1347.25	43.4	32.4	V	130	180	-5.1	74.0	54.0	30.6	21.6
1485.00	49.8	44.2	V	190	180	-4.3	74.0	54.0	24.2	9.8
1633.75	45.1	36.7	V	130	180	-3.5	74.0	54.0	28.9	17.3
1781.87	46.2	35.5	V	130	180	-1.5	74.0	54.0	27.8	18.5
1930.62	42.1	34.0	H	130	45	7.1	74.0	54.0	31.9	20.0

Table 6. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

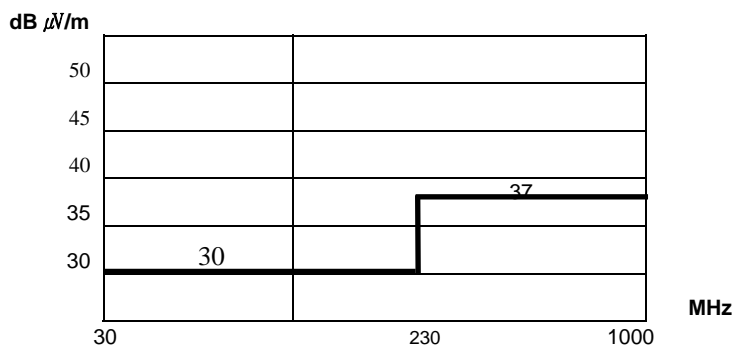


Fig. 4. Limits at 10 meters

NOTES:

1. All modes were measured and the worst-case emission was reported.
2. Below 1 GHz, the radiated limits are shown on Figure 4.

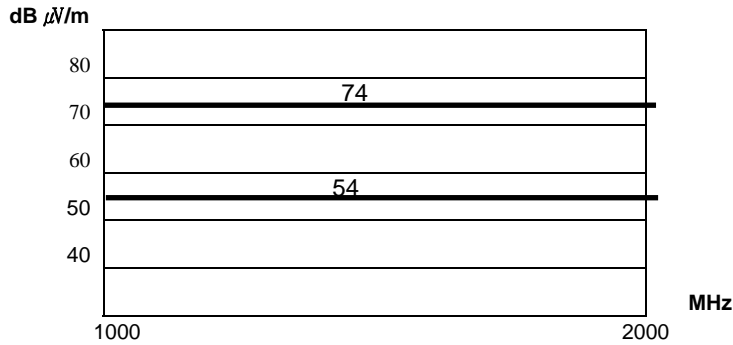


Fig. 5. Limits at 3 meters

NOTES:

1. All modes were measured and the worst-case emission was reported.
2. Above 1 GHz, the radiated limits are shown on Figure 5.

NOTES:

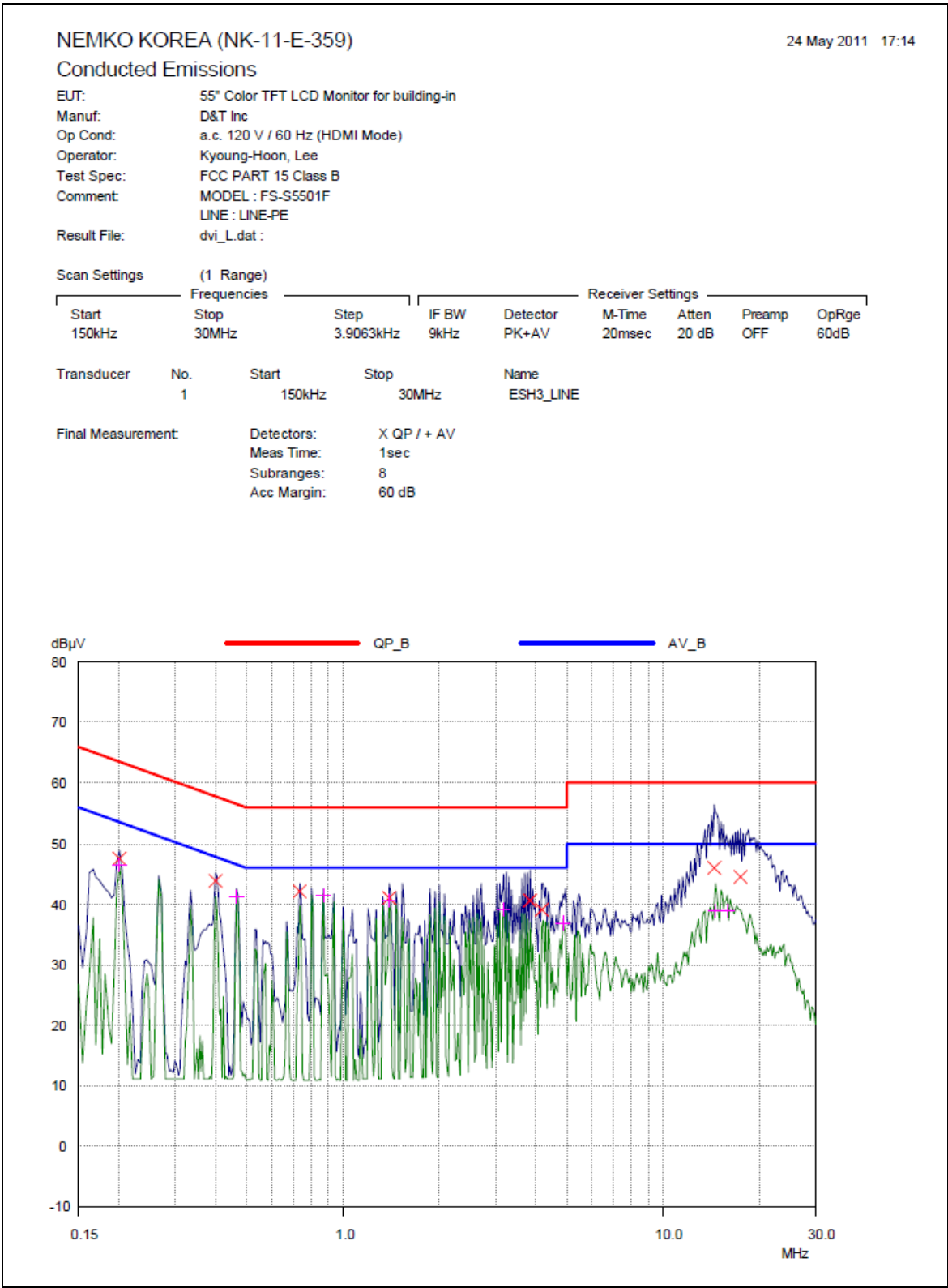
1. *Pol. H=Horizontal V=Vertical
2. **AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.
3. *** average limit is met when using a peak detector receiver, the EUT was deemed to meet both limits and measurement with the average detector receiver is unnecessary.
4. The limit for Class B device is on the FCC Part section 15.109(g) & (a).
5. All modes of operations were investigated and the worst-case emission was reported.
6. Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz, average detector function mode is used using a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz.
Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.



Tested by : Kyoungsoon Lee

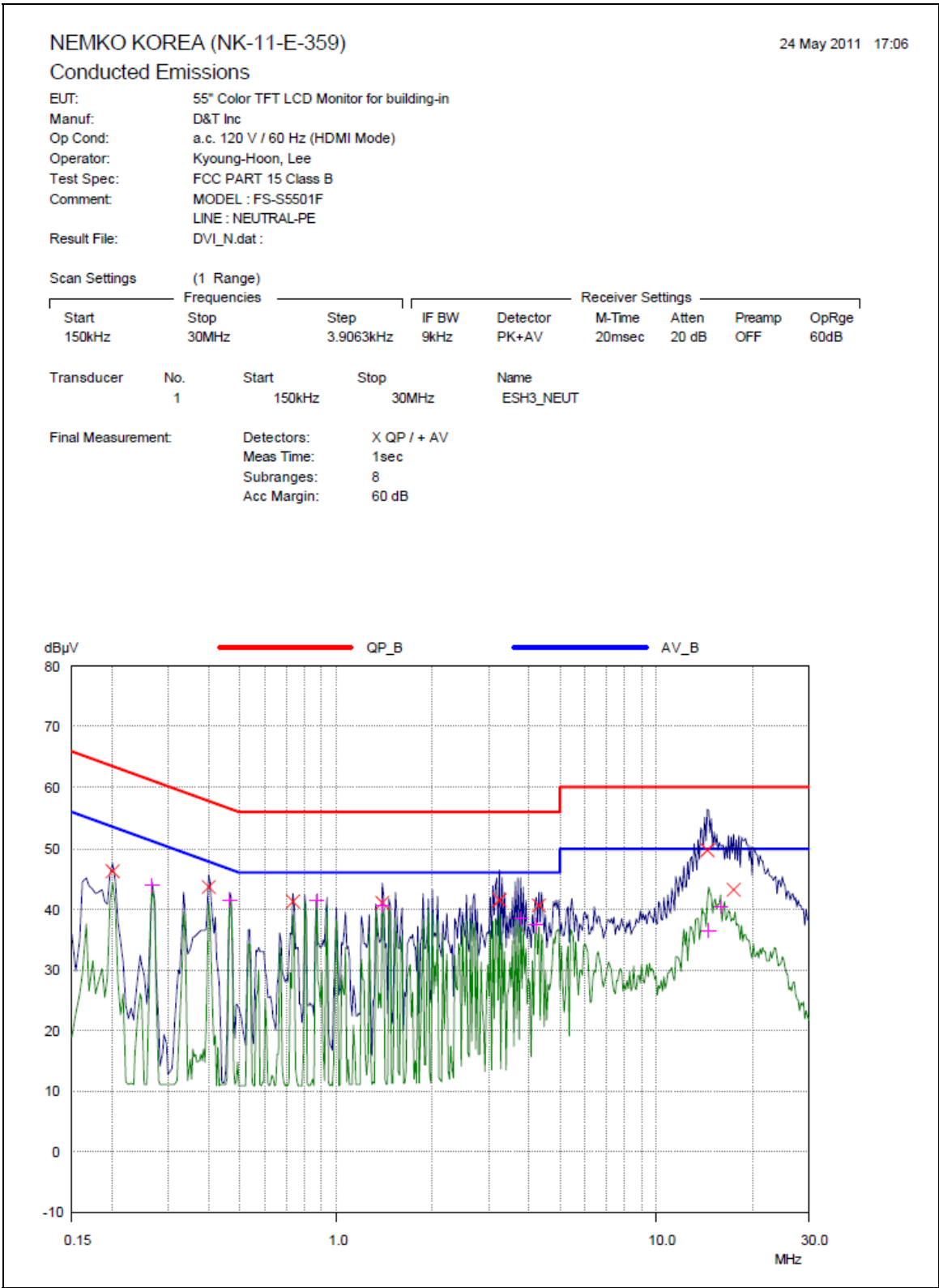
PLOTS OF EMISSIONS

● **Conducted Emission at the Mains port (Line)**



PLOTS OF EMISSIONS

● **Conducted Emission at the Mains port (Neutral)**



ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95 %

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	$LAMN$	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	$dVSW$	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	$dVPA$	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	$dVPR$	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	$dVNF$	± 0.00			0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
Ⓐ Mismatch	M	$+ 0.70$	U-Shaped	1.414	0.49	1	0.49
Ⓑ Mismatch	M	$- 0.80$	U-Shaped	1.414	$- 0.56$	1	$- 0.56$
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	Ⓐ: AMN-Receiver Mismatch : + Ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expanded Uncertainty U	Normal ($k = 2$)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.10	normal 1	1.000	0.10	1	0.10
Sine wave voltage	dV_{sw}	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dV_{pa}	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dV_{pr}	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dV_{nf}	± 0.50	normal 2	2.000	0.25	1	0.25
Antenna Factor Calibration	AF	± 1.50	normal 2	2.000	0.75	1	0.75
Attenuation Antenna-receiver	CL	± 0.52	normal 2	2.000	0.26	1	0.26
Antenna Directivity	AD	± 1.00	rectangular	1.732	0.58	1	0.58
Antenna Factor Height Dependence	AH	± 0.50	rectangular	1.732	0.29	1	0.29
Antenna Phase Centre Variation	AP	± 0.30	rectangular	1.732	0.17	1	0.17
Antenna Factor Frequency Interpolation	AI	± 0.30	rectangular	1.732	0.17	1	0.17
Site Imperfections	SI	± 4.00	triangular	2.449	1.63	1	1.63
Measurement Distance Variation	DV	± 0.10	rectangular	1.732	0.06	1	0.06
Antenna Balance	$Dbal$	± 0.90	rectangular	1.732	0.52	1	0.52
Cross Polarisation	$DCross$	± 0.90	rectangular	1.732	0.52	1	0.52
Ⓐ Mismatch	M	$+ 0.25$	U-Shaped	1.414	0.18	1	0.18
Ⓑ Mismatch	M	$- 0.26$	U-Shaped	1.414	$- 0.18$	1	$- 0.18$
Ⓒ Mismatch	M	$+ 0.98$	U-Shaped	1.414	0.69	1	0.69
Ⓓ Mismatch	M	$- 1.11$	U-Shaped	1.414	$- 0.79$	1	$- 0.79$

Measurement System Repeatability	<i>RS</i>	0.09	normal 1	1.000	0.09	1	0.09
Remark	Ⓐ: Biconical Antenna–receiver Mismatch : + (< 200 MHz) Ⓑ: Biconical Antenna–receiver Mismatch : – (< 200 MHz) Ⓒ: Log Periodic Antenna–receiver Mismatch : + (\geq 200 MHz) Ⓓ: Log Periodic Antenna–receiver Mismatch : – (\geq 200 MHz)						
Combined Standard Uncertainty	Normal			± 2.63 (< 200 MHz) ± 2.74 (\geq 200 MHz)			
Expanded Uncertainty U	Normal ($k = 2$)			± 5.26 (< 200 MHz) ± 5.48 (\geq 200 MHz)			

LIST OF TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESCS 30	833364/020	Jan. 14 2011	1 year
2	*Test Receiver	R & S	ESCS 30	100302	Nov. 10 2010	1 year
3	Amplifier	HP	8447F	2805A03427	July 20 2010	1 year
4	*Amplifier	Sonoma	310 N	291916	July 07 2011	1 year
5	*Signal Conditioning Unit	Rohde & Schwarz	SCU 01	10029	Apr. 06 2011	1 year
6	*Pre Amplifier	HP	8449B	3008A00107	Jan. 13 2011	1 year
7	*Spectrum Analyzer	R & S	FSL3	101732	Apr. 04 2011	1 year
8	*Spectrum Analyzer	R & S	FSP40	100361	Sep. 04 2010	1 year
9	*Biconical Log Antenna	ARA	LPB-2520/A	1180	Apr. 14 2010	2 years
10	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-257	Apr. 14 2010	2 years
11	*Horn Antenna	SCHWARZBECK	BBHA9120A	1201	Dec. 24 2010	2 years
12	Signal Generater	R & S	SMP02	833286/003	July 20 2010	1 year
13	*LISN	R & S	ESH3-Z5	833874/006	Nov. 10 2010	1 year
14	*LISN	R & S	ESH2-Z5	100227	Apr. 06 2011	1 year
15	*Position Controller	DAEIL EMC	N/A	N/A	N/A	N/A
16	*Turn Table	DAEIL EMC	N/A	N/A	N/A	N/A
17	*Antenna Mast	DAEIL EMC	N/A	N/A	N/A	N/A
18	*Anechoic Chamber	EM Eng.	N/A	N/A	N/A	N/A
19	*Shielded Room	EM Eng.	N/A	N/A	N/A	N/A
20	*Position Controller	Seo-Young EMC	N/A	N/A	N/A	N/A
21	*Turn Table	Seo-Young EMC	N/A	N/A	N/A	N/A
22	*Antenna Mast	Seo-Young EMC	N/A	N/A	N/A	N/A
23	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A

*) Test equipment used during the test

APPENDIX D – BLOCK DIAGRAM

APPENDIX E – USER’S MANUAL

APPENDIX F – SCHEMATIC DIAGRAM
