

Nemko Korea Co., Ltd.

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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. W. W. Lee

Dates of Issue : October 21, 2008

Test Report No. : NK08E740

Test Site : Nemko Korea Co., Ltd.

EMC site, Korea

FCC ID

THCFS-L4205C

Brand Name

TANDBERG

Contact Person

D&T Inc.

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

Daejeon, 305-343 Korea

Mr. W. W. Lee

Telephone No. : + 82 42 360 0820

Applied Standard:

Part 15 & 2

Classification :

FCC Class B Device

EUT Type:

42" Color TFT LCD Monitor

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.



Tested By : J. H. Ko

Engineer



Reviewed By : D.H. Ryu

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. W. W. Lee |
| | Tel No.: + 82 42 360 0820 |
| 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-L4205C
- Model: FS-L4205C
- EUT Type: 42" Color TFT LCD Monitor
- Electric Rating: a.c. 100-240 V, 50-60 Hz, 3 A
- Test Voltage: a.c. 120 V, 60 Hz
- Port/Connector: HDMI x 3 EA, Analog RGB x 1 EA, RS-232C x 2 EA,
Speaker x 1 EA
- Classification: FCC Class B
- Applied Standard: FCC Part 15 & Part 2
- Test Procedure(s): ANSI C63.4 (2003)
- Dates of Test: September 10, 2008 to October 17, 2008
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK08E740

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-L4205C, 42" Color TFT LCD Monitor.**

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

The site address is 300-2, Osan-Ri, Mohyun-Myeon, Cheoin-Gu, Yongin-City, 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 (18miles) 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.
OPEN AREA TEST SITE
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KOREA, 449-852
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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

| | | |
|------------------------------------|--|-----------------------------|
| 42" Color TFT LCD Monitor (EUT) | D&T Inc. FCC ID : THCFS-L4205C 2.0 m shielded HDMI cable 1.6 m shielded Analog D-Sub cable | S/N: N/A |
| PC | HEWLETT PACKARD COMPANY. Model : dc7600 1.6 m unshielded AC power cable | FCC DOC S/N: CNG62902XY |
| Keyboard | HEWLETT PACKARD COMPANY. Model : C4744-60201(KB-9970) 1.6 m shielded Din cable | FCC DOC S/N: 1B02800026B |
| USB Mouse | Kardak Model : M056UO 1.5 m shielded USB cable | FCC DOC S/N: 425000643 |
| Serial Mouse | ALL SPIRIT CO., LTD. Model : WS-V1-400 1.6 m unshielded serial cable | FCC DOC S/N: B050402 |
| Printer | HEWLETT PACKARD COMPANY. Model : C6429A 1.5 m shielded parallel cable 1.8 m unshielded AC power cable | FCC DOC S/N: N/A |

EUT Information

| | |
|----------------------------|---|
| Clock | 27.00 MHz (Y1), 28.322 MHz(Y2) |
| Chipset(s) | U4(SII8185), U9(PW338C), U10(SII9185), U14/U15(K4H561638H-UCCC), U12(M29W800DT), U27(AD9984A), U29(ATmega88V) |
| LCD Panel Type | A-si TFT Active matrix |
| Screen size | 106.7 cm (Diagonal) |
| Maximum Resolution | 1920 x 1080 @ 60 Hz |
| Pixel pitch | 0.4845 (H) mm x 0.4845 (V) mm |
| Colors | 1.06Billion colors (10 bit) |
| Contrast Ratio(Typ.) | 1000:1 |
| Viewing Angle(CR≥10, Typ.) | 89/89/89/89 |
| Response Time(Typ.) | 5 ms |
| Luminance(Typ.) | 700 cd |
| Synchronization | Horizontal Frequency : 25 ~ 90 kHz Vertical Frequency : 24 ~ 120 Hz |
| Power Consumption | Maximum : 300 W |
| Port(s) | HDMI x 3 EA, Analog RGB x 1 EA, RS-232C x 2 EA, Speaker x 1 EA |
| Size | 980.4 (W) x 839.7 (H) x 170 (D) : mm |
| Power | a.c. 100-240 V, 50-60 Hz, 3 A |

EUT System

| Equipment | Model | Manufacturer | Serial Number |
|----------------------------|---|---|---------------|
| LCD Panel | LD420WUB | LG-Philips LCD Co., Ltd | N/A |
| AD Board | LB506 Main board | D&T Inc. | N/A |
| IO Board | LB506 IO Board | D&T Inc. | N/A |
| AC Divide Board | AC Divide Board | D&T Inc. | N/A |
| SMPS Board 1 ¹⁾ | 0627D04349 | Li Shin International Enterprise Corp. | N/A |
| | Transformer : 5124-0611-0 ²⁾ | | |
| SMPS Board 2 ¹⁾ | 0627D04349(R1) | Li Shin International Enterprise Corp. | N/A |
| | Transformer : PSP8004FL ²⁾ | | |
| Right inverter Board | KLS-42NRF20-A | LG Display Co., Ltd | N/A |
| Left Inverter Board | KLS-42NRF20-B | LG Display Co., Ltd | N/A |

1) Now the manufacture (D&T Inc.) will use 2 kinds of SMPS Board (0627D04349, 0627D04349(R1)). Because the 0627D04349 will be EOL (End Of Line) a few months later, and they will use new one 0627D04349(R1). But the inventory of old one is too many, so they will install the old one for first MP product.

2) The type PSP8004FL is similar to type 5124-0611-0, except for the size of core and outer insulation tapes on the windings (see appendix C)

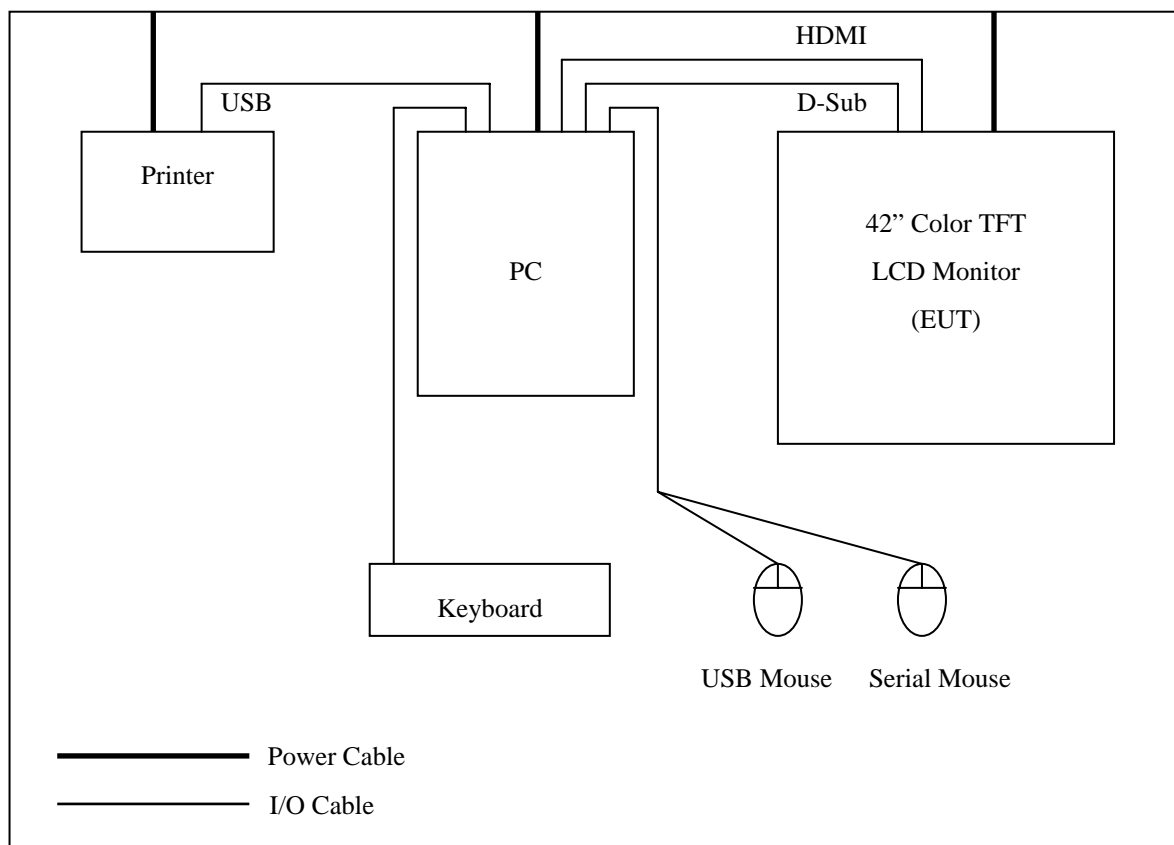
Description of Test Modes

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

1. 800 X 600 (75 Hz / 47 kHz) : Clock 48.875 MHz
2. 1400 X 1050 (60 Hz / 64.7 kHz) : Clock 101 MHz
3. 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(a) | 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-L4205C, 42" Color TFT LCD Monitor.**

The highest emission observed was at **0.27 MHz** for conducted emissions with a A.V margin of **2.7 dB**, at **742.50 MHz** for radiated emissions with a margin of **2.5 dB**.

SAMPLE CALCULATION

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

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

EX. 1.

@57.7 MHz

Class B limit = 100 $\mu V/m$ = 40.0 dB $\mu V/m$

Reading = 19.1 dB μV (calibrated level)

Antenna factor + Cable Loss = 10.12 dB

Total = 29.22 dB $\mu V/m$

Margin = 40.0 - 29.22 = 10.78

10.78 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 Kyoritsu (KNW-407) 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 LISN and the support equipment is powered from the Kyoritsu 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 DC 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 function 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 AC outlet, if applicable; which ever determined the worst case emission.

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

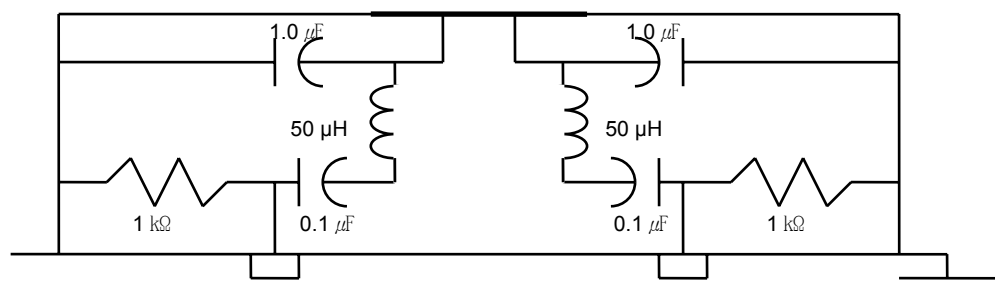


Fig. 2. LISN Schematic Diagram

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, Double Ridged Broadband Horn Antenna (SCHWARTZBECK, BBHA9120D) was used.

Final Measurements were made outdoors at 3 m or 10 m test range using Trilog-Broadband Antenna (Shwarzbeck, VULB9168) or Double Ridged Broadband Horn Antenna (SCHWARTZBECK, BBHA9120D). 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)

The detector function were set to CISPR quasi-peak and peak mode and the bandwidth of the receiver were set to 120 kHz and 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 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 AC outlet, if applicable; which ever determined the worst case emission.

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

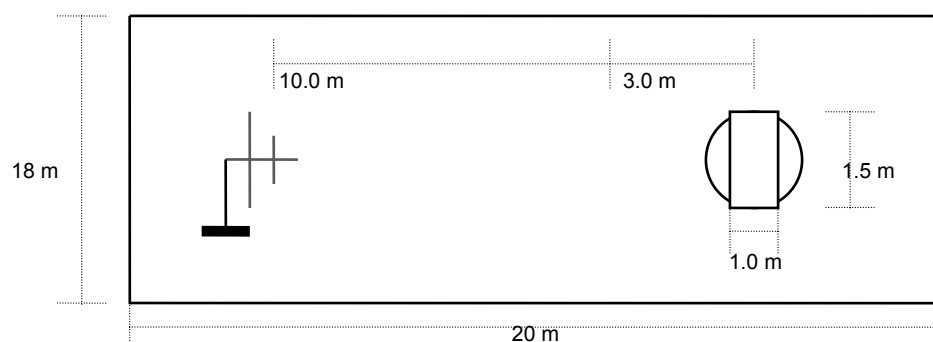


Fig. 3. Dimensions of Outdoor Test Site

TEST DATA

Conducted Emissions

FCC ID : THCFS-L4205C

► Analog D-Sub mode (SMPS : 0627D04349(R1))

| Frequency (MHz) | Level(dB μ V) | | Line | Limit(dB μ V) | | Margin(dB) | |
|--------------------|-------------------|---------|------|-------------------|---------|------------|---------|
| | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.27 | 51.0 | 48.3 | N | 61.1 | 51.1 | 10.1 | 2.8 |
| 1.16 | 39.0 | 30.9 | N | 56.0 | 46.0 | 17.0 | 15.1 |
| 1.70 | 40.5 | 32.3 | N | 56.0 | 46.0 | 15.5 | 13.7 |
| 1.91 | 39.8 | 30.5 | N | 56.0 | 46.0 | 16.2 | 15.5 |
| 2.11 | 40.5 | 31.3 | L | 56.0 | 46.0 | 15.5 | 14.7 |
| 19.26 | 47.9 | 35.0 | L | 60.0 | 50.0 | 12.1 | 15.0 |

Table 1. Line Conducted Emissions Tabulated Data

► HDMI mode (SMPS : 0627D04349(R1))

| Frequency (MHz) | Level(dB μ V) | | Line | Limit(dB μ V) | | Margin(dB) | |
|--------------------|-------------------|---------|------|-------------------|---------|------------|---------|
| | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.27 | 51.4 | 48.4 | L | 61.1 | 51.1 | 9.7 | 2.7 |
| 1.36 | 40.3 | 31.2 | L | 56.0 | 46.0 | 15.7 | 14.8 |
| 1.70 | 40.4 | 32.4 | N | 56.0 | 46.0 | 15.6 | 13.6 |
| 2.11 | 40.5 | 30.9 | L | 56.0 | 46.0 | 15.5 | 15.1 |
| 3.03 | 39.3 | 27.1 | L | 56.0 | 46.0 | 16.7 | 18.9 |
| 19.32 | 48.1 | 34.6 | L | 60.0 | 50.0 | 11.9 | 15.4 |

Table 2. Line Conducted Emissions Tabulated Data

► Analog D-Sub mode (SMPS : 0627D04349)

| Frequency (MHz) | Level(dB μ V) | | Line | Limit(dB μ V) | | Margin(dB) | |
|--------------------|-------------------|---------|------|-------------------|---------|------------|---------|
| | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.27 | 44.5 | 40.3 | N | 61.1 | 51.1 | 16.6 | 10.8 |
| 0.62 | 39.7 | 34.7 | N | 56.0 | 46.0 | 16.3 | 11.3 |
| 0.97 | 40.1 | 33.9 | N | 56.0 | 46.0 | 15.9 | 12.1 |
| 1.32 | 39.8 | 32.6 | N | 56.0 | 46.0 | 16.2 | 13.4 |
| 1.67 | 39.7 | 33.1 | N | 56.0 | 46.0 | 16.3 | 12.9 |
| 19.21 | 51.6 | 38.4 | L | 60.0 | 50.0 | 8.4 | 11.6 |

Table 3. Line Conducted Emissions Tabulated Data

► HDMI mode (SMPS : 0627D04349)

| Frequency (MHz) | Level(dB μ V) | | Line | Limit(dB μ V) | | Margin(dB) | |
|--------------------|-------------------|---------|------|-------------------|---------|------------|---------|
| | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.26 | 46.9 | 46.0 | L | 61.4 | 51.4 | 14.5 | 5.4 |
| 0.97 | 39.7 | 33.4 | L | 56.0 | 46.0 | 16.3 | 12.6 |
| 1.32 | 40.2 | 33.0 | N | 56.0 | 46.0 | 15.8 | 13.0 |
| 1.66 | 40.3 | 31.7 | N | 56.0 | 46.0 | 15.7 | 14.3 |
| 2.43 | 38.0 | 30.2 | L | 56.0 | 46.0 | 18.0 | 15.8 |
| 19.37 | 50.5 | 36.1 | L | 60.0 | 50.0 | 9.5 | 13.9 |

Table 4. 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 : J. H. Ko

TEST DATA

Radiated Emissions

FCC ID : THCFS-L4205C

► 30 MHz ~ 1 GHz (Analog D-Sub mode, SMPS : 0627D04349(R1))

| Frequency (MHz) | Reading (dB μ V/m) | Pol* (H/V) | AF+CL+Amp (dB)** | Result (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) |
|--------------------|---------------------------|---------------|---------------------|--------------------------|-------------------------|----------------|
| 55.25 | 50.6 | V | -17.9 | 32.7 | 40.0 | 7.3 |
| 148.50 | 42.2 | V | -10.2 | 32.0 | 43.5 | 11.5 |
| 533.37 | 40.2 | H | -4.7 | 35.5 | 46.0 | 10.5 |
| 593.57 | 40.4 | V | -3.6 | 36.8 | 46.0 | 9.2 |
| 816.31 | 32.3 | V | 0.9 | 33.2 | 46.0 | 12.8 |
| 967.38 | 36.6 | V | 3.9 | 40.5 | 54.0 | 13.5 |

Table 5. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

► 30 MHz ~ 1 GHz (HDMI mode, SMPS : 0627D04349(R1))

| Frequency (MHz) | Reading (dB μ V/m) | Pol* (H/V) | AF+CL+Amp (dB)** | Result (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) |
|--------------------|---------------------------|---------------|---------------------|--------------------------|-------------------------|----------------|
| 55.41 | 51.7 | V | -17.9 | 33.8 | 40.0 | 6.2 |
| 148.50 | 48.4 | V | -10.2 | 38.2 | 43.5 | 5.3 |
| 594.00 | 46.4 | V | -3.6 | 42.8 | 46.0 | 3.2 |
| 742.50 | 43.4 | H | 0.1 | 43.5 | 46.0 | 2.5 |
| 891.04 | 38.2 | H | 2.5 | 40.7 | 46.0 | 5.3 |
| 967.51 | 37.7 | V | 3.9 | 41.6 | 54.0 | 12.4 |

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

► 30 MHz ~ 1 GHz (Analog D-Sub mode, SMPS : 0627D04349)

| Frequency (MHz) | Reading (dB μ V/m) | Pol* (H/V) | AF+CL+Amp (dB)** | Result (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) |
|--------------------|---------------------------|---------------|---------------------|--------------------------|-------------------------|----------------|
| 74.29 | 50.4 | V | -18.1 | 32.3 | 40.0 | 7.7 |
| 193.44 | 44.9 | V | -11.5 | 33.4 | 43.5 | 10.1 |
| 297.60 | 44.6 | V | -9.5 | 35.1 | 46.0 | 10.9 |
| 594.15 | 38.2 | V | -3.6 | 34.6 | 46.0 | 11.4 |
| 817.40 | 37.6 | V | 0.9 | 38.5 | 46.0 | 7.5 |
| 968.16 | 39.2 | V | 3.9 | 43.1 | 54.0 | 10.9 |

Table 7. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

► 30 MHz ~ 1 GHz (HDMI mode, SMPS : 0627D04349)

| Frequency (MHz) | Reading (dB μ V/m) | Pol* (H/V) | AF+CL+Amp (dB)** | Result (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) |
|--------------------|---------------------------|---------------|---------------------|--------------------------|-------------------------|----------------|
| 74.20 | 51.7 | V | -18.1 | 33.6 | 40.0 | 6.4 |
| 148.50 | 46.9 | V | -10.2 | 36.7 | 43.5 | 6.8 |
| 594.00 | 42.9 | V | -3.6 | 39.3 | 46.0 | 6.7 |
| 742.50 | 42.8 | V | 0.1 | 42.9 | 46.0 | 3.1 |
| 891.04 | 38.5 | H | 2.5 | 41.0 | 46.0 | 5.0 |
| 960.51 | 38.2 | V | 3.8 | 42.0 | 54.0 | 12.0 |

Table 8. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)
► 1 GHz ~ 2 GHz (Analog D-Sub mode, SMPS : 0627D04349(R1))

| Frequency (MHz) | Reading (dB μ V) | | Pol* (H/V) | AF+CL+Amp (dB)** | Limit (dB μ V/m) | | Final Result(dB μ V/m) | |
|--------------------|----------------------|---------|---------------|---------------------|----------------------|---------|----------------------------|---------|
| | Peak | Average | | | Peak | Average | Peak | Average |
| 1063.00 | 65.7 | 45.0 | V | -6.5 | 74.0 | 54.0 | 59.2 | 38.5 |
| 1289.00 | 61.2 | 41.2 | V | -5.9 | 74.0 | 54.0 | 55.3 | 35.3 |
| 1369.00 | 62.3 | 41.5 | V | -5.5 | 74.0 | 54.0 | 56.8 | 36.0 |
| 1596.00 | 62.5 | 44.0 | V | -5.2 | 74.0 | 54.0 | 57.3 | 38.8 |
| 1821.00 | 59.2 | 37.6 | V | -4.4 | 74.0 | 54.0 | 54.8 | 33.2 |
| 1864.00 | 59.0 | 34.3 | V | -4.1 | 74.0 | 54.0 | 54.9 | 30.2 |

NOTES : Measurements using peak mode & average mode.

Table 9. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)
► 1 GHz ~ 2 GHz (HDMI mode, SMPS : 0627D04349(R1))

| Frequency (MHz) | Reading (dB μ V) | | Pol* (H/V) | AF+CL+Amp (dB)** | Limit (dB μ V/m) | | Final Result(dB μ V/m) | |
|--------------------|----------------------|---------|---------------|---------------------|----------------------|---------|----------------------------|---------|
| | Peak | Average | | | Peak | Average | Peak | Average |
| 1038.00 | 51.6 | ***) | H | -6.6 | 74.0 | 54.0 | 45.0 | - |
| 1162.00 | 56.4 | ***) | V | -6.3 | 74.0 | 54.0 | 50.1 | - |
| 1337.00 | 57.3 | ***) | V | -5.7 | 74.0 | 54.0 | 51.6 | - |
| 1485.00 | 67.8 | 53.9 | H | -5.3 | 74.0 | 54.0 | 62.5 | 48.6 |
| 1597.00 | 55.2 | ***) | V | -5.2 | 74.0 | 54.0 | 50.0 | - |
| 1633.00 | 56.5 | ***) | H | -5.1 | 74.0 | 54.0 | 51.4 | - |

NOTES : Measurements using peak mode & average mode.

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

► 1 GHz ~ 2 GHz (Analog D-Sub mode, SMPS : 0627D04349)

| Frequency (MHz) | Reading (dB μ V) | | Pol* (H/V) | AF+CL+Amp (dB)** | Limit (dB μ V/m) | | Final Result(dB μ V/m) | |
|--------------------|----------------------|---------|---------------|---------------------|----------------------|---------|----------------------------|---------|
| | Peak | Average | | | Peak | Average | Peak | Average |
| 1063.00 | 65.6 | 45.7 | V | -6.5 | 74.0 | 54.0 | 59.1 | 39.2 |
| 1289.00 | 62.3 | 41.9 | V | -5.9 | 74.0 | 54.0 | 56.4 | 36.0 |
| 1369.00 | 60.2 | 41.2 | V | -5.5 | 74.0 | 54.0 | 54.7 | 35.7 |
| 1596.00 | 63.7 | 43.8 | V | -5.2 | 74.0 | 54.0 | 58.5 | 38.6 |
| 1821.00 | 58.6 | 38.2 | V | -4.4 | 74.0 | 54.0 | 54.2 | 33.8 |

NOTES : Measurements using peak mode & average mode.

Table 11. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

► 1 GHz ~ 2 GHz (HDMI mode, SMPS : 0627D04349)

| Frequency (MHz) | Reading (dB μ V) | | Pol* (H/V) | AF+CL+Amp (dB)** | Limit (dB μ V/m) | | Final Result(dB μ V/m) | |
|--------------------|----------------------|---------|---------------|---------------------|----------------------|---------|----------------------------|---------|
| | Peak | Average | | | Peak | Average | Peak | Average |
| 1118.00 | 57.8 | ***) | V | -6.4 | 74.0 | 54.0 | 51.4 | - |
| 1337.00 | 56.7 | ***) | H | -5.7 | 74.0 | 54.0 | 51.0 | - |
| 1485.00 | 66.7 | 53.0 | H | -5.3 | 74.0 | 54.0 | 61.4 | 47.7 |
| 1592.00 | 57.7 | ***) | V | -5.2 | 74.0 | 54.0 | 52.5 | - |
| 1633.00 | 54.0 | ***) | H | -5.1 | 74.0 | 54.0 | 48.9 | - |
| 1930.00 | 52.7 | ***) | H | -3.7 | 74.0 | 54.0 | 49.0 | - |

NOTES : Measurements using peak mode & average mode.

Table 12. Radiated Measurements at 3 meters (1920 x 1080, 60 Hz)

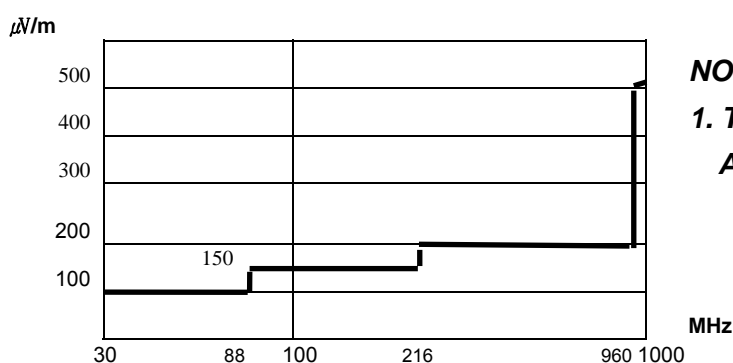


Fig. 4. Limits at 3 meters

NOTES:

1. The radiated limits are shown on Figure 4.
Above 1 GHz the limit is 500 μ V/m.

NOTES:

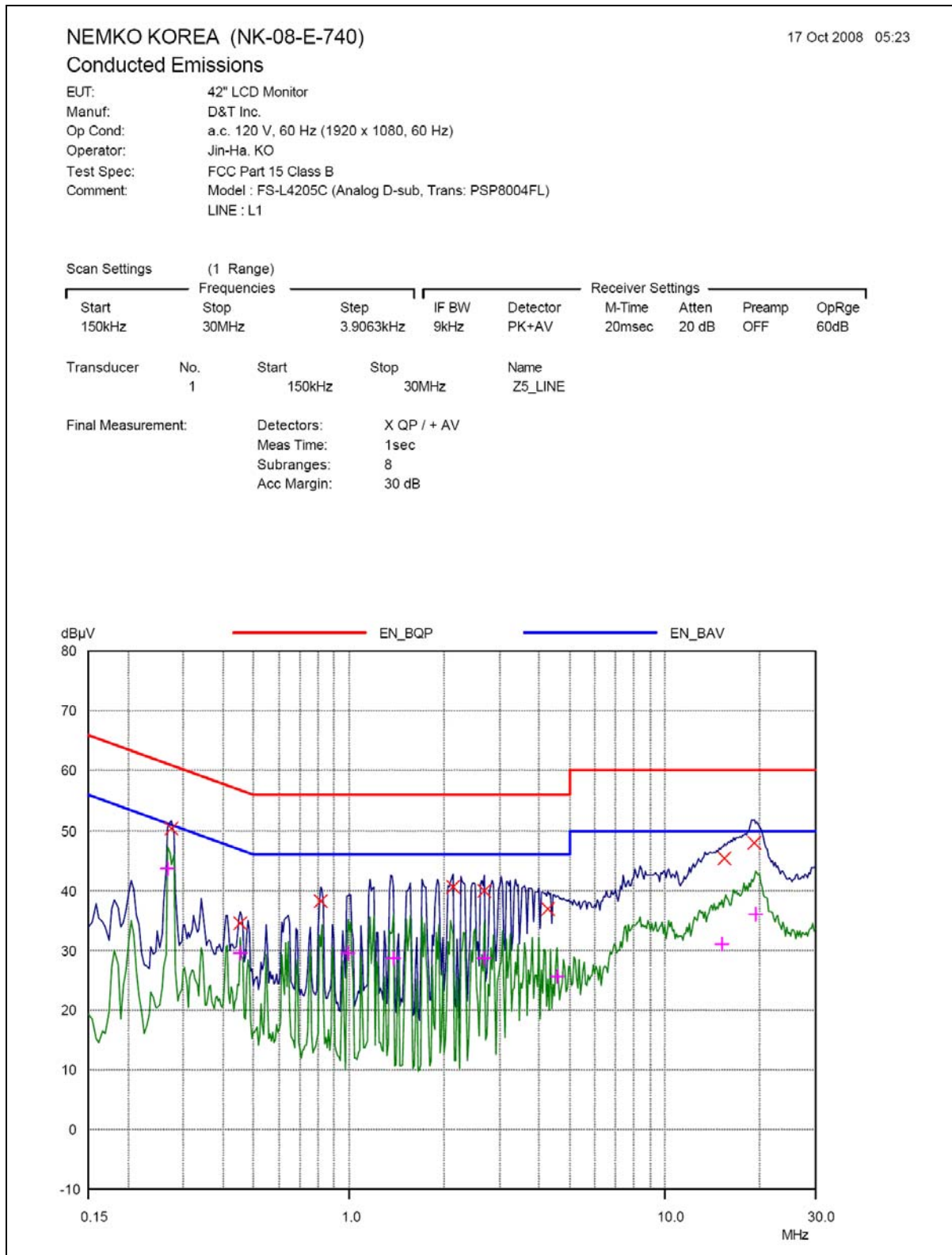
1. **Pol. H=Horizontal V=Vertical*
2. ***AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.*
3. **** average limit is met when using a peak detector receiver, the EUT was deemed to meet both limits and measurement with the average detector receiver is unnecessary.*
4. *The limit for Class B device is on the FCC Part section 15.109(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 30 Hz.*
Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

A blue ink signature, appearing to be 'J. H. Ko', is written over a horizontal line.

Tested by : **J. H. Ko**

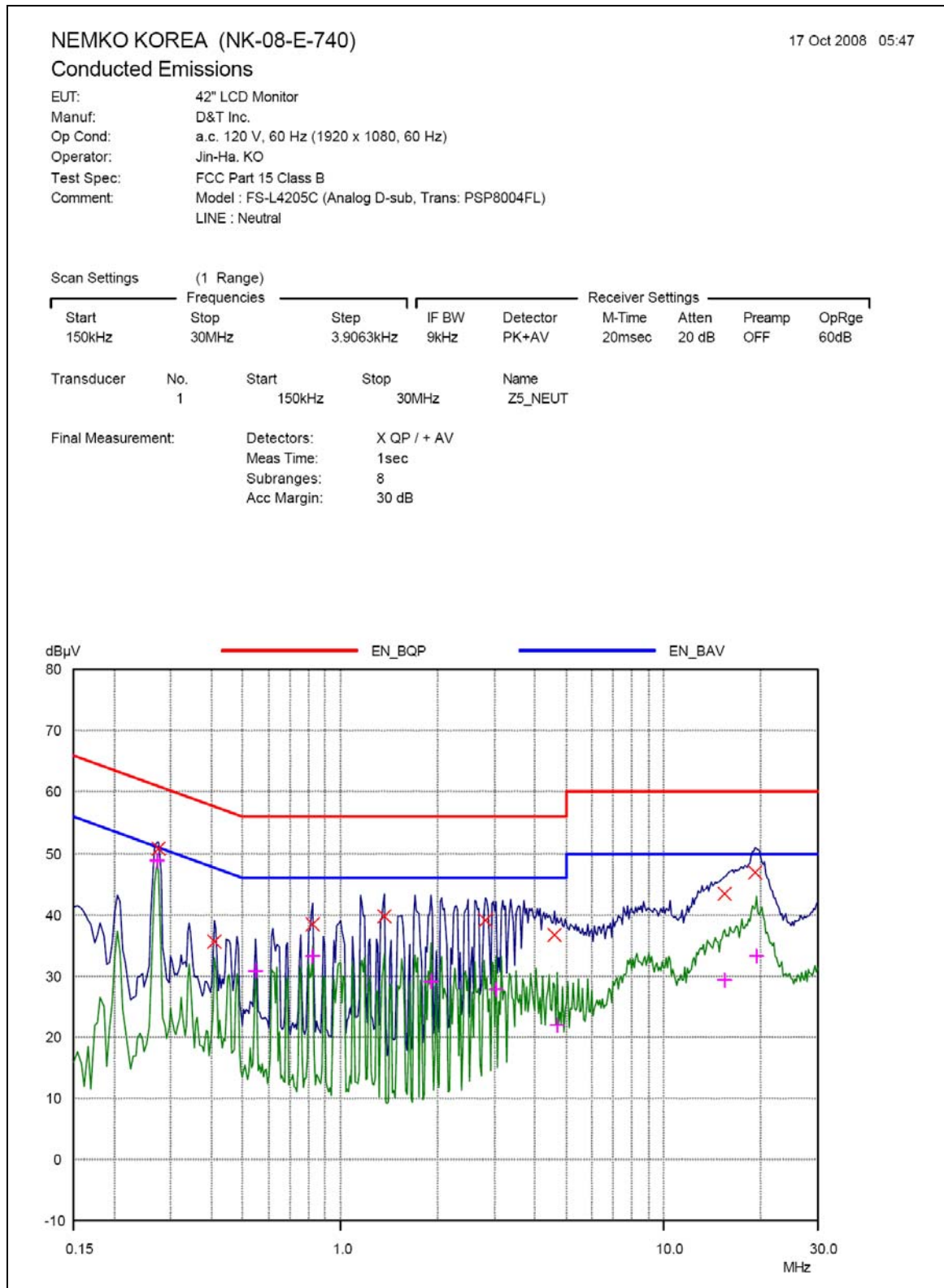
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (Analog D-Sub mode (SMPS : 0627D04349(R1), Line)



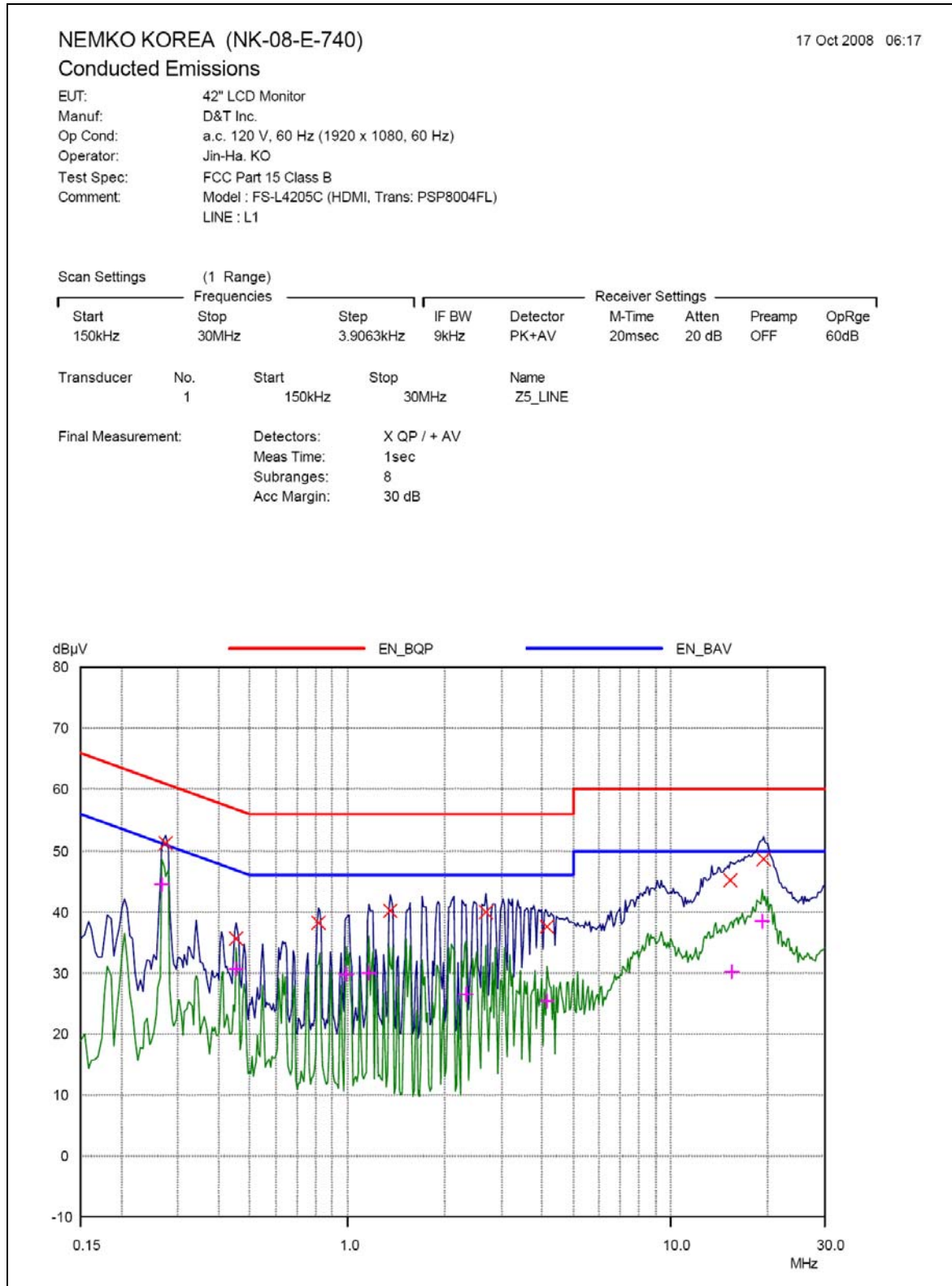
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (Analog D-Sub mode (SMPS : 0627D04349(R1), Neutral)



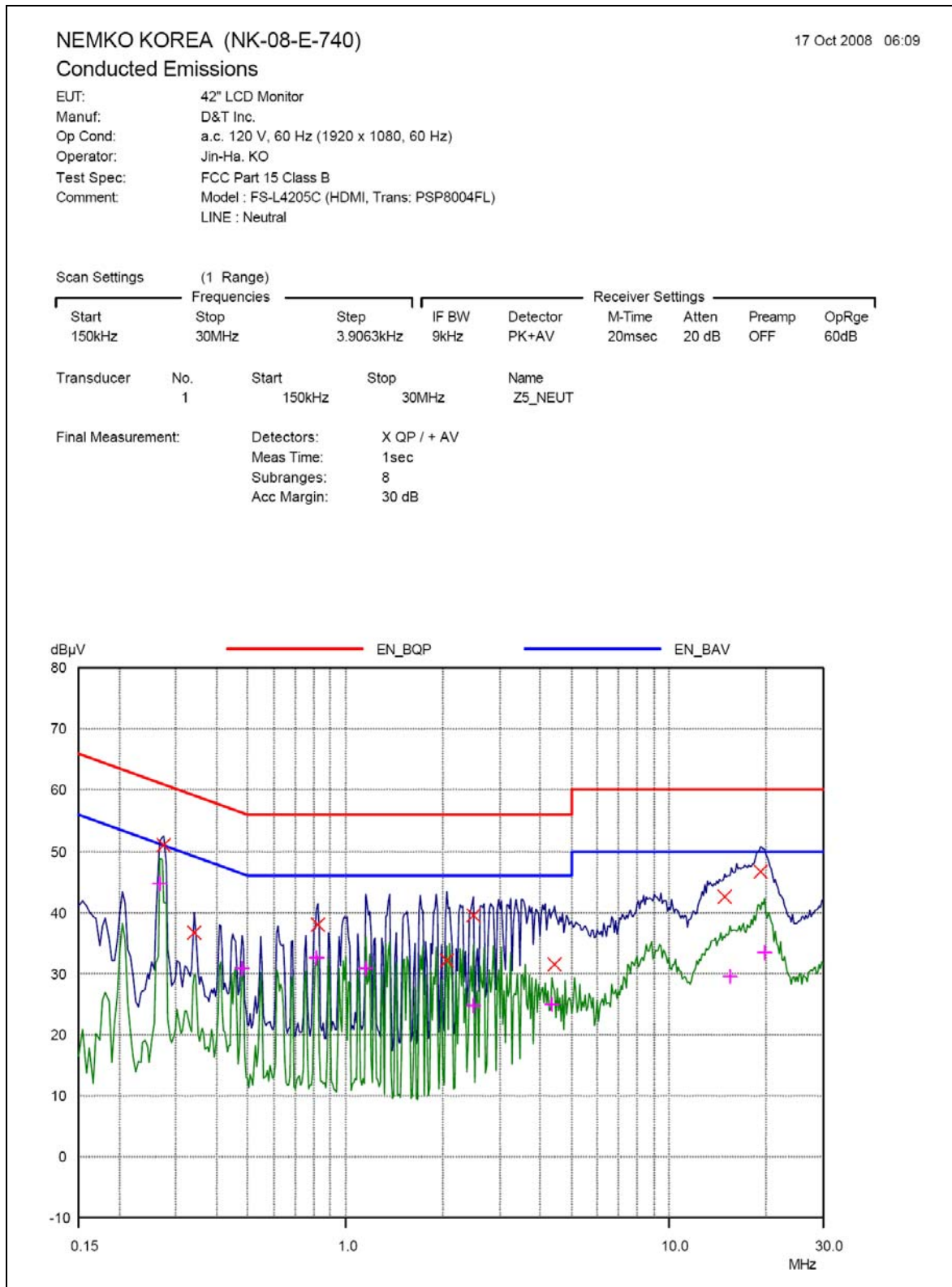
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (HDMI mode (SMPS : 0627D04349(R1), Line)



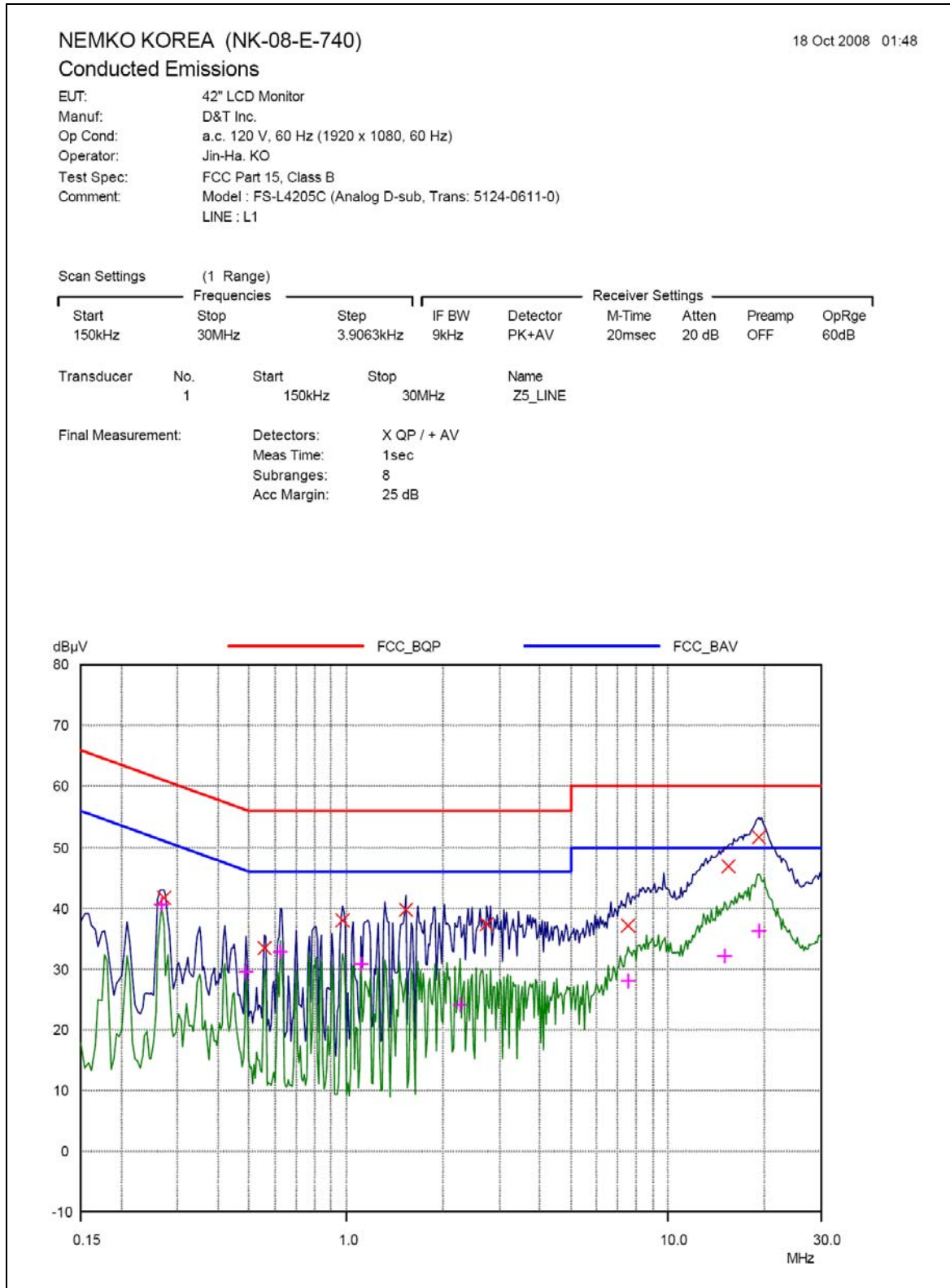
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (HDMI mode (SMPS : 0627D04349(R1), Neutral))



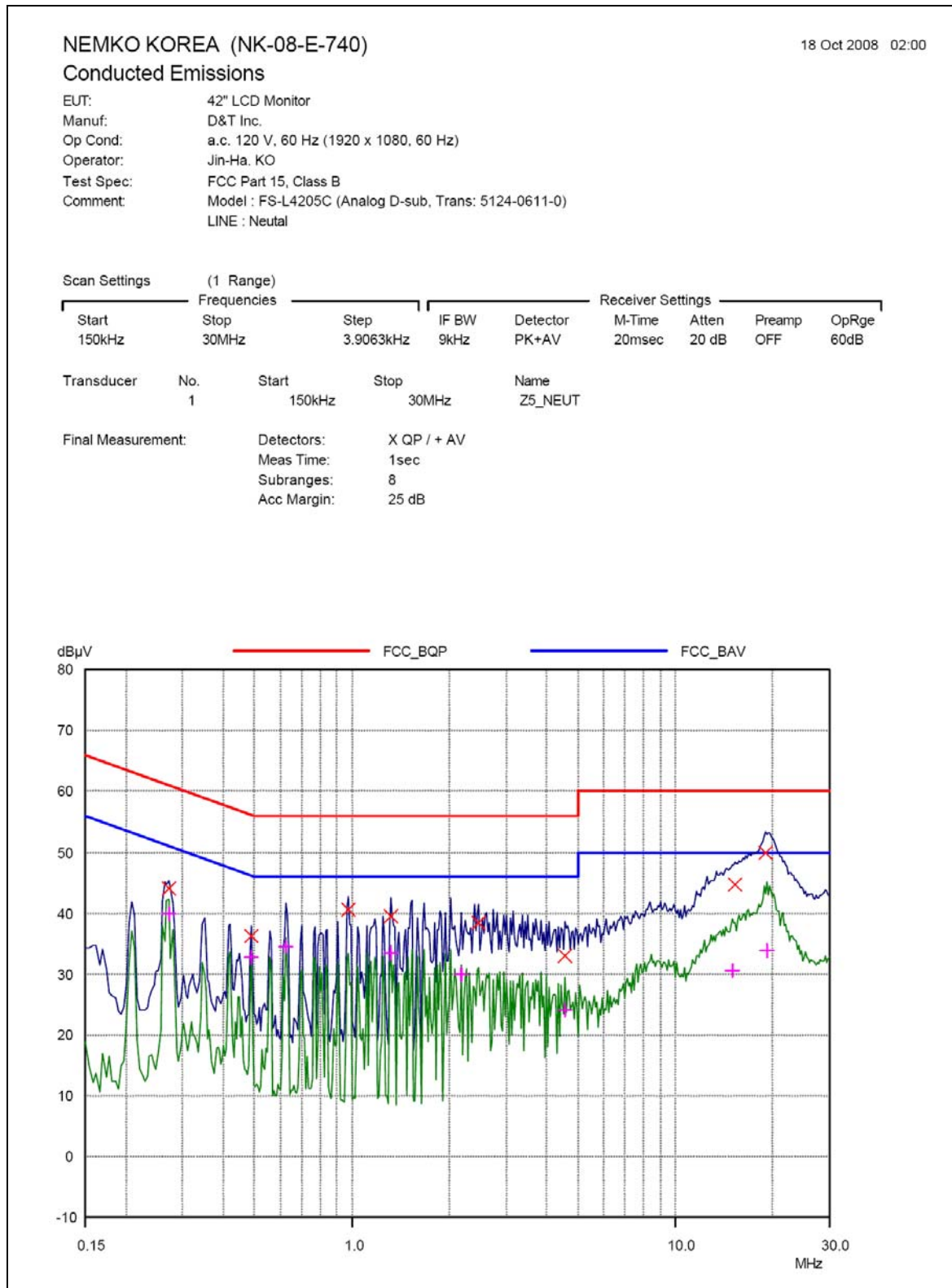
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (Analog D-Sub mode (SMPS : 0627D04349), Line)



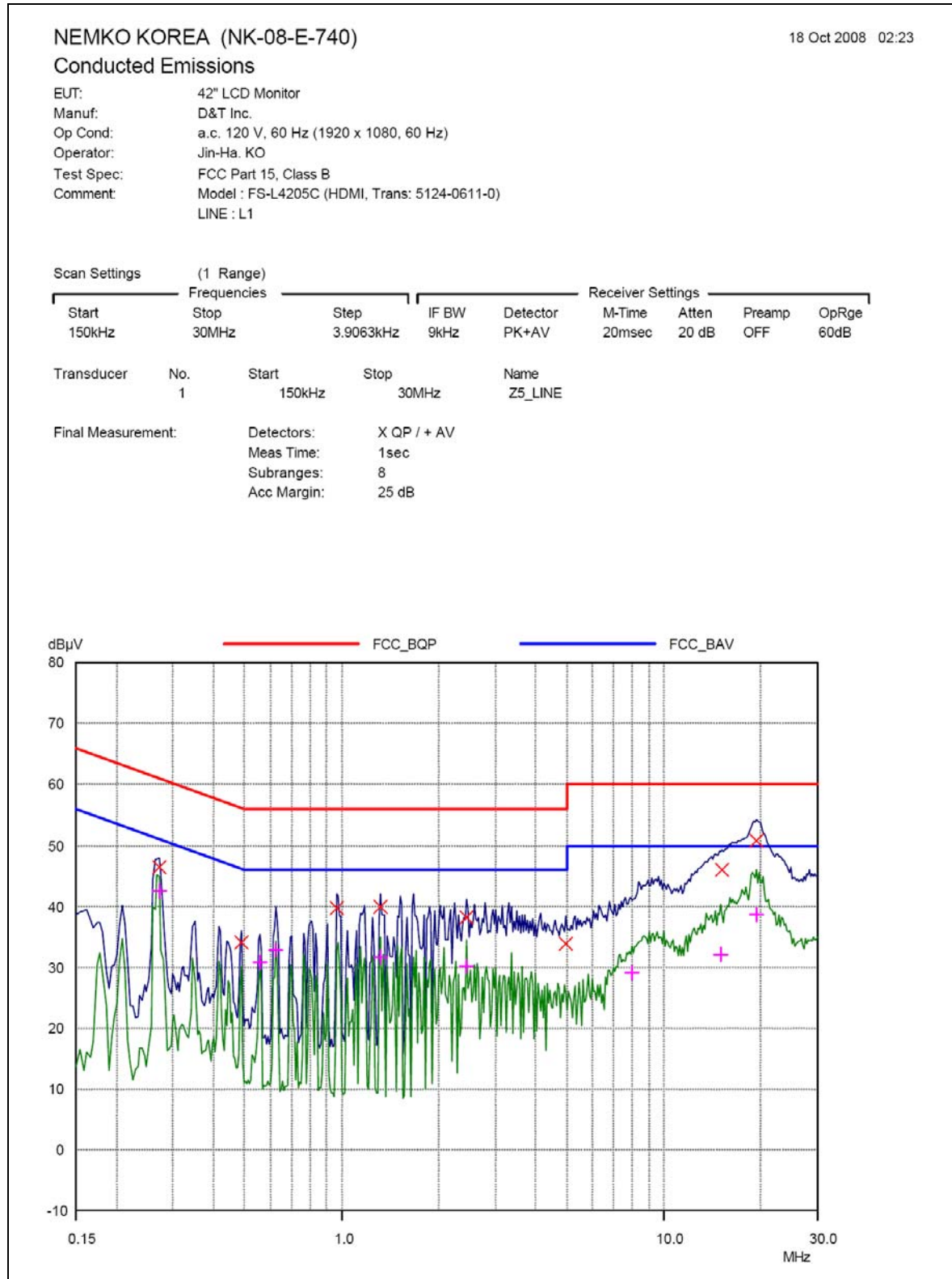
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (Analog D-Sub mode (SMPS : 0627D04349), Neutral)



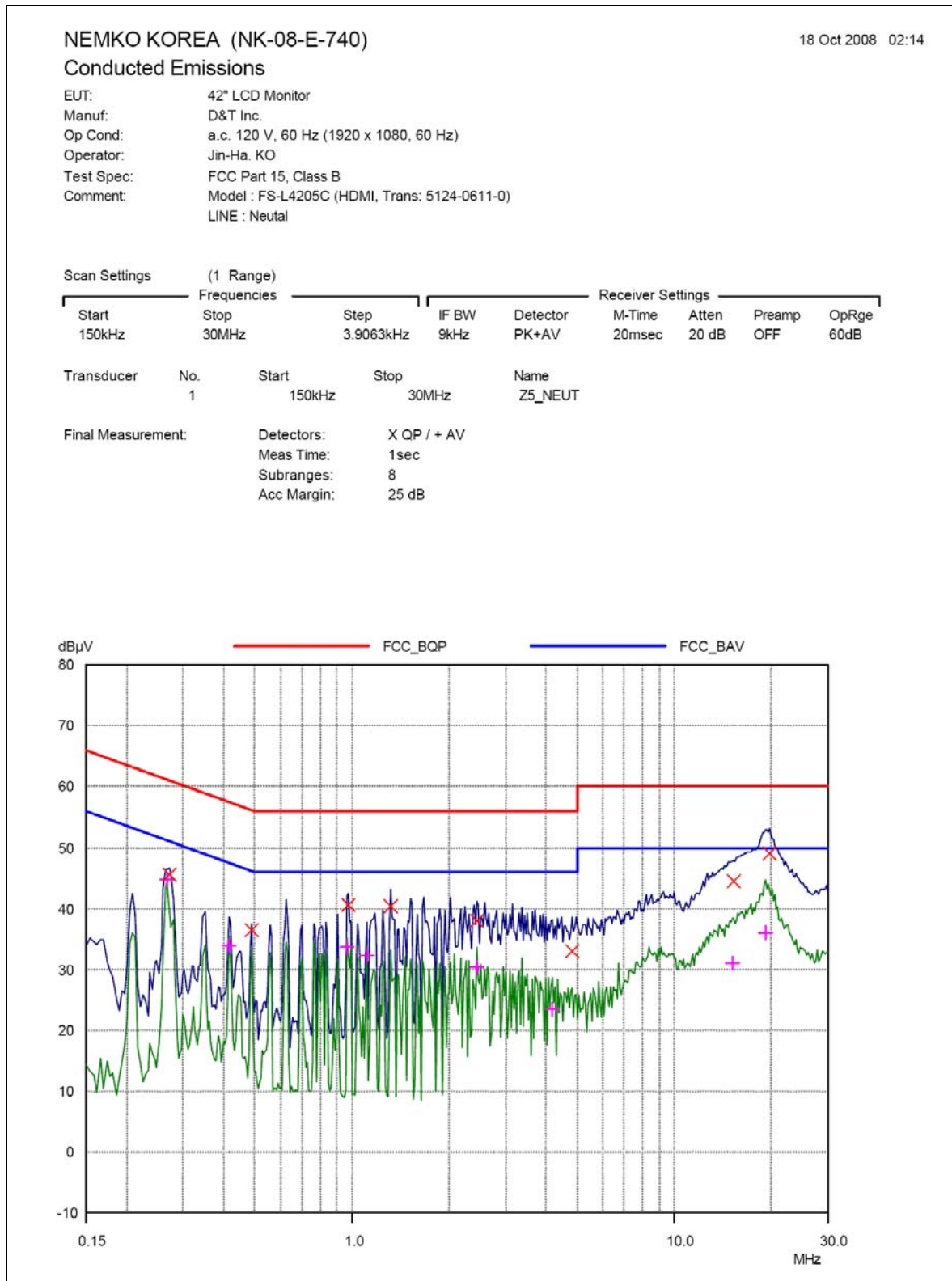
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (HDMI mode (SMPS : 0627D04349), Line)



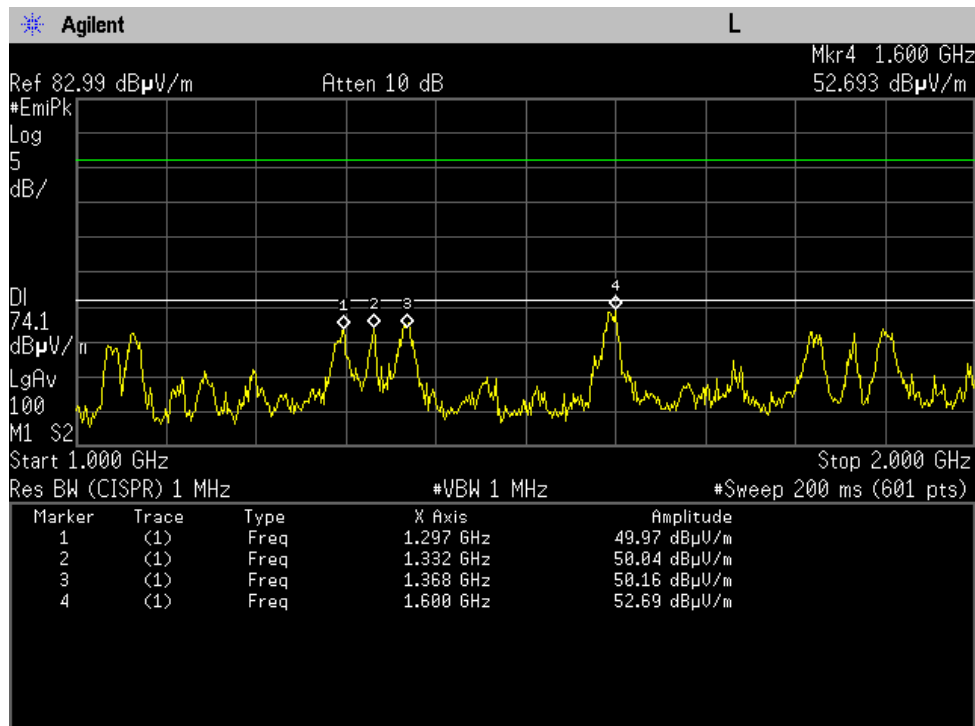
PLOTS OF EMISSIONS

- Conducted Emission at the Mains port (HDMI mode (SMPS : 0627D04349), Neutral)

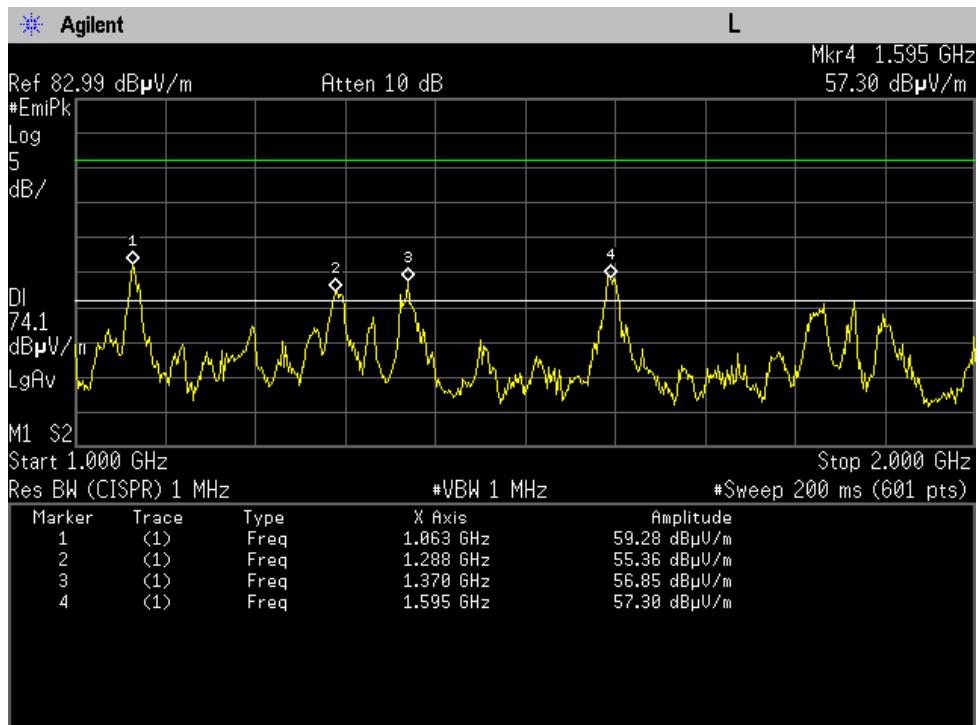


PLOTS OF EMISSIONS

- Radiated Emission (Analog D-Sub_SMPS : 0627D04349(R1), Above 1 GHz)



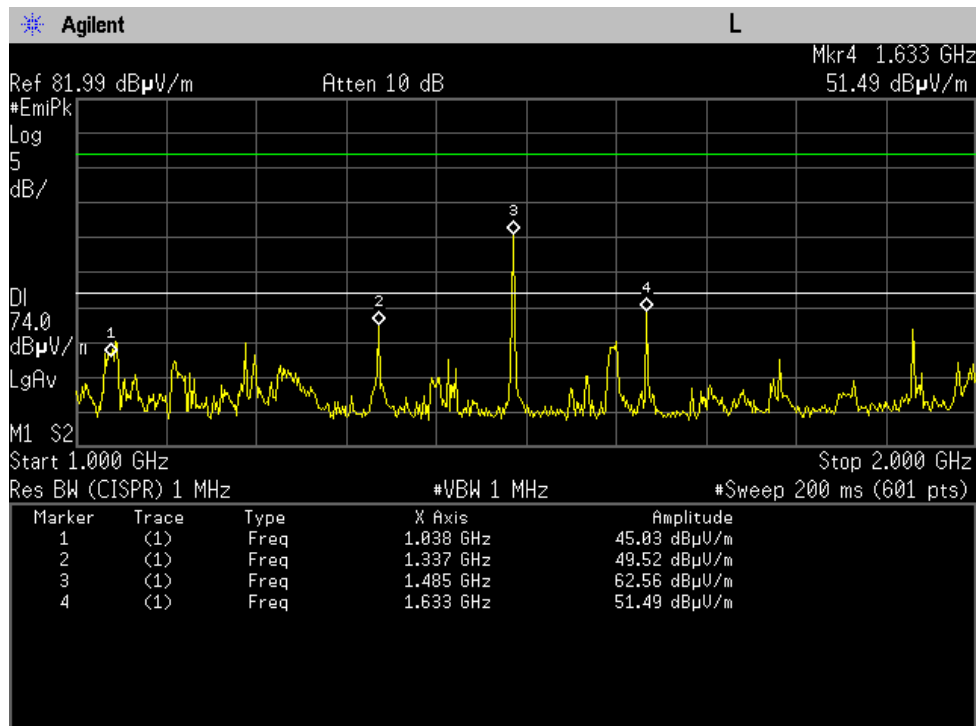
[Horizontal]



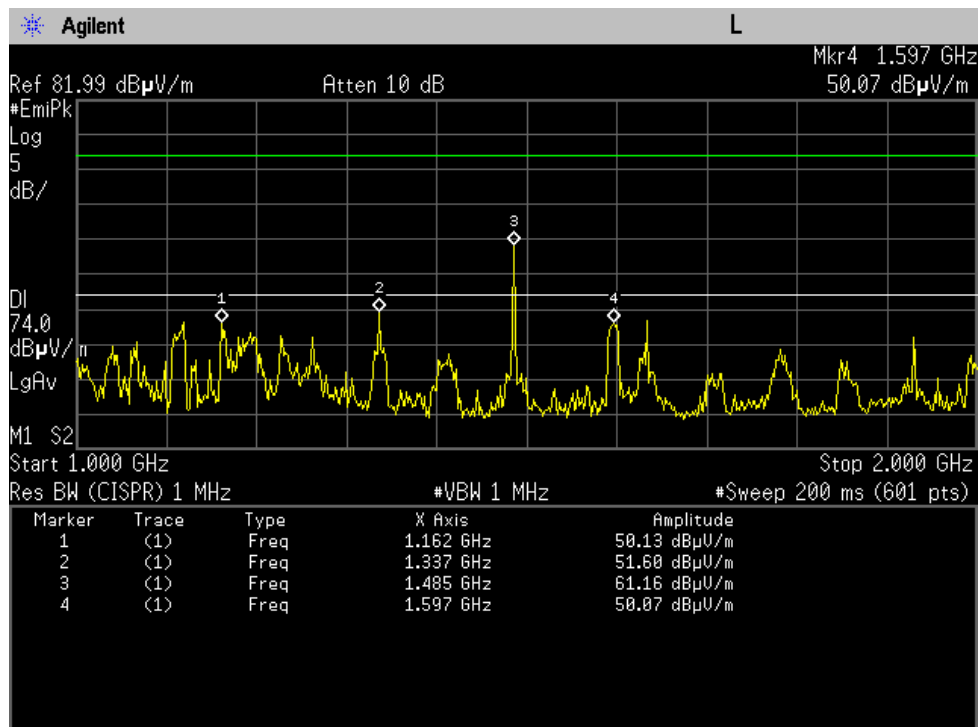
[Vertical]

PLOTS OF EMISSIONS

- Radiated Emission (HDMI_ SMPS : 0627D04349(R1), Above 1 GHz)



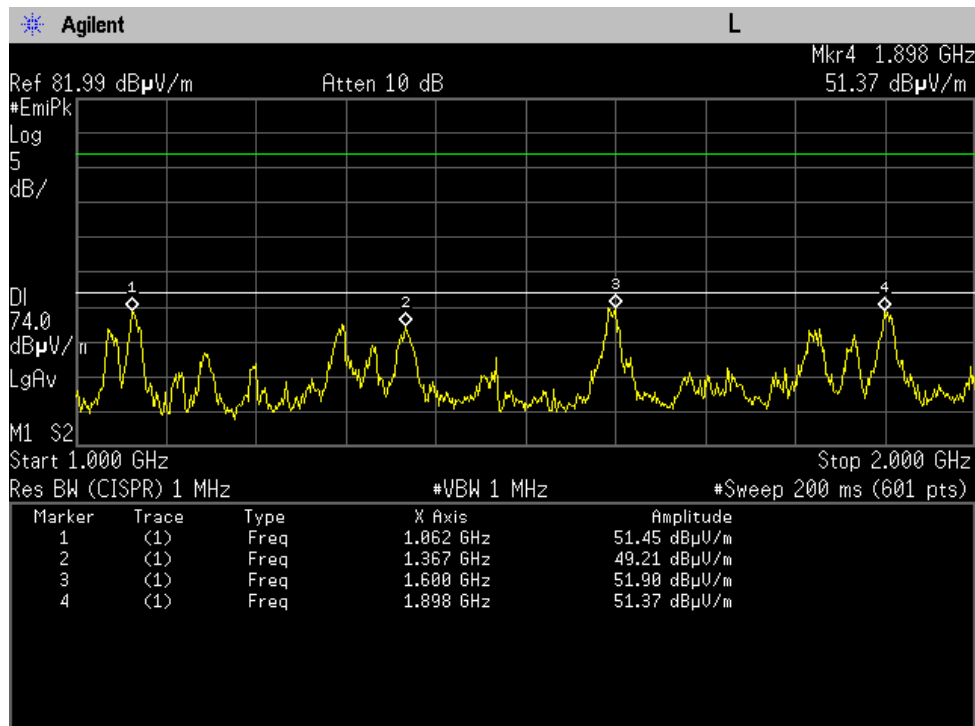
[Horizontal]



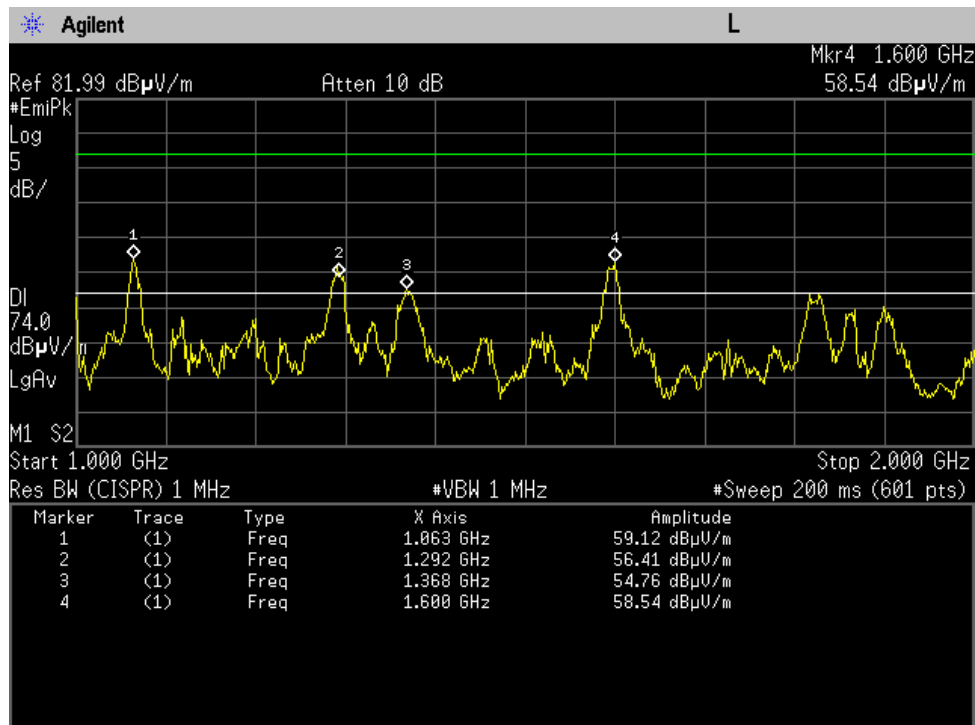
[Vertical]

PLOTS OF EMISSIONS

- Radiated Emission (Analog D-Sub_SMPS : 0627D04349, Above 1 GHz)



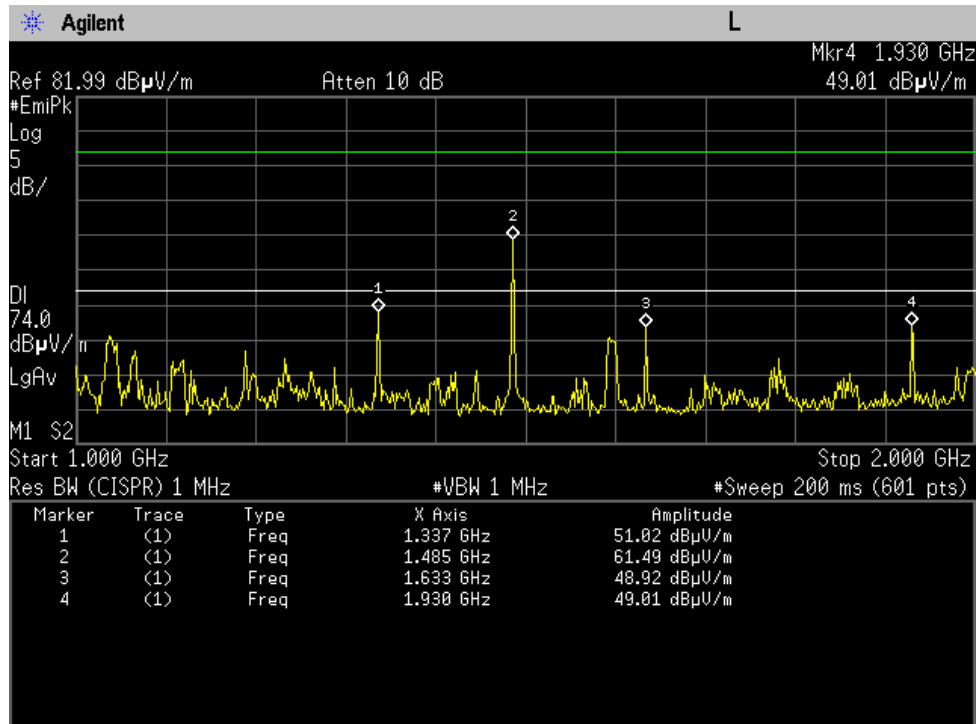
[Horizontal]



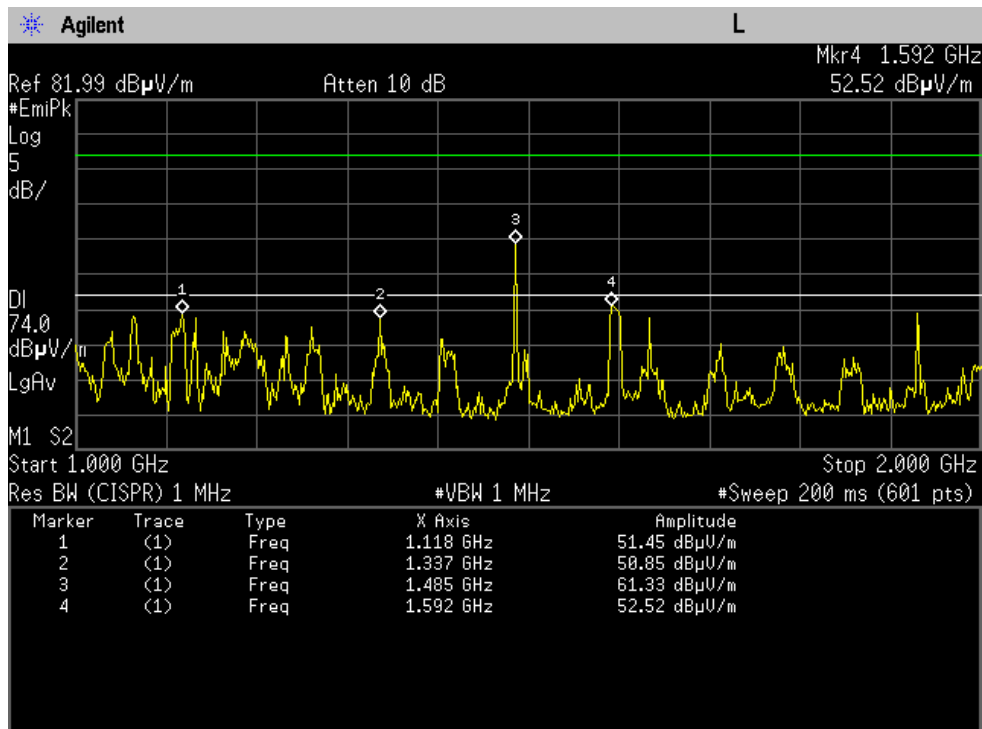
[Vertical]

PLOTS OF EMISSIONS

- Radiated Emission (HDMI_ SMPS : 0627D04349, Above 1 GHz)



[Horizontal]



[Vertical]

ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 with the confidence level of 95 %

1. Radiation Uncertainty Calculation

| <i>Contribution</i> | <i>Probability Distribution</i> | <i>Uncertainty(+/-dB)</i> |
|---|---------------------------------|---------------------------|
| Antenna Factor | Normal ($k = 2$) | ± 0.5 |
| Cable Loss | Normal ($k = 2$) | ± 0.04 |
| Receiver Specification | Rectangular | ± 2.0 |
| Antenna directivity | Rectangular | ± 1.0 |
| Antenna Factor variation with Height | | |
| Antenna Phase Center Variation | | |
| Antenna Factor Frequency Interpolation | | |
| Measurement Distance Variation | | |
| Site Imperfections | Rectangular | ± 2.0 |
| Mismatch:Receiver VRC $r_i=0.3$ Antenna VRC $r_R=0.1(B_i)0.4(L_p)$ Uncertainty Limits $20\log(1+/-r_i r_R)$ | U-Shaped | $+ 0.25 / - 0.26$ |
| System Repeatibility | Std.deviation | ± 0.05 |
| Repeatability of EUT | - | - |
| Combined Standard Uncertainty | Normal | ± 1.77 |
| Expended Uncertainty U | Normal ($k = 2$) | ± 3.5 |

2. Conducted Uncertainty Calculation

| <i>Contribution</i> | <i>Probability Distribution</i> | <i>Uncertainty(+/-dB)</i> |
|---|---------------------------------|---------------------------|
| Receiver Specification | Normal ($k = 2$) | ± 2.0 |
| LISN coupling spec. | Normal ($k = 2$) | ± 0.4 |
| Cable and input attenuator cal. | Rectangular | ± 0.4 |
| Mismatch:Receiver VRC $r_i=0.3$ LISN vrc $r_g=0.1$ Uncertainty Limits $20\log(1+/-r_i r_R)$ | U-Shaped | ± 0.26 |
| System Repeatibility | Std.deviation | ± 0.68 |
| Repeatability of EUT | - | - |
| Combined Standard Uncertainty | Normal | ± 1.18 |
| Expended Uncertainty U | Normal ($k = 2$) | ± 2.4 |

LIST OF TEST EQUIPMENT

| No. | Instrument | Manufacturer | Model | Serial No. | Calibration Date | Calibration Interval |
|-----|---------------------------------------|---------------|------------|------------|------------------|----------------------|
| 1 | *Test Receiver | R & S | ESCS 30 | 833364/020 | Apr. 01 2008 | 1year |
| 2 | *Test Receiver | R & S | ESCS 30 | 100302 | Dec. 03 2007 | 1year |
| 3 | *Amplifier | HP | 8447F | 2805A03427 | Jul. 21 2008 | 1year |
| 4 | Amplifier | HP | 8447F | 2805A03351 | Oct. 23 2007 | 1year |
| 5 | *Amplifier | HP | 8447F | 2805A03406 | Apr. 17 2008 | 1year |
| 6 | *Pre Amplifier | HP | 8449B | 3008A00107 | Feb. 27 2008 | 1year |
| 7 | Spectrum Analyzer | Advantest | R3265A | 45060401 | Dec. 04 2007 | 1year |
| 8 | *Spectrum Analyzer | R & S | FSP40 | 100361 | Sep. 04,2008 | 1year |
| 9 | *Spectrum Analyzer | Agilent | E4440A | MY44022567 | Dec. 04, 2007 | 1year |
| 10 | Spectrum Analyzer | HP | 8566B | 2607A03469 | Feb. 27 2008 | 1year |
| 11 | Loop Antenna | EMCO | EMCO/6502 | 8911-2436 | Dec. 13 2007 | 1year |
| 12 | Biconical Log Antenna | ARA | LPB-2520/A | 1180 | Apr. 21 2008 | 1year |
| 13 | *Biconical Log Antenna | ARA | LPB-2520/A | 1209 | Dec. 31 2007 | 1year |
| 14 | *Trilog-Broadband Antenna | SCHWARZBECK | VULB 9168 | 9168-257 | Apr. 21 2008 | 1year |
| 15 | *Double Ridged Broadband Horn Antenna | SCHWARZBECK | BBHA9120D | 9120D-474 | June. 13 2008 | 1year |
| 16 | Signal Generater | R & S | SMP02 | 833286/003 | Jul. 21 2008 | 1year |
| 17 | *LISN | R & S | ESH2-Z5 | 100227 | Sep. 02 2008 | 1year |
| 18 | *LISN | Kyoritsu | KNW-407 | 8-1034-10 | Feb. 27 2008 | 1year |
| 19 | *Position Controller | DAEIL EMC | N/A | N/A | N/A | N/A |
| 20 | *Turn Table | DAEIL EMC | N/A | N/A | N/A | N/A |
| 21 | *Antenna Mast | DAEIL EMC | N/A | N/A | N/A | N/A |
| 22 | *Anechoic Chamber | EM Eng. | N/A | N/A | N/A | N/A |
| 23 | *Shielded Room | EM Eng. | N/A | N/A | N/A | N/A |
| 24 | *Position Controller | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 25 | *Turn Table | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 26 | *Antenna Mast | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 27 | *Anechoic Chamber | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 28 | *Shielded Room | 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
