

EMC TEST REPORT

Samsung Electronics Co., Ltd.

416 Maetan 3-Dong, Yeongtong-Gu,
Suwon-Si, Gyeonggi-Do, 443-742 Korea
(Tel: 031 277 7752, Fax: 031 277 7753)

Project No. : LBE060453

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**1. Applicant**

- Name of organization : Samsung Electronics Co., Ltd.
- Address : 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si,
Gyeonggi-Do, 443-742 Korea
- Date of application : 2006. 02. 27

2. Purpose for the report : Approval for EMC**3. Kind of product : Laser MFP(Model name : Dell Laser MFP 1815dn)****4. Date of test : 2006.02. 14 ~ 2006.02.14****5. Applied standard : FCC Part 15:2003 Subpart B****6. Test result : PASS**

The equipment under test has found to be compliant with the applied standards.

(Refer to the attached test result for more detail.)

7. FCC ID : A3LLASERMFP1815dn

Tested by

Name : Sang Kyu, Seo

Reviewed by

Name : No Cheon Park

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.

2006. 02. 27

Samsung Electornics Co., Ltd.
Chief of CS Management Center

TEST RESULT

Test Report No. : LBE060453

Applicant / Address : Samsung Electronics Co., Ltd.
416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do
443-742 Korea

Manufacture / Address : 1) Samsung Electronics Co., Ltd.
259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea
2) Shandong Samsung Telecommunications Co., Ltd.
264209, Samsugn (Sanxing) Road, Weihai Hi-Tech. IDZ, Shandong
Province, P.R.China

EUT : 1. Product name : Laser MFP
2. Model name : Dell Laser MFP 1815dn
3. Brand name : Samsung
Variant model : Dell Laser MFP 1815n

Test Method : ANSI C 63.4:2003

Test Result : **PASS**
The equipment under test has found to be compliant
with the applied standards

Test Lab. : CS Management Center, Samsung Electronics Co., Ltd.



Tested by : Sang Kyu, Seo

Reviewed by : No Cheon Park

Date of Issue : 2006. 02. 27

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1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	Dell Laser MFP 1815dn
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea
Contact person	Sang Su, Roh
Kind of product	Laser MFP
Valiant model	-
Manufacturer	1) Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea 2) Shandong Samsung Telecommunications Co., Ltd. 264209, Samsugn (Sanxing) Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China
Rated power	AC 120 V, 60 Hz
New / Alternative / Permissive change information	Permissive change 1. Main PBA version Up : Rev 0.2 => Rev 0.3 2. HVPS PBA version Up : Rev 0.4 => Rev 1.0 3. SMPS PBA version Up : Rev 0.92 => Rev 0.93 4. CCD Module version Up : Rev B => Rev G 5. Harness ferrite core add USB Host harness & LSU_SW harness 6. Main Bracket shield tape add

1.2 Detail Information related product

1.2.1 Specification

Item	Specification	Remark
Power rating	220 - 240 VAC, 50/60 Hz, 3.2 A	-
Power consumption	Average : 520 W Power save mode : Less than 10 W	-
Display	16 characters x 2 lines	-
Toner cartridge life	4,000 or 8,000 pages at ISO 19752 5% coverage	-
Memory	Dell Laser MFP 1815n: 64 MB (max. 320 MB) Dell Laser MFP 1815dn: 96 MB (max. 320 MB)	-
External dimension	467,5 x 435,5 x 458 mm (W x D x H)	-
Weight	17,5 Kg (including consumables)	-
Printing method	Laser Beam Printing	-
Printing speed	Up to 28 ppm in A4 (30 ppm in Letter)	-
Duplex printing speed	(Dell Laser MFP 1815dn ONLY) Up to 19 ipm in A4 (21 ipm in Letter)	-

Print resolution	Up to 1,200 x 1,200 dpi effective output	-
Interface	High Speed USB 2.0 Ethernet 10/100 Base TX(Embedded type)	-
Scanning method	ADF and Flat-bed Color CCD (Charge Coupled Device)	-
Scan Resolution	Optical: 600 x 1,200 dpi (mono and color) Enhanced: 4,800 x 4,800 dpi	-
Copy speed	Up to 28 ppm in A4 (30 ppm in Letter)	-
Copy resolution	Scan: up to 600 x 300 (text, text/photo) up to 600 x 600 (photo using platen) up to 600 x 300 (photo using ADF) Print: up to 600 x 600 (text, text/photo, photo)	-
Modem speed	33,6 Kbps	-
Fax Resolution	Standard:203 x 98 dpi Fine: 203 x 196 dpi Super Fine: 300 x 300 dpi Photo: 203 x 196 dpi Color: 200 x 200 dpi	-
Fax Memory	8 MB	-
Fax Data coding	MH/MR/MMR/JPEG/ECM (Error Correction Mode)	-

1.3 Operating mode and condition

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O port. Where applicable, peripherals were attached to the I/O cables.

This EUT is supporting the USB and Network(LAN) printing, Fax Tx and Rx mode, Copy machine, Scanner function.

In each test mode, finally we found worst case emission. So, the data of the maximum EUT operation, ADF Copy was reported.

1.4 Equipment modifications

No equipment modifications were required.

1.5 Test procedure

1.5.1 Conducted emission

EUT was placed on a platform nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting ground plane.

The rear of EUT, including peripherals was aligned and flush with rear of tabletop.

All other surfaces of tabletop was at least 80 cm from any other grounded conducting surface.

I/O cables and AC cables that were connected to the peripherals were bundled in center.

They were folded back and forth forming a bindle 30 cm to 40 cm long and were handed at a 40 cm height to the ground plane.

Each EUT current-carrying power lead, except the ground(safety) lead, were individually connected through a LISN to the input power source.

All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
0.15 to 30	EMI Receiver	Quasi-Peak	9 kHz	-
		Average	9 kHz	-

1.5.2 Radiated emission

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of EUT, including peripherals was aligned and flush with rear of tabletop.

The I/O cables that were connected to the peripherals were bundle in center.

They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged 40 cm height to the ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane and the turntable azimuth was varied to obtain the maximum signal strength

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 1 000 MHz using biconiLog antenna.

Also, the EMI Receiver was scanned from 1 000 to 2 000 MHz using linearly polarization

Double ridge horn antennas were used. The explanation of measuring instrument setup when

Respective function is used in any frequency band is as following;

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1 000	EMI Receiver	Quasi-Peak	120 kHz	-
Above 1 000	EMI Receiver	Peak	1 MHz	1 MHz

1.6 Test configuration

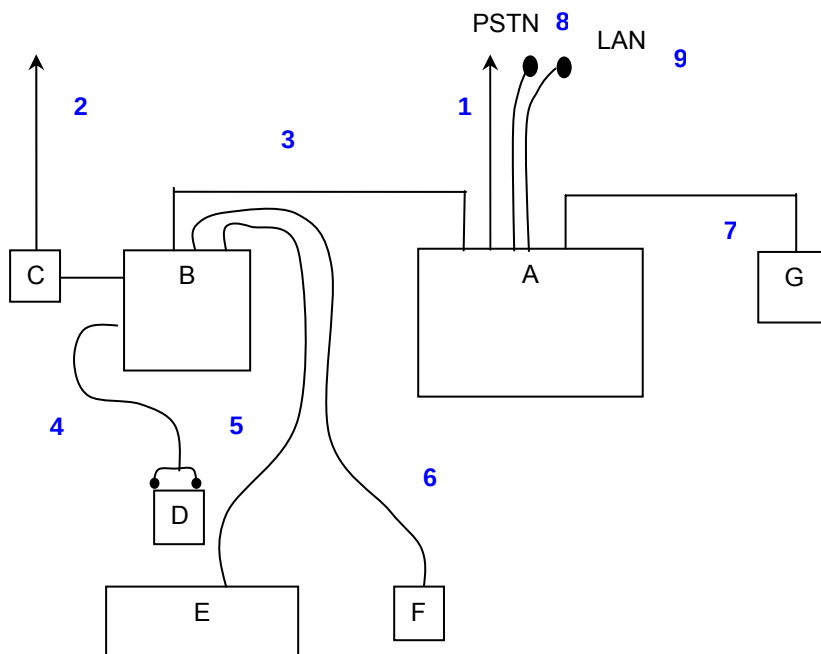
1.6.1 Used EUT and peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	Laser MFP	Dell Laser MFP 1815dn	–	Samsung	EUT
B	Note PC	PP03L	TW-049102-70161-23K-JOV7.	Dell	DoC
C	AC Adaptor	Adp-90fb	–	Dell	
D	Headset	Axis-202	–	Labtec	–
E	PS/2 Keyboard	SK-8110	CN-07N242-71616-55J-005U	Dell	DoC
F	Serial Mouse	C3KMS1	1020764	Microsoft	FCC ID:C3KMS1
G	Phone	SP-F209	KKAY972399A	Samsung	–

1.6.2 Used cable description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	AC power cable	1.7	No	For printer
2	AC power cable	1.7	No	For note pc
3	USB	2.0	Yes	From printer to pc
4	Headset	1.8	No	From printer to headset
5	PS/2	1.8	Yes	From printer to keyboard
6	Serial	1.8	Yes	From printer to mouse
7	RJ11C	2.0	No	From printer to phone
8	RJ11C	2.0	No	From printer to PSTN
9	RJ45C	3.0	No	From printer to hub

1.6.3 Block diagram



1.7 Applied Standards

Test standard	Test method
FCC Part 15:2003 Subpart B	ANSI C63.4:2003

1.8 Test Facility

1.8.1 General information

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 22, 16-1, 16-2.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement

(MRA) for the above test item(s) and test method(s).

This Lab. is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:1998.

1.8.2 Accreditation and listing



1.8.3 Measurement uncertainty

(According to CISPR 16-4 and Lab. 34)

Test item	Measurement uncertainty
Conducted emission	± 3.3 dB
Radiated emission Horizontal	± 4.0 dB
Vertical	± 4.4 dB

2. Summary of test results

Result : PASS

The equipment under test(EUT) has been found to comply with the applied standards.

Section of the product standard		Applied standard	Test result
3.1	Conducted Emission	FCC Part 15:2003 Subpart B	Complied
3.2	Radiated Emission	FCC Part 15:2003 Subpart B	Complied

3. Description of individual tests

3.1 Conducted emission

3.1.1 Test information

Test engineer	Sang Kyu, Seo
Test date	February 14, 2006
Climate condition	Ambient temperature : 20.4 °C, Relative humidity : 39 % Atmospheric pressure 1 009 hPa
Test place	Shielded room # 1

3.1.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Next date	Interval (Month)
Test Software	EMC 32	R&S	None	N/A	N/A
Field strength meter	ESCI	R&S	100136	2006-04-17	12
L.I.S.N	ENV216	R&S	100116	2006-09-08	12
L.I.S.N	ENV216	R&S	100107	2006-08-18	12

EUT Test Setup

The EUT was set up as per normal use on a wooden table, 0.4 m from a vertical ground reference plane, At least 0.8 m from other conduction surfaces and 0.8 m from the LISN.

See photo.

Test Result

Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.
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SAMSUNG ELECTRONICS EMC Report

Test Information

EUT Name: Dell Laser MFP 1815DN
Serial Number:
Test Description: 1200dpi Duplex Printing / Toner save=On
Operating Conditions: 110V / 60Hz
Operator Name: SSK
Comment:

Hardware Setup: Voltage with 2-Line-LISN - [EMI conducted]

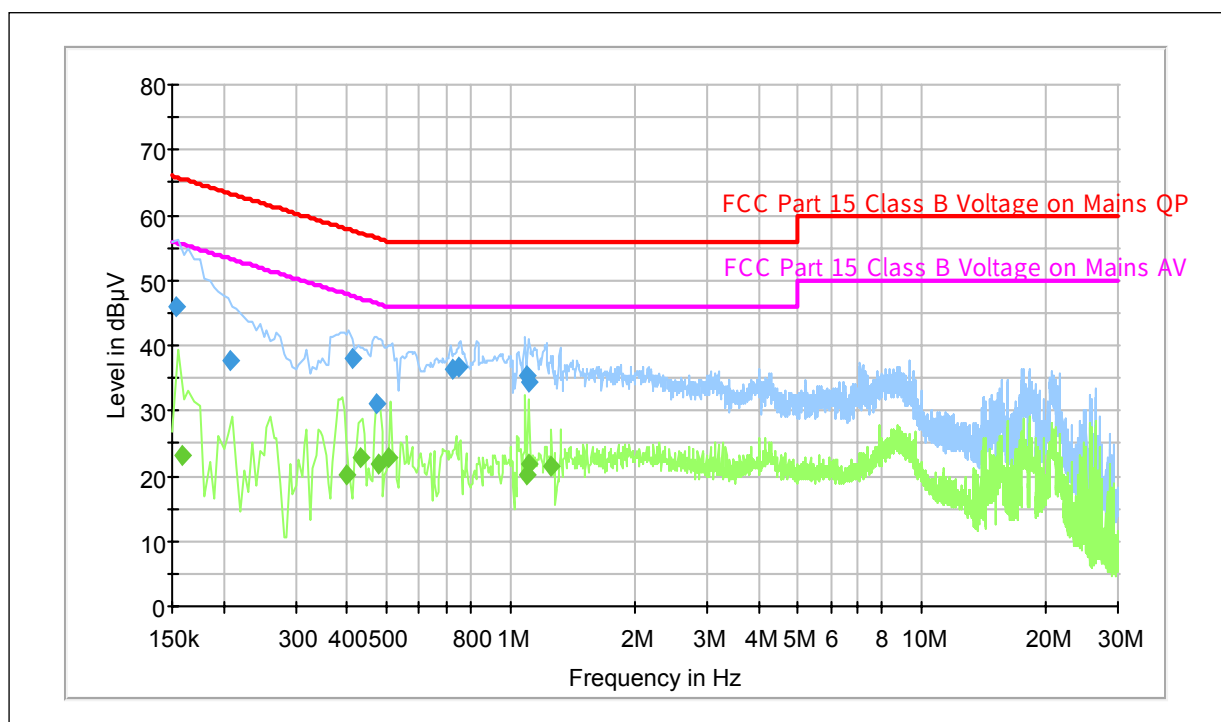
Subrange 1
Frequency Range: 150kHz - 30MHz
Receiver: ESCI 3
Transducer: ENV216 / Receiver-2-Line-LISN ENV216

Scan Setup: FCC Part 15 Class B_2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
Level Unit: dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	1s	ESCI 3

FCC Part 15 Class _B with 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μ V)	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Line
0.154000	46.0	9.6	19.7	65.8	N
0.207500	37.7	9.6	25.6	63.3	N
0.412500	38.1	9.6	19.5	57.6	L1
0.472500	31.0	9.6	25.5	56.5	N
0.719500	36.4	9.6	19.6	56.0	L1
0.747500	36.6	9.6	19.4	56.0	L1
1.089500	35.4	9.6	20.6	56.0	L1
1.105500	34.3	9.6	21.7	56.0	L1

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Line
0.158000	23.3	9.6	32.3	55.6	L1
0.397500	20.2	9.6	27.7	47.9	N
0.431500	22.7	9.6	24.5	47.2	N
0.474500	21.8	9.6	24.6	46.4	L1
0.502500	22.9	9.6	23.1	46.0	L1
1.089500	20.1	9.6	25.9	46.0	L1
1.105500	21.9	9.6	24.1	46.0	L1
1.255500	21.4	9.6	24.6	46.0	L1

3.2 Radiated emission

3.2.1 Test information

Test engineer	Sang Kyu, Seo
Test date	February 14, 2006
Climate condition	Ambient temperature : 24.3 °C, Relative humidity : 37 % Atmospheric pressure 1010 hPa
Test place	10 m Semi-anechoic Chamber

3.2.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Next date	Interval
Bi-con Antenna	CBL6141A	SCHAFFNER	4268	2006-05-24	12
Bi-con Antenna	CBL6141A	SCHAFFNER	4266	2006-05-24	12
EMI Receiver	ESI26	R&S	100289	2006-04-11	12
EMI Receiver	ESI26	R&S	100291	2006-04-12	12
AMPLIFIER	310N	SONOMA	251674	2006-03-08	12
AMPLIFIER	310N	SONOMA	251677	2006-03-08	12
Ant Mast	MA4000	Inn-co	-	N/A	
Ant Mast	MA4000	Inn-co	-	N/A	
Ant Mast	MA2000	Inn-co	-	N/A	
Mast Controller	CO2000	Inn-co	-	N/A	
RF Selector	NS4900	TOYO	-	N/A	

EUT Test Setup

EUT set up in semi-anechoic chamber. EUT positioned at 3 m from antenna in center of table.

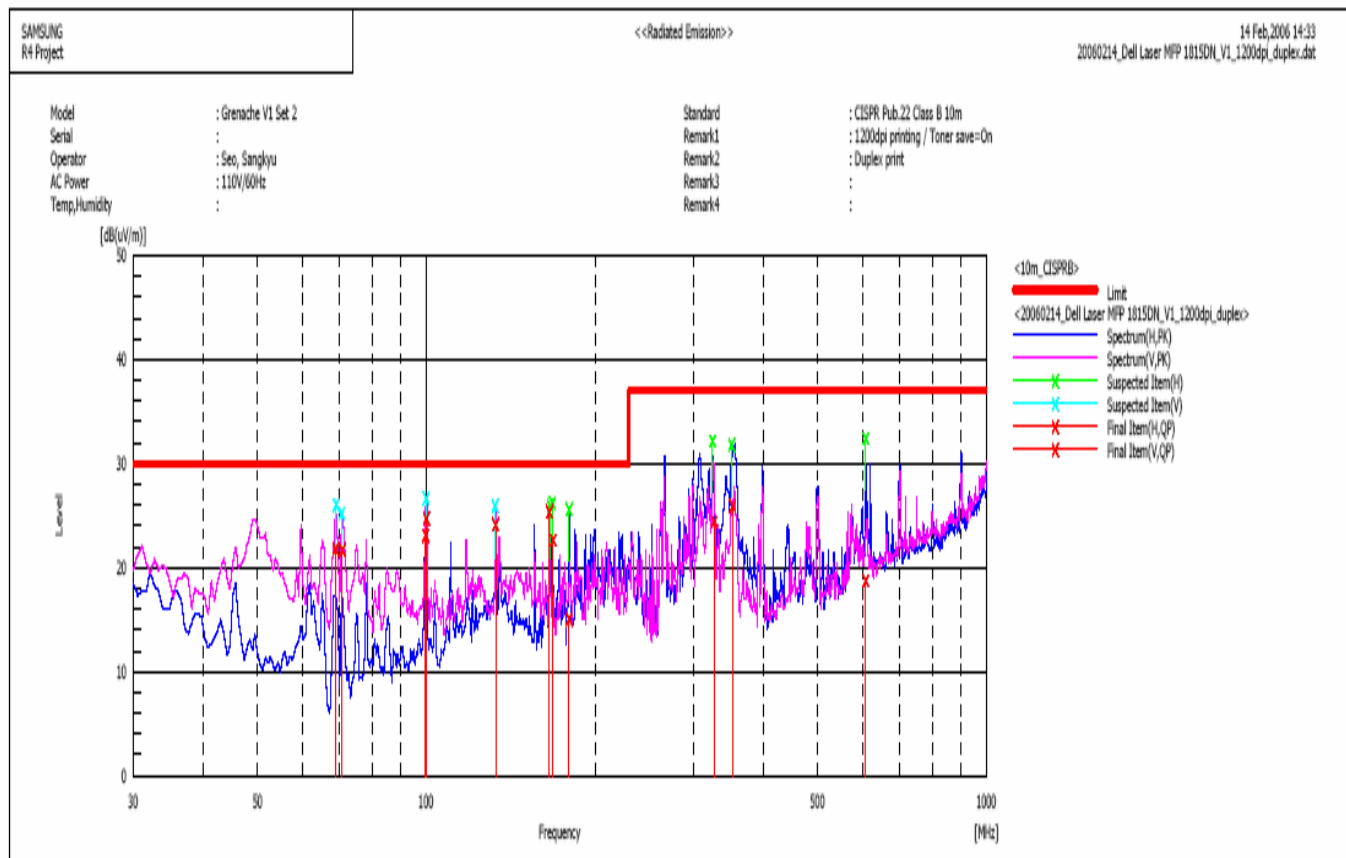
All ports terminated into characteristic loads.

Test Result

Measurement Results

Pass

The measured emissions of the EUT have found to be below the specified limits.



Final Result

No.	Frequency (P)	Reading	c.f	Result	Limit	Margin	Height	Angle	System	Remark
	[MHz]	[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]		
1	68,939	V 44,5	-22,7	21,8	30,0	8,2	128,0	246,2	2	
2	70,784	V 44,4	-22,7	21,7	30,0	8,3	197,0	245,0	2	
3	99,656	V 42,9	-19,8	23,1	30,0	6,9	118,0	219,9	2	
4	100,078	V 44,5	-19,7	24,8	30,0	5,2	100,0	237,8	2	cable maximize
5	133,068	V 41,7	-17,5	24,2	30,0	5,8	100,0	208,2	2	from the note book PC
6	166,090	H 44,1	-18,7	25,4	30,0	4,6	289,0	301,9	1	from the note book PC
7	168,022	H 41,5	-18,8	22,7	30,0	7,3	371,0	149,7	1	
8	179,553	H 34,4	-19,4	15,0	30,0	15,0	393,0	147,7	1	
9	326,815	H 39,4	-15,0	24,4	37,0	12,6	243,0	15,9	1	
10	351,827	H 40,2	-14,2	26,0	37,0	11,0	235,0	196,6	1	
11	608,274	H 26,3	-7,5	18,8	37,0	18,2	185,0	253,8	2	

4. Appendix

4.1 Test photography



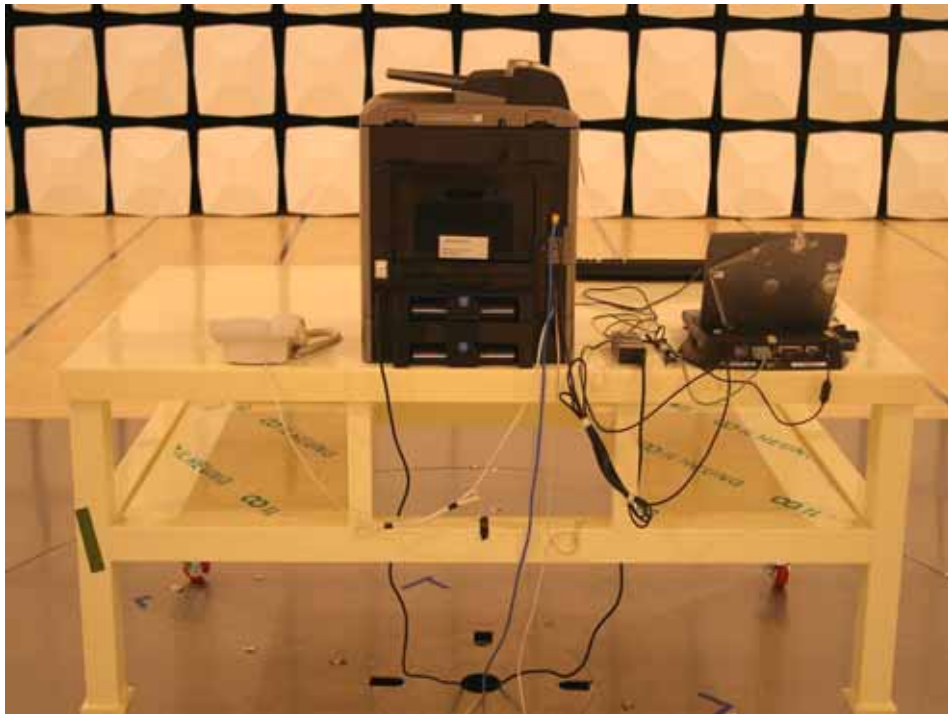
Picture 1. Conducted Emission (Front)



Picture 2. Conducted Emission (Rear)



Picture 3. Radiated emission (Front)



Picture 4. Radiated emission (Rear)

3.2 EUT photography



Picture 5. EUT (Front)



Picture 6. EUT (Rear)



Picture 7. EUT (Inside)

[Manufacture by Korea]

DELL™ Model No. : Dell Laser MFP 1815dn
Rating : AC 220-240V; 50/60Hz; 3.0 A
Manufactured :
Manufactured for Dell Austin, Texas, USA
Made in Korea

Apparatet må tilkoples jordet stikkontakt.
Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan,



CLASS 1 LASER PRODUCT

DELL™ Model No. : Dell Laser MFP 1815dn
Volts: AC 110-127V
Hertz: 50/60Hz
Amps: 5.4A
Manufactured:
Ringer Equivalence : 0,5B
USOC Jack Type: RJ11C

Manufactured for Dell Austin, Texas, USA
Made in Korea

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1) This device may not cause harmful interference, and
2) This device must accept any interference received, including interference that may cause undesired operation.
FCC ID: A5LLASERMFP1815DN
Complies with Part 15, FCC Rules.
FCC Certification No.
This product complies with 21 CFR Chapter 1, subchapter L, PLACE.

This Class 2 digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe "2" est conforme à la norme NMB-003 du Canada.
IC:



NÚMERO DEL CERTIFICADO DE CONFORMIDAD: TT0308184-026

(2)

DELL™ Model No. : Dell Laser MFP 1815n
Rating : AC 220-240V; 50/60Hz; 3.0 A
Manufactured :
Manufactured for Dell Austin, Texas, USA
Made in Korea

Apparatet må tilkoples jordet stikkontakt.
Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan,



CLASS 1 LASER PRODUCT

DELL™ Model No. : Dell Laser MFP 1815n
Volts: AC 110-127V
Hertz: 50/60Hz
Amps: 5.4A
Manufactured:
Ringer Equivalence : 0,5B
USOC Jack Type: RJ11C

Manufactured for Dell Austin, Texas, USA
Made in Korea

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1) This device may not cause harmful interference, and
2) This device must accept any interference received, including interference that may cause undesired operation.
FCC ID: A5LLASERMFP1815DN
Complies with Part 15, FCC Rules.
FCC Certification No.
This product complies with 21 CFR Chapter 1, subchapter L, PLACE.

This Class 2 digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe "2" est conforme à la norme NMB-003 du Canada.
IC:



NÚMERO DEL CERTIFICADO DE CONFORMIDAD: TT0308184-026

(2)

[Manufacture by China]



Picture 8. EUT (Label)