EMI 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. : LBE061421 Page (1)/(21)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 124

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 : 2006.04.28

2. Purpose for the report : Approval for EMI

3. Kind of product : Notebook PC(Model name : NP-Q1b)

4. Date of test : 2006.04.28

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.)

Tested by	Reviewed by
Name : Young Hun Cheong J.Y.H	Name : No Cheon Park N. C. 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. 05. 22

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

TEST RESULT

Test Report No.	:	LBE061421
Applicant / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Manufacture / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
EUT	:	1. Product name : Notebook PC 2. Model name : NP-Q1b 3. FCC ID : **A3L-NP-Q1-C** 4. Brand name : Samsung 5. Variant model : None
Basic Standards	:	ANSI C63.4:2003
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	:	Young Hun Cheong
Reviewed by	:	No Cheon Park
Date of Issue	:	2006. 05. 22

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1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	NP-Q1b
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Contact person	Young Hun, Cheong
Kind of product	Notebook PC
Variant model	-
Manufacturer	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Rated power	AC 120 V, 60 Hz
New / Alternative / Permissive change information	**New**

1.2 Detail Information related product

1.2.1 Specification

Item	Specification	Remark
CPU	VIA, C7-M779,1.0GHz,nanoBGA2,400P, L1 Cache : 64KB, L2 Cache: 128KB	-
Chipset	VX700,64Bit,FCBGA,964P,64Bit,All-in	-
Main Memory	Samsung,DDR2 533Mhz,512MB(M470T6554CZ3-CD5) * 1	-
Graphic controller	VX700 Integrated	-
Inverter Board	DELTA , VK.21216.004,1800Vrms,DC/AC	-
LCD DISPLAY	CPT, CLAA070VA06T,7"WVGA, 250nit, 800*480	-
HDD	Hitachi, PATA type 30GB(HTC426030G5CE00), 1.8”	-
Wireless LAN	Atheros, AR2413, WLL3093 (RoHS),2.4GHz,IEEE802.11b/g (13Ch),Half Height MiniPCI,CCK/OFDM	-
Bluetooth	Broadcom, BCM92045NMD, USB 2.0 type, Bluetooth Ver 2.0 MIC No.:R-LARN-05-0240, FCC ID:QDS-BRCM1018	-
ADAPTER	Acbel, API1AD02, AD-6019, 60W, 19Vdc, 2pin	-
Battery	SDI, 3Cell(AA-PB0UC3B, 2600mA/cell) LI-ION	-
Input Devices	Touch screen panel, Young Fast, 4-wire resistive type	-
Ports	2 USB, 1 VGA, DC IN, 1HP-OUT,1MIC-IN	-

Operating Frequency

1.0GHz(CPU Speed), 100MHz (Host Clock), 533MHz(DDR2), 33MHz(PCI Clock),
14.318MHz(Ref), 27MHz(LCD clock), 48MHz(USB),
24MHz(Audio bit clock)

1.3 Operating mode and condition

The EUT exercise program used during radiated and conducted emissions testing was the Samsung Standardized Emission Test Program for Windows. During the certification test, the LCD panel was open and video signals were simultaneously active on the LCD panel, and the VGA port.
The system was configured for testing in a typical fashion that a customer would normally use, and was tested while in an automated non-attendant mode.
The program repetitively sends a screen of 'H' to the display, reads and writes to the hard drive, and writes to all serial .
Music is played from the Memory to the Line-In jack and ported out to the earphones.
Cable were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables.

- Test Voltage : AC 120 V, 60 Hz

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 trun table 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.

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	1MHz	1MHz

1.6 Test configuration

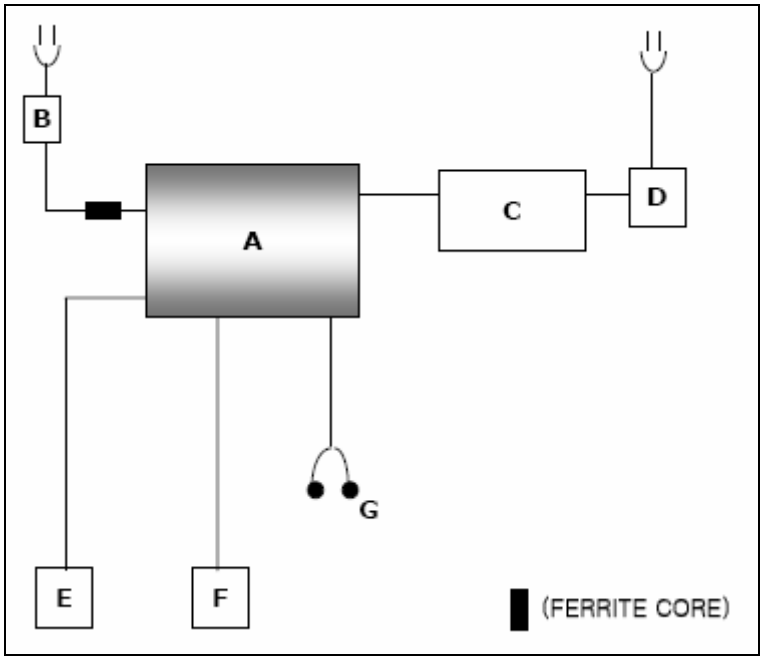
1.6.1 Used EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	Notebook PC	NP-Q1b	-	Samsung	**A3L-NP-Q1-C**
B	AC Adapter	AD-6019	CNBA4400162ABJ6F6260345	AcBel	-
C	LCD Monitor	TFT 7010	147CK23DA273	COMPAQ	Doc
D	AC Adapter	AD-4914N	C020100258	Samsung	-
E	ODD	-	CNBA4400162ABJ6F53I1004	Samsung	Doc
F	USB Mouse	M-UV-69a	HCA50702168	Logitech	Doc
G	Headset	-	-	-	-

1.6.2 Used cable description

Mark	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.8	No	Ferrite core on the AC/DC Adapter for EUT
2	USB	1.8	Yes	-
3	Headset	1.8	Yes	-
4	Monitor	1.6	Yes	-

1.6.3 Block Diagram



1.7 Applied Standards

Test standard	Basic standard
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 (Bi-Log Antenna)	± 4.3 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	Result
Electromagnetic Emission Test			
3.1	Conducted Emission	ANSI C63.4 : 2003	Complied
3.2	Radiated Emission	ANSI C63.4 : 2003	Complied

3. Description of individual tests

3.1 Conducted emission

3.1.1 Test information

Test engineer	Young Hun, Cheong
Test date	Apr. 28, 2006
Climate condition	Ambient temperature : 22.1 ℃, Relative humidity : 35 % Atmospheric pressure : 100.8 kPa
Test place	Shielded room #1

3.1.2 Test equipment

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Date	Interval **(Month)**
Test Software	EMC 32	R&S	Ver 4.40.0	N/A	N/A
Field strength meter	ESCI	R&S	100086	2006-03-28	12
L.I.S.N	ENV216	R&S	100116	2005-09-08	12
L.I.S.N	ENV216	R&S	100117	2005-08-18	12

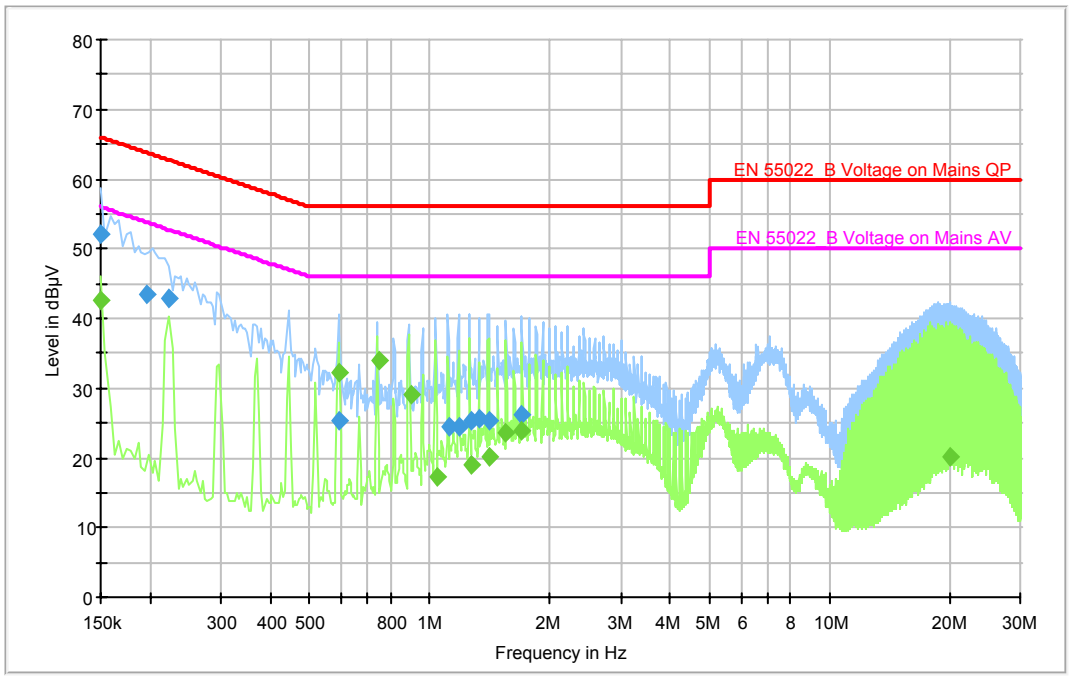
3.1.3 Test result : **Passed**

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

3.1.4 Test data and graph

The Initial step in collecting conducted data was to perform a peak and average scan over the measurement range using a receiver. The find data represents worst-case emissions.

3.1.4.1 Test graph



3.1.4.2 Quasi-peak results

Frequency (MHz)	Quasi Peak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150 000	52.1	L1	9.6	13.9	66.0
0.194 500	43.6	L1	9.6	20.2	63.8
0.221 500	42.9	L1	9.6	19.9	62.8
0.591 500	25.4	L1	9.6	30.6	56.0
1.115 500	24.3	L1	9.6	31.7	56.0
1.186 500	24.6	L1	9.6	31.4	56.0
1.262 500	25.4	L1	9.6	30.6	56.0
1.335 500	25.7	L1	9.6	30.3	56.0
1.405 500	25.3	L1	9.6	30.7	56.0
1.703 500	26.3	L1	9.6	29.7	56.0

3.1.4.3 Average results

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150 000	42.5	N	9.6	13.5	56.0
0.595 500	32.3	L1	9.6	13.7	46.0
0.745 500	33.8	L1	9.6	12.2	46.0
0.893 500	29.1	L1	9.6	16.9	46.0
1.039 500	17.3	L1	9.6	28.7	46.0
1.263 500	18.9	L1	9.6	27.1	46.0
1.411 500	20.2	L1	9.6	25.8	46.0
1.540 500	23.5	N	9.6	22.5	46.0
1.688 500	24.0	L1	9.6	22.0	46.0
20.107 500	20.1	L1	9.8	29.9	50.0

* QP : Quasi-peak, AV: Average

* Level (QuasiPeak or Average) = Meter Reading(QP or AV) + Corr. (LISN Insertion loss + Cable loss)

* Margin = Limit – Result

3.2 Radiated Emission

3.2.1 Test information

Test engineer	Young Hun, Cheong
Test date	Apr. 28, 2006
Climate condition	Ambient temperature : 22.5 ℃, Relative humidity : 35 % Atmospheric pressure : 101.6 kPa
Test place	10m Semi Anechoic Chamber

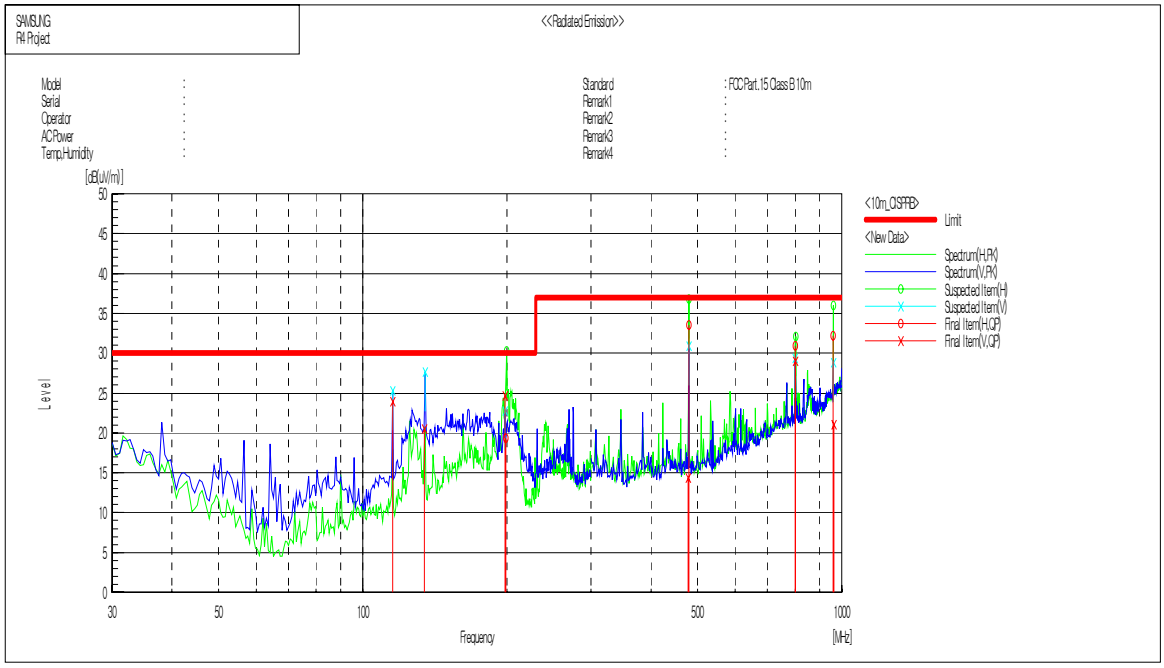
3.2.2 Test equipment

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Date	Interval **(Month)**
Bi-con Antenna	CBL6141A	SCHAFFNER	4266	2005-05-24	12
EMI Receiver	ESI-26	R&S	100287	2006-03-05	12
EMI Receiver	ESI-26	R&S	100288	2006-04-04	12
AMPLIFIER	310N	SONOMA	251674	2006-03-14	12
AMPLIFIER	310N	SONOMA	251677	2006-03-05	12
Ant Mast	MA4000	Inn-co	-	N/A	N/A
Ant Mast	MA4000	Inn-co	-	N/A	N/A
Mast Controller	CO2000	Inn-co	-	N/A	N/A
RF Selector	NS4900	TOYO	-	N/A	N/A

3.2.3 Test result : **Passed**

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

3.2.4 Test data



Final Result

No.	Frequency [MHz]	(P)	S.C	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	199.123	H	S	38.3	-18.9	19.4	30.0	10.6	355.0	92.5	
2	480.001	H	S	44.5	-11.0	33.5	37.0	3.5	185.0	131.5	
3	960.083	H	S	32.7	-0.6	32.1	37.0	4.9	105.0	12.6	
4	134.653	V	S	38.2	-17.7	20.5	30.0	9.5	100.0	18.8	
5	115.440	V	S	42.7	-18.7	24.0	30.0	6.0	112.0	340.2	
6	799.981	H	S	35.8	-4.9	30.9	37.0	6.1	337.0	248.4	
7	477.672	V	S	25.5	-11.1	14.4	37.0	22.6	214.0	66.4	
8	198.182	V	S	43.6	-18.9	24.7	30.0	5.3	100.0	235.9	
9	799.981	V	S	33.9	-4.9	29.0	37.0	8.0	343.0	330.8	
10	963.632	V	S	21.6	-0.5	21.1	37.0	15.9	160.0	212.1	

* Receiving antenna mode : Horizontal, Vertical

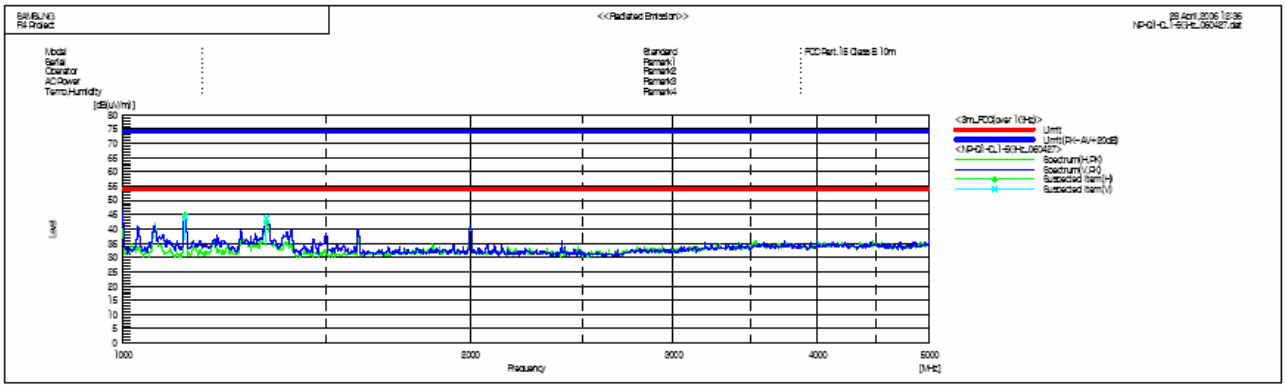
* Test distance : 10 m (RF Semi Anechoic Chamber)

* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)

* Margin = Limit – Result

2. Test Data (1GHz ~ 5GHz)

* Measurement detector function and bandwidth
  - Detector function : peak
  - Bandwidth : 1MHz
* Receiving Antenna Mode : Horizontal, Vertical
* Test distance : 3m (Semi-Anechoic Chamber)
* Result = Meter Reading + c.f(Antenna factor + Cable loss-Amp. Gain)
* Margin = Limit – Result



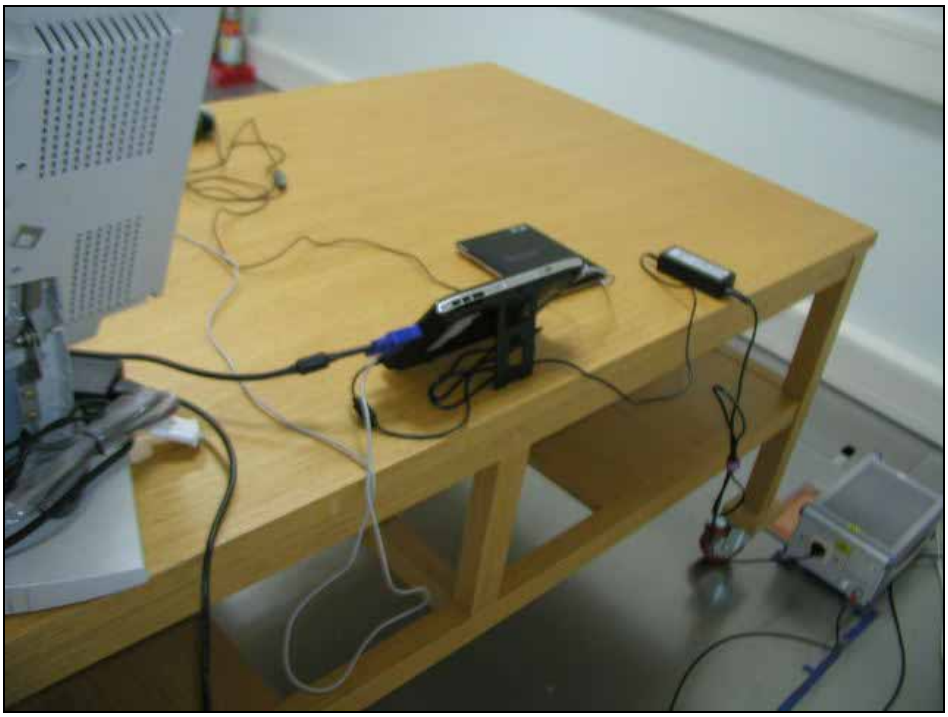
Spectrum Selection

No.	Frequency [MHz]	(P)	Reading [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]	Remark
1	1132.265	H	58.2	-13.4	44.8	54.0	9.2	100.0	265.8	
2	1132.265	V	57.5	-13.4	44.1	54.0	9.9	100.0	282.2	
3	1330.661	V	55.7	-12.2	43.5	54.0	10.5	200.0	279.4	
4	1330.661	H	54.4	-12.2	42.2	54.0	11.8	200.0	312.3	

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)

4.2 EUT photography

Picture 5. EUT (Top)

Picture 6. EUT (Bottom)

Picture 7. Label Location

Picture 8. Label