EMC TEST REPORT

Project No.	LBE20124932	**Issue No.**	0
Applicant	**Name of organization**	Samsung Electronics Co., Ltd.	
	Address	(Maetan dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si,Gyeonggi-do, 443-742, Republic of Korea	
	Date of application	October 16, 2012	
EUT	**Type of device**	☒ Class B personal computers and peripherals ☐ All other devices	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LSWDSC03E	
	Kind of product	Mobile Phone	
	Model No.	SC-03E	
	Variant Model No.	Refer to clause 4.6	
	Manufacturer	Samsung Telecommunication Co., Ltd. 730-350 #94-1, Imsoo-Dong, Gumi-City Gyeong-Buk, Korea.	
Applied Standards		FCC Part 15, Subpart B, Class B / ANSI C63.4-2003	
Test Period		October 16, 2012	
Issue date		October 26, 2012	

Test result : **Complied**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Tested by : Su-Young Son	**Reviewed by** : Tae-Young Jang

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SAMSUNG

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1. Report Information

1.1 Revision history

No	Revised detailed information
Issue 0	- LBE20124932 (SAMSUNG)

2. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result
☒	Conducted Disturbance (Mains port)	FCC Part 15 Subpart B / ANSI C63.4-2003 (Class B)	Complied
☒	Radiated Disturbance		Complied

3. General Information

3.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at (Maetan dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si,Gyeonggi-do, 443-742, Republic of Korea.
All testing are performed in Semi-anechoic chambers conforming to the site attenuation characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The CS & Environment center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

4. Test Setup configuration

4.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Mark	Description	Model No.	Serial No.	Manufacturer / Trademark	FCC ID / DoC
A	Mobile Phone	SC-03E	R31C91WBQ9Y	Samsung	A3LSWDSC03E
B	Battery	EB-L1H2LLD	NA1C911ES/2-B	Samsung	-
C	Headset	EHS64AVFWE	-	Samsung	-
D	USB Cable	ECC1DU4BBE	RT1C706AS E	Samsung	-
E	Micro SD Card	1GB	-	SANDISK	-
F	Desk-Top Computer	DCME	8JBVSBX	DELL	DoC
G	LCD Monitor	GH15LS	N719HVELA11890L	SAMSUNG	DoC
H	Mouse	MOARUO	MS-S5-AR03-01	SAMSUNG	DoC
I	Keyboard	GP-K5000U	15000099	SAMSUNG	DoC
J	Router	3CGS U08	AB/ 9XRQAC0024825	3COM	DoC
K	Power Supply	PW150	KA1203N03	AULT	DoC

4.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	USB Mode (Data Communication)

4.3 Details of Sampling

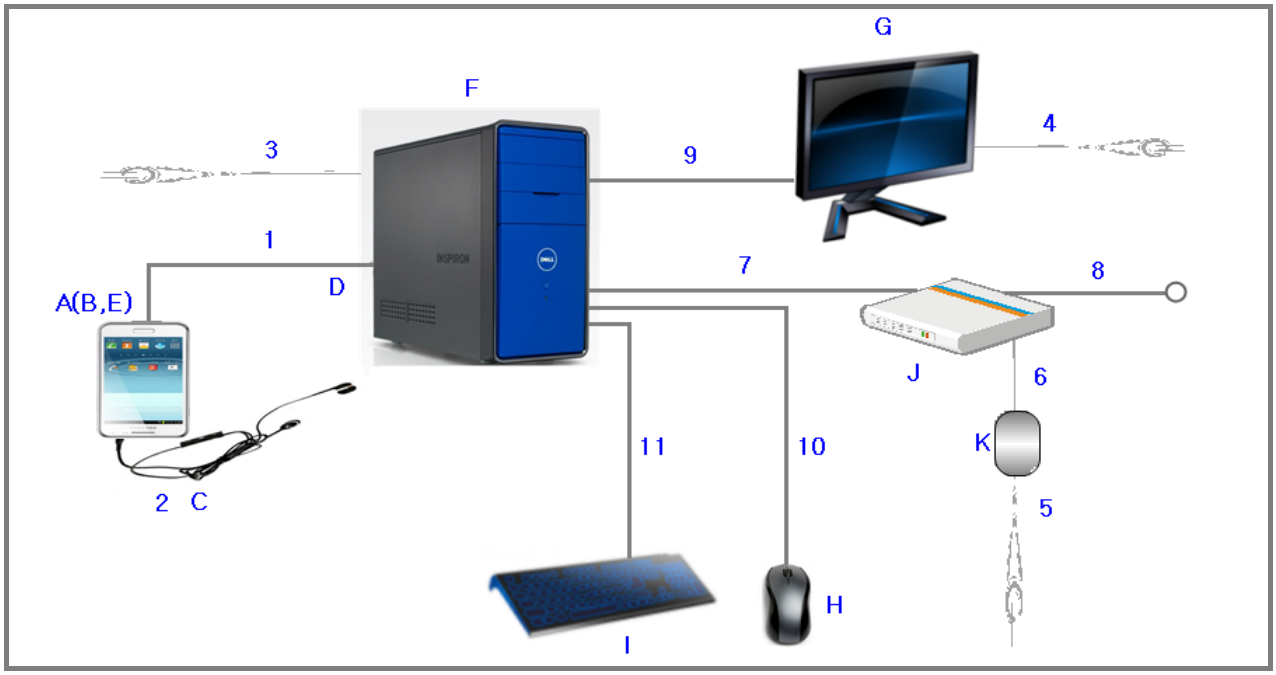
Customer selected, single unit.

4.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected:

No.	Connected cable	Length [m]	Shielded [Y/N]	Note
1	Data Cable	1.0	Y	From EUT to Desk-Top Computer
2	Headset	1.3	N	For EUT
3	Power	1.8	N	For Desk-Top Computer
4	Power	1.8	N	For LCD Monitor
5	Power	1.8	N	For Power Supply
6	Power	1.0	N	From Router to Power Supply
7	LAN	1.5	N	From Desk-Top Computer to Router
8	LAN	1.5	N	From Router to Local Area Network
9	RGB	1.8	Y	From Desk-Top Computer to LCD Monitor
10	USB	1.8	Y	From Desk-Top Computer to Mouse
11	USB	1.5	Y	From Desk-Top Computer to Keyboard

4.5 Test arrangement



4.6 EUT Description

4.6.1 The following features describe EUT represented by this report:

Item	Specification	
Frequency Range	GSM 850	TX : 824.2 ~ 848.8 MHz RX : 869.2 ~ 893.8 MHz
	GSM 1900	TX : 1 850.2 ~ 1 909.8 MHz RX : 1 930.2 ~ 1 989.8 MHz
	WCDMA FDD5	TX : 824 ~ 849 MHz RX : 869 ~ 894 MHz
Bluetooth	TX/RX Frequency : 2 402 ~ 2 480 MHz Version : 4.0	
WLAN	TX/RX Frequency : 2412 ~ 2472 MHz(802.11b/g/n) 5150 ~ 5250, 5250 ~5350, 5470 ~ 5650, 5725 ~5825 MHz (802.11a/n)	
Operating Temperature (℃)	-20 ~ +60	
Operating Humidity (%)	0 ~ 95	

4.6.2 The variant models

- None

4.7 Clock Frequencies

Kind of Clocks	Frequency [MHz]
CPU	1 600

4.8 Test configuration and condition

☐ The EUT exercise program which is the samsung standardized emission test program for windows was used during all EMC measurements were tested. This program was contained on the PC hard disk drive. Once loaded, the program sequentially exercises each system component in turn.

☒ The EUT was exercised during the testing by data read and write cycles repeated with internal storage devices. At the end of the test, the copied back data was compared with original.

☐ The EUT was connected to the PC by using USB data cable to charge.

☒ 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.

Power source for the EUT operating was supplied by CVCF made by the Pacific Power Source Corp.

- Test Voltage : AC 120 V, 60 Hz

4.9 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

4.9.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	AC Mains	±3.24 dB
Radiated Disturbance (30 MHz ~ 1 GHz)	Horizontal	±4.59 dB
	Vertical	±4.64 dB
Radiated Disturbance (1 GHz ~ 6 GHz)	Horizontal	±4.18 dB
	Vertical	±4.15 dB

5. Results of individual test

5.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

Limits for conducted disturbance at the mains ports

Frequency range Limits [MHz]	Resolution Bandwidth [kHz]	Limits dB(μV)	
		Quasi-peak	Average
0,15 to 0,50	9	66 to 56	56 to 46
0,50 to 5	9	56	46
5 to 30	9	60	50
NOTE 1 The lower limit shall apply at the transition frequency. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz			

5.1.1 Test instrumentation

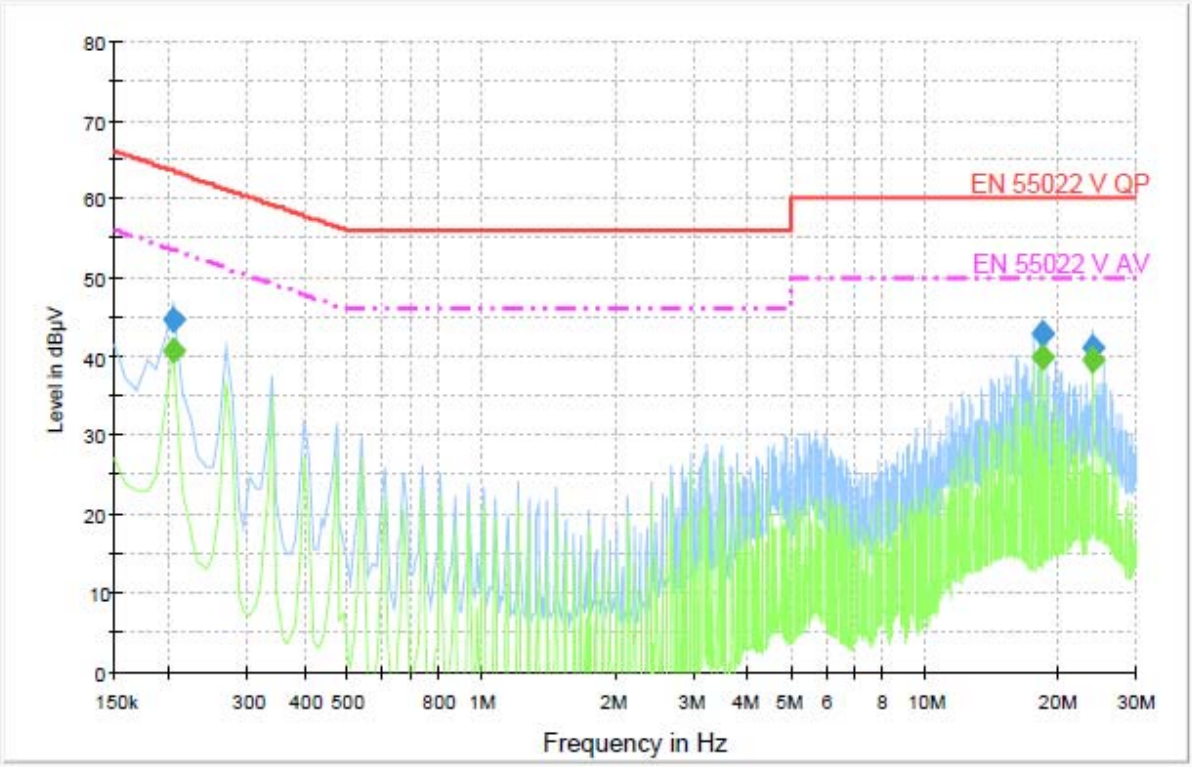
EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E4I-093	Test Receiver	ESCI3	R&S	100086	2011-11-11	12
E3I-049	Two-Line V-Network	R&S	ESH3-Z5	100260	2012-01-04	12
E3I-260	Two-Line V-Network	R&S	ENV216	101366	2012-09-11	12

5.1.2 Temperature and humidity condition

Test date	2012-10-16	Test engineer	Su-Young Son
Climate condition	Ambient temperature	23.0 ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	38.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	101.8 kPa	Limit (86.0 to 106.0) kPa
Test place	Shield Room (SR8)		

5.1.3 Test results

- Operating Mode 1: AC Mains



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	44.5	15000.0	9.000	On	N	10.0	19.00	63.40
18.366000	42.8	15000.0	9.000	On	N	10.0	17.20	60.00
23.910000	40.9	15000.0	9.000	On	N	10.1	19.10	60.00

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	40.7	15000.0	9.000	On	N	10.0	12.80	53.40
18.366000	39.8	15000.0	9.000	On	N	10.0	10.20	50.00
23.910000	39.5	15000.0	9.000	On	N	10.1	10.50	50.00

Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph. 'Final Result 1' is Quasi-peak final measurement results table and 'Final Result 2' is Average final measurement results table.

Note 2) Level (QP and/or AV) = Meter Reading (QP and/or AV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or AV) = Limit – Level (QP and/or AV)
QP = Quasi-Peak, AV = Average

5.2 Radiated disturbance

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 10 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [kHz]	Video Bandwidth [kHz]	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	120	300	Continuous

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using quasi-peak detectors.

Peak/Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th harmonics of the highest frequency in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [MHz]	Video Bandwidth [MHz]	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	1 (PK / AV)	3 (PK) 10 Hz (AV)	Continuous

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using peak and average detectors.

Limits for radiated disturbance of Class B ITE at a measuring distance of 3 m and 10 m

Frequency range Limits [MHz]	Field Strength		
	3 m [μV/m]	3 m [dB(μV/m)]	10 m [dB(μV/m)]
30 to 230	-	-	30
230 to 1 000	-	-	37
Above 1 000	500	54.0	43.5

Results checked manually; and points close to the limit line were re-measured.

5.2.1 Test instrumentation

EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E3I-190	BILOG Antenna	CBL6112B	Schaffner	2804	2011-06-22	24
E3I-130	BILOG Antenna	CBL6112D	TESEQ	25513	2010-11-12	24
E3I-213	Preamplifier	317	SONOMA	282424	2011-12-06	12
E3I-214	Preamplifier	317	SONOMA	282425	2011-12-06	12
E4I-013	EMI Test Receiver	ESU-08	R&S	100085	2012-03-22	12
E3I-233	EMI Test Receiver	ESU-26	R&S	100364	2011-10-24	12
E3I-231	Horn Antenna	3115	ETS Lindgren	00101620	2012-01-12	24

5.2.2 Temperature and humidity condition

Test date	2012-10-16	**Test engineer**	Su-Young Son
Climate condition	Ambient temperature	21.0 ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	40.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	101.8kPa	Limit (86.0 to 106.0) kPa
Test place	Semi-Anechoic Chamber (SAC4)		

5.2.3 Test results

☐ Operating Mode 1

- Frequency range: 30 ~ 1 000 MHz

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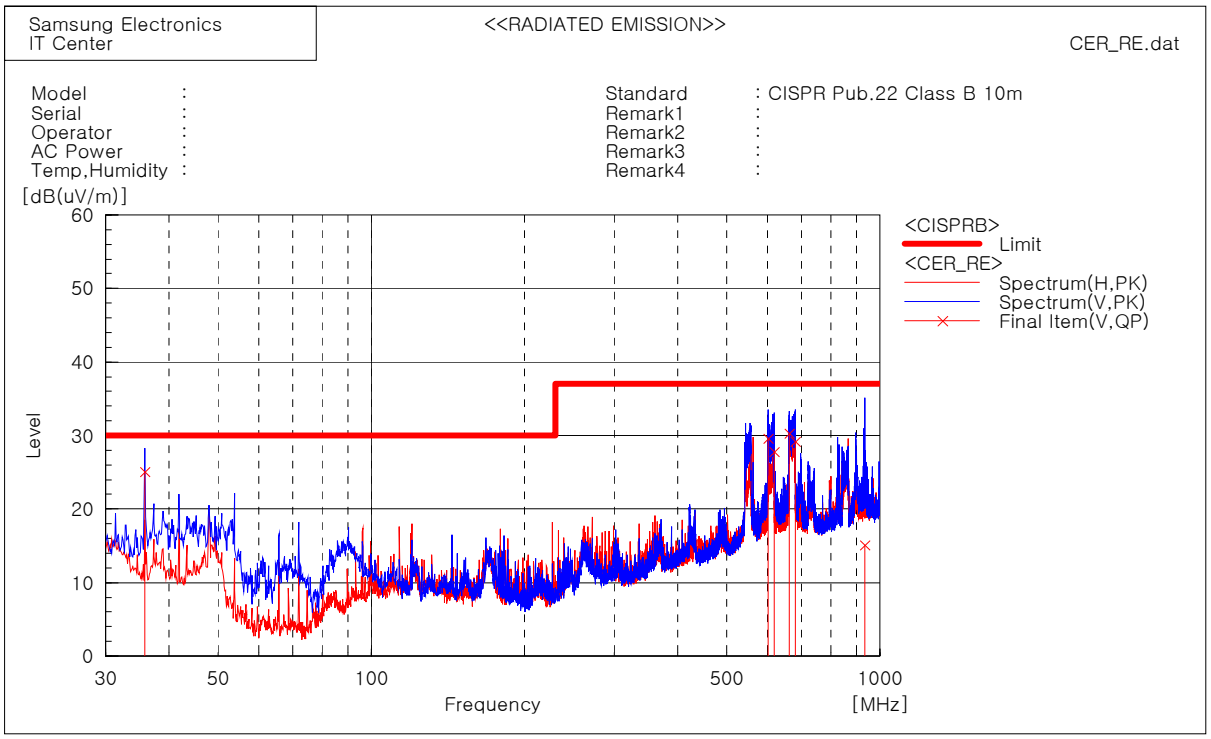

Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	935.391	V	27.0	-11.9	15.1	37.0	21.9	400.0	335.0	2
2	35.890	V	46.9	-21.9	25.0	30.0	5.0	197.0	315.0	2
3	602.619	V	44.7	-15.1	29.6	37.0	7.4	197.0	153.0	2
4	663.000	V	45.2	-14.9	30.3	37.0	6.7	197.0	146.0	2
5	619.257	V	42.5	-14.7	27.8	37.0	9.2	197.0	131.0	2
6	681.296	V	43.9	-14.7	29.2	37.0	7.8	197.0	94.0	2

Note) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 10 m, Antenna Height : 1 to 4 meters
Level (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)
Margin (QP) = Limit – Level (QP)
QP = Quasi-Peak

- Frequency range: 1 000 ~ 8 000 MHz

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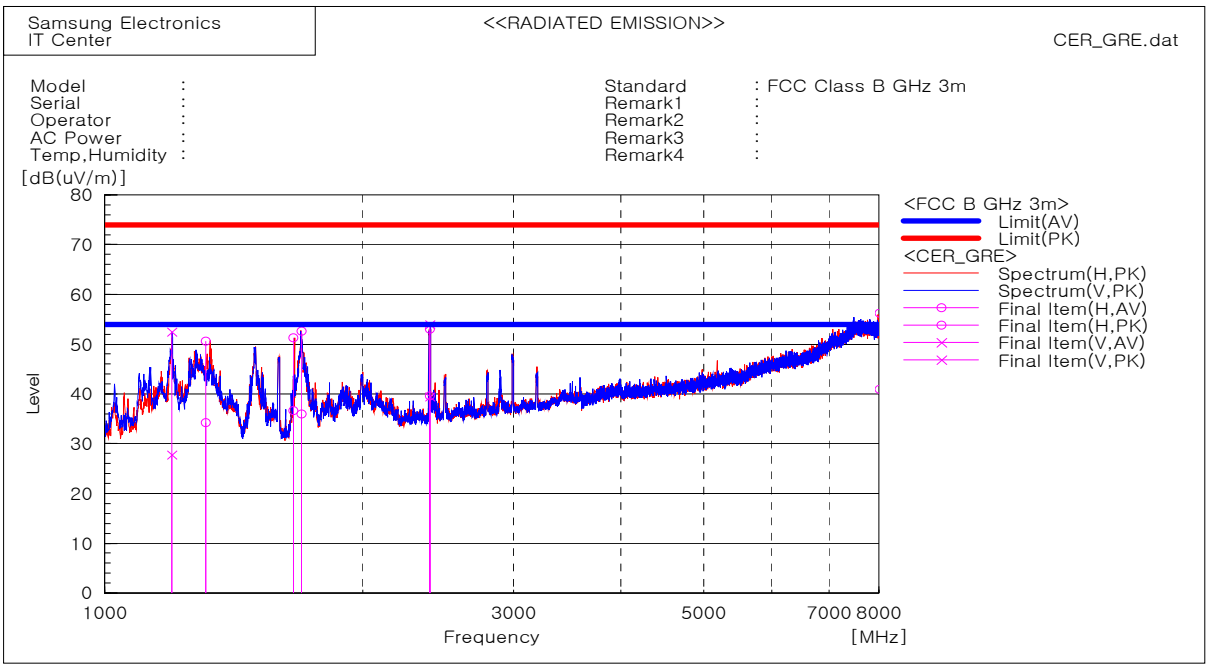

Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1312.375	45.8	-11.6	34.2	54.0	19.8	100.0	39.0
2	1658.706	45.4	-8.7	36.7	54.0	17.3	100.0	20.0
3	1696.614	44.4	-8.4	36.0	54.0	18.0	100.0	32.0
4	2395.695	45.1	-5.5	39.6	54.0	14.4	100.0	26.0
5	8010.925	26.3	14.7	41.0	54.0	13.0	100.0	354.0

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1312.375	62.2	-11.6	50.6	74.0	23.4	100.0	39.0
2	1658.706	60.0	-8.7	51.3	74.0	22.7	100.0	20.0
3	1696.614	61.0	-8.4	52.6	74.0	21.4	100.0	32.0
4	2395.695	58.5	-5.5	53.0	74.0	21.0	100.0	26.0
5	8010.925	41.5	14.7	56.2	74.0	17.8	100.0	354.0

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1196.596	40.0	-12.2	27.8	54.0	26.2	100.0	356.0
2	2393.044	44.9	-5.5	39.4	54.0	14.6	100.0	12.0

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1196.596	64.7	-12.2	52.5	74.0	21.5	100.0	356.0
2	2393.044	59.5	-5.5	54.0	74.0	20.0	100.0	12.0

Note1) Representative operating modes were selected by customer.

Note2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters
Level (PK and/or AV) = Reading (PK and/or AV) + c.f (Antenna Factor + Cable Loss - Amp. Gain)
Margin (PK and/or AV) = Limit – Level (PK and/or AV)
PK = Peak, AV = Average