EMC TEST REPORT

Project No.	LBE20116000	**Issue No.**	None
Applicant	**Name of organization**	Samsung Electronics Co., Ltd.	
	Address	416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Republic of Korea	
	Date of application	November 30, 2011	
EUT	**Type of device**	Class B computing devices peripheral	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LSGHI847	
	Kind of product	Mobile Phone	
	Model No.	SGH-i847	
	Variant Model No.	Refer to clause 3.5	
	Manufacturer	SAMSUNG ELECTRONICS CO., LTD. 94-1, Imsu-dong, Gumi-si, Gyengsangbuk-do, 730-722, Republic of Korea TIANJIN SAMSUNG TELECOM TECHNOLOGY CO., LTD. 300385 China Tianjin No.9, WeiWu Rd., Micro Electronic Industrial Park, Xiqing Dist, Tianjin, China	
Applied Standards		FCC Part 15, Subpart B, Class B / ANSI C63.4-2003	
Test Period		January 09, 2012 ~ January 10, 2012	
Issue date		January 10, 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 : Young-Jin Kim

Reviewed by : Tae-Young Jang

SAMSUNG

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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

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

2. General Information

2.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at 416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 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.

3. Test Setup configuration

3.1 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:

Description	Model No.	Serial No.	Manufacturer	FCC ID / DoC
Mobile Phone	SGH-i847	-	SAMSUNG	A3LSGHI847
Battery	EB524759VA	TH1B919GS/5-B	SAMSUNG	-
Headset	EHS60ANNBE	-	SAMSUNG	
USB Cable	ECC1DU6BBE	KD1BA26TS E	SAMSUNG	
Micro SD Card	2GB	-	SANDISK	
Desk-Top Computer	DCME	8JBVSBX	DELL	DoC
LCD Monitor	GH15LS	N719HVELA11890L	SAMSUNG	DoC
Mouse	MOARUO	MS-S5-AR03-01	SAMSUNG	DoC
Keyboard	GP-K5000U	15000099	SAMSUNG	DoC

3.2 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)

3.3 Details of Sampling

Customer selected, single unit.

3.4 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;

Connected cable	Length [m]	Shielded [Y/N]	Note
Data Cable	1.5	Yes	From EUT to Note PC
Headset	1.3	No	For Headset
Power	1.8	No	For Desk-Top Computer
Power	1.8	No	For LCD Monitor
RGB	1.8	Yes	From Desk-Top Computer to LCD Monitor
USB	1.8	Yes	From Desk-Top Computer to Mouse
USB	1.5	Yes	From Desk-Top Computer to Keyboard
LAN	1.5	Yes	From Desk-Top to LAN Port

3.5 EUT Description

1. The following features describe EUT represented by this report:

Item	Specification	
Frequency Range	US GSM850	Tx : 824.2 ~ 848.8 Mhz Rx : 869.2 ~ 893.8 Mhz
	US PCS	TX : 1850.2 ~ 1909.8 MHz RX : 1930.2 ~ 1989.8 MHz
	US WCDMA850	Tx : 826.4 ~ 846.6 Mhz Rx : 871.4 ~ 891.6 Mhz
	US WCDMA1900	TX : 1850 ~ 1910 Mhz RX : 1930 ~ 1990 Mhz
Size (Standard Battery)	65.9 x 122.4 x 11.99 (mm)	
Weight (Standard Battery)	118.8 (±1 g)	
LCD Specification	3.67” AMOLED (OCTA)	
Operating Temperature (℃)	-20 ~ +50	
Operating Humidity (%)	0 ~ 95	
Bluetooth	TX/RX Frequency : 2 402 ~ 2 480 MHz Version : 3.0 + EDR	
Wi-Fi	TX/RX Frequency : 2 400 ~ 2 483.5 MHz (801.11 b/g/n)	
NFC	N/A	
Memory	Internal Memory : 4 GB External Memory : MAX 32GB	

2. The variant models

- None

3.6 Clock Frequencies

Kind of Clocks	Frequency [MHz]
CPU	1 400

3.7 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 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.

- Test Voltage : AC 120 V, 60 Hz

3.8 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.)

3.8.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	AC Mains	±3.03 dB
Radiated Disturbance (30 MHz ~ 1 GHz)	Horizontal	±4.61 dB
	Vertical	±4.60 dB
Radiated Disturbance (1 GHz ~ 6 GHz)		±4.09 dB

4. Results of individual test

4.1 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	Limits dB(μV)	
		Quasi-peak	Average
0,15 to 0,50	9 kHz	66 to 56	56 to 46
0,50 to 5	9 kHz	56	46
5 to 30	9 kHz	60	50

4.1.1 Test instrumentation

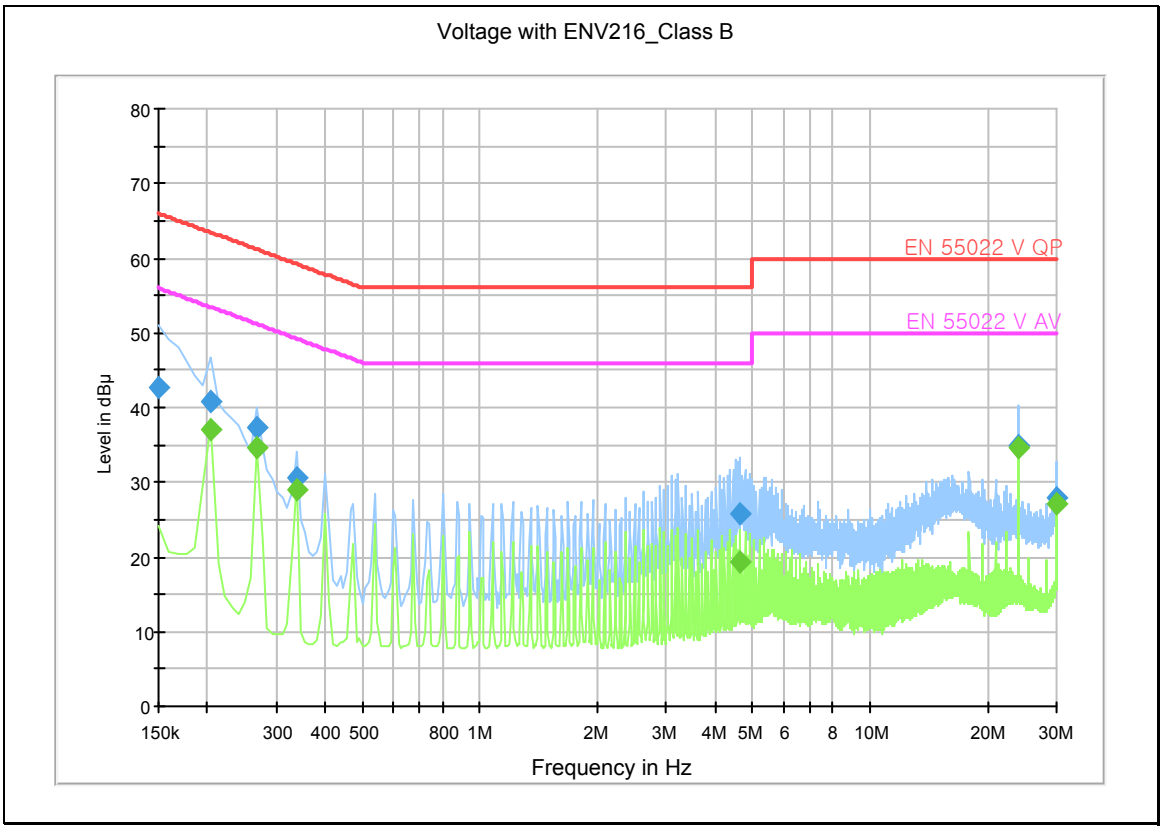
EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E3I-093	Test Receiver	ESCS30	R&S	830986/004	2011-02-11	12
E3I-050	LISN	ESH3-Z5	R&S	100263	2011-10-12	12
E3I-259	LISN	ENV216	R&S	101369	2011-10-11	12

4.1.2 Temperature and humidity condition

Test date	2012-01-09	**Test engineer**	Young-Jin Kim
Climate condition	Ambient temperature	22.8℃	Limit (15.0 to 35.0) ℃
	Relative humidity	33.1 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	100.4 kPa	Limit (86.0 to 106.0) kPa
Test place	Shield Room (SR8)		

4.1.3 Test results

- Operating Mode 1: AC Mains



Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

Quasi-peak final measurement results table

Frequency (MHz)	Level (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150	42.6	L1	9.9	23.40	66.00
0.204	40.7	N	10.0	22.80	63.40
0.267	37.3	L1	10.0	23.90	61.20
0.339	30.5	L1	10.0	28.70	59.20
4.641	25.8	N	9.8	30.20	56.00
23.910	34.9	L1	9.8	25.10	60.00
29.895	27.8	L1	9.8	32.20	60.00

Average final measurement results table

Frequency (MHz)	Level (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.204	37.1	L1	10.0	16.30	53.40
0.267	34.5	L1	10.0	16.70	51.20
0.339	29.0	L1	10.0	20.20	49.20
4.641	19.3	N	9.8	26.70	46.00
23.910	34.5	N	10.1	15.50	50.00
29.895	27.2	N	10.1	22.80	50.00

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

4.2 Radiated disturbance

Of those disturbances above (*L* - 20dB), where *L* is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.
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 3 m for the following antenna and turntable arrangements:

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

Measurements within 20 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using quasi-peak detectors.

Limits for radiated disturbance of ITE at a measuring distance of 3 m

Frequency range Limits [MHz]	Field Strength	
	µV/m	dB(µV/m)
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

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

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

Limits for radiated disturbance of ITE at a measurement distance of 3 m

Class	Limits [dB(µV/m)]	
	Peak	Average
A	80	60
B	74	54
Average limit 500, 20 log 500 = 53.979 dB ≒ 54 dB		

Measurements within 20 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using peak and average detectors.
Results checked manually; and points close to the limit line were re-measured.

4.2.1 Test instrumentation

EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E3I-130	BILOG Antenna	CBL6112D	TESEQ	25513	2010-11-12	24
E3I-257	EMI Test Receiver	ESU26	R&S	100364	2011-10-24	12
E3I-170	Double-Ridged Waveguide Horn Antenna	HF906	R&S	1000028	2010-10-07	24
E3I-175	Preamplifier	310N	Sonoma	273121	2011-12-06	12

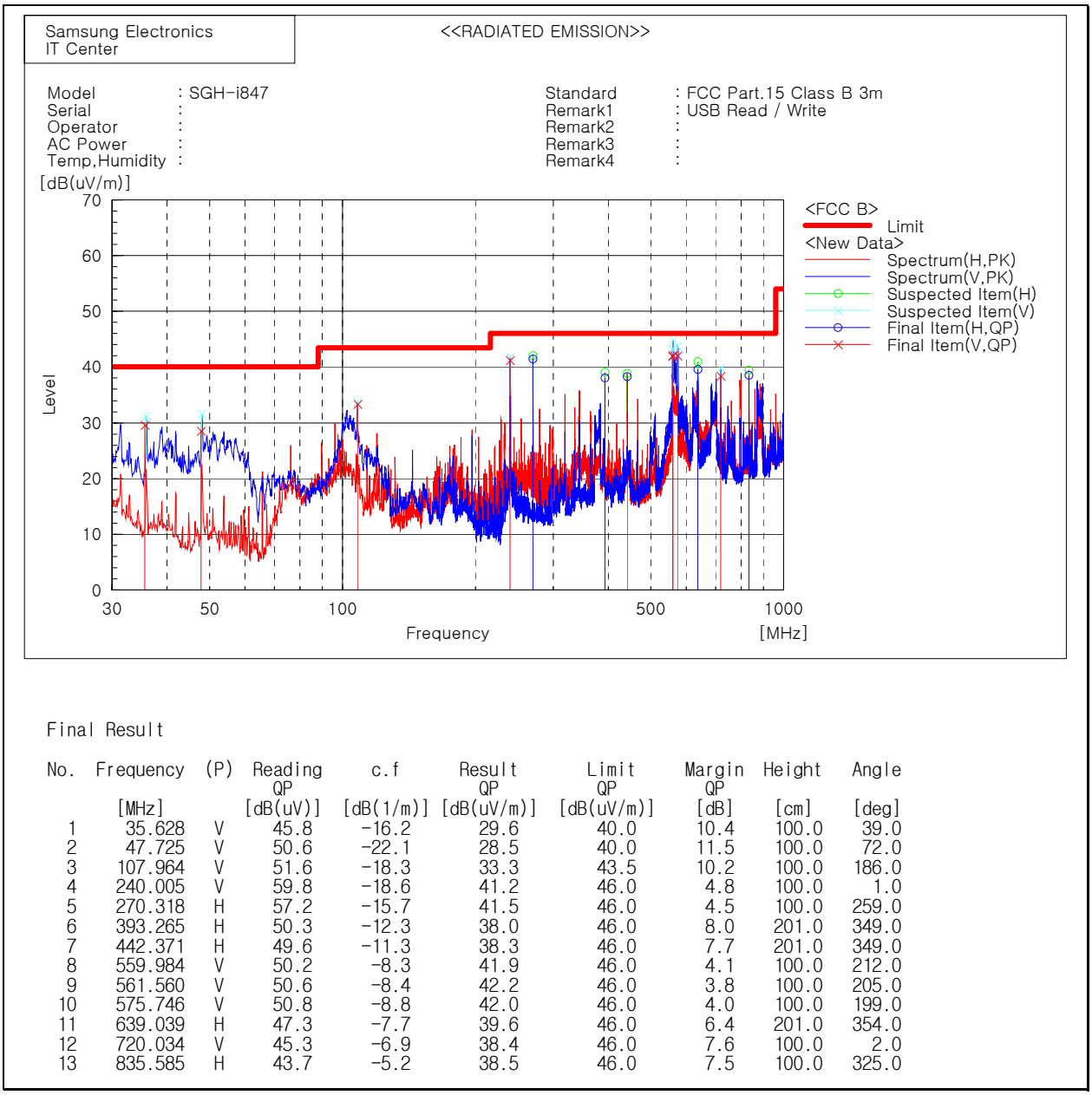
4.2.2 Temperature and humidity condition

Test date	2012-01-10	Test engineer	Young-Jin Kim
Climate condition	Ambient temperature	22.5 ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	33.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	101.0 kPa	Limit (86.0 to 106.0) kPa
Test place	Semi-Anechoic Chamber (SAC4)		

4.2.3 Test results

☐ Operating Mode 1

- Frequency range: 30 ~ 1 000 MHz



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]
1	35.628	V	45.8	-16.2	29.6	40.0	10.4	100.0	39.0
2	47.725	V	50.6	-22.1	28.5	40.0	11.5	100.0	72.0
3	107.964	V	51.6	-18.3	33.3	43.5	10.2	100.0	186.0
4	240.005	V	59.8	-18.6	41.2	46.0	4.8	100.0	1.0
5	270.318	H	57.2	-15.7	41.5	46.0	4.5	100.0	259.0
6	393.265	H	50.3	-12.3	38.0	46.0	8.0	201.0	349.0
7	442.371	H	49.6	-11.3	38.3	46.0	7.7	201.0	349.0
8	559.984	V	50.2	-8.3	41.9	46.0	4.1	100.0	212.0
9	561.560	V	50.6	-8.4	42.2	46.0	3.8	100.0	205.0
10	575.746	V	50.8	-8.8	42.0	46.0	4.0	100.0	199.0
11	639.039	H	47.3	-7.7	39.6	46.0	6.4	201.0	354.0
12	720.034	V	45.3	-6.9	38.4	46.0	7.6	100.0	2.0
13	835.585	H	43.7	-5.2	38.5	46.0	7.5	100.0	325.0

Note) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

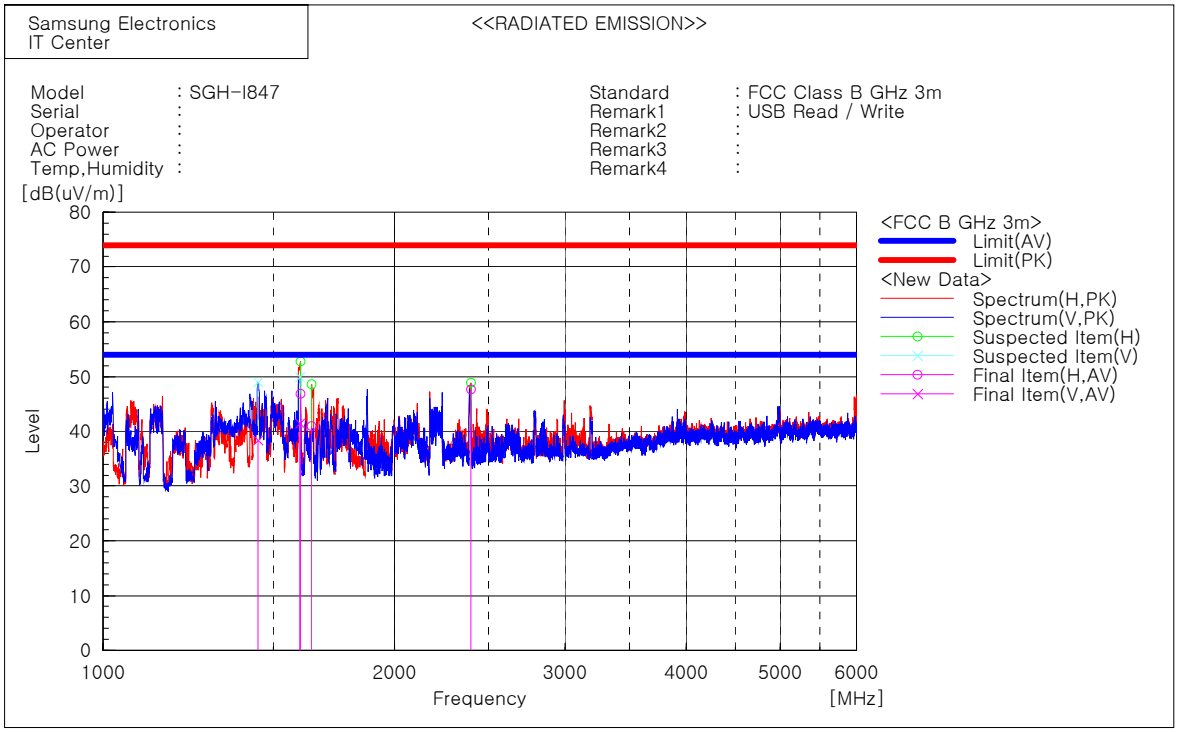
Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Result (QP)

QP = Quasi-Peak

☐ Operating Mode 1

- Frequency range: 1 000 ~ 6 000 MHz



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin AV [dB]	Height [cm]	Angle [deg]
1	1444.375	V	48.9	-10.5	38.4	54.0	15.6	100.0	344.0
2	1596.875	V	51.2	-9.7	41.5	54.0	12.5	100.0	224.0
3	1599.375	H	56.6	-9.7	46.9	54.0	7.1	100.0	177.0
4	1643.125	H	50.5	-9.5	41.0	54.0	13.0	100.0	170.0
5	2398.750	H	52.8	-5.1	47.7	54.0	6.3	100.0	351.0

Note1) Representative operating modes were selected by customer and any emissions that do NOT exceed Average limit were not tested with peak detector mode. There were no emissions from 6 GHz to 7 GHz.

Note2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 ~ 4 meters

Result (AV) = Reading (AV) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (AV) = Limit – Result (AV)

AV = Average