EMC TEST REPORT

Project No.	LBE20125205	**Issue No.**	1
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 30, 2012	
EUT	**Type of device**	☒ Class B personal computers and peripherals ☐ All other devices	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LGTI8190	
	Kind of product	Mobile Phone	
	Model No.	GT-I8190N	
	Variant Model No.	Refer to clause 4.6	
	Manufacturer	Mobile Communication division, #94-1, Imsoo-Dong, Gumi-city, Gyeongbuk, Koea 516229 chenjiang huizhou sehz Viet Nam Yen Phong I IP Yen Phong Bac Ninh	
Applied Standards		FCC Part 15, Subpart B, Class B / ANSI C63.4-2003	
Test Period		October 31, 2012 ~ November 02, 2012	
Issue date		November 05, 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 : Ho-Jin Choi	**Reviewed by** : Tae-Young Jang

SAMSUNG

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1. Report Information

1.1 Revision history

No.	Revised detailed information
Issue 0	There are no revisions and this version is basic test report.

2. Summary of test results

2.1 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

3. General Information

3.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at 416, (Maetan dong)129, Samsung-ro, 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.

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	GT-I8190N	-	SAMSUNG	A3LGTI8190
B	Battery	EB-L1M7FLU	AAaCA19KS/2-B	SAMSUNG	-
C	Data Cable	ECC1DU0BBK	KD1C725DS E	SAMSUNG	-
D	Headset	EHS64AVFWE	-	SAMSUNG	-
E	microSD Card	2GB	-	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	3CGSU08	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

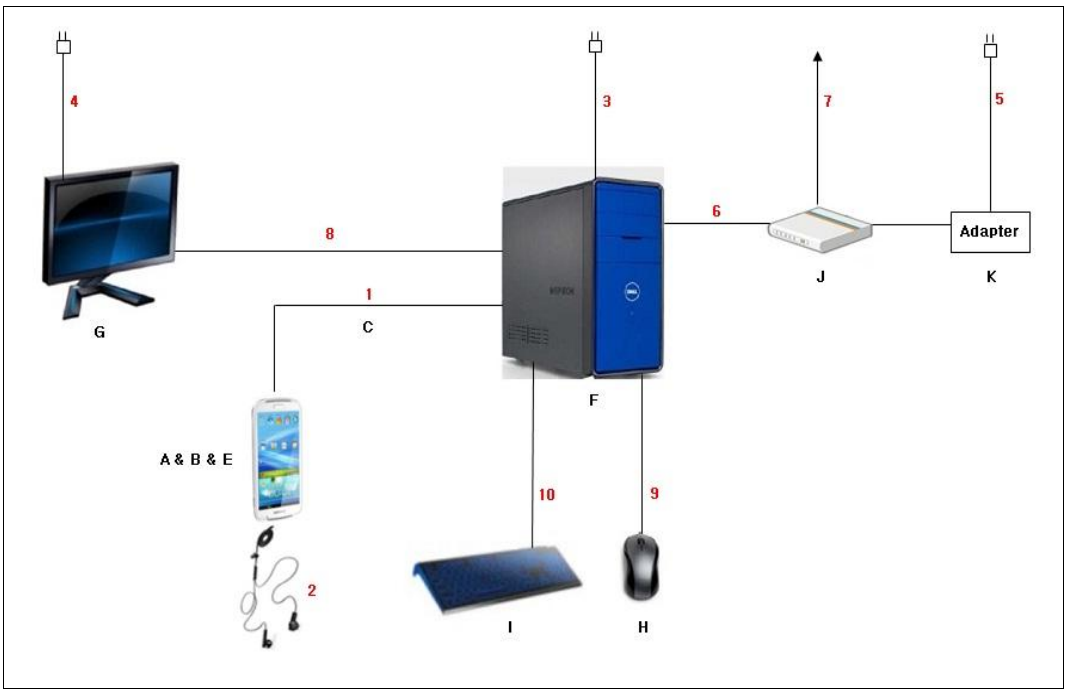
Customer selected, single unit.

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 USB	0.8	Yes	From EUT to Desk-Top Computer
2	Headset	1.25	No	For EUT
3	Power	1.8	No	For Desk-Top Computer
4	Power	1.8	No	For LCD Monitor
5	Power	1.8	No	For Power Supply
6	RJ45	1.5	No	From Desk-Top Computer to Router
7	RJ45	5.0	No	From Router to Local Area Network
8	D-sub	1.5	Yes	From Desk-Top Computer to LCD Monitor
9	USB	1.6	Yes	From Desk-Top Computer to Mouse
10	USB	1.7	Yes	From Desk-Top Computer to Keyboard

4.5 Test arrangement



4.6 EUT Description

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 : 1850.2 ~ 1909.8 MHz RX : 1930.2 ~ 1989.8 MHz
	WCDMA FDD2	TX : 1852.4 ~ 1907.6 MHz RX : 1932.4 ~ 1987.6 MHz
	WLAN	TX/RX Frequency : 2412 ~ 2472 MHz(802.11b/g/n) 5150 ~ 5250, 5250 ~5350, 5470 ~ 5650, 5725 ~5825 MHz(802.11a/n)
	Bluetooth	2 402 ~ 2 480 MHz Version : 4.0 + EDR
Operating Temperature (℃)	-20 ~ +60	
Operating Humidity (%)	0 ~ 95	

2. The variant models

- None

4.7 Clock Frequencies

Kind of Clocks	Frequency [MHz]
CPU	**1 000**

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	±4.75 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 of Class B ITE

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
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

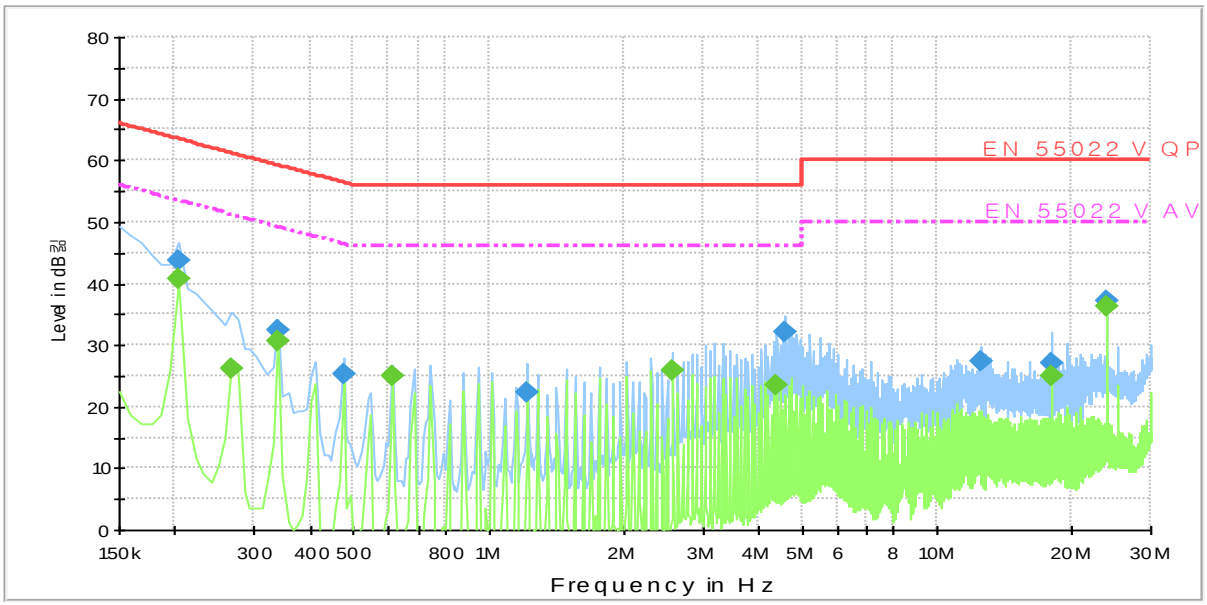
EMC No.	Test Instrument	Manufacturer	Model name	Serial No.	Calibration	
					Date	Interval (Month)
E3I-142	Test Receiver	R&S	ESI-26	100019	2012-06-04	12
E3I-049	LISN	R&S	ESH3-Z5	100260	2012-01-04	12
E3I-260	LISN	R&S	ENV216	101366	2012-09-11	12

5.1.2 Temperature and humidity condition

Test date	2012-11-02	**Test engineer**	Ho-Jin Choi
Climate condition	Ambient temperature	23.7 ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	37.6 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	100.9 kPa	Limit (86.0 to 106.0) kPa
Test place	Shield Room (SR8)		

5.1.3 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 (dBµV)	Corr. (dB)	Limit (dBµV)	Margin (dB)	Line
0.204	43.8	0.2	63.4	19.7	L1
0.339	32.3	0.2	59.2	26.9	L1
0.474	25.2	0.2	56.4	31.3	N
1.221	22.2	0.2	56.0	33.8	L1
4.605	32.2	0.3	56.0	23.8	N
12.588	27.3	0.5	60.0	32.7	N
17.934	27.2	0.6	60.0	32.8	N
23.910	37.0	0.7	60.0	23.0	N

Average final measurement results table:

Frequency (MHz)	Level (dBµV)	Corr. (dB)	Limit (dBµV)	Margin (dB)	Line
0.204	40.8	0.2	53.4	12.7	L1
0.267	26.1	0.2	51.2	25.1	L1
0.339	30.7	0.2	49.2	18.5	L1
0.609	24.9	0.2	46.0	21.1	L1
2.571	25.9	0.3	46.0	20.1	N
4.398	23.6	0.3	46.0	22.4	N
17.934	25.1	0.6	50.0	24.9	N
23.910	36.1	0.7	50.0	13.9	N

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 3 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	RBW	VBW	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.

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	RBW	VBW	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	1 MHz (PK / AV)	3 MHz (PK) 10 Hz (AV)	Continuous

Measurements within 20 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 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 88	100	40.0	29.5
88 to 216	150	43.5	33.0
216 to 960	200	46.0	35.5
Above 960	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	Manufacturer	Model name	Serial No.	Calibration	
					Date	Interval (Month)
E3I-003	BILOG Antenna	CBL6112B	Schaffner	2805	2012-04-19	24
E3I-190	BILOG Antenna	CBL6112B	Schaffner	2804	2011-06-22	24
E3I-213	Preamplifier	SONOMA	317	282424	2011-12-06	12
E3I-214	Preamplifier	SONOMA	317	282425	2011-12-06	12
E3I-231	Horn Antenna	ETS Lindgren	3115	00101620	2012-01-12	24
E3I-233	EMI Test Receiver	R&S	ESU-26	100364	2012-10-26	12
E4I-014	EMI Test Receiver	R&S	ESU-08	100084	2012-10-18	12

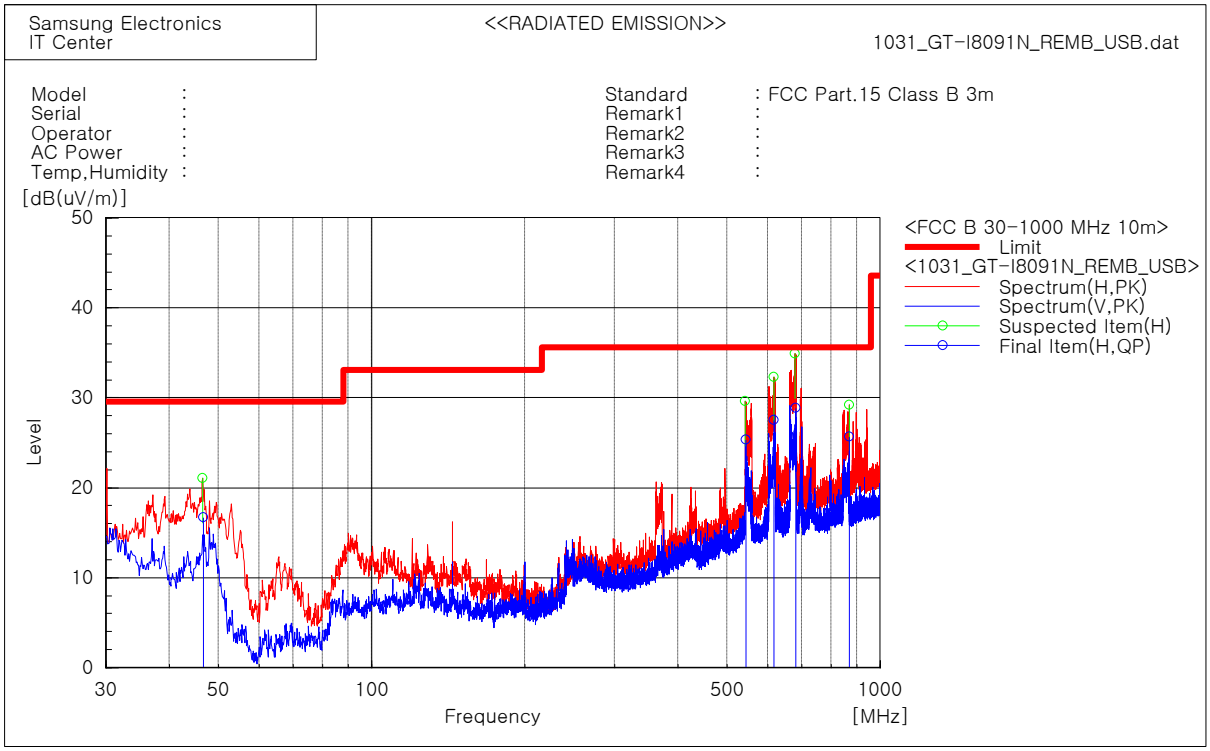
5.2.2 Temperature and humidity condition

Test date	2012-10-31	**Test engineer**	Ho-Jin Choi
Climate condition	Ambient temperature	23.5 ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	39.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	101.7 kPa	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



Final Result

--- Horizontal Polarization (QP)---

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]	System
1	46.551	42.7	-26.0	16.7	29.5	12.8	100.0	70.0	1
2	543.483	38.6	-13.3	25.3	35.5	10.2	400.0	312.0	1
3	617.924	40.6	-13.1	27.5	35.5	8.0	199.0	170.0	1
4	682.303	41.2	-12.4	28.8	35.5	6.7	200.0	137.0	1
5	868.715	35.8	-10.1	25.7	35.5	9.8	199.0	121.0	1

Note) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 10 m, Antenna Height : 1 to 4 meters

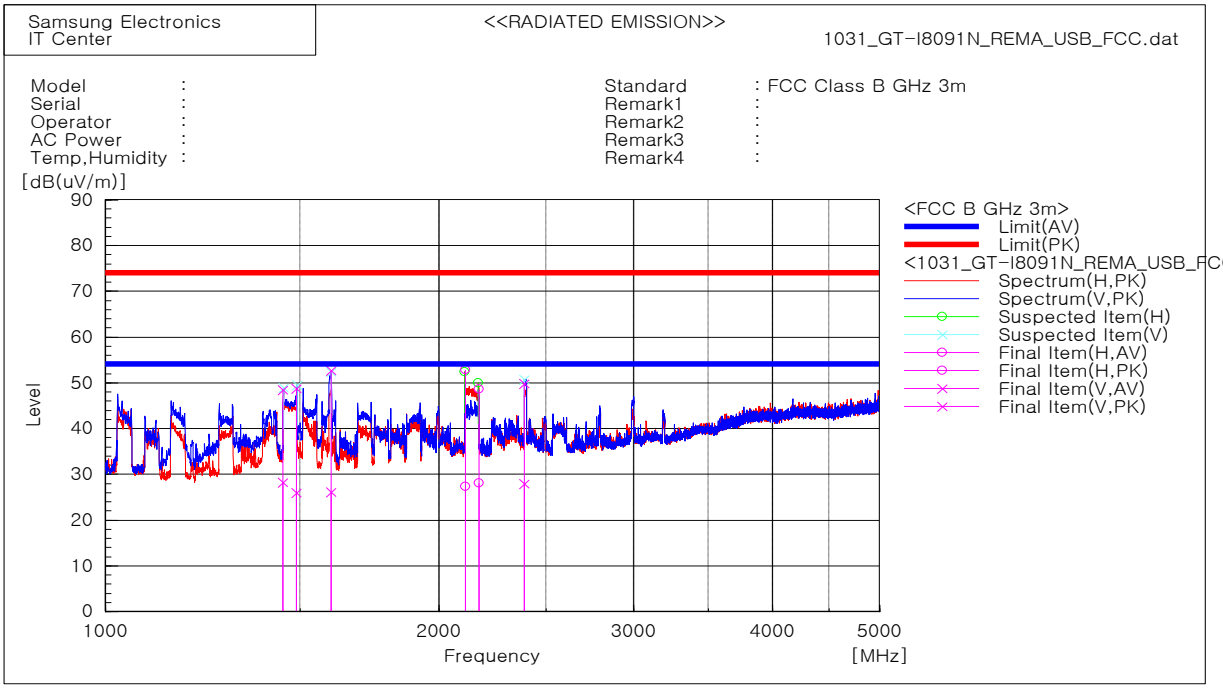
Level (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak

☐ Operating Mode 1

- Frequency range: 1 000 ~ 5 000 MHz



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	2112.955	33.0	-5.6	27.4	54.0	26.6	100.0	305.0
2	2172.618	33.5	-5.4	28.1	54.0	25.9	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	2112.955	58.4	-5.6	52.8	74.0	21.2	100.0	305.0
2	2172.618	54.0	-5.4	48.6	74.0	25.4	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	1446.119	38.9	-10.6	28.3	54.0	25.7	100.0	6.0
2	1487.938	36.2	-10.2	26.0	54.0	28.0	100.0	233.0
3	1599.216	35.3	-9.2	26.1	54.0	27.9	100.0	29.0
4	2389.375	33.4	-5.5	27.9	54.0	26.1	100.0	29.0

--- 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	1446.119	59.1	-10.6	48.5	74.0	25.5	100.0	6.0
2	1487.938	59.0	-10.2	48.8	74.0	25.2	100.0	233.0
3	1599.216	61.9	-9.2	52.7	74.0	21.3	100.0	29.0
4	2389.375	55.4	-5.5	49.9	74.0	24.1	100.0	29.0

Note 1 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