TEST REPORT

1. Applicant

Name : Samsung Electronics Co., Ltd.
Address : 416, Maetan 3-Dong, Yeongtong-Gu, Suwon-Si
Gyunggi-Do, 443-742, Republic of Korea

2. Products

Name : Wireless Charger
Model/Type : CY-SWC1000A
Manufacturer : Samsung Electronics Co., Ltd.

3. Test Standard : FCC CFR 47 Part 15, Subpart C section 15.225
IC RSS 210 Annex 2.6 – 2010

4. Test Method : ANSI C63.4-2003

5. Test Result : Positive

6. Date of Application : December. 29, 2010

7. Date of Issue : January. 27, 2011

Tested by

Jong-gon Ban
Telecommunication Center
Senior Engineer

Approved by

Jeong-min Kim
Telecommunication Center
Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	Samsung Electronics Co., Ltd.
Address	416, Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Republic of Korea
Contact Person	Sung Jin, Choi
Telephone No.	82-31-277-2026
Facsimile No.	82-31-277-2161
E-mail address	sjc.choi@samsung.com
Manufacturer Name	Samsung Electronics Co., Ltd.
Manufacturer Address	416, Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 443-742 Republic of Korea

1.2. Equipment (EUT)

FCC Classification	DXX– Part 15 Low Power Communication Device Transmitter
Model Name	CY-SWC1000A
FCC ID	A3LCYSWC1000A
IC Number	649E-CYSWC1000A
Frequency Band	13.56 MHz
EUT Modes of Operation	Transceiver
Type of Modulation	Continuous Wave
Number of Channels	1 channel
Antenna Type	Loop Antenna
AC/DC Adapter Information	Model No: SAD1212 Input: 100~240V, 50/60Hz, 0.3A Output: 12V, 1A Manufacturer: TIANJIN E&P ELECTRONICS Inc.

1.3. Testing Laboratory

Testing Place	Korea Testing Laboratory (KTL) 693, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Jong-gon Ban
Telephone number	+82 31 5000 133
Facsimile number	+82 31 5000 149
E-mail address	banjg@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for: Samsung Electronics Co., Ltd.

Equipment Under Test: CY-SWC1000A

Receipt of Test Sample: 2011. 01. 21

Test Start Date: 2011. 01. 24

Test End Date: 2011. 01. 27

The following table represents the list of measurements required under the FCC CFR 47 Part 15.225 and RSS 210 Annex 2.6

FCC Rules	IC Rules	Test Requirements	Result	Comments
15.225 (a)(b)(c)(d) 15.205, 15.209	RSS-210 A2.6 (a)(b)(c)(d)	Transmitter Radiated Emissions – Fundamental, Harmonic and Spurious	Pass	See Data sheets
15.225 (e)	RSS-210 A2.6	Carrier Frequency Stability	Pass	See Data sheets
15.207	RSS-Gen 7.2.4	AC Line Conducted Emission Limits	Pass	See Data sheets

Note1: Test results reported in this document relate only to the items tested
Note2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria
Note3: Test results apply only to the item(s) tested

*** Modifications required for compliance**
No modifications were implemented by KTL.
All results in this report pertain to the un-modified sample provided to KTL.

3.TEST RESULTS

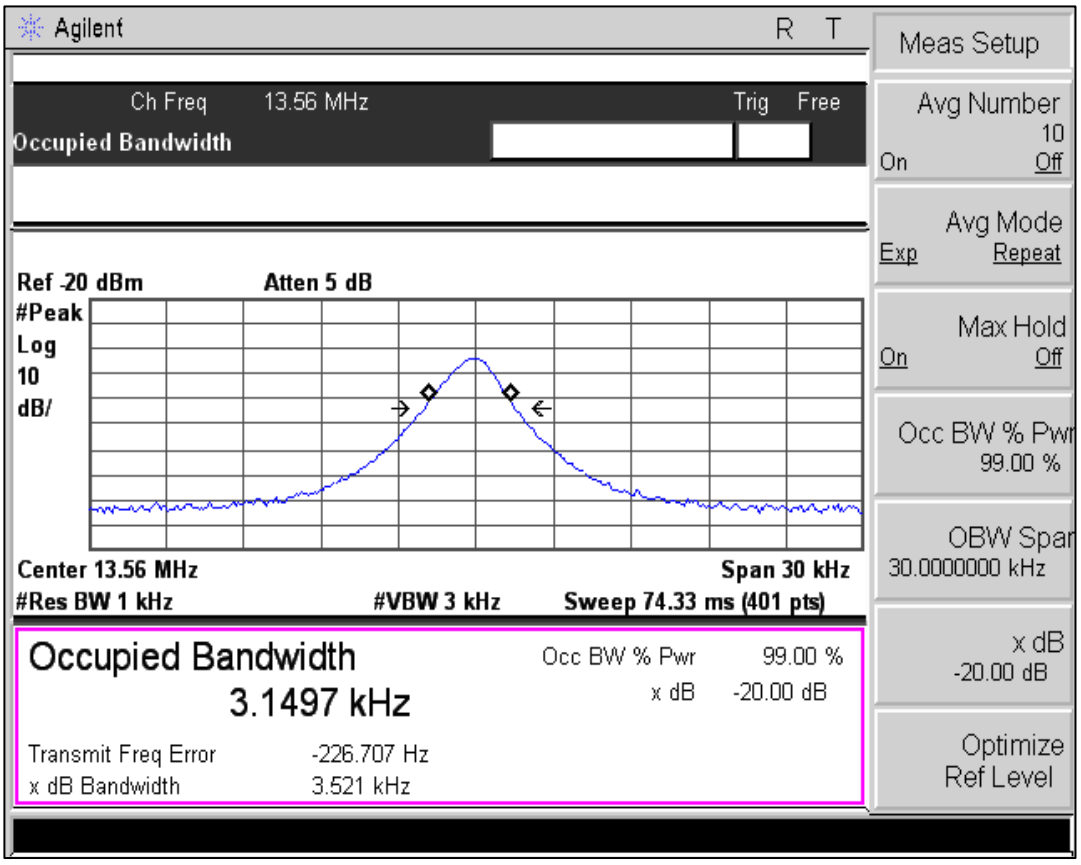
3.1. Occupied Bandwidth (20dB/ 99%)

3.1.1. Test Procedure

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 13.1.7 “Occupied bandwidth measurements” and Annex H.6 “Occupied bandwidth measurements”.
The spectrum analyzer RBW was set as follows and VBW the video bandwidth shall be set to a value at least three times greater than the RBW.
The occupied band measurement function was used of the spectrum analyzer.

3.1.2. Test Results

Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
13.56	3.521	3.150



<Occupied Bandwidth>

3.2. Frequency Stability: FCC 15.225(e) & IC RSS 210 A2.6

3.2.1. Test Procedure

Measurement procedures were implemented according to the test method of ANSI C63.4: 2003 Annex H5.
Place the de-energized EUT in the temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna was connected to the antenna output connector of the EUT if possible.
The frequency counter was connected to the measurement antenna with a suitable length of coaxial cable. The environmental chamber set to the highest temperature specified in applicable regulation. Allow sufficient time for the temperature of the chamber to stabilize.
Turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup.
The measurements were performed that the temperature chamber set to reduce the lowest temperature specified in applicable regulation.

3.2.2. Limits

Test items	Variation ranges	Limit
Temperature variations	-20℃ to +50℃	+/- 0.01% (0.001356MHz)
Power supply Voltage variations	85% to 115%	+/- 0.01% (0.001356MHz)

3.2.3. Test Results

Temperatures (℃)	Voltages (VAC)	Measured Frequency (MHz)	Deviation (MHz)	Limit (MHz)
+50	110	13.559967	-0.000033	+/- 0.001356
+20	126.5	13.559960	-0.000040	+/- 0.001356
+20	110	13.559957	-0.000043	+/- 0.001356
+20	93.5	13.559956	-0.000044	+/- 0.001356
-20	110	13.559995	-0.000005	+/- 0.001356

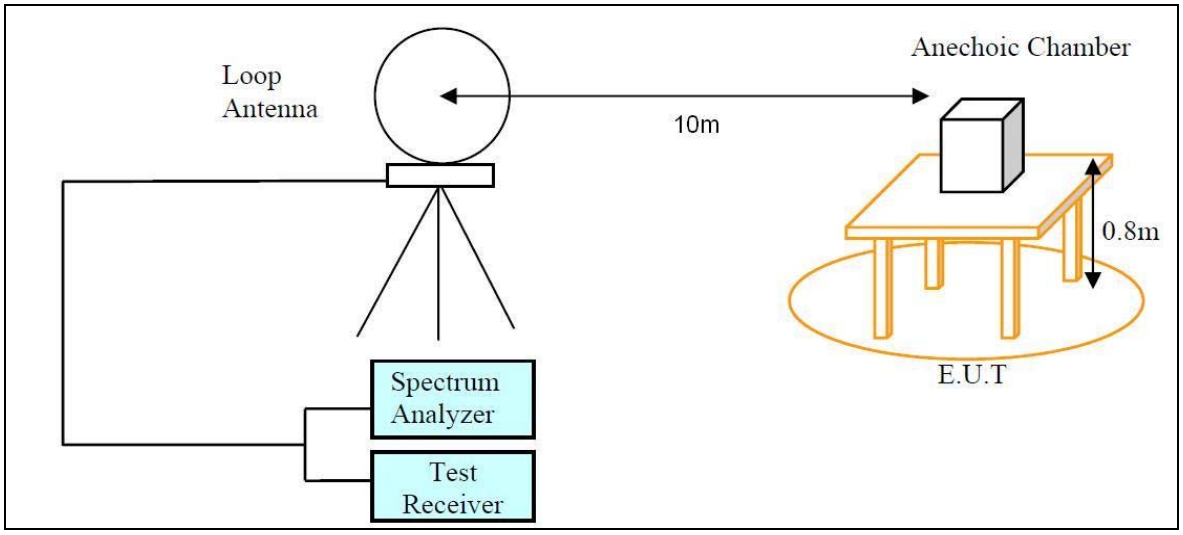
3.3. Radiated spurious emissions: FCC 15.225 & IC RSS 210 A2.6

3.3.1. Test Procedure (9kHz to 30MHz)

3.3.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 “General requirements for EUT equipment arrangements and operation”, clause 8.2 and Annex H.3 “Radiated emission measurements setup”.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.



< Test setup for below 30 MHz>

3.3.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 8.2. The measurement antenna to EUT distance is 10 meters. The turn table is rotated for 360 degrees to determine the maximum emission level.
In the frequency range of 9 kHz to 30 MHz, a calibrated loop antenna was positioned with its plane vertical at the distance 10m from the EUT with an extrapolation of corrected distance factor and rotated about its vertical axis for

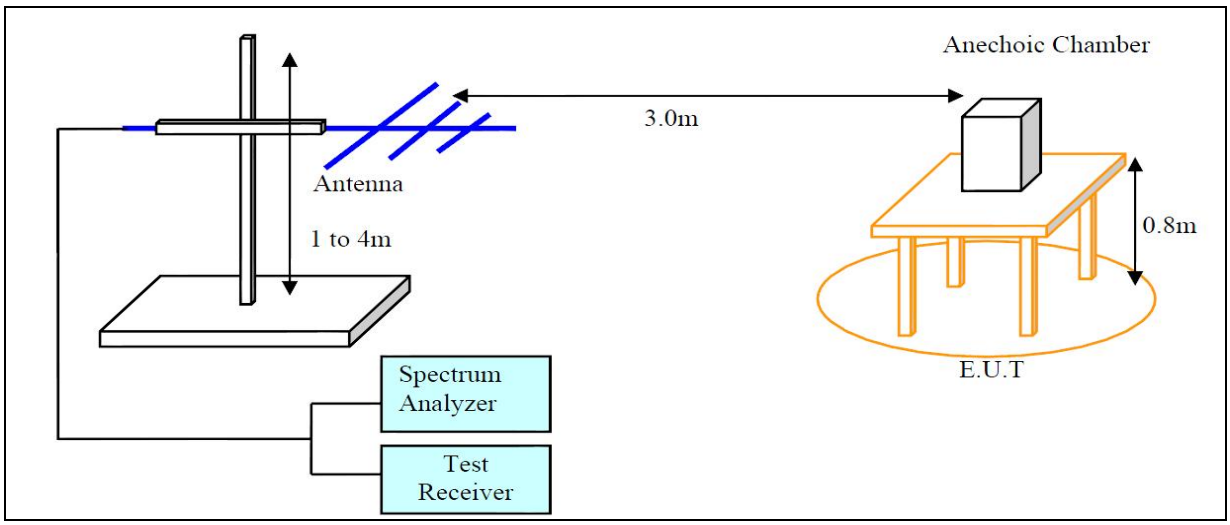
maximum response at each azimuth about the EUT. For certain applications, the loop antenna also needs to be positioned horizontally. The center of the loop shall be 1 m above the ground.
EUT is placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

3.3.2. Test Procedure (30MHz to 1GHz)

3.3.2.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna: 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.



< Test setup for 30 MHz to 1GHz>

3.3.2.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.
Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.
Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.
Tested in x, y, z axis and worst case results are reported.
The maximum frequency range measuring with the spectrum from 30 MHz to 10th harmonic was investigated with the transmitter.

3.3.3. Limits

FCC Section 15.225 & IC RSS 210 A2.6 Operation within and outside the band 13.110 – 14.010 MHz

Frequency (MHz)	Field strength @30m (uV/m)	Field strength @30m (dBuV/m)	Field strength @10m (dBuV/m)
13.110 – 13.410	106	40.5	59.6
13.410 – 13.553	334	50.5	69.6
13.553 – 13.567	15,848	84.0	103.1
13.567 – 13.710	334	50.5	69.6
13.710 – 14.010	106	40.5	59.6

dBuV/m = 20 x log (uV/m), Corrected distance factor = 40dB / decade (15.31(f))
The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the above radiated emission limits in § 15.209.

FCC Section 15.209 general requirements
Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
0.009 – 0.490	300	2400/F (kHz)	-
0.490 – 1.705	30	24000/F (kHz)	-
1.705 – 30	30	30	29.5
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
Above 960	3	500	53.9

In the emission table above, the tighter limit applies at the band edges.
The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.

3.3.4. Test Results

3.3.4.1 Radiated Spurious Emission

Frequency (MHz)	Ant. Pol. H/V	Bandwidth (kHz) Detector	Reading Level (dBμV)	Correction (AF+CL) dBμV/m	A.G	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin +/-	Measurement Distance
13.56	V	9, Q	61.0	9.9	0	70.9	103.1	+32.2	@10m
27.12	H	9, Q	39.7	7.6	0	47.3	48.6	+1.3	@10m
27.12	V	9, Q	37.4	7.6	0	45.0	48.6	+3.6	@10m
54.22	V	9, Q	45.4	14.9	32	28.3	40.0	+11.7	@3m
139.03	H	120, Q	35.1	14.6	32	17.7	43.5	+25.8	@3m
442.40	V	120, Q	22.6	20.1	32	10.7	46.0	+35.3	@3m
557.94	V	120, Q	23.0	22.8	32	13.8	46.0	+32.2	@3m
983.48	V	120, Q	22.3	29.0	32	19.3	54.0	+34.7	@3m

Level Corrected = Reading level + Correction factor (dB/m)
Corrected factor = Antenna factor + Cable loss – Pre-amplifier (when using a pre-amplifier)

Note: 1. Measurement was done over the frequency range from 9 kHz to 30MHz. The EUT was rotated and the antenna was changed to Horizontal and Vertical polarization for maximum response
2. Measurement was done over the frequency range from 30 MHz to 1000 MHz. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
3. If the Peak Emission Level is lower than 54 dBμV/m, average test was not perfomed.
4. Pre-amplifier was used in the range between 30 ~ 1000 MHz.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain

Remark: Noise floor of 30 ~ 1000 MHz : <20 dBμV at 3m distance

3.4. AC Line Conducted Emission FCC 15.207 & IC RSS Gen

3.4.1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m x 3.1 m in size to maintain 40 cm from the rear of EUT

LISN(TWO-LINE V-NETWORK, ROHDE & SCHWARZ, ENV216, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.

One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver (ROHDE & SCHWARZ, ESCI, 9 kHz to 3 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.

The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESCI, 9 kHz to 3 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.4.2. Limits

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency (MHz)	Conducted Limits (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

3.4.3. Test Results

3.4.3.1 Normal Operation Mode

Final Measurement: Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBuV)	Line	*C.F (dB)	Margin (dB)	Limit (dBuV)
0.190500	48.5	L1	9.7	15.5	64.0
0.321000	34.4	L1	9.7	25.3	59.7
0.559500	26.8	L1	9.8	29.2	56.0
1.050000	28.2	N	9.8	27.8	56.0
1.963500	28.4	L1	9.9	27.6	56.0
2.521500	30.5	L1	9.9	25.5	56.0
3.921000	30.5	L1	10.0	25.5	56.0
9.451500	30.5	N	10.1	29.5	60.0
13.560000	91.8	L1	10.2	-31.8	60.0
27.118500	49.1	N	10.5	10.9	60.0

* C.F (Correction Factor) : LISN Factor + Cable Loss

Final Measurement: Average

Frequency (MHz)	Average (dBuV)	Line	*C.F (dB)	Margin (dB)	Limit (dBuV)
0.190500	33.9	L1	9.7	20.1	54.0
0.258000	22.9	L1	9.7	28.6	51.5
0.523500	12.0	N	9.7	34.0	46.0
1.203000	15.7	N	9.8	30.3	46.0
1.963500	18.2	N	10.0	27.8	46.0
2.404500	21.3	N	10.0	24.7	46.0
4.618500	19.3	L1	10.0	26.7	46.0
9.735000	21.5	L1	10.2	28.6	50.0
13.560000	91.6	L1	10.2	-41.6	50.0
27.118500	47.5	N	10.5	2.5	50.0

* C.F (Correction Factor) : LISN Factor + Cable Loss

3.4.3.2 Antenna Terminated Mode

Final Measurement: Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBuV)	Line	C.F (dB)	Margin (dB)	Limit (dBuV)
13.560000	47.3	L1	10.2	12.7	60.0

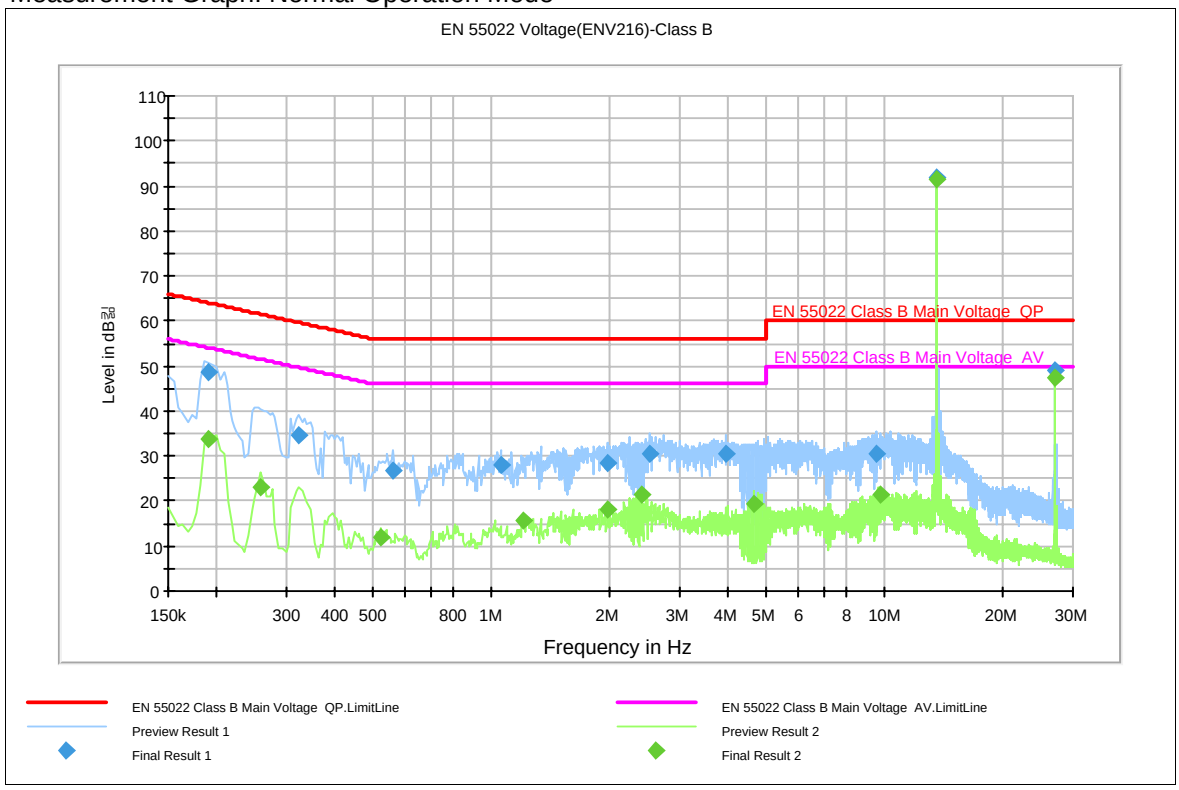
* C.F (Correction Factor) : LISN Factor + Cable Loss

Final Measurement: Average

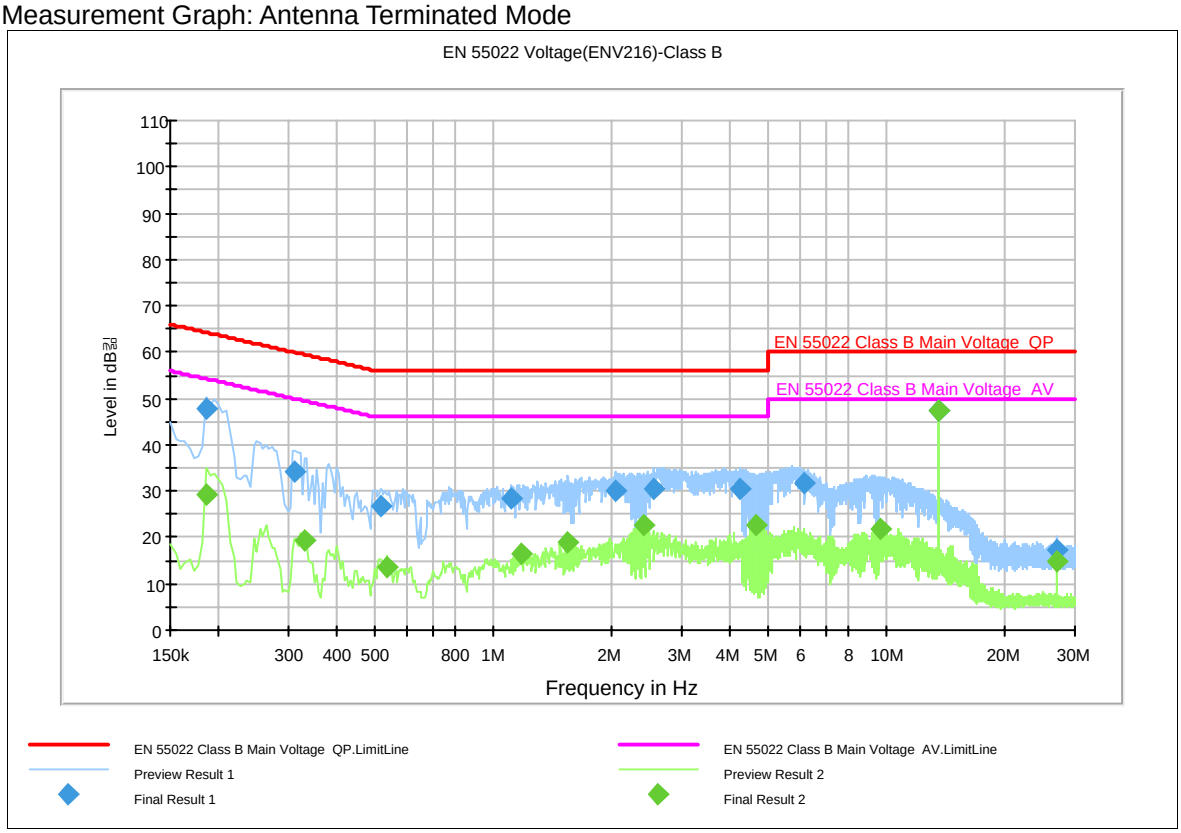
Frequency (MHz)	Quasi-Peak (dBuV)	Line	C.F (dB)	Margin (dB)	Limit (dBuV)
13.560000	47.2	L1	10.2	2.8	50.0

* C.F (Correction Factor) : LISN Factor + Cable Loss

Measurement Graph: Normal Operation Mode



Measurement Graph: Antenna Terminated Mode



4. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver	R&S	ESIB26	100280	08/17//2011
2	EMI Receiver	R&S	ESCI	101006	01/20/2012
3	TWO-LINE V-NETWORK (LISN)	R&S	ENV216	100094	26/08/2011
4	Pre-Amplifier	Agilent	83017A	MY39500982	04/02/2011
5	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-180	08/24/2012
6	Loop Ant.	EMCO	6507	00021178	05/19/2011
7	Antenna Mast	Frankonia	FAM4	1101F4006	--
8	Spectrum Analyzer	Agilent	E4407B	US41443316	12/01/2011