



KES Co., Ltd.
C-3701, Simin-daero 365-401,
Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-RF-14T0037
Page (1) of (37)

TEST REPORT

FCC Part 15C

Equipment under test Wireless Charger

Model name KWH-210

FCC ID 2ACCCKWH-210

Applicant KOMATECH Co.,Ltd.

Manufacturer KOMATECH Co.,Ltd.

Date of test(s) 2014.06.25~2014.07.03

Date of issue 2014.07.07

Issued to

KOMATECH Co.,Ltd.
62-16 19th st. Gamjeong-ro,
Gimpo-si, Gyeonggi-do, Korea
Tel: +82-31-999-3940 / Fax: +82-31-997-7900

Issued by

KES Co., Ltd.
C-3701, Simin-daero 365-40, Dongan-gu, Anyang-si,
Gyeonggi-do, 431-716, Korea
473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450

Test and report completed by :	Report approval by :
Byeong-Geol Chu Test engineer	Jeff Do Technical manager

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The test results in the report only apply to the tested sample.



Revision history

Revision	Date of issue	Test report No.	Description
-	2014.07.07	KES-RF-14T0037	Initial

TABLE OF CONTENTS

1.	General information.....	4
1.1.	EUT description	4
1.2.	Test frequency	4
1.3.	Information about derivative model	4
1.4.	Device modifications.....	4
1.5.	Device information.....	4
1.6.	Test facility	5
1.7.	Laboratory accreditations and listings.....	5
2.1	Summary of tests	6
2.2	Test mode.....	6
2.3	Battery status during charging	6
2.4	Fundamental emission comparison	6
3.	Test results	7
3.1.	Radiated spurious emission	7
3.2.	AC conducted emissions	20
	Appendix A. Measurement equipment	31
	Appendix B. Test setup photo.....	32

1. General information

1.1. EUT description

Equipment under test	Wireless Charger
Model name	KWH-210
Serial number	N/A
Frequency Range	112 kHz ~205 kHz
Modulation technique	ASK
Antenna type	Internal type(Coil antenna)
Power source	AC 110 V Adapter

1.2. Test frequency

	Frequency Range
Frequency (kHz)	112 kHz ~205 kHz

1.3. Information about derivative model

N/A

1.4. Device modifications

N/A

1.5 Device information

KWH-210 can be used Pad type and Stand Type.



1.6. Test facility

C-3701, Simin-daero 365-40, Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea
473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea

The open area test site is constructed in conformance with the requirements ANSI C63.4-2003/2009.

1.7. Laboratory accreditations and listings

Country	Agency	Scope of accreditation	Certificate No.
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	343818
KOREA	KC	EMI (10 meter Open Area Test Site and two conducted sites) Radio (3 & 10 meter Open Area Test Sites and one conducted site)	KR0100
CANADA	IC	3 & 10 meter Open Area Test Sites and one conducted site	4769B-1

2.1 Summary of tests

FCC Part Sections	RSS Sections	Parameter	Test results
15.209	RSS-Gen [7.2.5]	Radiated spurious emission	Pass
15.207	RSS-Gen [7.2.4]	AC conducted emissions	Pass

Statement:

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003/ 2009) were used in the measurement of the DUT.

2. 2 Test mode

Mode	Charging current	Description
Charging mode With load	237 mA	Using Max load
	467 mA	Using Mid load
	870 mA	Using Min load
Charging mode With Mobile Phone	-	< 1% of Battery status
	-	50% of Battery status

2. 3 Battery status during charging

< 1% of Battery, 50 % of Battery

2. 4 Fundamental emission comparison

The level of call connecting of WCDMA mode was more than airplane mode, charging with Mobile Phone in standby mode and charging with Mobile Phone turned off mode. So WCDMA mode was selected.

3. Test results

3.1. Radiated spurious emission

Test location

Testing was performed at a test distance of 3 meter Open Area Test Site

Test procedures

[9 kHz to 30 MHz]

The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Quasi-peak function and specified bandwidth with maximum hold mode.

The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 200 Hz / 300 Hz for peak detection (PK) at frequency below 9 kHz~ 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 9 kHz / 10 kHz for peak detection (PK) at frequency below 150 kHz~ 30 MHz.
3. For the frequency bands 9~ 90 kHz, 110~490 kHz the radiated emission limits are based on measurements employing an average detector.

[30 MHz to 1 GHz]

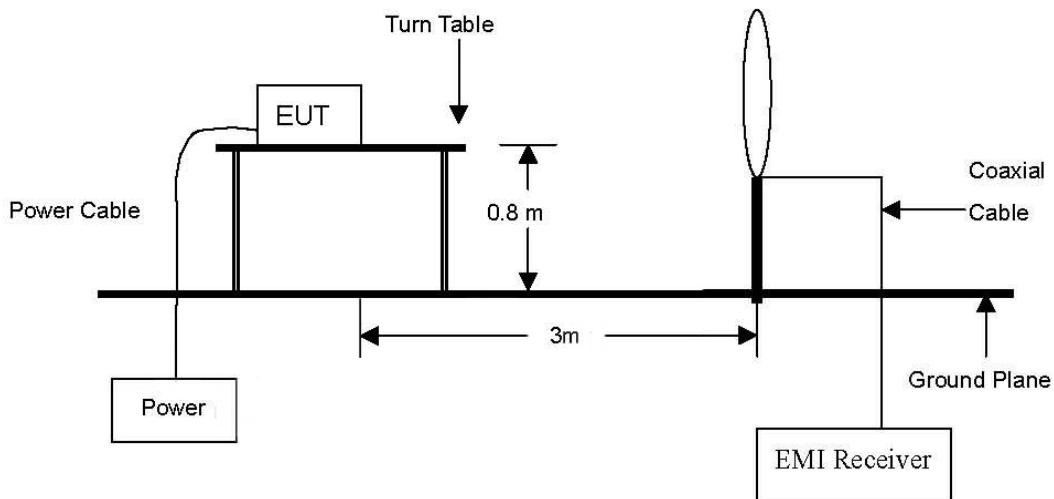
The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

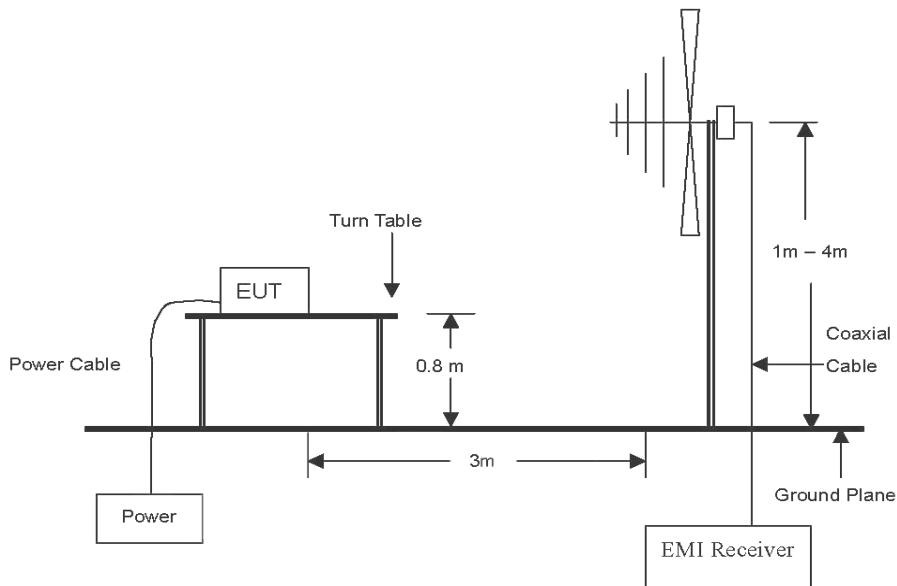
The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.





Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (μ V/m)
0.009 ~ 0.490	300	2400 / F(kHz)
0.490 ~ 1.705	30	24000 / F(kHz)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 ~ 72 MHz, 76 ~ 88 MHz, 174 ~ 216 MHz or 470 ~ 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

Test results (Below 30 MHz)

The frequency spectrum from 9 kHz to 30 MHz was investigated.

- Pad type / charging with load (Max)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ N)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
0.110 9*	Peak	21.59	19.70	0.02	-80	-38.69	27.53	66.22
	-	-				-		-
0.116 1**	Peak	55.38	19.69	0.02	-80	-4.91	26.31	31.22
	Avg	55.31				-4.98		31.29
0.335 1	Peak	34.99	19.60	0.07	-80	-25.34	17.10	42.44
	Avg	34.70				-25.63		42.73
0.560 4	Peak	27.07	19.60	0.12	-40	6.79	32.63	25.84
	-	-				-		-
0.784 4	Peak	22.13	19.60	0.15	-40	1.88	29.71	27.83
	-	-				-		-

- Pad type / charging with load (Mid)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ N)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
0.101 1*	Peak	25.57	19.70	0.02	-80	-34.71	27.51	62.22
	-	-				-		-
0.120 3**	Peak	55.74	19.69	0.02	-80	-4.55	26.00	30.55
	Avg	55.65				-4.64		30.64
0.361 0	Peak	33.80	19.60	0.07	-80	-26.53	16.45	42.98
	Avg	33.64				-26.69		43.14
0.601 0	Peak	26.30	19.60	0.13	-40	6.03	32.03	26.00
	-	-				-		-
0.838 5	Peak	21.70	19.60	0.16	-40	1.46	29.13	27.67
	-	-				-		-

- Pad type / charging with load (Min)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.092 9*	Peak	28.23	19.71	0.01	-80	-32.05	28.24	60.29
	-	-				-		-
0.112 0**	Peak	61.91	19.69	0.02	-80	1.62	26.62	25.00
	Avg	61.89				1.60		25.02
0.334 6	Peak	37.01	19.60	0.07	-80	-23.32	17.11	40.43
	Avg	36.95				-23.38		40.49
0.556 4	Peak	29.42	19.60	0.12	-40	9.14	32.70	23.56
	-	-				-		-
0.779 4	Peak	24.58	19.60	0.15	-40	4.33	29.77	25.44
	-	-				-		-

- Pad type / charging with Mobile Phone (< 1% of Battery)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.104 0*	Peak	15.79	19.70	0.02	-80	-44.49	27.26	71.75
	-	-				-		-
0.143 8**	Peak	50.44	19.68	0.03	-80	-9.85	24.45	34.30
	Avg	50.36				-9.93		34.38
0.430 8	Peak	30.45	19.60	0.09	-80	-29.86	14.92	44.78
	Avg	30.39				-29.92		44.84
0.719 1	Peak	22.90	19.60	0.14	-40	2.64	30.47	27.83
	-	-				-		-
0.993 5	Peak	17.82	19.60	0.19	-40	-2.39	27.66	30.05
	-	-				-		-



- Pad type / charging with Mobile Phone (50% of Battery)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.104 2*	Peak	21.88	19.70	0.02	-80	-38.40	27.25	65.65
	-	-				-		-
0.134 1**	Peak	49.98	19.68	0.03	-80	-10.31	25.06	35.37
	Avg	49.91				-10.38		35.44
0.401 3	Peak	29.06	19.60	0.08	-80	-31.26	15.53	46.79
	Avg	28.97				-31.35		46.88
0.705 2	Peak	18.22	19.60	0.14	-40	-2.04	30.64	32.68
	-	-				-		-

*** Remark**

1. “*” means Restricted frequency.
2. “**” means Fundamental frequency.
3. Measurement distance : 3 m.
4. Actual = Reading + Ant. factor + Cable loss + F_d
5. F_d = 40log(D_m / D_s)

Where:

F_d = Distance factor in dB

D_m = Measurement distance in meters

D_s = Specification distance in meters

For 300m: 40log(300/3) = 80 dB for frequency band 0.009 MHz to 0.490 MHz

For 30m: 40log(30/3) = 40 dB for frequency band 0.490 MHz to 30 MHz



- Stand type / charging with load (Max)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detector	Reading (dB μ N)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
0.107 1*	Peak	22.98	19.70	0.02	-80	-37.30	27.01	64.31
	-	-				-		-
0.121 3**	Peak	59.05	19.69	0.02	-80	-1.24	25.93	27.17
	Avg	59.00				-1.29		27.22
0.363 7	Peak	37.30	19.60	0.07	-80	-23.03	16.39	39.42
	Avg	37.24				-23.09		39.48
0.606 0	Peak	28.42	19.60	0.13	-40	8.15	31.95	23.80
	-	-				-		-
0.848 3	Peak	23.81	19.60	0.16	-40	3.57	29.03	25.46
	-	-				-		-

- Stand type / charging with load (Mid)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detector	Reading (dB μ N)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
0.103 2*	Peak	26.03	19.70	0.02	-80	-34.25	27.33	61.58
	-	-				-		-
0.1220**	Peak	59.05	19.69	0.02	-80	-1.24	25.88	27.12
	Avg	58.99				-1.30		27.18
0.365 1	Peak	36.61	19.60	0.07	-80	-23.72	16.36	40.08
	Avg	36.58				-23.75		40.11
0.609 9	Peak	28.32	19.60	0.13	-40	8.05	31.90	23.85
	-	-				-		-
0.852 2	Peak	23.54	19.60	0.16	-40	3.30	28.99	25.69
	-	-				-		-



- Stand type / charging with load (Min)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.094 9*	Peak	28.24	19.71	0.01	-80	-32.04	28.06	60.10
	-	-				-		-
0.112 1**	Peak	62.49	19.69	0.02	-80	2.20	26.61	24.41
	Avg	62.45				2.16		24.45
0.333 1	Peak	37.17	19.60	0.07	-80	-23.16	17.15	40.31
	Avg	37.10				-23.23		40.38
0.555 8	Peak	30.53	19.60	0.12	-40	10.25	32.71	22.46
	-	-				-		-
0.777 3	Peak	25.50	19.60	0.15	-40	5.25	29.79	24.54
	-	-				-		-

- Stand type / charging with Mobile Phone (< 1% of Battery)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.103 9*	Peak	17.77	19.70	0.02	-80	-42.51	27.27	69.78
	-	-				-		-
0.140 6**	Peak	58.63	19.68	0.03	-80	-1.66	24.64	26.30
	Avg	58.57				-1.72		26.36
0.422 4	Peak	36.30	19.60	0.08	-80	-24.02	15.09	39.11
	Avg	36.24				-24.08		39.17
0.704 1	Peak	28.99	19.60	0.14	-40	8.73	30.65	21.92
	-	-				-		-
0.985 9	Peak	22.56	19.60	0.19	-40	2.35	27.73	25.38
	-	-				-		-



- Stand type / charging with Mobile Phone (50% of Battery)

Radiated emissions			Correction factors			Total	Limit	
Frequency (MHz)	Detect	Reading (dB μ V)	Ant. factor (dB/m)	Cable loss (dB)	F _d (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
0.107 6*	Peak	20.94	19.70	0.02	-80	-39.34	26.97	66.31
	-	-				-		-
0.138 7**	Peak	59.86	19.68	0.03	-80	-0.43	24.76	25.19
	Avg	59.81				-0.48		25.24
0.414 4	Peak	36.42	19.60	0.08	-80	-23.90	15.26	39.16
	Avg	36.36				-23.96		39.22
0.689 8	Peak	29.11	19.60	0.14	-40	8.85	30.83	21.98
	-	-				-		-
0.968 4	Peak	25.25	19.60	0.18	-40	5.03	27.88	22.85
	-	-				-		-

*** Remark**

1. “*” means Restricted frequency.
2. “**” means Fundamental frequency.
3. Measurement distance : 3 m.
4. Actual = Reading + Ant. factor + Cable loss + F_d
5. F_d = 40log(D_m / D_s)

Where:

F_d = Distance factor in dB

D_m = Measurement distance in meters

D_s = Specification distance in meters

For 300m: 40log(300/3) = 80 dB for frequency band 0.009 MHz to 0.490 MHz

For 30m: 40log(30/3) = 40 dB for frequency band 0.490 MHz to 30 MHz



Test results (Below 1 000 MHz)

The frequency spectrum from 30 MHz to 1 000 MHz was investigated.

- Pad type / charging with load (Max)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Pad type / charging with load (Med)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Pad type / charging with load (Min)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							



- Pad type / charging with Mobile Phone (< 1% of Battery)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Pad type / charging with Mobile Phone (50% of Battery)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

*** Remark**

1. Actual = Reading + Ant. factor + Cable loss



- Stand type / charging with load (Max)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Stand type / charging with load (Med)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Stand type / charging with load (Min)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							



- Stand type / charging with Mobile Phone (< 1% of Battery)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

- Stand type / charging with Mobile Phone (50% of Battery)

Radiated emissions		Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ N)	Pol.	Ant. factor (dB/m)	Cable loss (dB)	Actual (dB μ N/m)	Limit (dB μ N/m)	Margin (dB)
No emissions were detected at a level greater than 20 dB below limit							

※ Remark

1. Actual = Reading + Ant. factor + Cable loss

3.2. AC conducted emissions

Frequency range of measurement

150 kHz to 30 MHz

Instrument settings

IF Band Width: 9 kHz

Test procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m. Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

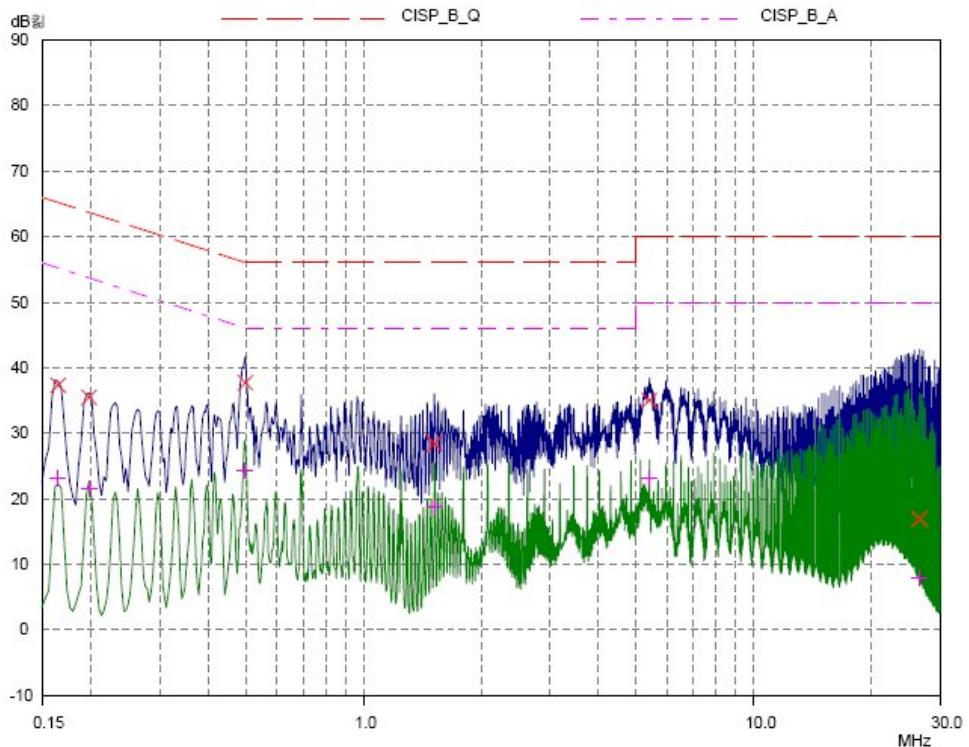
According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz , shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit ($\text{dB}\mu\text{V/m}$)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Remark

1. Decreases with the logarithm of the frequency.

Test results



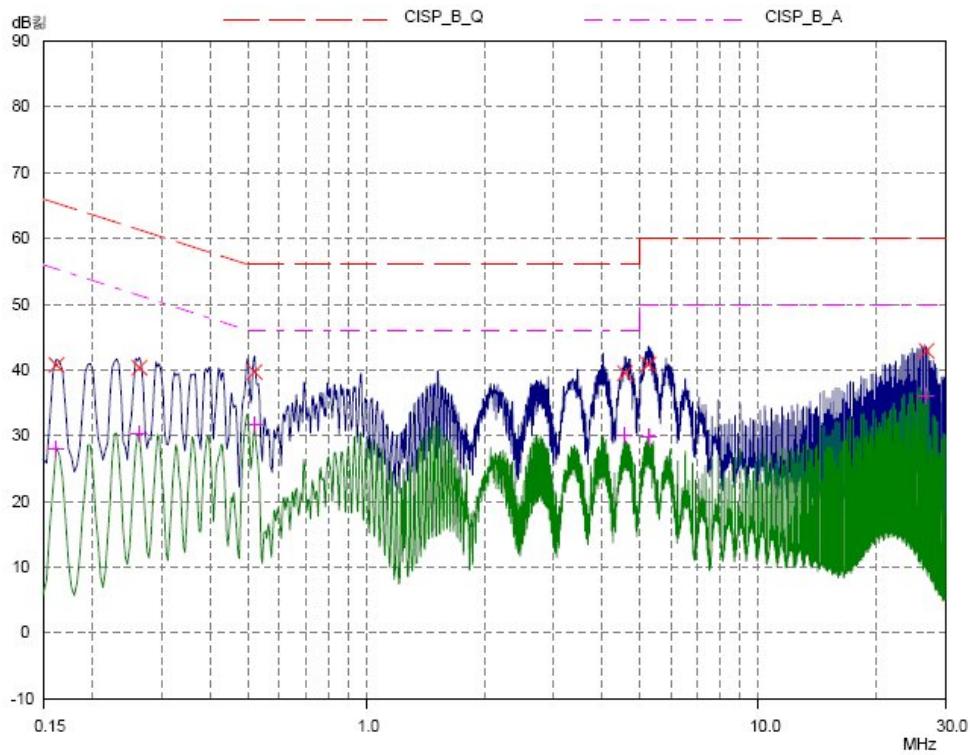
Mode: < 1% of Battery status

Frequency MHz	QP Level dB	QP Limit dB	QP Delta dB
0.165	37.31	65.21	27.90
0.198	35.47	63.69	28.22
0.498	37.70	56.03	18.33
1.518	28.39	56.00	27.61
5.403	35.01	60.00	24.99
26.607	16.95	60.00	43.05

Frequency MHz	AV Level dB	AV Limit dB	AV Delta dB
0.165	23.14	55.21	32.07
0.198	21.60	53.69	32.09
0.498	24.36	46.03	21.67
1.518	18.83	46.00	27.17
5.403	23.10	50.00	26.90
26.607	7.81	50.00	42.19

Note; Hot Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



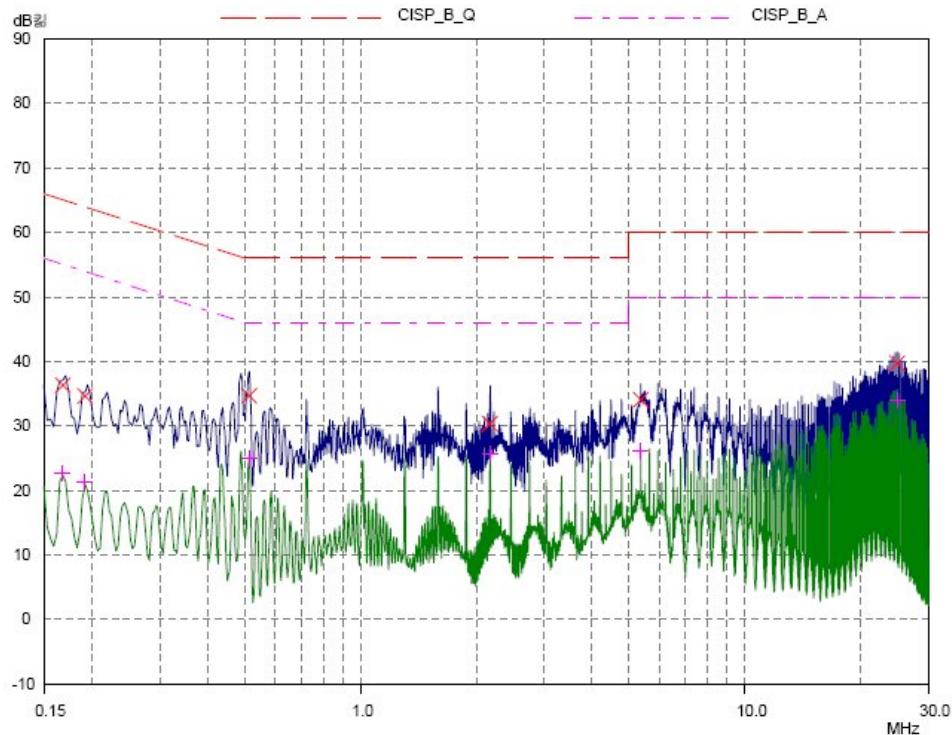
Mode: < 1% of Battery status

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
0.162	40.74	65.36	24.62
0.264	40.32	61.30	20.98
0.519	39.66	56.00	16.34
4.566	39.49	56.00	16.51
5.25	40.82	60.00	19.18
26.868	42.89	60.00	17.11

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
0.162	28.05	55.36	27.31
0.264	30.31	51.30	20.99
0.519	31.56	46.00	14.44
4.566	30.04	46.00	15.96
5.25	29.85	50.00	20.15
26.868	35.96	50.00	14.04

Note: Neutral Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



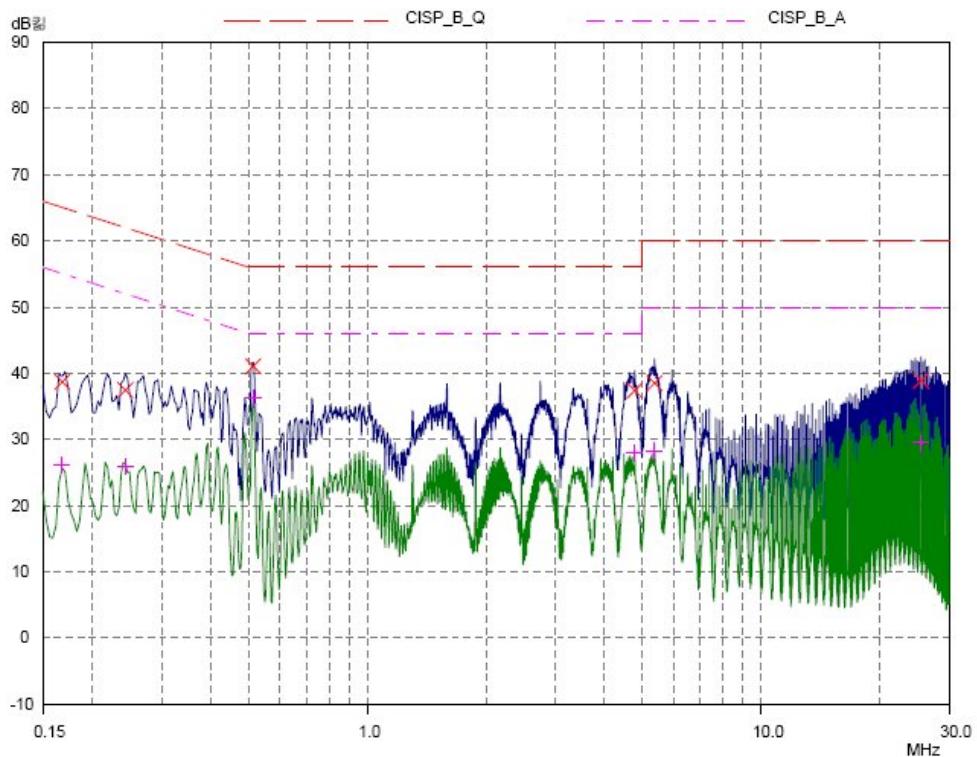
Mode: 50% of Battery status

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
0.168	36.31	65.06	28.75
0.192	34.64	63.95	29.31
0.513	34.66	56.00	21.34
2.169	30.33	56.00	25.67
5.358	34.06	60.00	25.94
24.897	39.72	60.00	20.28

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
0.168	22.74	55.06	32.32
0.192	21.29	53.95	32.66
0.513	25.05	46.00	20.95
2.169	25.57	46.00	20.43
5.358	26.15	50.00	23.85
24.897	33.92	50.00	16.08

Note; Hot Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



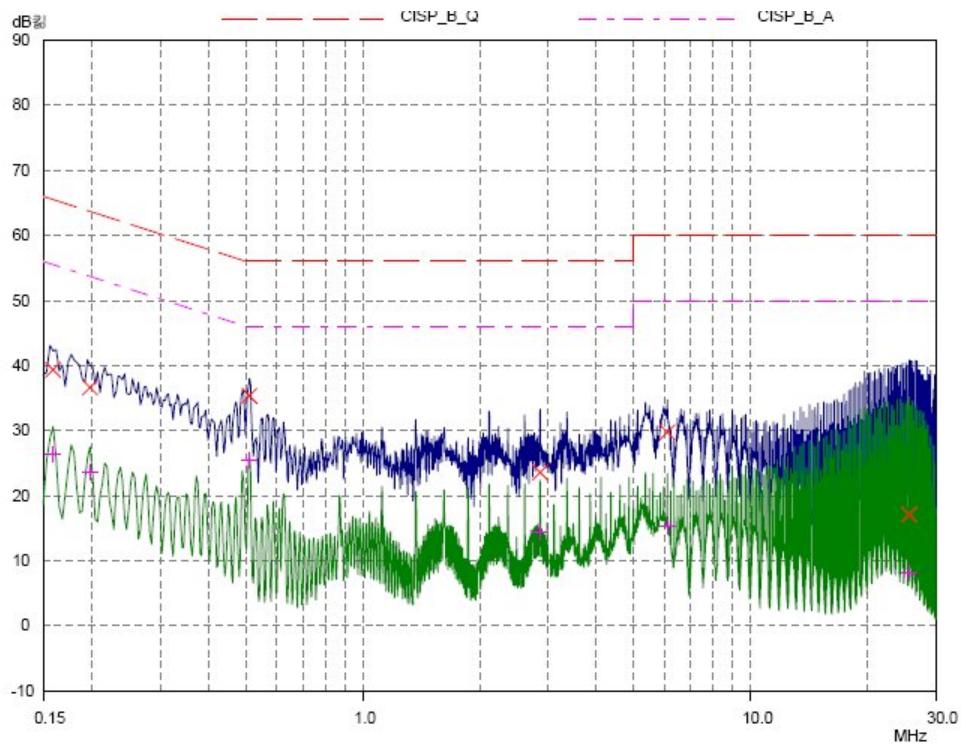
Mode: 50% of Battery status

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
0.168	38.66	65.06	26.40
0.243	37.43	61.99	24.56
0.513	41.04	56.00	14.96
4.773	37.37	56.00	18.63
5.358	38.50	60.00	21.50
25.473	38.85	60.00	21.15

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
0.168	26.21	55.06	28.85
0.243	25.83	51.99	26.16
0.513	36.17	46.00	9.83
4.773	28.06	46.00	17.94
5.358	28.12	50.00	21.88
25.473	29.47	50.00	20.53

Note; Neutral Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



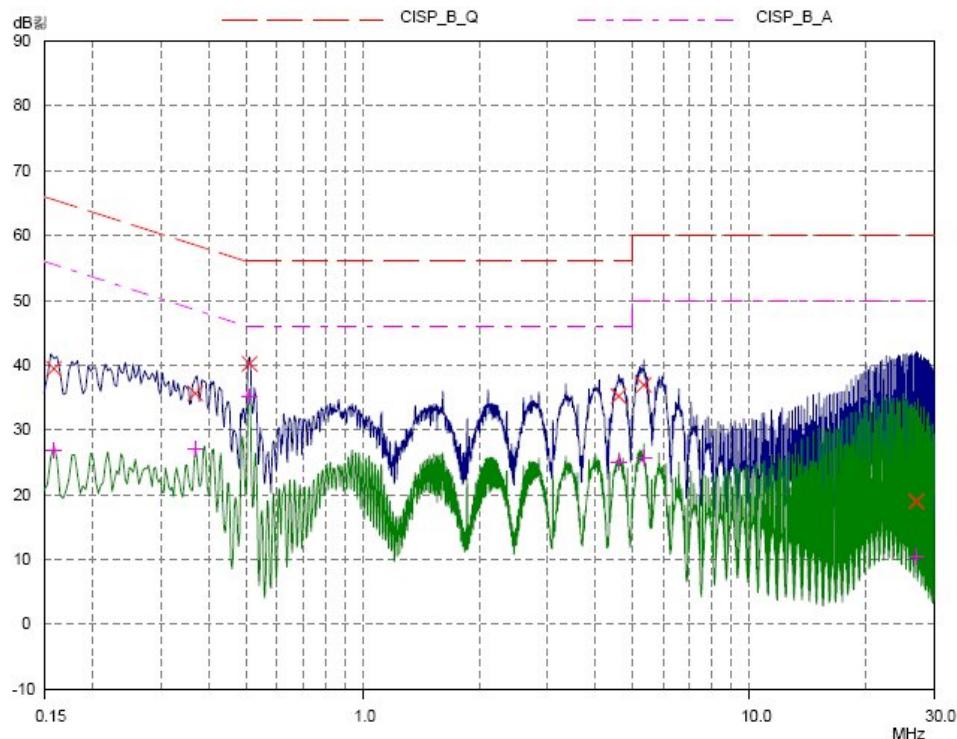
Mode: Using Max Load

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
0.159	39.34	65.52	26.18
0.198	36.61	63.69	27.08
0.51	35.33	56.00	20.67
2.865	23.53	56.00	32.47
6.096	29.72	60.00	30.28
25.599	17.11	60.00	42.89

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
0.159	26.33	55.52	29.19
0.198	23.64	53.69	30.05
0.51	25.46	46.00	20.54
2.865	14.41	46.00	31.59
6.096	15.36	50.00	34.64
25.599	8.05	50.00	41.95

Note; Hot Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



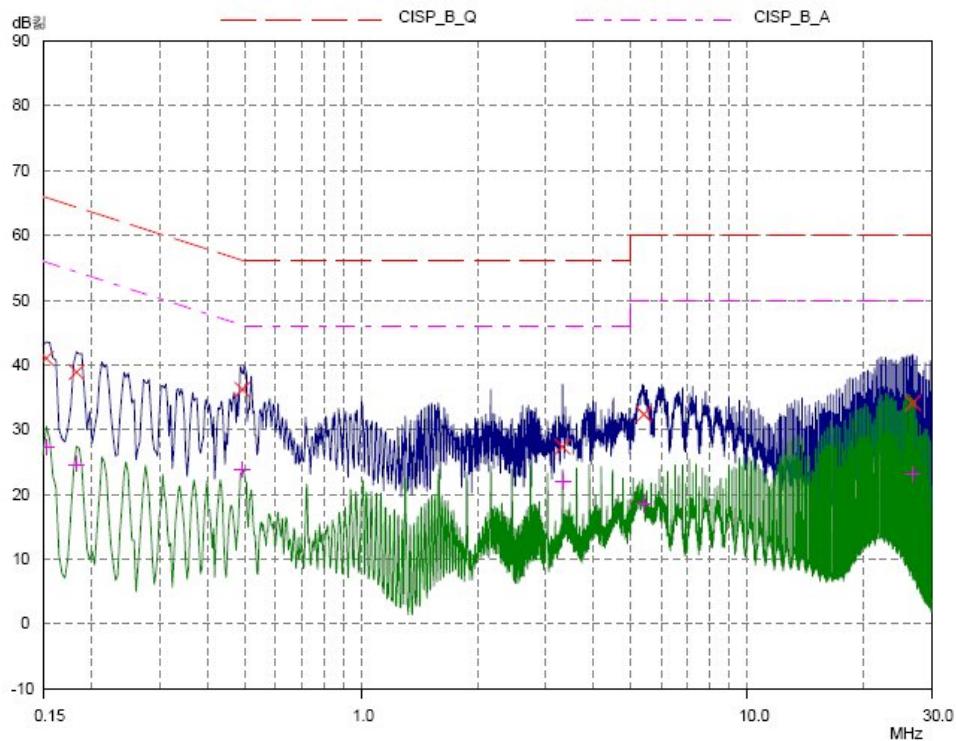
Mode: Using Max Load

Frequency MHz	QP Level dB _{LP}	QP Limit dB _{LP}	QP Delta dB
0.159	39.40	65.52	26.12
0.369	35.60	58.52	22.92
0.51	40.18	56.00	15.82
4.593	35.18	56.00	20.82
5.331	36.91	60.00	23.09
27.012	18.93	60.00	41.07

Frequency MHz	AV Level dB _{LP}	AV Limit dB _{LP}	AV Delta dB
0.159	26.79	55.52	28.73
0.369	26.96	48.52	21.56
0.51	35.13	46.00	10.87
4.593	24.95	46.00	21.05
5.331	25.65	50.00	24.35
27.012	10.41	50.00	39.59

Note; Neutral Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



Mode: Using Mid Load

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
------------------	------------------------------	------------------------------	----------------

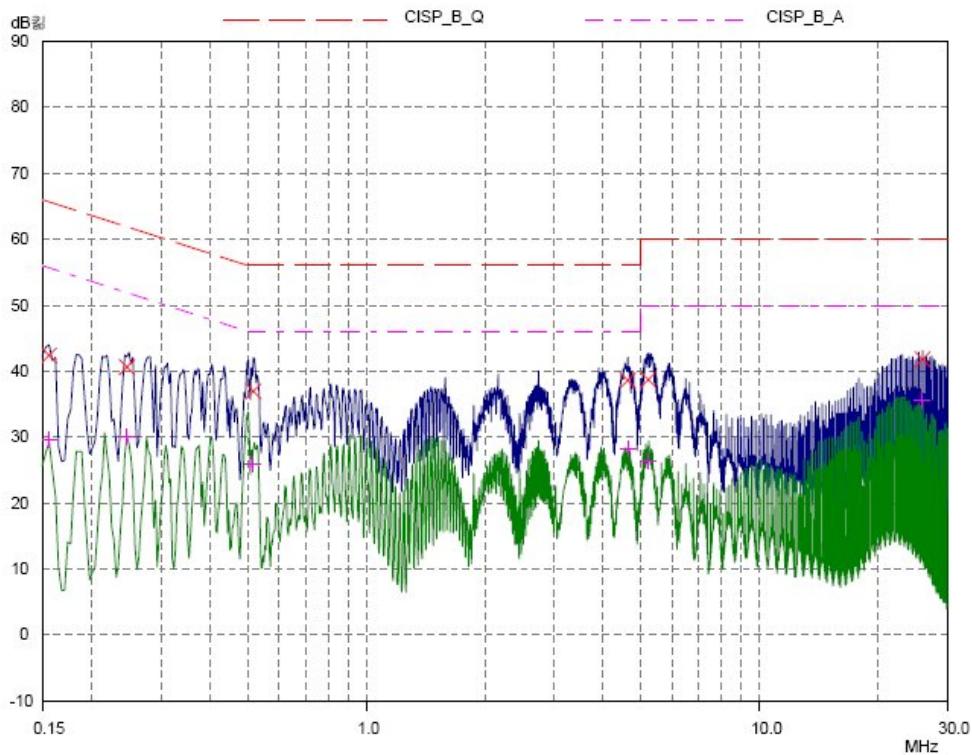
0.153	40.98	65.84	24.86
0.183	38.86	64.35	25.49
0.492	36.18	56.13	19.95
3.324	27.34	56.00	28.66
5.394	32.34	60.00	27.66
26.859	34.12	60.00	25.88

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
------------------	------------------------------	------------------------------	----------------

0.153	27.34	55.84	28.50
0.183	24.63	54.35	29.72
0.492	23.75	46.13	22.38
3.324	22.01	46.00	23.99
5.394	18.59	50.00	31.41
26.859	23.15	50.00	26.85

Note; Hot Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



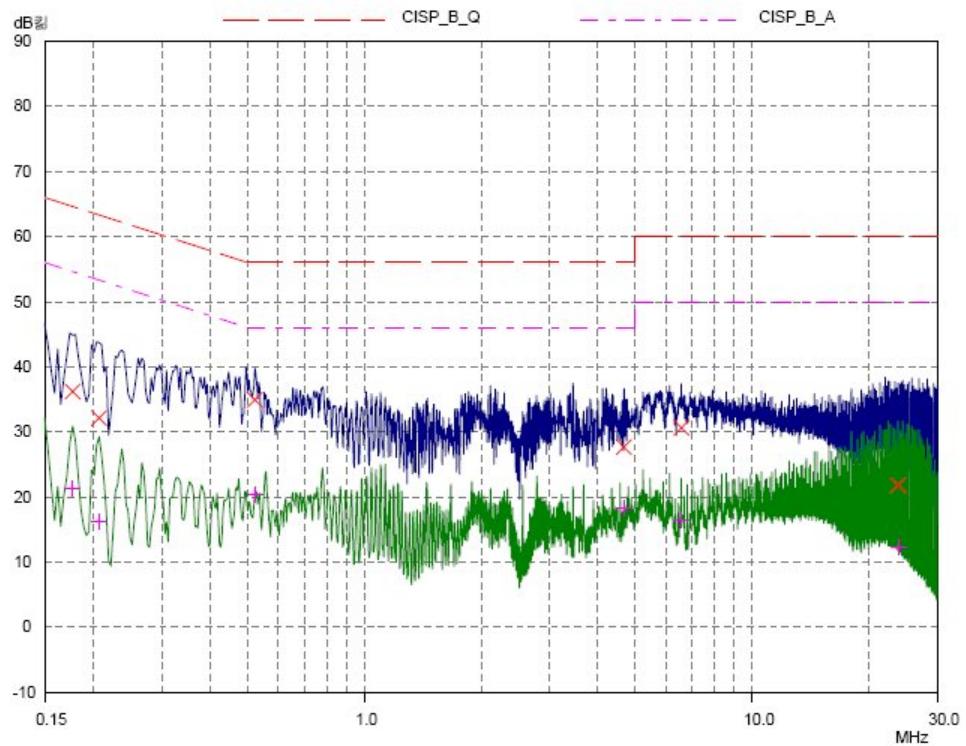
Mode: Using Mid Load

Frequency MHz	QP Level dB _{AV}	QP Limit dB _{AV}	QP Delta dB
0.156	42.37	65.67	23.30
0.246	40.60	61.89	21.29
0.516	36.93	56.00	19.07
4.62	38.61	56.00	17.39
5.214	38.68	60.00	21.32
25.959	41.78	60.00	18.22

Frequency MHz	AV Level dB _{AV}	AV Limit dB _{AV}	AV Delta dB
0.156	29.49	55.67	26.18
0.246	29.97	51.89	21.92
0.516	25.90	46.00	20.10
4.62	28.29	46.00	17.71
5.214	26.38	50.00	23.62
25.959	35.53	50.00	14.47

Note; Neutral Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



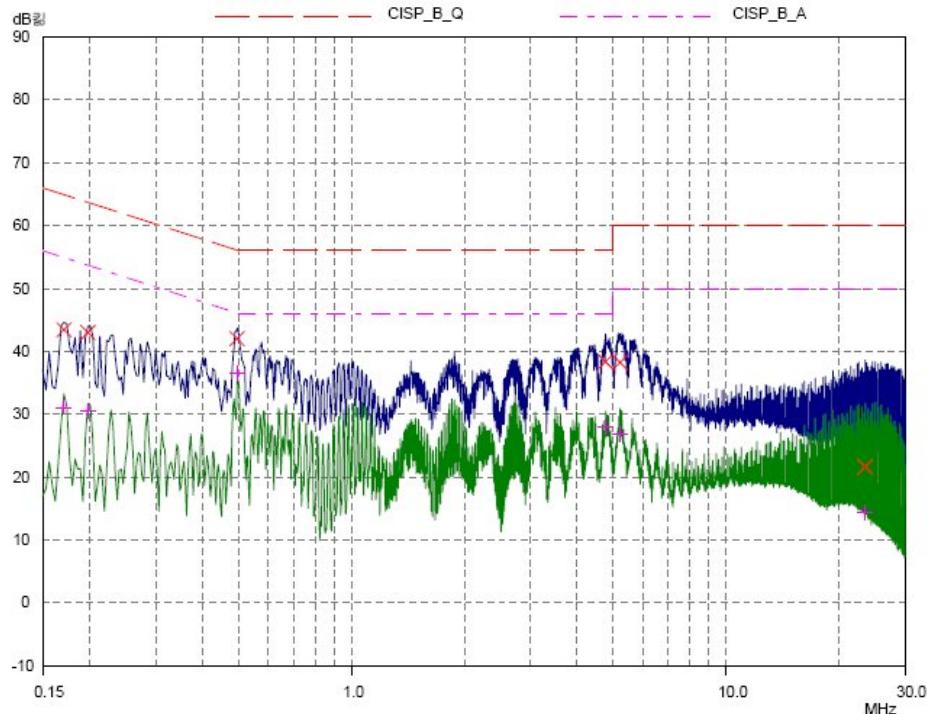
Mode: Using Min Load

Frequency MHz	QP Level dB _{LP}	QP Limit dB _{LP}	QP Delta dB
0.177	36.19	64.63	28.44
0.207	32.11	63.32	31.21
0.522	34.93	56.00	21.07
4.665	27.64	56.00	28.36
6.564	30.63	60.00	29.37
23.781	21.78	60.00	38.22

Frequency MHz	AV Level dB _{LP}	AV Limit dB _{LP}	AV Delta dB
0.177	21.19	54.63	33.44
0.207	16.20	53.32	37.12
0.522	20.27	46.00	25.73
4.665	18.39	46.00	27.61
6.564	16.54	50.00	33.46
23.781	12.34	50.00	37.66

Note; Hot Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



Mode: Using Min Load

Frequency MHz	QP Level dB _{RF}	QP Limit dB _{RF}	QP Delta dB
0.171	43.41	64.91	21.50
0.198	42.99	63.69	20.70
0.495	42.02	56.08	14.06
4.764	38.34	56.00	17.66
5.205	38.24	60.00	21.76
23.466	21.62	60.00	38.38

Frequency MHz	AV Level dB _{RF}	AV Limit dB _{RF}	AV Delta dB
0.171	31.08	54.91	23.83
0.198	30.58	53.69	23.11
0.495	36.41	46.08	9.67
4.764	28.06	46.00	17.94
5.205	26.73	50.00	23.27
23.466	14.27	50.00	35.73

Note; Neutral Line

Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial number	Cal Interval	Calibration due.
Spectrum analyzer	R&S	FSV30	101389	1 year	2015.04.30
Vector signal generator	R&S	SMBV2100A	1407.6004K02	1 year	2015.01.06
Radio Communication Tester	R&S	CMU200	107627	1 year	2014.12.27
Loop antenna	R&S	HFH2-Z2.335.4711.52	826532	2 years	2015.04.25
Trilog-broadband antenna	Schwarzbeck	VULB 9168	9168-385	2 years	2015.05.09
Preamplifier	HP	8447F	2805A02570	1 year	2015.04.30
AC power supply	HP	6813A	전-3-5-1292	1 year	2014.08.05
EMI Test Receiver	LIG NEX1	ISA-80	L0912K014	1 year	2014.11.15
EMI Receiver/Signal Analyzer	R&S	ESHS10	844077/0007	1 year	2014.07.03
LISN	R&S	ENV216	101137	1 year	2015.02.21

Peripheral device

Device	Manufacturer	Model No.	Note
Wireless Charging Cover(with load)	KOMATECH Co.,Ltd.	N/A	-
Mobile Phone	SAMSUNG ELECTRONICS CO., LTD.	SHV-E210S (FCC ID : A3LSHVE210S)	-

-The above devices were supported by manufacturer.

Appendix B. Test setup photo

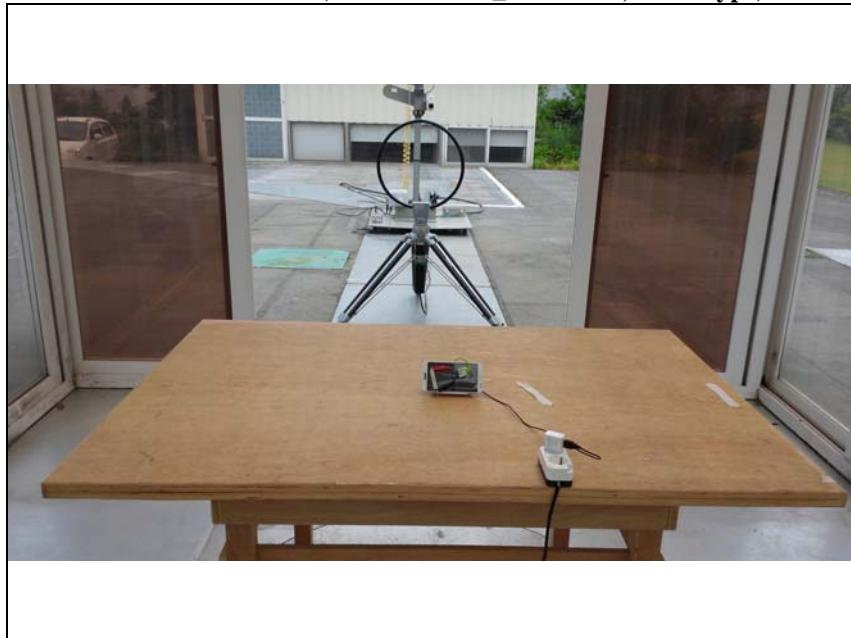
Radiated Emission (below 30 MHz_with Load, Pad type)



Radiated Emission ((below 30 MHz_with Phone, Pad type)



Radiated Emission (below 30 MHz_with Load, Stand type)

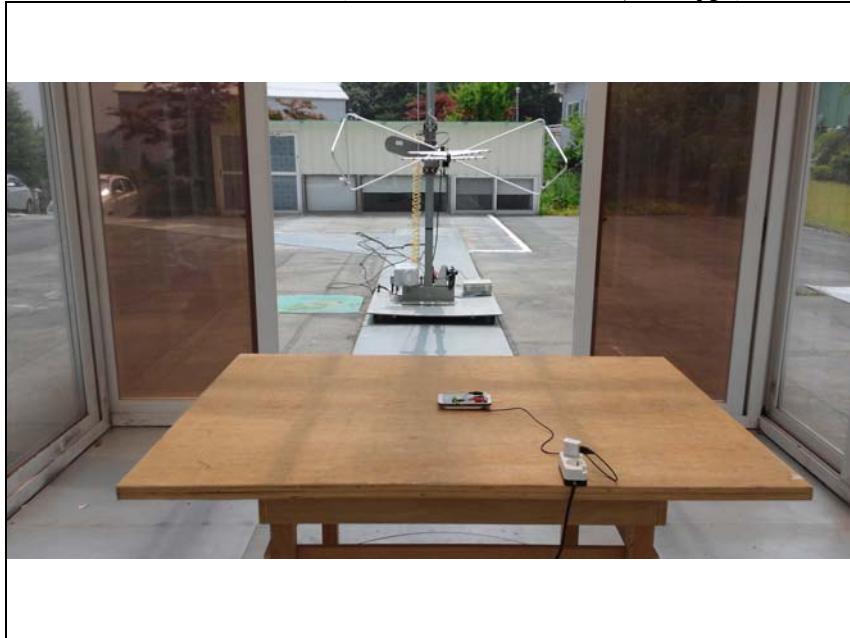


Radiated Emission ((below 30 MHz_with Phone, Stand type)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The test results in the report only apply to the tested sample.

Radiated Emission (below 1 GHz_with Load, Pad type)



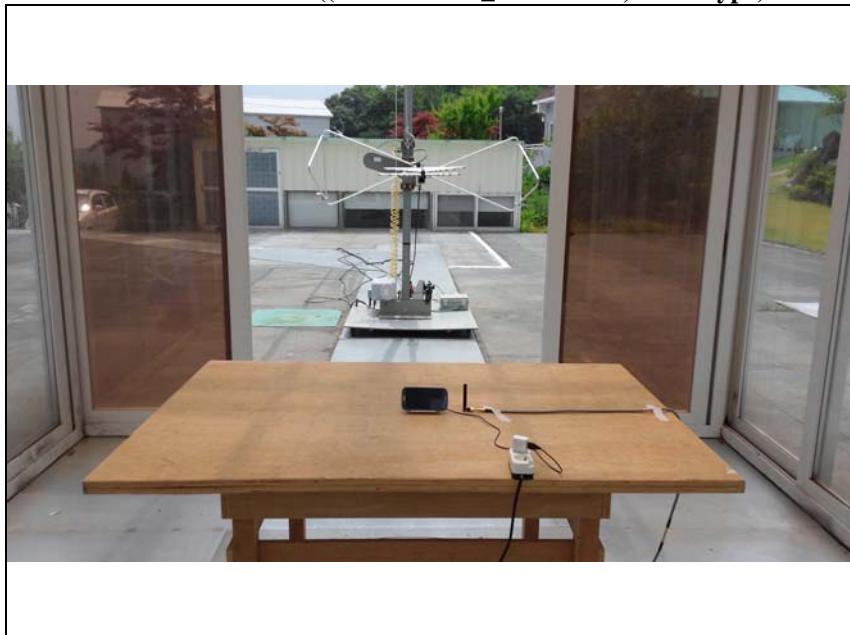
Radiated Emission ((below 1 GHz_with Phone, Pad type)



Radiated Emission (below 1 GHz_with Load, Stand type)



Radiated Emission ((below 1 GHz_with Phone, Stand type)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The test results in the report only apply to the tested sample.

AC conducted Emission (with Load)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The test results in the report only apply to the tested sample.

AC conducted Emission (with Phone)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The test results in the report only apply to the tested sample.