TEST REPORT

1. Applicant

Name	: Bitel Co., Ltd..
Address	: 11F Yohyun B/D 242-29 Nonhyun-dong Gangnam-gu, Seoul, South Korea
FCC ID	: STSIC5100

2. Products

Name	: INDUSTRIAL PDA POS
Model/Type	: IC5100
Manufacturer	: Bitel Co., Ltd..
Manufacturer(RF Module)	: Wavecom S.A(FCC ID : O9EQ2686)
3. Test Standard	: 47 CFR FCC Part 24(E), 22(H), 2
4. Test Method	: ANSI C63.4-2003
5. Test Result	: Positive
6.Dates of Test	: April 04, 2011 to April 06, 2011
7. Date of Issue	: April 07, 2011
8. Test Laboratory	: Korea Standard Quality Laboratories FCC Designation Number : KR0024

Tested by

YoungRyul, Jo

Test Engineer:

Approved by

SungBum, Hong

Compliance Engineer:

Korea Standard Quality Laboratories
Testing Laboratories for EMC and Safety Compliance
www.ksqlab.com #102, Jangduk-Dong, Hwasung-City, Kyunggi-Do, KOREA

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1. GENERAL

These tests were performed using the test procedure outlined in ANSI C63.4, 2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.247 and RSS-210 Issue 7 – Category I Equipment, Annex 8. The EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards.

We attest to the accuracy of data. All measurements reported herein were performed by Korea Standard Quality Laboratories and were made under Chief Engineer''s supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. TEST SITE

Korea Standard Quality Laboratories

2.1 Location

#102, Jangduk Dong, Hwasung City, Kyunggi Do, South Korea
(FCC Designation Number : KR0024)

This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

2.2 Test Date

Date of Test: April 04, 2011 to April 06, 2011

2.3 Test Environment

See each test item''s description.

3. DESCRIPTION OF THE EQUIPMENT UNDER TEST

The product specification described herein was obtained from the product data sheet or user''s manual.

3.1 Rating and Physical Characteristics

Model	IC5100
Power source	Adaptor(JP6004AS) : 100-240VAC/1.1A, 12VDC/3A Battery : Rechargeable Lithium Ion Battery 8.4VDC/1100mA
Transmit Frequency	GSM850 : 824.2 ~ 848.8MHz PCS1900 : 1850.2 ~ 1909.8MHz
Antenna Type	Internal antenna
Type of Modulation	GMSK, 8PSK
Temperature range	-20℃ ~ +60℃
GSM Module	Wavecom S.A (O9EQ2686)
Size	175×80×40(mm)
Weight	400g

3.2 Equipment Modifications

None.

3.3 Submitted Documents

Block diagram
Schematic diagram
Antenna Specification
External photos
Test setup photos
Part List
Tune up Procedure
Label Location
User manual

4. MEASUREMENT CONDITIONS

4.1 Tested frequency

Frequency	Ch.	GSM 850	Ch.	PCS
Low frequency (MHz)	128	824.2	512	1850.2
Middle frequency (MHz)	188	836.2	661	1880.0
High frequency (MHz)	251	848.8	810	1909.8

4.2 List of Peripherals

Equipment Type	Manufacturer	Model	S/N
Notebook	LG	-	-
-	-	-	-

4.3 Type of Used Cables

#	START		END		CABLE	
	NAME	I/O PORT	NAME	I/O PORT	LENGTH(m)	SHIELDED
1	INDUSTRIAL PDA POS	USB	Notebook	USB	1.0	Shield
2						

5. TEST AND MEASUREMENT

Summary of Test Reaults

Requirement	CFR 47 Section	Limit	Report Section	Test Result
FCC Part Section(s)				
GSM 850/1900 Terminal equipment (Q2686H) is certified by FCC(FCC ID : O9EQ2686) Refer to test report of FCC ID : O9EQ2686				
Additional items				
Radiated Power	22.913/24.232	-	5.1	PASS
Spurious Radiation	2.1053		5.2	PASS
Receiver Radiated Emissions	15.109, 2.1053		5.3	PASS
Field Strength of Harmonics	15.209(a)/109	-	5.4	PASS
AC Conducted Emissions	15.207	EN 55022	5.5	PASS

5.1. RADIATED POWER

5.1.1 Regulation

FCC 22.913

The Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 24.232

The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

5.1.2. Test Procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane on an open test site.

The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.

Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

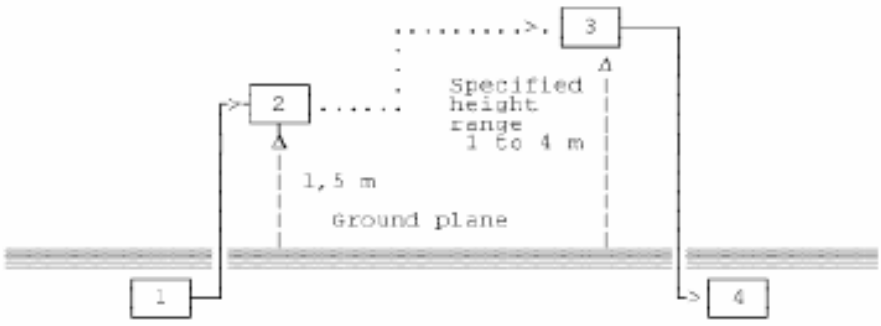
ERP in frequency band 824.2-848.8 MHz, and EIRP in frequency band 1850.2-1909.8 MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824.2-848.8 MHz) or horn antenna (1850.2-1909.8 MHz) connected to a signal generator.

5.1.3. Substitution RF power measurement at KSQ

General:

The applied substitution method follows ANSI/TIA/EIA-603, ANSI/TIA/EIA-102.CAAA or the appropriate ETSI rules respectively.

The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



1) Signal generator;
2) Substitution antenna;
3) Test antenna;
4) Spectrum analyzer or selective voltmeter.

The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement frequency. The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver. If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of the antenna. The measurement will be repeated in horizontal position.

Calibration:
In order to make this kind of measurement more effective and to avoid subjective measurement faults KSQ has installed automatic computer controlled measurement procedures. With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of the measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

Testing:
Now the test sample will be putted on the table at the defined position and the radiated power will be received and documented by the measurement receiver.
On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.
For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max reading with the MAXHOLD function during the rotation.

5.1.4 Test results

Table 1 : Measured values of the Radiated Power(GSM850)	
Channel 128	23.84 dBm
Channel 188	22.25 dBm
Channel 251	24.86 dBm

Table 2 : Measured values of the Radiated Power(PCS 1900)	
Channel 512	23.87 dBm
Channel 661	23.41 dBm
Channel 810	23.37 dBm

5.2 SPURIOUS RADIATION

5.2.1 Regulation

FCC 2.1053

5.2.2. Test procedure

The measurements from 30MHz to 824GHz and 849GHz to 12GHz were performed with a measurement bandwidth of 1MHz.

5.2.3 Test Results

The radiated spurious emissions were measured for channel 512, channel 661 and channel 810, respectively the upper, center, and lower frequencies of the USPCS band (1850.2 MHz, 1880.0 MHz and 1909.8 MHz). The measurement diagrams show that all significant spurs are well below the limit line.

5.2.4 Purpose

The measurements of the spurious emissions at the equipment output terminals were performed pursuant to § 2.1053 in order to verify that any emissions are below the limits given by § 22.917.

Calculation of test results:
Such factors like antenna correction, cable loss, external attenuation etc.
are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.
The peak and average spurious emission plots was measured with the average limits.
In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

GSM850

Summary table with radiated data of the test plots for Carrier Test Frequency 824,2 MHz

Table 3 : Measured values of the Spurious Radiation							
Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
37.74	-62.09	H	13.0	0.43	-48.66	-13	-35.66
64.00	-59.07	V	10.4	0.90	-47.77	-13	-34.77
867.79	-61.23	H	23.0	3.75	-34.48	-13	-21.48
960.26	-63.72	H	23.9	4.02	-35.8	-13	-22.80
2991.00	-56.65	V	28.43	9.34	-18.88	-13	-5.88
3984.00	-65.29	V	29.80	10.98	-24.51	-13	-11.51
4400.00	-63.47	H	30.54	11.84	-21.09	-13	-8.09
6400.00	-65.47	V	32.8	13.67	-19	-13	-6.00
7460.00	-76.87	H	35.5	14.72	-26.65	-13	-13.65
10120.00	-79.73	V	38.1	18.23	-23.4	-13	-10.40
11840.00	-80.32	H	39.5	19.36	-21.46	-13	-8.46
12420.00	-83.70	V	38.6	20.41	-24.69	-13	-11.69

Summary table with radiated data of the test plots for Carrier Test Frequency 836,2 MHz

Table 4 : Measured values of the Spurious Radiation							
Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
37.63	-62.23	H	13.0	0.43	-48.8	-13	-35.80
64.24	-59.37	V	10.4	0.90	-48.07	-13	-35.07
875.36	-61.69	H	23.0	3.75	-34.94	-13	-21.94
963.11	-63.42	H	23.9	4.02	-35.5	-13	-22.50
2985.00	-56.33	V	28.43	9.34	-18.56	-13	-5.56
3963.00	-65.47	V	29.80	10.98	-24.69	-13	-11.69
4420.00	-65.25	H	30.54	11.84	-22.87	-13	-9.87
6410.00	-65.69	V	32.8	13.67	-19.22	-13	-6.22
7430.00	-76.27	H	35.5	14.72	-26.05	-13	-13.05
10140.00	-79.26	V	38.1	18.23	-22.93	-13	-9.93
11810.00	-80.44	H	39.5	19.36	-21.58	-13	-8.58
12430.00	-83.29	V	38.6	20.41	-24.28	-13	-11.28

Summary table with radiated data of the test plots for Carrier Test Frequency 848,8 MHz

Table 5 : Measured values of the Spurious Radiation

Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
35.27	-60.31	H	13.0	0.43	-46.88	-13	-33.88
61.39	-57.28	V	10.4	0.90	-45.98	-13	-32.98
863.47	-62.17	H	23.0	3.75	-35.42	-13	-22.42
962.34	-63.55	H	23.9	4.02	-35.63	-13	-22.63
2985.00	-56.49	V	28.43	9.34	-18.72	-13	-5.72
3916.00	-65.36	V	29.80	10.98	-24.58	-13	-11.58
4460.00	-66.27	H	30.54	11.84	-23.89	-13	-10.89
6470.00	-69.08	V	32.8	13.67	-22.61	-13	-9.61
757.00	-75.36	H	35.5	14.72	-25.14	-13	-12.14
10100.00	-79.18	V	38.1	18.23	-22.85	-13	-9.85
11730.00	-82.09	H	39.5	19.36	-23.23	-13	-10.23
12540.00	-83.15	V	38.6	20.41	-24.14	-13	-11.14

Limits

Compliance with § 22.917 requires that any emission be attenuated below the transmitter power by at least $43 + 10 \log_{10} P$ (P = transmitter power in Watts).

The compliance limit was calculated as per the following table:

Maximum transmitter output power	0.306 W = 24.86 dBm
Required attenuation	$43 + 10 \log_{10}$ 0.306 W = 38.72 dB
Maximum transmitter output power Required attenuation Compliance limit	24.86 dBm -37.86 dB -13 dBm

5.2.5. Test procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane.
The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.
Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.
ERP was measured using a substitution method. The EUT was replaced by horn antenna connected to a signal generator.
The frequency range up to tenth harmonic was investigated.
In the 1st 1MHz band outside the band edge nearest the channel of interest a 3 kHz res. BW is used.
The measurements from 30MHz to 1845 GHz and 1915GHz to 26.56GHz were performed with a measurement bandwidth of 1MHz.

5.2.6 Test Results

The radiated spurious emissions were measured for channel 512, channel 661 and channel 810, respectively the upper, center, and lower frequencies of the USPCS band (1850.2 MHz, 1880.0 MHz and 1909.8 MHz). The measurement diagrams show that all significant spurs are well below the limit line.

5.2.7 Purpose

The measurements of the spurious emissions at the equipment output terminals were performed pursuant to § 2.1053 in order to verify that any emissions are below the limits given by § 24.238.
Calculation of test results:
Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.
The peak and average spurious emission plots was measured with the average limits. In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

PCS 1900

Summary table with radiated data of the test plots for Carrier Test Frequency 1850.2 MHz

Table 6 : Measured values of the Spurious Radiation

Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
31.23	-57.41	H	13.0	0.43	-43.98	-13	-30.98
68.89	-55.11	V	10.4	0.90	-43.81	-13	-30.81
847.23	-62.69	H	23.0	3.75	-35.94	-13	-22.94
947.23	-60.28	H	23.9	4.02	-32.36	-13	-19.36
2953.00	-57.33	V	28.43	9.34	-19.56	-13	-6.56
3926.00	-67.17	V	29.80	10.98	-26.39	-13	-13.39
4530.00	-68.24	H	30.54	11.84	-25.86	-13	-12.86
6380.00	-67.09	V	32.8	13.67	-20.62	-13	-7.62
7325.00	-78.48	H	35.5	14.72	-28.26	-13	-15.26
10730.00	-81.47	V	38.1	18.23	-25.14	-13	-12.14
11240.00	-82.07	H	39.5	19.36	-23.21	-13	-10.21
12070.00	-84.20	V	38.6	20.41	-25.19	-13	-12.19

Summary table with radiated data of the test plots for Carrier Test Frequency 1880.0 MHz

Table 7 : Measured values of the Spurious Radiation

Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
35.24	-64.12	H	13.0	0.43	-50.69	-13	-37.69
63.84	-55.78	V	10.4	0.90	-44.48	-13	-31.48
861.39	-63.64	H	23.0	3.75	-36.89	-13	-23.89
963.37	-61.07	H	23.9	4.02	-33.15	-13	-20.15
2956.00	-60.35	V	28.43	9.34	-22.58	-13	-9.58
3941.00	-64.37	V	29.80	10.98	-23.59	-13	-10.59
4470.00	-67.48	H	30.54	11.84	-25.1	-13	-12.1
6420.00	-69.23	V	32.8	13.67	-22.76	-13	-9.76
7480.00	-75.07	H	35.5	14.72	-24.85	-13	-11.85
10310.00	-80.01	V	38.1	18.23	-23.68	-13	-10.68
11690.00	-83.21	H	39.5	19.36	-24.35	-13	-11.35
12540.00	-86.27	V	38.6	20.41	-27.26	-13	-14.26

Summary table with radiated data of the test plots for Carrier Test Frequency 1909.8 MHz

Table 8 : Measured values of the Spurious Radiation

Indicated		Antenna	Correction Factor		Corrected Amplitude	Applicable Limit	Margin (dB)
Frequency (MHz)	Amplitude (dBm)	Polar. (H/V)	Ant. (dB)	Cable (dB)	(dBm)	(dBm)	
35.31	-61.24	H	13.0	0.43	-47.81	-13	-34.81
61.36	-65.39	V	10.4	0.90	-54.09	-13	-41.09
862.33	-65.17	H	23.0	3.75	-38.42	-13	-25.42
973.64	-64.28	H	23.9	4.02	-36.36	-13	-23.36
2988.00	-66.36	V	28.43	9.34	-28.59	-13	-15.59
3948.00	-67.47	V	29.80	10.98	-26.69	-13	-13.69
4410.00	-65.42	H	30.54	11.84	-23.04	-13	-10.04
6420.00	-68.89	V	32.8	13.67	-22.42	-13	-9.42
7450.00	-79.21	H	35.5	14.72	-28.99	-13	-15.99
10240.00	-83.25	V	38.1	18.23	-26.92	-13	-13.92
11770.00	-83.11	H	39.5	19.36	-24.25	-13	-11.25
12530.00	-83.41	V	38.6	20.41	-24.4	-13	-11.40

Limits

Compliance with § 22.917 requires that any emission be attenuated below the transmitter power by at least $43 + 10 \log_{10} P$ (P = transmitter power in Watts).

The compliance limit was calculated as per the following table:

Maximum transmitter output power	0.244 W = 23.87 dBm
Required attenuation	$43 + 10 \log_{10}$ 0.244 W = 36.87 dB
Maximum transmitter output power Required attenuation Compliance limit	23.87 dBm -36.87 dB -13 dBm

5.3 RECEIVER RADIATED EMISSIONS

5.3.1 Regulation

FCC 15.109, 2.1053

5.3.2 Result : PASS

Table 9 : Measured values of the Receiver Radiated Emissions

Indicated		Antenna		Correction Factor		Corrected Amplitude	Applicable Limit		Margin (dB)
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	(dBuV/m)	(uV/m)	
32.17	18.65	H	3.80	13.0	0.43	32.08	39.0	90	6.92
64.25	17.62	V	3.70	10.4	0.90	28.92	39.0	90	10.08
872.41	10.21	V	2.80	23.0	3.75	36.96	46.4	210	9.44
984.36	8.57	H	2.70	23.9	4.02	36.49	46.4	210	9.91

5.4 FIELD STRENGTH

5.4.1 Regulation

According to §15.209(a), The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Field Strength limits : Part 15.209(a)

Frequency (MHz)	Field strength (μV/m @ 3m)	Field strength (dBμV/m @ 3m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	53.9

**Except as provided in paragraph (g), fundamental emis-sions 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 sec-tions of this part, e.g., §§15.231 and 15.241.

Field Strength limits : Part 15.109

Frequency (MHz)	Field strength (μV/m @ 10m)	Field strength (dBμV/m @ 10m)
30–88	90	39.0
88–216	150	43.5
216–960	210	46.4
Above 960	300	49.5

5.4.2. Test Procedure

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

5.4.3.Test Condition

Set the spectrum analyzer as follows:

- Center frequency = the worst channel
- Frequency Range = 30MHz ~ 10th harmonic.
- RBW = 100kHz (30MHz ~ 1GHz), VBW ≥ RBW
  = 1MHz (1GHz ~ 10th harmonic.)
- Span = 100MHz, Detector function = Quasi-peak
- Trace = max hold, Sweep = auto

5.4.4 Result : **PASS**

Table 10 : Measured values of the Field Strength(IDLE Mode)

Indicated		Antenna		Correction Factor		Corrected Amplitude	FCC Part15 Class A		
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	(uV/m)	Margin (dB)
46.70	5.09	H	3.80	10.63	2.36	18.08	39.0	90	20.92
80.20	10.96	V	3.70	6.09	2.94	19.99	39.0	90	19.01
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
94.47	5.89	V	3.40	9.55	3.14	18.58	43.5	150	24.92
114.60	5.44	H	3.30	13.37	3.20	22.01	43.5	150	21.49
145.77	5.81	H	3.20	13.32	3.33	22.46	43.5	150	21.04
200.49	5.24	V	3.20	16.95	3.95	26.14	43.5	150	17.36
							43.5	150	-
							43.5	150	-
262.07	5.97	V	2.80	13.34	4.41	23.72	46.4	210	22.68
307.40	5.34	H	2.70	14.85	4.75	24.94	46.4	210	21.46
375.82	5.27	V	2.60	15.91	5.47	26.65	46.4	210	19.75
428.02	7.47	H	2.50	16.76	5.96	30.19	46.4	210	16.21
530.97	7.06	H	2.40	18.40	6.75	32.21	46.4	210	14.19
630.05	7.29	V	1.70	19.85	7.31	34.45	46.4	210	11.95
-	-	-	-	-	-	-	49.5	300	-

1. Margin (dB) = Limit − Emission Level
2. H = Horizontal, V = Vertical Polarization

Table 11 : Measured values of the Field Strength(PRINT Mode)									
Indicated		Antenna		Correction Factor		Corrected Amplitude	FCC Part15 Class A		
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	(uV/m)	Margin (dB)
57.18	10.03	V	3.60	10.45	2.50	22.98	39.0	90	16.02
67.98	7.87	H	3.50	8.90	2.61	19.38	39.0	90	19.62
84.00	14.47	H	3.20	6.91	2.94	24.32	39.0	90	14.68
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
100.86	9.28	V	2.90	11.33	3.15	23.76	43.5	150	19.74
127.20	5.31	V	2.60	13.60	3.26	22.17	43.5	150	21.33
208.98	8.59	H	2.30	16.25	3.95	28.79	43.5	150	14.71
							43.5	150	43.50
							43.5	150	-
							43.5	150	-
240.02	5.11	H	2.30	13.72	4.22	23.05	46.4	210	23.35
299.78	9.09	H	2.20	14.72	4.64	28.45	46.4	210	17.95
377.29	5.55	V	2.20	15.93	5.47	26.95	46.4	210	19.45
432.02	9.27	H	1.90	16.83	6.01	32.11	46.4	210	14.29
528.02	9.02	V	1.70	18.36	6.69	34.07	46.4	210	12.33
624.02	7.70	V	1.50	19.76	7.14	34.60	46.4	210	11.80
-	-	-	-	-	-	-	49.5	300	-

1. Margin (dB) = Limit − Emission Level
2. H = Horizontal, V = Vertical Polarization

Table 12 : Measured values of the Field Strength(GSM850 Mode)									
Indicated		Antenna		Correction Factor		Corrected Amplitude	FCC Part15 Class A		
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	Applicable Limit (uV/m)	Margin (dB)
48.84	5.76	H	3.80	10.62	2.36	18.74	39.0	90	20.26
81.54	11.03	V	3.80	6.38	2.94	20.35	39.0	90	18.65
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
93.66	5.37	V	3.00	9.31	3.14	17.82	43.5	150	25.68
114.36	5.59	V	2.70	13.33	3.20	22.12	43.5	150	21.38
145.92	5.58	H	2.60	13.35	3.33	22.26	43.5	150	21.24
180.30	5.82	H	2.60	15.75	3.75	25.32	43.5	150	18.18
							43.5	150	-
							43.5	150	-
278.12	11.16	V	2.10	13.93	4.49	29.58	46.4	210	16.82
396.74	5.06	H	1.90	16.24	5.84	27.14	46.4	210	19.26
431.95	9.07	V	1.80	16.83	6.01	31.91	46.4	210	14.49
479.96	6.87	V	1.70	17.63	6.23	30.73	46.4	210	15.67
527.96	9.93	H	1.50	18.36	6.69	34.98	46.4	210	11.42
625.22	7.36	H	1.40	19.78	7.14	34.28	46.4	210	12.12
-	-	-	-	-	-	-	49.5	300	-

1. Margin (dB) = Limit − Emission Level
2. H = Horizontal, V = Vertical Polarization

Table 13 : Measured values of the Field Strength(PCS1900 Mode)									
Indicated		Antenna		Correction Factor		Corrected Amplitude	FCC Part15 Class A		
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	Applicable Limit (uV/m)	Margin (dB)
45.48	5.80	H	3.90	10.64	2.36	18.80	39.0	90	20.2
81.12	10.56	H	3.70	6.29	2.94	19.79	39.0	90	19.21
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
-	-	-	-	-	-	-	39.0	90	-
93.48	5.19	V	3.70	9.25	3.14	17.58	43.5	150	25.92
113.58	5.66	V	3.50	13.21	3.20	22.07	43.5	150	21.43
144.78	5.81	V	3.20	13.19	3.33	22.33	43.5	150	21.17
200.46	5.26	H	2.70	16.95	3.95	26.16	43.5	150	17.34
							43.5	150	-
							43.5	150	-
261.08	5.90	V	2.50	13.30	4.41	23.61	46.4	210	22.79
306.38	5.29	V	2.50	14.83	4.75	24.87	46.4	210	21.53
374.72	5.88	H	2.40	15.90	5.47	27.25	46.4	210	19.15
428.00	7.37	V	2.40	16.76	5.96	30.09	46.4	210	16.31
527.96	7.31	H	2.00	18.36	6.69	32.36	46.4	210	14.04
631.04	7.28	H	1.60	19.87	7.31	34.46	46.4	210	11.94
-	-	-	-	-	-	-	49.5	300	-

1. Margin (dB) = Limit − Emission Level
2. H = Horizontal, V = Vertical Polarization

5.5. CONDUCTED EMISSIONS

5.5.1 Regulation

According to §15.207(a)/EN 55022, 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.

5.5.2. Conducted emissions limits

Class B

Frequency (MHz)	Quasi Peak [dB(uV)]	Average [dB(uV)]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

Class A

Frequency (MHz)	Quasi Peak [dB(uV)]	Average [dB(uV)]
0.15 - 0.5	79	66
0.5 - 30	73	60

5.5.3. Test result : PASS

Table 14 : Measured values of the Conducted Emissions(IDLE Mode)

Frequency (MHz)	Amplitude (dBuV)	Phase Hot/Neutral	Detector QP/AV/PK	Applicable Limit		Quasi-peak Margin (dB)
				Quasi-peak (dBuV)	Average (dBuV)	
0.26	53.10	N	QP	79.00	66.00	25.90
0.27	50.66	H	QP	79.00	66.00	28.34
0.32	52.12	N	QP	79.00	66.00	26.88
0.33	51.69	H	QP	79.00	66.00	27.31
0.47	55.40	H	QP	79.00	66.00	23.60
0.48	55.15	N	QP	79.00	66.00	23.85
1.39	53.92	N	QP	73.00	60.00	19.08
1.92	55.34	H	QP	73.00	60.00	17.66
2.92	57.69	H	QP	73.00	60.00	15.31
2.98	56.76	N	QP	73.00	60.00	16.24
4.58	61.75	N	QP	73.00	60.00	11.25
4.65	61.69	H	QP	73.00	60.00	11.31

PK = Peak; QP = Quasi-peak; AV = Average

Table 15 : Measured values of the Conducted Emissions(PRINT Mode)						
Frequency (MHz)	Amplitude (dBuV)	Phase Hot/Neutral	Detector QP/AV/PK	Applicable Limit		Quasi-peak Margin (dB)
				Quasi-peak (dBuV)	Average (dBuV)	
0.20	47.48	N	QP	79.00	66.00	31.52
0.27	51.02	H	QP	79.00	66.00	27.98
0.33	52.04	N	QP	79.00	66.00	26.96
0.34	51.40	H	QP	79.00	66.00	27.60
0.46	55.64	H	QP	79.00	66.00	23.36
0.47	30.42	N	QP	79.00	66.00	48.58
0.99	53.81	N	QP	73.00	60.00	19.19
1.73	53.67	H	QP	73.00	60.00	19.33
2.26	55.79	N	QP	73.00	60.00	17.21
2.99	56.96	H	QP	73.00	60.00	16.04
4.25	61.81	H	QP	73.00	60.00	11.19
5.18	60.64	N	QP	73.00	60.00	12.36

PK = Peak; QP = Quasi-peak; AV = Average

Table 16 : Measured values of the Conducted Emissions(GSM850 Mode)						
Frequency (MHz)	Amplitude (dBuV)	Phase Hot/Neutral	Detector QP/AV/PK	Applicable Limit		Quasi-peak Margin (dB)
				Quasi-peak (dBuV)	Average (dBuV)	
0.19	51.53	N	QP	79.00	66.00	27.47
0.20	51.65	H	QP	79.00	66.00	27.35
0.26	48.54	H	QP	79.00	66.00	30.46
0.27	47.52	N	QP	79.00	66.00	31.48
0.33	44.49	N	QP	79.00	66.00	34.51
0.46	49.08	H	QP	79.00	66.00	29.92
1.06	44.42	N	QP	73.00	60.00	28.58
1.07	49.55	H	QP	73.00	60.00	23.45
2.41	45.41	N	QP	73.00	60.00	27.59
5.01	46.18	H	QP	73.00	60.00	26.82
24.08	44.68	H	QP	73.00	60.00	28.32
24.09	44.93	N	QP	73.00	60.00	28.07

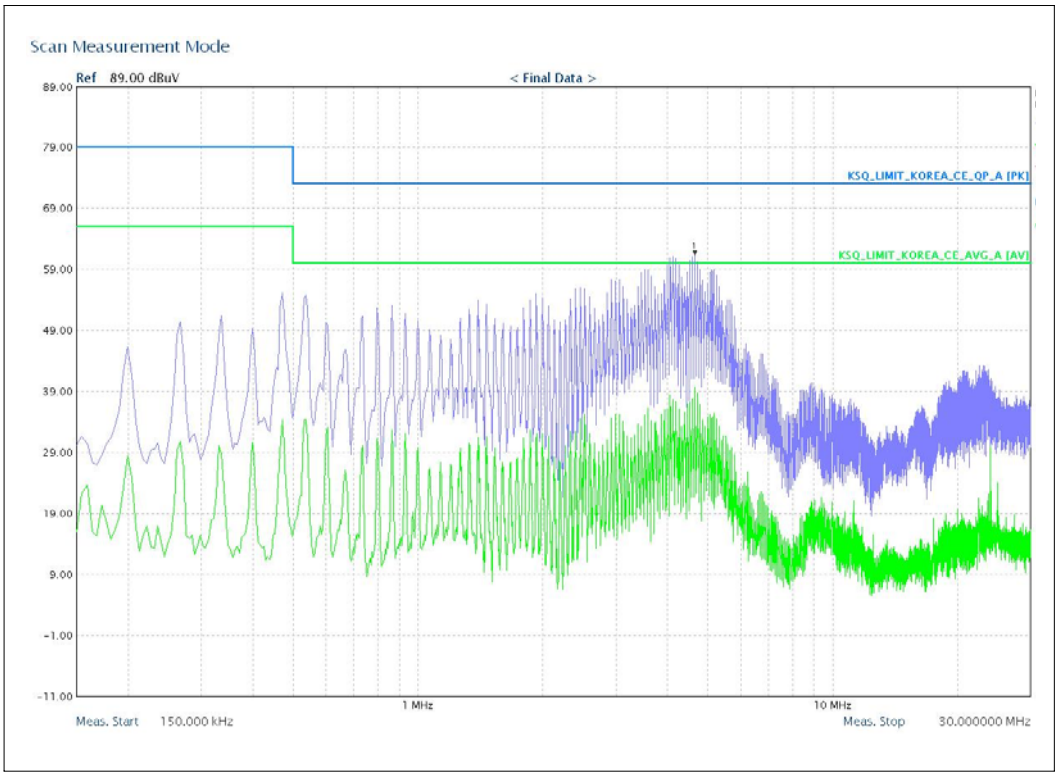
PK = Peak; QP = Quasi-peak; AV = Average

Table 17 : Measured values of the Conducted Emissions(PCS1900 Mode)						
Frequency (MHz)	Amplitude (dBuV)	Phase Hot/Neutral	Detector QP/AV/PK	Applicable Limit		Quasi-peak Margin (dB)
				Quasi-peak (dBuV)	Average (dBuV)	
0.19	51.78	H	QP	79.00	66.00	27.22
0.20	48.94	N	QP	79.00	66.00	30.06
0.26	48.59	H	QP	79.00	66.00	30.41
0.27	48.11	N	QP	79.00	66.00	30.89
0.46	48.98	H	QP	79.00	66.00	30.02
0.47	43.86	N	QP	79.00	66.00	35.14
1.00	44.69	N	QP	73.00	60.00	28.31
1.34	48.40	H	QP	73.00	60.00	24.60
2.00	45.51	N	QP	73.00	60.00	27.49
4.82	44.41	H	QP	73.00	60.00	28.59
24.08	43.23	H	QP	73.00	60.00	29.77
24.09	44.34	N	QP	73.00	60.00	28.66

PK = Peak; QP = Quasi-peak; AV = Average

Figure 1. Plot of the Conducted Emissions (IDLE Mode)

Polarization: HOT



Polarization: NEUTRAL

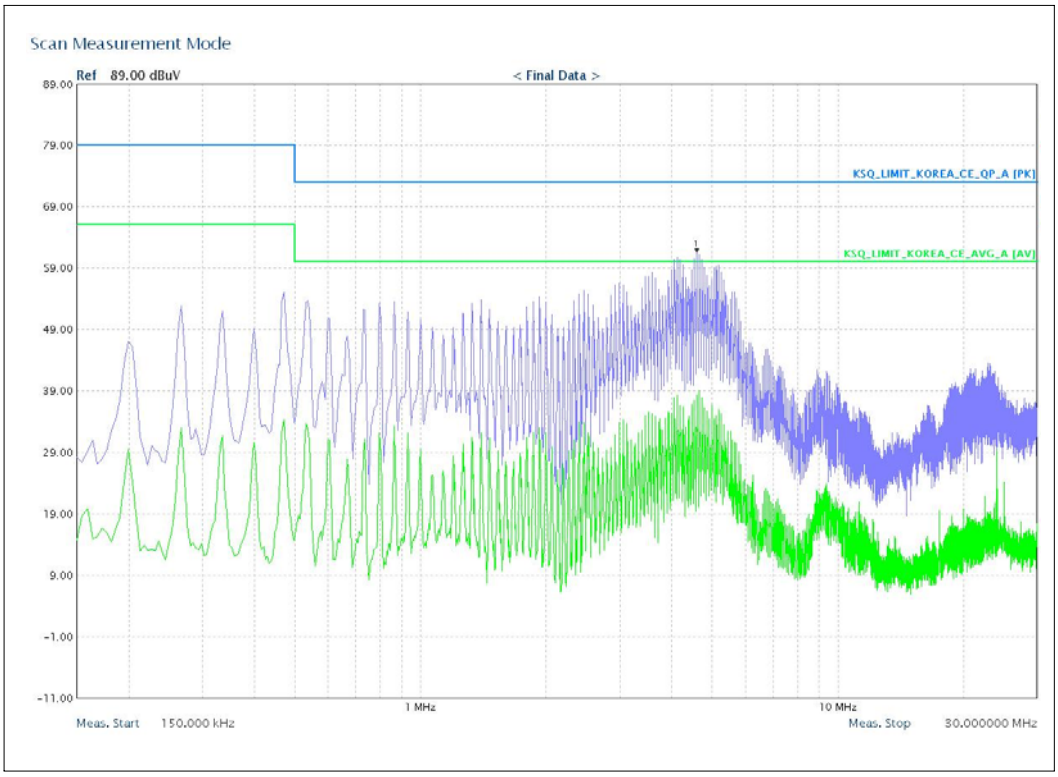
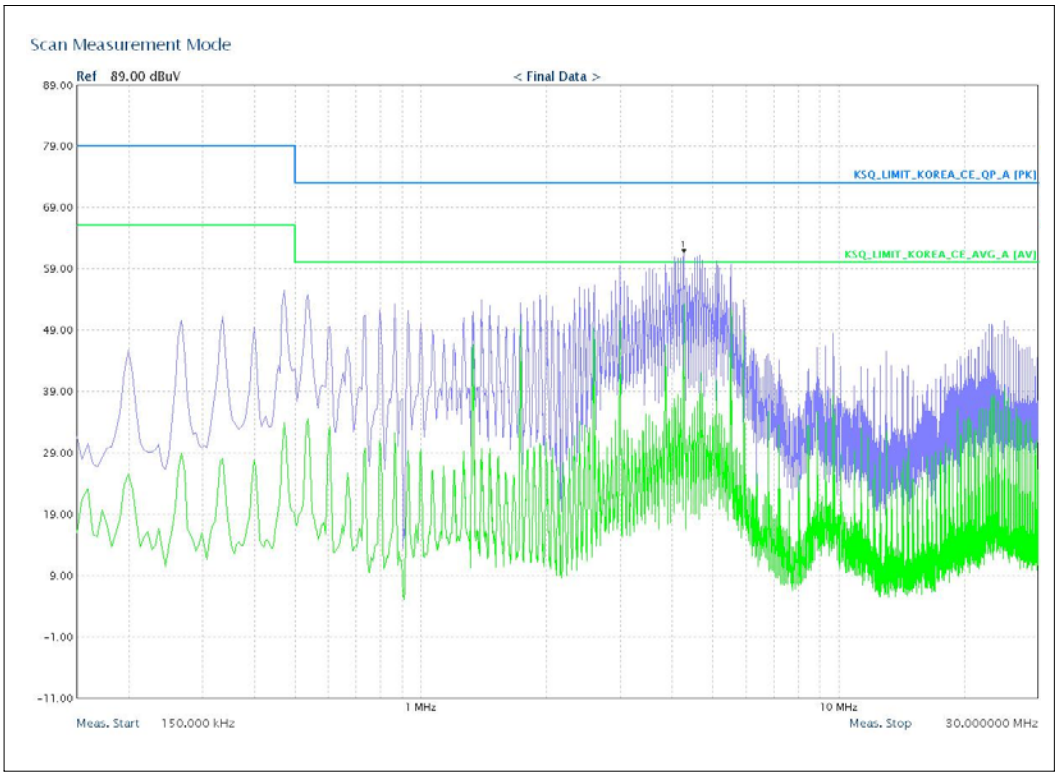


Figure 2. Plot of the Conducted Emissions (PRINT Mode)

Polarization: HOT



Polarization: NEUTRAL

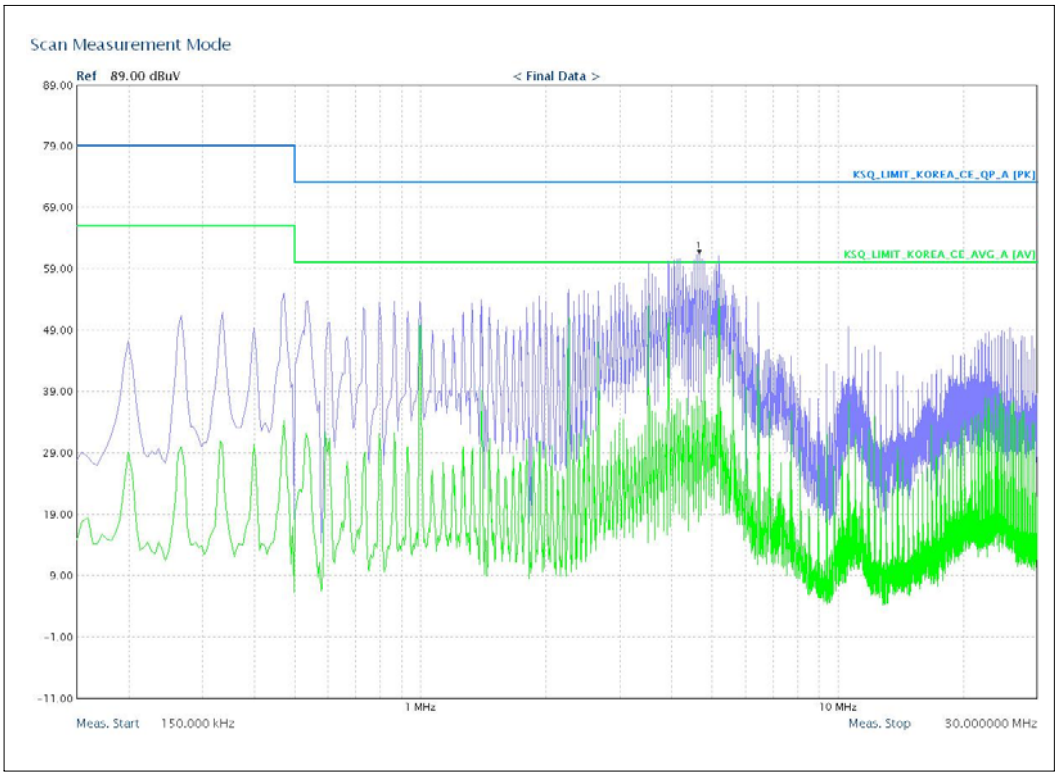
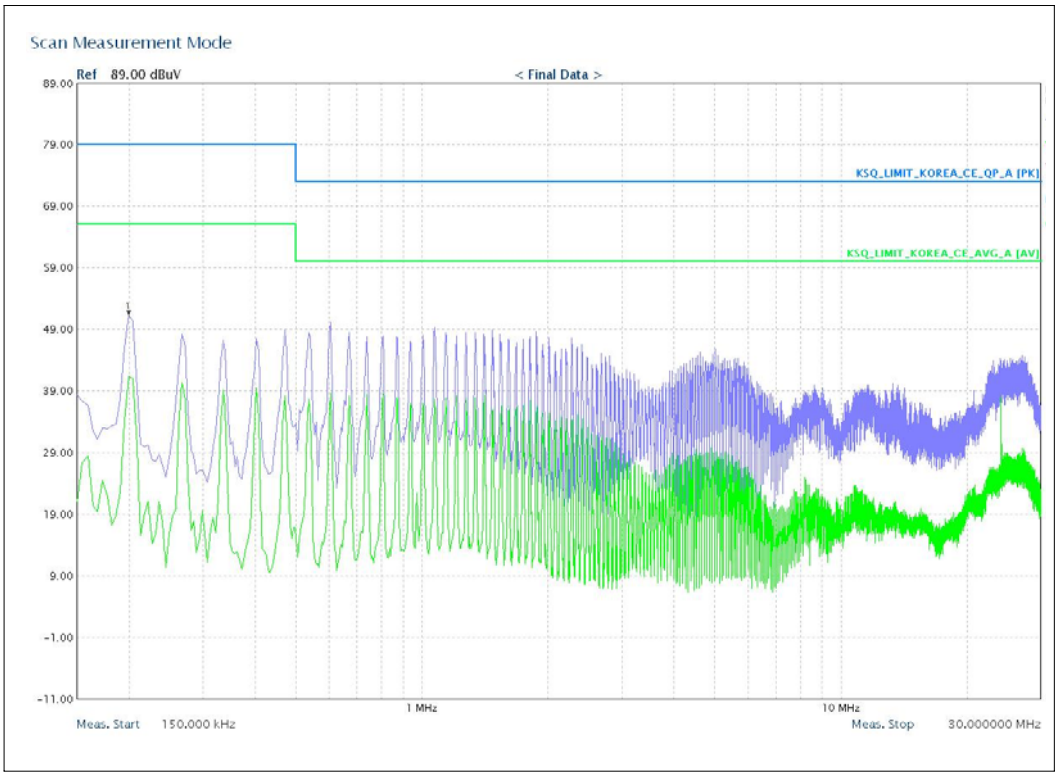


Figure 3. Plot of the Conducted Emissions (GSM850 Mode)

Polarization: HOT



Polarization: NEUTRAL

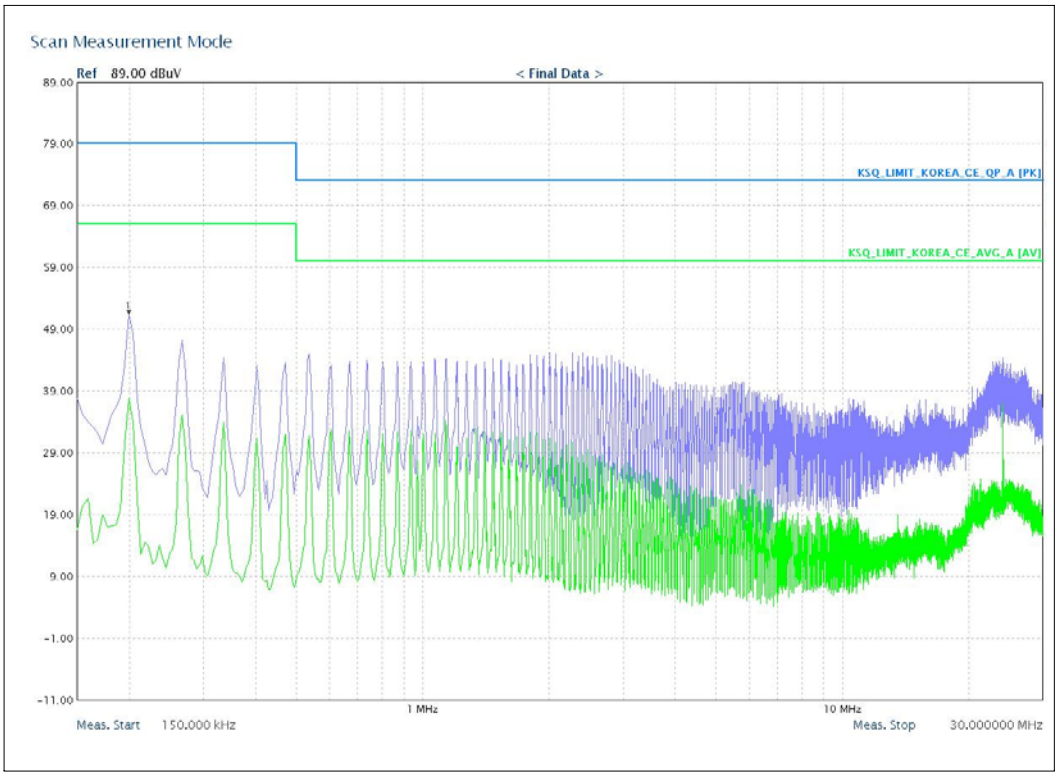
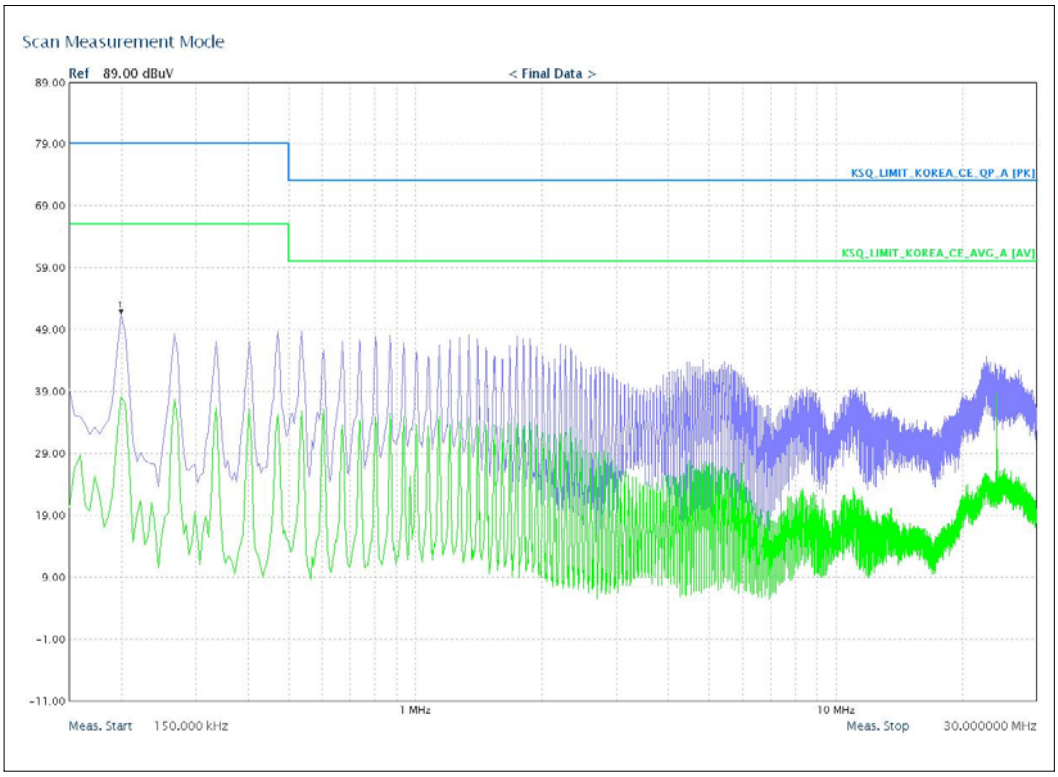
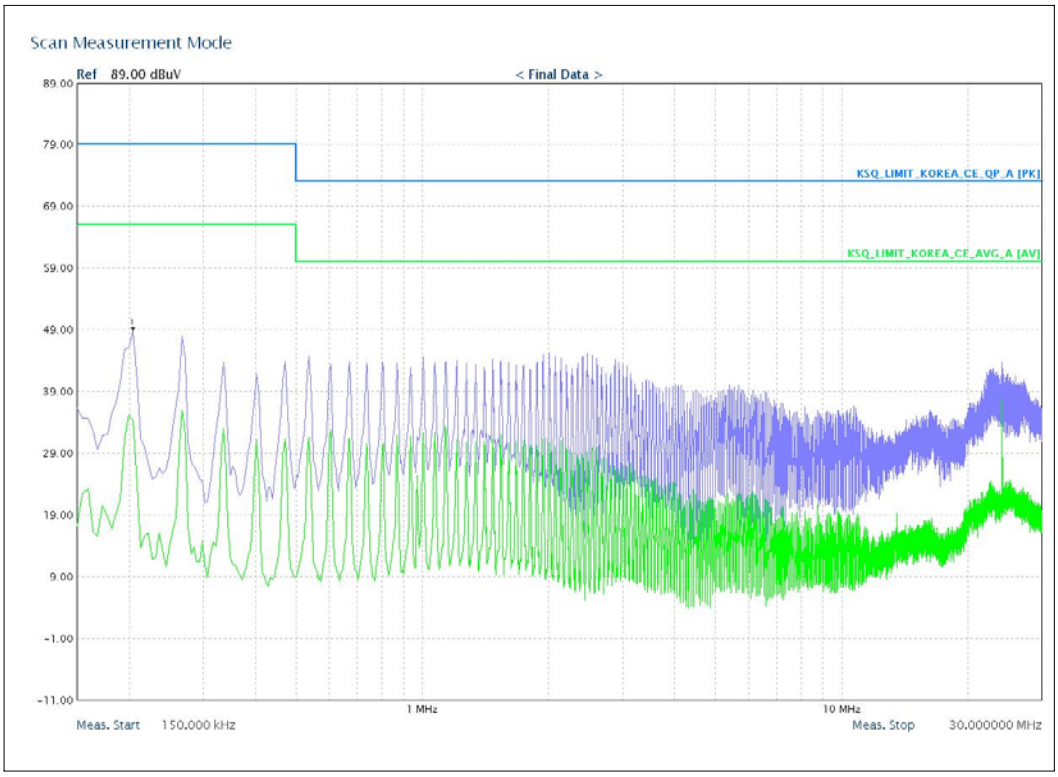


Figure 4. Plot of the Conducted Emissions (PCS1900 Mode)

Polarization: HOT



Polarization: NEUTRAL



APPENDIX

TEST EQUIPMENT USED FOR TESTS

No.	Description	Manufacturer	Model No.	Specifications	Next Cal. Data	Used equipment
1	EMI Test Receiver	LIG Nex1	LSA-265	3Hz~26.5GHz	11.12.18	■
2	Dipole ANT	ElectroMetrics	TDA-30/1-4	30~1GHz	12.03.23	■
3	Biconical ANT	ElectroMetrics	BIA-30S	30~300MHz	12.03.23	■
4	Log periodic ANT	ElectroMetrics	LPA-30	0.2~1GHz	12.03.23	■
5	Bilog Antenna	Schaffner-Chase EMC Ltd.	CBL6140A	50V, 5A	12.05.07	□
6	Turn Table	KEI	KEI-TURN	1500×1000×800	N/A	□
7	Turn Table	KEI	KEI-TURN	1500×1000×800	N/A	■
8	Loop ANT.	Com-Power	AL-130	9kHz~30MHz	11.03.24	□
9	Spectrum Analyzer	LIG Nex1	ISA-265	1kHz~26.5GHz	11.05.20	■
10	Function Generator	Agilent	33120A	15MHz sine&square	11.06.09	□
11	Frequency Counter	HP	5350B	10Hz~20GHz	11.06.09	□
12	Modulation Analyzer	Agilent	8901B	10MHz~1.3GHz	11.06.09	□
13	Audio Analyaer	Agilent	8903B	20Hz~100kHz	11.06.09	□
14	Attenuator	Agilent	8494B	0~11dB, 18GHz	11.06.09	□
15	Attenuator	Agilent	8496B	0~110dB, 18GHz	11.06.09	□
16	Attenuator	Agilent	8495B	0~70dB, 18GHz	11.06.09	□
17	Attenuator	TAE SUNG	SMA-1	6dB	11.09.02	□
18	Attenuator	TAE SUNG	SMA-2	6dB	11.09.02	□
19	Power Meter	Agilent	E4418B	100kHz~110GHz, 0.0001uW~25100mW	11.06.09	□
20	Power Sensor	HP	8485A	50MHz~26.5GHz	11.06.09	□
21	Vibration Tester	Gana	GNV-400	10~60Hz, 0~4mm	11.09.09	□
22	RF Cable	Gigalane	SMS-LL280-SMS -1.5M	1.5m	N/A	□
23	Temp & Humidity Chamber	Seoksan Tech	SE-CT-02	-40~150℃, 30~98%	11.06.09	□
24	Signal Generator	Leader Electronics	3220	100kHz~1.3GHz	11.06.09	□
25	Oscilloscope	Tektronix	TDS-350	200MHz	11.09.02	□
26	Drop Tester	Self-made	KSQ-01	150cm	N/A	□
27	Pre Amplifier	GTC	GA-1825A	0.1~18GHz	11.06.09	□
28	Continuous operation tester	GTC	CT-100	Local Control	N/A	□
29	CW Generator	HP	83711B	1~20GHz	11.06.09	□
30	POWER DIVIDER	Agilent	11636B	26.5GHz	11.06.09	□

No.	Description	Manufacturer	Model No.	Specifications	Next Cal. Data	Used equipment
31	Power Sensor	Agilent	8482B	100kHz ~ 4.2GHz	11.06.09	□
32	Attenuator	Winswell	53-30-33	dc-2.5GHz, 500W	11.06.09	□
33	DC Power Supply	Hanil	HPS-505A	50V, 5A	11.09.02	□
34	Slidacs	Hanchang	5KV	5kW, 300V	11.09.02	□
35	Termination	Kwang Yeok	KYTE-NJ-150W	150W	11.09.02	□
36	Band-limited filter	MITECH	KSQ-02	600Ω	11.09.02	□
37	Signal Generator	WILTRON	6759B	10MHz ~ 26.5GHz	11.09.02	□
38	Digital Multimeter	DONG HWA	DM-300A	AC/DC 500V Max,320mA Max	11.09.02	■
39	Horn ANT.	SCHWARZBECK	BBHA 9120D	700MHz ~ 18GHz	11.09.23	■
40	DC Power Supply	ALINCO	DM-340MW	15V, 30A	11.09.02	□
41	Radio Communication Analyzer	Anritsu	MT8815A	30MHz ~ 2.7GHz	11.10.06	■
42	LISN	Electro Metrics	ANS-25/2	5㎑ ~ 400㎒	11.09.03	■

APPENDIX

1. EUT photo