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Dates of Tests: May 2 ~ 10, 2007
 Test Report S/N: LR500190705D
 Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

VASEBP100B

APPLICANT

eb Corp.

FCC Classification : **Part 15 Low Power Communication Device Transmitter**
Manufacturing Description : **Exit Validator**
Manufacturer : **eb Corp.**
Model name : **EBP-100B**
Test Device Serial No.: : **Identical prototype**
Rule Part(s) : **FCC Part 15.225 Subpart C; ANSI C-63.4-2003**
Frequency Range : **13.56MHz**
RF power : **75.23dBuV/m @ 3m**
Data of issue : **May 10, 2007**

This test report is issued under the authority of:

The test was supervised by:

Dong-Min JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
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 Web site : <http://www.ltalab.com>
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2007-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2007-07-13	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

2. Information's about test item

2-1 Client

Company name : eb Corp.
 Address : 14th Fl., HIGH-END TOWER, 235-2, Guro-Dong, Guro-Ku, Seoul, Korea
 Tel / Fax : +82.2.6220.3085 / +82.2.6220.5001

2-2 Manufacturer

Company name : eb Corp.
 Address : 14th Fl., HIGH-END TOWER, 235-2, Guro-Dong, Guro-Ku, Seoul, Korea

2-3 Equipment Under Test (EUT)

Trade name : Exit Validator
 Model name : EBP-100B
 Serial number : Identical prototype
 Date of receipt : April 30, 2007
 EUT condition : Pre-production, not damaged
 Antenna type - 1 : PCB Pattern Loop Antenna (Size: 130 Ø)
 Frequency Range : 13.56 MHz
 RF output power : 75.23dBuV/m @ 3m
 Temperature range : -20°C ~ 55°C
 Power Source : DC/DC Converter: Input 24VDC, Output 12VDC/5VDC/3.3VDC

2-4 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	-	13.56	-

2-5 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
DC/DC Converter	PA-9000695	N/A	eb Corp.
-	-	-	-

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Test Condition	Status (note 1)
15.225(a)	Electric Field Strength - Fundamental Emission	Radiated	C
15.225(b) (c)	Electric Field Strength - Outside the Band		C
15.225(d)	Electric Field Strength - Spurious Emission		C
15.225(c)	20 dB Bandwidth		C
15.225(d)	Frequency Tolerance		C
15.209/15.109	Radiated Emission – CLASS A		C
15.207 /15.107	AC Conducted Emissions – CLASS A	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.225; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 Electric Field Strength

Procedure: About the Fundamental Emission, Outside the Band and Spurious Emission

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

→ From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for each antenna angle 0deg., 45deg. and 90deg.

→ From 30MHz to 1000MHz at distance 3m

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

The measurements were performed for both vertical and horizontal antenna polarization.

Bandwidth settings per frequency range;

	From 9kHz to 150kHz	From 150kHz to 30MHz	From 30MHz to 1000MHz
IF Bandwidth	200Hz	9kHz	120kHz

Part 15 Section 15.31 (f)(2) (9kHz ~ 30MHz)

9kHz ~ 490kHz [Limit at 3m] = [Limit at 300m]-40log(3[m]/300[m])

490kHz ~ 30MHz [Limit at 3m] = [Limit at 30m]-40log(3[m]/30[m])

3.2.1.1 Electric Field Strength - Fundamental Emission

Test method : Part 15.225(a)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement data:

Freq (MHz)	Pol.	Reading (dB μ V/m)	T.F (dB)	Field Strength @3m (dB μ V/m)	Limit @3m (dB μ V/m)	Margin (dB)
13.56	H	79.38	-6.87	72.51	124	51.49
13.56	V	82.10	-6.87	75.23	124	48.77

-- Note 1--

$$\begin{aligned}
 \text{Field strength of 13.553MHz to 13.567MHz Limit@3m} &= 84\text{dBuV/m} + 40\log 30\text{m}/3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$

-- Note 2--

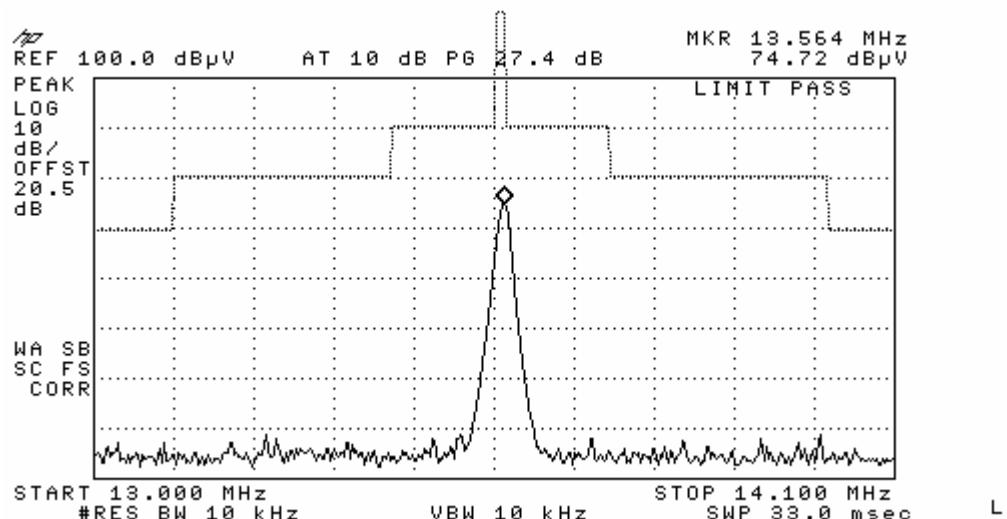
$$\text{T.F(Total Factor)} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain}$$

$$\text{Field Strength @3m} = \text{Reading} + \text{T.F}$$

3.2.1.2 Electric Field Strength - Outside the Allocated Band

Test method : Part 15.225(b) (c)
Tx Frequency : 13.56 MHz
Result : **Complies**

Measurement Data:



3.2.1.3 Electric Field Strength – Spurious Emission

Test method : Part 15.225(d)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement Data:

Freq (MHz)	Pol.	Reading (dB μ V/m)	T.F (dB)	Field Strength @3m (dB μ V/m)	Limit @3m (dB μ V/m)	Margin (dB)
40.69	V	44.50	-13.52	31.0	40.00	9.02
54.25	V	42.90	-13.59	29.3	40.00	10.69
67.81	V	41.20	-14.29	26.9	40.00	13.09
94.93	V	40.50	-16.28	24.2	43.50	19.28
108.49	V	42.20	-14.90	27.3	43.50	16.20
122.05	V	38.60	-13.57	25.0	43.50	18.47
135.61	V	46.50	-12.75	33.8	43.50	9.75
149.17	V	44.70	-11.97	32.7	43.50	10.77
162.73	V	50.80	-12.06	38.7	43.50	4.76
176.29	V	48.20	-12.80	35.4	43.50	8.10
189.85	V	55.30	-14.41	40.9	43.50	2.61
203.41	V	55.70	-15.08	40.6	43.50	2.88
216.97	V	56.50	-14.66	41.8	46.00	4.16
230.53	V	55.20	-13.94	41.3	46.00	4.74

→ Note 1: T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

Field Strength @3m = Reading + T.F

→ Note 2: No other emissions were detected at a level greater than 20dB below limit.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

3.2.2 20 dB Bandwidth

Procedure:

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test method : Part 15.225(c)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

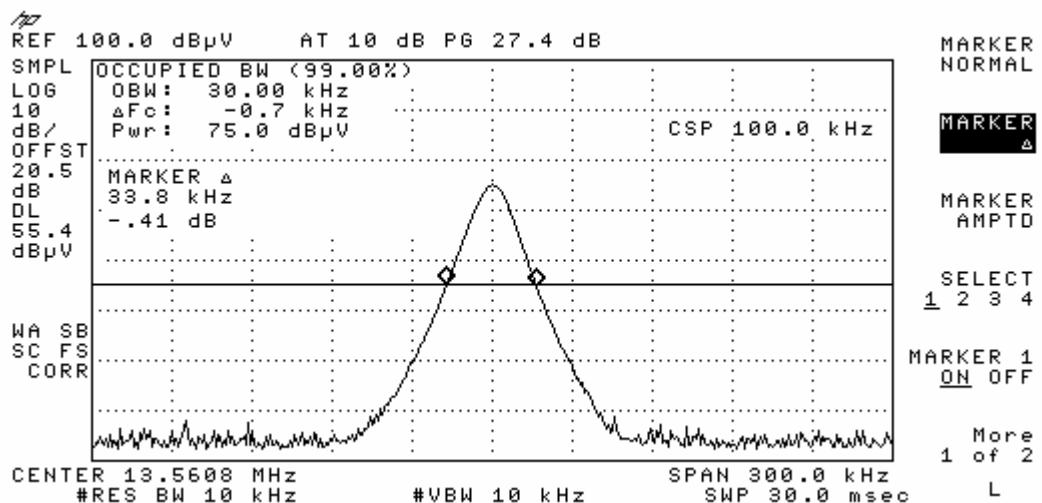
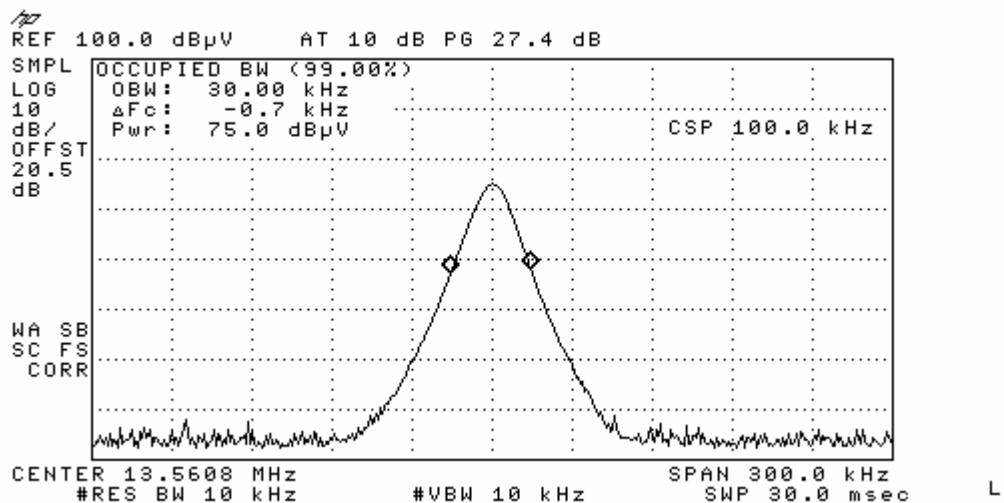
The spectrum analyzer is set to:

Center frequency = 13.56MHz

RBW = 10 kHz

VBW = 10 kHz (VBW \geq RBW)

Measurement Data:



3.2.3 Frequency Tolerance

Procedure:

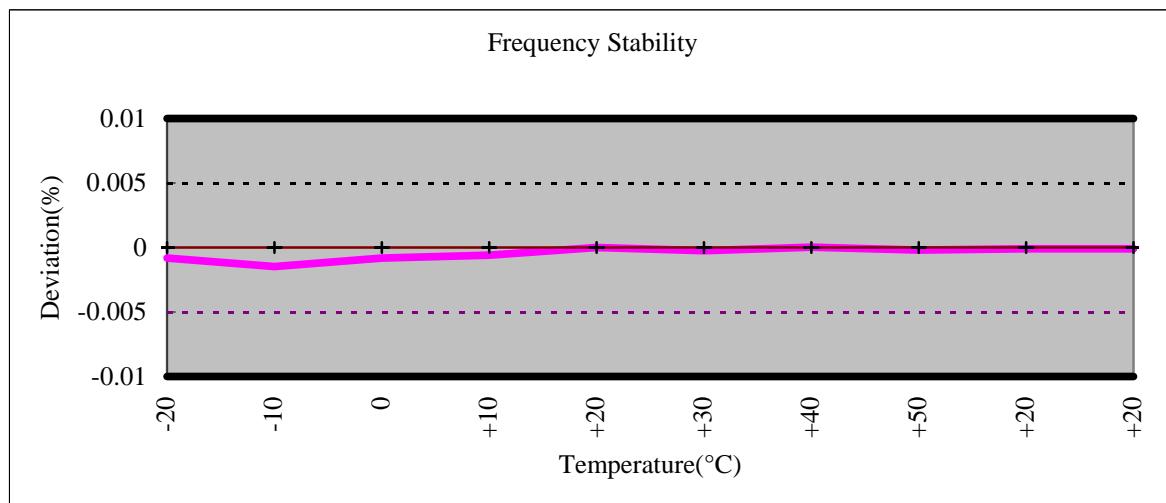
The temperature test was started after the temperature stabilization time of 30 minutes.

Test method : Part 15.225(d)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement Data:

OPERATING FREQUENCY: 13,560,130 Hz
Freq. Tolerance Limit: ± 0.01% %

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100	24.0	-20	13,560,241	-0.000819
100		-10	13,560,330	-0.001475
100		0	13,560,241	-0.000819
100		10	13,560,211	-0.000597
100		20	13,560,130	0.000000
100		30	13,560,163	-0.000243
100		40	13,560,127	0.000022
100		50	13,560,157	-0.000199
85	21.6	20	13,560,144	-0.000103
115	26.4	20	13,560,144	-0.000103



3.2.4 Radiated Emission

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.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

$$\text{VBW} \geq \text{RBW}$$

$\equiv 1 \text{ MHz}$ (1 GHz $\sim 10^{\text{th}}$ harmonic)

Trace = max hold

Sweep = auto

Measurement Data:

→ Refer to the Next Page

→ No other emissions were detected at a level greater than 10dB below limit.

Minimum Standard: Class B

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz.

However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Minimum Standard: Class A

Frequency (MHz)	Limit (uV/m) @ 10m
30 ~ 88	90
88 ~ 216	150
216 ~ 960	210
Above 960	300

Measurement Data:



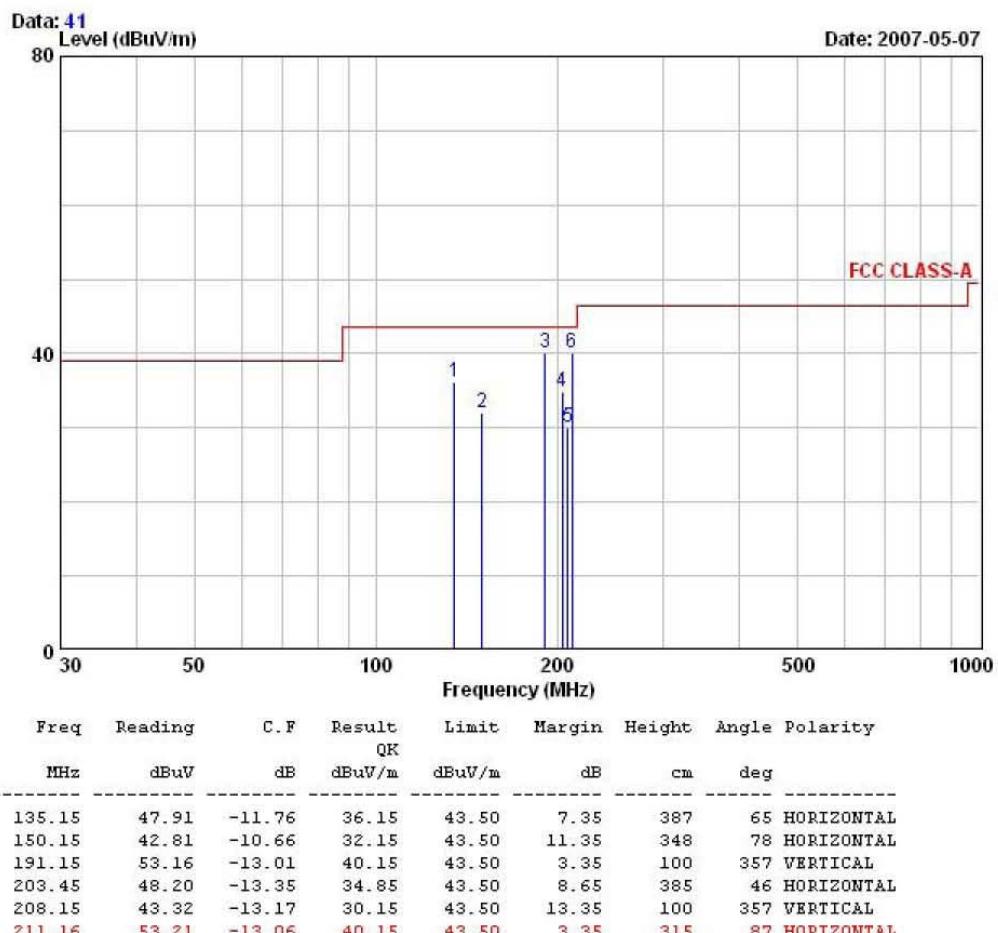
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EUT/Model No.: EBP-100B

TEST MODE:

Temp Humi : 12 / 33

Tested by: B. S. KIM



Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.5 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No other emissions were detected at a level greater than 10dB below limit.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Class B

Frequency Range	quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Class A

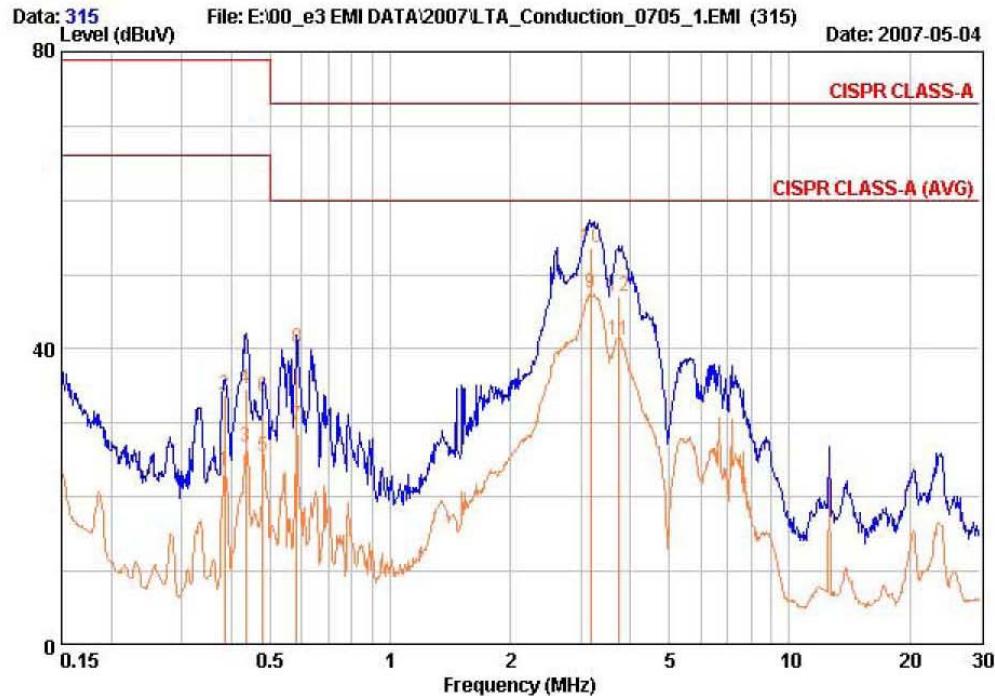
Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	66 dBuV
0.5 ~ 30 MHz	73 dBuV	60 dBuV

AC Conducted Emissions –Line



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EUT / Model No. : EBP-100B Phase : LINE
Test Mode : Test Power : 120 / 60
Temp./Humi. : 21 / 64 Test Engineer : B.S.KIM



Freq MHz	RD QP dBuV	RD AV dBuV	C. F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.385	33.40	23.12	0.37	33.77	23.49	79.00	66.00	45.23	42.51
0.435	34.30	26.56	0.35	34.65	26.91	79.00	66.00	44.35	39.09
0.479	33.20	25.24	0.31	33.51	25.55	79.00	66.00	45.49	40.45
0.582	39.90	29.31	0.29	40.19	29.60	73.00	60.00	32.81	30.40
3.173	53.00	46.82	0.62	53.62	47.44	73.00	60.00	19.38	12.56
3.720	46.50	40.81	0.48	46.98	41.29	73.00	60.00	26.02	18.71

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

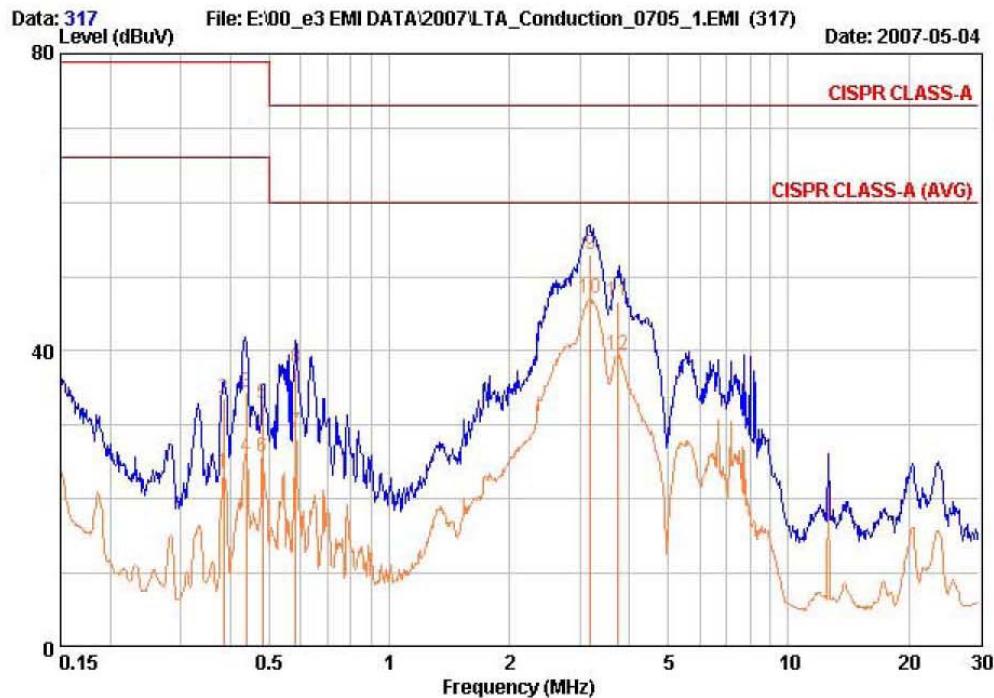
Note: The measurement data of 13.56MHz is retested with a dummy load(50ohm).

AC Conducted Emissions - Neutral



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EUT / Model No. : EBP-100B Phase : NEUTRAL
Test Mode : Test Power : 120 / 60
Temp./Humi. : 21 / 64 Test Engineer : B.S.KIM



Freq MHz	RD QP	RD AV	C. F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.385	33.30	23.24	0.37	33.67	23.61	79.00	66.00	45.33	42.39
0.437	34.20	25.28	0.34	34.54	25.62	79.00	66.00	44.46	40.38
0.481	32.70	25.34	0.30	33.00	25.64	79.00	66.00	46.00	40.36
0.582	37.50	28.81	0.28	37.78	29.09	73.00	60.00	35.22	30.91
3.190	52.40	46.47	0.59	52.99	47.06	73.00	60.00	20.01	12.94
3.740	46.30	39.12	0.44	46.74	39.56	73.00	60.00	26.26	20.44

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

Note: The measurement data of 13.56MHz is retested with a dummy load(50ohm).

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-08
2	Signal Generator	8648C	3623A02597	HP	Apr-08
3	Attenuator (3dB)	8491A	37822	HP	Nov-07
4	Attenuator (10dB)	8491A	63196	HP	Nov-07
5	EMI Test Receiver	ESVD	843748/001	R&S	Jan-08
6	LISN	KNW-407	8-1430-1	Kyoritsu	Jan-08
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Jan-08
8	RF Amplifier	8447D	2949A02670	HP	Jan-08
9	RF Amplifier	8447D	2439A09058	HP	Jan-08
10	RF Amplifier	8449B	3008A02126	HP	Apr-09
11	Test Receiver	ESHS10	828404009	R&S	Jan-08
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-07
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-09
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-09
15	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-09
16	Horn Antenna	BBHA 9120D	0499	Schwarzbeck	Jun-07
17	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-07
18	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-07
19	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-07
20	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-07
21	Spectrum Analyzer	8591E	3649A05888	HP	Jan-08
22	Spectrum Analyzer	8563E	3425A02505	HP	Apr-08
23	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Feb-08
24	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-07
25	RF Switch	MP59B	6200414971	ANRITSU	Jun-07
26	RF Switch	MP59B	6200438565	ANRITSU	Jun-07
27	Power Divider	11636A	6243	HP	Nov-07
28	DC Power Supply	6622A	3448A03079	HP	Oct-07
29	Attenuator (30dB)	11636A	6243	HP	Nov-07
30	Frequency Counter	5342A	2826A12411	HP	Apr-08
31	Power Meter	EPM-441A	GB32481702	HP	Apr-08
32	Power Sensor	8481A	2702A64048	HP	Apr-08
33	Audio Analyzer	8903B	3729A18901	HP	Nov-07
34	Modulation Analyzer	8901B	3749A05878	HP	Nov-07
35	TEMP & HUMIDITY Chamber	YJ-500	L05022	Jin Young Tech	Oct-07
36	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-09