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Dates of Tests: May 18~21, 2011

Test Report S/N: LR500111105I

Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

VULCATENACCIOLITE

APPLICANT

Bioinsec Co., Ltd.

FCC Classification	:	Part 15 Low Power Communication Device Transmitter
Manufacturing Description	:	Fingerprinter Access Controller
Manufacturer	:	Bioinsec Co., Ltd.
Model name	:	Catenaccio Lite
Variant Model name	:	Cadenacio Lite, BKS-5100
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	:	65.69dBuV/m @ 3m
Data of issue	:	May 23, 2011

This test report is issued under the authority of:

The test was supervised by:

Hyun-Chae You, Technical Manager

Il-Shin Kim, 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. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



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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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	2011-09-30	ECT accredited Lab.
KCC	KOREA	KR0049	2013-04-24	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	UPDATING	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2011-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Client& Manufacturer

Company name : Bioinsec Co., Ltd.
 Address : 902, 197-17, Ace Techno Tower1, Guro3-dong, Guro-gu, Seoul, Korea
 Tel / Fax : +82-2-2109-1140/ +82-2-2109-1143

2-2 Equipment Under Test (EUT)

Trade name : Fingerprinter Access Controller
 Model name : Catenaccio Lite
 Variant Modelname : Cadenacio Lite, BKS-5100
 Serial number : Identical prototype
 Date of receipt : May 9, 2011
 EUT condition : Pre-production, not damaged
 Antenna type : Loop Antenna
 Frequency Range : 13.56 MHz
 RF output power : 65.69dBuV/m @ 3m
 Power Source : DC 12V(By Adapter)

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	-	13.56	-

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400 Microtower	CNG8330J9R	HP
Monitor 17"	HPL1710	CNC816QH92	HP
Keyboard	SK-8115	641-OEWW	DELL
Mouse	MO56UOA	F0J00NOL	DELL
PRINTER	STYLUS C65	N/A	EPSON
Micro SD Card	N/A	N/A	SANDISK

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) / 15.209	Electric Field Strength - Spurious Emission		C
15.225(e)	Frequency Tolerance		C
15.207 /15.107	AC Conducted Emissions	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]-20log(3[m]/300[m])

490kHz ~ 30MHz [Limit at 3m] = [Limit at 30m]-20log(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	73.29	-7.6	65.69	104	45.91
13.56	V	71.75	-7.6	64.15	104	47.45

-- Note 1--

Field strength of 13.553MHz to 13.567MHz Limit@3m = 84dB μ V/m + 20log30m/3m
 = 104dB μ V/m

-- Note 2--

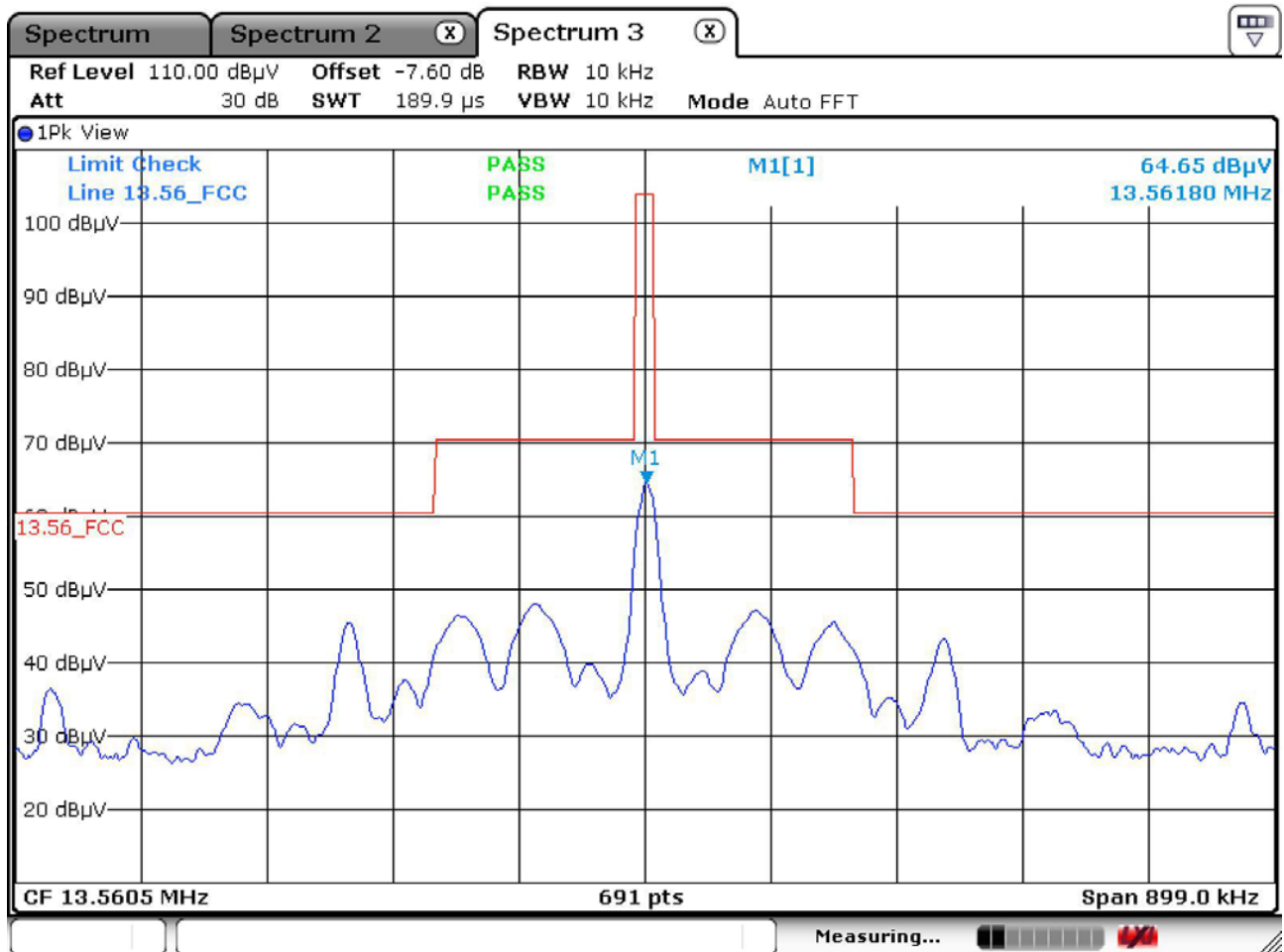
T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

Field Strength @3m = Reading + 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) / Part 15.209
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement Data:

Freq (MHz)	Pol.	Reading (dBμV/m)	T.F (dB)	Field Strength @3m (dBμV/m)	Limit @3m (dBμV/m)	Margin (dB)
135.60	H	32.64	-9.82	22.82	43.50	20.68
257.64	H	33.60	-8.77	24.83	46.00	21.17
271.20	H	35.44	-8.27	27.17	46.00	18.83
325.44	H	35.61	-6.62	28.99	46.00	17.01
339.00	H	31.91	-6.34	25.57	46.00	20.43
352.56	H	31.48	-6.06	25.42	46.00	20.58
366.12	H	31.10	-5.81	25.29	46.00	20.71
379.68	H	34.11	-5.63	28.48	46.00	17.52
433.92	H	33.03	-4.65	28.38	46.00	17.62
569.52	H	34.85	-4.06	30.79	46.00	15.21
623.76	H	36.01	-3.51	32.50	46.00	13.50

-- 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.

3.2.2 Frequency Tolerance

Procedure:

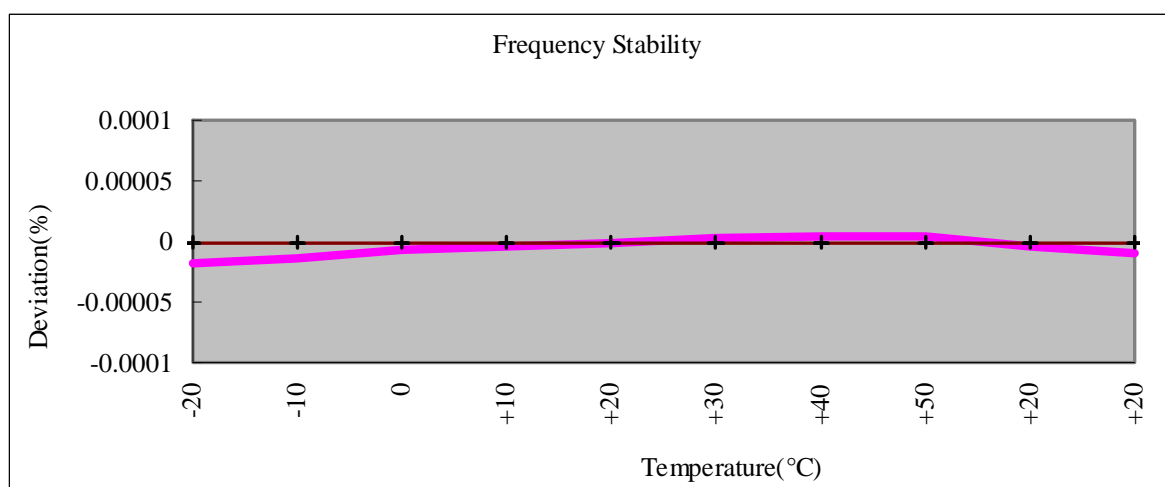
The temperature test was started after the temperature stabilization time of 30 minutes.

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

Measurement Data:

OPERATING FREQUENCY: 13,561,306 Hz
 Freq. Tolerance Limit: ± 0.01 %

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100	12.0	-20	13,561,531	-0.000017
100		-10	13,561,487	-0.000013
100		0	13,561,387	-0.000006
100		10	13,561,367	-0.000004
100		20	13,561,306	0.000000
100		30	13,561,264	0.000003
100		40	13,561,248	0.000004
100		50	13,561,232	0.000005
85	10.2	20	13,561,364	-0.000004
115	13.8	20	13,561,425	-0.000009



3.2.3 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 emissions were detected at a level greater than 10dB below limit.

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

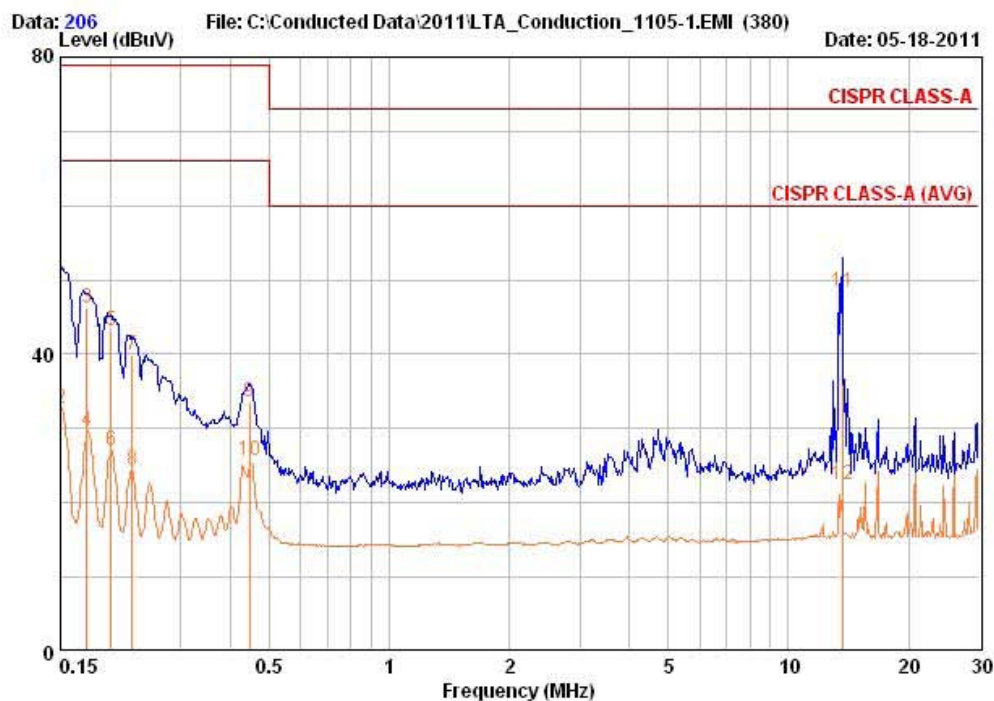
Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	73 dBuV
0.5 ~ 30 MHz	66 dBuV	60 dBuV

AC Conducted Emissions – PING + RFID MODE – Line



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EUT / Model No. :	Catenaccio Lite	Phase :	LINE
Test Mode :	PING TEST MODE + RFID MODE	Test Power :	120 / 60
Temp./Humi. :	24 / 41	Test Engineer :	PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	40.34	23.04	9.66	50.00	32.70	79.00	66.00	29.00	33.30
0.175	36.64	20.04	9.65	46.29	29.69	79.00	66.00	32.71	36.31
0.201	33.44	17.44	9.64	43.08	27.08	79.00	66.00	35.92	38.92
0.227	30.23	14.73	9.64	39.87	24.37	79.00	66.00	39.13	41.63
0.447	23.93	16.13	9.67	33.60	25.80	79.00	66.00	45.40	40.20
13.637	38.53	12.53	9.90	48.42	22.42	73.00	60.00	24.58	37.58

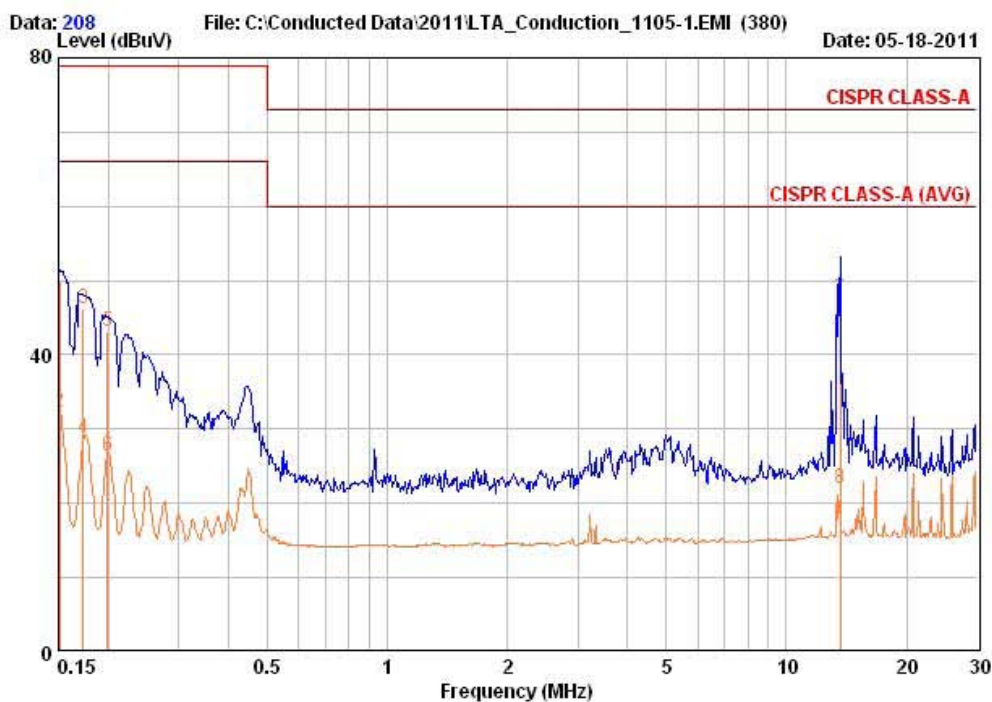
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions –PING + RFID MODE – Neutral



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EUT / Model No. : Catenaccio Lite	Phase : NEUTRAL
Test Mode : PING TEST MODE + RFID MODE	Test Power : 120 / 60
Temp./Humi. : 24 / 41	Test Engineer : PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.151	40.24	22.64	9.67	49.91	32.31	79.00	66.00	29.09	33.69
0.173	36.64	19.04	9.66	46.30	28.70	79.00	66.00	32.70	37.30
0.199	33.54	16.84	9.64	43.18	26.48	79.00	66.00	35.82	39.52
13.640	37.63	12.03	9.91	47.54	21.94	73.00	60.00	25.46	38.06

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

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Spectrum Analyzer (~30GHz)	FSV-30	100757	R&S	1 year	2011-01-24
2	Spectrum Analyzer (~2.9GHz)	8594E	3710A04074	HP	2 year	2009-10-12
3	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2011-03-30
4	Signal Generator (1~20GHz)	83711B	US34490456	HP	1 year	2011-03-30
5	Attenuator (3dB)	8491A	37822	HP	2 year	2010-10-08
6	Attenuator (10dB)	8491A	63196	HP	2 year	2010-10-08
7	Attenuator (30dB)	8498A	3318A10929	HP	2 year	2011-01-05
8	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2011-03-30
9	EMI Test Receiver (~1GHz)	ESCI7	100722	R&S	1 year	2010-10-08
10	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	2 year	2010-10-08
11	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2 year	2010-03-29
12	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
13	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
14	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
15	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2 year	2010-10-07
16	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
17	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
18	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
19	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
20	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2 year	2010-04-12
21	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
22	Power Divider	11636A	6243	HP	2 year	2010-10-08
23	DC Power Supply	6622A	3448A03079	HP	-	-
24	Frequency Counter	5342A	2826A12411	HP	1 year	2011-03-30
25	Power Meter	EPM-441A	GB32481702	HP	1 year	2011-03-30
26	Power Sensor	8481A	US41030291	HP	1 year	2010-10-08
27	Audio Analyzer	8903B	3729A18901	HP	1 year	2010-10-08
28	Modulation Analyzer	8901B	3749A05878	HP	1 year	2010-10-08
29	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2010-10-08
30	Stop Watch	HS-3	601Q09R	CASIO	2 year	2010-03-31
31	LISN	ENV216	100408	R&S	1 year	2010-10-08
32	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2 year	2010-05-13
33	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
34	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-