LTA
Laboratory for Test & Approval Co.,Ltd.

243 Jubug-Ri,Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 449-822
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: July 15 ~ 18, 2008
Test Report S/N: LR500190807B
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. **WLHBDS211**

APPLICANT **BNB Solutions Co., Ltd.**

FCC Classification	**:**	**Part 15 Low Power Communication Device Transmitter**
Manufacturing Description	**:**	**Digital Doorlock**
Manufacturer	**:**	**BNB Solutions Co., Ltd.**
Model name	**:**	**BDS-211**
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	**:**	**63.88dBuV/m @ 3m**
Data of issue	**:**	**July 21, 2008**

This test report is issued under the authority of:

Dong –Min JUNG, Technical Manager

The test was supervised by:

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.

Address : 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822

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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	2008-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2009-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2010-05-03	IC filing

2. Information's about test item

2-1 Client

Company name : BNB Solutions Co., Ltd.
Address : 169-1, Jubuk-ri, Yangji-Myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Tel / Fax : TEL: +82-31-337-1203 FAX: +82-31-337-1209

2-2 Manufacturer

Company name : BNB Solutions Co., Ltd.
Address : 169-1, Jubuk-ri, Yangji-Myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

2-3 Equipment Under Test (EUT)

Trade name : Digital Doorlock
Model name : BDS-211
Serial number : Identical prototype
Date of receipt : July 03, 2008
EUT condition : Pre-production, not damaged
Antenna type : Loop Antenna
Frequency Range : 13.56 MHz
RF output power : 63.88dBuV/m @ 3m
Temperature range : -20℃ ~ 55℃
Power Source : 6.0V (AAA Size * 4)

2-4 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	-	13.56	-

2-5 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
-	-	-	-
-	-	-	-

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	Radiated Emission		C
15.207 /15.107	AC Conducted Emissions	Line Conducted	NA

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

Note 2: This device is only operated by battery.

Note 3: 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 (dBµV/m)	T.F (dB)	Field Strength @3m (dBµV/m)	Limit @3m (dBuV/m)	Margin (dB)
13.56	H	56.16	7.72	63.88	124	60.12
13.56	V	55.94	7.72	63.66	124	60.34

-- Note 1--

Field strength of 13.553MHz to 13.567MHz Limit@3m = 84dBuV/m + 40log30m/3m

= 124dBuV/m

-- Note 2--

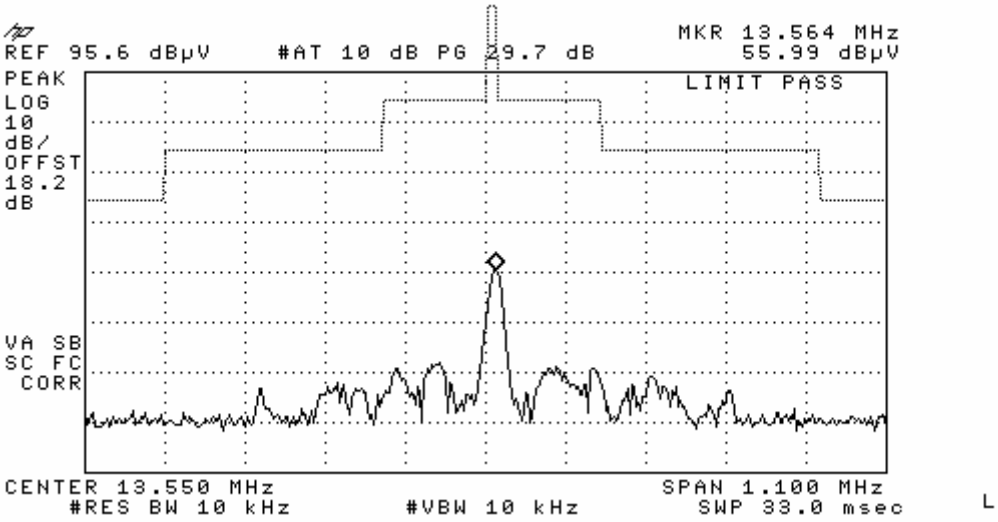
T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

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)

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 (dBuV/m)	Margin (dB)
54.24	H	35.01	-13.53	21.48	40.00	18.52
81.36	H	37.17	-17.21	19.96	40.00	20.04
108.48	H	34.79	-10.74	24.05	40.00	19.45
135.6	H	33.97	-12.42	21.55	40.00	21.95
149.16	H	34.06	-11.37	22.69	43.50	20.81
162.72	H	33.26	-10.99	22.27	43.50	21.23
176.28	H	36.88	-10.08	26.8	43.50	16.7
189.84	H	41.32	-9.45	31.87	43.50	11.63
203.4	H	44.44	-12.28	32.16	43.50	11.34
216.96	H	54.17	-13.5	40.67	43.50	5.33
230.52	H	56.94	-13.33	43.61	43.50	2.39
244.08	H	49.6	-12.65	36.95	43.50	9.05
257.64	H	54.36	-12.28	42.08	43.50	3.92
271.2	H	43.22	-11.18	32.04	46.00	13.96
284.76	H	46.71	-10.24	36.47	46.00	9.53
298.32	H	37.11	-9.86	27.25	46.00	18.75

-- 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 20 dB Bandwidth

Procedure:

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

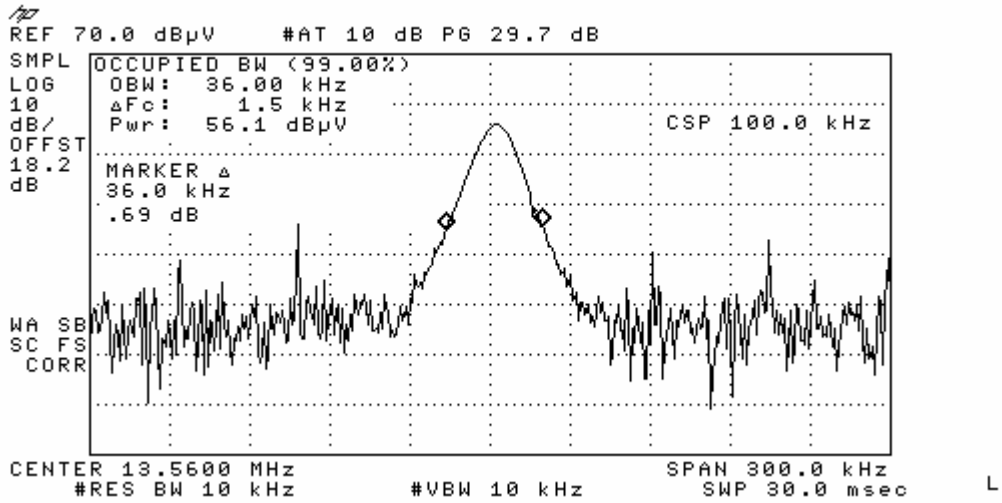
Test method	:	Part 15.225(c)
Tx Frequency	:	13.56 MHz
Result	:	**Complies**

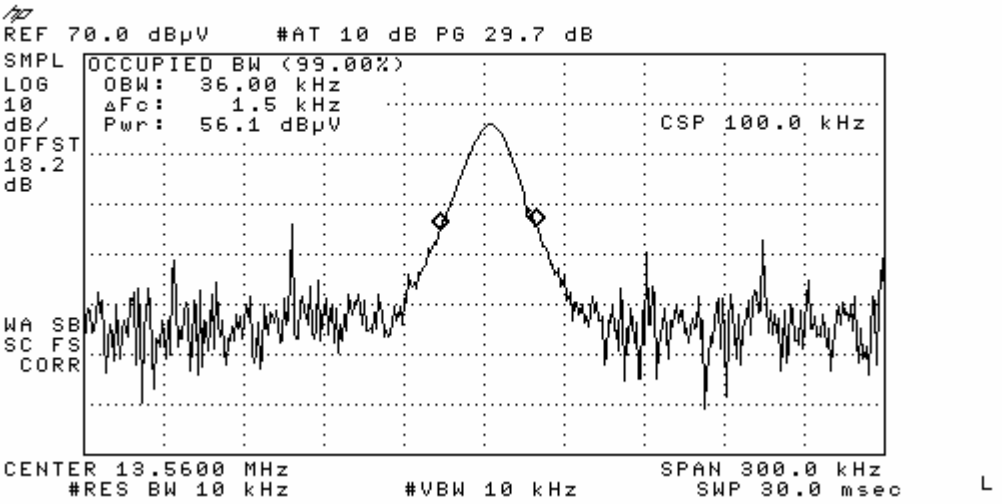
The spectrum analyzer is set to:

Center frequency = 13.56MHz

RBW = 10 kHz VBW = 10 kHz (VBW ≥ RBW)

Measurement Data:





3.2.3 Frequency Tolerance

Procedure:

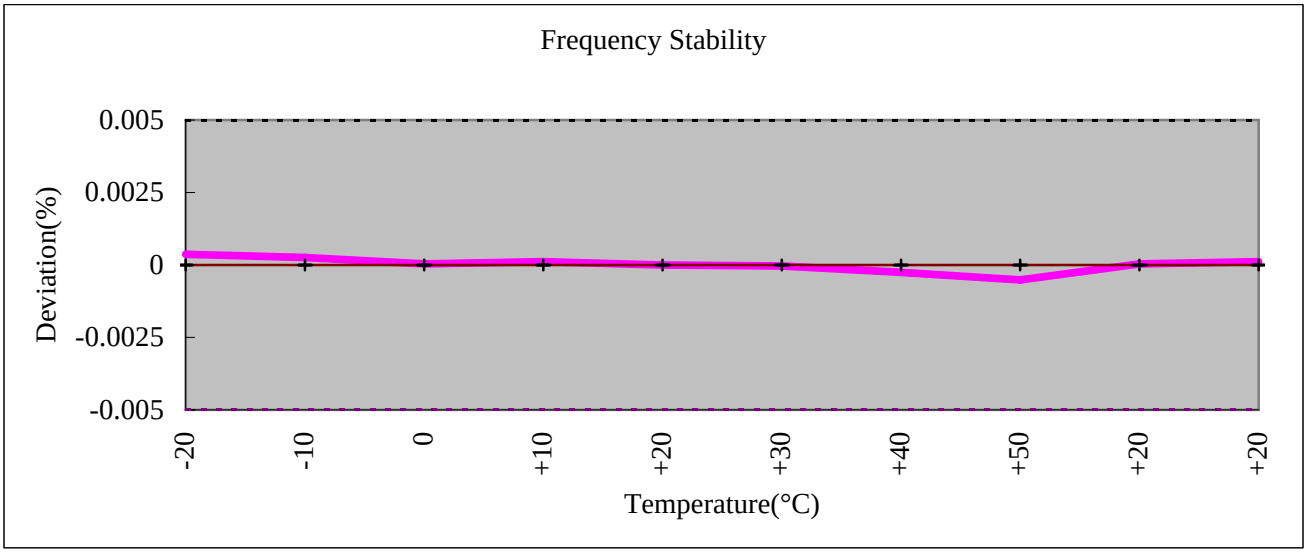
The temperature test was started after the temperature stabilization time of 30 minutes.

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

Measurement Data:

OPERATING FREQUENCY:	**13,561,386**	**Hz**
Freq. Tolerance Limit:	**± 0.01%**	**%**

VOLTAGE (%)	POWER (V)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100	6.0	-20	13,561,381	0.000369
100		-10	13,561,374	0.000258
100		0	13,561,375	0.000037
100		10	13,561,382	0.000111
100		20	13,561,386	0
100		30	13,561,367	-0.000037
100		40	13,561,379	-0.000258
100		50	13,561,384	-0.000516
85	5.1	20	13,561,376	0.000037
100	6.0	20	13,561,386	0



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) VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th 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: FCC Part 15.209(a)

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.

Measurement Data:

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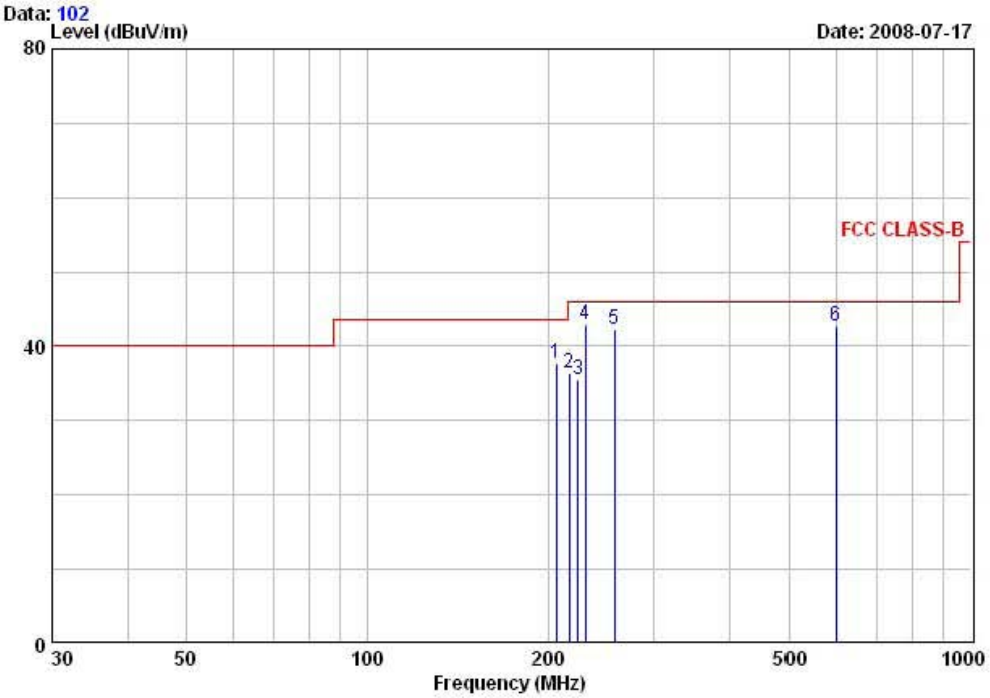
EUT/Model No.: BDS-211 TEST MODE: LOCK+UNLOCK mode

Temp Humi : 31 / 64 Tested by: KIM.B.S



	Freq	Reading	C.F	Result QK	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
1	206.05	50.60	-12.90	37.70	43.50	5.80	400	182	HORIZONTAL
2	216.72	48.90	-12.52	36.38	46.00	9.62	167	188	HORIZONTAL
3	224.02	47.60	-12.15	35.45	46.00	10.55	283	183	HORIZONTAL
4	230.60	54.60	-11.74	42.86	46.00	3.14	245	168	HORIZONTAL
5	257.71	52.80	-10.60	42.20	46.00	3.80	263	176	HORIZONTAL
6	596.78	45.40	-2.65	42.75	46.00	3.25	154	266	HORIZONTAL

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:

→ **Not Applicable (-This product is operated by battery.)**

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

Frequency Range (MHz)	Conducted Limit (dBuV)	
	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

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-09
2	Signal Generator	8648C	3623A02597	HP	Apr-09
3	Attenuator (3dB)	8491A	37822	HP	Oct-08
4	Attenuator (10dB)	8491A	63196	HP	Oct-08
5	EMI Test Receiver	ESVD	843748/001	R&S	Aug-09
6	LISN	KNW-407	8-1430-1	Kyoritsu	Jan-09
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Oct-08
8	RF Amplifier	8447D	2949A02670	HP	Jan-09
9	RF Amplifier	8447D	2439A09058	HP	Oct-08
10	RF Amplifier	8449B	3008A02126	HP	Apr-09
11	Test Receiver	ESHS10	828404009	R&S	Aug-09
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-09
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	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-08
17	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-08
18	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-08
19	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-08
20	Spectrum Analyzer	8591E	3649A05888	HP	Oct-08
21	Spectrum Analyzer	8563E	3425A02505	HP	Apr-09
22	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Apr-09
23	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-09
24	RF Switch	MP59B	6200414971	ANRITSU	Jun-09
25	RF Switch	MP59B	6200438565	ANRITSU	Jun-09
26	Power Divider	11636A	6243	HP	Oct-08
27	DC Power Supply	6622A	3448A03079	HP	Oct-08
28	Attenuator (30dB)	11636A	6243	HP	Oct-08
29	Frequency Counter	5342A	2826A12411	HP	Apr-09
30	Power Meter	EPM-441A	GB32481702	HP	Apr-09
31	Power Sensor	8481A	2702A64048	HP	Apr-09
32	Audio Analyzer	8903B	3729A18901	HP	Oct-08
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-08
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-08
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-09
36	Stop Watch	HS-3	601Q09R	CASIO	Apr-09