



Dates of Tests: : Oct 08~18, 2012

Test Report S/N: LR500111210C

Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

A2GM3BFUS05

APPLICANT

U-Chang Precision Co., Ltd.

TEST REPORT

Equipment Class : Part 15 Security/Remote Control Transmitter
Manufacturing Description : Automotive Vehicle Key
Manufacturer : U-Chang Precision Co., Ltd.
Model name : M3BFUS05
Test Device Serial No.: Identification
Rule Part(s) : FCC Part 15 Subpart C ; ANSI C-63.4-2003
Frequency Range : 314.9 MHz
Data of issue : Oct 18, 2012

This test report is issued under the authority of:



Kyu-Hyun Lee, Manager

The test was supervised by:



Jung-Moo Her, 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
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

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	2013-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2013-04-24	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	2013-04-13	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
VCCI	JAPAN	G-563	2015-05-28	VCCI registration
IC	CANADA	5799A-1	2015-06-21	IC filing

2. Information's about test item

2-1 Client & Manufacturer

Company name : U-Chang Precision Co., Ltd.
Address : 632-7, Sunggok-Dong, Danwon-Gu, Ansan-City, Kyungki-Do, Korea
Telephone / Facsimile : +82-31-491-9437 / +82-31-491-1802

2-2 Equipment Under Test (EUT)

Trade name : Automotive Vehicle Key
Model name : M3BFUS05
Serial number : Identification
Date of receipt : Oct 8, 2012
EUT condition : Pre-production, not damaged
Antenna type : Pattern Antenna
Frequency Range : 314.9 MHz
RF Output Power : Below 10 mW
Type of Modulation : ASK
Power Source : DC 3.0V By Battery
Firmware version : V2.0

2-3 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)
FCC Part 15.205/209	Restricted Bands of Operation	Radiated	C
FCC Part 15.231 a)	Operation mode		C ²⁾
FCC Part 15.231 b)	Radiated emissions		C
FCC Part 15.231 c)	20dB Bandwidth		C
15.207 /15.107	AC Conducted Emissions	Line Conducted	NA ³⁾

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

Note 2 The emitting time of fundamental frequency is less than 5seconds.

Refer to the APPENDIX 2.

Note 3: This device is only operated by battery.

Note 4: The data in this test report are traceable to the national or international standards.

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

Note 1: The sample was tested according to the following specification:

FCC Parts 15 Subpart C ; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 Conducted Emission

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**

- The EUT operates by the Battery
- According to the rule of section 15.207(c), The EUT exempt to the power line conducted test.

LIMIT:

Frequency Range	Near-peak	Average
0.15 ~ 0.5 MHz	66 ~ 56 dBuV	56 ~ 46 dBuV
0.5 ~ 5 MHz	56 dBuV	46 dBuV
5 ~ 30 MHz	60 dBuV	50 dBuV

Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

3.2.2 Radiated Emission

Definition:

The field strength of emissions from intentional radiators was measured.

Test method	: FCC Part 15.205 / 209
Transmit Frequency	: 314.9MHz
Frequency Range	: 9kHz ~30MHz / 30 MHz ~ 10 th harmonic.
Bandwidth	: 120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	: 3 meters
Test mode	: Tx mode
Result	: Complies

Measurement Data:

- No other emissions were detected at a level greater than 20dB below limit.
- Refer to the next page.

Field Strength Limit of fundamental and Harmonics: Part 15.231(b)

Frequency (MHz)	Limit @ 3m
314.9	41.6667(314.9) – 7083.3333 = 6037 uV/m = 75.6 dBuV/m (Average) 95.6dBuV/m (Peak)
Harmonics	60.8 dBuV/m (The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.)

Part 15.209 LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
0.009 ~ 0.490	2400/F (kHz) @ 300m
0.490 ~ 1.705	24000/F (kHz) @ 30m
1.705 ~ 30	30 @ 30m
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: (30MHz – 10th harmonic)**

Frequency	Reading		Pol.	Correction	Limits		Result		Margin	
	[dBuV / m]						[dBuV / m]		[dBuV / m]	
[MHz]	AV / Peak			Factor	AV / Peak		AV / Peak		AV / Peak	
314.906 ³⁾	81.2	84.5	H	-10.42	75.6	95.6	70.8	74.1	4.8	21.5
629.910	36.1	39.6	H	-2.54	60.8	80.8	33.6	37.1	27.2	43.7
944.760	37.9	41.6	H	2.03	60.8	80.8	39.9	43.6	20.9	37.2
Frequency	Reading		Pol.	Correction	Limits		Result		Margin	
	[dBuV / m]						[dBuV / m]		[dBuV / m]	
[MHz]	AV / Peak			Factor	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
Frequency	Reading		Pol.	Correction	Limits		Result		Margin	
	[dBuV / m]						[dBuV / m]		[dBuV / m]	
[MHz]	AV / Peak			Factor	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

*restricted band of operation §15.205

* Result level = Reading value + Antenna factor – Amp Gain + Cable Loss

* This EUT was tested in 3 orthogonal positions and the worst-case data was presented.

Note 1: No other emission were detected at a level greater than 20 dB below limit.

Note 2: All readings above 1GHz were taken using a peak detector function at a distance of 3 meters.

Note 3: Fundamental Frequency

***Measurement Data: (9kHz - 30MHz)**

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.												
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20dB below limit.

Radiated Emissions

243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: M3BFUS05

TEST MODE: Wireless mode

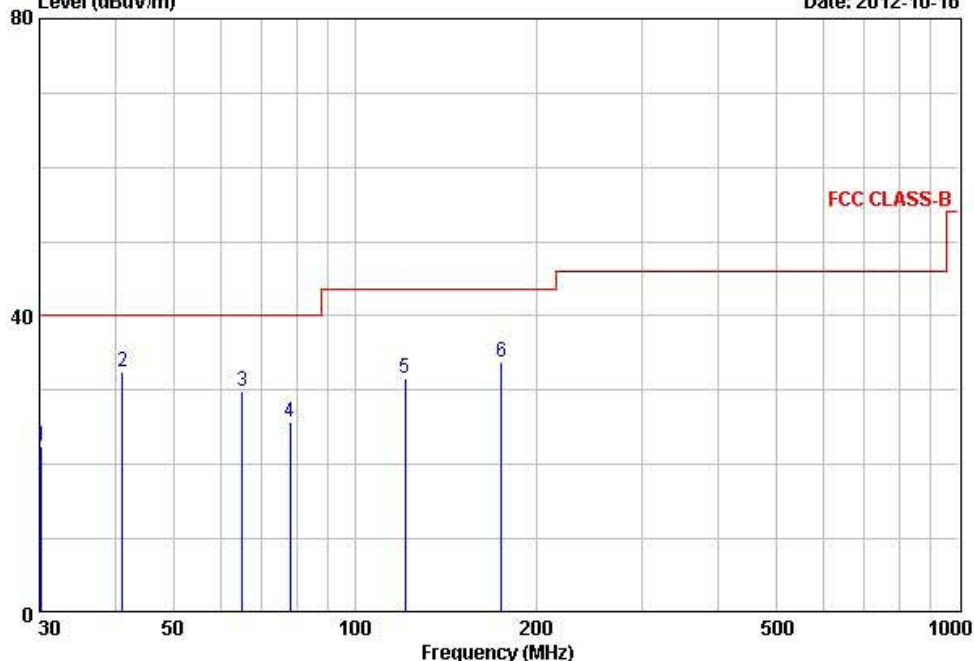
Temp Humi : 20 / 69

Tested by: PARK H W

Data: 9

Level (dBuV/m)

Date: 2012-10-16

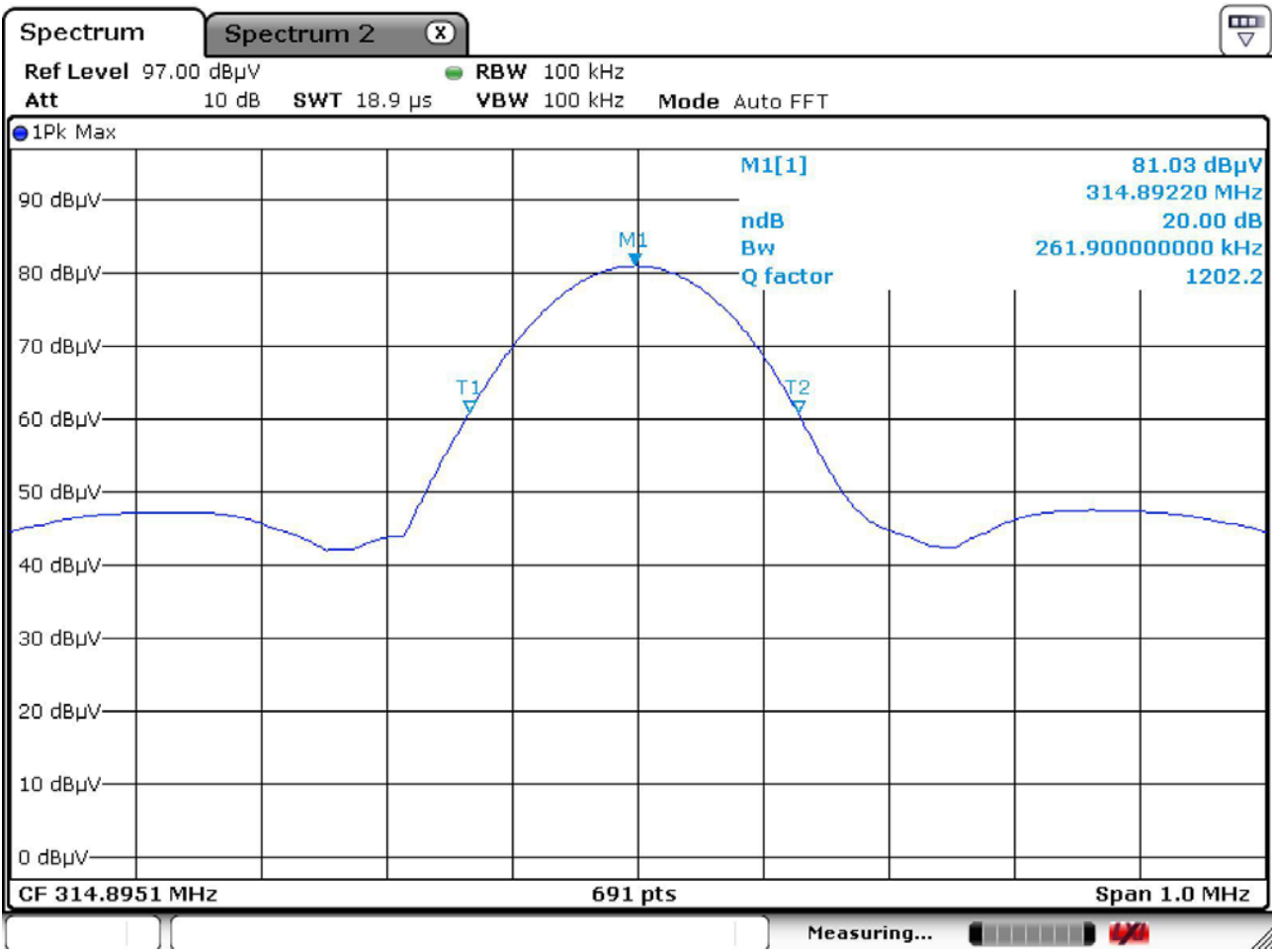


	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	QP	dB	cm	deg	
1	30.26	39.60	-17.11	22.49	40.00	17.51	100	284	VERTICAL
2	41.20	48.50	-15.93	32.57	40.00	7.43	100	25	VERTICAL
3	65.16	46.20	-16.44	29.76	40.00	10.24	100	316	VERTICAL
4	78.16	44.70	-19.00	25.70	40.00	14.30	100	217	VERTICAL
5	121.33	46.90	-15.22	31.68	43.50	11.82	318	254	HORIZONTAL
6	175.15	47.40	-13.55	33.85	43.50	9.65	326	169	HORIZONTAL

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

APPENDIX 1

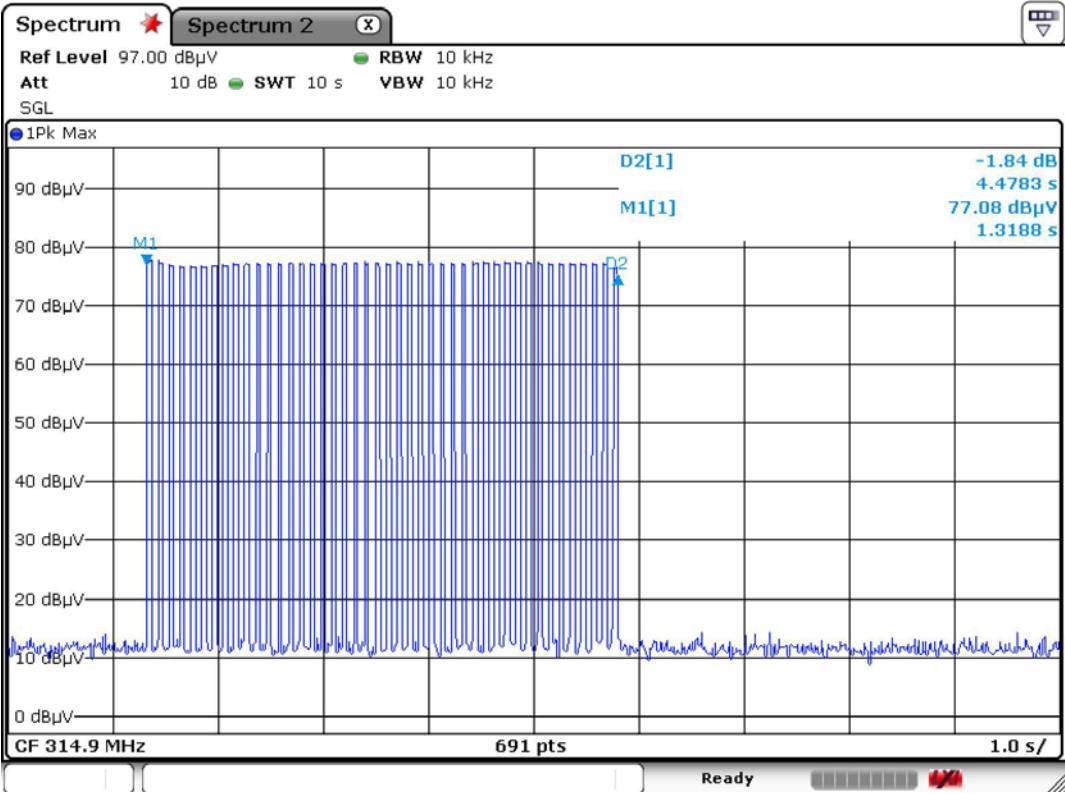
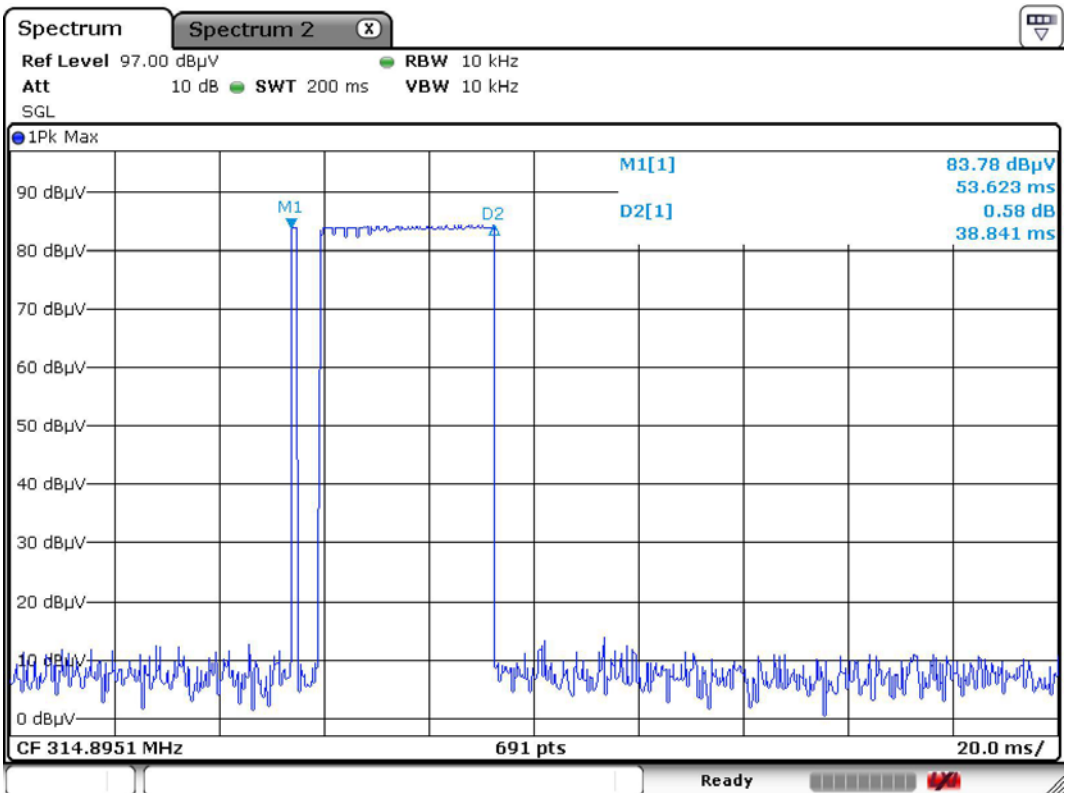
BANDWIDTH OF EMISSION



APPENDIX 2

THE EMITTING TIME OF FUNDAMENTAL FREQUENCY

The Emitting time of Fundamental Frequency



Note . The above plots is the worst case plots generated with the full data rate.

APPENDIX 3

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	2012-01-10
2	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2012-03-26
3	Signal Generator (1~20GHz)	83711B	US34490456	HP	1 year	2012-03-26
4	Attenuator (3dB)	8491A	37822	HP	2 year	2012-09-22
5	Attenuator (10dB)	8491A	63196	HP	2 year	2012-09-22
6	Attenuator (30dB)	8498A	3318A10929	HP	2 year	2011-01-05
7	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2012-03-26
8	EMI Test Receiver (~1GHz)	ESCI7	100722	R&S	1 year	2011-10-07
9	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	-	-
10	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2 year	2012-03-26
11	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
12	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
13	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
14	TRILOG Antenna	VULB 9160	9160-3242	SCHWARZBECK	2 year	2011-06-09
15	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
16	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
17	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
18	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
19	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2 year	2013-04-26
20	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
21	DC Power Supply	6622A	3448A03079	HP	-	-
22	Frequency Counter	5342A	2826A12411	HP	1 year	2012-03-26
23	Power Meter	EPM-441A	GB32481702	HP	1 year	2012-03-26
24	Power Sensor	8481A	US41030291	HP	1 year	2011-10-07
25	Audio Analyzer	8903B	3729A18901	HP	1 year	2011-10-07
26	Modulation Analyzer	8901B	3749A05878	HP	1 year	2011-10-07
27	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2011-10-07
28	Stop Watch	HS-3	601Q09R	CASIO	2 year	2012-03-26
29	LISN	ENV216	100408	R&S	1 year	2011-10-07
30	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
31	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-
32	Loop Antenna	FMZB 1516	151602/94	SCHWARZBECK	2 year	2011-04-05