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Dates of Tests: April 15 ~ May 22, 2013  
 Test Report S/N: LR500111305L  
 Test Site : LTA Co., Ltd.

## CERTIFICATION OF COMPLIANCE

FCC ID	<b>SS4BP70</b>
APPLICANT	<b>BLUEBIRD INC.</b>

- FCC Classification** : **Part 15 Low Power Communication Device Transmitter**
- Manufacturing Description** : **Industrial PDA**
- Manufacturer** : **BLUEBIRD INC.**
- Model name** : **BP70**
- 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** : **70.83dBuV/m @ 3m**
- Data of issue** : **May 23, 2013**

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. 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.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 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	2013-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	2015-03-06	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	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 : BLUEBIRD INC.  
 Address (Dogok-dong, SEI Tower 13~14), ., 39, Eonju-ro30-gil, Gangnam-gu,  
 : Seoul, Korea  
 Tel / Fax : Tel : +82-70-7730-8210 / Fax :+82-2-548-0870

### 2-2 Equipment Under Test (EUT)

Trade name :   
 Model name : BP70  
 Serial number : Identical prototype  
 Date of receipt : March 18, 2013  
 EUT condition : Pre-production, not damaged  
 Antenna type : FPCB antenna for RFID  
 Frequency Range : 13.56 MHz  
 RF output power : 70.83dBuV/m @ 3m  
 Power Source : DC 3.7 V by Battery  
 Power for Adaptor. : Input: 100-240VAC, 0.4A                      Output: 5.0VDC, 3A  
 Firmware Version : V 1.0.0

### 2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	-	13.56	-

### 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 $\mu$ V/m)	T.F (dB)	Field Strength @3m (dB $\mu$ V/m)	Limit @3m (dB $\mu$ V/m)	Margin (dB)
13.56	H	77.51	-6.68	70.83	104	33.17
13.56	V	75.83	-6.68	69.15	104	34.85

-- Note 1--

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

-- Note 2--

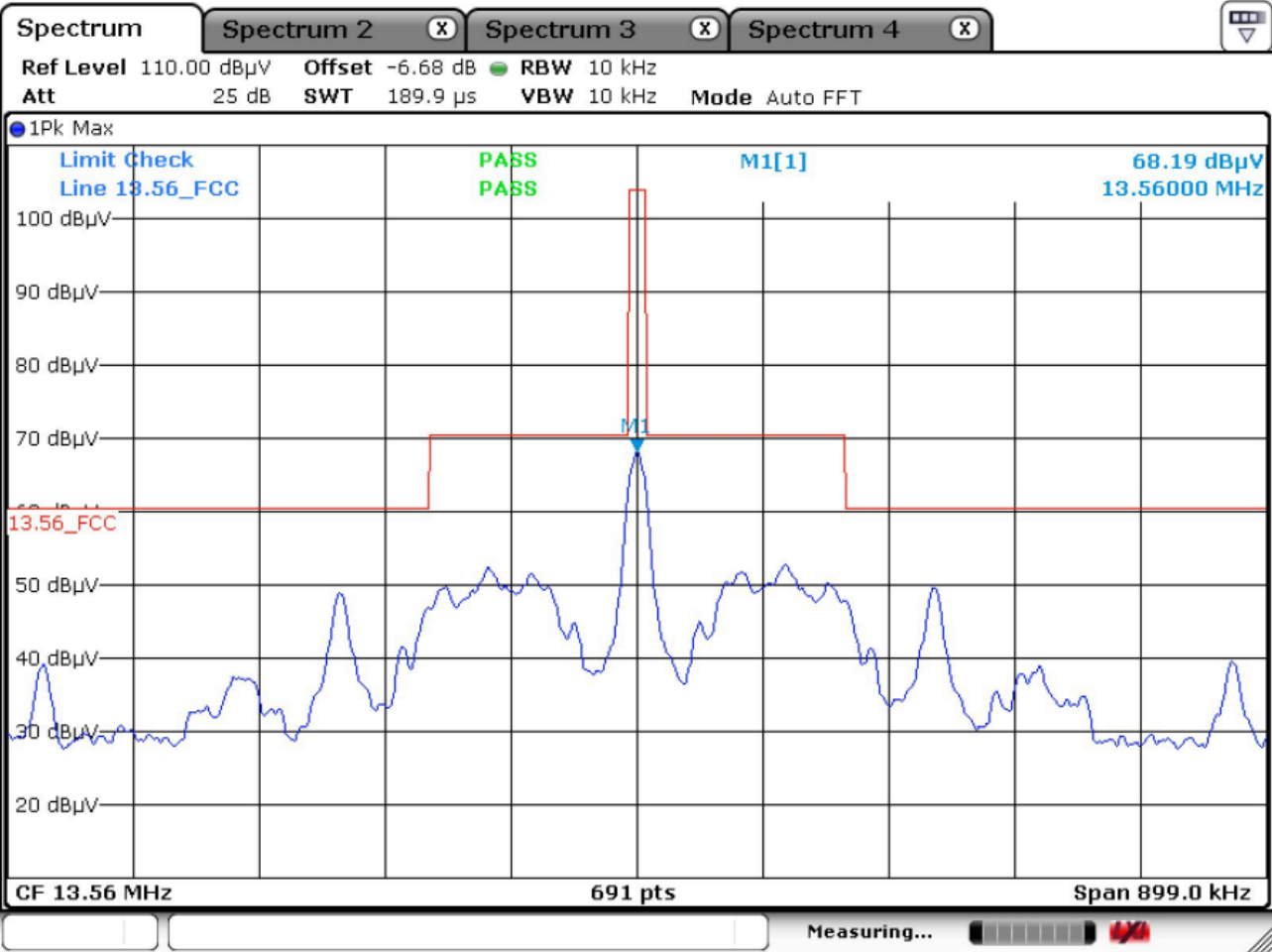
T.F(Total Factor) = Antenna Factor + Cable Loss – Amp Gain

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)
32.10	V	41.20	-17.40	23.80	40.00	16.20
40.80	V	39.00	-16.26	22.74	40.00	17.26
44.30	V	40.60	-15.98	24.62	40.00	15.38
55.20	V	33.00	-16.23	16.77	40.00	23.23
150.40	V	32.80	-12.92	19.88	43.50	23.62
912.20	H	23.10	8.84	31.94	46.00	14.06

-- 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:**

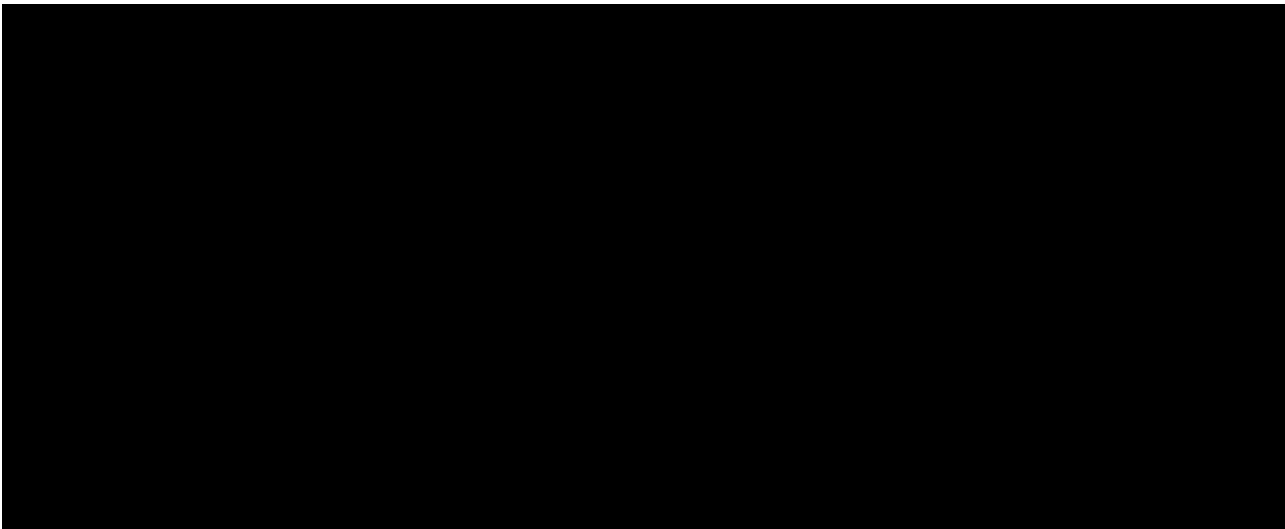
The temperature test was started after the temperature stabilization time of 30 minutes.

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

**Measurement Data:**

**OPERATING FREQUENCY:** 13,561,450 **Hz**  
**Freq. Tolerance Limit:** ± 0.01 **%**

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100	3.700	-20	13,561,675	-0.000017
100		-10	13,561,631	-0.000013
100		0	13,561,531	-0.000006
100		10	13,561,511	-0.000004
100		20	13,561,450	0.000000
100		30	13,561,408	0.000003
100		40	13,561,392	0.000004
100		50	13,561,376	0.000005
85		3.145	20	13,561,508
115	4.255	20	13,561,569	-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**

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

#### 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

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

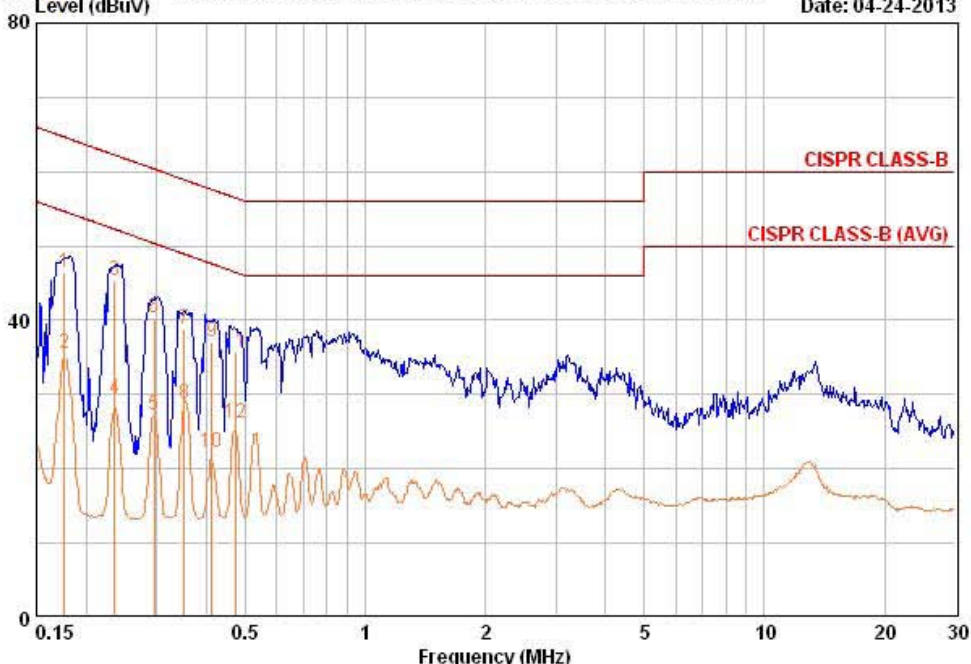
**Radiated Emissions – RFID mode - LINE**



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EUT / Model No. : BP70	Phase : LINE
Test Mode : RFID mode	Test Power : 120 / 60
Temp./Humi. : 21 / 46	Test Engineer : PARK H W

Data: 192 Level (dBuV) File: C:\Conducted Data\2013\LTA\_Conduction\_1304-3.EMI (378) Date: 04-24-2013



Freq MHz	RD		C.F	Result		Limit		Margin	
	QP dBuV	AV dBuV		QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.176	36.95	25.95	9.58	46.53	35.53	64.67	54.67	18.15	19.15
0.236	35.85	19.95	9.58	45.43	29.53	62.24	52.24	16.81	22.71
0.296	30.65	17.75	9.58	40.23	27.33	60.35	50.35	20.12	23.02
0.352	29.25	19.25	9.58	38.83	28.83	58.92	48.92	20.09	20.09
0.412	27.55	12.65	9.58	37.13	22.23	57.61	47.61	20.48	25.38
0.472	26.25	16.65	9.58	35.83	26.23	56.48	46.48	20.65	20.25

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

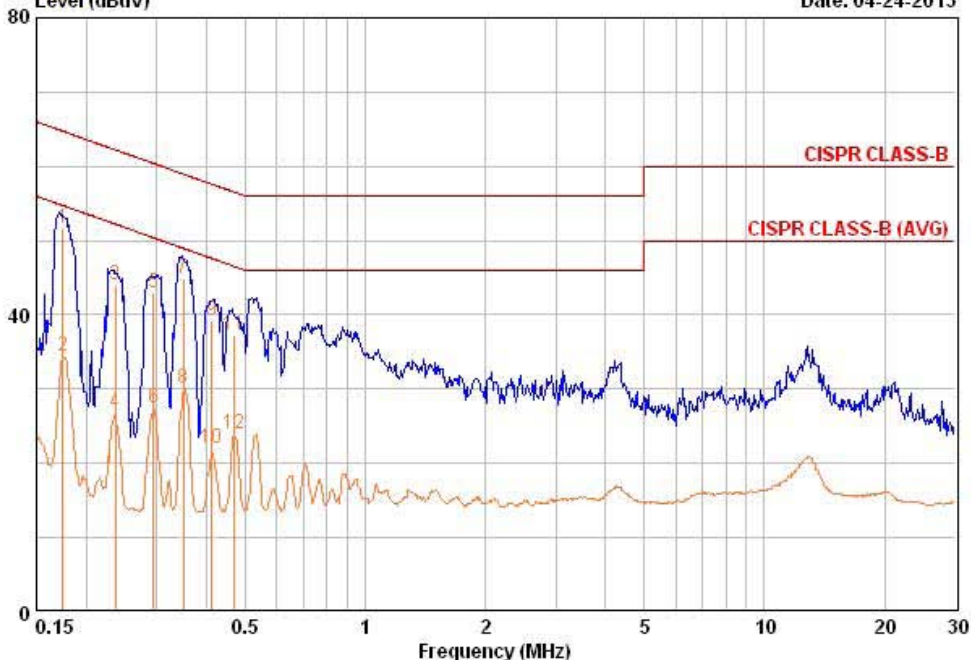
**Radiated Emissions – RFID mode - NEUTRAL**



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EUT / Model No. : BP70 Phase : NEUTRAL  
 Test Mode : RFID mode Test Power : 120 / 60  
 Temp./Humi. : 21 / 46 Test Engineer : PARK H W

Data: 194 File: C:\Conducted Data\2013\LTA\_Conduction\_1304-3.EMI (378) Date: 04-24-2013



Freq MHz	RD		C.F	Result		Limit		Margin	
	QP dBuV	AV dBuV		QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.175	42.05	24.85	9.59	51.64	34.44	64.72	54.72	13.08	20.28
0.237	34.45	17.15	9.58	44.03	26.73	62.20	52.20	18.17	25.47
0.295	33.25	17.85	9.59	42.84	27.44	60.38	50.38	17.55	22.95
0.351	35.35	20.55	9.60	44.95	30.15	58.94	48.94	13.99	18.79
0.413	29.65	12.45	9.61	39.26	22.06	57.59	47.59	18.33	25.53
0.467	27.75	14.45	9.62	37.37	24.07	56.57	46.57	19.20	22.50

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

APPENDIX

**TEST EQUIPMENT USED FOR TESTS**

	Description	Model No.	Serial No.	Manufacturer	Expiration date of Calibration
1	Spectrum Analyzer	FSV-30	100757	R&S	2014-01-15
2	Spectrum Analyzer	8594E	3649A03649	HP	2014-03-26
3	Spectrum Analyzer	8563E	3425A02505	HP	2014-03-26
4	VECTOR SIGNAL GENERATOR (~6GHz)	8648C	3623A02597	HP	2014-03-25
5	Signal Generator	83711B	US34490456	HP	2014-03-25
6	Attenuator (3dB)	8491A	37822	HP	2014-09-22
7	Attenuator (10dB)	8491A	63196	HP	2014-09-22
8	Test Receiver	ESHS10	828404/009	R&S	2014-03-25
9	EMI Test Receiver	ESCI7	100722	R&S	2013-09-22
10	RF Amplifier	8447D OPT 010	2944A07684	HP	2014-09-22
11	RF Amplifier	8449B	3008A02126	HP	2014-03-25
12	Horn Antenna (1~18GHz)	3115	114105	ETS	2014-01-26
13	DRG Horn (Small) (18~40GHz)	3116B	81109	ETS-Lindgren	2014-03-15
14	DRG Horn (Small) (18~40GHz)	3116B	133350	ETS-Lindgren	2014-03-15
15	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2014-09-20
16	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2013-10-12
17	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
18	Power Divider	11636A	06243	HP	2014-09-22
19	DC Power Supply	6674A	3637A01657	Agilent	-
20	Frequency Counter	5342A	2826A12411	HP	2014-03-25
21	Power Meter	EPM-441A	GB32481702	HP	2014-03-25
22	Power Sensor	8481A	US41030291	HP	2013-09-22
23	Audio Analyzer	8903B	3729A18901	HP	2013-09-22
24	Modulation Analyzer	8901B	3749A05878	HP	2013-09-22
25	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	2013-09-22
26	Stop Watch	HS-3	601Q09R	CASIO	2014-03-26
27	LISN	ENV216	100408	R&S	2013-09-22
28	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2014-06-27
29	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-
30	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-
31	Active Loop Antenna	FMZB 1519	1519-031	SCHWARZBECK	2014-12-14