

Dates of Tests: June 17 ~ July 12, 2013

Test Report S/N: LR500111307F

Test Site : LTA Co., Ltd.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**2AAM9AB700**

APPLICANT

**Futureid Co.,Ltd.**

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	Industrial PDA
Manufacturer	:	Futureid Co.,Ltd.
Model name	:	AB700
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2003
Frequency Range	:	2412MHz ~ 2462MHz
Max. Output Power	:	Max 13.09dBm - Conducted (802.11b) Max 12.83dBm - Conducted (802.11g)
Data of issue	:	July 15, 2013

This test report is issued under the authority of:



Jae-Ho Lee, Manager

The test was supervised by:



Young-Jin 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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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

## **2-1 Manufacturer**

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

### 2-3 Tested frequency

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### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.209	Field Strength of Harmonics	Emission	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	C
15.203	Antenna requirement	-	-	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.

#### → Antenna Requirement

The Futureid Co.,Ltd. FCC ID: 2AAM9AB700 unit complies with the requirement of §15.203. The antenna is connected to inside of EUT. And type is Chip antenna.

The sample was tested according to the following specification:

\*FCC Parts 15.247; ANSI C-63.4-2003

\*FCC KDB Publication No. 558074 D01 DTS Meas. Guidance V02

\*FCC TCB Workshop 2012, April

## 3.2 Technical Characteristics Test

### 3.2.1 Conducted Output Power

802.11b			
DATA RATE	OUTPUT POWER (dBm)		
	CH1	CH6	CH11
1	13.04	13.93	12.58
2	13.05	13.89	12.58
5.5	15.02	15.99	14.69
11	16.01	16.09	15.51

DATA RATE	OUTPUT POWER (dBm)		
	CH1	CH6	CH11
6	13.26	15.37	12.95
9	13.56	15.55	13.13
12	13.76	16.19	13.49
18	13.99	16.22	13.54
24	14.12	16.27	13.78
36	14.26	16.34	13.96
48	14.42	16.39	14.20
54	14.63	16.43	14.33

We found out the test mode with the highest power level after we analyzer all the data rates. So we chose 802.11b/g as a representative

### 3.2.2 Field Strength of Harmonics

#### Procedure:

\* The testing follows TCB Workshop 2012, April and fulfills ANSI C63.4-2003 and the guidelines in ANSI

C63.10-2009 test requirement. 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 = 9 KHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30 MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

Trace = max hold

Peak:VBW  $\geq$  RBW

Average:VBW=10Hz

Detector function = Peak and Average

Sweep = auto

#### Measurement Data: Complies

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20dB below limit.
- The three antennas were used with this EUT during the Testing.

#### Minimum Standard: FCC Part 15.109

Frequency (MHz)	Limit (uV/m) @ 10m
0.009 ~ 0.490	2400/F (kHz) @ 300m
0.490 ~ 1.705	24000/F (kHz) @ 30m
1.705 ~ 30	30 @ 30m
30 ~ 88	90
88 ~ 216	150
216 ~ 960	210
Above 960	300

\*\* 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.

**802.11b Measurement Data: (above 1GHz)**

Frequency  [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain+Cable	AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4824	41.5	54.3	V	33.1	32.7	54.0	74.0	41.9	54.7	12.1	19.3
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency  [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain+Cable	AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4874	43.2	57.9	V	33.1	32.7	54.0	74.0	43.6	58.3	10.4	15.7
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency  [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain+Cable	AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4924	40.1	52.7	V	33.1	32.7	54	74	40.5	53.1	13.5	20.9
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

**802.11b Measurement Data: (9kHz - 30MHz)**

Frequency  [MHz]	Reading  [dBuV/m]		Pol.	Correction  Factor		Limits  [dBuV/m]		Result  [dBuV/m]		Margin  [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak	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.



**802.11g Measurement Data: (above 1GHz)**

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain+Cable						
4825	37.7	49.1	V	33.1	32.7	54.0	74.0	38.1	49.5	15.9	24.5
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
4874	39.5	53.7	V	33.1	32.7	54.0	74.0	39.9	54.1	14.1	19.9
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
4924	36.3	47.2	V	33.1	32.7	54.0	74.0	36.7	47.6	17.3	26.4
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

**802.11g Measurement Data: (9kHz - 30MHz)**

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain+Cable						
-	-	-	-	-	-	-	-	-	-	-	-
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 –Wi-Fi mode**

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EUT/Model No.: AB700

TEST MODE: Wi-Fi mode

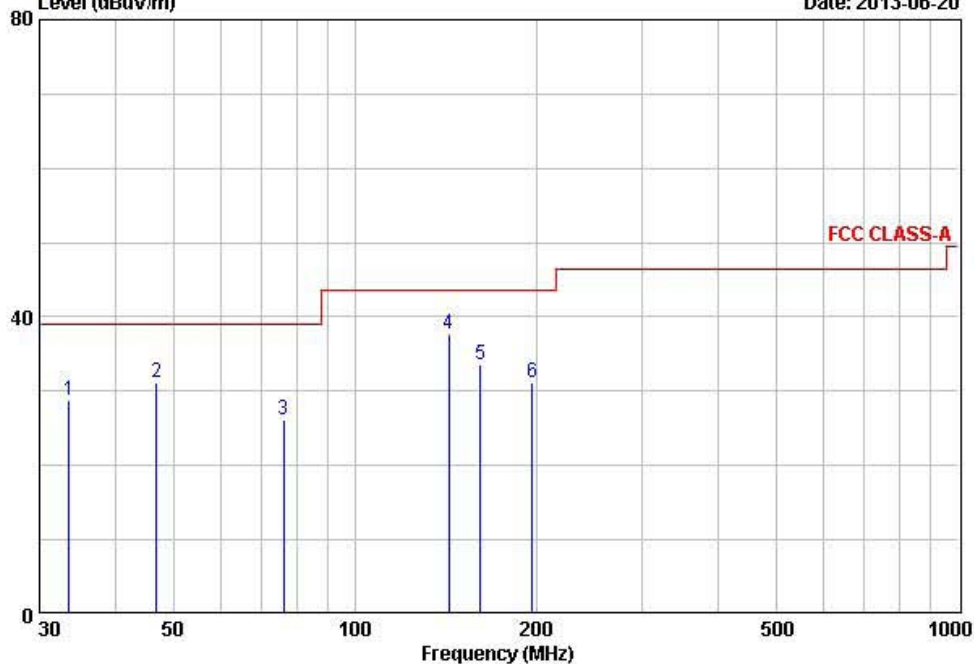
Temp Humi : 24 / 59

Tested by: PARK H W

Data: 50

Level (dBuV/m)

Date: 2013-06-20



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	QP	dB	cm	deg	
1	33.59	45.30	-16.59	28.71	39.00	10.29	400	102	HORIZONTAL
2	46.83	46.50	-15.27	31.23	39.00	7.77	100	209	VERTICAL
3	76.14	44.60	-18.35	26.25	39.00	12.75	400	214	HORIZONTAL
4	142.99	50.60	-12.92	37.68	43.50	5.82	100	155	VERTICAL
5	161.44	46.10	-12.44	33.66	43.50	9.84	400	331	HORIZONTAL
6	197.13	46.20	-14.93	31.27	43.50	12.23	400	289	HORIZONTAL

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

### 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 20dB below limit.

-

#### - Minimum Standard: FCC Part 15.107

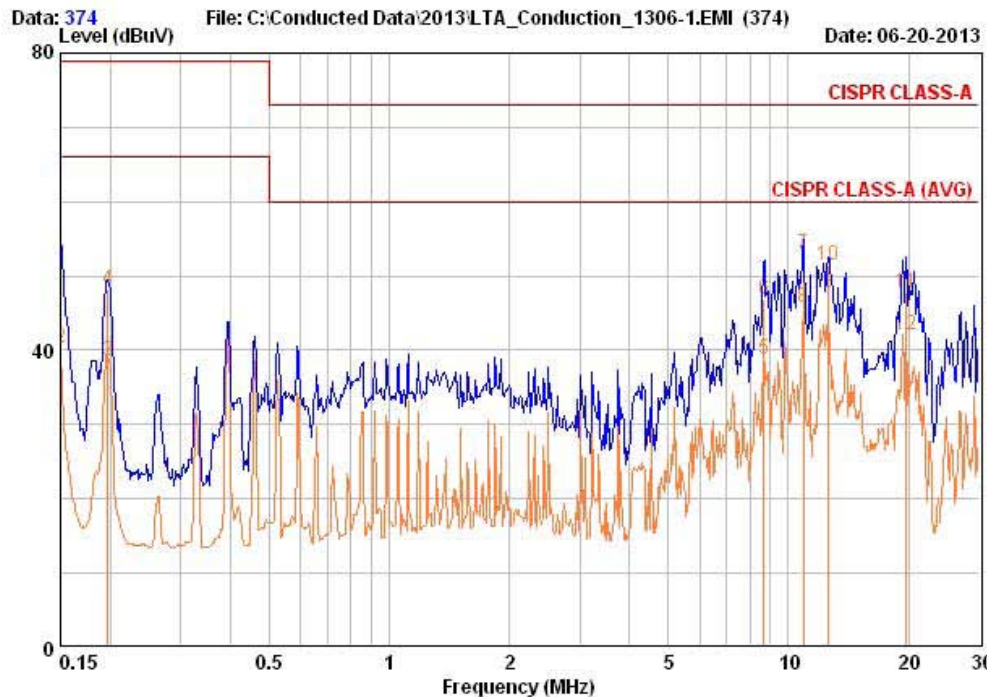
Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	79 dBuV	66 dBuV
0.5 ~ 30	73 dBuV	60 dBuV

- \* Decreases with the logarithm of the frequency

**Radiated Emissions – Wi-Fi mode - LINE**

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EUT / Model No. : AB700	Phase : LINE
Test Mode : Wi-Fi mode	Test Power : 120 / 60
Temp./Humi. : 24 / 54	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	42.14	30.74	9.58	51.72	40.32	79.00	66.00	27.28	25.68
0.197	38.55	28.95	9.58	48.13	38.53	79.00	66.00	30.87	27.47
8.697	36.98	28.98	9.83	46.81	38.81	73.00	60.00	26.19	21.19
10.916	43.09	36.09	9.79	52.88	45.88	73.00	60.00	20.12	14.12
12.590	41.70	38.00	9.78	51.47	47.77	73.00	60.00	21.53	12.23
19.670	37.93	32.33	9.77	47.70	42.10	73.00	60.00	25.30	17.90

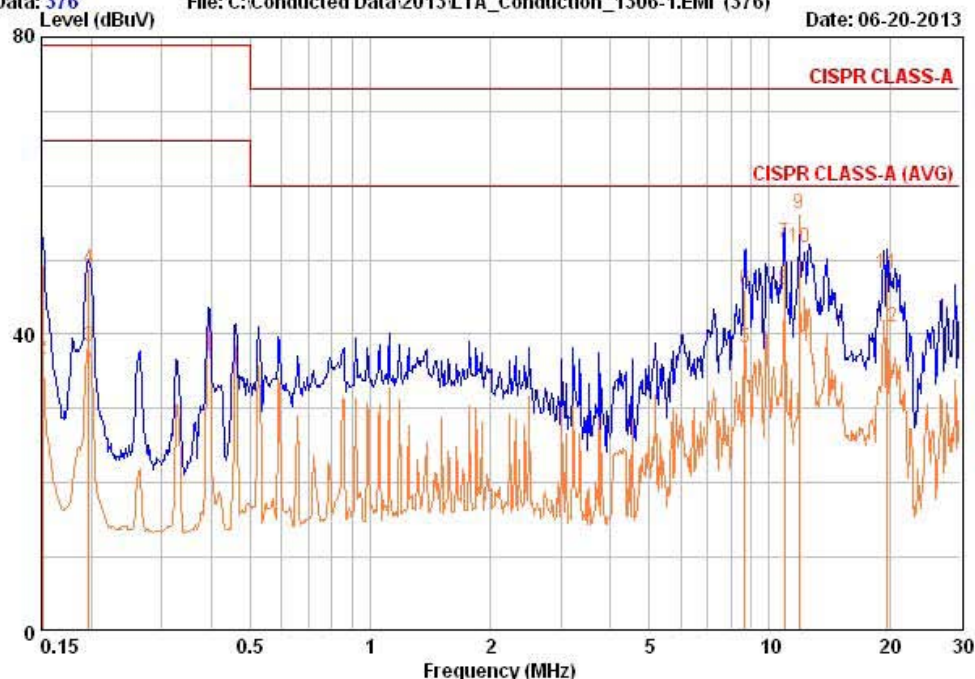
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

**Radiated Emissions – Wi-Fi mode - NEUTRAL**

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EUT / Model No. : AB700	Phase : NEUTRAL
Test Mode : Wi-Fi mode	Test Power : 120 / 60
Temp./Humi. : 24 / 54	Test Engineer : PARK H W

Data: 376 File: C:\Conducted Data\2013\LTA\_Conduction\_1306-1.EMI (376) Date: 06-20-2013



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
0.151	39.64	27.14	9.57	49.21	36.71	79.00	66.00	29.79	29.29
0.197	39.15	28.75	9.57	48.72	38.32	79.00	66.00	30.28	27.68
8.693	36.18	28.28	9.85	46.02	38.12	73.00	60.00	26.98	21.88
10.910	42.49	36.09	9.82	52.30	45.90	73.00	60.00	20.70	14.10
11.890	46.39	41.89	9.82	56.21	51.71	73.00	60.00	16.79	8.29
19.670	38.23	31.13	9.87	48.10	41.00	73.00	60.00	24.90	19.00

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