TEST REPORT

1. Applicant

Name	: Asiana IDT Co.,Ltd
Address	: Asiana Town #47, Osoe-Dong, Gangseo-Gu, Seoul 157-713, Korea

2. Products

Name	: UHF-Band RFID Tag(Low Power Transceiver-Rx Verified)
Model/Type	: 433 MHz Active Tag AI-TA-3A
Manufacturer	: Victek Co.,Ltd

3. Test Standard	: FCC CFR 47 Part 15, Subpart C section 15.240
4. Test Method	: ANSI C63.4-2003
5. Test Result	: Positive
6. Date of Application	: October 01, 2007
7. Date of Issue	: October 10, 2007

Tested by

Sung-Kyu Cho
Telecommunication Team
Engineer

Approved by

Seok-Jin Kim
Telecommunication Team
Manager

Korea Testing Laboratory

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Ⅰ. GENERAL INFORMATIONS

1.1 Applicant (Client)

Name	Asiana IDT Co.,Ltd
Address	Asiana Town #47, Osoe-Dong, Gangseo-Gu, Seoul 157-713, Korea
Contact Person	Ho Jeong ko
Telephone No.	+82-2-2669-5274
Facsimile No.	+82-2-2669-5280
E-mail address	microsite@lycos.co.kr

1.2 Equipment (EUT)

Type of equipment	UHF-Band RFID Tag (Low Power Transceiver-Rx Verified)
Model Name	433 MHz Active Tag AI-TA-3A
FCC ID	VDZAI-TA-3A
Operating Frequency	433.92 MHz
Date rate	27.7 kbps
Sensitivity	-95 dBm
Type of Signal	Pulse Code Signal
Power Source	DC 3.6V (Battery)
Manufacturer Name	Victek Co.,Ltd
Manufacturer Address	349 Gakpyung-ri Majang-myun Ichon-si Kyuggi-do, Korea 467-811.

1.3 Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 516 Haean-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901 Korea
Test Engineer	Sungkyu Cho
Telephone number	+82 31 500 0132
Facsimile number	+82 31 500 0159
E-mail address	skcho@ktl.re.kr
Other Comments	--

Ⅱ. SUMMARY OF TEST RESULTS

The 2W8000FMR has been found to conform as detailed below.

FCC	Test Requirements	Result
15.240(b)	Transmitter field strength & spurious Emissions	Pass
15.240(b)	Automatically limiting operation	Pass

Ⅲ. TEST RESULTS

3.1. Transmitter field strength & spurious Emissions (FCC Part 15.240)

3.1.1 Test procedure

3.1.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 18 GHz) was placed at the distance of 1 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT while rotating the table and varying antenna height.

Emissions level from the EUT with various configurations were examined on a Spectrum Analyzer connected with an RF amplifier and graphed by a plotter.

3.1.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.1.2. Photograph for the test configuration

3.1.3 Limit

detector	Limit	Result
Aveaage	11,000 ㎶/m at 3 m distance	Pass
Peak	55,000 ㎶/m at 3 m distance	Pass

3.1.4. Sample Calculation

The emission level measured in decibels above one microvolt (dB μV) was converted into microvolt per meter (μV/m) as shown in following sample calculation.

The field strengths were calculated as follows ;

E_{peak} (dB) = $E_{reading}$ (dB) + α_p + Ant. Factor & Cable Loss (dB)

To get the average voltage values in the one complete pulse train blanking intervals,

$$E_{averg.}(\mu V) = \frac{E_{peak}(\mu V) \times \text{Total pulse time of transmitter in the one complete pulse train (sec)}}{T_t \text{ (sec)}}$$

where,

Pulse desensitization (α_p) = 20log(τ_{eff} x B x K), HP AN150-2
= 0 (See 1.4)

Total pulse time of transmitter in the one complete pulse train (maximum value) = 5.4 msec (See the graph of page 10)

One complete pulse train time including blanking interval (T_t) = 100 msec (See the graph of page 10)

For example :

the average values at 433.92 MHz

Spectrum Analyzer measured values	: 74.0	dBμV
- Preamplifier	: 0.0	dB
+ Pulse Desensitization (α_p)	: 0.0	dB
+ Ant.Factor & Cable Loss	: 17.3	dB/m
Voltage Peak Levels	: 91.3	dBμV/m
	(= 36728.2	μV/m)

Voltage Average Levels

$$= \frac{E_{peak} \times \text{Total pulse time of transmitter in the one complete pulse train}}{T_t}$$

$$= \frac{36728.2\ \mu V/m \times 5.4\ msec}{100\ msec} = 1983.3\ \mu V/m = 65.9\ dB\mu V/m$$

3.1.5. Measurement Data

- Resolution Bandwidth : _x_ Peak (3 dB Bandwidth : 100 kHz for ranges under 1 GHz)
  _x_ Peak (3 dB Bandwidth : 100 kHz for ranges over 1 GHz)
- Measurement Distance : 3 Meter
- Measurement Frequency : 30 MHz ~ 1000 MHz

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB/m)	* A.G. (dB)	* D.C.F. (dB)	Emission Level		Limit (dBμV/m)	** Margin (dB)
							Peak (dBμV/m)	Average (dBμV/m)		
433.92	P	H	74.0	17.3	0.0	0.0	91.3	65.9	94.8	-3.5
433.92	P	V	70.6	17.3	0.0	0.0	87.9	62.5	94.8	-6.9
867.77	P	H	36.3	26.5	0.0	0.0	62.8	37.4	74.0	-11.2
867.77	P	V	36.3	26.5	0.0	0.0	62.8	37.4	74.0	-11.2
1301.90	P	H	69.0	29.8	-30.3	0.0	68.5	43.1	74.0	-5.5
1301.90	P	V	63.1	29.8	-30.3	0.0	62.6	37.2	74.0	-11.4
1735.93	P	H	51.5	32.2	-30.2	0.0	53.5	28.1	74.0	-20.5
2169.40	P	H	63.9	31.7	-30.2	0.0	65.4	40.0	74.0	-8.6
2169.40	P	V	64.1	31.7	-30.2	0.0	65.6	40.2	74.0	-8.4

Note

The observed EMI receiver(ESVS30) noise floor level was 2.0 dBμV. And all other emissions not reported on data were more than 25 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor
< : Less than

** Margin (dB) = Emission Level (dB) - Limit (dB)

Note ;

(1) Fundamental emissions from the intentional radiators were not located within any of frequency bands described in section 15.205(a) listed below ;

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.1775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

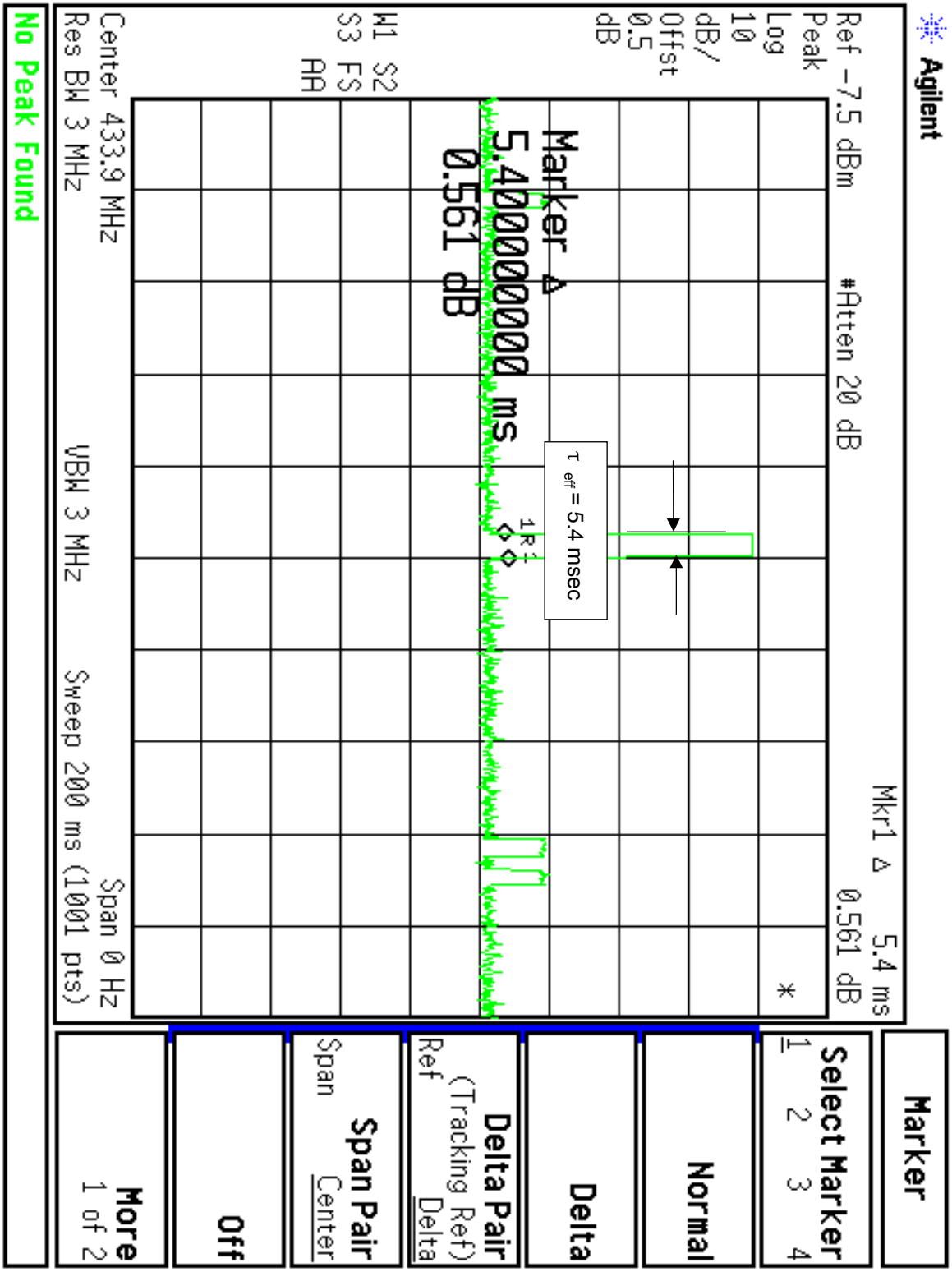
The field strength of emissions appearing within above frequency bands did not exceed the limits shown in section 15.209. At frequency equal to or less than 1000MHz, compliance with the limits section 15.209 was demonstrated using measurement employing a CISPR quasi-peak detector. Above 1000MHz, demonstrated based on the average value of the measured emissions.

(2) If the intentional radiator was operated under the radiated emission limits of the general requirements of section 15.209, it's fundamental emissions were not located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-860MHz.

(3) The level of any unwanted emissions from an intentional radiator did not exceed the level of the fundamental emission.

(4) Radiated and spurious emissions were checked from 30MHz to 3GHz. And all other emissions not reported on data were more than 20 dB below the permitted level.

3.2 Automatically limiting operation



Ⅳ. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 MHz ~ 1 GHz)	R&S	ESVS30	830516002	03/15/2007 ~ 03/15/2008
2	EMI Receiver (9 kHz ~ 3 GHz)	R&S	ESCI	100076	03/28/2007 ~ 03/28/2008
3	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2006 ~ 12/01/2007
4	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	02/26/2007 ~ 02/26/2008
5	Test Receicer (9 kHz ~ 30 MHz)	R&S	ESH3	860905001	06/18/2007 ~ 06/18/2008
6	Pre-Amplifier (100 kHz ~ 3 GHz)	H.P.	8347A	2834A00543	05/19/2007 ~ 05/19/2008
7	Pre-Amplifier (1 GHz ~ 26.5 GHz)	H.P.	8449B	3008A00302	06/14/2007 ~ 06/14/2008
8	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	07/05/2007 ~ 07/05/2008
9	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-168	08/16/2007 ~ 08/16/2008
10	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	--	05/09/2007 ~ 05/09/2008
11	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2007 ~ 06/08/2008
12	Shielded Room (5.0 m x 4.5 m)	SIN-MYUNG	--	--	--
13	Signal Generator (250 kHz ~ 20 GHz)	Agilent	E8257D	MY44320379	01/02/2007 ~ 01/02/2008
14	DC Power Supply	Agilent	E4356A	MY41000296	10/01/2007 ~ 10/01/2007
15	Power Splitter	H.P.	11667A	21063	10/09/2006 ~ 10/09/2007
16	Power Meter	Agilent	E4417A	GB4129075	09/17/2006 ~ 09/17/2007
17	Attenuator	Weinschel	56-20	N8257	01/13/2007 ~ 01/13/2008
18	Oscillator	Kenwood	AG-203D	10040568	10/23/2006 ~ 10/23/2007

Appendix Ⅰ. Receiver Spurious Emissions (FCC Part15.109)

■ **Test Results**

- Resolution Bandwidth : _x_ CISPR Quasi-Peak (6 dB Bandwidth : 120 kHz)
  ___ Peak (3 dB Bandwidth : 100 kHz)
- Measurement Distance : 3 Meter
- Measurement Frequency : 30 MHz ~ 4.5 GHz

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB/m)	* A.G. (dB)	* D.C.F. (dB)	Emission Level		Limit (dBμV/m)	** Margin (dB)
							(dBμV/m)	(μV/m)		
211.0	Q	V	35.89	12.5	-32.8	0.0	15.6	6.0	43.5	-27.9
245.0	Q	V	35.57	13.8	-32.8	0.0	16.6	6.7	46.0	-29.4
335.6	Q	V	36.92	17.0	-32.8	0.0	21.1	11.4	46.0	-24.9
356.0	Q	V	38.61	17.5	-32.8	0.0	23.3	14.6	46.0	-22.7
361.4	Q	H	34.67	17.6	-32.8	0.0	19.5	9.4	46.0	-26.5

Note

The observed EMI receiver(ESVS30) noise floor level was 2.0 dBμV. And all other emissions not reported on data were more than 25 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor
< : Less than

** Margin (dB) = Emission Level (dB) - Limit (dB)