

TEST REPORT

1. Applicant

Name : KPC, Inc
Address : #SM413, Industry-Academy Co-Operation Building, Dong-A Univ, 840, Hadan2-Dong, Saha-Gu, Busan 604-714, Korea

2. Products

Name : PortScan
Model/Type : KT902
Manufacturer : TEKMO Co., Ltd.

3. Test Standard : FCC CFR 47 Part 15, Subpart C section 15.240

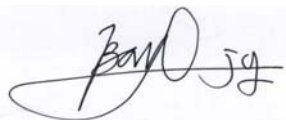
4. Test Method : ANSI C63.4-2003

5. Test Result : Positive

6. Date of Application : August. 10, 2009

7. Date of Issue : October. 28th, 2009

Tested by



Jong-Gon Ban

Telecommunication Center
Engineer

Approved by



Jeong-min Kim

Telecommunication Center
Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Korea Testing Laboratory

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1. GENERAL INFORMATION

1.1. Applicant (Client)

Name	KPC, Inc.
Address	#SM413, Industry-Academy Co-Operation Building, Dong-A Univ, 840, Hadan2-Dong, Saha-Gu, Busan 604-714, Korea
Contact Person	Kyong Soo, Kwon
Telephone No.	+82-51-203-2512
Facsimile No.	+82-51-203-2513
E-mail address	kskwon@kpcnet.com
Manufacturer Name	TEKMO Co., Ltd.
Manufacturer Address	705 World Meridian Venture Center-1 60-24, Gasan-Dong, Geumcheon-Gu, Seoul, 153-781, Korea

1.2. Equipment (EUT)

Type of equipment	433 MHz RFID Tag (Transceiver)
Model Name	KT902
FCC ID	T5A-KT902T
Frequency Band	433.92 MHz
EUT Modes of Operation	Transceiver
Type of Modulation	FSK
Number of Channels	1 channels
Input power supply	DC 3.6V Battery

1.3. Testing Laboratory

Testing Place	Korea Testing Laboratory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298A-1
Test Engineer	Jong-Gon Ban
Telephone number	+82 31 5000 133
Facsimile number	+82 31 5000 147
E-mail address	banjg@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for : KPC, Inc.

Equipment Under Test : KT902

Receipt of Test Sample : 2009. 10. 19

Test Start Date : 2009. 10. 20

Test End Date : 2009. 10. 23

The following table represents the list of measurements required under the FCC CFR 47 Part 15.240 and 15.215

FCC Rules	Description	Result	Comments
15.240 (b)	Field Strength measurement – Fundamental, Harmonic and Spurious	Complies	See Data sheets
15.240 (c)/ 15.209	General radiated emission limits	Complies	See Data sheets
15.215	Occupied Bandwidth emission	Complies	See Data sheets

Note1 : Test results reported in this document relate only to the items tested

Note2 : The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note3 : Test results apply only to the item(s) tested

* Modifications required for compliance

No modifications were implemented by KTL.

All results in this report pertain to the un-modified sample provided to KTL.

3. TEST FACILITY

3.1. Korea Testing Laboratory Location

All tests were conducted at Korea Testing Laboratory. The site address is 516 Hae-an-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901, KOREA. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1:1993 and ANSI C63.4: 2003. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.



The FCC registration number is 408324. The Industry Canada filing number for this site is 6298A-1.

3.2. Test Equipment

No.	Equipment	Manufacturer	Model	S/N	Effective Cal. Duration
1	EMI Receiver	R&S	ESIB26	100280	09/08/2010
2	Pre-Amplifier	Agilent	83017A	MY39500982	05/18/2010
3	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-179	04/06/2010
4	Horn Ant. (1 GHz ~ 18 GHz)	Agilent	E4448A	MY43360322	02/26/2010
5	Antenna Mast	Frankonia	FAM4	1101F4006	--
6	Spectrum Analyzer	Agilent	E4407B	US41443316	12/01/2009
7	Oscilloscope	Agilent	DSO44001104	MY44001104	03/16/2010

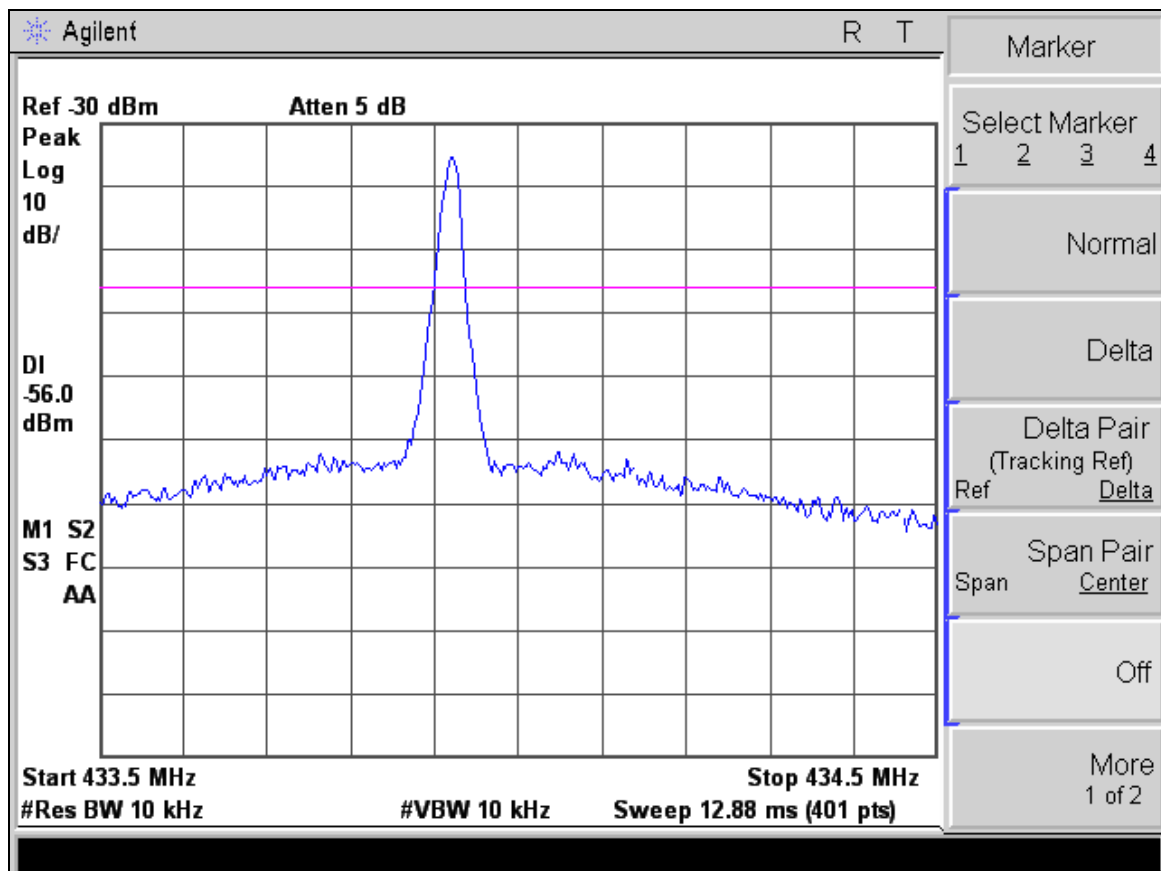
4. TEST RESULTS

4.1. Occupied Bandwidth measurement

4.1.1. Requirements of Bandwidth

The fundamental emission be kept with at least the central 80% of the permitted band.

4.1.2. Test Results



– Occupied Bandwidth plot (modulated mode) –

4.2. Radiated Spurious Emissions

4.2.1. Test Procedure

4.2.1.1 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 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.

The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

4.2.1.2 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.

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. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

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.

Tested in x, y, z axis and worst case results are reported . The worst case was founded in x axis.

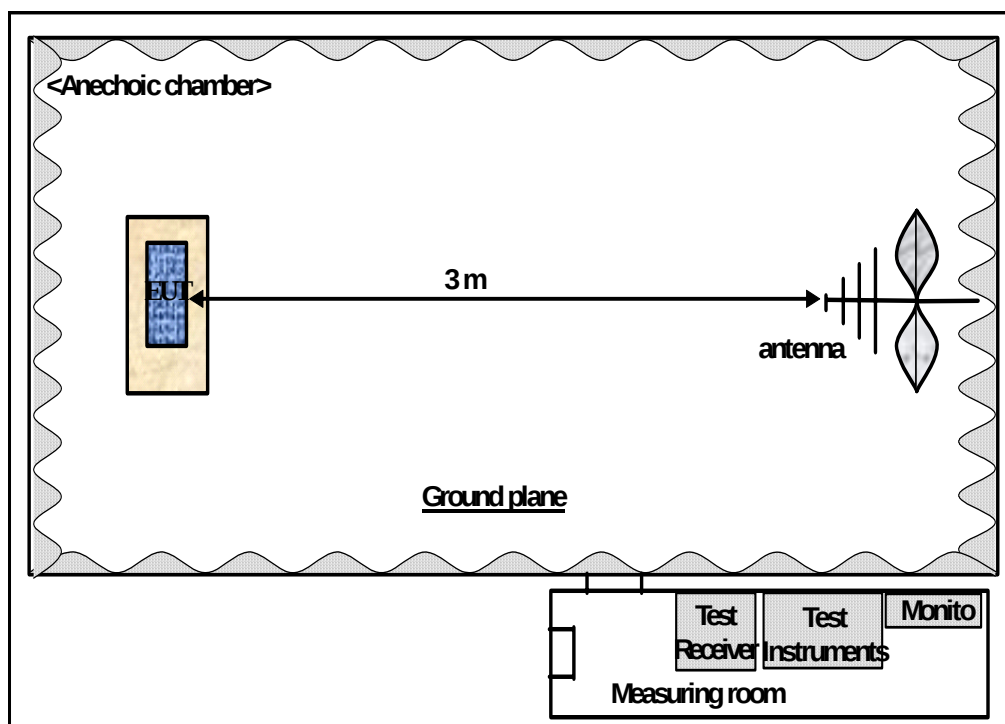
The maximum frequency range measuring with the spectrum from 30 MHz to 10th harmonic was investigated with the transmitter.

4.2.2. Limits

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following;

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts /meter)	
	Average detector	Peak detector
433.5-434.5 MHz	11,000	55,000

4.2.3. Test configuration



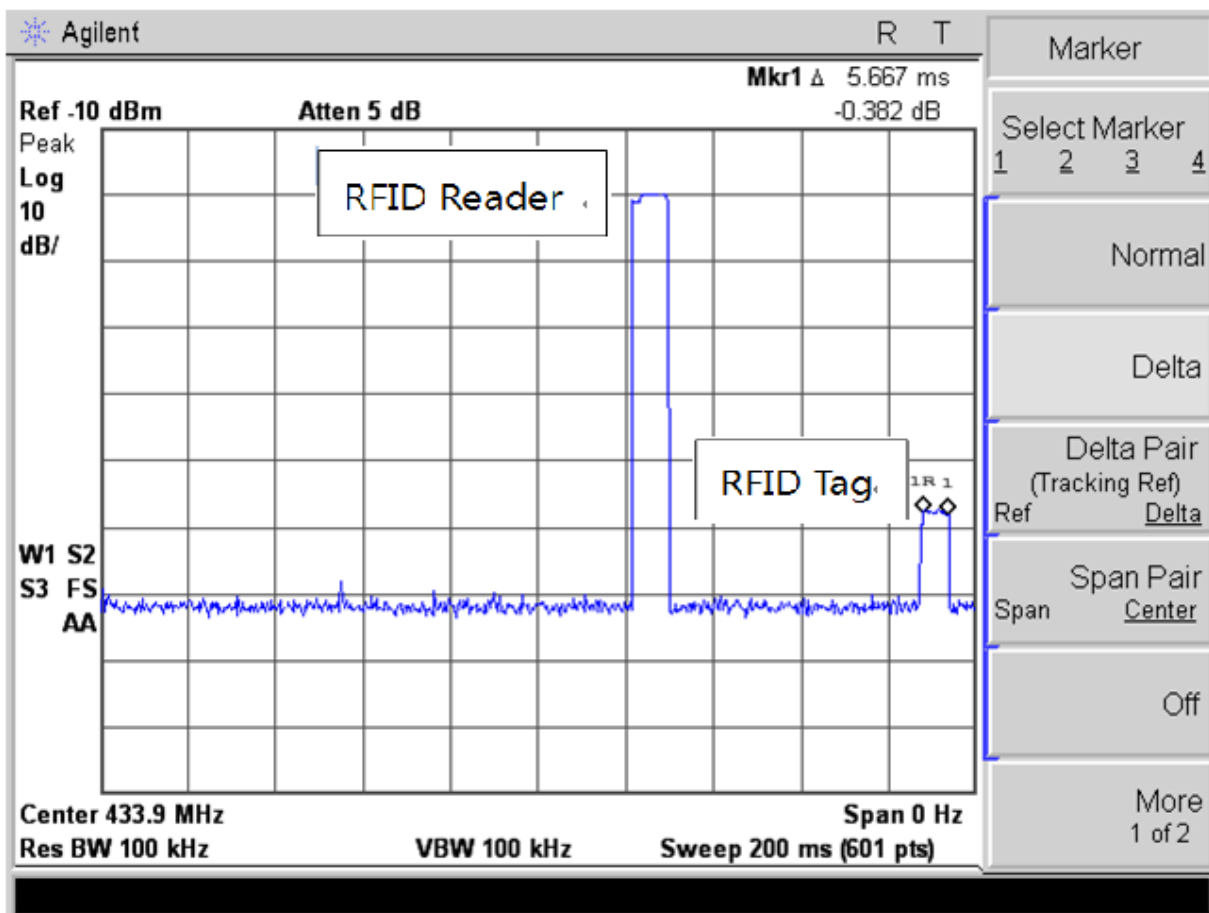
4.2.4. Calculation of Duty Cycle Correction Factor

The period of the pulse train is determined by observing it on a spectrum analyzer with zero frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train, which in this case is millisecond.

Total ON Time during 100 ms = 8 ms

Duty cycle correction factor = $20 \log (5.7 \text{ ms}/100\text{ms}) = -24.8$

Duty Cycle correction factor = -24.8 dB



– Duty cycle plot –

The duration of the tag transmission is 5.7 ms which complies with duration limit “ within 60 seconds”.
The tag transmits signal only after reception from the RFID reader’s signal.

4.2.5. Test Results

4.2.5.1 Spurious Radiated Emission

Frequency (MHz)	Antenna Pol. H/V	D.M	Reading Level (dBμV)	Correction (AF+CL) (dBμV/m)	A.G (dB)	D.C.F	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin +/-
433.92	V	P	70.1	16.3	0	--	86.4	94.8	8.4
433.92	V	A	70.1	16.3	0	-24.8	61.6	80.8	19.2
433.92	H	P	67.8	16.3	0	--	84.1	94.8	10.7
433.92	H	A	67.8	16.3	0	-24.8	59.3	80.8	21.5
867.84	V	Q	30.9	21.1	37.6	--	14.4	46.0	31.6
867.87	H	Q	48.5	21.1	37.6	--	32.0	46.0	14.0
2169.76	V	P	73.8	27.6	34.1	--	67.3	74.0	6.7
2169.76	V	A	73.8	27.6	34.1	-24.8	42.5	54.0	11.5
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Note : 1. Measurement was done over the frequency range from 30 MHz to 10th harmonic. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
2. The observed EMI Receiver (ESIB26) noise floor level was 2.0 dBμV. And all other emissions not reported on data were more than 40 dB below the permitted level.

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

Remark : Emission level (dBμV/m) = Reading level (dBμV) + Correction (dB/m) - Amplifier Gain (dB)
Margin (dB) = Limit (dBμV/m) – Emission level (dBμV/m)
The “+” sign of the margin means that emission level are within the limit and the “-” sign means over the limit.

Appendix.1 Test setup photo

