TEST REPORT

1. Applicant

Name	: KPC, Inc.
Address	: #830, Research Center for Industry Co-Operation, Dong-A Univ 840, Hadan2-Dong, Saha-Gu, Busan 604-714, Korea

2. Products

Name	: UHF Band RFID Reader (Low power transceiver - RX verfied)
Model/Type	: KR-951
Manufacturer	: KPC, Inc.

3. Test Standard/Method	: FCC Part 15, Subpart C
4. Test Results	: Positive
5. Use of Report	: -
6. Date of Application	: March 05, 2007
7. Date of Issue	: March 12, 2007

Tested by

Sung-Kyu Cho
Telecommunication Team
Engineer

Approved by

Seok-Jin Kim
Telecommunication Team
Manager

Korea Testing Laboratory

TABLE OF CONTENTS

I. GENERAL INFORMATION 3

1. Applicant(client)
2. Equipment(EUT)
3. Testing Laboratory

Ⅱ. GENERAL REQUIREMENTS OF EUT 4

1. Labelling Requiremetn
2. Information to user
3. Special Accessories
4. Antenna Requirements

Ⅲ. CONDUCTED EMISSION MEASUREMENT (Section 15.209) 5

1. Test Procedure
2. Photograph for the test configuration
3. Sample Calculation
4. Measurement Data

Ⅳ. RADIATED EMISSION MEASUREMENT (Section 15.209 & 240) 9

1. Test Procedure
2. Photograph for the test configuration
3. Sample Calculation
4. Measurement Data

Ⅴ. DURATION OF TRANSMISSION 13

Ⅵ. TEST EQUIPMENTS USED FOR MEASUREMENT 14

Ⅰ. GENERAL INFORMATIONS

1.1 Applicant (Client)

Name	KPC, Inc.
Address	#830, Research Center for Industry Co-Operation, Dong-A Univ 840, Hadan2-Dong, Saha-Gu, Busan 604-714, Korea
Contact Person	Hyun-chul, Kim
Telephone No.	+ 82-51-203-2512
Facsimile No.	+ 82-51-203-2513
E-mail address	hckim@kpcnet.com

1.2 Equipment (EUT)

Type of equipment	UHF Band RFID Reader (Low power transceiver – RX verfied)
Model Name	KR-951
FCC ID	T5A-KR951
Tunning Frequency	433.92 MHz
Modulation	Frequency Shift Keying
IF frequency	307.2 kHz
Data rate	27.8 Kbps
Air protocol	ISO/IEC 18000-7
Standard	FCC Part 15, Subpart C
Measuring Procedure	ANSI C63.4-2003
Manufacturer Name	KPC, Inc.
Manufacturer Address	#830, Research Center for Industry Co-Operation, Dong-A Univ 840, Hadan2-Dong, Saha-Gu, Busan 604-714, Korea

1.3 Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 222-13 Guro-dong, Guro-Gu, Seoul 152-848 Korea
Test Engineer	Sungkyu Cho
Telephone number	+82 2 860 1463
Facsimile number	+82 2 860 1468
E-mail address	skcho@ktl.re.kr
Other Comments	--

Ⅱ. GENERAL REQUIREMENTS OF THE EUT

1. Labelling Requirement (Section 15.19)

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.1 Location of Label : User' guide manual
1.2 How Applied : Printed

2. Information to User (Section 15.21)

The following or similar statements were provided in the manual for user instruction.
Please refer page 3 of the attached manual for details.

> CAUTION : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. Special Accessories (Section 15.27)

3.1 Were the special Accessories provided?
[ ] yes, [■] no

3.2 If yes, details for the special accessories are as follows :

3.3 If yes, were the appropriate instructions provided on the first page of the text concerned with the device?
[ ] yes, [ ] no

3.4 Are these accessories provided of the type which can be readily obtained from multiple retail outlets?
[ ] yes, [ ] no

And therefore does the manual specify what additional components or accessories are required to used in order to comply with the Rules?
[ ] yes, [ ] no

4. Antenna Requirements

Antenna connector type is TNC.
The following statements were provided in the manual.

> Professional installation is required. Installers are responsible for ensuring that the proper antenna is used as described in the FCC filing.

Ⅲ. CONDUCTED EMISSION MEASUREMENT (Section 15.207)

1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m x 3.1 m in size to maintain 40 cm from the rear of EUT

LISN(Line Impedance Stabilization Network, ROHDE & SCHWARZ, ESH3-Z5, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.

One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver (ROHDE & SCHWARZ, ESI, 20 Hz to 7 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.

The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESI, 20 Hz to 7 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph for the test configuration

3. Sample Calculation

The emission level measured in decibels above one microvolt (dBμV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

	Measured Value at 0.20 MHz	67.3 dBμV @ Q-Peak mode
+	Cable Losses *	0.0 dB
=	Conducted Emission	67.3 dBμV

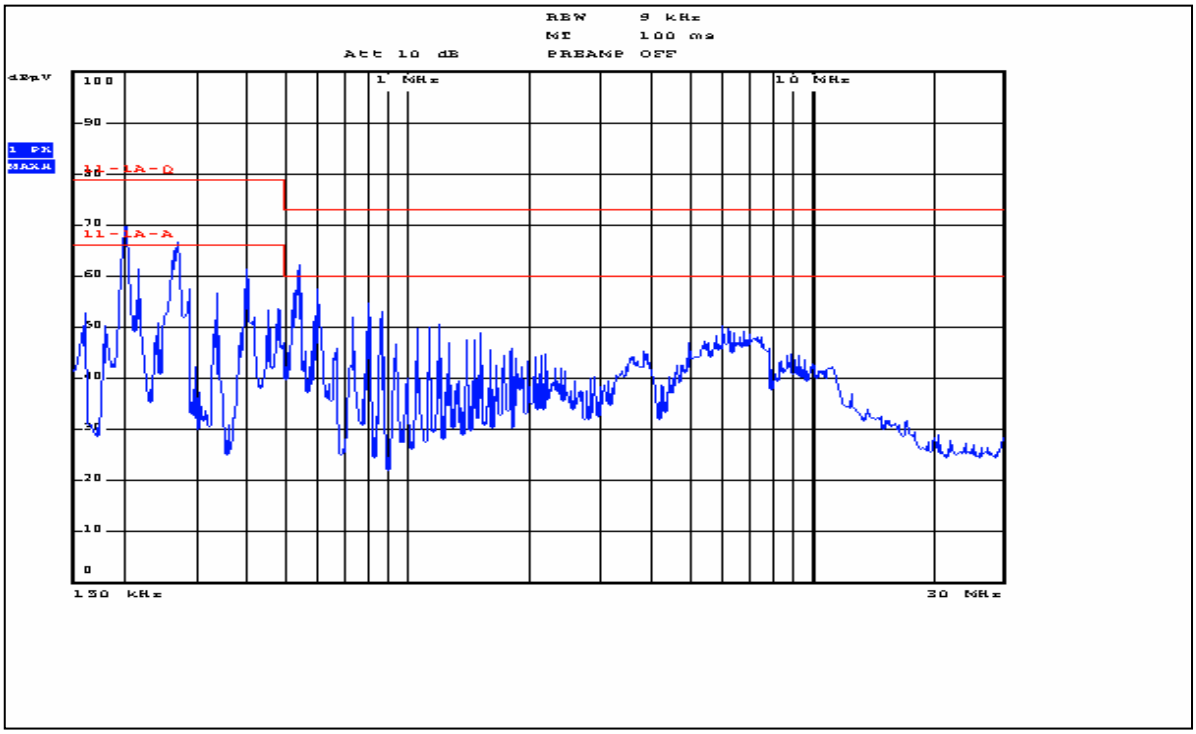
* In case of RG214/ RF cable 15 Ft, the loss is about 0.17 dB at the frequency of 30 MHz which is negligible.

4. Measurement Data

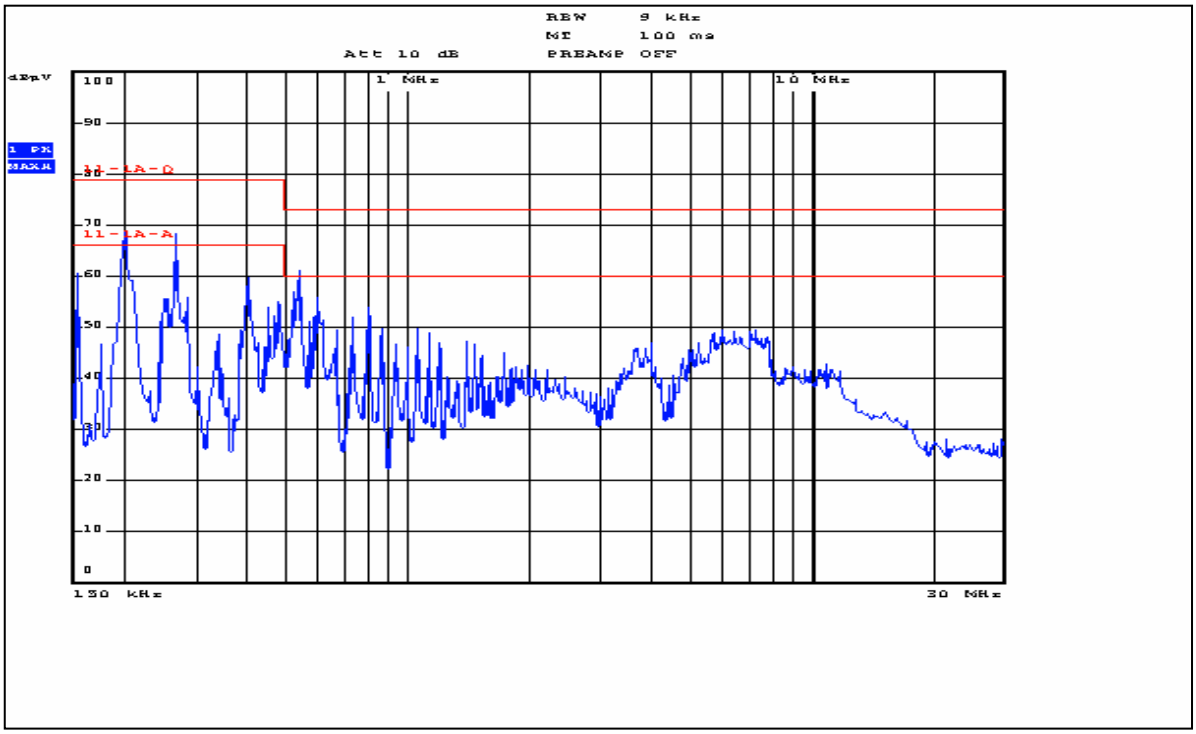
- Resolution Bandwidth : __x__ CISPR Quasi-Peak (6dB Bandwidth : 9 kHz)
  __x__ Average (6dB Bandwidth : 9 kHz)

Power Lead Tested	Frequency (MHz)	Emission Level		Limit		(*) Margin	
		Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)
Live to Ground	0.20	67.3	64.6	79.0	66.0	-11.7	-1.4
	0.27	61.1	57.0	79.0	66.0	-17.9	-9.0
	0.40	61.1	60.0	79.0	66.0	-17.9	-6.0
	0.53	60.6	59.2	73.0	60.0	-12.4	-0.8
	0.87	51.2	50.5	73.0	60.0	-21.8	-9.5
	6.79	42.4	39.3	73.0	60.0	-30.6	-20.7
Neutral to Ground	0.19	69.3	65.2	79.0	66.0	-9.7	-0.8
	0.27	67.6	63.2	79.0	66.0	-11.4	-2.8
	0.40	60.4	58.4	79.0	66.0	-18.6	-7.6
	0.60	58.3	56.4	73.0	60.0	-14.7	-3.6
	1.07	50.2	48.2	73.0	60.0	-22.8	-11.8
	6.46	37.0	32.0	73.0	60.0	-36.0	-28.0

Note : Refer to measured graphs on next page.
* Margin(dB) : Emission Level (dB) - Limit (dB)



(Test side: Live-Ground side)



(Test side: Neutral-Ground side)

Ⅳ. RADIATED EMISSION MEASUREMENT (Section 15.209 & 240)

1. Test Procedure

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.

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.

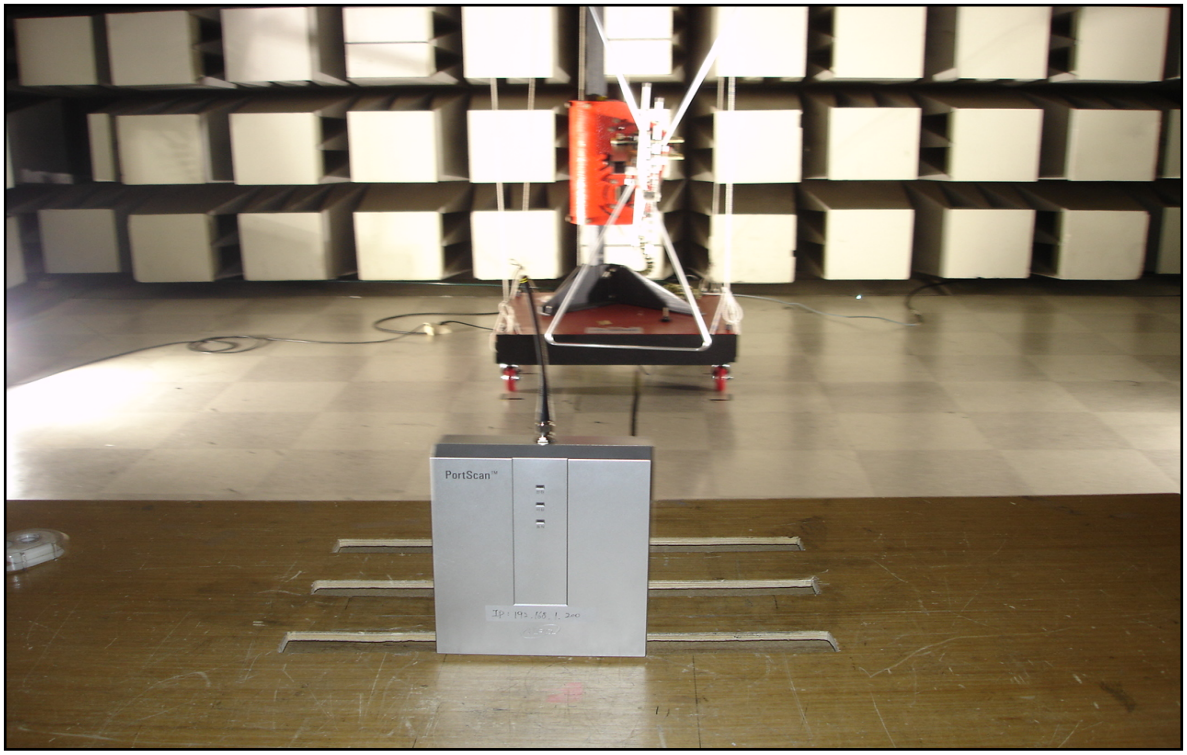
Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

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.

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.

2. Photograph for the test configuration



3. 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.

For example :

	Measured Value at 433.92 MHz	58.5 dB μV
+	Antenna Factor	16.0 dB/m
+	Cable Loss	2.7 dB
−	Preamplifier	0.0 dB
−	Distance Correction Factor *	0.0 dB
=	Radiated Emission	77.2 dB μV/m
		(= 7244.4 μV/m)

* Extrapolated from the measured distance to the specified distance by an inverse linear distance extrapolation.

4. Measurement Data

- Resolution Bandwidth : [■] Peak (3 dB Bandwidth : 100 kHz for below 1 GHz, 1 MHz for above 1 GHz)
  [■] Average (3 dB Bandwidth : 100 kHz for below 1 GHz, 1 MHz for above 1 GHz)
- Measurement Distance : 3 Meter
- Measurement Frequency : 30 MHz ~ 4400 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)
							(dBμV/m)	(μV/m)		
433.92	P	V	58.5	18.7	0.0	0.0	77.2	7244.4	94.8	-17.6
433.92	A	V	54.7	18.7	0.0	0.0	73.4	4666.6	80.8	-7.4
867.84	P	H	40.1	26.5	-31.5	0.0	35.1	56.6	46.0	-10.9
1301.76	P	H	< 36.6	29.8	-29.0	0.0	< 37.4	< 74.1	74.0	< -36.6
1301.76	A	H	< 36.6	29.8	-29.0	0.0	< 37.4	< 74.1	54.0	< -16.6

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.

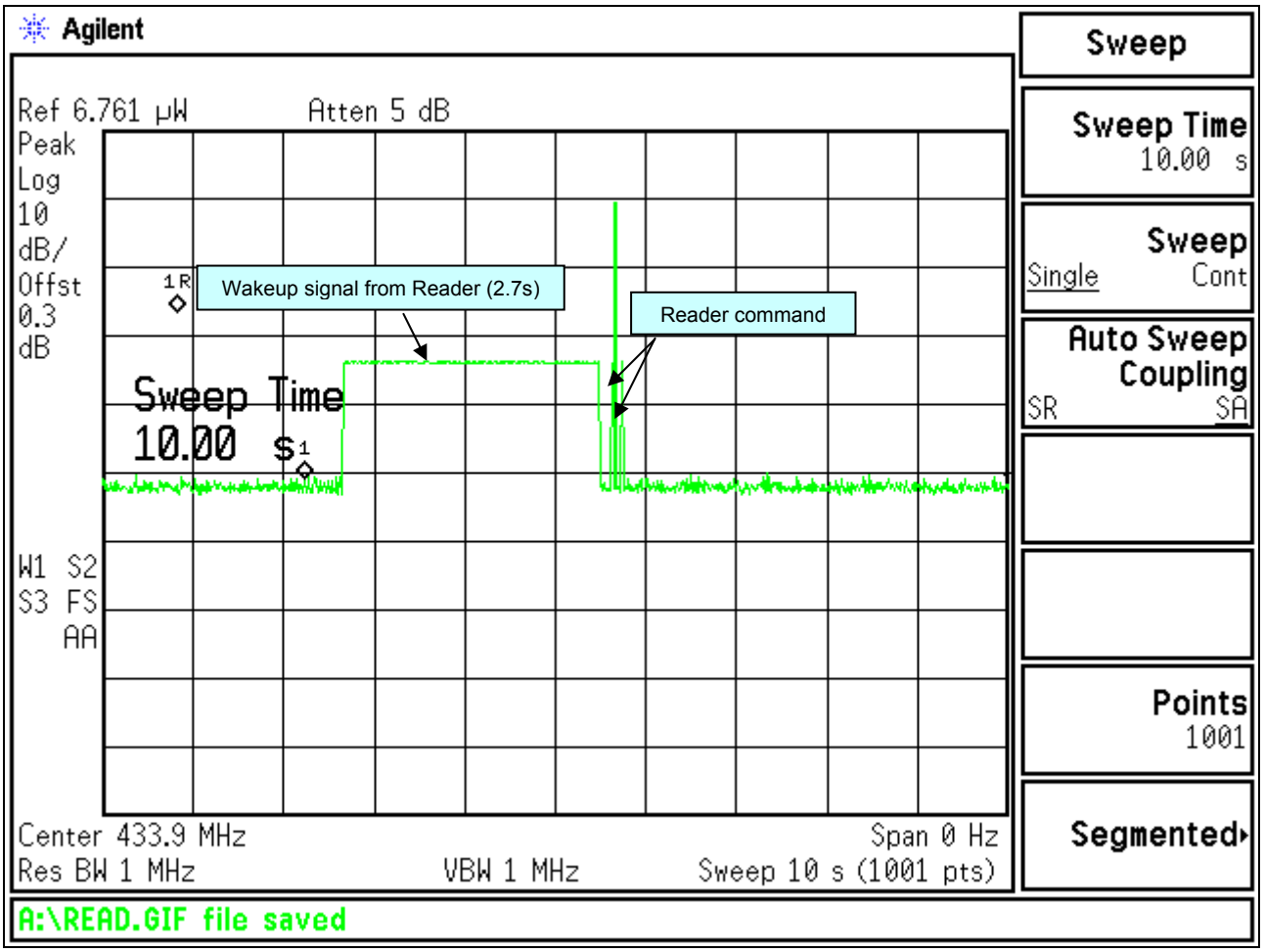
(4) Radiated and spurious emissions were checked from 30MHz to 3GHz. And all other emissions not reported on data were more than 20 dB below the permitted level.

Ⅴ. DURATION OF TRANSMISSIONS (Section 15.240(b))

1. Description

The maximum transmit time is about 2.7s.
The Reader is triggerd by the user to send transmissions under 15.240(b).
The client declare that a silent period is longer than 10s.

2. Operation plot



Ⅵ. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 MHz ~ 1 GHz)	R&S	ESVS30	830516002	03/15/2006 ~ 03/15/2007
2	EMI Receiver (9 kHz ~ 3 GHz)	R&S	ESCI	100076	03/28/2006 ~ 03/28/2007
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	02/26/2006 ~ 02/26/2007
5	Test Receicer (9 kHz ~ 30 MHz)	R&S	ESH3	860905001	06/18/2006 ~ 06/18/2007
6	Pre-Amplifier (100 kHz ~ 3 GHz)	H.P.	8347A	2834A00543	05/19/2006 ~ 05/19/2007
7	Pre-Amplifier (1 GHz ~ 26.5 GHz)	H.P.	8449B	3008A00302	06/14/2006 ~ 06/14/2007
8	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	07/05/2006 ~ 07/05/2007
9	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-168	08/16/2006 ~ 08/16/2007
10	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	--	05/09/2006 ~ 05/09/2007
11	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2006 ~ 06/08/2007
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	09/28/2006 ~ 09/28/2007
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	01/13/2006 ~ 01/13/2007
18	Oscillator	Kenwood	AG-203D	10040568	10/23/2006 ~ 10/23/2007