



Test Report

Product Name : HF RFID READER

Model No. : HNM001

FCC ID. : WQH-HNM001

Applicant : ClarIDy Solutions, Inc.

Address : 11F.,NO.8,Dunhua N.Rd.,Songshan District,Taiwan

Date of Receipt : 2008/09/16

Issued Date : 2008/10/24

Report No. : 089246R-RFUSP23V01

Version : V1.0

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuiTek Corporation.

Test Report Certification

Issued Date : 2008/10/24

Report No. : 089246R-RFUSP23V01

QuiTek

Product Name : HF RFID READER
Applicant : ClarIDy Solutions, Inc.
Address : 11F.,NO.8,Dunhua N.Rd.,Songshan District,Taiwan
Manufacturer : ClarIDy Solutions, Inc.
Model No. : HNM001
FCC ID. : WQH-HNM001
Rated Voltage : AC 120 V / 60 Hz
EUT Voltage : AC 120 V / 60 Hz
Trade Name : ClarIDy
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.225: 2007
Test Result : Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuiTek Corporation.

Documented By : Sandy Chuang

(Sandy Chuang / Engineering Adm. Assistant)

Reviewed By : Sheena Huang

(Sheena Huang / Engineer)

Approved By : Roy Wang

(Roy Wang / Manager)

TABLE OF CONTENTS

Description	Page
1. General Information	4
1.1. EUT Description	4
1.2. Operational Description	5
1.3. Test Mode	6
1.4. Tested System Details	7
1.5. Configuration of tested System	8
1.6. EUT Exercise Software	8
1.7. Test Facility	9
2. Conducted Emission	10
2.1. Test Equipment	10
2.2. Test Setup	10
2.3. Limits	11
2.4. Test Procedure	11
2.5. Test Specification	11
2.6. Uncertainty	11
2.7. Test Result	12
2.8. Test Photo	16
3. Radiated Emission	17
3.1. Test Equipment	17
3.2. Test Setup	17
3.3. Limits	18
3.4. Test Procedure	19
3.5. Test Specification	19
3.6. Uncertainty	19
3.7. Test Result	20
3.8. Test Photo	23
4. Frequency Tolerance	24
4.1. Test Equipment	24
4.2. Test Setup	24
4.3. Limits	24
4.4. Test Procedure	24
4.5. Test Specification	24
4.6. Uncertainty	24
4.7. Test Result	25
Attachment	26
EUT Photograph	26

1. General Information**1.1. EUT Description**

Product Name	HF RFID READER
Trade Name	ClarIDy
Model No.	HNM001
Frequency Range	13.56MHz±7kHz
Channel Number	1
Type of Modulation	ASK
Antenna Type	Loop

Component	
USB Cable	Shielded, 1.0m

Working Frequency of Each Channel	
Channel	Frequency
001	13.56MHz

Note:

1. This device is a HF RFID READER included a 13.56MHz±7kHz receiving function, a 13.56MHz±7kHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225 for spread spectrum devices.
3. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 089246R-RFUSP01V02 under Declaration of Conformity.

1.3. Test Mode

QuiTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
EMI	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

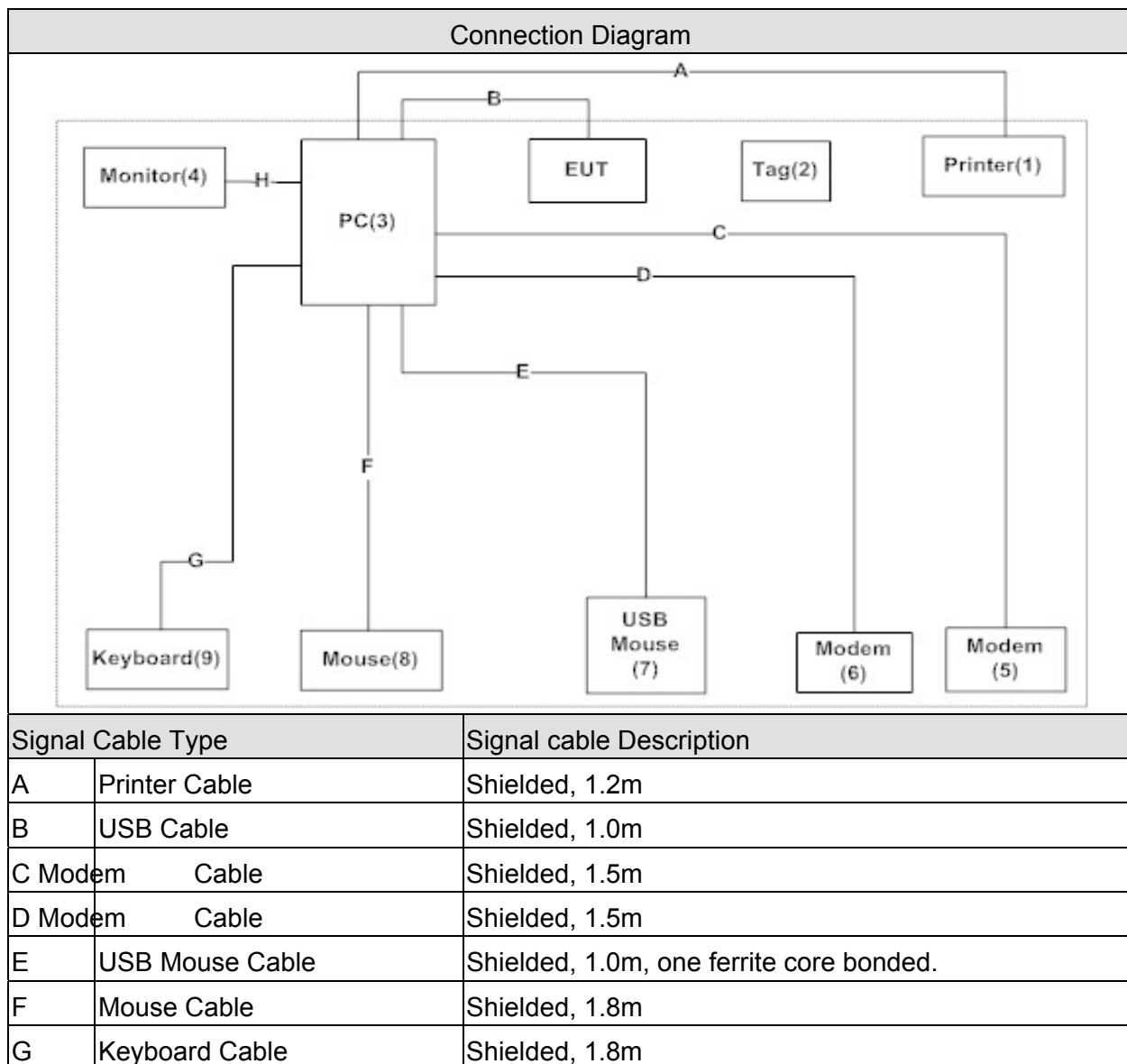
Emission	
Conducted Emission	Yes
Radiated Emission	Yes
Band Edge	No
Frequency Tolerance	Yes

1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Printer	HP	C2642A	MY75N1D2BC	DoC	Non-shielded, 0.7m
2 Tag	unitech	ISO 15693	N/A	DoC	--
3 PC	ASUS	P2L97	AS10233	DoC	Non-shielded, 1.8m
4 Monitor	CHI MEI	A170E1-09	3UC120955CA0019	DoC	Non-shielded, 1.8m
5 Modem	ACEEX	DM-1414	0102027545	DoC	Non-shielded, 1.6m
6 Modem	ACEEX	DM-1414	0102027544	DoC	Non-shielded, 1.6m
7 USB Mouse	Logitech	M-UV83	LZE35006044	DoC	--
8 Mouse Logitech		M-SBF83	HCA52200184	DoC	--
9 Keyboard	Logitech	Y-SM46	SY525U18099	DoC	--

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.5.
2	Turn on the power of all equipment.
3	Data will communicate between the tag and the reader.
4	The personal computer's monitor will show the continue transmitting characteristics when the communication is success.
5	Repeat at the above procedure (3) to (4)

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	Radiated Emission	15 - 35	24
Humidity (%RH)		25 - 75	59
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	Frequency Tolerance	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

January 24, 2005 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520



Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2010



Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2009



Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

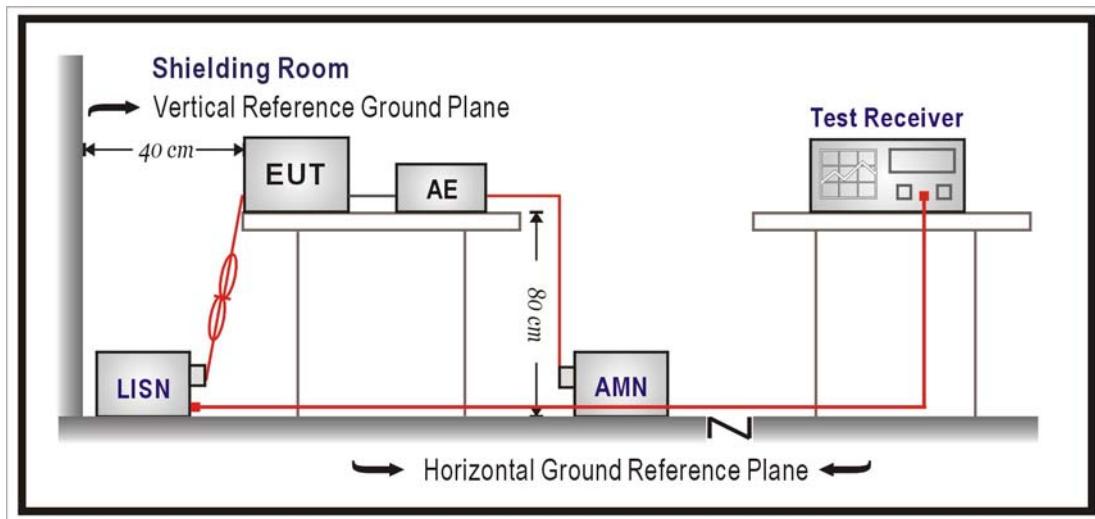
The following test equipment are used during the test:

Conducted Emission / SR3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
4-Wire ISN	R & S	ENY 41	837032/001	2008/04/15
Double 2-Wire ISN	R & S	ENY 22	835354/008	2008/04/15
LISN	R & S	ESH3-Z5	836679/022	2008/06/17
LISN	R & S	ESH3-Z5	836679/013	2007/12/30
Pulse Limiter	R & S	ESH3-Z2	100411	2007/11/16
Test Receiver	R & S	ESCS 30	100149	2007/11/15

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

Limits (dBuV)		
Frequency MHz	QP A	V
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Specification

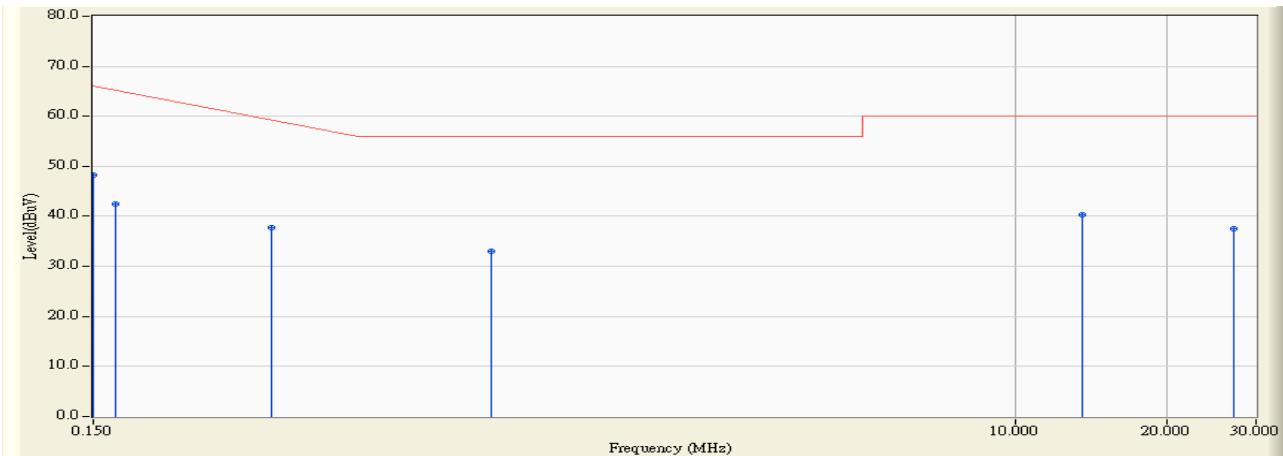
According to FCC Part 15 Subpart C Paragraph 15.207: 2007

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : ShieldingRoom3	Time : 2008/09/15 - 11:56
Limit : CISPR_B_00M_QP	Margin : 0
Probe : SR3 LISN(16A) - Line1	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX

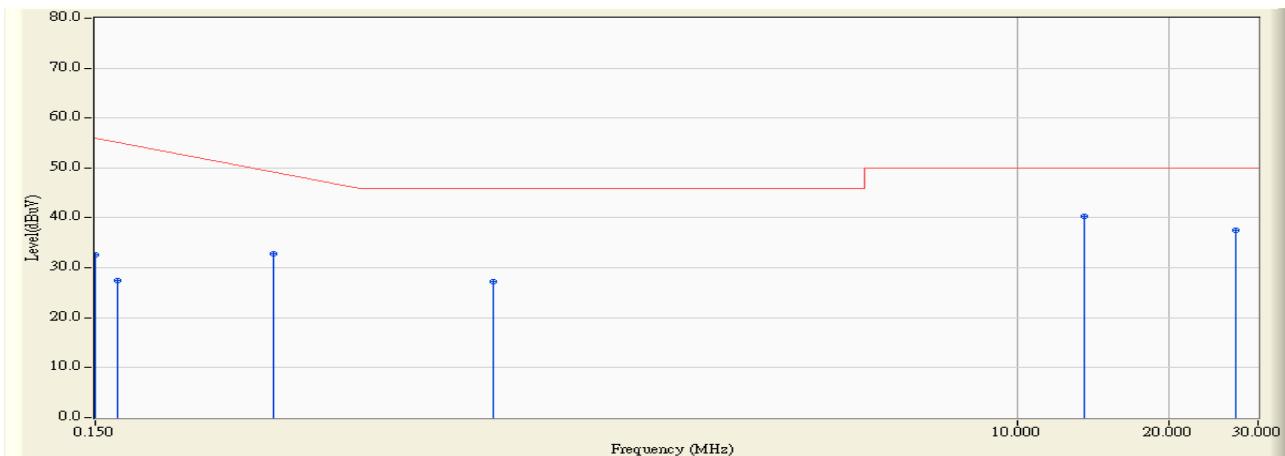


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type	
1	*	0.150	-0.033	48.390	48.357	-17.643	66.00	0	QUASIPEAK
2		0.166	-0.030	42.450	42.420	-23.123	65.54	3	QUASIPEAK
3		0.339	0.000	37.830	37.830	-22.770	60.60	0	QUASIPEAK
4		0.919	0.054	32.980	33.034	-22.966	56.00	0	QUASIPEAK
5		13.560	0.630	39.760	40.390	-19.610	60.00	0	QUASIPEAK
6		27.119	0.990	36.580	37.570	-22.430	60.00	0	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : ShieldingRoom3	Time : 2008/09/15 - 11:56
Limit : CISPR_B_00M_AV	Margin : 0
Probe : SR3_LISN(16A) - Line1	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX

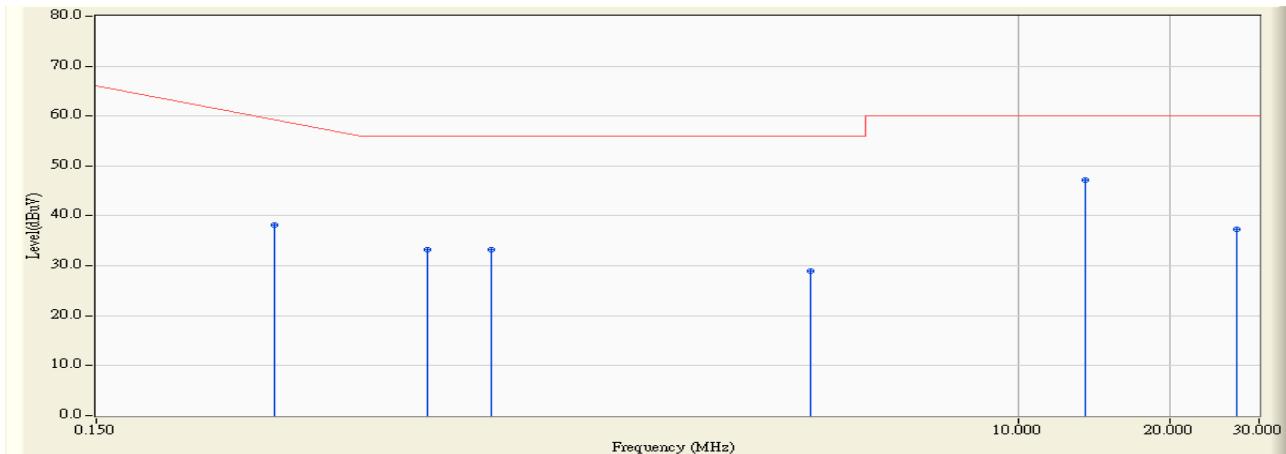


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type	
1		0.150	-0.033	32.710	32.677	-23.323	56.00	0	AVERAGE
2		0.166	-0.030	27.550	27.520	-28.023	55.54	3	AVERAGE
3		0.339	0.000	32.820	32.820	-17.780	50.60	0	AVERAGE
4		0.919	0.054	27.260	27.314	-18.686	46.00	0	AVERAGE
5*		13.560	0.630	39.750	40.380	-9.620	50.00	0	AVERAGE
6		27.119	0.990	36.570	37.560	-12.440	50.00	0	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : ShieldingRoom3	Time : 2008/09/15 - 13:12
Limit : CISPR_B_00M_QP	Margin : 0
Probe : SR3_LISN(16A) - Line2	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX

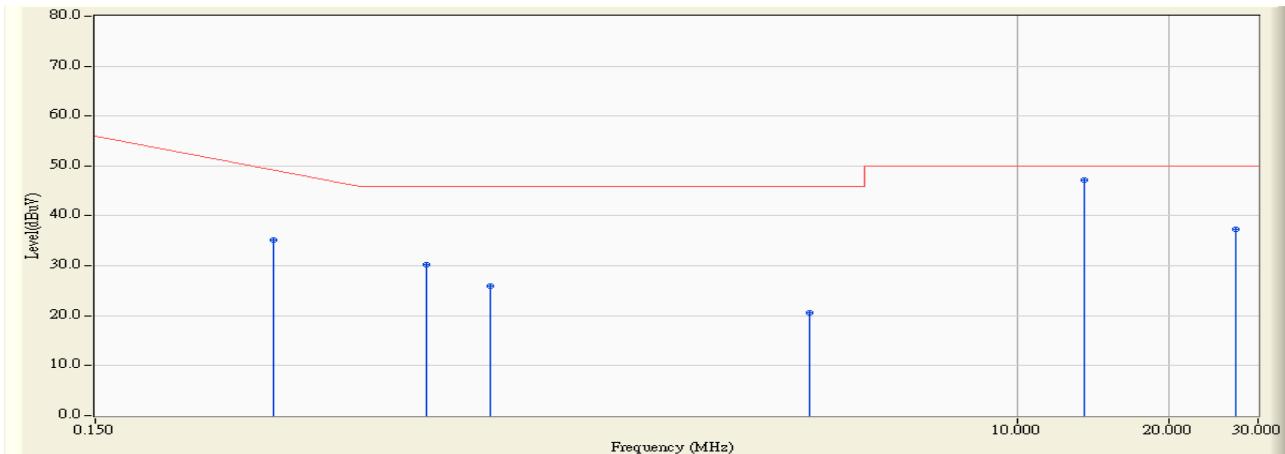


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.338	0.009	38.260	38.269	-22.360	60.62	9
2		0.677	0.050	33.110	33.160	-22.840	56.00	0
3		0.908	0.070	33.160	33.230	-22.770	56.00	0
4		3.888	0.250	28.810	29.060	-26.940	56.00	0
5*		13.560	0.730	46.440	47.170	-12.830	60.00	0
6		27.123	1.090	36.180	37.270	-22.730	60.00	0

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : ShieldingRoom3	Time : 2008/09/15 - 13:12
Limit : CISPR_B_00M_AV	Margin : 0
Probe : SR3_LISN(16A) - Line2	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.338	0.009	35.100	35.109	-15.520	50.62	9
2		0.677	0.050	30.180	30.230	-15.770	46.00	0
3		0.908	0.070	25.850	25.920	-20.080	46.00	0
4		3.888	0.250	20.270	20.520	-25.480	46.00	0
5*		13.560	0.730	46.430	47.160	-2.840	50.00	0
6		27.123	1.090	36.170	37.260	-12.740	50.00	0

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the test:

Radiated Emission / Site1

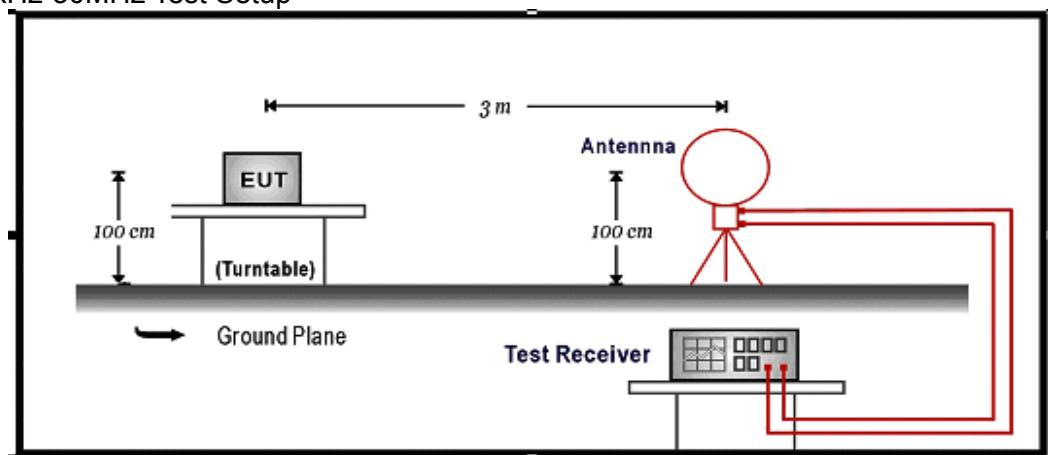
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2895	2008/09/03
Horn Antenna	Electro Metrics	EM-6961	103325	2008/03/15
Pre-Amplifier HP		8449B	3008A01123	2007/11/15
Pre-Amplifier Quietek		AP-025C	N/A	N/A
Spectrum Analyzer	R & S	FSP40	100005	2008/08/25
Spectrum Analyzer	Advantest	R3162	120300649	2007/11/24
Test Receiver	R & S	ESCS 30	825442/017	2008/02/13

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

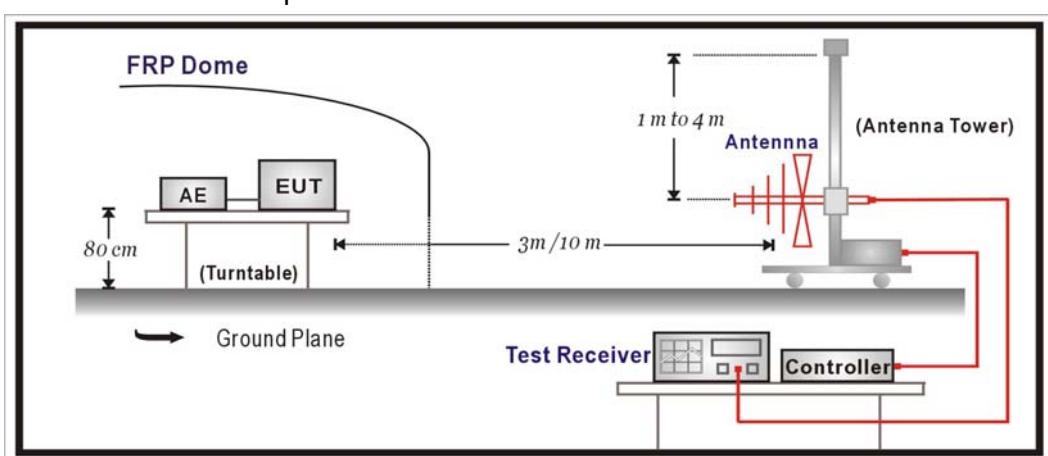
2. "N/A" Ca1.Date is used to Pre-test, not final test.

3.2. Test Setup

For 9kHz-30MHz Test Setup



For 30MHz-1GHz Test Setup



3.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.225 Limit

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Frequency MHz	Field strength of fundamental			
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
13.553-13.567 30	80.0		3	120

Remarks : 1. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

FCC Part 15 Paragraph 15.209 Limits		
Frequency MHz	Field Strength (Microvolts/meter)	Distance (Meters)
0.009-0.490 2400/F	(kHz)	300
0.490-1.705 24000/F	(kHz)	30
1.705-30 30		30
30-88 100		3
88-216 150		3
216-960 200		3
Above 960	500	3

Remark:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Voltage (dBuV/m) = $20 \log_{10}$ RF Voltage (uV/m)
4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted. The collection factor will be 80dB for this case.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Regard to the characteristic and operation band of EUT, Loop antenna was used for this measurement. The measurement method is hosed or ANSI C63.4 section 8.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

Radiated emissions were invested over the frequency range from 9kHz to 30MHz using a receive bandwidth of 9kHz and 30MHz to 1GHz using a receiver bandwidth of 120kHz.

Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

The emission limit shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz.

Radiated emission limit in these three bands are based on measurements employing an average detector.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.225: 2007

3.6. Uncertainty

The measurement uncertainty

30MHz~1GHz as $\pm 3.19\text{dB}$

3.7. Test Result

Product	HF RFID READER						
Test Item	Fundamental Radiated Emission						
Test Mode	Mode 1: Transmit						
Date of Test	2008/09/15			Test Site	No.1 OATS		

X axis Position

Radiated Electric Field Emission Within the Bands 13.553MHz to 13.567MHz (Note1)								
Ref	Freq. (MHz)	Ang. Deg.	Hight (cm)	MD (m)	Res at SD (dBuV/m)	Spec Limit (dBuV/m)	Margin (dB)	Result summary
1	13.56	0	100	30	17.7	84	-66.3	PASS
2	13.56	90	100	30	14.8	84	-69.2	PASS

Y axis Position

Radiated Electric Field Emission Within the Bands 13.553MHz to 13.567MHz								
Ref	Freq. (MHz)	Ang. Deg.	Hight (cm)	MD (m)	Res at SD (dBuV/m)	Spec Limit (dBuV/m)	Margin (dB)	Result summary
1	13.56	0	100	30	13.9	84	-70.1	PASS
2	13.56	90	100	30	12.7	84	-71.3	PASS

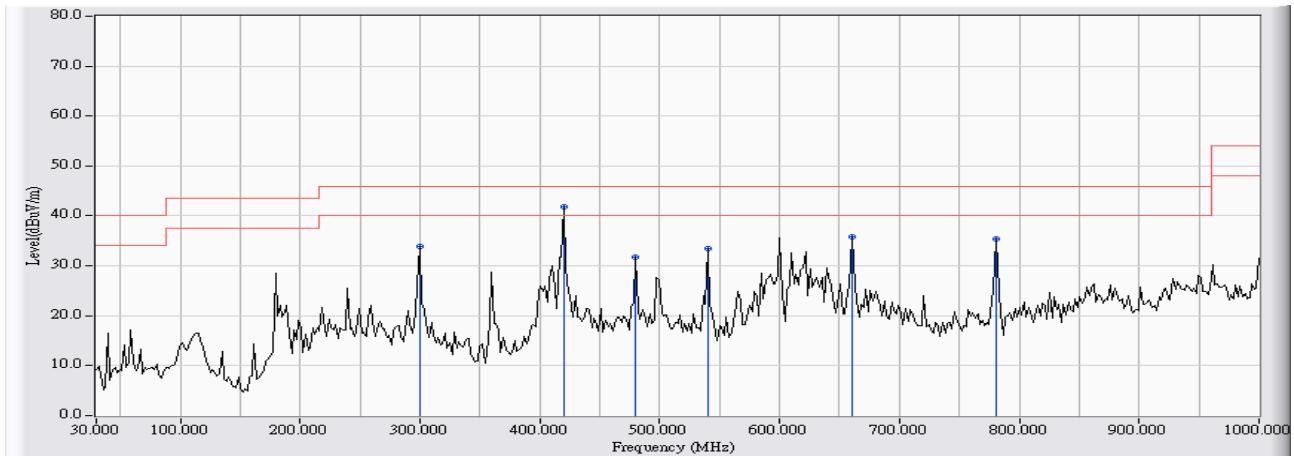
Z axis Position

Radiated Electric Field Emission Within the Bands 13.553MHz to 13.567MHz								
Ref	Freq. (MHz)	Ang. Deg.	Hight (cm)	MD (m)	Res at SD (dBuV/m)	Spec Limit (dBuV/m)	Margin (dB)	Result summary
1	13.56	0	100	30	13.4	84	-70.6	PASS
2	13.56	90	100	30	12.1	84	-71.9	PASS

Carrier frequency					
% variation	AC source(V)	Carrier level (dBuV/m)	SpecLimit (dBuV/m)	Margin (dB)	Result summary
85	102	17.7	84	-66.3	PASS
115	138	17.7	84	-66.3	PASS

Note1: The radiated emission measurements are performed in X,Y,Z axis positioning. The worst case is shown in the report.

Site : Site 1	Time : 2008/10/07 - 17:52
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - HORIZONTAL	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX

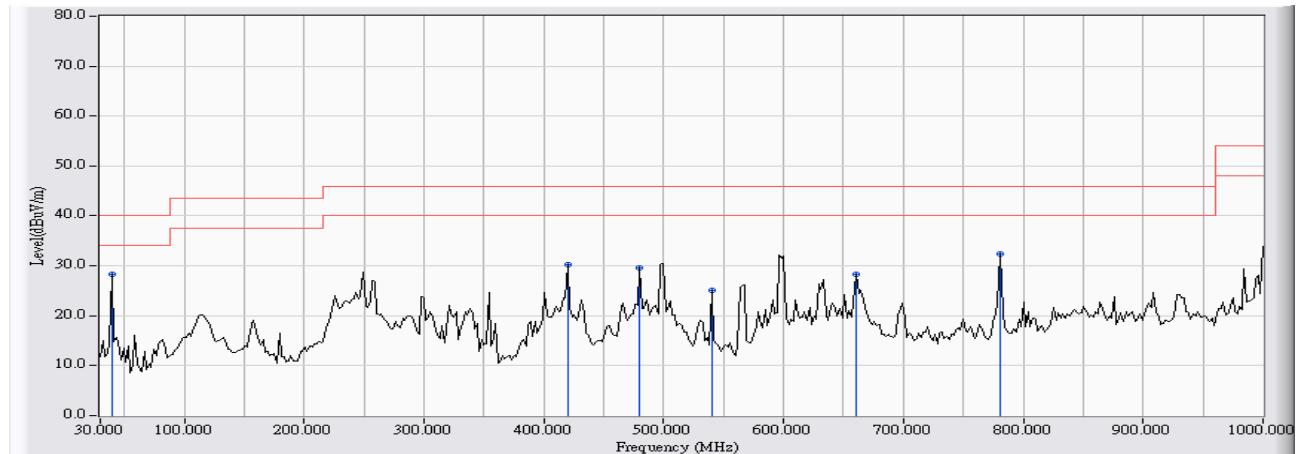


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	
1	299.660	-8.205	42.066	33.861	-12.139	46.00	0	QUASI-PEAK
2*	419.940	-3.758	45.534	41.776	-4.224	46.00	0	QUASI-PEAK
3	480.080	-7.633	39.394	31.761	-14.239	46.00	0	QUASI-PEAK
4	540.220	-8.490	42.027	33.537	-12.463	46.00	0	QUASI-PEAK
5	660.500	-3.316	39.045	35.728	-10.272	46.00	0	QUASI-PEAK
6	780.780	-6.395	41.684	35.289	-10.711	46.00	0	QUASI-PEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 1	Time : 2008/10/07 - 18:01
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - VERTICAL	Power : AC 120V/60Hz
EUT : HF RFID READER	Note : TX



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	
1 *	39.700	-8.212	36.526	28.315	-11.685	40.00	0	QUASI-PEAK
2	419.940	-4.351	34.595	30.244	-15.756	46.00	0	QUASI-PEAK
3	480.080	-4.134	33.805	29.671	-16.329	46.00	0	QUASI-PEAK
4	540.220	-11.276	36.299	25.023	-20.977	46.00	0	QUASI-PEAK
5	660.500	-2.704	30.910	28.206	-17.794	46.00	0	QUASI-PEAK
6	780.780	-5.690	38.094	32.403	-13.597	46.00	0	QUASI-PEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

4. Frequency Tolerance

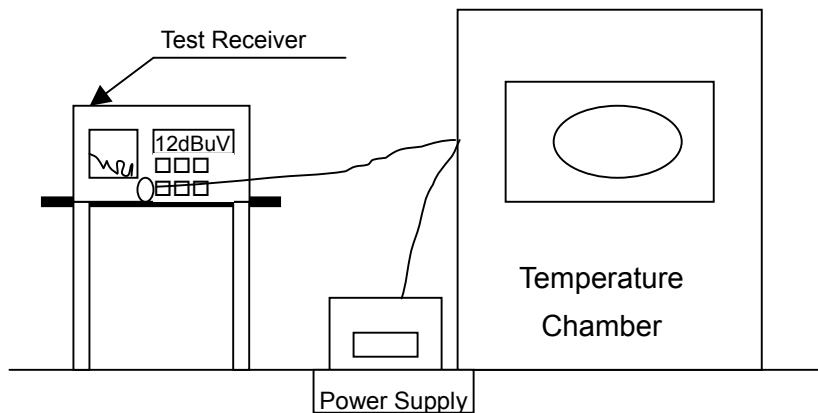
4.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2008
2	Standard Temperature & Humidity Chamber	WIT TH-1S-B/10	8210	Aug., 2008
No.1 OATS				Sep., 2008

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

4.4. Test Procedure

The over operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.225: 2007

4.6. Uncertainty

The measurement uncertainty is defined as $\pm 0.82 \times 10^{-7}$.

4.7. Test Result

Product	HF RFID READER		
Test Item	Frequency Tolerance		
Test Mode	Mode 1: Transmit		
Date of Test	2008/09/17	Test Site	No.1 OATS

Frequency stability versus ambient temperature measurement at t=0(startup),t+2 minutes,t+5 minutes and t+10 minutes								
Temp.	t=0 (startup)	Freq. error(%)	t+2	Freq. error(%)	t+5	Freq. error(%)	t+10	Freq. error(%)
-20	13.55990	0.0008	13.55989	0.0008	13.55990	0.0008	13.55990	0.0008
-10	13.55990	0.0007	13.55989	0.0008	13.55989	0.0008	13.55989	0.0008
0	13.55987	0.0010	13.55986	0.0011	13.55985	0.0011	13.55984	0.0012
10	13.55976	0.0018	13.55977	0.0017	13.55976	0.0017	13.55976	0.0017
20	13.55978	0.0016	13.55978	0.0016	13.55978	0.0016	13.55978	0.0016
30	13.55950	0.0037	13.55970	0.0022	13.55970	0.0022	13.55969	0.0023
40	13.55964	0.0027	13.55966	0.0025	13.55966	0.0025	13.55965	0.0026
50	13.55960	0.0030	13.55958	0.0031	13.55954	0.0034	13.55958	0.0031

The frequency tolerance from the nominal-rated at 20 degrees C:				
Temperature	Voltage Supply(120VAC60Hz)		Frequency	Frequency error(%)
20	85%	102VAC	13.55979	0.0016
20	115%	138VAC	13.55978	0.0016