

FCC Part 15B Measurement and Test Report

For

Guangzhou Andea Electronics Technology Co., Ltd

401, Building H, No.1, Jingye 3rd Street, Yushu Industry Park, Luogang

District, Guangzhou, China.

FCC ID: 2AFI8-RD543

Test Rule(s):	<u>FCC Part 15 Subpart B</u>	
Product Description:	<u>HF Reader</u>	
Tested Model:	<u>RD543</u>	
Report No.:	<u>STR15078100I-2</u>	
Tested Date:	<u>2015-07-07 to 2015-07-20</u>	
Issued Date:	<u>2015-07-20</u>	
Tested By:	<u>Mark Chen / Engineer</u>	<i>Mark Chen</i>
Reviewed By:	<u>Lahm Peng / EMC Manager</u>	<i>Lahm peng</i>
Approved & Authorized By:	<u>Jandy so / PSQ Manager</u>	<i>Jandyso</i>
Prepared By:	Shenzhen SEM.Test Technology Co., Ltd. 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn	

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION.....3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....3
1.2 TEST STANDARDS.....4
1.3 TEST METHODOLOGY.....4
1.4 TEST FACILITY.....4
1.5 EUT SETUP AND OPERATION MODE.....5
1.6 TEST EQUIPMENT LIST AND DETAILS.....5

2. SUMMARY OF TEST RESULTS.....6

3. CONDUCTED EMISSIONS.....7
3.1 MEASUREMENT UNCERTAINTY.....7
3.2 TEST PROCEDURE.....7
3.3 BASIC TEST SETUP BLOCK DIAGRAM.....7
3.4 ENVIRONMENTAL CONDITIONS.....8
3.5 SUMMARY OF TEST RESULTS/PLOTS.....8
3.6 CONDUCTED EMISSIONS TEST DATA.....8

4. RADIATED EMISSIONS.....11
4.1 MEASUREMENT UNCERTAINTY.....11
4.2 TEST PROCEDURE.....11
4.3 TEST RECEIVER SETUP.....12
4.4 CORRECTED AMPLITUDE & MARGIN CALCULATION.....12
4.5 ENVIRONMENTAL CONDITIONS.....12
4.6 SUMMARY OF TEST RESULTS/PLOTS.....12

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Guangzhou Andea Electronics Technology Co., Ltd
 Address of applicant: 401, Building H, No.1, Jingye 3rd Street, Yushu Industry Park, Luogang District, Guangzhou, China.
 Manufacturer: Guangzhou Andea Electronics Technology Co., Ltd
 Address of manufacturer: 401, Building H, No.1, Jingye 3rd Street, Yushu Industry Park, Luogang District, Guangzhou, China.

General Description of EUT	
Product Name:	HF Reader
Trade Name:	/
Model No.:	RD543
Adding Model(s):	RD503
<p><i>Note: The test data is gathered from a production sample, provided by the manufacturer. The number of antenna of others models listed in the report is different from main-test model RD543, but the circuit and the electronic construction do not change, RD503 only has one antenna, RD543 has four antennas, but there is only one antenna transmitting when operation, declared by the manufacturer.</i></p>	

Technical Characteristics of EUT	
Rated Voltage:	DC 12V
Rated Current:	/
Rated Power:	/
Power Adapter Model:	F150603-B I/P: AC 100-240V~1.8A 50-60Hz O/P: 12-16A-max. 5.0A(60W)
Lowest Internal Frequency:	8MHz
Highest Internal Frequency:	25MHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Guangzhou Andea Electronics Technology Co., Ltd in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Working	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
AC Cable	1.2	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Reticle	1.2	Unshielded	Without Core
DC Cable	1.2	Unshielded	With Core

1.6 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

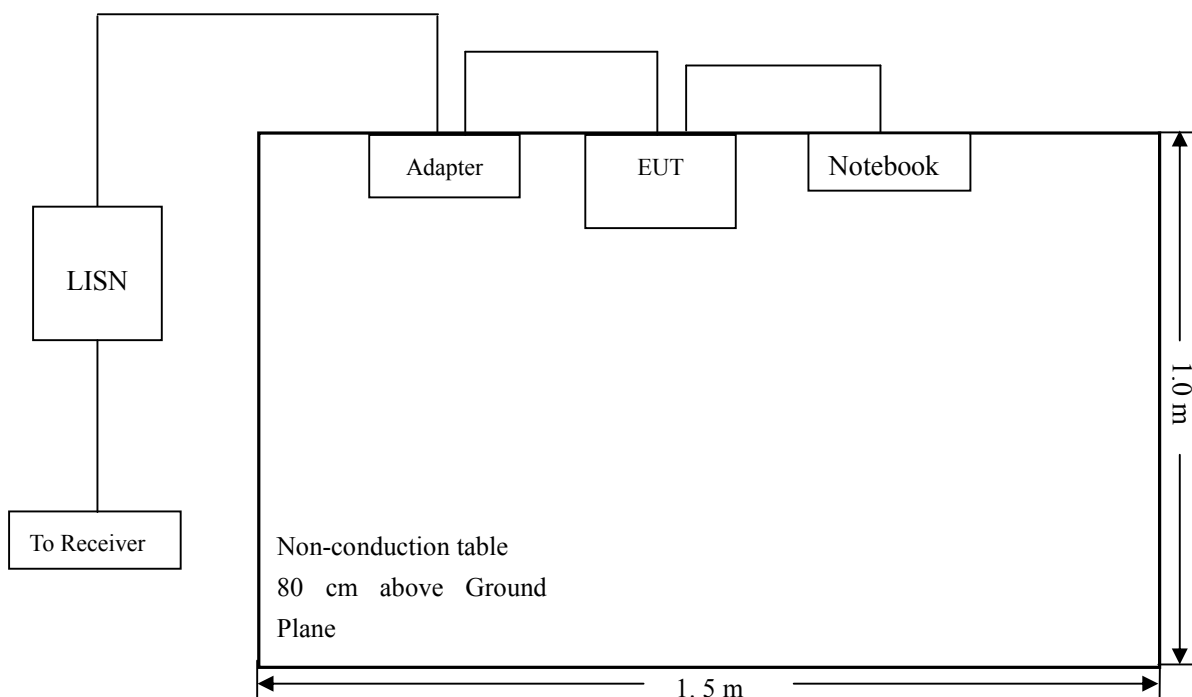
3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

3.2 Test Procedure

Test is conducting under the description of ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.3 Basic Test Setup Block Diagram



3.4 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.5 Summary of Test Results/Plots

According to the data in section 3.6, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

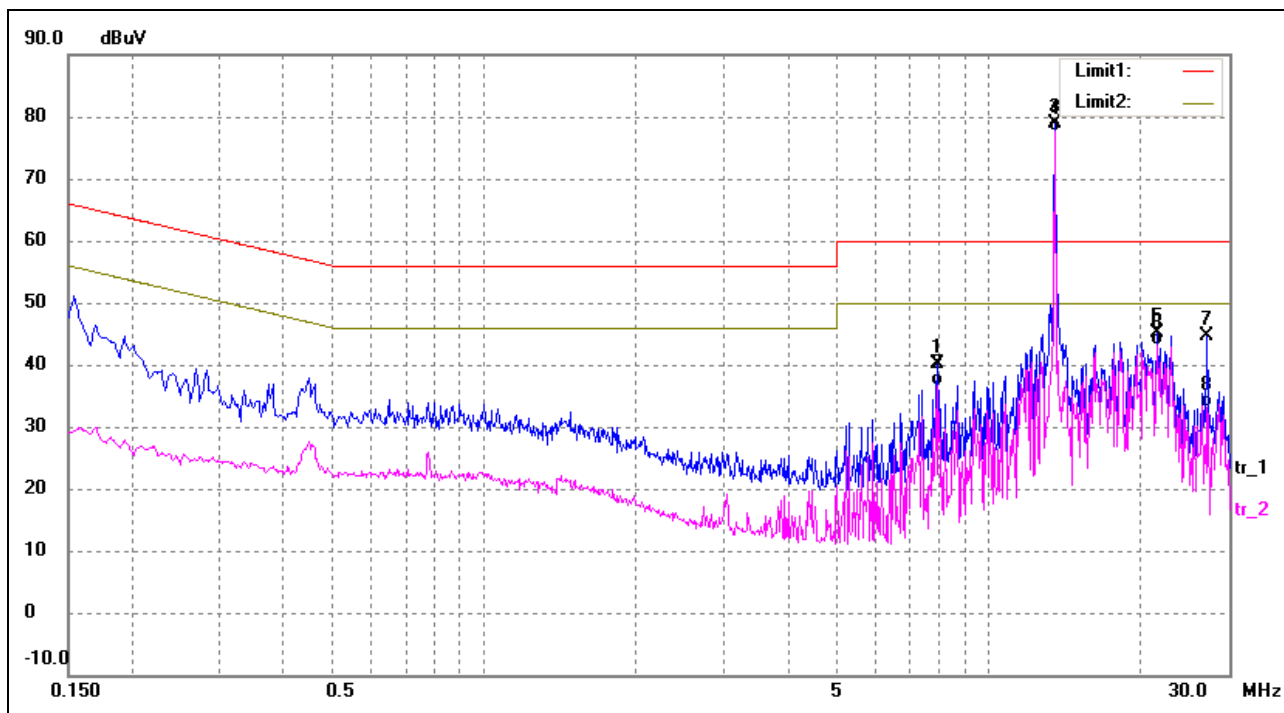
-6.84 dB at **21.6620 MHz** in the **Neutral, AVG** detector, 0.15-30MHz

3.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

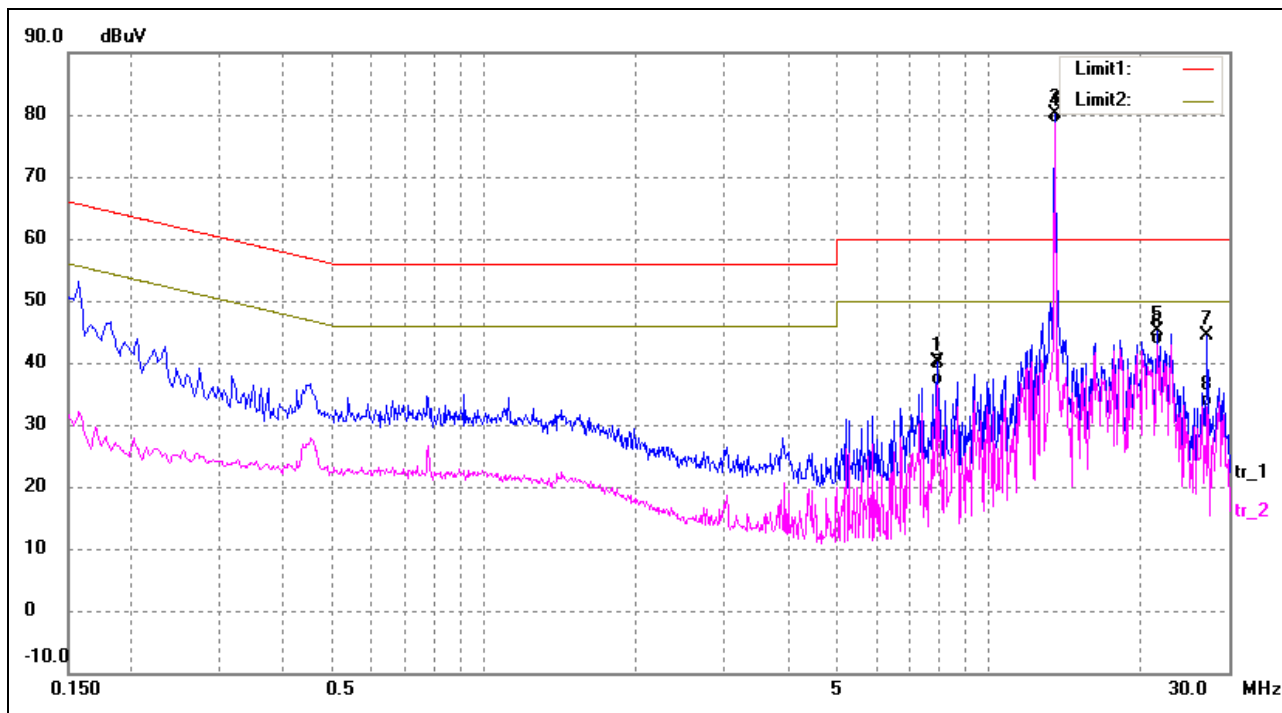
EUT: HF Reader
 Tested Model: RD543
 Operating Condition: TM1
 Comment: 120V/60Hz; Adapter DC 12V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	7.9220	28.30	11.83	40.13	60.00	-19.87	peak
2	7.9220	24.85	11.83	36.68	50.00	-13.32	AVG
3X	13.5580	67.97	11.00	78.97	Fundamental		peak
4*	13.5580	66.66	11.00	77.66			AVG
5	21.6620	33.17	12.00	45.17	60.00	-14.83	peak
6	21.6620	31.16	12.00	43.16	50.00	-6.84	AVG
7	27.1580	31.62	13.00	44.62	60.00	-15.38	peak
8	27.1580	20.19	13.00	33.19	50.00	-16.81	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	7.9220	28.33	11.83	40.16	60.00	-19.84	peak
2	7.9220	24.51	11.83	36.34	50.00	-13.66	AVG
3X	13.5620	69.10	11.00	80.10	Fundamental		peak
4*	13.5620	67.54	11.00	78.54			AVG
5	21.6620	33.07	12.00	45.07	60.00	-14.93	peak
6	21.6620	30.92	12.00	42.92	50.00	-7.08	AVG
7	27.1580	31.35	13.00	44.35	60.00	-15.65	peak
8	27.1580	19.94	13.00	32.94	50.00	-17.06	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

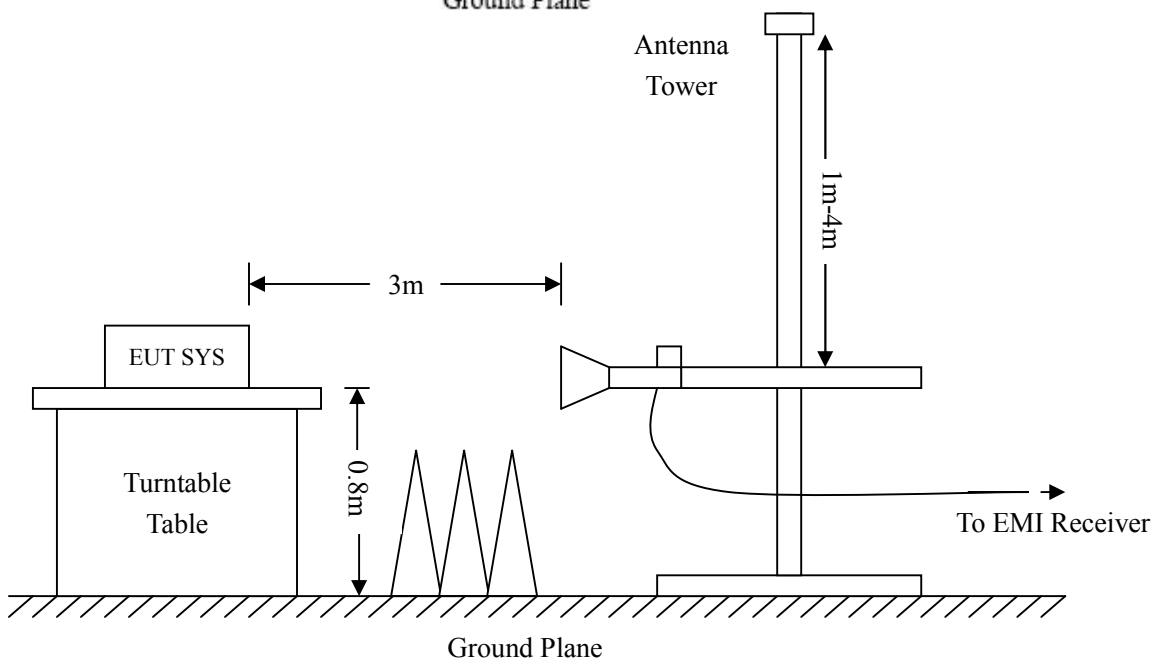
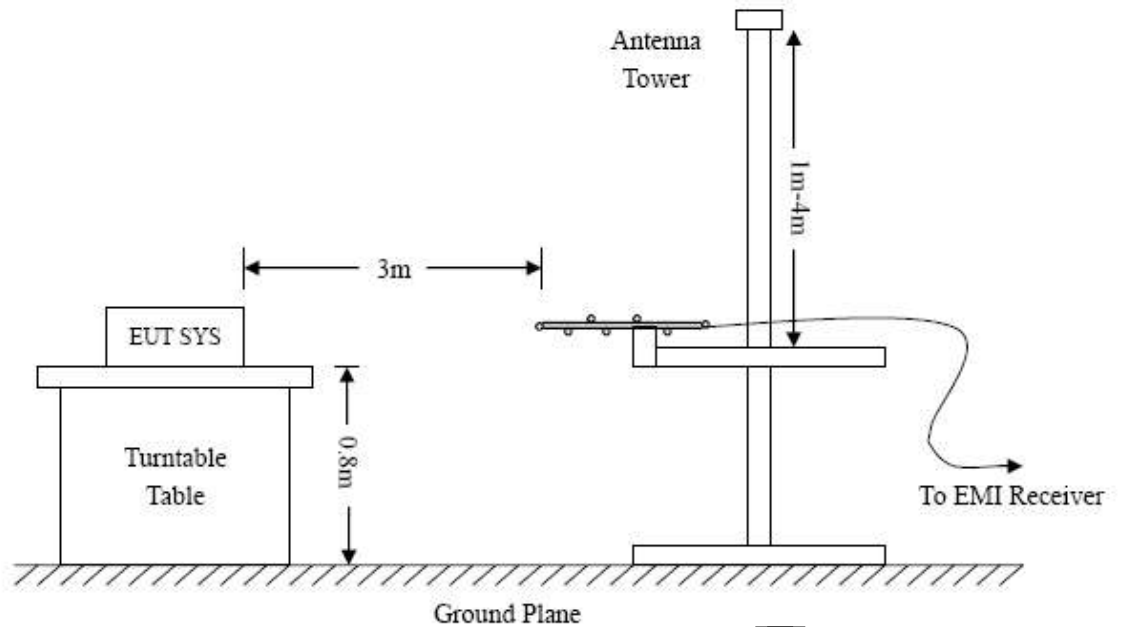
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.3 Test Receiver Setup

Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.6 Summary of Test Results/Plots

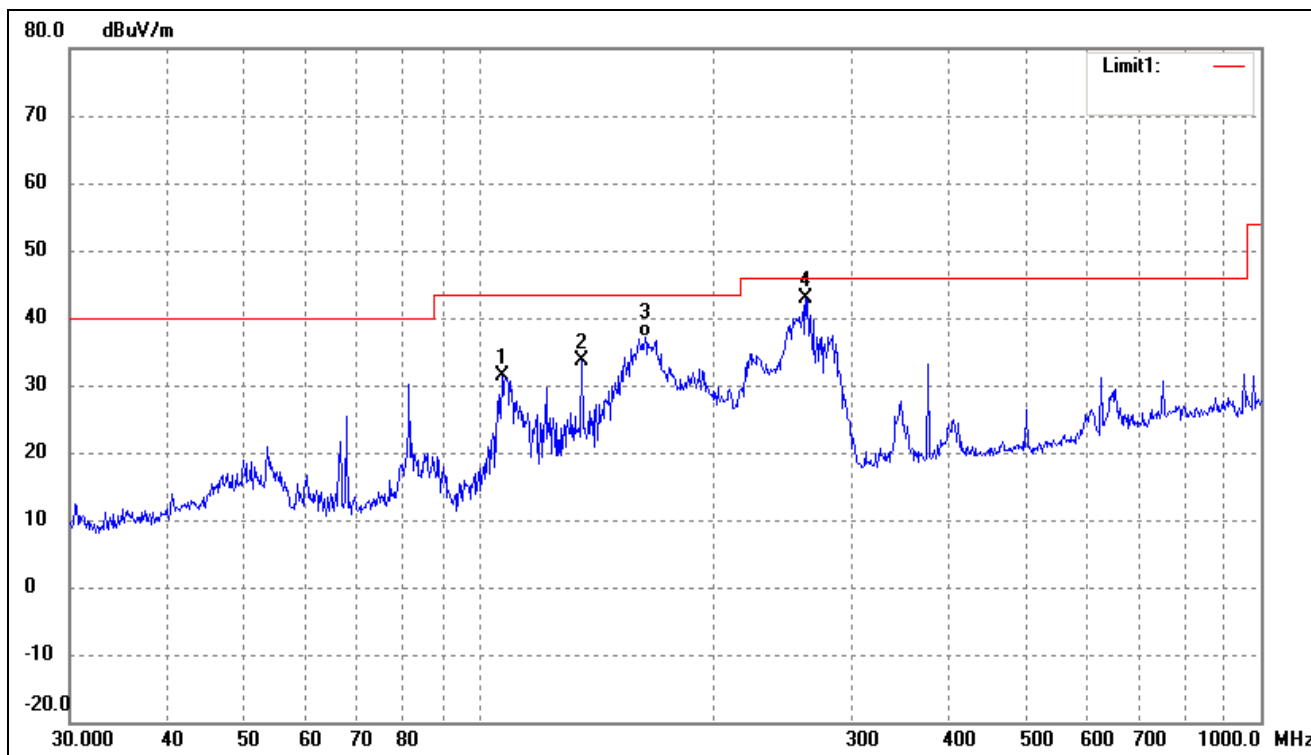
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-3.04 dB at 261.9753 MHz in the Horizontal polarization, 9 kHz to 1 GHz, 3Meters

Plot of Radiated Emissions Test Data

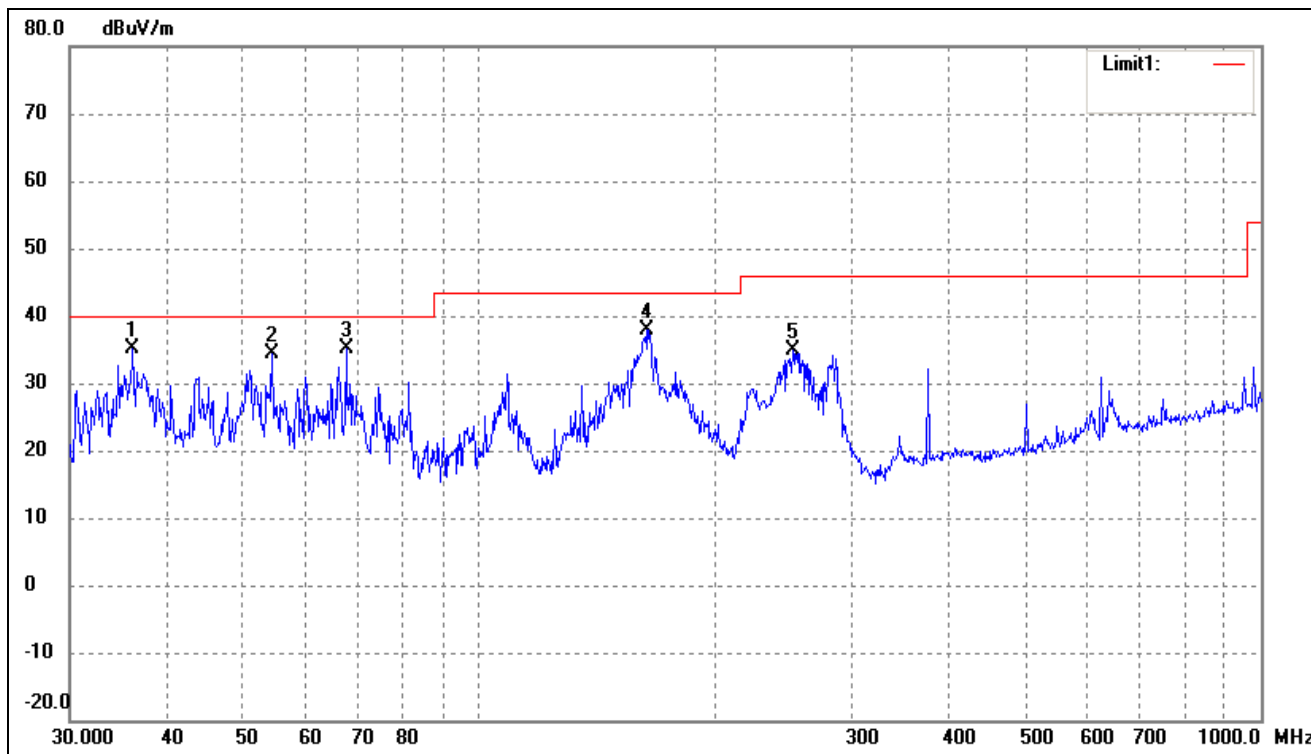
EUT: HF Reader
 Tested Model: RD543
 Operating Condition: TM1
 Comment: 120V/60Hz; Adapter DC 12v

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	107.1337	41.98	-10.68	31.30	43.50	-12.20	98	100	peak
2	135.5062	44.35	-10.82	33.53	43.50	-9.97	165	100	peak
3	163.1818	47.42	-10.40	37.02	43.50	-6.48	201	100	QP
4	261.9753	49.05	-6.09	42.96	46.00	-3.04	77	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	36.1272	45.52	-10.40	35.12	40.00	-4.88	98	100	peak
2	54.4515	43.55	-9.28	34.27	40.00	-5.73	26	100	peak
3	67.6751	47.13	-12.05	35.08	40.00	-4.92	201	100	peak
4	163.7549	48.27	-10.38	37.89	43.50	-5.61	26	100	peak
5	252.0627	40.89	-6.13	34.76	46.00	-11.24	65	100	peak

The measurements greater than 20dB below the limit from 9kHz to 30MHz and test data are not provided.

***** END OF REPORT *****