

EMC TEST REPORT

For

RF_READER

Model Number: RF_READER

FCC ID: TLDRFREADER

Report Number : WT078002523

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TEST REPORT DECLARATION

Applicant : Cogent systems, Inc. Shenzhen
Address : Fiyta Hi-tech Building 1706,Gaoxinnanyidao Avenue, Southern District of
Hi-tech Park, nanshan District, Shenzhen, China.
Manufacturer : Cogent systems, Inc. Shenzhen
Address : Fiyta Hi-tech Building 1706,Gaoxinnanyidao Avenue, Southern District of
Hi-tech Park, nanshan District, Shenzhen, China.
EUT Description : RF_READER
Model : RF_READER
Number :
FCC ID : TLDRFREADER

Test Standards:

FCC Part 15 15.225, 15.207, 15.209

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 15.225, 15.207, 15.209.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:	<u>Winnie Hou</u> (Winnie Hou)	Date:	<u>Nov. 2, 2007</u>
Checked by:	<u>Louis Lin</u> (Louis Lin)	Date:	<u>Nov. 2, 2007</u>
Approved by:	<u>Peter Lin</u> (Peter Lin)	Date:	<u>Nov. 2, 2007</u>

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Disturbance	15.207	Pass
Radiated Disturbance	15.209,15.205,15.225	Pass
Occupied Bandwidth	15.225	Pass
Frequency Tolerance	15.225	Pass
Antenna Requirement	15.203	Pass

2. GENERAL INFORMATION

2.1. Report information

- 2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.
- 2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.
- 2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Committee for Laboratories (**CNAL**) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (**FCC**), and the registration number are **97379**(open area test site) and **274801**(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number are **R-1974**(open area test site), **R-1966**(semi anechoic chamber), **C-2117**(mains ports conducted interference measurement) and **T-180**(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (**IC**), and the registration number is **IC4174**.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is **E2024086Z02**.

Measurement Uncertainty

2.3. Measurement Uncertainty

Radiated Disturbance: 30MHz~1000MHz 4.5dB
1GHz~18GHz 4.6dB

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description : RF_READER
Manufacturer : Cogent systems, Inc. Shenzhen
Model Number : RF_READER
Operate Frequency : 13.56MHz
Antenna Designation : Integrated

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: TLDRFREADER filing to comply with Section 15.207, 15.209, 15.225 of the FCC Part 15, Subpart C Rules.

3.3. Block Diagram of EUT Configuration

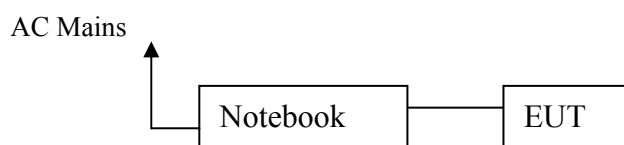


Figure 1 EUT setup 1

3.4. Operating Condition of EUT

Mode 1: Connect to PC

3.5. Test voltage

AC main voltage: AC 120V/60Hz

3.6. Special Accessories

Not available for this EUT intended for grant.

3.7. Equipment Modifications

Not available for this EUT intended for grant.

3.8. Support Equipment List

Table 2 Support Equipment

Name	Model Number	S/N	Manufacture
Notebook	2647	99-F48C0	IBM
Adaptor for notebook	AA21070	--	IBM

3.9. Test Conditions

Date of test: Oct 10, 2007- Nov 2, 2007

Date of EUT Receive: Oct 10, 2007

Temperature: -20-50 °C

Relative Humidity: 50-60%

4. TEST EQUIPMENT USED

Table 3 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Jan.25, 2007	1 Year
SB3321	AMN	Rohde & Schwarz	ESH2-Z5	Jan.25, 2007	1 Year
SB2604	AMN	Rohde & Schwarz	ESH3-Z5	Jan.25, 2007	1 Year
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.25, 2007	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.25, 2007	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.25, 2007	1 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.25, 2007	1 Year
SB3435/02	Amplifier(18-40GHz)	Rohde & Schwarz	---	May.05, 2007	1 Year
SB3435/03	Horn Antenna	Rohde & Schwarz	AT4560	May.05, 2007	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Jan.25, 2007	1 Year
SB3345	Loop Antenna	Schwarzbeck	FMZB1516		

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

FCC Part 15 15.207

5.1.2. Test Limit

Table 4 Conducted Disturbance Test Limit (Class B)

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

- Decreasing linearly with logarithm of the frequency
- The lower limit shall apply at the transition frequency.

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions form both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

5.4. Test Data

Table 5 Conducted Disturbance Test Data (AC Mains of notebook)

Model: RF_READER

Mode: 1

Line							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.302	9.8	41.3	51.1	60.2	33.0	42.8	50.2
27.120	10.3	38.4	48.7	60	38.2	48.5	50
13.560	10.2	33.1	43.3	60	33.1	43.3	50

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

Table 6 Conducted Disturbance Test Data (AC Mains of notebook)

Model: RF_READER

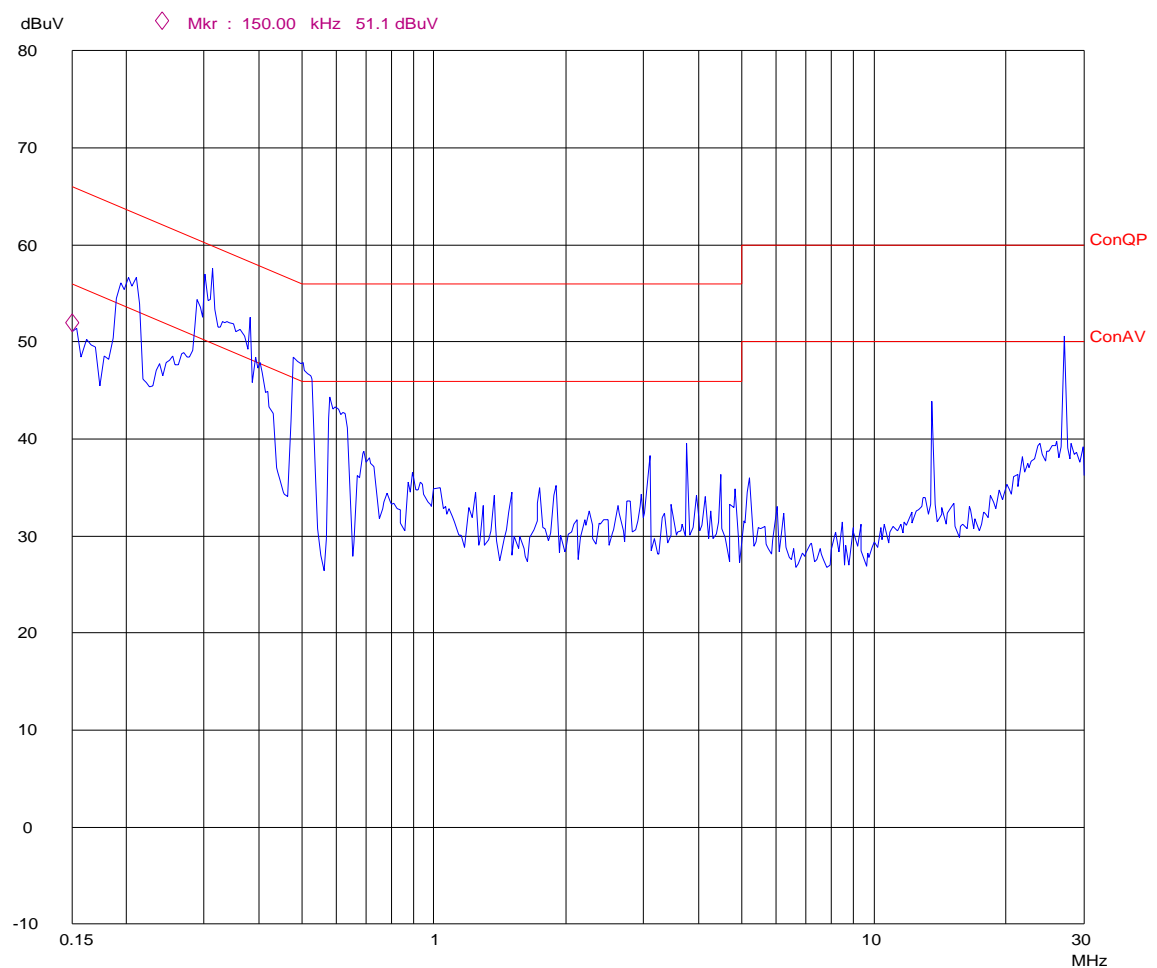
Mode: 1

Neural							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.210	9.8	44.6	54.4	63.2	36.8	46.6	53.2
0.314	9.8	41.6	51.4	59.9	32.2	42.0	49.9
27.120	10.3	38.6	48.9	60	38.7	49.0	50

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

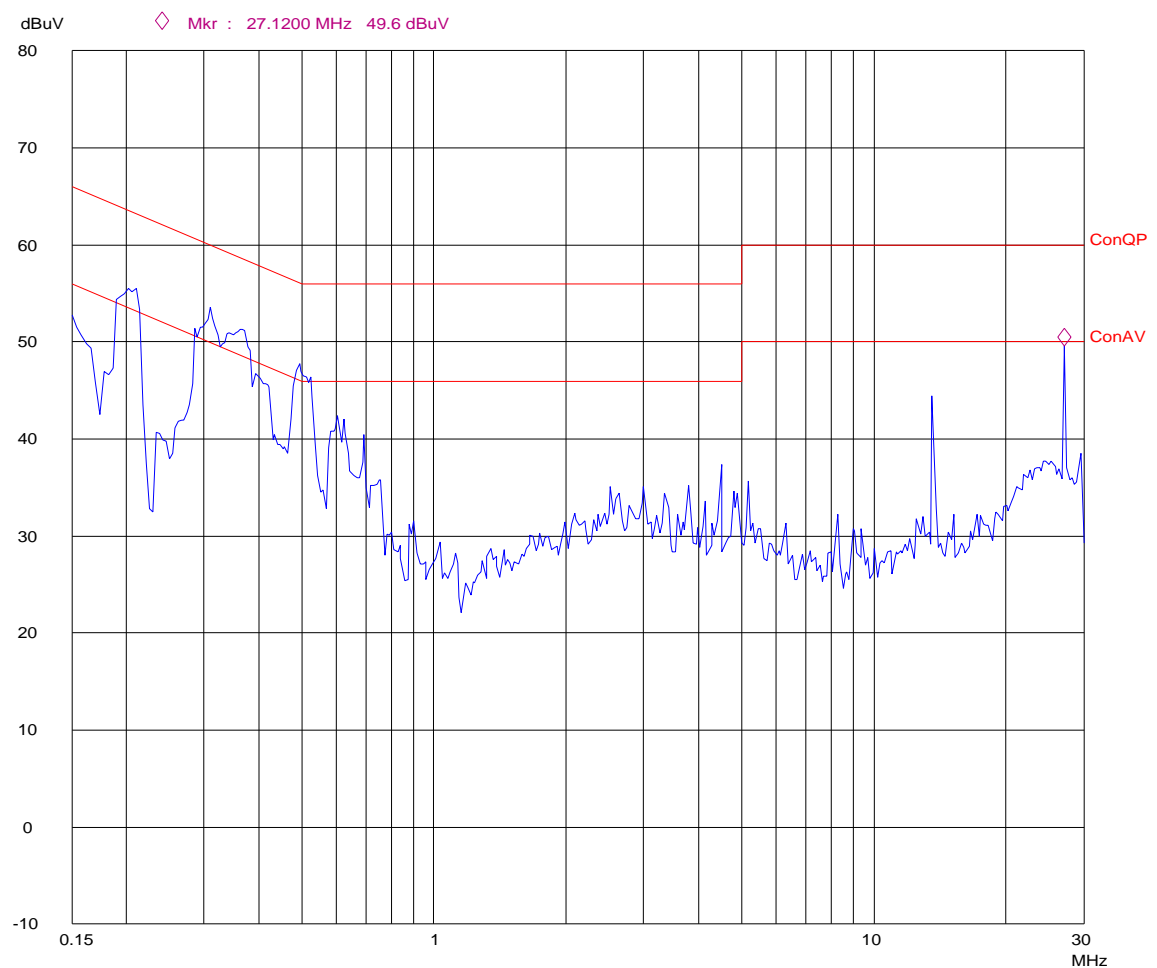
Conducted Disturbance

EUT: RF_READER
Op Cond: Connect to PC
Test Spec: L
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: RF_READER
Op Cond: Connect to PC
Test Spec: N
Comment: AC 120V/60Hz



6. RADIATED DISTURBANCE TEST

6.1. Test Standard and Limit

6.1.1. Test Standard

FCC Part 15 15.209, 15.205, 15.225

6.1.2. Test Limit

Table 7 Radiated Disturbance Test Limit

FREQUENCY MHz	FIELD STRENGTHS LIMITS ($\mu\text{V/m}$)	FIELD STRENGTHS LIMITS dB ($\mu\text{V/m}$)
Fundamental	50000	94.0
Harmonics	500	54.0
30 ~ 88	100	40.0
88 ~ 216	150	43.5
216 ~ 960	200	46.0
960 ~	500	54.0

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

Radiated test was performed on the frequency range from 30MHz to 25GHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz, $\text{VBW} \geq \text{RBW}$. All readings above 1 GHz are AV and PK values. $\text{RBW}=1\text{MHz}$ and $\text{VBW}=10\text{Hz}$ for AV value, $\text{RBW}=1\text{MHz}$ and $\text{VBW} \geq \text{RBW}$ for peak value.

Measurements were made at 3 meters

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

6.4. Test Data

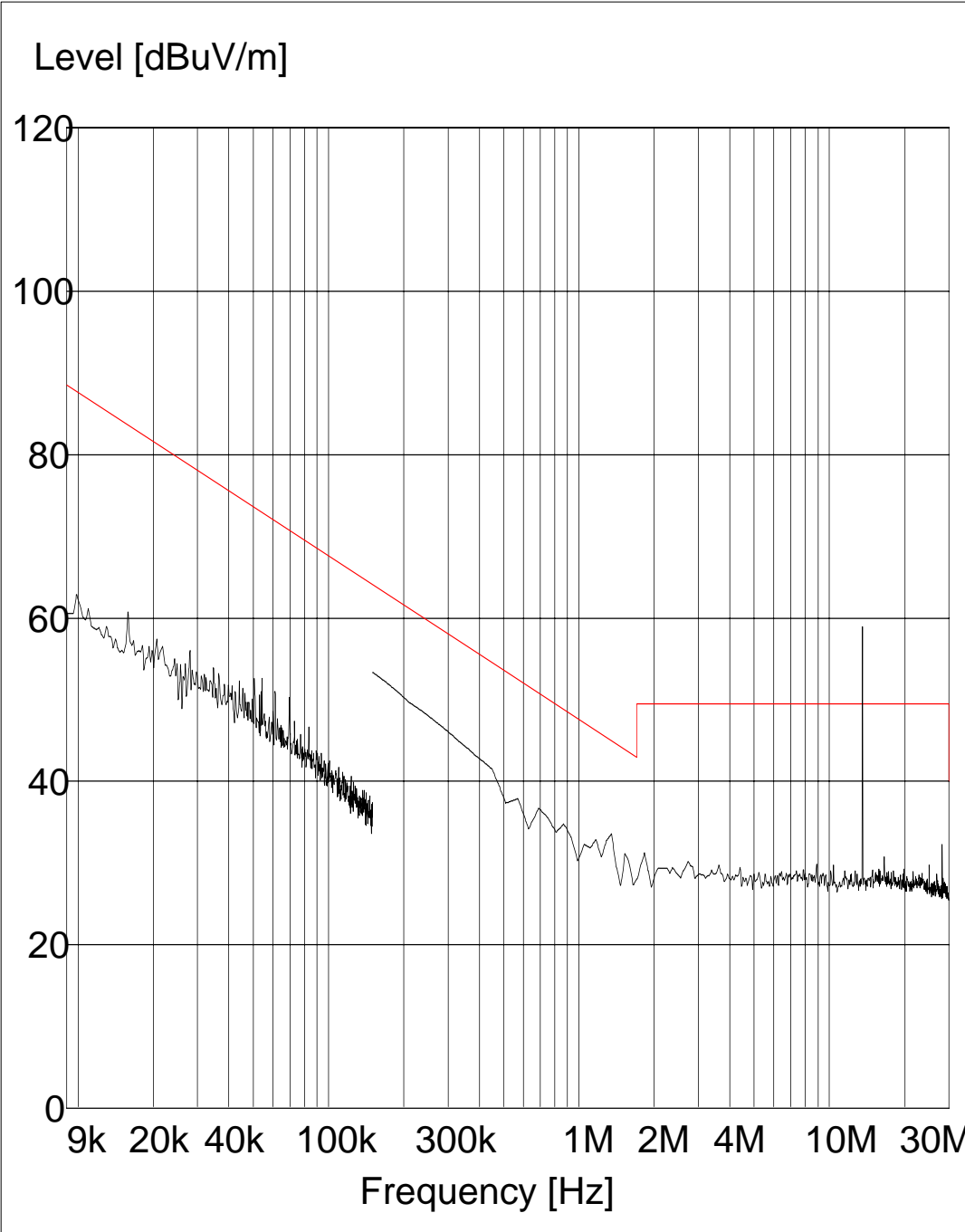
Table 8 Radiated Disturbance Test Data

Model number: RF_READER								
Mode:1								
Frequency (MHz)	Polarization	Reading Value (dBμV)	Correction Factor (dB)	Antenna Factor (dB/m)	Emission Level dB (μV/m)	Limits dB (μV/m)	Test voltage	Note
13.560	--	32.3	0.9	20	53.2	64.0	USB	QP
103.871	H	1.6	12.3	17.4	31.3	43.5	USB	QP
388.849	H	3.2	16.1	16.3	35.6	46.0	USB	QP
271.042	V	2.8	13.3	19.7	35.8	46.0	USB	QP
841.951	V	5.0	20.5	11.8	37.2	46.0	USB	QP

- Note: 1. Emission level(dBuV/m)=Reading Value(dBuV) + Correction Factor(dB/m)+ Antenna Factor (dB/m)
2. Correction Factor(dB/m) = Cable Factor (dB)+Amplifier Factor(dB)
3. The other emission levels were less than the limit 20dB

Radiated Disturbance

EUT: M/N: RF_READER
Operating Condition: Connect to PC
Test Site: SMQ EMC Lab. SAC



Radiated Disturbance

EUT: M/N: RF_READER
Operating Condition: connect to pc
Test Site: SMQ EMC Lab. No.2 SAC
Test Specification: Horizontal & Vertical

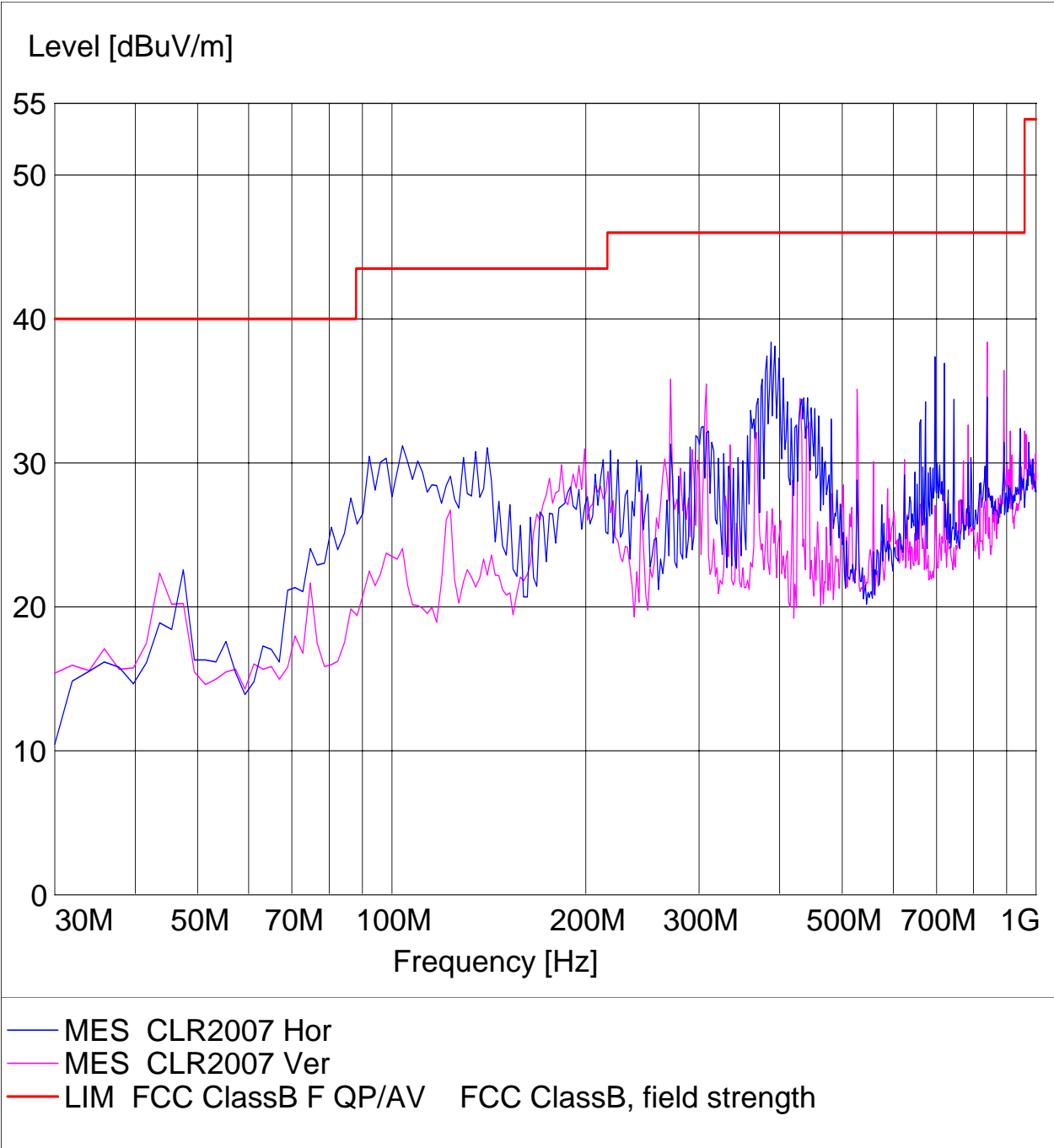


Table 9 Restricted Band Radiated Emission Data

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
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 - 4.17775	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	
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	
6.31175 - 6.31225	123 - 138	2200 - 2300	
8.291 - 8.294	149.9 - 150.05	2310 - 2390	
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	
12.29 - 12.293	167.72 - 173.2	3332 - 3339	
12.51975 -	240 - 285	3345.8 - 3358	
12.52025	322 - 335.4	3600 - 4400	
12.57675 -			
12.57725			
13.36 - 13.41			

All the emissions of the above band are 20dB less than the limit.

7. OCCUPIED BANDWIDTH

7.1. Test Standard and Limit

7.1.1. Test Standard

FCC Part 15 15.225

7.2. Test Procedure

The EUT was placed on a turn table which is 0.8m above ground plane.

Set EUT as normal operation

Set EMI test receiver (ESIB26) Center Frequency = fundamental frequency,

$RBW \geq \text{bandwidth}$, $VBW \geq RBW$.

Set EMI test receiver (ESIB26) Max hold. Mark peak, -20dB.

7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

7.4. Test Data

20dB bandwidth is 27.6 kHz

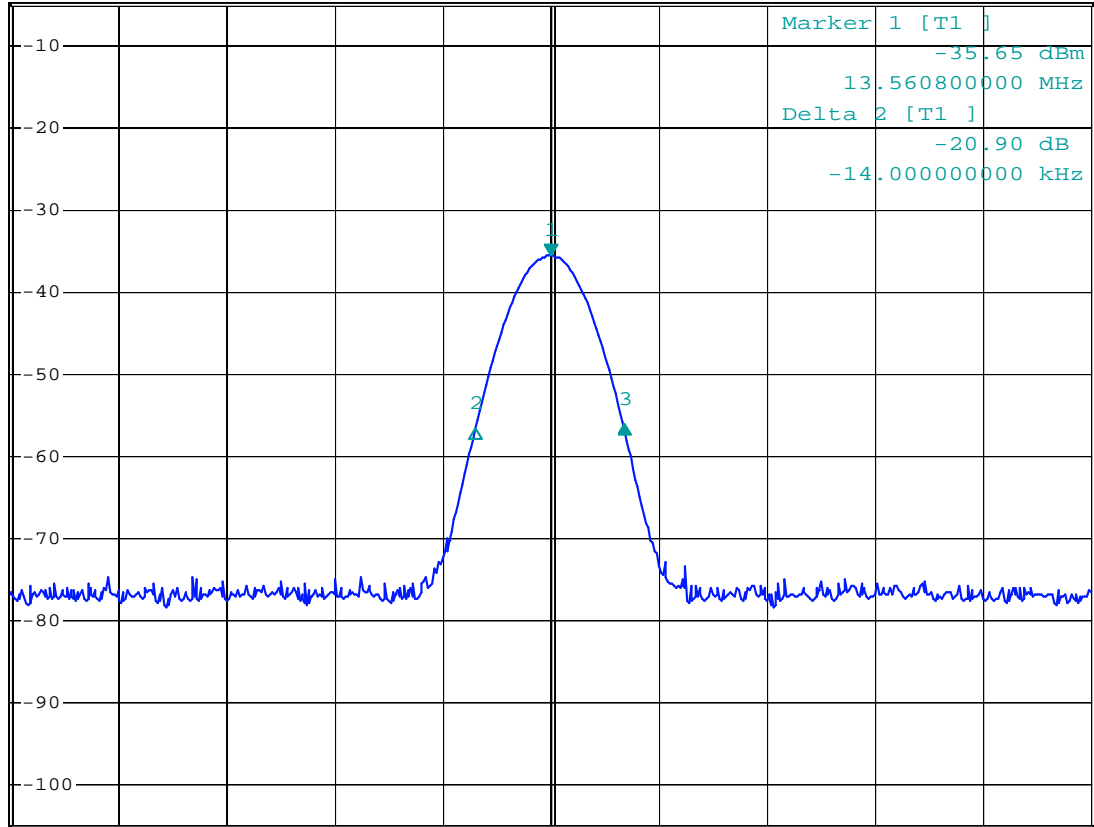


*RBW 10 kHz Delta 3 [T1]
*VBW 30 kHz -20.51 dB
*SWT 1 s 13.600000000 kHz

Ref -5 dBm

Att 30 dB

1 PK
VIEW



A

Center 13.5608 MHz

20 kHz/

Span 200 kHz

Date: 2.NOV.2007 04:20:33

8. FREQUENCY TOLERANCE

8.1. Test Standard and Limit

8.1.1. Test Standard

FCC Part 15 15.225

8.2. Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency

8.3. Test Procedure

1. The EUT was situated inside the environmental test chamber and supply the EUT with nominal supply voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Adjust the chamber from -20 degrees C to +50 degrees C.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 10 minutes, record the frequency.
5. Set the chamber to 20 degrees C, adjusted the supply voltage from 85% to 115% of the rated supply voltage, and the frequency record.

8.4. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

8.5. Test Data

Table 10 Frequency Error Test Data

Power supply	Temperature °C	Frequency(kHz)	Limit	Result
USB	-20	13560.6	±0.01%	Pass
	-10	13560.6	±0.01%	Pass
	0	13560.7	±0.01%	Pass
	10	13560.7	±0.01%	Pass
	20	13560.8	±0.01%	Pass
	30	13560.8	±0.01%	Pass
	40	13560.6	±0.01%	Pass
	50	13560.9	±0.01%	Pass

9. ANTENNA REQUIREMENT

9.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2. ANTENNA CONNECTED CONSTRUCTION

The EUT has a built in antenna which is integrated on the PCB, this is permanently attached antenna and meets the requirements of this section.