



# FCC TEST REPORT

**REPORT NO.:** 090110FIA01

**MODEL NO.:** IDCA-3620

**RECEIVED:** Jan. 14, 2009

**TESTED:** Jan. 14 ~ Jan. 19, 2009

**ISSUED:** Feb. 04, 2009

**APPLICANT:** ID TECH

**ADDRESS:** 10721 Walker Street, Cypress, CA 90630, USA

**ISSUED BY:** ADT (Shanghai) Corporation

**LAB LOCATION:** 2F, Building C, No.1618, Yishan rd., 201103,  
Shanghai, China

This test report consists of 34 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF, A2LA or any government agencies. The test results in the report only apply to the tested sample.





## Table of Contents

1	CERTIFICATION.....	4
2	SUMMARY OF TEST RESULTS .....	5
2.1	MEASUREMENT UNCERTAINTY .....	5
3	GENERAL INFORMATION .....	6
3.1	GENERAL DESCRIPTION OF EUT .....	6
3.2	DESCRIPTION OF TEST MODES .....	7
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST.....	7
3.2.2	TEST MODE APPLICABILITY .....	8
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS.....	9
3.4	FOR EMISSION TEST.....	9
4	TEST TYPES AND RESULTS .....	10
4.1	CONDUCTED EMISSION MEASUREMENT.....	10
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	10
4.1.2	TEST INSTRUMENTS.....	10
4.1.3	TEST PROCEDURE.....	11
4.1.4	DEVIATION FROM TEST STANDARD.....	11
4.1.5	TEST SETUP.....	12
4.1.6	EUT OPERATING CONDITIONS .....	12
4.1.7	TEST RESULTS .....	13
4.2	RADIATED EMISSION MEASUREMENT.....	15
4.2.1	LIMIT OF RADIATED EMISSION MEASUREMENT.....	15
4.2.2	TEST INSTRUMENTS.....	16
4.2.3	TEST PROCEDURE.....	17
4.2.4	DEVIATION FROM TEST STANDARD.....	17
4.2.5	TEST SETUP.....	18
4.2.6	EUT OPERATING CONDITIONS .....	18
4.2.7	TEST RESULTS .....	19
4.3	FREQUENCY STABILITY.....	23
4.3.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	23
4.3.2	TEST INSTRUMENTS.....	23
4.3.3	TEST PROCEDURE.....	24
4.3.4	DEVIATION FROM TEST STANDARD.....	24
4.3.5	TEST SETUP.....	25
4.3.6	EUT OPERATING CONDITIONS .....	25
4.3.7	TEST RESULTS .....	26
4.4	BANDEDGE.....	27
4.4.1	LIMIT OF THE FIELD STRENGTH IN THE SPECIAL BAND FOR THE PRODUCTS OPERATION WITHIN THE BAND 13.110-14.010MHZ.....	27
4.4.2	TEST INSTRUMENTS.....	27
4.4.3	TEST PROCEDURE.....	28
4.4.4	DEVIATION FROM TEST STANDARD.....	28
4.4.5	TSET SETUP.....	29
4.4.6	EUT OPERATING CONDITIONS .....	29
4.4.7	TEST RESULTS .....	29
5	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	32



6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES ..... 34



## 1 CERTIFICATION

**PRODUCT:** OmniXpress/OmniFare  
**MODEL:** IDCA-3620  
**BRAND:** ID TECH  
**APPLICANT:** ID TECH  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** Jan. 14~ Jan. 19, 2009  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.225)**  
ANSI C63.4-2003

The above equipment has been tested by **ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY :** Ray Xue , **DATE:** Feb. 04, 2009  
( Ray Xue / Engineer)

**TECHNICAL ACCEPTANCE :** Joy Zhu , **DATE:** Feb. 04, 2009  
Responsible for EMS (Joy Zhu / Manager)

**APPROVED BY :** [Signature] , **DATE:** Feb. 04, 2009  
( Wallace Pan / Director )



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.225)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -2.46dB at 27.12MHz
15.225(a)	Field Strength	PASS	Meet the requirement of limit.
15.225(d)	Radiated Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1.99dB at 230.55MHz
15.225(e)	Frequency Stability	PASS	Meet the requirement of limit.

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.55 dB
Radiated emissions	3.99 dB



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	OmniXpress/OmniFare
<b>MODEL NO.</b>	IDCA-3620
<b>FCC ID</b>	WQJ- IDCA36-0119
<b>POWER SUPPLY</b>	120Vac, 60Hz
<b>MODULATION TYPE</b>	ASK
<b>FREQUENCY RANGE</b>	13.56MHz
<b>NUMBER OF CHANNEL</b>	1
<b>ANTENNA TYPE</b>	Soldered on PCB
<b>DATA CABLE</b>	1m shielded RS232 cable with one core, undetachable
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	Adapter

**NOTE:**

1. The EUT is powered by the following adapter.

<b>ADAPTER</b>	
<b>BRAND</b>	ID TECH
<b>MODEL</b>	MW41-0500500R
<b>INPUT POWER</b>	120Vac, 60Hz, 5W
<b>OUTPUT POWER</b>	5Vdc, 500mA
<b>POWER LINE</b>	1.8m non-shielded cable with one core

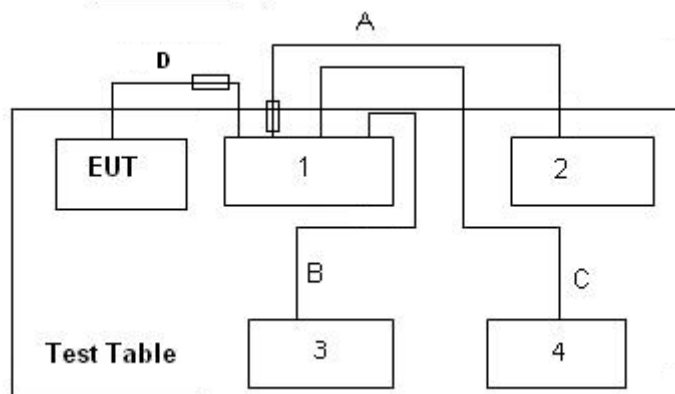
2. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

The EUT only has one channel.

TRANSMITTER	
CHANNEL	FREQUENCY (MHz)
1	13.56

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





### 3.2.2 TEST MODE APPLICABILITY

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	PLC	RE	FS	
1	√	√	√	Continuous card reading station

Where **PLC**: Power Line Conducted Emission  
**RE**: Radiated Emission  
**FS**: Frequency Stability

#### **POWER LINE CONDUCTED EMISSION TEST:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	ASK

#### **RADIATED EMISSION TEST:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ Axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
1	1	ASK	Y

#### **FREQUENCY STABILITY:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	ASK





### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.225)**  
**ANSI C63.4-2003**

All test items have been performed and recorded as per the above standards.

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

### 3.4 FOR EMISSION TEST

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PC	DELL	DCSM	E1P2012	FCC DoC Approved
2	Monitor	Samsung	743N	E1M2004	FCC DoC Approved
3	Keyboard	Logitech	Y-UR83	E1K2033	FCC DoC Approved
4	Mouse	Logitech	M-BZ96C	N/A	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
A	1.2m shielded VGA cable with one core
B	1.5m shielded USB cable without core
C	1.5m shielded USB cable without core
D	1m shielded RS232 cable with one core



## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.  
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1002	Oct. 31, 2009
LISN ROHDE & SCHWARZ	NSLK8127	E1L1001	Jul. 31, 2009
LISN ROHDE & SCHWARZ	NSLK8126	E1L1002	Oct. 31, 2009
Software ADT	ADT_Cond_V7.3.0	N/A	N/A



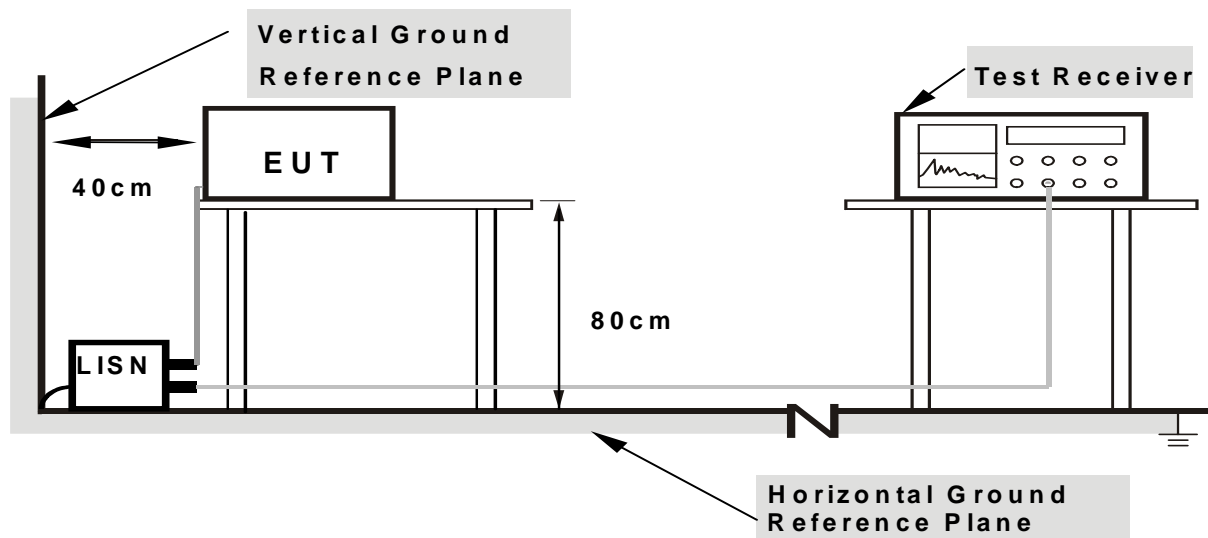
### **4.1.3 TEST PROCEDURE**

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

### **4.1.4 DEVIATION FROM TEST STANDARD**

No deviation

### 4.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.1.6 EUT OPERATING CONDITIONS

- Set up PC as the usual using configuration.
- Link EUT to PC by RS232 cable, then plug in power.
- Run manufactory's test software to make sure EUT continues emission station.
- Take away the mouse, keyboard and monitor while test.

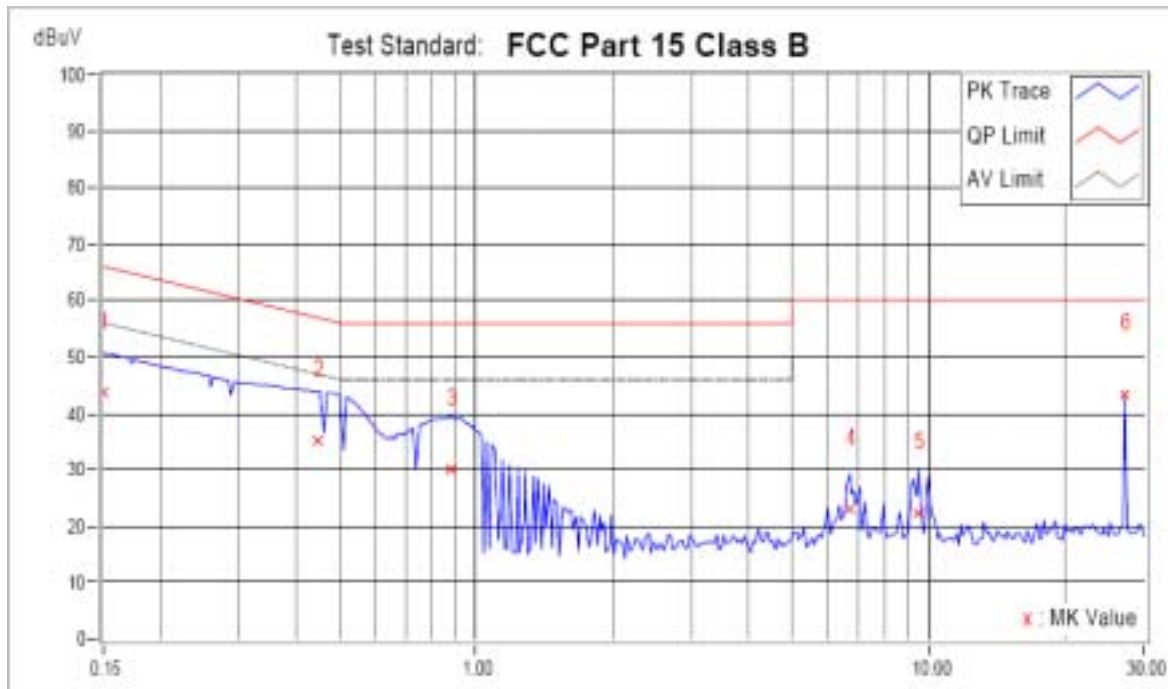


### 4.1.7 TEST RESULTS

<b>INPUT POWER</b>	120Vac, 60Hz	<b>PHASE</b>	Line 1
<b>MODULATION TYPE</b>	ASK	<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 1006hPa
<b>TESTED BY</b>	Ray Xue		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15	1.87	41.87	11.65	43.74	13.52	66.00
2	0.45	0.61	34.38	6.04	34.99	6.65	56.95	46.95	-21.96	-40.30
3	0.88	0.55	29.45	-1.06	30.00	-0.51	56.00	46.00	-26.00	-46.51
4	6.71	0.88	22.32	16.81	23.20	17.69	60.00	50.00	-36.80	-32.31
5	9.50	0.94	21.35	0.14	22.29	1.08	60.00	50.00	-37.71	-48.92
6	27.13	1.54	42.01	42.01	43.55	43.55	60.00	50.00	-16.45	-6.45

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

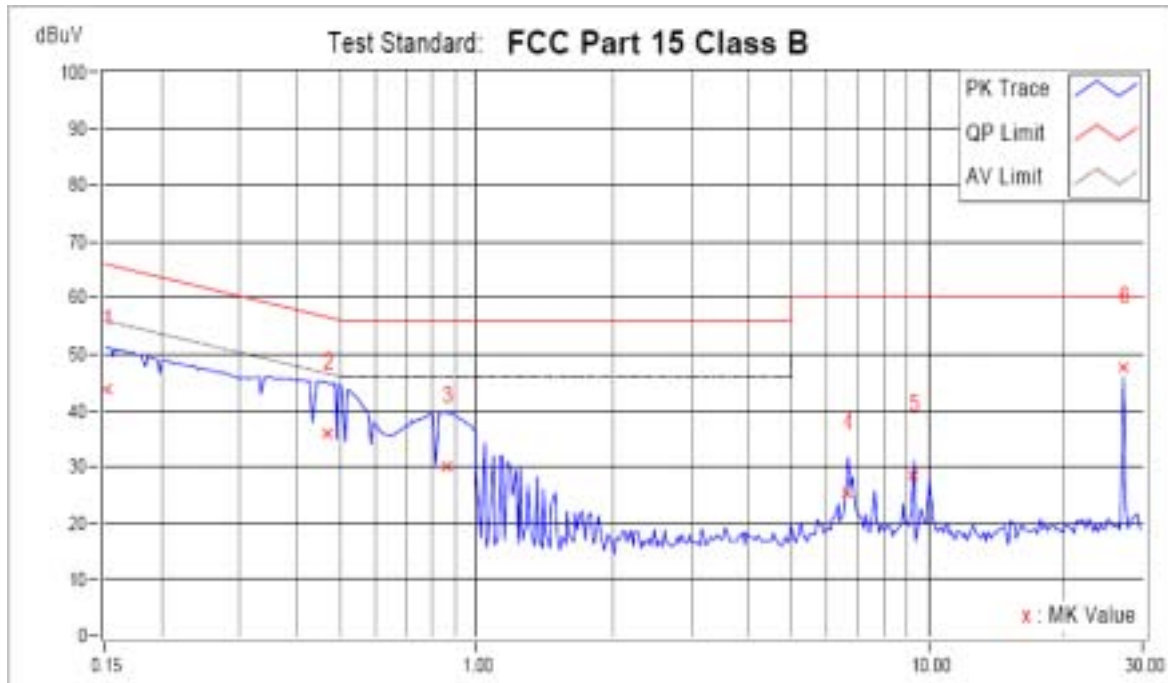




<b>INPUT POWER</b>	120Vac, 60Hz	<b>PHASE</b>	Line 2
<b>MODULATION TYPE</b>	ASK	<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 1006hPa
<b>TESTED BY</b>	Ray Xue		

No	Freq. [MHz]	Corr. Factor [dB]	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15	1.83	41.89	11.80	43.72	13.63	65.93
2	0.47	0.60	35.34	4.81	35.94	5.41	56.58	46.58	-20.64	-41.17
3	0.87	0.64	29.53	-0.23	30.17	0.41	56.00	46.00	-25.83	-45.59
4	6.66	0.80	24.47	18.78	25.27	19.58	60.00	50.00	-34.73	-30.42
5	9.33	0.89	27.46	13.73	28.35	14.62	60.00	50.00	-31.65	-35.38
6	27.12	1.48	46.00	46.06	47.48	47.54	60.00	50.00	-12.52	-2.46

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMIT OF RADIATED EMISSION MEASUREMENT

According to 15.225 the field strength of Emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)
13.110 – 14.010	Quasi-Peak
	124

Field strength limits are at the distance of 3 meters, Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



## 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Agilent	E4403B	E1S1001	Jul. 31, 2009
Receiver R&S	ESCS30	E1R1001	Oct. 31, 2009
Trilog Broadband Antenna Schwarzbeck	VULB 9168	E1A1001	Aug. 31, 2009
Active Loop Antenna Com-power	AL-130	E1A1010	Aug. 31, 2009
Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Sep. 30, 2009
Preamplifier Agilent	8447D	E1A2001	Oct. 01, 2010
Preamplifier Agilent	8449B	E1A2002	Aug. 01, 2009
Software ADT	ADT_Radiated_V7.5	N/A	N/A





### 4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For test below 30MHz, we use loop antenna and its height fixed by 1m above the ground.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

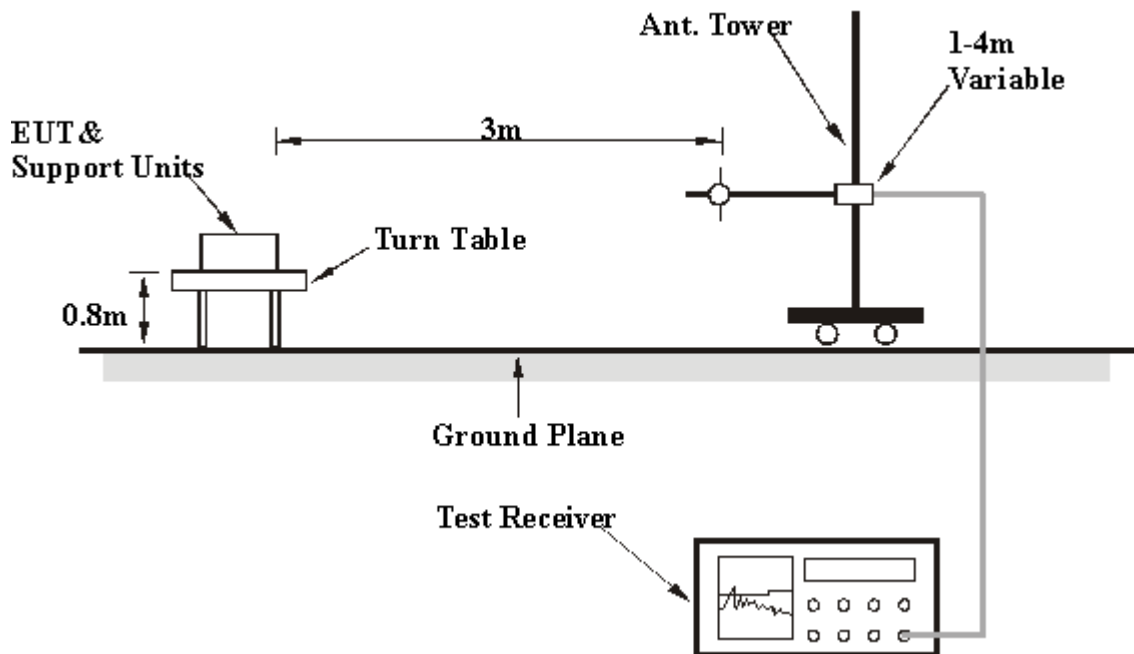
**NOTE:**

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz. And 9kHz and 30kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 30MHz

### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

## 4.2.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



### 4.2.7 TEST RESULTS

<b>INPUT POWER</b>	120Vac, 60 Hz	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 68%RH, 1006hPa	<b>DETECTOR FUNCTION</b>	Peak
<b>TESTED BY</b>	Ray Xue		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA 0 DEGREE OPEN AT 3 M								
No.	Freq. [MHz]	Factor (dB)	Reading Value [dB (uV)]	Emission Level [dB (uV)]	Limit [dB (uV)]	Margin (dB)	Antenna Height (m)	Table Angle (Degree)
1	13.56	11.59	67.55	79.14	124	-44.86	99	0

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA 90 DEGREE OPEN AT 3 M								
No.	Freq. [MHz]	Factor (dB)	Reading Value [dB (uV)]	Emission Level [dB (uV)]	Limit [dB (uV)]	Margin (dB)	Antenna Height (m)	Table Angle (Degree)
1	13.56	11.59	67.86	79.45	124	-44.55	99	0

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. "\*" = Fundamental frequency.
  6. Loop Antenna was used for all frequency below 30MHz.



<b>INPUT POWER</b>	120Vac, 60Hz	<b>FREQUENCY RANGE</b>	9kHz – 30MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 68%RH, 1006hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Ray Xue		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA 0 DEGREE OPEN AT 3 M								
No.	Freq. [MHz]	Factor (dB)	Reading Value [dB (uV)]	Emission Level [dB (uV)]	Limit [dB (uV)]	Margin (dB)	Antenna Height (m)	Table Angle (Degree)
1	15.42	11.30	9.36	20.66	69.54	-48.89	99	327
2	27.12	9.88	29.50	39.37	69.54	-30.17	99	352

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA 90 DEGREE CLOSE AT 3 M								
No.	Freq. [MHz]	Factor (dB)	Reading Value [dB (uV)]	Emission Level [dB (uV)]	Limit [dB (uV)]	Margin (dB)	Antenna Height (m)	Table Angle (Degree)
1	22.86	10.73	14.56	25.29	69.54	-44.25	99	346
2	27.12	9.88	34.57	44.44	69.54	-25.10	99	19

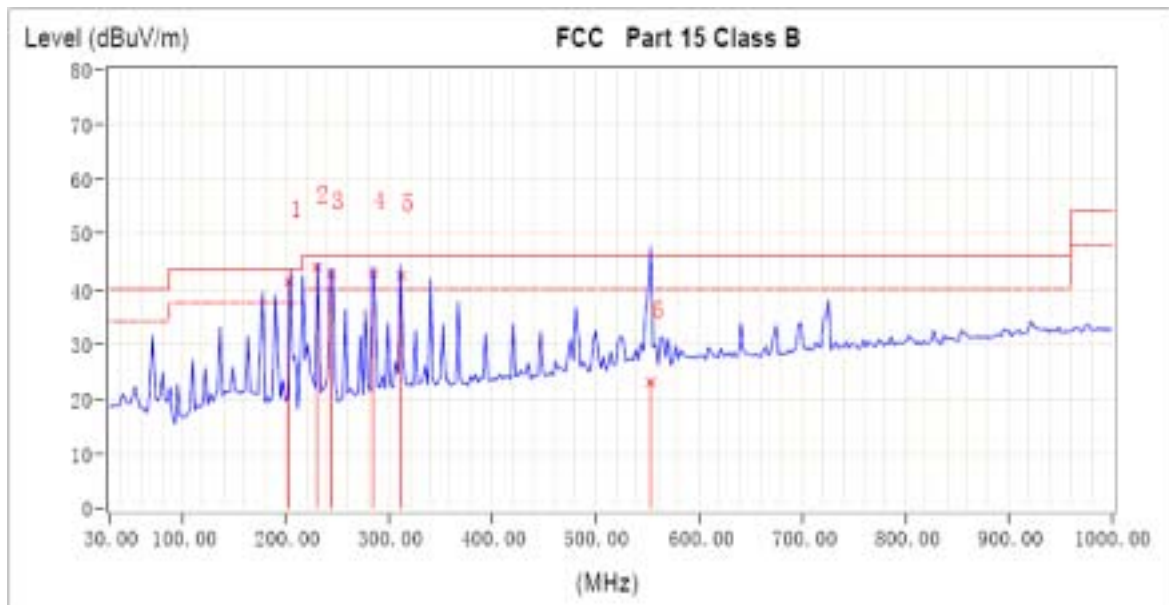
- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. Loop Antenna was used for all frequency below 30MHz.



<b>TEST MODE</b>	Mode 1	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	32 deg. C, 57% RH, 998hPa	<b>TESTED BY:</b> Brain Chen	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Factor (dB)	Reading (dbuv/m)	Emission (dbuv/m)	Limit (dbuv/m)	Margin (dB)	Tower cm	Table deg
1	203.43	13.01	28.33	41.34	43.50	-2.16	99	107
2	230.55	14.54	29.47	44.01	46.00	-1.99	100	335
3	244.10	14.77	27.95	42.73	46.00	-3.27	100	352
4	284.80	16.01	26.65	42.67	46.00	-3.33	100	3
5	311.90	16.94	25.48	42.42	46.00	-3.58	100	6
6	553.80	22.15	0.84	22.98	46.00	-23.02	100	192

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.

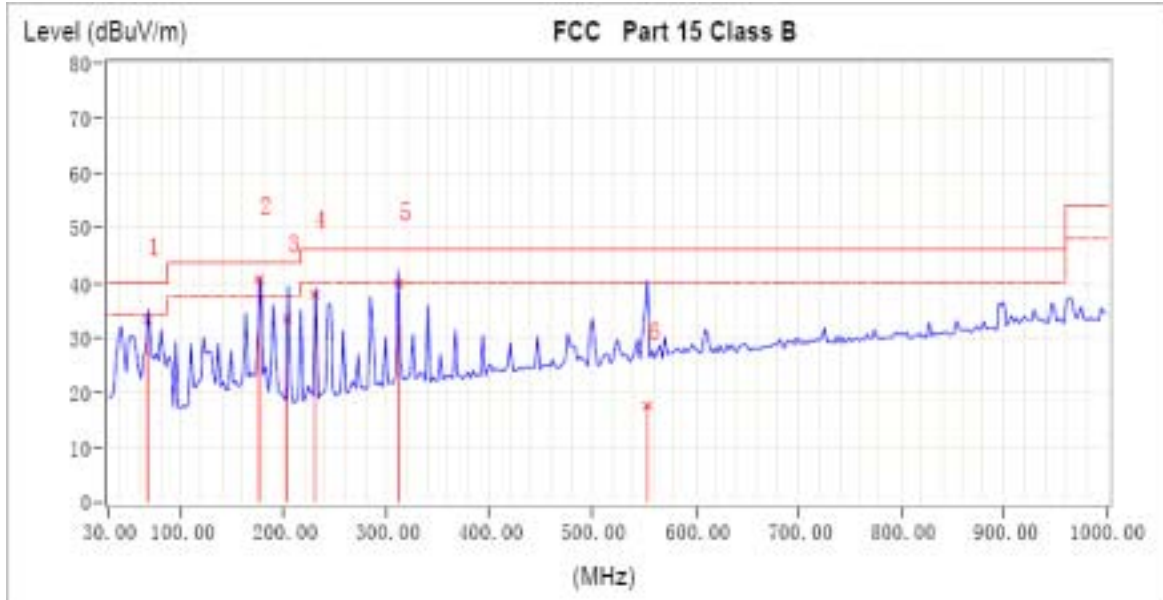




<b>TEST MODE</b>	Mode 1	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	32 deg. C, 57% RH, 998hPa	<b>TESTED BY:</b> Brain Chen	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Factor (dB)	Reading (dbuv/m)	Emission (dbuv/m)	Limit (dbuv/m)	Margin (dB)	Tower cm	Table deg
1	67.80	13.38	19.79	33.16	40.00	-6.84	99	287
2	176.30	15.18	25.41	40.60	43.50	-2.90	99	207
3	203.43	13.01	20.41	33.42	43.50	-10.08	99	248
4	230.55	14.54	23.26	37.80	46.00	-8.20	0	0
5	311.90	16.94	22.84	39.78	46.00	-6.22	99	233
6	553.80	22.15	-4.62	17.52	46.00	-28.48	99	327

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.





## 4.3 FREQUENCY STABILITY

### 4.3.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum R&S	FSP	E1S1002	Jul. 31, 2009
Digital Meter FLUKE	15B	E2M7003	Jul. 02, 2009
Temperature & humidity Chamber KING SON	KTHC - 715TBS	E3004	Jul. 21, 2009



### **4.3.3 TEST PROCEDURE**

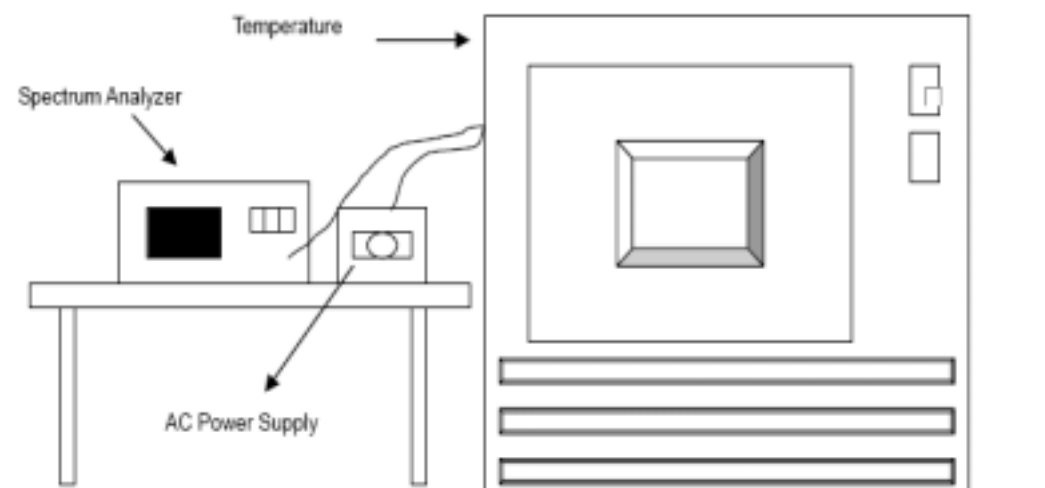
- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the following temperatures in the under table until to the lowest.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### **4.3.4 DEVIATION FROM TEST STANDARD**

No deviation



### 4.3.5 TEST SETUP



### 4.3.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



### 4.3.7 TEST RESULTS

OPERATING FREQUENCY: 13.5616MHz						LIMIT: ± 0.01%			
TEMP. ( )	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	120	13.5616	0	13.5616	0	13.5618	0.0015	13.5618	0.0015
40	120	13.5616	0	13.5616	0	13.5618	0.0015	13.5618	0.0015
30	120	13.5618	0.0015	13.5618	0.0015	13.5616	0	13.5618	0.0015
20	120	13.5616	0	13.5616	0	13.5616	0	13.5616	0
10	120	13.5616	0	13.5616	0	13.5616	0	13.5618	0.0015
0	120	13.5618	0.0015	13.5618	0.0015	13.5618	0.0015	13.5618	0.0015
-10	120	13.5618	0.0015	13.5618	0.0015	13.5622	0.0044	13.5618	0.0015
-20	120	13.5622	0.0044	13.5622	0.0044	13.5622	0.0044	13.5622	0.0044

TEMP. ( )	POWER SUPPLY (Vdc)	0 MINUTE	
		(MHz)	(%)
20	138	13.5616	0
20	120	13.5616	0
20	102	13.5616	0



## 4.4 BANDEDGE

### 4.4.1 LIMIT OF THE FIELD STRENGTH IN THE SPECIAL BAND FOR THE PRODUCTS OPERATION WITHIN THE BAND 13.110-14.010MHZ

According to 15.225

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

The limit of the field strength in the special band at the test distance of 3 meters shall not exceed the following:

FREQUENCIES (MHz)	FIELD STRENGTH (dBuV/m)
13.11-13.41,13.71-14.01	80.5
13.41-13.553,13.567-13.71	90.5
13.553-13.567	124

### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum R&S	FSP	E1S1002	Jul. 31, 2009
Active Loop Antenna Com-power	AL-130	E1A1010	Aug. 31, 2009
Software ADT	ADT_Radiated_V7.5	N/A	N/A



#### 4.4.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna.
- c. The antenna is a loop antenna, with the antenna height 1 meter from the ground. Both 0 and 90 degrees of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case, and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

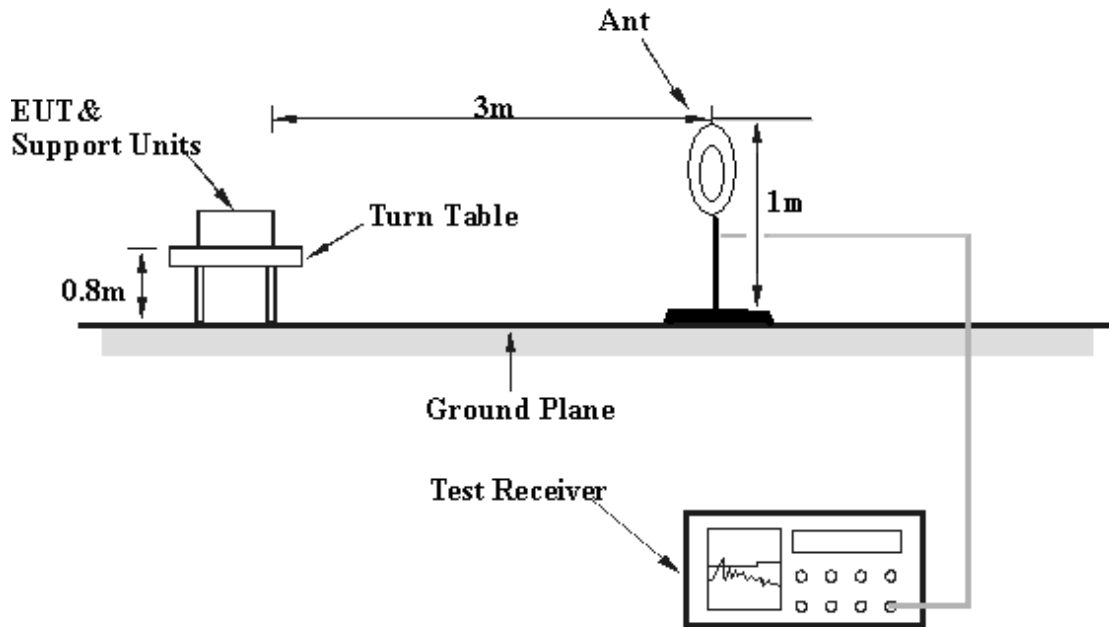
**NOTE:**

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz and 30kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 30MHz.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.4.5 TSET SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.4.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

### 4.4.7 TEST RESULTS

The following two plots show the emission in the special band.

Loop antenna: 0 degree

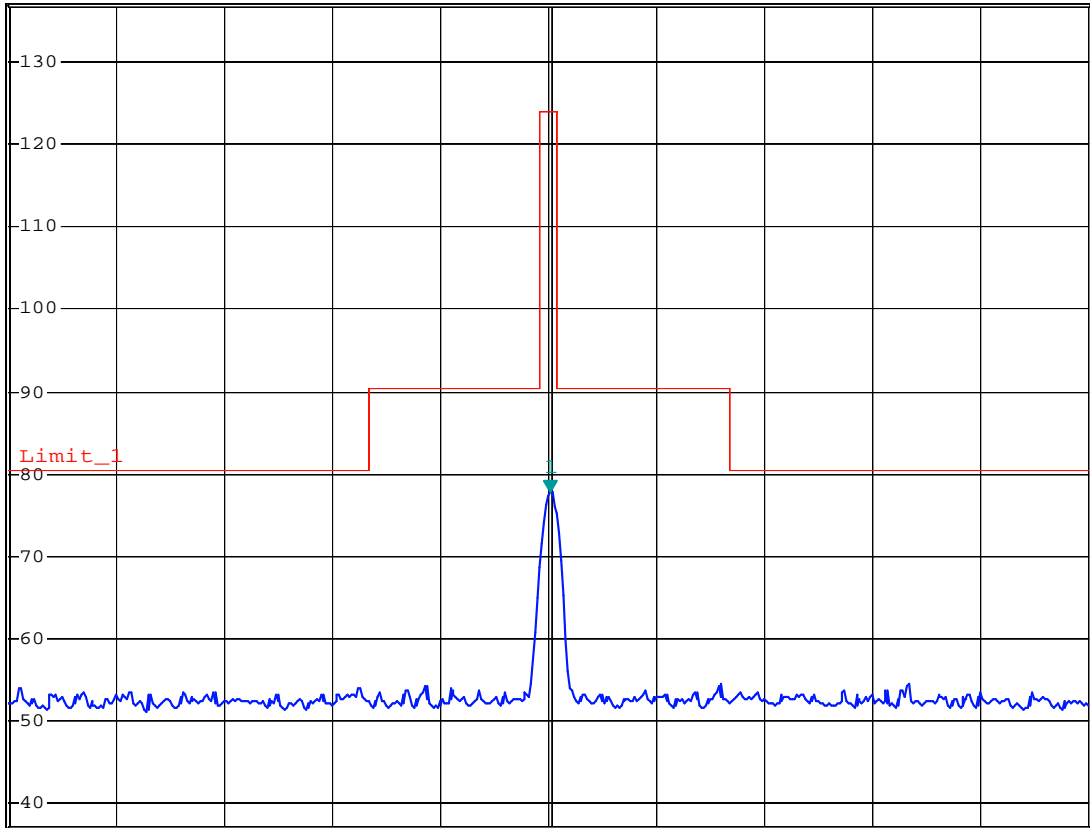


\*RBW 10 kHz    Marker 1 [T1 ]  
\*VBW 30 kHz                    77.78 dBμV  
SWT 10 ms                    13.561800000 MHz

Ref 137 dBμV

\*Att 70 dB

1 PK  
VIEW



Start 13.11 MHz                    90 kHz/                    Stop 14.01 MHz

Date: 16.JAN.2009 13:15:00

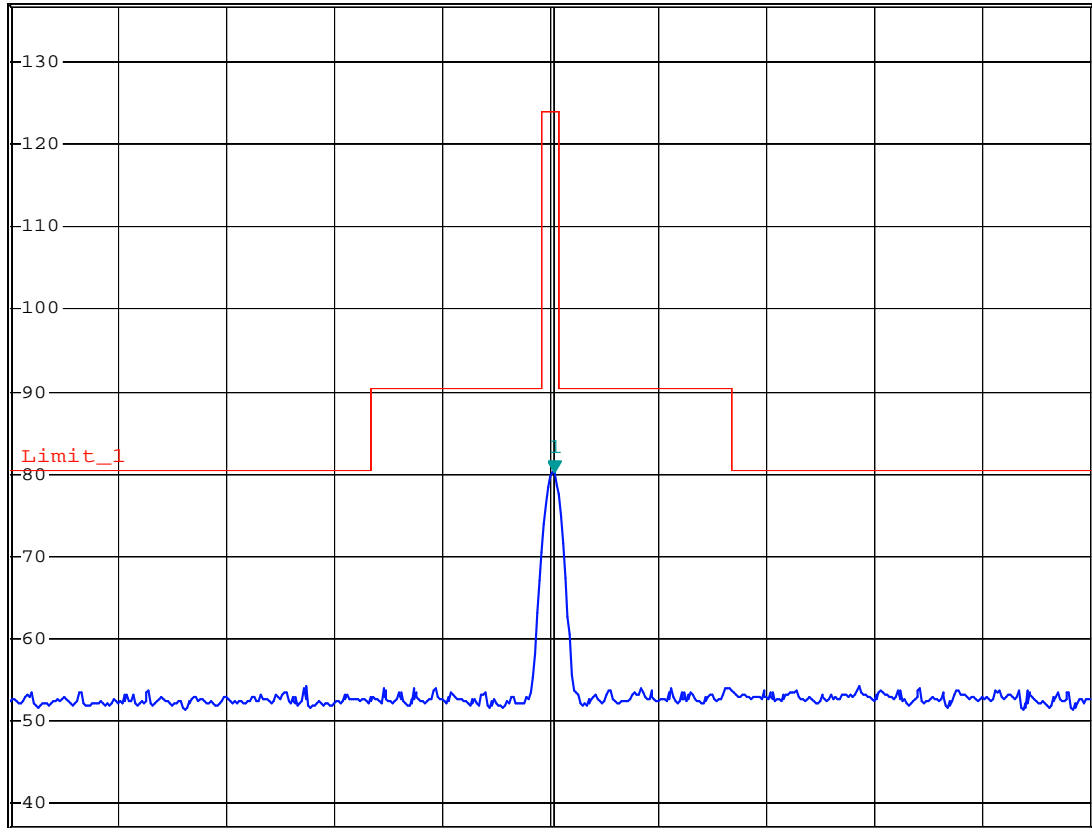
Loop antenna: 90 degree



\*RBW 10 kHz    Marker 1 [T1 ]  
\*VBW 30 kHz                    80.14 dBμV  
SWT 10 ms                    13.563058000 MHz

Ref 137 dBμV                    \*Att 70 dB

1 PK  
VIEW



Start 13.11 MHz                    90 kHz/                    Stop 14.01 MHz

Date:            16.JAN.2009    13:09:55

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST





### RADIATED EMISSION TEST





## 6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT (Shanghai) Corporation, were founded in 2004 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC, A2LA
<b>Japan</b>	VCCI
<b>Canada</b>	INDUSTRY CANADA
<b>P.O.C.</b>	CNAS

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.cnadt.com](http://www.cnadt.com). If you have any comments, please feel free to contact us at the following:

**Shanghai EMC / RF / Auto Lab:**

Tel: +86-21-64659091

Fax: +86-21-64659092

**Email:** [service@adt-sh.com](mailto:service@adt-sh.com)

**Web Site:** [www.cnadt.com](http://www.cnadt.com)

The address and road map of all our labs can be found in our web site also.

**--- END ---**