

FCC PART 15 TEST REPORT

Applicant : Apices Communication Co., Ltd.
Equipment : Wireless Audiocall Handsfree
Model : APX-AC

Exhibit B
Test Report

Test Report Certification

Best Laboratory Co., Ltd.

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Applicant : Apices Communication Co., Ltd.
Address : 3F, NO. 115, Ming De Road., Hsintien, Taipei , Taiwan, R.O.C.
Equipment : Wireless Audiocall Handsfree
FCC ID : P2BAPX-AC
Model : APX-AC
Device's Class : Intentional Radiator
Measurement Standard : FCC Part 15.239
Measurement Procedure : ANSI C63.4-1992
Operating Voltage : 1.5 VDC
Test Result : **Compliance** (Detail showed in the test report)
Sample Received : May 11, 2001
Test Date : Aug. 24, 2001
Report Number : RE-U02-FC-279
Test Firm : No. 336, Ba Lian Rd., Sec. 1,
Hsi Chih City, Taipei Hsien, Taiwan, R.O.C.
Remark:
(1) The test report is only relating to the sample tested
(2) The test report shall not be reproduced except in full, without the written approval of Best Laboratory Co., Ltd.
(3) The test report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.
(4) The test result of this report are traceable to the national or international standards.

Prepared : _____
JACKY WU

Approved : _____ (Title: Quality Department Manager)
JEFF CHIU

Date Issued :

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1. General Information

1.1 EUT Description

Applicant : Apices Communication Co., Ltd.

Address : 3F, NO. 115, Ming De Road., Hsintien, Taipei , Taiwan, R.O.C.

Equipment : Wireless Audiocall Handsfree

Model No. : APX-AC

Kind of Product : Engineer Sample

Condition of EUT : Good

Device's Class : Intentional Radiator

Operation Voltage : 1.5VDC

Output Ports :
Battery Cell: There is one battery, 1.5VDC, size AAA, putted in the battery cell of EUT.

1.2 Test System Detail

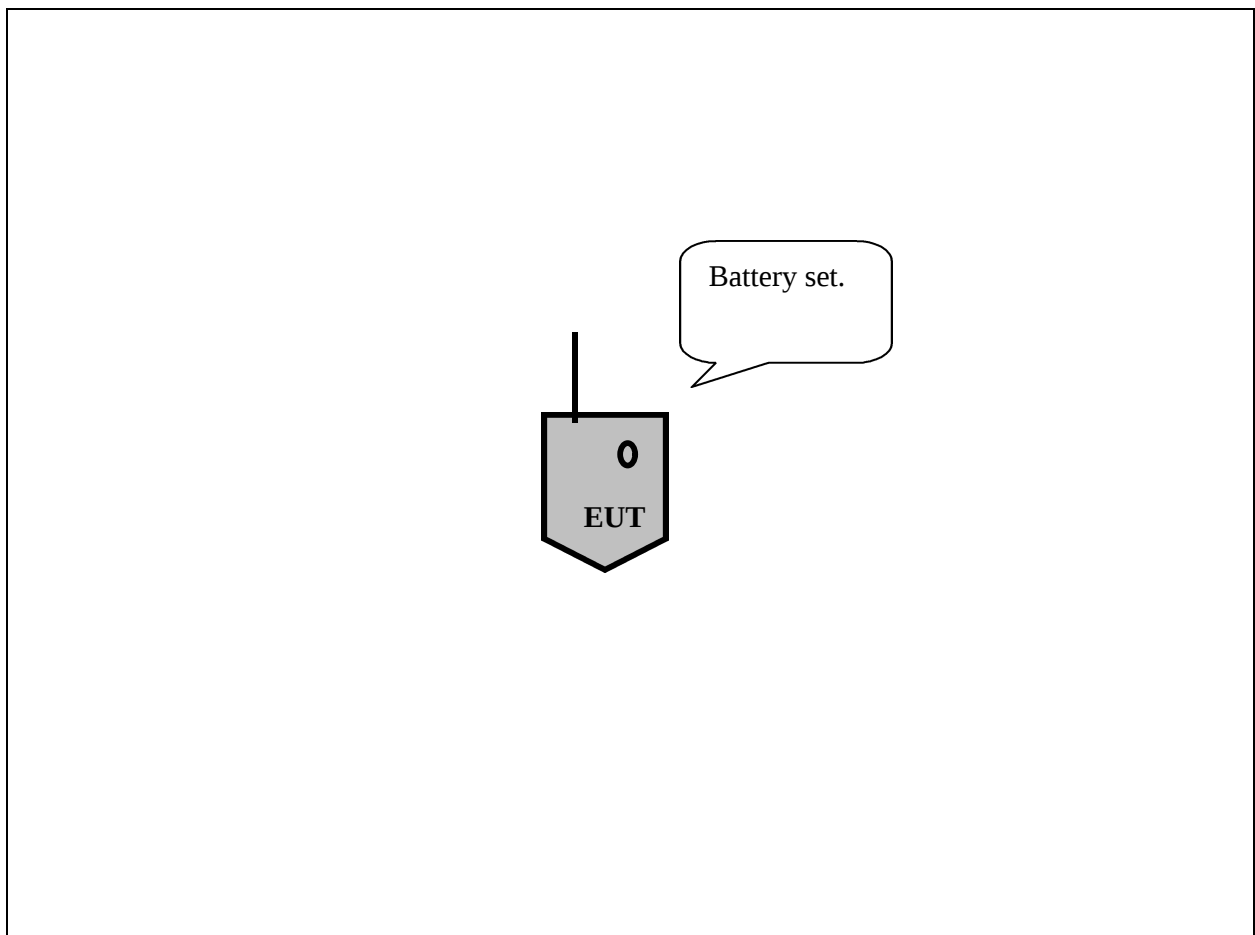
N / A

1.3 EUT Configuration

- (1) Put the battery into the battery cell.
- (2) Press one button to let EUT continuously transmit.

(***PS: Please refers to the Photograph***)

Drawing of Configuration



1.4 EUT Exercise Software

N / A

1.5 Test Performed

Conducted emissions were investigated over the frequency range from 0.45MHz to 30MHz using a receiver which bandwidth is set at 9KHz.

Radiated emissions were investigated over the frequency range from 30MHz to 1000MHz using a receiver which bandwidth is set at 120KHz. Radiated measurement was performed at distance that from an antenna to EUT is 3 meters.

To demonstrate that EUT complied with FCC regulation Part 15.239(b), the EMI receiver was set at bandwidth=120KHz, when the fundamental frequency was investigated.

To demonstrate that EUT complied with FCC regulation Part 15.239(a), the EMI receiver was set at Span=200KHz, Resolution Bandwidth=2KHz.

When the tests are performed, the input signal was generated by one signal generator which output 1KHz, sine-wave signal. To set the maximum input signal, adjusting output of signal generator and watching the changes of EUT's signal. When the EUT's signal is stable, no change, stop adjusting the output of signal generator. At this time, EUT will get the maximum input signal.

The testing result of pretest was shown out that the testing mode: "Antenna Fully Extended " is worse than the testing mode: " Antenna Fully Retracted " mode. So, the final measurement was made on the "Antenna Fully Extended " mode.

The testing result of pretest was shown out that the " Transmitting " mode is worse than the " Standby " mode. So, the final measurement was made on the " Transmitting " mode.

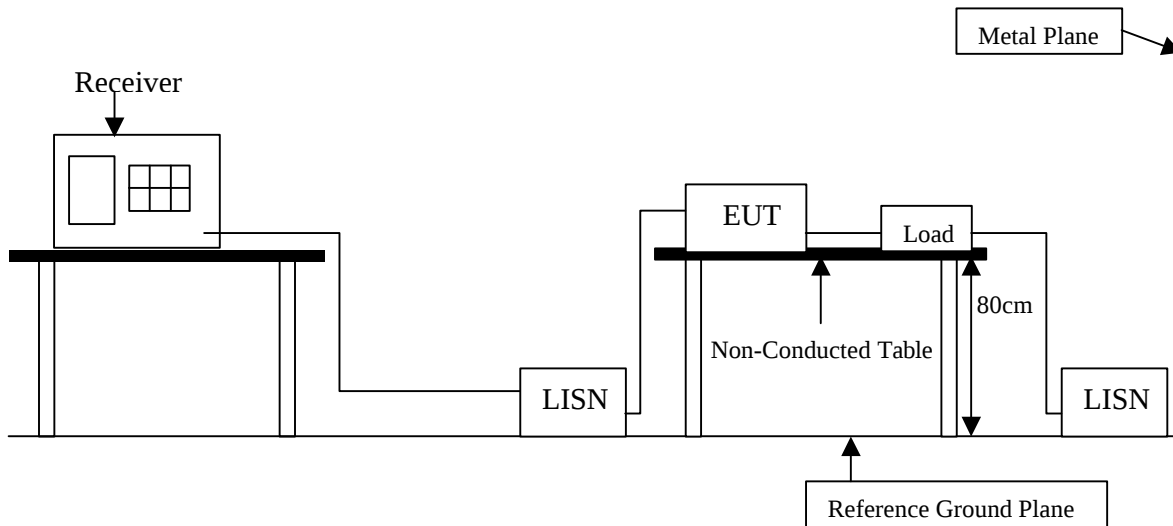
2 Conducted Emission Measurement

2.1 Test Equipment

No.	Instrument	Manufacture	Model	Serial No.	Last Calibrate
1.	LISN (EUT)	Rolf Heine	NNB-2/16Z	99084	May 14, 2001
2.	LISN (AXE)	Rolf Heine	NNB-2/16Z	99086	May 14, 2001
3.	EMI Receiver	Rohde & Schwarz	ESI 7	830154/001	June 27, 2001
4.	50Ω Terminator	Amphenol	46650-51	N/A	Dec. 10, 2000
5.	RF Cable	Belden	M17/158	MIL-C-17	Jan. 20, 2001

Remark: All equipment upon which need to calibrated are with calibration period of one year.

2.2 Test Set-Up



2.3 Limit

CISPR 22

Frequency	Limit (dBμV)			
	Class A		Class B	
MHz	QP	Avg.	QP	Avg.
0.15 ~ 0.50	79	66	66 ~ 56	56 ~ 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30.0	73	60	60	50

FCC Part 15

Frequency	Limit (dBμV)	
	Class A	Class B
MHz	QP	QP
0.50 ~ 1.705	60	48.0
1.705 ~ 30	69.5	48.0

Remark: 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 (LISN). It provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μ H coupling impedance with 50 ohm termination. (Please refers to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to ANSI C63.4-1992 regulation: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter (Rohde & Schwarz) is set at 9KHz.

2.5 Test Specification

According to the ANSI C63.4-1992

2.6 Test Result

N / A

2.7 Deviation from the Test Method

N / A

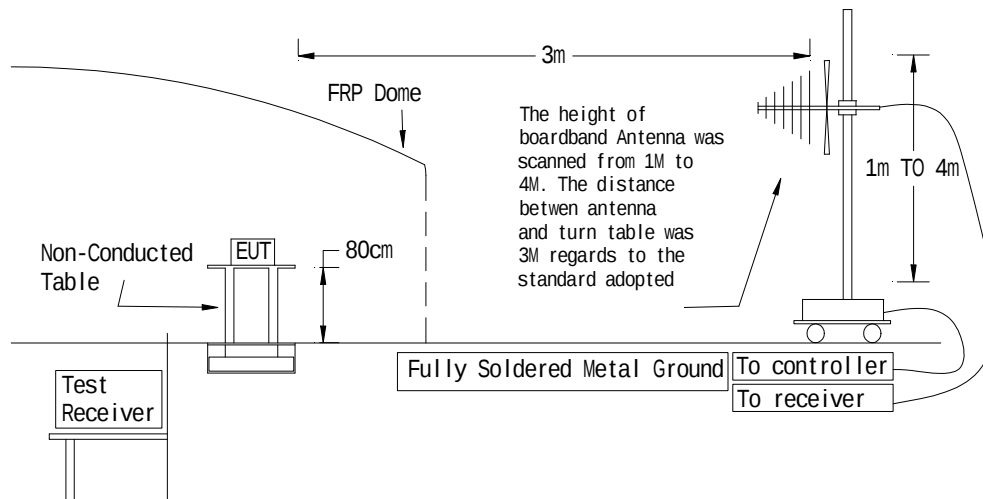
3. Radiated Emission Measurement

3.1 Test Equipment List

No.	Instrument	Manufacture	Model	Serial No.	Last Calibrate
1.	Antenna	Mess-Elektronik	VULB 9160	9160-3078	Jan. 19, 2001
2.	EMI Receiver	Rohde & Schwarz	ESI 7	830154/001	June 27, 2000
3.	RF Cable	Adventest	AD-N-CA-01	2000-0220	Jan. 20, 2001
4.	OATS	Bestlab	N/A	OATS#1	May 28, 2001

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

3.2 Test Setup



3.3 Limit

CISPR 22					FCC Part 15				
Frequency					Frequency	Class A		Class B	
MHz	Distance (Meter)	Limit (dB μ V/m)	Distance (Meter)	Limit (dB μ V/m)	MHz	Distance (Meter)	Limit (dB μ V/m)	Distance (Meter)	Limit (dB μ V/m)
30 ~ 230	10	40	10	30	30 ~ 88	10	39	3	40
					88 ~ 216	10	43.5	3	43.5
230 ~ 1000	10	47	10	37	216 ~ 960	10	46.5	3	46
					960 Above	10	49.5	3	54

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

3.4 Test Procedure

The EUT and its simulators are placed on turn table, non-ducted and wooden, which is 0.8 meter above ground. The turn table rotates 360 degree to determine the position of the maximum emission level. The EUT was positioned such that distance from antenna to the EUT is 3 meters. The antenna is moved up and down between 1 meter to 4 meter to receive the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interference cables must be manipulated according to ANSI C63.4-1992 regulation: the test procedure of the radiated emission measurement.

The bandwidth set on the field strength is 120KHz when the frequency range is below 1GHz

3.5 Test Specification

According to ANSI C63.4-1992

3.6 Test Result

The emissions that come from the EUT was below the specified limits. The worst case of conducted emissions measurement are shown in the appendix A. The acceptance criterion was met and the EUT has pass the measurement.

3.7 Deviation from the Test Method

No Deviation

4. Modification List for EMC Complying Test



5 Appendix

Appendix A: Summary of Test Result

Appendix B: The test photograph of EUT

Appendix C: The Detail Photograph of EUT

Appendix A: Summary of Test Result

The test result in the emission and immunity were performed according to the requirement of measurement standard and procedures. Best Laboratory is assumed full responsibility for the accuracy and completeness of these measurements. The Test data of the emissions and immunity are listed as the appendix data.

All these tests are were carried out with the EUT in normal operation, which was defined as:

******* EMC Test Result: The EUT has been pass the all measurements. *******

The uncertainty is calculated in accordance with NAMAS NIS 81, the total uncertainty for this test is as follows:

⇒ Emission Test

- * Uncertainty in the Conducted Emission Test: <±2.0dB
- * Uncertainty in the Field Strength measurement: <±4.0dB

Conducted Emission Test

N / A

Field Strength Measurement (Inside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree,

Testing Mode : Volume ON

Polarity : Vertical

Temperature : 27°C

Humidity : 65%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
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88.590	35.07	245	1.00	8.68	43.75	47.96	-4.21

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96 \text{ (dB}\mu\text{V/m)}$

Field Strength Measurement (Inside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree

Testing Mode : Volume ON

Polarity : Horizontal

Temperature : 27°C

Humidity : 65%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
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88.590	37.34	254	2.75	8.68	46.02	47.96	-1.94

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96 \text{ (dB}\mu\text{V/m)}$

Field Strength Measurement (Outside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree,

Testing Mode : Volume ON

Polarity : Vertical

Temperature : 27°C

Humidity : 65%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
53.220	16.35	125	1.00	11.64	27.99	40.00	-12.01
106.410	28.14	185	1.00	10.31	38.45	43.50	-5.05
123.960	27.99	87	1.00	11.67	39.66	43.50	-3.84
159.600	19.53	174	1.00	13.46	32.99	43.50	-10.51

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96$ (dBμV/m)

Field Strength Measurement (Outside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree

Testing Mode : Volume ON

Polarity : Horizontal

Temperature : 27°C

Humidity : 65%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
53.220	10.01	142	2.55	11.64	21.65	40.00	-18.35
70.770	10.37	172	3.51	9.50	19.87	40.00	-20.13
106.410	11.51	222	2.11	10.31	31.99	43.50	-11.51
124.230	29.08	188	2.74	11.69	40.77	43.50	-2.73
265.980	123.93	333	2.89	12.51	25.44	46.00	-20.56
301.399	11.78	111	3.05	13.88	25.66	46.00	-20.34

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96$ (dBμV/m)

Field Strength Measurement (Outside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree

Testing Mode : Volume OFF

Polarity : Vertical

Temperature : 23°C

Humidity : 78%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
53.221	13.57	115	1.00	11.64	25.21	40.00	-14.79
70.770	18.15	341	1.00	9.50	27.65	40.00	-12.35
88.590	28.54	215	1.00	8.68	37.22	47.96	-10.74
106.410	23.43	211	1.00	10.31	33.74	43.50	-9.76
123.960	19.20	67	1.00	11.67	30.87	43.50	-12.63
141.780	11.37	255	1.00	12.77	24.14	43.50	-19.36
159.600	9.25	188	1.00	13.46	22.71	43.50	-20.79

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96$ (dBμV/m)

Field Strength Measurement (Outside 200KHz Band)

Date Measurement Performed: Nov. 14, 2001

EUT : Wireless Audiocall Handsfree

Testing Mode : Volume OFF

Polarity : Horizontal

Temperature : 23°C

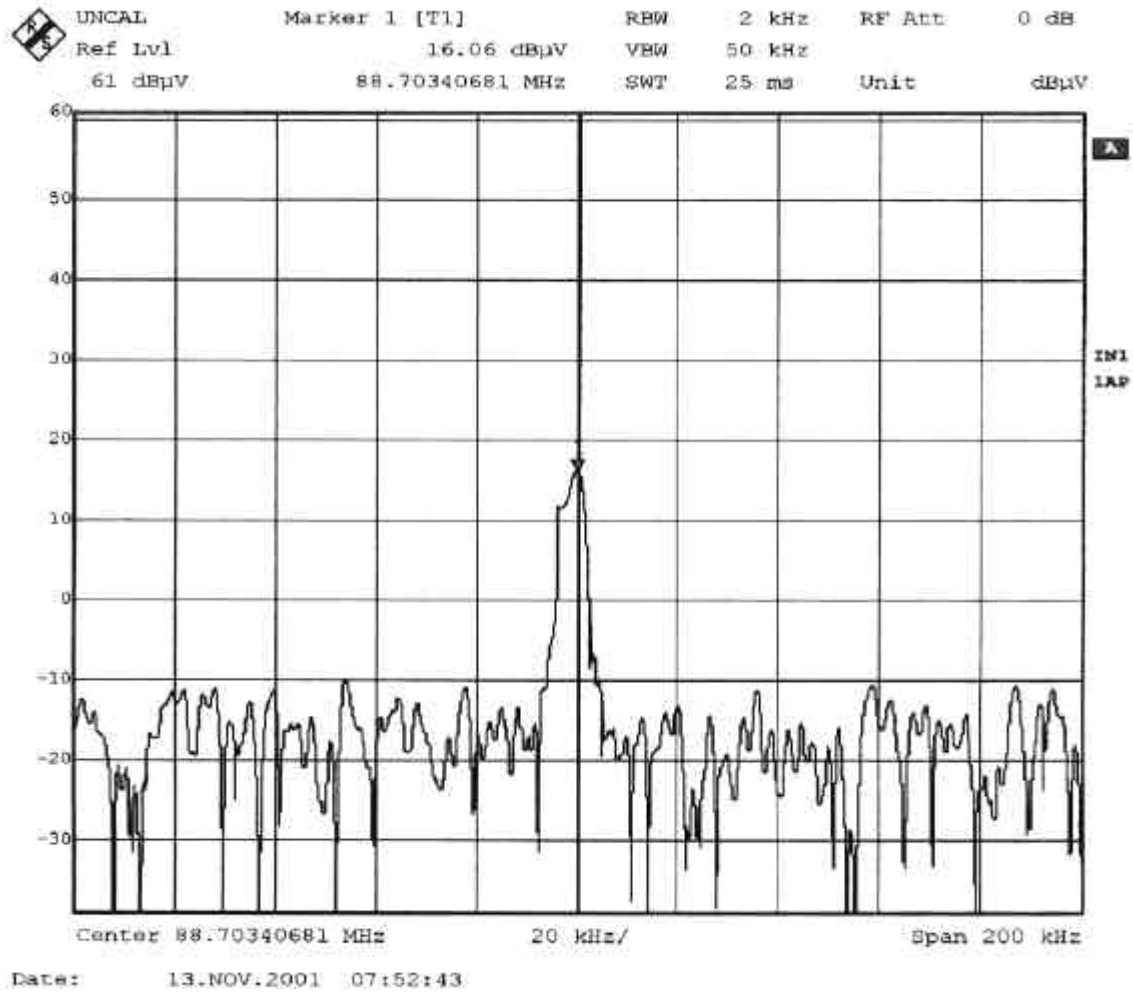
Humidity : 78%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
70.770	6.60	152	2.51	9.50	16.10	40.00	-23.90
88.590	21.37	274	2.75	8.68	30.05	47.96	-17.91
106.410	10.80	292	2.31	10.31	21.11	43.50	-22.39
124.230	9.08	118	2.74	11.69	20.77	43.50	-22.73

Remark:

1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
Reading Amplitude + Correction Factor = Corrected Amplitude.
3. $20 \times \log 250 = 47.96 \text{ (dBμV/m)}$

The Plot of 200KHz Bandwidth



Appendix B: The Test Photograph of EUT

The Photograph of Conducted Emission Test

N / A

The Photograph of Radiated Emission Test

