

FCC TEST REPORT

REPORT NO.: RF920814R02

MODEL NO.: 1160

RECEIVED: Aug. 14, 2003

TESTED: Aug. 18 ~ Sept. 2, 2003

APPLICANT: SYNTECH INFORMATION CO., LTD.

ADDRESS: 8F, No.210, Ta-Tung Rd., Sec.3, Hsi-Chih,
Taipei Hsien, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei,
Taiwan, R.O.C.

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0528
ILAC MRA



Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT : Wireless Scanner
BRAND NAME : CipherLab
MODEL NO : 1160
TEST ITEM: Engineering Sample
APPLICANT : SYNTECH INFORMATION CO., LTD.
STANDARDS : 47 CFR Part 15, Subpart C (15.249)
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Aug. 18 ~ Sept. 2, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY: Wendy Liao, **DATE:** Sept. 08, 2003
Wendy Liao

APPROVED BY: Dr. Alan Lane, **DATE:** Sept. 08, 2003
Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Paragraph	Test Type	Result	Remark
15.207	Conducted Emission Test	N/A	3.7VDC from batteries
15.249	Radiated Emission Test	PASS	Minimum passing margin is -10.30dB at 957.85MHz
15.249	Band Edge Measurement	PASS	Meet the requirement of limit

NOTE: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Scanner
MODEL NO.	1160
POWER SUPPLY	3.7VDC from batteries
MODULATION TYPE	FHSS
CARRIER FREQUENCY OF EACH CHANNEL	2402MHz ~ 2480MHz
BANDWIDTH OF EACH CHANNEL	1MHz
NUMBER OF CHANNEL	79
ANTENNA TYPE	Patch antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is the transmitter part of a Wireless Scanner.
2. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 15, Subpart C. (15.249)
ANSI C63.4 : 1992

All tests 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.

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

NA

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.249 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)	
	Peak	Average
2400 ~ 2483.5	114	94

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

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
* HP Spectrum Analyzer	8594E	3911A07465	Jul. 07, 2004
* HP Preamplifier	8447D	2944A10386	Aug. 12, 2004
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
SCHAFFNER TEST RECEIVER	SCR 3501	409	Jan. 26, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	Jul. 15, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V 5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 30, 2003
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 30, 2003

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 10.
5. The VCCI Site Registration No. is R-1625.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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.
- 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 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

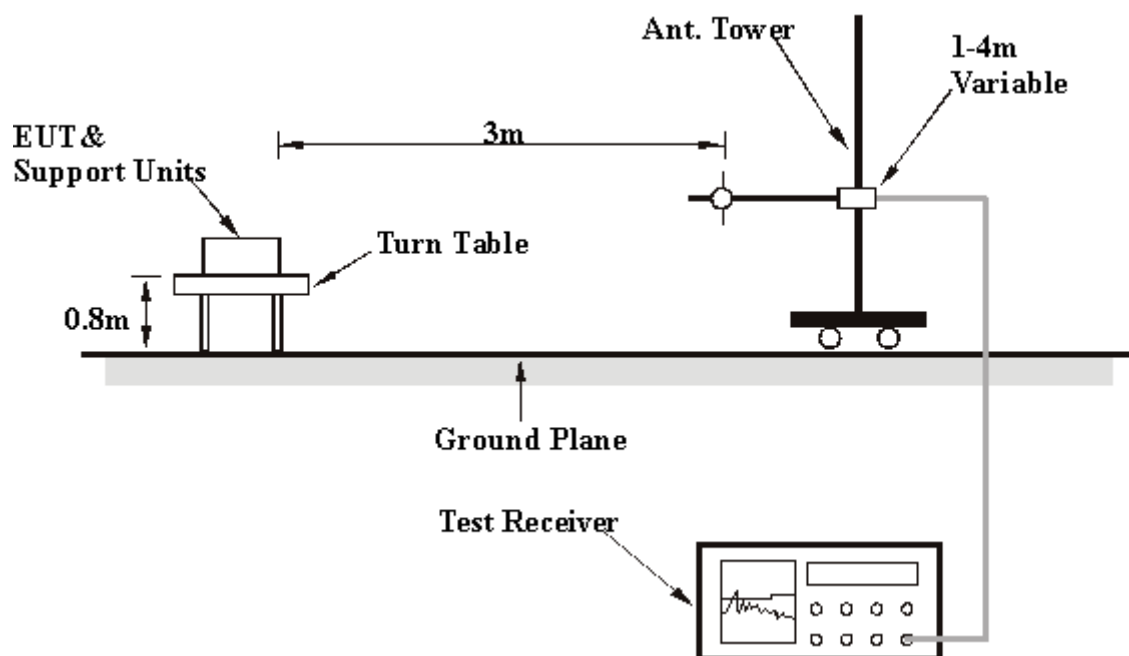
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 TEST RESULTS

Digital Portion:

EUT	Wireless Scanner	MODEL	1160
MODE	Channel 78	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	34 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	171.43	13.4 QP	43.50	-30.10	1.76 H	350	4.10	9.40
2	171.47	16.9 QP	43.50	-26.60	1.71 H	289	7.50	9.40
3	194.55	17.1 QP	43.50	-26.40	1.77 H	359	7.90	9.20
4	205.25	23.9 QP	43.50	-19.60	1.71 H	289	14.30	9.60
5	228.96	12.8 QP	46.00	-33.20	1.82 H	334	1.60	11.20
6	240.02	17.0 QP	46.00	-29.00	2.06 H	274	5.10	11.90
7	251.84	15.8 QP	46.00	-30.20	2.06 H	331	3.00	12.80
8	263.63	16.4 QP	46.00	-29.60	2.06 H	336	2.50	13.90
9	283.52	22.6 QP	46.00	-23.40	1.76 H	214	8.50	14.20
10	326.88	18.1 QP	46.00	-27.90	1.71 H	289	3.00	15.10
11	336.04	24.1 QP	46.00	-21.90	1.71 H	289	8.80	15.20
12	375.02	18.5 QP	46.00	-27.50	1.78 H	358	2.10	16.40
13	400.93	31.8 QP	46.00	-14.20	1.70 H	288	14.40	17.40
14	485.94	32.4 QP	46.00	-13.60	1.70 H	316	13.30	19.10
15	597.25	32.3 QP	46.00	-13.70	1.70 H	316	10.70	21.60
16	668.20	28.9 QP	46.00	-17.10	1.84 H	295	6.30	22.60
17	857.97	27.7 QP	46.00	-18.30	1.84 H	295	2.20	25.50
18	939.63	32.9 QP	46.00	-13.10	1.71 H	319	5.80	27.10
19	957.85	35.7 QP	46.00	-10.30	1.98 H	345	8.30	27.40

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 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.

EUT	Wireless Scanner	MODEL	1160
MODE	Channel 78	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	34 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	171.42	26.5 QP	43.50	-17.00	1.00 V	359	17.10	9.40
2	204.61	24.9 QP	43.50	-18.60	1.00 V	7	15.30	9.60
3	215.69	28.1 QP	43.50	-15.40	1.00 V	13	17.80	10.30
4	226.72	27.3 QP	46.00	-18.70	1.00 V	20	16.30	11.00
5	237.79	23.7 QP	46.00	-22.30	1.05 V	19	11.90	11.70
6	270.97	27.4 QP	46.00	-18.60	1.00 V	19	13.60	13.80
7	326.28	28.4 QP	46.00	-17.60	1.00 V	9	13.30	15.10
8	337.32	27.8 QP	46.00	-18.20	1.00 V	20	12.60	15.20
9	370.51	24.8 QP	46.00	-21.20	1.39 V	356	8.60	16.20
10	403.69	28.2 QP	46.00	-17.80	1.26 V	338	10.70	17.40
11	414.75	26.6 QP	46.00	-19.40	1.12 V	338	9.00	17.60
12	425.82	28.9 QP	46.00	-17.10	1.26 V	351	11.10	17.80
13	436.88	30.8 QP	46.00	-15.20	1.25 V	343	12.80	18.00
14	447.93	27.6 QP	46.00	-18.40	1.18 V	341	9.50	18.10
15	547.46	26.6 QP	46.00	-19.40	1.05 V	3	5.90	20.60
16	558.54	27.7 QP	46.00	-18.30	1.03 V	337	6.90	20.90
17	591.71	33.8 QP	46.00	-12.20	1.07 V	133	12.40	21.50
18	917.99	30.8 QP	46.00	-15.20	1.27 V	355	4.70	26.10
19	929.05	30.9 QP	46.00	-15.10	1.27 V	346	4.40	26.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 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.

RF Portion :

EUT	Wireless Scanner	MODEL	1160
MODE	Channel 0	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1200.00	44.4 PK	74.00	-29.60	1.79 H	295	16.00	28.40
2	*2402.00	94.2 PK	114.00	-19.80	1.77 H	237	61.30	32.90
2	*2402.00	64.2 AV	94.00	-29.80	1.77 H	237	34.50	32.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1200.00	45.7 PK	74.00	-28.30	1.00 V	178	17.30	28.40
2	2390.00	55.0 PK	74.00	-19.00	1.92 V	193	22.20	32.80
2	2390.00	25.0 AV	54.00	-29.00	1.92 V	193	-7.80	32.80
3	*2402.00	94.6 PK	114.00	-19.40	1.92 V	193	61.70	32.90
3	*2402.00	64.6 AV	94.00	-29.40	1.92 V	193	34.50	32.90

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.
Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Wireless Scanner	MODEL	1160
MODE	Channel 39	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1220.00	45.5 PK	74.00	-28.50	1.79 H	251	17.00	28.40
2	*2440.00	96.4 PK	114.00	-17.60	1.44 H	150	63.30	33.10
2	*2440.00	66.4A V	94.00	-27.60	1.44 H	150	35.20	33.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1220.00	45.8 PK	74.00	-28.20	1.91 V	318	17.30	28.40
2	*2440.00	93.4 PK	114.00	-20.60	2.60 V	77	60.30	33.10
2	*2440.00	63.4 AV	94.00	-30.60	2.60 V	77	34.20	33.10

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. “ * ” : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.
Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Wireless Scanner	MODEL	1160
MODE	Channel 78	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1240.52	44.9 PK	74.00	-29.10	1.77 H	252	16.40	28.50
2	*2480.00	96.6 PK	114.00	-17.40	1.55 H	278	63.30	33.30
2	*2480.00	66.6 AV	94.00	-27.40	1.55 H	278	35.20	33.30
3	2483.50	55.3 PK	74.00	-18.70	1.55 H	278	22.00	33.30
3	2483.50	25.3 AV	54.00	-28.70	1.55 H	278	-8.00	33.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1240.38	54.8 PK	74.00	-19.20	1.88 V	303	26.30	28.50
1	1240.38	24.8 AV	54.00	-29.20	1.88 V	303	-3.70	28.50
2	*2480.00	95.1 PK	114.00	-18.90	1.00 V	27	61.80	33.30
2	*2480.00	65.1 AV	94.00	-28.90	1.00 V	27	33.80	33.30

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.
Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
7. Average value = peak reading $-20\log(\text{duty cycle})$

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RB).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTES:

The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges were measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

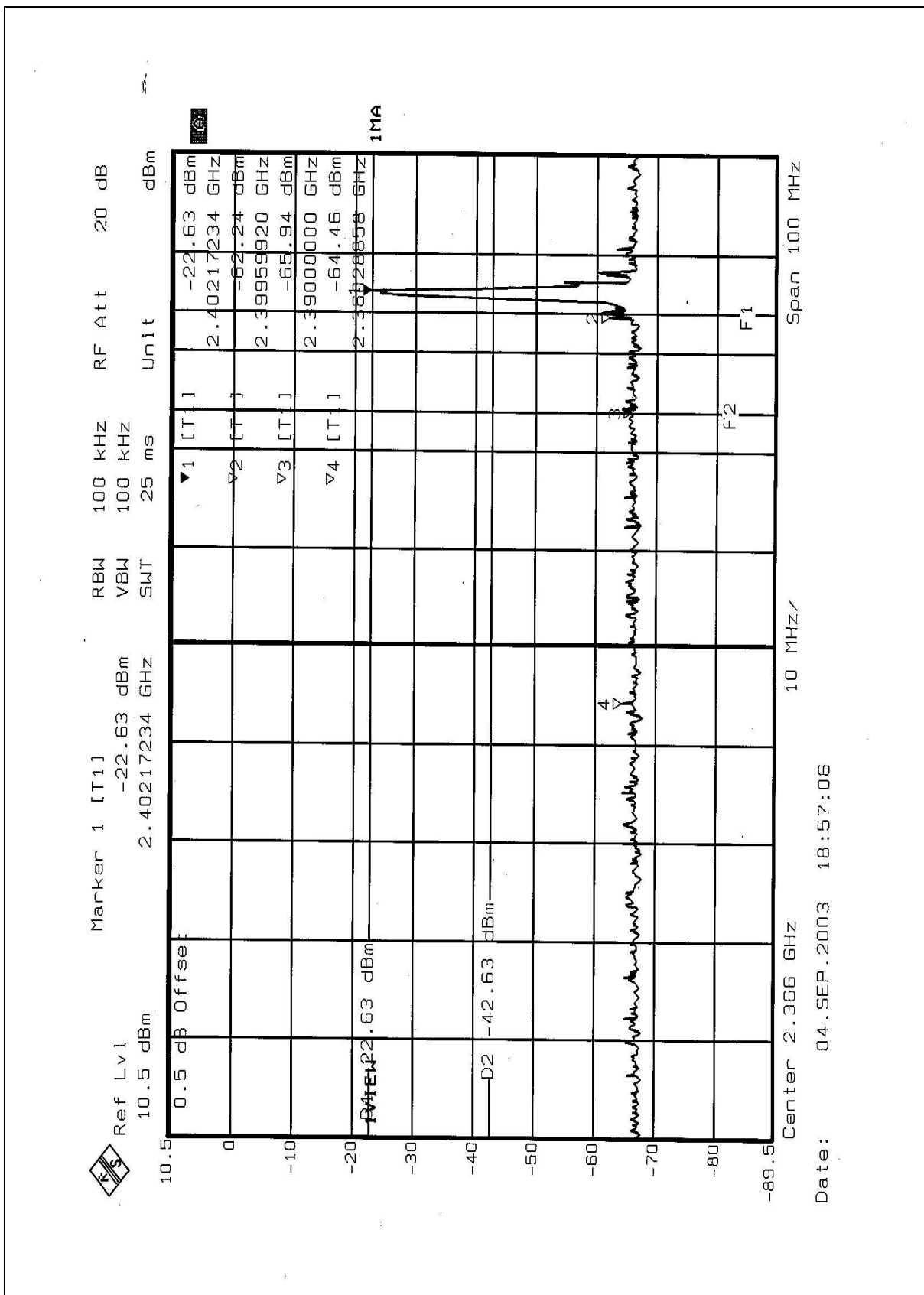


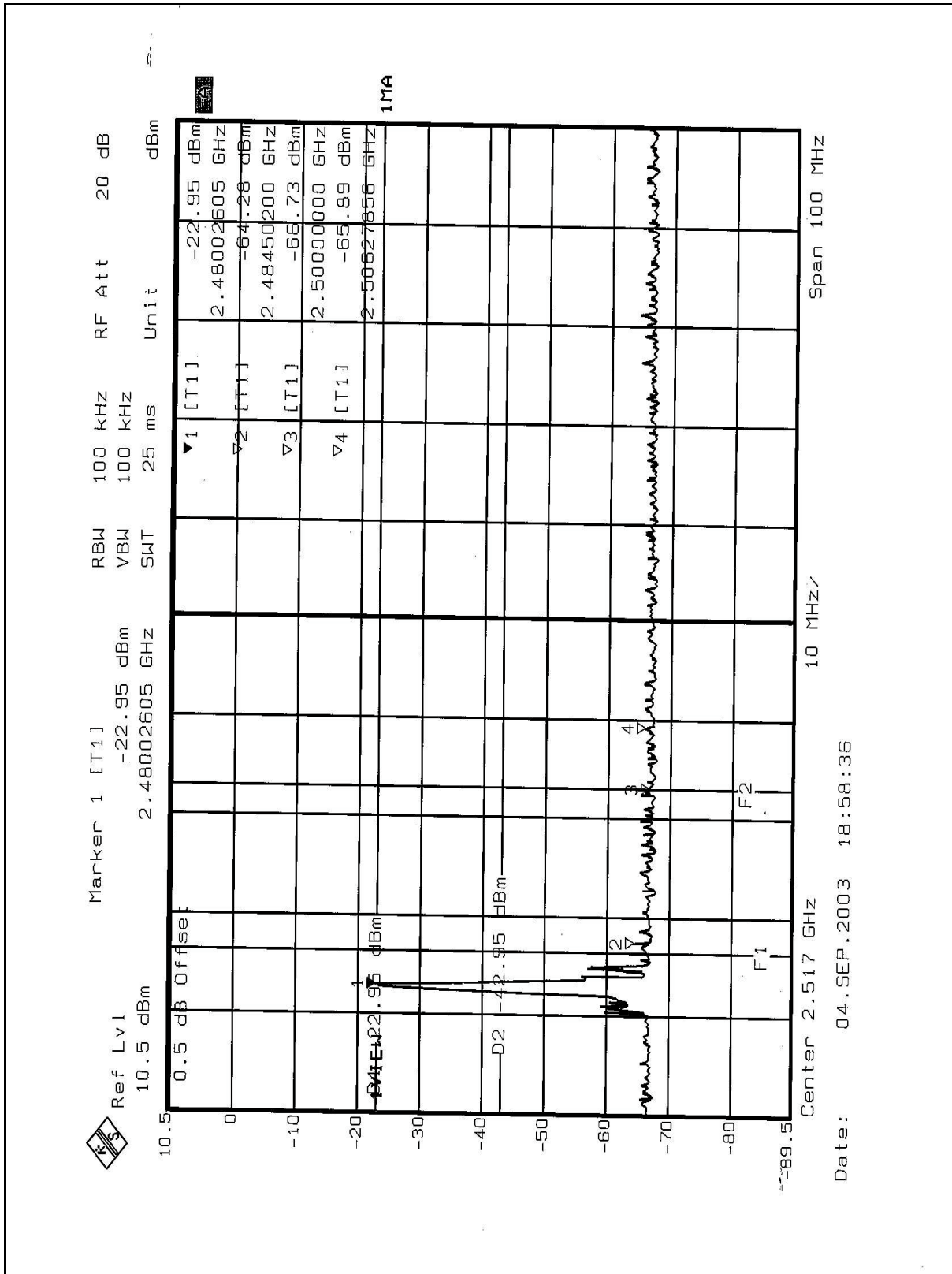
4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.249.





5 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST



6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

If you have any comments, please feel free to contact us at the following:

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