FCC TEST REPORT

REPORT NO.: RF921107A06

MODEL NO.: WT-01

RECEIVED: Nov. 7, 2003

TESTED: March 19 ~ 30, 2004

APPLICANT: Beauty Up Co., Ltd.

ADDRESS: 6F, No. 3, Jenge Rd., Chung-Ho City, 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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1 CERTIFICATION

PRODUCT: RF-Transceiver (for touch board)
BRAND NAME: BUTC
MODEL NO.: WT-01
TEST ITEM: ENGINEERING SAMPLE
APPLICANT: Beauty Up Co., Ltd.
MANUFACTURER: Maxwin System Technology Corp.
STANDARDS: FCC Part 15, Subpart C (Section 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 March 19 ~ 30, 2004. 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: _____ , **DATE:** March 30, 2004
(Yemmy Soong)

APPROVED BY: _____ , **DATE:** March 30, 2004
(Mike Su, 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 Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is –17.30dB at 29.031MHz
15.249	Transmitter Radiated Emissions	PASS	Meet the requirement of limit Minimum passing margin is –3.00dB at 82.48MHz
15.249	Band Edge Measurement	PASS	Meet the requirement of limit

Note: 1. The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	RF-Transceiver (for touch board)
MODEL NO.	WT-01
POWER SUPPLY	DC 3.3V from power adapter
MODULATION TYPE	RF/2.4GHz ISM band FSK transceiver
NUMBER OF CHANNEL	32
CARRIER FREQUENCY OF EACH CHANNEL	2416MHz ~ 2478MHz
VCO FREQUENCY	2450MHz
BANDWIDTH OF EACH CHANNEL	2MHz
NUMBER OF CHANNEL	32
ANTENNA TYPE	Wired antenna
OPERATING TEMPERATURE	-5℃ ~ 60℃

NOTE: The EUT is a 2.4GHz transceiver modular, which is ideal for wireless data applications such as to be used with a wireless interactive touch board.

The EUT was tested together with a power adapter:
Model: ADS1618-1305-W 0520
Input: 100-240V, 0.5A, 50-60Hz Output: 5V, 2.0A, 10W

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODE

Thirty two channels are provided for the EUT:

Ch.	Frequency MHz	Ch.	Frequency MHz	Ch.	Frequency MHz	Ch.	Frequency MHz
1.	2416	9.	2432	17.	2448	25.	2464
2.	2418	10.	2434	18.	2450	26.	2466
3.	2420	11.	2436	19.	2452	27.	2468
4.	2422	12.	2438	20.	2454	28.	2470
5.	2424	13.	2440	21.	2456	29.	2472
6.	2426	14.	2442	22.	2458	30.	2474
7.	2428	15.	2444	23.	2460	31.	2476
8.	2430	16.	2446	24.	2462	32.	2478

NOTE:

1. Below 1GHz, the channel 1, 16 and 32 were pre-tested in chamber. The channel 32, the worst case, was chosen for final test.
2. Above 1GHz, the channel 1, 16 and 32 were tested individually.

3.3 DESCRIPTION OF APPLIED STANDARD

The EUT is a transceiver module, which function as a transmitter and receiver, according to the specifications of the manufacturer, it must comply with the requirements of the following standards:

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

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

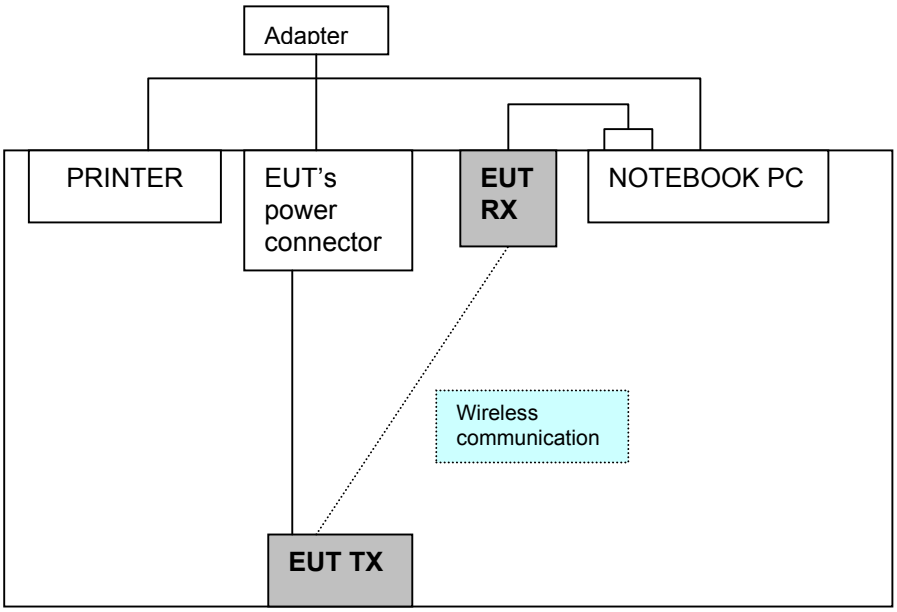
3.4 DESCRIPTION OF SUPPORT UNITS

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	NOTEBOOK COMPUTER	DELL	PP01L	TW-09C748-12800-19I-2365	FCC DoC Approved
2	PRINTER	HP	2225C	2442S63076	BS46XU2225C

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	From power adapter.
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. The EUT receiver part was connected to support unit 1 via cable with 2-in-1 connector (RS232+USB) .



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTES: (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 0.50 MHz.

(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
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Jan. 4, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 9, 2004
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 19, 2004
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 19, 2004
Software	Cond-V3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May 1, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

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 conducted telecom port test only (if tested).
3. The test was performed in ADT Shielded Room No. 10.
4. The VCCI Site Registration No. is C-1312.

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.

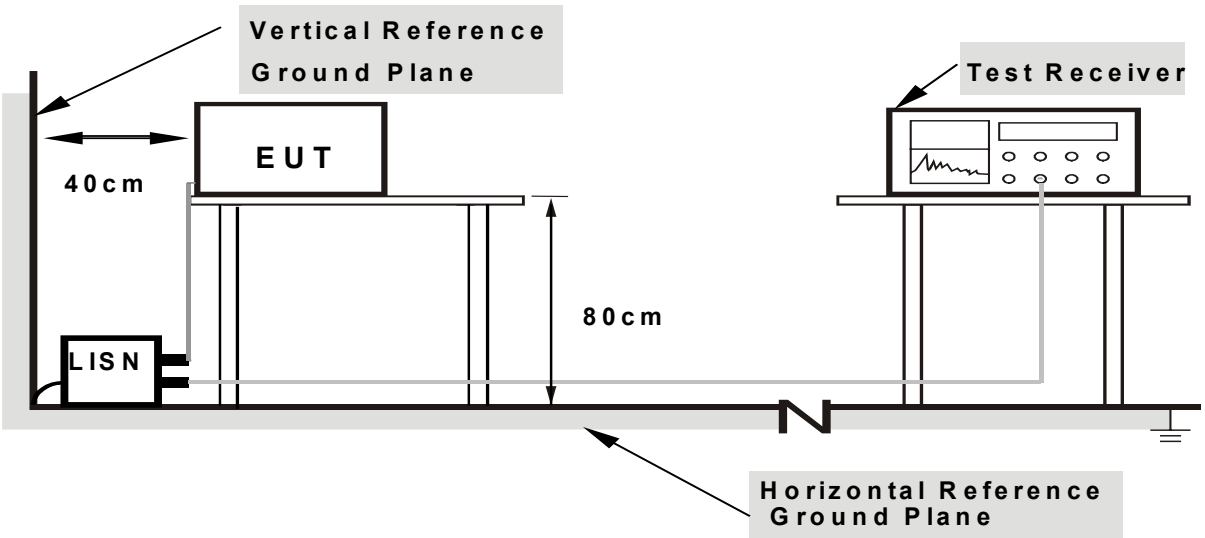
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (L – 20 dB) were 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 related Item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

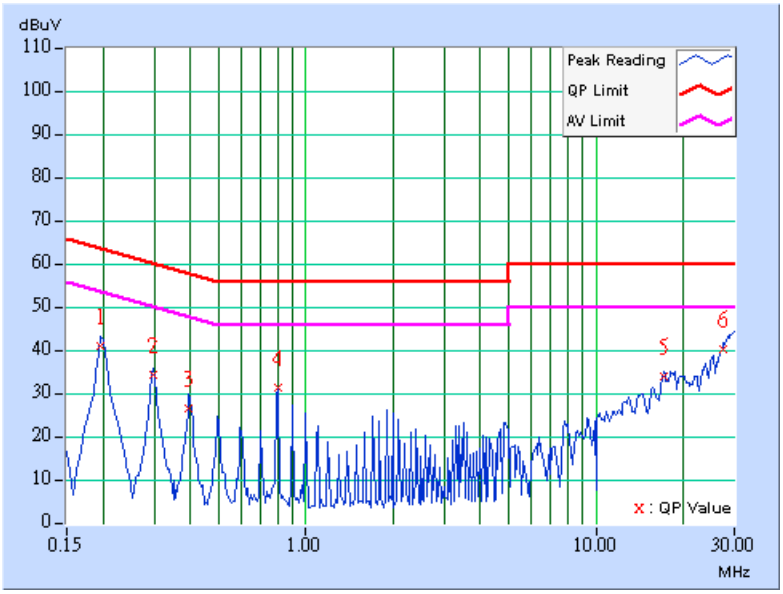
EUT was kept on a transmit/receive mode to send/receive messages to/from the notebook PC via wireless transmission on a specific channel frequency.

4.1.7 TEST RESULTS

EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 1	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	40.07	-	40.17	-	63.74	53.74	-23.57	-
2	0.298	0.10	33.30	-	33.40	-	60.29	50.29	-26.89	-
3	0.396	0.10	25.32	-	25.42	-	57.93	47.93	-32.51	-
4	0.798	0.17	30.33	-	30.50	-	56.00	46.00	-25.50	-
5	17.063	0.84	32.98	-	33.82	-	60.00	50.00	-26.18	-
6	27.535	1.20	39.18	-	40.38	-	60.00	50.00	-19.62	-

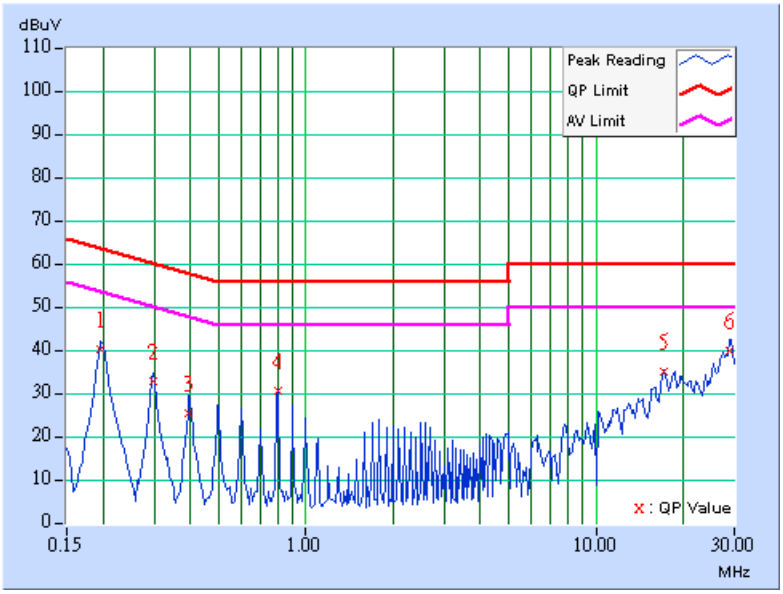
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 1	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	39.32	-	39.42	-	63.74	53.74	-24.32	-
2	0.298	0.10	32.13	-	32.23	-	60.29	50.29	-28.06	-
3	0.396	0.10	24.61	-	24.71	-	57.93	47.93	-33.22	-
4	0.798	0.17	29.92	-	30.09	-	56.00	46.00	-25.91	-
5	17.160	0.74	34.14	-	34.88	-	60.00	50.00	-25.12	-
6	28.734	1.00	38.91	-	39.91	-	60.00	50.00	-20.09	-

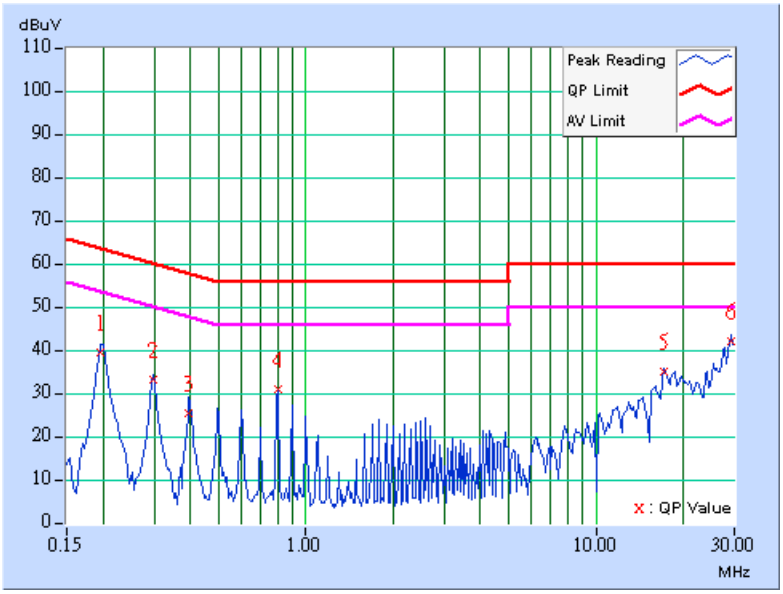
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 16	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	38.59	-	38.69	-	63.74	53.74	-25.05	-
2	0.298	0.10	32.08	-	32.18	-	60.29	50.29	-28.11	-
3	0.396	0.10	24.46	-	24.56	-	57.93	47.93	-33.37	-
4	0.798	0.17	30.00	-	30.17	-	56.00	46.00	-25.83	-
5	17.160	0.84	34.05	-	34.89	-	60.00	50.00	-25.11	-
6	29.230	1.20	40.84	-	42.04	-	60.00	50.00	-17.96	-

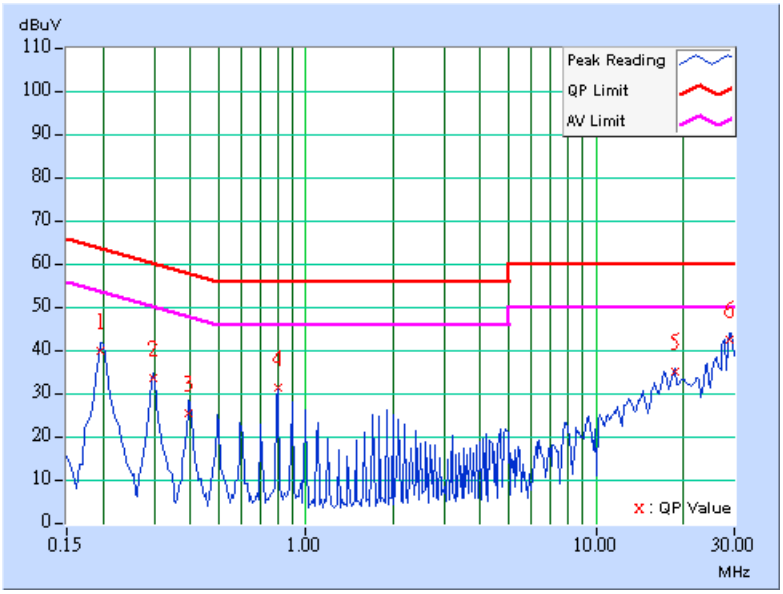
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 16	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	38.87	-	38.97	-	63.74	53.74	-24.77	-
2	0.298	0.10	32.77	-	32.87	-	60.29	50.29	-27.42	-
3	0.396	0.10	24.67	-	24.77	-	57.93	47.93	-33.16	-
4	0.798	0.17	30.45	-	30.62	-	56.00	46.00	-25.38	-
5	18.656	0.77	34.08	-	34.85	-	60.00	50.00	-25.15	-
6	29.031	1.00	41.70	-	42.70	-	60.00	50.00	-17.30	-

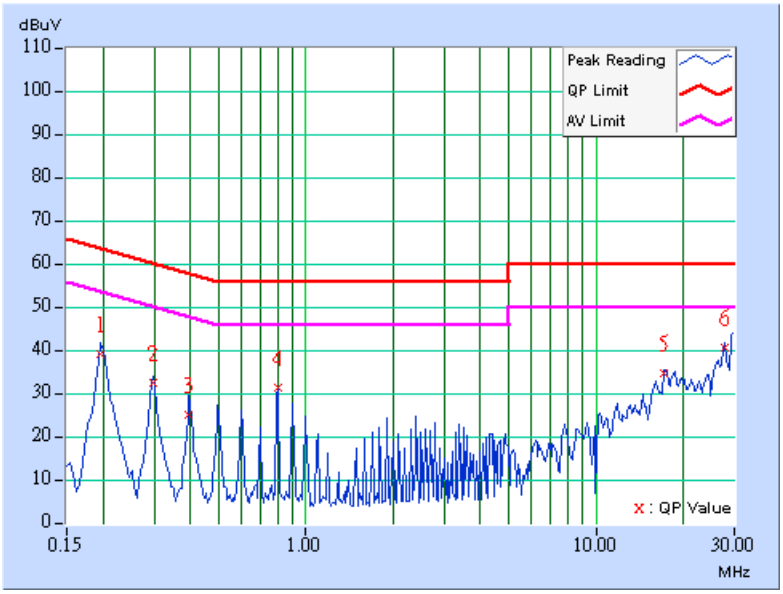
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 32	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	38.12	-	38.22	-	63.74	53.74	-25.52	-
2	0.298	0.10	31.53	-	31.63	-	60.29	50.29	-28.66	-
3	0.396	0.10	24.14	-	24.24	-	57.93	47.93	-33.69	-
4	0.798	0.17	30.14	-	30.31	-	56.00	46.00	-25.69	-
5	17.258	0.85	33.76	-	34.61	-	60.00	50.00	-25.39	-
6	27.832	1.20	39.64	-	40.84	-	60.00	50.00	-19.16	-

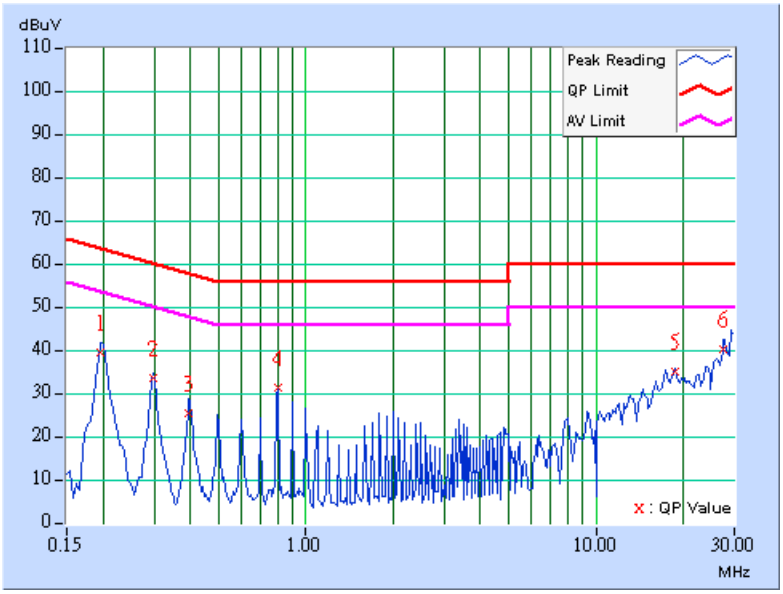
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	RF-Transceiver	**MODEL NO.**	WT-01
MODE	Channel 32	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 1005hPa	**TESTED BY**: Allen Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	38.69	-	38.79	-	63.74	53.74	-24.95	-
2	0.298	0.10	32.58	-	32.68	-	60.29	50.29	-27.61	-
3	0.396	0.10	24.63	-	24.73	-	57.93	47.93	-33.20	-
4	0.798	0.17	30.47	-	30.64	-	56.00	46.00	-25.36	-
5	18.656	0.77	34.02	-	34.79	-	60.00	50.00	-25.21	-
6	27.434	1.00	39.44	-	40.44	-	60.00	50.00	-19.56	-

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 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:

Frequencies (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 the 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 Preamplifier	8447D	2432A03504	Jun. 10, 2004
* HP Preamplifier	8449B	3008A01924	Oct. 12, 2004
* HP Preamplifier	8449B	3008A01638	Oct. 17, 2004
SCHWARZBECK Tunable Dipole Antenna SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	NA 977	Nov. 15, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 12, 2005
Schwarzbeck Antenna	VULB9168	137	Apr. 03, 2004
* EMCO Horn Antenna	3115	6714	Nov. 26, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V6	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Apr. 30, 2004

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 Chamber No. 6.

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 meters 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 Quasi-peak detection (QP) at frequency below 1GHz.

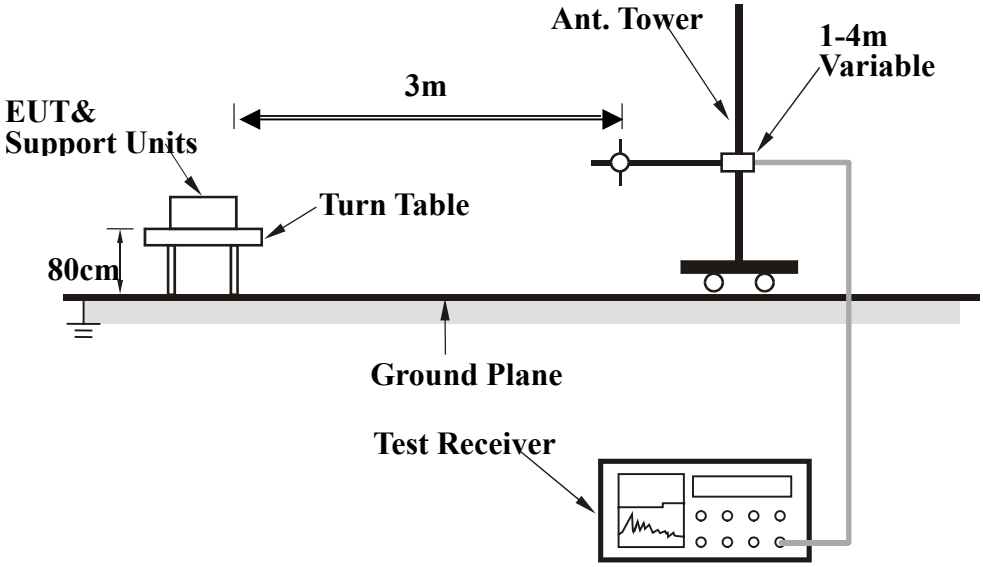
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.

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 EUT OPERATING CONDITIONS

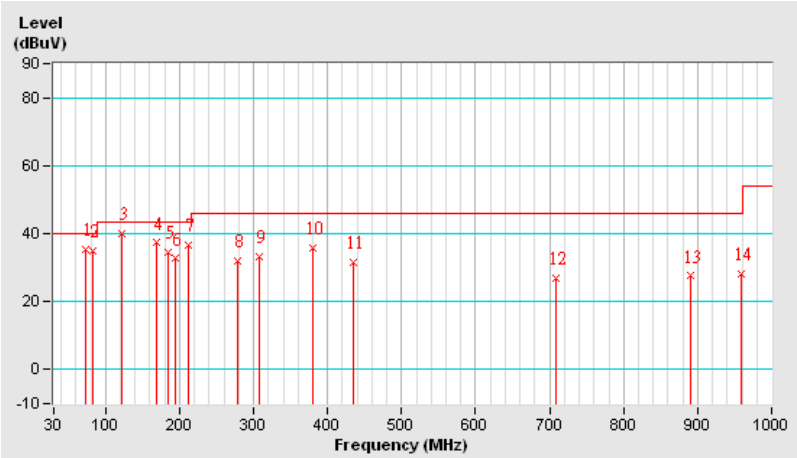
Same as 4.1.6.

4.2.7 TEST RESULTS

EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 32	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	72.77	35.50 QP	40.00	-4.50	2.50 H	160	24.79	10.71
2	82.48	35.09 QP	40.00	-4.91	2.00 H	13	25.99	9.10
3	121.36	39.94 QP	43.50	-3.56	2.50 H	223	28.31	11.63
4	168.02	37.30 QP	43.50	-6.20	2.50 H	208	24.65	12.66
5	183.57	34.42 QP	43.50	-9.08	1.25 H	229	22.18	12.24
6	195.23	32.60 QP	43.50	-10.90	1.00 H	241	21.61	10.99
7	212.73	36.68 QP	43.50	-6.82	1.00 H	313	25.79	10.89
8	278.82	32.14 QP	46.00	-13.86	1.00 H	112	17.73	14.41
9	307.98	33.27 QP	46.00	-12.73	1.00 H	247	17.87	15.40
10	379.90	35.89 QP	46.00	-10.11	1.00 H	295	18.97	16.92
11	434.33	31.56 QP	46.00	-14.44	1.00 H	10	13.40	18.16
12	708.42	26.97 QP	46.00	-19.03	1.00 H	103	3.77	23.20
13	891.14	27.57 QP	46.00	-18.43	1.50 H	118	2.31	25.27
14	959.18	28.09 QP	46.00	-17.91	1.50 H	106	1.71	26.38

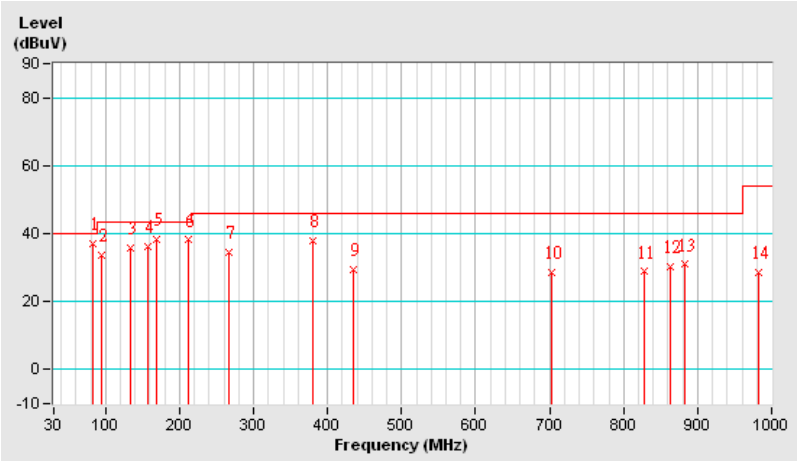
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 32	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	82.48	37.00 QP	40.00	-3.00	1.25 V	67	27.90	9.10
2	94.15	33.76 QP	43.50	-9.74	1.25 V	355	25.37	8.40
3	133.03	35.80 QP	43.50	-7.70	1.00 V	334	23.31	12.49
4	156.35	36.23 QP	43.50	-7.27	1.50 V	301	23.49	12.74
5	168.02	38.42 QP	43.50	-5.08	1.25 V	196	25.77	12.66
6	212.73	38.14 QP	43.50	-5.36	1.00 V	322	27.25	10.89
7	267.15	34.57 QP	46.00	-11.43	1.00 V	19	21.02	13.55
8	379.90	37.86 QP	46.00	-8.14	1.00 V	169	20.93	16.92
9	434.33	29.29 QP	46.00	-16.71	1.25 V	46	11.14	18.16
10	702.59	28.67 QP	46.00	-17.33	1.00 V	91	5.65	23.02
11	826.99	28.83 QP	46.00	-17.17	1.00 V	67	3.93	24.90
12	863.93	30.42 QP	46.00	-15.58	1.00 V	64	5.20	25.22
13	883.37	30.96 QP	46.00	-15.04	1.00 V	58	5.71	25.25
14	982.51	28.46 QP	54.00	-25.54	1.00 V	55	2.03	26.42

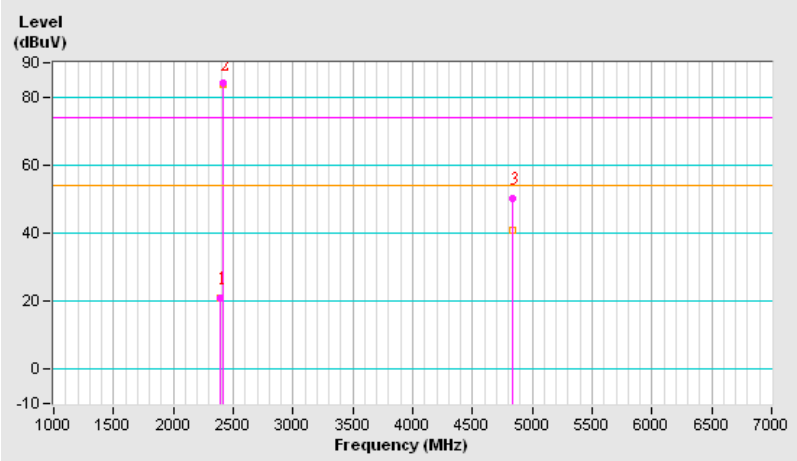
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 1	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	2390.00	21.01 PK	74.00	-52.99	1.05 H	163	-10.75	31.76
2	2416.00	83.87 PK	74.00	9.87	1.05 H	163	52.08	31.79
2	2416.00	83.74 AV	54.00	29.74	1.05 H	163	51.95	31.79
3	4832.00	50.08 PK	74.00	-23.92	1.78 H	72	12.25	37.84

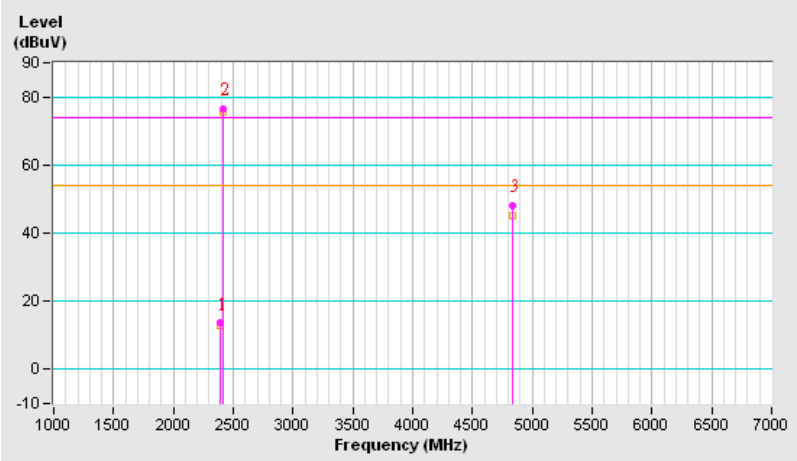
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 1	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	2390.00	13.55 PK	74.00	-60.45	1.69 V	112	-18.21	31.76
2	*2416.00	76.41 PK	114.00	-37.59	1.69 V	112	44.62	31.79
2	*2416.00	75.72 AV	94.00	-18.28	1.69 V	112	43.93	31.79
3	4832.00	48.03 PK	74.00	-25.97	1.64 V	72	10.20	37.84

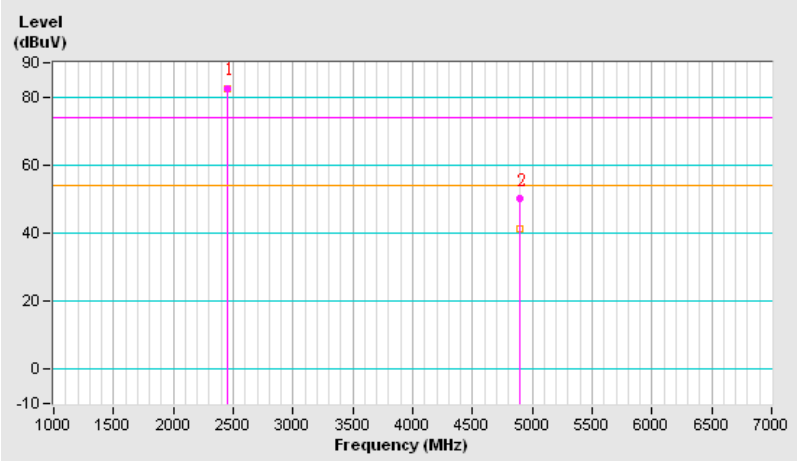
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 16	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	*2446.00	82.49 PK	114.00	-31.51	1.22 H	2	50.65	31.84
1	*2446.00	82.26 AV	94.00	-11.74	1.22 H	2	50.42	31.84
2	4892.00	50.02 PK	74.00	-23.98	1.70 H	68	12.07	37.95
2	4892.00	41.29 AV	54.00	-12.71	1.70 H	68	3.34	37.95

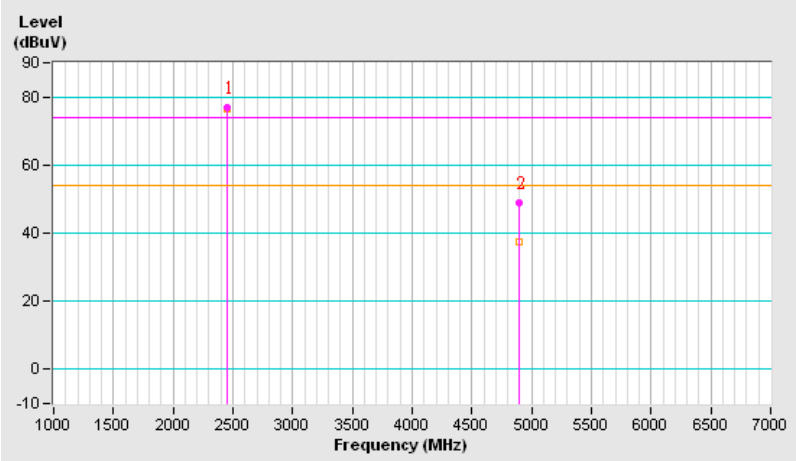
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 16	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	*2446.00	76.90 PK	114.00	-37.10	2.00 V	270	45.06	31.84
1	*2446.00	76.23 AV	94.00	-17.77	2.00 V	270	44.39	31.84
2	4892.00	48.94 PK	74.00	-25.06	2.04 V	36	10.99	37.95
2	4892.00	37.64 AV	54.00	-16.36	2.04 V	36	-0.31	37.95

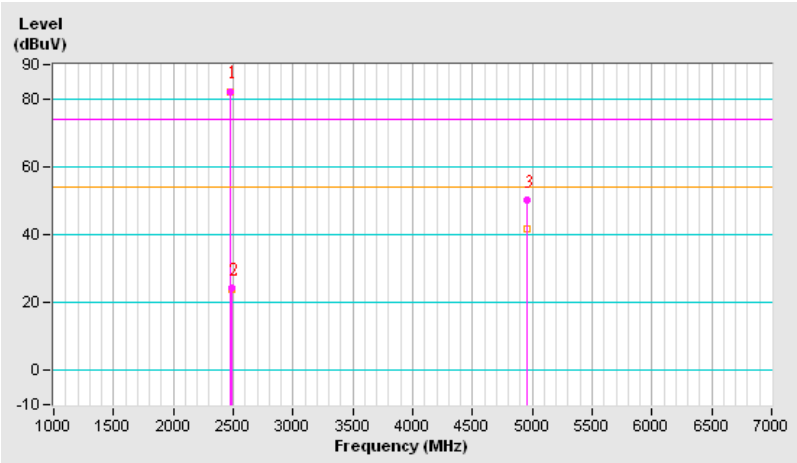
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 32	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	*2478.00	82.16 PK	114.00	-31.84	1.08 H	179	50.27	31.89
1	*2478.00	81.78 AV	94.00	-12.22	1.08 H	179	49.89	31.89
2	2483.50	24.14 PK	74.00	-49.86	1.08 H	179	-7.76	31.90
3	4956.00	49.96 PK	74.00	-24.04	1.79 H	90	11.90	38.06
3	4956.00	41.88 AV	54.00	-12.12	1.79 H	90	3.82	38.06

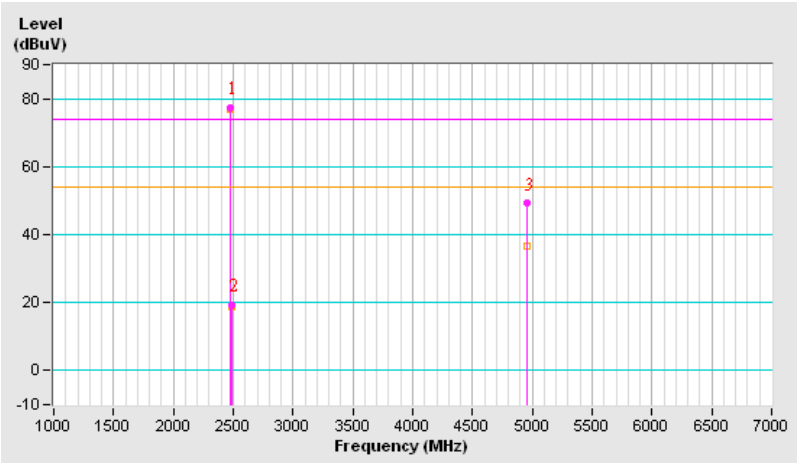
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	RF-Transceiver	**MODEL**	WT-01
MODE	Channel 32	**FREQUENCY RANGE**	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18 deg. C, 76% RH, 1005 hPa	**TESTED BY**: Allen Chang	

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	*2478.00	77.26 PK	114.00	-36.74	1.26 V	300	45.37	31.89
1	*2478.00	76.94 AV	94.00	-17.06	1.26 V	300	45.05	31.89
2	2483.50	19.24 PK	74.00	-54.76	1.26 V	300	-12.66	31.90
2	2483.50	18.92 AV	54.00	-35.08	1.26 V	300	-12.98	31.90
3	4956.00	49.12 PK	74.00	-24.88	1.49 V	299	11.06	38.06
3	4956.00	36.80 AV	54.00	-17.20	1.49 V	299	-1.26	38.06

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. 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 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

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

4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

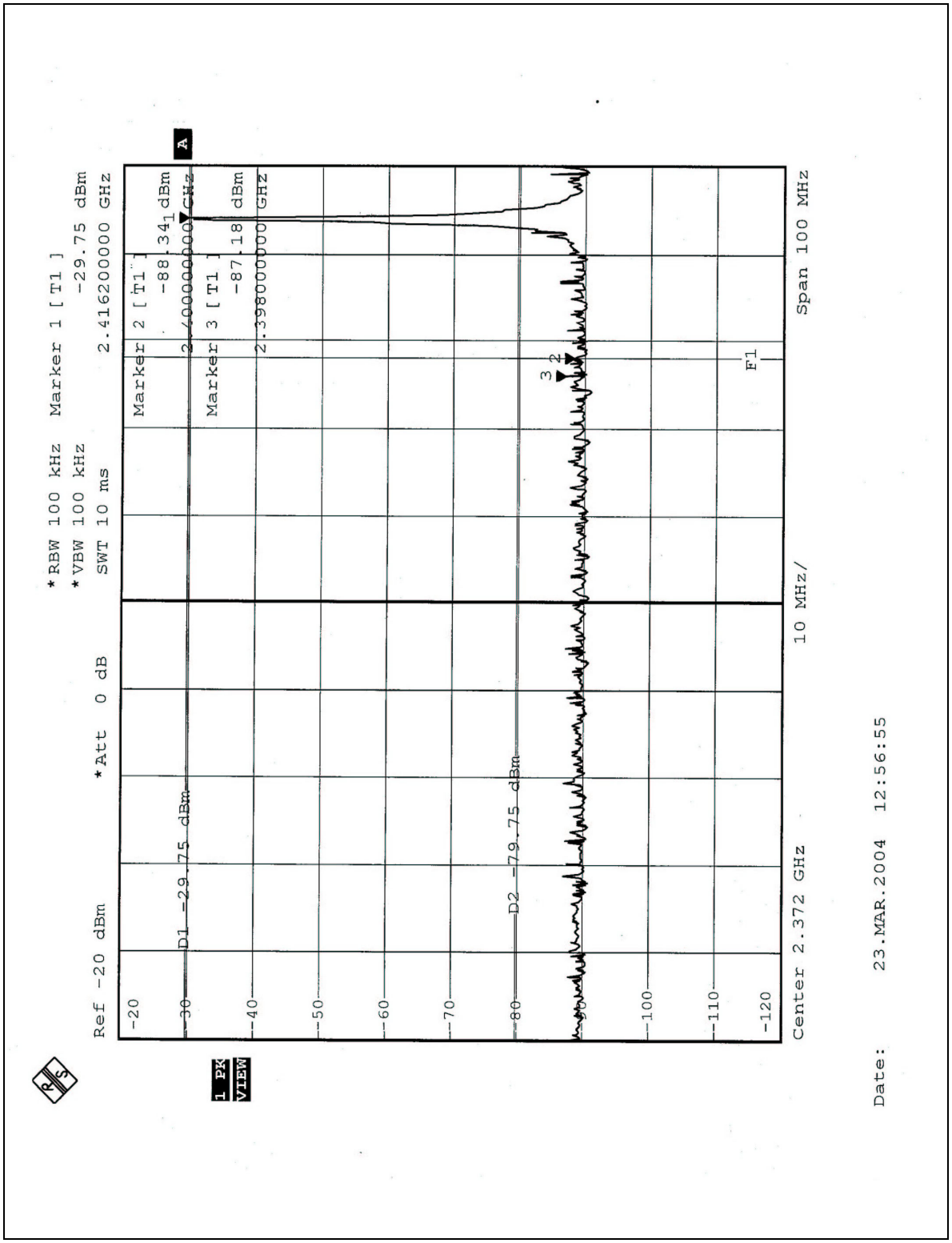
4.3.5 EUT OPERATING CONDITION

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

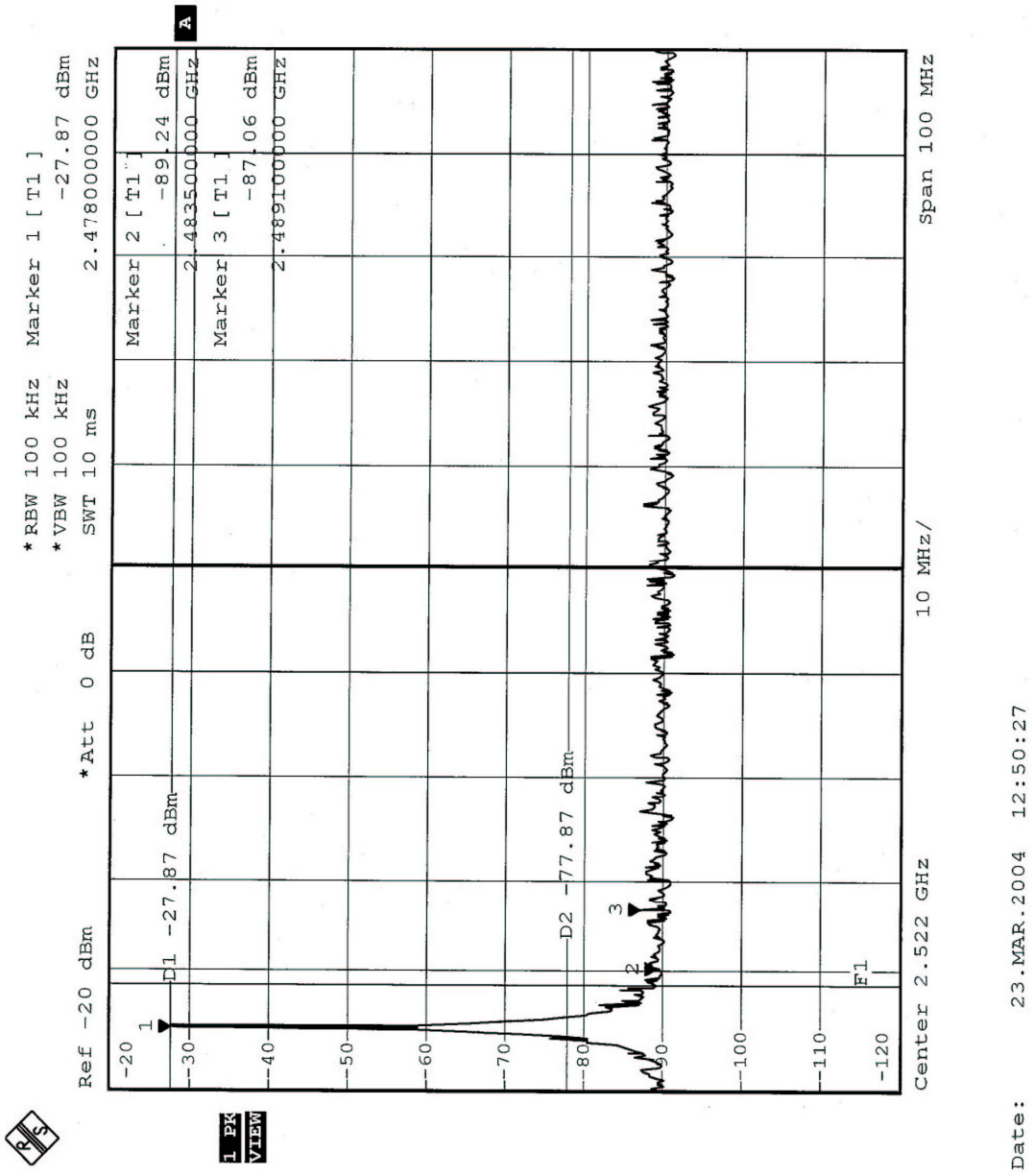
4.3.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer pages form 22 to 29 for met the requirement of the general radiated emission limits in § 15.209.

CH 1


Ref -20 dBm
*Att 0 dB
*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-29.75 dBm
2.416200000 GHz
Marker 2 [T1]
-88.34 dBm
2.400000000 GHz
Marker 3 [T1]
-87.18 dBm
2.398000000 GHz
D1 -29.75 dBm
D2 -79.75 dBm
1 PK VIEW
A
Center 2.372 GHz
10 MHz/
Span 100 MHz
Date: 23.MAR.2004 12:56:55

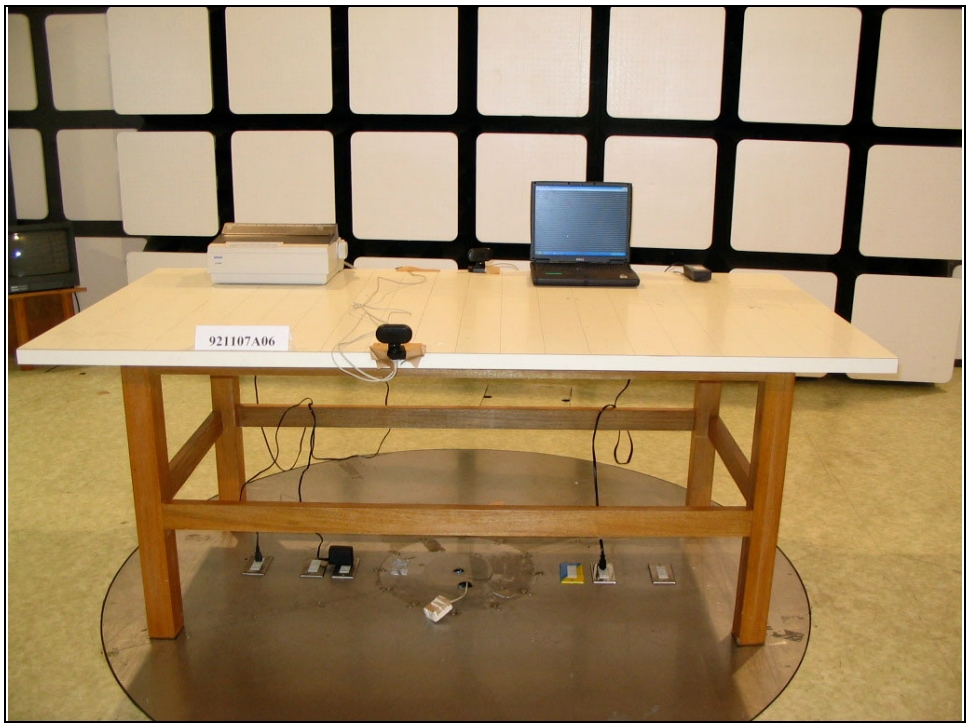
CH 32

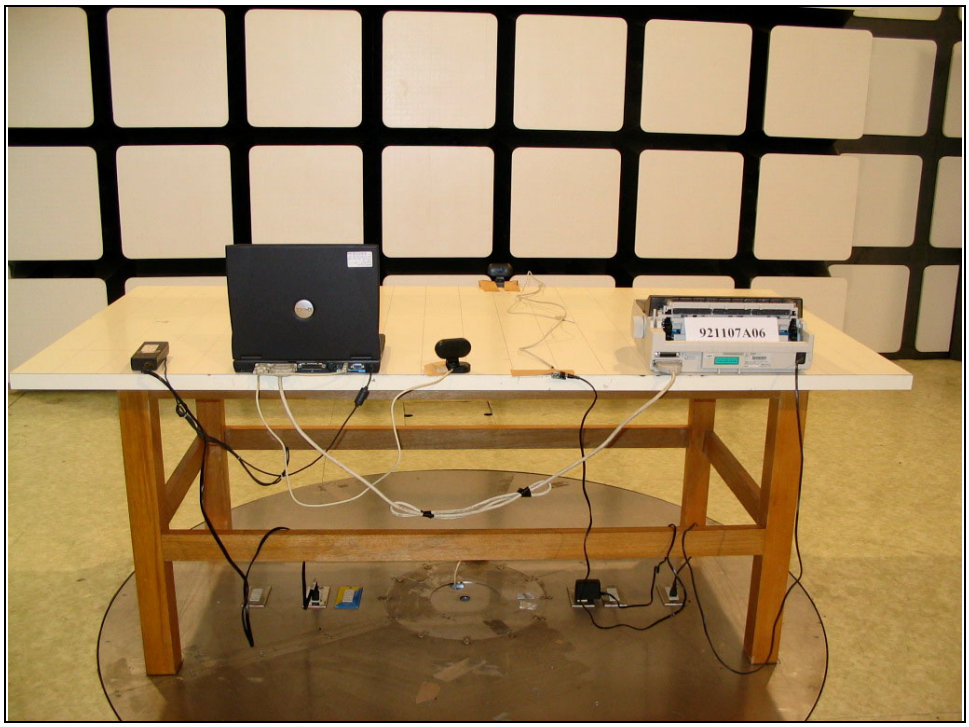

Ref -20 dBm
*Att 0 dB
*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-27.87 dBm
2.478000000 GHz
Marker 2 [T1]
-89.24 dBm
2.483500000 GHz
Marker 3 [T1]
-87.06 dBm
2.489100000 GHz
D1 -27.87 dBm
D2 -77.87 dBm
1 PK
VIEW
A
Center 2.522 GHz
10 MHz/
Span 100 MHz
Date: 23.MAR.2004 12:50:27

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

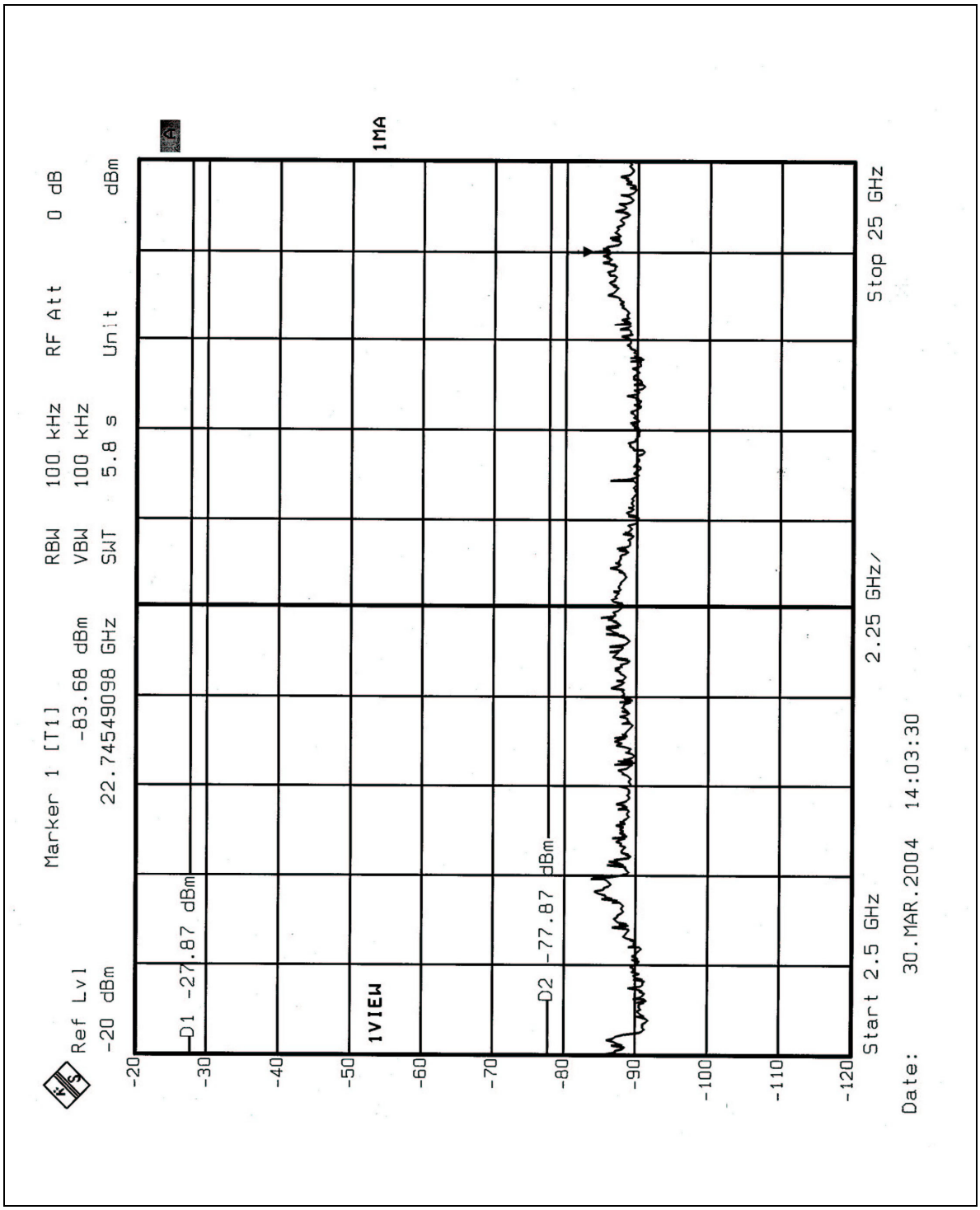
RADIATED EMISSION TEST



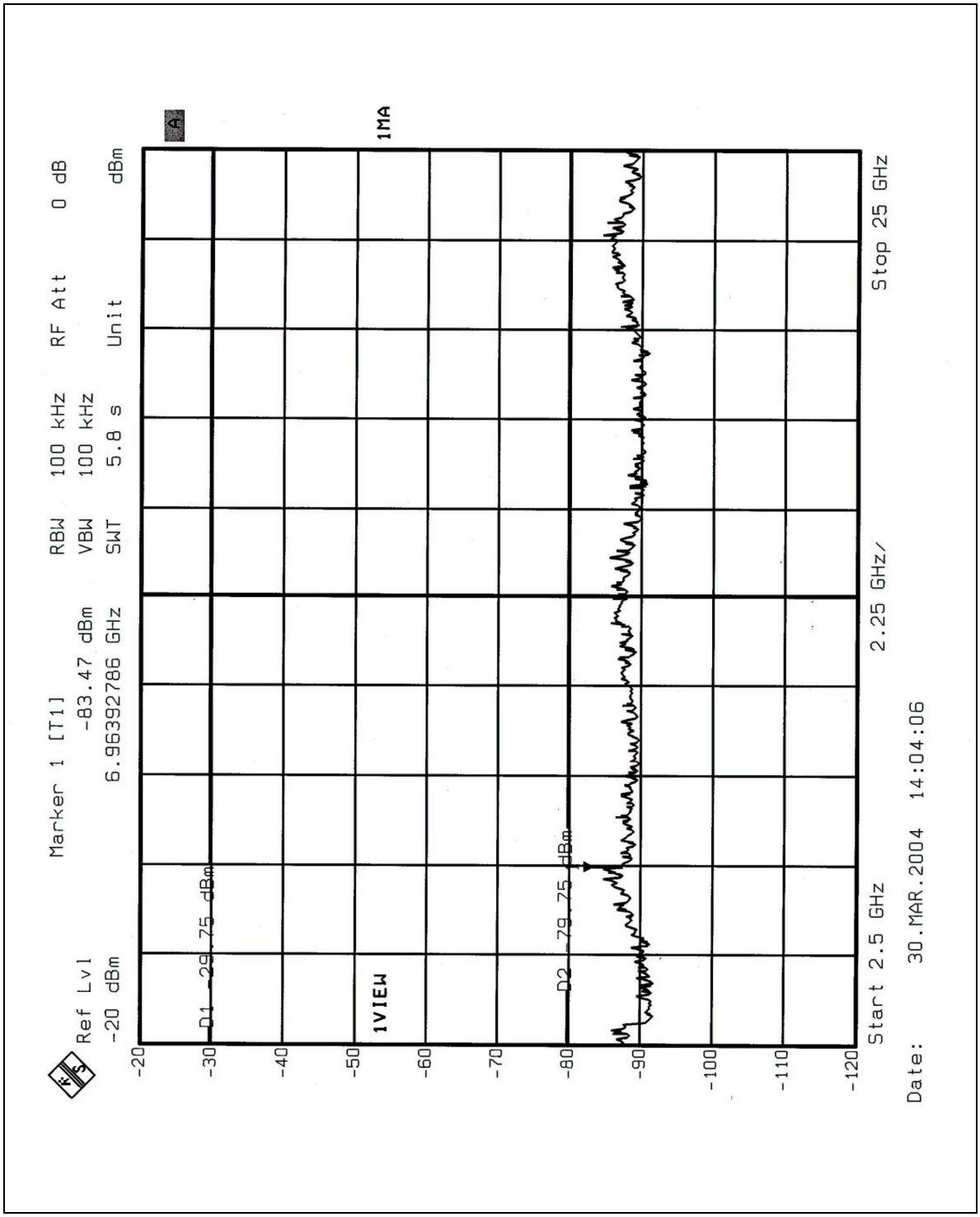


6 APPENDIX I – MEASUREMENT OF CONDUCTED SPURIOUS EMISSION FOR THE 10TH HARMONIC

CH1



CH11


Ref Lvl
-20 dBm
D1 -29.75 dBm
Marker 1 [T1]
-83.47 dBm
6.96392786 GHz
RBW 100 kHz
VBW 100 kHz
SWT 5.8 s
RF Att 0 dB
Unit dBm
1VIEW
D2 -79.75 dBm
1MA
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz
Date: 30.MAR.2004 14:04:06

7 APPENDIX II - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 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, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB
Russia	CERTIS(MOU)

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.