



FCC TEST REPORT

REPORT NO.: RF930223H05

MODEL NO.: BP-1000

RECEIVED: Feb. 23, 2004

TESTED: Feb. 23 to 26, 2004

APPLICANT: BluePacket Communications, Inc.

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ISSUED BY: Advance Data Technology Corporation

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1 CERTIFICATION

PRODUCT : AirBase
BRAND NAME : BluePacket
MODEL NO. : BP-1000
APPLICANT : BluePacket Communications, Inc.
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample (Model: BP-1000) of the designation has been tested in our facility from Feb. 23 to 26, 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: Carol Liao, **DATE:** Mar. 04, 2004
(Carol Liao)

APPROVED BY: Eric Lin, **DATE:** Mar. 04, 2004
(Eric Lin, 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	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -16.86dBuV at 0.400 MHz
15.247(a)(1) (I)-(ii)	Number of Hopping Frequency Used Spec.: At least 75 channels	PASS	Meet the requirement of limit
15.247(a)(1) (ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 30 second	PASS	Meet the requirement of limit
15.247(a)(1) (I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Spec.: Max. 1 MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -6.3dBuV at 2483.50 MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	AirBase
MODEL NO.	BP-1000
POWER SUPPLY	5VDC from AC Adapter
MODULATION TYPE	FHSS (GFSK)
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	-0.12dBm
ANTENNA TYPE	Dipole Antenna
DATA CABLE	DC output Cable (Nonshielded, 1m)
I/O PORTS	RJ11 port x 2
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT was powered by the following power adapter:

Brand:	DVE
Model No.:	DSA-0051-03 AUS 50100F
Input power :	AC100-120V, 0.2A, 50/60Hz
Output power :	DC 5V, 1A DC Cable: 1.8m/unshielded/without core

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

3.2 DESCRIPTION OF TEST MODES

Seventy-nine channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2431	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

NOTE:

1. Below 1 GHz, the channel 0, 39, and 78 were pre-tested in chamber. The channel 78, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 0, 39, and 78 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an AirBase. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C. (15.247)
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 47 CFR Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

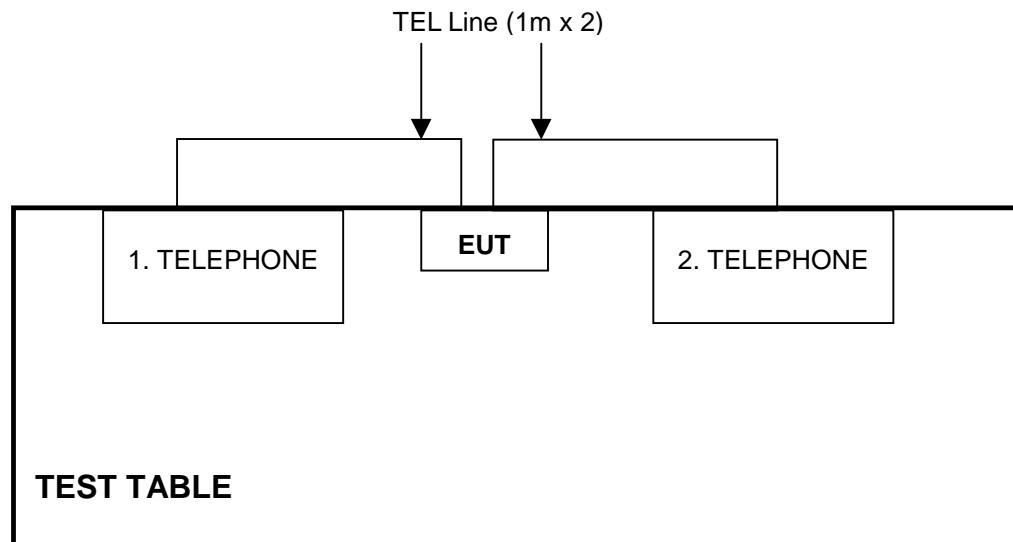
3.4 DESCRIPTION OF SUPPORT UNITS

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	TELEPHONE	Romeo	TE-812	97280926	N/A
2	TELEPHONE	Youmax	DT-901HF	NA	N/A

No.	Signal cable description
1	1 m nonshielded telephone wire, terminated with RJ11 connector, w/o core.
2	1 m nonshielded telephone wire, terminated with RJ11 connector, w/o core.

Note: 1. All power cords of the above support units are unshielded (1.8m).



NOTE: 1. Please refer to the photos of test configuration in Item 5 also.



4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. 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	847124/029	Dec. 04, 2004
ROHDE & SCHWARZ LISN (for EUT)	ESHS-Z5	848773/004	Nov. 04, 2004
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	Jul. 27, 2004
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 03, 2004
Terminator(for KYORITSU)	50	3	Apr. 11, 2004
Software	Cond-V2e	NA	NA

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. The test was performed in ADT Shielded Room No. A.
 3. The VCCI Con A Registration No. is C-817.



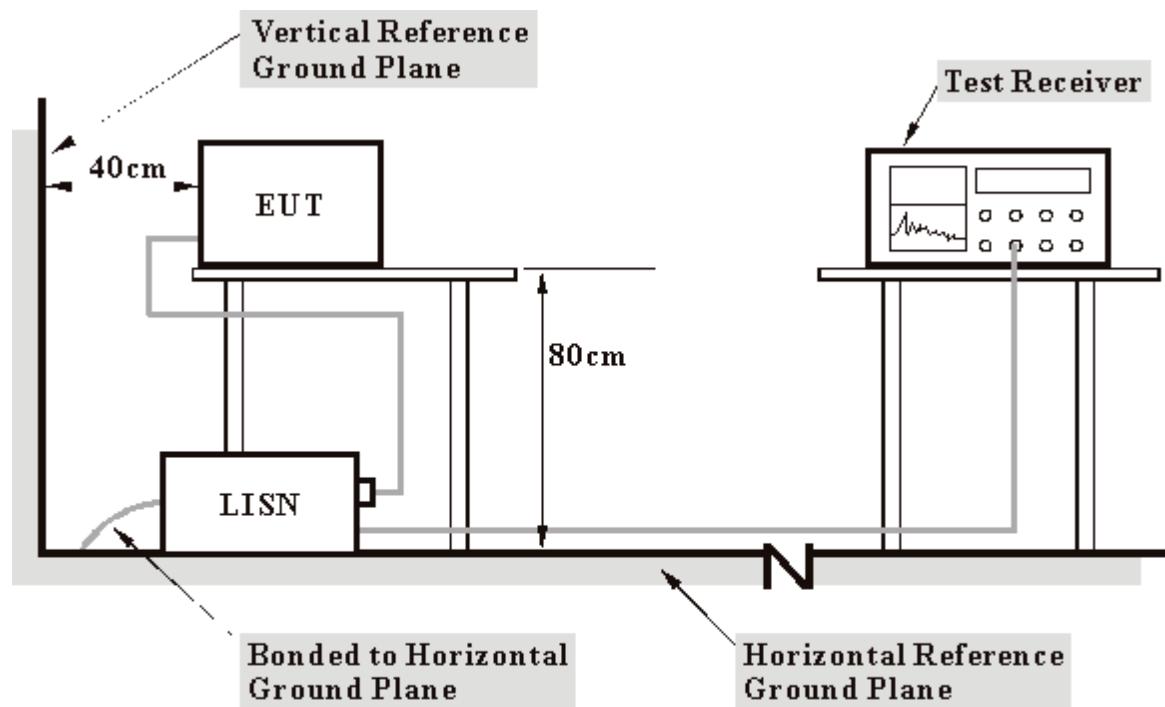
4.1.3 TEST PROCEDURES

- 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 over 10dB under the prescribed limits could not be reported

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 (AMIN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT to support unit 1 and 2 (Telephone) and placed them on a testing table.
- b. The EUT transmits wireless signal continuously at specific channel frequency.

4.1.7 TEST RESULTS

EUT	AirBase	MODEL	BP-1000
MODE	Channel 78	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25 deg. C, 50%RH, 978 hPa	TESTED BY	Eric Lee

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	0.201	0.20	42.39	-	42.59	-	63.58	53.58	-20.99	-
2	0.400	0.20	40.79	-	40.99	-	57.85	47.85	-16.86	-
3	1.404	0.30	35.49	-	35.79	-	56.00	46.00	-20.21	-
4	1.603	0.30	35.99	-	36.29	-	56.00	46.00	-19.71	-
5	2.607	0.33	34.42	-	34.75	-	56.00	46.00	-21.25	-
6	11.629	0.90	37.68	-	38.58	-	60.00	50.00	-21.42	-

NOTES: (1) "": Undetectable

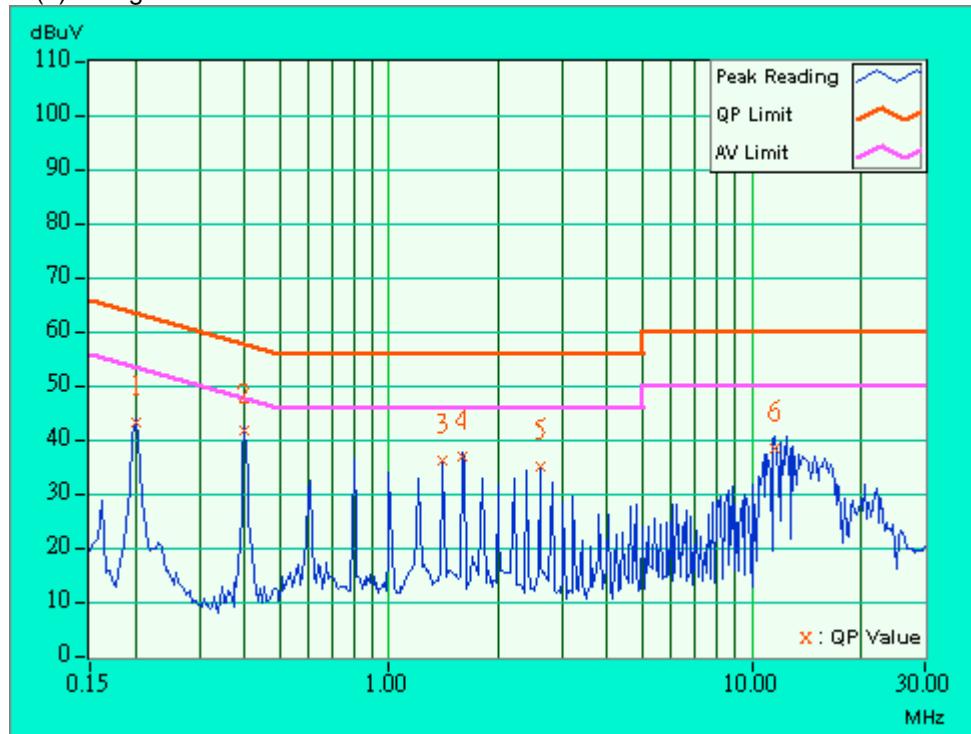
(2) Q.P. and AV. are abbreviations of quasi-peak and average.

(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

(4) The emission levels of other frequencies were very low against the limit.

(5) Correction Factor = Insertion loss + Cable loss

(6) Margin value = Emission level - Limit value

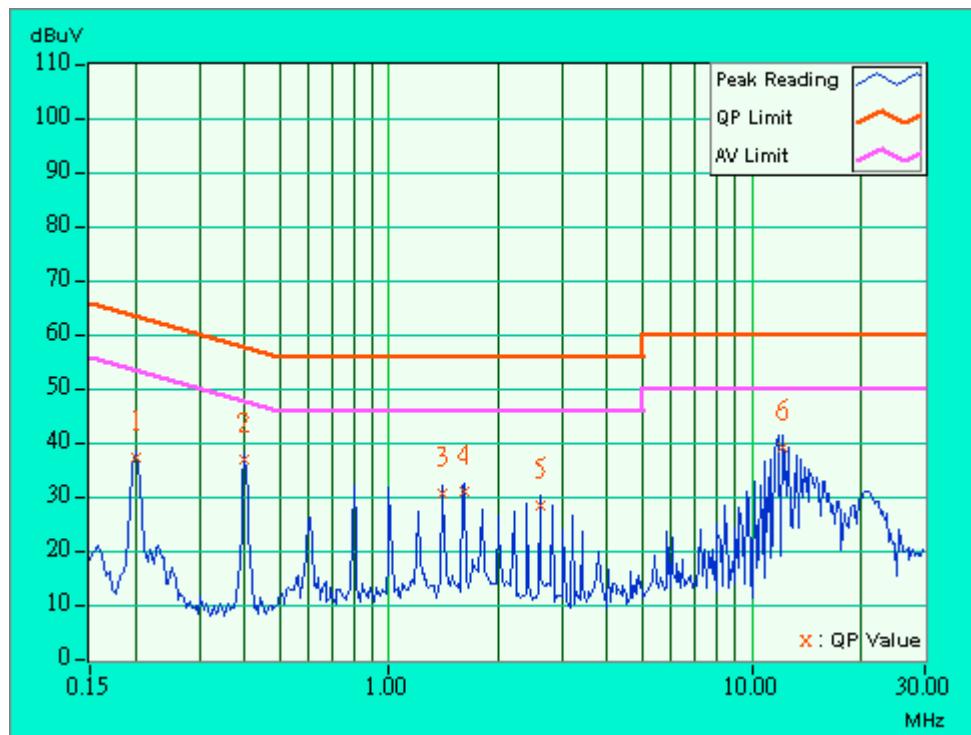


EUT	AirBase	MODEL	BP-1000
MODE	Channel 78	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25 deg. C, 50%RH, 978 hPa	TESTED BY	Eric Lee

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	0.201	0.20	36.42	-	36.62	-	63.58	53.58	-26.96	-
2	0.400	0.20	36.32	-	36.52	-	57.85	47.85	-21.33	-
3	1.404	0.30	29.97	-	30.27	-	56.00	46.00	-25.73	-
4	1.607	0.30	30.38	-	30.68	-	56.00	46.00	-25.32	-
5	2.611	0.33	27.61	-	27.94	-	56.00	46.00	-28.06	-
6	12.238	0.83	38.52	-	39.35	-	60.00	50.00	-20.65	-

NOTES: (1) "": Undetectable

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





4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	May. 06, 2004

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

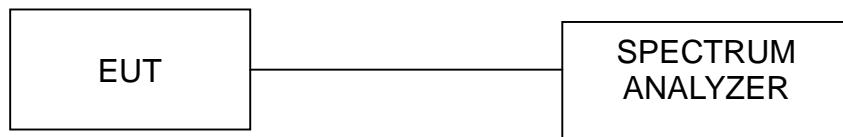
4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

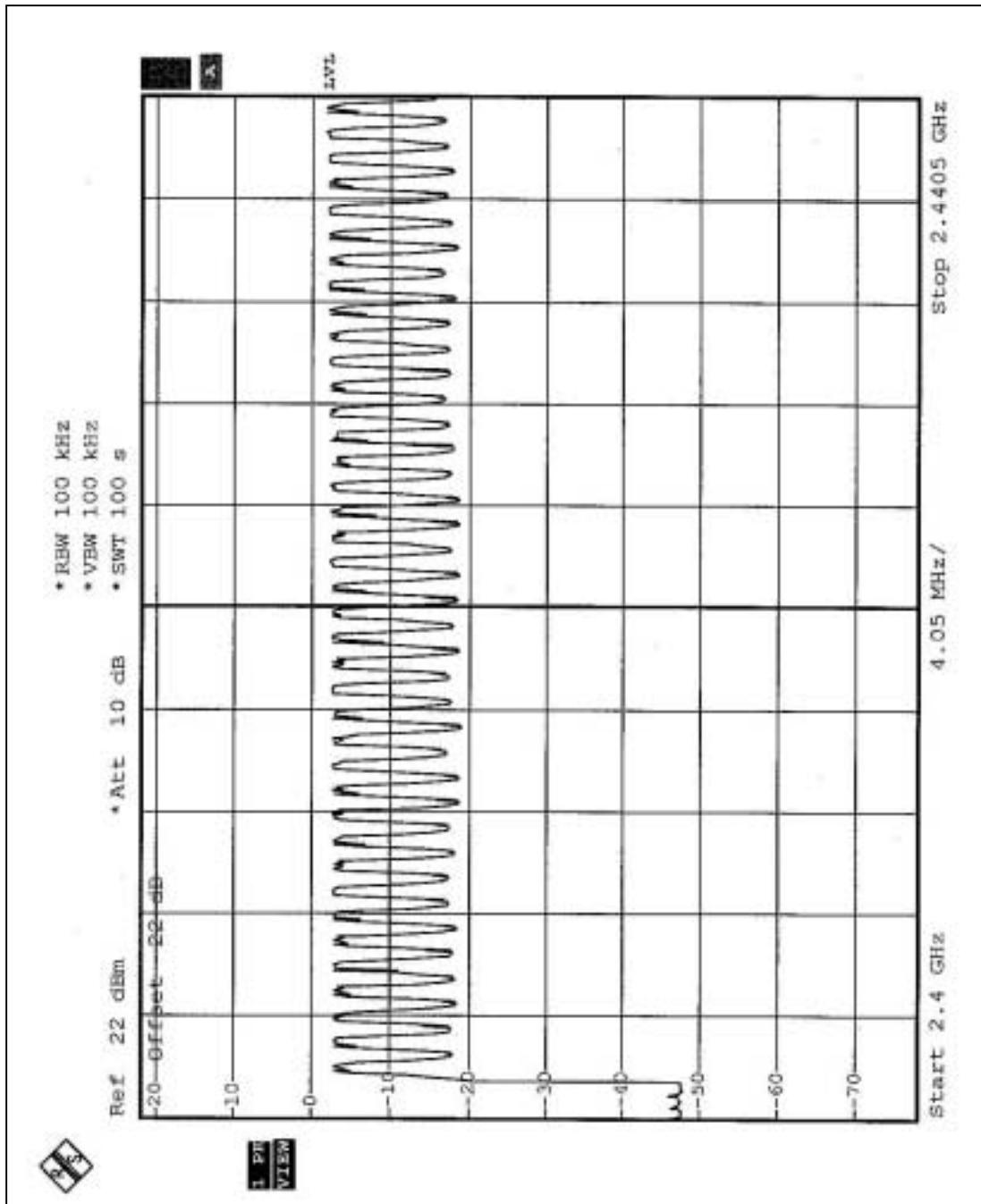
No deviation

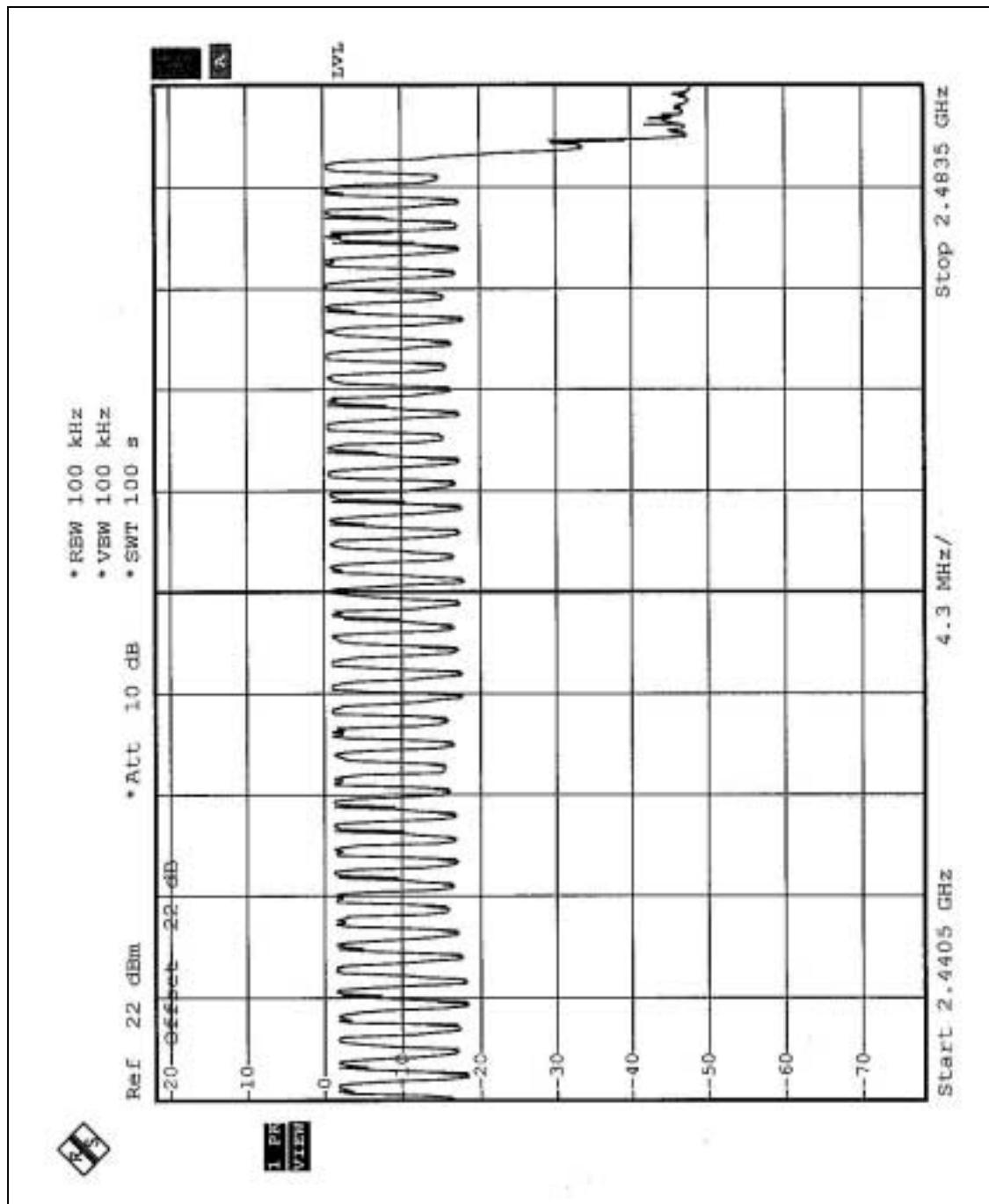
4.2.5 TEST SETUP



4.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.





4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	May. 06, 2004

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

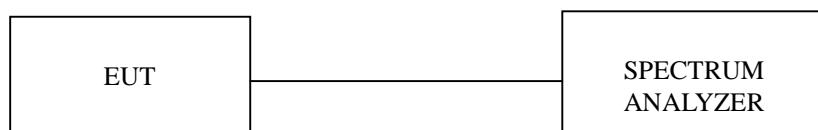
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency to be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

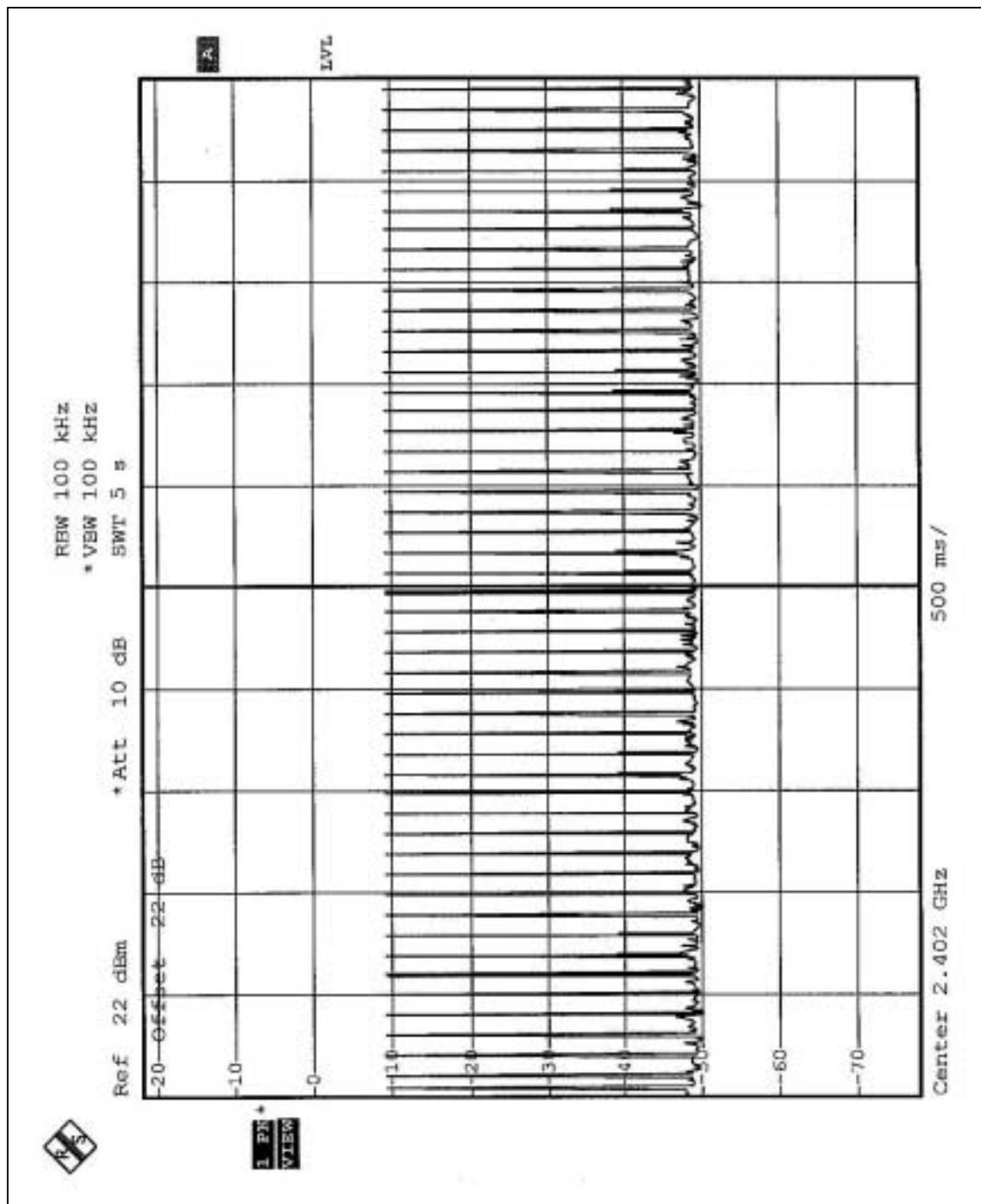


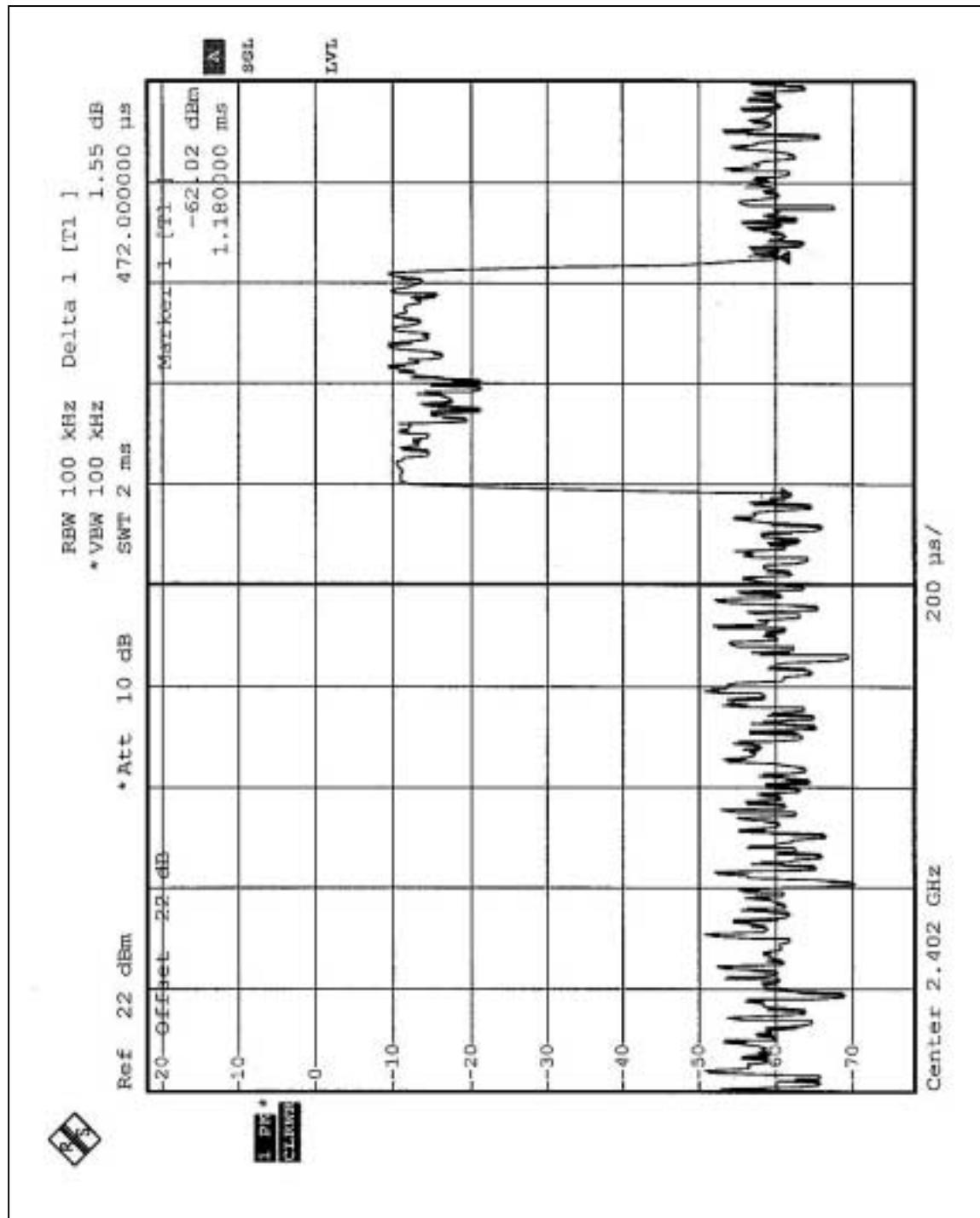
4.3.6 TEST RESULTS

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 times / 5 sec *6.32=322.32 times	0.472	152.14	400
DH3	26 times / 5 sec *6.32=164.32 times	1.728	283.94	400
DH5	17 times / 5 sec *6.32=107.44 times	3.024	324.90	400

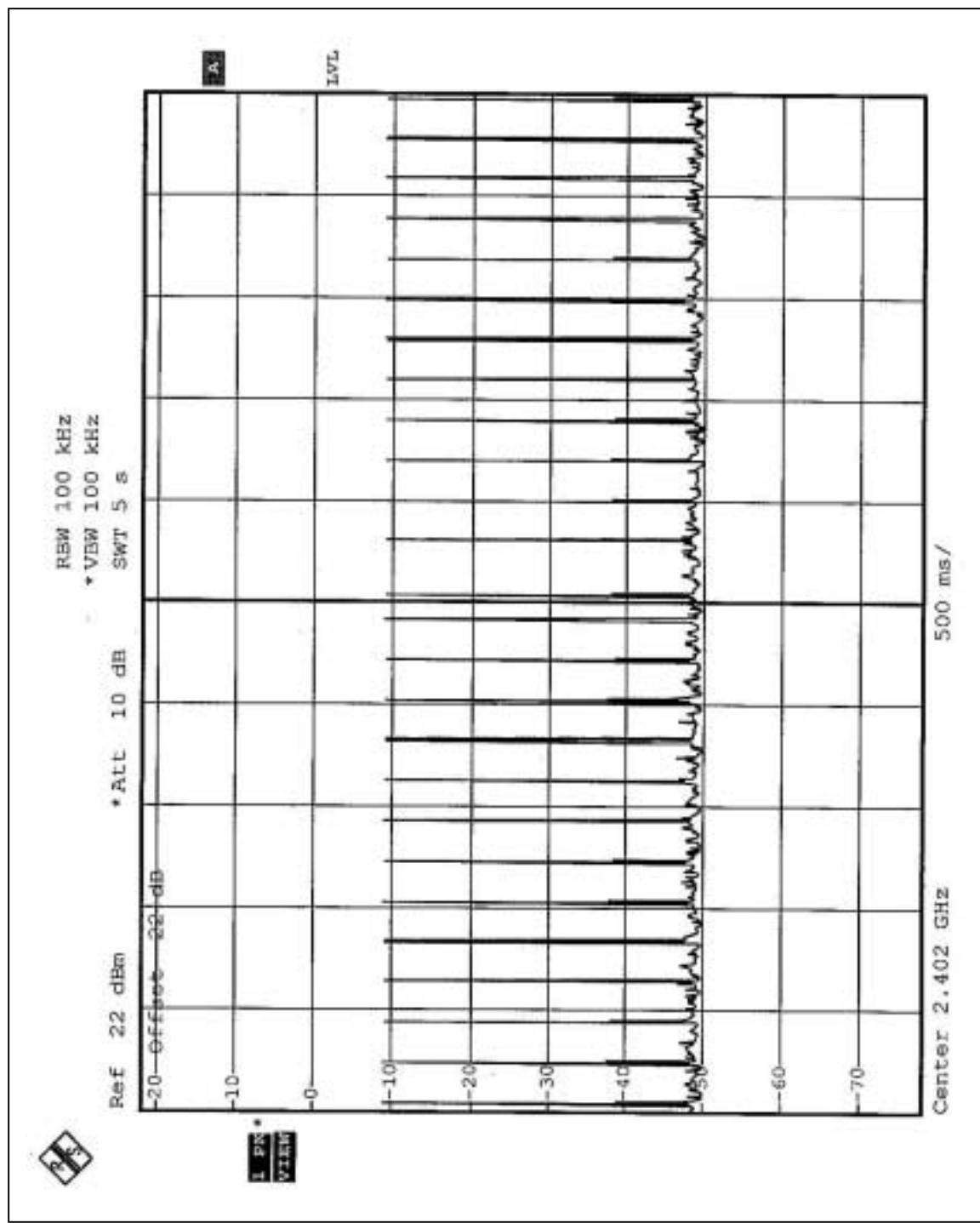
Test plots of the transmitting time slot are shown on next six pages.

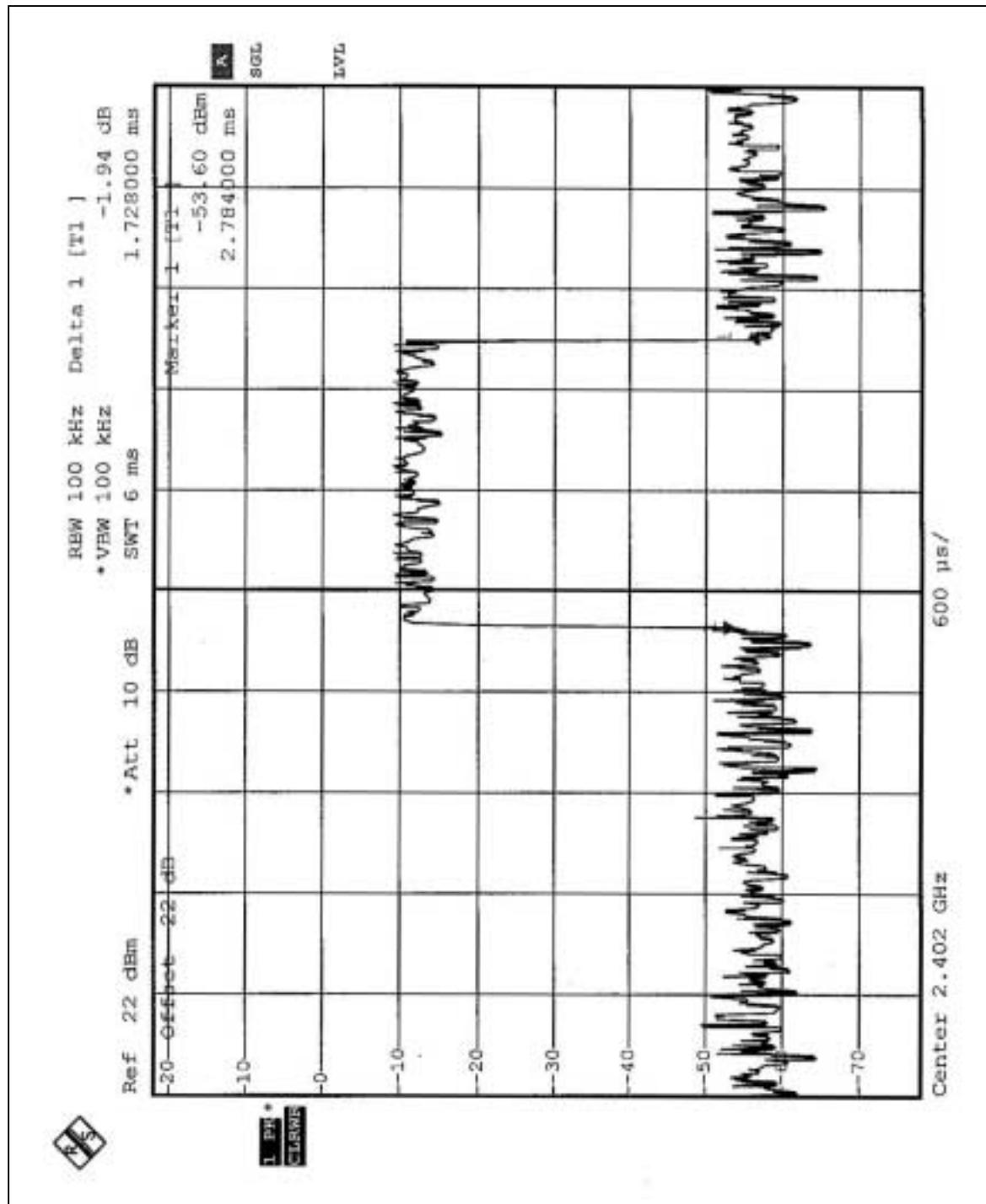
DH1



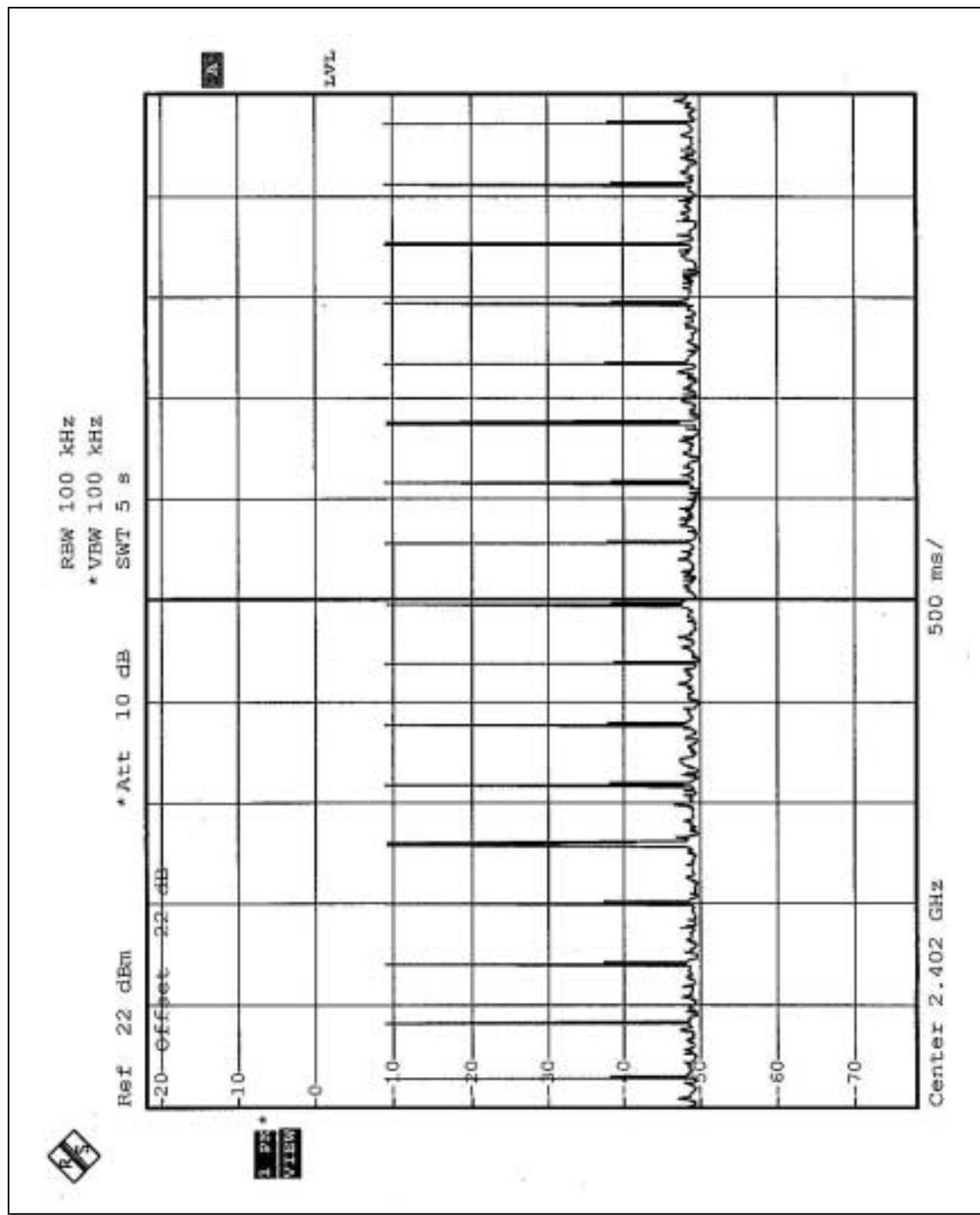


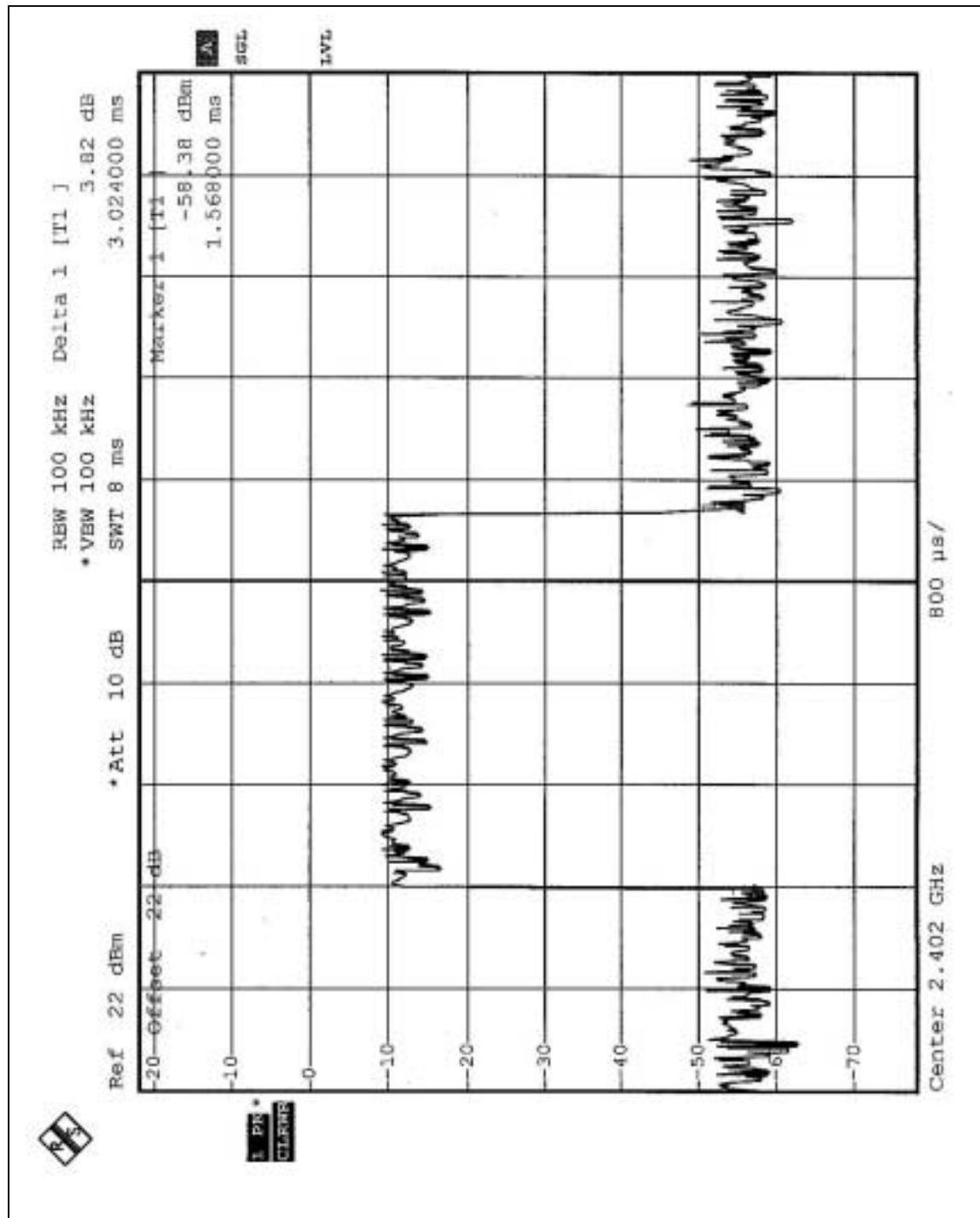
DH3





DH5





4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5 MHz and 5725-5850 MHz bands, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	May. 06, 2004

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

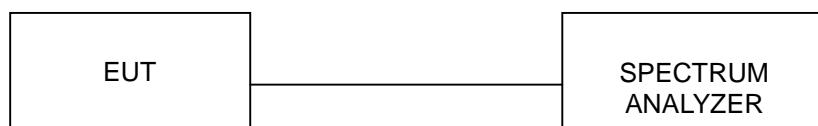
4.4.3 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



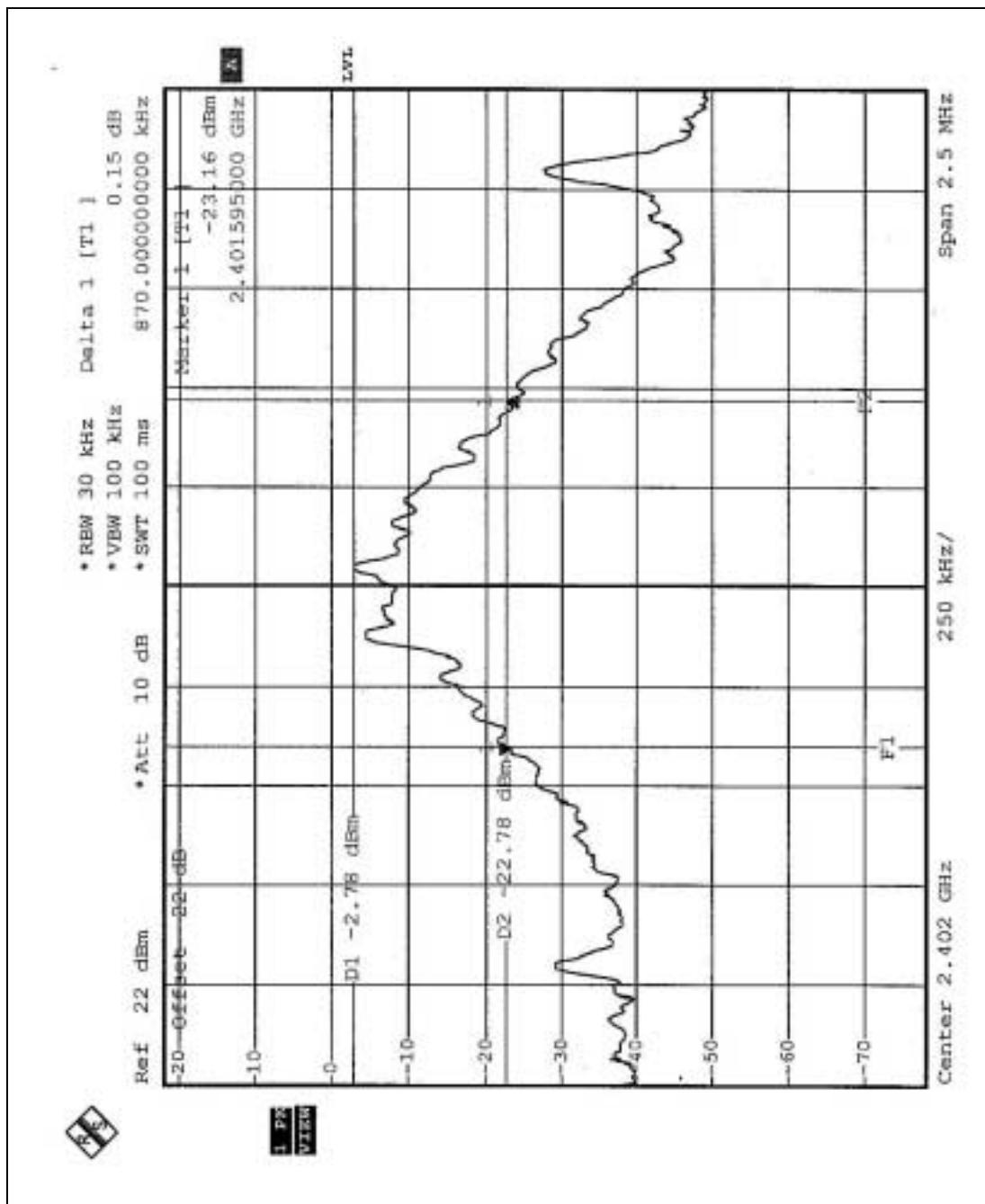
4.4.6 EUT OPERATING CONDITION

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

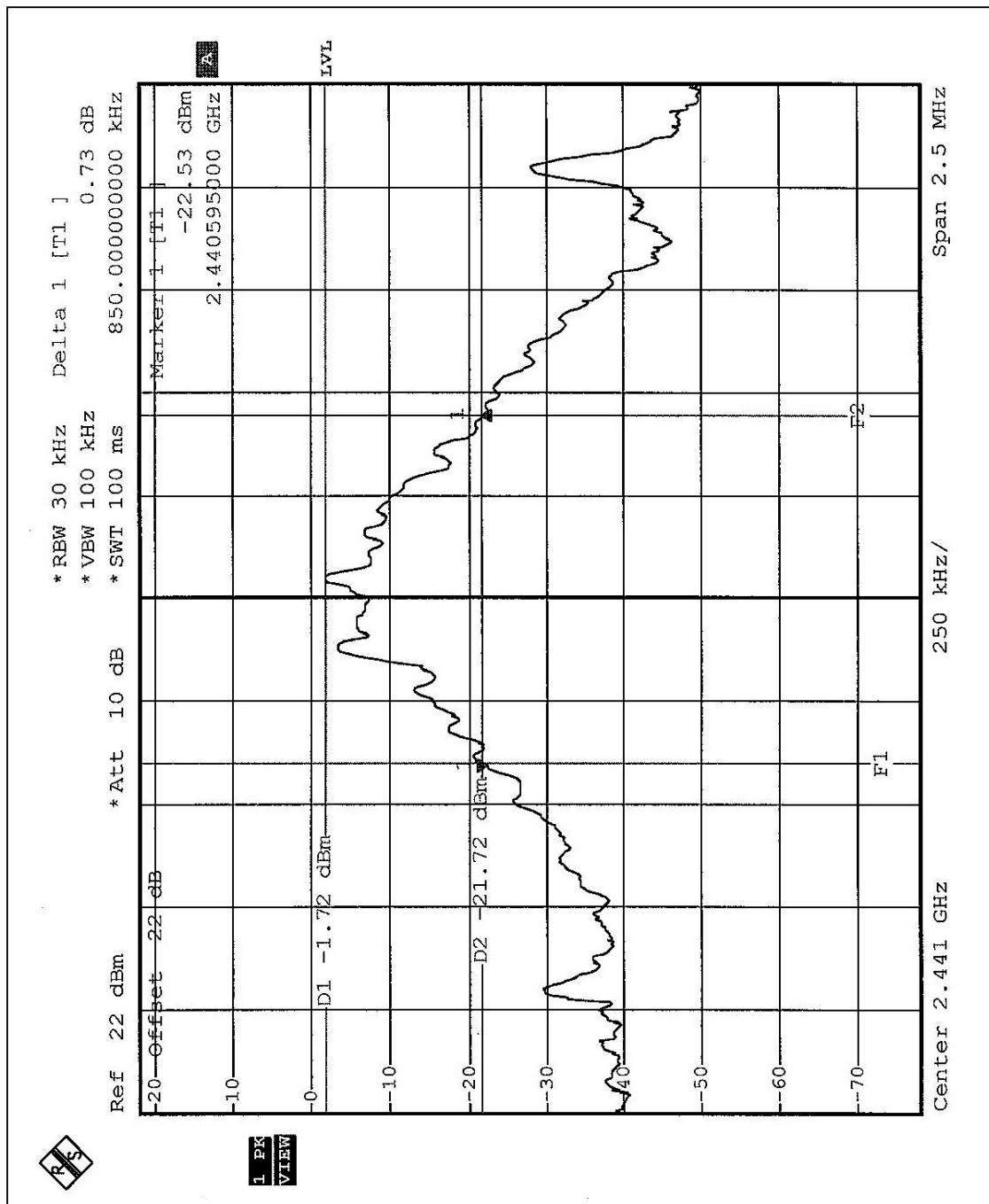
4.4.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)	MAXIMUM LIMIT (MHz)	PASS/FAIL
0	2402	870	1	PASS
39	2441	850	1	PASS
78	2480	870	1	PASS

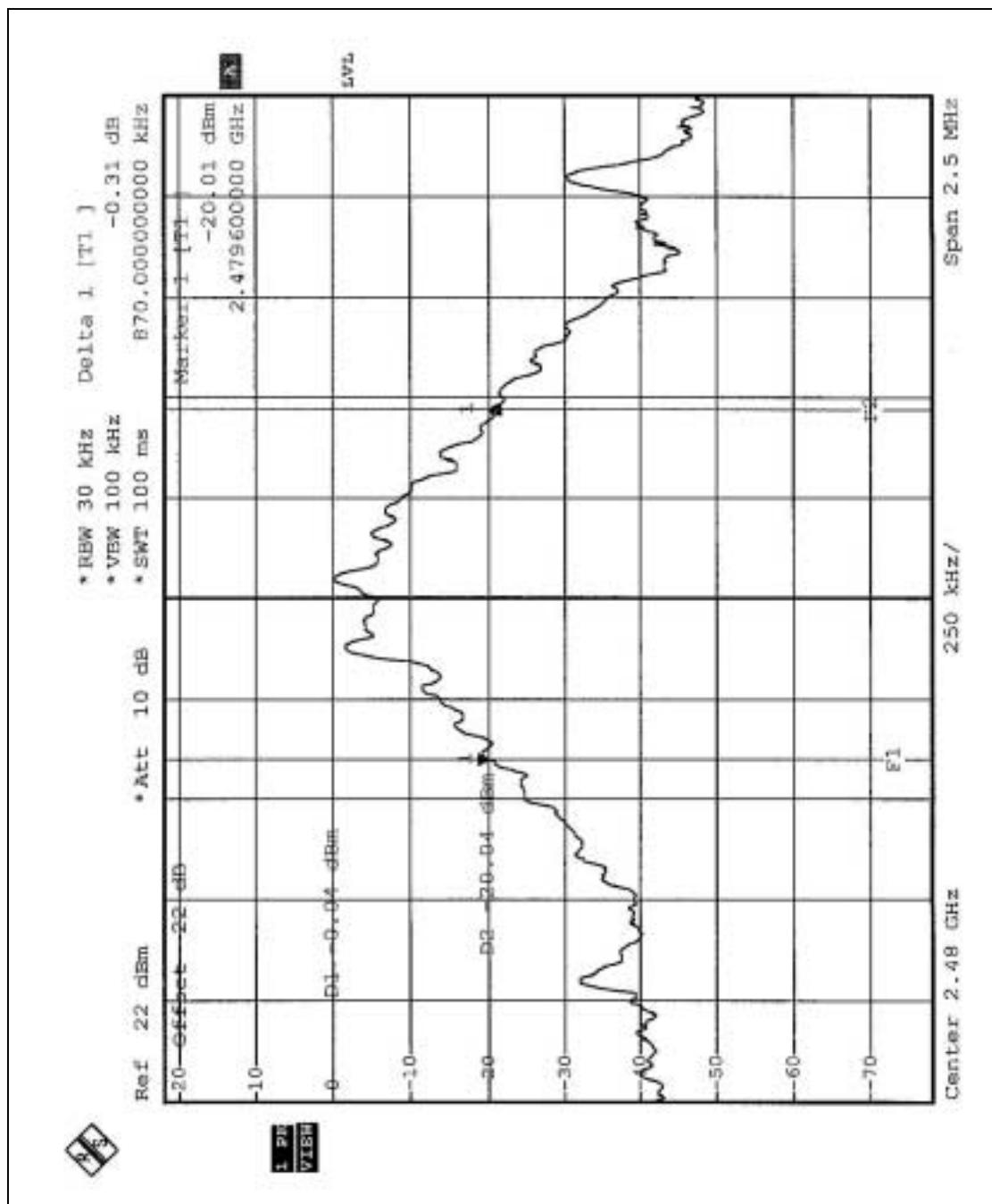
Channel 0



Channel 39



Channel 78



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25KHz or 20dB bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	May. 06, 2004

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

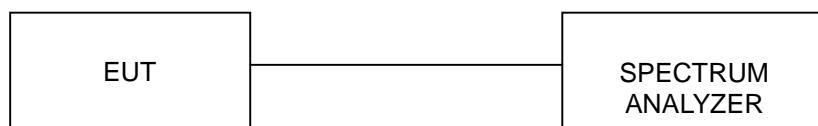
4.5.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

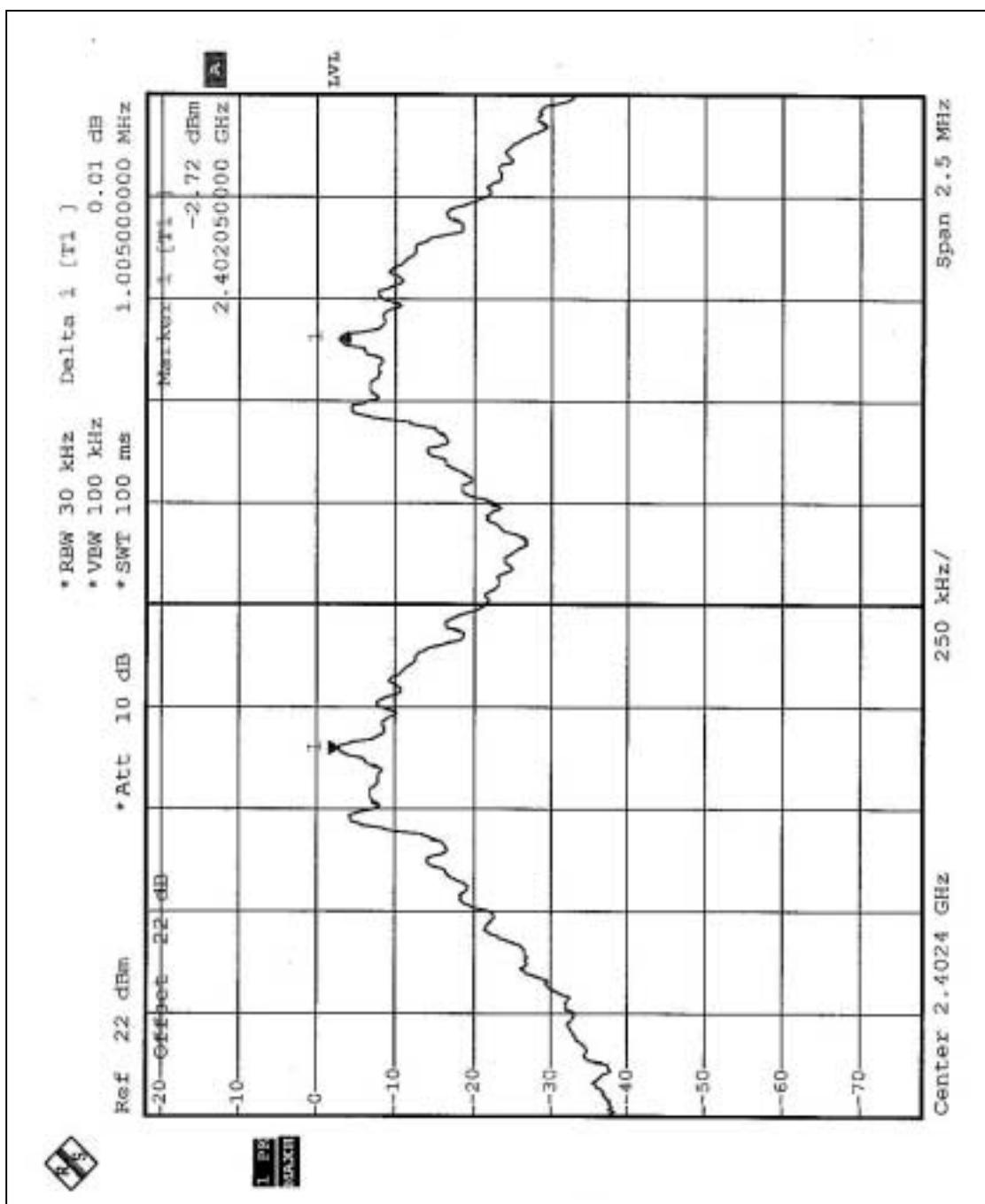


4.5.6 TEST RESULTS

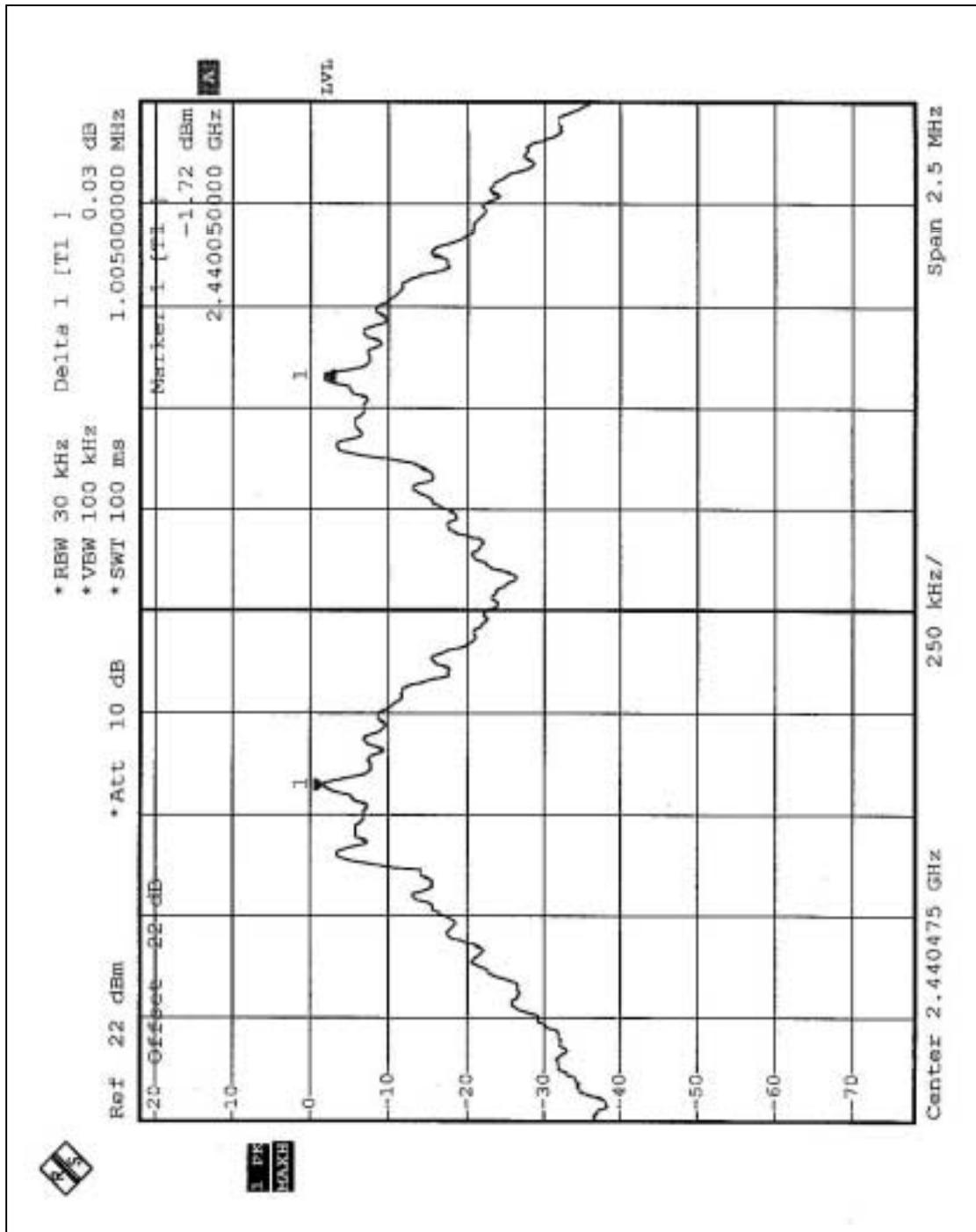
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	1.005MHz	810	PASS
39	2441	1.005MHz	805	PASS
78	2480	1.0MHz	815	PASS

The minimum limit is 20dB bandwidth. Test results please refer to next three pages.

Channel 0



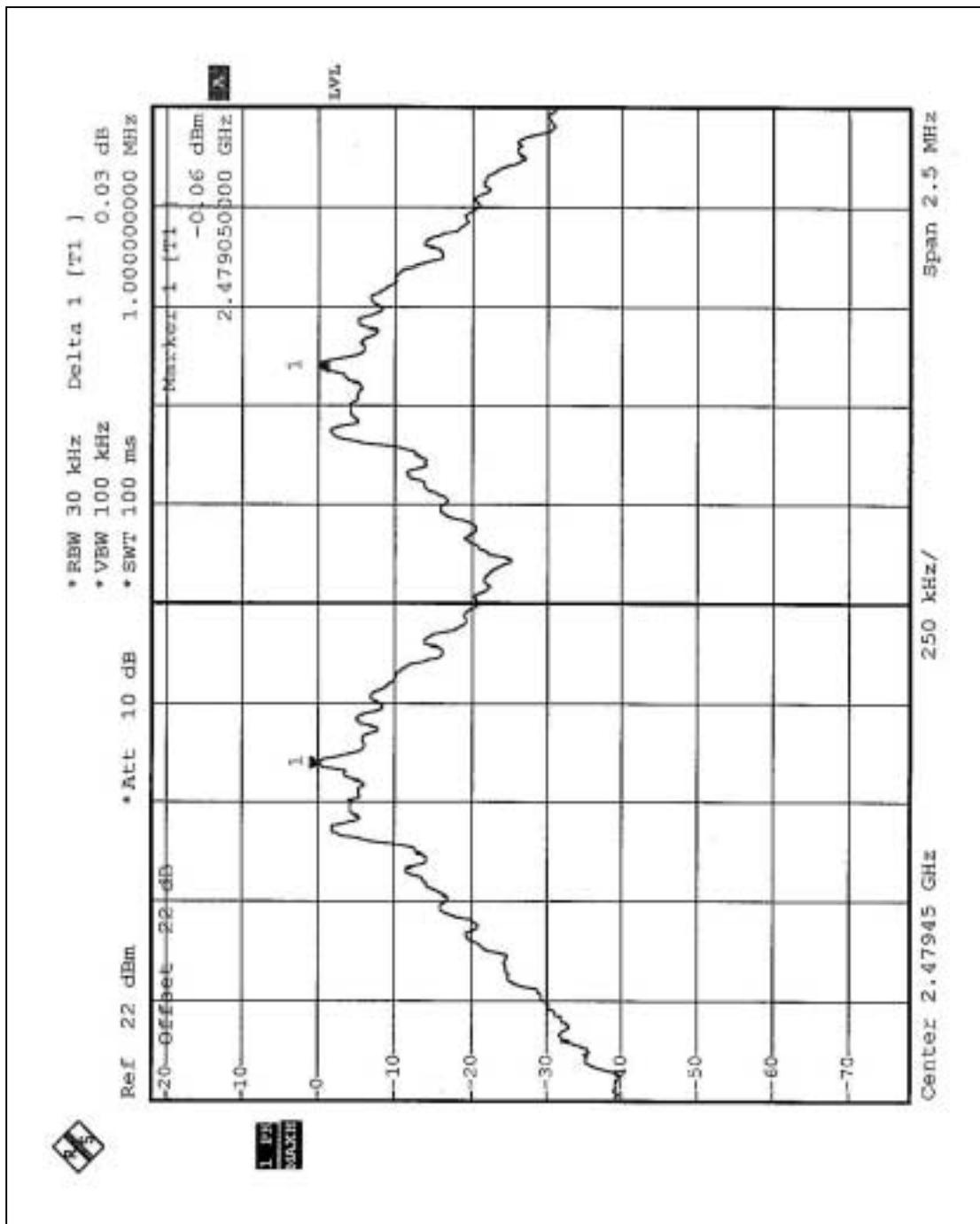
Channel 39



FCC ID: RXH-BP-1000



Channel 78



4.6 MAXIMUM PEAK OUTPUT POWER –USING SPECTRUM ANALYZER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Limit of Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SINGLE CHANNEL POWER METER	NRVS	100026	Mar. 06, 2004
PEAK POWER SENSOR	NRV-Z32	100013	Mar. 06, 2004

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

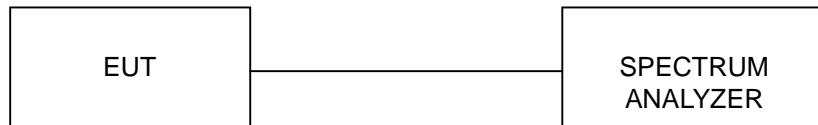
4.6.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITION

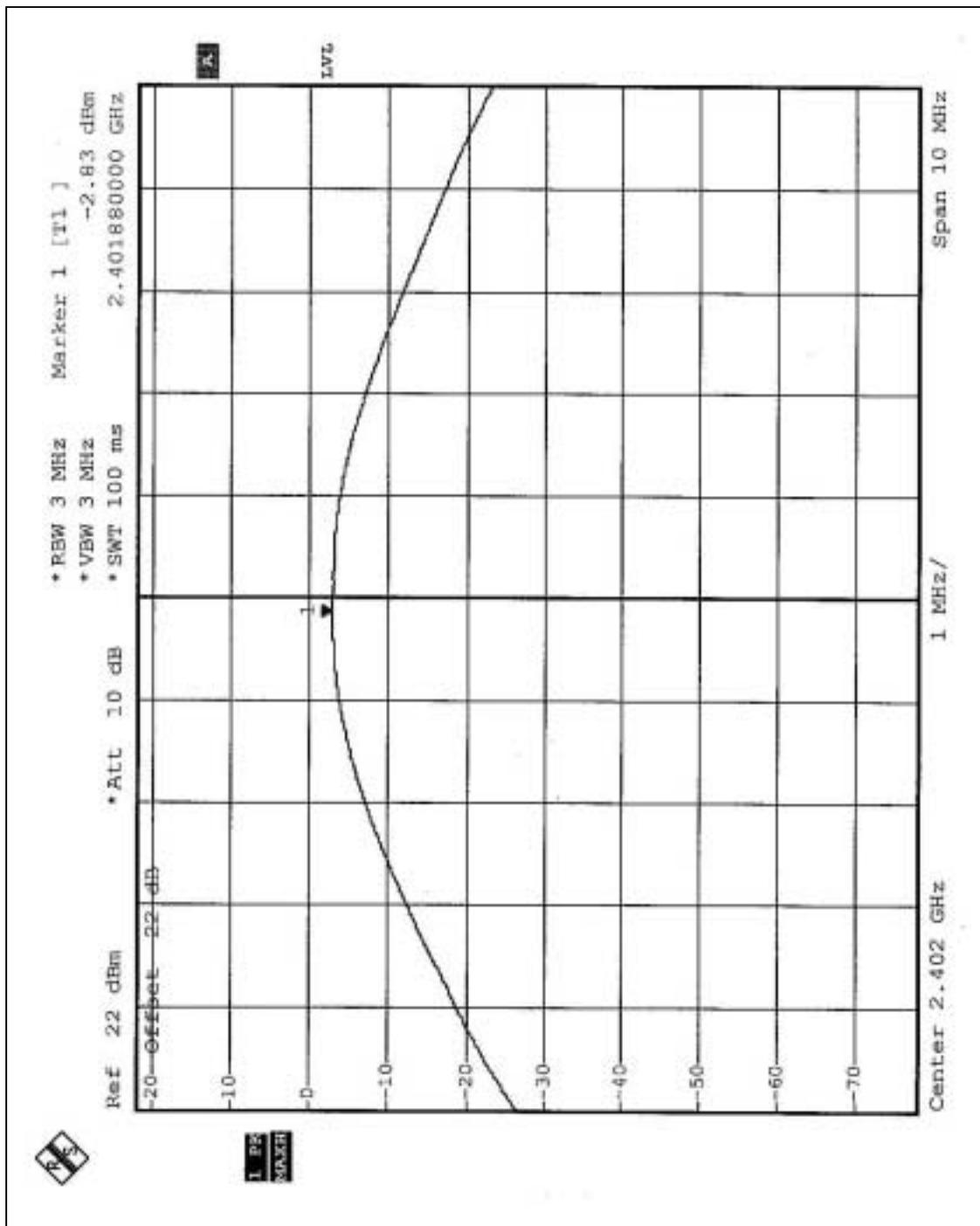
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

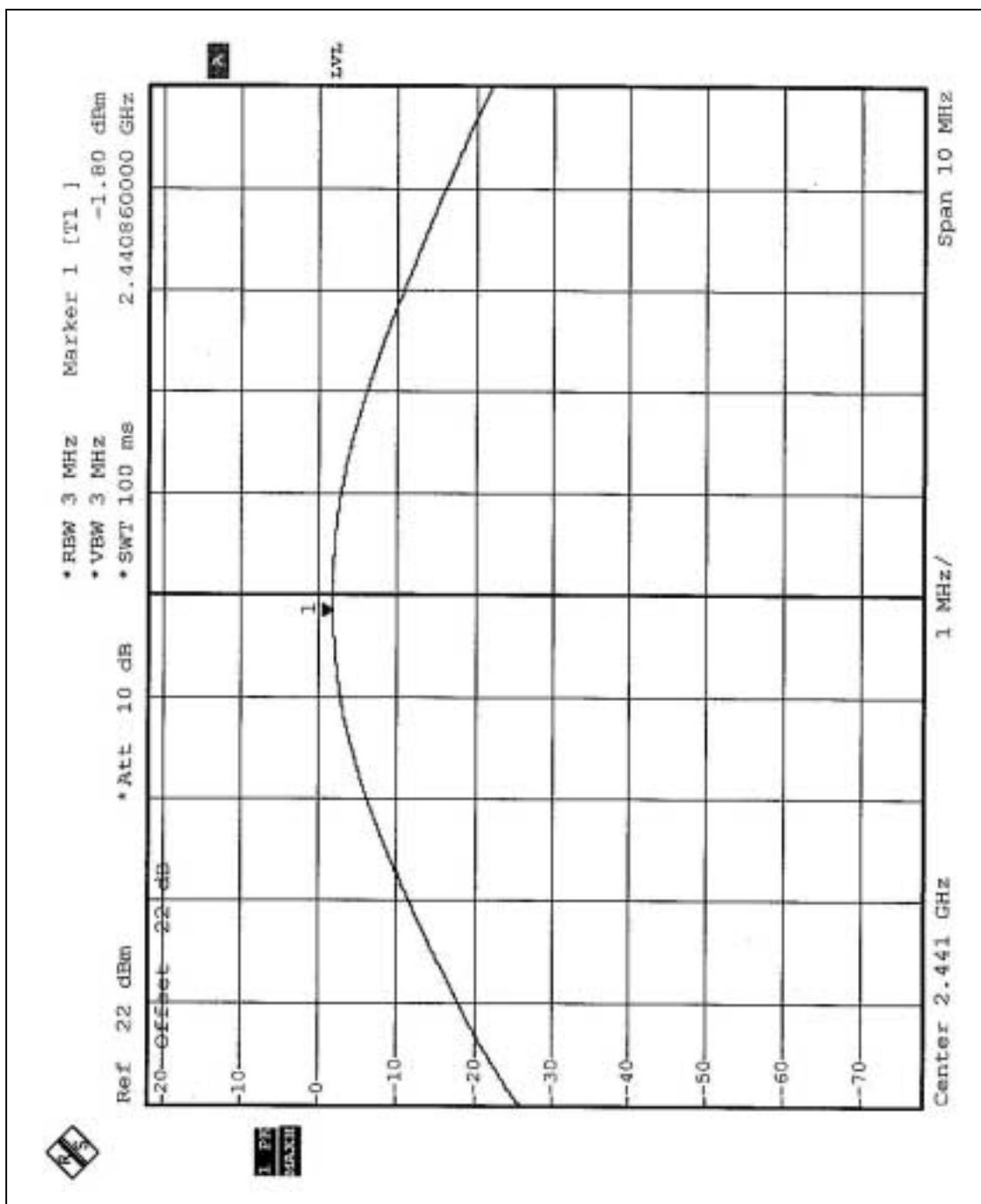
Output Power to Antenna:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	-2.83	30	PASS
39	2441	-1.80	30	PASS
78	2480	-0.12	30	PASS

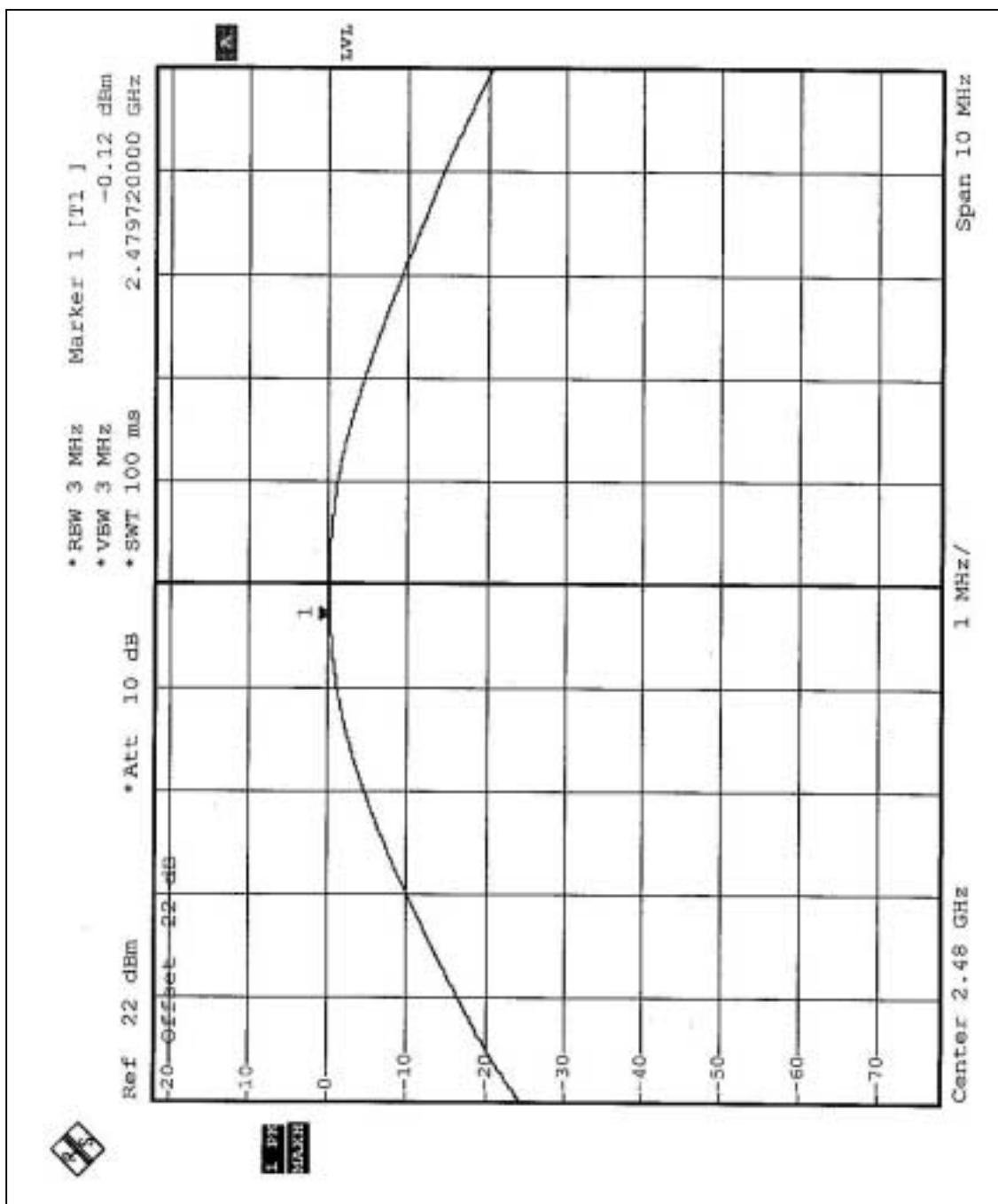
Channel 0



Channel 39



Channel 78



4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8594ER	3829U04676	Aug. 30, 2004
ADVANTEST Spectrum Analyzer	R3271A	85060311	Jun. 16, 2004
CHASE RF Pre_Amplifier	CPA9232	1057	May. 10, 2004
HP Pre_Amplifier	8449B	3008A01922	Oct. 13, 2004
ROHDE & SCHWARZ Test Receiver	ESVS 10	849231 /019	Sep. 30, 2004
CHASE Broadband Antenna	CBL6111c	2730	Jul, 30, 2004
Schwarzbeck Horn_Antenna	3115	5619	Jul. 17, 2004
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170192	Feb. 16, 2005
SCHWARZBECK Tunable Dipole Antenna	UHAP	897	Mar. 07, 2005
SCHWARZBECK Tunable Dipole Antenna	VHAP	880	Mar. 07, 2005
RF Switches (ARNITSU)	CS-201	1565157	Dec. 01, 2004
RF CABLE (Chaintek) 1GHz-20GHz	SF102	22054-2	Feb. 10. 2005
RF Cable(RICHTEC)	9913-30M	STCCAB-30M-1GHz-021	Dec. 01, 2004
Software	AS60P8	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Tunable Dipole Antenna)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. C.
5. The FCC Site Registration No. is 656396.
6. The VCCI Site Registration No. is R-1626.
7. The CANADA Site Registration No. is IC 4284-3.

4.7.3 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.

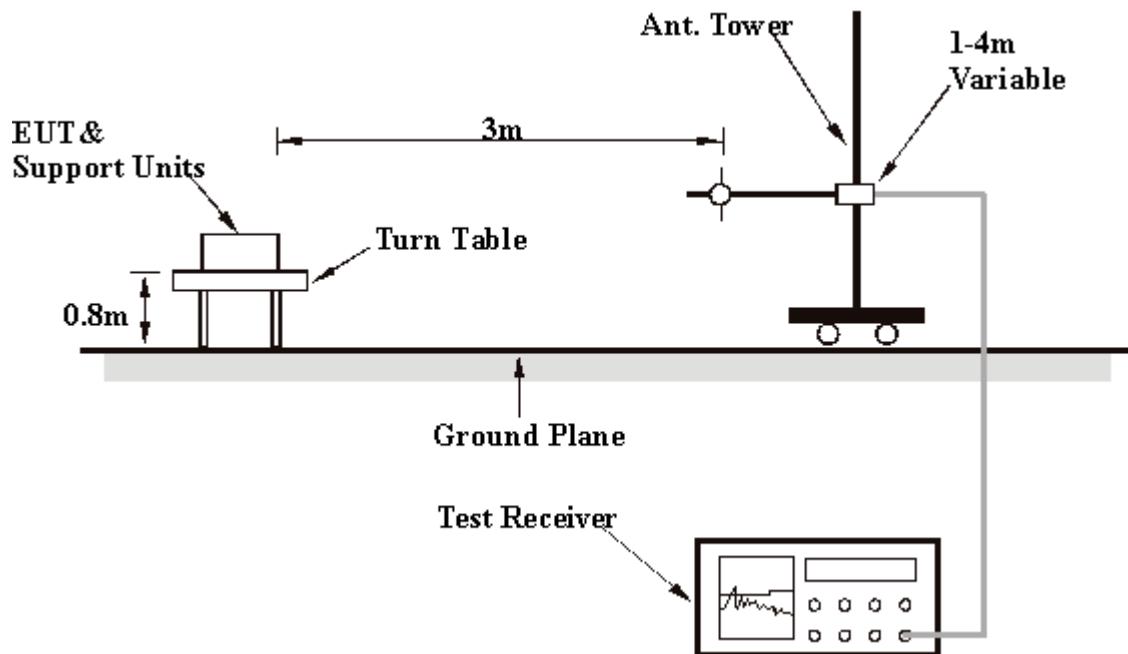
NOTE:

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.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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



4.7.6 TEST RESULTS

EUT		AirBase	MODEL		BP-1000		
MODE		Channel 78	FREQUENCY RANGE		30 ~ 1000 MHz		
INPUT POWER (SYSTEM)		120Vac, 60 Hz	DETECTOR FUNCTION		Quasi-Peak		
ENVIRONMENTAL CONDITIONS		23 deg. C, 70%RH, 978 hPa	TESTED BY		Eric Lee		

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	128.00	31.20 QP	43.50	-12.30	1.39 H	53	18.90	12.30
2	160.00	32.80 QP	43.50	-10.70	1.42 H	43	18.40	14.40
3	176.00	29.60 QP	43.50	-13.90	1.47 H	103	16.40	13.20
4	192.00	27.10 QP	43.50	-16.40	1.34 H	94	15.30	11.90
5	240.01	31.80 QP	46.00	-14.20	1.21 H	269	19.00	12.80
6	288.01	36.80 QP	46.00	-9.20	1.06 H	79	22.10	14.80
7	304.01	37.00 QP	46.00	-9.00	1.00 H	89	21.60	15.40
8	320.01	33.70 QP	46.00	-12.30	1.11 H	97	17.90	15.80
9	384.01	33.10 QP	46.00	-12.90	1.00 H	213	15.50	17.60
10	432.02	29.90 QP	46.00	-16.10	1.03 H	160	11.00	18.90

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	63.99	29.90 QP	40.00	-10.10	1.00 V	312	16.90	13.00
2	128.00	35.60 QP	43.50	-7.90	1.00 V	2	22.10	13.50
3	160.00	30.10 QP	43.50	-13.40	1.00 V	121	16.40	13.60
4	240.01	35.20 QP	46.00	-10.80	1.00 V	2	21.20	14.00
5	383.99	25.40 QP	46.00	-20.60	1.43 V	2	10.70	14.70
6	432.02	23.90 QP	46.00	-22.10	1.00 V	2	9.00	14.90

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

4.7.7 TEST RESULTS

EUT	AirBase	MODEL	BP-1000
MODE	Channel 0	FREQUENCY RANGE	1000 ~ 25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 978 hPa	TESTED BY	Eric Lee

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	1201.00	42.70 PK	74.00	-31.30	1.06 H	355	15.80	26.90
2	2370.00	38.90 PK	74.00	-35.10	1.07 H	351	8.60	30.40
3	2385.00	38.40 PK	74.00	-35.60	1.08 H	353	8.00	30.40
4	2390.00	40.00 PK	74.00	-34.00	1.01 H	358	9.60	30.40
5	*2402.00	88.60 PK			1.00 H	333	58.10	30.50
5	*2402.00	80.20 AV			1.00 H	333	49.70	30.50
6	4804.00	44.90 PK	74.00	-29.10	1.78 H	272	8.70	36.10

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	1201.00	45.60 PK	74.00	-28.40	1.07 V	23	18.70	26.90
2	2370.00	39.10 PK	74.00	-34.90	1.09 V	12	8.80	30.40
3	2385.00	40.70 PK	74.00	-33.30	1.01 V	20	10.30	30.40
4	2390.00	45.60 PK	74.00	-28.40	1.01 V	100	15.20	30.40
5	*2402.00	94.20 PK			1.00 V	94	63.70	30.50
5	*2402.00	85.80 AV			1.00 V	94	55.30	30.50
6	4804.00	43.70 PK	74.00	-30.30	1.00 V	10	7.50	36.10

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	AirBase	MODEL	BP-1000
MODE	Channel 39	FREQUENCY RANGE	1000 ~ 25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 978 hPa	TESTED BY	Eric Lee

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	37.60 PK	74.00	-36.40	1.23 H	339	10.60	26.90
2	*2441.00	91.50 PK			1.00 H	315	60.80	30.70
2	*2441.00	83.00 AV			1.00 H	315	52.30	30.70
3	4882.00	43.20 PK	74.00	-30.80	1.00 H	27	6.70	36.50

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	37.90 PK	74.00	-36.10	1.46 V	22	10.90	26.90
2	*2441.00	98.80 PK			1.21 V	10	68.10	30.70
2	*2441.00	90.40 AV			1.21 V	10	59.70	30.70
3	4882.00	44.40 PK	74.00	-29.60	1.02 V	27	7.90	36.50

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	AirBase	MODEL	BP-1000
MODE	Channel 78	FREQUENCY RANGE	1000 ~ 25000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 978 hPa	TESTED BY:	Eric Lee

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	1240.00	46.40 PK	74.00	-27.60	1.18 H	1	19.40	27.00
2	*2480.00	88.10 PK			1.20 H	301	57.10	30.90
2	*2480.00	79.60 AV			1.20 H	301	48.70	30.90
3	2483.50	45.30 PK	74.00	-28.70	1.20 H	301	14.30	31.00
4	2496.00	39.10 PK	74.00	-34.90	1.21 H	0	8.40	30.80
5	2512.00	37.40 PK	74.00	-36.60	1.21 H	10	6.60	30.70
6	4960.00	43.60 PK	74.00	-30.40	1.30 H	48	6.70	36.80

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	1240.00	46.70 PK	74.00	-27.30	1.16 V	75	19.70	27.00
2	*2480.00	98.90 PK			1.17 V	10	67.90	30.90
2	*2480.00	90.50 AV			1.17 V	10	59.50	30.90
3	2483.50	56.10 PK	74.00	-17.90	1.17 V	10	25.10	31.00
3	2483.50	47.70 AV	54.00	-6.30	1.17 V	10	16.70	31.00
4	2496.00	42.10 PK	74.00	-31.90	1.18 V	11	11.40	30.80
5	2512.00	39.20 PK	74.00	-34.80	1.15 V	19	8.50	30.70
6	4960.00	44.90 PK	74.00	-29.10	1.23 V	10	8.10	36.80

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
R&S SPECTRUM ANALYZER	FSP40	100037	May. 06, 2004

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.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 kHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

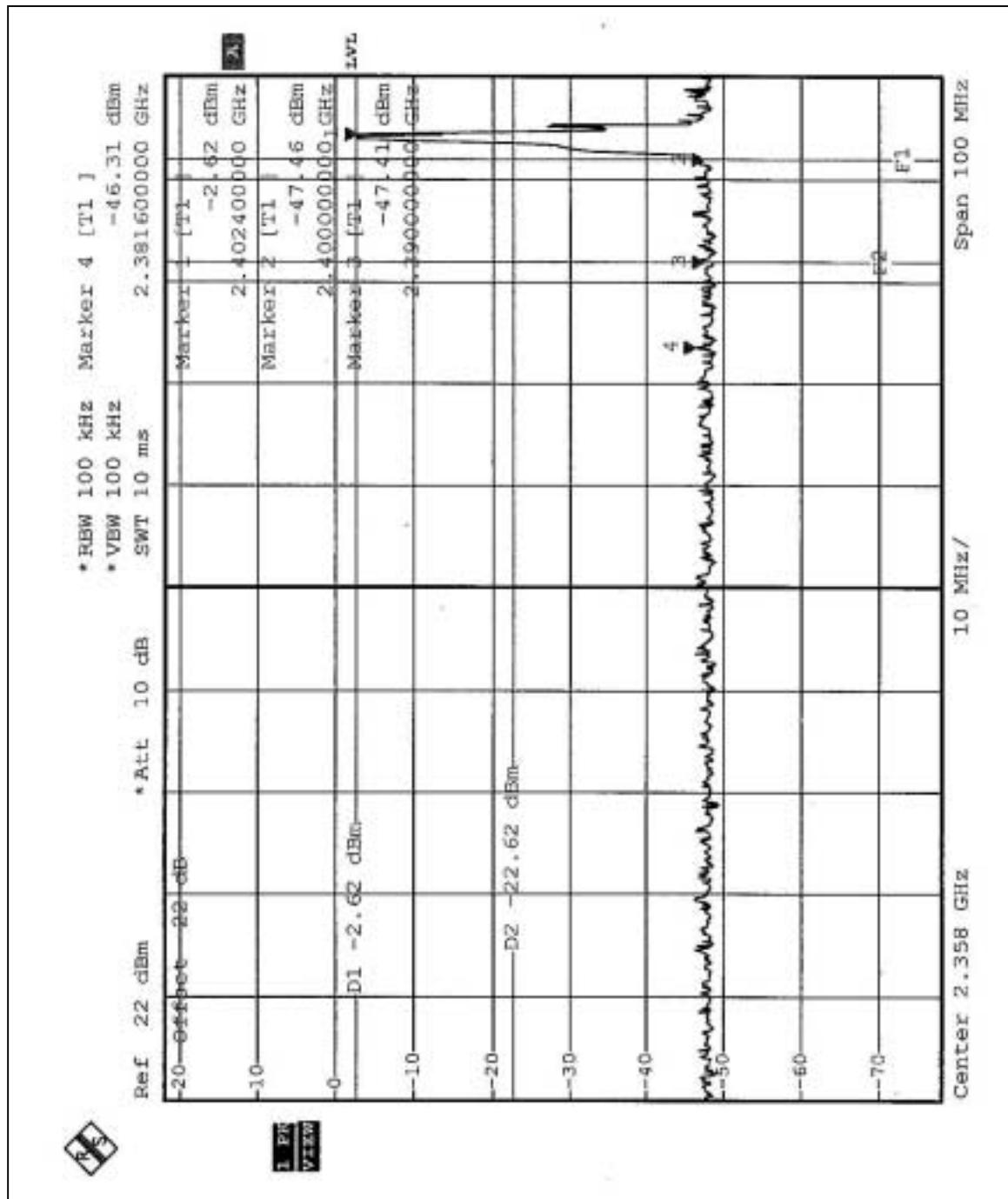
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

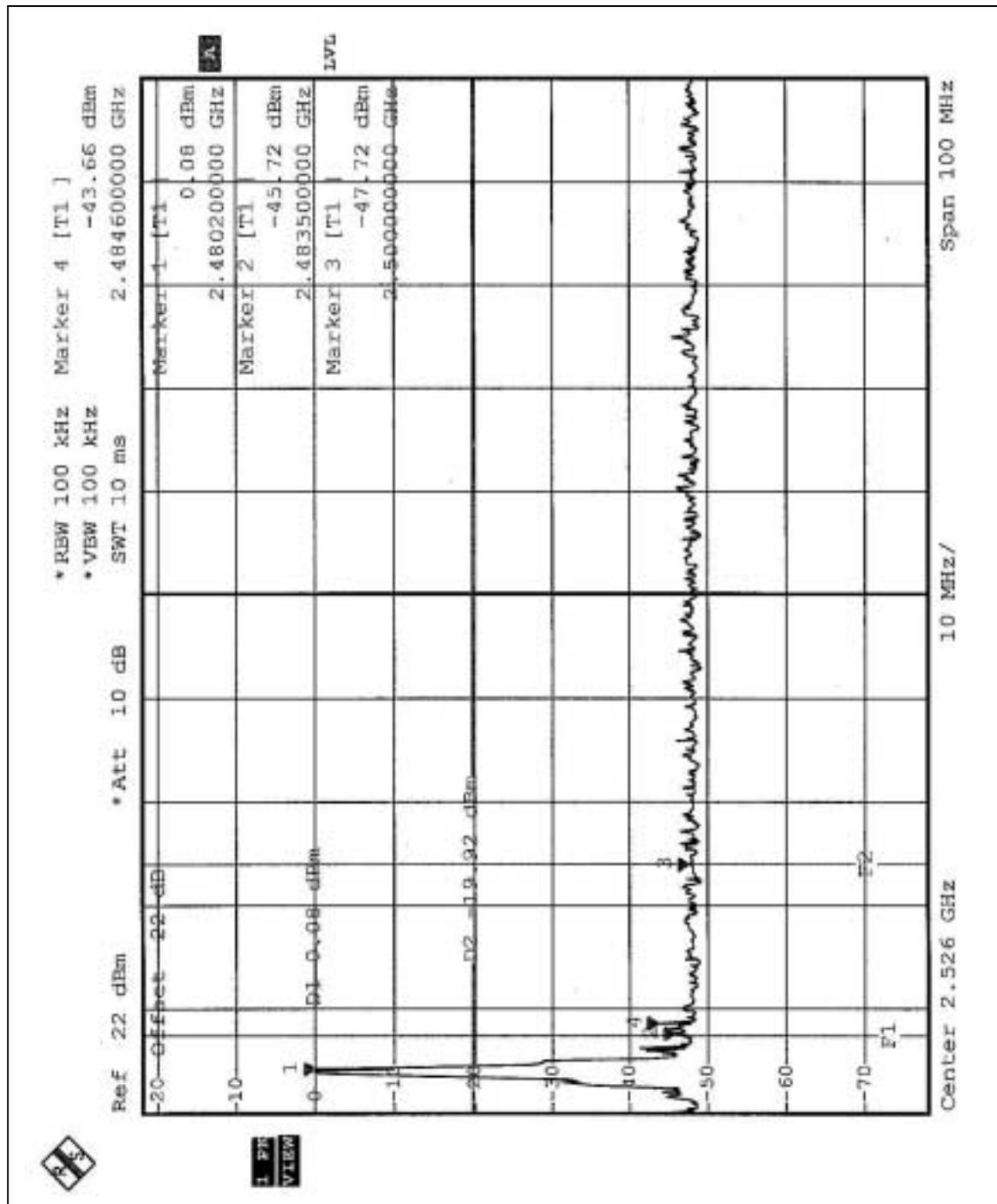
4.8.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

NOTE: The band edge emission plot on the following first page shows 44.79dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.7 is 85.8dB_uV/m, so the maximum field strength in restrict band is $85.8 - 44.79 = 41.01$ dB_uV/m which is under 54 dB_uV/m limit.

NOTE: The band edge emission plot on the following second page shows 43.74dB delta between carrier maximum power and local maximum emission in restrict band (2.4846GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.7 is 90.5dB_uV/m, so the maximum field strength in restrict band is $90.5 - 43.74 = 46.76$ dB_uV/m which is under 54 dB_uV/m limit.







4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole Antenna and MCX/MMCX/Solder connector. The maximum Gain of this antenna is only 1.5dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



6 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 , GOST-ASIA(MOU)
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:

Linko EMC/RF Lab:

Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:

Tel: 886-3-3183232
Fax: 886-3-3185050

Linko RF & Telecom Lab.

Tel: 886-3-3270910
Fax: 886-3-3270892

Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

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