

FCC TEST REPORT

REPORT NO.: RF931006L05A

MODEL NO.: LD-1W

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0528
ILAC MRA



No. 2177-01

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1 CERTIFICATION

PRODUCT : Bluetooth GPS Receiver
BRAND : Nokia
MODEL NO. : LD-1W
APPLICANT : Nokia Corporation
TESTED DATE: Oct. 13 ~ Nov. 03, 2004
TEST ITEM : Engineering Sample
STANDARDS : FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4:2003

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

PREPARED BY : Suntee Liu, **DATE:** Nov. 08, 2004
Suntee Liu

TECHNICAL
ACCEPTANCE : Gary Chang, **DATE:** Nov. 08, 2004
Responsible for RF Gary Chang

APPROVED BY : Jeff Chuang for, **DATE:** Nov. 08, 2004
Cody Chang, Deputy Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC 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 -17.00 dB at 1.875 MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, which ever is greater	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(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -7.99 dB at 49.44 MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted emissions	9k~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~1000MHz	3.58 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.0 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth GPS Receiver
MODEL NO.	LD-1W
POWER SUPPLY	5.7Vdc from adapter 5.7Vdc from car charger 3.7Vdc from rechargeable Li-ion battery
MODULATION TYPE	GFSK
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	2402 MHz ~ 2480 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	1.17 mW
ANTENNA TYPE	Chip antenna with -2.01dBi gain
DATA CABLE	NA
I/O PORTS	NA

NOTE:

1. The EUT was powered by the following adapter.

Brand	Nokia
Model	ACP-12U
Input Rating	100-240Vac, 180mA, 50-60Hz
Output Rating	5.7Vdc, 800mA
Power Line	1.8 m, without core

2. The EUT was powered by the following car charger.

Brand	Nokia
Model	LCH-12
Input Rating	12Vdc/24Vdc
Output Rating	5.7Vdc, 800mA
Power Line	0.4 m, without core

3. The EUT was powered by the following battery.

Brand	Nokia
Model	BL-5C
Output Rating	3.7Vdc

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

3.1 DESCRIPTION OF TEST MODES

79 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. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane. There for only the test data of this Y-plane was used for Radiated test.
2. For conducted emission and radiated emission 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.
3. For radiated emission above 1 GHz, the channel 0, 39, and 78 were tested individually.
4. For radiated emission below 1 GHz, 6 test results presented in the report as below.

Test Results	Description
A	EUT powered by battery
B	EUT powered by battery and tested with the external GPS antenna
C	EUT powered by the car charger
D	EUT powered by the car charger and tested with the external GPS antenna
E	EUT powered by the adapter
F	EUT powered by the adapter and tested with the external GPS antenna

3.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

ANSI C63.4:2003

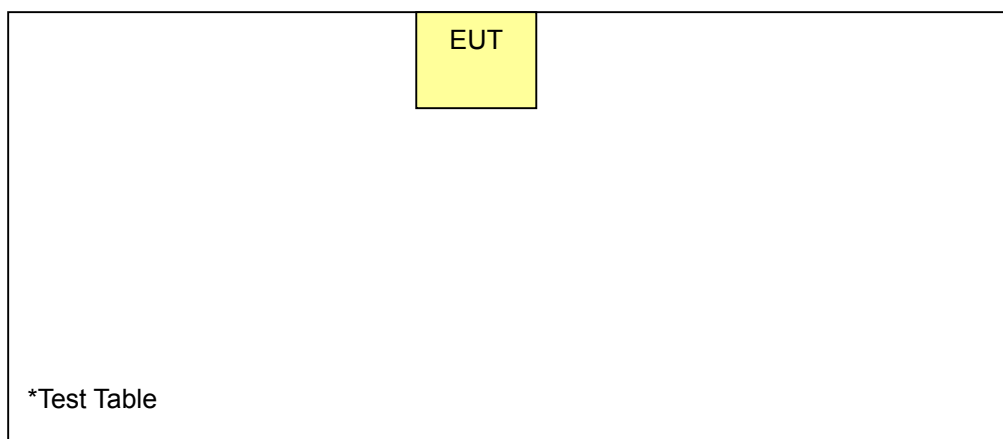
All test items have been performed and recorded as per the above standards.

3.3 DESCRIPTION OF SUPPORT UNITS

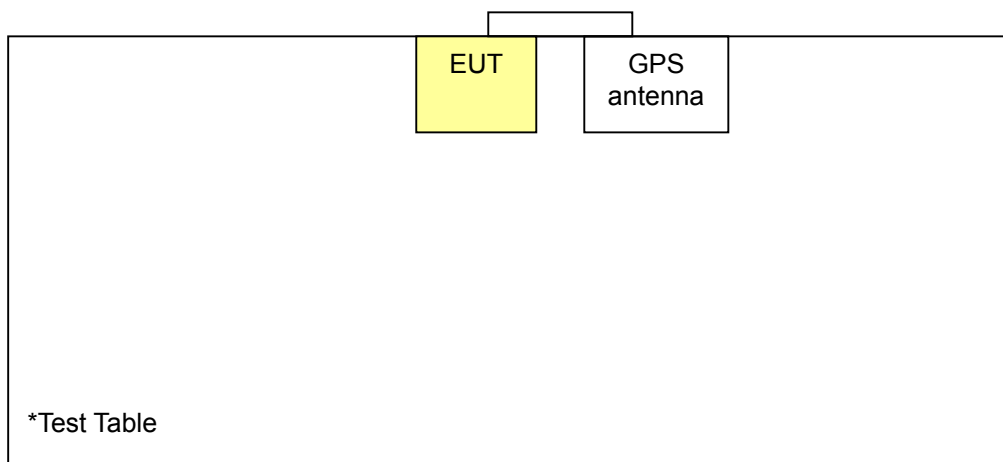
NA

3.4 CONFIGURATION OF SYSTEM UNDER TEST

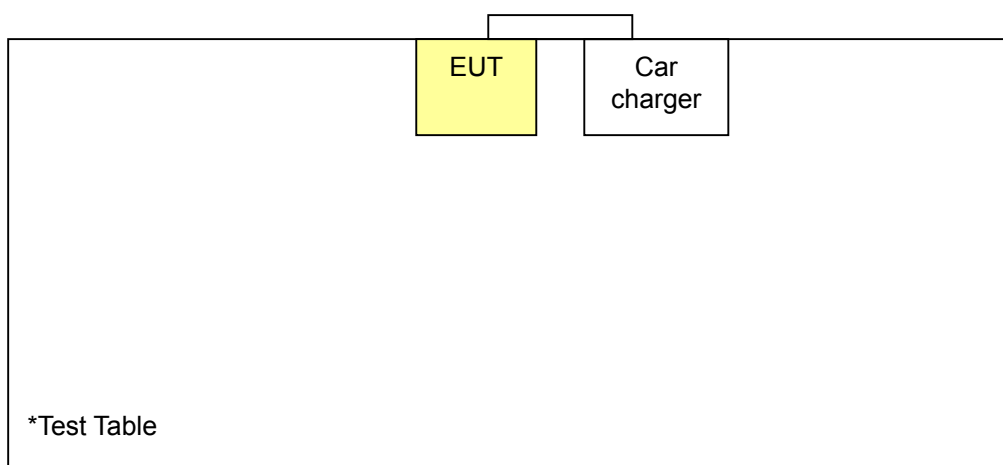
For test mode A



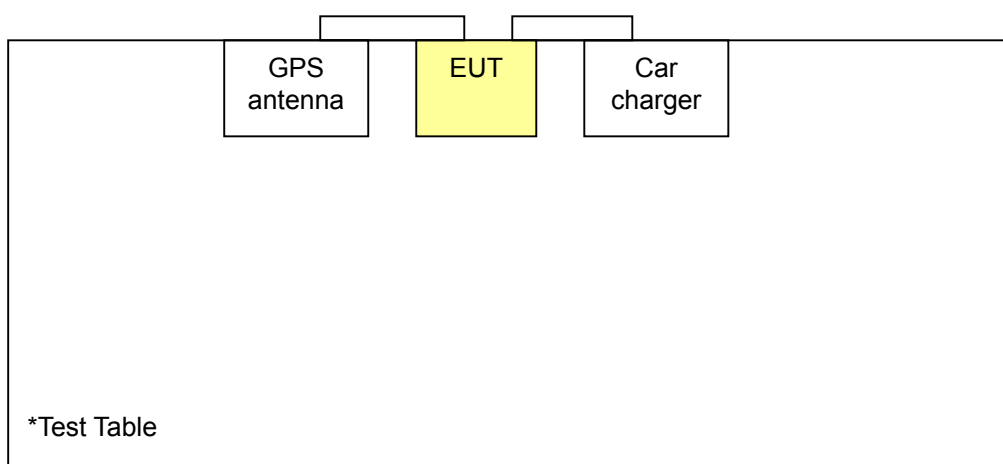
For test mode B



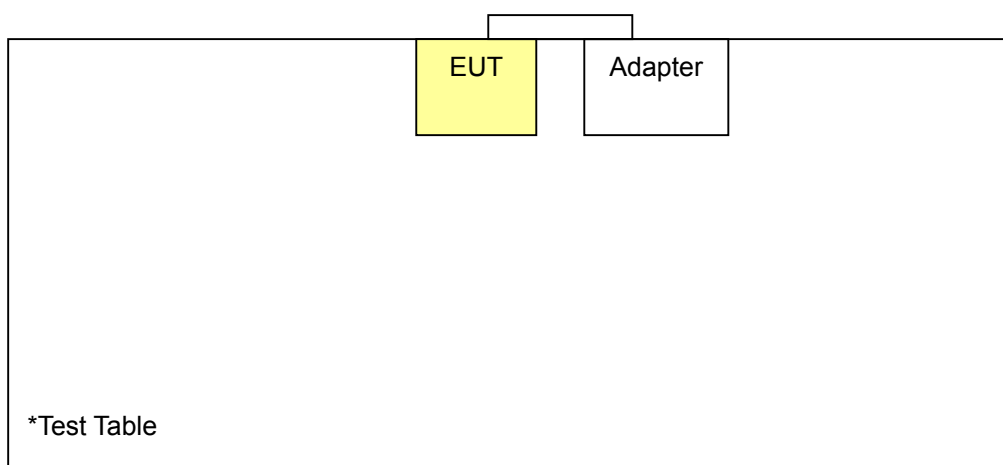
For test mode C



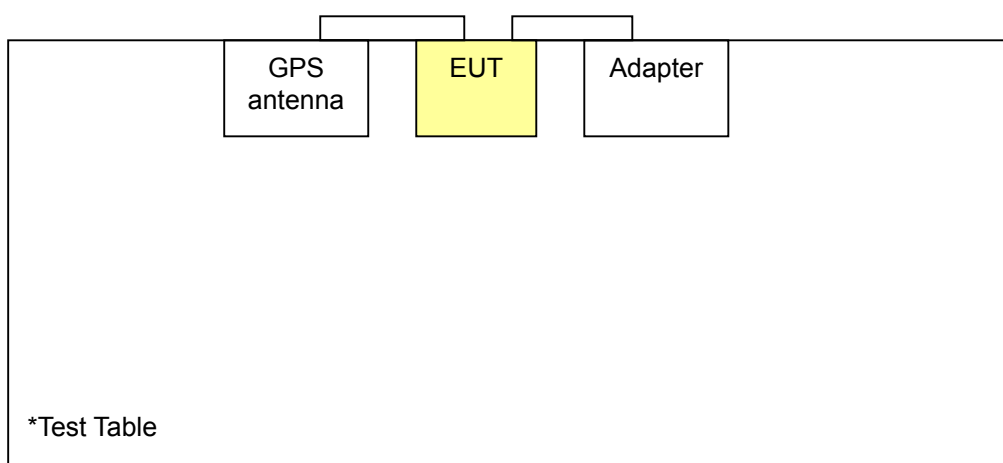
For test mode D



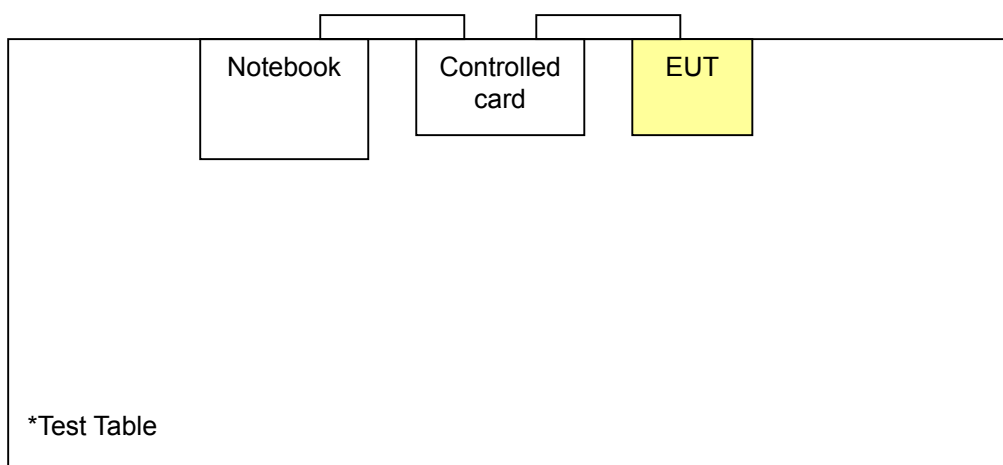
For test mode E



For test mode F



For radiated emission measurement above 1 GHz



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
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Dec. 12, 2004
RF signal cable Woken	5D-FB	Cable-HYC01-01	Mar. 02, 2005
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Mar. 03, 2005
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Mar. 02, 2005
Software ADT	ADT_Cond_V3	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 HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

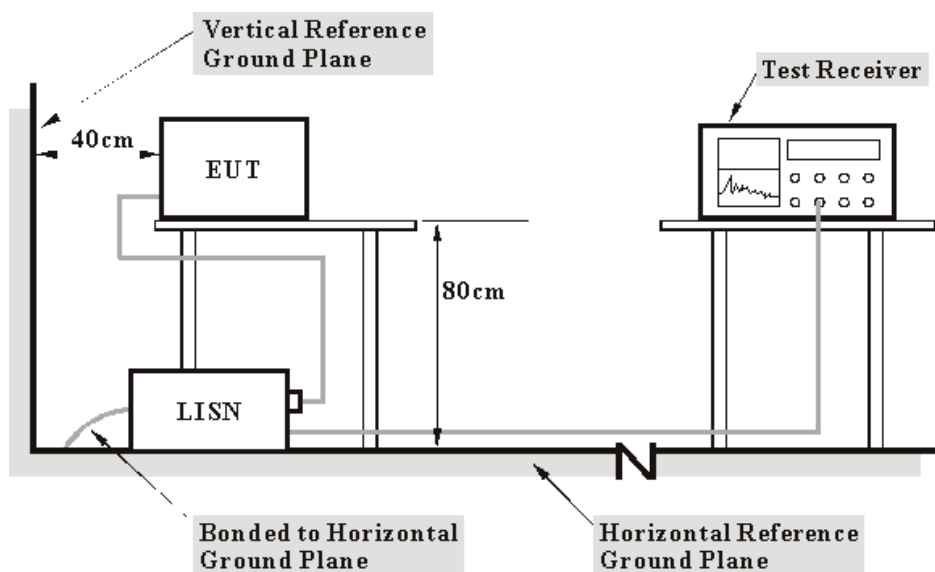
4.1.3 TEST PROCEDURES

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under Limit - 20dB was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 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

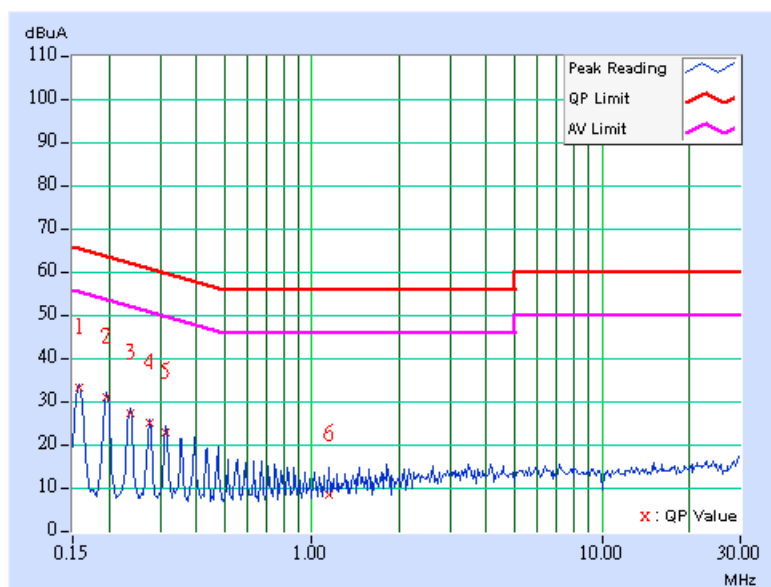
- a. The EUT was charging by the adapter and connected to an external GPS antenna.

4.1.7 TEST RESULTS (C)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	12 Vac	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	POS
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.11	33.09	-	33.20	-	65.58	55.58	-32.38	-
2	0.197	0.12	31.08	-	31.20	-	63.74	53.74	-32.54	-
3	0.236	0.12	27.16	-	27.28	-	62.24	52.24	-34.96	-
4	0.275	0.12	24.90	-	25.02	-	60.97	50.97	-35.94	-
5	0.314	0.12	22.79	-	22.91	-	59.86	49.86	-36.95	-
6	1.141	0.15	8.40	-	8.55	-	56.00	46.00	-47.45	-

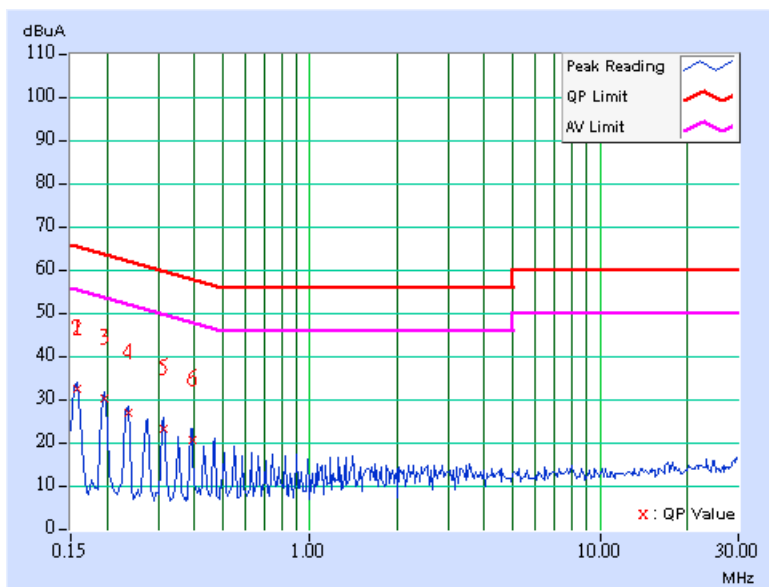
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	12 Vac	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	NEG
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.10	32.54	-	32.64	-	65.58	55.58	-32.94	-
2	0.158	0.10	32.30	-	32.40	-	65.58	55.58	-33.18	-
3	0.197	0.11	30.31	-	30.42	-	63.74	53.74	-33.32	-
4	0.236	0.11	26.90	-	27.01	-	62.24	52.24	-35.23	-
5	0.314	0.11	23.29	-	23.40	-	59.86	49.86	-36.46	-
6	0.392	0.12	20.44	-	20.56	-	58.02	48.02	-37.46	-

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

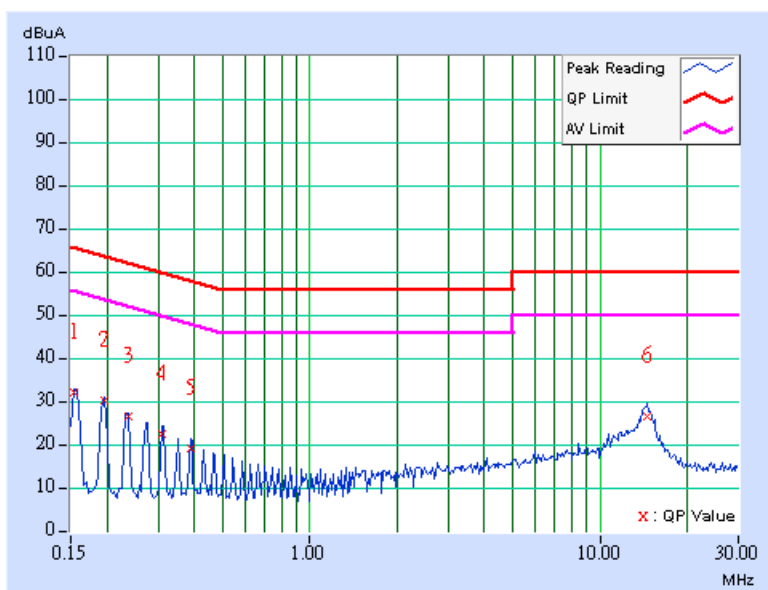


4.1.8 TEST RESULTS (D)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	12 Vac	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	POS
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.11	31.39	-	31.50	-	65.79	55.79	-34.29	-
2	0.197	0.12	29.73	-	29.85	-	63.74	53.74	-33.89	-
3	0.236	0.12	25.83	-	25.95	-	62.24	52.24	-36.29	-
4	0.310	0.12	21.91	-	22.03	-	59.97	49.97	-37.93	-
5	0.388	0.13	18.41	-	18.54	-	58.10	48.10	-39.56	-
6	14.547	0.74	25.95	-	26.69	-	60.00	50.00	-33.31	-

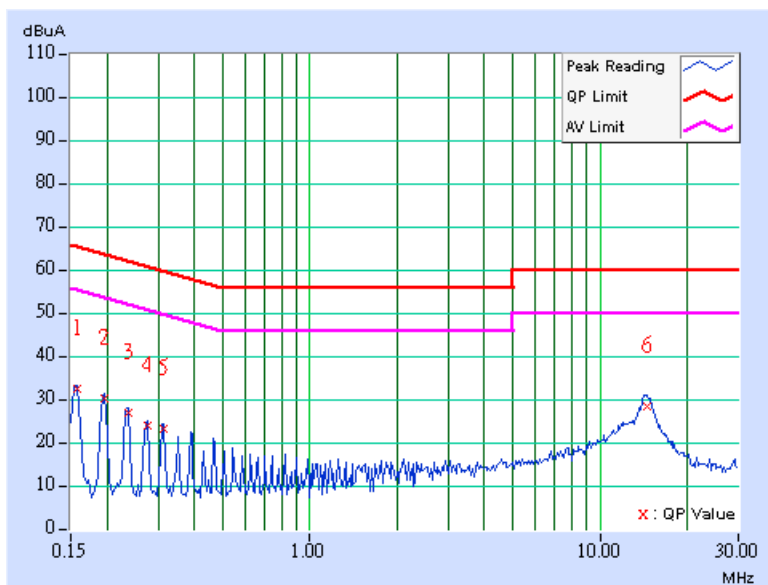
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	12 Vac	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	NEG
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.10	32.00	-	32.10	-	65.58	55.58	-33.48	-
2	0.197	0.11	29.93	-	30.04	-	63.74	53.74	-33.70	-
3	0.236	0.11	26.51	-	26.62	-	62.24	52.24	-35.62	-
4	0.275	0.11	23.50	-	23.61	-	60.97	50.97	-37.35	-
5	0.314	0.11	22.65	-	22.76	-	59.86	49.86	-37.10	-
6	14.629	0.61	27.73	-	28.34	-	60.00	50.00	-31.66	-

- 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.

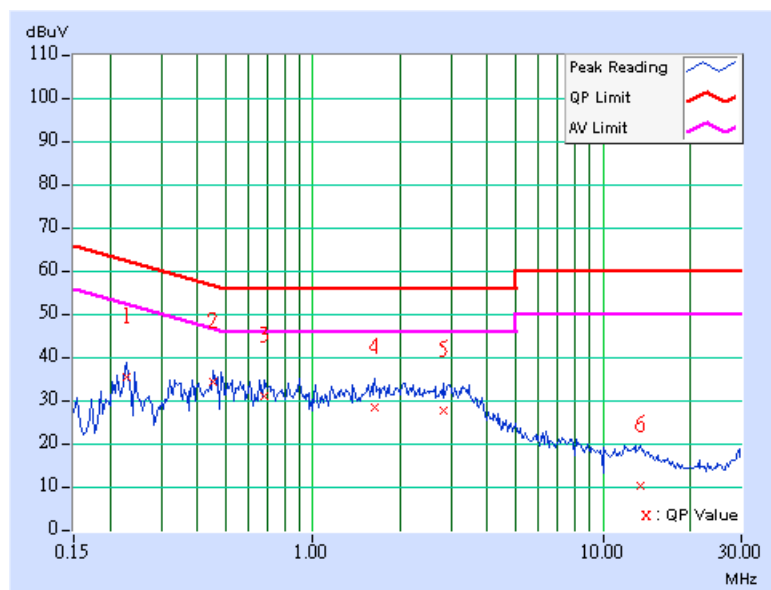


4.1.9 TEST RESULTS (E)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	Line (L)
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.228	0.12	35.02	-	35.14	-	62.52	52.52	-27.38	-
2	0.455	0.13	33.75	-	33.88	-	56.79	46.79	-22.91	-
3	0.677	0.13	30.44	-	30.57	-	56.00	46.00	-25.43	-
4	1.637	0.16	27.78	-	27.94	-	56.00	46.00	-28.06	-
5	2.828	0.18	26.98	-	27.16	-	56.00	46.00	-28.84	-
6	13.414	0.63	9.76	-	10.39	-	60.00	50.00	-49.61	-

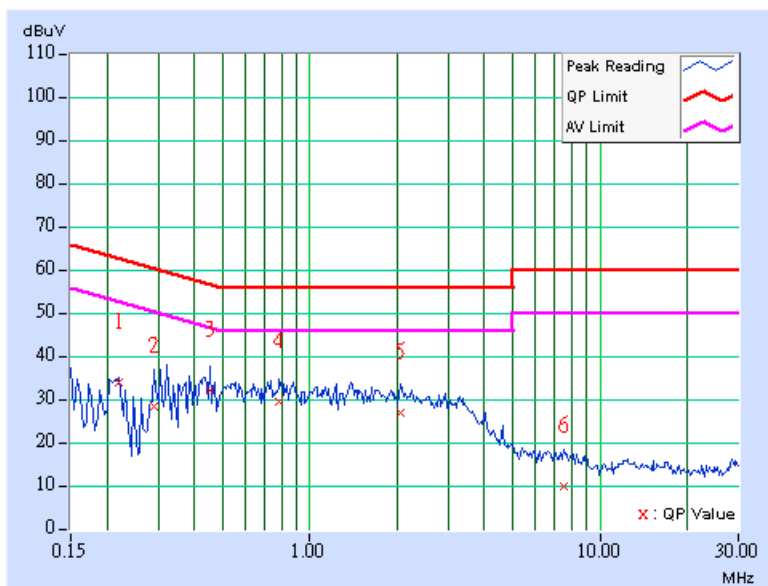
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value =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



EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	Neutral (N)
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.220	0.11	33.70	-	33.81	-	62.81	52.81	-29.00	-
2	0.291	0.11	28.32	-	28.43	-	60.51	50.51	-32.07	-
3	0.451	0.12	31.95	-	32.07	-	56.86	46.86	-24.79	-
4	0.787	0.13	29.41	-	29.54	-	56.00	46.00	-26.46	-
5	2.047	0.16	26.83	-	26.99	-	56.00	46.00	-29.01	-
6	7.555	0.28	9.90	-	10.18	-	60.00	50.00	-49.82	-

- 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.

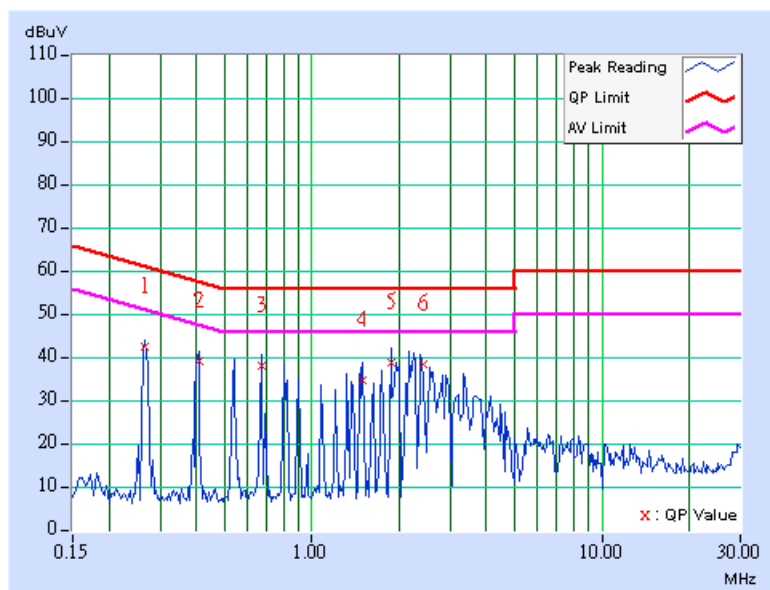


4.1.10 TEST RESULTS (F)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	Line (L)
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.267	0.12	42.37	-	42.49	-	61.20	51.20	-18.71	-
2	0.408	0.13	39.00	-	39.13	-	57.69	47.69	-18.57	-
3	0.670	0.13	38.04	-	38.17	-	56.00	46.00	-17.83	-
4	1.504	0.16	34.83	-	34.99	-	56.00	46.00	-21.01	-
5	1.875	0.16	38.84	-	39.00	-	56.00	46.00	-17.00	-
6	2.418	0.17	38.19	-	38.36	-	56.00	46.00	-17.64	-

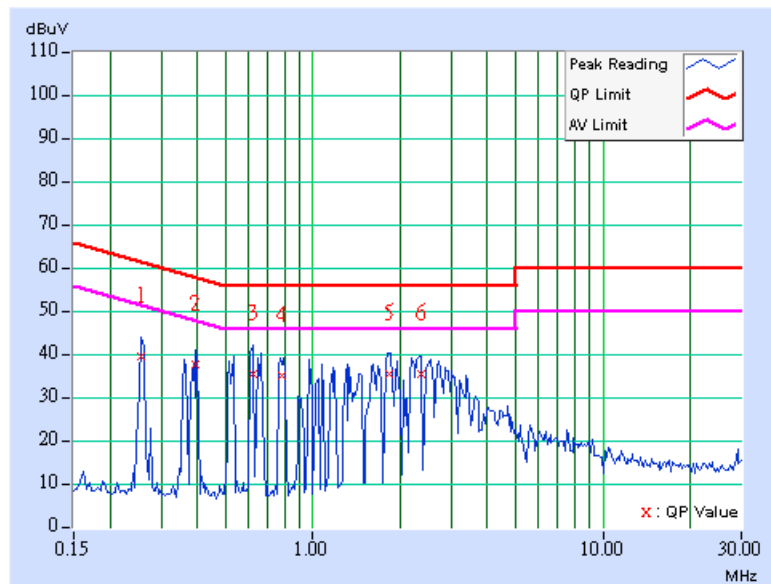
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Bluetooth GPS Receiver	MODEL	LD-1W
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 65% RH, 991 hPa	PHASE	Neutral (N)
CHANNEL	78	TESTED BY	Gary Chang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.255	0.11	39.33	-	39.44	-	61.58	51.58	-22.14	-
2	0.396	0.12	37.48	-	37.60	-	57.93	47.93	-20.34	-
3	0.619	0.12	35.50	-	35.62	-	56.00	46.00	-20.38	-
4	0.786	0.13	35.14	-	35.27	-	56.00	46.00	-20.73	-
5	1.842	0.16	35.34	-	35.50	-	56.00	46.00	-20.50	-
6	2.363	0.17	35.30	-	35.47	-	56.00	46.00	-20.53	-

- 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 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
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

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

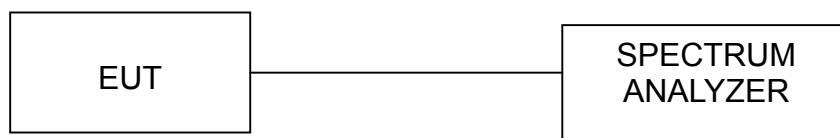
4.2.3 TEST PROCEDURES

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

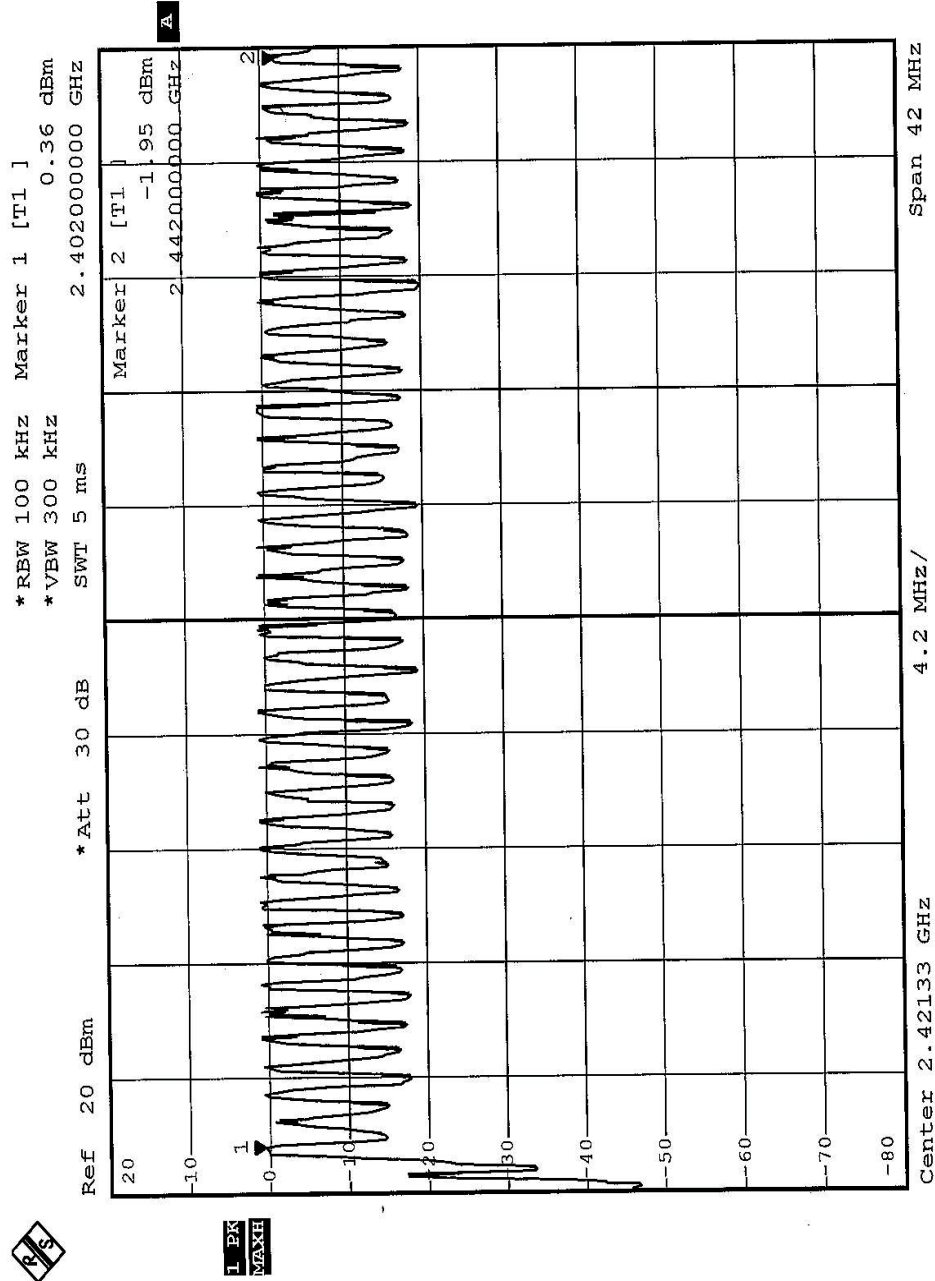
No deviation.

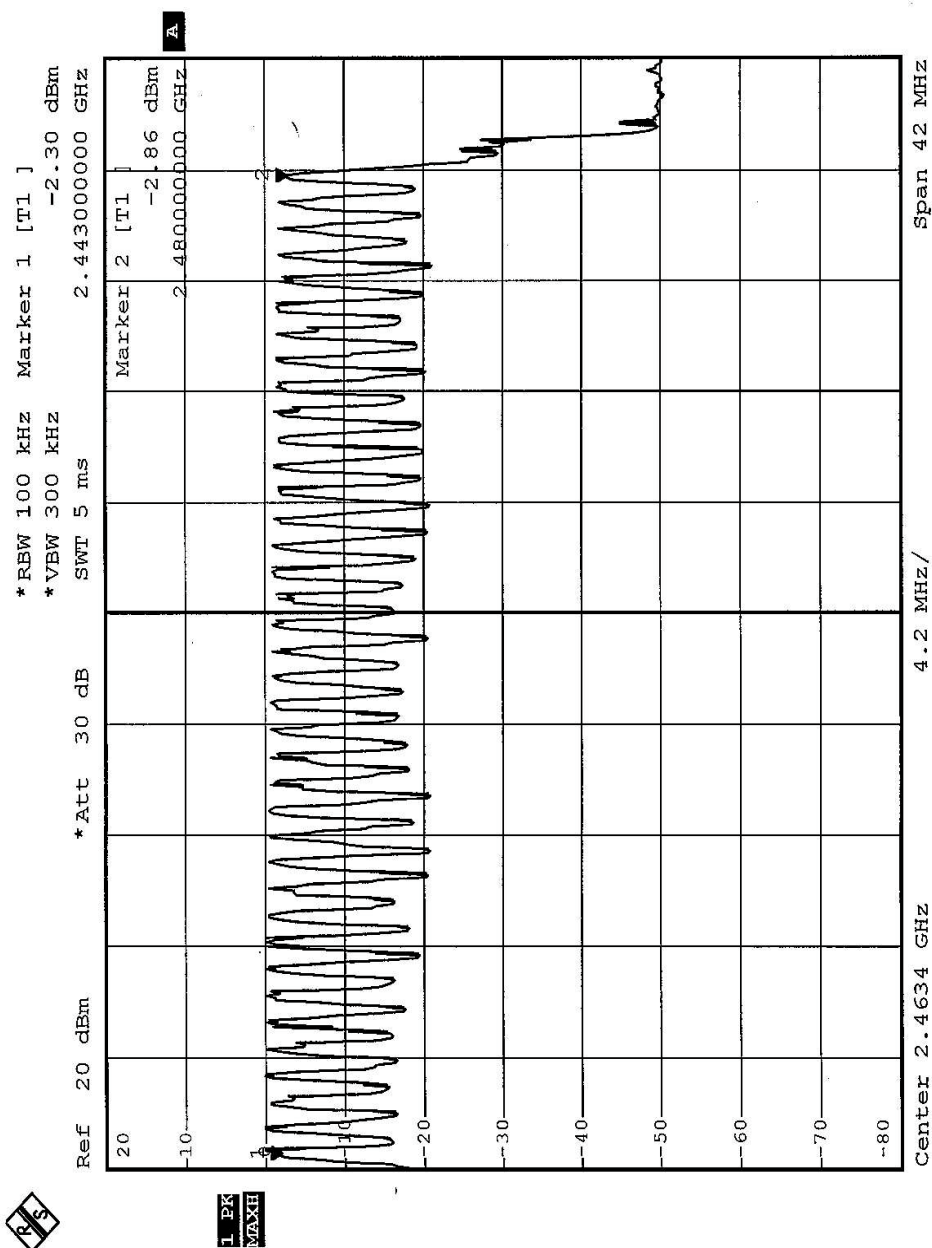
4.2.5 TEST SETUP



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
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTES:

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 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

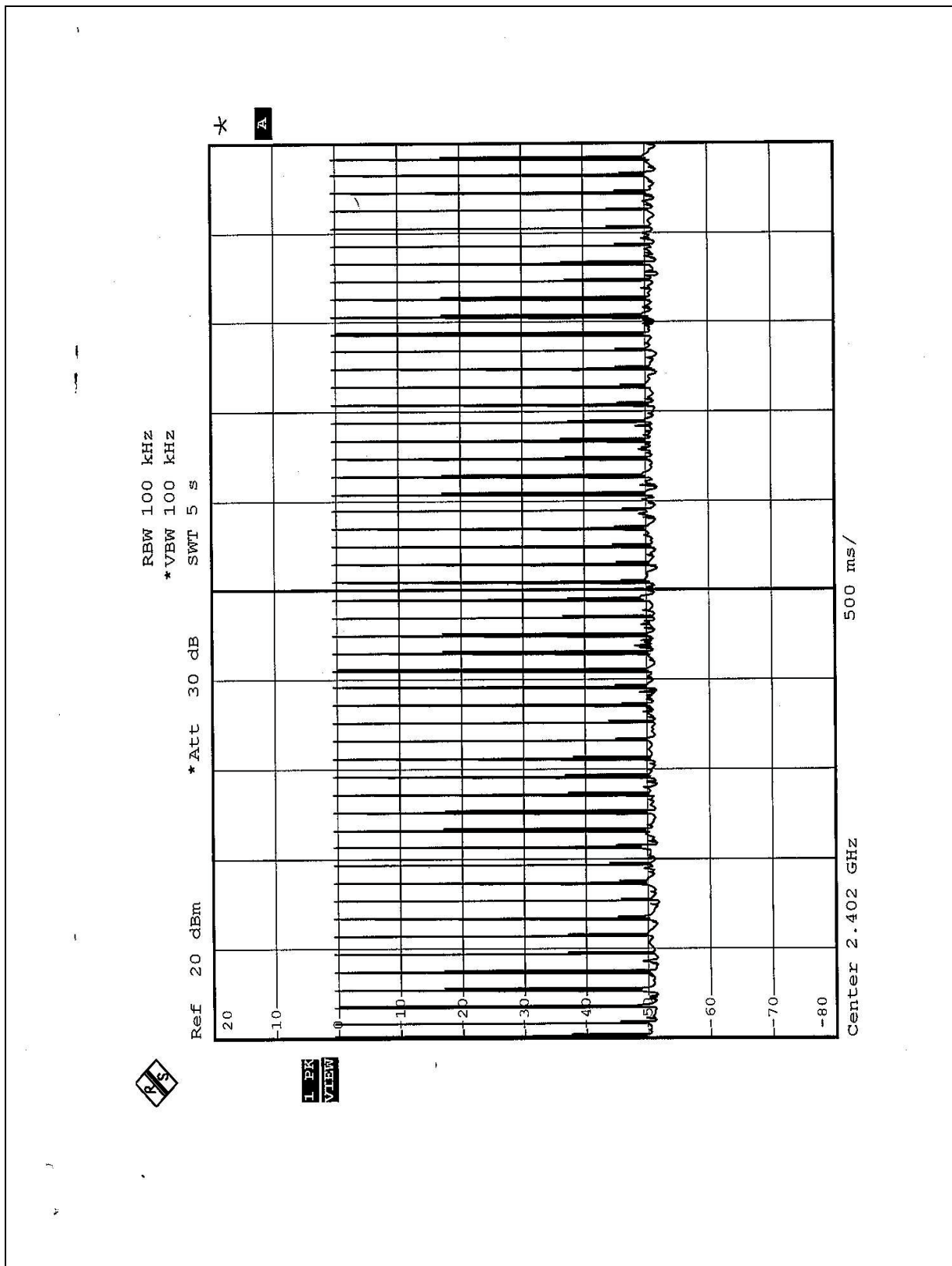


4.3.6 TEST RESULTS

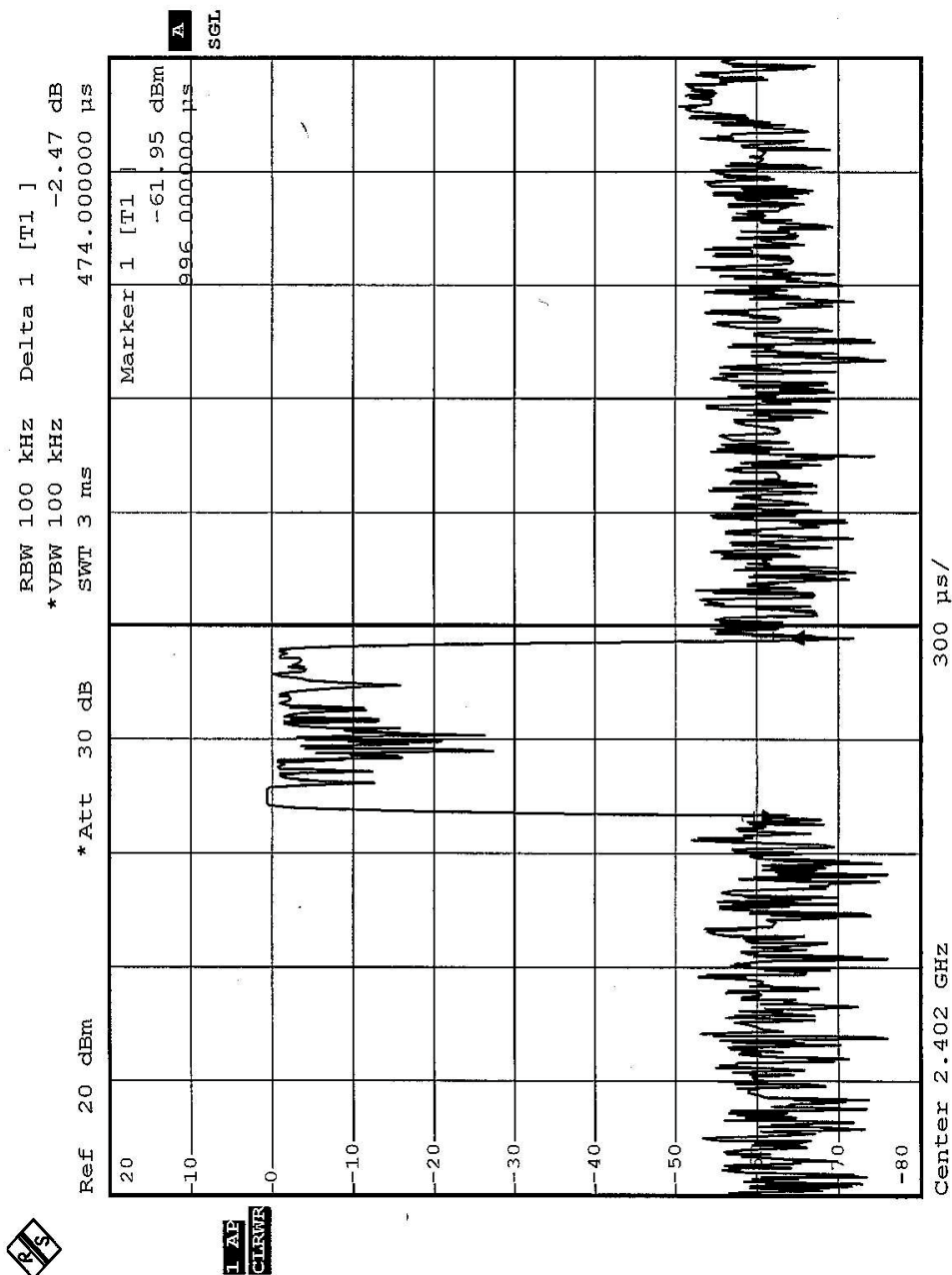
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.474	152.78	400
DH3	25 (times / 5 sec) *6.32=158.00 times	1.752	276.82	400
DH5	17 (times / 5 sec) *6.32=107.44 times	2.990	321.25	400

Test plots of the transmitting time slot are shown on next 6 pages.

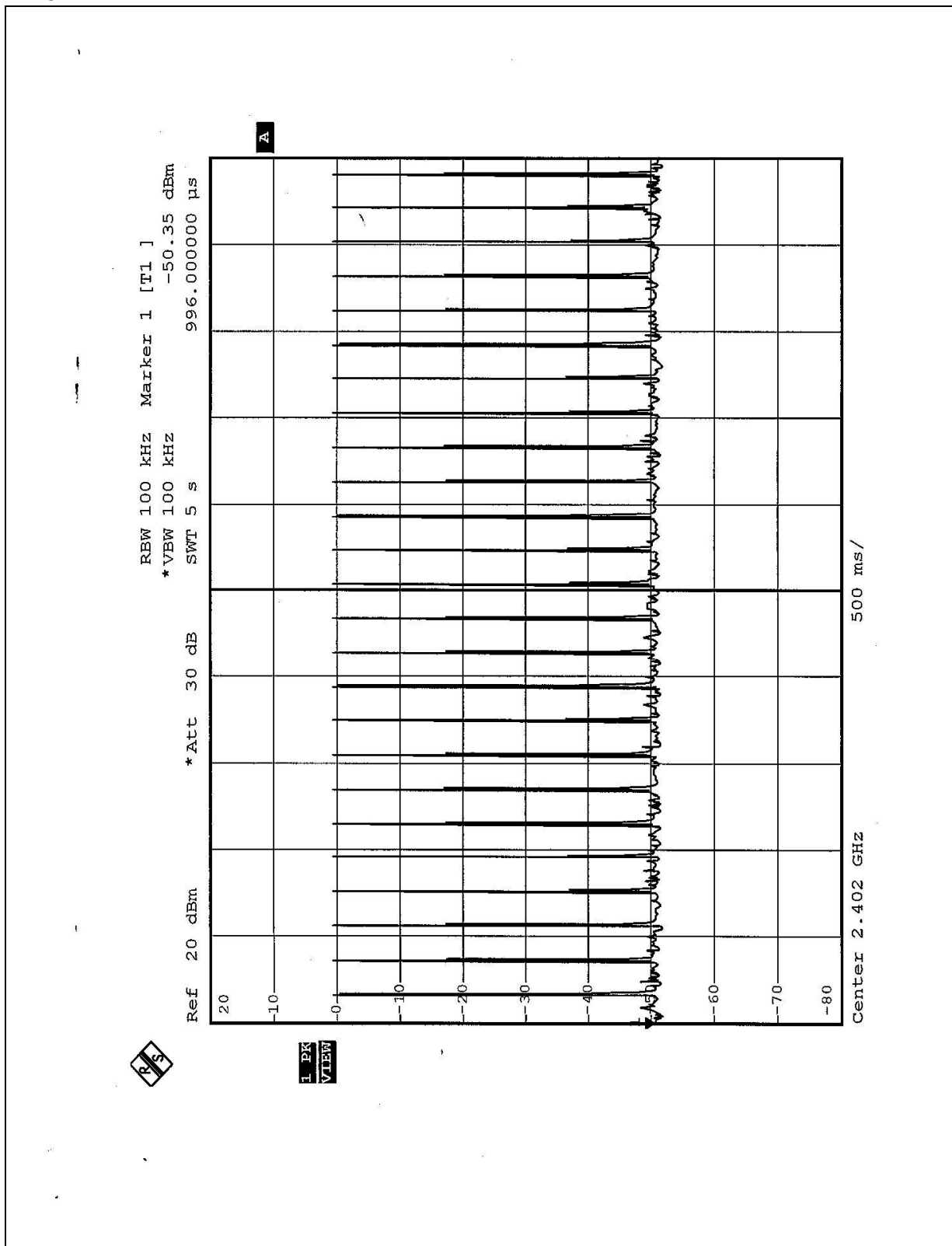
DH1



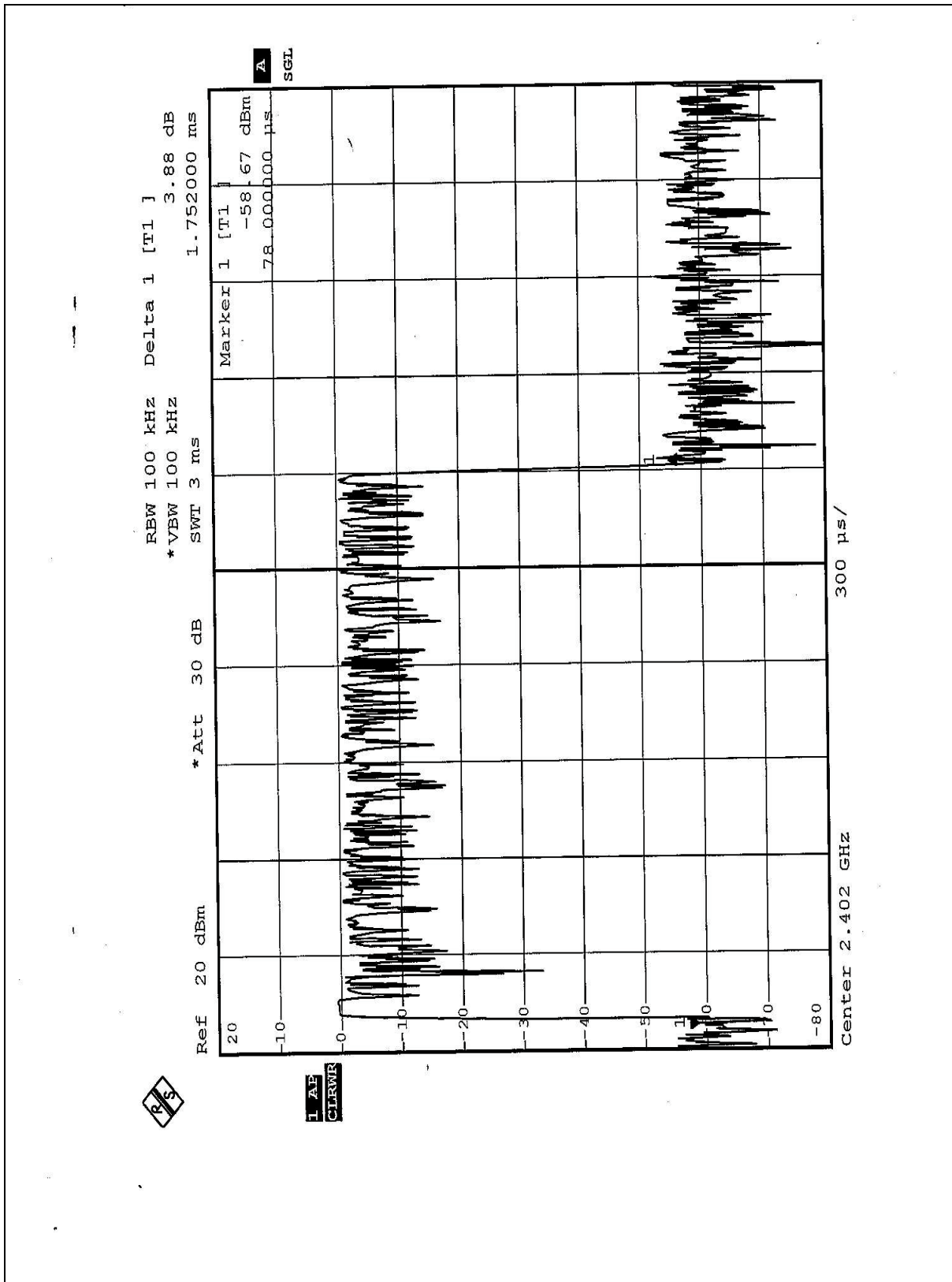
DH1



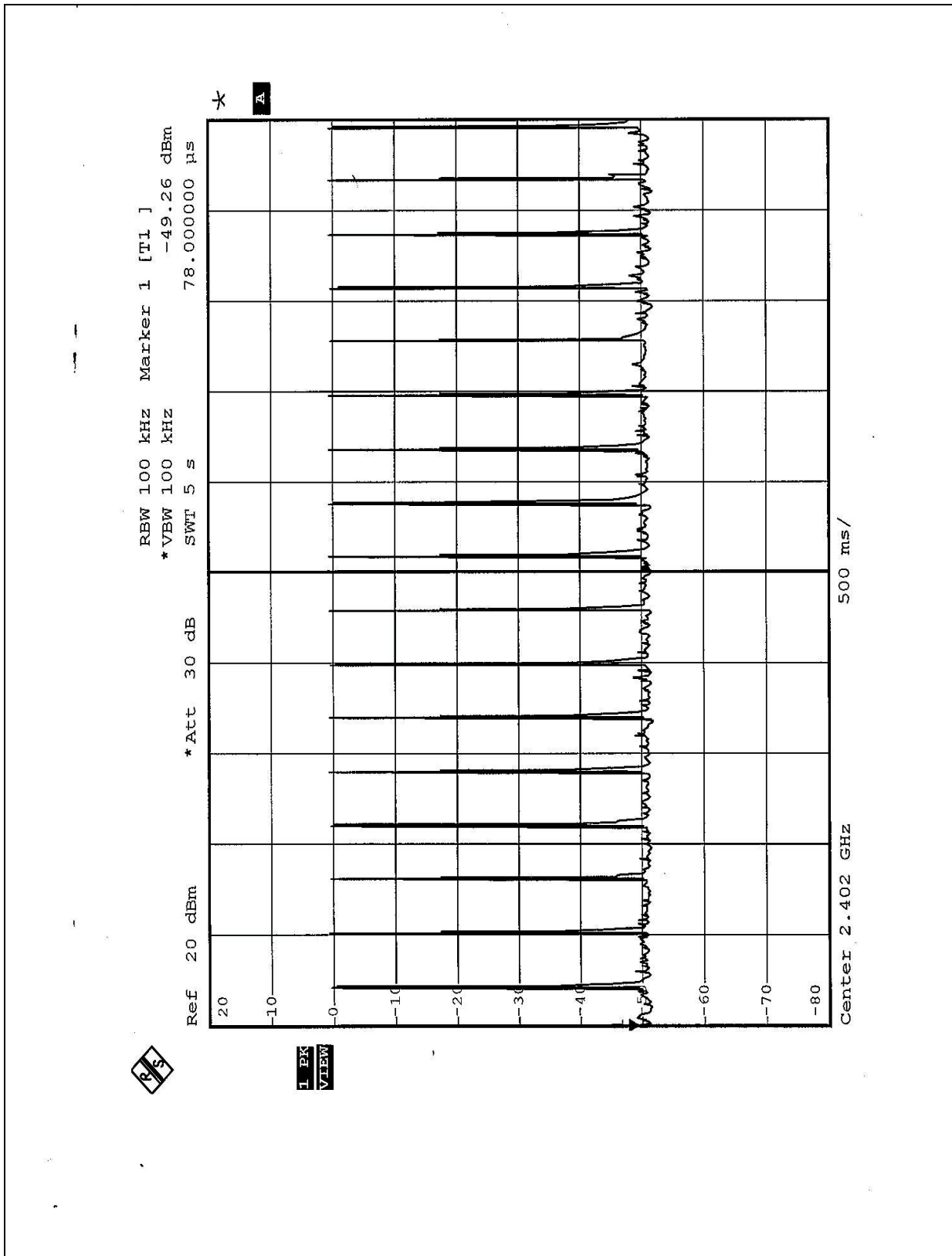
DH3



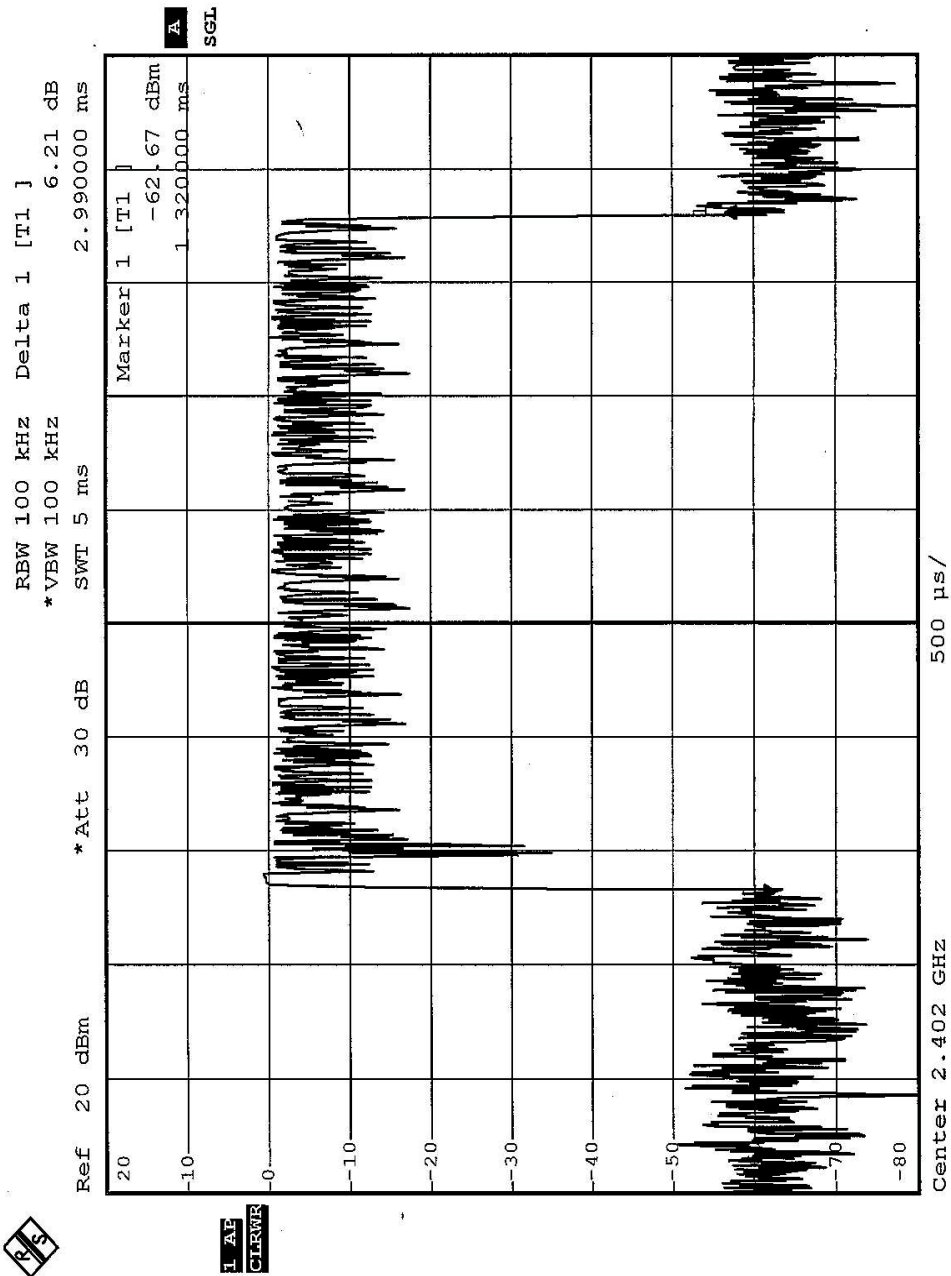
DH3



DH5



DH5



4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

NA

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

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

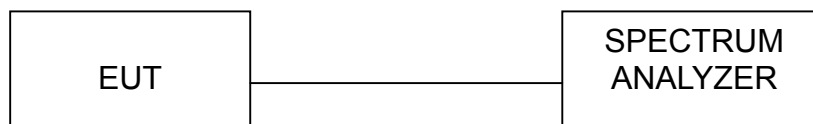
4.4.3 TEST PROCEDURE

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

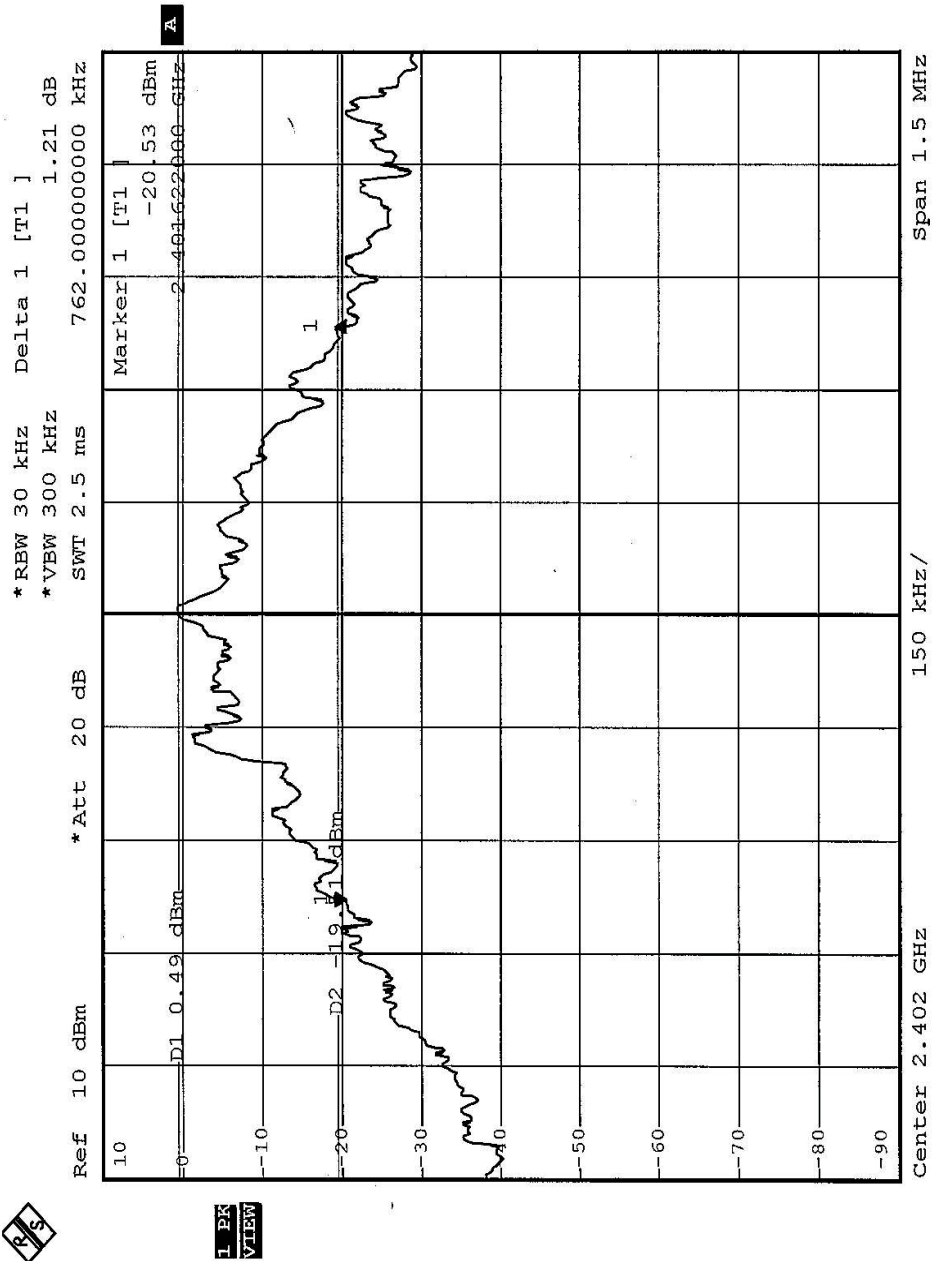
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

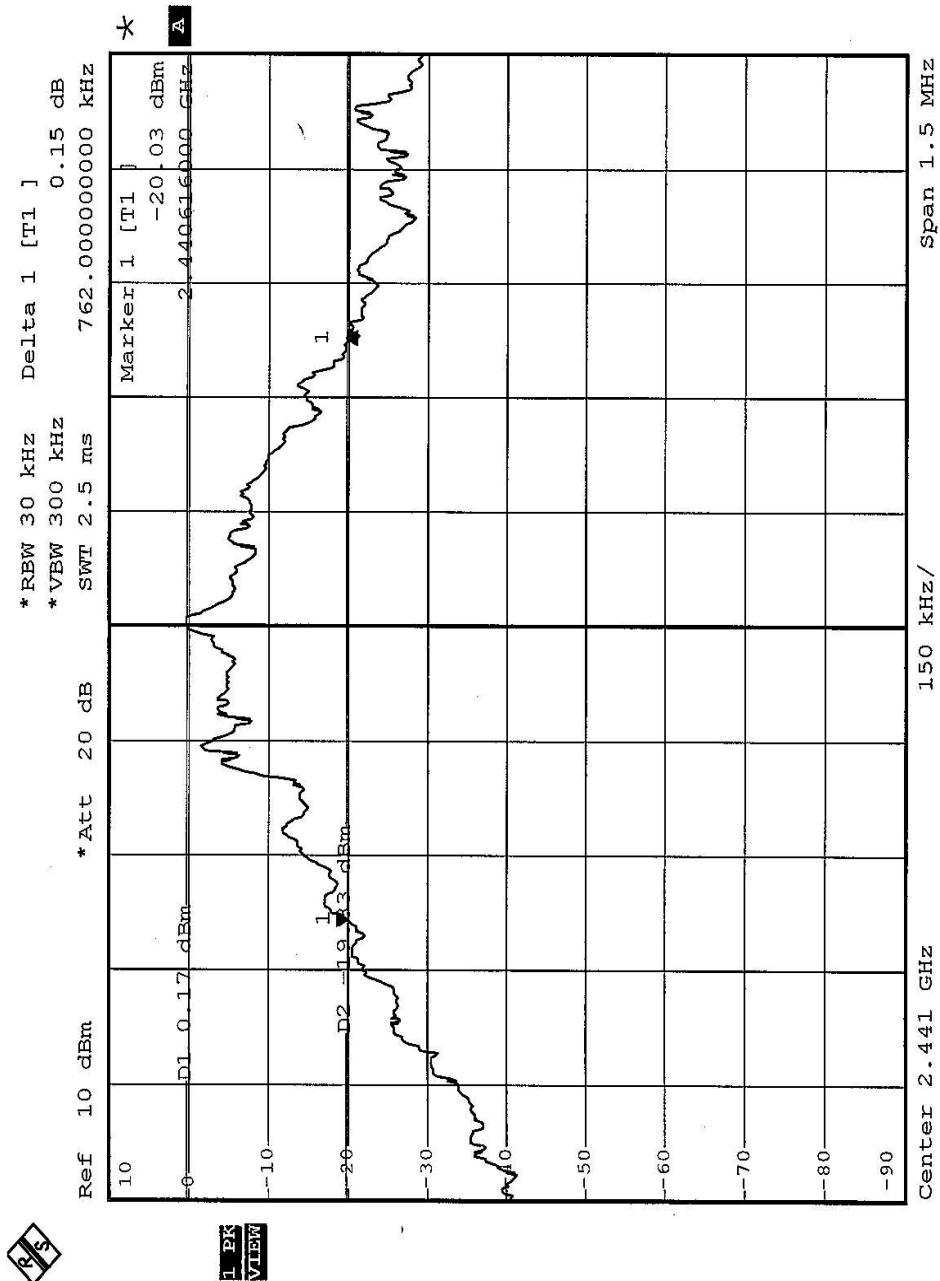
EUT	Bluetooth GPS Receiver	MODEL	LD-1W
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	0.762
39	2441	0.762
78	2480	0.768

Channel 0



Channel 39



1 PK
VIEW

1
A

Ref 10 dBm

*Att 20 dB

RBW 30 kHz

*VBW 300 kHz

SWT 2.5 ms

Delta 1 [T1]

-0.76 dB

768.000000000 kHz

Marker 1 [T1]

-20.06 dBm

2 479619000 GHz

D1 -0.95 dBm

D2 -20.55 dBm

Center 2.48 GHz

150 kHz/

Span 1.5 MHz

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
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

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



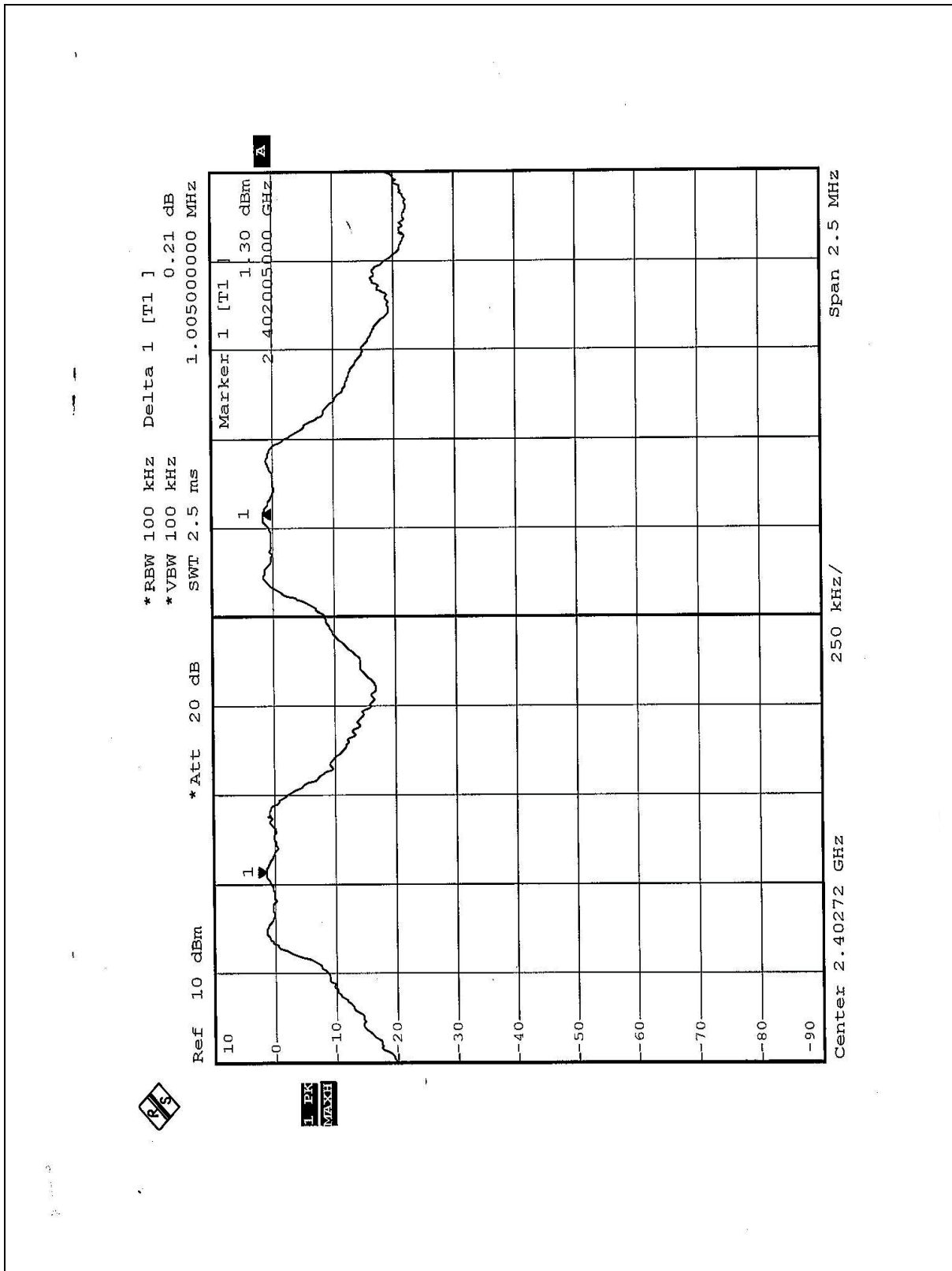
4.5.6 TEST RESULTS

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

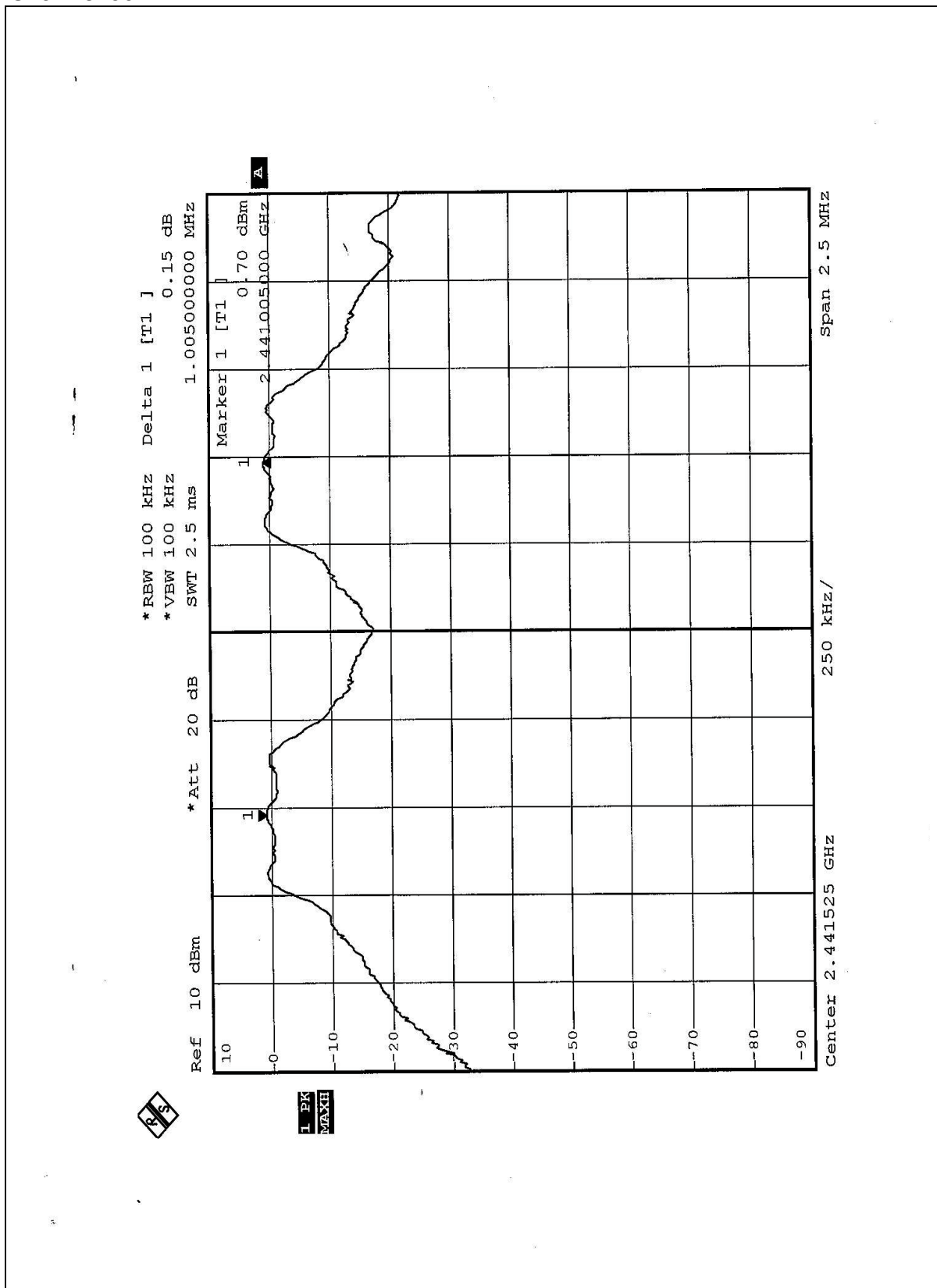
Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.005	0.762	PASS
39	2441	1.005	0.762	PASS
78	2480	1.005	0.768	PASS

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

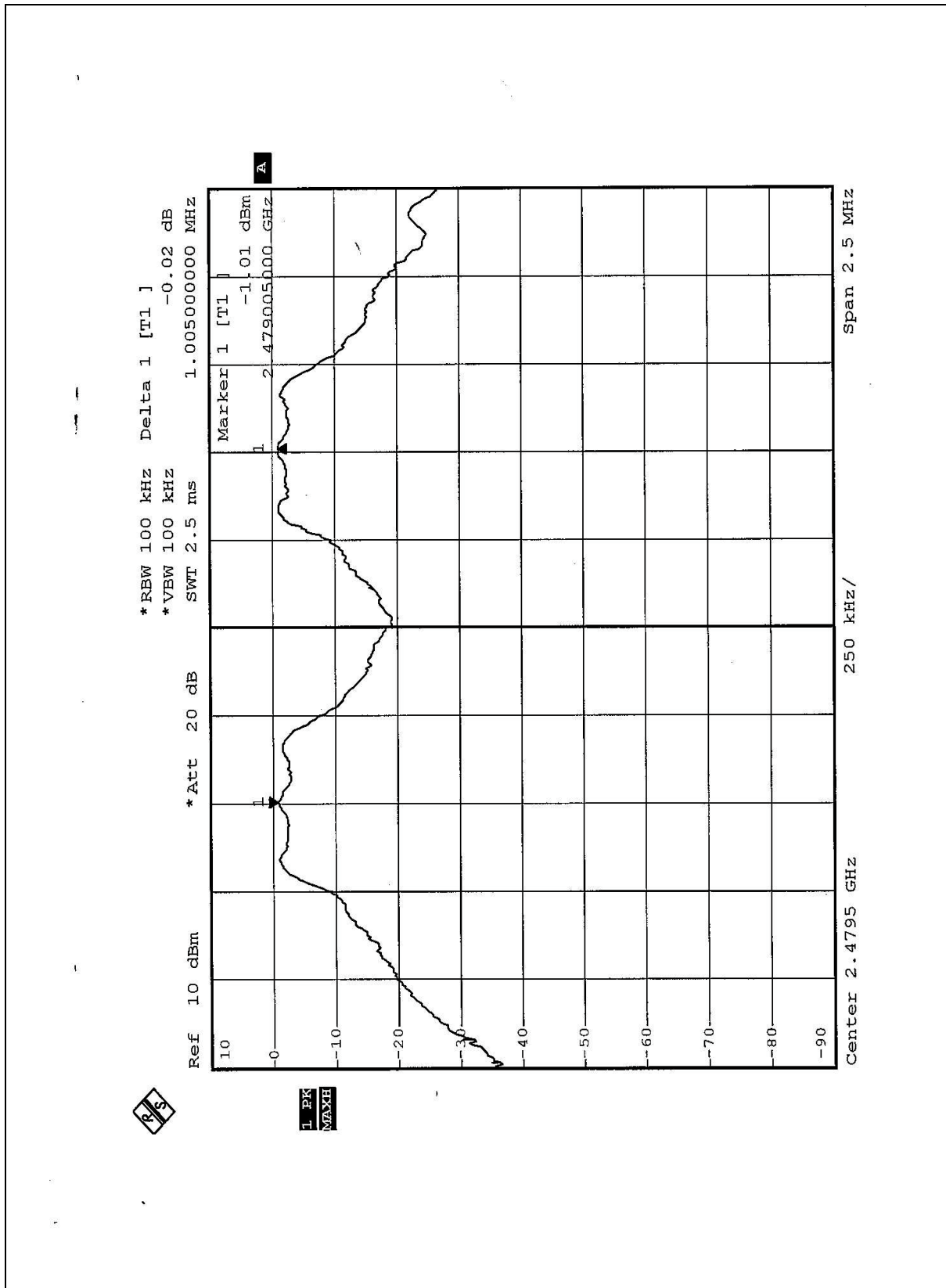
Channel 0



Channel 39



Channel 78



4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYEER	FSEK30	100049	Aug. 12, 2005

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

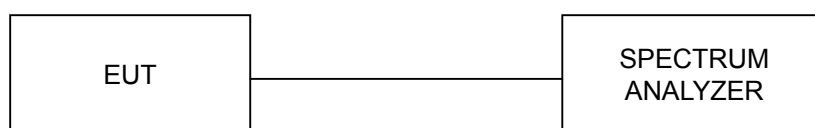
4.6.3 TEST PROCEDURES

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

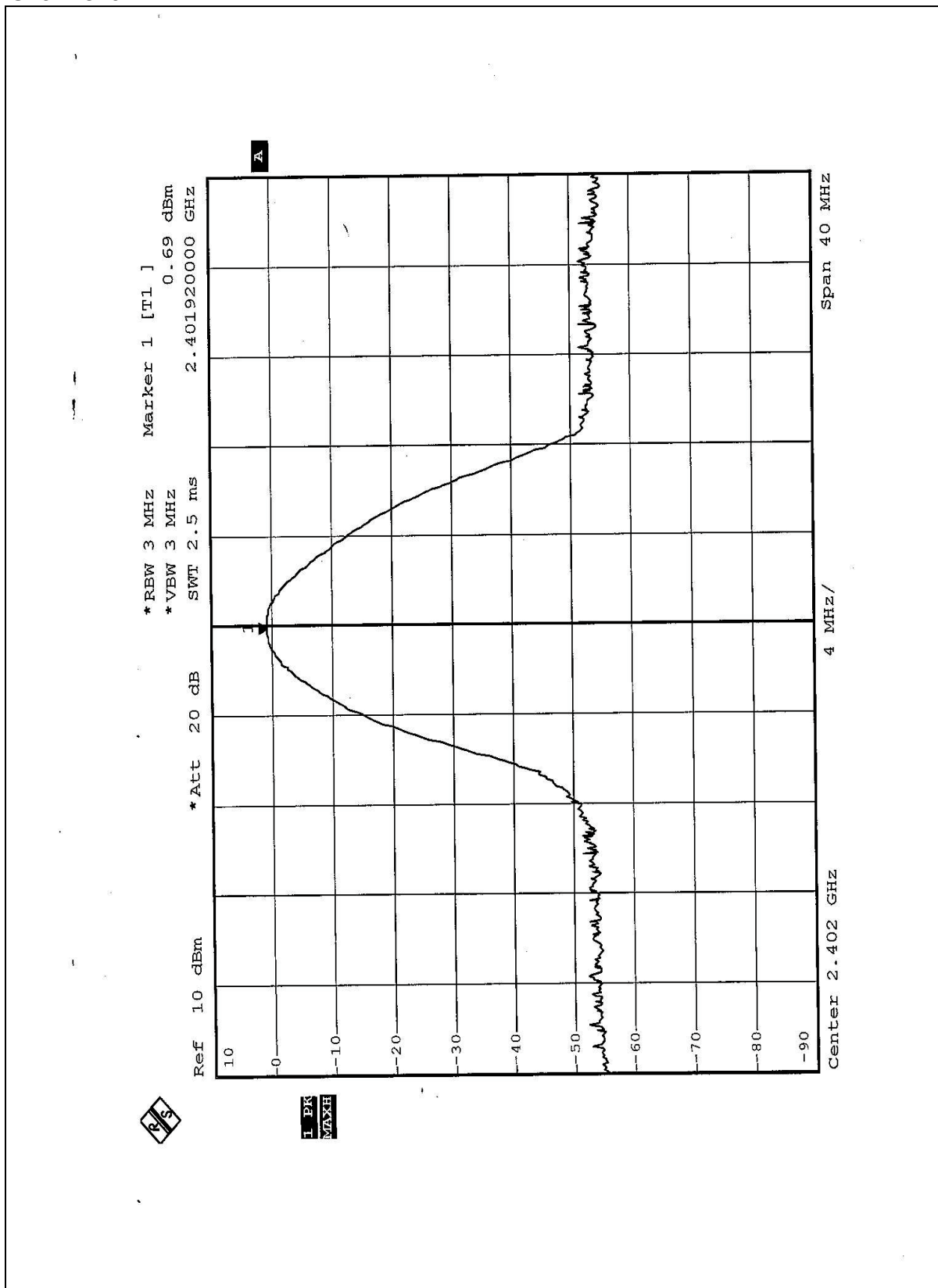
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

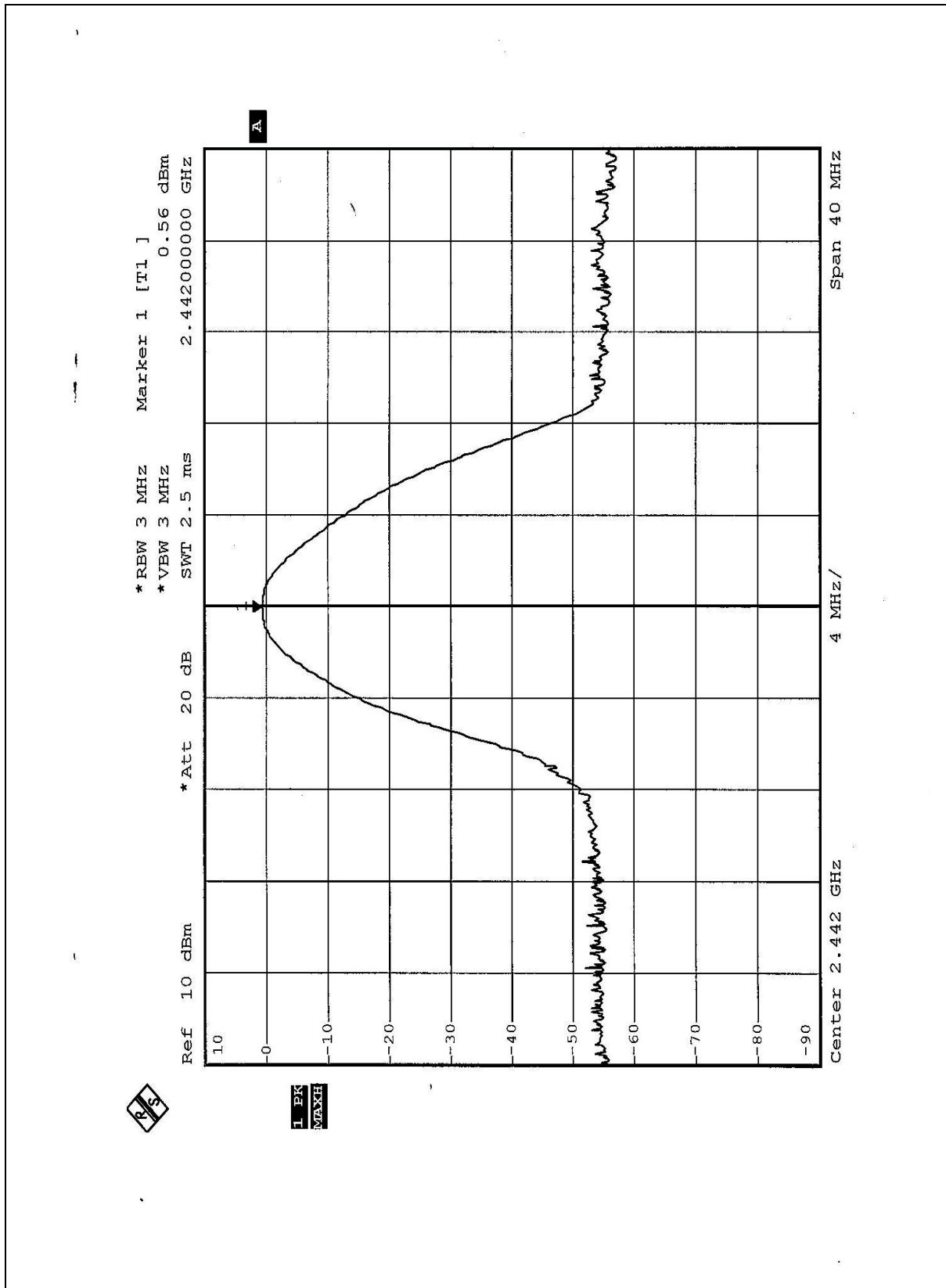
EUT	Bluetooth GPS Receiver	MODEL	LD-1W
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.17	0.69	30	PASS
39	2441	1.14	0.56	30	PASS
78	2480	0.83	-0.82	30	PASS

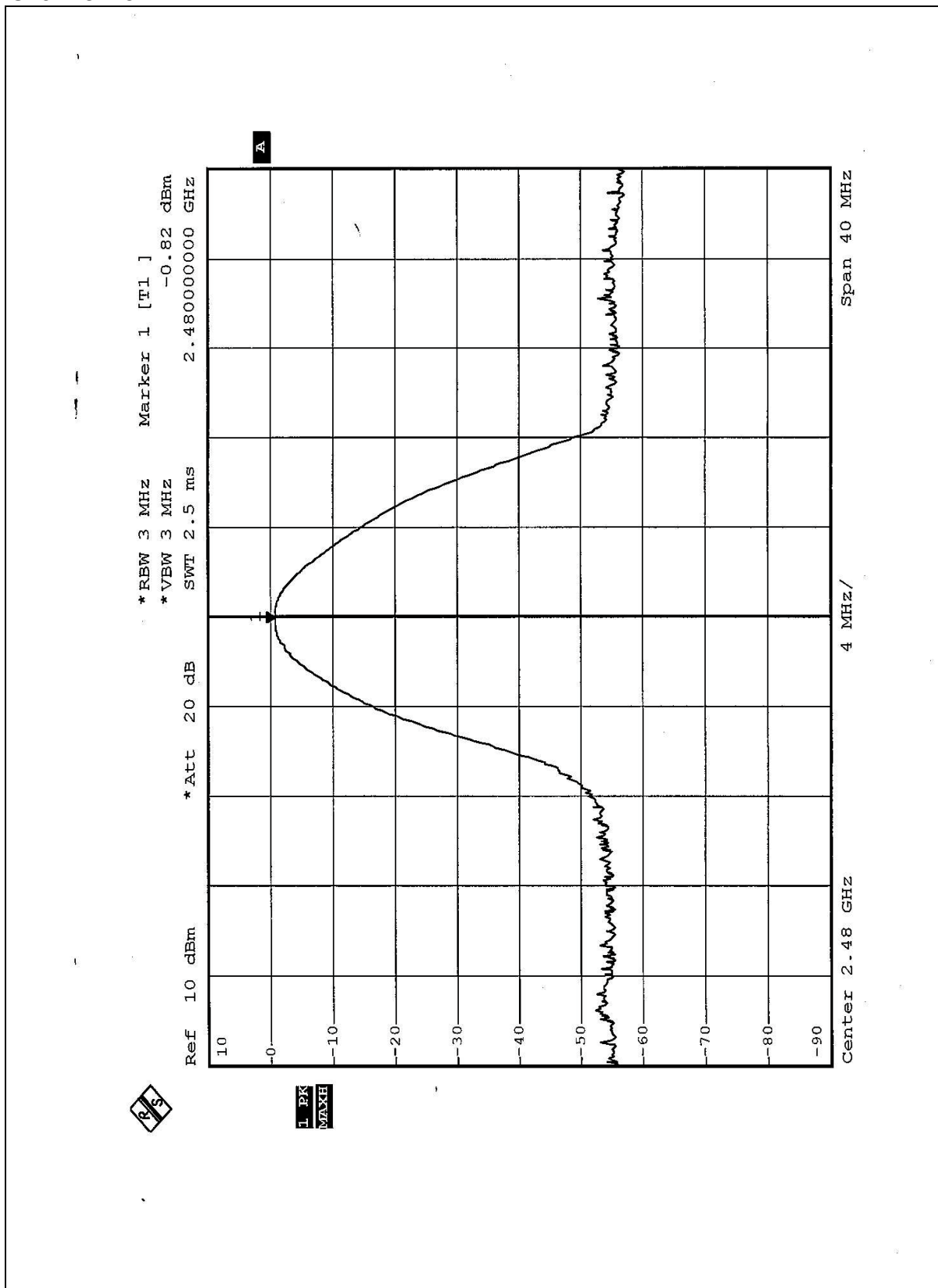
Channel 0



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
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun, 08, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Dec. 15, 2004
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Feb. 03, 2005
HORN Antenna SCHWARZBECK	9120D	9120D-408	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170243	Feb. 23, 2005
Preamplifier Agilent	8447D	2944A10633	Jan. 15, 2005
Preamplifier Agilent	8449B	3008A01964	Jan. 27, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Mar. 05, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Mar. 05, 2005
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-3.

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 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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.

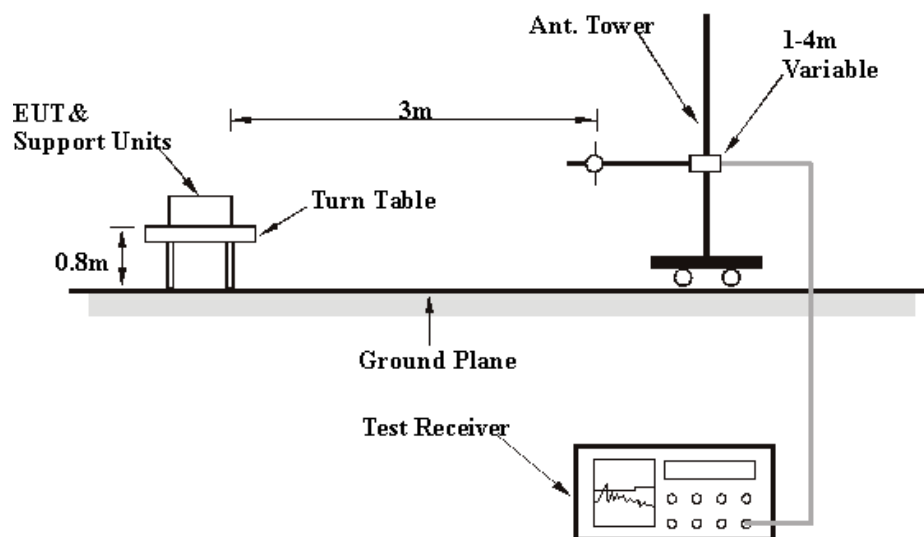
NOTE:

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.

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 EUT OPERATING CONDITIONS

For test mode A

- a. The EUT was powered by battery.

For test mode B

- a. The EUT was powered by battery and connected to a external GPS antenna.

For test mode C

- a. The EUT was charging by the car charger.

For test mode D

- a. The EUT was charging by the car charger and connected to an external GPS antenna.

For test mode E

- a. The EUT was charging by the adapter.

For test mode F

- a. The EUT was charging by the adapter and connected to an external GPS antenna.

For radiated emission measurement above 1 GHz

- a. Connected the EUT to the notebook via a controlled card.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.7.7 TEST RESULTS (A)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Long Chen

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	35.83	22.49 QP	40.00	-17.51	1.00 H	10	7.37	15.12
2	45.55	18.99 QP	40.00	-21.01	1.00 H	145	3.08	15.91
3	117.47	13.14 QP	43.50	-30.36	3.00 H	229	0.51	12.63
4	377.96	17.47 QP	46.00	-28.53	1.00 H	340	1.00	16.48
5	589.84	22.01 QP	46.00	-23.99	3.00 H	4	1.06	20.96
6	755.07	24.07 QP	46.00	-21.93	2.00 H	130	0.38	23.69
7	836.71	24.25 QP	46.00	-21.75	1.00 H	31	0.13	24.12
8	869.76	24.23 QP	46.00	-21.77	4.00 H	34	-0.41	24.64

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	41.66	16.81 QP	40.00	-23.19	1.00 V	337	0.92	15.89
2	99.98	13.40 QP	43.50	-30.10	1.00 V	19	2.26	11.14
3	140.80	14.37 QP	43.50	-29.13	2.00 V	82	0.22	14.14
4	391.56	17.61 QP	46.00	-28.39	2.00 V	172	0.84	16.77
5	706.47	23.14 QP	46.00	-22.86	2.00 V	121	0.48	22.66
6	747.29	23.73 QP	46.00	-22.27	3.00 V	334	0.11	23.62
7	809.50	24.75 QP	46.00	-21.25	1.00 V	124	0.89	23.86
8	869.76	24.16 QP	46.00	-21.84	4.00 V	178	-0.48	24.64

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

4.7.8 TEST RESULTS (B)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Gary 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	35.83	21.60 QP	40.00	-18.40	1.00 H	52	6.47	15.12
2	45.55	19.86 QP	40.00	-20.14	2.00 H	232	3.96	15.91
3	162.18	14.85 QP	43.50	-28.65	4.00 H	169	0.31	14.54
4	337.13	16.30 QP	46.00	-29.70	4.00 H	106	0.71	15.59
5	523.75	20.56 QP	46.00	-25.44	4.00 H	202	1.32	19.23
6	751.18	24.12 QP	46.00	-21.88	2.00 H	31	0.44	23.68
7	877.54	24.58 QP	46.00	-21.42	1.00 H	91	-0.21	24.80
8	959.18	25.51 QP	46.00	-20.49	4.00 H	301	-0.35	25.86

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	35.83	19.64 QP	40.00	-20.36	1.00 V	340	4.52	15.12
2	99.98	15.04 QP	43.50	-28.46	2.00 V	253	3.90	11.14
3	257.43	14.11 QP	46.00	-31.89	2.00 V	169	0.56	13.55
4	515.97	21.06 QP	46.00	-24.94	1.00 V	34	1.99	19.06
5	568.46	21.34 QP	46.00	-24.66	3.00 V	151	1.00	20.34
6	764.79	23.96 QP	46.00	-22.04	4.00 V	193	0.25	23.71
7	807.56	24.76 QP	46.00	-21.24	1.00 V	211	0.91	23.84
8	937.80	25.82 QP	46.00	-20.18	3.00 V	88	0.14	25.68

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

4.7.9 TEST RESULTS (C)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Gary 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	37.78	18.09 QP	40.00	-21.91	2.00 H	283	2.63	15.46
2	45.55	18.11 QP	40.00	-21.89	2.00 H	10	2.21	15.91
3	154.41	14.66 QP	43.50	-28.84	2.00 H	142	0.10	14.56
4	372.12	16.78 QP	46.00	-29.22	2.00 H	145	0.43	16.35
5	444.05	18.63 QP	46.00	-27.37	2.00 H	349	0.66	17.97
6	628.72	22.51 QP	46.00	-23.49	1.00 H	52	0.86	21.65
7	749.24	24.85 QP	46.00	-21.15	1.00 H	1	1.19	23.66
8	860.04	24.91 QP	46.00	-21.09	3.00 H	28	0.46	24.45

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	31.94	22.51 QP	40.00	-17.49	1.00 V	34	8.01	14.50
2	101.92	14.38 QP	43.50	-29.12	1.00 V	214	3.08	11.30
3	148.58	16.69 QP	43.50	-26.81	2.00 V	130	2.31	14.38
4	323.53	14.90 QP	46.00	-31.10	1.00 V	205	-0.40	15.30
5	383.79	16.80 QP	46.00	-29.20	2.00 V	286	0.19	16.60
6	760.90	23.98 QP	46.00	-22.02	1.00 V	64	0.28	23.70
7	842.55	24.39 QP	46.00	-21.61	1.00 V	355	0.21	24.18
8	949.46	25.62 QP	46.00	-20.38	2.00 V	334	-0.20	25.81

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

4.7.10 TEST RESULTS (D)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Gary 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	43.61	18.40 QP	40.00	-21.60	2.00 H	175	2.46	15.94
2	136.91	13.87 QP	43.50	-29.63	1.00 H	37	-0.05	13.92
3	294.37	14.44 QP	46.00	-31.56	1.00 H	253	-0.28	14.72
4	414.89	18.55 QP	46.00	-27.45	1.00 H	52	1.25	17.30
5	585.95	22.10 QP	46.00	-23.90	1.00 H	91	1.25	20.85
6	751.18	24.15 QP	46.00	-21.85	1.00 H	244	0.46	23.68
7	811.44	24.82 QP	46.00	-21.18	1.00 H	244	0.94	23.88
8	854.21	24.38 QP	46.00	-21.62	1.00 H	40	0.05	24.33

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	43.61	17.88 QP	40.00	-22.12	1.00 V	49	1.95	15.94
2	101.92	13.62 QP	43.50	-29.88	1.00 V	61	2.32	11.30
3	263.27	17.52 QP	46.00	-28.48	1.00 V	88	3.78	13.74
4	348.80	17.40 QP	46.00	-28.60	1.00 V	58	1.57	15.83
5	428.50	18.31 QP	46.00	-27.69	4.00 V	235	0.69	17.62
6	758.96	23.93 QP	46.00	-22.07	3.00 V	1	0.24	23.70
7	790.06	25.15 QP	46.00	-20.85	1.00 V	139	1.40	23.75
8	826.99	24.12 QP	46.00	-21.88	3.00 V	178	0.09	24.03

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

4.7.11 TEST RESULTS (E)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Gary 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	45.55	21.23 QP	40.00	-18.77	2.00 H	355	5.32	15.91
2	156.35	14.66 QP	43.50	-28.84	2.00 H	334	0.04	14.62
3	304.09	14.90 QP	46.00	-31.10	2.00 H	19	0.00	14.90
4	531.52	20.65 QP	46.00	-25.35	1.00 H	244	1.25	19.40
5	725.91	23.41 QP	46.00	-22.59	2.00 H	205	0.29	23.12
6	762.85	24.40 QP	46.00	-21.60	1.00 H	49	0.70	23.70
7	840.60	24.41 QP	46.00	-21.59	2.00 H	94	0.25	24.16
8	933.91	25.27 QP	46.00	-20.73	2.00 H	61	-0.37	25.63

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	49.44	32.01 QP	40.00	-7.99	1.00 V	283	16.56	15.46
2	101.92	14.40 QP	43.50	-29.10	1.00 V	139	3.10	11.30
3	162.18	14.95 QP	43.50	-28.55	2.00 V	292	0.41	14.54
4	381.84	16.88 QP	46.00	-29.12	2.00 V	82	0.32	16.56
5	653.99	23.31 QP	46.00	-22.69	1.50 V	235	1.33	21.99
6	762.85	24.73 QP	46.00	-21.27	1.00 V	142	1.03	23.70
7	823.11	24.56 QP	46.00	-21.44	4.00 V	61	0.56	23.99
8	873.65	24.07 QP	46.00	-21.93	1.50 V	64	-0.65	24.72

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

4.7.12 TEST RESULTS (F)

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 63% RH, 991 hPa	TESTED BY	Gary 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	33.89	18.40 QP	40.00	-21.60	1.00 H	139	3.59	14.81
2	45.55	20.89 QP	40.00	-19.11	2.00 H	130	4.98	15.91
3	206.89	13.98 QP	43.50	-29.52	2.00 H	343	2.35	11.63
4	753.13	24.43 QP	46.00	-21.57	3.00 H	145	0.75	23.69
5	795.89	24.32 QP	46.00	-21.68	4.00 H	97	0.56	23.76
6	873.65	24.40 QP	46.00	-21.60	2.00 H	253	-0.32	24.72
7	906.69	29.40 QP	46.00	-16.60	1.00 H	325	4.09	25.32
8	955.29	25.75 QP	46.00	-20.25	1.00 H	154	-0.10	25.85

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	53.33	27.02 QP	40.00	-12.98	1.00 V	256	12.12	14.91
2	385.73	17.92 QP	46.00	-28.08	3.00 V	352	1.27	16.65
3	582.06	22.05 QP	46.00	-23.95	2.00 V	277	1.31	20.73
4	692.87	24.14 QP	46.00	-21.86	4.00 V	142	1.72	22.43
5	809.50	24.64 QP	46.00	-21.36	1.00 V	52	0.78	23.86
6	844.49	24.54 QP	46.00	-21.46	3.00 V	289	0.34	24.20
7	883.37	24.36 QP	46.00	-21.64	3.00 V	211	-0.55	24.91
8	945.57	25.66 QP	46.00	-20.34	3.00 V	163	-0.11	25.77

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

4.7.13 TEST RESULTS

EUT	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	0	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Long Chen

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	*2402.00	93.29 PK			1.13 H	274	61.65	31.64
1	*2402.00	63.29 AV			1.13 H	274	31.65	31.64
2	4804.00	49.36 PK	74.00	-24.64	1.54 H	296	11.81	37.55

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	*2402.00	95.63 PK			1.12 V	24	63.99	31.64
1	*2402.00	65.63 AV			1.12 V	24	33.99	31.64
2	4804.00	47.69 PK	74.00	-26.31	1.36 V	228	10.14	37.55

- 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.
 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 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	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	39	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Long Chen

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	*2441.00	95.21 PK			1.32 H	160	63.33	31.88
1	*2441.00	65.21 AV			1.32 H	160	33.33	31.88
2	4882.00	47.39 PK	74.00	-26.61	1.13 H	268	9.72	37.67

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	*2441.00	96.24 PK			1.36 V	224	64.36	31.88
1	*2441.00	66.24 AV			1.36 V	224	34.36	31.88
2	4882.00	51.89 PK	74.00	-22.11	1.36 V	224	14.22	37.67
2	4882.00	21.89 AV	54.00	-32.11	1.36 V	224	-15.78	37.67

- 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.
 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 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	Bluetooth GPS Receiver	MODEL	LD-1W
CHANNEL	78	FREQUENCY RANGE	1 ~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Long Chen

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	*2480.00	92.28 PK			1.04 H	147	60.17	32.11
1	*2480.00	62.28 AV			1.04 H	147	30.17	32.11
2	4960.00	49.21 PK	74.00	-24.79	1.36 H	320	11.40	37.81

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	*2480.00	94.16 PK			1.47 V	223	62.05	32.11
1	*2480.00	64.16 AV			1.47 V	223	32.05	32.11
2	4960.00	51.36 PK	74.00	-22.64	1.26 V	287	13.55	37.81
2	4960.00	21.36 AV	54.00	-32.64	1.26 V	287	-16.45	37.81

- 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.
 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 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
 7. Average value = peak reading $-20\log(\text{duty cycle})$