FCC TEST REPORT

REPORT NO.: RF931108A04

MODEL NO.: IT-10M30B , IT-10M30BR, IT-10M20BR

RECEIVED: Nov. 11, 2004

TESTED: Nov. 22 ~ 30, 2004

ISSUED: Dec. 6, 2004

APPLICANT: Casio Computer Co., Ltd.

ADDRESS: 2951-5, Ishikawa-cho, Hachioji-shi,
Tokyo 192-8556, Japan

ISSUED BY: Advance Data Technology Corporation

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

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

0528
ILAC MRA

No. 2177-01

Table of Contents

1 CERTIFICATION

PRODUCT:	Rugged PDA
BRAND NAME:	CASIO
MODEL NO.:	IT-10M30B, IT-10M30BR, IT-10M20BR
APPLICANT:	Casio Computer Co., Ltd.
TESTED:	Nov. 22 ~ 30, 2004
TEST ITEM:	ENGINEERING SAMPLE
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (model: IT-10M30BR) 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 : Annie Chang (Annie Chang), **DATE:** Dec. 6, 2004

TECHNICAL ACCEPTANCE Responsible for EMI : (Arthur Lin), **DATE:** Dec. 6, 2004

APPROVED BY : (Cody Chang, Deputy Manager), **DATE:** Dec. 6, 2004

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

FOR MODULATING TYPE DSSS:

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 –10.97dB at 0.193MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit : min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –5.00dB at 7311.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

FOR MODULATING TYPE FHSS:

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 –14.52dB at 0.306MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.:At least 79 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, whichever is greater.	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Limit: max. 1MHz	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 –3.00dB at 2483.50MHz
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	2.44dB
Radiated emissions	30MHz ~ 1GHz	3.86 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Rugged PDA
MODEL NO.	IT-10M30B, IT-10M30BR, IT-10M20BR
POWER SUPPLY	3.7Vdc from battery
MODULATION TYPE	DSSS: DBPSK, DQPSK and CCK FHSS: GFSK
TRANSFER RATE	DSSS: 1/2/5.5/11Mbps FHSS: 723Kbps
FREQUENCY RANGE	2412MHz ~ 2472MHz for DSSS 2402MHz ~ 2480MHz for FHSS
NUMBER OF CHANNEL	13 for DSSS 79 for FHSS
OUTPUT POWER	26.303mW for DSSS 1.371mW for FHSS
ANTENNA TYPE	DSSS:PIFA antenna (PEX connector) with 3dBi gain FHSS:CHIP antenna with 0.38dBi gain
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is a Rugged PDA and it has three model names, which are identical to each other in all aspects except for their function and memory capacity as the follows:

Brand	Model No.	Function	RAM
CASIO	IT-10M30B	Bluetooth only	128MB
	IT-10M30BR	Bluetooth + 802.11b	128MB
	IT-10M20BR	Bluetooth + 802.11b	64MB

From above models, model no.: **IT-10M30BR** was selected as the representative model for the test and therefore only its test data was recorded in this report.

The EUT's 802.11b function was controlled by software to on or off, therefore, the device was the same.

2. The EUT was supplied with cradle or battery as the follows:

CRADLE		
Brand	**Model No.**	**Adapter Supplied**
CASIO	HA-C60IO	Brand: NAGANO, M/N: SQS15W5P-15 (same as Casio, AD-S15050A) AC I/P:100-240V, 0.36-0.2A, 50-60Hz DC O/P:5V, 3A
	HA-C61IO	Brand: Casio, M/N: AD-S42120A AC I/P:100-240V, 1.3-0.7A, 50-60Hz DC O/P:12V, 3.5A
BATTERY		
Brand	**Model No.**	**Adapter Supplied**
CASIO	HA-C21BAT	DC O/P:3.7V, 2300mAH

3. The EUT operates in the 2.4GHz frequency spectrum and complies with DSSS and FHSS technique and they can transmit at the same time.

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

3.2 DESCRIPTION OF TEST MODES

The EUT was pre-tested with the following condition:

1. With the test result for the EUT tested on separate function (Bluetooth and WLAN). Therefore for the final test, both function was tested under DSSS and FHSS modulation techniques.
2. 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 Z-plane for WLAN function and X-plane for Bluetooth function. Therefore only the test data of this X-plane and Z-plane were used for **Radiated test**.
3. The EUT was functional at the same time during the test.

Eleven channels were provided to the EUT for DSSS modulation type:

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

1. Below 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, the worst case, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. Data rate 11Mbps, the worst case, was chosen for final test.
4. For Conducted and Radiated Tests, three test modes as following:
   Mode 1 is for Transmission function
   Mode 2 is for charging function with NAGANO cradle.
   Mode 3 is for charging function with Casio cradle.

Seventy-nine channels were provided to the EUT for FHSS modulation type:

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		

1. Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel 0, 39 and 78 are chosen for testing to fulfill the requirement of frequency spectrum usage in each country.
2. 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. Above 1 GHz, the channel 0, 39, and 78 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Rugged PDA. 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

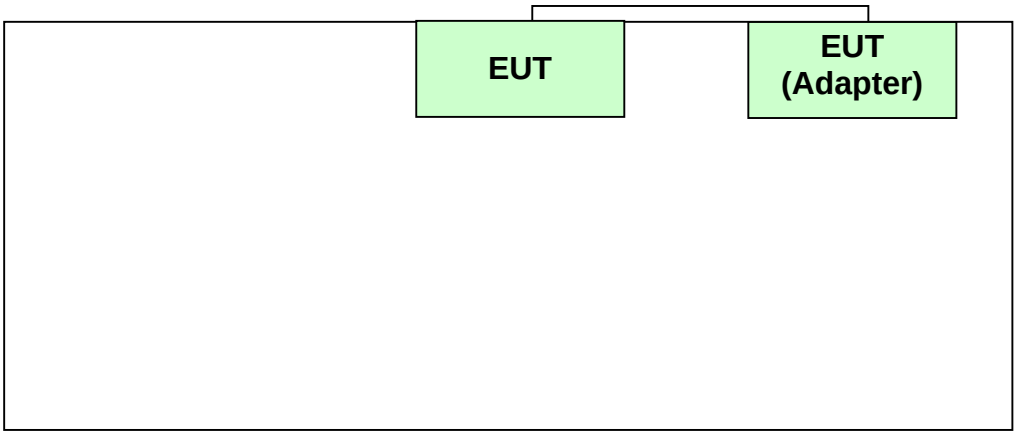
All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

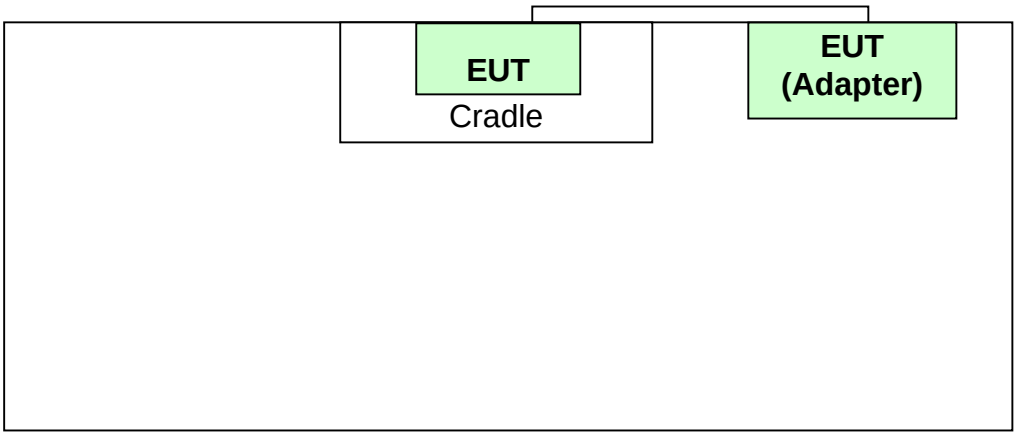
The EUT has been tested as an independent unit together with its power adapter.

3.5 CONFIGURATION OF SYSTEM UNDER TEST

For Transmission Function:



For Charging Function:



4 TEST PROCEDURE AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	CONDUCTED LIMIT (DBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTES: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Jan. 4, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 9, 2004
Software	ADT_Cond_V7.3.2	NA	NA
Software	ADT_ISN_V7.3.2	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Apr. 28, 2005
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Feb. 28, 2005
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 28, 2005

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. "*": These equipment are used for conducted telecom port test only (if tested).
3. The test was performed in ADT Shielded Room No. 10.
4. The VCCI Site Registration No. C-1852.

4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

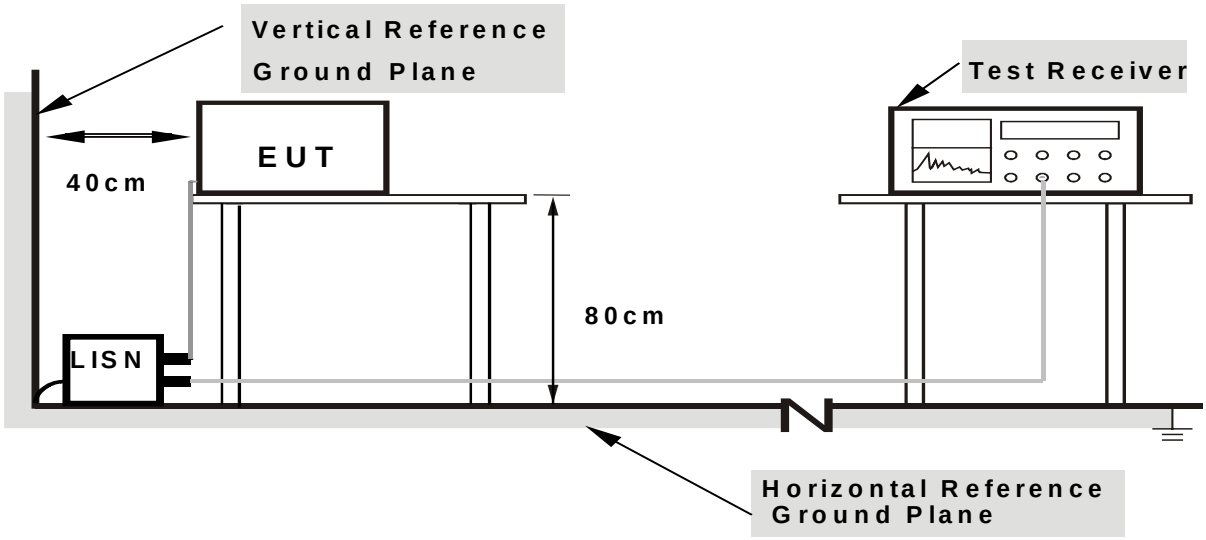
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

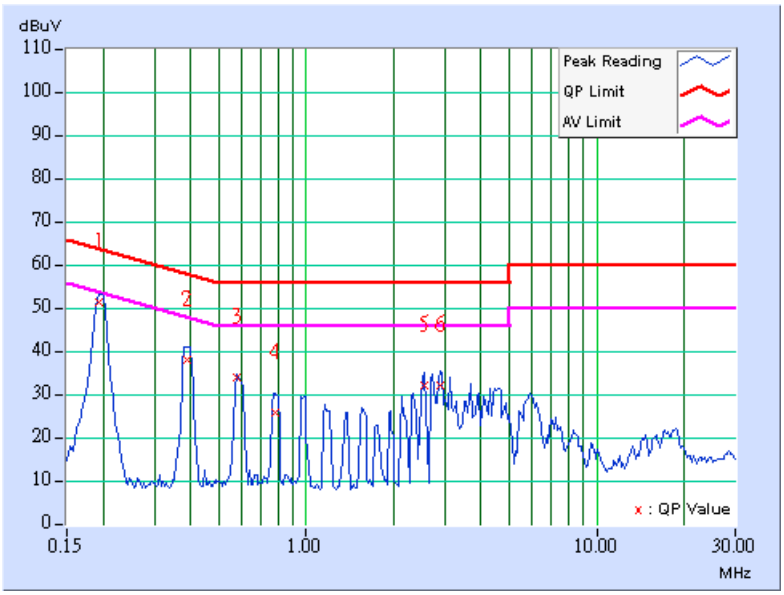
Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS (A)

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	1	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	51.42	-	51.52	-	63.91	53.91	-12.39	-
2	0.388	0.10	37.86	-	37.96	-	58.10	48.10	-20.14	-
3	0.580	0.13	33.96	-	34.09	-	56.00	46.00	-21.91	-
4	0.779	0.16	25.77	-	25.93	-	56.00	46.00	-30.07	-
5	2.539	0.23	31.84	-	32.07	-	56.00	46.00	-23.93	-
6	2.891	0.24	31.96	-	32.20	-	56.00	46.00	-23.80	-

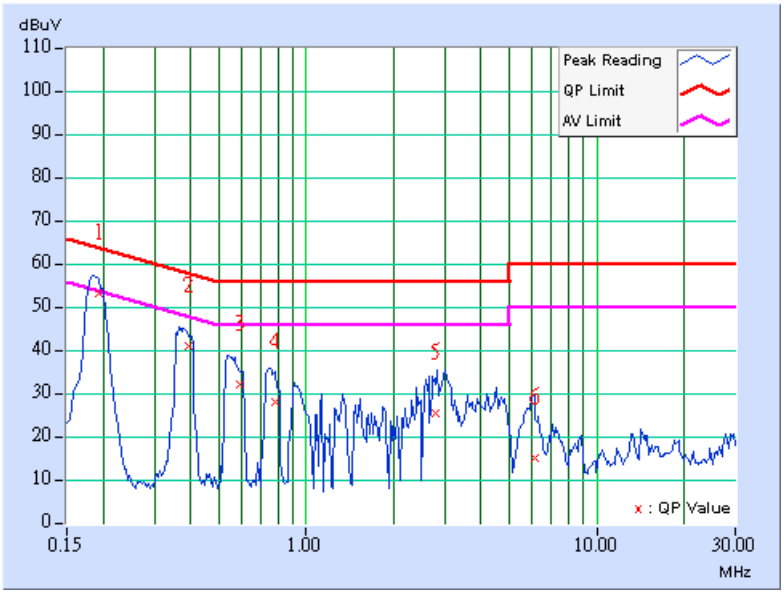
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	1	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.193**	**0.10**	**52.83**	**-**	**52.93**	**-**	**63.90**	**53.90**	**-10.97**	**-**
2	0.393	0.10	40.73	-	40.83	-	58.00	48.00	-17.17	-
3	0.591	0.13	31.73	-	31.86	-	56.00	46.00	-24.14	-
4	0.780	0.16	27.94	-	28.10	-	56.00	46.00	-27.90	-
5	2.788	0.24	25.08	-	25.32	-	56.00	46.00	-30.68	-
6	6.094	0.37	14.67	-	15.04	-	60.00	50.00	-44.96	-

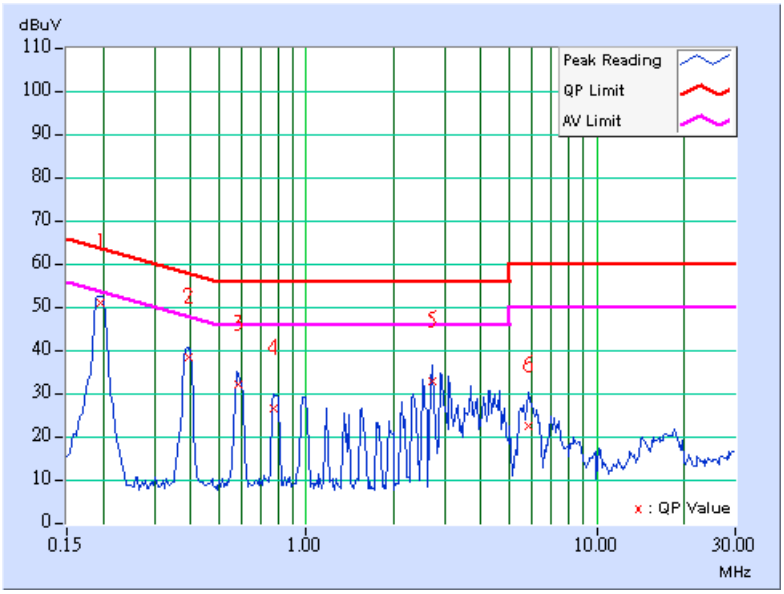
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	6	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	50.83	-	50.93	-	63.74	53.74	-12.81	-
2	0.392	0.10	38.04	-	38.14	-	58.02	48.02	-19.88	-
3	0.586	0.13	31.86	-	31.99	-	56.00	46.00	-24.01	-
4	0.775	0.16	26.15	-	26.31	-	56.00	46.00	-29.69	-
5	2.727	0.24	32.54	-	32.78	-	56.00	46.00	-23.22	-
6	5.797	0.39	22.34	-	22.73	-	60.00	50.00	-37.27	-

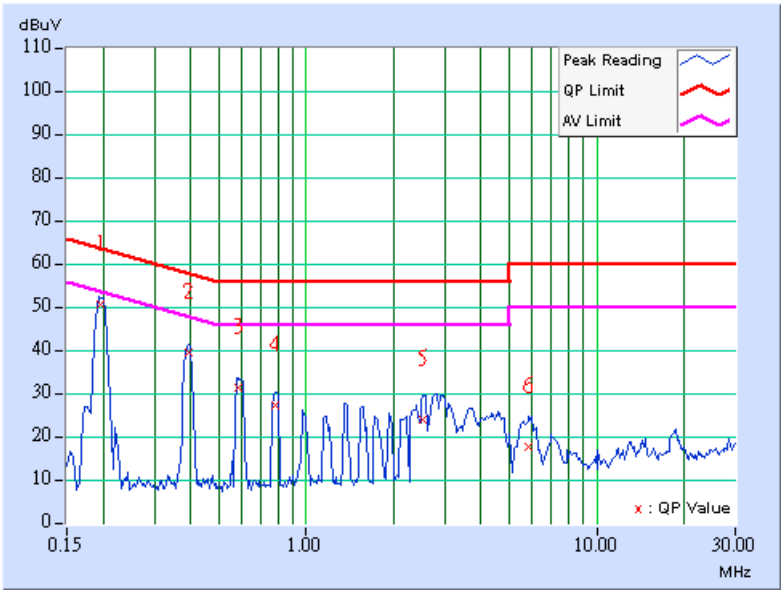
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	6	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.196	0.10	50.43	-	50.53	-	63.79	53.79	-13.26	-
2	0.392	0.10	39.16	-	39.26	-	58.02	48.02	-18.76	-
3	0.588	0.13	31.09	-	31.22	-	56.00	46.00	-24.78	-
4	0.783	0.16	26.99	-	27.15	-	56.00	46.00	-28.85	-
5	2.531	0.23	23.71	-	23.94	-	56.00	46.00	-32.06	-
6	5.840	0.36	17.31	-	17.67	-	60.00	50.00	-42.33	-

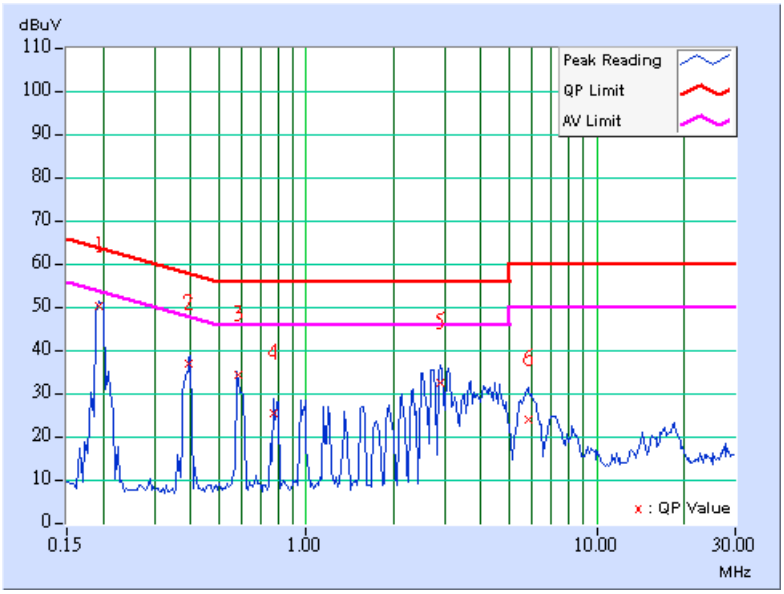
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	11	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	49.88	-	49.98	-	63.91	53.91	-13.93	-
2	0.394	0.10	36.47	-	36.57	-	57.98	47.98	-21.41	-
3	0.585	0.13	34.22	-	34.35	-	56.00	46.00	-21.65	-
4	0.775	0.16	25.10	-	25.26	-	56.00	46.00	-30.74	-
5	2.883	0.24	32.30	-	32.54	-	56.00	46.00	-23.46	-
6	5.801	0.39	23.52	-	23.91	-	60.00	50.00	-36.09	-

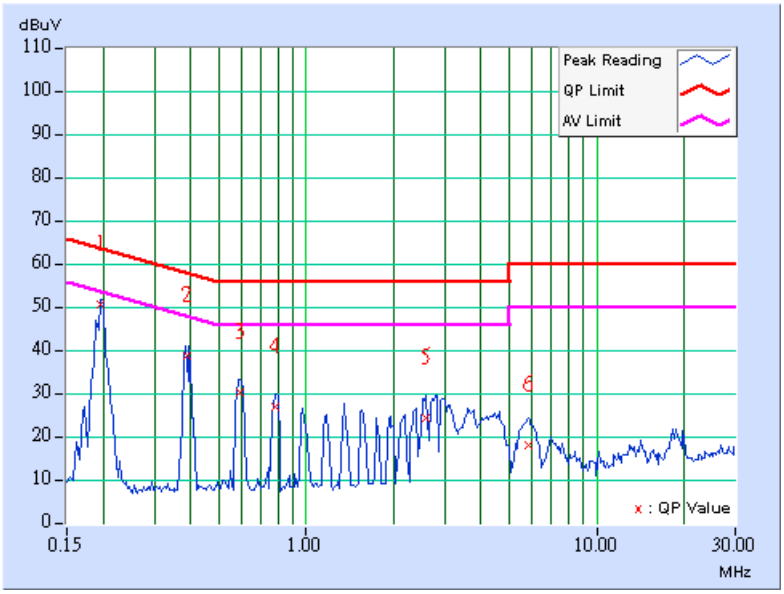
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	11	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	1
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.195	0.10	50.27	-	50.37	-	63.80	53.80	-13.43	-
2	0.389	0.10	38.51	-	38.61	-	58.07	48.07	-19.46	-
3	0.589	0.13	29.98	-	30.11	-	56.00	46.00	-25.89	-
4	0.779	0.16	26.62	-	26.78	-	56.00	46.00	-29.22	-
5	2.582	0.23	24.16	-	24.39	-	56.00	46.00	-31.61	-
6	5.789	0.36	17.61	-	17.97	-	60.00	50.00	-42.03	-

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.

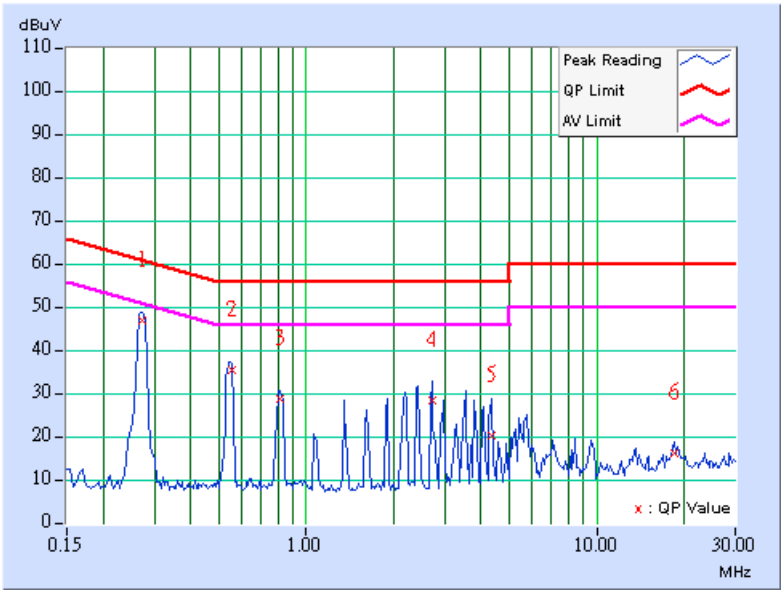


4.1.8 TEST RESULTS (B)

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
		PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	2
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.271	0.10	46.13	-	46.23	-	61.08	51.08	-14.85	-
2	0.552	0.13	34.67	-	34.80	-	56.00	46.00	-21.20	-
3	0.818	0.17	27.89	-	28.06	-	56.00	46.00	-27.94	-
4	2.715	0.24	27.73	-	27.97	-	56.00	46.00	-28.03	-
5	4.344	0.32	19.65	-	19.97	-	56.00	46.00	-36.03	-
6	18.613	0.87	15.32	-	16.19	-	60.00	50.00	-43.81	-

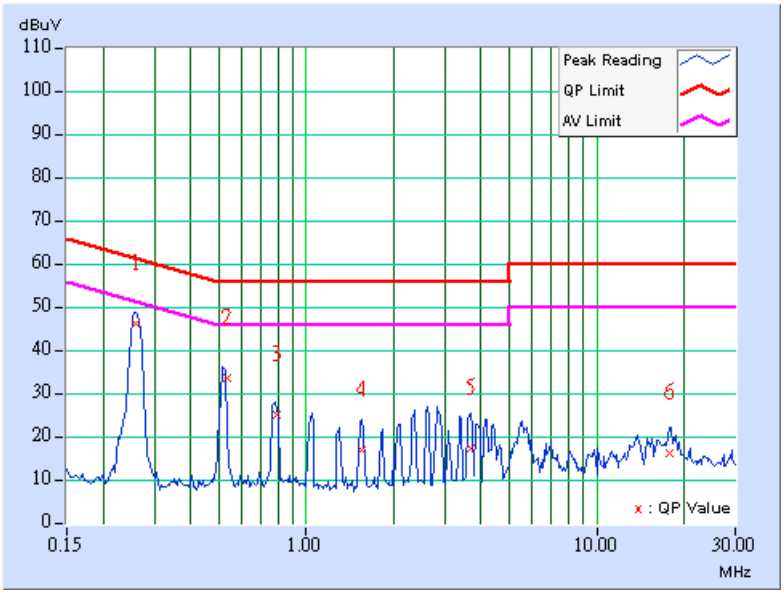
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
		PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	2
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.259	0.10	45.55	-	45.65	-	61.45	51.45	-15.80	-
2	0.531	0.12	33.06	-	33.18	-	56.00	46.00	-22.82	-
3	0.797	0.17	24.40	-	24.57	-	56.00	46.00	-31.43	-
4	1.555	0.20	16.35	-	16.55	-	56.00	46.00	-39.45	-
5	3.668	0.28	16.53	-	16.81	-	56.00	46.00	-39.19	-
6	17.883	0.76	15.69	-	16.45	-	60.00	50.00	-43.55	-

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.

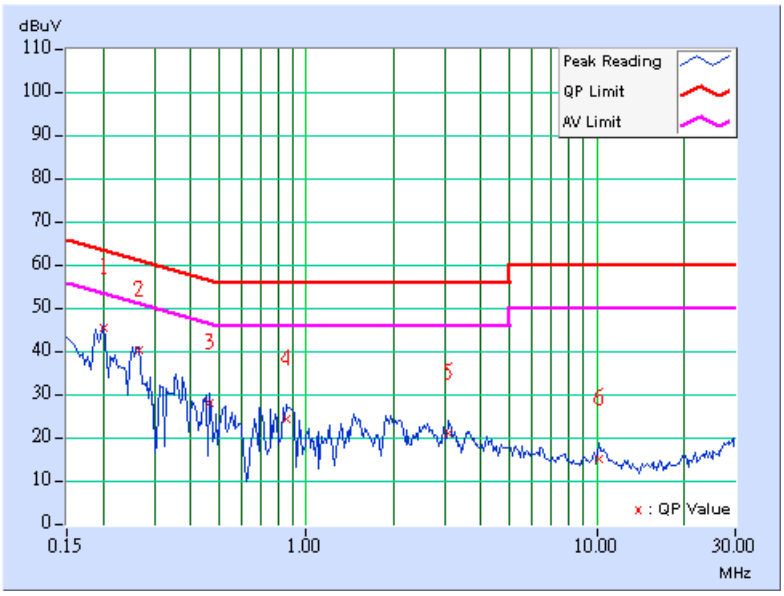


4.1.9 TEST RESULTS (C)

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
		PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	3
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.10	44.93	-	45.03	-	63.58	53.58	-18.55	-
2	0.267	0.10	39.87	-	39.97	-	61.20	51.20	-21.23	-
3	0.463	0.11	27.50	-	27.61	-	56.65	46.65	-29.04	-
4	0.857	0.18	23.77	-	23.95	-	56.00	46.00	-32.05	-
5	3.090	0.25	20.33	-	20.58	-	56.00	46.00	-35.42	-
6	10.242	0.61	14.63	-	15.24	-	60.00	50.00	-44.76	-

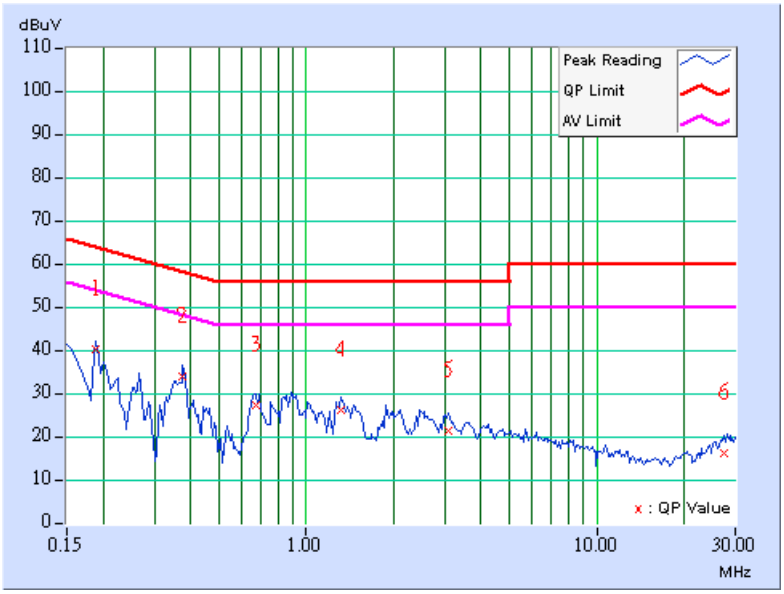
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
INPUT POWER	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
		PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TEST MODE**	3
		TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.10	39.26	-	39.36	-	64.08	54.08	-24.72	-
2	0.377	0.10	33.13	-	33.23	-	58.35	48.35	-25.12	-
3	0.670	0.14	26.39	-	26.53	-	56.00	46.00	-29.47	-
4	1.324	0.20	25.21	-	25.41	-	56.00	46.00	-30.59	-
5	3.090	0.25	20.57	-	20.82	-	56.00	46.00	-35.18	-
6	27.410	1.05	15.32	-	16.37	-	60.00	50.00	-43.63	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Preamplifier	8447D	2432A03504	Jun. 3, 2005
***** HP Preamplifier	8449B	3008A01924	Sep. 19, 2005
***** HP Preamplifier	8449B	3008A01638	Sep. 30, 2005
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	Oct. 29, 2005
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* ROHDE & SCHWARZ TEST RECEIVER	ESI7	836697/012	Nov. 05, 2005
Schwarzbeck Antenna	VULB 9168	137	Feb. 27, 2005
Schwarzbeck Antenna	VHBA 9123	480	Feb. 18, 2005
***** EMCO Horn Antenna	3115	6714	Oct. 28, 2005
***** EMCO Horn Antenna	3115	9312-4192	Feb. 28, 2005
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V6	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Apr. 16, 2005

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Chamber No. 6.
5. The Industry Canada Reference No. IC 3789-6.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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.

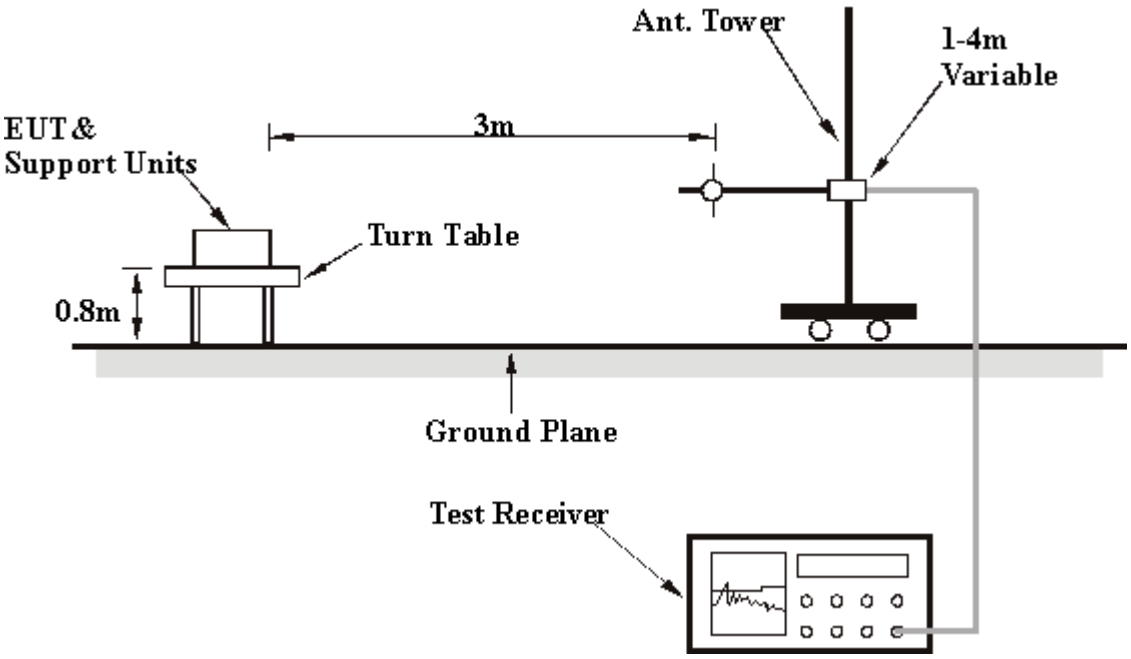
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS (A)

EUT	Rugged PDA	**MODEL**	IT-10M30BR
CHANNEL	11	**FREQUENCY RANGE**	Below 1000 MHz
TEST MODE	1		
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	**TESTED BY**	Jamison Chan

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	747.29	23.92 QP	46.00	-22.08	1.00 H	73	-0.76	24.69
2	778.40	24.33 QP	46.00	-21.67	1.50 H	340	-0.49	24.82
3	809.50	25.17 QP	46.00	-20.83	1.50 H	223	0.17	25.00
4	842.55	25.61 QP	46.00	-20.39	1.00 H	121	0.13	25.48
5	904.75	25.92 QP	46.00	-20.08	1.00 H	241	0.10	25.82
6	947.52	25.89 QP	46.00	-20.11	1.00 H	346	-0.73	26.62

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	690.92	23.82 QP	46.00	-22.18	1.50 V	340	0.80	23.02
2	770.62	25.06 QP	46.00	-20.94	1.00 V	223	0.25	24.81
3	811.44	24.00 QP	46.00	-22.00	1.25 V	22	-1.03	25.03
4	844.49	25.74 QP	46.00	-20.26	1.25 V	331	0.23	25.51
5	879.48	25.57 QP	46.00	-20.43	1.50 V	319	-0.11	25.67
6	937.80	26.36 QP	46.00	-19.64	1.75 V	241	-0.08	26.44

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

EUT	Rugged PDA	MODEL	IT-10M30BR
CHANNEL	1	FREQUENCY RANGE	1~25 GHz
TEST MODE	1		
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	TESTED BY	Jamison Chan

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	46.27 PK	74.00	-27.73	1.24 H	16	12.95	33.32
1	2390.00	38.24 AV	54.00	-15.76	1.24 H	16	4.92	33.32
2	*2412.00	103.46 PK			1.24 H	16	70.03	33.43
2	*2412.00	95.43 AV			1.24 H	16	62.00	33.43
3	7236.00	56.06 PK	74.00	-17.94	1.66 H	306	8.50	47.57
3	7236.00	43.61 AV	54.00	-10.39	1.66 H	306	-3.95	47.57

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	41.24 PK	74.00	-32.76	1.00 V	355	7.92	33.32
1	2390.00	33.10 AV	54.00	-20.90	1.00 V	355	-0.22	33.32
2	*2412.00	98.43 PK			1.00 V	355	65.00	33.43
2	*2412.00	90.29 AV			1.00 V	355	56.86	33.43
3	7236.00	55.74 PK	74.00	-18.26	1.05 V	152	8.18	47.57
3	7236.00	43.33 AV	54.00	-10.67	1.05 V	152	-4.23	47.57

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

EUT	Rugged PDA	**MODEL**	IT-10M30BR
CHANNEL	6	**FREQUENCY RANGE**	1~25 GHz
TEST MODE	1		
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	**TESTED BY**	Jamison Chan

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	*2437.00	103.27 PK			1.17 H	270	69.73	33.54
1	*2437.00	95.24 AV			1.17 H	270	61.70	33.54
2	7311.00	60.53 PK	74.00	-13.47	1.07 H	273	12.87	47.66
2	**7311.00**	**49.00 AV**	**54.00**	**-5.00**	**1.07 H**	**273**	**1.34**	**47.66**

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	*2437.00	99.46 PK			1.26 V	264	65.92	33.54
1	*2437.00	91.29 AV			1.26 V	264	57.75	33.54
2	7311.00	58.95 PK	74.00	-15.05	1.34 V	25	11.28	47.66
2	7311.00	47.05 AV	54.00	-6.95	1.34 V	25	-0.62	47.66

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

EUT	Rugged PDA	MODEL	IT-10M30BR
CHANNEL	11	FREQUENCY RANGE	1~25GHz
TEST MODE	1		
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	TESTED BY	Jamison Chan

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	*2462.00	103.86 PK			1.34 H	214	70.22	33.64
1	*2462.00	95.85 AV			1.34 H	214	62.21	33.64
2	2483.50	46.78 PK	74.00	-27.22	1.34 H	214	13.05	33.73
2	2483.50	38.77 AV	54.00	-15.23	1.34 H	214	5.04	33.73
3	7386.00	56.81 PK	74.00	-17.19	1.58 H	202	8.85	47.96
3	7386.00	44.37 AV	54.00	-9.63	1.58 H	202	-3.59	47.96

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	*2462.00	100.92 PK			1.22 V	261	67.28	33.64
1	*2462.00	92.95 AV			1.22 V	261	59.31	33.64
2	2483.50	43.84 PK	74.00	-30.16	1.22 V	261	10.11	33.73
2	2483.50	35.87 AV	54.00	-18.13	1.22 V	261	2.14	33.73
3	7386.00	56.66 PK	74.00	-17.34	1.00 V	134	8.70	47.96
3	7386.00	44.66 AV	54.00	-9.34	1.00 V	134	-3.30	47.96

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

4.2.8 TEST RESULTS (B)

EUT	Rugged PDA	**MODEL**	IT-10M30BR
CHANNEL	11	**FREQUENCY RANGE**	Below 1000 MHz
TEST MODE	2		
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	**TESTED BY**	Jamison Chan

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	31.94	32.41 QP	40.00	-7.59	1.32 H	250	19.80	12.61
2	64.99	26.14 QP	40.00	-13.86	1.56 H	55	14.00	12.14
3	127.19	28.36 QP	43.50	-15.14	1.93 H	247	16.22	12.14
4	407.11	34.43 QP	46.00	-11.57	1.87 H	55	16.72	17.71
5	438.22	37.80 QP	46.00	-8.20	1.42 H	91	19.48	18.32
6	519.86	29.65 QP	46.00	-16.35	1.75 H	322	9.38	20.27
7	554.85	30.52 QP	46.00	-15.48	1.55 H	88	9.59	20.92

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	39.72	20.72 QP	40.00	-19.28	1.11 V	253	14.22	6.50
2	74.71	23.15 QP	40.00	-16.85	1.50 V	121	19.66	3.49
3	179.68	21.47 QP	43.50	-22.03	1.24 V	121	10.30	11.18
4	519.86	22.62 QP	46.00	-23.38	1.62 V	10	7.72	14.90
5	558.74	21.19 QP	46.00	-24.81	1.53 V	253	7.23	13.97
6	840.60	26.97 QP	46.00	-19.03	1.93 V	187	2.95	24.02

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.

4.2.9 TEST RESULTS (C)

EUT	Rugged PDA	**MODEL**	IT-10M30BR
CHANNEL	11	**FREQUENCY RANGE**	Below 1000 MHz
TEST MODE	3		
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa	**TESTED BY**	Jamison Chan

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	59.16	19.68 QP	40.00	-20.32	4.00 H	169	6.50	13.18
2	782.28	24.54 QP	46.00	-21.46	3.00 H	79	-0.29	24.83
3	821.16	25.24 QP	46.00	-20.76	2.00 H	181	0.07	25.17
4	852.26	24.78 QP	46.00	-21.22	4.00 H	100	-0.82	25.60
5	889.20	25.74 QP	46.00	-20.26	1.50 H	184	0.04	25.70
6	949.46	26.11 QP	46.00	-19.89	2.00 H	46	-0.55	26.66

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	31.93 QP	40.00	-8.07	1.00 V	331	18.51	13.42
2	74.71	20.77 QP	40.00	-19.23	1.50 V	100	10.42	10.35
3	774.51	25.47 QP	46.00	-20.53	1.00 V	271	0.65	24.81
4	836.71	25.77 QP	46.00	-20.23	1.50 V	235	0.37	25.40
5	891.14	25.25 QP	46.00	-20.75	3.00 V	325	-0.45	25.71
6	957.23	25.88 QP	46.00	-20.12	1.50 V	82	-0.78	26.65

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.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100036	Mar 18. 2005

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

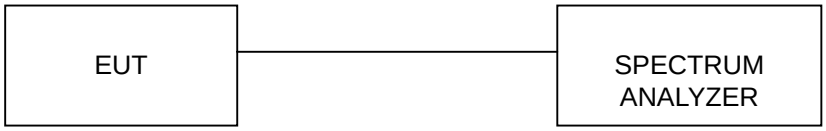
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



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

4.3.6 EUT OPERATING CONDITIONS

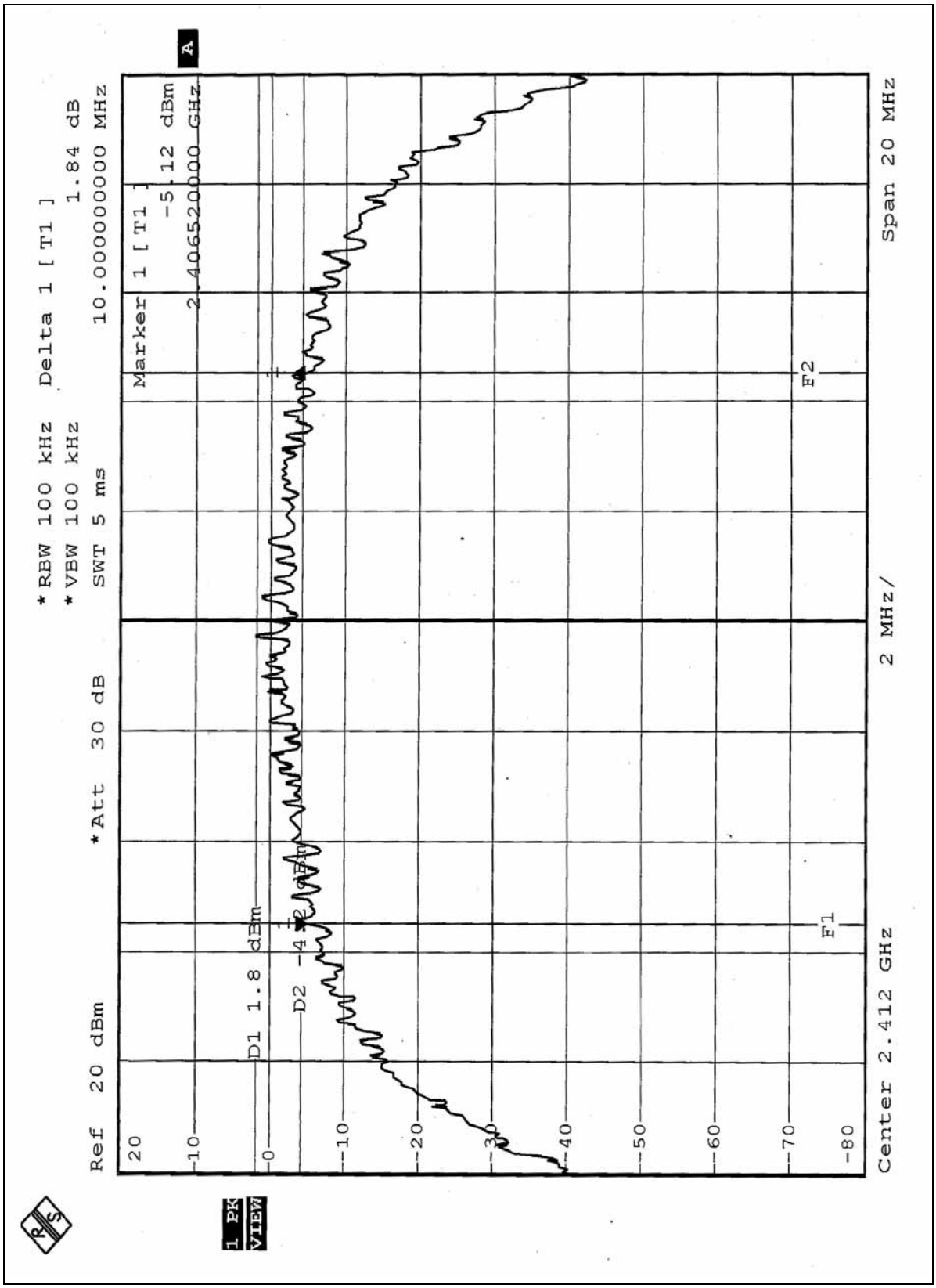
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

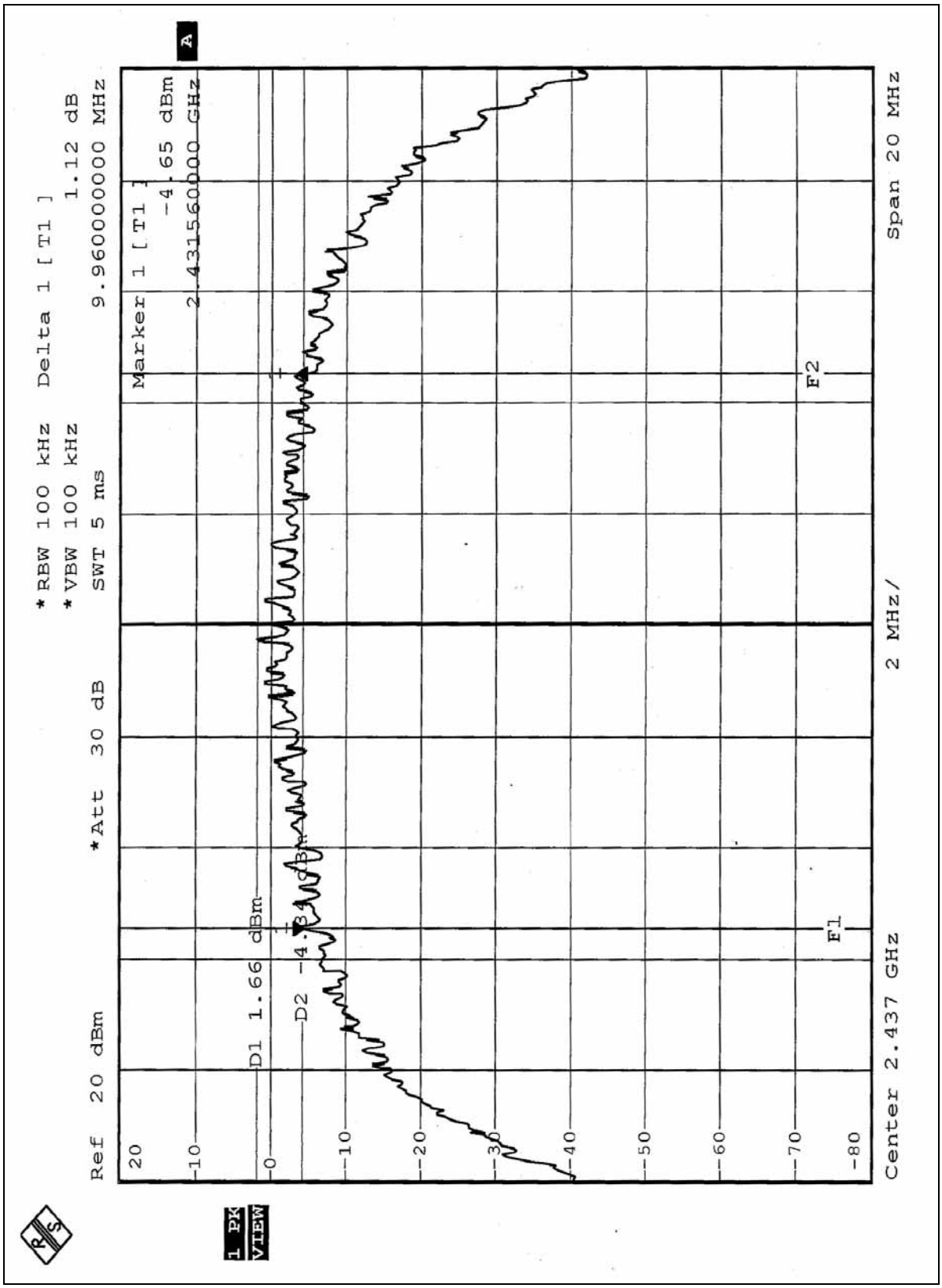
EUT	Rugged PDA	MODEL	IT-10M30BR
INPUT POWER	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	10.00	0.5	PASS
6	2437	9.96	0.5	PASS
11	2462	9.92	0.5	PASS

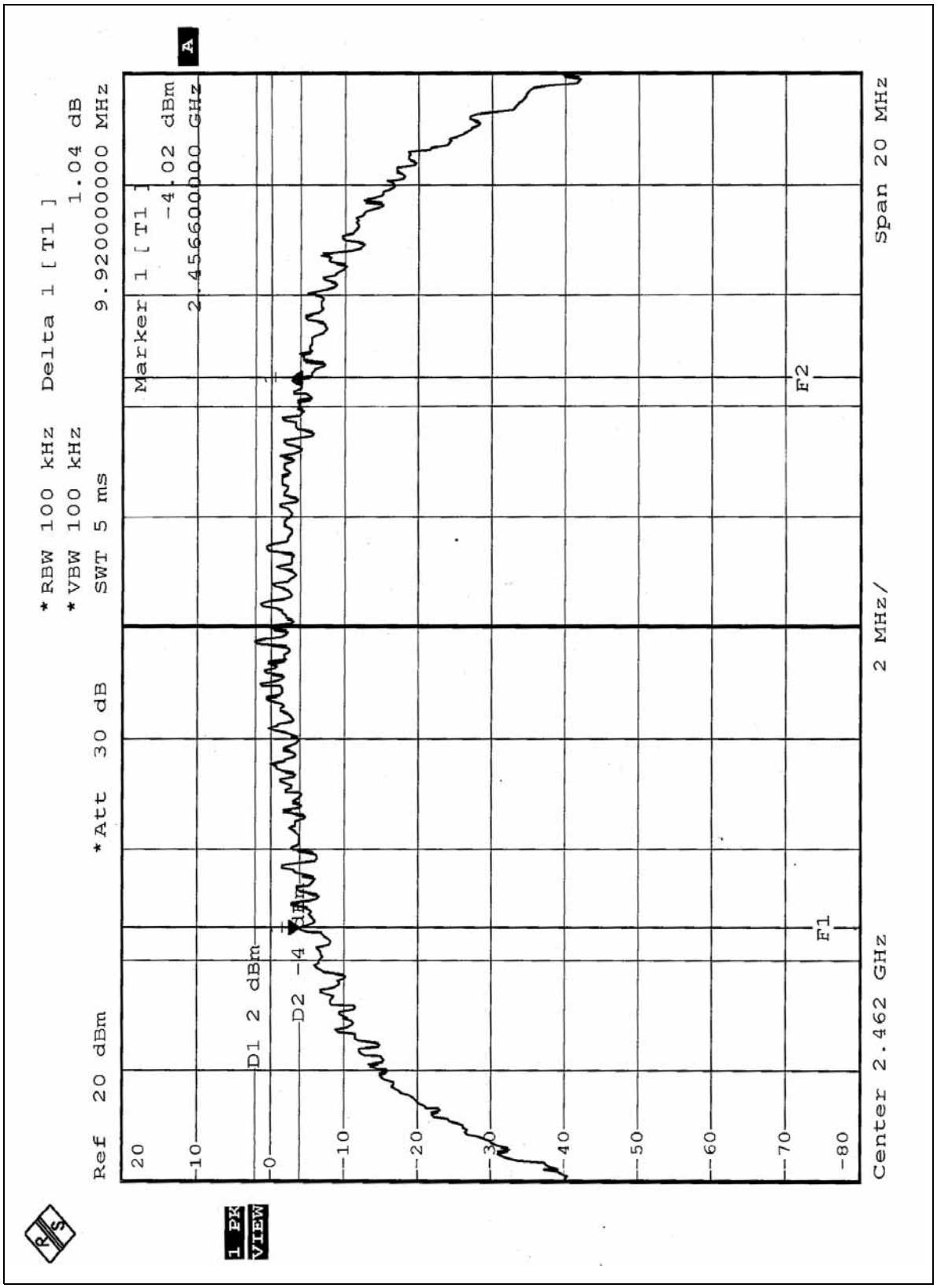
CH1


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Att 30 dB
Ref 20 dBm
Delta 1 [T1]
1.84 dB
10.000000000 MHz
Marker 1 [T1]
-5.12 dBm
2.406520000 GHz
D1 1.8 dBm
D2 -4
Center 2.412 GHz
2 MHz/
Span 20 MHz
F1
F2
1 PK VIEW

CH6


A
Marker 1 [T1]
-4.65 dBm
2.431560000 GHz
Delta 1 [T1]
1.12 dB
9.960000000 MHz
*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
*Att 30 dB
Ref 20 dBm
D1 1.66 dBm
D2 -4.48 dBm
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz
1 PK
VIEW

CH11


A
Marker 1 [T1]
-4.02 dBm
2.45600000 GHz
Delta 1 [T1]
1.04 dB
9.92000000 MHz
*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
*Att 30 dB
Ref 20 dBm
D1 2 dBm
D2 -4
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz
1 PK
VIEW

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Mar 18. 2005
ROHDE & SCHWARZ Signal Generator	SMR40	100231	Mar. 17. 2005
Tektronix Oscilloscope	TDS1012	C019167	Feb. 01. 2005
Narda Detector	4503A	FSCM99899	NA

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 PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to peak the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same peak reading on oscilloscope. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

EUT	Rugged PDA	**MODEL**	IT-10M30BR
INPUT POWER	120 Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 70% RH, 1010 hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	25.704	14.1	30	PASS
6	2437	25.119	14.0	30	PASS
11	2462	26.303	14.2	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100036	Mar 18. 2005

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

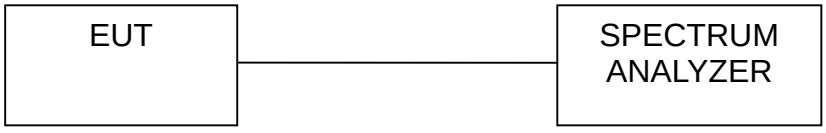
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

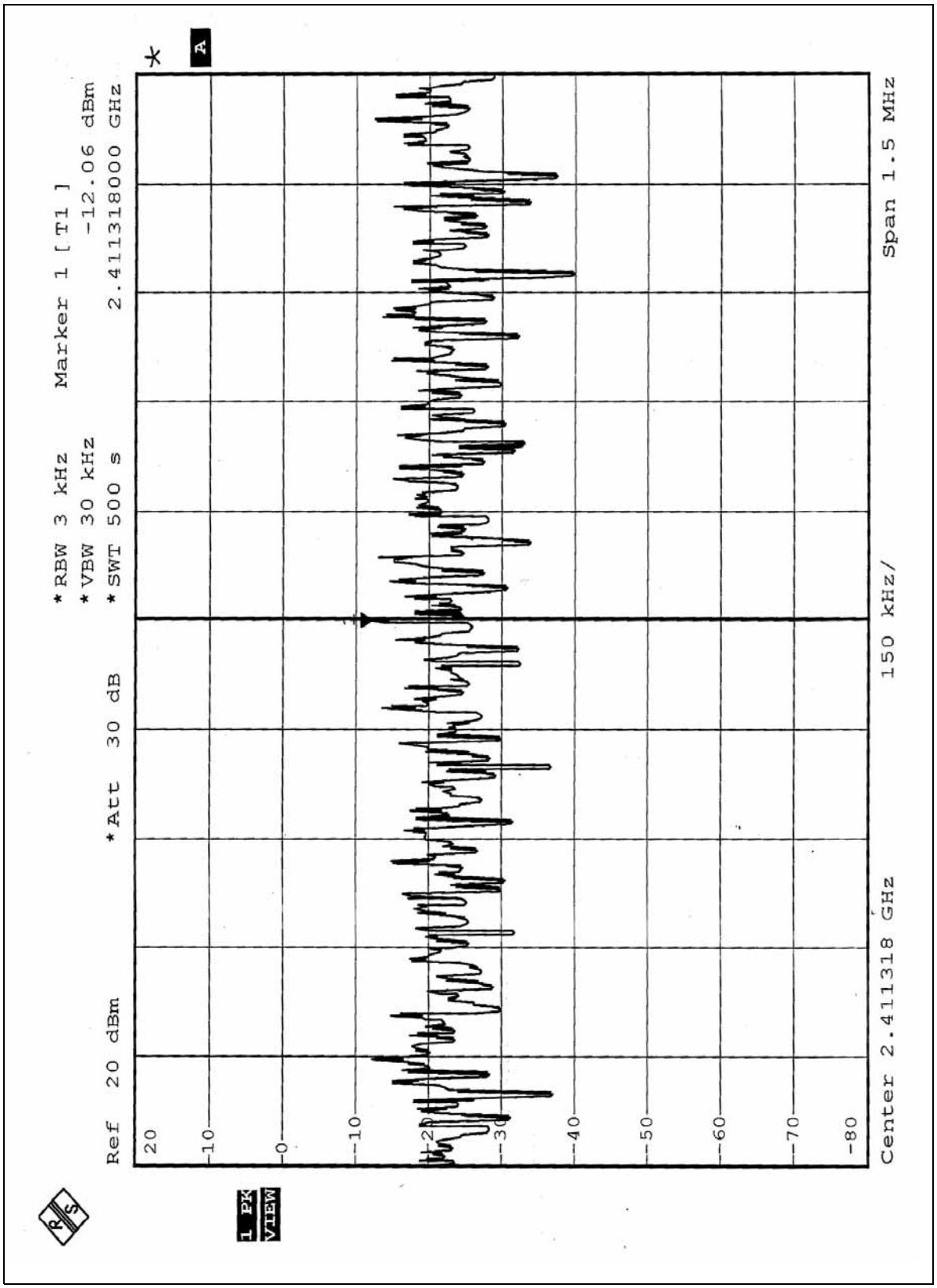
Same as 4.3.6

4.5.7 TEST RESULTS

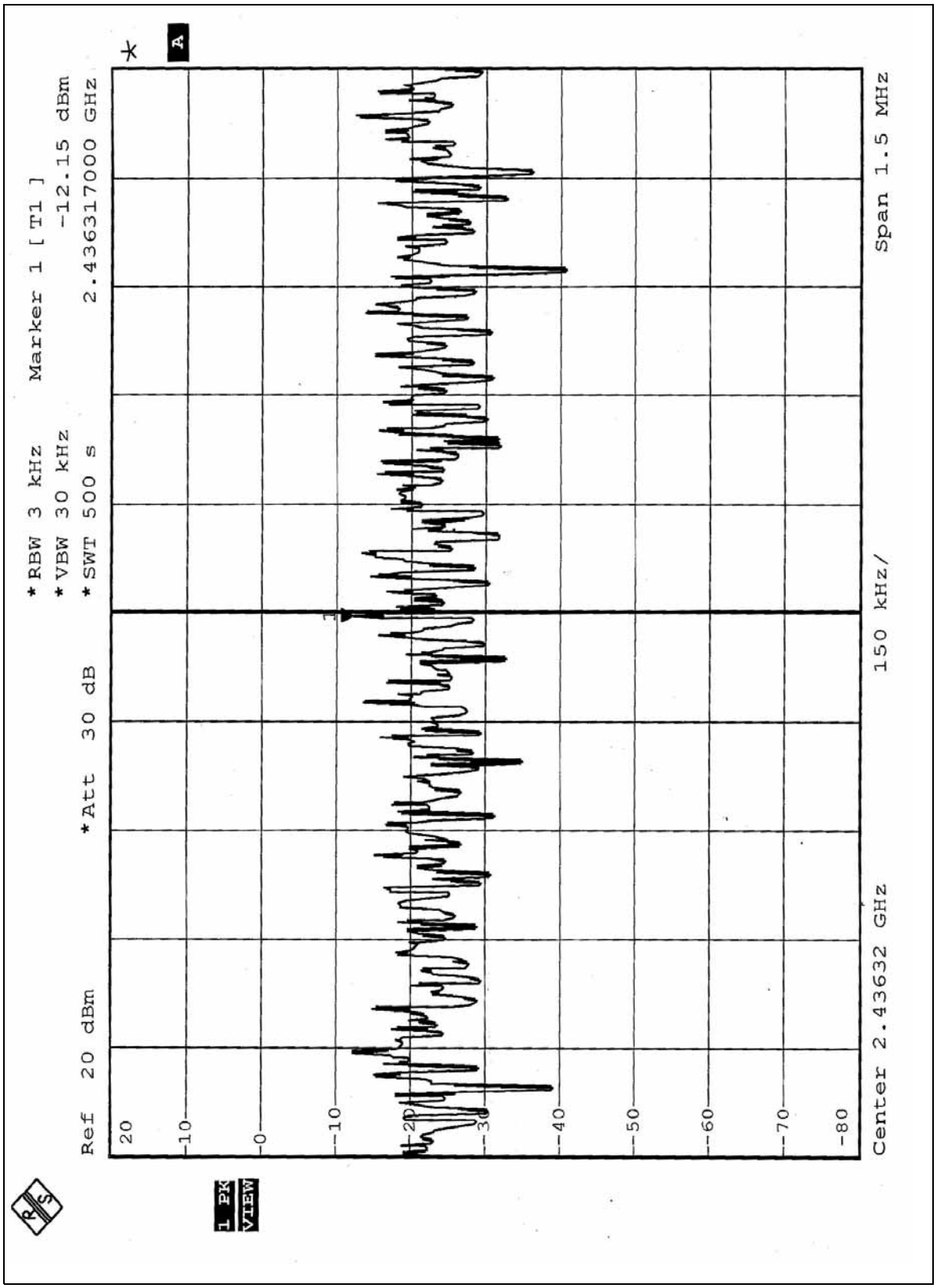
EUT	Rugged PDA	MODEL	IT-10M30BR
INPUT POWER	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25 deg. C, 70% RH, 1010 hPa
TESTED BY	Jamison Chan		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-12.06	8	PASS
6	2437	-12.15	8	PASS
11	2462	-11.75	8	PASS

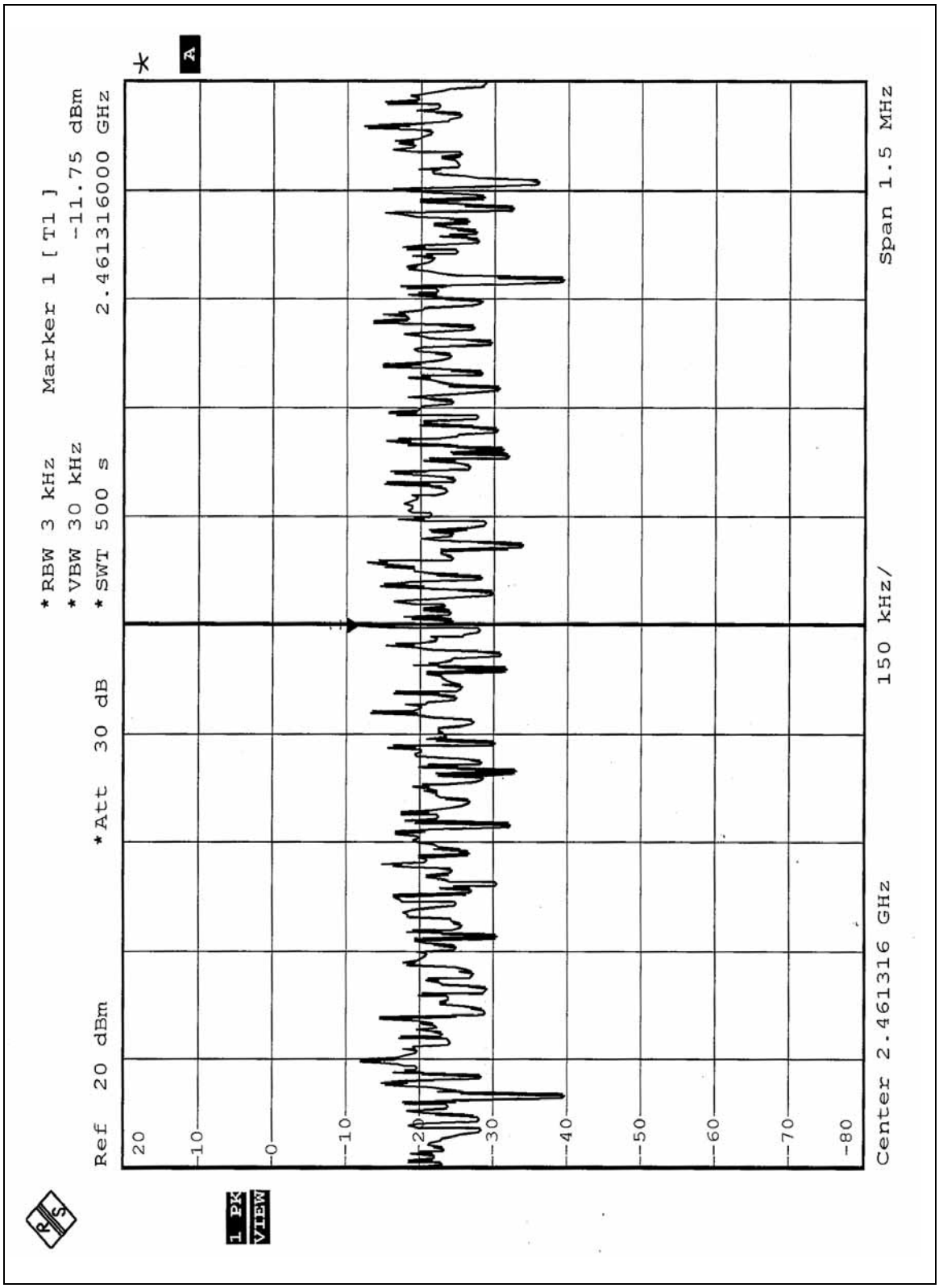
CH1


Marker 1 [T1]
-12.06 dBm
2.411318000 GHz
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
*Att 30 dB
Ref 20 dBm
Center 2.411318 GHz
150 kHz/
Span 1.5 MHz
1 PK VIEW

CH6


Marker 1 [T1]
-12.15 dBm
2.436317000 GHz
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
*Att 30 dB
Ref 20 dBm
Center 2.43632 GHz
150 kHz/
Span 1.5 MHz
1 PK VIEW

CH11


Ref 20 dBm
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-11.75 dBm
2.461316000 GHz
Center 2.461316 GHz
150 kHz/
Span 1.5 MHz
1 PK
VIEW

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 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.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 1MHz and 1kHz with suitable frequency span including 1MHz and 1kHz bandwidth from band edge. The band edges was measured and recorded.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.6 TEST RESULTS

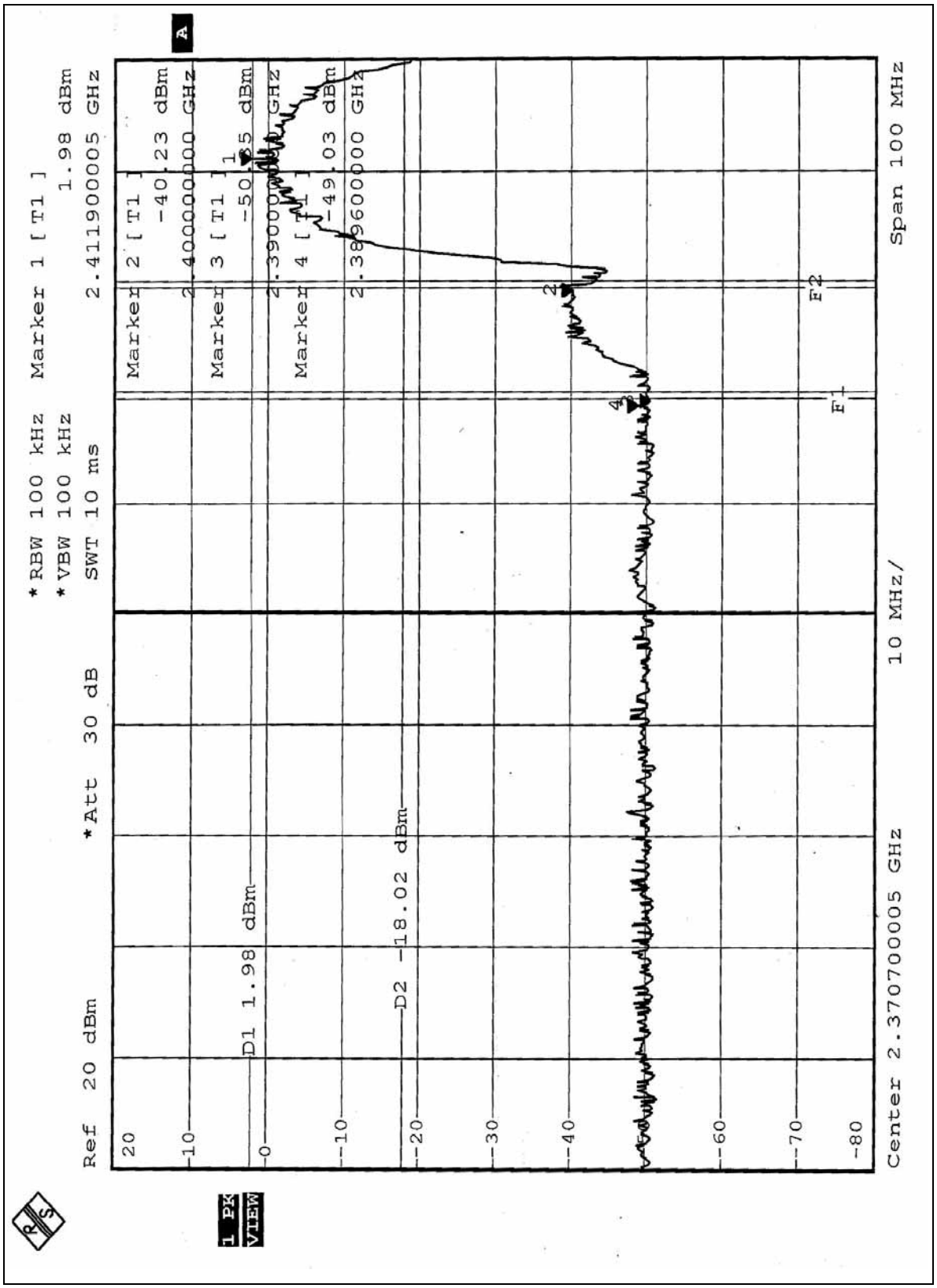
The spectrum plots are attached on the following 4 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

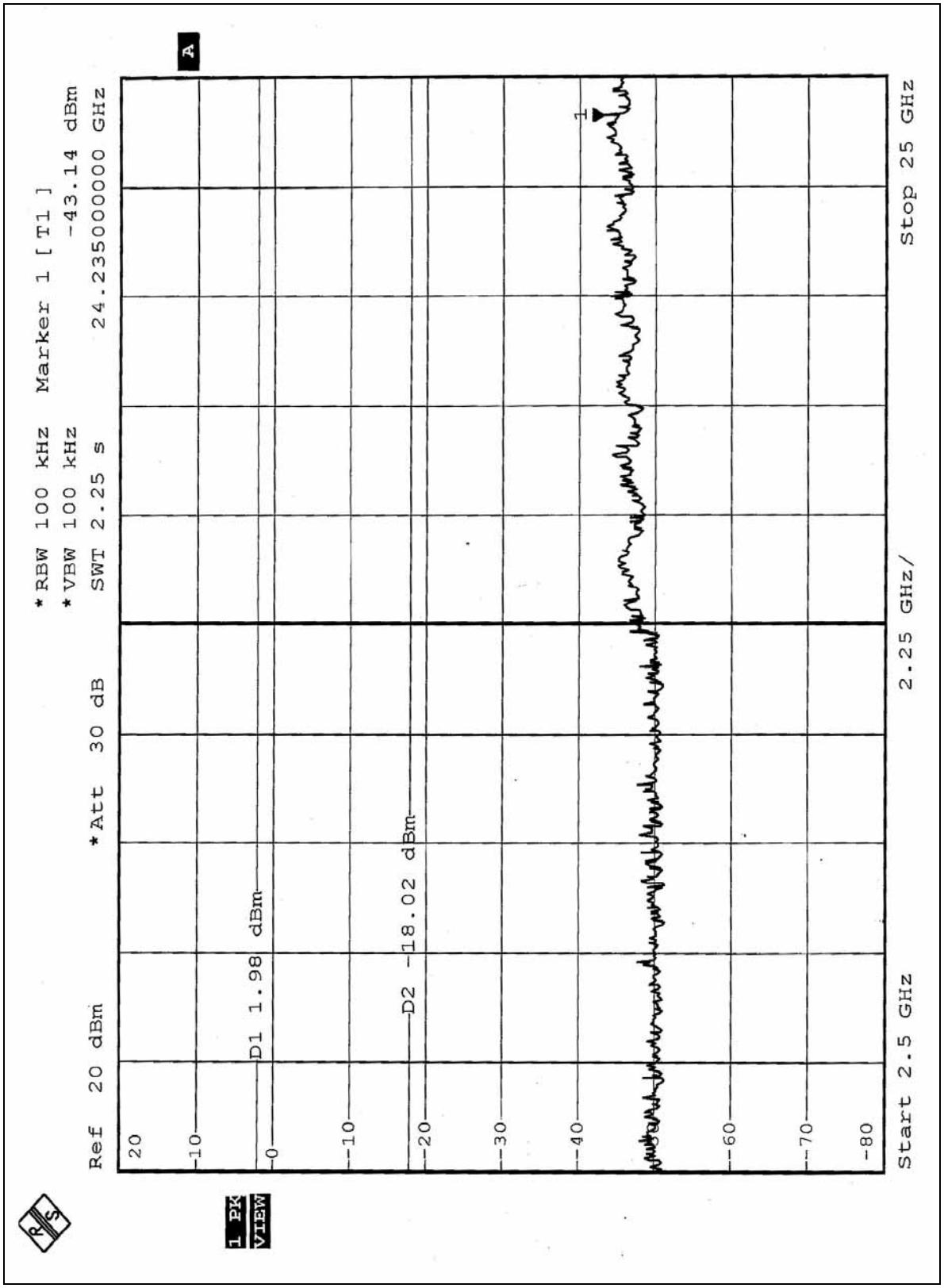
4.6.7 TEST RESULTS

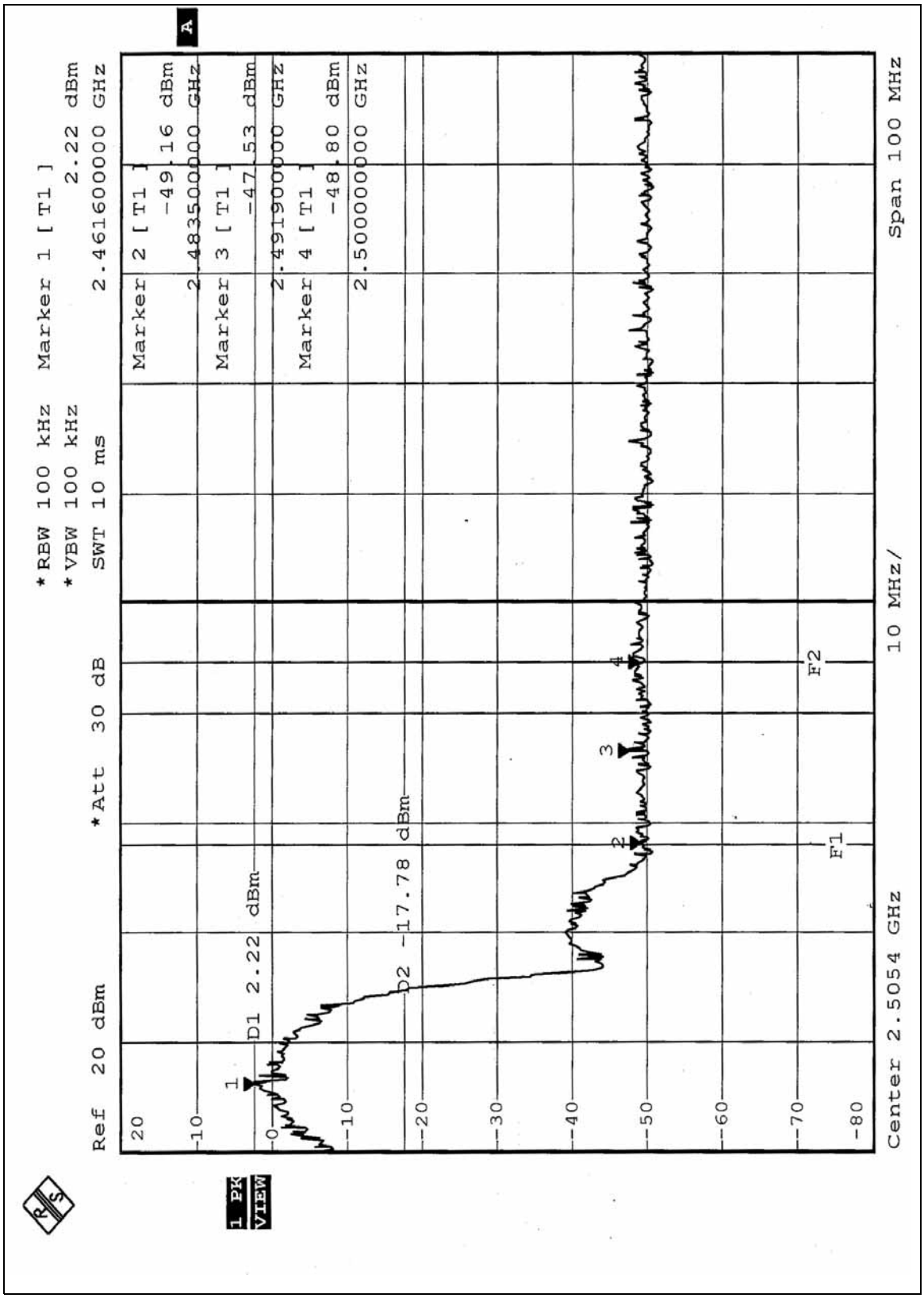
NOTE:

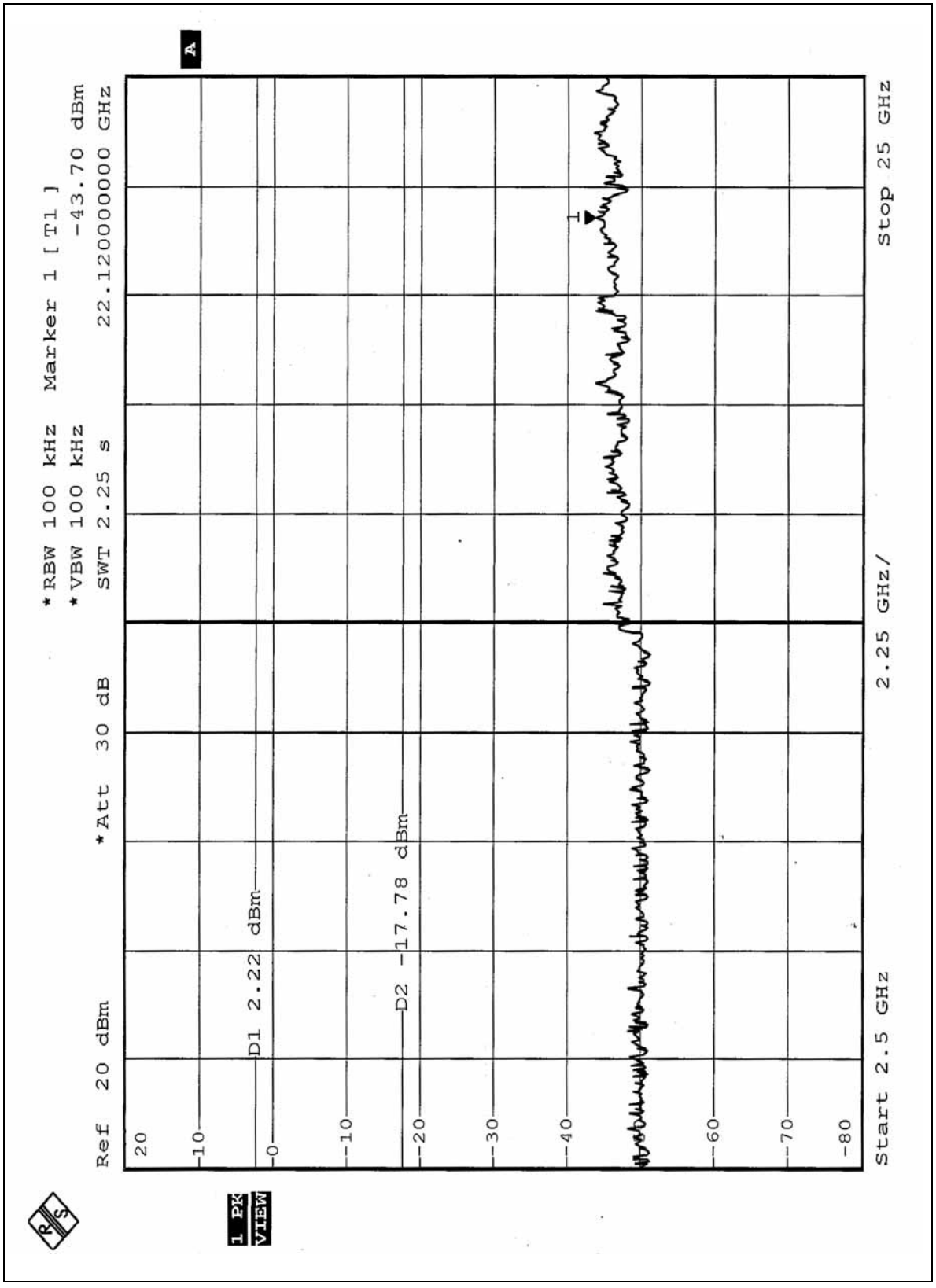
The band edge emission plot on the following 1~2 pages show 51.01dB delta between carrier maximum power and local maximum emission in restrict band (2.3896GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 95.43dBuV/m, so the maximum field strength in restrict band is 95.43-51.01=44.42dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of on the following 3~4 pages show 49.75dB delta between carrier maximum power and local maximum emission in restrict band (2.4919GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 95.85dBuV/m, so the maximum field strength in restrict band is 95.85-49.75=46.1dBuV/m which is under 54dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
1.98 dBm
2.411900005 GHz
Marker 2 [T1]
-40.23 dBm
2.400000000 GHz
Marker 3 [T1]
-50.85 dBm
2.390000000 GHz
Marker 4 [T1]
-49.03 dBm
2.389600000 GHz
D1 1.98 dBm
D2 -18.02 dBm
Center 2.370700005 GHz
10 MHz/
Span 100 MHz
1 PK VIEW


A
*RBW 100 kHz
*VBW 100 kHz
SWT 2.25 s
Marker 1 [T1]
-43.14 dBm
24.235000000 GHz
Ref 20 dBm
*Att 30 dB
D1 1.98 dBm
D2 -18.02 dBm
1 PK VIEW
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
2.22 dBm
2.461600000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
-49.16 dBm
2.483500000 GHz
Marker 3 [T1]
-47.53 dBm
2.491900000 GHz
Marker 4 [T1]
-48.80 dBm
2.500000000 GHz
D1 2.22 dBm
D2 -17.78 dBm
F1
F2
Center 2.5054 GHz
10 MHz/
Span 100 MHz
1 PK VIEW


Ref 20 dBm
*Att 30 dB
*RBW 100 kHz
*VBW 100 kHz
SWT 2.25 s
Marker 1 [T1]
-43.70 dBm
22.120000000 GHz
D1 2.22 dBm
D2 -17.78 dBm
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz
1 PK
VIEW

4.7 ANTENNA REQUIREMENT

4.7.1 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 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

For 802.11b, the antenna type used in this product is PIFA antenna with PEX connector. The maximum Gain of this antenna is 3dBi.

FOR BLUETOOTH FUNCTION

4.8 CONDUCTED EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	CONDUCTED LIMIT (DBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTES: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Jan. 4, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 9, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 9, 2004
Software	ADT_Cond_V7.3.2	NA	NA
Software	ADT_ISN_V7.3.2	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Apr. 28, 2005
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Feb. 28, 2005
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 28, 2005

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. "*": These equipment are used for conducted telecom port test only (if tested).
3. The test was performed in ADT Shielded Room No. 10.
4. The VCCI Site Registration No. C-1852.

4.8.3 TEST PROCEDURE

d. 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.

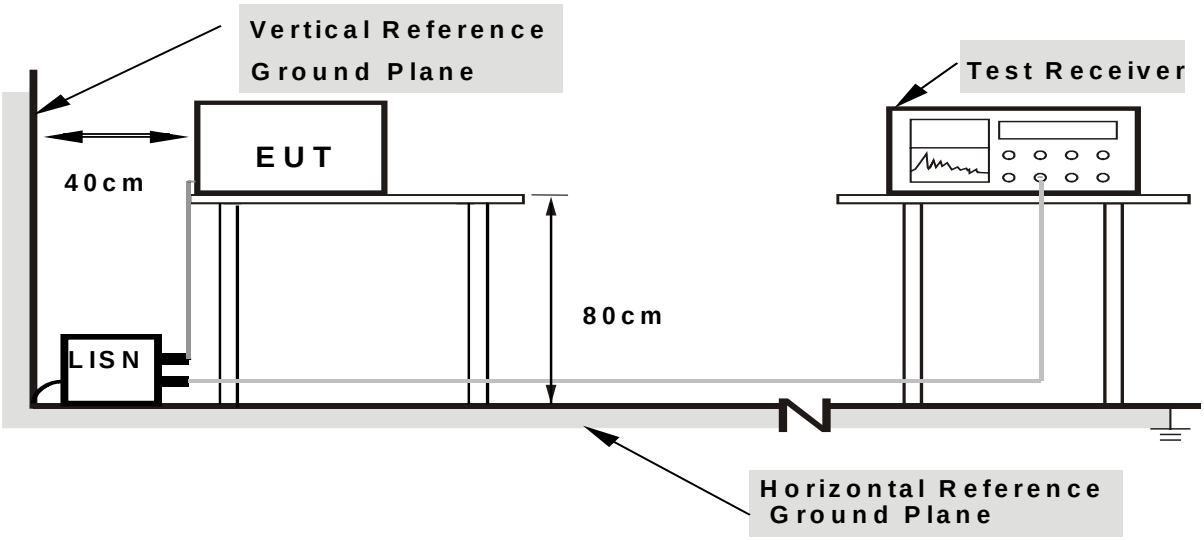
e. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

f. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.8.6 EUT OPERATING CONDITIONS

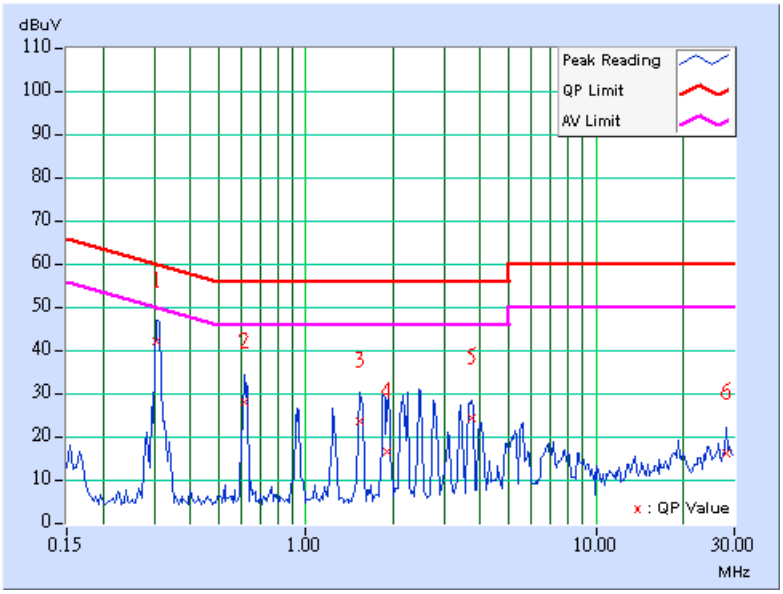
Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

4.8.7 TEST RESULTS

EUT	Rugged PDA	MODEL NO.	IT-10M30BR
CHANNEL	0	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	TESTED BY	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.306	0.10	41.14	-	41.24	-	60.07	50.07	-18.83	-
2	0.615	0.14	27.03	-	27.17	-	56.00	46.00	-28.83	-
3	1.543	0.20	22.35	-	22.55	-	56.00	46.00	-33.45	-
4	1.903	0.20	15.32	-	15.52	-	56.00	46.00	-40.48	-
5	3.738	0.29	23.18	-	23.47	-	56.00	46.00	-32.53	-
6	28.332	1.20	15.27	-	16.47	-	60.00	50.00	-43.53	-

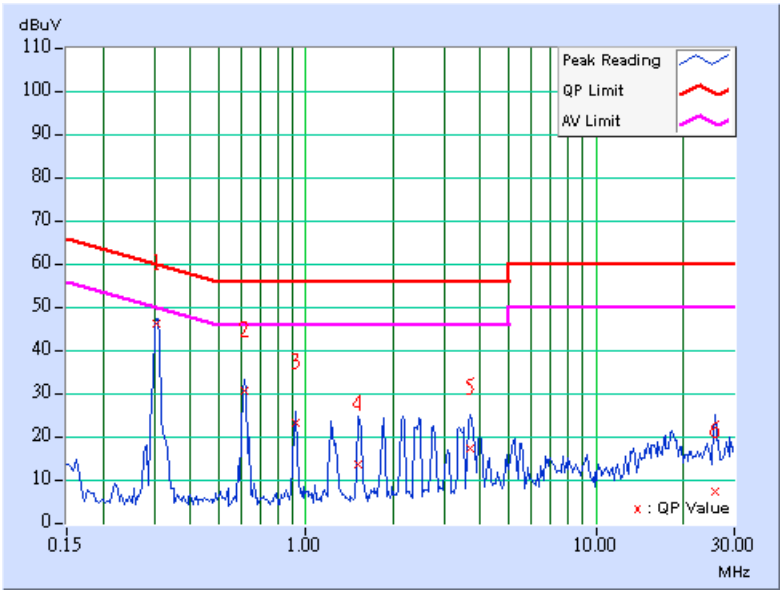
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	0	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	**TESTED BY**	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.306**	**0.10**	**45.45**	**-**	**45.55**	**-**	**60.07**	**50.07**	**-14.52**	**-**
2	0.615	0.14	29.70	-	29.84	-	56.00	46.00	-26.16	-
3	0.920	0.19	22.21	-	22.40	-	56.00	46.00	-33.60	-
4	1.520	0.20	12.54	-	12.74	-	56.00	46.00	-43.26	-
5	3.672	0.28	16.34	-	16.62	-	56.00	46.00	-39.38	-
6	25.813	1.00	6.59	-	7.59	-	60.00	50.00	-52.41	-

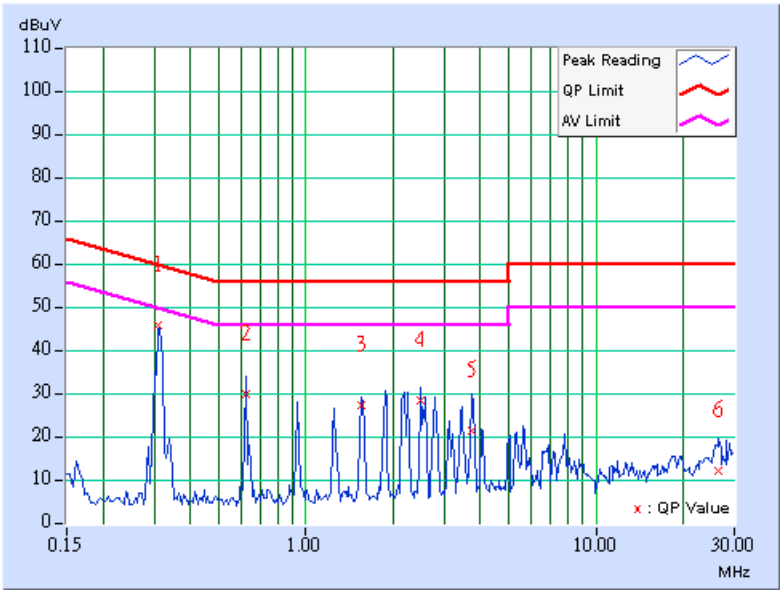
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	39	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	**TESTED BY**	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.310	0.10	44.58	-	44.68	-	59.97	49.97	-15.29	-
2	0.623	0.14	28.66	-	28.80	-	56.00	46.00	-27.20	-
3	1.555	0.20	26.30	-	26.50	-	56.00	46.00	-29.50	-
4	2.492	0.22	27.43	-	27.65	-	56.00	46.00	-28.35	-
5	3.711	0.29	20.43	-	20.72	-	56.00	46.00	-35.28	-
6	26.293	1.20	10.84	-	12.04	-	60.00	50.00	-47.96	-

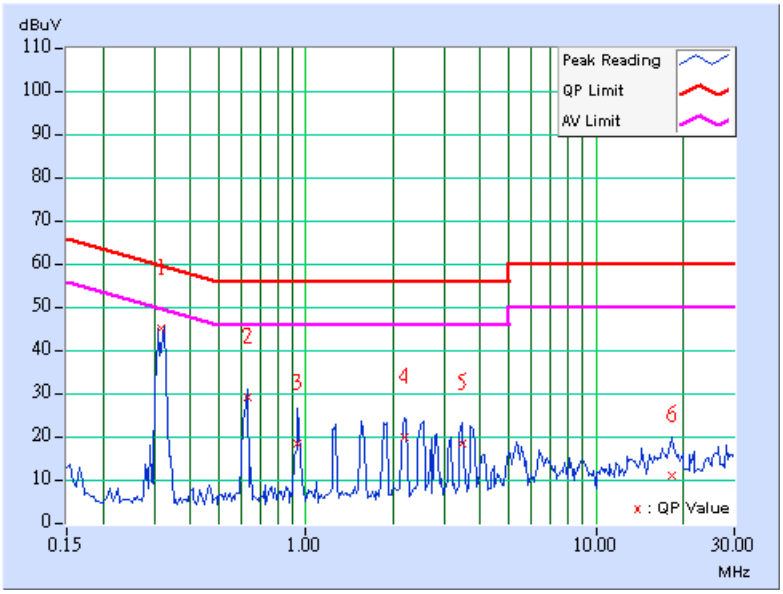
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	39	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	**TESTED BY**	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.317	0.10	44.49	-	44.59	-	59.79	49.79	-15.20	-
2	0.627	0.14	28.50	-	28.64	-	56.00	46.00	-27.36	-
3	0.935	0.19	17.91	-	18.10	-	56.00	46.00	-37.90	-
4	2.191	0.21	19.20	-	19.41	-	56.00	46.00	-36.59	-
5	3.441	0.27	17.61	-	17.88	-	56.00	46.00	-38.12	-
6	18.363	0.77	10.47	-	11.24	-	60.00	50.00	-48.76	-

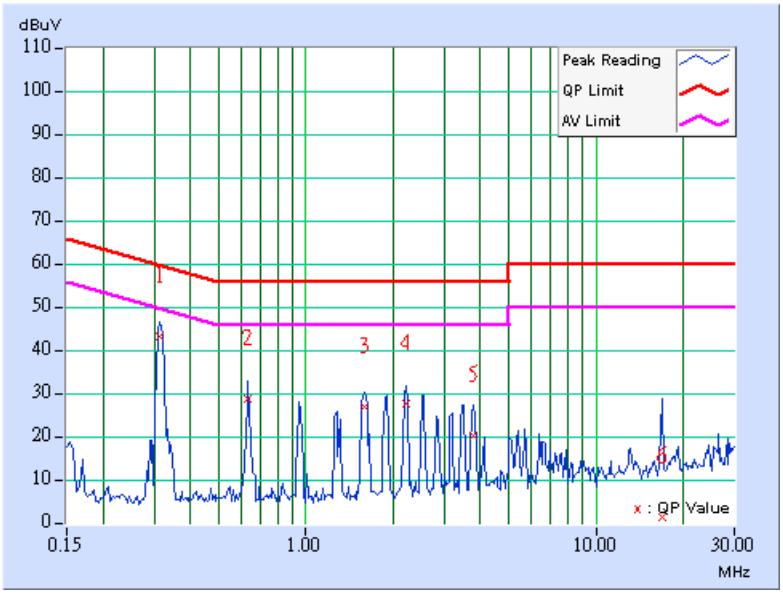
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	78	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	**TESTED BY**	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.314	0.10	42.36	-	42.46	-	59.86	49.86	-17.40	-
2	0.630	0.14	28.06	-	28.20	-	56.00	46.00	-27.80	-
3	1.586	0.20	26.23	-	26.43	-	56.00	46.00	-29.57	-
4	2.215	0.21	26.96	-	27.17	-	56.00	46.00	-28.83	-
5	3.801	0.29	19.70	-	19.99	-	56.00	46.00	-36.01	-
6	16.949	0.84	0.70	-	1.54	-	60.00	50.00	-58.46	-

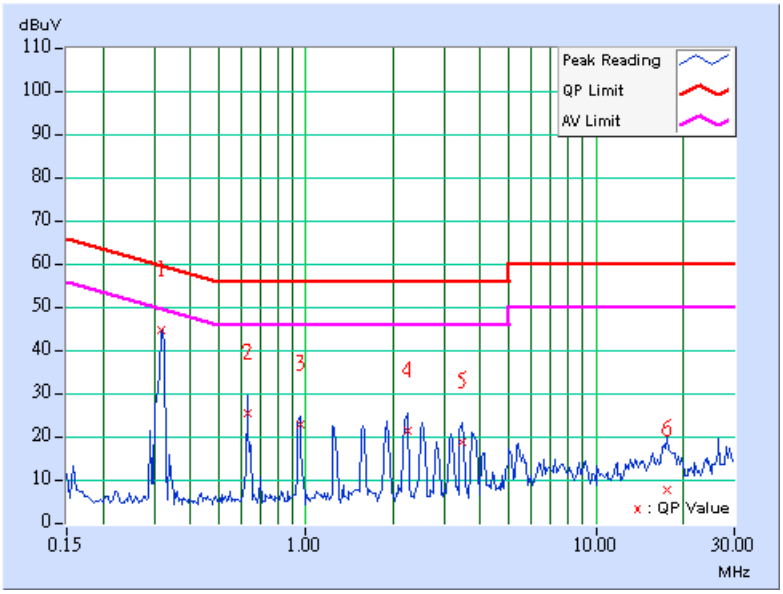
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	78	**6dB BANDWIDTH**	9 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	23deg. C, 78 % RH, 1012hPa	**TESTED BY**	Jamison Chen

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.318	0.10	44.00	-	44.10	-	59.76	49.76	-15.66	-
2	0.627	0.14	24.75	-	24.89	-	56.00	46.00	-31.11	-
3	0.955	0.19	22.19	-	22.38	-	56.00	46.00	-33.62	-
4	2.246	0.21	20.66	-	20.87	-	56.00	46.00	-35.13	-
5	3.480	0.27	18.15	-	18.42	-	56.00	46.00	-37.58	-
6	17.520	0.75	6.85	-	7.60	-	60.00	50.00	-52.40	-

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.



4.9 NUMBER OF HOPPING FREQUENCY USED

4.9.1 LIMIT OF HOPPING FREQUENCY USED

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

4.9.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec 31, 2004

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

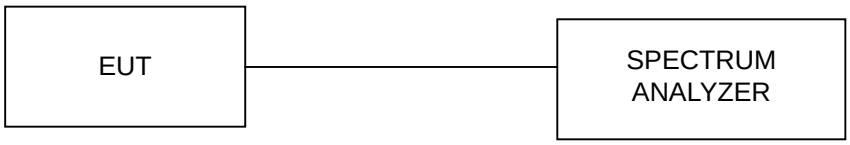
4.9.3 TEST PROCEDURES

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.

4.9.4 DEVIATION FROM TEST STANDARD

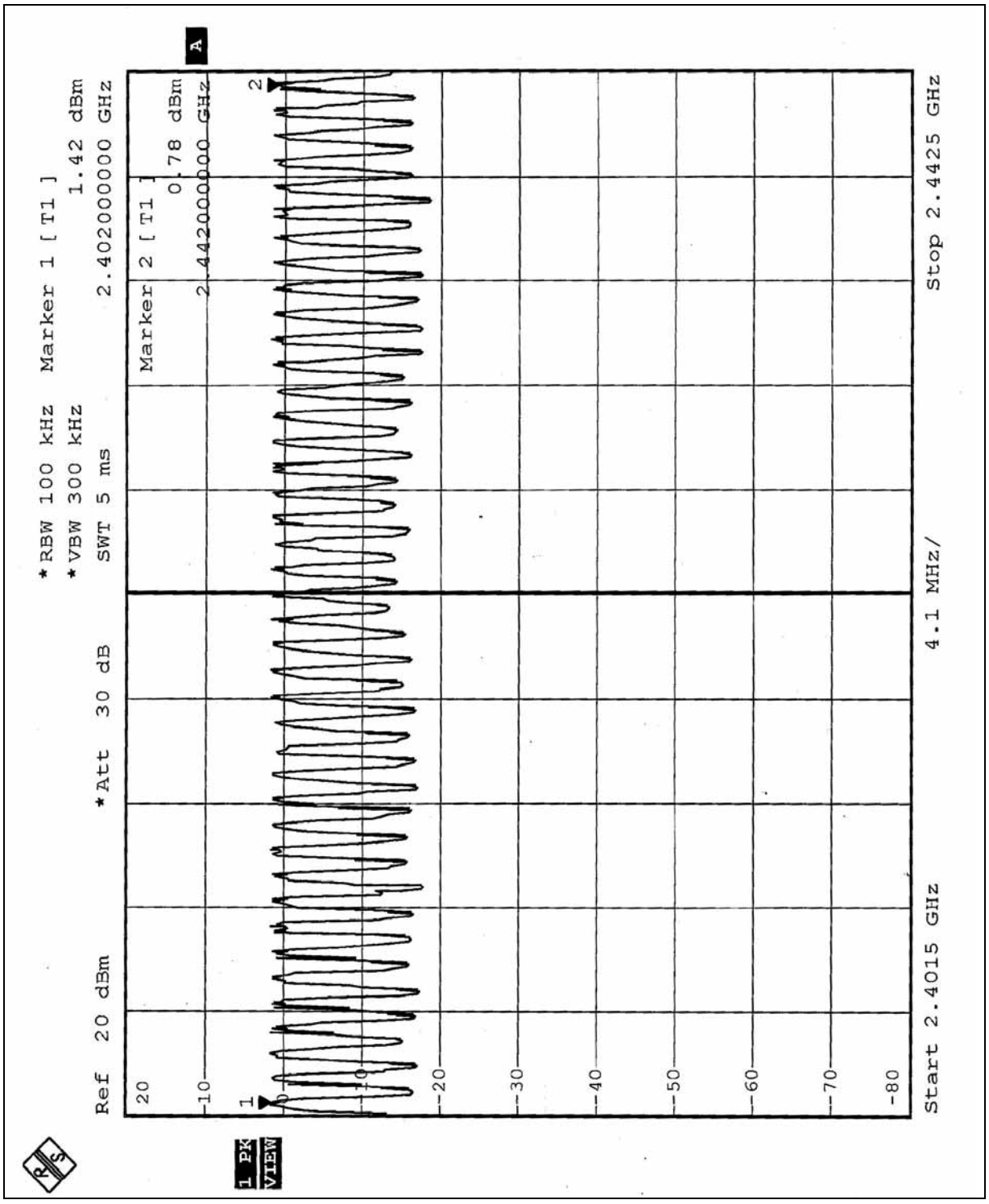
No deviation

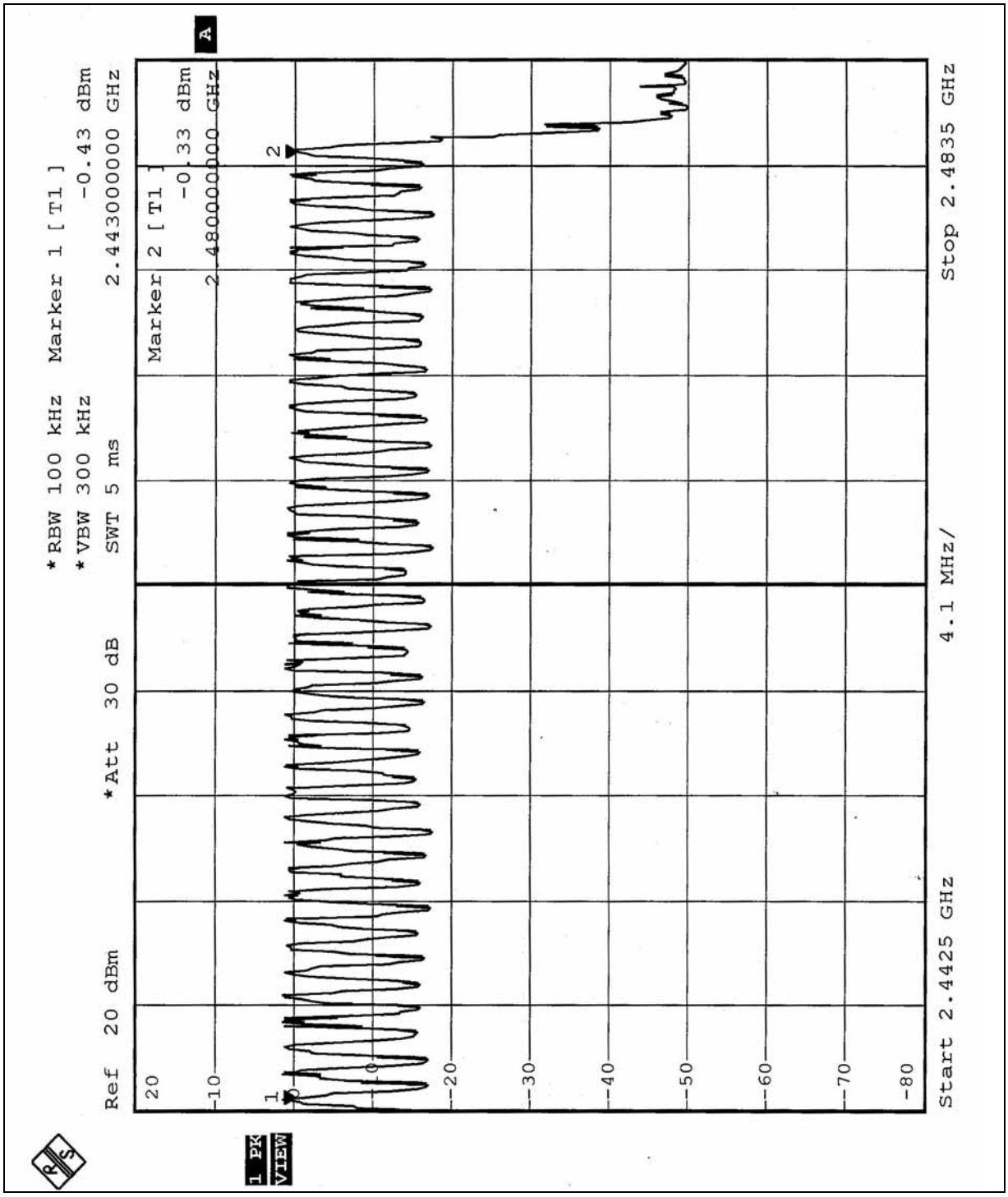
4.9.5 TEST SETUP



4.9.6 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.


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
1.42 dBm
2.402000000 GHz
Marker 2 [T1]
0.78 dBm
2.442000000 GHz
Ref 20 dBm
Att 30 dB
Start 2.4015 GHz
4.1 MHz/
Stop 2.4425 GHz
1 PK VIEW


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 ms
Marker 1 [T1]
-0.43 dBm
2.443000000 GHz
Marker 2 [T1]
-0.33 dBm
2.480000000 GHz
Start 2.4425 GHz
4.1 MHz/
Stop 2.4835 GHz
1 PK VIEW

4.10 DWELL TIME ON EACH CHANNEL

4.10.1 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.

4.10.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec 31, 2004

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

4.10.3 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.

4.10.4 DEVIATION FROM TEST STANDARD

No deviation

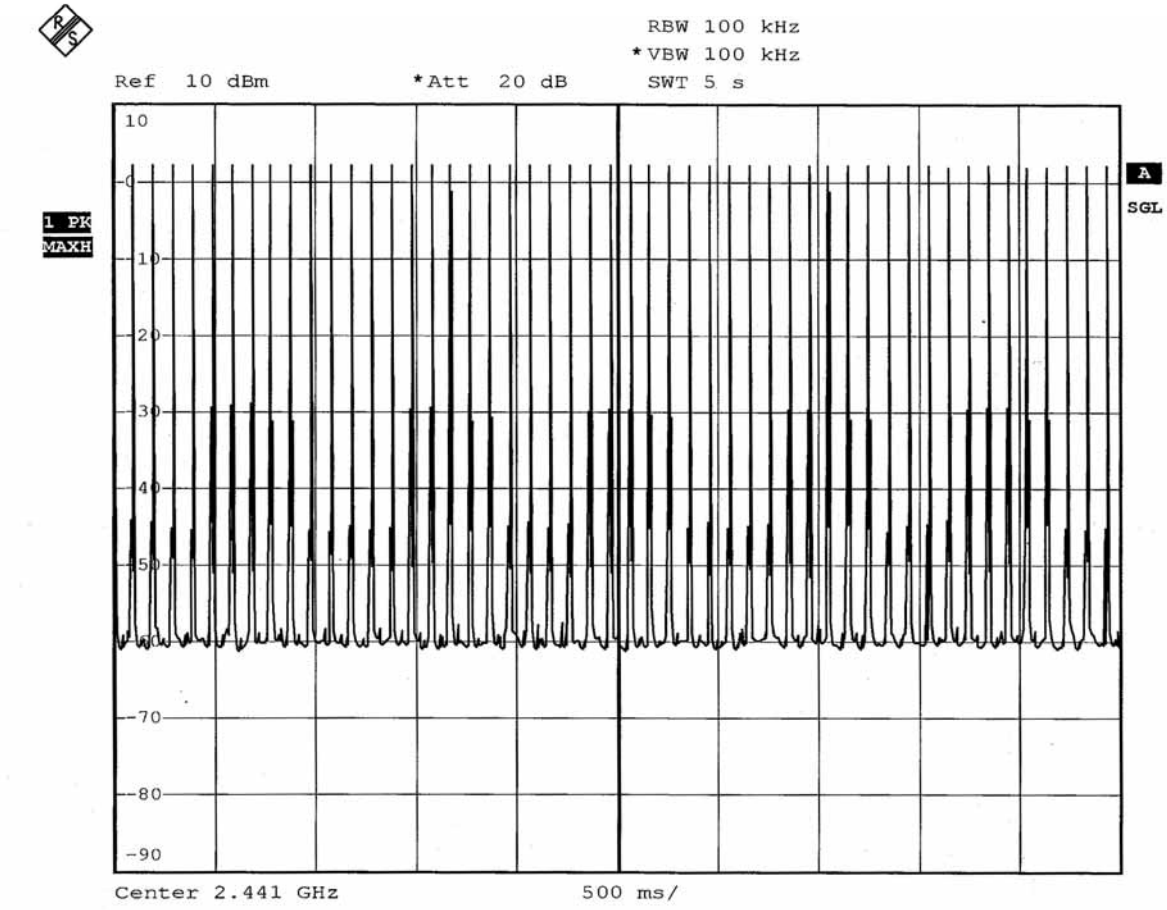
4.10.5 TEST SETUP

4.10.6 TEST RESULTS

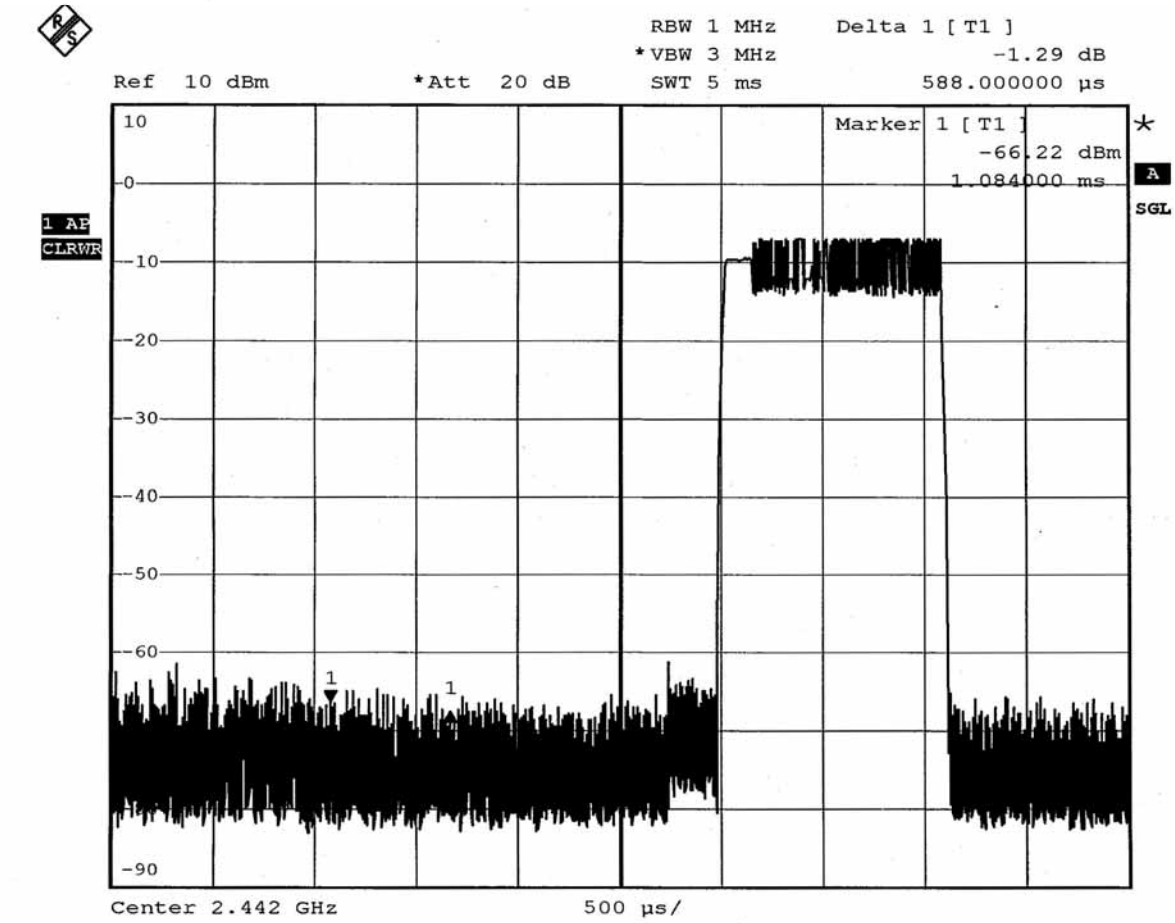
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316 times	0.59	186.44	400
DH3	25 (times / 5 sec) *6.32=158 times	1.83	289.14	400
DH5	17 (times / 5 sec) *6.32=107 times	3.16	338.12	400

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

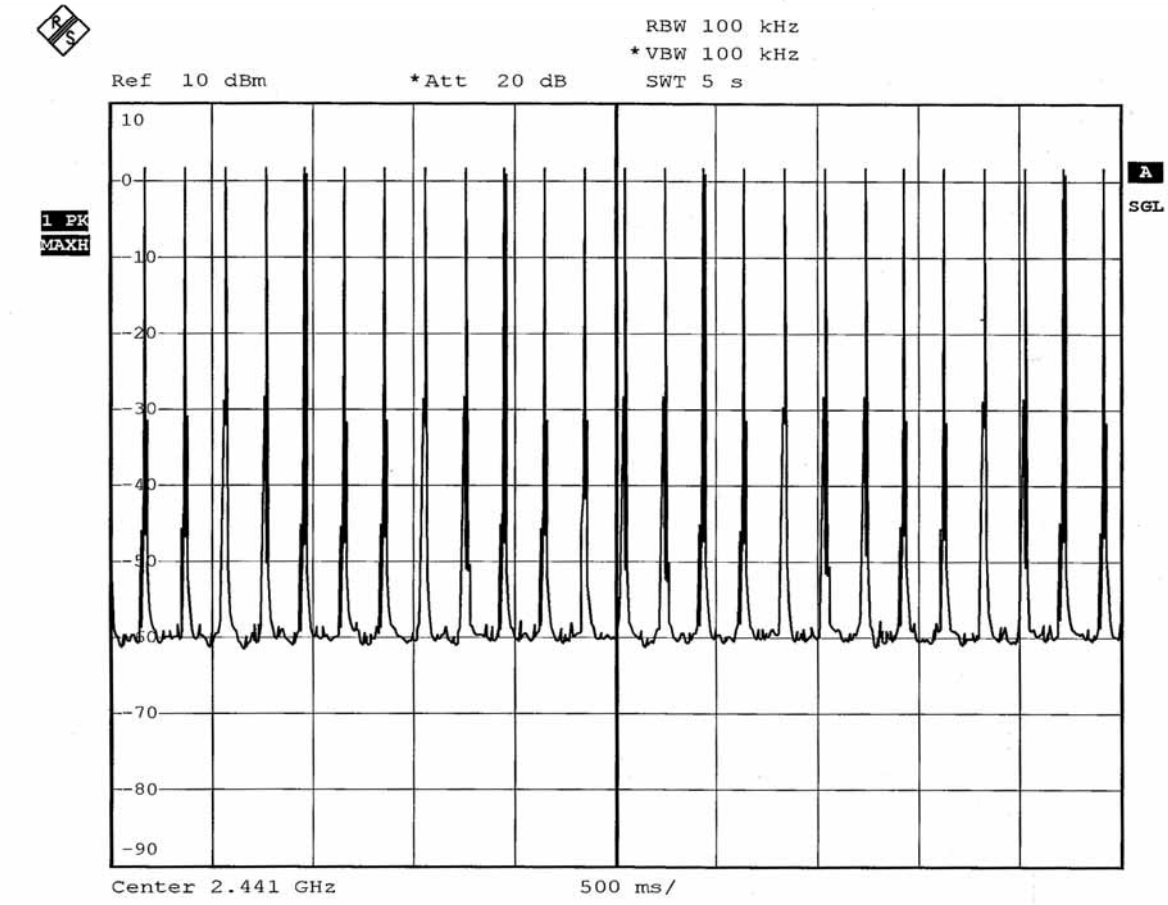
DH1


RBW 100 kHz
*VBW 100 kHz
Ref 10 dBm
*Att 20 dB
SWT 5 s
1 PK
MAXH
A
SGL
10
0
-10
-20
-30
-40
-50
-70
-80
-90
Center 2.441 GHz
500 ms/

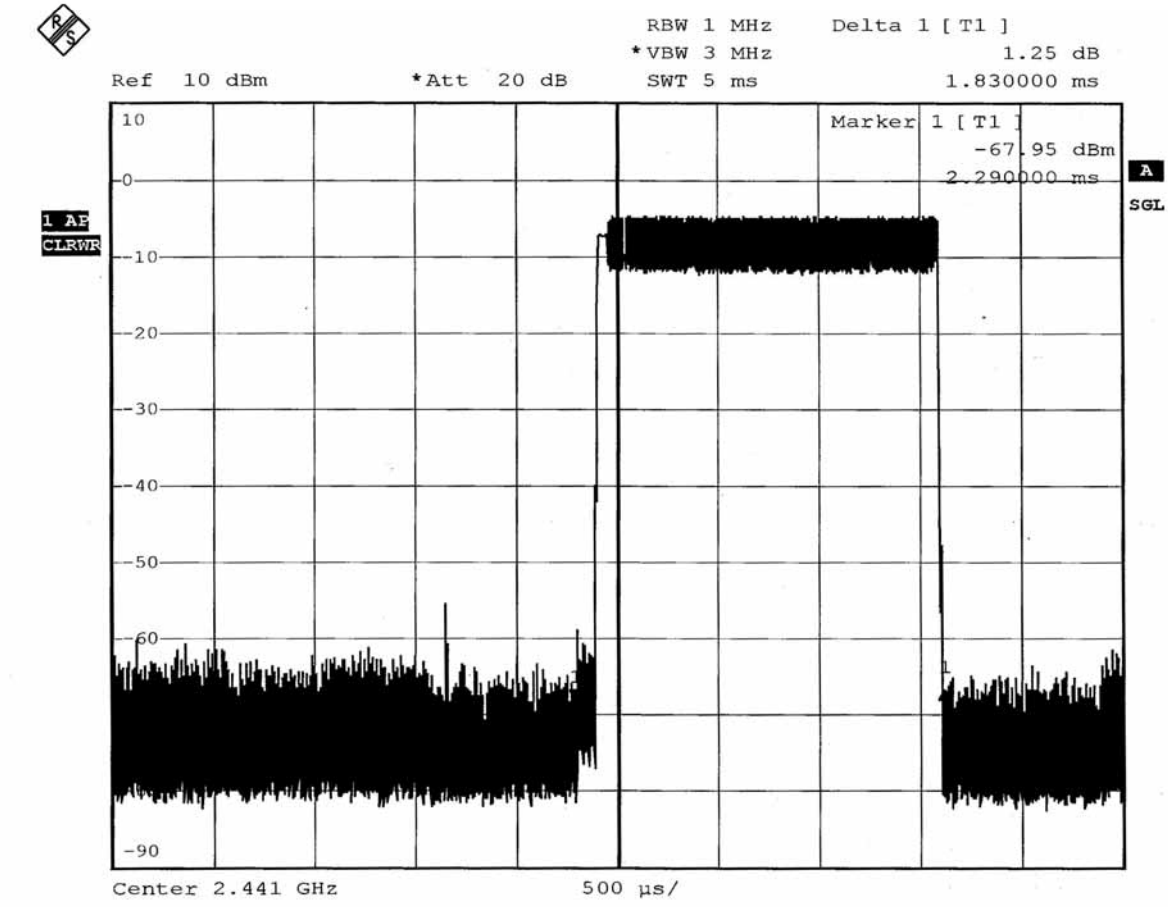
DH1


RBW 1 MHz
*VBW 3 MHz
SWT 5 ms
Delta 1 [T1]
-1.29 dB
588.000000 µs
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-66.22 dBm
1.084000 ms
1 AP
CLRWR
A
SGL
10
0
-10
-20
-30
-40
-50
-60
-90
Center 2.442 GHz
500 µs/

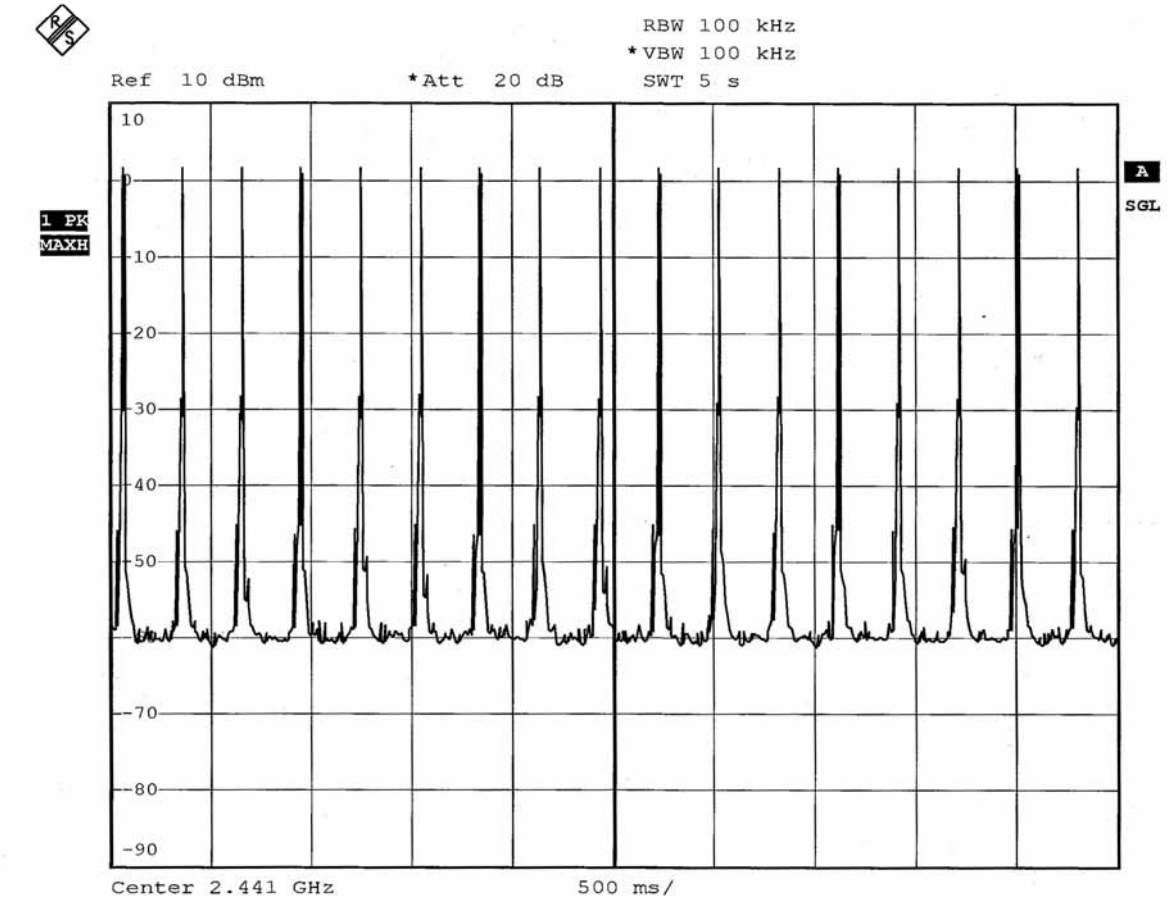
DH3


RBW 100 kHz
*VBW 100 kHz
Ref 10 dBm
*Att 20 dB
SWT 5 s
1 PK
MAXH
A
SGL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
500 ms/

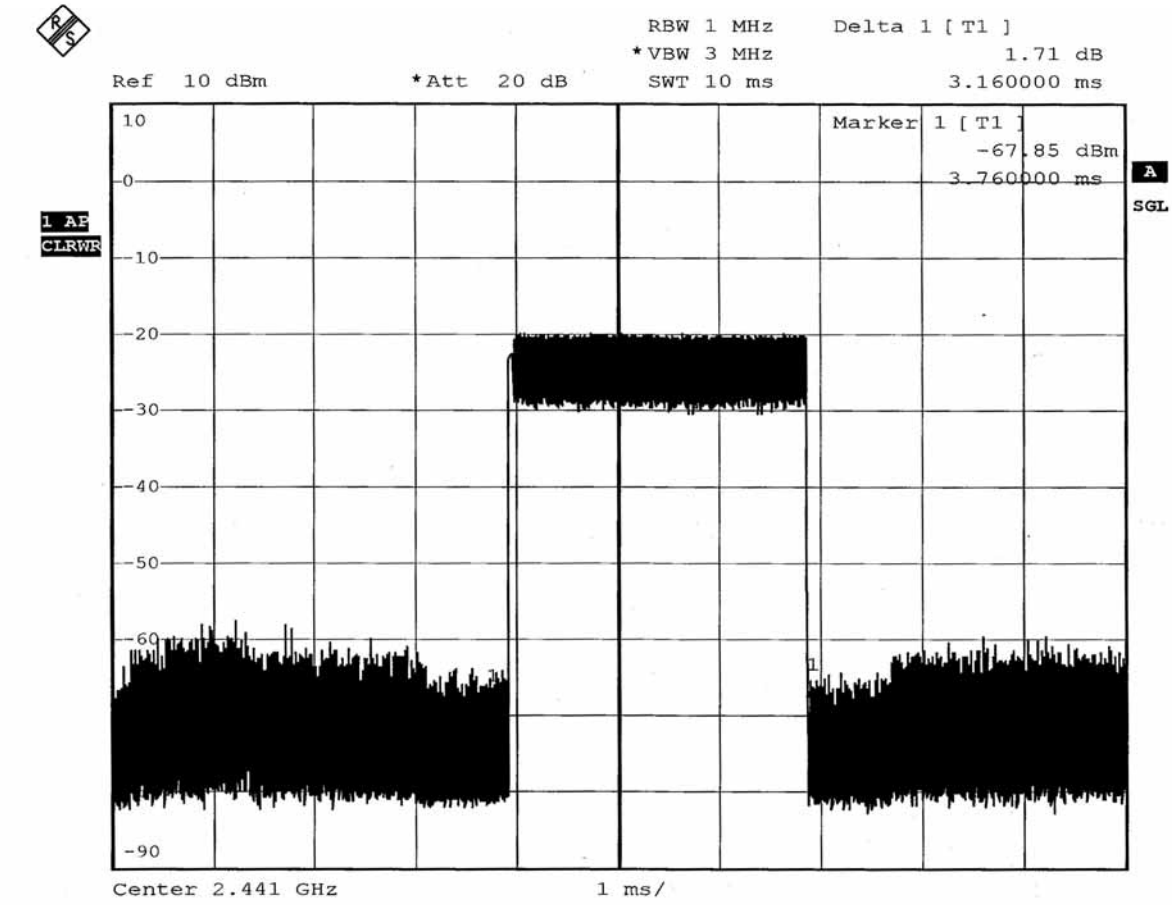
DH3


RBW 1 MHz
*VBW 3 MHz
SWT 5 ms
Delta 1 [T1]
1.25 dB
1.830000 ms
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-67.95 dBm
2.290000 ms
A
SGL
1 AP
CLRWR
10
0
-10
-20
-30
-40
-50
-60
-90
Center 2.441 GHz
500 µs/

DH5


RBW 100 kHz
*VBW 100 kHz
Ref 10 dBm
*Att 20 dB
SWT 5 s
10
0
-10
-20
-30
-40
-50
-70
-80
-90
1 PK
MAXH
A
SGL
Center 2.441 GHz
500 ms/

DH5


RBW 1 MHz
*VBW 3 MHz
SWT 10 ms
Delta 1 [T1]
1.71 dB
3.160000 ms
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
-67.85 dBm
3.760000 ms
1 AP
CLRWR
A
SGL
10
0
-10
-20
-30
-40
-50
-60
-90
Center 2.441 GHz
1 ms/

4.11 CHANNEL BANDWIDTH

4.11.1 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.

4.11.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec 31, 2004

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

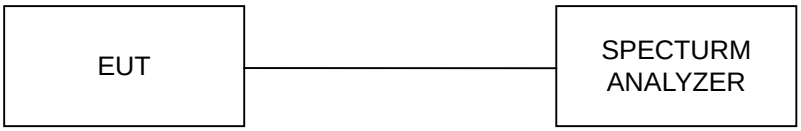
4.11.3 TEST PROCEDURE

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.

4.11.4 DEVIATION FROM TEST STANDARD

No deviation

4.11.5 TEST SETUP



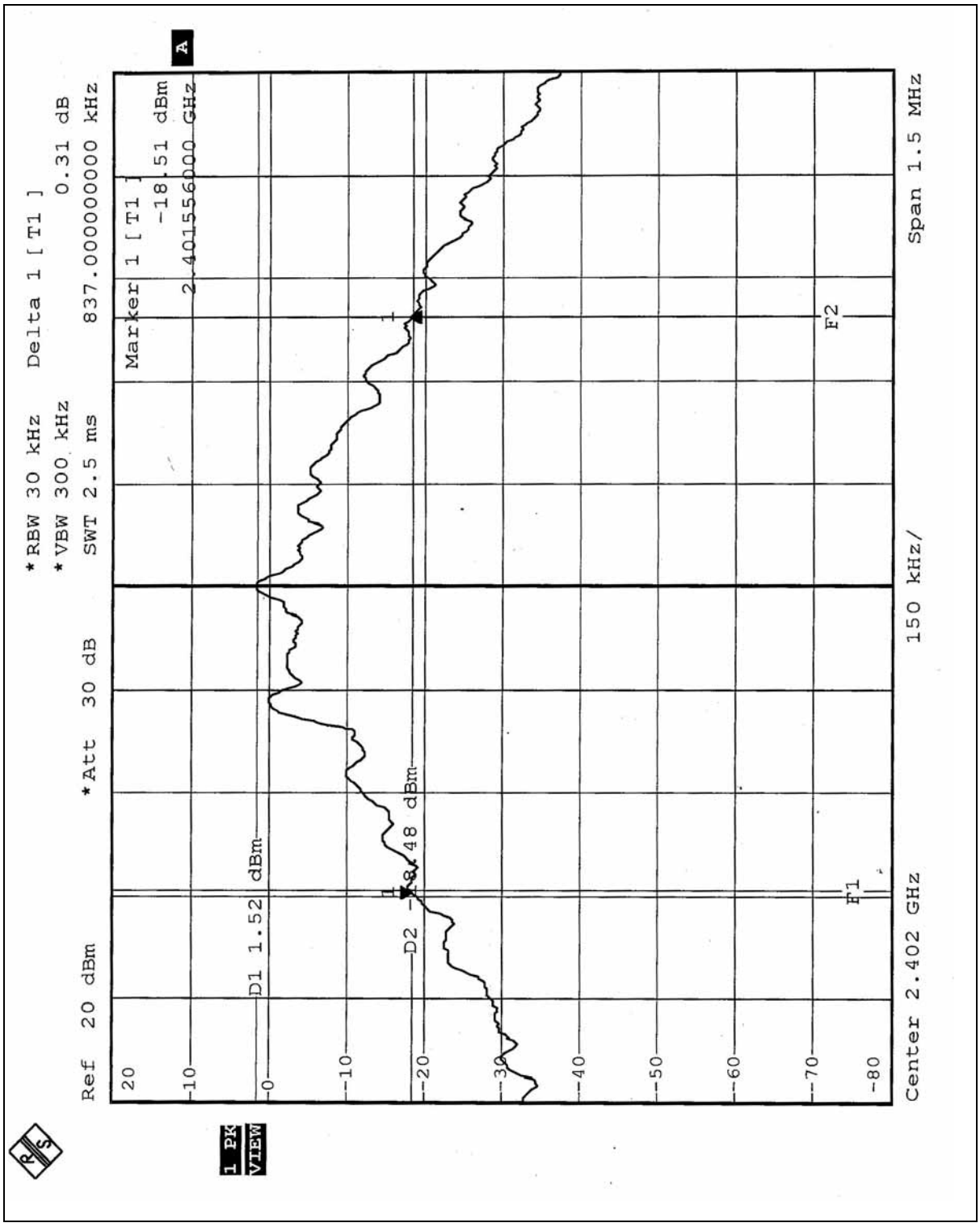
4.11.6 EUT OPERATING CONDITION

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

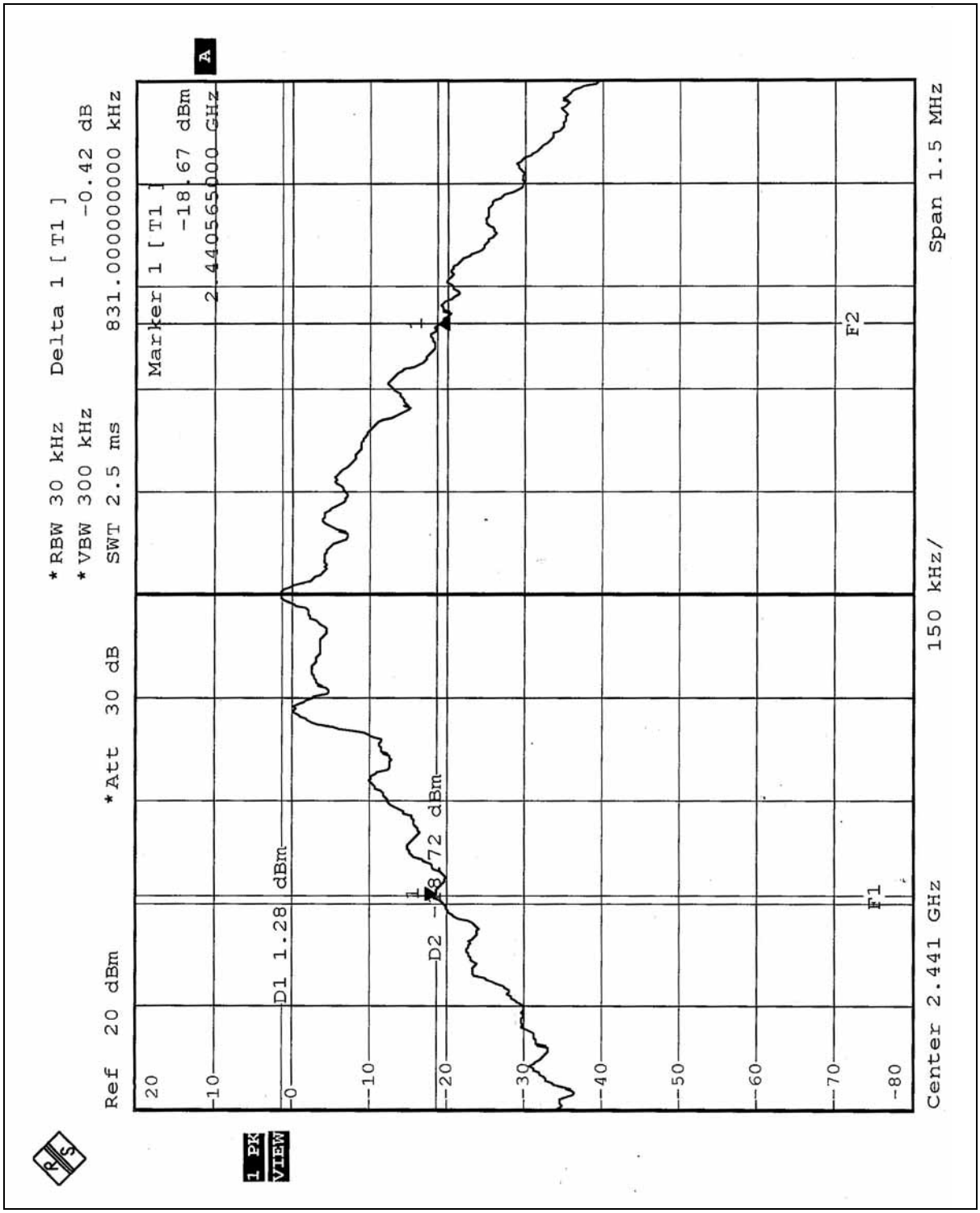
4.11.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)	MAXIMUM LIMIT (MHz)	PASS/FAIL
0	2402	0.873	1	PASS
39	2441	0.831	1	PASS
78	2480	0.840	1	PASS

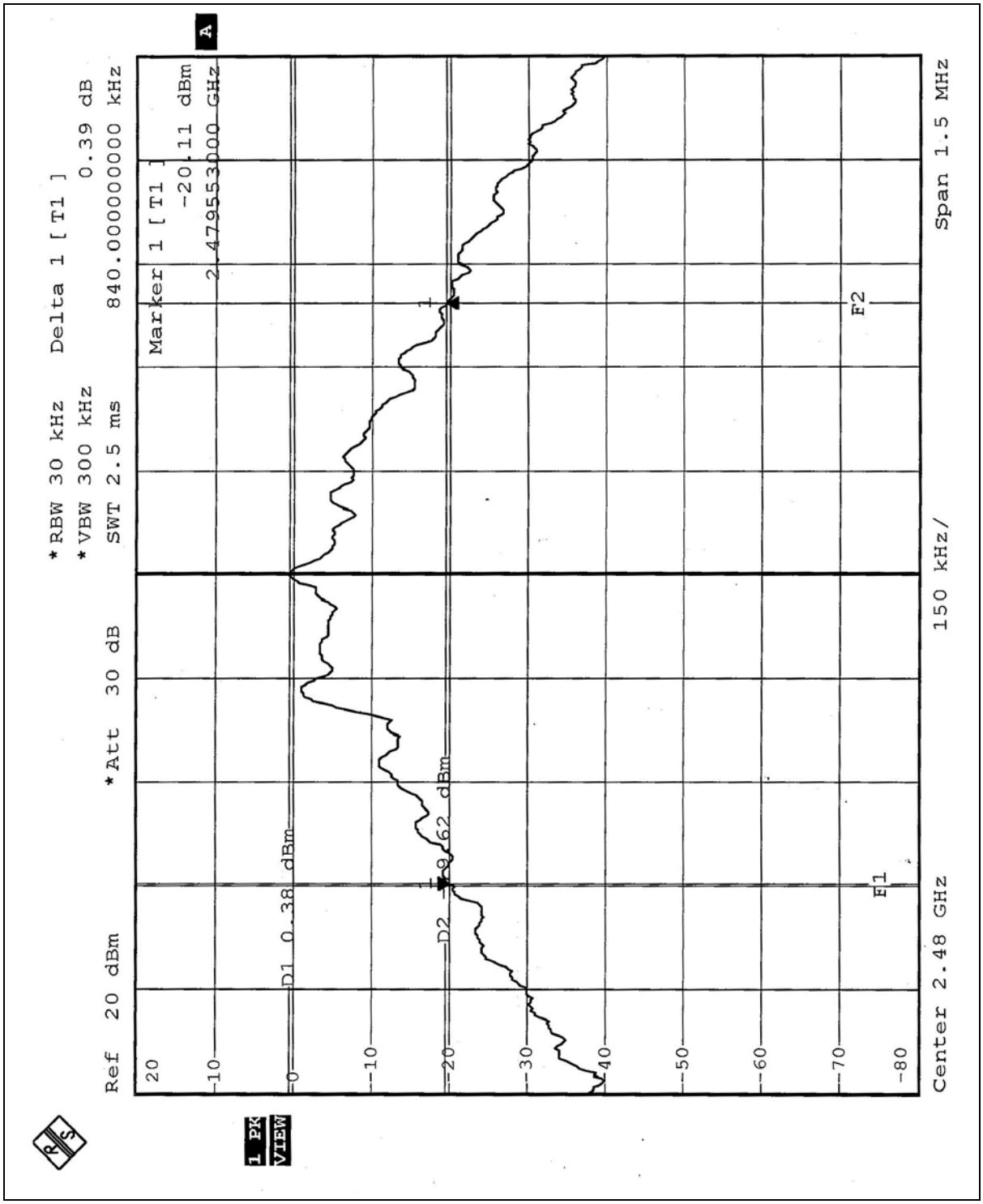
Channel 0


A
*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.31 dB
837.000000000 kHz
Marker 1 [T1]
-18.51 dBm
2.40155600 GHz
*Att 30 dB
Ref 20 dBm
D1 1.52 dBm
D2 -8.48 dBm
F1
F2
Center 2.402 GHz
150 kHz/
Span 1.5 MHz
1 PK
VIEW

Channel 39


RBW 30 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.42 dB
831.000000000 kHz
Marker 1 [T1]
-18.67 dBm
2.440565000 GHz
Ref 20 dBm
Att 30 dB
D1 1.28 dBm
D2 -8.72 dBm
F1
F2
Center 2.441 GHz
150 kHz/
Span 1.5 MHz
1 PK VIEW

Channel 78


A
Marker 1 [T1]
-20.11 dBm
2.47953000 GHz
Delta 1 [T1]
0.39 dB
840.000000000 kHz
*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
*Att 30 dB
Ref 20 dBm
D1 0.38 dBm
D2 -19.62 dBm
F1
F2
Center 2.48 GHz
150 kHz/
Span 1.5 MHz
1 PK
VIEW

4.12 HOPPING CHANNEL SEPARATION

4.12.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.12.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec 31, 2004

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

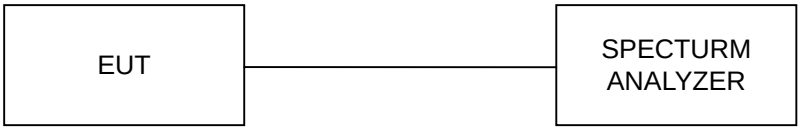
4.12.3 TEST PROCEDURES

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.

4.12.4 DEVIATION FROM TEST STANDARD

No deviation

4.12.5 TEST SETUP

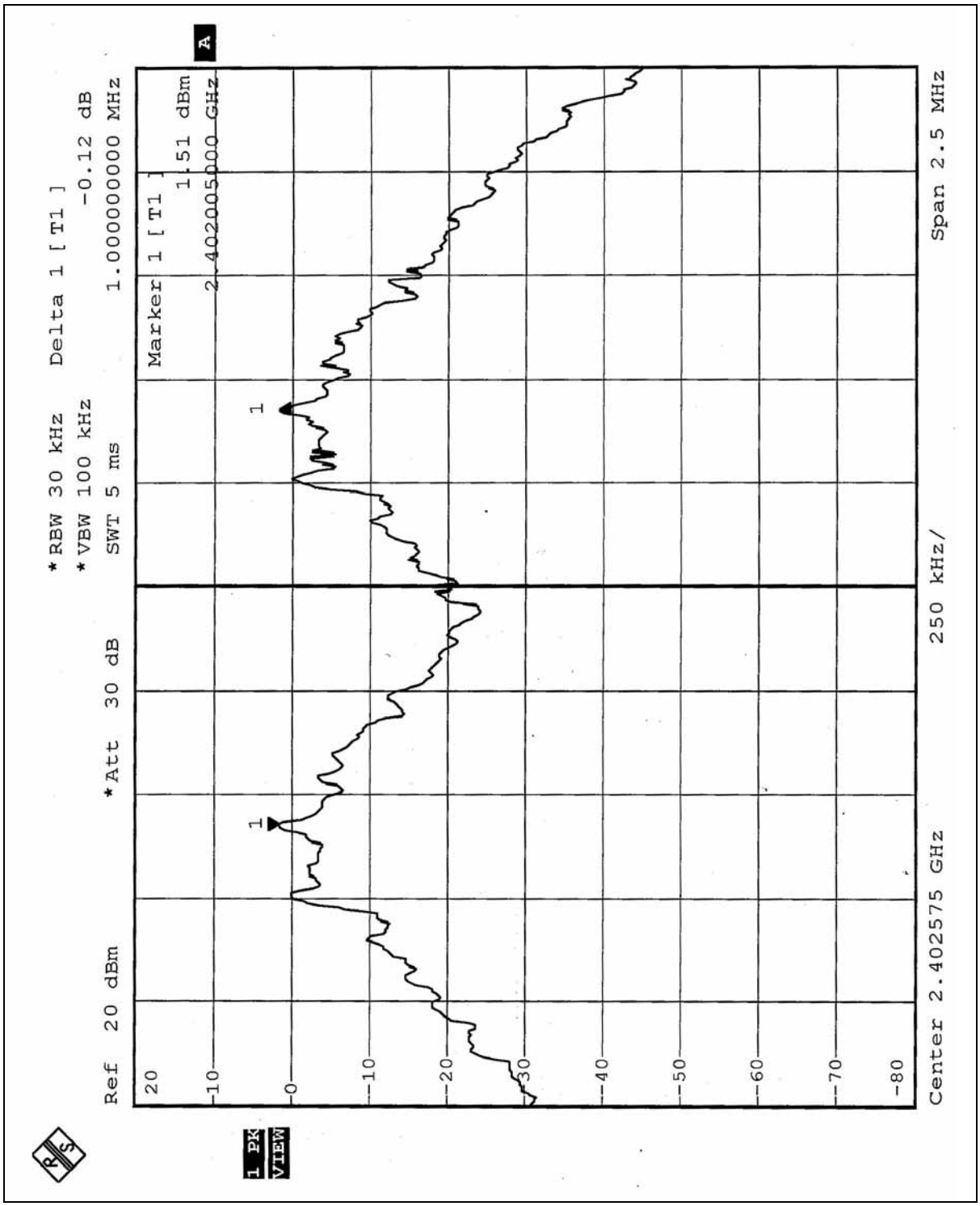


4.12.6 TEST RESULTS

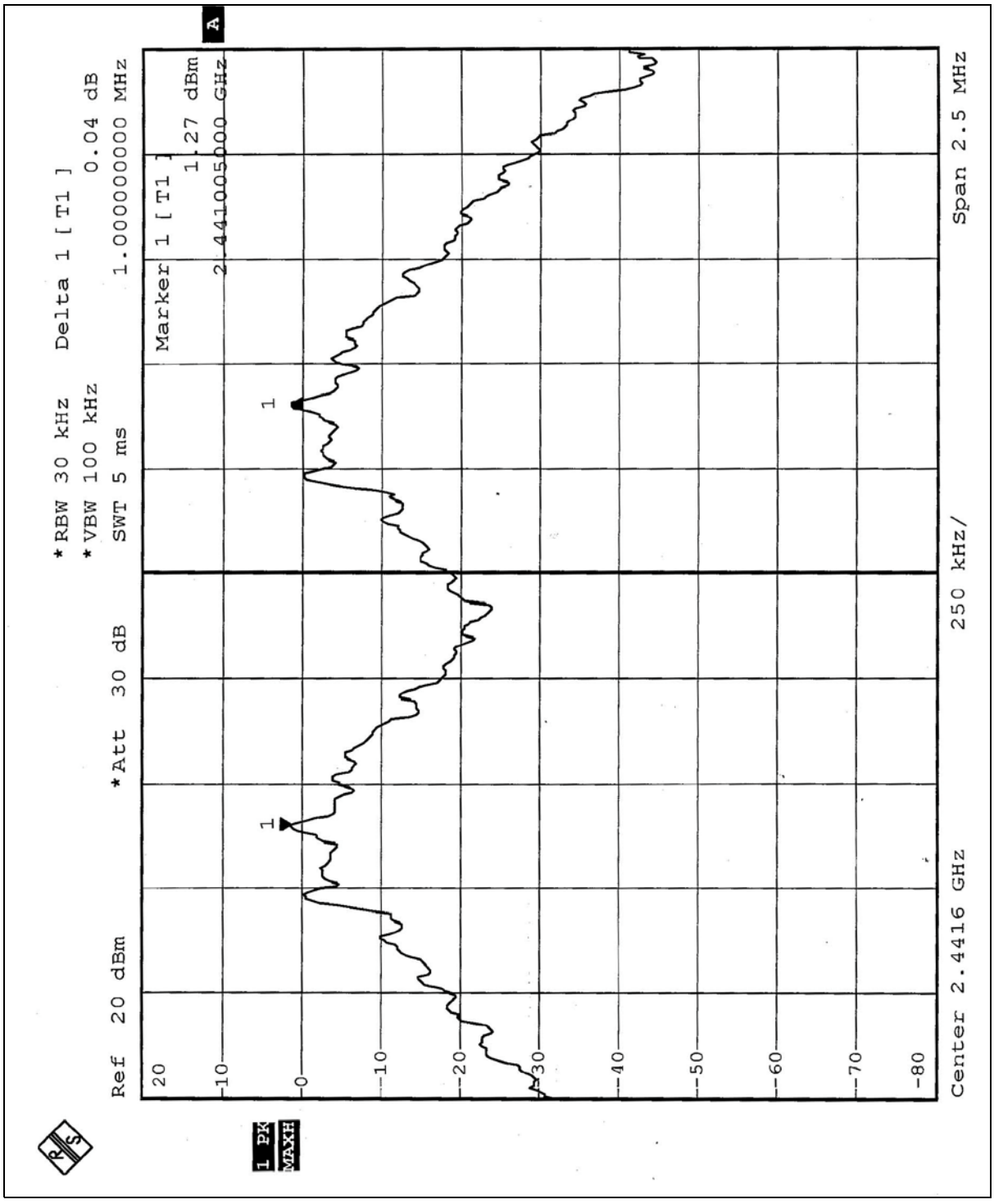
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (MHz)	Pass / Fail
0	2402	1.000 MHz	0.873	PASS
39	2441	1.000 MHz	0.831	PASS
78	2480	1.005 MHz	0.840	PASS

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

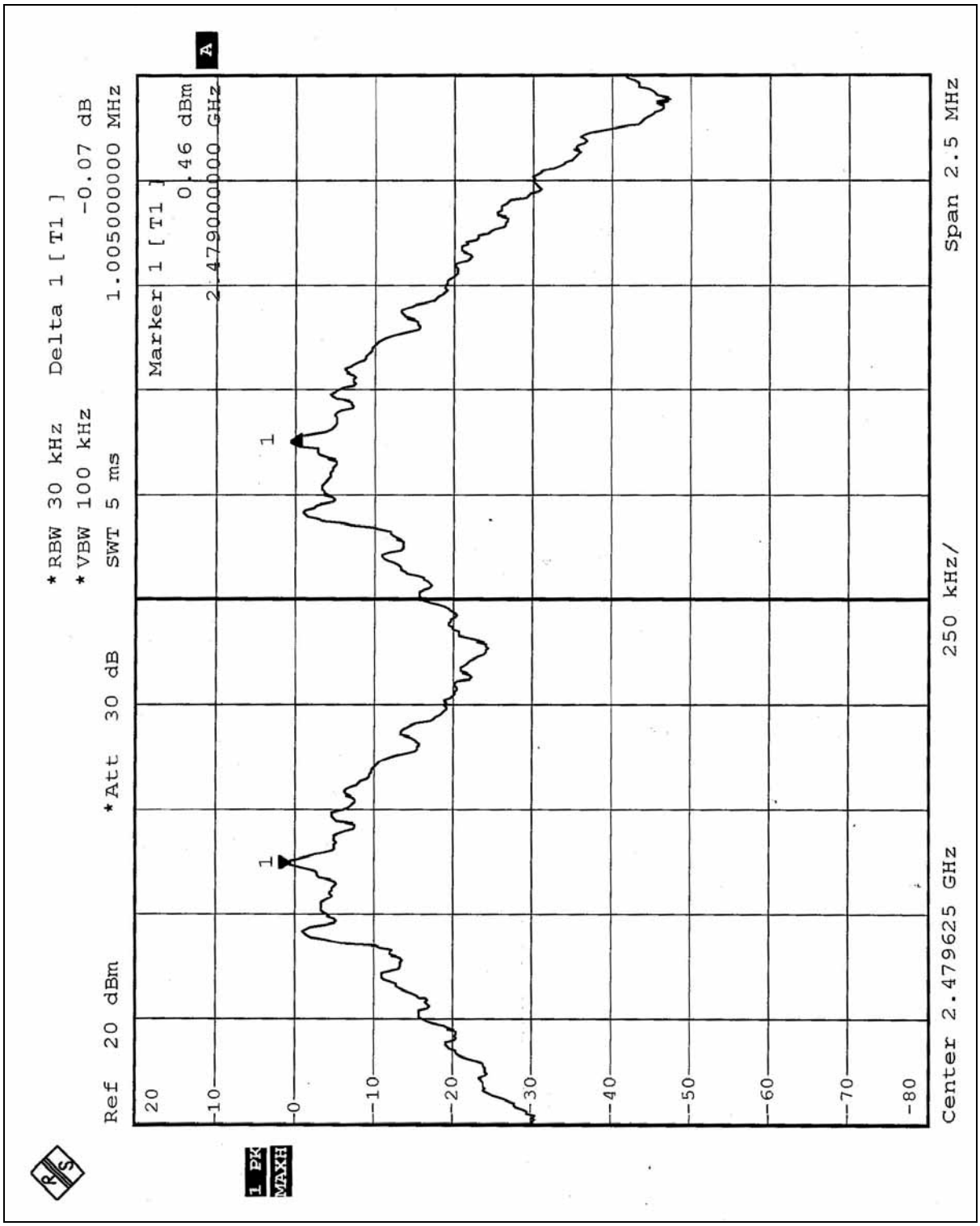
Channel 0


Ref 20 dBm
*Att 30 dB
SWT 5 ms
*VBW 100 kHz
*RBW 30 kHz
Delta 1 [T1]
-0.12 dB
1.000000000 MHz
Marker 1 [T1]
1.51 dBm
2.402005000 GHz
Center 2.402575 GHz
250 kHz/
Span 2.5 MHz
1 PK VIEW

Channel 39


A
Marker 1 [T1]
1.27 dBm
2.441005000 GHz
Delta 1 [T1]
0.04 dB
1.000000000 MHz
*RBW 30 kHz
*VBW 100 kHz
SWT 5 ms
*Att 30 dB
Ref 20 dBm
Span 2.5 MHz
250 kHz/
Center 2.4416 GHz
1 PK MAXH

Channel 78


A
Marker 1 [T1]
0.46 dBm
2.47900000 GHz
Delta 1 [T1]
-0.07 dB
1.00500000 MHz
*RBW 30 kHz
*VBW 100 kHz
SWT 5 ms
*Att 30 dB
Ref 20 dBm
Span 2.5 MHz
250 kHz/
Center 2.479625 GHz
1 PK MAXH

4.13 MAXIMUM PEAK OUTPUT POWER

4.13.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.13.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SIGNAL GENERATOR / Agilent	E8257C	MY43320668	Dec 31, 2004

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

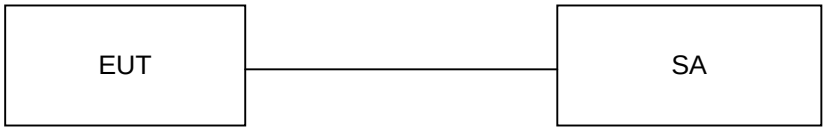
4.13.3 TEST PROCEDURES

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.

4.13.4 DEVIATION FROM TEST STANDARD

No deviation

4.13.5 TEST SETUP



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

4.13.6 EUT OPERATING CONDITION

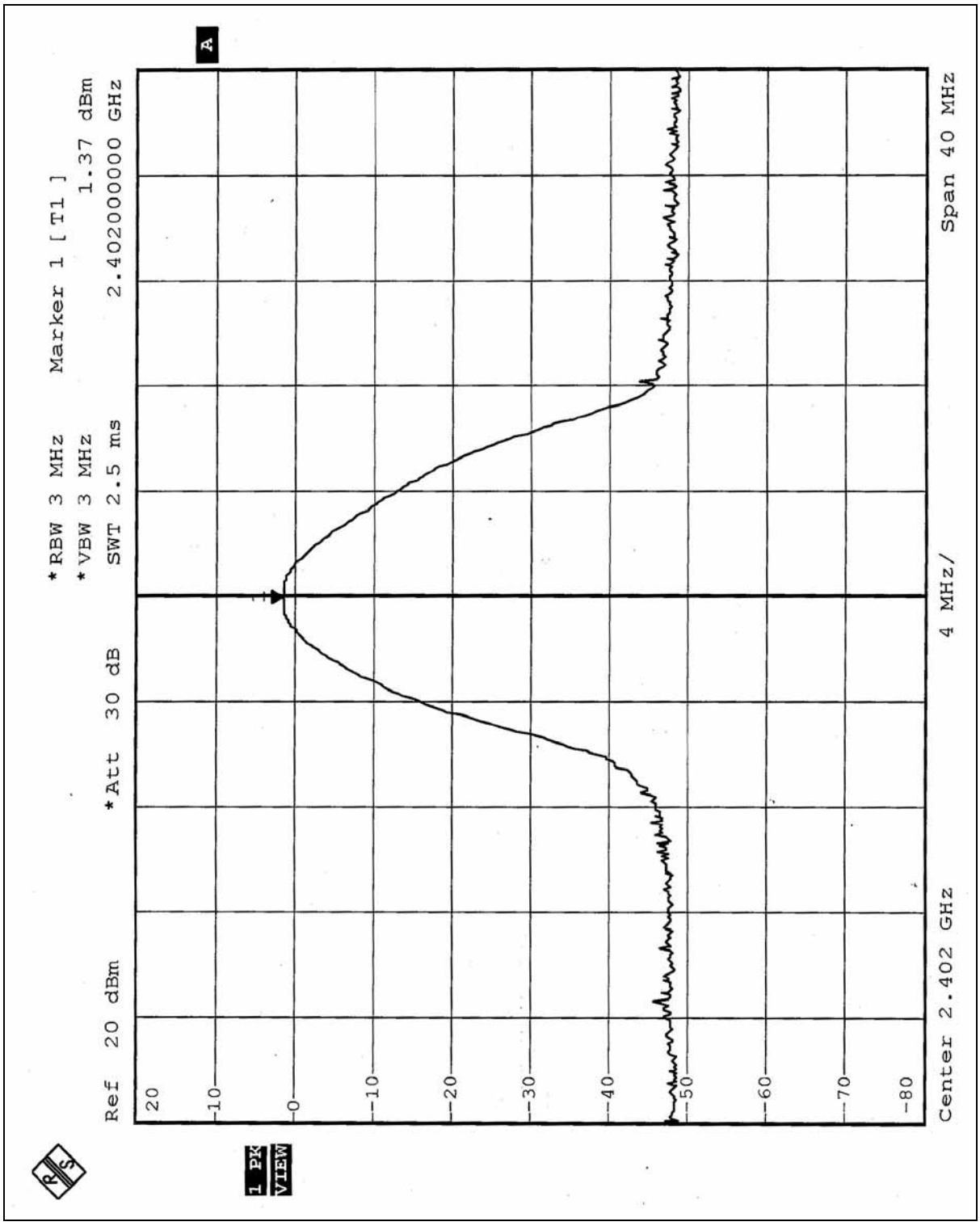
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.13.7 TEST RESULTS

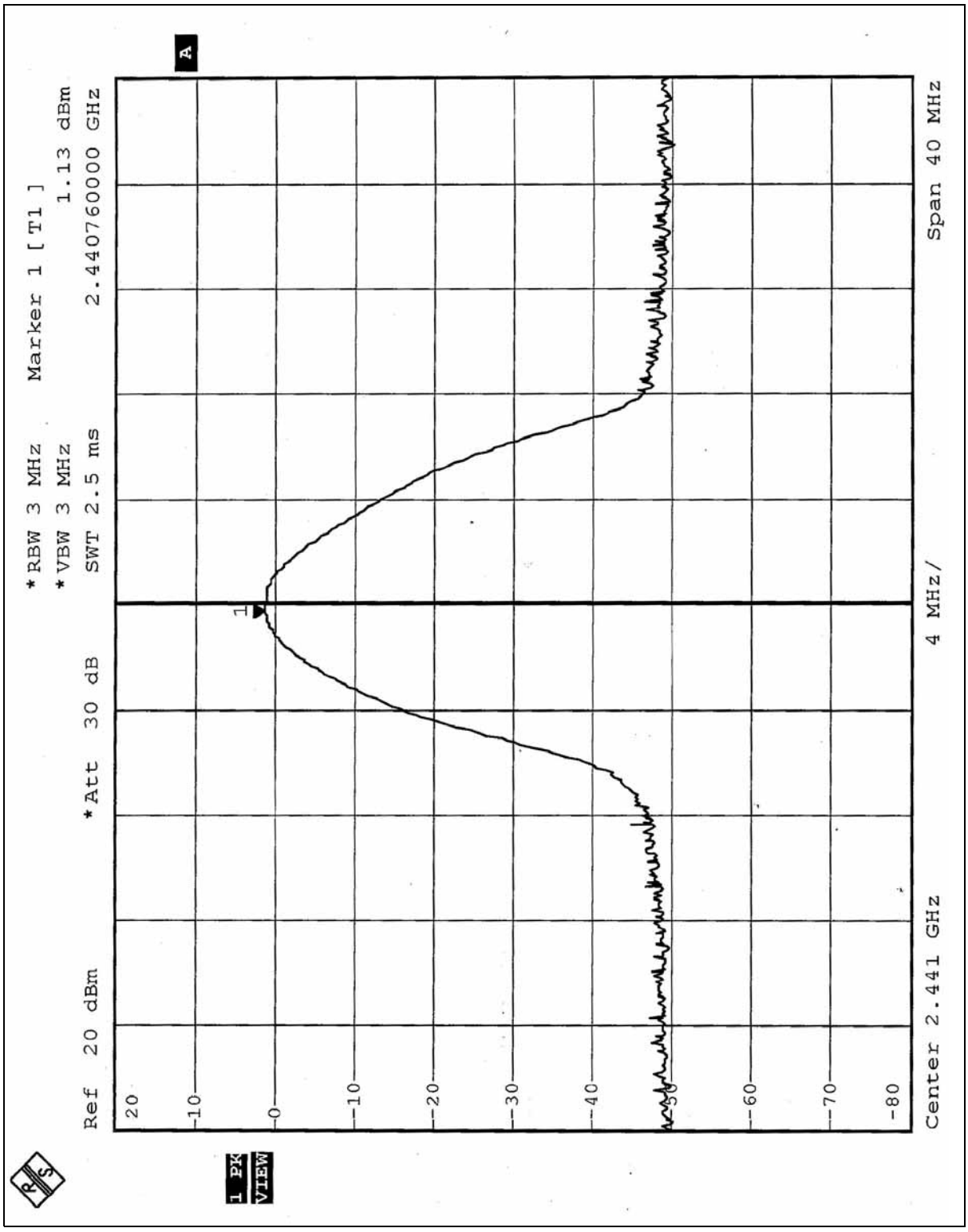
Output Power to Antenna:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.371	1.37	30	PASS
39	2441	1.297	1.13	30	PASS
78	2480	1.062	0.26	30	PASS

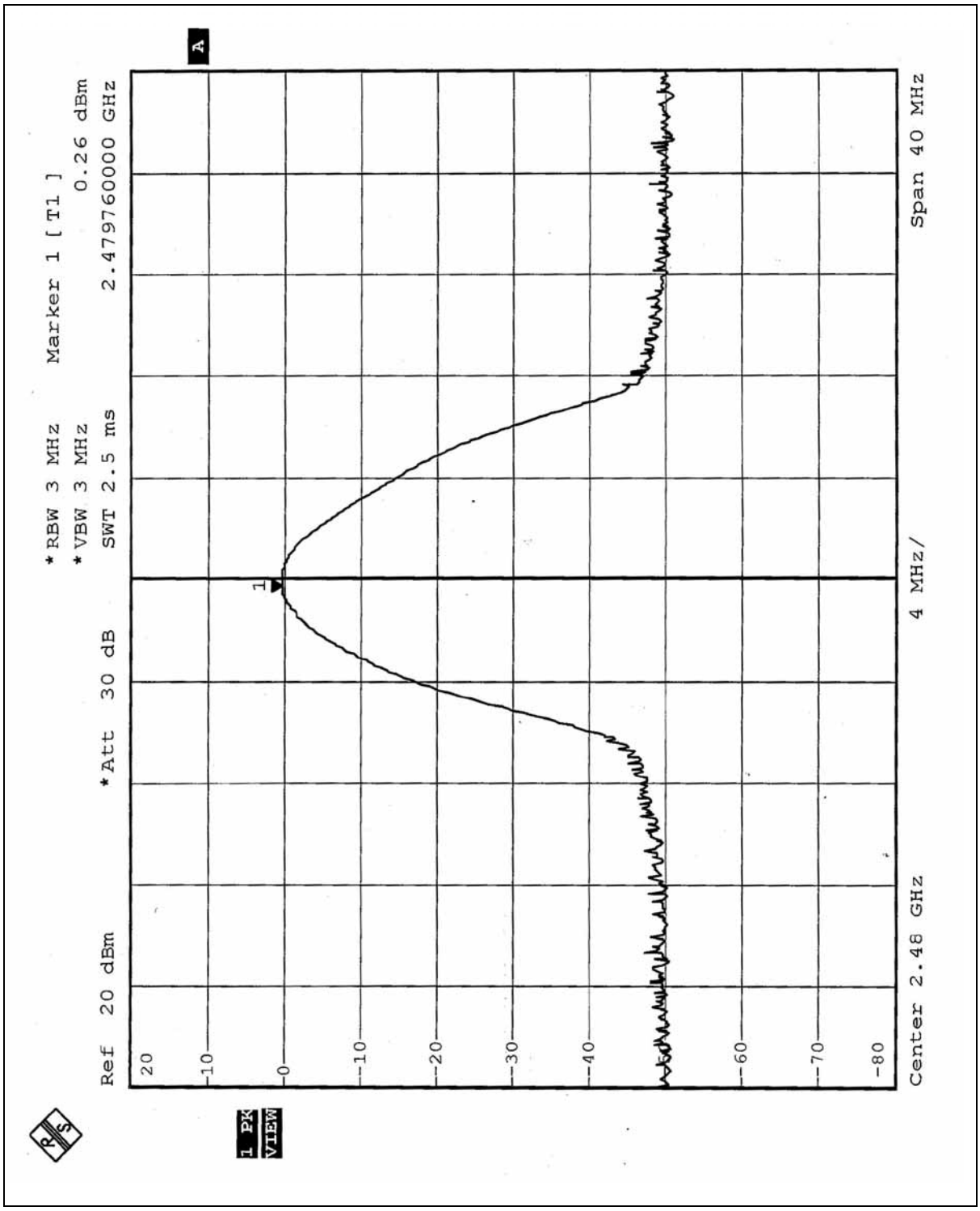
Channel 0


A
*RBW 3 MHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
1.37 dBm
2.402000000 GHz
*Att 30 dB
Ref 20 dBm
Span 40 MHz
4 MHz/
Center 2.402 GHz
1 PK
VIEW

Channel 39


A
*RBW 3 MHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
1.13 dBm
2.440760000 GHz
Ref 20 dBm
*Att 30 dB
Span 40 MHz
4 MHz/
Center 2.441 GHz
1 PK VIEW
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80

Channel 78


A
*RBW 3 MHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
0.26 dBm
2.479760000 GHz
Ref 20 dBm
*Att 30 dB
Span 40 MHz
4 MHz/
Center 2.48 GHz
1 PK
VIEW

4.14 RADIATED EMISSION MEASUREMENT

4.14.1 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.

4.14.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Preamplifier	8447D	2432A03504	Jun. 3, 2005
***** HP Preamplifier	8449B	3008A01924	Sep. 19, 2005
***** HP Preamplifier	8449B	3008A01638	Sep. 30, 2005
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	Oct. 29, 2005
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* ROHDE & SCHWARZ TEST RECEIVER	ESI7	836697/012	Nov. 05, 2005
Schwarzbeck Antenna	VULB 9168	137	Feb. 27, 2005
Schwarzbeck Antenna	VHBA 9123	480	Feb. 18, 2005
***** EMCO Horn Antenna	3115	6714	Oct. 28, 2005
***** EMCO Horn Antenna	3115	9312-4192	Feb. 28, 2005
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V6	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Apr. 16, 2005

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Chamber No. 6.
5. The Industry Canada Reference No. IC 3789-6.

4.14.3 TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

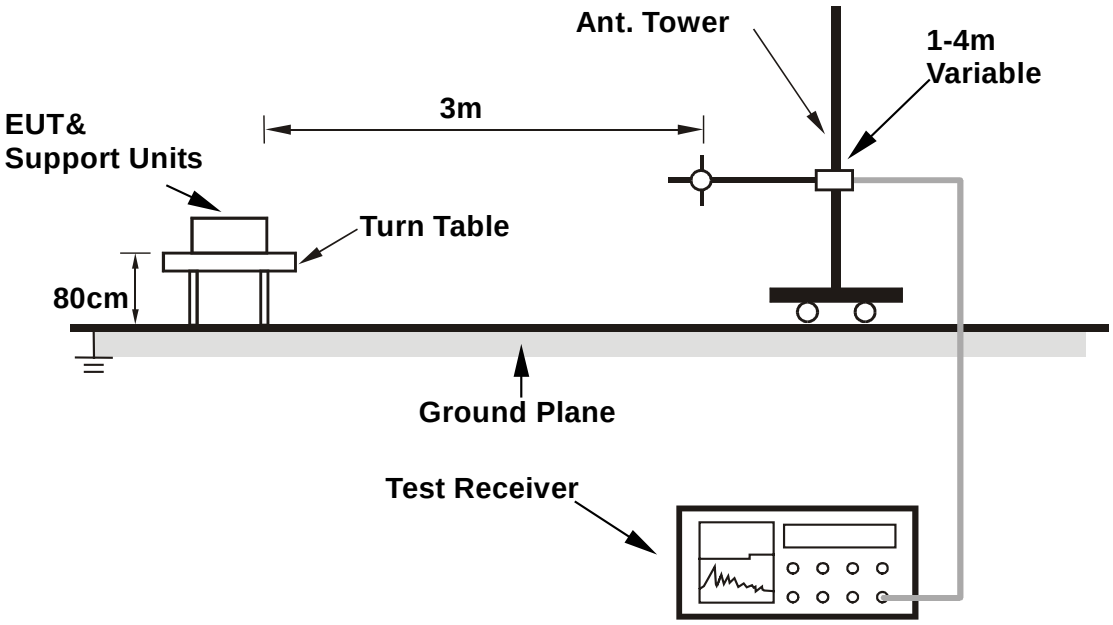
NOTE:

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

4.14.4 DEVIATION FROM TEST STANDARD

No deviation

4.14.5 TEST SETUP



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

4.14.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

4.14.7 TEST RESULTS

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	78	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TESTED BY**	Jamison Chan

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	739.52	23.88 QP	46.00	-22.12	1.50 H	115	-0.56	24.44
2	770.62	24.62 QP	46.00	-21.38	1.50 H	139	-0.18	24.81
3	809.50	25.50 QP	46.00	-20.50	3.00 H	232	0.50	25.00
4	869.76	25.59 QP	46.00	-20.41	1.75 H	40	-0.05	25.65
5	916.41	25.34 QP	46.00	-20.66	1.00 H	187	-0.70	26.04
6	953.35	25.81 QP	46.00	-20.19	1.75 H	343	-0.85	26.66

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	768.68	24.39 QP	46.00	-21.61	2.00 V	337	-0.42	24.80
2	809.50	24.05 QP	46.00	-21.95	1.50 V	4	-0.95	25.00
3	850.32	25.61 QP	46.00	-20.39	2.00 V	232	0.01	25.59
4	883.37	24.64 QP	46.00	-21.36	1.00 V	346	-1.04	25.68
5	916.41	24.69 QP	46.00	-21.31	1.25 V	274	-1.34	26.04
6	949.46	26.47 QP	46.00	-19.53	1.25 V	226	-0.19	26.66

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

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	0	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TESTED BY**	Jamison Chan

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	33.60 PK	74.00	-40.40	1.48 H	194	0.28	33.32
1	2390.00	29.87 AV	54.00	-24.13	1.48 H	194	-3.45	33.32
2	*2402.00	94.38 PK			1.48 H	194	60.99	33.39
2	*2402.00	64.38 AV			1.48 H	194	57.26	33.39
3	4804.00	50.69 PK	74.00	-23.31	1.00 H	171	10.25	40.44
3	4804.00	38.72 AV	54.00	-15.28	1.00 H	171	-1.72	40.44

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	28.73 PK	74.00	-45.27	1.21 V	0	-4.59	33.32
1	2390.00	25.68 AV	54.00	-28.32	1.21 V	0	-7.64	33.32
2	*2402.00	89.51 PK			1.21 V	0	56.12	33.39
2	*2402.00	59.51 AV			1.21 V	0	53.07	33.39
3	4804.00	49.81 PK	74.00	-24.19	1.06 V	306	9.37	40.44
3	4804.00	38.84 AV	54.00	-15.16	1.06 V	306	-1.60	40.44

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	39	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TESTED BY**	Jamison Chan

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	96.62 PK			1.19 H	191	63.07	33.55
1	*2441.00	66.62 AV			1.19 H	191	59.63	33.55
2	4882.00	50.12 PK	74.00	-23.88	1.00 H	244	9.68	40.44
2	4882.00	38.06 AV	54.00	-15.94	1.00 H	244	-2.38	40.44

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	89.80 PK			1.17 V	0	56.25	33.55
1	*2441.00	59.80 AV			1.17 V	0	53.33	33.55
2	4882.00	49.40 PK	74.00	-24.60	1.20 V	354	8.96	40.44
2	4882.00	38.36 AV	54.00	-15.64	1.20 V	354	-2.08	40.44

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	Rugged PDA	**MODEL NO.**	IT-10M30BR
CHANNEL	78	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 70 % RH, 1010hPa	**TESTED BY**	Jamison Chan

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	94.62 PK			1.13 H	196	60.90	33.72
1	*2480.00	64.62 AV			1.13 H	196	57.45	33.72
2	2483.50	54.45 PK	74.00	-19.55	1.13 H	196	20.72	33.73
2	2483.50	51.00 AV	54.00	-3.00	1.13 H	196	17.27	33.73
3	4960.00	46.02 PK	74.00	-27.98	1.34 H	94	5.48	40.54
3	4960.00	35.93 AV	54.00	-18.07	1.34 H	94	-4.61	40.54

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	85.72 PK			1.49 V	183	52.00	33.72
1	*2480.00	55.72 AV			1.49 V	183	48.82	33.72
2	2483.50	45.60 PK	74.00	-28.40	1.49 V	183	11.87	33.73
2	2483.50	42.42 AV	54.00	-11.58	1.49 V	183	8.69	33.73
3	4960.00	45.38 PK	74.00	-28.62	1.38 V	212	4.84	40.54
3	4960.00	35.44 AV	54.00	-18.56	1.38 V	212	-5.10	40.54

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

4.15 BAND EDGES MEASUREMENT

4.15.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.15.2 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.

4.15.3 TEST PROCEDURE

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

4.15.4 DEVIATION FROM TEST STANDARD

No deviation

4.15.5 EUT OPERATING CONDITION

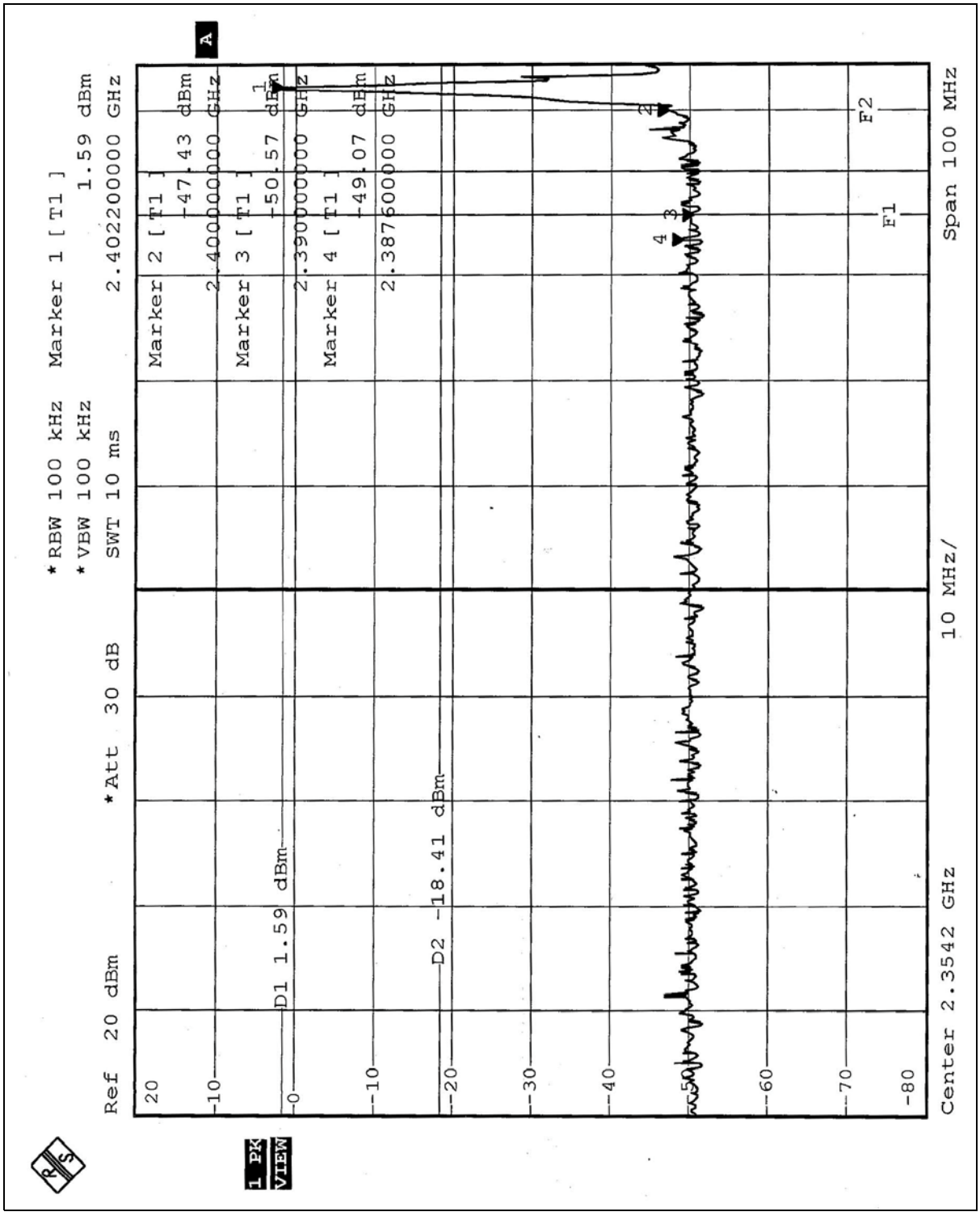
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

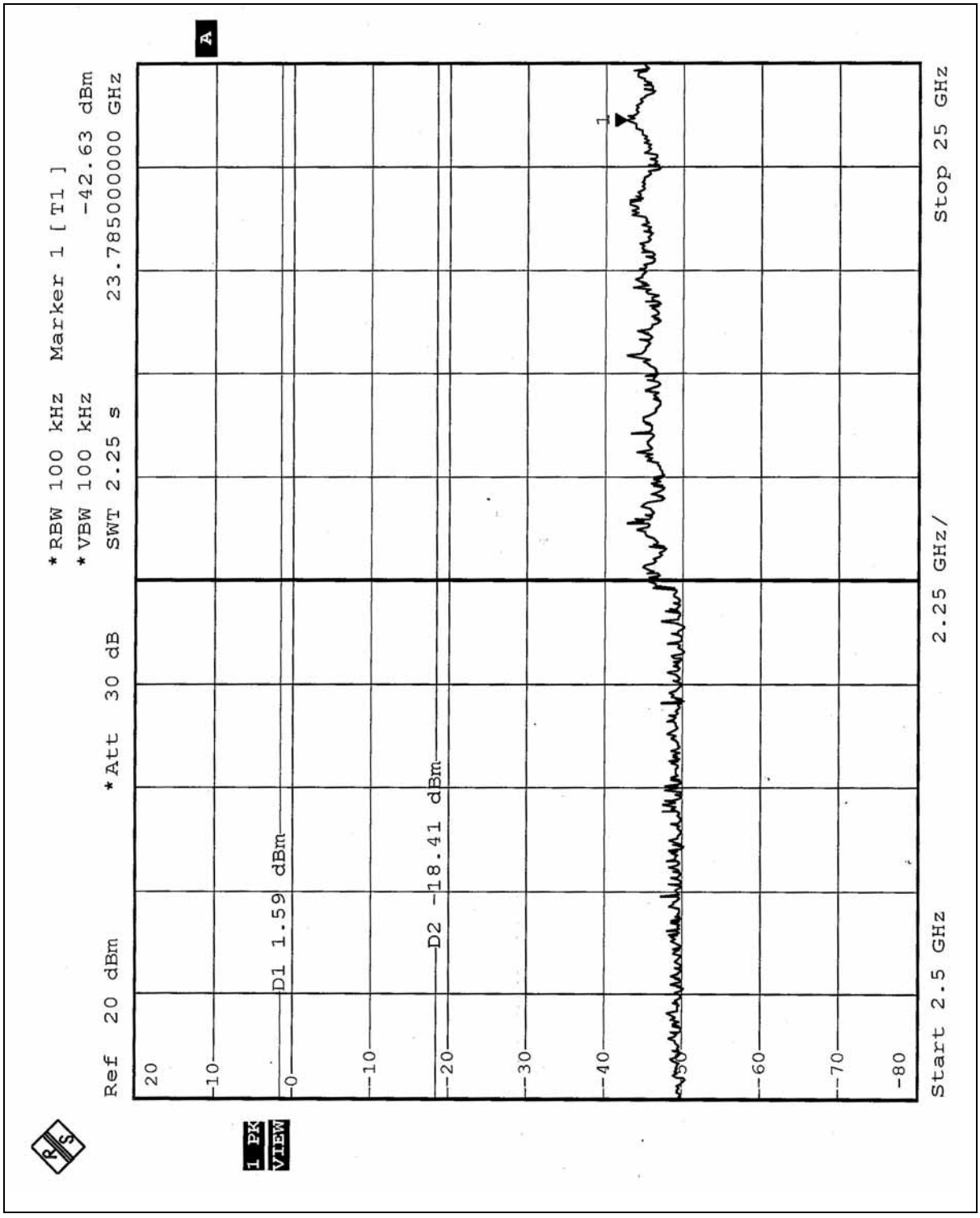
4.15.6 TEST RESULTS

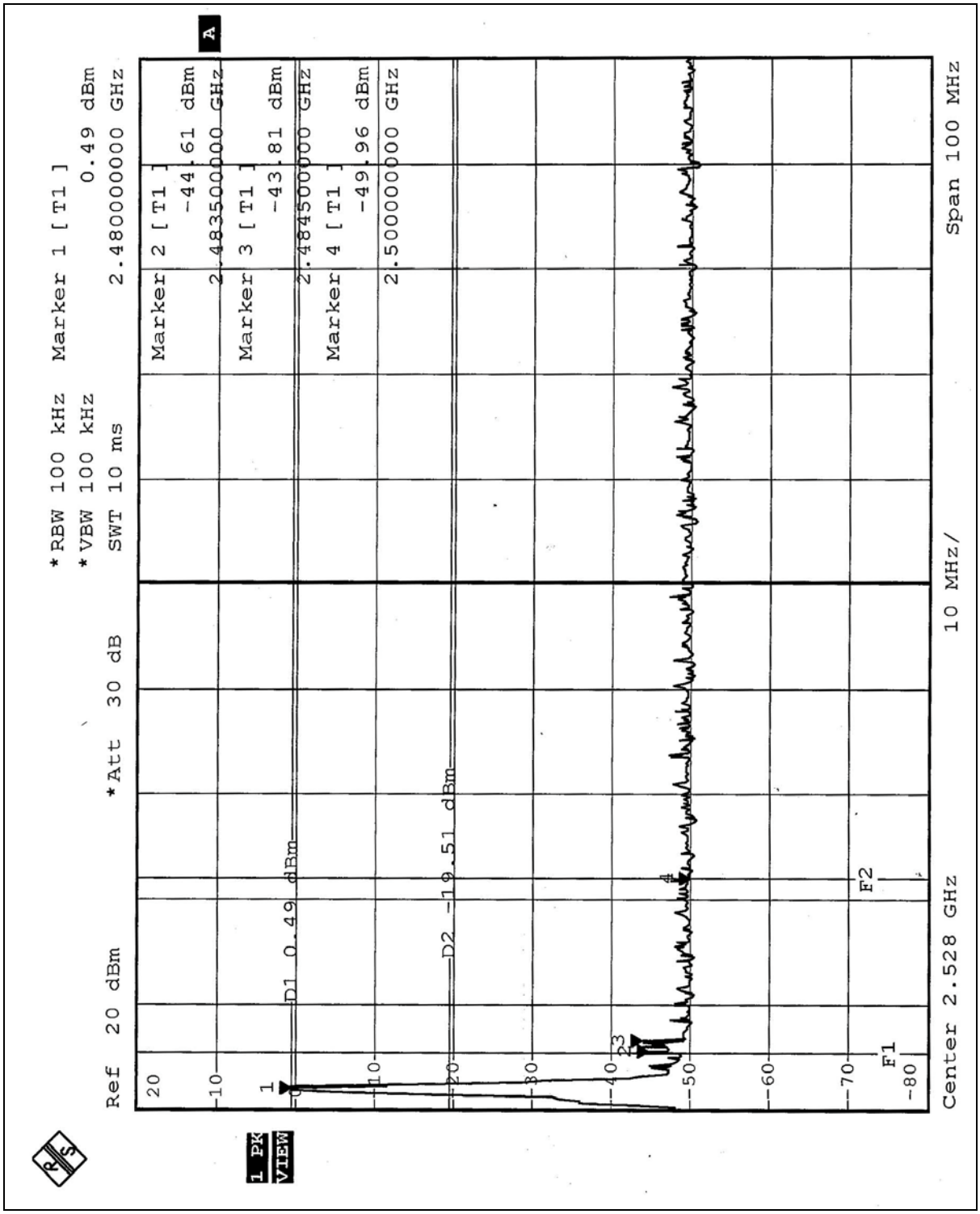
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

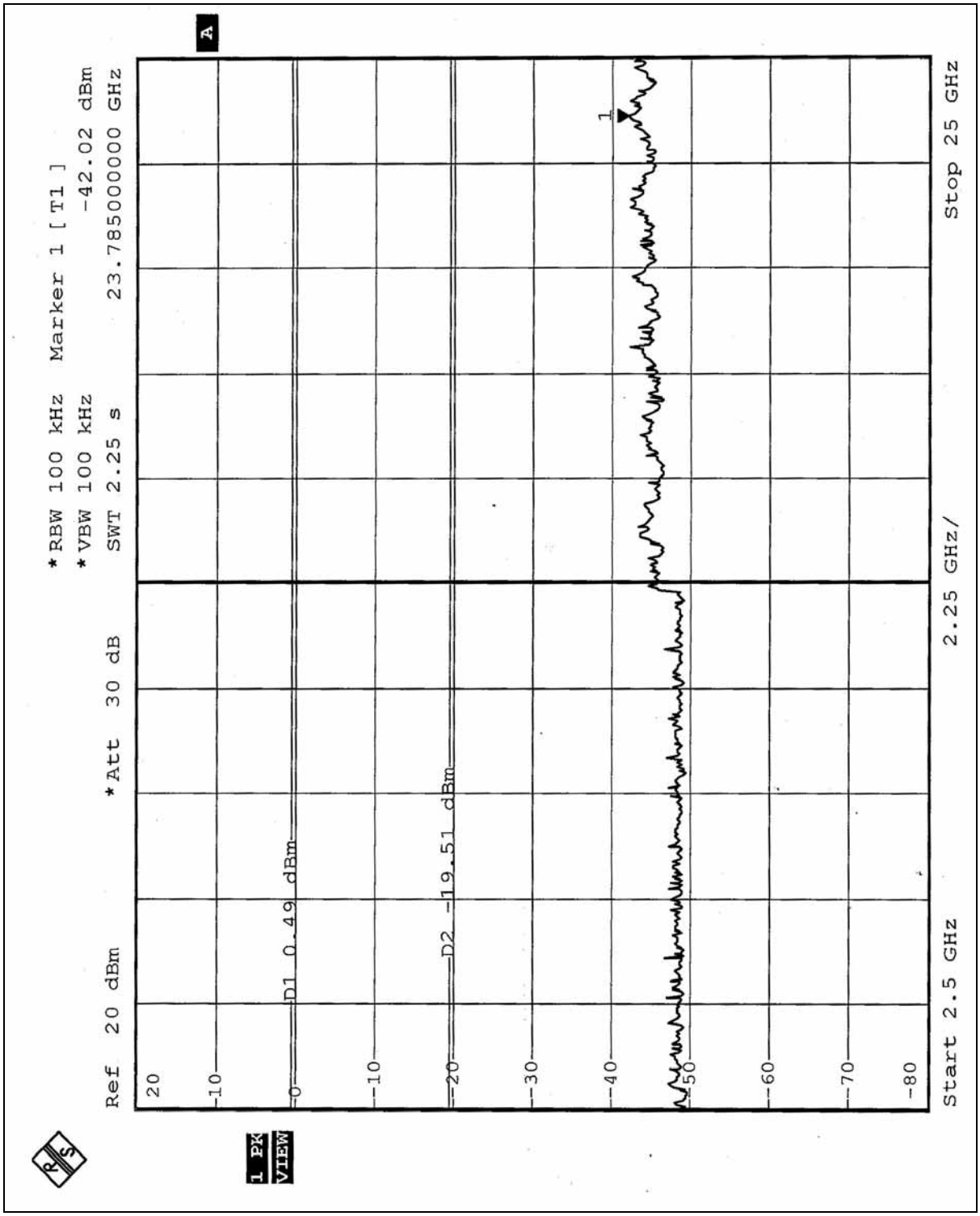
NOTE: The band edge emission plot on the following 1~2 page shows 50.66dB delta between carrier maximum power and local maximum emission in restrict band (2.3876GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.14.7 is 64.38dBuV/m, so the maximum field strength in restrict band is 64.38-50.66=13.72dBuV/m which is under 54 dBuV/m limit.

NOTE: The band edge emission plot on the following 3~4 page shows 44.30dB delta between carrier maximum power and local maximum emission in restrict band (2.4845GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.14.7 is 64.62dBuV/m, so the maximum field strength in restrict band is 64.62-44.30=20.32dBuV/m which is under 54 dBuV/m limit.


RBW 100 kHz
VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
1.59 dBm
2.402200000 GHz
Ref 20 dBm
Att 30 dB
Marker 2 [T1]
-47.43 dBm
2.400000000 GHz
Marker 3 [T1]
-50.57 dBm
2.390000000 GHz
Marker 4 [T1]
-49.07 dBm
2.387600000 GHz
D1 1.59 dBm
D2 -18.41 dBm
Center 2.3542 GHz
10 MHz/
Span 100 MHz
F1
F2
1 PK VIEW


A
*RBW 100 kHz
*VBW 100 kHz
SWT 2.25 s
Marker 1 [T1]
-42.63 dBm
23.785000000 GHz
Ref 20 dBm
*Att 30 dB
D1 1.59 dBm
D2 -18.41 dBm
1 PK VIEW
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
0.49 dBm
2.480000000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
-44.61 dBm
2.483500000 GHz
Marker 3 [T1]
-43.81 dBm
2.484500000 GHz
Marker 4 [T1]
-49.96 dBm
2.500000000 GHz
D1 0.49 dBm
D2 -19.51 dBm
F1
F2
Center 2.528 GHz
10 MHz/
Span 100 MHz
1 PK VIEW


A
*RBW 100 kHz
*VBW 100 kHz
SWT 2.25 s
Marker 1 [T1]
-42.02 dBm
23.785000000 GHz
Ref 20 dBm
*Att 30 dB
D1 0.49 dBm
D2 -19.51 dBm
1 PK
VIEW
Start 2.5 GHz
2.25 GHz/
Stop 25 GHz

4.16 ANTENNA REQUIREMENT

4.16.1 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.

4.16.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is CHIP Antenna without antenna connector. The maximum Gain of this antenna is only 0.38dBi.

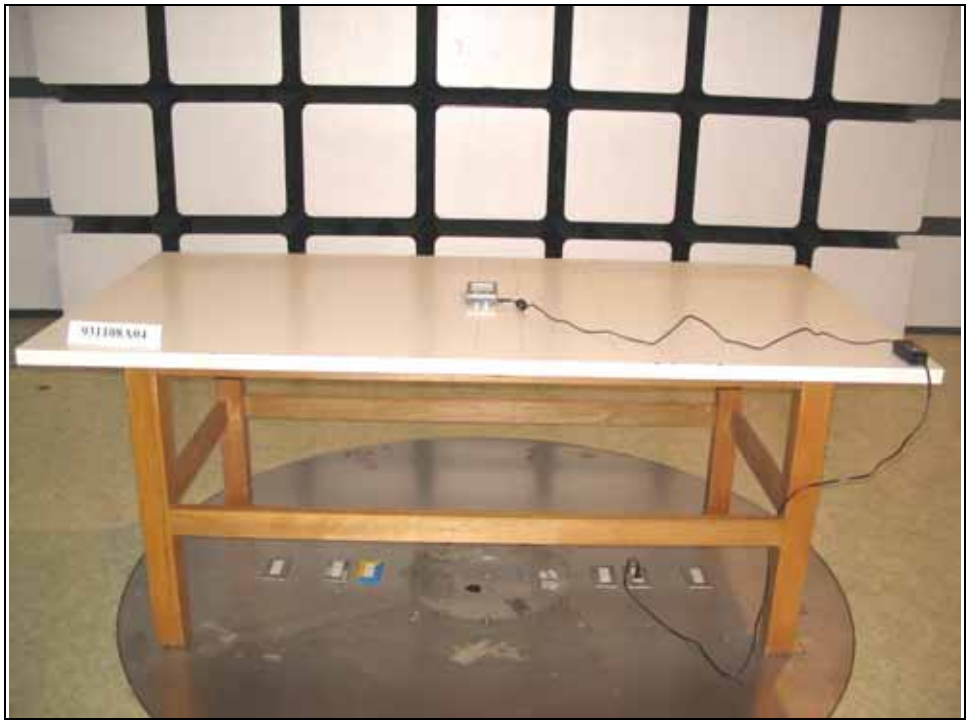
5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST (Test Mode 1)

CONDUCTED EMISSION TEST (Test Mode 2)

CONDUCTED EMISSION TEST (Test Mode 3)

RADIATED EMISSION TEST (Test Mode 1)



RADIATED EMISSION TEST (Test Mode 2)

RADIATED EMISSION TEST (Test Mode 3)

6 APPENDIX - 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:

USA	FCC, NVLAP, UL, A2LA
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/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Email: service@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.