FCC TEST REPORT

REPORT NO.: RF910614R01
MODEL NO.: BT-0002M
(The other models please refer to page 6)
RECEIVED: June 14, 2002
TESTED: June 17 ~ June 21, 2002

APPLICANT: CC&C TECHNOLOGIES INC.
ADDRESS: 8F, 150, Jian Yi Road, Chung Ho City, Taipei, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation
LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

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0528
ILAC MRA

Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT :	Bluetooth Module
BRAND NAME :	CC&C
MODEL NO. :	BT-0002M
	(The other models please refer to page 6)
APPLICANT :	CC&C TECHNOLOGIES INC.
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247), ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from June 17 ~ June 21, 2002. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

CHECKED BY: Rennie Wang , **DATE:** June 25, 2002

Rennie Wang

APPROVED BY: Alan Lane , **DATE:** June 25, 2002

Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is –7.37dBuV at 25.23 MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.:At least 75 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 30 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Spec.: Max. 1 MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –8.30dBuV at 4960.00MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth Module
MODEL NO.	BT-0002M BT-0002 BT-0002MS BT-0002A BT-0002B
POWER SUPPLY	5.0VDC from host equipment
MODULATION TYPE	FHSS (GFSK)
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	-0.22dBm
ANTENNA TYPE	Inverted F Antenna, Printed Dipole Antenna
DATA CABLE	NA
I/O PORTS	USB
ASSOCIATED DEVICES	NA

NOTE:

1. Five model names are identical expect for their model number due to marketing requirement.

2. There are two sets of antenna provided to this EUT.

3. The details about two antennas:

	ANTENNA TYPE	ANTENNA GAIN
1	Inverted F	-2dBi
2	Printed Dipole	-2dBi

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

3.2 DESCRIPTION OF TEST MODES

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

Two test results provided to this EUT. The test result A is for Antenna 1, and the test result B is for Antenna 2.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC CFR 47 Part 15, Subpart C. (15.247)
ANSI C63.4 : 1992

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP01L	TW-09C748-12800-19O-B220	FCC DoC APPROVED
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC APPROVED
3	MODEM	ACEEX	1414	980020503	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

NOTE: All power cords of the above support units are non shielded (1.8m).

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.45 – 30	48	-	48	-

Notes:

1. The lower limit shall apply at the transition frequencies.
1. 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	ESCS30	847793/022	Mar. 12, 2003
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	July 19, 2002
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Oct. 25, 2002
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 2, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Dec. 2, 2002
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	July 19, 2002
Software	Cond-V2L	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	July 19, 2002
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 20, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 20, 2003
Shielded Room	Site 5	ADT-C05	NA
VCCI Site Registration No.	Site 5	C-1093	NA

NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

3. "*": These equipment are used for conducted telecom port test only (if tested).

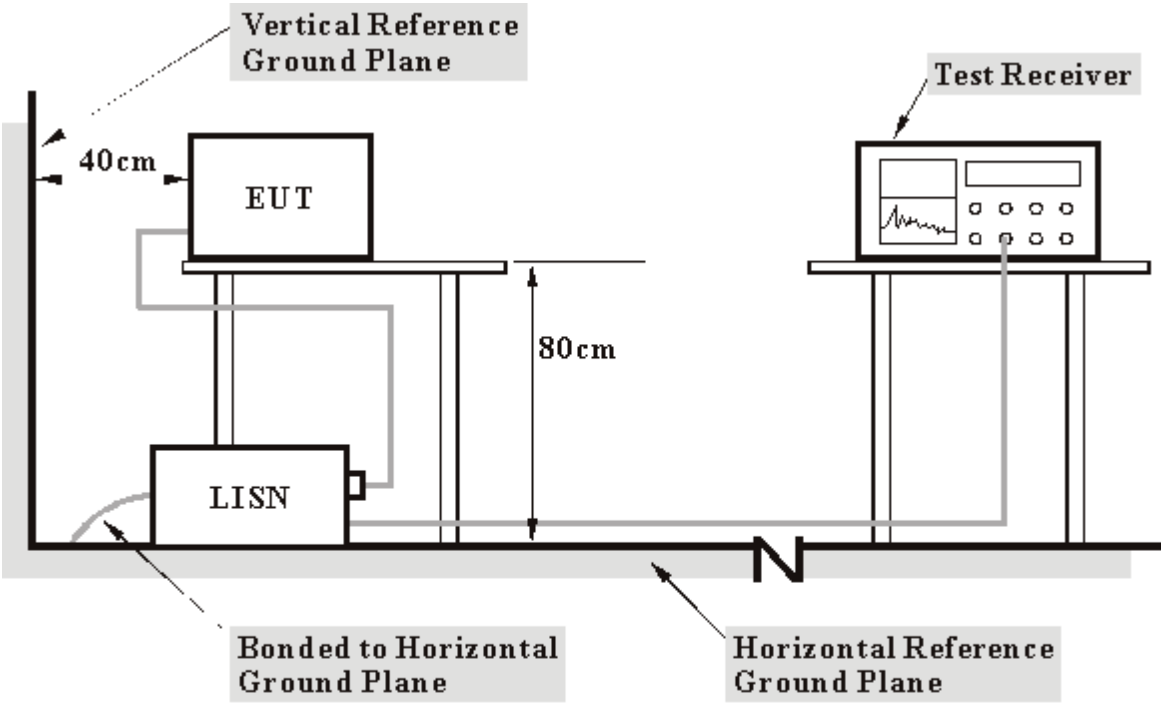
4.1.3 TEST PROCEDURES

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

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

c. The frequency range from 450 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



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

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

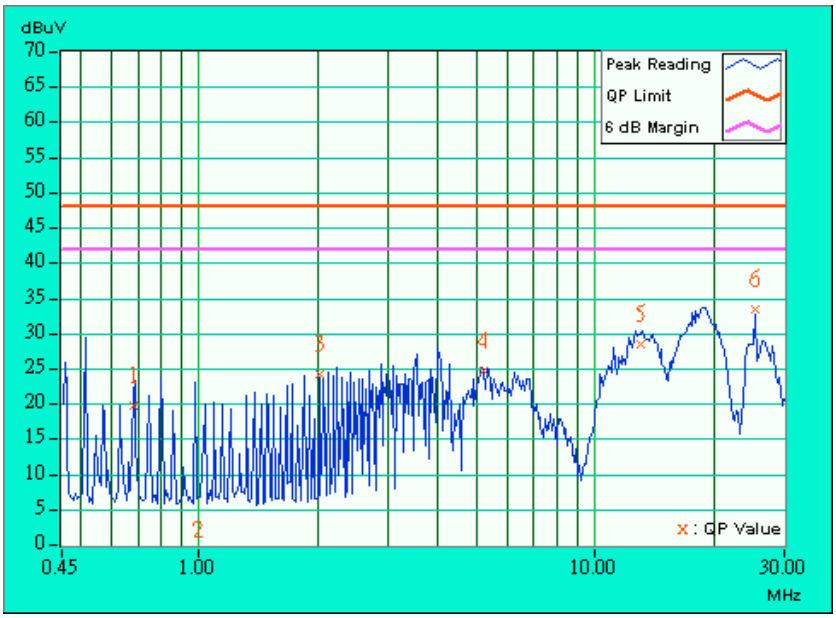
4.1.5 TEST RESULTS (A)

EUT	Bluetooth Module	**MODEL**	BT-0002M
CHANNEL	0	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.684	0.15	18.71	-	18.86	-	48.00	-	-29.14	-
2	0.997	0.20	-3.27	-	-3.07	-	48.00	-	-51.07	-
3	2.008	0.20	23.06	-	23.26	-	48.00	-	-24.74	-
4	5.219	0.44	23.43	-	23.87	-	48.00	-	-24.13	-
5	13.008	0.66	27.29	-	27.95	-	48.00	-	-20.05	-
6	25.227	1.20	32.32	-	33.52	-	48.00	-	-14.48	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

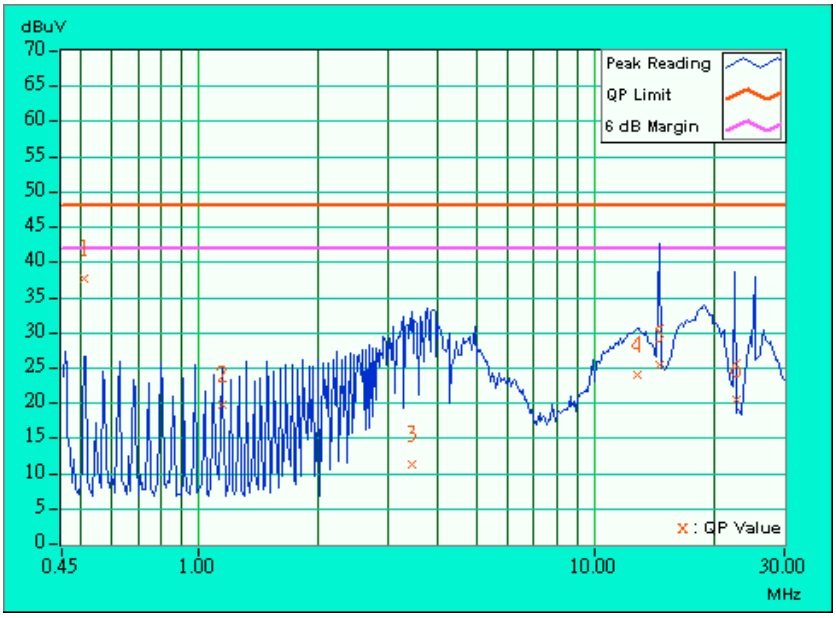


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 0	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.513	0.12	36.97	-	37.09	-	48.00	-	-10.91	-
2	1.145	0.20	19.06	-	19.26	-	48.00	-	-28.74	-
3	3.434	0.27	10.49	-	10.76	-	48.00	-	-37.24	-
4	12.816	0.46	23.23	-	23.69	-	48.00	-	-24.31	-
5	14.523	0.49	24.80	-	25.29	-	48.00	-	-22.71	-
6	22.723	0.75	19.66	-	20.41	-	48.00	-	-27.59	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

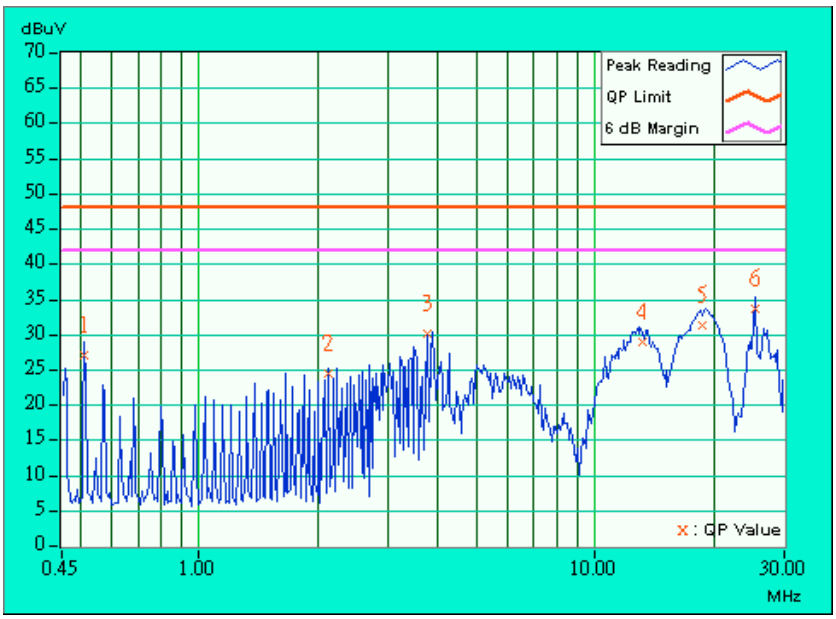


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.513	0.12	25.85	-	25.97	-	48.00	-	-22.03	-
2	2.121	0.21	23.19	-	23.40	-	48.00	-	-24.60	-
3	3.781	0.38	28.96	-	29.34	-	48.00	-	-18.66	-
4	13.184	0.66	27.71	-	28.37	-	48.00	-	-19.63	-
5	18.688	0.92	30.04	-	30.96	-	48.00	-	-17.04	-
6	25.227	1.20	32.52	-	33.72	-	48.00	-	-14.28	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

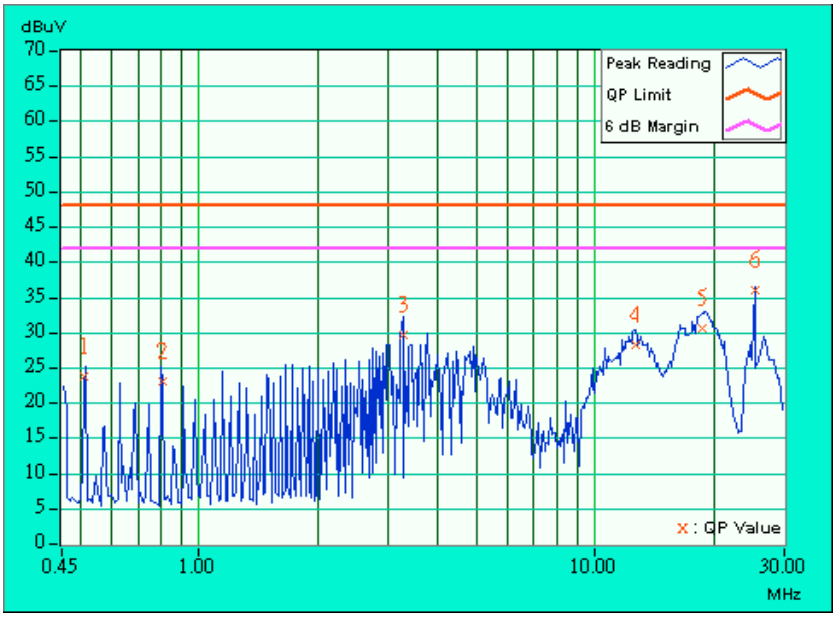


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.513	0.12	23.20	-	23.32	-	48.00	-	-24.68	-
2	0.805	0.17	22.48	-	22.65	-	48.00	-	-25.35	-
3	3.266	0.26	28.88	-	29.14	-	48.00	-	-18.86	-
4	12.605	0.45	27.55	-	28.00	-	48.00	-	-20.00	-
5	18.625	0.72	29.83	-	30.55	-	48.00	-	-17.45	-
6	25.230	0.70	35.38	-	36.08	-	48.00	-	-11.92	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

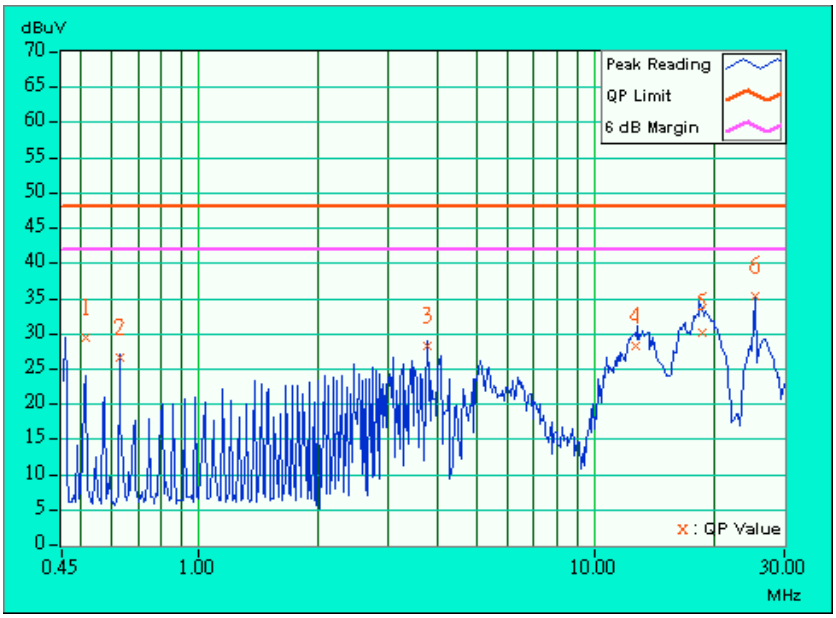


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	28.26	-	28.38	-	48.00	-	-19.62	-
2	0.630	0.14	25.54	-	25.68	-	48.00	-	-22.32	-
3	3.785	0.38	27.06	-	27.44	-	48.00	-	-20.56	-
4	12.664	0.65	27.01	-	27.66	-	48.00	-	-20.34	-
5	18.672	0.92	29.05	-	29.97	-	48.00	-	-18.03	-
6	25.227	1.20	34.09	-	35.29	-	48.00	-	-12.71	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

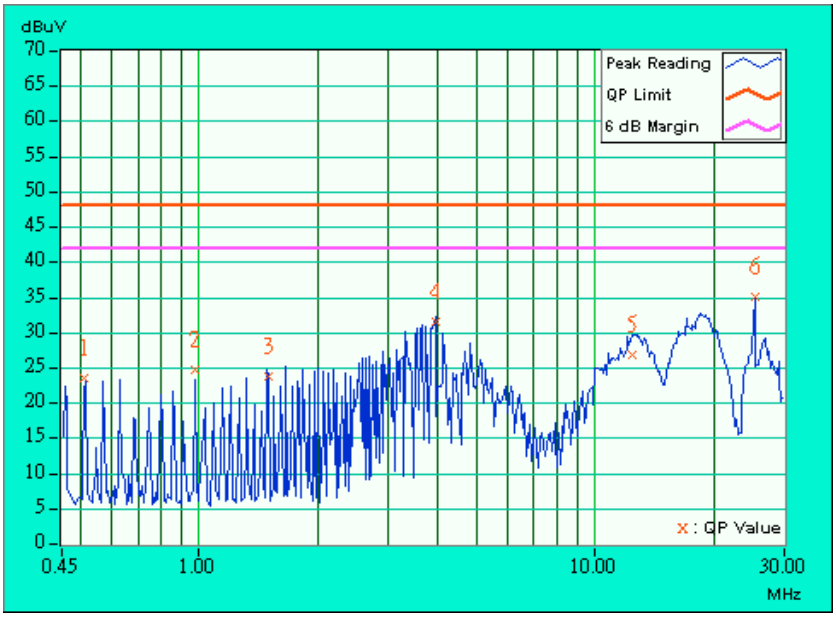


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Netural (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.513	0.12	22.82	-	22.94	-	48.00	-	-25.06	-
2	0.973	0.20	24.08	-	24.28	-	48.00	-	-23.72	-
3	1.492	0.20	23.09	-	23.29	-	48.00	-	-24.71	-
4	3.953	0.30	30.81	-	31.11	-	48.00	-	-16.89	-
5	12.375	0.45	26.24	-	26.69	-	48.00	-	-21.31	-
6	25.227	0.70	34.39	-	35.09	-	48.00	-	-12.91	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.



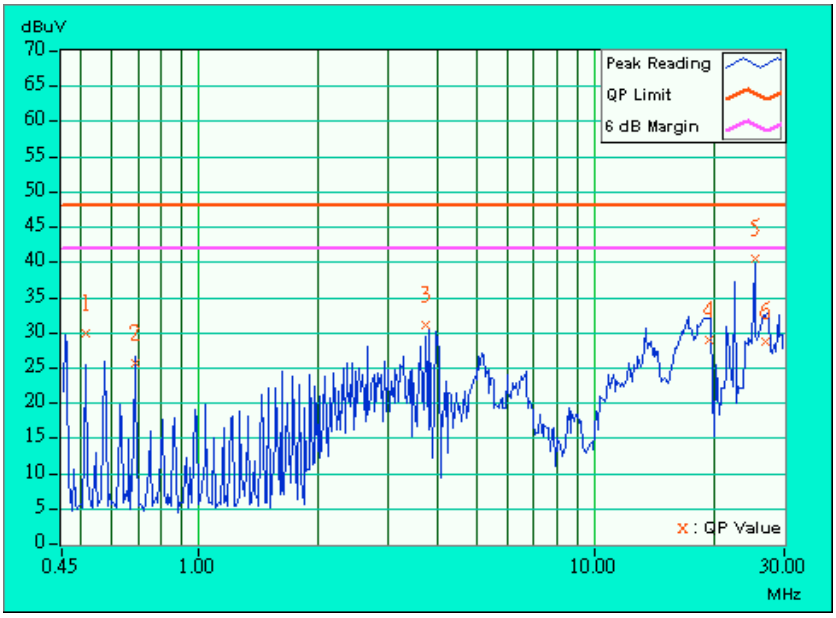
4.1.6 TEST RESULTS (B)

EUT	Bluetooth Module	**MODEL**	BT-0002M
CHANNEL	0	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	28.80	-	28.92	-	48.00	-	-19.08	-
2	0.688	0.15	24.38	-	24.53	-	48.00	-	-23.47	-
3	3.742	0.37	29.95	-	30.32	-	48.00	-	-17.68	-
4	19.301	0.96	27.75	-	28.71	-	48.00	-	-19.29	-
5	25.230	1.20	39.41	-	40.61	-	48.00	-	-7.39	-
6	26.898	1.24	27.56	-	28.80	-	48.00	-	-19.20	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.

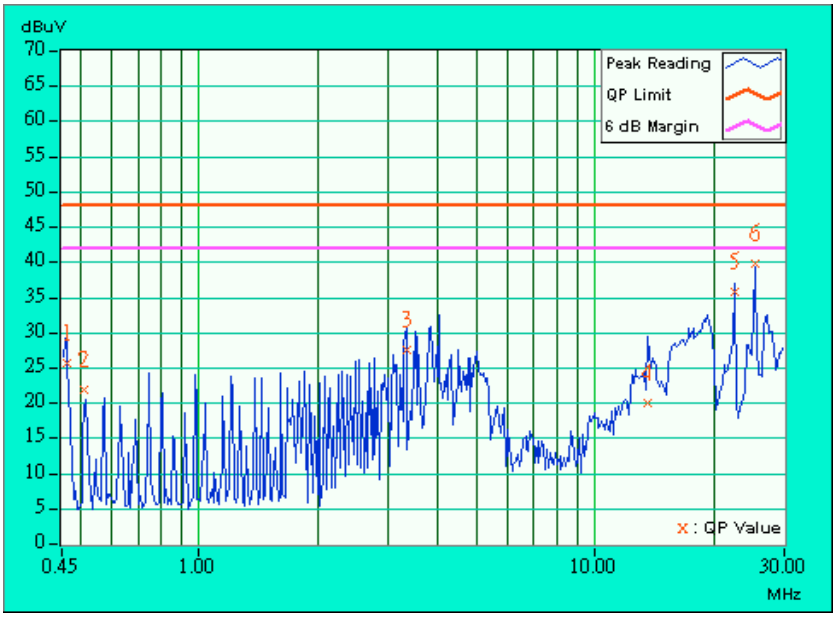


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 0	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.462	0.11	25.04	-	25.15	-	48.00	-	-22.85	-
2	0.513	0.12	21.10	-	21.22	-	48.00	-	-26.78	-
3	3.336	0.27	26.86	-	27.13	-	48.00	-	-20.87	-
4	13.586	0.47	19.32	-	19.79	-	48.00	-	-28.21	-
5	22.570	0.75	35.22	-	35.97	-	48.00	-	-12.03	-
6	25.230	0.70	39.02	-	39.72	-	48.00	-	-8.28	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.

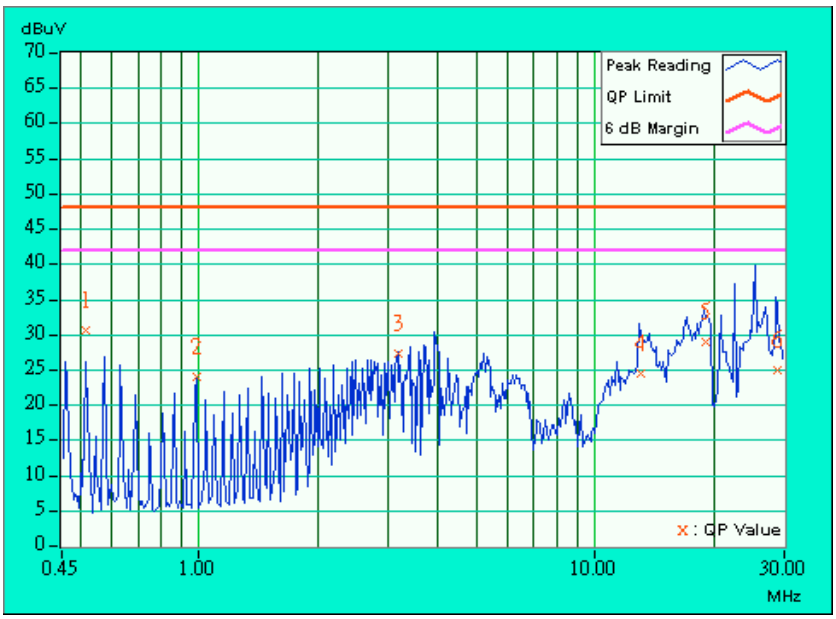


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	29.43	-	29.55	-	48.00	-	-18.45	-
2	0.981	0.20	22.77	-	22.97	-	48.00	-	-25.03	-
3	3.168	0.32	26.08	-	26.40	-	48.00	-	-21.60	-
4	13.082	0.66	23.32	-	23.98	-	48.00	-	-24.02	-
5	18.992	0.94	27.61	-	28.55	-	48.00	-	-19.45	-
6	28.867	1.28	23.69	-	24.97	-	48.00	-	-23.03	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.

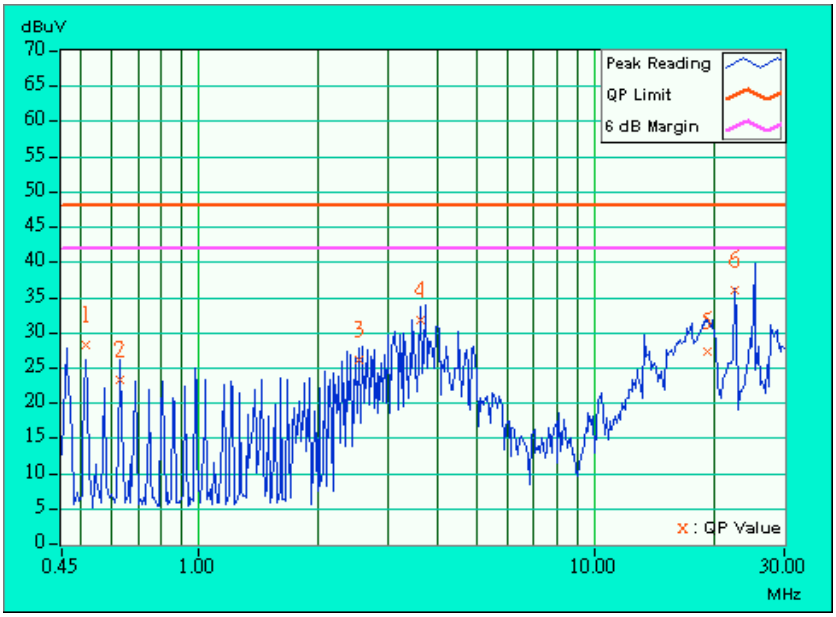


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	27.61	-	27.73	-	48.00	-	-20.27	-
2	0.630	0.14	22.59	-	22.73	-	48.00	-	-25.27	-
3	2.531	0.23	25.34	-	25.57	-	48.00	-	-22.43	-
4	3.625	0.28	31.17	-	31.45	-	48.00	-	-16.55	-
5	19.133	0.75	26.57	-	27.32	-	48.00	-	-20.68	-
6	22.570	0.75	35.24	-	35.99	-	48.00	-	-12.01	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.

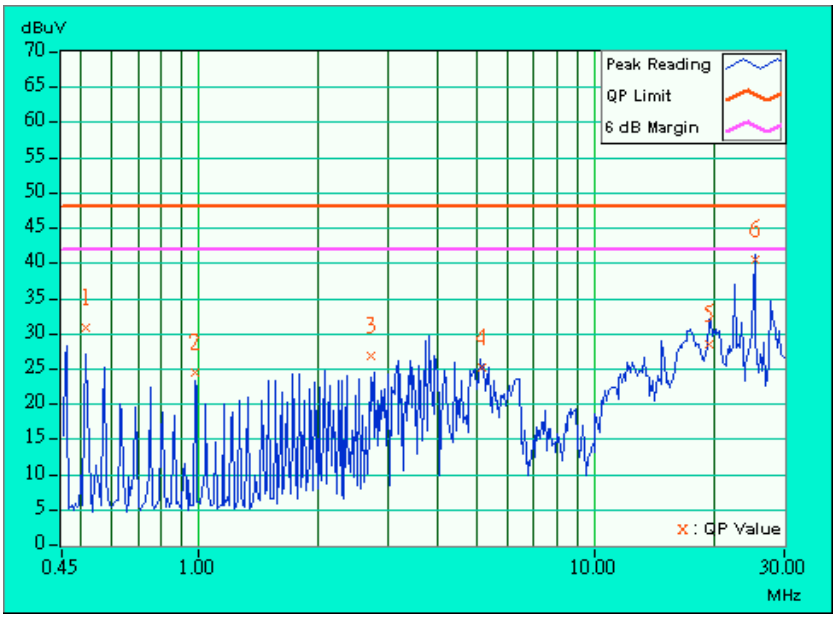


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	29.70	-	29.82	-	48.00	-	-18.18	-
2	0.977	0.20	23.42	-	23.62	-	48.00	-	-24.38	-
3	2.707	0.27	25.77	-	26.04	-	48.00	-	-21.96	-
4	5.184	0.44	23.95	-	24.39	-	48.00	-	-23.61	-
5	19.363	0.96	27.33	-	28.29	-	48.00	-	-19.71	-
6	25.230	1.20	39.43	-	40.63	-	48.00	-	-7.37	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.

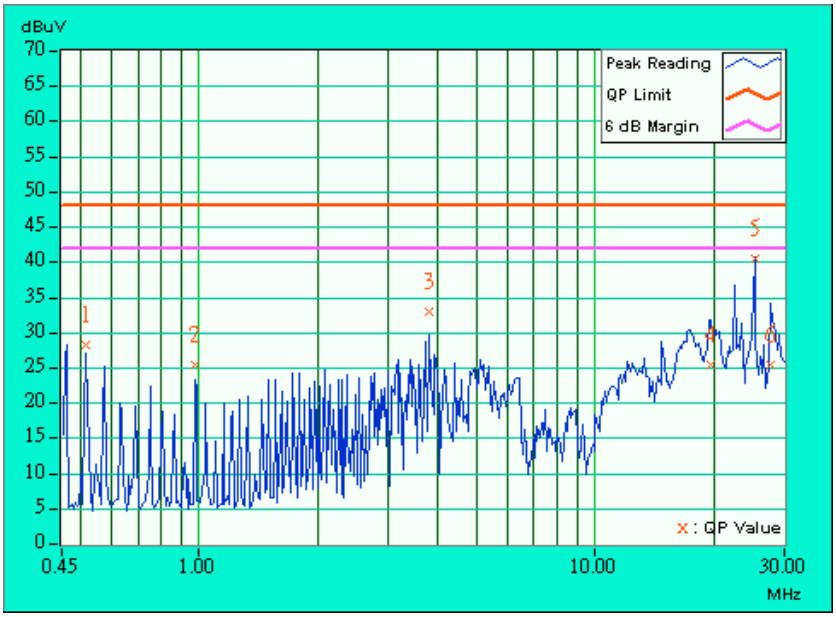


EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Netural (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	0.516	0.12	27.55	-	27.67	-	48.00	-	-20.33	-
2	0.977	0.20	24.67	-	24.87	-	48.00	-	-23.13	-
3	3.797	0.29	32.13	-	32.42	-	48.00	-	-15.58	-
4	19.609	0.78	24.76	-	25.54	-	48.00	-	-22.46	-
5	25.230	0.70	39.73	-	40.43	-	48.00	-	-7.57	-
6	27.727	0.75	24.70	-	25.45	-	48.00	-	-22.55	-

NOTE:

6. QP. and AV. are abbreviations of quasi-peak and average individually.
7. "-": NA
8. The emission levels of other frequencies were very low against the limit.
9. Margin value = Emission level - Limit value
10. Emission Level = Reading Value + Correction Factor.



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 75 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

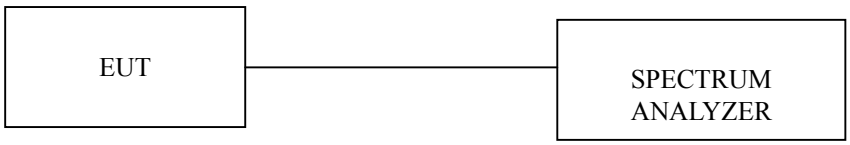
NOTE:

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

4.2.3 TEST PROCEDURES

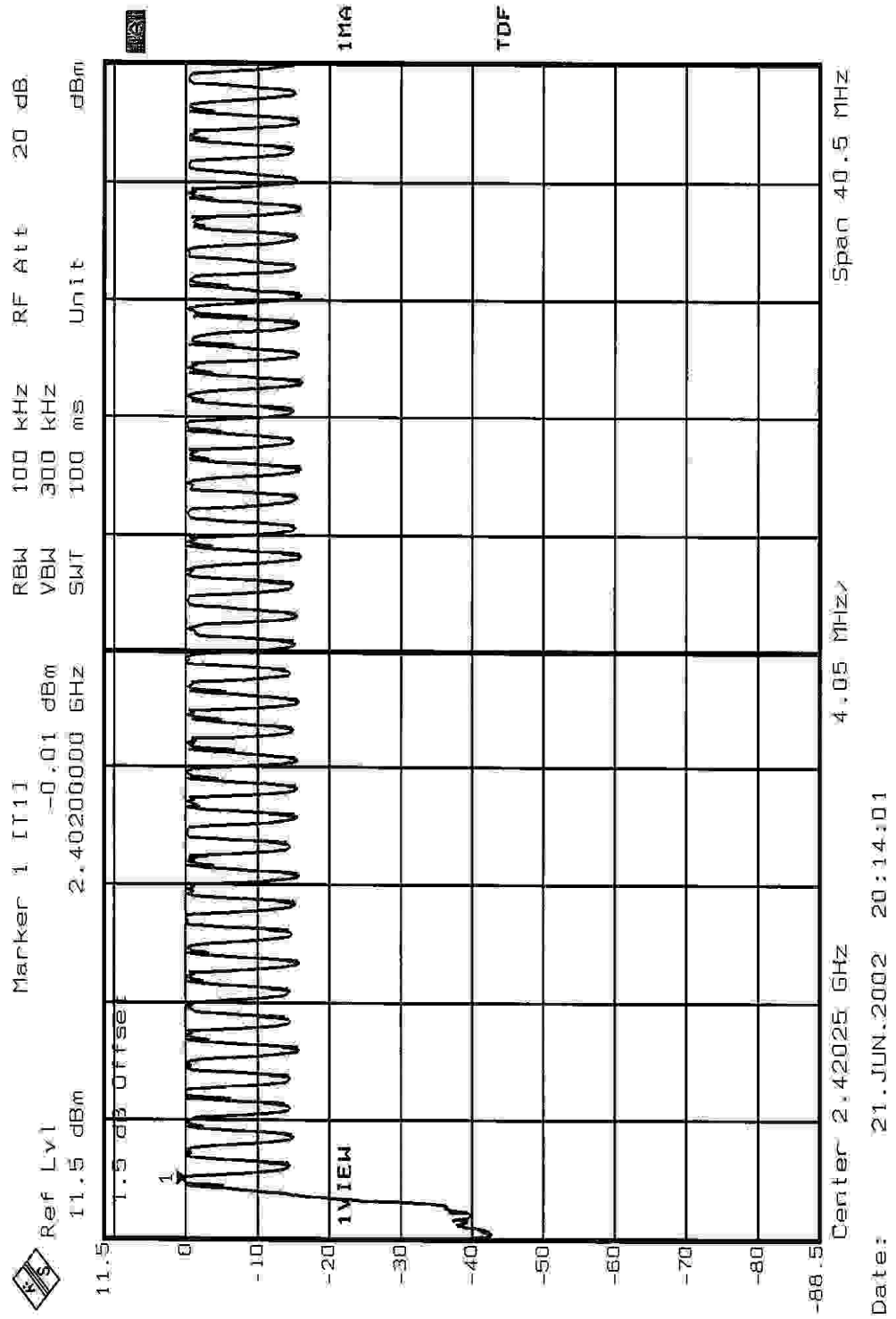
1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and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

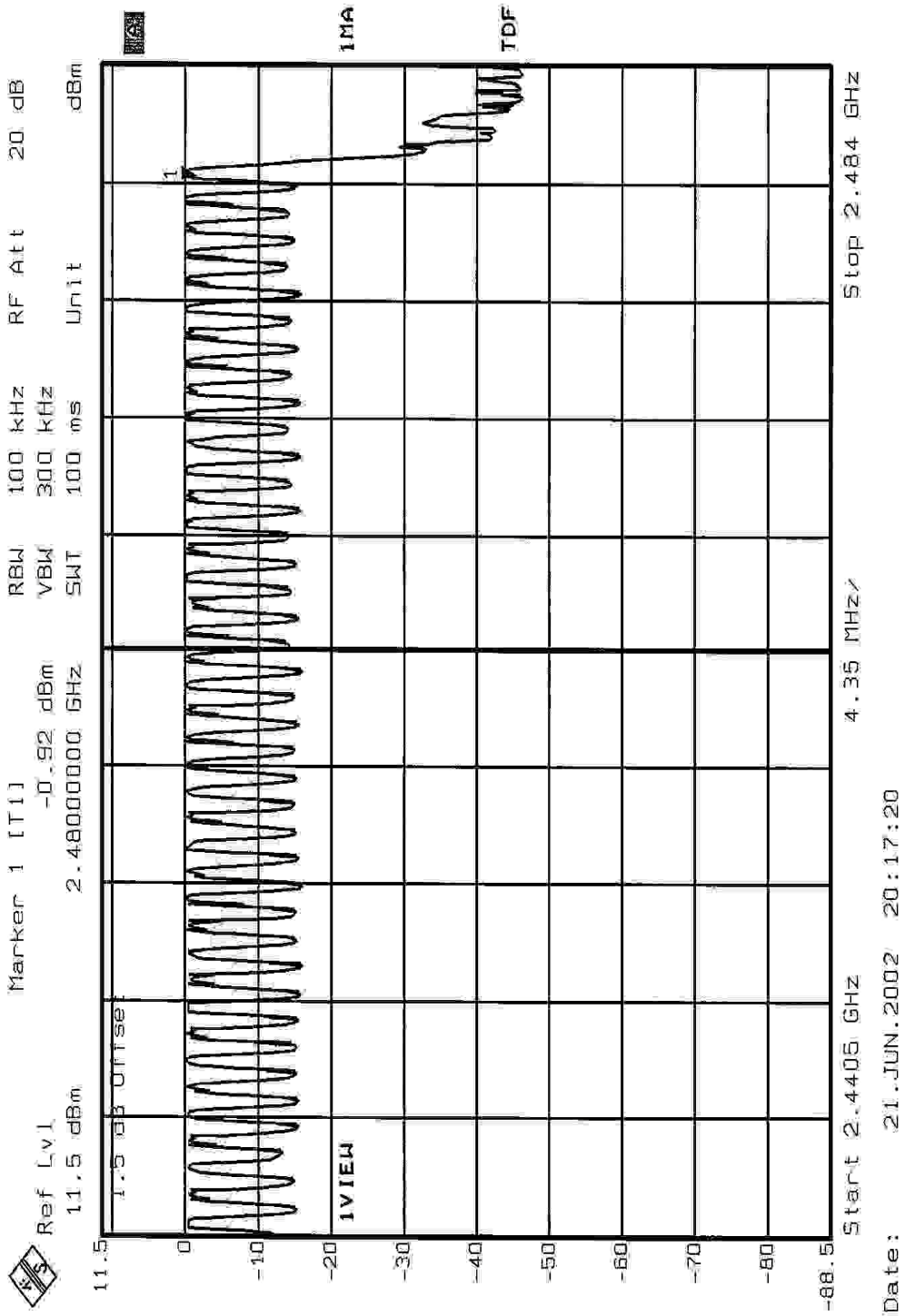
4.2.4 TEST SETUP



4.2.5 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.


Ref Lvl
11.5 dBm
1.5 dB Offset
Marker 1 [T1]
-0.01 dBm
2.40200000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.42025 GHz
4.05 MHz/
Span 40.5 MHz
Date: 21.JUN.2002 20:14:01


Ref Lvl
11.5 dBm
1.5 dB Offset
Marker 1 [T1]
-0.92 dBm
2.48000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Start 2.4405 GHz
4.35 MHz/
Stop 2.484 GHz
Date: 21.JUN.2002 20:17:20

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

NOTES:

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

4.3.3 TEST PROCEDURES

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

4.3.4 TEST SETUP

4.3.5 TEST RESULTS

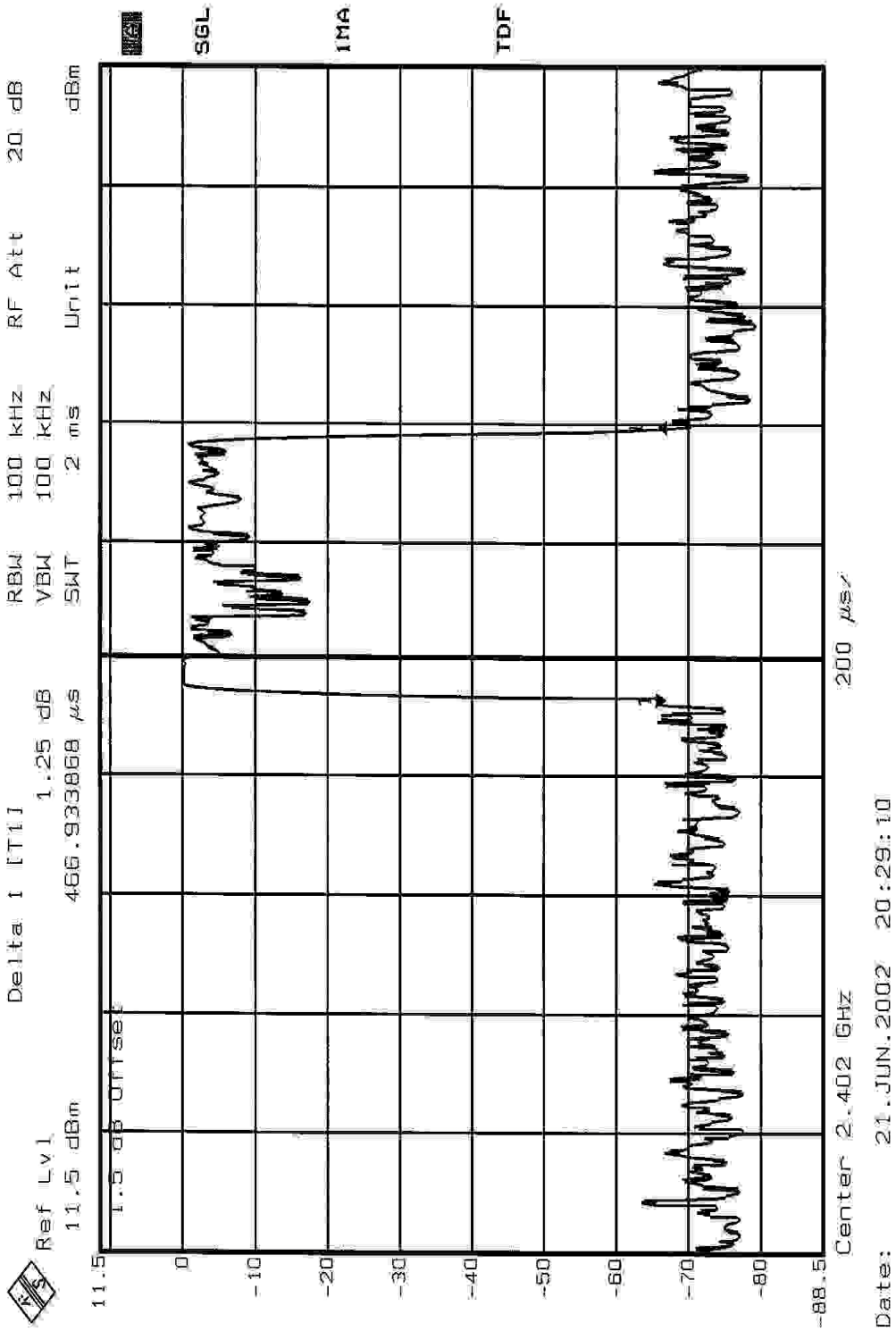
CHANNEL	DWELL TIME
0	283.70ms
39	283.70ms
78	283.70ms

Note : This product is averagely hopped on 79 frequencies. The maximum hopping rate is 1600 hops/sec. The longest pulse duration is 460.92μsec.

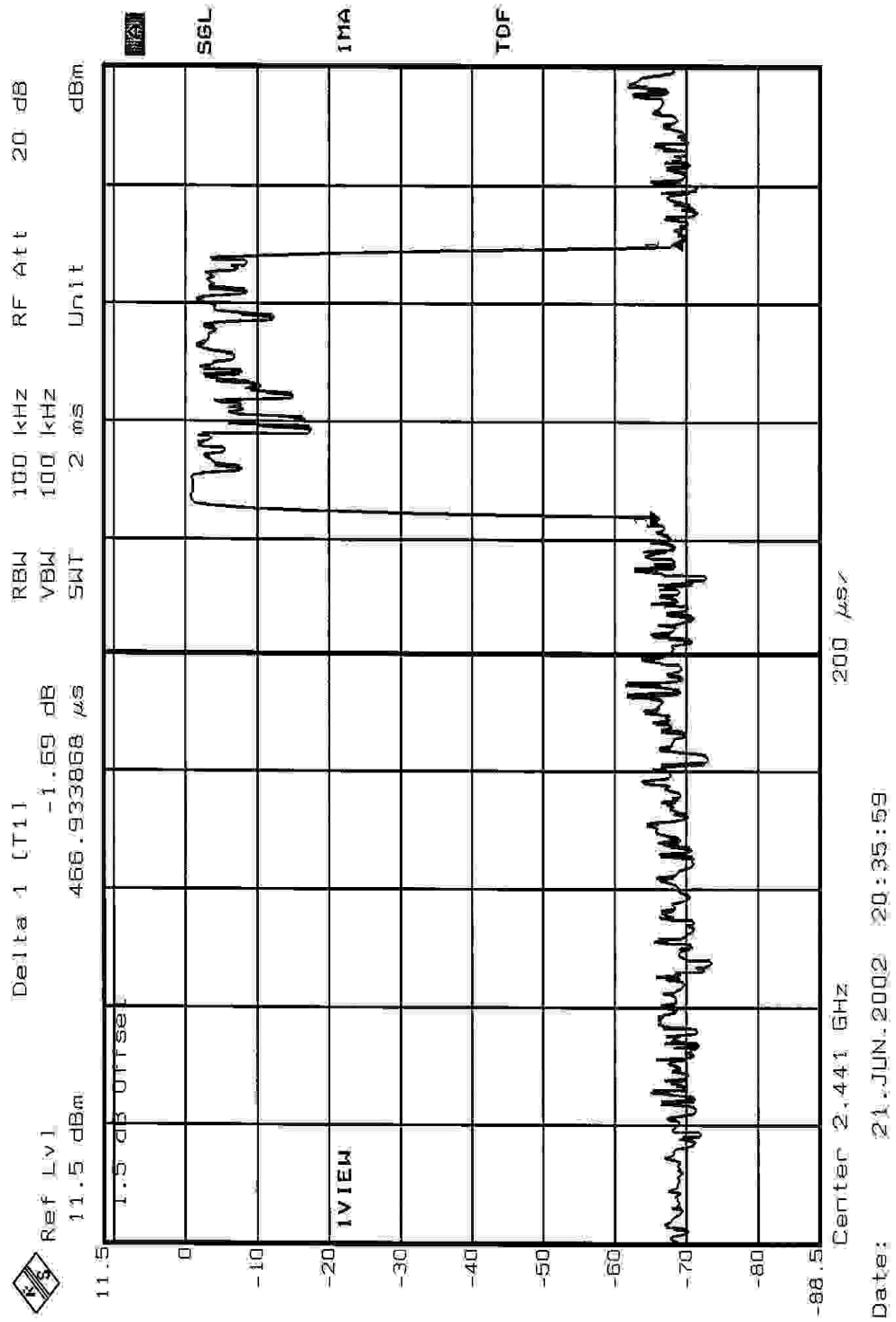
So, the longest Dwell Time = 466.93 μsec x 1600 ÷79 x 30 = 283.70 msec. which is smaller than 0.4sec.

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

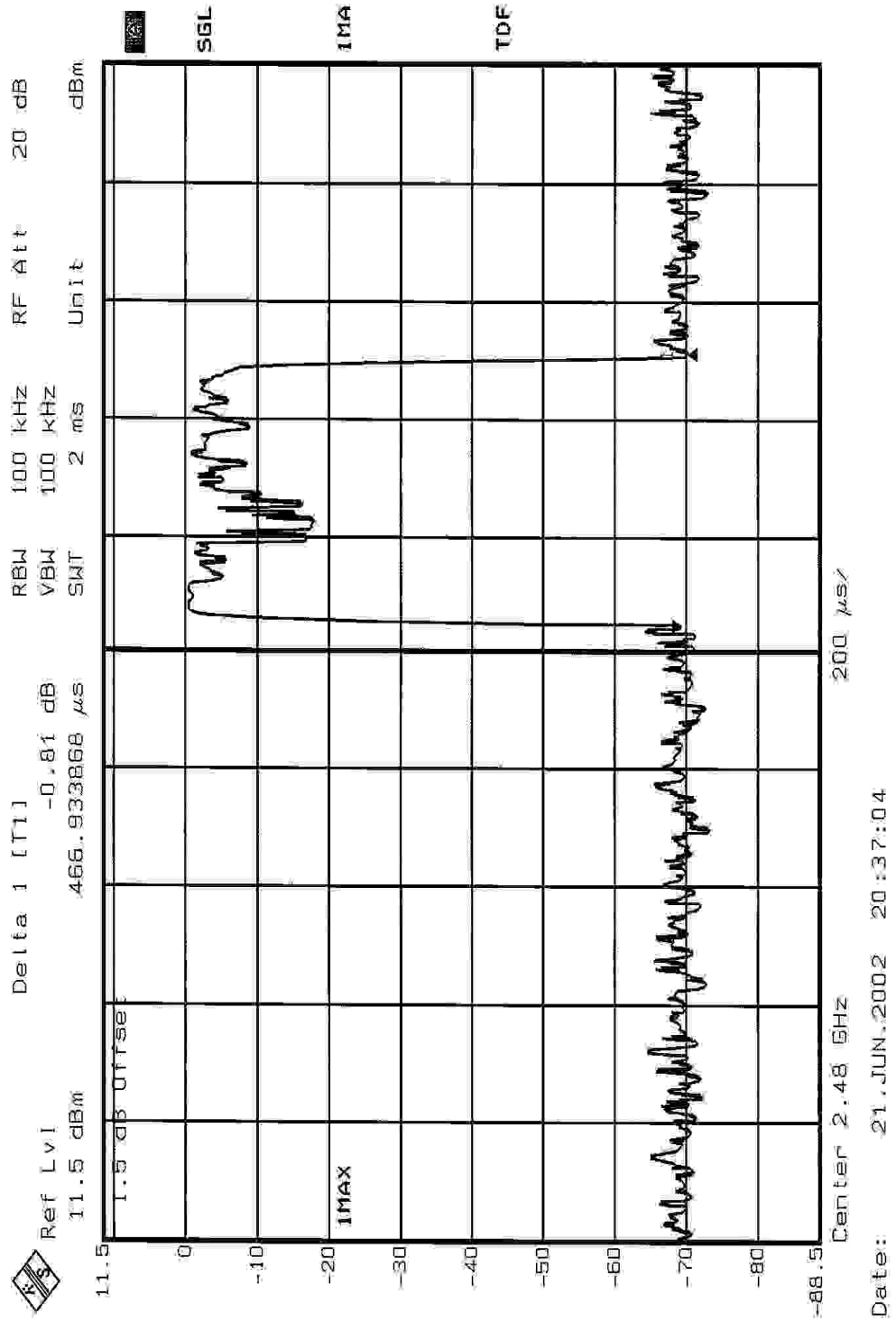
Channel 0


Ref Lvl
11.5 dBm
1.5 dB Offset
Delta 1 [T1]
1.25 dB
466.933868 µs
RBW 100 kHz
VBW 100 kHz
SWT 2 ms
RF Att 20 dB
Unit dBm
SGL
1MA
TDF
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
200 µs/
Center 2.402 GHz
Date: 21.JUN.2002 20:29:10

Channel 39


Ref Lvl
11.5 dBm
Delta 1 [T1]
-1.69 dB
466.933868 µs
RBW 100 kHz
VBW 100 kHz
SWT 2 ms
RF Att 20 dB
Unit dBm
1.5 dB Offset
1VIEW
SGL
IMA
TDF
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.441 GHz
200 µs/
Date: 21.JUN.2002 20:35:59

Channel 78


Ref Lvl
11.5 dBm
1.5 dB Offset
Delta 1 [T1]
-0.81 dB
466.933868 µs
RBW 100 kHz
VBW 100 kHz
SWT 2 ms
RF Att 20 dB
Unit dBm
SGL
1MA
TDF
1MAX
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.48 GHz
200 µs/
Date: 21.JUN.2002 20:37:04

4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

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

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

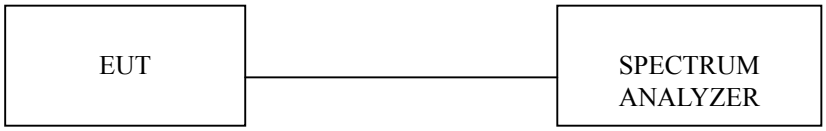
NOTES:

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

4.4.3 TEST PROCEDURE

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

4.4.4 TEST SETUP



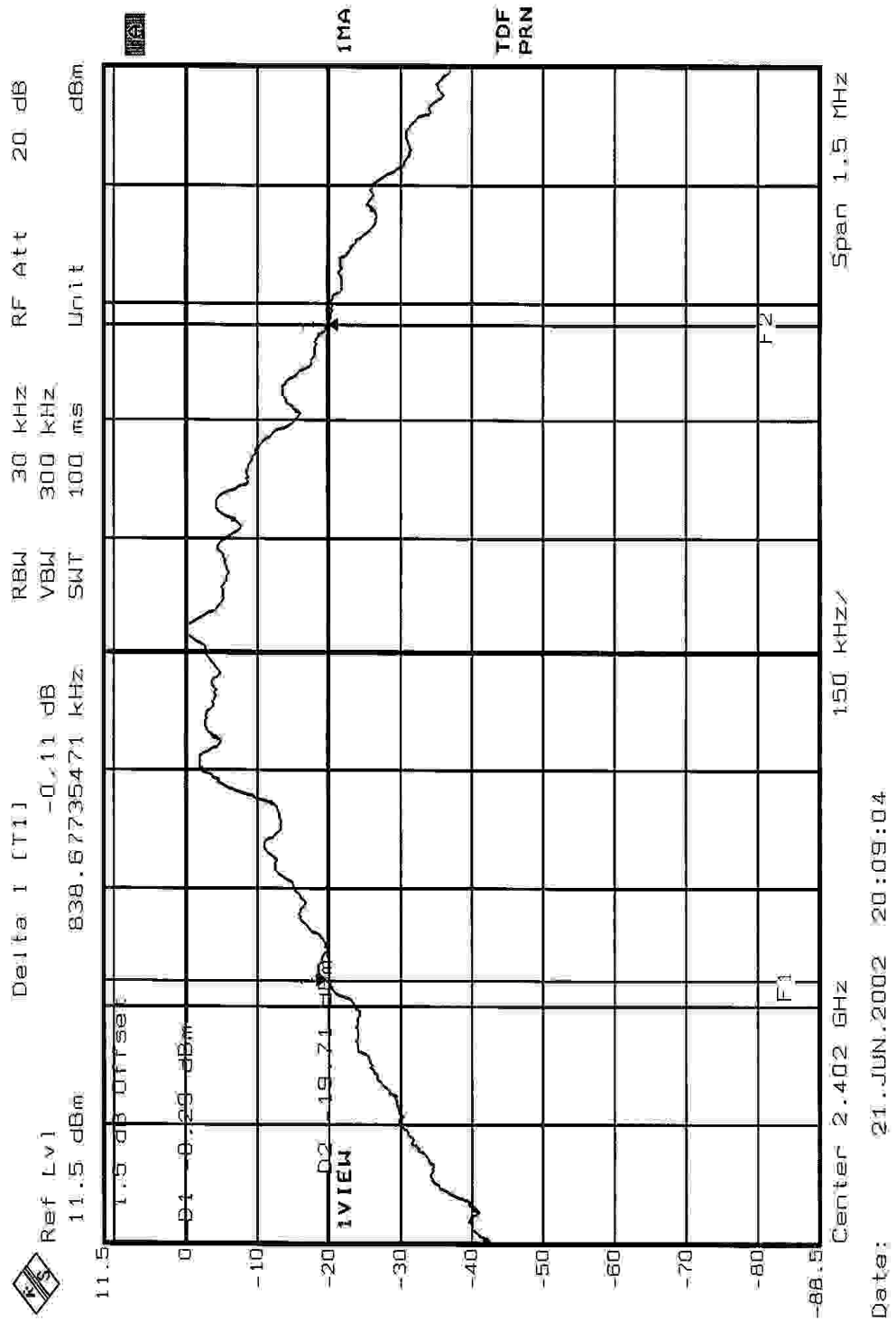
4.4.5 EUT OPERATING CONDITION

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

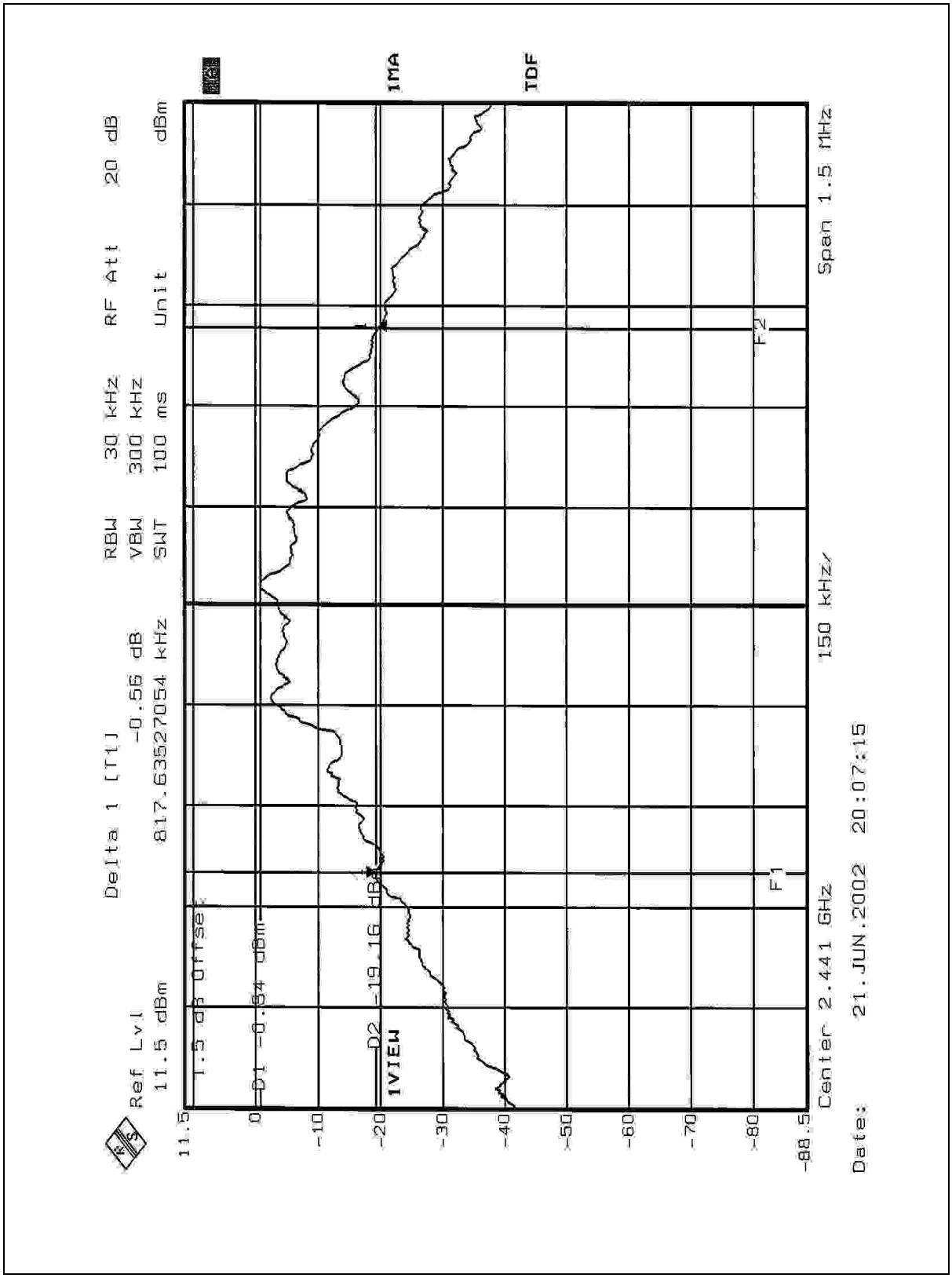
4.4.6 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20 dB BANDWIDTH (kHz)	MAXIMUM LIMIT (MHz)	PASS/FAIL
0	2402	838.677	1	PASS
39	2441	817.635	1	PASS
78	2480	838.677	1	PASS

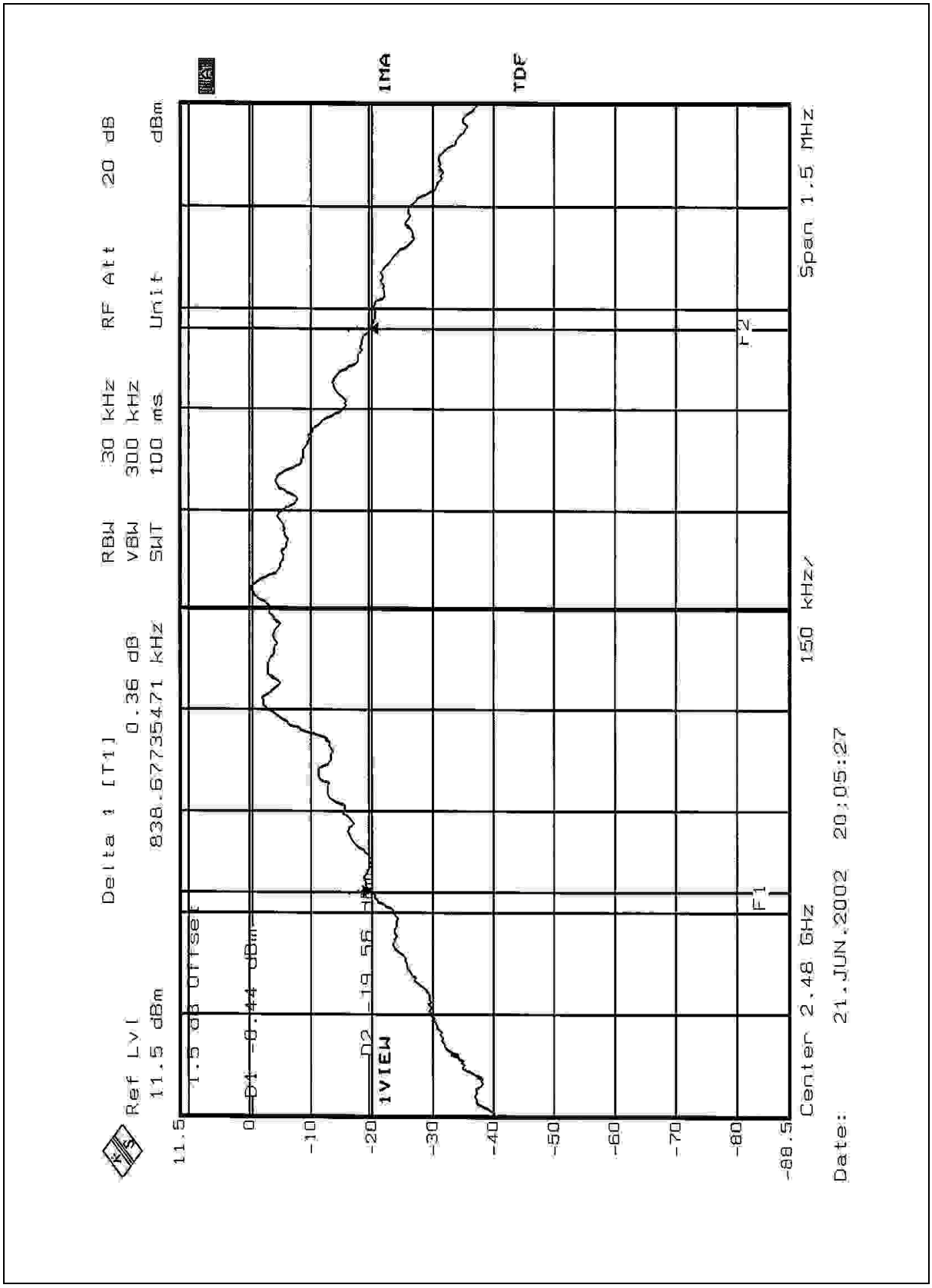
Channel 0


Ref Lvl
11.5 dBm
1.5 dB Offset
D1 -8.29 dBm
D2 19.71 dBm
Delta 1 [T1]
-0.11 dB
838.677354 71 kHz
RBW 30 kHz
VBW 300 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
PRN
1VIEW
F1
F2
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.402 GHz
150 kHz/
Span 1.5 MHz
Date: 21.JUN.2002 20:09:04

Channel 39


Ref Lvl
11.5 dBm
1.5 dB Offset
D1 -0.84 dBm
Delta 1 [T1]
-0.56 dB
817.63527054 kHz
D2 -19.16 dB
1VIEW
RBW 30 kHz
VBW 300 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
F1
F2
Center 2.441 GHz
150 kHz/
Span 1.5 MHz
Date: 21.JUN.2002 20:07:15

Channel 78


Ref Lvl
11.5 dBm
1.5 dB Offset
D1 -8.44 dBm
D2 -19.56 dBm
Delta 1 [T1]
0.36 dB
838.677354.71 kHz
RBW 30 kHz
VBW 300 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1VIEW
IMA
TDF
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
F1
F2
Center 2.48 GHz
150 kHz/
Span 1.5 MHz
Date: 21.JUN.2002 20:05:27

4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

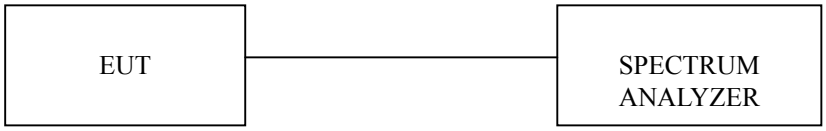
NOTES:

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

4.5.3 TEST PROCEDURES

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

4.5.4 TEST SETUP

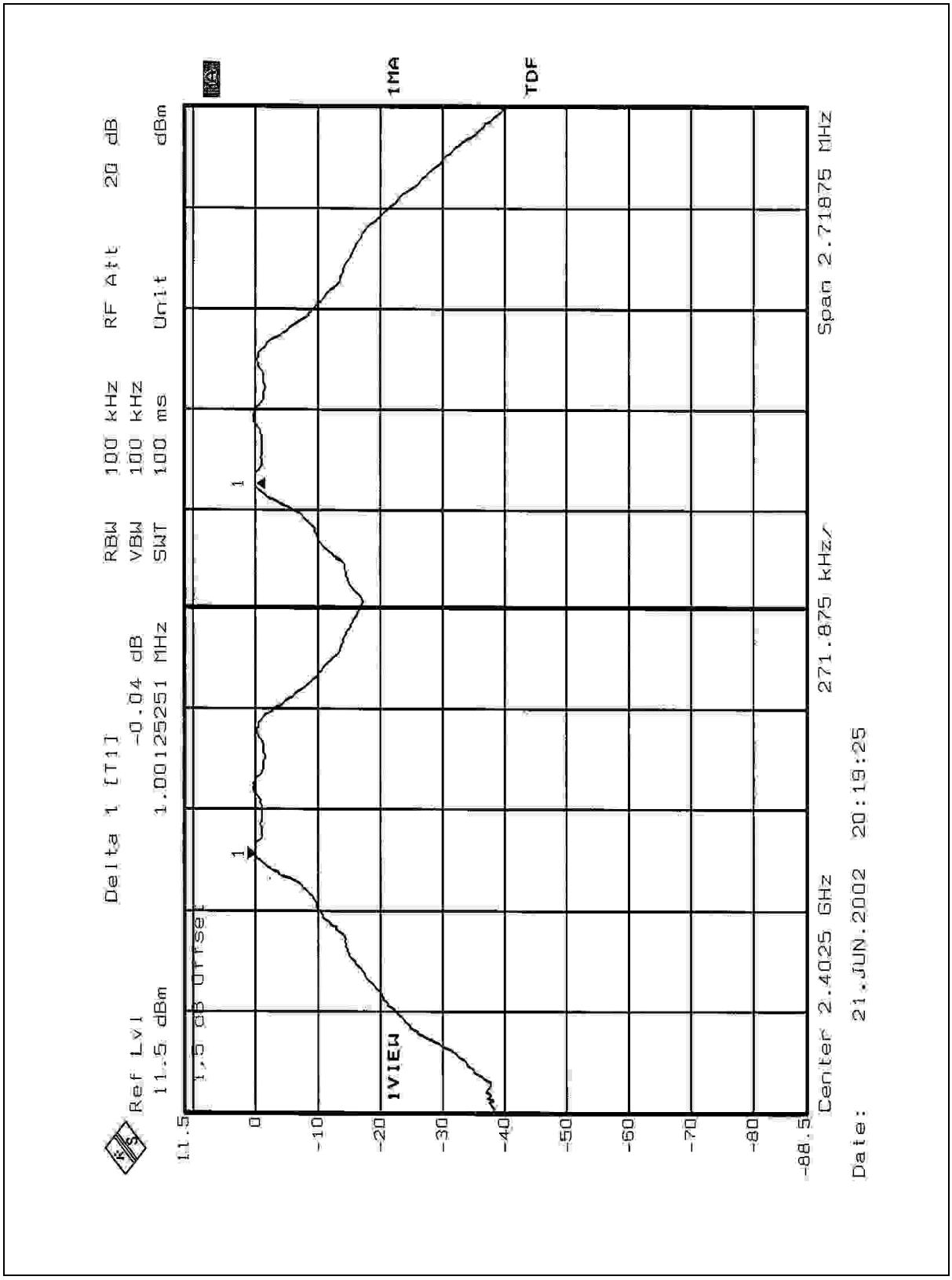


4.5.5 TEST RESULTS

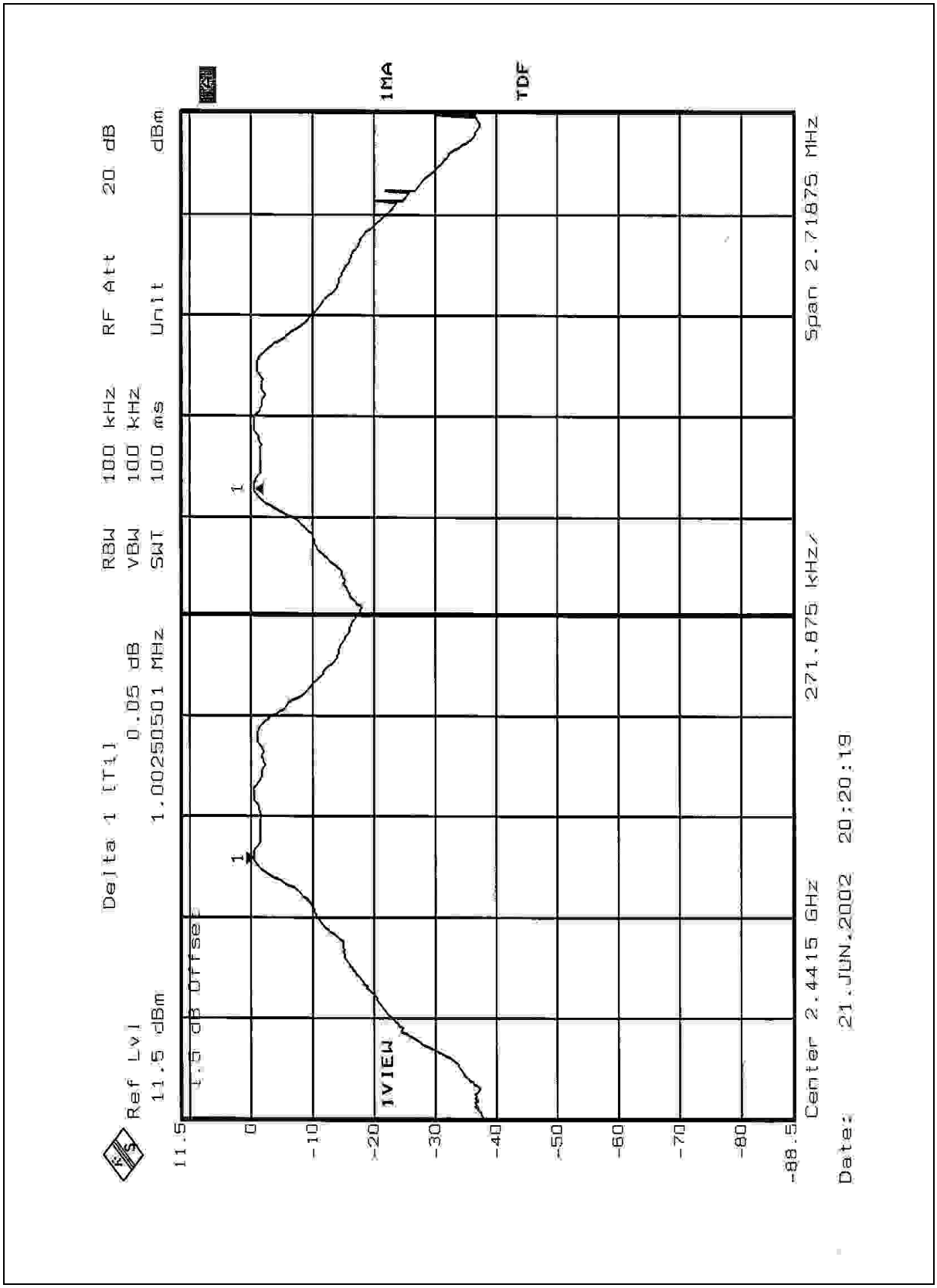
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	1MHz	838.677	PASS
39	2441	1MHz	817.635	PASS
78	2480	1MHz	838.677	PASS

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

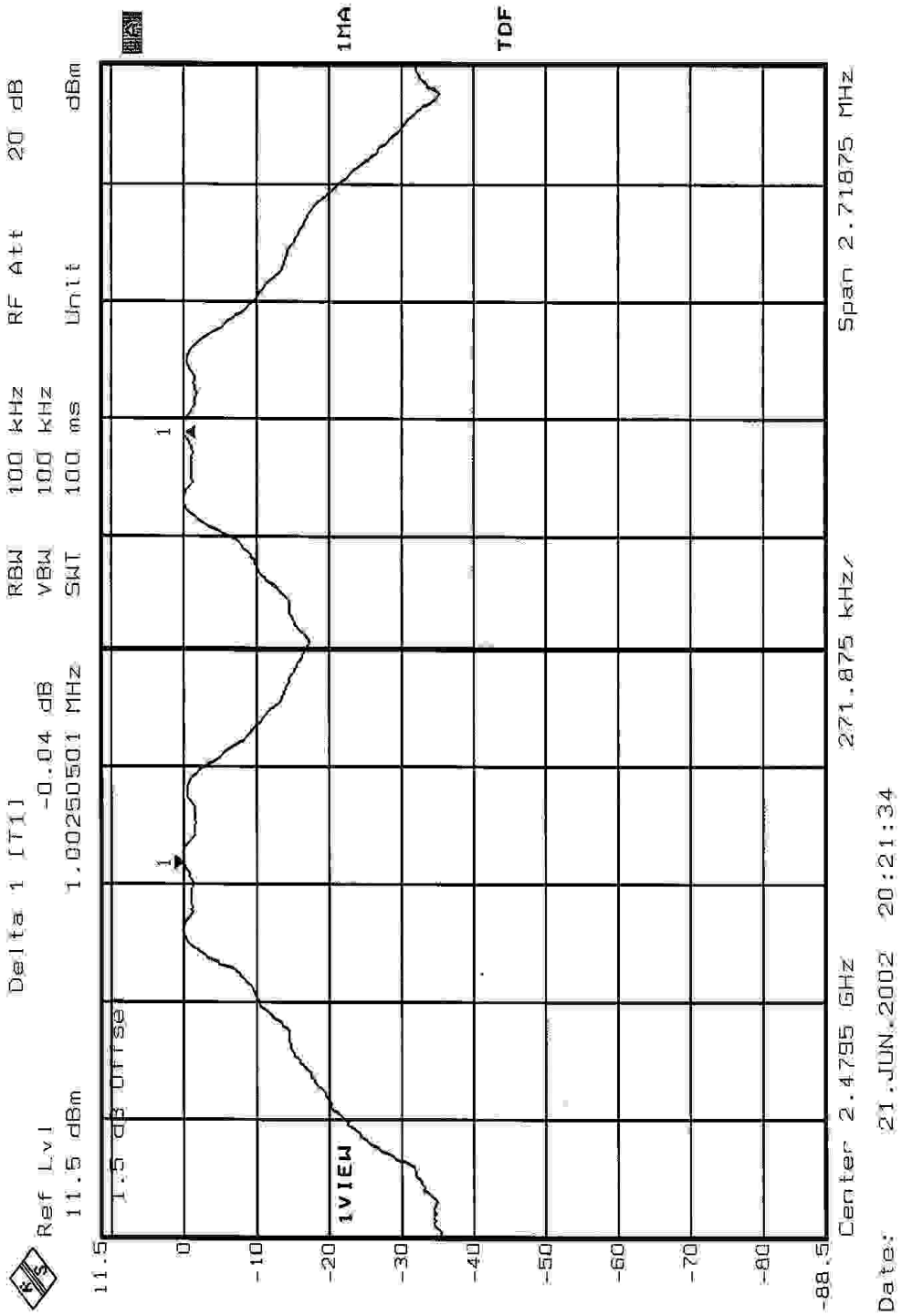
Channel 0


Ref Lvl
11.5 dBm
1.5 dB Offset
Delta 1 [T1]
-0.04 dB
1.00125251 MHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1VIEW
1MA
TDF
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.4025 GHz
271.875 kHz/
Span 2.71875 MHz
Date: 21.JUN.2002 20:19:25

Channel 39


Ref Lvl
11.5 dBm
1.5 dB Offset
Delta 1 [T1]
0.05 dB
1.00250501 MHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.4415 GHz
271.875 kHz/
Span 2.71875 MHz
Date: 21.JUN.2002 20:20:19

Channel 78


Ref Lvl
11.5 dBm
1.5 dB Offset
Delta 1 [T1]
-0.04 dB
1.00250501 MHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.4795 GHz
271.875 kHz/
Span 2.71875 MHz
Date: 21.JUN.2002 20:21:34

4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

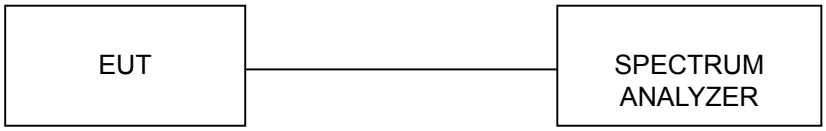
NOTES:

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

4.6.3 TEST PROCEDURES

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

4.6.4 TEST SETUP



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

4.6.5 EUT OPERATING CONDITION

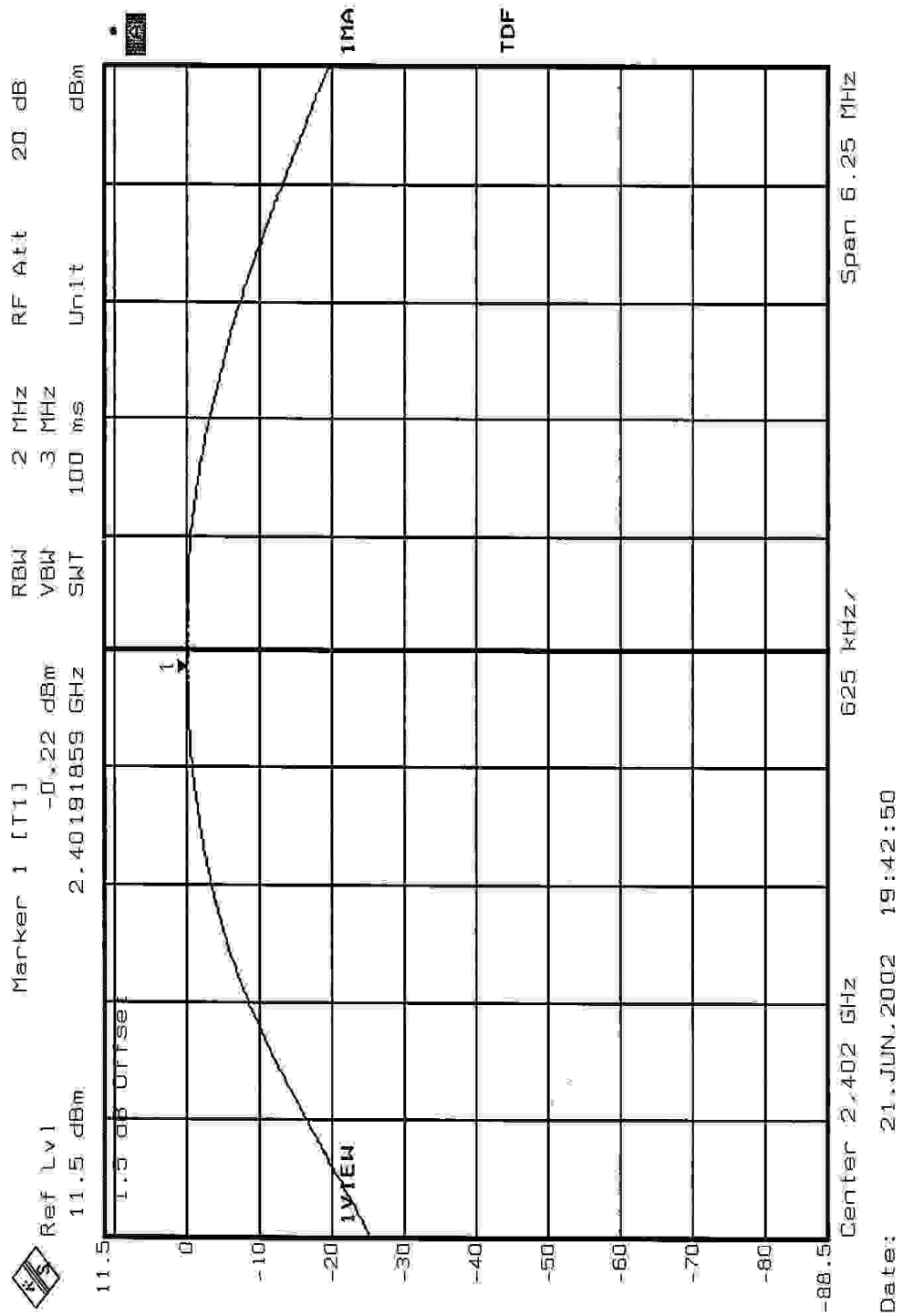
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.6 TEST RESULTS

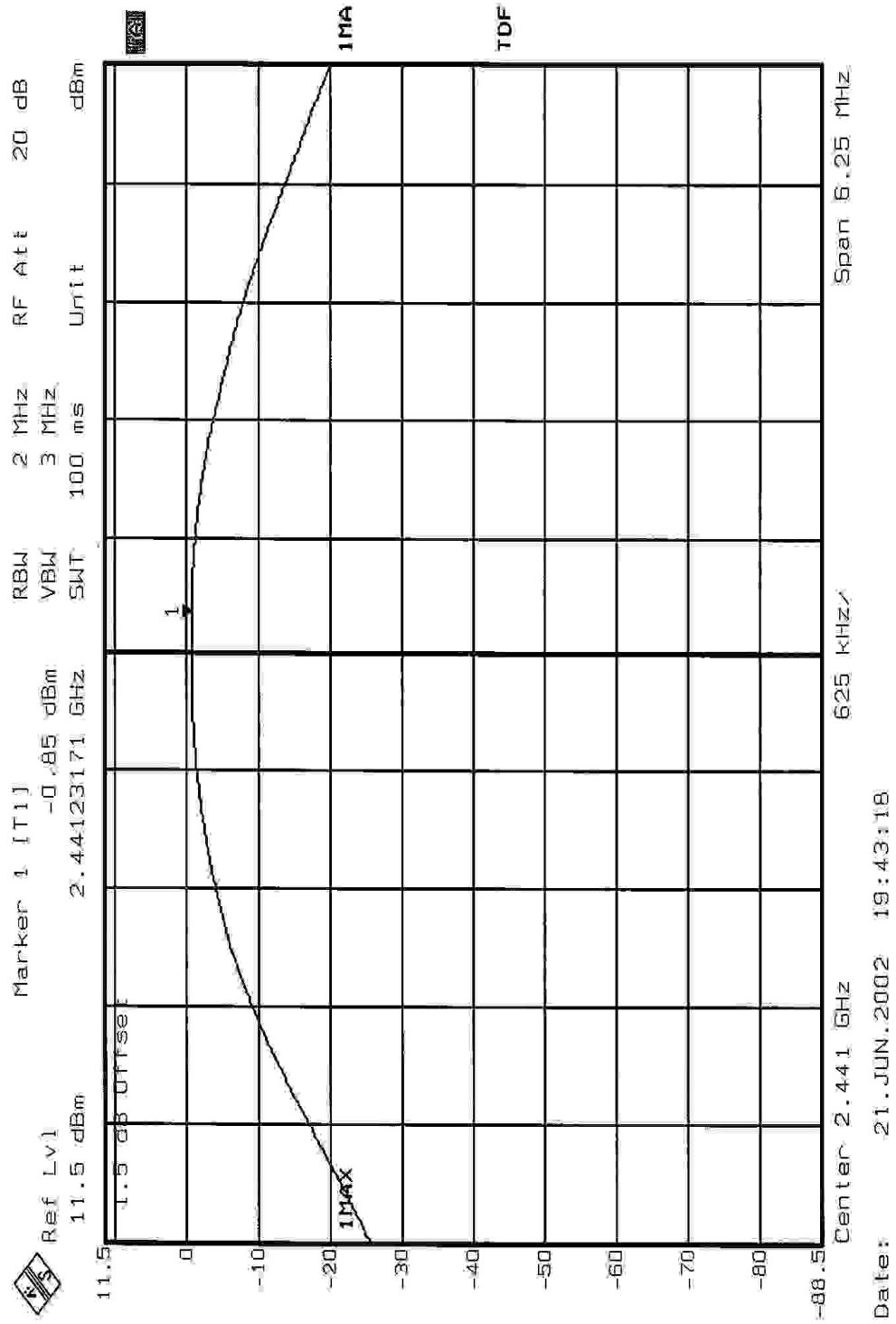
Output Power Into Antenna:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	-0.22	30	PASS
39	2441	-0.85	30	PASS
78	2480	-0.45	30	PASS

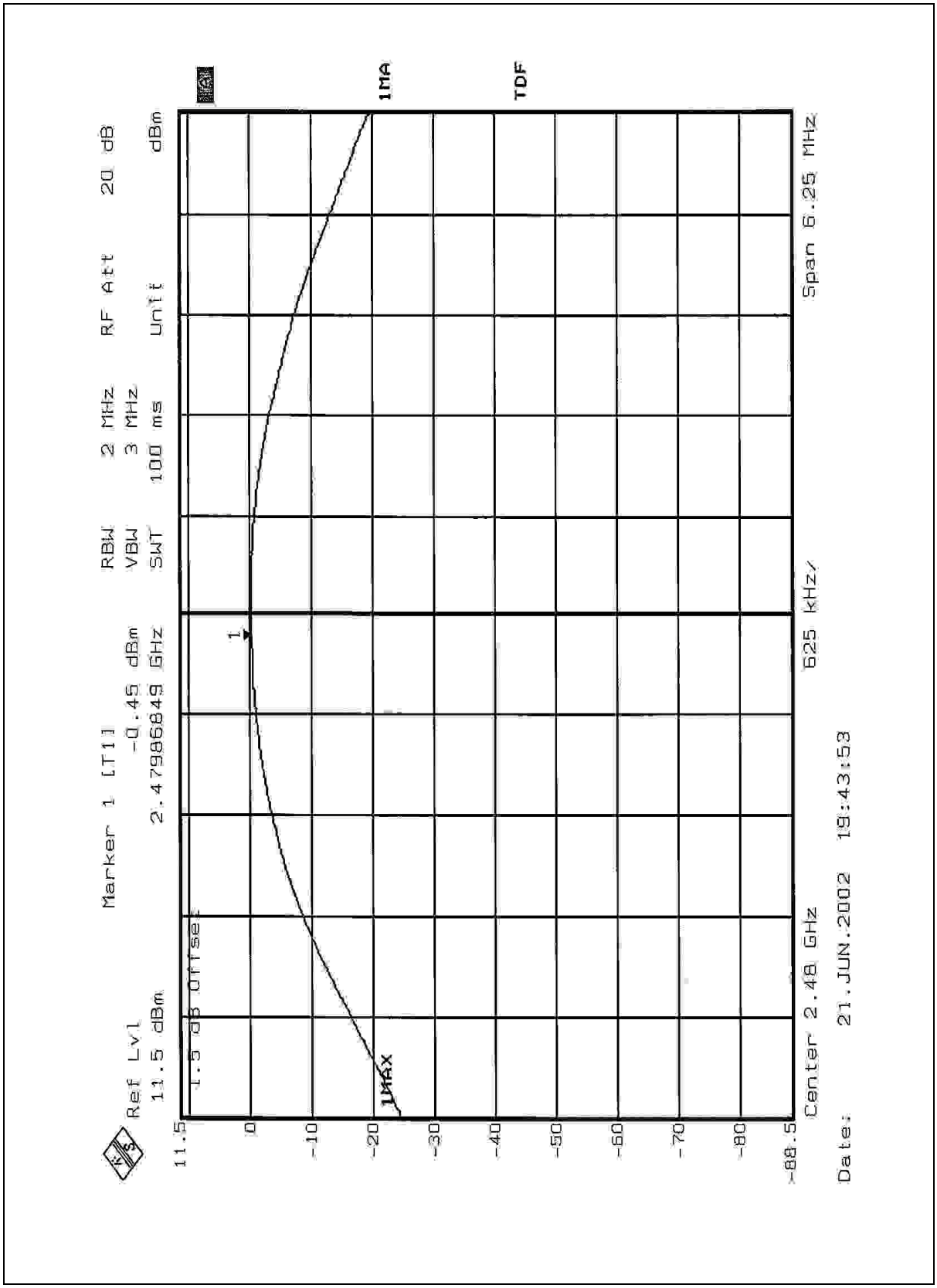
Channel 0


Ref Lvl
11.5 dBm
1.5 dB Offset
Marker 1 [T1]
-0.22 dBm
2.4019189 GHz
RBW 2 MHz
VBW 3 MHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1WTEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.402 GHz
625 kHz/
Span 6.25 MHz
Date: 21.JUN.2002 19:42:50

Channel 39


Ref Lvl
11.5 dBm
1.5 dB Offset
Marker 1 [T1]
-0.85 dBm
2.441231171 GHz
RBW 2 MHz
VBW 3 MHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1MAX
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.441 GHz
625 kHz/
Span 6.25 MHz
Date: 21.JUN.2002 19:43:18

Channel 78


Ref Lvl
11.5 dBm
1.5 dB Offset
Marker 1 [T1]
-0.45 dBm
2.479686849 GHz
RBW 2 MHz
VBW 3 MHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1MAX
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.48 GHz
625 kHz/
Span 6.25 MHz
Date: 21.JUN.2002 19:43:53

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	May 13, 2003
* HP Preamplifier	8447D	2944A08485	Oct. 30, 2002
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2002
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 27, 2003
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2002
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2002
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 6, 2002
* EMCO Horn Antenna	3115	9312-4192	April 9, 2003
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D4	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 2, 2002
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 2, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2002
VCCI Site Registration No.	Site 5	R-1039	NA

NOTE: 1.The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.

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

3. "*" = These equipment are used for the final measurement.

4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

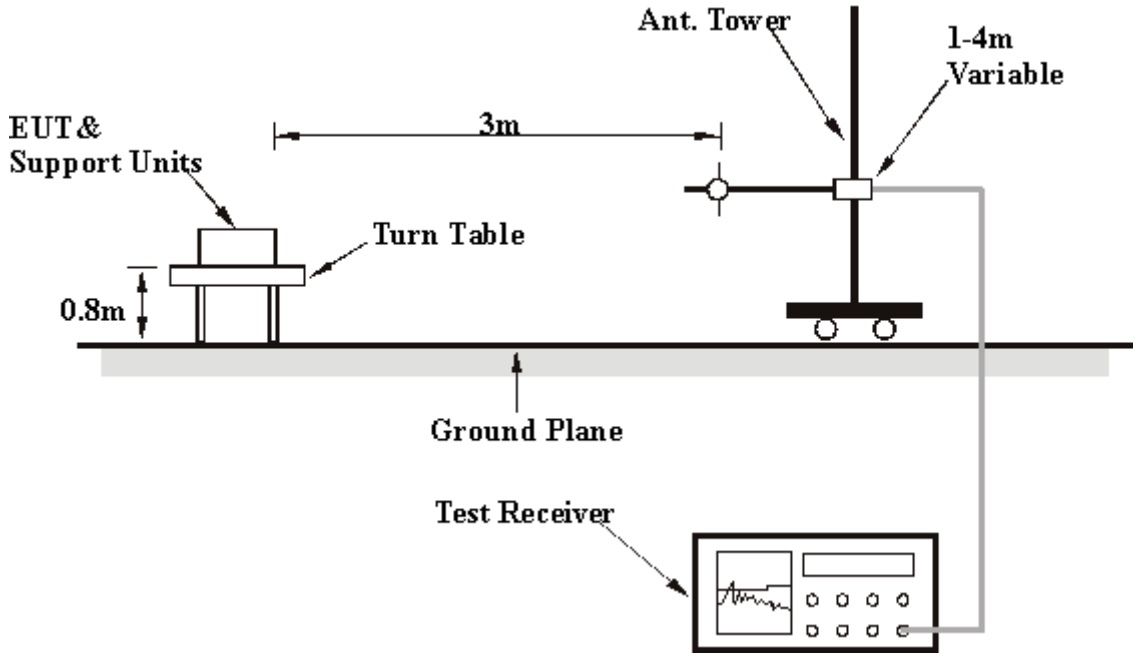
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

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

4.7.4 TEST SETUP



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

4.7.5 TEST RESULTS (A)

Digital Portion:

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	80.00	18.2 QP	40.00	-21.80	1.05H	3	9.75	7.33	1.12	0.00	-8.45
2	128.00	12.8 QP	43.50	-30.70	1.21H	17	0.20	11.37	1.23	0.00	-12.60
3	144.00	16.5 QP	43.50	-27.00	1.15H	292	4.64	10.58	1.28	0.00	-11.86
4	160.00	18.0 QP	43.50	-25.50	1.32H	39	7.00	9.62	1.38	0.00	-11.01
5	208.00	25.3 QP	43.50	-18.20	1.38H	83	14.46	9.40	1.45	0.00	-10.85
6	224.00	22.7 QP	46.00	-23.30	1.44H	169	10.74	10.41	1.56	0.00	-11.96
7	240.00	19.9 QP	46.00	-26.10	1.57H	273	6.82	11.41	1.67	0.00	-13.09
8	300.00	24.3 QP	46.00	-21.70	2.79H	80	9.24	13.18	1.88	0.00	-15.07
9	320.00	24.0 QP	46.00	-22.00	1.74H	315	8.40	13.62	1.98	0.00	-15.61
10	336.00	21.0 QP	46.00	-25.00	1.63H	235	5.03	13.92	2.05	0.00	-15.98
11	600.00	25.7 QP	46.00	-20.30	1.49H	12	4.24	18.61	2.85	0.00	-21.47
12	915.00	26.3 QP	46.00	-19.70	2.59H	72	1.68	20.92	3.69	0.00	-24.63

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	80.00	27.8 QP	40.00	-12.20	1.07V	2	48.06	7.33	1.12	28.71	20.26
2	160.00	20.9 QP	43.50	-22.60	1.12V	252	38.61	9.62	1.38	28.71	17.71
3	216.00	17.9 QP	43.50	-25.60	1.31V	99	35.16	9.97	1.51	28.71	17.23
4	240.00	25.9 QP	46.00	-20.10	1.72V	103	41.53	11.41	1.67	28.71	15.63
5	320.00	20.8 QP	46.00	-25.20	1.18V	85	33.90	13.62	1.98	28.71	13.10
6	336.00	22.9 QP	46.00	-23.10	1.60V	223	35.64	13.92	2.05	28.71	12.74
7	360.00	21.4 QP	46.00	-24.60	1.76V	95	33.40	14.58	2.13	28.71	12.00
8	384.00	18.6 QP	46.00	-27.40	1.56V	194	29.66	15.50	2.15	28.71	11.06
9	432.00	22.9 QP	46.00	-23.10	1.26V	52	33.05	16.28	2.28	28.71	10.16
10	460.00	29.0 QP	46.00	-17.00	1.48V	155	38.80	16.53	2.37	28.71	9.82
11	528.00	22.0 QP	46.00	-24.00	1.26V	131	30.47	17.62	2.62	28.71	8.48
12	720.00	23.5 QP	46.00	-22.50	1.37V	124	29.25	19.68	3.28	28.71	5.76

RF Portion :

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 0	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	97.9 PK	-	-	1.38H	32	65.70	27.11	5.10	0.00	-32.21
2	*2402.00	80.0 AV	-	-	1.38H	32	47.80	27.11	5.10	0.00	-32.21
3	4804.00	42.5 AV	54.00	-11.50	1.57H	147	38.48	31.43	7.23	34.63	-4.02
4	4804.00	52.2 PK	74.00	-21.80	1.57H	147	48.20	31.43	7.23	34.63	-4.02

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	72.9 AV	-	-	1.27V	94	40.70	27.11	5.10	0.00	-32.21
2	*2402.00	87.6 PK	-	-	1.27V	94	55.40	27.11	5.10	0.00	-32.21
3	4804.00	43.0 AV	54.00	-11.00	1.08V	46	39.00	31.43	7.23	34.63	-4.02
4	4804.00	53.5 PK	74.00	-20.50	1.08V	46	49.50	31.43	7.23	34.63	-4.02

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	79.6 AV	-	-	1.38H	48	47.20	27.33	5.08	0.00	-32.40
2	*2441.00	96.8 PK	-	-	1.38H	48	64.40	27.33	5.08	0.00	-32.40
3	4882.00	42.1 AV	54.00	-11.90	1.31H	45	38.00	31.47	7.21	34.63	-4.05
4	4882.00	52.3 PK	74.00	-21.70	1.31H	45	48.20	31.47	7.21	34.63	-4.05

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	90.6 PK	-	-	1.26V	97	58.20	27.33	5.08	0.00	-32.40
2	*2441.00	74.8 AV	-	-	1.26V	97	42.40	27.33	5.08	0.00	-32.40
3	4882.00	44.9 AV	54.00	-9.10	1.25V	3	40.80	31.47	7.21	34.63	-4.05
4	4882.00	55.1 PK	74.00	-18.9	1.25V	3	51.00	31.47	7.21	34.63	-4.05.

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	77.8 AV	-	-	1.56H	51	45.20	27.54	5.06	0.00	-32.59
2	*2480.00	94.5 PK	-	-	1.56H	51	61.90	27.54	5.06	0.00	-32.59
3	4960.00	45.7 AV	54.00	-8.30	1.35H	48	41.50	31.55	7.26	34.61	-4.21
4	4960.00	55.7 PK	74.00	-18.3	1.35H	48	51.50	31.55	7.26	34.61	-4.21.

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	89.7 PK	-	-	1.29V	19	57.10	27.54	5.06	0.00	-32.59
2	*2480.00	74.9 AV	-	-	1.29V	19	42.30	27.54	5.06	0.00	-32.59
3	4960.00	43.1 AV	54.00	-10.90	1.51V	4	38.90	31.55	7.26	34.61	-4.21
4	4960.00	52.4 PK	74.00	-21.60	1.51V	4	48.20	31.55	7.26	34.61	-4.21

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

4.7.6 TEST RESULTS (B)

Digital Portion:

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	80.00	18.3 QP	40.00	-21.70	1.54H	337	9.85	7.33	1.12	0.00	-8.45
2	128.00	14.0 QP	43.50	-29.50	1.66H	262	1.40	11.37	1.23	0.00	-12.60
3	144.00	16.0 QP	43.50	-27.50	1.39H	185	4.14	10.58	1.28	0.00	-11.86
4	208.00	25.7 QP	43.50	-17.80	1.34H	114	14.86	9.40	1.45	0.00	-10.84
5	224.00	24.3 QP	46.00	-21.70	1.56H	70	12.34	10.41	1.56	0.00	-11.96
6	240.00	17.0 QP	46.00	-29.00	1.16H	144	3.92	11.41	1.67	0.00	-13.08
7	300.00	25.8 QP	46.00	-20.20	1.11H	224	10.74	13.18	1.88	0.00	-15.06
8	320.00	23.3 QP	46.00	-22.70	1.06H	316	7.70	13.62	1.98	0.00	-15.61
9	336.00	17.5 QP	46.00	-28.50	1.12H	3	1.53	13.92	2.05	0.00	-15.98
10	460.00	20.7 QP	46.00	-25.30	1.55H	138	1.80	16.53	2.37	0.00	-18.91
11	600.00	20.7 QP	46.00	-25.30	1.06H	193	-0.76	18.61	2.85	0.00	-21.46
12	915.00	24.4 QP	46.00	-21.60	1.86H	110	-0.22	20.92	3.69	0.00	-24.62

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	80.00	28.8 QP	40.00	-11.20	1.43V	100	20.35	7.33	1.12	0.00	-8.45
2	160.00	23.4 QP	43.50	-20.10	1.30V	36	12.40	9.62	1.38	0.00	-11.00
3	216.00	25.9 QP	43.50	-17.60	1.37V	35	14.42	9.97	1.51	0.00	-11.48
4	240.00	24.4 QP	46.00	-21.60	1.65V	143	11.32	11.41	1.67	0.00	-13.08
5	320.00	15.9 QP	46.00	-30.10	1.23V	36	0.30	13.62	1.98	0.00	-15.60
6	336.00	20.4 QP	46.00	-25.60	1.60V	291	4.43	13.92	2.05	0.00	-15.98
7	360.00	21.5 QP	46.00	-24.50	1.54V	321	4.79	14.58	2.13	0.00	-16.72
8	384.00	17.7 QP	46.00	-28.30	1.39V	161	0.05	15.50	2.15	0.00	-17.66
9	432.00	24.5 QP	46.00	-21.50	1.83V	105	5.94	16.28	2.28	0.00	-18.57
10	460.00	33.8 QP	46.00	-12.20	1.18V	218	14.90	16.53	2.37	0.00	-18.90
11	528.00	21.3 QP	46.00	-24.70	1.08V	306	1.06	17.62	2.62	0.00	-20.24
12	720.00	21.9 QP	46.00	-24.10	1.48V	177	-1.06	19.68	3.28	0.00	-22.96

RF Portion :

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 0	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	73.5 AV	-	-	1.05H	43	41.33	27.11	5.10	0.00	-32.21
2	*2402.00	88.1 PK	-	-	1.05H	43	55.90	27.11	5.10	0.00	-32.21
3	4804.00	50.8 PK	74.00	-23.20	1.04H	11	46.80	31.43	7.23	34.63	-4.02
4	4804.00	39.6 AV	54.00	-14.40	1.04H	11	35.60	31.43	7.23	34.63	-4.02

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	70.8 AV	-	-	1.24V	48	38.60	27.11	5.10	0.00	-32.21
2	*2402.00	84.5 PK	-	-	1.24V	48	52.30	27.11	5.10	0.00	-32.21
3	4804.00	42.0 AV	54.00	-12.00	1.26V	104	38.00	31.43	7.23	34.63	-4.02
4	4804.00	52.9 PK	74.00	-21.10	1.26V	104	48.90	31.43	7.23	34.63	-4.02

NOTE:

6. Emission level = Raw value - Correction Factor
7. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
8. Margin value = Emission level - Limit value
9. " * " : Fundamental frequency
10. The other emission levels were very low against the limit.

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 39	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	90.3 PK	-	-	1.12H	47	57.90	27.33	5.08	0.00	-32.40
2	*2441.00	74.2 AV	-	-	1.12H	47	41.80	27.33	5.08	0.00	-32.40
3	4882.00	44.4 AV	54.00	-9.60	1.24H	36	40.30	31.47	7.21	34.63	-4.05
4	4882.00	55.0 PK	74.00	-19.00	1.24H	36	50.90	31.47	7.21	34.63	-4.05.

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	72.2 AV	-	-	1.46V	50	39.80	27.33	5.08	0.00	-32.40
2	*2441.00	86.7 PK	-	-	1.46V	50	54.30	27.33	5.08	0.00	-32.40
3	4880.00	43.6 AV	54.00	-10.40	1.51V	38	39.50	31.47	7.21	34.63	-4.05
4	4880.00	53.2 PK	74.00	-20.80	1.51V	38	49.10	31.47	7.21	34.63	-4.05

NOTE:

6. Emission level = Raw value - Correction Factor
7. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
8. Margin value = Emission level - Limit value
9. " * " : Fundamental frequency
10. The other emission levels were very low against the limit.

EUT	Bluetooth Module	**MODEL**	BT-0002M
MODE	Channel 78	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Bunny Yao	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	75.5 AV	-	-	1.23H	34	42.95	27.54	5.06	0.00	-32.59
2	*2480.00	91.4 PK	-	-	1.23H	34	58.80	27.54	5.06	0.00	-32.59
3	4960.00	53.8 PK	74.00	-20.20	1.09H	68	49.60	31.55	7.26	34.61	-4.21
4	4960.00	44.3 AV	54.00	-9.70	1.09H	68	40.10	31.55	7.26	34.61	-4.21

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	74.4 AV	-	-	1.41V	51	41.80	27.54	5.06	0.00	-32.59
2	*2480.00	89.5 PK	-	-	1.41V	51	56.90	27.54	5.06	0.00	-32.59
3	4960.00	44.2 AV	54.00	-9.80	1.51V	64	40.00	31.55	7.26	34.61	-4.21
4	4960.00	54.3 PK	74.00	-19.7	1.51V	64	50.10	31.55	7.26	34.61	-4.21.

NOTE:

6. Emission level = Raw value - Correction Factor
7. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
8. Margin value = Emission level - Limit value
9. " * " : Fundamental frequency
10. The other emission levels were very low against the limit.

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

Notes:

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

4.8.3 TEST PROCEDURE

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

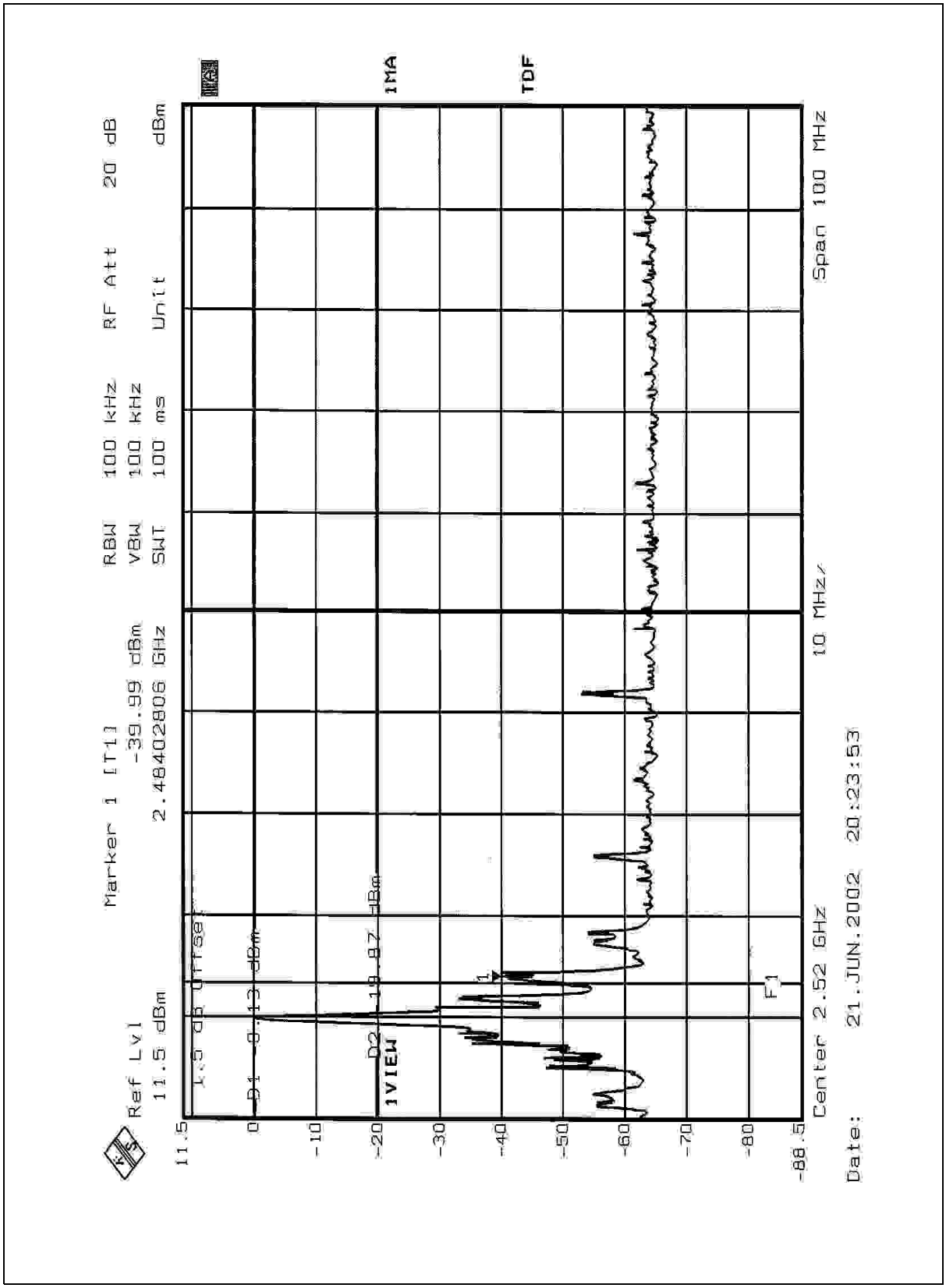
4.8.4 EUT OPERATING CONDITION

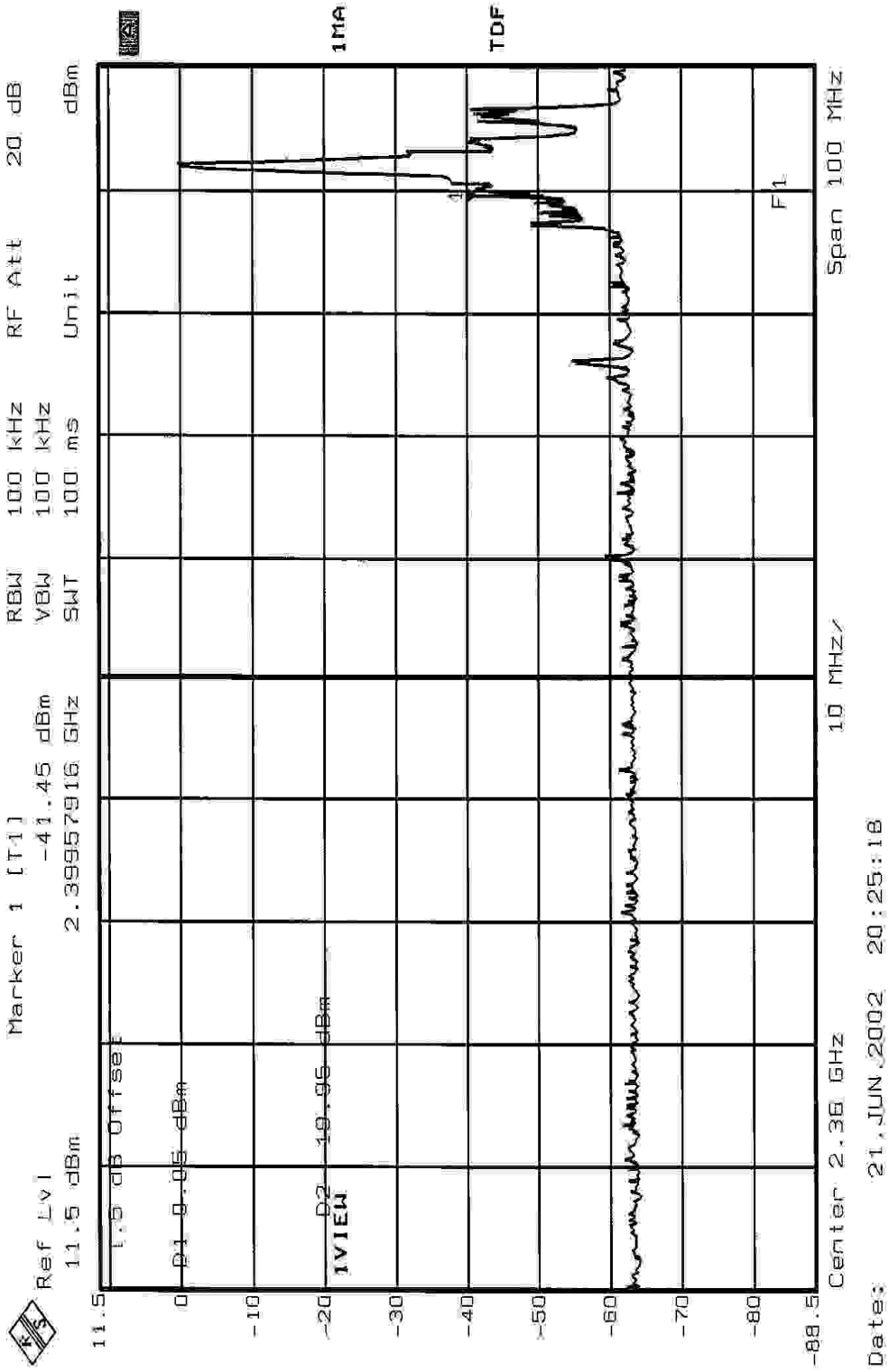
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.5 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(C).

NOTE: The band edge emission plot on the following 2 pages shows 39.86dB delta between carrier maximum power and local maximum emission in restrict band (2.4840GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.5 (Page 58) is 77.8dBuV/m, so the maximum field strength in restrict band is 77.8-39.86=37.94 dBuV/m which is under 54 dBuV/m limit.


Ref Lvl
11.5 dBm
1.5 dB Offset
D1 -8.13 dBm
D2 19.87 dBm
Marker 1 [T1]
-39.99 dBm
2.48402806 GHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5
Center 2.52 GHz
10 MHz/
Span 100 MHz
Date: 21.JUN.2002 20:23:53


Ref Lvl
11.5 dBm
1.5 dB Offset
D1 0.05 dBm
D2 19.95 dBm
Marker 1 [T1]
-41.45 dBm
2.39957916 GHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 20 dB
Unit dBm
1MA
TDF
1VIEW
F1
Span 100 MHz
10 MHz/
Center 2.38 GHz
Date: 21.JUN.2002 20:25:18
11.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.5

4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

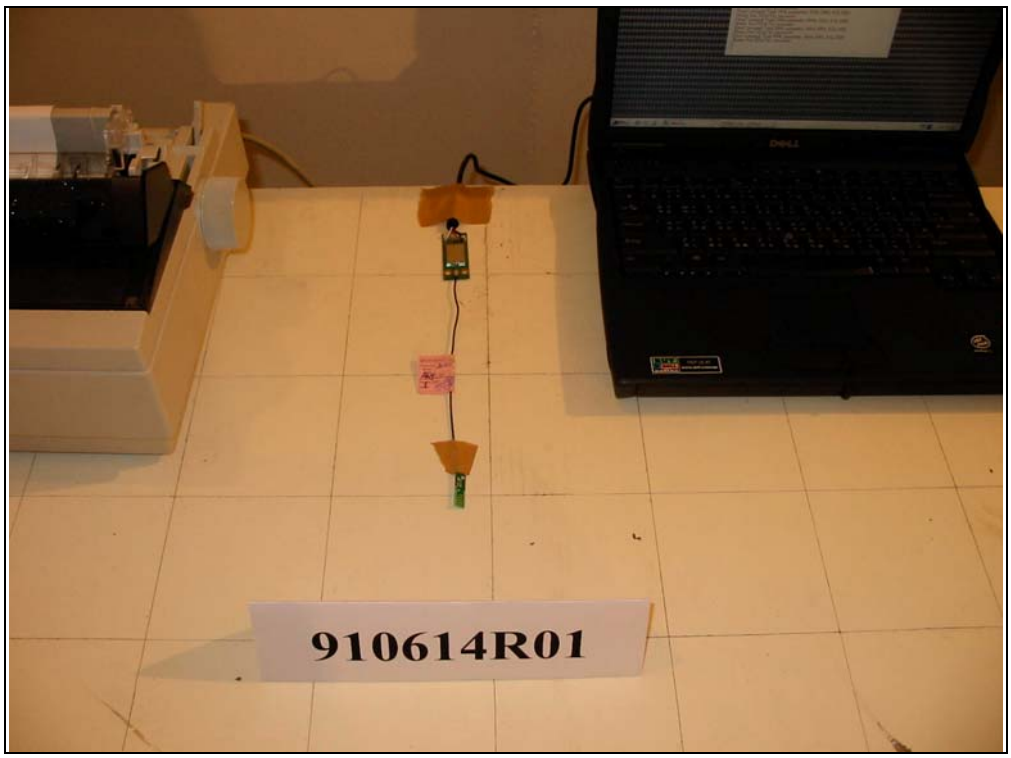
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

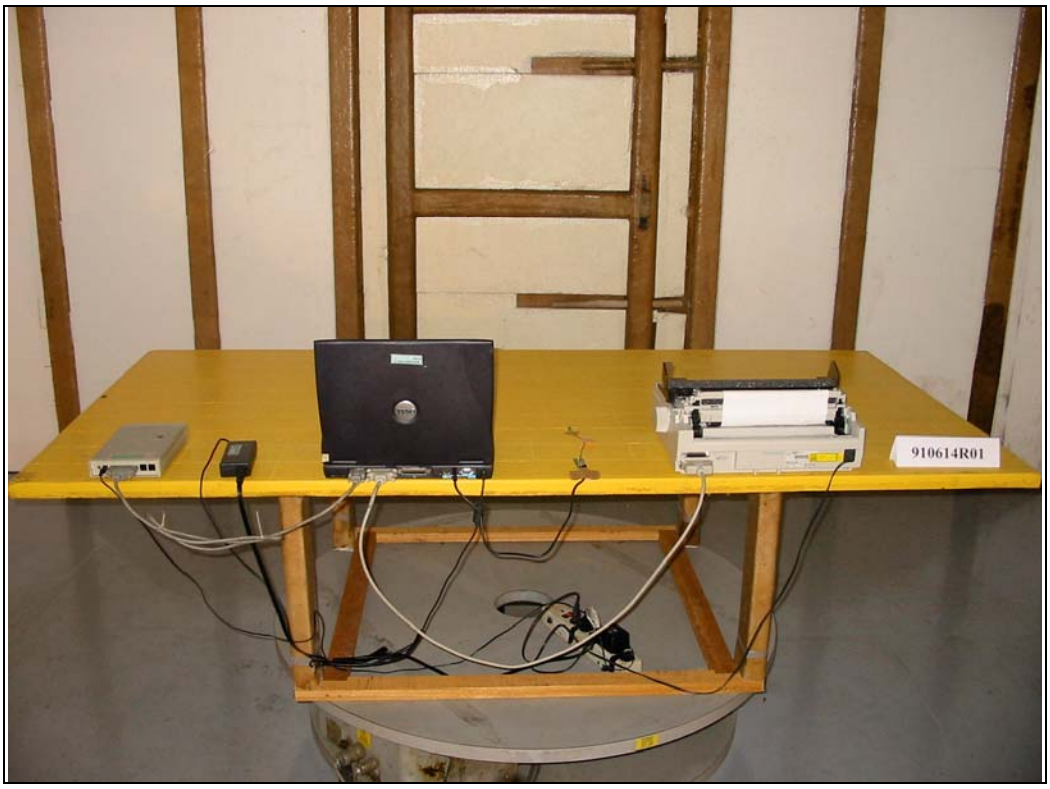
The antenna used in this product are Inverted F Antenna and Printed dipole Antenna. The antenna connector is UFL. The maximum Gain of this antenna is only -2dBi.

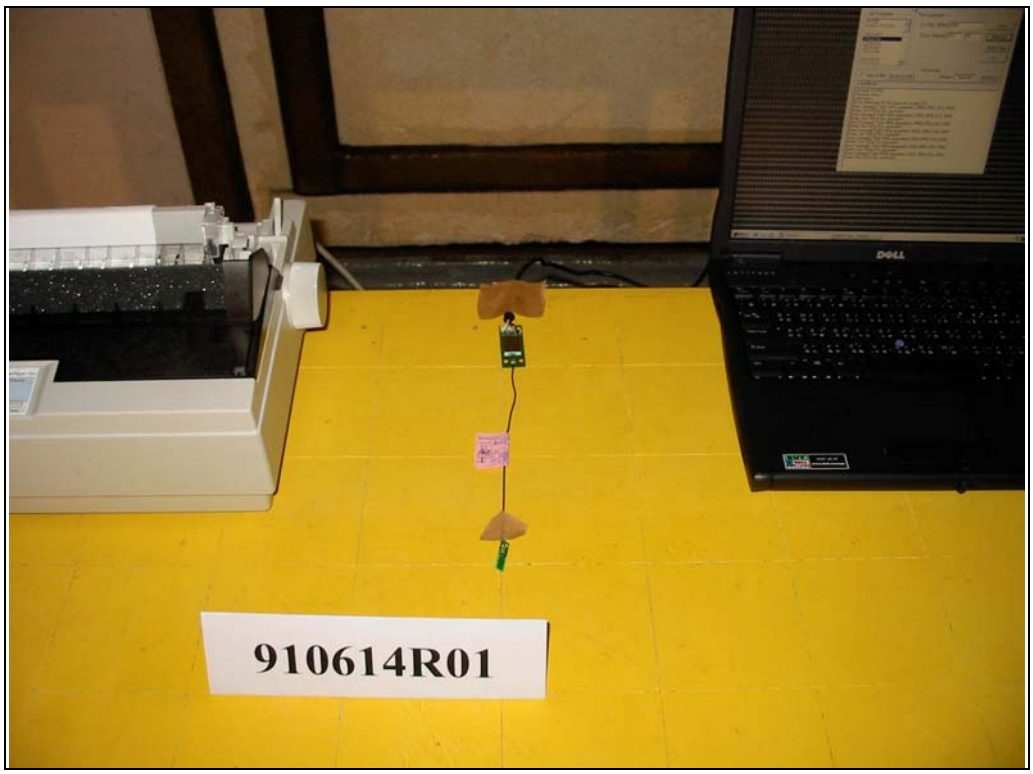
5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST


910614R01

RADIATED EMISSION TEST




910614R01

6 INFORMATION ON THE TESTING LABORATORIES

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

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

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

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

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