TEST REPORT

Product Name	:	Bluetooth Headset
Product ID	:	GG301x
Applicant	:	G.G. Telecom(2002) Inc.
Address of Applicant	:	5F, No. 186,Sec. 2,Chung-Hsing Road Hsin Tien city, Taipei, Taiwan, R.O.C.

Standards:

FCC Part 15 subpart C

In the configuration tested, the EUT complied with the standards specified above.
The test data, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4(1992).

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan E&E Services or testing done by SGS Taiwan E&E Services in connection with distribution or use of the product described in this report must be approved by SGS Taiwan E&E Services in writing.

Tested by	:	**Alex Hsieh**	**Date**	:	**Jun. 5, 2003**
Approved by	:	**Robert Chang**	**Date**	:	**Jun. 6, 2003**

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1. General Information

1.1 Testing Laboratory

SGS Taiwan Ltd. (FCC Registration number: 573967)
1F, No. 134, Wukung Road, Wuku industrial zone
Taipei county , Taiwan , R.O.C.
Telephone : +886-2-2299-3279
Fax : +886-2-2298-2698
Internet : http://www.sgs.com.tw

1.2 Details of Applicant

Name : G.G. Telecom(2002) Inc.
Address : 5F, No. 186,Sec. 2,Chung-Hsing Road, Hsin Tien city, Taipei, Taiwan, R.O.C.
Contact : Mr. Jimmy Chu
Telephone : +886-2-29111648 ext 608

1.3 Description of EUT(s)

1	Product name	Bluetooth Headset
2	Product ID	GG301x
3	Supply Voltage	DC 3.3V
4	Carrier Frequency	2402MHz to 2480MHz
5	Modulation Method	GFSK,1Mbps,0.5BT Gaussian
6	Hopping	1600hops/sec, 1MHz channel space
7	Operation Temperature	0 to +60 degree
8	Compliant	Bluetooth Specification Ver1.1

1.4 Operation Procedure

Since Bluetooth is a FHSS system, it is difficult to measure the parameters under hopping mode. The output power and operating frequency are NOT End-user adjustable. Applicant offer a engineering software “BlueTest” install in PC to control the EUT. And the applicant provide an additional UART interface to control this Headset. Operating frequency are set as testing required. The output power is set as Ext=255, Int=50.

The lowest operating frequency within Bluetooth specification is 2402Mhz, and highest operating frequency is 2480Mhz. So the frequency above are used as the lowest and highest frequency in the testing, and the middle frequency is set as 2441Mhz.

The pseudorandom hopping sequence is produced by the Bluesuite software which is provided by the manufacturer of the chipset.

1.5 Testing Method

The testing standard follows CFR 47, Part 15.247 , and measurement method according to Public Notice DA00-705 (March 2000).

2.Summary of Results

subclause	Parameter to be measures	Verdict	Page
15.207	Conducted Limits	*PASS*	7
15.209	Radiated emission Limits, general requirement	*PASS*	10
15.247(a)(1)	Channel Spacing	*PASS*	17
15.247(a)(1)(ii)	20db bandwidth / No. of channels	*PASS*	19
15.247(a)(1)(ii)	Average Time of Occupacy	*PASS*	24
15.247(b)(1)	Peak Output power	*PASS*	27
15.247(c)	Band-Edge Emission	*PASS*	30
15.247(c)	Spurious Emission under 25Ghz	*PASS*	32

3. Instruments List

Instrument	Model	Serial number	Calibration date
Desktop PC	HP Pavillion 723D	N/A	N/A
Spectrum Analyzer	R&S FSP 40	100034	Mar. 27, 2003
Antenna	Schwarzbeck BBHA9170A	184/185	July 01, 2002
Antenna	Schwarzbeck BBHA9120A	309/320	July 01, 2002
Antenna	Schwarzbeck VULB9163	152	July 01, 2002
Signal generator	R&S SMR 40	100210	Feb. 11, 2003
EMC Analyzer	HP 8594EM	3624A00203	Dec. 13, 2002
EMI Test Receiver	R&S ESCS 30	828985/004	Oct. 11, 2002
Transient Limiter	HP 11947A	3107A02062	Jul. 24, 2002
L.I.S.N	Rolf-Heine NNB-2/16Z	99012	Oct. 08, 2002

4. Measurements

4.1 Conducted Limits SUBCLAUSE 15.207

Line

Product Name: Bluetooth headset Test Date: May,26,2003

Model No.: GG301 Tester : Gallon

Test Mode: Operation Mode Temperature: 26 ℃

Test Result: PASS Humidity: 57 %

Main Terminals:L

FREQ MHz	QP1 dBuV	AVG1 dBuV	Factor	QP2 dBuV	AVG2 dBuV	QP Limit	AV Limit	QP Offset	AV Offset
0.15	28.8	12.5	3.00	31.80	15.50	66.00	56.00	-34.20	-40.50
0.17	25.1	17.4	2.96	28.06	20.36	65.04	55.04	-36.98	-34.68
0.2	22	12.8	2.90	24.90	15.70	63.61	53.61	-38.71	-37.91
0.28	30.4	27.5	2.82	33.22	30.32	60.91	50.91	-27.69	-20.59
0.49	20.3	14.7	2.91	23.21	17.61	56.19	46.19	-32.98	-28.58
1.3	16.4	10.9	2.89	19.29	13.79	56.00	46.00	-36.71	-32.21

1." -" denotes the emission level was - 10 dB beneth the Average limit,so nothing need to re-check anymore.

2. QP1/ AVG1 value means the QP/AV reading without the factor.

3. QP2/AVG2 value means the QP/AV final reading with the factor.

Neural

Product Name: Bluetooth headset Test Date: May,26,2003

Model No.: GG301 Tester : Gallon

Test Mode: Operation Mode Temperature: 26 ℃

Test Result: PASS Humidity: 57 %

Main
Terminals:N

FREQ MHz	QP1 dBuV	AVG1 dBuV	Factor	QP2 dBuV	AVG2 dBuV	QP Limit	AV Limit	QP Offset	AV Offset
0.17	29.7	17.6	2.96	32.66	20.56	65	55.04	-32.4	-34.48
0.21	26.80	17.30	2.89	29.69	20.19	63.27	53.27	-33.58	-33.08
0.28	32.40	29.80	2.82	35.22	32.62	60.91	50.91	-25.69	-18.29
0.45	19.10	13.80	2.95	22.05	16.75	56.93	46.93	-34.88	-30.18
1.31	16.00	10.60	2.89	18.89	13.49	56.00	46.00	-37.11	-32.51
2.35	16.50	11.10	3.11	19.61	14.21	56.00	46.00	-36.39	-31.79

1." -" denotes the emission level was - 10 dB beneth the Average limit,so nothing need to re-check anymore.

2. QP1/ AVG1 value means the QP/AV reading without the factor.

3. QP2/AVG2 value means the QP/AV final reading with the factor.

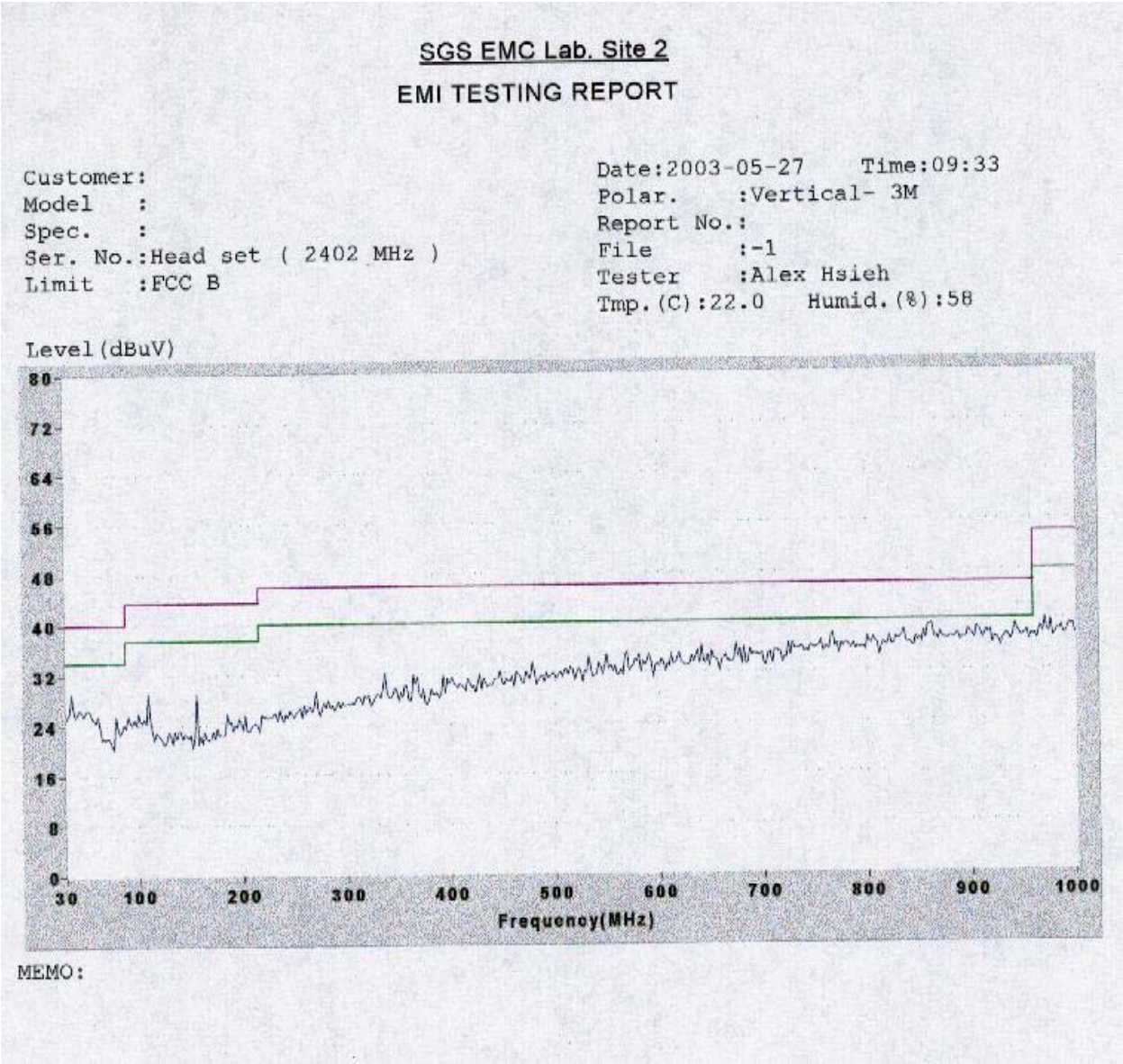
4.1.1 Limits (EN55022)

Frequency range Mhz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

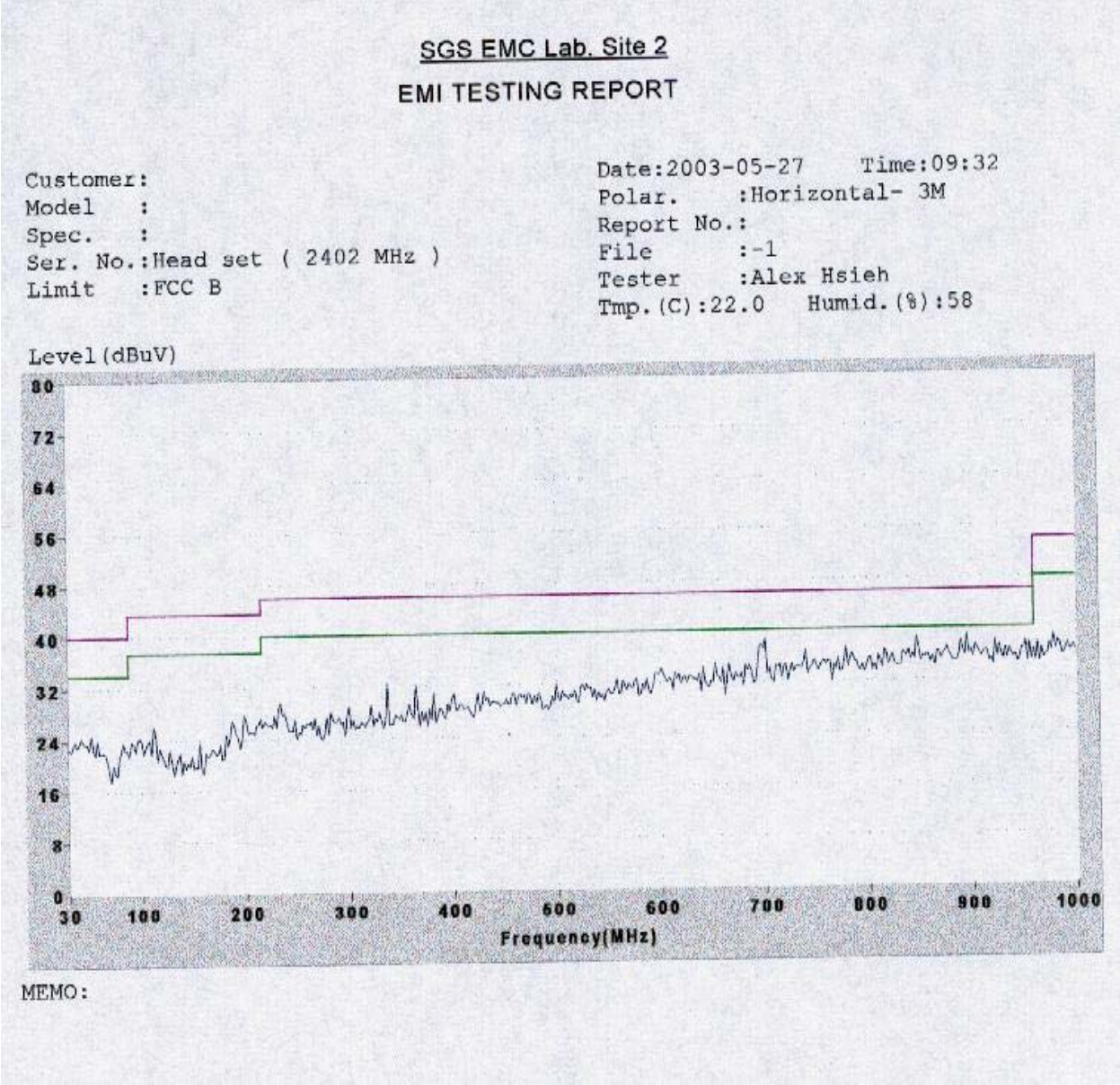
4.2 Radiated emission Limits, general requirement SUBCLAUSE 15.209

Part 1: 30Mhz-1000Mhz , transmit at 2402Mhz

Vertical

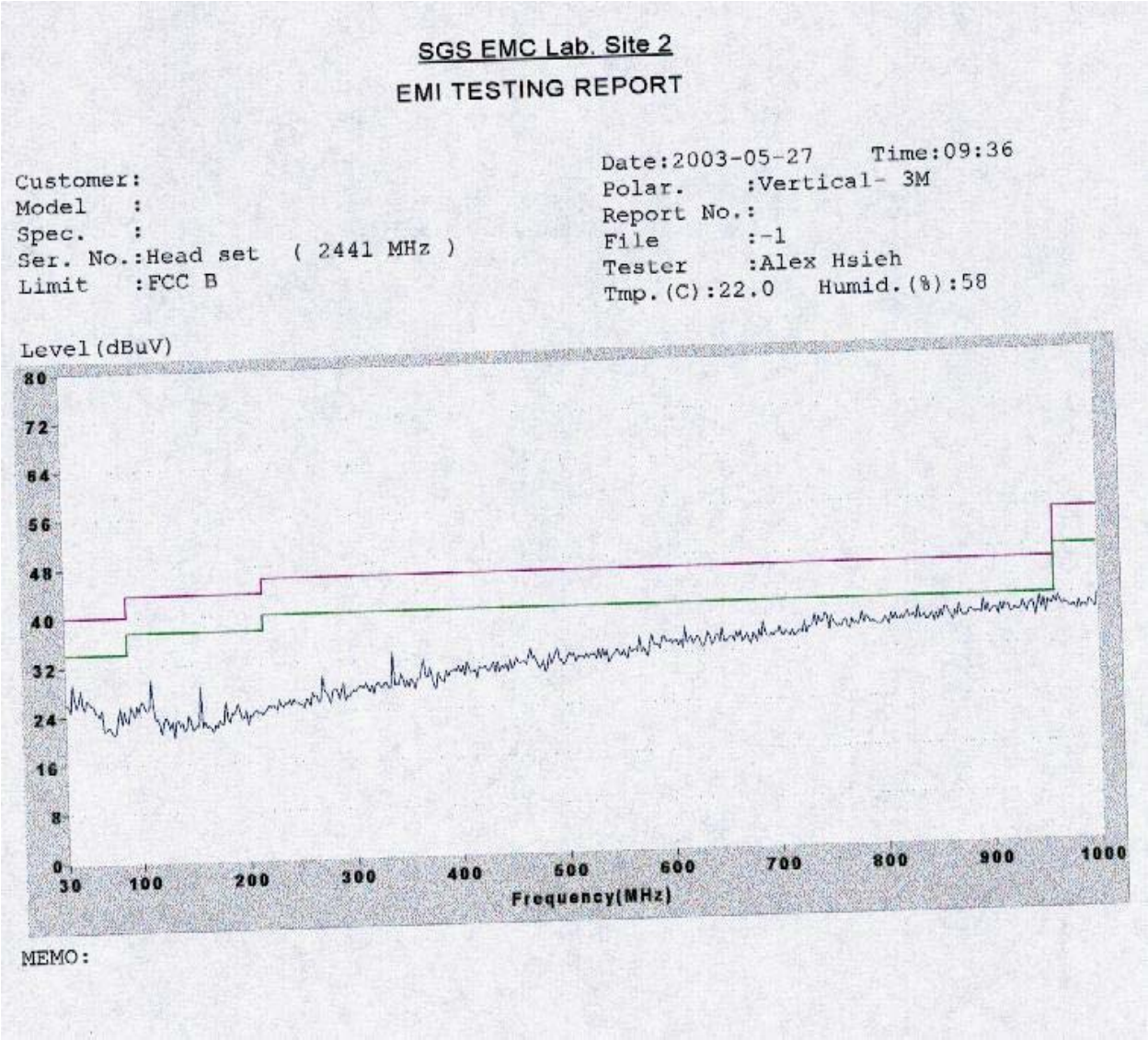


Horizontal

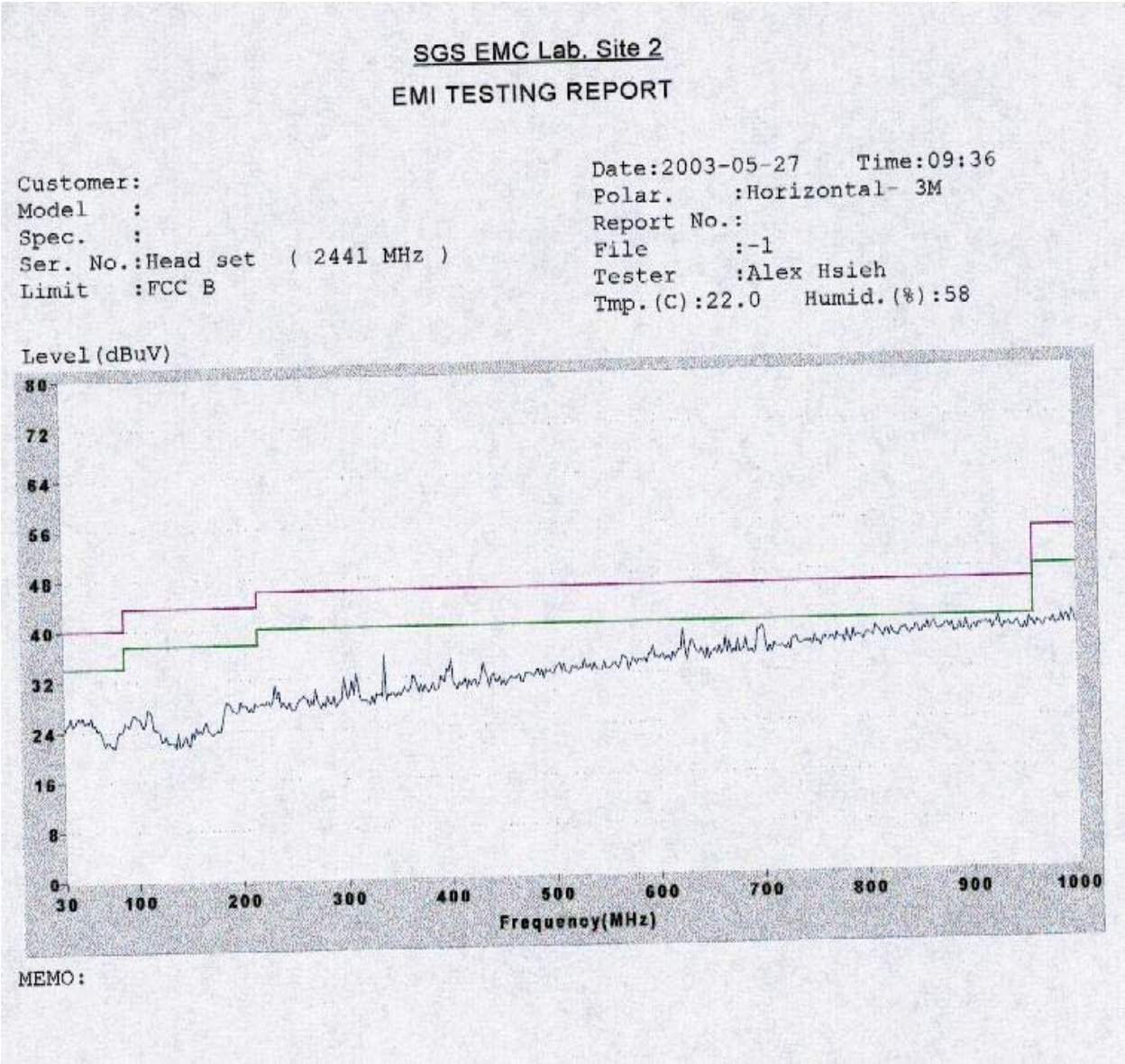

SGS EMC Lab. Site 2
EMI TESTING REPORT
Customer:
Model :
Spec. :
Ser. No.:Head set (2402 MHz)
Limit :FCC B
Date:2003-05-27 Time:09:32
Polar. :Horizontal- 3M
Report No.:
File :-1
Tester :Alex Hsieh
Tmp.(C):22.0 Humid.(%):58
Level(dBuV)
80
72
64
56
48
40
32
24
16
8
0
30
100
200
300
400
500
600
700
800
900
1000
Frequency(MHz)
MEMO:

Part 2: 30Mhz-1000Mhz , transmit at 2441Mhz

Vertical

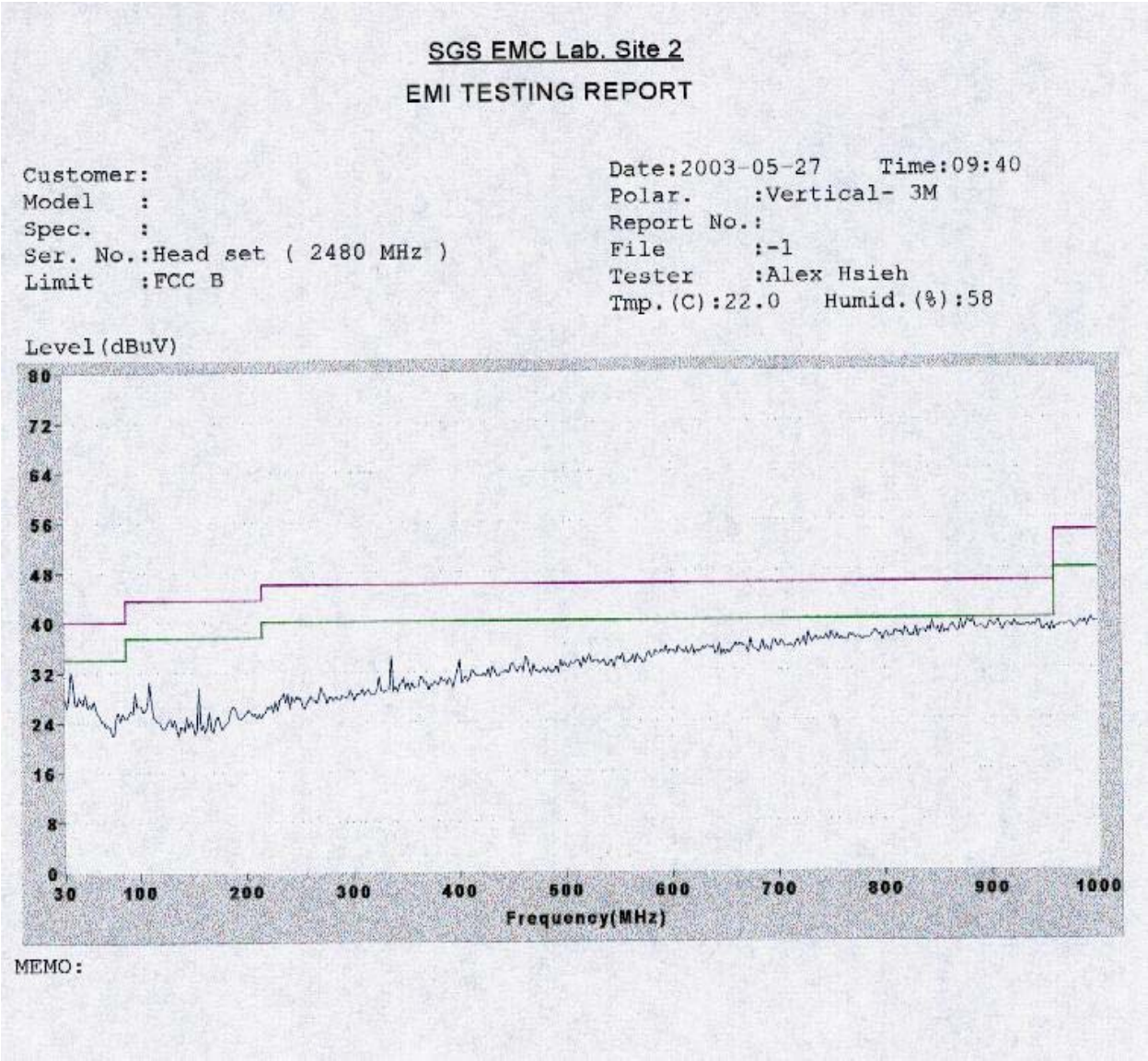


Horizontal

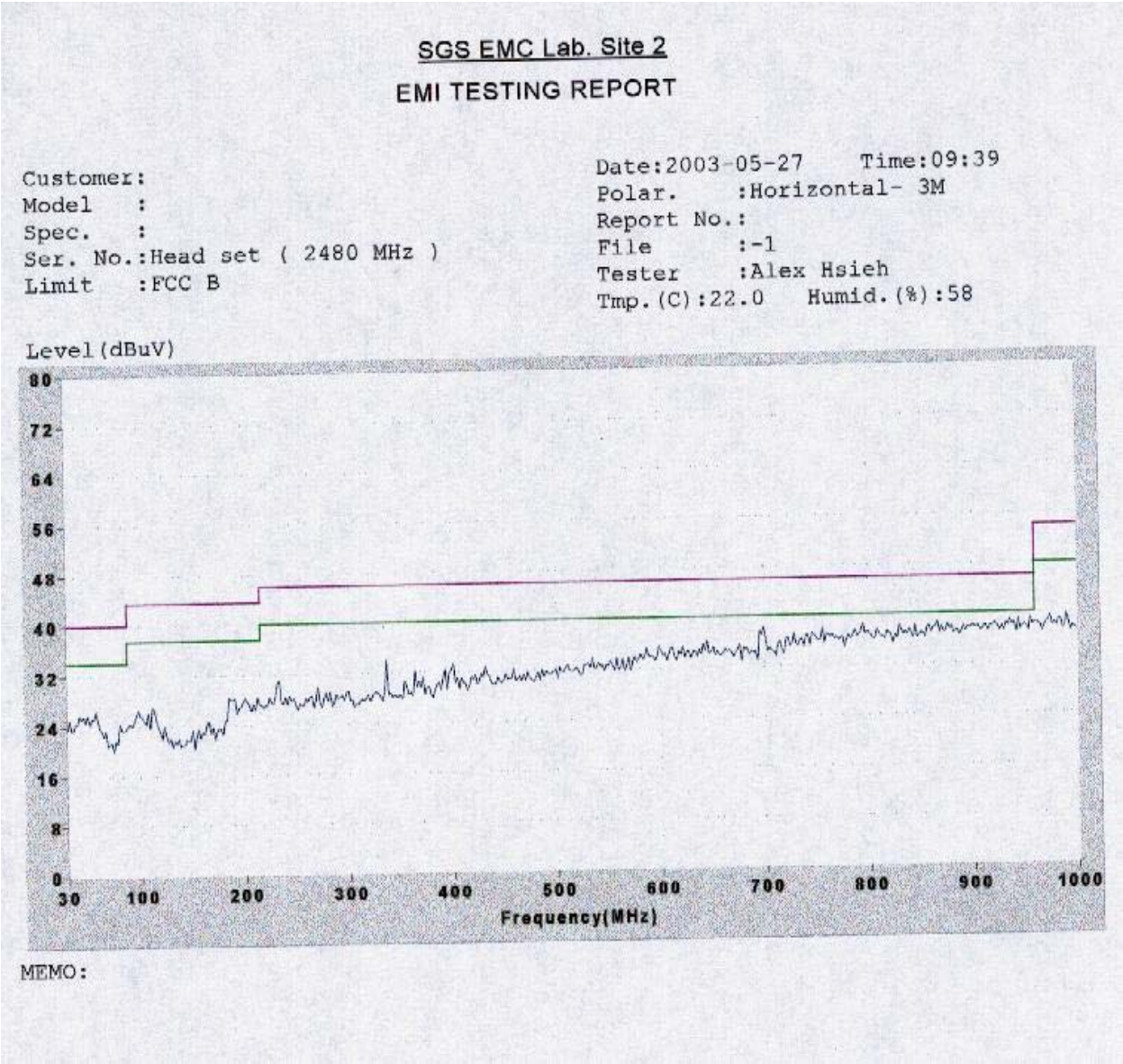

SGS EMC Lab. Site 2
EMI TESTING REPORT
Customer:
Model :
Spec. :
Ser. No.:Head set (2441 MHz)
Limit :FCC B
Date:2003-05-27 Time:09:36
Polar. :Horizontal- 3M
Report No.:
File :-1
Tester :Alex Hsieh
Tmp.(C):22.0 Humid.(%):58
Level(dBuV)
80
72
64
56
48
40
32
24
16
8
0
30
100
200
300
400
500
600
700
800
900
1000
Frequency(MHz)
MEMO:

Part 3: 30Mhz-1000Mhz , transmit at 2480Mhz

Vertical



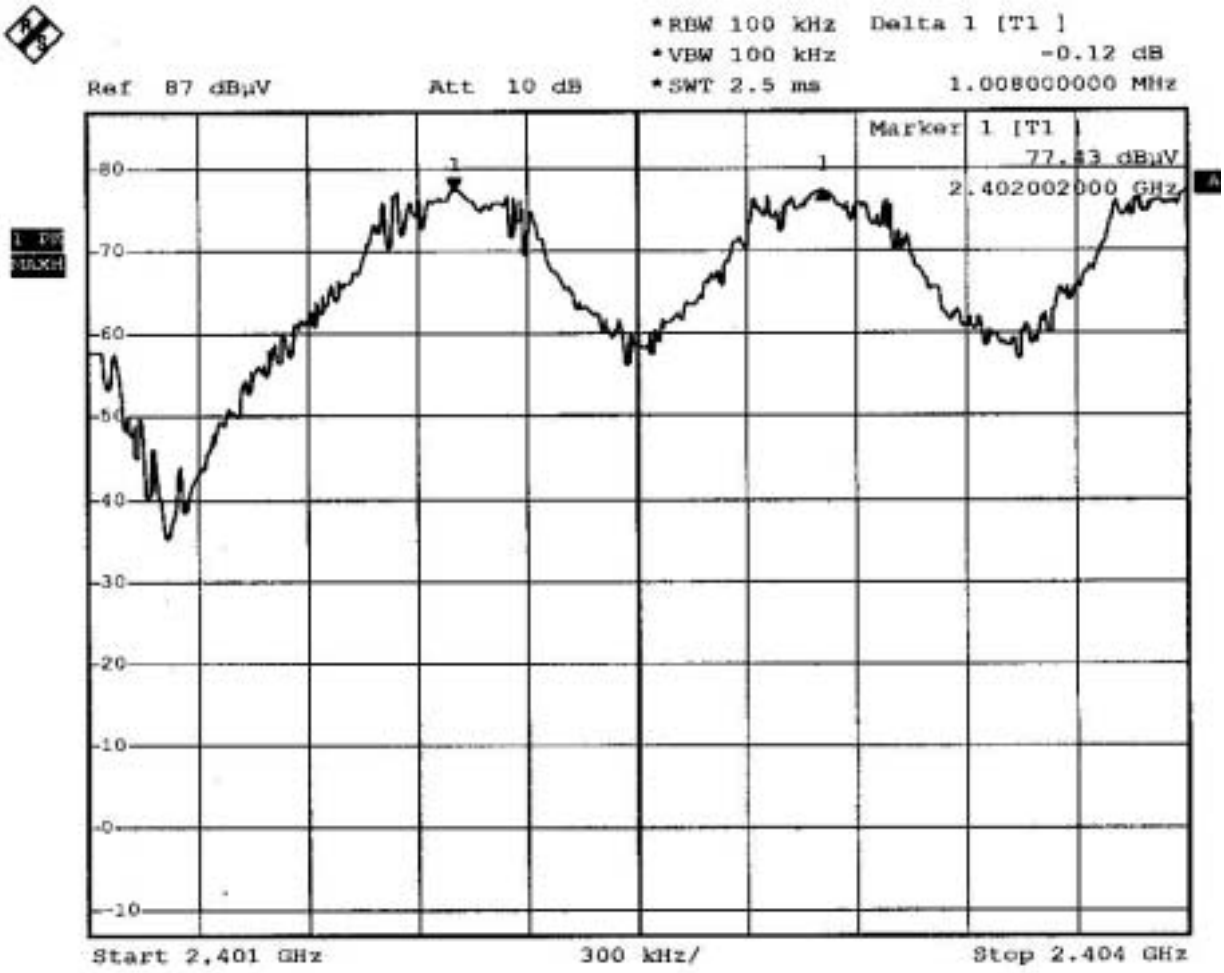
Horizontal


SGS EMC Lab. Site 2
EMI TESTING REPORT
Customer:
Model :
Spec. :
Ser. No.:Head set (2480 MHz)
Limit :FCC B
Date:2003-05-27 Time:09:39
Polar. :Horizontal- 3M
Report No.:
File :-1
Tester :Alex Hsieh
Tmp.(C):22.0 Humid.(%):58
Level(dBuV)
80
72
64
56
48
40
32
24
16
8
0
30
100
200
300
400
500
600
700
800
900
1000
Frequency(MHz)
MEMO:

4.2.1 Limits

Frequency (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

4.3 Channel Separation SUBCLAUSE15.247(a)(1)



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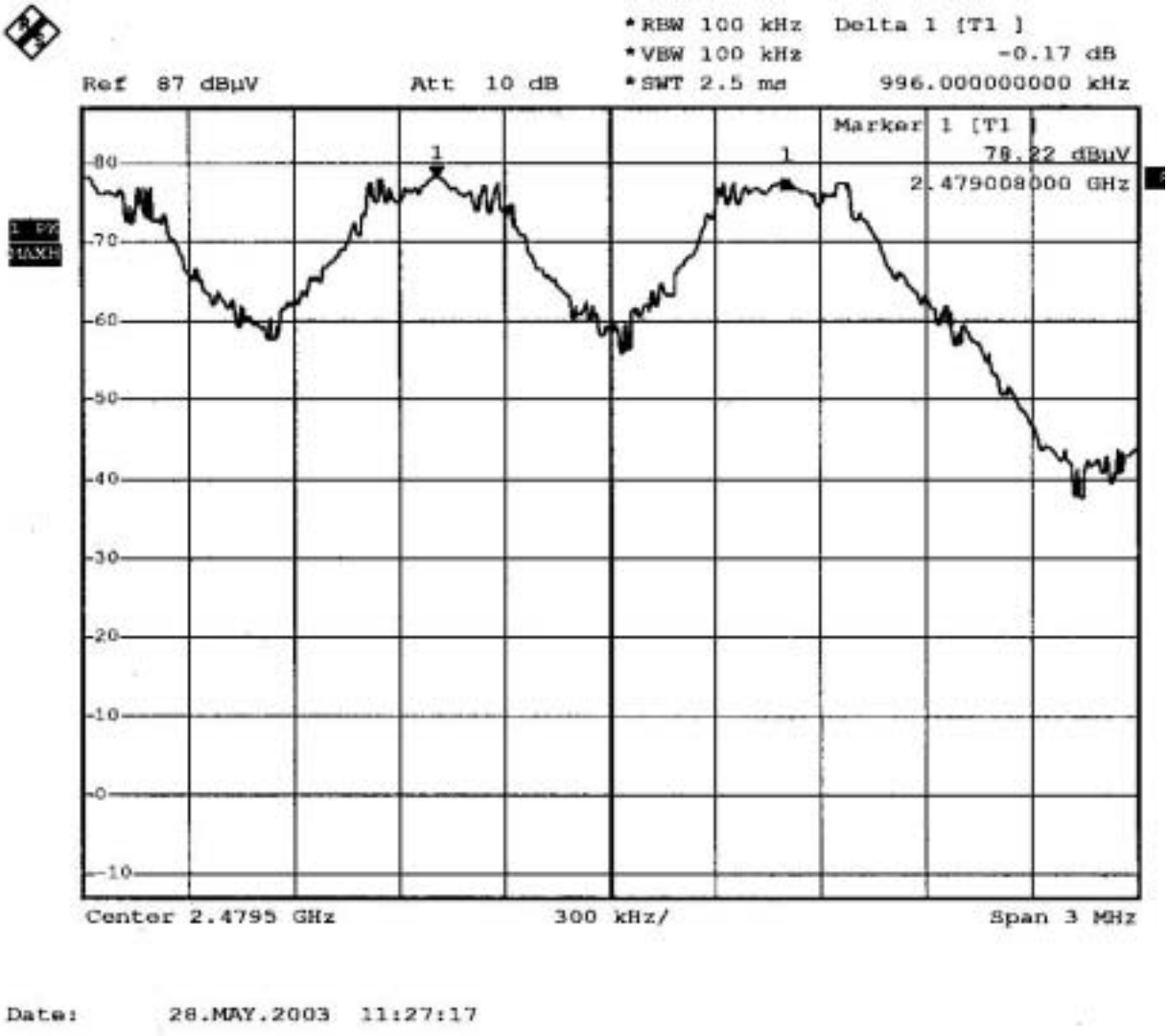
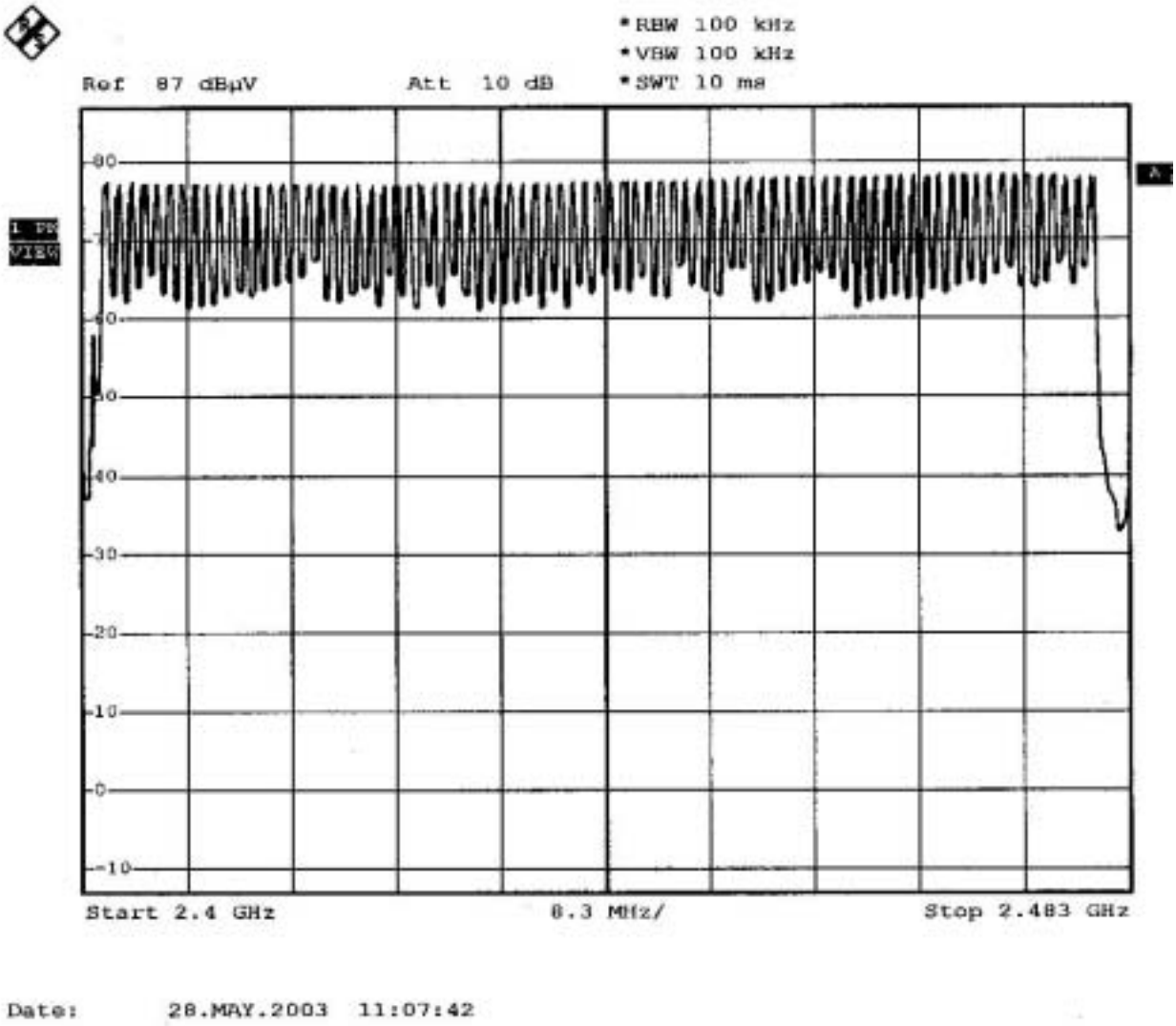


	Lowest channel	Highest channel
Channel separation (khz)	1008	996

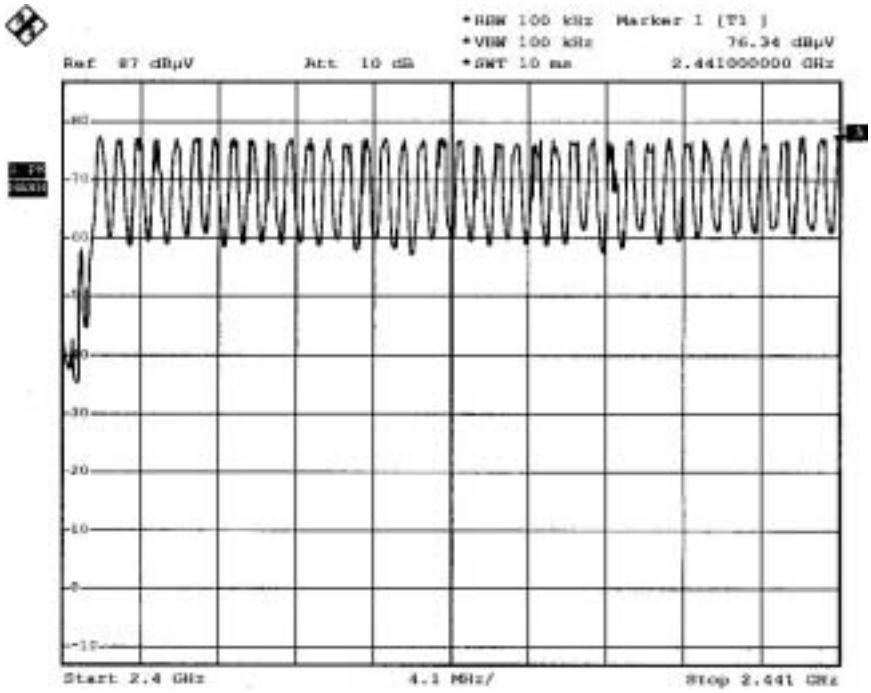
4.4 No. of carrier frequency / 20db Bandwidth

SUBCLAUSE15.247(a)(1)(ii)



No. of channels = 79

Split the whole frequency band into two.



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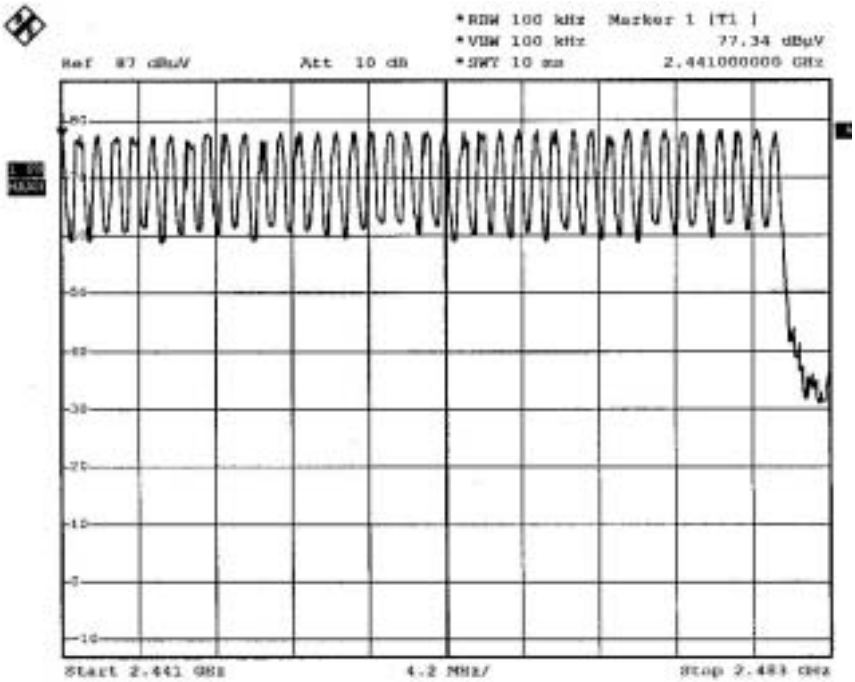
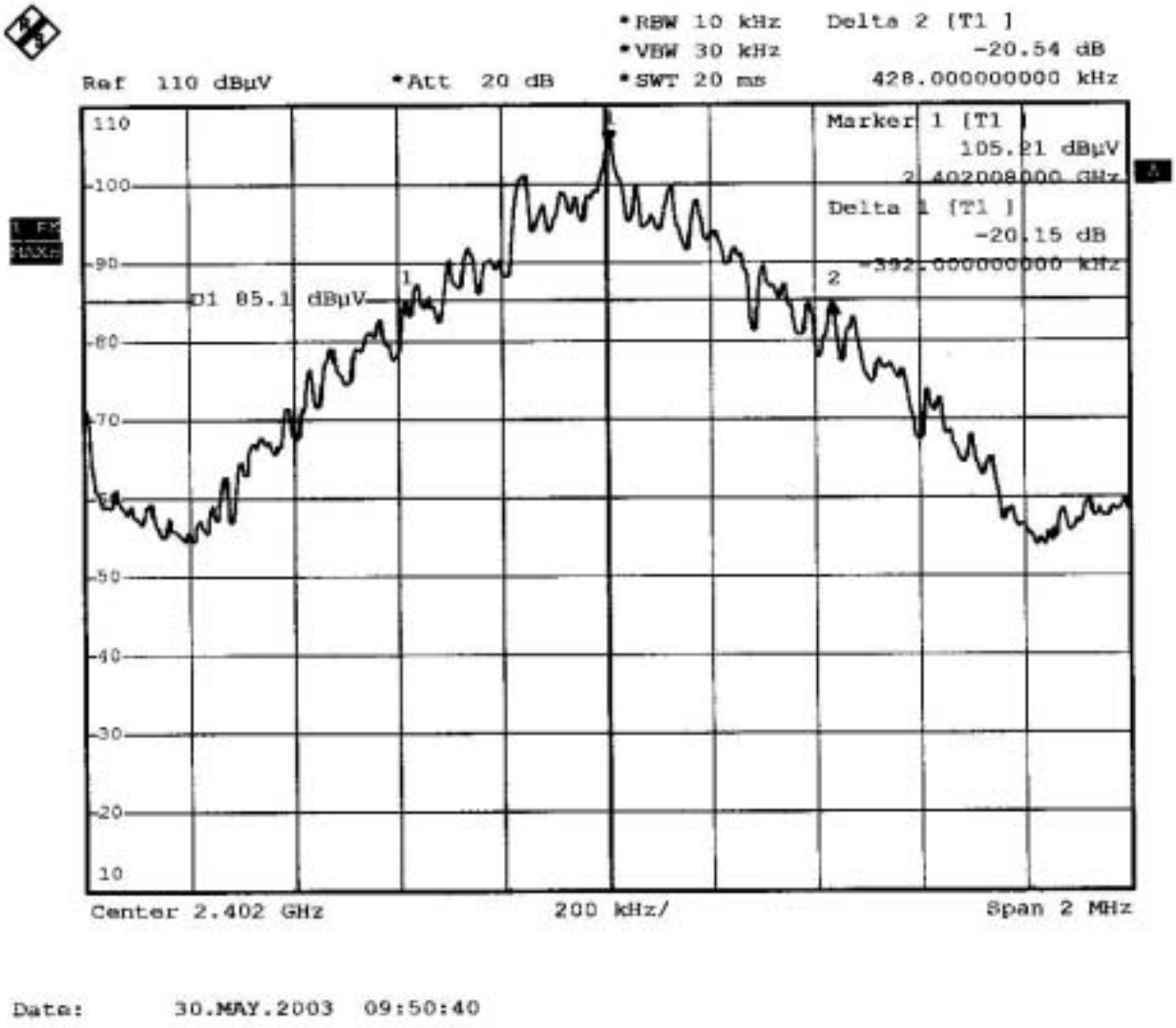
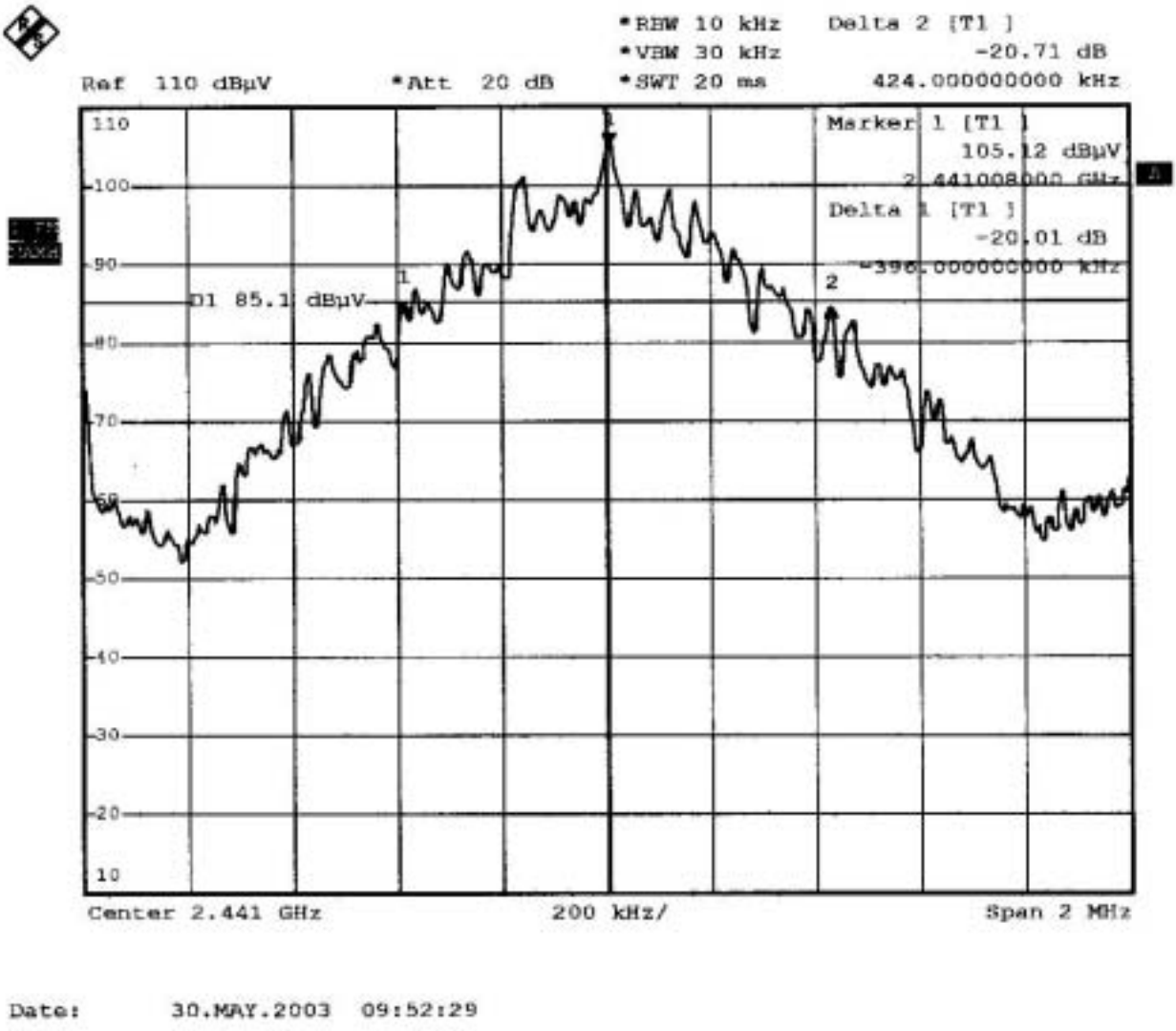


Date: 28.MAY.2003 11:12:33

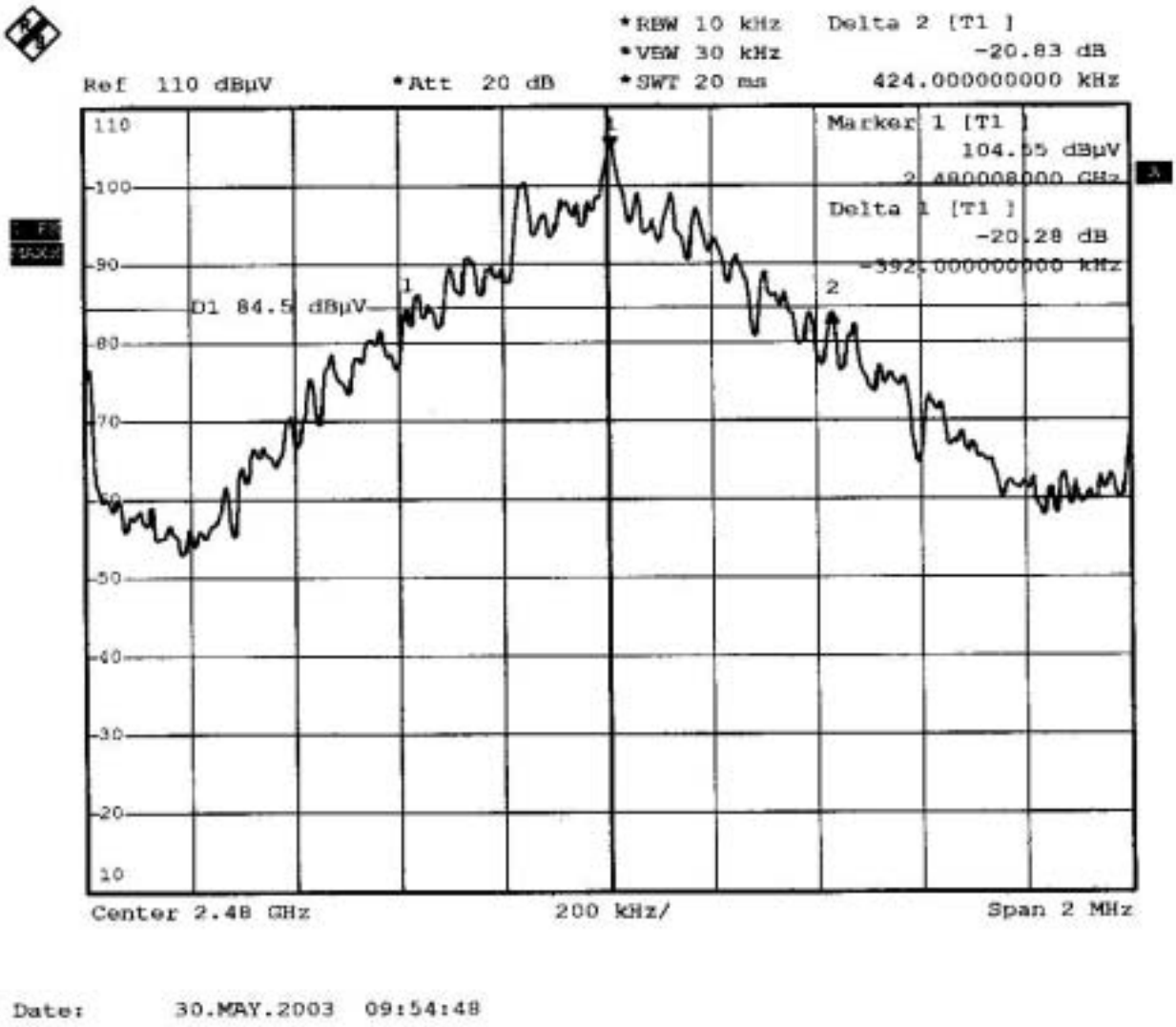
20dB bandwidth at lowest (2402Mhz), middle(2442Mhz), highest channel(2480Mhz)



channel bandwidth = 820 Khz

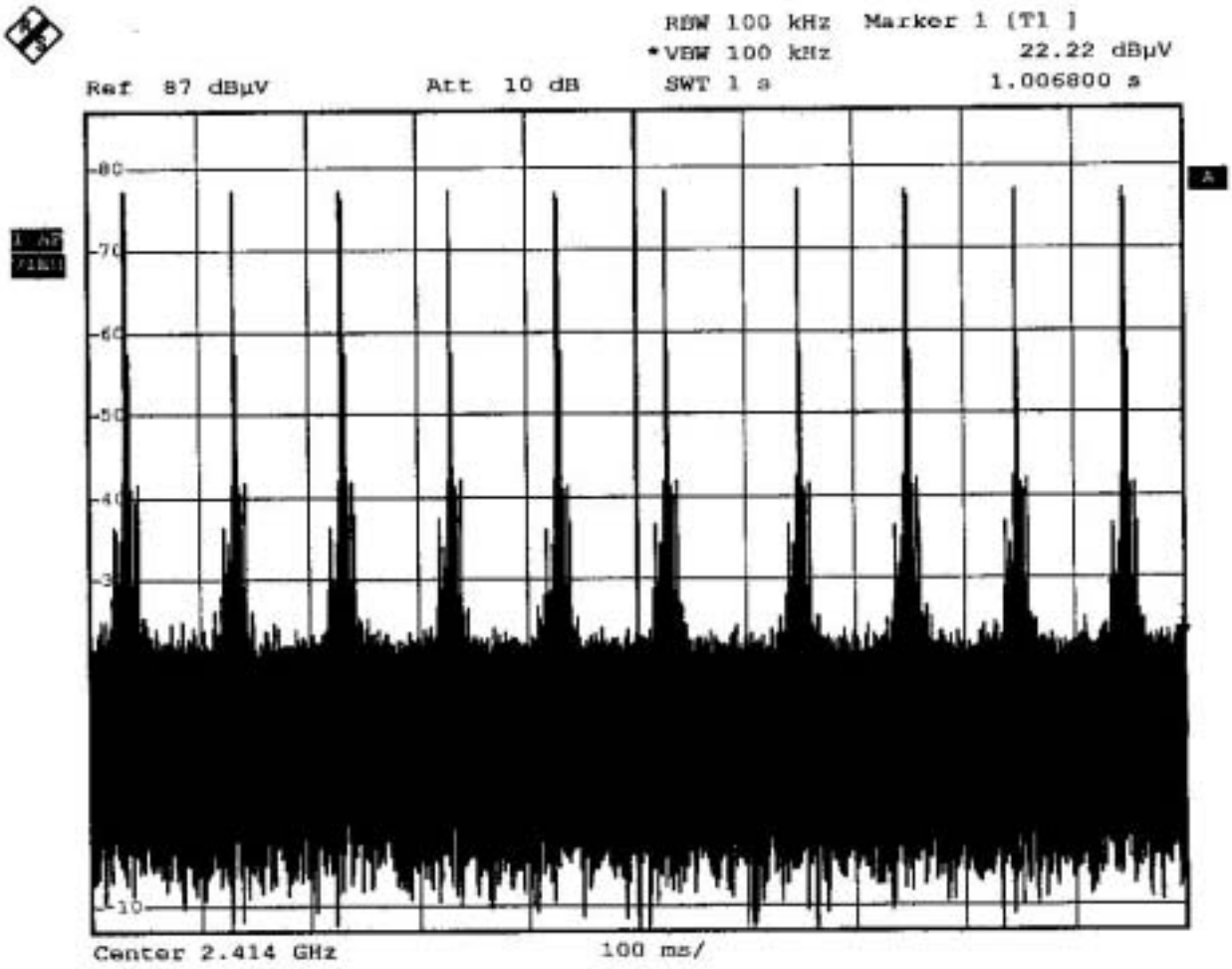


channel bandwidth = 820 Khz



channel bandwidth = 816 Khz

4.5 Average Time of Occupancy SUBCLAUSE15.247(a)(1)(ii)



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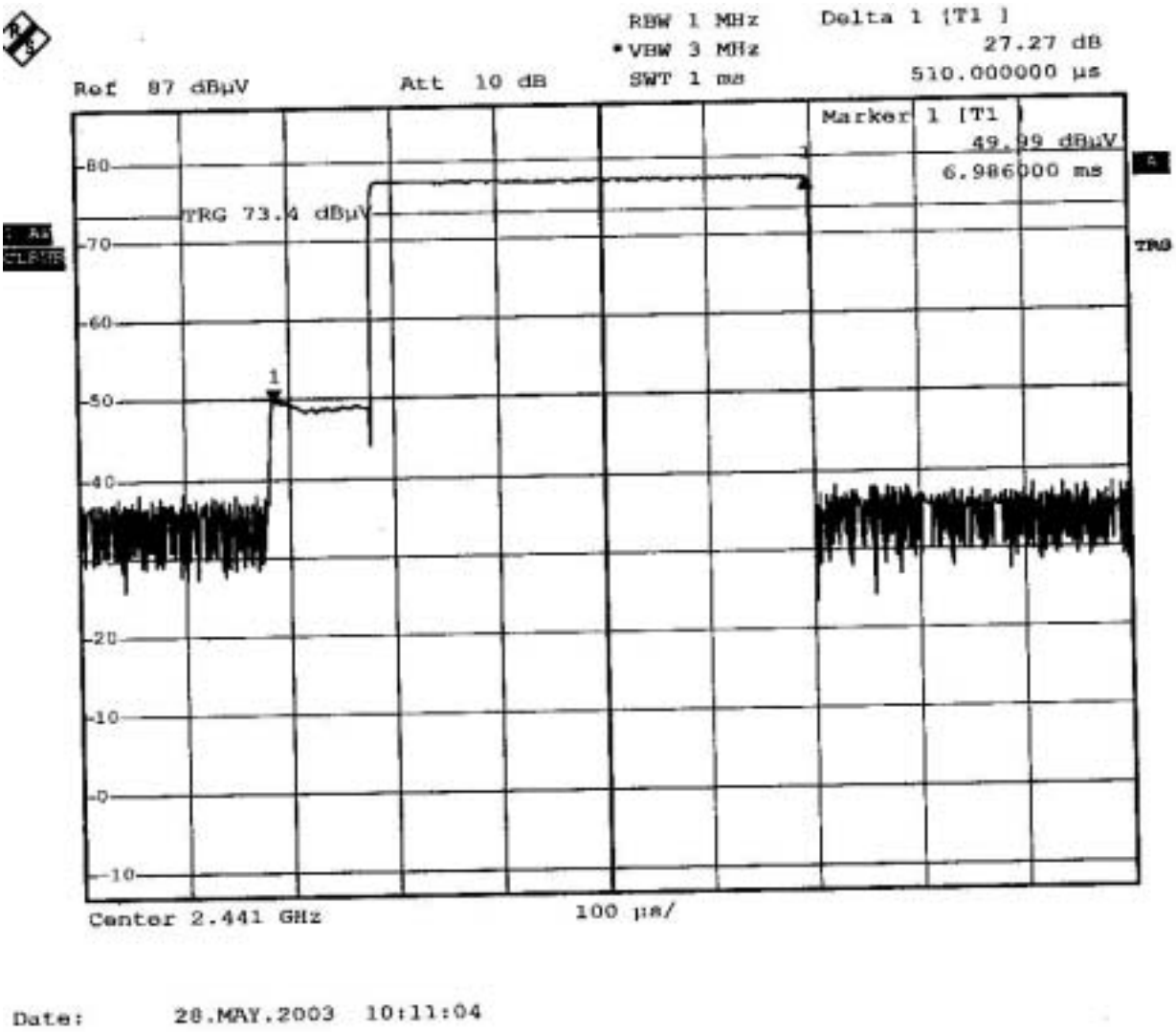


4.5.1 calculation

At channel 2441Mhz, there are 10 bursts in 1 sec. Time period of each burst is 510 µSec. So the occupacy time within 30 second is 510 x 10 x 30 = 153000 µSec = 153 mSec = 0.153 Sec.

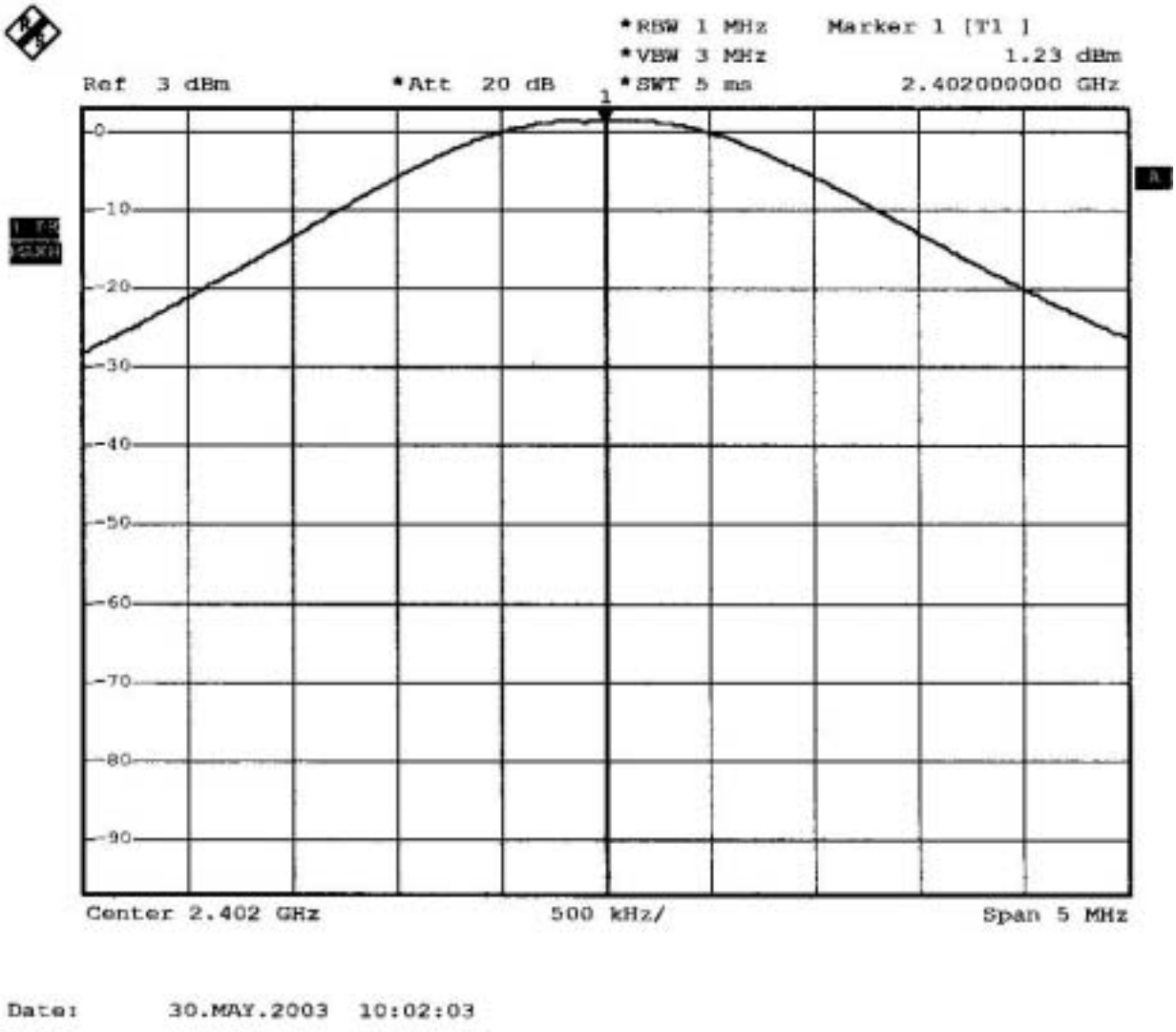
4.5.2 Limits

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

The EUT comply with the requirement in Sec 15.247 (a)(1) that use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

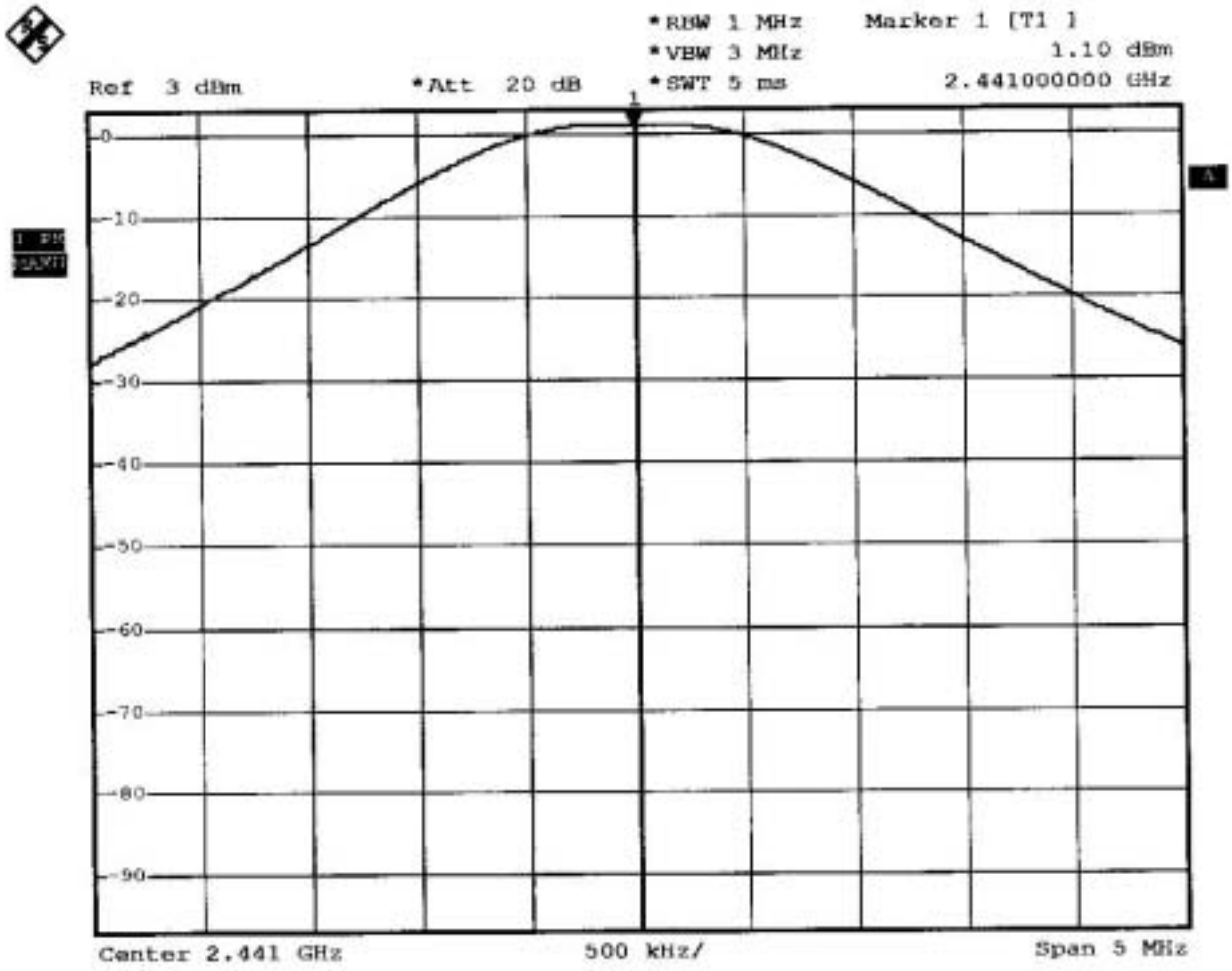
4.6 Peak output Power SUBCLAUSE15.247(b)(1)

Transmitter transmit at lowest channel (2402Mhz)



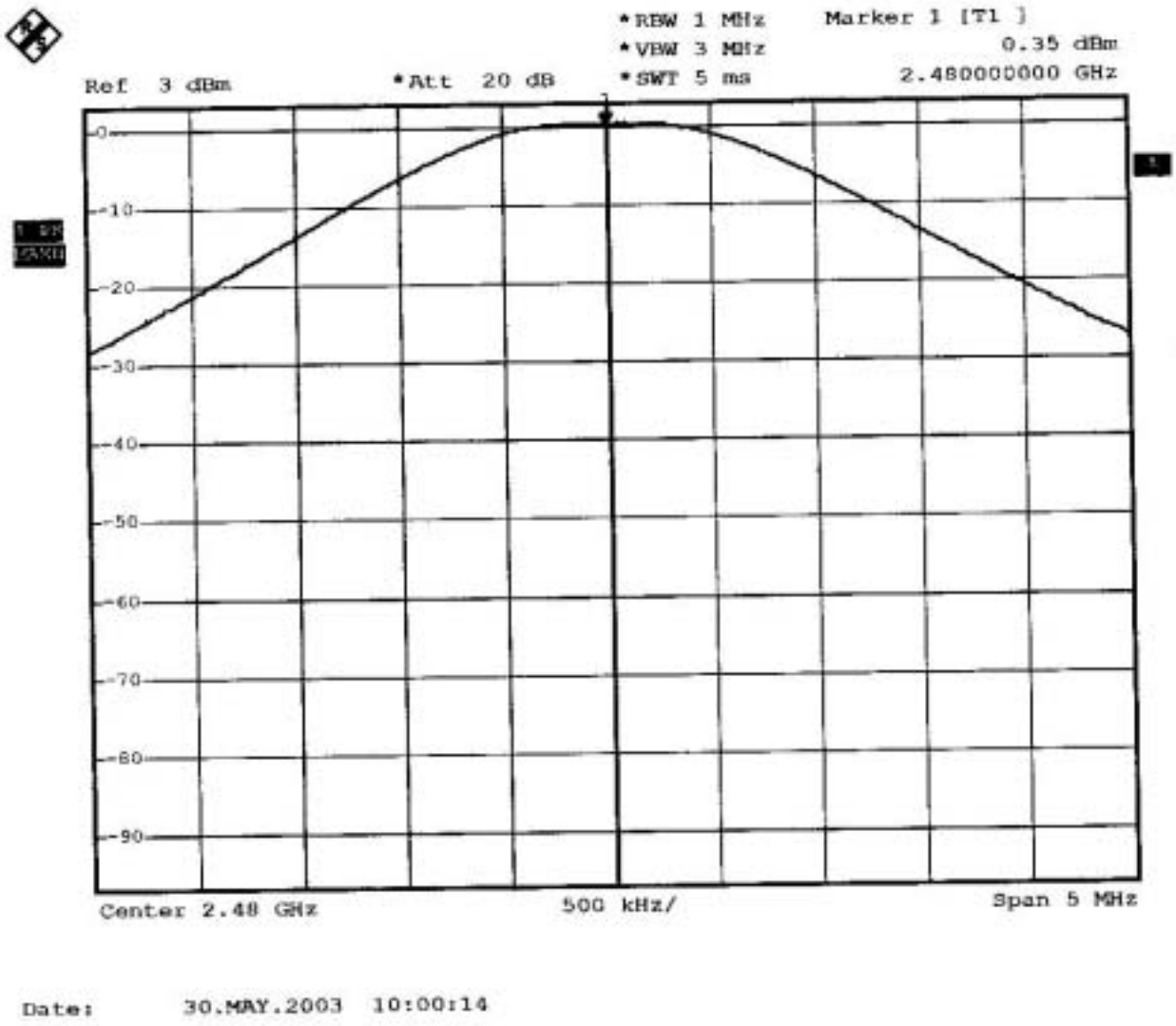
Power=1.23 dbm + 1.4 db (cable loss)= 2.63 dbm

Transmitter transmit at middle channel (2441Mhz)



Power =1.10 dbm + 1.4 db (cable loss) = 2.5 dbm

Transmitter transmit at highest channel (2480Mhz)



Power =0.35 dbm + 1.4 db (cable loss) = 1.75 dbm

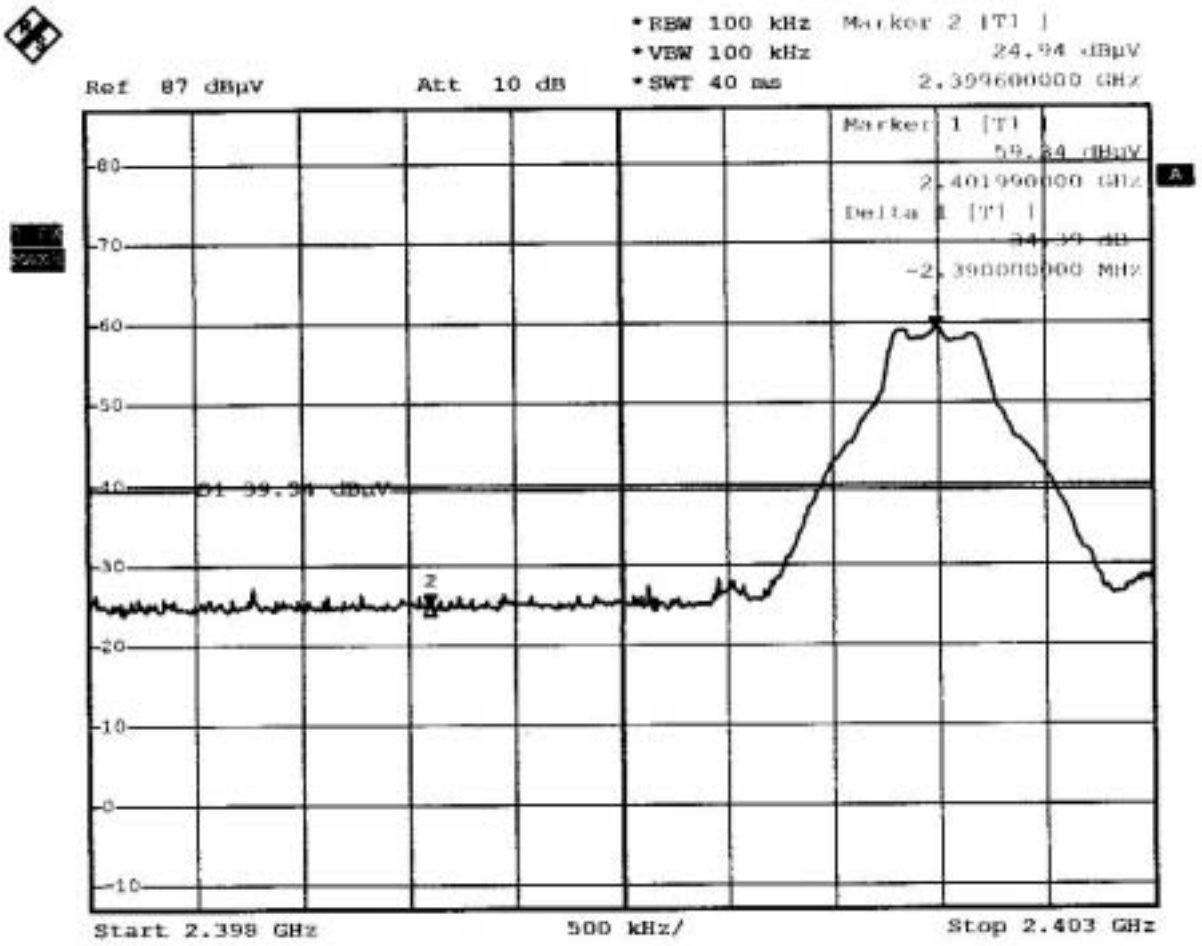
The maximun power happens in lowest channel which is 2.63 dbm = 1.83mW

Limits:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing

at least 75 hopping channels, all frequency hopping systems in the 5725-5850 MHz band, and all direct sequence systems: 1 watt.

4.7 Band Edge emission SUBCLAUSE15.247(c)



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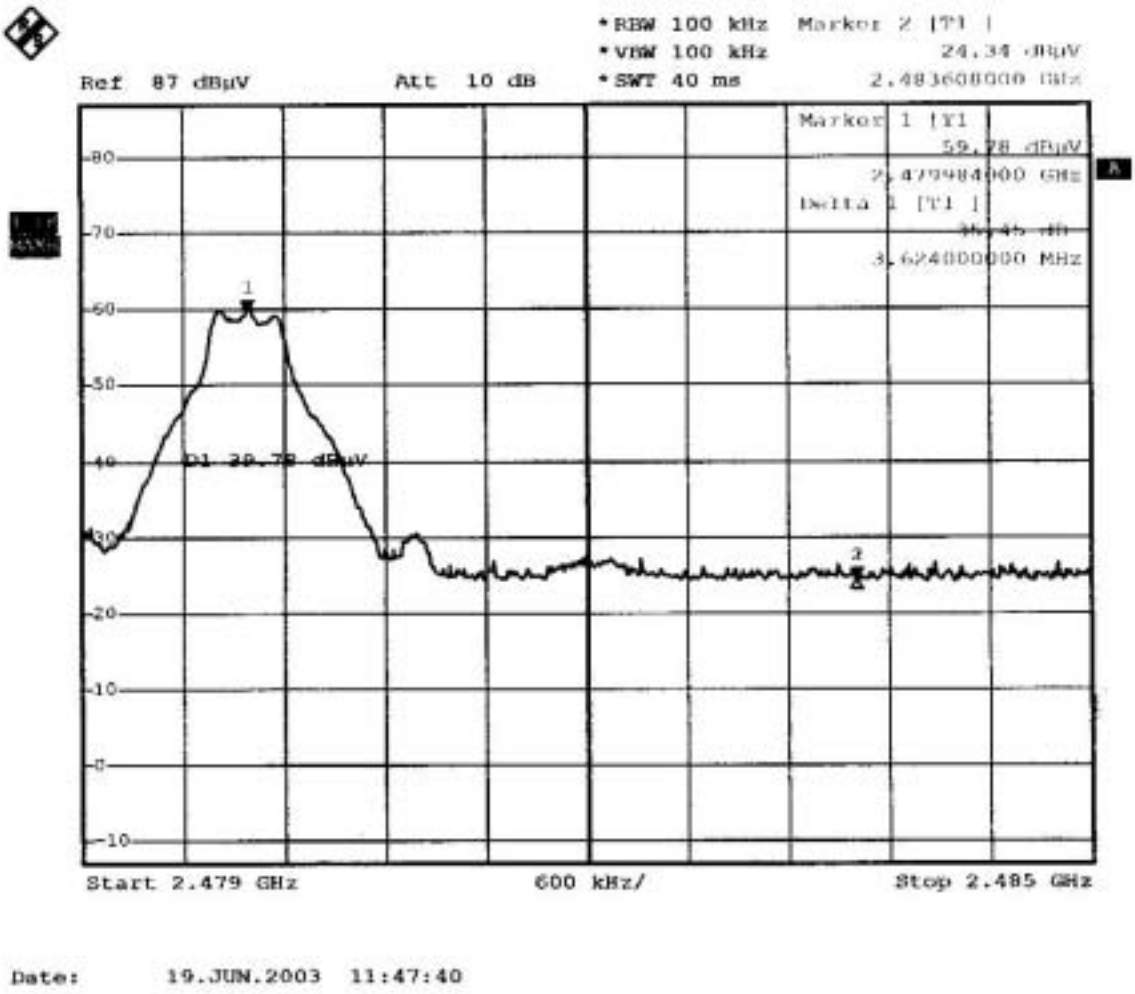


	Lower bandedge	Upper bandedge
Bandedge difference from main channel	**34.39 db**	**35.45 db**

4.7.1 Limits

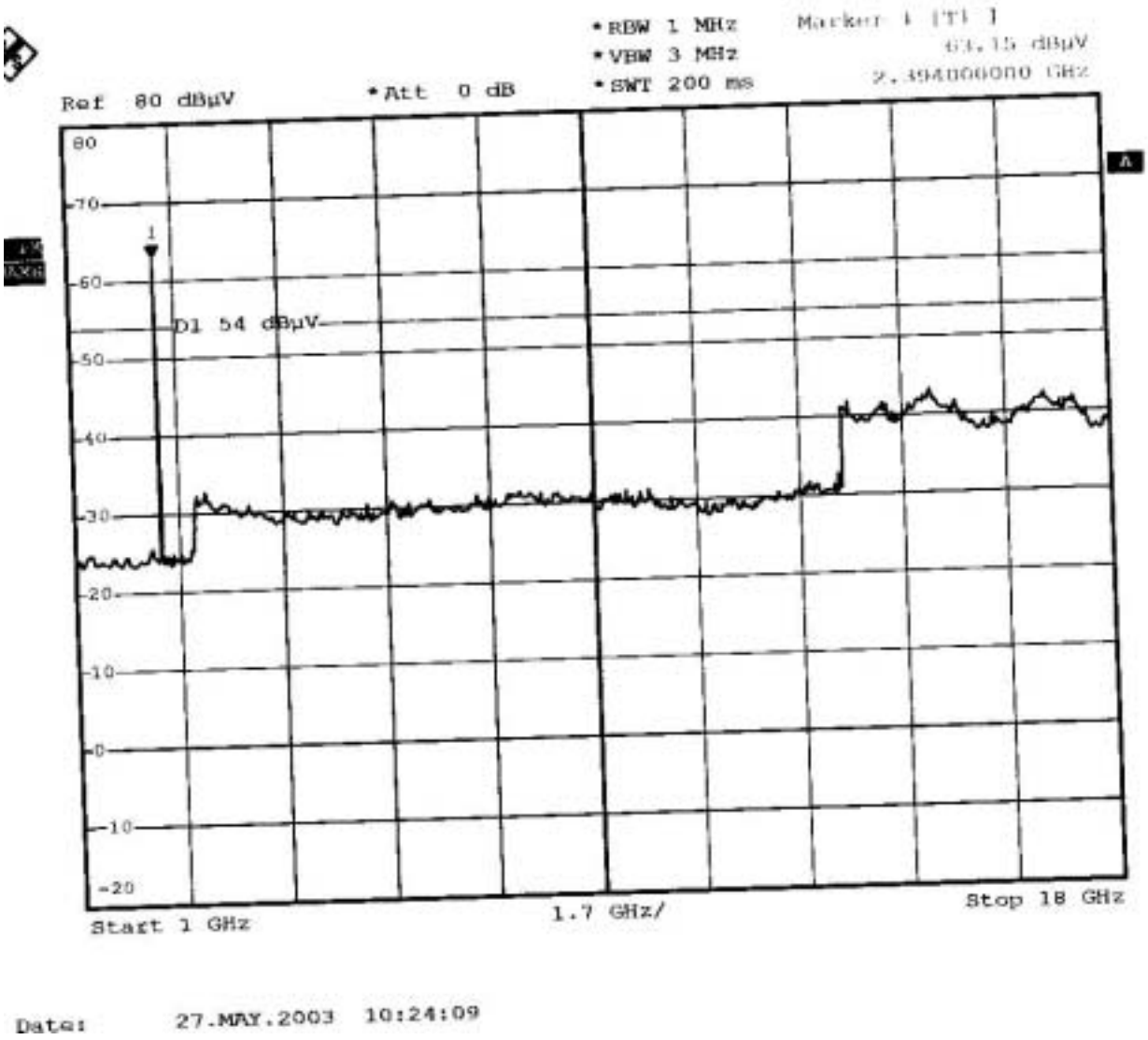
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. And it must

comply with the limit in 15.209.

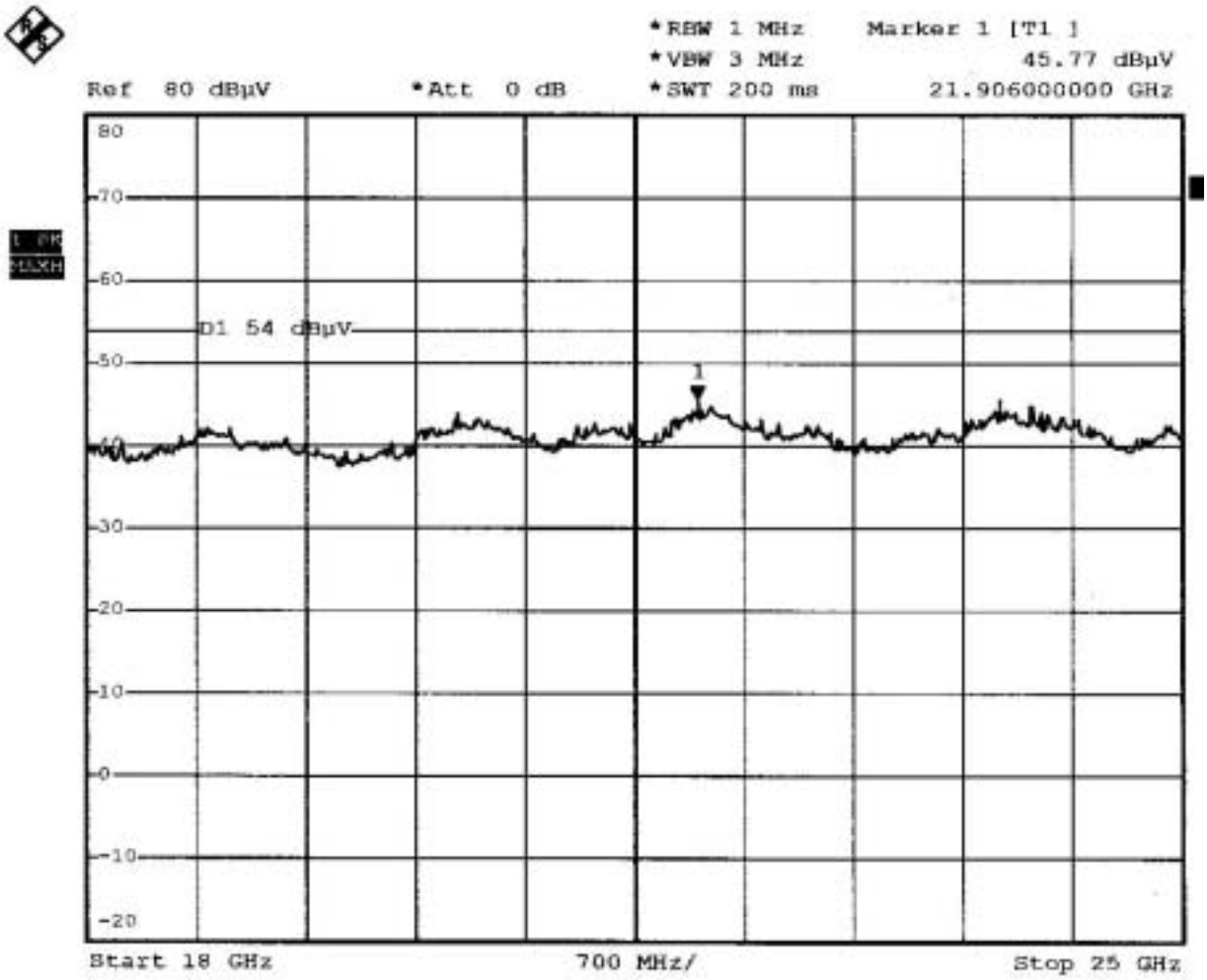
4.8 Spurious Emission under 25Ghz SUBCLAUSE15.247(c)

F=2402MHz with max. power , vertical

(1) 1Ghz – 18Ghz



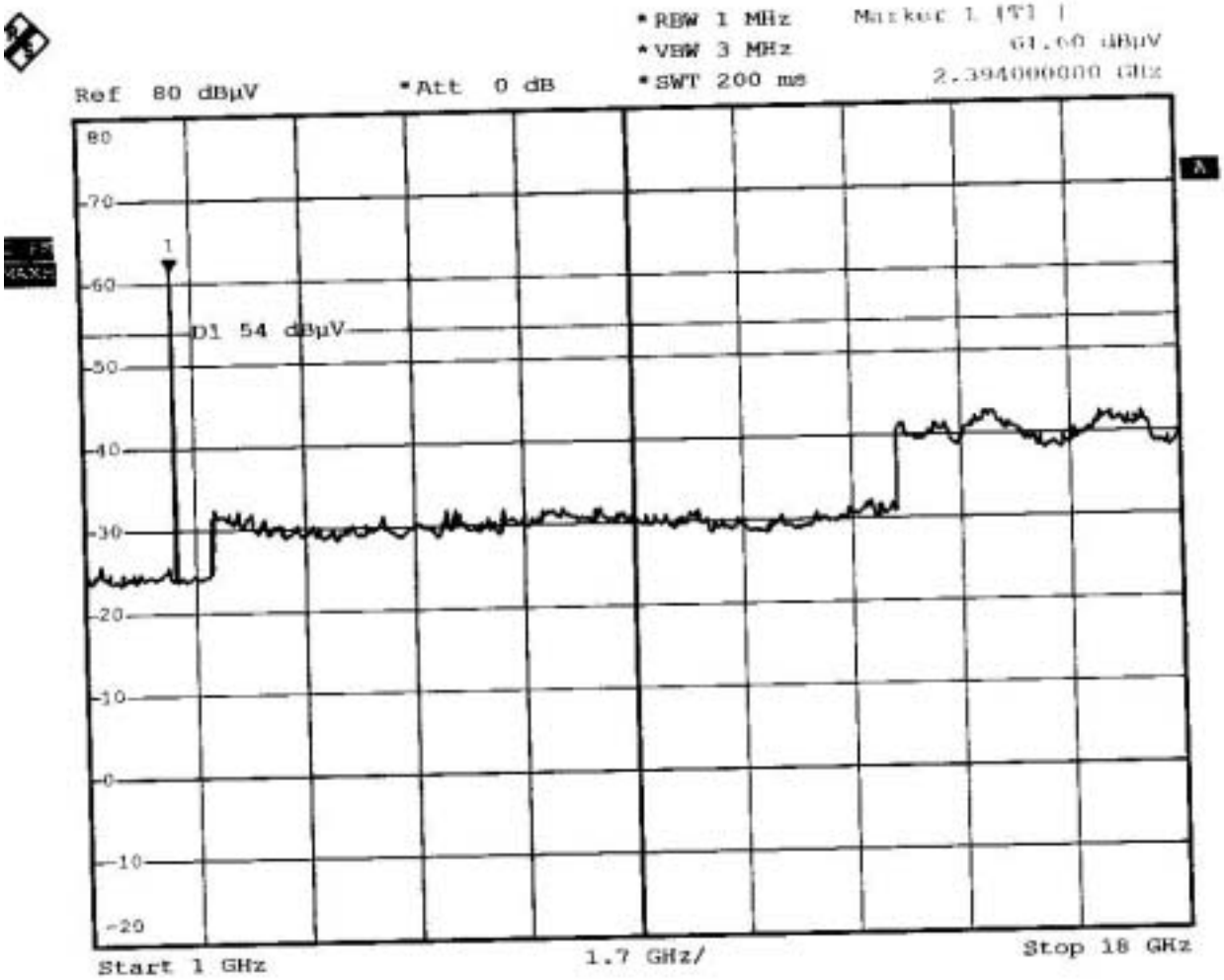
(2) 18Ghz – 25Ghz



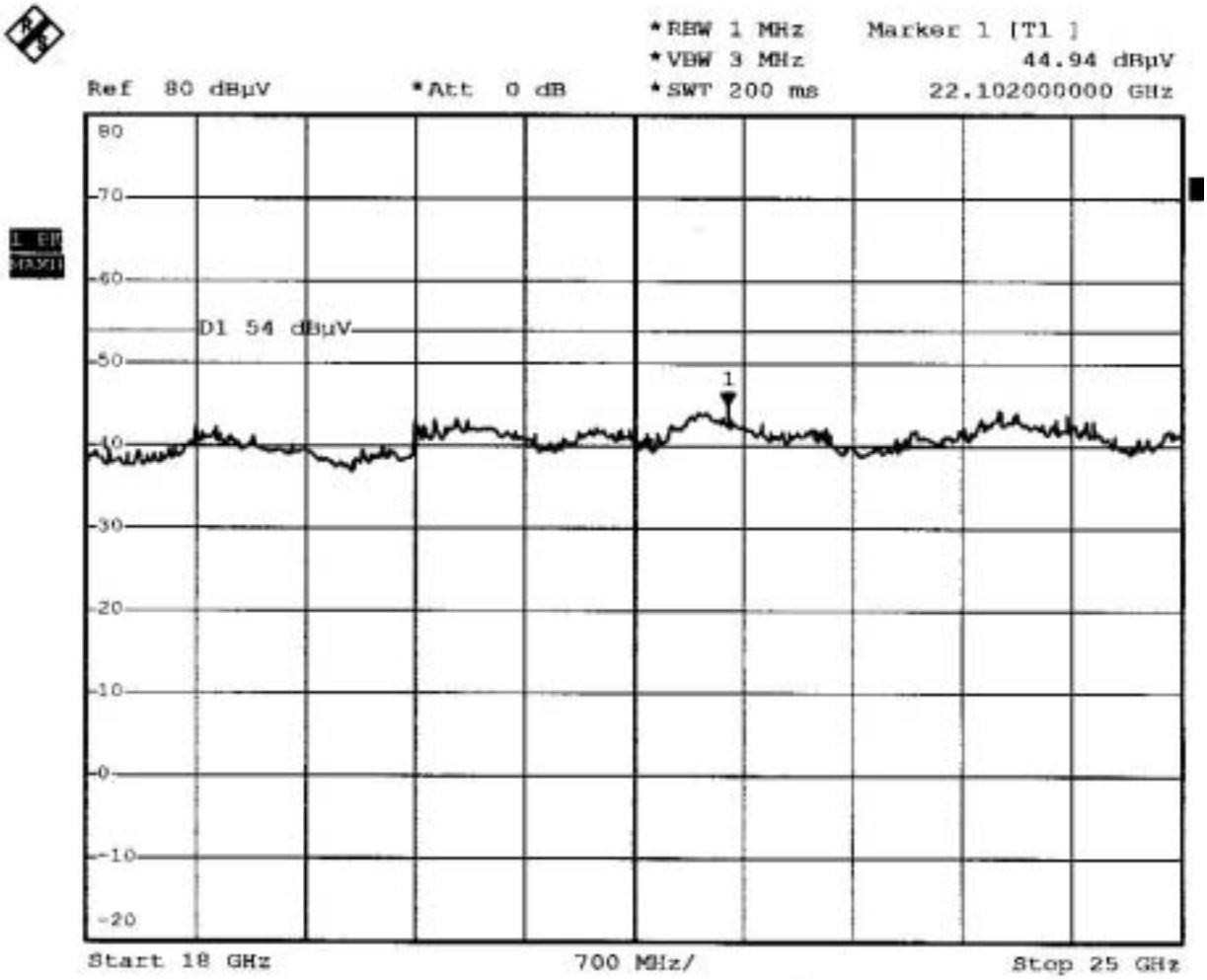
Date: 27.MAY.2003 10:42:40

F=2402MHz with max. power , horizontal

(1) 1Ghz – 18Ghz



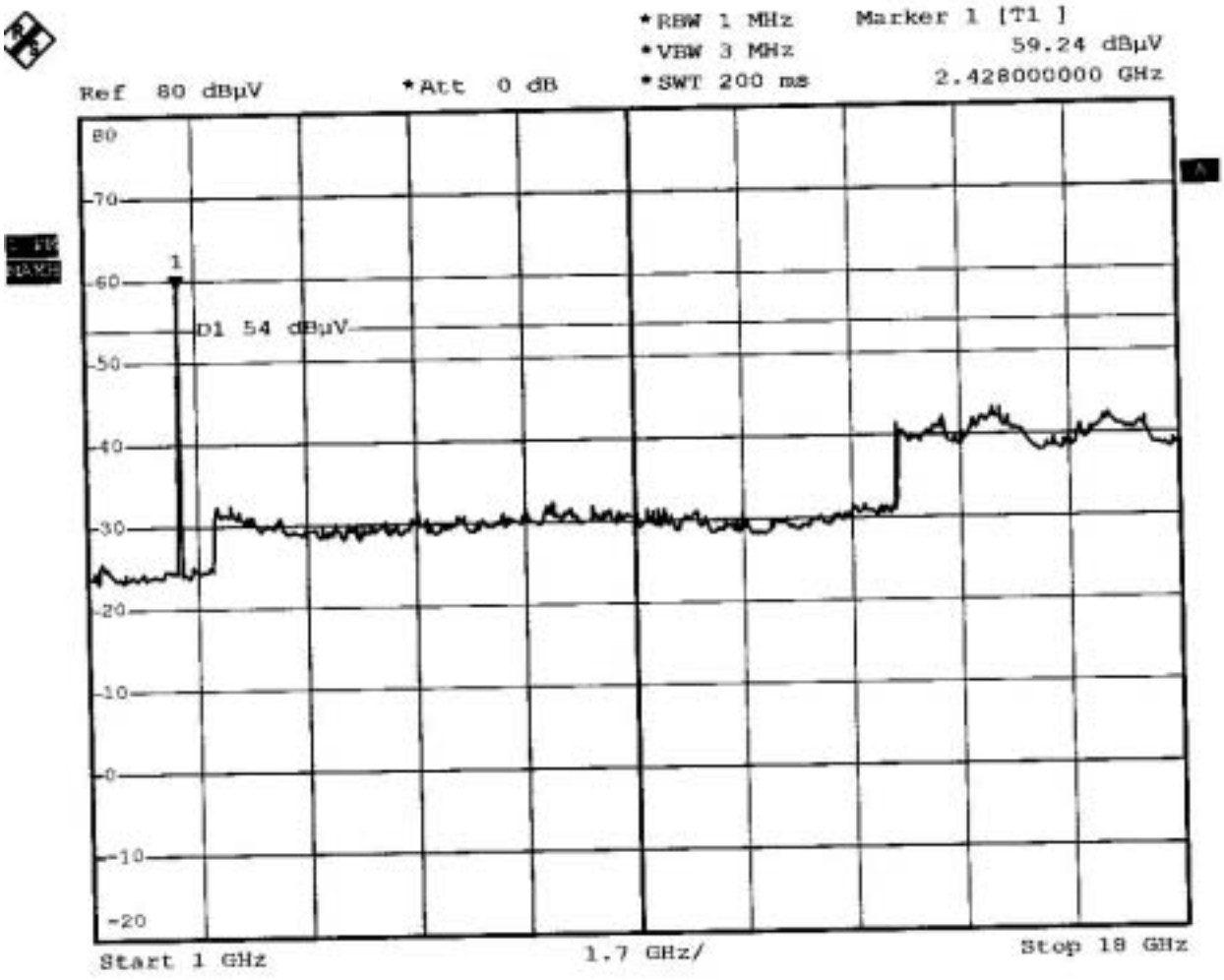
(2) 18Ghz – 25Ghz



Date: 27.MAY.2003 10:41:46

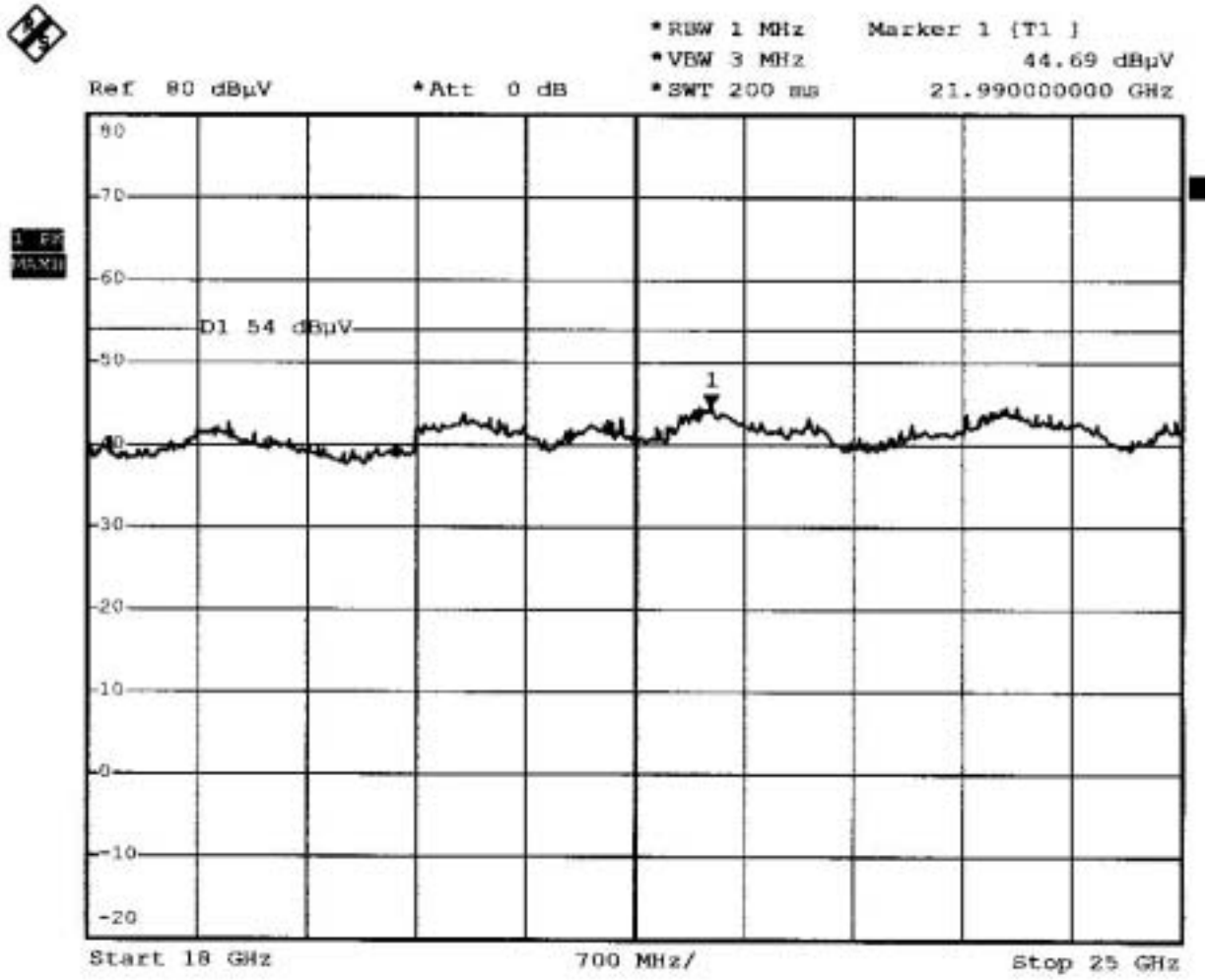
F=2441MHz with max. power , vertical

(1) 1Ghz – 18Ghz



Date: 27.MAY.2003 10:26:48

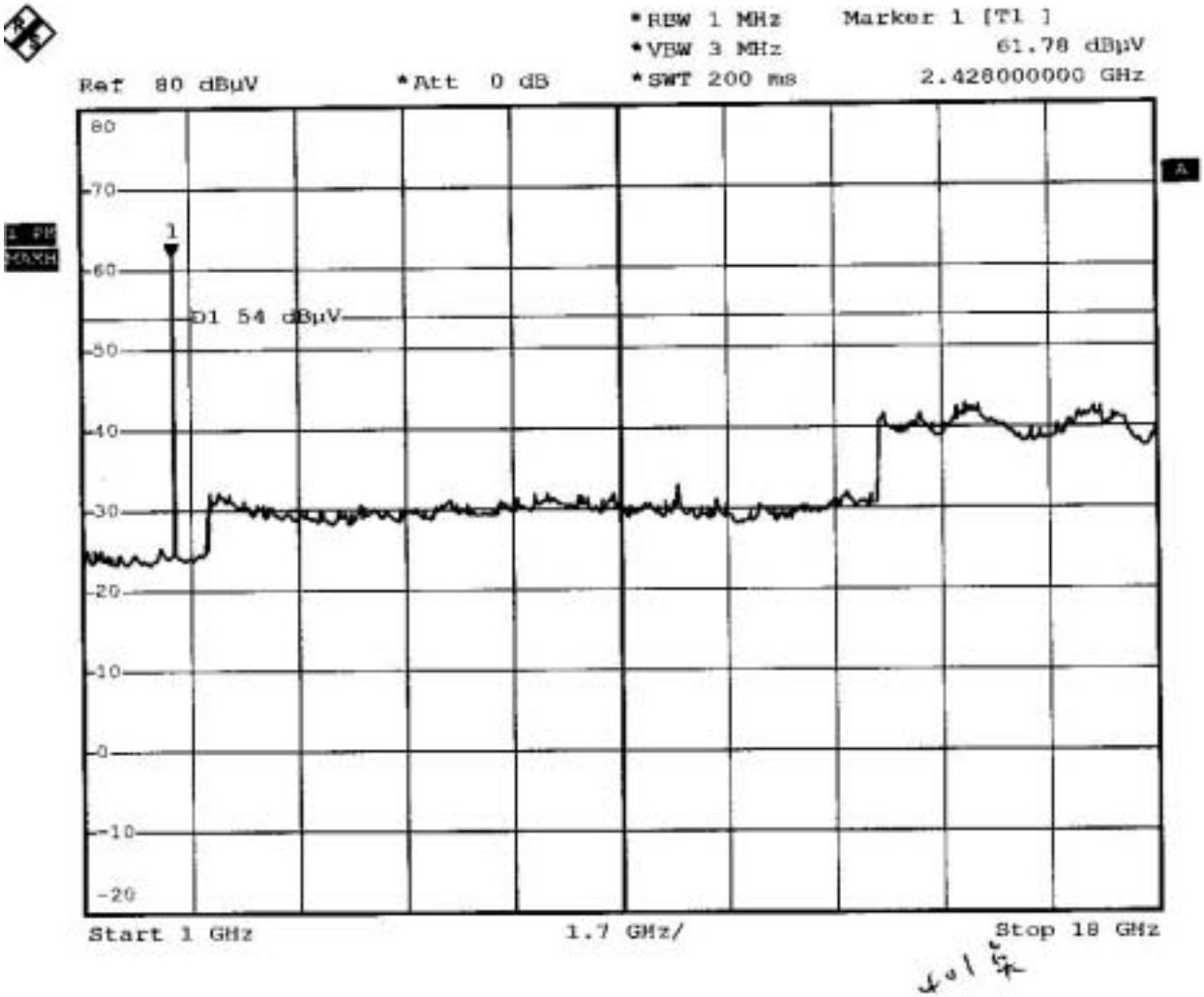
(2) 18Ghz – 25Ghz



Date: 27.MAY.2003 10:41:02

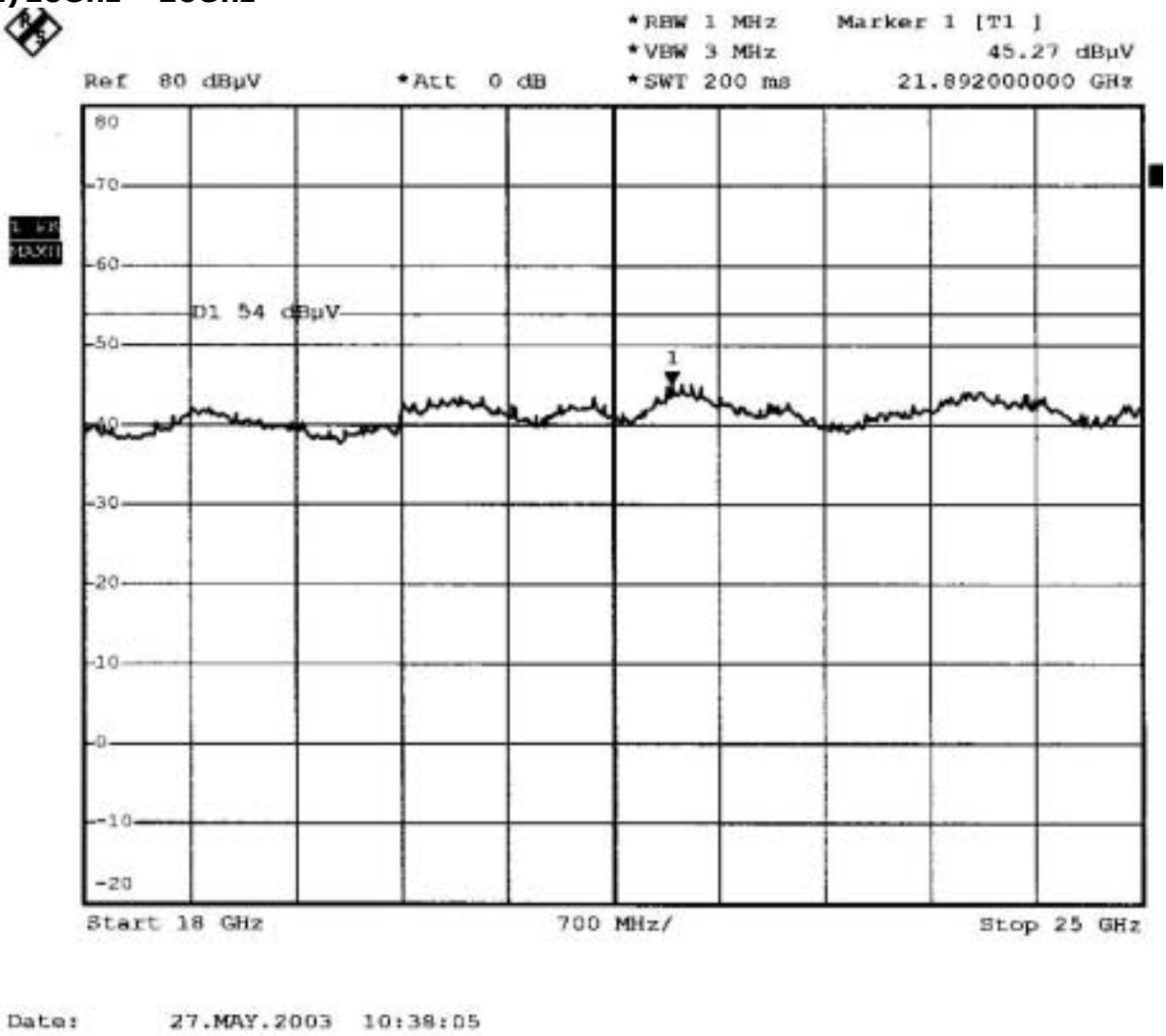
F=2441MHz with max. power , horizontal

(1) 1Ghz – 18Ghz



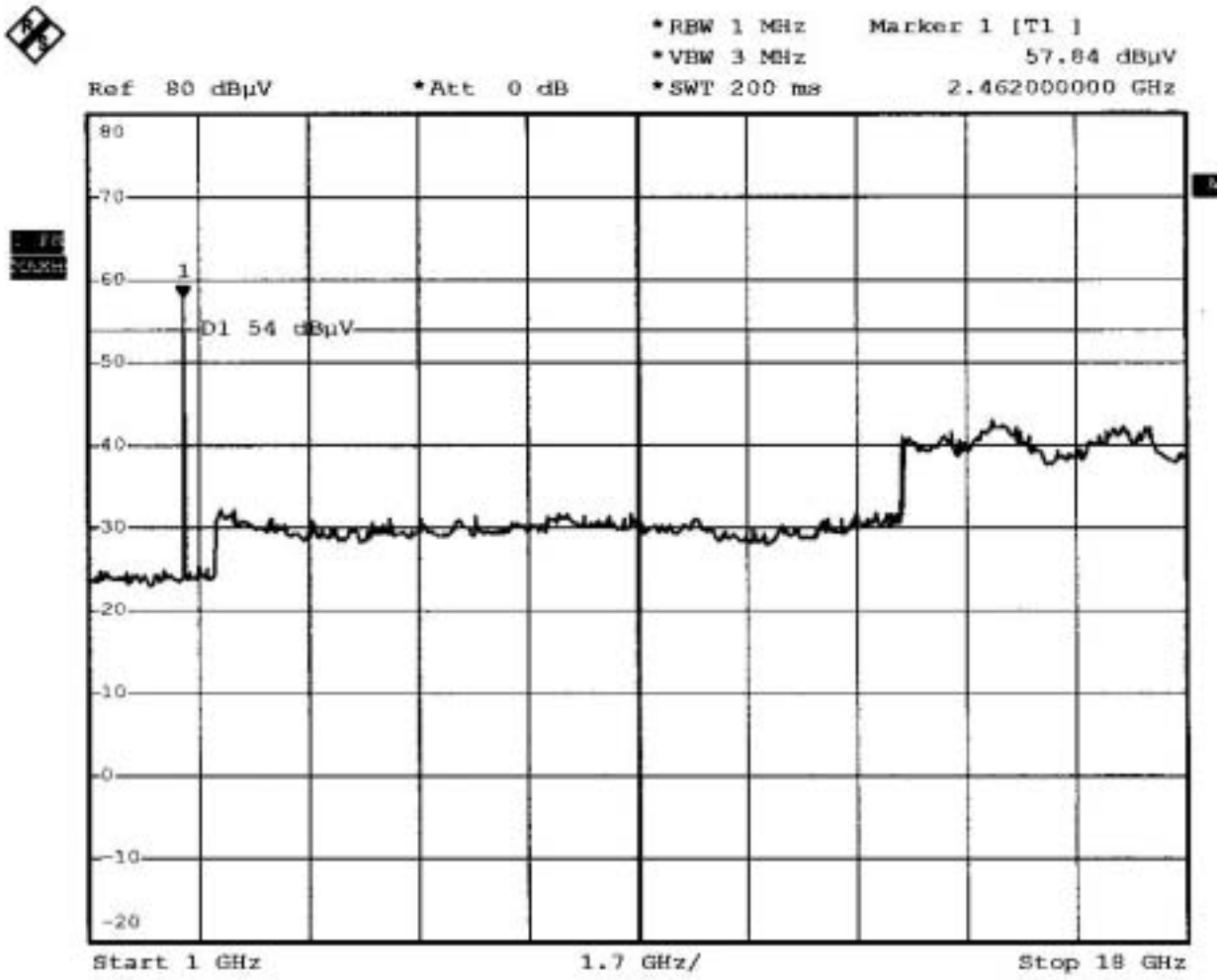
Date: 27.MAY.2003 10:28:51

(2) 18Ghz – 25Ghz

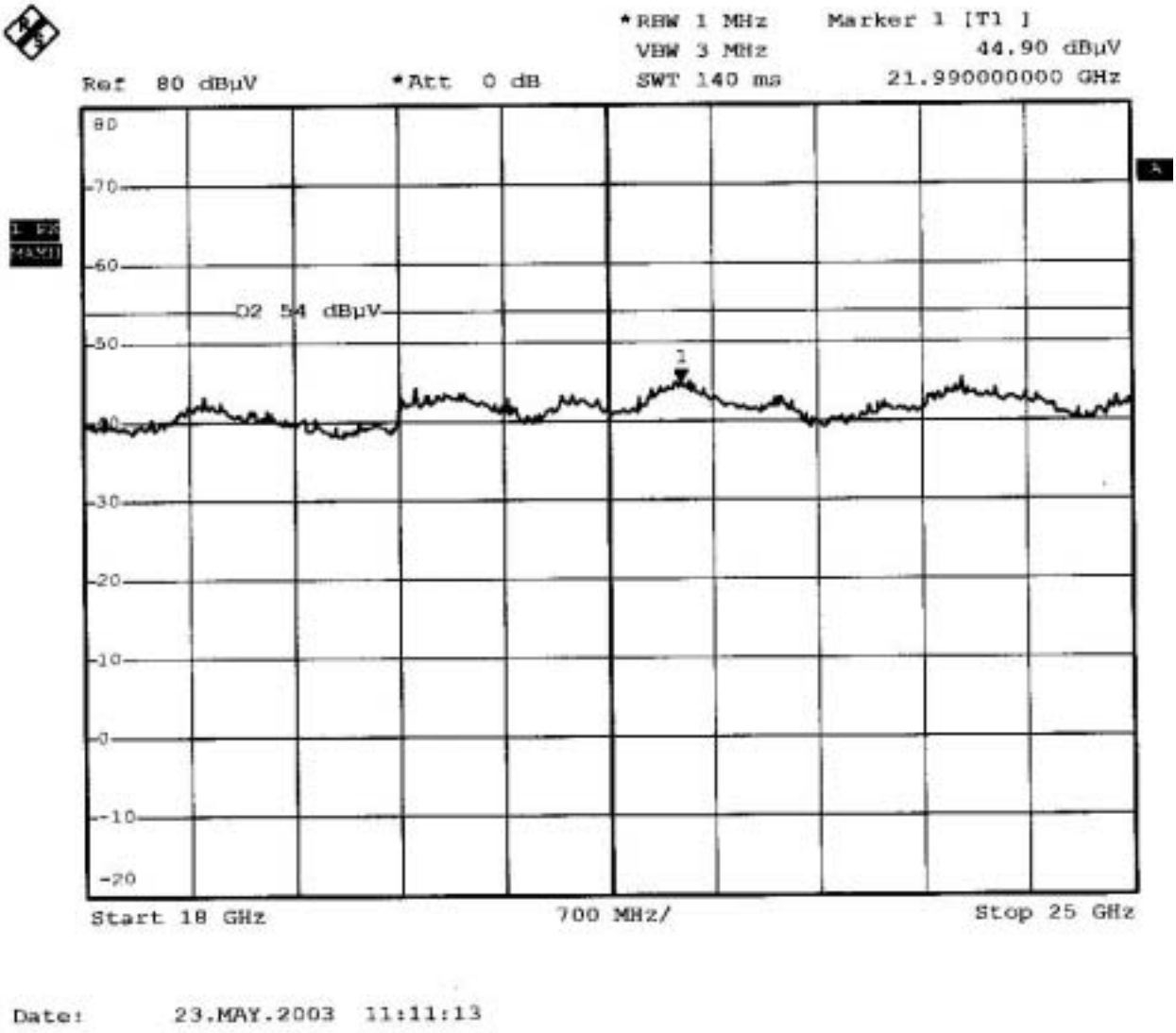


F=2480 MHz with max. power , vertical

(1) 1Ghz – 18Ghz

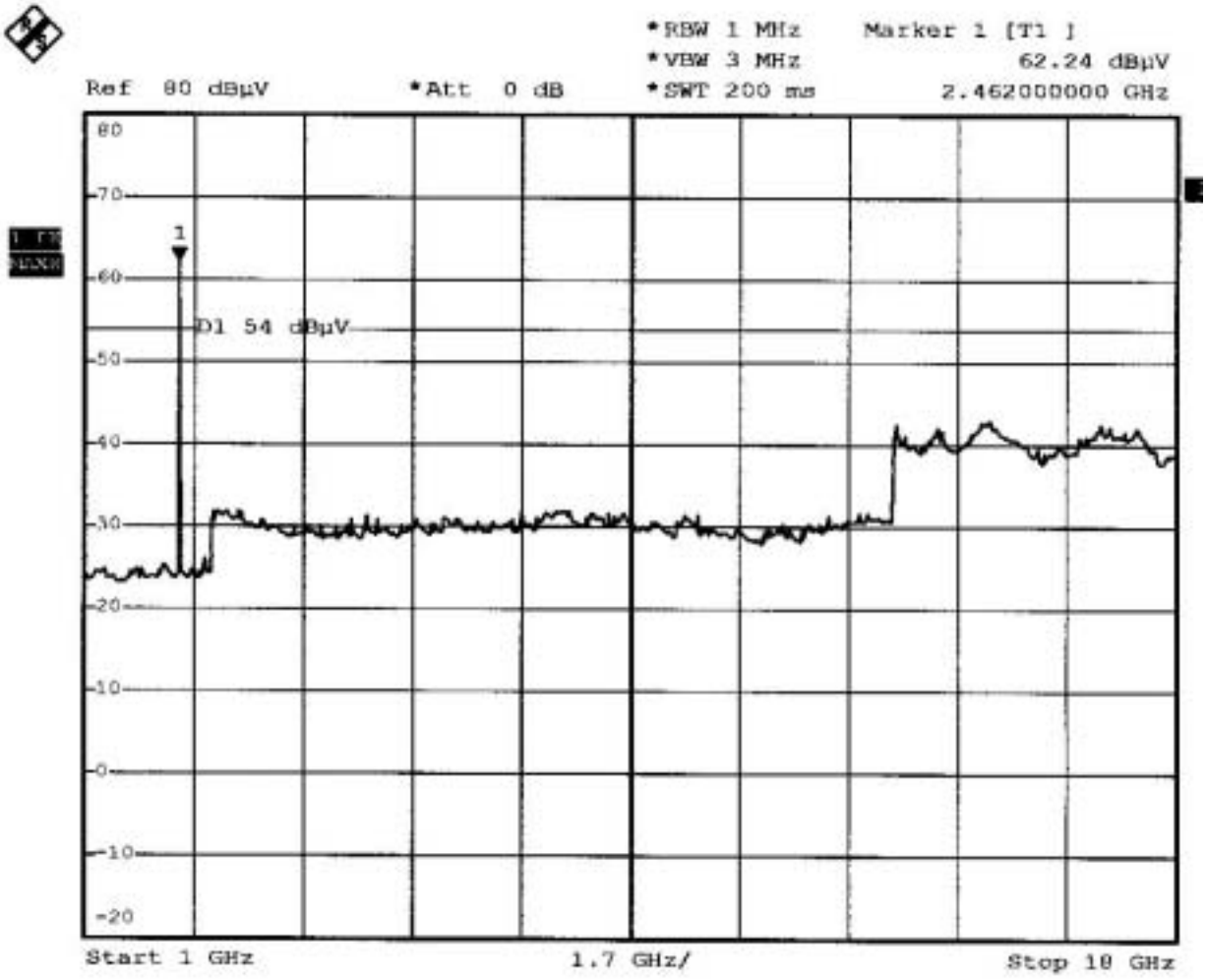


(2) 18Ghz – 25Ghz



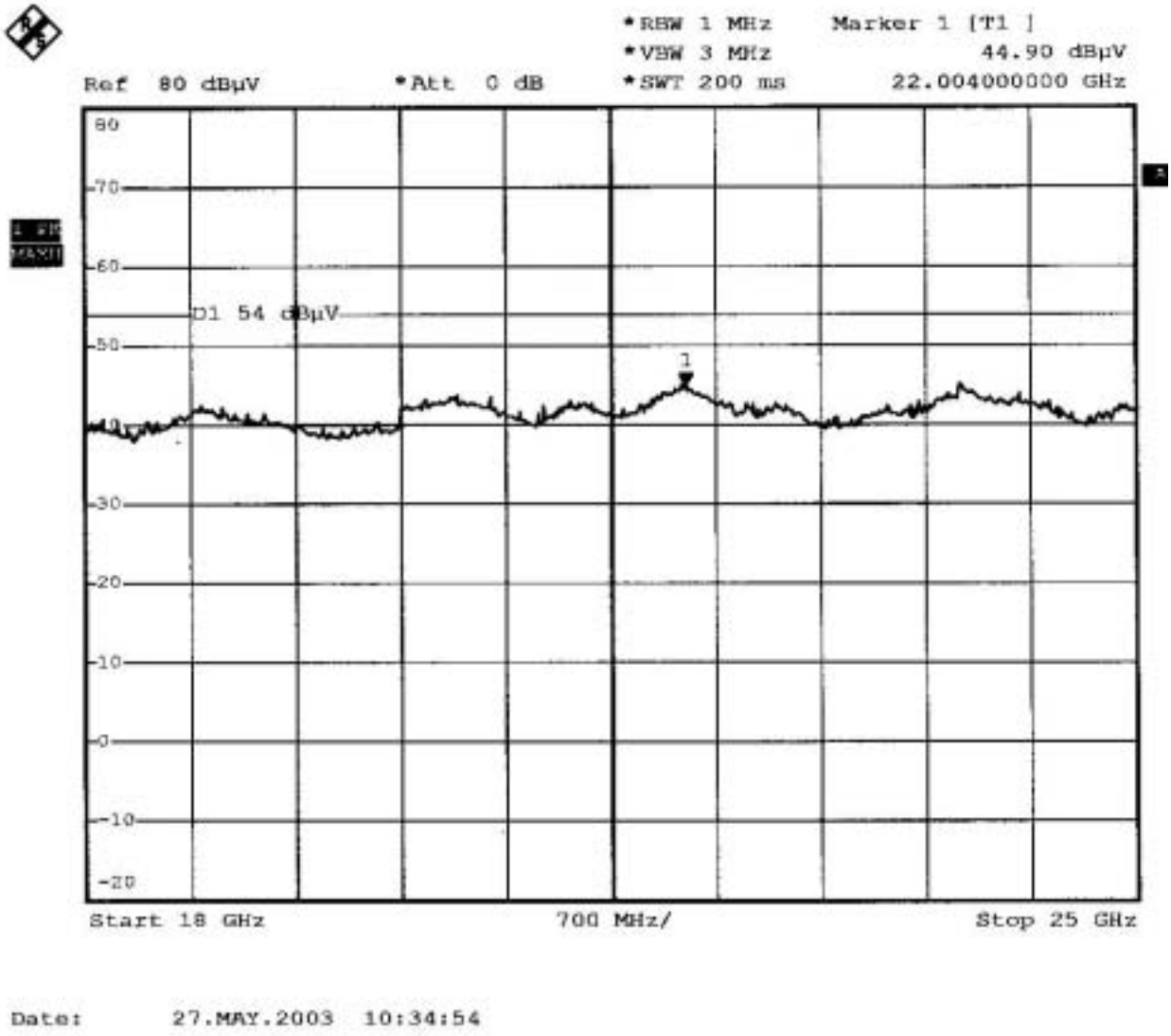
F=2480 MHz with max. power , horizontal

(1) 1Ghz – 18Ghz



Date: 27.MAY.2003 10:32:26

(2) 18Ghz – 25Ghz



APPENDIX: Photographs of Test Setup

<Photos are saved separately>

APPENDIX : Photographs of EUT

Internal Photo

<Photos are saved separately>

External Photo

<Photos are saved separately>

<Photos are saved separately>