

FCC TEST REPORT

Equipment Under Test : Bluetooth USB Dongle
Model No. : BT-DG03

Applicant : EPOX COMPUTER CO., LTD.
Address of Applicant : 346, Chung San Rd., Sec. 2, 10 Fl., Chung Ho City,
Tapei Hsien 235, 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 : Robert Chang **Date** : 2002/11/7

Approved by : Jason Lin **Date** : 2002/11/8

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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 : EPOX COMPUTER CO., LTD.
Address : 346, Chung San Rd., Sec. 2, 10 Fl., Chung Ho City,
Taipei Hsien 235, Taiwan, R.O.C.
Contact : Mr. David Chen
Telephone : +886-2-22479888 ext. 1708

1.3 Description of EUT(s)

1	Product name	Bluetooth USB Dongle
2	Product ID	BT-DG03
3	Hardware Version	REV.1.0
4	Software Version	14.3
5	Supply Voltage	USB Power Supply 5V±10%
6	Carrier Frequency	2402MHz to 2480MHz
7	Modulation Method	GFSK, 1Mbps, 0.5BT Gaussian
8	Hopping	1600hops/sec, 1MHz channel space
9	Output Interface	USB
10	Operation Temperature	-20 to +70 degree
11	Compliant	Bluetooth Specification Ver1.1
12	Storage Temperature	-40 to +85 degree

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 "BlueSuite" to control the EUT. Setting of the software parameters are set as default. 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	<i>PASS</i>	7
15.209	Radiated emission Limits, general requirement	<i>PASS</i>	9
15.247(a)(1)	Channel Spacing	<i>PASS</i>	14
15.247(a)(1)(ii)	20db bandwidth / No. of channels	<i>PASS</i>	15
15.247(a)(1)(ii)	Average Time of Occupancy	<i>PASS</i>	19
15.247(b)(1)	Peak Output power	<i>PASS</i>	21
15.247(c)	Band-Edge Emission	<i>PASS</i>	22
15.247(c)	Spurious Emission under 25Ghz	<i>PASS</i>	24

3. Instruments List

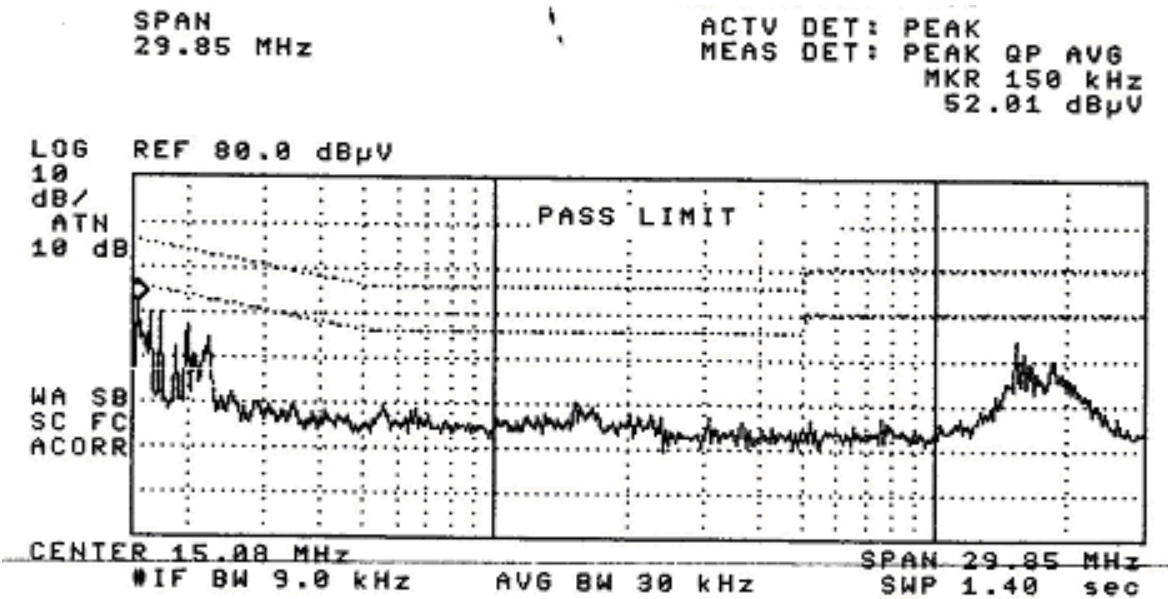
Instrument	Model	Serial number	Calibration date
Desktop PC	Acer Veriton 7200	N/A	N/A
Spectrum Analyzer	Agilent 7405A	US40240202	May 22, 2002
Climatic chamber	Terchy MHG-120L	911009	Oct. 15, 2002
Antenna	Schwarzbeck BBHA9120A	309/320	July 01, 2002
Antenna	Schwarzbeck VULB9163	152	July 01, 2002
RF Signal generator	Agilent 83752A	3601A02720	Sep. 04, 2002
EMC Analyzer	HP 8594EM	3624A00203	Dec. 13, 2001
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

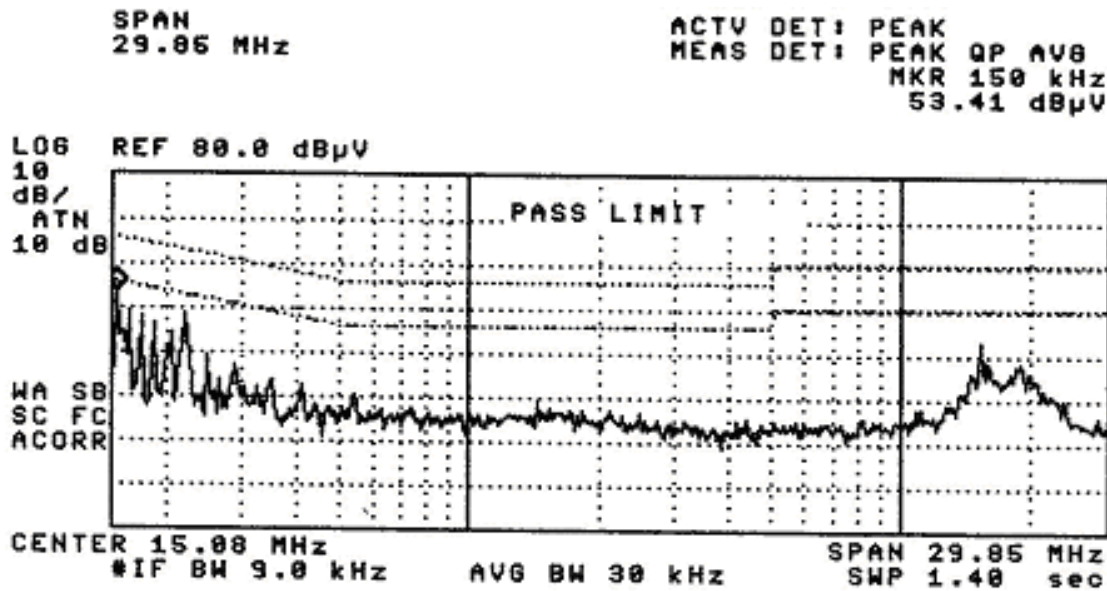
4.1 Conducted Limits

SUBCLAUSE 15.207

Line



Neural



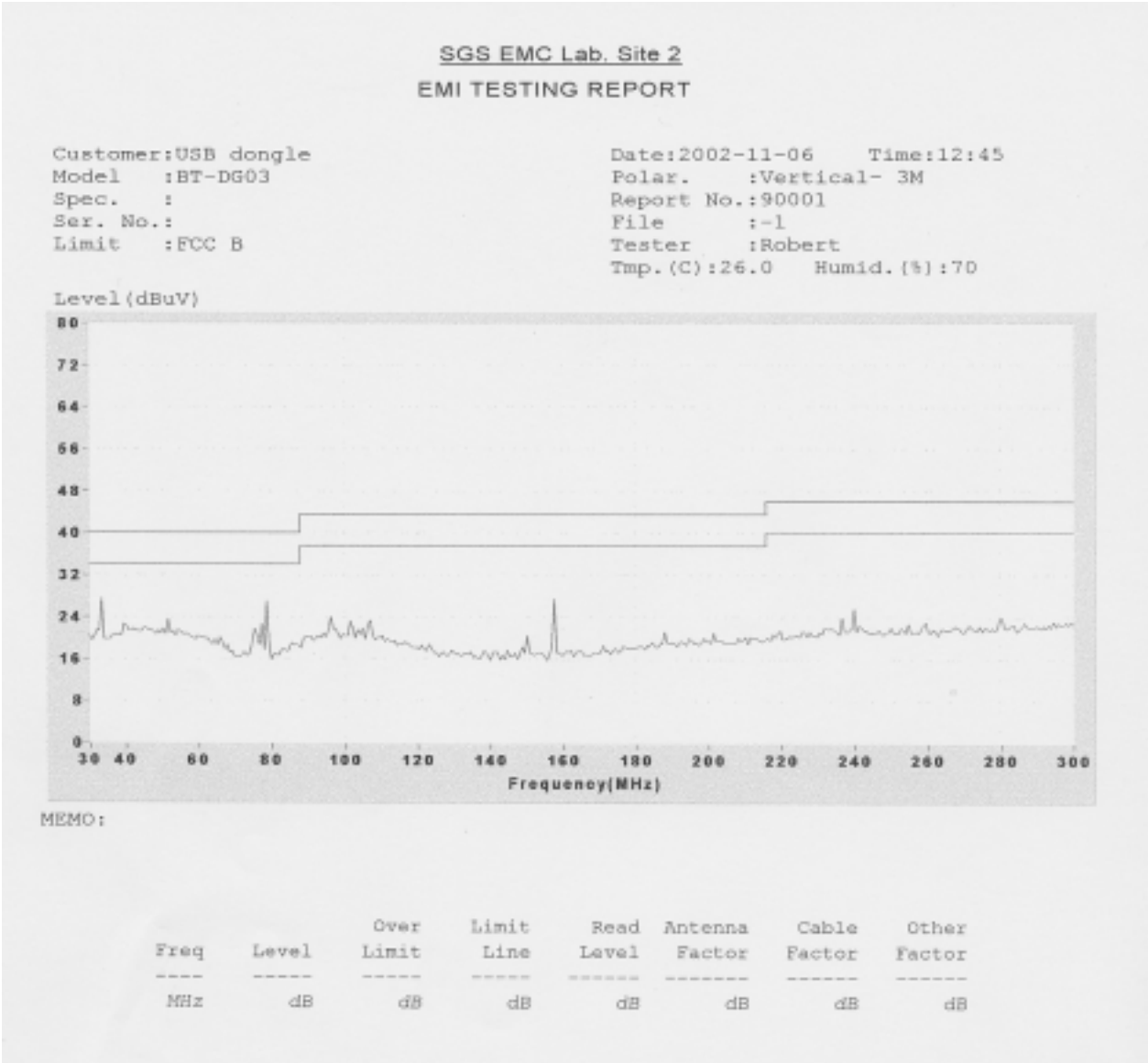
4.1.1 Limits (EN55022)

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

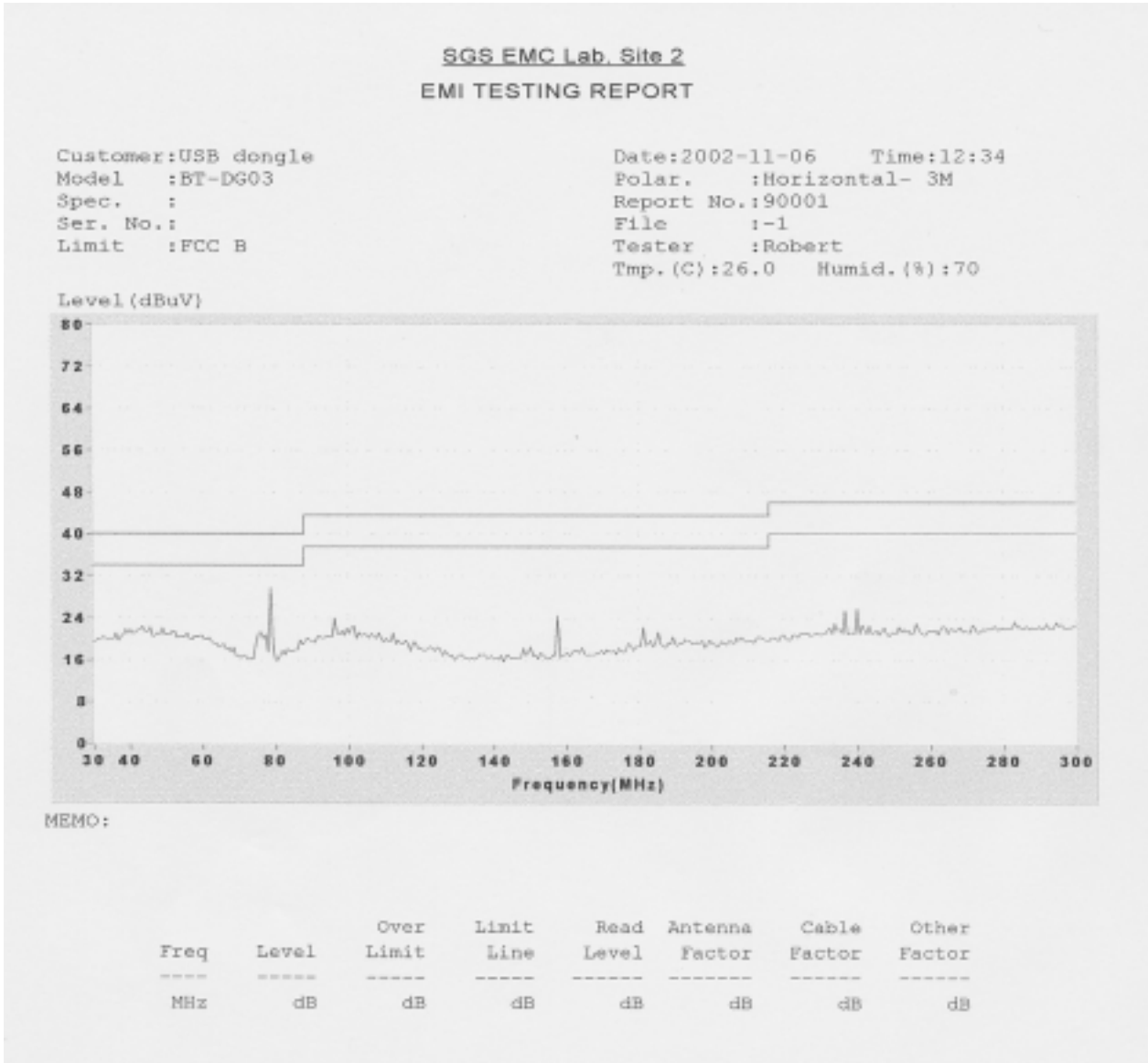
4.2 Radiated emission Limits, general requirement SUBCLAUSE 15.209

Part 1: 30Mhz-300Mhz

Vertical

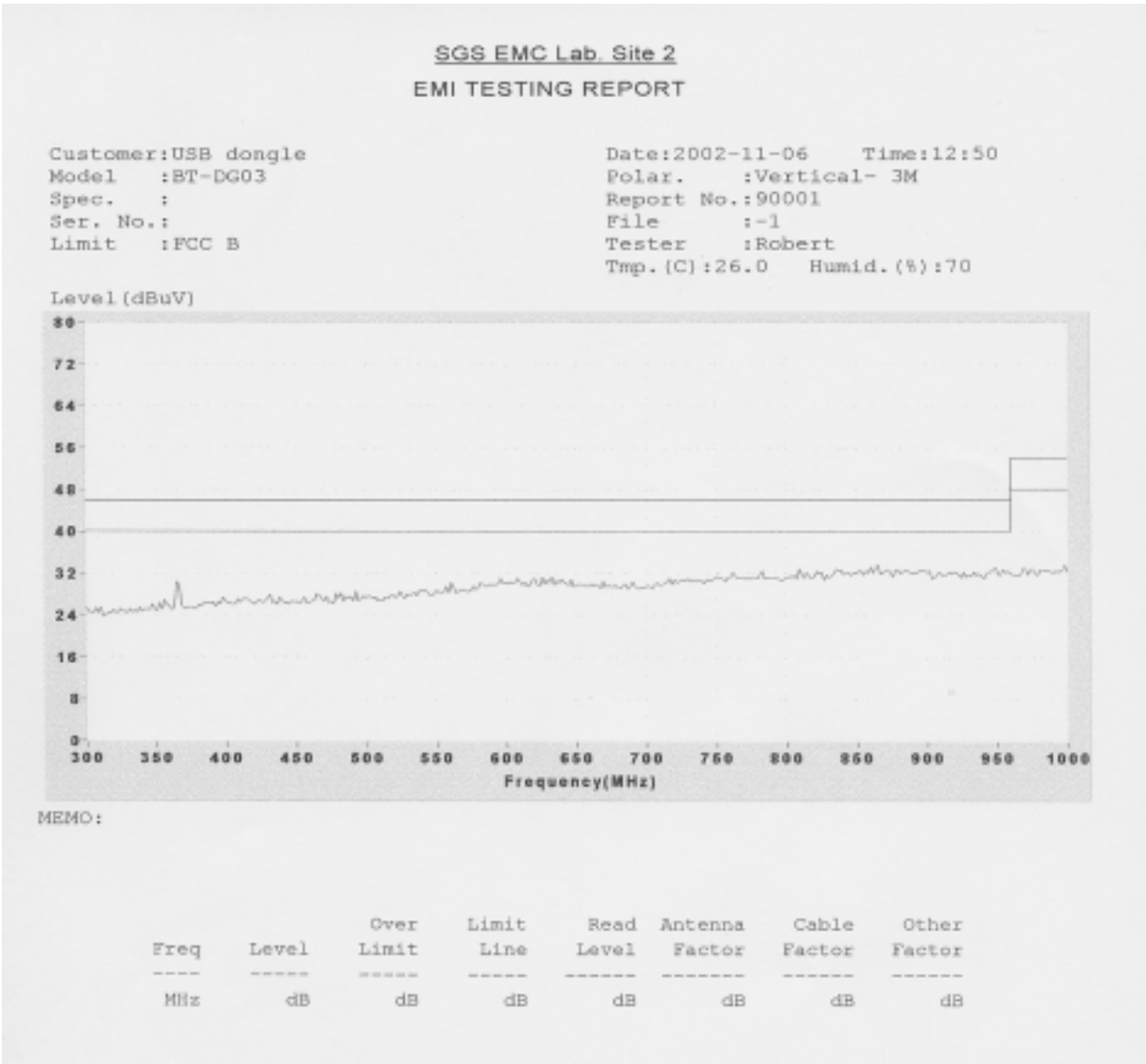


Horizontal

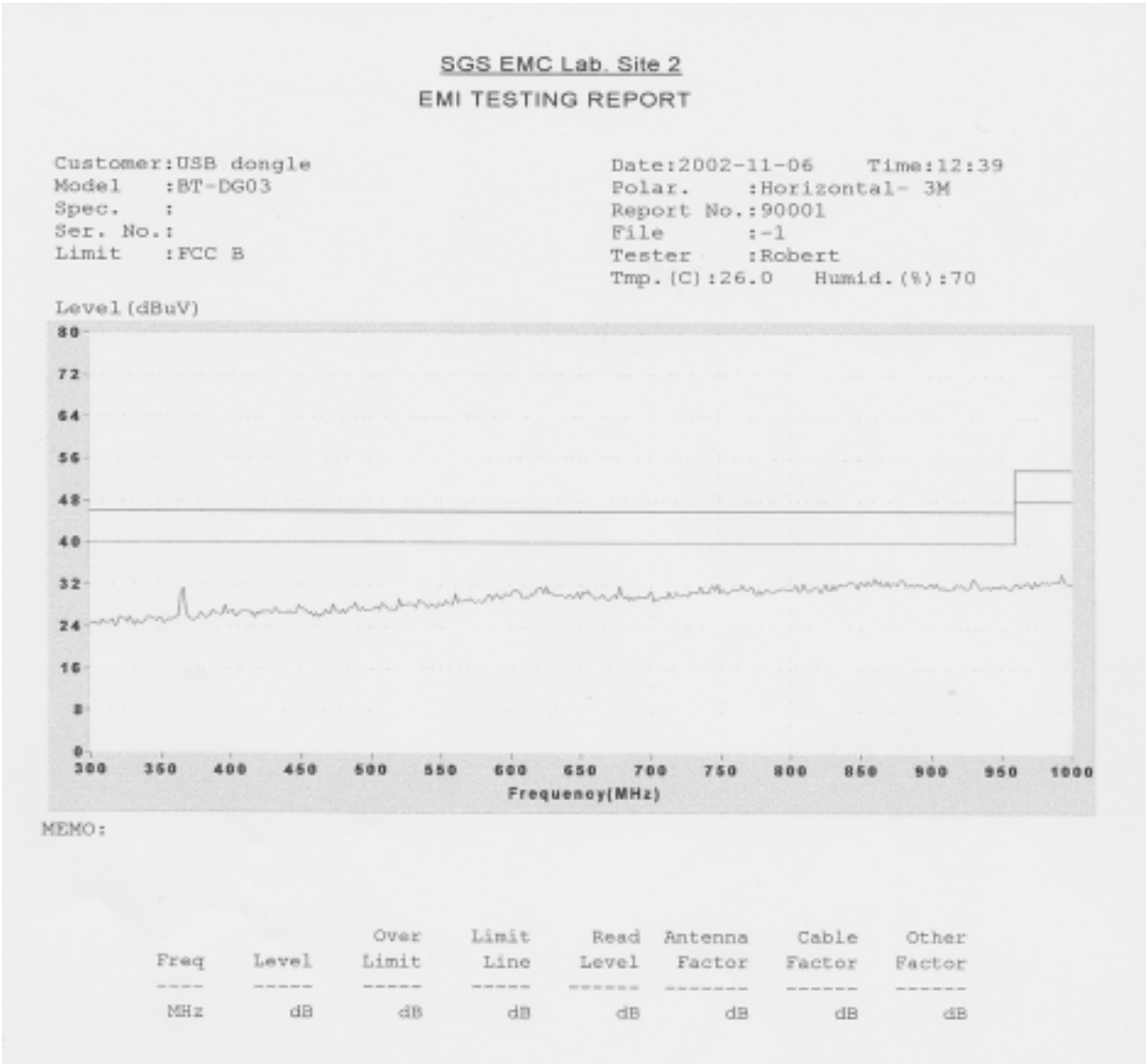


Part2: 300Mhz- 1Ghz

Vertical



Horizontal

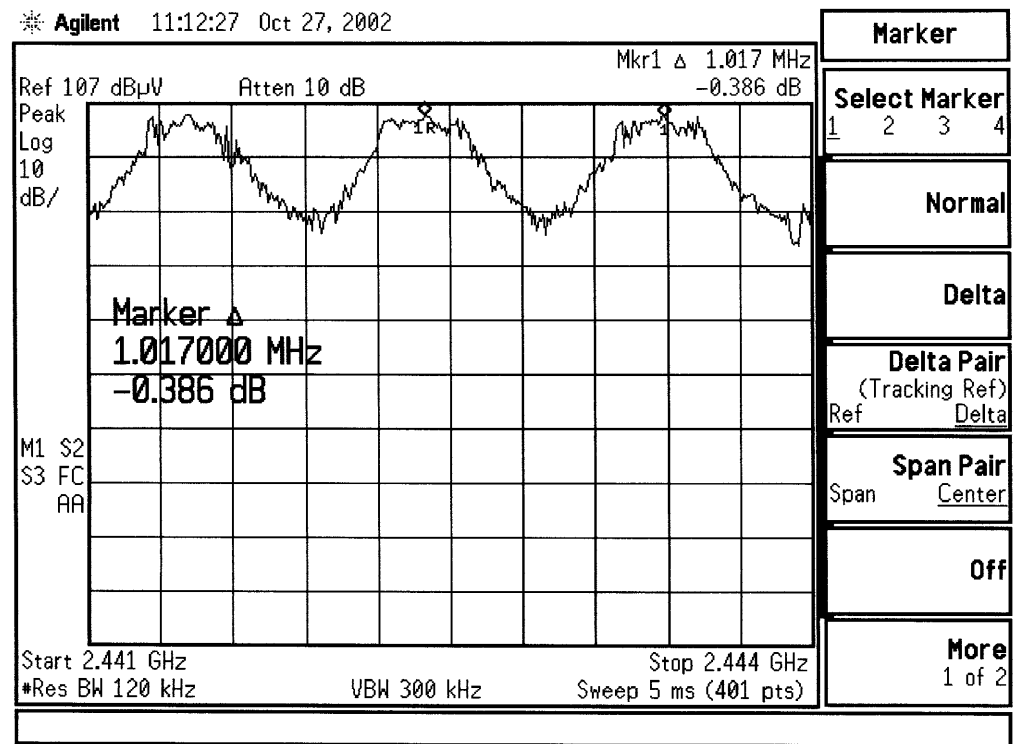
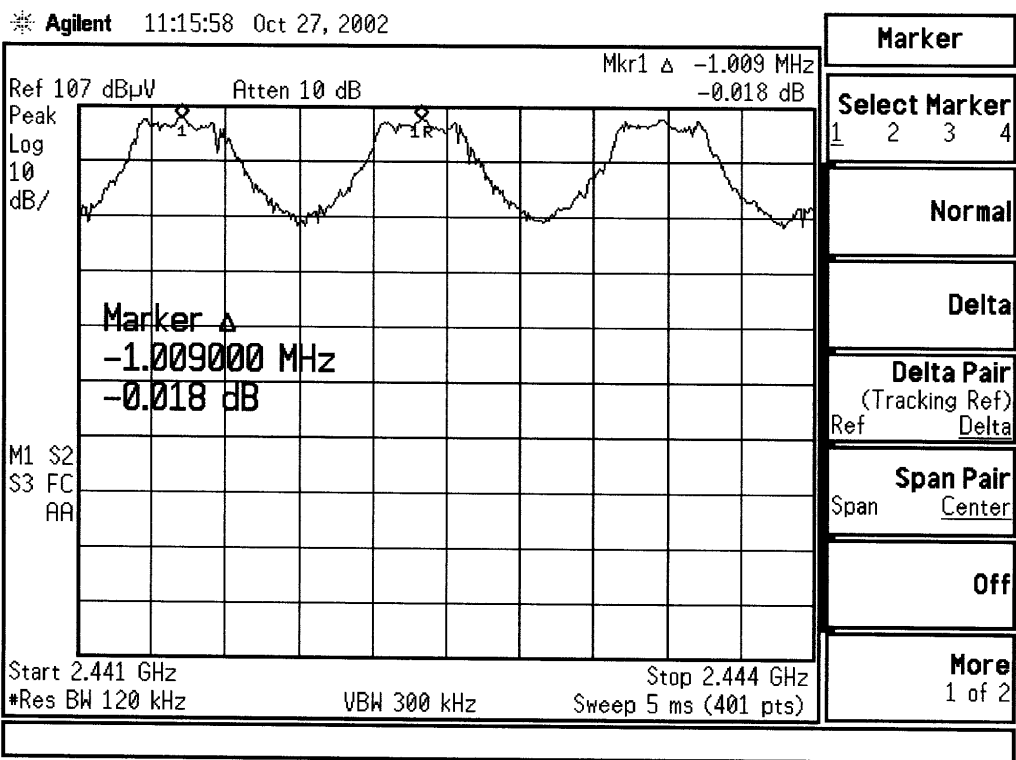


4.2.1 Limits

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

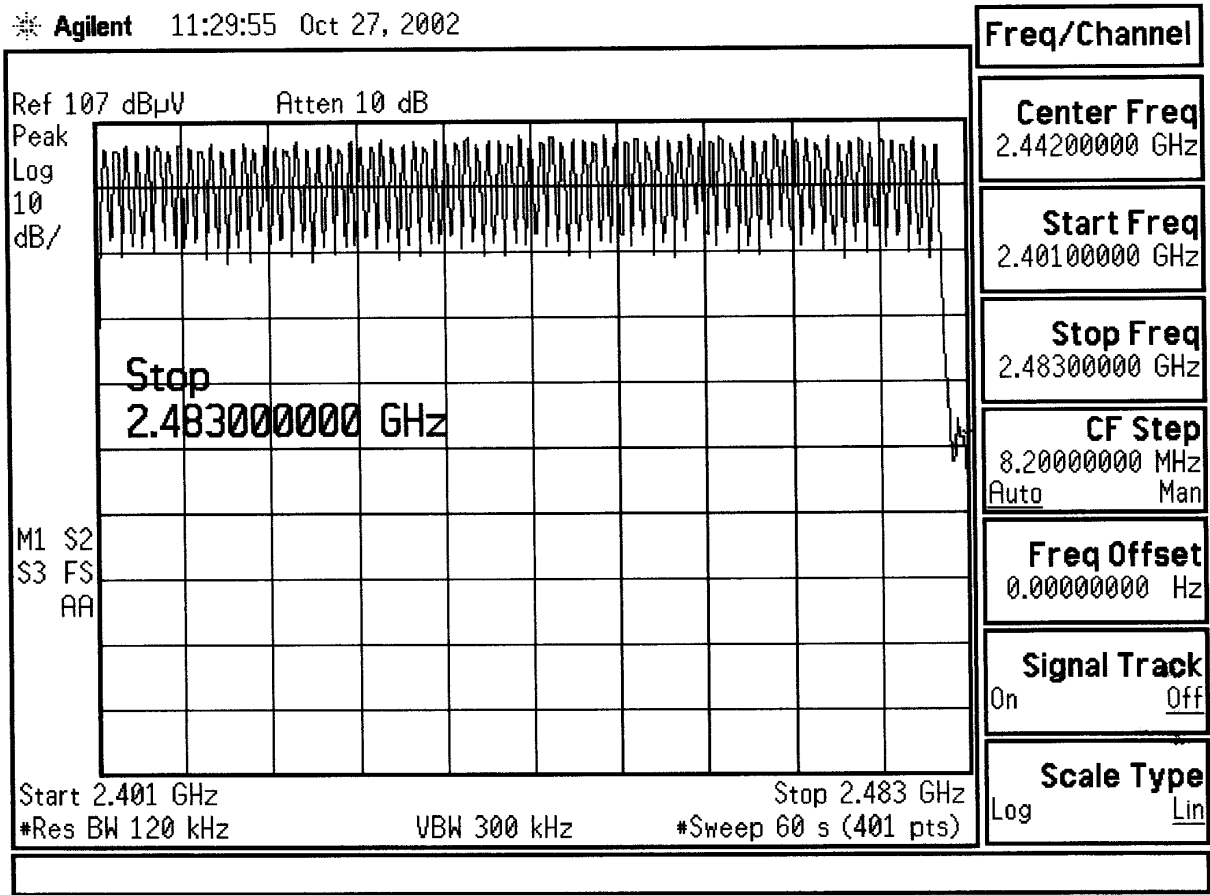
4.3 Channel Spacing

SUBCLAUSE15.247(a)(1)

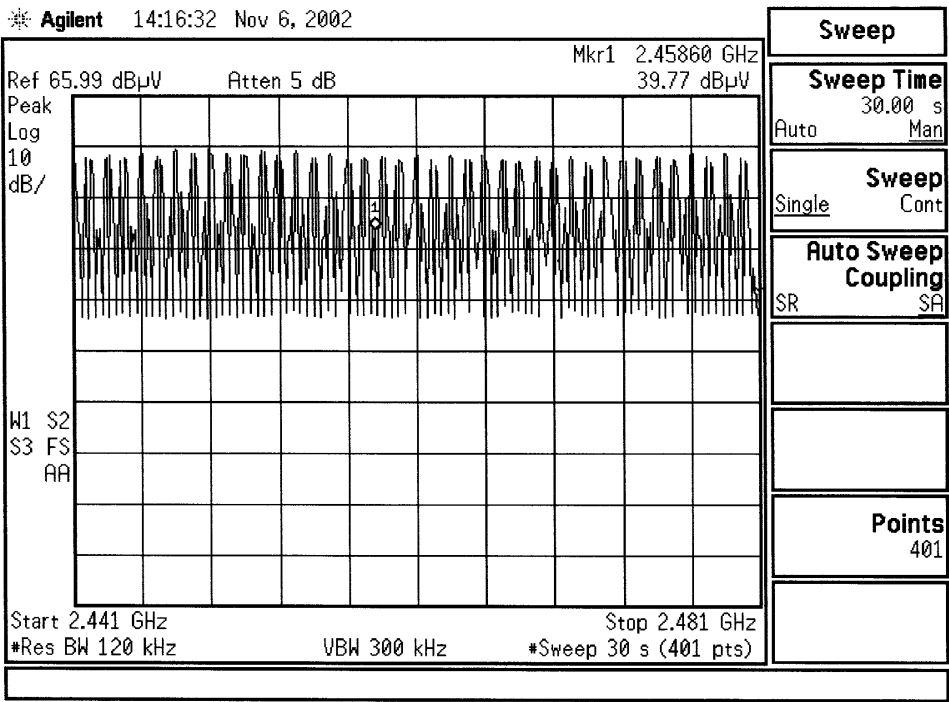
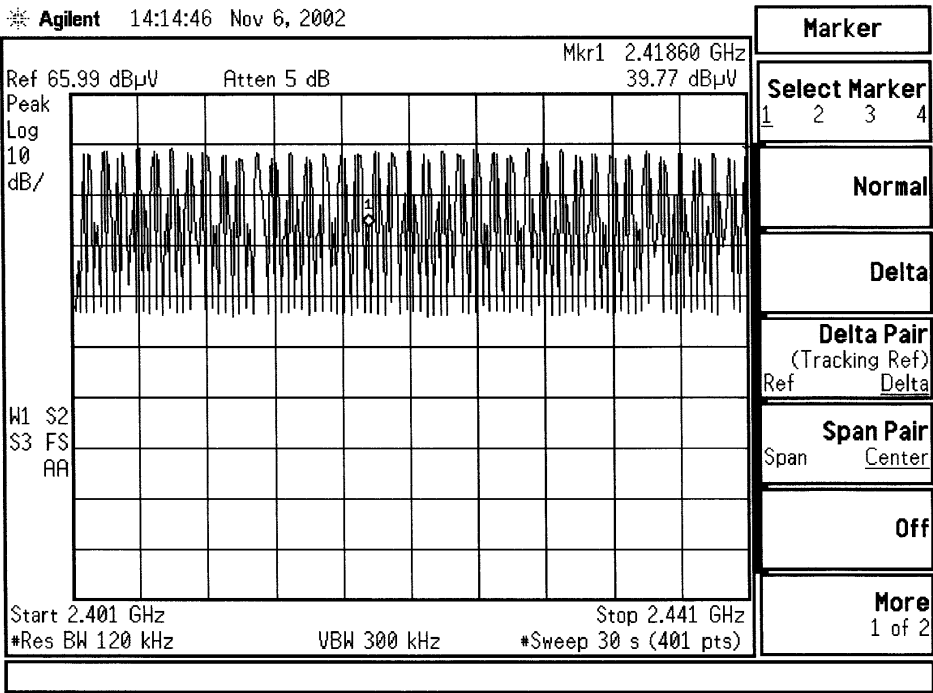


4.4 No. of carrier frequency / 20db Bandwidth

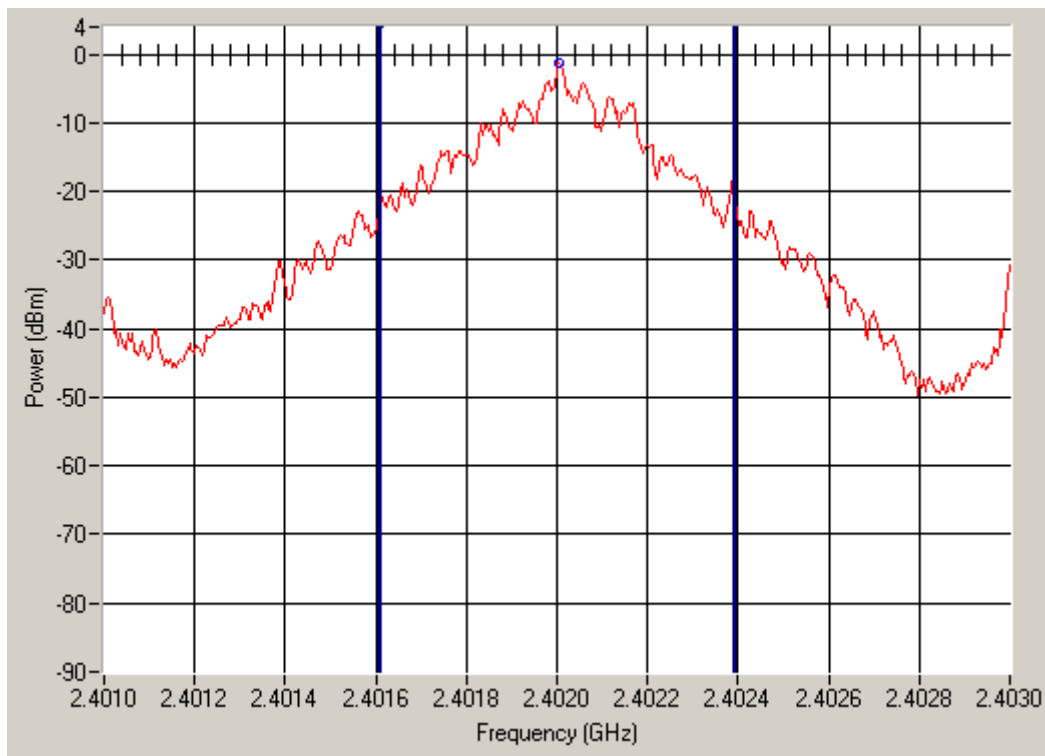
SUBCLAUSE15.247(a)(1)(ii)



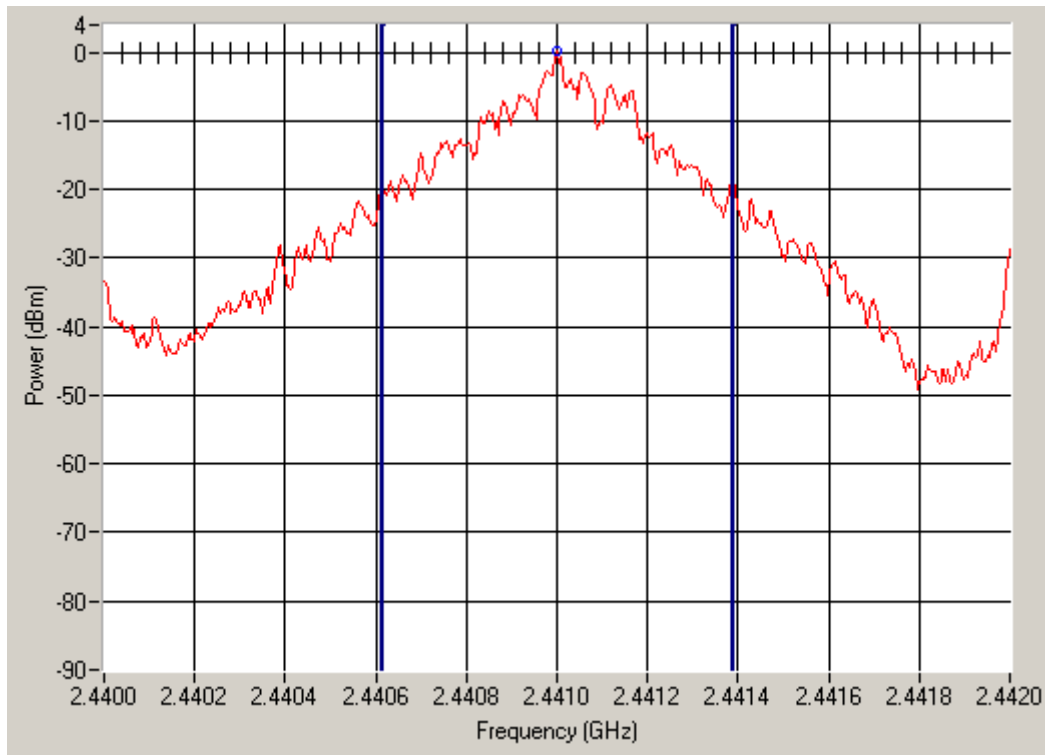
Split the whole frequency band into two.



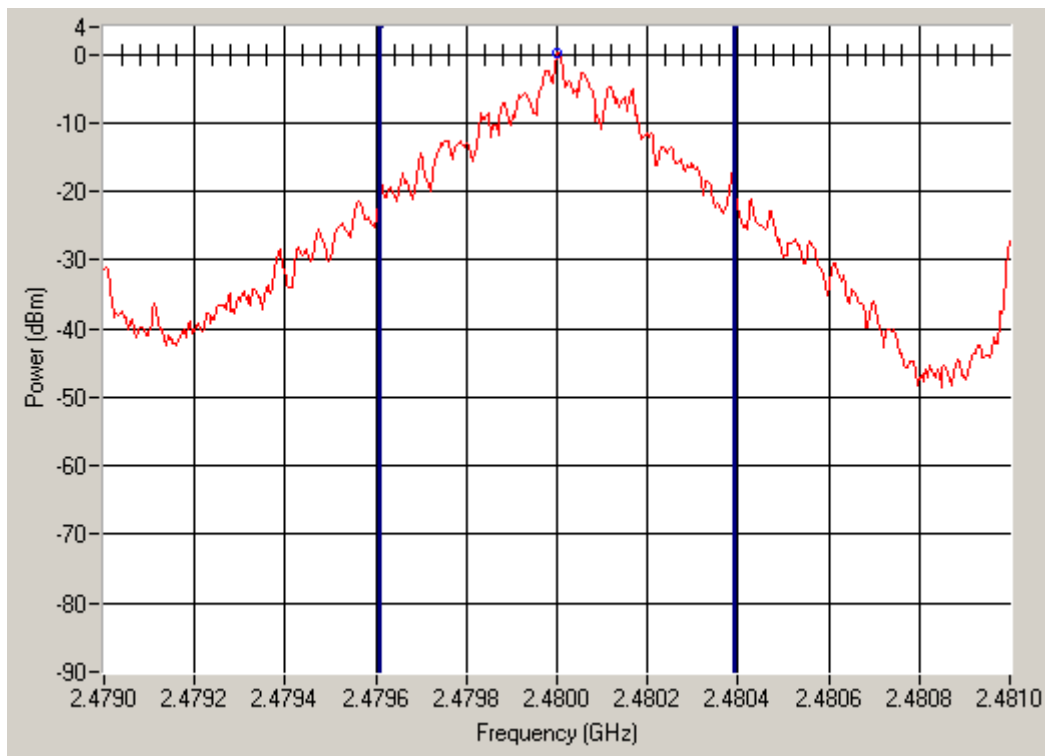
20dB bandwidth at lowest (2402Mhz), middle(2442Mhz), highest channel(2480Mhz)



channel bandwidth = 786Khz



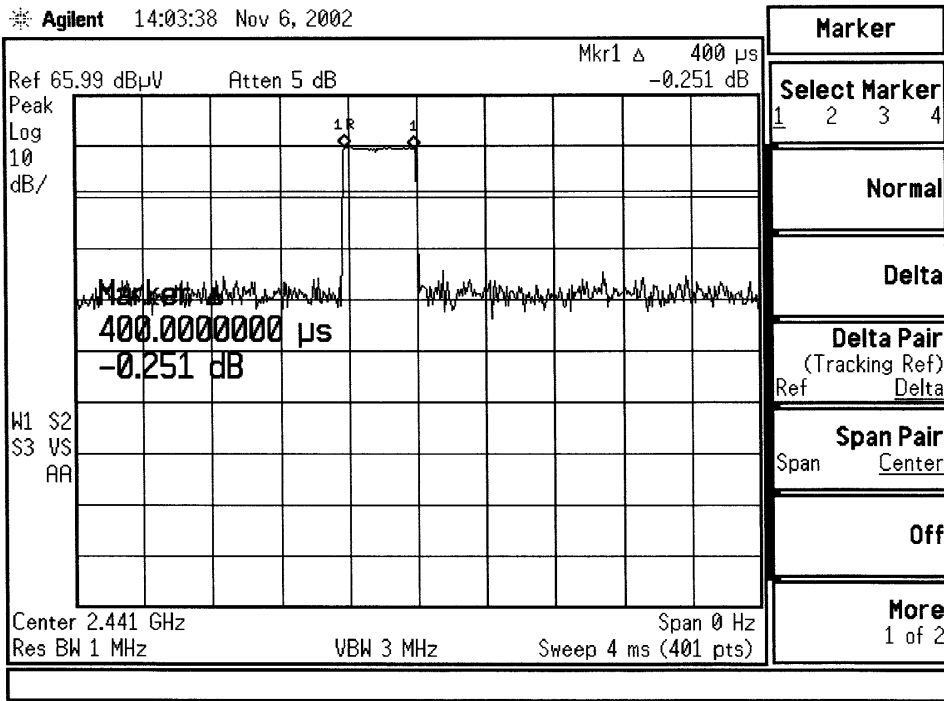
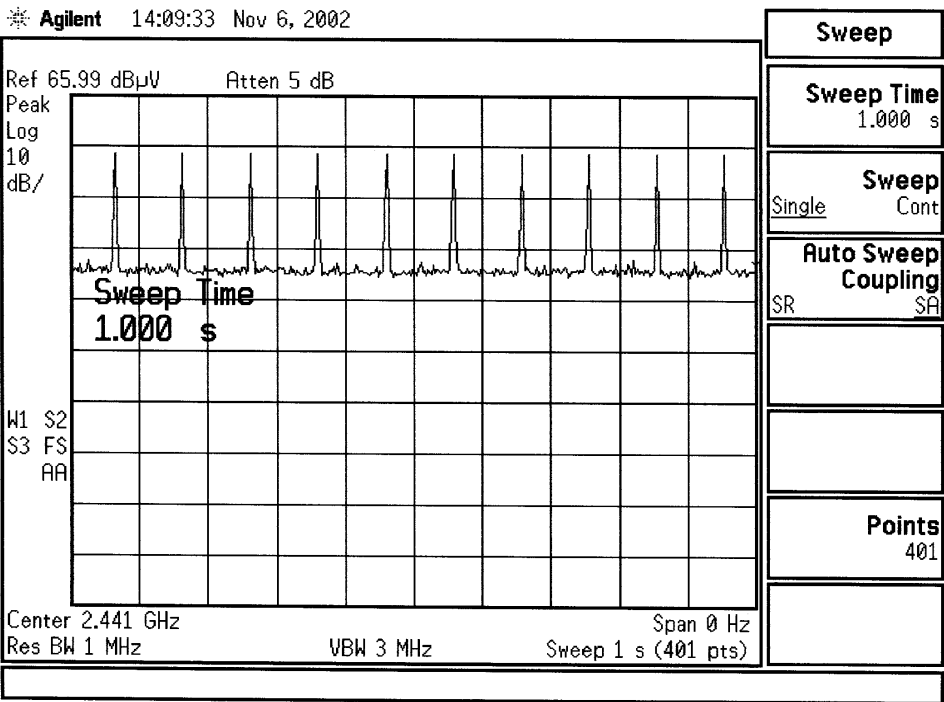
channel bandwidth = 778Khz



channel bandwidth = 786KHz

4.5 Average Time of Occupancy

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



4.5.1 calculation

At channel 2441Mhz, there are 10 bursts in 1 sec. Time period of each burst is 400 μ Sec. So the occupancy time within 30 second is $400 \times 10 \times 30 = 120000 \mu \text{ Sec} = 120 \text{ mSec} = 0.12 \text{ Sec}$.

4.5.2 Limits

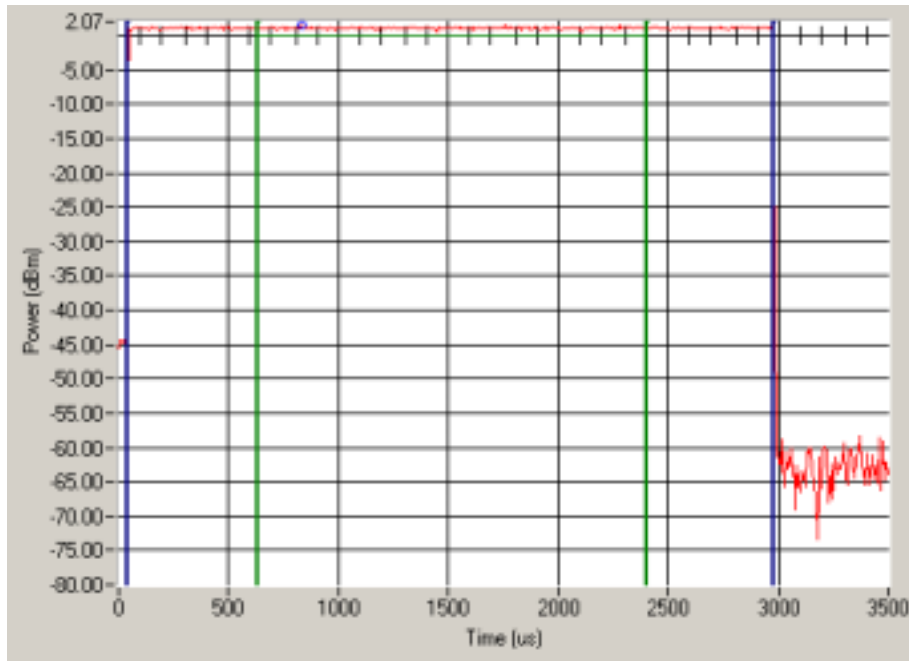
The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

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)

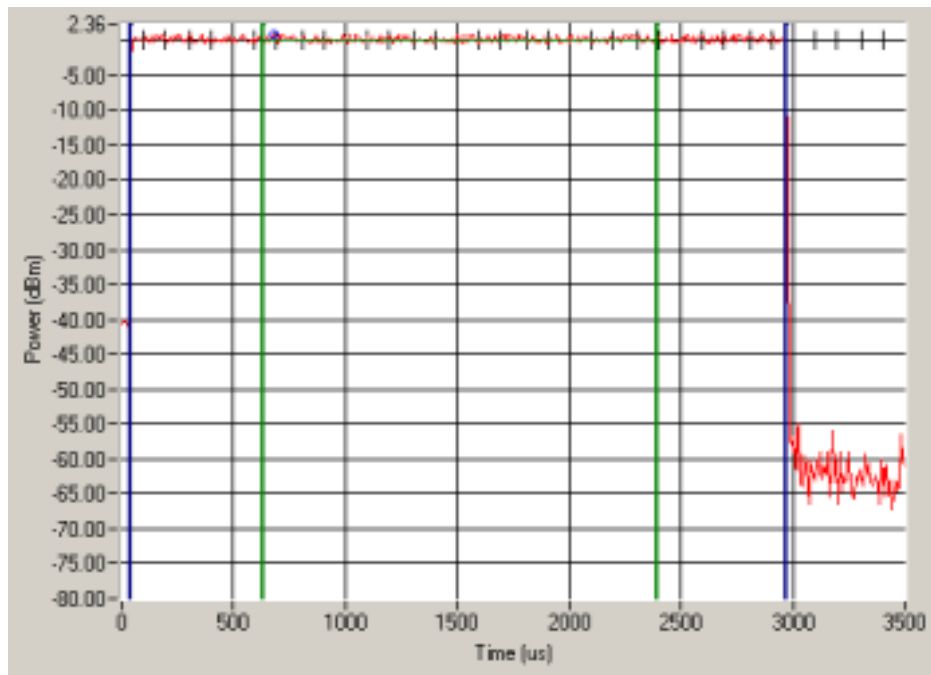
Transmitter transmit at lowest channel (2402Mhz)



Peak Power (EIRP)=1.47 dbm

Average Power(EIRP)=1.10 dbm

Transmitter transmit at highest channel (2480Mhz)



Peak Power (EIRP)=0.91 dbm

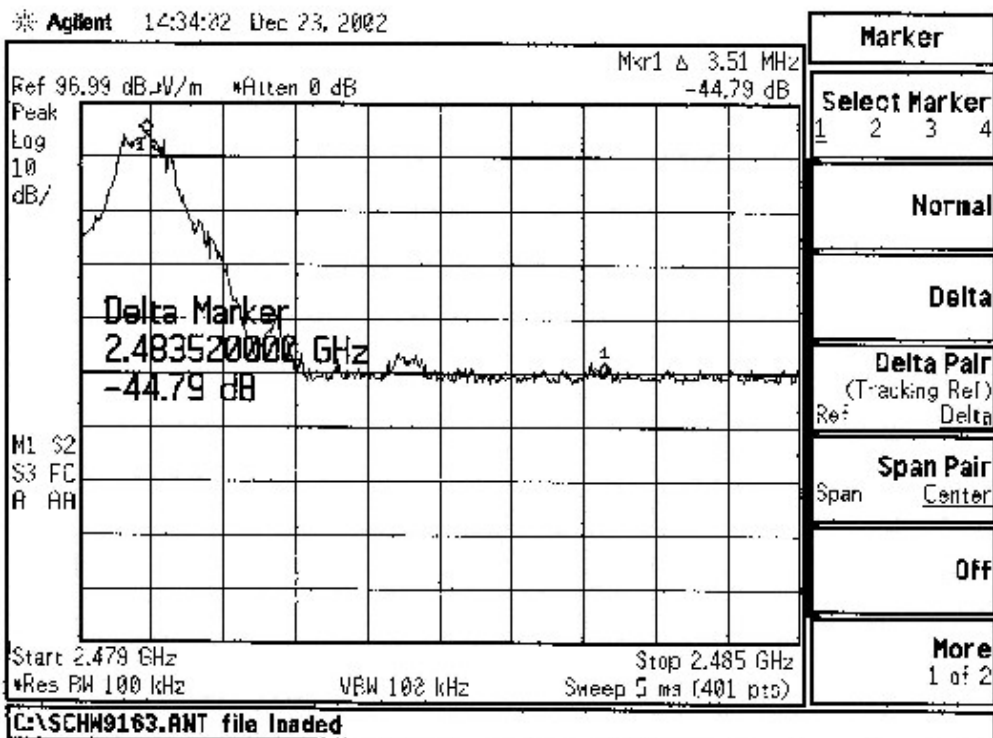
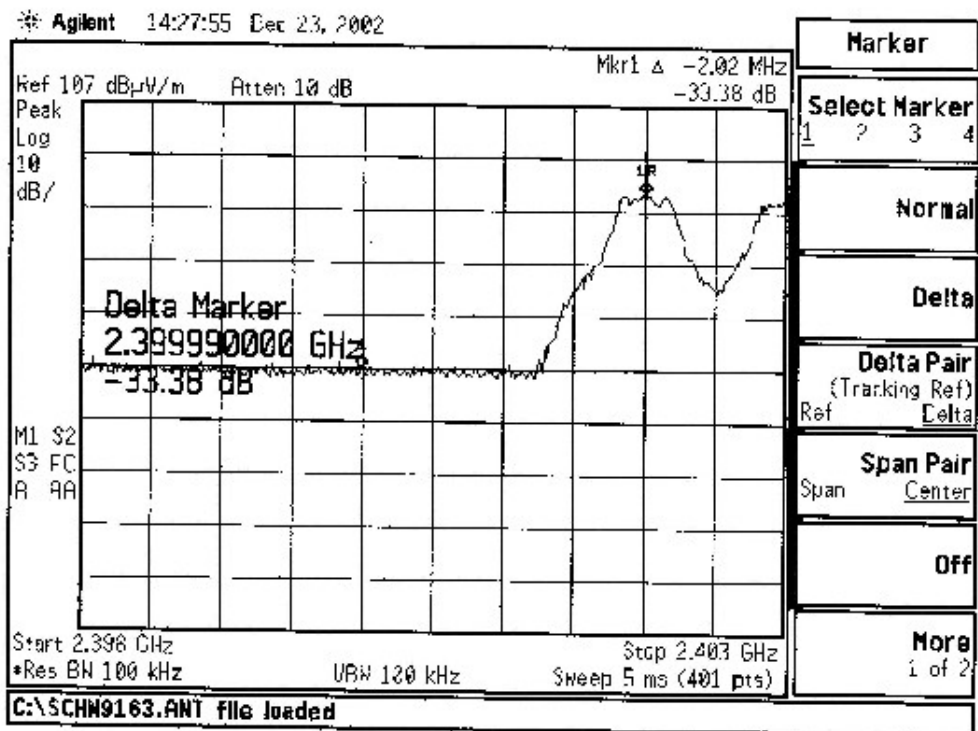
Average Power(EIRP)=0.17 dbm

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

SUBCLAUSE 15.247(c)



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,

4.8 Spurious Emission under 25Ghz

SUBCLAUSE15.247(c)

Spectrum Analyzer setup

Start frequency	0.030 GHz
Stop frequency	25.000 GHz
Center frequency	2.441 GHz
Low frequency	2.402 GHz
Mid frequency	2.441 GHz
High frequency	2.480 GHz
Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Sweep time	12.000 s
Reference level	4.00 dBm

EUT operating at lowest frequency

Frequency (Mhz)	Read value (dBuV/m)	Antenna factor	Cable loss (dB)	Real Value (dBuV/m)	Limit (dBuV/m)
2401.743	57.16	27.62	4.55	80.23	In band
4803.486	25.1	31.26	7.02	49.34	54
7205.229	Not Detectable	36.53	9.09	N/A	54

EUT operating at middle frequency

Frequency (Mhz)	Read value (dBuV/m)	Antenna factor	Cable loss (dB)	Real Value (dBuV/m)	Limit (dBuV/m)
2441.042	56.79	27.60	4.62	79.77	In band
4882.084	22.58	31.41	7.24	46.75	54
7323.126	Not Detectable	36.55	9.13	N/A	54

EUT operating at highest frequency

Frequency (Mhz)	Read value (dBuV/m)	Antenna factor	Cable loss (dB)	Real Value (dBuV/m)	Limit (dBuV/m)
2479.699	55.61	27.58	4.67	78.52	In band
4959.398	23.23	31.55	7.31	47.47	54
7439.097	Not Detectable	36.59	9.24	N/A	54

APPENDIX: Photographs of Test Setup

<The photos are saved separately>

APPENDIX : Photographs of EUT

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