FCC TEST REPORT

Equipment Under Test	:	Bluetooth USB Adapter
Model No.	:	USBBTC1A0
Applicant	:	Billionton Systems Inc.
Address of Applicant	:	No.21 Sui-Lih Rd., Hsin Chu , 300 , Taiwan

Standards:

FCC Part 15 subpart C

In the configuration tested, the EUT complied with the standards specified above.

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 Lee Date : Feb. 25,2003

Approved by : Jason Lin Date : Feb. 25,2003

Contents

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

Applicant : Billionton Systems Inc.
Address of Applicant: No.21 Sui-Lih Rd., Hsin Chu , 300 , Taiwan
Contact: Mr. John Huang
Telephone: +886-3-5729399 ext.358

1.3 Description of EUT(s)

1	Product name	Bluetooth USB Adapter
2	Product ID	USBBTC1A0
3	Supply Voltage	USB Power Supply 5V±10%
4	Carrier Frequency	2402MHz to 2480MHz
5	Modulation Method	GFSK,1Mbps,0.5BT Gaussian
6	Hopping	1600hops/sec, 1MHz channel space
7	Output Interface	USB
8	Operation Temperature	-20 to +70 degree
9	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 “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=60 (at max. power)

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.

Due to cable loss, the real value will equal to measured value(show on the instrument) add cable loss.

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*	9
15.247(a)(1)	Channel Spacing	*PASS*	12
15.247(a)(1)(ii)	20db bandwidth / No. of channels	*PASS*	13
15.247(a)(1)(ii)	Average Time of Occupacy	*PASS*	17
15.247(b)(1)	Peak Output power	*PASS*	19
15.247(c)	Band-Edge Emission	*PASS*	21
15.247(c)	Spurious Emission under 25Ghz	*PASS*	22

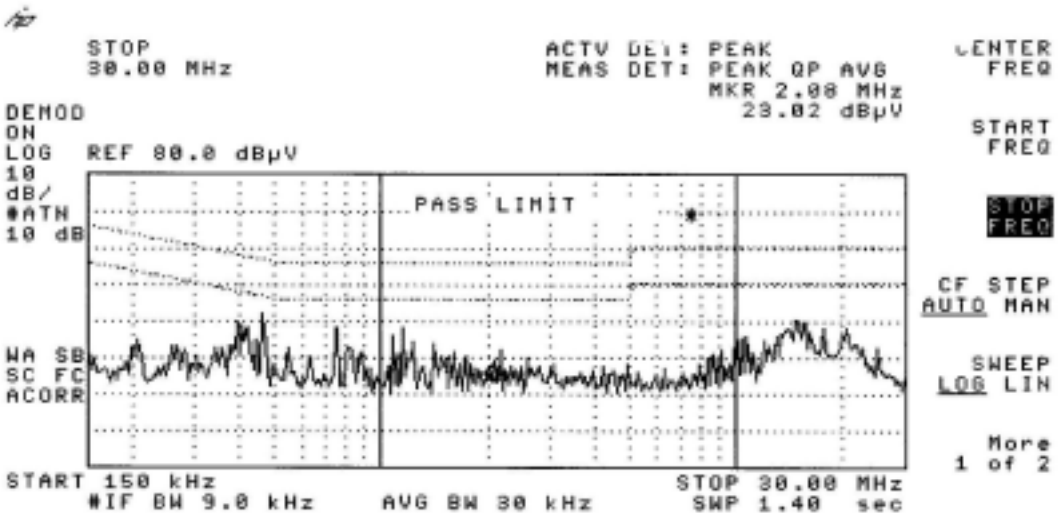
3. Instruments List

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, 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

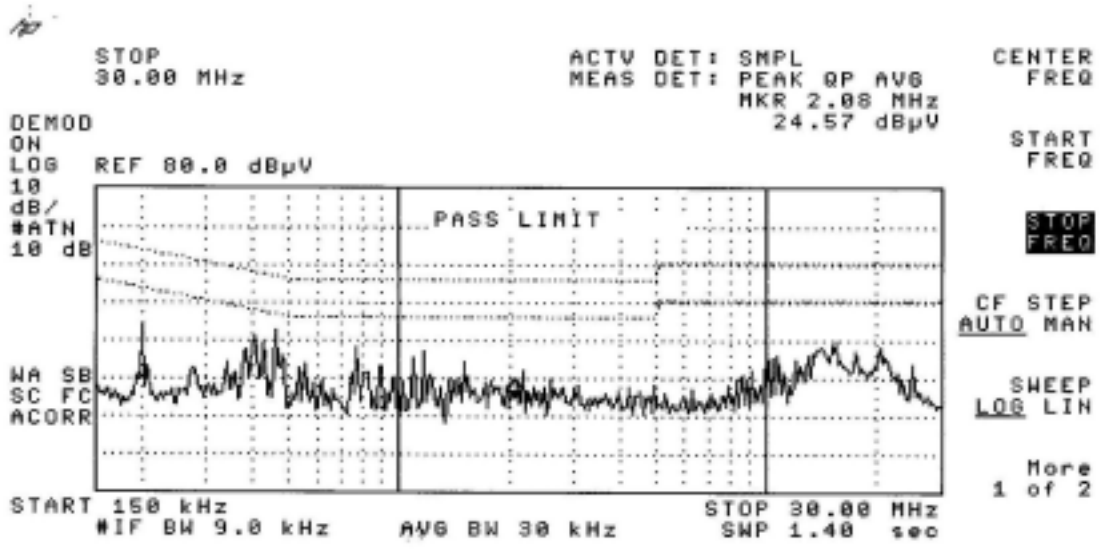
4. Measurements

4.1 Conducted Limits SUBCLAUSE 15.207

Line



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

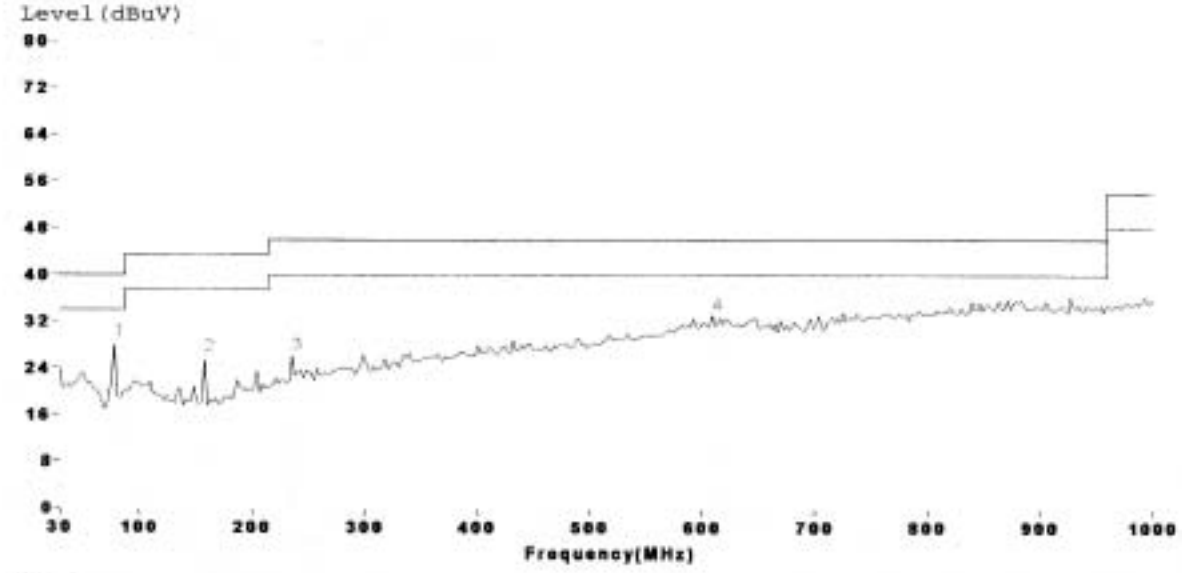
Vertical(30Mhz-1000Mhz)

SGS EMC Lab. Site 2

EMI TESTING REPORT

Customer:Billionton
Model :USBBTC1A
Spec. :N/A
Ser. No.:N/A
Limit :FCC B

Date:2003-02-21 Time:16:04
Polar. :Vertical- 3M
Report No.:ER/2003/1005
File :-1
Tester :ALEX
Tmp.(C):21.0 Humid.(%):47



MEMO:

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Factor	Other Factor
	MHz	dB	dB	dB	dB	dB	dB	dB
1	78.50	28.66	-11.34	40.00	20.93	7.07	0.66	0.00
2	158.53	26.02	-17.48	43.50	17.18	7.95	0.89	0.00
3	236.12	26.34	-19.66	46.00	13.35	11.91	1.08	0.00
4	609.58	33.32	-12.68	46.00	11.86	19.35	2.10	0.00

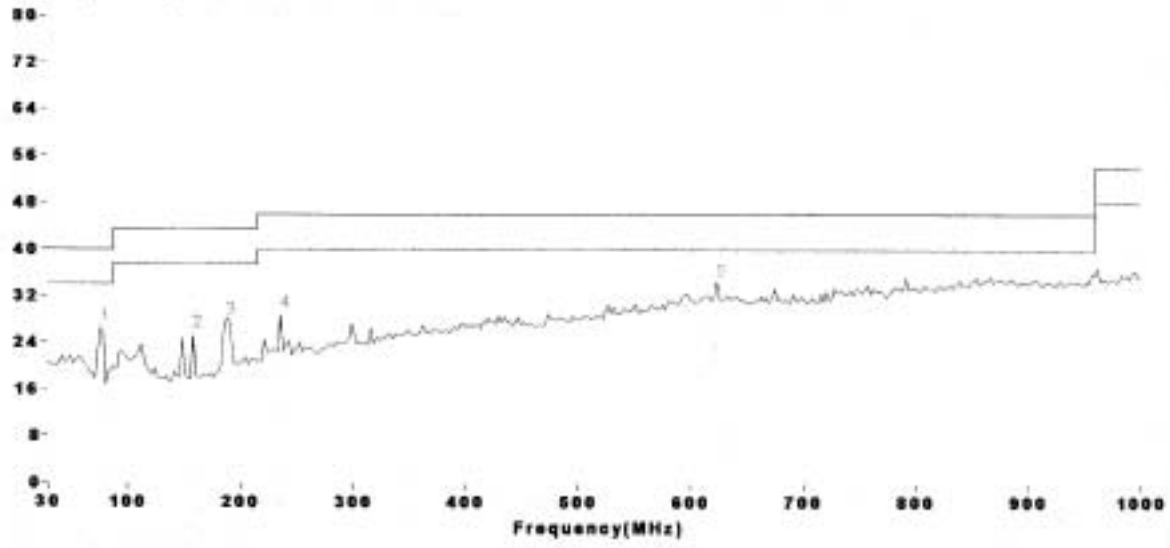
Horizontal(30Mhz-1000Mhz)

SGS EMC Lab. Site 2

EMI TESTING REPORT

Customer:Billionton
Model :USBBTC1A
Spec. :N/A
Ser. No.:N/A
Limit :FCC B

Date:2003-02-21 Time:16:00
Polar. :Horizontal- 3M
Report No.:ER/2003/1005
File :-1
Tester :ALEX
Tmp.(C):21.0 Humid.(%):47



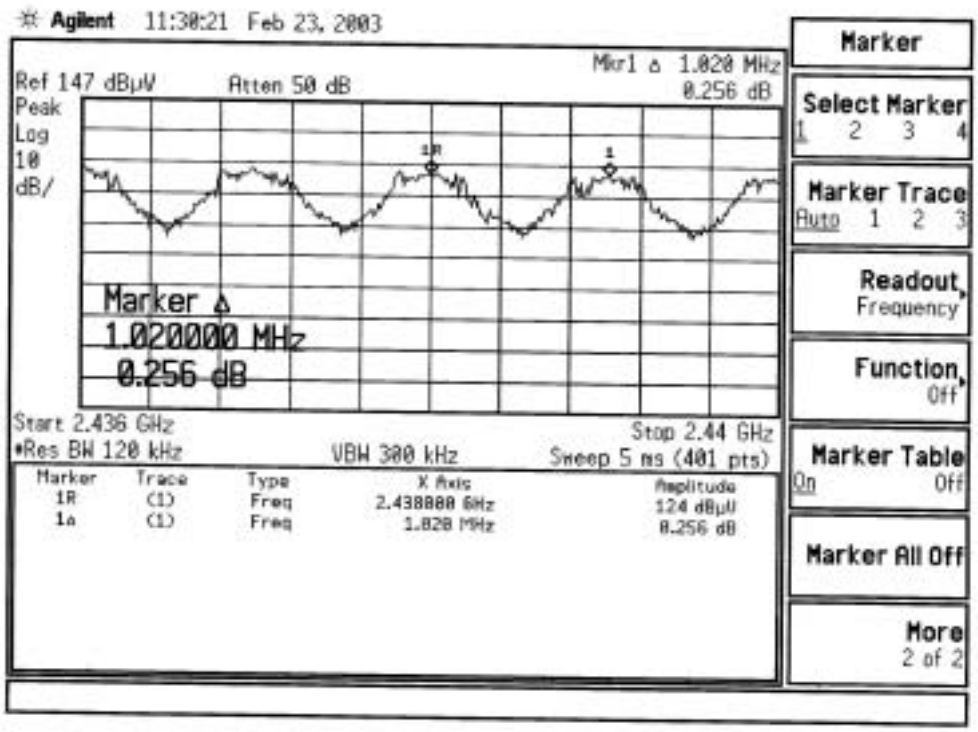
MEMO:

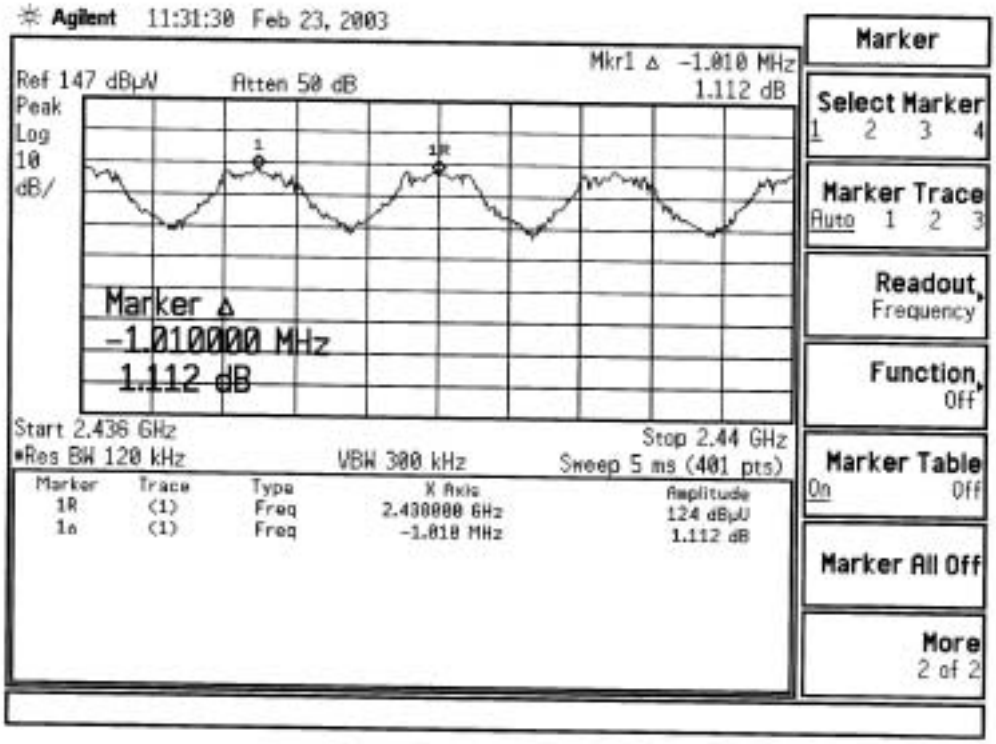
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Factor	Other Factor
	MHz	dB	dB	dB	dB	dB	dB	dB
1	76.08	26.87	-13.13	40.00	19.51	6.71	0.65	0.00
2	158.53	25.83	-17.67	43.50	16.99	7.95	0.89	0.00
3	187.62	28.02	-15.48	43.50	17.08	9.98	0.96	0.00
4	236.12	29.15	-16.85	46.00	16.16	11.91	1.08	0.00
5	624.12	34.69	-11.31	46.00	13.14	19.44	2.12	0.00

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

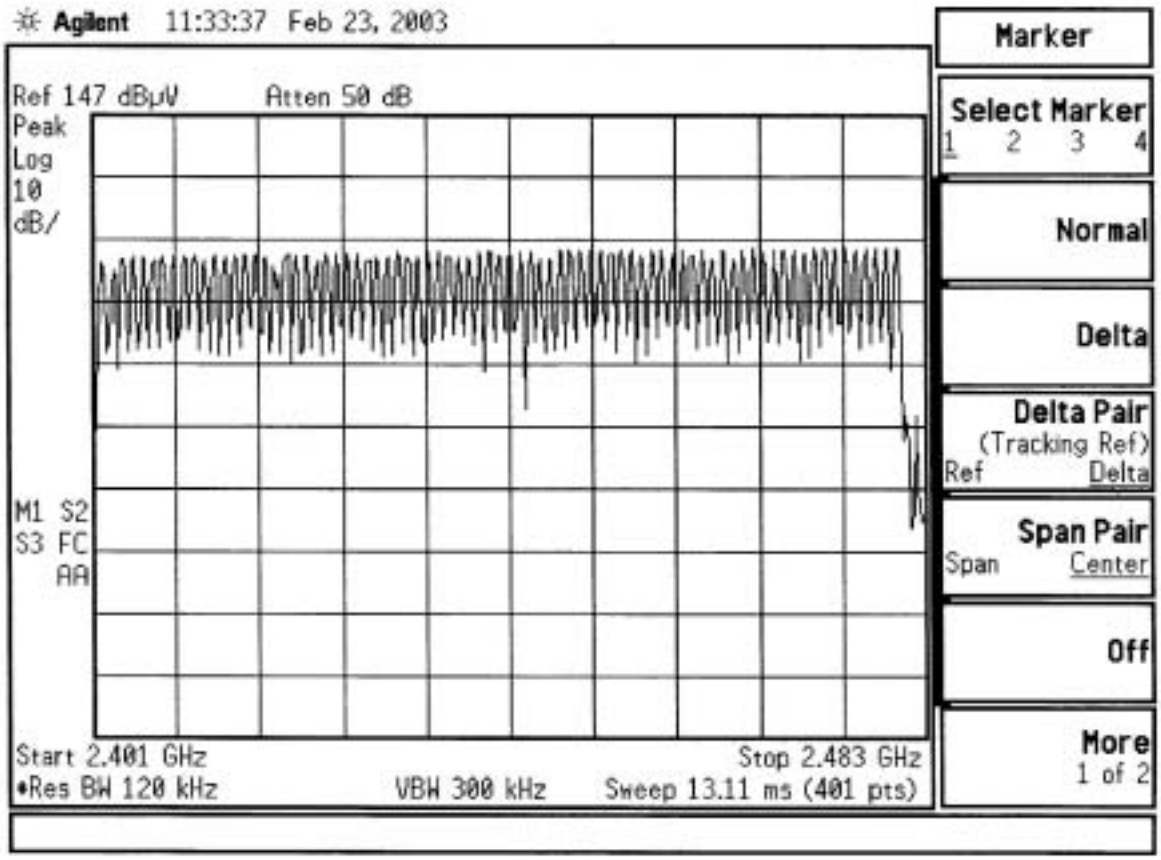
4.3 Channel Spacing SUBCLAUSE15.247(a)(1)





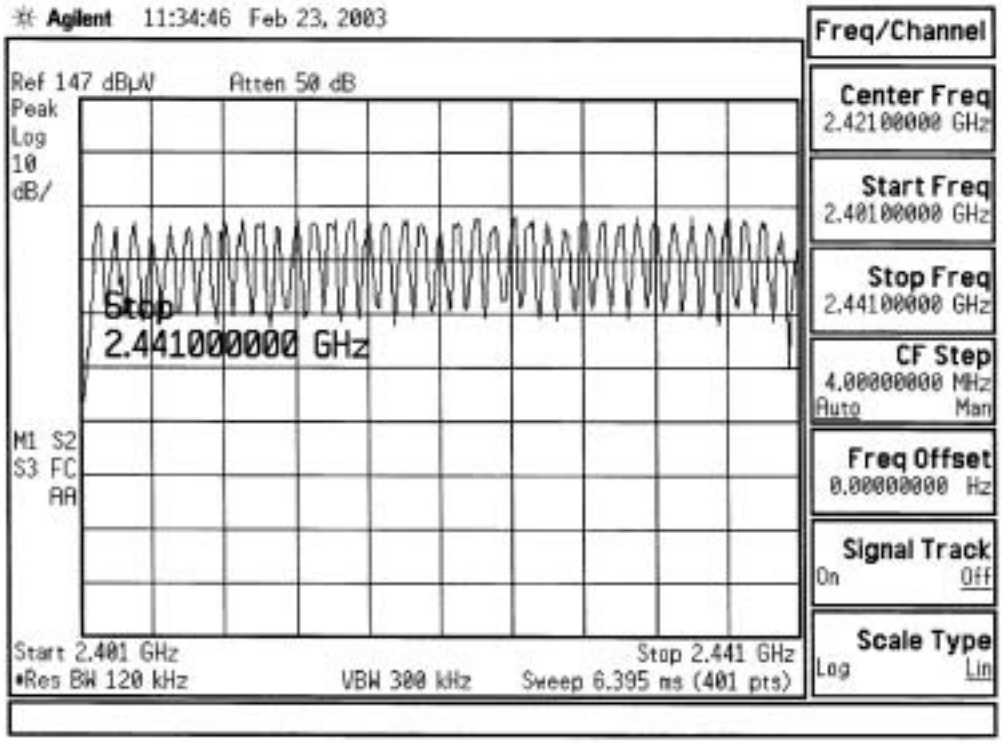
4.4 No. of carrier frequency / 20db Bandwidth

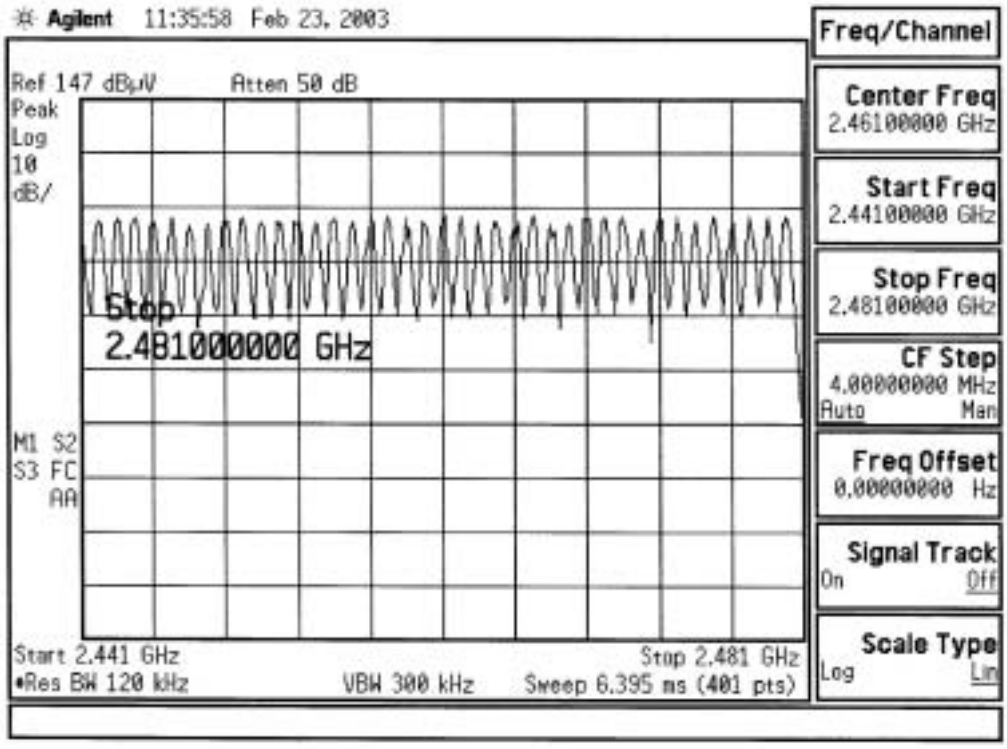
SUBCLAUSE15.247(a)(1)(ii)



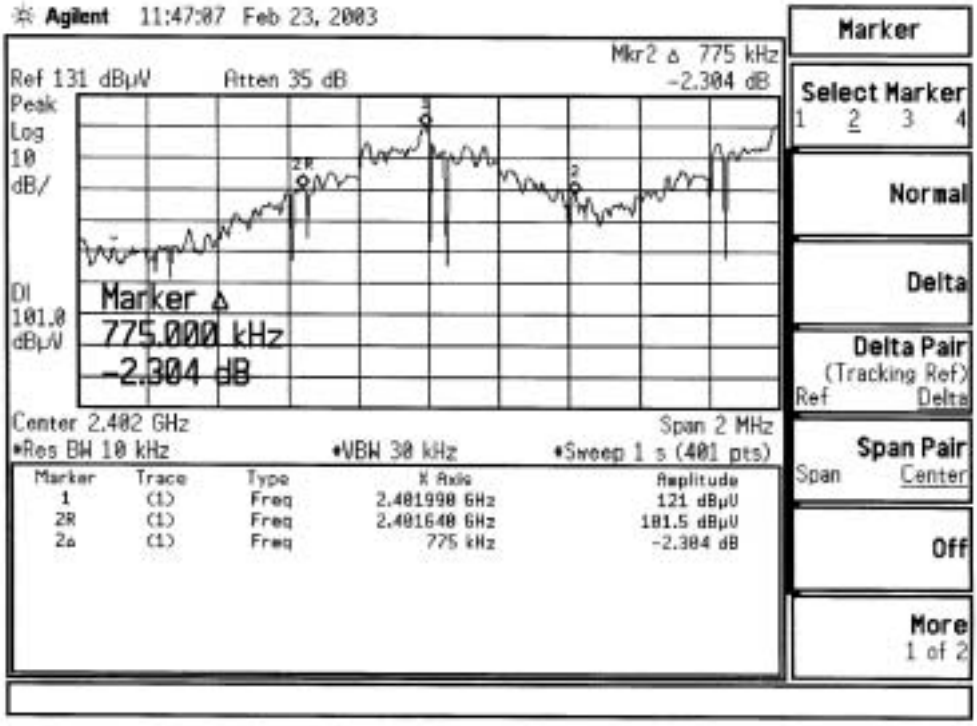
Number of channels = 79

Split the whole frequency band into two.

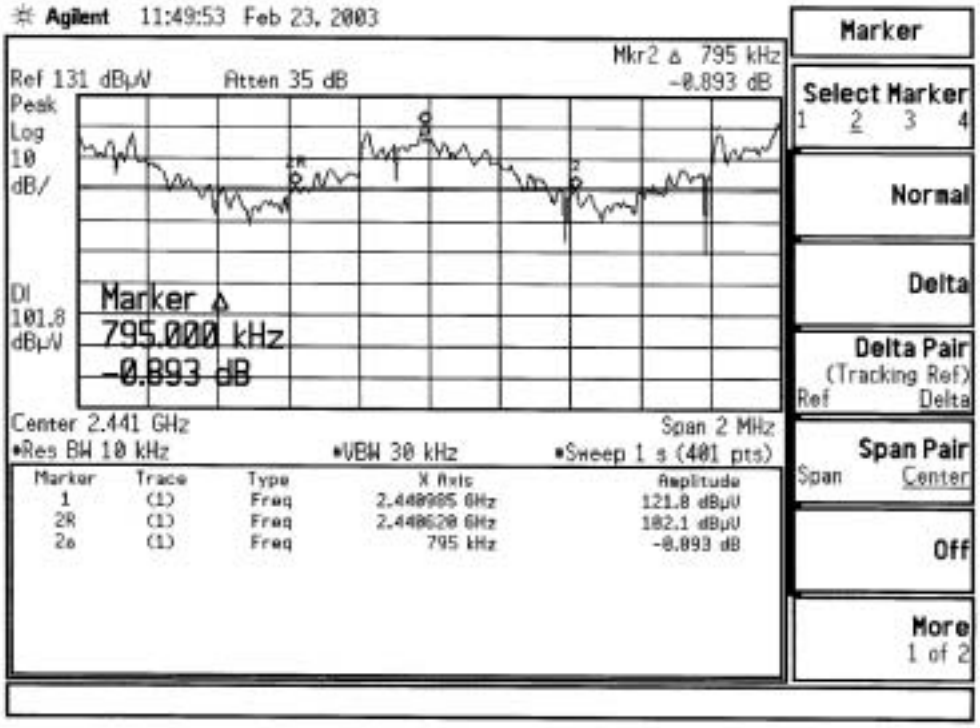




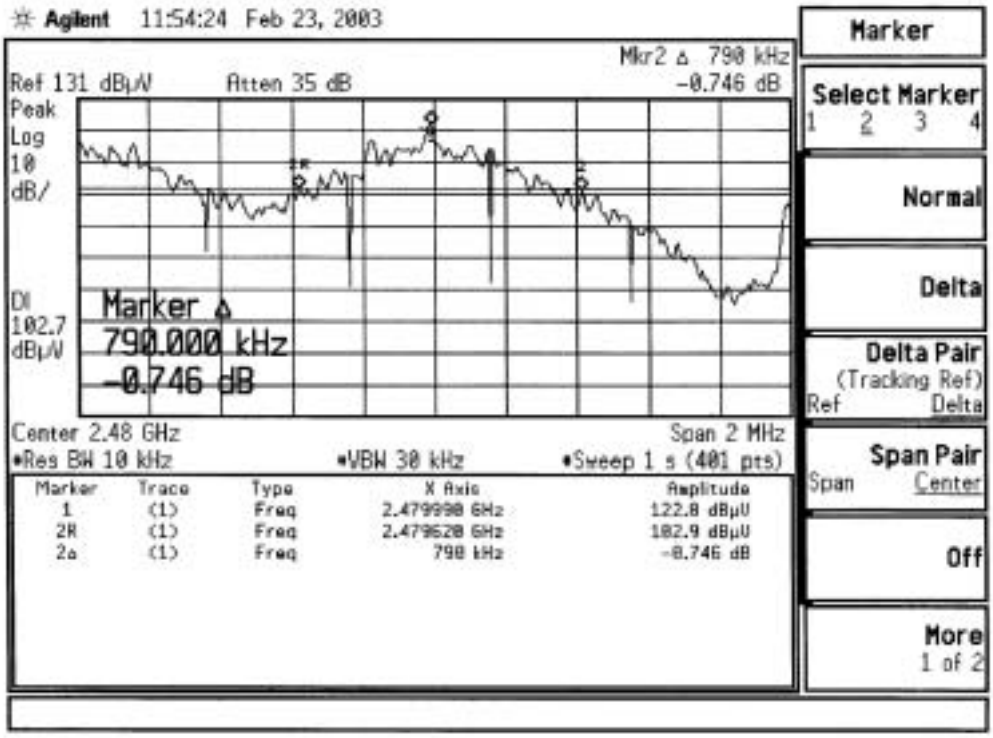
20dB bandwidth at lowest (2402Mhz), middle(2441Mhz), highest channel(2480Mhz)



Channel bandwidth = 775KHZ

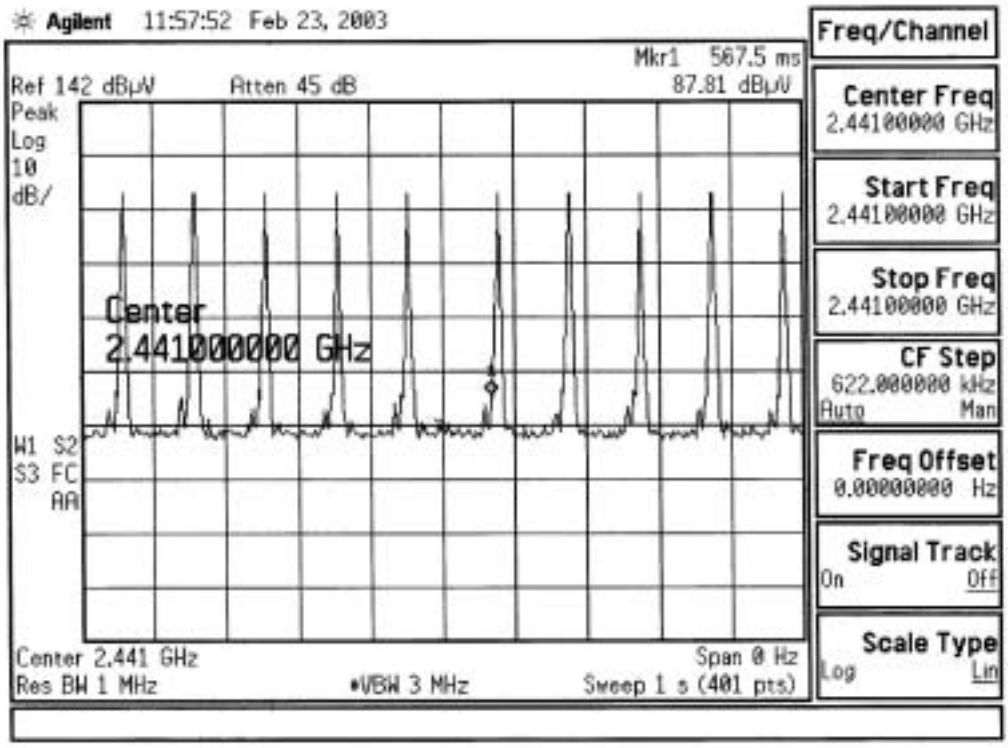


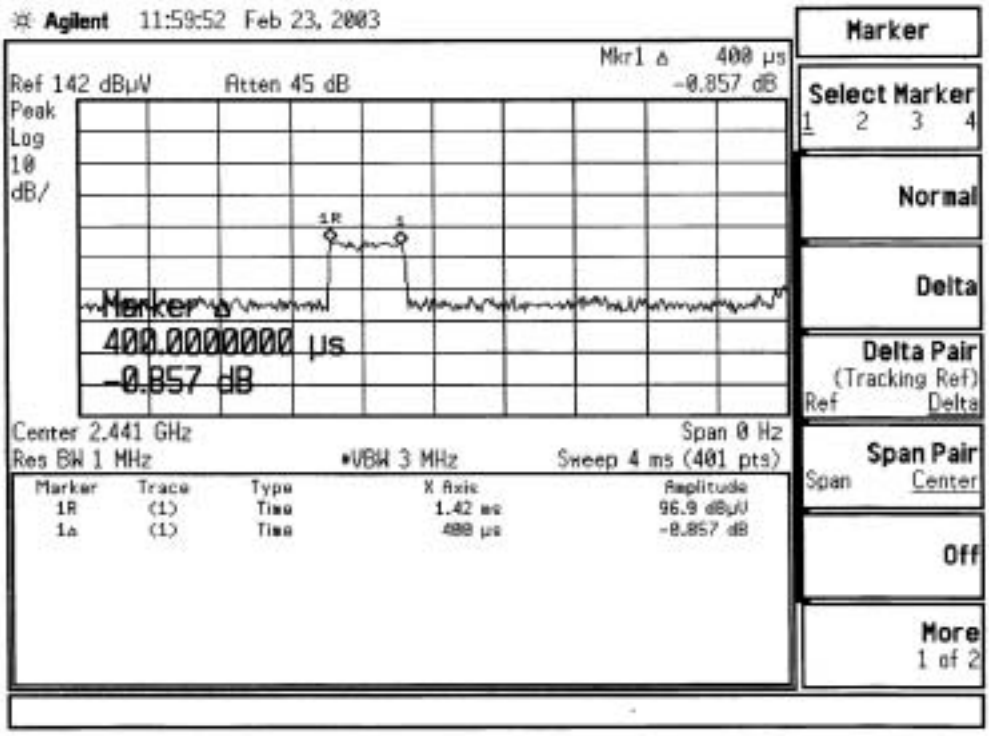
Channel bandwidth = 795KHZ



Channel bandwidth = 790KHZ

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 µSec. So the occupacy time within 30 second is 400 x 10 x 30 = 120000 µSec = 120 mSec = 0.12 Sec.

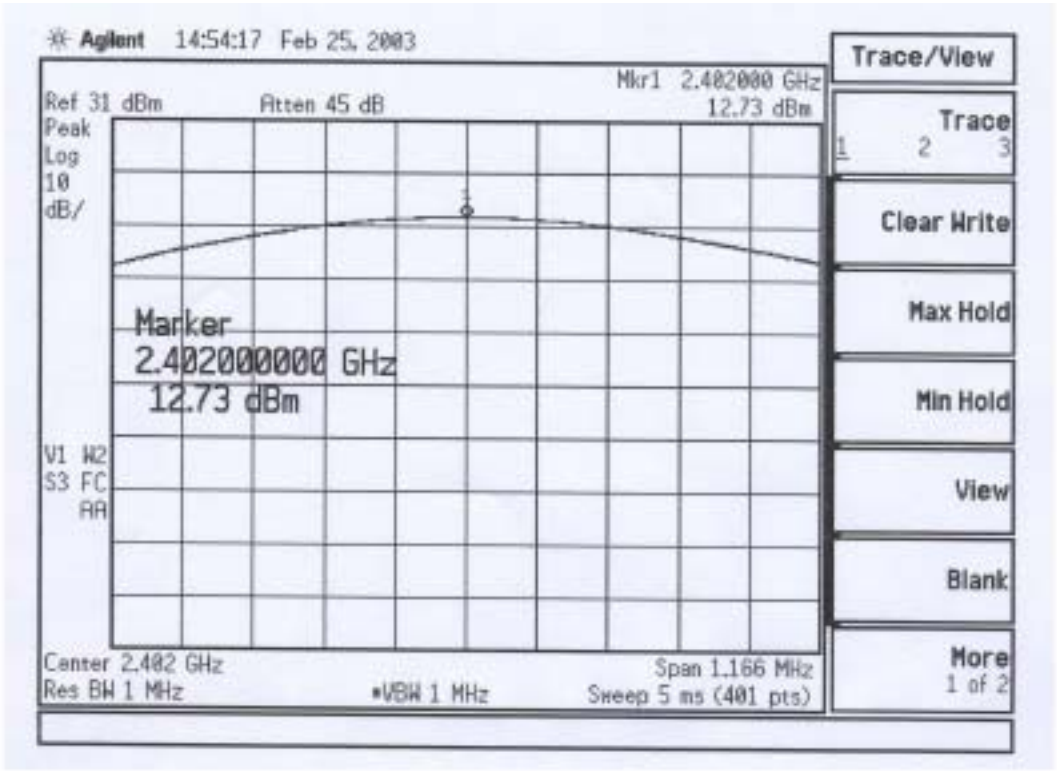
4.5.2 Limits

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 20dB 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)

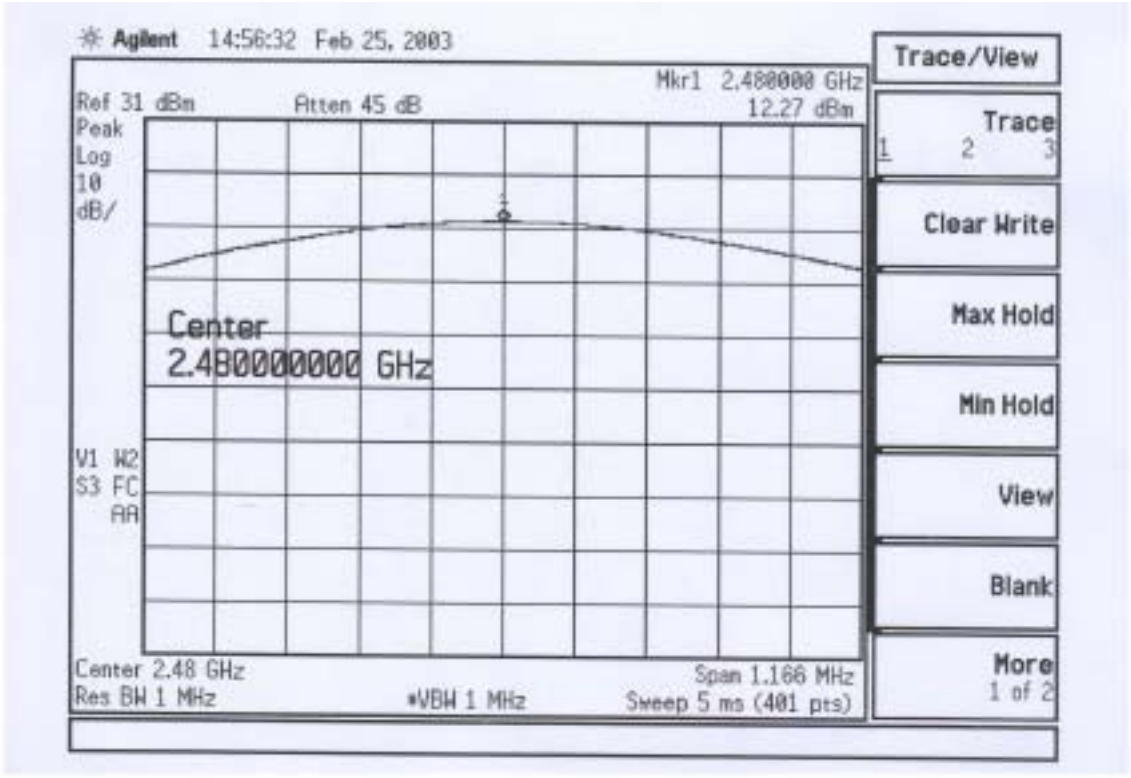
Transmitter transmit at lowest channel (2402Mhz)



At the 2402Mhz , The measured power is 12.73 dbm +0.4db(cable loss)

= 13.13 dbm

Transmitter transmit at highest channel (2480Mhz)



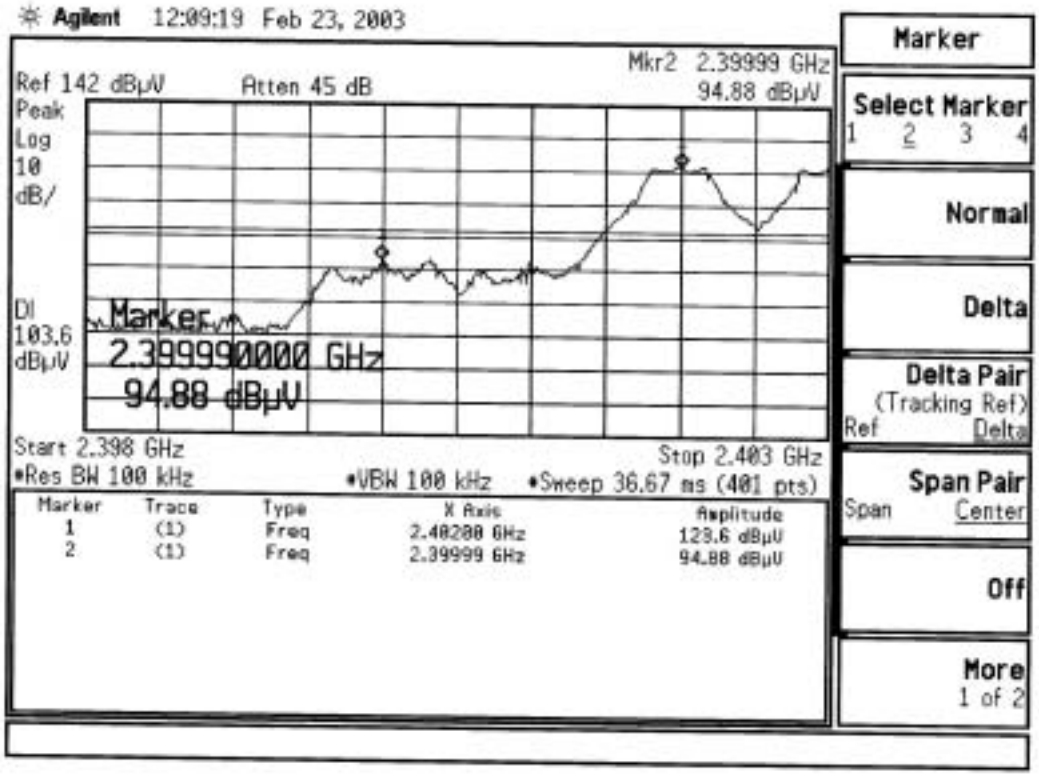
At the 2480 Mhz , The measured power is 12.27 dBm + 0.4 db = 12.67dbm

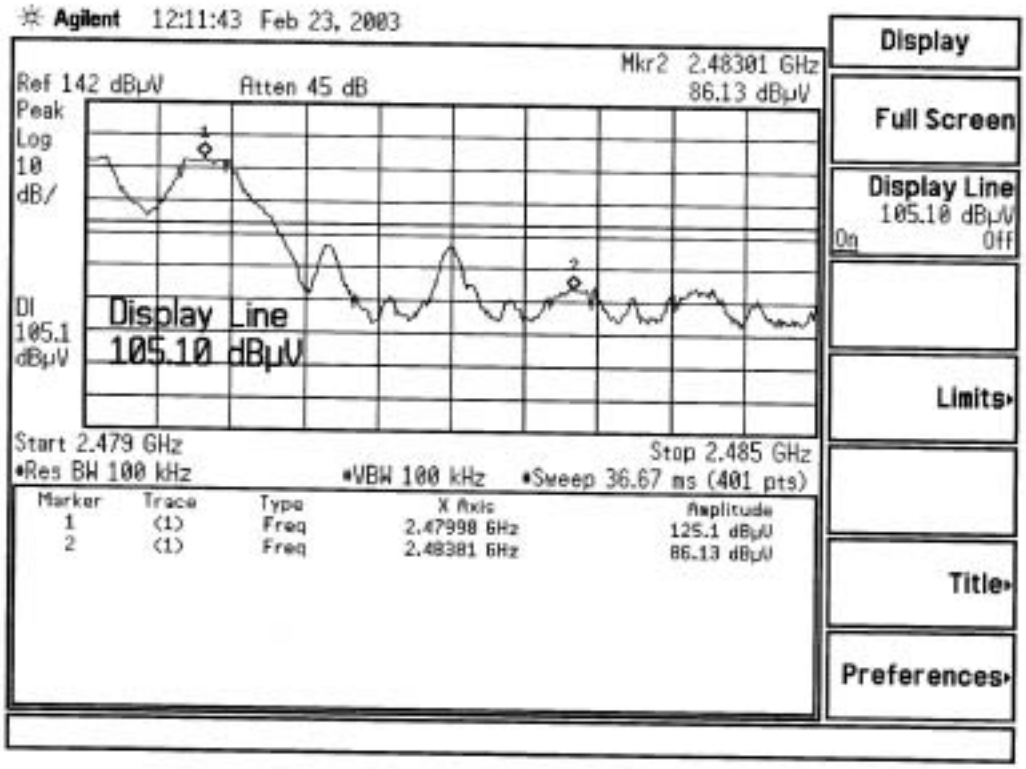
So the max power happens at 2402Mhz , equals to 13.13dbm = 20.56 mW

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 5725-5850MHZ Band, and all direct sequence systems: 1 Watt.

4.7 Band Edge emission SUBCLAUSE15.247(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)

EUT operating at low frequency

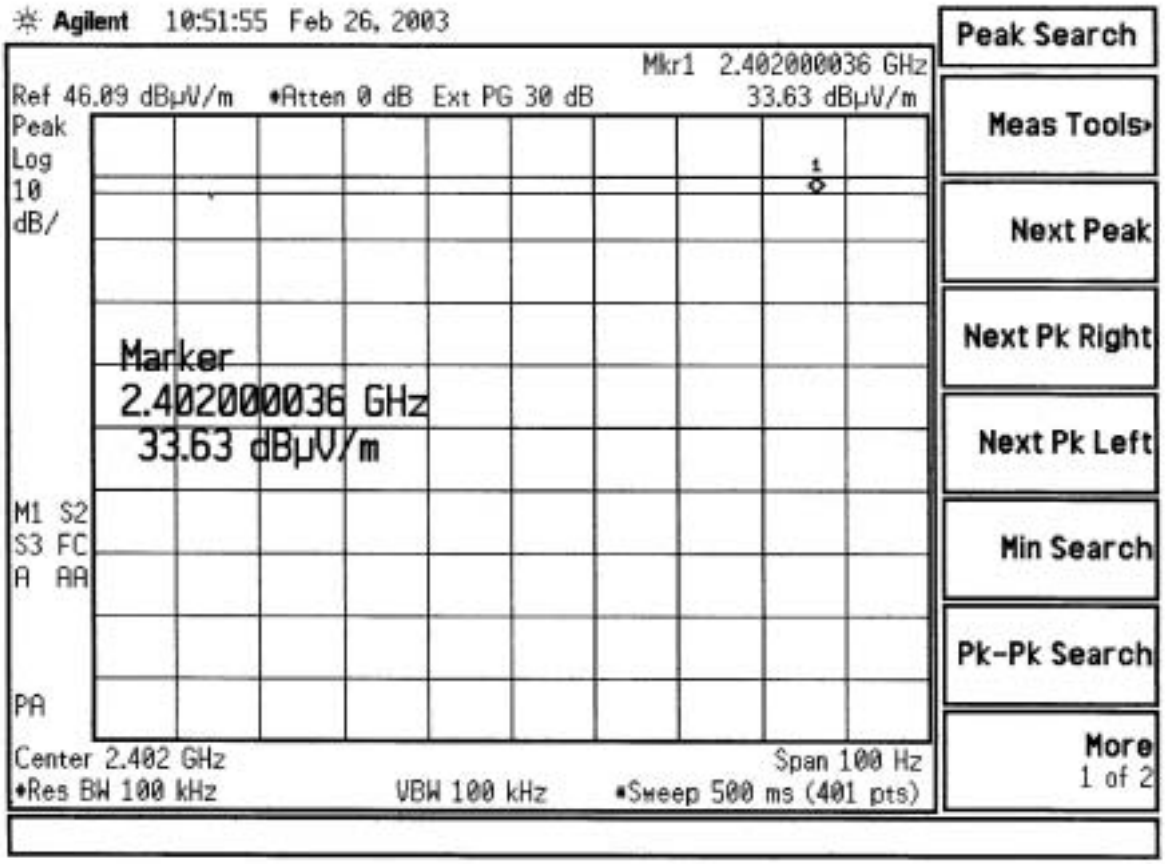
Frequency(MHz)	Read value(dBuV/m)	Antenna factor	Cable loss(db)	Real Value(dbuV/m)	Limit(dbuV/m)
2402.000	33.63	27.2	4.55	63.38	In band
4803.999	8.83	30.26	5.02	44.11	54
7206.000	16.27	31.31	5.45	53.03	54

EUT operating at middle frequency

Frequency(MHz)	Read value(dBuV/m)	Antenna factor	Cable loss(db)	Real Value(dbuV/m)	Limit(dbuV/m)
2440.999	37.10	27.4	4.62	69.12	In band
4881.999	8.875	30.41	5.24	44.53	54
7323.999	16.11	31.55	5.55	53.21	54

EUT operating at highest frequency

Frequency(MHz)	Read value(dBuV/m)	Antenna factor	Cable loss(db)	Real Value(dbuV/m)	Limit(dbuV/m)
2479.999	34.48	27.49	4.67	66.64	In band
4959.999	9.011	30.55	7.31	46.87	54
7439.999	15.53	31.59	5.74	52.86	54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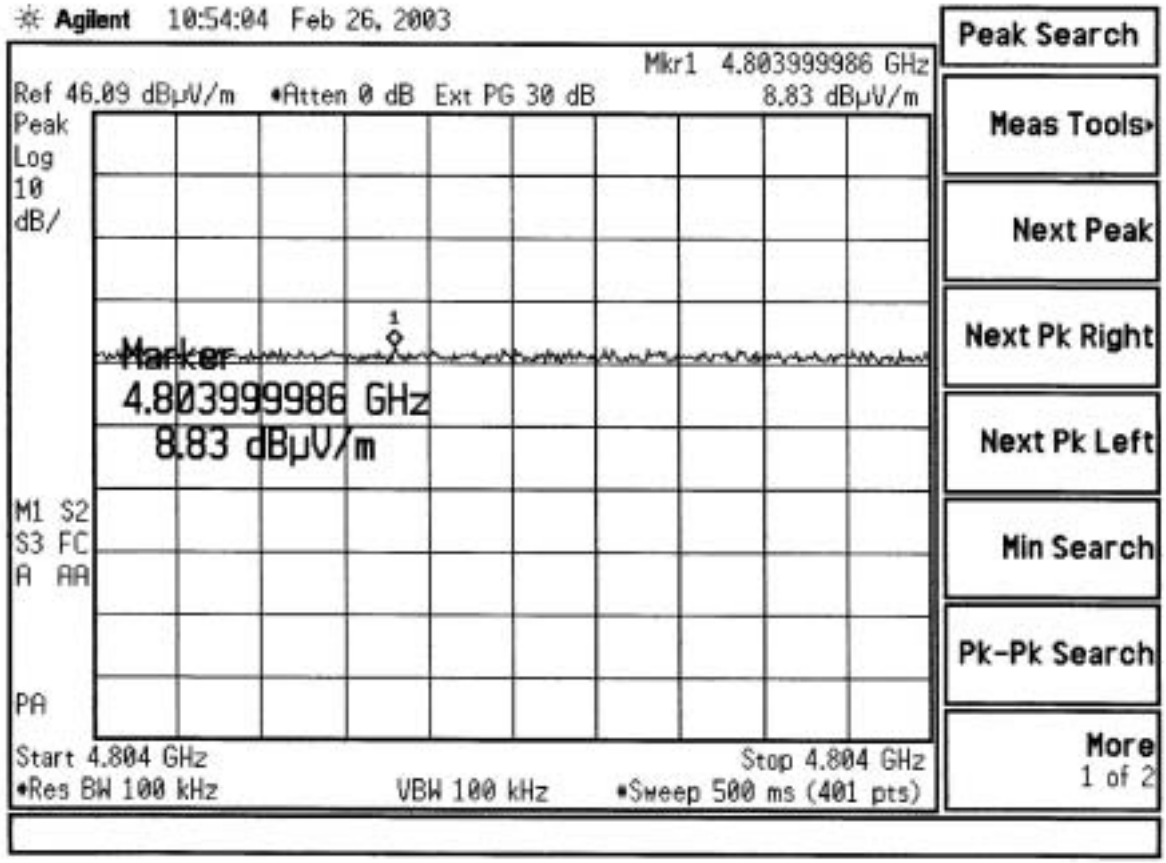
33.63 dBµV/m
Peak
Log
10
dB/
Marker
2.402000036 GHz
33.63 dBµV/m
M1 S2
S3 FC
A AA
PA
Center 2.402 GHz
•Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
•Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2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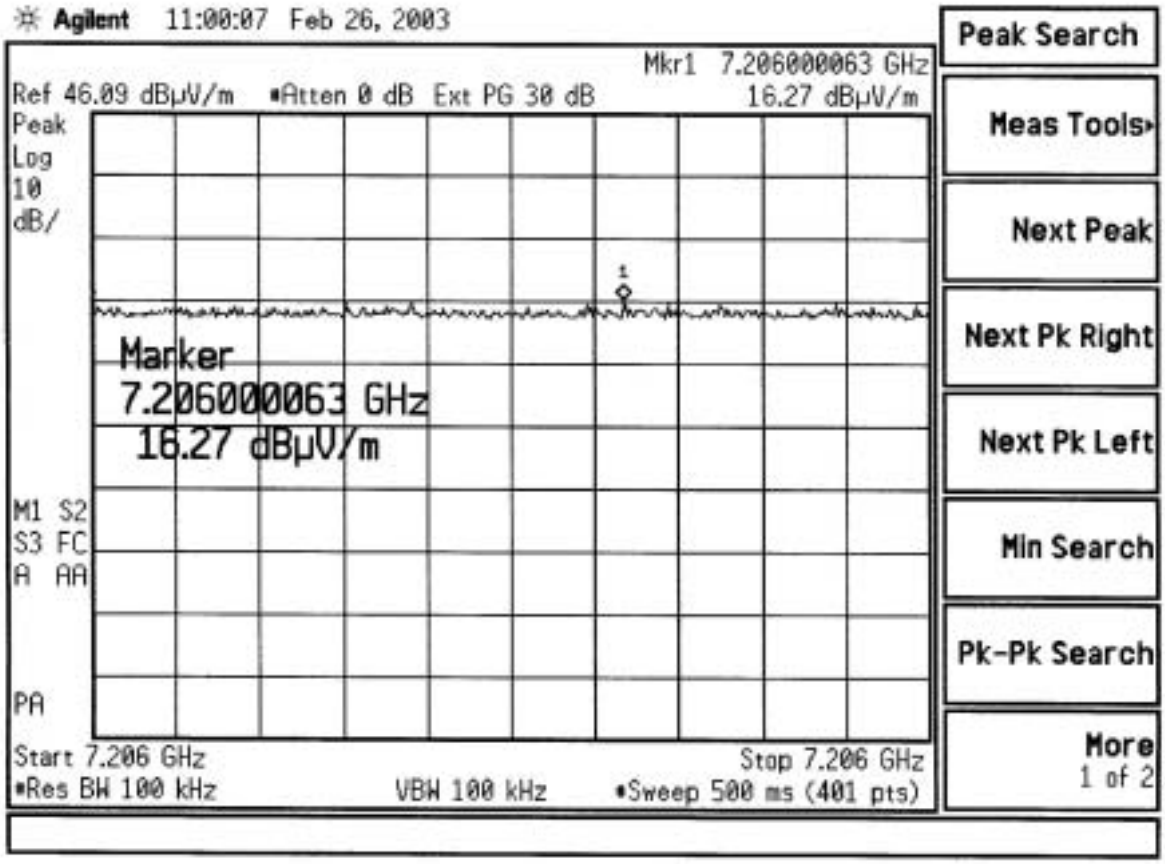
Peak
Log
10
dB/
Marker
4.803999986 GHz
8.83 dBµV/m
M1 S2
S3 FC
A AA
PA
Start 4.804 GHz
•Res BW 100 kHz
VBW 100 kHz
Stop 4.804 GHz
•Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2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Peak
Log
10
dB/
Marker
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16.27 dBµV/m
M1 S2
S3 FC
A AA
PA
Start 7.206 GHz
•Res BW 100 kHz
VBW 100 kHz
Stop 7.206 GHz
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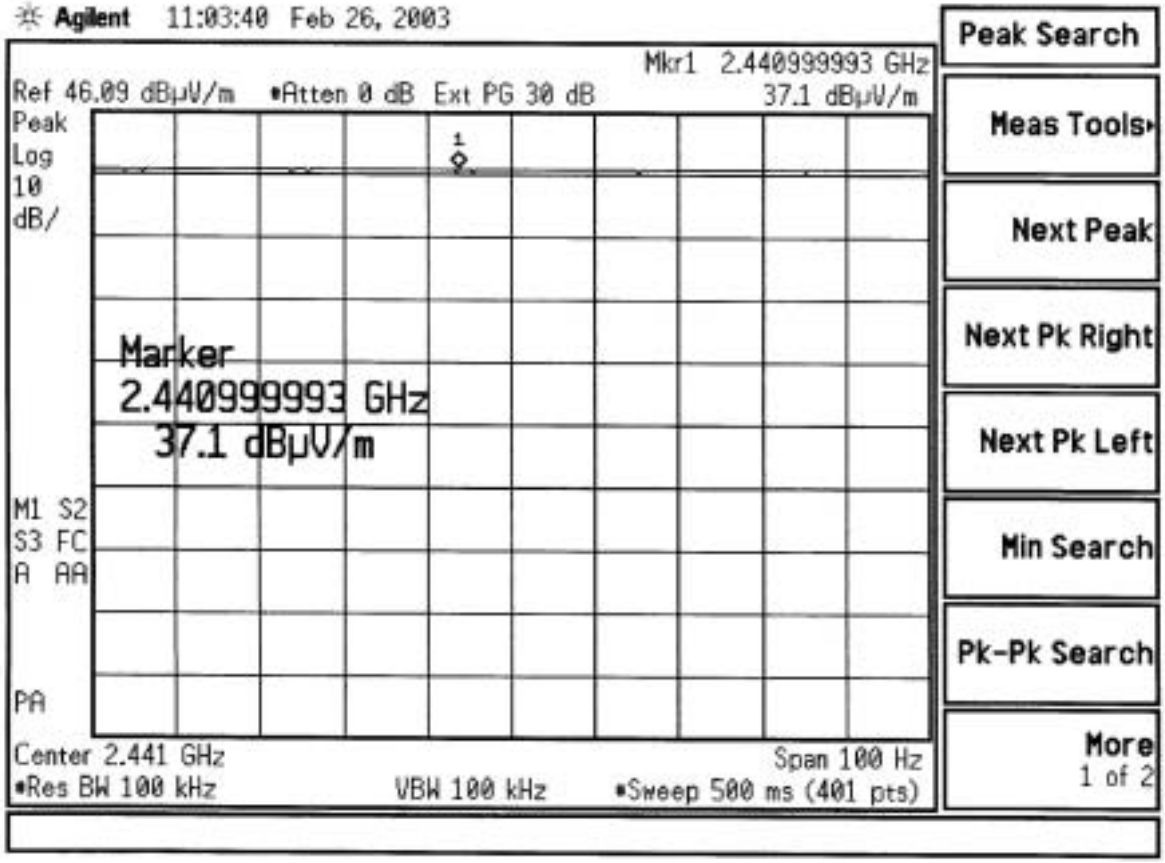
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2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Log
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dB/
Marker
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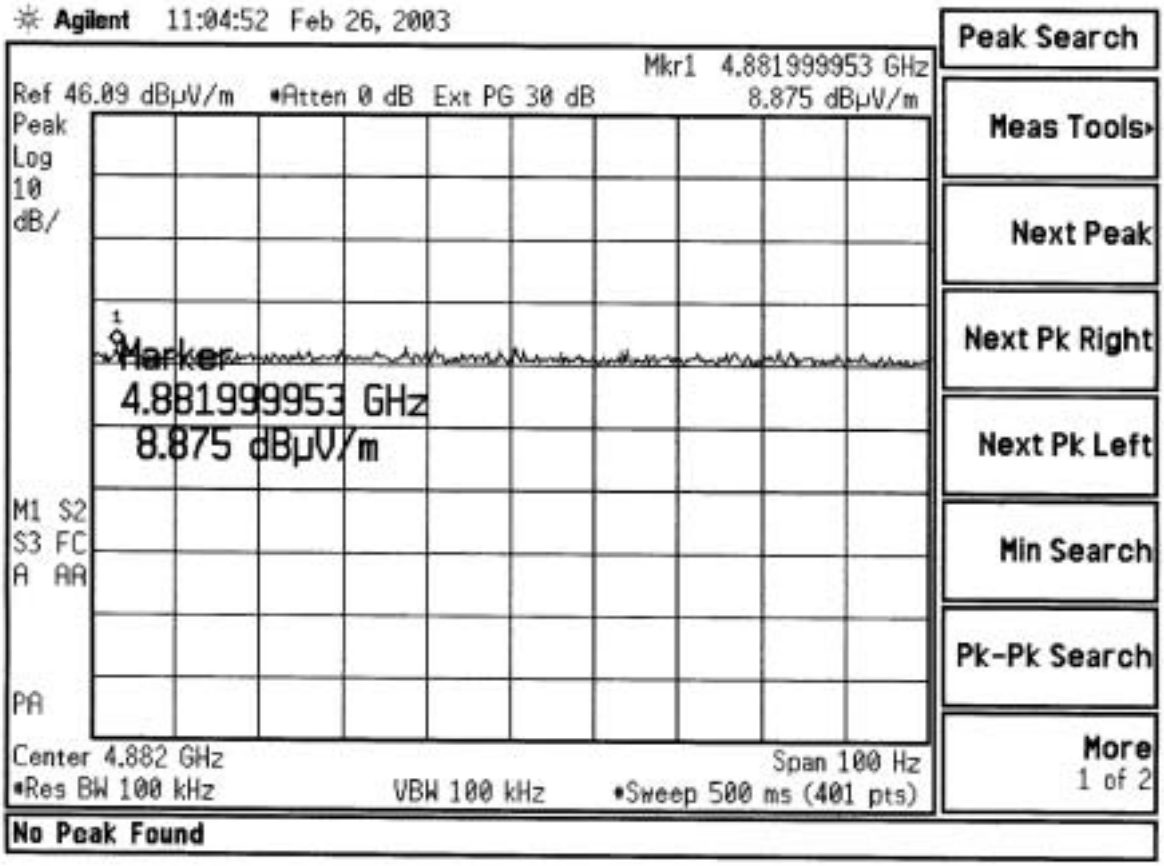
37.1 dBµV/m
M1 S2
S3 FC
A AA
PA
Center 2.441 GHz
•Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
•Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2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8.875 dBµV/m
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8.875 dBµV/m
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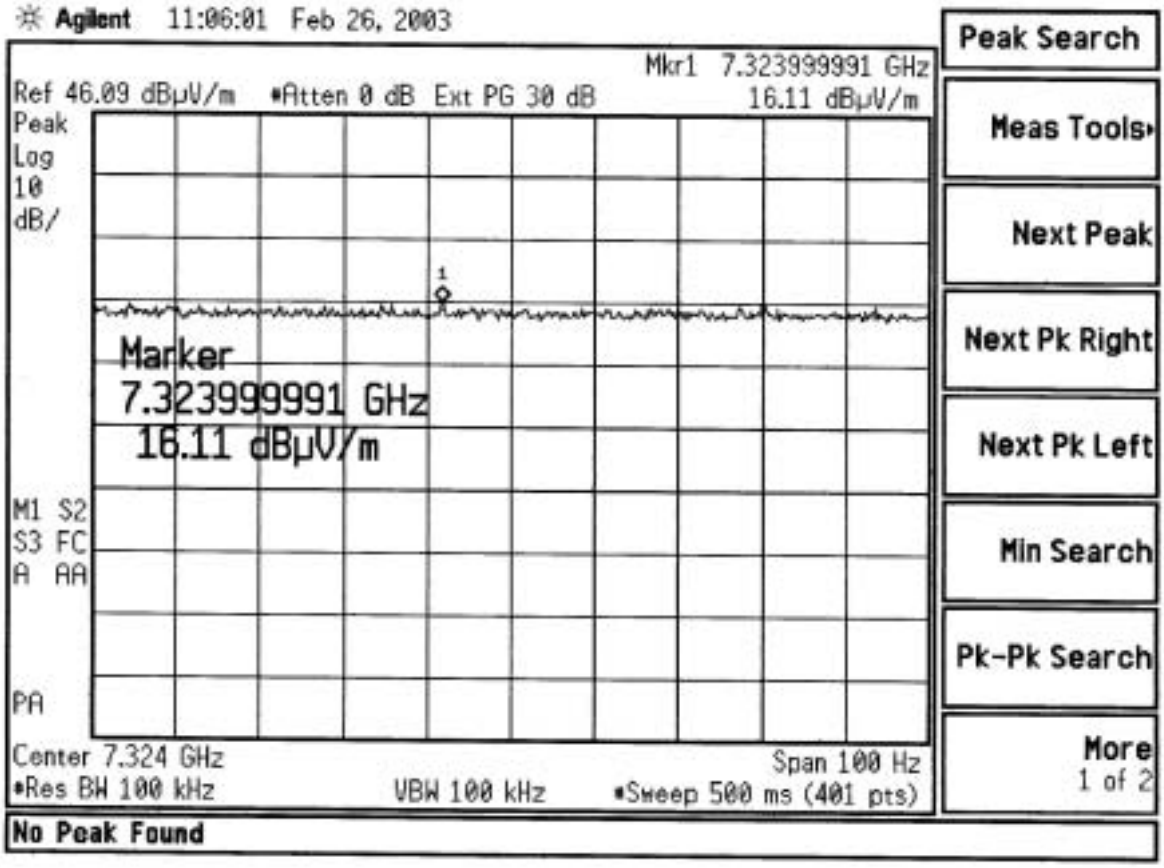
S3 FC
A AA
PA
Center 4.882 GHz
#Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
#Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2
No Peak Found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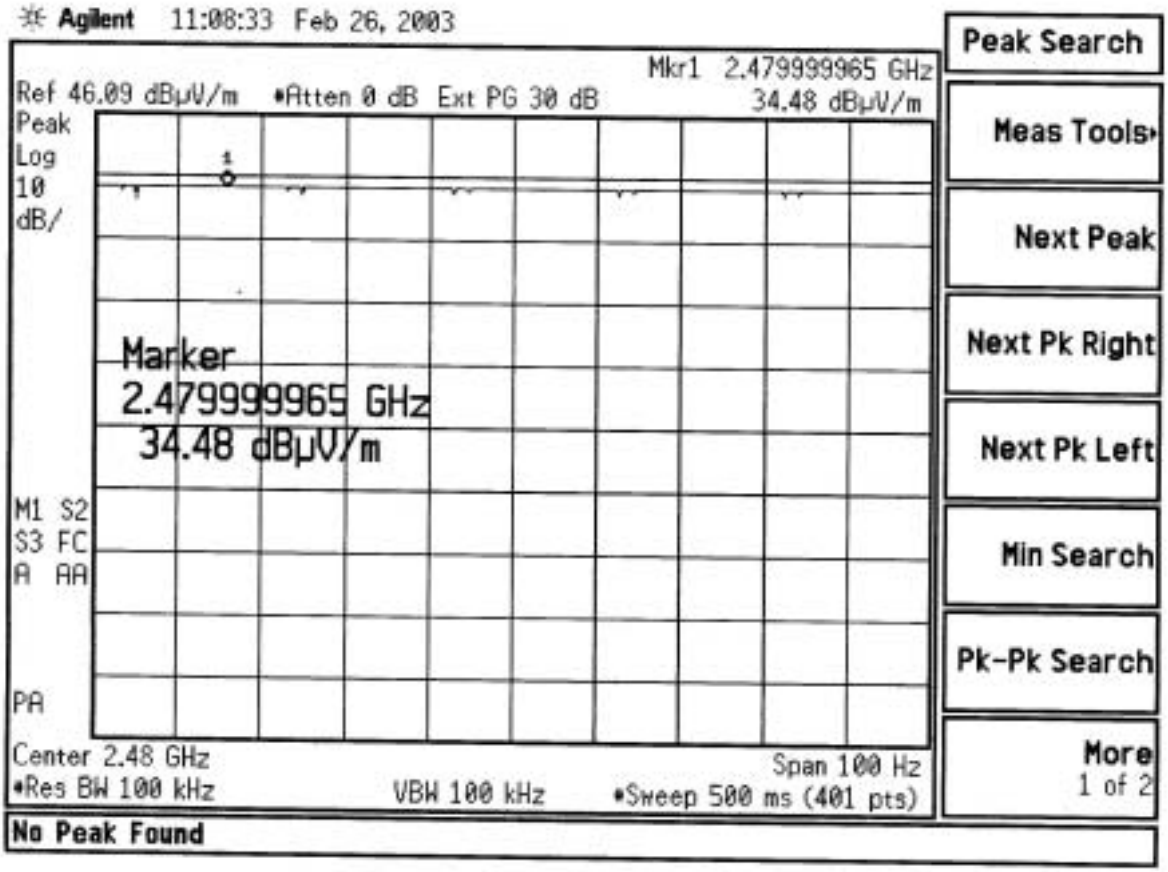
16.11 dBµV/m
M1 S2
S3 FC
A AA
PA
Center 7.324 GHz
#Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
#Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2
No Peak Found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Peak
Log
10
dB/
Marker
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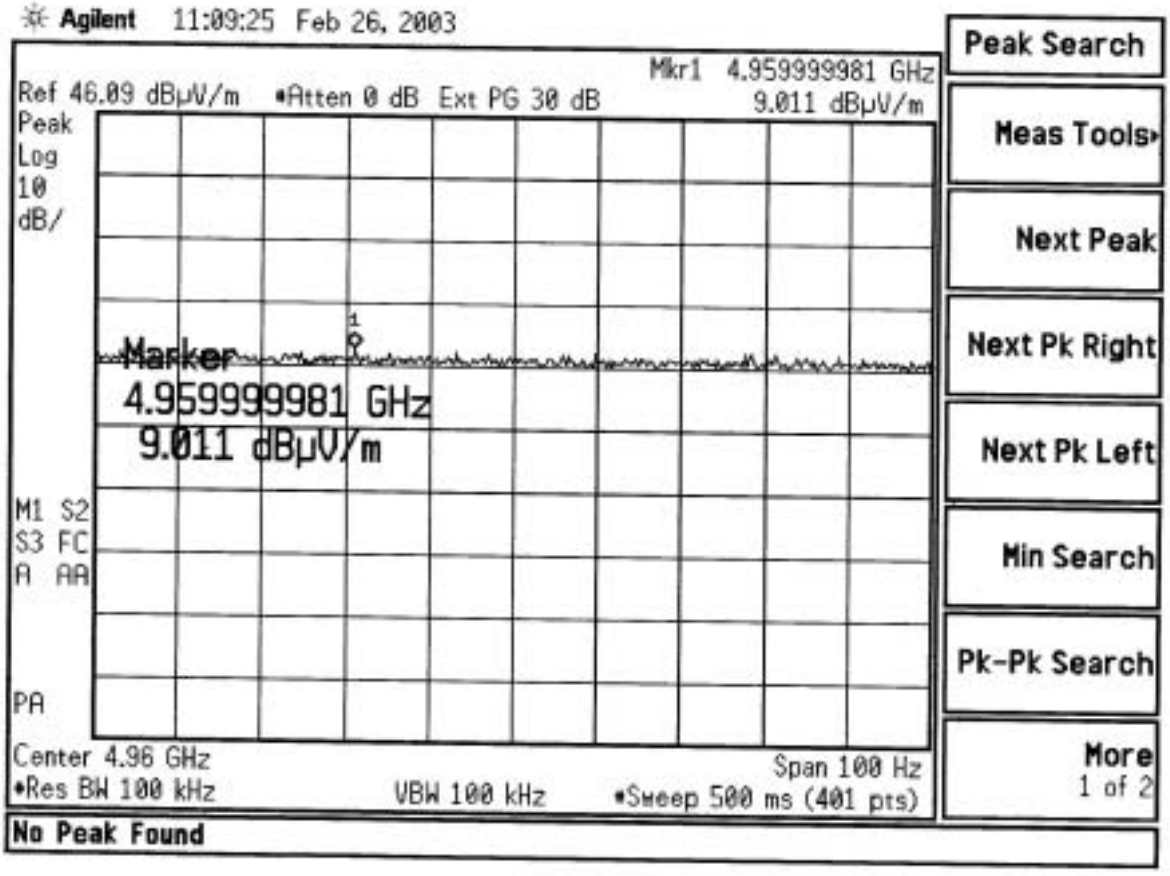
34.48 dBµV/m
M1 S2
S3 FC
A AA
PA
Center 2.48 GHz
#Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
#Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2
No Peak Found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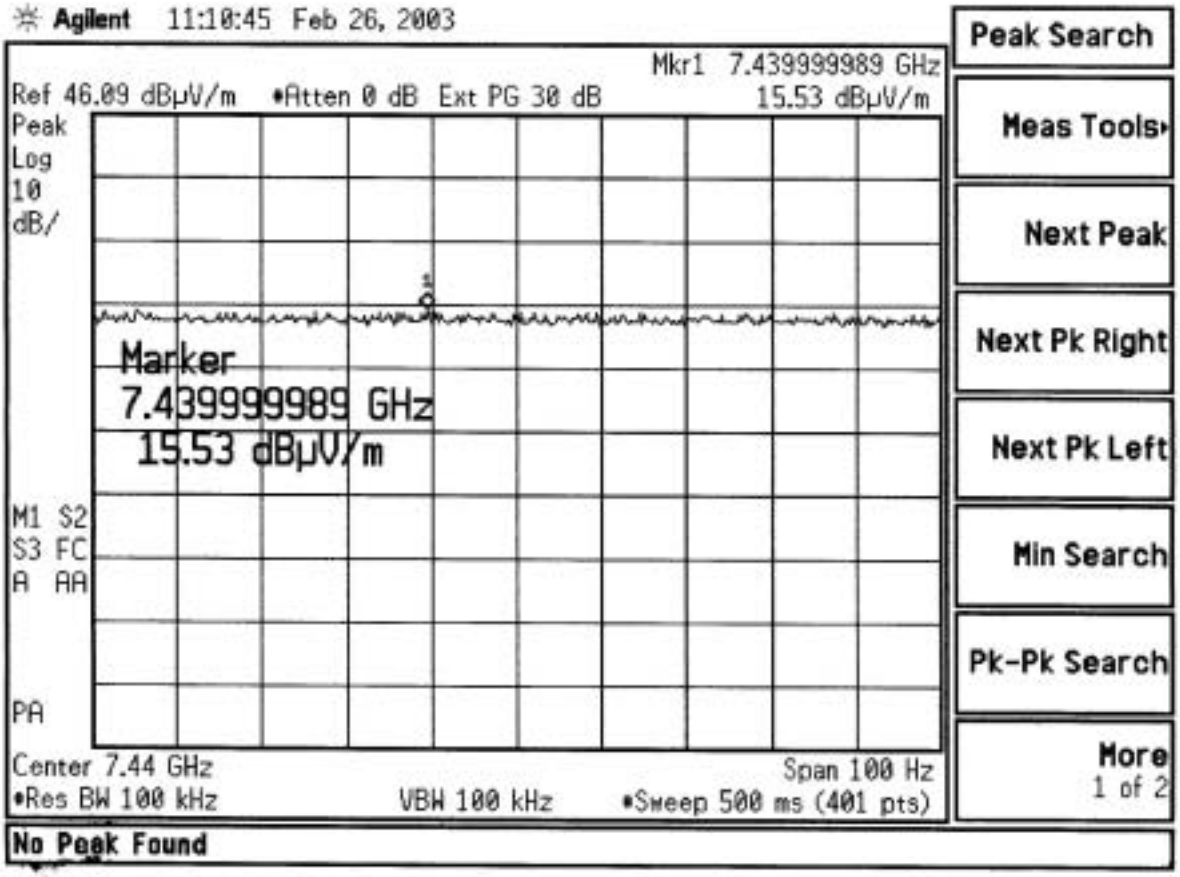
M1 S2
S3 FC
A AA
PA
Center 4.96 GHz
#Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
#Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2
No Peak Found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15.53 dBµV/m
Peak
Log
10
dB/
Marker
7.439999989 GHz
15.53 dBµV/m
M1 S2
S3 FC
A AA
PA
Center 7.44 GHz
•Res BW 100 kHz
VBW 100 kHz
Span 100 Hz
•Sweep 500 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2
No Peak Found

APPENDIX: Photographs of Test Setup

(The Photos are saved separately)

APPENDIX : Photographs of EUT

Internal Photos

(The Photos are saved separately)

External Photos

(The Photos are saved separately)