FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

SMARTPHONE

MODEL NUMBER: ST22A

FCC ID: NM8TND

REPORT NUMBER: 05T3459-2

ISSUE DATE: JULY 14, 2005

Prepared for
HIGH TECH COMPUTER CORP.
23 HSIN-HUA RD., TAOYUAN 330
TAIWAN, R.O.C.

Prepared by
COMPLIANCE ENGINEERING SERVICES, INC.
d.b.a.
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

LAB CODE:200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
A	7/14/05	Initial Issue	Thu

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HIGH TECH COMPUTER CORP.
23 HSIN HUA ROAD
TAOYUAN 330, TAIWAN R.O.C.

EUT DESCRIPTION: SMARTPHONE

MODEL: ST22A

SERIAL NUMBER: HT525ES00124

DATE TESTED: JULY 05 - 06, 2005

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By: Tested By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. CROSS REFERENCE TO OTHER REPORTS ON THIS PRODUCT

Other FCC report applicable to this product includes CCS 05U3452-1.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a PDA Phone with all auxiliary equipment as described below

Auxiliary Equipment	Brand	Model No.
Li-Ion Rechargeable Battery	Celxpert	ST26B
AC adaptor	Delta Electronic	ADP-5FH B
Earphone	eAcepech Corp.	TS888-03206N

``````

## 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

2400 to 2483.5 MHz Authorized Band

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|
| 2402 - 2480 | Bluetooth | 2.51 | 1.78 |
| 2412 - 2462 | 802.11b | 16.50 | 44.67 |

## 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna with a maximum gain of 0 dBi for both WLAN and Bluetooth modes.
.

## 6.4. SOFTWARE AND FIRMWARE

For the WLAN: The EUT driver software installed during testing was “RadioControlCEsp2.0”.

For the Bluetooth: The test driver software was “Bluetooth Test “.
``````

6.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest average output power. The highest measured output powers were at 2441MHz for Bluetooth mode and 2412MHfor 802.11b

The worst-case data rate for the channel is determined to be 1MP/s for WLAN mode.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Dell	PA-1900-02D	09T215480102CK027	DoC

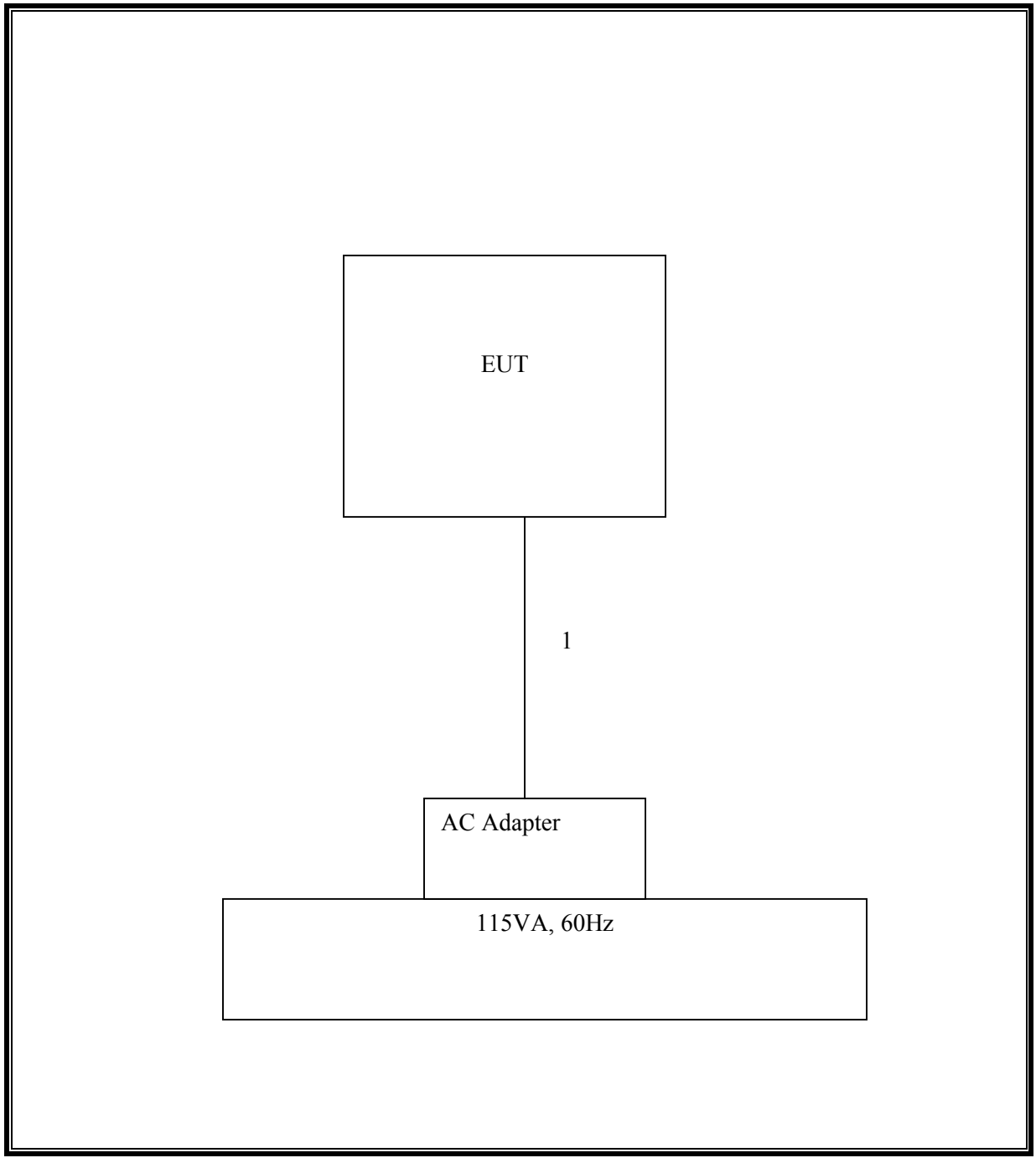
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	DC	1	DC	Unshielded	2m	No
2	Headphone	1	Din	Un-shielded	2m	NA

TEST SETUP

The EUT is installed as a stand-alone device during the tests.

SETUP DIAGRAM FOR TESTS



SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Modem	Hayes	4714US	A02247143261	BFJUSA-31719-M5-E
Printer	HP	2225C	2930S52614	DSI6XU2225
Mouse	Logitech	M-UA34	LTC70500299	DZL211087
Laptop	Dell	Latitude D510	NA	DoC
AC Adapter	Dell	PA-1900-02D	09T215480102CK027	DoC
Earphone	eAcetech Corp	TS888-03206N	NA	NA

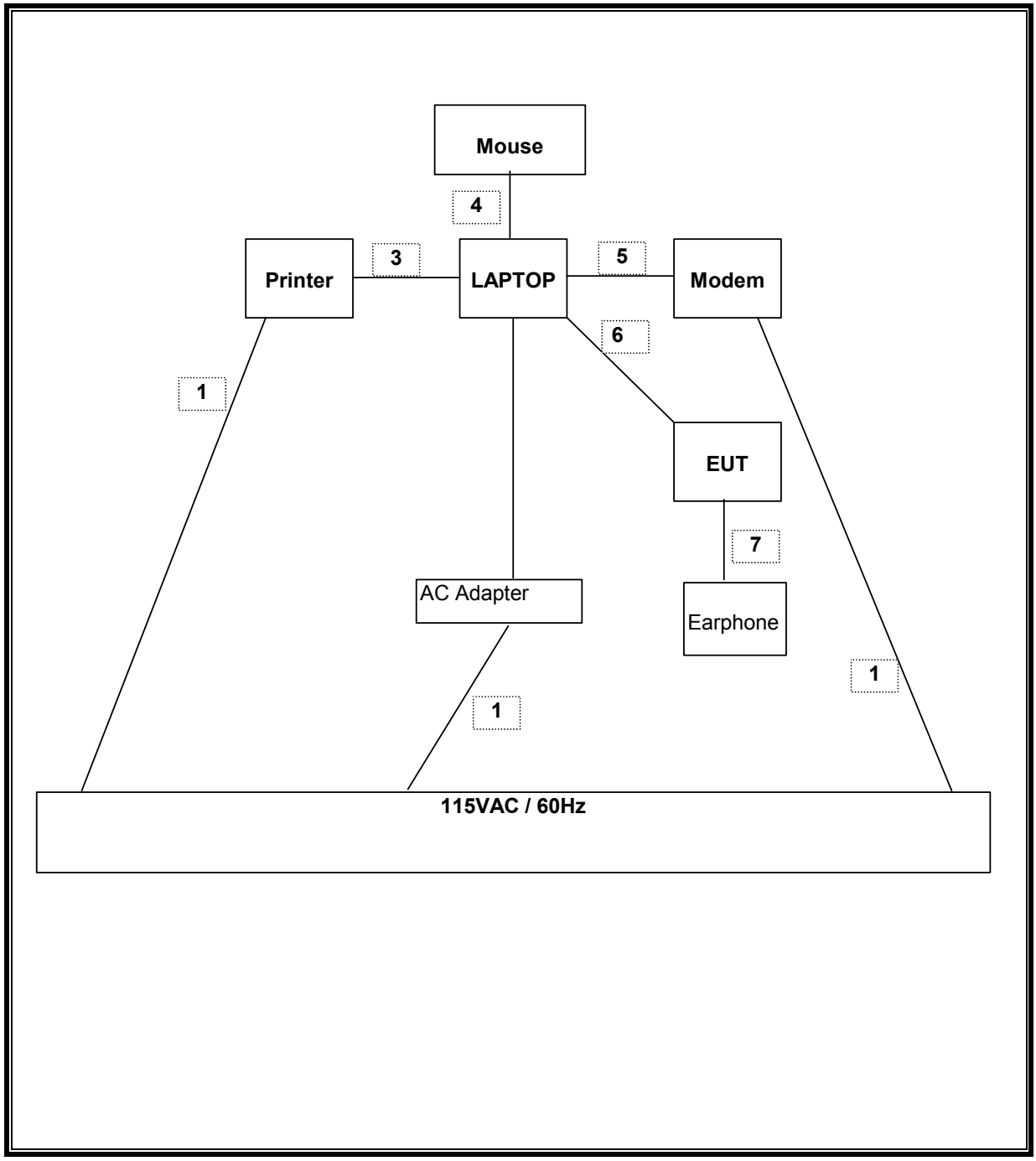
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	3	US 115V	Un-shielded	2m	No
2	DC	1	DC	Un-shielded	2m	No
3	Parallel	1	DB25	Shielded	2m	Yes
4	Mouse	1	PS/2	Un-shielded	2m	Yes
5	Serial	1	DB9	Shielded	1m	Yes
6	USB	1	USB	Un-shielded	1.5m	Yes
7	Earphone	1	Din	Un-shielded	1m	Yes

TEST SETUP

The EUT is connected to a laptop computer system with minimum configuration during the tests. Test software exercised and linked with the EUT

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	MY43360112	3/28/2006
Peak Power Meter	Agilent	E4416A	GB41291160	2/9/2006
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	9/12/2005
Preamplifier, 1 ~ 26 GHz	Miteq	NSP2600-SP	924341	12/23/2005
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/2006
Site A Line Stabilizer/Conditioner	Tripplite	LC-1800a	A005181	CNR
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	10/21/2005
Antenna, Bilog 30MHz ~ 2Ghz	Sunol Sciences	JB1	A121003	3/3/2006
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	3/29/2006
RF Filter Section	HP	85420E	3705A00256	3/29/2006
Peak / Average Power Sensor	Agilent	E9327A	US40440755	2/10/2006
4.0 High Pass Filter	Micro Tronics	HPM13351	3	N/A

8. LIMITS AND RESULTS

8.1.1. 6 dB BANDWIDTH

LIMIT

§15.247 (a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

BLUETOOTH

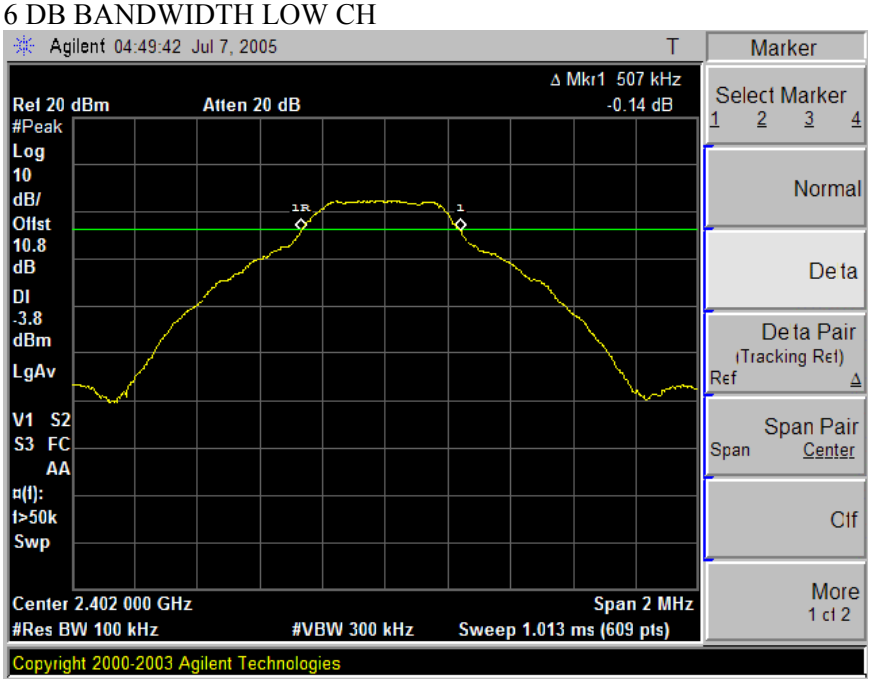
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	507	500	7
Middle	2437	506	500	6
High	2462	506	500	6

802.11b

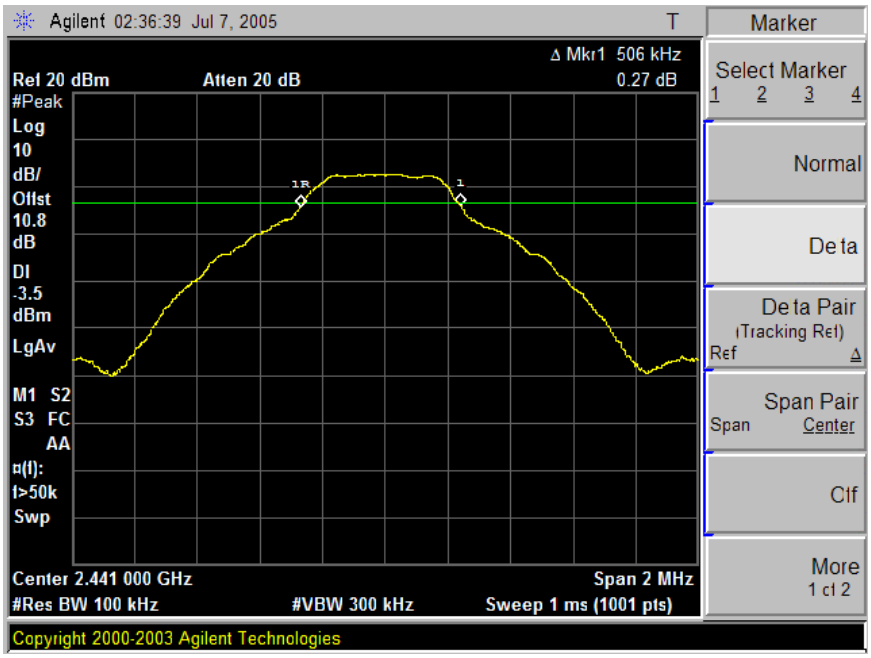
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	12200	500	11700
Middle	2437	12260	500	11760
High	2462	12300	500	11800

6 DB BANDWIDTH (BLUETOOTH)

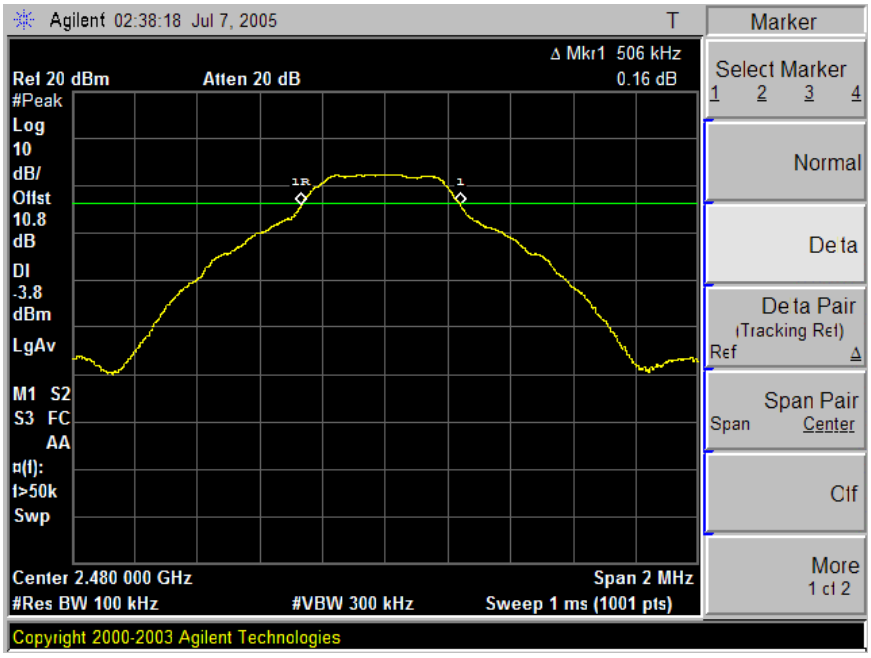
6 DB BANDWIDTH LOW CH



6 DB BANDWIDTH MID CH

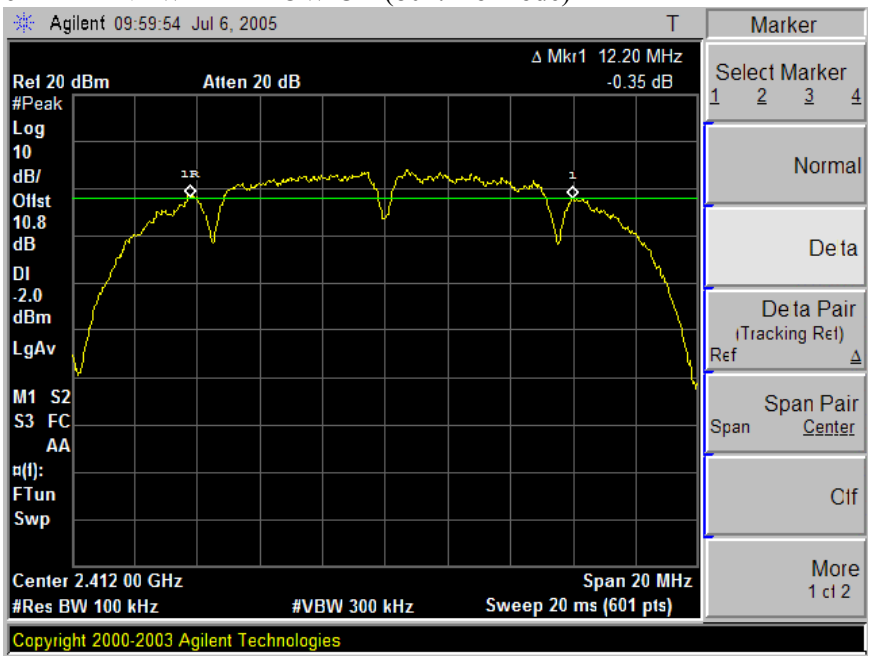


6 DB BANDWIDTH HIGH CH

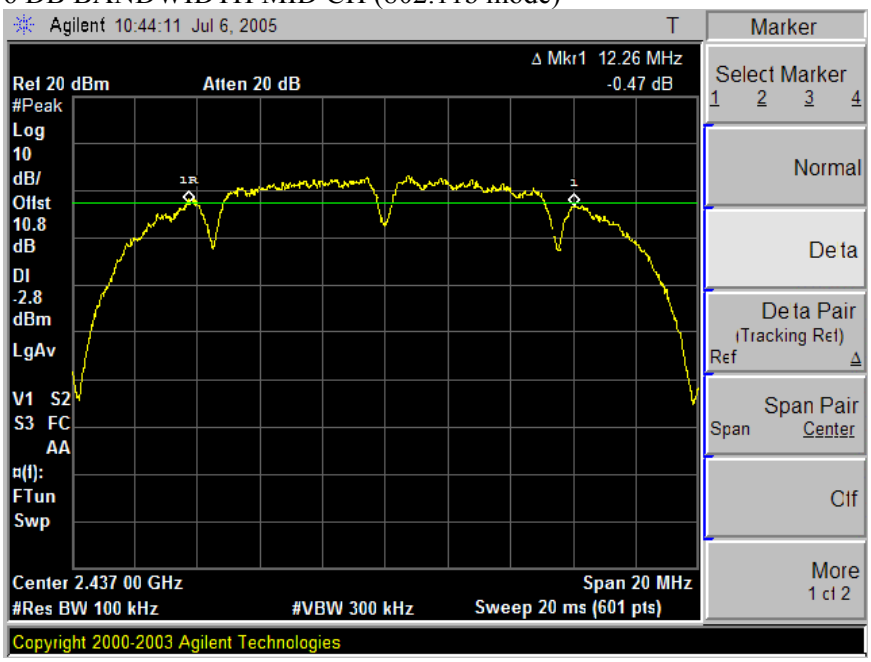


6 DB BANDWIDTH (802.11b MODE)

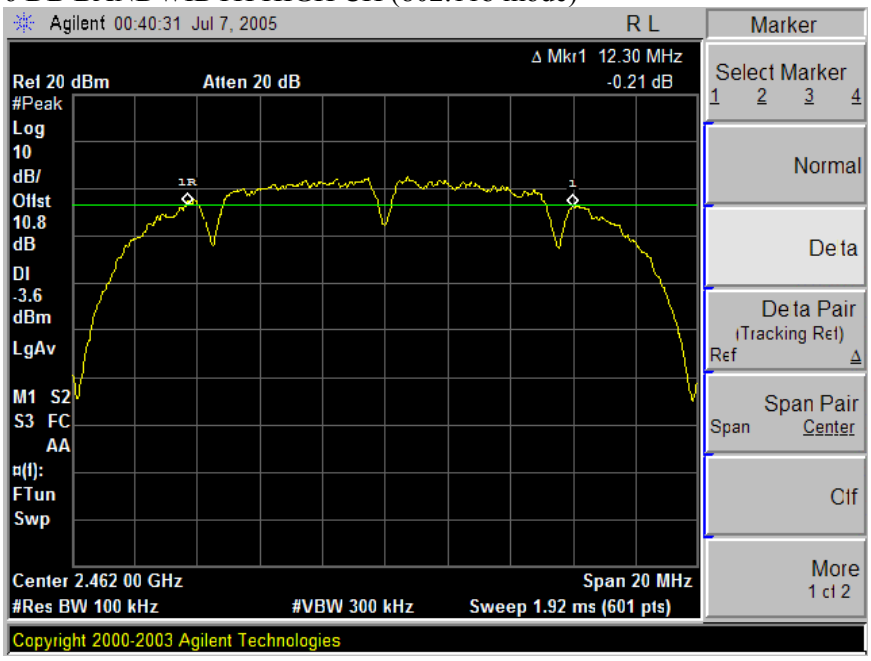
6 DB BANDWIDTH LOW CH (802.11b mode)



6 DB BANDWIDTH MID CH (802.11b mode)



6 DB BANDWIDTH HIGH CH (802.11b mode)



8.1.2. 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

No non-compliance noted:

BLUETOOTH

Channel	Frequency (MHz)	99% Bandwidth (KHz)
Low	2412	875.2395
Middle	2437	875.4264
High	2462	878.4699

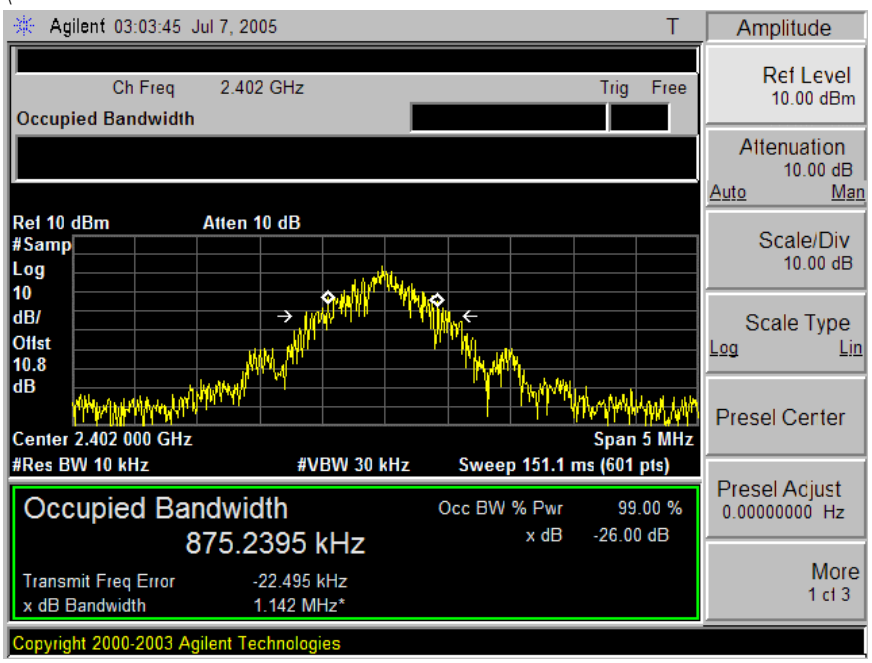
802.11b Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	15.5715
Middle	2437	15.5734
High	2462	15.5839

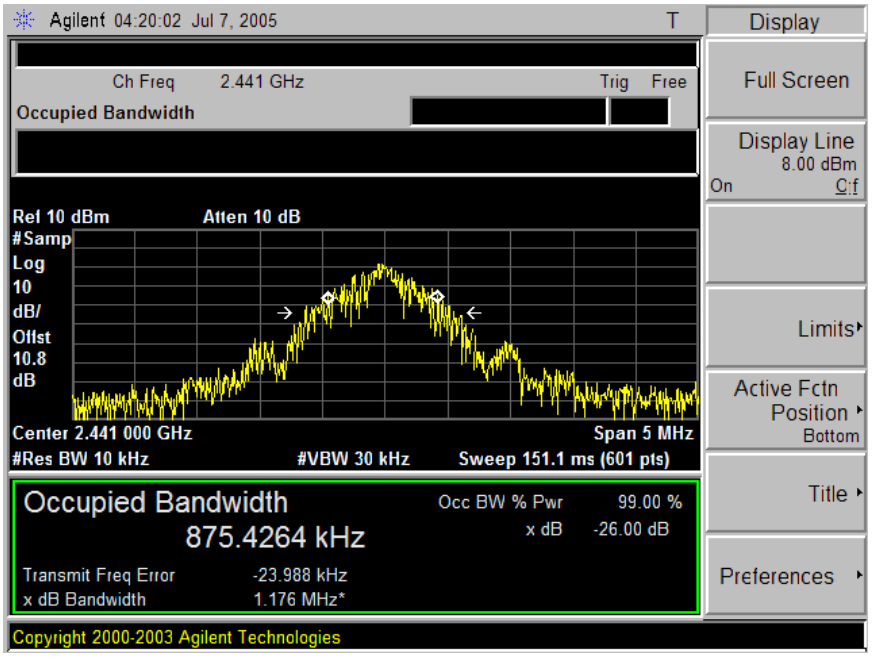
99% BANDWIDTH (BLUETOOTH MODE)

99% BANDWIDTH LOW CH

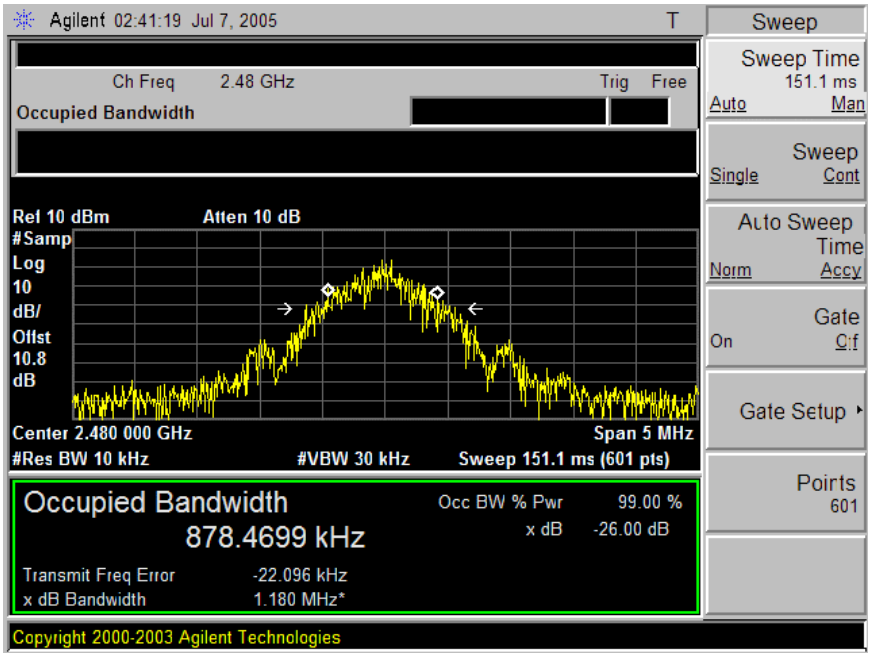
\



99% BANDWIDTH MID CH

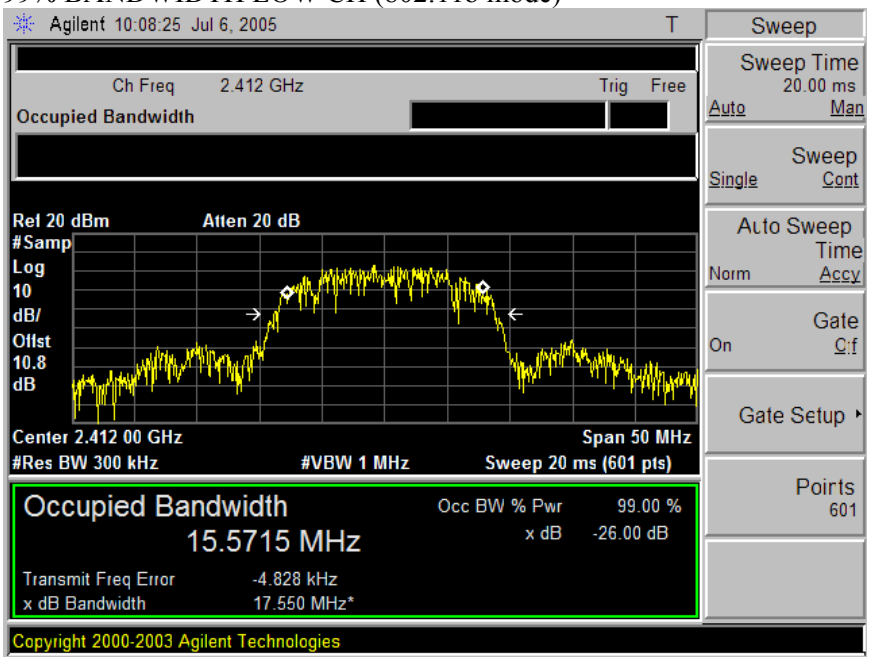


99% BANDWIDTH HIGH CH

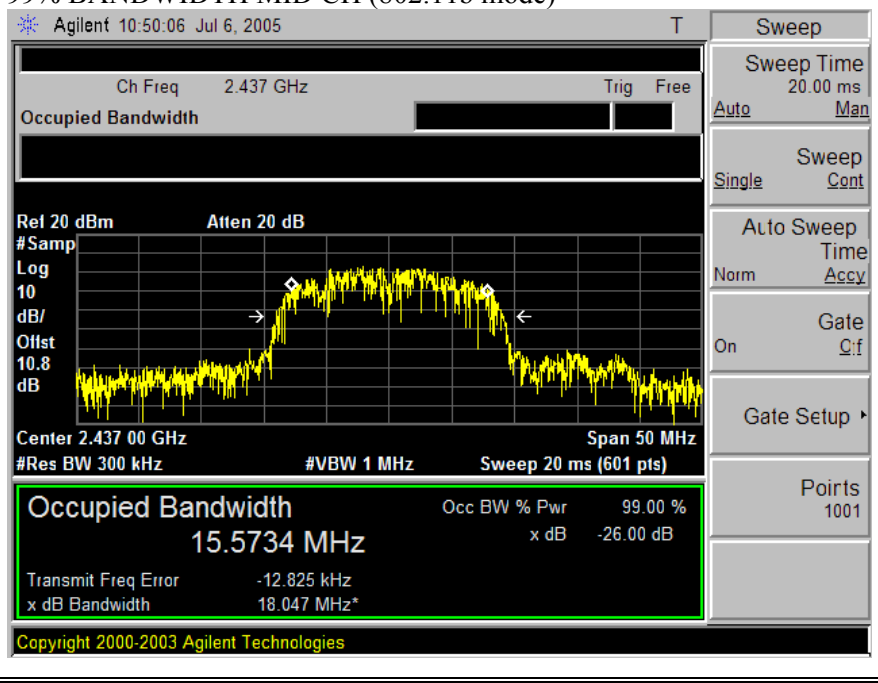


99% BANDWIDTH (802.11b MODE)

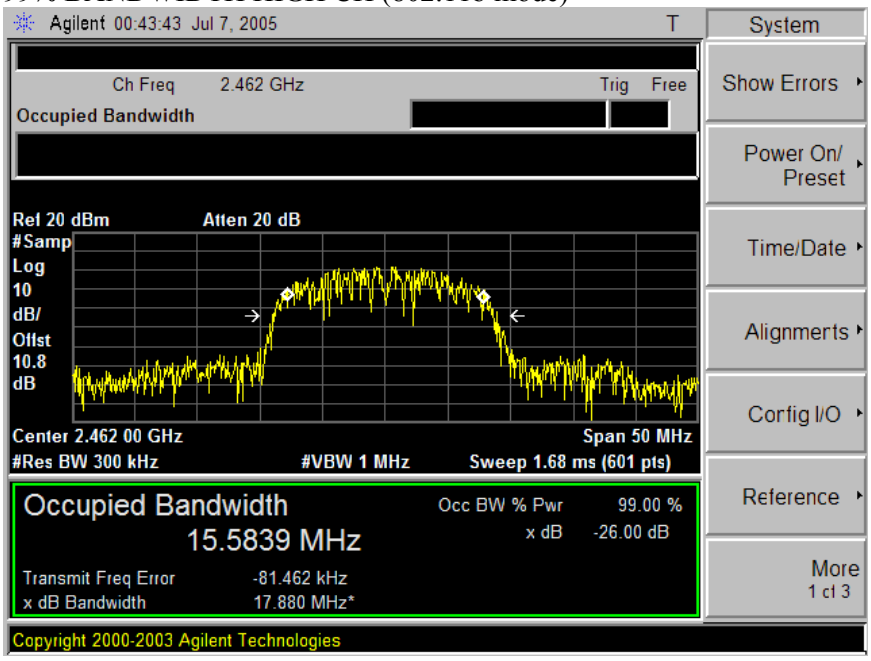
99% BANDWIDTH LOW CH (802.11b mode)



99% BANDWIDTH MID CH (802.11b mode)



99% BANDWIDTH HIGH CH (802.11b mode)



8.1.3. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(4) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.247 (b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth

RESULTS

The maximum antenna gain is -1 dBi of Bluetooth, and 1 dBi of WLAN for other than fixed, point-to-point operations, therefore the limit is 30 dBm.

No non-compliance noted:

BLUETOOTH

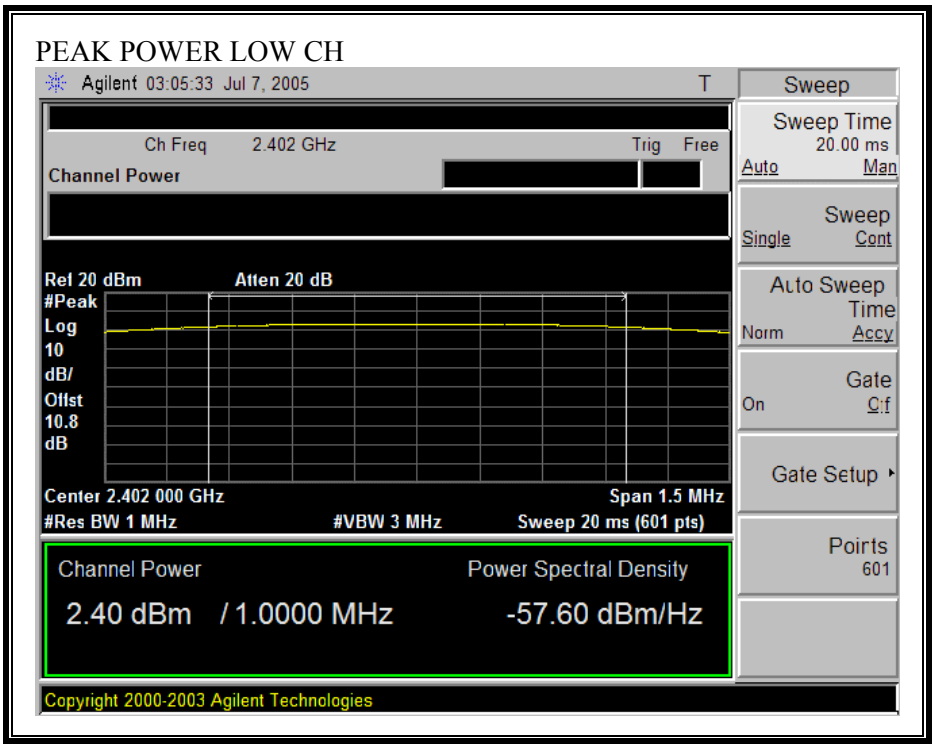
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	2.40	30	-27.60
Middle	2437	2.51	30	-27.49
High	2462	2.25	30	-27.75

802.11b Mode

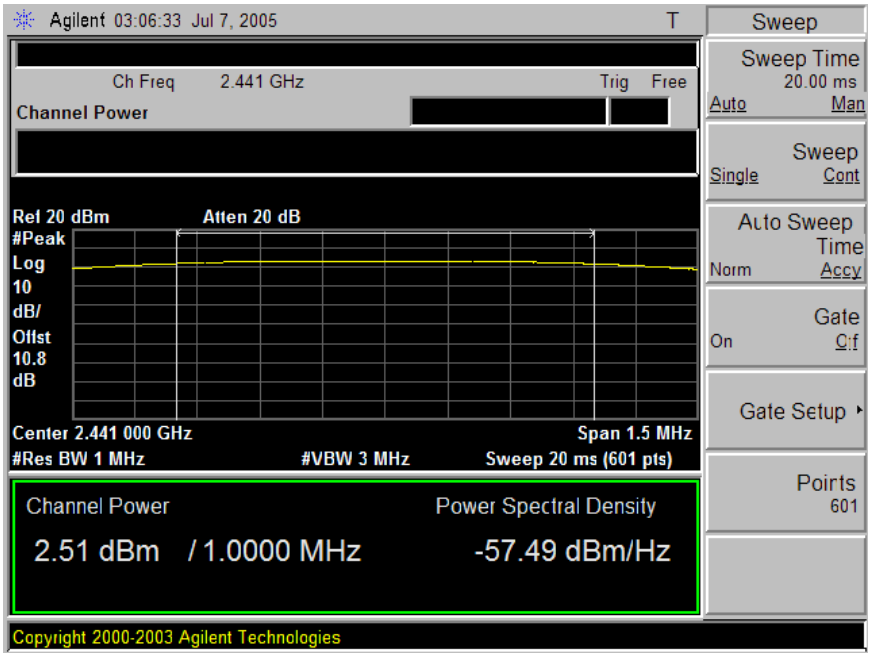
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	16.50	30	-13.50
Middle	2437	16.01	30	-13.99
High	2462	14.42	30	-15.58

OUTPUT POWER (BLUETOOTH MODE)

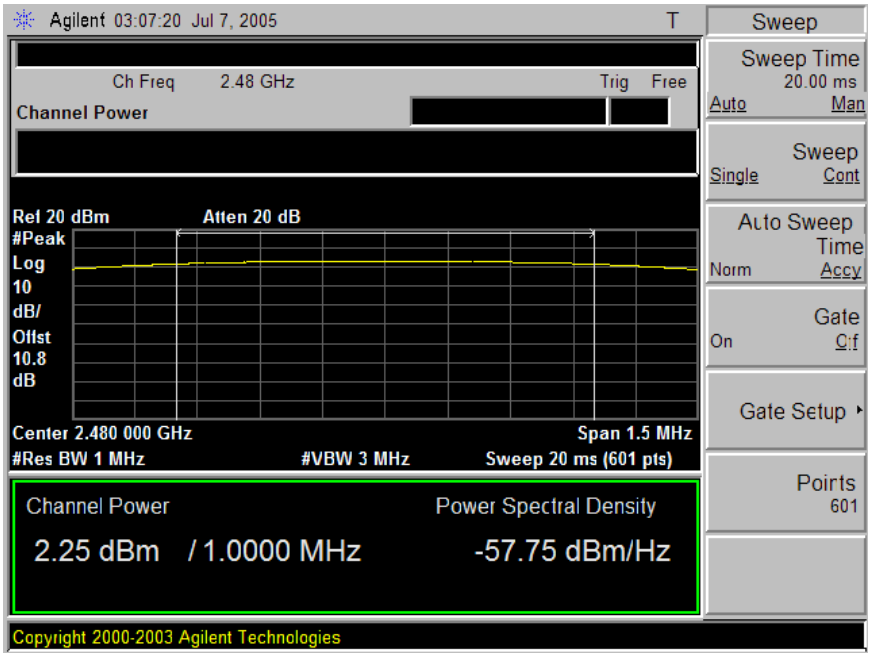
PEAK POWER LOW CH



PEAK POWER MID CH

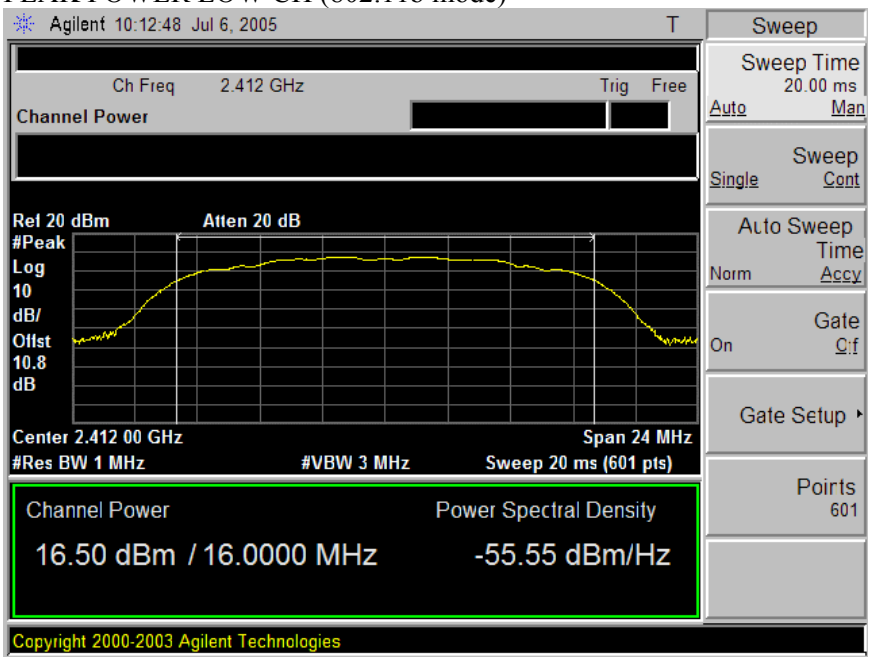


PEAK POWER HIGH CH

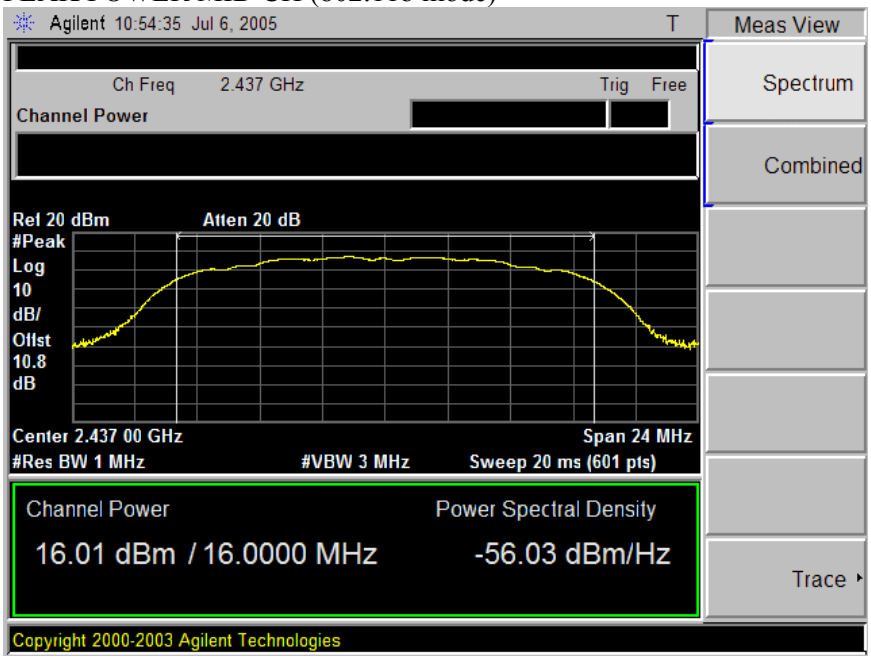


OUTPUT POWER (802.11b MODE)

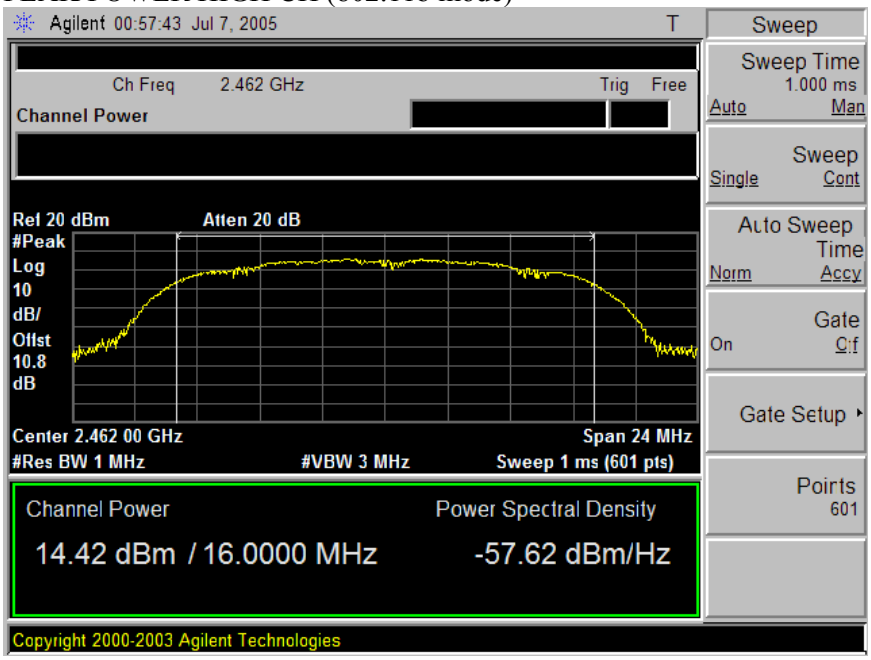
PEAK POWER LOW CH (802.11b mode)



PEAK POWER MID CH (802.11b mode)



PEAK POWER HIGH CH (802.11b mode)



8.1.4. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 10.75 dB (including 10 dB pad and 0.75 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

BLUETOOTH

Channel	Frequency (MHz)	Power (dBm)
Low	2412	2.19
Middle	2437	2.13
High	2462	1.91

802.11b Mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	13.29
Middle	2437	12.75
High	2462	11.65

8.1.5. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.247 (d) For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

RESULTS

No non-compliance noted:

BLUETOOTH

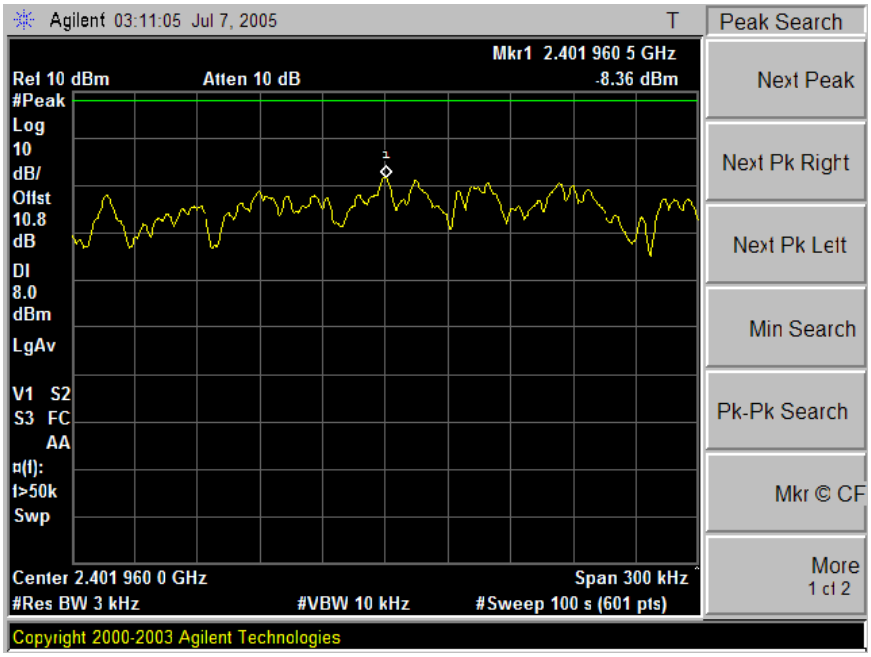
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.36	8	-16.36
Middle	2437	-8.21	8	-16.21
High	2462	-8.32	8	-16.32

802.11b Mode

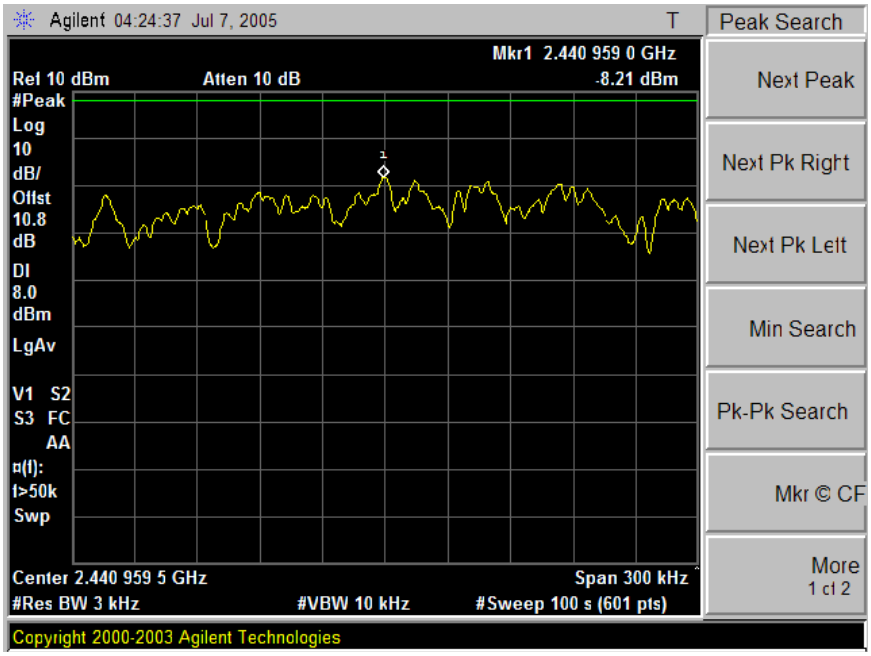
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.01	8	-18.01
Middle	2437	-10.69	8	-18.69
High	2462	-11.75	8	-19.75

PEAK POWER SPECTRAL DENSITY (BLUETOOTH MODE)

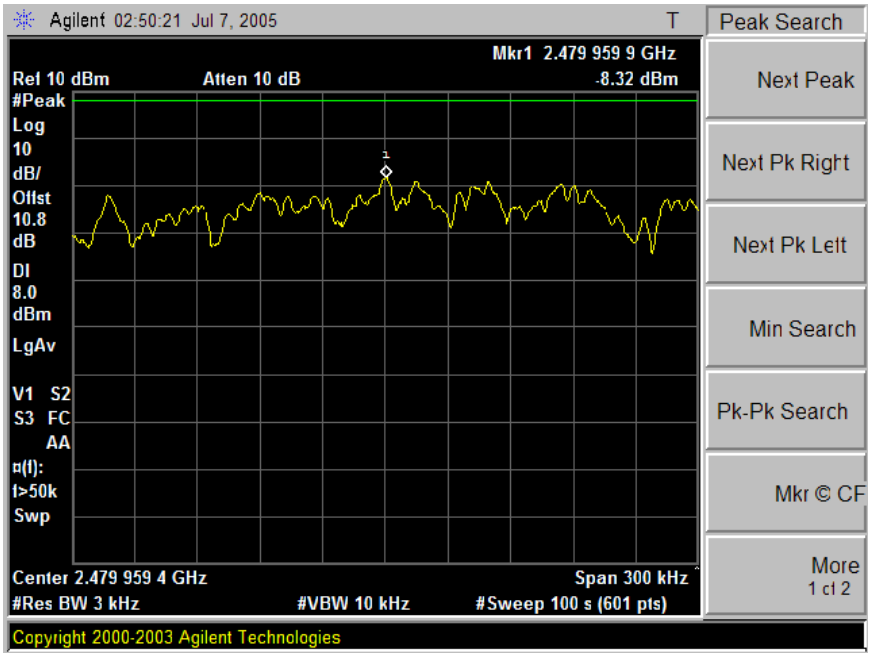
PPSD LOW CH



PPSD MID CH

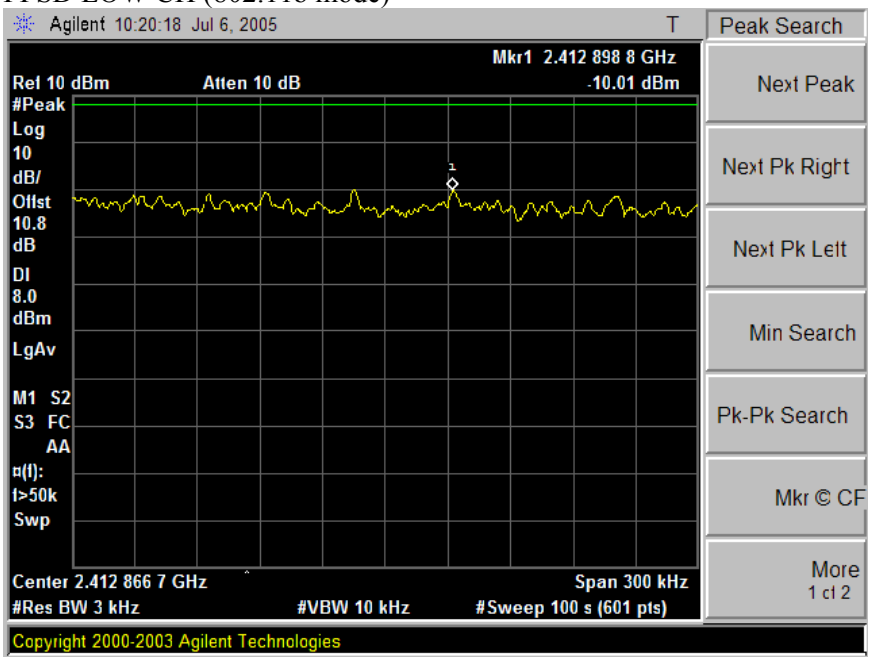


PPSD HIGH CH

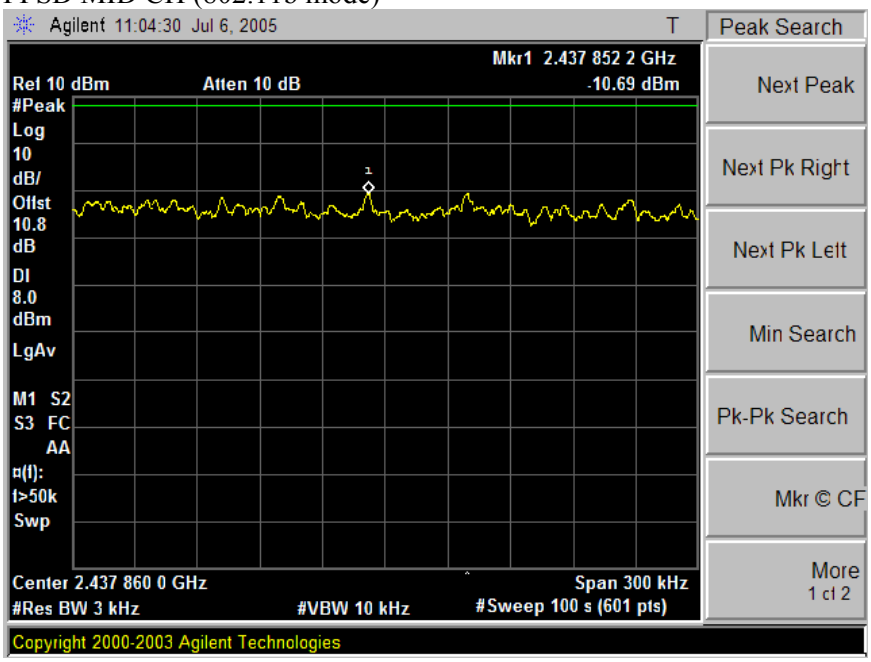


PEAK POWER SPECTRAL DENSITY (802.11b MODE)

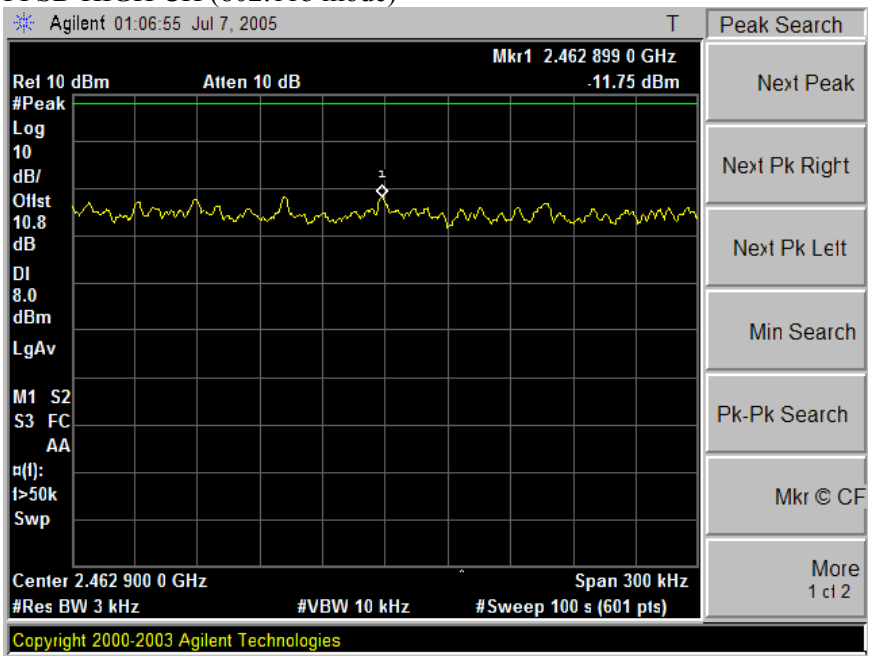
PPSD LOW CH (802.11b mode)



PPSD MID CH (802.11b mode)



PPSD HIGH CH (802.11b mode)



8.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) 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, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

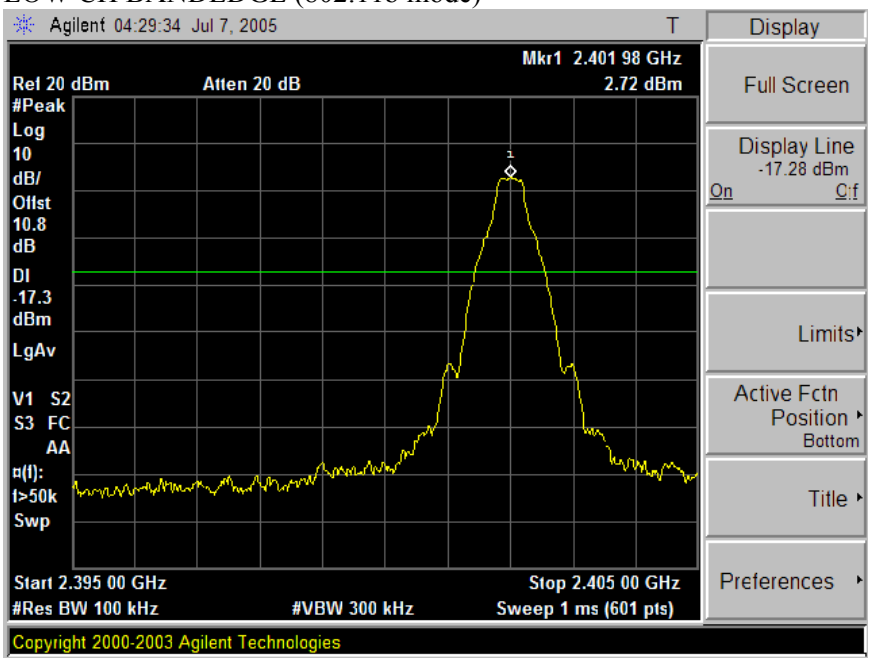
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

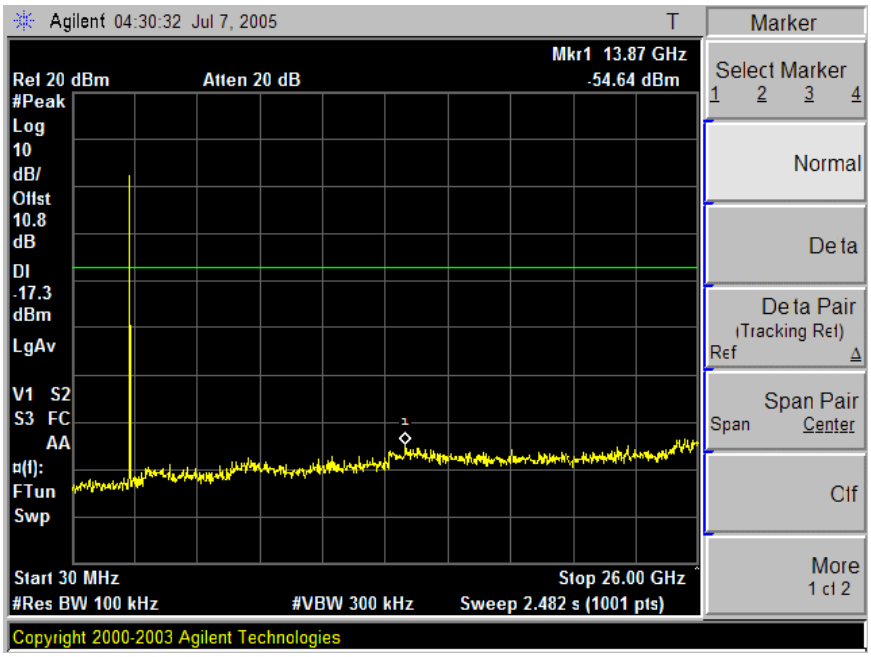
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL (BLUETOOTH MODE))

LOW CH BANDEDGE (802.11b mode)

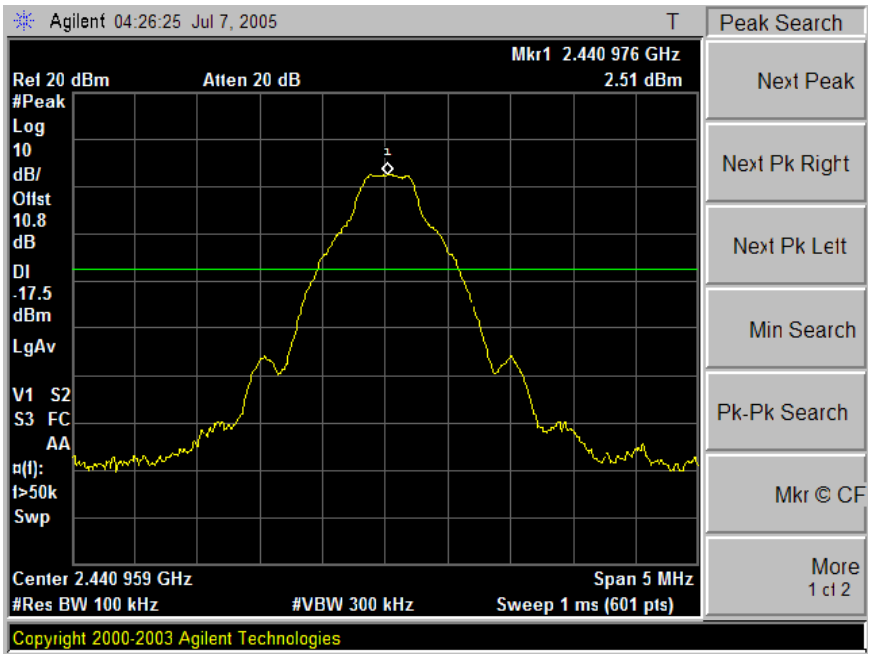


LOW CH SPURIOUS

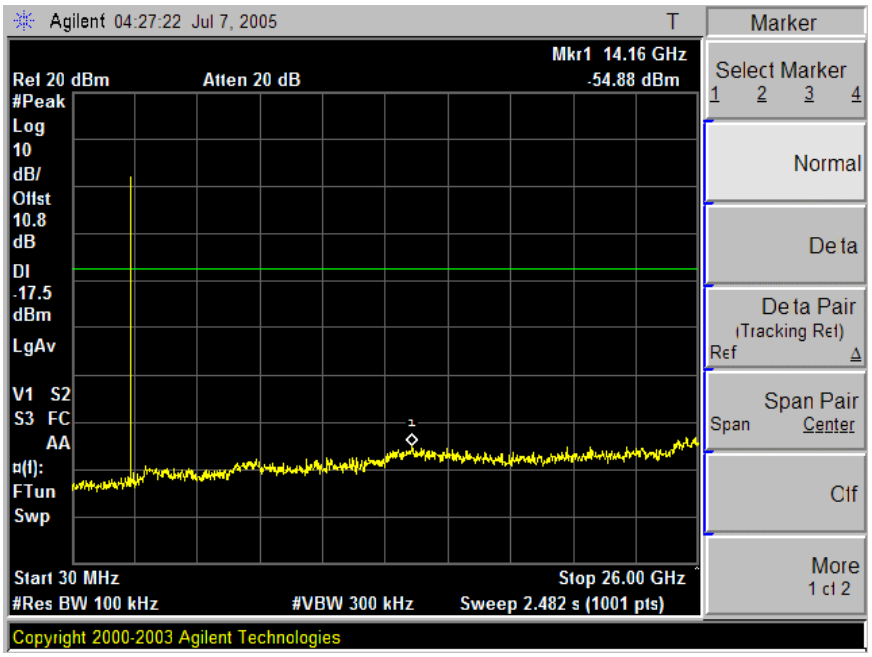


SPURIOUS EMISSIONS, MID CHANNEL (BLUETOOTH MODE

MID CH REFERENCE

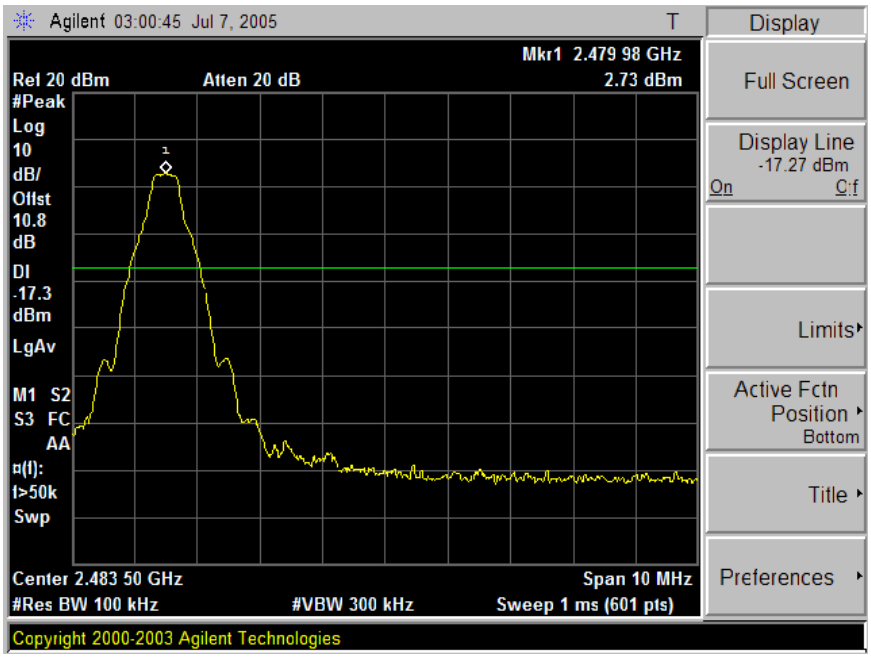


MID CH SPURIOUS

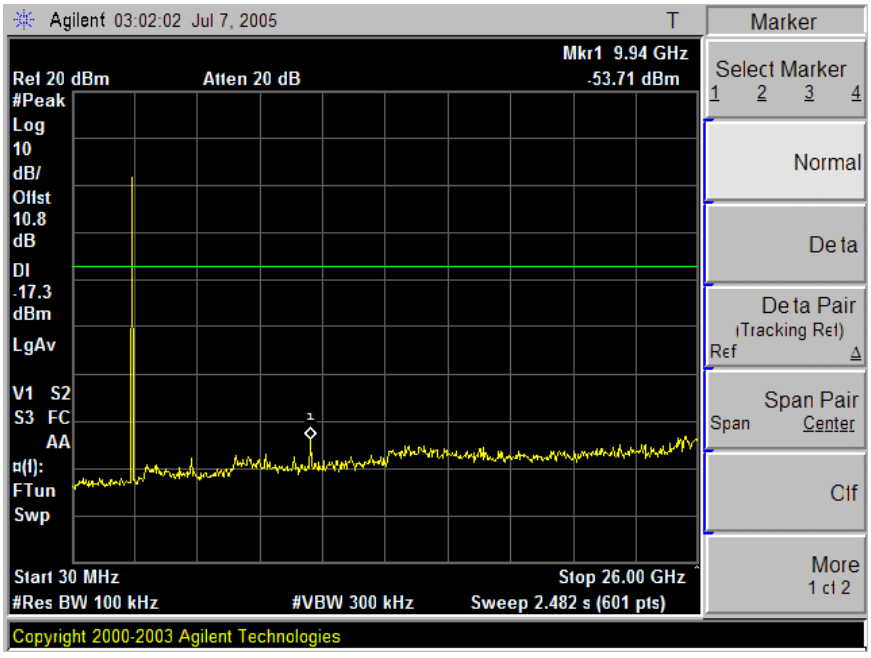


SPURIOUS EMISSIONS, HIGH CHANNEL (BLUETOOTH MODE

HIGH CH BANDEDGE



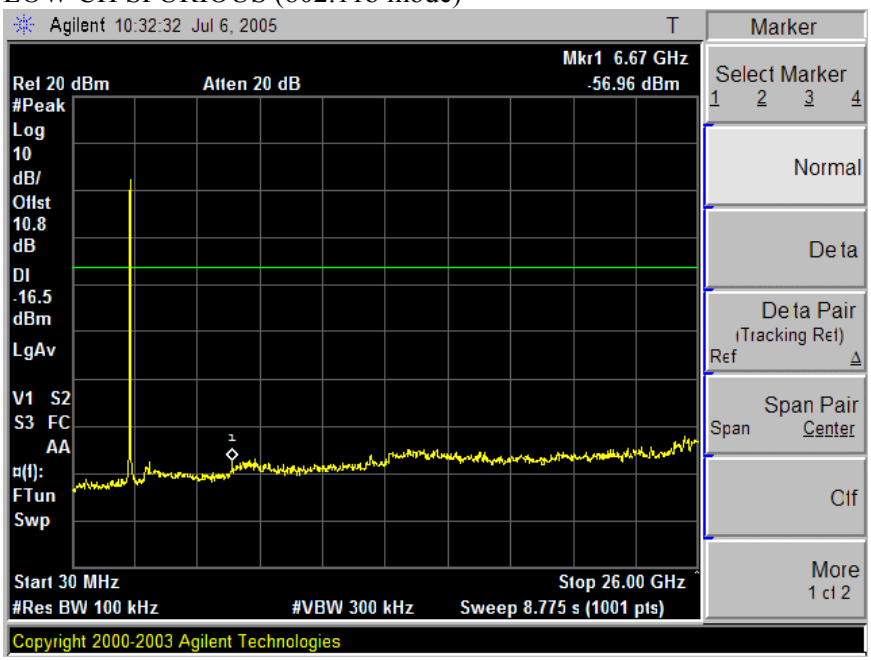
HIGH CH SPURIOUS



SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

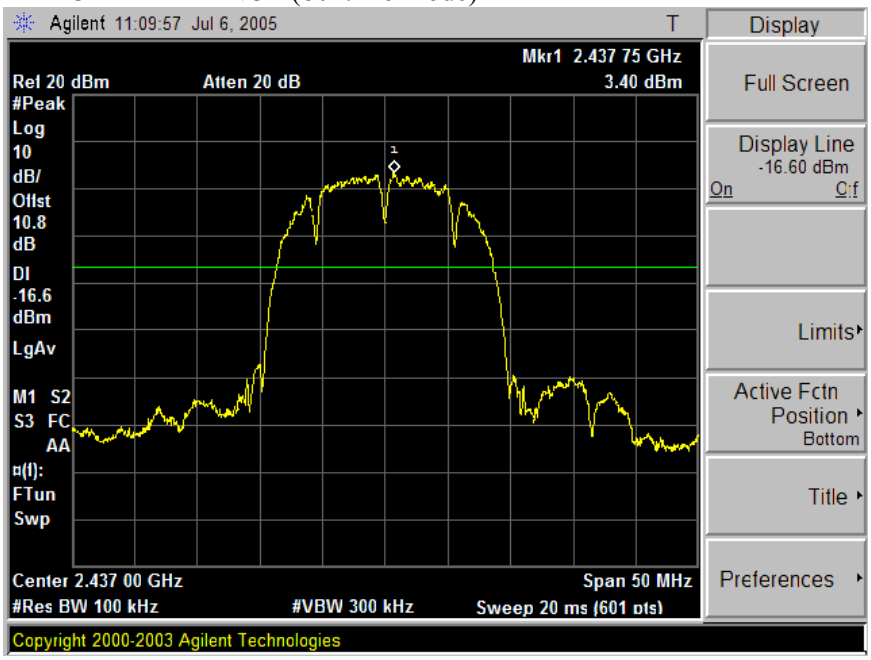
LOW CH BANDEDGE (802.11b mode)

LOW CH SPURIOUS (802.11b mode)



SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

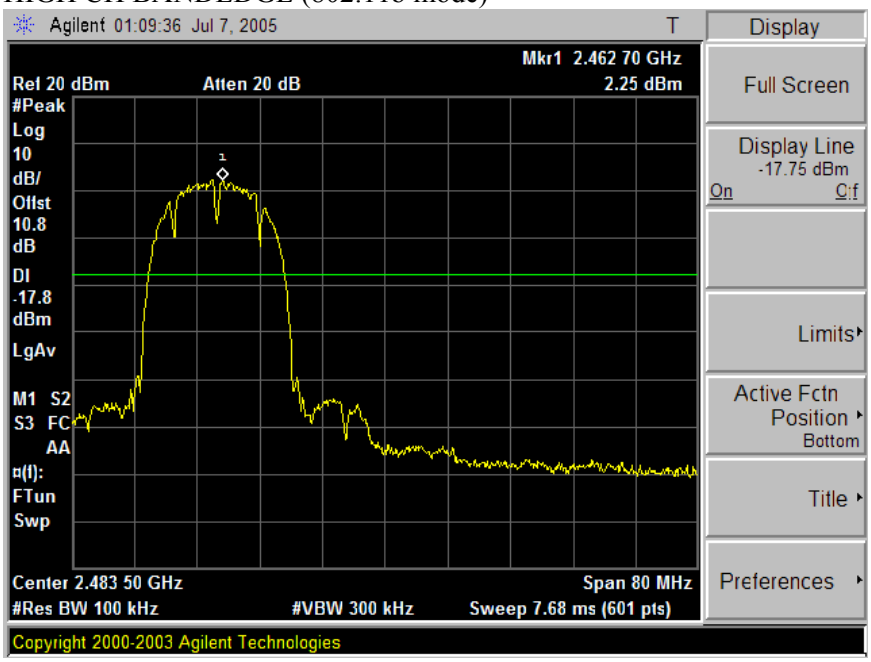
MID CH REFERENCE (802.11b mode)



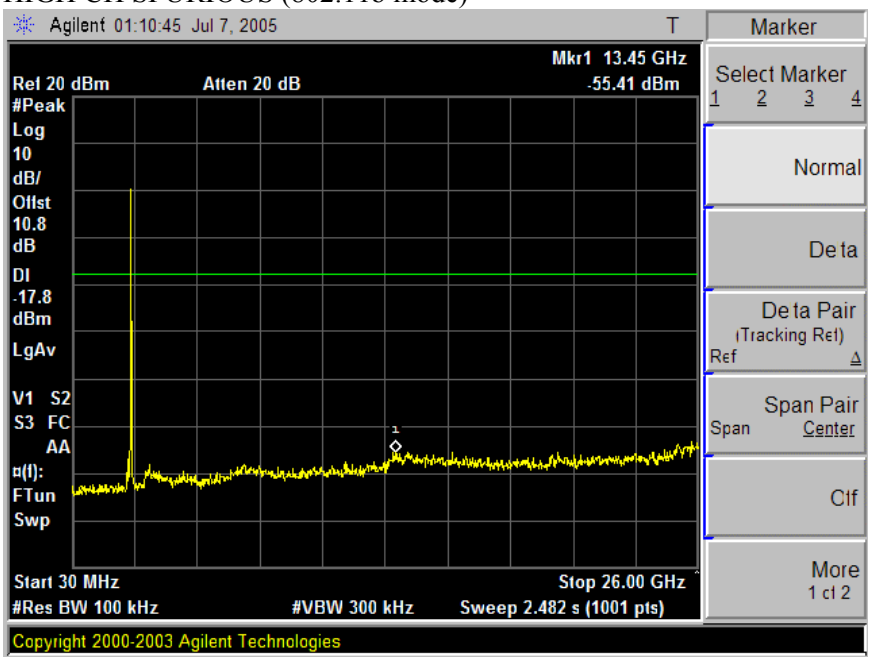
MID CH SPURIOUS (802.11bmode)

SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

HIGH CH BANDEDGE (802.11b mode)



HIGH CH SPURIOUS (802.11b mode)



8.2. RADIATED EMISSIONS

8.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

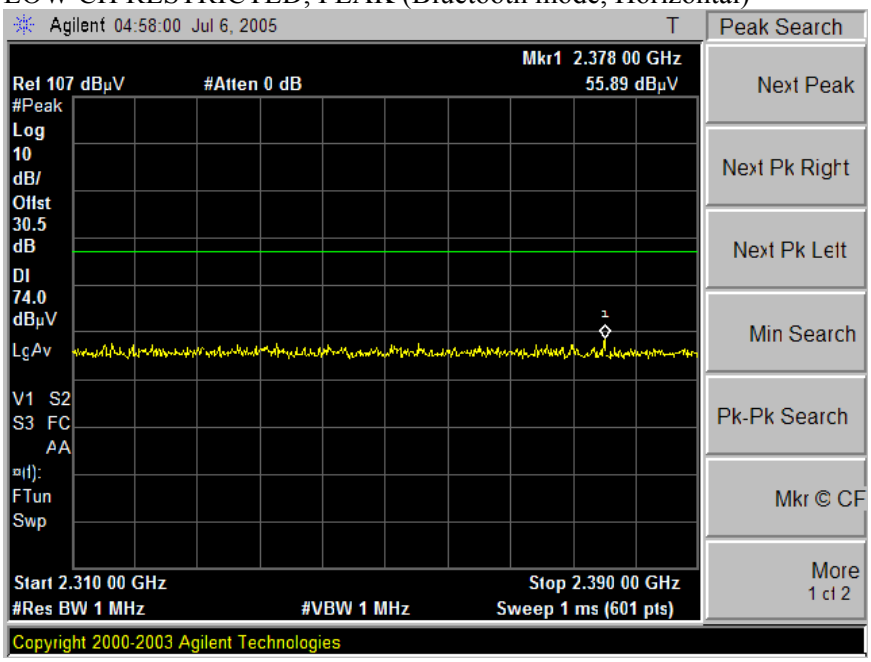
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

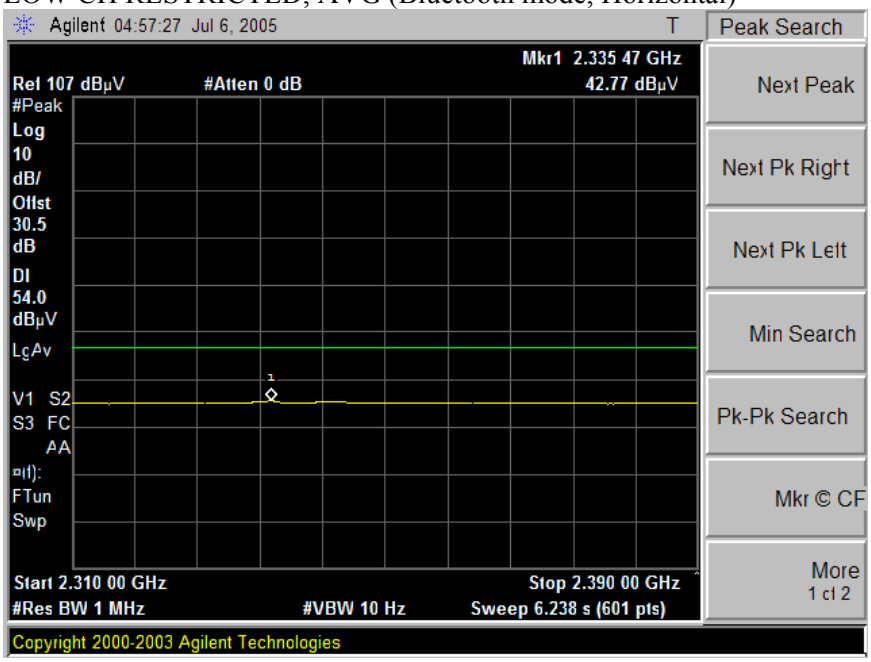
8.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

RESTRICTED BANDEDGE (BLUETOOTH MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (Bluetooth mode, Horizontal)

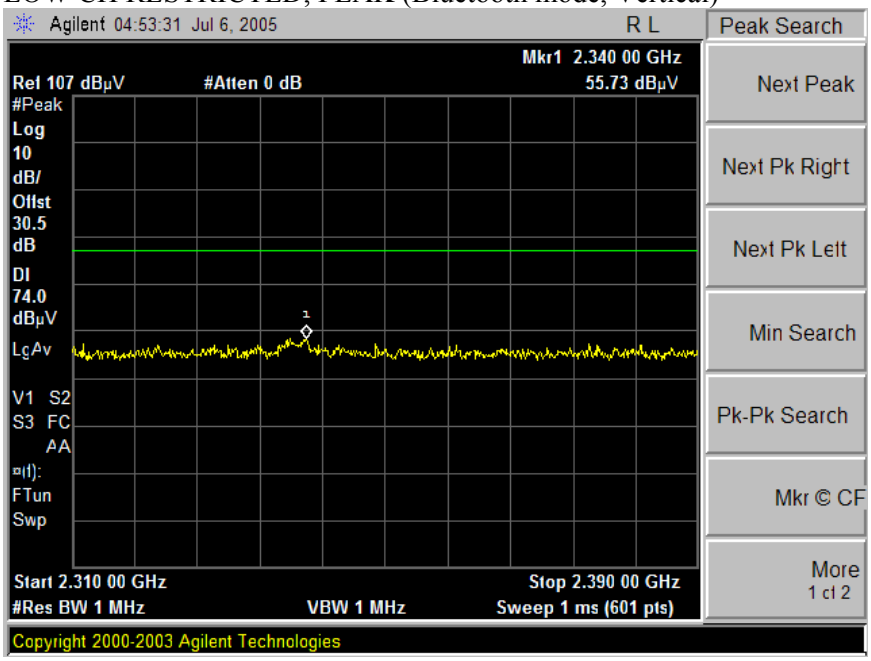


LOW CH RESTRICTED, AVG (Bluetooth mode, Horizontal)

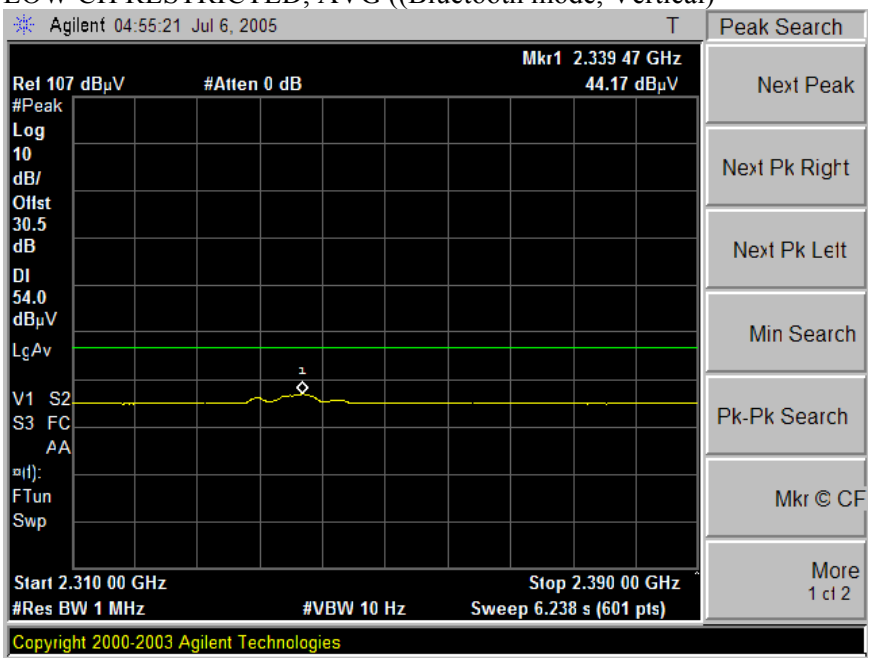


RESTRICTED BANDEDGE (BLUETOOTH MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (Bluetooth mode, Vertical)

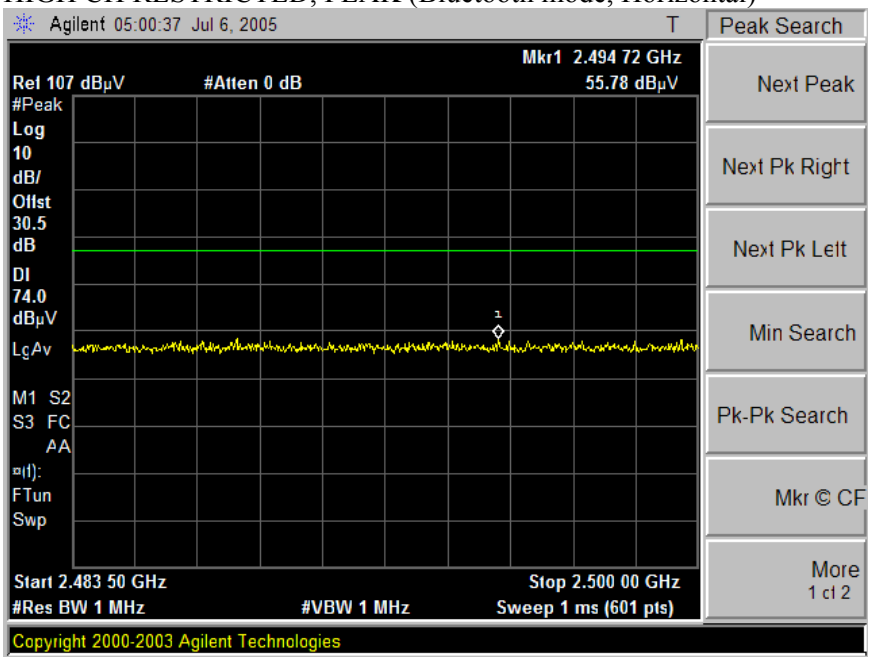


LOW CH RESTRICTED, AVG ((Bluetooth mode, Vertical)

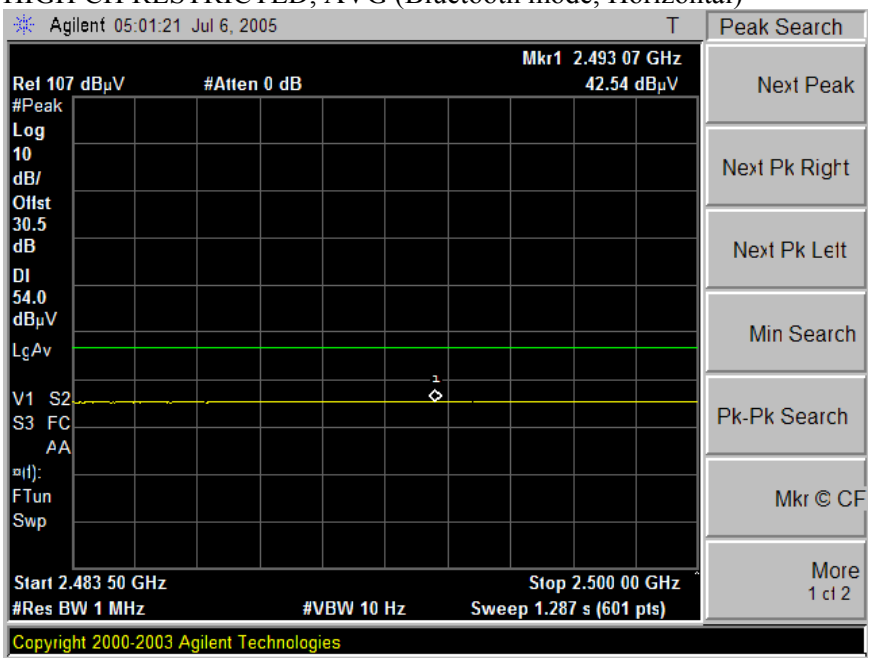


RESTRICTED BANDEDGE (BLUETOOTH MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (Bluetooth mode, Horizontal)

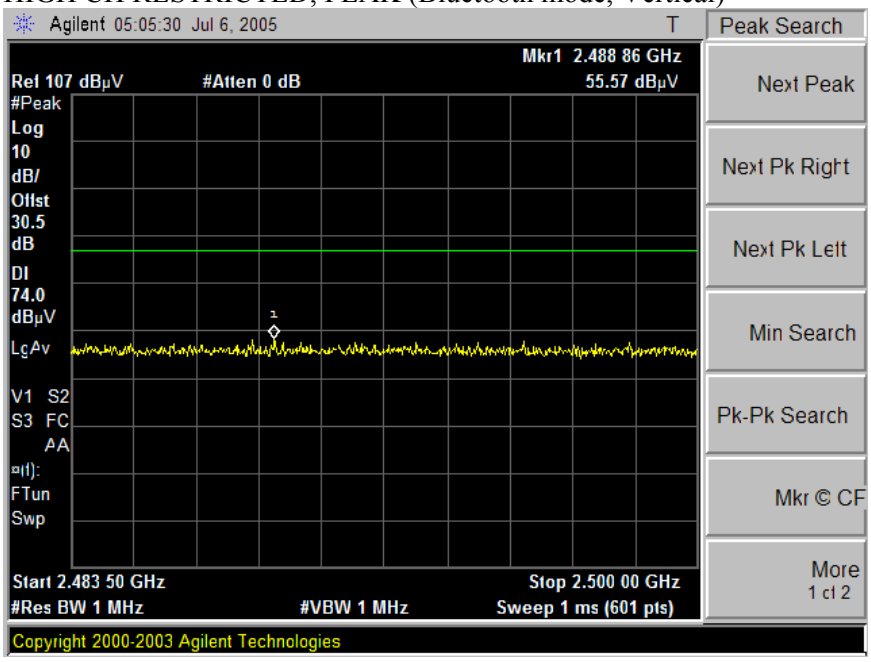


HIGH CH RESTRICTED, AVG (Bluetooth mode, Horizontal)

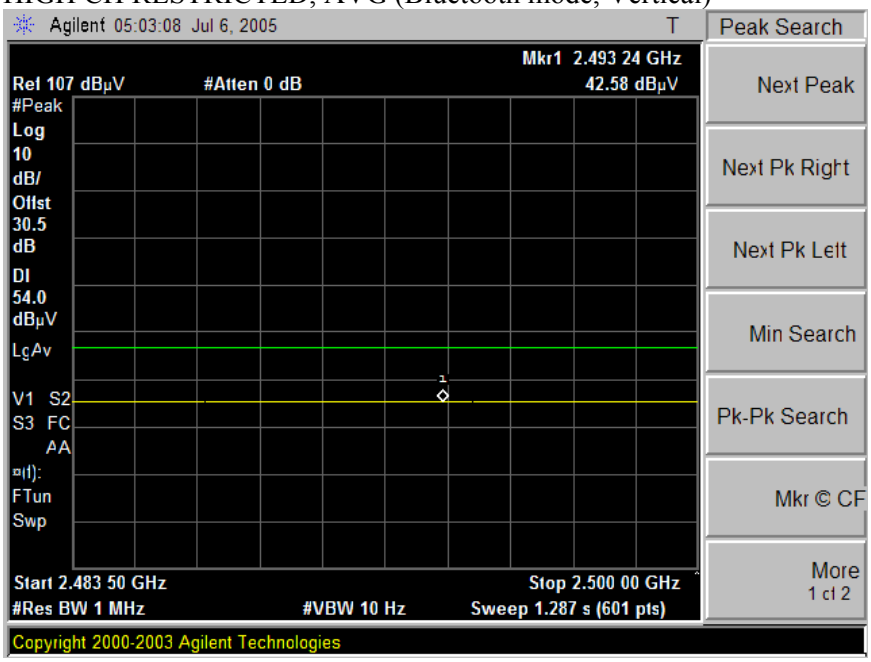


RESTRICTED BANDEDGE (BLUETOOTH MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (Bluetooth mode, Vertical)



HIGH CH RESTRICTED, AVG (Bluetooth mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (BLUETOOTH MODE))

07/05/05 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
Project #:05T3452-2
Company:HIGH TECH COMPUTER CORP.
EUT Descrip.: SmartphonePhone(GSM 800/1900, EDGE,BT, 802. 11b)
EUT M/N: ST22A
Test Target:FCC Part 15.247
Mode Oper: Transmit BT (Worst Case)

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T86 Miteq 924341			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable	12 foot cable	HPF	Reject Filter
	3_Chin		12_Neelesh	HPF_4.0GHz	

Peak Measurements
RBW=VBW=1MHz

Average Measurements
RBW=1MHz ; VBW=10Hz

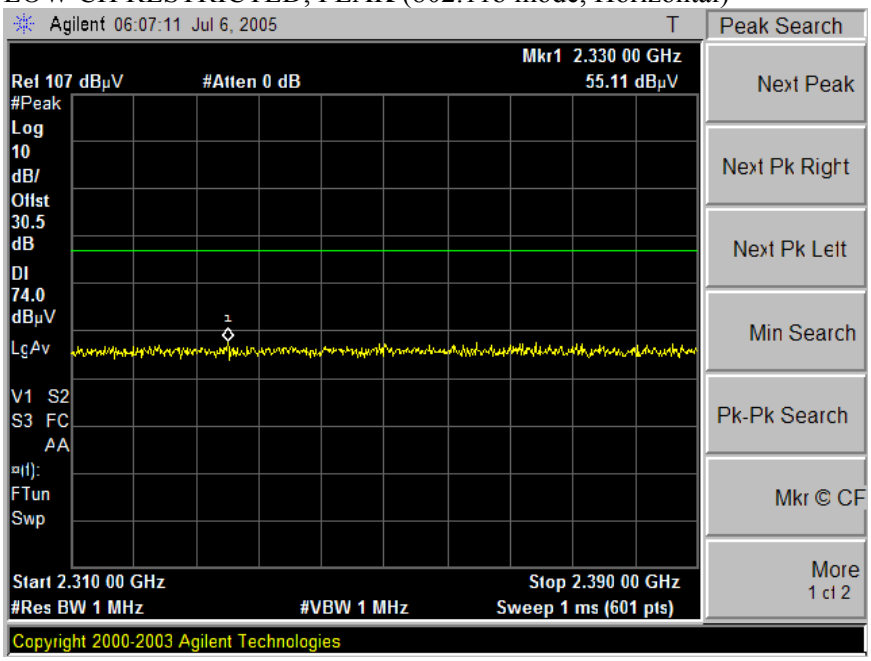
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.804	3.0	53.4	48.5	33.6	3.7	-44.0	0.0	0.6	47.3	42.4	74	54	-26.7	-11.6	
4.804	3.0	52.6	45.8	33.6	3.7	-44.0	0.0	0.6	46.5	39.7	74	54	-27.5	-14.3	
Mid Ch															
4.882	3.0	54.7	50.9	33.7	3.8	-44.1	0.0	0.6	48.7	44.9	74	54	-25.3	-9.1	
4.882	3.0	52.0	46.0	33.7	3.8	-44.1	0.0	0.6	46.0	40.0	74	54	-28.0	-14.0	
High Ch															
4.960	3.0	53.2	48.0	33.8	3.8	-44.2	0.0	0.6	47.2	42.0	74	54	-26.8	-12.0	
4.960	3.0	51.5	42.0	33.8	3.8	-44.2	0.0	0.6	45.5	36.0	74	54	-28.5	-18.0	

Note: No other emissions were detected above the system noise floor.

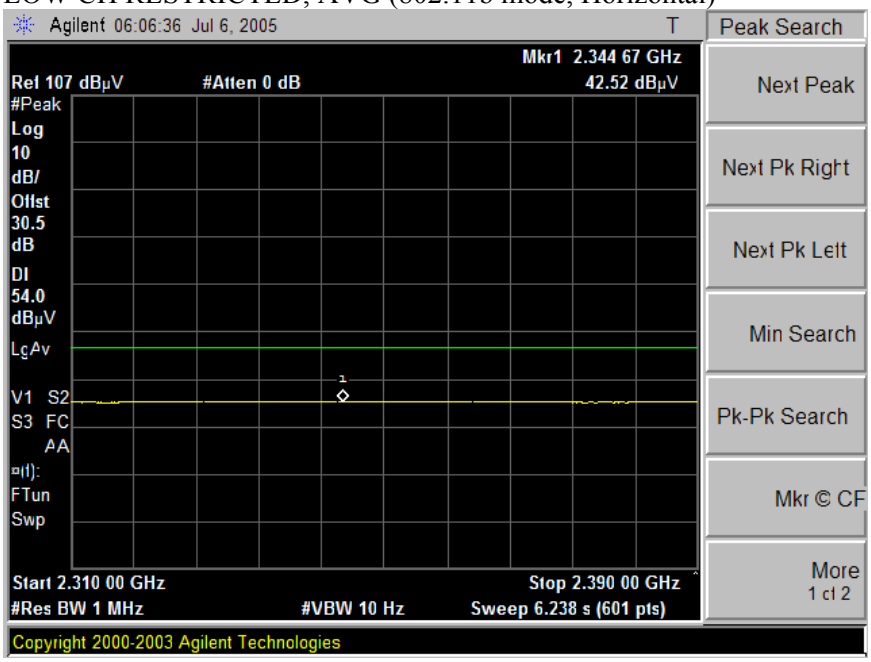
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Horizontal)

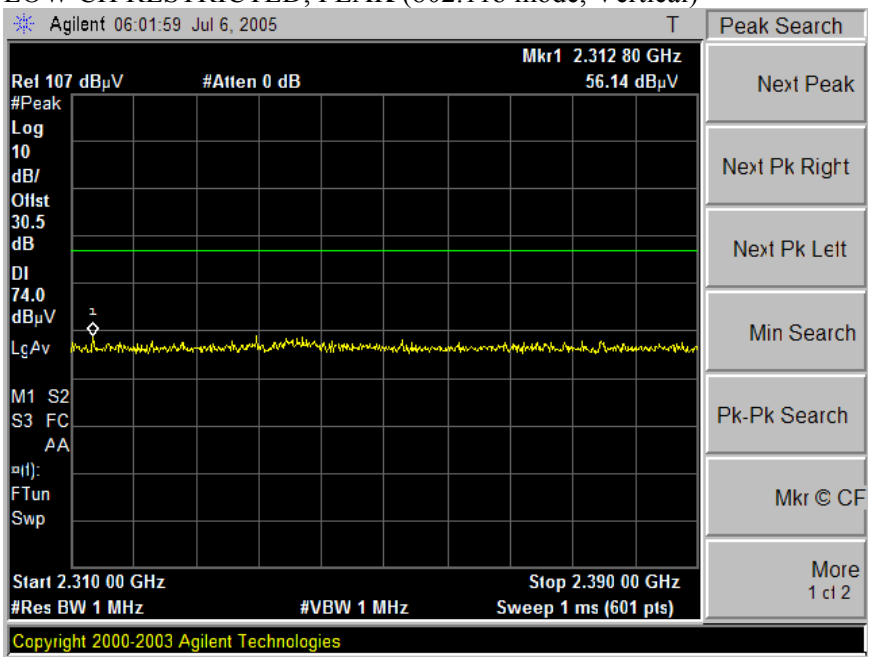


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

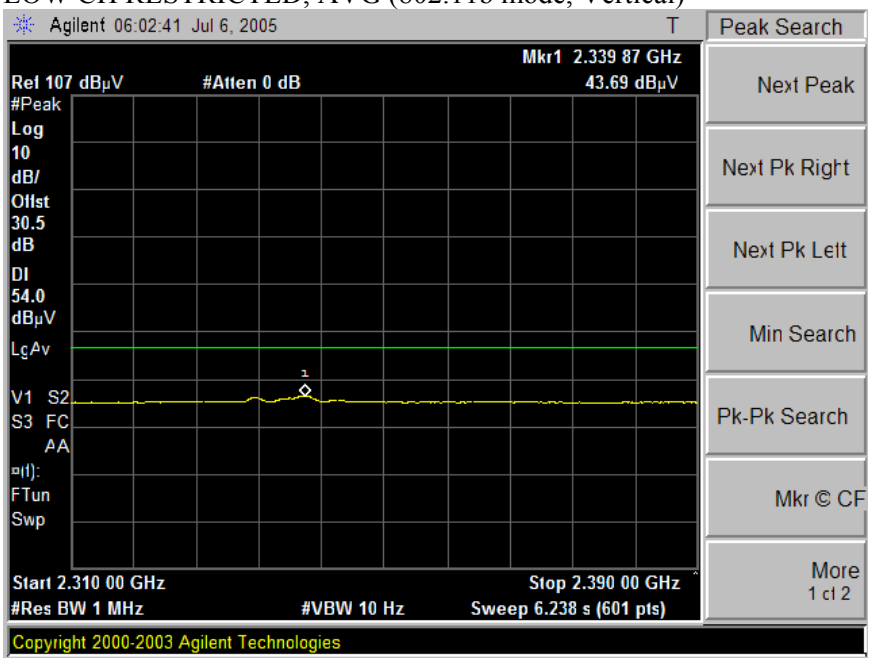


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Vertical)

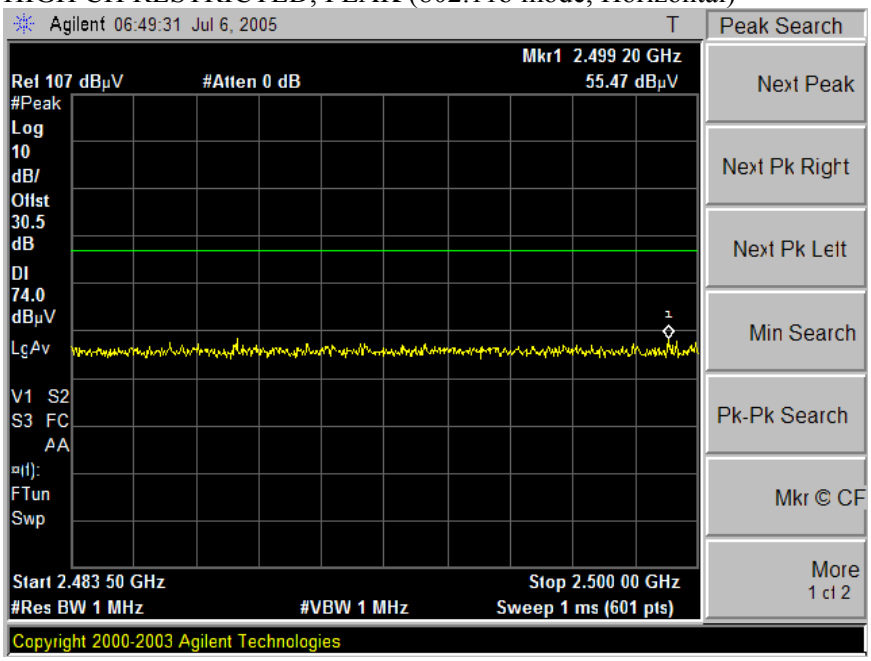


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

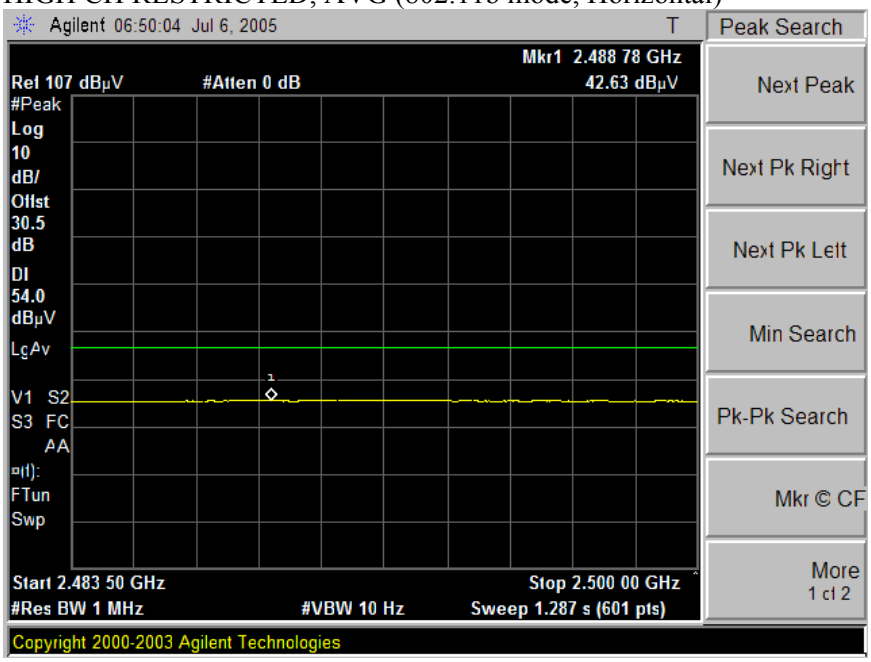


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Horizontal)

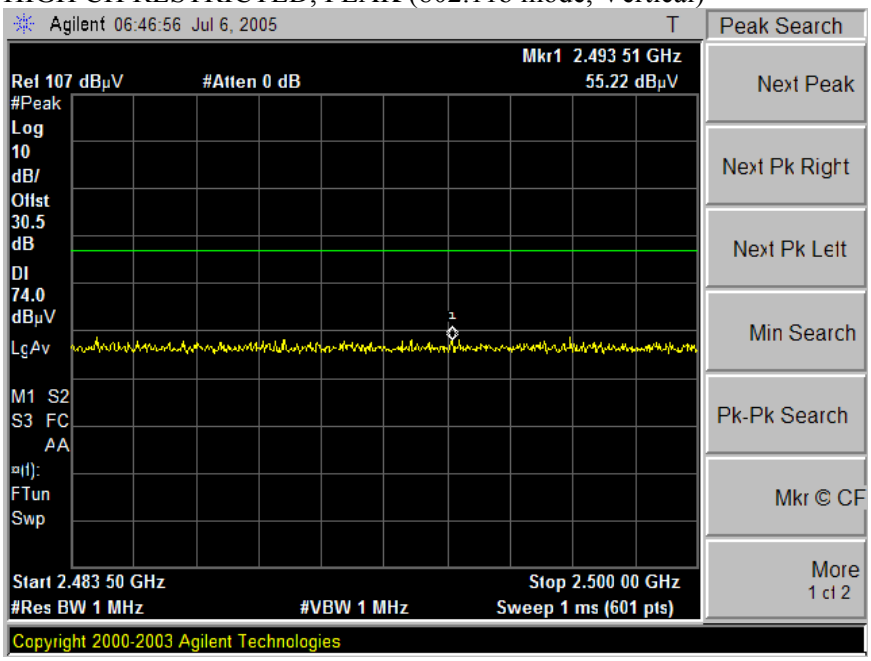


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

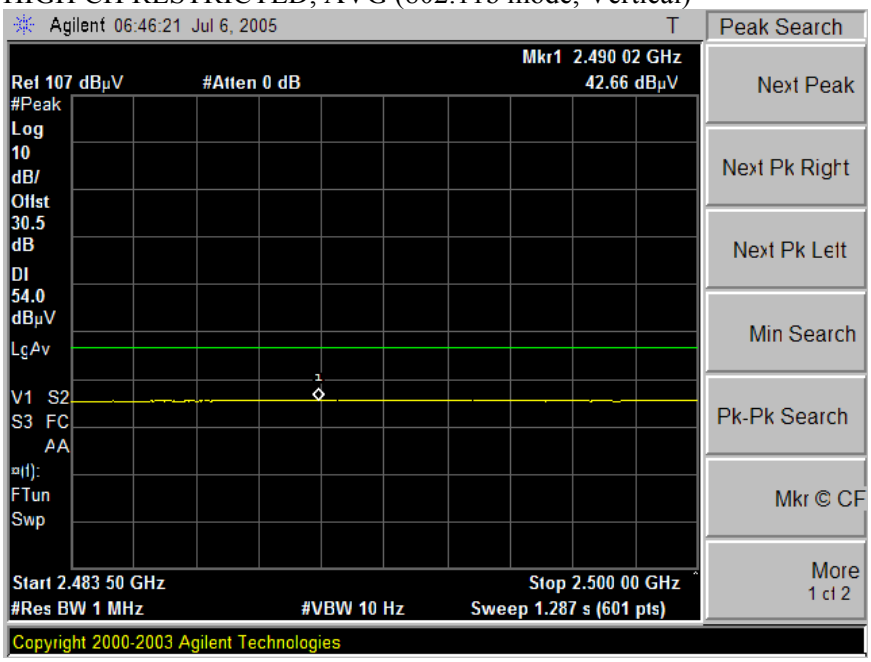


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

07/05/05 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
Project #:05T3452-2
Company:HIGH TECH COMPUTER CORP.
EUT Descrip.: SmartphonePhone(GSM 800/1900, EDGE,BT, 802. 11b)
EUT M/N: ST22A
Test Target:FCC Part 15.247
Mode Oper: Transmit WLAN 802.11b (Worst Case)

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T86 Miteq 924341			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable	12 foot cable	HPF	Reject Filter
	3_Chin		12_Neelesh	HPF_4.0GHz	

Peak Measurements
RBW=VBW=1MHz

Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.824	3.0	51.0	37.8	33.6	3.8	-44.0	0.0	0.6	44.9	31.7	74	54	-29.1	-22.3	
4.824	3.0	50.7	37.6	33.6	3.8	-44.0	0.0	0.6	44.6	31.5	74	54	-29.4	-22.5	
Mid Ch															
4.874	3.0	51.5	39.1	33.7	3.8	-44.1	0.0	0.6	45.5	33.1	74	54	-28.5	-20.9	
4.874	3.0	50.8	37.8	33.7	3.8	-44.1	0.0	0.6	44.8	31.8	74	54	-29.2	-22.2	
High Ch															
4.924	3.0	51.2	39.0	33.7	3.8	-44.2	0.0	0.6	45.2	33.0	74	54	-28.8	-21.0	
4.924	3.0	50.9	38.9	33.7	3.8	-44.2	0.0	0.6	44.9	32.9	74	54	-29.1	-21.1	

Note: No other emissions were detected above the system noise floor.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

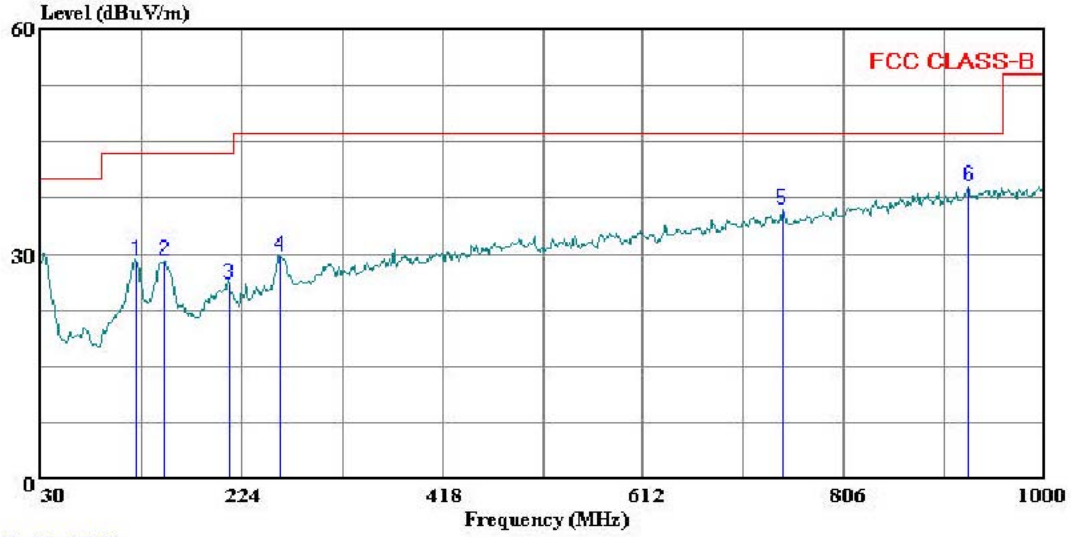
TX MODE AT WORST CASE:

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT

COMPLIANCE Engineering Service, Inc.
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 2 File#: HTC 3459.EMI Date: 07-01-2005 Time: 13:59:15



(Audix ATC)

Trace: 1 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : Chin pang
Project #: : 05T3459-2
Company: : High Tech Computer
EUT: : Smartphone (GSM850/1900/EDGE/BT/802.11b
Model No. : ST22A
Configuration : EUT/AC Adapter/Microphone
Target of Test : FCC Class B
Mode of Operation: TX MODE AT WORST CASE

HORIZONTAL DATA

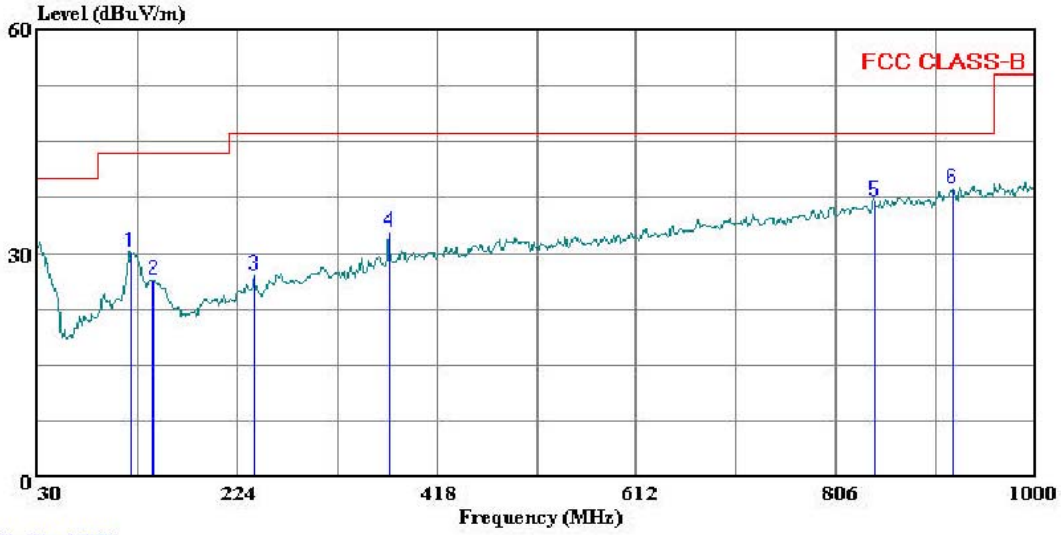
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	122.150	13.89	15.18	29.07	43.50	-14.43	Peak
2	149.310	14.79	14.26	29.05	43.50	-14.45	Peak
3	212.360	13.23	12.81	26.04	43.50	-17.46	Peak
4	260.860	15.38	14.25	29.63	46.00	-16.37	Peak
5	746.830	12.16	23.79	35.95	46.00	-10.05	Peak
6	926.280	12.88	26.23	39.11	46.00	-6.89	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: HTC 3459.EMI Date: 07-01-2005 Time: 14:04:43



(Audix ATC)

Trace: 3 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin pang
Project #: : 05T3459-2
Company: : High Tech Computer
EUT: : Smartphone (GSM850/1900/EDGE/BT/802.11b
Model No. : ST22A
Configuration : EUT/AC Adapter/Microphone
Target of Test : FCC Class B
Mode of Operation: TX MODE AT WORST CASE

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	120.210	15.01	15.13	30.14	43.50	-13.37	Peak
2	142.520	11.65	14.69	26.34	43.50	-17.16	Peak
3	240.490	13.54	13.54	27.08	46.00	-18.92	Peak
4	371.440	15.29	17.44	32.73	46.00	-13.27	Peak
5	843.830	11.73	25.15	36.88	46.00	-9.12	Peak
6	919.490	12.64	26.08	38.72	46.00	-7.28	Peak

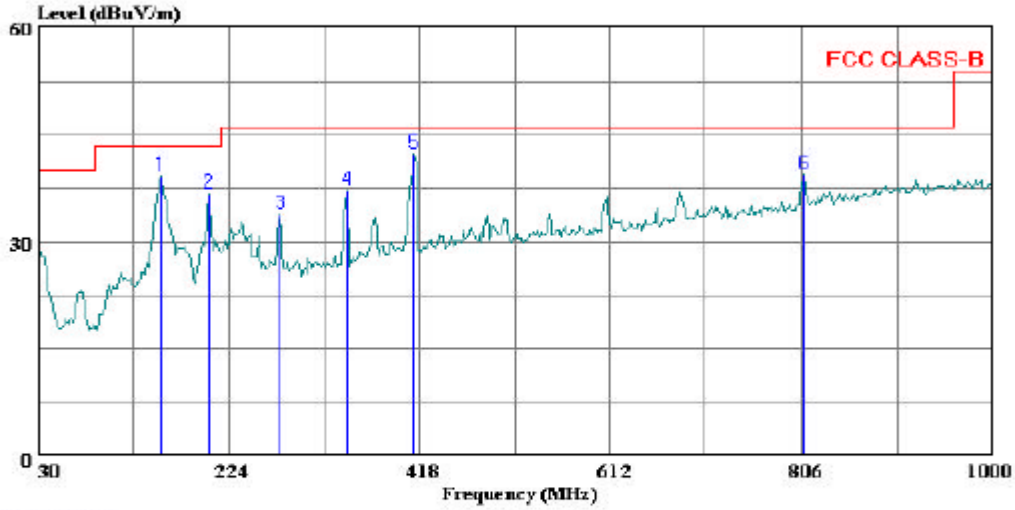
LINKING MODE:

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 13 File#: Htc 3459.emi Date: 07-05-2005 Time: 10:23:58



(Audix ATC)
Trace: 12 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : Chin pang
Project #: : 05T3459-2
Company: : High Tech Computer
EUT: : Smartphone (GSM850/1900/EDGE/BT/802.11b
Model No. : ST22A
Configuration : EUT/Printer/Moden/Microphone/Microphone
Target of Test : FCC Class B
Mode of Operation: Linking to Laptop

HORIZONTAL DATA

Page: 1

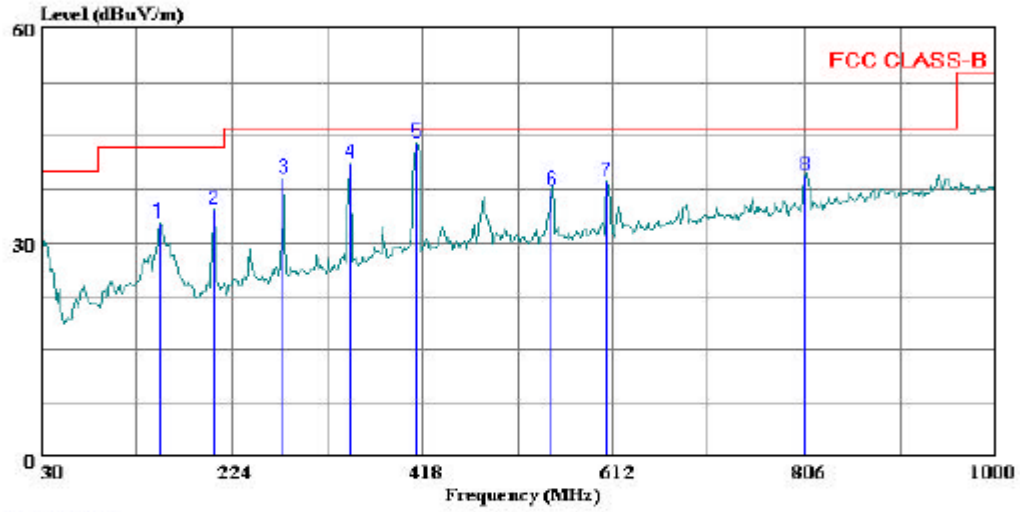
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	155.130	25.21	13.95	39.16	43.50	-4.34	Peak
2	203.630	22.66	14.01	36.67	43.50	-6.83	Peak
3	276.380	18.98	14.85	33.83	46.00	-12.17	Peak
4	344.280	20.45	16.79	37.24	46.00	-8.76	Peak
5	412.180	23.99	18.34	42.33	46.00	-3.67	Peak
6	807.940	14.84	24.69	39.53	46.00	-6.47	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 11 File#: Htc 3459.emi Date: 07-05-2005 Time: 10:20:38



(Audix ATC)
Trace: 10 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin pang
Project #: : 05T3459-2
Company: : High Tech Computer
EUT: : Smartphone (GSM850/1900/EDGE/BT/802.11b
Model No. : ST22A
Configuration : EUT/Printer/Moden/Microphone/Microphone
Target of Test : FCC Class B
Mode of Operation: Linking to Laptop

VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	150.280	18.77	14.10	32.87	43.50	-10.63	Peak
2	206.540	21.06	13.61	34.67	43.50	-8.83	Peak
3	276.380	24.18	14.85	39.03	46.00	-6.97	Peak
4	344.280	24.23	16.79	41.02	46.00	-4.98	Peak
5	412.180	25.77	18.34	44.11	46.00	-1.89	Peak
6	549.920	16.58	20.88	37.46	46.00	-8.54	Peak
7	606.180	17.03	21.63	38.66	46.00	-7.34	Peak
8	806.000	14.76	24.64	39.40	46.00	-6.60	Peak

8.3. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

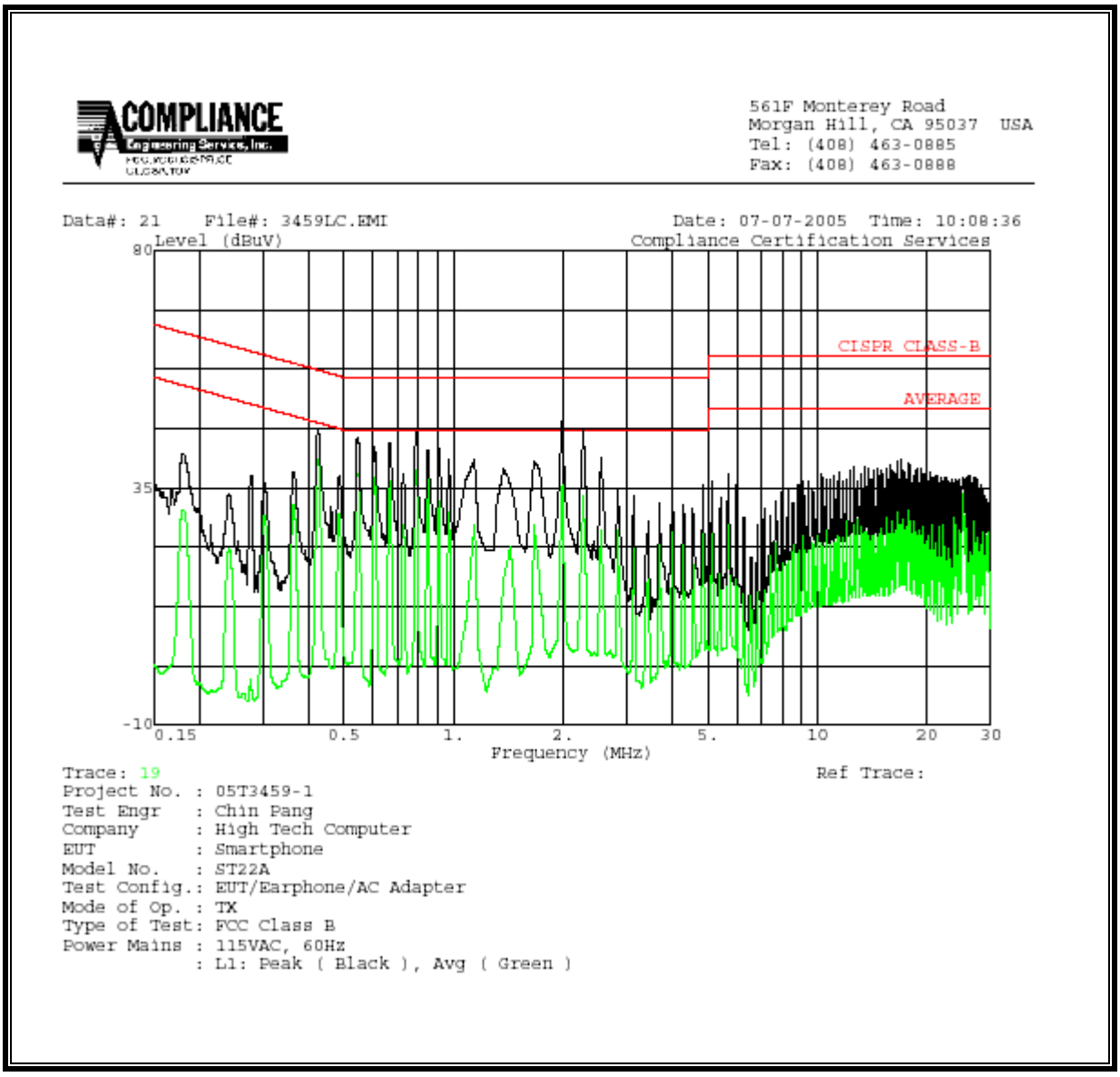
No non-compliance noted:

TX MODE AT WORST CASE:

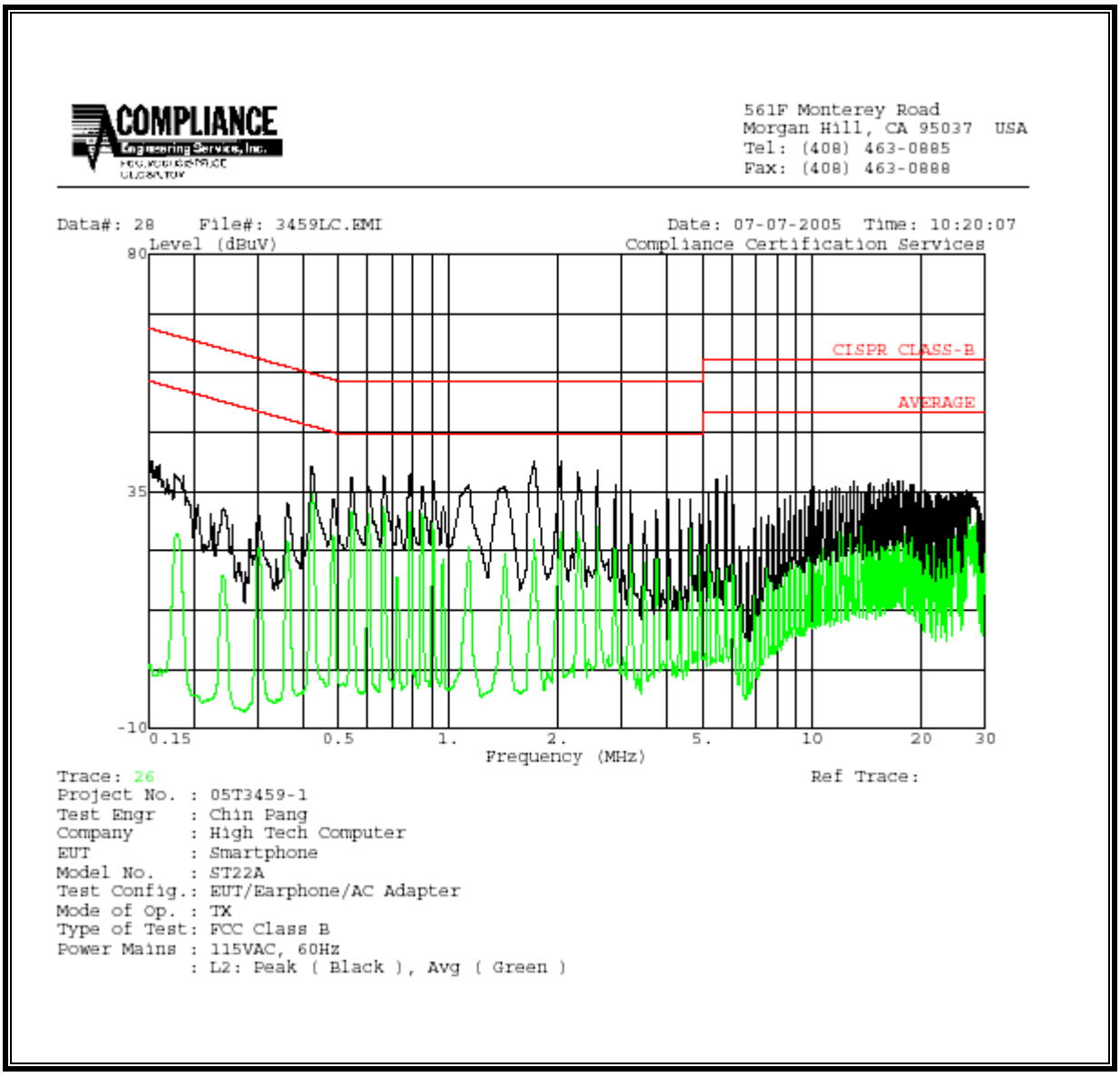
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.42	45.84	--	40.28	0.00	57.37	47.37	-11.53	-7.09	L1
1.99	47.80	--	35.65	0.00	56.00	46.00	-8.20	-10.35	L1
2.27	46.16	--	33.41	0.00	56.00	46.00	-9.84	-12.59	L1
0.42	39.88	--	34.66	0.00	57.43	47.43	-17.55	-12.77	L2
1.73	40.94	--	26.03	0.00	56.00	46.00	-15.06	-19.97	L2
2.57	39.18	--	29.80	0.00	56.00	46.00	-16.82	-16.20	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

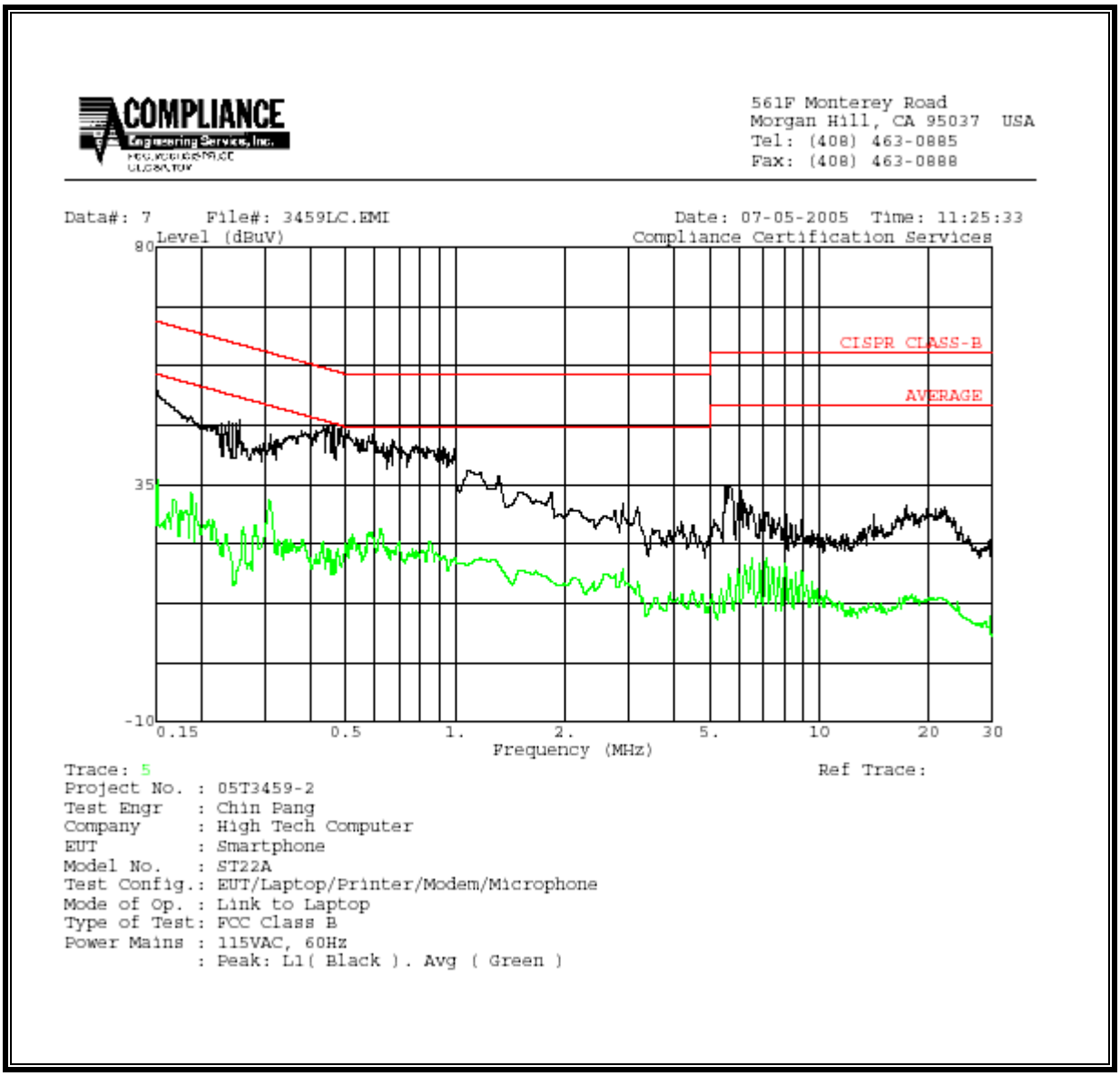


LINKING MODE:

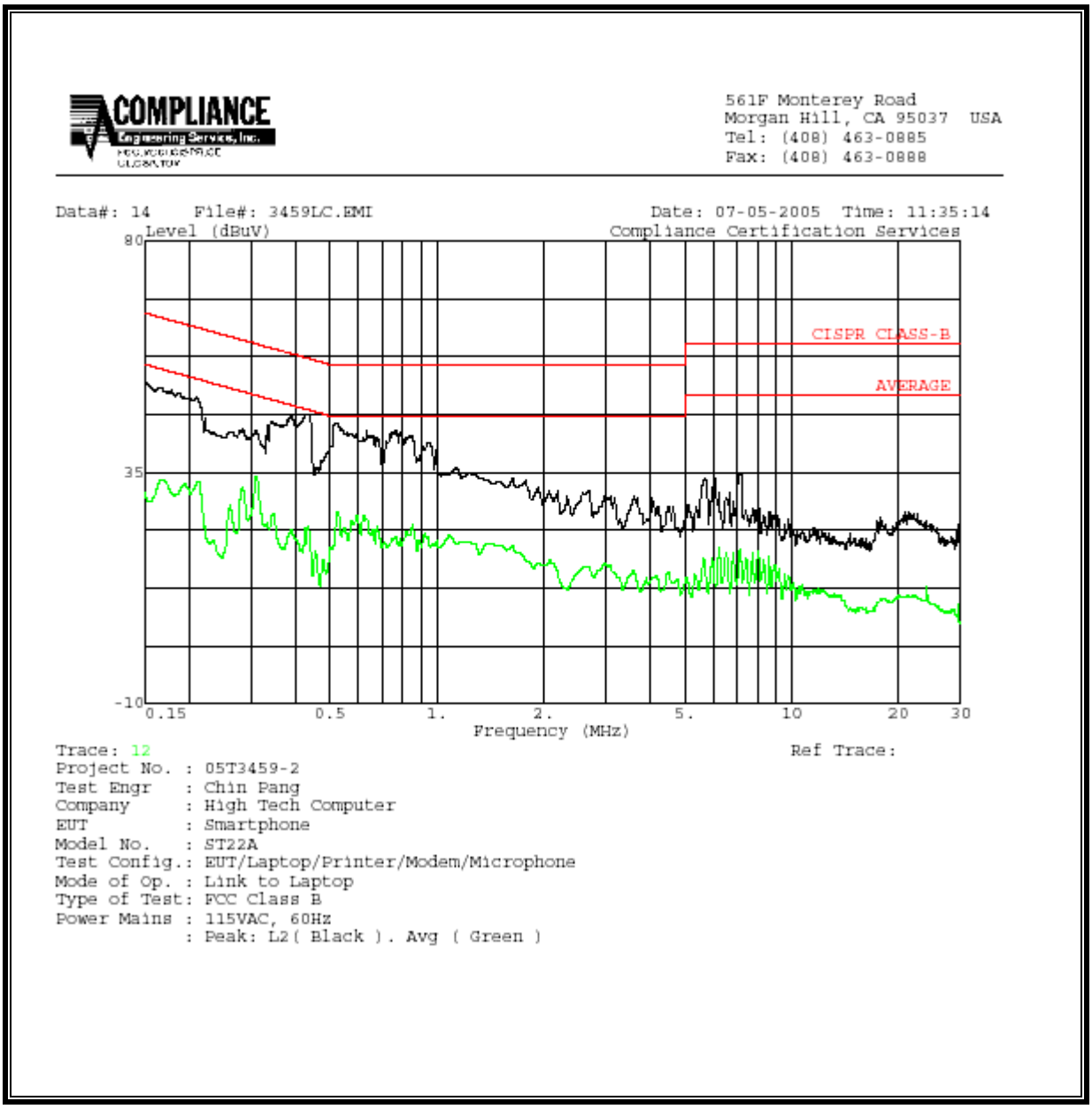
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	52.68	--	36.00	0.00	66.00	56.00	-13.32	-20.00	L1
0.45	46.18	--	32.01	0.00	56.89	46.89	-10.71	-14.88	L1
1.00	42.18	--	24.20	0.00	56.00	46.00	-13.82	-21.80	L1
0.17	51.18	--	33.69	0.00	65.01	55.01	-13.83	-21.32	L2
0.44	46.36	--	34.22	0.00	57.12	47.12	-10.76	-12.90	L2
0.85	42.08	--	24.88	0.00	56.00	46.00	-13.92	-21.12	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS



(Please note that the setup photos on pages 83 through 95 have been extracted under a separate file.)