

Intentional Radiator Test Report

Test Standards:
FCC Part 15 (Subpart C – Intentional Radiators)
Industry Canada RSS-210

Prepared For:
Socket Communications, Inc.
37400 Central Court
Newark, CA 94560

Equipment Under Test:
Compact Flash Bluetooth Card

Model:
CFBC04-1

M/N:
8520-00264

Prepared by:



44366 S. Grimmer Blvd.
Fremont, CA 94538
USA

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1.0 CUSTOMER INFORMATION

Test Laboratory:	EMCE Engineering 44366 S. Grimmer Blvd. Fremont, CA 94538 USA Tel: 510-490-4307 Fax: 510-490-3441 bob@universalcompliance.com
FCC registration number	0007-1981-20
Customer:	Socket Communications, Inc. 37400 Central Court Newark, CA Tel: 510-744-2700 Fax: 510-744-2701
Contact Person:	Bob Miller
Receipt of EUT:	4/24/06
Test plan reference:	FCC Part 2, 15 (15.247) / IC RSS-210
FCC ID:	LUBCFBC04-1
IC #:	2529A-CFBC04-1
Date of testing:	4/24/06 – 5/25/06
Date of Report:	6/5/06

The tests listed in this report have been completed to demonstrate compliance to the CFR 47 Section 15.247, as well as Industry Canada Radio Standard RSS-210, Issue 5.

Contents approved:


Name: Bob Cole Title: President

2.0 EUT AND ACCESSORY INFORMATION

EUT description

The EUT is a Socket Communications, Inc. **M/N: CFBC04-1**.

EUT and accessories

The table below lists all EUTs and accessories used in the tests. Later in this report, only numbers in the last column are used to refer to the devices in each test.

Software

The computers were equipped with test software provided by the customer. The software was used to control the EUT in the tests.

	Name	Type	S/N	Number
EUT	CF Bluetooth Card	CFBC04-1	N/A	E0001
Accessories	Laptop Computer	Compaq Presario M/N: 1694	3882A744	S0001
Software	CSR Bluesuite 1.20	Bluetest, BlueChat	N/A	N/A

EUT Information

Product Specification	Description
Model Name	CFBC04-1
Type of Modulation	Frequency Hopping Spread Spectrum (FHSS)
Number of Hopping Channels	79
Operating Frequency Range	2480 – 2483.5 MHz
Type of Equipment	Combined, Battery Powered
Extreme Operating Temperature Range	-20 C – 55 C
Extreme Operating Voltage Range	Fully Charged Battery
Type of Antenna	Integral
Antenna Gain (dBi)	-3.0
Transmitter Method of Frequency Generation	Synthesized
Transmitter Aggregate Data Rate	>250kbps
Transmitter Duty Type	Intermittant
Transmitter Duty Cycle	Tx ON: .326 ms, Tx OFF: .924 ms: Duty Cycle = .261
Continuous Operation for Testing Purposes?	Yes
Transmit Emissions Designator	1M00 Q1D

3.0 SUMMARY OF TEST RESULTS

Section in CFR 47	Section in RSS-210	Description	Results
15.245 (b)(1)	6.2.2(o) (a2)	Peak output power (Radiated Emissions)	<i>PASSED</i>
15.247 (a)(1)	6.2.2(o) (a3)	CF Separation	<i>PASSED</i>
15.247 (a)(1)(ii)	6.2.2(o) (a3)	Number of Hopping Frequencies	<i>PASSED</i>
15.247 (a)(1)(ii)	6.2.2(o) (a3)	Dwell Time	<i>PASSED</i>
15.247 (a)(1)(ii)	6.2.2(o) (a3)	20 dB Bandwidth	<i>PASSED</i>
15.247, c	6.2.2(o) (e1)	Band-edge compliance of RF Radiated emission	<i>PASSED</i>
15.247, c	6.2.2(o) (e1)	Restricted Band (Radiated Emissions)	<i>PASSED</i>
15.247(d)	6.2.2(o) (e1)	Spurious radiated emissions	<i>PASSED</i>
15.247(d)	6.2.2(o) (e1)	Spurious Antenna Conducted emissions	<i>PASSED</i>

PASS The EUT passed that particular test.
FAIL The EUT failed that particular test.

4.0 STANDARDS AND MEASUREMENT METHODS

The tests were performed in guidance of CFR 47 section 15.247, FCC Public Notice DA 00-705 (March 30, 2000), FCC Report & Order 97-114 (April 10, 1997), and ANSI C63.4 (2003). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method". For the test equipment, see device list in the end of this test.

4.1 Selection of operation mode for tests

Before tests, several operation modes, and modulation patterns were tried. The worst case was selected for each test and those results reported.

5.0 TEST SETUPS

To fulfill all requirements for the testing, total of two different test setups were used. One EUT was used, unmodified for radiated tests.

SMA connector added in place of internal antenna for Antenna Conducted measurements.

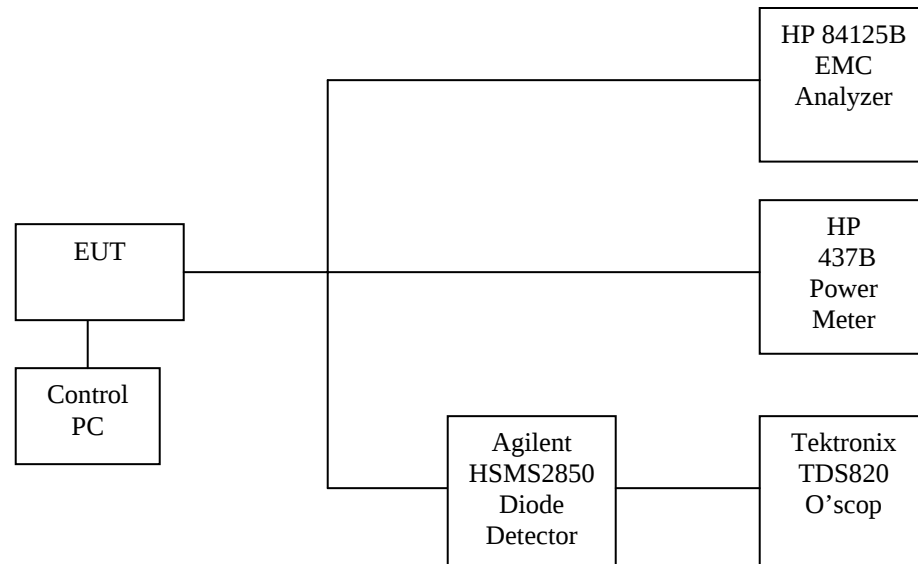
Setup A (Antenna Conducted measurements)

Operational description

ANTENNA CONDUCTED EMISSIONS MEASUREMENTS

The EUT was connected to the Laptop Computer through the serial port (COM1), the antenna bypassed and the SMA Cable connected to the Spectrum Analyzer. This setup was used for the **PEAK POWER OUTPUT, CF SEPARATION, NUMBER OF HOPPING FREQUENCIES, 20 dB BW, BAND-EDGE COMPLIANCE, and RESTRICTED BAND** measurements.

Block Diagram



The solid lines are coaxial cables and the dashed lines are either EUT insertion to the test board or control cables between test setup devices. The measurement results were adjusted with the attenuation of the coaxial cable.

Setup B (Radiated measurements)

Operational description

RADIATED EMISSIONS MEASUREMENTS

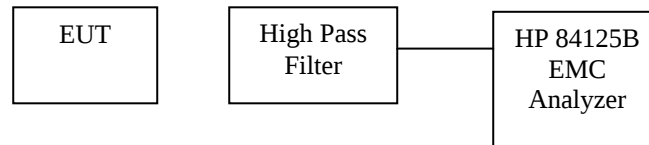
This setup was used in radiated emissions measurements with hopping enabled.

The EUT was tested in 3 orthogonal orientations.

Worst case data is presented.

THIS SETUP USED FOR ***RADIATED SPURIOUS EMISSIONS***

Block diagram



Note: The high –pass filter is used for the Radiated Spurious emissions above 2.4835 GHz. A pass-thru connector is used for Radiated Spurious emissions measurements from 30 MHz – 2.4 GHz.

The solid lines are coaxial cables and the dashed lines are either EUT insertion to the test board or control cables between test setup devices.

6.0 TEST RESULTS

The measurement results were adjusted for the attenuation of the cable between the EUT connector and receiver.

PEAK OUTPUT POWER

Peak Output Power [CFR 47, 15.247(b)(1) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	A (conducted – hopping DISABLED)
Temp, Humidity, Air Pressure	68° F, 30.28
Date of Measurement	5/03/06
Measured by	Bob Cole
Result	PASSED

Limits and results

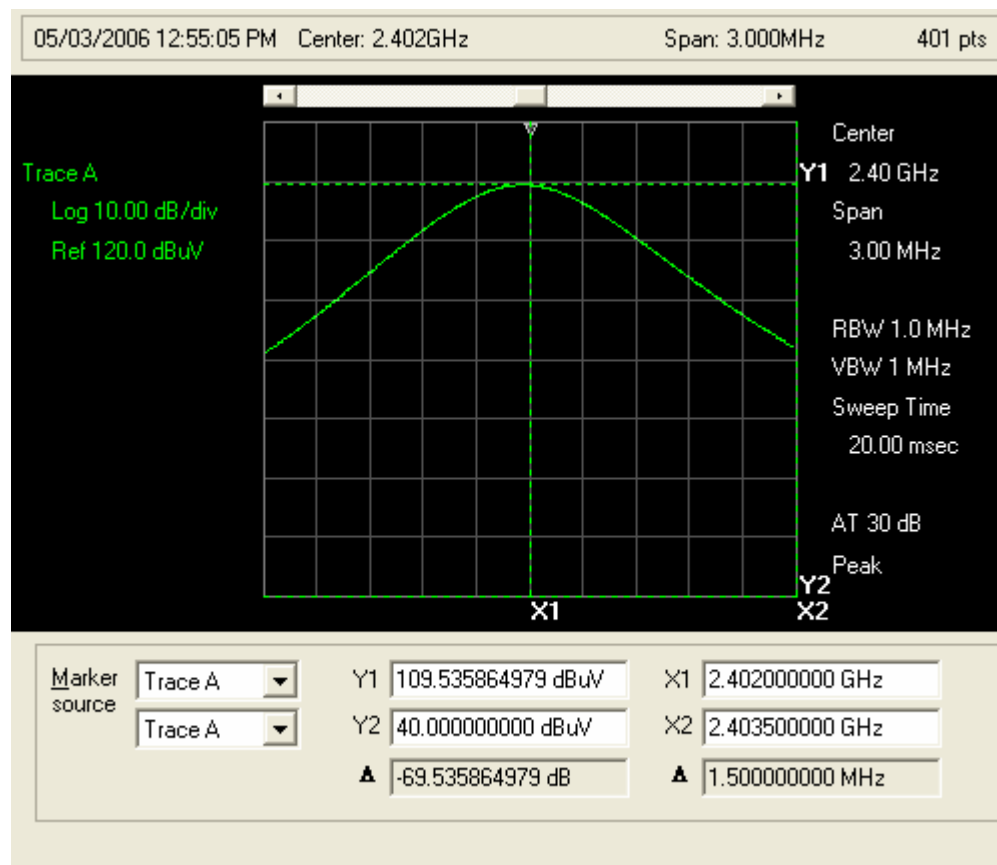
PEAK OUTPUT POWER

EUT Channel	Limit (dBuV)	Test results (dBuV)
2	137.0	109.535
40	137.0	108.161
80	137.0	109.198

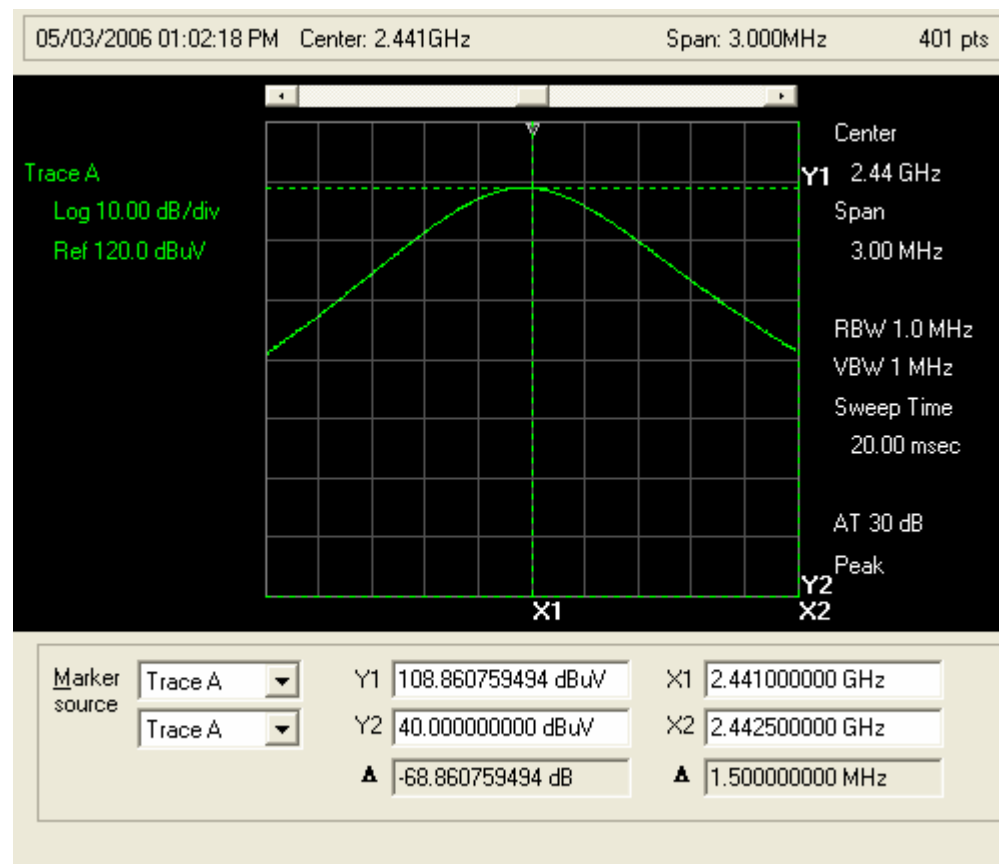
Note: 0 dBm = 107 dBuV

Screen shots

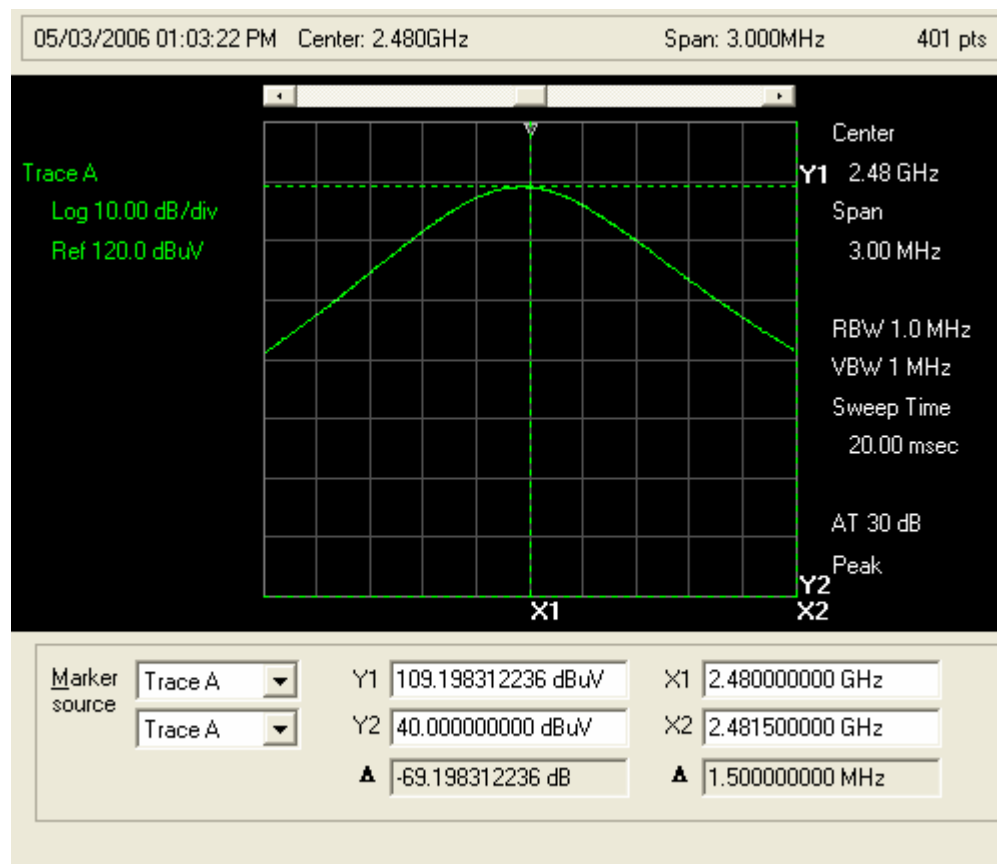
Plot 1: Peak output power 2402 MHz



Plot 2: Peak output power 2441 MHz



Plot 3: Peak output power 2480 MHz



CENTER FREQUENCY SEPARATION

CF Separation [CFR 47, 15.247 (a)(1) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	67° F, 29.96
Date of Measurement	5/24/06
Measured by	Bob Cole
Result	PASSED

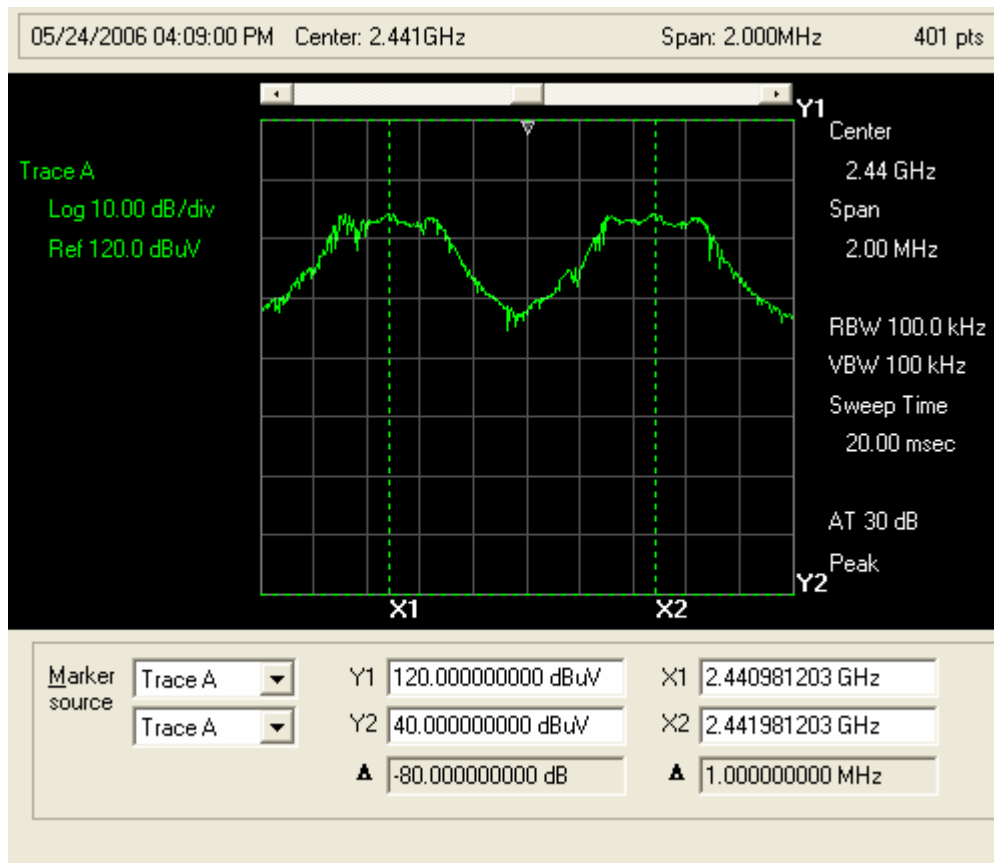
Limits and results

CENTER FREQUENCY SEPARATION

EUT Channel	Limit (MHz)	Test results (MHz)
41-42	≤ 1.0	1.000

Screen Shot:

Plot 4: CF separation



NUMBER OF HOPPING FREQUENCIES

Number of Hopping Frequencies [CFR 47, 15.247 (a)(1)(ii) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	60° F, 29.92
Date of Measurement	5/03/06
Measured by	Bob Cole
Result	PASSED

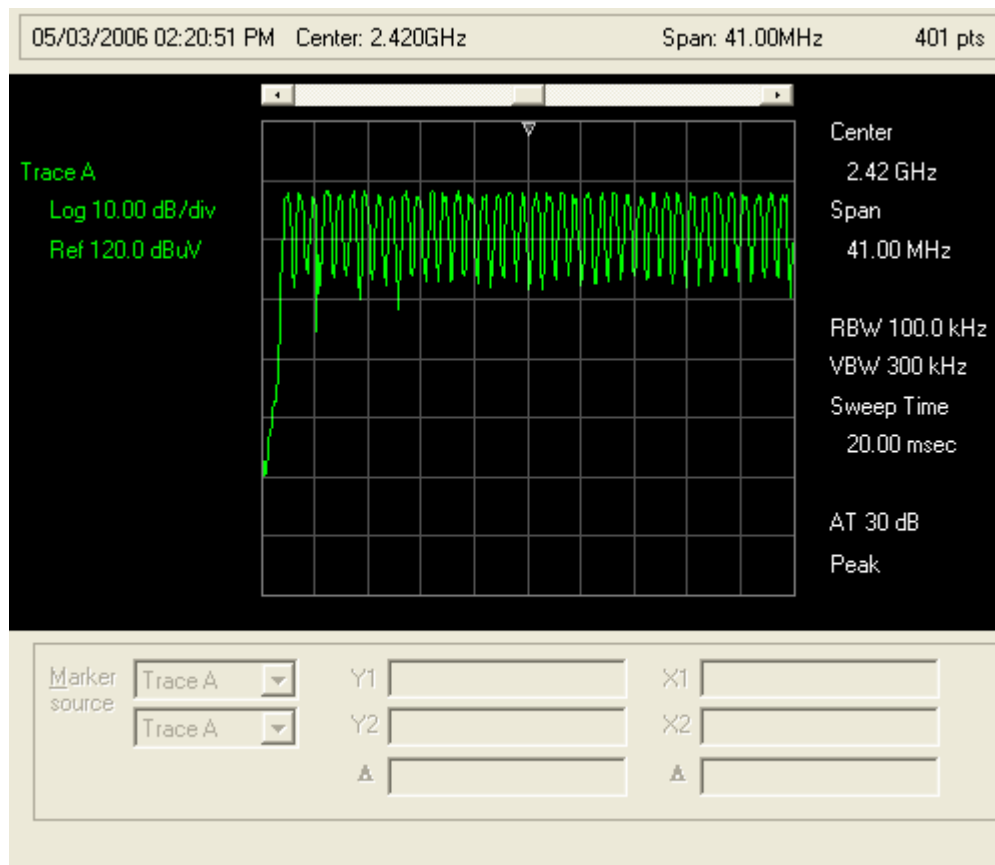
Limits and results

NUMBER OF HOPPING FREQUENCIES

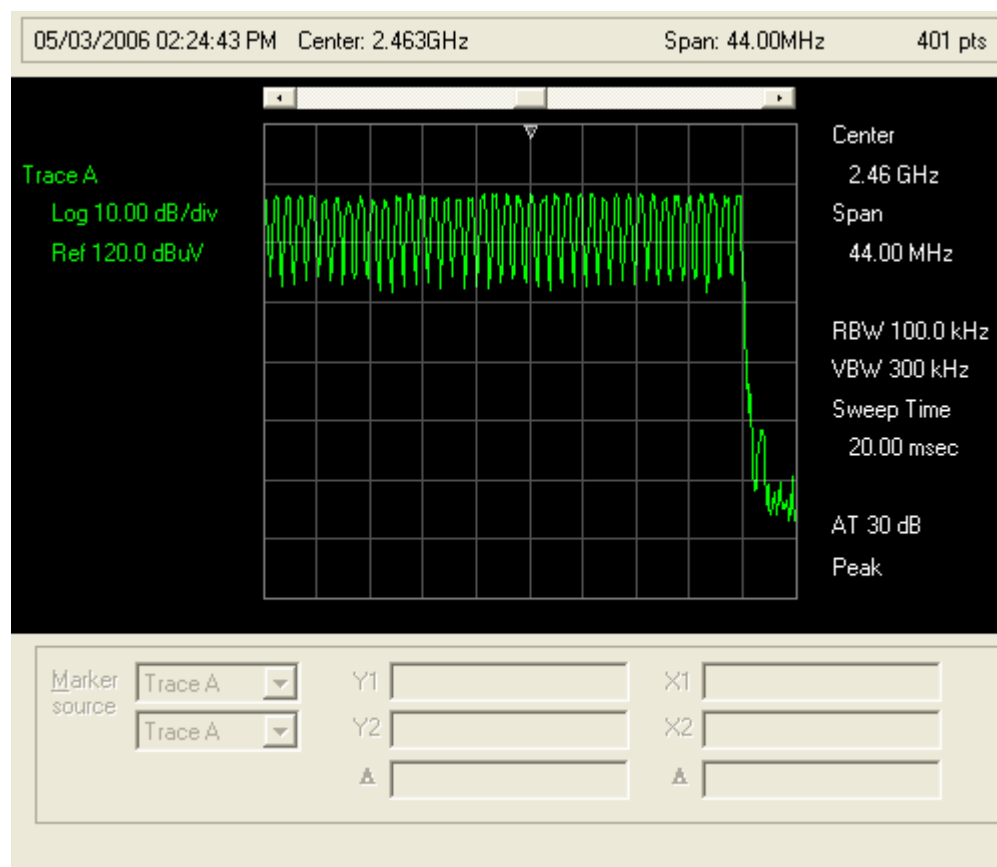
EUT Channel	Limit (MHz)	Test results (MHz)
2-80	<= 75	79

Screen Shot:

Plot 5: Number of Hopping Frequencies



Plot 5A: Number of Hopping Frequencies (2)



DWELL TIME

Dwell Time

EUT	CFBC04-1
Test setup	N/A
Temp, Humidity, Air Pressure	N/A
Date of Measurement	N/A
Measured by	Bob Cole
Result	PASSED – see Bluetooth Specification below

Limits and results

DWELL TIME

EUT Channel	Limit	Test results
2	400 ms per 30 second of operation	PASSED <i>See description that follows</i>

There are five hopping sequences (section 11, Bluetooth Spec. 1.1):

- 1) A **page hopping sequence** with 32 unique wake-up frequencies distributed equally over the 79 MHz, with a period length of 32; The basic slot time can be 312.5 uS or 625 uS. Min. hop repeat rate = $32 \times 3125\text{mS} = 10\text{mS}$.
- 2) A **page response sequence (page scan)** covering 32 unique response frequencies that all are in a one-to-one correspondence to the current page hopping sequence. The master and slave use different rules to obtain the same sequence. The basic slot time can be 312.5 uS or 625 uS and the period is 1.28s.
- 3) An **inquiry sequence** with 32 unique wake-up frequencies distributed equally over the 79 MHz, with a period length of 32; The basic slot time can be 312.5 uS or 625 uS. Min. hop repeat rate = $32 \times 3125\text{mS} = 10\text{mS}$.
- 4) An **inquiry response sequence (inquiry scan)** covering 32 unique response frequencies that all are in a one-to-one correspondence to the current inquiry hopping sequence. The basic slot time can be 312.5 uS or 625 uS and the period is 1.28s.
- 5) A **channel hopping sequence** which has a very long period length, which does not show repetitive patterns over a short time interval, but which distributes the hop frequencies equally over the 79 MHz during a short time interval; The basic slot time is 625 uS.

Worst case dwell times (largest dwell value) would be found with #5, the Channel Hopping (or data) sequence. The other hopping sequences may short shorter time sequences; however they are not repeated as often and hence have a lower overall dwell or duty cycle.

In normal transactions one may see occasional short periods between a chosen frequency due to inquiry and page scans possibly be interleaved during data transactions. It's my understanding that this would not create a dwell cycle result worse than the Channel hopping or data sequence.

Channel Hopping Sequence (Data sequence) Dwell Calculation

Cycle time for complete hopping sequence of a 79 hop cycle (data transmission mode) =

$$(1.1) \text{ Time slot period} * 79 \text{ slots} = 625\mu\text{S} * 79 = 49.375 \text{ mS}$$

See page below from Bluetooth spec. Rev 1.1, section 2, for a depiction of the hopping sequence versus packet size. Figure 2.1 shows a DH1 cycle. Figure 2.2 shows a DH1, DH3 and DH5 sequence (resp.).

Every time slot has a frequency assignment, and the frequency used for a packet remains the same as the slot it started in, if the packet is longer than one time slot.

For a DH1 packet this does not have an impact. The channel selector steps thru the entire list of 79 pseudo-random channels and then start over from the beginning.

For a DH5 (5 Slot packet), the starting frequency will be used for all 5 time slots ($f(k)$ in this example), and 4 following frequencies will not be used during that hopping cycle. Therefore instead of stepping sequential thru the 79 frequency channel list, only every 5th channel is used. Each time the 79 frequency channel list is started, is it a new randomized list of 79 channels. The probability that it will use the same frequency channel in the next list is 1/5.

Therefore even though the DH5 is at one frequency for 5 times longer than a DH1 packet, it repeats itself 1/5 as often, with the effective dwell time (averaged over a long period over a long period of time – for instance the 30 sec FCC dwell test) being the same.

For the “duty cycle correction factor”, my “read” of the FCC doc says that one should take the “worst” 100mS period found, in contrast to the average 30 sec dwell time just mentioned. As a result the DH1 and DH5 numbers for the 100 mS dwell case will be different. For a worst case DH5 packet sequence, the same frequency channel could appear in two successive 79 channel sequences.

DH1 calculation: DH1 uses 1 time slot of 0.625 mS per hopping cycle.

Dwell time per 100mS – since one 79 hop sequence is approx 50mS, there will be approx. two hop sequences in 100 mS (more accurately $100/49.375$).

$$(1.2) \text{ DH1 dwell time} = 0.625 \text{ mS} * (100\text{ms}/49.375\text{mS}) = 1.26 \text{ mS (per 100 mS)}$$

DH5 calculation: DH5 uses 5 time slots of 0.625 mS per hopping cycle.

Dwell time per 100mS – since one 79 hop sequence is approx 50mS and there could be two appearances of a frequency channel in 100 mS (more accurately $100\text{mms}/49.375\text{ms}$).

$$(1.3) \text{ DH5 dwell time} = 5 * 0.625 \text{ mS} * (100\text{ms}/49.375\text{mS}) = 6.3 \text{ mS (per 100 mS)}$$

Using the FCC duty cycle correction factor:

$$(1.4) \text{ DH1 Dwell correction} = 20 \log (\text{DH1 dwell time}/100\text{mS}) = 20 \log (0.0126) = -38 \text{ dB}$$

$$(1.5) \text{ DH5 Dwell correction} = 20 \log (\text{DH5 dwell time}/100\text{mS}) = 20 \log (0.0633) = -24 \text{ dB}$$

Therefore the worst case duty cycle adjustment condition will be for the DH5 packet.

The calculation shows us that we can subtract 24 dB from our 2nd harmonic measurement to compensate for this duty cycle adjustment.

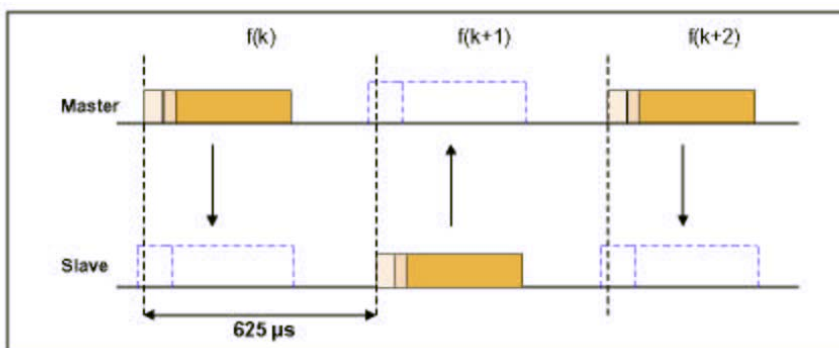


Figure 2.1: TDD and timing

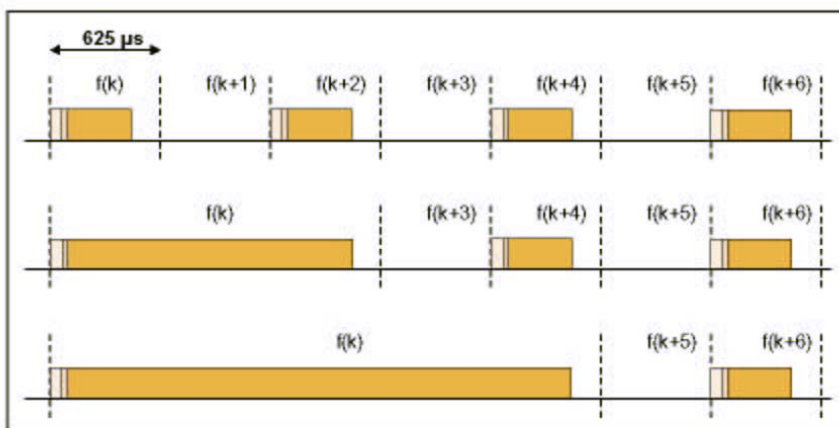


Figure 2.2: Multi-slot packets

20 dB Bandwidth

20 dB Bandwidth [CFR 47 15.247 (a)(1)(ii) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	A (conducted – hopping ENABLED)
Temp, Humidity, Air Pressure	78° F, 30.47
Date of Measurement	5/24/06
Measured by	Bob Cole
Result	PASSED

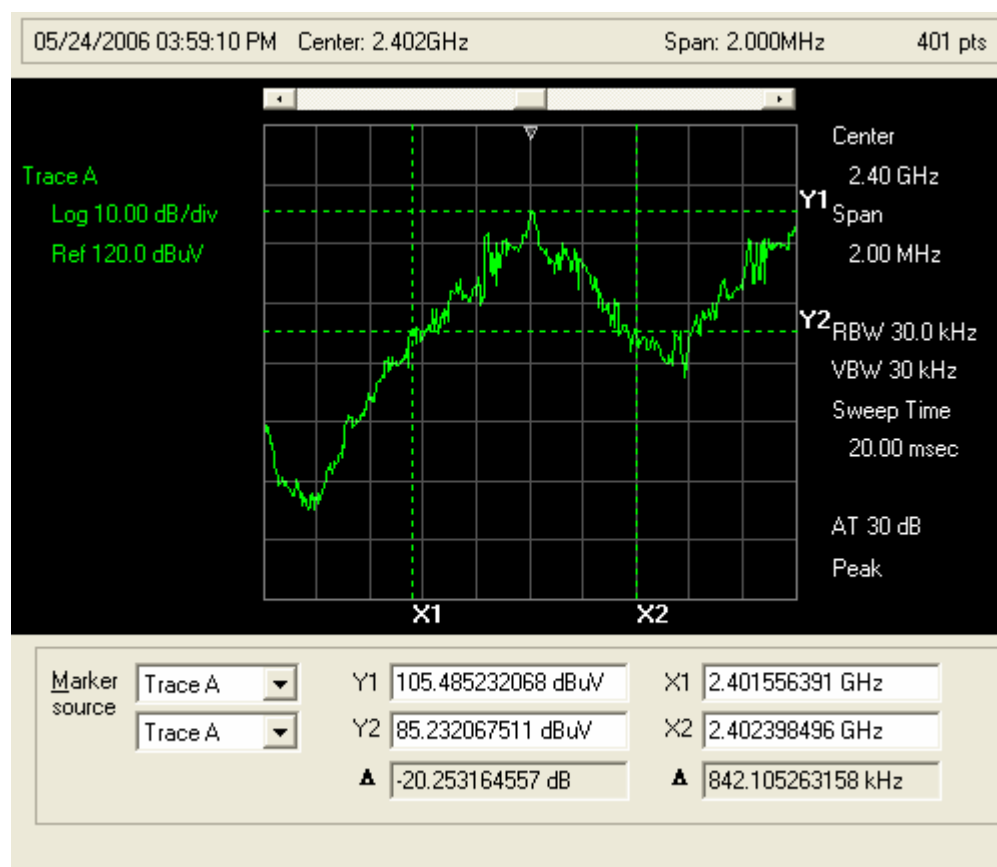
Limits and Results

20 dB BANDWIDTH

EUT Channel	Limit (MHz)	Test results (MHz)
2	≤ 1.0	0.842
40	≤ 1.0	0.842
80	≤ 1.0	0.834

Screen Shots

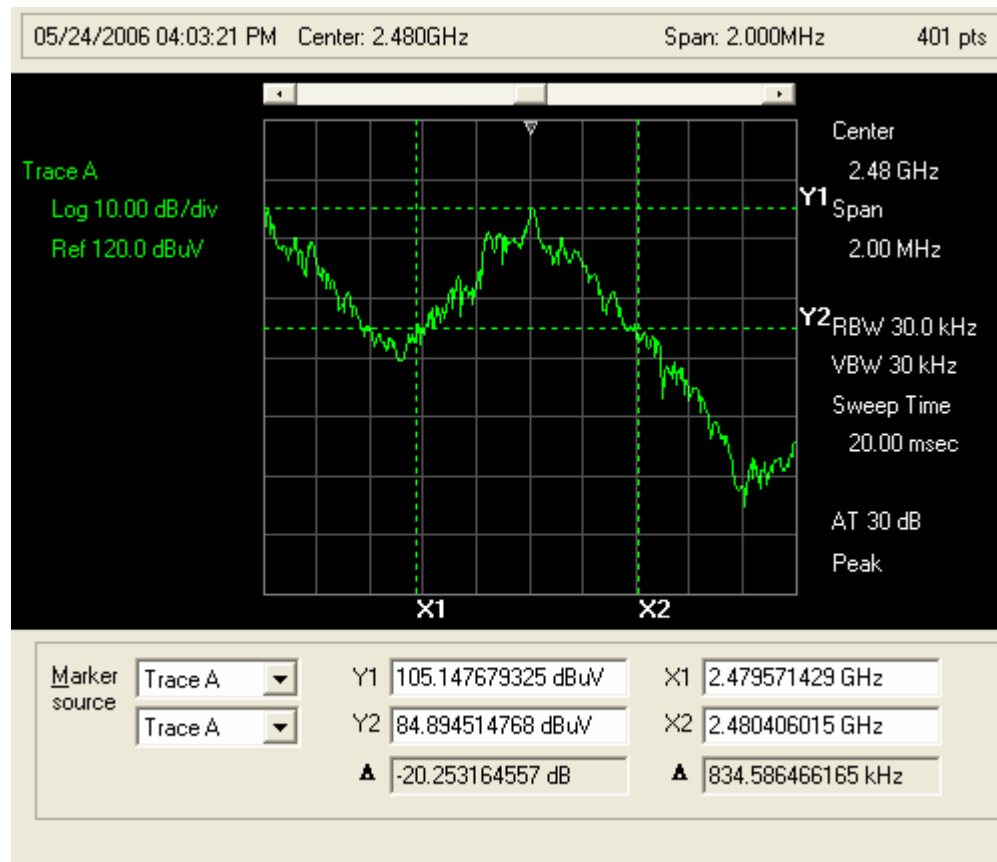
Plot 6: 20 dB BW 2402 MHz



Plot 7: 20 dB BW 2441 MHz



Plot 8: 20 dB BW 2480 MHz



BAND-EDGE COMPLIANCE

Band-edge compliance of RF Radiated emissions [CFR 47, 15.247c(1) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	A (conducted – hopping enabled & disabled)
Temp, Humidity, Air Pressure	69° F, 30.72
Date of Measurement	5/03/06
Measured by	Bob Cole
Result	PASSED

EUT operation mode

EUT operation mode	Hopping Enabled / Disabled
EUT channel	2, 80
EUT TX power level	Maximum

Limits and results

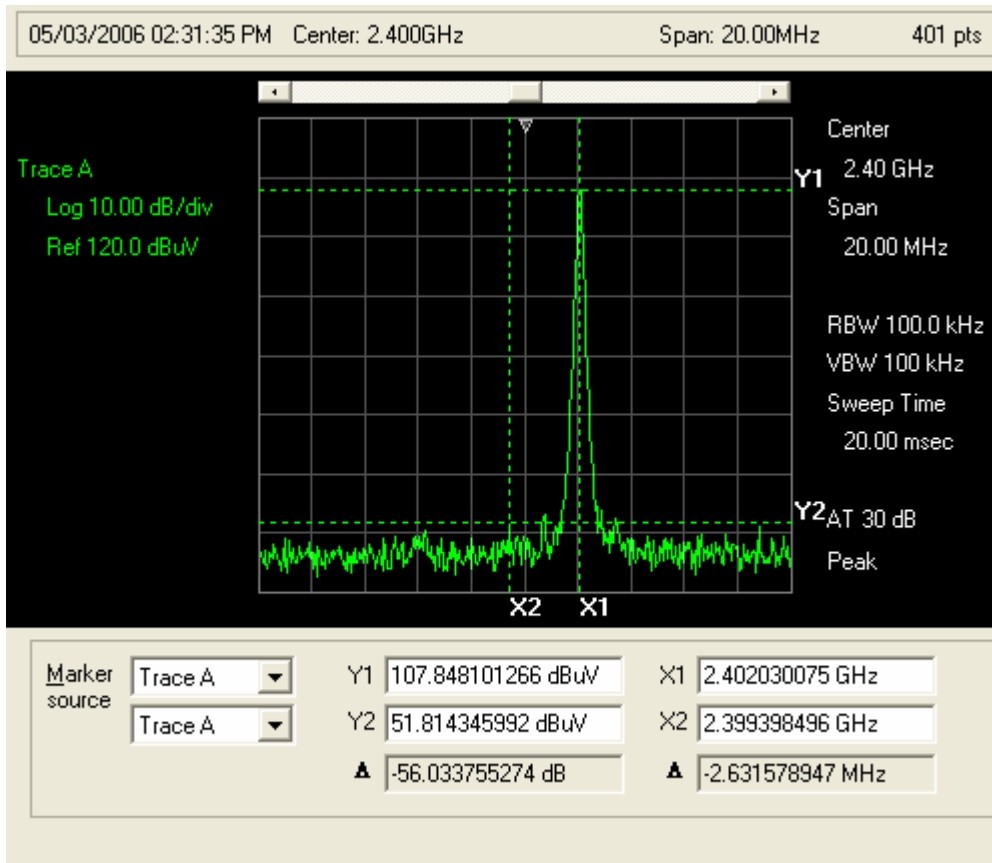
BAND-EDGE COMPLIANCE

Channel	Limit (dBuV)	Results (dBuV)
2	98.0	64.30
80	98.0	58.28

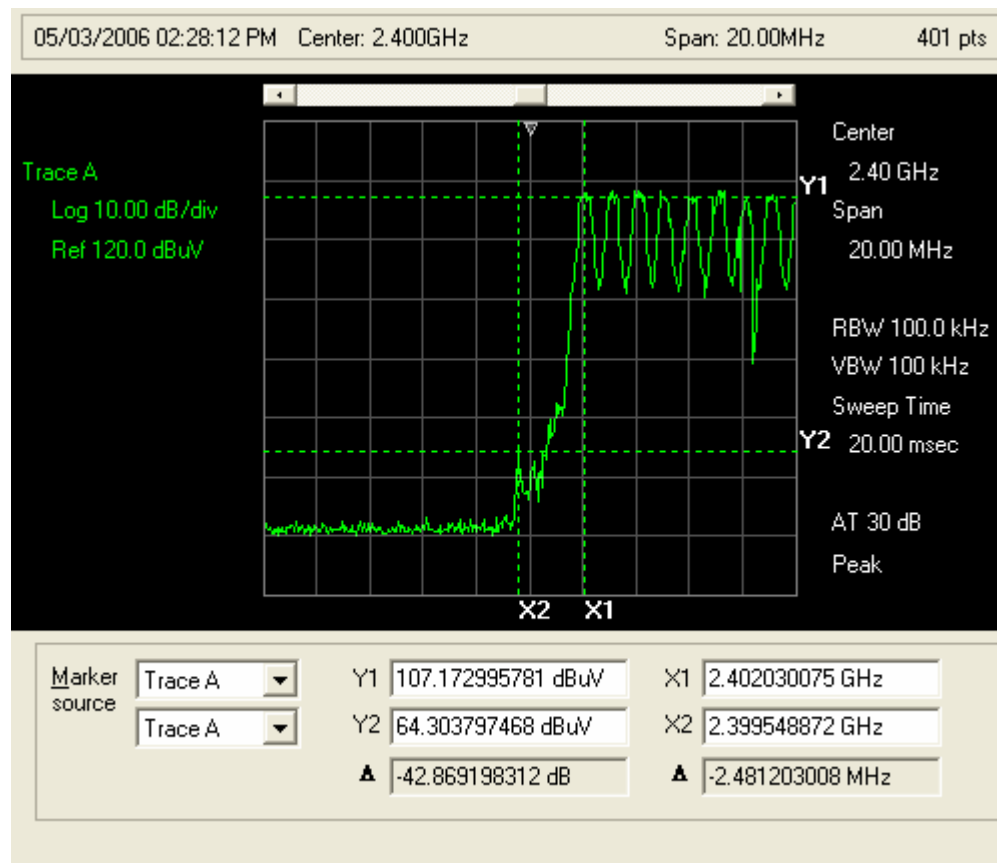
NOTE: 0 dBm = 107 dBuV

Screen shots:

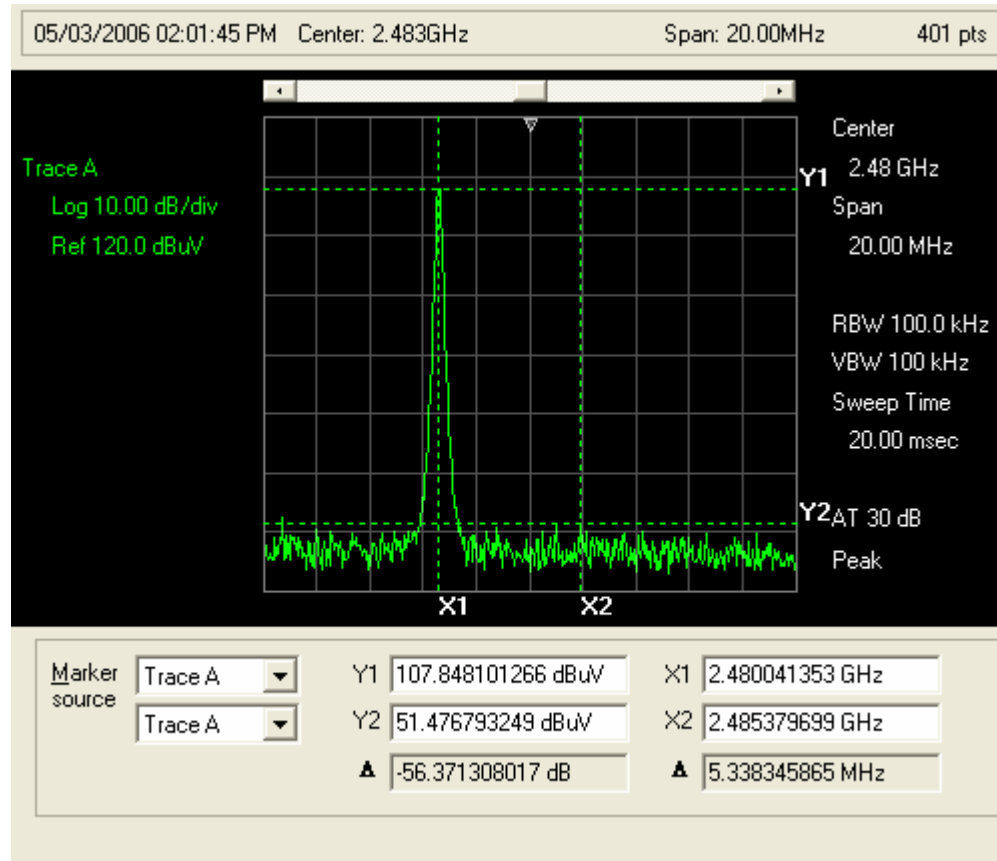
Plot 9: Band-edge Compliance, Lower Band-edge (Hopping Disabled)



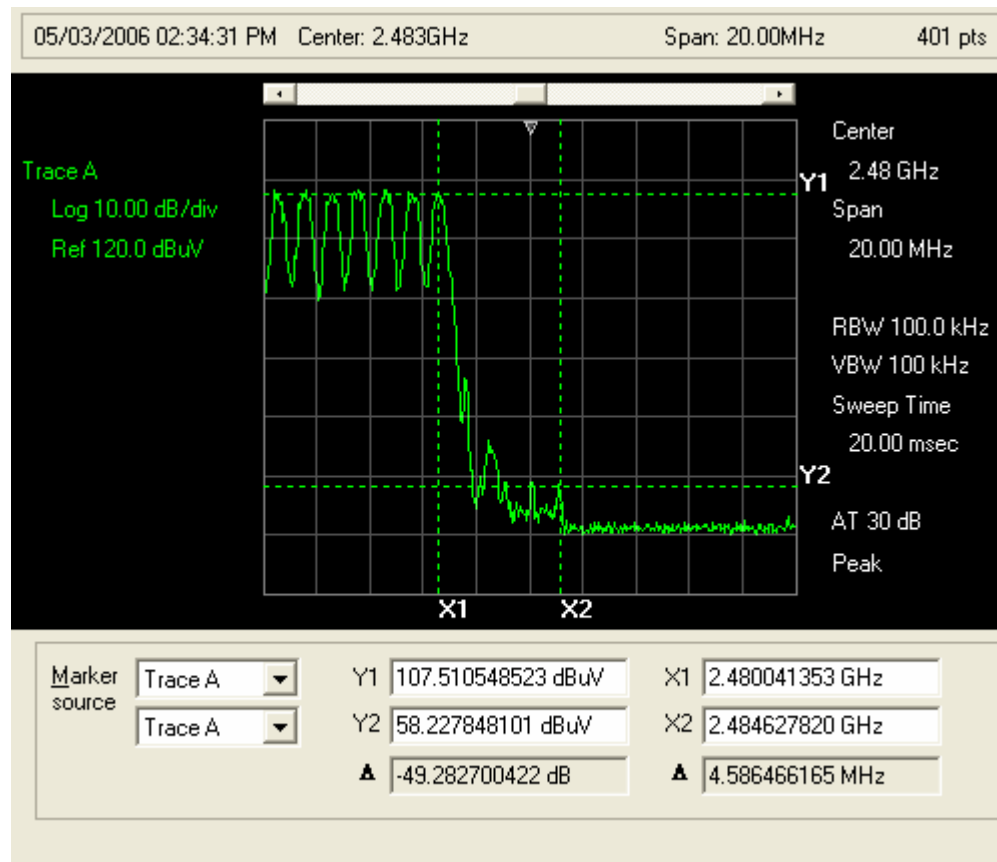
Plot 10: Band-edge Compliance, Lower Band-edge (Hopping Enabled)



Plot 11: Band-edge compliance, Upper Band-edge (Hopping Disabled)



Plot 12: Band-edge Compliance, Upper Band-edge (Hopping Enabled)



RESTRICTED BAND MEASUREMENTS

Restricted Band Measurements [CFR 47, 15.247(c) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	B (Radiated – hopping enabled)
Temp, Humidity, Air Pressure	78° F, 30.02
Date of Measurement	5/03/05
Measured by	Bob Cole
Result	PASSED

Limits and results

RESTRICTED BANDS

Frequency (MHz)	Limit (dBuV)	Results (dBuV)
2310 - 2390	101.0	64.30
2483.5-2500	101.0	58.28

NOTE: 0 dBm = 107 dBuV

Note: All restricted Bands from 30 MHz to 18 GHz were examined.

SPURIOUS RF RADIATED EMISSIONS

Spurious RF Radiated Emissions [CFR 47, 15.247c1) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	B (Radiated – hopping enabled)
Temp, Humidity, Air Pressure	67° F, 30.38
Date of Measurement	4/25/06
Measured by	Bob Cole
Result	PASSED

CFR 47, 15.209 LIMIT (3M MEASURING DISTANCE)

Frequency Band (MHz)	Limit (dBµV/m)	Detector
30-88	40	Q-Peak
88-230	43.5	Q-Peak
230-960	46	Q-Peak
960-1000	54	Q-Peak

Emission measurement data, 30 MHz – 1GHz

The measurement results were obtained as described below.

$$E[uV/m] - URX + ACABLE + AF - GPREAMP$$

Where:

U_{RX}	receiver reading
A_{CABLE}	Attenuation of the cable
AF	Antenna Factor
G_{PREAMP}	Gain of the preamplifier

RADIATED EMISSIONS, 30-1000 MHz (3 meter Measurement Distance)
CFR 47, 15.209 Limits
Horizontal Polarization

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
Specification: **EN 55022B Radiated**
Work Order #: **2505** Date: 4/25/2006
Test Type: **Radiated Scan** Time: 4:09:53 PM
Equipment: **CF BT Card** Sequence#: 1
Manufacturer: **Socket** Tested By: Bob Cole
Model: 8520-00264
S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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Transducer Legend:

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Measurement Data: Reading listed by margin. Test Distance: 3 Meter

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
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No signals detected within 10 dB of the limit.

RADIATED EMISSIONS, 30-1000 MHz (3 meter Measurement Distance)
CFR 47, 15.209 Limits
Vertical Polarization

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
Specification: **EN 55022B Radiated**
Work Order #: **2505** Date: 4/25/2006
Test Type: **Radiated Scan** Time: 4:09:53 PM
Equipment: **CF BT Card** Sequence#: 1
Manufacturer: **Socket** Tested By: Bob Cole
Model: 8520-00264
S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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Transducer Legend:

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Measurement Data: Reading listed by margin. Test Distance: 3 Meter

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
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No signals detected within 10 dB of the limit.

1.0 - 2.4835 GHz Test Data

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer:	Socket		
Specification:	BT FCC Radiated Spurious 1000 - 2400 MHz		
Work Order #:	2505	Date:	4/25/2006
Test Type:	Radiated Scan	Time:	4:09:53 PM
Equipment:	CF BT Card	Sequence#:	1
Manufacturer:	Socket	Tested By:	Bob Cole
Model:	8520-00264		
S/N:			

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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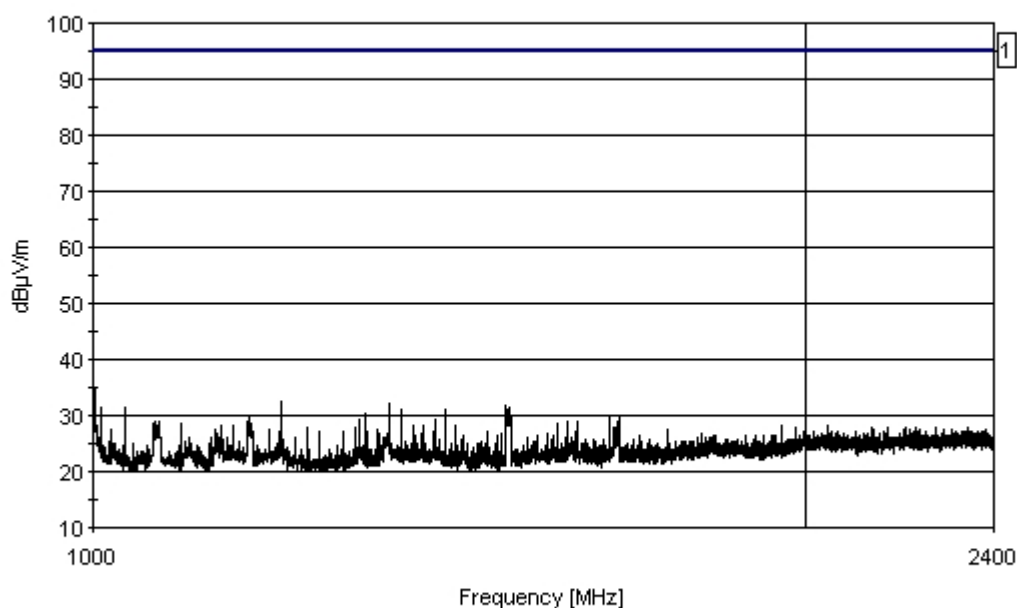
Transducer Legend:

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Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	1002.503M	34.6					+0.0	34.6	95.0	-60.4	Vert
2	1200.200M	32.5					+0.0	32.5	95.0	-62.5	Vert
3	1334.334M	32.2					+0.0	32.2	95.0	-62.8	Vert
4	1493.743M	31.8					+0.0	31.8	95.0	-63.2	Vert
5	1031.031M	31.4					+0.0	31.4	95.0	-63.6	Vert
6	1008.258M	31.3					+0.0	31.3	95.0	-63.7	Vert
7	1349.099M	31.0					+0.0	31.0	95.0	-64.0	Vert
8	1407.907M	31.0					+0.0	31.0	95.0	-64.0	Vert
9	1303.053M	30.2					+0.0	30.2	95.0	-64.8	Vert
10	1500.500M	30.1					+0.0	30.1	95.0	-64.9	Vert

EMCE Engineering Date: 4/25/2006 Time: 4:09:53 PM Socket W/O#: 2505
BT FCC Radiated Spurious 1000 - 2400 MHz Test Distance: 1 Meter Sequence#: 1



— Sweep Data — 1 - BT FCC Radiated Spurious 1000 - 2400 MHz

2.4835 – 25 GHz Test Data

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
 Specification: **FCC 15.247 Radiated Spurious High**
 Work Order #: **2505** Date: 4/25/2006
 Test Type: **Radiated Scan** Time: 4:19:04 PM
 Equipment: **CF BT Card** Sequence#: 2
 Manufacturer: **Socket** Tested By: Bob Cole
 Model: 8520-00264
 S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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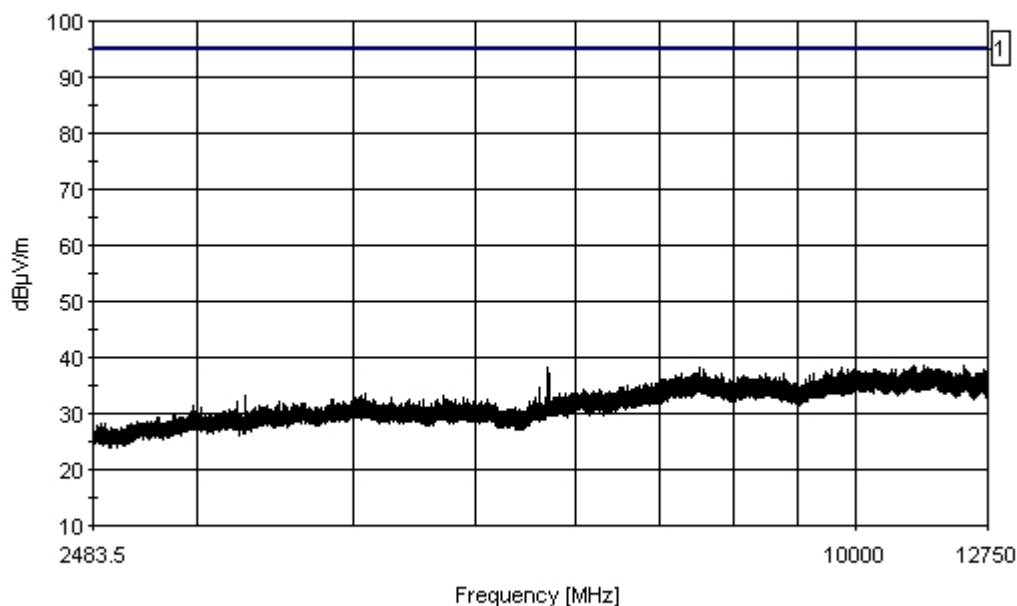
Transducer Legend:

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Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dB μ V	dB	dB	dB	dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	11348.350M	38.5					+0.0	38.5	95.0	-56.5	Vert
2	12211.210M	38.5					+0.0	38.5	95.0	-56.5	Vert
3	11143.140M	38.4					+0.0	38.4	95.0	-56.6	Vert
4	5695.712M	38.3					+0.0	38.3	95.0	-56.7	Vert
5	9767.777M	38.2					+0.0	38.2	95.0	-56.8	Vert
6	11077.080M	38.2					+0.0	38.2	95.0	-56.8	Vert
7	7525.292M	38.1					+0.0	38.1	95.0	-56.9	Vert
8	11174.170M	38.1					+0.0	38.1	95.0	-56.9	Vert
9	11417.170M	38.1					+0.0	38.1	95.0	-56.9	Vert
10	12650.150M	38.0					+0.0	38.0	95.0	-57.0	Vert

EMCE Engineering Date: 4/25/2006 Time: 4:19:04 PM Socket VVO#: 2505
FCC 15.247 Radiated Spurious High Test Distance: 1 Meter Sequence#: 2



— Sweep Data — 1 - FCC 15.247 Radiated Spurious High

RECEIVER SPURIOUS RADIATED EMISSIONS

Spurious RF Radiated Emissions [CFR 47, 15.247c1) and RSS-210 6.2.2(o)]

EUT	CFBC04-1
Test setup	B (Radiated – Receive Mode)
Temp, Humidity, Air Pressure	74° F, 30.38
Date of Measurement	4/26/06
Measured by	Bob Cole
Result	PASSED

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket Communications**
 Specification: **BT RX Radiated 1000-12750**
 Work Order #: **2505** Date: 4/26/2006
 Test Type: **Radiated Scan** Time: 4:13:24 PM
 Equipment: **CF BT Card** Sequence#: 17
 Manufacturer: **Socket** Tested By: Bob Cole
 Model: **8520-00264**
 S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Compaq Presario	1649	3882A744

Test Conditions / Notes:

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Transducer Legend:

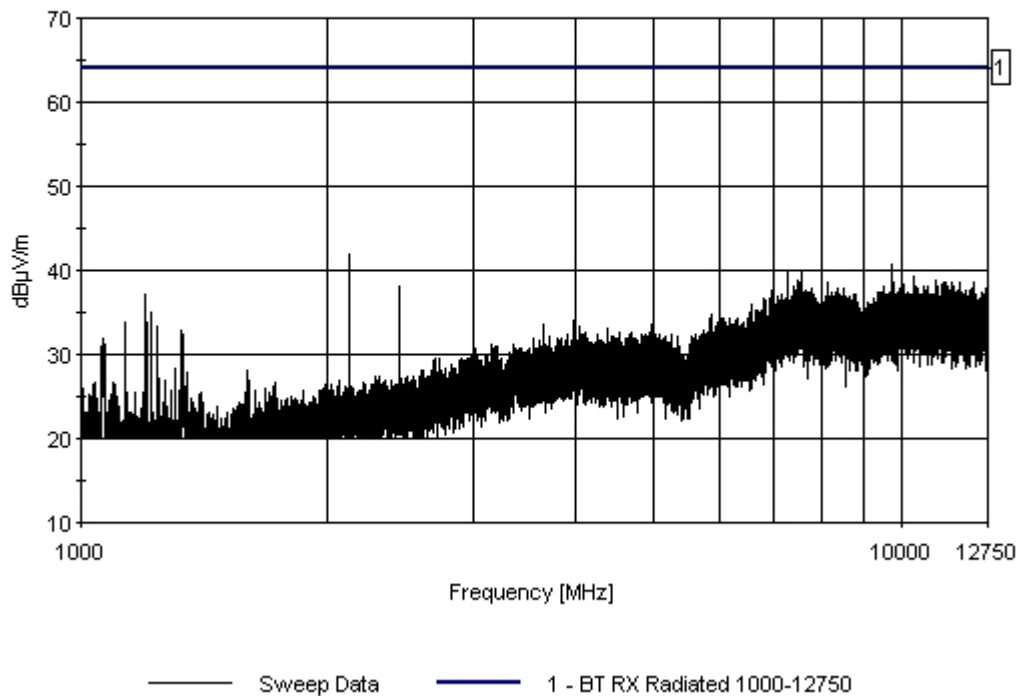
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Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2127.626M	42.0					+0.0	42.0	64.0	-22.0	Vert
2	1000.500M	40.8					+0.0	40.8	64.0	-23.2	Vert
3	9758.248M	40.8					+0.0	40.8	64.0	-23.2	Vert
4	7543.542M	39.8					+0.0	39.8	64.0	-24.2	Vert

5	7257.756M	39.7	+0.0	39.7	64.0	-24.3	Vert
6	10375.870M	39.3	+0.0	39.3	64.0	-24.7	Vert
7	7476.976M	38.9	+0.0	38.9	64.0	-25.1	Vert
8	7555.304M	38.7	+0.0	38.7	64.0	-25.3	Vert
9	11003.980M	38.7	+0.0	38.7	64.0	-25.3	Vert
10	7519.268M	38.6	+0.0	38.6	64.0	-25.4	Vert

EMCE Engineering Date: 4/26/06 Time: 4:13:24 PM Socket Communications WVO#: 2505
BT RX Radiated 1000-12750 Test Distance: 1 Meter Sequence#: 17



TRANSMITTER SPURIOUS CONDUCTED EMISSIONS

Spurious Conducted Emissions 1 GHz - 26 GHz – Worst Case Emission

Spurious Antenna Conducted Emissions 1.0 – 2.4 GHz

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer:

Specification: **FCC 15.247 Cond Spurious 1000 - 2400 MHz**

Work Order #: **2505**

Date: 4/26/2006

Test Type: **Conducted Emissions**

Time: 1:26:10 PM

Equipment: **CF BT Card**

Sequence#: 1

Manufacturer: Socket

Tested By: Bob Cole

Model: 8520-00264

120V 60Hz

S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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Transducer Legend:

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Measurement Data:

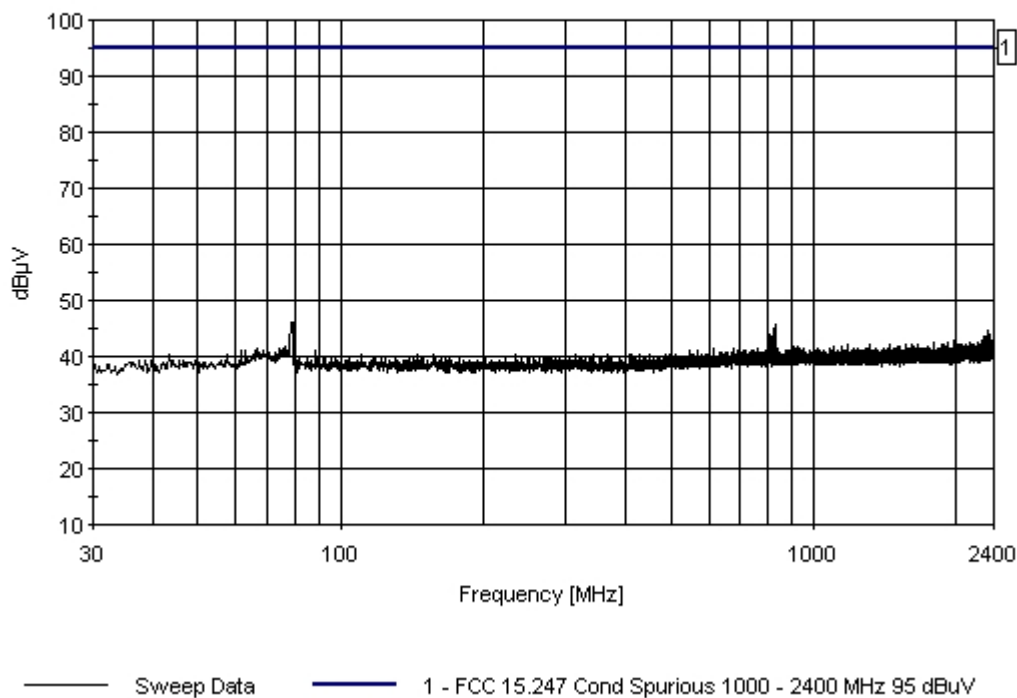
Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dBμV	dB	dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2399.829M	57.7					+0.0	57.7	95.0	-37.3	Black
2	2398.458M	49.4					+0.0	49.4	95.0	-45.6	Black
3	78.890M	46.2					+0.0	46.2	95.0	-48.8	Black
4	828.248M	45.6					+0.0	45.6	95.0	-49.4	Black
5	823.494M	45.0					+0.0	45.0	95.0	-50.0	Black
6	802.473M	44.6					+0.0	44.6	95.0	-50.4	Black
7	2323.492M	44.5					+0.0	44.5	95.0	-50.5	Black
8	807.227M	44.1					+0.0	44.1	95.0	-50.9	Black
9	2347.061M	44.1					+0.0	44.1	95.0	-50.9	Black

10	804.975M	43.9	+0.0	43.9	95.0	-51.1	Black
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EMCE Engineering Date: 4/26/2006 Time: 1:26:10 PM Socket W/O#: 2505
FCC 15.247 Cond Spurious 1000 - 2400 MHz 95 dBuV Test Lead: Black 120V 60Hz Sequence#: 1



Spurious Antenna Conducted Emissions 2.4835-18 GHz

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
 Specification: **FCC 15.247 Cond Spurious High 2483.5 - 12750 MHz**
 Work Order #: **2505** Date: 4/26/2006
 Test Type: **Conducted Emissions** Time: 1:35:14 PM
 Equipment: **CF BT Card** Sequence#: 2
 Manufacturer: **Socket** Tested By: **Bob Cole**
 Model: **8520-00264** 120V 60Hz
 S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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Transducer Legend:

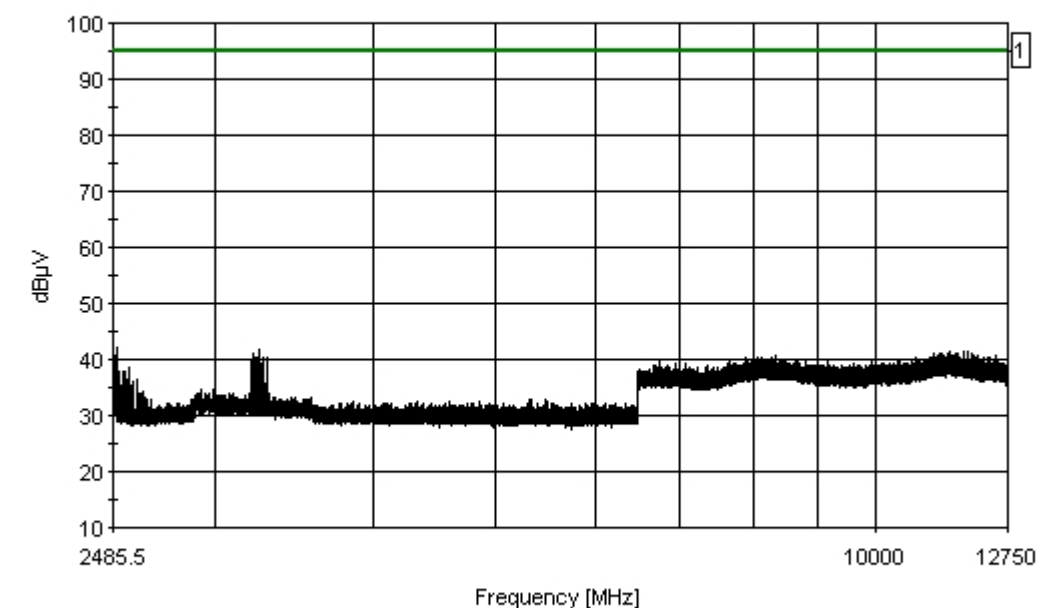
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Measurement Data: Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dBμV	dB	dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2508.273M	42.3					+0.0	42.3	95.0	-52.7	Black
2	3250.765M	41.8					+0.0	41.8	95.0	-53.2	Black
3	11473.720M	41.4					+0.0	41.4	95.0	-53.6	Black
4	11762.010M	41.3					+0.0	41.3	95.0	-53.7	Black
5	11851.100M	41.3					+0.0	41.3	95.0	-53.7	Black
6	11128.880M	41.2					+0.0	41.2	95.0	-53.8	Black
7	11456.450M	41.2					+0.0	41.2	95.0	-53.8	Black
8	3212.727M	41.1					+0.0	41.1	95.0	-53.9	Black
9	11597.100M	41.1					+0.0	41.1	95.0	-53.9	Black
10	11297.300M	41.0					+0.0	41.0	95.0	-54.0	Black

EMCE Engineering Date: 4/26/2006 Time: 1:35:14 PM Socket WVO#: 2505
FCC 15.247 Cond Spurious High 2483.5 - 12750 MHz 95 dBuV Test Lead: Black 120V 60Hz Sequence#: 2



— Sweep Data — 1 - FCC 15.247 Cond Spurious High 2483.5 - 12750 MHz 95 dBuV

RECEIVER CONDUCTED EMISSIONS

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
 Specification: **BT RX Conducted 30M-12.75G**
 Work Order #: **2505**
 Test Type: **Conducted Emissions**
 Equipment: **CF BT Card**
 Manufacturer: **Socket**
 Model: **8520-00264**
 S/N:

Date: 4/26/2006
 Time: 1:51:38 PM
 Sequence#: 3
 Tested By: Bob Cole
 120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

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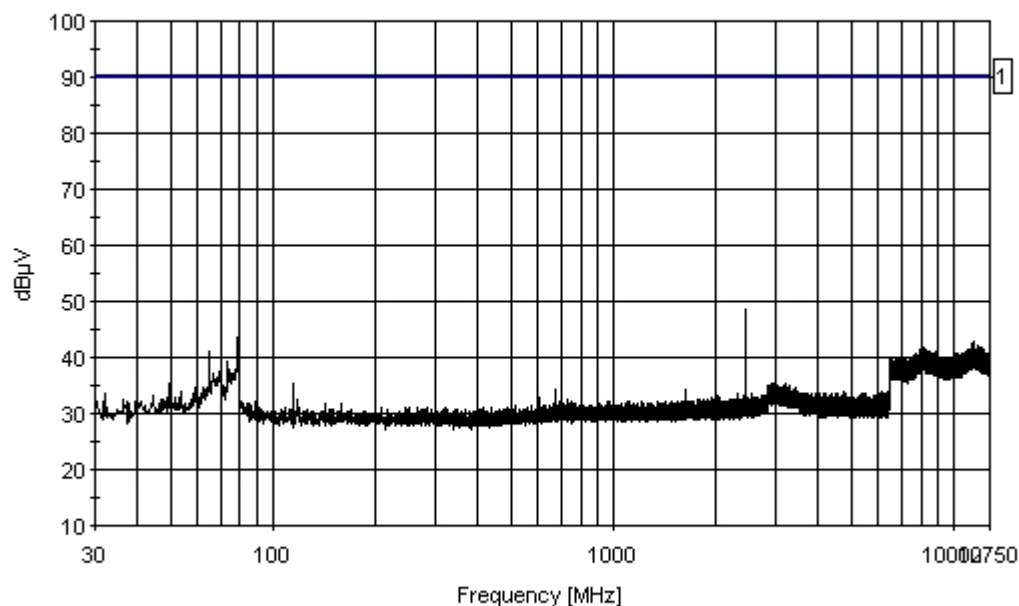
Transducer Legend:

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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2439.407M	48.5					+0.0	48.5	90.0	-41.5	Black
2	79.049M	44.2					+0.0	44.2	90.0	-45.8	Black
3	64.785M	41.0					+0.0	41.0	90.0	-49.0	Black
4	73.794M	39.4					+0.0	39.4	90.0	-50.6	Black
5	69.039M	37.4					+0.0	37.4	90.0	-52.6	Black
6	114.835M	35.3					+0.0	35.3	90.0	-54.7	Black
7	49.269M	35.2					+0.0	35.2	90.0	-54.8	Black
8	59.029M	34.6					+0.0	34.6	90.0	-55.4	Black
9	675.395M	34.3					+0.0	34.3	90.0	-55.7	Black
10	32.002M	33.4					+0.0	33.4	90.0	-56.6	Black

EMCE Engineering Date: 4/26/2006 Time: 1:51:38 PM Socket WO#: 2505
BT RX Conducted 30M-12.75G Test Lead: Antenna Terminal 120V 60Hz Sequence#: 3



— Sweep Data — 1 - BT RX Conducted 30M-12.75G

AC LINE CONDUCTED EMISSIONS MEASUREMENT

AC Line Conducted Emissions Measurement 150 kHz – 30 MHz

EUT	CFBC04-1 – US Version AC Adaptor
Test setup	C (conducted – hopping enabled)
Temp, Humidity, Air Pressure	68° F, 30.69
Date of Measurement	4/26/06
Measured by	Bob Cole
Result	PASSED

CLASS B LIMIT

Frequency Band (MHz)	EN 55022 B Limit (dBμV/m)	Detector
0.15 – 0.5	66 to 56	QP
0.5 – 5.0	56	QP
5.0 – 30.0	60	QP

EUT operation mode

EUT operation mode	Hopping Enabled
EUT channel	Hopping
EUT TX power level	Maximum
EUT operation voltage	120 VAC

LINE CONDUCTED EMISSIONS, .15 - 30 MHz
EN 55022 Class B Limits

LINE 1 - HOT

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer:	Socket	Date:	4/26/2006
Specification:	EN55022 B COND [QP]	Time:	3:18:08 PM
Work Order #:	2505	Sequence#:	6
Test Type:	Conducted Emissions	Tested By:	Bob Cole
Equipment:	CF BT Card		120V 60Hz
Manufacturer:	Socket		
Model:	8520-00264		
S/N:			

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

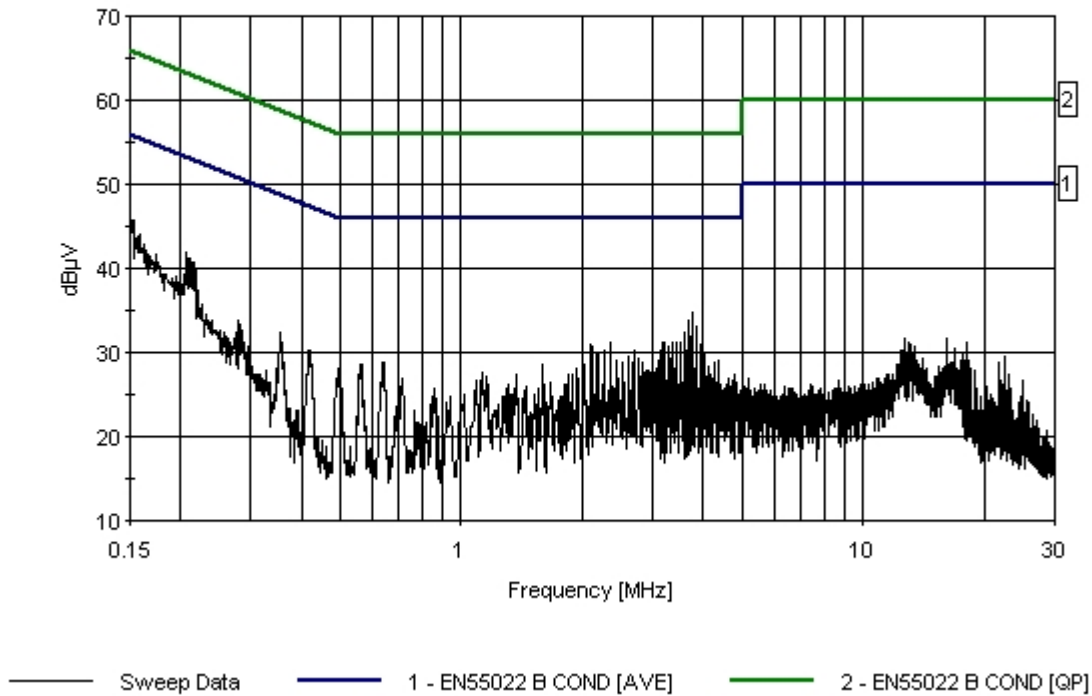
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Transducer Legend:

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Measurement Data:		Reading listed by margin.					Test Lead: Black				
#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	150.000k	46.4					+0.0	46.4	66.0	-19.6	Black
2	3.769M	34.7					+0.0	34.7	56.0	-21.3	Black
3	206.722k	41.9					+0.0	41.9	63.3	-21.4	Black
4	209.630k	41.2					+0.0	41.2	63.2	-22.0	Black
5	211.085k	41.2					+0.0	41.2	63.2	-22.0	Black
6	3.688M	33.9					+0.0	33.9	56.0	-22.1	Black
7	3.854M	33.0					+0.0	33.0	56.0	-23.0	Black
8	3.603M	32.5					+0.0	32.5	56.0	-23.5	Black
9	3.186M	31.3					+0.0	31.3	56.0	-24.7	Black
10	3.437M	31.2					+0.0	31.2	56.0	-24.8	Black

EMCE Engineering Date: 4/26/2006 Time: 3:18:08 PM Socket W/O#: 2505
EN55022 B COND [QP] Test Lead: Black 120V 60Hz Sequence#: 6



LINE CONDUCTED EMISSIONS, .15 - 30 MHz
EN 55022 Class B Limits

LINE 2 – Neutral

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **Socket**
Specification: **EN55022 B COND [QP]**
Work Order #: **2505**
Test Type: **Conducted Emissions**
Equipment: **CF BT Card**
Manufacturer: **Socket**
Model: **8520-00264**
S/N:

Date: 4/26/2006
Time: 3:31:59 PM
Sequence#: 9
Tested By: Bob Cole
120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
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Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
CF BT Card*	Socket	8520-00264	

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

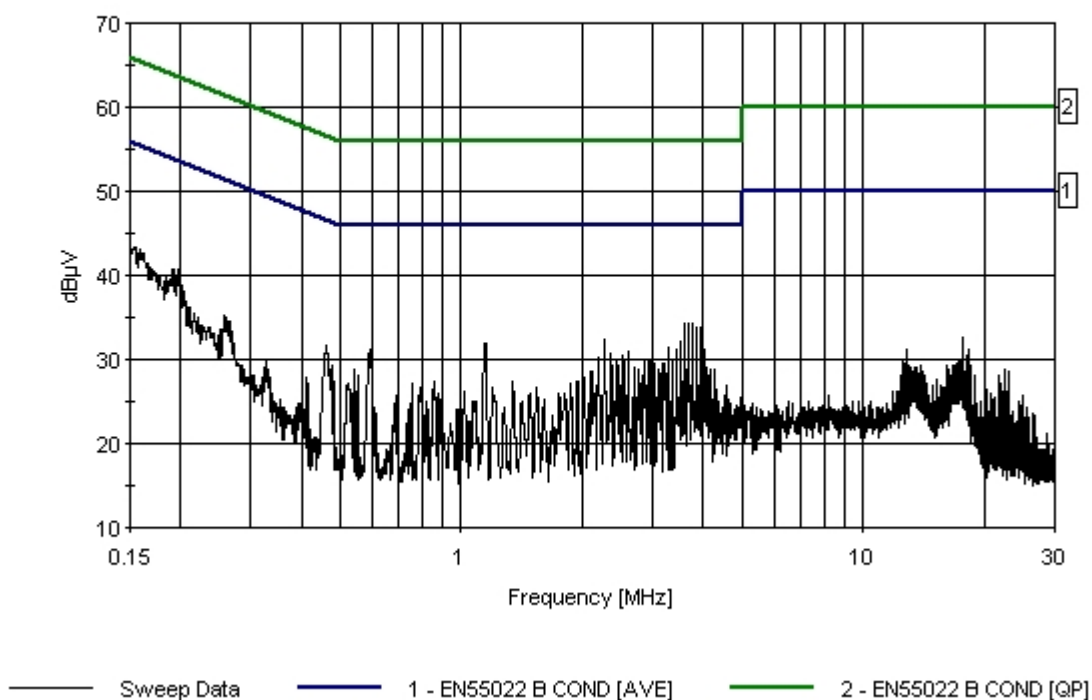
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Transducer Legend:

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Measurement Data:			Reading listed by margin.				Test Lead: Black				
#	Freq MHz	Rdng dB μ V					Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	3.684M	34.3					+0.0	34.3	56.0	-21.7	Black
2	3.765M	34.3					+0.0	34.3	56.0	-21.7	Black
3	3.603M	34.2					+0.0	34.2	56.0	-21.8	Black
4	150.000k	43.8					+0.0	43.8	66.0	-22.2	Black
5	3.850M	33.8					+0.0	33.8	56.0	-22.2	Black
6	3.935M	33.7					+0.0	33.7	56.0	-22.3	Black
7	2.276M	32.5					+0.0	32.5	56.0	-23.5	Black
8	3.518M	32.1					+0.0	32.1	56.0	-23.9	Black
9	1.145M	31.9					+0.0	31.9	56.0	-24.1	Black
10	3.271M	31.5					+0.0	31.5	56.0	-24.5	Black

EMCE Engineering Date: 4/26/2006 Time: 3:31:59 PM Socket W/O#: 2505
EN55022 B COND [QP] Test Lead: Black 120V 60Hz Sequence#: 9



7.0 TEST EQUIPMENT

Antenna Conducted Measurements:

Equipment	Type	Manufacturer	Calibration Due Date
Spectrum Analyzer	8593EM	Hewlett-Packard	2/1/07
Oscilloscope	TDS820	Tektronix	2/1/07
Coaxial cable	SMA Male – Reverse SMA Male (Length = 20 cm)	Own	10/1/06

Spurious RF radiated emissions:

Equipment	Type	Manufacturer	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	2/1/07
Spectrum Analyzer	8593EM	Hewlett-Packard	2/1/07
Pre-Amp	83051A	Hewlett-Packard	2/1/07
Pre-Amp	83017A	Hewlett-Packard	2/1/07
High Pass Filter	9701	CMT	2/1/07
Horn Antenna	3115	EMCO	2/1/07
Cable		Hewlett Packard	2/1/07

Note: The HP 84125B EMC Analyzer System is calibrated as a system, including the analyzer, pre-amps, filters, and cable.

EN 55022 (AC powerline conducted emissions)

Equipment	Type	Manufacturer	Calibration Due Date
Spectrum analyzer	8568B	Hewlett-Packard	2/1/07
LISN	3810/2	EMCO	10/1/06
Coaxial cable	N Type – BNC (5 Meters)	Own	10/1/06