Intentional Radiator Test Report

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

Prepared For:

Socket Mobile, Inc.
39700 Eureka Drive
Newark, CA 94560

Equipment Under Test:
Cordless Hand Scanner

Model:
CORDLESS HAND SCANNER SERIES 7

M/N:
8550-000XX

Prepared by:

44366 S. Grimmer Blvd.
Fremont, CA 94538
USA

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1.0 CUSTOMER INFORMATION

Test Laboratory: **FCC registration number**	EMCE Engineering 44366 S. Grimmer Blvd. Fremont, CA 94538 USA Tel: 510-490-4307 Fax: 510-490-3441 bob@universalcompliance.com 0007-1981-20
Customer:	Socket Communications, Inc. 37400 Central Court Newark, CA Tel: 510-744-2700 Fax:510-744-2701
Contact Person:	Thomas Moyland
Receipt of EUT:	12/01/07
Test plan reference:	FCC Part 2, 15 (15.247) / IC RSS-210
FCC ID:	LUBCHS2
IC #:	2529A-CHS2
Date of testing:	12/1/07 – 1/7/08
Date of Report:	1/7/08

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 7.

Contents approved:


Name: Bob Cole Title: President

2.0 EUT AND ACCESSORY INFORMATION

EUT description

The EUT is a Socket Communications, Inc. **Cordless Hand Scanner, M/N: CORDLESS HAND SCANNER SERIES 7.**

Model Numbers Represented

8550-00005, 8550-00006, 8550-00007, 8550-000014, 8550-00015, and 8550-00016

There is no difference in the electronics or Bluetooth module. Model differences denote software and enclosure differences.

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	**CHS**	**CORDLESS HAND SCANN SERIES 7**	N/A	E0001
Accessories	Laptop Computer	Compaq Presario M/N: 1694	3882A744	S0001
Software	CRS	BlueTest	N/A	N/A

EUT Information

Product Specification	Description
Model Name	CORDLESS HAND SCANNER SERIES 7
Type of Modulation	FHSS
Number of Channels	79
Operating Frequency Range	2480 – 2483.5 MHz
Type of Equipment	Portable
Extreme Operating Temperature Range	-20 C – 55 C
Extreme Operating Voltage Range	108 – 132 VAC
Type of Antenna	Integral
Antenna Gain (dBi)	-0.0

Transmitter Method of Frequency Generation	Synthesized
Transmitter Aggregate Data Rate	>250kbps
Transmitter Duty Type	Intermittant
Continuous Operation for Testing Purposes?	Yes
Transmit Emissions Designator	1M0G1D

3.0 SUMMARY OF TEST RESULTS

RSS 210 Section	CFR Section		**Results**
A8.4(2)	15.245 (b)(1)	Peak output power (Radiated Emissions)	PASSED
N/A	N/A	Power Density	N/A
A8.1(a)	15.247 (a)(2)	20 dB Bandwidth	PASSED
A8.1(b)	15.247(a)(1)	Center Frequency	PASSED
A8.5	15.247, c	Band-edge compliance of RF emissions	PASSED
2.2, 2.7	15.247, (4)(c)	Restricted Band	PASSED
A8.5	15.247,c	Spurious radiated emissions	PASSED

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), Industry Canada RSS-210 Issue 7, 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.

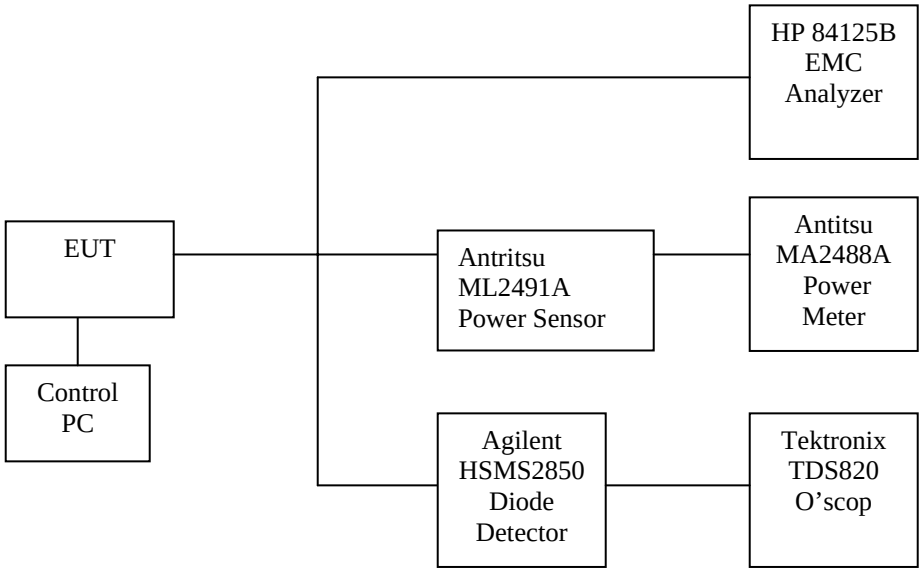
Setup A (Antenna Conducted measurements)

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, POWER DENSITY, 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

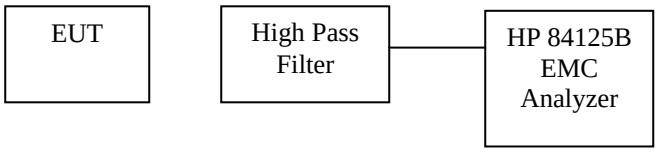
This setup was used in radiated emissions measurements.

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.

Measurements made using Anritsu MA2488A Peak Power Meter with ML2491A Power Sensor, set for "Bluetooth" / 100% Duty Cycle.

PEAK OUTPUT POWER

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

EUT	**CORDLESS HAND SCANNER SERIES 7**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	64º F, 30/97
Date of Measurement	1/16/08
Measured by	Bob Cole
Result	PASSED

Limits and results

PEAK OUTPUT POWER

EUT Channel Info	Limit (dBm)	Test results (dBm)
2402	30.0	11.14
2441	30.0	11.42
2480	30.0	11.97

20 dB Bandwidth

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

EUT	**CORDLESS HAND SCANNER SERIES 7**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	58º F, 30.98
Date of Measurement	12/22/07
Measured by	Bob Cole
Result	PASSED

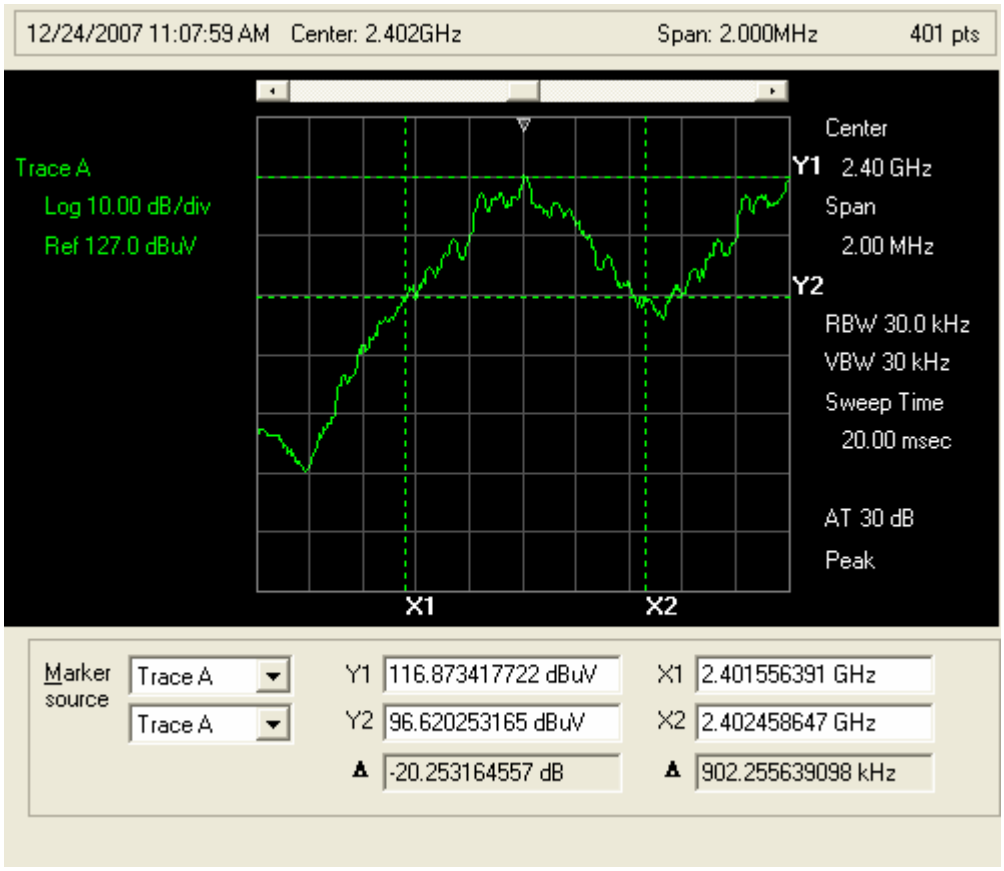
Limits and Results

20 dB BANDWIDTH

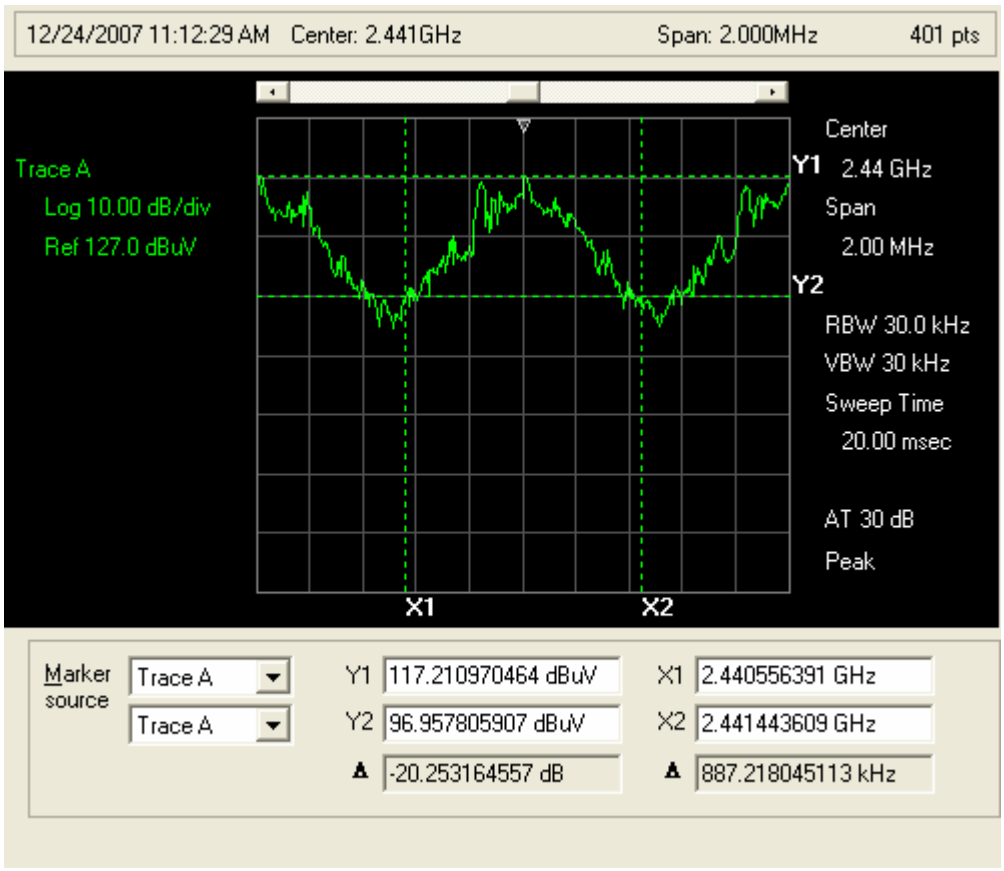
EUT Channel	Limit (MHz)	Test results (MHz)
2402	1.00	0.902
2441	1.00	0.887
2480	1.00	0.872

Screen Shots

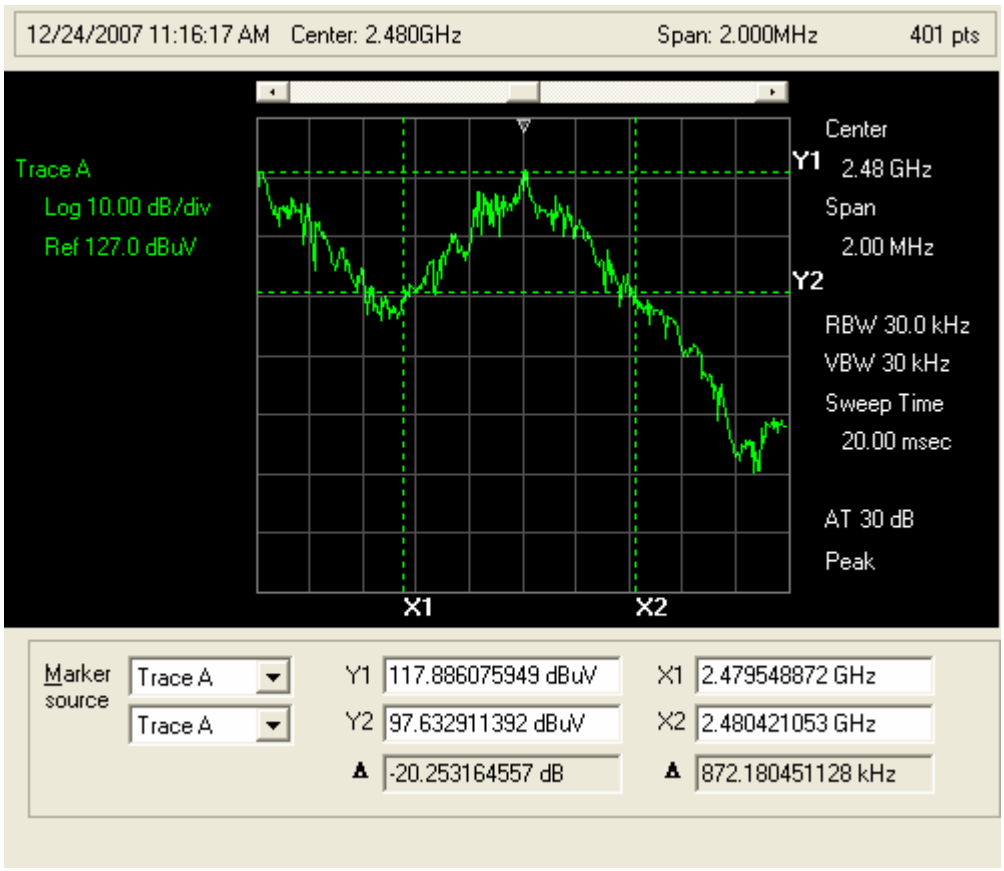
Plot 4: 20 dB BW 2402 MHz



Plot 5: 20B BW 2441Hz



Plot 6: 20B BW 2480 MHz



CENTER FREQUENCY SEPARATION

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

EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	77º F, 30.96
Date of Measurement	7/23/07
Measured by	Bob Cole
Result	PASSED

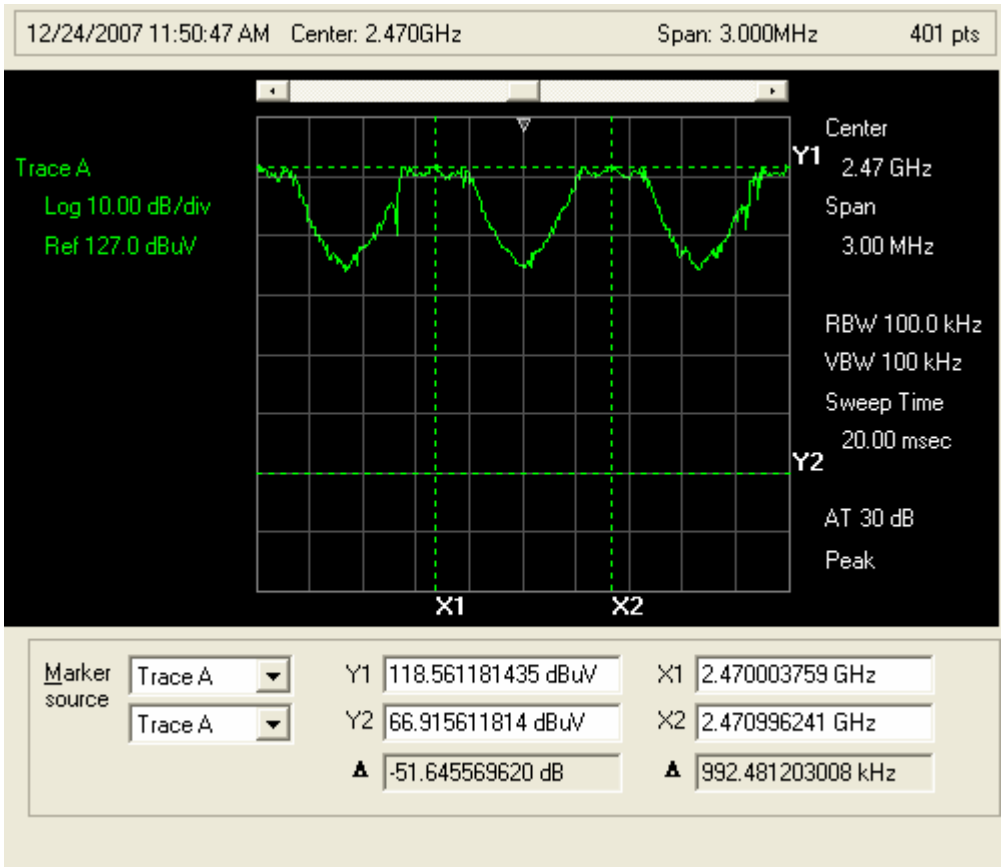
Limits and results

CENTER FREQUENCY SEPARATION

EUT Channel	Limit (MHz)	Test results (MHz)
41-42	</= 1.0	0.992

Screen Shot:

Plot 7: CF separation



NUMBER OF HOPPING FREQUENCIES

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

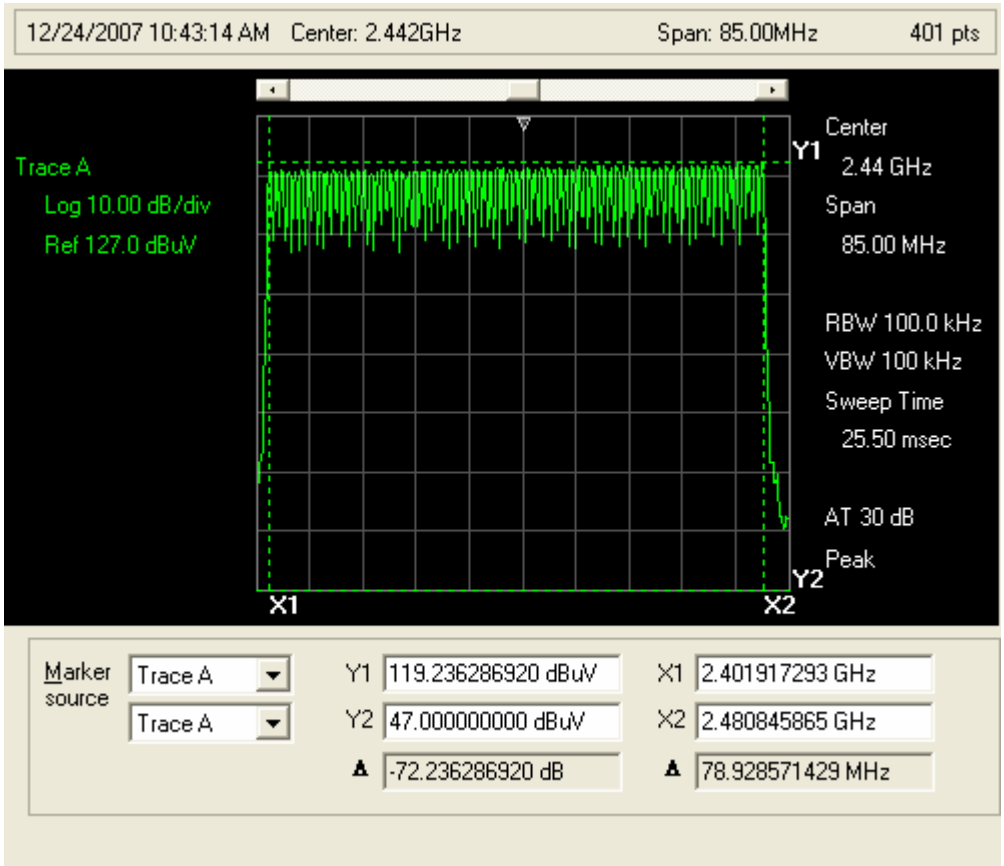
EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	80º F, 30.92
Date of Measurement	7/23/07
Measured by	Bob Cole
Result	PASSED

Limits and results

NUMBER OF HOPPING FREQUENCIES

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

Plot 8: Number of Hopping Frequencies



BAND-EDGE COMPLIANCE

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

EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled & disabled)
Temp, Humidity, Air Pressure	79º F, 30.72
Date of Measurement	10/24/05
Measured by	Bob Cole
Result	PASSED

EUT operation mode

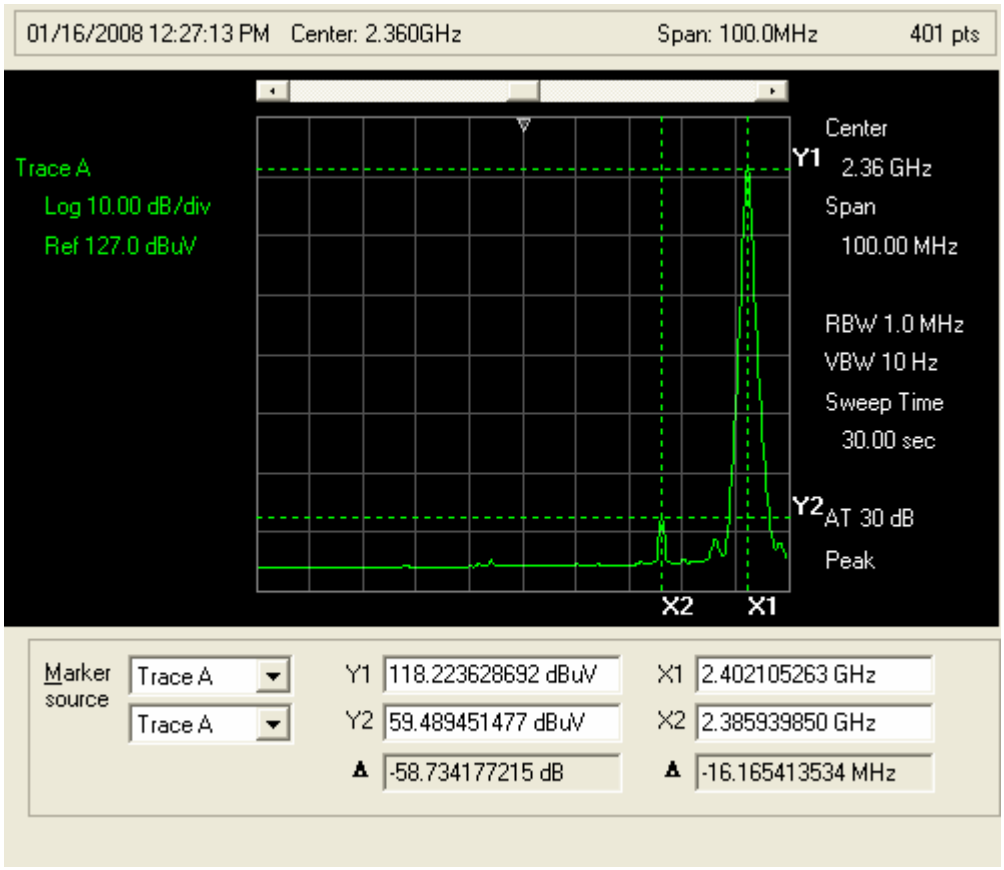
EUT operation mode	Hopping Enabled / Disabled
EUT channel	2, 80
EUT TX power level	Maximum

Limits and results

BAND-EDGE COMPLIANCE

Channel	Limit (dBuV)	Results (dBuV)
2	54.00	
80	54.00	

BAND-EDGE COMPLIANCE
2310 – 2400 MHz
Average Mode
NO Hopping



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

Customer: **Socket Communications**
Specification: **FCC 2402 MHz AVE**
Work Order #: **2753** Date: 1/16/2008
Test Type: **Radiated Scan** Time: 2:17:13 PM
Equipment: **Cordless Hand Scanner** Sequence#: 1
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

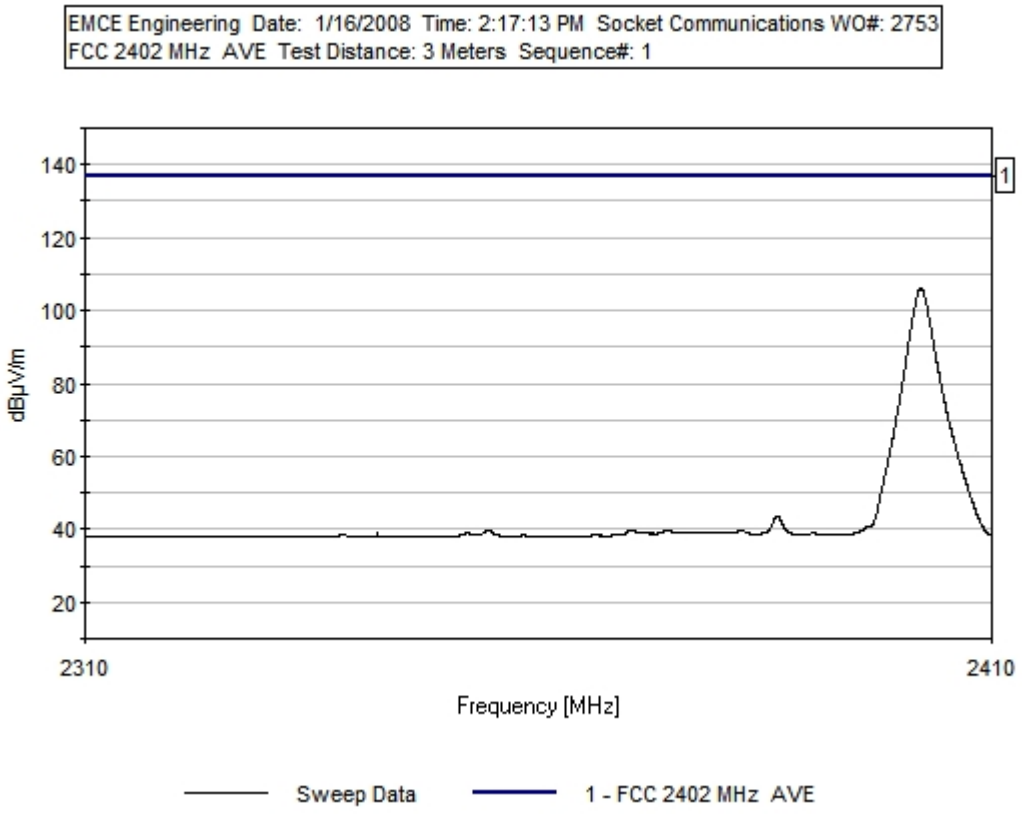
Transducer Legend:

T1=A.H. SAS-200/571 Horn 1 meter	T2=84125 RF Amps
T3=cable1 18 GHz test	

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2401.979M	122.9	+29.2	+54.8	+8.8		+0.0	106.1	137.0	-30.9	Vert
2	2385.924M	60.5	+29.1	+54.8	+8.8		+0.0	43.6	137.0	-93.4	Vert
3	2369.757M	56.7	+29.1	+54.8	+8.8		+0.0	39.8	137.0	-97.2	Vert
4	2353.726M	56.7	+29.1	+54.8	+8.7		+0.0	39.7	137.0	-97.3	Vert
5	2341.709M	56.0	+29.1	+54.8	+8.7		+0.0	39.0	137.0	-98.0	Vert



Bandedge Calculation:

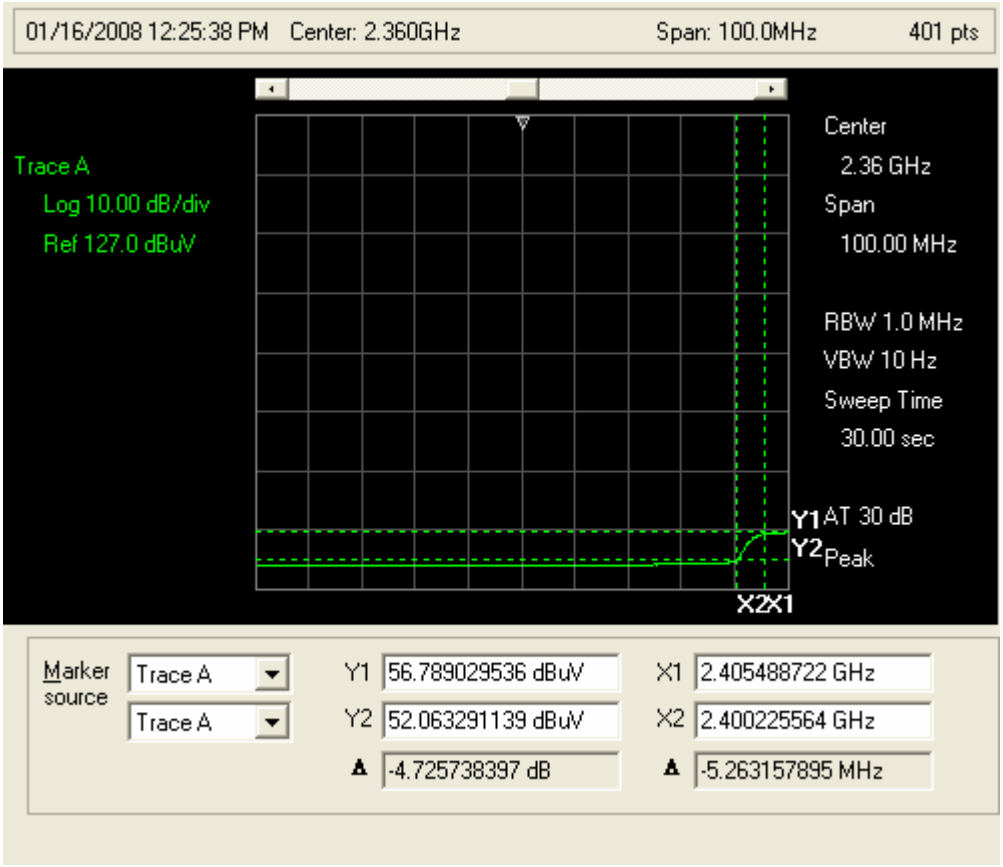
Radiated Amplitude – Conducted Delta = Bandedge Amplitude

106.1 – 58.49 = 47.61 dBuV

47.61 < 54 dB Limit

PASS

BAND-EDGE COMPLIANCE
2310 – 2400 MHz
Average Mode
Hopping Enabled



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

Customer: **Socket Communications**
Specification: **FCC 2402 MHz AVE**
Work Order #: **2753** Date: 1/16/2008
Test Type: **Radiated Scan** Time: 2:19:59 PM
Equipment: **Cordless Hand Scanner** Sequence#: 2
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

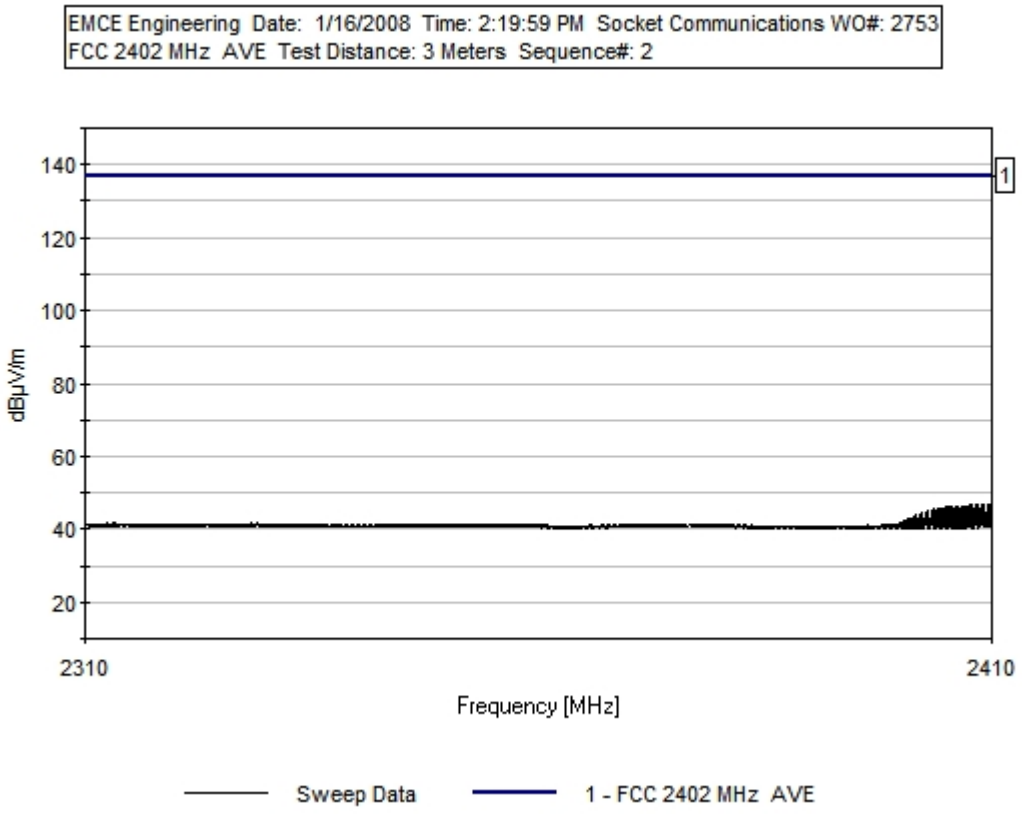
Transducer Legend:

T1=A.H. SAS-200/571 Horn 1 meter	T2=84125 RF Amps
T3=cable1 18 GHz test	

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2409.821M	63.6	+29.2	+54.8	+8.8		+0.0	46.8	137.0	-90.2	Vert
2	2408.165M	63.5	+29.2	+54.8	+8.8		+0.0	46.7	137.0	-90.3	Vert
3	2408.469M	63.5	+29.2	+54.8	+8.8		+0.0	46.7	137.0	-90.3	Vert
4	2408.807M	63.5	+29.2	+54.8	+8.8		+0.0	46.7	137.0	-90.3	Vert
5	2409.145M	63.5	+29.2	+54.8	+8.8		+0.0	46.7	137.0	-90.3	Vert
6	2407.489M	63.4	+29.2	+54.8	+8.8		+0.0	46.6	137.0	-90.4	Vert
7	2407.827M	63.4	+29.2	+54.8	+8.8		+0.0	46.6	137.0	-90.4	Vert
8	2409.483M	63.4	+29.2	+54.8	+8.8		+0.0	46.6	137.0	-90.4	Vert
9	2406.847M	63.3	+29.2	+54.8	+8.8		+0.0	46.5	137.0	-90.5	Vert
10	2407.151M	63.3	+29.2	+54.8	+8.8		+0.0	46.5	137.0	-90.5	Vert



Bandedge Calculation:

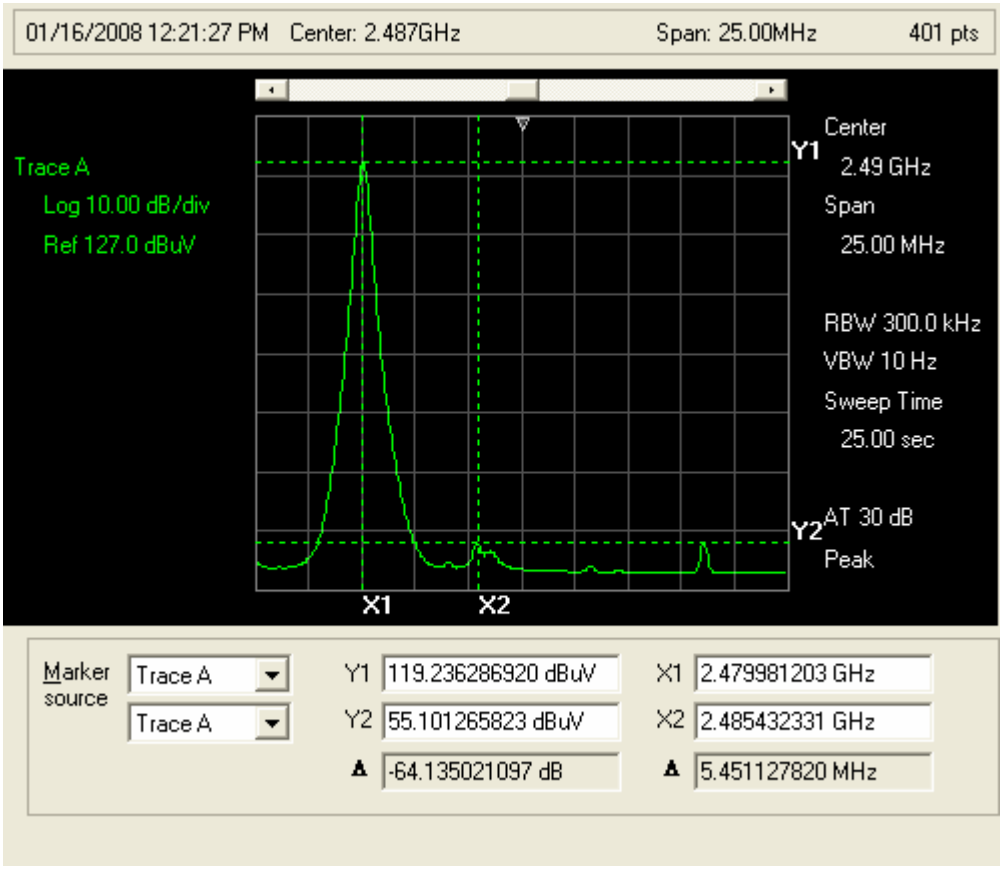
Radiated Amplitude – Conducted Delta = Bandedge Amplitude

46.8 – 4.7 = 42.1 dBuV

42.61 < 54 dB Limit

PASS

BAND-EDGE COMPLIANCE
2470 - 2500 MHz
Average Mode
NO Hopping



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

Customer: **Socket Communications**
Specification: **FCC 2480 MHz AVE**
Work Order #: **2753** Date: 1/16/2008
Test Type: **Radiated Scan** Time: 2:24:36 PM
Equipment: **Cordless Hand Scanner** Sequence#: 4
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

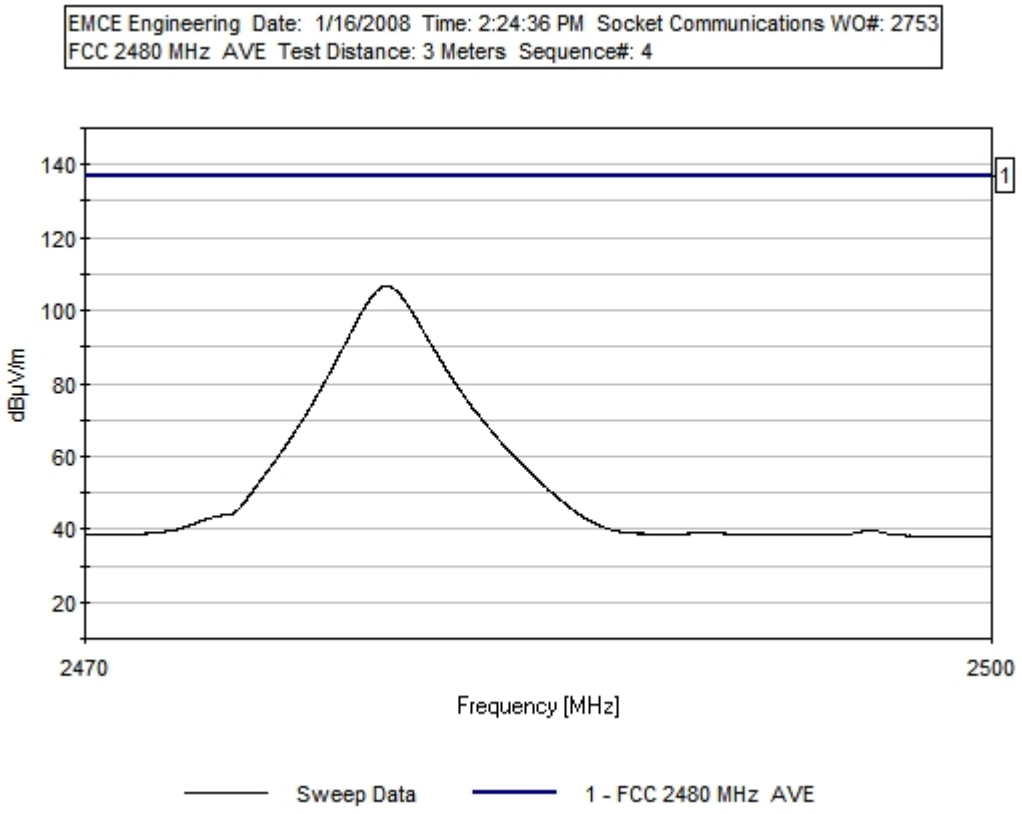
Transducer Legend:

T1=A.H. SAS-200/571 Horn 1 meter	T2=84125 RF Amps
T3=cable1 18 GHz test	

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2479.890M	123.4	+29.3	+55.0	+9.0		+0.0	106.7	137.0	-30.3	Vert
2	2479.950M	123.4	+29.3	+55.0	+9.0		+0.0	106.7	137.0	-30.3	Vert
3	2495.833M	56.3	+29.3	+55.0	+9.0		+0.0	39.6	137.0	-97.4	Vert



Bandedge Calculation:

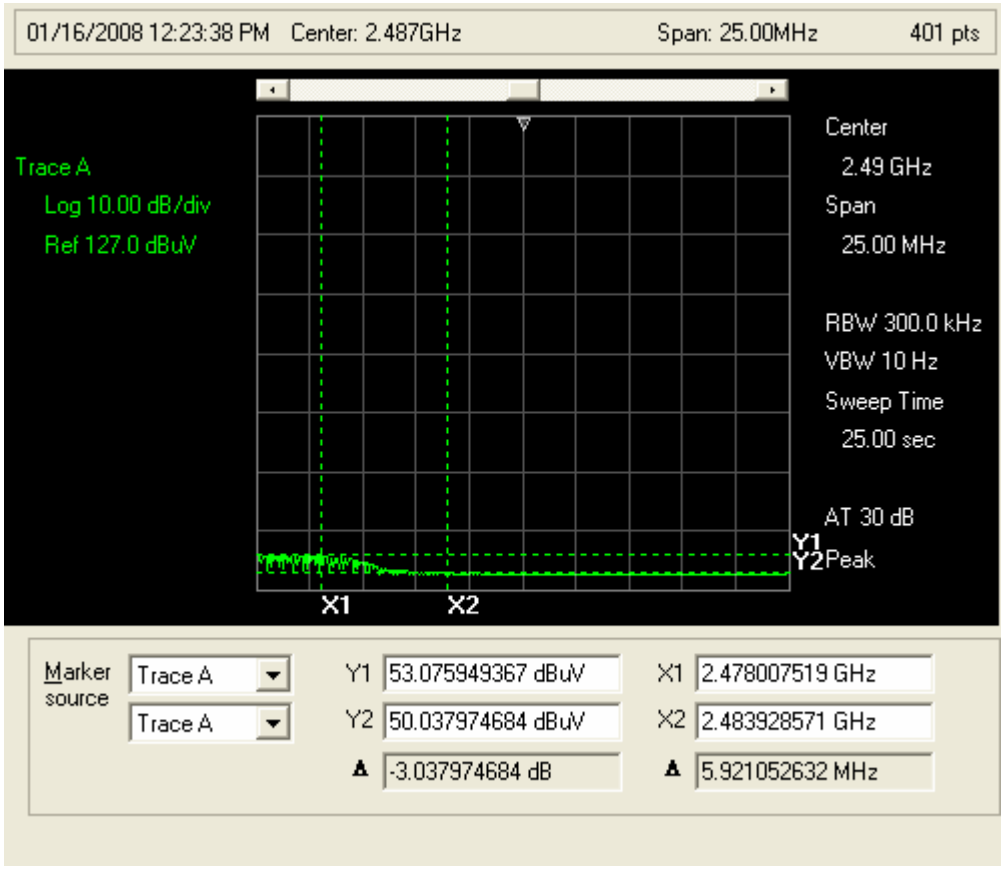
Radiated Amplitude – Conducted Delta = Bandedge Amplitude

106.7 – 64.14 = 42.56 dBuV

42.56 < 54 dB Limit

PASS

BAND-EDGE COMPLIANCE
2470 - 2500 MHz
Average Mode
Hopping Enabled



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

Customer: **Socket Communications**
Specification: **FCC 2480 MHz AVE**
Work Order #: **2753** Date: 1/16/2008
Test Type: **Radiated Scan** Time: 2:22:38 PM
Equipment: **Cordless Hand Scanner** Sequence#: 3
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

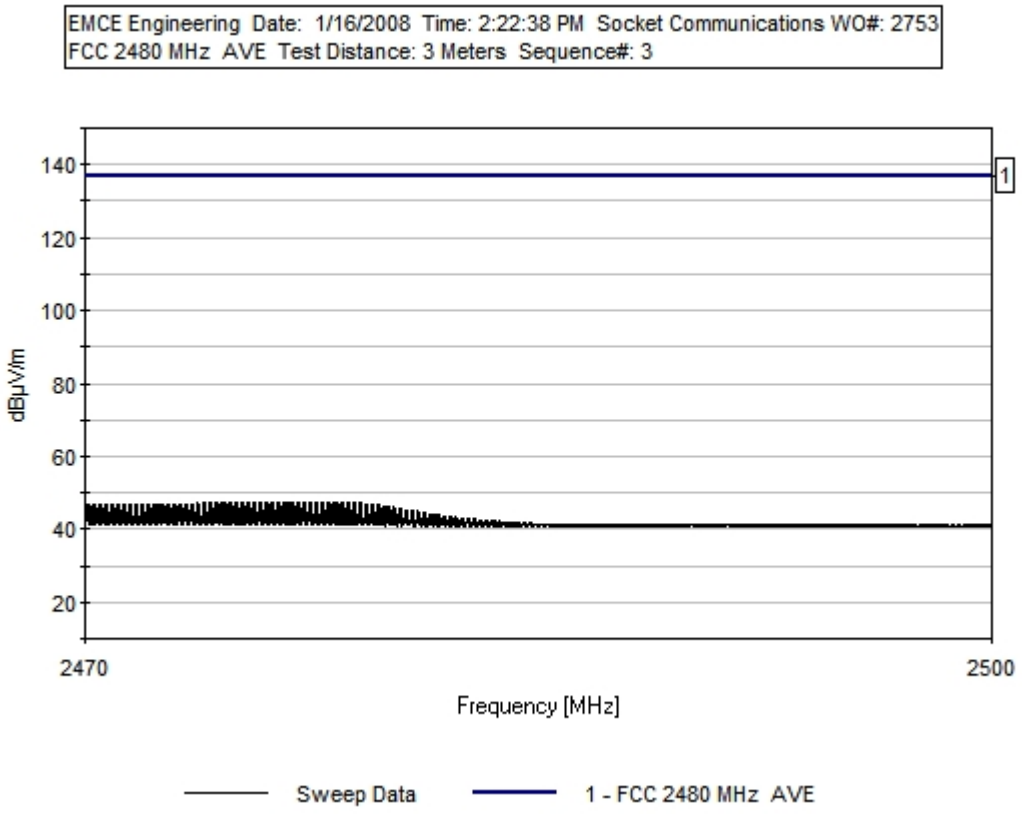
Transducer Legend:

T1=A.H. SAS-200/571 Horn 1 meter T2=84125 RF Amps
T3=cable1 18 GHz test

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2477.759M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
2	2477.858M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
3	2477.948M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
4	2478.048M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
5	2478.147M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
6	2478.247M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
7	2478.536M	64.1	+29.3	+55.0	+9.0		+0.0	47.4	137.0	-89.6	Vert
8	2475.817M	64.0	+29.3	+55.0	+9.0		+0.0	47.3	137.0	-89.7	Vert
9	2475.906M	64.0	+29.3	+55.0	+9.0		+0.0	47.3	137.0	-89.7	Vert
10	2476.006M	64.0	+29.3	+55.0	+9.0		+0.0	47.3	137.0	-89.7	Vert



Bandedge Calculation:

Radiated Amplitude – Conducted Delta = Bandedge Amplitude

47.4 – 3.04 = 44.36 dBuV

44.36 < 54 dB Limit

PASS

DWELL TIME

Dwell Time

EUT	**RING SCANNER**
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 *See description that follows*

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*.3125mS = 10mS.
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*.3125mS = 10mS.
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) Time slot period * 79 slots = 625uS * 79 = 49.375 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) DH1 dwell time = 0.625 mS * (100ms/49.375mS) = 1.26 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 100mms/49.375ms).

(1.3) DH5 dwell time =5* 0.625 mS * (100ms/49.375mS) = 6.3 mS (per 100 mS)

Using the FCC duty cycle correction factor:

(1.4) DH1 Dwell correction =
20 log (DH1 dwell time/100mS) = 20 log (0.0126) = -38 dB

(1.5) DH5 Dwell correction =
20 log (DH5 dwell time/100mS) = 20 log (0.0633) = -24 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.

RESTRICTED BAND MEASUREMENTS

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

EUT	**CORDLESS HAND SCANNER SERIES 7**
Test setup	B (Radiated)
Temp, Humidity, Air Pressure	68º F, 30.02
Date of Measurement	05/23/07
Measured by	Bob Cole
Result	PASSED

Restricted Band Measurements were taken, using a peak detector, over the frequency bands of 30 - 1000 MHz, 1000 – 2400 MHz, and 2483.5 – 12750 MHz in both horizontal and vertical polarizations. All measurements were repeated with the EUT operating at 2402, 2441, and 2480 MHz. Worst case data for each frequency range is presented in this report.

Restricted Band Spurious Radiated Emissions
30 - 1000 MHz

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

Customer: **SocketMobile, Inc.**
Specification: **FCC-Restricted Band 30-1000**
Work Order #: **2753** Date: 12/22/2007
Test Type: **Radiated Scan** Time: 3:41:40 PM
Equipment: **Cordless Hand Scanner** Sequence#: 24
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

2402 MHz; 1 MHz RBW / VBW 120 kHz QPA BW

Transducer Legend:

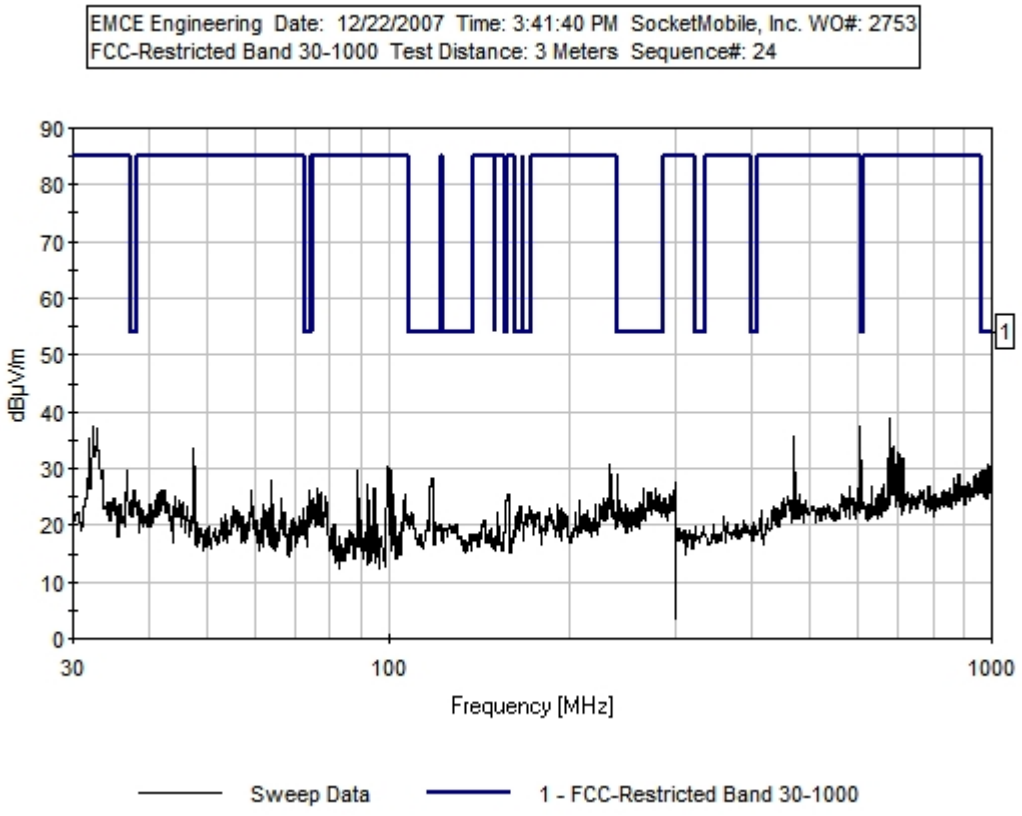
T1=cable5 test	T2=AH Log P SAS-200_510 S-N853
T3=8447 Pre-Amp	

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant

1	608.080M	37.7	+1.3	+19.2	+26.9	+0.0	31.3	54.0	-22.7	Horiz
2	997.505M	32.8	+1.6	+23.8	+27.0	+0.0	31.2	54.0	-22.8	Horiz
3	982.804M	32.5	+1.7	+23.5	+27.0	+0.0	30.7	54.0	-23.3	Horiz
4	995.918M	32.2	+1.6	+23.7	+27.0	+0.0	30.5	54.0	-23.5	Horiz
5	991.846M	32.0	+1.6	+23.6	+27.0	+0.0	30.2	54.0	-23.8	Horiz
6	994.745M	31.9	+1.6	+23.7	+27.0	+0.0	30.2	54.0	-23.8	Horiz
7	984.875M	31.9	+1.7	+23.5	+27.0	+0.0	30.1	54.0	-23.9	Horiz
8	993.847M	31.8	+1.6	+23.7	+27.0	+0.0	30.1	54.0	-23.9	Horiz
9	983.080M	31.7	+1.7	+23.5	+27.0	+0.0	29.9	54.0	-24.1	Horiz
10	998.472M	31.3	+1.6	+23.8	+27.0	+0.0	29.7	54.0	-24.3	Horiz



Restricted Band Spurious Radiated Emissions
1000 - 2400 MHz

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

Customer: **SocketMobile, Inc.**
Specification: **FCC Peak Restricted Band 1000-2400**
Work Order #: **2753** Date: 12/22/2007
Test Type: **Radiated Scan** Time: 1:48:17 PM
Equipment: **Cordless Hand Scanner** Sequence#: 20
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

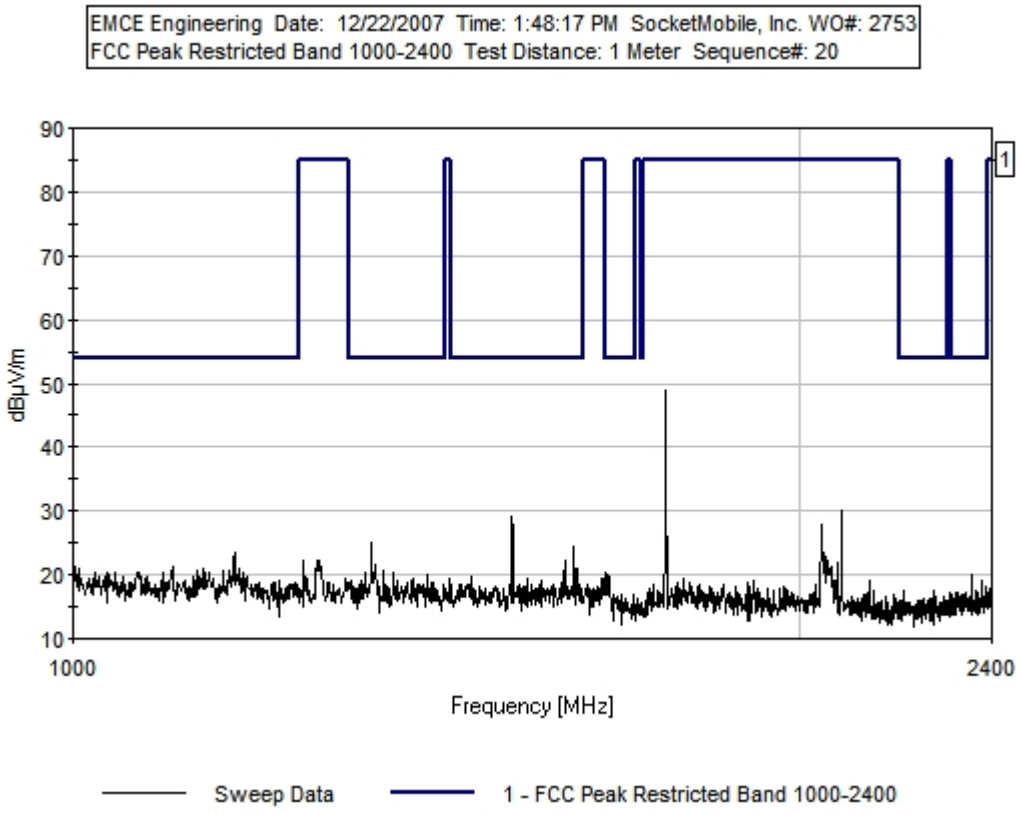
2480 MHz; 1 MHz RBW / VBW

Transducer Legend:

Ext Attn: 0 dB

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	1519.768M	39.2					-10.0	29.2	54.0	-24.8	Vert
2	1328.674M	35.0					-10.0	25.0	54.0	-29.0	Vert
3	1612.229M	34.5					-10.0	24.5	54.0	-29.5	Vert
4	1000.000M	34.4					-10.0	24.4	54.0	-29.6	Vert
5	1166.460M	33.5					-10.0	23.5	54.0	-30.5	Vert
6	1599.164M	32.2					-10.0	22.2	54.0	-31.8	Vert
7	1100.216M	31.4					-10.0	21.4	54.0	-32.6	Vert
8	1131.640M	31.1					-10.0	21.1	54.0	-32.9	Vert
9	1618.259M	31.1					-10.0	21.1	54.0	-32.9	Vert
10	1153.721M	30.8					-10.0	20.8	54.0	-33.2	Vert


EMCE Engineering Date: 12/22/2007 Time: 1:48:17 PM SocketMobile, Inc. WO#: 2753
FCC Peak Restricted Band 1000-2400 Test Distance: 1 Meter Sequence#: 20
90
80
70
60
50
40
30
20
10
dBµV/m
1
1000
2400
Frequency [MHz]
Sweep Data
1 - FCC Peak Restricted Band 1000-2400

Restricted Band Spurious Radiated Emissions
2483.5 – 12750 MHz

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

Customer: **SocketMobile, Inc.**
Specification: **FCC Restricted Band 2483.5 - 18000**
Work Order #: **2753** Date: 12/22/2007
Test Type: **Radiated Scan** Time: 12:03:25 PM
Equipment: **Cordless Hand Scanner** Sequence#: 9
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

2480 MHz; 1 MHz RBW / VBW

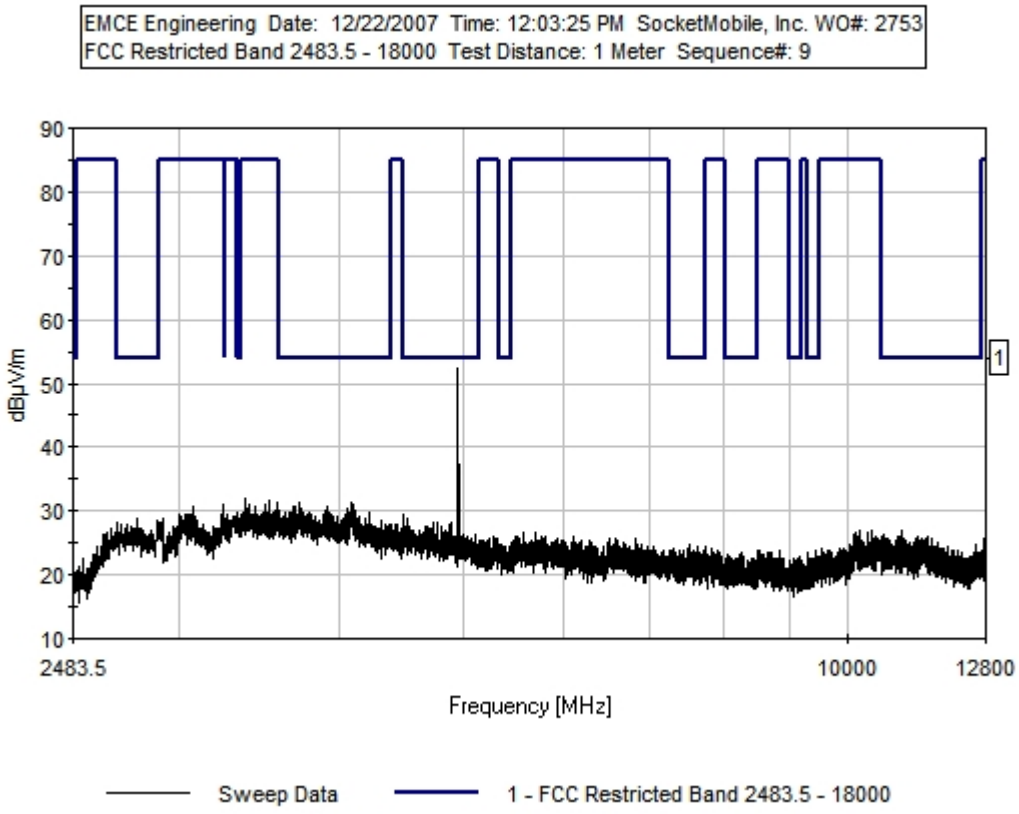
Transducer Legend:

Ext Attn: 0 dB

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	4960.856M	62.4					-10.0	52.4	54.0	-1.6	Vert
2	3730.720M	41.2					-10.0	31.2	54.0	-22.8	Vert
3	4095.540M	41.2					-10.0	31.2	54.0	-22.8	Vert
4	3915.643M	40.7					-10.0	30.7	54.0	-23.3	Vert
5	3740.771M	40.4					-10.0	30.4	54.0	-23.6	Vert
6	4064.385M	40.3					-10.0	30.3	54.0	-23.7	Vert
7	3909.613M	40.1					-10.0	30.1	54.0	-23.9	Vert
8	3761.876M	39.9					-10.0	29.9	54.0	-24.1	Vert
9	3941.773M	39.9					-10.0	29.9	54.0	-24.1	Vert

10	4225.187M	39.9			-10.0	29.9	54.0	-24.1	Vert



RADIATED SPURIOUS EMISSIONS
AVERAGE DETECTOR

EUT	**CORDLESS HAND SCANNER SERIES 7**
Test setup	B (Radiated)
Temp, Humidity, Air Pressure	58º F, 30.02
Date of Measurement	12/22/07
Measured by	Bob Cole
Result	PASSED

Radiated Spurious Emissions Measurements were taken, using an Average detector, over the frequency bands of 1000 – 2400 MHz, and 2483.5 – 12750 MHz in both horizontal and vertical polarizations. All measurements were repeated with the EUT operating at 2402, 2441, and 2480 MHz. Worst case data for each frequency range is presented in this report.

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Average Limits 1000-2400**
Work Order #: **2753** Date: 12/22/2007
Test Type: **Radiated Scan** Time: 1:42:35 PM
Equipment: **Cordless Hand Scanner** Sequence#: 17
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

2441 MHz; 1 MHz RBW / 10 Hz VBW

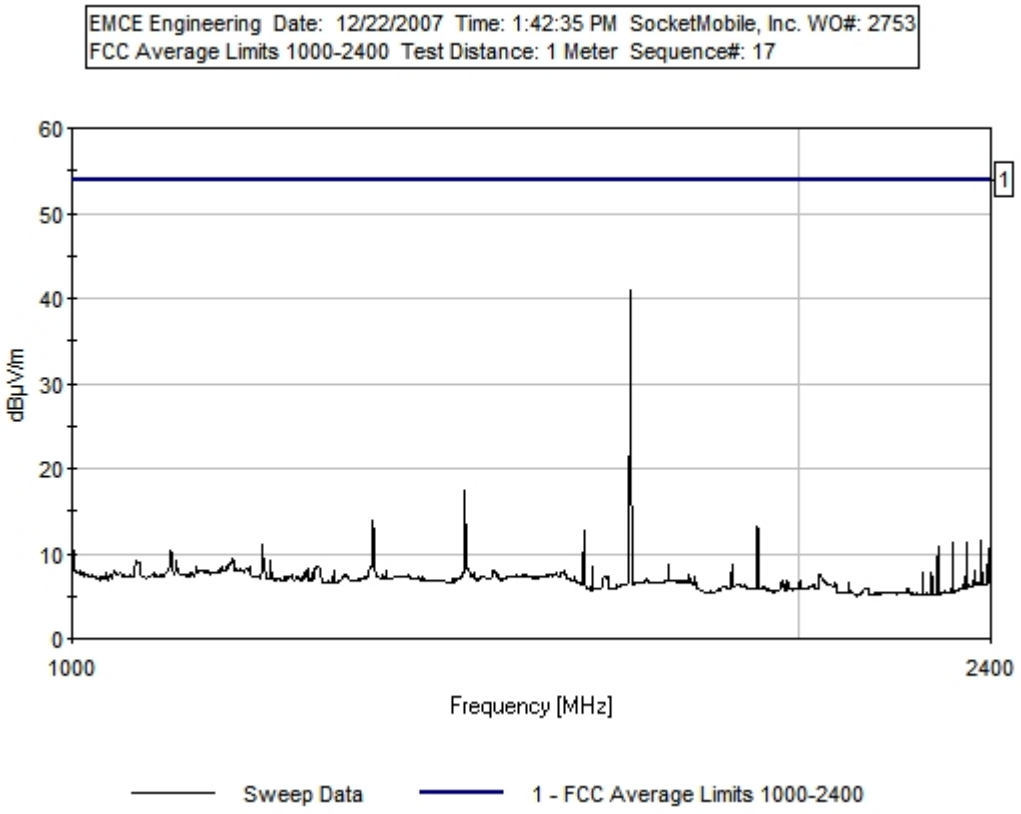
Transducer Legend:

Ext Attn: 0 dB

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	1702.680M	51.0					-10.0	41.0	54.0	-13.0	Vert
2	1454.442M	27.5					-10.0	17.5	54.0	-36.5	Vert

3	1332.072M	24.0	-10.0	14.0	54.0	-40.0	Vert
4	1921.773M	23.2	-10.0	13.2	54.0	-40.8	Vert
5	1628.309M	22.6	-10.0	12.6	54.0	-41.4	Vert
6	1000.849M	22.0	-10.0	12.0	54.0	-42.0	Vert
7	2378.568M	21.5	-10.0	11.5	54.0	-42.5	Vert
8	2314.271M	21.3	-10.0	11.3	54.0	-42.7	Vert
9	2346.095M	21.2	-10.0	11.2	54.0	-42.8	Vert
10	1198.733M	21.0	-10.0	11.0	54.0	-43.0	Vert



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

Customer: **SocketMobile, Inc.**
Specification: **FCC Rad Average Limits 2483.5 - 12750**
Work Order #: **2753** Date: 12/22/2007
Test Type: **Radiated Scan** Time: 12:38:11 PM
Equipment: **Cordless Hand Scanner** Sequence#: 12
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS BC04
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS BC04	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

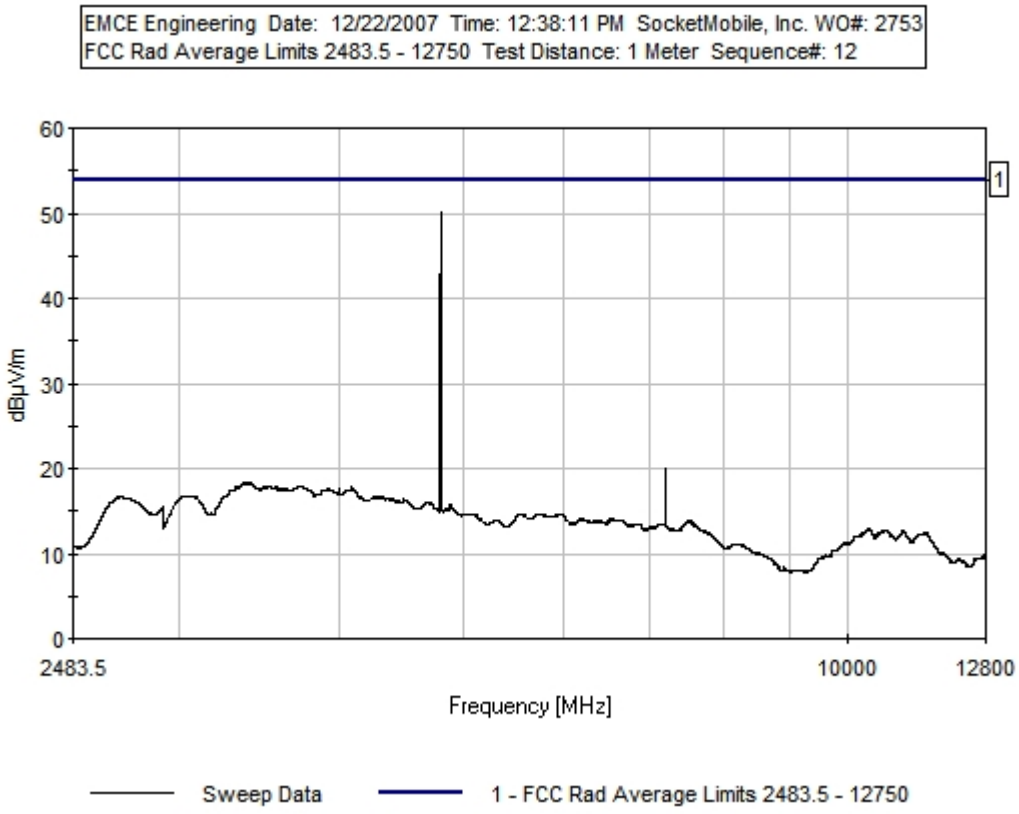
2402 MHz; 1 MHz RBW / 10 Hz VBW

Transducer Legend:

Ext Attn: 0 dB

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	4805.079M	60.1					-10.0	50.1	54.0	-3.9	Vert
2	7208.064M	30.1					-10.0	20.1	54.0	-33.9	Vert
3	3409.116M	28.4					-10.0	18.4	54.0	-35.6	Vert
4	3728.710M	28.0					-10.0	18.0	54.0	-36.0	Vert
5	4087.500M	27.8					-10.0	17.8	54.0	-36.2	Vert
6	3283.490M	27.0					-10.0	17.0	54.0	-37.0	Vert
7	3031.232M	26.8					-10.0	16.8	54.0	-37.2	Vert
8	2701.588M	26.7					-10.0	16.7	54.0	-37.3	Vert
9	4488.500M	26.5					-10.0	16.5	54.0	-37.5	Vert
10	4889.500M	25.8					-10.0	15.8	54.0	-38.2	Vert


EMCE Engineering Date: 12/22/2007 Time: 12:38:11 PM SocketMobile, Inc. WO#: 2753
FCC Rad Average Limits 2483.5 - 12750 Test Distance: 1 Meter Sequence#: 12
60
50
40
30
20
10
0
dBµV/m
1
2483.5
10000
12800
Frequency [MHz]
Sweep Data
1 - FCC Rad Average Limits 2483.5 - 12750

AC LINE CONDUCTED EMISSIONS MEASUREMENT

AC Line Conducted Emissions Measurement 150 kHz – 30 MHz

EUT	**CORDLESS HAND SCANNER SERIES 7**
Test setup	C (conducted)
Temp, Humidity, Air Pressure	65º F, 30.21
Date of Measurement	12/24/07
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
EUT channel	
EUT TX power level	Maximum
EUT operation voltage	120 VAC

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

LINE 1

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

Customer: **SocketMobile, Inc.**
Specification: **EN55022 B COND [AVE]**
Work Order #: **2753** Date: 12/24/07
Test Type: **Conducted Emissions** Time: 09:44:09 PM
Equipment: **Cordless Hand Scanner** Sequence#: 2
Manufacturer: SocketMobile, Inc. Tested By: Bob Cole
Model: CHS 120V 60Hz
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	SocketMobile, Inc.	CHS	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

100 kHz RBW / VBW Peak Mode passed Average Limits

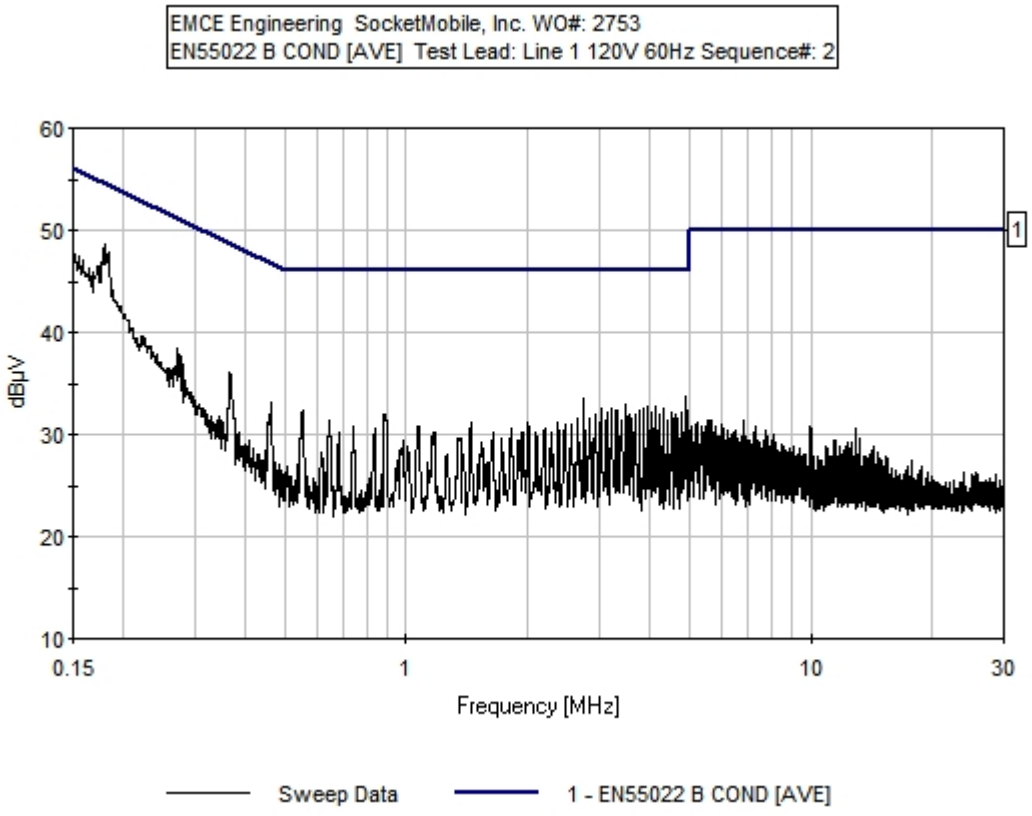
Transducer Legend:

T1=cable5 test	T2=LISN 1

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Line 1

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	179.815k	47.6	+0.0	+1.0			+0.0	48.6	54.5	-5.9	Black
2	150.727k	46.6	+0.0	+1.1			+0.0	47.7	56.0	-8.3	Black
3	4.892M	32.8	+0.2	+0.7			+0.0	33.7	46.0	-12.3	Black
4	365.251k	35.2	+0.1	+0.8			+0.0	36.1	48.6	-12.5	Black
5	2.740M	32.7	+0.2	+0.6			+0.0	33.5	46.0	-12.5	Black
6	3.484M	32.0	+0.2	+0.7			+0.0	32.9	46.0	-13.1	Black
7	3.960M	31.9	+0.2	+0.7			+0.0	32.8	46.0	-13.2	Black
8	4.143M	31.8	+0.2	+0.7			+0.0	32.7	46.0	-13.3	Black
9	3.867M	31.7	+0.2	+0.7			+0.0	32.6	46.0	-13.4	Black
10	4.330M	31.7	+0.2	+0.7			+0.0	32.6	46.0	-13.4	Black


EMCE Engineering SocketMobile, Inc. WO#: 2753
EN55022 B COND [AVE] Test Lead: Line 1 120V 60Hz Sequence#: 2
60
50
40
30
20
10
dBµV
0.15
1
10
30
Frequency [MHz]
1
Sweep Data
1 - EN55022 B COND [AVE]

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

Customer: **SocketMobile, Inc.**
Specification: **EN55022 B COND [AVE]**
Work Order #: **2753** Date: 12/24/07
Test Type: **Conducted Emissions** Time: 10:24:49 PM
Equipment: **Cordless Hand Scanner** Sequence#: 4
Manufacturer: SocketMobile, Inc. Tested By: Bob Cole
Model: CHS 120V 60Hz
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	SocketMobile, Inc.	CHS	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

100 kHz RBW / VBW Peak Mode passes Average Liimits

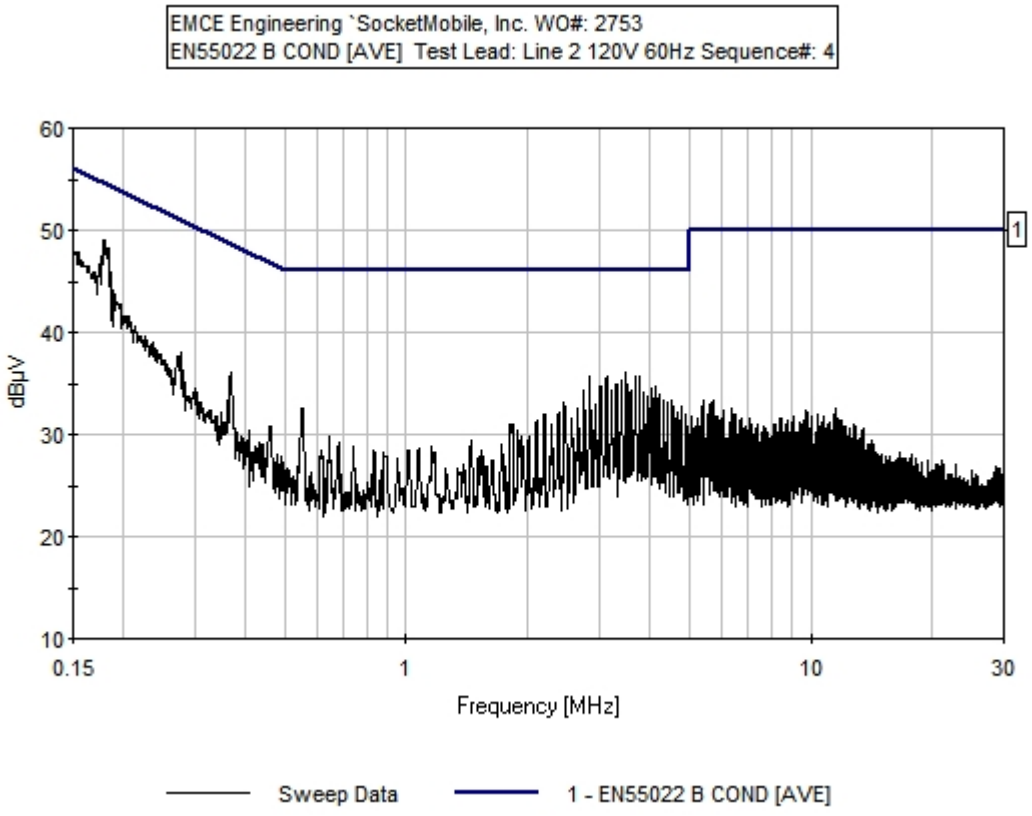
Transducer Legend:

T1=cable5 test	T2=LISN 1

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Line 2

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	178.361k	48.0	+0.0	+1.0			+0.0	49.0	54.6	-5.6	Line
2	151.454k	46.7	+0.0	+1.1			+0.0	47.8	55.9	-8.1	Line
3	186.360k	44.8	+0.0	+1.0			+0.0	45.8	54.2	-8.4	Line
4	3.484M	35.1	+0.2	+0.7			+0.0	36.0	46.0	-10.0	Line
5	190.723k	42.8	+0.0	+1.0			+0.0	43.8	54.0	-10.2	Line
6	3.127M	34.8	+0.2	+0.7			+0.0	35.7	46.0	-10.3	Line
7	3.684M	34.8	+0.2	+0.7			+0.0	35.7	46.0	-10.3	Line
8	3.765M	34.8	+0.2	+0.7			+0.0	35.7	46.0	-10.3	Line
9	2.850M	34.7	+0.2	+0.7			+0.0	35.6	46.0	-10.4	Line
10	3.403M	34.3	+0.2	+0.7			+0.0	35.2	46.0	-10.8	Line


EMCE Engineering `SocketMobile, Inc. WO#: 2753
EN55022 B COND [AVE] Test Lead: Line 2 120V 60Hz Sequence#: 4
60
50
40
30
20
10
dBµV
0.15
1
10
30
Frequency [MHz]
1
Sweep Data
1 - EN55022 B COND [AVE]

7.0 TEST EQUIPMENT

Antenna Conducted Measurements:

Equipment	Type	Manufacturer	Calibration Due Date
Spectrum Analyzer	8593EM	Hewlett-Packard	2/1/08
Oscilloscope	TDS820	Tektronix	2/1/08
Peak Power Meter	Anritsu	2488A	11/1/08
Power Sensor	Anritsu	MA2491A	11/1/08
Coaxial cable	SMA Male – Reverse SMA Male (Length = 20 cm)	Own	10/1/08

Spurious RF radiated emissions:

Equipment	Type	Manufacturer	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	2/1/08
Spectrum Analyzer	8593EM	Hewlett-Packard	2/1/08
Pre-Amp	83051A	Hewlett-Packard	2/1/08
Pre-Amp	83017A	Hewlett-Packard	2/1/08
High Pass Filter	9701	CMT	2/1/08
Horn Antenna	3115	EMCO	2/1/08
Cable		Hewlett Packard	2/1/08

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	2/1/08
LISN	3810/2	EMCO	10/1/08
Coaxial cable	N Type – BNC (5 Meters)	Own	10/1/08