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 7X

M/N:
8550-00036 / 8550-00047

Prepared by:

44366 S. Grimmer Blvd.
Fremont, CA 94538
USA

TABLE OF CONTENTS

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	743299
Customer:	Socket Communications, Inc. 39700 Eureka Drive Newark, CA 94560 Tel: 510-744-2700 Fax:510-744-2701
Contact Person:	Tim Miller
Receipt of EUT:	11/20/09
Test plan reference:	FCC Part 2, 15 (15.247) / IC RSS-210
FCC ID:	**LUBCHS3**
IC #:	**2529A-CHS3**
Date of testing:	11/24/09 – 12/10/09
Date of Report:	12/21/09

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 7X.**

Model Numbers Represented

8550-00036 / 8550-00047

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 RING SCANNER 7X**	N/A	E0001
Accessories	Laptop Computer	HP M/N: dv4000	3882A744	S0001
Software	CRS	BlueTest	N/A	N/A

EUT Information

Product Specification	Description
Model Name	CORDLESS HAND SCANNER 7X
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	N/A
Type of Antenna	Integral
Antenna Gain (dBi)	-3.0
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

CFR 47, 15.247:2007 Section	RSS 210 Issue 7:2007 Section	Description	Results
15.203		Antenna Requirement	PASSED
15.205	RSS 210(A8.5)	Restricted Band of Operation	N/A
15.207a	RSS Gen 7.2.2	Conducted Emission Voltage	PASSED
15.247a(1)	RSS 210(A8.1)	Channel Separation	PASSED
15.247a(1)	RSS 210(A8.1)	Occupied Bandwidth	PASSED
15.247a(2)	RSS 210(A8.2)	Bandwidth	N/A
15.247a(1)	RSS 210(A8.1)	Number of Hopping Channels	PASSED
15.247a(1)	RSS 210(A8.1)	Time of Occupancy	PASSED
15.247b	RSS 210(A8.4)	Output Power	PASSED
15.247c	RSS 210(A8.4)	Antenna Gain >6 dB	N/A
15.247d	RSS 210(A8.5)	Conducted Spurious Emissions	PASSED
15.247d: 15.209	RSS 210(A8.5)	Radiated Spurious Emissions	PASSED
15.247e	RSS 210(A8.3)	Power Spectral Density	N/A
15.247f	RSS 210(A8.3)	Hybrid System Requirement	N/A
15.247g	RSS 210(A8.1)	Hopping Capability	PASSED
15.247h	RSS 210(A8.1)	Hopping Coordination Requirement	PASSED
15.247i	RSS Gen(5.5)	RF Exposure Requirement	PASSED
	RSS Gen(4.8)	Receiver Spurious Emissions	PASSED

PASS The EUT passed that particular test.
FAIL The EUT failed that particular test.
N/A Not Applicable due to product type.

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.

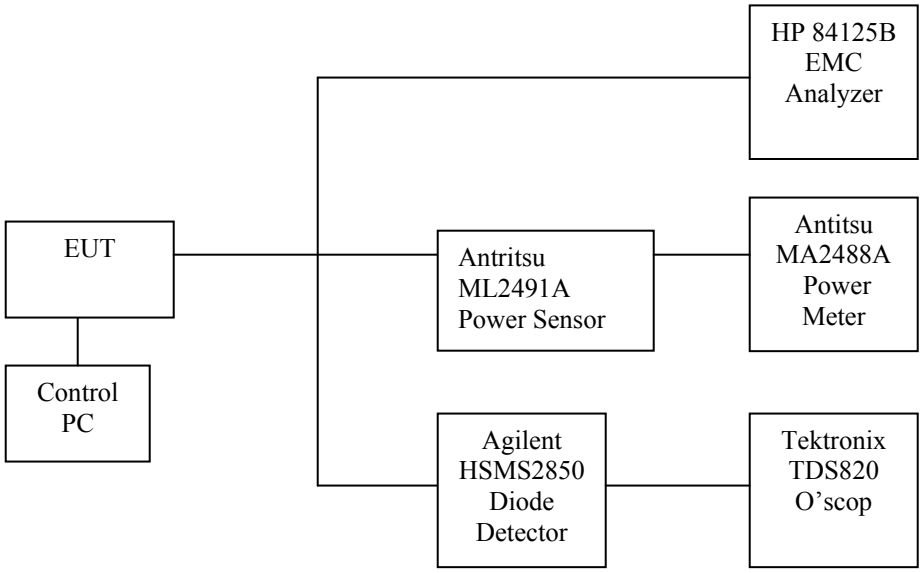
Setup A (Antenna Conducted measurements)

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

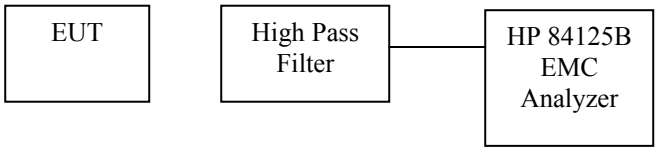
This setup was used in radiated emissions measurements.

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 ENGINEERING EVALUATION RESULTS

6.1 Antenna Requirement

Requirement(s): CFR47, 15.203:

An intentional radiator shall be designed such that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet one of the following:

- Antenna must be permanently attached to the device.
- Antenna must use unique type of connector to attach to the device.
- Device must be professionally installed. Installer shall be responsible for insuring the the correct antenna is installed with the device.

The antenna is a printed trace, integral to the PCB.

Antenna Gain (max) is -3.0 in the 2400 – 2483.5 MHz band.

6.2 Conducted Emissions Voltage

Requirement(s): CFR47, 15.207a, RSS Gen 7.2.2

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.

CFR47, 15.207c Waives the requirement for battery powered devices:

Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

AC Line Conducted Emissions Measurement 150 kHz – 30 MHz

EUT	**CORDLESS HAND SCANNER 7X**
Test setup	
Temp, Humidity, Air Pressure	
Date of Measurement	
Measured by	Bob Cole
Result	

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

Not Applicable – Battery Powered EUT

5.3 Channel Separation

Requirement(s): 15.247(a)(1), RSS 210(A8.2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

CF Separation

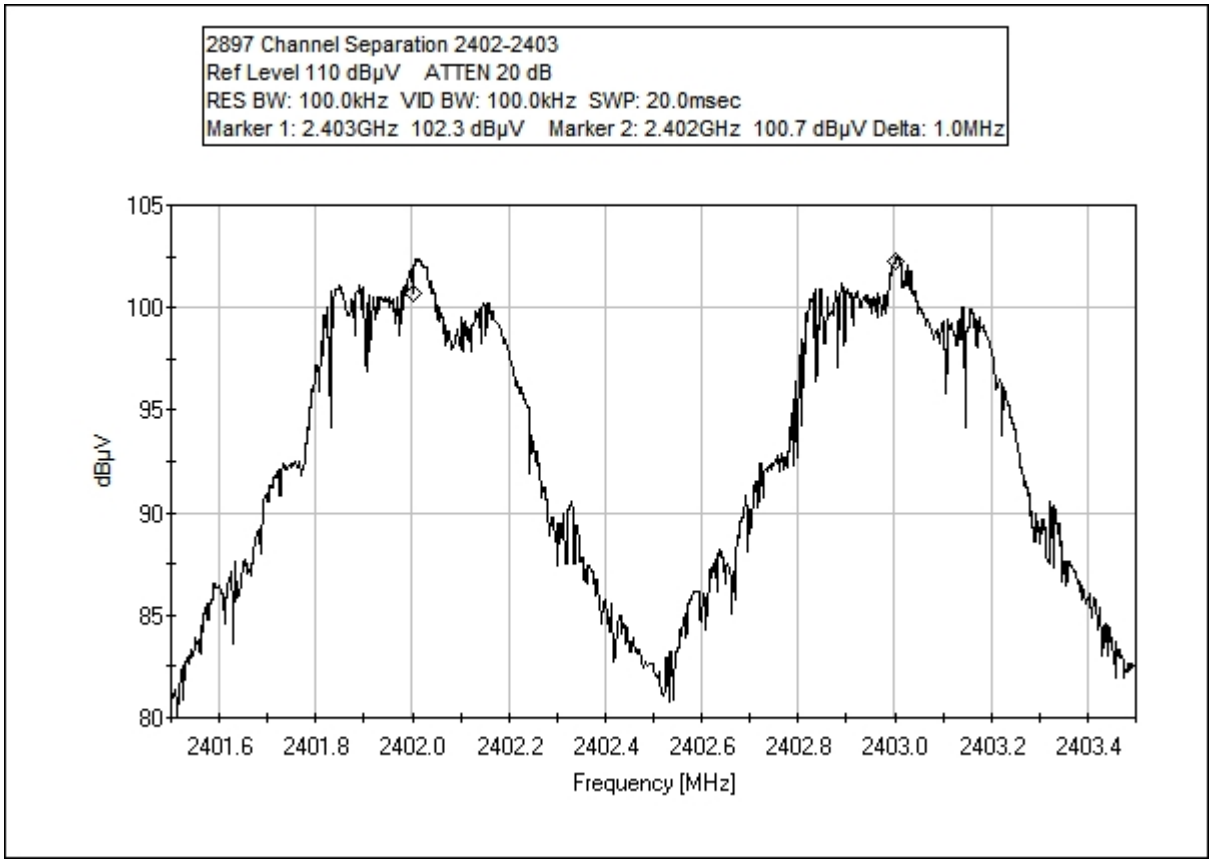
EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	57º F, 30.96
Date of Measurement	2/10/09
Measured by	Bob Cole
Result	PASSED

- The EUT was set to low, mid, and high channels at maximum RF Power output. The spectrum analyzer was connected directly to the antenna output.
- Conducted Emissions Measurement Uncertainty: The uncertainty of the measurement with a confidence factor of approx. 95% (normal distribution) with a coverage factor of 2, in the range of 30 MHz – 26.2 GHz, is +/- 1.5 dB

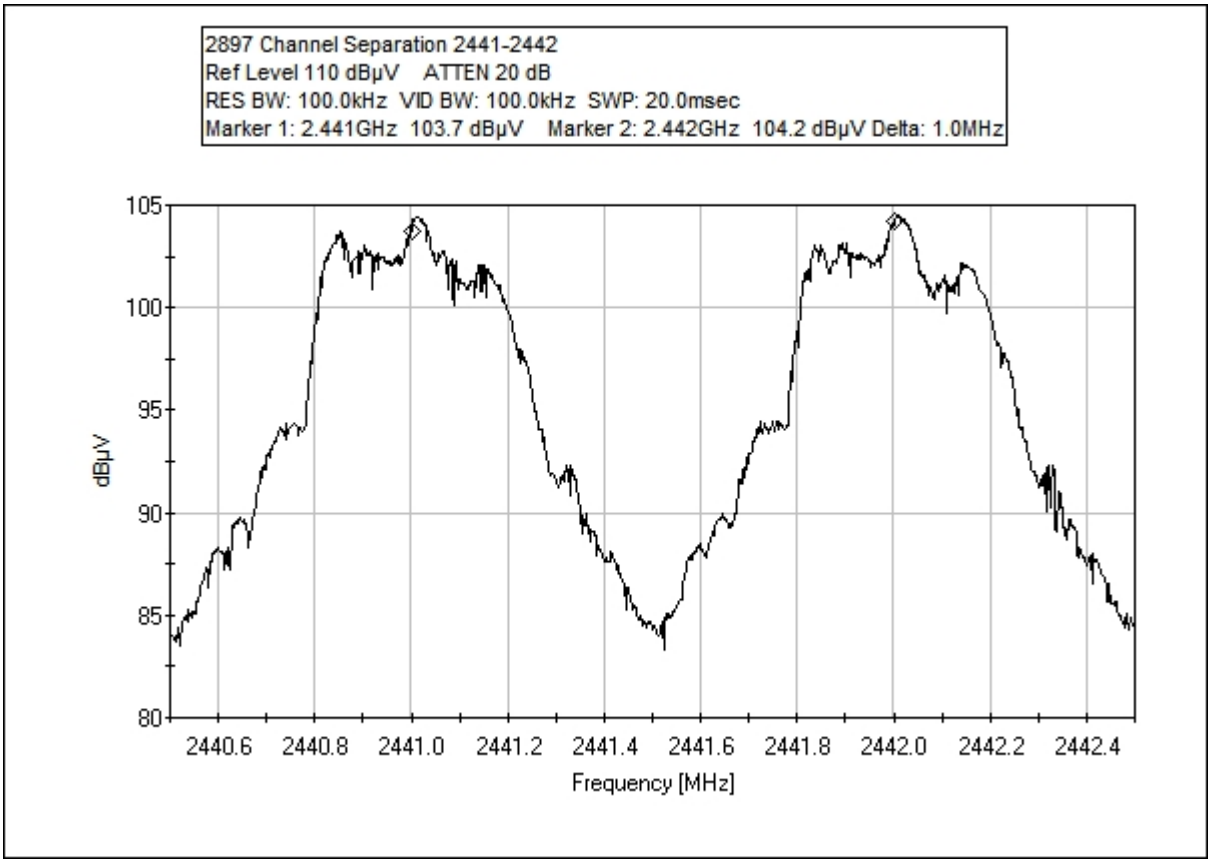
CENTER FREQUENCY SEPARATION LIMITS

EUT Channel	Limit	Test results (MHz)
2402 - 2403	20 dB BW	1.000
2441 - 2442	20 dB BW	1.000
2479 - 2480	20 dB BW	1.000

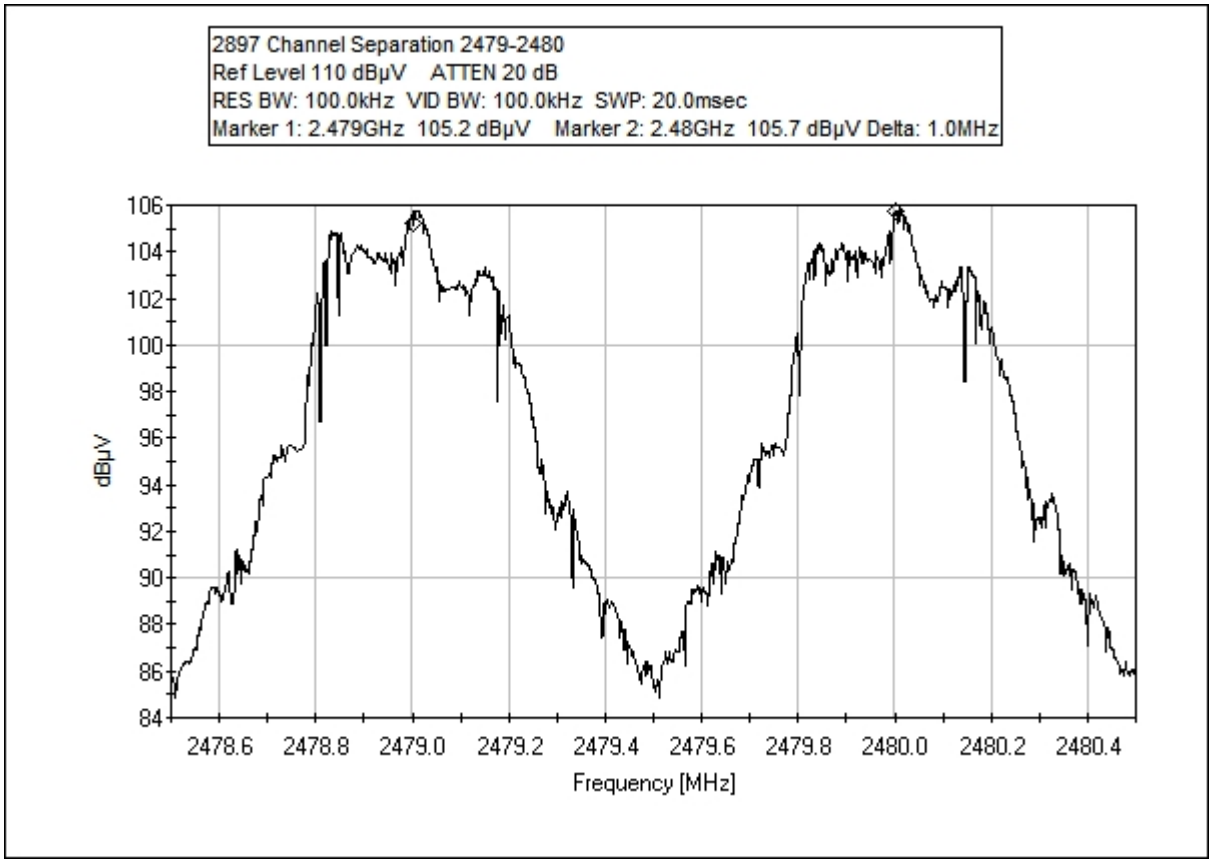
2402 – 2403 MHz



2441- 2442 MHz



2479 – 2480 MHz



5.4 20 dB Bandwidth

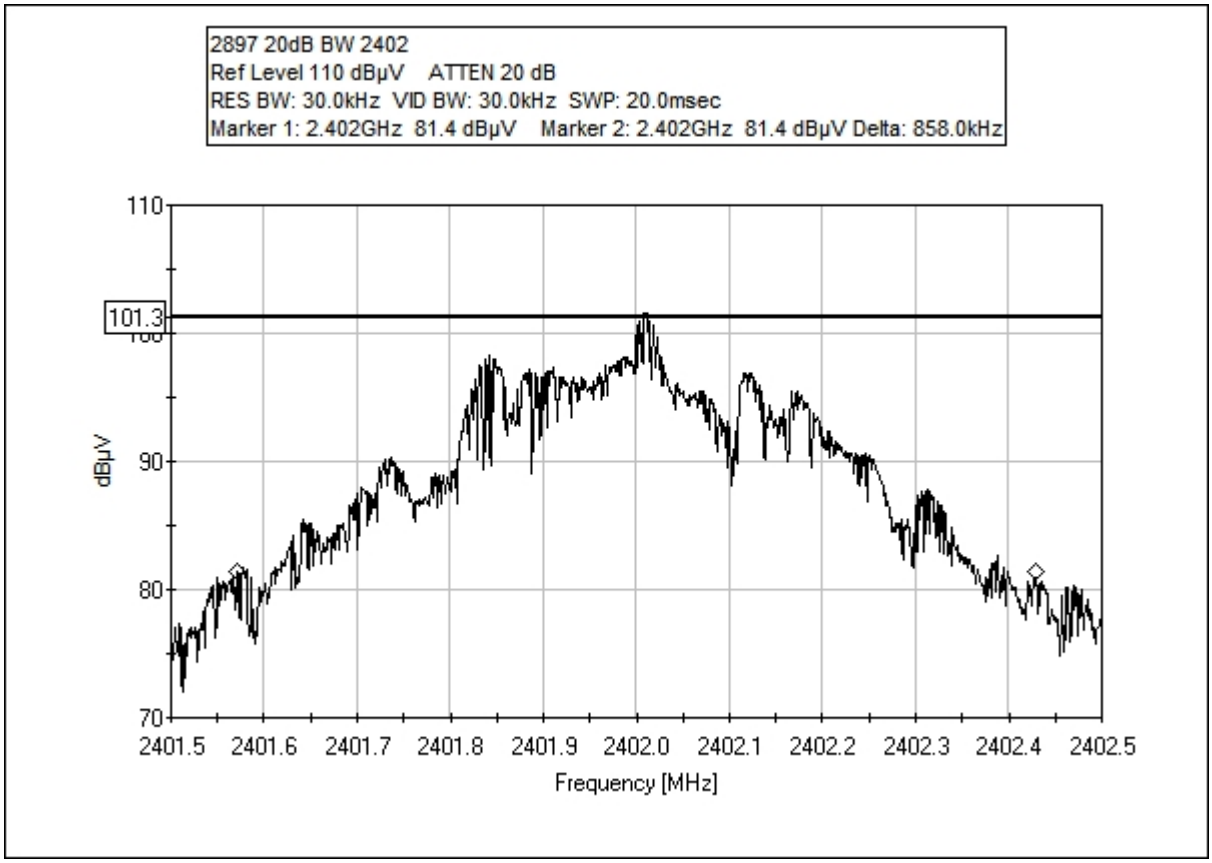
20 dB Bandwidth

EUT	**CORDLESS HAND SCANNER 7X**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	58º F, 30.98
Date of Measurement	2/10/09
Measured by	Bob Cole
Result	PASSED

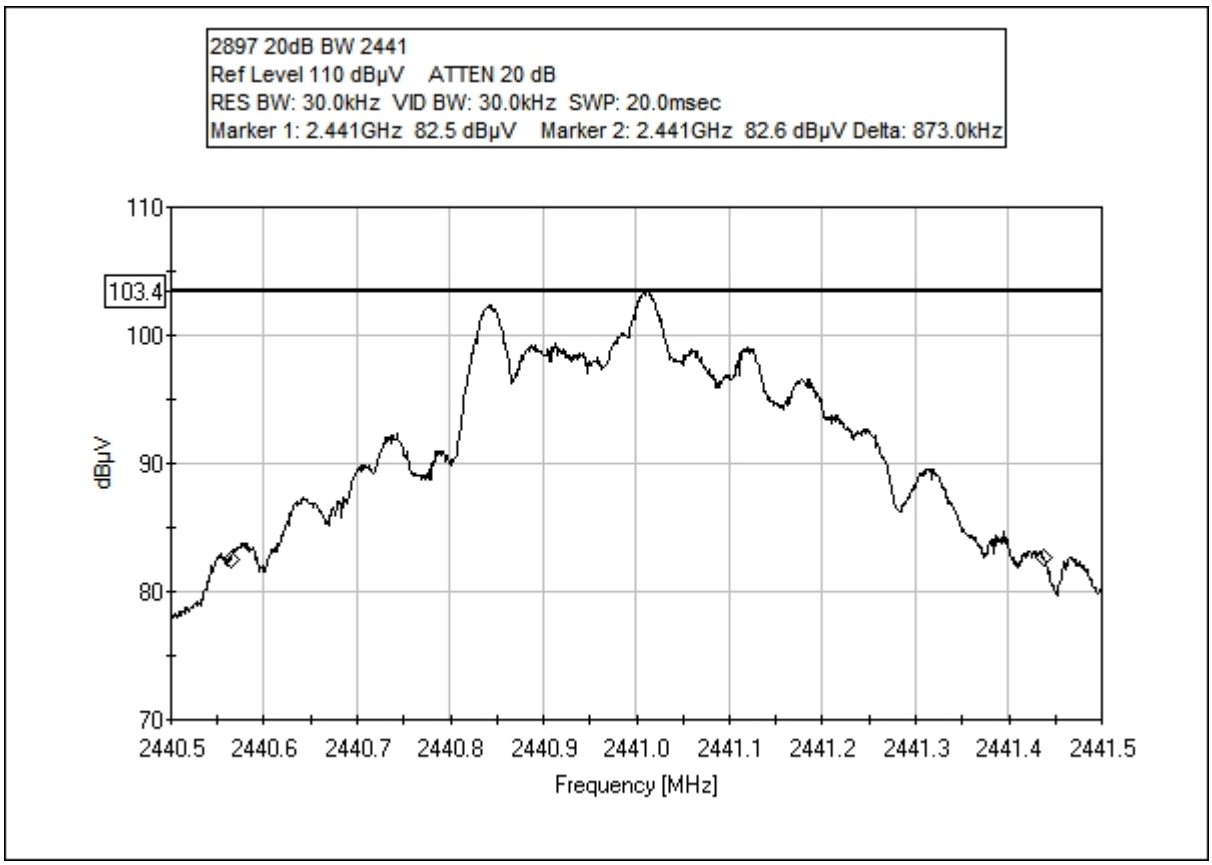
20 dB BANDWIDTH LIMITS

EUT Channel		Test results (kHz)
2402		858
2441		873
2480		867

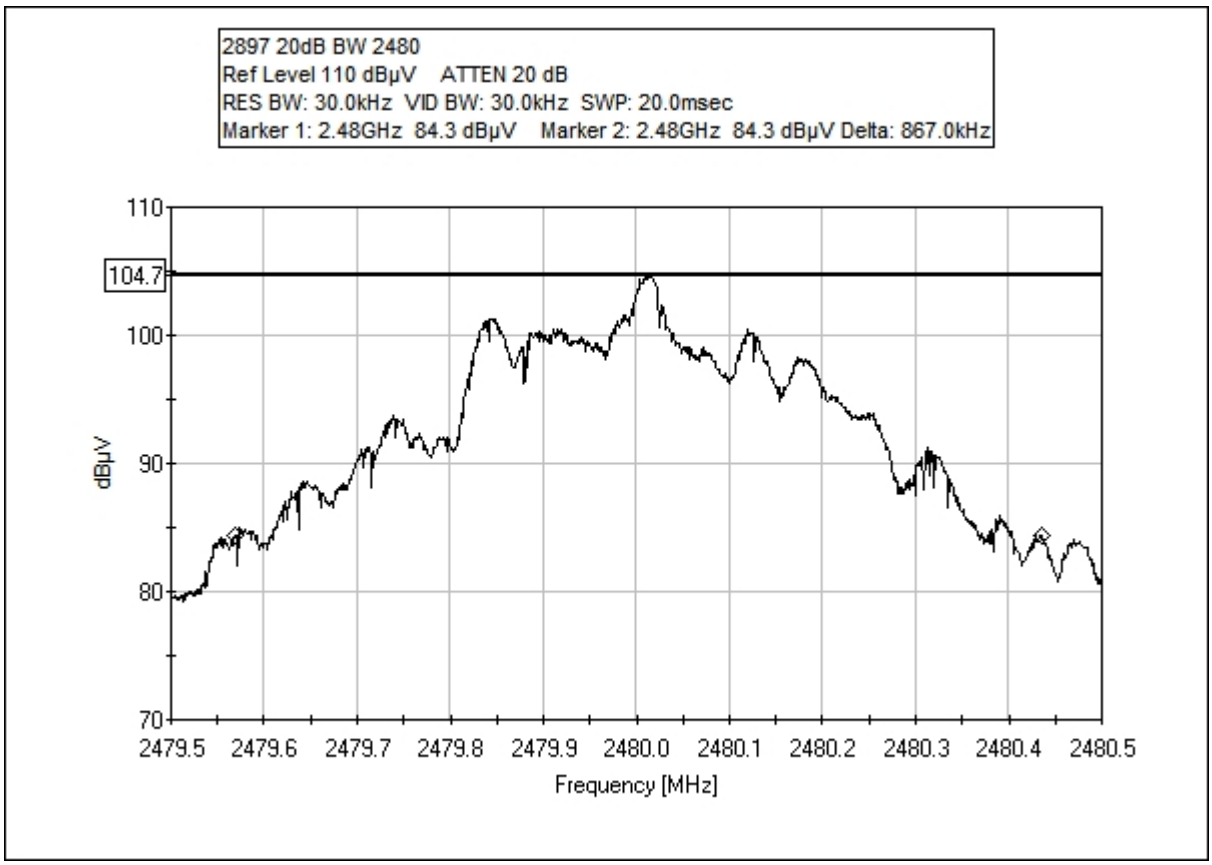
20 dB BW 2402 MHz



20B BW 2441Hz



20B BW 2480 MHz



5.5 Number of Hopping Frequencies

Requirement(s): CFR47, 15.247(a)(1)(iii), RSS210(A8.1)

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Number of Hopping Frequencies

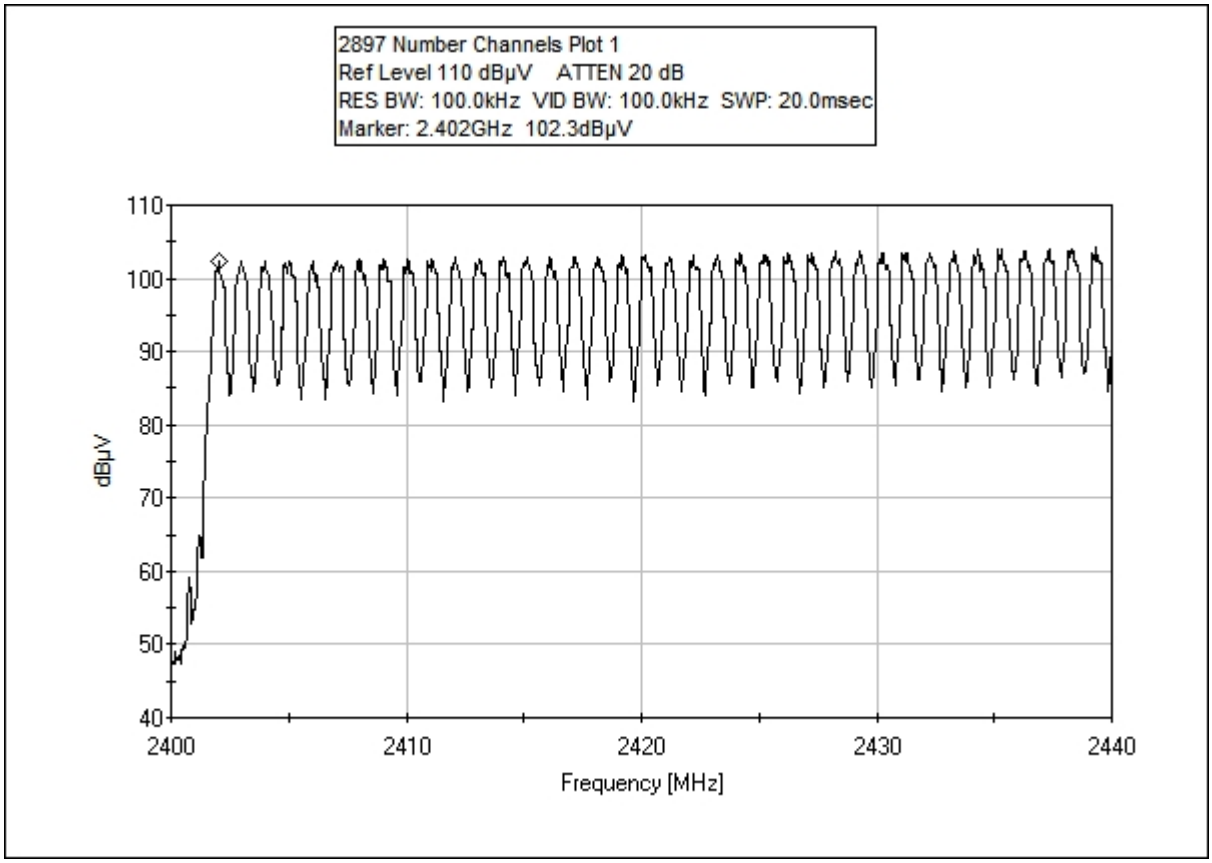
EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	75º F, 30.92
Date of Measurement	2/12/09
Measured by	Bob Cole
Result	PASSED

Limits and results

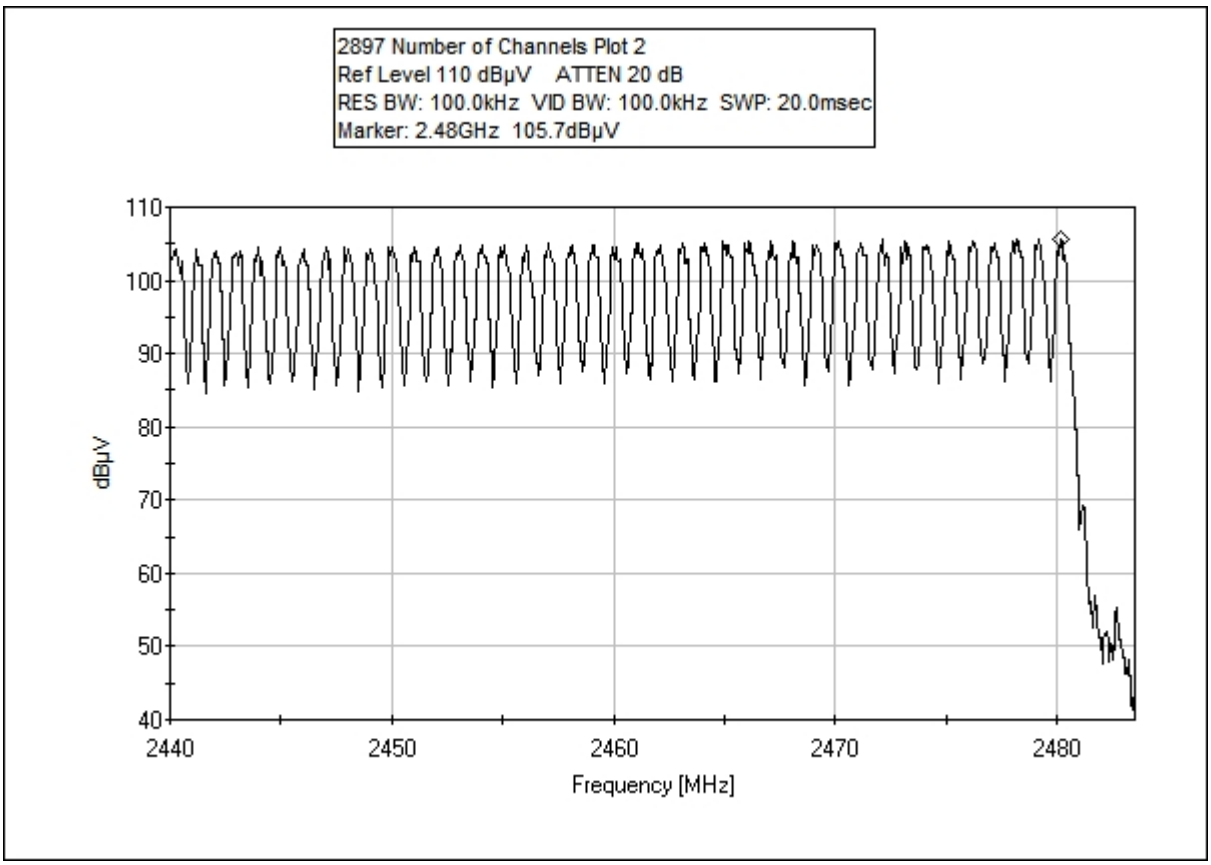
NUMBER OF HOPPING FREQUENCIES

EUT Channel	Limit (MHz)	Test results (MHz)
2-80	>/= 15	79

Number of Hopping Frequencies (2402 – 2441)



Number of Hopping Frequencies (2441 – 2480)



5.6 Time of Occupancy

Requirement(s): CFR47, 15.247(a)(1)(iii), RSS210(A8.1)

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Time of Occupancy

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

Time of Occupancy

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.

5.7 Peak Output Power

Requirement(s): CFR47, 15.247(b)(1), RSS210(A8.4)

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

Peak Output Power

EUT	**CORDLESS HAND SCANNER 7X**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	67º F, 30.97
Date of Measurement	2/1/09
Measured by	Bob Cole
Result	PASSED

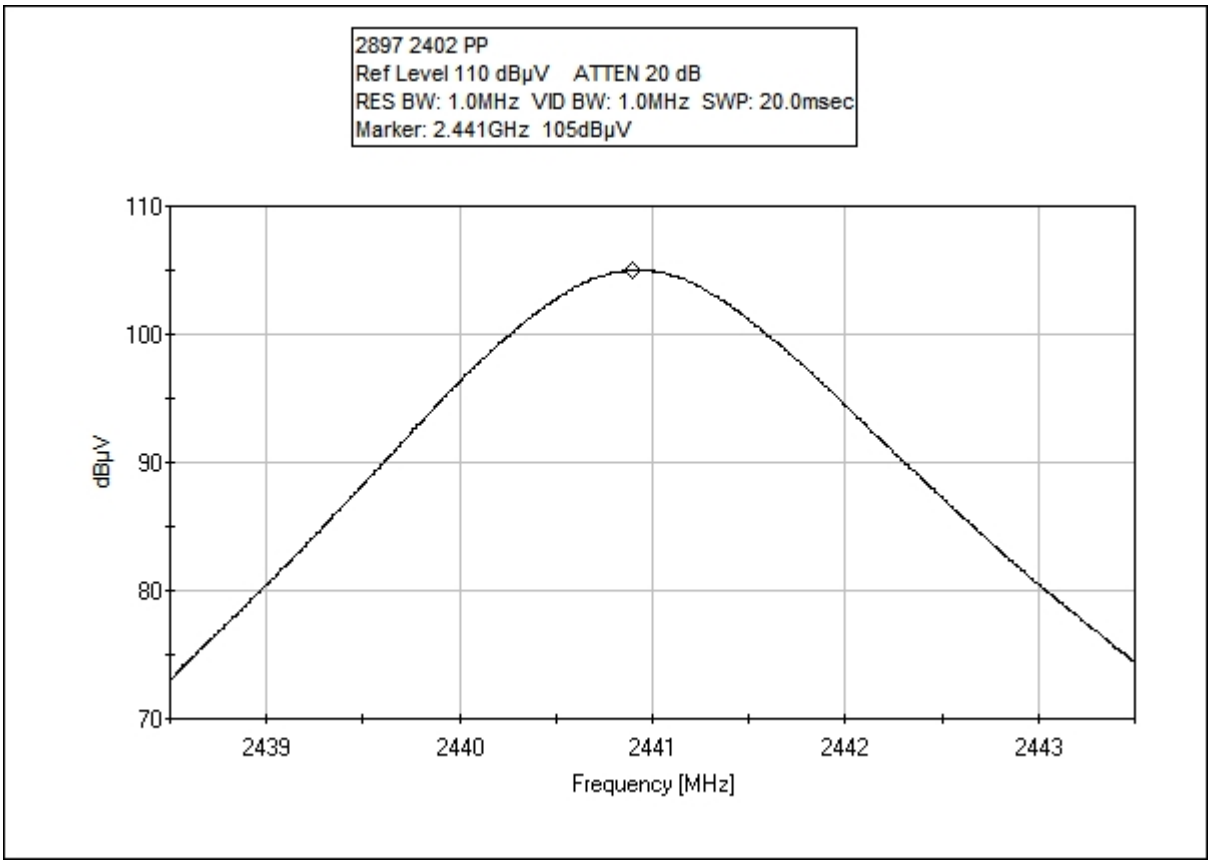
- The EUT was set to low, mid, and high channels at maximum RF Power output. The spectrum analyzer was connected directly to the antenna output.
- Conducted Emissions Measurement Uncertainty: The uncertainty of the measurement with a confidence factor of approx. 95% (normal distribution) with a coverage factor of 2, in the range of 30 MHz – 26.2 GHz, is +/- 1.5 dB

PEAK OUTPUT POWER

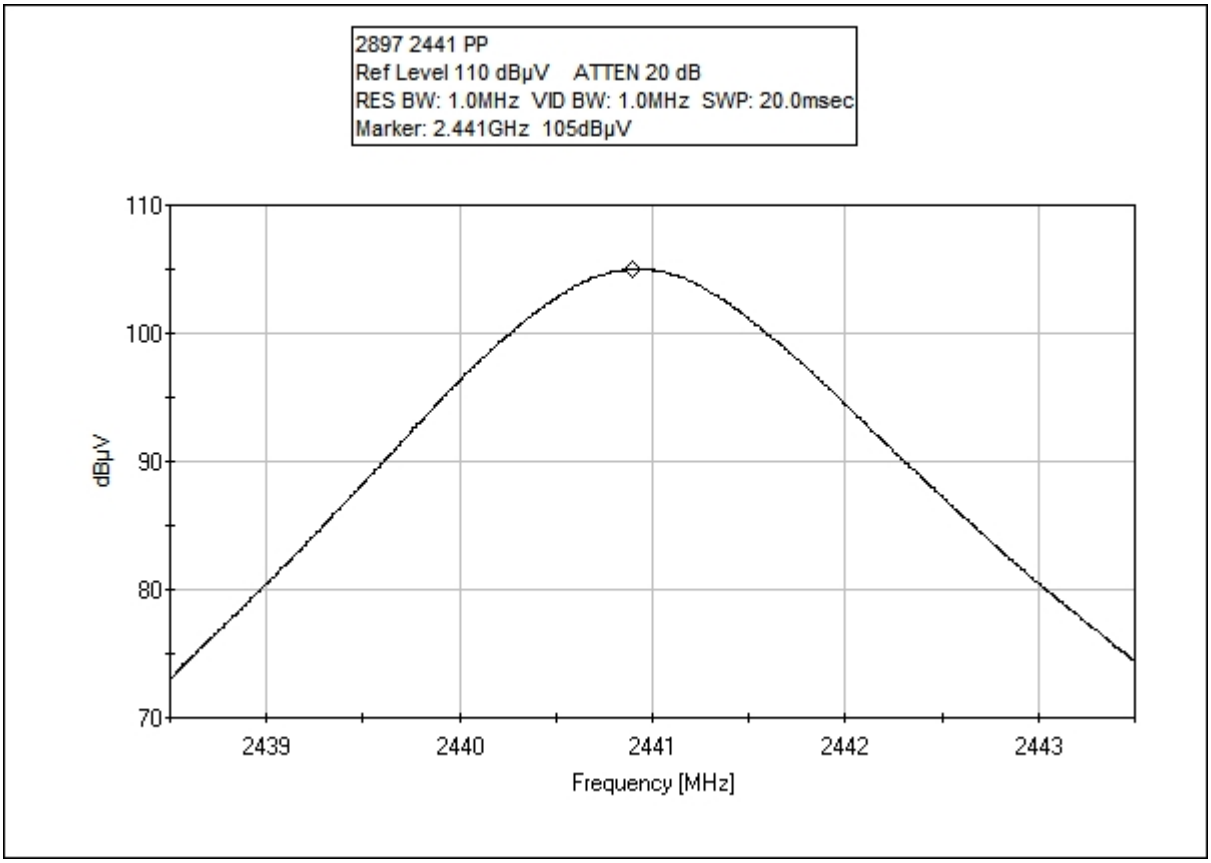
EUT Channel Info	Limit (dBm)	Test results (dBm)
2402	30.0	-2.0
2441	30.0	-2.0
2480	30.0	-0.8

Note: 0 dBm = 107 dBuV

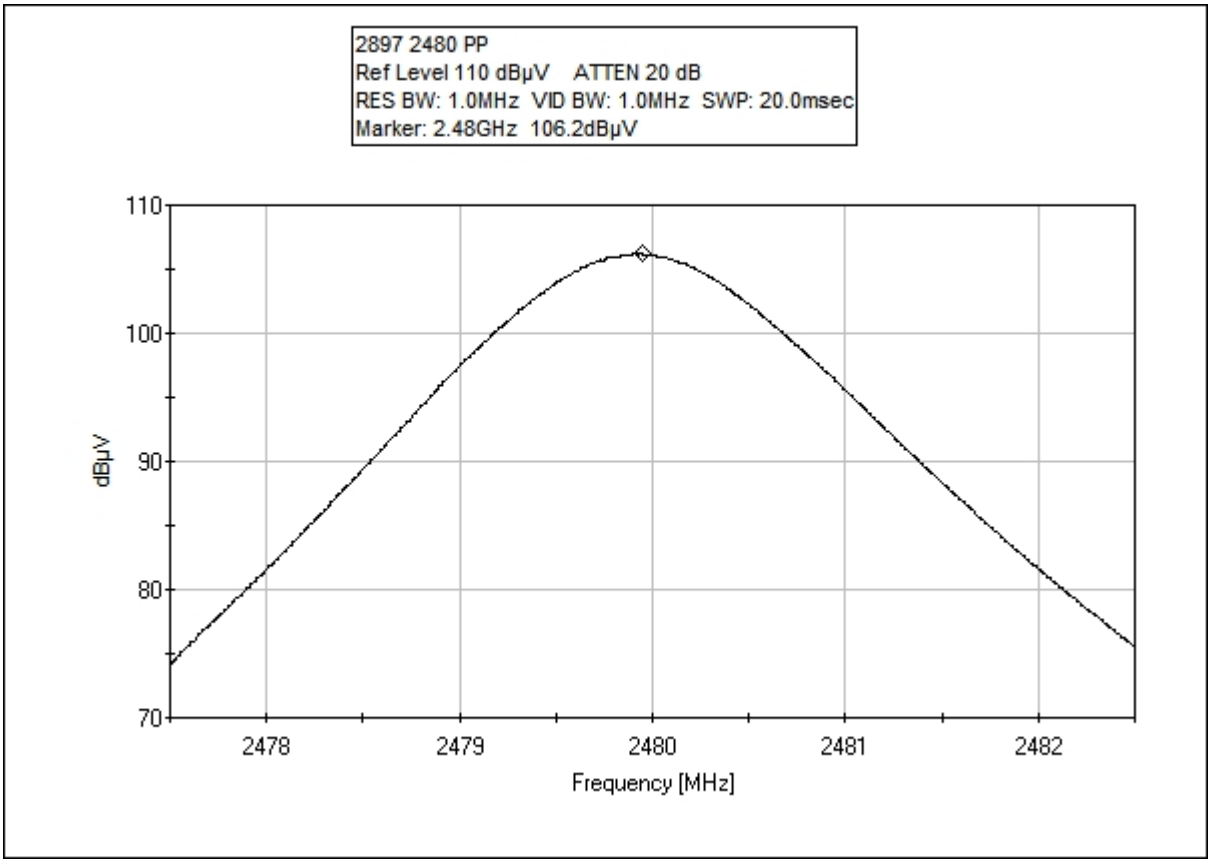
Peak Output Power – 2402 MHz



Peak Output Power – 2441 MHz



Peak Output Power – 2480 MHz



5.8 ANTENNA CONDUCTED SPURIOUS EMISSIONS

Requirement: CFR47, 15.247(d), RSS210(A8.5)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

30 – 2400 MHz
Transmit Frequency: 2402 MHz

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

Customer:	**Socket Mobile, Inc.**		
Specification:	**FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm**		
Work Order #:	**2897**	Date:	12/18/2009
Test Type:	**Conducted Emissions**	Time:	11:50:35 AM
Equipment:	**Cordless Hand Scanner**	Sequence#:	4
Manufacturer:	Socket Mobile	Tested By:	Bob Cole
Model:	CHS 7X		N/A
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW / VBW = 100 kHz
Xmit Freq: 2402 MHz

Transducer Legend:

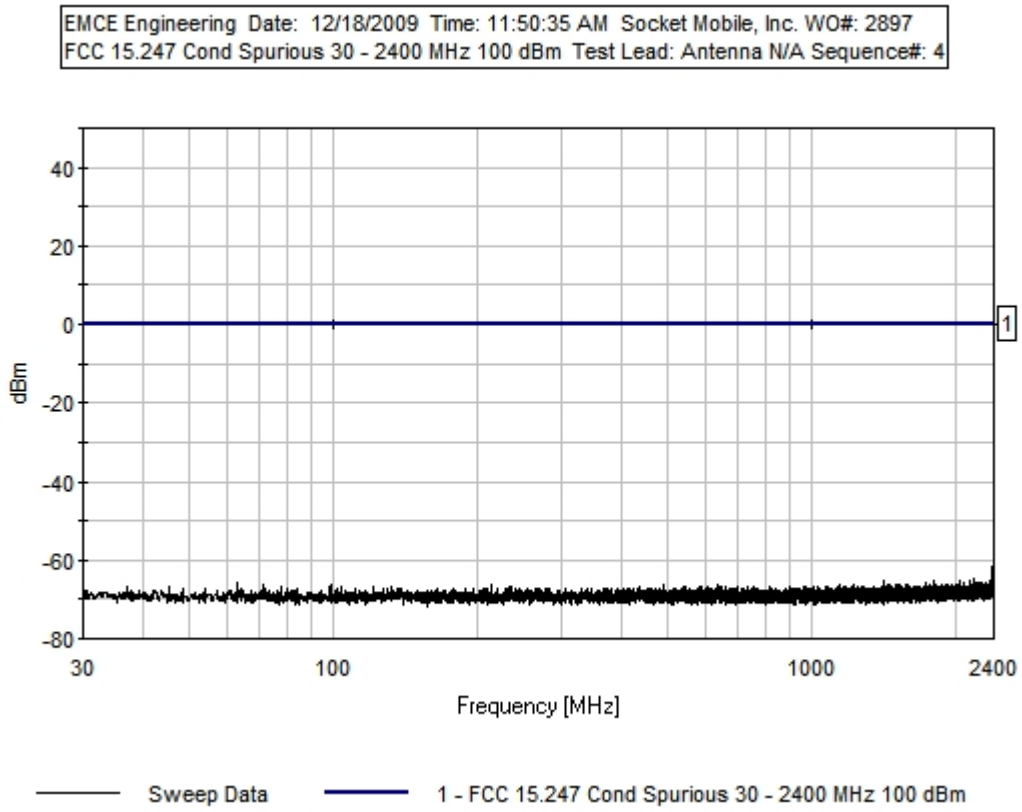
T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	2385.607M	45.2	-107.0				+0.0	-61.8	0.0	-61.8	Anten
2	2395.888M	45.1	-107.0				+0.0	-61.9	0.0	-61.9	Anten
3	2399.657M	43.4	-107.0				+0.0	-63.6	0.0	-63.6	Anten

4	2179.648M	42.3	-107.0	+0.0	-64.7	0.0	-64.7	Anten
5	2384.030M	42.3	-107.0	+0.0	-64.7	0.0	-64.7	Anten
6	2393.420M	42.2	-107.0	+0.0	-64.8	0.0	-64.8	Anten



2483.5 – 25000 MHz
Transmit Frequency: 2402 MHz

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

Customer:	**Socket Mobile, Inc.**		
Specification:	**FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz**		
Work Order #:	**2897**	Date:	12/15/2009
Test Type:	**Conducted Emissions**	Time:	2:05:08 PM
Equipment:	**Cordless Hand Scanner**	Sequence#:	2
Manufacturer:	Socket Mobile	Tested By:	Bob Cole
Model:	CHS 7X		N/A
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW/VBW = 100 kHz
Xmit Freq: 2402 MHz

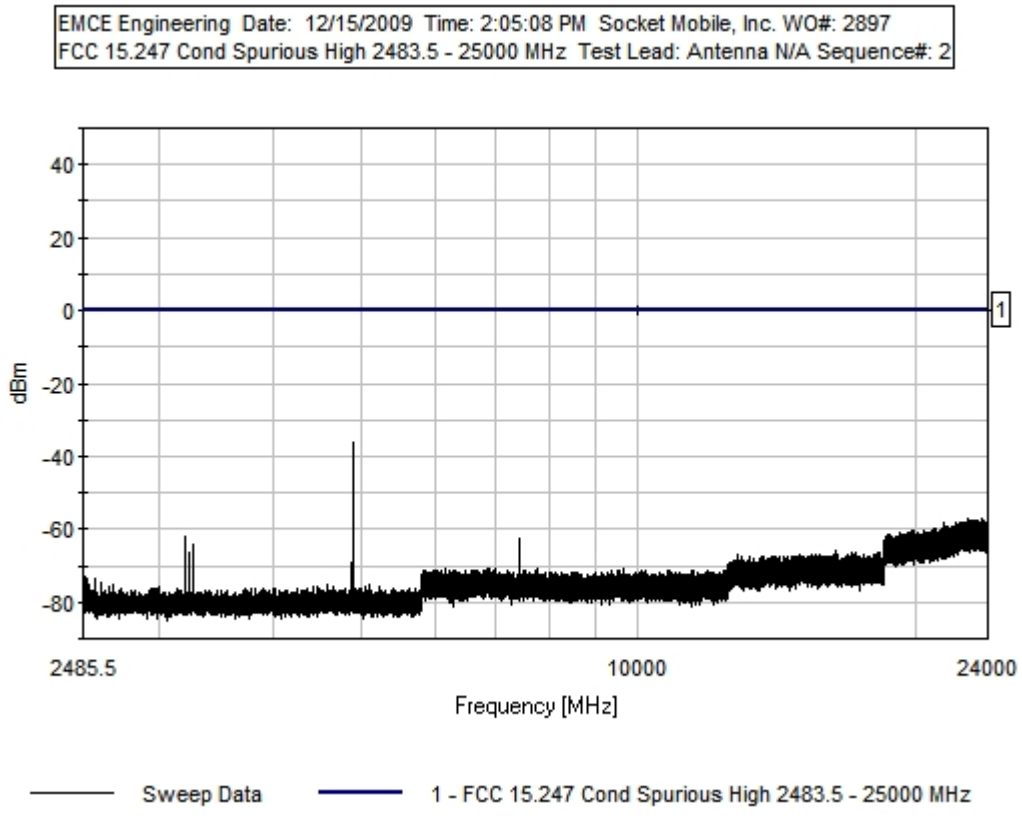
Transducer Legend:

T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	4885.898M	70.8	-107.0				+0.0	-36.2	0.0	-36.2	Anten
2	4890.502M	65.1	-107.0				+0.0	-41.9	0.0	-41.9	Anten
3	22819.510 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
4	23644.340 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
5	23956.610 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
6	23735.830 M	49.5	-107.0				+0.0	-57.5	0.0	-57.5	Anten


EMCE Engineering Date: 12/15/2009 Time: 2:05:08 PM Socket Mobile, Inc. WO#: 2897
FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz Test Lead: Antenna N/A Sequence#: 2
40
20
0
-20
-40
-60
-80
dBm
1
2485.5
10000
24000
Frequency [MHz]
Sweep Data
1 - FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz

30 – 2400 MHz
Transmit Frequency: 2441 MHz

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

Customer:	**Socket Mobile, Inc.**		
Specification:	**FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm**		
Work Order #:	**2897**	Date:	12/18/2009
Test Type:	**Conducted Emissions**	Time:	12:12:36 PM
Equipment:	**Cordless Hand Scanner**	Sequence#:	5
Manufacturer:	Socket Mobile	Tested By:	Bob Cole
Model:	CHS 7X		N/A
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW/VBW = 100 kHz
Xmit Freq: 2441 MHz

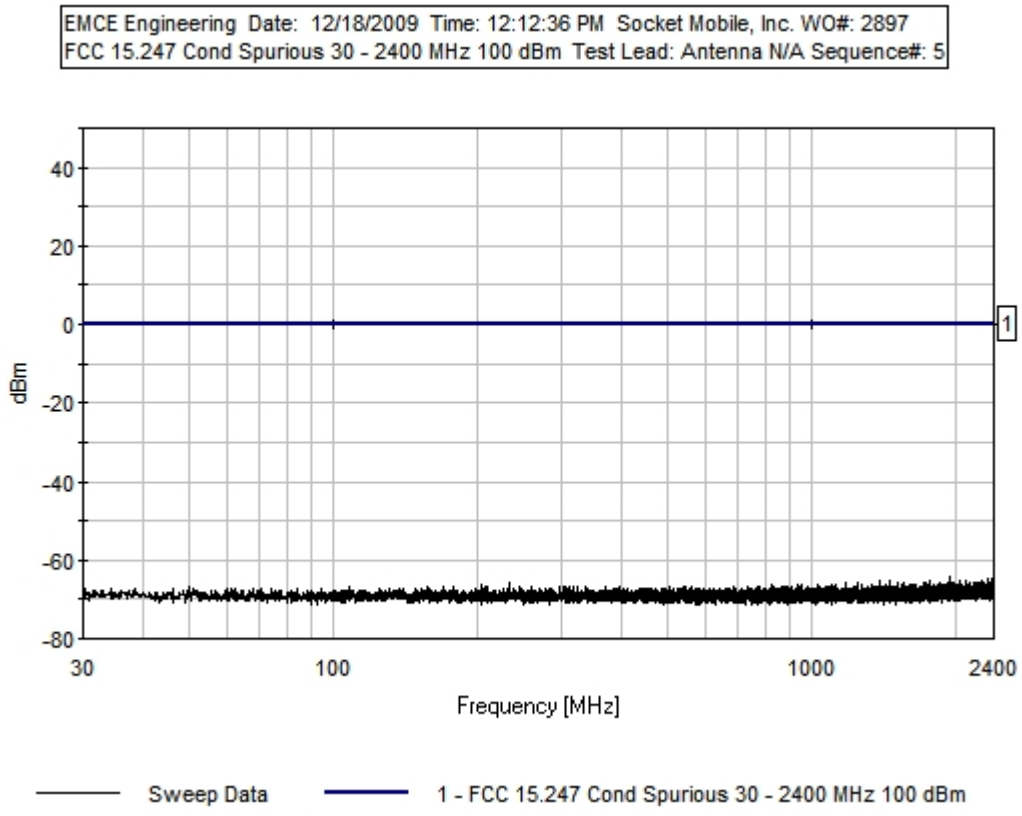
Transducer Legend:

T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	1938.407M	42.6	-107.0				+0.0	-64.4	0.0	-64.4	Anten
2	2377.313M	42.2	-107.0				+0.0	-64.8	0.0	-64.8	Anten
3	2323.392M	42.1	-107.0				+0.0	-64.9	0.0	-64.9	Anten
4	1381.751M	41.9	-107.0				+0.0	-65.1	0.0	-65.1	Anten
5	2255.824M	41.9	-107.0				+0.0	-65.1	0.0	-65.1	Anten
6	2272.641M	41.9	-107.0				+0.0	-65.1	0.0	-65.1	Anten


EMCE Engineering Date: 12/18/2009 Time: 12:12:36 PM Socket Mobile, Inc. WO#: 2897
FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm Test Lead: Antenna N/A Sequence#: 5
40
20
0
-20
-40
-60
-80
dBm
1
30
100
1000
2400
Frequency [MHz]
Sweep Data
1 - FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm

2483.5 – 25000 MHz
Transmit Frequency: 2441 MHz

30 – 2400 MHz
Transmit Frequency: 2480 MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm**
Work Order #: **2897** Date: 12/15/2009
Test Type: **Conducted Emissions** Time: 3:44:39 PM
Equipment: **Cordless Hand Scanner** Sequence#: 3
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X N/A
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW / VBW = 100 kHz
Xmit Freq: 2480 MHz

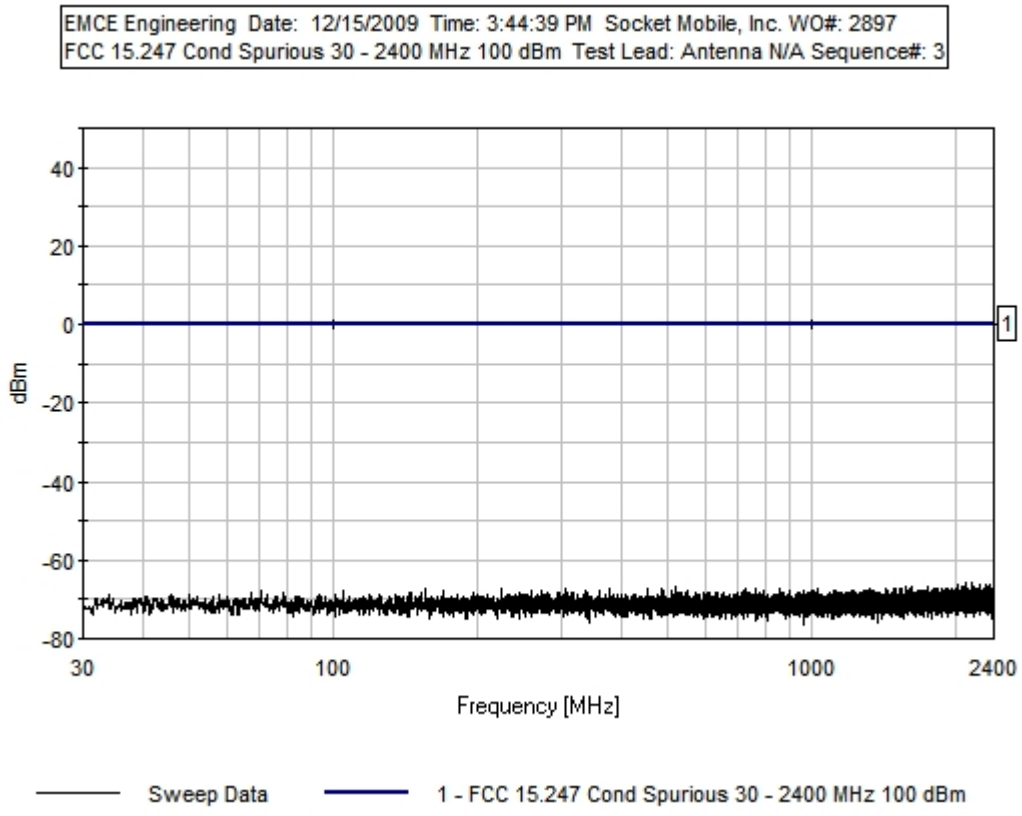
Transducer Legend:

T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	2093.162M	41.4	-107.0				+0.0	-65.6	0.0	-65.6	Anten
2	2152.822M	41.1	-107.0				+0.0	-65.9	0.0	-65.9	Anten
3	2236.505M	40.9	-107.0				+0.0	-66.1	0.0	-66.1	Anten
4	2361.618M	40.9	-107.0				+0.0	-66.1	0.0	-66.1	Anten
5	2015.284M	40.7	-107.0				+0.0	-66.3	0.0	-66.3	Anten
6	2309.979M	40.6	-107.0				+0.0	-66.4	0.0	-66.4	Anten


EMCE Engineering Date: 12/15/2009 Time: 3:44:39 PM Socket Mobile, Inc. WO#: 2897
FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm Test Lead: Antenna N/A Sequence#: 3
40
20
0
-20
-40
-60
-80
dBm
1
30
100
1000
2400
Frequency [MHz]
Sweep Data
1 - FCC 15.247 Cond Spurious 30 - 2400 MHz 100 dBm

2483.5 – 25000 MHz
Transmit Frequency: 2480 MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz**
Work Order #: **2897** Date: 12/15/2009
Test Type: **Conducted Emissions** Time: 2:05:08 PM
Equipment: **Cordless Hand Scanner** Sequence#: 2
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X N/A
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW / VBW = 100 kHz
Xmit Freq: = 2480 MHz

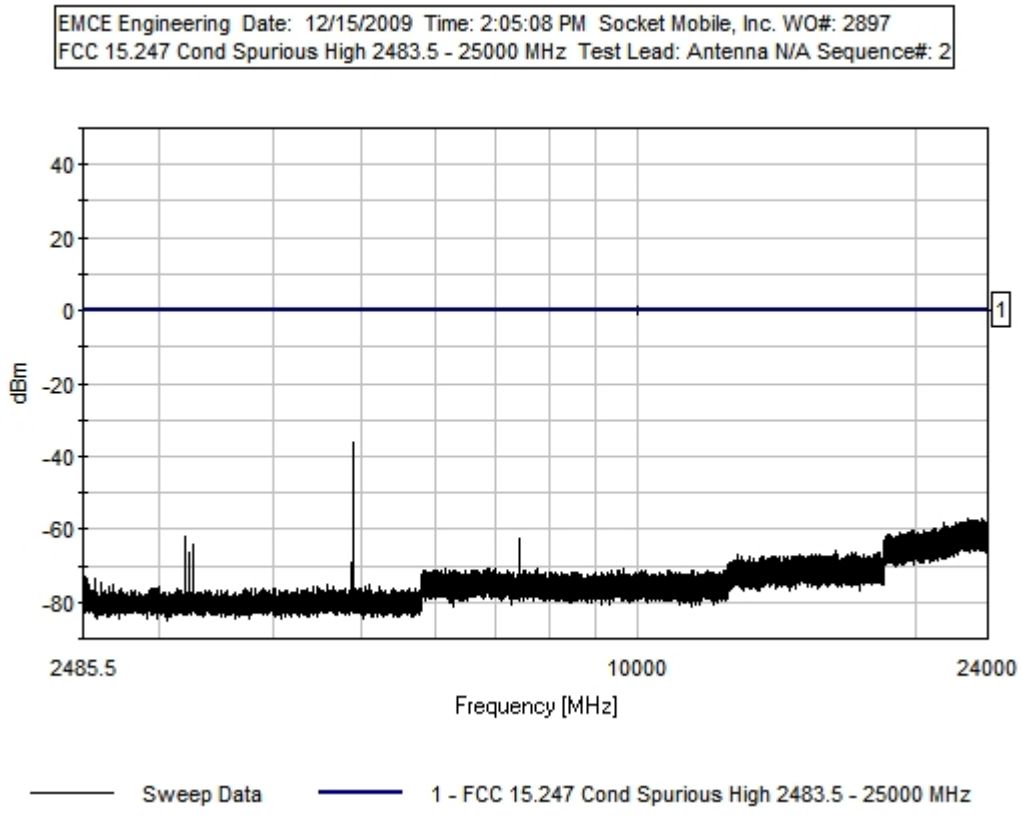
Transducer Legend:

T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	4885.898M	70.8	-107.0				+0.0	-36.2	0.0	-36.2	Anten
2	4890.502M	65.1	-107.0				+0.0	-41.9	0.0	-41.9	Anten
3	22819.510 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
4	23644.340 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
5	23956.610 M	49.7	-107.0				+0.0	-57.3	0.0	-57.3	Anten
6	23735.830 M	49.5	-107.0				+0.0	-57.5	0.0	-57.5	Anten


EMCE Engineering Date: 12/15/2009 Time: 2:05:08 PM Socket Mobile, Inc. WO#: 2897
FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz Test Lead: Antenna N/A Sequence#: 2
40
20
0
-20
-40
-60
-80
dBm
1
2485.5
10000
24000
Frequency [MHz]
Sweep Data
1 - FCC 15.247 Cond Spurious High 2483.5 - 25000 MHz

5.9 Radiated Emissions – Restricted Bands

Requirement(s): CFR47, 15.247(d), 15.209, RSS210(2.2, A8.5)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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)).**

Restricted Band Measurements

EUT	**CORDLESS HAND SCANNER 7X**
Test setup	B (Radiated)
Temp, Humidity, Air Pressure	68º F, 30.02
Date of Measurement	12/21/09
Measured by	Bob Cole
Result	PASSED

Restricted Band Measurements were taken, using a Peak detector, over the frequency band of 30 - 1000 MHz, and using an Average Detector over the bands of 1000 – 2400 MHz, and 2483.5 – 25000 MHz, in both horizontal and vertical polarizations. All measurements were repeated with the EUT operating at 2402, 2441, and 2480 MHz. Worst case data is presented in this report.

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2402 MHz

30 - 1000 MHz
PEAK DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **EN55022B RADIATED**
Work Order #: **2897** Date: 12/21/2009
Test Type: **Radiated Scan** Time: 14:49:40
Equipment: **Cordless Hand Scanner** Sequence#: 1
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	12/01/2009	12/01/2010	004
HP 85650A Quasi Peak Adapter	3145A01673	03/30/2009	03/30/2010	003
EMCO BiConiLog Antenna	1059-0087	08/22/2008	08/22/2010	005
HP 8447D PreAmp	2443A03587	03/30/2009	03/30/2010	008

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

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transducer Legend:

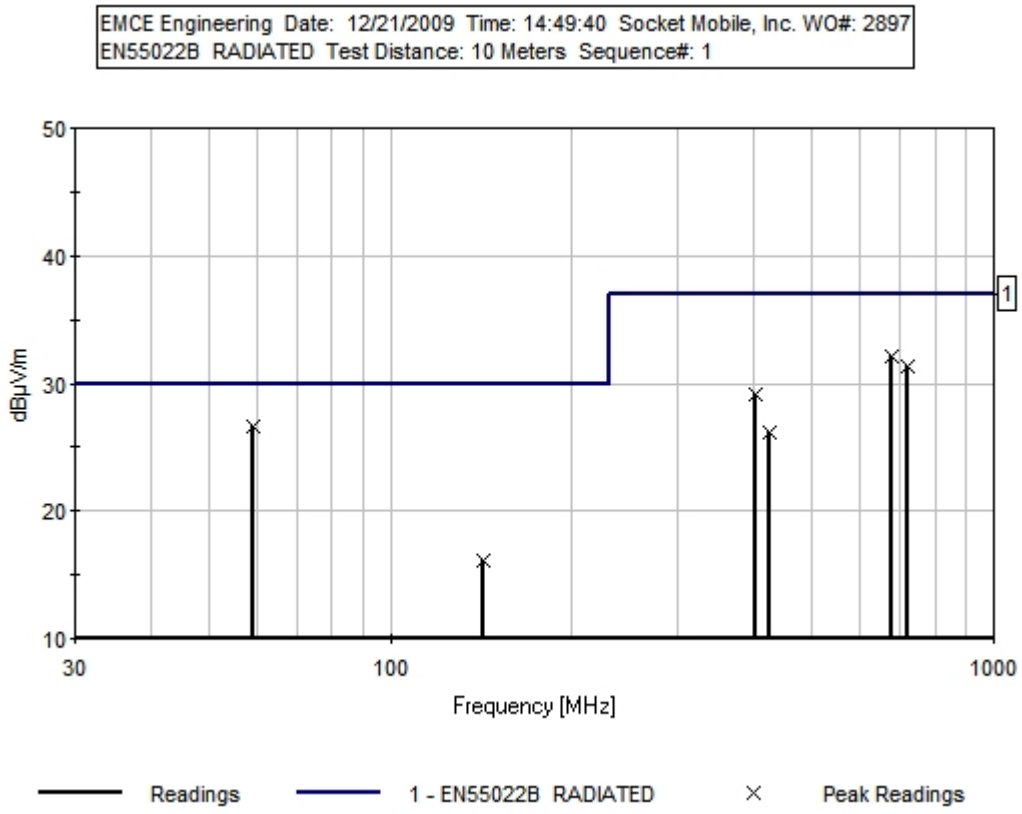
T1=75' LMR Cable to 1 GHz	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 377	

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 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	59.080M	31.1	+2.1	+20.6	+27.1		+0.0 127	26.7	30.0	-3.3	Vert 290
2	677.290M	36.5	+2.1	+20.6	+27.1		+0.0 177	32.1	37.0	-4.9	Vert 154
3	719.580M	34.4	+2.2	+21.9	+27.1		+0.0 202	31.4	37.0	-5.6	Vert 119
4	402.760M	38.1	+2.1	+16.0	+27.0		+0.0 150	29.2	37.0	-7.8	Vert 128

5	424.180M	34.5	+2.1	+16.5	+27.0	+0.092	26.1	37.0	-10.9	Vert 225
6	142.080M	34.3	+1.0	+7.4	+26.6	+0.04	16.1	30.0	-13.9	Vert 171



Restricted Band Spurious Radiated Emissions
Transmit Frequency 2402 MHz

1000 - 2400 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 1000 - 2400**
Work Order #: **2897** Date: 12/17/2009
Test Type: **Radiated Scan** Time: 12:39:09 PM
Equipment: **Cordless Hand Scanner** Sequence#: 11
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

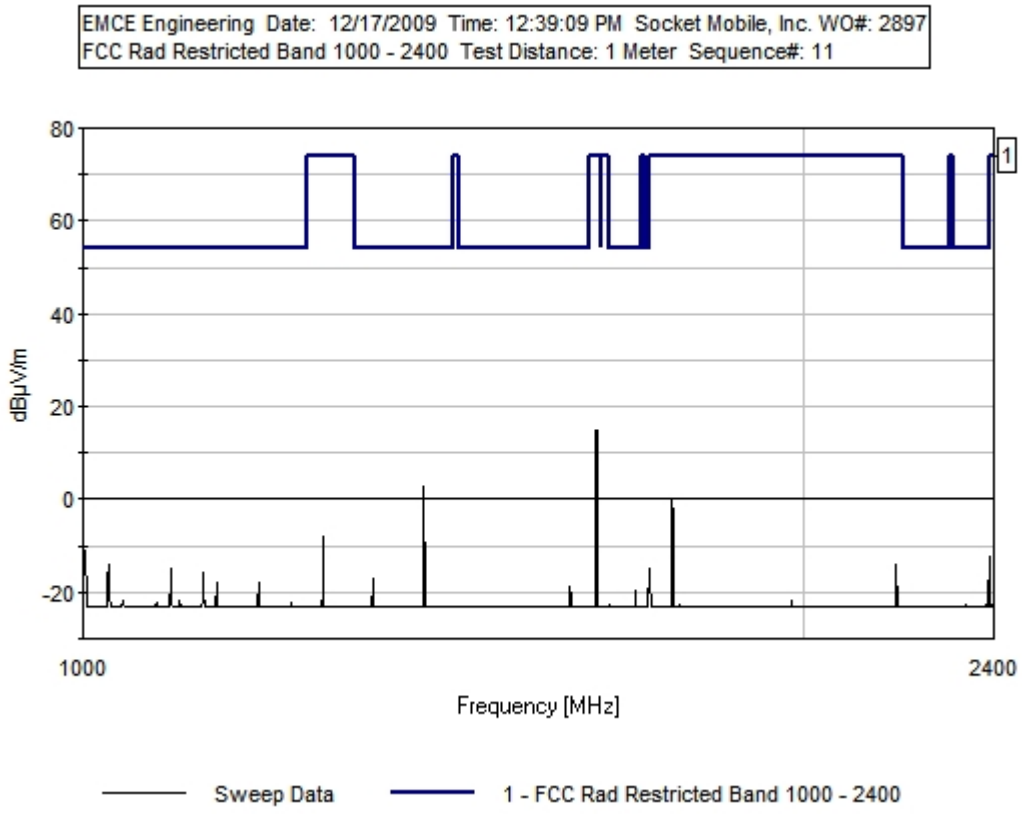
RBW = 1 MHz
VBW = 10 Hz
Xmit Freq: 2402 MHz

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	1387.760M	13.0					-10.0	3.0	54.0	-51.0	Vert
2	1637.919M	24.9					-10.0	14.9	74.0	-59.1	Vert
3	1001.699M	-1.2					-10.0	-11.2	54.0	-65.2	Vert
4	2389.043M	-2.3					-10.0	-12.3	54.0	-66.3	Vert
5	1024.629M	-4.1					-10.0	-14.1	54.0	-68.1	Vert
6	1088.326M	-4.7					-10.0	-14.7	54.0	-68.7	Vert


EMCE Engineering Date: 12/17/2009 Time: 12:39:09 PM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 1000 - 2400 Test Distance: 1 Meter Sequence#: 11
80
60
40
20
0
-20
dBµV/m
1
1000
2400
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 1000 - 2400

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2402 MHz

2483.5 - 25000 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 2483.5-25G**
Work Order #: **2897** Date: 12/16/2009
Test Type: **Radiated Scan** Time: 3:12:19 PM
Equipment: **Cordless Hand Scanner** Sequence#: 6
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

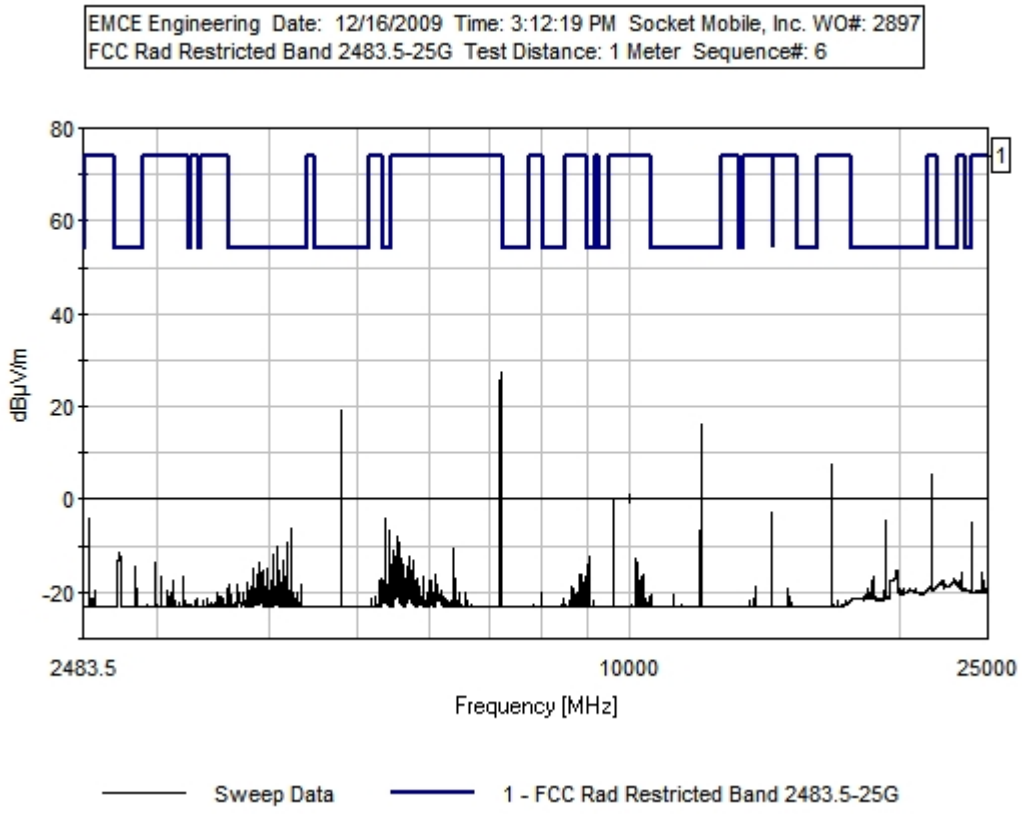
RBW = 1MHz
VBW = 10 Hz
Xmit Freq: 2402 MHz

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	4806.162M	29.0					-10.0	19.0	54.0	-35.0	Vert
2	12012.140M	26.1					-10.0	16.1	54.0	-37.9	Vert
3	7207.149M	37.2					-10.0	27.2	74.0	-46.8	Vert
4	5380.049M	5.9					-10.0	-4.1	54.0	-58.1	Vert
5	19218.110M	5.6					-10.0	-4.4	54.0	-58.4	Vert
6	4230.768M	3.9					-10.0	-6.1	54.0	-60.1	Vert


EMCE Engineering Date: 12/16/2009 Time: 3:12:19 PM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 2483.5-25G Test Distance: 1 Meter Sequence#: 6
80
60
40
20
0
-20
dBµV/m
1
2483.5
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 2483.5-25G

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2441 MHz

30 - 1000 MHz
PEAK DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **EN55022B RADIATED**
Work Order #: **2897** Date: 12/21/2009
Test Type: **Radiated Scan** Time: 14:53:14
Equipment: **Cordless Hand Scanner** Sequence#: 2
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	12/01/2009	12/01/2010	004
HP 85650A Quasi Peak Adapter	3145A01673	03/30/2009	03/30/2010	003
EMCO BiConiLog Antenna	1059-0087	08/22/2008	08/22/2010	005
HP 8447D PreAmp	2443A03587	03/30/2009	03/30/2010	008

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

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transducer Legend:

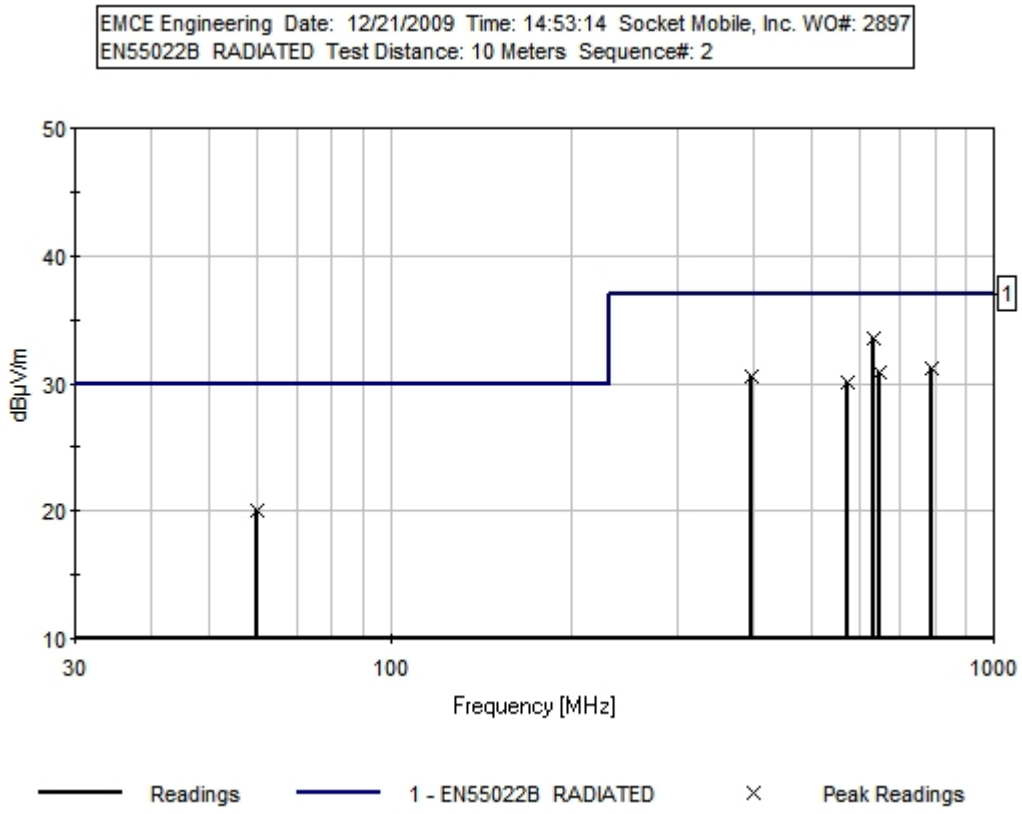
T1=75' LMR Cable to 1 GHz	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 377	

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 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	631.940M	37.5	+2.2	+21.0	+27.1		+0.0 182	33.6	37.0	-3.4	Vert 172
2	789.410M	33.3	+2.6	+22.3	+27.0		+0.0 184	31.2	37.0	-5.8	Horiz 147
3	648.530M	35.2	+2.1	+20.6	+27.1		+0.0 88	30.8	37.0	-6.2	Vert 154
4	396.740M	39.6	+2.1	+15.9	+27.0		+0.0 17	30.6	37.0	-6.4	Horiz 120

5	574.010M	35.5	+2.2	+19.4	+27.0		+0.0 119	30.1	37.0	-6.9	Horiz 200
6	60.310M	39.0	+0.6	+7.2	+26.8		+0.0 356	20.0	30.0	-10.0	Vert 144



Restricted Band Spurious Radiated Emissions
Transmit Frequency 2441 MHz

1000 - 2400 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 1000 - 2400**
Work Order #: **2897** Date: 12/17/2009
Test Type: **Radiated Scan** Time: 12:30:47 PM
Equipment: **Cordless Hand Scanner** Sequence#: 10
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

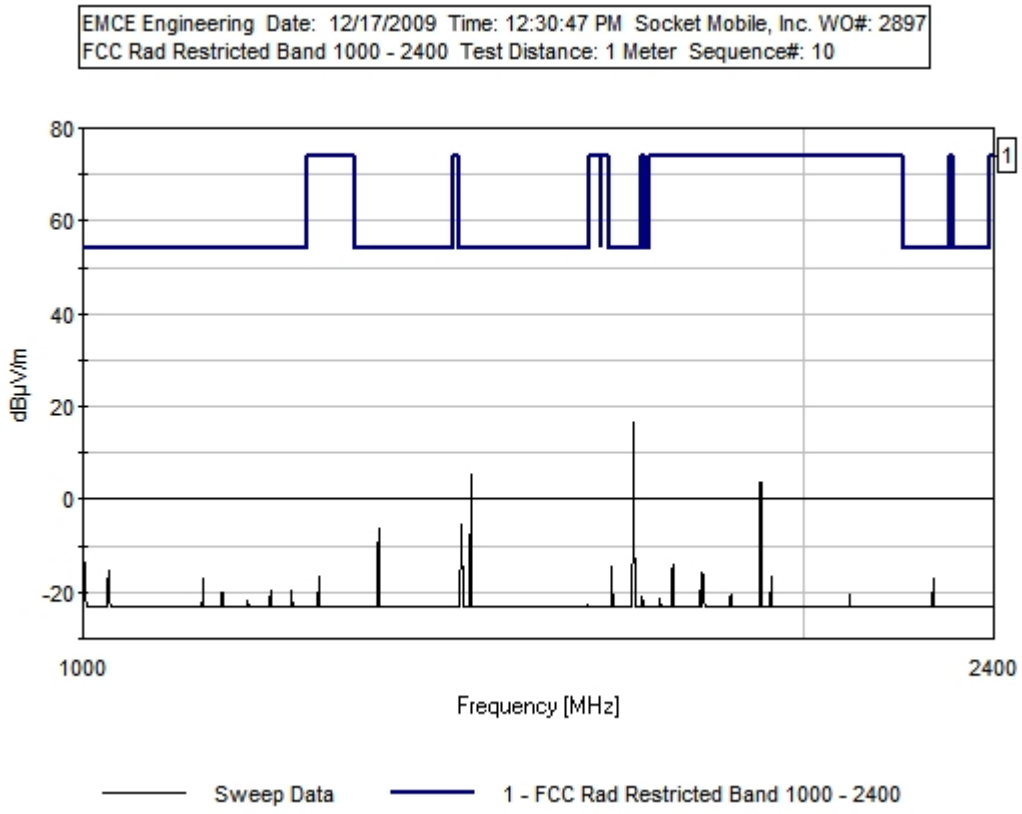
Test Conditions / Notes:

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	1697.047M	26.5					-10.0	16.5	54.0	-37.5	Vert
2	1451.437M	15.5					-10.0	5.5	54.0	-48.5	Vert
3	1438.929M	4.8					-10.0	-5.2	54.0	-59.2	Vert
4	1328.674M	3.6					-10.0	-6.4	54.0	-60.4	Vert
5	1001.699M	-3.4					-10.0	-13.4	54.0	-67.4	Vert
6	1661.797M	-4.4					-10.0	-14.4	54.0	-68.4	Vert


EMCE Engineering Date: 12/17/2009 Time: 12:30:47 PM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 1000 - 2400 Test Distance: 1 Meter Sequence#: 10
80
60
40
20
0
-20
dBµV/m
1
1000
2400
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 1000 - 2400

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2441 MHz

2483.5 - 25000 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 2483.5-25G**
Work Order #: **2897** Date: 12/17/2009
Test Type: **Radiated Scan** Time: 10:41:45 AM
Equipment: **Cordless Hand Scanner** Sequence#: 7
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

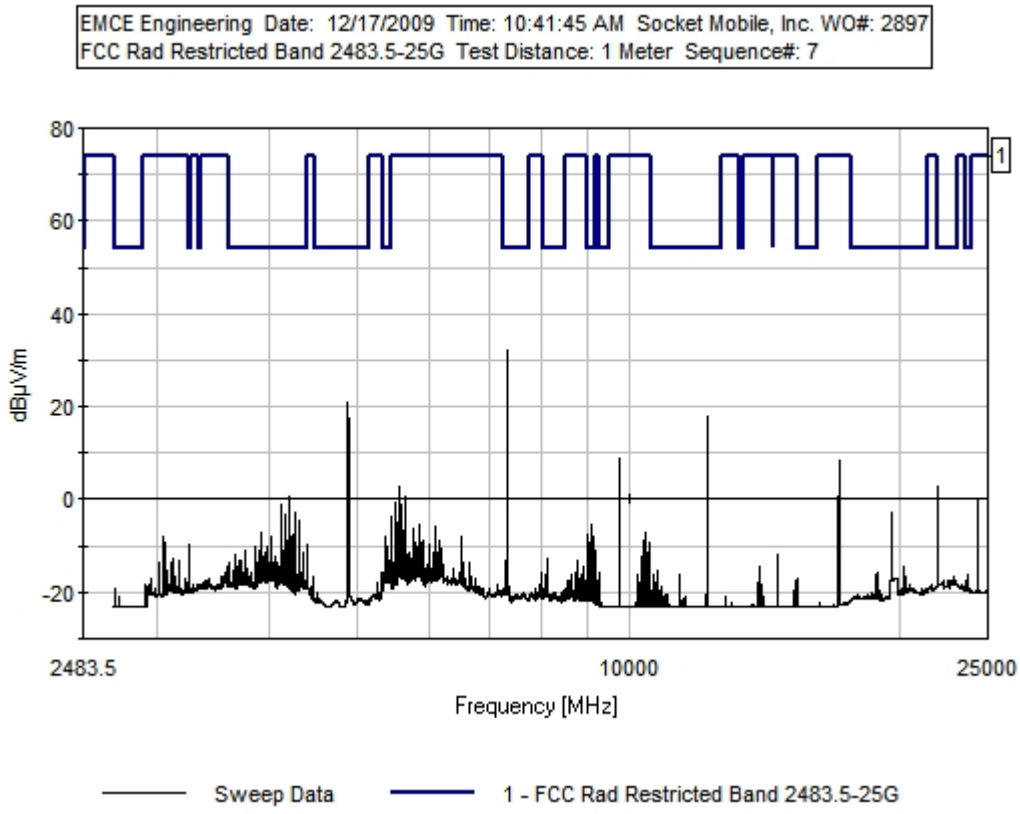
Test Conditions / Notes:

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	7323.131M	42.3					-10.0	32.3	54.0	-21.7	Vert
2	4885.994M	30.8					-10.0	20.8	54.0	-33.2	Vert
3	12206.450M	28.0					-10.0	18.0	54.0	-36.0	Vert
4	4211.187M	10.8					-10.0	0.8	54.0	-53.2	Vert
5	4110.267M	9.1					-10.0	-0.9	54.0	-54.9	Vert
6	4260.894M	7.3					-10.0	-2.7	54.0	-56.7	Vert


EMCE Engineering Date: 12/17/2009 Time: 10:41:45 AM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 2483.5-25G Test Distance: 1 Meter Sequence#: 7
80
60
40
20
0
-20
dBµV/m
1
2483.5
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 2483.5-25G

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2480 MHz

30 - 1000 MHz
PEAK DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **EN55022B RADIATED**
Work Order #: **2897** Date: 12/21/2009
Test Type: **Radiated Scan** Time: 14:58:51
Equipment: **Cordless Hand Scanner** Sequence#: 3
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	12/01/2009	12/01/2010	004
HP 85650A Quasi Peak Adapter	3145A01673	03/30/2009	03/30/2010	003
EMCO BiConiLog Antenna	1059-0087	08/22/2008	08/22/2010	005
HP 8447D PreAmp	2443A03587	03/30/2009	03/30/2010	008

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

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transducer Legend:

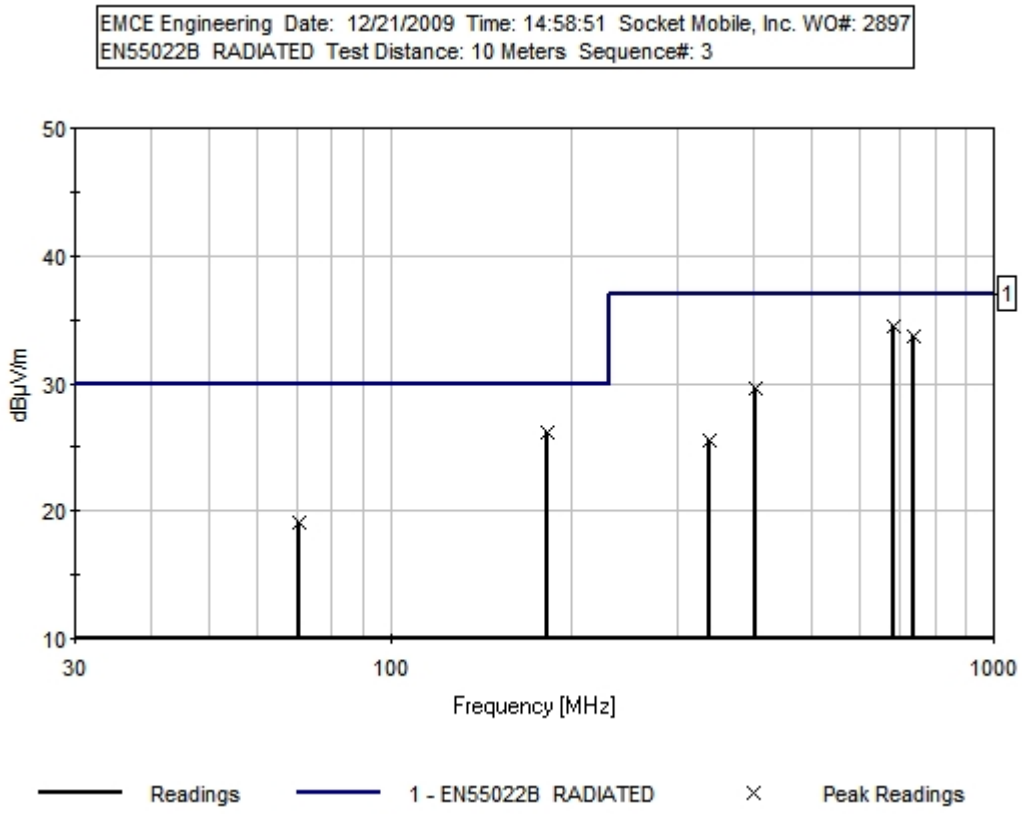
T1=75' LMR Cable to 1 GHz	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 377	

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 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	682.510M	38.8	+2.1	+20.7	+27.1		+0.0 174	34.5	37.0	-2.5	Horiz 210
2	737.480M	36.7	+2.3	+21.8	+27.1		+0.0 37	33.7	37.0	-3.3	Vert 254
3	181.470M	41.7	+1.4	+9.8	+26.7		+0.0 6	26.2	30.0	-3.8	Horiz 278
4	401.880M	38.6	+2.1	+15.9	+27.0		+0.0 358	29.6	37.0	-7.4	Horiz 154
5	70.490M	38.7	+0.8	+6.5	+26.9		+0.0 180	19.1	30.0	-10.9	Vert 152

6	336.780M	35.8	+1.9	+14.8	+26.9		+0.0 188	25.6	37.0	-11.4	Vert 162



Restricted Band Spurious Radiated Emissions
Transmit Frequency 2480 MHz

1000 - 2400 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 1000 - 2400**
Work Order #: **2897** Date: 12/16/2009
Test Type: **Radiated Scan** Time: 11:45:10 AM
Equipment: **Cordless Hand Scanner** Sequence#: 2
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW = 1 MHz
VBW = 10 Hz
Xmit Freq: 2480 MHz

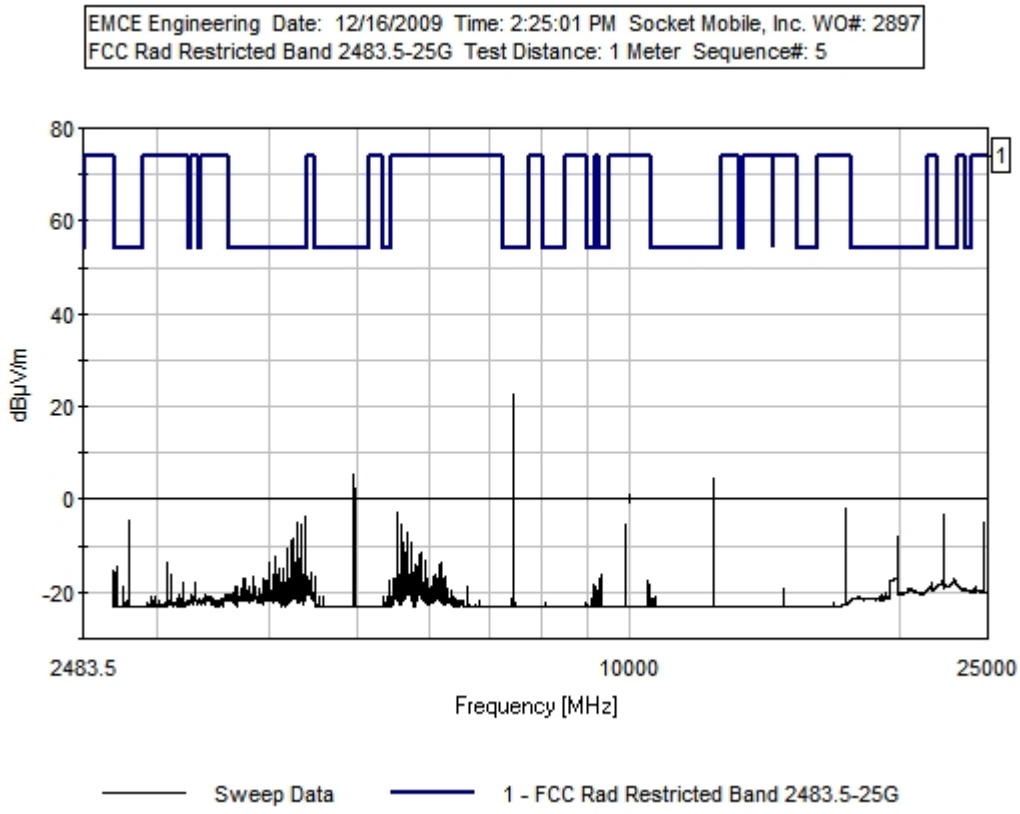
Transducer Legend:

T1=dBuV/M to dBm factor - 1 Meter

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	1515.843M	80.4	+104.7				-10.0	-34.3	54.0	-88.3	Vert
2	1397.881M	70.7	+104.7				-10.0	-44.0	54.0	-98.0	Vert
3	1554.407M	67.8	+104.7				-10.0	-46.9	54.0	-100.9	Vert
4	1025.417M	66.0	+104.7				-10.0	-48.7	54.0	-102.7	Vert
5	1123.698M	65.0	+104.7				-10.0	-49.7	54.0	-103.7	Vert
6	1030.501M	64.0	+104.7				-10.0	-50.7	54.0	-104.7	Vert


EMCE Engineering Date: 12/16/2009 Time: 2:25:01 PM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 2483.5-25G Test Distance: 1 Meter Sequence#: 5
80
60
40
20
0
-20
dBµV/m
1
2483.5
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 2483.5-25G

Restricted Band Spurious Radiated Emissions
Transmit Frequency 2480 MHz

2483.5 - 25000 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 2483.5-25G**
Work Order #: **2897** Date: 12/16/2009
Test Type: **Radiated Scan** Time: 2:25:01 PM
Equipment: **Cordless Hand Scanner** Sequence#: 5
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
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 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

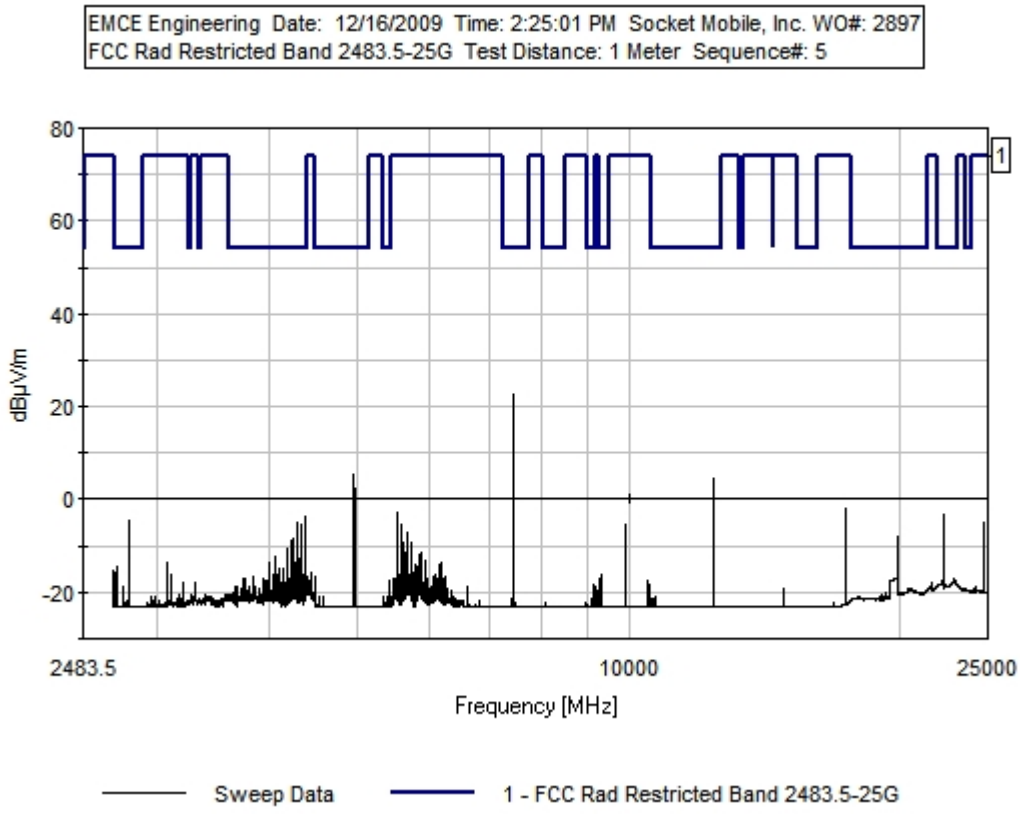
RBW = 1 MHz
VBW = 10 Hz
Xmit Freq: 2480 MHz

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	7440.620M	32.5					-10.0	22.5	54.0	-31.5	Vert
2	4961.307M	15.3					-10.0	5.3	54.0	-48.7	Vert
3	12402.260M	14.4					-10.0	4.4	54.0	-49.6	Vert
4	22322.530M	6.7					-10.0	-3.3	54.0	-57.3	Vert
5	4387.420M	6.4					-10.0	-3.6	54.0	-57.6	Vert
6	2797.623M	5.4					-10.0	-4.6	54.0	-58.6	Vert


EMCE Engineering Date: 12/16/2009 Time: 2:25:01 PM Socket Mobile, Inc. WO#: 2897
FCC Rad Restricted Band 2483.5-25G Test Distance: 1 Meter Sequence#: 5
80
60
40
20
0
-20
dBµV/m
1
2483.5
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC Rad Restricted Band 2483.5-25G

BAND-EDGE COMPLIANCE

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

EUT	**RING SCANNER**
Temp, Humidity, Air Pressure	59º F, 30.72
Date of Measurement	1/5/10
Measured by	Bob Cole
Result	PASSED

EUT operation mode

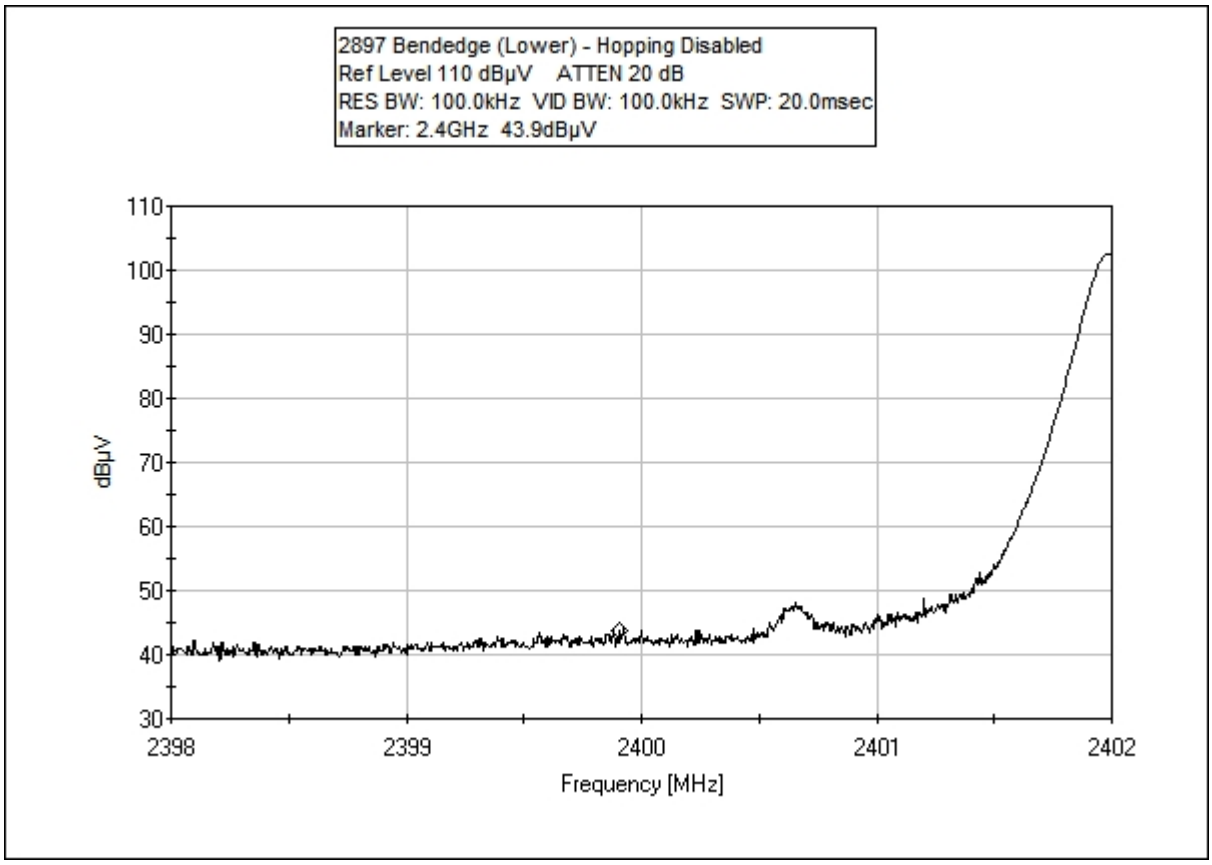
EUT operation mode	Hopping Enabled / Disabled
EUT channel	2, 80
EUT TX power level	Maximum

Limits and results

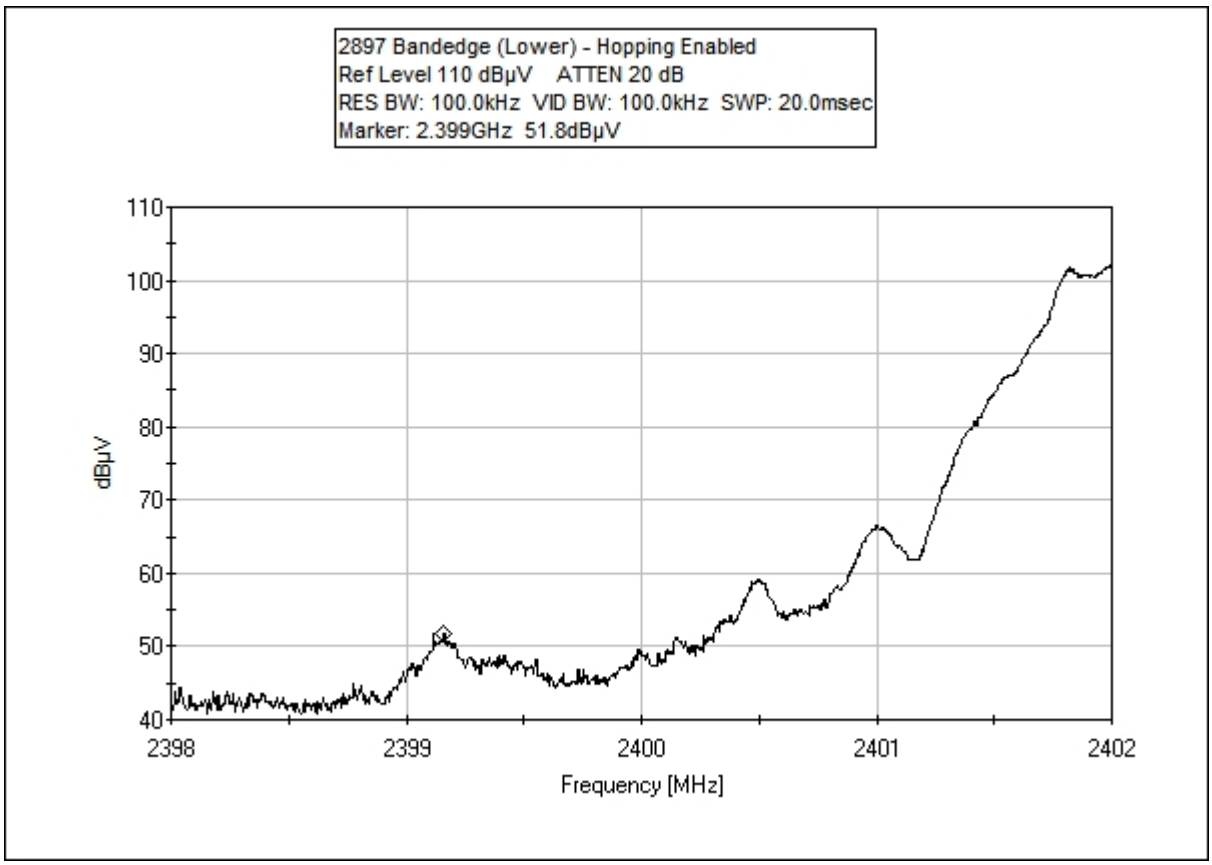
BAND-EDGE COMPLIANCE

Channel	Limit (dBuV)	Results (dBuV)
2	54	51.8
80	54	47.1

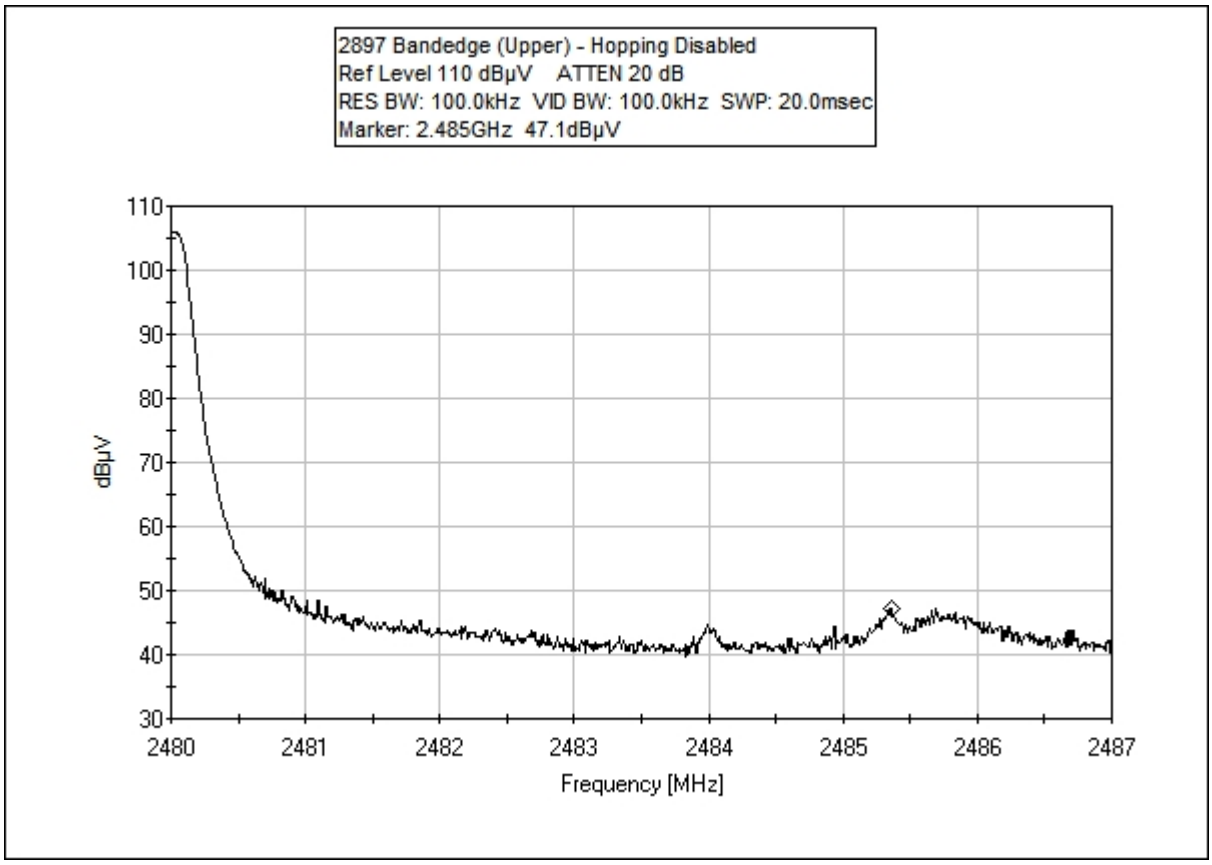
Band-edge Compliance, Lower Band-edge (Hopping Disabled)



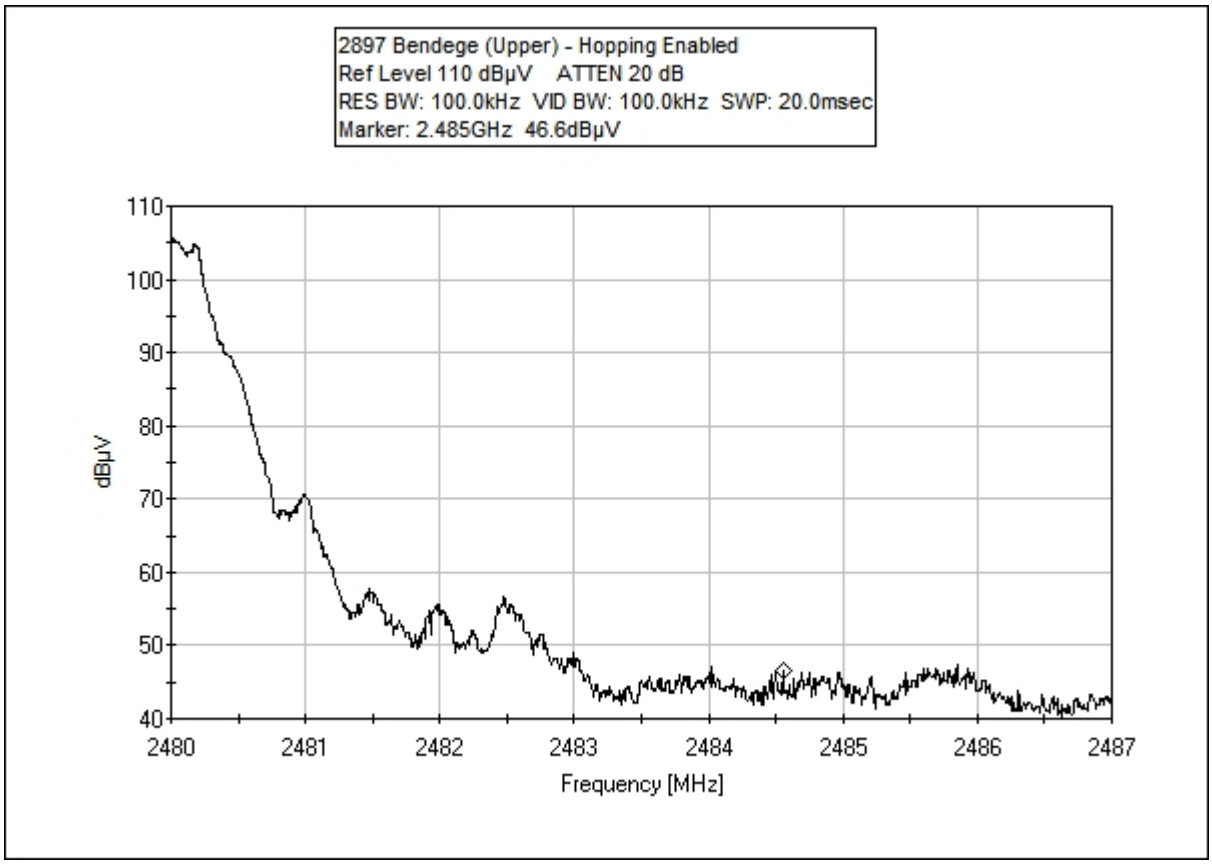
Band-edge Compliance, Lower Band-edge (Hopping Enabled)



Band-edge compliance, Upper Band-edge (Hopping Disabled)



Band-edge Compliance, Upper Band-edge (Hopping Enabled)



99% BANDWIDTH REQUIREMENT

EUT	**RING SCANNER**
Temp, Humidity, Air Pressure	59º F, 30.72
Date of Measurement	1/5/10
Measured by	Bob Cole
Result	PASSED

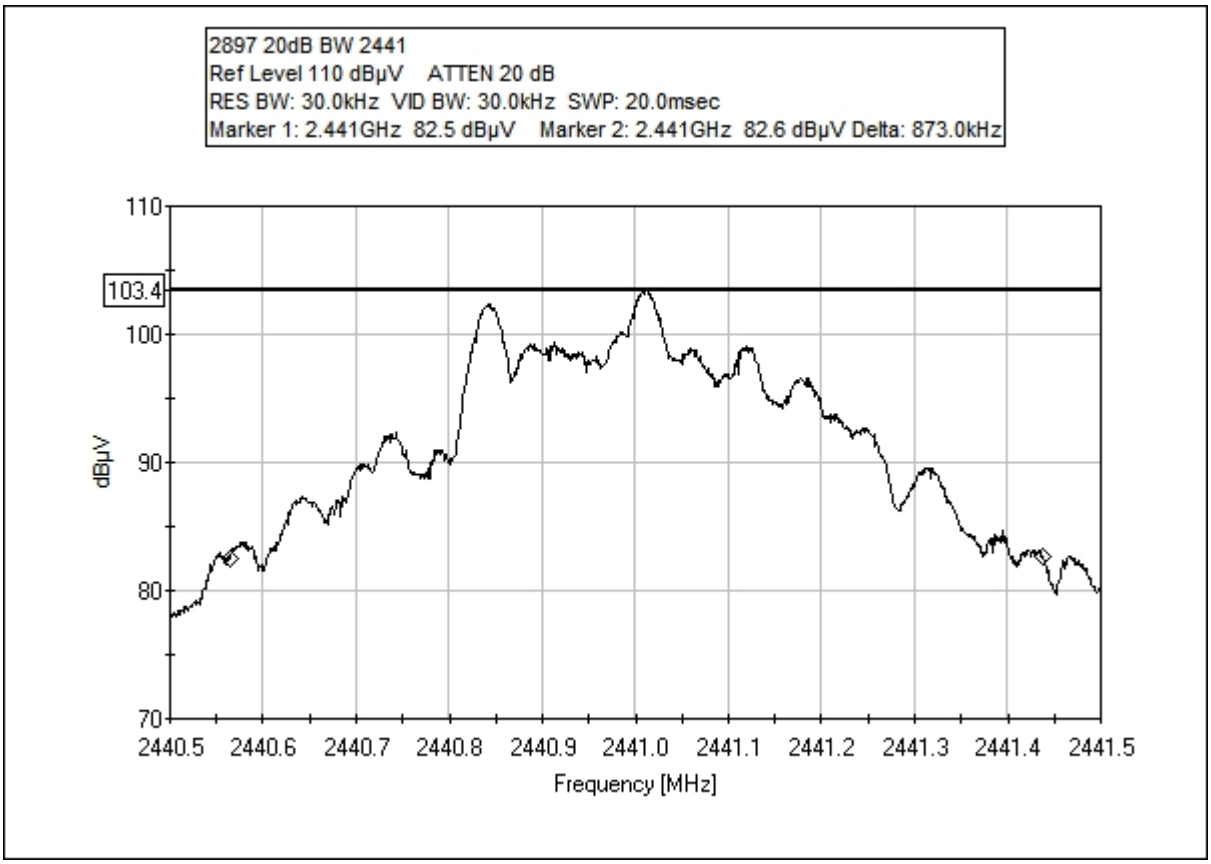
EUT operation mode

EUT operation mode	Hopping Enabled
EUT channel	
EUT TX power level	Maximum

Limits and results

99% BANDWIDTH COMPLIANCE

Channel	Limit (MHz)	Results (MHz)
2441	1.0	.873



5.10 RECEIVE MODE EMISSIONS MEASUREMENT

Requirement(s): RSS Gen (4.8)

The receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.
Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.
Radiated emission measurements are to be performed using a calibrated open-area test site. As an alternative, the conducted measurement method may be used when the antenna is detachable. In such a case, the receiver spurious signal may be measured at the antenna port.
If the receiver is super-regenerative, stabilize it by coupling to it an unmodulated carrier on the receiver frequency (antenna conducted measurement) or by transmitting an unmodulated carrier on the receiver frequency from an antenna in the proximity of the receiver (radiated measurement). Taking care not to overload the receiver, vary the amplitude and frequency of the stabilizing signal to obtain the highest level of the spurious emissions from the receiver.
For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

RECEIVE MODE EMISSIONS MEASUREMENT
30 - 1000MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **EN55022B RADIATED**
Work Order #: **2897** Date: 1/5/2010
Test Type: **Radiated Scan** Time: 12:20:34
Equipment: **Cordless Hand Scanner** Sequence#: 3
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: CHS 7X
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	12/01/2009	12/01/2010	004
HP 85650A Quasi Peak Adapter	3145A01673	03/30/2009	03/30/2010	003
EMCO BiConiLog Antenna	1059-0087	08/22/2008	08/22/2010	005
HP 8447D PreAmp	2443A03587	03/30/2009	03/30/2010	008

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

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	CHS 7X	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

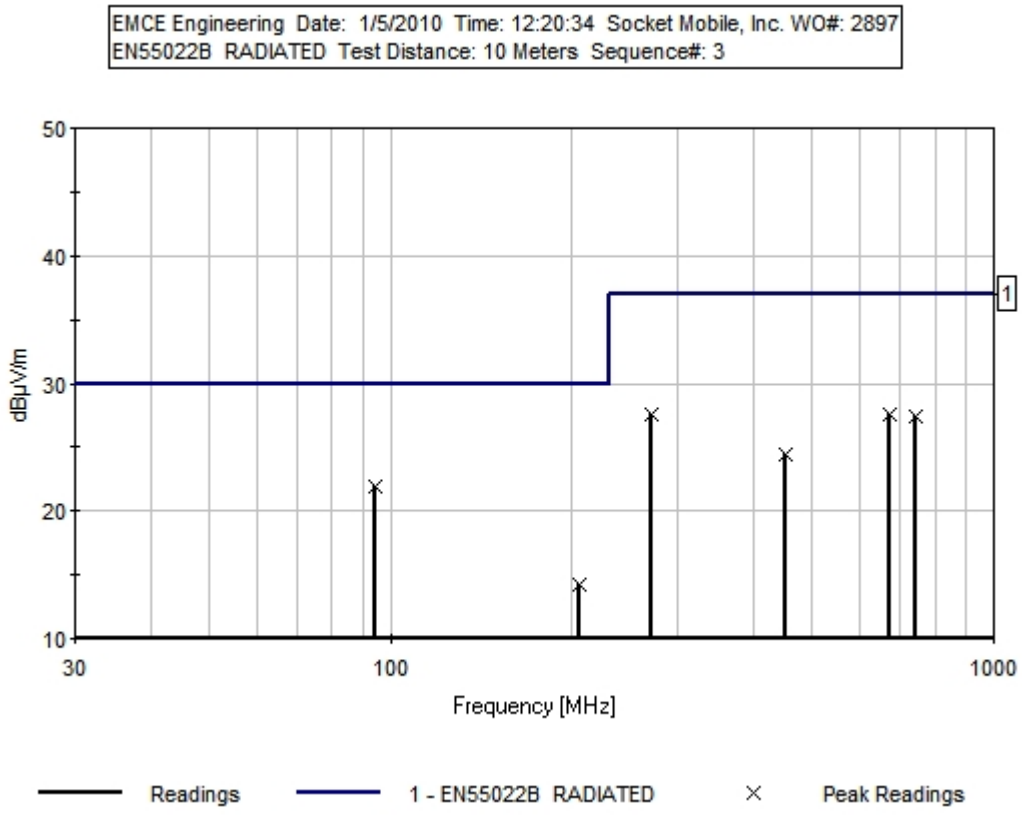
Transducer Legend:

T1=75' LMR Cable to 1 GHz	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 377	

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 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	94.600M	39.9	+1.2	+7.7	+26.9		+0.0	21.9	30.0	-8.1	Vert
2	670.400M	31.9	+2.1	+20.6	+27.1		+0.0	27.5	37.0	-9.5	Vert
3	270.000M	40.0	+1.5	+12.9	+26.9		+0.0	27.5	37.0	-9.5	Vert
4	739.600M	30.5	+2.3	+21.7	+27.1		+0.0	27.4	37.0	-9.6	Vert
5	452.800M	32.7	+2.1	+16.7	+27.0		+0.0	24.5	37.0	-12.5	Vert
6	206.400M	29.3	+1.5	+10.2	+26.8		+0.0	14.2	30.0	-15.8	Vert


EMCE Engineering Date: 1/5/2010 Time: 12:20:34 Socket Mobile, Inc. WO#: 2897
EN55022B RADIATED Test Distance: 10 Meters Sequence#: 3
50
40
30
20
10
dBµV/m
1
30
100
1000
Frequency [MHz]
Readings
1 - EN55022B RADIATED
Peak Readings

RECEIVE MODE EMISSIONS MEASUREMENT
1000 – 25000 MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC 15.209 Average Limits 1 - 25 G**
Work Order #: **2816** Date: 3/17/2009
Test Type: **Radiated Scan** Time: 12:30:06 PM
Equipment: **Cordless Hand Scanner** Sequence#: 6
Manufacturer: Socket Mobile Tested By: Bob Cole
Model: 8550-00028
S/N:

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	02/20/09	08/20/2009	003
HP Transient Limiter	3107A02941	10/01/2008	10/01/2009	006
EMCO 3810-2 LISN	4576	10/01/2008	10/01/2009	007

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

Function	Manufacturer	Model #	S/N
Cordless Hand Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW = 1 MHz
VBW = 10 Hz

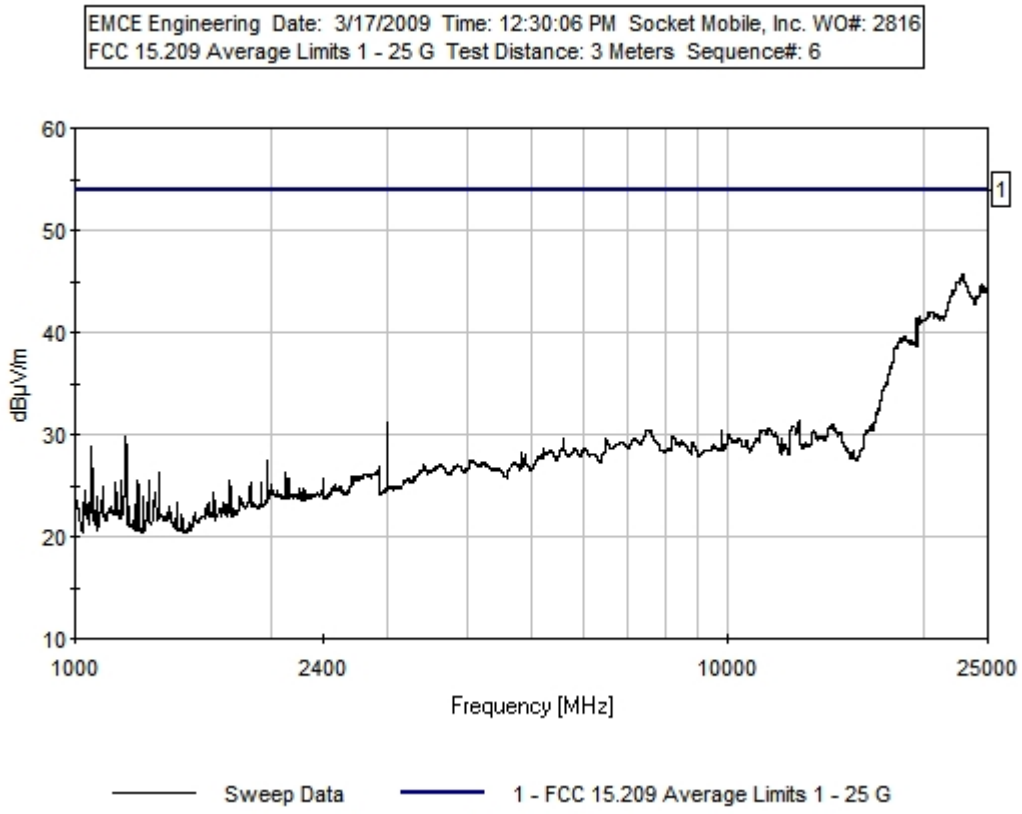
Transducer Legend:

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	22913.150M	45.7					+0.0	45.7	54.0	-8.3	Vert
2	22434.160M	45.0					+0.0	45.0	54.0	-9.0	Vert
3	24422.430M	44.7					+0.0	44.7	54.0	-9.3	Vert
4	24444.630M	44.6					+0.0	44.6	54.0	-9.4	Vert
5	23237.000M	44.4					+0.0	44.4	54.0	-9.6	Vert

6	22031.990M	44.1				+0.0	44.1	54.0	-9.9	Vert



7.0 TEST EQUIPMENT

Antenna Conducted Measurements:

Equipment	Type	Manufacturer	Calibration Due Date
Spectrum Analyzer	8593EM	Hewlett-Packard	8/20/10
Oscilloscope	TDS820	Tektronix	8/20/10
Peak Power Meter	Anritsu	2488A	11/1/10
Power Sensor	Anritsu	MA2491A	11/1/10
Coaxial cable	SMA Male – Reverse SMA Male (Length = 20 cm)	Own	10/1/10

Spurious RF radiated emissions:

Equipment	Type	Manufacturer	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	8/20/10
Spectrum Analyzer	8593EM	Hewlett-Packard	8/20/10

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	8566B	Hewlett-Packard	8/20/10
LISN	3810/2	EMCO	10/1/10
Coaxial cable	N Type – BNC (5 Meters)	Own	10/1/10