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 Ring Scanner

Model:
CORDLESS RING SCANNER SERIES 9

M/N:
8550-00028

Prepared by:

44366 S. Grimmer Blvd.
Fremont, CA 94538
USA

TABLE OF CONTENTS

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 743299
Customer:	Socket Communications, Inc. 39700 Eureka Drive Newark, CA 94560 Tel: 510-744-2700 Fax:510-744-2701
Contact Person:	Tom Noggle
Receipt of EUT:	1/21/09
Test plan reference:	FCC Part 2, 15 (15.247) / IC RSS-210
FCC ID:	LUBCRS002
IC #:	2529A-CRS002
Date of testing:	1/21/09 – 3/17/09
Date of Report:	3/30/09

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 Ring Scanner, M/N: CORDLESS RING SCANNER SERIES 9.**

Model Numbers Represented

8550-00028

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 SERIES 9**	N/A	E0001
Accessories	Laptop Computer	Compaq Presario M/N: 1694	3882A744	S0001
Software	CRS 8550-00028	BlueTest	N/A	N/A

EUT Information

Product Specification	Description
Model Name	CORDLESS RING SCANNER SERIES 9
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.

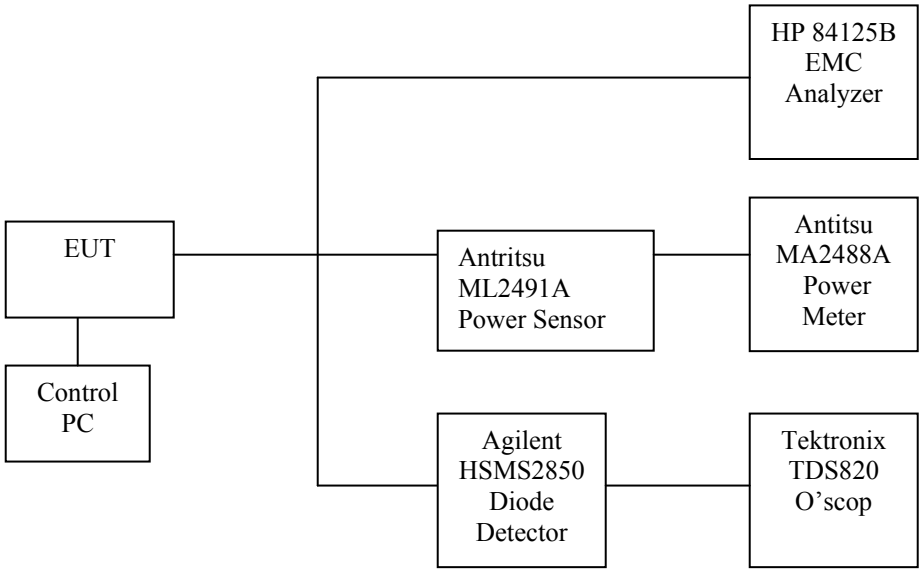
Setup A (Antenna Conducted measurements)

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

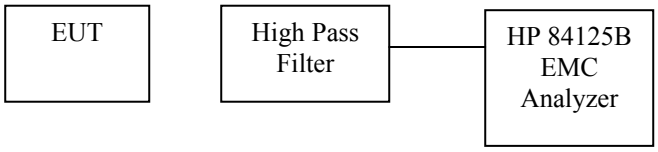
This setup was used in radiated emissions measurements.

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 RING SCANNER SERIES 9**
Test setup	C (conducted)
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

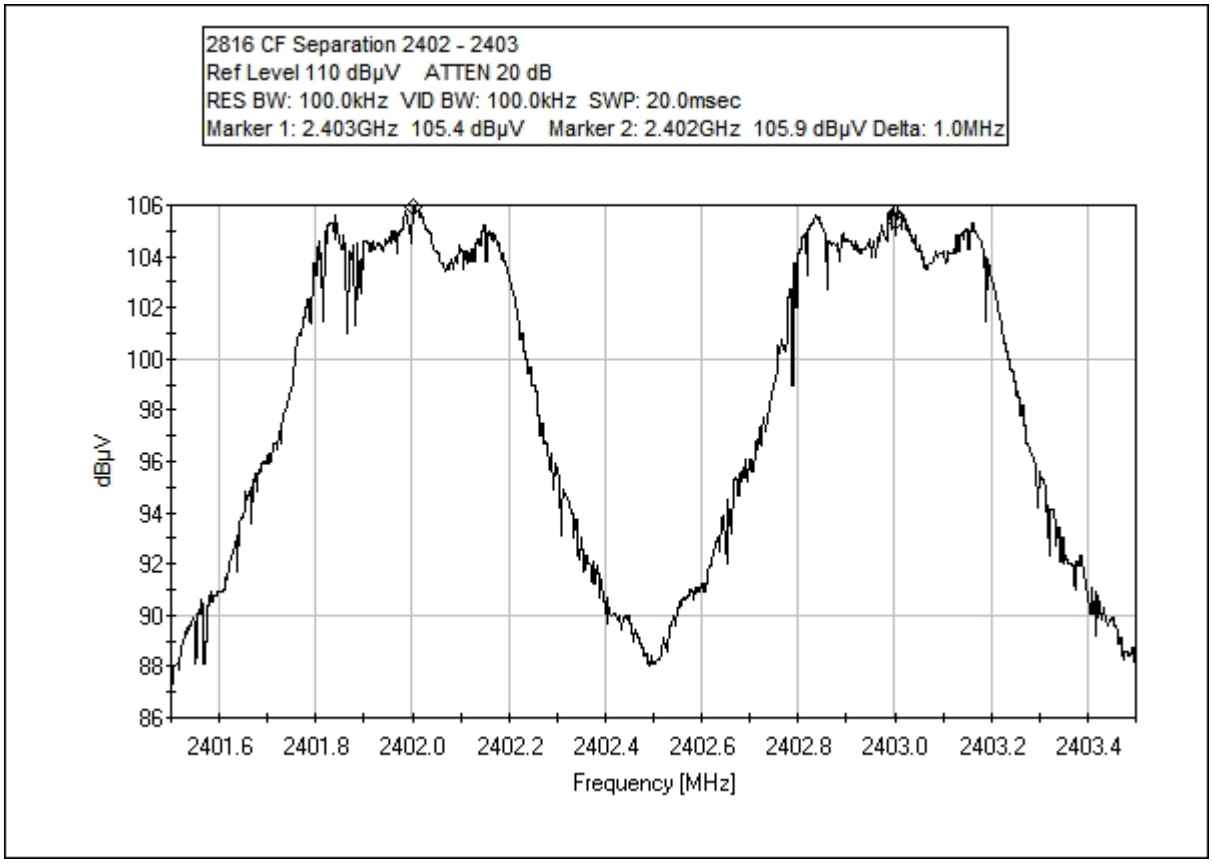
EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	57º F, 30.96
Date of Measurement	2/10/09
Measured by	Bob Cole
Result	PASSED

- 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

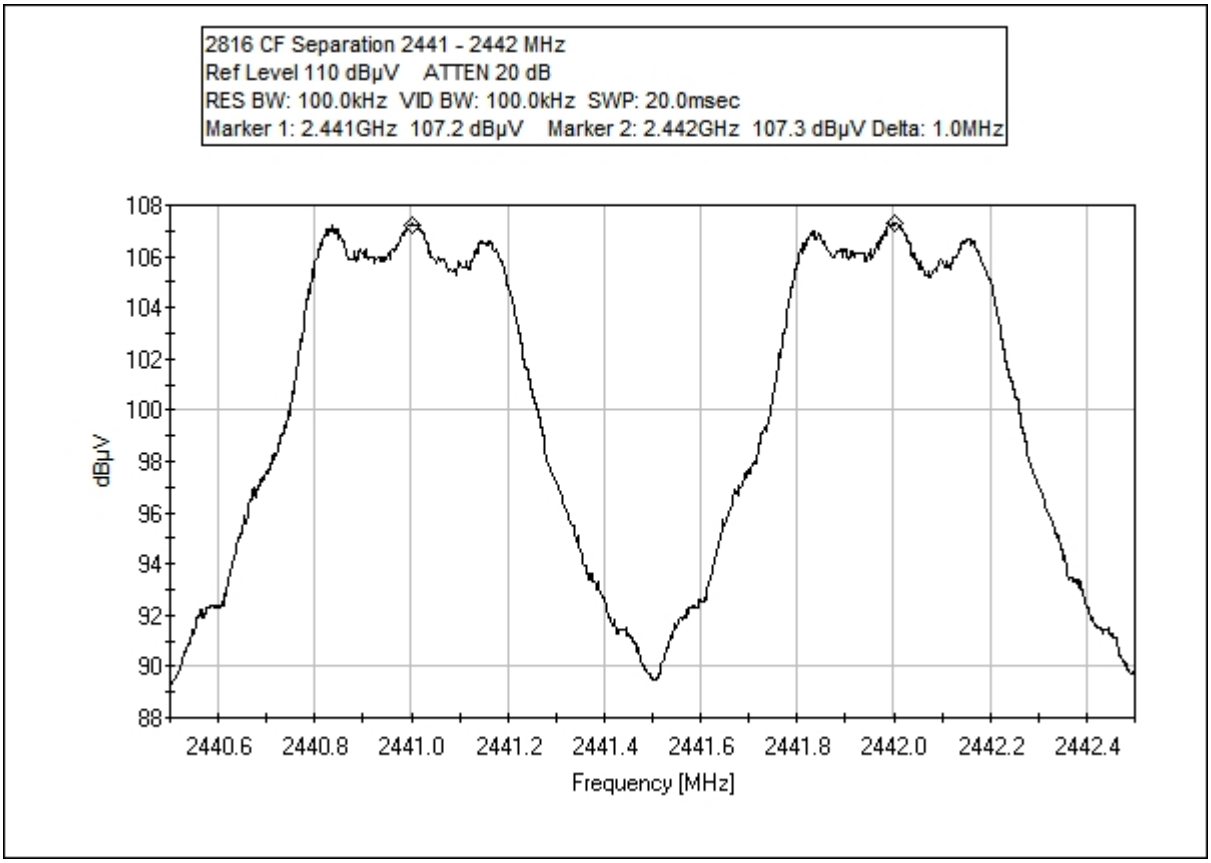
CENTER FREQUENCY SEPARATION LIMITS

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

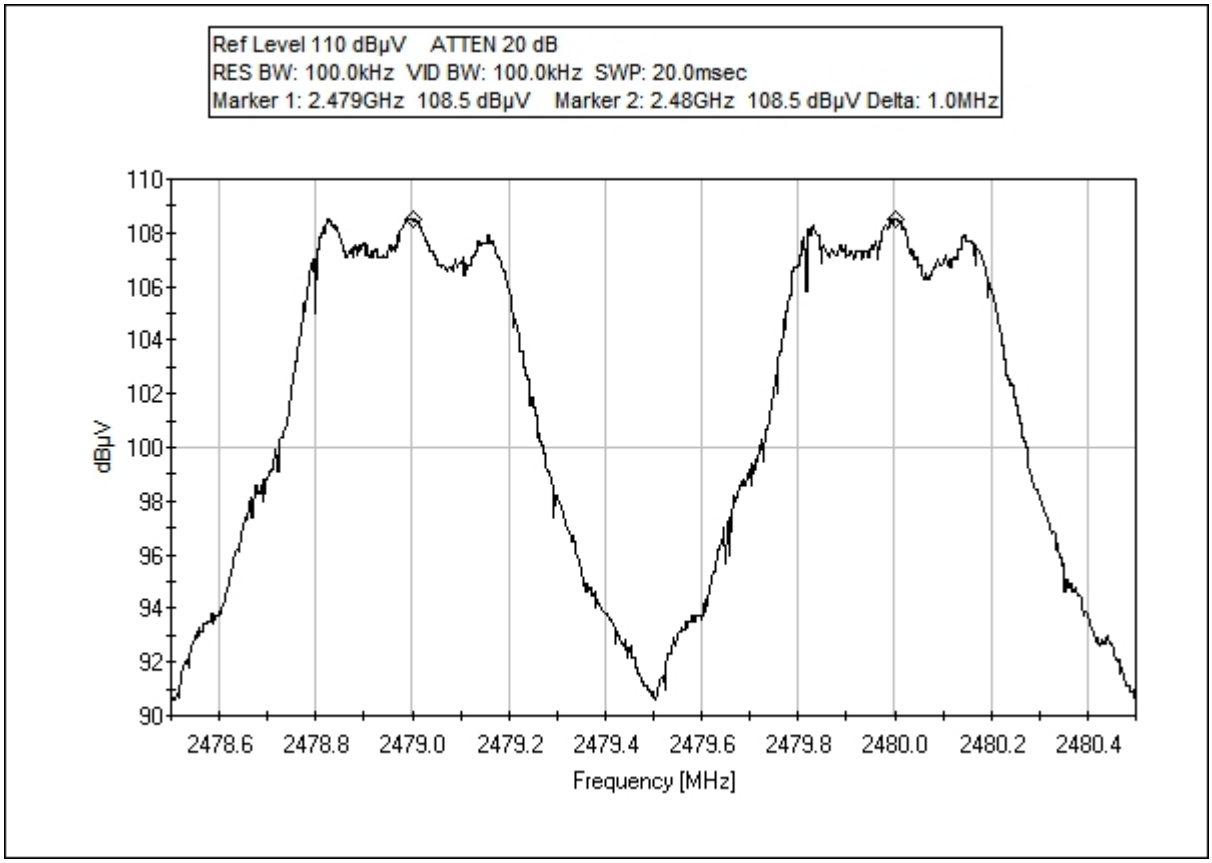
2402 – 2403 MHz



2441- 2442 MHz



2479 – 2480 MHz



5.4 20 dB Bandwidth

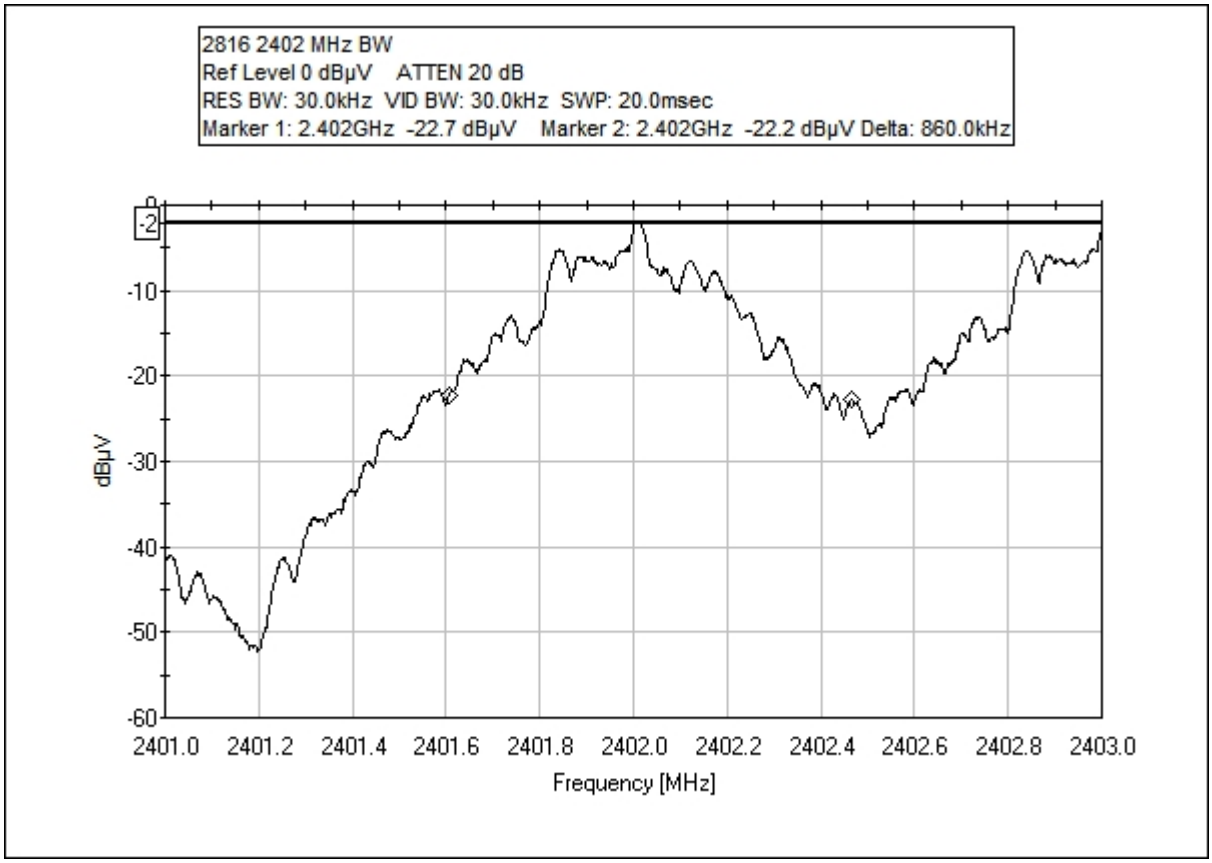
20 dB Bandwidth

EUT	**CORDLESS RING SCANNER SERIES 9**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	58º F, 30.98
Date of Measurement	2/10/09
Measured by	Bob Cole
Result	PASSED

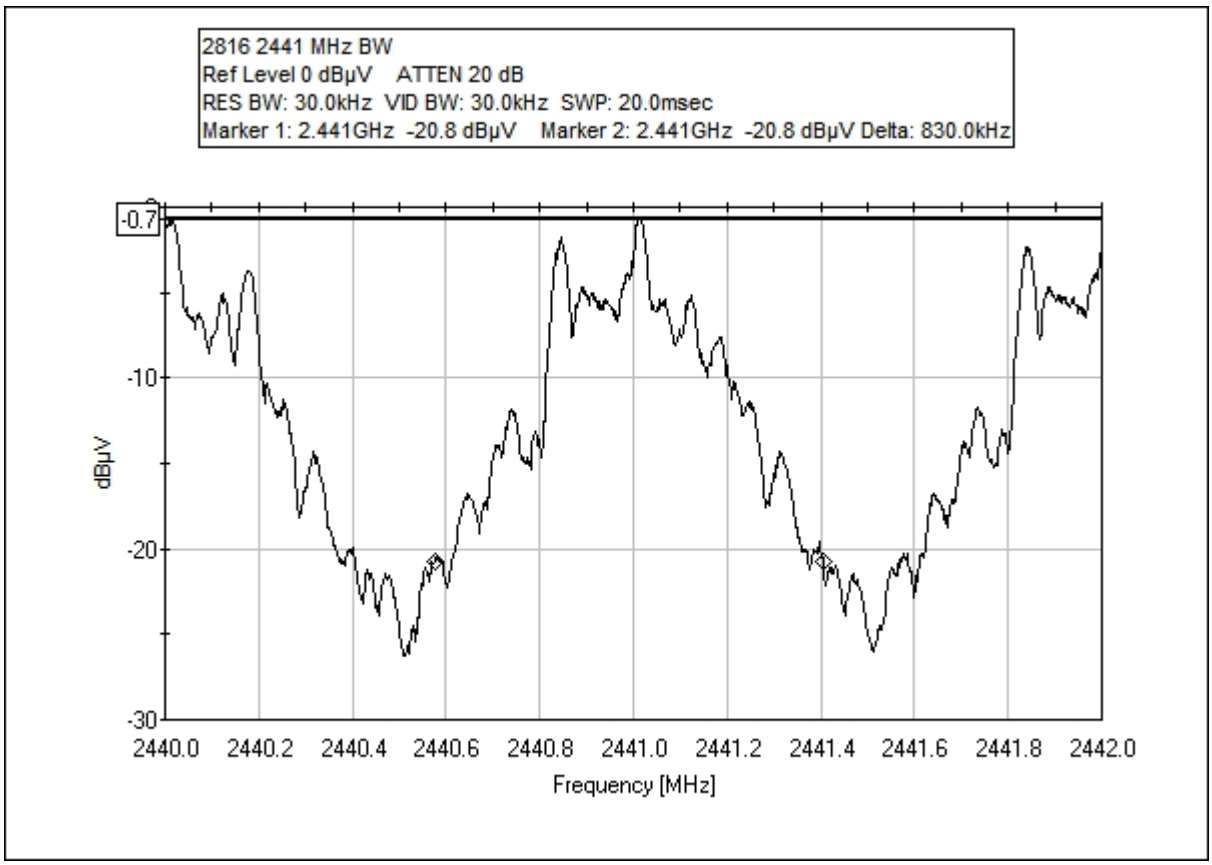
20 dB BANDWIDTH LIMITS

EUT Channel		Test results (kHz)
2402		860
2441		830
2480		864

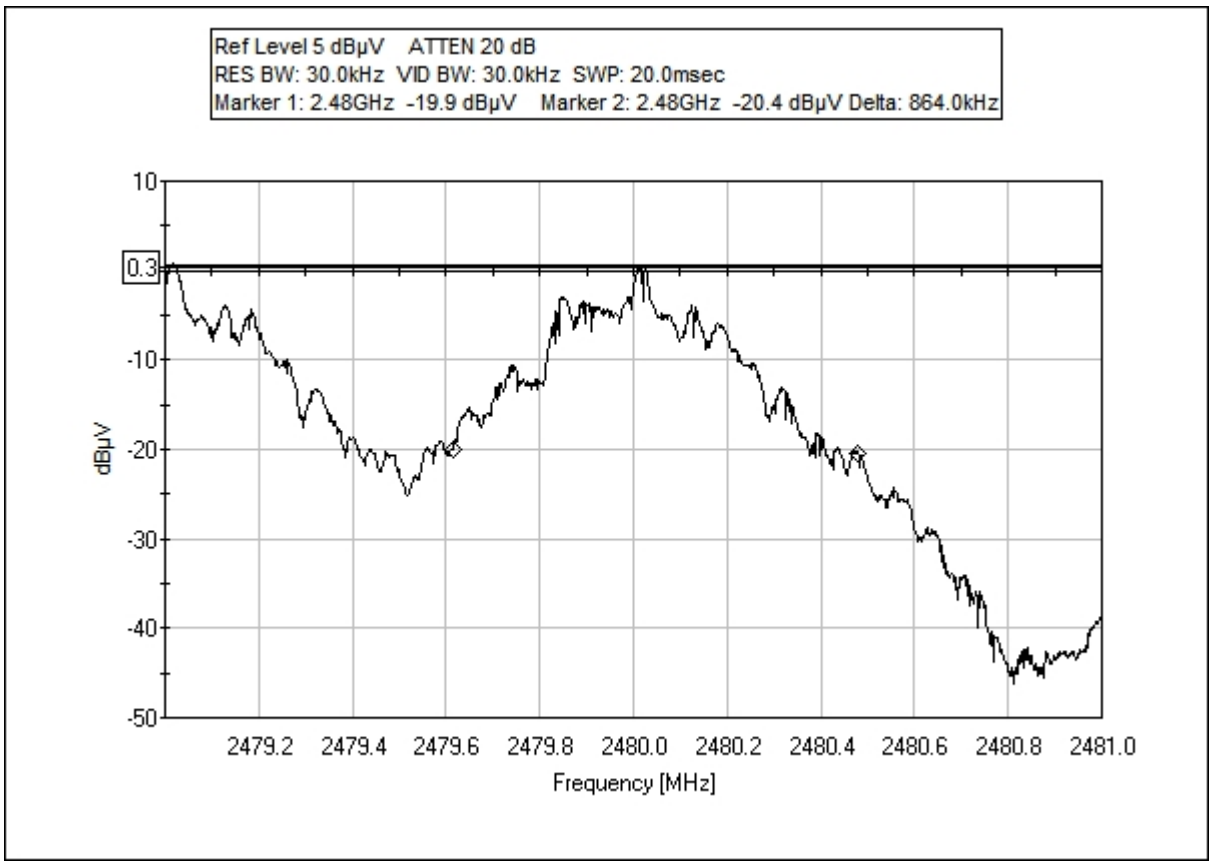
20 dB BW 2402 MHz



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

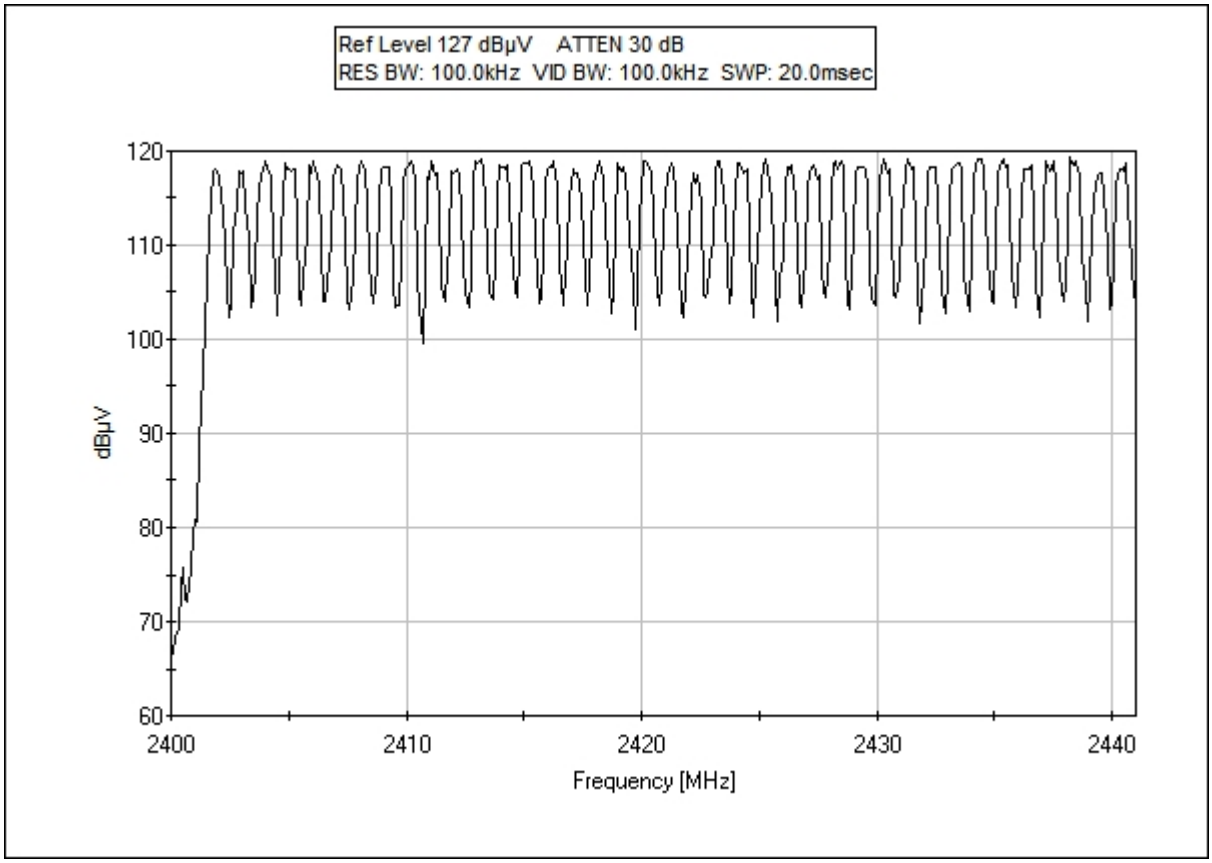
EUT	**RING SCANNER**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	75º F, 30.92
Date of Measurement	2/12/09
Measured by	Bob Cole
Result	PASSED

Limits and results

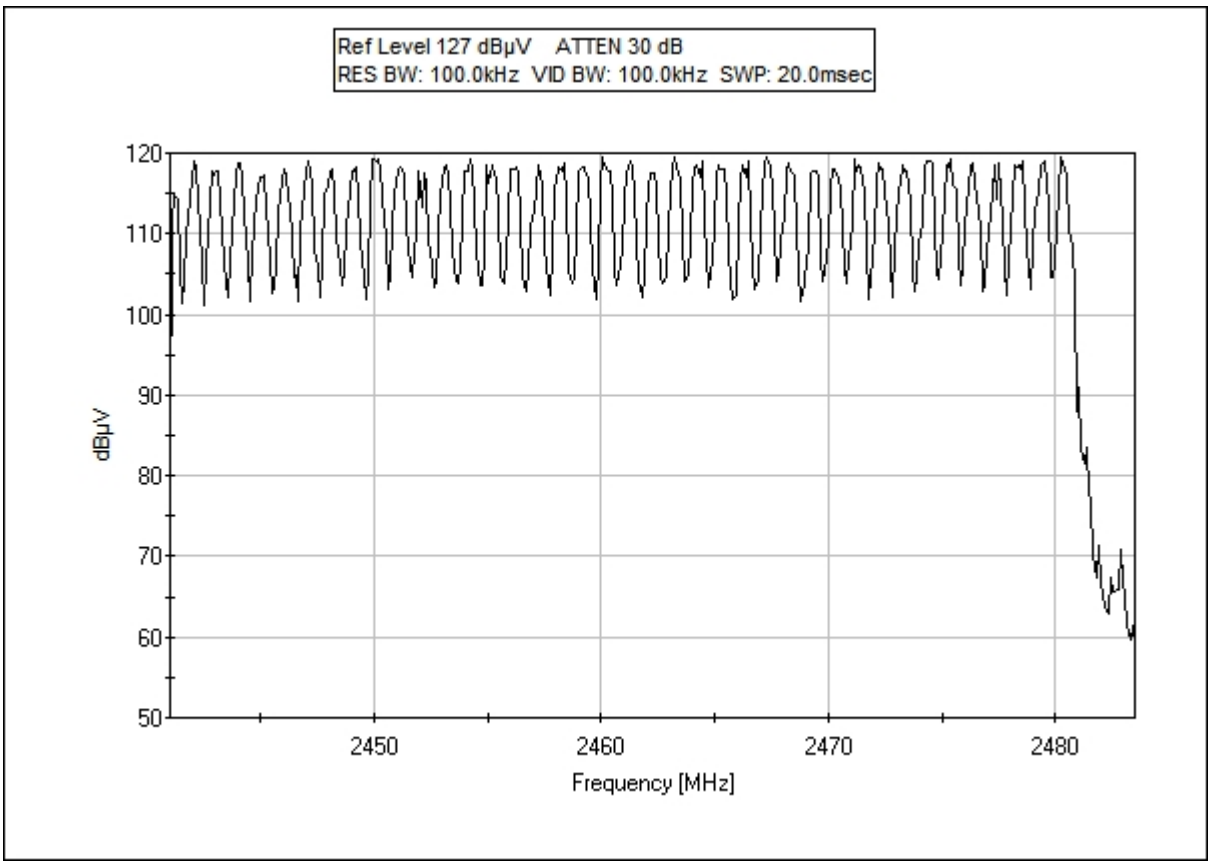
NUMBER OF HOPPING FREQUENCIES

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

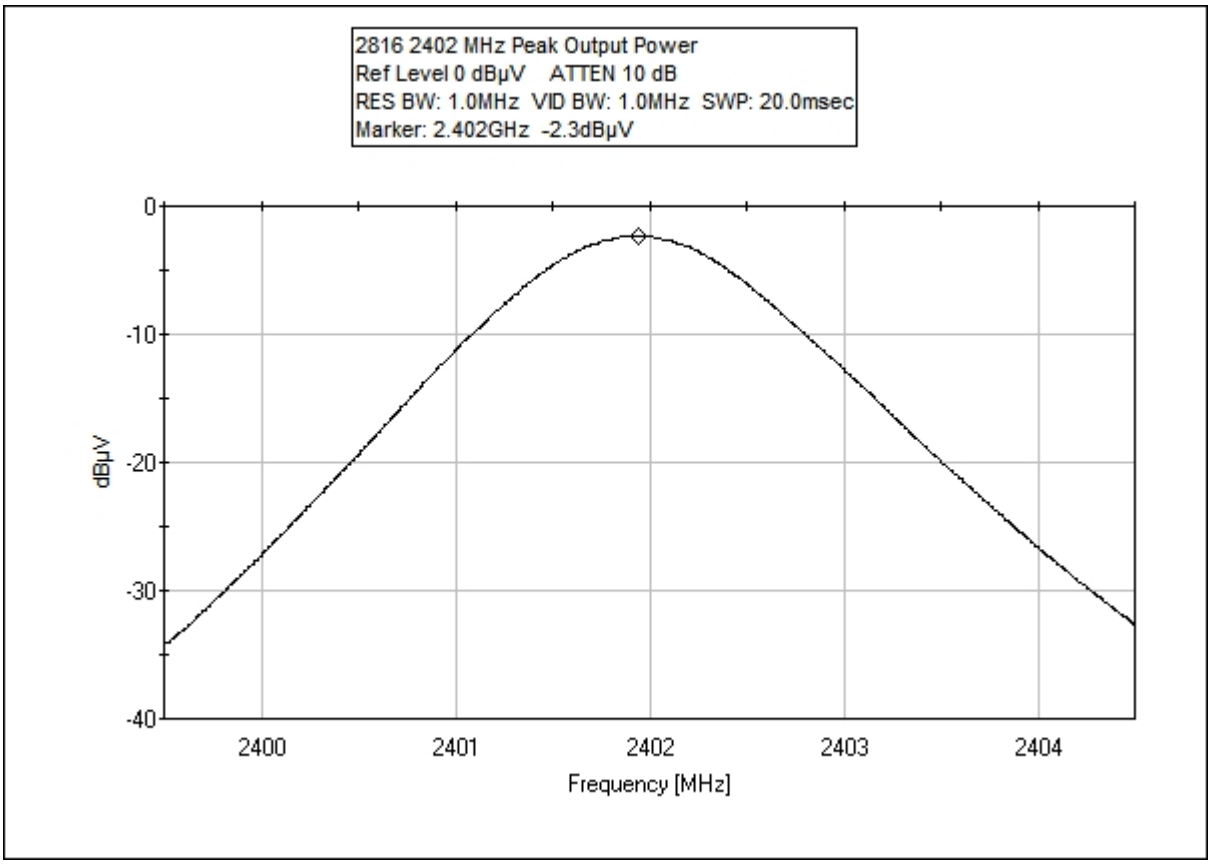
EUT	**CORDLESS RING SCANNER SERIES 9**
Test setup	A (conducted)
Temp, Humidity, Air Pressure	67º F, 30.97
Date of Measurement	2/1/09
Measured by	Bob Cole
Result	PASSED

- 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

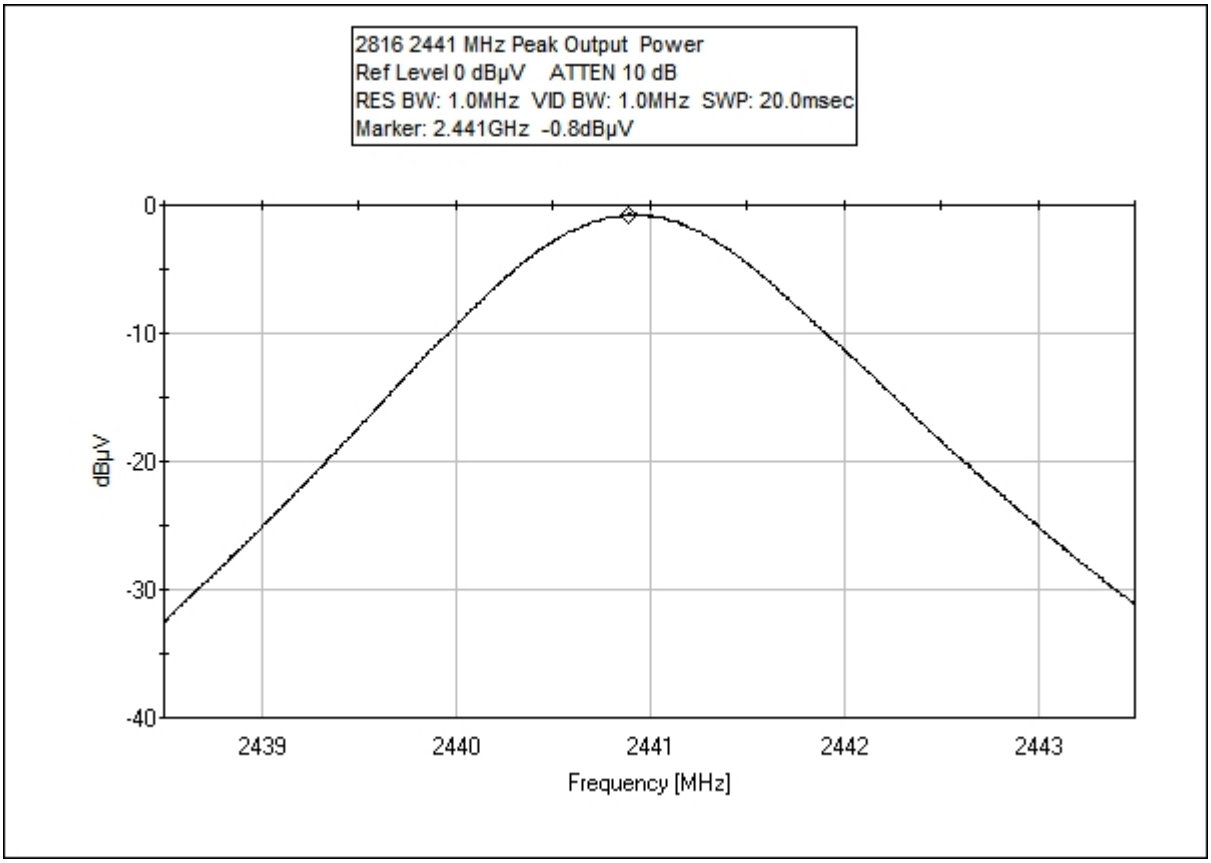
PEAK OUTPUT POWER

EUT Channel Info	Limit (dBm)	Test results (dBm)
2402	30.0	-2.3
2441	30.0	-0.8
2480	30.0	0.7

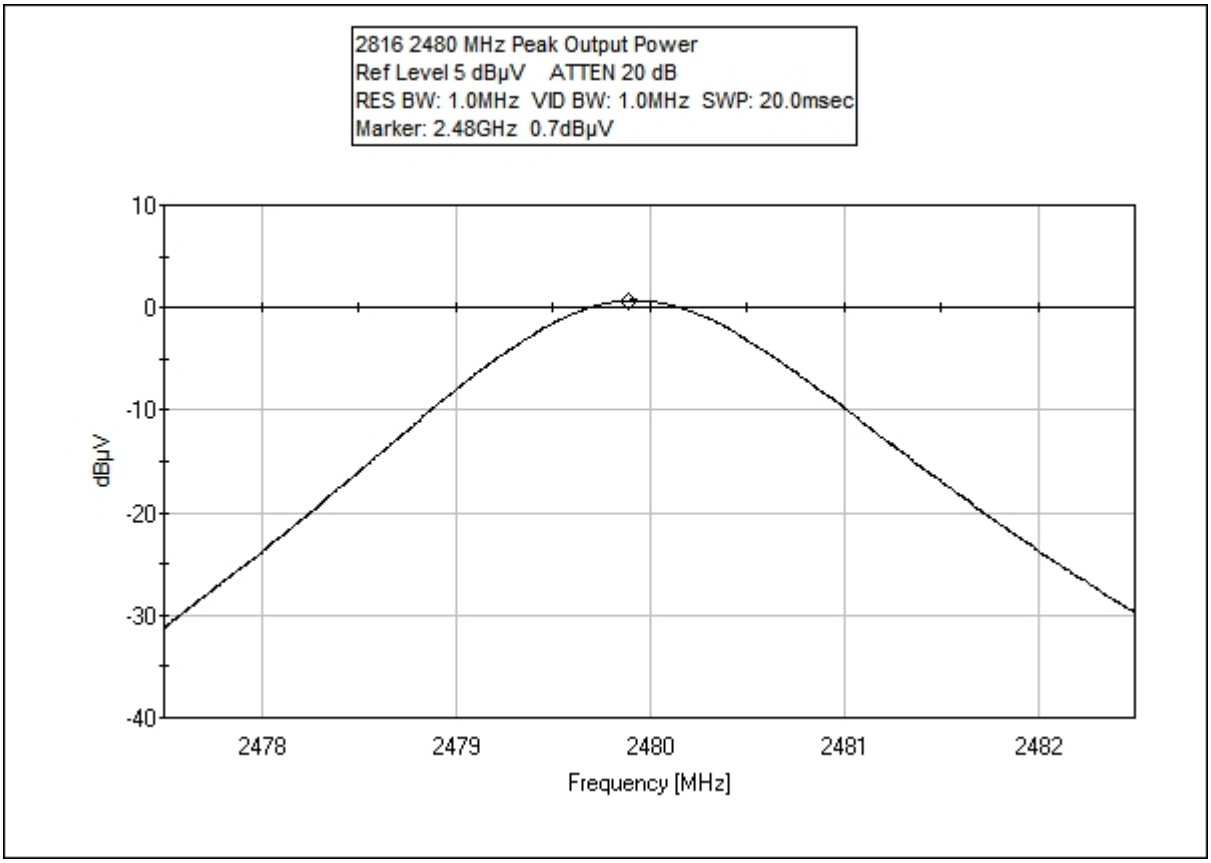
Peak Output Power – 2402 MHz



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

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 #:	**2816**	Date:	3/6/2009
Test Type:	**Conducted Emissions**	Time:	11:17:28 AM
Equipment:	**Cordless Ring Scanner**	Sequence#:	2
Manufacturer:	Socket Mobile	Tested By:	Test Engineer
Model:	8550-00028		N/A
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	10/15/2008	10/15/2008	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
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 Ring Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW = 100 kHz
VBW = 100 kHz

Transducer Legend:

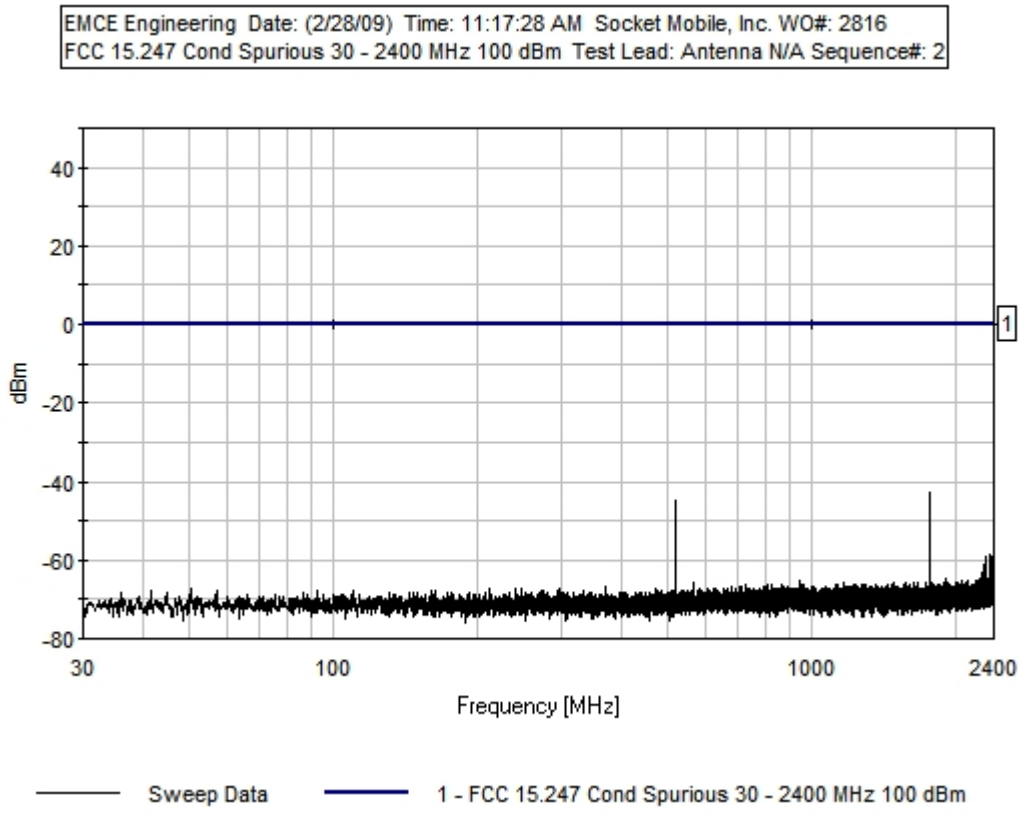
T1=dBuV - dBm 50 ohm conversion

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	1759.344M	64.3	-107.0				+0.0	-42.7	0.0	-42.7	Black

2	519.235M	62.3	-107.0		+0.0	-44.7	0.0	-44.7	Black
3	2352.210M	48.5	-107.0		+0.0	-58.5	0.0	-58.5	Black
4	2319.825M	48.0	-107.0		+0.0	-59.0	0.0	-59.0	Black
5	2384.039M	48.0	-107.0		+0.0	-59.0	0.0	-59.0	Black
6	2288.043M	46.1	-107.0		+0.0	-60.9	0.0	-60.9	Black



2483.5 – 25000 MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC 15.247 dBm Cond Spuious High 2483.5 - 25000 MHz 95 dBuV**
Work Order #: **2816** Date: 3/6/2009
Test Type: **Conducted Emissions** Time: 1:50:31 PM
Equipment: **Cordless Ring Scanner** Sequence#: 2
Manufacturer: Socket Mobile Tested By: Test Engineer
Model: 8550-00028 120V 60Hz
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	10/15/2008	10/15/2008	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
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 Ring Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW = 100 kHz
VBW = 100 kHz

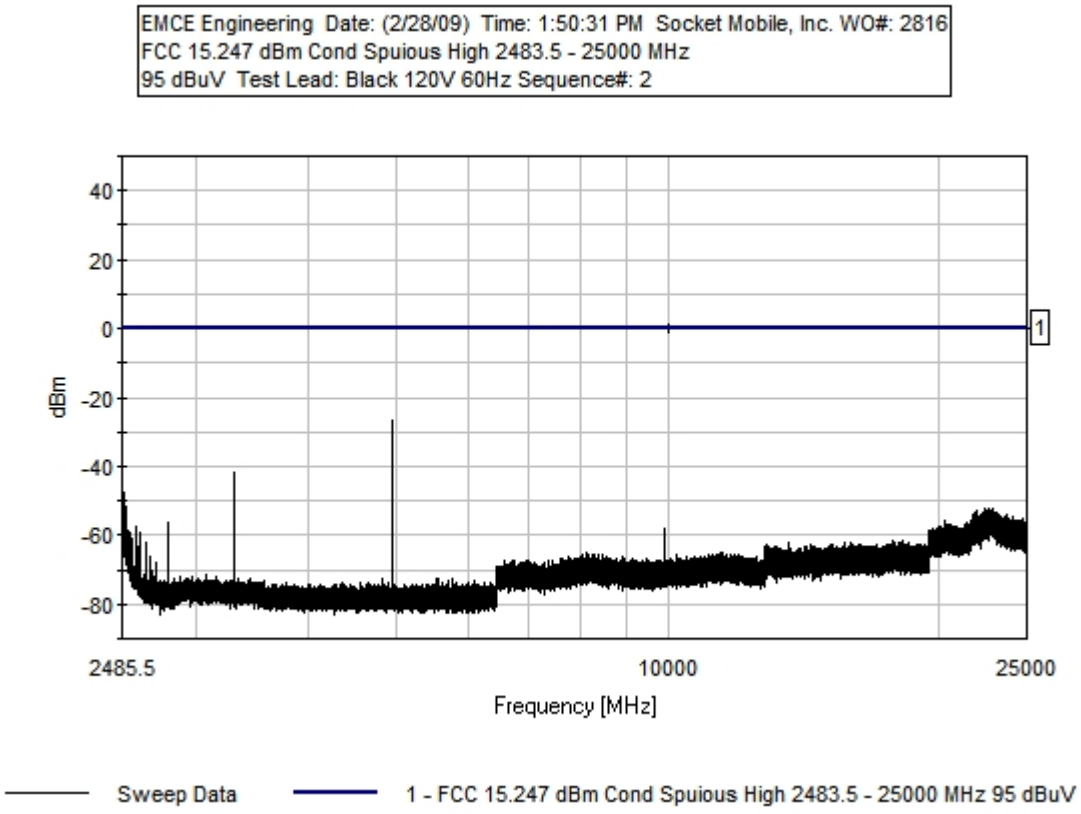
Transducer Legend:

T1=dBuV - dBm 50 ohm conversion

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	4959.993M	80.1	-107.0				+0.0	-26.9	0.0	-26.9	Black
2	3306.716M	65.3	-107.0				+0.0	-41.7	0.0	-41.7	Black
3	2495.893M	59.5	-107.0				+0.0	-47.5	0.0	-47.5	Black
4	2485.952M	55.3	-107.0				+0.0	-51.7	0.0	-51.7	Black
5	2512.010M	55.1	-107.0				+0.0	-51.9	0.0	-51.9	Black
6	22931.700 M	55.0	-107.0				+0.0	-52.0	0.0	-52.0	Black


EMCE Engineering Date: (2/28/09) Time: 1:50:31 PM Socket Mobile, Inc. WO#: 2816
FCC 15.247 dBm Cond Spuious High 2483.5 - 25000 MHz
95 dBuV Test Lead: Black 120V 60Hz Sequence#: 2
40
20
0
-20
-40
-60
-80
dBm
1
2485.5
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC 15.247 dBm Cond Spuious High 2483.5 - 25000 MHz 95 dBuV

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 RING SCANNER SERIES 9**
Test setup	B (Radiated)
Temp, Humidity, Air Pressure	68º F, 30.02
Date of Measurement	2/4/09
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
30 - 1000 MHz
PEAK DETECTOR

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 30-1000**
Work Order #: **2816** Date: 2/4/2009
Test Type: **Radiated Scan** Time: 15:43:35
Equipment: **Cordless Ring Scanner** Sequence#: 1
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	10/15/2008	10/15/2008	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
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 Ring Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Xmit Frequency 2480 MHz
RBW = 120 kHz
VBW = 300 kHz

Transducer Legend:

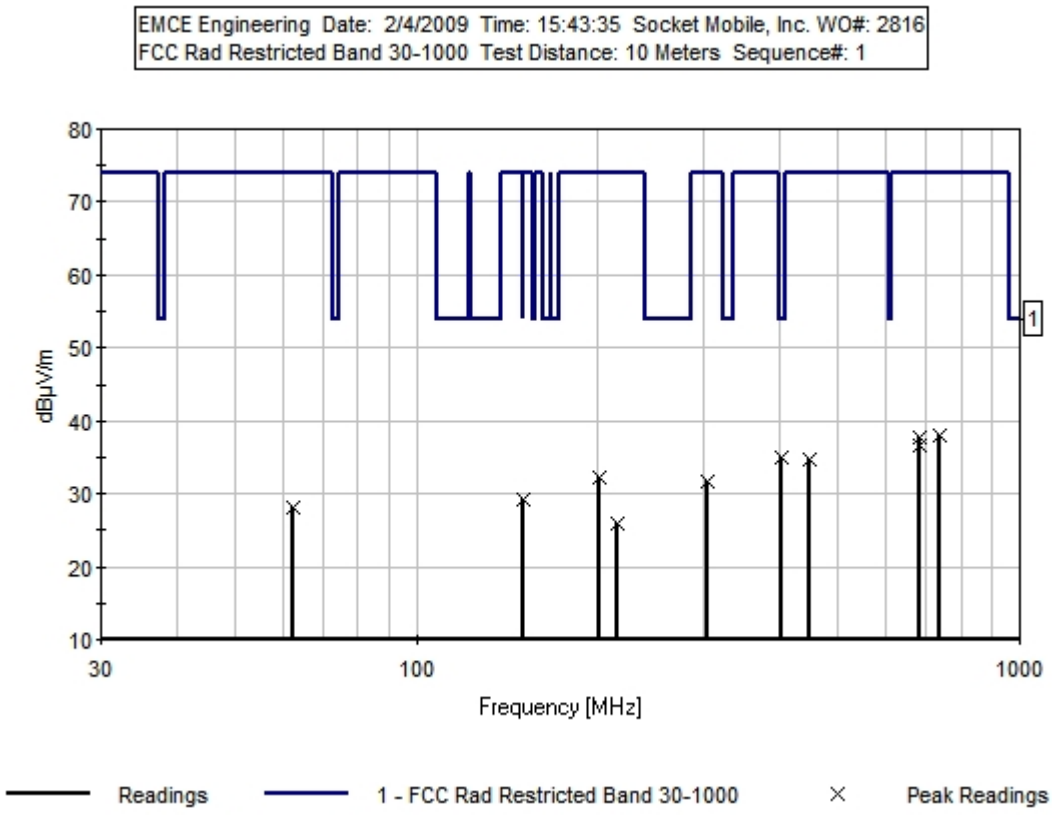
T1=75' LMR Cable to 1 GHz T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 458

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	402.710M	33.9	+2.1	+16.0	+26.9		+10.0	35.1	54.0	-18.9	Vert
2	737.460M	31.0	+2.3	+21.8	+27.1		+10.0	38.0	74.0	-36.0	Horiz
3	683.440M	31.9	+2.1	+20.7	+27.0		+10.0	37.7	74.0	-36.3	Vert
4	682.440M	30.9	+2.1	+20.7	+27.0		+10.0	36.7	74.0	-37.3	Horiz

5	448.220M	33.0	+2.1	+16.5	+26.8	+10.0	34.8	74.0	-39.2	Horiz
6	200.870M	37.6	+1.5	+9.9	+26.8	+10.0	32.2	74.0	-41.8	Horiz
7	304.290M	33.7	+1.7	+13.2	+26.9	+10.0	31.7	74.0	-42.3	Vert
8	149.860M	36.5	+1.0	+8.4	+26.6	+10.0	29.3	74.0	-44.7	Vert
9	62.440M	37.4	+0.6	+7.0	+26.8	+10.0	28.2	74.0	-45.8	Vert
10	216.040M	30.5	+1.5	+10.7	+26.9	+10.0	25.8	74.0	-48.2	Vert



Restricted Band Spurious Radiated Emissions
1000 - 2400 MHz
AVERAGE DETECTOR

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

Customer: **Socket Mobile**
Specification: **FCC Rad Restricted Band 1000 - 2400**
Work Order #: Date: 1/27/2009
Test Type: **Radiated Scan** Time: 12:54:38 PM
Equipment: **CRS 8550-00028 Series 9** Sequence#: 1
Manufacturer: Socket Mobile Tested By: Test Engineer
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	10/15/2008	2/20/09	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002

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

Function	Manufacturer	Model #	S/N

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Xmit Frequency 2480 MHz
RBW = 1 MHz
VBW 10 Hz

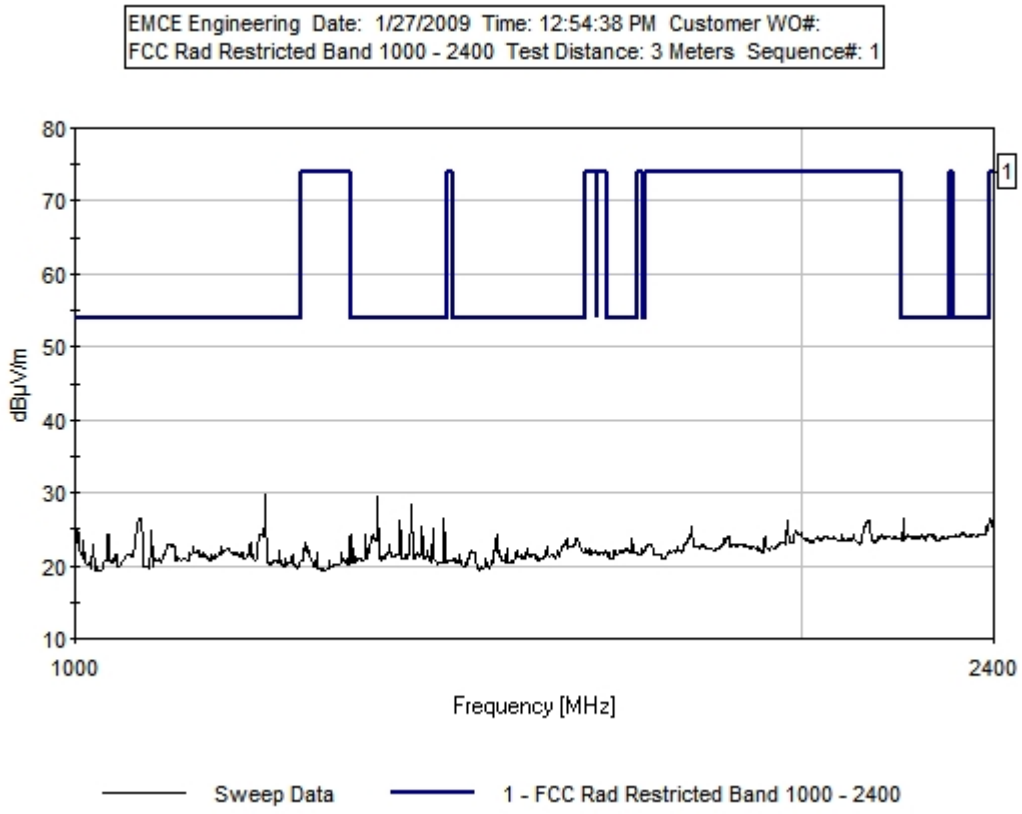
Transducer Legend:

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	1198.733M	29.7					+0.0	29.7	54.0	-24.3	Vert
2	1333.770M	29.4					+0.0	29.4	54.0	-24.6	Vert
3	1378.061M	28.5					+0.0	28.5	54.0	-25.5	Vert
4	1063.697M	26.6					+0.0	26.6	54.0	-27.4	Vert
5	1421.277M	26.4					+0.0	26.4	54.0	-27.6	Vert

6	2201.266M	26.4		+0.0	26.4	54.0	-27.6	Vert
7	1362.986M	26.3		+0.0	26.3	54.0	-27.7	Vert
8	2389.609M	26.1		+0.0	26.1	54.0	-27.9	Vert
9	1392.132M	25.3		+0.0	25.3	54.0	-28.7	Vert
10	1407.207M	25.2		+0.0	25.2	54.0	-28.8	Vert



Restricted Band Spurious Radiated Emissions
2483.5 - 25000 MHz
AVERAGE DETECTOR

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

Customer: **Socket Communications**
Specification: **FCC Rad Restricted Band 2483.5-18000**
Work Order #: **2816** Date: 1/26/2009
Test Type: **Radiated Scan** Time: 12:38:36 PM
Equipment: **Ring Scanner** Sequence#: 1
Manufacturer: SocketMobile, Inc. Tested By: Test Engineer
Model: CRS 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	10/15/2008	2/20/09	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
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
Ring Scanner*	SocketMobile, Inc.	CRS 8550-00028 8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Xmit Frequency 2480 MHz
RBW 1 MHz
VBW 10 Hz

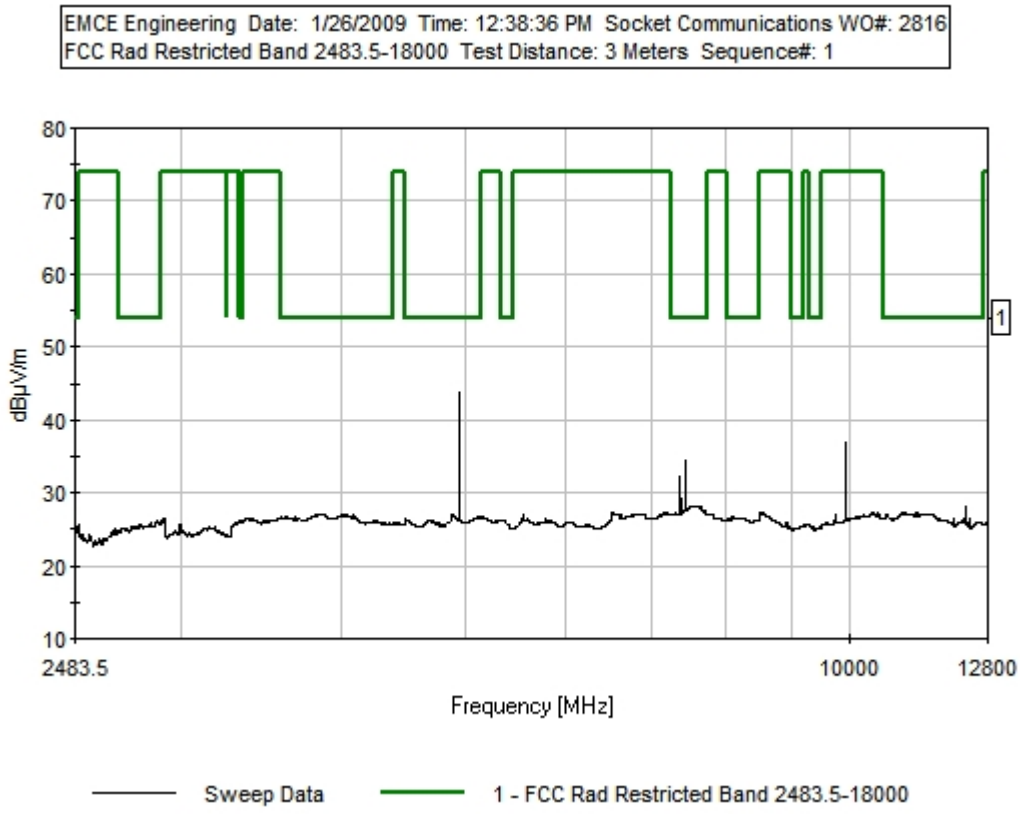
Transducer Legend:

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	4958.846M	43.9					+0.0	43.9	54.0	-10.1	Vert
2	7438.212M	34.5					+0.0	34.5	54.0	-19.5	Vert
3	7358.816M	32.1					+0.0	32.1	54.0	-21.9	Vert

4	7366.856M	32.1	+0.0	32.1	54.0	-21.9	Vert
5	7346.756M	29.4	+0.0	29.4	54.0	-24.6	Vert
6	7392.986M	29.3	+0.0	29.3	54.0	-24.7	Vert
7	12294.430M	28.2	+0.0	28.2	54.0	-25.8	Vert
8	2484.505M	27.8	+0.0	27.8	54.0	-26.2	Vert
9	12302.470M	27.7	+0.0	27.7	54.0	-26.3	Vert
10	9917.578M	37.0	+0.0	37.0	74.0	-37.0	Vert



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 - 1000 MHz

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

Customer: **Socket Mobile, Inc.**
Specification: **FCC Rad Restricted Band 30-1000**
Work Order #: **2816** Date: 3/17/2009
Test Type: **Radiated Scan** Time: 3:12:55 PM
Equipment: **Cordless Ring Scanner** Sequence#: 7
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	08/20/09	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 Ring Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

RBW = 120kHx
VBW = 300 kHz

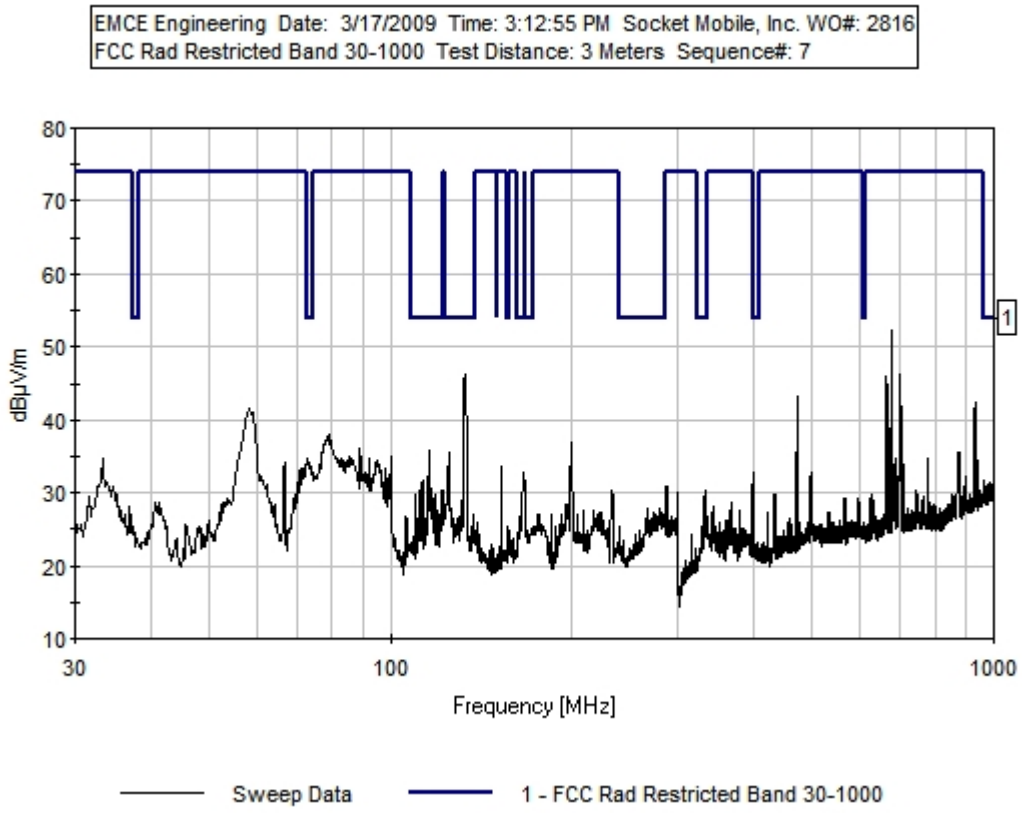
Transducer Legend:

T1=25' LMR #001	T2=AH Log P SAS-200_510 S-N853
T3=AH SAS-200/543 S/N: 199	T4=8447 Pre-Amp Asset 377

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	132.577M	61.0	+0.1	+0.0	+11.8	+26.7	+0.0	46.2	54.0	-7.8	Vert
2	115.556M	51.8	+0.1	+0.0	+10.8	+26.8	+0.0	35.9	54.0	-18.1	Horiz
3	124.744M	50.6	+0.1	+0.0	+11.5	+26.7	+0.0	35.5	54.0	-18.5	Horiz
4	73.079M	53.7	+0.0	+0.0	+7.1	+26.9	+0.0	33.9	54.0	-20.1	Vert
5	165.564M	47.5	+0.0	+0.0	+12.0	+26.7	+0.0	32.8	54.0	-21.2	Horiz
6	675.361M	58.7	+0.7	+20.1	+0.0	+27.1	+0.0	52.4	74.0	-21.6	Vert



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 Ring 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 Ring Scanner*	Socket Mobile	8550-00028	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

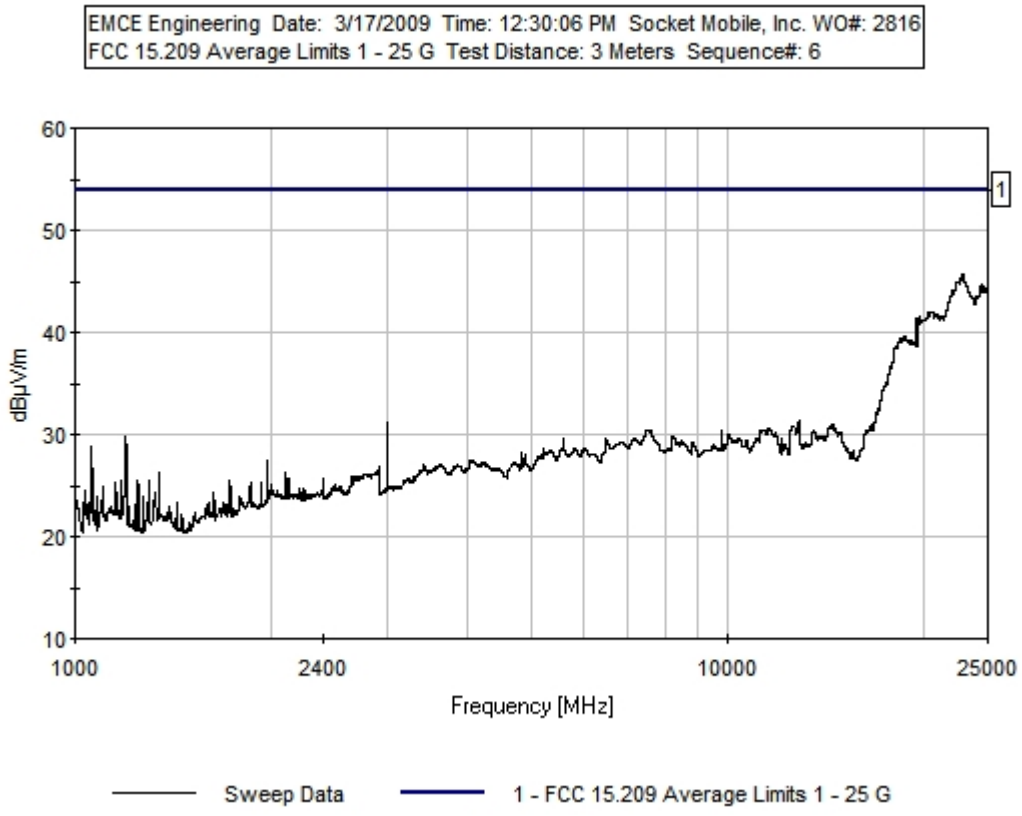
RBW = 1 MHz
VBW = 10 Hz

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


EMCE Engineering Date: 3/17/2009 Time: 12:30:06 PM Socket Mobile, Inc. WO#: 2816
FCC 15.209 Average Limits 1 - 25 G Test Distance: 3 Meters Sequence#: 6
60
50
40
30
20
10
dBµV/m
1
1000
2400
10000
25000
Frequency [MHz]
Sweep Data
1 - FCC 15.209 Average Limits 1 - 25 G

7.0 TEST EQUIPMENT

Antenna Conducted Measurements:

Equipment	Type	Manufacturer	Calibration Due Date
Spectrum Analyzer	8593EM	Hewlett-Packard	8/20/09
Oscilloscope	TDS820	Tektronix	8/20/09
Peak Power Meter	Anritsu	2488A	11/1/09
Power Sensor	Anritsu	MA2491A	11/1/09
Coaxial cable	SMA Male – Reverse SMA Male (Length = 20 cm)	Own	10/1/09

Spurious RF radiated emissions:

Equipment	Type	Manufacturer	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	8/20/09
Spectrum Analyzer	8593EM	Hewlett-Packard	8/20/09
Pre-Amp	83051A	Hewlett-Packard	7/4/09
Pre-Amp	83017A	Hewlett-Packard	7/4/09
High Pass Filter	9701	CMT	7/4/09
Horn Antenna	3115	EMCO	7/4/09
Cable		Hewlett Packard	7/4/09

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	8/20/09
LISN	3810/2	EMCO	10/1/09
Coaxial cable	N Type – BNC (5 Meters)	Own	10/1/09