CKC LABORATORIES, INC. Testing the Future

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803.01 - 803.06
EMC/SAFETY

ASCOM WIRELESS SOLUTIONS TEST REPORT

FOR THE

HANDSET, 9P23

FCC PART 15 SUBPART D, PART 15 SUBPART C SECTIONS 15.207 AND 15.209 & PART 15 SUBPART B SECTIONS 15.107 AND 15.109 CLASS B

COMPLIANCE

DATE OF ISSUE: JANUARY 8, 2003

PREPARED FOR:

Ascom Wireless Solutions
598 Airport Blvd., Suite 300
Morrisville, NC 27560

P.O. No.: 000727
W.O. No.: 79246

PREPARED BY:

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5473A Clouds Rest
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Date of test: October 21, 2002 –
January 6, 2003

Report No.: FC02-095

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	October 21, 2002 to January 6, 2003
DATE OF RECEIPT:	October 21, 2002
PURPOSE OF TEST:	To demonstrate the compliance of the Handset, 9p23 with the requirements for FCC Part 15 Subpart D, Part 15 Subpart C Sections 15.207 and 15.209 & Part 15 Subpart B Sections 15.107 and 15.109 Class B devices.
TEST METHOD:	ANSI C63.4 (1992) ANSI C63.17 (1998)
MANUFACTURER:	Ascom Wireless Solutions 598 Airport Blvd., Suite 300 Morrisville, NC 27560
REPRESENTATIVE:	Bo Eriksson
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the Ascom Wireless Solutions Handset, 9p23 was found to be fully compliant with the following standards and specifications:

United States	**Canada**
➢ FCC Part 15 Subpart B Sections 15.107 and 15.109 Class B ➢ FCC Part 15 Subpart C Sections 15.207 and 15.209 ➢ FCC Part 15 Subpart D ➢ ANSI C63.4 (1992) method ➢ ANSI C63.17 (1998) method	➢ RSS 213 using: See matrix below

Comparison Between FCC part 15 D and IC RSS-213			
FCC PART 15 D	DESCRIPTION	IC RSS-213	ANSI C63.17
15.307	Coordination with fixed microwave service	8.5	
15.309	Cross Reference To Subpart B	11.0	6.1, 6.3
15.311	Labeling requirements	5.1	
15.313	Measurement procedures	3.0, 6.1	
15.315	AC power line conducted limits	10.0	N/A
15.317	Antenna requirements	8.4(c)(8)	N/A
15.319 (a)	Frequency of operation	1.0	N/A
15.319 (b)	Modulation technique	5.4	6.1.4
15.319 (c)	Peak TX power and emission bandwidth	8.1	6.1.2
15.319 (d)	Power spectral density	8.2 (2)	6.1.5
15.319 (e)	Directional gain of Antenna	5.5	N/A
15.319 (f)	Automatic discontinuance of transmission	8.4 (a)	N/A
15.319 (g)	Emissions limits	6.2	
15.319 (h)		6.2	

15.319 (i)	Radio frequency radiation Exposure	12.0	N/A
15.323 (a)	Channel allocation	6.3, 8.2 (1)	N/A
15.323 (b)	Time and spectrum window	8.4 (b)	8.1.2
15.323 (c) (1)	Monitoring interval	8.4 (c)(1)	7.3.2.2, 7.5
15.323 (c) (2)	Monitoring threshold	8.4 (c)(2)	7.3.2.1
15.323 (c) (3)	Transmission duration	8.4 (c)(3)	8.2.2
15.323 (c) (4)	acknowledgments	8.4 (c)(4)	8.2.1
15.323 (c) (5)	Monitoring threshold for system with a minimum of 40 channels	8.4 (c)(5)	7.3.2.1, 7.3.2.2, 8.2.1
15.323 (c) (6)	Isochronous random waiting interval	8.4 (c)(6)	8.1.3
15.323 (c) (7)	Threshold monitoring bandwidth	8.4 (c)(7)	7.4, 7.5
15.323 (c) (8)	Threshold monitoring antenna	8.4 (c)(8)	N/A
15.323 (c) (9)	Monitoring detection threshold for devices with less than maximum output power	8.4 (c)(9)	N/A
15.323 (c) (10)	Duplex connections	8.4 (c)(10)	8.2.3
15.323 (c) (11)	Alternative monitoring interval	8.4 (c)(11)	8.2.4
15.323 (c) (12)	Limitation on use of sections (c)(10) and (c)(11)	8.4 (c)(12)	N/A
15.323 (d)	Spurious emissions	8.3	6.1.1
15.323 (e)	Frame repetition stability / frame period and jitter	8.4 (d)	6.2.3, 6.2.4
15.323 (f)	Frequency stability	9.0	6.2.2

CONDITIONS FOR COMPLIANCE
No modifications to the EUT were necessary to comply.

APPROVALS

QUALITY ASSURANCE:	**TEST PERSONNEL:**
Steve Behm, Director of Engineering Services	Randy Clark, EMC Engineer
Joyce Walker, Quality Assurance Administrative Manager	Chuck Kendall, Lab Manager

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The Handset, 9p23 tested by CKC Laboratories was a production unit. The 9p23 is a portable telephone which operates in the unlicensed isochronous PCS band from 1920 MHz to 1930 MHz. The frequency spacing of 8 separate channels is 1.25 MHz with the lowest channel centered at 1920.625 MHz. The 9p23 operates on two power levels, 2mW and 90mW. The maximum peak transmit power level is 19.5dBm or 90mW. The Frequency reference for the handset is a 15 MHz. Temperature compensated crystal oscillator (TCXO), X101.

The portable transceiver is made up of two major circuit elements. A combination of digital and analog circuits provides a telephony user interface, with associated keypad, display, microprocessor and battery functions. The other part of the transceiver is the radio circuit. Radio circuits consist of synthesizers, mixer, amplifiers and filters. Also included is the QPSK modem (IC114) function and related radio control functions for transmitting and receiving digital radio signals. Since the system is Time Division Duplexed the same frequency is used for both transmit and receive.

After converting the TX signal to the frequency between 1920 MHz and 1930 MHz the signal is routed through a 3 pole bandpass filter, FL235, which removes the 1075.625 MHz to 1085.625 MHz image signals as well as the second LO at 1498.125 to 1506.875 MHz. A discrete filter follows the PA to reject harmonics of the output signal.

15.31(e) Voltage Variations

Not applicable to this device.

15.31(m) Number Of Channels

This device operates on eight channels.

15.33(a) Frequency Ranges Tested

15.107 Conducted Emissions: 150 kHz – 30 MHz
15.109 Radiated Emissions: 30 MHz – 20 GHz
15.315/15.207 Conducted: 150 kHz – 30 MHz
15.323/15.209 Radiated: 10 MHz – 20 GHz

FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	10 MHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	20 GHz	1 MHz

15.205 Restricted Bands
The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

15.307 UTAM Statement
The UTAM authorization of the DCT1900 system is controlled through the base station by the Administration software. The handset is not capable of initiating transmissions without an active base station and therefore is not subject to the required testing. No modifications or changes were made to the authorization routines for UTAM. This was confirmed with the UTAM authorities prior to testing.

15.309 Cross Reference to 47CFR 15 Subpart B
See FCC Part 15 Subpart B Sections 15.107 and 15.109

15.311 Label
This information is in a separate document.

15.317 Antenna Requirements
The 9p23 used an inverted F antenna that was soldered directly to the main board. The antenna of the 9p23 can only be replaced by the same type of antenna as specified by the manufacturer.

15.319(a) Eut Operating Frequency
The EUT was operating at 1920.625 MHz – 1929.375 MHz.

15.319(b) Modulation Techniques
The DCT1900 uses a Differential π/4 DQPSK Differential Quadrature Phase Shift Keying digital modulation.

15.319(c) Peak Transmit Power

Test Conditions: Power output measurements were performed both at the antenna terminals using the customer provided antenna port and on the OATS using the normal integral antenna.

§15.319 General technical requirements.

(c) Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in hertz.

Calculation of limit:

The measured emissions bandwidth is 835 kHz.

$100\mu W * \sqrt{(BW\ Hz)} = 100 * \sqrt{835000}$

$= 91378\ \mu W$

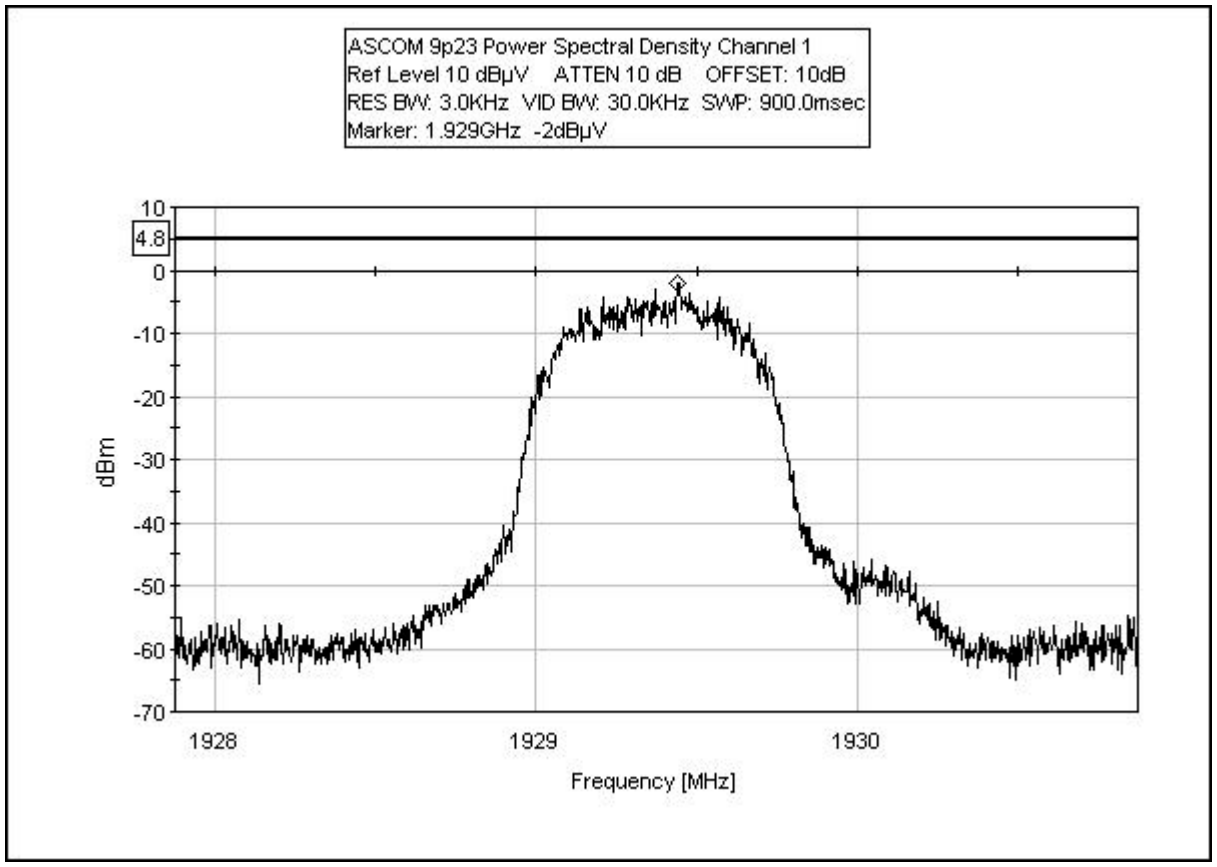
or = 19.61 dBm

Frequency	Measured at Antenna Port (dBm)		Measured at OATS (dBm)		Results
Power Setting	90mW	2mW	90mW	2mW	
1920.625	18.8	3.9	18.2	3.0	Pass
1929.375	19.0	4.7	19.5	5.0	Pass

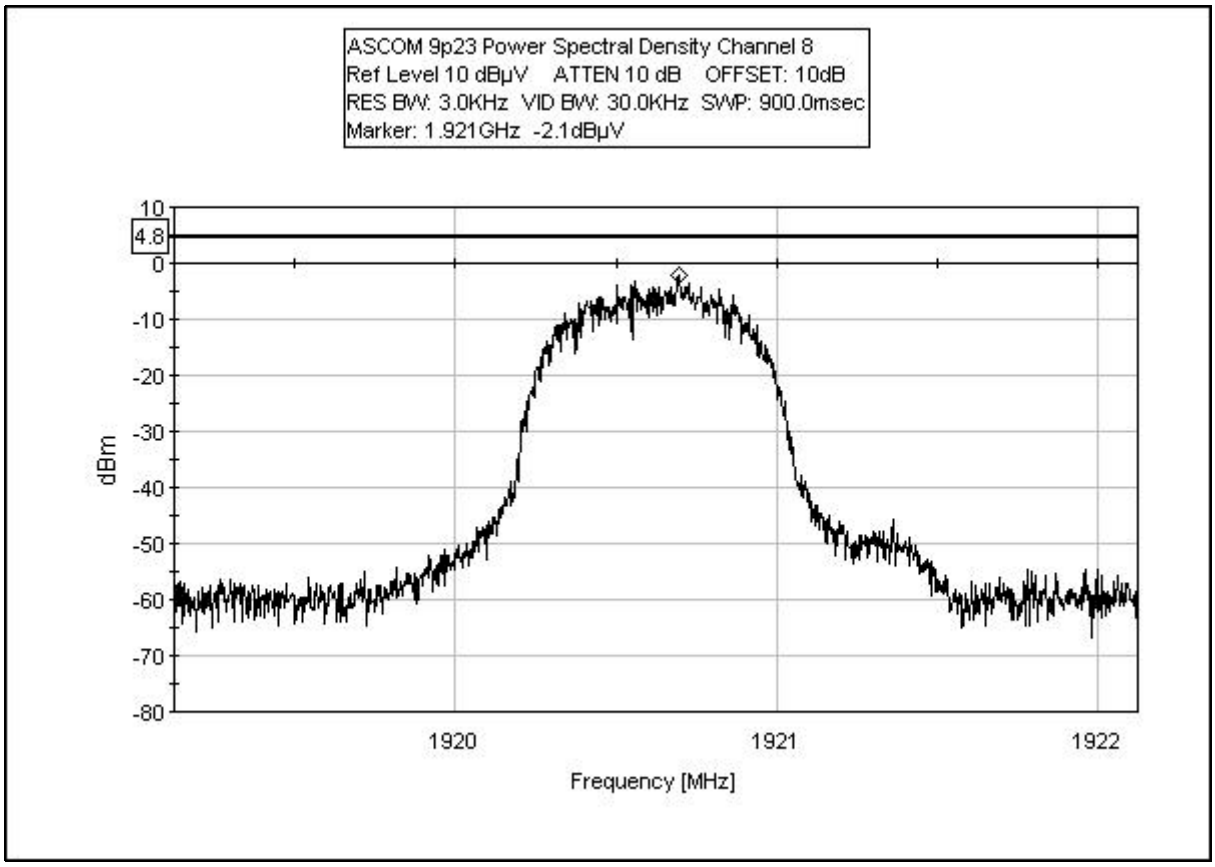
15.319(d) Power Spectral Density

Test Setup: EUT is connected directly to spectrum analyzer through suitable attenuation. Readings were directly compared to the limit in the following plots. RBW = 3 kHz, VBW = 30 kHz. Limit is 3 mW = 4.77 dBm.

Channel 1



Channel 8


ASCOM 9p23 Power Spectral Density Channel 8
Ref Level 10 dBµV ATTEN 10 dB OFFSET: 10dB
RES BW: 3.0KHz VID BW: 30.0KHz SWP: 900.0msec
Marker: 1.921GHz -2.1dBµV
10
4.8
0
-10
-20
-30
-40
-50
-60
-70
-80
dBm
1920
1921
1922
Frequency [MHz]

DIRECT CONNECT

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003

15.319(e) Antenna Gain Requirements
Antenna gain was less than 3 dBi, therefore, no reduction in the relevant limit was required.

15.319(f) Automatic Discontinuation of Transmission
The EUT ceased transmission under the following conditions:

1) Reset of radio exchange (with base station powered by radio exchange)
2) Removed power from radio exchange
3) Removed interface line between base station and radio exchange
4) Removed battery from handset

The EUT passes this test.

15.319(i) SAR Information
The SAR report is in a separate document.

Temperature And Humidity During Testing
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST

Handset

Manuf:	Ascom Wireless Solutions
Model:	9p23
Serial:	4939817
FCC ID:	O4M9P23 (pending)

Battery Pack

Manuf:	Ascom Wireless Solutions
Model:	643103
Serial:	NA
FCC ID:	NA

Handset w/Vibrator

Manuf:	Ascom Wireless Solutions
Model:	9p23-BAB4
Serial:	4939812
FCC ID:	O4M9P23 (pending)

Power Supply Brick

Manuf:	Ascom Wireless Solutions
Model:	130111
Serial:	NA
FCC ID:	NA

Desktop Charger

Manuf:	Ascom Wireless Solutions
Model:	9p23
Serial:	4913165
FCC ID:	DoC

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Base Station
Manuf: Ascom Wireless Solutions
Model: DB-600
Serial: UA200NYN2Z
FCC ID: AKAKRC1011371

The Radio Exchange System includes the following:

Radio Exchange
Manuf: Ascom Wireless Solutions
Model: 9d
Serial: ASMD003008
FCC ID: AXAHOL-74896-wc-E

CPU Card
Manuf: Ascom Wireless Solutions
Model: ROFNB15719/2
Serial: ASMD002717
FCC ID: DoC

Line Termination Unit Card
Manuf: Ascom Wireless Solutions
Model: ROFNB14702/6
Serial: ASMD001199
FCC ID: DoC

Speech Linking Unit Card
Manuf: Ascom Wireless Solutions
Model: ROFNB15716/1
Serial: ASMD001263
FCC ID: DoC

SCOPE
This document provides an outline of the testing performed for the 9p23 wireless telephone to show compliance to the requirements of FCC Part 15D rules. The test methods in this document were taken directly from ANSI C63.4 and ANSI C63.17 §7&8. Where necessary, additional paragraphs have been provided for further clarification of the test procedures.

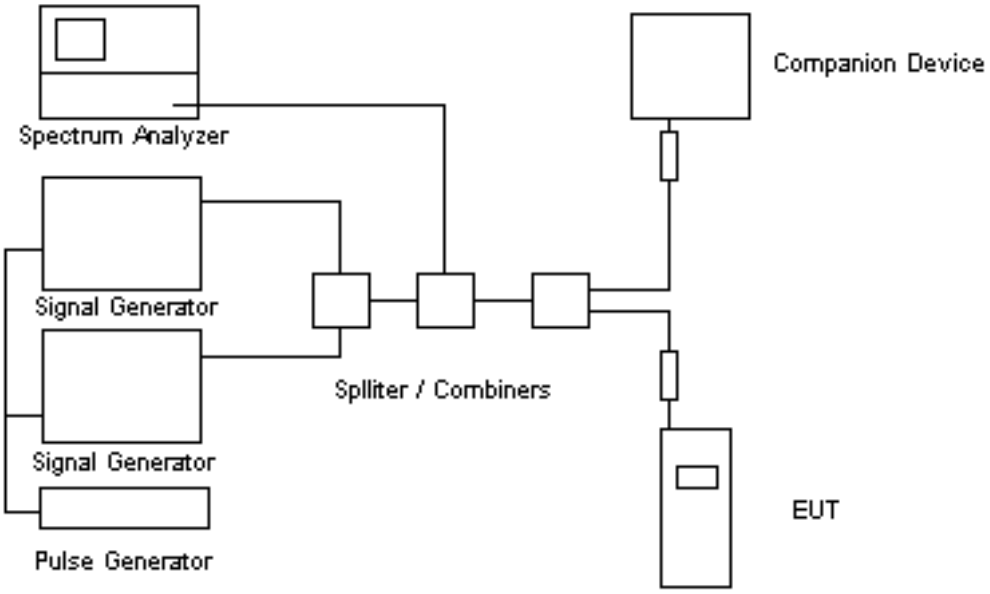
ANSI C653.17 Sections 7 & 8 provide test criterion and methodology for demonstrating compliance with FCC Part 15D results relating to access channel (time and spectrum window) monitoring and access procedures. Not all sections of ANSI C63.17 are included because they do not apply to isochronous devices. The following Test Report identifies the applicable tests for the Handset, 9p23 transceiver which is an isochronous device. The host equipment and the 9p23 utilize up to 8 TDMA carriers with 24 (12 duplex timeslots each creating a total of 96 possible access channels for establishing voice telephone communications.

15.323(c)/ANSI C63.17 §7 & 8 Test Setup

All calculations and setups were based on a reference output power of 19.5 dBm (as measured at the antenna terminals) and an emissions bandwidth of 835 kHz. All tests were performed using "frequency administration" commands through the base station to limit the number of available frequencies. The interfering signal generators were either gated to the synchronization signal of the base station, or a CW carrier as allowed by the governing procedure. All tests were performed at the antenna terminals of the device. System losses were measured using a power meter. All system losses were accounted for during testing.

15.323(c)/ANSI C63.17 §7 & 8 Test Configuration

Test configurations vary according to the particular test being run. The following illustration shows the general connectivity for the various tests.



ANSI C63.17 Setup Diagram for Ascom 9p23

Note: This diagram is representative of test setup, actual configurations are changed as needed depending on the test performed.

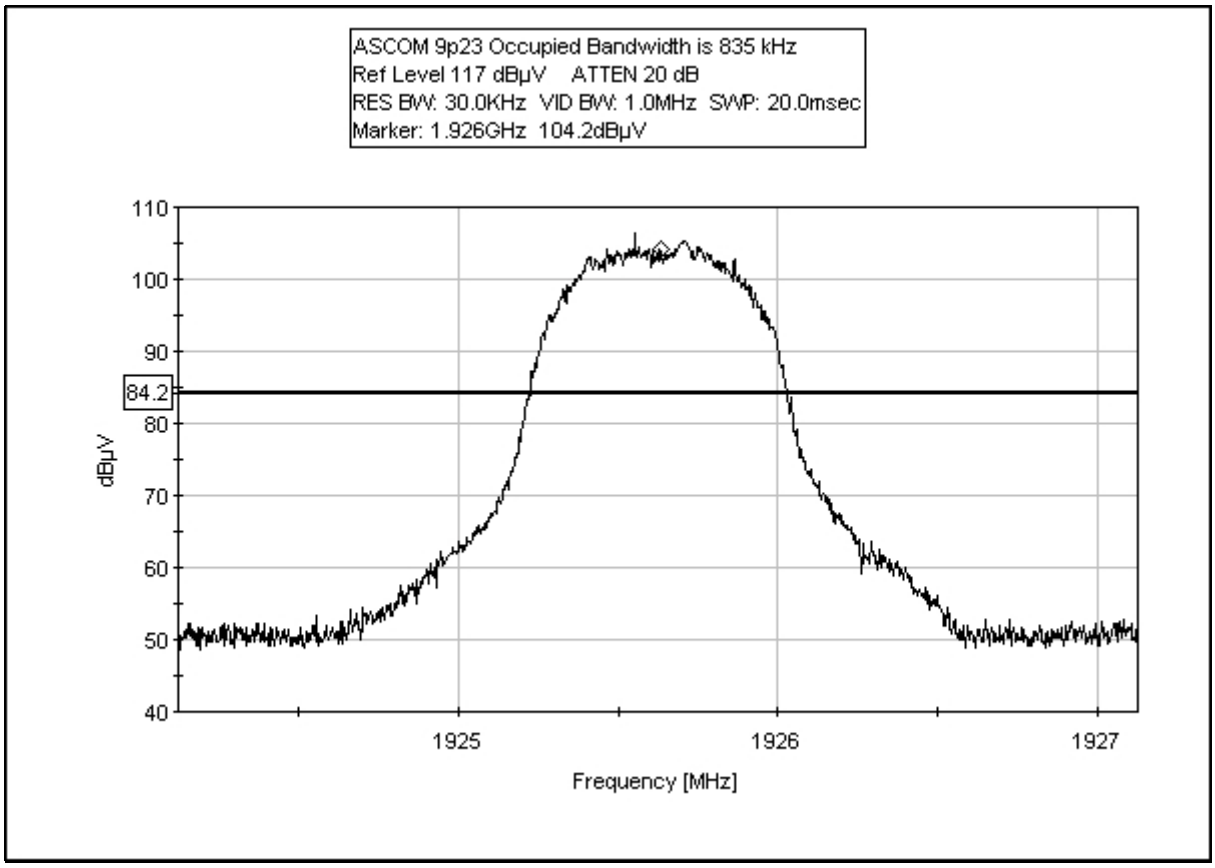
CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

15.323(a) Occupied Bandwidth

Test Setup: EUT is connected directly to spectrum analyzer through suitable attenuation.



DIRECT CONNECT

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
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MEASUREMENT PROCEDURES

All measurements were conducted according to procedures described in the relevant sections of ANSI C63.17. Some were not relevant because they address asynchronous devices.

Because the ANSI procedure often provides a choice of methods, or requires calculations based on the technology being tested, the following paragraphs contain additional needed information to clarify the procedures whenever appropriate.

The applicable tests for the 9p23 (an isochronous device) were as identified and described in the following sub-paragraphs:

ANSI C63.17 §7.1 Introduction

For the Section 7 Monitoring Tests, the ANSI procedure requires "forcing" the EUT to operate in one region of the sub-band by either of two methods: introduction of out-of-operating area interference, or by direct frequency administration commands, if available. The 9p23 has the latter capability, thus this more convenient method was used whenever relevant.

Under frequency administration commands from the Cordless System Manager software utility shipped with each system, any single or combination of carrier frequencies can be "blocked", thus allowing many of the ANSI tests to be conducted without injection of "out of operating region" interference.

ANSI C63.17 §7.1.2 Monitoring Test Procedure - General

This paragraph refers to the general scope of the testing objectives. It does not describe a test, per se.

Additional details follow:

All tests were run using "frequency administration" commands to limit the EUT to operate on a limited number of target frequencies.

The Interference Generator was set to provide an interfering carrier at (for example) 1924.375 MHz gated at 5 ms bursts (50% duty cycle) to coincide with the 9p23 10 ms total frame timing or a CW carrier was used as allowed by the ANSI procedure.

The objective was to verify that the EUT refused to set up a connection on any carrier which was, in effect, "blocked" by the interfering source already occupying the channel. The EUT passed when it operated only in the allowed combinations of operating conditions as described in each test scenario.

ANSI C63.17 §7.2.1 Calculation of Thresholds

This paragraph does not describe a test. It simply requires a calculation be performed to establish upper and lower threshold limits.

Thresholds were calculated according to the formulas provided in the referenced ANSI document paragraph. This resulted in the following:

Isochronous Devices
Lower Threshold: 15*LOG(B) - 184 + 30 - P (dBm)
Upper Threshold: 15*LOG(B) - 184 + 50 - P (dBm)
Where B is the emissions bandwidth in Hz and P is the transmitter power level in dBm

Calculation of upper and low threshold limits:
B = 835kHz
P = 19.5 dBm

Lower Threshold = -84.6 dBm
Upper Threshold = -64.6 dBm

ANSI C63.17 §7.2.2 Calibration of Test Interference Field Strength (Radiated Technique)
Not applicable, EUT has a manufacturer-provided antenna connector (not normally installed).

ANSI C63.17 §7.2.3 Standard Test Frequencies
The 9p23 operates on the following frequencies:

CSM Carrier Number	Carrier Frequency (MHz)
8	1920.625
7	1921.875
6	1923.125
5	1924.375
4	1925.625
3	1926.875
2	1928.125
1	1929.375

ANSI C63.17 §7.2.4 Procedures for Using Out-of-Operating Region Interference

Not applicable to these tests. Host control is capable of blocking channels through administrative commands as in §7.1.2.

7.3.2.1 Determination of Thresholds and Verification of "Best Channel" Selection

Manufacturer's Declaration of Relevant Monitoring Thresholds

The DCT1900 monitoring thresholds are nominally set for -87 dBm (lower) and -67 dBm (upper) on both the Portable and the Base Station. In receiver sections, the received signal strength indicator (RSSI) signal monitored by software via an a-d converter, providing an accurate mechanism for interfering signal threshold measurement. In the case of beacon transmissions from Base Stations, monitoring during the receive slots occurs at least once every 14 seconds, insuring transmissions can be shifted over another time/frequency access channel within the FCC required 30-second period. In the case of an active transmission state with a Portable Handset continuous (frame by frame) monitoring takes place primarily by the Portable with messaging sent to the Base Station to effect the handover of the call to another time/frequency access channel if interference exceeding thresholds is sensed. The software algorithms necessary to process information in real-time and effect selection of the least interfered channel are complex and are designed to comply with the relevant FCC Rules while also providing transparent handover capability for the users.

These tests were performed using the conducted technique. The interference test signals were CW. The system preferred carriers at the upper end of the isochronous band because emission bandwidths were greater than 625 kHz.

For the Portable, the tests were run concurrently with the Base Station as a "companion" device.

15.323(b) and (c)(2, 5)

ANSI C63.17 §7.3.2.1.1 Lower Threshold

The following two carriers were selected for operation. (The other 6 were administratively "blocked".)

f1 = 1925.625 MHz
f2 = 1924.375 MHz

It was confirmed that the preferred carrier (f1) was selected and following the ANSI procedure, measured the lower threshold for the Portable with the Base Station and Portable communicating together.

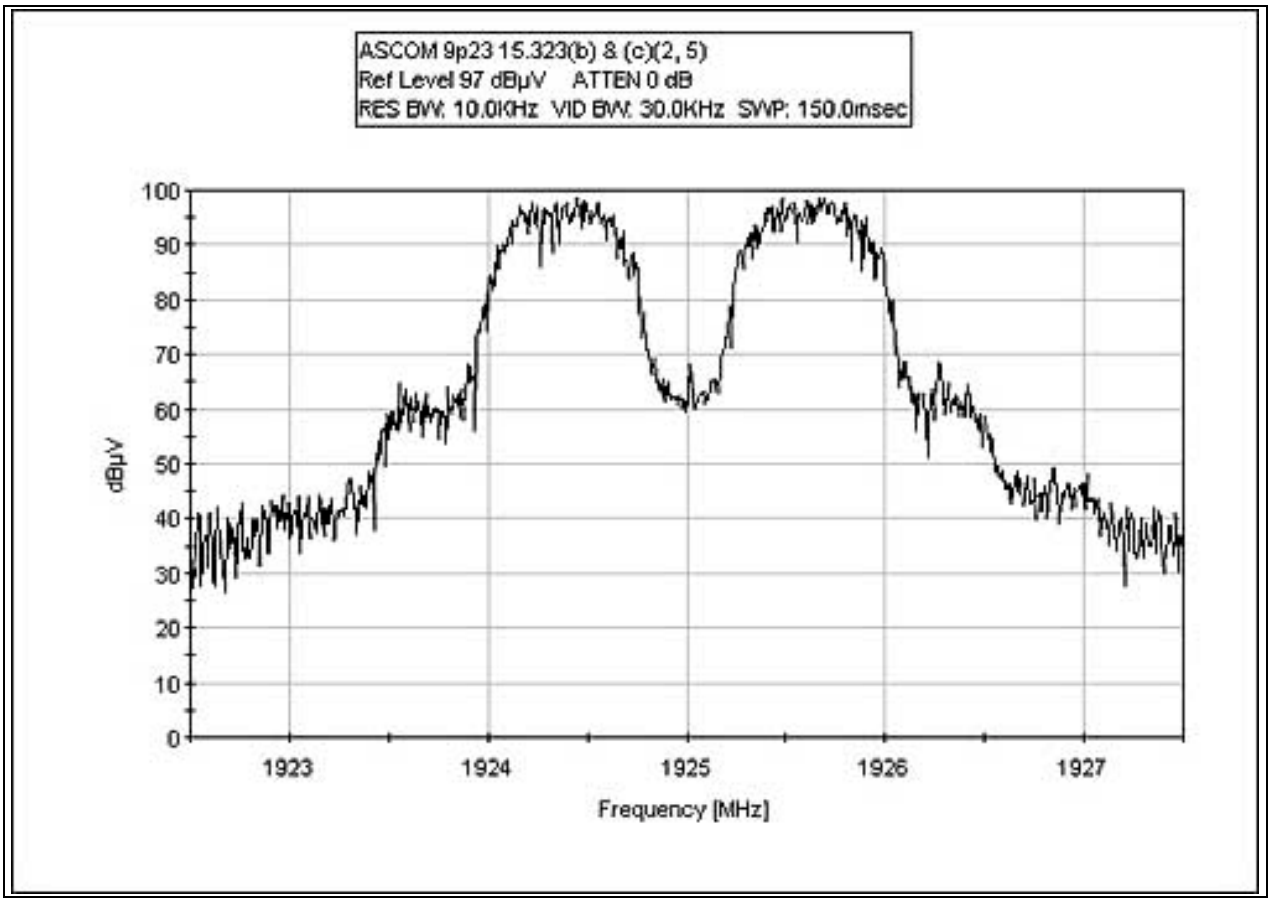
Interference test signal is CW on f_1.

Measured Lower Threshold was -84.8 dBm

Results: PASS – the measured lower threshold was lower than the calculated.

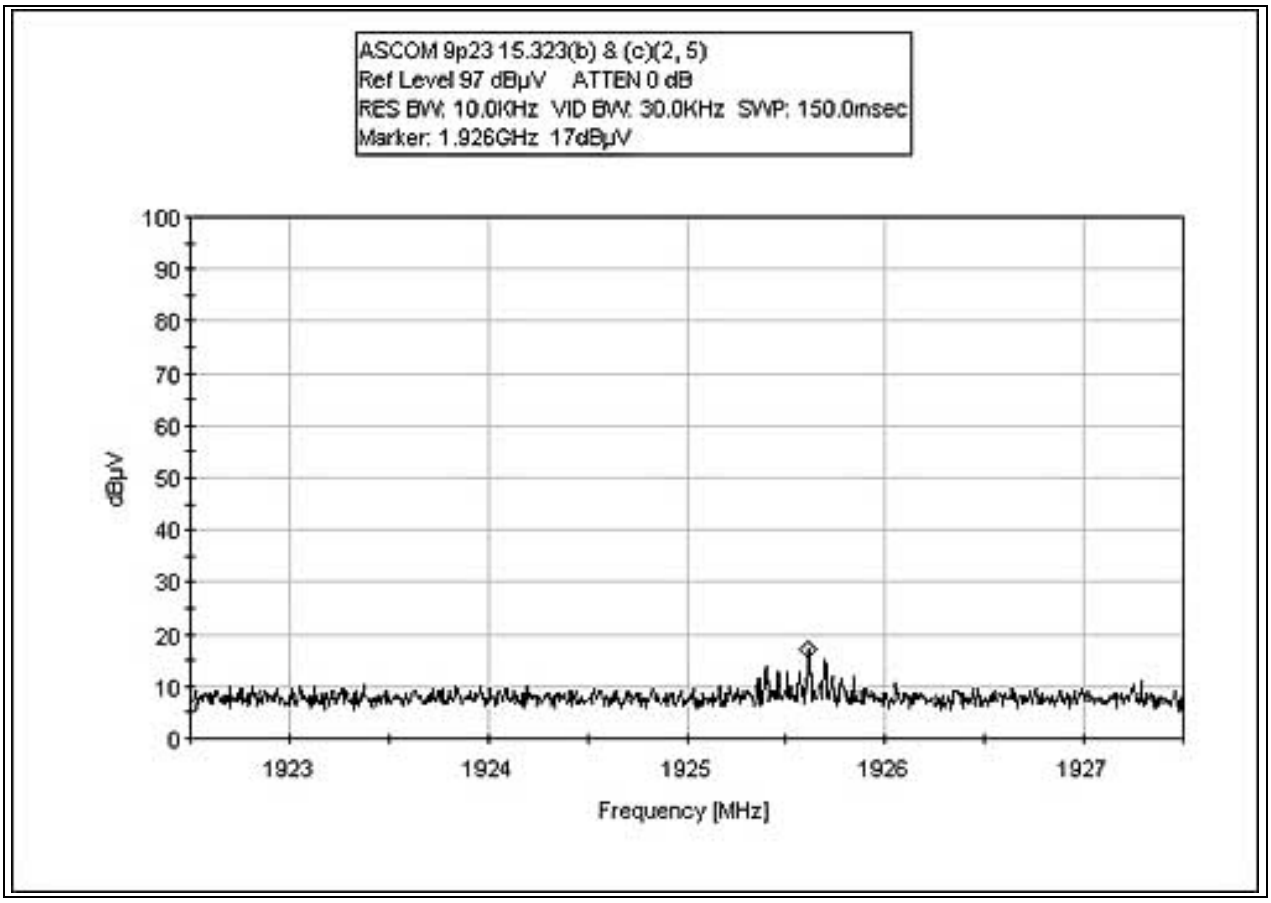
15.323(b&c)(2,5) Lower Threshold - Two Channels

The Portable initiated a call on f_1. Once interference was injected above the lower threshold, the Portable hopped to f2. Both channels are shown simultaneously below.



15.323(b&c)(2,5) Lower Threshold - Interfering Channel

The interfering signal is shown below.



ANSI C63.17 §7.3.2.1.2 Least Interfered Channel

This test was intended to prove that the Least-Interfered-Channel will always be selected.

The following two carriers were selected for operation. (The other 6 are administratively "blocked.")

f1 = 1925.625 MHz
f2 = 1924.375 MHz

Step 1 of the ANSI procedure was run with f1 CW interference set at 10 dB above the measured lower threshold and f2 CW interference set at 3 dB above the measured lower threshold. The EUT transmitted on f2 under this condition.

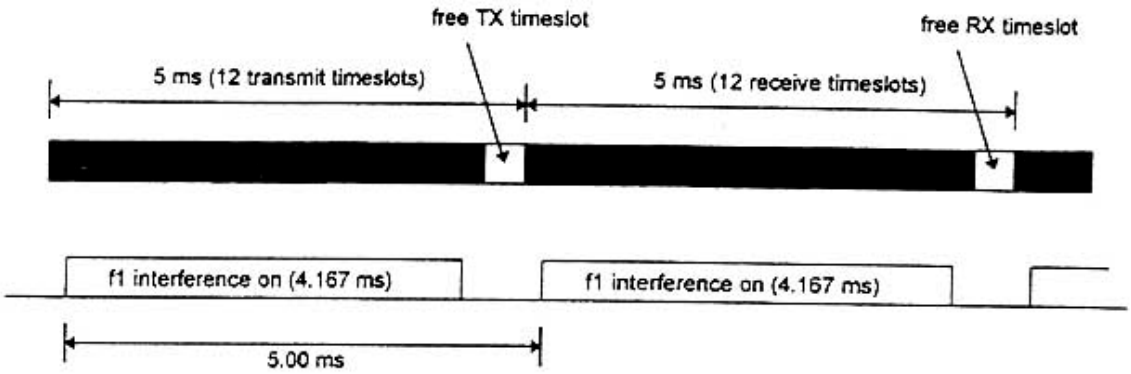
Step 3 of the ANSI procedure was run with f2 CW interference set at 10 dB above the measured lower threshold and f1 CW interference set at 3 dB above the measured lower threshold. The EUT transmitted on f1 under this condition.

Because 9p23 is a TDMA system, Step 2 of the ANSI procedure was run with interference 10 dB above the measured lower threshold selectively placed on all but one f1 timeslot and CW interference 3 dB above the measured lower threshold on all f2 timeslots. The EUT transmitted on the single non-interfered timeslot on f1 (as opposed to selecting an f2 timeslot).

> Note: During this test, it was not necessary to "lock" the interfering source to the 9p23 TDMA frame timing; however the accurate timing of both the 9p23 (50 ppm) and the test equipment (10 ppm) insured that the relative "drift" of the timeslots occurred at a very low slip-rate, enabling the test to be successfully completed during the relatively long periods of alignment. (Additionally, even when there was a "slip", a different free timeslot still became available for the call to be set up on.)

The RF Signal Generator controlled by the pulse generator provided an interference "mask" that insured one pair of timeslots were free during the test. The pulse generator period was set to 5.00 ms and duty cycle to 83.33%. The signal generator was gated with this pulse to provide a RF burst that was "10 timeslots long" (41.167 ms). A "2 timeslot wide" off time was therefore provided. Since there was no phase alignment or synchronization, this slowly drifted in time relative to the slot timing of the 9p23, ensuring ONE non-interfered timeslot pair was always available to set up a connection for the brief test.

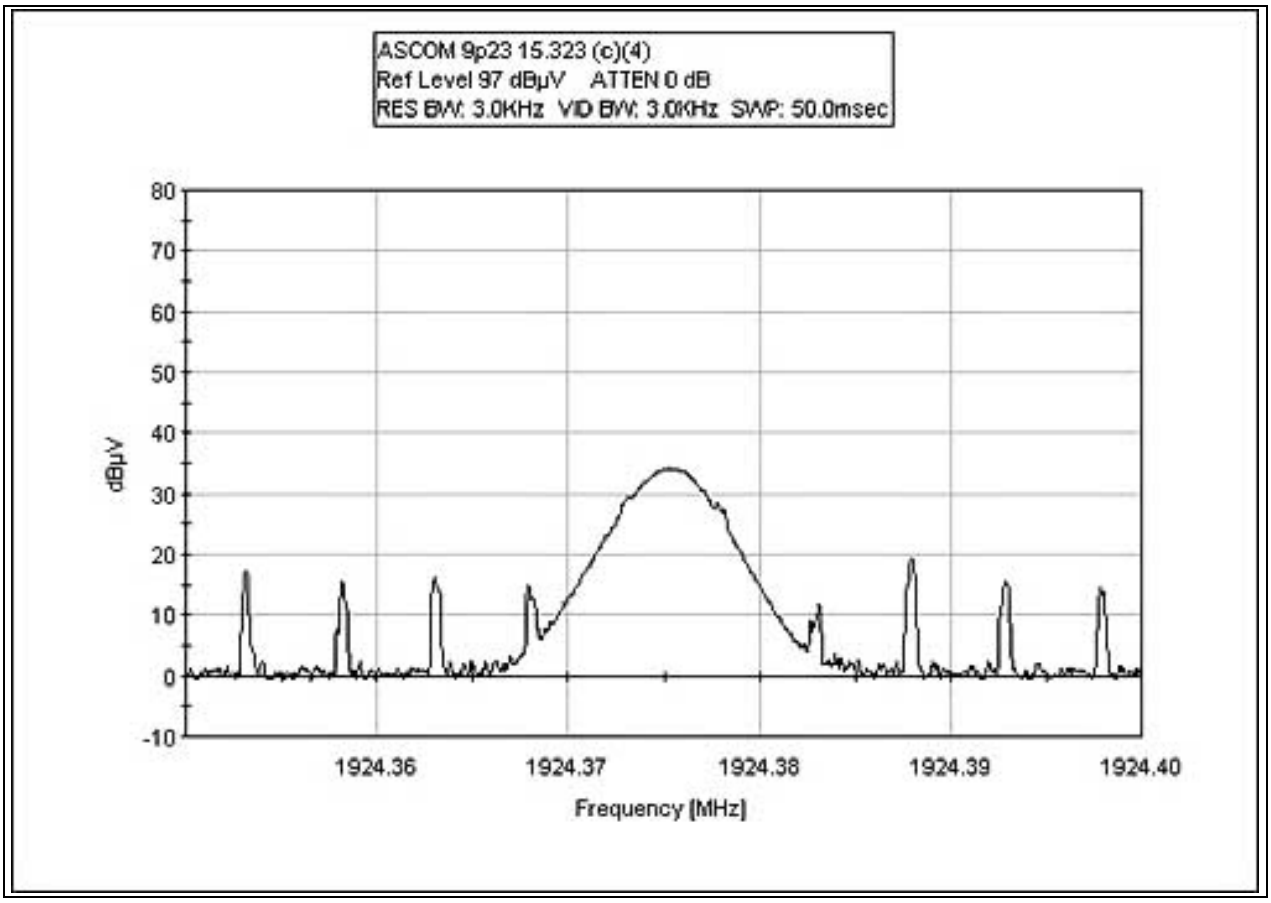
This is shown in the following illustration:



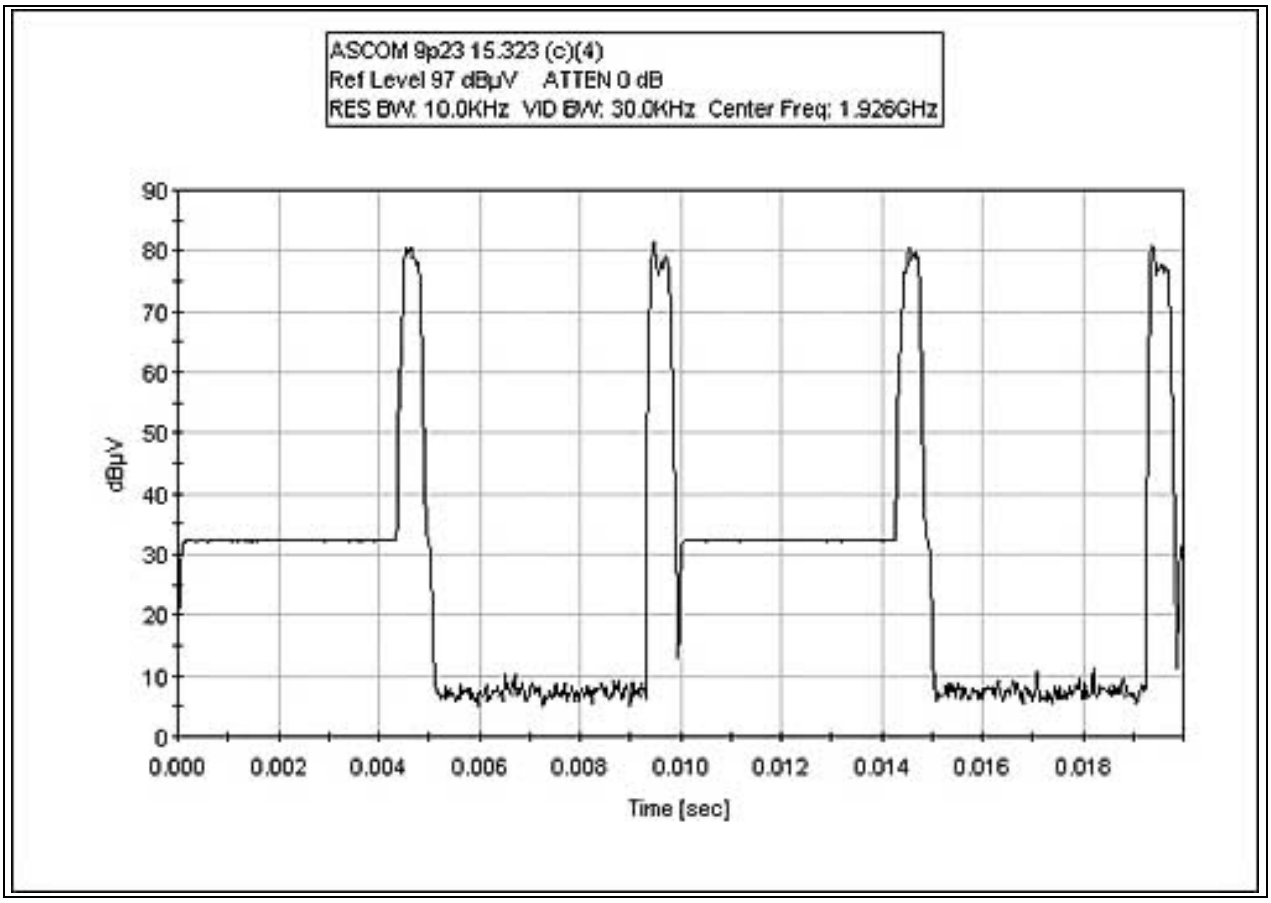
Results:
Step 1: EUT Transmits on f_2.
Step 3: EUT Transmits on f_1.
Step 2: EUT transmits on available timeslots on channel f_1 on

EUT transmits only on the Least Interfered Channel.

7.3.2.1.2 Step 2 f_2 CW Interference Shown



7.3.2.1.2 Step 2 f_1 Interference Shown With Portable Transmitting In Free Timeslots



ANSI C63.17 §7.3.2.1.3 Upper Threshold

This test was intended to prove that when no other carriers were available (blocked), calls could still be set up on f2 only if the interfering signal (also on f1) was below the upper threshold limit and that the next available carrier was selected in order.

The following two carriers were selected for operation. (The other 6 were administratively "blocked".)

f1 = 1925.625 MHz
f2 = 1924.375 MHz

Interference levels were injected on f1 at 10 dB below the measured upper threshold and on f2 at 10 dB above the measured upper threshold.

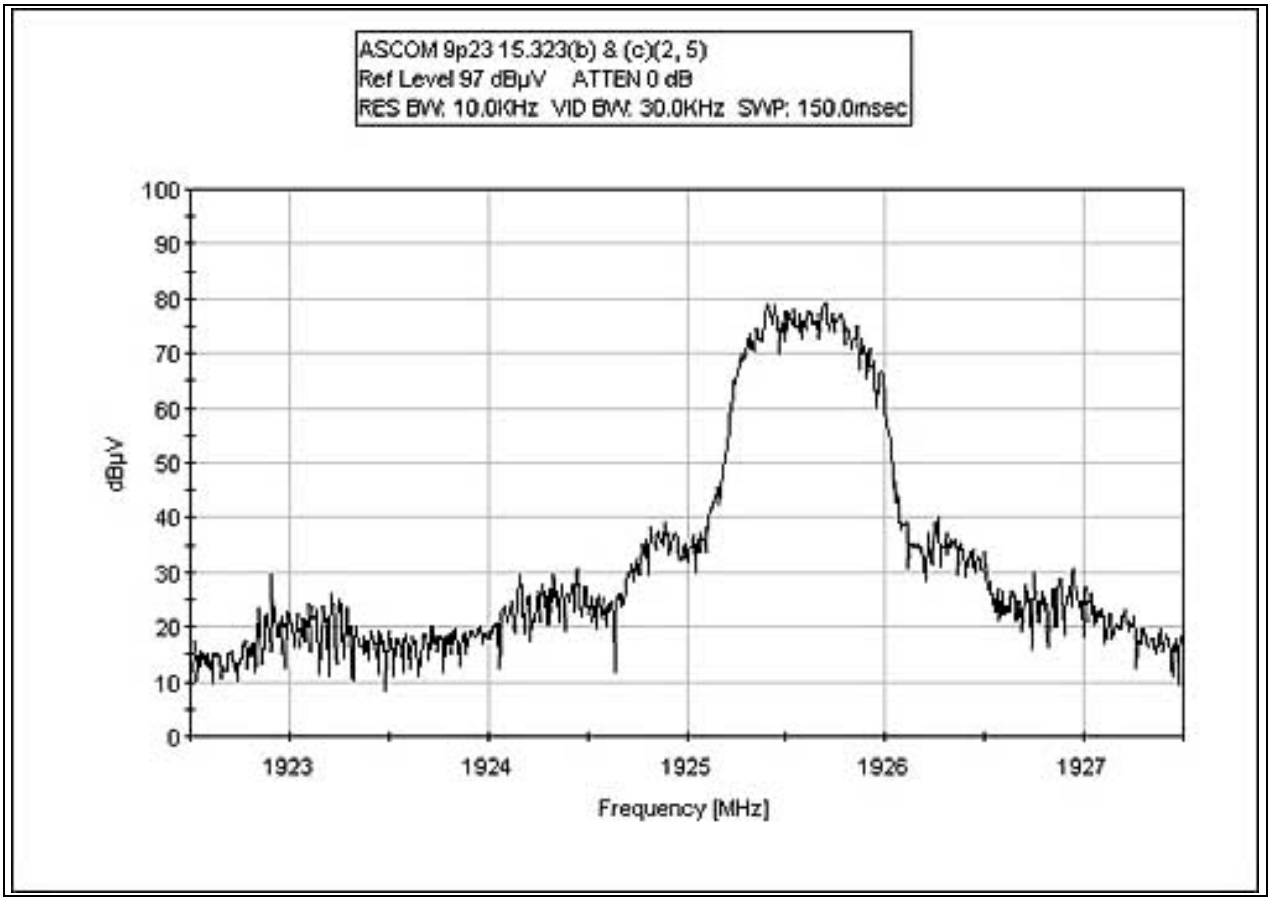
It was confirmed that the preferred carrier (f1) was selected and following the ANSI procedure measured the upper threshold for the Portable with the Base Station and Portable communicating together. The interference on f1 was increased by 1 dB increments until the portable was unable to establish a call. The lowest level of interference on f1 in which the portable would not transmit was the measured upper threshold.

Interfering test signals are CW

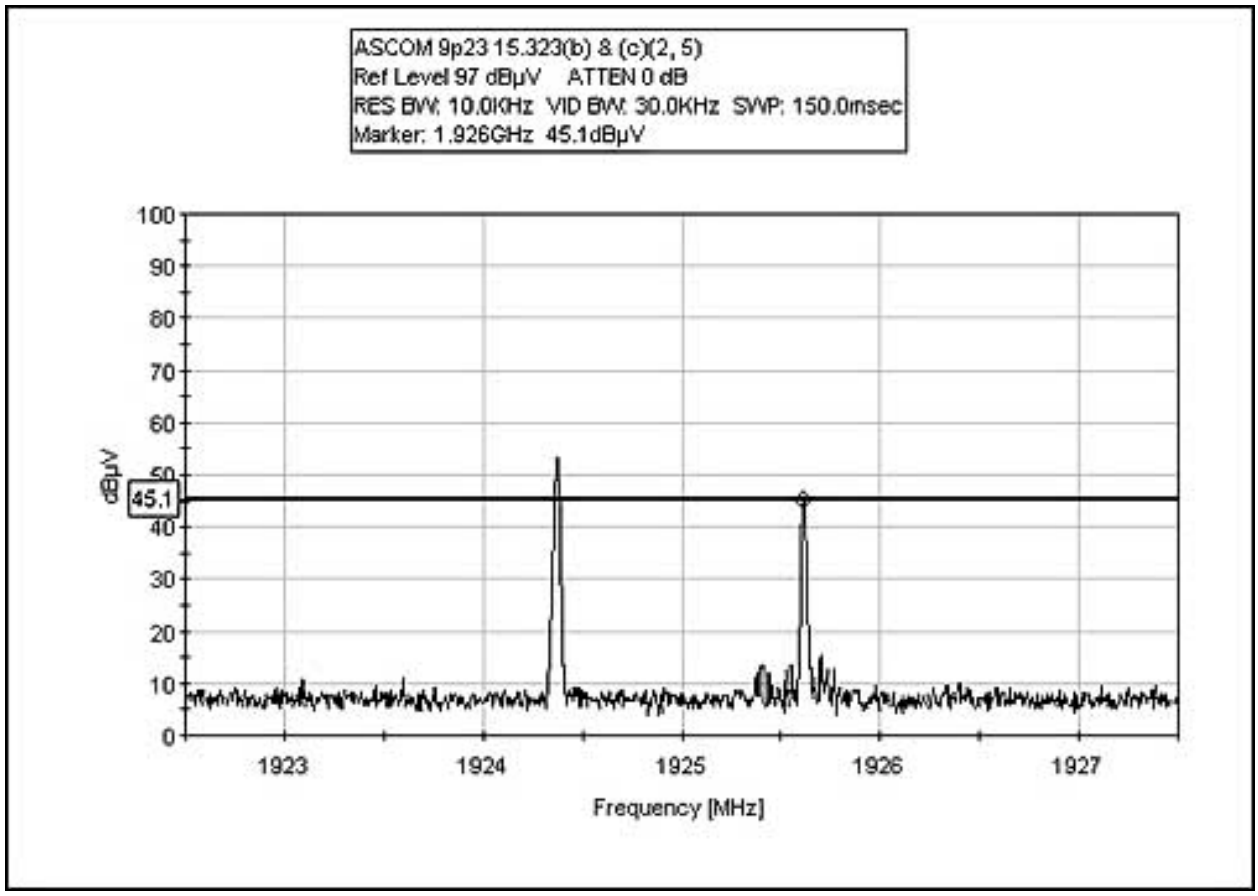
Measured Upper Threshold was -64.9 dBm

Results: Pass – The measured upper threshold was lower than the calculated.

7.3.2.1.3 Portable Transmitting on f_1



7.3.2.1.3 f_1 & f_2 Interference Shown Below



15.323 (c)(1, 5)

ANSI C63.17 §7.3.2.2 Selected Channel Confirmation

This test was intended to confirm that the EUT made its channel selection decision on the basis of a recent power level reading. The test also requested submittal of a manufacturer's description of the channel monitoring and selection process.

The following two carriers were selected for operation. (The other 6 were administratively "blocked".)

f1 = 1925.625 MHz
f2 = 1924.375 MHz

Interference levels were injected on f1 at 3 dB above the measured lower threshold and on f2 at 10 dB above the measured lower threshold.

Interfering test signals are CW.

Step 1: The interference on f2 was temporarily removed and verified that a connection was made on f2 with interference on f1.
Step 2: With the portable on hook, the interference on f2 was simultaneously replaced and a call was initiated.

Results: Step 1) EUT transmits on f2.
Step 2) EUT transmits on f1.
Results: Pass.

Manufacturer's Description of Channel Monitoring and Selection Process

Channel Monitoring

The RFP (Base Station) performs channel monitoring at a rate of one (1) RF carrier every frame (10 ms) on a continuous basis. To completely scan a normal system with all eight (8) carriers enabled takes 8 x 10 ms = 80 ms., i.e., the sys "refreshes" its power level memory table every 80 ms.

Channel Selection

The beacon channel will be selected within one multiframe (160 ms.) prior to channel verification. The selection process conforms to both licensed (Least Interfered Channel) and unlicensed (Listen Before Talk/Least Interfered Channel) FCC Part 15D "etiquette" requirements.

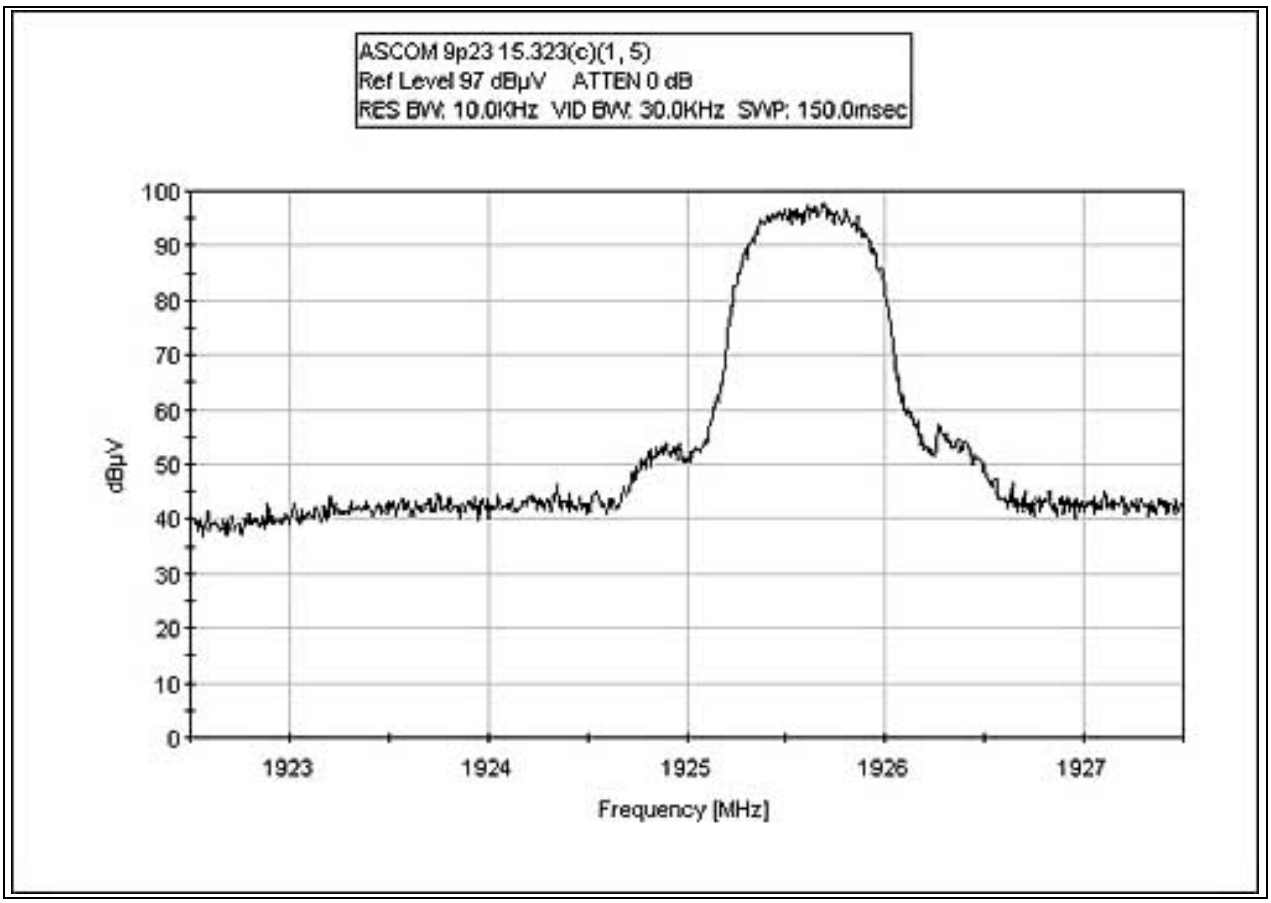
Channel Verification

Channel verification will occur one (1) frame (10 ms.) prior to establishing a beacon. Verification is in accordance with the Listen Before Talk and Least Interfere Channel rules, respectively.

A frame and slot timing diagram is provided in ANSI Section 7.5 Isochronous Reaction Time and Monitoring Interval for reference.

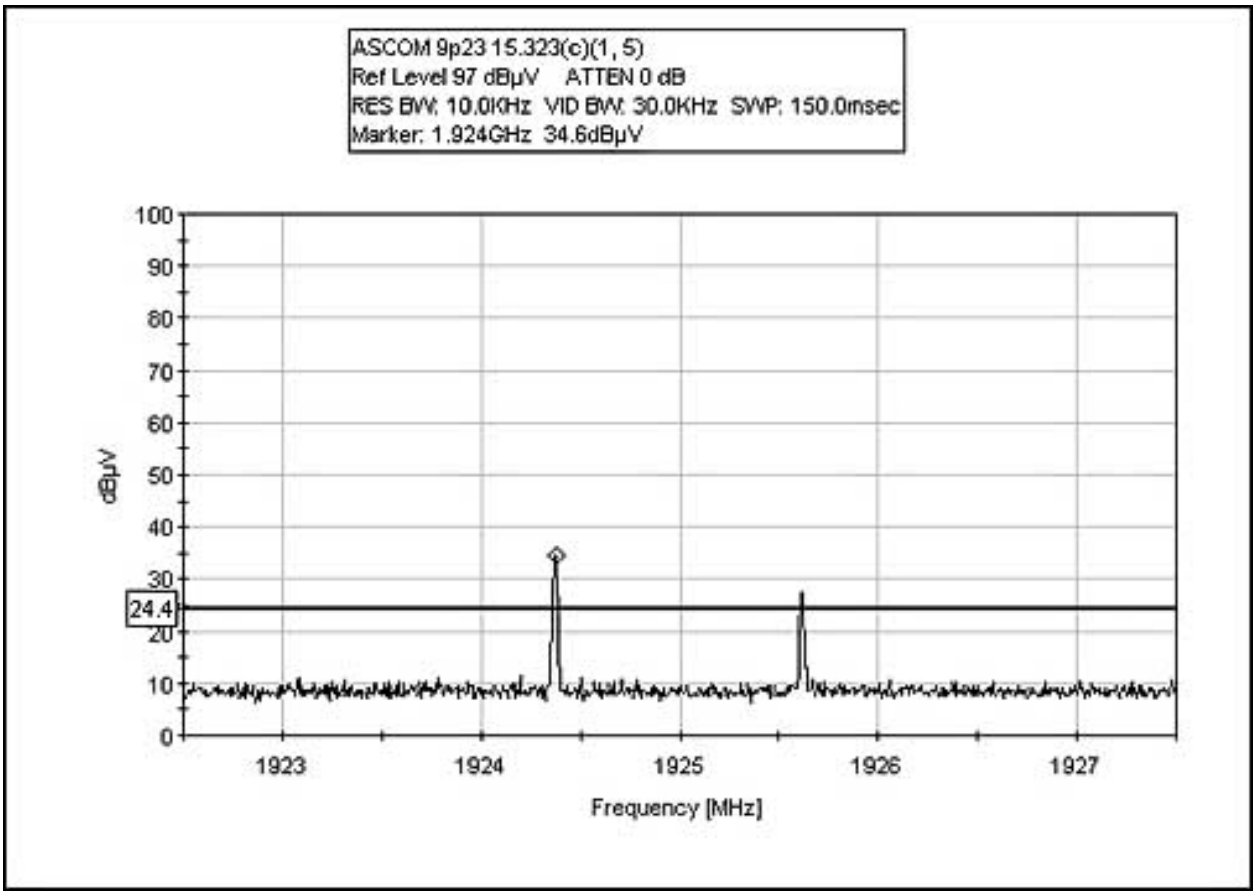
7.3.2.2 - Transmit Channel

Step 2 with simultaneous activation of f2 interference and call initiation, the Portable transmits on channel f1.



7.3.2.2 - Interference

f1 and f2 interference shown below.



ANSI C63.17 §7.4 Threshold Monitoring Bandwidth

Only CSM Carrier 4 (f1 = 1925.625 MHz) was enabled, all others were administratively blocked. Interfering test signal was modulated with a FM signal with an emissions bandwidth greater than the minimum bandwidth allowed in a sub-band (50 kHz). In this case 2 kHz FM modulation was input with a bandwidth of 100 kHz. Signal level was set to 4 dB above upper threshold.

Signal Frequency was set to $f_1 \pm 40\%$ of the emissions bandwidth.

$\Delta = 835 \text{ kHz} * 0.4$
$= 334 \text{ kHz}$

CSM Carrier Number	Carrier Frequency (MHz)	Carrier - Δ (MHz)	Carrier + Δ (MHz)
8	1920.625	1920.291	1920.959
7	1921.875	1921.541	1922.209
6	1923.125	1922.791	1923.459
5	1924.375	1924.041	1924.709
4	1925.625	1925.291	1925.959
3	1926.875	1926.541	1927.209
2	1928.125	1927.791	1928.459
1	1929.375	1929.041	1929.709

Before each test, the interfering signal of the channel being tested was turned off and the equipment was checked to ensure a proper connection. Then the interfering signal was re-established and the test performed at the frequency of interest.

The EUT passes this test in all channels.

15.323(c)(1,7)

ANSI C63.17 §7.5 Isochronous Reaction Time and Monitoring Interval
Interference signals are CW.

For each test, the pulse width and interference level, respectively, are shown below.
Step 1 = 50√(1.25 / B) at upper threshold
Step 2 = 35√(1.25 / B) at upper threshold + 6 dB
Step 3 = 75√(1.25 / B) at upper threshold + 10 dB
Bandwidth "B" is the emissions bandwidth in MHz (0.835 MHz), and the calculated upper threshold (-65 dBm)
Calculated pulse duration values are:

Step	Pulse Width	Interference Level
1	61.17 usec.	-64.8 dBm
2	42.82 usec.	-58.8 dBm
3	91.76 usec.	-54.8 dBm

		Step 1	Step 2	Step 3
CSM Carrier Number	**Carrier Frequency**	**61.17uS at -64.8dBm**	**42.82uS at -58.8dBm**	**91.76uS at -54.8dBm**
8	1920.625	Pass	Pass	Pass
7	1921.875	Pass	Pass	Pass
6	1923.125	Pass	Pass	Pass
5	1924.375	Pass	Pass	Pass
4	1925.625	Pass	Pass	Pass
3	1926.875	Pass	Pass	Pass
2	1928.125	Pass	Pass	Pass
1	1929.375	Pass	Pass	Pass

The intention of this test was to confirm that the EUT does not set up connections when the interfering signals were of a time duration that exceeds the allowed limit. The conducted technique was used for this test. Frequency administration commands were used to allow only one active carrier during this test. The test was repeated for each of the 8 carriers.

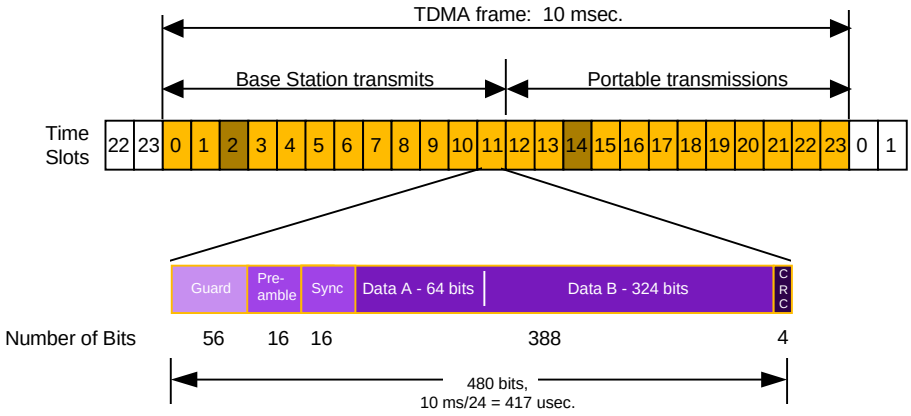
The interfering CW signal (same frequency as the active carrier chosen) was “gated” to the EUT and its companion device in a manner similar to the example in the ANSI C63.17 Section 7.5 illustration. A variable pulse generator was connected to provide the needed timing pulses to the generator pulse input port.

Refer to the frame/slot timing diagram provided. The pulsed CW source repetition rate was set up to match the frame timing (10 mS), placing an interfering RF pulse in each of the (24) 417 usec. wide timeslots.

The test procedure steps 3, 4 & 5 were executed in the ANSI procedure.

Under all test conditions it was not be possible to establish a connection.

Frame timing information provided.



- 480 bits x 1/.01sec x 24 slots = 1152 kb/s

15.323(b)

ANSI C63.17 §8.1.2.1 Test for First Free Channel Below Lower Threshold

This test was intended to prove that 9p23 always selected the highest carrier frequency available. Since the emissions bandwidth is >625 kHz, the equipment under test must prefer the high end of the band.

The test was performed by using the administrative commands through the Cordless System Management (CSM) software. Using the CSM allows us to block from one to all eight carriers in the UPCS band.

Using the administrative commands, the highest carrier, 1929.375 MHz, was disabled and the system was reset to assure the base station did not transmit on the highest channel. A link was established between the base station and portable part under test. Each EUT's transmission was measured with a spectrum analyzer to assure that the upper channel was not being used. The spectrum analyzer showed that the next carrier, 1928.125 MHz, was the channel being transmitted from the portable part.

Using the administrative commands, the 1st and 2nd channels, 1929.375 and 1928.125 MHz, were disabled and the system reset to assure that base station did not transmit at the two disabled channels at the high end of the sub-band. A link was established between the base station and portable part under test. Each EUT's transmission was measured with a spectrum analyzer to assure that the upper channel was not being used. The spectrum analyzer showed that the next carrier, 1926.875 MHz, was the channel being transmitted from the portable part.

Results:
With channel 1 administratively disabled, EUT transmits on channel 2.
With channel 1 & 2 administratively disabled, EUT transmits on channel 3.
EUT passes this test.

ANSI C63.17 §8.1.2.2 Three Band Limit
Not applicable to this device**.** 9p23 utilizes the channel search provisions required in FCC Part 15.323(b), thus is not subject to the segment occupancy requirement described in the ANSI procedure.

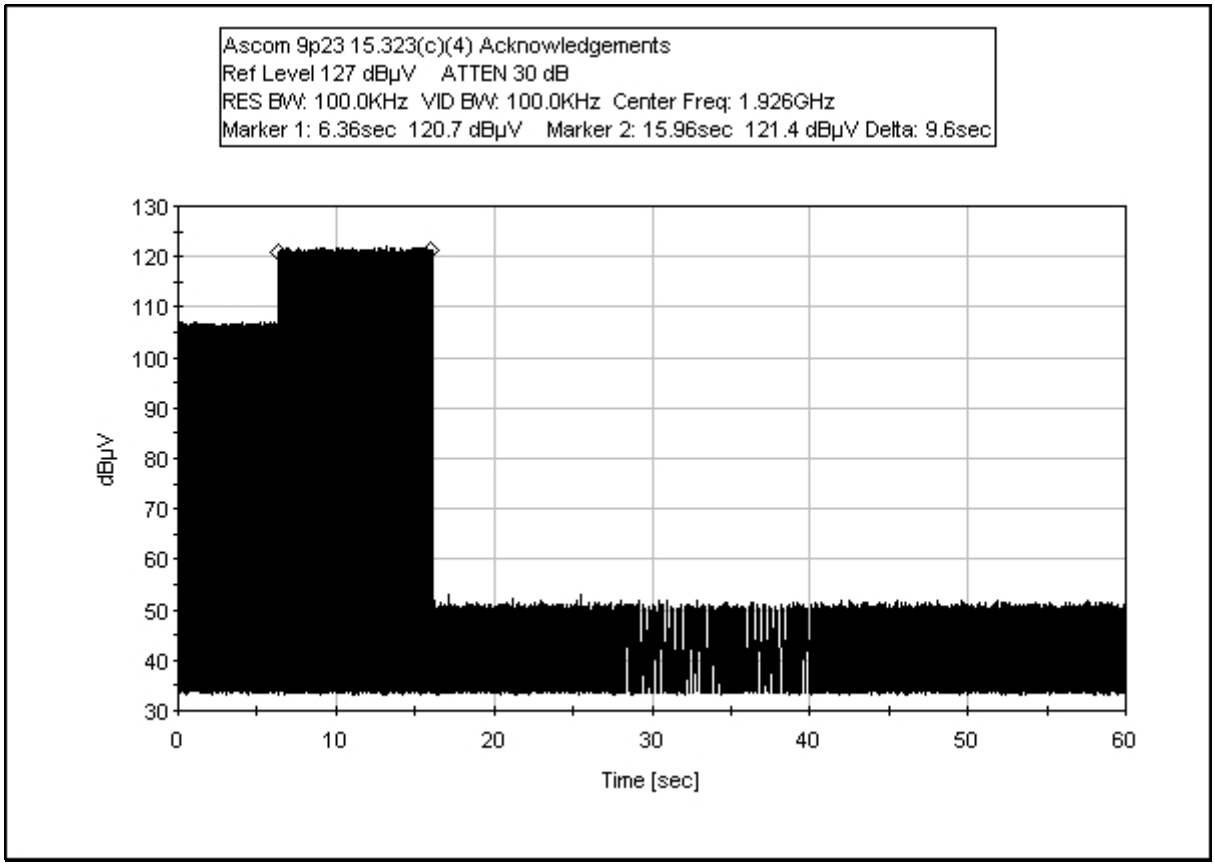
15.323(c)(4, 6)

ANSI C63.17 §8.1.3 Unacknowledged Transmissions (Isochronous)
This test only applies to the base station since it is the only device that is capable of transmitting control and signaling information on its own without a companion device, hence the portable part was not tested.

15.323(c)(4)
ANSI C63.17 §8.2.1 Acknowledgements

Step 1: With the base station off, an attempt was made to activate a call. If the pp transmitted for longer than 1 second, the device failed the test.
Step 2: With an active call initiated, power was removed to the base station. The pp ceased transmission within 30 seconds.

Results:
Step 1: EUT could not initiate a call – pass.
Step 2: EUT ceased transmission after 9.6 seconds – pass.



15.323(c)(3)

ANSI C63.17 §8.2.2 Transmission Duration

The Portable Handset was the "initiating device" and the Base Station was the "responding device". Using frequency administration commands, all but one channel was blocked. Without introducing interference, the EUT re-acquired its access protocol within the time frame allowed.

Results: 9p23 operated according to the referenced FCC rules.

The EUT re-acquired its access protocol after approximately 6 hours 10 minutes.

Manufacturer Declarative Statement

CT1900 is designed such that it can not occupy the same combined time and spectrum window for a period exceeding 8 hours. A Call Timer implemented in the MAC Layer of the software protocol is set to 6 hours, which repeats the Access Protocol to find a new combined time and spectrum window. The system is designed such that 4 of the 12 timeslots available in each of the 8 carriers provided by each base station will always be available.

15.323(c)(10)

ANSI C63.17 §8.2.3 Duplex Connections

The test was designed to prove that the EUT, Portable Part (PP), monitored both the transmit and receive time/spectrum windows by applying specified interference threshold levels on either the transmit timeslot or the receive timeslot. The "initiating"device, PP, used the "least interfered" transmit or receive timeslot whether the interference was applied to the transmit timeslot or receive timeslot.

Using the CSM software to the Radio Exchange, all carriers were disabled except for the (f1) 1925.625 MHz carrier. This test only required the use of one carrier because the interference applied determined if the "initiating" device, PP, moved to another timeslot not another carrier.

It was verified that only carrier f1 was enabled.

Step 1: An interfering signal was applied to f1 (carrier 4) at the calculated lower threshold limit. The interfering signal applied to all the receive timeslots except for one, which was free of all interference. Another interfering signal f1 (carrier 4) was applied at the calculated lower threshold limit to the EUT (PP) on all twelve transmit timeslots. A connection was attempted from the PP to the RFP. Since the system has more than 40 channels, a connection was established. If a connection existed, it was terminated. Interference was applied at the calculated lower-threshold limit to the EUT on all of its transmit time/spectrum windows in the 1.25 MHz channel except one, which remained free of interference. Interference was applied at the calculated lower-threshold limit to the EUT on all receive time/spectrum windows. It was ensured that the interference levels at the companion device were at least 10 dB below the measured lower threshold for all time/spectrum windows.

Step 2: An interfering signal was applied to f1 (carrier 4) at 3 dB above the calculated lower threshold limit to the EUT on all transmit timeslots except for one, which remained free of all interference. Another interfering signal was applied to f1 (carrier 4) at 10 dBm above the calculated lower threshold limit to the EUT on all receive timeslots except for one, which remained free of all interference. The interference-free receive timeslot was not the duplex mate to the interference-free transmit timeslot. A connection was attempted from the EUT (PP) to the companion device (RFP). The connection was established on the interference-free receive timeslot and its duplex mate. If the connection was established on any other timeslot, the system failed the test. The connection was terminated. The interference was reduced on the EUT's receive time/spectrum windows to a level that is 3 dB above the measured lower threshold, maintaining one time/spectrum window that was interference-free. The interference was raised on the EUT's transmit time/spectrum windows to a level 10 dB above the measured lower threshold, maintaining one time/spectrum window that was interference-free. The interference to the companion device was at least 10 dB below the measured lower threshold on all active time/spectrum windows. Again, the interference-free transmit and receive time/spectrum windows did not constitute a duplex pair, if the system designated a specific duplex pairing for time/spectrum windows.

Step 3: An interfering signal was applied to the f1 (carrier 4) at the calculated upper threshold limit to the EUT on all receive and transmit timeslots, except one of the receive and transmit timeslots remained free of all interference. The interference-free receive and transmit timeslots were not the duplex pair to each other; the duplex mate of each timeslot had interference associated to them. A connection was attempted from the EUT (PP) to the companion device (RFP). If the EUT (PP) established a connection with the companion device, the system failed.

Results:
Step one: Interference on TX and RX timeslots as specified above for channel $f_{1.}$ With RX and TX timeslots loaded with interference signals as stated above, the equipment was still able to establish a call. EUT passes this test.

Step two: Different amplitudes of interference on TX and RX timeslots for channel f_1. Interference levels are described above. With RX and TX timeslots loaded with interference signals as stated above, the equipment was still able to establish a call. EUT passes this test.

Step three: With interference injected on the RX and TX timeslots as indicated above, the EUT did not establish a call. The equipment passes this test.

Manufacturer's Declarative Statement

Procedure for Making Duplex Connections

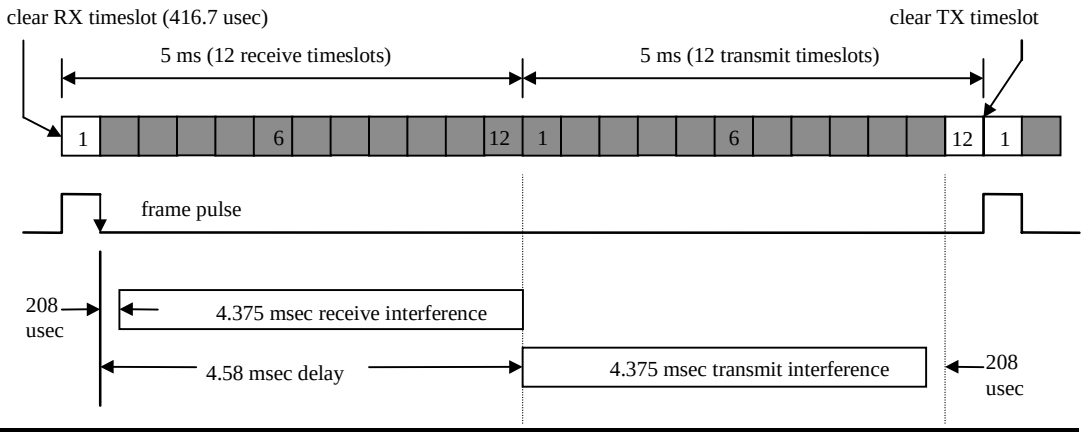
The Portable Handset is the "initiating device" and the Base Station is the "responding device". DCT1900 is a multiple carrier TDMA TDD system. When calls are in process, RF transmissions always occur on duplex time/frequency access channels made up of a paired TX and RX timeslot within the overall frame. In case of beacon transmissions from the Base Stations, a simplex connection is established to the Portable.

DCT1900 Base Stations emit "beacons" carrying control and signaling information. Portables "lock" to this information without transmitting.

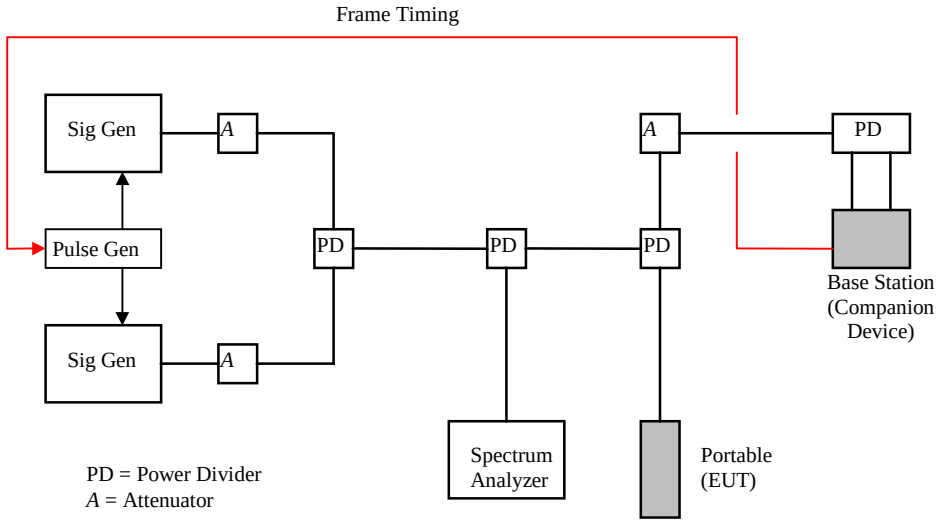
When an incoming call occurs, the appropriate Portable is paged through the beacon transmissions. Only the correct Portable responds, transmitting back acknowledgement message to the Base Station. "Normal" call processing then progresses in which the Portable continuously controls the selection of the least interfered RF channel based on both TX and RX timeslots and initiates monitoring and handovers as required. When the call is terminated, Portable RF transmissions immediately cease.

When the Portable originates a call, RF energy is transmitted upon call setup in a similar manner.

Slot and interference timing from the Portable, the "initiating device"

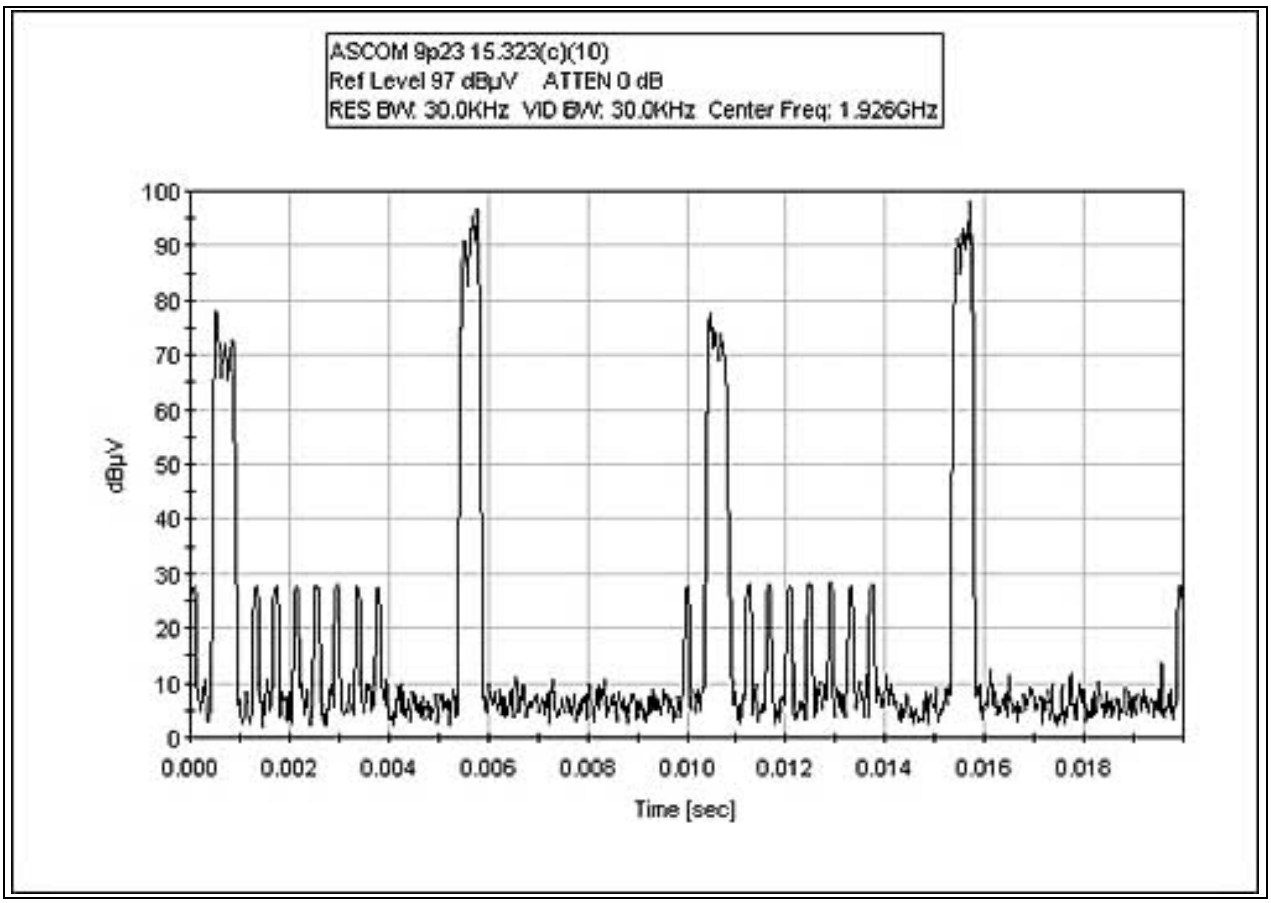


Test Setup for the Duplex Connection Test



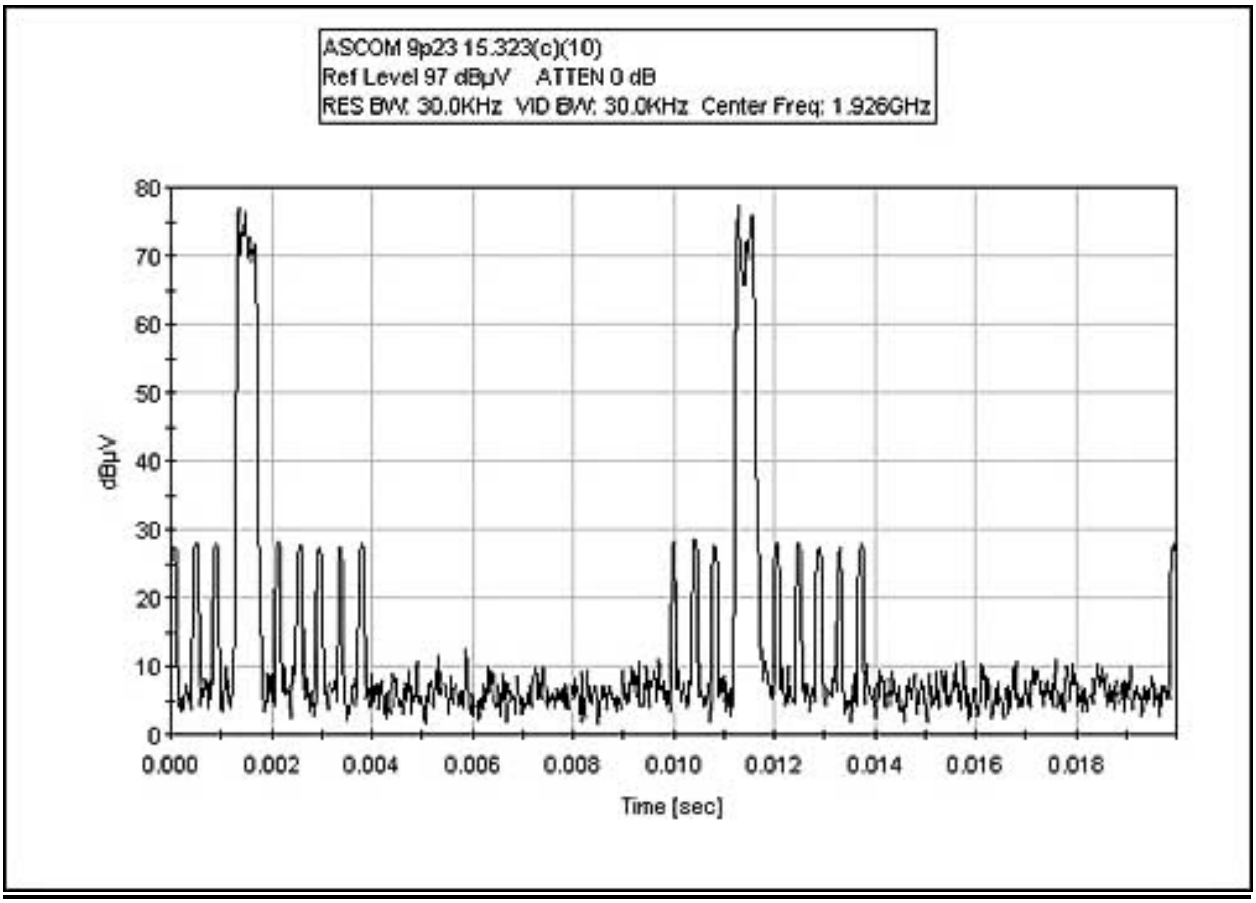
8.2.3 - PP RX Interference - TX Showing

Example of TX timeslot interference.



8.2.3 - PP RX Interference

Example of RX timeslot interference.



TEST EQUIPMENT LIST

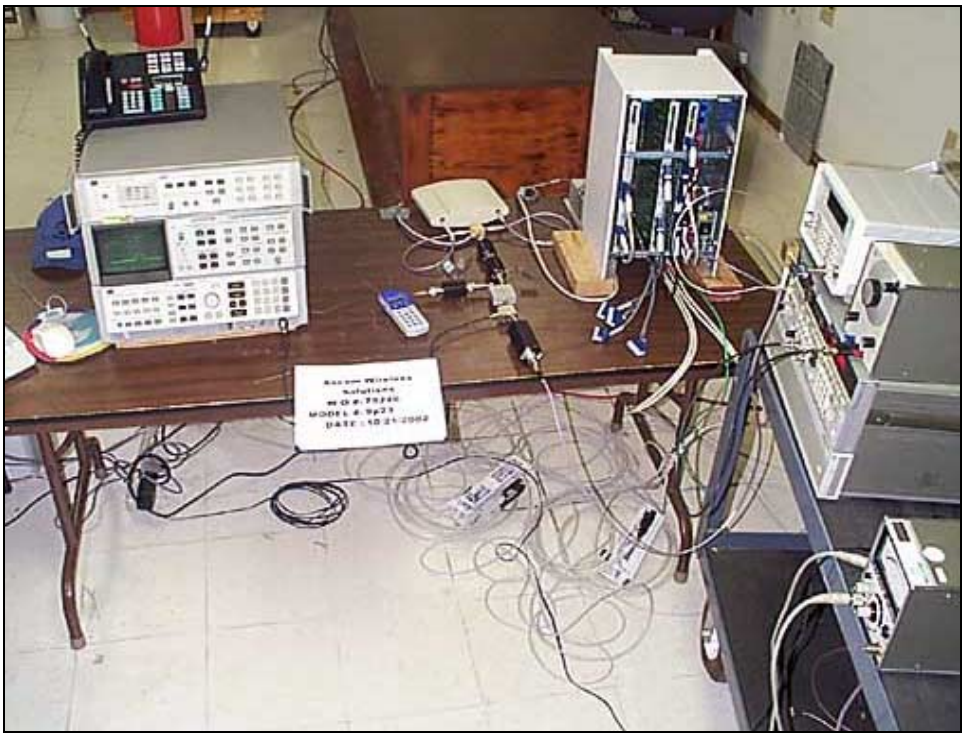
ANSI C63.17 Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
Attenuator	JFW	50FHC-014-20		P01630	3/21/02	3/21/2003
Attenuator	JFW	50FHC-014-20		P01631	3/21/02	3/21/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer 100 Hz - 22.5 GHz	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
Attenuator	Bird	25-AMFN-30	9724	P01577	3/21/02	3/21/2003
Generator, Signal	Marconi	2022D	119259/016	01870	9/5/02	9/5/2003
Generator, Signal	HP	8673C	2822A00551	01469	9/13/02	9/13/2003
Oscilloscope, Digital	HP	54111D	3051A03191	02008	9/28/02	9/28/2003
Frequency Doubler 1-6 GHz	Miteq	MX2J010060	626883	02090	11/4/02	11/4/2003
Pulse Generator Mainframe*	HP	81110A	DE38700115	NA	8/16/02	8/16/03
Pulse Generator Module*	HP	91111A	DE38700111	NA	8/16/02	8/16/03

*Equipment not owned by CKC Laboratories, but copies of calibration certificates available from CKC Laboratories.

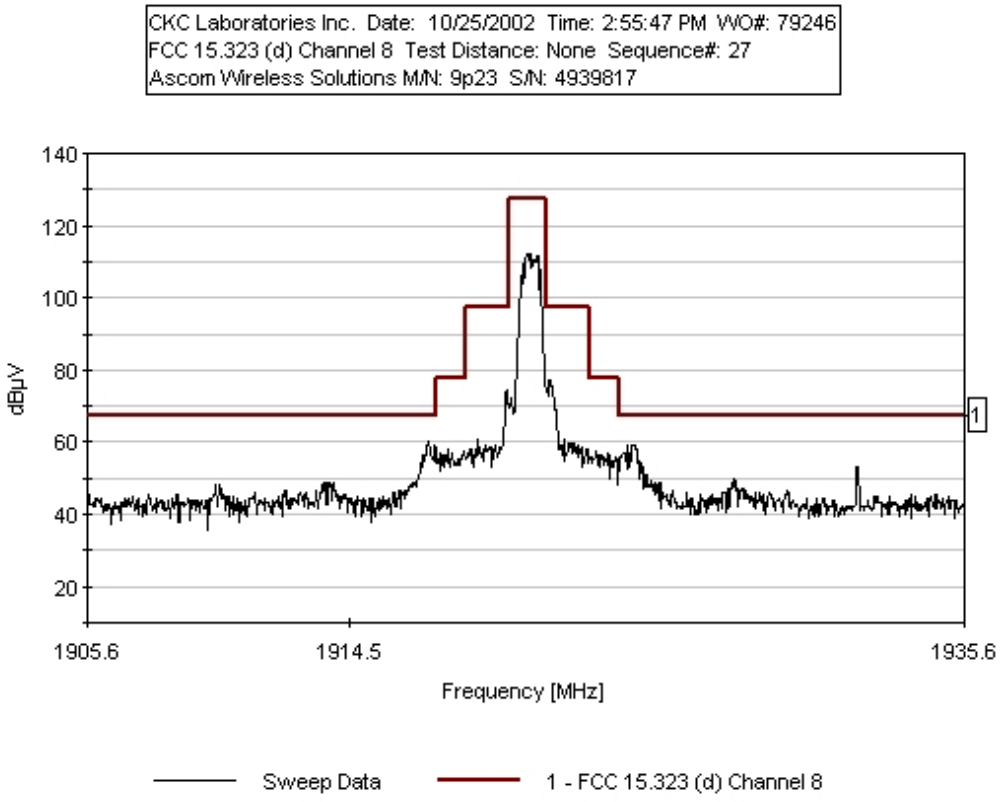
Test Setup for ANSI Dual Generator

Example setup using two signal generators.



15.323(d) Emissions Mask

Test conditions: The equipment was connected directly to a spectrum analyzer using an EUT fitted with a customer provided antenna terminal port The measurement bandwidth settings were set to 1% of the emissions bandwidth which was most closely represented by 10kHz. The spectrum analyzer was set for positive peak detection. Emissions mask is calculated in accordance with 15.323(d).



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323 (d) Channel 8**
Work Order #: **79246** Date: 10/25/2002
Test Type: **Radiated Scan** Time: 2:55:47 PM
Equipment: **Handset** Sequence#: 27
Manufacturer: Ascom Wireless Solutions Tested By: Randal Clark
Model: 9p23
S/N: 4939817

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

Function	Manufacturer	Model #	S/N
Handset*	Ascom Wireless Solutions	9p23	4939817

Support Devices:

Function	Manufacturer	Model #	S/N
PBX Interface	Ascom Wireless	9d	ASMD003008
CPU Card	Ascom Wireless Solutions	ROFNB15719/2	ASMD002717
Line Termination Unit Card	Ascom Wireless Solutions	ROFNB15702/6	ASMD001199
Speech Linking Unit Card	Ascom Wireless Solutions	ROFNB15716/1	ASMD001263

Test Conditions / Notes:

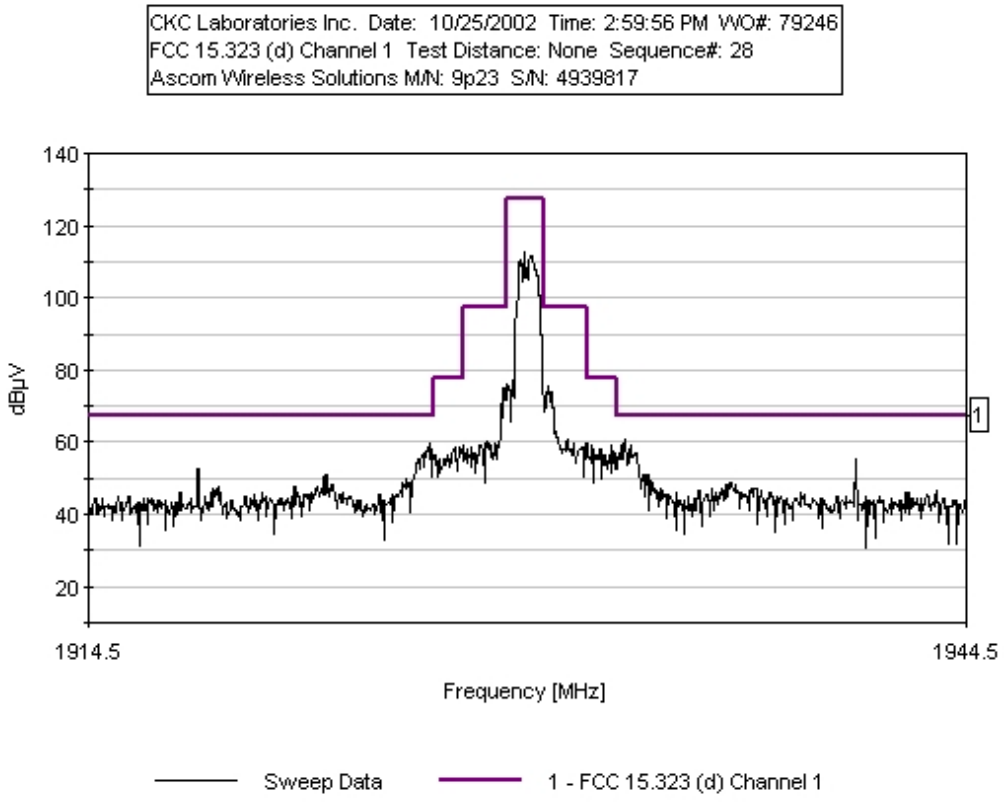
EUT is operating on channel 1 (1921.625 MHz) with antenna port terminated into a spectrum analyzer through suitable attenuation. Frequency range investigated 10 MHz to 10 GHz. Only spurious emissions that are within 20dB of the limit are recorded. Resolution Bandwidth is set to 1% of the emissions bandwidth which is most closely represented by 10 kHz. Video bandwidth is set to 10 kHz.

Transducer Legend:

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1917.210M	60.1					+0.0	60.1	67.5	-7.4	Anten
2	1924.020M	59.1					+0.0	59.1	67.5	-8.4	Anten
3	1917.420M	59.0					+0.0	59.0	67.5	-8.5	Anten
4	1924.230M	59.0					+0.0	59.0	67.5	-8.5	Anten
5	1924.440M	54.6					+0.0	54.6	67.5	-12.9	Anten
6	1931.880M	53.4					+0.0	53.4	67.5	-14.1	Anten
7	1920.630M	112.4					+0.0	112.4	127.5	-15.1	Anten
8	1924.650M	51.1					+0.0	51.1	67.5	-16.4	Anten
9	1927.680M	50.0					+0.0	50.0	67.5	-17.5	Anten

10	1920.420M	109.4	+0.0	109.4	127.5	-18.1	Anten
11	1925.130M	48.8	+0.0	48.8	67.5	-18.7	Anten
12	1913.670M	48.7	+0.0	48.7	67.5	-18.8	Anten
13	1913.790M	48.6	+0.0	48.6	67.5	-18.9	Anten
14	1913.970M	48.6	+0.0	48.6	67.5	-18.9	Anten
15	1910.100M	48.2	+0.0	48.2	67.5	-19.3	Anten
16	1909.980M	48.1	+0.0	48.1	67.5	-19.4	Anten
17	1917.900M	57.9	+0.0	57.9	77.5	-19.6	Anten
18	1921.020M	107.9	+0.0	107.9	127.5	-19.6	Anten
19	1921.350M	77.4	+0.0	77.4	97.5	-20.1	Anten
20	1927.800M	47.4	+0.0	47.4	67.5	-20.1	Anten
21	1927.500M	47.1	+0.0	47.1	67.5	-20.4	Anten
22	1927.950M	47.1	+0.0	47.1	67.5	-20.4	Anten
23	1917.990M	56.9	+0.0	56.9	77.5	-20.6	Anten
24	1923.360M	56.9	+0.0	56.9	77.5	-20.6	Anten
25	1925.550M	46.6	+0.0	46.6	67.5	-20.9	Anten
26	1929.510M	46.6	+0.0	46.6	67.5	-20.9	Anten
27	1916.190M	46.5	+0.0	46.5	67.5	-21.0	Anten
28	1923.420M	56.3	+0.0	56.3	77.5	-21.2	Anten
29	1911.270M	46.1	+0.0	46.1	67.5	-21.4	Anten
30	1925.220M	46.1	+0.0	46.1	67.5	-21.4	Anten


CKC Laboratories Inc. Date: 10/25/2002 Time: 2:59:56 PM WO#: 79246
FCC 15.323 (d) Channel 1 Test Distance: None Sequence#: 28
Ascom Wireless Solutions M/N: 9p23 S/N: 4939817
140
120
100
80
60
40
20
dBµV
1
1914.5
1944.5
Frequency [MHz]
Sweep Data
1 - FCC 15.323 (d) Channel 1

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323 (d) Channel 1**
Work Order #: **79246** Date: 10/25/2002
Test Type: **Radiated Scan** Time: 2:59:56 PM
Equipment: **Handset** Sequence#: 28
Manufacturer: Ascom Wireless Solutions Tested By: Randal Clark
Model: 9p23
S/N: 4939817

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

Function	Manufacturer	Model #	S/N
Handset*	Ascom Wireless Solutions	9p23	4939817

Support Devices:

Function	Manufacturer	Model #	S/N
PBX Interface	Ascom Wireless	9d	ASMD003008
CPU Card	Ascom Wireless Solutions	ROFNB15719/2	ASMD002717
Line Termination Unit Card	Ascom Wireless Solutions	ROFNB15702/6	ASMD001199
Speech Linking Unit Card	Ascom Wireless Solutions	ROFNB15716/1	ASMD001263

Test Conditions / Notes:

EUT is operating on channel 1 (1921.625 MHz) with antenna port terminated into a spectrum analyzer through suitable attenuation. Frequency range investigated 10 MHz to 10 GHz. Only spurious emissions that are within 20dB of the limit are recorded. Resolution Bandwidth is set to 1% of the emissions bandwidth which is most closely represented by 10 kHz. Video bandwidth is set to 10 kHz.

Transducer Legend:

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1932.770M	60.8					+0.0	60.8	67.5	-6.7	Anten
2	1926.110M	59.7					+0.0	59.7	67.5	-7.8	Anten
3	1932.620M	59.4					+0.0	59.4	67.5	-8.1	Anten
4	1932.980M	59.2					+0.0	59.2	67.5	-8.3	Anten
5	1926.200M	57.8					+0.0	57.8	67.5	-9.7	Anten
6	1925.900M	57.0					+0.0	57.0	67.5	-10.5	Anten
7	1940.690M	55.5					+0.0	55.5	67.5	-12.0	Anten
8	1929.320M	112.5					+0.0	112.5	127.5	-15.0	Anten
9	1918.190M	52.4					+0.0	52.4	67.5	-15.1	Anten

10	1929.590M	111.7		+0.0	111.7	127.5	-15.8	Anten
11	1922.570M	51.1		+0.0	51.1	67.5	-16.4	Anten
12	1933.400M	51.1		+0.0	51.1	67.5	-16.4	Anten
13	1933.520M	51.0		+0.0	51.0	67.5	-16.5	Anten
14	1929.200M	110.7		+0.0	110.7	127.5	-16.8	Anten
15	1922.480M	50.5		+0.0	50.5	67.5	-17.0	Anten
16	1925.300M	49.7		+0.0	49.7	67.5	-17.8	Anten
17	1933.640M	49.3		+0.0	49.3	67.5	-18.2	Anten
18	1932.320M	59.2		+0.0	59.2	77.5	-18.3	Anten
19	1931.660M	58.9		+0.0	58.9	77.5	-18.6	Anten
20	1936.400M	48.9		+0.0	48.9	67.5	-18.6	Anten
21	1926.950M	58.5		+0.0	58.5	77.5	-19.0	Anten
22	1927.100M	58.4		+0.0	58.4	77.5	-19.1	Anten
23	1931.720M	58.0		+0.0	58.0	77.5	-19.5	Anten
24	1921.490M	47.6		+0.0	47.6	67.5	-19.9	Anten
25	1918.940M	47.5		+0.0	47.5	67.5	-20.0	Anten
26	1918.700M	47.4		+0.0	47.4	67.5	-20.1	Anten
27	1937.090M	47.4		+0.0	47.4	67.5	-20.1	Anten
28	1932.440M	57.1		+0.0	57.1	77.5	-20.4	Anten
29	1933.970M	46.9		+0.0	46.9	67.5	-20.6	Anten
30	1935.740M	46.9		+0.0	46.9	67.5	-20.6	Anten

DIRECT CONNECT

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003

15.323(e)

ANSI C63.17 §6.2.3 Frame Repetition Stability and §6.2.4 Frame Period and Jitter

The EUT is directly connected to a modulation domain analyzer via the customer provided antenna port.

The frame period, frame repetition stability and jitter were measured.

Frame Repetition Stability

Measured Deviation	Limit	Result
39.6ppm	50ppm	Pass

The measured deviation is calculated as three times the standard deviation of the frequency deviation over at least a one hour period with a minimum of 1000 samples.

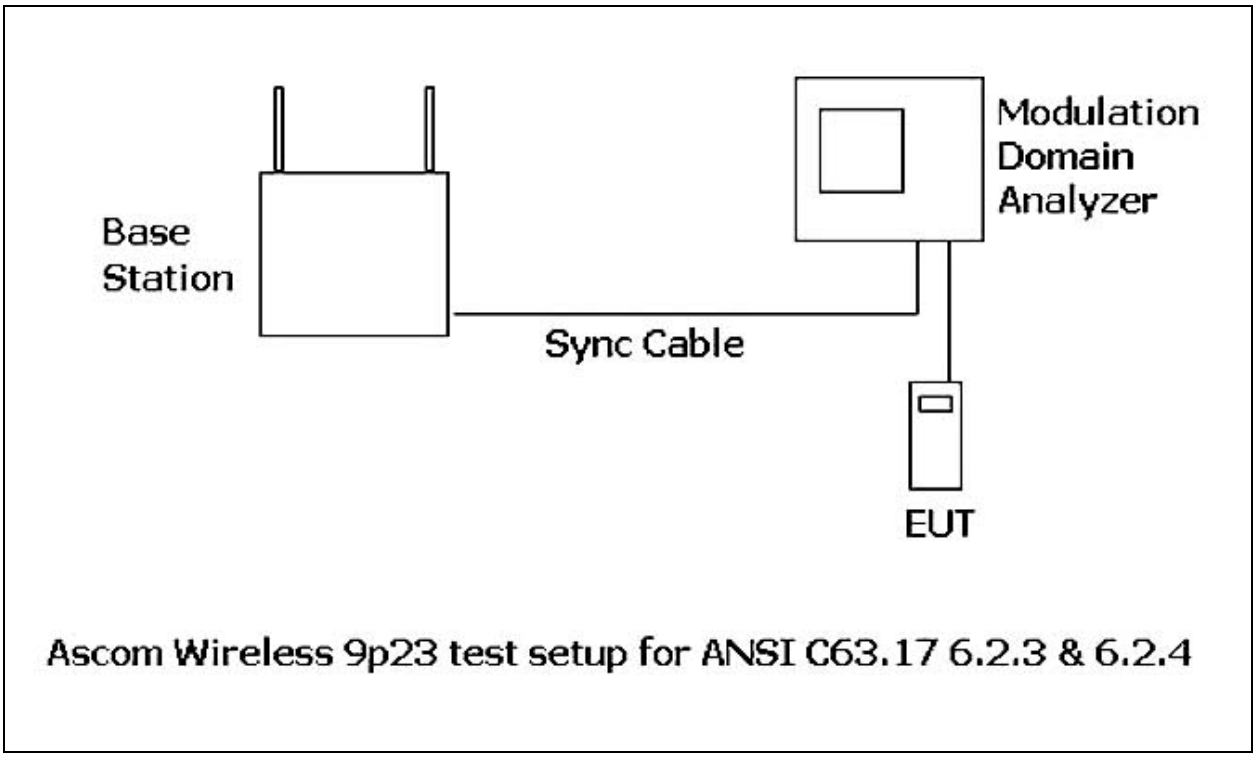
Frame Period

Frame Period	Measured Period	σ	Pk-Pk
10.00 mS	10.00023 mS	325.74 nS	2.009uS

Jitter

Measured Deviation	Limit	Result
977.22 nS	25 µS	Pass

The measured deviation is calculated as three times the standard deviation of the frame period deviation over a minimum of 1 000 000 frames.



Ascom Wireless 9p23 test setup for ANSI C63.17 6.2.3 & 6.2.4

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Modulation Domain Analyzer	HP	53310A	3121A02309	12/02/02	12/02/03

15.323(f) FREQUENCY STABILITY

Test Conditions: The EUT was placed in a temperature chamber where the temperature was varied over -20ºC to +50ºC. Frequency data was collected at every 10º increment with the range. Since the equipment was battery powered, the equipment was not required to undergo voltage variations. The equipment does not have a provision for creating an un-modulated carrier; therefore the measurements were carried out with modulation. The antenna terminal port provided for testing purposes gave a convenient medium of measurement. Through suitable attenuation, the antenna port was connected directly to a spectrum analyzer with the following settings: RBW 3kHz, VBW 3kHz, Span 200kHz, and Sweep time 100msec.

Customer:	Ascom Wireless Solutions
WO#:	79246
Date:	04-Dec-02
Test Engineer:	Randal Clark

Device Model #:	9p23	
Operating Voltage:	Battery	**VDC**
Frequency Limit:	10	**PPM**

Temperature Variations

Channel Frequency:		Channel 1 (MHz) 1929.446	Dev. (MHz)	Channel 2 (MHz) 1920.696	Dev. (MHz)
Temp (C)	Voltage				
-20	Battery	1929.44500	0.00100	1920.69000	0.00600
-10	Battery	1929.44740	0.00140	1920.69290	0.00310
0	Battery	1929.45140	0.00540	1920.69190	0.00410
10	Battery	1929.45090	0.00490	1920.69290	0.00310
20	Battery	1929.44440	0.00160	1920.69290	0.00310
30	Battery	1929.44690	0.00090	1920.69240	0.00360
40	Battery	1929.45440	0.00840	1920.69170	0.00430
50	Battery	1929.44690	0.00090	1920.69180	0.00420

Note: A freshly charged battery was installed at the time of test.

Max Deviation (MHz)	**0.00840**		**0.00600**
Max Deviation (PPM)	**4.35358**		**3.12387**
	PASS		**PASS**

Frequency Stability

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
Temp Chamber	Thermotron	S-1.2 MiniMax	11899	01879	2/7/02	2/7/2003
Thermometer	Omega	HH-26K	T-202884	02242	8/30/02	8/30/2003

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	R1A
CRT was displaying:	N/A
Power Supply Manufacturer:	SAC (China)(A30965 0040 120/9/0,6) 9VDC Wall Adapter
Power Supply Part Number:	130111
AC Line Filter Manufacturer:	N/A
AC Line Filter Part Number:	N/A

I/O PORTS	
Type	#
Battery Charger	1
Headset	1

CRYSTAL OSCILLATORS	
Type	Freq In MHz
TCXO	15.000
TCVCXO	13.824

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Handset	9P23 rev. E	15.000	6	Handset

CABLE INFORMATION

Cable #:	1	Cable(s) of this type:	1
Cable Type:	N/A	Shield Type:	N/A
Construction:	Combination Coax / Twisted pair	Length In Meters:	1.2
Connected To End (1):	Handset	Connected To End (2):	N/A
Connector At End (1):	2.5mm Stereo Plug	Connector At End (2):	N/A
Shield Grounded At (1):	N/A	Shield Grounded At (2):	N/A
Part Number:	F150068	Number of Conductors:	4
Notes and/or description:	Lapel Mic		

Cable #:	2	Cable(s) of this type:	1
Cable Type:	N/A	Shield Type:	N/A
Construction:	Combination Coax / Twisted pair	Length In Meters:	1.2
Connected To End (1):	Handset	Connected To End (2):	N/A
Connector At End (1):	2.5mm Stereo Plug	Connector At End (2):	N/A
Shield Grounded At (1):	N/A	Shield Grounded At (2):	N/A
Part Number:	F150067	Number of Conductors:	4
Notes and/or description:	Boom Mic		

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. The horn antenna was used for frequencies above 1000 MHz. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

15.315/15.207 AC CONDUCTED EMISSIONS

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50 µH-/+50 ohms. Above 150 kHz, a 0.15 µF series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.315/15.207 - AVE**
Work Order #: **79246** Date: 10/25/2002
Test Type: **Conducted Emissions** Time: 15:48:45
Equipment: **Handset w/vibrator** Sequence#: 2
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is trickle (maintenance) charging only. Frequency range investigated: 150 kHz to 30 MHz.

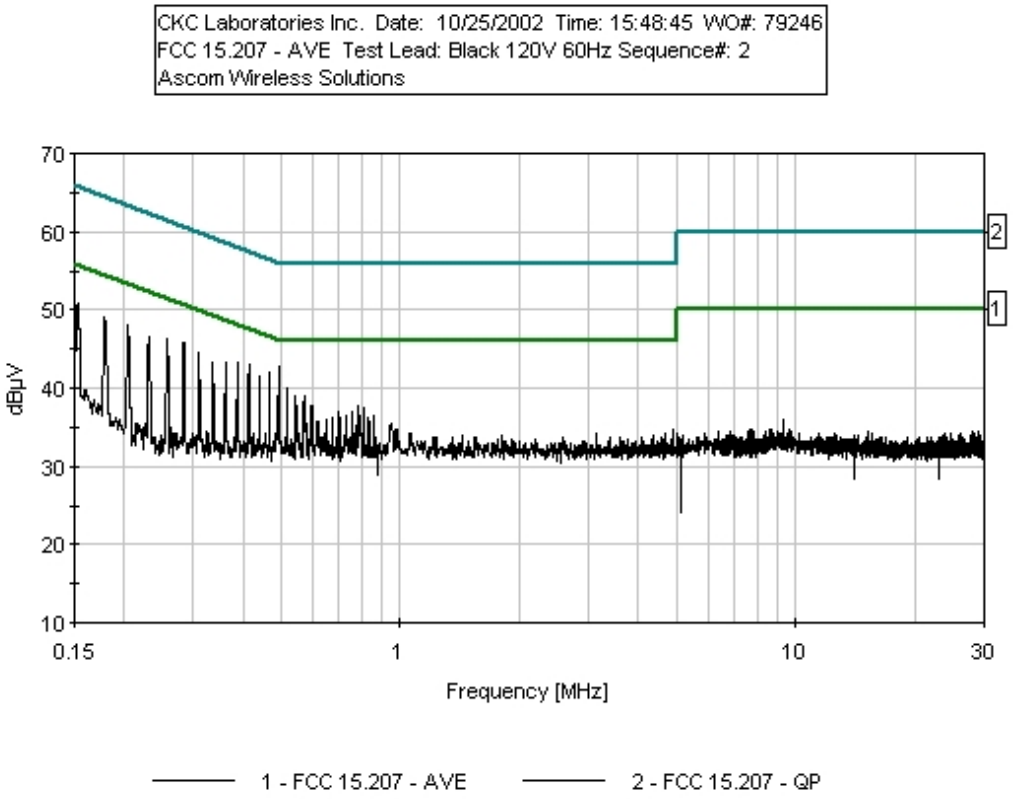
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n474

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	414.701k	43.0	+0.1	+0.0			+0.0	43.1	47.6	-4.5	Black
2	467.059k	41.9	+0.1	+0.0			+0.0	42.0	46.6	-4.6	Black
3	387.794k	43.1	+0.1	+0.0			+0.0	43.2	48.1	-4.9	Black
4	152.909k	50.6	+0.2	+0.0			+0.0	50.8	55.8	-5.0	Black
5	283.078k	45.5	+0.1	+0.1			+0.0	45.7	50.7	-5.0	Black
6	256.898k	46.2	+0.1	+0.1			+0.0	46.4	51.5	-5.1	Black
7	205.267k	48.0	+0.1	+0.0			+0.0	48.1	53.4	-5.3	Black
8	361.615k	43.3	+0.1	+0.0			+0.0	43.4	48.7	-5.3	Black
9	179.088k	49.0	+0.1	+0.0			+0.0	49.1	54.5	-5.4	Black
10	309.257k	44.4	+0.1	+0.1			+0.0	44.6	50.0	-5.4	Black
11	440.153k	41.3	+0.1	+0.0			+0.0	41.4	47.1	-5.7	Black
12	231.446k	46.5	+0.1	+0.0			+0.0	46.6	52.4	-5.8	Black
13	336.163k	43.2	+0.1	+0.1			+0.0	43.4	49.3	-5.9	Black
14	517.963k	39.9	+0.1	+0.0			+0.0	40.0	46.0	-6.0	Black
15	544.142k	38.9	+0.1	+0.0			+0.0	39.0	46.0	-7.0	Black
16	571.776k	38.8	+0.1	+0.1			+0.0	39.0	46.0	-7.0	Black
17	597.228k	37.5	+0.1	+0.1			+0.0	37.7	46.0	-8.3	Black
18	780.482k	37.6	+0.0	+0.1			+0.0	37.7	46.0	-8.3	Black
19	805.934k	37.5	+0.0	+0.1			+0.0	37.6	46.0	-8.4	Black
20	700.490k	36.8	+0.0	+0.1			+0.0	36.9	46.0	-9.1	Black
21	753.576k	36.8	+0.0	+0.1			+0.0	36.9	46.0	-9.1	Black
22	792.118k	36.4	+0.0	+0.1			+0.0	36.5	46.0	-9.5	Black
23	857.566k	36.4	+0.0	+0.1			+0.0	36.5	46.0	-9.5	Black

24	727.397k	36.3	+0.0	+0.1		+0.0	36.4	46.0	-9.6	Black
25	675.038k	36.0	+0.1	+0.1		+0.0	36.2	46.0	-9.8	Black
26	832.114k	36.0	+0.0	+0.1		+0.0	36.1	46.0	-9.9	Black
27	649.586k	35.7	+0.1	+0.1		+0.0	35.9	46.0	-10.1	Black
28	622.680k	35.5	+0.1	+0.1		+0.0	35.7	46.0	-10.3	Black
29	949.301k	35.3	+0.1	+0.1		+0.0	35.5	46.0	-10.5	Black
30	491.784k Ave	26.4	+0.1	+0.0		+0.0	26.5	46.1	-19.6	Black
^	491.784k	42.6	+0.1	+0.0		+0.0	42.7	46.1	-3.4	Black



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.315/15.207 - AVE**
Work Order #: **79246** Date: 10/22/2002
Test Type: **Conducted Emissions** Time: 10:11:38 AM
Equipment: **Handset w/vibrator** Sequence#: 5
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is trickle (maintenance) charging only. Frequency range investigated: 150 kHz to 30 MHz.

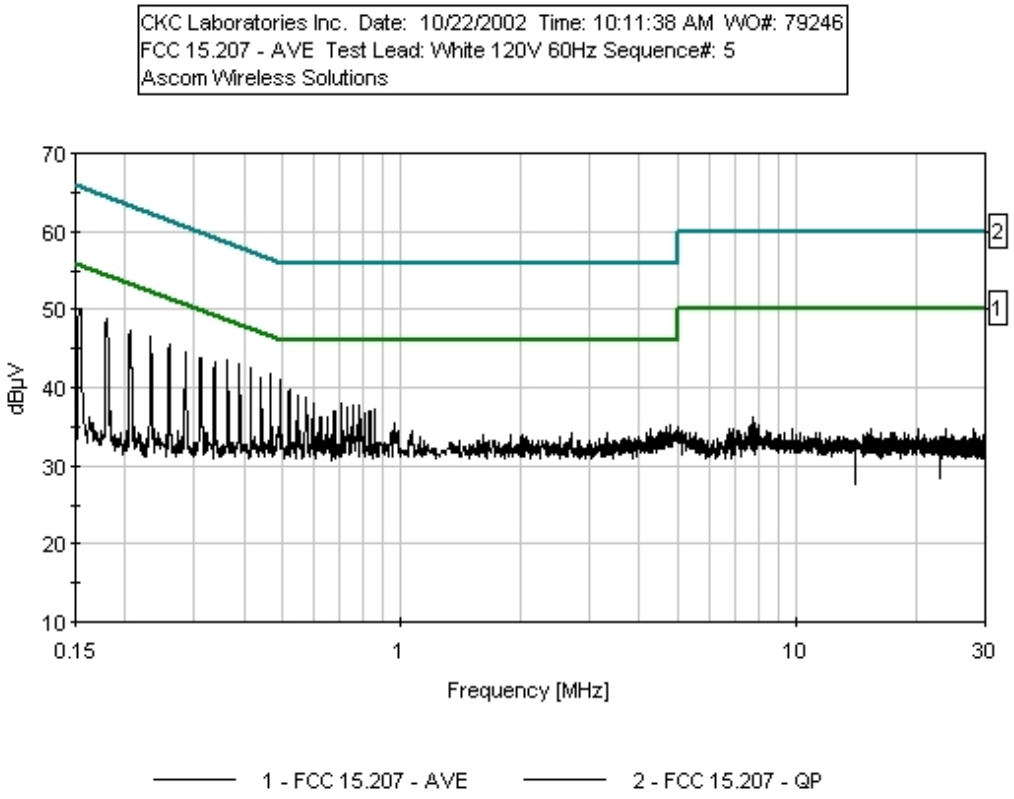
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n493

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	468.514k	41.5	+0.1	+0.2			+0.0	41.8	46.5	-4.7	White
2	416.155k	42.3	+0.1	+0.1			+0.0	42.5	47.5	-5.0	White
3	493.966k	40.8	+0.1	+0.2			+0.0	41.1	46.1	-5.0	White
4	363.797k	43.3	+0.1	+0.1			+0.0	43.5	48.6	-5.1	White
5	389.249k	42.7	+0.1	+0.1			+0.0	42.9	48.1	-5.2	White
6	153.636k	49.7	+0.2	+0.2			+0.0	50.1	55.8	-5.7	White
7	179.815k	48.5	+0.1	+0.2			+0.0	48.8	54.5	-5.7	White
8	232.174k	46.3	+0.1	+0.2			+0.0	46.6	52.4	-5.8	White
9	440.880k	41.0	+0.1	+0.1			+0.0	41.2	47.0	-5.8	White
10	336.890k	43.1	+0.1	+0.2			+0.0	43.4	49.3	-5.9	White
11	206.722k	47.0	+0.1	+0.2			+0.0	47.3	53.3	-6.0	White

12	259.080k	45.2	+0.1	+0.2		+0.0	45.5	51.5	-6.0	White
13	285.259k	44.2	+0.1	+0.2		+0.0	44.5	50.7	-6.2	White
14	310.711k	43.5	+0.1	+0.2		+0.0	43.8	50.0	-6.2	White
15	520.872k	39.5	+0.1	+0.2		+0.0	39.8	46.0	-6.2	White
16	546.324k	38.7	+0.1	+0.2		+0.0	39.0	46.0	-7.0	White
17	571.776k	38.5	+0.1	+0.2		+0.0	38.8	46.0	-7.2	White
18	704.126k	37.9	+0.0	+0.2		+0.0	38.1	46.0	-7.9	White
19	598.682k	37.7	+0.1	+0.2		+0.0	38.0	46.0	-8.0	White
20	756.485k	37.6	+0.0	+0.2		+0.0	37.8	46.0	-8.2	White
21	781.937k	37.6	+0.0	+0.2		+0.0	37.8	46.0	-8.2	White
22	728.851k	37.3	+0.0	+0.2		+0.0	37.5	46.0	-8.5	White
23	859.747k	37.1	+0.0	+0.2		+0.0	37.3	46.0	-8.7	White
24	677.220k	36.7	+0.1	+0.2		+0.0	37.0	46.0	-9.0	White
25	832.841k	36.8	+0.0	+0.2		+0.0	37.0	46.0	-9.0	White
26	807.389k	36.5	+0.0	+0.2		+0.0	36.7	46.0	-9.3	White
27	624.862k	35.9	+0.1	+0.2		+0.0	36.2	46.0	-9.8	White
28	651.041k	35.9	+0.1	+0.2		+0.0	36.2	46.0	-9.8	White
29	957.807k	35.2	+0.1	+0.1		+0.0	35.4	46.0	-10.6	White
30	7.724M	35.0	+0.2	+1.1		+0.0	36.3	50.0	-13.7	White


CKC Laboratories Inc. Date: 10/22/2002 Time: 10:11:38 AM WO#: 79246
FCC 15.207 - AVE Test Lead: White 120V 60Hz Sequence#: 5
Ascom Wireless Solutions
70
60
50
40
30
20
10
dBµV
0.15
1
10
30
Frequency [MHz]
2
1
1 - FCC 15.207 - AVE
2 - FCC 15.207 - QP

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.315/15.207 - AVE**
Work Order #: **79246** Date: 10/22/2002
Test Type: **Conducted Emissions** Time: 9:52:43 AM
Equipment: **Handset w/vibrator** Sequence#: 3
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is in full charging mode. Frequency range investigated: 150 kHz to 30 MHz.

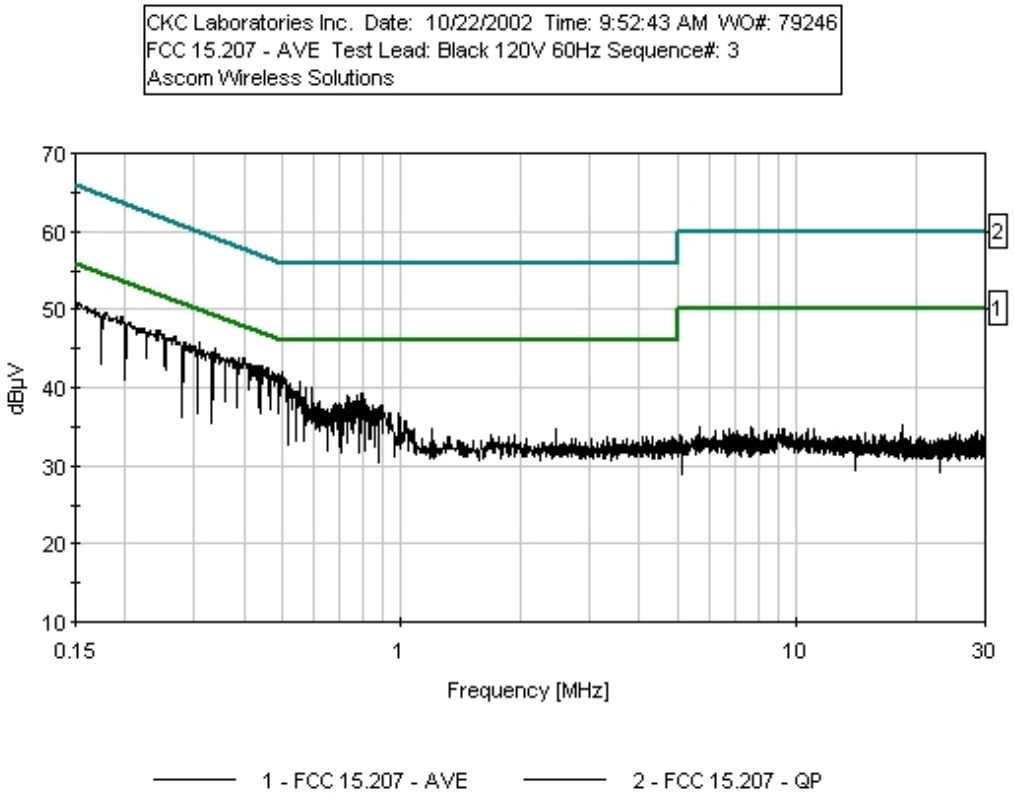
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n474

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	399.430k	43.8	+0.1	+0.0			+0.0	43.9	47.9	-4.0	Black
2	501.965k	41.9	+0.1	+0.0			+0.0	42.0	46.0	-4.0	Black
3	309.257k	45.6	+0.1	+0.1			+0.0	45.8	50.0	-4.2	Black
4	340.526k	44.8	+0.1	+0.1			+0.0	45.0	49.2	-4.2	Black
5	443.062k	42.7	+0.1	+0.0			+0.0	42.8	47.0	-4.2	Black
6	473.604k	41.9	+0.1	+0.0			+0.0	42.0	46.5	-4.5	Black
7	372.523k	43.7	+0.1	+0.0			+0.0	43.8	48.4	-4.6	Black
8	265.625k	46.3	+0.1	+0.1			+0.0	46.5	51.3	-4.8	Black
9	285.259k	45.6	+0.1	+0.1			+0.0	45.8	50.7	-4.9	Black
10	177.634k	49.5	+0.1	+0.0			+0.0	49.6	54.6	-5.0	Black
11	204.540k	48.3	+0.1	+0.0			+0.0	48.4	53.4	-5.0	Black

12	152.182k	50.6	+0.2	+0.0		+0.0	50.8	55.9	-5.1	Black
13	553.596k	40.6	+0.1	+0.1		+0.0	40.8	46.0	-5.2	Black
14	520.872k	40.3	+0.1	+0.0		+0.0	40.4	46.0	-5.6	Black
15	574.685k	39.8	+0.1	+0.1		+0.0	40.0	46.0	-6.0	Black
16	593.592k	39.8	+0.1	+0.1		+0.0	40.0	46.0	-6.0	Black
17	571.049k	39.5	+0.1	+0.1		+0.0	39.7	46.0	-6.3	Black
18	595.046k	39.2	+0.1	+0.1		+0.0	39.4	46.0	-6.6	Black
19	795.026k	39.2	+0.0	+0.1		+0.0	39.3	46.0	-6.7	Black
20	731.760k	38.9	+0.0	+0.1		+0.0	39.0	46.0	-7.0	Black
21	811.752k	38.3	+0.0	+0.1		+0.0	38.4	46.0	-7.6	Black
22	718.670k	37.9	+0.0	+0.1		+0.0	38.0	46.0	-8.0	Black
23	683.038k	37.7	+0.1	+0.1		+0.0	37.9	46.0	-8.1	Black
24	702.672k	37.7	+0.0	+0.1		+0.0	37.8	46.0	-8.2	Black
25	845.930k	37.6	+0.0	+0.1		+0.0	37.7	46.0	-8.3	Black
26	889.759k	37.6	+0.0	+0.1		+0.0	37.7	46.0	-8.3	Black
27	864.110k	37.1	+0.0	+0.1		+0.0	37.2	46.0	-8.8	Black
28	987.578k	36.4	+0.1	+0.1		+0.0	36.6	46.0	-9.4	Black
29	1.022M	35.6	+0.1	+0.1		+0.0	35.8	46.0	-10.2	Black
30	18.444M	34.6	+0.4	+0.1		+0.0	35.1	50.0	-14.9	Black


CKC Laboratories Inc. Date: 10/22/2002 Time: 9:52:43 AM WO#: 79246
FCC 15.207 - AVE Test Lead: Black 120V 60Hz Sequence#: 3
Ascom Wireless Solutions
70
60
50
40
30
20
10
dBµV
0.15
1
10
30
Frequency [MHz]
2
1
1 - FCC 15.207 - AVE
2 - FCC 15.207 - QP

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.315/15.207 - AVE**
Work Order #: **79246** Date: 10/22/2002
Test Type: **Conducted Emissions** Time: 10:01:14 AM
Equipment: **Handset w/vibrator** Sequence#: 4
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is in full charging mode. Frequency range investigated: 150 kHz to 30 MHz.

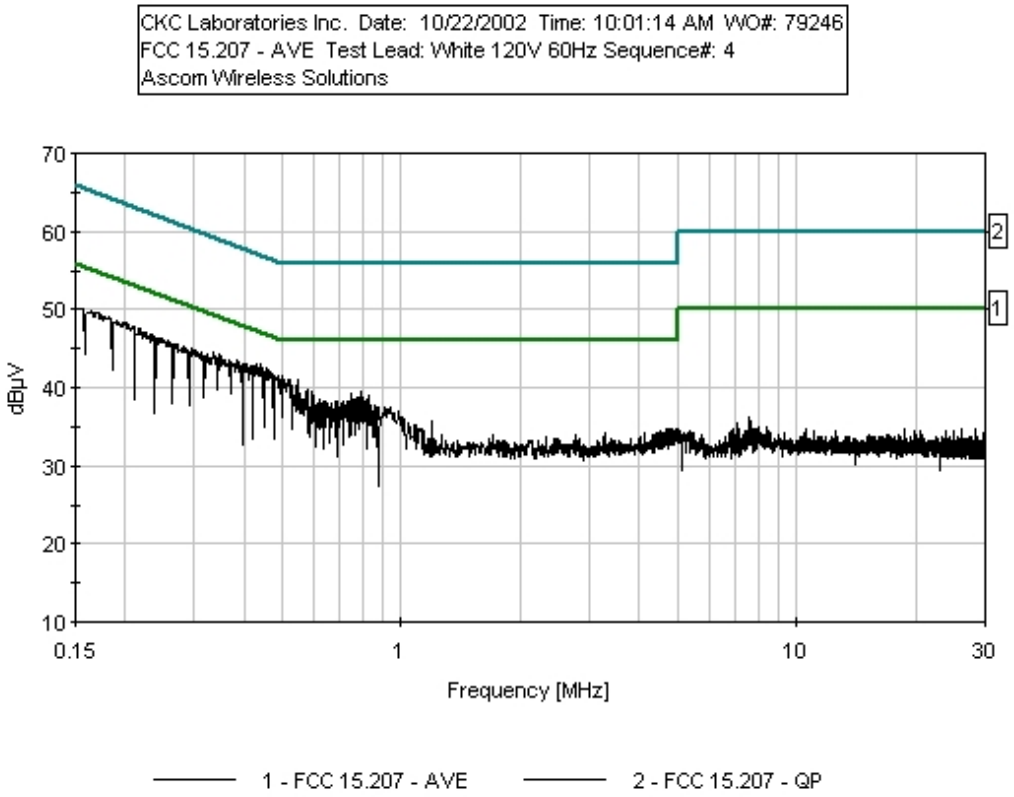
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n493

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	429.972k	42.9	+0.1	+0.1			+0.0	43.1	47.3	-4.2	White
2	457.606k	42.1	+0.1	+0.2			+0.0	42.4	46.7	-4.3	White
3	384.886k	43.4	+0.1	+0.1			+0.0	43.6	48.2	-4.6	White
4	488.148k	41.3	+0.1	+0.2			+0.0	41.6	46.2	-4.6	White
5	334.709k	44.3	+0.1	+0.2			+0.0	44.6	49.3	-4.7	White
6	345.617k	44.1	+0.1	+0.2			+0.0	44.4	49.1	-4.7	White
7	397.975k	42.9	+0.1	+0.1			+0.0	43.1	47.9	-4.8	White
8	504.146k	40.8	+0.1	+0.2			+0.0	41.1	46.0	-4.9	White
9	549.233k	40.6	+0.1	+0.2			+0.0	40.9	46.0	-5.1	White
10	189.996k	48.3	+0.1	+0.2			+0.0	48.6	54.0	-5.4	White
11	216.175k	47.3	+0.1	+0.2			+0.0	47.6	53.0	-5.4	White

12	295.440k	44.7	+0.1	+0.2		+0.0	45.0	50.4	-5.4	White
13	163.817k	49.4	+0.2	+0.2		+0.0	49.8	55.3	-5.5	White
14	152.909k	49.8	+0.2	+0.2		+0.0	50.2	55.8	-5.6	White
15	245.263k	46.0	+0.1	+0.2		+0.0	46.3	51.9	-5.6	White
16	268.534k	45.3	+0.1	+0.2		+0.0	45.6	51.2	-5.6	White
17	531.053k	40.0	+0.1	+0.2		+0.0	40.3	46.0	-5.7	White
18	577.594k	39.4	+0.1	+0.2		+0.0	39.7	46.0	-6.3	White
19	789.209k	39.3	+0.0	+0.2		+0.0	39.5	46.0	-6.5	White
20	592.865k	39.1	+0.1	+0.2		+0.0	39.4	46.0	-6.6	White
21	749.940k	39.0	+0.0	+0.2		+0.0	39.2	46.0	-6.8	White
22	824.842k	38.8	+0.0	+0.2		+0.0	39.0	46.0	-7.0	White
23	621.226k	38.2	+0.1	+0.2		+0.0	38.5	46.0	-7.5	White
24	640.133k	38.0	+0.1	+0.2		+0.0	38.3	46.0	-7.7	White
25	683.765k	37.9	+0.1	+0.2		+0.0	38.2	46.0	-7.8	White
26	861.202k	37.5	+0.0	+0.2		+0.0	37.7	46.0	-8.3	White
27	911.024k	37.2	+0.1	+0.2		+0.0	37.5	46.0	-8.5	White
28	872.110k	37.2	+0.0	+0.2		+0.0	37.4	46.0	-8.6	White
29	1.192M	35.5	+0.1	+0.1		+0.0	35.7	46.0	-10.3	White
30	1.200M	34.9	+0.1	+0.1		+0.0	35.1	46.0	-10.9	White



Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
LISN Set	Solar	8028-50-TS-24-BNC	814493, 474	02056	6/5/02	6/5/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
3/10m Cable & LISN Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/2002

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Front View

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Side View

15.323/15.209 RADIATED EMISSIONS

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 88 MHz was scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. The frequency range of 100 to 300 MHz was then scanned in the same manner using the biconical antenna and the peaks recorded. Lastly, a scan of the FM band from 88 to 110 MHz was made, using a reduced resolution bandwidth and frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 to 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 to 1000 MHz was again scanned. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	10 MHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	20 GHz	1 MHz

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323/15.209**
Work Order #: **79246** Date: 10/24/2002
Test Type: **Radiated Scan** Time: 11:08:04
Equipment: **Handset w/vibrator** Sequence#: 17
Manufacturer: Ascom Tested By: Randal Clark
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is operating on 1929.375 MHz. Handset with battery pack is installed in the charger. Unit is trickle (maintenance) charging only. Frequency range investigated: 10 MHz - 1000 MHz. Data is representative of testing in three orthogonal orientations. No signals detected within 20dB of the limit below 30 MHz.

Transducer Legend:

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	136.308M	38.9					+0.0	38.9	43.5	-4.6	Vert
2	135.700M	38.9					+0.0	38.9	43.5	-4.6	Vert
3	132.640M	38.8					+0.0	38.8	43.5	-4.7	Vert
4	128.270M	38.7					+0.0	38.7	43.5	-4.8	Vert
5	139.080M	38.2					+0.0	38.2	43.5	-5.3	Vert
6	127.610M	38.1					+0.0	38.1	43.5	-5.4	Vert
7	133.630M	38.0					+0.0	38.0	43.5	-5.5	Vert
8	135.223M	37.8					+0.0	37.8	43.5	-5.7	Vert
9	136.000M	37.7					+0.0	37.7	43.5	-5.8	Vert
10	137.760M	37.4					+0.0	37.4	43.5	-6.1	Vert
11	137.760M	37.4					+0.0	37.4	43.5	-6.1	Vert
12	137.060M	37.3					+0.0	37.3	43.5	-6.2	Vert
13	123.890M	37.3					+0.0	37.3	43.5	-6.2	Vert
14	125.538M QP	37.2					+0.0	37.2	43.5	-6.3	Vert
^	125.514M	40.5					+0.0	40.5	43.5	-3.0	Vert

16	126.222M QP	37.1	+0.0	37.1	43.5	-6.4	Vert
^	126.204M	40.6	+0.0	40.6	43.5	-2.9	Vert
18	124.920M	37.1	+0.0	37.1	43.5	-6.4	Vert
19	129.290M	37.0	+0.0	37.0	43.5	-6.5	Vert
20	122.843M QP	36.9	+0.0	36.9	43.5	-6.6	Vert
^	122.930M	39.1	+0.0	39.1	43.5	-4.4	Vert
22	122.843M QP	36.9	+0.0	36.9	43.5	-6.6	Vert
23	124.240M	36.9	+0.0	36.9	43.5	-6.6	Vert
24	130.940M	36.8	+0.0	36.8	43.5	-6.7	Vert
25	131.630M	36.7	+0.0	36.7	43.5	-6.8	Vert
26	125.300M	36.6	+0.0	36.6	43.5	-6.9	Vert
27	135.080M	36.1	+0.0	36.1	43.5	-7.4	Vert
28	130.640M	35.9	+0.0	35.9	43.5	-7.6	Vert
29	131.130M	35.9	+0.0	35.9	43.5	-7.6	Horiz
30	128.990M	35.8	+0.0	35.8	43.5	-7.7	Vert
31	124.510M	35.8	+0.0	35.8	43.5	-7.7	Vert
32	126.400M	35.8	+0.0	35.8	43.5	-7.7	Horiz
33	131.100M	35.7	+0.0	35.7	43.5	-7.8	Horiz
34	123.600M	35.5	+0.0	35.5	43.5	-8.0	Vert
35	127.040M	35.3	+0.0	35.3	43.5	-8.2	Vert
36	123.250M	35.3	+0.0	35.3	43.5	-8.2	Vert
37	125.720M	35.3	+0.0	35.3	43.5	-8.2	Horiz
38	130.370M	35.0	+0.0	35.0	43.5	-8.5	Vert
39	131.780M	35.0	+0.0	35.0	43.5	-8.5	Horiz
40	126.610M	35.0	+0.0	35.0	43.5	-8.5	Horiz

41	44.260M	31.4	+0.0	31.4	40.0	-8.6	Horiz
42	128.400M	34.8	+0.0	34.8	43.5	-8.7	Horiz
43	134.020M	34.7	+0.0	34.7	43.5	-8.8	Vert
44	128.670M	34.7	+0.0	34.7	43.5	-8.8	Vert
45	127.360M	34.7	+0.0	34.7	43.5	-8.8	Horiz
46	127.150M	34.7	+0.0	34.7	43.5	-8.8	Horiz
47	125.370M	34.6	+0.0	34.6	43.5	-8.9	Horiz
48	125.030M	34.5	+0.0	34.5	43.5	-9.0	Horiz
49	128.330M	34.3	+0.0	34.3	43.5	-9.2	Horiz
50	127.740M	34.2	+0.0	34.2	43.5	-9.3	Horiz
51	135.220M	33.8	+0.0	33.8	43.5	-9.7	Horiz
52	130.440M	33.7	+0.0	33.7	43.5	-9.8	Horiz
53	130.760M	33.6	+0.0	33.6	43.5	-9.9	Horiz
54	129.800M	33.6	+0.0	33.6	43.5	-9.9	Horiz
55	123.020M	33.6	+0.0	33.6	43.5	-9.9	Horiz
56	129.100M	33.2	+0.0	33.2	43.5	-10.3	Horiz
57	124.050M	33.2	+0.0	33.2	43.5	-10.3	Horiz
58	129.470M	33.1	+0.0	33.1	43.5	-10.4	Horiz
59	136.490M	32.8	+0.0	32.8	43.5	-10.7	Horiz
60	433.780M	34.8	+0.0	34.8	46.0	-11.2	Horiz
61	442.578M	31.9	+0.0	31.9	46.0	-14.1	Vert

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323/15.209**
Work Order #: **79246** Date: 10/24/2002
Test Type: **Radiated Scan** Time: 09:35:50
Equipment: **Handset w/vibrator** Sequence#: 16
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is on wooden table 80 cm from the groundplane. Unit is in the charger and green light is on. Handset is in transmit mode. Frequency range investigated: 1-20 GHz All readings not reported are 20 dB below the limit. 1929.375 MHz operating frequency.

Transducer Legend:

T1=Cable GHz #1	T2=Cable GHz #4
T3=Horn 1-18 GHz (Mariposa)	T4=Amp - S/N 301

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	5788.090M	43.1	+5.9	+8.5	+25.4	-31.2	+0.0	51.7	54.0	-2.3	Horiz
2	1954.960M Ave	38.8	+2.5	+4.0	+28.2	-34.6	+0.0	38.9	54.0	-15.1	Vert
^	1955.000M	61.0	+2.5	+4.0	+28.2	-34.6	+0.0	61.1	54.0	+7.1	Vert
4	3858.593M Ave	29.0	+4.2	+6.3	+29.6	-32.0	+0.0	37.1	54.0	-16.9	Vert
^	3858.606M	56.0	+4.2	+6.3	+29.6	-32.0	+0.0	64.1	54.0	+10.1	Vert
6	5787.854M Ave	24.5	+5.9	+8.5	+25.4	-31.2	+0.0	33.1	54.0	-20.9	Horiz
7	5788.359M Ave	24.3	+5.9	+8.5	+25.4	-31.2	+0.0	32.9	54.0	-21.1	Vert
^	5787.966M	50.2	+5.9	+8.5	+25.4	-31.2	+0.0	58.8	54.0	+4.8	Vert
9	3858.912M Ave	24.5	+4.2	+6.3	+29.6	-32.0	+0.0	32.6	54.0	-21.4	Horiz
^	3858.610M	48.1	+4.2	+6.3	+29.6	-32.0	+0.0	56.2	54.0	+2.2	Horiz

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323/15.209**
Work Order #: **79246** Date: 10/22/2002
Test Type: **Radiated Scan** Time: 12:16:27
Equipment: **Handset w/vibrator** Sequence#: 6
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is operating on 1920.625 MHz. Handset with battery pack is installed in the charger. Unit is trickle (maintenance) charging only. Frequency range investigated: 10 MHz - 1000 MHz. Data is representative of testing in three orthogonal orientations. No signals detected within 20dB of the limit below 30 MHz.

Transducer Legend:

T1=Amp - S/N 604 T2=Cable - 10 Meter
T3=Bicon 156

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	44.506M	48.9	-26.8	+1.2	+10.9		+0.0	34.2	40.0	-5.8	Vert
2	77.731M	49.5	-26.8	+1.8	+7.1		+0.0	31.6	40.0	-8.4	Vert
3	116.252M	44.5	-26.6	+2.1	+13.9		+0.0	33.9	43.5	-9.6	Vert
4	32.466M	44.6	-26.9	+1.1	+11.3		+0.0	30.1	40.0	-9.9	Vert
5	32.958M	43.8	-26.9	+1.1	+11.3		+0.0	29.3	40.0	-10.7	Vert
6	44.580M	40.7	-26.8	+1.2	+10.9		+0.0	26.0	40.0	-14.0	Horiz
7	55.282M	40.4	-26.8	+1.4	+10.7		+0.0	25.7	40.0	-14.3	Vert
8	217.810M	37.3	-26.2	+3.0	+17.1		+0.0	31.2	46.0	-14.8	Horiz
9	70.975M	41.6	-26.8	+1.6	+7.9		+0.0	24.3	40.0 BB	-15.7	Vert
10	33.024M	37.4	-26.9	+1.1	+11.3		+0.0	22.9	40.0	-17.1	Horiz

11	51.110M	37.0	-26.8	+1.3	+11.4	+0.0	22.9	40.0	-17.1	Vert
12	135.231M	36.2	-26.6	+2.3	+13.6	+0.0	25.5	43.5	-18.0	Horiz
13	120.001M	35.7	-26.6	+2.2	+14.2	+0.0	25.5	43.5	-18.0	Vert
14	217.706M	33.6	-26.2	+3.0	+17.1	+0.0	27.5	46.0	-18.5	Vert
15	116.130M	35.0	-26.6	+2.1	+13.9	+0.0	24.4	43.5	-19.1	Horiz
16	135.197M	33.4	-26.6	+2.3	+13.6	+0.0	22.7	43.5	-20.8	Vert
17	143.351M	33.4	-26.5	+2.4	+13.1	+0.0	22.4	43.5	-21.1	Vert
18	151.569M	32.9	-26.5	+2.4	+13.0	+0.0	21.8	43.5	-21.7	Vert
19	232.529M	29.8	-26.2	+3.1	+16.4	+0.0	23.1	46.0	-22.9	Vert
20	148.020M	31.5	-26.5	+2.4	+13.0	+0.0	20.4	43.5	-23.1	Vert
21	136.007M	30.6	-26.6	+2.3	+13.5	+0.0	19.8	43.5	-23.7	Vert
22	244.153M	28.8	-26.1	+3.2	+15.9	+0.0	21.8	46.0	-24.2	Vert
23	131.067M	29.7	-26.6	+2.3	+13.9	+0.0	19.3	43.5	-24.2	Vert

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.323/15.209**
Work Order #: **79246** Date: 10/23/2002
Test Type: **Radiated Scan** Time: 17:04:57
Equipment: **Handset w/vibrator** Sequence#: 15
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is on wooden table 80 cm from the groundplane. Unit is in the charger and green light is on. Handset is in transmit mode. Frequency range investigated: 1-20 GHz. All readings not reported are 20 dB below the limit. 1920.625 MHz operating frequency.

Transducer Legend:

T1=Cable GHz #1	T2=Cable GHz #4
T3=Horn 1-18 GHz (Mariposa)	T4=Amp - S/N 301

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	1931.900M	53.6	+2.5	+3.9	+28.0	-34.6	+0.0	53.4	54.0	-0.6	Horiz
2	5761.685M	43.4	+5.8	+8.4	+25.4	-31.2	+0.0	51.8	54.0	-2.2	Horiz
3	1954.800M	51.1	+2.5	+4.0	+28.2	-34.6	+0.0	51.2	54.0	-2.8	Vert
4	1088.000M	58.4	+1.8	+2.9	+23.4	-36.0	+0.0	50.5	54.0	-3.5	Horiz
5	5761.881M Ave	26.9	+5.8	+8.4	+25.4	-31.2	+0.0	35.3	54.0	-18.7	Horiz
6	5762.193M Ave	23.0	+5.8	+8.4	+25.4	-31.2	+0.0	31.4	54.0	-22.6	Vert
^	5762.182M	42.8	+5.8	+8.4	+25.4	-31.2	+0.0	51.2	54.0	-2.8	Vert
8	3841.449M Ave	20.6	+4.2	+6.3	+29.6	-32.0	+0.0	28.7	54.0	-25.3	Vert
^	3841.200M	58.6	+4.2	+6.3	+29.6	-32.0	+0.0	66.7	54.0	+12.7	Vert
10	3841.392M Ave	20.2	+4.2	+6.3	+29.6	-32.0	+0.0	28.3	54.0	-25.7	Horiz

11	3841.187M	47.8	+4.2	+6.3	+29.6	-32.0	+0.0	55.9	54.0	+1.9	Horiz
12	1933.226M Ave	25.6	+2.5	+3.9	+28.0	-34.6	+0.0	25.4	54.0	-28.6	Horiz
13	1956.051M Ave	24.9	+2.5	+4.0	+28.2	-34.6	+0.0	25.0	54.0	-29.0	Horiz
^	1956.072M	49.0	+2.5	+4.0	+28.2	-34.6	+0.0	49.1	54.0	-4.9	Horiz
15	1955.986M Ave	24.9	+2.5	+4.0	+28.2	-34.6	+0.0	25.0	54.0	-29.0	Vert

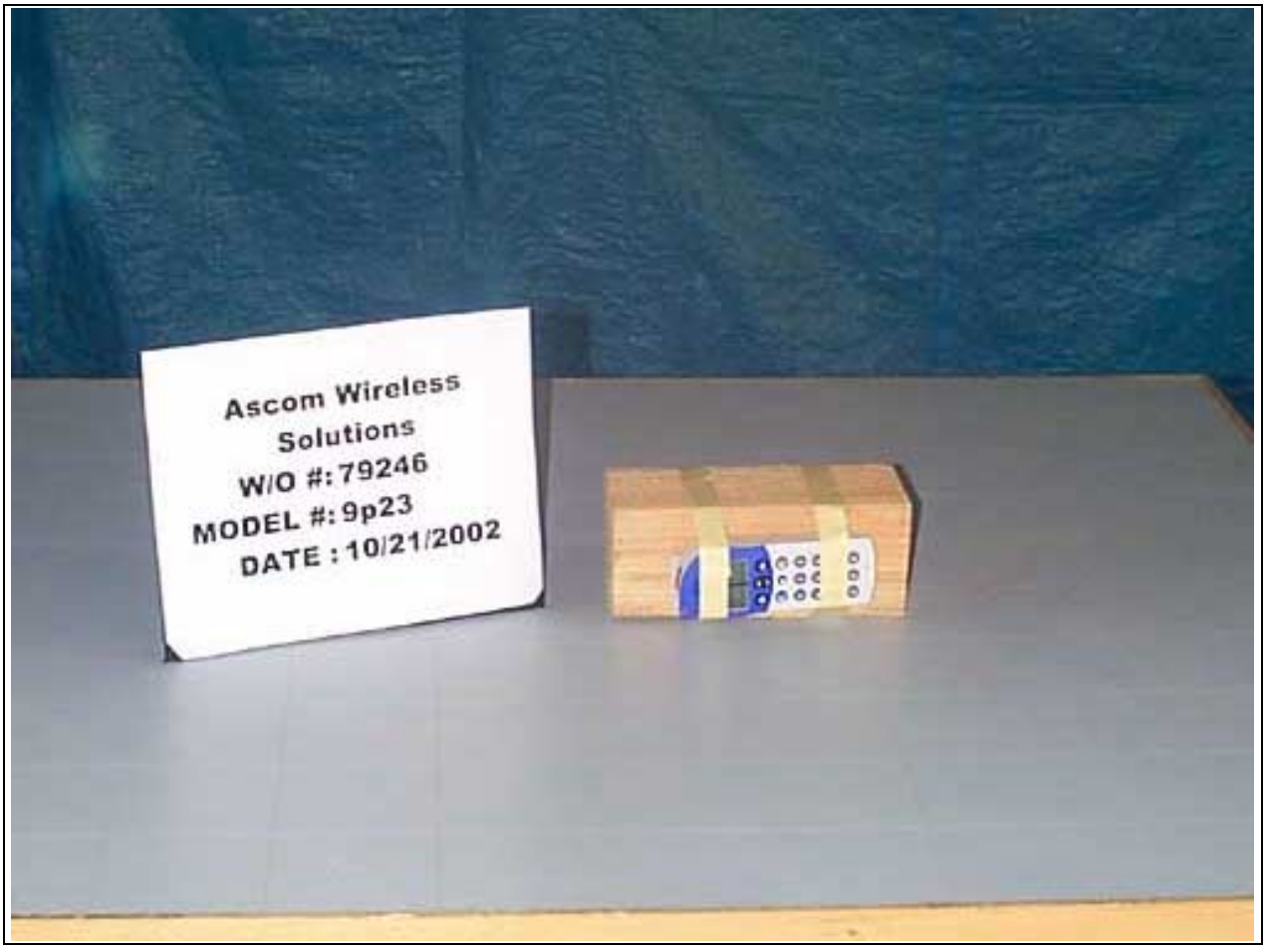
Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
3/10m Cable & LISN Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/2002
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/06/01	12/6/2002
Antenna, Log Periodic	A&H	SAS -200/512	127	00210	6/19/02	6/19/2003
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/2003
Preamp	HP	8449B	3008A00301	02010	10/18/02	10/18/2003
Preamp	HP	8447D	1937A02604	00099	3/21/02	3/21/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
Antenna, Horn 1-18GHz	EMCO	3115	9307-4085	00656	3/19/02	3/19/2003
Cable #1 (30')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Cable #2 (2')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Cable #4 (50')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Antenna, Horn 18-26GHz	HP	84125-80008	3643A00027	02112	6/28/02	6/28/2003

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View - X

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View - Y

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View - Z

15.107 AC CONDUCTED EMISSIONS

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50 µH-/+50 ohms. Above 150 kHz, a 0.15 µF series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.107(b) - AVE**
Work Order #: **79246** Date: 10/23/2002
Test Type: **Conducted Emissions** Time: 9:19:27 AM
Equipment: **Handset w/vibrator** Sequence#: 10
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is in full charge mode only. Frequency range investigated: 150 kHz to 30 MHz.

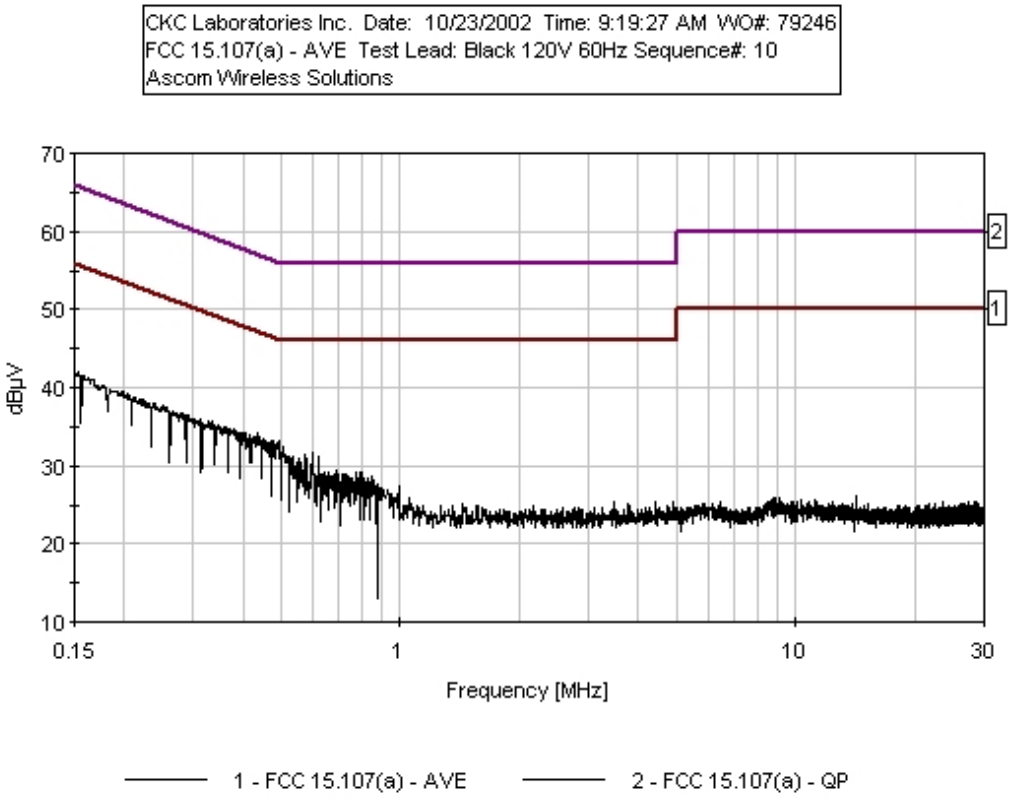
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n474

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	473.604k	33.2	+0.1	+0.0			+0.0	33.3	46.5	-13.2	Black
2	452.515k	33.3	+0.1	+0.0			+0.0	33.4	46.8	-13.4	Black
3	406.702k	34.1	+0.1	+0.0			+0.0	34.2	47.7	-13.5	Black
4	505.601k	32.4	+0.1	+0.0			+0.0	32.5	46.0	-13.5	Black
5	327.437k	35.5	+0.1	+0.1			+0.0	35.7	49.5	-13.8	Black
6	345.617k	35.1	+0.1	+0.1			+0.0	35.3	49.1	-13.8	Black
7	367.433k	34.7	+0.1	+0.0			+0.0	34.8	48.6	-13.8	Black
8	152.909k	41.8	+0.2	+0.0			+0.0	42.0	55.8	-13.8	Black
9	289.622k	36.3	+0.1	+0.1			+0.0	36.5	50.5	-14.0	Black
10	157.272k	41.4	+0.2	+0.0			+0.0	41.6	55.6	-14.0	Black
11	236.537k	38.0	+0.1	+0.0			+0.0	38.1	52.2	-14.1	Black
12	265.625k	36.8	+0.1	+0.1			+0.0	37.0	51.3	-14.3	Black
13	599.410k	31.4	+0.1	+0.1			+0.0	31.6	46.0	-14.4	Black
14	212.539k	38.6	+0.1	+0.0			+0.0	38.7	53.1	-14.4	Black
15	623.407k	31.1	+0.1	+0.1			+0.0	31.3	46.0	-14.7	Black
16	538.325k	31.0	+0.1	+0.0			+0.0	31.1	46.0	-14.9	Black
17	690.310k	29.1	+0.1	+0.1			+0.0	29.3	46.0	-16.7	Black
18	774.665k	29.1	+0.0	+0.1			+0.0	29.2	46.0	-16.8	Black
19	795.026k	29.0	+0.0	+0.1			+0.0	29.1	46.0	-16.9	Black
20	718.670k	28.8	+0.0	+0.1			+0.0	28.9	46.0	-17.1	Black
21	847.385k	28.6	+0.0	+0.1			+0.0	28.7	46.0	-17.3	Black
22	831.386k	28.4	+0.0	+0.1			+0.0	28.5	46.0	-17.5	Black
23	875.018k	27.6	+0.0	+0.1			+0.0	27.7	46.0	-18.3	Black

24	991.831k	27.2	+0.1	+0.1	+0.0	27.4	46.0	-18.6	Black
25	4.879M	24.8	+0.3	+0.4	+0.0	25.5	46.0	-20.5	Black
26	14.264M	25.5	+0.3	+0.4	+0.0	26.2	50.0	-23.8	Black
27	23.675M	24.8	+0.4	+0.1	+0.0	25.3	50.0	-24.7	Black
28	7.985M	24.1	+0.2	+0.4	+0.0	24.7	50.0	-25.3	Black
29	5.147M	23.8	+0.3	+0.5	+0.0	24.6	50.0	-25.4	Black



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **FCC 15.107(b) - AVE**
Work Order #: **79246** Date: 10/25/2002
Test Type: **Conducted Emissions** Time: 15:53:18
Equipment: **Handset w/vibrator** Sequence#: 12
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4 120V 60Hz
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is installed in the charger and the charger is connected to the LISN. Unit is in full charge mode only. Frequency range investigated: 150 kHz to 30 MHz.

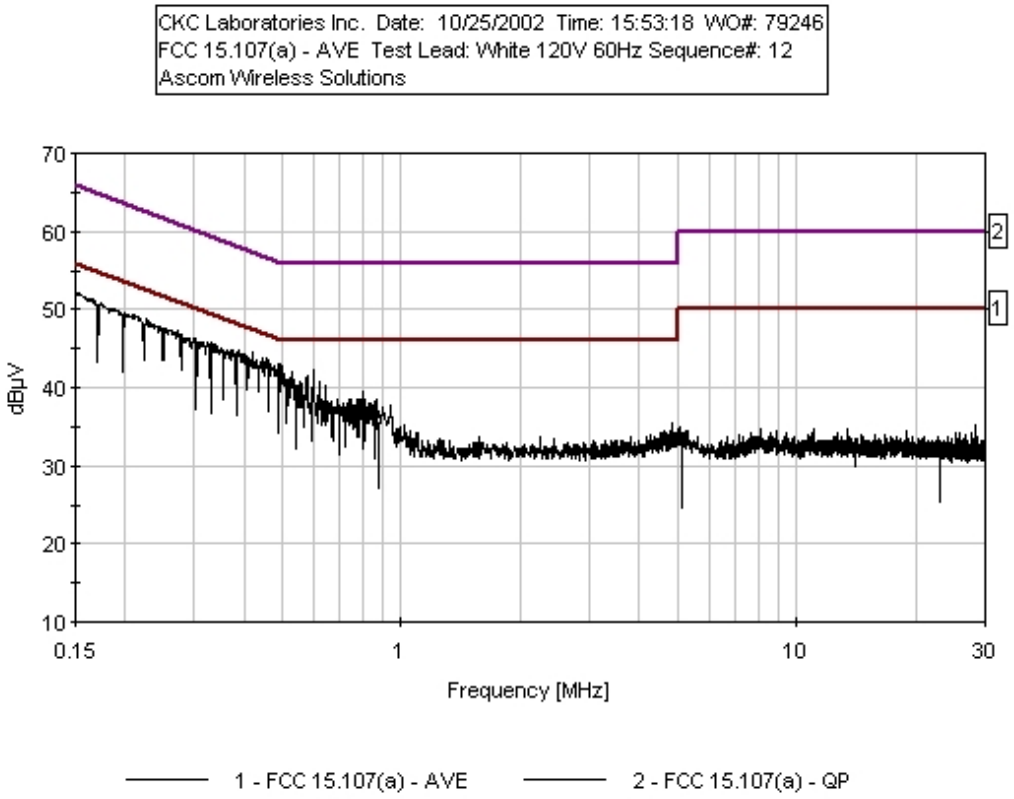
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n493

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	200.177k	49.2	+0.1	+0.2			+0.0	49.5	53.6	-4.1	White
2	252.535k	47.3	+0.1	+0.2			+0.0	47.6	51.7	-4.1	White
3	578.228k	41.5	+0.1	+0.2			+0.0	41.8	46.0	-4.2	White
4	278.714k	46.4	+0.1	+0.2			+0.0	46.7	50.9	-4.2	White
5	304.894k	45.6	+0.1	+0.2			+0.0	45.9	50.1	-4.2	White
6	580.502k	41.1	+0.1	+0.2			+0.0	41.4	46.0	-4.6	White
7	552.142k	40.4	+0.1	+0.2			+0.0	40.7	46.0	-5.3	White
8	622.680k	40.4	+0.1	+0.2			+0.0	40.7	46.0	-5.3	White
9	644.496k	39.9	+0.1	+0.2			+0.0	40.2	46.0	-5.8	White
10	796.481k	39.4	+0.0	+0.2			+0.0	39.6	46.0	-6.4	White
11	870.655k	38.4	+0.0	+0.2			+0.0	38.6	46.0	-7.4	White

12	775.392k	38.3	+0.0	+0.2		+0.0	38.5	46.0	-7.5	White
13	811.752k	38.2	+0.0	+0.2		+0.0	38.4	46.0	-7.6	White
14	711.398k	37.8	+0.0	+0.2		+0.0	38.0	46.0	-8.0	White
15	945.048k	37.5	+0.1	+0.2		+0.0	37.8	46.0	-8.2	White
16	4.858M	33.6	+0.3	+1.6		+0.0	35.5	46.0	-10.5	White
17	28.225M	34.6	+0.4	+0.1		+0.0	35.1	50.0	-14.9	White
18	11.111M	33.8	+0.2	+0.7		+0.0	34.7	50.0	-15.3	White
19	8.111M	33.1	+0.2	+1.3		+0.0	34.6	50.0	-15.4	White
20	491.056k Ave	26.8	+0.1	+0.2		+0.0	27.1	46.1	-19.0	White
^	491.057k	42.7	+0.1	+0.2		+0.0	43.0	46.1	-3.1	White
22	528.871k Ave	21.8	+0.1	+0.2		+0.0	22.1	46.0	-23.9	White
^	528.871k	41.8	+0.1	+0.2		+0.0	42.1	46.0	-3.9	White
24	464.150k Ave	21.4	+0.1	+0.2		+0.0	21.7	46.6	-24.9	White
^	464.150k	43.2	+0.1	+0.2		+0.0	43.5	46.6	-3.1	White
26	387.067k Ave	22.8	+0.1	+0.1		+0.0	23.0	48.1	-25.1	White
^	387.067k	44.6	+0.1	+0.1		+0.0	44.8	48.1	-3.3	White
28	421.972k Ave	22.1	+0.1	+0.1		+0.0	22.3	47.4	-25.1	White
^	421.973k	44.3	+0.1	+0.1		+0.0	44.5	47.4	-2.9	White
30	331.800k Ave	21.6	+0.1	+0.2		+0.0	21.8	49.4	-27.6	White
^	331.800k	45.4	+0.1	+0.2		+0.0	45.7	49.4	-3.7	White
32	173.997k Ave	20.9	+0.1	+0.2		+0.0	21.2	54.8	-33.6	White
^	173.998k	50.5	+0.1	+0.2		+0.0	50.8	54.8	-4.0	White
34	152.908k Ave	21.2	+0.2	+0.2		+0.0	21.6	55.8	-34.2	White
^	152.909k	51.8	+0.2	+0.2		+0.0	52.2	55.8	-3.6	White



Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
LISN Set	Solar	8028-50-TS-24-BNC	814493, 474	02056	6/5/02	6/5/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
3/10m Cable & LISN Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/2002

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Front View - 15.107

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Side View - 15.107

15.109 RADIATED EMISSIONS

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 88 MHz was scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. The frequency range of 100 to 300 MHz was then scanned in the same manner using the biconical antenna and the peaks recorded. Lastly, a scan of the FM band from 88 to 110 MHz was made, using a reduced resolution bandwidth and frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 to 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 to 1000 MHz was again scanned. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	20 GHz	1 MHz

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **15.109 CLASS B**
Work Order #: **79246** Date: 10/23/2002
Test Type: **Radiated Scan** Time: 14:11:30
Equipment: **Handset w/vibrator** Sequence#: 13
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is on wooden table 80 cm from the groundplane. Unit is in the charger and green light is on. Handset is in receive mode-not transmitting. Frequency range investigated: 30 MHz - 1000 MHz.

Transducer Legend:

T1=Amp - S/N 604	T2=Bicon 156
T3=Log s/n 154	T4=Cable - 10 Meter

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	59.241M	42.3	-26.8	+10.1	+0.0	+1.5	+0.0	24.1	40.0	-15.9	Vert
2	438.850M	43.8	-27.1	+0.0	+17.0	+4.5	+0.0	29.2	46.0	-16.8	Vert
3	53.824M	39.8	-26.8	+11.0	+0.0	+1.4	+0.0	22.6	40.0	-17.4	Vert
4	50.015M	38.9	-26.8	+11.6	+0.0	+1.3	+0.0	22.4	40.0	-17.6	Horiz
5	130.676M	39.5	-26.6	+13.9	+0.0	+2.2	+0.0	24.6	43.5	-18.9	Vert
6	905.985M	38.0	-27.1	+0.0	+23.0	+6.9	+0.0	27.0	46.0	-19.0	Vert
7	117.141M	38.2	-26.6	+14.0	+0.0	+2.1	+0.0	23.5	43.5	-20.0	Vert
8	121.854M	37.9	-26.6	+14.3	+0.0	+2.2	+0.0	23.4	43.5	-20.1	Vert
9	127.930M	37.8	-26.6	+14.2	+0.0	+2.2	+0.0	23.2	43.5	-20.3	Vert
10	906.031M	36.6	-27.1	+0.0	+23.0	+6.9	+0.0	25.6	46.0	-20.4	Horiz
11	136.002M	38.3	-26.6	+13.5	+0.0	+2.3	+0.0	22.9	43.5	-20.6	Vert
12	125.889M	37.4	-26.6	+14.3	+0.0	+2.2	+0.0	22.9	43.5	-20.6	Vert
13	348.805M	36.4	-26.4	+0.0	+19.1	+4.0	+0.0	25.1	46.0	-20.9	Vert
14	61.912M	37.1	-26.8	+9.6	+0.0	+1.5	+0.0	18.4	40.0	-21.6	Vert
15	57.895M	36.4	-26.8	+10.3	+0.0	+1.5	+0.0	18.4	40.0	-21.6	Vert
16	141.417M	37.3	-26.5	+13.2	+0.0	+2.3	+0.0	21.7	43.5	-21.8	Vert

17	56.527M	35.7	-26.8	+10.5	+0.0	+1.4	+0.0	18.0	40.0	-22.0	Vert
18	139.321M	36.9	-26.5	+13.3	+0.0	+2.3	+0.0	21.4	43.5	-22.1	Horiz
19	144.088M	37.1	-26.5	+13.1	+0.0	+2.4	+0.0	21.3	43.5	-22.2	Vert
20	130.594M	35.9	-26.6	+13.9	+0.0	+2.2	+0.0	21.0	43.5	-22.5	Vert
21	138.712M	36.2	-26.5	+13.3	+0.0	+2.3	+0.0	20.7	43.5	-22.8	Vert
22	138.037M	36.1	-26.5	+13.3	+0.0	+2.3	+0.0	20.6	43.5	-22.9	Vert
23	414.377M	37.7	-26.9	+0.0	+16.6	+4.4	+0.0	23.0	46.0	-23.0	Vert
24	136.665M	35.9	-26.6	+13.5	+0.0	+2.3	+0.0	20.5	43.5	-23.0	Vert
25	115.121M	35.3	-26.6	+13.8	+0.0	+2.1	+0.0	20.4	43.5	-23.1	Vert
26	406.276M	37.5	-26.9	+0.0	+16.4	+4.3	+0.0	22.7	46.0	-23.3	Vert
27	119.165M	34.8	-26.6	+14.1	+0.0	+2.2	+0.0	20.1	43.5	-23.4	Vert
28	142.063M	35.3	-26.5	+13.2	+0.0	+2.3	+0.0	19.7	43.5	-23.8	Vert
29	116.470M	34.1	-26.6	+13.9	+0.0	+2.1	+0.0	19.3	43.5	-24.2	Vert
30	128.605M	33.6	-26.6	+14.1	+0.0	+2.2	+0.0	18.9	43.5	-24.6	Vert
31	139.387M	33.6	-26.5	+13.2	+0.0	+2.3	+0.0	18.0	43.5	-25.5	Vert
32	131.980M	32.3	-26.6	+13.8	+0.0	+2.3	+0.0	17.2	43.5	-26.3	Vert
33	114.439M	32.1	-26.6	+13.8	+0.0	+2.1	+0.0	17.2	43.5	-26.3	Vert
34	153.538M	32.9	-26.5	+13.1	+0.0	+2.4	+0.0	17.1	43.5	-26.4	Vert
35	129.955M	31.7	-26.6	+14.0	+0.0	+2.2	+0.0	16.9	43.5	-26.6	Vert
36	129.280M	31.7	-26.6	+14.0	+0.0	+2.2	+0.0	16.9	43.5	-26.6	Vert
37	144.763M	32.5	-26.5	+13.1	+0.0	+2.4	+0.0	16.7	43.5	-26.8	Vert
38	149.488M	31.9	-26.5	+13.0	+0.0	+2.4	+0.0	16.0	43.5	-27.5	Vert
39	154.858M	31.5	-26.5	+13.1	+0.0	+2.4	+0.0	15.7	43.5	-27.8	Vert
40	132.655M	30.2	-26.6	+13.8	+0.0	+2.3	+0.0	15.1	43.5	-28.4	Vert

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Ascom Wireless Solutions**
Specification: **15.109 CLASS B**
Work Order #: **79246** Date: 10/23/2002
Test Type: **Radiated Scan** Time: 15:33:10
Equipment: **Handset w/vibrator** Sequence#: 14
Manufacturer: Ascom Tested By: Chuck Kendall
Model: 9p23-BAB4
S/N: 4939812

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

Function	Manufacturer	Model #	S/N
Handset w/vibrator*	Ascom	9p23-BAB4	4939812
Battery Pack	Ascom	643103	N/A
Desktop Charger	Ascom	9p23	4913165
Power Supply Brick	Ascom	130111	N/A

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Handset with battery pack is on wooden table 80 cm from the groundplane. Unit is in the charger and green light is on. Handset is in receive mode-not transmitting. Frequency range investigated: 1-20 GHz. All readings not reported are 20 dB below the limit.

Transducer Legend:

T1=Cable GHz #1	T2=Cable GHz #4
T3=Horn 1-18 GHz (Mariposa)	T4=Amp - S/N 301

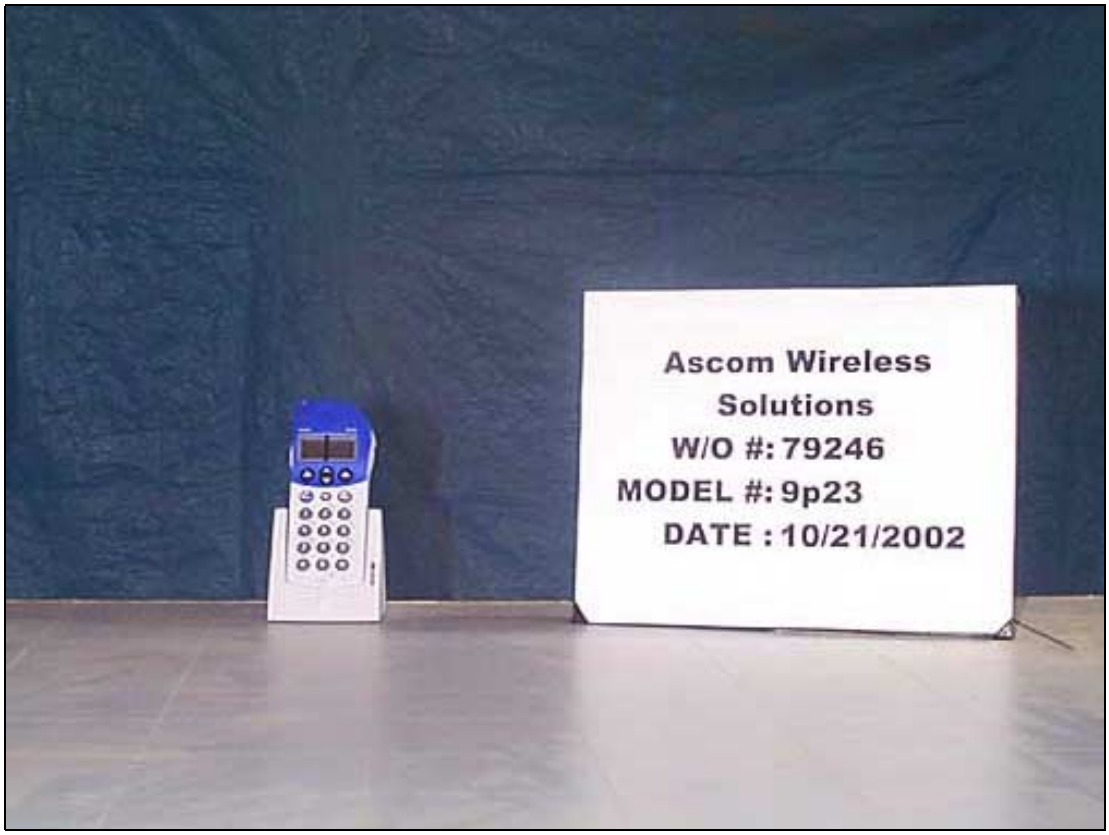
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	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	1036.094M	49.1	+1.7	+2.9	+23.2	-36.1	+0.0	40.8	54.0	-13.2	Horiz
2	1036.060M	39.4	+1.7	+2.9	+23.2	-36.1	+0.0	31.1	54.0	-22.9	Vert

Test Equipment

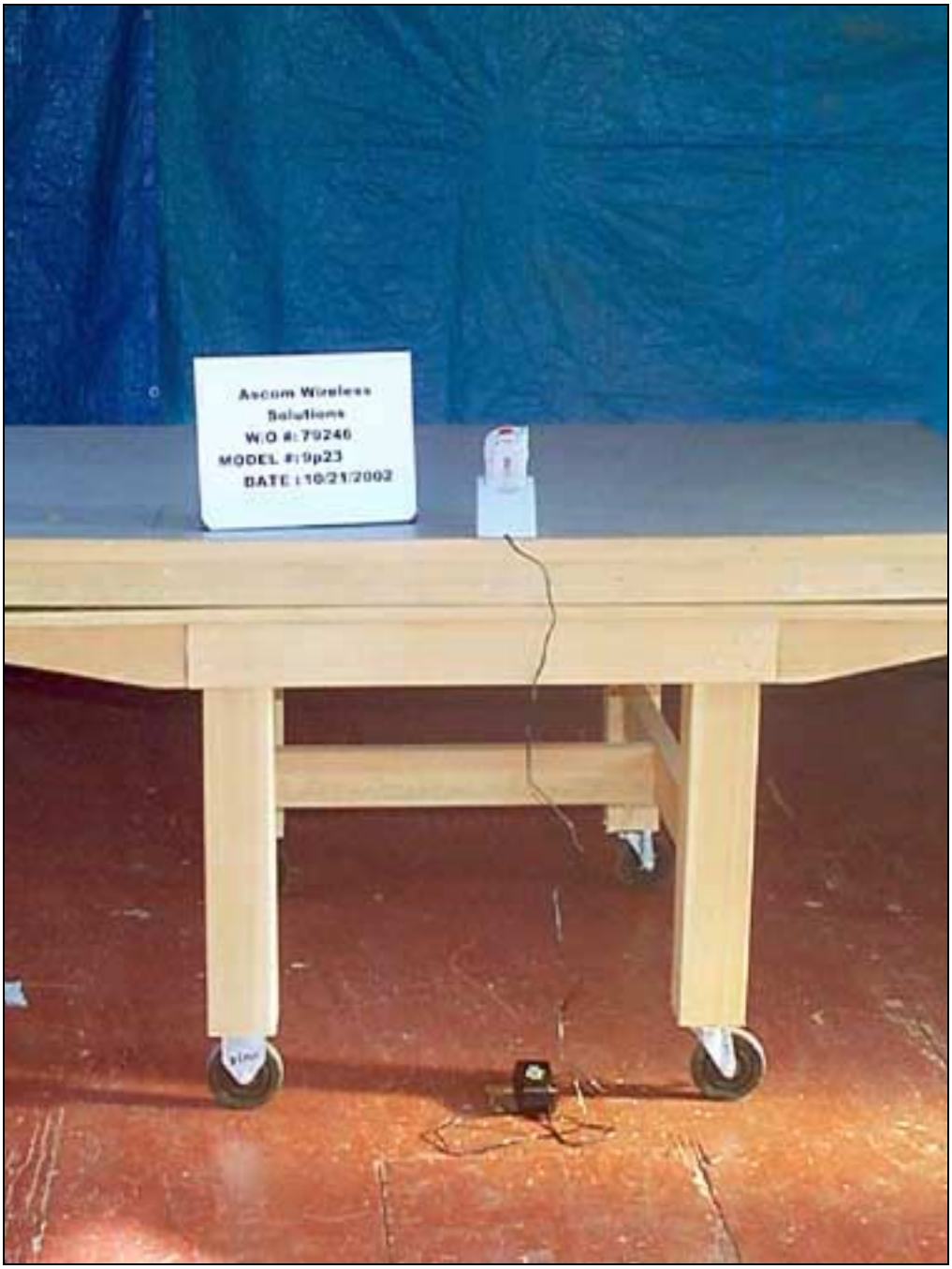
Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
3/10m Cable & LISN						
Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/2002
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/06/01	12/6/2002
Antenna, Log Periodic	A&H	SAS -200/512	127	00210	6/19/02	6/19/2003
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/2003
Preamp	HP	8449B	3008A00301	02010	10/18/02	10/18/2003
Preamp	HP	8447D	1937A02604	00099	3/21/02	3/21/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003
Antenna, Horn 1-18GHz	EMCO	3115	9307-4085	00656	3/19/02	3/19/2003
Cable #1 (30')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Cable #2 (2')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Cable #4 (50')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/2003
Antenna, Horn 18-26GHz	HP	84125-80008	3643A00027	02112	6/28/02	6/28/2003

RADIATED EMISSIONS – FRONT VIEW



Radiated Emissions – Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View