

Prepared (and subject responsible) EUS/B/W Steven Saverino ext.7697		No. EUS/B/WT-98:1106		
Approved (S. Saverino)	Checked	Date 1998-06-11	Rev A	File 980611.DOC

TEST REPORT

FCC PART 15.323 / ANSI C63.17 SECTION 7 & 8 COMPLIANCE

1 REVISION INFORMATION

First release of document

2 INTRODUCTION

This document is an appendix of our overall FCC Part 15 submittal. It provides results demonstrating full compliance for testing performed on individual DCT1900 Base Station and Portable transceivers and/or systems in Ericsson Business Networks' development laboratory in Research Triangle Park, NC.

ANSI C63.17 Sections 7 & 8 provide test criterion and methodology for demonstrating compliance with FCC Part 15D rules relating to access channel (time and spectrum window) monitoring and access procedures. The following Test Report identifies the applicable tests¹ for DCT1900 transceivers which are *isochronous* devices. DCT1900 utilizes up to 8 TDMA carriers with 24 (12 duplex) timeslots each creating a total of 96 possible access channels for establishing voice telephony communications.

This report is applicable for both the Base Station and Portable Handset transceivers the testing generally involves their interaction with each other as companion devices a part of the overall "system".

3 TEST REPORT

3.1 TEST REPORT CONTENTS

The following sections of this document are organized according to the ANSI-C63.17-1997 section 9 Test Report requirements.

3.2 APPLICABLE STANDARDS

ANSI-C63.17-1997 "Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices"

EI/TIA-662 "Personal Wireless Telephone" Standard

FCC PART 15 RULES

¹ ANSI C63.17-1997 is a "universal" document intended to provide guidelines for several different isochronous and asynchronous technologies. Only relevant tests are applicable for the DCT1900 isochronous technology.

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

3.3 EQUIPMENT UNITS TESTED

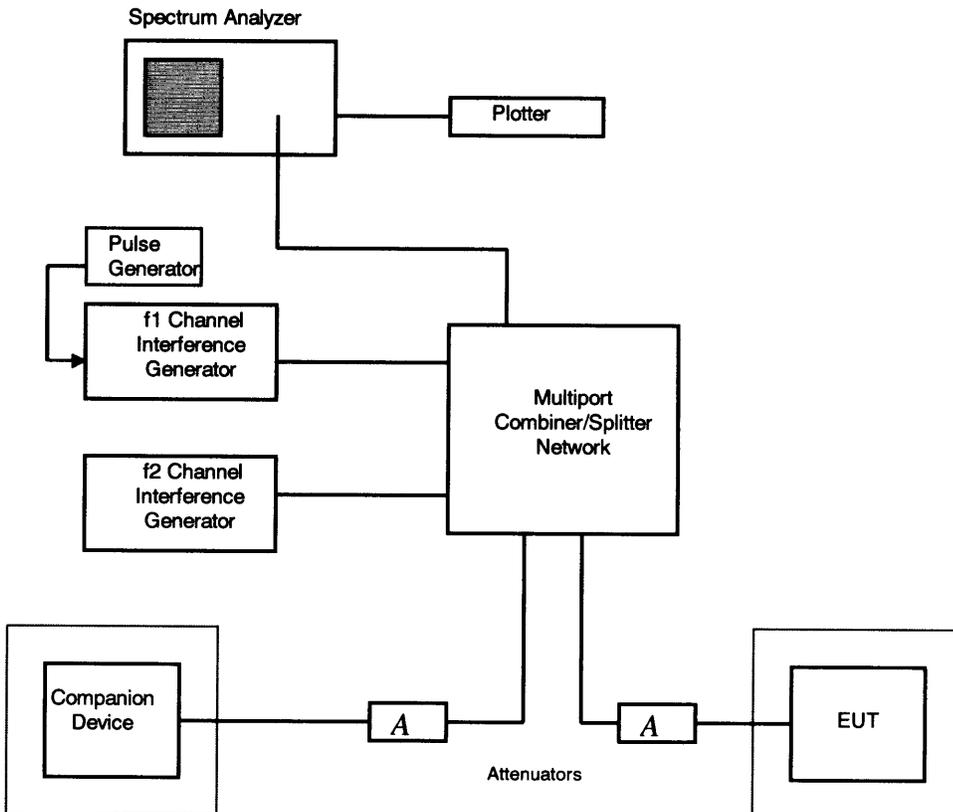
- Portable Telephone Transceiver
Model Number: DT620
FCC I.D. AXAROA1173201
Serial Number: 45
- Base Station Transceiver
Model Number: DB600
FCC I.D. AXAKRC1011371
Serial Number: UA200GA76B
- Radio Exchange (common control system logic)
Serial Number: 4003609157

3.4 TEST CONFIGURATION

Test configurations vary according to the particular test being run. The following illustration shows the general connectivity for the various tests and is referenced with the appropriate paragraphs describing the test procedures in section 3.8 sub paragraph

3.4.1 Equipment Configuration for Conducted Monitoring and Operational Tests

Note: This is the same as illustrated in ANSI C63.17 Figure 7.3(b). Depending on the type of test being performed, the "Multiport Combiner/Splitter Network" is configured as needed.



<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

3.5 LIST OF TEST EQUIPMENT

- Tektronix 497P Spectrum Analyzer
Serial Number: B020243
Calibration valid through 7-30-99.
- HP 8110A Pulse Generator
Serial Number: 3501GO1948
Calibration valid through 5-28-99.
- Anritsu MG3670B Digital Modulation Signal Generator
Serial Number: MQ1930
Calibration valid through 8-1-99.
- HP 8648C Signal Generator
Serial Number: 3619U00810
Calibration valid through 7-29-99.
- HP 33120A Arbitrary Waveform Generator
Serial Number: US36005593
Calibration valid through 9-11-99.
- HP 437B Power Meter
Serial Number: 3125U16805
Calibration valid through 7-30-99.
(Used for calibrating the various network losses in the test setup)

3.6 UNITS OF MEASUREMENT

Where applicable, measurements of conducted emissions are reported in dB referenc to one milli-Watt (dBm). Measurements of operating frequency, operating frequency with variations in ambient temperature and input voltage, and occupied bandwidth of intentional radiators are reported in units of Hertz or multiples thereof. Measurement: input power to intentional radiators are reported in units of watts. All formulas of conversions and conversion factors, if used are included within this report.

3.7 LOCATION OF TEST SITE

The tests described in this document have been performed in our Research Triangle Park development laboratory using accepted good engineering practices. (These tes do not require a "recognized" or "accredited" test site to be valid.)

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

3.8 MEASUREMENT PROCEDURES

All measurements are conducted according to procedures described in the relevant sections of ANSI C63.17. (Some are 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 DCT1900 (an isochronous device) are as identified and described in the following sub-paragraphs:

3.8.1 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-operating area interference, or by direct frequency administration commands, if available. DCT1900 has the latter capability, thus this more convenient method is 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 “blocked”, thus allowing many of the ANSI tests to be conducted without injection of “of operating region” interference. This makes the testing more straightforward.

3.8.2 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:

- The threshold used for channel access deferral are based on the measured power +19 dBm and emission bandwidth of 825 KHz.
- All tests will be run using “frequency administration” commands to limit the EUT to operate on a limited number of “target frequencies.
- All tests are run according to the general setup of figure 3.4.1.
- The Interference Generator is set to provide an interfering carrier at (for example 1924.375 MHz gated at 5 ms bursts (50% duty cycle) to coincide with the DCT1900 10 ms total frame timing or a CW carrier is used as allowed by the ANSI procedure.

The objective is to verify that the EUT refuses to set up a connection on any carrier which is, in effect, “blocked” by the interfering source already occupying the channel. The EUT passes when it operates only in the allowed combinations of operating conditions as described in each test scenario.

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

3.8.3 7.2.1 Calculation of Thresholds

Reference FCC Part 15.323 (c)(2, 5, 9). This paragraph does not describe a test. It simply requires a calculation be performed to establish upper and lower threshold lim

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

$$\text{Lower Threshold} = -84.7 \text{ dBm}$$

$$\text{Upper Threshold} = -64.7 \text{ dBm}$$

3.8.4 7.2.2 Calibration of Test Interference Field Strength (Radiated Technique)

This is not applicable as the tests are being run using conducted techniques.

3.8.5 7.2.3 Standard Test Frequencies

DCT1900 operates on the following carrier frequencies:

<u>CSM Carrier Number</u>	<u>Carrier Frequency</u>
8	1920.625 MHz
7	1921.875 MHz
6	1923.125 MHz
5	1924.375 MHz
4	1925.625 MHz
3	1926.875 MHz
2	1928.125 MHz
1	1929.375 MHz

3.8.6 7.2.4 Procedures for Using Out-of-Operating Region Interference

This is not applicable because the tests are being run by blocking channels using frequency administration commands as allowed under ANSI paragraph 7.1.2.

3.8.7 7.3.2.1 Determination of Thresholds and Verification of "Best Channel" Selection

Reference FCC Part 15.323(b) and (c)(2, 5)

These tests are performed using the conducted technique.

The interference test signals are CW.

The system should prefer carriers at the upper end of the isochronous band because emission bandwidths are greater than 625 KHz.

These tests are performed slightly different for the Base Station and the Portable. Th Base Station transmits signalling/control "beacons", therefore measurements are conducted on it independently. For the Portable, the tests are run concurrently with tl Base Station as a "companion" device.

3.8.8 7.3.2.1.1 Lower Threshold

Reference FCC Part 15.323(b) and (c)(2, 5)

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

Select the following two carriers for operation. (The other 6 are administratively "blocked")

f1 = 1925.625
f2 = 1924.375

Confirm that the preferred carrier (f1) is selected and following the ANSI procedure, determine the "measured" lower threshold for the Base Station operating in the beacc mode (no call setup) and then with the Base Station and Portable communicating together.

3.8.9 7.3.2.1.2 Least Interfered Channel

Reference FCC Part 15.323(b) and (c)(2, 5)

This test is intended to prove that the Least-Interfered-Channel will always be selecte

Select the following two carriers for operation. (The other 6 are administratively "blocked")

f1 = 1925.625
f2 = 1924.375

Run step 1 of the ANSI procedure with f1 CW interference set at -77 dBm and f2 CW interference set at -84 dBm. The EUT must transmit on f2 under this condition.

Run step 3 of the ANSI procedure with f2 CW interference set at -77 dBm and f1 CW interference set at -84 dBm. The EUT must transmit on f1 under this condition.

Because DCT1900 is a TDMA system, run step 2 of the ANSI procedure with interference (-77dBm) selectively placed on all but one f1 timeslot (use the Anritsu Digital Modulation Signal Generator and external pulse generator) and CW interferen (-84 dBm) on all f2 timeslots. The EUT must transmit on the single non-interfered timeslot on f1 (as opposed to selecting an f2 timeslot).

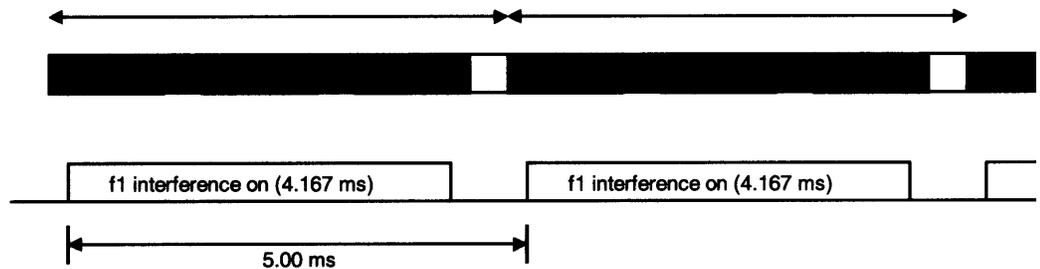
Note: During this test, it is not necessary to "lock" the interfering source to the DCT1900 TDMA frame timing, however the accurate timing of both the DCT1900 ppm) and the test equipment (10 ppm) insures that the relative "drift" of the times will occur at a very low slip-rate, enabling the test to be successfully completed during the relatively long periods of alignment. (Additionally, even when there is a "slip", a different free timeslot still becomes available for the call to be set up on.)

The RF Signal Generator controlled by the pulse generator provides an interference "mask" that insures one pair of timeslots are free during the test. Set pulse generator period to 5.00 ms and duty cycle to 83.33%. Gate the signal generator with this pulse provide an RF burst that is "10 timeslots long" (4.167 ms). A "2 timeslot wide" off tim therefore provided. Since there is no phase alignment or synchronization, this will slowly drift in time relative to the slot timing of the DCT1900, ensuring ONE non-interfered timeslot pair is always available to set up a connection for the brief test.

This is shown in the following illustration:



Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC



3.8.10 7.3.2.1.3 Upper Threshold

Reference FCC Part 15.323(b) and (c)(2, 5)

This test is intended to prove that when no other carriers are available (blocked), call can still be set up on f1 only if the interfering signal (also on f1) is below the upper threshold limit of -64.75 dBm.

Select the following two carriers for operation. (The other 6 are administratively "blocked")

f1 = 1925.625
f2 = 1924.375

Confirm that the preferred carrier (f1) is selected and following the ANSI procedure, determine the "measured" upper threshold for the Base Station operating in the beac mode (no call setup) and then for the Base Station and Portable communicating together.

3.8.11 7.3.2.2 Selected Channel Confirmation

Reference FCC Part 15.323(c)(1, 5)

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

Setup is the same as the previous test.

3.8.12 7.4 Threshold Monitoring Bandwidth

Frequency administration commands are employed to restrict operation of the EUT to single system carrier frequency, f1 (1925.625 MHz).

Introduce an interfering signal spaced 40% of emission bandwidth (825 KHz x .40) = 330 KHz away from center frequency, therefore (1925.295 MHz / 1925.955 MHz).

The interfering signal level = -61 dBm and 50 KHz BW (produced by modulating the signal.)

Verify the EUT sees this interference and does not establish a connection.

3.8.13 7.5 Isochronous Reaction Time and Monitoring Interval

Reference FCC Part 15.323(c)(1, 7)

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

The intention of this test is to confirm that the EUT does not set up connections when the interfering signals are of a time duration that exceeds the allowed limit.

The conducted technique is used for this test.

Use frequency administration commands to allow only one active carrier during this test.

Repeat the test for each of the 8 carriers.

The interfering CW signal (same frequency as the active carrier chosen) is "gated" to EUT and its companion device in a manner similar to the example in the ANSI-C63.1 section 7.5 illustration. Connect a variable pulse generator (HP 8110A) to provide the needed timing pulses to the Anritsu MG670B RF generator pulse input port.

Refer to the frame/slot timing diagram provided in the results section 3.9.9. Set up the pulsed CW source repetition rate to match the frame timing (10 mS), placing an interfering RF pulse in each of the (24) 417 usec. wide timeslots.

Execute the test procedure steps 3, 4 & 5 in the ANSI procedure. The needed pulse widths (RF burst width) and interference levels are derived from the provided formula and are based on our calculated upper threshold limit of -65 dBm and our 825 Khz emission bandwidth. They are as follows:

Step	Pulse Width	Interference Level
1	62 usec.	-65 dBm
2	43 usec.	-59 dBm
3	92 usec.	-55 dBm

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

3.8.14 8.1.2.1 Isochronous Time and Spectrum Window Selection

Reference FCC Part 15.323(b)

This test is intended to prove that DCT1900 will always select the highest carrier frequency available. (Because our emissions are >625 Khz, we must prefer the high end of the band.)

Follow the ANSI procedure, blocking carriers as necessary using frequency administration commands from the CSM.

3.8.15 8.1.2.2 Tests for 3-Band Limit

DCT1900 utilizes 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.

3.8.16 8.1.3 Unacknowledged Transmissions (Isochronous)

Reference FCC Part 15.323(c)(4, 6)

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

This test is to verify that a Base Station terminates beacon transmissions at least once every 30 seconds when it has no other access channel (time/frequency combination) available.

This test also determines the time interval between the termination and restart of the beacon transmissions. (The "wait" time must randomly vary between 10 and 150 ms.

Using frequency administration commands, block all but one carrier from transmitting

Using the pulsed interference generator setup (described in paragraph 3.8.9) block all but one timeslot pair with interference at the upper threshold level (-65 dBm).

Using a digital storage oscilloscope and a detector diode, monitor and plot the RF beacon (TDMA burst) emissions from the Base Station. Verify that the Base Station is applying random "wait" times at least once every 30 seconds in conformance with the requirements of step 4 of the ANSI procedure.

Using frequency administration commands, "unblock" all 8 carriers.

Apply interference at -81 dBm (6 dB above the measured lower threshold of -87 dBm the highest 3 carrier frequencies (1929.375, 1928.125 and 1926.875 MHz).

Set up a connection and verify that it occurs on the highest preferred carrier next to the blocked carriers. (This should be 1925.625 Mhz.)

Terminate the connection, then verify that after 30 seconds, beacon transmissions conform to step 4 of the ANSI procedure. (They should not be "continuous".)

Remove the interference and verify that beacon transmissions move to the preferred (highest) carrier which is now unblocked.

3.8.17 8.2.1 Acknowledgments

Reference FCC Part 15.323(c)(4)

This test verifies that the Portable does not transmit for more than 1 second once communication is lost with the Base Station. It also is intended to verify that the Base Station ceases regular transmissions (reverts to beacons) within 30 seconds of a terminated transmission.

Set up a call between the Portable and the Base Station. Monitor the Portable transmissions and determine how long they continue after the power to the Base Station is removed. (Must be less than 1 second.)

Set up a call between the Portable and the Base Station. Monitor the Base Station transmissions and determine how long they continue after the Portable terminates the call. (Must revert to beacon transmission within 30 seconds.)

3.8.18 8.2.2 Transmission Duration

Reference FCC Part 15.323(c)(3)

This test is intended to verify that the system will terminate any individual continuous communication (call) that exceeds 8 hours duration. A "Declarative Statement" to this effect is also required.

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc /Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

Perform the test according to the ANSI procedure.

3.8.19 8.2.3 Duplex Connections

Reference FCC Part 15.323(c)(10)

DCT1900 operates according to the referenced FCC rule. The Portable Handset is the "initiating device" and the Base Station is the "responding device".

The objective of this test is to prove that both the TX and RX windows are monitored by the Portable and verify that transmission always occurs on the "least interfered" transmit/receive slot pair based on the specified interference threshold levels.

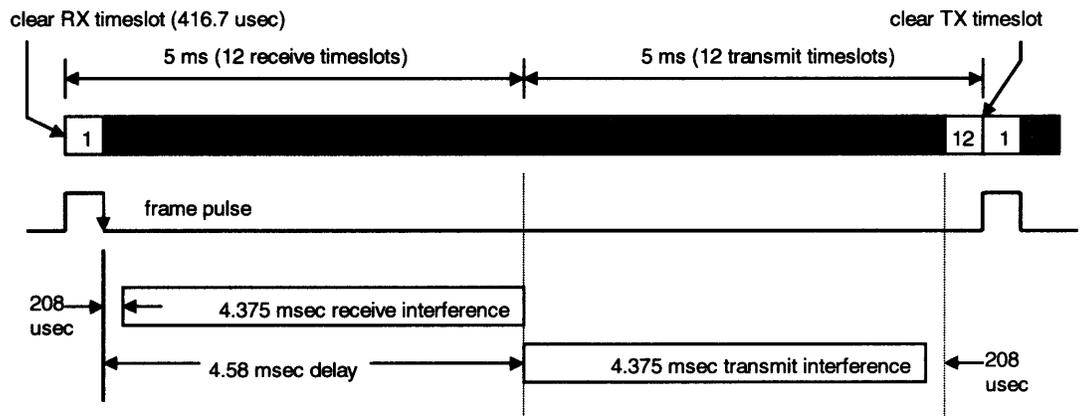
Perform this test using the conducted technique. (Refer to the setup illustrated on the next page.)

Use frequency administration commands to limit operation to a single carrier (1925.62 Mhz).

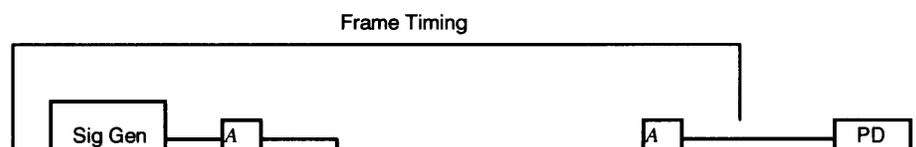
Introduce interference to the receive and transmit timeslots according to the timing described in the various steps in the ANSI procedure. Synchronize the pulse generator triggering to the frame timing of the system. (CMOS level frame timing is available at the programming port connector on the Base Station.)

See the example below where the timing setup creates a "clear" set of unpaired TX and RX slots. The HP3110A Pulse Generator is triggered by the frame pulse and produce two independently controllable outputs that are used to "gate" the RF bursts from two independently controllable Anritsu Digital Modulation Signal Generators. The slot-aligned RF interference is introduced to the Portable through the test RF network shown

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



Test Setup for the Duplex Connection Test



<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

3.8.20

8.2.4 Alternative Monitoring Interval

Reference FCC Part 15.323(c)(11)

This test is not required as DCT1900 operates according to the provisions of Part 15.323(c)(10). [see above paragraph 3.8.19]

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

3.9 MEASUREMENT DATA

The results of this test are provided in the following sub-paragraphs and, when appropriate, are supported by attachments to this document.

3.9.1 7.1.2 Monitoring Test Procedure - General

This paragraph did not describe a test, thus no data/results are reported.

3.9.2 7.2.1 Calculation of Thresholds

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

$$\text{Lower Threshold} = -84.7 \text{ dBm}$$

$$\text{Upper Threshold} = -64.7 \text{ dBm}$$

3.9.3 7.3.2.1 Determination of Thresholds and Verification of "Best Channel" Selection

This section measures the actual thresholds and verifies they do not exceed the calculated limits of 7.2.1. Results are detailed in the following sub-paragraphs.

Additionally, the ANSI requires the following declaritive statement concerning these thresholds:

Manufacturer's Declaration of Relevant Monitoring Thresholds

The DCT1900 monitoring thresholds are nominally set for -87 dBm (low) 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-sec 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 this 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 providing transparent handover capability for the users.

3.9.4 7.3.2.1.1 Lower Threshold

Operating as a System (Portable communicating with Base Station)

Compliant. Under non-interference conditions, the system always initiated beacons as a set up calls on f1, the preferred carrier.

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC

Compliant. When interference was introduced and incrementally increased per the procedure, the highest interference level at which transmission could still occur (the "measured" lower threshold) was -87 dBm, which is lower than the failing criterion of $\log_{10} B-154-P_{EUT}$ which = $(15 \log_{10} 825000) -154 -P_{EUT} = \underline{-84.75 \text{ dBm}}$.

Base Station only (beacon).

Compliant. When interference was introduced and incrementally increased per the procedure, the highest interference level at which transmission could still occur (the "measured" lower threshold) was -87 dBm, which is lower than the failing criterion of $\log_{10} B-154-P_{EUT}$ which = $(15 \log_{10} 825000) -154 -P_{EUT} = \underline{-84.75 \text{ dBm}}$.

3.9.5 7.3.2.1.2 Least Interfered Channel

These tests were conducted as a system (Portable communicating with Base Station,

Interference levels were based on the preceding tests "measured" lower threshold values.

Compliant. In step 1, transmission occurred on f2, the least interfered channel. (f1 was "blocked" by a higher level interfering source.)

Compliant. In step 3, transmission occurred on f1, the least interfered channel. (f2 was "blocked" by a higher level interfering source.)

Compliant. In step 2, transmission occurred on the single interference-free f1 timeslot (the least interfered channel).

3.9.6 7.3.2.1.3 Upper Threshold

Operating as a System (Portable communicating with Base Station)

Compliant. Under the test conditions, the system only initiated beacons and set up c on f1, the preferred carrier. (F2 was "blocked" by a high-level interfering source.)

Compliant. When interference was introduced and incrementally increased per the procedure, the interference level at which transmissions ceased to occur on f1 was -7 dBm (the "measured" upper threshold), which is lower than the failing criterion of $15 \log_{10} B-134-P_{EUT}$ which = $(15 \log_{10} 825000) -134 -P_{EUT} = -64.75 \text{ dBm}$.

Base Station only (beacon).

Compliant. Interference was introduced and incrementally increased per the procedure. The Base Station was then enabled to see if it would still transmit beacons. The interference level at which beacon transmissions ceased to occur was -67 dBm, (the "measured" upper threshold) which is lower than the failing criterion of $15 \log_{10} B-134 -P_{EUT}$ which = $(15 \log_{10} 825000) -134 -P_{EUT} = -64.75 \text{ dBm}$.

3.9.7 7.3.2.2 Selected Channel Confirmation

Compliant. The EUT transmitted on f1 as required, indicating it immediately recognized the preferred channel had become available.

The test also requires submittal of a Manufacturer's Description of the channel monitoring and selection process:

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

**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 ca every frame (10 ms) on a continuous basis. To completely scan a normal sys with all eight (8) carriers enabled takes $8 \times 10 \text{ ms} = 80 \text{ ms}$, 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 cha verification. The selection process conforms to both licensed (Least Interf Channel) and unlicensed (Listen Before Talk / Least Interfered Channel) FCC Par D "etiquette" requirements.

Channel Verification

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

A frame and slot timing diagram is provided in section 3.9.9 for reference.

3.9.8 **7.4 Threshold Monitoring Bandwidth**

Compliant. The portable did not establish a connection under the 2 adjacent narrowband interference conditions described in the procedure.

Compliant. When the interference conditions were already present, the Base Station, when enabled, did not establish a beacon.

3.9.9 **7.5 Isochronous Reaction Time and Monitoring Interval**

Complies. With interference introduced at the calculated (upper) threshold limit of -61 dBm, the EUT did not establish a connection when the width of the interference pulse exceeds 62 usec.

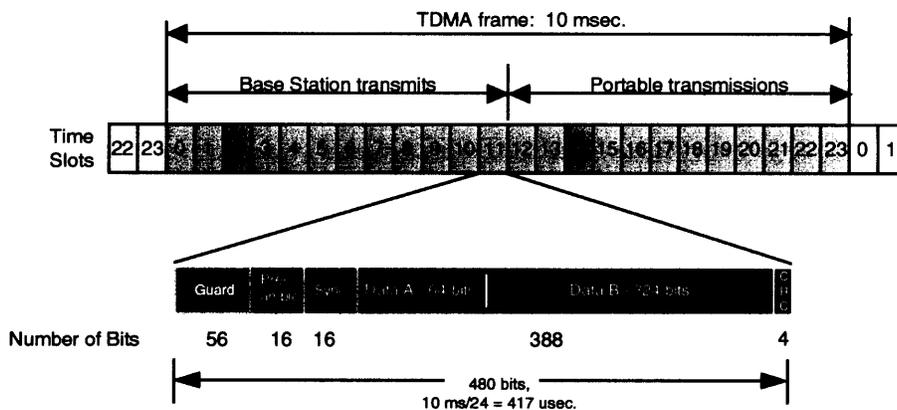
Complies. With interference 6 dB above the calculated (upper) threshold limit of -65 dBm, the EUT did not establish a connection when the width of the interference pulse exceeds 43 usec.

Complies. With interference power set 10 dB above the calculated upper threshold limit, and random variance of the synchronization of the pulses relative to the overall msec frame time, the EUT did not establish a connection.

This test was repeated on each standard test frequency.

The procedure also requires submittal of the following frame timing information.

Prepared (and subject responsible) EUS/B/W		No. EUS/B/WT-90107		
Doc / Approved (S. Saverino)	Checked	Date 1998-07-11	Rev A	File 97028.DOC



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

3.9.10 8.1.2.1 Isochronous Time and Spectrum Window Selection

Complies. Confirmed that connections were always set up on the highest unblocked carrier.

3.9.11 8.1.2.2 Tests for 3-Band Limit

DCT1900 utilizes utilizes the channel search provisions required in FCC Part 15.323(l) thus is not subject to the segment occupancy requirement described in the ANSI procedure. As confirmed in the previous test, DCT1900 will set up calls on the highest unblocked carriers.

3.9.12 8.1.3 Unacknowledged Transmissions (Isochronous)

Frequency administration commands were used to block all but one carrier (1925.625 Mhz) from transmitting. Interference was applied to all but one timeslot pair.

Complies. Verified that the Base Station is applying random "wait" times before transmitting (indicating listen-before-talk has occurred) at least once every 30 seconds conformance with the requirements of step 4 of the ANSI procedure. (See storage scope plots in Appendix). The measured intervals over hundreds of samples vary between 10 and 150 ms at precise 10 ms increments.

Complies. Verified that with all carriers available, connection is set up on highest preferred carrier next to the interfered carriers. (1925.625 MHz).

Complies. Verified that after terminating the connection, beacon transmissions becor discontinuous in conformance with Step 4 of the ANSI procedure.

Complies. Verified beacons move to the preferred highest carrier (1929.375 Mhz) 30 seconds after terminating the connection.

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

3.9.13 8.2.1 Acknowledgments

Complies. Portable transmissions terminated in less than 1 second after communication is lost with the Base Station.

Complies. Base Station communication channel transmissions reverted to beacon transmissions in approximately 14 seconds.

3.9.14 8.2.2 Transmission Duration

Complies. Transmission was automatically terminated at the 8-hour (2,880,000 frame) point.

Declarative Statement:

DCT1900 is designed to terminate any individual continuous transmission that exceeds 8 hours. This is implemented by Timer #217 in the MAC Layer of the software protocols.

3.9.15 8.2.3 Duplex Connections

Complies. Passed all tests and provided required declarative statement following:

Procedure for Making Duplex Connections

The Portable Handset is the "initiating device" and the Base Station is "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 signalling information to 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 an 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.

The test was set up per the ANSI procedure and the individual tests (referred to hereinafter) were run to demonstrate compliance.

ANSI Test Steps and Results

1. The test was run on the Portable (the "initiating device") connected to its companion device, the Base Station as shown in paragraph 3.8.19.
2. Path loss was set as specified. Verified the Portable was receiving a signal at least 40 dB above its lower threshold. (-87 dBm + 40 = -37 dBm)
3. Complies. Verified a connection could be set up.

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

4. Set up interference as specified.
5. Complies. A connection was established. DCT1900 utilizes >40 channels (96) so this is O.K.
6. Set up interference as specified.
7. Complies. Connection setup was not possible.
8. Set up interference as specified.
9. Complies. Connection setup was only possible on the interference-free receive time/spectrum window and its duplex mate.
10. Set up interference as specified.
11. Complies. Connection setup was only possible on the interference-free transmit time/spectrum window and its duplex mate.
12. Complies. Set up interference as specified. It was not possible to transmit or establish a connection because all duplex channels had interference in either their TX RX slots above the threshold limit.

3.9.16

8.2.4 Alternative Monitoring Interval

This test is not required as DCT1900 operates according to the provisions of Part 15.323(c)(10), as tested above. (The DCT1900 Portable initiates transmissions and monitors both the its receive and intended transmit slots.)

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc / Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC

3.10 GENERAL AND SPECIAL CONDITIONS

There are no special conditions for this test.

3.11 SUMMARY OF RESULTS

The tested DCT1900 equipment fully complies with the requirements ANSI C63.17 Sections 7 & 8.

3.12 REQUIRED SIGNATURES

Engineer performing the test:

Steve Saverino (Ericsson)



Witness:

Gerald Michalak (Ericsson)



Ericsson Responsible Staff:

Gerald Michalak (Director, Business Systems Wireless Development)
7001 Development Drive
Research Triangle Park, NC 27701
(919) 472-7538

3.12.1 Agreement to Incorporate Changes

This certifies that any equipment hardware or software changes required during the testing necessary to bring the EUT into compliance shall be implemented by Ericsson into production units before commercial product release.

List applicable changes: (or indicate "not applicable")

_____ (NOT APPLICABLE) _____



Gerald Michalak (Director of Business Systems Wireless Development) or designee.

3.13 TEST REPORT DISPOSITION

This document is archived as a normal released document in the Ericsson document control system, thus it is available for review by regulatory agencies for a period of at least 3 years.

<i>Prepared (and subject responsible)</i> EUS/B/W		<i>No.</i> EUS/B/WT-90107		
<i>Doc /Approved</i> (S. Saverino)	<i>Checked</i>	<i>Date</i> 1998-07-11	<i>Rev</i> A	<i>File</i> 97028.DOC