Chapter 12 Test Setup Photos

Overview

This section contains test setup photos.

Contents

12.1 Radiated Emissions Test Setup

Radiated emissions measurements shall be made over the frequency range specified by the regulatory agency — in this case, per FCC Part 15, subpart 15.207. Measurements shall be made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This was accomplished using both an automated 360 degree turntable and 1- to 4-meter height antenna positioners. Sixteen azimuth cuts at 22.5 degrees and 1- to 4-meter antenna scans in both polarizations were utilized. The FWAN WCS Base Station was set up in a typical field configuration, as shown in Figure 12.1, with the FWAN WCS Base Station being in the center of the turntable. Proper interconnecting cable was utilized from the FWAN WCS Base Station to the system power supply.

All radiated emissions testing was completed in two configurations:

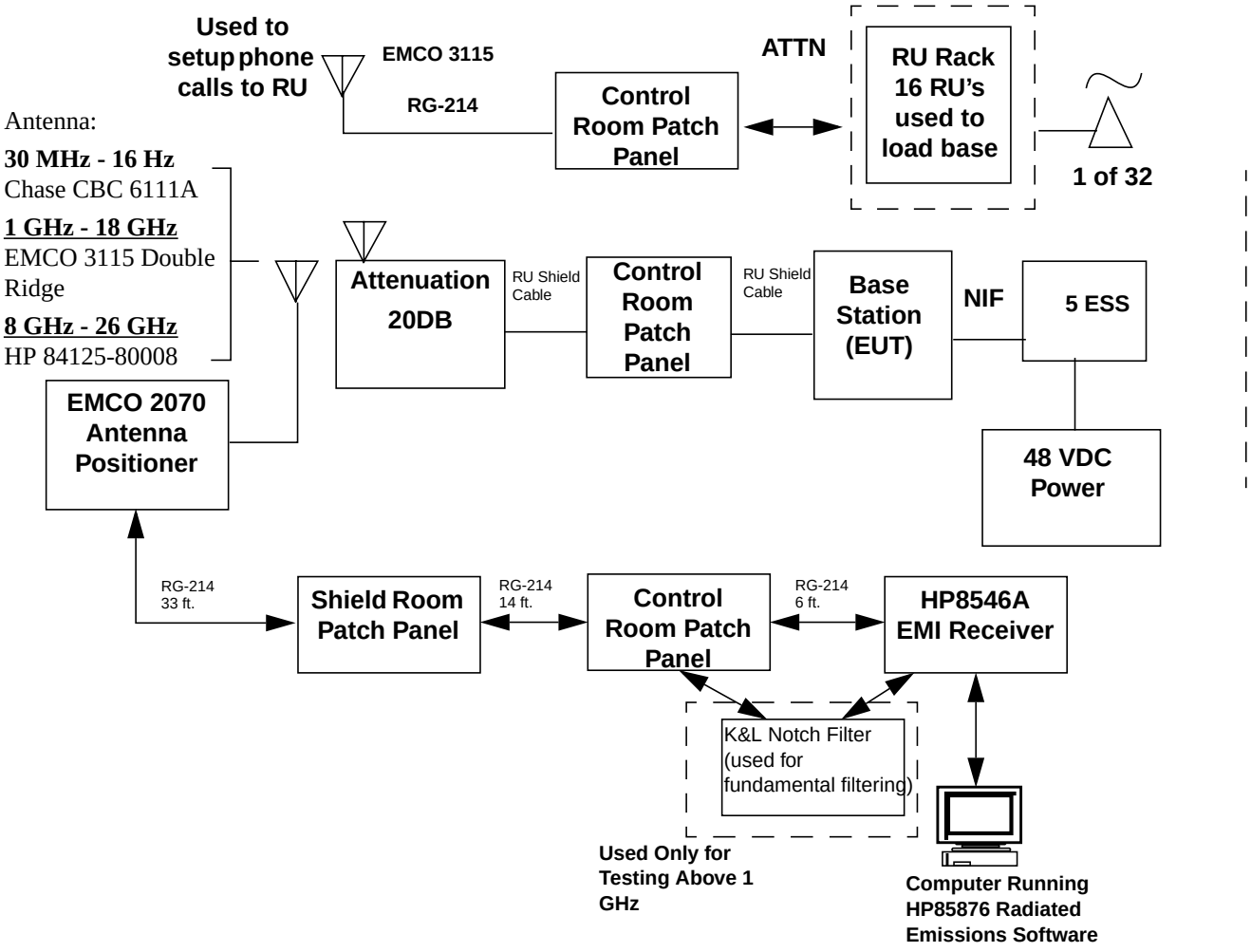
- Fifteen (15)[1] voice calls on the same time slot in the same sector
- Eight (8) voice calls per sector.

Testing was completed from 30 MHz to 26 GHz.

To complete the calls, a test fixture utilizing a rack of sixteen (16) Remote Units (RUs) with four telephones per RU was established. Figure 12.10 shows the RU test rack used to load the Base Station. The rack was designed to hold up to 16 remote units together with all power, RF, and telco connections. This design was necessary in order to load the Base Station with the maximum number of calls on the same time slot and sector. That is, we used 16 remote units, four lines each, for a total of 64 calls. Also shown are the 64 phones and the spectrum analyzer used to monitor calls through the duration of FCC testing.

1. It was not possible to test 16 voice calls on the same time slot in the same sector. As a result, the loss of this one call relates to a power loss of.3dB. To make up for this loss, the base transmitted power level was increased by 1dB.

Figure 12.1 Radiated Emissions Test Setup



12.2 Parts Comprising Equipment Under Test (EUT)

12.2.1 List of Equipment Under Test

Table 12.1 EUT List

Card Name	Serial Number	Revision
Baseband Shelf 1 Components		
BBC	15448 000627	D
NCP	116985 000614	G
TSP 1	0998 000993 000614	A
TSP 2	0000216042000310	C
TSP 3	0000215656991021	A
TSP 4	0000216116000310	C
TSP 5	0000216063000310	C
TSP 6	0000216059000310	C
TSP 7	0000216308000330	C
MODEM	0000086217000614	L
Baseband Shelf 2 Components		
BBC	0000016070 000614	D
NCP	0000116962 000614	G
TSP 1	0998001063 000601	A
TSP 2	0000215659 991021	A
TSP 3	0000216298 000330	C
TSP 4	0000216061 000310	C
TSP 5	0000216040 000310	C
TSP 6	0000216285 000330	C
TSP 7	0000215282 000309	A
MODEM	0000086149 000614	L
Baseband Shelf Redundant Components		
BBC	0000016073 000614	D
NCP	0000117061 000614	G
TSP 1	0000216341 000407	C
TSP 2	0000216210 000323	C
TSP 3	0000216055 000310	C
TSP 4	0000216314 000330	C
TSP 5	0998028959 001130	H

Card Name	Serial Number	Revision
TSP 6	0998029055 001130	H
TSP 7	0998029015 001130	H
Network Shelf Components		
MODEM	0000086237 000614	L
Sync-P	1999901134DC0025	1
Sync-R	1999901014DC0017	1
TSI-P	0000205877 000614	D
TSI-R	0000205855 000614	D
NIF-1	0998001306 000601	A
NIF-2	95807 991007	H
NIF-3	0998001309 000601	A
NIF-4	000009550 990903	F
DNIF-5	0000095559 990903	F
DNIF-6	0000095501 000627	E
DNIF-7	0000095527 000627	E
NMP	0000105531 000614	B
ICP-P	0000075251 000627	D
ICP-R	0000075188 000627	D

12.3 EUT Test Configuration Photos

Figure 12.2 Base, Configuration, Doors Open—Front View

Figure 12.3 Base Configuration, Doors Closed—Side View

Figure 12.4 Base Configuration, Doors Closed—Rear Side View

Figure 12.5 Base Configuration, Rear Panels Removed—Rear View

12.4 Testing Facility and Location

During the month of January, 2001, a series of radio frequency interference measurements were performed on the AT&T Base Station Version B1.5 WCS.

For Class A digital devices/intentional radiator, the tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions from Low – Voltage Electrical and Electronic Equipment in the range of 9kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-1992 (Revision of the ANSI C63.4-1988). These tests were performed by personnel of AT&T WIRELESS SERVICES EMC Laboratory at 9461 Willows Road Redmond, Washington. Additionally FCC Part 15 radiated emissions testing was completed at the same location within an FCC certified 3 meter semi-anechoic shield room.

Figure 12.6 shows the overall control room setup used to acquire test data during radiated and conducted emissions testing. From left to right, the control room is set up as follows: HP8546A receiver, EMCO 2090 dual device controller (turntable and tower), CCTV and controller used to monitor the device under test, and HP Vectra computer, monitor, and printer used to control the EMC measurement software and data acquisition processes.

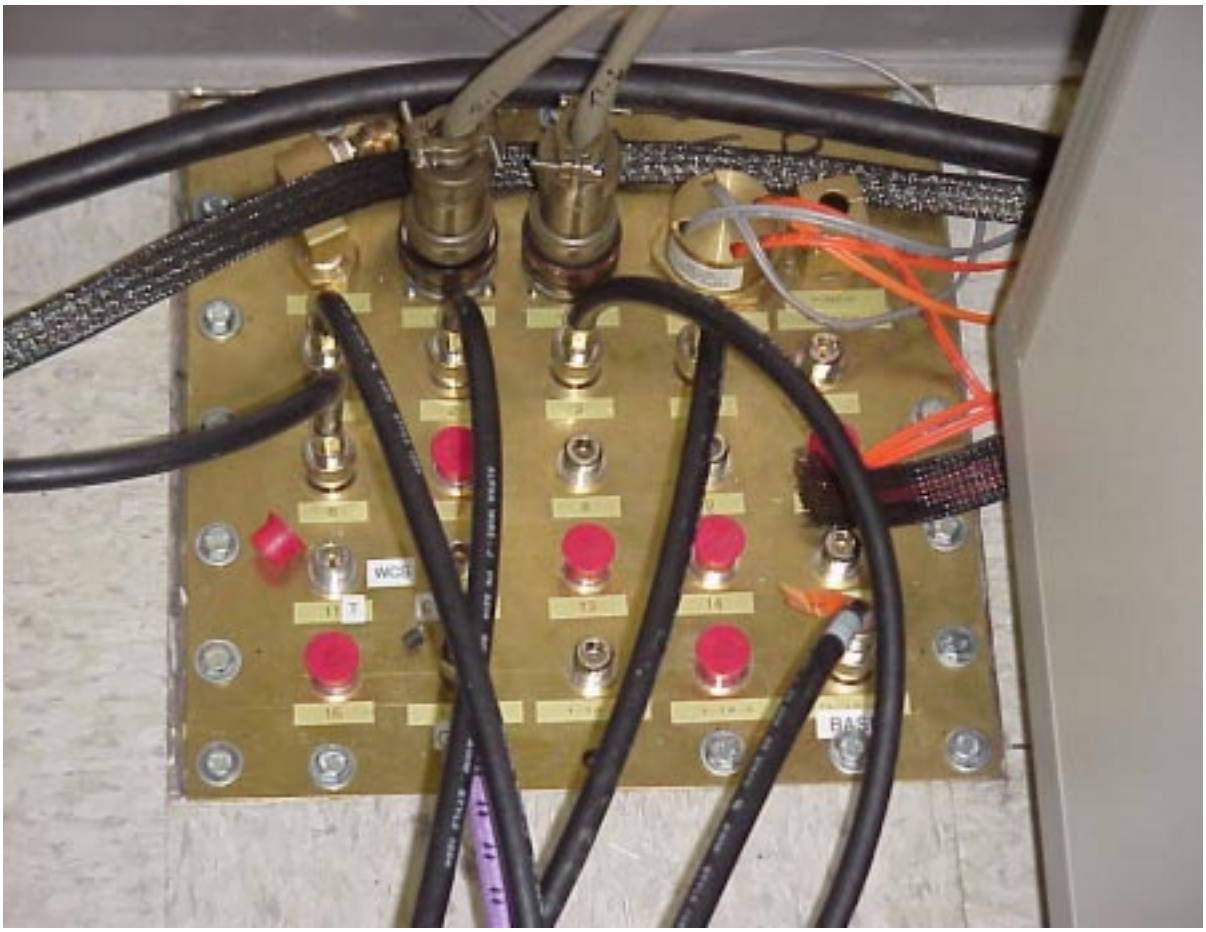
Figure 12.6 3-meter Shield Room Control Room

All radiated emission measurements were taken in an isolated /shielded control room using a Hewlett Packard 8546A EMI receiver system 12.7

Figure 12.7 3-meter Control Room

All data/telco and RF enters and exits shield room from this panel

Figure 12.8 3-meter Control Chamber Access Panel Penetration.



Fiber carries telecom lines into control room and then converts into copper wire.

Figure 12.9 T1 Fiber Optic Lines

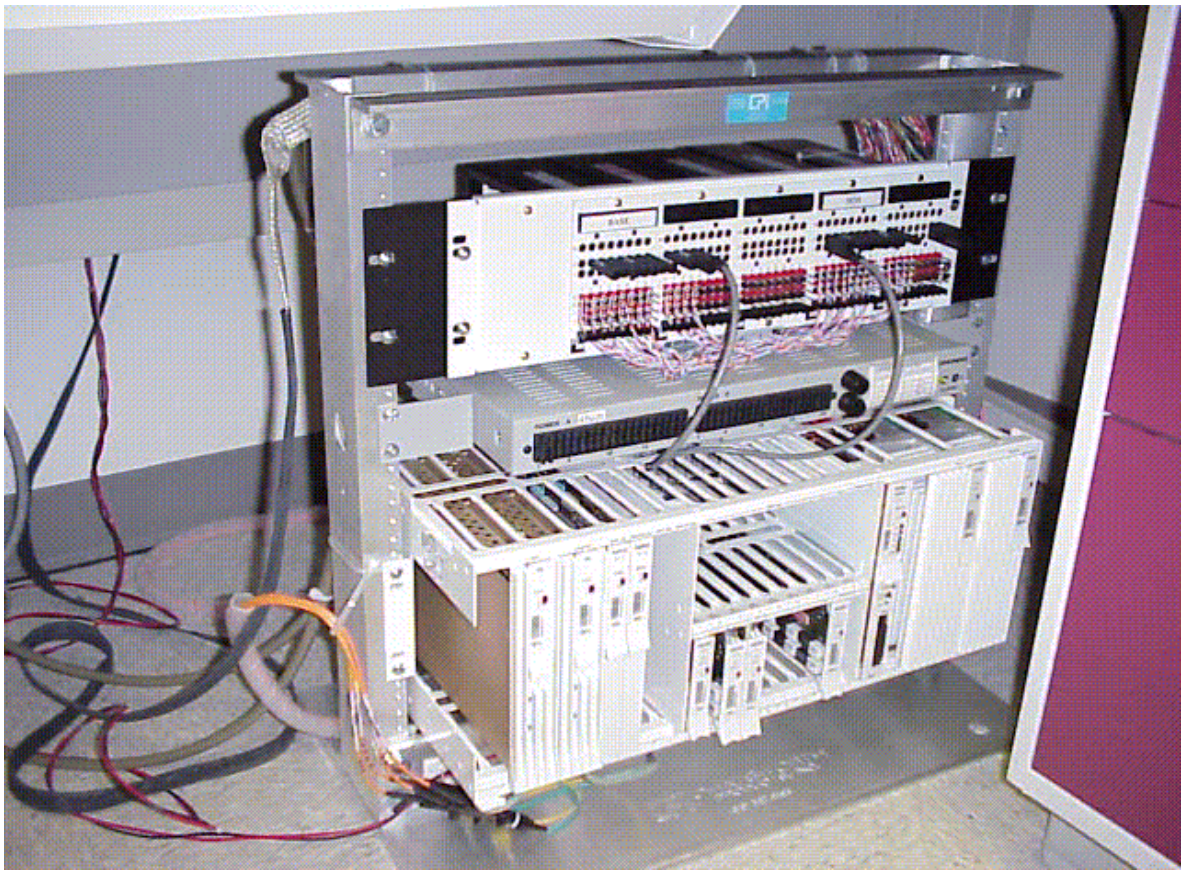


Figure 12.10RU Test Rack

Figure 12.11 shows a close-up view of the setup shown in Figure 12.10.

Figure 12.11Setup of the 16 Remote Units

Figure 12.12 shows the test setup for radiated emissions testing in the range from 1GHz - 26GHz. An EMCO 3115 horn antenna is shown here during the 1GHz - 3.5GHz testing phase, horizontal polarization (additional high frequency waveguide antennas were used for testing above 3.5GHz). Also shown is the HP 84300A E62 microwave intentional radiator system in the background, with a portable laptop serving as the software control and data capturing system.

Figure 12.12HP 84300A E62 Microwave Intentional Radiator System

Figure 12.13 shows the 3 Meter Chamber EMCO Antenna Tower which was controlled with the EMCO 2090 to vary the receive antenna height from one to four meters. Also shown is the Chase CBL6111A 30MHz to 1000MHz Biconical - Log Periodic receive antenna, used for radiated emissions testing at a distance of three meters from the device under test.

Figure 12.13Radiated Emission 30MHz - 1GHz Test Setup