

Chapter 12 Test Setup Photos

Overview

This section contains test setup photos.

Contents

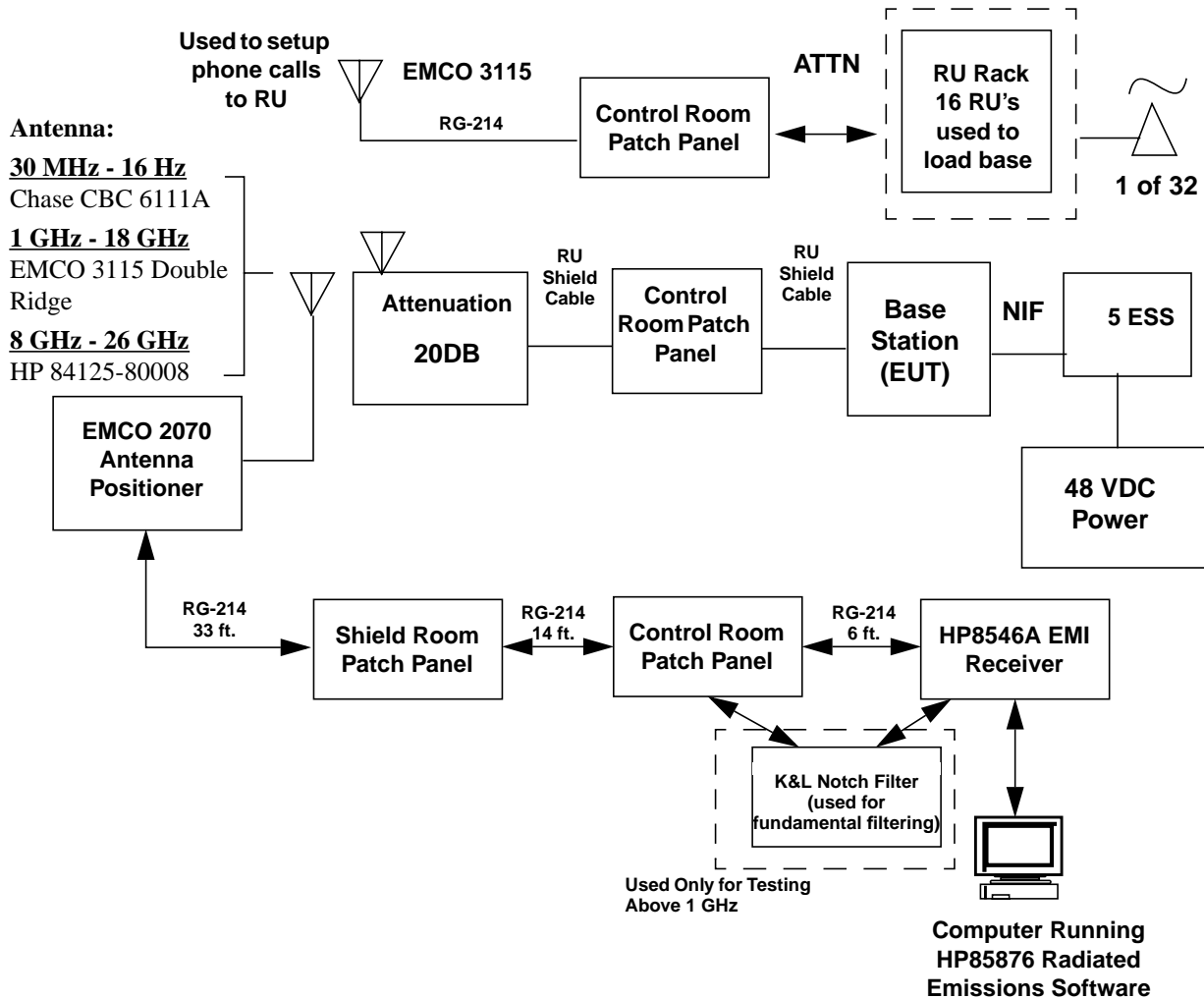
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12.1 Radiated Emissions Test Setup

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 PWAN Base was setup in a typical field configuration, as shown in [Figure 12.1](#), consisting of the PWAN Base being in the center of the turntable. Proper interconnecting cable was utilized from the PWAN Base to the system power supply. All radiated emissions testing was completed a worst case configuration: 15 voice calls on the same time slot in the TDMA slot. Testing was completed from 30 MHz to 18GHz. When testing close to or over the fundamental frequency range, a notch filter tuned to the Remote Unit and PWAN Base Station fundamental frequencies was utilized to prevent receiver radio frequency overload and/or damage.

To complete the calls, a test fixture utilizing a rack of sixteen (16) Remote Units (RU's) with two telephones per RU was established. Figure 12.10 shows the RU Test rack used to load the Base. 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 with the maximum amount of calls on the same time slot and sector 16 remote units, two lines each for a total of 32 calls). Also shown are the 32 phones and spectrum analyzer used to monitor calls through the duration of FCC testing

Figure 12.1 Radiated Emissions Test Setup



12.2 EUT Parts

Table 12.1 Network Components

Card Name	Serial Number	Revision
Sync-P	1999011 04	D
Sync-R	19990162	D
TSI-P	205826	D
TSI-R	205789	D
NIF-1	0998032100	J
NIF-2	0998005253	G
NIF-3	0998005105	G
NIF-4	099803229	J
DNIF-5	0998032281	J
DNIF-6	0998000435	A
DNIF-7	0998000425	A
NMP	106315	C
ICP-P	75652	B
ICP-R	75854	D

Table 12.2 Baseband Components

Card Name	Serial Number	Revision
(Top Left) BBC	16286	D
NSP	116939	G
TSP-1	0998004948	H
TSP-2	0998038747	L
TSP-3	0998038826	L
TSP-4	0998038736	L
TSP-5	0998038708	L
TSP-6	0998038438	L
TSP-7	0998038699	L
MODEM	86299	L
BBC	16313	D
NSP	117115	G

Table 12.2 Baseband Components

Card Name	Serial Number	Revision
TSP-1	0998004934	H
TSP-2	0998038711	L
TSP-3	0998038889	L
TSP-4	0998038414	L
TSP-5	0998038474	L
TSP-6	0998038362	L
TSP-7	0998038765	L
MODEM	8622	L
BBC	16388	D
NSP	117017	G
TSP-1	0998004885	H
TSP-2	0998038733	L
TSP-3	0998038787	L
TSP-4	0998038781	L
TSP-5	0998038428	L
TSP-6	0998038366	L
TSP-7	0998038390	L
MODEM	86339	L

Table 12.3 Transceiver Components

Card Name	Serial Number	Revision
FE Unit 1	241012	A
FE Unit 2	240911	A
FE Unit 3	240912	A
FE Unit 4	240913	A
FE Unit 5	240910	A

Table 12.3 Transceiver Components

Card Name	Serial Number	Revision
FE Unit 6	240914	A
FE Unit 7	240984	A
FE Unit 8	240917	A
DSI 0	427793	A
DSI 1	427828	A
DSI 2	427836	A
DSI 3	427802	A

12.3 EUT Test Configuration Photos

Figure 12.2 Base, Configuration, Doors Open—Front View

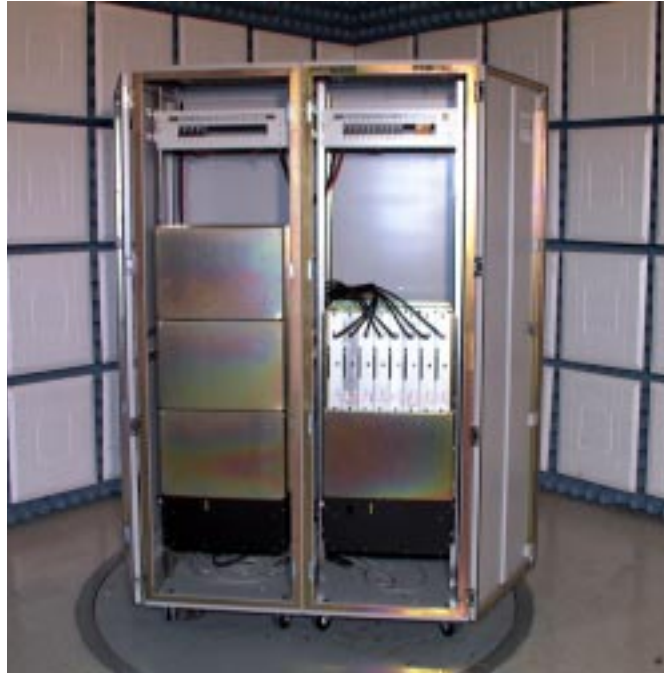


Figure 12.3 Base Configuration, Doors Closed—Side View



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 March 2000, a series of radio frequency interference measurements were performed on the AT&T Base Version B1.5.

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.

Figure 12.7 3 meter shield room control room

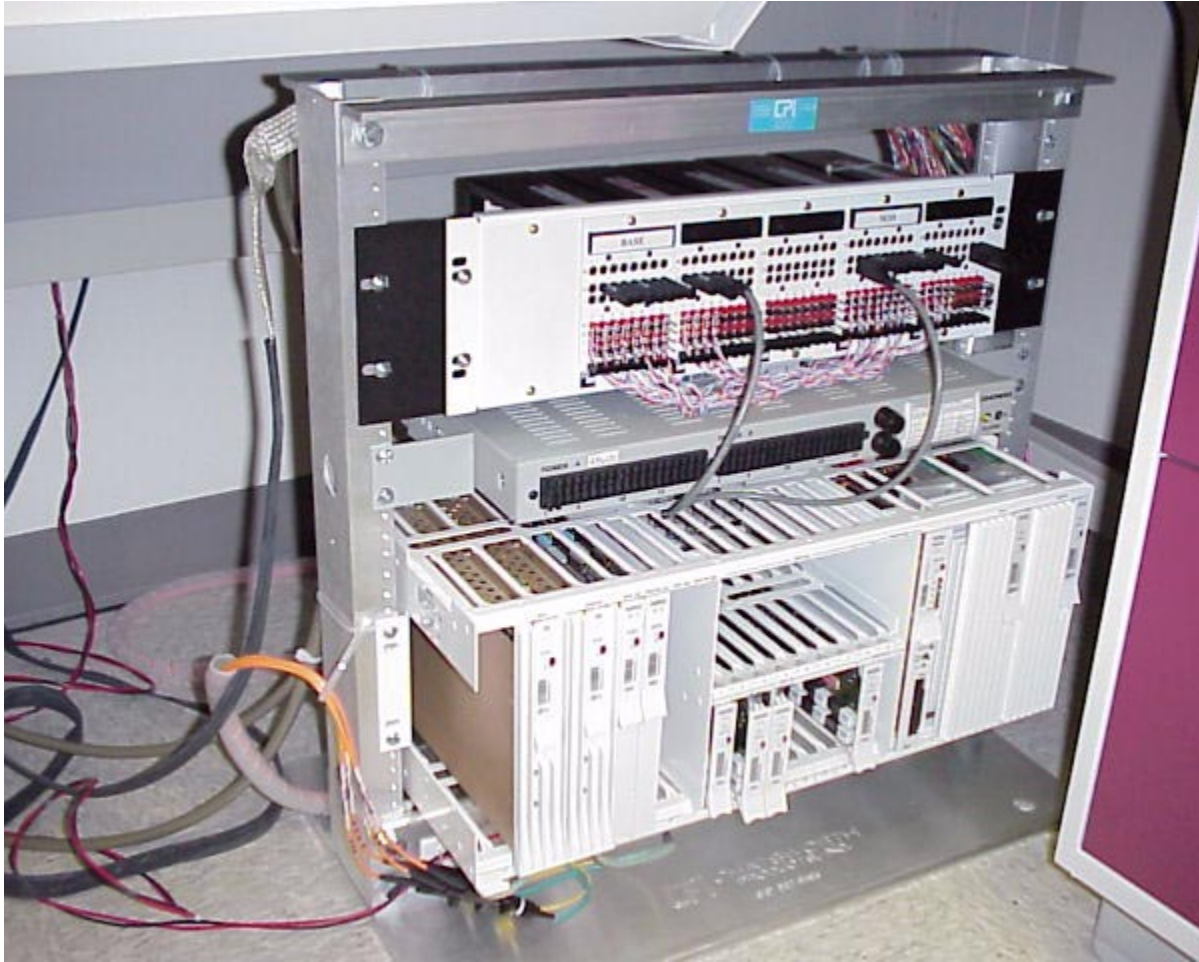


Figure 12.8 3-meter Control Chamber Access Panel Penetration



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

Figure 12.9 T1 fiber optic lines



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

Figure 12.10 RU test rack



Close up view of the setup shown in Figure 12.10.

Figure 12.11 Overall of the 16 Remote Units



Figure 12.12 shows the test setup for radiated emissions testing in the range from 1GHz - 18GHz. 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 12.12 HP 84300A E62 Microwave Intentional Radiator System



Figure 12.13 shows the test setup for radiated emissions testing in the range from 1GHz - 18.0GHz. 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 12.13 HP 84300A E62 Microwave Intentional Radiator System



Figure 12.14 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 12.14 Radiated Emission 30MHz - 1GHz test set-up



