

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : 900MHz TYPE II CORDLESS PHONE

Model No. : IP2420, IP2420x, IP24xx (x could be blank, numbers or alphabetical characters)

FCC ID : PIZIP2420

Filing Type : Certification

Applicant : **CIDMATE INTERNATIONAL TECHNOLOGY INC.**
3F, No. 58, Sec. 1, Minsheng E. Rd., Taipei,
Taiwan 104, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Sep. 12, 2001

- ☒ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : 900MHz TYPE II CORDLESS PHONE

Model No. : IP2420, IP2420x, IP24xx (x could be blank, numbers or alphabetical characters)

FCC ID : PIZIP2420

Applicant : **CIDMATE INTERNATIONAL TECHNOLOGY INC.**
3F, No. 58, Sec. 1, Minsheng E. Rd., Taipei,
Taiwan 104, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was ***passed*** both radiated and conducted emission limits. Testing was carried out on Sep. 3, 2001 at **SPORTON International Inc.** LAB. in Lin Kou.


K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

CIDMATE INTERNATIONAL TECHNOLOGY INC.
3F, No. 58, Sec. 1, Minsheng E. Rd., Taipei,
Taiwan 104, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment : 900MHz TYPE II CORDLESS PHONE
Model No. : IP2420, IP2420x, IP24xx (x could be blank, numbers or alphabetical characters)
FCC ID : PIZIP2420
Trade Name : PACIFIC BELL, Southwestern Bell, SBC, US WEST, Verizon, Ameritech
Power Supply Type : From Battery 3.6V for Handdset, Linear for Base Station
AC Power Cord of Base Station: Wall-Mount, 2pin
DC Power Cable of Base Station: Non-Shielded, 1.8m, 2pin

1.4. Feature of Equipment under Test

- BASE UNIT Controls
 1. POWER-IN CONNECTION JACK
 2. TELEPHONE LINE CONNECTION JACK
 3. HANDSET HANGER
 4. PAGE Button: Press to page the HANDSET.
 5. TONE/PULSE Select Switch
 6. ANTENNA: Raise or reposition for the best reception.
 7. IN USE/CHARGE/MSG (MESSAGE) WAITING/NEW CALL LED Indicator:
 - (IN USE) Lights up to indicate that the HANDSET is in TALK mode or an extension telephone is in use.
 - (CHARGE) Lights up when the HANDSET is placed on the BASE UNIT for charging.
 - (MSG (MESSAGE) WAITING/NEW CALL) Blinks when recording new incoming call or when receiving Message Waiting signal, if you have subscribed from your local telephone company.
 8. CHARGE LED Indicator
 9. CHARGE TERMINALS: For charging the HANDSET BATTERY PACK. For best performance, clean the CHARGE TERMINALS periodically with a damp cloth.

- HANDSET Controls
 1. HANDSET ANTENNA
 2. Large LCD Screen: Shows call information, phone status, prompts and directory items.
 3. NEW CALL/MSG (MESSAGE) WAITING LED Indicator: Blinks when recording new incoming call or when receiving Message Waiting signal, if you have subscribed from your local telephone company.
 4. TALK Button: Press to answer an incoming call or to place a call. Press to end a call.
 5. 7 DIGIT/TEMPORARY TONE (*) Button: (7 DIGIT) Press and hold down to place a local call. (*) Press to temporarily change the dialing mode from Pulse to Tone for rotary service users. (Press once before entering numbers to access the answering system or electronic banking service, etc.
 6. FLASH Button: Press to answer a call if you have Call Waiting.
 7. DIR (DIRECTORY) Button: Press to access names and numbers stored in the DIRECTORY.
 8. FUNC (FUNCTION) Button: Press to access special functions operation in STANDBY mode.
 9. SCROLL UP-DOWN, SHIFT LEFT-RIGHT Button: Press to move around the Large LCD Screen.
 10. HANDSET VOLUME CONTROL (hi, mid low) Switch: Select the receiver volume level (HI, MID, LOW).
 11. HEADSET JACK: For connecting your headset plug to enjoy hands-free communication.
 12. 10 DIGIT/0 Button: (10 DIGIT) Press and hold down to place a local call with Area Code.
 13. 1+/# Button: (1+) Press and hold down to place a long distance call. (Automatically adds the number 1 at the beginning of the displayed telephone number.)
 14. HEADSET JACK: For connecting your headset plug to enjoy hands-free communication.
 15. SAVE/RE(REDIAL)/PA(PAUSE) Button: (SAVE) Press and hold down to save the changes on the listed items. (REDIAL) Press to redial the last number you dialed. (PAUSE) Press to insert a pause while dialing. (You will need the button to dial numbers which use an alternative long distance access code.)
 16. DEL (DELETE)/SCAN Button: (DELETE) Press and hold down to delete items or individual characters. (SCAN) Press to change the operating channel when you hear interference.
 17. EDIT Button: Press to edit listed items.
 18. CHARGE CONTACTS: For charging the BATTERY PACK inside the HANDSET. We recommend cleaning the CHARGE CONTACTS periodically with a damp cloth.

1.5. Channel Table of Equipment under Test

1st IF : 10.7MHz		2nd IF : 450KHz		CH space: 50KHz
Ref. OSC: 10.25MHz		Ref. Freq. : 25KHz		
Channel	Base (MHz)		Handset (MHz)	
	TX	Local Osc.	TX	Local Osc.
1	902.675	936.075	925.375	891.975
2	902.725	936.125	925.425	892.025
3	902.775	936.175	925.475	892.075
4	902.825	936.225	925.525	892.125
5	902.875	936.275	925.575	892.175
6	902.925	936.325	925.625	892.225
7	902.975	936.375	925.675	892.275
8	903.025	936.425	925.725	892.325
9	903.075	936.475	925.775	892.375
10	903.125	936.525	925.825	892.425
11	903.175	936.575	925.875	892.475
12	903.225	936.625	925.925	892.525
13	903.275	936.675	925.975	892.575
14	903.325	936.725	926.025	892.625
15	903.375	936.775	926.075	892.675
16	903.425	936.825	926.125	892.725
17	903.475	936.875	926.175	892.775
18	903.525	936.925	926.225	892.825
19	903.575	936.975	926.275	892.875
20	903.625	937.025	926.325	892.925
21	903.675	937.075	926.375	892.975
22	903.725	937.125	926.425	893.025
23	903.775	937.175	926.475	893.075
24	903.825	937.225	926.525	893.125
25	903.875	937.275	926.575	893.175
26	903.925	937.325	926.625	893.225
27	903.975	937.375	926.675	893.275
28	904.025	937.425	926.725	893.325
29	904.075	937.475	926.775	893.375
30	904.125	937.525	926.825	893.425
31	904.175	937.575	926.875	893.475
32	904.225	937.625	926.925	893.525
33	904.275	937.675	926.975	893.575
34	904.325	937.725	927.025	893.625
35	904.375	937.775	927.075	893.675
36	904.425	937.825	927.125	893.725
37	904.475	937.875	927.175	893.775
38	904.525	937.925	927.225	893.825
39	904.575	937.975	927.275	893.875
40	904.625	938.025	927.325	893.925

1.6. Statement of the EUT to comply with requirement of 15.214 (d)

The following description was described on page 26 in user manual

Security System

Your cordless telephone uses a digital coding security system to prevent unauthorized use of your telephone line by another nearby cordless telephone. The system has its own identifying signal created by microcomputers in both the BASE UNIT and HANDSET.

Security Code

This telephone has an internal security code with 65,536 possible combinations.

Resetting Security Code and Channel Information

Communication between HANDSET and BASE UNIT may not be possible in any of the following situations:

1. After a power failure.
2. After relocating the BASE UNIT by disconnecting the AC ADAPTER.
3. After replacing the HANDSET BATTERY PACK.

To reset, place the HANDSET on the BASE UNIT for 2 to 5 seconds.

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been configured and operated pursuant to ANSI C63.4-1992 in a manner which tended to maximize its emission characteristics in a typical application.
- b. Frequency range investigated: conduction 450 KHz to 30 MHz, radiation 30 MHz to 10000MHz.
- c. The complete test system included CIDMATE Earphone and EUT for EMI test.
- d. During testing, the EUT kept transmitting signals.
- e. According to 15.203 of FCC rule, the EUT is designed to ensure that no antenna other than that furnished with the EUT could be used. The antenna is permanently mounted on the EUT.
- f. The EUT has 40 channels as shown on section 1.5 of this test report, the frequency rang of the EUT is within 10MHz, two frequencies were tested. One is near top, the other is near bottom. For the Handset, channel 1 at 925.375MHz and channel 40 at 927.375MHz were tested. For the base station, channel 1 at 902.675MHz and channel 40 at 904.625MHz were tested.
- g. The emissions test of handset were made by rotating three orthogonal axes. (Normal mode, Horizontal mode, Vertical mode).

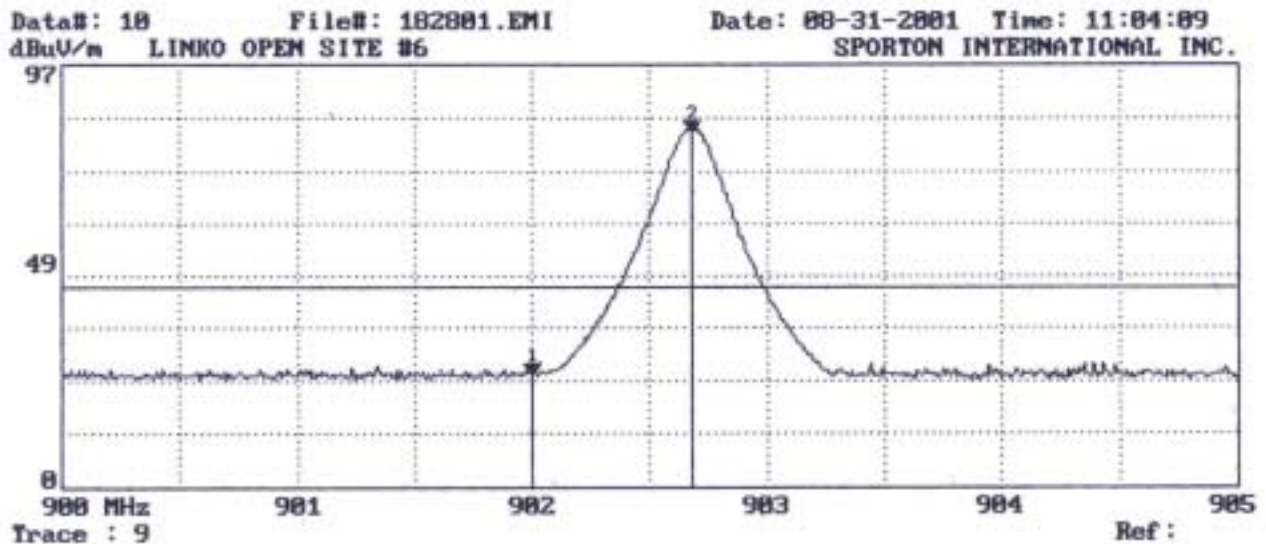
2.2. Description of Test System

Support Unit 1. -- Earphone (CIDMATE) for Handset Mode

FCC ID	: N/A
Model No.	: C60
Serial No.	: SP5486
Data cable	: Non-Shielded, 1.3m

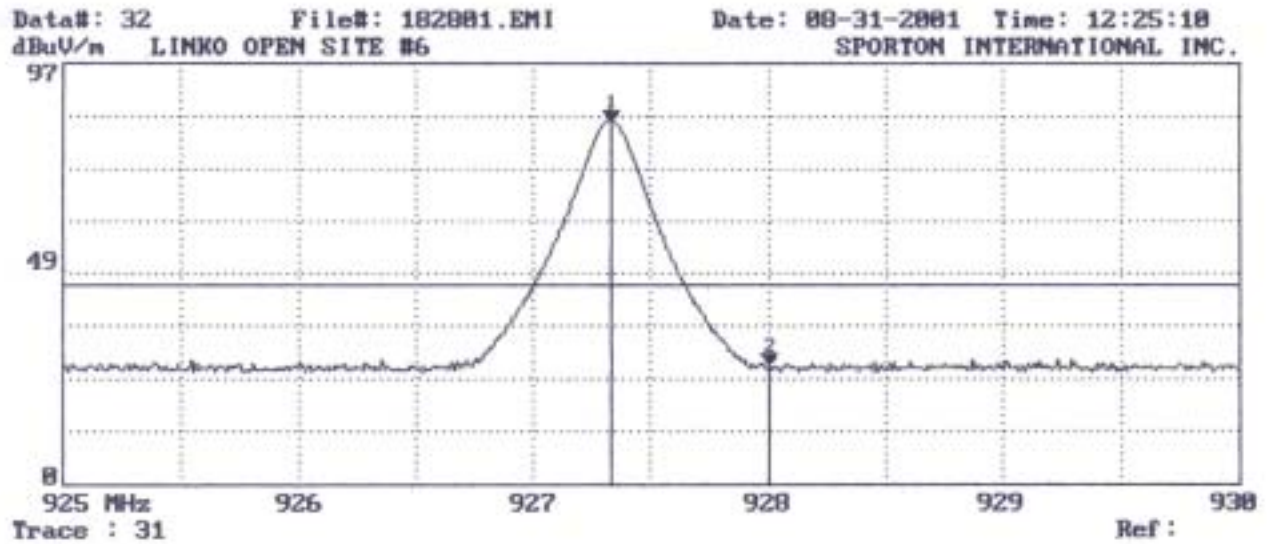
2.3. Band edges measurement

Channel 1 of base station:



Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
902.00	H	20.51	5.17	0.17	46.00	199.53	25.85
							19.61
							-20.15

Channel 40 of handset:



Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin		
Polarity	Factor	Loss							
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	
928.00	H	20.64	5.17	1.67	46.00	199.53	27.48	23.66	-18.52

3. General Information of Test

3.1. Test Facility

This test was carried out by SPORTON International Inc.

Test Site Location : No. 30-2, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

3.2. Standard for Methods of Measurement

ANSI C63.4-1992

3.3. Test in Compliance with

FCC Part 15, Subpart C

3.4. Frequency Range Investigated

- a. Conduction: from 450 kHz to 30 MHz
- b. Radiation : from 30 MHz to 10 GHz

3.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

4. Test of Conducted Powerline

Conducted Emissions were measured from 450 kHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

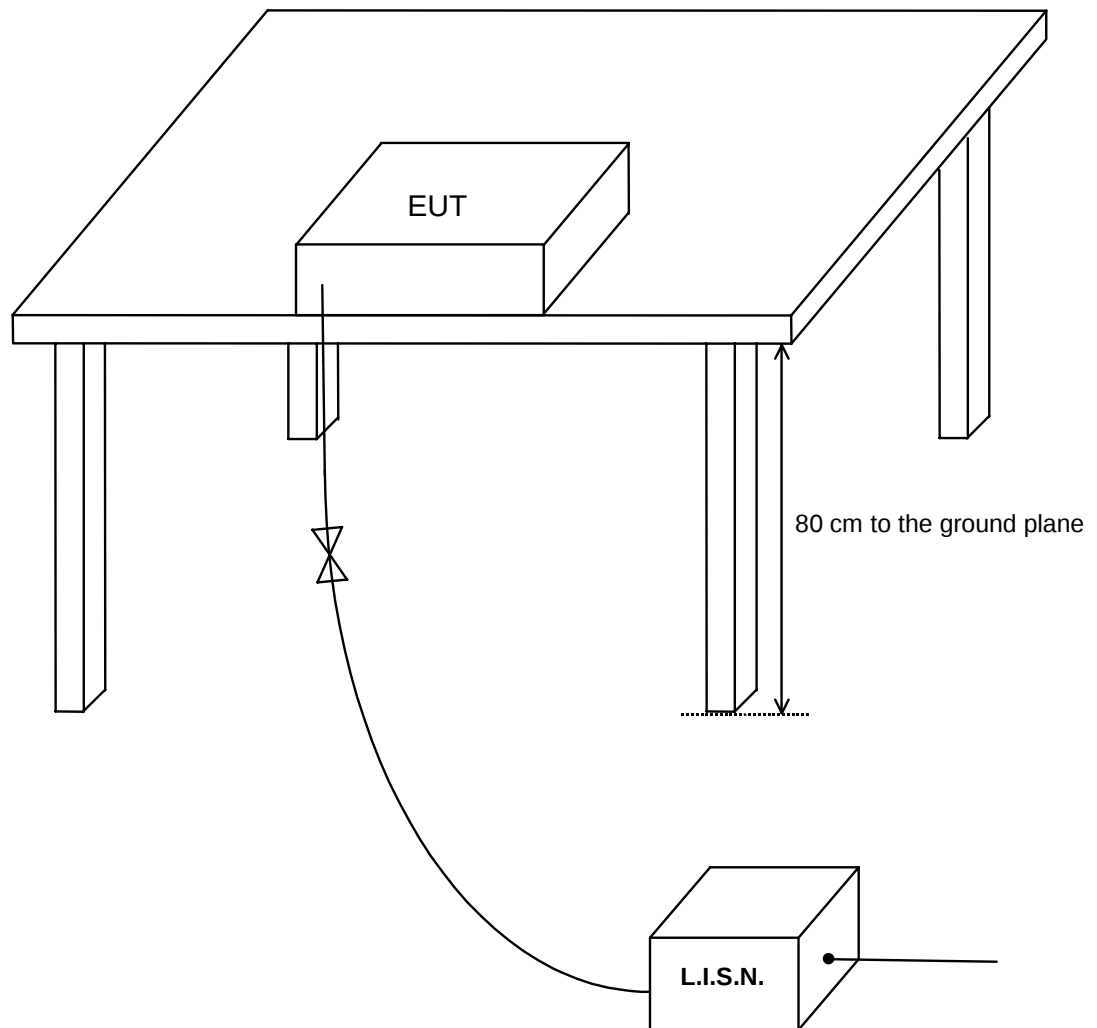
4.1. Major Measuring Instruments

Test Receiver	HP 8591EM
Attenuation	0 dB
Start Frequency	0.45 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.2. Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 450 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- i. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be retested one by one using the quasi-peak method and reported.

4.3. Typical Test Setup Layout of Conducted Powerline



4.4. Test Result of AC Powerline Conducted Emission

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 23°C
- Relative Humidity : 57 %
- Test Date : Sep. 3, 2001
- Test Mode: Base, CHANNEL 1

The Conducted Emission test was passed at minimum margin **NEUTRAL 25.082 MHz / 27.50 dBuV.**

Freq. (MHz)	Line/ Neutral	Meter (dBuV)	Reading (uV)	Limits (dBuV) (uV)		Margin (dB)
0.550	L	27.40	23.44	48.00	251.19	-20.60
0.824	L	26.50	21.13	48.00	251.19	-21.50
25.082	L	25.70	19.28	48.00	251.19	-22.30
0.550	N	26.50	21.13	48.00	251.19	-21.50
0.824	N	25.00	17.78	48.00	251.19	-23.00
25.082	N	27.50	23.71	48.00	251.19	-20.50

Test Engineer : _____

Jackson Huang

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 23°C
- Relative Humidity : 57 %
- Test Date : Sep. 3, 2001
- Test Mode: Base, CHANNEL 40

The Conducted Emission test was passed at minimum margin LINE 0.596 MHz / 26.20 dBuV.

Freq. (MHz)	Line/ Neutral	Meter (dBuV)	Reading (uV)	Limits (dBuV) (uV)		Margin (dB)
0.596	L	26.20	20.42	48.00	251.19	-21.80
0.903	L	25.50	18.84	48.00	251.19	-22.50
1.246	L	24.00	15.85	48.00	251.19	-24.00
0.596	N	25.00	17.78	48.00	251.19	-23.00
0.903	N	25.50	18.84	48.00	251.19	-22.50
1.246	N	23.90	15.67	48.00	251.19	-24.10

Test Engineer :


Jackson Huang

5. Test of Radiated Emission

Radiated emissions from 30 MHz to 10 GHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 5.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

5.1. Major Measuring Instruments

5.1.1. from 30MHz to 1GHz

- Amplifier (HP 87405A)
 - RF Gain 20 dB
 - Signal Input 10 MHz to 3 GHz

- Spectrum Analyzer (HP 8560E)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 120KHz
 - Video Bandwidth 300KHz
 - Signal Input 30 Hz to 2.9 GHz

- Test Receiver (R&S ESCS30)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 KHz to 2.75 GHz
 - Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode

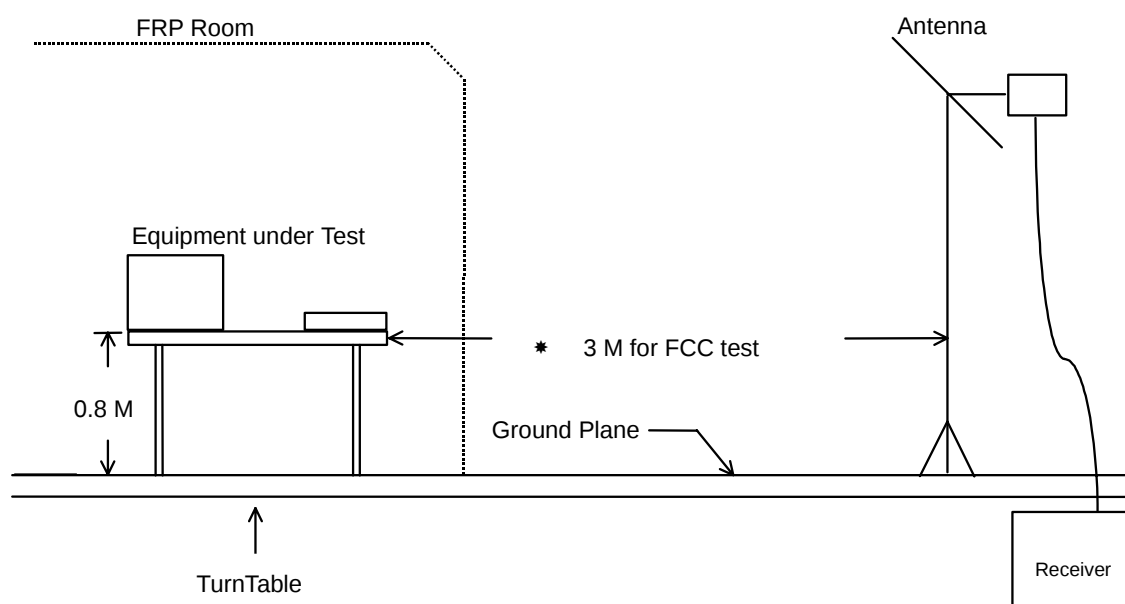
5.1.2. from 1GHz to 10GHz

- Spectrum (R&S FSP30)
 - Attenuation 0 dB
 - Start Frequency 1000 MHz
 - Stop Frequency 10GHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth For peak mode: 1MHz
For average mode: 300Hz
 - Signal Input 30 MHz to 30 GHz

5.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

5.3. Typical Test Setup Layout of Radiated Emission



5.4. Test Result of Radiated Emission

5.4.1. Test mode : BASE, CHANNEL 1

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

64.500 MHz / 26.86 dBuV/m (VERTICAL) Antenna Height 1 Meter, Turntable Degree 15 °.

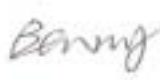
▪ Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)	Margin (dB)	Detect Mode
64.500	H	6.35	1.06	19.36	40.00 100.00	26.77 21.80	-13.23	Peak
936.000	H	20.67	5.17	1.39	46.00 199.53	27.23 22.99	-18.77	Peak
57.300	V	6.42	1.00	16.77	40.00 100.00	24.19 16.20	-15.81	Peak
64.500	V	6.35	1.06	19.45	40.00 100.00	26.86 22.03	-13.14	Peak
71.600	V	7.25	1.19	14.94	40.00 100.00	23.38 14.76	-16.62	Peak
936.000	V	20.67	5.17	2.84	46.00 199.53	28.68 27.16	-17.32	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)		Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
902.675	H	20.51	5.17	56.34	94.00	50118.72	82.02	12618.2	-11.98	Q.P.
902.675	V	20.51	5.17	53.17	94.00	50118.72	78.85	8759.92	-15.15	Q.P.
1805.300	H	27.24	5.46	11.00	54.00	501.19	43.70	153.11	-10.30	A.V.
1805.300	H	27.24	5.46	22.41	74.00	5011.87	55.11	569.51	-18.89	Peak
1805.300	V	27.24	5.46	8.20	54.00	501.19	40.90	110.92	-13.10	A.V.
1805.300	V	27.24	5.46	20.56	74.00	5011.87	53.26	460.26	-20.74	Peak
2708.000	H	29.15	6.79	15.12	74.00	5011.87	51.06	357.27	-22.94	Peak
2708.000	H	29.15	6.79	5.00	54.00	501.19	40.94	111.43	-13.06	A.V.
2708.000	V	29.15	6.79	14.36	74.00	5011.87	50.30	327.34	-23.70	Peak
2708.000	V	29.15	6.79	2.80	54.00	501.19	38.74	86.50	-15.26	A.V.
3610.700	H/V						-			Peak, A.V.
4513.375	H/V						-			Peak, A.V.
5416.050	H/V						-			Peak, A.V.
6318.725	H/V						-			Peak, A.V.
7221.400	H/V						-			Peak, A.V.
8124.075	H/V						-			Peak, A.V.
9026.750	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.2. Test mode : BASE, CHANNEL 40

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

64.500 MHz / 28.35 dBuV/m (HORIZONTAL) Antenna Height 2 Meter, Turntable Degree 354 °.

▪ Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)	Margin (dB)	Detect Mode
64.500	H	6.35	1.06	20.94	40.00 100.00	28.35 26.15	-11.65	Peak
938.000	H	20.68	5.17	4.42	46.00 199.53	30.27 32.62	-15.73	Peak
64.500	V	6.35	1.06	20.36	40.00 100.00	27.77 24.46	-12.23	Peak
893.900	V	20.46	5.12	4.92	46.00 199.53	30.50 33.50	-15.50	Peak
908.200	V	20.54	5.17	7.34	46.00 199.53	33.05 44.93	-12.95	Peak
938.000	V	20.68	5.17	4.50	46.00 199.53	30.35 32.92	-15.65	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
904.625	H	20.52	5.17	56.34	94.00	50118.72	82.03	12632.8	-11.97	Q.P.
904.625	V	20.52	5.17	53.00	94.00	50118.72	78.69	8600.03	-15.31	Q.P.
1809.200	H	27.34	5.48	10.60	54.00	501.19	43.42	148.25	-10.58	A.V.
1809.200	H	27.34	5.48	22.38	74.00	5011.87	55.20	575.44	-18.80	Peak
1809.200	V	27.34	5.48	21.00	74.00	5011.87	53.82	490.91	-20.18	Peak
1809.200	V	27.34	5.48	8.60	54.00	501.19	41.42	117.76	-12.58	A.V.
2713.900	H	29.15	6.79	17.74	74.00	5011.87	53.68	483.06	-20.32	Peak
2713.900	H	29.15	6.79	3.10	54.00	501.19	39.04	89.54	-14.96	A.V.
2713.900	V	29.15	6.79	16.51	74.00	5011.87	52.45	419.28	-21.55	Peak
2713.900	V	29.15	6.79	3.40	54.00	501.19	39.34	92.68	-14.66	A.V.
3618.500	H/V						-			Peak, A.V.
4523.125	H/V						-			Peak, A.V.
5427.750	H/V						-			Peak, A.V.
6332.375	H/V						-			Peak, A.V.
7237.000	H/V						-			Peak, A.V.
8141.625	H/V						-			Peak, A.V.
9046.250	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 

Benny Lee

5.4.3. Test mode : HANDSET, CHANNEL 1, NORMAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

892.000 MHz / 31.57 dBuV/m (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 74 °.

▪ Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
892.000	H	20.45	5.12	6.00	46.00 199.53	31.57	37.89	-14.43	Peak
915.100	H	20.57	5.17	1.00	46.00 199.53	26.74	21.73	-19.26	Peak
892.000	V	20.45	5.12	5.34	46.00 199.53	30.91	35.12	-15.09	Peak
915.100	V	20.57	5.17	0.34	46.00 199.53	26.08	20.14	-19.92	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
925.375	H	20.62	5.17	45.50	94.00	50118.72	71.29	3668.60	-22.71	Q.P.
925.375	V	20.62	5.17	45.17	94.00	50118.72	70.96	3531.83	-23.04	Q.P.
1850.800	H	27.53	5.55	3.90	54.00	501.19	36.98	70.63	-17.02	A.V.
1850.800	H	27.53	5.55	15.23	74.00	5011.87	48.31	260.32	-25.69	Peak
1850.800	V	27.53	5.55	1.20	54.00	501.19	34.28	51.76	-19.72	Peak
1850.800	V	27.53	5.55	12.29	74.00	5011.87	45.37	185.57	-28.63	A.V.
2776.125	H/V						-			Peak, A.V.
3701.500	H/V						-			Peak, A.V.
4626.875	H/V						-			Peak, A.V.
5552.250	H/V						-			Peak, A.V.
6447.625	H/V						-			Peak, A.V.
7403.000	H/V						-			Peak, A.V.
8328.375	H/V						-			Peak, A.V.
9253.750	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.4. Test mode : HANDSET, CHANNEL 1, VERTICAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

892.000 MHz / 30.57 dBuV/m (VERTICAL) Antenna Height 1 Meter, Turntable Degree 17 °.

- Spurious Emissions:

Frequency	Antenna	Cable	Reading	Limits		Emission Level		Margin	Detect	
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode	
892.000	H	20.45	5.12	1.50	46.00	199.53	27.07	22.57	-18.93	Peak
915.100	H	20.57	5.17	-0.32	46.00	199.53	25.42	18.66	-20.58	Peak
892.000	V	20.45	5.12	5.00	46.00	199.53	30.57	33.77	-15.43	Peak
915.100	V	20.57	5.17	0.34	46.00	199.53	26.08	20.14	-19.92	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
925.375	H	20.62	5.17	37.84	94.00	50118.72	63.63	1518.80	-30.37	Q.P.
925.375	V	20.62	5.17	46.34	94.00	50118.72	72.13	4041.10	-21.87	Q.P.
1850.800	H	27.53	5.55	3.10	54.00	501.19	36.18	64.42	-17.82	A.V.
1850.800	H	27.53	5.55	14.67	74.00	5011.87	47.75	244.06	-26.25	Peak
1850.800	V	27.53	5.55	4.70	54.00	501.19	37.78	77.45	-16.22	A.V.
1850.800	V	27.53	5.55	15.23	74.00	5011.87	48.31	260.32	-25.69	Peak
2776.125	H/V						-			Peak, A.V.
3701.500	H/V						-			Peak, A.V.
4626.875	H/V						-			Peak, A.V.
5552.250	H/V						-			Peak, A.V.
6447.625	H/V						-			Peak, A.V.
7403.000	H/V						-			Peak, A.V.
8328.375	H/V						-			Peak, A.V.
9253.750	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.5. Test mode : HANDSET, CHANNEL 1, HORIZONTAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

892.000 MHz / 32.57 dBuV/m (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 25 °.

▪ Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
892.000	H	20.45	5.12	7.00	46.00 199.53	32.57	42.51	-13.43	Peak
915.100	H	20.57	5.17	1.66	46.00 199.53	27.40	23.44	-18.60	Peak
892.000	V	20.45	5.12	3.67	46.00 199.53	29.24	28.97	-16.76	Peak
915.100	V	20.57	5.17	1.94	46.00 199.53	27.68	24.21	-18.32	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
925.375	H	20.62	5.17	46.84	94.00	50118.72	72.63	4280.55	-21.37	Q.P.
925.375	V	20.62	5.17	42.34	94.00	50118.72	68.13	2549.76	-25.87	Q.P.
1850.800	H	27.53	5.55	3.20	54.00	501.19	36.28	65.16	-17.72	A.V.
1850.800	H	27.53	5.55	14.21	74.00	5011.87	47.29	231.47	-26.71	Peak
1850.800	V	27.53	5.55	1.40	54.00	501.19	34.48	52.97	-19.52	A.V.
1850.800	V	27.53	5.55	13.37	74.00	5011.87	46.45	210.14	-27.55	Peak
2776.125	H/V						-			Peak, A.V.
3701.500	H/V						-			Peak, A.V.
4626.875	H/V						-			Peak, A.V.
5552.250	H/V						-			Peak, A.V.
6447.625	H/V						-			Peak, A.V.
7403.000	H/V						-			Peak, A.V.
8328.375	H/V						-			Peak, A.V.
9253.750	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.6. Test mode : HANDSET, CHANNEL 40, NORMAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

893.900 MHz / 41.41 dBuV/m (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 63 °.

- Spurious Emissions:

Frequency	Antenna	Cable	Reading	Limits		Emission Level		Margin	Detect	
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode	
893.900	H	20.46	5.13	15.82	46.00	199.53	41.41	117.63	-4.59	Peak
917.000	H	20.58	5.17	2.00	46.00	199.53	27.75	24.41	-18.25	Peak
893.900	V	20.46	5.13	12.98	46.00	199.53	38.57	84.82	-7.43	Peak
917.000	V	20.58	5.17	1.84	46.00	199.53	27.59	23.96	-18.41	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
927.325	H	20.63	5.17	57.17	94.00	50118.72	82.97	14076.6	-11.03	Q.P.
927.325	V	20.63	5.17	53.17	94.00	50118.72	78.97	8881.78	-15.03	Q.P.
1854.700	H	27.53	5.55	3.30	54.00	501.19	36.38	65.92	-17.62	A.V.
1854.700	H	27.53	5.55	13.82	74.00	5011.87	46.90	221.31	-27.10	Peak
1854.700	V	27.53	5.55	13.92	74.00	5011.87	47.00	223.87	-27.00	Peak
1854.700	V	27.53	5.55	2.30	54.00	501.19	35.38	58.75	-18.62	A.V.
2781.975	H/V						-			Peak, A.V.
3709.300	H/V						-			Peak, A.V.
4636.625	H/V						-			Peak, A.V.
5564.250	H/V						-			Peak, A.V.
6491.875	H/V						-			Peak, A.V.
7418.600	H/V						-			Peak, A.V.
8345.925	H/V						-			Peak, A.V.
9273.250	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.7. Test mode : HANDSET, CHANNEL 40, VERTICAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

893.900 MHz / 41.60 dBuV/m (VERTICAL) Antenna Height 1 Meter, Turntable Degree 22 °.

- Spurious Emissions:

Frequency	Antenna	Cable	Reading	Limits		Emission Level		Margin	Detect	
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode	
893.900	H	20.46	5.13	7.35	46.00	199.53	32.94	44.36	-13.06	Peak
917.000	H	20.58	5.17	-0.33	46.00	199.53	25.42	18.66	-20.58	Peak
893.900	V	20.46	5.13	16.01	46.00	199.53	41.60	120.23	-4.40	Peak
917.000	V	20.58	5.17	1.00	46.00	199.53	26.75	21.75	-19.25	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)		Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
927.325	H	20.63	5.17	47.84	94.00	50118.72	73.64	4808.39	-20.36	Q.P.
927.325	V	20.63	5.17	58.34	94.00	50118.72	84.14	16106.46	-9.86	Q.P.
1854.700	H	27.53	5.55	3.30	54.00	501.19	36.38	65.92	-17.62	A.V.
1854.700	H	27.53	5.55	14.67	74.00	5011.87	47.75	244.06	-26.25	Peak
1854.700	V	27.53	5.55	5.20	54.00	501.19	38.28	82.04	-15.72	A.V.
1854.700	V	27.53	5.55	14.02	74.00	5011.87	47.10	226.46	-26.90	Peak
2781.975	H/V						-			Peak, A.V.
3709.300	H/V						-			Peak, A.V.
4636.625	H/V						-			Peak, A.V.
5564.250	H/V						-			Peak, A.V.
6491.875	H/V						-			Peak, A.V.
7418.600	H/V						-			Peak, A.V.
8345.925	H/V						-			Peak, A.V.
9273.250	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

5.4.8. Test mode : HANDSET, CHANNEL 40, HORIZONTAL MODE

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 63 %
- Test Date : Aug. 31, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

893.900 MHz / 41.94 dBuV/m (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 23 °.

▪ Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
893.900	H	20.46	5.13	16.35	46.00	199.53	41.94	125.03	-4.06	Peak
917.000	H	20.58	5.17	2.00	46.00	199.53	27.75	24.41	-18.25	Peak
893.900	V	20.46	5.13	12.17	46.00	199.53	37.76	77.27	-8.24	Peak
917.000	V	20.58	5.17	1.00	46.00	199.53	26.75	21.75	-19.25	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
927.325	H	20.63	5.17	55.17	94.00	50118.72	80.97	11181.5	-13.03	Q.P.
927.325	V	20.63	5.17	52.17	94.00	50118.72	77.97	7915.89	-16.03	Q.P.
1854.700	H	27.53	5.55	5.60	54.00	501.19	38.68	85.90	-15.32	A.V.
1854.700	H	27.53	5.55	14.67	74.00	5011.87	47.75	244.06	-26.25	Peak
1854.700	V	27.53	5.55	2.61	54.00	501.19	35.69	60.88	-18.31	A.V.
1854.700	V	27.53	5.55	13.88	74.00	5011.87	46.96	222.84	-27.04	Peak
2781.975	H/V						-			Peak, A.V.
3709.300	H/V						-			Peak, A.V.
4636.625	H/V						-			Peak, A.V.
5564.250	H/V						-			Peak, A.V.
6491.875	H/V						-			Peak, A.V.
7418.600	H/V						-			Peak, A.V.
8345.925	H/V						-			Peak, A.V.
9273.250	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : 
Benny Lee

6. EMI Suppression Component List

No. EMI suppression component.

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.6	0.8
35	14.9	0.8
40	15.5	1.0
45	10.1	0.9
50	8.1	1.0
55	6.9	1.0
60	5.7	1.0
65	6.5	1.1
70	7.3	1.2
75	7.1	1.2
80	6.9	1.3
85	7.8	1.3
90	8.7	1.3
95	9.6	1.3
100	10.6	1.3
110	11.1	1.5
120	11.5	1.5
130	11.2	1.5
140	10.7	1.7
150	10.2	1.7
160	9.6	1.8
170	8.9	2.0
180	8.4	1.8
190	8.3	2.0
200	8.3	2.0
220	9.5	2.2
240	10.8	2.2
260	11.7	2.2
280	12.3	2.3
300	12.8	2.5
320	13.4	2.5
340	14.0	2.7
360	14.6	2.8
380	15.0	2.8
400	15.5	2.8
450	16.3	3.2
500	17.3	3.5
550	18.7	3.5
600	18.7	4.0
650	18.6	4.0
700	18.7	4.0
750	20.0	4.5
800	19.9	4.7
850	20.2	4.8
900	20.5	5.2
950	20.7	5.2
1000	21.2	5.5
1000	24.0	4.1
2000	28.4	5.8
3000	30.0	7.2
4000	32.6	8.6
5000	33.3	10.0
6000	34.3	11.6
7000	35.4	13.5

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver (site 2)	HP	8591EM	3710A00187	9 KHz – 1.8 GHz	Sep. 16, 2000	Conduction
LISN (Support Unit) (site 2)	AFJ	AFJ LT32	32030012050	50 ohm / 50 uH	May 29, 2001	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98081	50 ohm / 50 uH	Dec. 06, 2000	Conduction
Spectrum Analyzer (Site 6)	HP	8560E	3728A03186	30KHz – 2.9GHz	Sep. 15, 2000	Radiation
Receiver (Site 6)	R&S	ESCS30	8477931/003	9 K – 2.75 GHz	Dec. 27, 2000	Radiation
Amplifier (Site 6)	HP	87405A	3207A01437	100K - 3GHz	Aug. 17, 2001	Radiation
Bilog Antenna (Site 6)	CHASE	CBL6112A	2442	30MHz -2GHz	Jun. 23, 2001	Radiation
Half-wave dipole antenna (Site 6)	EMCO	3121C	9705-1285	28 M - 1GHz	May 16, 2001	Radiation
Turn Table (site 6)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 6)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation
Spectrum analyzer	R&S	FSP30	100024	9KHz~30GHz	Mar. 31, 2001	Radiation
Horn Antenna	EMCO	3115	4976	1GHz~18GHz	Jun. 20, 2001	Radiation

Calibration Interval of instruments listed above is one year.

9. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2.5
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.4

$$U = \sqrt{\{(0.3/2)^2 + (2.5^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.7$$

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m	10m
Antenna factor calibration	normal(k=2)	±1.6	±1.6
cable loss calibration	normal(k=2)	±0.3	±0.3
RCV/SPA specification	rectangular	±2.5	±2.5
Antenna Directivity	rectangular	±3	±0.5
Antenna Factor V.S. Height	rectangular	±2	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25	±0.25
site imperfection	rectangular	±2	±2
Mismatch Receiver VSWR $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	±0.54	±0.54
combined standard uncertainty Ue(y)	normal	±2.9	±2.4
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.8	±4.8

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.4 \quad \text{for 10m test distance}$$

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.9 \quad \text{for 3m test distance}$$