# FCC TEST REPORT

**for**

## 47 CFR, Part 15, Subpart C

Equipment : ME-103 Wireless Access Point with Booster, Injector, Antenna and cables

Model No. : Please see section 1.4 of this test report

FCC ID. : PY3-ANT24BX

Filing Type : Certification

Applicant : **NETGEAR Inc.**
4500 Great America Parkway, Santa Clara, CA 95054, USA

- The test result refers exclusively to the test presented test model / sample.
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- **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: Aug. 12, 2003

■ No additional attachment.

□ Additional attachment were issued as following record:

| Attachment No. | Issue Date | Description |
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Certificate No. : F341402

# CERTIFICATE OF COMPLIANCE

**for**

## 47 CFR, Part 15, Subpart C

| | | |
|---|---|---|
| Equipment | : | ME-103 Wireless Access Point with Booster, Injector, Antenna and cables |
| Model No. | : | Please see section 1.4 of this test report |
| FCC ID. | : | PY3-ANT24BX |
| Filing Type | : | Certification |
| Applicant | : | **NETGEAR Inc.**<br>4500 Great America Parkway, Santa Clara, CA 95054, USA |

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2001** and the equipment under test was ***passed*** all test items required in FCC Part 15 subpart C, relative to the equipment under test. Testing was carried out on Aug. 25, 2003 at **SPORTON International Inc.** LAB.

Alex Chen Aug. 27, 2003

Alex Chen
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

NETGEAR Inc.
4500 Great America Parkway, Santa Clara, CA 95054, USA

## 1.2. Manufacturer

SENAO INTERNATIONAL CO., LTD.
2FL., NO. 531, CHUNG CHENG RD., HSIN-TIEN CITY, TAIPEI HSIEN, TAIWAN, R.O.C.

## 1.3. Basic Description of Equipment under Test

| | |
|---|---|
| Equipment | : ME-103 Wireless Access Point with Booster, Injector, Antenna and cables |
| FCC ID. | : PY3-ANT24BX |
| Trade Name | : NETGEAR |
| TP Cable | : Non-Shielded, 2m |
| Antenna Cable x 2 | : Shielded, 1.5m |
| Antenna Cable | : Shielded, 10m |
| Power Supply Type | : Switching |
| AC Power Input | : Wall-Mount, 2pin |
| DC Power Cable | : Shielded, 1.8m |

## 1.4. Model No.

1. ANT24D18 18dBi Patch Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
2. ANT24D18 18dBi Patch Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
3. ANT24D12 12dBi Patch Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
4. ANT24D12 12dBi Patch Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
5. ANT24P5 5dBi Dipole Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
6. ANT24P5 5dBi Dipole Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
7. ANT2405 5dBi Ceiling Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
8. ANT2405 5dBi Ceiling Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
9. ANT24P7 7dBi Dipole Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
10. ANT24P7 7dBi Dipole Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
11. ANT24P2 2dBi Dipole Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
12. ANT24P2 2dBi Dipole Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
13. ANT24S4 4dBi Triband Stand Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
14. ANT24S4 4dBi Triband Stand Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
15. ANT24S5 5dBi Stand Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
16. ANT24S5 5dBi Stand Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103
17. ANT24P9 9dBi Dipole Antenna & ANT24B Booster & ANT24BDC Injector & ACC-10314-01/02/03/04 RF Cables & ME103
18. ANT24P9 9dBi Dipole Antenna & ANT24B Booster & ACC-10314-01/02/03/04 RF Cables & ME103

## 1.5. Feature of Equipment under Test

| | Description | Comments |
|---|---|---|
| Chipset | TI ACX100 | Mac + BB |
| Power | 12V DC/5V DC | Must interoperate with POE101 |
| Ethernet port | Single 10/100, RJ45 | Auto-MDIX |
| Wireless | 802.11b | 2.4GHz, 11 Mbps |
| Antennae | 1x2dBi+18dBi detachable Patch Antenna<br>1x2dBi+12dBi detachable Patch Antenna<br>1x2dBi+5dBi detachable Dipole Antenna<br>1x2dBi+5dBi detachable Ceiling Antenna<br>1x2dBi+7dBi detachable Dipole Antenna<br>1x2dBi+2dBi detachable Dipole Antenna<br>1x2dBi+4dBi detachable Triband Stand Antenna<br>1x2dBi+5dBi detachable Stand Antenna<br>1x2dBi+9dBi detachable Dipole Antenna | Antenna Type: Reverse SMA / Reverse N Type |
| Booster | ANT24B | Connector Type: Reverse SMA |
| DC Injector | ANT24BDC | Connector Type: Reverse SMA |
| Ext. Antenna(e) Average gain | Min.+1dBI (+3dBi desired) | mounted with the housing, if applicable |
| Ext. Antenna(e) Average gain | Min.+2dBI (+5dBi desired) | |
| Maximum Output Power | 27.12dBm | |
| Adapter | NETGEAR / PWR-012-101(For Access Point)<br>Touch / SA07M0507 (For Injector) | |

# 2. Test Configuration of Equipment under Test

## 2.1. Test Manner

a. The EUT has been associated with notebook and peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.

b. The complete test system included LOGITECH PS/2 Keyboard, LOGITECH USB Mouse, Epson Printer, VIEWSONIC Monitor, COMPAQ Notebook and EUT for EMI test.

c. The following test modes were performed for conduction test:

Mode 1: CH 01 (2412MHz), Adapter: NETGEAR for AP (ME 103)
Mode 2: CH 01 (2412MHz), Adapter: Touch for DC Injector (ANT24BDC)
Mode 3: CH 06 (2437MHz), Adapter: NETGEAR for AP (ME 103)
Mode 4: CH 06 (2437MHz), Adapter: Touch for DC Injector (ANT24BDC)
Mode 5: CH 11 (2462MHz), Adapter: NETGEAR for AP (ME 103)
Mode 6: CH 11 (2462MHz), Adapter: Touch for DC Injector (ANT24BDC)

d. The EUT equipped nine types of antenna, the following modes were pretested:

1. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m + SMA(Fr) to N(Mr) connector + 18 dBi patch antenna.
2. ME103 +1.5/3/5/10m cables + Booster +1.5/3/5/10m + SMA(Fr) to N(Mr) connector + 18 dBi patch antenna.
3. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m cables + 12 dBi patch antenna.
4. ME103 + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m cables + 12 dBi patch antenna.
5. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 5 dBi dipole antenna.
6. ME103 + 1.5/3/5/10m cables + Booster + 5 dBi dipole antenna.
7. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m cables + 5 dBi ceiling antenna.
8. ME103 + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m cables + 5 dBi ceiling antenna.
9. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 7 dBi dipole antenna.
10. ME103 + 1.5/3/5/10m cables + Booster + 7 dBi dipole antenna.
11. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 2 dBi dipole antenna.
12. ME103 + 1.5/3/5/10m cables + Booster + 2 dBi dipole antenna.
13. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 4 dBi triband stand antenna.
14. ME103 + 1.5/3/5/10m cables + Booster + 4 dBi triband stand antenna.
15. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster + 5 dBi stand antenna.
16. ME103 + 1.5/3/5/10m cables + Booster + 5 dBi stand antenna.
17. ME103 + 0.5/1.5m cables + DC injector + 1.5/3/5/10m cables + Booster +1.5/3/5/10m cables + 9 dBi dipole antenna.
18. ME103 + 1.5/3/5/10m cables + Booster + 1.5/3/5/10m cables + 9 dBi dipole antenna.

e. The following test modes were performed for radiation test:
Mode 1: CH 01 (2412MHz), 1.5m+inject+5m+booster+1.5m+5dBi Ceili
Mode 2: CH 01 (2412MHz), 0.5m+inject+1.5m+booster+1.5m+5dBi Ceili
Mode 3: CH 01 (2412MHz), 0.5m+inject+1.5m+booster+1.5m+18dBi Patch
Mode 4: CH 01 (2412MHz), 0.5m+inject+1.5m+booster+1.5m+9dBi Dipol
Mode 5: CH 06 (2437MHz), 1.5m+inject+5m+booster+1.5m+5dBi Ceili
Mode 6: CH 06 (2437MHz), 0.5m+inject+1.5m+booster+1.5m+5dBi Ceili
Mode 7: CH 06 (2437MHz), 0.5m+inject+1.5m+booster+1.5m+18dBi Patch
Mode 8: CH 06 (2437MHz), 0.5m+inject+1.5m+booster+1.5m+9dBi Dipol
Mode 9: CH 11 (2462MHz), 1.5m+inject+5m+booster+1.5m+5dBi Ceili
Mode 10: CH 11 (2462MHz), 0.5m+inject+1.5m+booster+1.5m+5dBi Ceili
Mode 11: CH 11 (2462MHz), 0.5m+inject+1.5m+booster+1.5m+18dBi Patch
Mode 12: CH 11 (2462MHz), 0.5m+inject+1.5m+booster+1.5m+9dBi Dipol

f. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 24620MHz.

## 2.2. Description of Test System

Support Unit 1. -- PS/2 Keyboard (LOGITECH)

| | |
|---|---|
| FCC ID | : N/A |
| Model No. | : Y-SJ17 |
| Serial No. | : SP0054 |
| Data Cable | : Shielded, 1.7m |
| Remark | : This support device was tested to comply with FCC standards and authorized under a declaration of conformity. |

Support Unit 2. -- USB Mouse (LOGITECH)

| | |
|---|---|
| FCC ID | : N/A |
| Model No. | : M-BE58 |
| Serial No. | : SP0041 |
| Data Cable | : Shielded, 1.7m |
| Remark | : This support device was tested to comply with FCC standards and authorized under a declaration of conformity. |

Support Unit 3. -- Printer (EPSON)

| | |
|---|---|
| FCC ID | : N/A |
| Model No. | : STYLUS COLOR S680 |
| Power Supply Type | : Linear |
| Power Cord | : Non-Shielded |
| Serial No. | : SP0048 |
| Data Cable | : Shielded, 1.35m |

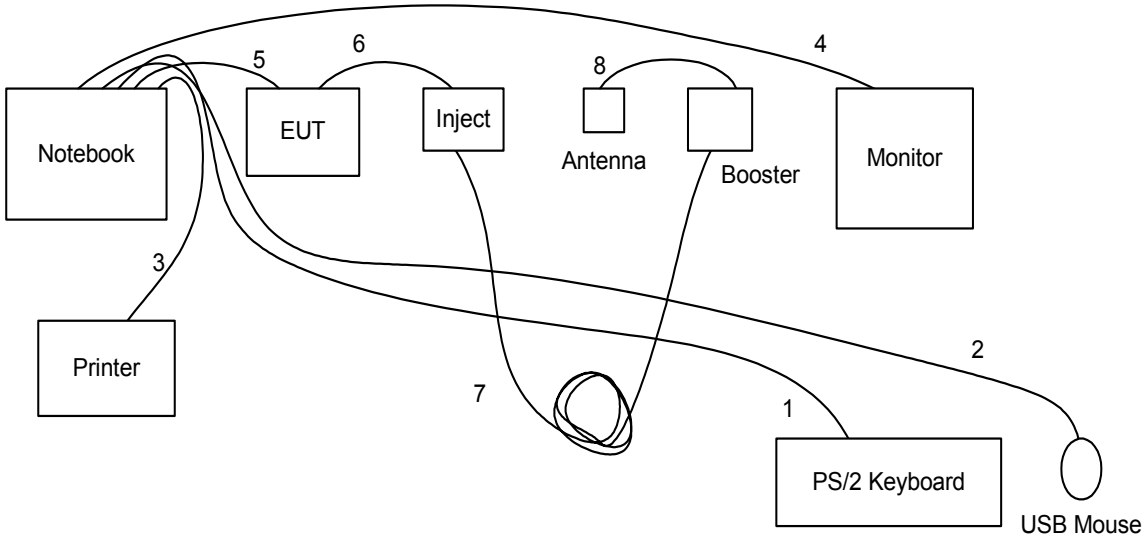
Support Unit 4. -- Monitor (VIEWSONIC)

| | |
|---|---|
| FCC ID | : N/A |
| Model No. | : VCDTS21553-3P |
| Power Supply Type | : Switching |
| Power Cord | : Non-Shielded |
| Serial No. | : SP0051 |
| Data Cable | : Shielded, 1.7m |
| Remark | : This support device was tested to compy with FCC standards and authorized under a declaration of conformity. |

Support Unit 5. -- Notebook (COMPAQ)

| | |
|---|---|
| FCC ID | : N/A |
| Model No. | : Presario 1500 |
| Power Supply Type | : Switching |
| Power Cord | : Non-Shielded |
| Serial No. | : SP0036 |
| Remark | : This support device was tested to comply with FCC standards and authorized under a declaration of conformity. |

## 2.3. Connection Diagram of Test System




1. The I/O cable is connected from Notebook to the support unit 1.
2. The I/O cable is connected from Notebook to the support unit 2.
3. The I/O cable is connected from Notebook to the support unit 3.
4. The I/O cable is connected from Notebook to the support unit 4.
5. The TP cable is connected from Notebook to the EUT.
6. The Antenna cable is connected from EUT to the Inject.
7. The Antenna cable is connected from Inject to the Booster.
8. The Antenna cable is connected from Booster to the Antenna.

# 3. Test Software

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.
b. The PC reads the test program from the hard disk drive and runs it.
c. The PC sends " H" messages to the monitor, and the monitor displays " H " patterns on the screen.
d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
e. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
f. Repeat the steps from c to e.

At the same time, "Win FT" was executed to keep transmitting signals at fixed frequency.

# 4. General Information of Test

| | | |
|---|---|---|
| Test Site Location | : | No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL : 886-3-327-3456<br>FAX : 886-3-318-0055 |
| Test Site No | : | CO01-HY, 03CH03-HY |

## 4.1. Test Voltage

110V/60Hz

## 4.2. Standard for Methods of Measurement

ANSI C63.4-2001 for conducted power line test and radiated emission test,
FCC 97-114 for test of 6dB Bandwidth
FCC 97-114 for test of Maximum Peak Output Power
FCC 97-114 for test of 100kHz Bandwidth of Frequency Band Edges
FCC 97-114 for test of Power Spectral Density

## 4.3. Test in Compliance with

FCC Part 15, Subpart C

## 4.4. Frequency Range Investigated

a. Conduction: from 150 KHz to 30 MHz
b. Radiation: from 30 MHz to 24620MHz

## 4.5. Test Distance

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

# 5. Report of Measurements and Examinations

## 5.1. List of Measurements and Examinations

| FCC Rule | Description of Test | Result |
|---|---|---|
| 15.247(a)(2) | 6dB Bandwidth | Pass |
| 15.247(b) | Maximum Peak Output Power | Pass |
| 15.247(d) | Power Spectral Density | Pass |
| 15.207 | Conducted Emission | Pass |
| 15.209 | Radiated Emission | Pass |
| 15.247(c) | 100kHz Bandwidth of Frequency Band Edges | Pass |
| 15.203 | Antenna Requirement | Pass |

## 5.2. 6dB Bandwidth

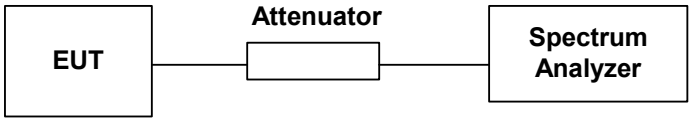
5.2.1. Measuring Instruments

As described in chapter 7 of this test report.

5.2.2. Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

5.2.3. Test Setup Layout



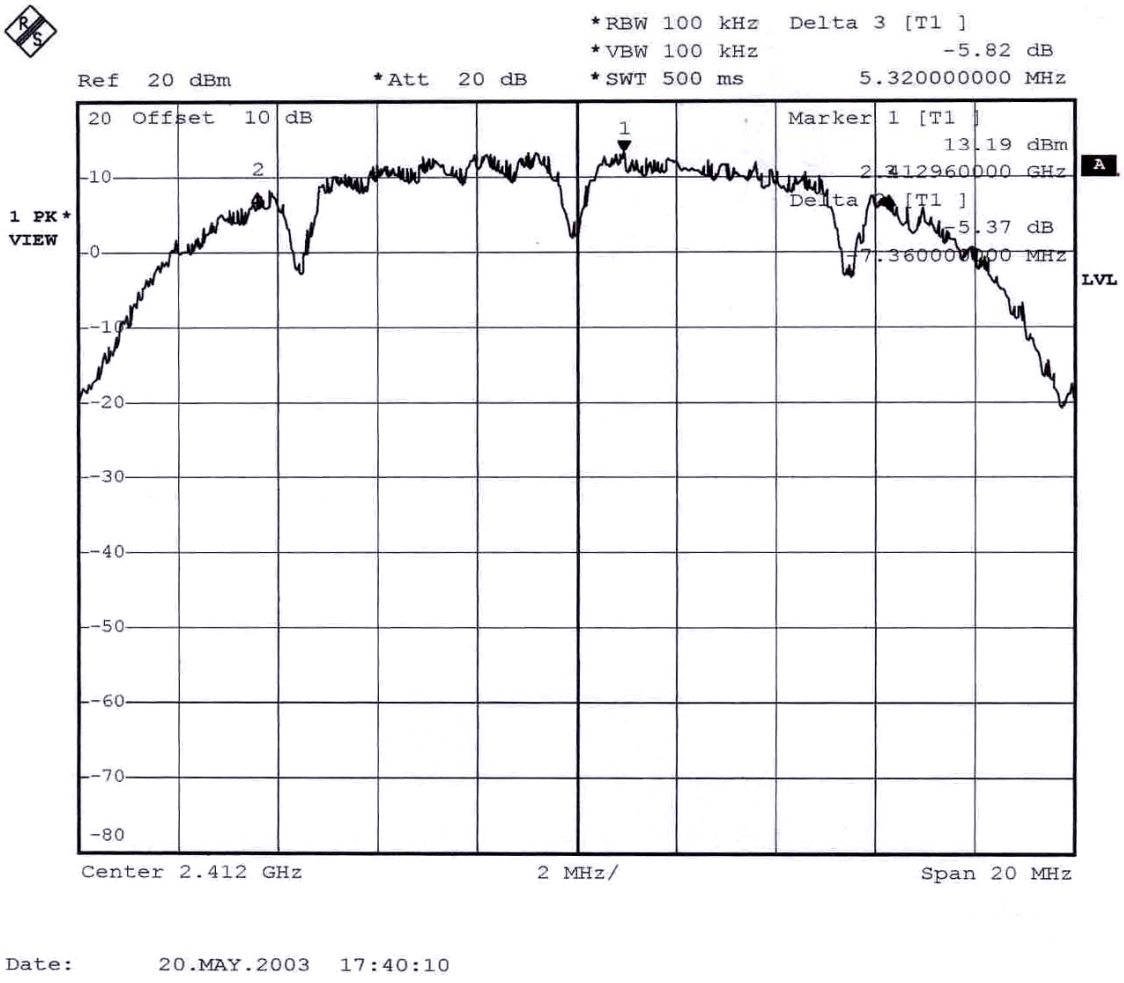

5.2.4. Test Result The spectrum analyzer plots are attached as below

- Temperature : 26°C
- Relative Humidity : 68 %

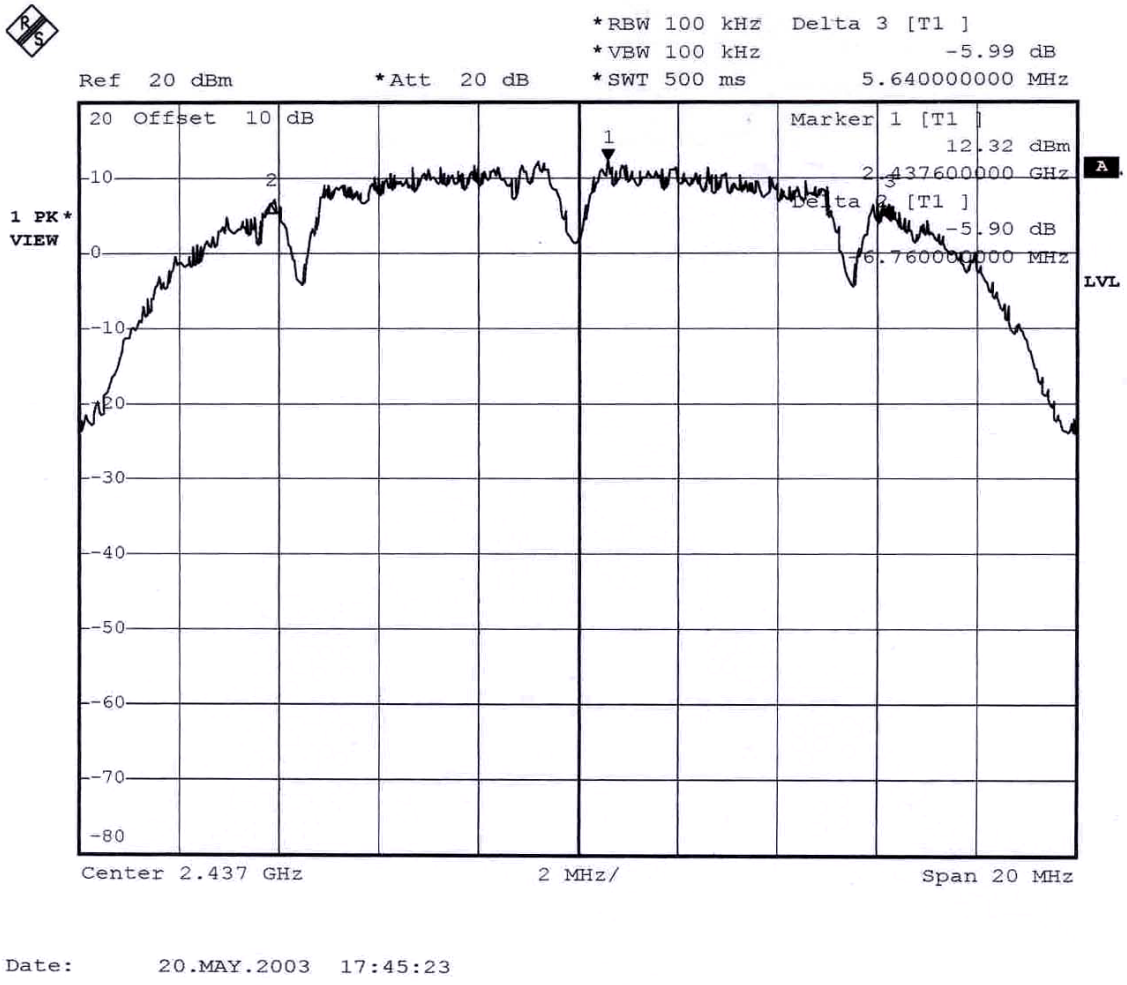
| Channel | Frequency ( MHz ) | 6dB Emission bandwidth ( MHz ) | Limits ( MHz ) | Plot Ref. No. |
|---|---|---|---|---|
| 1 | 2412 | 12.68 | 0.5 | 1 |
| 6 | 2437 | 12.40 | 0.5 | 2 |
| 11 | 2462 | 12.56 | 0.5 | 3 |

-

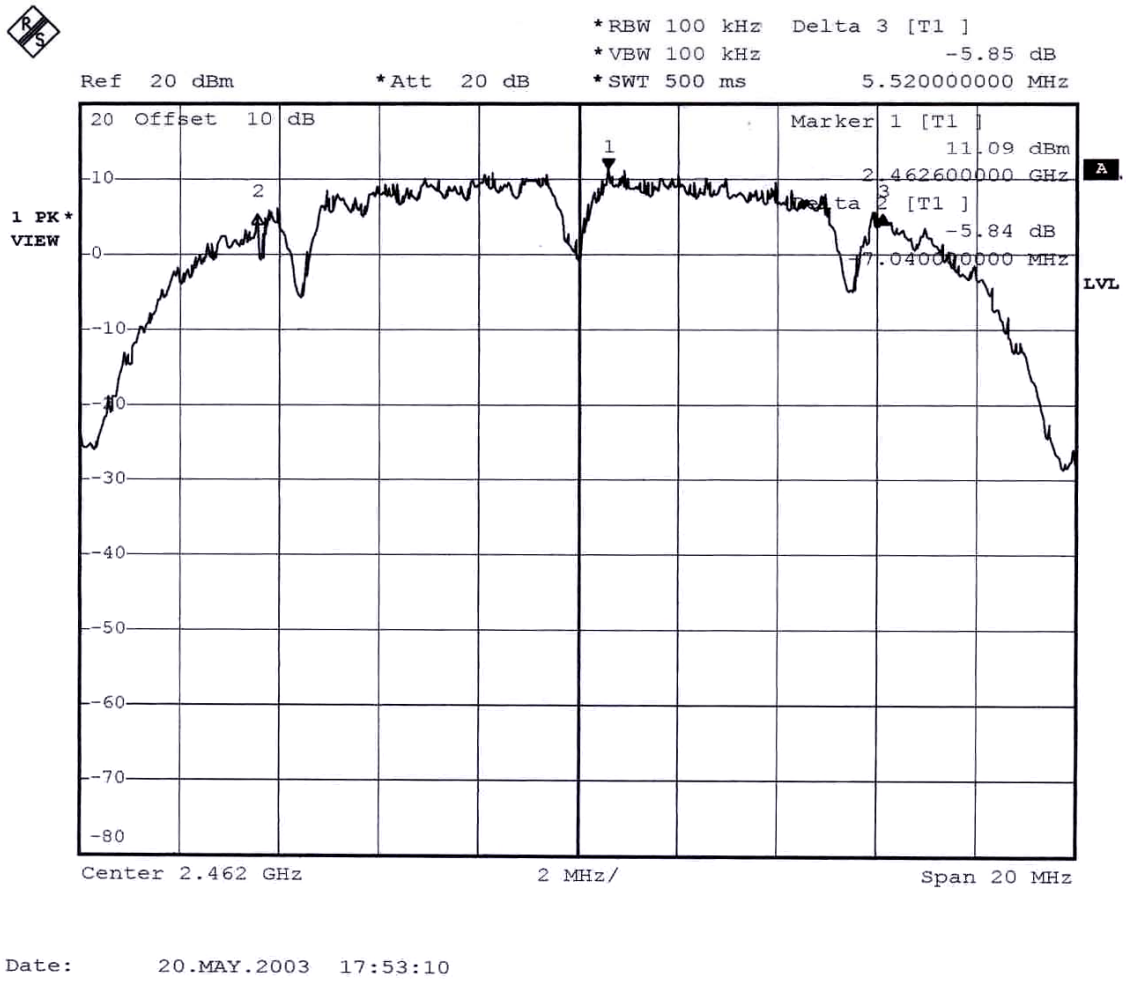
Plot1(Channel 1)



Plot2(Channel 6)



Plot3(Channel 11)




Comments：6dB Emission bandwidth>500kHz

## 5.3. Peak Output Power

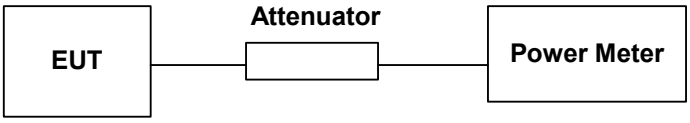
5.3.1. Measuring Instruments

As described in chapter 7 of this test report.

5.3.2. Test Procedure

The Booster Output port of the EUT was connected to the input RF input of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

5.3.3. Test Setup Layout




5.3.4. Test Result See spectrum analyzer plots below

- Temperature : 26°C
- Relative Humidity : 68 %
- EUT= ME103 + 0.5m cable + DC Injector + 1.5m cable + Booster

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (mW) | Limits (Watt/dBm ) |
|---|---|---|---|---|
| 1 | 2412 | 27.02 | 503.5006088 | 1W/30 dBm |
| 6 | 2437 | 27.12 | 515.2286446 | 1W/30 dBm |
| 11 | 2462 | 26.88 | 487.5284901 | 1W/30 dBm |

- Temperature : 26°C
- Relative Humidity : 68 %
- EUT= ME103 + 0.5m cable + DC Injector + 1.5m cable + Booster + 1.5m cable

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (mW) | Limits (Watt/dBm ) |
|---|---|---|---|---|
| 1 | 2412 | 25.92 | 390.8408958 | 1W/30 dBm |
| 6 | 2437 | 25.96 | 394.4573021 | 1W/30 dBm |
| 11 | 2462 | 25.68 | 369.8281798 | 1W/30 dBm |

- Comments Maximum Peak Output Power < 30dBm ( 1Watt)