

EMC TEST REPORT

Report No. : EME-050128

Model No. : WR254

Issued Date : May 2, 2005

**Applicant : AboCom Systems, Inc.
1F, No. 21, Yanfa 2nd Rd., SBIP, HsinChu City 300,
Taiwan**

**Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan**

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Project Engineer



Jackey Chiu

Reviewed By



Jerry Liu

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Summary of Tests**Wireless Router-Model: WR254**
FCC ID: MQ4WR254

| Test | Reference | Results |
|------------------------------------|----------------|----------|
| Minimum 6dB Bandwidth test | 15.247(a)(2) | Complies |
| Maximum Output Power test | 15.247(b) | Complies |
| Radiated Spurious Emission test | 15.205, 15.209 | Complies |
| Power Spectrum Density test | 15.247(d) | Complies |
| Power Line Conducted Emission test | 15.207 | Complies |

1. General information

1.1 Identification of the EUT

| | |
|---------------------------|---|
| Applicant | : AboCom Systems, Inc. |
| Product | : Wireless Router |
| Model No. | : WR254 |
| FCC ID. | : MQ4WR254 |
| Frequency Range | : 2400 MHz to 2483.5MHz |
| Channel Number | : 11 Channels |
| Frequency of Each Channel | : 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz |
| Type of Modulation | : DSSS, OFDM |
| Rated Power | : 120Vac, 60Hz with adapter (MW48-1200800) |
| Power Cord | : N/A |
| Sample Received | : Feb. 14, 2005 |
| Test Date(s) | : Feb. 14, 2005 ~ Feb. 23, 2005 |

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is a Wireless Router, and was defined as information technology equipment.

The Wireless Router is a multi-function device providing the following services:

- **Shared Broadband Internet Access** for all LAN users.
- **4-Port Switching Hub** for 10BaseT or 100BaseT connections.
- **Wireless Access Point** for 802.11b and 802.11g Wireless Stations.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"

1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain: 2dBi max

Antenna Type: Dipole antenna

Connector Type: Reverse

1.4 Peripherals equipment

| Peripherals | Manufacturer | Product No. | Serial No. | FCC ID |
|---------------|--------------|-------------|--------------------------|------------------|
| Notebook PC 1 | IBM | R51 | 99XML12 | FCC DoC Approved |
| Notebook PC 2 | DELL | PP05L | CN-0G5152-48643-498-6810 | FCC DoC Approved |

Dummy Load: 100Ω

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、§15.207 、§15.209 、§15.247 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied with 120Vac, 60Hz with adapter and run the test program “nfjrom.exe” under windows OS, which provide by manufacturer.

During conducted emission test, the EUT was in normal operating mode communication with AP. While in other test, it worked in the status of continuously transmitting.

Verifying, the maximum output power; we found the maximum output power was occurred at 11Mbps data rate in 802.11b and at 54Mbps data rated in 802.11g. The final test was executed under this condition and recorded in this report individually.

2.3 Test equipment

| Equipment | Brand | Frequency range | Model No. | Intertek ID No. | Next Cal. Date |
|-----------------------------------|-----------------|-----------------|------------------|-----------------|----------------|
| EMI Test Receiver | Rohde & Schwarz | 9kHz~2.75GHz | ESCS 30 | EC303 | 04/13/2005 |
| EMI Test Receiver | Rohde & Schwarz | 20Hz~26.5GHz | ESMI | EC317 | 07/14/2005 |
| Spectrum Analyzer | Rohde & Schwarz | 9kHz~30GHz | FSP 30 | EC353 | 07/13/2005 |
| Spectrum Analyzer | Rohde & Schwarz | 20Hz~40GHz | FSEK 30 | EC365 | 10/18/2005 |
| Horn Antenna | EMCO | 1GHz~18GHz | 3115 | EC338 | 08/16/2005 |
| Horn Antenna | SCHWARZBECK | 14GHz~40GHz | BBHA 9170 | EC351 | 07/08/2005 |
| Bilog Antenna | SCHWARZBECK | 25MHz~1.7GHz | VULB 9160 | EC368 | 05/20/2005 |
| Pre-Amplifier | MITEQ | 100MHz~26.5GHz | 919981 | EC373 | 4/13/2005 |
| Pre-Amplifier | MITEQ | 26GHz~40GHz | 828825 | EC374 | 1/27/2006 |
| Wideband Peak Power Meter/ Sensor | Anritsu | 100MHz~18GHz | ML2497A/ MA2491A | EC396 | 10/18/2005 |
| Controller | HDGmbH | N/A | HD 100 | EP317-1 | N/A |
| Antenna Tower | HDGmbH | N/A | MA 240 | EP317-2 | N/A |
| Turn Table | HDGmbH | N/A | DS 420S | EP317-3 | N/A |
| LISN | Rohde & Schwarz | 9KHz~30MHz | ESH3-Z5 | EC344 | 01/13/2006 |

Note: The above equipments are within the valid calibration period.

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 23 °C
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

3.2 Test setup & procedure

The minimum 6dB bandwidth per FCC §15.247(a)(2) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6-dB modulation bandwidth is in the following Table.

3.3 Measured data of Minimum 6dB Bandwidth test results

Test Mode: 802.11b operating mode (DSSS Modulation)

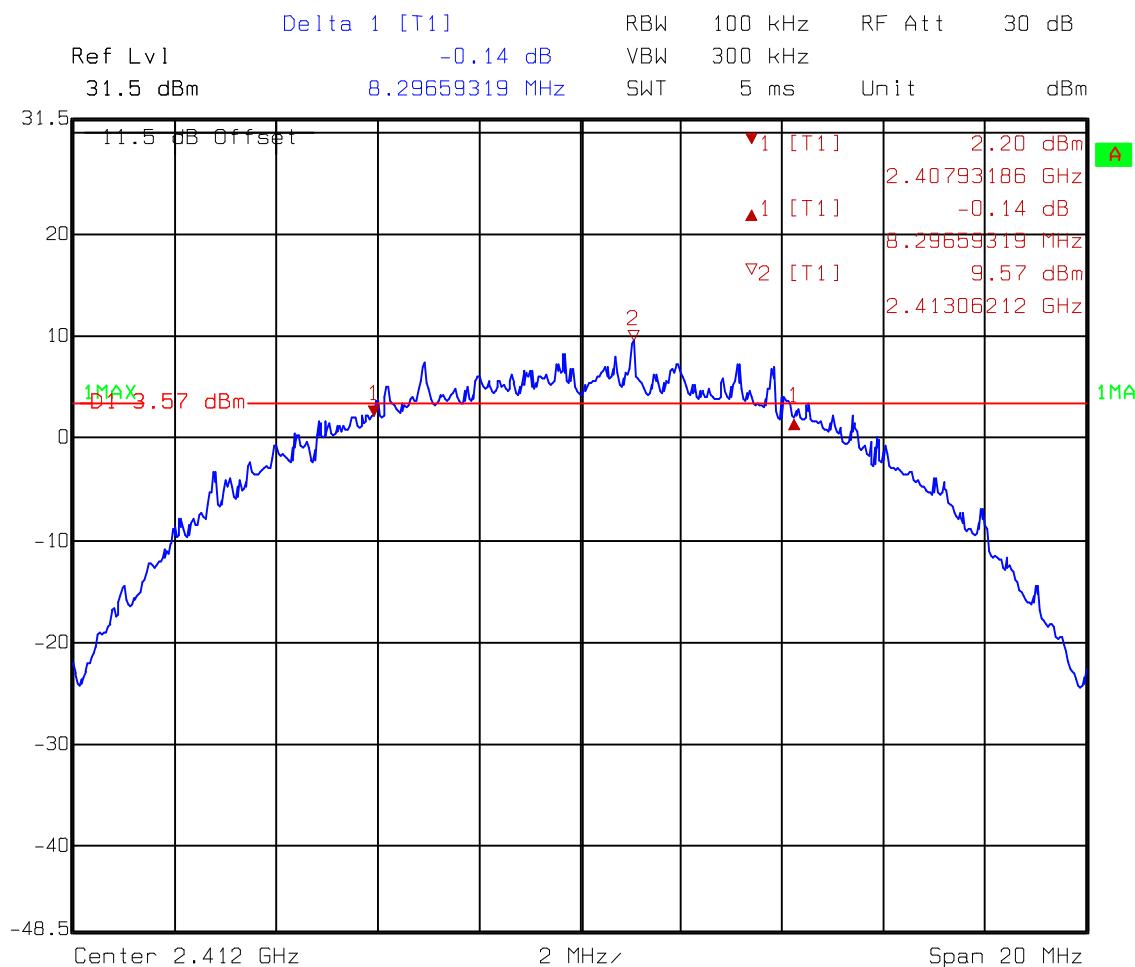
| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit |
|---------|-----------------|-----------------|---------|
| 1 | 2412 | 8.29659 | >500kHz |
| 6 | 2437 | 8.61723 | >500kHz |
| 11 | 2462 | 8.25651 | >500kHz |

Test Mode: 802.11g operating mode (OFDM Modulation)

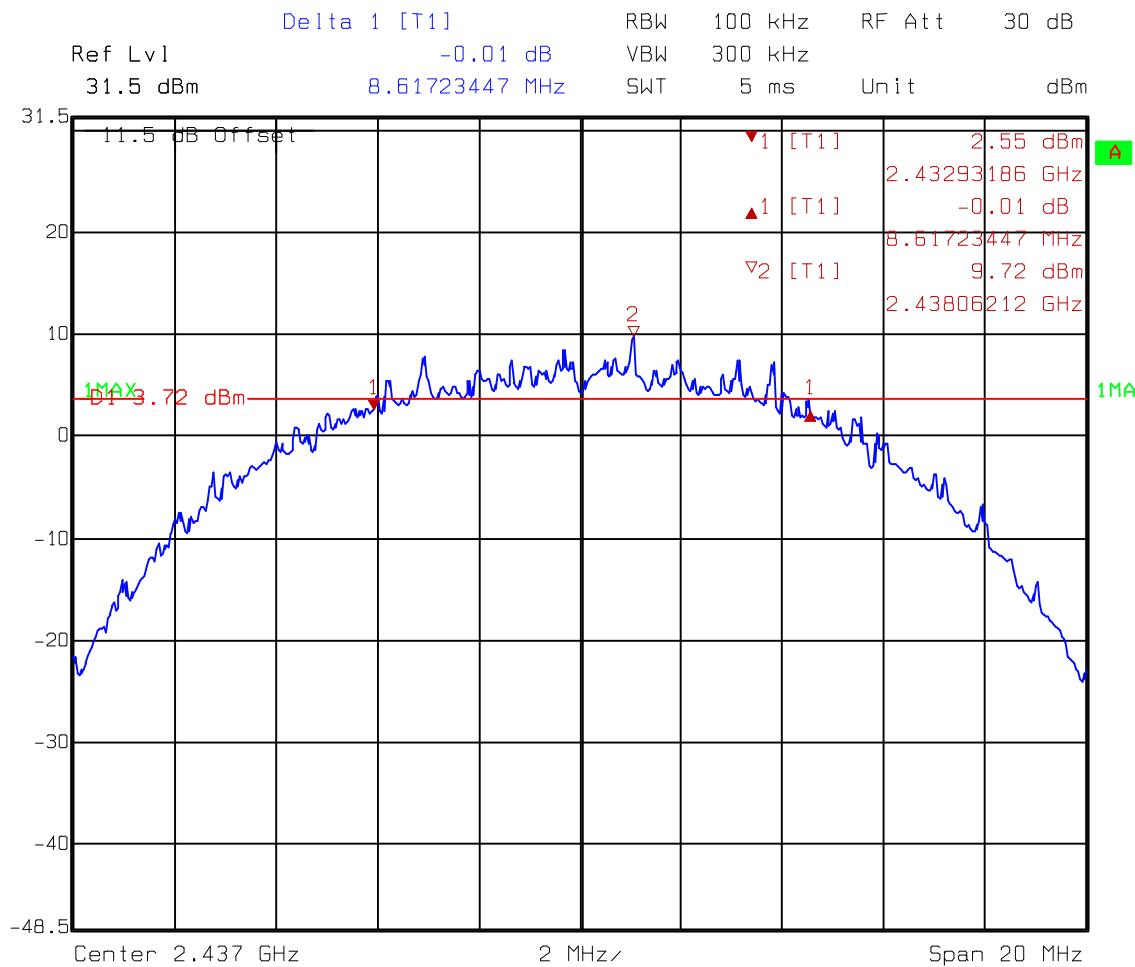
| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit |
|---------|-----------------|-----------------|---------|
| 1 | 2412 | 16.03206 | >500kHz |
| 6 | 2437 | 16.07214 | >500kHz |
| 11 | 2462 | 15.99198 | >500kHz |

Please see the plot below.

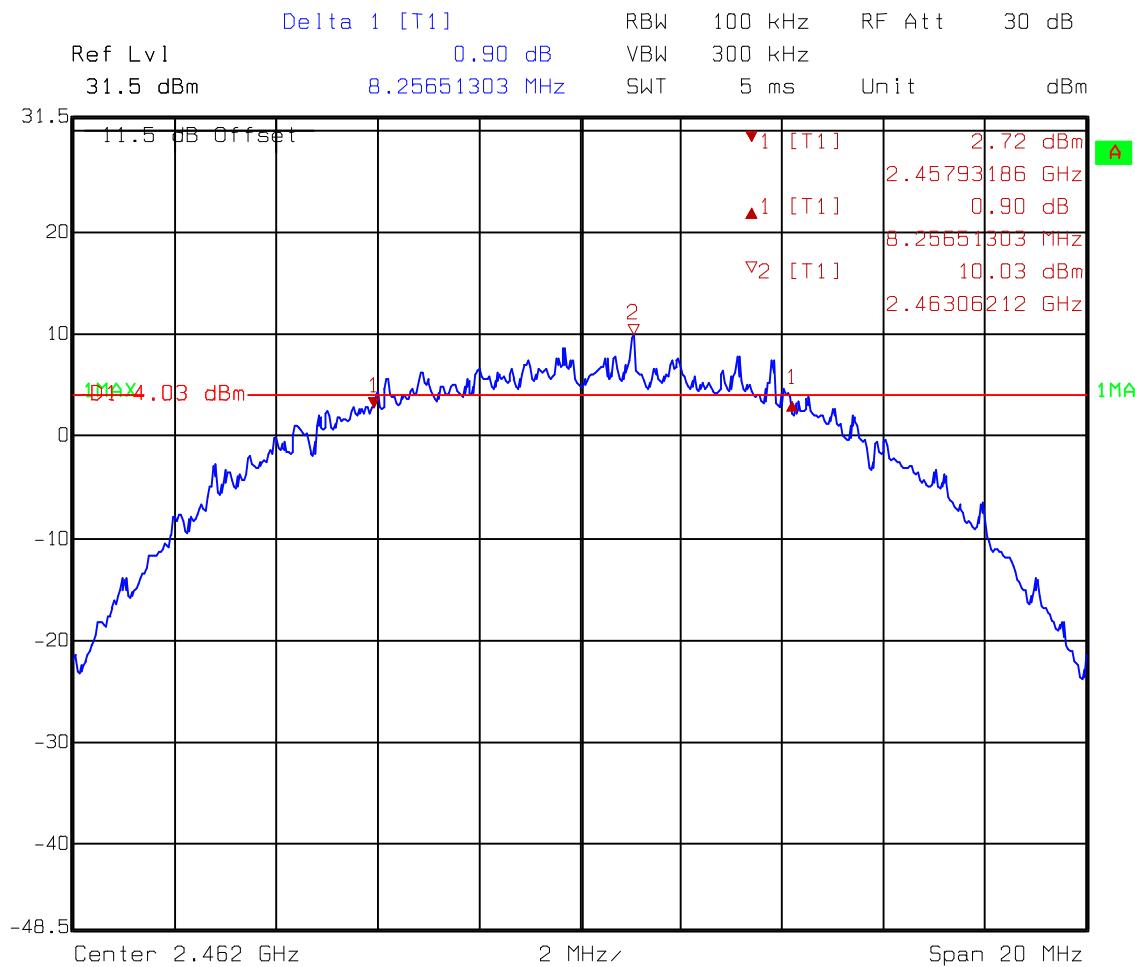
Test Mode: 802.11b operating mode (DSSS Modulation)



Comment A: 6dB bandwidth at channel 1 (EC365) 802.11b
 Date: 15.FEB.2005 17:17:19

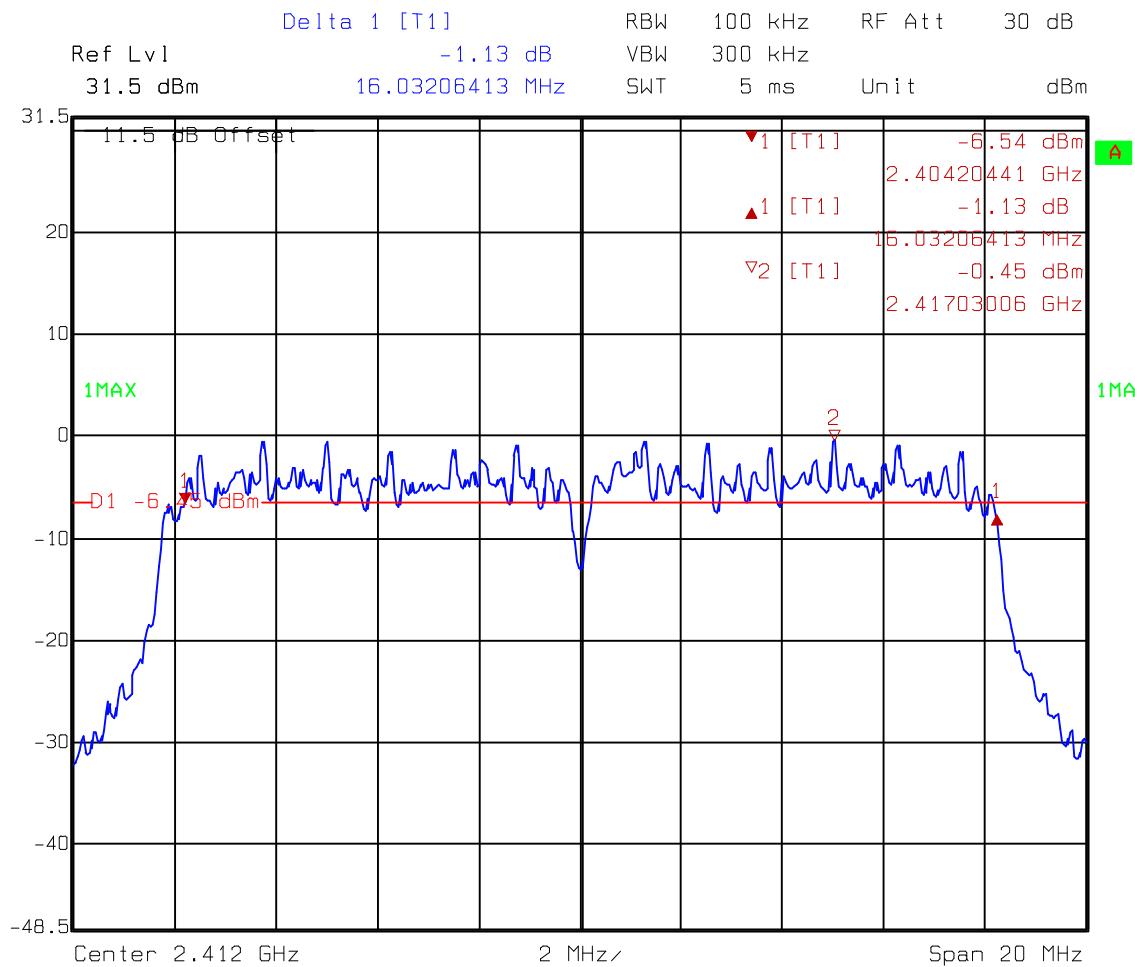


Comment A: 6dB bandwidth at channel 6 (EC365) 802.11b
 Date: 15.FEB.2005 17:14:42

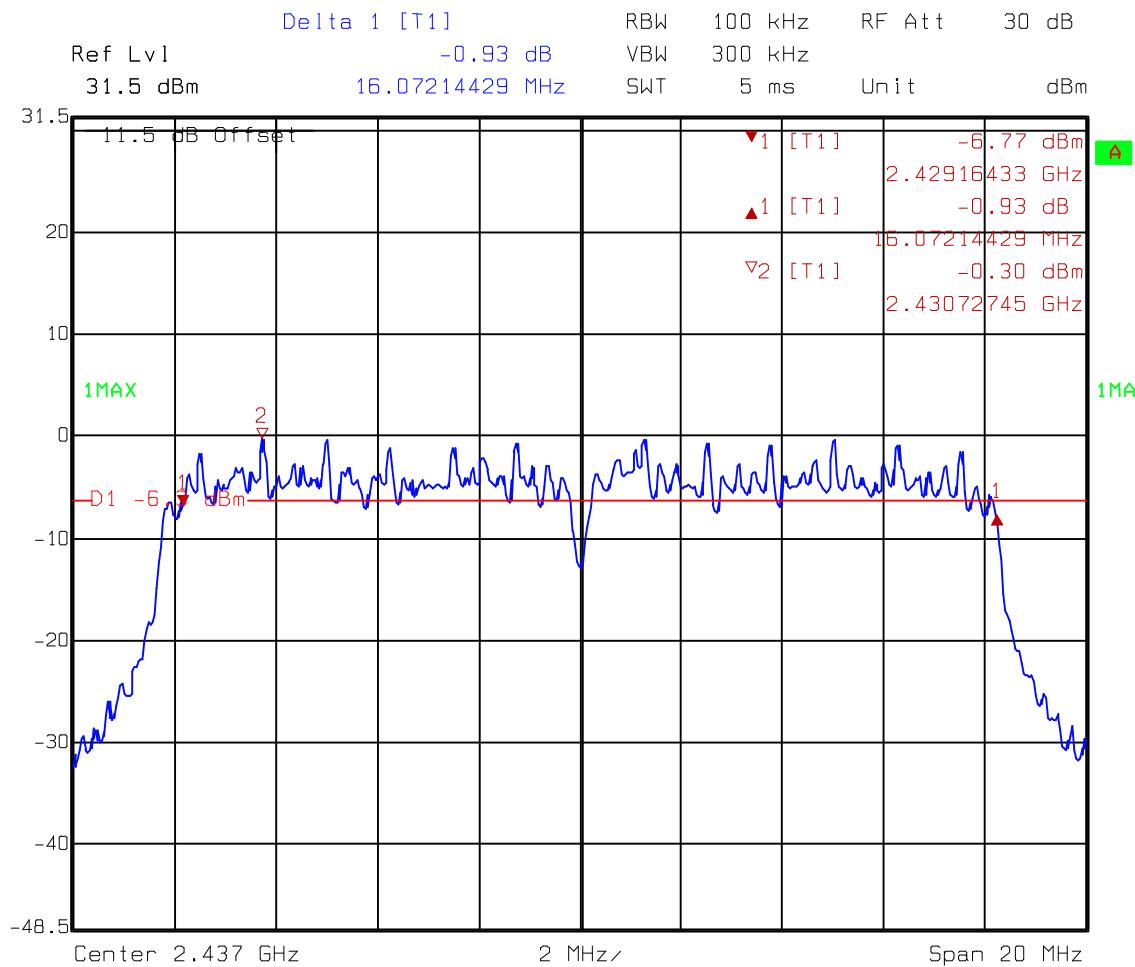


Comment A: 6dB bandwidth at channel 11 (EC365) 802.11b
 Date: 15.FEB.2005 17:16:03

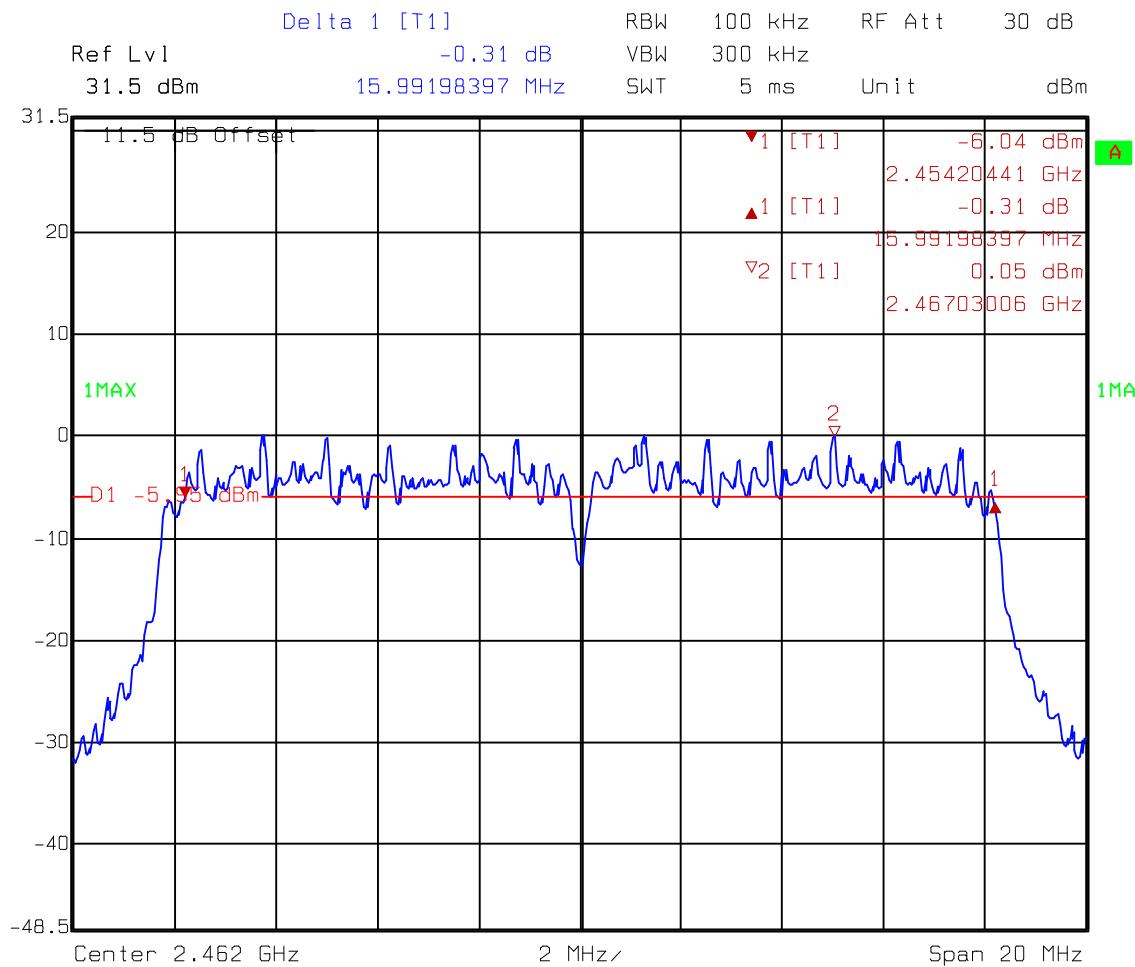
Test Mode: 802.11g operating mode (OFDM Modulation)



Comment A: 6dB bandwidth at channel 1 (EC365) 802.11g
Date: 15.FEB.2005 17:03:43



Comment A: 6dB bandwidth at channel 6 (EC365) 802.11g
Date: 15.FEB.2005 17:06:30



Comment A: 6dB bandwidth at channel 11 (EC365) 802.11g
Date: 15.FEB.2005 17:08:35

4. Maximum Output Power test

4.1 Operating environment

Temperature: 23 °C
 Relative Humidity: 55 %
 Atmospheric Pressure: 1023 hPa

4.2 Test setup & procedure

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (1.5 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

4.3 Measured data of Maximum Output Power test results

Test Mode: 802.11b operating mode (DSSS Modulation)

| Channel | Freq. (MHz) | C.L. (dB) | Reading (dBm) | Conducted Peak Output Power | | Limit (W) |
|---------|----------------|--------------|------------------|--------------------------------|-------|--------------|
| | | | | (dBm) | (mW) | |
| 1 | 2412 | 1.5 | 16.48 | 17.98 | 62.81 | 1 |
| 6 | 2437 | 1.5 | 16.72 | 18.22 | 66.37 | 1 |
| 11 | 2462 | 1.5 | 16.56 | 18.06 | 63.97 | 1 |

Remark:

Conducted Peak Output Power = Reading + C.L.

Test Mode: 802.11g operating mode (OFDM Modulation)

| Channel | Freq. (MHz) | C.L. (dB) | Reading (dBm) | Conducted Peak Output Power | | Limit (W) |
|---------|----------------|--------------|------------------|--------------------------------|--------|--------------|
| | | | | (dBm) | (mW) | |
| 1 | 2412 | 1.5 | 19.83 | 21.33 | 135.83 | 1 |
| 6 | 2437 | 1.5 | 19.87 | 21.37 | 137.09 | 1 |
| 11 | 2462 | 1.5 | 19.92 | 21.42 | 138.68 | 1 |

Remark:

Conducted Peak Output Power = Reading + C.L.

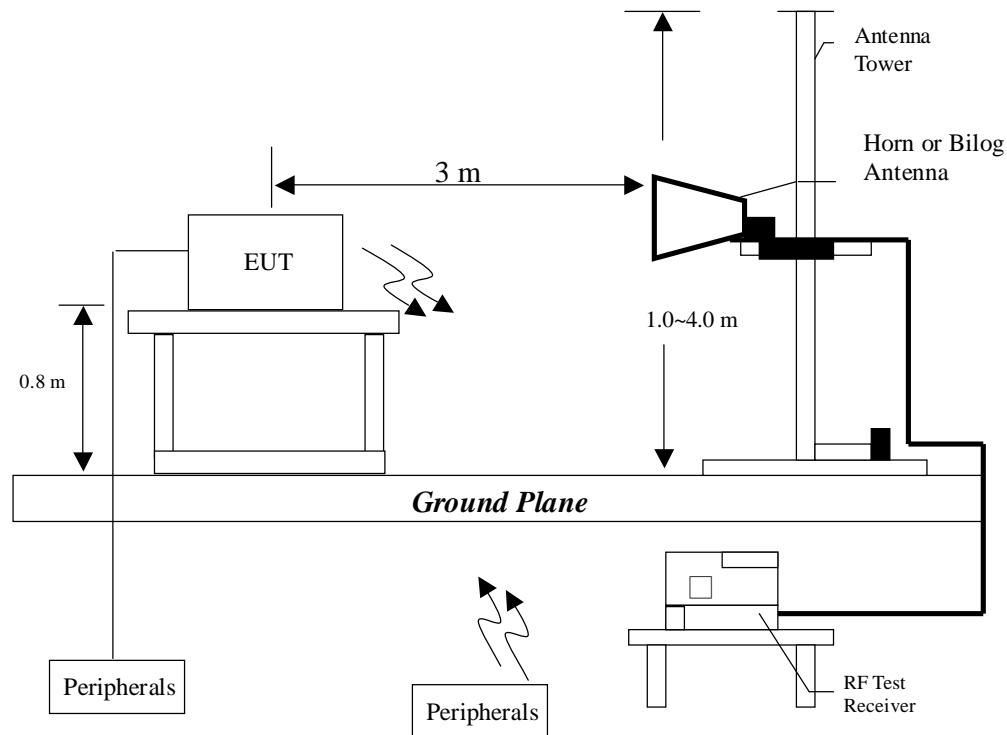
5. Radiated Emission test

5.1 Operating environment

Temperature: 25 °C
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

5.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated over the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

5.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

| Frequency (MHz) | Limits (dB μ V/m@3m) |
|--------------------|-----------------------------|
| 30-88 | 40 |
| 88-216 | 43.5 |
| 216-960 | 46 |
| Above 960 | 54 |

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is 4.98 dB.

5.4 Radiated spurious emission test data

The radiated spurious emissions at

| Frequency(MHz) | Margin |
|----------------|--------|
| 39.700 | -1.80 |
| 39.700 | -2.10 |

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

5.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11b continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at 802.11b Tx channel 1.

EUT : WR254

Worst Case Condition : 802.11b Tx at channel 1

| Frequency (MHz) | Spectrum Analyzer Detector | Antenna Polariz. (H/V) | Correction Factor (dB/m) | Reading (dBuV) | Corrected Level (dBuV) | Limit @ 3 m (dBuV) | Margin (dB) | Antenna high (cm) | Turn Table angle (degree) |
|--------------------|----------------------------------|------------------------------|--------------------------------|-------------------|------------------------------|--------------------------|----------------|-------------------------|------------------------------------|
| 39.700 | QP | V | 12.74 | 25.46 | 38.20 | 40.00 | -1.80 | 101.00 | 117.00 |
| 57.230 | QP | V | 12.97 | 20.93 | 33.90 | 40.00 | -6.10 | 159.00 | 222.00 |
| 103.700 | QP | V | 10.97 | 22.83 | 33.80 | 43.50 | -9.70 | 126.00 | 109.00 |
| 115.100 | QP | V | 12.01 | 17.87 | 29.88 | 43.50 | -13.62 | 130.00 | 262.00 |
| 171.630 | QP | V | 14.24 | 17.01 | 31.25 | 43.50 | -12.25 | 169.00 | 351.00 |
| 575.160 | QP | V | 20.18 | 10.72 | 30.90 | 46.00 | -15.10 | 185.00 | 210.00 |
| 103.720 | QP | H | 10.97 | 25.13 | 36.10 | 43.50 | -7.40 | 385.00 | 103.00 |
| 171.630 | QP | H | 14.24 | 16.86 | 31.10 | 43.50 | -12.40 | 320.00 | 163.00 |
| 198.800 | QP | H | 13.01 | 18.59 | 31.60 | 43.50 | -11.90 | 219.00 | 187.00 |
| 264.700 | QP | H | 12.99 | 18.21 | 31.20 | 46.00 | -14.80 | 184.00 | 99.00 |
| 460.780 | QP | H | 17.89 | 16.91 | 34.80 | 46.00 | -11.20 | 200.00 | 259.00 |
| 575.100 | QP | H | 20.18 | 16.02 | 36.20 | 46.00 | -9.80 | 193.00 | 117.00 |

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

The test was performed on EUT under 802.11g continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at 802.11g Tx channel 1.

EUT : WR254
Worst Case Condition : 802.11g Tx at channel 1

| Frequency (MHz) | Spectrum Analyzer Detector | Antenna Polariz. (H/V) | Correction Factor (dB/m) | Reading (dBuV) | Corrected Level (dBuV) | Limit @ 3 m (dBuV) | Margin (dB) | Antenna high (cm) | Turn Table angle (degree) |
|--------------------|----------------------------------|------------------------------|--------------------------------|-------------------|------------------------------|--------------------------|----------------|-------------------------|------------------------------------|
| 39.700 | QP | V | 12.74 | 25.16 | 37.90 | 40.00 | -2.10 | 105.00 | 222.00 |
| 57.320 | QP | V | 12.97 | 20.43 | 33.40 | 40.00 | -6.60 | 119.00 | 234.00 |
| 103.720 | QP | V | 10.97 | 22.73 | 33.70 | 43.50 | -9.80 | 126.00 | 88.00 |
| 171.690 | QP | V | 14.24 | 16.76 | 31.00 | 43.50 | -12.50 | 125.00 | 203.00 |
| 200.710 | QP | V | 12.91 | 16.29 | 29.20 | 43.50 | -14.30 | 157.00 | 35.00 |
| 575.100 | QP | V | 20.18 | 10.92 | 31.10 | 46.00 | -14.90 | 200.00 | 285.00 |
| 103.720 | QP | H | 10.97 | 24.43 | 35.40 | 43.50 | -8.10 | 333.00 | 62.00 |
| 200.750 | QP | H | 12.91 | 18.79 | 31.70 | 43.50 | -11.80 | 400.00 | 106.00 |
| 264.700 | QP | H | 12.99 | 19.21 | 32.20 | 46.00 | -13.80 | 326.00 | 52.00 |
| 379.630 | QP | H | 15.92 | 16.58 | 32.50 | 46.00 | -13.50 | 265.00 | 109.00 |
| 460.780 | QP | H | 17.89 | 16.41 | 34.30 | 46.00 | -11.70 | 251.00 | 119.00 |
| 575.100 | QP | H | 20.18 | 17.88 | 38.06 | 46.00 | -7.94 | 177.00 | 162.00 |

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

5.4.2 Measurement results: frequency above 1GHz

EUT : WR254
Test Condition : 802.11b Tx at channel 1

| Frequency (MHz) | Spectrum Analyzer Detector | Antenna Polariz. (H/V) | Preamp (dB) | Correction Factor (dB/m) | Reading (dBuV) | Corrected Level (dBuV) | Limit @ 3 m (dBuV) | Margin (dB) | Antenna high (cm) | Turn Table angle (degree) |
|--------------------|----------------------------------|------------------------------|----------------|--------------------------------|-------------------|------------------------------|--------------------------|----------------|-------------------------|---------------------------------|
| 7236.000 | PK | V | 34.17 | 39.97 | 45.81 | 51.61 | 74.00 | -22.39 | 188.00 | 334.00 |
| 7236.000 | AV | V | 34.17 | 39.97 | 33.97 | 39.77 | 54.00 | -14.23 | 188.00 | 334.00 |
| 9648.000 | PK | V | 35.75 | 43.38 | 50.56 | 58.19 | 74.00 | -15.81 | 154.00 | 26.00 |
| 9648.000 | AV | V | 35.75 | 43.38 | 44.70 | 52.33 | 54.00 | -1.67 | 154.00 | 26.00 |

Remark:

1. Corrected Level = Reading + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is :

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11b Tx at channel 6

| Frequency (MHz) | Spectrum Analyzer Detector | Antenna Polariz. (H/V) | Preamp (dB) | Correction Factor (dB/m) | Reading (dBuV) | Corrected Level (dBuV) | Limit @ 3 m (dBuV) | Margin (dB) | Antenna high (cm) | Turn Table angle (degree) |
|--------------------|----------------------------------|------------------------------|----------------|--------------------------------|-------------------|------------------------------|--------------------------|----------------|-------------------------|---------------------------------|
| 7312.000 | PK | V | 34.17 | 39.97 | 53.25 | 59.05 | 74.00 | -14.95 | 219.00 | 29.00 |
| 7312.000 | AV | V | 34.17 | 39.97 | 47.31 | 53.11 | 54.00 | -0.89 | 219.00 | 29.00 |
| 9748.000 | PK | V | 35.75 | 43.38 | 52.44 | 60.07 | 74.00 | -13.93 | 142.00 | 358.00 |
| 9748.000 | AV | V | 35.75 | 43.38 | 45.75 | 53.38 | 54.00 | -0.62 | 142.00 | 358.00 |
| 7312.000 | PK | H | 34.17 | 39.97 | 44.69 | 50.49 | 74.00 | -23.51 | 164.00 | 304.00 |
| 7312.000 | AV | H | 34.17 | 39.97 | 32.40 | 38.20 | 54.00 | -15.80 | 164.00 | 304.00 |

Remark:

1. Corrected Level = Reading Level + Correction Factor—Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11b Tx at channel 11

| Frequency (MHz) | Spectrum Analyzer Detector | Antenna Polariz. (H/V) | Preamp (dB) | Correction Factor (dB/m) | Reading (dBuV) | Corrected Level (dBuV) | Limit @ 3 m (dBuV) | Margin (dB) | Antenna high (cm) | Turn Table angle (degree) |
|--------------------|----------------------------------|------------------------------|----------------|--------------------------------|-------------------|------------------------------|--------------------------|----------------|-------------------------|---------------------------------|
| 7387.000 | PK | V | 34.17 | 39.97 | 50.58 | 56.38 | 74.00 | -17.62 | 197.00 | 80.00 |
| 7387.000 | AV | V | 34.17 | 39.97 | 40.04 | 45.84 | 54.00 | -8.16 | 197.00 | 80.00 |
| 9848.000 | PK | V | 35.75 | 43.38 | 50.51 | 58.14 | 74.00 | -15.86 | 143.00 | 301.00 |
| 9848.000 | AV | V | 35.75 | 43.38 | 43.83 | 51.46 | 54.00 | -2.54 | 143.00 | 301.00 |

Remark:

1. Corrected Level = Reading Level + Correction Factor—Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WR254
Test Condition : 802.11g Tx at channel 1

Test Result:

No spurious emission was found above the spectrum analyzer's noise floor.
The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11g Tx at channel 6

Test Result:

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WR254
Test Condition : 802.11g Tx at channel 11

Test Result:

No spurious emission was found above the spectrum analyzer's noise floor.
The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

6. Power Spectrum Density test

6.1 Operating environment

Temperature: 23 °C
Relative Humidity: 55 %
Atmospheric Pressure 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.247(d) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 10kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly correction was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel). The Power Spectral Density measured result is in the following table.

6.3 Measured data of Power Spectrum Density test results

Test Mode: 802.11b operating (DSSS Modulation) mode

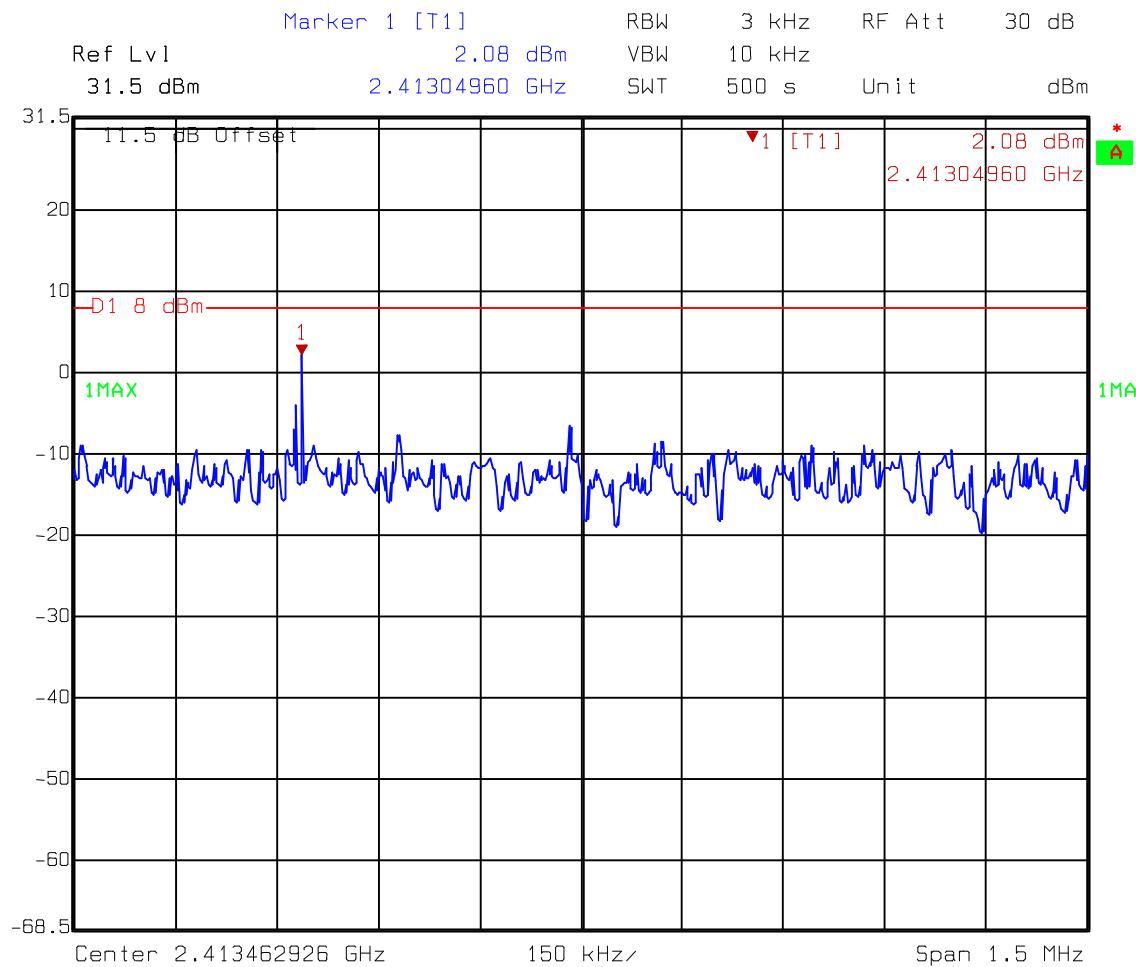
| Channel | Frequency (MHz) | Measured level (dBm) | Limit (dBm) |
|---------|-----------------|----------------------|-------------|
| 1 | 2412 | 2.08 | 8 |
| 6 | 2437 | -0.70 | 8 |
| 11 | 2462 | 6.18 | 8 |

Test Mode: 802.11g operating (OFDM Modulation) mode

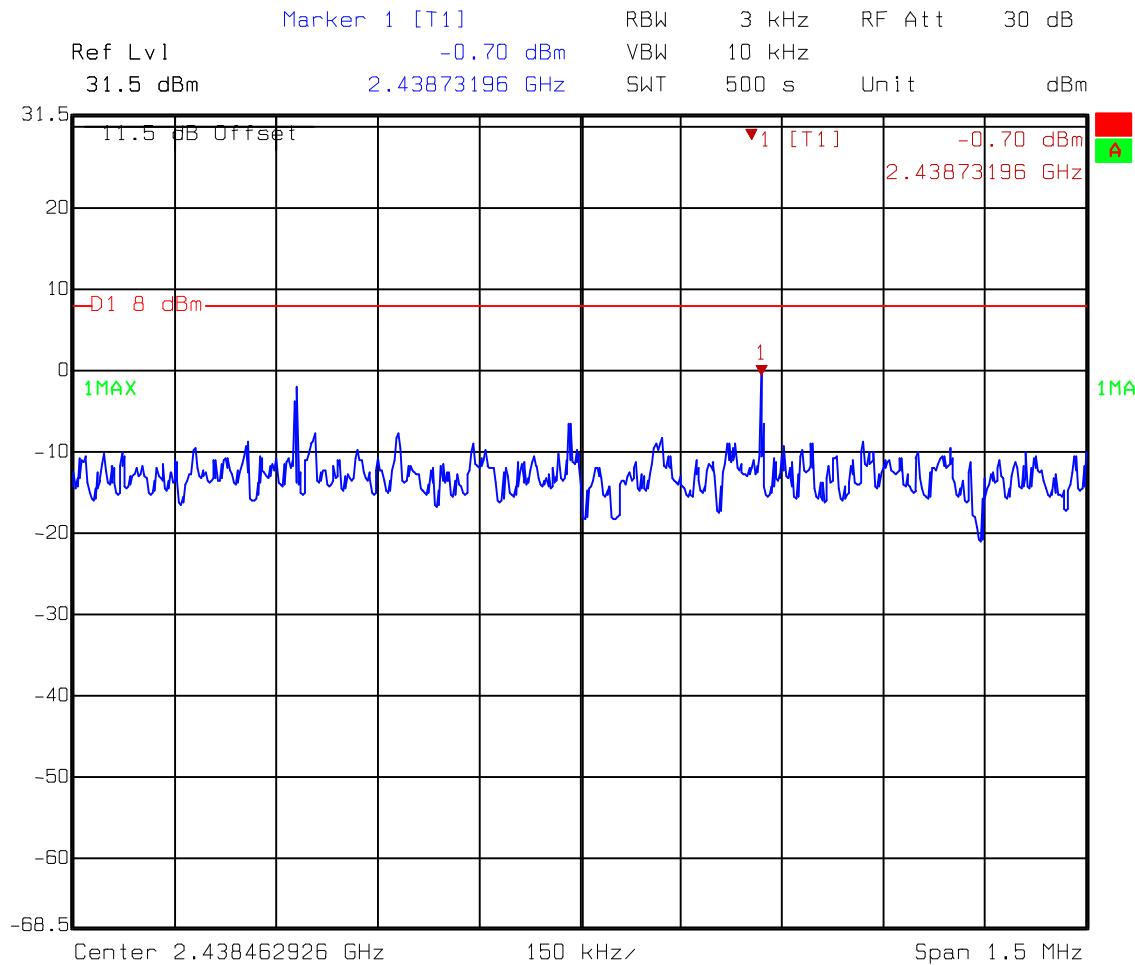
| Channel | Frequency (MHz) | Measured level (dBm) | Limit (dBm) |
|---------|-----------------|----------------------|-------------|
| 1 | 2412 | -14.71 | 8 |
| 6 | 2437 | -13.87 | 8 |
| 11 | 2462 | -13.61 | 8 |

Please see the plot below.

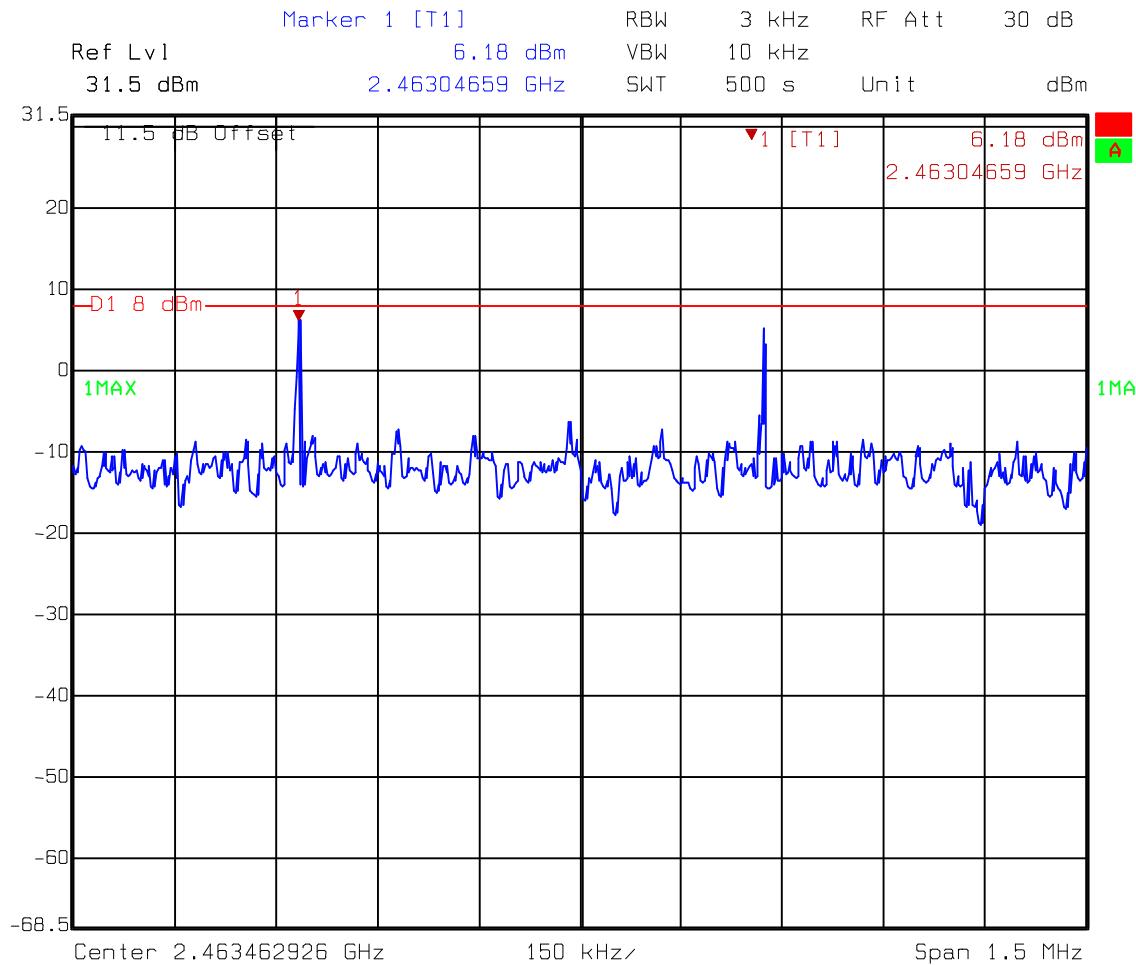
Test Mode: 802.11b operating (DSSS Modulation) mode



Comment A: Power spectrum density at channel 1 (EC365) 802.11b
Date: 15.FEB.2005 17:25:37

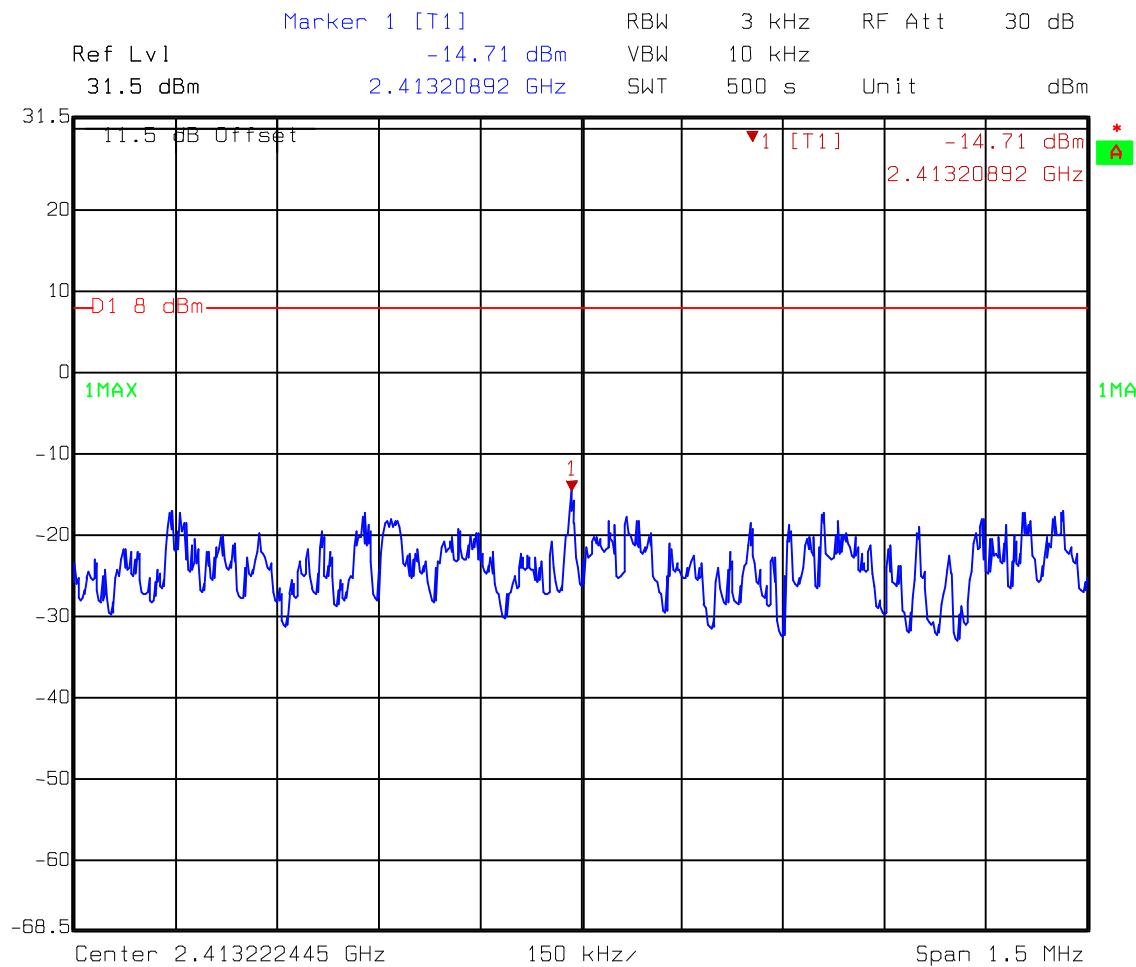


Comment A: Power spectrum density at channel 6 (EC365) 802.1b
 Date: 15.FEB.2005 17:22:17

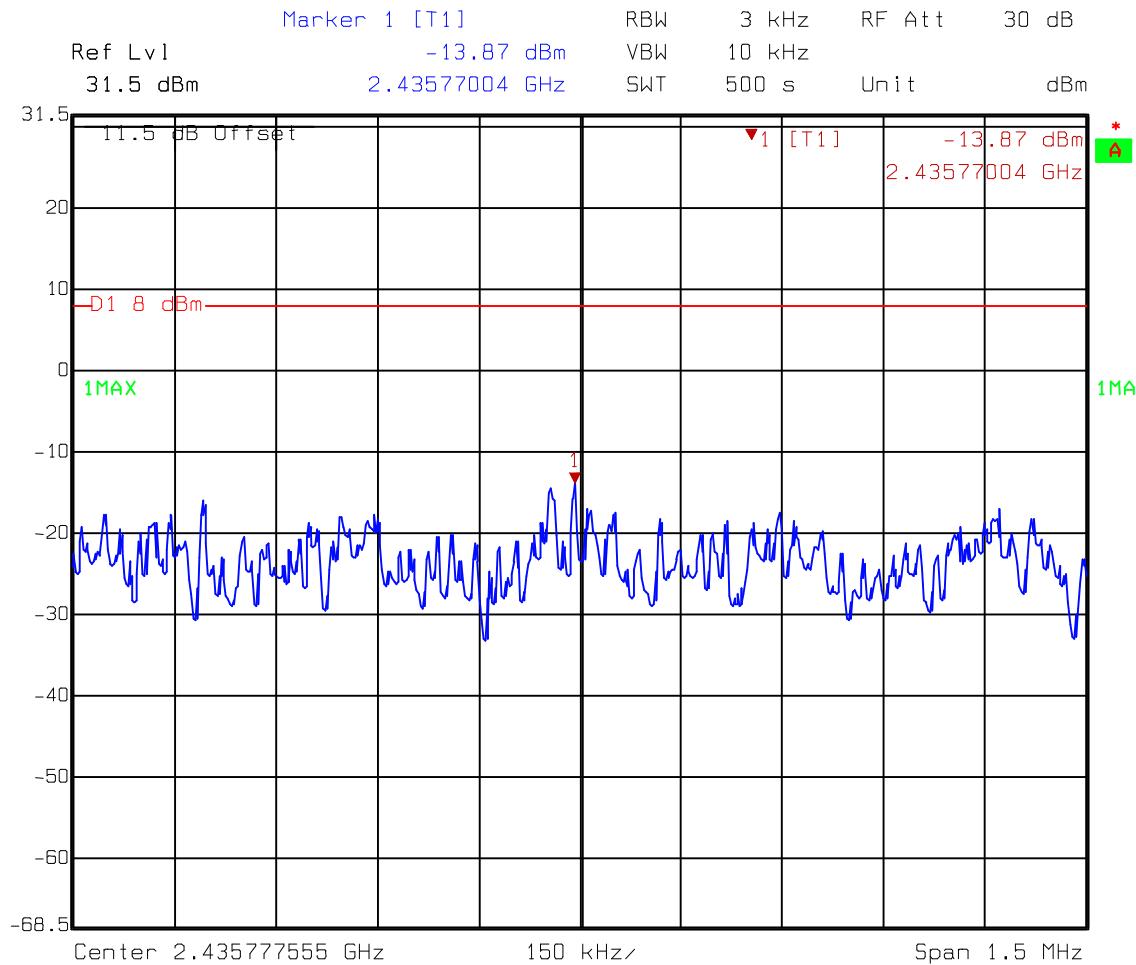


Comment A: Power spectrum density at channel 11 (EC365) 802.1b
Date: 15.FEB.2005 17:23:52

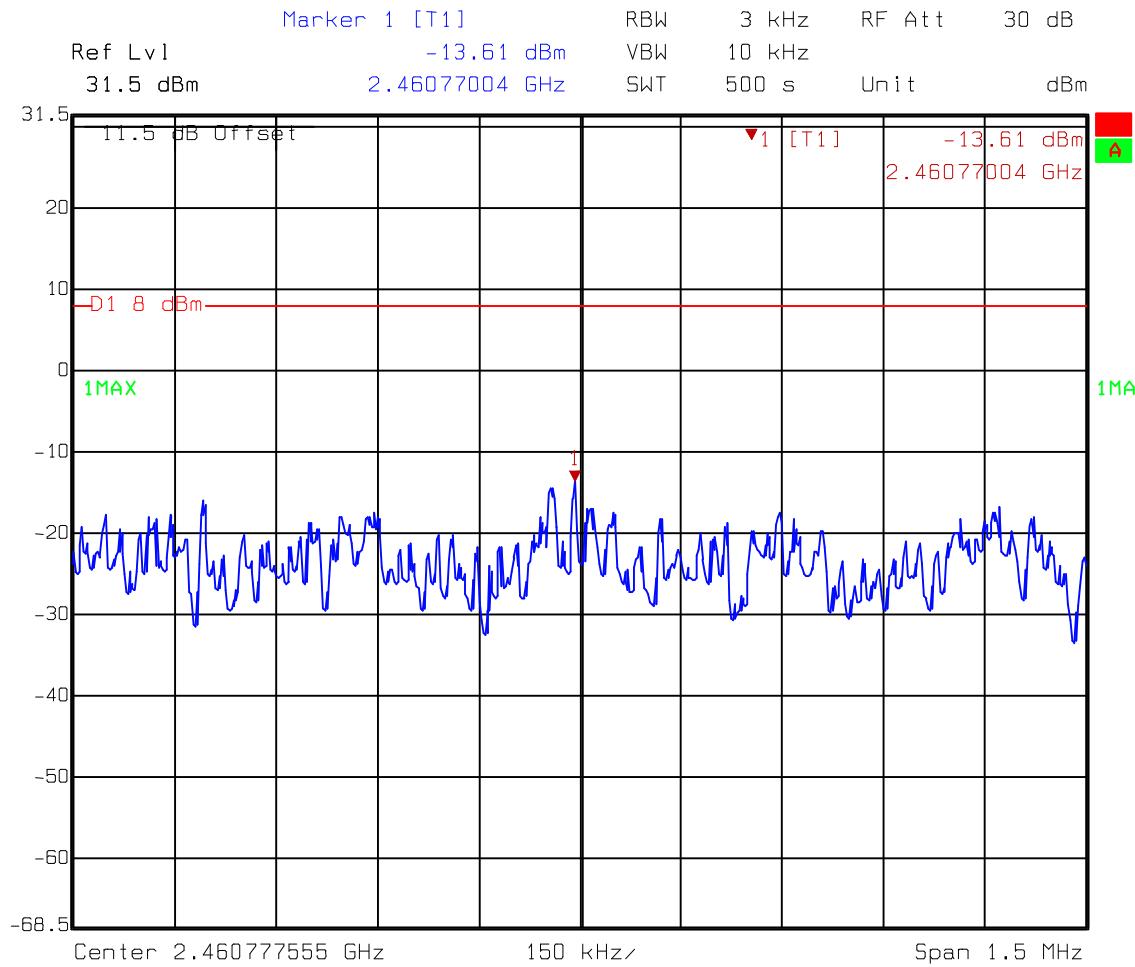
Test Mode: 802.11g operating (OFDM Modulation) mode



Comment A: Power spectrum density at channel 1 (EC365) 802.11g
 Date: 15.FEB.2005 17:26:44



Comment A: Power spectrum density at channel 6 (EC365) 802.11g
Date: 15.FEB.2005 17:28:01



Comment A: Power spectrum density at channel 11 (EC365) 802.11g
Date: 15.FEB.2005 17:29:12

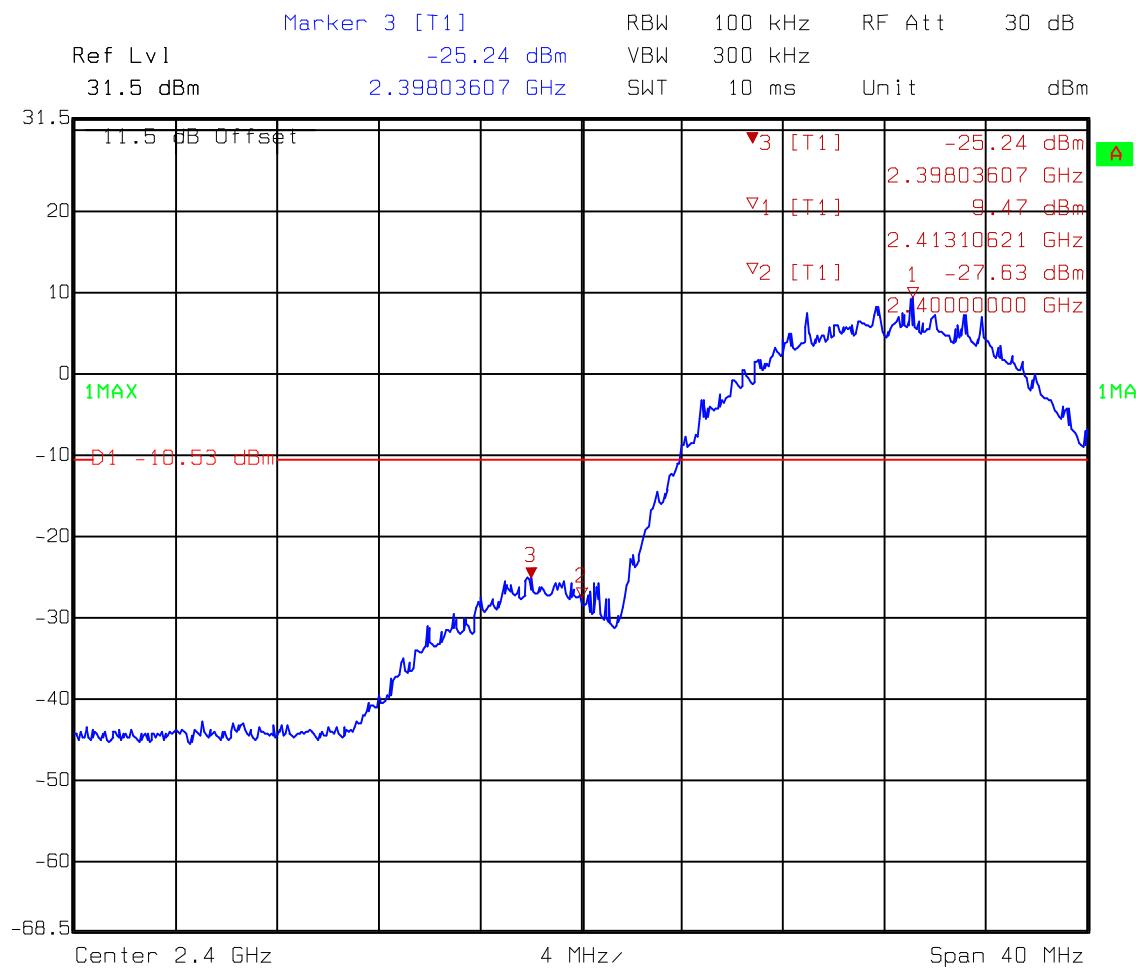
7. Emission on the band edge §FCC 15.247(C)

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

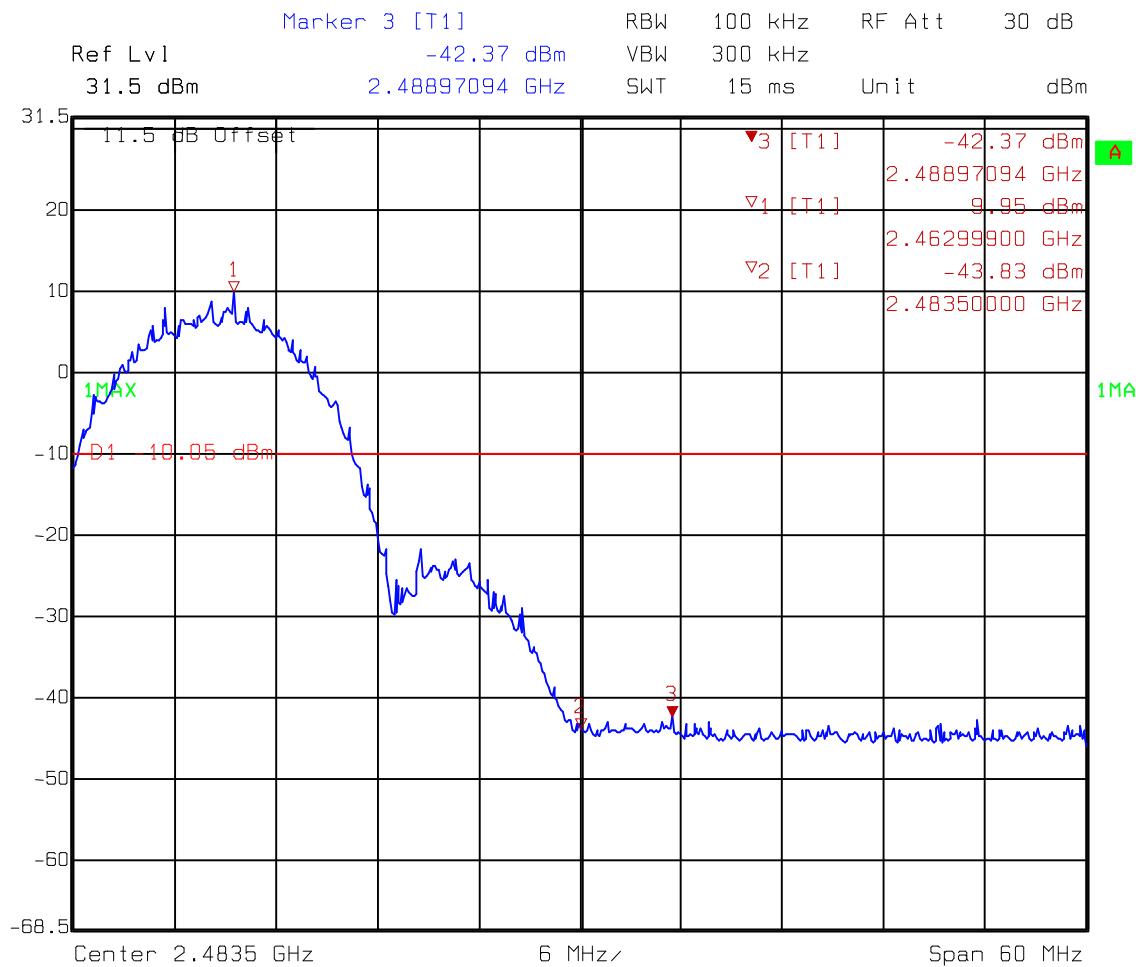
Please see the plot below.

7.1 Band-edge (Conducted method)

Test Mode: 802.11b operating (DSSS Modulation) mode

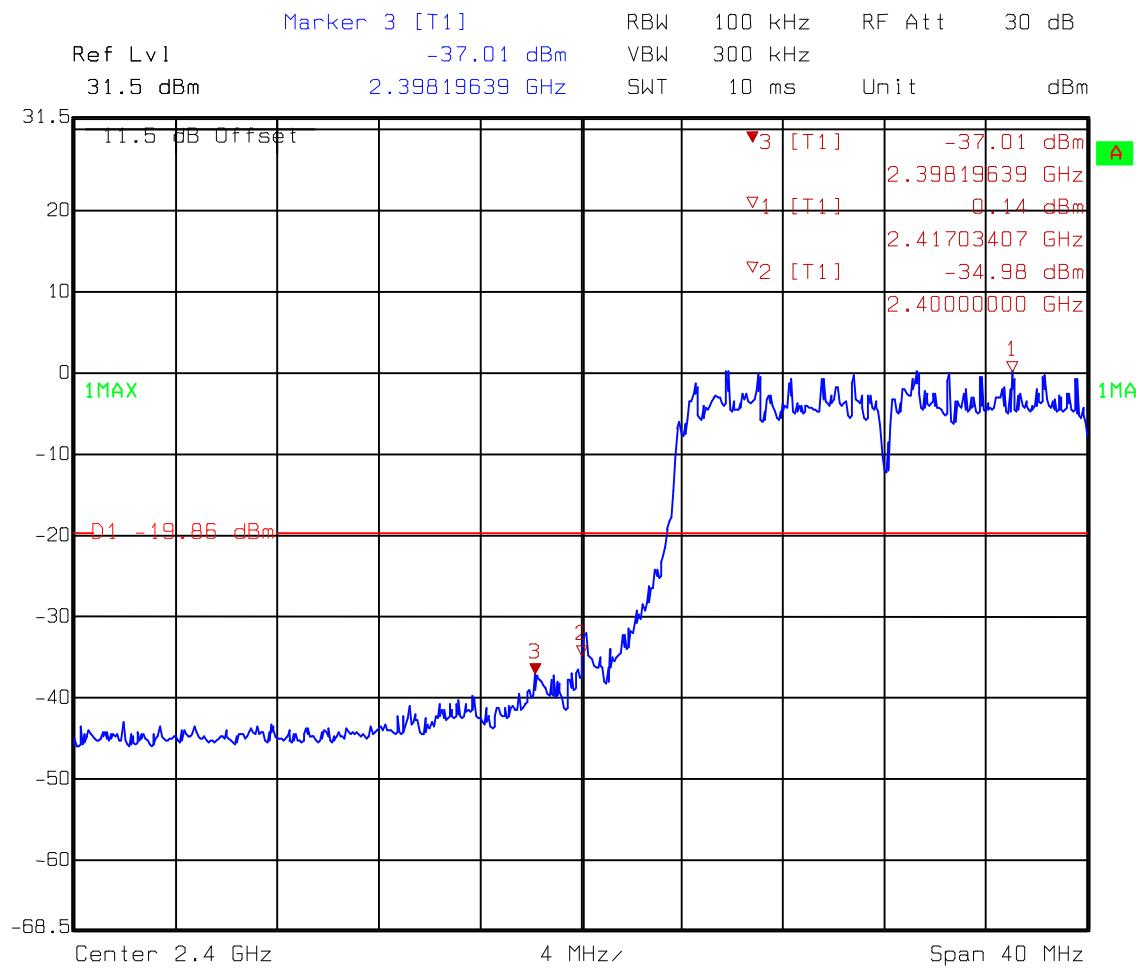


Comment A: Band-edge at channel 1 (EC365) 802.11b
Date: 15.FEB.2005 17:36:50

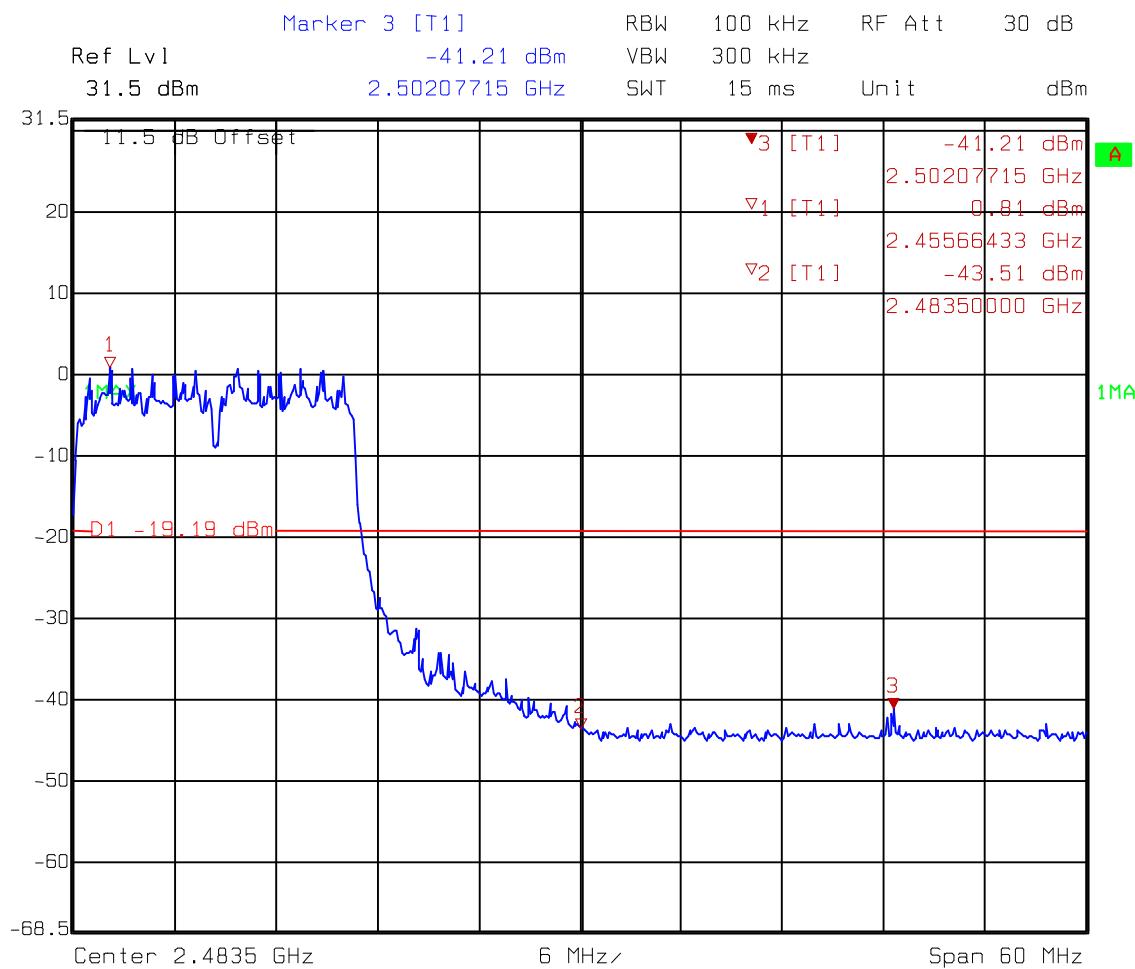


Comment A: Band-edge at channel 11 (EC365) 802.11b
Date: 15.FEB.2005 17:33:50

Test Mode: 802.11g operating (OFDM Modulation) mode



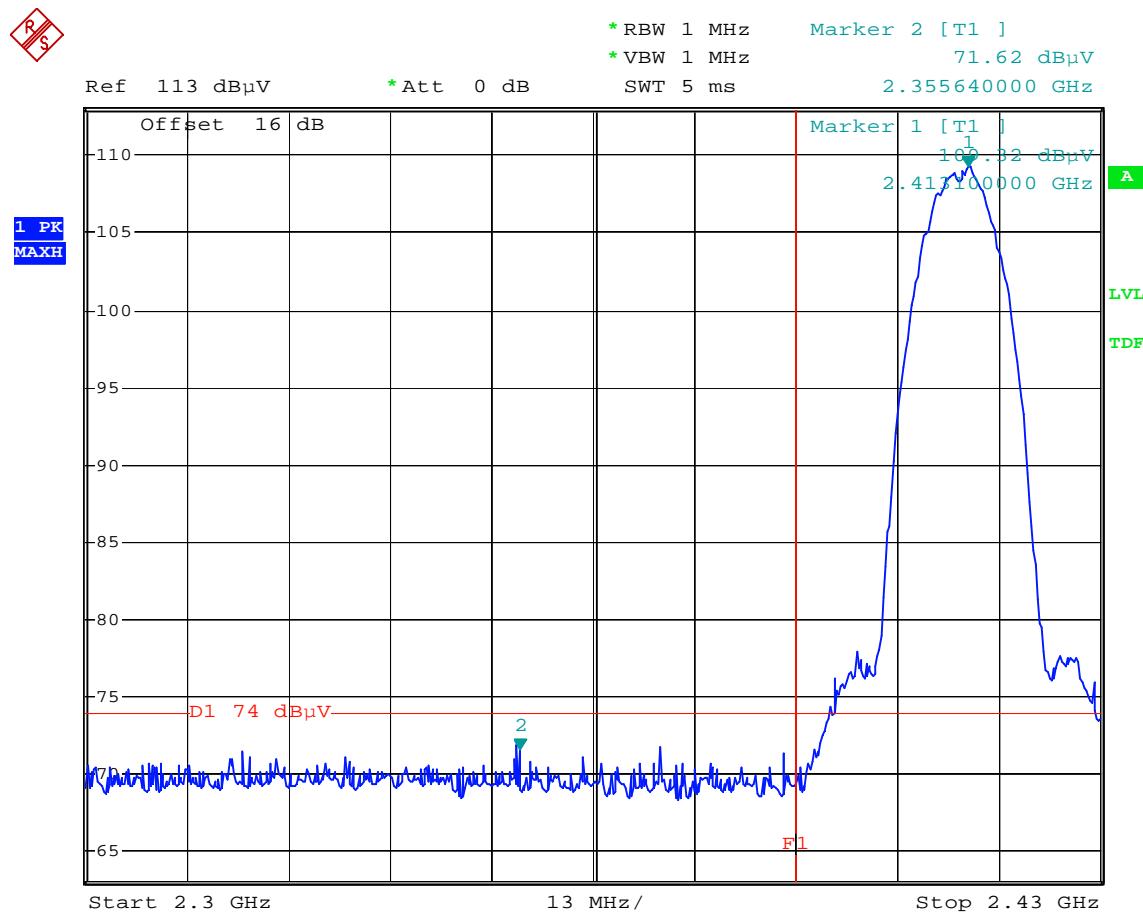
Comment A: Band-edge at channel 1 (EC365) 802.11g
 Date: 15.FEB.2005 17:38:09



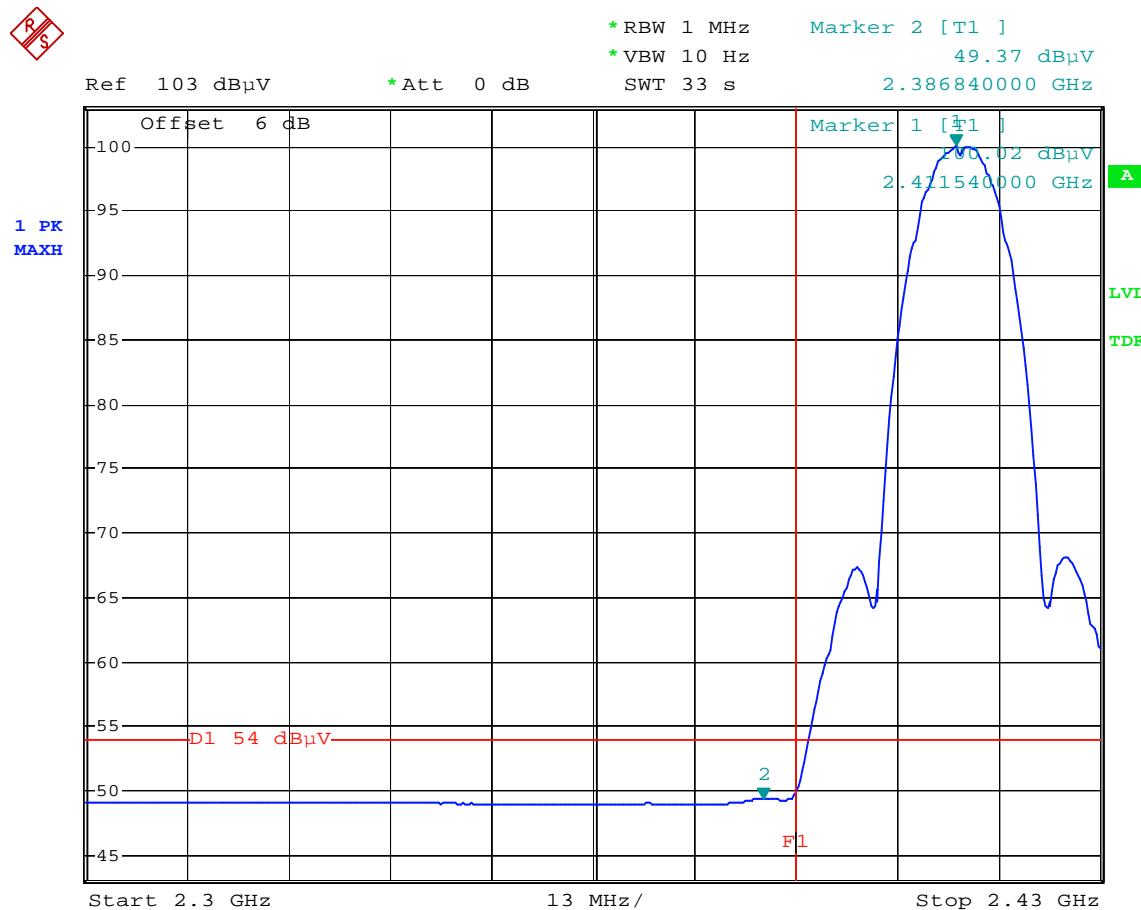
Comment A: Band-edge at channel 11 (EC365) 802.11g
 Date: 15.FEB.2005 17:32:20

7.2 Band-edge (Radiated method)

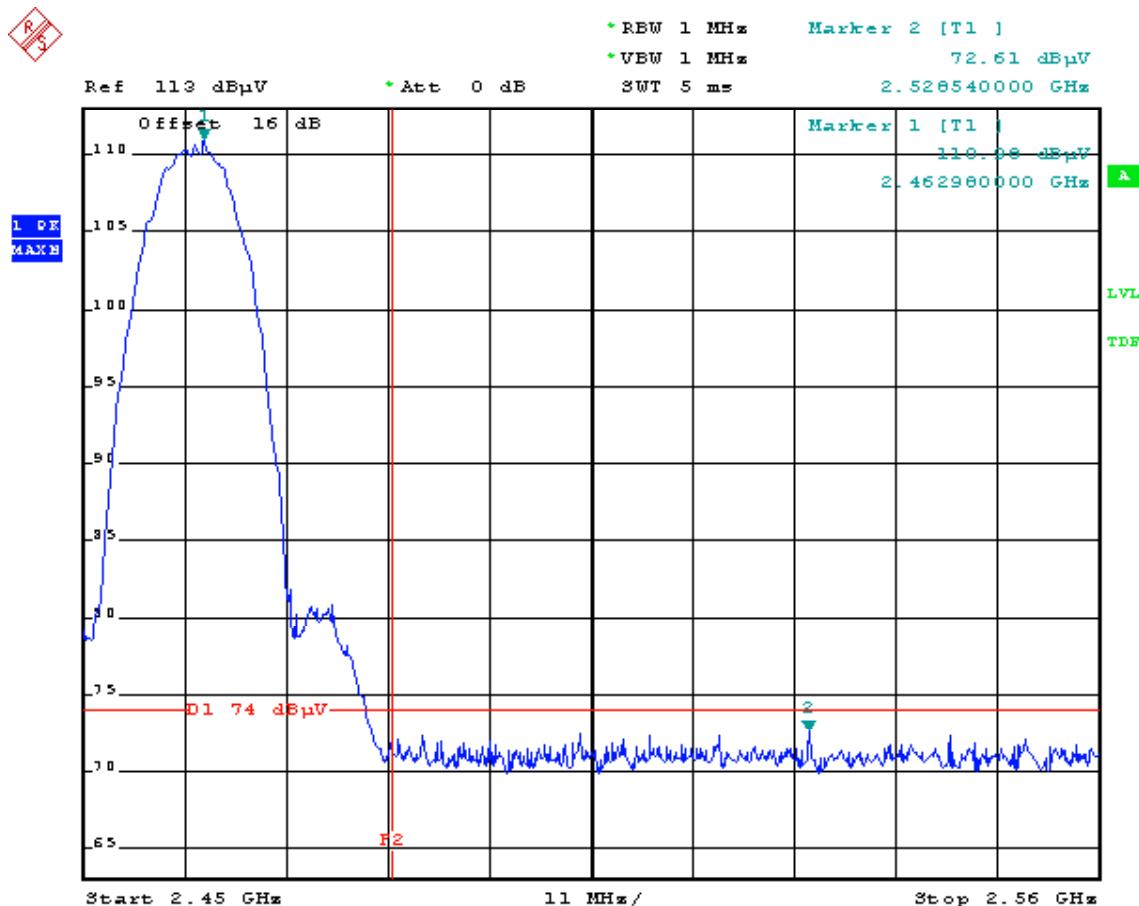
Test Mode: 802.11b operating (DSSS Modulation) mode



Comment: Band-edge Test at CH1
 Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11b
 Date: 18.FEB.2005 11:15:36



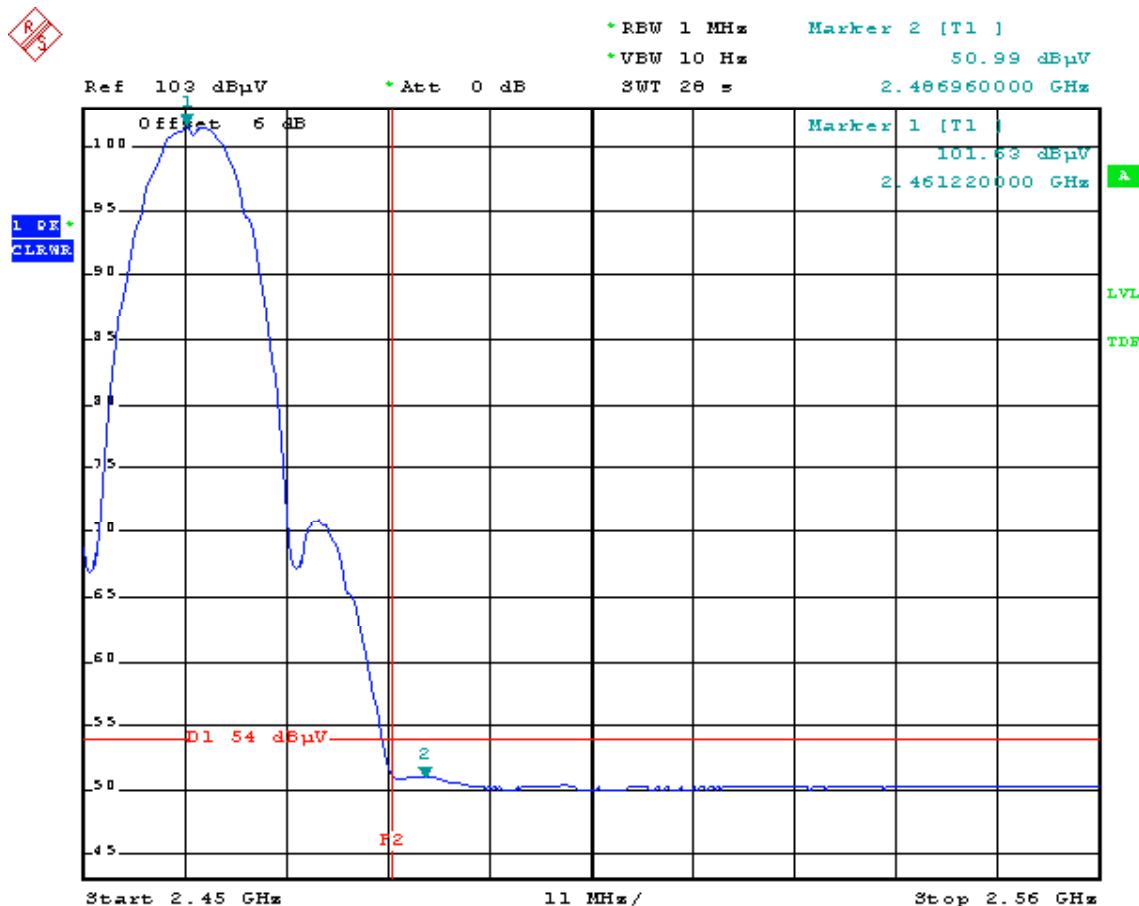
Comment: Band-edge Test at CH1
 Comment: Avg. Detector F1=2390MHz ATT=6dB 802.11b
 Date: 18.FEB.2005 11:12:13



Comment: Band-edge Test at CH11

Comment: Peak. Detector F2=2463.5MHz ATT=16dB 602.11b

Date: 18.FEB.2005 10:44:25

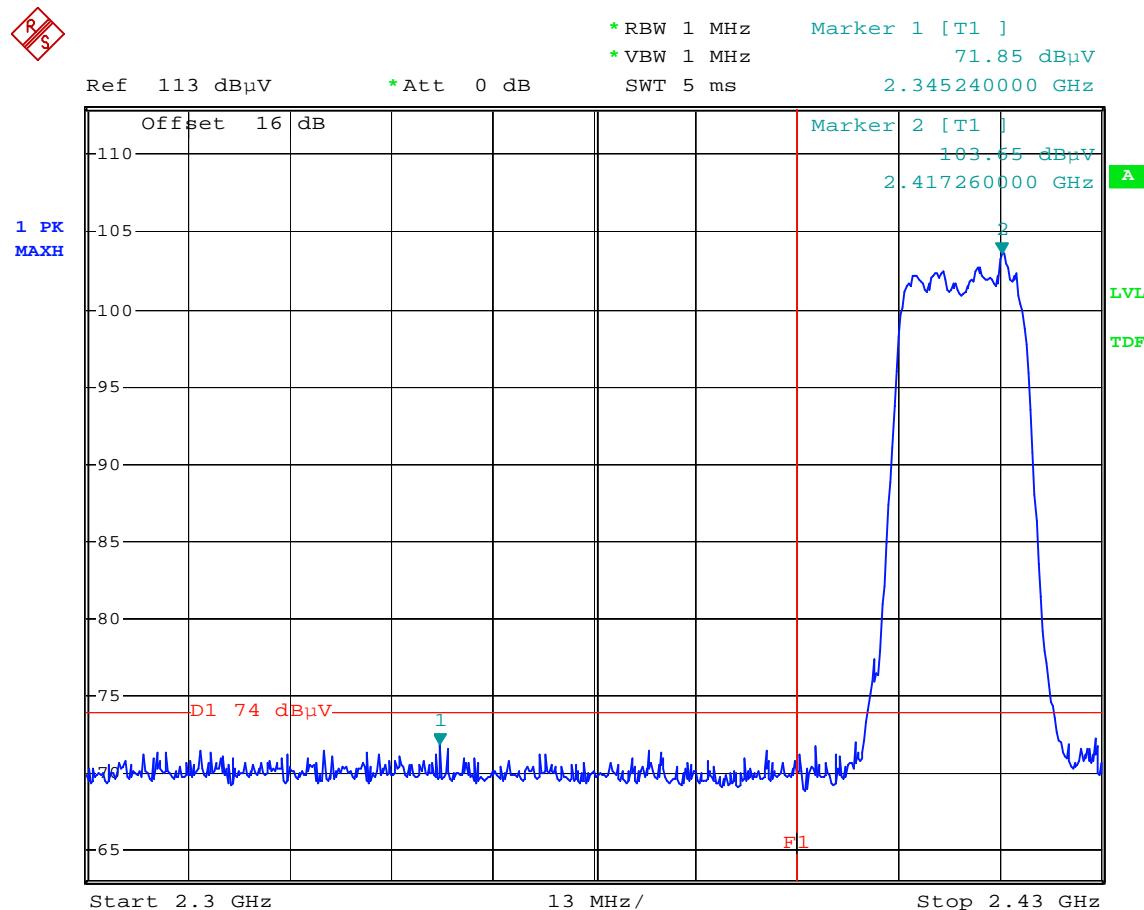


Comment: Band-edge Test at CH11

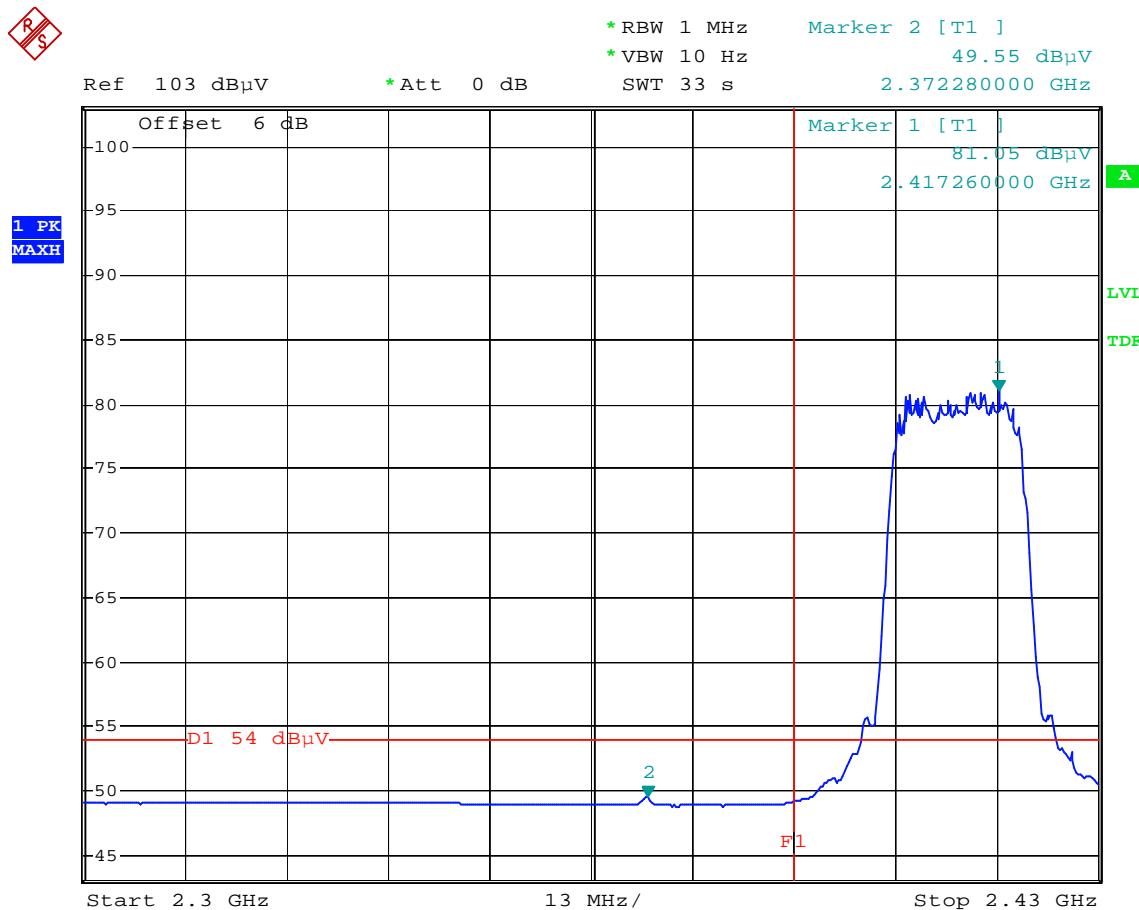
Comment: Avg. Detector F2=2483.5MHz ATT=6dB 602.11b

Date: 18.FEB.2005 10:52:06

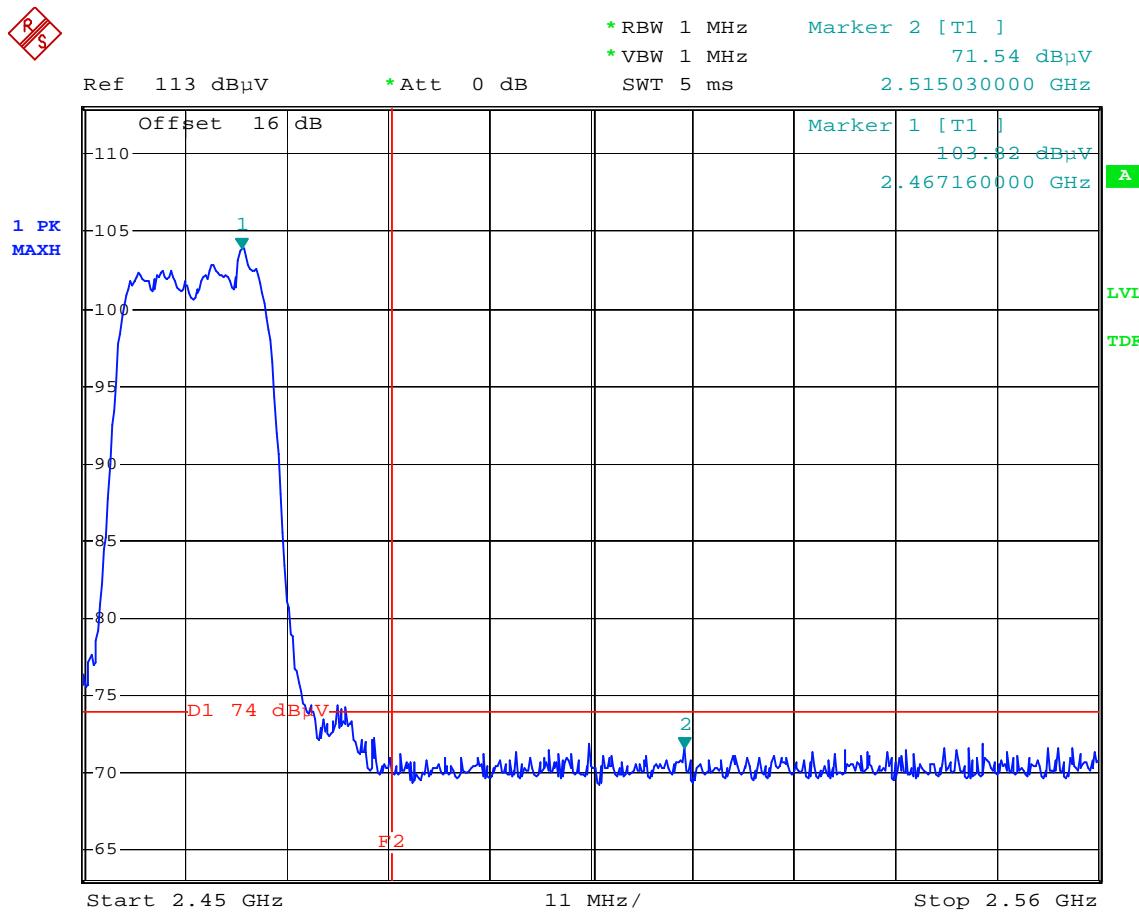
Test Mode: 802.11g operating (OFDM Modulation) mode



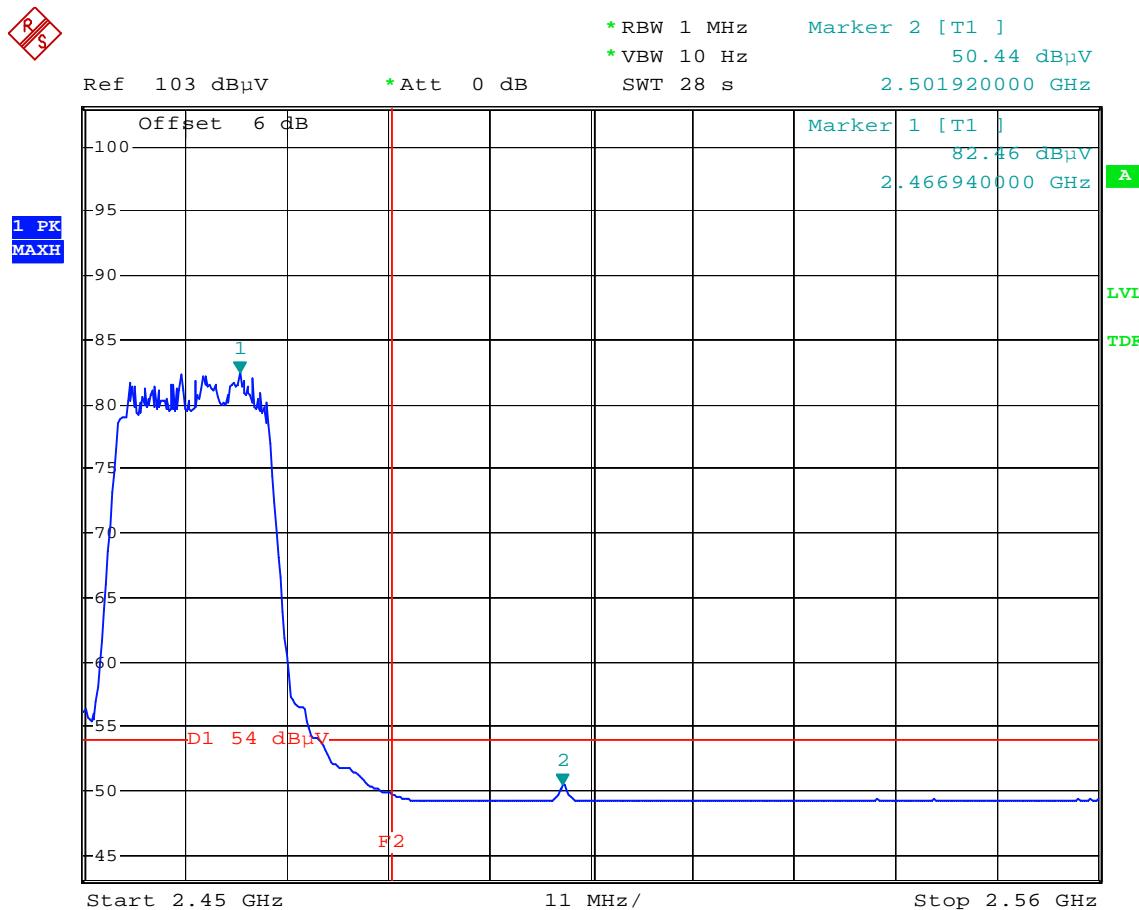
Comment: Band-edge Test at CH1
 Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11g
 Date: 18.FEB.2005 11:05:54



Comment: Band-edge Test at CH1
 Comment: Avg. Detector F1=2390MHz ATT=6dB 802.11g
 Date: 18.FEB.2005 11:09:16



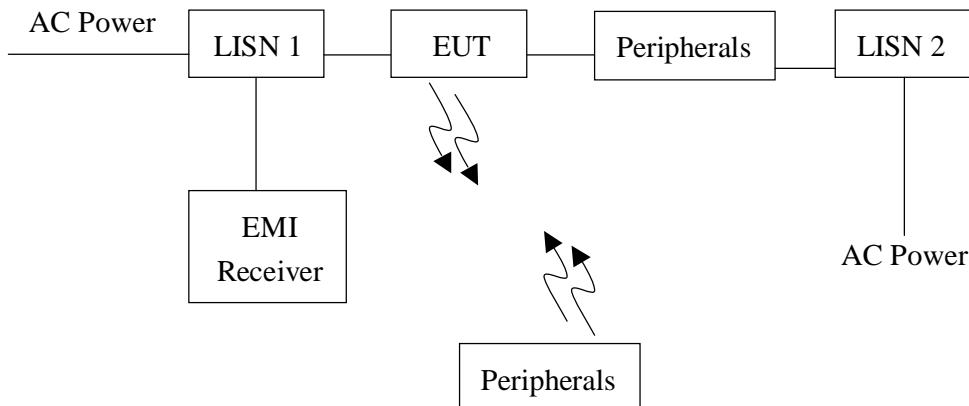
Comment: Band-edge Test at CH11
Comment: Peak. Detetor F2=2483.5MHz ATT=16dB 802.11g
Date: 18.FEB.2005 10:57:53



Comment: Band-edge Test at CH11
 Comment: Avg. Detector F2=2483.5MHz ATT=6dB 802.11g
 Date: 18.FEB.2005 11:01:22

8. Power Line Conducted Emission test §FCC 15.207**8.1 Operating environment**

Temperature: 23 °C
Relative Humidity: 55 %
Atmospheric Pressure 1023 hPa

8.2 Test setup & procedure

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement. The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

8.3 Emission limit

| Freq. (MHz) | Conducted Limit (dBuV) | |
|----------------|------------------------|----------|
| | Q.P. | Ave. |
| 0.15~0.50 | 66 – 56* | 56 – 46* |
| 0.50~5.00 | 56 | 46 |
| 5.00~30.0 | 60 | 50 |

*Decreases with the logarithm of the frequency.

8.4 Uncertainty of Conducted Emission

Expanded uncertainty (k=2) of conducted emission measurement is 2.6 dB.

8.5 Power Line Conducted Emission test data

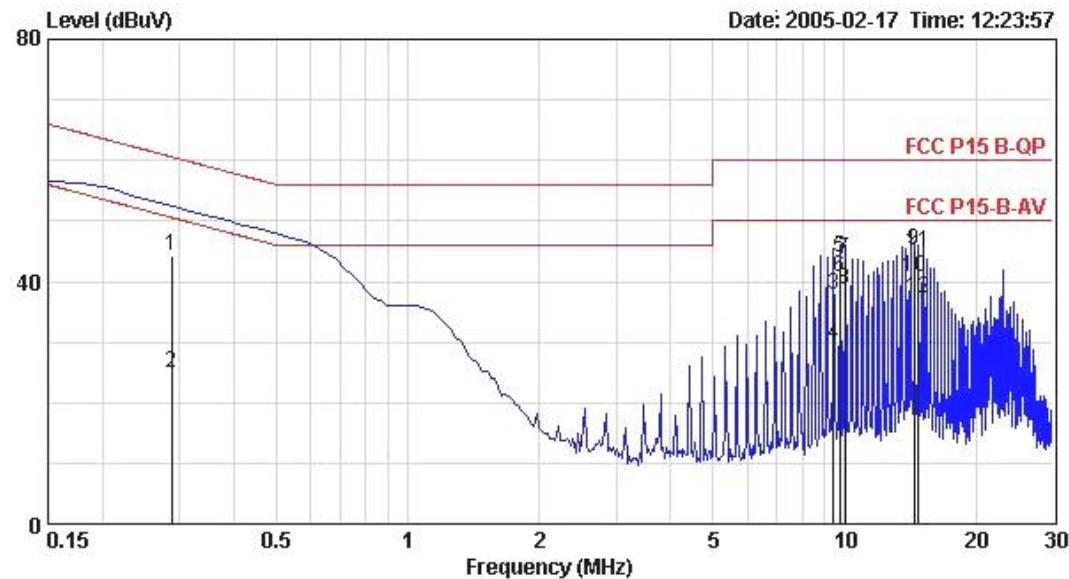
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11g normal operating mode

Phase: Line
 Model No.: WR254
 Worst Case: 802.11g normal operating mode

| Frequency (MHz) | Corr. Factor (dB) | Level Qp (dBuV) | Limit Qp (dBuV) | Level Av (dBuV) | Limit Av (dBuV) | Margin (dB) Qp | Margin (dB) Av |
|--------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|
| 0.288 | 0.10 | 44.27 | 60.60 | 24.87 | 50.60 | -16.33 | -25.73 |
| 9.429 | 0.48 | 37.72 | 60.00 | 29.61 | 50.00 | -22.28 | -20.39 |
| 9.739 | 0.49 | 43.84 | 60.00 | 40.77 | 50.00 | -16.16 | -9.23 |
| 10.047 | 0.50 | 43.59 | 60.00 | 38.60 | 50.00 | -16.41 | -11.40 |
| 14.446 | 0.78 | 45.16 | 60.00 | 40.76 | 50.00 | -14.84 | -9.24 |
| 14.761 | 0.80 | 44.74 | 60.00 | 37.34 | 50.00 | -15.26 | -12.66 |

Remark:

1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral
 Model No.: WR254
 Worst Case: 802.11g normal operating mode

| Frequency (MHz) | Corr. Factor (dB) | Level Qp (dBuV) | Limit Qp (dBuV) | Level Av (dBuV) | Limit Av (dBuV) | Margin (dB) Qp | Margin (dB) Av |
|--------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|
| 0.285 | 0.10 | 44.29 | 60.67 | 24.11 | 50.67 | -16.38 | -26.56 |
| 9.420 | 0.29 | 42.84 | 60.00 | 36.80 | 50.00 | -17.16 | -13.20 |
| 9.735 | 0.30 | 41.95 | 60.00 | 37.57 | 50.00 | -18.05 | -12.43 |
| 10.044 | 0.30 | 46.03 | 60.00 | 40.43 | 50.00 | -13.97 | -9.57 |
| 14.436 | 0.50 | 47.11 | 60.00 | 42.78 | 50.00 | -12.89 | -7.22 |
| 14.749 | 0.51 | 47.09 | 60.00 | 41.51 | 50.00 | -12.91 | -8.49 |

Remark:

1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

