

# FCC TEST REPORT

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## Locations & Offices

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### Network Navigation

• SEOUL  
• YONGIN  
• GUMI

June 13, 2006

NEX 1 Future Co., Ltd.

**TEST REPROT CERTIFICATION**

**Applicant** : Pantech C&I Co.,Ltd

**Adderss** : 12F, Shinsong Center Bldg, 25-12, Yeouido-dong, Youngdeungpo-gu, Seoul, 150-711, Korea

**EUT Name** : Pantech Portable Handsfreetkit

**Model No.** : PK1

**Serial No.** : Engineering Sample

**FCCID** : JYCPK1

**Testing location** : Nex1 Future Co., Ltd.  
133, Kongdan-Dong, Gumi-City, Kyeongsangbuk-Do, 730-030, R.O.K

**Applied specification** : FCC Part 15

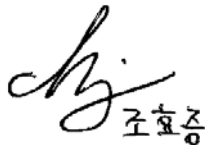
**Test result** : The above mentioned test item passed.

**Test Date** June 13, 2006 **Review Date** June 13, 2006

**Tested by** Hyo-Jeung, Cho **Reviewed by** Jeong-Hi, Jin

**Title** Engineer **Title** EMC Manager

**Signature**

  
조효정

**Signature**

  
진정희

I HEREBY CERTIFY THAT the data shown in this report were made in accordance with the procedures given in the applied specification and I assume full responsibility for accuracy and completeness of these data.

Note : This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.

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## **1. General Information**

### **1.1 Product Description**

Product Name : Pantech Portable Handsfreekit  
Product ID : PK1  
Serial No. : Prototype  
FCC ID : JYCPK1

### **1.2 Project data**

Receipt of EUT : May 20, 2006  
Date of Test : June 12, 2006  
Data of report : June 13, 2006

### **1.3 Applicant**

Company Name : Pantech C&I Co.,Ltd  
Address : 12F, Shinsong Center Bldg, 25-12, Yeouido-dong, Youngdeungpo-gu, Seoul, 150-711, Korea  
Contact Person : Mr. Sung Min Bong

### **1.4 Manufacturer**

Company Name : Pantech C&I Co.,Ltd  
Address : 12F, Shinsong Center Bldg, 25-12, Yeouido-dong, Youngdeungpo-gu, Seoul, 150-711, Korea  
Contact Person : Mr. Sung Min Bong

## 2. EUT Information

### 2.1 General EUT Information

| Type                      | Transmitter                           | Receiver                              |
|---------------------------|---------------------------------------|---------------------------------------|
| FCC Classification        | FHSS Sequence Spread Spectrum ( FHSS) | FHSS Sequence Spread Spectrum ( FHSS) |
| Operating frequency range | 2402 – 2480 MHz                       | 2402 – 2480 MHz                       |
| Bands of operation        | 2.400 – 2.4835 GHz                    | 2.400 – 2.4835 GHz                    |
| Number of Channels        | 79                                    | 79                                    |
| Channel Separation        | 1MHz                                  | 1MHz                                  |
| Type of Antenna           | Chip Antenna                          | Chip Antenna                          |
| Power Supply              | DC 12 V Vehicular Battery             | DC 12 V Vehicular Battery             |

### 2.2 Center Frequency of Tested Channel

| Frequency | Tx ( MHz ) | Rx ( MHz) |
|-----------|------------|-----------|
| Lowest    | 2402       | 2402      |
| Middle    | 2441       | 2441      |
| Highest   | 2480       | 2480      |

### 2.3 Test Environment

|                   |          |
|-------------------|----------|
| Temperature       | 25°C     |
| Relative Humidity | 30 ~ 60% |
| DC Voltage        | DC 12 V  |

### 2.4 Accessories and Ancillary Equipment

| Equipment | Model No.    | Serial Number | Maker   |
|-----------|--------------|---------------|---------|
| Laptop PC | PS428L-OE142 | 30014068J     | Toshiba |
|           |              |               |         |
|           |              |               |         |
|           |              |               |         |
|           |              |               |         |
|           |              |               |         |

### 3. Testing Facilities

Nex1 Future Co., Ltd.

133, Kongdan-Dong, Gumi-City, Kyeongsangbuk-Do, 730-030, R.O.K

### 4. EUT Description and Operational Description

This Product is a Bluetooth CarKit featuring a state of the art Bluetooth Wireless technology.

It has excellent echo cancel and noise reduction ability, and surely is in its class by itself.

Using this CarKit, users can make or answer a call without touching their cell phones.

This device also features well-defined Man Machine interface with 3 buttons ,

1 Jog Dial and 2 LEDs which are :

- Buttons : 3 pcs [Send, End, Mute]
- Jog Dial : 1 pcs [Volume Up/Down]
- LEDs : 2 pcs [RED/BLUE]

And it is also fully compliant with Bluetooth 1.2 specification.

#### \* General specifications

| Item                          | Description               |
|-------------------------------|---------------------------|
| Bluetooth Specification       | V1.2                      |
| Supported Profile             | Headset/Handfree profile  |
| Rx. Sensitivity               | Typ. -80 dBm              |
| Speaker                       | 8Ω / 2W (normal)          |
| MIC                           | -47dB / Unidirectional x2 |
| Low Power Current (Idle Mode) | ≤ 10 mA                   |
| Operating Temperature         | -10℃ ~ 50℃                |
| Operating Humidity            | 5% ~ 85% RH               |
| Storage Temperature           | -20℃ ~ 85℃                |
| Storage Humidity              | 85% RH                    |

## **5. Test Set-up**

### **5.1 Principle of configuration**

**Conducted** : The equipment under test (EUT) was configured with a temporary SMA Connector and EUT transmits the related packet type with PRBS 9 as payload.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes and test settings were adapted accordingly in reference to the instructions for use.

For details, please refer to the Operation mode in chapter 7.

### **5.2 Operational Modes**

Page Scan,

Inquiry Scan

Hopping Mode

Fixed mode ( 2402Mhz, 2441Mhz and 2480Mhz )

### **5.3 Applied Specification**

FCC Part 15

## 6. Test Report Summary

| Related Clause | Test Cases                                                                           | FCC Part Sections | Result ( Note1) |
|----------------|--------------------------------------------------------------------------------------|-------------------|-----------------|
| 7.1            | Antenna Connector Requirements                                                       | 15.203<br>15.204  | C               |
| 7.2            | AC Connected Emission                                                                | 15.207            | N/A             |
| 7.3            | Carrier Frequency Separation                                                         | 15.247            | Pass            |
| 7.4            | Time of Occupancy(Dwell time)                                                        | 15.247            | Pass            |
| 7.5            | 20dB Bandwidth                                                                       | 15.247            | Pass            |
| 7.6            | Number of Hopping Frequencies Requirements                                           | 15.247            | C               |
| 7.7            | Pseudorandom Frequency Hopping Sequence and Equal Hopping Frequency use Requirements | 15.247            | C               |
| 7.8            | Receiver Input Bandwidth Requirements                                                | 15.247            | C               |
| 7.9            | Peak Output Power                                                                    | 15.247            | Pass            |
| 7.10           | Band-edge Compliance                                                                 | 15.247            | Pass            |
| 7.11           | Spurious Conducted emissions                                                         | 15.247            | Pass            |
| 7.12           | Spurious Radiated emissions                                                          | 15.247            | Pass            |

\* Note1: C: Complies, Pass: Passed, Fail : Failed and NA : Not Applicable

## 7. Test Results

### 7.1 Antenna Connector Requirements

#### Requirements

#### **Subclause 15.203 and 15.204(c)**

According to the Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to the Part 15.204(c), only the antenna with which an intentional radiator is authorized may be used with the intentional radiator.

#### Test results

#### **RESULT:**

#### **Complies**

The antenna is permanently attached on the PCB.

The EUT has a Chip Antenna soldered to the circuit board.

For more information on the antenna:

|              |                        |
|--------------|------------------------|
| Antenna gain | : 0 dBi                |
| Manufacturer | : AMOTECH Co., Ltd.    |
| Model No.    | : ALA931C5             |
| Type         | : Surface Chip Antenna |

## 7.2 AC Connected Emission

### Test Mode and conditions

The power is only supplied by a DC 12 V Vehicular battery.

### Requirements

### Subclause15.207(a)

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

| Frequency of Emission (M<br>Hz) | Conducted Limit (dB $\mu$ V) |         |
|---------------------------------|------------------------------|---------|
|                                 | Quasi-peak                   | Average |
| 0.15-0.5                        | 66-56*                       | 56-46*  |
| 0.5-5                           | 56                           | 46      |
| 5-30                            | 60                           | 50      |

\* Decreases with the logarithm of the frequency.

### Test results

N/A

### 7.3 Carrier Frequency Separation

#### Test Mode and conditions

Mode of operation : Tx mode (hopping on), DH1 packet with PRBS9 payload  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 100kHz/300kHz

#### Requirements

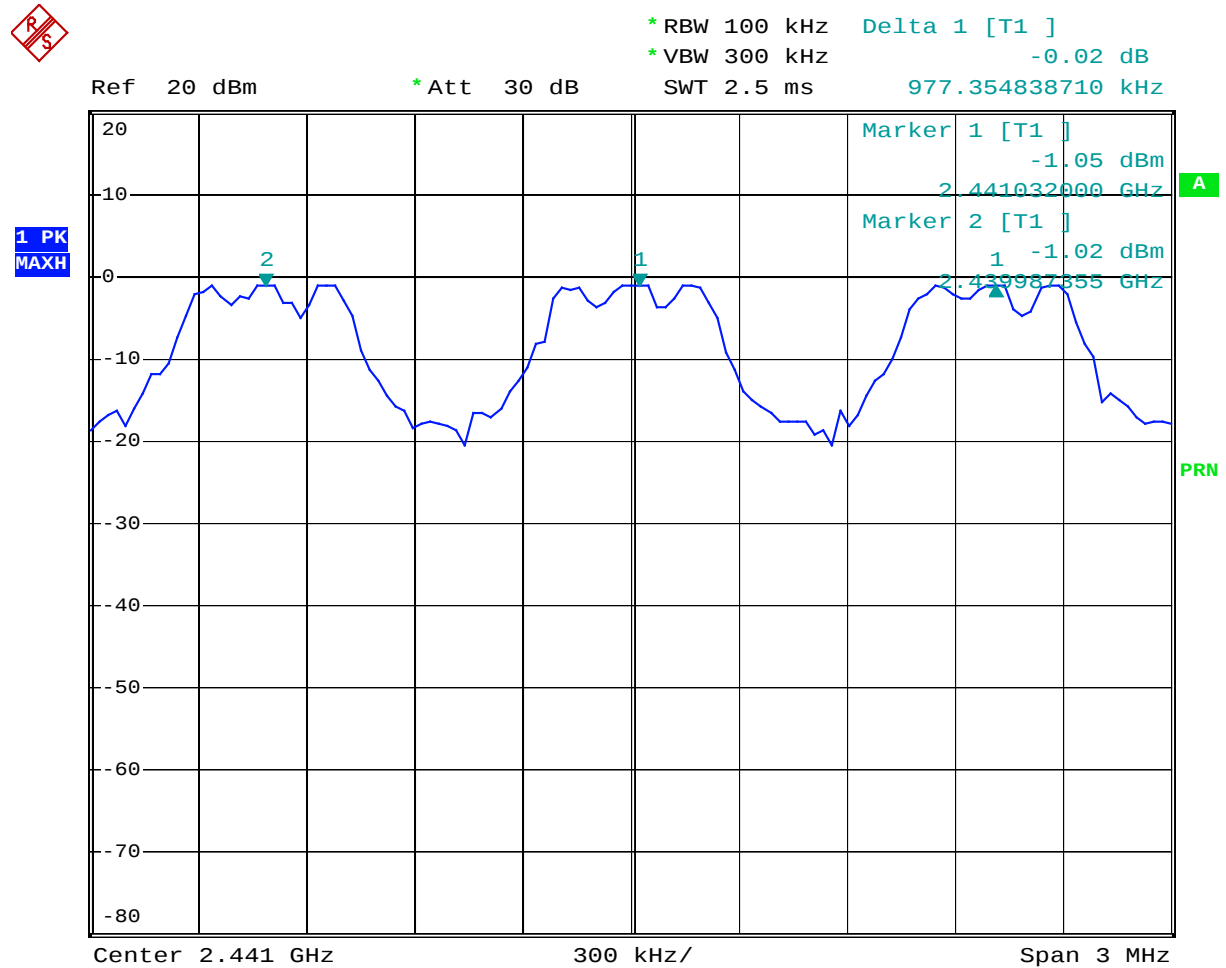
#### Subclause 15.247(a)(1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

#### Test results

| Reference frequency<br>(MHz) | Channel Separation<br>(kHz) | Limit                                     | Results |
|------------------------------|-----------------------------|-------------------------------------------|---------|
| 2441.000                     | 977.35                      | Minimum of 25kHz or<br>the 20dB bandwidth | Pass    |

### Carrier Frequency Separation Plot



Date: 27.MAY.2006 14:55:53

#### 7.4 Time of Occupancy(Dwell time)

##### Test Mode and conditions

Mode of operation : Hopping on , DH5 packet with PRBS9 payload  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 1MHz/300kHz

##### Requirements

##### Subclause 15.247(a)(1)(iii)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 75 hopping frequencies. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

##### Test results

The system makes 1600 hops per second or has a length of 625us.

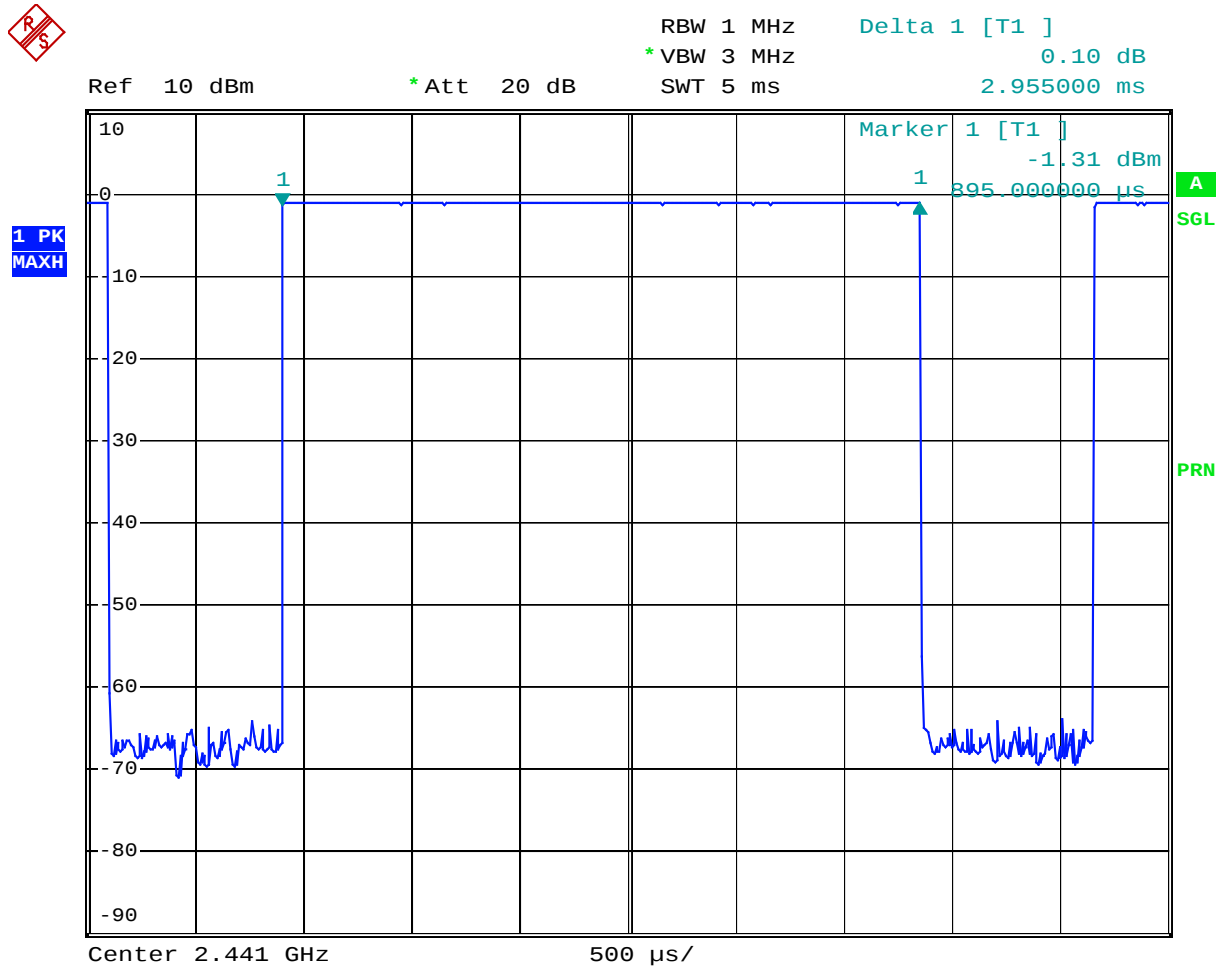
Let take DH5 packet in worst case. A DH5 packet has 5 slots for transmitting and 1 slot for receiving. It means it can have maximum 266.67 ( $=1600/6$ ) hops per second.

Therefore it has 3.38 hops( $=266.67/79$ ) per second for each channel.

And it has 106.81hops appearance for 31.6 seconds ( $= 0.4 \times 79 \text{ channels}$ ).

| Length per slot(L) | Number slots (N) | Dwell Time (=L*N) | Limit       | Results |
|--------------------|------------------|-------------------|-------------|---------|
| 2.955ms            | 106.81           | 315.62355ms       | 0.4 seconds | Pass    |

### Time of Occupancy Plot



Date: 27.MAY.2006 15:16:13

**7.5 20dB Bandwidth****Test Mode and conditions**

Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz),  
DH5 packet with PRBS9 payload  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 30kHz/100kHz

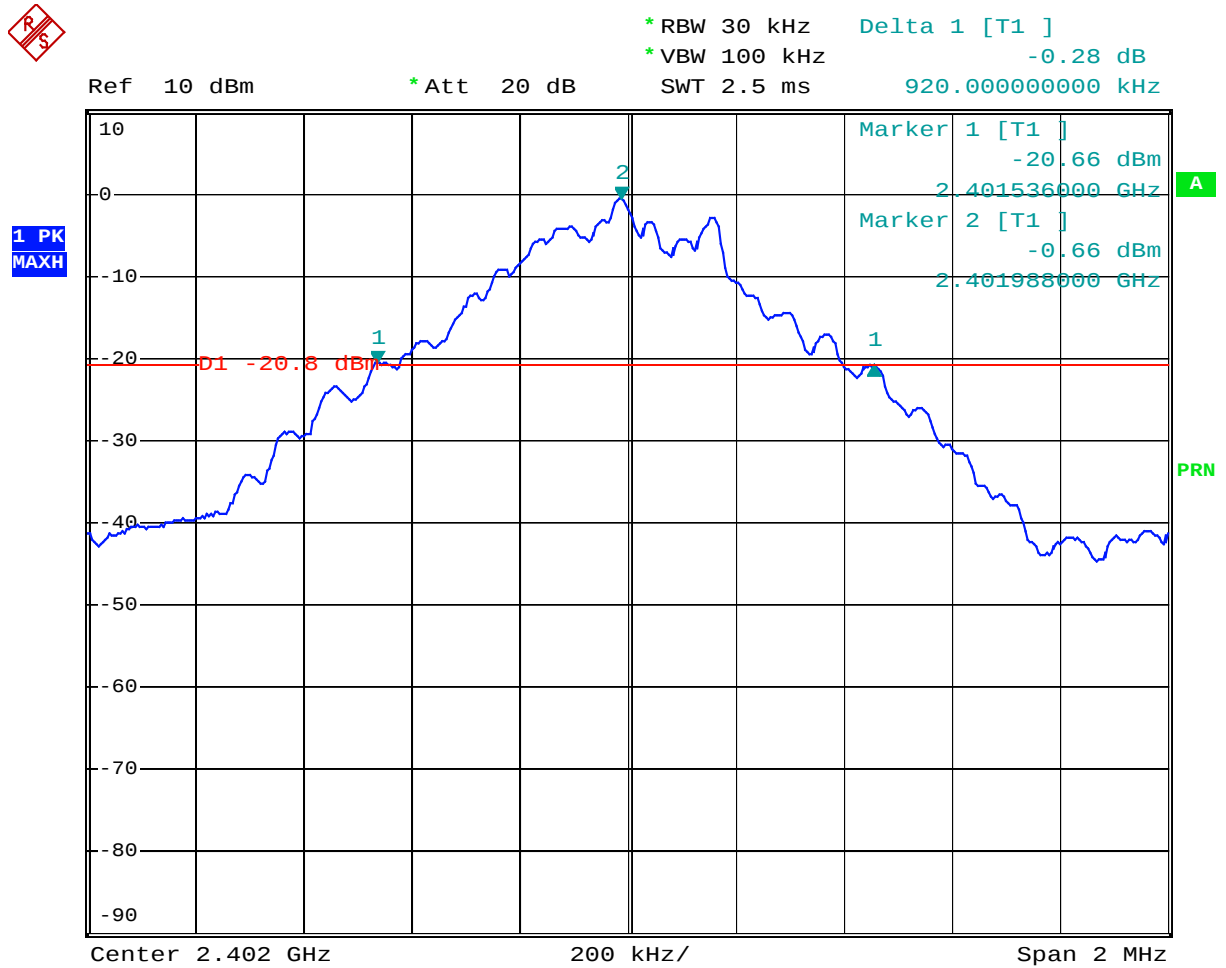
**Requirements****Subclause 15.247(a)(1)**

It is mentioned implicitly as the maximum 20dB bandwidth of the hopping channel is 1Mhz.

**Test results**

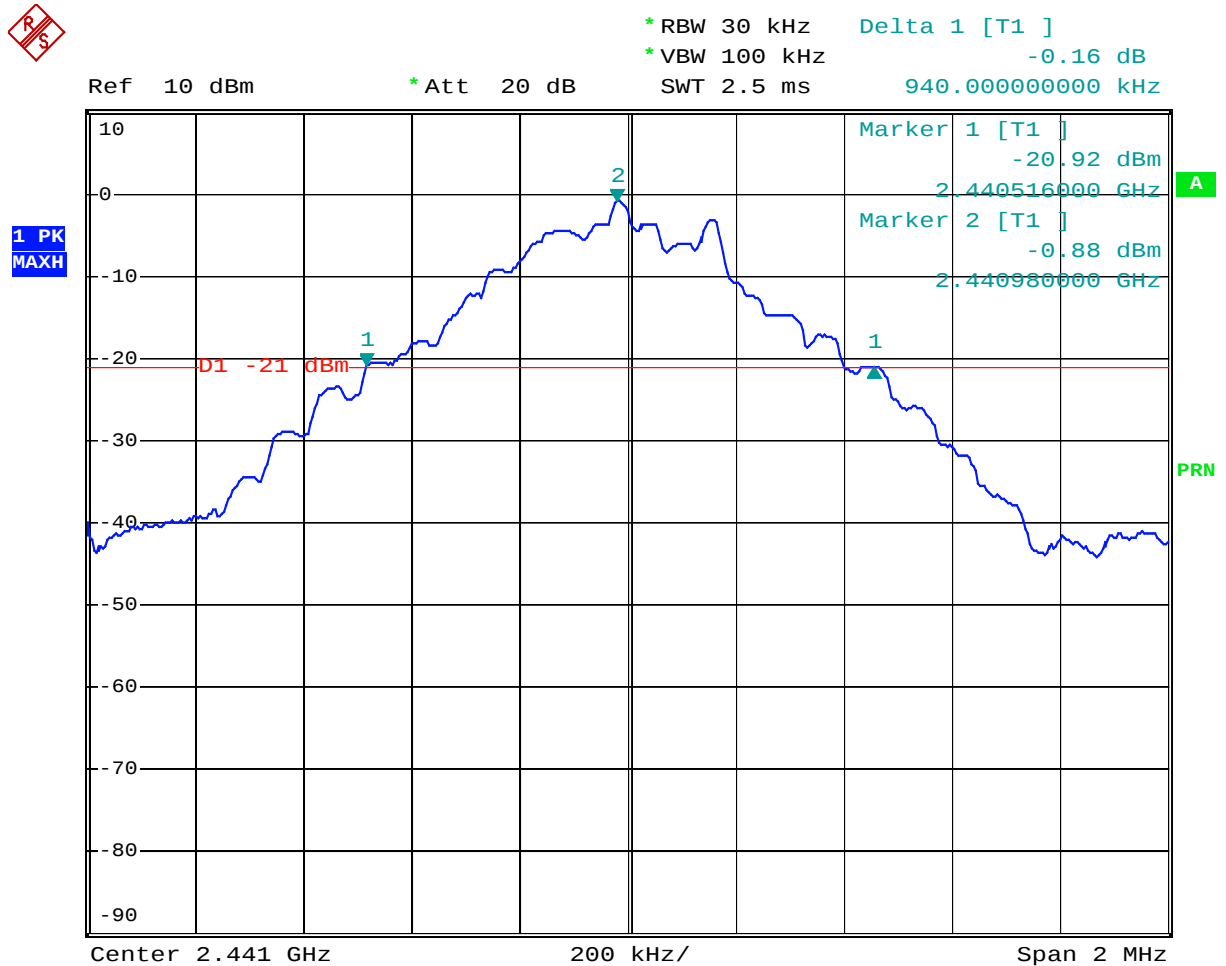
| Operating frequency (MHz) | 20dB Bandwidth (MHz) | Limit   | Results |
|---------------------------|----------------------|---------|---------|
| 2402                      | 0.920                | < 1 Mhz | Pass    |
| 2441                      | 0.940                | < 1 Mhz | Pass    |
| 2480                      | 0.924                | < 1 Mhz | Pass    |

## 20dB Bandwidth Plot – 2402Mhz



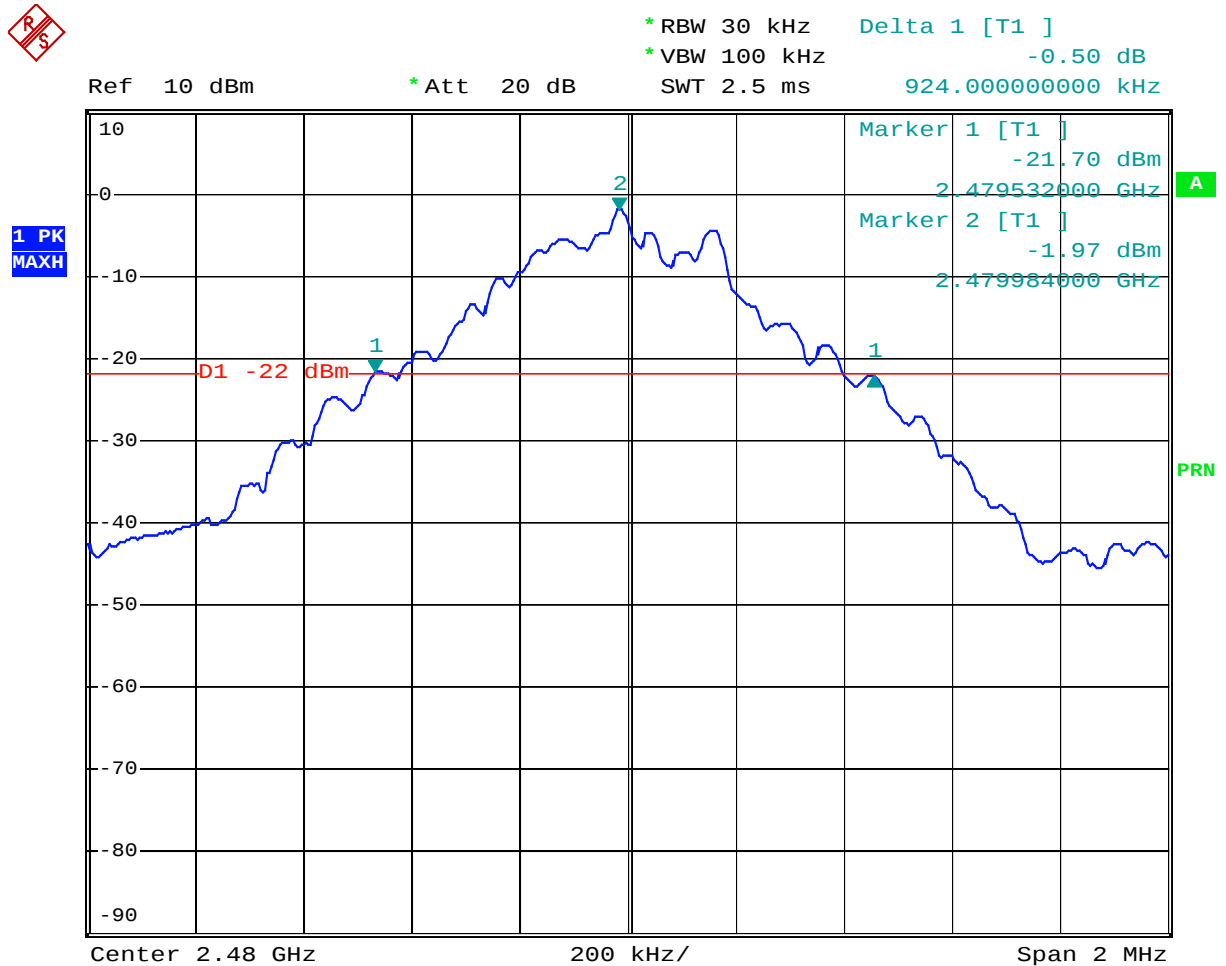
Date: 27.MAY.2006 15:27:53

**20dB Bandwidth Plot – 2441Mhz**



Date: 27.MAY.2006 15:29:24

**20dB Bandwidth Plot – 2480Mhz**



Date: 27.MAY.2006 15:23:42

## 7.6 Number of Hopping Frequencies Requirements

### Test Mode and conditions

Mode of operation : Hopping, DH1 with PRBS9 payload  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 100kHz/100kHz

### Requirements

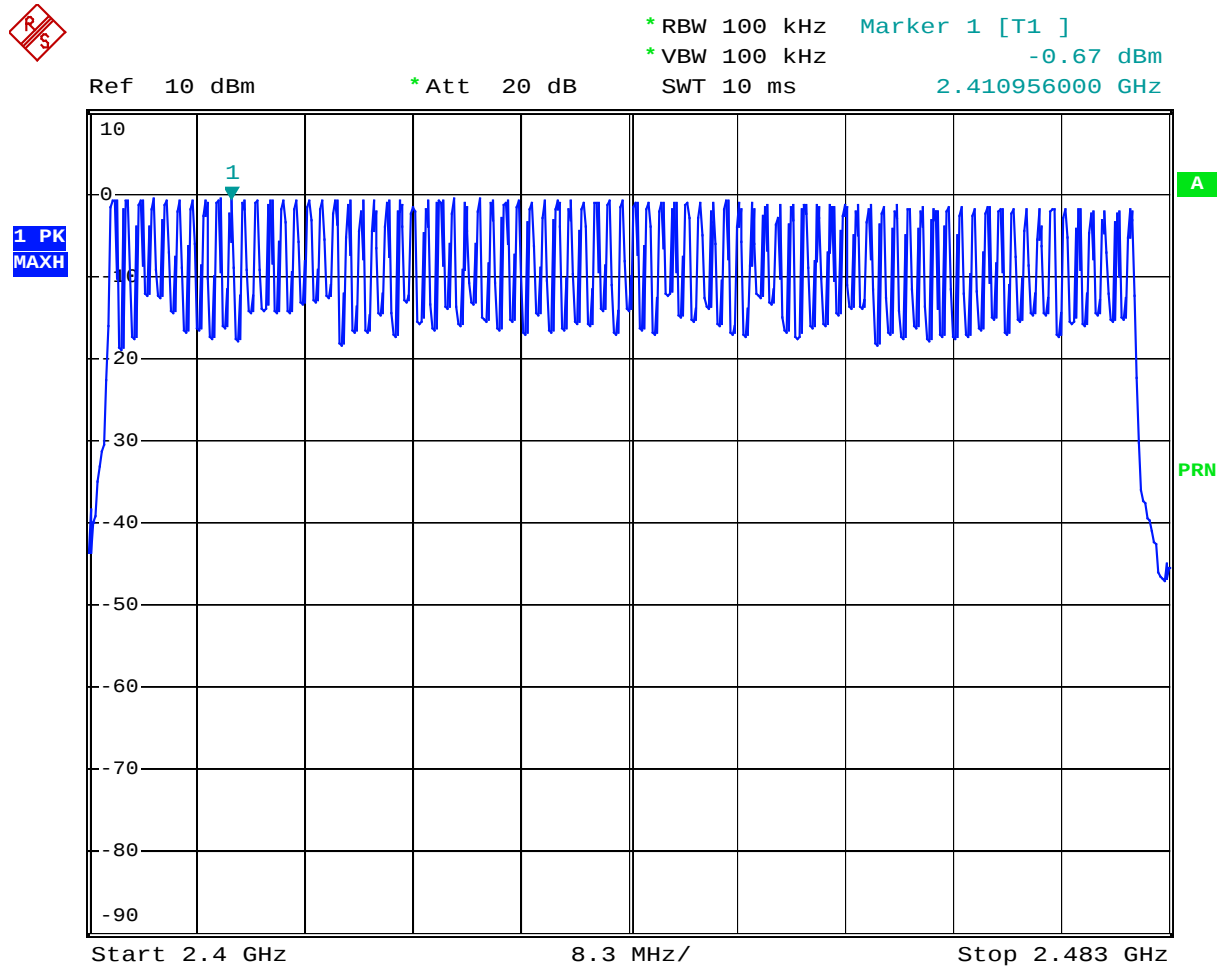
**15.247(a)(1)(iii)**

Frequency hopping systems in the 2400-2483.5 Mhz band shall use at least 15 non-overlapping Channels.

### Test results

| Operating frequency (MHz) | Number of Hopping | Limit     | Results |
|---------------------------|-------------------|-----------|---------|
| 2402~2480                 | 79                | $\geq 15$ | Pass    |

### Number of Hopping Frequencies Plot



Date: 27.MAY.2006 15:35:02

## 7.7 Pseudorandom FHS and Equal Hopping Frequency use Requirements

### Requirements

### Subclause 15.247 (a)(1)

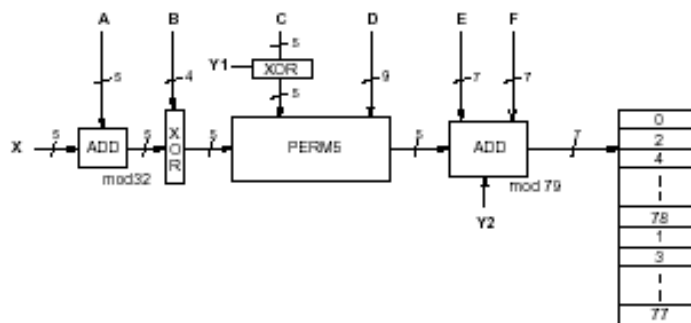
The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter.

### RESULT

### Complies

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master. For details, refer to the figure 1. The X input determines the phase in the 32-hop segment, whereas Y1 and Y2 selects between master-to-slave and slave-to-master transmission. The inputs A to D determine the ordering within the segment, the inputs E and F determine the mapping onto the hop frequencies.

The algorithm in the Bluetooth specifications shows the each of its hopping channels is used equally on average also.



< Figure 1 : Block diagram of hop selection kernel for 79 hop system >

## 7.8 Receiver Input Bandwidth Requirements

### Requirements

### **Subclause 15.247 (a)(1)**

The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in the synchronization with the transmitted signals.

### RESULT

### **Complies**

The receiver bandwidth is equal to the receiver bandwidth in the 79 hopping channel mode, which is 1 MHz. The receiver bandwidth is indirectly verified during Bluetooth RF conformance testing.

## 7.9 Peak Output Power

### Test Mode and conditions

Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz),  
DH1 packet with PRBS 9 payload  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 1MHz/3MHz

### Requirements

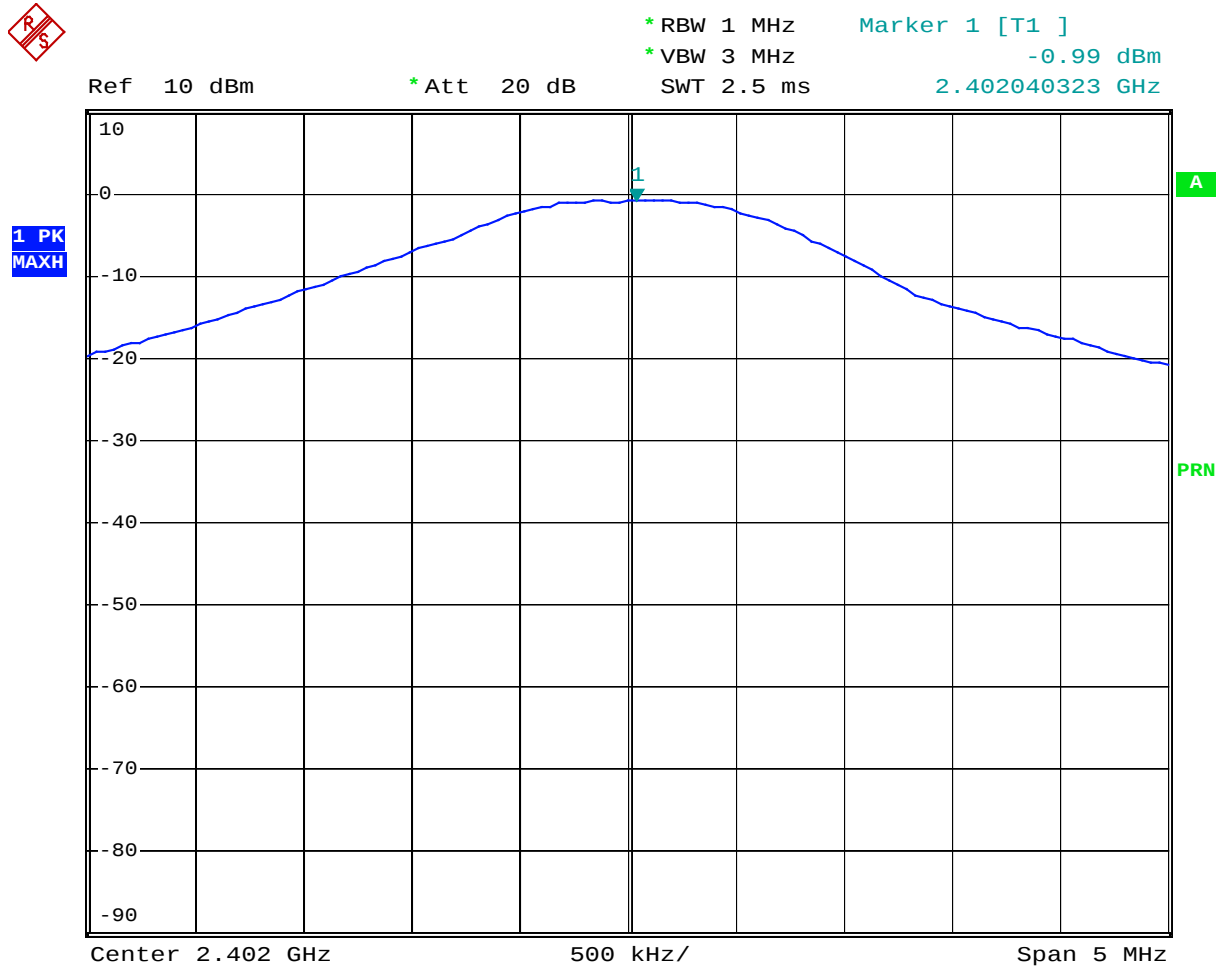
### Subclause 15.247(b)(1)

For frequency hopping systems operating in the 2400~2483.5 Mhz band employing at least 75hopping channels, the maximum output power of the intentional radiator shall not exceeded 1 watt.

### Test results

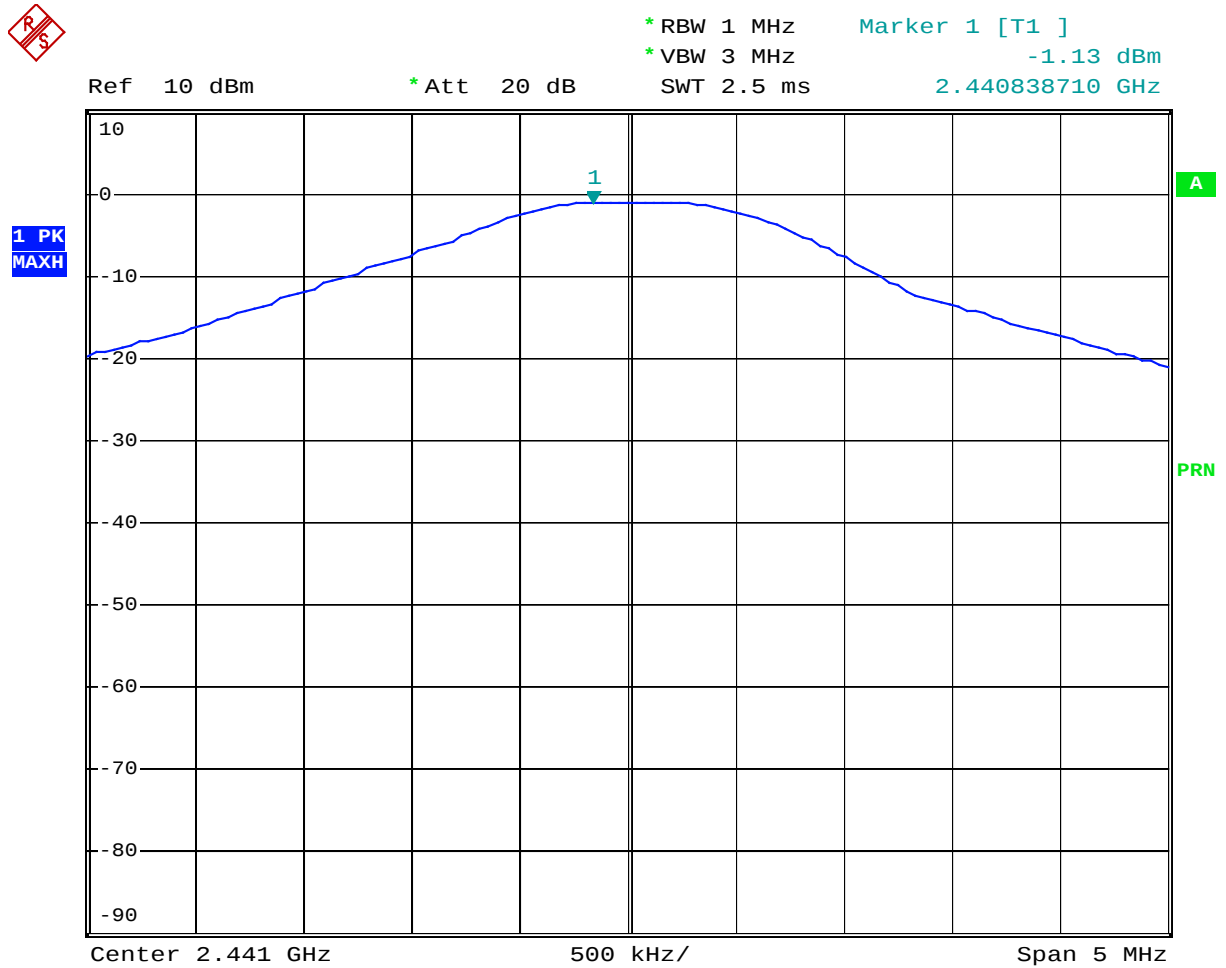
| Operating Frequency (MHz) | Reading (dBm) | Cable attenuation (dB) | Actual Value ( W ) | Limit (W) | Results |
|---------------------------|---------------|------------------------|--------------------|-----------|---------|
| 2402                      | -0.99         | 1.80                   | 0.001205036        | <1.0      | Pass    |
| 2441                      | -1.13         | 1.83                   | 0.001174900        | <1.0      | Pass    |
| 2480                      | -2.39         | 1.85                   | 0.000883080        | <1.0      | Pass    |

**Peak Output Power Plot - 2402**



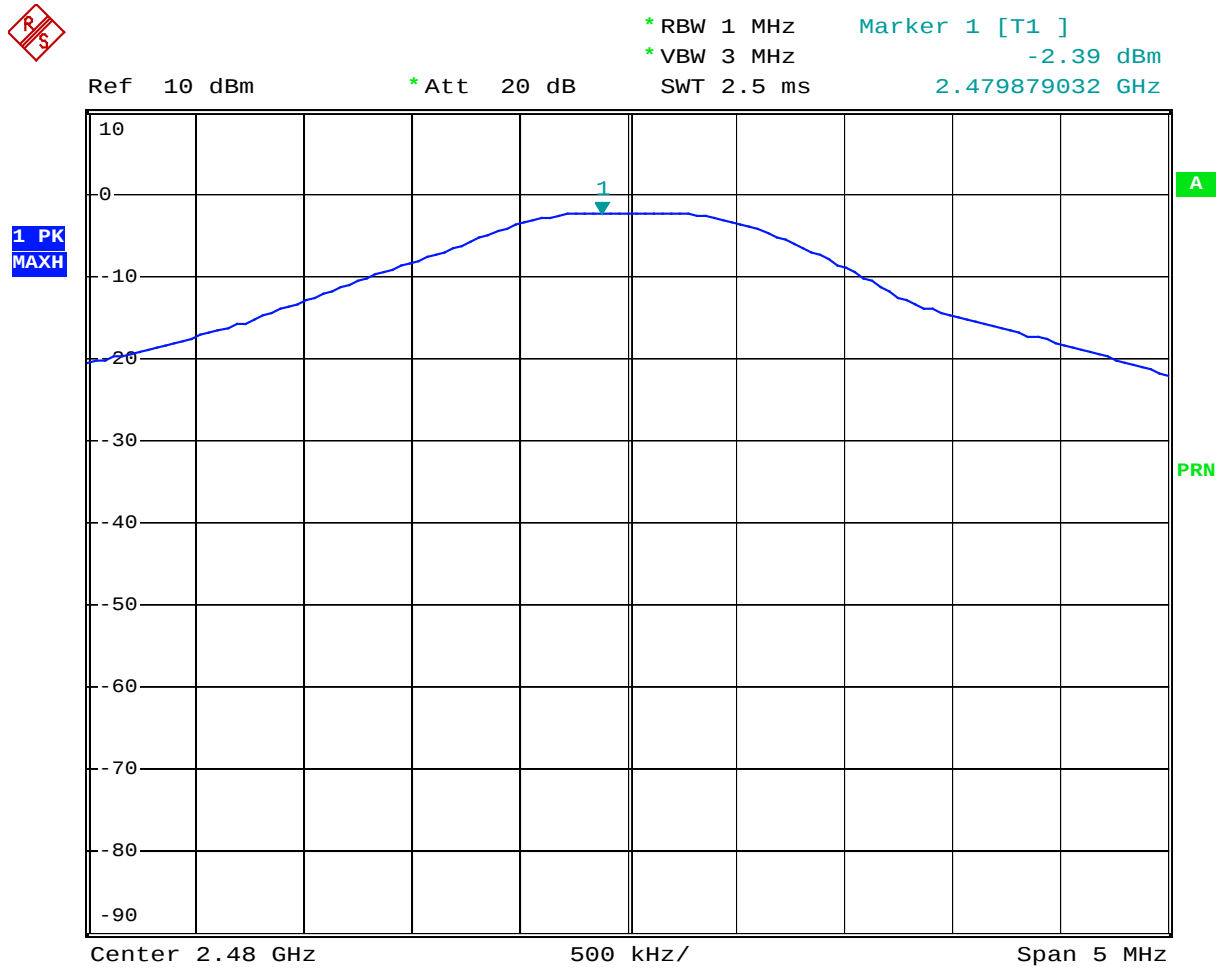
Date: 27.MAY.2006 15:37:11

**Peak Output Power Plot – 2441**



Date: 27.MAY.2006 15:37:59

**Peak Output Power Plot – 2480**



Date: 27.MAY.2006 15:40:00

## 7.10 Band-edge Compliance

### Test Mode and conditions

Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet  
Measurement Method : Conducted  
Detector : PK  
Trace : Max hold  
RBW/VBW : 300kHz/1.0MHz

### Requirements

### Subclause 15.247(c)

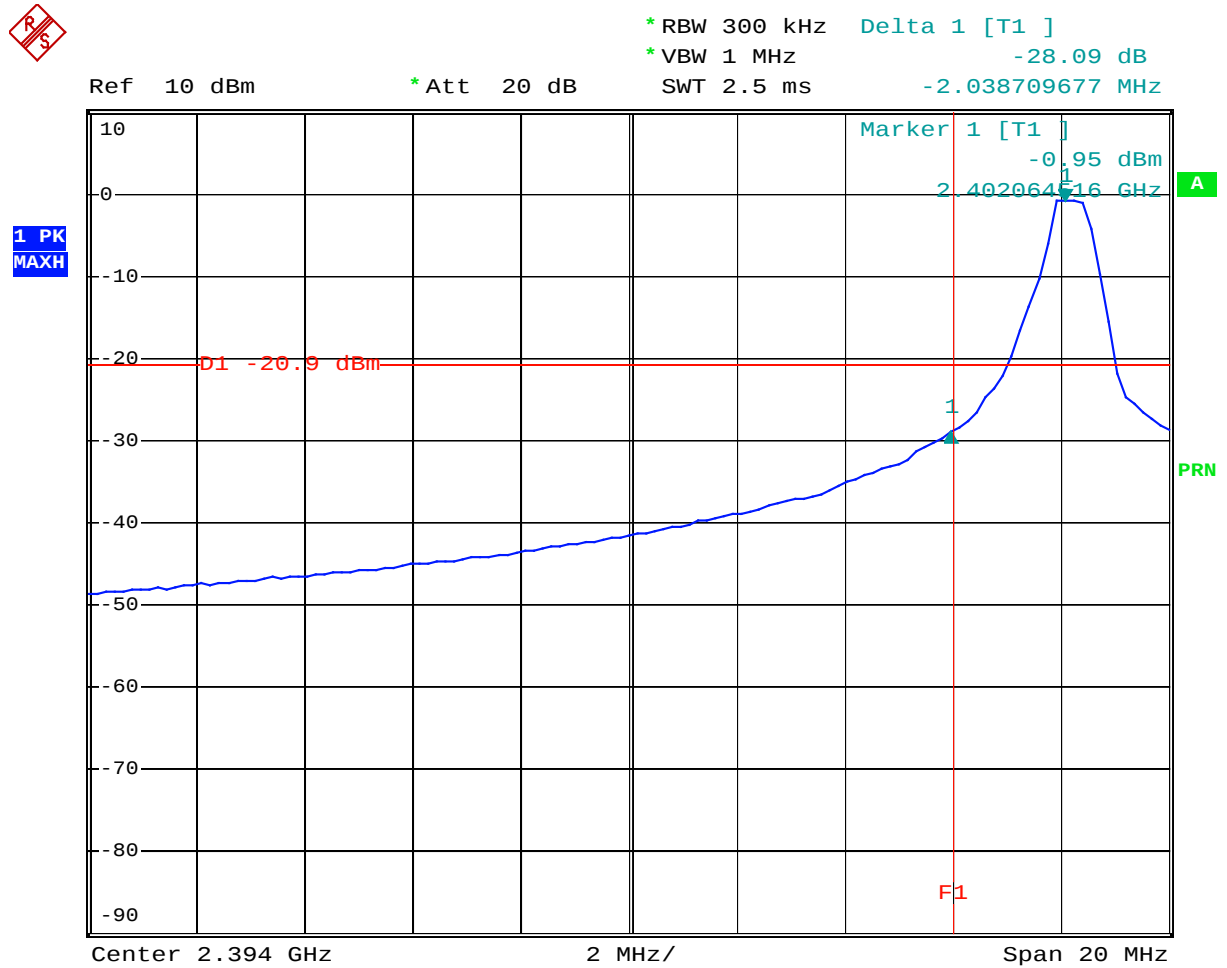
In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

### Test results

There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency.

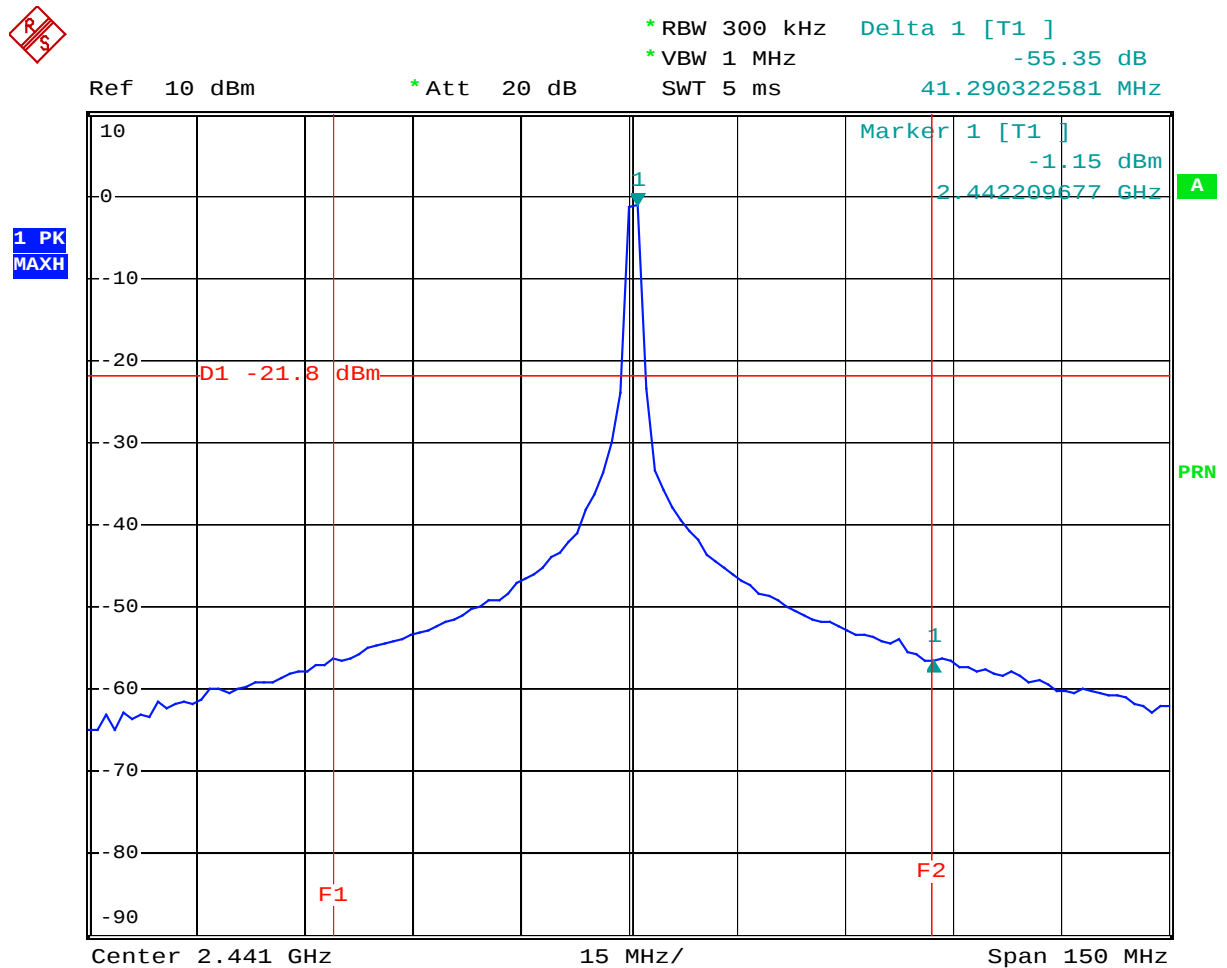
| Tx Frequency (MHz) | RF power outside 100kHz BW (MHz) | Limit      | Results |
|--------------------|----------------------------------|------------|---------|
| 2402               | No peak above 20dB               | 20dB below | Pass    |
| 2441               | No peak above 20dB               | 20dB below | Pass    |
| 2480               | No peak above 20dB               | 20dB below | Pass    |

**Band-edge Compliance Plot - 2402**



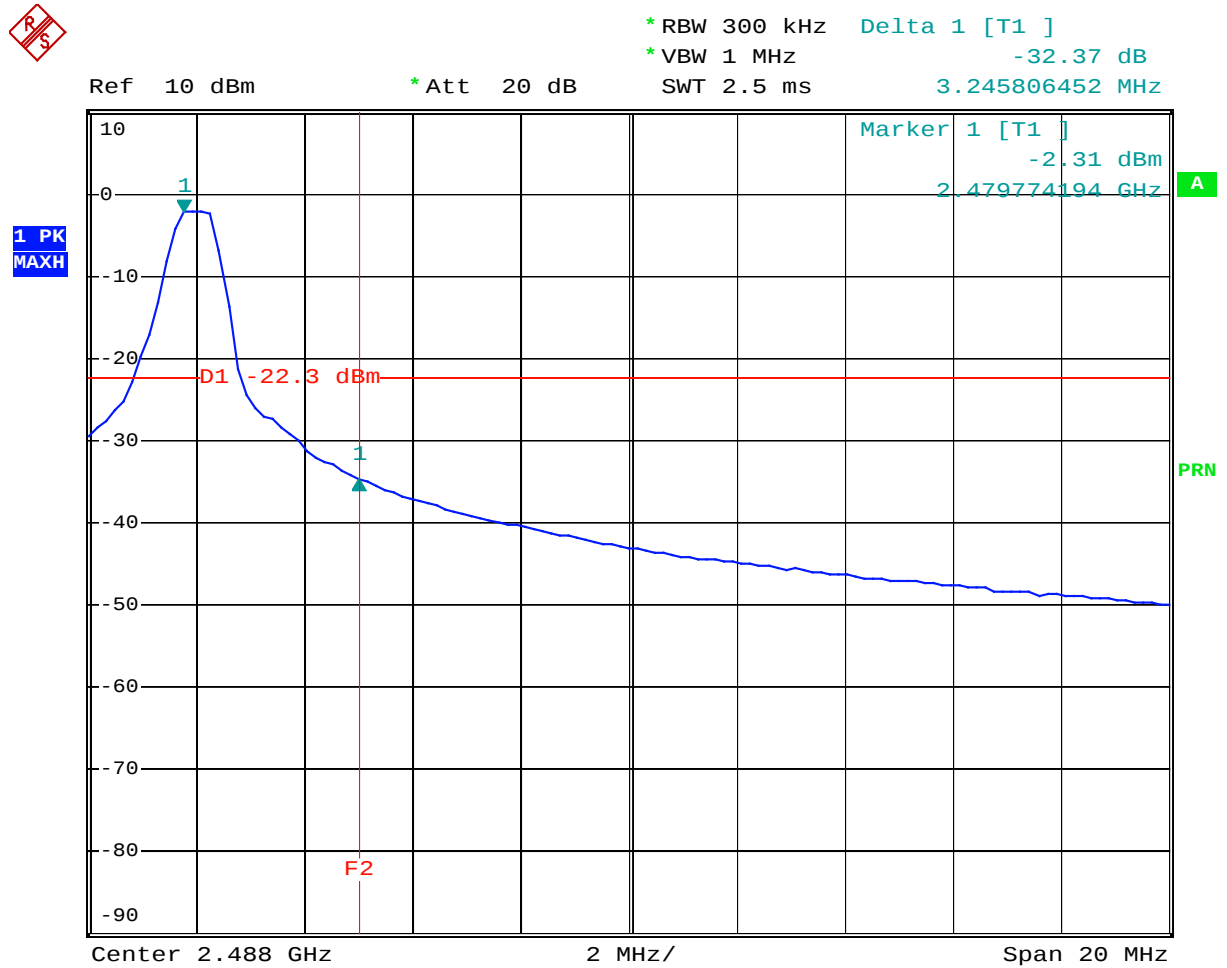
Date: 27.MAY.2006 15:43:13

**Band-edge Compliance Plot – 2441**



Date: 27.MAY.2006 15:45:03

**Band-edge Compliance Plot – 2480**



Date: 27.MAY.2006 15:46:39

## 7.11 Spurious Conducted emissions

### Test Mode and conditions

Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet  
 Measurement Method : Conducted  
 Detector : PK  
 Trace : Max hold  
 RBW/VBW : 100kHz/300kHz

### Requirements

### **Subclause 15.247(c)**

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

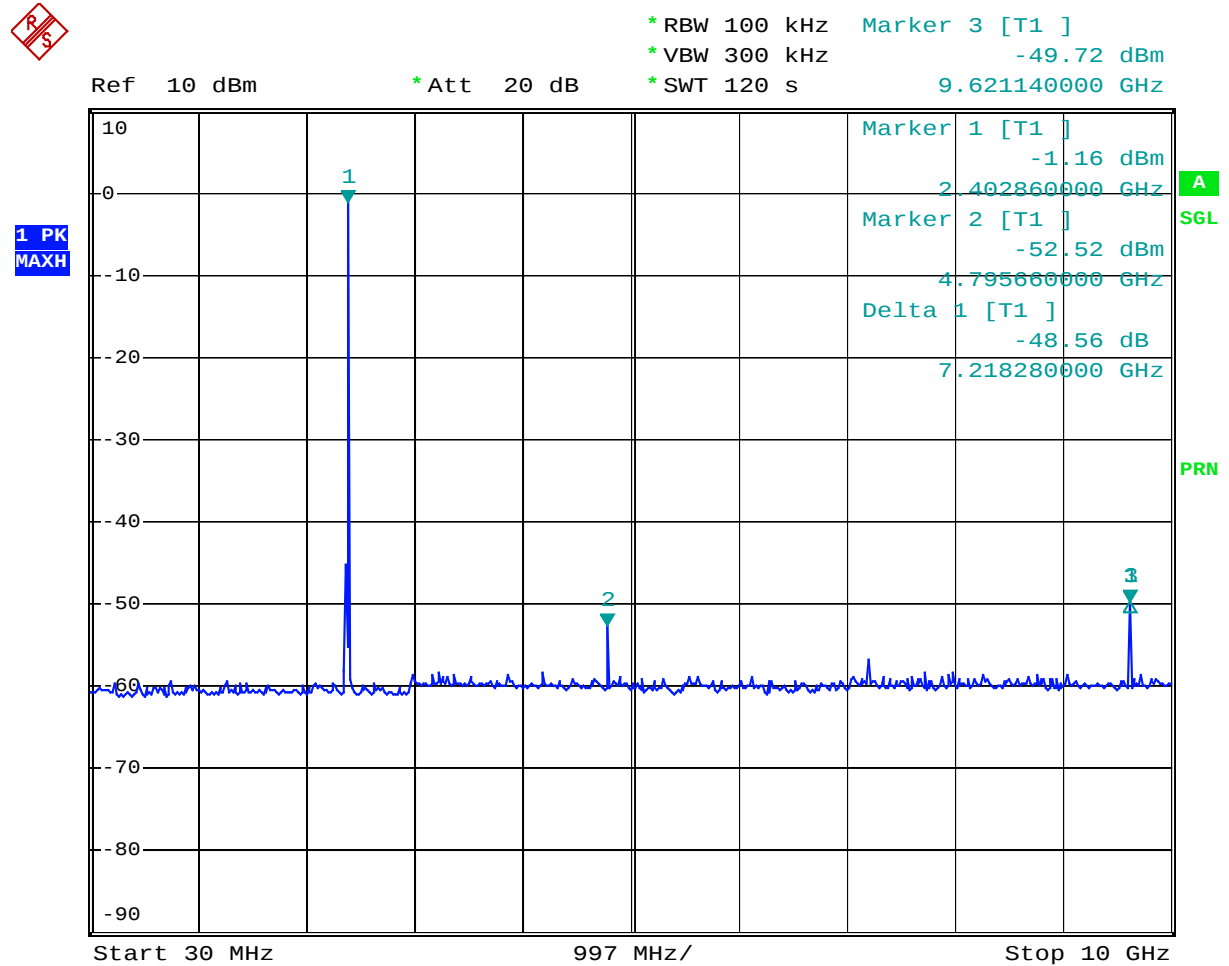
### Test results

| Frequency (MHz)                      | Reading Value (dBm) | Correction Factor (dB) | Results (dBm) | Reference Value (dBm) | Delta to Reference (dB) |
|--------------------------------------|---------------------|------------------------|---------------|-----------------------|-------------------------|
| <i>Operating frequency : 2402MHz</i> |                     |                        |               |                       |                         |
| 4795.66                              | -52.52              | 3.4                    | -49.12        | -20.990               | 28.13                   |
| 9621.14                              | -49.72              | 4.5                    | -45.22        | -20.990               | 24.23                   |
| 14700                                | -51.93              | 6.0                    | -45.93        | -20.990               | 24.94                   |
| 20060                                | -46.96              | 6.7                    | -40.26        | -20.990               | 19.27                   |
|                                      |                     |                        |               |                       |                         |

| Frequency (MHz)                      | Reading Value (dBm) | Correction Factor (dB) | Results (dBm) | Reference Value (dBm) | Delta to Reference (dB) |
|--------------------------------------|---------------------|------------------------|---------------|-----------------------|-------------------------|
| <i>Operating frequency : 2441MHz</i> |                     |                        |               |                       |                         |
| 4875.42                              | -55.48              | 3.4                    | -52.08        | -21.130               | 30.95                   |
| 9780.66                              | -48.4               | 4.5                    | -43.9         | -21.130               | 22.77                   |
| 15160                                | -52.27              | 6.0                    | -46.27        | -21.130               | 25.14                   |
| 20040                                | -47.03              | 6.7                    | -40.33        | -21.130               | 19.2                    |
|                                      |                     |                        |               |                       |                         |

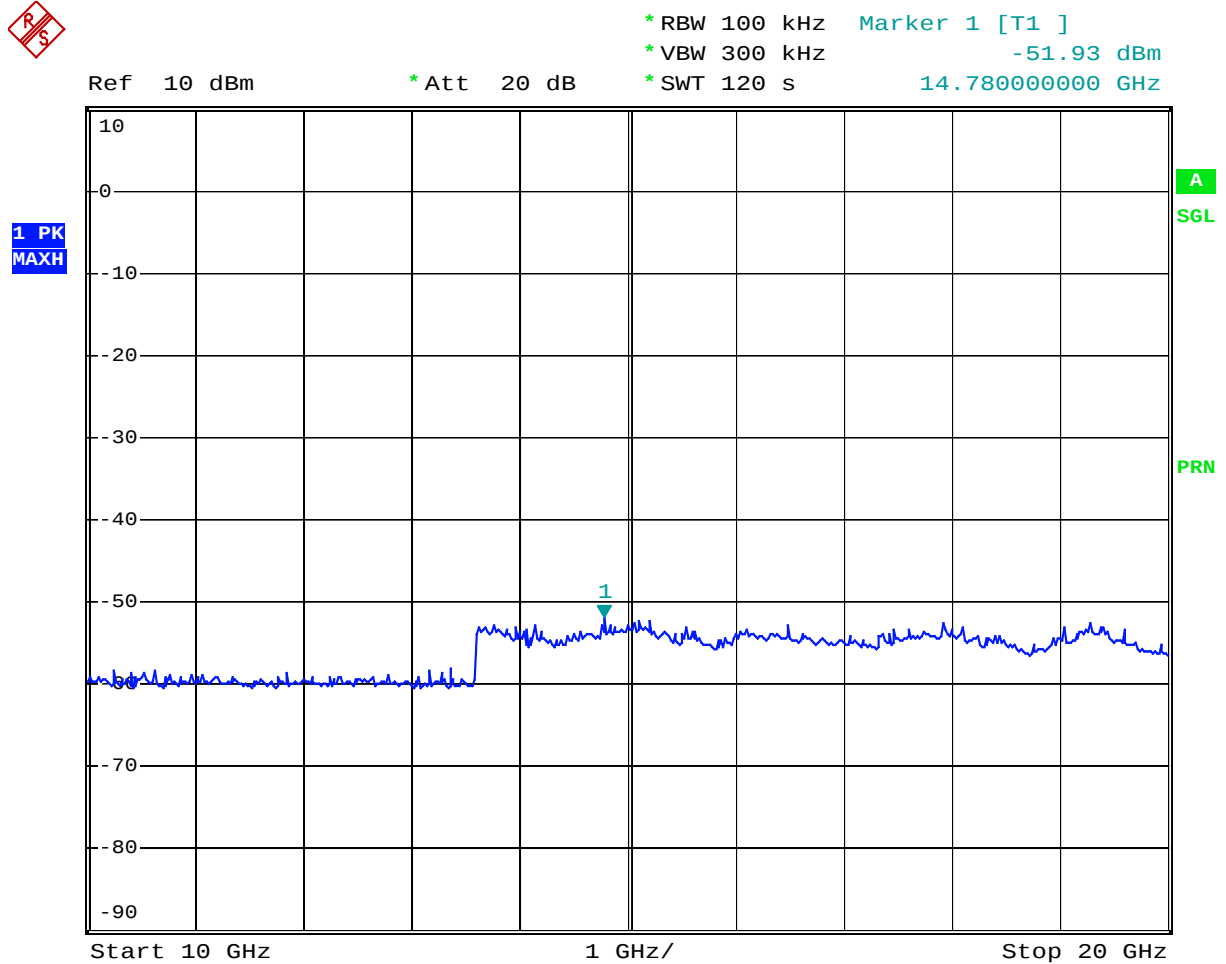
| Frequency (MHz)                      | Reading Value (dBm) | Correction Factor (dB) | Results (dBm) | Reference Value (dBm) | Delta to Reference (dB) |
|--------------------------------------|---------------------|------------------------|---------------|-----------------------|-------------------------|
| <i>Operating frequency : 2480MHz</i> |                     |                        |               |                       |                         |
| 4955.18                              | -57.03              | 3.4                    | -53.63        | -22.390               | 31.24                   |
| 9920.24                              | -50.58              | 4.5                    | -46.08        | -22.390               | 23.69                   |
| 13900                                | -52.11              | 6.0                    | -46.11        | -22.390               | 23.72                   |
| 20050                                | -46.65              | 6.7                    | -39.95        | -22.390               | 17.56                   |
|                                      |                     |                        |               |                       |                         |

**Spurious Conducted emissions plot- 2402 (30MHz~10GHz)**



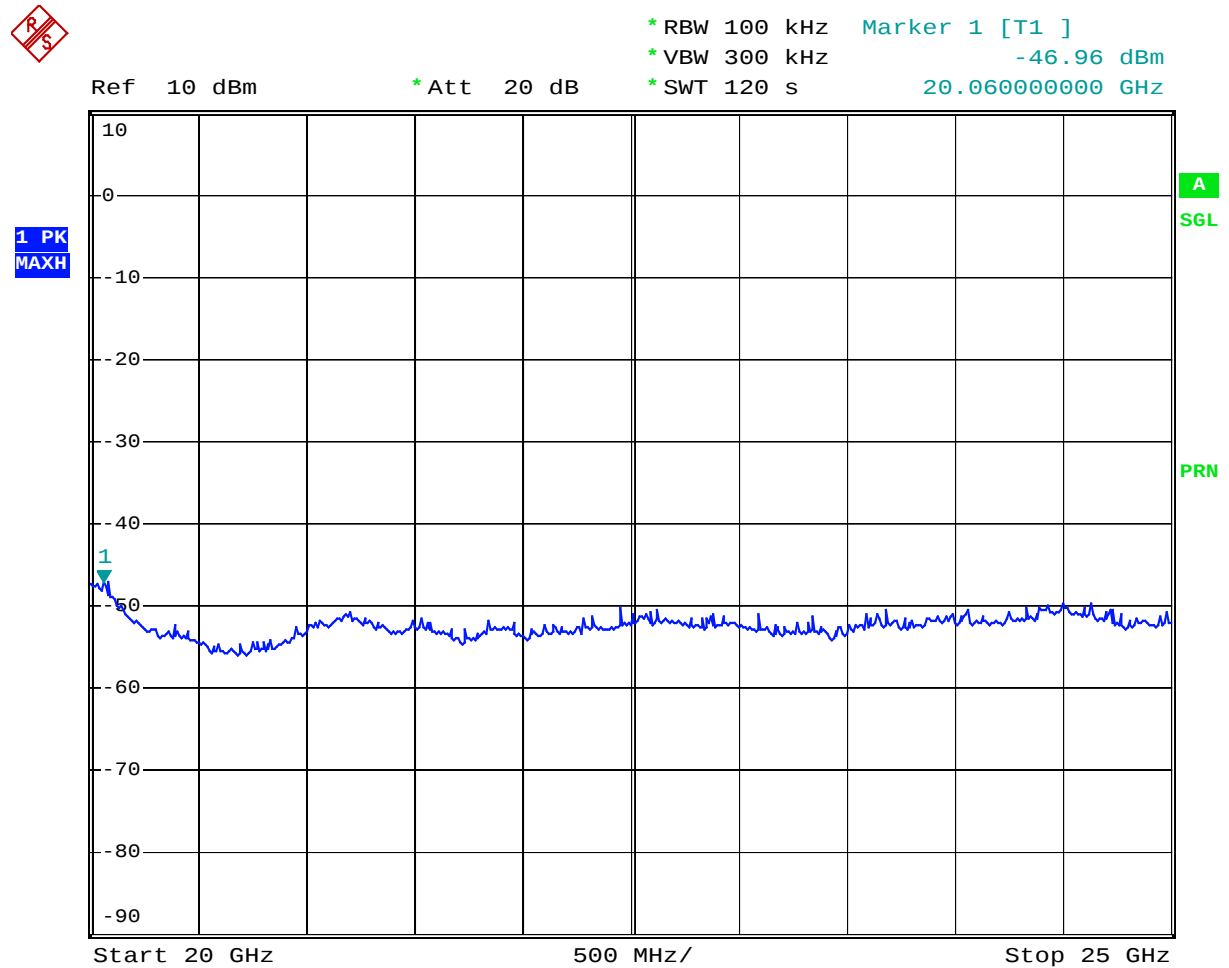
Date: 27.MAY.2006 15:52:38

**Spurious Conducted emissions plot- 2402 (10GHz~20GHz)**



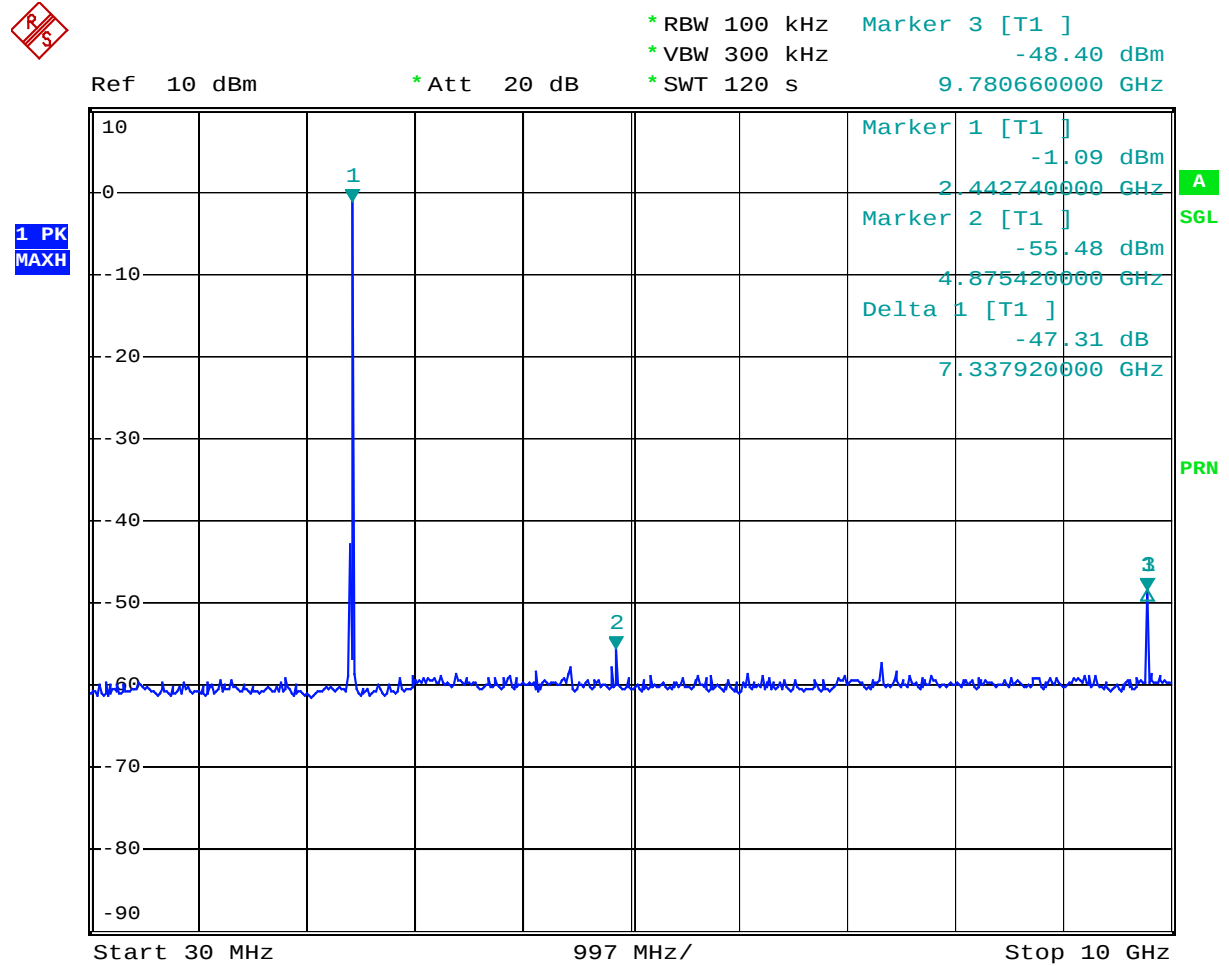
Date: 27.MAY.2006 15:55:22

**Spurious Conducted emissions plot- 2402 (20GHz~25GHz)**



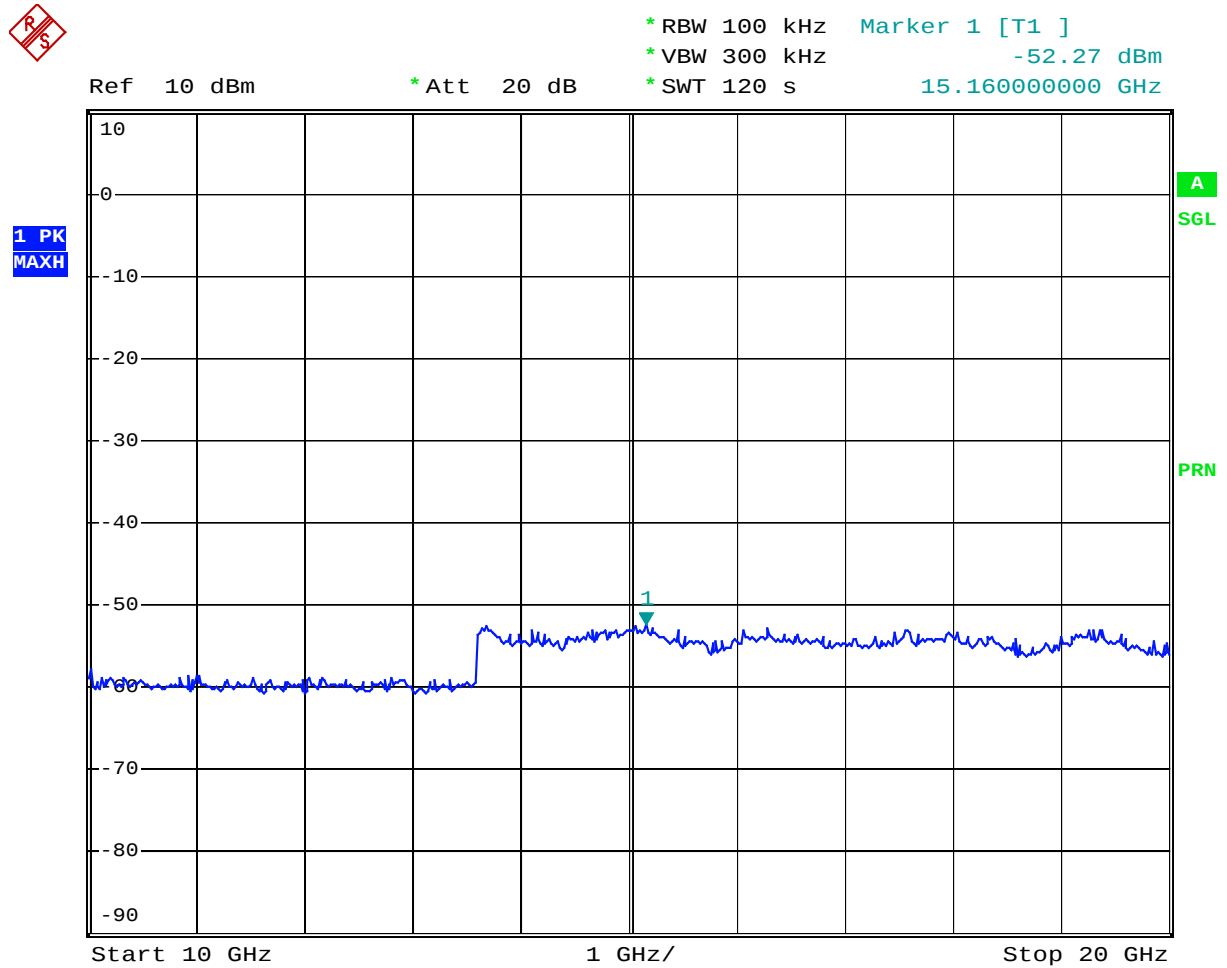
Date: 27.MAY.2006 15:58:09

**Spurious Conducted emissions plot- 2441 (30MHz~10GHz)**



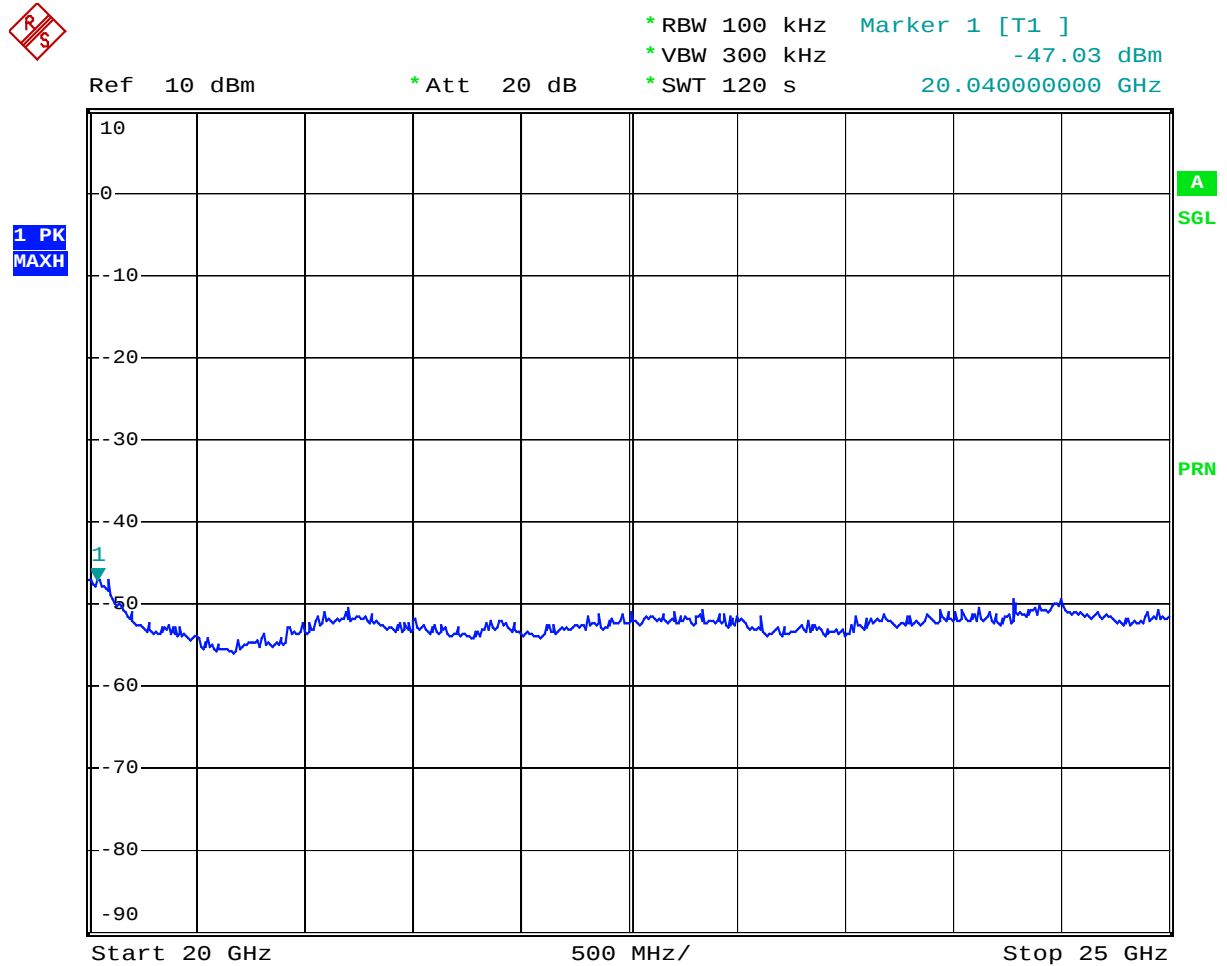
Date: 27.MAY.2006 16:01:15

**Spurious Conducted emissions plot- 2441 (10GHz~20GHz)**



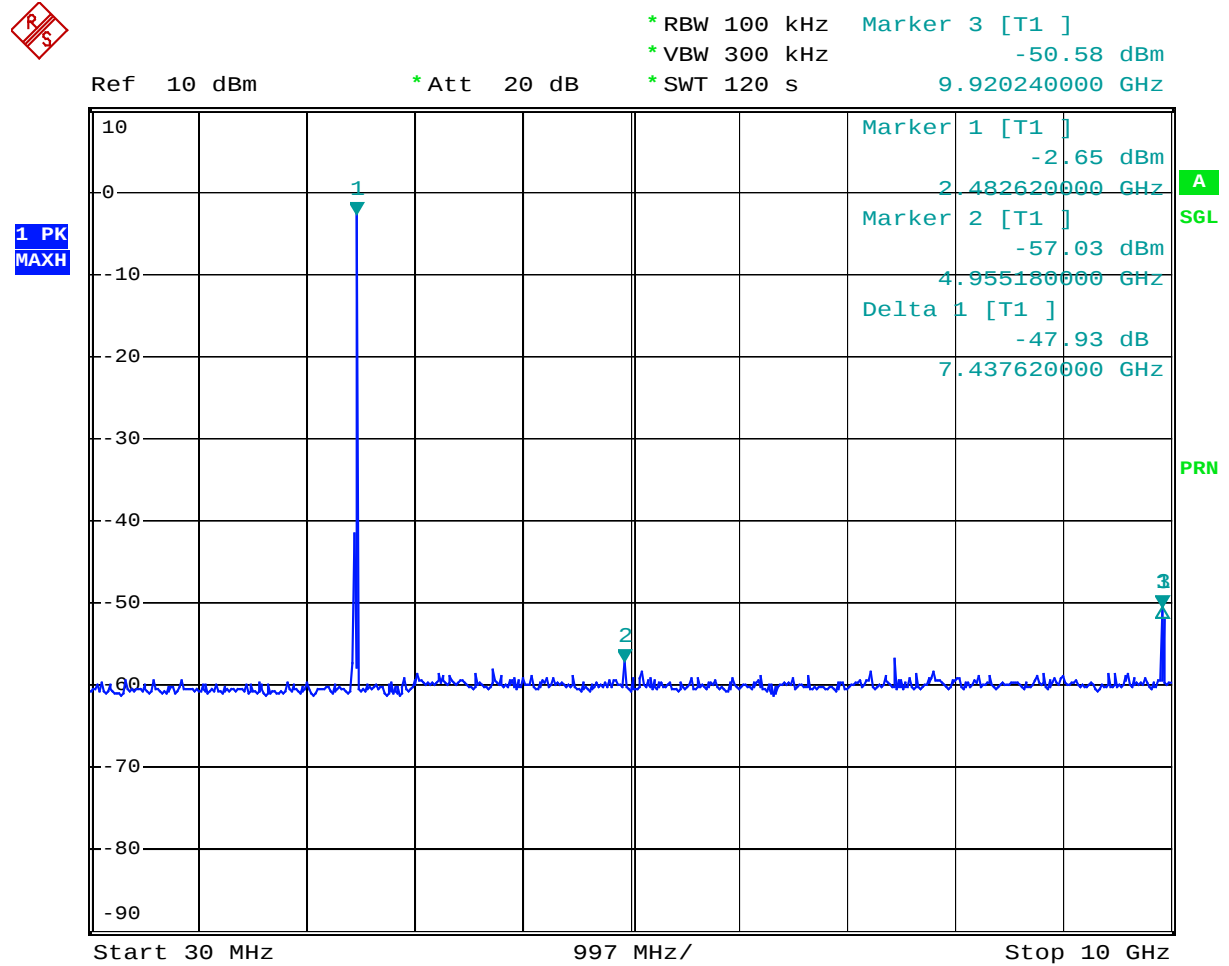
Date: 27.MAY.2006 16:04:02

**Spurious Conducted emissions plot- 2441 (20GHz~25GHz)**



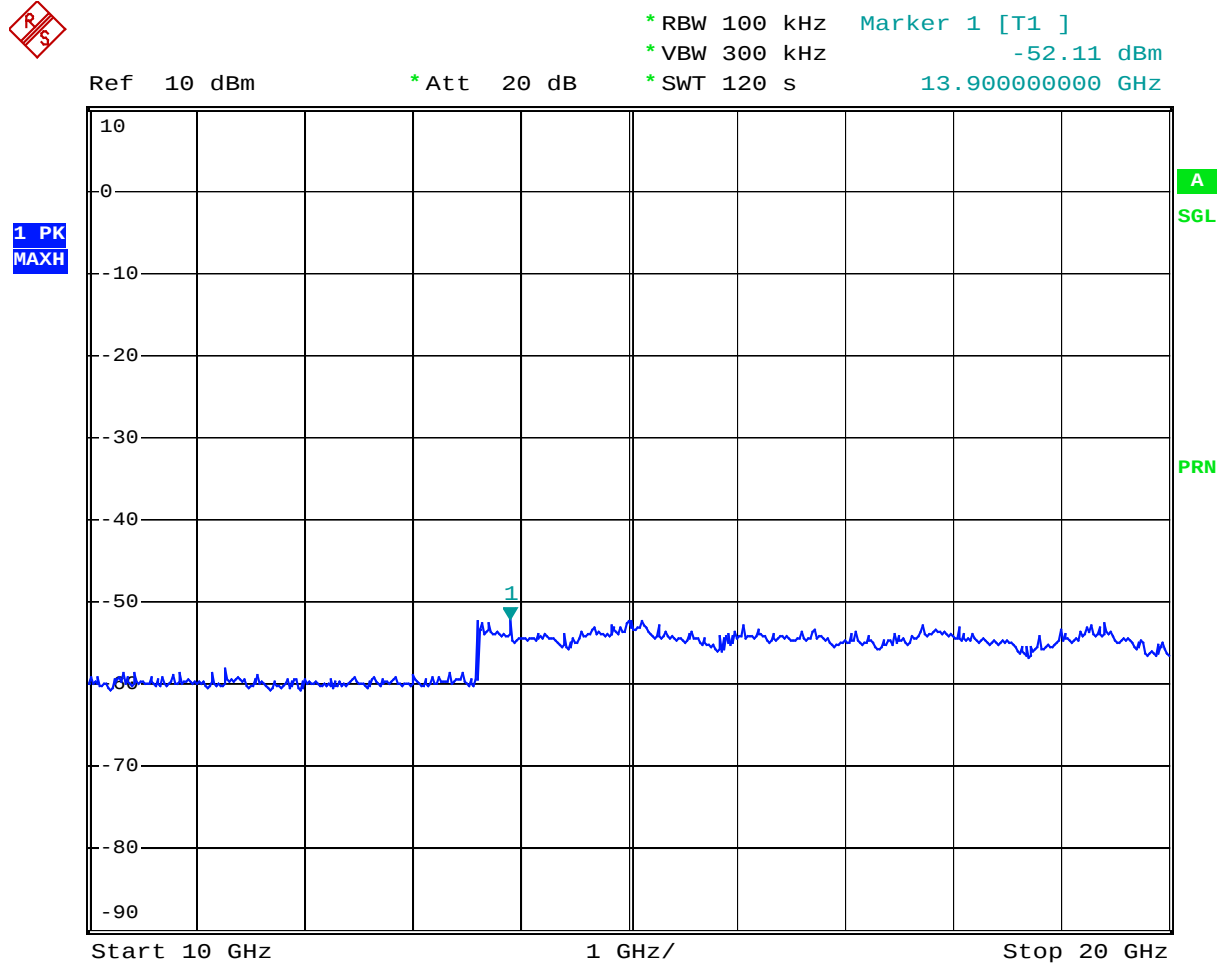
Date: 27.MAY.2006 16:06:45

**Spurious Conducted emissions plot- 2480 (30MHz~10GHz)**



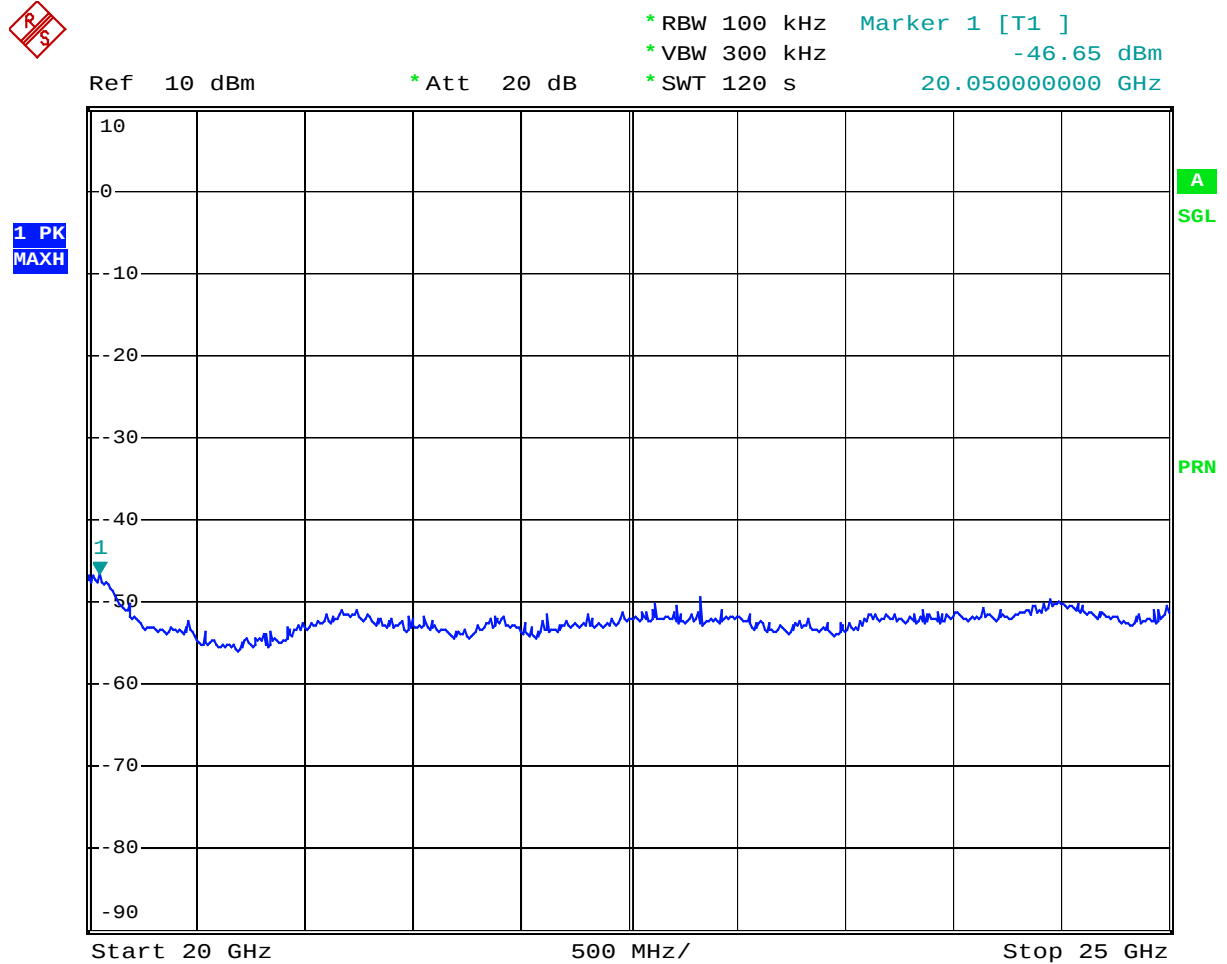
Date: 27.MAY.2006 16:10:06

**Spurious Conducted emissions plot- 2480 (10GHz~20GHz)**



Date: 27.MAY.2006 16:13:04

**Spurious Conducted emissions plot- 2480 (20GHz~25GHz)**



Date: 27.MAY.2006 16:16:23

## 7.12 Spurious Radiated emissions

### Test Mode and conditions

Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz),  
DH1 packet  
Detector : PK  
Trace : Max hold  
Measurement Method : Radiated- Enclosure  
Measurement Distance : 3m  
Measurement BW : 1 MHz for  $f \geq 1 \text{ GHz}$ , 100kHz for  $f < 1 \text{ GHz}$

### Requirements

#### **Subclause 15.247(c)**

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

According to Section 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (microvolts/meter) | Field strength (dB $\mu$ V/m) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|-------------------------------|
| 30-88           | 100**                             | $20 \cdot \log(100) = 40.0$   | 3                             |
| 88-216          | 150**                             | $20 \cdot \log(150) = 43.5$   | 3                             |
| 216-960         | 200                               | $20 \cdot \log(200) = 46.0$   | 3                             |
| 960-2500        | 500                               | $20 \cdot \log(500) = 54.0$   | 3                             |

\*\* Except as provided in paragraph(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72Mhz, 76-88Mhz, 174-216Mhz or 470-806Mhz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

According to section 15.35(b), on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission

measurements are specified in this part, including emission measurements below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated

### Test results

| Frequency<br>(MHz)            | Polarization<br>(H/V) | Corr.<br>Factor<br>(dB) | Result<br>(dBuV/m) |      | Limit<br>(dBuV/m) |    | Margin<br>(dB) |      | Table<br>Angle<br>(Deg.) | Ant.<br>Height<br>(m) |
|-------------------------------|-----------------------|-------------------------|--------------------|------|-------------------|----|----------------|------|--------------------------|-----------------------|
|                               |                       |                         | A                  | P    | A                 | P  | A              | P    |                          |                       |
| Operating frequency : 2402Mhz |                       |                         |                    |      |                   |    |                |      |                          |                       |
| 4804                          | V                     | 16.3                    | 45.1               | 60.0 | 54                | 74 | 8.9            | 14.0 | 80                       | 1.6                   |
| 4804                          | H                     | 16.3                    | 47.0               | 62.0 | 54                | 74 | 7.0            | 12.0 | 60                       | 1.5                   |
| 7207                          | H                     | 19.8                    | 47.4               | 60.6 | 54                | 74 | 6.6            | 13.4 | 60                       | 1.5                   |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |

| Frequency<br>(MHz)            | Polariz-<br>ation<br>(H/V) | Corr.<br>Factor<br>(dB) | Result<br>(dBuV/m) |      | Limit<br>(dBuV/m) |    | Margin<br>(dB) |      | Table<br>Angle<br>(Deg.) | Ant.<br>Height<br>(m) |
|-------------------------------|----------------------------|-------------------------|--------------------|------|-------------------|----|----------------|------|--------------------------|-----------------------|
|                               |                            |                         | A                  | P    | A                 | P  | A              | P    |                          |                       |
| Operating frequency : 2441Mhz |                            |                         |                    |      |                   |    |                |      |                          |                       |
| 4882                          | V                          | 16.4                    | 42.2               | 55.0 | 54                | 74 | 11.8           | 19.0 | 80                       | 1.6                   |
| 4882                          | H                          | 16.4                    | 43.9               | 58.7 | 54                | 74 | 10.1           | 15.3 | 60                       | 1.5                   |
| 7323                          | H                          | 20.1                    | 47.8               | 60.5 | 54                | 74 | 6.2            | 13.5 | 60                       | 1.5                   |
|                               |                            |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                            |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                            |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                            |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                            |                         |                    |      |                   |    |                |      |                          |                       |

| Frequency<br>(MHz)            | Polarization<br>(H/V) | Corr.<br>Factor<br>(dB) | Result<br>(dBuV/m) |      | Limit<br>(dBuV/m) |    | Margin<br>(dB) |      | Table<br>Angle<br>(Deg.) | Ant.<br>Height<br>(m) |
|-------------------------------|-----------------------|-------------------------|--------------------|------|-------------------|----|----------------|------|--------------------------|-----------------------|
|                               |                       |                         | A                  | P    | A                 | P  | A              | P    |                          |                       |
| Operating frequency : 2480Mhz |                       |                         |                    |      |                   |    |                |      |                          |                       |
| 4960                          | V                     | 16.4                    | 43.2               | 56.4 | 54                | 74 | 10.8           | 17.6 | 80                       | 1.6                   |
| 4960                          | H                     | 16.4                    | 44.1               | 58.0 | 54                | 74 | 9.9            | 16.0 | 60                       | 1.5                   |
| 7440                          | H                     | 20.3                    | 48.3               | 60.4 | 54                | 74 | 5.7            | 13.6 | 60                       | 1.5                   |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |
|                               |                       |                         |                    |      |                   |    |                |      |                          |                       |

Note :

1. Remark “\*” means that the emission frequency is produced by local oscillator.
2. Remark “- -” means that the emission level is too low to be measured.
3. The measurement uncertainty of the radiated emission test is  $\pm 3\text{dB}$
4. “A” and “P” mean average and peak measurement respectively.
5. There are no spurious emissions found between the lowest internal oscillating frequency and 30 MHz.

## 8. List of Test and Measurement Instruments

|                                     | Kind of Equipment      | Type     | Manufacturer | S/N          |
|-------------------------------------|------------------------|----------|--------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test Receiver      | ESI26    | R/S          | 8340.0010.02 |
| <input checked="" type="checkbox"/> | Spectrum Analyzer      | FSP30    | R/S          | 1093.4495.30 |
| <input type="checkbox"/>            | Tracking Generator     | ESMI-B1  | R/S          | 1033.3240.52 |
| <input type="checkbox"/>            | Spectrum Analyzer      | 8566B    | HP           | 3638A0857E   |
| <input type="checkbox"/>            | Spectrum Analyzer      | E4407B   | HP           | MY41310181   |
| <input type="checkbox"/>            | Wave Dipole Antenna    | HZ-12    | R/S          | 842006/0012  |
| <input type="checkbox"/>            | Wave Dipole Antenna    | HZ-12    | R/S          | 846556/0004  |
| <input type="checkbox"/>            | Biconical Antenna      | 3104C    | EMCO         | 9408-4667    |
| <input type="checkbox"/>            | Biconical Antenna      | 3109     | EMCO         | 9405-2812    |
| <input checked="" type="checkbox"/> | Log-Periodic Antenna   | 3146A    | EMCO         | 1064         |
| <input type="checkbox"/>            | Biconilog Antenna      | HLP2603  | EMC          | 080100       |
| <input type="checkbox"/>            | V-Network              | ESH3-Z5  | R/S          | 847265/030   |
| <input type="checkbox"/>            | V-Network              | ESH3-Z6  | R/S          | 847250/016   |
| <input type="checkbox"/>            | T-Network              | E-Z10    | R/S          | 84480/011    |
| <input type="checkbox"/>            | LISN                   | 3825/2   | EMCO         | 9502-2334    |
| <input checked="" type="checkbox"/> | Turn Table             | 2081     | EMCO         |              |
| <input checked="" type="checkbox"/> | Antenna Tower          | 1072-5   | EMCO         | 9202-1651    |
| <input checked="" type="checkbox"/> | Positioning Controller | 1090     | EMCO         |              |
| <input type="checkbox"/>            | Printer                | C4569A   | HP           | SG78K1H1FS   |
| <input type="checkbox"/>            | Absorbing Clamp        | MDS 21   | R/S          | 847905/005   |
| <input type="checkbox"/>            | Signal Generator       | 2023     | MARCONI      | 112246067    |
| <input type="checkbox"/>            | Swept Signal Generator | 83620B   | HP           | 3722A00549   |
| <input type="checkbox"/>            | 10dB Attenuator        | 23-10-34 | Weinschel co | BD4316       |
| <input type="checkbox"/>            | 10dB Attenuator        | 33-10-34 | Weinschel co | BB9784       |
| <input checked="" type="checkbox"/> | Loop Antenna           | 6507     | EMCO         | 9408-1327    |
| <input checked="" type="checkbox"/> | Antenna                | 3142     | EMCO         | 9710-1220    |
| <input checked="" type="checkbox"/> | Antenna                | 3115     | EMCO         | 9202-3820    |
| <input checked="" type="checkbox"/> | Antenna                | 3160-08  | EMCO         | 1168         |
| <input checked="" type="checkbox"/> | Antenna                | 3160-09  | EMCO         | 1304         |
| <input checked="" type="checkbox"/> | Amplifier              | HP8447F  | HP           | 3113A06911   |
| <input checked="" type="checkbox"/> | Amplifier              | HP83006  | HP           | 3104A00611   |

|                                     |                          |          |                                    |            |
|-------------------------------------|--------------------------|----------|------------------------------------|------------|
| <input checked="" type="checkbox"/> | Amplifier                | HP8449B  | HP                                 | 3008A00859 |
| <input type="checkbox"/>            | EMI test receiver        | ESCS30   | R&S                                | 839809/003 |
| <input type="checkbox"/>            | Artificial mains network | ESH2-Z5  | R&S                                | 829991/009 |
| <input type="checkbox"/>            | Artificial hand          | FCC-AH-1 | Fischer custom communications Inc. | 2008       |

## 9. Notes

N/A