FCC LISTED,
REGISTRATION
NUMBER: 905266

IC LISTED,
REGISTRATION
NUMBER: IC 4621

CETECOM™

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# TEST REPORT

**Report No.: 22938RET.101**

**TEST NAME:** FCC PART 15.247 TESTING FOR BLUETOOTH RADIO DEVICE

| | | |
|---|---|---|
| **Product** | : | MOBILE PHONE WITH BLUETOOTH TECHNOLOGY |
| **Trade Mark** | : | SONY ERICSSON |
| **Model/type Ref.** | : | W900 |
| **Manufacturer** | : | SONY ERICSSON MOBILE COMMUNICATIONS AB |
| **Requested by** | : | SONY ERICSSON MOBILE COMMUNICATIONS AB |
| **Other identification of the product** | : | FCC ID: PY7AD022011<br>IC: 4170B-AD022011<br>Product ID: Type AAD-3022011-BV |
| **Standard(s)** | : | USA FCC Part 15.247, 15.205, 15.209, 15.109<br>CANADA RSS-210 |

This test report includes 2 annexes and therefore the total number of pages is 61.

**INDEX**

# 1. COMPETENCE AND GUARANTEES

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621.

In order to assure the traceability to other national and international laboratories, CETECOM has a calibration and maintenance programme for its measuring equipment.

CETECOM guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at CETECOM at the time of execution of the test.

CETECOM is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

# 2. GENERAL CONDITIONS

1. This report only refers to the item that has undergone the test.
2. This report does not constitute or imply by its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without written approval of CETECOM.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of CETECOM and the Accreditation Bodies.

# 3. CHARACTERISTICS OF THE TEST

## 3.1 TEST REQUESTED

Measurements for frequency hopping spread spectrum equipment (Bluetooth) operating in the 2400 MHz -2483.5 MHz band and using, according to FCC Part 15.247.

## 3.2 REQUIREMENTS AND METHOD

The test has been carried out according to FCC parts 15.33, 15.35, 15.109, 15.207, 15.205, 15.209 and the document DA 00-705:"Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems".

The testing was performed according to the procedure in ANSI C63.4. Radiated testing was performed in Cetecom's semi-anechoic chamber. This site has been fully described in a report submitted to the FCC and was accepted in a letter dated July 25, 2002.

The instrumentation used to perform the testing is listed below:

1. Semianechoic Absorber Lined Chamber IR 11. BS.
2. Control Chamber IR 12.BC.
3. Antenna mast EM 1072 NMT.
4. Rotating table EM 1084-4. ON.
5. Multi device controller ETS 2090.
6. Bluetooth test set Anritsu MT8852A.
7. Bilog antenna CHASE CBL6111.
8. Antenna tripod EMCO 11968C.
9. Double-ridge Guide Horn antenna 1-18 GHz HP 11966E.
10. Double-ridge Guide Horn antenna 18-40 GHz Agilent 119665J.
11. RF pre-amplifier Miteq JS4-12002600-30-5A.
12. Semianechoic Absorber Lined Chamber IR 11. BS.
13. RF pre-amplifier Miteq AFS5-04001300-15-10P-6.
14. Spectrum analyzer R&S ESIB 26.
15. Spectrum analyzer R&S FSM.
16. RF pre-amplifier Schaffner CPA 9231.
17. DC power supply R&S NGPE 40/40.

## 4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

Identification data in this section has been supplied by the client.

### 4.1 APPLICANT

**Name or Company:** SONY ERICSSON MOBILE COMMUNICATIONS AB

**V.A.T.:** ---

**Address:** Nya Vattentornet **City:** Lund

**Postal code:** 22188 **Country:** SWEDEN

**Telephone:** +46 46194000 **Fax:** +46 46193295

### 4.2 REPRESENTATIVE

**Name:** Hakan Sjöberg (Senior Staff Engineer).

### 4.3 TEST SAMPLES SUPPLIER

**Name or Company:** Same as indicated in point 4.1.

Samples undergoing test have been selected by: **the client.**

### 4.4 IDENTIFICATION OF ITEM/ITEMS TESTED

**Product:** MOBILE PHONE WITH BLUETOOTH TECHNOLOGY

**Trade mark:** SONY ERICSSON **Model:** W900

**Other identification of the product:** Type AAD-3022011-BV

**HW Version:** A (icluding Bluetooth chipset BGB203) **SW Version:** ITP version

**Manufacturer:** SONY ERICSSON MOBILE COMMUNICATIONS AB

**Country of manufacture:** SWEDEN

**Manufacture site:** Data not available

**Description:** GSM 900 / 1800 / 1900 & WCDMA mobile phone with Bluetooth support

## 5. USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS

### 5.1 USAGE OF SAMPLES

**Sample M/01 is formed by the following elements:**

| Control No. | Description | Model | Serial No. | Date of reception |
|---|---|---|---|---|
| 22938/02 | Mobile cellular phone with Bluetooth and integral antenna | W900 | Prototype | 03/10/2005 |

**Sample M/02 is formed by the following elements:**

| Control No. | Description | Model | Serial No. | Date of reception |
|---|---|---|---|---|
| 22938/01 | Mobile cellular phone with Bluetooth and antenna connector | W900 | Prototype | 03/10/2005 |

1. Sample M/01 has undergone following test(s).
   Radiated measurements indicated in annex A.
2. Sample M/02 has undergone following test(s).
   All tests indicated in annex A, except radiated measurements.

### 5.2 PERIOD OF TESTING

The performed test started on 2005-10-04 and finished on 2005-10-06.

The tests as detailed in this report have been performed at CETECOM.

## 5.3 ENVIROMENTAL CONDITIONS

In the control chamber the following limits were not exceeded during the test:

| | |
|---|---|
| Temperature | Min. = 24.0 ºC<br>Max. = 25.0 ºC |
| Relative humidity | Min. = 51.0 %<br>Max. = 51.0 % |
| Shielding effectiveness | > 100 dB |
| Electric insulation | > 10 kΩ |
| Reference resistance to earth | < 0,5 Ω |

In the semianechoic chamber (21 meters x 11 meters x 8 meters) the following limits were no exceeded during the test.

| | |
|---|---|
| Temperature | Min. = 26.0 ºC<br>Max. = 26.0 ºC |
| Relative humidity | Min. = 53 %<br>Max. = 53 % |
| Air pressure | Min. = 1017 mbar<br>Max. = 1017 mbar |
| Shielding effectiveness | > 100 dB |
| Electric insulation | > 10 kΩ |
| Reference resistance to earth | < 0,5 Ω |
| Normal site attenuation (NSA) | < ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz) |
| Field homogenousity | More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz). |

In the chamber for conducted measurements the following limits were no exceeded during the test:

| | |
|---|---|
| Temperature | Min. = 23.0ºC<br>Max. = 23.0 ºC |
| Relative humidity | Min. = 48 %<br>Max. = 49 % |
| Air pressure | Min. = 1020 mbar<br>Max. = 1020 mbar |
| Shielding effectiveness | > 100 dB |
| Electric insulation | > 10 kΩ |
| Reference resistance to earth | < 0,5 Ω |

## 6. TEST RESULTS

Abbreviations used in the VERDICT column of the following tables are:

**P** Pass

**F** Fail

**NA** not applicable

**NM** not measured

| FCC PART 15 PARAGRAPH | VERDICT | | | |
|---|---|---|---|---|
| | NA | P | F | NM |
| 15.247 Subclause (a) (1). 20 dB Bandwidth and Carrier frequency separation | | P | | |
| 15.247 Subclause (a) (1) (iii). Number of hopping channels | | P | | |
| 15.247 Subclause (a) (1) (iii). Time of occupancy (Dwell Time) | | P | | |
| 15.247 Subclause (b). Maximum peak output power and antenna gain | | P | | |
| 15.247 Subclause (d). Band-edge of conducted emissions (Transmitter) | | P | | |
| 15.247 Subclause (d). Emission limitations conducted (Transmitter) | | P | | |
| 15.247 Subclause (d). Emission limitations radiated (Transmitter) | | P | | |
| 15.109. Receiver spurious radiation | | P | | |

## 7. REMARKS AND COMMENTS

None.

## 8. SUMMARY

Based on the results of the performed test, stated in annex A the item under test is **IN COMPLIANCE** with the specifications listed in section 3.1 "TEST REQUESTED".

NOTE: The results presented in this Test Report apply only to the particular item under test declared in section 4.4 "IDENTIFICATION OF ITEM/ITEMS TESTED" of this document, as presented for test on the date(s) declared in section 5, "USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS".

# ANNEX A

# TEST RESULTS

**Report No: 229381RET.101**

**INDEX**

## TEST CONDITIONS

Power supply (V):

$V_{nominal}$ = 3.8 Vdc

Type of power supply = Lithium Polymer rechargeable battery.

Type of antenna = Integral antenna.

Maximum Declared Gain for antenna = -6.9 dBi

Operating Temperature Range (ºC):

$T_n$ = -10ºC to + 55ºC

TEST FREQUENCIES:

Lowest channel: 2402 MHz

Middle channel: 2441 MHz

Highest channel: 2480 MHz

The test set-up was made in accordance to the general provisions of ANSI C63.4.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to a Bluetooth signalling unit (Bluetooth test set) and to the spectrum analyzer using a 6 dB power splitter and low loss RF cables with sma type connectors. The reading in the spectrum analyzer is corrected taking into account the power splitter and cable loss.

RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

An additional horn antenna is used to control the equipment under test with the Bluetooth signalling unit (Bluetooth test set).

## Section 15.247 Subclause (a) (1). 20 dB Bandwidth and Carrier frequency separation

SPECIFICATION

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

RESULTS

20 dB Bandwidth (see next 3 plots).

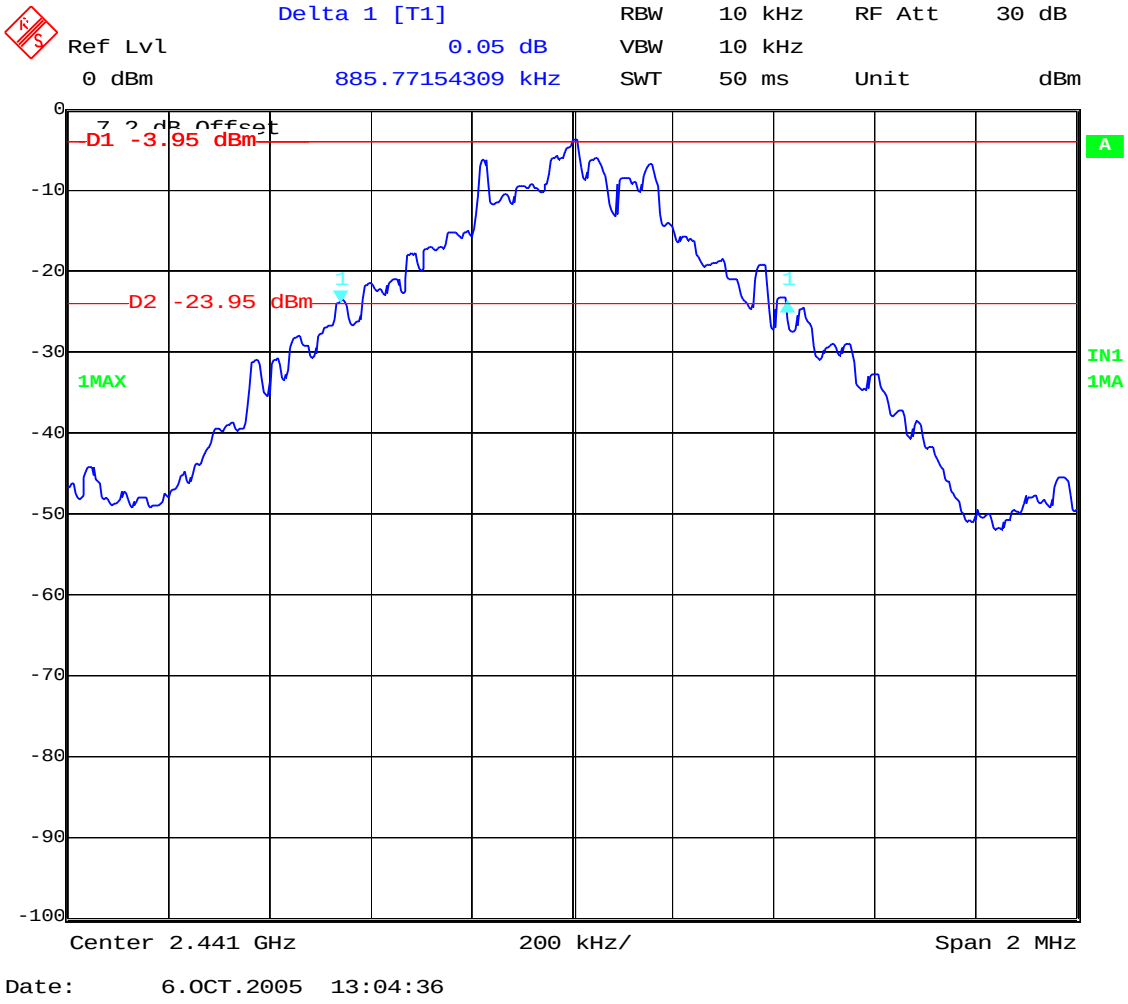
| | Lowest frequency 2402 MHz | Middle frequency 2441 MHz | Highest frequency 2480 MHz |
|---|---|---|---|
| 20 dB Spectrum bandwidth (kHz) | 889.78 | 885.77 | 805.61 |
| Measurement uncertainty (kHz) | ±11 | | |

20 dB BANDWIDTH.

Lowest Channel: 2402 MHz.

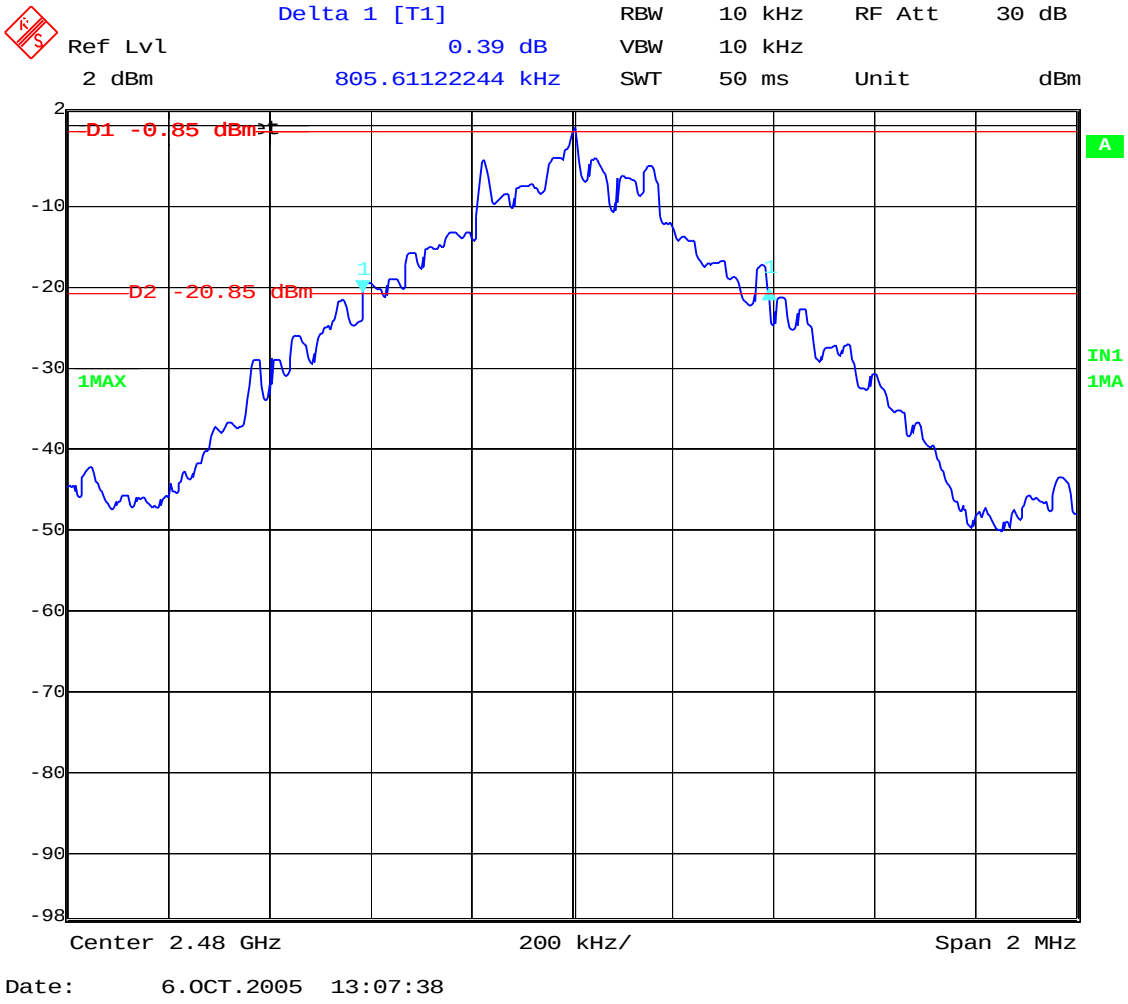
20 dB BANDWIDTH.

Middle Channel: 2441 MHz.

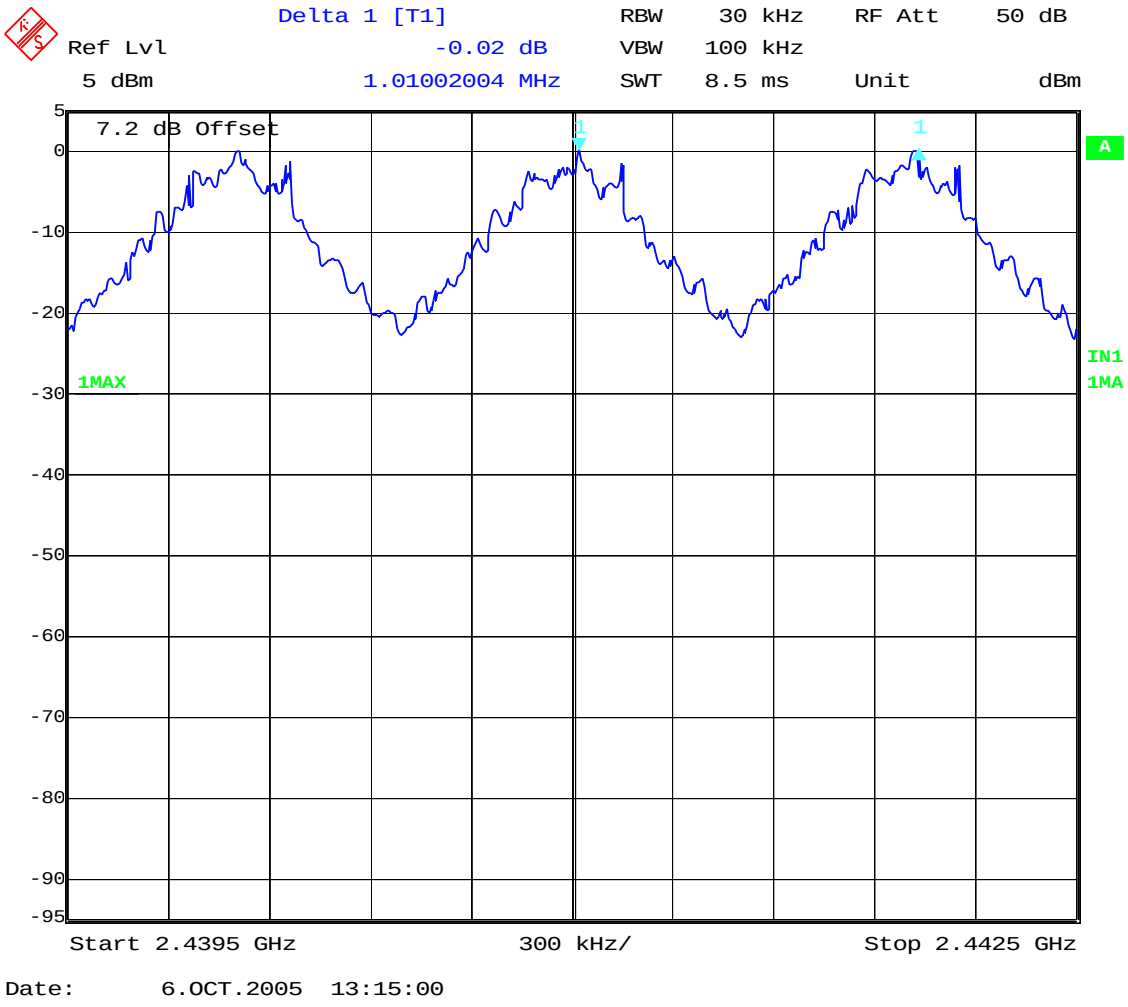


20 dB BANDWIDTH.

Highest Channel: 2480 MHz.



Carrier frequency separation (see next plot).




The hopping channel carrier frequencies are separated by a minimum of the 20 dB bandwidth of the hopping channel.

Verdict: PASS

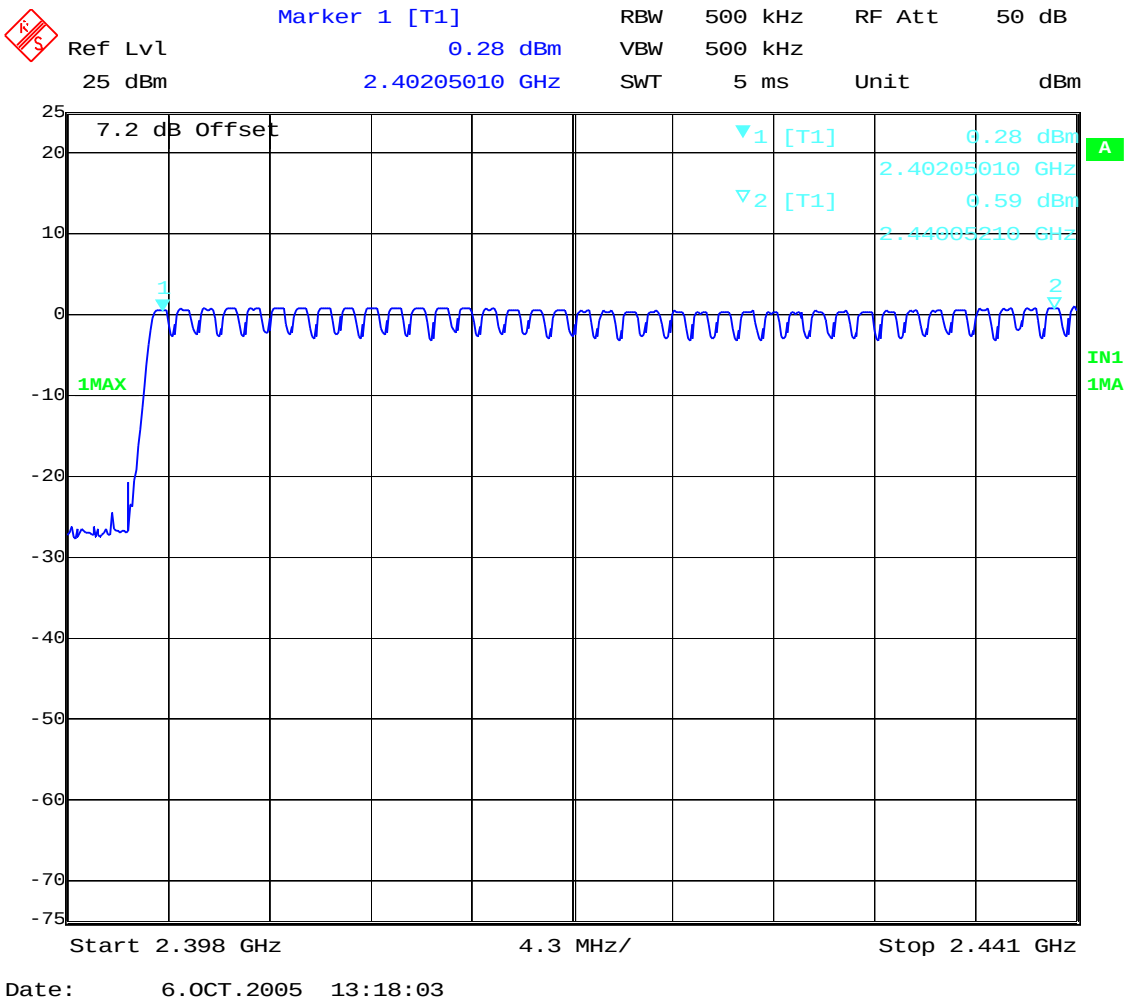
## Section 15.247 Subclause (a) (1) (iii). Number of hopping channels

SPECIFICATION

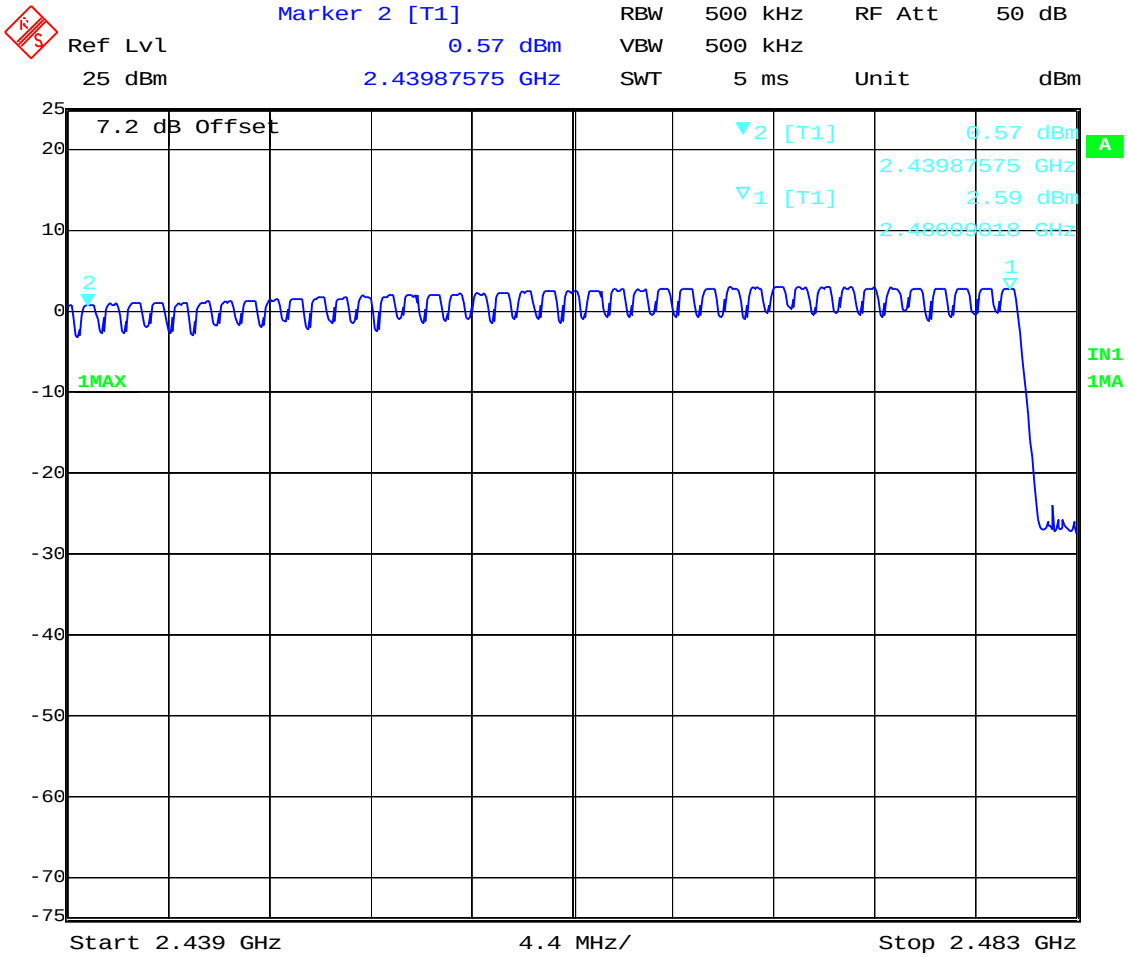
Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels.

RESULTS

The number of hopping channels is 79 (see next two plots).




Number of hopping frequencies: 39




Number of hopping frequencies: 40

Total number of hopping frequencies: 79

Verdict: PASS

## Section 15.247 Subclause (a) (1) (iii). Time of occupancy (Dwell Time)

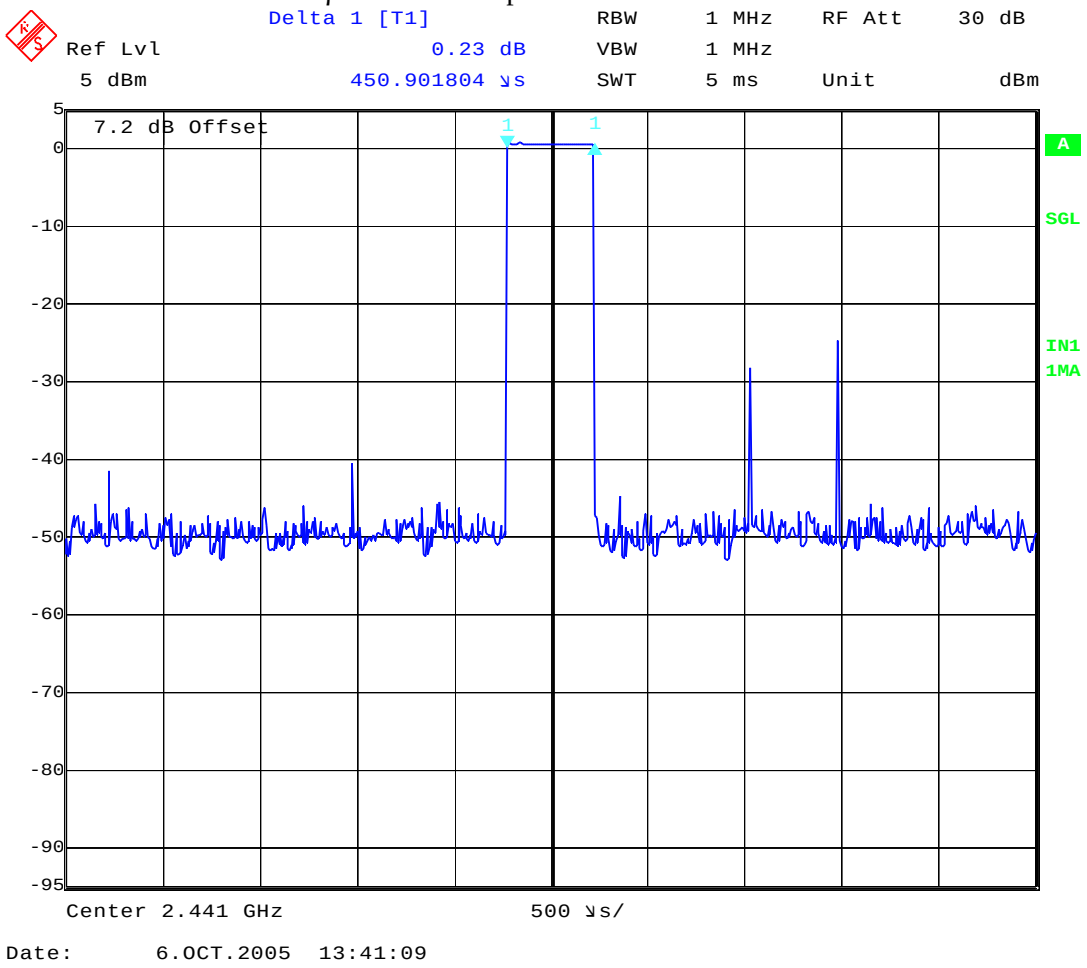
SPECIFICATION

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

RESULTS

1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

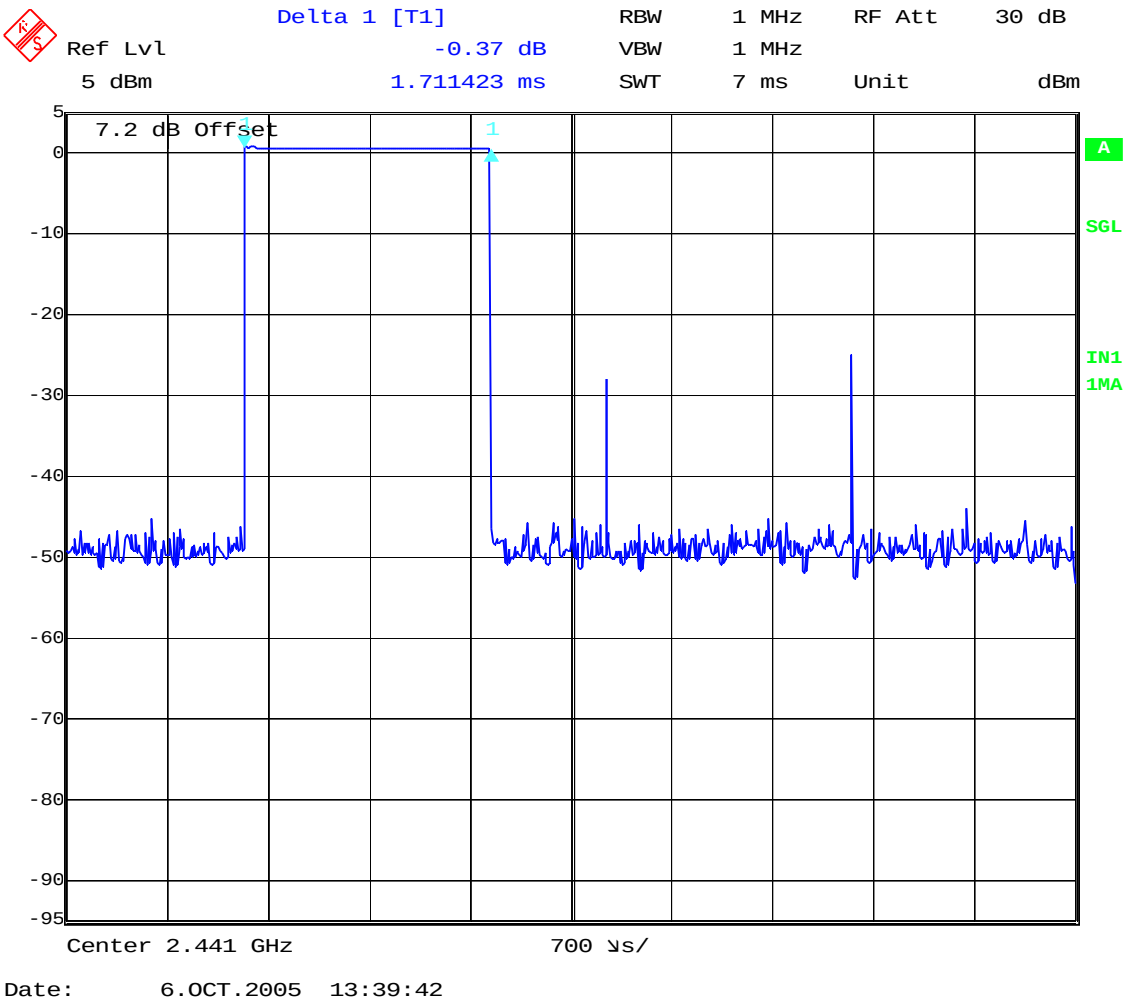
The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/2 = 800 hops per second with 79 channels. So you have each channel 800/79 = 10.13 times per second and so for a period of 0.4 x 79 = 31.6 seconds you have 10.13 x 31.6 = 320.11 times of appearance.
Each Tx-time per appearance is 450.90 µs (see next plot).
So we have 320.11 x 450.90 µs =144.34 ms per 31.6 seconds.




Verdict: PASS

2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

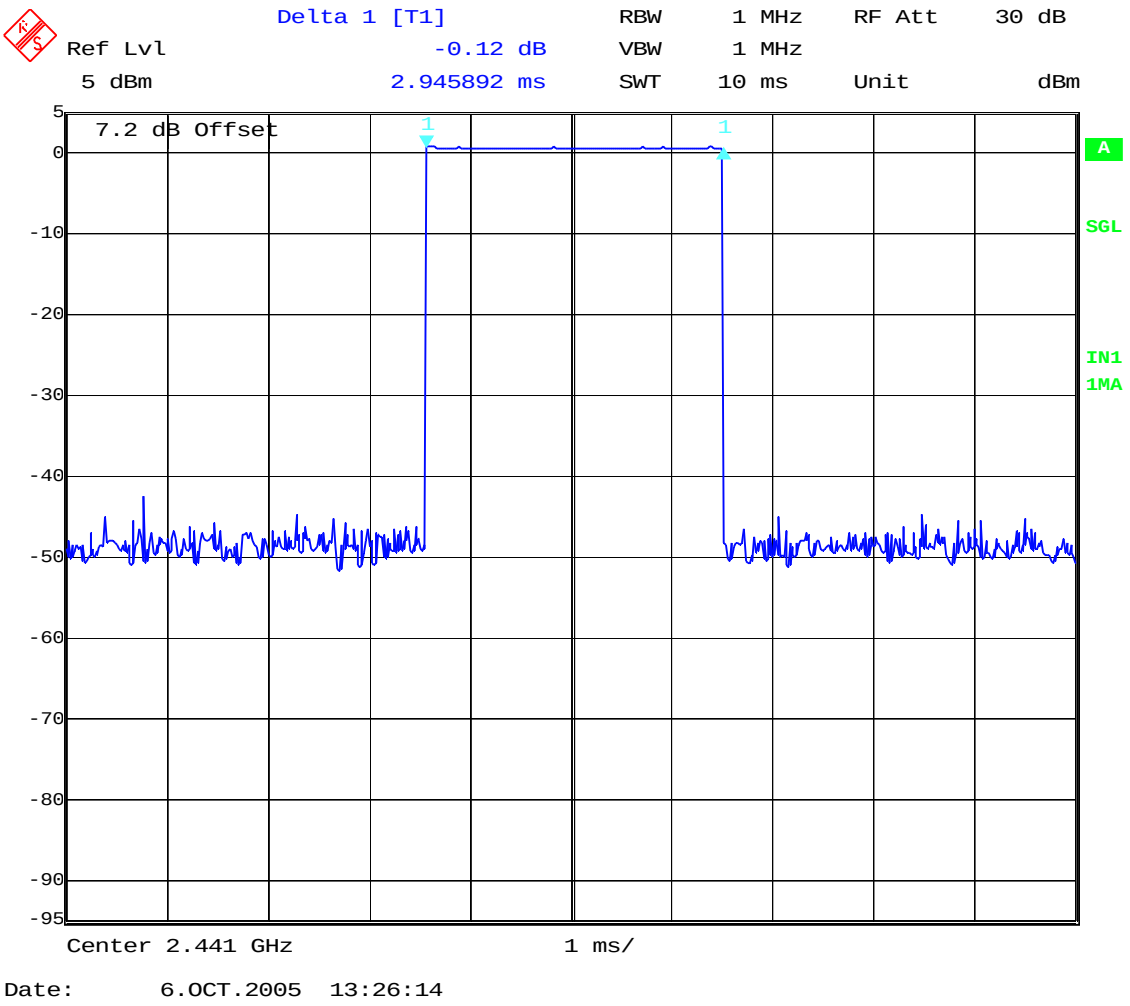
A DH3 Packet need 3 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/4 = 400 hops per second with 79 channels. So you have each channel 400/79 = 5.1 times per second and so for a period of 0.4 x 79 = 31.6 seconds you have 5.1 x 31.6 = 161.16 times of appearance.
Each Tx-time per appearance is 1.71 ms (see next plot).
So we have 161.16 x 1.71 ms = 275.58 ms per 31.6 seconds.




Verdict: PASS

3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

A DH5 Packet need 5 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 = 266.67 hops per second with 79 channels. So you have each channel 266.67/79 = 3.37 times per second and so for a period of 0.4 x 79 = 31.6 seconds you have 3.37 x 31.6 = 106.49 times of appearance.
Each Tx-time per appearance is 2.95 ms (see next plot).
So we have 106.49 x 2.95 ms = 314.15 ms per 31.6 seconds.




Verdict: PASS

## Section 15.247 Subclause (b). Maximum peak output power and antenna gain

SPECIFICATION

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm).

RESULTS

MAXIMUM PEAK OUTPUT POWER (CONDUCTED). See next plots.

| | Lowest frequency 2402 MHz | Middle frequency 2441 MHz | Highest frequency 2480 MHz |
|---|---|---|---|
| Maximum peak power (dBm) | 0.27 | 0.68 | 2.69 |
| Measurement uncertainty (dB) | ±1.5 | | |

The maximum declared antenna gain for this device is –6.9 dBi, therefore the maximum theoretical peak radiated power (EIRP) in the three measurement channels for this device is -4.21 dBm or 0.38 mW.

The actual peak radiated power (EIRP) was measured for the lowest, middle and highest frequency (see next plots):

MAXIMUM PEAK OUTPUT POWER (RADIATED).

| | Lowest frequency 2402 MHz | Middle frequency 2441 MHz | Highest frequency 2480 MHz |
|---|---|---|---|
| Correction Factor (dB) | 34.96 | 35.10 | 35.24 |
| Maximum EIRP peak power (dBm) | -5.76 | -6.93 | -5.16 |
| Measurement uncertainty (dB) | +1.98 / -1.75 | | |

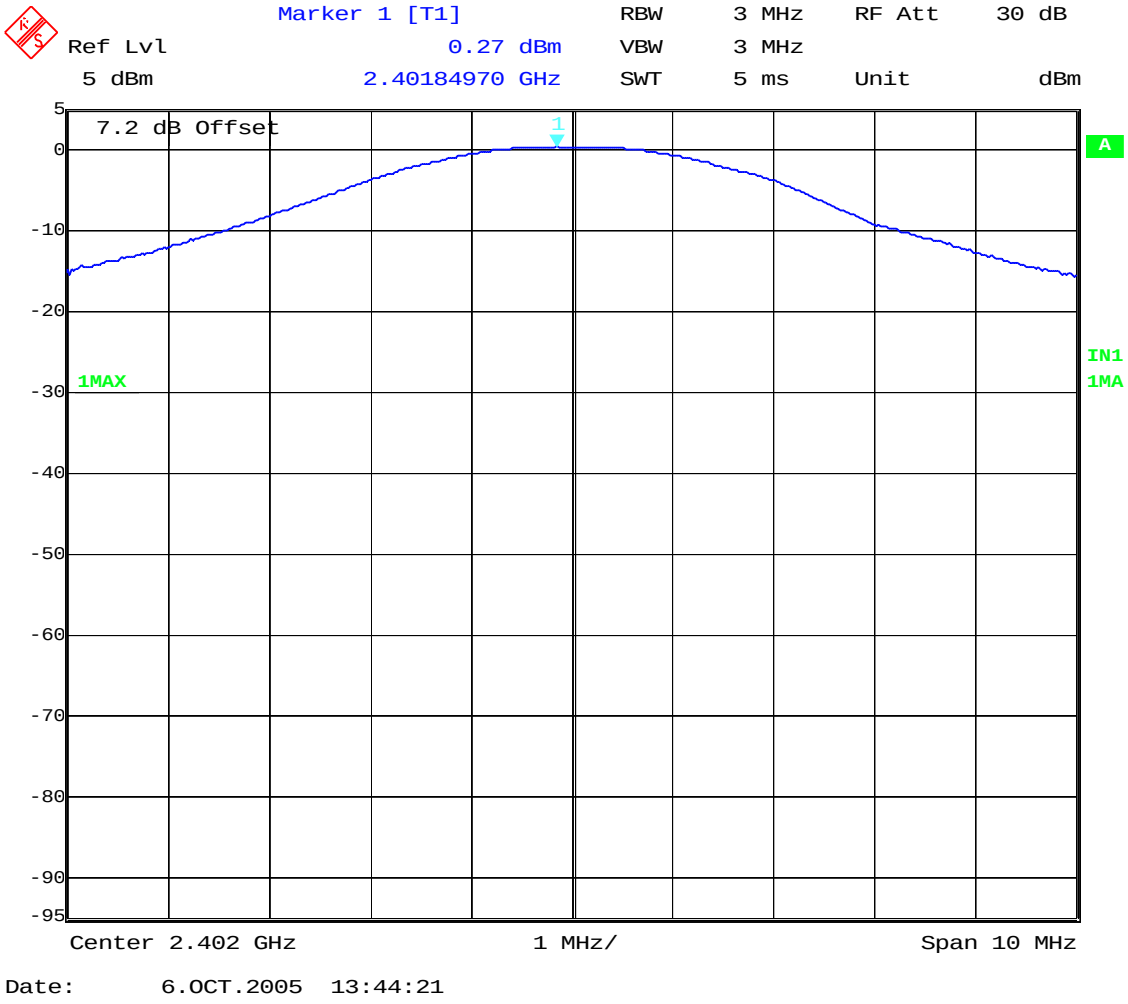
Declared peak gain: -6.9 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Verdict: PASS

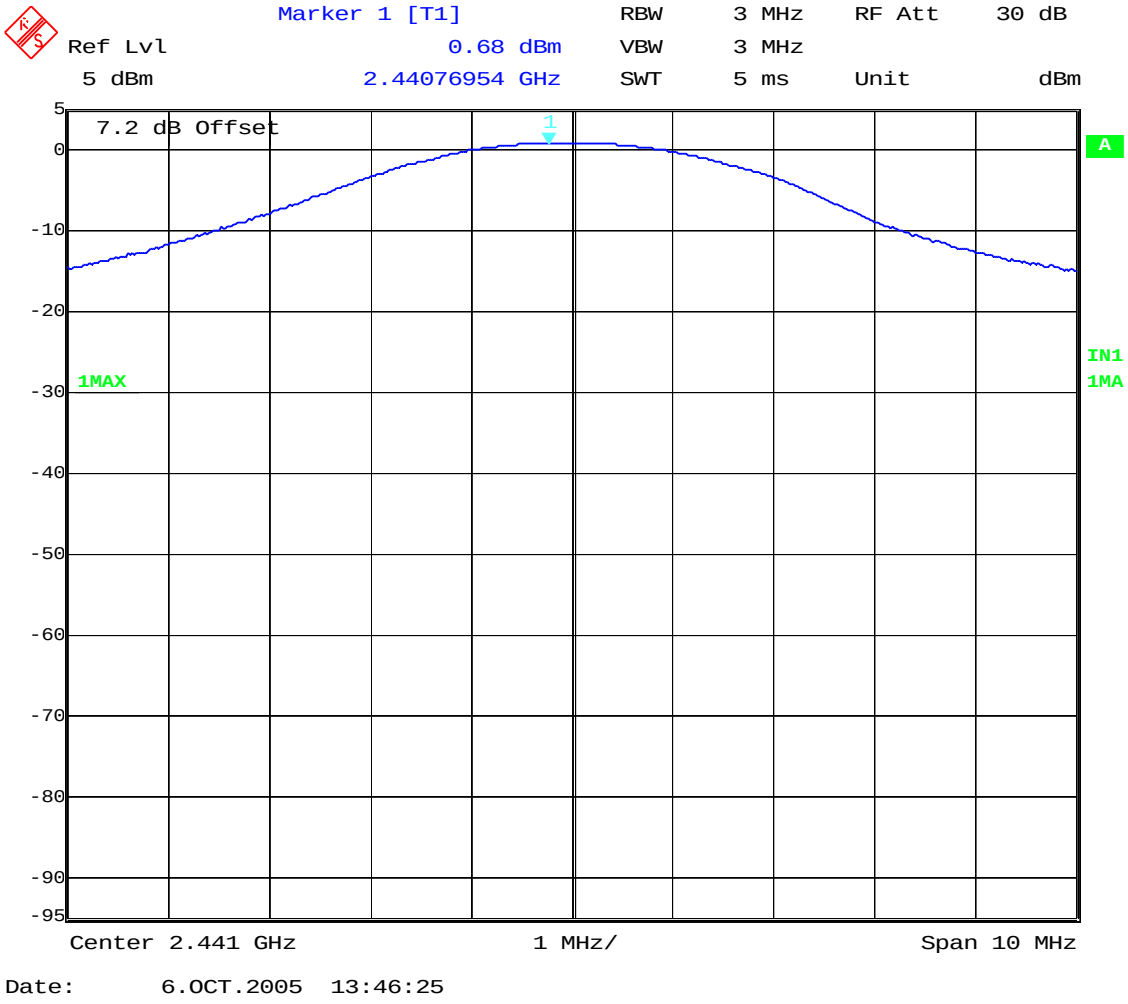
PEAK OUTPUT POWER (CONDUCTED).

Lowest Channel: 2402 MHz.



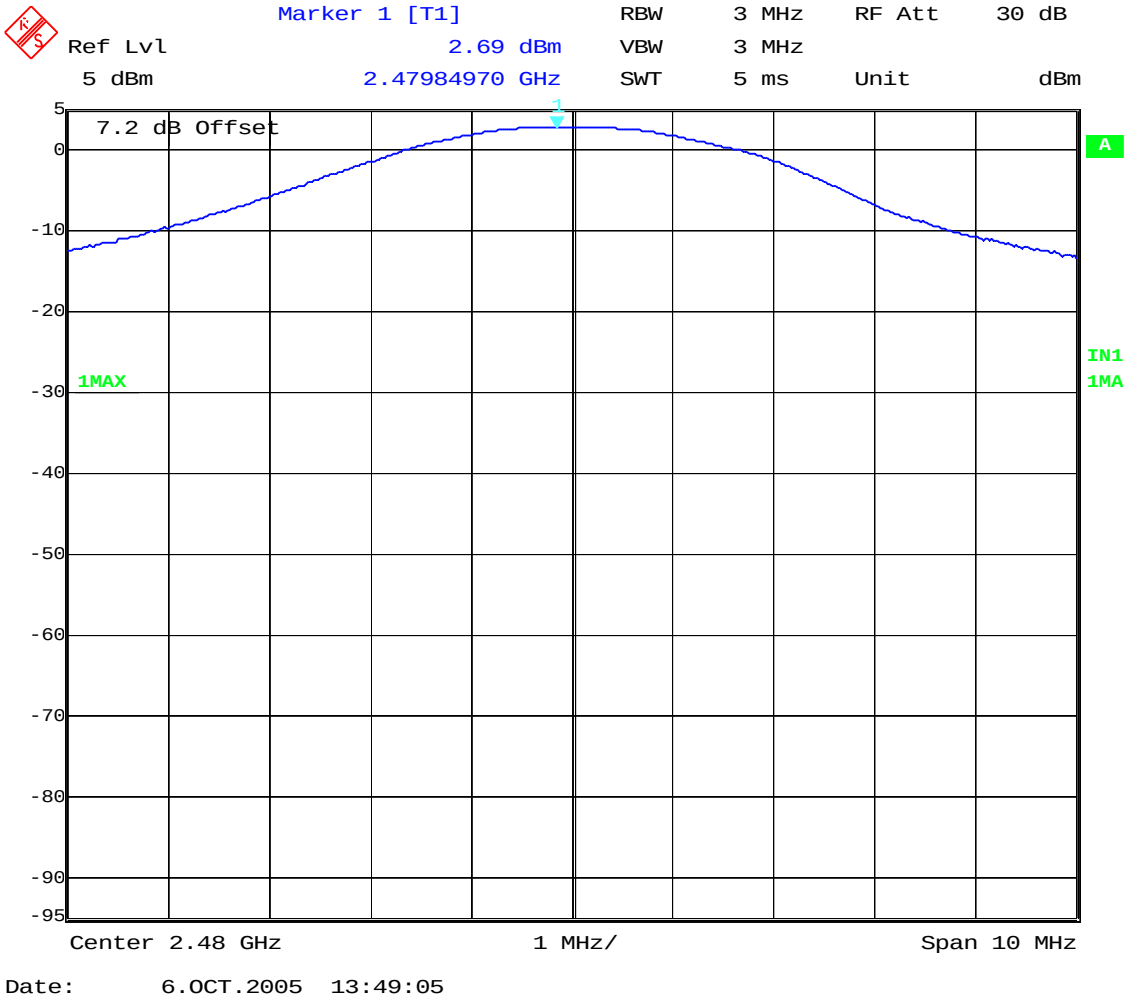
PEAK OUTPUT POWER (CONDUCTED).

Middle Channel: 2441 MHz.



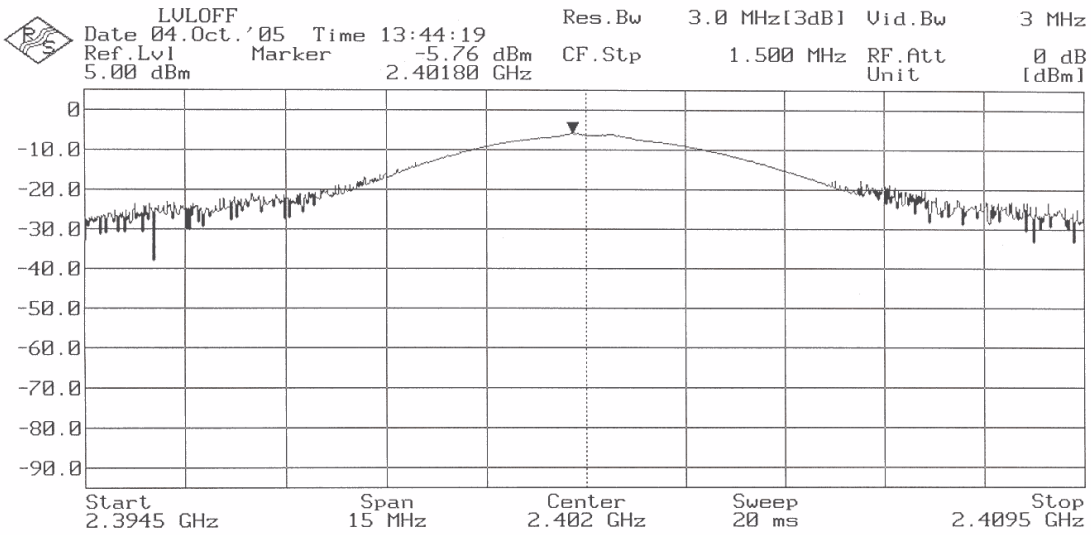
PEAK OUTPUT POWER (CONDUCTED).

Highest Channel: 2480 MHz.



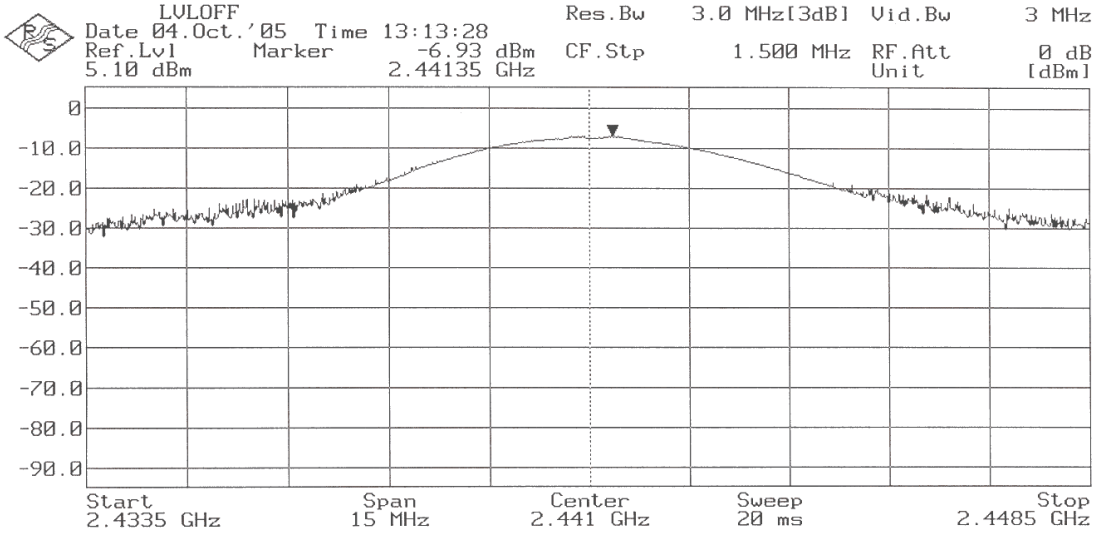
PEAK OUTPUT POWER (RADIATED).

Lowest Channel: 2402 MHz.



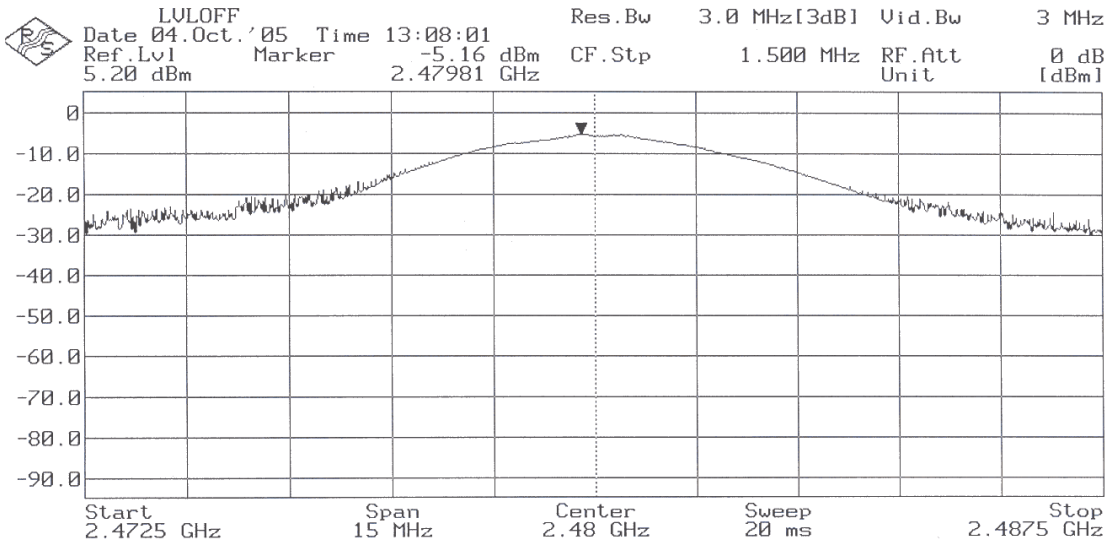

PEAK OUTPUT POWER (RADIATED).

Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (RADIATED).

Highest Channel: 2480 MHz.



## Section 15.247 Subclause (d). Band-edge of conducted emissions (Transmitter)

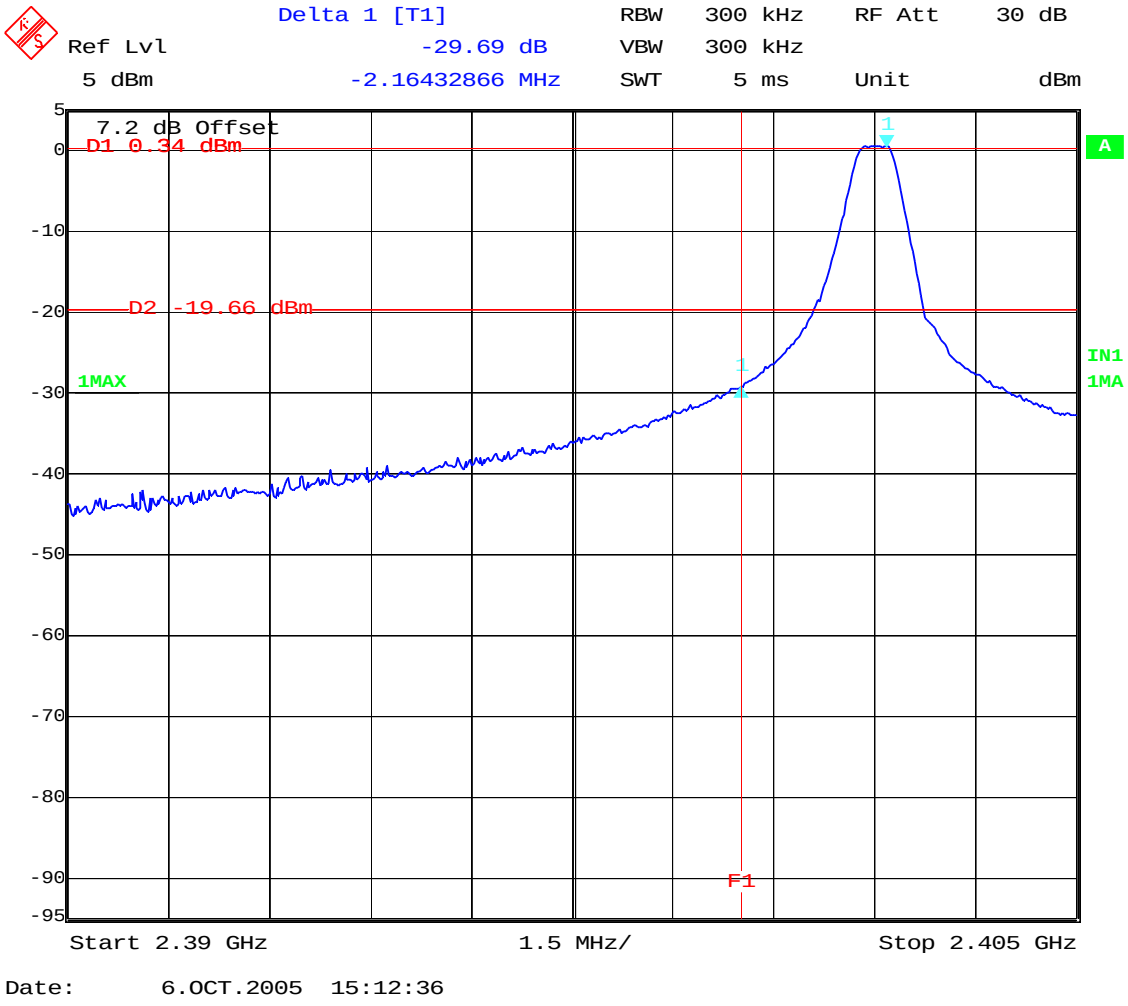
SPECIFICATION

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

RESULTS:

1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). CONDUCTED.

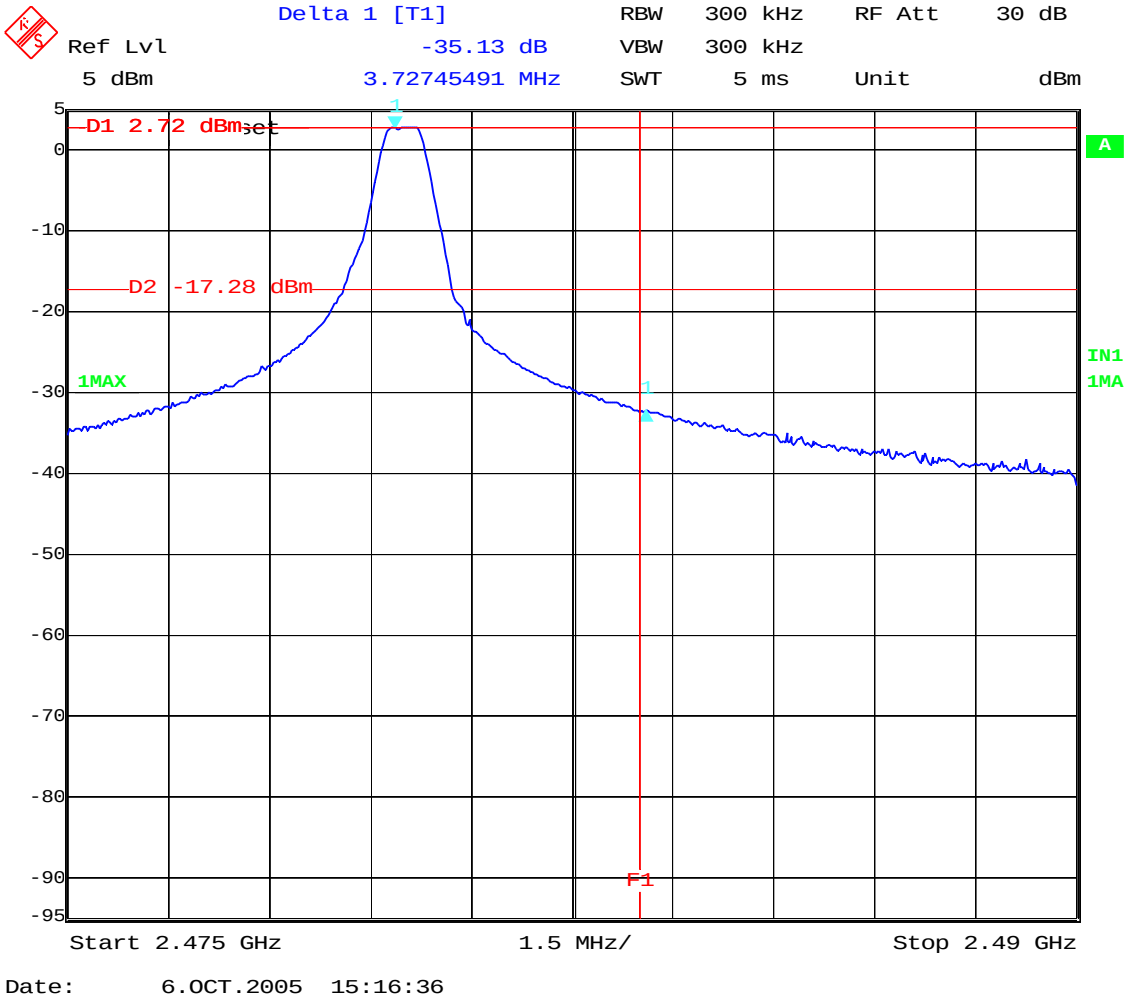
See next plot.




Verdict: PASS

2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). CONDUCTED.

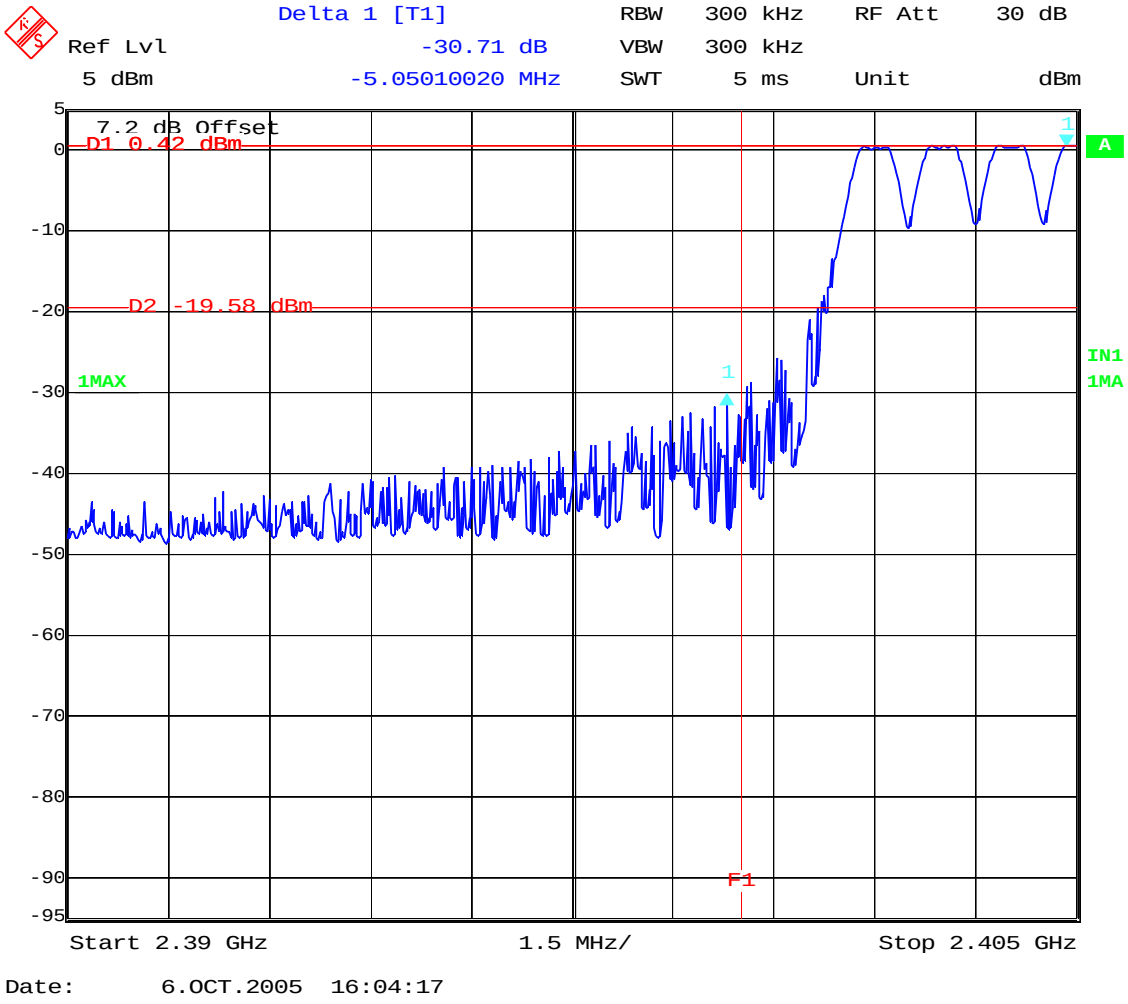
See next plot.




Verdict: PASS

3. LOW FREQUENCY SECTION (HOPPING ON). CONDUCTED.

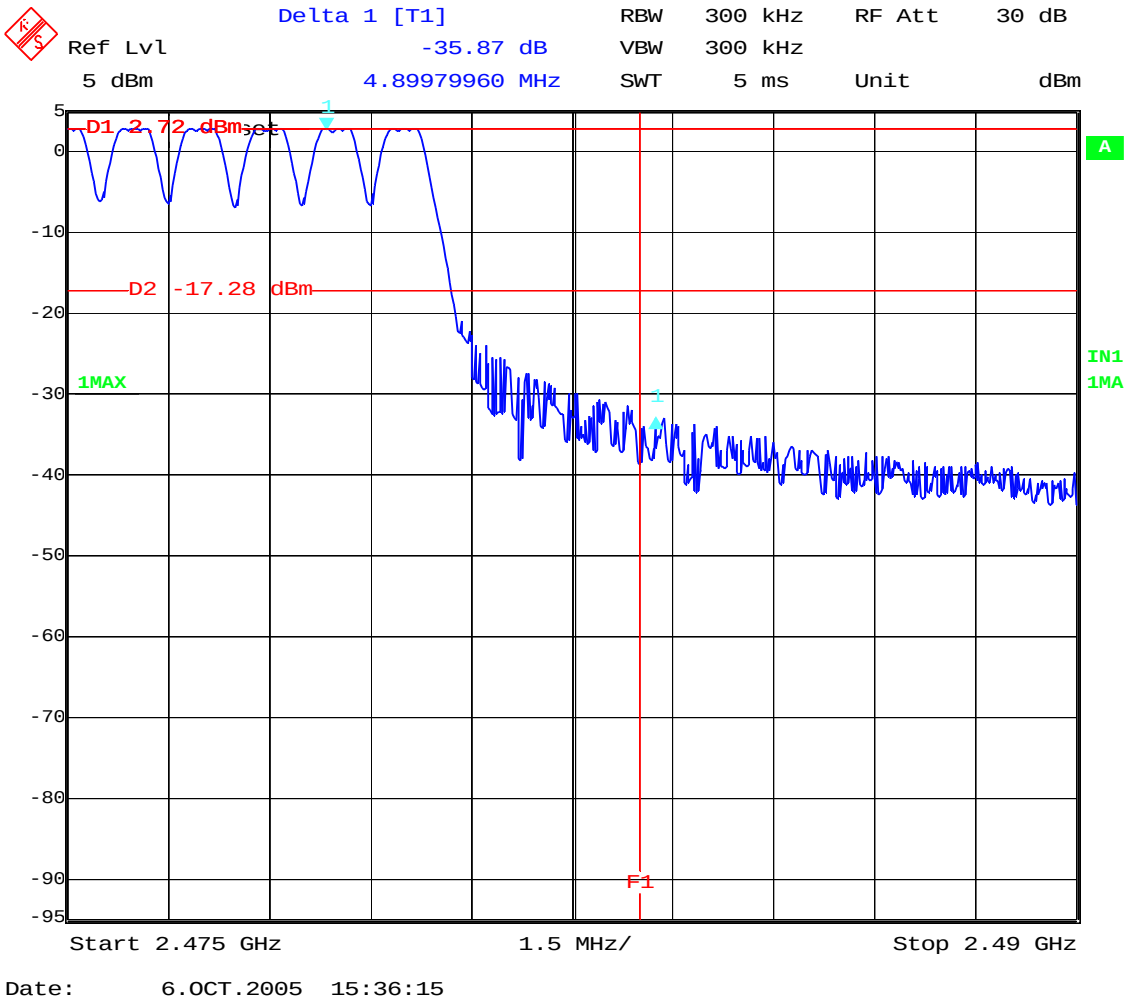
See next plot.




Verdict: PASS

4. HIGH FREQUENCY SECTION (HOPPING ON). CONDUCTED.

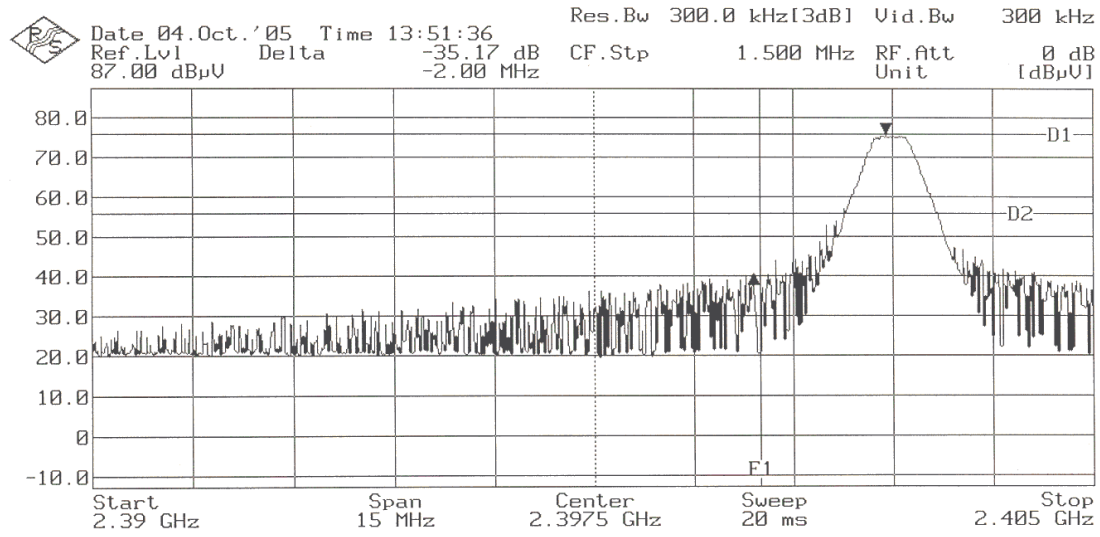
See next plot.




Verdict: PASS

5. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). RADIATED.

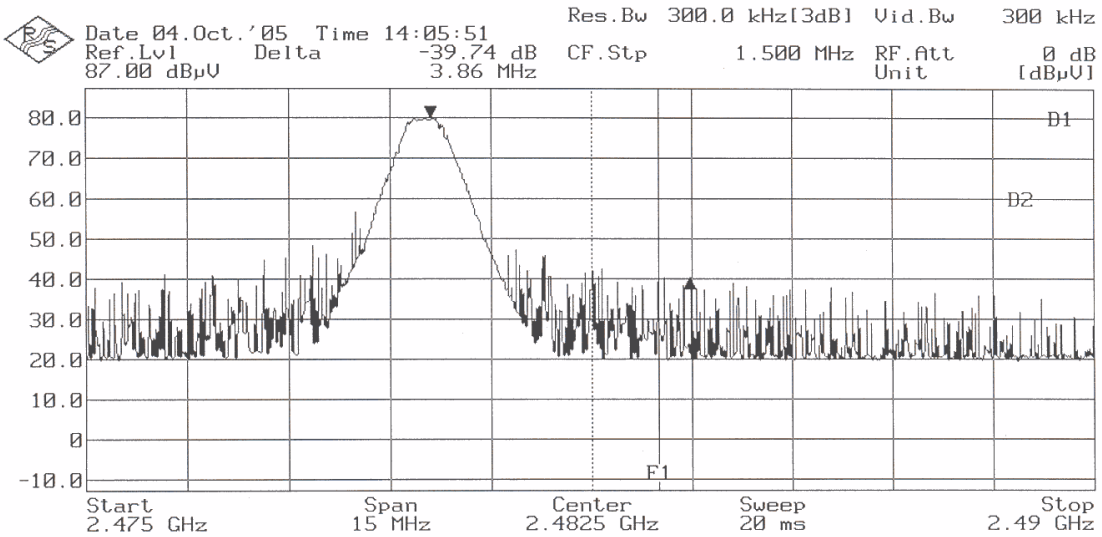
See next plot.




Verdict: PASS

6. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). RADIATED.

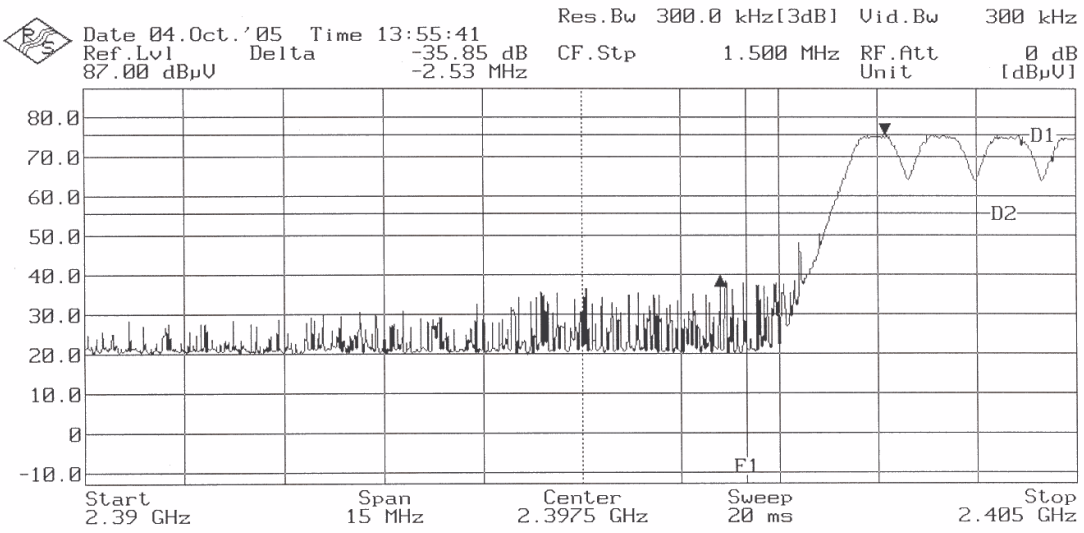
See next plot.




Verdict: PASS

7. LOW FREQUENCY SECTION (HOPPING ON). RADIATED.

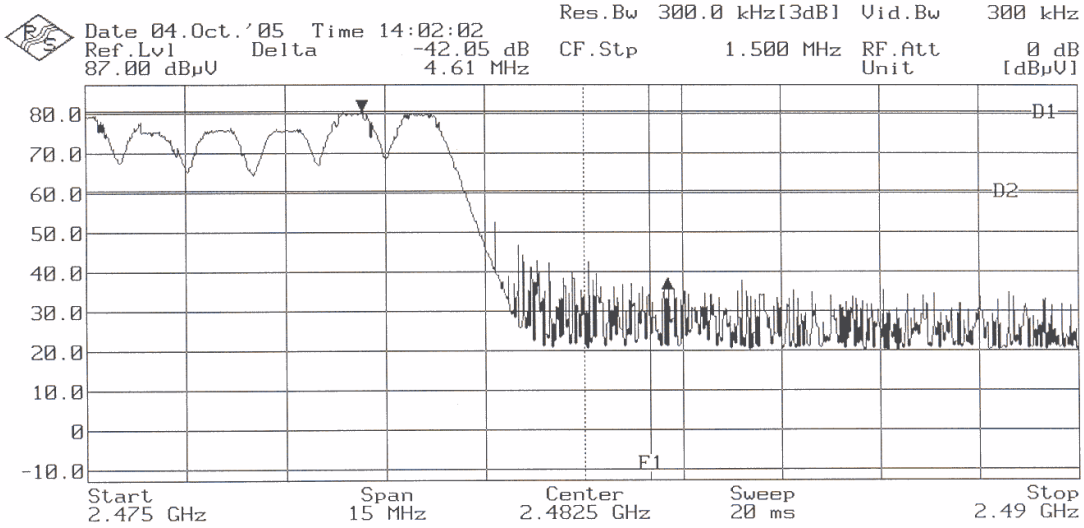
See next plot.




Verdict: PASS

8. HIGH FREQUENCY SECTION (HOPPING ON). RADIATED.

See next plot.




Verdict: PASS

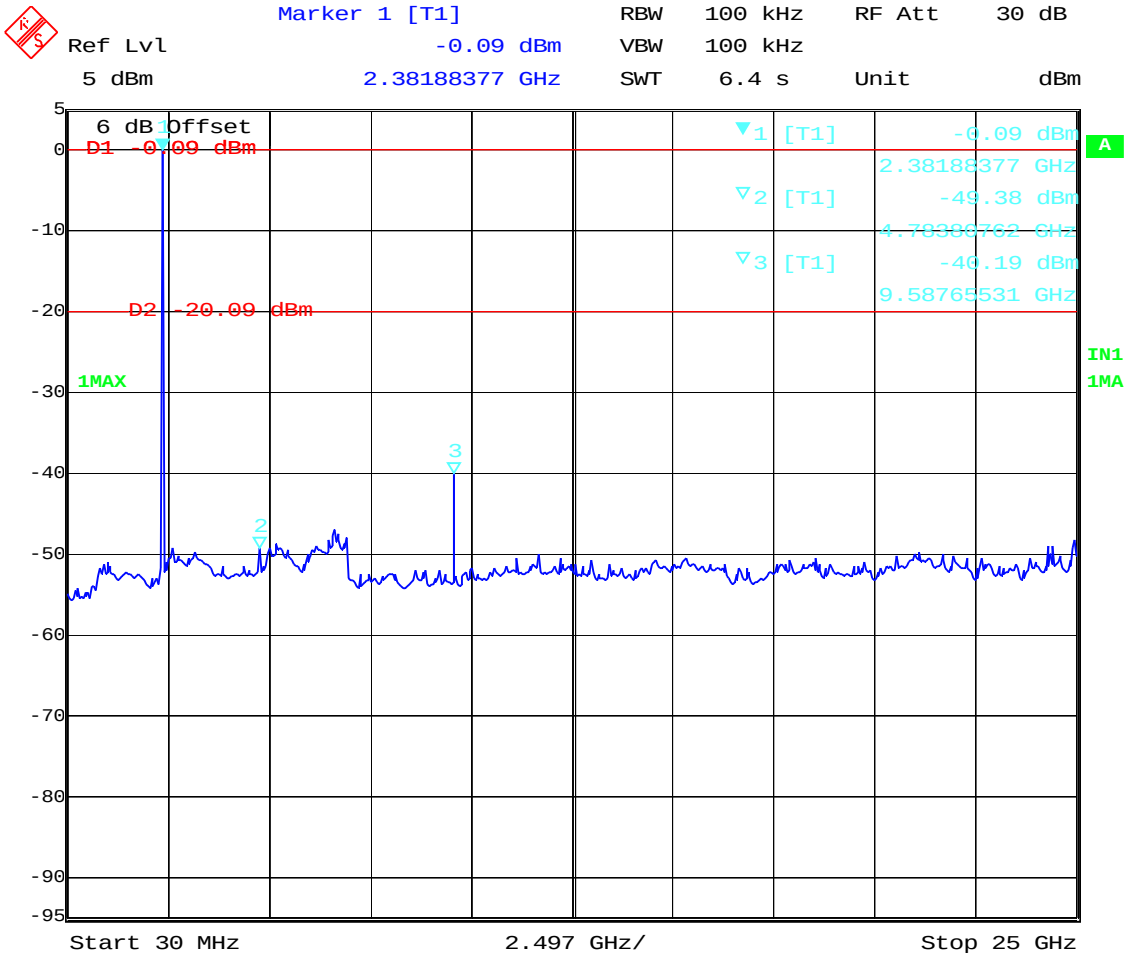
## Section 15.247 Subclause (d). Emission limitations conducted (Transmitter)

SPECIFICATION

In any 100 kHz bandwidths outside the frequency band in which the 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.

RESULTS:

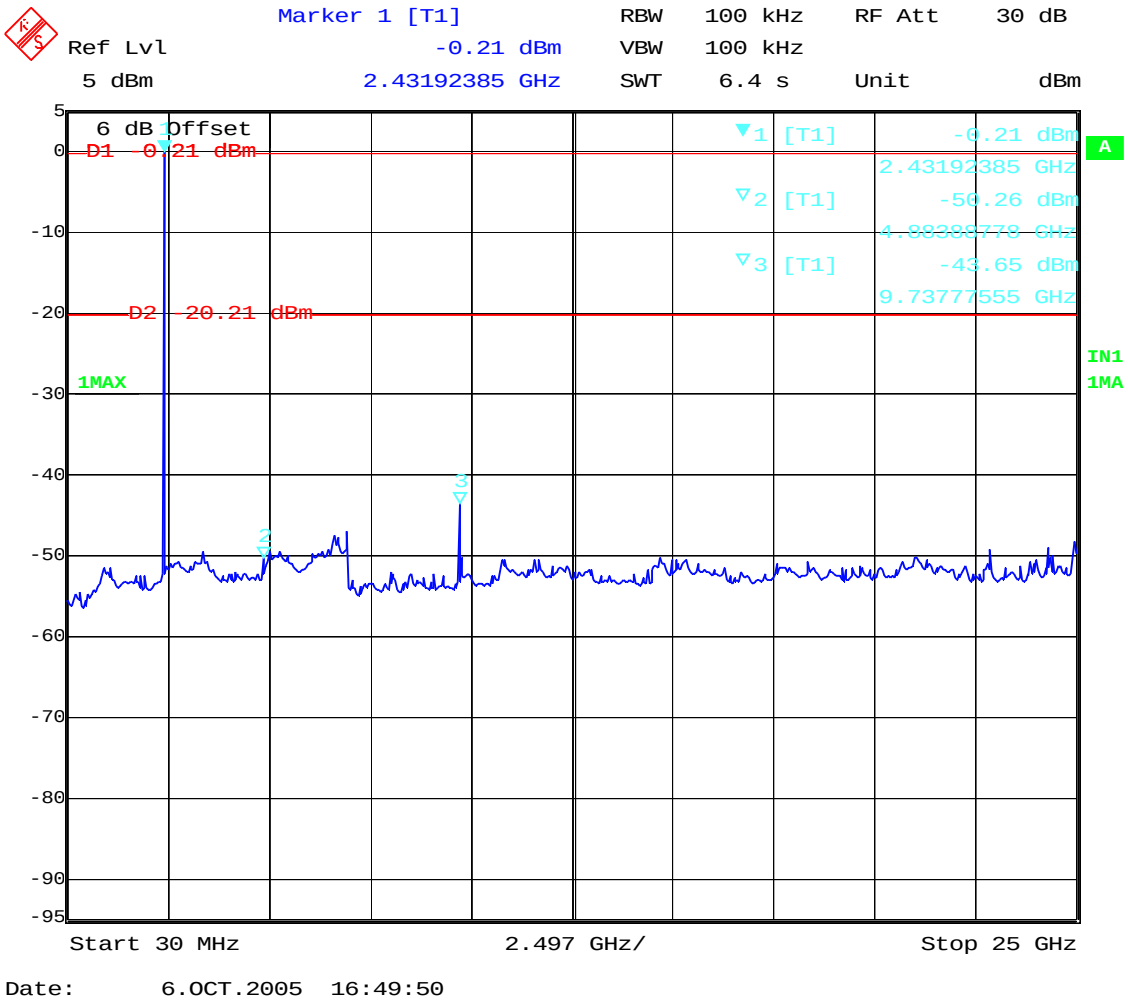
1. LOWEST CHANNEL (2402 MHz): 30 MHz-25 GHz (see next plot).




Note: The peak above the limit is the carrier frequency.

Verdict: PASS

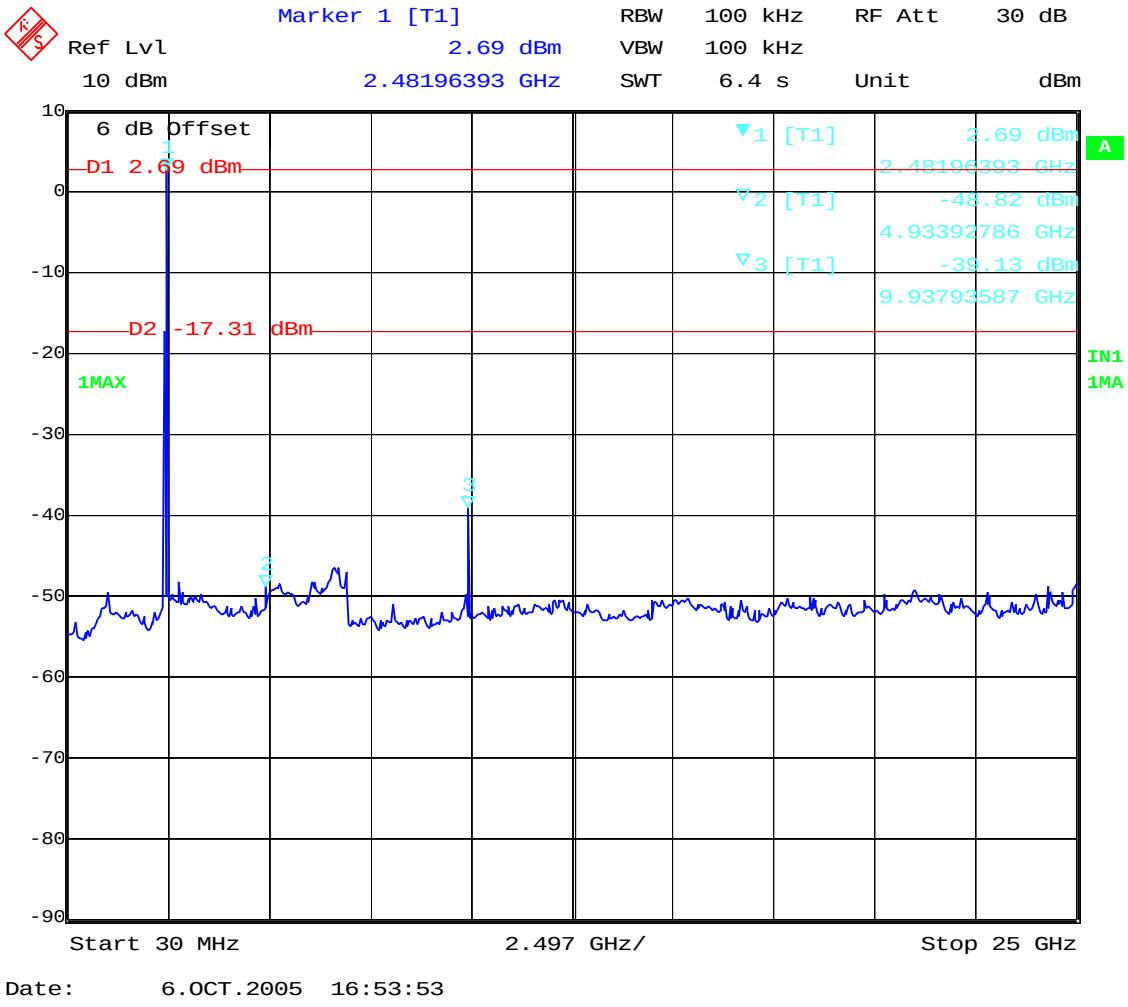
2. MIDDLE CHANNEL (2441 MHz): 30 MHz-25 GHz (see next plot).




Note: The peak above the limit is the carrier frequency.

Verdict: PASS

3. HIGH CHANNEL (2480 MHz): 30 MHz-25 GHz (see next plot).




Note: The peak above the limit is the carrier frequency.

Verdict: PASS

## Section 15.247 Subclause (d). Emission limitations radiated (Transmitter)

SPECIFICATION

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) (see §15.205(c)):

| Frequency Range (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | - | 300 |
| 0.490-1.705 | 24000/F(kHz) | - | 300 |
| 1.705 - 30.0 | 30 | - | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| 960 - 25000 | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

The equipment transmits continuously in the selected channel so it is not necessary a duty cycle correction factor.

1. CHANNEL: LOWEST (2402 MHz).

**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz, and at the harmonic frequencies.

2. CHANNEL: MIDDLE (2441 MHz).

**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz, and at the harmonic frequencies.

CHANNEL: HIGHEST (2480 MHz).

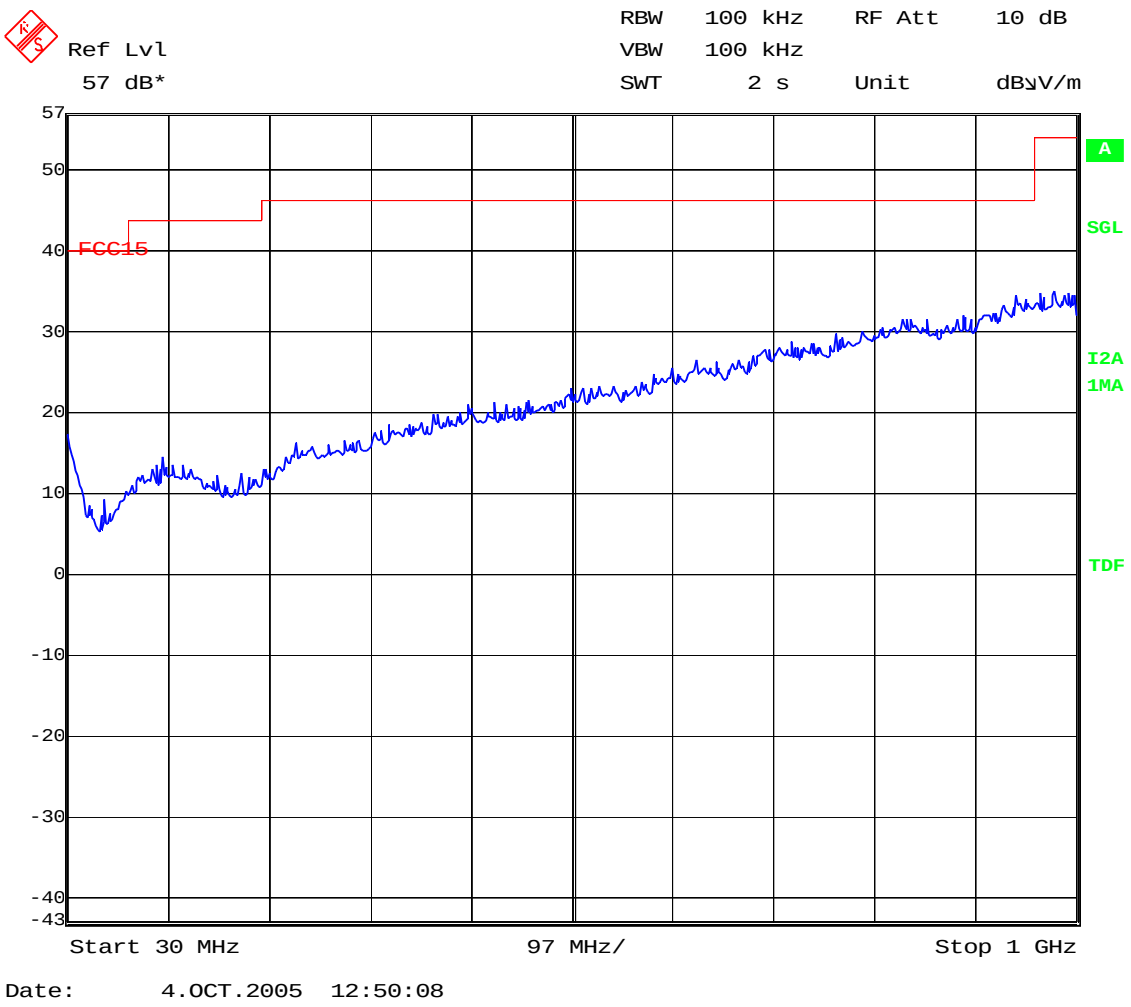
**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz, and at the harmonic frequencies.

Verdict: PASS

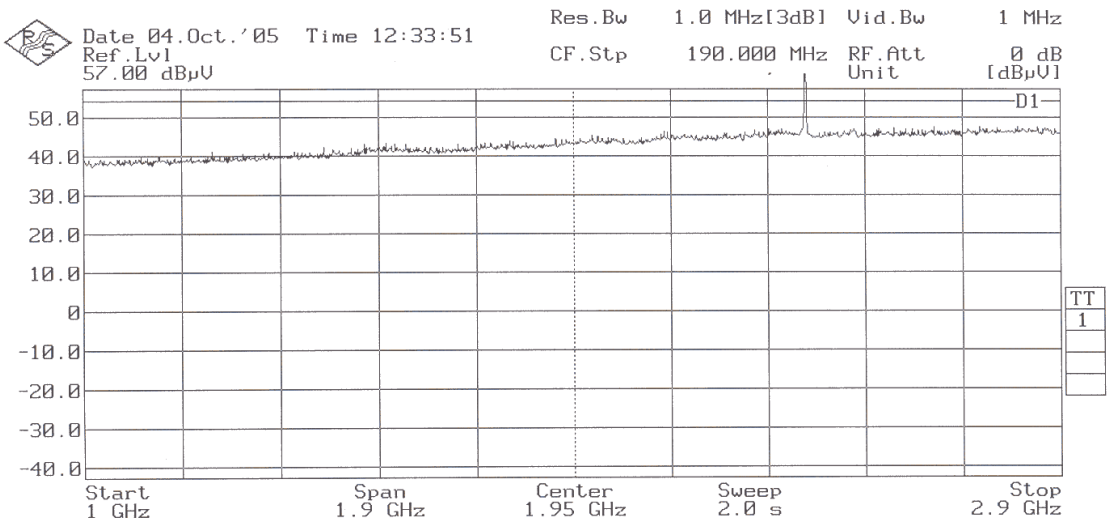
FREQUENCY RANGE 30 MHz-1000 MHz.




This plot is valid for all three channels.

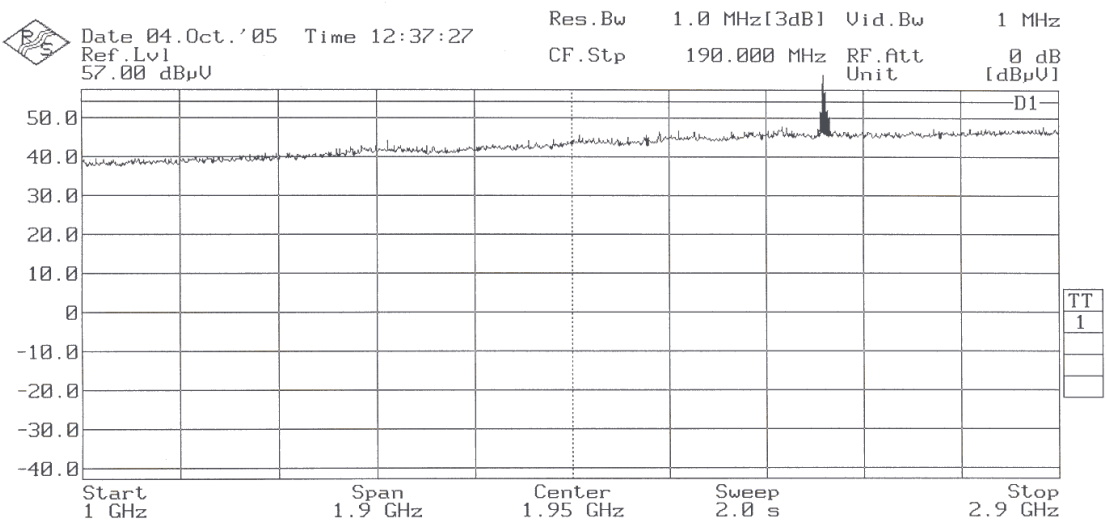
FREQUENCY RANGE 1 GHz to 2.9 GHz.

**CHANNEL: Lowest (2402 MHz).**



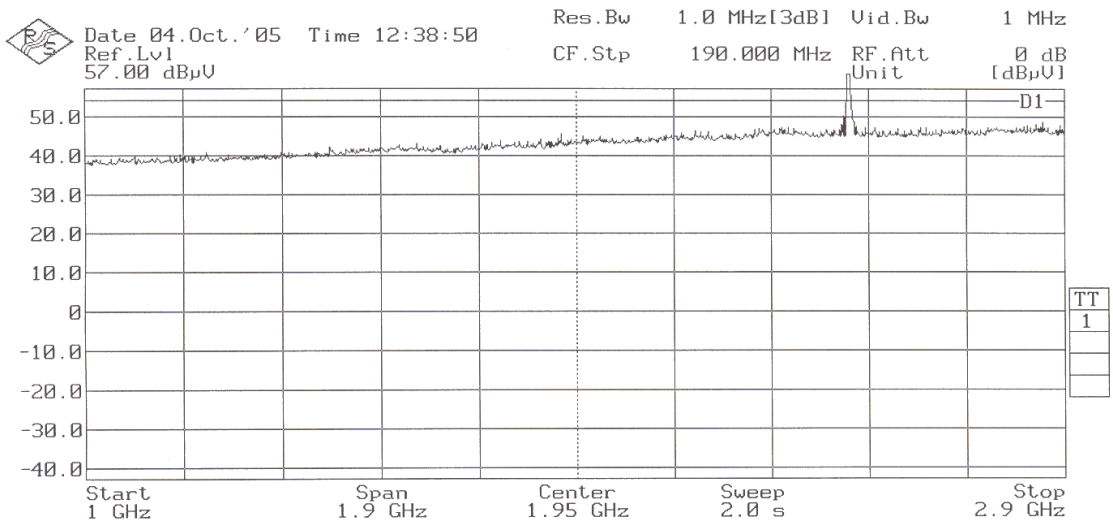

Note: The peak above the limit is the carrier frequency.

**CHANNEL: Middle (2441 MHz).**



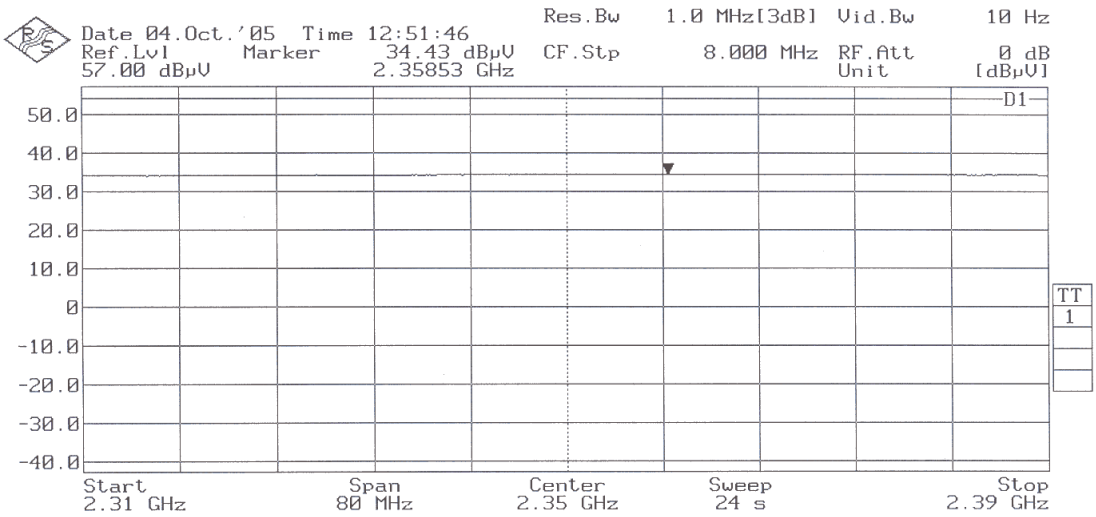

Note: The peak above the limit is the carrier frequency.

**CHANNEL: Highest (2480 MHz).**

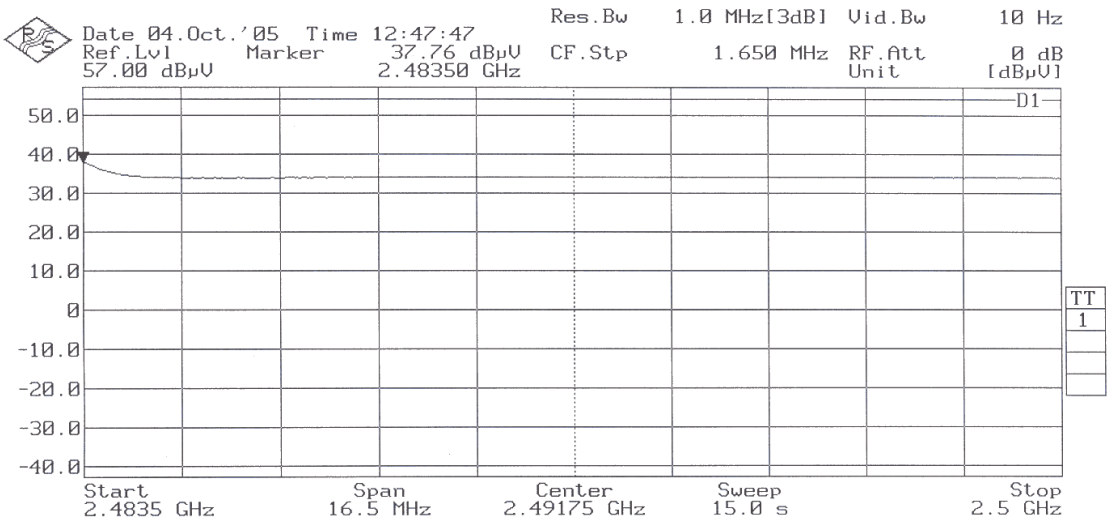



Note: The peak above the limit is the carrier frequency.

FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

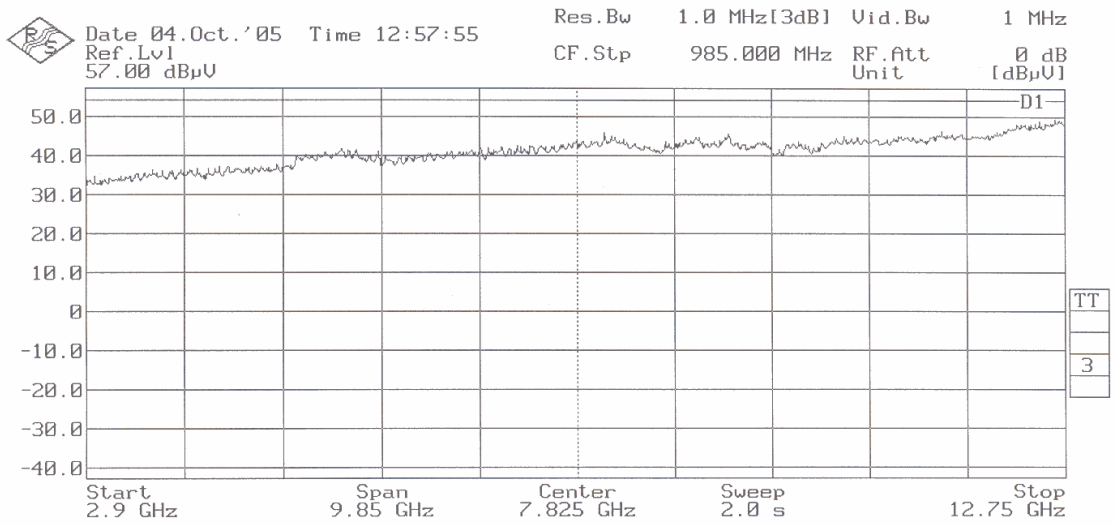



FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)



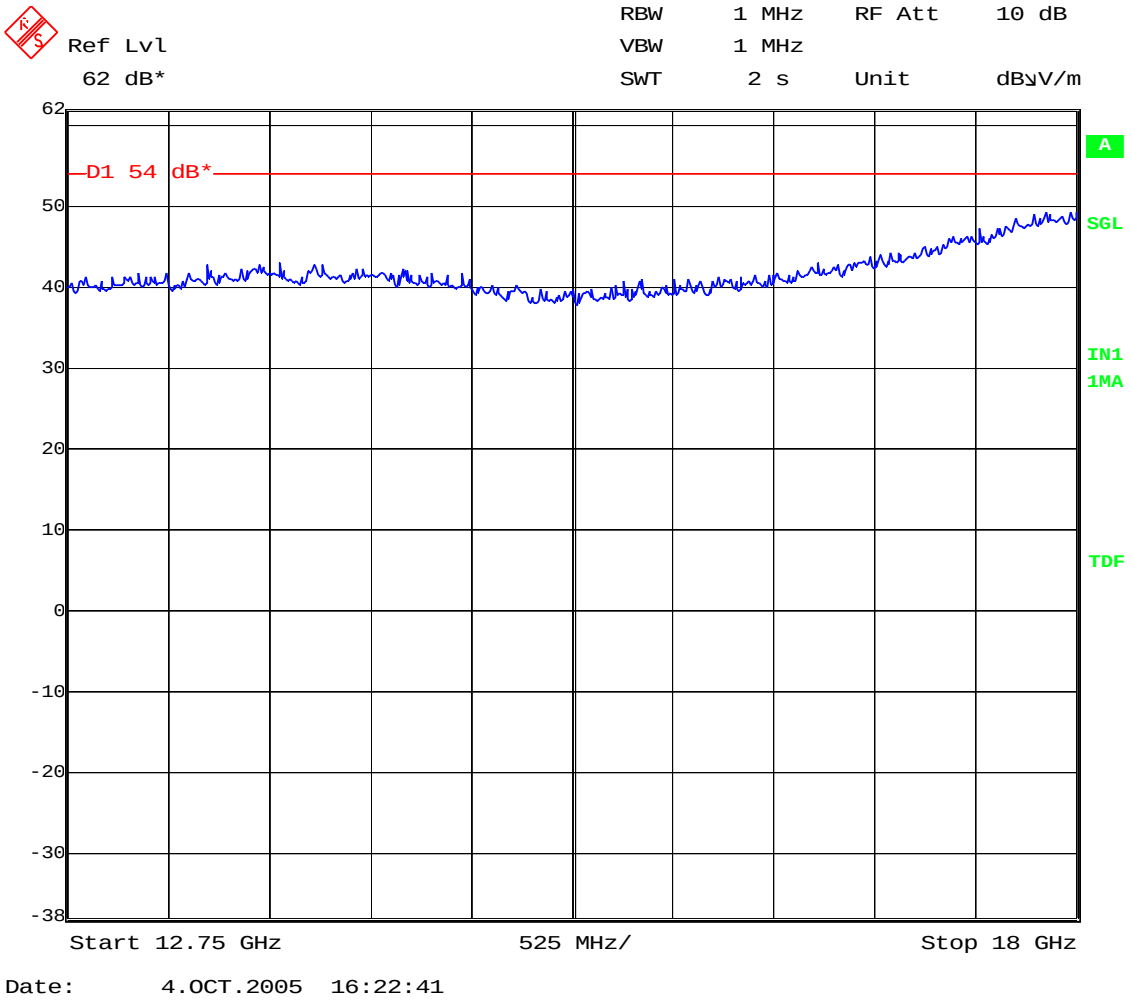
FREQUENCY RANGE 2.9 GHz to 12.75 GHz.

**CHANNEL: Lowest (2402 MHz).**



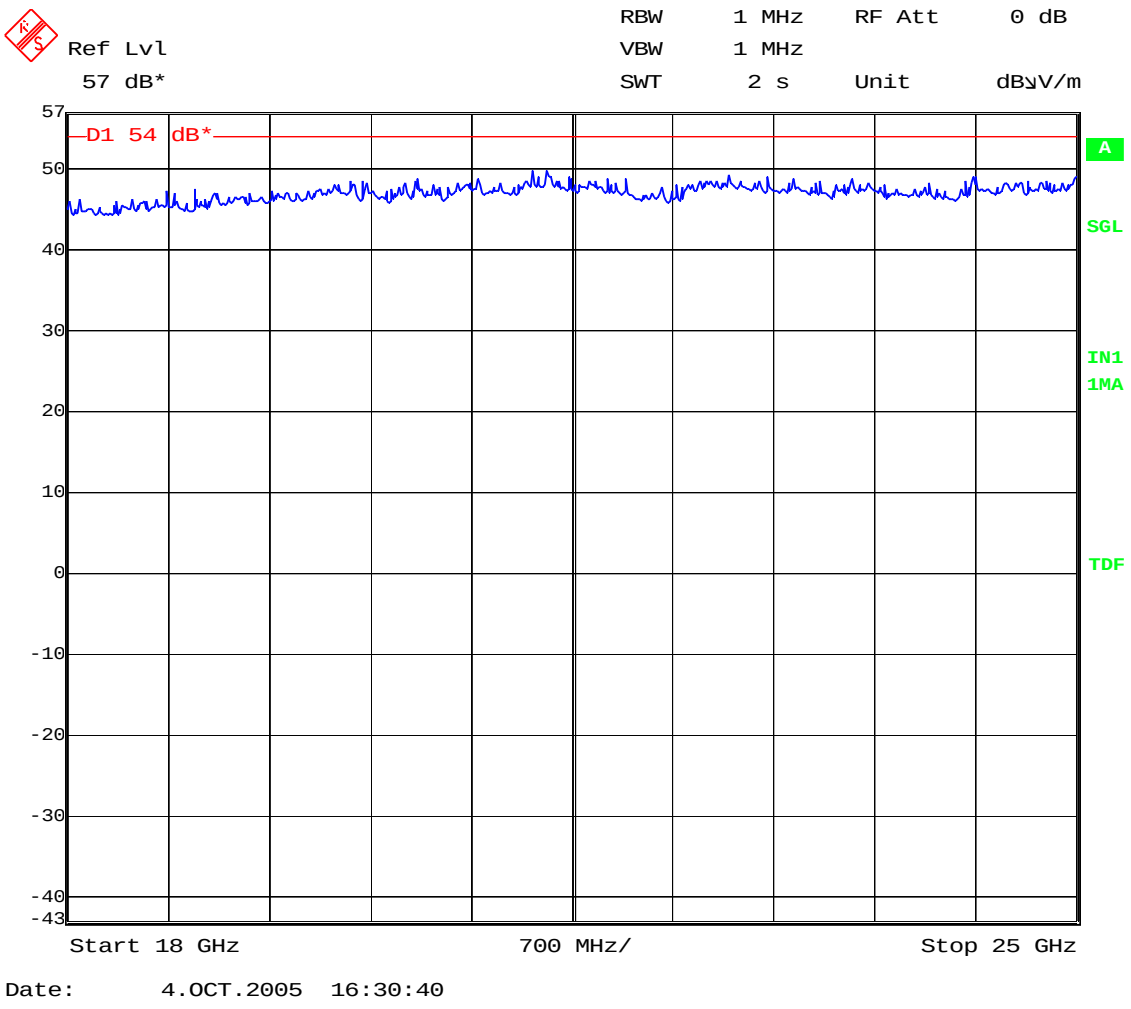

(This plot is valid for all three channels)

FREQUENCY RANGE 12.75 GHz to 18 GHz.




(This plot is valid for all three channels).

FREQUENCY RANGE 18 GHz to 25 GHz.




(This plot is valid for all three channels).

## Section 15.109. Receiver spurious radiation

SPECIFICATION

The field strength shall not exceed the following values:

| Frequency Range (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | - | 300 |
| 0.490-1.705 | 24000/F(kHz) | - | 300 |
| 1.705 - 30.0 | 30 | - | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| 960 - 25000 | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

1. CHANNEL: LOWEST (2402 MHz).

**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz.

2. CHANNEL: MIDDLE (2441 MHz).

**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz.

CHANNEL: HIGHEST (2480 MHz).

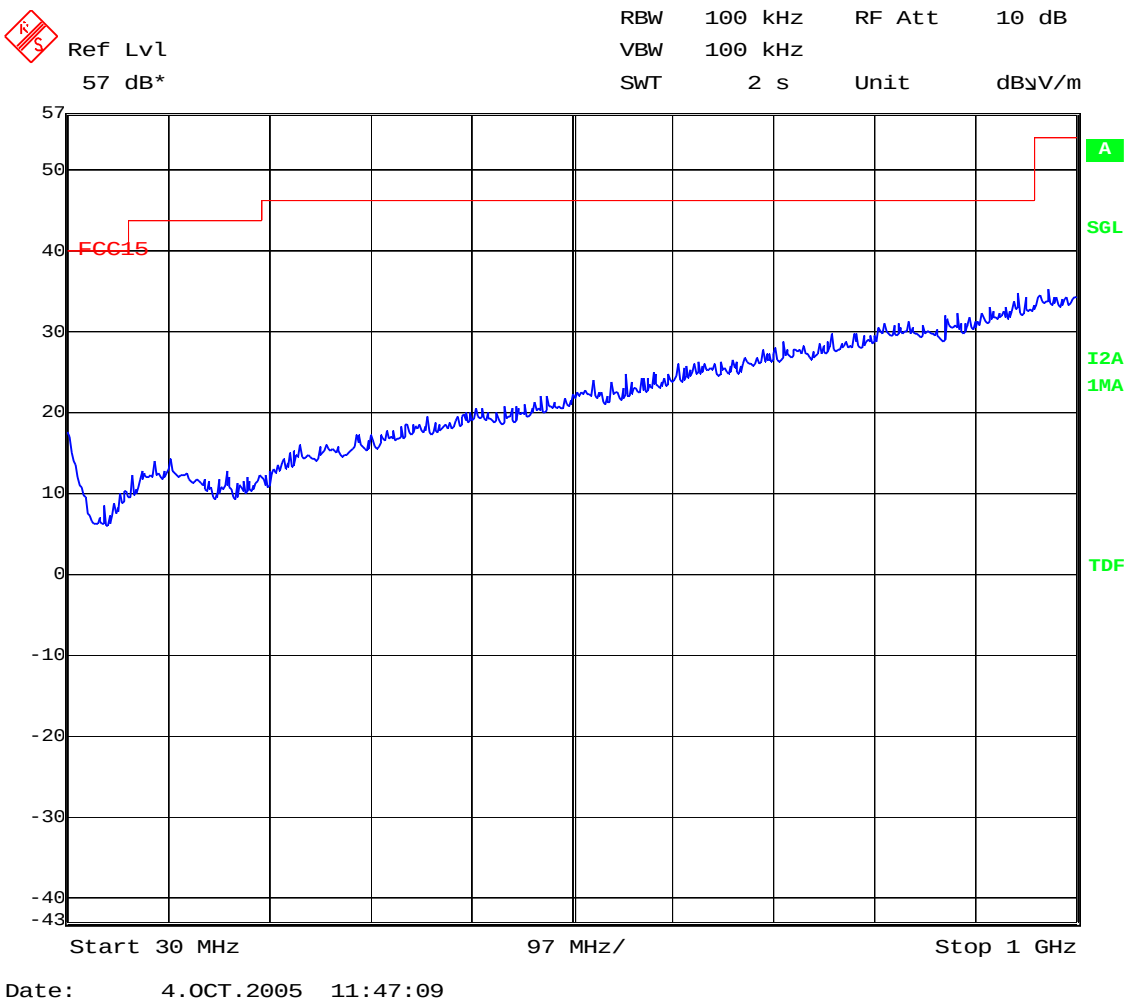
**Frequency range 30 MHz-1000 MHz**.
No spurious signals were found in all the range.

**Frequency range 1 GHz-25 GHz**.
No spurious signals were found in all the range.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz.

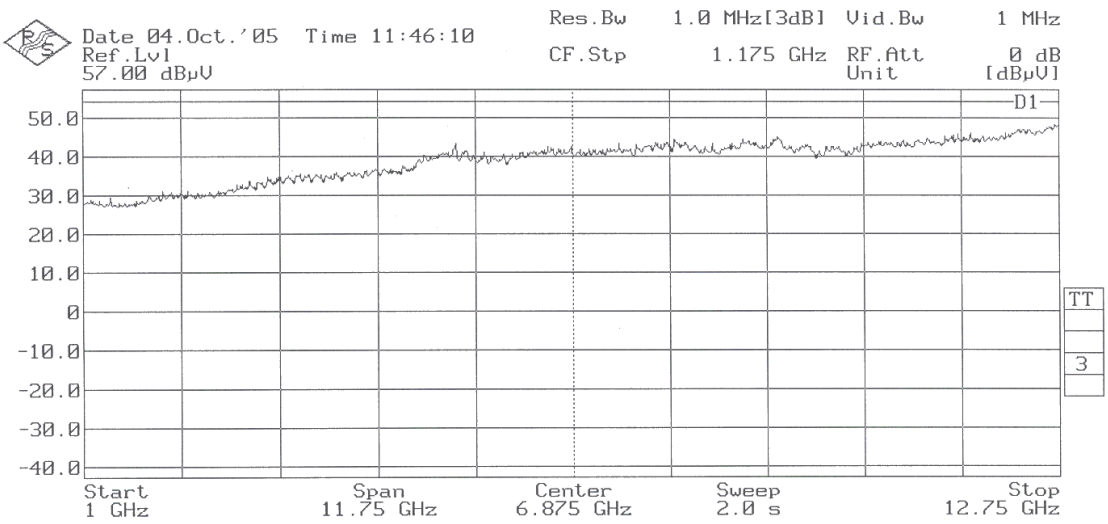
Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.



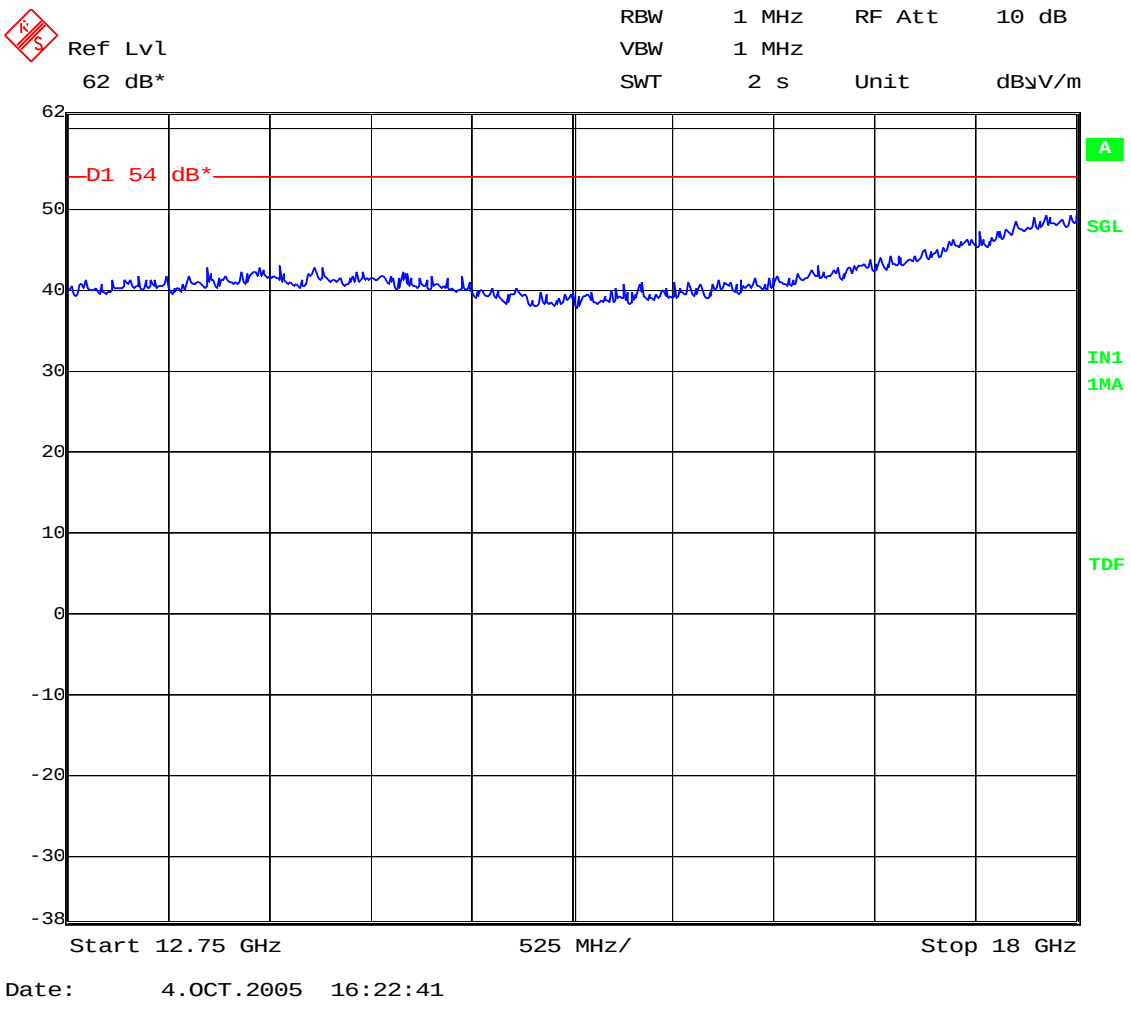

(This plot is valid for all three channels).

FREQUENCY RANGE 1 GHz-12.75 GHz.



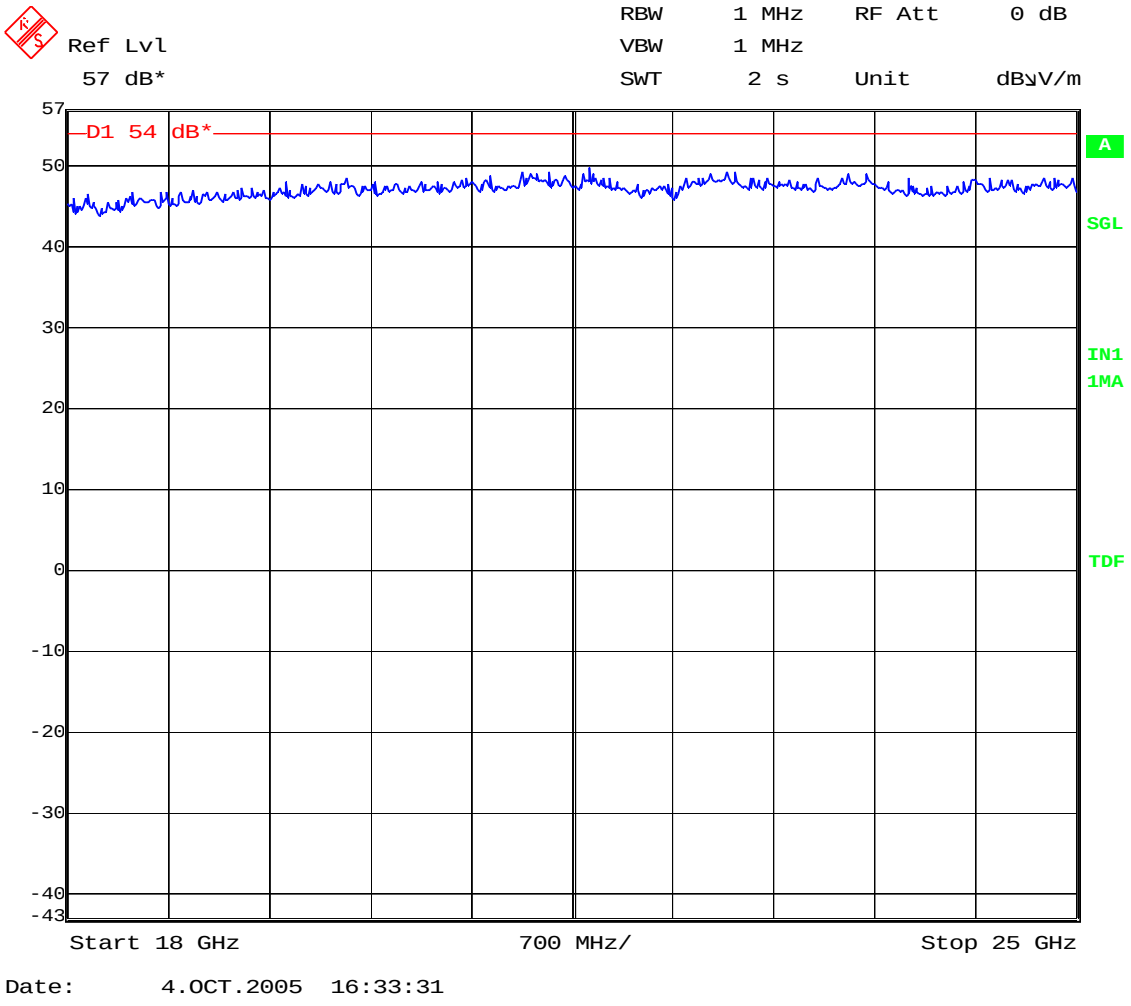

(This plot is valid for all three channels)

FREQUENCY RANGE 12.75 GHz-18 GHz.




(This plot is valid for all three channels)

FREQUENCY RANGE 18 GHz-25 GHz.




(This plot is valid for all three channels)