

## FCC Part 15C Compliance Test Report

|   |  |                                   |  |
|---|--|-----------------------------------|--|
| <b>Test Report no.:</b>                                 | FCC15CWLAN_RM-927_04.docx  | <b>Date of Report:</b>            | 30-Aug-2013  |
| <b>Number of pages:</b>                                 | 23   | <b>Customer's Contact person:</b> | Victoria Abadilla  |
| <b>Testing laboratory:</b>                              | TCC Nokia San Diego Laboratory<br>16620 West Bernardo Drive<br>San Diego, CA 92127<br>USA<br>Tel. +1 858 831 5000<br>Fax. +1 858 831 6500  | <b>Customer:</b>                  | Nokia, Inc.<br>16620 West Bernardo Drive<br>San Diego, CA 92127<br>USA<br>Tel. +1 858 831 5000<br>Fax. +1 858 385 1598 |
| <b>FCC listing no.:</b>                                 | 586140   |                                   |  |
| <b>IC recognition no.:</b>                              | 10162A-1   |                                   |  |
| <b>Tested devices/ accessories:</b>                     | <b>Phone RM-927 / Dummy Battery SD-217R</b>  |                                   |  |
| <b>FCC ID:</b>  | QMND   | <b>IC:</b>                        | 661X-D   |
| <b>Supplement reports:</b>                              | -  |                                   |  |
| <b>Testing has been carried out in accordance with:</b> | <b>CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), DTS procedures KDB 558074, IC standards. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".</b> |                                   |  |
| <b>Documentation:</b>                                   | The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia. |                                   |  |
| <b>Test Results:</b>                                    | <b>The EUT complies with the requirements in respect of all parameters subject to the test.</b><br>The test results relate only to devices specified in this document  |                                   |  |
| <b>Date and signature for the contents:</b>             |  |                                   |  |

**Tyrone Hawes, Specialist**

## 1. Summary for FCC Part 15C Compliance Test Report

|                                      |   |
|--------------------------------------|---|
| <b>Date of receipt</b>               | 20-Jul-2013   |
| <b>Testing completed</b>             | 28-Aug-13   |
| <b>The customer's contact person</b> | Victoria Abadilla                                   |
| <b>Test Plan referred to</b>         | T:\Projects\RM-927\TestPlan\RS_testplan_RM-927.xlsm |
| <b>Notes</b>                         | -   |
| <b>Document name</b>                 | T:\Projects\RM-927\EMC\FCC15CWLAN_RM-927_04.docx    |

### 1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:  
GSM/CDMA/WCDMA/LTE/WLAN/Bluetooth  
The EUT is tested with maximum rated TX power.

Devices under tests

| Product       | Type    | SN              | HW   | MV | SW                  | DUT   |
|---------------|---------|-----------------|------|----|---------------------|-------|
| Phone         | RM-927  | 355906050012748 | 0161 | -  | 1028.0305.1329.2000 | 30738 |
| Dummy Battery | SD-217R | 50346           | 0.3  | -  | -                   | 30742 |

### 1.2. Summary of Test Results

WLAN:

| Section in CFR 47    | Section in RSS-GEN or RSS-210 | Name of the test                     | Result |
|----------------------|-------------------------------|--------------------------------------|--------|
| 15.247(b)(1)         | A8(0.4(4))                    | Conducted peak output power          | PASSED |
| 15.247(d), 15.205(b) | A8(0.5)                       | Band edge compliance of RF emissions | NP     |
| 15.247(d)            | A8(0.5)                       | Spurious RF conducted emissions      | PASSED |
| 15.247(d), 15.209    | A8(0.5)                       | Spurious radiated emissions          | NP     |
| 15.207               | 7.2.2                         | AC powerline conducted emissions     | NP     |
| 15.247(a)(2)         | A8(0.1(1))                    | 6dB(bandwidth)                       | PASSED |
| 15.247(e)            | A8(0.1(2))                    | Power spectral density               | PASSED |

PASSED  
FAILED  
NP

The EUT complies with the essential requirements in the standard.  
The EUT does not comply with the essential requirements in the standard.  
The test was not performed by the TCC Nokia Laboratory.

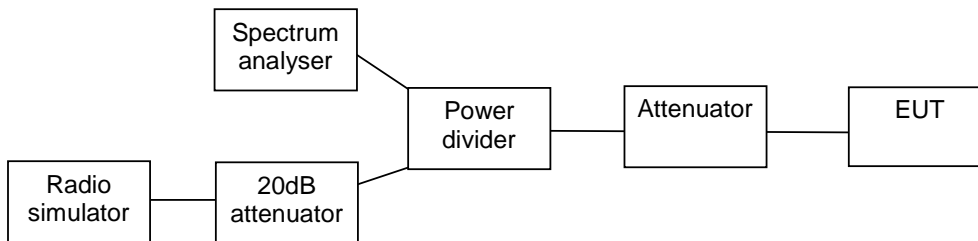
## CONTENTS

|   |                                     |
|---|-------------------------------------|
| <b>1. Summary for FCC Part 15C Compliance Test Report.....</b>                    | <b>2</b>                            |
| 1.1. EUT and Accessory Information.....   | 2                                   |
| 1.2. Summary of Test Results.....   | 2                                   |
| <b>2. Conducted peak output power<br/>(15.247(b)(1), RSS-210 A8.4 (4)) .....</b>  | <b>4</b>                            |
| 2.1. Test Setup.....  | 4                                   |
| 2.2. Test method and limit.....   | 4                                   |
| 2.3. Power results summary.....   | 5                                   |
| 2.4. WLAN Test results .....  | 6                                   |
| <b>3. Spurious RF conducted emissions<br/>(FCC §15.247(d), RSS-210 A8.5).....</b> | <b>9</b>                            |
| 3.1. Test Setup.....  | 9                                   |
| 3.2. Test method and limit.....   | 9                                   |
| 3.3. WLAN Test results .....  | 10                                  |
| <b>4. 6 dB bandwidth<br/>(FCC §15.247(a)(2), RSS-210 A8.2 (1)).....</b>           | <b>13</b>                           |
| 4.1. Test Setup.....  | 13                                  |
| 4.2. Test method and limit.....   | 13                                  |
| 4.3. WLAN Test results .....  | 14                                  |
| <b>5. Power spectral density<br/>(FCC §15.247(e), RSS-210 A8.2 (2)) .....</b>     | <b>18</b>                           |
| 5.1. Test Setup.....  | 18                                  |
| 5.2. Test method and limit.....   | 18                                  |
| 5.3. WLAN Test results .....  | <b>Error! Bookmark not defined.</b> |
| <b>6. Test Equipment.....</b>   | <b>22</b>                           |
| 6.1. Conducted measurements .....   | 22                                  |
| 6.2. Radiated measurements.....   | 22                                  |

## 2. Conducted peak output power (15.247(b)(1), RSS-210 A8.4 (4))

|  |                    |
|--|--------------------|
| <b>EUT with DUT number</b>                             | RM-927, DUT 30738  |
| <b>Accessories with DUT numbers</b>                    | SD-217R, DUT 30742 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 3.8V DC            |
| <b>Results</b>   | PASSED             |
| <b>Remarks</b>   |                    |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 21.3 / 48.8 / 1050 |
| <b>Date of measurements</b>                            | 26-Jul-2013        |
| <b>Measured by</b>                                     | Feng You           |

### 2.1. Test Setup



### 2.2. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for conducted peak output power measurements

| Frequency range [MHz]        | Limit [W] | Limit [dBm] |
|------------------------------|-----------|-------------|
| 2400 – 2483.5<br>5725 - 5850 | <= 1      | <= 30       |

### 2.3. Power results summary

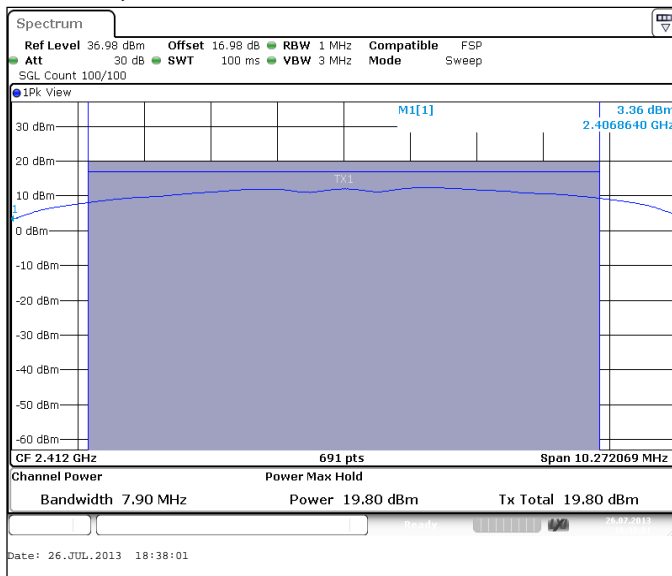
| Channel / $f_c$ [MHz] | Mode    | Modulation | Data rate | Level [dBm] |
|-----------------------|---------|------------|-----------|-------------|
| 1 / 2412              | 802.11b | BPSK       | 1 Mbps    | 19.8        |
| 6 / 2437              | 802.11b | BPSK       | 1 Mbps    | 19.62       |
| 11 / 2462             | 802.11b | BPSK       | 1 Mbps    | 19.31       |
| 1 / 2412              | 802.11b | QPSK       | 5.5 Mbps  | 21.84       |
| 6 / 2437              | 802.11b | QPSK       | 5.5 Mbps  | 19.66       |
| 11 / 2462             | 802.11b | QPSK       | 5.5 Mbps  | 19.82       |

## 2.4. WLAN Test results

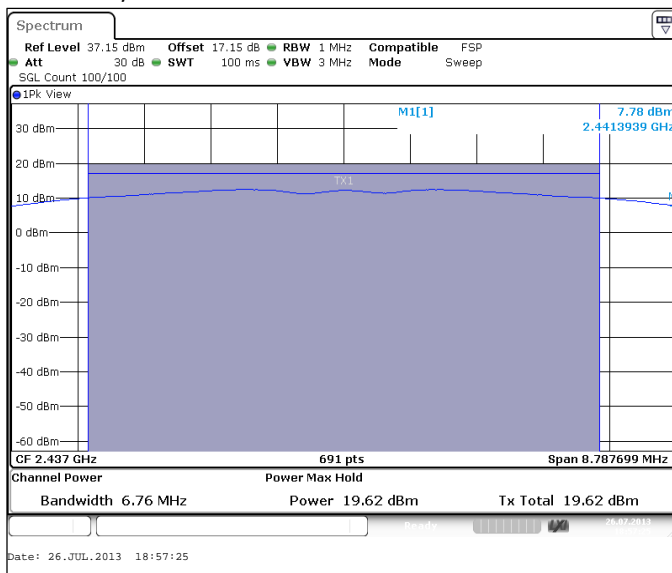
### 2.4.1 802.11b mode, BPSK modulation, 1 Mbps data rate

| Channel / f <sub>c</sub> [MHz] | P [dBm] | P [mW] | Result |
|--------------------------------|---------|--------|--------|
| 1 / 2412                       | 19.8    | 95.499 | PASSED |
| 6 / 2437                       | 19.62   | 91.622 | PASSED |
| 11 / 2462                      | 19.31   | 85.31  | PASSED |

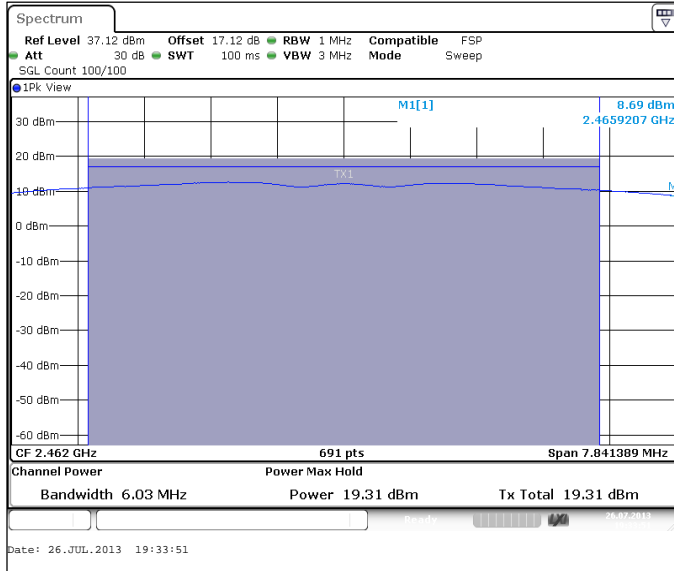
#### Channel 1 / 2412 MHz



#### Channel 6 / 2437 MHz



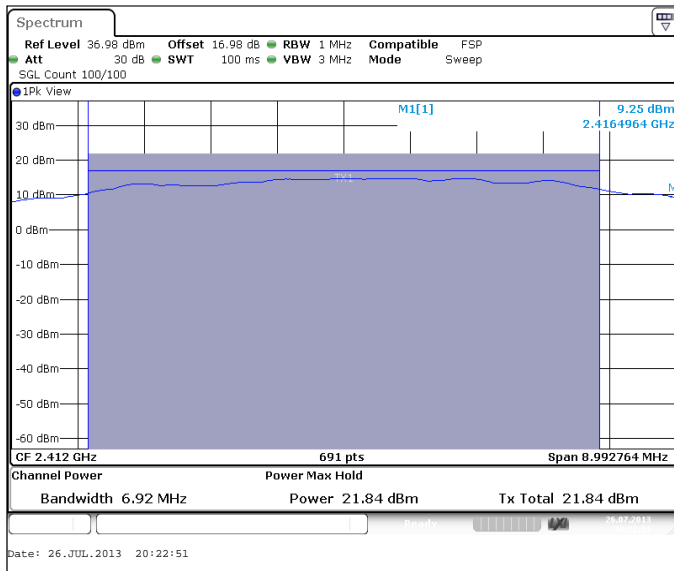
Channel 11 / 2462 MHz



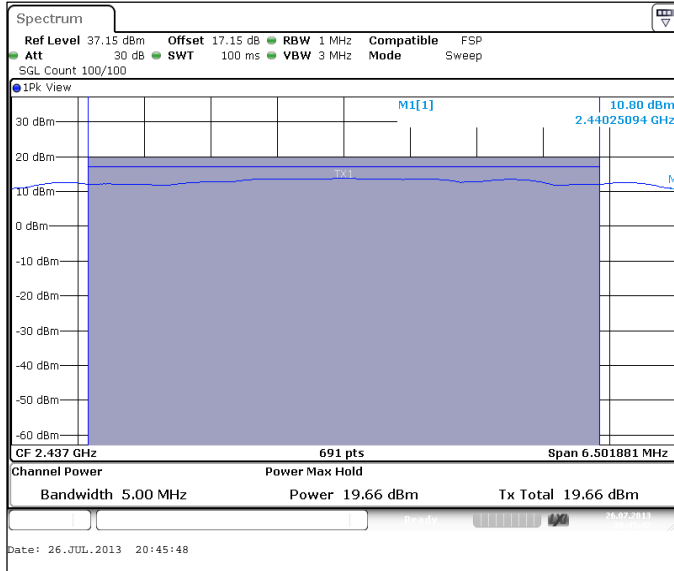
2.4.2 802.11b mode, QPSK modulation, 5.5 Mbps data rate

| Channel / f <sub>c</sub> [MHz] | P [dBm] | P [mW]  | Result |
|--------------------------------|---------|---------|--------|
| 1 / 2412                       | 21.84   | 152.757 | PASSED |
| 6 / 2437                       | 19.66   | 92.47   | PASSED |
| 11 / 2462                      | 19.82   | 95.94   | PASSED |

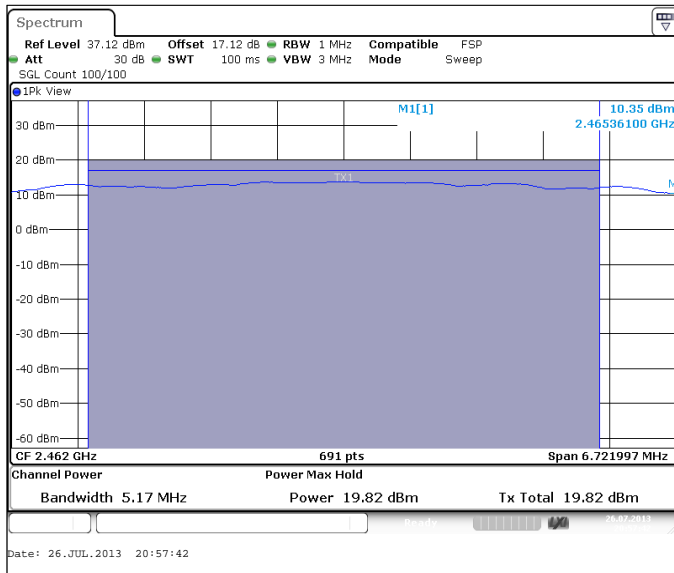
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



Channel 11 / 2462 MHz

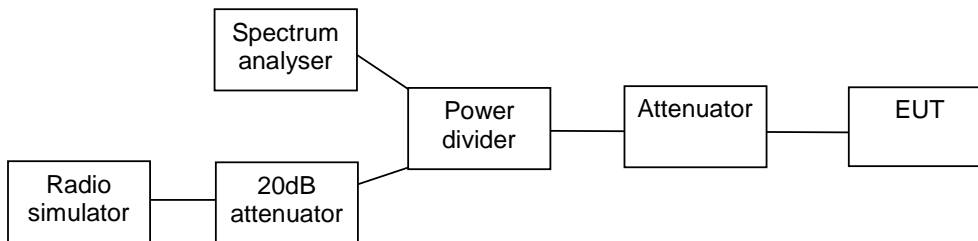




### 3. Spurious RF conducted emissions (FCC §15.247(d), RSS-210 A8.5)

|   |                    |
|---|--------------------|
| EUT with DUT number                             | RM-927, DUT 30738  |
| Accessories with DUT numbers                    | SD-217R, DUT 30742 |
| Operation Voltage [V] / [Hz]                    | 3.8V DC            |
| Results   | PASSED             |
| Remarks   |                    |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 21.3 / 48.8 / 1050 |
| Date of measurements                            | 26-Jul-2013        |
| Measured by                                     | Feng You           |

#### 3.1. Test Setup



#### 3.2. Test method and limit

The measurement is made according to Public notice KDB 558 074 and IC standard RSS-210.

The reference level for the -20 dBc measurement was obtained as instructed in section 11.2 of the KDB 558074, using span of 1.5 times the OBW.

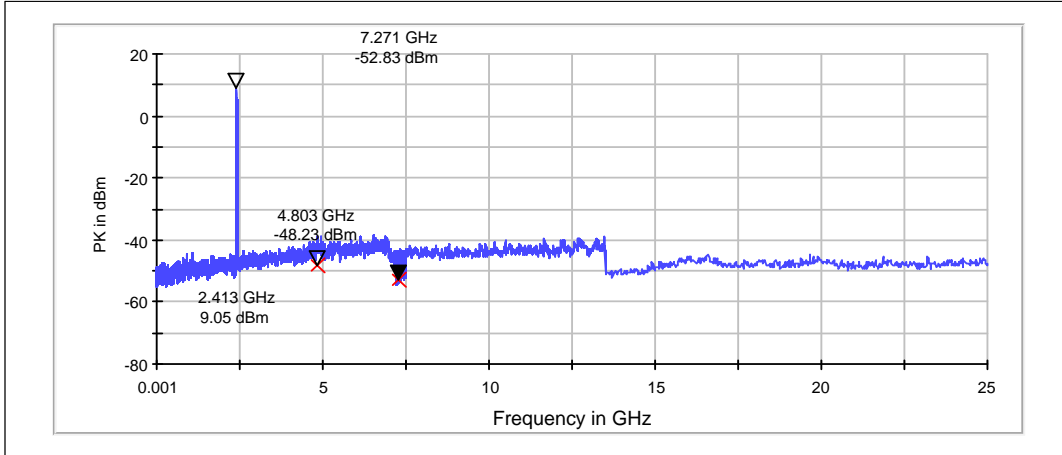
Limits for spurious RF conducted emissions measurements

| Frequency range [MHz] | Limit [dBc] |
|-----------------------|-------------|
| 1 – 25000             | <= -20      |

### 3.3. WLAN Test results

#### 3.3.1 802.11b mode, BPSK modulation, 1 Mbps data rate

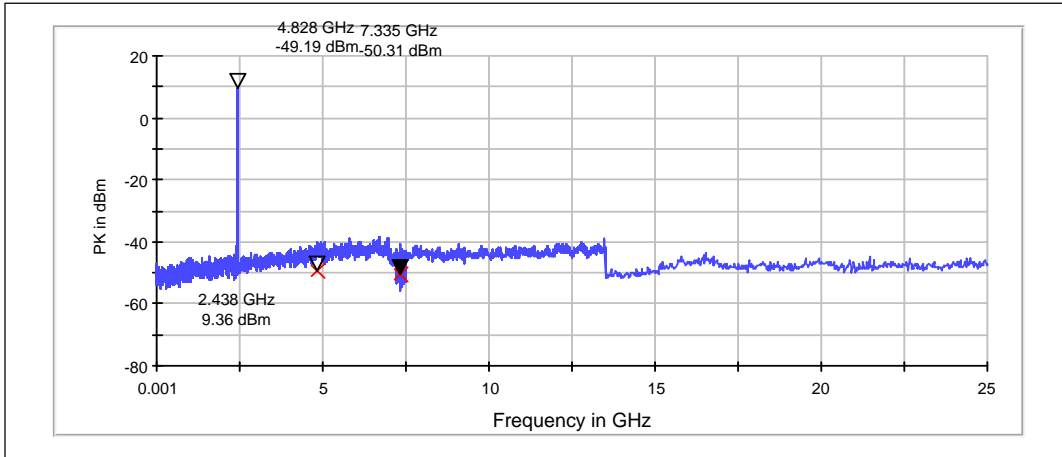
Channel 1 / 2412 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4802.800        | -48.23  | PASSED |
| 7270.800        | -52.83  | PASSED |

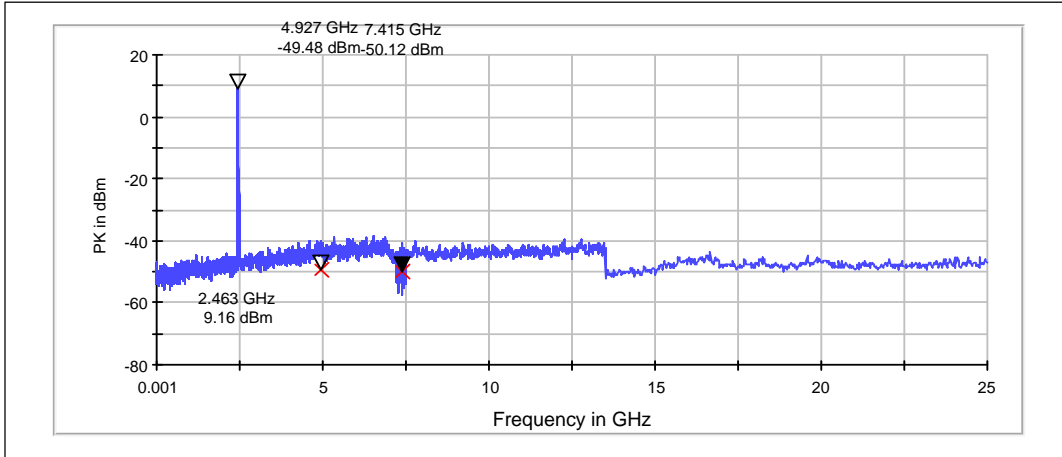
Channel 6 / 2437 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4828.000        | -49.19  | PASSED |
| 7335.000        | -50.31  | PASSED |

Channel 11 / 2462 MHz

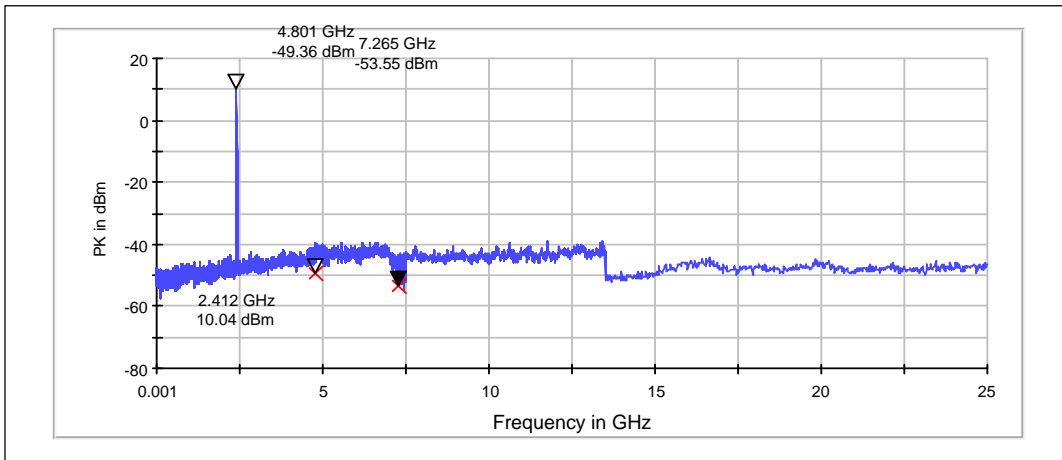


Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4926.800        | -49.48  | PASSED |
| 7414.800        | -50.12  | PASSED |

3.3.2 802.11b mode, QPSK modulation, 5.5 Mbps data rate

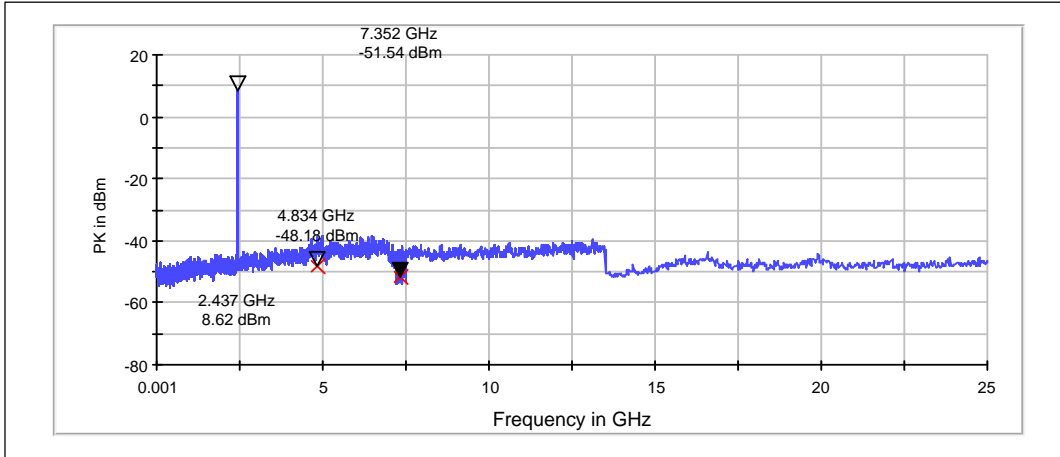
Channel 1 / 2412 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4800.800        | -49.36  | PASSED |
| 7264.800        | -53.55  | PASSED |

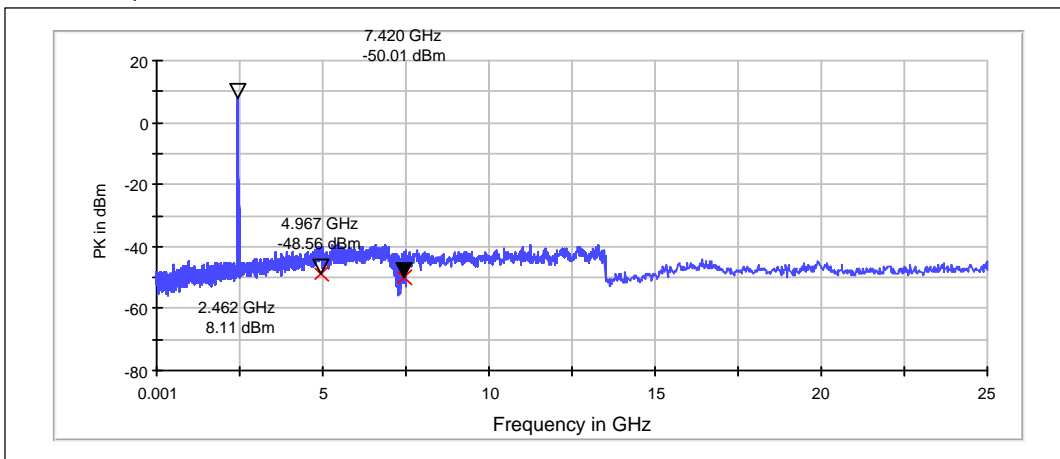
Channel 6 / 2437 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4834.400        | -48.18  | PASSED |
| 7351.800        | -51.54  | PASSED |

Channel 11 / 2462 MHz



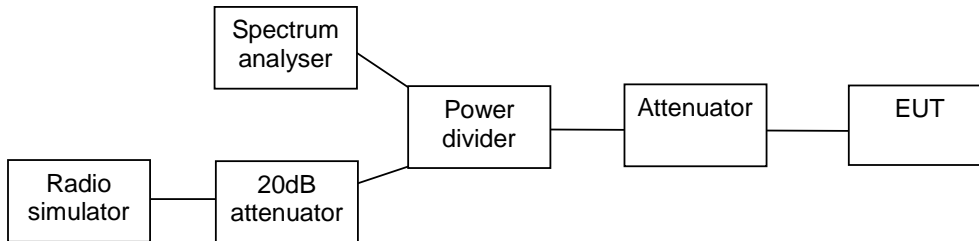
Peak (RBW: 100 kHz, VBW: 300 kHz)

| Frequency [MHz] | P [dBc] | Result |
|-----------------|---------|--------|
| 4967.200        | -48.56  | PASSED |
| 7419.600        | -50.01  | PASSED |

**4. 6 dB bandwidth**  
(FCC §15.247(a)(2), RSS-210 A8.2 (1))

|   |                    |
|---|--------------------|
| EUT with DUT number                             | RM-927, DUT 30738  |
| Accessories with DUT numbers                    | SD-217R, DUT 30742 |
| Operation Voltage [V] / [Hz]                    | 3.8V DC            |
| Results   | PASSED             |
| Remarks   |                    |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 20 / 49 / 1050     |
| Date of measurements                            | 28-Aug-2013        |
| Measured by                                     | Tyrone Hawes       |

**4.1. Test Setup**



**4.2. Test method and limit**

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for 6 dB bandwidth measurements

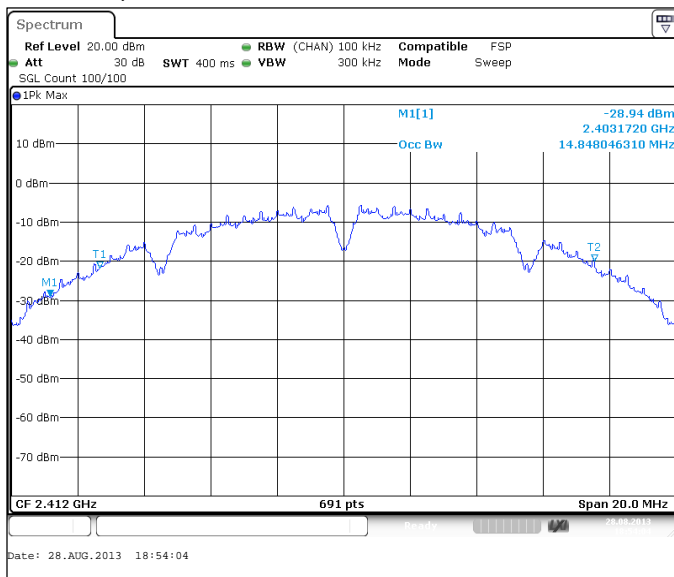
| Limit [kHz] |
|-------------|
| >= 500      |

### 4.3. WLAN Test results

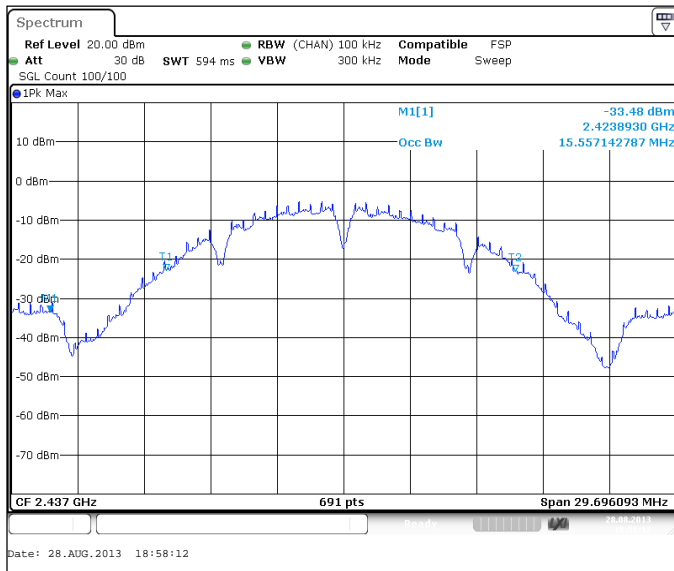
#### 4.3.1 802.11b mode, BPSK modulation, 1 Mbps data rate

| Channel / f <sub>c</sub> [MHz] | 6 dB bandwidth [kHz] | Result |
|--------------------------------|----------------------|--------|
| 1 / 2412                       | 14848                | PASSED |
| 6 / 2437                       | 15716.4              | PASSED |
| 11 / 2462                      | 15716.4              | PASSED |

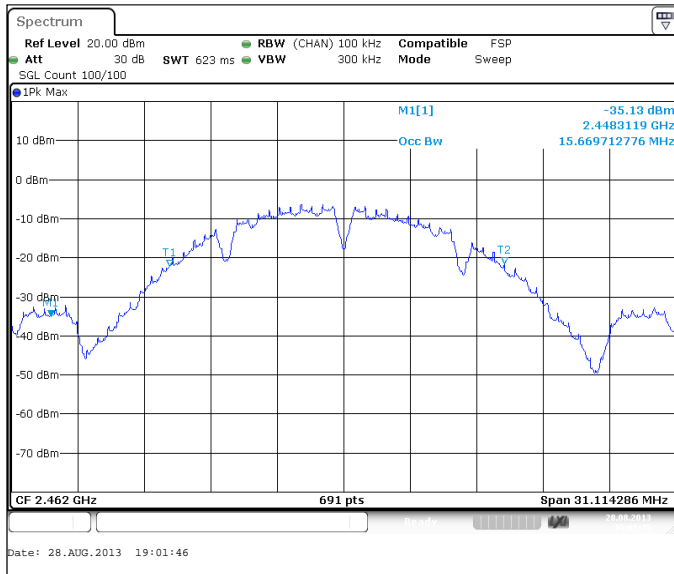
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



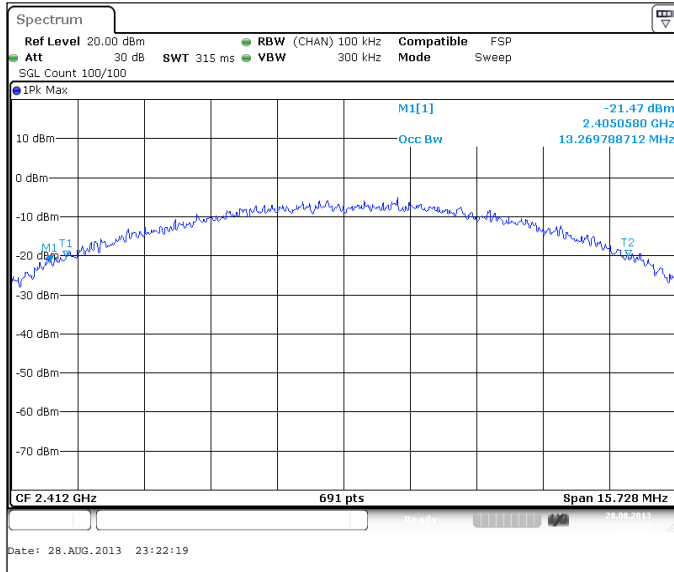
Channel 11 / 2462 MHz



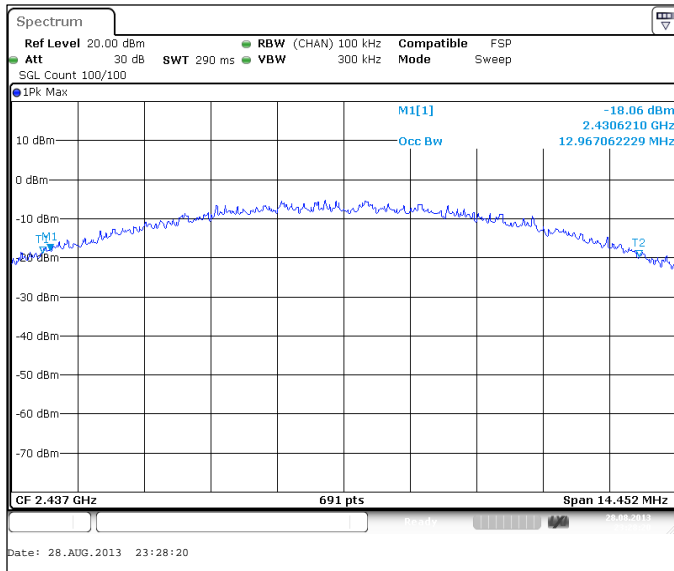
**4.3.2 802.11b mode, QPSK modulation, 5.5 Mbps data rate**

| Channel / f <sub>c</sub> [MHz] | 6 dB bandwidth [kHz] | Result |
|--------------------------------|----------------------|--------|
| 1 / 2412                       | 13269.8              | PASSED |
| 6 / 2437                       | 12967.1              | PASSED |
| 11 / 2462                      | 13474                | PASSED |

Channel 1 / 2412 MHz

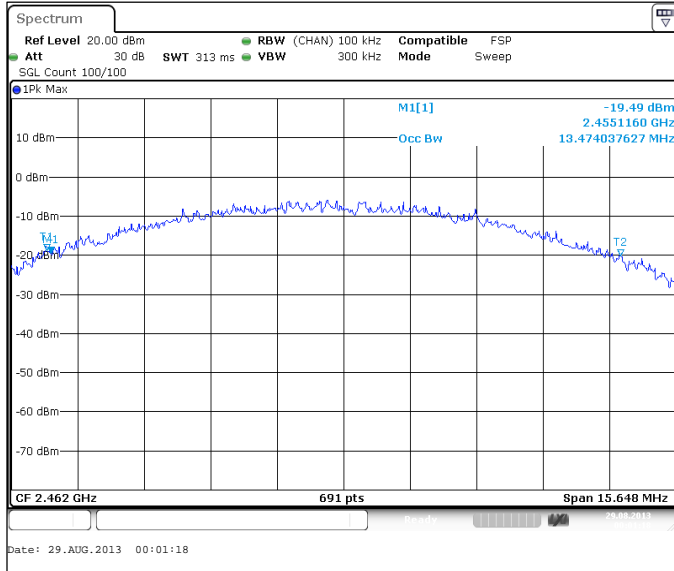


Channel 6 / 2437 MHz





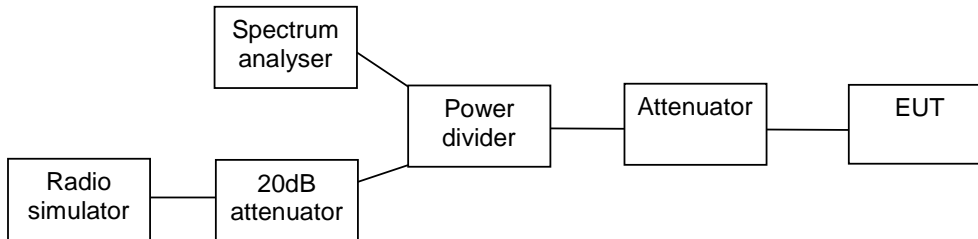
Channel 11 / 2462 MHz



## 5. Power spectral density (FCC §15.247(e), RSS-210 A8.2 (2))

|   |                    |
|---|--------------------|
| EUT with DUT number                             | RM-927, DUT 30738  |
| Accessories with DUT numbers                    | SD-217R, DUT 30742 |
| Operation Voltage [V] / [Hz]                    | 3.8V DC            |
| Results   | PASSED             |
| Remarks   |                    |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 20 / 50 / 1050     |
| Date of measurements                            | 28-Aug-2013        |
| Measured by                                     | Tyrone Hawes       |

### 5.1. Test Setup



### 5.2. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for power spectral density measurements

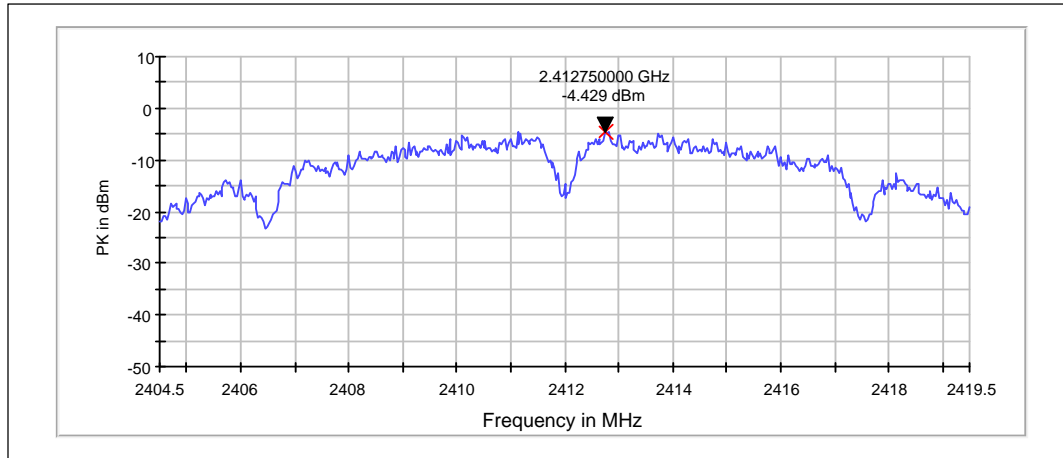
| Limit [dBm] @ 3 kHz |
|---------------------|
| ≤ 8                 |

### 5.2.1 802.11b mode, BPSK modulation, 1 Mbps data rate

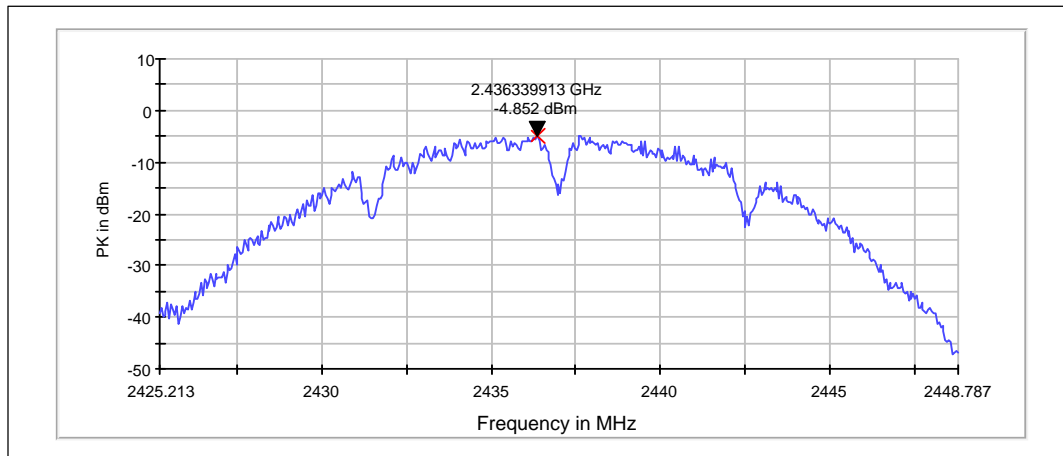
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

| Channel / f <sub>c</sub> [MHz] | P [dBm] | Result |
|--------------------------------|---------|--------|
| 1 / 2412                       | -4.43   | PASSED |
| 6 / 2437                       | -4.85   | PASSED |
| 11 / 2462                      | -4.65   | PASSED |

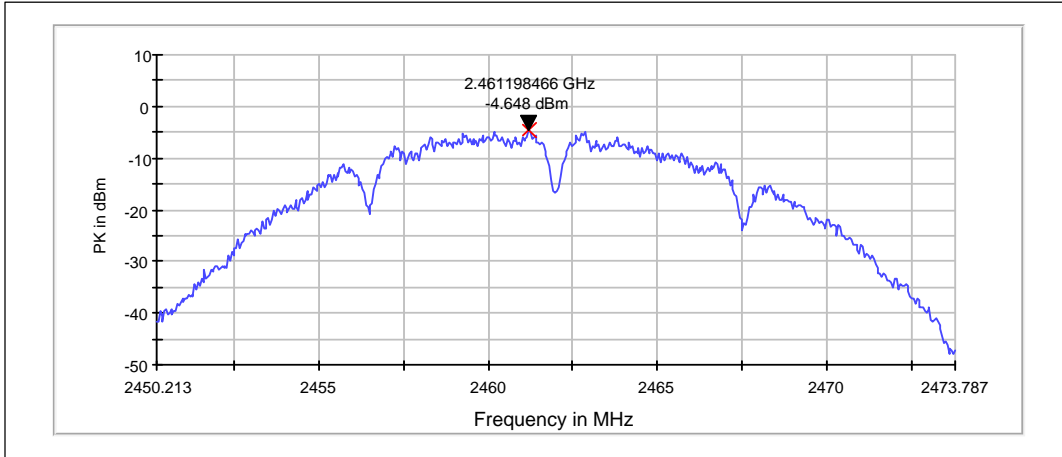
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



Channel 11 / 2462 MHz

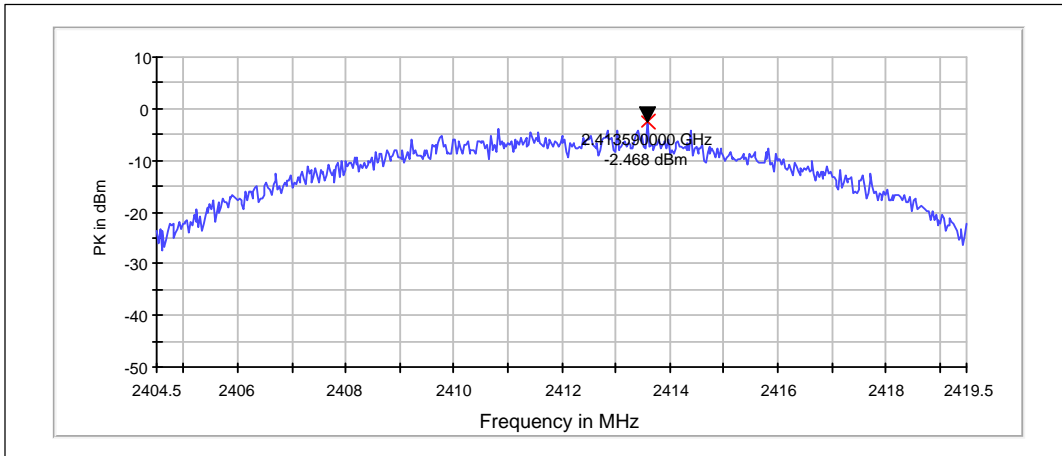


**5.2.2 802.11b mode, QPSK modulation, 5.5 Mbps data rate**

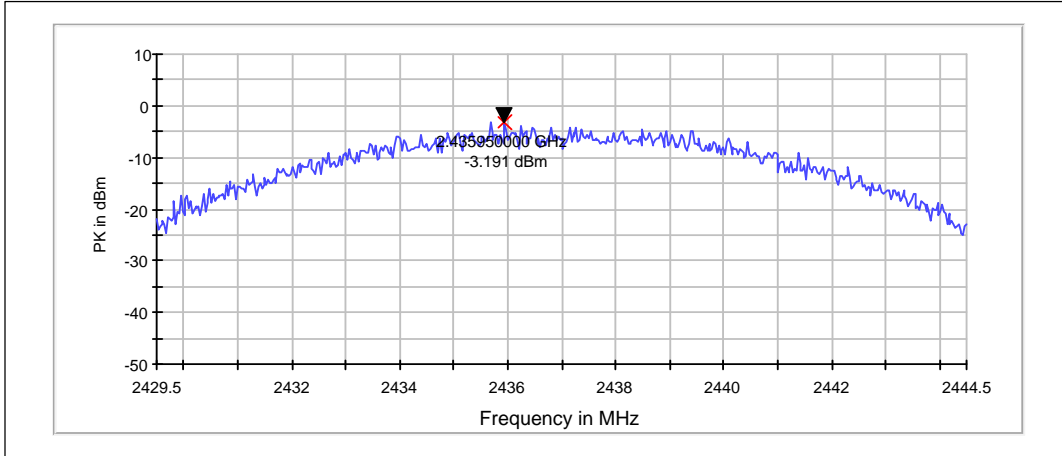
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

| Channel / $f_c$ [MHz] | P [dBm] | Result |
|-----------------------|---------|--------|
| 1 / 2412              | -2.47   | PASSED |
| 6 / 2437              | -3.19   | PASSED |
| 11 / 2462             | -3.33   | PASSED |

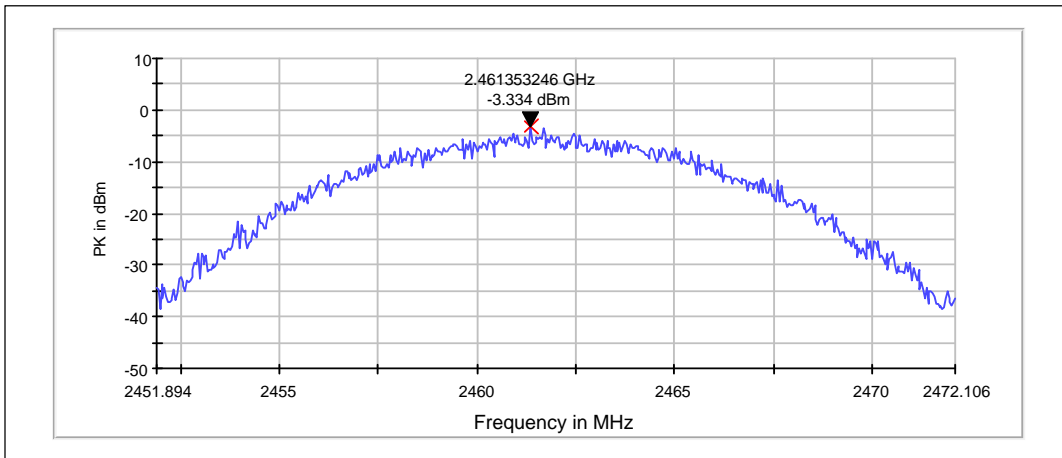
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



## 6. Test Equipment

### 6.1. Conducted measurements

| Eq. No | Equipment            | Type          | Manufacturer | Used in            |
|--------|----------------------|---------------|--------------|--------------------|
| 4406   | Communication Tester | CMU200        | R&S          | 22/24/27, 15C, 15B |
| 7602   | Communication Tester | CMW500        | R&S          | 22/24/27, 15C, 15B |
| 7151   | Bluetooth Tester     | CBT           | R&S          | 15B                |
| -      | GPS RX Antenna w/AMP | L1A-PM-NF     | GPS Source   | 15C                |
| -      | GPS Inline amplifier | A11M-V-NF-NM  | GPS Source   | 15C                |
| -      | GPS signal Splitter  | S12-P110/5-NF | GPS Source   | 15C                |
| -      | GPS TX Antenna       | L1P-PV-NF     | GPS Source   | 15C                |
| 7912   | Spectrum Analyzer    | FSV-30        | R&S          | 22/24/27, 15C      |
| -      | Thermal Chamber      | VT-4002       | Vötsch       | 22/24/27, 15C      |
| -      | Power splitter       | 11667B        | Agilent      | 22/24/27, 15C      |
| 3396   | EMC Analyzer         | E7405A        | HP           | -                  |
| 7451   | EMI Receiver         | ESU-26        | R&S          | 22/24/27, 15C, 15B |
| 4188   | LISN 50 µH           | ESH3-Z5       | R&S          | 15C, 15B           |
| 6981   | LISN 50 µH           | ESH3-Z5       | R&S          | 15C, 15B           |
| -      | Pulse Limiter        | ESH3-Z2       | R&S          | 15C, 15B           |
| 7582   | Signal Generator     | SMB100A       | R&S          | 15C, 15B           |

### 6.2. Radiated measurements

| Eq. No | Equipment                 | Type                                   | Manufacturer   | Used in            |
|--------|---------------------------|--|----------------|--------------------|
| 7591   | Antenna                   | HL562                                  | R&S            | 22/24/27, 15C, 15B |
| 7572   | Double Ridge Horn Antenna | 3117                                   | ETS-Lindgren   | 22/24/27, 15C      |
| 7607   | Standard Gain HornAntenna | SAS 586                                | A.H. System    | 22/24/27, 15C      |
| 7624   | Standard Gain HornAntenna | SAS 587                                | A.H. System    | 22/24/27, 15C      |
| 7561   | Antenna                   | HFH2-Z2                                | R&S            | 15C, 15B           |
| 5715   | Antenna                   | MBA-3030                               | EMC Automation | 22/24/27, 15C      |
| 5712   | Antenna                   | PLP3003                                | EMC Automation | 22/24/27, 15C      |
| 7457   | Relay Switch Unit         | TS-RSP                                 | R&S            | 22/24/27, 15C, 15B |
| 7459   | Relay Switch Unit         | TS-RSP                                 | R&S            | 22/24/27, 15C, 15B |
| 5729   | Relay Switch Unit         | TS-RSP                                 | R&S            | 22/24/27, 15C, 15B |
| 5728   | EMI Receiver              | ESIB26                                 | R&S            | 22/24/27, 15C, 15B |
| 4406   | Communication Tester      | CMU200                                 | R&S            | 22/24/27, 15C, 15B |
| 7602   | Communication Tester      | CMW500                                 | R&S            | 22/24/27, 15C, 15B |
| 7151   | Bluetooth Tester          | CBT                                    | R&S            | 15B                |
| 3406   | Controller                | Sc99V                                  | Sunol          | 22/24/27, 15C, 15B |
| -      | Controller                | G-1000DXC                              | Yaesu          | 22/24/27, 15C, 15B |
| -      | Computer Controller       | GS-232B                                | Yaesu          | 22/24/27, 15C, 15B |
| 7040   | Preamplifier              | TS-PR3                                 | R&S            | 22/24/27, 15C, 15B |
| -      | Preamplifier              | AMF-6D-020180-29-20P                   | Miteq          | 22/24/27, 15C, 15B |
| -      | Preamplifier              | AMF-4D-01000800-30-29P                 | Miteq          | 22/24/27, 15C, 15B |
| -      | Preamplifier              | AMF-5F-18002650-25-10P                 | Miteq          | 22/24/27, 15C, 15B |
| -      | High Pass Filter          | 4HC1700-1-KK                           | R&S            | 22                 |
| -      | High Pass Filter          | F-15041                                | RLC            | 22/24/27, 15C      |
| -      | Band Reject Filter        | WRCA824/849-0,2-6SS                    | Wainwright     | 22                 |
| -      | Band Reject Filter        | WRCC1800/2000-0.2-10SS                 | Wainwright     | 24                 |
| -      | Band Reject Filter        | WRCG2400/2483-2390/2493-35/10SS        | Wainwright     | 15C                |
| -      | Band Reject Filter        | WRCG832/838-825/845-40/5SS             | Wainwright     | 22                 |
| -      | Band Reject Filter        | WRCG1729.4/1735.4-1722.4/1742.4-40/6SS | Wainwright     | 27                 |

| Eq. No  | Equipment            | Type                             | Manufacturer | Used in  |
|---------|----------------------|----------------------------------|--------------|----------|
| -       | Band Reject Filter   | WRCG1877/1883 - 1870/1890-40/6SS | Wainwright   | 24       |
| -       | Notch Filter         | WRCD1880-1.1.25/50-10SS          | Wainwright   | 22/24/27 |
| -       | Notch Filter         | WRCT902.4-0.4/40-8SS             | Wainwright   | -        |
| Planned | Notch Filter         | WRCJV2531/2539-2523/2547-60/12SS | Wainwright   | 22/24/27 |
| -       | GPS RX Antenna w/AMP | L1A-PM-NF                        | GPS Source   | 15C      |
| -       | GPS Inline amplifier | A11M-V-NF-NM                     | GPS Source   | 15C      |
| -       | GPS signal Splitter  | S12-P110/5-NF                    | GPS Source   | 15C      |
| -       | GPS TX Antenna       | L1P-PV-NF                        | GPS Source   | 15C      |