

## FCC Part 15E Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                                                                          |                                   |                                                                                                                      |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | FCC15E_RM-985_19.docx                                                                                                                                                                                                                                                                                    | <b>Date of Report:</b>            | 30-Jul-2014                                                                                                          |
| <b>Number of pages:</b>                                 | 12                                                                                                                                                                                                                                                                                                       | <b>Customer's Contact person:</b> | Victoria Abadilla                                                                                                    |
| <b>Testing laboratory:</b>                              | TCC Microsoft Tampere Laboratory<br>P.O.Box 403<br>Visiokatu 3<br>FIN-33101 TAMPERE, FINLAND<br>Tel. +358 71 800 8000<br>Fax. +358 71 804 6880                                                                                                                                                           | <b>Customer:</b>                  | Microsoft<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>                                 | 94436                                                                                                                                                                                                                                                                                                    |                                   |                                                                                                                      |
| <b>IC recognition no.:</b>                              | 661AK-1                                                                                                                                                                                                                                                                                                  |                                   |                                                                                                                      |
| <b>Tested devices/ accessories:</b>                     | Phone RM-985 / Dummy battery                                                                                                                                                                                                                                                                             |                                   |                                                                                                                      |
| <b>FCC ID:</b>                                          | QMNRM-985                                                                                                                                                                                                                                                                                                | <b>IC:</b>                        | 661X-RM985                                                                                                           |
| <b>Supplement reports:</b>                              | -                                                                                                                                                                                                                                                                                                        |                                   |                                                                                                                      |
| <b>Testing has been carried out in accordance with:</b> | CFR 47, FCC rules Part 15 Subpart E, ANSI C63.4 (2003), MO&O FCC 06-96, IC standards RSS-GEN (Issue 3, December 2010) and RSS-210 (Issue 8, December 2010). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit". |                                   |                                                                                                                      |
| <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 Microsoft.                                                 |                                   |                                                                                                                      |
| <b>Test Results:</b>                                    | The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document                                                                                                                                              |                                   |                                                                                                                      |
| <b>Date and signature for the contents:</b>             |                                                                                                                                                                                                                                                                                                          |                                   |                                                                                                                      |

Sami Lehtonen, Specialist, EMC

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

|                               |                                                     |
|-------------------------------|-----------------------------------------------------|
| Date of receipt               | 19-Jun-2014                                         |
| Testing completed             | 22-Jul-2014                                         |
| The customer's contact person | Victoria Abadilla                                   |
| Test Plan referred to         | T:\Projects\RM-984\TestPlan\RS_testplan_RM-984.xlsm |
| Notes                         | -                                                   |
| Document name                 | T:\Projects\RM-985\EMC\FCC15E_RM-985_19.docx        |

### 1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/WCDMA/WLAN/Bluetooth

The EUT is tested with maximum rated TX power.

| Product       | Type   | SN              | HW   | MV | SW                      | DUT   |
|---------------|--------|-----------------|------|----|-------------------------|-------|
| Phone         | RM-984 | 004402478222536 | 0200 | -  | 02028.00000.14224.06001 | 43187 |
| Dummy Battery | -      | -               | -    | -  | -                       | -     |

### 1.2. Summary of Test Results

RLAN 5 GHz:

| Section in CFR 47    | Section in RSS-GEN or RSS-210 | Name of the test            | Result |
|----------------------|-------------------------------|-----------------------------|--------|
| 15.407 (h) (2) (iii) | A9.3 (b) (iii)                | Dynamic frequency selection | PASSED |

PASSED

The EUT complies with the essential requirements in the standard.

FAILED

The EUT does not comply with the essential requirements in the standard.

NP

The test was not performed by the TCC Nokia Tampere Laboratory.

*The test results of QMNRM-984 are re-used for certification of the QMNRM-985. The table above indicates the results, which will be re-used.*

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### 3. Dynamic frequency selection (FCC §15.407 (h) (2) (iii), RSS-210 A9.3 (b) (iii))

|                                                 |                  |
|-------------------------------------------------|------------------|
| EUT with DUT number                             | RM-984 DUT 43187 |
| Accessories with DUT numbers                    | -                |
| Operation Voltage [V] / [Hz]                    | Nominal          |
| Result                                          | PASSED           |
| Remarks                                         | -                |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 22 / 45 / 102.0  |
| Date of measurements                            | 22-Jul-2014      |
| Measured by                                     | Timo Raiskio     |

#### 3.1. EUT information

The EUT operates as a client and does not have radar detection capability. It operates on following channels:

5180 (36)  
5200 (40)  
5220 (44)  
5240 (48)  
5260 (52)  
5280 (56)  
5300 (60)  
5320 (64)  
5500 (100)  
5520 (104)  
5540 (108)  
5560 (112)  
5580 (116)  
5680 (136)  
5700 (140)  
5745 (149)  
5765 (153)  
5785 (157)  
5805 (161)  
5825 (165)

### 3.2. Test method and setup

The measurement was made according to the MO&O FCC 06-96.

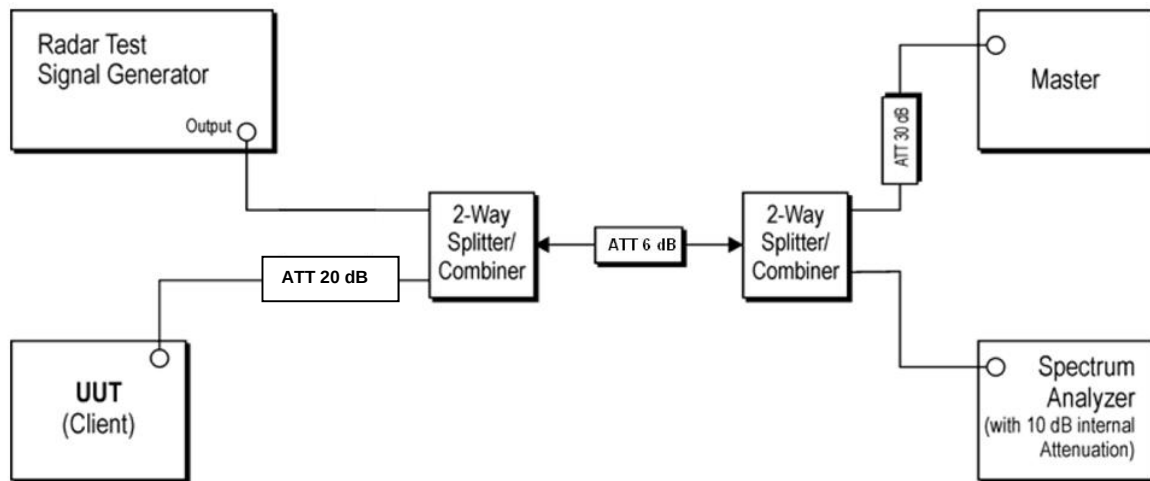
The master used was Cisco AIR-AP1262N-A-K9, FCCID: LDK102073. The 5 GHz B Rx-Tx antenna port was connected to the test setup, others were left unconnected.

The output power of the radar signal test generator was 15 dBm.

The radar signal generator was set to simulate radar type 4: pulse width 16 us, PRI 300 us and number of pulses 15.

There was traffic between the EUT and master by means of the commonly available 'iperf' tool. A PC was connected to the master via Ethernet to serve as a remote endpoint. Unlimited rate up-link (from EUT to the remote endpoint) TCP protocol data transfer was generated with the 'iperf' tool.

The test was repeated four times to record the four graphs, shown in section



### 3.3. Limit

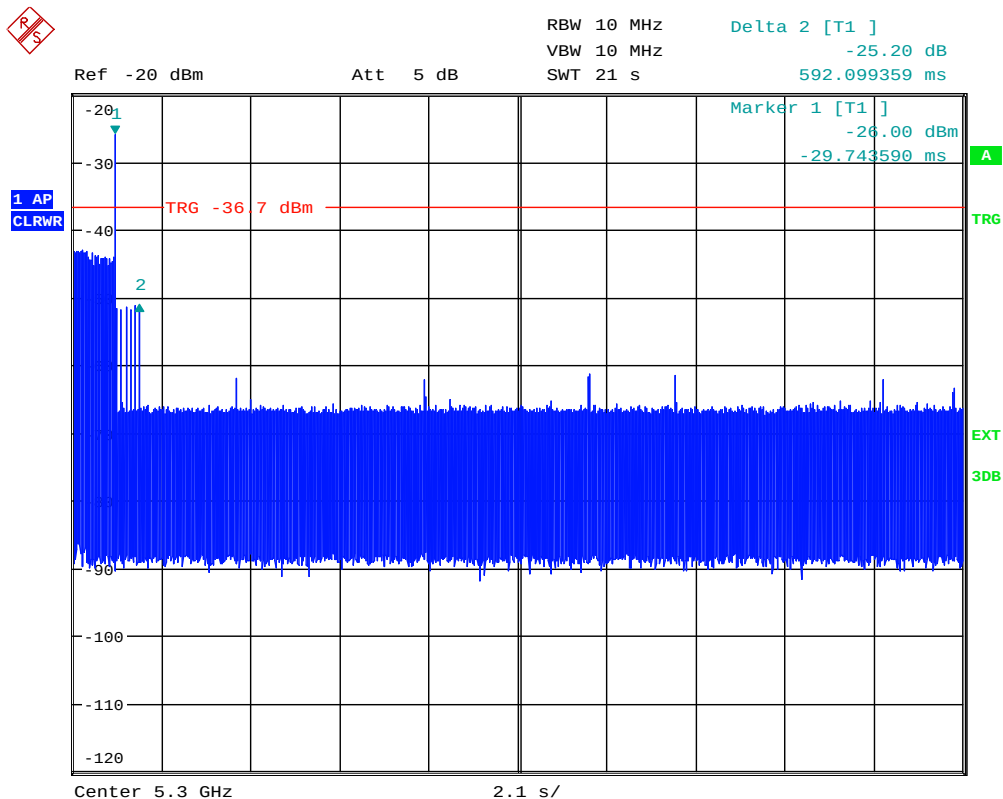
| Parameter                             | Limit     |
|---------------------------------------|-----------|
| Channel move time                     | 10 s      |
| Transmission during channel move time | 200+60 ms |
| Non-occupancy period                  | 30 min    |

### 3.4. Test results

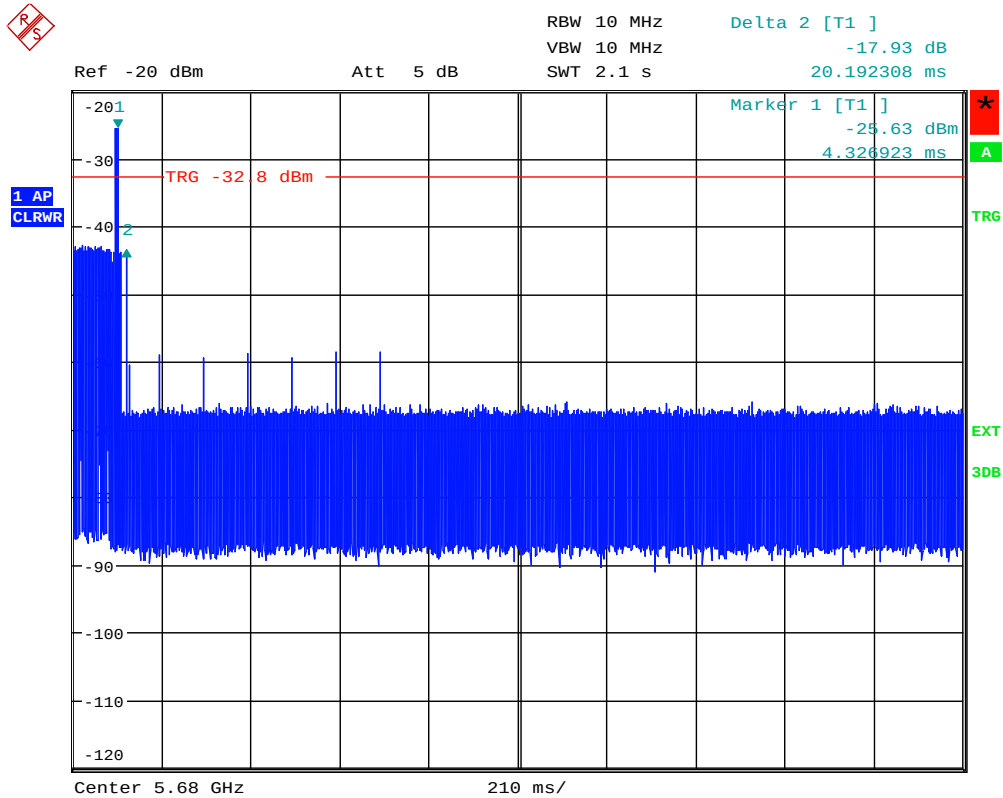
In the graphs below, the signal levels are as follows: radar signal generator -25 dBm, EUT -45 dBm and master -60 dBm.

| Parameter                             | Value    | Result |
|---------------------------------------|----------|--------|
| Channel move time                     | 592 ms   | PASS   |
| Transmission during channel move time | < 20 ms  | PASS   |
| Non-occupancy period                  | > 30 min | PASS   |

### 3.4.1 Channel move time



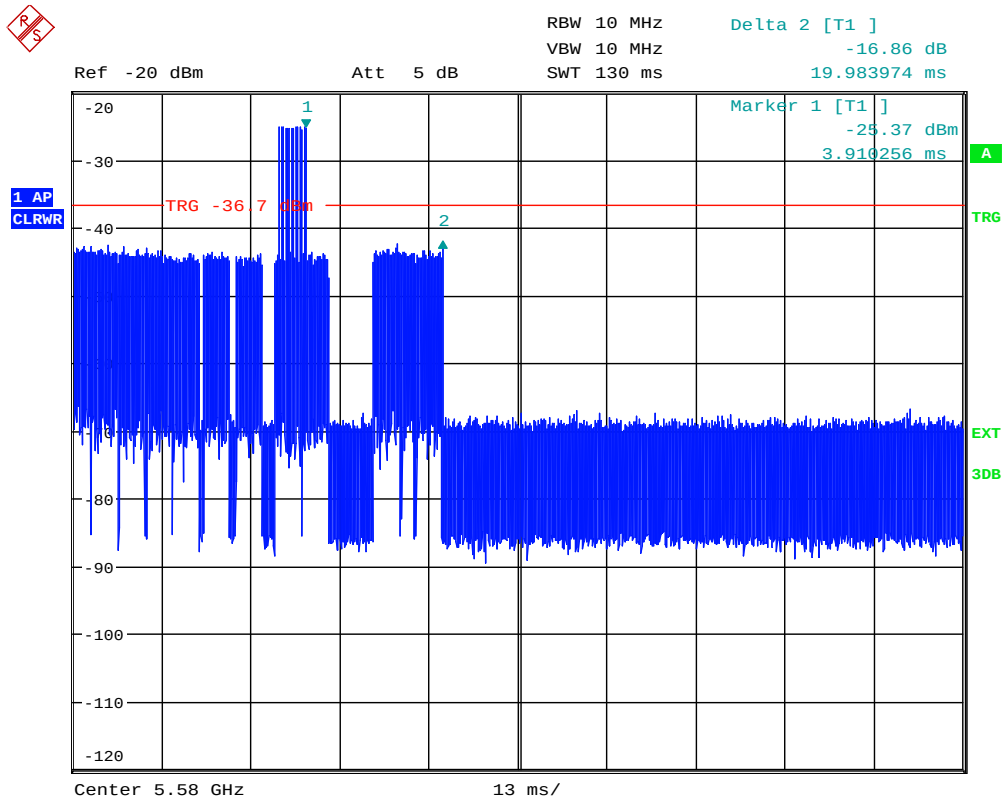
Date: 22.JUL.2014 15:30:33



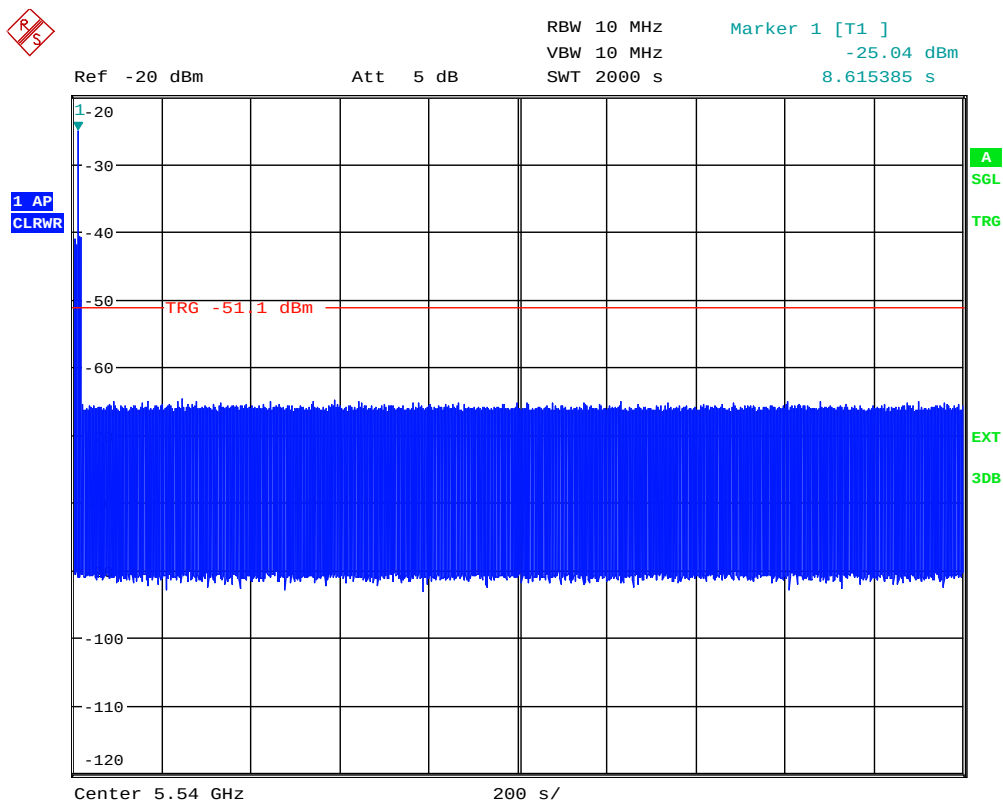
Date: 22.JUL.2014 15:18:47



### 3.4.2 Transmission time



### 3.4.3 Non-occupancy period



Date: 22.JUL.2014 16:09:16

## 4. Test Equipment

### 4.1. Conducted measurements

| Eq. No       | Equipment                           | Type        | Manufacturer  | Used in            |
|--------------|-------------------------------------|-------------|---------------|--------------------|
| TM38112      | Power supply                        | 6632A       | Agilent       | 22/24/27, 15C      |
| TM38631      | Signal Generator                    | 83640L      | Agilent       | 22/24/27, 15C, 15B |
| OM0631<br>2  | Signal Generator                    | E4422B      | Agilent       | 22/24              |
| TM37678      | Communication Tester                | CMU200      | R&S           | 22/24/27, 15C, 15B |
| TM37773      | Communication Tester                | CMU200      | R&S           | 22/24/27, 15C, 15B |
| TM30600      | Impulse limiter                     | ESH3-Z2     | R&S           | 15C, 15B           |
| TM26490      | LISN 50 µH                          | ESH3-Z5     | R&S           | 15C, 15B           |
| TM26491      | LISN 50 µH                          | ESH3-Z5     | R&S           | 15C, 15B           |
| TM37610      | Spectrum Analyzer                   | FSU26       | R&S           | 22/24/27, 15C      |
| TM22806      | Battery                             | BAT 20/E    | Fiskars       | 15C, 15B           |
| TM22805      | UPS                                 | PS 20/1.2   | Fiskars       | 15C, 15B           |
| -            | Temperature and humidity logger     | 175-H2      | Testo         | 15C, 15B           |
| -            | Temperature and humidity logger     | 175-H2      | Testo         | 22/24/27, 15C      |
| -            | Air pressure and temperature logger | 635-2       | Testo         | 22/24/27, 15C, 15B |
| -            | Air pressure sensor                 | 0638-1835   | Testo         | 22/24/27, 15C, 15B |
| -            | Temperature test chamber            | VT 4002     | Vötsch        | 22/24              |
| 2058         | Receiver                            | ESPC        | R&S           | 15C, 15B           |
| 2001         | Bluetooth tester                    | CBT         | R&S           | 22/24/27, 15C, 15B |
| 2002         | Communication Tester                | CMU200      | R&S           | 22/24/27           |
| 2009         | LISN 50 µH                          | ENV216      | R&S           | 15C, 15B           |
| 2010         | LISN 50 µH                          | ENV216      | R&S           | 15C, 15B           |
| 2012         | Power splitter                      | 11667B      | Agilent       | 22/24/27, 15C      |
| 2013         | Attenuator                          | 8493C       | Agilent       | 22/24/27, 15C      |
| 2014         | Attenuator                          | 8493C       | Agilent       | 22/24/27, 15C      |
| 2019         | Power splitter                      | ZN2PD-9G-S+ | Mini-Circuits | 15E                |
| 2020         | Power splitter                      | ZN2PD-9G-S+ | Mini-Circuits | 15E                |
| TM12004<br>7 | Signal Generator                    | E4438C      | Agilent       | 15E                |
| TM13005<br>6 | Pulse/Pattern Generator             | 3401        | Keithley      | 15E                |

## 4.2. Radiated measurements

| Eq. No  | Equipment                           | Type                                   | Manufacturer    | Used in            |
|---------|-------------------------------------|----------------------------------------|-----------------|--------------------|
| TM38114 | Power supply                        | 6632A                                  | Agilent         | 22/24/27, 15C, 15B |
| TM38631 | Signal Generator                    | 83640L                                 | Agilent         | 22/24/27, 15C, 15B |
| TM38323 | Preamplifier                        | PA-02 18-26 GHz                        | EMC Automation  | 22/24/27, 15C, 15B |
| -       | Antenna                             | BBHA 9120 D                            | Schwarzbeck     | 22/24/27, 15C      |
| TM26497 | Antenna                             | 3115                                   | Emco            | 22/24/27, 15C, 15B |
| TM37678 | Communication Tester                | CMU200                                 | R&S             | 22/24/27, 15C, 15B |
| TM37773 | Communication Tester                | CMU200                                 | R&S             | 22/24/27, 15C, 15B |
| TM38845 | Receiver                            | ESIB 26                                | R&S             | 22/24/27, 15C, 15B |
| -       | Antenna                             | HL562                                  | R&S             | 22/24/27, 15C, 15B |
| TM26500 | Turntable                           | DS412                                  | Deisel          | 22/24/27, 15C, 15B |
| TM30642 | Mast/turntable controller           | HD-100                                 | Deisel          | 22/24/27, 15C, 15B |
| TM38990 | Remote switching module             | RSM1                                   | EMC Automation  | 22/24/27, 15C, 15B |
| TM38341 | System interface                    | SI-300                                 | EMC Automation  | 22/24/27, 15C, 15B |
| -       | Mini mast                           | 2075-2                                 | ETS Lindgren    | 22/24/27, 15C, 15B |
| TM38843 | Mini mast                           | 2075                                   | Emco            | 22/24/27, 15C, 15B |
| TM38842 | Controller                          | 2090                                   | Emco            | 22/24/27, 15C, 15B |
| TM39158 | Antenna                             | 3116                                   | Emco            | 22/24/27, 15C, 15B |
| TM30643 | LISN 50 µH                          | LISN-5-20-2                            | FCC             | 22/24/27, 15C, 15B |
| TM30644 | LISN 50 µH                          | LISN-5-20-2                            | FCC             | 22/24/27, 15C, 15B |
| -       | Temperature and humidity logger     | 175-H2                                 | Testo           | 22/24/27, 15C, 15B |
| -       | Air pressure and temperature logger | 635-2                                  | Testo           | 22/24/27, 15C, 15B |
| -       | Air pressure sensor                 | 0638-1835                              | Testo           | 22/24/27, 15C, 15B |
| TM39180 | Laser distance meter                | Disto Pro                              | Leica           | 22/24/27, 15C, 15B |
| TM37523 | Preamplifier                        | AMF-4D-10M-3G-25-20P                   | Miteq           | 22/24/27, 15C, 15B |
| -       | Preamplifier                        | AFS4-00100300-20-23P6                  | Miteq           | 15C                |
| TM37498 | Preamplifier                        | AMF-5D-020180-26-10P                   | Miteq           | 22/24/27, 15C, 15B |
| TM30599 | Semi anechoic chambre               | UNKNOWN                                | TDK             | 22/24/27, 15C, 15B |
| TM22638 | Power supply                        | OL63743-901                            | Torqueleader    | 22/24/27, 15C, 15B |
| TM38066 | High pass filter                    | 4HC3000/18000-3-KK                     | Trilithic       | 22/24/27, 15C, 15B |
| TM26511 | Tunable notch filter                | WRCA870/                               | Wainwright      | 27                 |
| TM38215 | Band reject filter                  | WRCD 1920/1980-1918/1982-40/20         | Wainwright UMTS | 27                 |
| TM38214 | Band reject filter                  | WRCT 2402/2480-2400/2483.5-30/         | Wainwright ISM  | 15C                |
| -       | Band reject filter                  | WRCG1877/1883-1870/1890-40/6EE         | Wainwright      | 27                 |
| -       | Band reject filter                  | WRCG1729.4/1735.4-1722.4/1742.4-40/6SS | Wainwright      | 27                 |
| -       | Band reject filter                  | WRCG832/838-825/848-40/5SS             | Wainwright      | 27                 |
| TM23892 | Controller                          | G-1000SDX                              | Yaesu           | 22/24/27           |
| 2001    | Bluetooth tester                    | CBT                                    | R&S             | 22/24/27, 15C, 15B |
| -       | Antenna                             | SBA 9113                               | Schwarzbeck     | 22/24/27           |
| 6023    | Antenna                             | VUBA 9117                              | Schwarzbeck     | 22/24/27, 15C      |