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## **Radio Tests Report in Extreme Environment for 1900 MHz UMTS Mono iBTS equipped with i-modules**

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**Reference:** RPT-T-030525-6G1

**Version:** A

**Status:** Approved

**Date:** 30/09/03

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**Product Name:** UMTS Mono iBTS

**Frequency:** UMTS 1900

**Discipline:** RF in extreme environment

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**Verified by:** P. GALOPIN

**Approved by:** C. CHANSARD

2/10/03

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## PUBLICATION HISTORY

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## 1. INTRODUCTION

This document presents the measurements results of Radio tests performed on the 1900 MHz UMTS Mono iBTS equipped with UMTS 1900 MHz i-modules, in extreme environment according to 3GPP TS 25.141 and 47CFR Part 24 and Nortel requests.

The measurements reported in this document have been performed in Sanmina-SCI climatic chamber. The tests definitions, methods and requirements follow the applicable version of the 3GPP TS 25.141 and 47CFR Part 24 as defined in the PLN-T-030466-6G1 Test Plan.

The tests results in this report relate to the equipment under test only described below and in the Nortel Networks AVL ref: UMT/BTS/DJD/7225 Ver 01.01/EN:

|                            |                                                           |
|----------------------------|-----------------------------------------------------------|
| Product:                   | UMTS Mono iBTS                                            |
| Manufacturer:              | Nortel Networks                                           |
| Type:                      | UMTS 1900                                                 |
| Configuration:             | OTOR1                                                     |
| Power supply:              | DC: -48Vdc and AC: 208-240Vac for Heater (See Note below) |
| Power supply range:        | DC Range: -40.5Vdc to -57Vdc                              |
| Extreme temperature range: | -20°C to +45°C                                            |

**Note:** The UMTS Mono iBTS has two Operation Mode:

Mode 1: AC Supply Only (208-240Vac)

Mode 2: AC +DC Supply (AC for Heater: 208-240VAC and DC: -48Vdc)

As the Mode 1 has been used during the RF tests performed on the UMTS Mono iBTS with Alpha modules, the Mode 2 has been chosen to performed the RF tests on the UMTS Mono iBTS with i-modules.

This document is addressed to Nortel Networks and Sanmina-SCI R&D department involved in the development of the UMTS Mono iBTS and UMTS 1900 MHz i-modules.

## 2. RELATED DOCUMENTS

### 2.1. APPLICABLES DOCUMENTS

|      |                |                                                                                                                                                                               |
|------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [A1] | 3GPP TS 25.141 | 3 <sup>rd</sup> generation partnership project: Technical Specification Group Radio Access Networks; Base Station (BS) conformance testing (FDD) Release 1999; Version 3.12.0 |
| [A2] | 47 CFR Part 24 | Personal Communications Services                                                                                                                                              |

### 2.2. REFERENCE DOCUMENTS

|      |                   |                                                                                                   |
|------|-------------------|---------------------------------------------------------------------------------------------------|
| [R1] | UMT/BTS/DPL/07135 | 1900 MHz UMTS Project Qualification Plan                                                          |
| [R2] | PLN-V-030355-6G1  | 1900 Mhz UMTS PI Qualification Plan                                                               |
| [R3] | UMT/BTS/DD/453    | Mechanical, Environmental and Electrical Requirement Specification for a Mono iBTS Cabled Cabinet |
| [R4] | Nortel-sinf-00358 | Mono iBTS Cooling Unit Description                                                                |
| [R5] | UMT/BTS/DJD/7225  | Hardware Delivery form for 1900 MHz UMTS Mono iBTS                                                |
| [R6] | PLN-T-030465-6G1  | Radio Tests Plan in Extreme Environment for UMTS Mono iBTS equipped with 1900 MHz i-modules       |

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### 3. IDENTIFICATION OF TESTED TECHNICAL VARIANT AND OF THE MODULES CONSTITUTING THE TESTED EQUIPMENT

Tests were performed on all the following variants:

| TECHNICAL VARIANTS |           |                    |
|--------------------|-----------|--------------------|
| Identification     | Comments  | Configuration code |
| UMTS Mono iBTS     | OTOR1 30W | A                  |

**Software compatibility :**

Modules software version : V03E3.0E01.4

PI bench : v03d0402

Visual TRM : v03d0402 with a modification : the file for channelizers configuration "TX\_umts.chz" delivered with Visual TRM was modified by the file "TX\_umts.chz" delivered with PI Bench v03d0402.

Visual BBS for iCEM : V03D3.2\_E04

| ARTICLE               | PEC code | Release | Serial number | Comment         |
|-----------------------|----------|---------|---------------|-----------------|
| iTRM 1900             | NTUM17BA | D1      | CDN200326005  | 136.147. 33.145 |
| iCCM shelf            | NTUM27AA | D1      | CDN200247007  |                 |
| iCCM board            | NTUM25BA | D2      | SLR200247007  | 136.147. 32.149 |
| iCEM 128              | NTUM00DA | D2      | CDN200316023  | 136.147. 33.98  |
| eGPSAM                | NTA520AA | 02      | NNTM7503OECE  |                 |
| MCPA 1900             | NTUM30PA | D2      | PWWT03DC11NY  | Firmware 1.16   |
| eDDM 1900             | NTU719AA | D1      | FORM01437242  |                 |
| Cooling Unit          | NTU752AA | D1      | SNMN7500AV7Q  |                 |
| MCA                   | NTU750AA | D1      | SNMN7500AW3T  |                 |
| INTERCO PANEL         | NTU727AA | D1      | SNMN7500AVY9  |                 |
| DIGITAL SHELF         | NTU753DA | D1      | SNMN7500AW3U  |                 |
| Control board         | NTU751AA | D1      | SNMN7500AV7L  |                 |
| Rectifier             | NTU753HA | D1      | PITS01W00606  |                 |
| DC Box                | NTU754AA | D2      | SNMN7500C9YY  |                 |
| LPPCM                 | NTU733AA | D1      | SNMN7500BTTR  |                 |
| External alarm module | NTU735BA | D1      | SNMN7500B4UP  |                 |

## 4. SYNTHESIS OF TESTS RESULTS FOR ALL VARIANTS

### For 3GPP TS 25.141:

| Identification | Description                       | Configuration Code |
|----------------|-----------------------------------|--------------------|
|                |                                   | A                  |
|                | UMTS Mono iBTS, OTOR1 30W         | X                  |
| Clause number  | Description                       | Test Status (note) |
| 6.2.1          | Base station maximum output power | P                  |
| 6.3            | Frequency error                   | P                  |
| 7.2            | Reference sensitivity level       | P                  |

### For 47 CFR Part 24:

| Identification | Description               | Configuration Code |
|----------------|---------------------------|--------------------|
|                |                           | A                  |
|                | UMTS Mono iBTS, OTOR1 30W | X                  |
| Clause number  | Description               | Test Status (note) |
| 24.235         | Frequency error           | P                  |

Note : P = Pass, F = Fail, NT = Not Tested, N/A = Not Applicable

## 5. TESTS DATES AND OPERATORS FOR EACH VARIANT

Configuration: A

Start of Test: 24 September 2003  
Finish of Test: 29 September 2003

Location of Tests: SANMINA-SCI laboratory at Plaisir (78-France)

Tests Engineer: J. PALARD

## 6. TESTS APPARATUS USED FOR TESTS

| ID  | Instrument/Ancillary            | Type       | Manufacturer | Serial number |
|-----|---------------------------------|------------|--------------|---------------|
| ESG | ESG-D                           | E4433B     | Agilent      | 524529        |
| VSA | VSA                             | E4406A     | Agilent      | 524069        |
| CO  | Counter                         | RACAL 1992 | RACAL - DANA | 57220007      |
| SG1 | High stability signal generator | 8657B      | HP           | 57220052      |
| PCM | PCM analyser                    | ANT 20     | W&G          | 57220004      |
| PM  | Power meter                     | 8542C      | Gigatronics  | 57220022      |

## 7. TESTS RESULTS OF 3GPP TS 25.141 STANDARD

### 7.1. BASE STATION MAXIMUM OUTPUT POWER AT 30W (CL. 6.2.1)

| Ambient Temperature (°C) | Relative humidity (%) | Operator  |
|--------------------------|-----------------------|-----------|
| -20°C                    | 20                    | J. PALARD |
| +45°C                    | 45                    | J. PALARD |

|                                                                       |
|-----------------------------------------------------------------------|
| Configuration code: A                                                 |
| Site configuration type :<br>OTOR1 30W at -20°C<br>OTOR1 30W at +45°C |
| Activation mode :<br>Single carrier                                   |
| Output power : 44.7dBm at power amplifier output                      |
| Test model: 1                                                         |

#### Tests results:

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | BS max output power(dB) |
|--------------------|--------------------------|---------------------|-------------------------|
| B                  | 45                       | -40,5               | 43,4                    |
| B                  | 45                       | -48                 | 43,4                    |
| B                  | 45                       | -57                 | 43,4                    |

|   |    |       |      |
|---|----|-------|------|
| M | 45 | -40,5 | 43,8 |
| M | 45 | -48   | 43,8 |
| M | 45 | -57   | 43,8 |

|   |    |       |      |
|---|----|-------|------|
| T | 45 | -40,5 | 43,8 |
| T | 45 | -48   | 43,8 |
| T | 45 | -57   | 43,8 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | BS max output power(dB) |
|--------------------|--------------------------|---------------------|-------------------------|
| B                  | -20                      | -40,5               | 43,6                    |
| B                  | -20                      | -48                 | 43,6                    |
| B                  | -20                      | -57                 | 43,6                    |

|   |     |       |      |
|---|-----|-------|------|
| M | -20 | -40,5 | 44,1 |
| M | -20 | -48   | 44,1 |
| M | -20 | -57   | 44,1 |

|   |     |       |    |
|---|-----|-------|----|
| T | -20 | -40,5 | 44 |
| T | -20 | -48   | 44 |
| T | -20 | -57   | 44 |

# Radio Tests Report in Extreme Environment for 1900 MHz UMTS Mono iBTS equipped with i-modules

## Requirements of the clause 6.2.1:

| Maximum Output Power |                    |
|----------------------|--------------------|
| Normal Conditions    | 43.3 dBm $\pm$ 2.7 |
| Extreme conditions   | 43.3 dBm $\pm$ 3.2 |

## Result

The equipment passed the requirement of this clause.

## 7.2. FREQUENCY ERROR AT P<sub>MAX</sub>-3DB (CL. 6.3)

| Ambient Temperature (°C) | Relative humidity (%) | Operator  |
|--------------------------|-----------------------|-----------|
| -20°C                    | 20                    | J. PALARD |
| +45°C                    | 45                    | J. PALARD |

|                                                                       |
|-----------------------------------------------------------------------|
| Configuration code: A                                                 |
| Site configuration type :<br>OTOR1 30W at -20°C<br>OTOR1 30W at +45°C |
| Activation mode :<br>Single carrier                                   |
| Output power : 41.7 dBm at power amplifier output                     |
| Test model: 4                                                         |

## Tests results:

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 45                       | -40,5               | -16,4                |
| B                  | 45                       | -48                 | -8,3                 |
| B                  | 45                       | -57                 | -3,6                 |

|   |    |       |       |
|---|----|-------|-------|
| M | 45 | -40,5 | 2,7   |
| M | 45 | -48   | -3,5  |
| M | 45 | -57   | -11,1 |

|   |    |       |      |
|---|----|-------|------|
| T | 45 | -40,5 | 7,9  |
| T | 45 | -48   | -9,8 |
| T | 45 | -57   | 13,9 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | -20                      | -40,5               | 2,4                  |
| B                  | -20                      | -48                 | 11,9                 |
| B                  | -20                      | -57                 | -9,1                 |

|   |     |       |      |
|---|-----|-------|------|
| M | -20 | -40,5 | 1,6  |
| M | -20 | -48   | -3,1 |
| M | -20 | -57   | 8,5  |

|   |     |       |       |
|---|-----|-------|-------|
| T | -20 | -40,5 | 5,8   |
| T | -20 | -48   | -2,6  |
| T | -20 | -57   | -10,1 |

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# Radio Tests Report in Extreme Environment for 1900 MHz UMTS Mono iBTS equipped with i-modules

## Requirements of the Clause 6.3:

| Frequency error    |                                      |
|--------------------|--------------------------------------|
| Normal Conditions  | $\pm (0.05\text{ppm} + 12\text{Hz})$ |
| Extreme conditions | $\pm (0.05\text{ppm} + 12\text{Hz})$ |

## Result

The equipment passed the requirement of this clause.

## 7.3. FREQUENCY ERROR AT P<sub>MAX</sub>-18DB (CL. 6.3)

|                          |                       |           |
|--------------------------|-----------------------|-----------|
| Ambient Temperature (°C) | Relative humidity (%) | Operator  |
| -20°C                    | 20                    | J. PALARD |
| +45°C                    | 45                    | J. PALARD |

|                                                                       |
|-----------------------------------------------------------------------|
| Configuration code: A                                                 |
| Site configuration type :<br>OTOR1 30W at -20°C<br>OTOR1 30W at +45°C |
| Activation mode :<br>Single carrier                                   |
| Output power : 26,7 dBm at power amplifier output                     |
| Test model: 4                                                         |

## Tests results:

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 45                       | -40,5               | 10,8                 |
| B                  | 45                       | -48                 | -12,3                |
| B                  | 45                       | -57                 | 13,4                 |

|   |    |       |      |
|---|----|-------|------|
| M | 45 | -40,5 | 4,3  |
| M | 45 | -48   | 5,5  |
| M | 45 | -57   | 10,7 |

|   |    |       |       |
|---|----|-------|-------|
| T | 45 | -40,5 | 8,7   |
| T | 45 | -48   | -13,2 |
| T | 45 | -57   | -11,9 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | -20                      | -40,5               | -11,2                |
| B                  | -20                      | -48                 | -7,7                 |
| B                  | -20                      | -57                 | -2,3                 |

|   |     |       |      |
|---|-----|-------|------|
| M | -20 | -40,5 | 18,4 |
| M | -20 | -48   | -8,1 |
| M | -20 | -57   | -7,5 |

|   |     |       |      |
|---|-----|-------|------|
| T | -20 | -40,5 | 11,6 |
| T | -20 | -48   | -0,4 |
| T | -20 | -57   | -4,6 |

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**Requirements of the Clause 6.3:**

| Frequency error    |                                      |
|--------------------|--------------------------------------|
| Normal Conditions  | $\pm (0.05\text{ppm} + 12\text{Hz})$ |
| Extreme conditions | $\pm (0.05\text{ppm} + 12\text{Hz})$ |

**Result**

The equipment passed the requirement of this clause.

**7.4. REFERENCE SENSITIVITY LEVEL (CL. 7.2)**

| Ambient Temperature (°C) | Relative humidity (%) | Operator  |
|--------------------------|-----------------------|-----------|
| -20°C                    | 20                    | J. PALARD |
| +45°C                    | 45                    | J. PALARD |

|                                                                       |
|-----------------------------------------------------------------------|
| Configuration code: B                                                 |
| Site configuration type :<br>OTOR1 30W at -20°C<br>OTOR1 30W at +45°C |
| Activation mode :<br>Single carrier                                   |
| Wanted Signal Level: -121dBm                                          |

**Tests results:**

| Tests Conditions |                 | BIT ERROR RATIO (BER en %) |                       |                        |
|------------------|-----------------|----------------------------|-----------------------|------------------------|
|                  |                 | Channel B<br>1932.4 MHz    | Channel M<br>1960 MHz | Channel T<br>1987.6MHz |
| Tmin (-20°C)     | Vmin (-40.5Vdc) | 0                          | 0                     | 0                      |
|                  | Vnom (-48Vdc)   | 0                          | 0                     | 0                      |
|                  | Vmax (-57Vdc)   | 0                          | 0                     | 0                      |
| Tmax (45°C)      | Vmin (-40.5Vdc) | 0                          | 0                     | 0                      |
|                  | Vnom (-48Vdc)   | 0                          | 0                     | 0                      |
|                  | Vmax (-57Vdc)   | 0                          | 0                     | 0                      |

**Requirements clause 7.2:**

|     |        |
|-----|--------|
| BER | < 0.1% |
|-----|--------|

**Result**

The equipment passed the requirement of this clause.

## 8. TESTS RESULTS OF 47 CFR PART 24

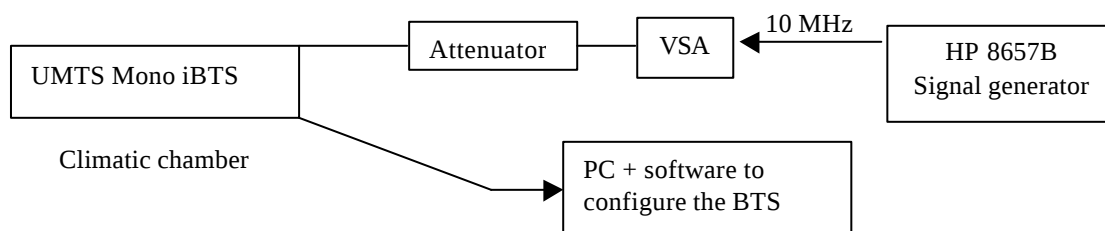
**Test performed:** clause 24.235 of the 47CFR Part 24 standard

|                                                                                                  |
|--------------------------------------------------------------------------------------------------|
| Configuration code: A                                                                            |
| Site configuration type :<br>OTOR1 30W at -20°C, -10°C, 0°C, +5°C, +15°C, +25°C, +35°C and +45°C |
| Activation mode :<br>Single carrier                                                              |
| Output Power: 44,7 dBm at power amplifier output                                                 |
| Test model: 1                                                                                    |
| Operator: J. PALARD                                                                              |

### **Test Procedure:**

To realize these tests, the equipment was placed in the climatic chamber during sufficient time to obtain good temperature stabilization at several temperatures. The PA were configured at maximum RF output power (44,7dBm, test model: 1) and this value was controlled during all tests.

The measurements were performed with a VSA, as described on the figure below:



A period of at least one hour was allowed prior to measurement to ensure that all the components of the oscillator circuit were stabilized at each temperature.

### **Tests results:**

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 45                       | -40,5               | 7,7                  |
| B                  | 45                       | -48                 | 12,8                 |
| B                  | 45                       | -57                 | -9,5                 |

|   |    |       |      |
|---|----|-------|------|
| M | 45 | -40,5 | 2,7  |
| M | 45 | -48   | 13,4 |
| M | 45 | -57   | -3,5 |

|   |    |       |      |
|---|----|-------|------|
| T | 45 | -40,5 | 4,1  |
| T | 45 | -48   | -0,9 |
| T | 45 | -57   | 11,2 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 35                       | -40,5               | 14,7                 |
| B                  | 35                       | -48                 | -10,8                |
| B                  | 35                       | -57                 | -5,3                 |

## Radio Tests Report in Extreme Environment for 1900 MHz UMTS Mono iBTS equipped with i-modules

|   |    |       |       |
|---|----|-------|-------|
| M | 35 | -40,5 | 0,3   |
| M | 35 | -48   | 8,8   |
| M | 35 | -57   | -16,7 |

|   |    |       |       |
|---|----|-------|-------|
| T | 35 | -40,5 | -0,9  |
| T | 35 | -48   | -14,4 |
| T | 35 | -57   | -8,6  |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 25                       | -40,5               | 11,4                 |
| B                  | 25                       | -48                 | -1,2                 |
| B                  | 25                       | -57                 | -5,8                 |

|   |    |       |       |
|---|----|-------|-------|
| M | 25 | -40,5 | -10,2 |
| M | 25 | -48   | -9,4  |
| M | 25 | -57   | -7,1  |

|   |    |       |       |
|---|----|-------|-------|
| T | 25 | -40,5 | 13,8  |
| T | 25 | -48   | -14,1 |
| T | 25 | -57   | -0,4  |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 15                       | -40,5               | 14,2                 |
| B                  | 15                       | -48                 | -9,3                 |
| B                  | 15                       | -57                 | -3,2                 |

|   |    |       |      |
|---|----|-------|------|
| M | 15 | -40,5 | 15,1 |
| M | 15 | -48   | 10,1 |
| M | 15 | -57   | -3,8 |

|   |    |       |     |
|---|----|-------|-----|
| T | 15 | -40,5 | 0,4 |
| T | 15 | -48   | 4,9 |
| T | 15 | -57   | 5,2 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 5                        | -40,5               | 7,4                  |
| B                  | 5                        | -48                 | -12,7                |
| B                  | 5                        | -57                 | 14,1                 |

|   |   |       |       |
|---|---|-------|-------|
| M | 5 | -40,5 | 3,8   |
| M | 5 | -48   | 3,5   |
| M | 5 | -57   | -13,1 |

|   |   |       |      |
|---|---|-------|------|
| T | 5 | -40,5 | 1,3  |
| T | 5 | -48   | 12,7 |
| T | 5 | -57   | -0,9 |

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| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | 0                        | -40,5               | 12,7                 |
| B                  | 0                        | -48                 | 14,3                 |
| B                  | 0                        | -57                 | 0,2                  |

|   |   |       |       |
|---|---|-------|-------|
| M | 0 | -40,5 | 6,9   |
| M | 0 | -48   | -15,1 |
| M | 0 | -57   | -4,8  |

|   |   |       |      |
|---|---|-------|------|
| T | 0 | -40,5 | 9,4  |
| T | 0 | -48   | -8,9 |
| T | 0 | -57   | 7,2  |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | -10                      | -40,5               | 0,2                  |
| B                  | -10                      | -48                 | 12,4                 |
| B                  | -10                      | -57                 | -17,9                |

|   |     |       |      |
|---|-----|-------|------|
| M | -10 | -40,5 | 3,2  |
| M | -10 | -48   | 8,4  |
| M | -10 | -57   | 12,2 |

|   |     |       |      |
|---|-----|-------|------|
| T | -10 | -40,5 | 8,9  |
| T | -10 | -48   | -1,8 |
| T | -10 | -57   | 13,1 |

| Emission frequency | Ambient temperature (°C) | Input voltage (Vdc) | Frequency error (Hz) |
|--------------------|--------------------------|---------------------|----------------------|
| B                  | -20                      | -40,5               | 1,5                  |
| B                  | -20                      | -48                 | 4,9                  |
| B                  | -20                      | -57                 | -9,6                 |

|   |     |       |      |
|---|-----|-------|------|
| M | -20 | -40,5 | 5,2  |
| M | -20 | -48   | -6,5 |
| M | -20 | -57   | 4,4  |

|   |     |       |       |
|---|-----|-------|-------|
| T | -20 | -40,5 | 9,6   |
| T | -20 | -48   | -7,4  |
| T | -20 | -57   | -11,3 |

## 9. CONCLUSION

The 1900 MHz UMTS Mono iBTS equipped with i-modules, respects the RF requirements of the TS 25.141 V3.12.0 standard for measurements in extreme environment and the clause 24.235 of the 47 CFR Part 24 standard.

## 10. ABBREVIATIONS & DEFINITIONS

### 10.1. ABBREVIATIONS

ETS : European Telecommunication Standard

BTS : Base Transceiver Station

UMTS : Universal Mobile Telecommunication System

PA : Power Amplifier

CEM : Channel element module

CCM : Core Control Module

TRM : Transmitter receiver module

TMA: Tower Mounted Amplifier

GPSAM : Global position system alarm module

MCA : Manufacturing Commissioning Alarm Module

DC : Direct Current

TBC : To Be Confirmed

EUT : Equipment Under Test

BS : Base Station

UARFCN : Ultra ARFCN

ARFCN : Absolute Radio Frequency Channel Number

ESG : E Signal Generator

VSA : Vector Signal Analyzer

3GPP : Generation Partnership Project

Tx : Transmit

Rx : Receive

B : Bottom UARFCN Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follows :  
 $F_{B \text{ Downlink}} = 1932.4 \text{ MHz}$  ;  $F_{B \text{ uplink}} = 1852.4 \text{ MHz}$ .

M : Middle UARFCN Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follows :  
 $F_{M \text{ Downlink}} = 1960 \text{ MHz}$  ;  $F_{M \text{ uplink}} = 1880 \text{ MHz}$ .

T : Top UARFCN Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follows :  $F_{T \text{ Downlink}} = 1987.6 \text{ MHz}$  ;  $F_{T \text{ uplink}} = 1907.6 \text{ MHz}$ .

### 10.2. DEFINITIONS

N/A

❧END OF DOCUMENT❧