# TEST REPORT
# FROM
# RADIO FREQUENCY
# INVESTIGATION LTD.

Test of UMTS Compact iBTS

To FCC Part 24.235 & 3GPP TS 25.141
(Requested Parts Only)

**Test Report Serial No.:** RFI/MPTB5/RP45610JD01A

**Supersedes Test Report Serial No.:** RFI/MPTB4/RP45610JD01A,

Remarks:

| | |
|---|---|
| Equipment complied with the specification | [ * ] |
| Equipment did not comply with the specification | [ ] |
| Results were within measurement uncertainties | [ ] |

| | |
|---|---|
| **This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director:**  | **Checked By:**  |
| **Tested By:**  | **Release Version No: PDF 01** |
| **Issue Date: 12 December 2003** | **Test Dates: 05 November 2003 to 14 November 2003** |

It should be noted that 3GPP TS 25.141 is not listed on RFI's current UKAS accreditation schedule and is therefore "not UKAS accredited". However, the test methods used to determine RF frequency and output power are covered by RFI's UKAS accreditation.

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This report may be copied in full. The results in this report apply only to the sample(s) tested.

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## Section 1. Client Information

| | |
|---|---|
| **Company Name:** | Nortel Networks |
| **Address:** | Nortel Networks<br>Parc d'activité de Magny-Chateaufort<br>CHATEAUFORT<br>78928 Yvelines Cedex 9 - France |
| **Contact Name:** | Luc Moulin |

# Section 2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

## 2.1. Identification Of Equipment Under Test (EUT)

| | |
|---|---|
| **Brand Name:** | Nortel Networks |
| **Model Name or Number:** | UMTS Compact iBTS |
| **Unique Type Identification:** | UMTS Compact iBTS |
| **FCC ID Number:** | AB6UMTS1900COMP |
| **Country of Manufacture:** | Not Stated by Client |
| **Date of Receipt:** | 05 November 2003 |

| | |
|---|---|
| **Description:** | Tower Mounted Amplifier (TMA) |
| **Brand Name:** | Not Stated |
| **Model Name or Number:** | 1850-1990MHz |
| **Unique Type Identification:** | FORM01429980 |
| **Serial Number:** | NTUM35AA-D1 |
| **Country of Manufacture:** | Not Stated |
| **Date of Receipt:** | 05 November 2003 |

## 2.2.Accessories Supplied with Equipment Under Test (EUT)

| | |
|---|---|
| **Description:** | Duplexer |
| **Brand Name:** | Not Stated |
| **Model Name or Number:** | Not Stated |
| **Unique Type Identification:** | 1850-1910MHz |
| **Serial Number:** | MTEC0219A076 |
| **Country of Manufacture:** | Not Stated |
| **Date of Receipt:** | 05 November 2003 |

## 2.3. Modules supplied with Nortel Networks UMTS Compact iBTS

| ARTICLE | PEC code | Release | Serial Number |
|---|---|---|---|
| iTRM 1900 | NTUM17BA | D1-DER AC 03 06 046 | CDN200326005 |
| iCCM shelf | NTUM26AA | D1 | CDN200247010 |
| iCCM board | NTUM25BA | D2 | SLR200247010 |
| iCEM 128 | NTUM00DA | D2 | CDN200316007 |
| iCEM 128 | NTUM00DA | D2 | CDN200316032 |
| cGPSAM | NTA520AA | 02 | NNTM7503OECE |
| MCPA 1900 | NTUM30PA | D2 | PWWT03DC11NY |
| MCPA 1900 | NTUM30PA | D2 | PWWT03D9RGYN |
| MCPA 1900 | NTUM30PA | D2 | PWWT03D9L777 |
| DDM 1900 | NTUM42AA | D1 | FORM01428020 |
| DDM 1900 | NTUM42AA | D1 | FORM01426048 |
| DDM 1900 | NTUM42AA | D1 | FORM01426047 |
| DIGITAL SHELF | NTA535EA | 01 | SNMN7500C84D |
| INTERCO | NTA525AA | 01 | SNMN7500C5XV |
| CICU | NTA535AA | No label with hardware release and serial number | |
| MCA | NTA536EA | No label with hardware release and serial number | |
| Pallet | CELESTICA P/N: CNN00194 | | |
| Cabinet Support | CELESTICA P/N: CNN00195 | | |

## 2.4. Description Of EUT

The equipment under test is a Nortel Networks UMTS Compact iBTS.

## 2.5. Modifications Incorporated In EUT

The EUT has not been modified from what is described by the Model Number and Unique Type Identification stated above.

## 2.6. Additional Information Related To Testing

| | | |
|---|---|---|
| **Power Supply Requirement: (Supply via AC/DC converter unit)** | -48V DC | |
| **Intended Operating Environment:** | Within the GSM/3GPP Networks | |
| **Equipment Category:** | UMTS Base Station | |
| **Type of Unit:** | Transceiver | |
| **Highest Fundamental Frequency** | 1987.6 MHz | |
| **Transmit Frequency Range** | 1930 MHz to 1990 MHz | |
| **Transmit Channels Tested** | **Channel ID** | **Channel Frequency (MHz)** |
| | **Bottom** | 1932.4 |
| | **Middle** | 1960 |
| | **Top** | 1987.6 |
| **Receive Frequency Range** | 1850 MHz to 1910 MHz | |
| **Receive Channels Tested** | **Channel ID** | **Channel Frequency (MHz)** |
| | **Bottom** | 1852.4 |
| | **Middle** | 1880.0 |
| | **Top** | 1907.6 |
| **Maximum Power Output** | 45.1dBm | |

## 2.7. Support Equipment

The following support equipment was used to exercise the EUT during testing:

| Manufacturer | Model No/Name | Serial No | Test Equipment ID |
|---|---|---|---|
| Hewlett Packard | 6031A (0-20V/0-120A/1000W) | US 35430161 | e1 |
| Hewlett Packard | 6031A (0-20V/0-120A/1000W) | US 35430198 | e2 |
| Hewlett Packard | 6031A (0-20V/0-120A/1000W) | US 35430229 | e3 |
| Agilent | 53131A/225MHz Universal Counter | MY40002203 | e4 |
| Hewlett Packard | 37718B/Omni BER/718 | GB00000266 | e5 |
| Hewlett Packard | E4433B 250kHz-4.0Ghz ESG-D Series Signal Generator | US3840769 opt 100/101/1E5/H97/H99/UN8/UND | e6 |
| Agilent | E4406A 7MHz-4.0GHz VSA Series Transmitter Tester | US41152712 opt 202/BAF | e7 |
| 3Com | 3C16985B Superstack 3/10 Base-T/100 Base-Tx | 0100/7MAV4CBC4D8 | e8 |
| Duplexer | (1850-1910)MHz - MTEC0219A076 | | e9 |
| TMA cable | TMA feeder cable | supplied by customer | e10 |
| TIMES MICROWAVE RF CABLES | LMR 400 (68999) RF CABLES | 3 off | e11 |
| WEINSCHEL In-line-attenuator | model no. 24-40-34 /40dB In-line-attenuator | 3-off | e12 |

# Section 3. Test Specification, Methods And Procedures

## 3.1. Test Specifications

| | |
|---|---|
| **Reference:** | FCC Part 24.235 Subpart E: 2002 (Broadband PCS) |
| **Title:** | Code of Federal Regulations, Part 24 (47CFR24)<br>Personal Communication Services. |
| **Comments:** | A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules. |
| **Purpose of Test:** | To determine whether the equipment complied with the requirements of the specification for the purposes of certification. |

| | |
|---|---|
| **Reference:** | 3GPP TS 25.141 Version 3.13.0 Release 1999<br>ETSI TS 125 141 V3.13.0 (2003-03)<br><br>Clause 6.2, 6.3 and 7.2<br><br>(It should be noted that this standard is not listed on RFI 's current UKAS accreditation and is therefore "not UKAS accredited".<br>The test methods used to determine RF frequency and output power are covered by RFI's UKAS accreditation.) |
| **Title:** | Universal Mobile Telecommunications System (UMTS) |
| **Comments:** | Base Station Conformance Testing (FDD) |
| **Purpose of Test:** | To determine whether the equipment complied with the requirements of the specification for the purposes of certification. |

| | |
|---|---|
| **Reference:** | 3GPP TS 25.141 Version 5.6.0 Release 5<br>ETSI TS 125 141 V5.6.0 (2003-03)<br><br>Clause 6.2, 6.3 and 7.2<br><br>(It should be noted that this standard is not listed on RFI 's current UKAS accreditation and is therefore "not UKAS accredited".<br>The test methods used to determine RF frequency and output power are covered by RFI's UKAS accreditation.) |
| **Title:** | Universal Mobile Telecommunications System (UMTS) |
| **Comments:** | Base Station Conformance Testing (FDD) |
| **Purpose of Test:** | To determine whether the equipment complied with the requirements of the specification for the purposes of certification. |

## 3.2. Methods And Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2002
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

## 3.3. Definition Of Measurement Equipment

The specialist measurement equipment used was supplied by the client and validated against RFI reference equipment for frequency accuracy and output power only. Appendix 1 contains a list of the test equipment used.

## Section 4. Deviations From The Test Specification

Testing was also performed to an earlier version of the 3GPP standard to cover Pmax-3 dB requirements at the client's request.

# Section 5. Operation Of The EUT During Testing

## 5.1. Operating Conditions

During testing, the EUT was powered by 3 x Hewlett Packard 6031A (0-20V/0-120A/1000W) DC Power Supplies. The Base Station was controlled using a customer's PC with PI Bench Tool. This utilises the Ethernet and GPIB buses to activate the iBTS digital modules and test equipment like ESG and VSA. Tests were performed in a normal laboratory environment and within an environmentally controlled chamber.

## 5.2. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

**STSR2 45W no TMA**

| | |
|---|---|
| Max Output Power | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax measured on B PA1, M PA2, T PA3 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03)/FCC 24.235 |
| Test model 1 | Pmax measured on B PA1, M PA2, T PA3 |
| Frequency Error | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 4 | Pmax-3dB measured on B PA1, M PA2, T PA3 |
| Frequency Error (2003-03) | TS 25.141 V5.6 (Release 5) (2003-03)/ TS 25.141 V3.13 Release 1999) |
| Test model 4 | Pmax-18dB (1 PA operating) measured on B PA1, M PA2, T PA3 |
| Reference Sensitivity | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 2 | All PA running, measures on DDM1 Main (PA1 antenna), uplink frequencies B 1852.4MHz M 1880MHz T 1907.6MHz (with TX on) All PA's were transmitting Pmax on paired downlink |

## Operating Modes (Continued)

**STSR2 45W with TMA**

| | |
|---|---|
| Max Output Power | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 4 | Pmax-3dB measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03)/ TS 25.141 V3.13 Release 1999) (2003-03) |
| Test model 4 | Pmax-18dB (1 PA operating) measured on B PA1, M PA1, T PA1 |
| Reference Sensitivity | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 2 | All PA running, measures on DDM1 Main (PA1 antenna), uplink frequencies B 1852.4MHz M 1880MHz T 1907.6MHz (with TX on) All PA's were transmitting Pmax on paired downlink |

**OTOR 30W no TMA**

| | |
|---|---|
| Max Output Power | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax (1 carrier) measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 4 | Pmax-3dB measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03)/ TS 25.141 V3.13 (Release 1999)(2003-03) |
| Test model 4 | Pmax-18dB (1 PA operating) measured on B PA1, M PA1, T PA1 |
| Reference Sensitivity | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 2 | One PA running, measures on DDM1 Main (PA1 antenna), uplink frequencies B 1852.4MHz M 1880MHz T 1907.6MHz (with TX on) All PA's were transmitting Pmax on paired downlink |

## Operating Modes (Continued)

**OTOR 30W with TMA**

| | |
|---|---|
| Max Output Power | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax (1 carrier) measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03) |
| Test model 1 | Pmax measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 4 | Pmax-3dB measured on B PA1, M PA1, T PA1 |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03)/ TS 25.141 V3.13 (Release 1999)(2003-03) |
| Test model 4 | Pmax-18dB measured on B PA1, M PA1, T PA1 |
| Reference Sensitivity | TS 25.141 V3.13 (Release 1999) (2003-03) |
| Test model 2 | One PA running, measures on DDM1 Main (PA1 antenna), uplink frequencies B 1852.4MHz M 1880MHz T 1907.6MHz (with TX on) All PA's were transmitting Pmax on paired downlink |

## 5.3. Configuration And Peripherals

The EUT was tested in the following configuration:

Please refer to Appendix A for Configuration Diagrams

These configurations were chosen at the clients request.

# Section 6. Summary Of Test Results

## FCC Part 24

| Range Of Measurements | Specification Reference | Port Type | Compliancy Status |
|---|---|---|---|
| Transmitter Frequency Stability (Temperature Variation) | C.F.R. 47 FCC Part 24: 2002 Section 24.235 | Antenna Port | Complied |
| Transmitter Frequency Stability (Voltage Variation) | C.F.R. 47 FCC Part 24: 2002 Section 24.235 | Antenna Port | Complied |

## 3GPP TS 25.141 V 5.6.0 Release 5 & V 3.13.0 Release 1999 (2003-03)

| Range Of Measurements | Specification Reference | Port Type | Compliancy Status |
|---|---|---|---|
| Base Station Output Power | TS 25.141 V5.6 (Release 5) (2003-03) | Antenna Port | Complied |
| Frequency Error | TS 25.141 V5.6 (Release 5) (2003-03) & TS 25.141 V3.13 (Release 1999) (2003-03) | Antenna Port | Complied |
| Reference Sensitivity Level | TS 25.141 V3.13 (Release 1999) (2003-03) | Antenna Port | Complied |

## 6.1. Location Of Tests

All the measurements described in this report were performed at the premises of
Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

# Section 7.Measurements, Examinations And Derived Results

## 7.1. General Comments

7.1.1. This section contains test results only.

7.1.2. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 7 for details of measurement uncertainties.

Partial testing was performed against the applicable standards at the request of the client. Two versions of the TS 25.141 were tested against to show compliance an earlier version for output power levels of Pmax-3 dB and Pmax-18dB.

## 7.2. Test Results – FCC Part 24.235

### 7.2.1. FCC Part 24.235 Transmitter Frequency Stability (Temperature and Voltage Variation)

### Procedure

7.2.1.1. The client has stated that the EUT has an operating temperature range of -5°C to +45°C, and thus requested testing be performed over the temperature range -5°C to +45°C, rather than the -30°C to +50°C stated in the FCC Part 2.1055 standard.

7.2.1.2. The client requested that the clock reference for the VSA, and ESG-D be supplied from the Base Station's CCM 10MHz out clock signal. The accuracy of this signal was verified using RFI's EIP Microwave counter (M154) for each set up and was found to be accurate to 10MHz ± 1Hz.

7.2.1.3. The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an access port.

7.2.1.4. Measurements were performed with the EUT operating under extremes of temperature over the range –5°C to 45°C in 10 degree increments.

7.2.1.5. Measurements were also performed at voltage extremes between the declared nominal supply voltage by varying the primary supply voltage from 85% to 115% of the nominal value.

7.2.1.6. Measurements were made on the top, middle and bottom channels.

7.2.1.7. The EUT was switched off for a minimum of 60 minutes between each stage of testing while the environmental chamber, and EUT stabilised at the next temperature within the stated temperature range.

7.2.1.8. Once the environmental chamber had reached thermal equilibrium, the nominal frequency of the EUT was measured and recorded. The recorded frequency was compared to the applicants declared operating frequency band edges.

7.2.1.9. In order to show compliance, the measured frequency must remain within the declared frequency band.

7.2.1.10. This uncertainty value of this test is ± 24.14 Hz.

## FCC Part 24.235 Transmitter Frequency Stability (Temperature and Voltage Variation) (Continued)

**Configuration A was as follows. -** Please refer to Appendix A for configuration diagrams.
Configuration A was deemed worse case by the client.

**STSR2 45W no TMA**
**PA1 used for Bottom Channel**
**PA2 used for Middle Channel**
**PA3 used for Top Channel**

**Results Bottom Channel (1932.4MHz)**

| Temp (°C) | Voltage (DC) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|---|---|---|---|---|---|---|
| 45 | -40.8 | 23 | 1932.400023 | 1930 | 2.400023 | Complied |
| 45 | -48.0 | 17 | 1932.400017 | 1930 | 2.400017 | Complied |
| 45 | -55.2 | 26 | 1932.400026 | 1930 | 2.400026 | Complied |
| 35 | -40.8 | 21 | 1932.400021 | 1930 | 2.400021 | Complied |
| 35 | -48.0 | 21 | 1932.400021 | 1930 | 2.400021 | Complied |
| 35 | -55.2 | 20 | 1932.400020 | 1930 | 2.400020 | Complied |
| 25 | -40.8 | 16 | 1932.400016 | 1930 | 2.400016 | Complied |
| 25 | -48.0 | -20 | 1932.399980 | 1930 | 2.399980 | Complied |
| 25 | -55.2 | 19 | 1932.400019 | 1930 | 2.400019 | Complied |
| 15 | -40.8 | 30 | 1932.400030 | 1930 | 2.400030 | Complied |
| 15 | -48.0 | 19 | 1932.400019 | 1930 | 2.400019 | Complied |
| 15 | -55.2 | 23 | 1932.400023 | 1930 | 2.400023 | Complied |
| 5 | -40.8 | -15 | 1932.399985 | 1930 | 2.399985 | Complied |
| 5 | -48.0 | -12 | 1932.399988 | 1930 | 2.399988 | Complied |
| 5 | -55.2 | -25 | 1932.399975 | 1930 | 2.399975 | Complied |
| -5 | -40.8 | 27 | 1932.400027 | 1930 | 2.400027 | Complied |
| -5 | -48.0 | 28 | 1932.400028 | 1930 | 2.400028 | Complied |
| -5 | -55.2 | -16 | 1932.399984 | 1930 | 2.399984 | Complied |

## FCC Part 24.235 Transmitter Frequency Stability (Temperature and Voltage Variation) (Continued)

**Results Middle Channel (1960 MHz)**

| Temp (°C) | Voltage | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Upper Band Edge Limit (MHz) | Worst Case Margin (MHz) | Result |
|---|---|---|---|---|---|---|---|
| 45 | -40.8 | -30 | 1959.999970 | 1930 | 1990 | 30.000030 | Complied |
| 45 | -48.0 | -31 | 1959.999969 | 1930 | 1990 | 30.000031 | Complied |
| 45 | -55.2 | -18 | 1959.999982 | 1930 | 1990 | 30.000018 | Complied |
| 35 | -40.8 | 45 | 1960.000045 | 1930 | 1990 | 30.000045 | Complied |
| 35 | -48.0 | 32 | 1960.000032 | 1930 | 1990 | 30.000032 | Complied |
| 35 | -55.2 | 17 | 1960.000017 | 1930 | 1990 | 30.000017 | Complied |
| 25 | -40.8 | 19 | 1960.000019 | 1930 | 1990 | 30.000019 | Complied |
| 25 | -48.0 | 28 | 1960.000028 | 1930 | 1990 | 30.000028 | Complied |
| 25 | -55.2 | 14 | 1960.000014 | 1930 | 1990 | 30.000014 | Complied |
| 15 | -40.8 | 24 | 1960.000024 | 1930 | 1990 | 30.000024 | Complied |
| 15 | -48.0 | -18 | 1959.999982 | 1930 | 1990 | 30.000018 | Complied |
| 15 | -55.2 | 28 | 1960.000028 | 1930 | 1990 | 30.000028 | Complied |
| 5 | -40.8 | -21 | 1959.999979 | 1930 | 1990 | 30.000021 | Complied |
| 5 | -48.0 | -20 | 1959.999980 | 1930 | 1990 | 30.000020 | Complied |
| 5 | -55.2 | -20 | 1959.999980 | 1930 | 1990 | 30.000020 | Complied |
| -5 | -40.8 | 26 | 1960.000026 | 1930 | 1990 | 30.000026 | Complied |
| -5 | -48.0 | 25 | 1960.000025 | 1930 | 1990 | 30.000025 | Complied |
| -5 | -55.2 | 18 | 1960.000018 | 1930 | 1990 | 30.000018 | Complied |

## FCC Part 24.235 Transmitter Frequency Stability (Temperature and Voltage Variation) (Continued)

**Results Top Channel (1987.6MHz)**

| Temp (°C) | Voltage | Frequency Error (Hz) | Measured Frequency (MHz) | Upper Band Edge Limit (MHz) | Margin (MHz) | Result |
|---|---|---|---|---|---|---|
| 45 | -40.8 | 30 | 1987.600030 | 1990 | 2.399970 | Complied |
| 45 | -48.0 | -17 | 1987.599983 | 1990 | 2.400017 | Complied |
| 45 | -55.2 | -27 | 1987.599973 | 1990 | 2.400027 | Complied |
| 35 | -40.8 | 42 | 1987.600042 | 1990 | 2.399958 | Complied |
| 35 | -48.0 | 38 | 1987.600038 | 1990 | 2.399962 | Complied |
| 35 | -55.2 | 41 | 1987.600041 | 1990 | 2.399959 | Complied |
| 25 | -40.8 | -30 | 1987.599970 | 1990 | 2.400030 | Complied |
| 25 | -48.0 | 33 | 1987.600033 | 1990 | 2.399967 | Complied |
| 25 | -55.2 | 23 | 1987.600023 | 1990 | 2.399977 | Complied |
| 15 | -40.8 | 56 | 1987.600056 | 1990 | 2.399942 | Complied |
| 15 | -48.0 | 21 | 1987.600021 | 1990 | 2.399979 | Complied |
| 15 | -55.2 | 21 | 1987.600021 | 1990 | 2.399979 | Complied |
| 5 | -40.8 | -29 | 1987.599971 | 1990 | 2.400029 | Complied |
| 5 | -48.0 | -35 | 1987.599965 | 1990 | 2.400035 | Complied |
| 5 | -55.2 | 41 | 1987.600041 | 1990 | 2.399959 | Complied |
| -5 | -40.8 | 28 | 1987.600028 | 1990 | 2.399972 | Complied |
| -5 | -48.0 | 25 | 1987.600025 | 1990 | 2.399975 | Complied |
| -5 | -55.2 | -16 | 1987.599984 | 1990 | 2.400016 | Complied |

## 7.3. 3GPP Base Station Output Power

### Procedure

7.3.1. The Base Station was placed in the environmental chamber. The Chamber was set manually to the desired temperature and sufficient time allowed for the unit to stabilize. The Base Station was configured using the customer's PC and installed software and power was measured from the appropriate antenna port.

7.3.2. The EUT was switched off for a minimum of 60 minutes between each stage of testing while the environmental chamber and EUT stabilised at the next temperature within the stated temperature range.

7.3.3. The total loss of the cables, attenuators and combiner were measured and was noted as reference offset to correct for the losses.

7.3.4.Final measurements were obtained using a wide band power meter and derived by adding the relevant offsets for the losses that was measured.

7.3.5.For tests where the TMA was connected, the output power is declared at the base station output connector with 3.1dB cable loss and 0.3 db declared TMA loss being deducted. The final output power was measured at the TMA antenna output port.

**TMA and Feeder Cable losses**

| Frequency (MHz) | Feeder Cable (dB) | TMA declared loss (dB) |
|---|---|---|
| B (1932.4) | 3.1 | 0.3 |
| B (1960) | 3.1 | 0.3 |
| B (1987.6) | 3.2 | 0.3 |
| B (1852.4) | 3.1 | 0.3 |
| B (1880) | 3.1 | 0.3 |
| B (1907.6) | 3.1 | 0.3 |

## 3GPP Base Station Output Power (Continued)

**Configuration A was as follows. -** Please refer to Appendix A for configuration diagrams

**45W mode, no TMA, Pmax - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA2 for Middle Channel**
**PA3 for Top Channel**

| Manufacturers' declared maximum output power | | | |
|---|---|---|---|
| **45W mode no TMA** | 45W mode with TMA | 30W mode no TMA | 30W mode with TMA |
| **45.1dBm** | 41.7dBm | 43.5dBm | 40.1dBm |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W no TMA | 1932.4 | 44.3 | **Pass** |
| 45 | -40.5 | STSR2 45W no TMA | 1932.4 | 44.3 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W no TMA | 1960 | 45.1 | **Pass** |
| 45 | -40.5 | STSR2 45W no TMA | 1960 | 45.1 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W no TMA | 1987.6 | 45.3 | **Pass** |
| 45 | -40.5 | STSR2 45W no TMA | 1987.6 | 45.3 | **Pass** |

**LIMITS** **CLAUSE 6.2.1.5**

| | | | |
|---|---|---|---|
| **Extreme Conditions** | **no TMA** | **Nortel Limit** | **45.1dBm ±2.0dB** |
| | | **3GPP Limit** | **45.1dBm ±3.2dB** |
| **Uncertainty** | **± 0.46 dB** | | |

## 3GPP Base Station Output Power (Continued)

**Configuration B was as follows:-** Please refer to Appendix A for configuration diagrams

**45W mode, with TMA, Pmax – All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| **Manufacturers' declared maximum output power** | | | |
|---|---|---|---|
| 45W mode no TMA | **45W mode with TMA** | 30W mode no TMA | 30W mode with TMA |
| 45.1dBm | **41.7dBm** | 43.5dBm | 40.1dBm |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W with TMA | 1932.4 | 41.0 | **Pass** |
| 45 | -40.5 | STSR2 45W with TMA | 1932.4 | 41.0 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W with TMA | 1960 | 41.7 | **Pass** |
| 45 | -40.5 | STSR2 45W with TMA | 1960 | 41.7 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| 45 | -57.0 | STSR2 45W with TMA | 1987.6 | 41.5 | **Pass** |
| 45 | -40.5 | STSR2 45W with TMA | 1987.6 | 41.5 | **Pass** |

**LIMITS** **CLAUSE 6.2.1.5**

| | | | |
|---|---|---|---|
| **Extreme Conditions** | **With TMA** | **Nortel Limit** | **41.7dBm ±2.0dB** |
| | | **3GPP Limit** | **41.7dBm ±3.2dB** |
| **Uncertainty** | **± 0.46 dB** | | |

## 3GPP Base Station Output Power (Continued)

**Configuration C was as follows:-** Please refer to Appendix A for configuration diagrams

**30W mode, no TMA, Pmax - Only one PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| **Manufacturers' declared maximum output power** | | | |
|---|---|---|---|
| 45W mode no TMA | 45W mode with TMA | **30W mode no TMA** | 30W mode with TMA |
| 45.1dBm | 41.7dBm | **43.5dBm** | 40.1dBm |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W no TMA | 1932.4 | 43.1 | **Pass** |
| -5 | -40.5 | OTOR1 30W no TMA | 1932.4 | 43.1 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W no TMA | 1960 | 43.6 | **Pass** |
| -5 | -40.5 | OTOR1 30W no TMA | 1960 | 43.6 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W no TMA | 1987.6 | 43.8 | **Pass** |
| -5 | -40.5 | OTOR1 30W no TMA | 1987.6 | 43.7 | **Pass** |

**LIMITS** **CLAUSE 6.2.1.5**

| | | | |
|---|---|---|---|
| **Extreme Conditions** | **no TMA** | **Nortel Limit** | **43.5dBm ±2.0dB** |
| | | **3GPP Limit** | **43.5dBm ±3.2dB** |
| **Uncertainty** | **± 0.46 dB** | | |

## 3GPP Base Station Output Power (Continued)

**Configuration D was as follows:-** Please refer to Appendix A for configuration diagrams

**30W mode, with TMA, Pmax - Only one PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| **Manufacturers' declared maximum output power** | | | |
|---|---|---|---|
| 45W mode no TMA | 45W mode with TMA | 30W mode no TMA | **30W mode with TMA** |
| 45.1dBm | 41.7dBm | 43.5dBm | **40.1dBm** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W with TMA | 1932.4 | 40.0 | **Pass** |
| -5 | -40.5 | OTOR1 30W with TMA | 1932.4 | 40.0 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W with TMA | 1960 | 40.7 | **Pass** |
| -5 | -40.5 | OTOR1 30W with TMA | 1960 | 40.7 | **Pass** |

| Temperature (°C) | Voltage | Configuration | Frequency (MHz) | Power (dBm) | Limit Pass/Fail |
|---|---|---|---|---|---|
| -5 | -57.0 | OTOR1 30W with TMA | 1987.6 | 40.6 | **Pass** |
| -5 | -40.5 | OTOR1 30W with TMA | 1987.6 | 40.6 | **Pass** |

**LIMITS** **CLAUSE 6.2.1.5**

| | | | |
|---|---|---|---|
| **Extreme Conditions** | **With TMA** | **Nortel Limit** | **40.1dBm ±2.0dB** |
| | | **3GPP Limit** | **40.1dBm ±3.2dB** |
| **Uncertainty** | **± 0.46 dB** | | |

## 7.4. 3GPP Frequency Error clause 6.3

### Procedure

7.4.1. The Base Station was placed in the environmental chamber. The Chamber was set manually to the desired temperature and sufficient time allowed for the unit to stabilize. The unit was configured using the customer's PC and installed software. Measurements were made using the Agilent E4406A 7MHz-4.0GHz VSA. The frequency accuracy of the VSA's reference oscillator was verified using RFI calibrated frequency counter (M154).

7.4.2. The EUT was switched off for a minimum of 60 minutes between each stage of testing while the environmental chamber, and EUT, stabilised at the next temperature within the stated temperature range.

## 3GPP Frequency Error clause (Continued)

**Configuration A was as follows:-** Please refer to Appendix A for configuration diagrams

**45W mode, no TMA, Pmax - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA2 for Middle Channel**
**PA3 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -57.0 | 33 |
| B PA1 | 45 | -40.5 | 41 |
| M PA2 | 45 | -57.0 | -19 |
| M PA2 | 45 | -40.5 | 18 |
| T PA3 | 45 | -57.0 | 20 |
| T PA3 | 45 | -40.5 | -30 |

## 3GPP Frequency Error (Continued)

**Configuration A.** Please refer to Appendix A for configuration diagrams

**45W mode, no TMA, Pmax-3dB - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA2 for Middle Channel**
**PA3 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -57.0 | 29 |
| B PA1 | 45 | -40.5 | -28 |
| M PA2 | 45 | -57.0 | -40 |
| M PA2 | 45 | -40.5 | 29 |
| T PA3 | 45 | -57.0 | -19 |
| T PA3 | 45 | -40.5 | -22 |

## 3GPP Frequency Error (Continued)

**Configuration A.** Please refer to Appendix A for configuration diagrams

**45W mode, no TMA, Pmax-18dB - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA2 for Middle Channel**
**PA3 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -57.0 | -23 |
| B PA1 | 45 | -40.5 | -16 |
| M PA2 | 45 | -57.0 | -30 |
| M PA2 | 45 | -40.5 | 23 |
| T PA3 | 45 | -57.0 | 34 |
| T PA3 | 45 | -40.5 | -29 |

## 3GPP Frequency Error (Continued)

**Configuration B.** Please refer to Appendix A for configuration diagrams

**45W mode, with TMA, Pmax - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -40.5 | -35 |
| M PA1 | 45 | -40.5 | 27 |
| T PA1 | 45 | -40.5 | 30 |

## 3GPP Frequency Error (Continued)

**Configuration B.** Please refer to Appendix A for configuration diagrams

**45W mode, with TMA, Pmax-3dB - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -40.5 | 44 |
| M PA1 | 45 | -40.5 | -27 |
| T PA1 | 45 | -40.5 | -24 |

## 3GPP Frequency Error (Continued)

**Configuration B.** Please refer to Appendix A for configuration diagrams

**45W mode, with TMA, Pmax-18dB - All PA's running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | 45 | -40.5 | -26 |
| M PA1 | 45 | -40.5 | 34 |
| T PA1 | 45 | -40.5 | 16 |

## 3GPP Frequency Error (Continued)

**Configuration C.** Please refer to Appendix A for configuration diagrams

**30W mode, no TMA, Pmax - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | 26 |
| B PA1 | -5 | -40.5 | 28 |
| M PA1 | -5 | -57.0 | -18 |
| M PA1 | -5 | -40.5 | -36 |
| T PA1 | -5 | -57.0 | 17 |
| T PA1 | -5 | -40.5 | -29 |

## 3GPP Frequency Error (Continued)

**Configuration C.** Please refer to Appendix A for configuration diagrams

**30W mode, no TMA, Pmax-3dB - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | -19 |
| B PA1 | -5 | -40.5 | -33 |
| M PA1 | -5 | -57.0 | -32 |
| M PA1 | -5 | -40.5 | -27 |
| T PA1 | -5 | -57.0 | -13 |
| T PA1 | -5 | -40.5 | 19 |

## 3GPP Frequency Error (Continued)

**Configuration C.** Please refer to Appendix A for configuration diagrams

**30W mode, no TMA, Pmax-18dB - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | 33 |
| B PA1 | -5 | -40.5 | 25 |
| M PA1 | -5 | -57.0 | 42 |
| M PA1 | -5 | -40.5 | 25 |
| T PA1 | -5 | -57.0 | 26 |
| T PA1 | -5 | -40.5 | 20 |

## 3GPP Frequency Error (Continued)

**Configuration D.** Please refer to Appendix A for configuration diagrams

**30W mode, with TMA, Pmax - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | -16 |
| B PA1 | -5 | -40.5 | -24 |
| M PA1 | -5 | -57.0 | -21 |
| M PA1 | -5 | -40.5 | 22 |
| T PA1 | -5 | -57.0 | 16 |
| T PA1 | -5 | -40.5 | 34 |

## 3GPP Frequency Error (Continued)

**Configuration D.** Please refer to Appendix A for configuration diagrams

**30W mode, with TMA, Pmax-3dB - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | -26 |
| B PA1 | -5 | -40.5 | -25 |
| M PA1 | -5 | -57.0 | 38 |
| M PA1 | -5 | -40.5 | 22 |
| T PA1 | -5 | -57.0 | -25 |
| T PA1 | -5 | -40.5 | -30 |

## 3GPP Frequency Error (Continued)

**Configuration D.** Please refer to Appendix A for configuration diagrams

**30W mode, with TMA, Pmax-18dB - Only 1 PA running and tested using:**

**PA1 for Bottom Channel**
**PA1 for Middle Channel**
**PA1 for Top Channel**

| Emission Frequency | Ambient Temperature (°C) | Input Voltage (V DC) | Frequency Error (Hz) |
|---|---|---|---|
| B PA1 | -5 | -57.0 | 30 |
| B PA1 | -5 | -40.5 | 44 |
| M PA1 | -5 | -57.0 | 20 |
| M PA1 | -5 | -40.5 | 22 |
| T PA1 | -5 | -57.0 | 22 |
| T PA1 | -5 | -40.5 | -29 |

**LIMITS** **CLAUSE 6.3**

Frequency error minimum requirement.

| | |
|---|---|
| **Accuracy** | **(-0.05ppm – 12Hz)**<br>**(+0.05ppm + 12Hz)** |
| **Client Limit** | **± 90 Hz** |
| **Uncertainty** | **± 24.14 Hz** |

TEST EQUIPMENT USED (Listed under RFI serial numbers):
Please refer to Section 7 for test equipment used

## 7.5. Reference Sensitivity Level

### Procedure

7.5.1. The Base Station was placed in the environmental chamber. The Chamber was set manually to the desired temperature and sufficient time allowed for the unit to stabilise. The unit was configured using the customer's PC and installed software.

7.5.2. Due to the low signal level required, a signal source of 0dBm was used and attenuated to the required amount to attain –122dBm. In-line-attenuators were calibrated and used for this task, in addition to the duplexer, TMA, and cables. The level accuracy of the ESG's RF level was verified using RFI calibrated power meter (M1122, M1123).

**N.B. The customer requested to test to limit of -122dBm, with Tx On. The standard stated limit is –121dBm.**

Table shows total calculated attenuation between signal generator and tested antenna port.

| Channel | Total loss (dB) |
|---|---|
| **Bottom** | **122.6dB** |
| **Middle** | **122.4dB** |
| **Top** | **122.3dB** |

**TMA and Feeder Cable losses**

| Frequency (MHz) | Feeder Cable (dB) | TMA declared loss (dB) |
|---|---|---|
| B (1932.4) | 3.1 | 0.3 |
| B (1960) | 3.1 | 0.3 |
| B (1987.6) | 3.2 | 0.3 |
| B (1852.4) | 3.1 | 0.3 |
| B (1880) | 3.1 | 0.3 |
| B (1907.6) | 3.1 | 0.3 |

## Reference Sensitivity Level (Continued)

**Configuration A.** Please refer to Appendix A for configuration diagrams

Test model 2 Pmax. All PA's running and PA mode 45W. Measures on DDM1 Main (PA1 antenna) uplink frequencies B (1852.4MHz), M (1880MHz), T (1907.6MHz) **with no TMA**

| **Test Conditions** | | **BER – (using sensitivity level of –122dBm)** | | |
|---|---|---|---|---|
| | | **Channel B** | **Channel M** | **Channel T** |
| **Tmax (+45°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |
| **Tmax (+45°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |

## Reference Sensitivity Level (Continued)

**Configuration B.** Please refer to Appendix A for configuration diagrams

Test model 2 Pmax. All PA 's running and PA mode 45W. Measures on DDM1 Main (PA1 antenna) uplink frequencies B (1852.4MHz), M (1880MHz), T (1907.6MHz) **with TMA**

| **Test Conditions** | | **BER (using sensitivity level of –122dBm)** | | |
|---|---|---|---|---|
| | | **Channel B** | **Channel M** | **Channel T** |
| **Tmax (+45°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |
| **Tmax (+45°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |

## Reference Sensitivity Level (Continued)

**Configuration C.** Please refer to Appendix A for configuration diagrams

Test model 2 Pmax. Only 1 PA running and PA mode 30W. Measures on DDM1 Main (PA1 antenna) uplink frequencies B (1852.4MHz), M (1880MHz), T (1907.6MHz) **with no TMA**

| **Test Conditions** | | **BER (using sensitivity level of –122dBm)** | | |
|---|---|---|---|---|
| | | **Channel B** | **Channel M** | **Channel T** |
| **Tmin (-5°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |
| **Tmin (-5°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax(-57V DC)** | 0 | 0 | 0 |

## Reference Sensitivity Level (Continued)

**Configuration D.** Please refer to Appendix A for configuration diagrams

Test model 2 Pmax. Only 1 PA running and PA mode 30W. Measures on DDM1 Main (PA1 antenna) uplink frequencies B (1852.4MHz), M (1880MHz), T (1907.6MHz) **with TMA**

| **Test Conditions** | | **BER (using sensitivity level of –122dBm)** | | |
|---|---|---|---|---|
| | | **Channel B** | **Channel M** | **Channel T** |
| **Tmin (-5°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |
| **Tmin (-5°C)** | **Vmin (-40.5V DC)** | 0 | 0 | 0 |
| | **Vnom (-48V DC)** | 0 | 0 | 0 |
| | **Vmax (-57V DC)** | 0 | 0 | 0 |

**LIMITS** **CLAUSE 7.2**

Table 7.1: BS reference sensitivity levels

| **Reference measurement channel data rate** | **BS reference sensitivity level (dBm)** | **BER** |
|---|---|---|
| **12,2kbps** | **-121.0** | **BER shall not exceed 0,001** |
| **Uncertainty** | **± 0.91 dB** | |

The BER shall not exceed 0,001 for the parameters specified in table 7.2.

The normative reference for this requirement is in TS 25.104 [1] subclause 7.2

**N.B. The customer requested to test to limit of -122dBm, with Tx On. The standard stated limit is –121dBm.**

TEST EQUIPMENT USED (Listed under RFI serial numbers):
Please refer to Section 7 for test equipment used

# Section 8.Test Equipment Used

## RFI Test Equipment List

| RFI No. | Instrument | Manufacturer | Type No. | Serial No. |
|---|---|---|---|---|
| A030 | Step Attenuator | Narda | 745-69 | 01544 |
| A163 | Step Attenuator 2W | Narda | 743-80 | 01344 |
| A246 | 30 dB Attenuator | Schaffner | 6830-17-B | None |
| A248 | 60 dB Variable Attenuator | Narda | 743-60 | 01411 |
| C1000 | Cable | Rosenberger | FA210A1020M3 0309 | 002 |
| C1001 | Cable | Rosenberger | FA210A1020M3 0309 | 003 |
| E007 | Environmental Chamber | Prolan | PV427H75F 30HV | None |
| E009 | Environmental Chamber | Thermotron Corporation | S-8-E Mini Max | 25-2407-0 |
| E011 | Environmental Chamber | Design Environmental | WIR3-40 | 11-96-A2103 |
| G011 | SMGU Signal Generator | Rohde & Schwarz | SMGU | 894 054/004 |
| M1068 | Thermometer Digital | Iso-Tech | RS55 | 93102884 |
| M1123 | Boonton | Boonton | 4531 | 138201 |
| M122 | Fluke 77 DVM | Fluke | 77 | 64910017 |
| M124 | Temperature/Humidity Meter | RS Components | 212-124 | None |
| M128 | Fluke 76 DVM | Fluke | 76 | 65340273 |
| M199 | Power Meter | Rohde & Schwarz | NRVS | 827023/075 |
| M212 | Digital Thermometer | RS Components | RS 206-3738 | 70319456 |
| M281 | Power Meter | Hewlett Packard | E4418A (EPM441A) | GB37170210-01 |
| M283 | Power Sensor | Hewlett Packard | 8487A | 3318A03241 |

## Section 9. Abbreviations

| Abbreviation | Terminology |
|---|---|
| iTRM | Transmit/Receive module |
| iCCM | Core Control module |
| iCEM | Channel Element module |
| cGPSAM | Global Position System Alarm Module |
| MCPA | Multi Channel Power Amplifier |
| DDM | Dual Duplexer Module |
| CICU | Cooling Unit |
| MCA | Manufacturing Commissioning Alarm |
| OTOR | Omni Transmit Omni Receive |
| STSR | Sector Transmit Sector Receive |
| TMA | Tower Mounted Amplifier (Low Noise Amplifier) |
| PA | Power Amplifier |

# Appendix 1. Test Configuration Drawings

This appendix contains the following drawings:

| Drawing Reference Number | Title |
|---|---|
| DRG\45610JD01\001 | Configuration A |
| DRG\45610JD01\002 | Configuration B with TMA |
| DRG\45610JD01\003 | Configuration C |
| DRG\45610JD01\004 | Configuration D with TMA |
| DRG\45610JD01\005 | Reference Sensitivity Set-up |
| DRG\45610JD01\006 | Customer Set-up |

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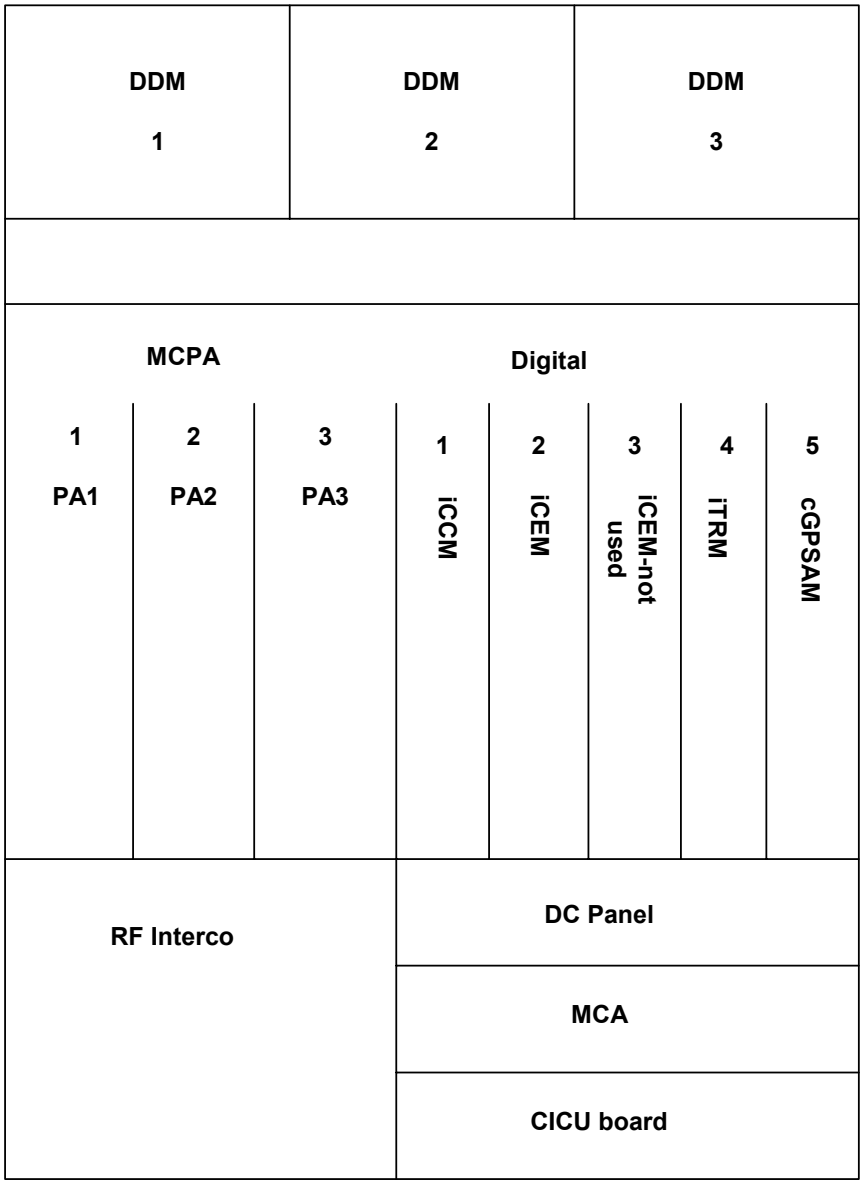
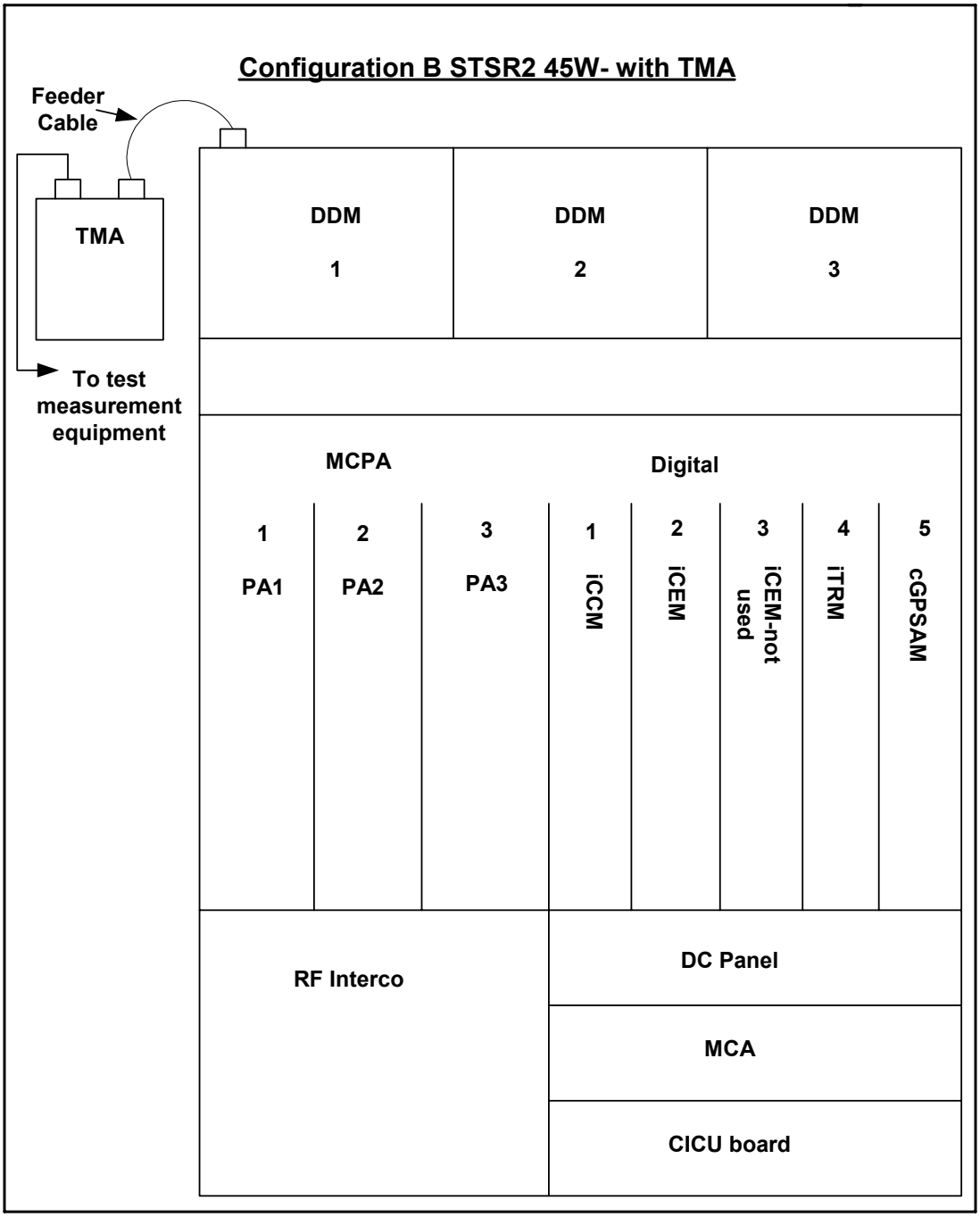
## DRG\45610JD01\001 - Configuration A

### Configuration A

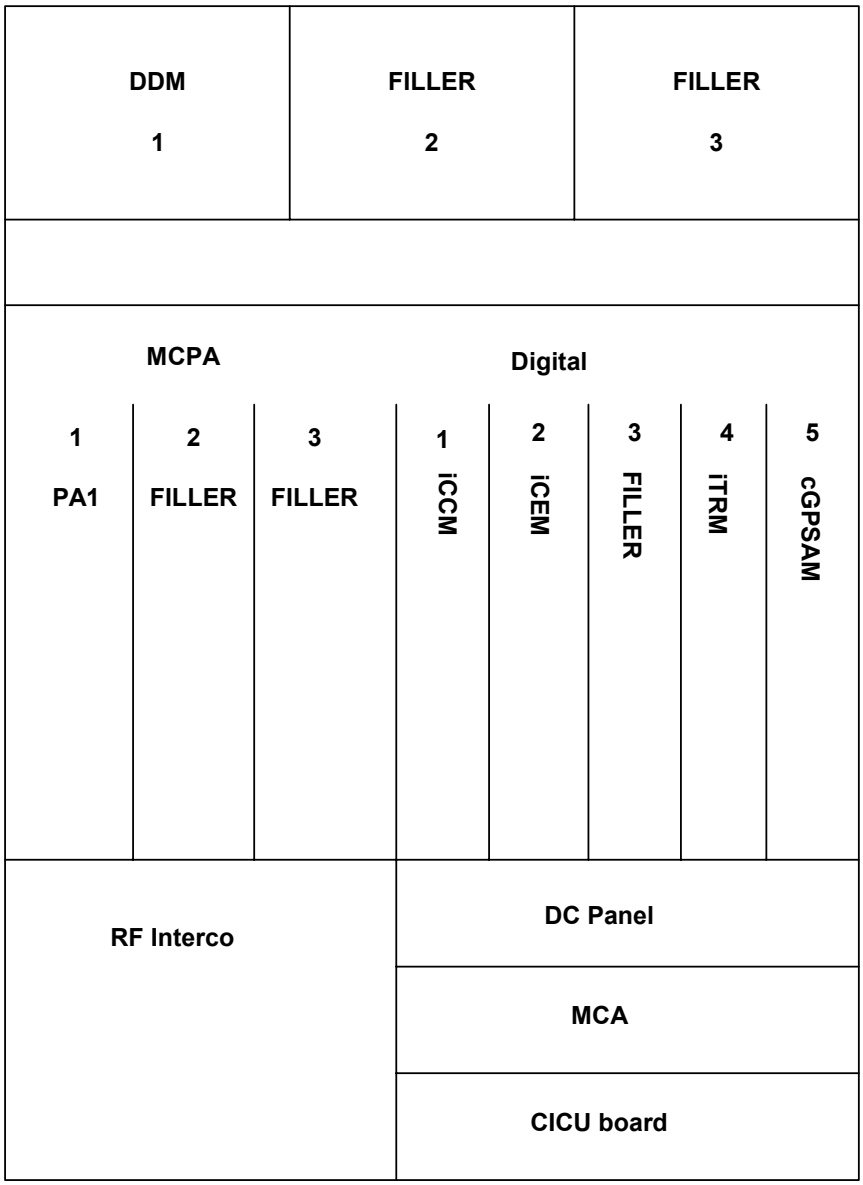


## DRG\45610JD01\002 - Configuration B with TMA

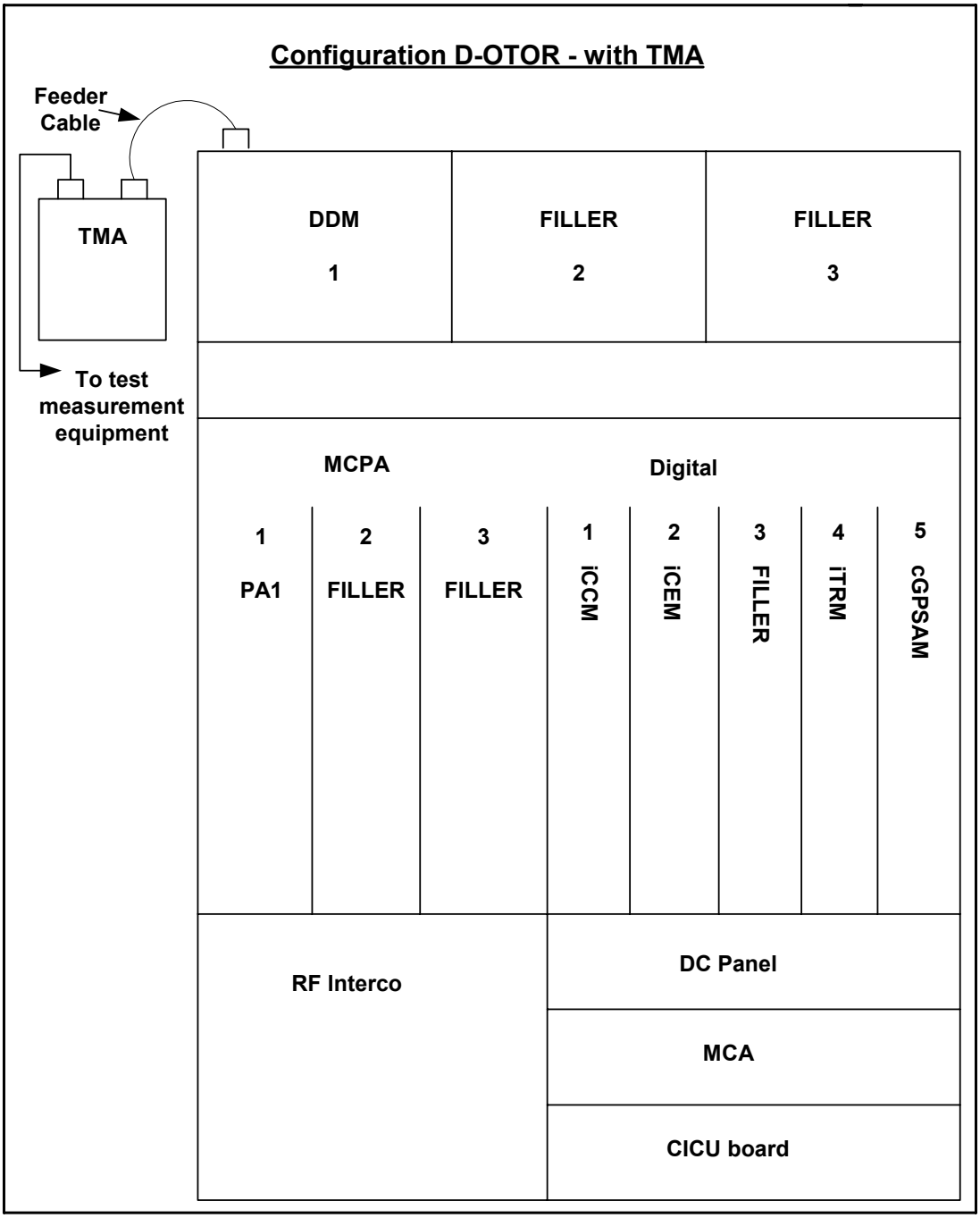


## DRG\45610JD01\003 - Configuration C

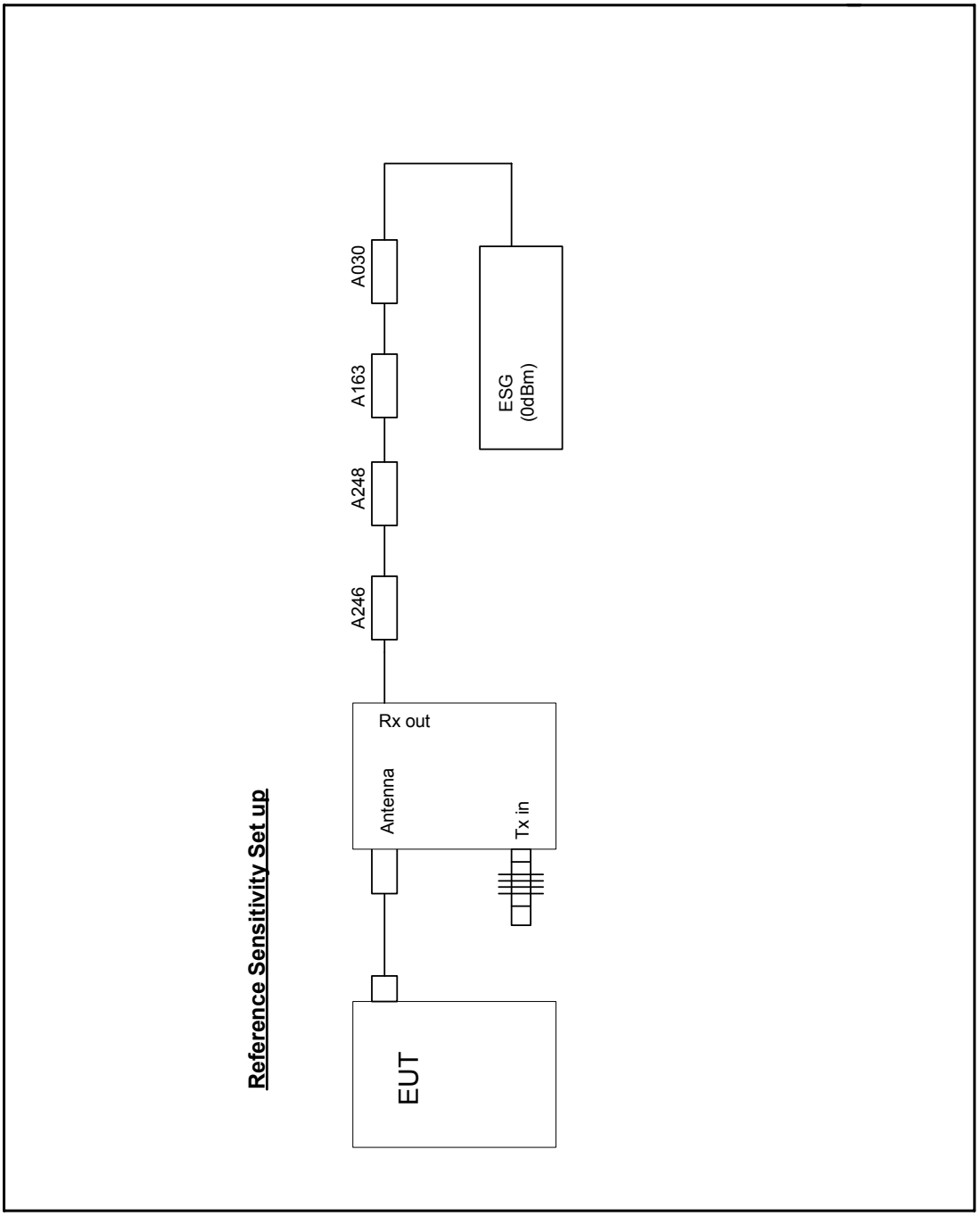
### Configuration C



## DRG\45610JD01\004 - Configuration D with TMA



## DRG\45610JD01\005 - Reference Sensitivity Set-up



## DRG\45610JD01\006 – Customer Set-up