

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

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RF Tests concerning FCC are performed in :
Alcatel-Lucent France site of Vélizy
7-9 avenue Morane Saulnier
78140 Vélizy-Villacoublay Cedex France

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Power supply variations updates.

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1. INTRODUCTION

1.1. OBJECT

This document presents all the RF tests performed for LightRadio 9764 MCO V1.0 B2 3G 1W according to FCC specifications.

1.2. SCOPE OF THIS DOCUMENT

The qualification tests presented in this document apply to and cover introduction of:

- LightRadio 9764 MCO V1.0 B2 3G 1W

This document presents the measurement results of FCC Radio tests performed on:

- LightRadio 9764 MCO V1.0 B2 3G 1W

According to FCC Part 2 [A1], Part 24 [A2].

1.3. AUDIENCE FOR THIS DOCUMENT

This document is to be used by any person needing a view on Alcatel-Lucent:

- LightRadio 9764 MCO V1.0 B2 3G 1W.

2. RELATED DOCUMENTS

2.1. APPLICABLE DOCUMENTS

| | | |
|------|----------------|---|
| [A1] | 47 CFR Part 1 | PRACTICE AND PROCEDURE |
| [A2] | 47 CFR Part 2 | FREQUENCY ALLOCATIONS AND RADIO |
| [A3] | 47 CFR Part 24 | PERSONAL COMMUNICATIONS SERVICES |
| [A4] | RSS133 | Personnal Communication Services in the 2GHz band |

2.2. REFERENCE DOCUMENTS

| | | |
|------|--------------------|--|
| [R1] | UMT/BTS/DPL/038409 | HCCTP_ Introduction_of_LightRadio_9764_MCO V1.0_B2_3G_1W_V01.03 |
|------|--------------------|--|

3. GENERAL INFORMATION

The measurements reported in this document have been performed in Alcatel-Lucent premises at the following address:

Alcatel-Lucent France
7/9 avenue Morane Saulnier
78141 Vélizy cedex

This report contains results for testing in accordance with FCC Part 2 [A2], FCC Part 24 [A3] and . RSS133[A4].

The test definitions, methods and requirements follow the applicable version (as indicated earlier, Applicable Documents section) of FCC Part 2 [A2], FCC Part 24 [A3] and . RSS133[A4].

Alcatel-Lucent retains all results, plots and printouts for the tests performed and also calibration details of the test equipment used.

The test results in this report relate to the equipment under test only.

4. APPLICANT'S AND MANUFACTURER DETAILS

| APPLICANT'S DETAILS | |
|---|---|
| CATEGORY OF APPLICANT (please tick relevant box opposite) | |
| (a) <input checked="" type="checkbox"/> | MANUFACTURER |
| (b) <input type="checkbox"/> | IMPORTER |
| (c) <input type="checkbox"/> | DISTRIBUTOR |
| (d) <input type="checkbox"/> | AGENT |
| If box (b), (c) or (d) is ticked complete details in box below with respect to the manufacturer | |
| PANY NAME : | ALCATEL LUCENT |
| ADDRESS : | Alcatel Lucent Centre de Villarceaux Route de Villejust 91260 NOZAY France |
| NAME FOR CONTACT PURPOSES : | Luc MOULIN |
| TELEPHONE NO : +33 (0) 1 3077 8652 | FAX NO : |
| | TELEX NO: |

| MANUFACTURER'S DETAILS | |
|-----------------------------|-----------|
| COMPANY NAME : | |
| ADDRESS : | |
| NAME FOR CONTACT PURPOSES : | |
| TELEPHONE NO: | FAX NO: |
| | TELEX NO: |

5. TYPE DESIGNATION OF THE EQUIPMENT

| TYPE DESIGNATION |
|-----------------------------------|
| LightRadio 9764 MCO V1.0 B2 3G 1W |

6. TECHNICAL VARIANTS COVERED BY THIS REPORT

This report covers the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W:

| TECHNICAL VARIANTS | |
|--------------------|----------|
| IDENTIFICATION | COMMENTS |
| | |

7. IDENTIFICATION

| TECHNICAL PART | | |
|--|--|--------------------|
| Identification | Comments | Configuration code |
| LightRadio 9764 MCO Ambient | <p>STSR 1</p> <p>LightRadio 9764 MCO V1.0 B2 3G 1W</p> <p><i>Firmware version:</i> UBOOT 3.0.5 (PDM 3BK60787ACAA) Filesystem v.1.5/SidEmb 2.4.18/Sidlab 1.9.1 (PDM 3BK60831AAAB)</p> | A1 |
| LightRadio 9764 MCO Extreme temperature | <p>STSR 1</p> <p>LightRadio 9764 MCO V1.0 B2 3G 1W</p> <p><i>Firmware version:</i> UBOOT 3.0.5 (PDM 3BK60787ACAA) Filesystem v.1.5/SidEmb 2.4.18/Sidlab 1.9.1 (PDM 3BK60831AAAB)</p> | A2 |

8. SYNTHESIS OF TESTS RESULTS FOR ALL VARIANTS

| Identification | Description | Configuration code | |
|--|-------------|--------------------|----|
| | | A1 | A2 |
| LightRadio 9764 MCO V1.0 B2 3G 1W Maximum Output Power Ambient temperature: 20°C | STSR 1 | X | |
| LightRadio 9764 MCO V1.0 B2 3G 1W Occupied Bandwith Ambient temperature: 20°C | STSR 1 | X | |
| LightRadio 9764 MCO V1.0 B2 3G 1W Frequency Stability Ambient temperature: 20°C | STSR 1 | X | |
| LightRadio 9764 MCO V1.0 B2 3G 1W Spurious Emissions at antenna terminal Ambient temperature: 20°C | STSR 1 | X | |
| LightRadio 9764 MCO V1.0 B2 3G 1W Maximum Output Power Temperature from -40°C to +55°C with steps of 10°C | STSR 1 | | X |
| LightRadio 9764 MCO V1.0 B2 3G 1W Frequency Stability Temperature from -40°C to +55°C with steps of 10°C | STSR 1 | | X |

9. TECHNICAL STATUS OF THE MODULES CONSTITUTING THE TESTED EQUIPMENT

| Config # | Designation | Hardware code | Release | Manufacturer | Serial number |
|----------|--------------------------------------|---------------|---------|----------------|---------------|
| A1 A2 | LightRadio 9764 MCO V1.0 B2 3G 1W | 3BK60850AB | AA01 | Alcatel-Lucent | RT124100312 |
| | Metrodoc LBALLU- | 3BK60891AA | AA01 | Alcatel-Lucent | RT123700021 |
| | DOCAGEA01 SN LBALLL- | 3BK60892AA | AA01 | Alcatel-Lucent | RT123200147 |
| | Board MCO B2 SN LBALLU- | 3BK60801AB | AA01 | Alcatel-Lucent | RT124100300 |
| | Power supply | 3BK60812AB* | AA01 | Alcatel-Lucent | RT124000420 |
| | SFP | ABCU-5731ARZ | | Avago | AGC121450020 |
| | | | | | |
| | | | | | |

* : Rework as ACAA version

10. TESTS DATES AND OPERATORS

Configuration A1 and A2:

Date of receipt of test sample: 22/11/2012

Start of test: 29/11/2012

Finish of test: 10/12/2012

Location of tests: Vélizy

Test engineers: Buet Philippe ; Renaudin Pierre ; Robert Yves;

11. TEST APPARATUS USED FOR TESTS

| Id | Instrument / Ancillary | Type | Manufacturer | Alcatel Serial N° | Calibration date | |
|-------|---|------------------|-----------------|-----------------------------------|------------------|----------|
| | | | | | Serv. | Due |
| PM1 | Power Meter | 437B | Agilent | 1521189 | 22.06.10 | 22.06.13 |
| PS1 | Low Power Sensor -70 to -20dBm | 8481D | Agilent | 109664 | 22.06.11 | 22.06.13 |
| PS2 | Power Sensor -20 to +20dBm | 8481A | Agilent | 103108 | 25.08.11 | 25.08.13 |
| PS3 | High Power Sensor (30uW to 3W) | 8482H | Agilent | 62569 | 27.07.12 | 27.07.14 |
| MXA | MSA Series Spectrum Analyzer | N9020A | Agilent | Microlease 39075 US46470485 | 18.04.12 | 18.04.14 |
| EXG | EXG Vector Signal Generator | N5172B | Agilent | 1511800 | 11.11.12 | 11.11.14 |
| NA1.1 | Network Analyzer (Frequency Range: 9kHz-3GHz) | ZVB8 | Rohde&Schwarz | 20-349890 | 29.08.11 | 29.08.13 |
| NA1.2 | Calibration kit | ZV-Z51 | Rohde&Schwarz | 1523945 | 01.08.11 | 01.08.13 |
| CMU | Universal radio communication | CMU300 | Rohde&Schwarz | 1522499 | 14.04.11 | 14.04.13 |
| F1 | Notch Filter | 5NF-1800/2200-S | Lorch Microwave | 1522040 | | |
| F2 | Notch Filter | 5NF-1800/2200-S | Lorch Microwave | 1522039 | | |
| F3 | Low pass filter | WLKS1500-10SS | WI | 116625 | | |
| F4 | High Pass filter | 4HC2800/13G-3-KK | Trilithic inc | 23042 | | |
| A1 | Attenuator 10dB 10W | R415310 | Radiall | 0130 | | |
| A2 | Attenuator 20dB 5W | R414720 | Radiall | | | |
| S1 | Universal measurer | Fluke 867 | Fluke | 93476 | 31.01.12 | 31.01.15 |
| S2 | Temperature sensor | 80T-250U | Fluke | 313178 | 05.10.12 | 05.10.15 |
| E | Climatic chamber | 2604 | Eurotherm | 930005989 | | |

Note1: Calibration of the measurement instrumentation is maintained in accordance with the supplier's recommendations or as necessary to ensure its accuracy.

12. TEST RESULTS

12.1. INTRODUCTION

This document presents the RF tests performed for the introduction of LightRadio 9764 MCO V1.0 B2 3G 1W.

The configuration A1 is feeded with -48 V DC as standard configuration.

The configuration A1 is feeded with -48 V DC as standard configuration.

The following information is submitted to introduce a Certification of the LightRadio 9764 MCO V1.0 B2 3G 1W for Alcatel-Lucent:

- According to 47CFR Part 24
- According to 47CFR Part 2, Subpart J
- According to RSS133[A4]

of the FCC Rules and Regulations. The measurement procedures were in accordance with the requirements of Part 2.947.

12.2. MEASUREMENT RESULTS AT AMBIANT

Table 1 is a summary of the measurement results performed in this report.

| Description & Configuration code | | Measurement Specification | Limit Specification | Test | Result |
|----------------------------------|--------------------------------------|---------------------------|---------------------|---|-------------|
| A1 | LightRadio 9764 MCO V1.0 B2 3G 1W | FCC 2.1046 RSS133 | 24.232 6.4 | Maximum Output Power | PASS |
| | | FCC 2.1049 | FCC 24.238 | Occupied Bandwidth | PASS |
| | | FCC 2.1055 RSS133 | 24.235 6.3 | Frequency Stability | PASS |
| | | FCC 2.1051 RSS133 | FCC 24.238 6.5 | Spurious Emissions at antenna terminal | PASS |

Table 1: Measurement results performed for the qualification of the LightRadio 9764 MCO V1.0 B2 3G 1W

Test conditions in all the performed tests (temperature and nominal voltage) remain the same as the maximum output power test. For more details, please refer to the table 2.

12.2.1 MAXIMUM OUTPUT POWER

FCC REQUIREMENTS

Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 100 Watts.

TEST RESULTS

The table 2 summarizes the maximum output power test performed according to the BTS configuration code as described in the section above.

| CONFIGURATION CODE | TEST CONDITIONS | | Measured Base Station Maximum Output Power (dBm) | | | Nominal Output Power (dBm) |
|--------------------|-------------------------|---------------------------|--|-----------------------|-------------------------|----------------------------|
| | | | Channel B 1932.4 MHz | Channel M 1960 MHz | Channel T 1987.6 MHz | |
| | | | Sector 1 | Sector 1 | Sector 1 | |
| Config A1 | T _{nom} (20°C) | V _{nom} (-48V) | 29.3 | 29.5 | 29.8 | 30 ±1.2dB |
| Config A1 | T _{nom} (20°C) | V _{nom} (-40.5V) | 29.3 | 29.5 | 29.8 | 30 ±1.2dB |
| Config A1 | T _{nom} (20°C) | V _{nom} (-57V V) | 29.3 | 29.5 | 29.8 | 30 ±1.2dB |

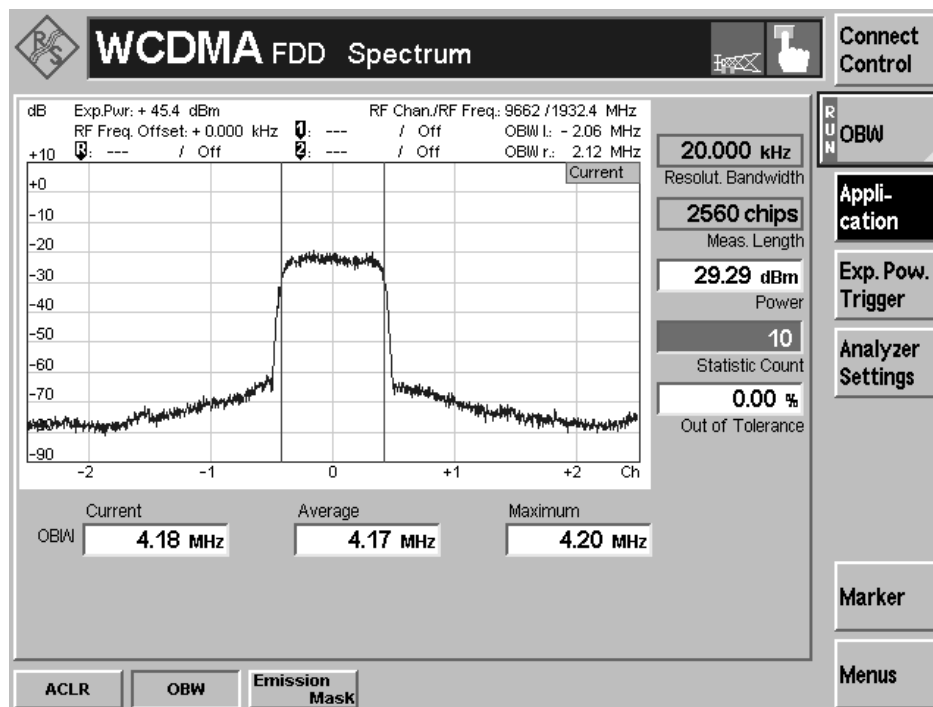
Table 2: Measurements result for Maximum Output Power

Power supply variations don't change output power.

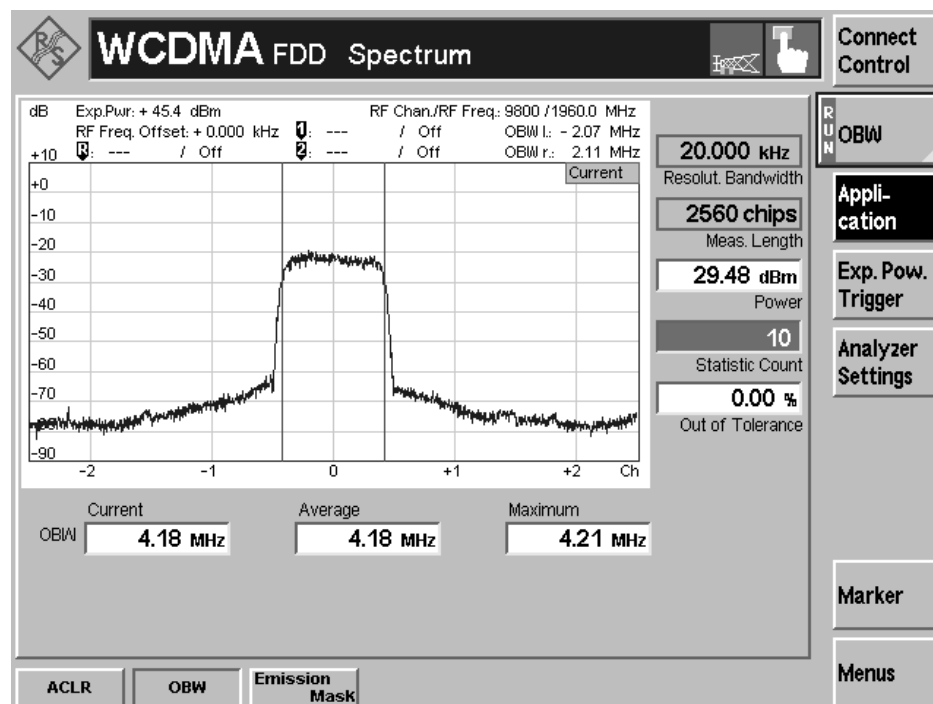
The installation team should verify the conformity to 47 CFR – Chapter I – Part 2 - §24.232 and RSS133 §6.4 considering the base station output power, the feeder losses and antenna gain.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

- CMU screenshots hereunder:

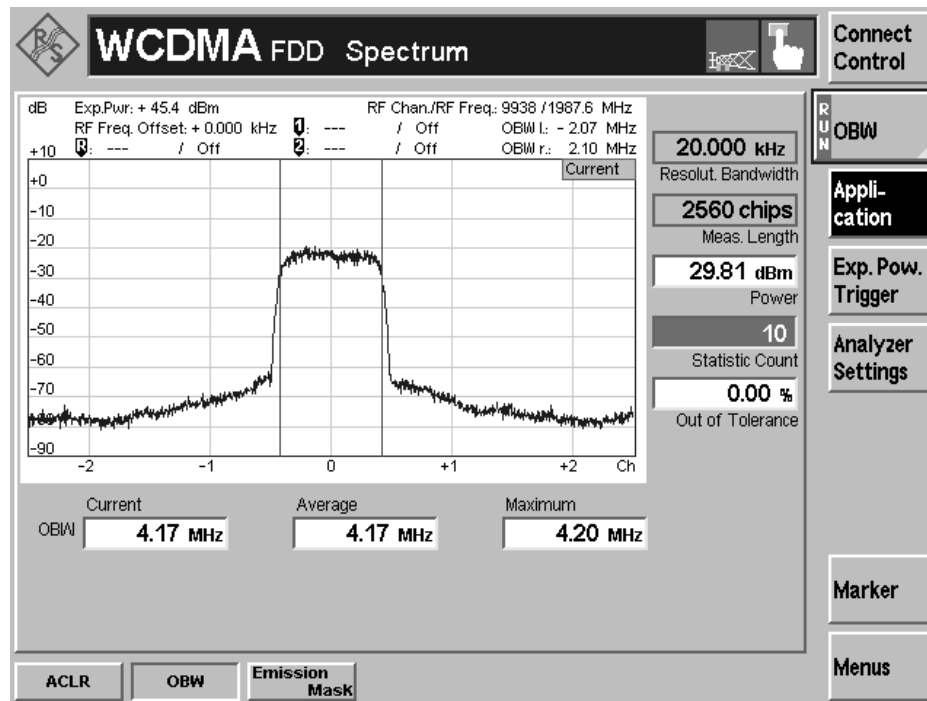


Config A1_MOP_B



Config A1_MOP_M

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



Config A1_MOP_T

TEST PROCEDURE

The equipment was configured as shown in Figure 1 and 2. A CMU300 has been used to perform the maximum output power test.

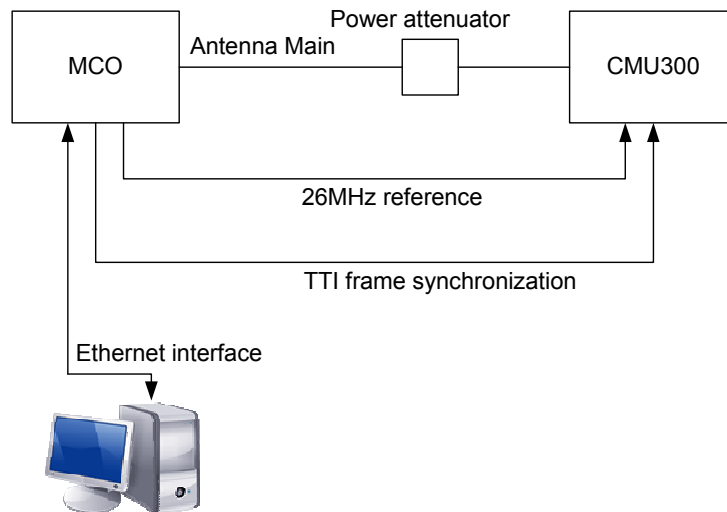


Figure 1: Test configuration to measure RF output Power

The BTS was configured to transmit at maximum power with 32 dedicated channels on the single carrier.

12.2.2 OCCUPIED BANDWIDTH

FCC REQUIREMENTS

Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 100 Watts

TEST RESULTS

The table 2 summarizes the maximum output power test performed according to the BTS configuration code as described in the section above.

| CONFIGURATION CODE | TEST CONDITIONS | | Occupied bandwidth (Mhz) | | | Nominal Occupied bandwidth (MHz) |
|--------------------|-------------------------|---------------------------|--------------------------|-----------------------|-------------------------|----------------------------------|
| | | | Channel B 1932.4 MHz | Channel M 1960 MHz | Channel T 1987.6 MHz | |
| | | | Sector 1 | Sector 1 | Sector 1 | |
| Config A1 | T _{nom} (20°C) | V _{nom} (-48V) | 4.17 | 4.18 | 4.17 | < 5MHz |
| Config A1 | T _{nom} (20°C) | V _{nom} (-40.5V) | 4.17 | 4.18 | 4.17 | < 5MHz |
| Config A1 | T _{nom} (20°C) | V _{nom} (-57V) | 4.17 | 4.18 | 4.17 | < 5MHz |

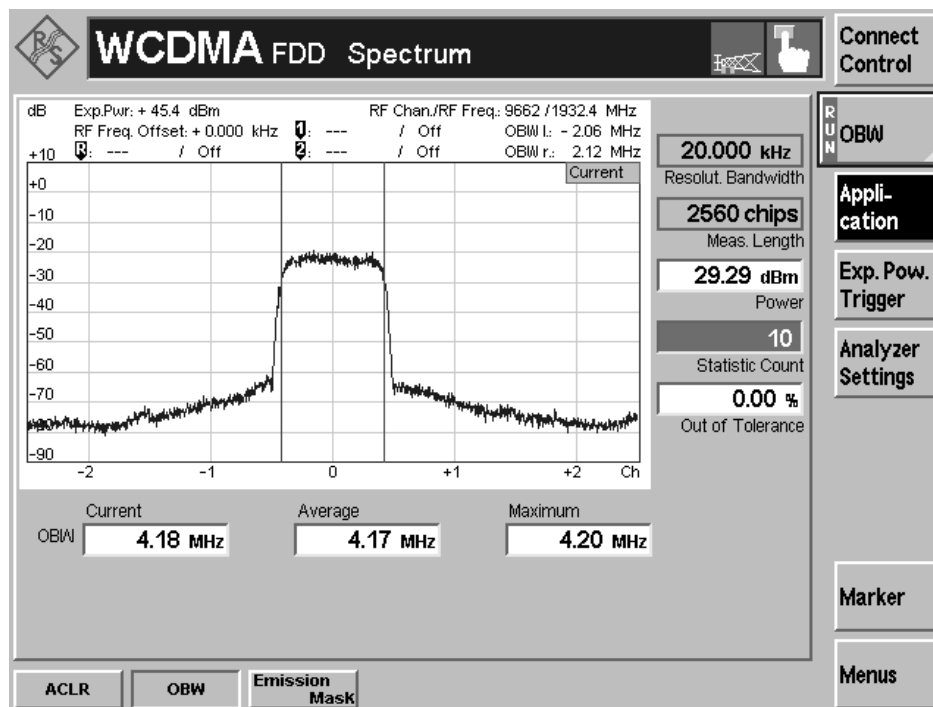
Table 3: Measurements result for Maximum Output Power

Power supply variations don't change occupied bandwidth.

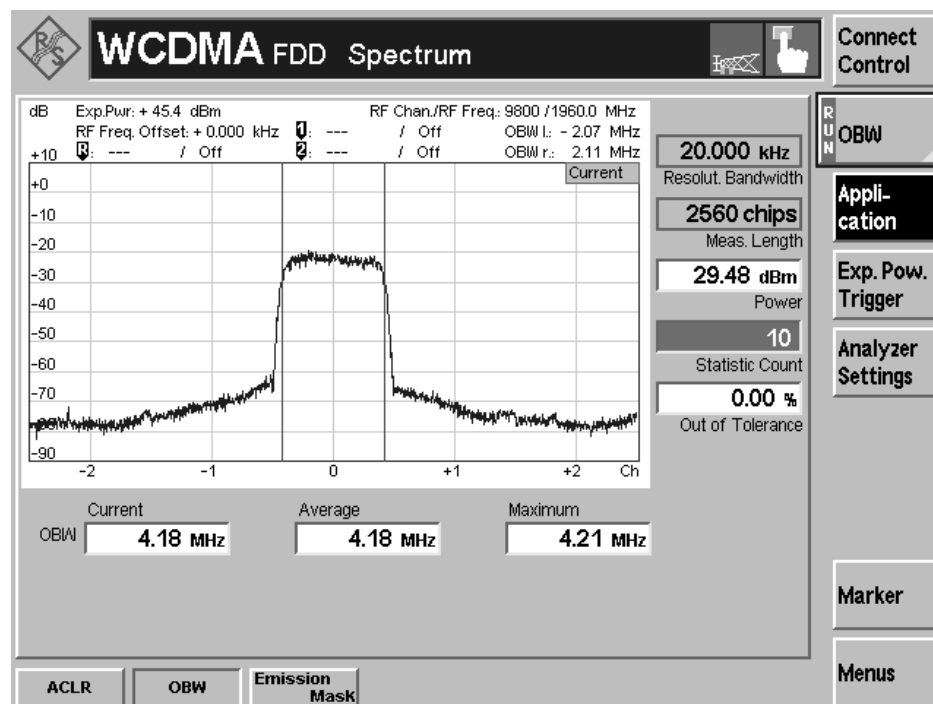
The installation team should verify the conformity to 47 CFR – Chapter I – Part 2 - §24.238 considering the base station output power, the feeder losses and antenna gain.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

- CMU screenshots hereunder:

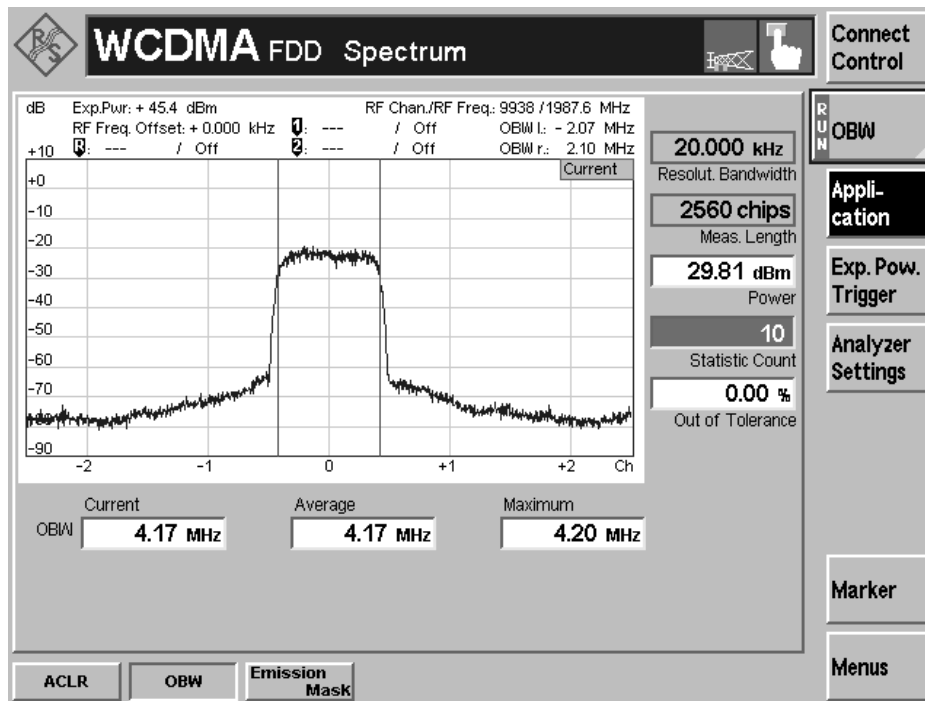


Config A1_MOP_B



Config A1_MOP_M

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



TEST PROCEDURE

The equipment was configured as shown in Figure 1 and 2. A CMU300 has been used to perform the maximum output power test.

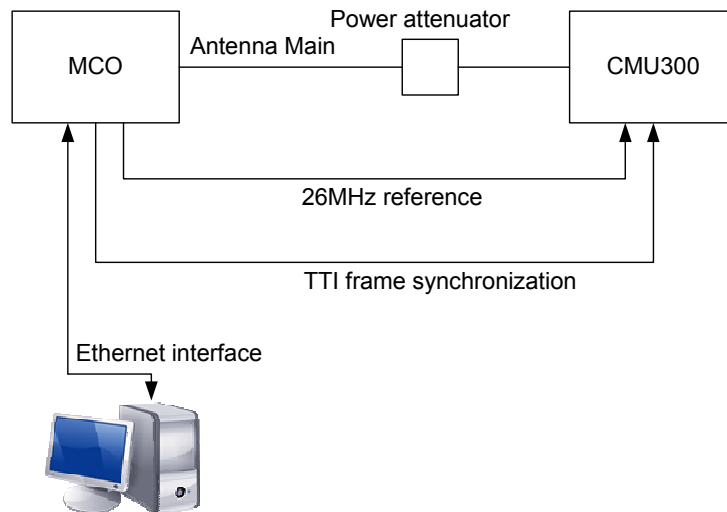


Figure 2: Test configuration to measure RF output Power

The BTS was configured to transmit at maximum power with 32 dedicated channels on the single carrier.

12.2.3 FREQUENCY ERROR

FCC REQUIREMENTS

For the operating frequency band, the carrier frequency of each transmitter in the Public Mobile Services must be maintained lower than 1 ppm.

TEST RESULTS

The table 3 summarizes the Frequency Error test performed:

| CONFIGURATION CODE | TEST CONDITIONS | | Frequency error (Hz) | | | Nominal Frequency error (ppm) |
|--------------------|-------------------------------|--------------------------|---|--------------------------------------|--|-------------------------------|
| | | | Channel B 1932.4 MHz Peak/Average | Channel M 1960MHz Peak/Average | Channel T 1987.6MHz Peak/Average | |
| | | | Sector 1 | Sector 1 | Sector 1 | |
| Config A1 | $T_{nom}(20^{\circ}\text{C})$ | $V_{nom}(-48\text{V})$ | 20/2 | 12/2 | 20/-1 | ± 1 |
| Config A1 | $T_{nom}(20^{\circ}\text{C})$ | $V_{nom}(-40.5\text{V})$ | 12/2 | 6/0 | 20/0 | ± 1 |
| Config A1 | $T_{nom}(20^{\circ}\text{C})$ | $V_{nom}(-57\text{V})$ | 15/1 | 12/2 | 18/-1 | ± 1 |

Table 4: Measurements result for Frequency Error

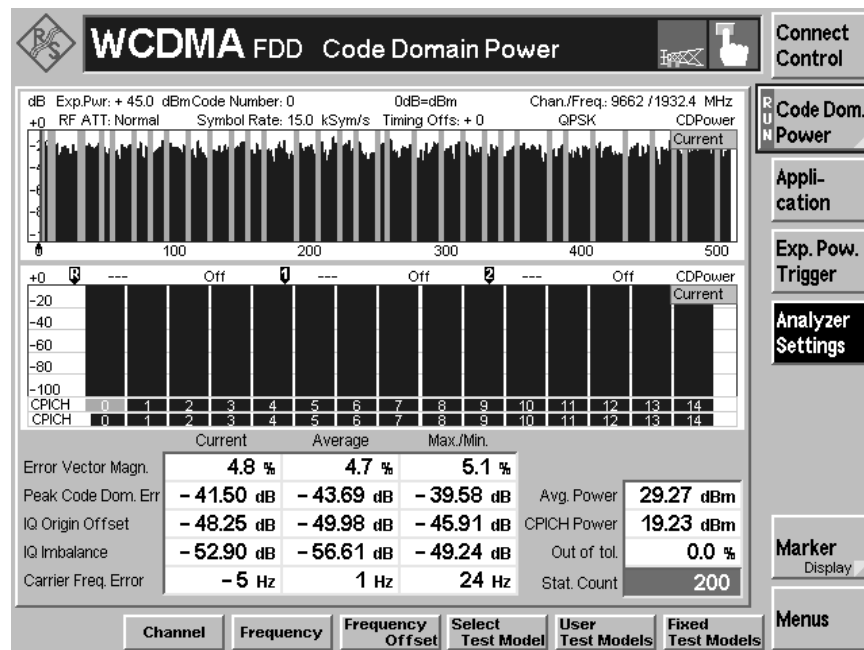
Note1: Frequency Error measured with CMU300 synchronized on 26MHz ref from MCO.

Note2: Frequency error result is the worst value of 200 measurements

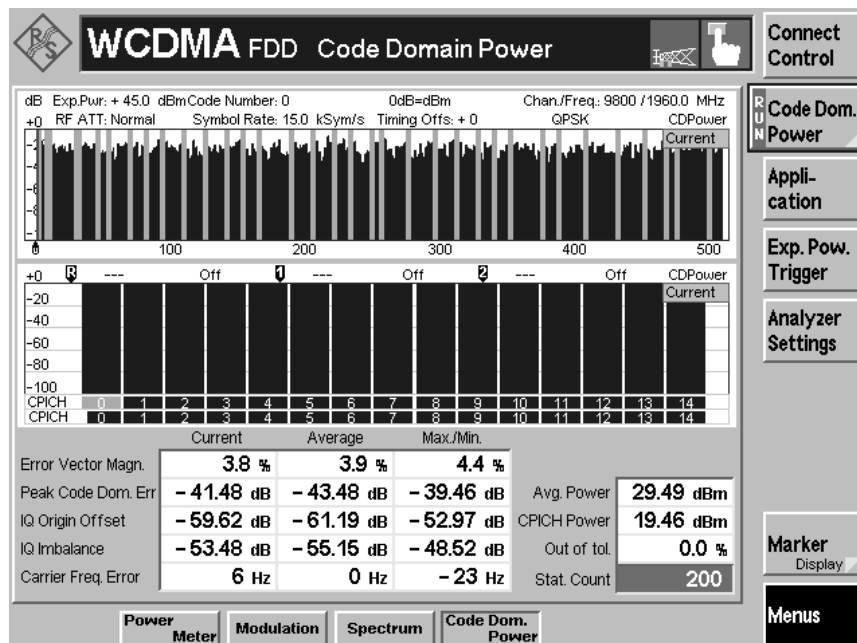
Power supply variations don't change frequency error.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

- CMU screenshots hereunder:

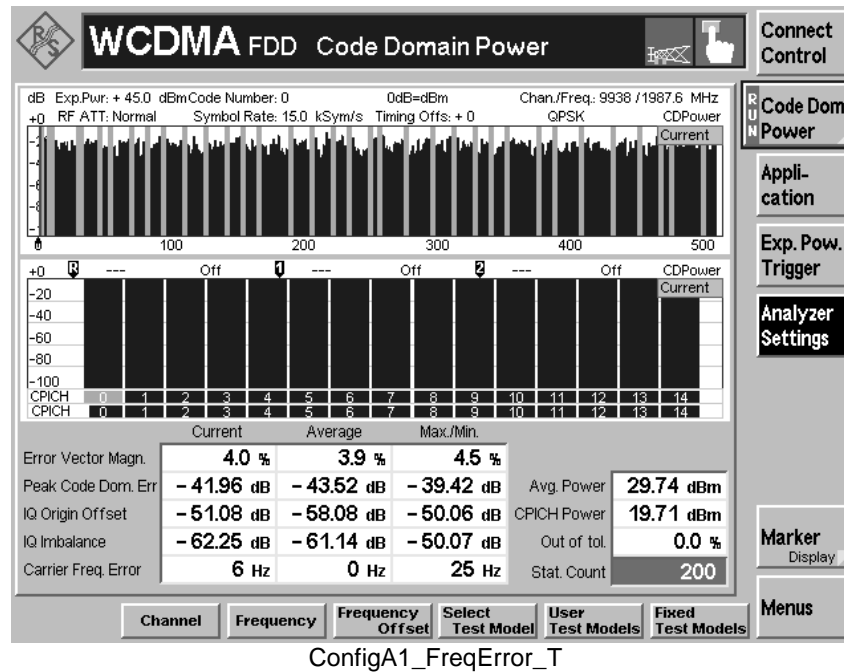


Config A1_FreqError_B



Config A1_FreqError_M

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



TEST PROCEDURE

The equipment was configured as shown in Figure 2. A CMU300 has been used to perform the maximum output power test.

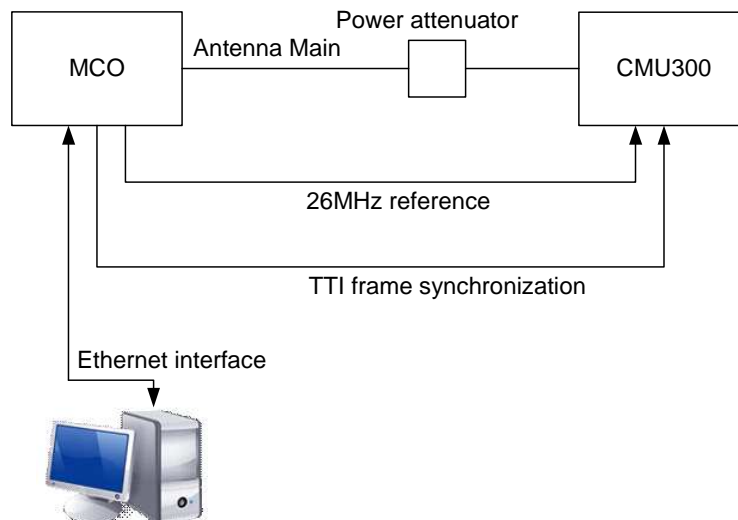


Figure 3: Test configuration to measure Frequency Error

Note: CMU300 synchronized on a 26MHz ref.

12.2.4 SPURIOUS EMISSIONS AT ANTENNA TERMINAL.

FCC REQUIREMENTS

For the operating frequency band, the spurious of each transmitter in the Public Mobile Services for medium range must be maintained lower than $43+10\log(P_w)$ in this case the measured output power should be 30dBm therefore the limit is -13dBm.

TEST RESULTS

The table 3 summarizes the spurious test performed:

| CONFIGURATION CODE | TEST CONDITIONS | | Measured Base Station Maximum Spurious emissions (dBm) | | | Nominal Output Spurious emission (dBm) $43-10\log(P)$ |
|--------------------|--------------------------------------|--|--|----------------------|------------------------|--|
| | | | Channel B 1932.4MHz | Channel M 1960MHz | Channel T 1987.6MHz | |
| | | | Sector 1 | Sector 1 | Sector 1 | |
| Config A1 | $T_{nom}(20^{\circ}\text{C})$ | $V_{nom}(-48\text{V})$ $V_{nom}(-40.5\text{V})$ $V_{nom}(-57\text{V})$ | | | | |
| | From 9kHz to 150kHz | | -101 | -100 | -100 | -13dBm |
| | From 150kHz to 30MHz | | -95 | -93 | -92 | -13dBm |
| | From 30GHz to 1GHz | | -110 | -110 | -110 | -13dBm |
| | From 1GHz to 1.5GHz | | -100 | -100 | -100 | -13dBm |
| | From 1.5GHz to channel minus 12.5MHz | | -62 | -65 | -69 | -13dBm |
| | From channel plus 12.5MHz to 2.8 GHz | | -62 | -65 | -47 | -13dBm |
| | From 2.8GHz to 12.75GHz | | -64 | -71 | -57 | -13dBm |
| | From 12.75GHz to 20GHz | | -100 | -100 | -100 | -13dBm |

Table 5: Measurements result for Spurious emissions

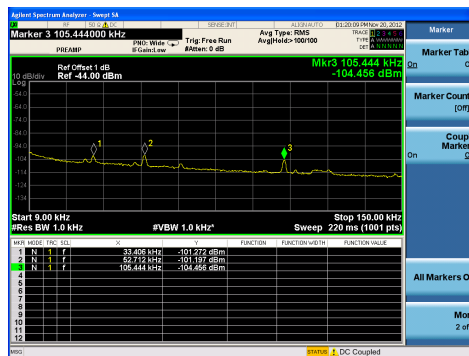
Note1: Spurious emission measured with MXA synchronized on 26MHz ref from MCO.

Power supply variations don't change spurious emissions.

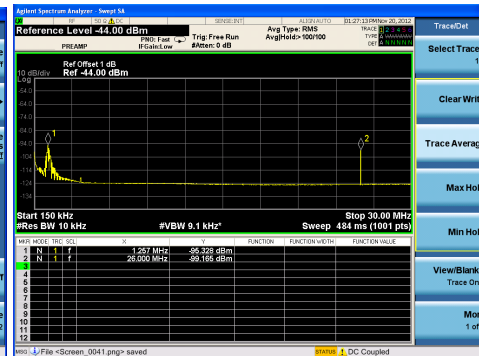
Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

CMU screenshots hereunder:

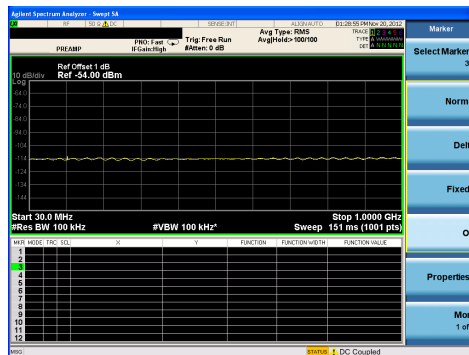
TX at 1932.4MHz 30dBm



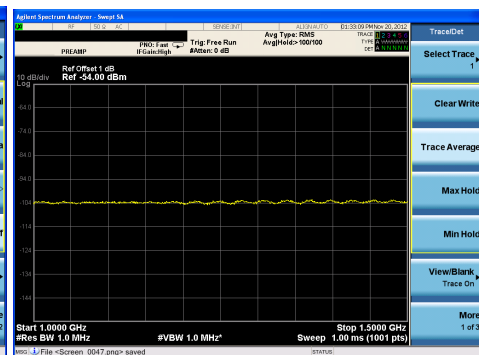
Config A1_B_9kHz to 150kHz



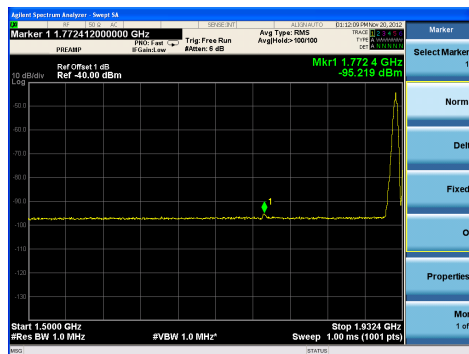
Config A1_B_150kHz to 30MHz



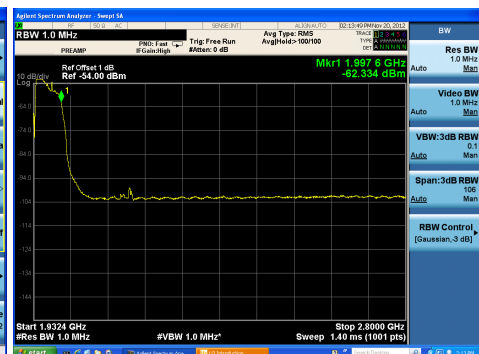
Config A1_B_30MHz to 1GHz



Config A1_B_1GHz to 1.5GHz



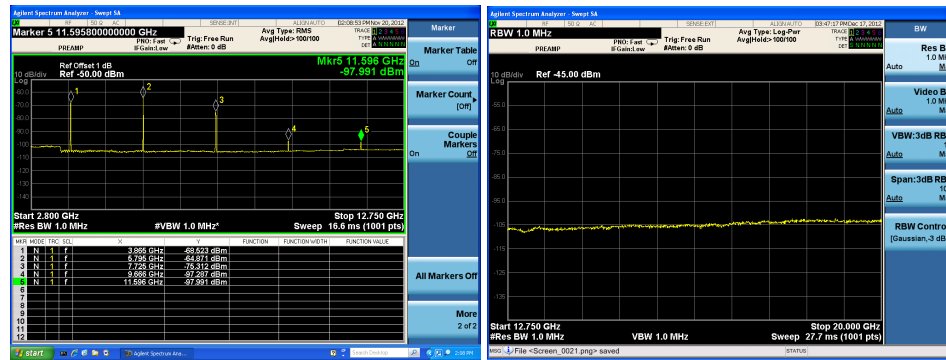
Config A1_B_1.5GHz to 1932.4MHz



Config A1_B_1932.4MHz to 2.8GHz

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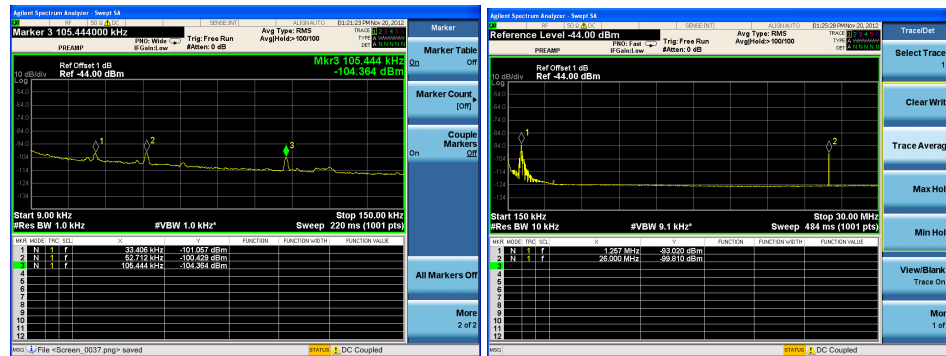
Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



Config A1_B_2.8GHz to 12.75GHz

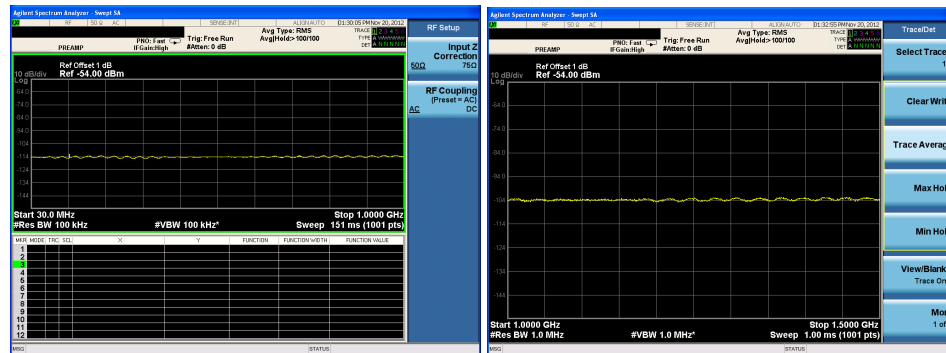
Config A1_B_12.75GHz to 20GHz

TX at 1960MHz 30dBm



Config A1_M_9kHz to 150kHz

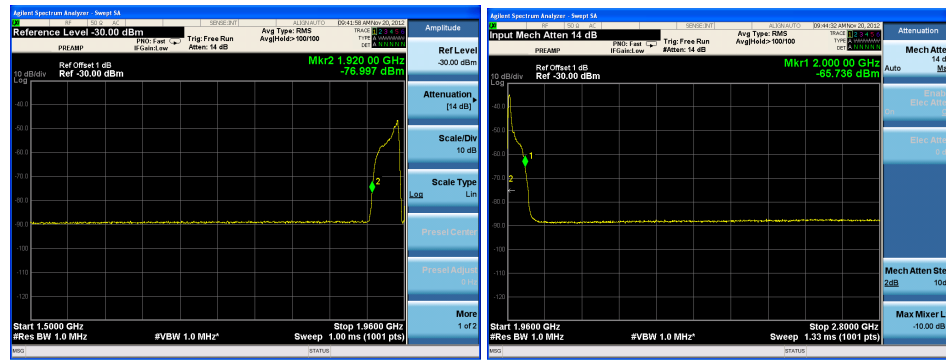
Config A1_M_150kHz to 30MHz



Config A1_M_30MHz to 1GHz

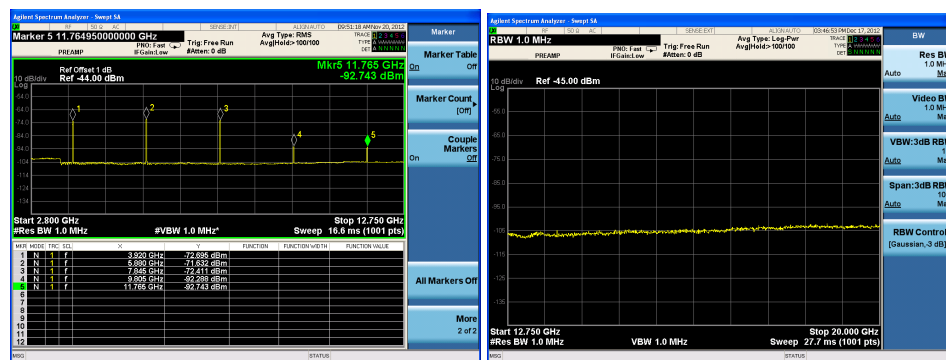
Config A1_M_1GHz to 1.5GHz

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



Config A1_M_1.5GHz to 1960MHz

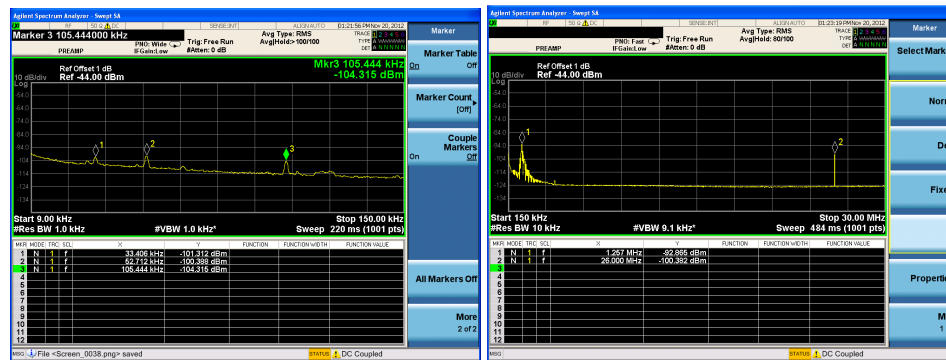
Config A1_M_1960MHz to 2.8GHz



Config A1_M_2.8GHz to 12.75GHz

Config A1_B_12.75GHz to 20GHz

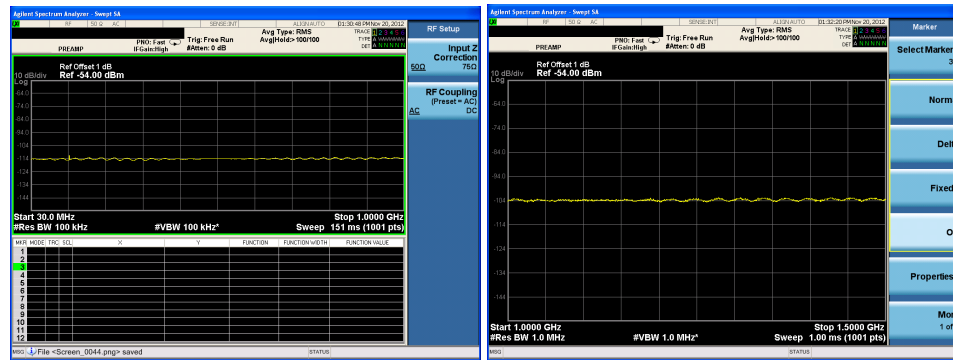
TX at 1987.6MHz 30dBm



Config A1_T_9kHz to 150kHz

Config A1_T_150kHz to 30MHz

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



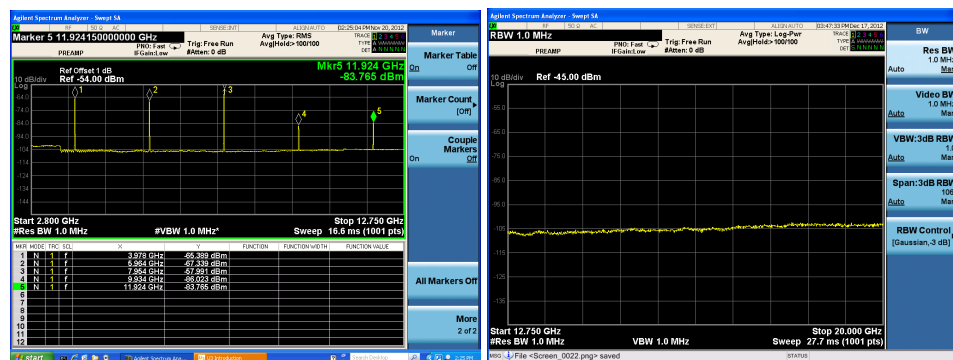
Config A1_T_30MHz to 1GHz

Config A1_T_1GHz to 1.5GHz



Config A1_T_1.5GHz to 1987.6MHz

Config A1_T_1987.6MHz to 2.8GHz



Config A1_T_2.8GHz to 12.75GHz

Config A1_B_12.75GHz to 20GHz

TEST PROCEDURE

The equipment was configured as shown in Figure 2. A CMU300 has been used to perform the maximum output power test.

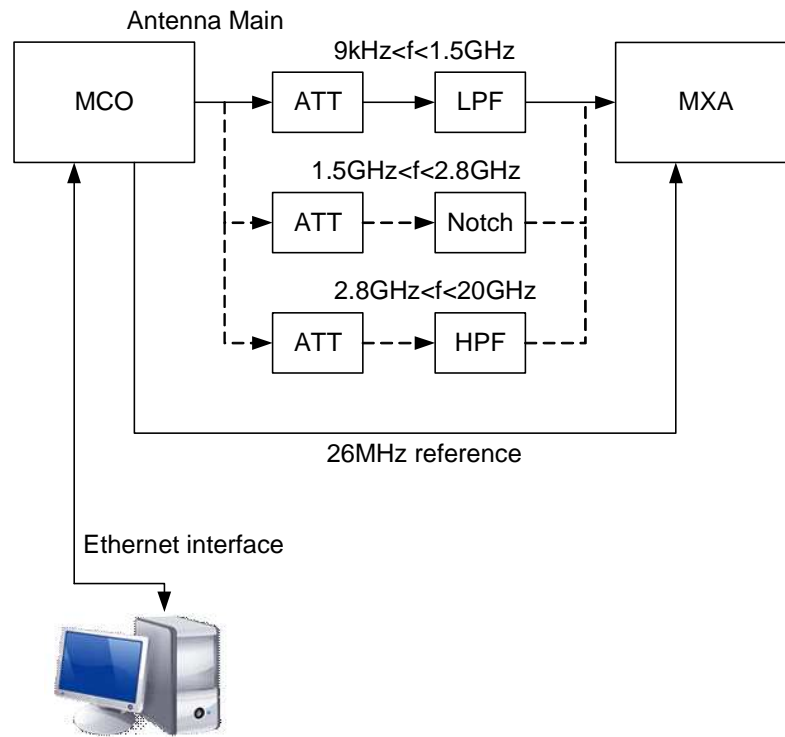


Figure 4: Test configuration to measure spurious emissions

Note: MXA synchronized on a 26MHz ref.

12.3. MEASUREMENT RESULTS AT EXTREME TEMPERATURE

Table 4 is a summary of the measurement results performed at extreme temperature:

| Description & Configuration code | | Measurement Specification | Limit Specification | Test | Result |
|----------------------------------|--|---------------------------|---------------------|----------------------|-------------|
| Config A2 | LightRadio 9764 MCO inside climatic chamber | FCC 2.1046 RSS133 | 24.232 6.4 | Maximum Output Power | PASS |
| | synchronization on 26MHz Temperature from -40°C to +55°C with steps of 10°C | FCC 2.1055 RSS133 | 24.235 6.3 | Frequency Stability | PASS |

Table 4: Measurement results performed at extreme temperature for the qualification of the LightRadio 9764 MCO V1.0 B2 3G 1W

As required by FCC Part 22, all tests should be measured with variation of ambient temperature as from -40°C to +55°C with several steps of 10°C.
For each step of 10°C, measurement should be done during at least 1hour after temperature stabilization.

12.3.1 MAXIMUM OUTPUT POWER

FCC REQUIREMENTS

Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 100 Watts.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

TEST RESULTS

The tables 5 summarize the maximum output power test performed at different temperature steps.

| CONFIGURATION CODE | TEST CONDITIONS | | Measured Base Station Maximum Output Power (dBm) | | | Nominal Output Power (dBm) |
|--------------------|-----------------|---|--|-----------------------|-------------------------|----------------------------|
| | | | Channel B 1932.4 MHz | Channel M 1960 MHz | Channel T 1987.6 MHz | |
| | | | - | Sector 1 | - | |
| Config A2 | T -40°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.3 | | 30 dBm (1W) ±1.5dB |
| | T -30°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.65 | | |
| | T -20°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.45 | | |
| | T -10°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.8 | | |
| | T 0°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.8 | | |
| | T +10°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.55 | | |
| | T +20°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.5 | | |
| | T +30°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 30.06 | | |
| | T +40°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.8 | | |

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Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

| | | | | | | |
|--|---------|---|--|------|--|--|
| | T +50°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.6 | | |
| | T +55°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 29.7 | | |

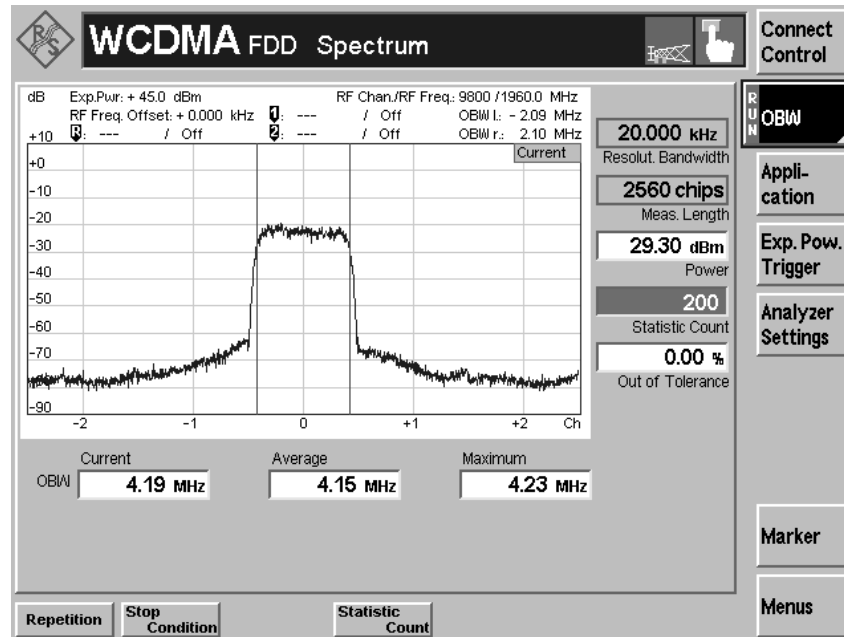
The installation team should verify the conformity to 47 CFR – Chapter I – Part 2 - §24.232 and RSS133 §6.4 considering the base station output power, the feeder losses and antenna gain.

Note1: For each step of 10°C, measurement should be done during at least 1hour after temperature stabilization.

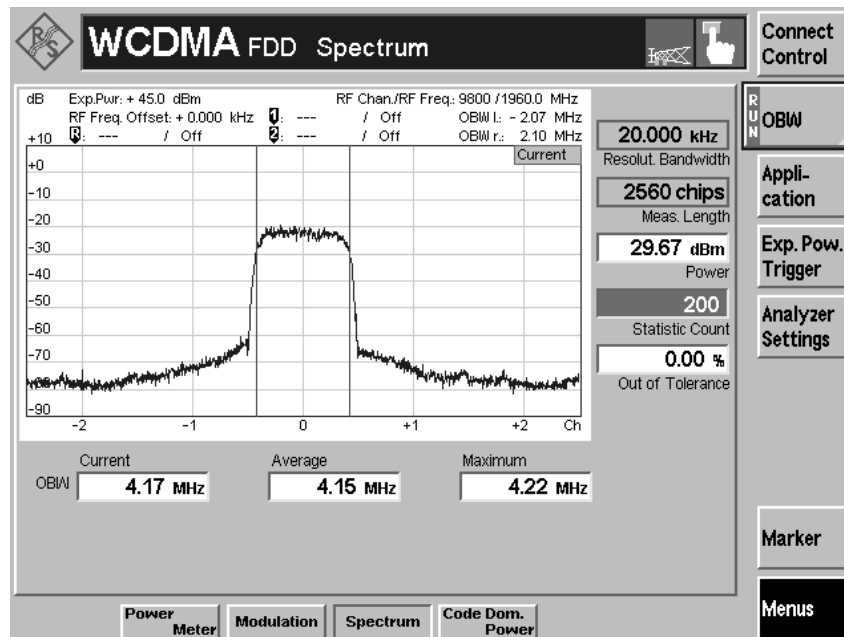
Power supply variations don't change output power.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

- Screenshots for each 10°C step hereunder:

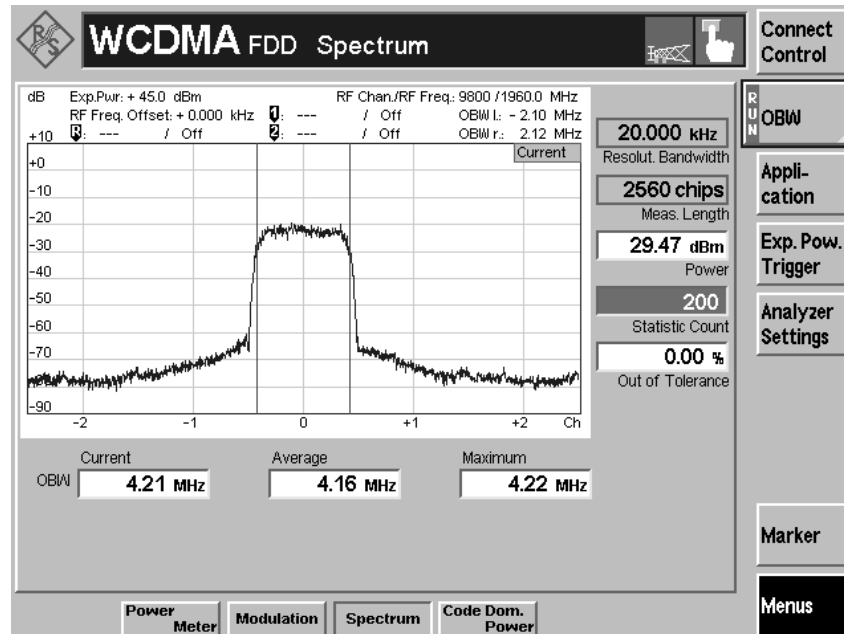


Config A2_-40°C

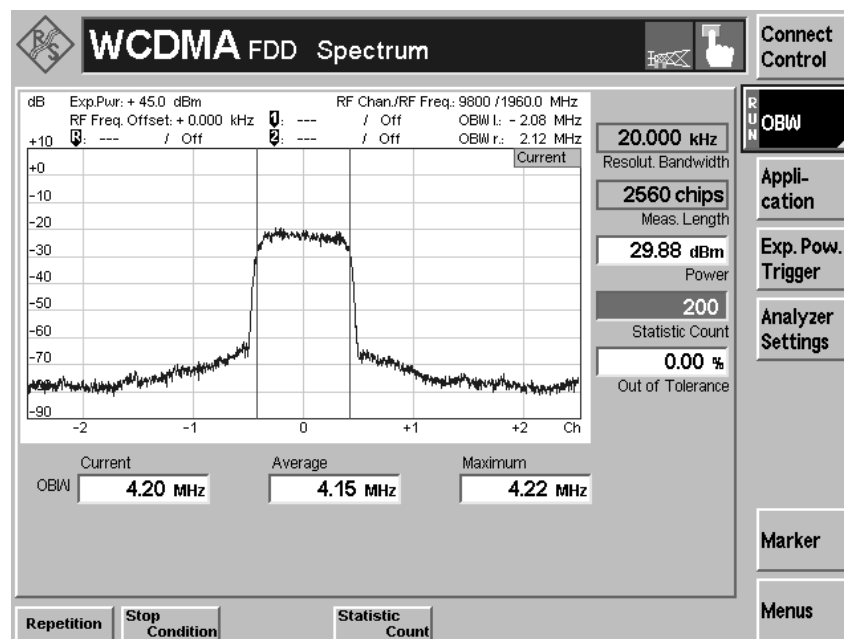


Config A2_-30°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

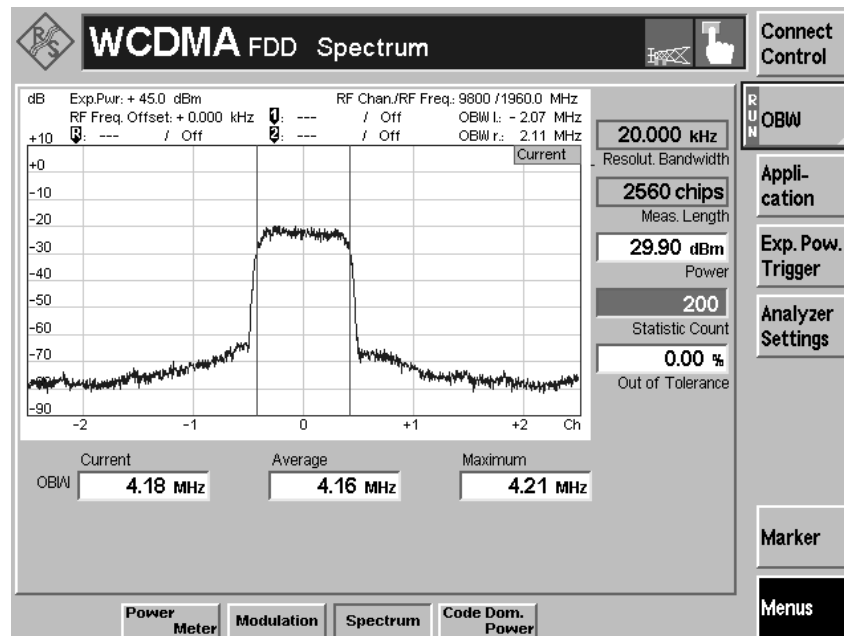


Config A2_-20°C

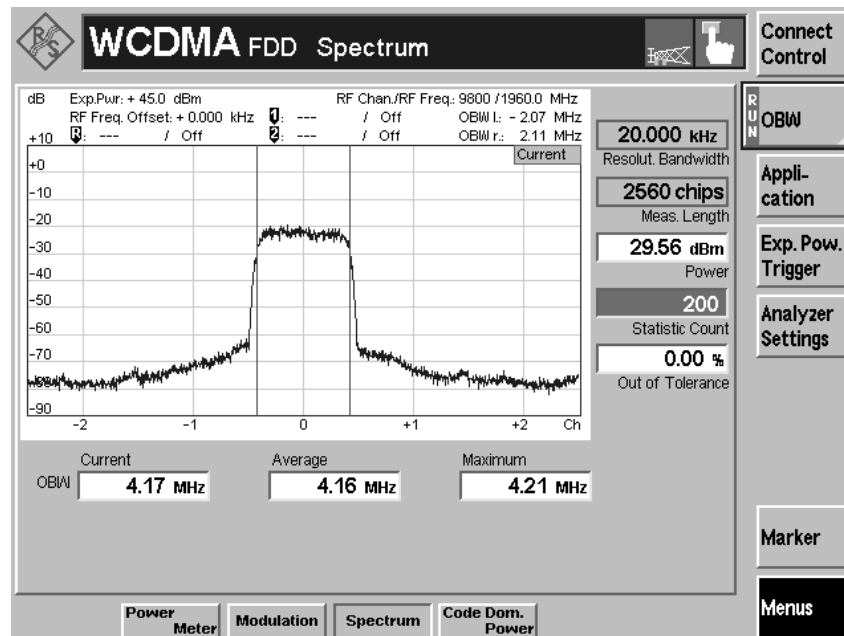


Config A2_-10°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

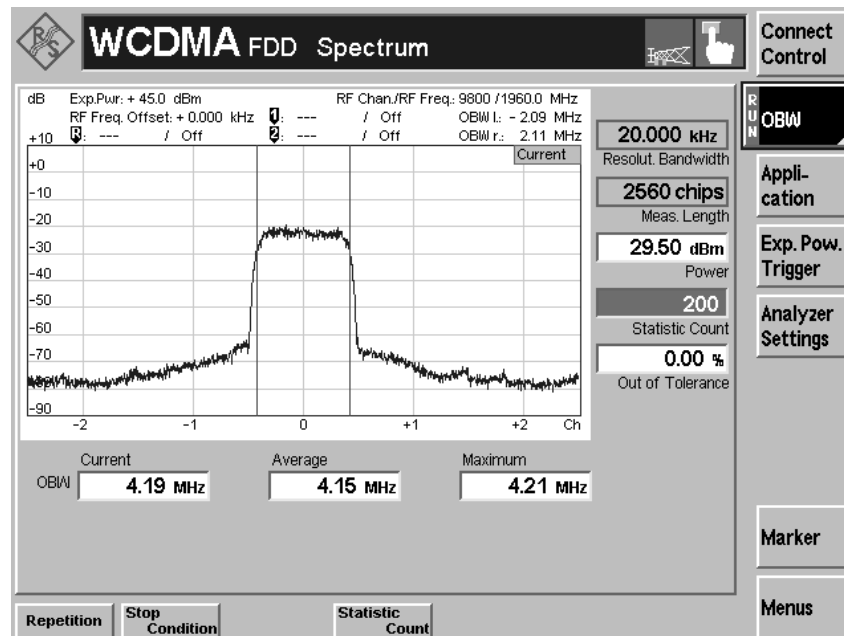


Config A2_0°C

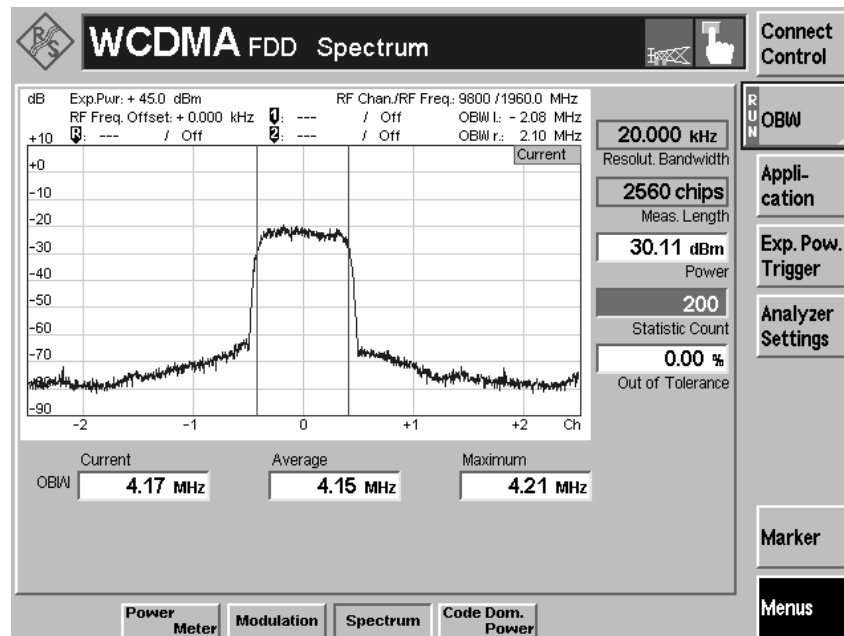


Config A2_+10°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

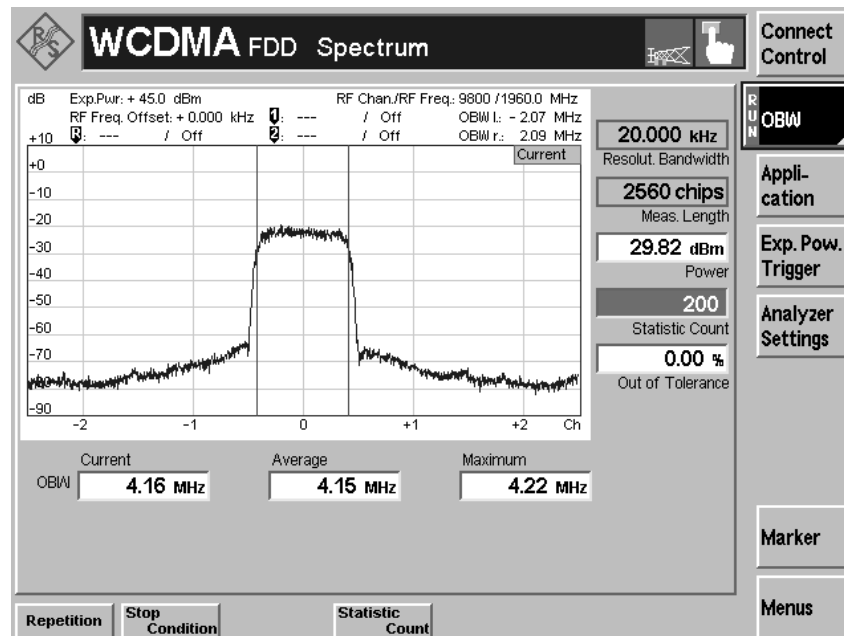


Config A2_+20°C

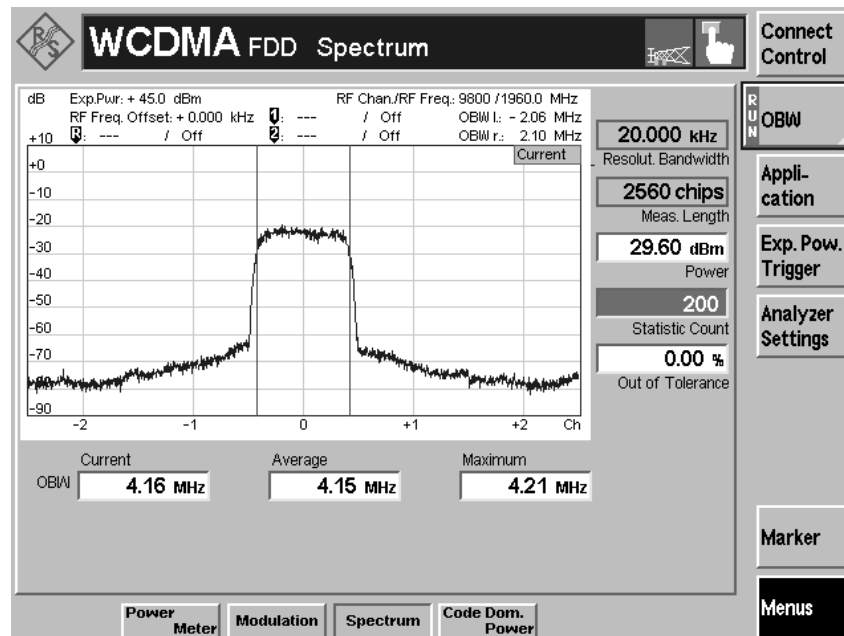


Config A2_+30°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

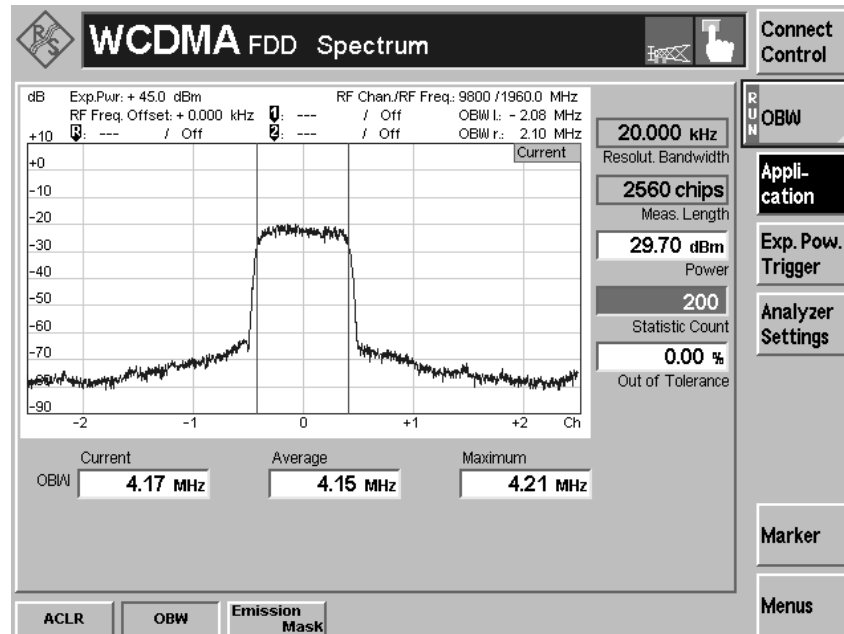


Config A2_+40°C



Config A2_+50°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



Config A2_+55°C

TEST PROCEDURE

The equipment was configured as shown in Figure 5. A CMU300 has been used to perform the maximum output power test.

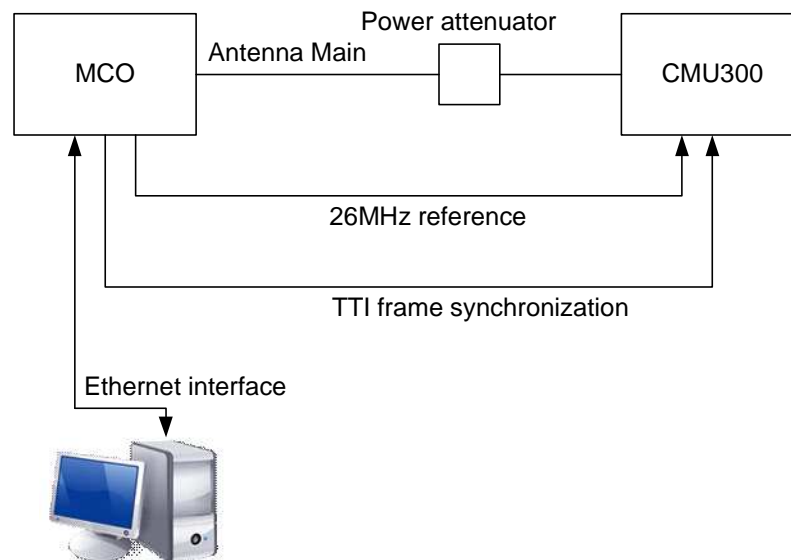


Figure 5: Test configuration to measure RF Output Power for config A1

The BTS was configured to transmit at maximum power with 32 dedicated channels on the single carrier.

12.3.2 FREQUENCY ERROR

FCC REQUIREMENTS

For the operating frequency band, the carrier frequency of each transmitter in the Public Mobile Services must be maintained lower than 1.5 ppm.

TEST RESULTS

The tables 6 summarize the Frequency Error test performed at different temperature steps:

| CONFIGURATION CODE | TEST CONDITIONS | | Frequency Error (Hz) | | | FCC Requirement |
|--------------------|-----------------|---|---|---------------------------------------|---|-----------------|
| | | | Channel B 1932.4 MHz peak/average | Channel M 1960 MHz peak/average | Channel T 1987.6 MHz peak/average | |
| | | | - | Sector 1 | - | |
| Config A2 | T -40°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -13/-1 | | ±1ppm |
| | T -30°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -18/-4 | | |
| | T -20°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 22/0 | | |
| | T -10°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -20/0 | | |
| | T 0°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 20/-1 | | |
| | T +10°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -18/0 | | |

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

| | | | | | | |
|--|---------|---|--|--------|--|--|
| | T +20°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 24/0 | | |
| | T +30°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 26/1 | | |
| | T +40°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | 22/0 | | |
| | T +50°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -26/-1 | | |
| | T +55°C | V _{nom} (-48V) V _{nom} (-40.5V) V _{nom} (-57V) | | -18/1 | | |

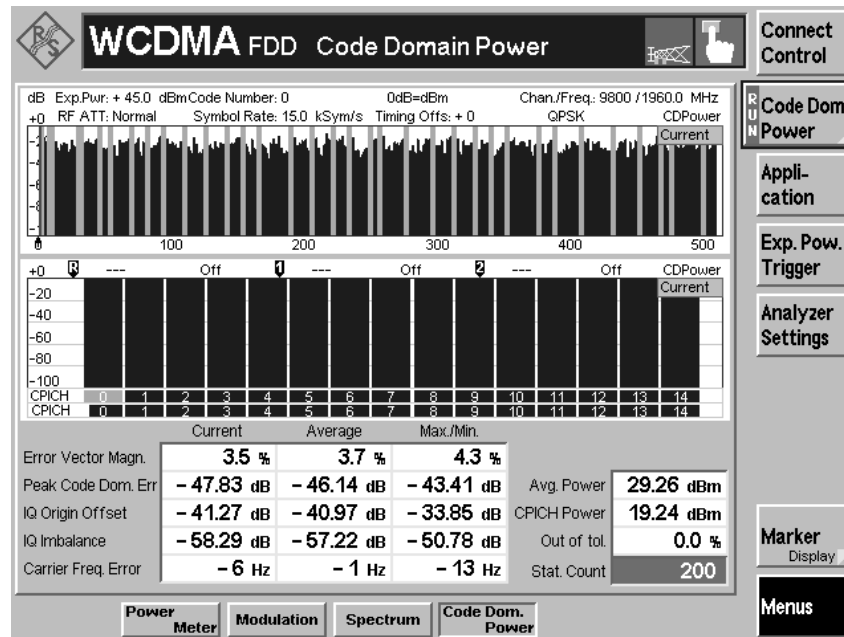
Note1: Frequency Error measured with CMU300 synchronized on 26MHz ref from board.

Note2: Frequency error result is the worst value of the test.

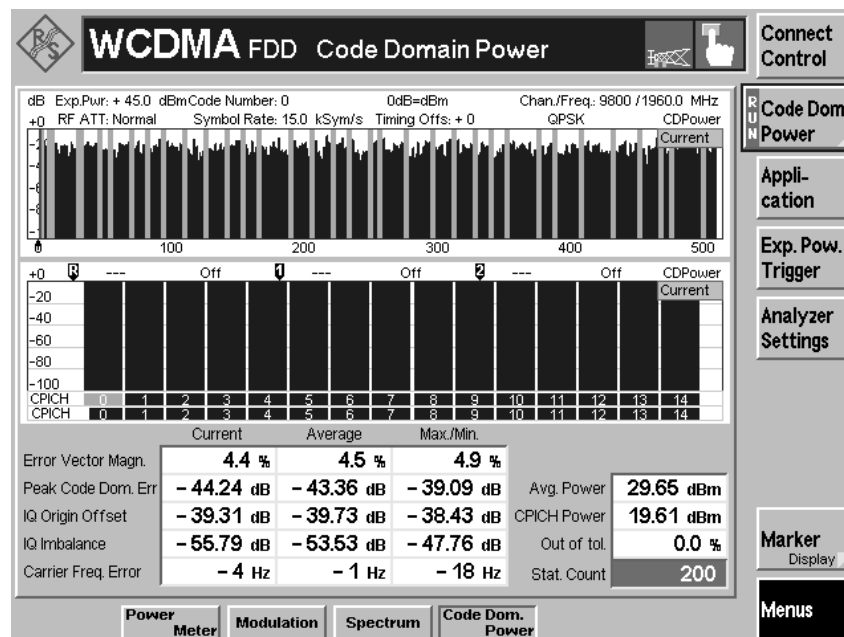
Note3: For each step of 10°C, measurement should be done during at least 1hour after temperature stabilization.

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

- Screenshots for each 10°C step hereunder:

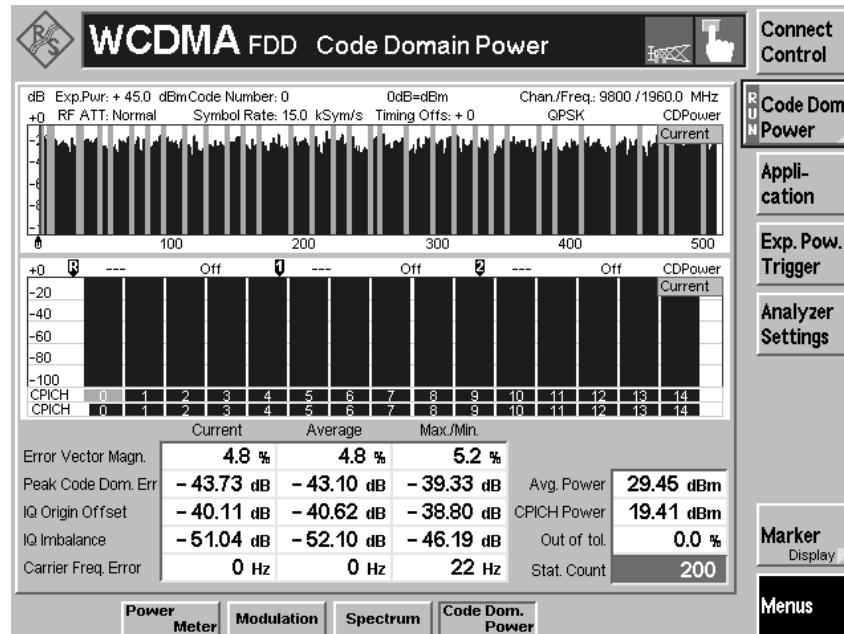


Config A2_-40°C

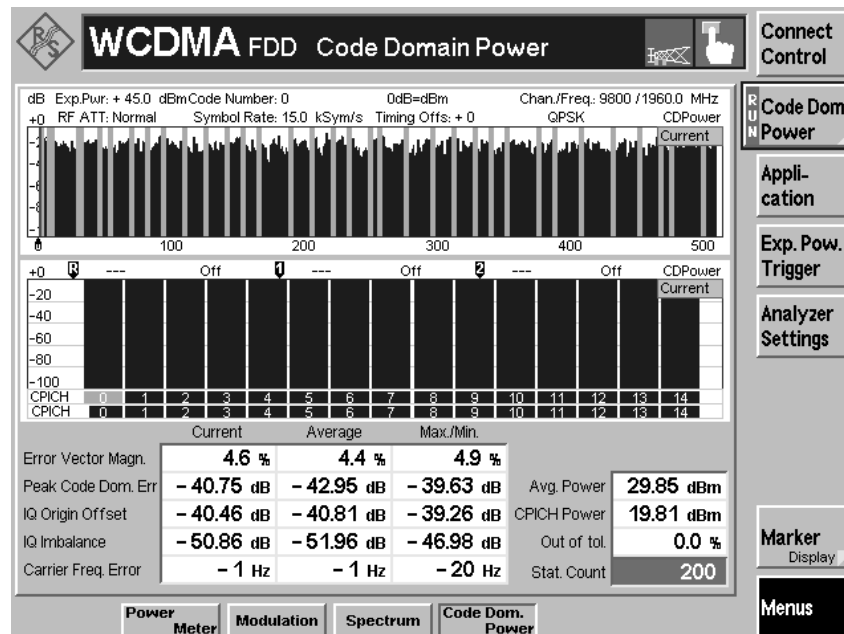


Config A2_-30°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

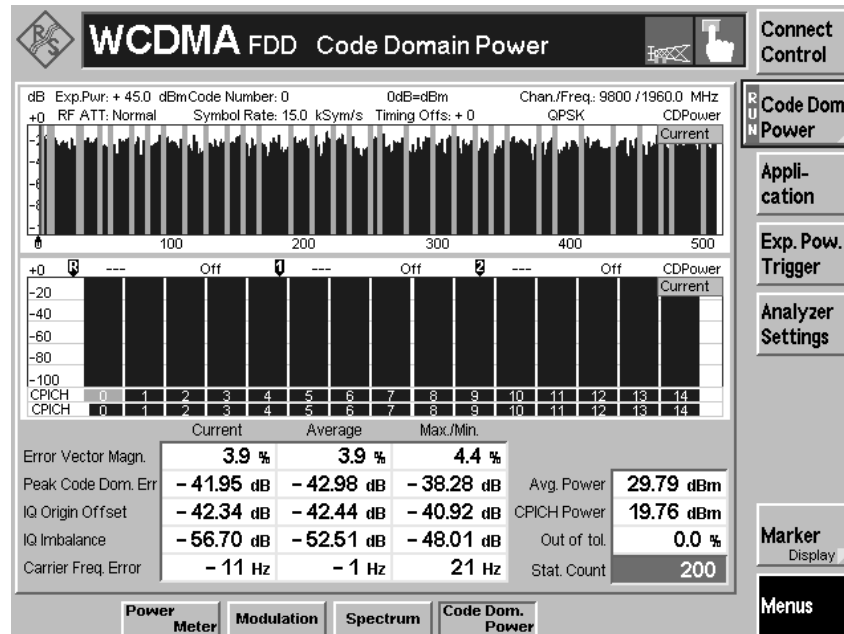


Config A2_-20°C

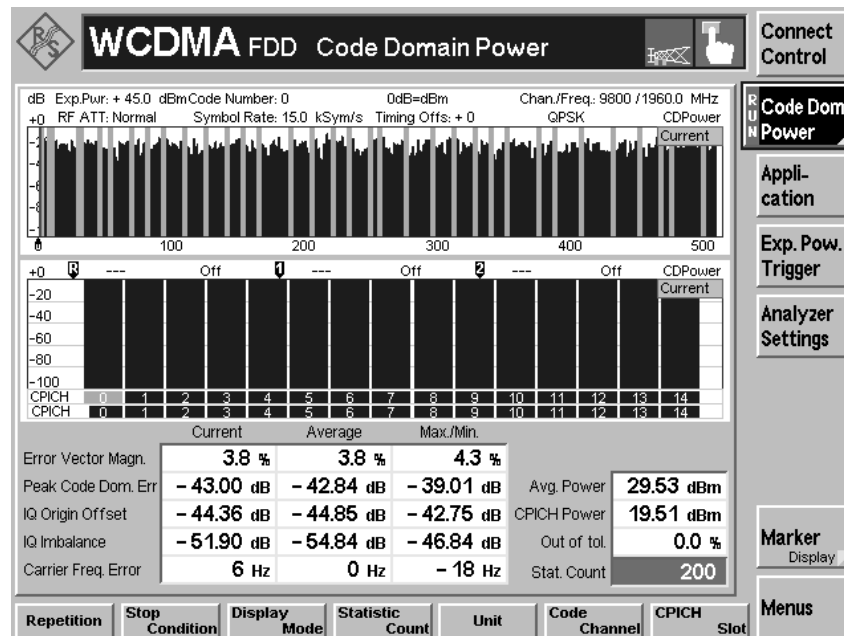


Config A2_-10°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

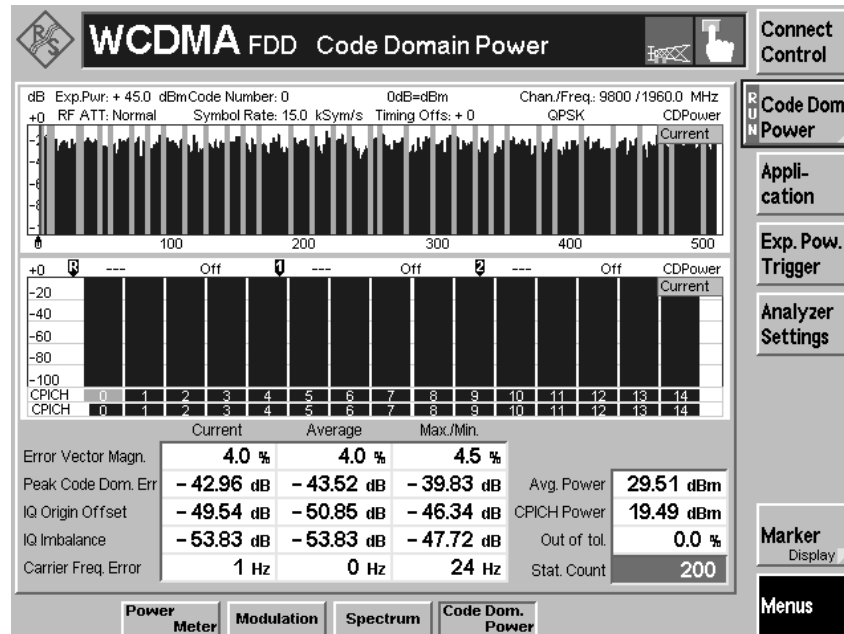


Config A2_0°C

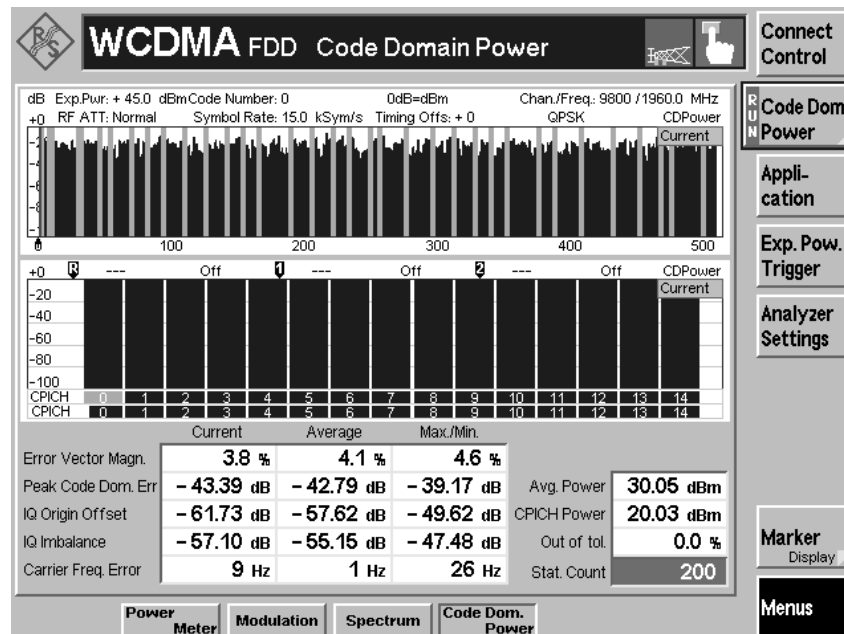


Config A2_+10°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

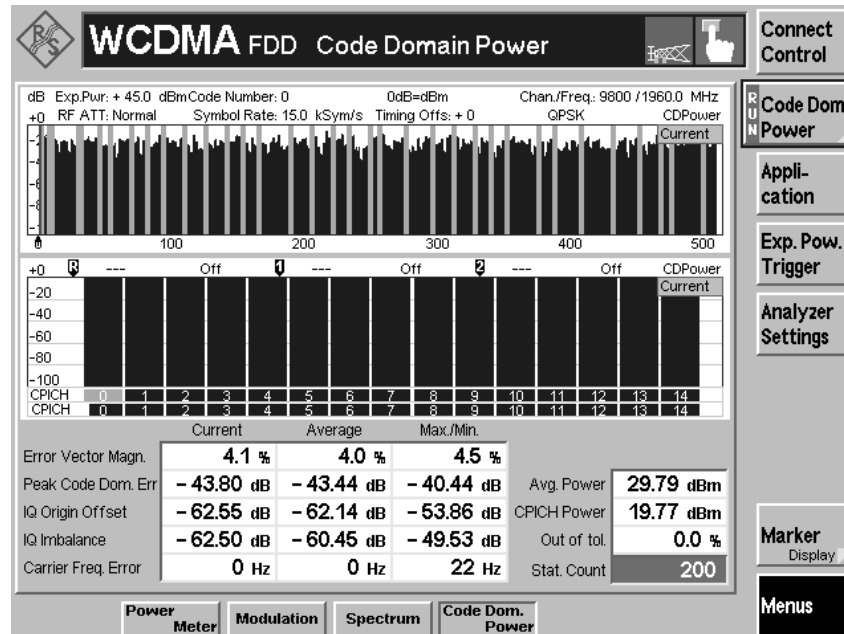


Config A2_+20°C

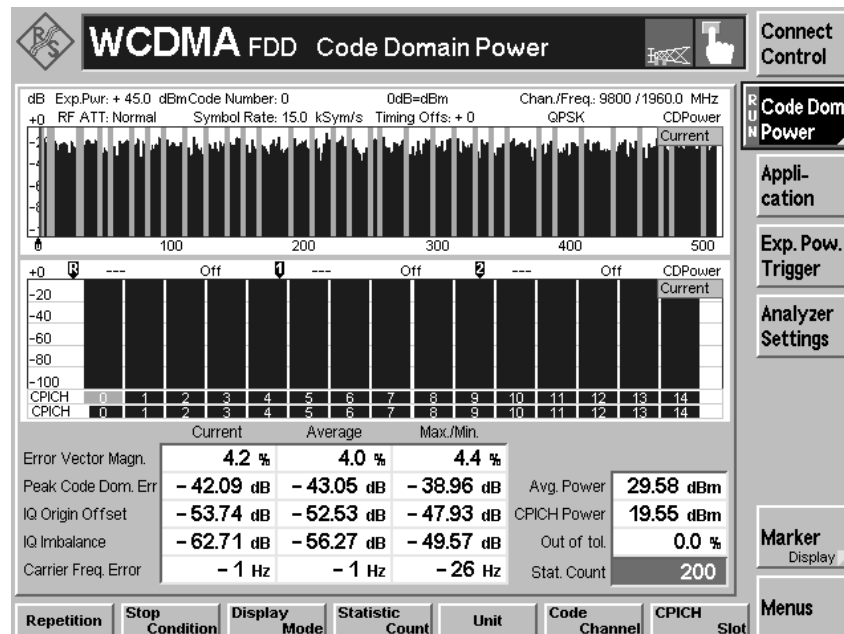


Config A2_+30°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

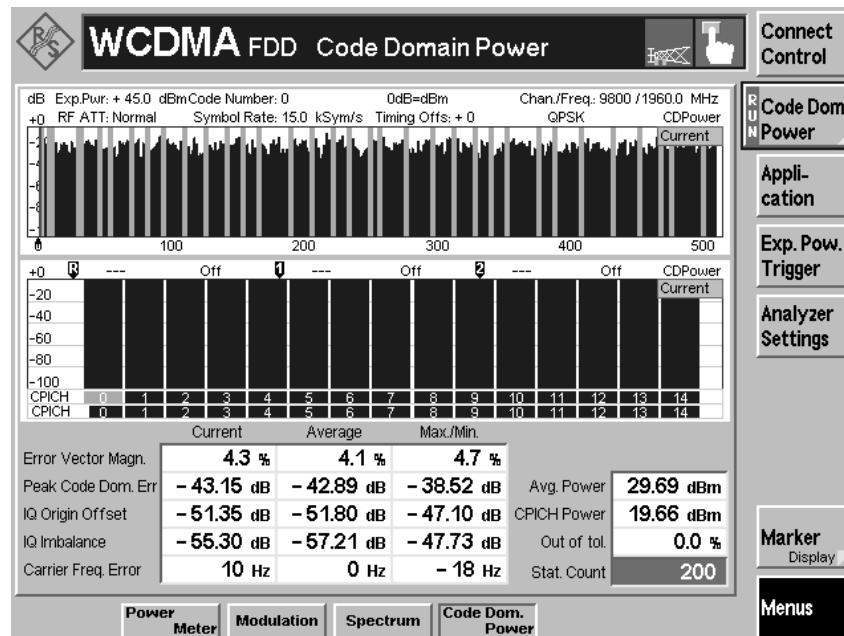


Config A2_+40°C



Config A2_+50°C

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W



Config A2_+55°C

TEST PROCEDURE

The equipment was configured as shown in Figure 6. A CMU300 has been used to perform the frequency error test.

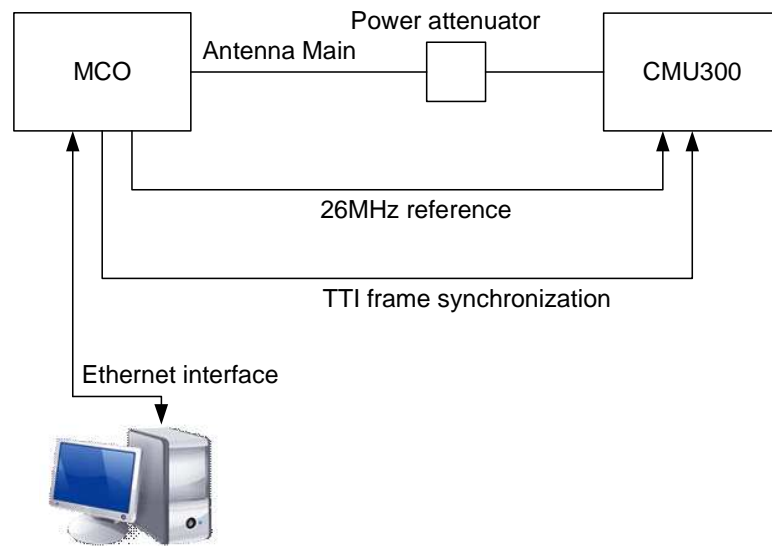
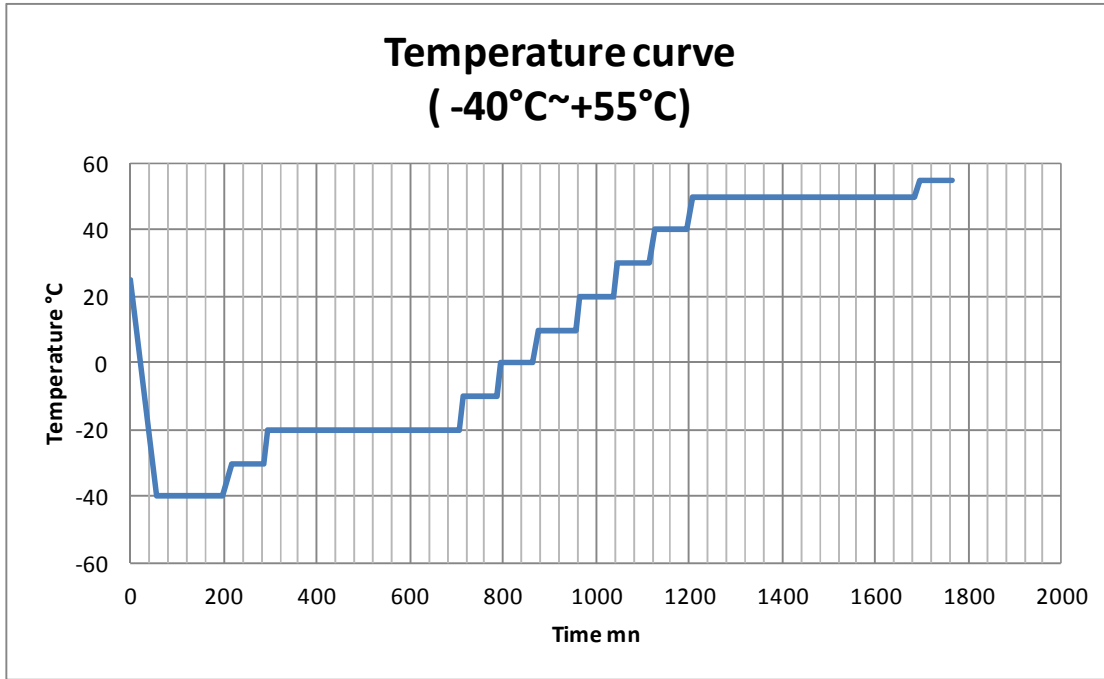


Figure 6: Test configuration to measure Frequency Error for config A1

Note: CMU300 synchronized on a 26MHz ref from board.

12.3.3 CURB OF TEMPERATURES DURING EXTREME FCC TESTS



Temperature Curve

12.3.4 CONCLUSION

The tests results on LightRadio 9764 MCO V1.0 B2 3G 1W are compliant with requirements of:

- Clauses §2.1046 and §24.232, §2.1049 and §24.238, §2.1055 and §24.235, §2.1051 and §24.238 of FCC Parts 2 & 22 and RSS133 §6.4 and RSS133 §6.3 and RSS133 §6.5. standard.

13. ABBREVIATIONS AND DEFINITIONS

13.1. ABBREVIATIONS

| | |
|-------|---|
| 16QAM | 16-Quadrature Amplitude Modulation |
| 8PSK | 8 Phase Shift Keying |
| AC | Alternative Current (Power source) |
| ACLR | Adjacent Channel Leakage power Ratio |
| ACS | Adjacent Channel Selectivity |
| ARFCN | Absolute Radio Frequency Channel Number |
| B | Bottom frequency |
| BER | Bit Error Ratio |
| BLER | Block Error Ratio |
| BTS | Base Transceiving Station |
| CCM | Core Controller Module |
| CEM | Channel Element Module |
| CW | Carrier Wave |
| DC | Direct Current (Power source) |
| DCH | Dedicated Channel |
| DDM | Dual Duplexer Module |
| DPCH | Dedicated Physical Channel |
| EN | European Norm |
| EVM | Error Vector Magnitude |
| GE | Gigabit Ethernet |
| LNA | Low Noise Amplifier |
| M | Middle frequency |
| MDA | Medium Dependant Access |
| N/A | Not Applicable |
| PHS | Portable Handset System |
| PSA | Power Signal Analyzer |
| QPSK | Quadrature Phase Shift Keying |
| RF | Radio Frequency |
| RRH | Remote Radio Head |
| RX | Receiver |
| SA | Spectrum Analyzer |

Radio Test Report (FCC) for the qualification of LightRadio 9764 MCO V1.0 B2 3G 1W

| | |
|--------|---|
| SEM | Spectrum Emission Mask |
| SG | Signal Generator |
| STSR | Sectored Transmit, Sectored Receive |
| T | Top frequency |
| TMA | Tower Mounted Amplifier |
| TX | Transmitter |
| UARFCN | UTRA ARFCN |
| UMTS | Universal Mobile Telecommunication System |
| UTRAN | UMTS Terrestrial Radio Access Network |
| VSA | Vector Signal Analyzer |
| W-CDMA | Wideband-Code Division Multiple Access |

13.2. DEFINITIONS

Band II (1900MHz):

- B Bottom UARFCN. Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follow: $F_{B \text{ downlink}} = 1932.4 \text{ MHz}$; $F_{B \text{ uplink}} = 1852.4 \text{ MHz}$
- M Middle UARFCN. Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follow: $F_{M \text{ downlink}} = 1960.0 \text{ MHz}$; $F_{M \text{ uplink}} = 1880.0 \text{ MHz}$
- T Top UARFCN. Downlink (BTS Tx) and Uplink (BTS Rx) frequencies are given as follow: $F_{T \text{ downlink}} = 1987.6 \text{ MHz}$; $F_{T \text{ uplink}} = 1907.6 \text{ MHz}$

❧ END OF DOCUMENT ❧