

Radio Test Report for the qualification of the UMTS 1900 iBTS according to FCC Part 24

Document number: UMT/BTS/DJD/007777 Document issue: V01.01/EN Document status: Standard Date: 04/Jul/2003

RF Tests concerning FCC are performed in Les Miroirs building – laboratory 006 – Nortel Networks, 38 Bd Paul Cézanne, 78280 Guyancourt – France

Author:	Sylvain BALE
Approved by:	L. MOULIN HW Integration Manager
	Y. RENARD UMTS BTS RF Department Senior Manager

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Printed in France

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PUBLICATION HISTORY

04/Jul/2003 S. BALE

Document creation. Issue V01.01 / EN Standard

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1. INTRODUCTION

1.1. OBJECT

This document presents the measurements results of tests performed on Nortel Networks UMTS iBTS according to FCC specifications.

1.2. SCOPE OF THIS DOCUMENT

This document applies to Nortel FDD

UMTS Indoor 2 iBTS

UMTS Outdoor iBTS

1.3. AUDIENCE FOR THIS DOCUMENT

This document is to be used by any person needing a view on Nortel FDD UMTS 1900 iBTS.

2. RELATED DOCUMENTS

2.1. APPLICABLE DOCUMENTS

[A1]	UMT/BTS/APP/0022	Methodology of UMTS BTS validation under 25.141 specification
[A2]	UMT/BTS/DD/0017	e-mobility iBTS platform/UMTS/GSM product specification
[A3]	UMT/BTS/DPL/07135	1900 MHz UMTS Project Qualification Plan

[A4] UMT/BTS/DPL/7401 Radio Test Plan for the qualification of the 1900 iBTS

2.2. REFERENCE DOCUMENTS

[R1]	47CFR Part 24	PERSONAL COMMUNICATIONS SERVICES January 2001			
[R2]	47CFR Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS			

October 2001

3. TEST RESULTS

3.1. INTRODUCTION

This document presents the RF tests performed for the qualification of the 1900 iBTS.

UMTS Indoor2 iBTS is feeded with -48V DC as standard configuration.

As an option, UMTS Indoor2 may be feeded with +24V DC, through an additional DC to DC converter (+24 V to -55 V).

UMTS Outdoor iBTS is feeded with 220V AC split phase.

The following information is submitted to introduce a Certification of the UMTS 1900 iBTS for Northern Telecom, Inc:

- According to 47CFR Part 24, Subpart E

- According to 47CFR Part 2, Subpart J

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

3.2. MEASUREMENT RESULTS

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

Description & Configuration code		Measurement Specification	Limit Specification	Test	Result
		FCC 2.1046	24.232	Maximum Output Power	Complies
	UMTS Indoor2 iBTS 45W STSR	FCC 2.1049	-	Occupied Bandwidth	Complies
A		FCC 2.1051, 2.1057	24.238	Spurious Emission at Antenna Terminals with single carrier and three carriers	Complies
- 1	UMTS Indoor2 iBTS	FCC 2.1046	24.232	Maximum Output Power	Complies
B.	30W STSR	FCC 2.1051, 2.1057	24.238	Spurious Emission at Antenna Terminals with three carriers	Complies
	UMTS Indoor2 iBTS	FCC 2.1046	24.232	Maximum Output Power	Complies
С	45W STSR TMA with DC/DC converter	FCC 2.1051, 2.1057	24.238	Spurious Emission at Antenna Terminals with three carriers	Complies
	UMTS Indoor2 iBTS	FCC 2.1046	24.232	Maximum Output Power	Complies
D	45W STSR with DC/DC converter	FCC 2.1051, 2.1057	24.238	Spurious Emission at Antenna Terminals with three carriers	Complies
E	UMTS Indoor2 iBTS 30W STSR with DC/DC converter	FCC 2.1046	24.232	Maximum Output Power	Complies
F ²	UMTS Outdoor iBTS 45W STSR TMA	FCC 2.1046	24.232	Maximum Output Power	Complies
G	UMTS Outdoor iBTS 30W STSR TMA	FCC 2.1046	24.232	Maximum Output Power	Complies

Table 1. Measurement results performed for the qualification of the 1900 MHz

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.

¹ Occupied Bandwidth results for configurations code B to G are assumed to be similar to those of configuration code A since the same transceiver module is used (digital signal filtering & modulator).

² Spurious emissions results for UMTS Outdoor iBTS are assumed to be similar to those of configuration code C since the transmit RF chain remains unchanged.

3.3. MAXIMUM OUTPUT POWER

3.3.1 FCC REQUIREMENTS

- (a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT. See 24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power. In no case may the peak output power of a base station transmitter exceed 100 watts.
- (b) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

3.3.2 TEST RESULTS

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

	URATION TEST CONDITIONS		Base Station Maximum Output Power (dBm)			
CONFIGURATION CODE			Channel B 1932.4 MHz	Channel M 1960 MHz	Channel T 1987.6 MHz	Nominal Output Power (dBm)
			Sector 1	Sector 2	Sector 3	
А	T _{nom} (25°C)	V _{nom} (49.8V)	44.96	45.5	45.4	45.2 ±2.7dB
В	T _{nom} (25°C)	V _{nom} (49.8V)	43.2	43.7	43.7	43.4 ±2.7dB
С	T _{nom} (25°C)	V _{nom} (24.03V)	41.5	42.3	42.2	41.7 ±2.7dB
D	T _{nom} (25°C)	V _{nom} (24.03V)	44.9	45.55	45.5	45.2 ±2.7dB
E	T _{nom} (25°C)	V _{nom} (24.03V)	43.2	43.8	43.7	43.4 ±2.7dB
F	T _{nom} (25°C)	V _{nom} (223.1V)	41.75	42.45	42.4	41.7 ±2.7dB
G	T _{nom} (25°C)	V _{nom} (223.1V)	39.9	40.6	40.6	39.9 ±2.7dB

Table 2. Measurements result for Maximum output power

For equivalent isotropically radiated power requirement, the sum of the antenna gain and the feeder losses should not be higher than 17.05dB.

3.3.3 TEST PROCEDURE

The equipment was configured as shown in Figure 1. A power meter has been used to performed the maximum output power test.



Figure 1. Test configuration to measure RF Output Power

The iBTS was configured to transmit at maximum power with 64 dedicated channels on the single carrier.

3.4. OCCUPIED BANDWIDTH

3.4.1 FCC REQUIREMENTS

The occupied bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated of at least 23 dB.

3.4.2 TEST RESULTS

The table 3 summarizes the Occupied bandwidth test performed in 45W mode (Configuration code A).

	Occupied bandwidth (MHz)			
OBSERVED CHANNEL	Channel B 1932.4 MHz	Channel M 1960 MHz	Channel T 1987.6 MHz	
	Sector 1	Sector 2	Sector 3	
Occupied bandwidth	4.62 MHz	4.63 MHz	4.63 MHz	

Table 3. Measurements result for Occupied Bandwidth



Figure 2. Sample plot for Occupied Bandwidth @ 1932.4 MHz





Figure 3. Sample plot for Occupied Bandwidth @ 1960 MHz

Figure 4. Sample plot for Occupied Bandwidth @ 1987.6 MHz

For the -26dB emission bandwidth, the results are almost the same:

B: 4.67 MHz - M: 4.63 MHz - T: 4.63 MHz

3.4.3 TEST PROCEDURE

The equipment was configured as shown in Figure 5.



Figure 5. Test configuration for Occupied Bandwidth

The iBTS was configured to transmit at maximum power (45W). Measurements were performed at bottom, middle and top frequency of the transmit channel on each sector.

The spectrum analyzer had the following setting:

Resolution Bandwidth	10 kHz	
Video Bandwidth	100 kHz	
Span	10 MHz	
Sweep time	250 ms	
Reference Level Offset	Corrected to take into account cables and attenuator losses	

3.5. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

3.5.1 FCC REQUIREMENTS

- (a) At any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.
- (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 23 dB below the transmitter power.
- (c) When measuring the emission limits, the nominal carrier frequency shallbe adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- (d) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

3.5.2 TEST RESULTS

The reference level for spurious emissions at the antenna terminals is taken from the measured output power (45 dBm => 31.6 W).

Therefore the spurious emissions must be attenuated by at least:

43 + 10*Log(31.6) = 58 dB

The measured output power was 45 dBm, therefore the limit is -13 dBm.

1. UMTS INDOOR2 IBTS, 45W MODE WITH SINGLE CARRIER

Table 4 to 6 show the the results for Spurious Emissions at Antenna Terminals for the configuration A.

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel B 1932.4 MHz Sector 1	Margin (dB)	Limit (dBm)
9 kHz to 50 MHz	-84.01	71.01	
50 MHz to 500 MHz	-82.13	69.13	
500 MHz to 1 GHz	-78.26	65.26	
1 GHz to 1.92 GHz	-75.98	62.98	
1920 MHz to 1927.025 MHz	-22.2	9.2	
1927.025 MHz to 1928.025 MHz	-25.12	12.12	
1928.025 MHzto 1929.025 MHz	-20.28	7.28	
1929.025 MHz to 1929.975 MHz	-17.78	4.78	
1935.025 MHz to 1935.975 MHz	-23.55	10.55	-13
1935.975 MHz to 1936.975 MHz	-19.33	6.33	-15
1936.975 MHz to 1937.975 MHz	-23.82	10.82	
1937.975 MHz to 2000 MHz	-18.12	5.12	
2000 MHz to 3 GHz	-39.89	26.89	
3 GHz to 5 GHz	-56.81	43.81	
5 GHz to 7 GHz	-52.66	39.66	
7 GHz to 9 GHz	-52.93	39.93	
9 GHz to 12.75 GHz	-49.28	36.28	
12.75 GHz to 20 GHz	-49.85	36.85	

Table 4. Measurements result for Spurious Emission in B channel

UMT/BTS/DJD/007777



Date: 15.JUL.2003 09:43:50

31.JUL.2003 15:30:42

Date:

 $^{^{\}rm 3}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer



1920 MHz- 1927.025 MHz

1927.025 MHz-1928.025 MHz

RF Att

diar

Stop 1.928025 GHz

44.00

Unit

0 dB

dBm



15.JUL.2003 09:31:56

Date:

1928.025 MHz-1929.025 MHz







Date:

15.JUL.2003 09:36:35

Start 1.936975 GHz 100 kHz/ 15.JUL.2003 09:35:16 Date:

UMT/BTS/DJD/007777





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12.75 GHz-20 GHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel M 1960 MHz Sector 2	Margin (dB)	Limit (dBm)
9 kHz to 50 MHz	-82.84	69.84	
50 MHz to 500 MHz	-81.27	68.27	
500 MHz to 1 GHz	-79.4	66.4	
1 GHz to 1.92 GHz	-73.89	60.89	
1920 MHz to 1954.525 MHz	-24.38	11.38	
1954.525 MHz to 1955.525 MHz	-25.74	12.74	
1955.525 MHzto 1956.525 MHz	-20.49	7.49	
1956.525 MHz to 1957.475 MHz	-22.81	9.81	
1962.525 MHz to 1963.475 MHz	-22.50	9.5	-13
1963.475 MHz to 1964.475 MHz	-19.01	6.01	-15
1964.475 MHz to 1965.475 MHz	-23.49	10.49	
1965.475 MHz to 2000 MHz	-19.28	6.28	
2000 MHz to 3 GHz	-37.63	24.63	
3 GHz to 5 GHz	-57.33	44.33	
5 GHz to 7 GHz	-57.10	44.1	
7 GHz to 9 GHz	-53.32	40.32	
9 GHz to 12.75 GHz	-49.21	36.21	
12.75 GHz to 20 GHz	-50.11	37.11	

Table 5. Measurements result for Spurious Emission in M channel



500 MHz-1 GHz



1 GHz-1.92 GHz



 $^{^{\}rm 4}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer



1954.525 MHz-1955.525 MHz



1955.525 MHz-1956.525 MHz



1956.525 MHz-1957.475 MHz







1964.475 MHz-1965.475 MHz



1965.475 MHz-2000 MHz





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Radio Test Report for the qualification of the UMTS 1900 iBTS according to FCC Part 24



12.75 GHz-20 GHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel T 1987.6 MHz Sector 3	Margin (dB)	Limit (dBm)
9 kHz to 50 MHz	-84.16	71.16	
50 MHz to 500 MHz	-82.27	69.27	
500 MHz to 1 GHz	-79.07	66.07	
1 GHz to 1927.6 MHz	-35.89	22.89	
1927.6 MHz to 1982.025 MHz	-17.57	4.57	
1982.025 MHz to 1983.025 MHz	-25.61	12.61	
1983.025 MHzto 1984.025 MHz	-22.14	9.14	
1984.025 MHz to 1984.975 MHz	-26.6	13.6	
1990.025 MHz to 1990.975 MHz	-17.2	4.2	-13
1990.975 MHz to 1991.975 MHz	-19.85	6.85	-15
1991.975 MHz to 1992.975 MHz	-24.85	11.85	
1992.975 MHz to 2000 MHz	-15.2	2.2	
2000 MHz to 3 GHz	-39.56	26.56	
3 GHz to 5 GHz	-57.24	44.24	
5 GHz to 7 GHz	-52.6	39.6	
7 GHz to 9 GHz	-52.85	39.85	
9 GHz to 12.75 GHz	-49.23	36.23	
12.75 GHz to 20 GHz	-49.85	36.85	

Table 6. Measurements result for Spurious Emission in T channel



500 MHz-1 GHz



1 GHz-1.927.6 GHz



 $^{^{\}rm 5}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer



1927.6 MHz- 1982.025 MHz

1982.025 MHz-1983.025 MHz

0 dB

wh.

хī

dBm

1983.025 MHz-1984.025 MHz



1984.025 MHz-1984.975 MHz





1990.025 MHz-1990.975 MHz

1991.975 MHz-1992.975 MHz



1992.975 MHz-2000 MHz

1990.975 MHz-1991.975 MHz

dBm

vт

СС





5 GHz-7 GHz



7 GHz-9 GHz



Radio Test Report for the qualification of the UMTS 1900 iBTS according to FCC Part 24



12.75 GHz-20 GHz

2. UMTS INDOOR2 IBTS, 45W MODE WITH 3 CARRIERS

Table 7 to 9 show the the results for Spurious Emissions at Antenna Terminals for the configuration A.

	SPURIOUS EMISSION LEVEL (dBm)		
Frequency band	Channel B	Margin (dB)	LIMIT (dBm)
	1932.4 MHz	(ub)	(ubiii)
	Sector 1		
9 kHz to 1GHz	-80.40	67.4	
1 GHz to 1.92 GHz	-75.35	62.35	
1920 MHz to 1927.025 MHz	-19.58	6.58	
1927.025 MHz to 1928.025 MHz	-21.52	8.52	
1928.025 MHzto 1929.025 MHz	-20.57	7.57	
1929.025 MHz to 1929.975 MHz	-20.08	7.08	
1935.025 MHz to 1935.975 MHz	-29.53	16.53	-13
1935.975 MHz to 1936.975 MHz	-19.27	6.27	
1936.975 MHz to 1937.975 MHz	-19.82	6.82	
1937.975 MHz to 2000 MHz	-17.37	4.37	
2000 MHz to 3 GHz	-39.85	26.85	
3 GHz to 12.75 GHz	-48.84	35.84	
12.75 GHz to 20 GHz	-49.58	36.58	

Table 7. Measurements result for Spurious Emission in B channel



1920 MHz- 1927.025 MHz



1927.025 MHz-1928.025 MHz



 $^{^{\}rm 6}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer

Ref Lvl -6.9 dBm RBW 50 kHz RF Att 0 dB -34.16 dBm 1.92802500 GHz VBW SWT 500 kHz 5 ms Unit dBm -6.9 -10 51.1 dB Offset A -2 -3 Mulpu Month and he Make myli www. Million and M mound work -80 -9 -10 -106 Start 1.928025 GHz 100 kHz/ Stop 1.929025 GHz Date: 17.JUL.2003 11:09:50

1928.025 MHz-1929.025 MHz

1929.025 MHz-1929.975 MHz









1947.975 MHz-2000 MHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel M 1960 MHz Sector 2	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-79.54	66.54	-13
1 GHz to 1.92 GHz	-75.57	62.57	
1920 MHz to 1949.525 MHz	-18.30	5.3	
1949.525 MHz to 1950.525 MHz	-19.33	6.33	
1950.525 MHzto 1951.525 MHz	-18.91	5.91	
1951.525 MHz to 1952.475 MHz	-24.62	11.62	
1967.525 MHz to 1965.475 MHz	-24.86	11.86	
1968.475 MHz to 1969.475 MHz	-18.46	5.46	
1969.475 MHz to 1970.475 MHz	-18.96	5.96	
1970.475 MHz to 2000 MHz	-17.88	4.88	
2000 MHz to 3 GHz	-38.07	25.07	
3 GHz to 12.75 GHz	-48.88	35.88	
12.75 GHz to 20 GHz	-49.44	36.44	

Table 8. Measurements result for Spurious Emission in M channel



1920 MHz- 1949.525 MHz



1949.525 MHz-1950.525 MHz

Ref Lvl -5.9 dBm Marker 1 [T1] RBW 50 kHz RF Att 0 dB -32.75 dBm 1.95052500 GHz VBW SWT 500 kHz 5 ms Unit dBm -5.9 _10__51.1 dB Offset A -2 -30 MUM MAN -5 -9 -100 -105 Start 1.950525 GHz 100 kHz/ Stop 1.951525 GHz Date: 17.JUL.2003 09:30:20

1950.525 MHz-1951.525 MHz

1951.525 MHz-1952.475 MHz








1969.475 MHz-1970.475 MHz

1970.475 MHz-2000 MHz

Date:

31,JUL,2003 15;35;03

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel T 1987.6 MHz Sector 3	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz MHz	-83.65	70.65	
1 GHz to 1927.6 MHz	-35.89	22.89	
1927.6 MHz to 1972.025 MHz	-17.57	4.57	
1972.025 MHz to 1973.025 MHz	-25.61	12.61	
1973.025 MHzto 1974.025 MHz	-22.14	9.14	
1974.025 MHz to 1974.975 MHz	-26.6	13.6	
1990.025 MHz to 1990.975 MHz	-17.2	4.2	-13
1990.975 MHz to 1991.975 MHz	-19.85	6.85	
1991.975 MHz to 1992.975 MHz	-24.85	11.85	
1992.975 MHz to 2000 MHz	-15.2	2.2	
2000 MHz to 3 GHz	-38.78	25.78	
9 GHz to 12.75 GHz	-48.74	35.74	
12.75 GHz to 20 GHz	-49.63	36.63	

Table 9. Measurements result for Spurious Emission in T channel



Date: 17.JUL.2003 08:26:54

Date: 17.JUL.2003 08:24:34

 $^{^{7}}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer



1927.6 MHz- 1972.025 MHz



1972.025 MHz-1973.025 MHz

Ref Lvl 2.1 dBm RBW 50 kHz RF Att 0 dB -30.38 dBm 1.97302500 GHz VBW SWT 500 kHz 5 ms Unit dBm 2.1 -51.1 dB Offs A -1 -30 *** -4 - x --50 -6 -9 -97.9 Start 1.973025 GHz 100 kHz/ Stop 1.974025 GHz Date: 17.JUL.2003 09:10:13

1973.025 MHz-1974.025 MHz

1974.025 MHz-1974.975 MHz



1990.025 MHz-1990.975 MHz



1990.975 MHz-1991.975 MHz





1992.975 MHz-2000 MHz

31,JUL,2003 15:36:33

Date:

3. UMTS INDOOR2 IBTS, 30W MODE WITH 3 CARRIERS

Table 10 to 12 show the the results for Spurious Emissions at Antenna Terminals for the configuration B.

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel B 1932.4 MHz Sector 1	Margin (dB)	Limit (dBm)
9 kHz to 1GHz	-78.92	65.92	
1 GHz to 1.92 GHz	-75.45	62.45	
1920 MHz to 1927.025 MHz	-20.95	7.95	
1927.025 MHz to 1928.025 MHz	-22.61	9.61	
1928.025 MHzto 1929.025 MHz	-21.97	8.97	
1929.025 MHz to 1929.975 MHz	-22.77	9.77	
1935.025 MHz to 1935.975 MHz	-28.44	15.44	-13
1935.975 MHz to 1936.975 MHz	-20.31	7.31	
1936.975 MHz to 1937.975 MHz	-20.90	7.9	
1937.975 MHz to 2000 MHz	-18.16	5.16	
2000 MHz to 3 GHz	-39.85	26.85	
3 GHz to 12.75 GHz	-48.75	35.75	
12.75 GHz to 20 GHz	-49.49	36.49	

Table 10. Measurements result for Spurious Emission in B channel



1920 MHz- 1927.025 MHz



1927.025 MHz-1928.025 MHz



 $^{^{\}rm 8}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer

Ref Lvi 6.1 dBm RBW 50 kHz RF Att 0 dB -35.48 dBm 1.92802500 GHz VBW SWT 500 kHz 5 ms Unit dBm 6.1 51.1 dB Offse A -10 ma yully/ MUMM MY AM while mound nho NMA MM.M -41 -5 -6 С -93.9 Start 1.928025 GHz 100 kHz/ Stop 1.929025 GHz Date: 17.JUL.2003 11:28:18

1928.025 MHz-1929.025 MHz

1929.025 MHz-1929.975 MHz









1947.975 MHz-2000 MHz

Date:

31,JUL,2003 15;37;14

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel M 1960 MHz Sector 2	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-78.92	65.92	
1 GHz to 1.92 GHz	-75.77	62.77	
1920 MHz to 1949.525 MHz	-20.01	7.01	
1949.525 MHz to 1950.525 MHz	-21.92	8.92	
1950.525 MHzto 1951.525 MHz	-21.34	8.34	
1951.525 MHz to 1952.475 MHz	-25.96	12.96	
1967.525 MHz to 1965.475 MHz	-26.25	13.25	-13
1968.475 MHz to 1969.475 MHz	-21.32	8.32	
1969.475 MHz to 1970.475 MHz	-21.91	8.91	
1970.475 MHz to 2000 MHz	-18.69	5.69	
2000 MHz to 3 GHz	-38.90	25.9	
3 GHz to 12.75 GHz	-48.87	35.87	
12.75 GHz to 20 GHz	-49.71	36.71	

Table 11. Measurements result for Spurious Emission in M channel



1920 MHz- 1949.525 MHz

6.1

-10

-30

-40

-50

-6

-93.9

Date:

RF Att RF Att 1 MHz 0 dB Ref Lvi 6.1 dBm 50 kHz 0 dB Ref Lvl 6.1 dBm RBW RBW VBW SWT 10 MHz 5 ms -34.99 dBm 1.95051899 GHz VBW SWT 500 kHz 5 ms -20.01 dBm 1.94952500 GHz Unit dBr Unit dBr 6.1 51.1 dB Offse 51.1 dB Offset -10 -21 RM -30 More where where. Man howard ander ANNU 1 miller Mary -40 -50 -61 C -93.9 Stop 1.949525 GHz Stop 1.950525 GHz Start 1.92 GHz 2.9525 MHz/ Start 1.949525 GHz 100 kHz/ 17.JUL.2003 09:47:53 Date: 17.JUL.2003 09:48:56

1949.525 MHz-1950.525 MHz

Ref Lvi 6.1 dBm RBW 50 kHz RF Att 0 dB -33.93 dBm 1.95052500 GHz VBW SWT 500 kHz 5 ms Unit dBm 6.1 51.1 dB Offse A -10 montal my hory mornelyper Andren untru mon - 4 -5 -6 С -93.9 Start 1.950525 GHz 100 kHz/ Stop 1.951525 GHz Date: 17.JUL.2003 09:49:57

1950.525 MHz-1951.525 MHz

1951.525 MHz-1952.475 MHz







Ref Lvi -2.9 dBm RBW 50 kHz RF Att 0 dB Ref Lvl -2.9 dBm RBW 1 MHz RF Att 0 dB -33.90 dBm 1.96947500 GHz VBW SWT 500 kHz 5 ms -18.69 dBm 1.97047500 GHz VBW SWT 10 MHz 5 ms Unit dBm Unit dBm -2.9 -2.9 51.1 dB Offs 51.1 dB Offse -10 -11 -20 -31 mbb when white when white yman the poly mult weat -4 -41 -50 -5 -61 -6 _8 -8 -9 -9 С -100 -102 -100 -102 Start 1.969475 GHz 100 kHz/ Stop 1.970475 GHz Start 1.970475 GHz 2.9525 MHz/ Stop 2 GHz 17.JUL.2003 09:56:01 Date: 17.JUL.2003 09:56:54 Date: 2GHz-3GHz 3GHz- 12.75 GHz RBW VBW SWT 1 MHz 10 MHz RF Att 0 dB Ref Lvl -34.5 dBm RBW VBW 1 MHz 10 MHz RF Att 0 dB Ref Lvi -38.90 dBm -48.87 dBm 5 ms Unit dBr Unit dBm -6.9 dBm SWT 56 ms -6.9 -10 51.1 dB -34.5 36.5 dB Offse S Off -2 -51 -61 -41 -5 -81 -6 -91 -10 -11 -9 -12 -10 -13 -134 -108 100 MHz/ Start 3 GHz Start 2 GHz Stop 3 GHz 975 MHz/ Stop 12.75 GHz 17.JUL.2003 09:59:42 Date: 31.JUL.2003 15:43:24 Date: 12.75 GHz- 20 GHz 1 MHz 10 MHz RF Att 0 dB RBW Ref Lvl -49.71 dBm νвы -34.5 dBm SWT 41 ms Unit dBr -34 36.5 dB Offs -5 -6 -70 -8

1969.475 MHz-1970.475 MHz

1970.475 MHz-2000 MHz

31,JUL,2003 15;37;58

-100 -110 -12

-134

Date:

Start 12.75 GHz

725 MHz/

Stop 20 GHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel T 1987.6 MHz Sector 3	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-79.22	66.22	
1 GHz to 1927.6 MHz	-33.04	20.04	
1927.6 MHz to 1972.025 MHz	-19.12	6.12	
1972.025 MHz to 1973.025 MHz	-20.65	7.65	
1973.025 MHzto 1974.025 MHz	-20.54	7.54	
1974.025 MHz to 1974.975 MHz	-31.25	18.25	
1990.025 MHz to 1990.975 MHz	-20.73	7.73	-13
1990.975 MHz to 1991.975 MHz	-20.25	7.25	
1991.975 MHz to 1992.975 MHz	-20.62	7.62	
1992.975 MHz to 2000 MHz	-18.48	5.48	
2000 MHz to 3 GHz	-39.44	26.44	
3 GHz to 12.75 GHz	-48.96	35.96	
12.75 GHz to 20 GHz	-49.6	36.6	

Table 12. Measurements result for Spurious Emission in T channel



-11

-12

-13

-140 -144

Date:

Start 1 GHz

17.JUL.2003 07:59:29

Stop 1 GHz

9 kHz-50 MHz⁹

50 MHz-500 MHz

50 MHz/

-110

-12

-13

-14

-146

Date:

Start 500 MHz

17.JUL.2003 07:42:26

92 MHz/

Stop 1.92 GHz

 $^{^{\}rm 9}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer



1927.6 MHz- 1972.025 MHz



1972.025 MHz-1973.025 MHz

Ref Lvl 2.1 dBm RBW 50 kHz RF Att 0 dB -31.65 dBm 1.97302500 GHz VBW SWT 500 kHz 5 ms Unit dBm 2.1 -51.1 UB Offs A -1 -3 when IRM manpa ww unger 1/h/m moun www.www.www. -4 - x --50 -6 -9 -97.9 Start 1.973025 GHz 100 kHz/ Stop 1.974025 GHz Date: 17.JUL.2003 08:51:50

1973.025 MHz-1974.025 MHz

1974.025 MHz-1974.975 MHz



1990.025 MHz-1990.975 MHz



1990.975 MHz-1991.975 MHz





1992.975 MHz-2000 MHz

31,JUL,2003 15:38:43

Date:

4. UMTS INDOOR2 IBTS, 45W MODE, 24V DC, TMA WITH 3 CARRIERS

Table 13 to 15 show the the results for Spurious Emissions at Antenna Terminals for the configuration C.

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel B 1932.4 MHz Sector 1	Margin (dB)	Limit (dBm)
9 kHz to 1GHz	-77.68	64.68	
1 GHz to 1.92 GHz	-75.85	62.85	
1920 MHz to 1927.025 MHz	-23.67	10.67	
1927.025 MHz to 1928.025 MHz	-24.83	11.83	
1928.025 MHzto 1929.025 MHz	-23.91	10.91	
1929.025 MHz to 1929.975 MHz	-21.36	8.36	
1935.025 MHz to 1935.975 MHz	-33.96	20.96	-13
1935.975 MHz to 1936.975 MHz	-23	10	
1936.975 MHz to 1937.975 MHz	-23.26	10.26	
1937.975 MHz to 2000 MHz	-21.35	8.35	
2000 MHz to 3 GHz	-40.19	27.19	
3 GHz to 12.75 GHz	-48.91	35.91	
12.75 GHz to 20 GHz	-49.81	36.81	

Table 13. Measurements result for Spurious Emission in B channel



1920 MHz- 1927.025 MHz



1927.025 MHz-1928.025 MHz



 $^{^{\}rm 10}$ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer

Ref Lvi -6.9 dBm RBW 50 kHz RF Att 0 dB -37.58 dBm 1.92802500 GHz VBW SWT 500 kHz 5 ms Unit dBm -6.9 _10 _51.1 dB Offse ▼1 [T1] -37.58 dBm .92802500 GHz A -23 .91 dB C -2 CH -3 Junit Man All Why un no 1 LAN -40 -80 -9 -10 -106 Start 1.928025 GHz 100 kHz/ Stop 1.929025 GHz Date: 23.JUL.2003 10:38:40

1928.025 MHz-1929.025 MHz

1929.025 MHz-1929.975 MHz









1946.975 MHz-1947.975 MHz

1947.975 MHz-2000 MHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel M 1960 MHz Sector 2	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-76.78	63.78	
1 GHz to 1.92 GHz	-75.72	62.72	
1920 MHz to 1949.525 MHz	-22.52	9.52	
1949.525 MHz to 1950.525 MHz	-24.20	11.2	
1950.525 MHzto 1951.525 MHz	-23.98	10.98	
1951.525 MHz to 1952.475 MHz	-29.74	16.74	
1967.525 MHz to 1965.475 MHz	-29.29	16.29	-13
1968.475 MHz to 1969.475 MHz	-23.79	10.79	
1969.475 MHz to 1970.475 MHz	-24.27	11.27	
1970.475 MHz to 2000 MHz	-21.39	8.39	
2000 MHz to 3 GHz	-39.77	26.77	
3 GHz to 12.75 GHz	-48.96	35.96	
12.75 GHz to 20 GHz	-49.78	36.78	

Table 14. Measurements result for Spurious Emission in M channel



1920 MHz- 1949.525 MHz

Ref Lvl -11.9 dBm

51.1 dB Offs

-11.9

-2

-3

-4

-6

-8

-10

-111

Date:

Start 1.92 GHz





Ref Lvl -14.9 dBm RBW 50 kHz RF Att 0 dB -38.22 dBm 1.95052500 GHz VBW SWT 500 kHz 5 ms Unit dBm -14.9 51.1 dB Offset ▼1 [T1] -38.22 dBm .95052500 GHz A СН PWR -23.98 dB -MIR. Mahn MAN hulp dun Nam de als. MN -40 -50 -60 -8 -9 -100 -110 -114 Start 1.950525 GHz 100 kHz/ Stop 1.951525 GHz Date: 24.JUL.2003 13:49:56

1950.525 MHz-1951.525 MHz

1951.525 MHz-1952.475 MHz









1969.475 MHz-1970.475 MHz

1970.475 MHz-2000 MHz

24,JUL,2003 14:34:33

Start 12.75 GHz

Date:

725 MHz/

Stop 20 GHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel T 1987.6 MHz Sector 3	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz MHz	-76.88	63.88	
1 GHz to 1927.6 MHz	-34.57	21.57	
1927.6 MHz to 1972.025 MHz	-21.07	8.07	
1972.025 MHz to 1973.025 MHz	-23.98	10.98	
1973.025 MHzto 1974.025 MHz	-23.57	10.57	
1974.025 MHz to 1974.975 MHz	-31.54	18.54	
1990.025 MHz to 1990.975 MHz	-23.11	10.11	-13
1990.975 MHz to 1991.975 MHz	-23.82	10.82	
1991.975 MHz to 1992.975 MHz	-24.79	11.79	
1992.975 MHz to 2000 MHz	-22.68	9.68	
2000 MHz to 3 GHz	-39.76	26.76	
3 GHz to 12.75 GHz	-49.02	36.02	
12.75 GHz to 20 GHz	-49.92	36.92	

Table 15. Measurements result for Spurious Emission in T channel



Ref Lvi -8.9 dBm RBW 50 kHz RF Att 0 dB -36.98 dBm 1.97302500 GHz VBW SWT 500 kHz 5 ms Unit dBm -8.9 51.1 BB Offs -36.98 dB .97302500 GH A -2 СН .0000 000 MH -3 mal MM Awa in 1MU U. ... Hall Μ. -40 -6 -8 -100 -108 Start 1.973025 GHz 100 kHz/ Stop 1.974025 GHz Date: 24.JUL.2003 18:27:15

1973.025 MHz-1974.025 MHz

1974.025 MHz-1974.975 MHz



1990.025 MHz-1990.975 MHz



1990.975 MHz-1991.975 MHz





1991.975 MHz-1992.975 MHz

1992.975 MHz-2000 MHz

24,JUL,2003 16;41;21

Date:

5. UMTS INDOOR2 IBTS, 45W MODE, 24V DC WITH 3 CARRIERS

Table 16 to 18 show the the results for Spurious Emissions at Antenna Terminals for the configuration D.

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel B 1932.4 MHz Sector 1	Margin (dB)	Limit (dBm)
9 kHz to 1GHz	-79.89	66.89	
1 GHz to 1.92 GHz	-75.89	62.89	
1920 MHz to 1927.025 MHz	-19.51	6.51	
1927.025 MHz to 1928.025 MHz	-21.25	8.25	
1928.025 MHzto 1929.025 MHz	-20.13	7.13	
1929.025 MHz to 1929.975 MHz	-18.90	5.9	
1935.025 MHz to 1935.975 MHz	-27.79	14.79	-13
1935.975 MHz to 1936.975 MHz	-19.41	6.41	
1936.975 MHz to 1937.975 MHz	-19.92	6.92	
1937.975 MHz to 2000 MHz	-17.92	4.92	
2000 MHz to 3 GHz	-38.58	25.58	
3 GHz to 12.75 GHz	-49	36	
12.75 GHz to 20 GHz	-49.91	36.91	

Table 16. Measurements result for Spurious Emission in B channel



1920 MHz- 1927.025 MHz



1927.025 MHz-1928.025 MHz



¹¹ Spectrum lines at 9 kHz are internal DC spectrum line of Analyzer

RBW 50 kHz RF Att 0 dB Ref Lvl -2.9 dBm RBW 50 kHz RF Att 0 dB Ref Lvi -32.97 dBm 1.92802500 GHz -18.90 dBm 1.92996718 GHz 500 kHz 5 ms VBW 500 kHz VBW SWT Unit SWT Unit dBm -2.9 dBm 5 ms -2.9 -2.1 51.1 dB Offs ▼1 [T1] -32.97 dBm 51.1 dB Offse ▼1 [T1] 18.90 Α -1 -1 СН -20.13 dB PWR СН в₩ .0000 ю мн -20 -2 Muhu Jahry Martin 1945 unh moun AVG -40 -4 -50 -5 -60 -6 -80 -8 -90 _0 С -100 -102 -10 -10 Start 1.929 GHz 97.5 kHz/ Stop 1.929975 GHz Start 1.928025 GHz 100 kHz/ Stop 1.929025 GHz Date: 23.JUL.2003 09:20:01 23.JUL.2003 09:19:01 Date: 1945.025 MHz-1945.975 MHz 1945.975 MHz-1946.975 MHz Ref Lvl -2.9 dBm 0 dB Ref Lvl -2.9 dBm 0 dB RBW VBW 50 kHz RF Att RBW 50 kHz RF Att 500 kHz 5 ms 500 kHz 5 ms VBW SWT SWT Unit Unit dBm -2.9 -2.9 51.1 dB Offse ▼1 [T1] 51.1 dB Offse ₹1 -27 79 dBm 13 GHz (T1) -1 -10 СН −WR -19 41 dB СН -2 -2 . PV 1WY with -4 -41 -5 -51 -8 -81

1928.025 MHz-1929.025 MHz

-9 -100 -102

1946.975 MHz-1947.975 MHz

95 kHz∕

1947.975 MHz-2000 MHz

100 kHz/

1929.025 MHz-1929.975 MHz

dBm

dBm

dBm

С

Stop 1.946975 GHz

A

RМ

Start 1.945025 GHz

23.JUL.2003 09:20:59

Date:

-9

-100 -102

Date:

Start 1.945975 GHz

23.JUL.2003 09:22:11

Stop 1.945975 GHz



Radio Test Report for the qualification of the UMTS 1900 iBTS according to FCC Part 24

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel M 1960 MHz Sector 2	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-79.50	66.5	
1 GHz to 1.92 GHz	-75.49	62.49	
1920 MHz to 1949.525 MHz	-19.32	6.32	
1949.525 MHz to 1950.525 MHz	-20.74	7.74	
1950.525 MHzto 1951.525 MHz	-20.74	7.74	
1951.525 MHz to 1952.475 MHz	-20.45	7.45	
1967.525 MHz to 1965.475 MHz	-25.18	12.18	-13
1968.475 MHz to 1969.475 MHz	-20.3	7.3	
1969.475 MHz to 1970.475 MHz	-20.89	7.89	
1970.475 MHz to 2000 MHz	-17.4	4.4	
2000 MHz to 3 GHz	-38.58	25.58	
3 GHz to 12.75 GHz	-49	36	
12.75 GHz to 20 GHz	-48.75	35.75	

Table 17. Measurements result for Spurious Emission in M channel


1920 MHz- 1949.525 MHz

1949.525 MHz-1950.525 MHz



Ref Lvl 1.1 dBm RBW 50 kHz RF Att 0 dB -33.33 dBm 1.95052500 GHz VBW SWT 500 kHz 5 ms Unit dBm 1.1 51.1 dB Offs -33.33 dB .95052500 GH A -10 СН вu 1.0000 0000 MH -20 -3 and when the token when ny you where we want alayou uppor ullu mpre IRM Mupa -5 -98.9 Start 1.950525 GHz 100 kHz/ Stop 1.951525 GHz Date: 24.JUL.2003 10:23:40

1950.525 MHz-1951.525 MHz

1951.525 MHz-1952.475 MHz







Ref Lvl 1.1 dBm RBW 50 kHz RF Att 0 dB Ref Lvl RBW 1 MHz RF Att 0 dB -32.75 dBm 1.96947500 GHz VBW SWT 500 kHz 5 ms -17.40 dBm 1.97047500 GHz VBW SWT 10 MHz 5 ms Unit Unit dBm dBm 1.1 1.1 51.1 dB Offs 51.1 dB Offs -32.75 dB .96947500 GH A .97047 500 GH -10 -10 СН 1.0000 0000 MH Rω -2 -20 land -30 WGN mort phraps MUNU www.haha www outros IRM RM MAN Anna MARM -5 -51 -61 -71 -9 -98. -98.9 Start 1.969475 GHz 100 kHz/ Stop 1.970475 GHz Start 1.970475 GHz 2.9525 MHz/ Stop 2 GHz 24.JUL.2003 10:31:41 24.JUL.2003 10:35:10 Date: Date: 2GHz-3GHz 3GHz- 12.75 GHz RBW VBW SWT 1 MHz 10 MHz Ref Lvl -15.9 dBm RF Att 0 dB Ref Lvl -21.5 dBm RBW VBW 1 MHz 10 MHz RF Att 0 dB -38.58 dBm -48.96 dBm 10.95240481 GHz 5 ms Unit dBr Unit SWT 56 ms dBm -15.9 -20 51.1 dB Offse -21. 36.5 dB Offs ▼1 -48.96 dBr [T1] 95240 481 GH -3 -41 -51 -5 -61 -81 -8 -9 -10 -10 -110 -11 -115 -121 100 MHz/ Start 3 GHz Stop 12.75 GHz Start 2 GHz Stop 3 GHz 975 MHz/ 24.JUL.2003 10:18:06 24.JUL.2003 16:20:06 Date: Date: 9 GHz-12.75 GHz 1 MHz 10 MHz RF Att 0 dB RBW Ref Lvl ٧BW -21.5 dBm SWT 41 ms Unit dBr -21. 36.5 BOff ▼1 [T1] -49.78 dBn 2565130 GHz -4 -50 -6 -8 -90 -10

1969.475 MHz-1970.475 MHz

1970.475 MHz-2000 MHz

24,JUL,2003 16;21;03

Start 12.75 GHz

-110

Date:

725 MHz/

Stop 20 GHz

Frequency band	SPURIOUS EMISSION LEVEL (dBm) Channel T 1987.6 MHz Sector 3	Margin (dB)	Limit (dBm)
9 kHz to 1 GHz	-76.74	63.74	
1 GHz to 1927.6 MHz	-32.62	19.62	
1927.6 MHz to 1982.025 MHz	-17.81	4.81	
1982.025 MHz to 1983.025 MHz	-20.84	7.84	
1983.025 MHzto 1984.025 MHz	-20.32	7.32	
1984.025 MHz to 1984.975 MHz	-27.37	14.37	
1990.025 MHz to 1990.975 MHz	-19.42	6.42	-13
1990.975 MHz to 1991.975 MHz	-20.58	7.58	
1991.975 MHz to 1992.975 MHz	-21.39	8.39	
1992.975 MHz to 2000 MHz	-17.35	4.35	
2000 MHz to 3 GHz	-39.81	26.81	
3 GHz to 12.75 GHz	-49.14	36.14	
12.75 GHz to 20 GHz	-48.75	35.75	

Table 18. Measurements result for Spurious Emission in T channel



9 kHz-1 GHz

1 GHz-1.92 GHz



1973.025 MHz-1974.025 MHz

1974.025 MHz-1974.975 MHz



1990.025 MHz-1990.975 MHz



1990.975 MHz-1991.975 MHz





1991.975 MHz-1992.975 MHz

1992.975 MHz-2000 MHz

24,JUL,2003 17;19;21

Date:

3.5.3 TEST PROCEDURE

The equipment was configured as shown in Figure 6.



Figure 6. Test configuration for Spurious Emission

For these measurements, three benches have been used.

The bench 1 is used to measure spurious near the Tx band.

The bench 2 and 3 use respectively a stop band filter and a high pass filter in order to filter out the TX band of the iBTS and only measure the spurious created inside the iBTS.

The spectrum analyzer has the following setting in the 1 MHz bands immediately outside and adjacent to the frequency block:

Resolution Bandwidth	50 kHz	
Video Bandwidth	5 / 500 kHz	
Reference Level Offset	Corrected to take into account cables and attenuator losses	

As regards to the other bands, the following setting is applied:

Resolution Bandwidth	1 MHz (see Note)
Video Bandwidth	10 MHz
Reference Level Offset	Corrected to take into account cables and attenuator losses

Note:

Just beside the 1 MHz bands immediately adjacent to the frequency block, the measure has been performed with 50kHz resolution bandwidth instead of 1 MHz. With this resolution bandwidth, **integrated over 1 MHz**, a better estimation of spurious power has been achieved (in the case of RBW 1MHz influence from the carrier power on the measurement has been observed)

3.6. CONCLUSION

FCC part 24 tests have been performed. Test results comply with all the requirements.

3.7. MEASUREMENT EQUIPMENT LIST

Equipment Description	Manufacturer	Model	Serial Number	Calibration
Spectrum Analyzer	Rohde & Schwarz	FSEM	525495	25/07/02
Vector Signal Analyzer	Agilent	E4406A	525201	31/01/03
Power Meter	Gigatronics	8542C	511322	27/11/01
Power sensor	Gigatronics	80401A	515344	20/05/03
Power Supply	Hewlett Packard	E3630A	511497	27/03/03
Network Analyzer	Hewlett Packard	8719D	521768	03/12/01
Network Analyzer	Rohde & Schwarz	ZVRE	500701	08/08/01
Calibration Kit	Hewlett Packard	85032B	-	21/05/01
High Pass Filter	Trilithic	4HC2800/13 G-3- KK 9745041	23042	N/A
Notch Filter	TEMEX	CRL 21304006A	-	N/A
40dB attenuator	BIRD	50-A-MFN-40	-	N/A
10dB attenuator	Radiall	R417010128	-	N/A
30dB attenuator HF	Hewlett Packard	8498A	519473	N/A
Catapult	SUN Microsystems	ULTRA 10	530797	N/A

Table 19 is a list of the measurement equipments used in these tests.

Table 19. Measurement equipment list

4. TECHNICAL STATUS OF THE MODULES CONSTITUTING THE TESTED EQUIPMENT

Conf. #	Designation	Hardware code / Software version	Release	Manufacturer	Serial number
	Indoor 2 iBTS	NTBY06AA / v03.D5.0	D2	Nortel Networks	SNMN75007TZA
	iCU	NTBY58AA	D3	SANMINA	SNMN75007UCL
	MCA	NTBY90AA	D1	SANMINA	SNMN75007KT1
	Interconnect	NTBY76AA	P1	SANMINA	SNMN27000800
		NTUM00AA /			NNTM7503B3EF
	CEM (digital shelf slot 1)	V03D5.0_E09.0	D9	Nortel Networks	
		NTUM10EA /	_		
	IRM (digital shelf slot 2)	V03D5.0_E05.0	P1	Nortel Networks	NNTM7502DTSD
		NTGY25AA /			
	CCM Board (digital shelf slot 4)	V03D5.0_E12.0	14	Nortel Networks	NNTM5330LH0B
A B	CEM (digital shelf slot 6)	NTUM00AA / V03D5.0_E09.0	01	Nortel Networks	NNTM7503OR10
	CEM (digital shelf slot 7)	NTUM00AA / V03D5.0_E09.0	01	Nortel Networks	NNTM7503L4N8
	CEM (digital shelf slot 8)	NTUM00AA / V03D5.0_E09.0	G6	Nortel Networks	NNTM7503L503
	GPSAM (digital shelf slot 10)	NTUM24AA	D3	Nortel Networks	NNTM7502E0HH
	DDM (slot 1)	NTUM42AA	D1	Forem	FORM01411850
	DDM (slot 2)	NTUM42AA	D1	Forem	FORM01411847
	DDM (slot 3)	NTUM42AA	D1	Forem	FORM01428023
	MCPA UMTS (slot 1)	NTUM30PA	D2	Powerwave	PWWT03DC0NE9
	MCPA UMTS (slot 2)	NTUM30PA	D2	Powerwave	PWWT03D9DJX9
	MCPA UMTS (slot 3)	NTUM30PA	D2	Powerwave	PWWT03D9DJT6
С	ТМА	NTUM35AA	D1	FOREM	FORM01429981
	DC / DC Converter shelf	NTBY51AA	00	DELTA	EN032502S0
	DC / DC Converter		01		ENGODODALA
	Rectifier (slot 1)	NTBY5101	51	DELTA Electronics	EN030900111
	DC / DC Converter		64		EN02000014E
С	Rectifier (slot 2)	NIBISIUI	51	DELTA Electronics	EN030900145
D	DC / DC Converter		C1	DELTA Electronica	EN020000126
Е	Rectifier (slot 3)		31	DELTA Electronics	E11030900120
	DC / DC Converter		C1	DELTA Electronica	EN030000141
	Rectifier (slot 4)		51	DELTA Electronics	E11030900141
	DC / DC Converter	ΝΤΒΥ98ΑΑ	D2	SANMINA	SNMN75007DEC
	External Alarm Kit		52	0,	51111110007010

Radio Test Report for the qualification of the UMTS 1900 iBTS according to FCC Part 24

Conf. #	Designation	Hardware code / Software version	Release	Manufacturer	Serial number
	Outdoor iBTS	NTUM70AA / v03.D5.0	D3	Nortel Networks	SNMN750096AS
	iDACS	NTUM80AA	D3	LIEBERT	HIRSA200006E
	INTERCO	NTUM60AA	D1		FCIN25000315
	User ICO	NTUM37AA	D2	SANMINA	SNMN75004YW2
	AC main	NTUM39AA	D2	SANMINA	SNMN75004YNF
	Filtering box	NTUM90BA	D1	SANMINA	SNMN7500BGLF
	Rectifier shelf	NTUM87AA	D2	CHEROKEE	PITS01C30895
	LPPCM	NTUM98BA	D2	SANMINA	SNMN75005IYL
	SPCM (Rectifier control board)	NTUM85AA	D3	CHEROKEE	PITS01U31380
	Rectifier (rectifier slot 1)	NTUM86AA	D1	CHEROKEE	PITS01030217
	Rectifier (rectifier slot 2)	NTUM86AA	D2	CHEROKEE	PITS01030221
	Rectifier (rectifier slot 3)	NTUM86AA	D2	CHEROKEE	PITS01030225
	Rectifier (rectifier slot 4)	NTUM86AA	D1	CHEROKEE	PITS01030462
	Rectifier (rectifier slot 5)	NTUM86AA	D1	CHEROKEE	PITS01030560
	Rectifier (rectifier slot 6)	NTUM86AA	D1	CHEROKEE	PITS01H34417
	Rectifier (rectifier slot 7)	NTUM86AA	D1	CHEROKEE	PITS01030214
	Digital Shelf	NTUM20AA	D2	SANMINA	SNMN750050RX
_	CEM (digital shelf slot 1)	NTUM00AA / V03D5.0 E09.0	D9	Nortel Networks	NNTM7503B3EF
F G	TRM (digital shelf slot 2)	NTUM10EA / V03D5.0 E05.0	P1	Nortel Networks	NNTM7502DTSD
	CCM Board (digital shelf slot 4)	NTGY25AA / V03D5.0 E12.0	14	Nortel Networks	NNTM5330LH0B
	CEM (digital shelf slot 6)	 NTUM00AA / V03D5.0_E09.0	01	Nortel Networks	NNTM7503OR10
	CEM (digital shelf slot 7)	NTUM00AA / V03D5.0_E09.0	01	Nortel Networks	NNTM7503L4N8
	CEM (digital shelf slot 8)	NTUM00AA / V03D5.0_E09.0	G6	Nortel Networks	NNTM7503L503
	GPSAM (digital shelf slot 12)	NTUM24AA	D7	Nortel Networks	NNTM7503CVP9
	DDM (slot 1)	NTUM42AA	D1	Forem	FORM01411850
	DDM (slot 2)	NTUM42AA	D1	Forem	FORM01411847
	DDM (slot 3)	NTUM42AA	D1	Forem	FORM01428023
	MCPA UMTS (slot 1)	NTUM30PA	D2	Powerwave	PWWT03DC0NE9
	MCPA UMTS (slot 2)	NTUM30PA	D2	Powerwave	PWWT03D9DJX9
	MCPA UMTS (slot 3)	NTUM30PA	D2	Powerwave	PWWT03D9DJT6
	ТМА	NTUM35AA	D1	FOREM	FORM01429981
	Feeder cable (3dB)	-	-	-	-
	DDM/bulkhead cable with gas surge protection	NTA595XA	-	RADIALL	AO868993

5. ABBREVIATIONS AND DEFINITIONS

5.1. ABBREVIATIONS

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
ARFCN	Absolute Radio Frequency Channel Number
BER	Bit Error Ratio
BLER	Block Error Ratio
BTS	Base Transceiving Station
CDMA	Code Division Multiple Access
CW	Carrier Wave
DCH	Dedicated Channel
DPCH	Dedicated Physical Channel
EUT	Equipment Under Test
EVM	Error Vector Magnitude
FDD	Frequency Division Duplex
N/A	Not Applicable
OTSR	Omni Transmit, Sectored Receive
PHS	Portable Handset System
SA	Spectrum Analyzer
sanf	Spectrum analyzer noise floor
SG	Signal Generator
SSDT	Site Selection Diversity Transmission
STSR	Sectored Transmit, Sectored Receive
SUT	System Under Test
UARFCN	UTRA ARFCN
UMTS	Universal Mobile Telecommunication System
VSA	Vector Signal Analyzer
WCDMA	Wide-band CDMA

5.2. **DEFINITIONS**

Frequency Channel

	В	Μ	Т
Tx (MHz)	1932.4	1960	1987.6
Rx (MHz)	1852.4	1880	1907.6

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