

# TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B

To: FCC Part 22: 2002

Test Report Serial No: RFI/MPTB2/RP45184JD05A

Supersedes Test Report Serial No: RFI/MPTB1/RP45184JD05A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director:	Checked By:
Richard Jackin	anges -
Tested By:	Release Version No: PDF01
Montha Dercenzi	
Issue Date: 15 October 2003	Test Dates: 05 September 2003 to 11 September 2003

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Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 2 of 108 Issue Date: 15 October 2003

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**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### Table of Contents

1. Client Information	4
2. Equipment Under Test (EUT)	5
3. Test Specification, Methods And Procedures	11
4. Deviations From The Test Specification	13
5. Operation Of The EUT During Testing	14
6. Summary Of Test Results	15
7. Measurements, Examinations And Derived Results	16
8. Measurement Uncertainty	93
9. Measurement Methods	94
Appendix 1. Test Equipment Used	102
Appendix 2. Test Configuration Drawings	104

Test Report Serial No: RFI/MPTB2/RP45184JD05A Supersedes Test Report Serial No: RFI/MPTB1/RP45184JD05A

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 1. Client Information

Company Name:	Ericsson AB
Address:	Bergfotsgatan 2 Mölndal SE-431 84 Sweden
Contact Name:	Mr Pelle Hellberg

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 2. Equipment Under Test (EUT)

The following information has been supplied by the client:

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

FCC ID: B5KBKRC16184-7

No.	Unit	Model Number	Serial Number	<b>Revision Number</b>
1.	RBS 2308 Cabinet	KRC 161 84/7	AE50310239	R5B

Note The above unit was tested for all conducted measurements at Mölndal.

No.	Unit	Model Number	Serial Number	<b>Revision Number</b>
1.	RBS 2308 Cabinet	KRC 161 84/7	AE50217707	R5B

Note The above unit was tested for radiated spurious emissions at RFI in Basingstoke.

#### RBS 2308 (115 V, 60 Hz AC) Hardware List (Conducted Measurements at Mölndal)

Unit	Model Number	Serial Number	Revision Number
Mounting Base	SEB 112 1133/3	S952223482	R1A
IXU21	BOE 602 15/2	AE50311237	R3B
RRU-M	KRC 161 84/7	AE50310239	R5B
Radio Access Board 1	ROA 117 4853/1	AE50269311	R2F
Radio Access Board 2	ROA 117 4853/1	AE50269720	R2F
Digital Radio Board 1	ROA 117 4767/2	AE50249323	R2B
Digital Radio Board 2	ROA 117 4767/2	AE50249311	R2B
Duplex Filter 1	KRF 102 249/1	TF31003248	R1A
Duplex Filter 2	KRF 102 249/1	TF31003251	R1A
Heater	BPC 111 25/1	X031000925	R3C
PSU	BML 151 23/1	X701002653	R4D
Power Interface Board	ROA 117 4775/1	S952192044	R2A
Y Interface Board	ROA 117 4799/3	S952181811	R1B
Radio Interface Board	ROA 117 4831/1	S952182538	R2A

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### RBS 2308 (115 V, 60 Hz AC) Hardware List (Radiated Measurements at Basingstoke)

Unit	Model Number	Serial Number	<b>Revision Number</b>
IXU21	BOE 602 15/2	AE50311242	R3B
Mounting Base	SEB 112 1133/2	S952121720	R2A
RRU Edge 850 Transceiver	KRC 161 84/7	AE50217707	R5B

## 2.2. Description Of EUT

The equipment under test is an RBS 2308 GMSK/8PSK base transceiver station operating in the GSM 850 MHz band.

## 2.3. Modifications Incorporated In EUT

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

**Conformance Testing Department** 

Test Of:	Ericsson AB.	
	RBS 2308 850 MHz R5B	
To:	FCC Part 22: 2002	

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 7 of 108 Issue Date: 15 October 2003

## 2.4. Additional Information Related To Testing

Power Supply Requirement:	Nominal 115 V 60 Hz	z AC Mains supp	ly
Intended Operating Environment:	Within GSM Network Coverage		
Equipment Category:	Fixed (Base Station)		
Type of Unit:	GSM 850 Base Tran	sceiver Station	
Interface Ports:	Telecommunication Line – E1 or T1 PCM x 2 (G703) TIB – Synchronisation Interface Mains 115 V AC Input DVT – RBS Master Control RF x 2 RXBP x 2		
Transmit Frequency Range	869.0 MHz to 894.0 MHz		
Transmit Channels Tested	Channel ID	Channel Number	Channel Frequency (MHz)
	GMSK	128	869.2
	GMSK	129	869.4
	GMSK	189	881.4
	GMSK	250	893.6
	GMSK	251	893.8
	8PSK	128	869.2
	8PSK	129	869.4
	8PSK	189	881.4
	8PSK	250	893.6
	8PSK	251	893.8
Receive Frequency Range	824.0 MHz to 849.0 MHz		
Maximum Power Output	+34.33 dBm		

**Conformance Testing Department** 

Test Of:	Ericsson AB.	
	RBS 2308 850 MHz R5B	
To:	FCC Part 22: 2002	

# 2.5. Support Equipment – Mölndal

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

Description:	BSC Simulator
Brand Name:	RBS Master 2
Model Name or Number:	LPY 107 1007/1 R1F
Serial Number:	00163
FCC ID Number:	Not applicable
Cable Length And Type:	3 m, 9 pin, D Type
Connected to Port:	G703-1 ABIS
Cable Length And Type:	3 m, 9 pin, D Type, Shielded
Connected to Port:	G.703-2 ABIS
Cable Length And Type:	3 m, 9 pin, D type
Connected to Port:	RBS DVT
Cable Length And Type:	2 m, BNC
Connected to Port:	Ext Ref In
Cable Length And Type:	2 m, BNC
Connected to Port:	TRIG Out
Cable Length And Type:	2 m, BNC
Connected to Port:	10 MHz Out
Cable Length And Type:	1.5m, 9 Way, D Type
Connected to Port:	PC DVT
Cable Length And Type:	1.5m, 9 Way, D Type
Connected to Port:	PC Ctrl
Cable Length And Type:	2m, Mains Cable
Connected to Port:	AC Mains In
Cable Length And Type:	3 m, 34 Way Ribbon Cable
Connected to Port:	TIB In/Out

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## Support Equipment – Mölndal (continued)

Description:	Computer
Brand Name:	Compaq
Model Name or Number:	Evo
Serial Number:	CZC3230BNT
FCC ID Number:	Not applicable
Cable Length And Type:	1.5 m, 9 Pin D Type
Connected to Port:	PC DVT
Cable Length And Type:	1.5 m, 9 Pin D Type
Connected to Port:	PC Ctrl
Cable Length And Type:	2 m, Mains Cable
Connected to Port:	AC Input
Cable Length And Type:	0.3 m, GPIB
Connected to Port:	IEEE Bus
Cable Length And Type:	4 m, 8 Core
Connected to Port:	Network
Cable Length And Type:	5 m, 7 Way
Connected to Port:	Mouse
Cable Length And Type:	5 m, 7 Way
Connected to Port:	Keyboard

Test Of:	Ericsson AB.		
	RBS 2308 850 MHz R5B		
To:	FCC Part 22: 2002		

## 2.6. Support Equipment - Basingstoke

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

Description:	Laptop PC	
Brand Name:	Login	
Model Name or Number:	Rocky II Plus	
Serial Number:	1974449	
FCC ID Number:	Not stated	
Cable Length And Type:	9 Pin D-Connector, Serial Cable 2.5m Shielded	
Connected to Port:	PC Control on RBS-Master	

Description:	Controller RBS	
Brand Name:	Ericsson	
Model Name or Number:	RBS Master 2	
Serial Number:	LPY 107 1007/1	
FCC ID Number:	None stated	
Cable Length And Type:	9 Pin D-Connector, Serial Cable 15m Shielded (x2)	
Connected to Port:	G.703 Ports A&B (on RBS) to ports A&B (on base station)	

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 3. Test Specification, Methods And Procedures

## 3.1. Test Specification

Reference:	FCC Part 22: 2002 Subpart C (Operational and Technical Requirements)	
Title:	Code of Federal Regulations, Part 22 (47CFR) Personal Communication Services.	
Comments:	None.	
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.	

Reference:	FCC Part 2: 2002
Title:	Code of Federal Regulations, Part 2 (47CFR) Frequency allocations and radio treaty matters; General Rules and Regulations
Comments:	None.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### 3.2. Methods And Procedures

The methods and procedures used were as detailed in:

47CFR: Part 22 (2002) Title: Federal Communications Commission: Code of Federal Regulations 47: Public Mobile Services.

47CFR: Part 2 (2002) Title: Federal Communications Commission: Code of Federal Regulations 47: Telecommunication

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

ANSI C63.2 (1996) Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001) Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1998) Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988) Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

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 measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 4. Deviations From The Test Specification

None

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 5. Operation Of The EUT During Testing

## 5.1. Operating Conditions

The EUT was tested in a normal laboratory environment.

## 5.2. Operating Modes

The EUT operates in modulation modes 8PSK and GMSK and therefore all tests have been performed in both modes.

There were two transceivers tested, each transceiver has 2 transmitter outputs TX0-TX1 for the first transceiver and TX2-TX3 for the second. This gives a total of 4 transmitters. All transmitters are identical with regards to operating modes.

For Occupied Bandwidth, Band Edge testing and Frequency Stability, TX0 and TX2 were chosen to represent each transceiver.

Modulation Characteristics were performed on TX1 and TX3.

Carrier Output Power and Spurious Emissions were tested all on all 4 transceivers.

All transmitters TX0, TX1, TX2 and TX3 are identical in all respects. Testing was performed on the specified TX's to show that they were indeed identical.

Tests were performed on bottom (128), middle(189) and top(251) channels unless stated otherwise for each measurement.

The ARFCN's tested at Band Edges needed to have their power levels reduced by 4 dB in order to fulfil the requirements. The ARFCN's adjacent to these channels were also tested to show that the requirements were met for these ARFCN's at full output power.

## 5.3. Configuration and Peripherals

The EUT was tested in the following configuration:

As a standalone RBS 2308 base transceiver station.

Test Of:	Ericsson AB.		
	RBS 2308 850 MHz R5B		
To:	FCC Part 22: 2002		

# 6. Summary Of Test Results

Range Of Measurements	Specification Reference	Mode of Operation	Port Type	Compliancy Status
Transmitter Carrier Output Power	Part 2 of CFR 47: 2002, Section 2.1046(a)	Transmit	Antenna Terminals	Complied
Transmitter Modulation Characteristics	Part 2 of CFR 47: 2002, Section 2.1047	Transmit	Antenna Terminals	Complied
Transmitter Frequency Stability (Temperature Variation)	Part 22 of CFR 47: 2002, Section 2.1055/22.355	Transmit	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	Part 22 of CFR 47: 2002, Section 2.1055/22.355	Transmit	Antenna Terminals	Complied
Transmitter Occupied Bandwidth	Part 2 & 22 of CFR 47: 2002 Sections 2.1049/22.917	Transmit	Antenna Terminals	Complied
Transmitter Conducted Out of Band Emissions	Part 2 & 22 of CFR 47: 2002 Sections 2.1051/22.917	Transmit	Antenna Terminals	Complied
Conducted Emissions, Inband Intermodulation	Part 2 & 22 of CFR 47: 2002 Sections 2.1051/22.917	Transmit	Antenna Terminals	Complied
Transmitter Conducted Emissions at Band Edges	Part 22 of CFR 47: 2002 Section 2.1051/22.917	Transmit	Antenna Terminals	Complied
Electric Field Strength, Spurious Emissions (30 MHz to 10.0 GHz)	Part 2 & 22 of CFR 47: 2002 Section 2.1053/22.913	Transmit	Enclosure	Complied

## 6.1. Location Of Tests

All the measurements described in this report were performed at the premises of Ericsson AB, Bergfotsgatan 2, Mölndal, SE-431 84, Sweden and Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 7. Measurements, Examinations And Derived Results

## 7.1. General Comments

7.1.1. This section contains test results only. Details of the test methods and procedures can be found in Section 9 of this report.

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 8 for details of measurement uncertainties.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.2. Transmitter Carrier Output Power: Section 2.1046 (a)

7.2.1. The EUT was configured as for Conducted Carrier Output Power Measurements testing as described in Section 9 of this report.

7.2.2. Tests were performed to identify the maximum transmit power in accordance with FCC Part 2.1046(a) for conducted power, with reference to TIA\_EIA\_603B.

### Results: GMSK – TX0

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.23006	34.24
Middle	881.45010	34.33
Тор	893.85010	34.30

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 18 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch128. +34dBm. OutputPower. GMSKmode TX0. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 16:34:14



Title: Testing for Ericsson AB, KB52308 850 MH2, 451840D05 Comment A: Ch251. +34dBm. OutputPower. GMSK TX0. FCC Part 2.1046(a) Date: 5.SEP.2003 16:42:39 
 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +34dEm. OutputPower. GMSK TX0. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 16:39:30

**Conformance Testing Department** 

Test Of:	Ericsson AB.		
	RBS 2308 850 MHz R5B		
To:	FCC Part 22: 2002		

# Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

## Results: GMSK – TX1

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.27014	34.22
Middle	881.47014	34.23
Тор	893.83006	34.19

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 20 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch128. +34dBm. OutputPower. GMSK TX1. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 16:47:28



Title: Testing for Ericsson AB, KB52308 850 MH2, 451840D05 Comment A: Ch251. +34dBm. OutputPower. GMSK TX1. FCC Part 2.1046(a) Date: 5.SEP.2003 16:52:01

Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +34dEm. OutputPower. GMSK TX1. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 16:50:16

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 21 of 108 Issue Date: 15 October 2003

## Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

#### Results: GMSK – TX2

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.21002	34.13
Middle	881.45010	34.22
Тор	893.78997	34.19

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 22 of 108 Issue Date: 15 October 2003



### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch128. +34dBm. OutputPower. GMSK TX2. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 16:59:30



 Title:
 Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05

 Comment A:
 Ch251. +34dBm. OutputPower. GMSK TX2. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:08:18

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +34dEm. OutputPower. GMSK TX2. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:02:04

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 23 of 108 Issue Date: 15 October 2003

## Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

### Results: GMSK – TX3

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.25010	33.99
Middle	881.43006	34.14
Тор	893.83006	33.97

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 24 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch128. +34dBm. OutputPower. GMSK TX3. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:11:03



Title: Testing for Ericsson AB, KB52308 850 MH2, 451840D05 Comment A: Ch251. +34dBm. OutputPower. GMSK TX3. FCC Part 2.1046(a) Date: 5.SEP.2003 17:15:05

Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +34dEm. OutputPower. GMSK TX3. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:13:22

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 25 of 108 Issue Date: 15 October 2003

## Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

## Results: 8PSK (EDGE) – TX0

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.27014	34.22
Middle	881.49018	34.29
Тор	893.85010	34.22

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 26 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A: Ch128. +30.7dBm. OutputPower. 8PSK TX0. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:56:33



Title: Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Comment A: Ch251. +30.7dBm. OutputPower. 8PSK TX0. FCC Part 2.1046(a) Date: 5.SEP.2003 18:00:09 
 Title:
 Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +30.7dBm. OutputPower. 8PSK TXO. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:58:24

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 27 of 108 Issue Date: 15 October 2003

Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

## Result: 8PSK (EDGE) – TX1

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.23006	34.24
Middle	881.41002	34.24
Тор	893.83006	34.19

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 28 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz, 45184JD05

 Comment A:
 Ch128, +30.7dBm. OutputPower. 8PSK TX1. FCC Part 2,1046(a)

 Date:
 5.SEP.2003 18:02:14



Title: Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Comment A: Ch251. +30.7dBm. OutputPower. 8PSK TX1. FCC Part 2.1046(a) Date: 5.SEP.2003 18:05:45 
 Title:
 Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05

 Comment A:
 Ch189. +30.7dBm. OutputPower. 8PSK TX1. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 18:04:13

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 29 of 108 Issue Date: 15 October 2003

## Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

## Results: 8PSK (EDGE) – TX2

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.21002	34.04
Middle	881.43006	34.19
Тор	893.85010	34.04

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 30 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz, 45184JD05

 Comment A:
 Ch128, +30.7dBm. OutputPower. 8PSK TX2. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:44:14



Title: Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Comment A: Ch251. +30.7dBm. OutputPower. 8PSK TX2. FCC Part 2.1046(a) Date: 5.SEP.2003 17:47:27

Title:
 Testing for Ericsson AB, RBS2308 850 MHz, 45184JD05

 Comment A: Ch189, +30.7dBm, OutputPower, 8PSK TX2, FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:45:50

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002 TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 31 of 108 Issue Date: 15 October 2003

## Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

## Results: 8PSK (EDGE) – TX3

Channel	Frequency (MHz)	Level (dBm)
Bottom	869.23006	33.96
Middle	881.45010	33.99
Тор	893.87014	33.94

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 32 of 108 Issue Date: 15 October 2003



#### Transmitter Carrier Output Power: Section 2.1046 (a) (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A: Ch128. +30.7dBm. OutputPower. 8PSK TX3. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:36:46



Title: Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Comment A: Ch251. +30.7dBm. OutputPower. 8PSK TX3. FCC Part 2.1046(a) Date: 5.SEP.2003 17:42:07 
 Title:
 Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05

 Comment A: Ch189, +30.7dBm. OutputPower. 8PSK TX3. FCC Part 2.1046(a)

 Date:
 5.SEP.2003 17:39:48

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.3. Transmitter Modulation Characteristics: Section 2.1047

7.3.1. The EUT was configured as for Modulation Characteristics testing as described in Section 9 of this report.

7.3.2. Tests were performed to identify the modulation characteristics in accordance with FCC Part 2.1047, with reference to TIA\_EIA\_603B.

#### **Results: Middle Channel**

GMSK	Phase Error (°)		
	<b>TX</b> 1	<b>TX</b> 3	
Phase Error	3.51	3.46	
Мах	3.4	51	

8PSK	EVM (% RMS)		
	<b>TX</b> 1	TX3	
EVM	1.48	1.64	
Max EVM	1.	64	

8PSK	Origin Offset (dBc)			
	TX1	TX3		
Origin Offset	-44.28	-45.77		
Max OO	-44	.28		

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.4. Transmitter Frequency Stability (Temperature Variation): Section 22.355

7.4.1. The EUT was configured as for frequency stability measurements as described in Section 9 of this report.

7.4.2. Tests were performed to identify the maximum frequency error of the EUT with variations in ambient temperature.

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
-20	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
-10	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
0	869.2	869.199991	-9	-0.010	1.5	1.490	Complied
10	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
20	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
30	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
40	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
50	869.2	869.199991	-9	-0.010	1.5	1.490	Complied

### <u>Results: GMSK – TX0</u> Channel: 128 (869.2 MHz)

## Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.		
	RBS 2308 850 MHz R5B		
To:	FCC Part 22: 2002		

#### Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

#### <u>Results: GMSK – TX0</u> Channel: 251 (893.8 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
-20	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
-10	893.8	893.799988	-12	-0.013	1.5	1.487	Complied
0	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
10	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
20	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
30	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
40	893.8	893.799994	-6	-0.007	1.5	1.493	Complied
50	893.8	893.799990	-10	-0.011	1.5	1.489	Complied

### Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.		
	RBS 2308 850 MHz R5B		
To:	FCC Part 22: 2002		

#### Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

#### <u>Results: 8PSK – TX0</u> Channel: 128 (869.2 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
-20	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
-10	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
0	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
10	869.2	869.199991	-9	-0.010	1.5	1.490	Complied
20	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
30	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
40	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
50	869.2	869.199993	-7	-0.008	1.5	1.492	Complied

Frequency Variation From 869.2 MHz


**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

### <u>Results: 8PSK – TX0</u> Channel: 251 (893.8 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	893.8	893.799996	-4	-0.004	1.5	1.496	Complied
-20	893.8	893.799994	-6	-0.007	1.5	1.493	Complied
-10	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
0	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
10	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
20	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
30	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
40	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
50	893.8	893.799993	-7	-0.008	1.5	1.492	Complied

Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

### <u>Results: GMSK – TX2</u> Channel: 128 (869.2 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error ppm)	Limit (ppm)	Margin (ppm)	Result
-30	869.2	869.199996	-4	-0.005	1.5	1.495	Complied
-20	869.2	869.199995	-5	-0.006	1.5	1.494	Complied
-10	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
0	869.2	869.199991	-9	-0.010	1.5	1.490	Complied
10	869.2	869.199995	-5	-0.006	1.5	1.494	Complied
20	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
30	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
40	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
50	869.2	869.199994	-6	-0.007	1.5	1.493	Complied

Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

### <u>Results: GMSK – TX2</u> Channel: 251 (893.8 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	893.8	893.799995	-5	-0.006	1.5	1.494	Complied
-20	893.8	893.799995	-5	-0.006	1.5	1.494	Complied
-10	893.8	893.799995	-5	-0.006	1.5	1.494	Complied
0	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
10	893.8	893.799995	-5	-0.006	1.5	1.494	Complied
20	893.8	893.799994	-6	-0.007	1.5	1.493	Complied
30	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
40	893.8	893.799995	-5	-0.006	1.5	1.494	Complied
50	893.8	893.799992	-8	-0.009	1.5	1.491	Complied

Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

### <u>Results: 8PSK – TX2</u> Channel: 128 (869.2 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	869.2	869.199995	-5	-0.006	1.5	1.494	Complied
-20	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
-10	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
0	869.2	869.199990	-10	-0.012	1.5	1.488	Complied
10	869.2	869.199995	-5	-0.006	1.5	1.494	Complied
20	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
30	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
40	869.2	869.199991	-9	-0.010	1.5	1.490	Complied
50	869.2	869.199992	-8	-0.009	1.5	1.491	Complied

Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Temperature Variation): Section 22.355 (continued)

### <u>Results: 8PSK – TX2</u> Channel: 251 (893.8 MHz)

Temperature (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
-20	893.8	893.799994	-6	-0.007	1.5	1.493	Complied
-10	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
0	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
10	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
20	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
30	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
40	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
50	893.8	893.799992	-8	-0.009	1.5	1.491	Complied

Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 7.5. Transmitter Frequency Stability (Voltage Variation): Section 22.355

7.5.1. The EUT was configured as for frequency stability measurements as described in Section 9 of this report.

7.5.2. Tests were performed to identify the maximum frequency error of the EUT with variations in nominal operating voltage.

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	869.2	869.199991	-9	-0.010	1.5	1.490	Complied
115.00	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
132.25	869.2	869.199993	-7	-0.008	1.5	1.492	Complied

#### Results: GMSK – TX0 Channel: 128 (869.2 MHz)

Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: GMSK – TX0</u> Channel: 251 (893.8 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
115.00	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
132.25	893.8	893.799993	-7	-0.008	1.5	1.492	Complied

## Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: 8PSK – TX0</u> Channel: 128 (869.2 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	869.2	869.199992	-8	-0.009	1.5	1.491	Complied
115.00	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
132.25	869.2	869.199992	-8	-0.009	1.5	1.491	Complied

## Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: 8PSK – TX0</u> Channel: 251 (893.8 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	893.8	893.799991	-9	-0.010	1.5	1.490	Complied
115.00	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
132.25	893.8	893.799992	-8	-0.009	1.5	1.491	Complied

## Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: GMSK – TX2</u> Channel: 128 (869.2 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	869.2	869.199995	-5	-0.006	1.5	1.494	Complied
115.00	869.2	869.199994	-6	-0.007	1.5	1.493	Complied
132.25	869.2	869.199995	-5	-0.006	1.5	1.494	Complied

## Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: GMSK – TX2</u> Channel: 251 (893.8 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	893.8	893.799992	-8	-0.009	1.5	1.491	Complied
115.00	893.8	893.799994	-6	-0.007	1.5	1.493	Complied
132.25	893.8	893.799991	-9	-0.010	1.5	1.490	Complied

## Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: 8PSK – TX2</u> Channel: 128 (869.2 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
115.00	869.2	869.199993	-7	-0.008	1.5	1.492	Complied
132.25	869.2	869.199993	-7	-0.008	1.5	1.492	Complied

## Frequency Variation From 869.2 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## Transmitter Frequency Stability (Voltage Variation): Section 22.355 (Continued)

## <u>Results: 8PSK – TX2</u> Channel: 251 (893.8 MHz)

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
97.75	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
115.00	893.8	893.799993	-7	-0.008	1.5	1.492	Complied
132.25	893.8	893.799993	-7	-0.008	1.5	1.492	Complied

## Frequency Variation From 893.8 MHz



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

## 7.6. Transmitter Occupied Bandwidth: Section 2.1049(i)

7.6.1. The EUT was configured as for Occupied Bandwidth measurements as described in Section 9 of this report.

7.6.2. Tests were performed to identify the maximum bandwidth occupied by the fundamental frequency of the EUT.

## Results: GMSK, TX0 and TX2

тх	Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (kHz)
TX0	128	869.21703	3	3	240.48096
TX0	129	869.41904	3	3	240.48096
TX0	250	893.61503	3	3	240.48096
TX0	251	893.78297	3	3	240.48096
TX2	128	869.21904	3	3	242.48497
TX2	129	869.41703	3	3	240.48096
TX2	250	893.63307	3	3	240.48096
TX2	251	893.82305	3	3	238.47693

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 51 of 108 Issue Date: 15 October 2003



# Transmitter Occupied Bandwidth: Section 2.1049(i) (Continued)

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B FCC Part 22: 2002 To:

#### **TEST REPORT** S.No: RFI/MPTB2/RP45184JD05A Page 52 of 108 Issue Date: 15 October 2003



# Transmitter Occupied Bandwidth: Section 2.1049(i) (Continued)

Date: 8.SEP.2003 17:09:39

Conformance Testing Department

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 53 of 108 Issue Date: 15 October 2003

## Transmitter Occupied Bandwidth: Section 2.1049(i) (Continued)

## Results: 8PSK, TX0 and TX2

тх	Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (kHz)
TX0	128	869.13286	3	3	238.47693
TX0	250	893.63912	3	3	232.46493
TX0	251	893.83912	3	3	238.47693
TX2	128	869.25912	3	3	234.46894
TX2	250	893.65711	3	3	234.46894
TX2	251	893.85912	3	3	234.46894

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 54 of 108 Issue Date: 15 October 2003



# Transmitter Occupied Bandwidth: Section 2.1049(i) (Continued)

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 55 of 108 Issue Date: 15 October 2003



# Transmitter Occupied Bandwidth: Section 2.1049(i) (Continued)

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.7. Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917

7.7.1. The EUT was configured as for conducted emissions testing as described in Section 9 of this report.

7.7.2. Tests were performed to identify the maximum transmitter conducted emission levels.

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-39.70	-13.0	26.70	Complied
894.0 to 1000.0 MHz	-47.15	-13.0	34.15	Complied
1.0 to 5.0 GHz	-35.16	-13.0	22.16	Complied
5.0 to 10.0 GHz	-36.25	-13.0	23.25	Complied

## Result: GMSK, TX0 CH129 and TX1 CH154

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 57 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-21.96	-13.0	8.96	Complied
894.0 to 1000.0 MHz	-41.71	-13.0	28.71	Complied
1.0 to 5.0 GHz	-34.95	-13.0	21.95	Complied
5.0 to 10.0 GHz	-35.99	-13.0	22.99	Complied

# Results: GMSK, TX0 CH225 and TX1 CH250

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 59 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 60 of 108 Issue Date: 15 October 2003

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

## Results: GMSK, TX2 CH129 and TX3 CH154

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-42.80	-13.0	29.80	Complied
894.0 to 1000.0 MHz	-46.90	-13.0	33.90	Complied
1.0 to 5.0 GHz	-35.21	-13.0	22.21	Complied
5.0 to 10.0 GHz	-35.92	-13.0	22.92	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 61 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.				
	RBS 2308 850 MHz R5B				
To:	FCC Part 22: 2002				

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 62 of 108 Issue Date: 15 October 2003

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

## Results: GMSK, TX2 CH225 and TX3 CH250

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-22.43	-13.0	9.43	Complied
894.0 to 1000.0 MHz	-43.90	-13.0	30.90	Complied
1.0 to 5.0 GHz	-34.27	-13.0	21.27	Complied
5.0 to 10.0 GHz	-35.88	-13.0	22.88	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 63 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.			
	RBS 2308 850 MHz R5B			
To:	FCC Part 22: 2002			

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 64 of 108 Issue Date: 15 October 2003

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

## Results: 8PSK, TX0 CH129 and TX1 CH154

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-44.36	-13.0	31.36	Complied
894.0 to 1000.0 MHz	-47.00	-13.0	34.00	Complied
1.0 to 5.0 GHz	-35.43	-13.0	22.43	Complied
5.0 to 10.0 GHz	-34.79	-13.0	21.79	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 65 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-22.11	-13.0	9.11	Complied
894.0 to 1000.0 MHz	-40.04	-13.0	27.04	Complied
1.0 to 5.0 GHz	-34.81	-13.0	21.81	Complied
5.0 to 10.0 GHz	-36.53	-13.0	23.53	Complied

### Results: 8PSK, TX0 CH225 and TX1 CH250

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 67 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.			
	RBS 2308 850 MHz R5B			
To:	FCC Part 22: 2002			

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 68 of 108 Issue Date: 15 October 2003

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

## Results: 8PSK, TX2 CH129 and TX3 CH154

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Result
0.009 to 869.0 MHz	-43.99	-13.0	30.99	Complied
894.0 to 1000.0 MHz	-47.63	-13.0	34.63	Complied
1.0 to 5.0 GHz	-35.06	-13.0	22.06	Complied
5.0 to 10.0 GHz	-35.13	-13.0	22.13	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 69 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of:	Ericsson AB.			
	RBS 2308 850 MHz R5B			
To:	FCC Part 22: 2002			

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 70 of 108 Issue Date: 15 October 2003

Transmitter Conducted Out of Band Emissions: Section 2.1051/22.917 (Continued)

## Results: 8PSK, TX2 CH225 and TX3 CH250

Band	Peak Power (dBm)	Limit (dBm)	Margin (dB)	Results
0.009 to 869.0 MHz	-29.01	-13.0	16.01	Complied
894.0 to 1000.0 MHz	-38.84	-13.0	25.84	Complied
1.0 to 5.0 GHz	-34.89	-13.0	21.89	Complied
5.0 to 10.0 GHz	-35.46	-13.0	22.46	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

#### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 71 of 108 Issue Date: 15 October 2003



**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.8. Transmitter Conducted Intermodulation Responses: Section 2.1051/22.917 (a)

7.8.1. The EUT was configured as for conducted emissions testing as described in Section 9 of this report.

7.8.2. Tests were performed to identify the level of any Intermodulation responses present.

ΤХ	Peak Power Emission (dBm)	Frequency (MHz)	Limit (dBm)	Margin (dB)	Result
TX0/TX1	-49.49	886.16433	-13.0	36.49	Complied
TX2/TX3	-48.98	878.23848	-13.0	35.98	Complied
TX0/TX1	-48.97	883.63928	-13.0	35.97	Complied
TX2/TX3	-48.79	884.20040	-13.0	35.79	Complied

### Results: GMSK, TX0, TX1, TX2 and TX3
Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 73 of 108 Issue Date: 15 October 2003



### Transmitter Conducted Intermodulation Responses: Section 2.1051/22.917 (a) (Continued)

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

<u>Transmitter Conducted Intermodulation Responses: Section 2.1051/22.917 (a) (Continued)</u> <u>Results: 8PSK, TX0, TX1, TX2 and TX3</u>

тх	Peak Power Emission (dBm)	Frequency (MHz)	Limit (dBm)	Margin (dB)	Result
TX0/TX1	-49.20	881.11423	-13.0	36.20	Complied
TX2/TX3	-48.31	879.43086	-13.0	35.31	Complied
TX0/TX1	-48.53	874.73146	-13.0	35.53	Complied
TX2/TX3	-48.38	876.13427	-13.0	35.38	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 75 of 108 Issue Date: 15 October 2003



### Transmitter Conducted Intermodulation Responses: Section 2.1051/22.917 (a) (Continued)

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.9. Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917

7.9.1. The EUT was configured as for conducted emissions at band edges testing as described in Section 9 of this report.

7.9.2. Tests were performed to identify the maximum conducted band edge emissions.

### **Results: GMSK - TX0**

### Lower Band Edge

Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
128	868.979559	30.0	-15.47	-13.0	2.47	Complied
129	868.993186	34.0	-46.06	-13.0	33.06	Complied

### Upper Band Edge

	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
250	894.012825	34.0	-45.61	-13.0	32.61	Complied
251	894.002405	30.0	-13.62	-13.0	0.62	Complied

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### **TEST REPORT** S.No: RFI/MPTB2/RP45184JD05A Page 77 of 108 Issue Date: 15 October 2003



## Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

Title: Comment A: CH128. +30dBm. OBW Band Edge. GMSK TX0. FCC 22.917 8.SEP.2003 14:10:04 Date:









Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Title: Comment A: CH250. +34dBm. OBW Band Edge. GMSK TX0. FCC 22.917 8.SEP.2003 15:57:44 Date:

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

## Result: GMSK – TX2

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Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result			
128	868.98156	32.0	-14.11	-13.0	1.11	Complied			
129	868.98317	34.0	-44.66	-13.0	31.66	Complied			

### Upper Band Edge

Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
250	894.00481	34.0	-44.89	-13.0	31.89	Complied
251	894.02044	30.0	-15.25	-13.0	2.25	Complied

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### **TEST REPORT** S.No: RFI/MPTB2/RP45184JD05A Page 79 of 108 Issue Date: 15 October 2003



## Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

Title: Comment A: CH128. +32dBm. OBW Band Edge. GMSK TX2. FCC 22.917 8.SEP.2003 16:41:18 Date:







RBW

3 kHz RF Att 10 dB

Marker 1 [T1]



Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05 Title: Comment A: CH250. +34dBm. OBW Band Edge. GMSK TX2. FCC 22.917 8.SEP.2003 17:08:22 Date:

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

## Results: 8PSK – TX0

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Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
128	868.99359	34.0	-13.93	-13.0	0.93	Complied

### Upper Band Edge

Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
250	894.00881	34.0	-44.47	-13.0	31.47	Complied
251	894.00441	30.0	-14.29	-13.0	1.29	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B FCC Part 22: 2002 To:

### **TEST REPORT** S.No: RFI/MPTB2/RP45184JD05A Page 81 of 108 Issue Date: 15 October 2003



## Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

Ref Lvl -44.47 dBm VBW 3 kHz 30 dBm 894.00881764 MHz SWT 280 ms Unit dBm -44.47 dBm A 31 Offs ▼1 [T1] M 894.00881764 MHz 1MAX 1 ма -D1 -1 EXT 4M And Mark under when you wanted with your law Start 893.6 MHz 100 kHz/ Stop 894.6 MHz

RBW

3 kHz RF Att 10 dB

Marker 1 [T1]



**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

## Results: 8PSK – TX2

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Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
128	868.97956	34.0	-14.09	-13.0	1.09	Complied

### Upper Band Edge

Channel Number	Frequency (MHz)	Output Power (dBm)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
250	894.00281	34.0	-42.68	-13.0	29.68	Complied
251	894.00240	30.0	-14.42	-13.0	1.42	Complied

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 83 of 108 Issue Date: 15 October 2003



### Transmitter Conducted Emissions at Band Edges: Section 2.1051/22.917 (Continued)

 Title:
 Testing for Ericsson AB. RES2308 850 MHz. 45184JD05

 Comment A:
 Ch128. +34dBm. OBW Band Edge. 8PSK TX2. FCC 22.917

 Date:
 9.SEP.2003 11:22:26

 Title:
 Testing for Ericsson AB. RBS2308 850 MHz. 45184JD05

 Comment A:
 CH251. +30dBm. OBW Band Edge. 8PSK TX2. FCC 22.917

 Date:
 8.SEP.2003 18:33:05





Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 7.10. Transmitter Radiated Emissions: Section 2.1053/22.917 (a)

### <u>Electric Field Strength Measurements of Spurious Emissions and Intermodulation</u> <u>Products: 30 MHz to 10 GHz</u>

7.10.1. The EUT was configured as for radiated emissions testing as described in Section 9 of this report.

7.10.2. Tests were performed to identify the field strength of spurious emissions.

7.10.3. Tests were also performed to identify the field strength of any Intermodulation responses present.

### **Results:**

Excluding the fundamental emissions, all other indicated spurious and intermodulation responses were at least 20 dB below the relevant limit; therefore no final measurements were performed.

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

### GMSK DRTU Channels: trx0 ch 128, trx1 ch 190, trx2 ch 251, trx3 ch 160 Voltage: 110 V



Note: these plots are pre-scans and for indication purposes only.

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 86 of 108 Issue Date: 15 October 2003



Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

Note: these plots are pre-scans and for indication purposes only.

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)





Note: these plots are pre-scans and for indication purposes only.

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# 45333JD01 009 45333JD01 008 92 82

**TEST REPORT** 

Page 88 of 108

S.No: RFI/MPTB2/RP45184JD05A

Issue Date: 15 October 2003



Note: these plots are pre-scans and for indication purposes only.

## Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 89 of 108 Issue Date: 15 October 2003

### Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

### GMSK DTRU Channels: trx0 ch 128, trx1, ch 190, trx2 ch 251, trx3 ch 160 Voltage: -48 V



Note: these plots are pre-scans and for indication purposes only.

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

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#### 45333JD01 023 45333JD01 025 90 97 80 87 70 77 67 60 ŝ 50 57 8 Ē 47 40 30 37 27 20 17 10 0 7 -10 -3 Trace 1 Trace 1 84 dBµV/m 84 dBµV/m Start 6.0 GHz; Stop 8.0 GHz Start 8.0 GHz; Stop 10.0 GHz Ref 90 dBµV/m; Ref Offset 0.0 dB; 10 dB/div Ref 97 dBµV/m; Ref Offset 0.0 dB; 10 dB/div RBW 1000.0 kHz; VBW 3.0 MHz; Att 10 dB; Swp 20.0 mS RBW 1000.0 kHz; VBW 3.0 MHz; Att 10 dB; Swp 20.0 mS Peak 6.884 GHz, 53.87 dBµV/m Peak 9.698 GHz, 54.09 dBµV/m Display Line: 84 dBµV/m; ; Limit Test Passed Transducer Factors: 6\_to\_8\_GHz Display Line: 84 dBµV/m; ; Limit Test Passed Transducer Factors: 8\_to\_12\_GHz

27/08/2003 11:42:22

**TEST REPORT** 

Page 90 of 108

S.No: RFI/MPTB2/RP45184JD05A

Issue Date: 15 October 2003

Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

Note: these plots are pre-scans and for indication purposes only.

27/08/2003 11:20:59

**Conformance Testing Department** 

Test Of:	Ericsson AB.
	RBS 2308 850 MHz R5B
To:	FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 91 of 108 Issue Date: 15 October 2003

### Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

### 8PSK DTRU Channels: trx0 ch 128, trx1, ch 190, trx2 ch 251, trx3 ch 160 Voltage: -48 V



Note: these plots are pre-scans and for indication purposes only.

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 92 of 108 Issue Date: 15 October 2003

### 45333JD01 027 45333JD01 026 97 97 87 87 77 77 67 67 57 57 Щ Ц d D L 47 47 37 37 27 27 17 17 7 7 -3 -3 - Trace 1 Trace 1 – 84 dBµV/m – 84 dBµV/m Start 6.0 GHz; Stop 8.0 GHz Start 8.0 GHz; Stop 10.0 GHz Ref 97 dBuV/m; Ref Offset 0.0 dB; 10 dB/div

Ref 97 dBµV/m; Ref Offset 0.0 dB; 10 dB/div REf 97 dBµV/m; Ref Offset 0.0 dB; 10 dB/div RBW 1000.0 kHz; VBW 3.0 MHz; Att 10 dB; Swp 20.0 mS Peak 9.68 GHz, 54.34 dBµV/m Display Line: 84 dBµV/m; ; Limit Test Passed Transducer Factors: 8\_to\_12\_GHz 27/08/2003 11:54:03

Note: these plots are pre-scans and for indication purposes only.

RBW 1000.0 kHz; VBW 3.0 MHz; Att 10 dB; Swp 20.0 mS

Peak 7.58 GHz, 55.49 dBµV/m

27/08/2003 12:02:52

Transducer Factors: 6\_to\_8\_GHz

Display Line: 84 dBµV/m; ; Limit Test Passed

### Transmitter Radiated Emissions: Section 2.1053/22.917 (a) (Continued)

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 8. Measurement Uncertainty

8.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

8.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

8.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

8.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level	Calculated Uncertainty
Carrier Output Power	869 to 894 MHz	95%	+/- 0.7 dB
Frequency Stability	869 to 894 MHz	95%	+/- 5.0 Hz
Occupied Bandwidth	869 to 894 MHz	95%	+/- 5.0 Hz
Modulation Characteristics	869 to 894 MHz	95%	Phase error +/- 2.1° EVM (rms) <0.5% Origin Offset +/- 0.54 dB
Conducted Out of Band Emissions	9 kHz to 10 GHz	95%	+/- 3.0 dB
Conducted Emissions Inband Intermodulation	869 to 894 MHz	95%	+/- 0.6 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	+/- 4.18 dB
Emissions at Band Edges	869 to 894 MHz	95%	+/- 0.6 dB

8.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## 9. Measurement Methods

## **Conducted Carrier Output Power**

Tests were performed to identify the maximum transmit power in accordance with FCC Part 2.1046 (a) for conducted power, with reference to TIA\_EIA\_603B.

Measurements were made at the ARP output connectors and testing was performed on bottom, middle and top channels for both GMSK and 8PSK modulation types on TX0, TX1, TX2 and TX3.

The BTS output was connected to a spectrum analyser, via cables, a 50 Ohm attenuator and a RF box containing further attenuators. The path loss was entered into the spectrum analyser as a reference level offset.

The test equipment settings for conducted carrier output power measurements were as follows:

<b>Receiver Function</b>	Setting
Detector Type:	Peak
Mode:	Max Hold
Bandwidth:	1 MHz
Step Size:	Continuous sweep
Sweep Time:	Coupled

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Modulation Characteristics**

Tests were performed to identify the modulation characteristics in accordance with FCC Part 2.1047, with reference to TIA\_EIA\_603B.

Measurements were made at the ARP output connectors and testing was performed on middle channel only.

The output was connected to a spectrum analyser, which was used in GSM BTS analyser mode, via cables and with 30 dB of attenuation in the path.

The phase error was measured for GMSK, whilst for 8PSK the EVM and Origin Offset were measured.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Frequency Stability**

The EUT was situated within an environmental test chamber and connected to test equipment via an air link radiated from the antenna.

Measurements were performed with the EUT operating under extremes of temperature in 10 degree increments within the range –30 to 50 Deg C.

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltage.

The requirement was to determine the frequency stability of the device under specified environmental operating conditions.

Measurements were made on the bottom and top channels.

The EUT was switched off for a minimum of 30 minutes between each stage of testing while the environmental chamber stabilised at the next temperature within the stated temperature range.

The frequency error measured was converted to an error in ppm using the following formula as defined by TIA\_EIA\_603B :-

ppm error =  $((MCF_{MHz} / ACF_{MHz}) - 1) * 1000000$ 

where  $MCF_{MHz}$  is the measured carrier frequency in MHz  $ACF_{MHz}$  is the assigned carrier frequency in MHz

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Occupied Bandwidth**

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function.

Measurements were performed to determine the Occupied Bandwidth in accordance with FCC Part 2.1049. The Occupied Bandwidth was measured on the bottom middle and top channels.

The Occupied Bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSIQ spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser settings were set as per those outlined in the FSIQ user manual for this measurement, i.e., RBW <= 1/20 of occupied bandwidth. A value of 3 kHz was used.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Transmitter Conducted Emissions**

Spurious emission measurements at the Antenna port were performed from 9 kHz to 10 times the highest EUT fundamental frequency as used in Section 7.7 of this report.

A spectrum analyser was connected to the antenna port of the EUT via cables, attenuators and filters. The total loss of the path was measured and entered as a reference level offset into the spectrum analyser to correct for the losses.

The limit in the standard states that emissions shall be attenuated by at least 43+10 Log(P) dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. This limit always reduces to -13 dBm as such, the limit line presented on the accompanying plots is set to -13 dBm.

The frequency band described above was investigated with the transmitter operating at full power on bottom and top channels. Any spurious emissions observed were recorded and compared to the -13 dBm limit. The requirement for the emission is to be less than -13 dBm.

It should be noted that FCC Part 22.917 states that the 1<sup>st</sup> MHz band immediately adjacent to the applicants declared frequency block may be measured using a resolution bandwidth of at least 1% of the emission bandwidth. This bandwidth was found to be 3 kHz.

<b>Receiver Function</b>	Settings
Detector Type:	Peak
Mode:	Max Hold
Bandwidth:	1 MHz >1GHz
Bandwidth:	10 kHz <1GHz
Step Size:	Continuous sweep
Sweep Time:	Coupled

The test equipment settings for conducted antenna port measurements were as follows:

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Conducted Emissions Inband Intermodulation**

Conducted Emissions Inband Intermodulation measurements were performed at the Antenna port.

A spectrum analyser was connected to the antenna port of the EUT via cables and attenuators. The total loss of the path was measured and entered as a reference level offset into the spectrum analyser to correct for the losses.

The base station was set up to transmit on two transmitters. First at bottom ARFCN and bottom ARFCN +25 and then on top ARFCN and top ARFCN -25, 5 MHz apart as this was stated by the client as being worst case for intermodulation purposes. However, as the band edge ARFCNs need to be reduced by 4dB, the adjacent channels were measured at full output power instead. Bottom ARFCN +1 and bottom ARFCN +26, top ARFCN -1 and top ARFCN -26.

The limit in the standard states that emissions shall be attenuated by at least 43+10 Log(P) dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. This limit always reduces to -13 dBm as such, the limit line presented on the accompanying plots is set to -13 dBm.

Any spurious emissions observed were recorded and compared to the -13 dBm limit. The requirement for the emission is to be less than -13 dBm.

Receiver Function:	Settings
Detector Type:	Peak
Mode:	Max Hold
Bandwidth:	10 kHz <1GHz
Step Size:	Continuous sweep
Sweep Time:	Coupled

The test equipment settings for conducted antenna port measurements were as follows:

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## Transmitter Conducted Emissions at Band Edges

Testing was performed as per transmitter-conducted emissions.

In GMSK mode this unit must use a reduced transmit power by 4 dB to 30 dBm for the channels adjacent to each frequency band edge in order to show compliance.

In 8PSK mode this unit must use a reduced transmit power by 4 dB to 30 dBm for the channels adjacent to each frequency band edge in order to show compliance.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

## **Transmitter Radiated Emissions**

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to 10 times the highest fundamental frequency were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT which required further examination.

The radiated scans were performed at 3 m test distance with 1.5 m antenna height in a anechoic lined screened room in the frequency range of 30.0 MHz to 1.0 GHz. Between 1.0 GHz and 20.0 GHz a 1 m test distance was used. A limit line was set to the specifications limit. Levels within 20 dB of this limit were measured where possible, on occasion; the receiver noise floor came within the 20 dB boundary.

The limit stated in the standard states that emissions shall be attenuated by at least 43+10 Log (P) dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. The limit line was determined by radiating -13 dBm from a dipole located in place of the EUT and measuring the equivalent field strength at the 3 meters.

At the shorter test distance of 1 meter all results or limits were corrected using 20log(D1/D2) where D1 and D2 are the respective test distances.

Measurements were performed at 3 m test distance with 1.5 m antenna height in a screened room in the frequency range of 30 MHz to 10 GHz.

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# Appendix 1. Test Equipment Used

	_		
Description	Manufacturer	Model Number	Serial Number
Signal Analyser	Rohde & Schwarz	FSIQ26	838600/010
RF Box	Ericsson	LYP 108 15/2	1
Attenuator	Weinschel Corp.	48-10-34	BC2562
Cable 1	Suhner Sucoflex	3 M N-Type to N-Type 104PE	SN 30641/4PE
Cable 2	Suhner Sucoflex	0.5 M N-Type to N- Type 104E	SN 7502/4E
Cable 3	Suhner Sucoflex	0.5 M N-Type to N- Type 104PE	SN 30658/4PE
Cable 4	Suhner Sucoflex	0.5 M N-Type to N- Type 104PE	SN 30652/4PE
Cable 5	Suhner Sucoflex	3 M N-Type to N-Type 104E	SN 2026/4E
Network Analyser	Hewlett Packard	HP8720D	US34440122
Multimeter	Fluke	77	63580770
Temperature Chamber	Vötsch	VCS 7250/S	58566031900020
Cable 6	Suhner Sucoflex	0.25 M N-Type to N- Type 104E	SN 1962/4E
Power Supply	Hewlett Packard	6812A	3523A00641
Signal Generator	R&S	SME03	843441/003
Terminator	Weinschel Corp.	M1426	N/A
Notch Filter	K&L	LPY 108 16/1	-

## Test equipment used for testing at Ericsson AB

Conformance Testing Department

Test Of:	Ericsson AB.	
	RBS 2308 850 MHz R5B	
To:	FCC Part 22: 2002	

### TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 103 of 108 Issue Date: 15 October 2003

## Test equipment used for testing at Basingstoke.

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A031	2 to 4 GHz Horn Antenna	Eaton	91889-2	557
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519
A259	Bilog Antenna	Chase	CBL6111	1513
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	-
A277	OATS Antenna Mast	Rohde & Schwarz	НСМ	-
A392	3 dB attenuator (9)	Suhner	6803.17.B	None
A430	WG 18 horn	Flann	18240-20	425
A436	WG 20 horn	Flann	20240-20	330
A490	Bilog Antenna	Chase	CBL6111A	1590
C1080	Rosenberger Cable 3m	Rosenberger	FA210A1030 M5050	28464-1
C222	Cable	Rosenberger	UFA210A-1- 1181-70x70	None
C341	Cable	Andrews	None	None
C461	Cable	Rosenberger	UFA210A-1- 1182-704704	98H0305
C468	N-Type Coaxial Cable	Rosenberger	UFA210A-1- 3937-504504	98L0440
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M069	ESMI Spectrum Analyser / Receiver	Rohde & Schwarz	ESMI	829 808/007 (DU) / 827 063/008 (RU)
M208	Thermo/hygro meter	RS Components Ltd	RS212-124	M208-RS212- 124
S201	Site 1	RFI	1	-
S209	Site 9	RFI	9	-

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

# **Appendix 2. Test Configuration Drawings**

This Appendix contains the following drawings:

Drawing Reference Number	Title
DRG\45184JD05\EMIRAD	Test configuration for measurement of radiated emissions
DRG\45184JD05\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the conducted measurements in Mölndal.
DRG\45184JD05\002	Schematic diagram of the EUT, support equipment and interconnecting cables for testing in Basingstoke.

**Conformance Testing Department** 

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

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Test Of:	Ericsson AB.	
	RBS 2308 850 MHz R5B	
To:	FCC Part 22: 2002	

TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 106 of 108 Issue Date: 15 October 2003

### DRG\45184JD05\EMIRAD



Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### DRG\45184JD05\001



TEST REPORT S.No: RFI/MPTB2/RP45184JD05A Page 107 of 108 Issue Date: 15 October 2003

Test Of: Ericsson AB. RBS 2308 850 MHz R5B To: FCC Part 22: 2002

### DRG\45184JD05\002

