

Date:	ESPOO 31.01.2007	Page: 1 (29)
		Appendices
Number: No. 1 / 1	80106R2	Date of handing in: 23.01.2007 Measured by:
		Timo Hietala, Test Engineer
		Reviewed by: Jyrki Leino, Manager

SORT OF EQUIPMENT: WCDMA Base Station RF module

Nokia Flexi BTS RF module 1.7GHz/2.1GHz MARKETING NAME:

TYPE: **FRIB**

MANUFACTURER: **Nokia Corporation**

FCC ID: **UAFFRIB-01**

CLIENT: **Nokia Corporation**

P.O.Box 319, FI-90651 OULU, FINLAND ADDRESS:

TELEPHONE: +358 7180 08000

TEST LABORATORY: NET/IMN Oulu

FCC REG. NO. 411251

REFERENCE: FCC Part 27, SUBPART L

SUMMARY:

In regard to the performed tests the equipment under test fulfils the requirements defined in the test specifications, see page 4 for details

The test results are valid for the tested unit only. Without a written permission of Nemko Oy it is allowed to copy this report as a whole, but not partially.



FCC ID: UAFFRIB-01 Type: FRIB Test report No.: 80106R2

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1.2

FCC ID: UAFFRIB-01 Type: FRIB

Test report No.: 80106R2

1. EUT and Accessory Information

1.1 EUT description

The EUT is a WCDMA Base station RF module 1.7GHz/2.1GHz with 1 power amplifiers.

EUT and a	ccessories				
Manufactur	er:	Nokia			
Model:		FRIB,	s/n: L90645000	28	
Other Units	:	-	module, FSMB nission module, F7	ГΙΑ	
General:		All mea	asurements are tr	aceable to n	ational standards.
	s were conducted with FCC Part 27,			uipment for	the purpose of demonstrating
	New Submission			\boxtimes	Production Unit
	Class I Permissiv	e Chang	e		Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. **NONE**

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This report applies only to the items tested.



Test report No.: 80106R2

Summary of Test Data

NAME OF TEST	SECTION IN CFR 47	SPEC.	RESULT
RF Power Output	27.50 (d), 2.1046	100 W	Complies
99% Occupied Bandwidth	2.1049, (i)	Unspecified	Not Tested
Spurious Emissions at Antenna Terminals	27.53(g), 2.1051	- 13 dBm	Complies
Field Strength of Spurious Emissions	27.53(g), 2.1053	- 13 dBm E.I.R.P	Complies
Frequency stability	27.54, 2.1055	± 0.05 ppm ¹⁾	Not Tested

Note 1) Limit is the manufacturer's specification

Measurement uncertainty is expressed to a confidence level of 95%.



Test report No.: 80106R2

2. General Equipment Specification

	48 Vdc		
	Block A: 2110 – 212	20 MHz	
	Block B: 2120 – 213	30 MHz	
	Block C: 2130 – 213	35 MHz	
	Block D: 2135 – 214	40 MHz	
\boxtimes	Block E: 2140 – 215	55 MHz	
\square	Block A : 1710 – 172	20 MHz	
	Block D : 1735 – 174	10 MHz	
	Block E : 1740 – 175	55 MHz	
	W-CDMA (5M00F9W)	GSM (200KG7W)	NADC 40K0DXW)
	2		
	50 ohms.		
	Per channel: 40 \	W or 2x20W.	
	Software	Duplexer	Fullband
		Block A: 2110 - 213 Block B: 2120 - 213 Block C: 2130 - 213 Block D: 2135 - 214 Block D: 2135 - 214 Block E: 2140 - 215 Block A: 1710 - 173 Block B: 1720 - 173 Block C: 1730 - 173 Block D: 1735 - 174 Block E: 1740 - 175 W-CDMA (5M00F9W) 2 50 ohms. Per channel: 40 \ Software	



Test report No.: 80106R2

System Description

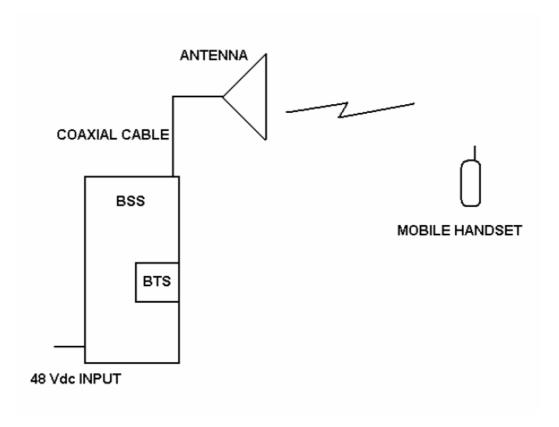
The BTS performs the radio function of the Base Station System (BSS), and is connected to the Radio Network Controller (RNC) via the Iub interface, and to Mobile Stations (MS) via the Air interface (Antenna). The RNC is further connected to Serving GPRS Support Node (SGSN) or it can be connected to the Mobile Switching Centre (MSC) via IWU (Inter Working Unit).

Setup for testing single carrier: The transmitter was set up according to 3GPP TS 25.141 Test Model 1 and 5 for all tests. Test model 1: 64 DPCHs at 30 ksps (SF=128) distributed randomly across the code space, at random power levels and random timing offsets, were defined to simulate a realistic operating scenario which may have high PAR (Peak-to-Average Ratio). Test model 5: 30 DPCHs at 30 ksps (SF=128) together with 8 HS-PDSCHs at 240 ksps (SF=16). Each DPCH is modulated by QPSK and each HS-PDCH is modulated by 16QAM modulation.

Setup for testing multi carrier:

The transmitter was set up according to 3GPP TS 25.141 Test Model 1 and 5 for all tests. Test model 1: 32 DPCHs at 30 ksps (SF=128) distributed randomly across the code space, at random power levels and random timing offsets, were defined to simulate a realistic operating scenario which may have high PAR (Peak-to-Average Ratio). Test model 5: 14 DPCHs at 30 ksps (SF=128) together with 4 HS-PDSCHs at 240 ksps (SF=16). Each DPCH is modulated by QPSK and each HS-PDCH is modulated by 16QAM modulation.

System Diagram





Test report No.: 80106R2

3. RF Power Output

NAME OF TEST: RF Power Output PARA.NO.: 27.50 (d) & 2.1046

TESTED BY: Timo Hietala DATE: 23/01/2007

Test Results: Complies.

Measurement Data: Refer to attached plot.

Multi carrier

Modulation Type	Frequency	Measured Output		
	(MHz)	Power/carr.	Power/carr.	Total power
		(dBm)	(W)	(dBm) / (W)
QPSK	2112.6 / 2117.6	42.04 / 42.28	16.0 / 16.90	45.17 / 32.90
QPSK	2132.5 / 2137.5	42.50 / 42.55	17.78 / 17.99	45.54 / 35.77
QPSK	2147.4 / 2152.4	42.08 / 42.18	16.14/ 16.52	45.14 / 32.66
16QAM	2112.6 / 2117.6	42.08 / 42.32	16.14 / 17.06	45.21 / 33.2
16QAM	2132.5 / 2137.5	42.44 / 42.49	17.54 / 17.74	45.48 / 35.28
16QAM	2147.4 / 2152.4	42.12 / 42.20	16.19 / 16.60	45.16 / 32.79

Equipment used: 1, 2, 4, 7, 8, 9.

Measurement

Uncertainty: $\pm 0.7 \text{ dB}$.

Temperature: 23 °C.

Relative

Humidity: 10 %.



FCC ID: UAFFRIB-01

Type: FRIB Test report No.: 80106R2

Test Data – RF Power Output

Nemko Oy, Finland

Data	Plot				RF POV	VER OU	TPUT					
Page 1	of <u>2</u>			-						Comple	ete <u>x</u>	
Job No.		80105			Date:	23/01/2007			Pre	eliminary	/:	
Specific	ation:	PT27		Tempe	erature (°C):							•
Tested I	Ву:	Timo Hietala			umidity (%):							
E.U.T.:		WCDMA TRAN	NSMITTER		* ` ' •		_					
Configu	ration:	TX FULL POW		CHANNEL. n	nulti carrier							
-		1										
Location		NET/IMN Ould	1			RRW.	Refer to pl	nts	Meas	suremer	nt	
Detecto		Rms					Refer to pl				e: <u>N/A</u>	m
			_									
	quipme	nt Used			5							
Antenna			_		Directi	onal Coupler:						
Pre-Am	p:		_			Cable #1:						
Filter:						Cable #2:						
Receive	er:	11	_									
Attenua	tor #1:	7	_			Cable #4:						
Attenua	tor #2:					Mixer:						
		nent used:										
Measure	ement Un	certainty:	± 0.7 dB	_								
r)			Marker	1 [T1]		RBW	30 k	Hz	RF At	t	40 dB	
% \$/ 1	Ref L	v1		21.	30 dBm	VBW	300 k	Hz				
•	33.8		2	2.116440	000 GHz	SWT	2	s	Unit		dBı	n
33.8			11	1	1				П			7
30	33.8	dB Offs	et				▼ 1	[T1]	_	21	.30 dBr	A
									2.1	1644	000 GHz	
						l .	СH	,P.W.R		42	04.dBn	1
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-60		C	<u> </u>									1
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(Cente:	r 2.1126	GHz		768	kHz/			Sp	an 7	.68 MHz	3

Notes: Carrier 1 QPSK 2112.6 MHz

Date: 23.JAN.2007 13:16:04



Test report No.: 80106R2

Nemko Oy, Finland

<u>Data Plot</u> Page 2 of 2

 Job No.:
 80105
 Date:
 23/01/2007

 Specification:
 PT27
 Temperature (°C):
 23

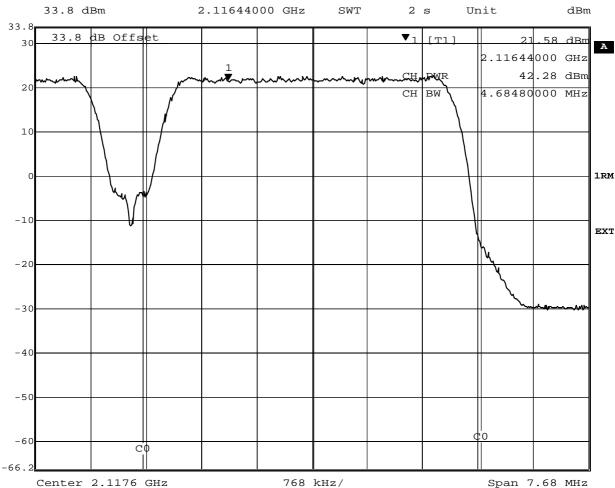
Tested By: Timo Hietala Relative Humidity (%): 10

E.U.T.: WCDMA TRANSMITTER

Configuration: TX FULL POWER CENTER CHANNEL, multi carrier

Marker 1 [T1] RBW 30 kHz RF Att 40 dB

Ref Lvl 21.58 dBm VBW 300 kHz



Date: 23.JAN.2007 13:16:40

Notes: Carrier 2 QPSK 2117.6 MHz



Test report No.: 80106R2

4. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals PARA.NO.: 27.53(g), 2.1051

TESTED BY: Timo Hietala DATE: 23/01/2007

Test Results: Complies.

Test Data: See attached plots.

Multi carrier

Frequency		Spurious Emission
(MHz)	Modulation	(dBm) rms det.
All	QPSK	More than 20 dB below limit -13 dBm
All	16QAM	More than 20 dB below limit -13 dBm

Lower Band Edge Multi carrier

Frequency		Peak Emission
(MHz)	Modulation	Level (dBm) rms det.
2110.000	QPSK	-19.28
2110.000	16QAM	-19.81

Upper Band Edge Multi carrier

Frequency		Peak Emission
(MHz)	Modulation	Level (dBm) rms det.
2155.020	QPSK	-20.96
2155.020	16QAM	-21.86

Equipment used: 1, 2, 3, 4, 7, 8, 9, 12, 13, 14

Measurement

Uncertainty: $\pm 0.7 \text{ dB}$.

Temperature: 23 °C.

Relative

Humidity: 10 %.



FCC ID: UAFFRIB-01

Type: FRIB Test report No.: 80106R2

Test Data – Spurious Emissions

Data Plo	<u>'t</u>	<u>s</u>	puri	<u>ous Emi</u>	ssions a	at Antenn	a Termin		
Page <u>1</u> of <u>10</u>									plete <u>x</u>
ob No.:	80105					: 23/01/2007	-	Prelimina	ary:
pecification:	PT27			Temp	erature (°C):	23	-		
ested By:	Timo Hietala			Relative F	lumidity (%):	10	•		
.U.T.:	WCDMA TRA							_	
Configuration:		WER LO	OWES ⁻	r Channel,	multi carrier			_	
Sample Numbe									
ocation:	NET/IMN Ou	ılu					Refer to plots		
Detector type:	Rms					VBW:	Refer to plots	<u>Distar</u>	ice: N/A r
Test Equipm	ent Used								
intenna:					Direc	tional Coupler:			
re-Amp:						Cable #1:		_	
ïlter:						Cable #2:		_	
Receiver:	1							_	
Attenuator #1:	7					Cable #4:		_	
Attenuator #2:						Mixer:			
Additional equip Measurement U		+ ().7 dB					_	
				1 [F.O. 1.77		05.15
		Маз	rker	1 [T1]		RBW	50 kH:		25 dB
Ref I	ivl			-19	.28 dBm	VBW	50 kH:	Z	
37.8	8 dBm			2.110000	000 GHz	SWT	2 s	Unit	dBm
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23.JAN.2007 13:31:20 Date:

Tx 2112.6 and 2117.6 MHz, QPSK, LOWER BANDEDGE and 3rd order IM Notes:_



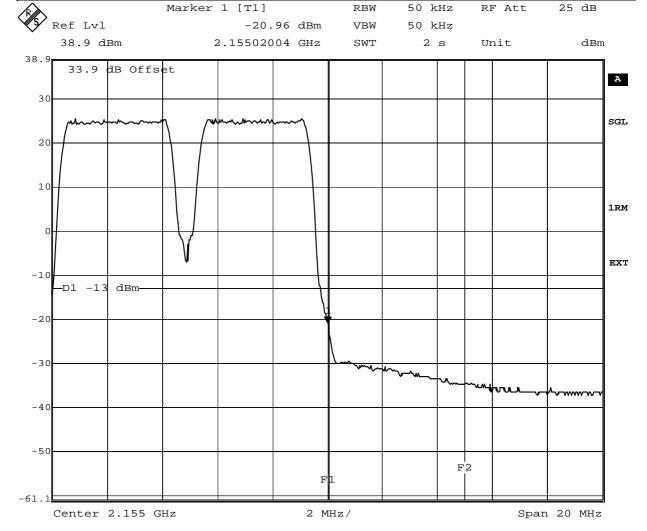
FCC ID: UAFFRIB-01

Type: FRIB
Test report No.: 80106R2

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot		Spurious Emissions a	t Antenn
Page 2 of <u>10</u>	·		
Job No.:	80105	Date:	23/01/2007
Specification:	PT27	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	10
E.U.T.:	WCDMA TRANSM	ITTER	
Configuration:	TX FULL POWER	HIGHEST CHANNEL, multi carrier	



Date: 23.JAN.2007 13:26:48

Notes: Tx 2147.2 and 2152.4 MHz, QPSK, UPPER BANDEDGE and 3rd order IM

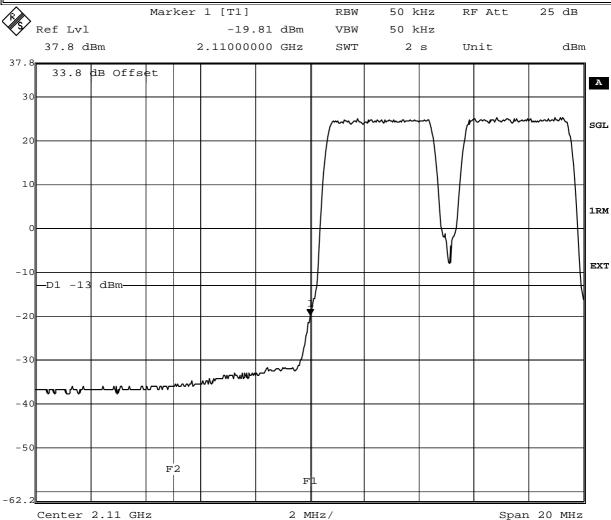


Test report No.: 80106R2

Test Data - Spurious Emissions

Nemko Oy, Finland

Data Plo	<u>t</u> Spur	ious Emissions a	t Antenna	a Terminals	<u>S</u>	
Page 3 of <u>10</u>	90405	Data	22/04/2007			
Job No.:	80105	-	23/01/2007			
Specification:	PT27	Temperature (°C):	23			
Tested By:	Timo Hietala	Relative Humidity (%):	10			
E.U.T.:	WCDMA TRANSMITTER					
Configuration:	TX FULL POWER LOWE	ST CHANNEL, multi carrier				
^	Ml	1 [m1]	DDW	F 0 1-TT-	DE 3	2F 3D



Date: 23.JAN.2007 13:30:13

Notes: Tx 2112.6 and 2117.6 MHz, 16QAM, LOWER BANDEDGE and 3rd order IM

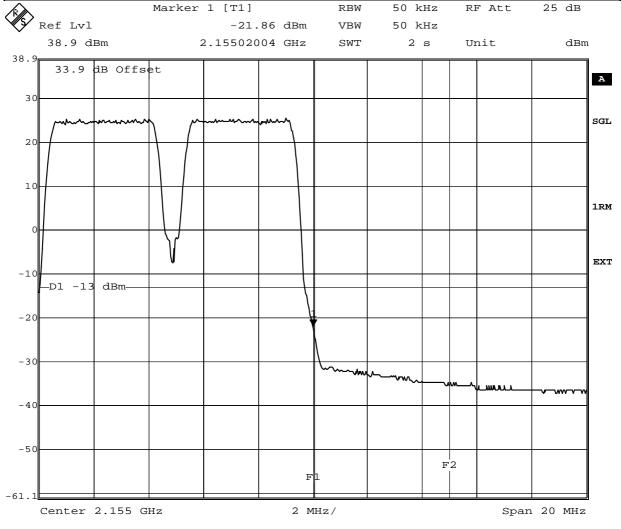


Test report No.: 80106R2

Test Data – Spurious Emissions

Nemko Oy, Finland

	Spurious Emissions a	t Antenn
	Band edge and 3 rd IM	
80105	Date:_	23/01/2007
PT27	Temperature (°C):	23
Timo Hietala	Relative Humidity (%):	10
WCDMA TRANS	SMITTER	
TX FULL POWE	R highest CHANNEL, multi carrier	
	80105 PT27 Timo Hietala WCDMA TRANS	Band edge and 3 rd IM 80105 Date: PT27 Temperature (°C):



Date: 23.JAN.2007 13:27:52

Notes: Tx 2147.2 and 2152.4 MHz, 16QAM, UPPER BANDEDGE and 3rd order IM

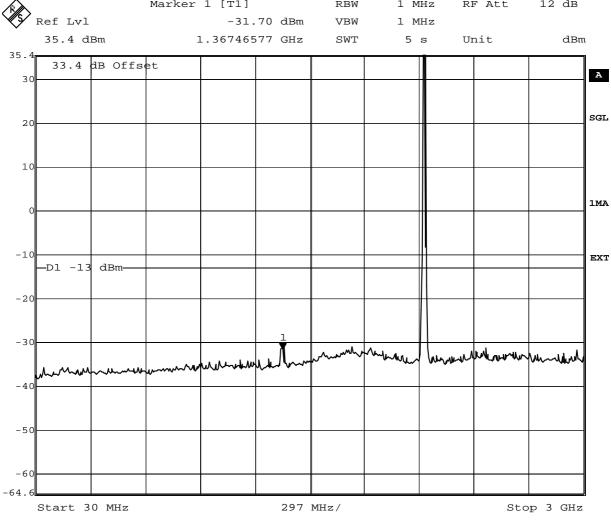


Test report No.: 80106R2

Test Data - Spurious Emissions

Nemko Oy, Finland

Data Plot		Spuriou	s Emissio	ons a	t Antenn	a Term	ninals	<u>s</u>				
Page <u>5</u> of <u>10</u>						-			Compl	ete	x	
Job No.:	80105			Date:	23/01/2007				Preliminar	y:		
Specification:	PT27		Temperatur	e (°C): _	23							
Tested By:	Timo Hietala	F	Relative Humidi	ty (%):	10							
E.U.T.:	WCDMA TRAN	SMITTER										
Configuration:	TX FULL POW	ER MIDDLE CHA	NNEL, multi ca	arrier								
Sample Number:	1											
Location:	NET/IMN Oulu	_			RBW:	Refer to p	olots		Measureme	nt		
Detector type:	Peak	_			VBW:	Refer to p	lots		Distanc	e: N//	4	m
Test Equipme	nt Used											
Antenna:		_		Direction	onal Coupler:							
Pre-Amp:		_			Cable #1:							
Filter:		_			Cable #2:							
Receiver:	1	_			Cable #3:							
Attenuator #1:	13	_			Cable #4:							
Attenuator #2:		_			Mixer:							
Additional equipr	nent used:											
Measurement Ur	certainty:	± 0.7 dB										
<u> </u>		Marker 1	[T1]		RBW	1 1	MHz	RF	Att	12	dв	
\% \	_											



Date: 23.JAN.2007 12:15:25

Notes: Tx 2132.5 and 2137.5 MHZ QPSK

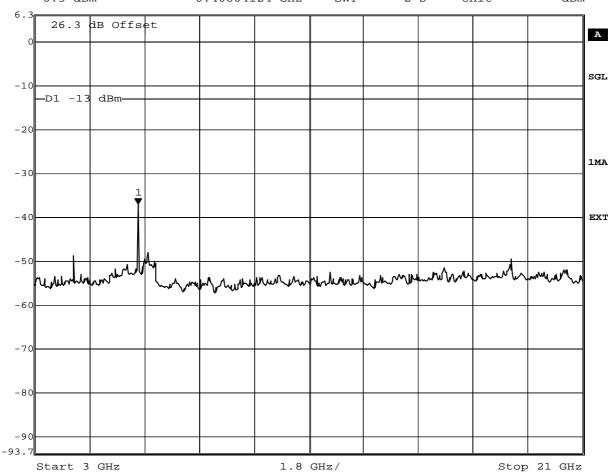


FCC ID: UAFFRIB-01

Type: FRIB Test report No.: 80106R2

Test Data - Spurious Emissions

Data Plot		Spurio	us Fmis	esions a	t Antenn	a Tarmi	nale				
Page 6 of 10		<u>Spuric</u>	us Lillis	sions a	LAIILEIIII	a remin	IIais		Complete	v	
Job No.:	80105			Date:	23/01/2007				minary:	^	1
Specification:	PT27		Temne	rature (°C):				1 10111			
•	Timo Hietala			umidity (%): _							
E.U.T.:	WCDMA TRAN	SMITTER	_ INCIALIVE FIL	unificity (70)	10						
Configuration:	TX FULL POWI		PHANNEL mu	ılti carrior							
Sample Number:		LIX MIIDDLL (JI IAMNEL IIIO	iiii cairiei							
Location:	NET/IMN Oulu				DD\\/·	Refer to plo	oto	Moacu	rement		
Detector type:	Peak	_				Refer to ple	_		stance: N	/Λ	m
Detector type.	reak	_			V DVV.	Relei to pio	JIS	DI	Starice. IN	A	. '''
Test Equipme	nt Used										
Antenna:				Direction	onal Coupler:						
Pre-Amp:		_			Cable #1:						
Filter:	12	_			Cable #2:						
Receiver:	1				Cable #3:						
Attenuator #1:	14	_			Cable #4:						
Attenuator #2:		_			Mixer:						
Additional equipm	nent used:	_									
Measurement Un		± 0.7 dB									
		Marker	I [TI]		RBW	1 M	HZ	RF Att	0	dВ	
Ref L	71		-37.	01 dBm	VBW	1 M	Hz				
6.3	dBm	6	.408041	24 GHz	SWT	2	S	Unit		dBm	ı
6.3											1
26.3	dB Offs	et									2
0	_										A
											SGL



23.JAN.2007 12:41:12 Date:

Notes: Tx 2132.5 and 2137.5 MHZ QPSK



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Test Data – Spurious Emissions

ata Plot		<u>Spuri</u>	ous Emi	ssions a	t Antenn	a Termin	nals_	
ge <u>7</u> of <u>10</u>								Complete x
No.:	80105			-	23/01/2007	=	Preli	minary:
ecification:	PT27			erature (°C):		_		
sted By:	Timo Hietala		Relative F	lumidity (%):	10	_		
J.T.:	WCDMA TRAN	SMITTER					_	
nfiguration:	TX FULL POWE	R MIDDLE	CHANNEL m	ulti carrier			_	
mple Number:	1							
cation:	NET/IMN Oulu	_			RBW:	Refer to plots	Measu	ırement
tector type:	Peak	-			VBW:	Refer to plots	<u>s</u> Di	stance: N/A
st Equipme	nt Used							
tenna:		_		Directi	onal Coupler:			
e-Amp:		_			Cable #1:			
er:	12	_			Cable #2:		_	
ceiver:	1	_			Cable #3:		_	
enuator #1:	14	_					_	
enuator #2:		_			Mixer:		_	
ditional equipr	ment used:							
asurement Ur		± 0.7 dB	_				_	
<u> </u>		Marker	1 [T1]		RBW	1 MH	z RF Att	12 dB
Ref L	vl		-31	.70 dBm	VBW	1 MH:	Z	
35.4	dBm		1.36746	577 GH2	SWT	5 s	Unit	dBm
.4	CIBIII		1.30740.	577 GIIZ	SWI	J 5	OIIIC	QBIII
I	4 dB Offse	et.						
30								
2.0								
20								
10								
0								
10								
—D1 -	13 dBm——					╫		
20						#1		
ll .								

297 MHz/

Date: 23.JAN.2007 12:15:25

Start 30 MHz

-40

-50

-60 -64.6

Notes: Tx 2132.5 and 2137.5 MHZ 16QAM

Stop 3 GHz



Test report No.: 80106R2

Test Data – Spurious Emissions

ata Plot	<u> </u>	<u>Spuri</u>	<u>ous Emi</u>	ssions a	t Antenn	a Term	inal	<u>s</u>		
age <u>8</u> of <u>10</u>								Com	olete <u>x</u>	_
b No.:	80105				23/01/2007	_		Prelimina	ary:	_
ecification:	PT27		Temp	erature (°C):	23	_				
ested By:	Timo Hietala		Relative H	lumidity (%):	10	_				
U.T.:	WCDMA TRAN	ISMITTER		_		=				
onfiguration:	TX FULL POW	ER MIDDLE	CHANNEL, n	nulti carrier						
ample Number	: 1									
cation:	NET/IMN Oulu	l			RBW:	Refer to ple	ots	Measurem	ent	
etector type:	Peak					Refer to pl			ce: N/A	r
icolor type.	1 Cak				VDVV.	recici to pi	013	Distan	CC. 14// C	- '
est Equipme	ent Used									
itenna:	5111 000u			Directi	onal Coupler:					
e-Amp:				Directi	-					
		_								
ter:	12	_								
eceiver:	1	_								
enuator #1:	14				Cable #4:					
enuator #2:					Mixer:					
ditional equip	ment used:									
easurement U	ncertainty:	± 0.7 dB								
		Ml	1 [T1]		RBW	1 M	TT	DE 3	0 dB	
		Marker						RF Att	о ав	
Ref L	vl		-38	.99 dBm	VBW	1 M	Hz			
6.3	dBm		6.408043	124 GHz	SWT	2	s	Unit	dBn	n
5.3		I	T					<u> </u>	T	7
26.	3 dB Offs	et								۱
0										┦╹
-10										1
—D1 -	-13 dBm									1
-20										4
2.0										1
-30										1
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-40		-	1							- F
F 0		A								
-50	//	ሥላ					/	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		1
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000.0.	•	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		T 30 (1.7 10)	***	-U-U-				
-60										4
7.0										
-70										1
										1
-80									1	4
-90			<u> </u>	1					1	4

1.8 GHz/

23.JAN.2007 12:39:04 Date:

Start 3 GHz

Notes: Tx 2132.5 and 2137.5 MHZ 16QAM

Stop 21 GHz



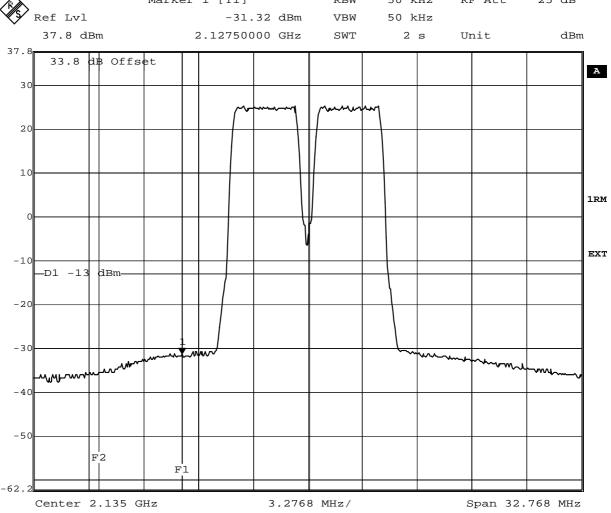
FCC ID: UAFFRIB-01

Type: FRIB
Test report No.: 80106R2

Test Data - Spurious Emissions

Nemko Oy, Finland

Data Plot		Spurious Emissions at			_
Page <u>9</u> of <u>10</u>		3 rd order inband interm	odulation	on	Complete x
Job No.:	80105	Date:	23/01/2007	_	Preliminary:
Specification:	PT27	Temperature (°C):	23	_	
Tested By:	Timo Hietala	Relative Humidity (%):	10	_	
E.U.T.:	WCDMA TRAN	ISMITTER			
Configuration:	TX FULL POW	ER MIDDLE CHANNEL, multi carrier			
Sample Number:	1				
Location:	NET/IMN Oulu	<u>ı </u>	RBW:	Refer to plots	Measurement
Detector type:	rms		VBW:	Refer to plots	Distance: N/A m
Test Equipme	nt Used				
Antenna:		Directio	nal Coupler:		
Pre-Amp:		_	Cable #1:		
Filter:	12		Cable #2:		
Receiver:	1				
Attenuator #1:	14		Cable #4:		
Attenuator #2:			Mixer:		
Additional equipr	ment used:				
Measurement Ur	ncertainty:	± 0.7 dB			



Date: 23.JAN.2007 12:23:19

Notes: Tx 2132.5 and 2137.5 MHZ QPSK 3rd order IM

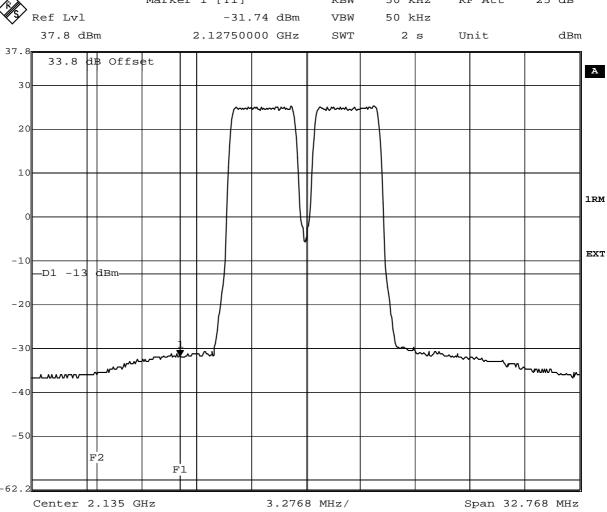


Test report No.: 80106R2

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot		Spurious Emissions at			<u> </u>
Page <u>10</u> of <u>10</u>		3 rd order inband interm	odulatio	on	Completex
Job No.:	80105	Date:	23/01/2007	_	Preliminary:
Specification:	PT27	Temperature (°C):	23	_	
Tested By:	Timo Hietala	Relative Humidity (%):	10	_	
E.U.T.:	WCDMA TRAN	ISMITTER			
Configuration:	TX FULL POW	ER MIDDLE CHANNEL, multi carrier			
Sample Number	: 1				
Location:	NET/IMN Oulu	<u> </u>	RBW:	Refer to plots	Measurement
Detector type:	rms		VBW:	Refer to plots	Distance: N/A m
Test Equipme	ent Used	Directio	nal Coupler:		
Pre-Amp:		_	Cable #1:		
Filter:	12	_	Cable #2:		
Receiver:	1	_	Cable #3:		
Attenuator #1:	14	_	Cable #4:		
Attenuator #2:		_	Mixer:		
Additional equipa Measurement Ur		± 0.7 dB			
_		Marker 1 [T1]	RBW	50 kHz	RF Att 25 dB



Date: 23.JAN.2007 12:21:52

Notes: Tx 2132.5 and 2137.5 MHZ 16QAM 3rd order IM



Test report No.: 80106R2

5. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions PARA.NO.: 27.53(g), 2.1053

TESTED BY: Timo Hietala DATE: 26/01/2007

Test Results: Complies.

Test Data: See attached table.

Frequency	Spurious Emission
(MHz)	EIRP (dBm)
ALL	More than 20 dB below limit -13 dBm

Equipment used: 15, 16, 17, 18, 19, 23, 24, 25, 26

Measurement

Uncertainty: ± 5.2 dB.

Temperature: 23 °C.

Relative

Humidity: 10 %.

NOTE:

The spectrum was searched from 30 MHz to the 10th harmonic of the carrier.



Test report No.: 80106R2

Test Data - Radiated Emissions

Nemko Oy, Finland

Data Plot		Radia	ted Emissior	ns Substitut	ion Method	d		
Page <u>1</u> of <u>1</u>						_	Comple	etex
Job No.:	80105			Date: 26/01/2007			Preliminar	y:
Specification:	PT27		Temperature	(°C): 23				
Tested By:	Timo Hietala	ı	Relative Humidity	(%): 10				
E.U.T.:	WCDMA TR	ANSMITTER	_					
Configuration:	TX FULL PC	WER						
Sample Number:	1							
Location:	NET/IMN O	ulu		RBW:	1 MHz		Measuremen	nt
Detector type:	Ave			VBW:	1 MHz		Distance	e: <u>3</u> m
•								
Test Equipme	nt Used							
Antenna:	17 and 18	<u> </u>		Directional Coupler:				
Pre-Amp:	24			Cable #1:				
Filter:								
Receiver:	16							
Attenuator #1:	-			Cable #4:				
Attenuator #2:				Mixer:				
Additional equipn	nent used:	19,23,25	and 26					
Measurement Un	certainty:	± 5.2 dB	_					
Frequency	Meter	Correction	Gen.	Substitution	EIRP	EIRP	Polarity	Comments
(MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Antenna Gain (dBi)	(dBm)	(µW)	-	

Notes: Pre measurement in stack installation FRIB Tx C1 2132.5 MHz and C2 2137.5 MHz and FRIA Tx C1 2112.5 MHz and C2 2117.5 MHz, transmitters full power terminated 50Ω

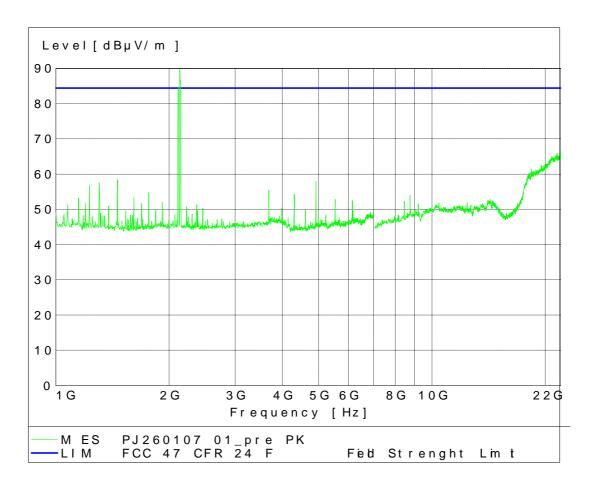
Page Date 3

22 (29) 31.01.2007



Test report No.: 80106R2

Test Data - Radiated Emissions 1 GHz -22 GHz



Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (-13 dBm) to unit dBuV/m in 3 meter measurement distance

Pre measurement in stack installation FRIB Tx C1 2132.5 MHz and C2 2137.5 MHz and FRIA Tx C1 2112.5 MHz and C2 2117.5 MHz, transmitters full power terminated 50Ω

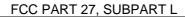


Test report No.: 80106R2

6. List of test equipment

Each active test equipment is calibrated annually.

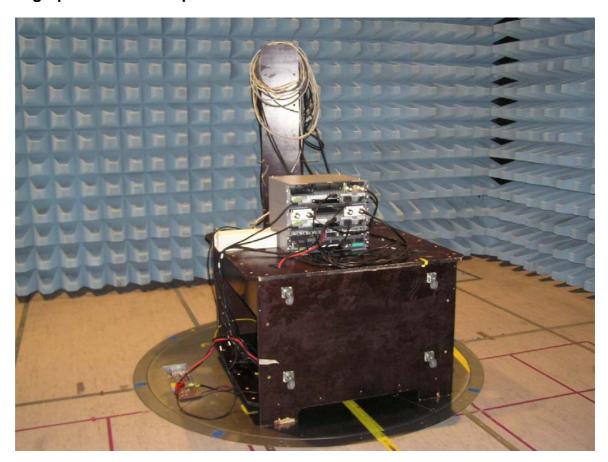
Nr.	Equipment	Name of equipment	Serial number
1	Signal analyzer	Rohde & Schwarz:FSIQ26	836702/020
2	Network analyzer	Hewlett-Packard:HP8753E	US38431868
3	Network analyzer	Hewlett-Packard:HP8720ES	US39172107
4	Calibration kit	Hewlett-Packard:HP85032B	2919A04843
5	Enviromental chamber	Weiss technick	59226012320010
6	Frequency standard	Datum 8040	23006282
7	Interface Unit	Orbis TX SSU2100A	SSU-0346-999
8	DC power	Sörensen	9950C0085
9	Temperature/humidity meter	VAISALA HMI 31	P3730008
10	Signal analyzer	Rohde & Schwarz:FSIQ26	833370/009
11	Frequency standard	Datum 8040	0041005473
12	High Pass filter	Reactel 9HSX-3/20-S11	0531
13	Attenuator	MCE/Weinschel 67-20-33	BM0633
14	Attenuator	Narda FSCM 99899	08275
15	Semianechoic chamber	Siemens Matsushita	Product No
		$9m \times 5m \times 6m$	S&M B83317-
		(room 0039)	C6019-T232
16	EMI Test Receiver	R&S ESIB 26	100335
17	LogPer Antenna	R&S HL025	349048/002
			(1-26 GHz)
18	Bilog Antenna	Chase CBL6112B	2694
19	Horn Antenna	Emco 3115	0102A06346
20	Biconical Antenna	R&S HK116	836891/009
21	Dipole VHF	Mess-Elektronik VHA9103	
22	Dipole UHF	Mess-Elektronik UHA9105	
23	Signal Generator	R&S SMR 20	1715
24	Amplifier	Miteg AFSX4	791117
25	Antenna Mast	Deisel HD240	2401323194
26	Mast Controller	Deisel HD100	1001331





FCC ID: UAFFRIB-01 Type: FRIB Test report No.: 80106R2

7. Photographs of Test Setup





Test report No.: 80106R2

8. ANNEX A, TEST DETAILS

NAME OF TEST: RF Power Output PARA. NO.: 2.1046

Minimum Standard: Para. No. 27.50 (d). Base stations are limited to 1640 watts peak

E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter

exceed 100 watts.

Method Of Measurement:

CDMA Per ANSI/J-STD-014 TDMA Per ANSI/J-STD-010

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

NAME OF TEST: Occupied Bandwidth

Minimum Standard: Para. No. 2.1049. The 99% occupied bandwidth is the width of a

frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to

0.5% of the emitted power.

Method Of Measurement:

The 99% occupied bandwidth of the carrier emission is measured using a spectrum analyzer with Resolution Bandwidth set to 1% of the necessary bandwidth of the transmitted carrier.

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

Minimum Standard: Para. No. 27.53(g). On any frequency outside a licensee's

frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 \log (P) dB.

Method Of Measurement:

Spectrum analyzer settings:

RBW: 1 MHz VBW: 1 MHz

Within 1 MHz of the upper and lower edges of the assigned band of operation the resolution bandwidth is lowered to 1 % of the 26 dB occupied bandwidth of the

transmitted carrier. A pre-measurement was performed with the max peak detector and spurious emissions closer than 20 dB to the limit was measured with rms detector.

PARA. NO.: 2.1049



Test report No.: 80106R2

PARA. NO.: 2.1053

NAME OF TEST: Field Strength of Spurious Radiation

Para. No.27.53(g). On any frequency outside a licensee's

frequency block, the power of any emission shall be attenuated

below the transmitter power by at least 43 + 10 log (P) dB.

Test Method:

Minimum Standard:

TIA/EIA-603-C-2004, Section 2.2.12

The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable. During the test in the frequency range 30-22000 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations.

Vertical and horizontal polarizations in the frequency range 30-22000 MHz was first measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 2.5 m.

The limit of -13 dBm has been calculated to correspond 84.4 dB(μ V/m). Spurious emissions closer than 20 dB to the limit was measured with average detector.

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The EUT was replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator $G_{Antenna[dBi]}$. This antenna was fed with a signal at the spurious frequency $P_{Gen[dBm]}$. The level of the signal was adjusted to repeat the previously measured level. The resulting EIRP is the signal level fed to the reference antenna corrected for gain referenced to an isotropic. The formula below was used to calculate the EIRP of the EUT.

 $P_{EIRP[dbm]} = P_{Gen[dBm]} - L_{Cable[dB]} + G_{Antenna[dBi]}$

NAME OF TEST: Frequency Stability

Minimum Standard: Para. No. 27.54. The frequency stability shall be sufficient to

ensure that the fundamental emission stays within the

authorized frequency block.

Method Of Measurement:

Frequency Stability With Voltage Variation

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency error is measure. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency error is measured.

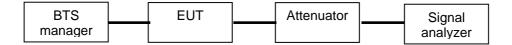
PARA. NO.: 2.1055



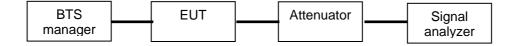
Test report No.: 80106R2

9. ANNEX B, TEST DIAGRAMS

RF Power Output PARA. NO.: 2.1046



Occupied Bandwidth PARA. NO.: 2.1049



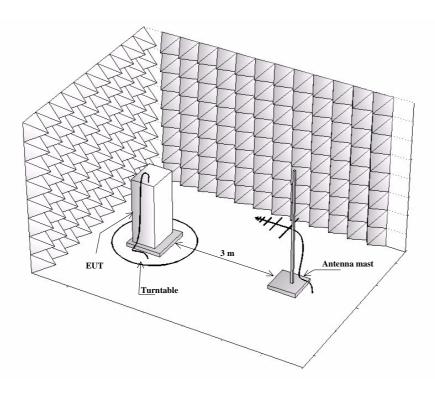
Spurious Emission at Antenna Terminals PARA. NO.: 2.1051





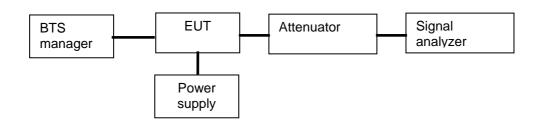
FCC ID: UAFFRIB-01 Type: FRIB Test report No.: 80106R2

Field Strength of Spurious Radiation PARA. NO.: 2.1053



Frequency Stability PARA. NO.: 2.1055

Frequency Stability With Voltage Variation



Frequency Stability With Temperature Variation

