Nemko TEST REPORT

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**
MARKETING NAME:	***Nokia Flexi BTS RF module 1.7GHz/2.1GHz***
TYPE:	***FRIB***
MANUFACTURER:	***Nokia Corporation***
FCC ID:	**UAFFRIB-01**
CLIENT:	**Nokia Corporation**
ADDRESS:	**P.O.Box 319, FI-90651 OULU, FINLAND**
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

Contents

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.

1.2 EUT and accessories

Manufacturer:	Nokia
Model:	FRIB, s/n: L9064500028
Other Units:	System module, FSMB Transmission module, FTIA
General:	All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 27, Subpart L.

☐	New Submission	☒	Production Unit
☒	Class I Permissive Change	☐	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**

This report applies only to the items tested.

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%.

2. General Equipment Specification

Supply Voltage Input:	48 Vdc
Frequency Bands: TX:	☒ Block A : 2110 – 2120 MHz ☒ Block B : 2120 – 2130 MHz ☒ Block C : 2130 – 2135 MHz ☒ Block D : 2135 – 2140 MHz ☒ Block E : 2140 – 2155 MHz
Frequency Bands: RX:	☒ Block A : 1710 – 1720 MHz ☒ Block B : 1720 – 1730 MHz ☒ Block C : 1730 – 1735 MHz ☒ Block D : 1735 – 1740 MHz ☒ Block E : 1740 – 1755 MHz
Type of Modulation and Designator:	**W-CDMA (5M00F9W)** ☒ **GSM (200KG7W)** ☐ **NADC 40K0DXW)** ☐
Maximum No. of Carriers:	2
Output Impedance:	50 ohms.
RF Output:	Per channel: 40 W or 2x20W.
Band Selection:	**Software** ☒ **Duplexer** ☐ **Fullband** ☐

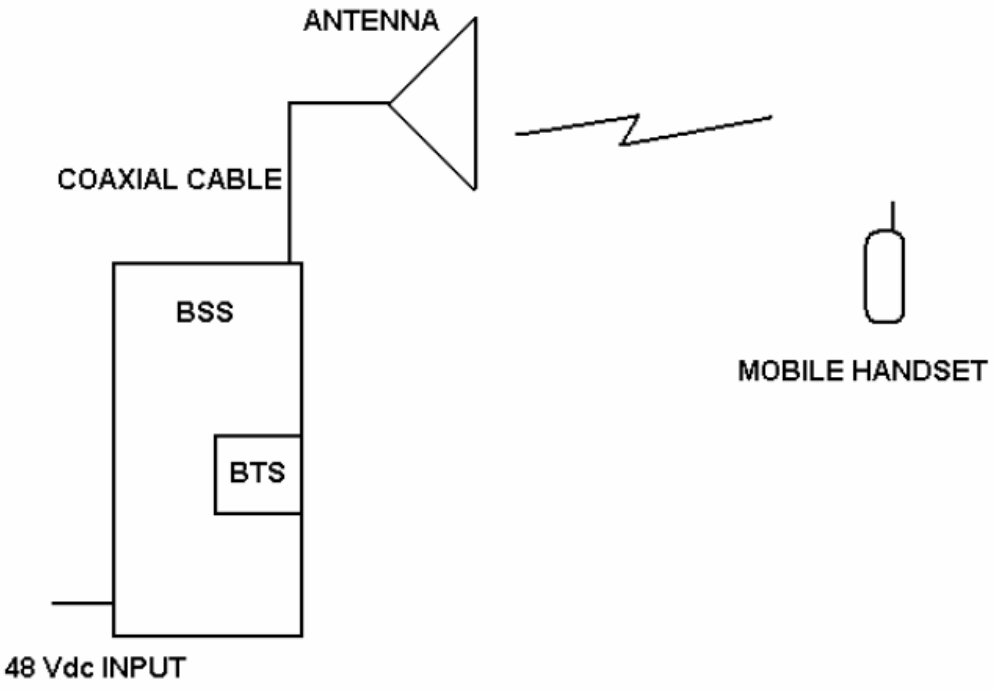
System Description

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



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 (MHz)	Measured Output Power/carr. (dBm)	Power/carr. (W)	Total power (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: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 10 %.

Test Data – RF Power Output

Nemko Oy, Finland

Data Plot — RF POWER OUTPUT

Page 1 of 2 — Complete x

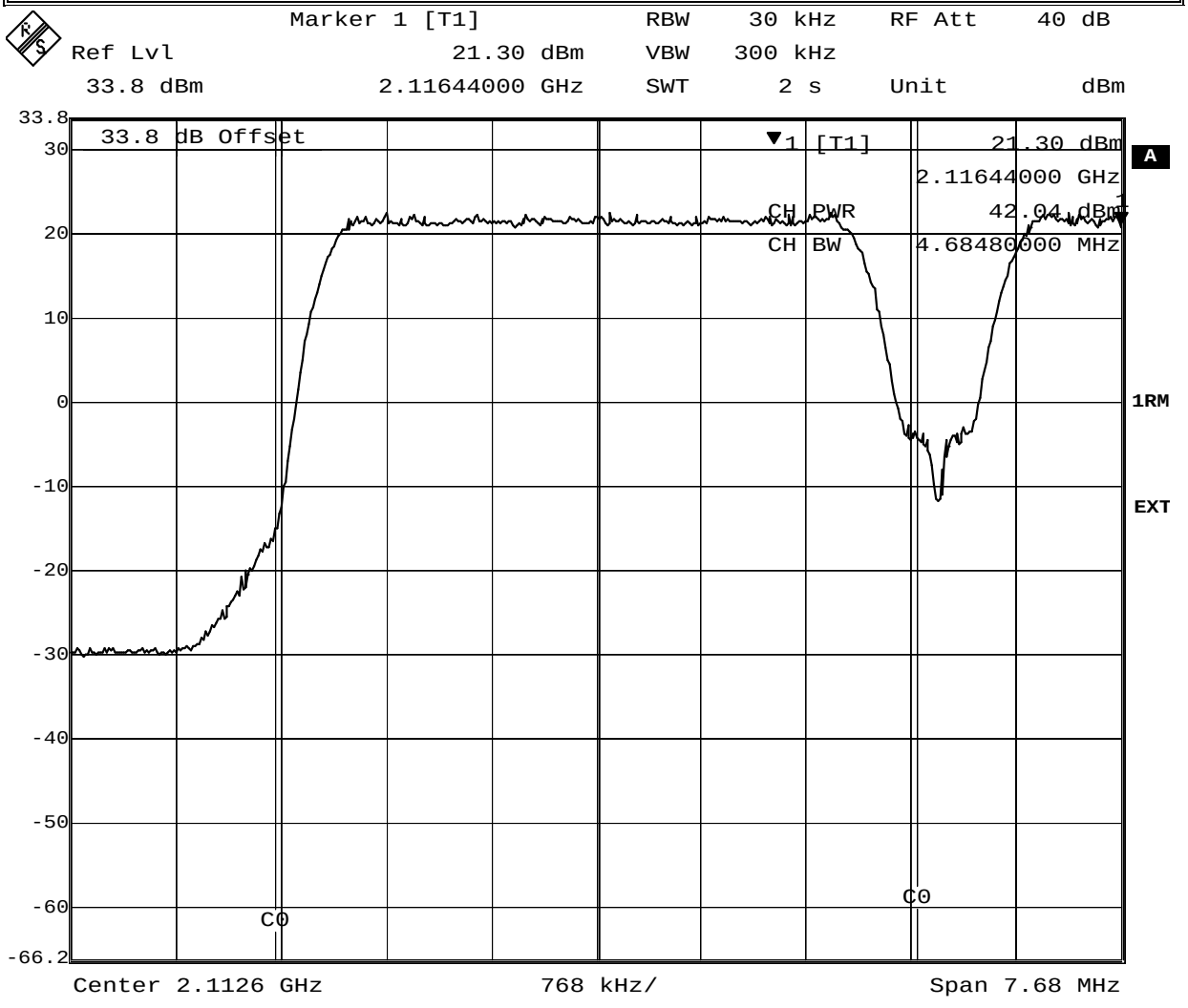
Job No.:	80105	Date:	23/01/2007	Preliminary:	
Specification:	PT27	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	10		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER CENTER CHANNEL, multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Rms	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:		Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	7	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



Notes: Carrier 1 QPSK 2112.6 MHz

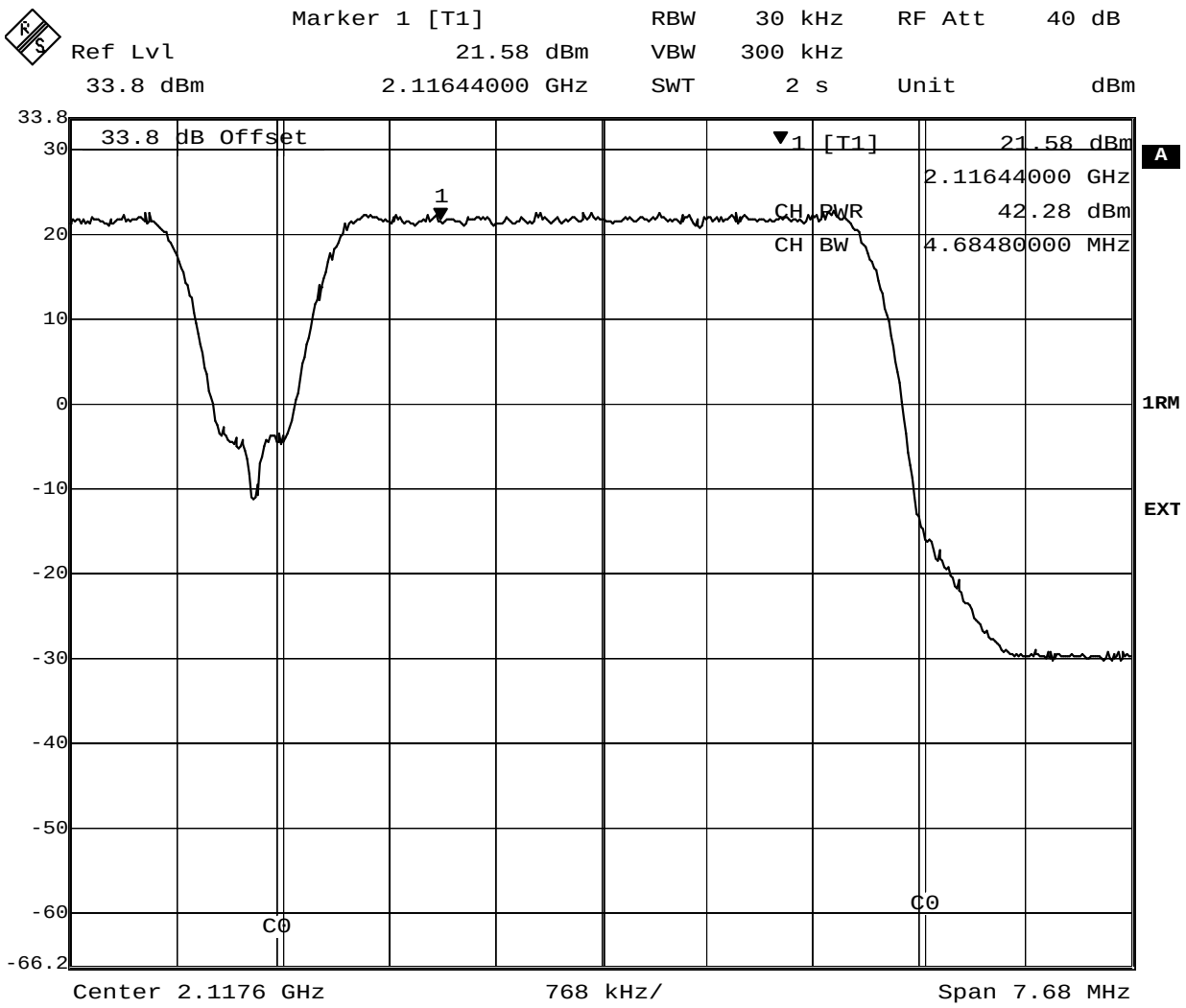
Nemko Oy, Finland

Data Plot

RF POWER OUTPUT

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		



Notes: Carrier 2 QPSK 2117.6 MHz

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

Upper Band Edge
Multi carrier

Frequency (MHz)	Modulation	Peak Emission 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: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 10 %.

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot — Spurious Emissions at Antenna Terminals

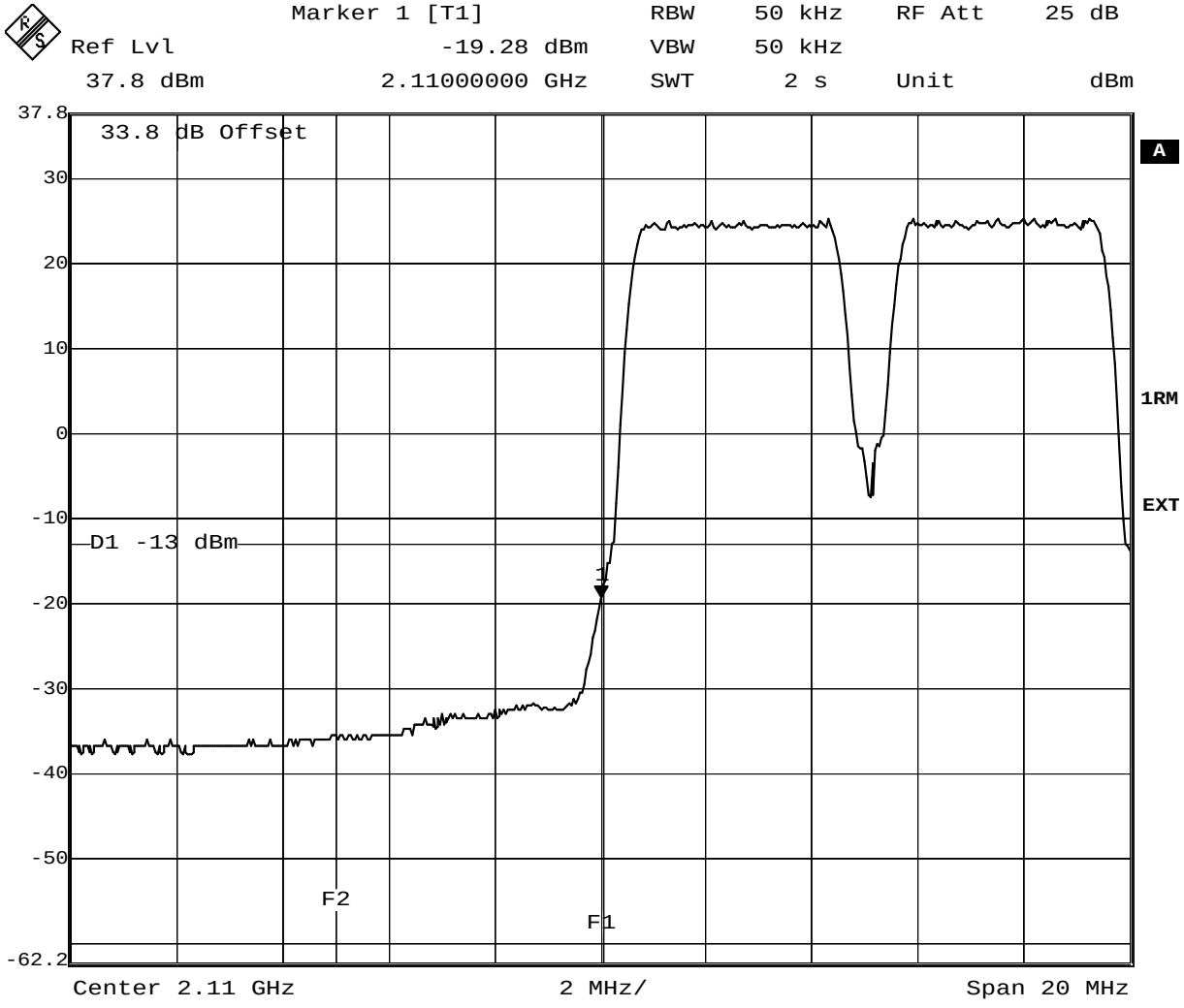
Page 1 of 10				Complete	x
Job No.:	80105	Date:	23/01/2007	Preliminary:	
Specification:	PT27	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	10		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER LOWEST CHANNEL, multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Rms	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:		Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	7	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



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

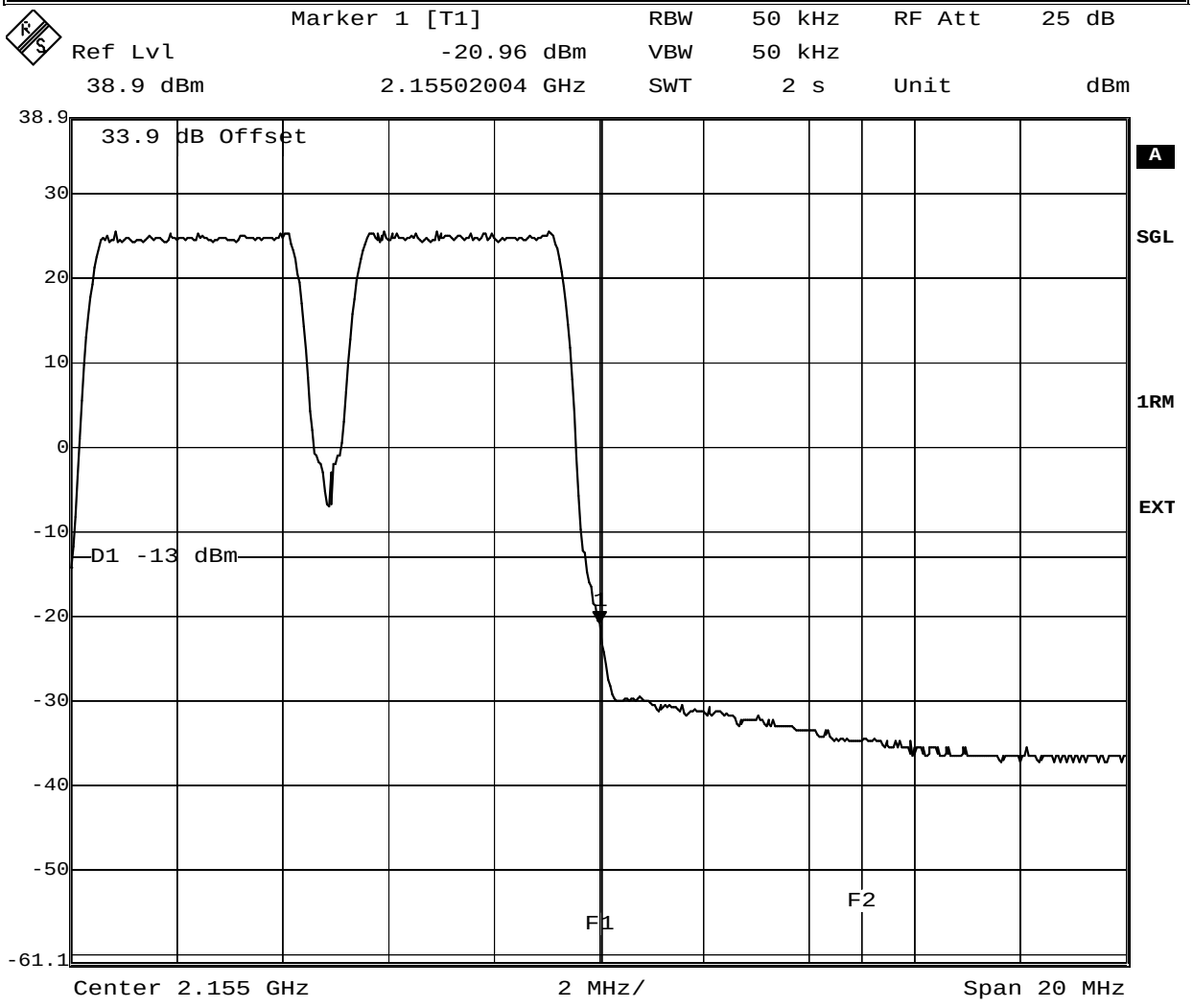
Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 10

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 HIGHEST CHANNEL, multi carrier		



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

Test Data – Spurious Emissions

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Data Plot **Spurious Emissions at Antenna Terminals**

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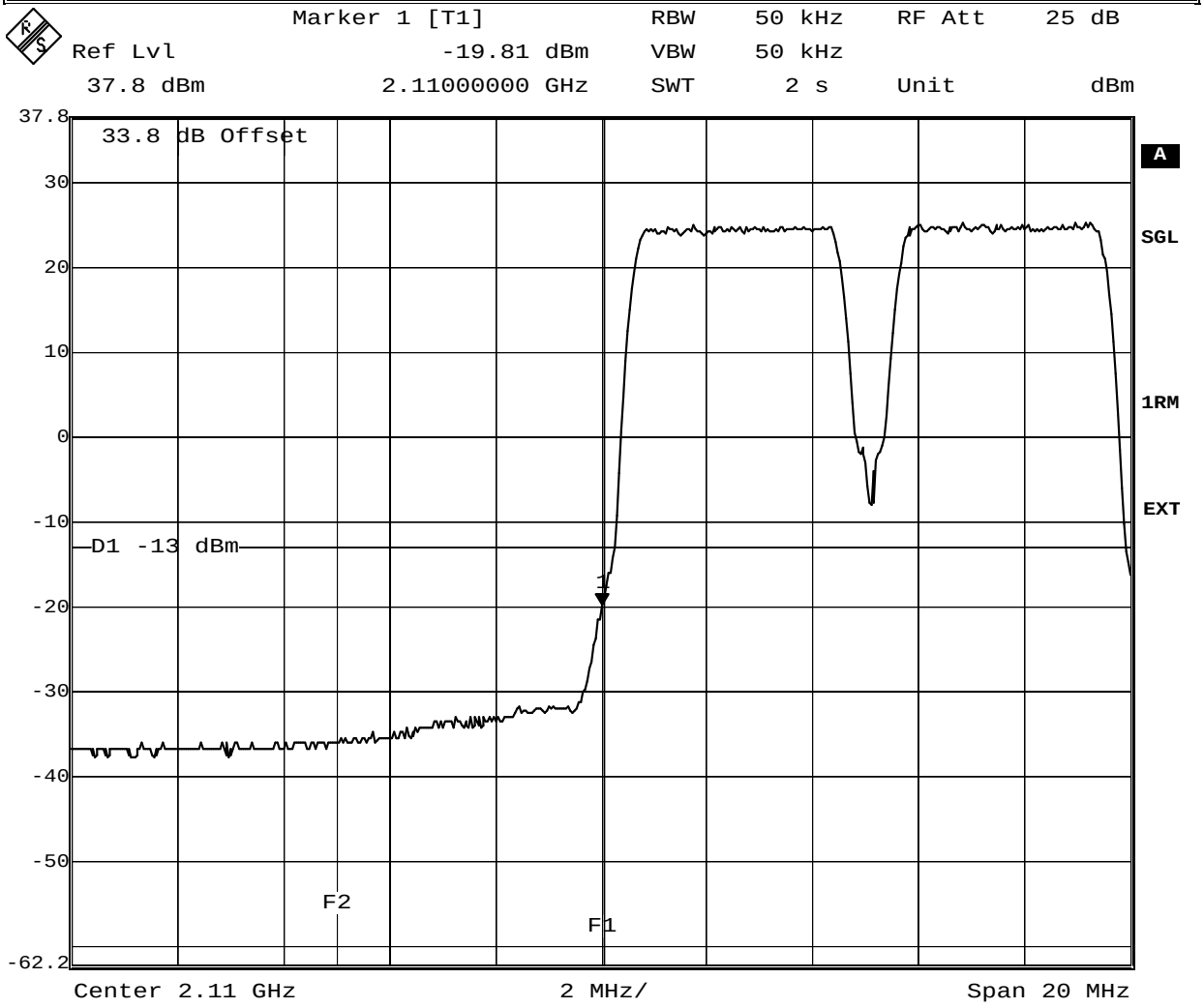
Job No.:	80105	Date:	23/01/2007
Specification:	PT27	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	10
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER LOWEST CHANNEL, multi carrier		



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

Test Data – Spurious Emissions

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Data Plot — **Spurious Emissions at Antenna Terminals**
Band edge and 3rd IM

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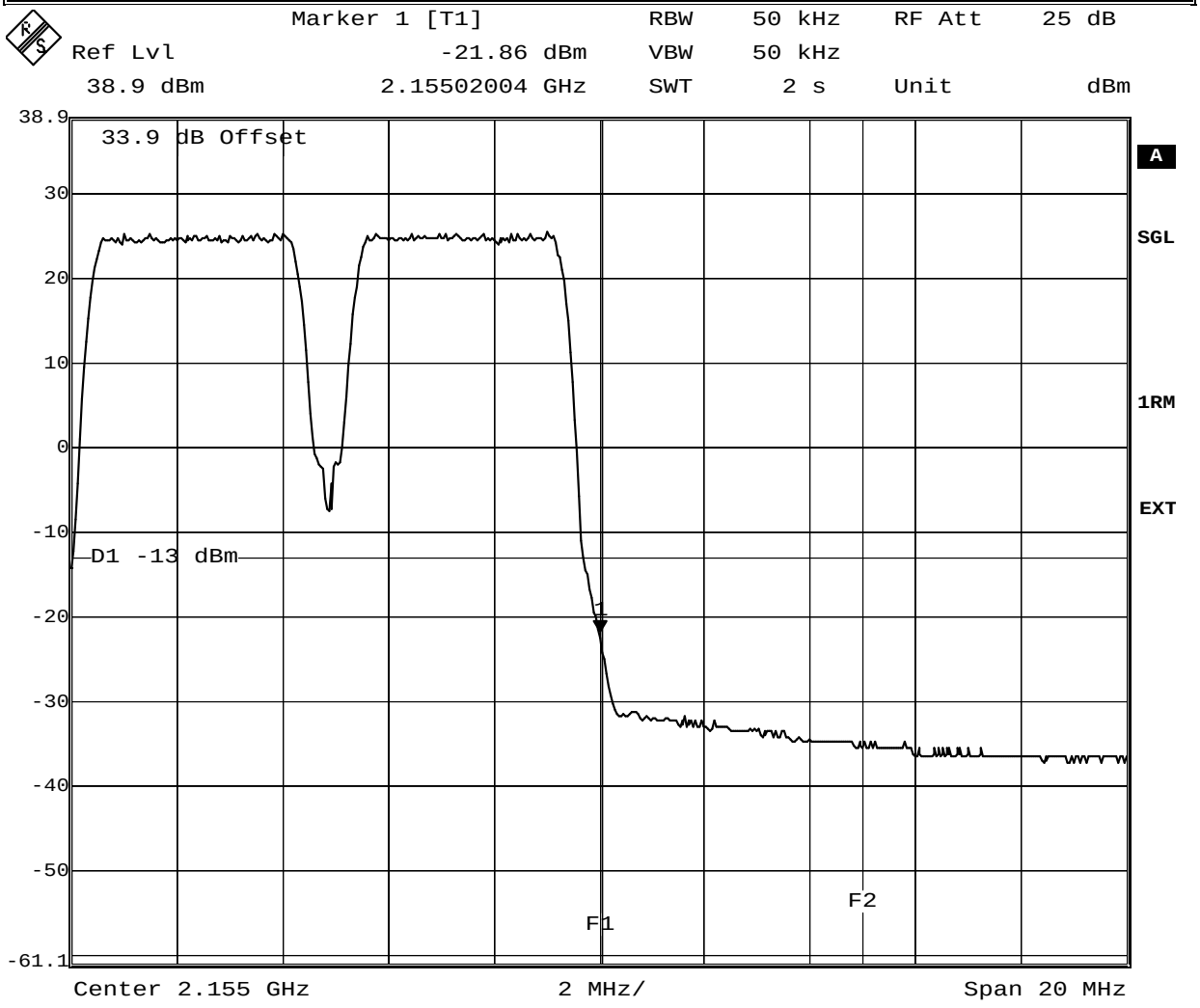
Job No.:	80105	Date:	23/01/2007
Specification:	PT27	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	10
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER highest CHANNEL, multi carrier		



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

Test Data – Spurious Emissions

Nemko Oy, Finland

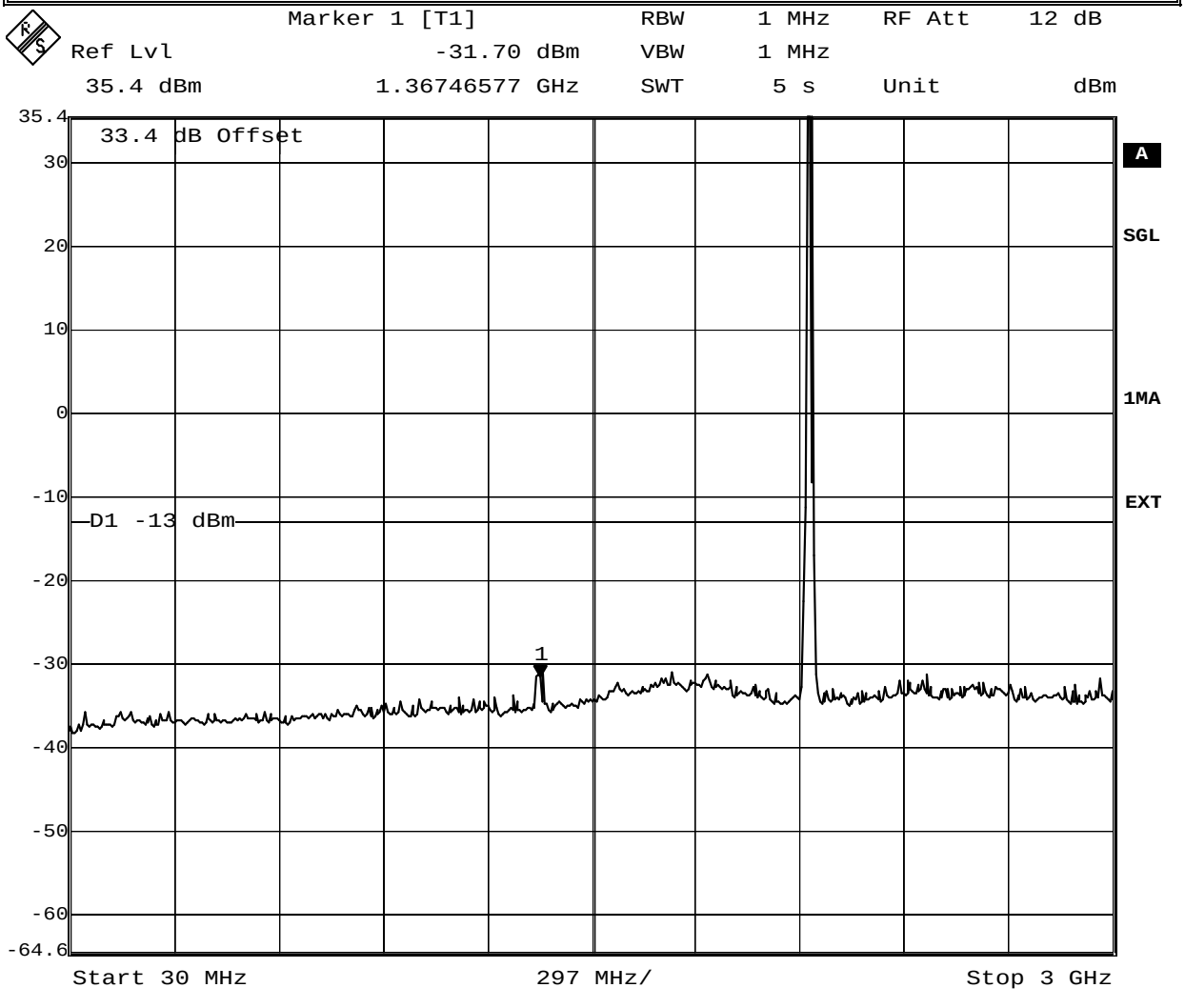
Data Plot — Spurious Emissions at Antenna Terminals

Page 5 of 10 | Complete x | Preliminary:

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 MIDDLE CHANNEL, multi carrier		
Sample Number:	1		
Location:	NET/IMN Oulu	RBW:	Refer to plots
Detector type:	Peak	VBW:	Refer to plots
Measurement Distance:	N/A m		

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:		Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	13	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:			
Measurement Uncertainty:	± 0.7 dB		



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

Notes: Tx 2132.5 and 2137.5 MHZ QPSK

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot — Spurious Emissions at Antenna Terminals

Page 6 of 10 — Complete x

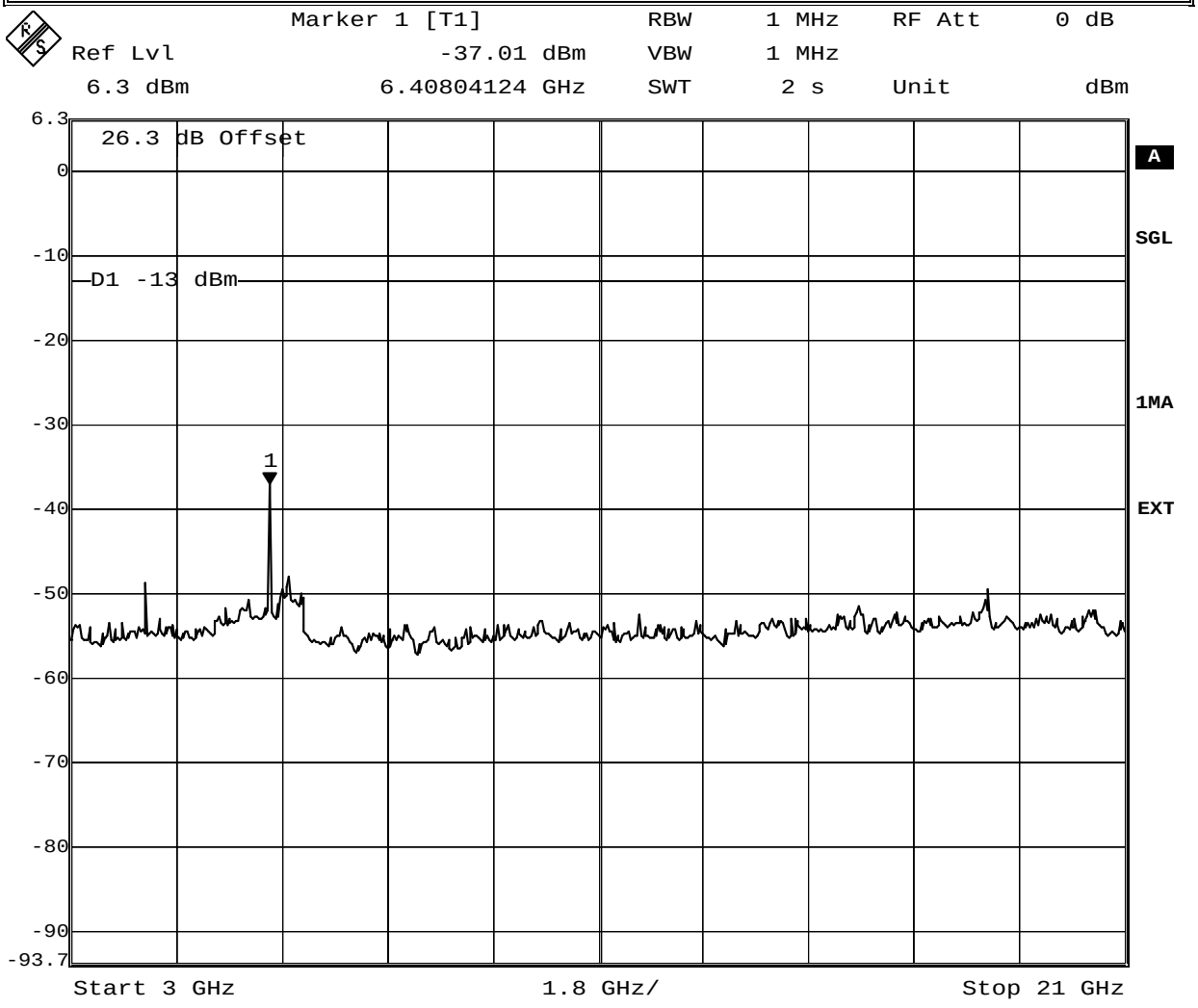
Job No.:	80105	Date:	23/01/2007	Preliminary:	
Specification:	PT27	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	10		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER MIDDLE CHANNEL multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Peak	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	12	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



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

Notes: Tx 2132.5 and 2137.5 MHZ QPSK

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot — Spurious Emissions at Antenna Terminals

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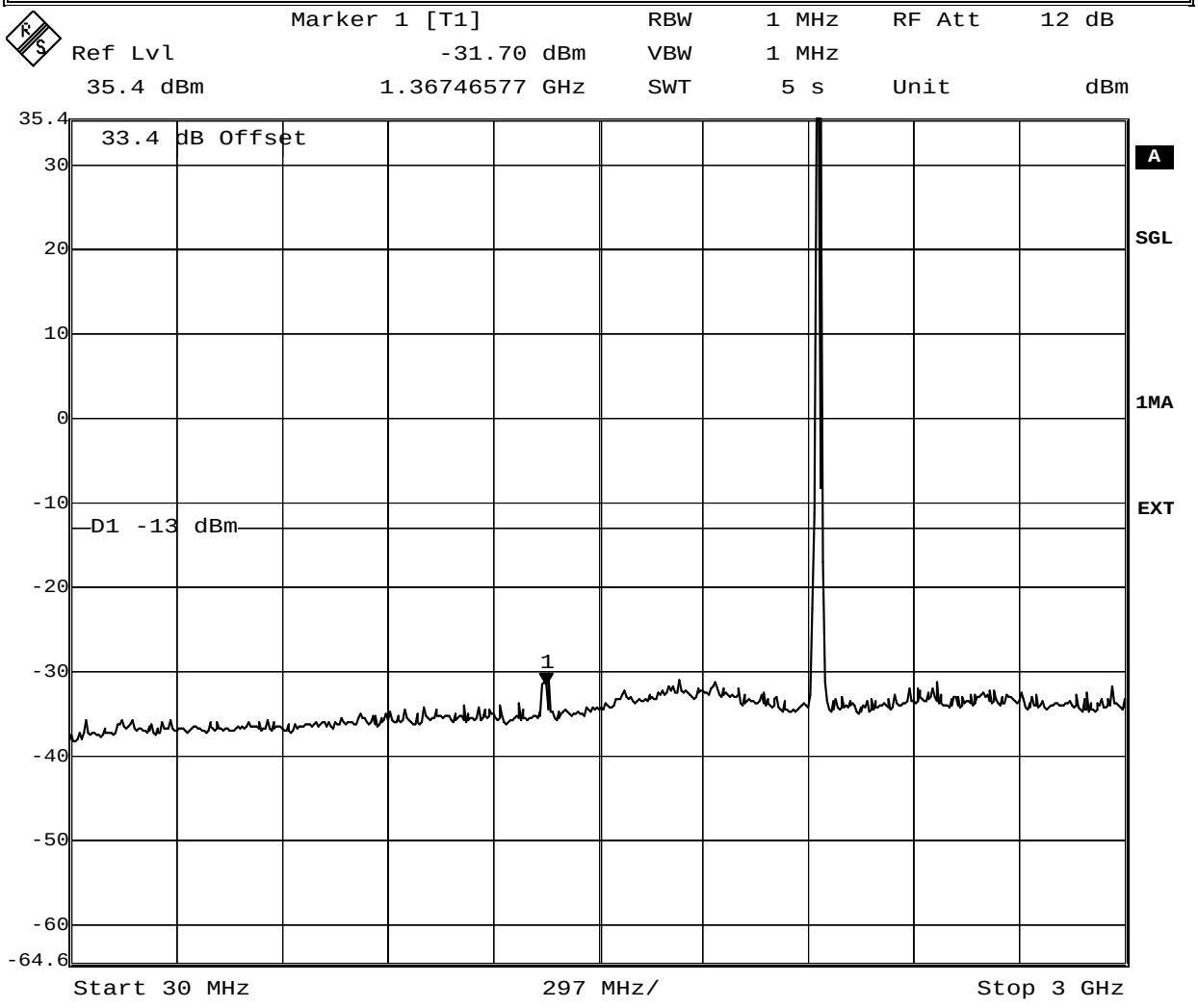
Job No.:	80105	Date:	23/01/2007	Preliminary:	
Specification:	PT27	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	10		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER MIDDLE CHANNEL multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Peak	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	12	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:			
Measurement Uncertainty:	± 0.7 dB		



Notes: Tx 2132.5 and 2137.5 MHZ 16QAM

Test Data – Spurious Emissions

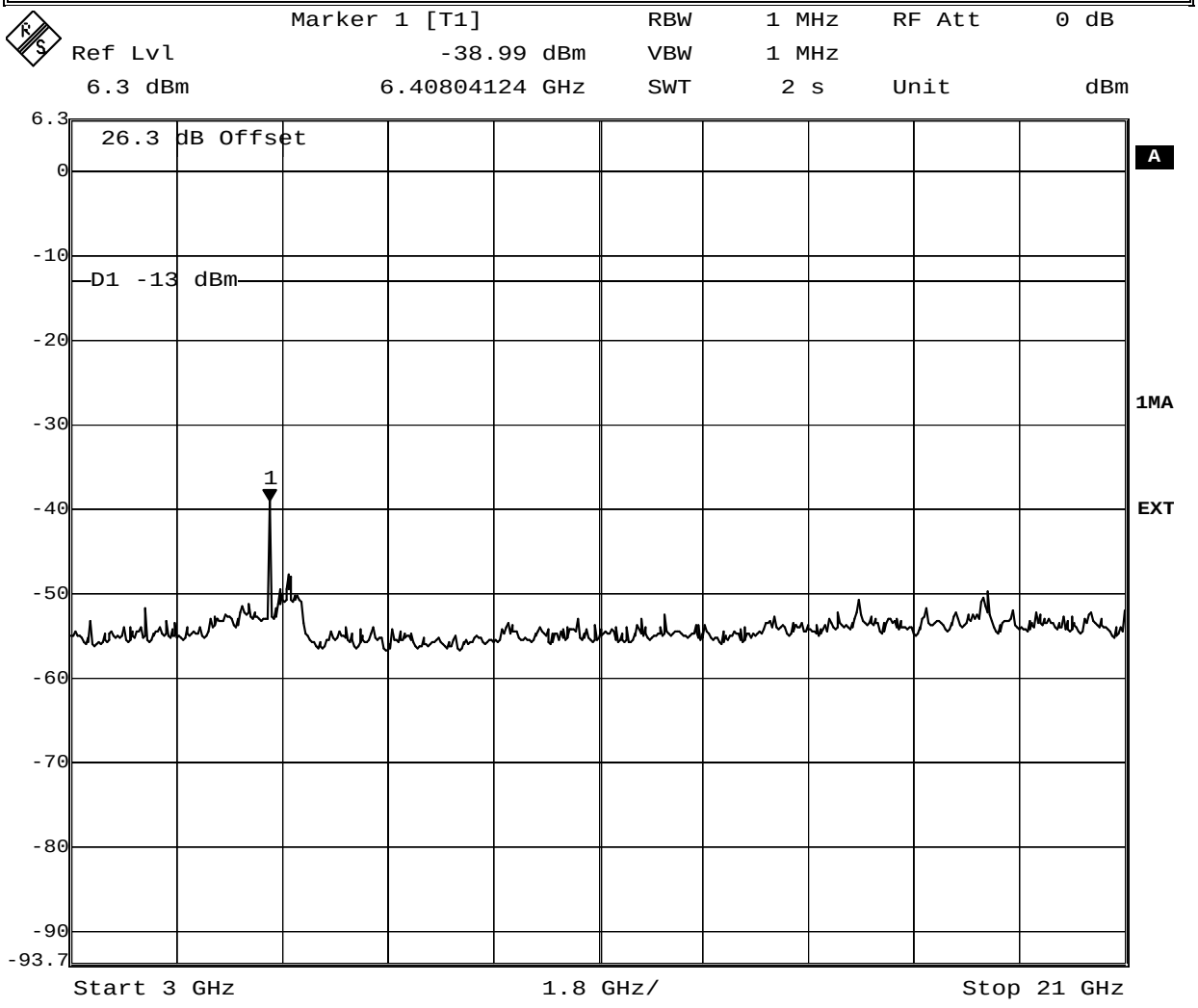
Nemko Oy, Finland

Data Plot — Spurious Emissions at Antenna Terminals

Page 8 of 10				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 TRANSMITTER				
Configuration:	TX FULL POWER MIDDLE CHANNEL, multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Peak	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	12	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:			
Measurement Uncertainty:	± 0.7 dB		



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

Notes: Tx 2132.5 and 2137.5 MHZ 16QAM

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot

Spurious Emissions at Antenna Terminals
3rd order inband intermodulation

Page 9 of 10 | Complete x | Preliminary:

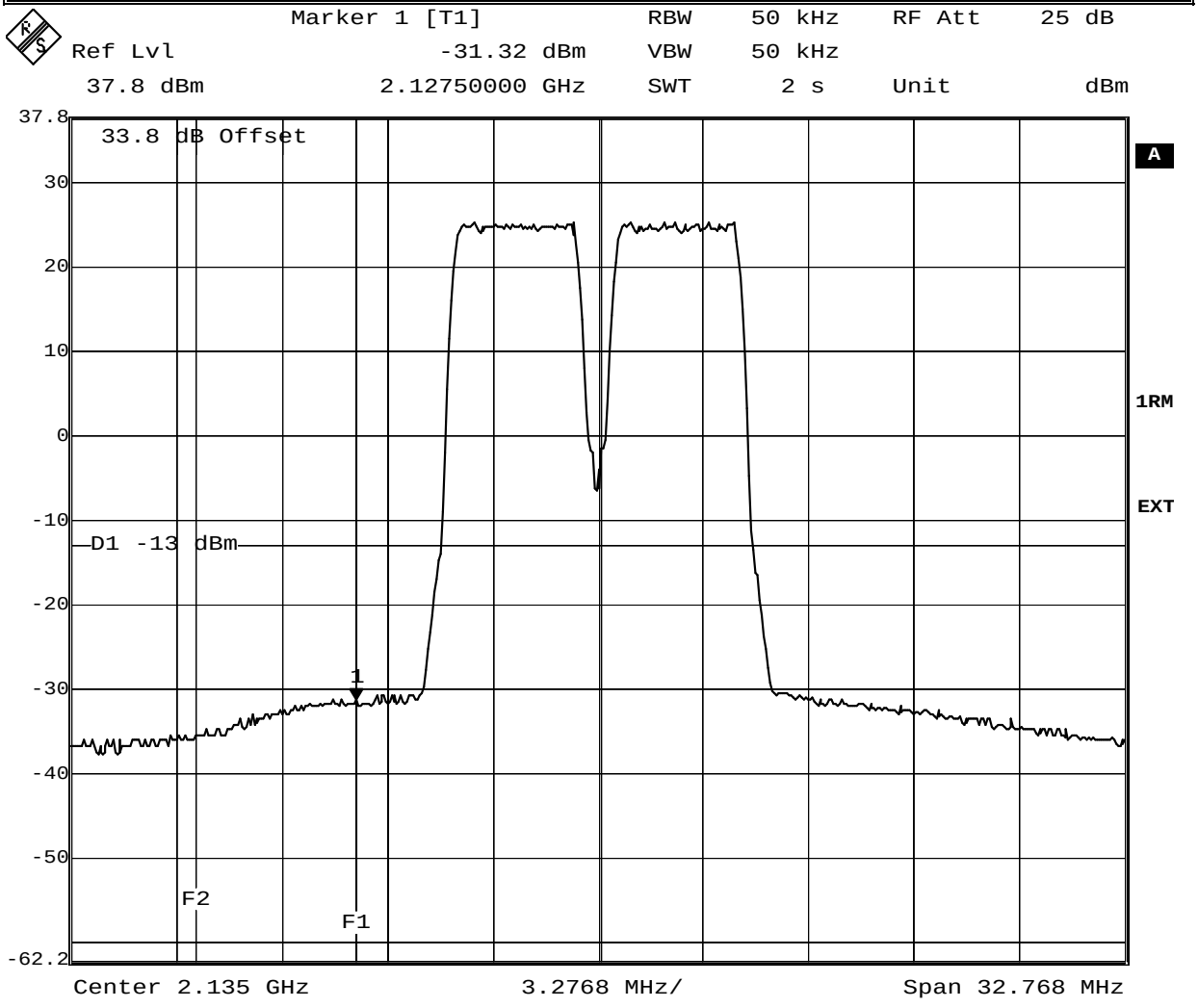
Job No.:	80105	Date:	23/01/2007		
Specification:	PT27	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	10		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER MIDDLE CHANNEL, multi carrier				
Sample Number:	1				
Location:	NET/IMN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	rms	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	12	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



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

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

Test Data – Spurious Emissions

Nemko Oy, Finland

Data Plot

Spurious Emissions at Antenna Terminals
3rd order inband intermodulation

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Complete x
Preliminary:

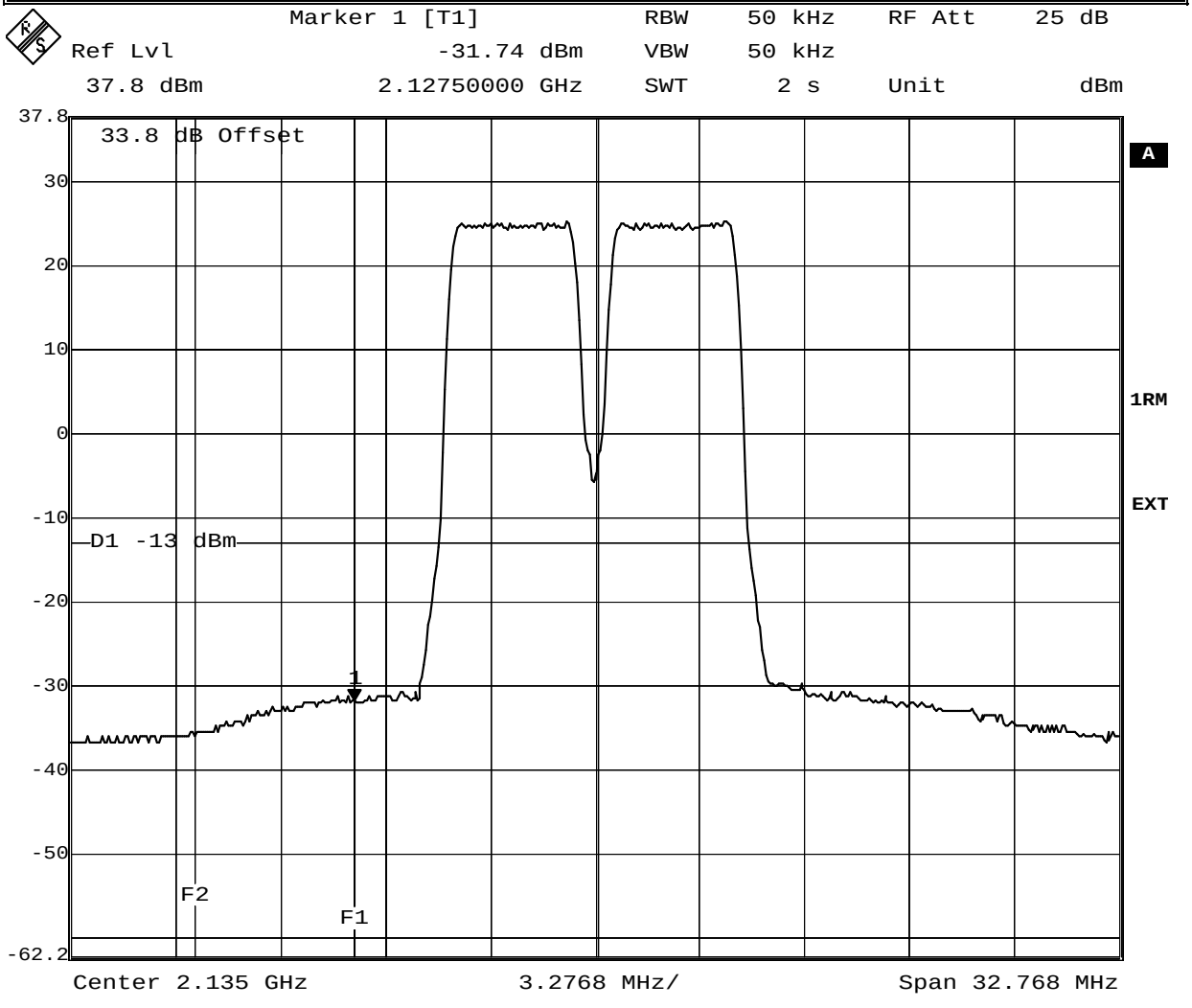
Job No.:	80105	Date:	23/01/2007
Specification:	PT27	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	10
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER MIDDLE CHANNEL, multi carrier		
Sample Number:	1		
Location:	NET/IMN Oulu	RBW:	Refer to plots
Detector type:	rms	VBW:	Refer to plots

Measurement Distance: N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	12	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:
Measurement Uncertainty: ± 0.7 dB



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

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 (MHz)	Spurious Emission 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 Data – Radiated Emissions

Nemko Oy, Finland

Data Plot — Radiated Emissions Substitution Method

Page 1 of 1 — Complete x

Job No.: 80105 — Date: 26/01/2007 — Preliminary:

Specification: PT27 — Temperature (°C): 23

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

E.U.T.: WCDMA TRANSMITTER

Configuration: TX FULL POWER

Sample Number: 1

Location: NET/IMN Oulu — RBW: 1 MHz — Measurement

Detector type: Ave — VBW: 1 MHz — Distance: 3 m

Test Equipment Used

Antenna: 17 and 18 — Directional Coupler:

Pre-Amp: 24 — Cable #1:

Filter: — Cable #2:

Receiver: 16 — Cable #3:

Attenuator #1: - — Cable #4:

Attenuator #2: — Mixer:

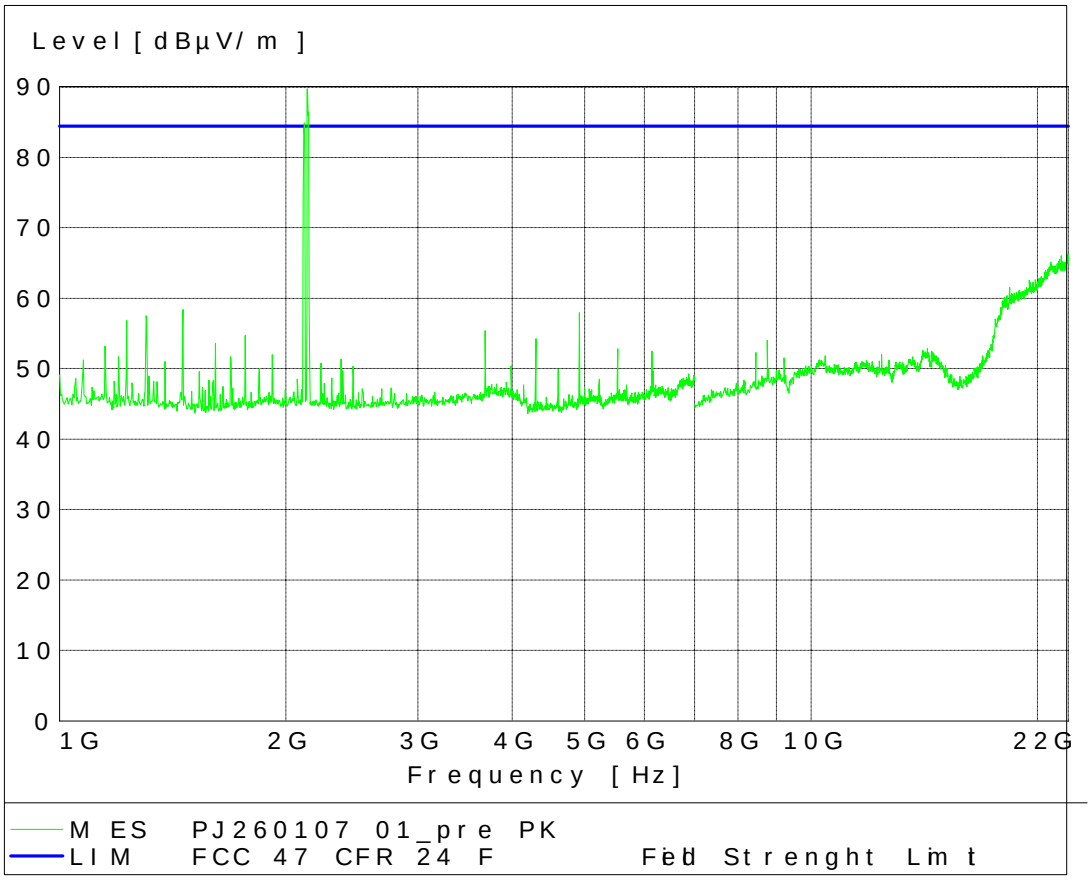
Additional equipment used: 19,23,25 and 26

Measurement Uncertainty: ± 5.2 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)	Gen. Level (dBm)	Substitution Antenna Gain (dBi)	EIRP (dBm)	EIRP (µW)	Polarity	Comments

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

Test Data – Radiated Emissions 1 GHz -22 GHz



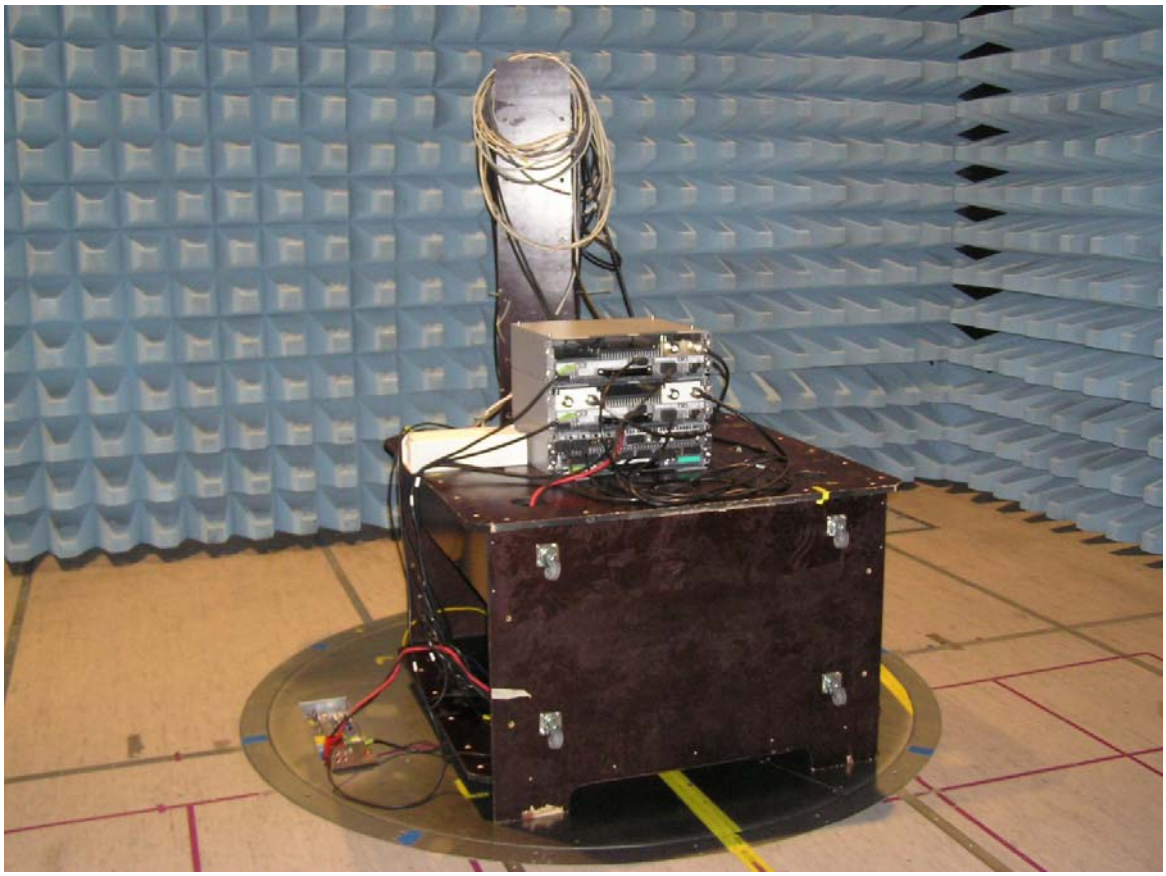
Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (–13 dBm) to unit dBuV/m in 3 meter measurement distance
Pre measurement in stack installation FRIB Tx C1 2132.5 MHz and C2 2137.5 MHz and FRIA Tx C1 2112.5 MHz and C2 2117.5 MHz, transmitters full power terminated 50Ω

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 9m × 5m × 6m (room 0039)	Product No S&M B83317- 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	Miteq AFSX4	791117
25	Antenna Mast	Deisel HD240	2401323194
26	Mast Controller	Deisel HD100	1001331

7. Photographs of Test Setup



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	PARA. NO.: 2.1049

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.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053

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.

Test Method:
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(µV/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	PARA. NO.: 2.1055

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

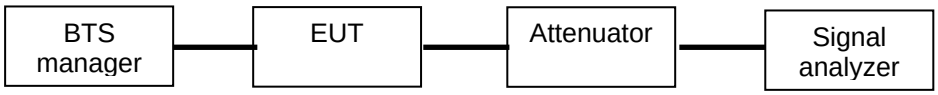
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency error is measure. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

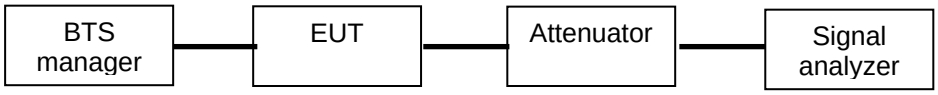
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency error is measured.

9. ANNEX B, TEST DIAGRAMS

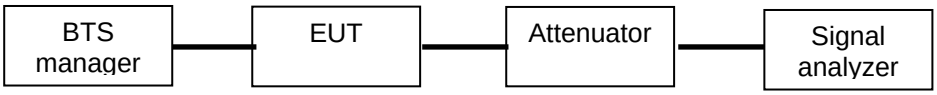
RF Power Output PARA. NO.: 2.1046



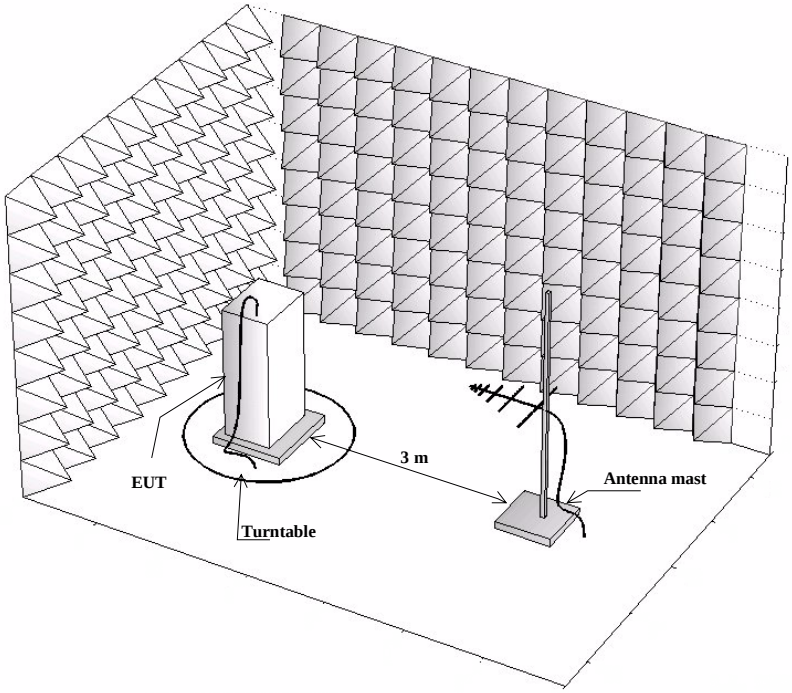
Occupied Bandwidth PARA. NO.: 2.1049



Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

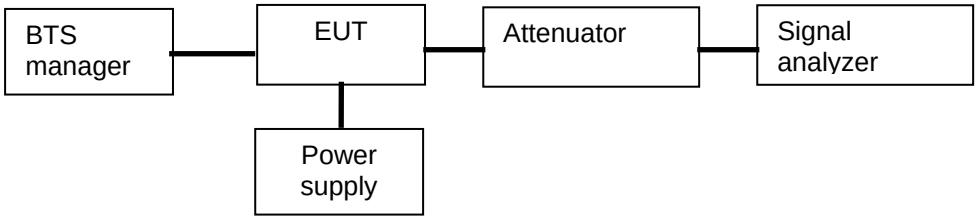


Field Strength of Spurious Radiation PARA. NO.: 2.1053



Frequency Stability PARA. NO.: 2.1055

Frequency Stability With Voltage Variation



Frequency Stability With Temperature Variation