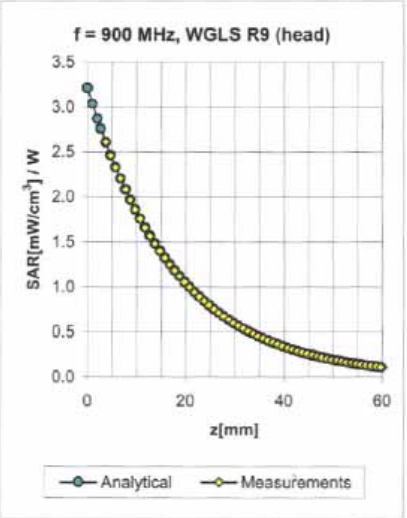
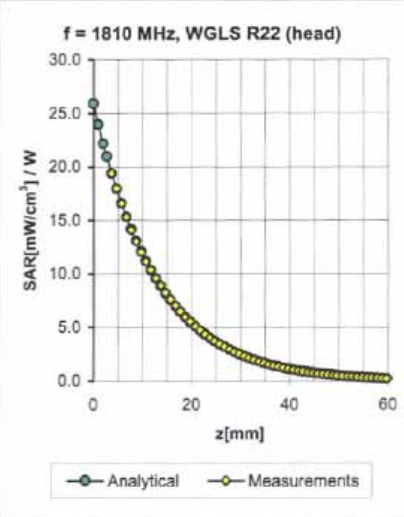
ET3DV6 SN:1787 May 31, 2006

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.50	1.85	6.38 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.59	2.46	5.26 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.44	2.10	6.18 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.44	4.66 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.62	2.13	4.13 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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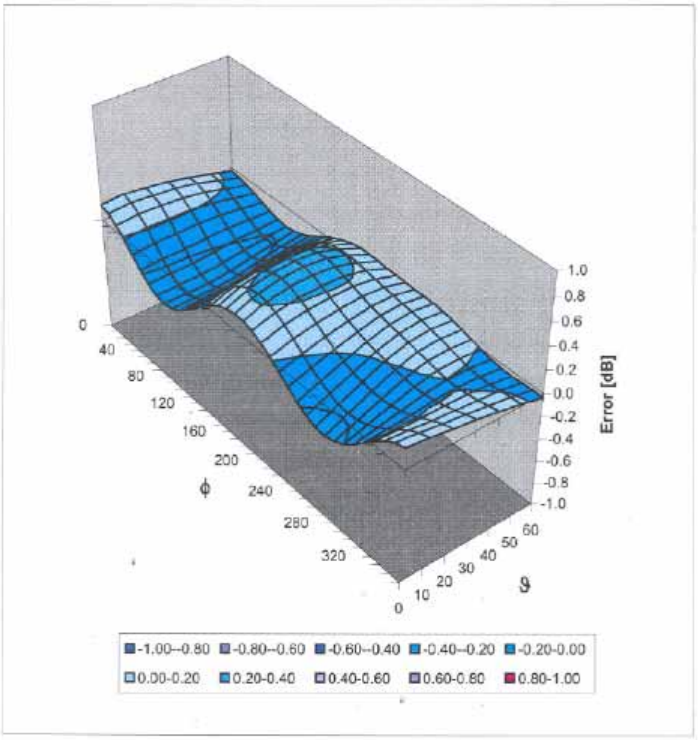
Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: DAE3-577_Nov05

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 577
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 11, 2005
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295803	7-Oct-05 (Sintrel, No.E-050073)	Oct-06
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1002	29-Jun-05 (SPEAG, in house check)	In house check Jun-06

	Name	Function	Signature
Calibrated by:	Daniel Steinacher	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: November 11, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accreditation No.: SCS 108

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
- *Channel separation*: Influence of a voltage on the neighbor channels not subject to an input voltage.
- *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
- *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
- *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
- *Input resistance:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
- *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.445 ± 0.1% (k=2)	403.896 ± 0.1% (k=2)	404.369 ± 0.1% (k=2)
Low Range	3.94241 ± 0.7% (k=2)	3.89919 ± 0.7% (k=2)	3.95427 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	130 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	199999.3	0.00
Channel X	+ Input	20000	20006.75	0.03
Channel X	- Input	20000	-19997.90	-0.01
Channel Y	+ Input	200000	200000.3	0.00
Channel Y	+ Input	20000	20004.58	0.02
Channel Y	- Input	20000	-20000.75	0.00
Channel Z	+ Input	200000	199999.6	0.00
Channel Z	+ Input	20000	20001.43	0.01
Channel Z	- Input	20000	-20003.93	0.02

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	2000.1	0.00
Channel X	+ Input	200	200.42	0.21
Channel X	- Input	200	-200.30	0.15
Channel Y	+ Input	2000	2000.1	0.00
Channel Y	+ Input	200	199.35	-0.32
Channel Y	- Input	200	-200.96	0.48
Channel Z	+ Input	2000	1999.9	0.00
Channel Z	+ Input	200	199.37	-0.31
Channel Z	- Input	200	-200.62	0.31

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	13.40	12.55
	- 200	-12.29	-13.06
Channel Y	200	-6.93	-7.43
	- 200	6.72	6.47
Channel Z	200	0.71	0.36
	- 200	-1.67	-1.93

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.59	0.08
Channel Y	200	1.69	-	3.62
Channel Z	200	-0.73	-1.49	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15946	15679
Channel Y	15960	16151
Channel Z	16233	15968

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.08	-1.13	2.31	0.51
Channel Y	-0.35	-2.00	0.81	0.43
Channel Z	-0.38	-2.76	1.68	0.40

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	200.8
Channel Y	0.2000	201.4
Channel Z	0.2001	200.3

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9

Appendix D – WCDMA Test Modes

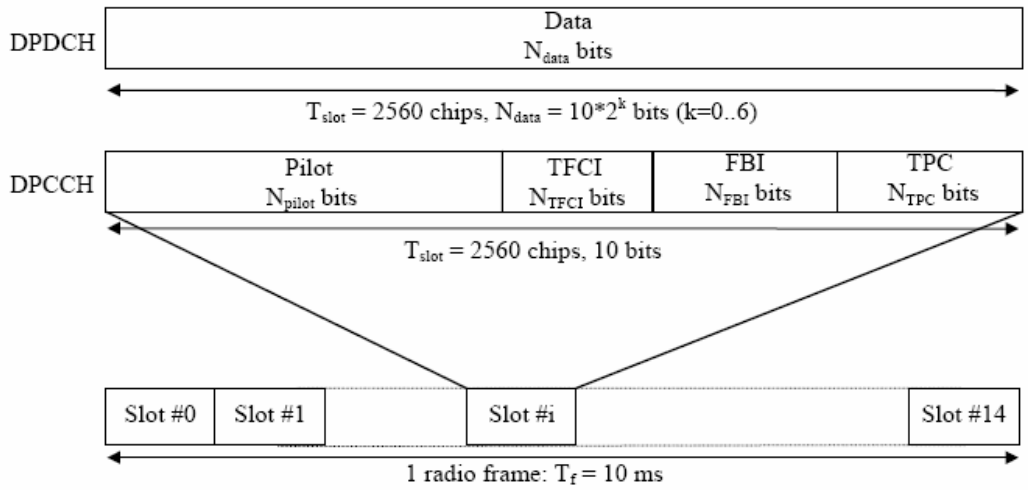
1. Conducted Output Power

RMC 12.2 kbps is the main WCDMA test mode for both EMC and SAR reports. A detailed analysis of the output power for other WCDMA modes is provided in the table below. The mobile phone supports only one DPDCH1 with a various of data rates, such as 12.2Kbps, 64kbps, 144Kbps and 384Kbps.

	Sysmbol Rates (Kbps)	SF	K	Data	Reference Channel Type (Data Rates)	Band II			Band V		
						Ch 9262	Ch9400	Ch9538	Ch 4132	Ch4182	Ch4233
						1852.4	1880	1907.6	826.4	836.4	846.6
DPDCH1	15	256	0	10	RAB 3.4Kbps	23.68	23.61	23.66	23.19	23.37	23.2
	30	128	1	20	RAB 13.6Kbps	23.7	23.64	23.57	23.18	23.41	23.16
	60	64	2	40	RMC 12.2Kbps	23.73	23.72	23.69	23.36	23.45	23.18
	120	32	3	80	Not support						
	240	16	4	160	RMC 64Kbps	23.71	23.67	23.66	23.3	23.42	23.19
	480	8	5	320	RMC 144Kbps	23.71	23.65	23.66	23.32	23.37	23.17
	960	4	6	640	RMC 384Kbps	23.7	23.65	23.62	23.31	23.4	23.15
	60	64	2	40	Vocie AMR 12.2Kbps	23.73	23.71	23.68	23.15	23.43	23.13
DPCCH	15	256	0	10							
Data: Bits/Slot ; SF:Spreading Factor ; K: Number of bits per uplink DPDCH slot.											

Table 1 Conducted output power

Followed by FCC suggestinons[1]:



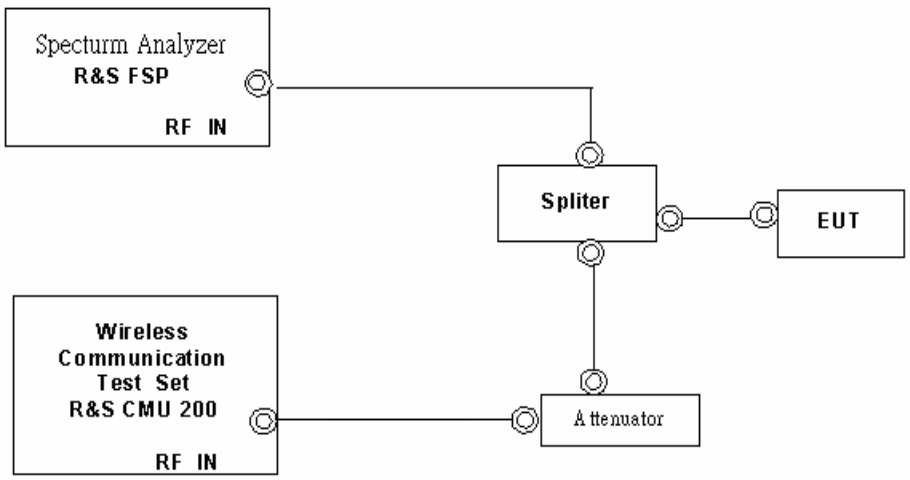
Frame structure for uplink DPDCH/DPCCH

The parameter K in the figure determines the number of bits per uplink DPDCH slot. It is related to the spreading factor SF of the DPDCH as SF = $256/2^k$. The DPDCH spreading factor may range from 256 down to 4. The spreading factor of the uplink DPCCH is always equal to 256, i.e. there are 10 bits per uplink DPCCH slot.

	Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
$DPDCH_1$	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640
$DPDCH_n$	960	960	4	1, 2, 3	640

DPCCH and DPDCH

There is only one DPCCH per radio link. Data rates, channelization codes and spread factor information for DPCCH and $DPDCH_n$ are indicated in the following Table. Spreading Rate (SF) * Symbol Rate = 3.84 Mcps.



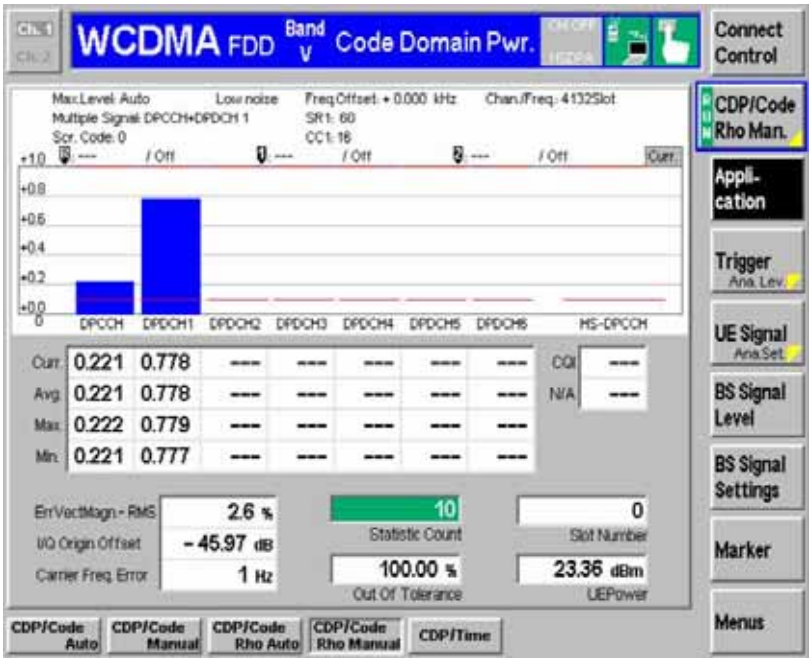
Setup Configuration

1. The EUT was connected to Specturm Analyzer and Base Station via power spliter. Refer to the drawing of Setup Configuration.

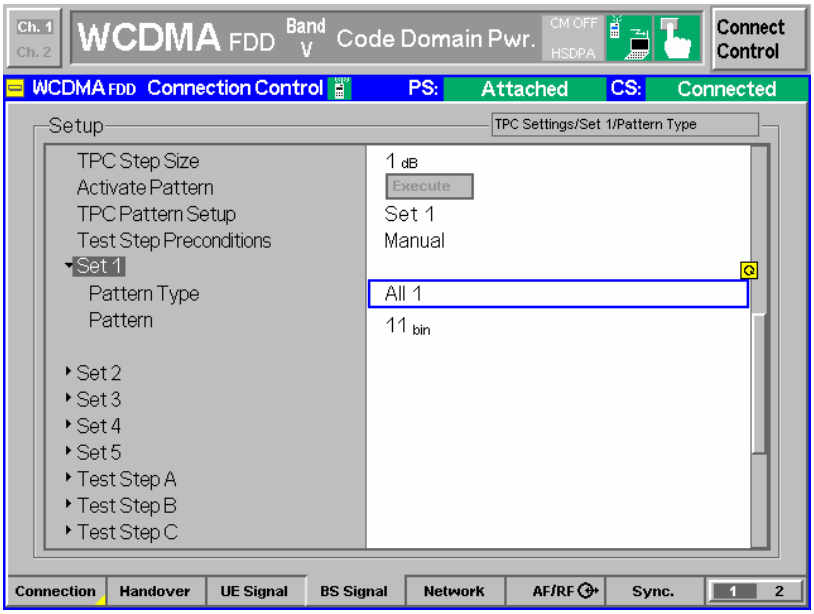
2. The RF path losses was compensated into the measurements.

3. A call was established beween EUT and Bsae Station with following setting
   a. Data rates : Varied RAB,RMC and Voice for each measurements.
   b. TPC with All Up

4. The transmitted maximum output power was recorded.



Single DPCCH with only one DPDCH at RMC 12.2Kbps (Symbol Rate 60 Kbps)



TPC with All " 1" (Contiunous transmiting)

2. Band Edge and Conducted Spurious Emission

The band edge and conducted spurious emission do not have obvious difference for all different WCDMA modes. As those results were far from the limit line, -13dBm, the test mode RMC 12.2Kbps can take as the main test mode for EMC requirement.

Sysmbol Rates	SF	K	Data	Refe Channel Type	Band II		Band V	
					Ch 9262	Ch9538	Ch 4132	Ch4233
					1852.4(MHz)	1907.6(MHz)	826.4(MHz)	846.6(MHz)
15	256	0	10	RAB 3.4Kbps	-27.59dBm	-25.6dBm	-27.08dBm	-25.08dBm
30	128	1	20	RAB 13.6Kbps	-27.57dBm	-25.48dBm	-26.94dBm	-25.45dBm
60	64	2	40	RMC 12.2KbpsDL/UL	-27.49dBm	-27.96dBm	-27.28dBm	-26.38dBm
240	16	4	160	RMC 64KbpsDL/UL	-27.42dBm	-28.4dBm	-27.71dBm	-26.03dBm
480	8	5	320	RMC 144KbpsDL/UL	-27.02dBm	-27.86dBm	-26.33dBm	-25.15dBm
960	4	6	640	RMC 384KbpsDL/UL	-27.16dBm	-26.97dBm	-27.02dBm	-25.65dBm
60	64	2	40	Vocie AMR 12.2Kbps	-26.93dBm	-26.44dBm	-27.53dBm	-26.51dBm

Table 2 Worst band edge data

Refe Channel Type	Band II Ch9400				Band V Ch4182			
	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
RAB 3.4Kbps	142.52	-26.83	-13	-13.83	1672	-57.98	-13	-44.98
	3760	-33.6	-13	-20.6	2508	-47.55	-13	-34.55
RAB 13.6Kbps	142.52	-29.08	-13	-16.08	1672	-58.64	-13	-45.64
	3760	-35.44	-13	-22.44	2508	-47.79	-13	-34.79
RMC 12.2KbpsDL/UL	142.52	-28.4	-13	-15.4	1672	-58	-13	-45
	3760	-33.92	-13	-20.92	2508	-48.01	-13	-35.01
RMC 64KbpsDL/UL	142.52	-29.16	-13	-16.16	1672	-58.61	-13	-45.61
	3760	-34.76	-13	-21.76	2508	-48.75	-13	-35.75
RMC 144KbpsDL/UL	142.52	-29	-13	-16	1672	-57.73	-13	-44.73
	3760	-34.76	-13	-21.76	2508	-48.17	-13	-35.17
RMC 384KbpsDL/UL	142.52	-28.9	-13	-15.9	1672	-58.44	-13	-45.44
	3760	-33.55	-13	-20.55	2512	-48.27	-13	-35.27
Vocie AMR 12.2Kbps	142.52	-29.38	-13	-16.38	1672	-58.36	-13	-45.36
	3760	-34.17	-13	-21.17	2512	-47.87	-13	-34.87

Table 3 Conducted spurious emission

Reference:

[1.] SAR Measurement Procedures for 3G Devices CDMA 2000/Ev-Do/WCDMA/HSDPA June 2006 Laboratory Division Office of Engineering and Technology Federal Communications Commission

[2.] TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification,Radio Transmission and Reception (FDD)