



FCC REPORT

Applicant: Shenzhen Tianjian Telecom Technology Co., Ltd

Address of Applicant: 22J Room, D Building Huaqiang Square, Huaqiang Road, Shenzhen, Guangdong, China

Equipment Under Test (EUT)

Product Name: USB Modem

Model No.: E618, E301, E302, E602, E603, E608, E613, E616, E617, W801, W802, W803, W805, W806, W807, W808, W916, W917, W918, W928, WM72, WM31

FCC ID: RSZ-TJE618

Applicable standards: FCC CFR Title 47 Part 2: 2012

FCC CFR Title 47 Part22 Subpart H: 2012

FCC CFR Title 47 Part24 Subpart E: 2012

Date of sample receipt: January 22, 2013

Date of Test: January 23-31, 2013

Date of report issued: February 04, 2013

Test Result : Pass *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

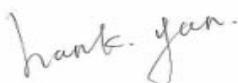
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

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2 Version

Version No.	Date	Description
00	February 04, 2013	Original

Prepared By:



Date:

February 04, 2013

Project Engineer

Check By:



Date:

February 04, 2013

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed* (Please refer to SAR Report)
Conducted Output Power	Part 2.1046	Pass
Effective Radiated Power	Part22.913(a)(2)	Pass
Equivalent Isotropic Radiated Power	Part 24.232(c)	Pass
Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass
AC Conducted emission	Part15.207	Pass

5 General Information

5.1 Client Information

Applicant:	Shenzhen Tianjian Telecom Technology Co., Ltd
Address of Applicant:	22J Room, D Building Huaqiang Square, Huaqiang Road, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Tianjian Telecom Technology Co., Ltd
Address of Manufacturer:	22J Room, D Building Huaqiang Square, Huaqiang Road, Shenzhen, Guangdong, China

5.2 General Description of EUT

Product Name:	USB Modem
Model No.:	E618, E301, E302, E602, E603, E608, E613, E616, E617, E618, W801, W802, W803, W805, W806, W807, W808, W916, W917, W918, W928, WM72, WM31
Operation Frequency: (Transmit)	CDMA2000 BC0: 824.70MHz ~ 848.31MHz CDMA2000 BC1: 1851.25MHz ~ 1908.75MHz
Operation Frequency: (Receive)	CDMA2000 BC0: 869.70MHz ~ 893.31MHz CDMA2000 BC1: 1931.25MHz ~ 1988.75MHz
Modulation Type:	QPSK
Antenna Type:	PCB Antenna
Antenna Gain:	-0.5dBi for EVDO 850 1dBi for EVDO 1900
Power supply:	USB port supply

5.3 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

5.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4 (2003) and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

- **Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 29 2012	Mar. 28 2013
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Mar. 29 2012	Mar. 28 2013
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 25 2012	Feb. 24 2013
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2012	June 28 2013
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS213	Mar. 31 2012	Mar. 30 2013
8	Coaxial Cable	GTS	N/A	GTS211	Mar. 31 2012	Mar. 30 2013
9	Coaxial cable	GTS	N/A	GTS210	Mar. 31 2012	Mar. 30 2013
10	Coaxial Cable	GTS	N/A	GTS212	Mar. 31 2012	Mar. 30 2013
11	Coaxial Cable	GTS	N/A	GTS213	Mar. 31 2012	Mar. 30 2013
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 03 2012	Jul. 02 2013
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 03 2012	Jul. 02 2013
14	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 11 2012	May 10 2013
15	Signal Generator	Rohde & Schwarz	SML03	GTS236	May 11 2012	May 10 2013
16	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 11 2012	May 10 2013
17	D.C. Power Supply	Instek	PS-3030	GTS232	NA	NA
18	Splitter	Agilent	11636B	GTS237	May 11 2012	May 10 2013

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS252	Jul. 03 2012	Jul. 02 2013
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 03 2012	Jul. 02 2013
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 03 2012	Jul. 02 2013
4	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 03 2012	Jul. 02 2013
5	Coaxial Cable	GTS	N/A	GTS227	Mar. 31 2012	Mar. 30 2013
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

7 SYSTEM TEST CONFIGURATION

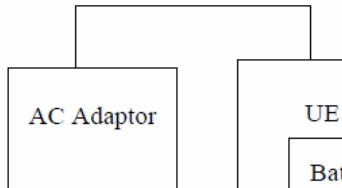
7.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

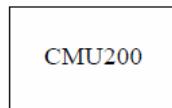
7.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

7.3 Configuration of Tested System



Remote Side



7.4 DESCRIPTION OF TEST MODES

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

- 30 MHz to 9000 MHz for CDMA2000 BC0.
- 30 MHz to 19000 MHz for CDMA2000 BC1.

Test mode		
Band	Radiated emissions	Conducted emission
CDMA2000 BC0	1XRTT Link Mode	1XRTT Link Mode
CDMA2000 BC1	1XRTT Link Mode	1XRTT Link Mode

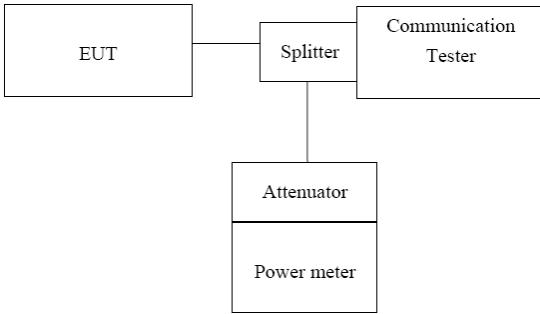
Note: The maximum RF output power levels are 1xRTT RC3+SO32 (+ F-SCH) mode for CDMA2000 BC0, CDMA2000 BC1 and CDMA2000 BC14 on QPSK Link; only these modes were used for all tests.

Conducted Power (dBm)			
Band	CDMA2000 BC0		
Channel	1013	384	777
1xRTT RC1+SO55	24.14	23.81	23.50
1xRTT RC3+SO55	24.16	23.83	23.53
1xRTT RC3+SO32(+F-SCH)	24.18	23.87	23.55
1xRTT RC3+SO32(+SCH)	24.17	23.86	23.54
1x EVDO RTAP 153.6	24.11	23.85	23.52
1x EVDO RETAP 4096	24.13	23.85	23.52

Conducted Power (dBm)			
Band	CDMA2000 BC1		
Channel	25	600	1175
1xRTT RC1+SO55	23.81	23.44	22.92
1xRTT RC3+SO55	23.81	23.43	22.90
1xRTT RC3+SO32(+F-SCH)	23.85	23.49	22.99
1xRTT RC3+SO32(+SCH)	23.83	23.48	22.97
1x EVDO RTAP 153.6	23.79	23.41	22.89
1x EVDO RETAP 4096	23.79	23.42	22.92

8 MEASUREMETN RESULTS

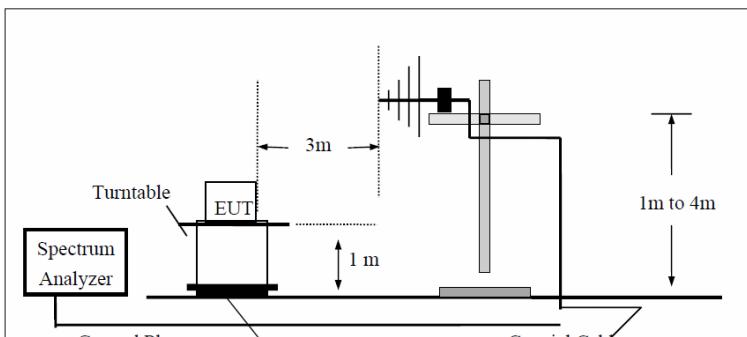
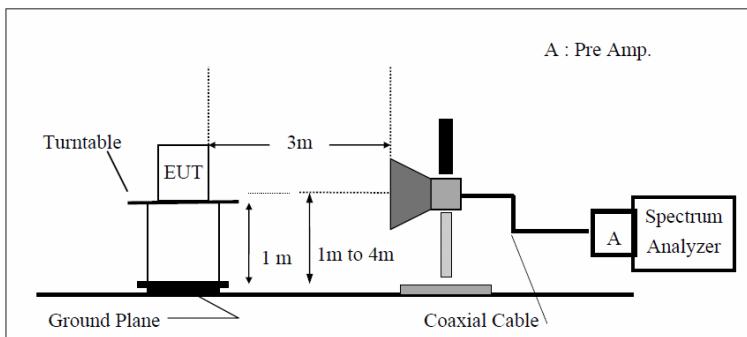
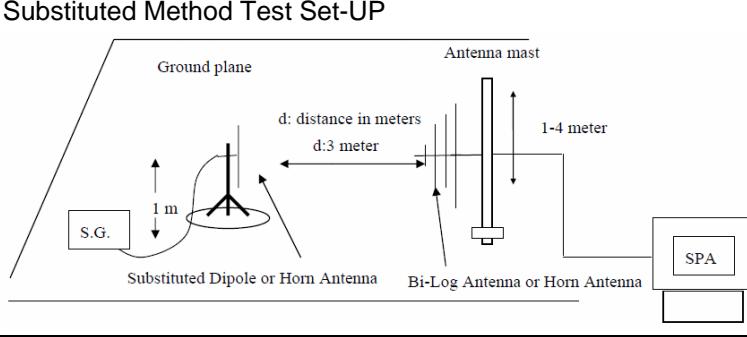
8.1 CONDUCTED OUTPUT POWER

Description:	A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Measurement Procedure:	The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to power meter reading.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

Test Result

EUT Mode	Channel	Frequency (MHz)	Conducted Power (dBm)
CDMA2000 BC0	1013	824.70	24.18
	384	836.52	23.87
	777	848.31	23.55
CDMA2000 BC1	25	1851.25	23.85
	600	1880.00	23.49
	1175	1908.75	22.99

8.2 Effective Radiated Power and Effective Isotropic Radiated Power

Description	The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.
Test setup:	<p>Below 1GHz:</p>  <p>Above 1GHz:</p> 
Substituted Method Test Set-UP	
Measurement Procedure:	<p>The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.</p> <p>ERP was measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP</p>

		was calculated as follows: EIRP was measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB) EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
Test Instruments:		Refer to section 6 for details
Test mode:		Refer to section 7.4 for details
Test results:		Pass

Measurement Result

CDMA2000 BC0									
Channel	Frequency (MHz)	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)	Result
1013	824.70	H	104.86	17.24	5.12	3.62	18.74	38.45	Pass
		V	111.63	22.88	5.12	3.62	24.38		
384	836.52	H	102.16	16.49	5.09	3.67	17.91	38.45	Pass
		V	109.22	22.37	5.09	3.67	23.79		
777	848.31	H	101.52	15.28	4.96	3.72	16.52	38.45	Pass
		V	110.33	22.25	4.96	3.72	23.49		
CDMA2000 BC1									
Channel	Frequency (MHz)	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
25	1851.25	H	103.45	16.56	6.52	5.85	17.23	33.00	Pass
		V	110.94	22.79	6.52	5.85	23.46		
600	1880.00	H	102.95	16.31	6.50	5.90	16.91	33.00	Pass
		V	109.34	22.18	6.50	5.90	22.78		
1175	1908.75	H	103.11	17.03	6.48	5.92	17.59	33.00	Pass
		V	108.99	22.09	6.48	5.92	22.65		

Remark :

RBW= 2MHz , VBW= 6MHz

8.3 Occupied Bandwidth and 26dB Bandwidth

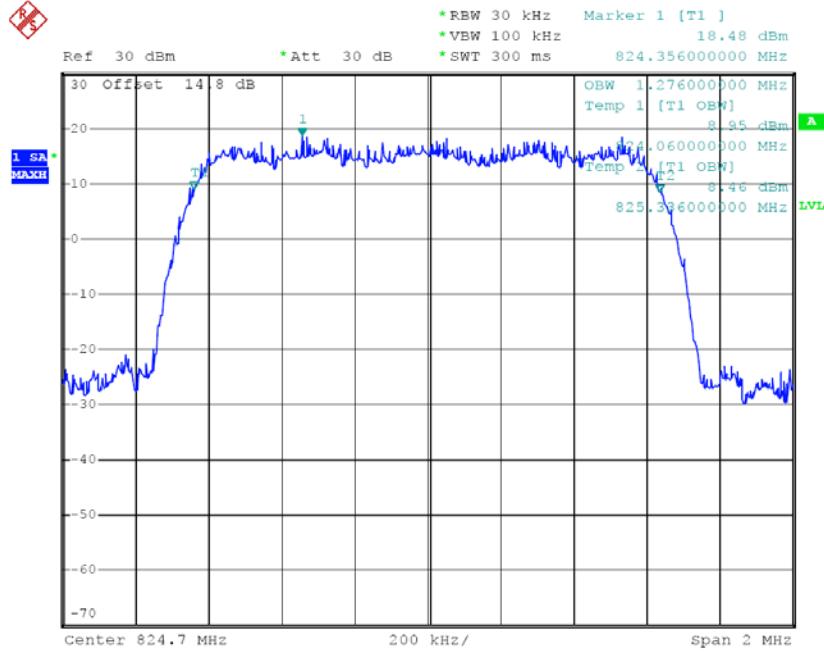
Description	<p>The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.</p> <p>The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</p>
Test setup:	<p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Measurement Procedure:	The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10/50KHz) was set to about 1% of emission BW, VBW= 3 times RBW(30/150KHz), -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

Measurement Result

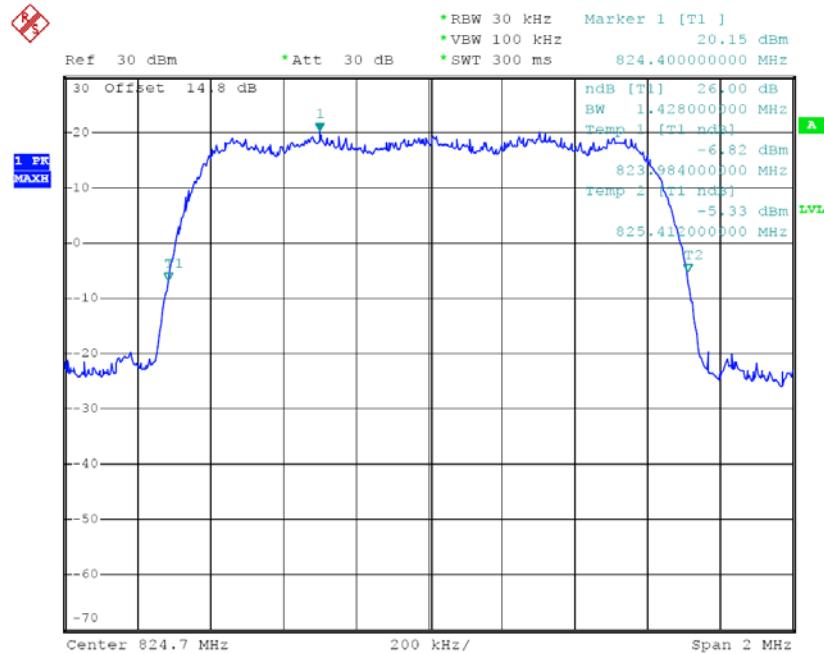
EUT Mode	CH	Frequency(MHz)	99% Occupy Bandwidth(MHz)	26dB bandwidth(MHz)
CDMA2000 BC0	1013	824.70	1.276	1.428
	384	836.52	1.280	1.436
	777	848.31	1.276	1.436
CDMA2000 BC1	25	1851.25	1.276	1.428
	600	1880.00	1.280	1.432
	1175	1908.75	1.276	1.432

Please refer to the following plots.

Test mode:	CDMA2000 BC0	Test channel:	1013
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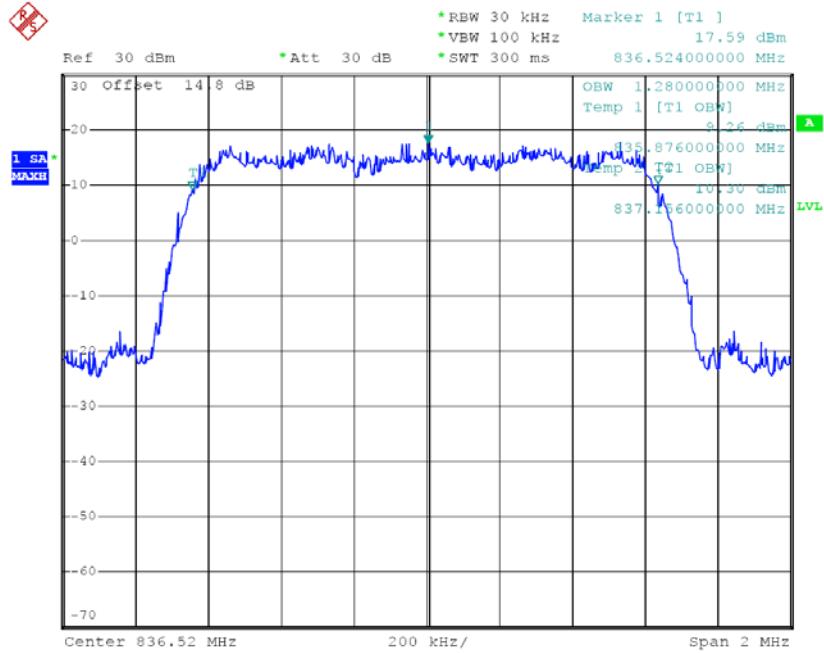


99% occupy bandwidth

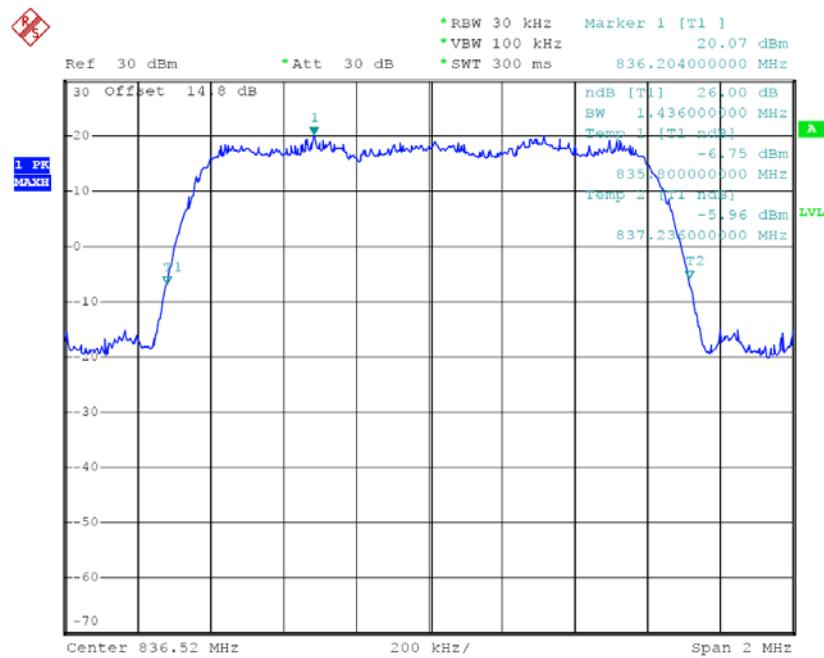


26dB bandwidth

Test mode:	CDMA2000 BC0	Test channel:	384
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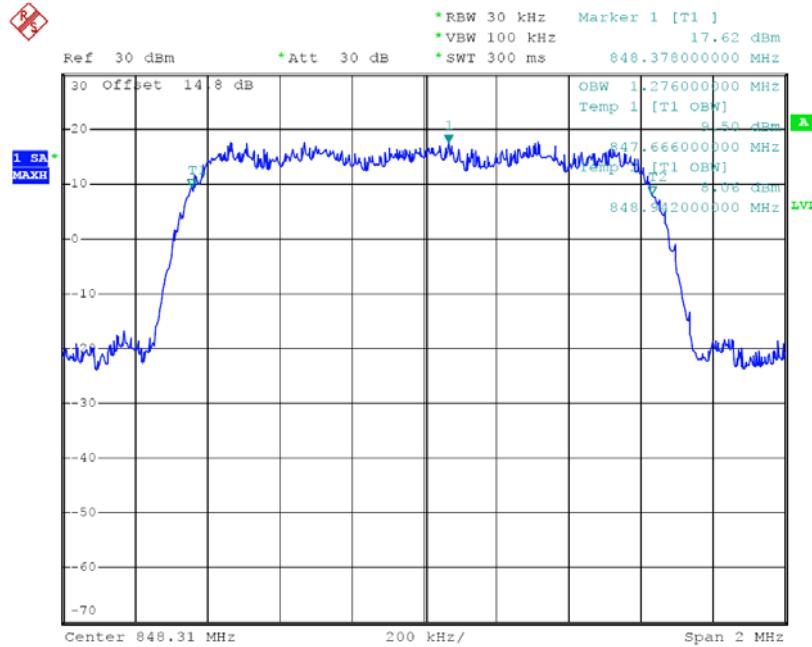


99% occupy bandwidth

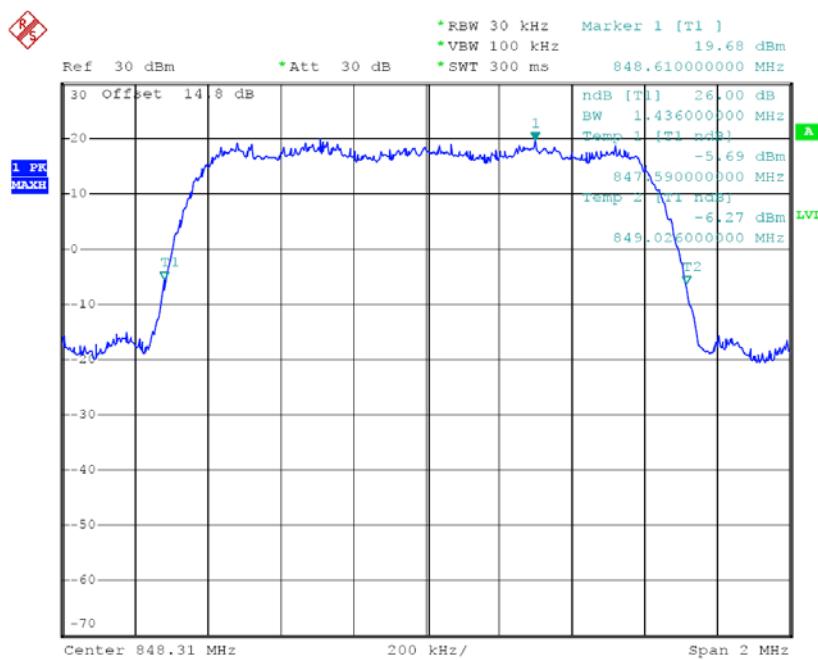


26dB bandwidth

Test mode:	CDMA2000 BC0	Test channel:	777
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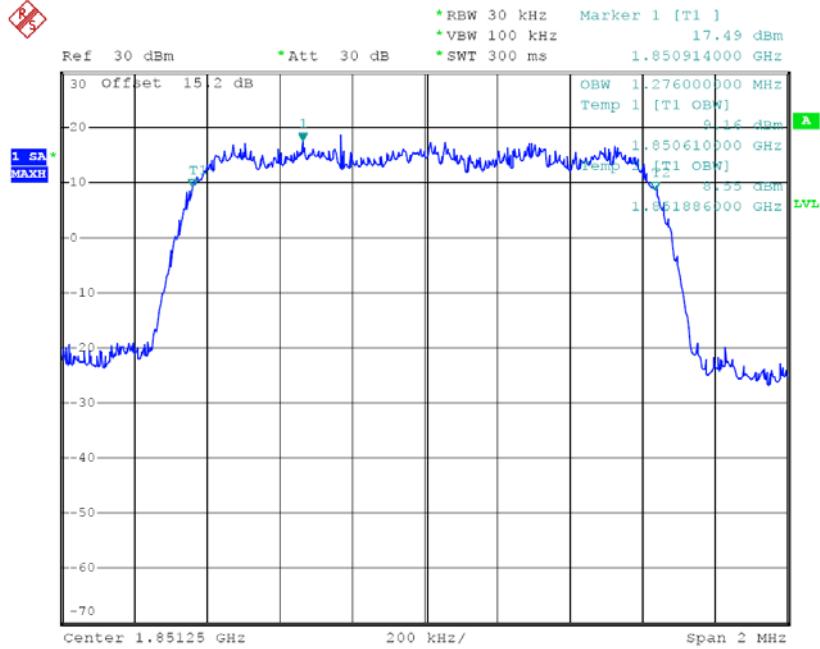


99% occupy bandwidth

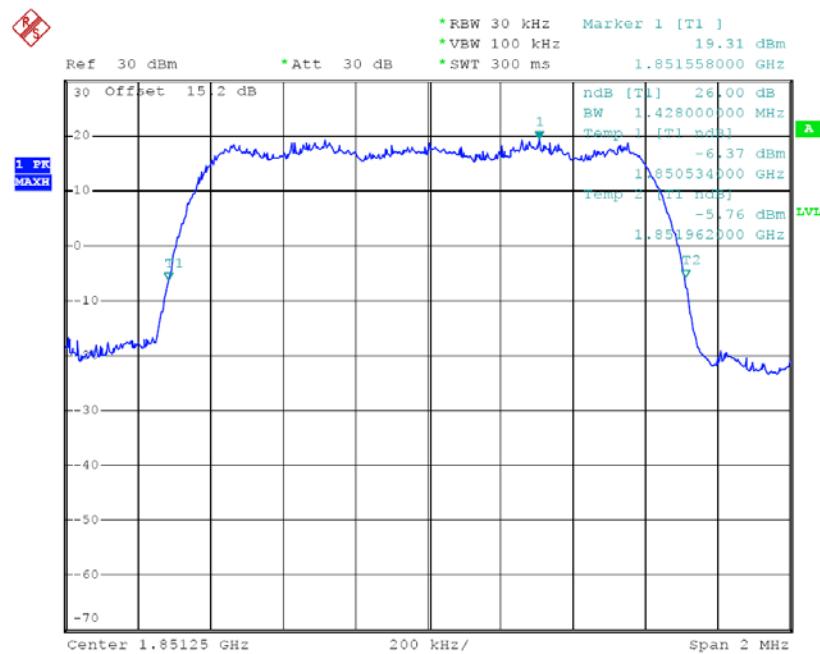


26dB bandwidth

Test mode:	CDMA2000 BC1	Test channel:	25
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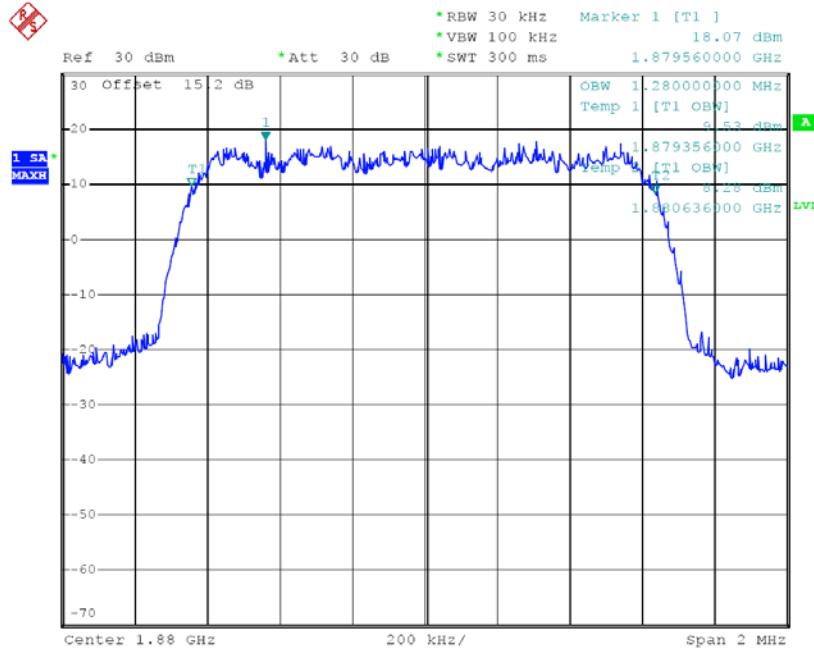


99% occupy bandwidth

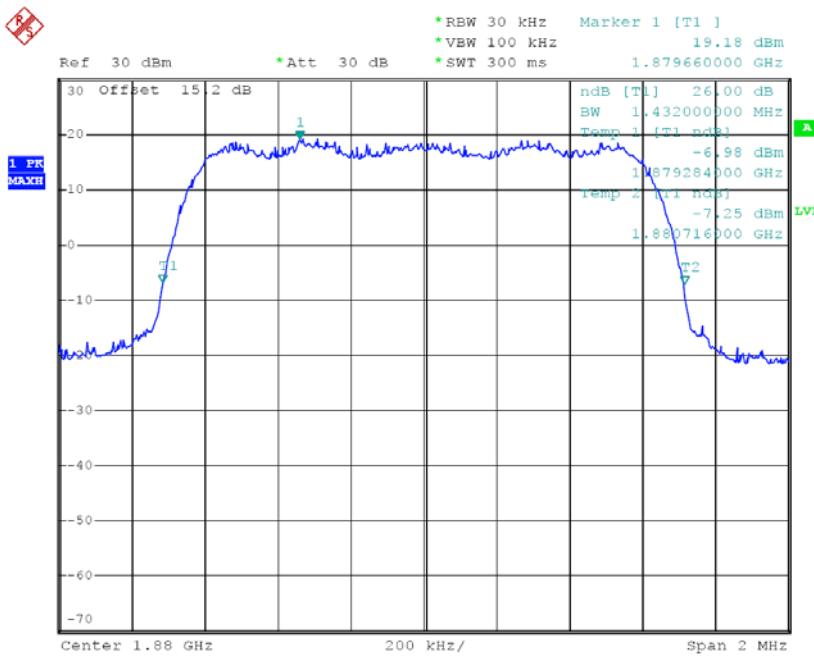


26dB bandwidth

Test mode:	CDMA2000 BC1	Test channel:	600
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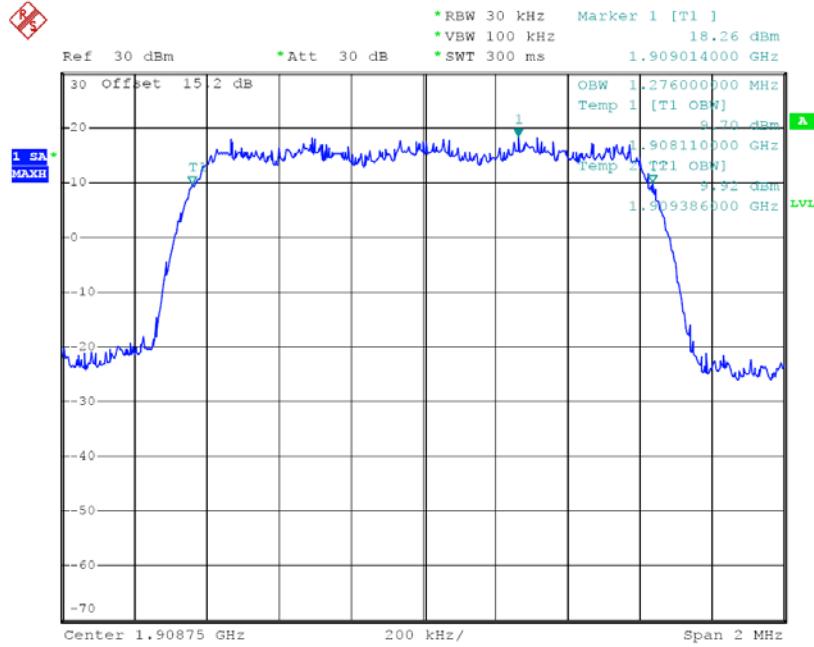


99% occupy bandwidth

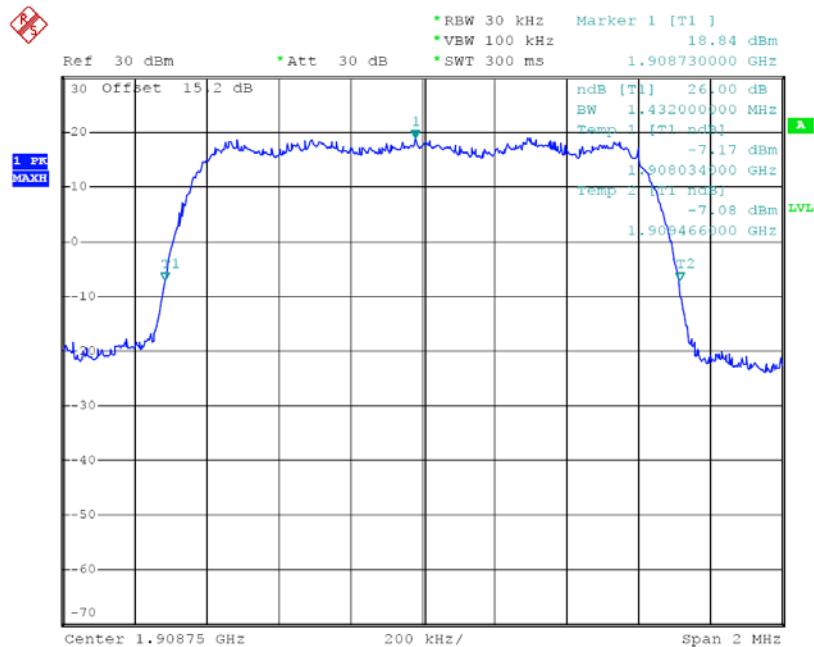


26dB bandwidth

Test mode:	CDMA2000 BC1	Test channel:	1175
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99% occupy bandwidth

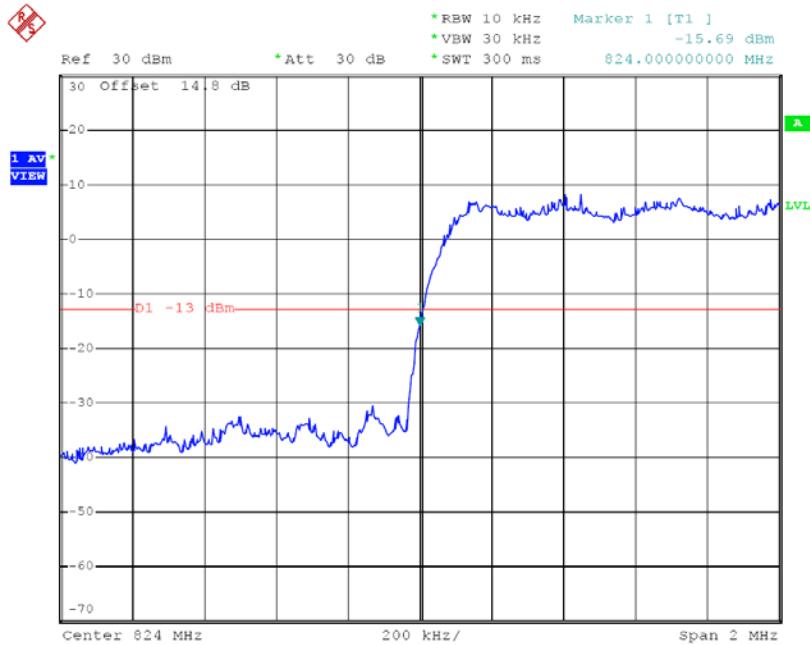


26dB bandwidth

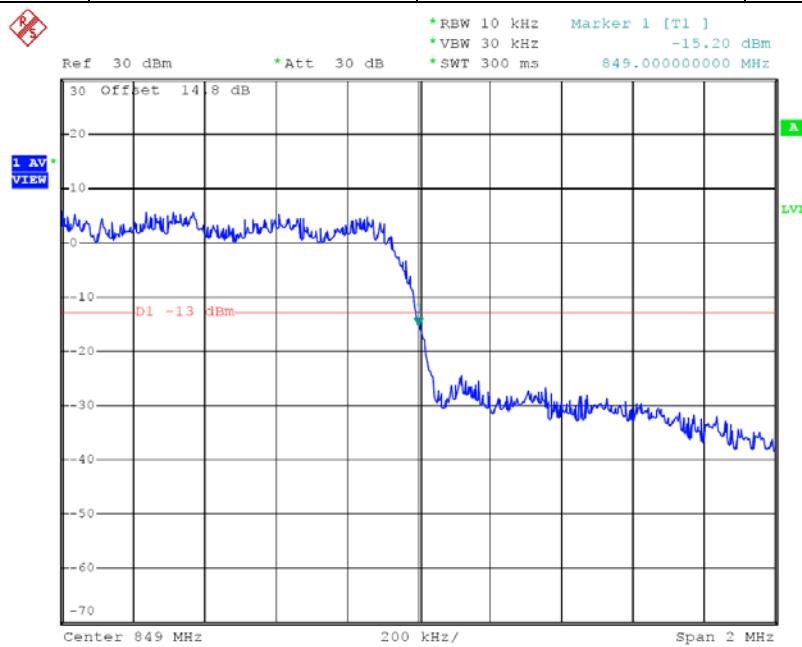
8.4 Band Edge

Description	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.
Test setup:	<p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Measurement Procedure:	<ol style="list-style-type: none"> 1. The EUT was connected to Spectrum Analyzer and Base Station via power divider. 2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100. 3. The RBW was replaced by 10 kHz, slightly smaller than the value in (2), due to the spectrum analyzer limitation to set the exact value. A worst case correction factor of $10 \log (1\% \text{ emission-BW}/\text{measurement RBW})$ was compensated.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

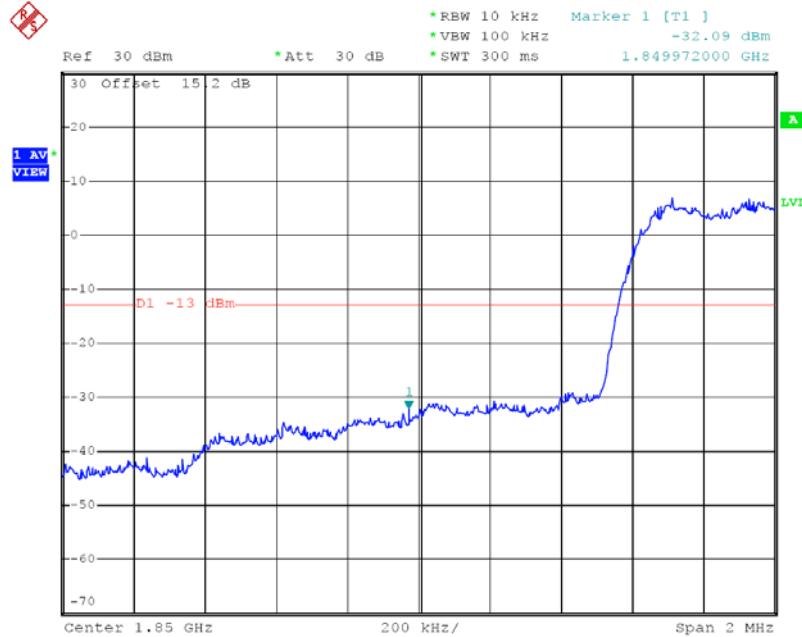
Test mode:	CDMA2000 BC0	Test channel:	1013
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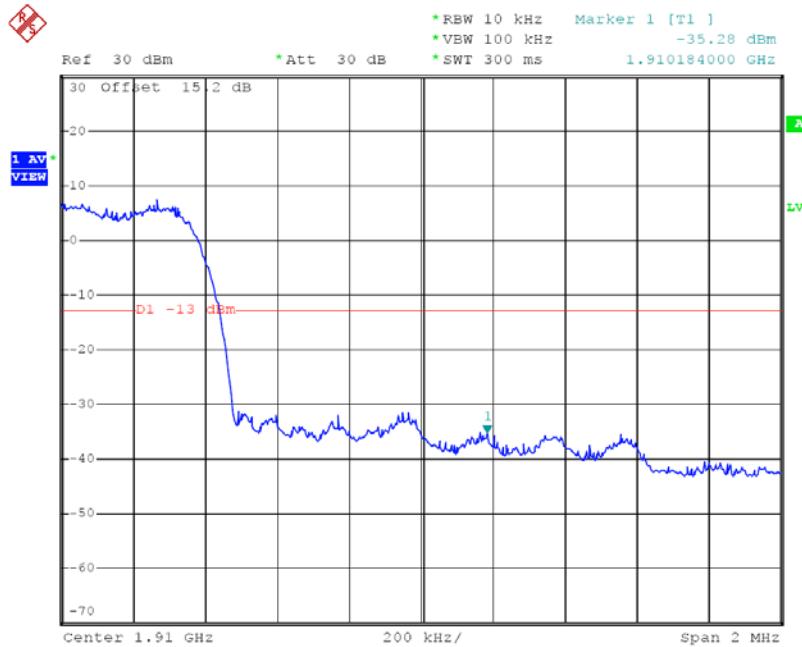
Test mode:	CDMA2000 BC0	Test channel:	777
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Test mode:	CDMA2000 BC1	Test channel:	25
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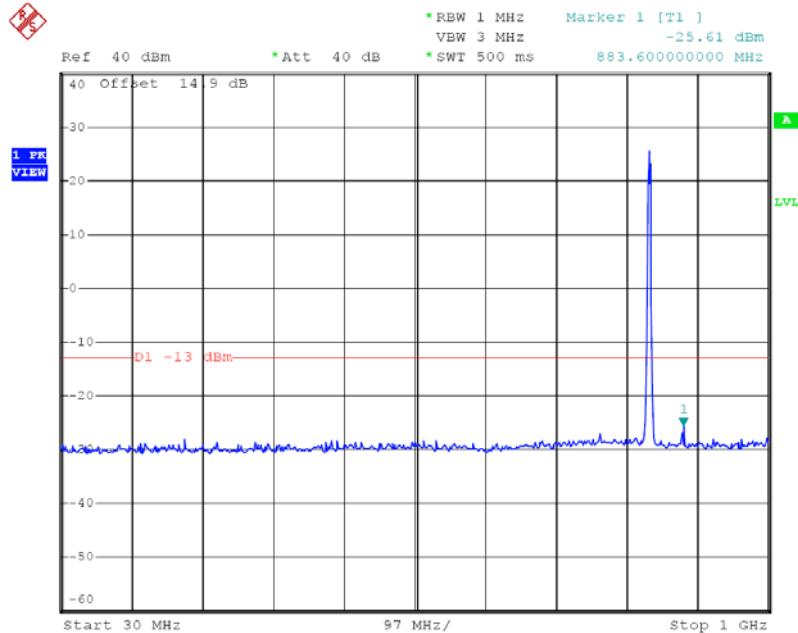
Test mode:	CDMA2000 BC1	Test channel:	1175
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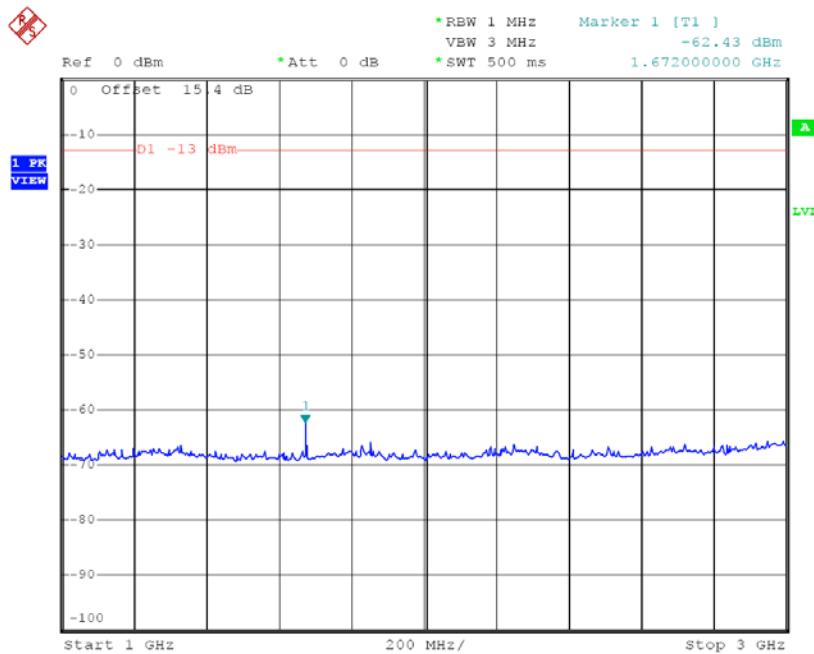
8.5 Conducted Spurious Emission

Description	<p>The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.</p> <p>It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.</p>
Test setup:	<pre> graph LR EUT[EUT] --- Splitter[Splitter] Splitter --- CommTester[Communication Tester] Splitter --- FilterStack[Filter Attenuator SPA] </pre> <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Measurement Procedure:	<ol style="list-style-type: none"> 1. The EUT was connected to spectrum analyzer and base station via power divider. 2. The middle channel for the highest RF power within the transmitting frequency was measured. 3. The conducted spurious emission for the whole frequency range was taken.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

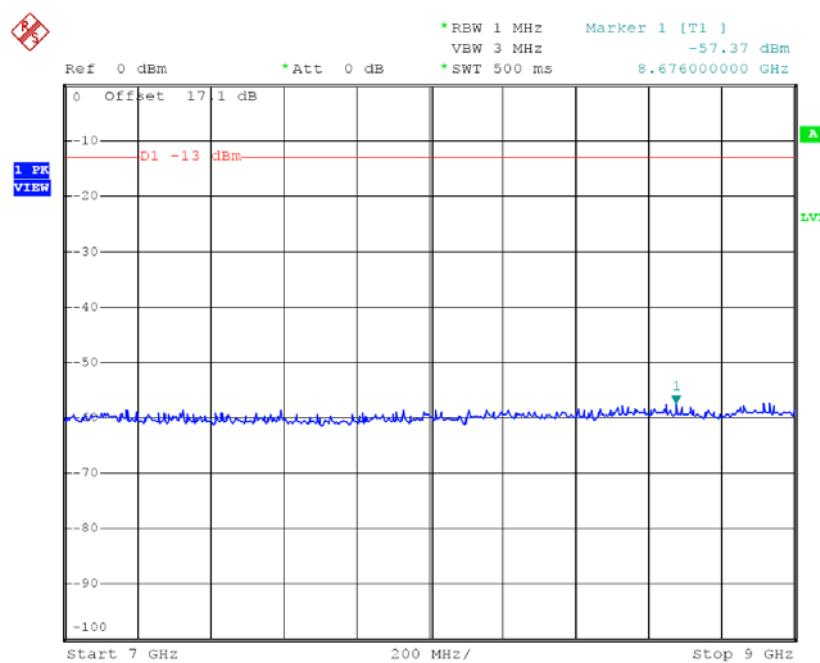
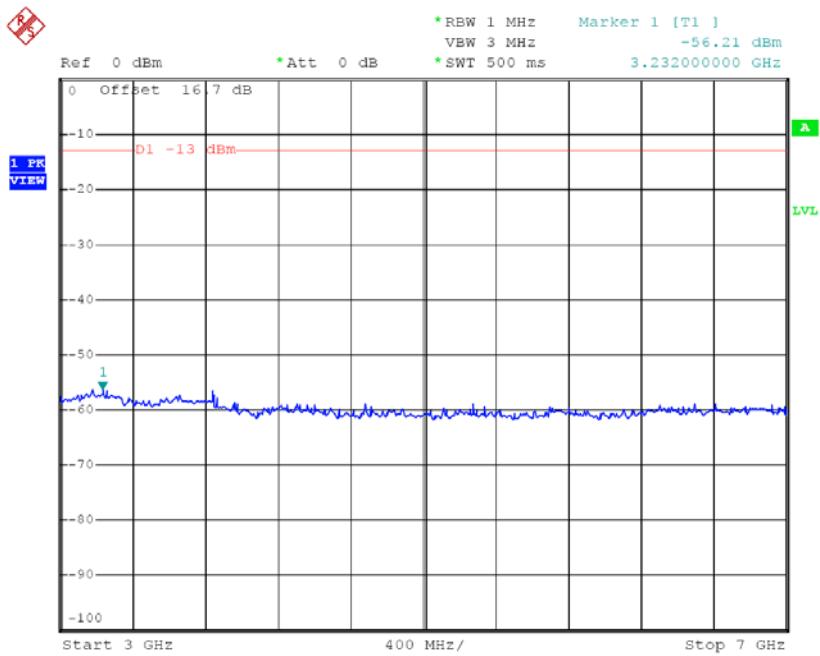
Test mode:	CDMA2000 BC0	Test channel:	384
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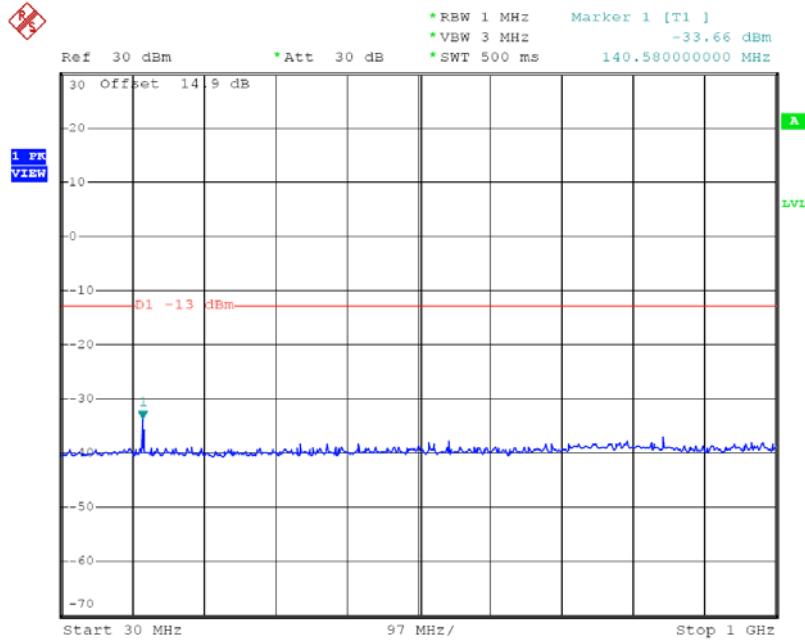
30MHz~1GHz



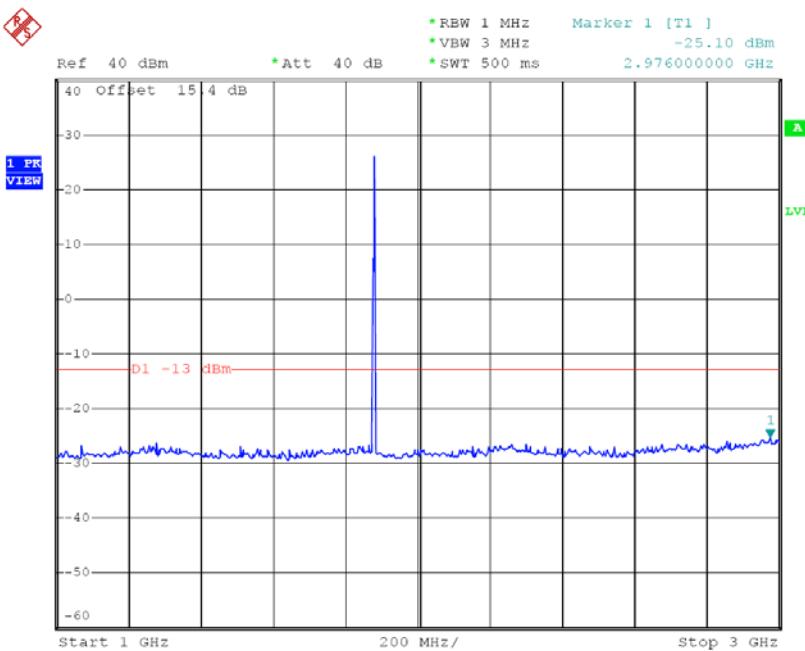
1GHz~3GHz



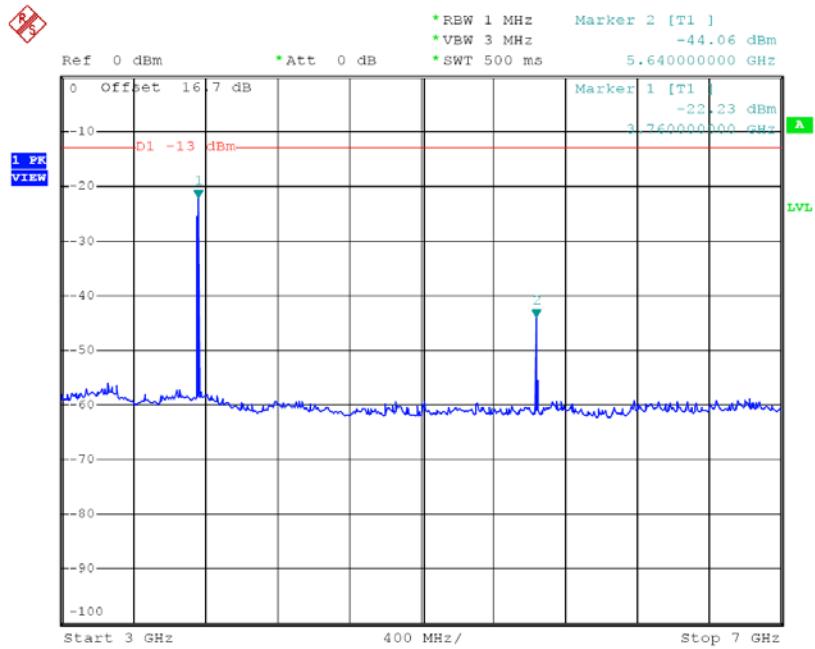
Test mode:	CDMA2000 BC1	Test channel:	600
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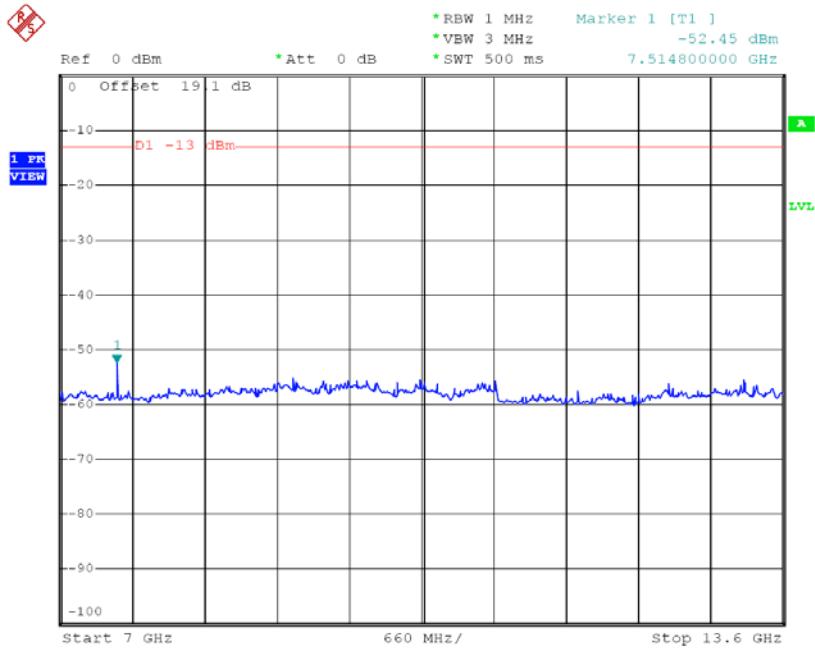
30MHz~1GHz



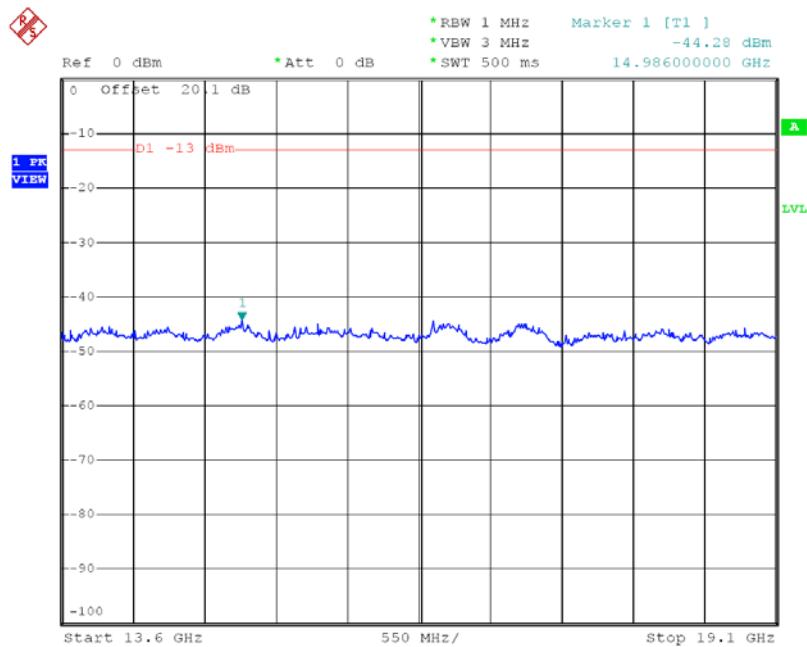
1GHz~3GHz



3GHz~7GHz

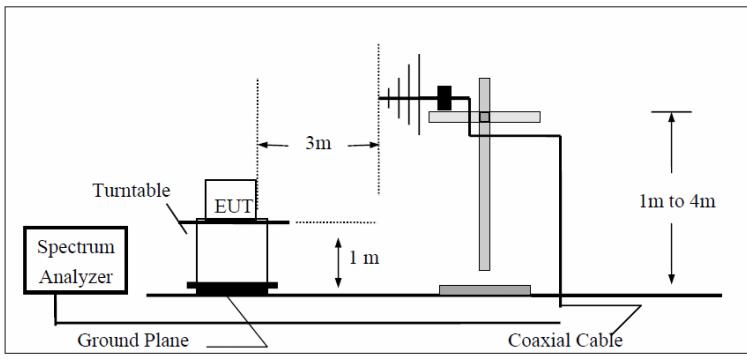
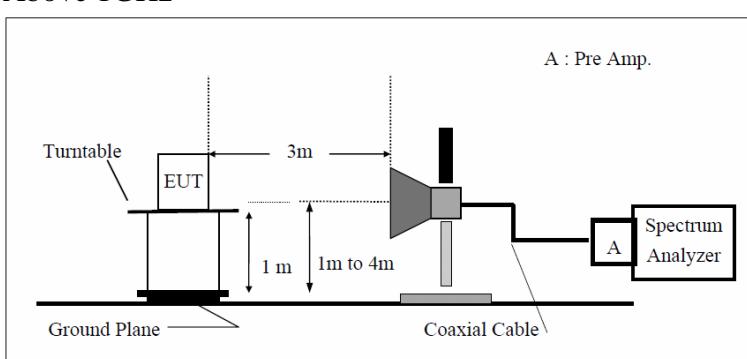
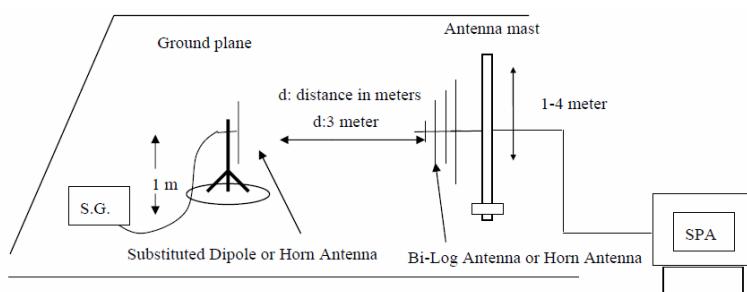


7GHz~13.6GHz



13.6GHz~19.1GHz

8.6 FIELD STRENGTH OF SPURIOUS RADIATION

Description	FCC Part 22.917(a),Part 24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)
Test setup:	<p>Below 1GHz:</p>  <p>Above 1GHz:</p> 
Substituted Method Test Set-UP	
Measurement Procedure:	<p>The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.</p> <p>ERP was measured using a substitution method. The EUT was replaced</p>

	<p>by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:</p> <p>EIRP was measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:</p> $\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$ $\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

Test Result

Test mode:	CDMA2000 BC0	Test channel:	1013
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
345.58	54.67	V	-57.03	4.16	0.95	-53.82	-13.00	-40.82
761.84	50.71	V	-53.05	4.79	1.37	-49.63	-13.00	-36.63
824.00	78.69	V	-22.31	5.12	3.62	-20.81	-13.00	-7.81
1649.40	67.31	V	-40.27	4.93	5.23	-40.57	-13.00	-27.57
2474.10	63.76	V	-35.25	3.11	6.53	-38.67	-13.00	-25.67
3298.80	---	V					-13.00	
4123.50	---	V					-13.00	
4948.20	---	V					-13.00	
5772.90	---	V					-13.00	

Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
345.58	53.29	H	-59.50	4.16	0.95	-56.29	-13.00	-43.29
761.84	52.91	H	-56.51	4.79	1.37	-53.09	-13.00	-40.09
824.00	76.66	H	-29.73	5.12	3.62	-28.23	-13.00	-15.23
1649.40	68.03	H	-47.79	4.93	5.23	-48.09	-13.00	-35.09
2474.10	67.08	H	-42.99	3.11	6.53	-46.41	-13.00	-33.41
3298.80	---	H					-13.00	
4123.50	---	H					-13.00	
4948.20	---	H					-13.00	
5772.90	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

Test mode:	CDMA2000 BC0	Test channel:	384
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
295.68	50.86	V	-55.98	4.10	1.10	-52.98	-13.00	-39.98
651.27	47.78	V	-52.48	4.61	1.58	-49.45	-13.00	-36.45
1673.04	67.44	V	-34.94	5.31	5.27	-34.90	-13.00	-21.90
2509.56	66.78	V	-46.76	3.53	6.58	-49.81	-13.00	-36.81
3346.08	69.23	V	-43.44	1.90	7.79	-49.33	-13.00	-36.33
4182.60	---	V					-13.00	
5019.12	---	V					-13.00	
5855.64	---	V					-13.00	
6692.16	---	V					-13.00	

Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
295.68	52.10	H	-59.17	4.10	1.10	-56.17	-13.00	-43.17
651.27	52.01	H	-55.40	4.61	1.58	-52.37	-13.00	-39.37
1673.04	69.29	H	-39.51	5.31	5.27	-39.47	-13.00	-26.47
2509.56	67.24	H	-48.51	3.53	6.58	-51.56	-13.00	-38.56
3346.08	66.82	H	-47.25	1.90	7.79	-53.14	-13.00	-40.14
4182.60	---	H					-13.00	
5019.12	---	H					-13.00	
5855.64	---	H					-13.00	
6692.16	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

Test mode:	CDMA2000 BC0	Test channel:	777
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
325.48	51.58	V	-54.09	4.44	1.38	-51.03	-13.00	-38.03
748.51	49.75	V	-52.33	4.59	2.88	-50.62	-13.00	-37.62
849.00	74.34	V	-23.20	5.10	3.68	-21.78	-13.00	-8.78
1696.62	67.38	V	-46.47	5.36	5.31	-46.42	-13.00	-33.42
2544.93	68.52	V	-40.56	5.43	6.63	-41.76	-13.00	-28.76
3393.24	---	V					-13.00	
4241.55	---	V					-13.00	
5089.86	---	V					-13.00	
5938.17	---	V					-13.00	

Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
325.48	52.43	H	-57.94	4.44	1.38	-54.88	-13.00	-41.88
748.51	52.46	H	-55.94	4.59	2.88	-54.23	-13.00	-41.23
849.00	72.67	H	-29.80	5.10	3.68	-28.38	-13.00	-15.38
1696.62	68.94	H	-50.78	5.36	5.31	-50.73	-13.00	-37.73
2544.93	69.63	H	-45.73	5.43	6.63	-46.93	-13.00	-33.93
3393.24	---	H					-13.00	
4241.55	---	H					-13.00	
5089.86	---	H					-13.00	
5938.17	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

Test mode:	CDMA2000 BC1	Test channel:	25
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	54.67	V	-56.85	7.03	1.41	-51.23	-13.00	-38.23
1387.27	50.71	V	-46.77	7.61	4.31	-43.47	-13.00	-30.47
1850.00	75.00	V	-23.79	6.64	5.56	-22.71	-13.00	-9.71
3704.80	60.07	V	-36.96	3.59	8.31	-41.68	-13.00	-28.68
5557.20	58.41	V	-35.34	4.12	10.33	-41.55	-13.00	-28.55
7409.60	---	V					-13.00	
9262.00	---	V					-13.00	
11114.40	---	V					-13.00	
12966.80	---	V					-13.00	

Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	53.96	H	-57.95	7.03	1.41	-52.33	-13.00	-39.33
1387.27	49.37	H	-54.62	7.61	4.76	-51.77	-13.00	-38.77
1850.00	73.84	H	-25.18	6.64	5.56	-24.10	-13.00	-11.10
3704.80	58.06	H	-39.11	3.59	8.31	-43.83	-13.00	-30.83
5557.20	57.81	H	-41.10	4.12	10.33	-47.31	-13.00	-34.31
7409.60	---	H					-13.00	
9262.00	---	H					-13.00	
11114.40	---	H					-13.00	
12966.80	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

Test mode:	CDMA2000 BC1	Test channel:	600
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	55.55	V	-55.90	7.03	1.41	-50.28	-13.00	-37.28
1607.43	49.98	V	-51.91	7.45	4.82	-49.28	-13.00	-36.28
3760.00	71.87	V	-36.64	3.54	8.39	-41.49	-13.00	-28.49
5640.00	65.99	V	-39.33	4.03	10.41	-45.71	-13.00	-32.71
7520.00	66.54	V	-36.38	2.75	12.19	-45.82	-13.00	-32.82
9400.00	---	V					-13.00	
11280.00	---	V					-13.00	
13160.00	---	V					-13.00	
15040.00	---	V					-13.00	

Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	56.83	H	-55.05	7.03	1.41	-49.43	-13.00	-36.43
1607.43	50.23	H	-53.43	7.45	4.58	-50.56	-13.00	-37.56
3760.00	72.73	H	-36.36	3.54	8.39	-41.21	-13.00	-28.21
5640.00	66.53	H	-42.03	4.03	10.41	-48.41	-13.00	-35.41
7520.00	68.43	H	-40.80	2.75	12.19	-50.24	-13.00	-37.24
9400.00	---	H					-13.00	
11280.00	---	H					-13.00	
13160.00	---	H					-13.00	
15040.00	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

Test mode:	CDMA2000 BC1	Test channel:	1175
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Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	55.55	V	-55.97	7.03	1.41	-50.35	-13.00	-37.35
1388.22	50.98	V	-52.11	6.37	4.56	-50.30	-13.00	-37.30
1910.00	74.35	V	-35.88	6.48	5.66	-35.06	-13.00	-22.06
3817.50	63.89	V	-42.56	3.59	8.69	-47.66	-13.00	-34.66
5726.25	65.32	V	-42.12	2.98	10.73	-49.87	-13.00	-36.87
7635.00	---	V					-13.00	
9543.75	---	V					-13.00	
11452.50	---	V					-13.00	
13361.25	---	V					-13.00	

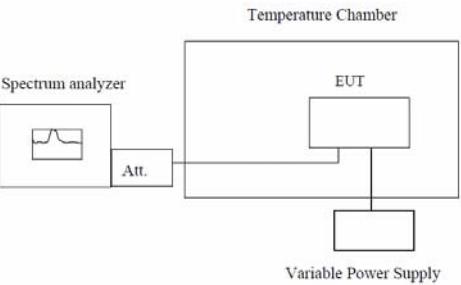
Frequency (MHz)	SPA reading	Ant. Pol.	S.G output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Margin (dBm)
527.54	54.84	H	-56.81	7.03	1.41	-51.19	-13.00	-38.19
1388.22	52.18	H	-53.85	6.37	3.68	-51.16	-13.00	-38.16
1910.00	65.59	H	-34.56	6.48	5.66	-33.74	-13.00	-20.74
3817.50	62.09	H	-44.93	3.59	8.69	-50.03	-13.00	-37.03
5726.25	64.45	H	-41.31	2.98	10.73	-49.06	-13.00	-36.06
7635.00	---	H					-13.00	
9543.75	---	H					-13.00	
11452.50	---	H					-13.00	
13361.25	---	H					-13.00	

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:

$$\text{ERP/EIRP (dBm)} = \text{SG Setting(dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$$

8.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

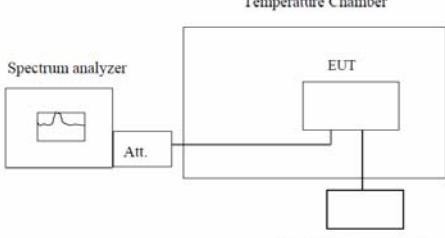
Description	The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.
Test setup:	 <p>Temperature Chamber</p> <p>Spectrum analyzer</p> <p>Att.</p> <p>EUT</p> <p>Variable Power Supply</p> <p>Note : Measurement setup for testing on Antenna connector</p>
Measurement Procedure:	The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

Test Result

Reference Frequency: CDMA2000 BC0 Middle channel 836.52MHz @25°C				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	45	0.054	2.5
-20	3.7	45	0.054	2.5
-10	3.7	43	0.051	2.5
0	3.7	42	0.050	2.5
10	3.7	38	0.045	2.5
20	3.7	36	0.043	2.5
30	3.7	38	0.045	2.5
40	3.7	37	0.044	2.5
50	3.7	40	0.048	2.5

Reference Frequency: CDMA2000 BC1 Middle channel 1880MHz @25°C				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	50	0.027	2.5
-20	3.7	52	0.028	2.5
-10	3.7	50	0.027	2.5
0	3.7	46	0.024	2.5
10	3.7	48	0.026	2.5
20	3.7	45	0.024	2.5
30	3.7	47	0.025	2.5
40	3.7	49	0.026	2.5
50	3.7	52	0.028	2.5

8.8 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

Description	The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.
Test setup:	 <p>Temperature Chamber</p> <p>Spectrum analyzer</p> <p>Att.</p> <p>EUT</p> <p>Variable Power Supply</p> <p>Note : Measurement setup for testing on Antenna connector</p>
Measurement Procedure:	<p>Set chamber temperature to 25°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.</p> <p>Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.</p>
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 7.4 for details
Test results:	Pass

Test Result

Reference Frequency: CDMA2000 BC0 Middle channel 836.52MHz @25°C				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
25	4.26	38	0.045	2.5
25	3.70	36	0.043	2.5
25	3.15	34	0.041	2.5
25	2.90	37	0.044	2.5

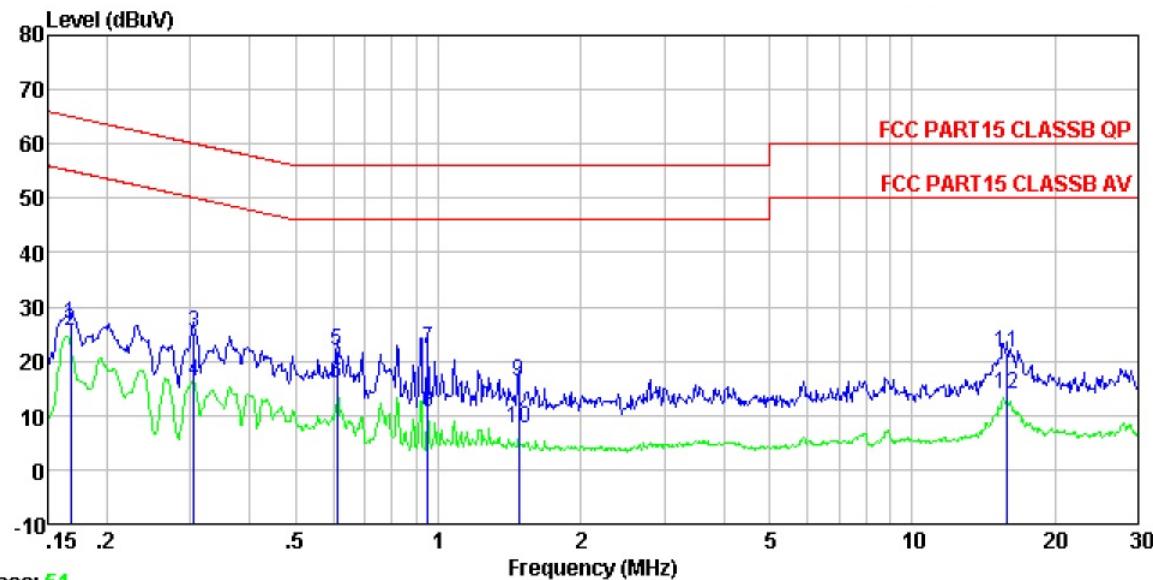
Reference Frequency: CDMA2000 BC1 Middle channel 1880MHz @25°C				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
25	4.26	46	0.024	2.5
25	3.70	45	0.024	2.5
25	3.15	43	0.023	2.5
25	2.90	46	0.024	2.5

Note: The battery is rated 3.7V dc.

8.9 AC POWER LINE CONDUCTED EMISSION TEST

Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.4:2003																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
	<small>* Decreases with the logarithm of the frequency.</small>																
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>40cm</p> <p>80cm</p> <p>AUX Equipment</p> <p>E.U.T</p> <p>Test table/Insulation plane</p> <p>EMI Receiver</p> <p>Filter</p> <p>AC power</p> <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement. 																
Test Instruments:	Refer to section 6 for details																
Test mode:	Refer to section 7.4 for details																
Test results:	Pass																

Measurement Result

Line:

Trace: 51

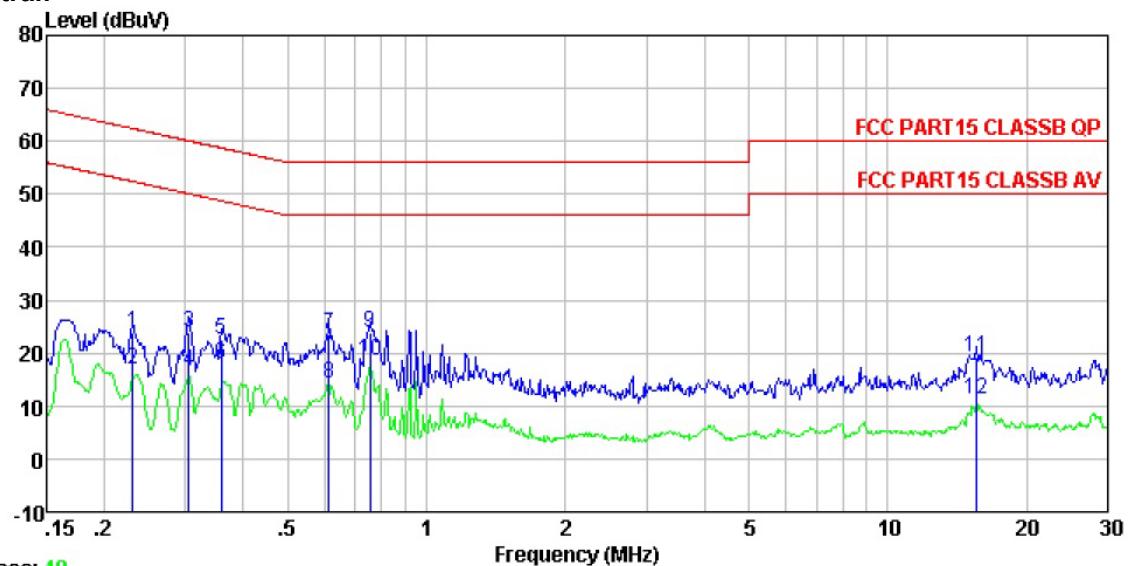
Condition : FCC PART15 CLASSB QP LISN-2012 LINE

Job No. : 054RF

Test Mode : Operation mode

Test Engineer: Osccar

	Read Freq	LISN Level	Cable Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.168	26.98	-0.26	0.10	26.82	65.08	-38.26 QP
2	0.168	25.61	-0.26	0.10	25.45	55.08	-29.63 Average
3	0.305	25.44	-0.22	0.10	25.32	60.10	-34.78 QP
4	0.305	16.27	-0.22	0.10	16.15	50.10	-33.95 Average
5	0.611	22.05	-0.20	0.10	21.95	56.00	-34.05 QP
6	0.611	15.94	-0.20	0.10	15.84	46.00	-30.16 Average
7	0.953	22.48	-0.21	0.10	22.37	56.00	-33.63 QP
8	0.953	10.57	-0.21	0.10	10.46	46.00	-35.54 Average
9	1.480	16.34	-0.22	0.10	16.22	56.00	-39.78 QP
10	1.480	7.69	-0.22	0.10	7.57	46.00	-38.43 Average
11	15.885	21.81	-0.53	0.20	21.48	60.00	-38.52 QP
12	15.885	14.21	-0.53	0.20	13.88	50.00	-36.12 Average

Neutral:

Trace: 49

Condition : FCC PART15 CLASSB QP LISN-2012 NEUTRAL

Job No. : 054RF

Test Mode : Operation mode

Test Engineer: Osccar

Freq	Read	LISN	Cable	Limit	Over	Over		
	Freq	Level	Factor				Remark	
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.230	23.91	-0.09	0.10	23.92	62.44	-38.52	QP
2	0.230	16.84	-0.09	0.10	16.85	52.44	-35.59	Average
3	0.305	23.82	-0.09	0.10	23.83	60.10	-36.27	QP
4	0.305	16.64	-0.09	0.10	16.65	50.10	-33.45	Average
5	0.360	22.39	-0.08	0.10	22.41	58.74	-36.33	QP
6	0.360	17.75	-0.08	0.10	17.77	48.74	-30.97	Average
7	0.614	23.57	-0.08	0.10	23.59	56.00	-32.41	QP
8	0.614	14.31	-0.08	0.10	14.33	46.00	-31.67	Average
9	0.755	23.76	-0.08	0.10	23.78	56.00	-32.22	QP
10	0.755	18.67	-0.08	0.10	18.69	46.00	-27.31	Average
11	15.635	19.36	-0.42	0.20	19.14	60.00	-40.86	QP
12	15.635	11.60	-0.42	0.20	11.38	50.00	-38.62	Average

9 Test Setup Photo

Radiated Emission (below 1GHz)



Radiated Emission (above 1GHz)



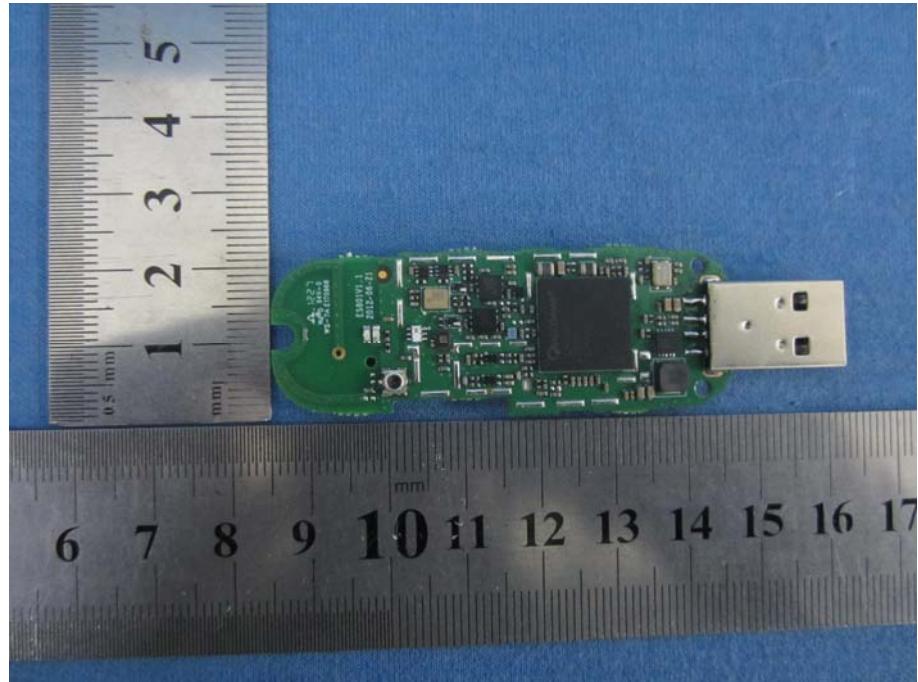
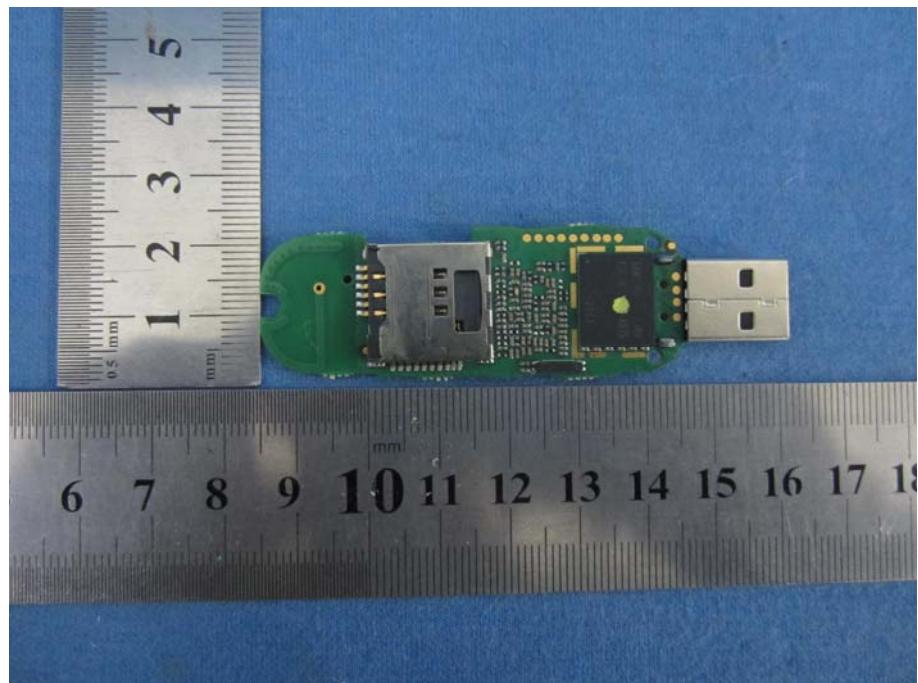
Conducted Emission



10 EUT Constructional Details







-----End-----