RADIATED EMISSIONS PORTIONS OF
FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E

CERTIFICATION TEST REPORT

FOR

NETBOOK
MODEL: TOSHIBA NB200 / NB205

FCC ID: CJ6UPLL20PC

REPORT NUMBER: 09U12710-3

ISSUE DATE: JULY 21, 2009

Prepared for
TOSHIBA CORPORATION
DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO
TOKYO, 198-8710, JAPAN

Prepared by
COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/21/09	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 4

2. TEST METHODOLOGY 5

3. FACILITIES AND ACCREDITATION 5

4. CALIBRATION AND UNCERTAINTY 5

4.1. MEASURING INSTRUMENT CALIBRATION 5

4.2. SAMPLE CALCULATION 5

4.3. MEASUREMENT UNCERTAINTY 5

5. EQUIPMENT UNDER TEST 6

5.1. DESCRIPTION OF EUT 6

5.2. DESCRIPTION OF TEST SETUP 6

6. TEST AND MEASUREMENT EQUIPMENT 8

7. OUTPUT POWER VERIFICATION 9

7.1. CDMA2000 1xRTT 9

7.2. CDMA200 1xEv-Do 10

7.2.1. Rel 0 10

7.2.2. Rev A 11

7.3. (E)GPRS 12

7.4. UMTS RELEASE 99 13

7.5. UMTS HSDPA 14

7.6. UMTS Rel 6 HDPA (HSDPA & HSUPA) 15

8. WORST-CASE CONFIGURATION AND MODE 17

9. LIMITS AND RESULTS 18

9.1. CONDUCTED TEST RESULTS 18

9.1.1. RF POWER OUTPUT 18

9.1.2. FREQUENCY STABILITY 21

9.2. RADIATED TEST RESULTS 24

9.2.1. OUTPUT POWER 24

9.2.2. FIELD STRENGTH OF SPURIOUS EMISSION 35

10. SETUP PHOTOS 44

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TOSHIBA CORPORATION
DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO
TOKYO, 198-8710, JAPAN

EUT DESCRIPTION: NETBOOK

MODEL: TOSHIBA NB200/NB205

SERIAL NUMBER: 95KN 00258F4562E

DATE TESTED: JULY 12 – JULY 18, 2009

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
Radiated emissions portions of CFR 47 Part 22 Subpart H	Pass
Radiated emissions portions of CFR 47 Part 24 Subpart E	Pass

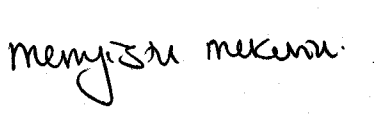
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MENGISTU MEKURIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22, FCC CFR Part 24, RSS-132 Issue 2, and RSS-133 Issue 4.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a multi-band wireless modem that installed inside Toshiba Mini-Notebook Computer. The EUT operates on the GSM/GPRS/EDGE/UMTS networks in the US and Canada, only. Cellular and PCS bands are used for EDGE/GPRS/UMTS operation, so this test report only contains data for these two bands (850MHz and 1900MHz).

5.2. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	TOSHIBA	PA3743U1ACA	G71C0009S118	DoC

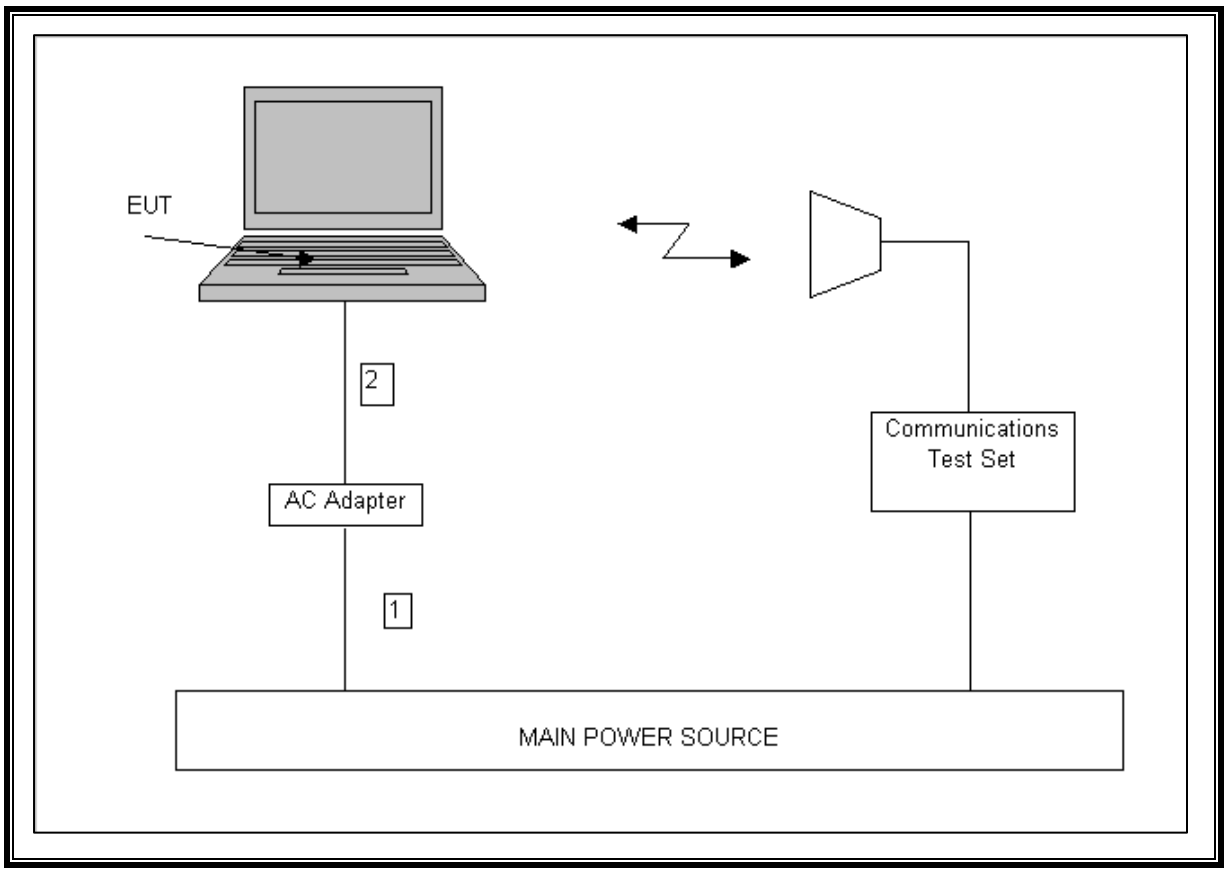
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	2m	No
2	DC	1	DC	Un-shielded	2m	Ferrite at one end

TEST SETUP

The EUT installed inside Toshiba mini-notebook laptop during the tests. The Wireless Communication test set exercised the EUT.

RADIATED TEST SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	MY46186329	08/06/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	US42070220	02/03/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	3008A00369	02/04/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	3008A00561	02/04/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	2944A06589	02/04/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	2944A06550	02/04/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	A0022704	01/14/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	A092308	01/14/10
Antenna, Horn, 18 GHz	EMCO	2238	C00872	01/29/10
Antenna, Horn, 18 GHz	EMCO	9001-3245	C00783	01/29/10
Antenna, Horn, 18 GHz	EMCO	6739	C00943	01/29/10
Communication Test Set	R & S	CMU 200	838114/032	12/16/10
Communications Test Set	Agilent / HP	E5515C	GB46160222	09/15/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	2023	10/29/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	2023	10/29/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	827129/006	08/06/09
Signal Generator 1024 MHz	R & S	SMY01	DE 12311	05/28/10
Dipole	EMCO	3121C-DB2	22435	06/17/10
2.7GHz HPF	MicroTronic	HPM13194	2	CNR
1.5GHz HPF	MicroTronic	HPM13195	1	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	29800	04/06/10

7. OUTPUT POWER VERIFICATION

7.1. CDMA2000 1xRTT

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
CDMA2000 Mobile Test	B.13.08, L

- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)
  -

RF Output Power for Cellular Band

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch. 1013 / 824.7 MHz		Ch. 384 / 836.52 MHz		Ch. 777 / 848.31 MHz	
		Average	Peak	Average	Peak	Average	Peak
RC1	2 (Loopback)	24.45		24.50		24.48	
	55 (Loopback)	24.46		24.49		24.49	
RC2	9 (Loopback)	24.45		24.52		24.48	
	55 (Loopback)	24.47		24.38		24.50	
RC3	2 (Loopback)	24.43		24.52		24.50	
	55 (Loopback)	24.44		24.43		24.49	
	32 (Test Data)	**24.51**	**27.63**	**24.53**	**27.83**	**24.52**	**27.66**
RC4	2 (Loopback)	24.49		24.51		24.50	
	55 (Loopback)	24.50		24.52		24.52	
	32 (Test Data)	24.49		24.49		24.50	
RC5	9 (Loopback)	24.41		24.44		24.45	
	55 (Loopback)	24.43		24.50		24.47	

RF Output Power for PCS Band

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch. 25 / 1851.25 MHz		Ch. 600 / 1880 MHz		Ch. 1175 / 1908.75 MHz	
		Average	Peak	Average	Peak	Average	Peak
RC1	2 (Loopback)	24.50		24.53		24.35	
	55 (Loopback)	24.52		24.57		24.37	
RC2	9 (Loopback)	24.53		24.54		24.38	
	55 (Loopback)	24.52		24.53		24.38	
RC3	2 (Loopback)	24.53		24.59		24.38	
	55 (Loopback)	24.48		24.58		24.36	
	32 (Test Data)	**24.54**	**27.81**	**24.60**	**28.29**	**24.39**	**27.47**
RC4	2 (Loopback)	24.43		24.51		24.34	
	55 (Loopback)	24.50		24.51		24.39	
	32 (Test Data)	24.51		24.51		24.34	
RC5	9 (Loopback)	24.39		24.53		24.26	
	55 (Loopback)	24.32		24.53		24.26	

7.2. CDMA200 1xEv-Do

7.2.1. Rel 0

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Power Output for EV-DO Rel 0

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	24.21	
			384	836.52	24.31	
			777	848.31	24.25	
PCS	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.15	
			600	1880.00	24.37	
			1175	1908.75	24.21	

7.2.2. Rev A

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Release A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	23.84	
			384	836.52	24.08	
			777	848.31	23.95	
PCS	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.97	
			600	1880.00	24.41	
			1175	1908.75	23.85	

7.3. (E)GPRS

GPRS (GMSK) - Coding Scheme: MCS4

Band	Ch No.	Frequency	Conducted output power (dBm)			
			1 slot (Avg)	2 slot (Avg)	3 / 4 slot (Avg)	1 slot (Peak)
GSM850	128	824.2	32.30	32.20	n/a	32.35
	190	836.6	**32.50**	32.40	n/a	**32.54**
	251	848.8	32.40	32.40	n/a	32.46
GSM1900	512	1850.2	29.40	29.50	n/a	29.45
	661	1880	**29.50**	29.50	n/a	**29.55**
	810	1909.8	29.30	29.30	n/a	29.36

EGPRS (8PSK) - Coding Scheme: MCS9

Band	Ch No.	Frequency	Conducted output power (dBm)			
			1 slot (Avg)	2 slot (Avg)	3 / 4 slot (Avg)	1 slot (Peak)
GSM850	128	824.2	27.50	27.50	n/a	30.34
	190	836.6	**27.60**	27.50	n/a	**30.44**
	251	848.8	27.50	27.50	n/a	30.49
GSM1900	512	1850.2	26.60	26.60	n/a	29.51
	661	1880	**26.70**	26.70	n/a	**29.56**
	810	1909.8	26.50	26.50	n/a	29.26

7.4. UMTS RELEASE 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V7.5.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). A summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm) (Avg)	O/P Power (dBm) (Peak)
UMTS850 (Band V)	Rel 99 12.2kps RMC	4132	4357	826.4	24.60	26.38
		4182	4407	836.4	**24.60**	**26.30**
		4233	4458	846.6	24.40	26.28
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	24.80	26.44
		9400	9800	1880.0	**25.00**	**26.81**
		9538	9938	1907.6	24.50	26.42

7.5. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
	CM (dB)	0	1	1.5	1.5
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs = βhs/βc	30/15			

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	24.39
		4182	4407	836.4	24.46
		4233	4458	846.6	24.25
	Subtest 2	4132	4357	826.4	23.90
		4182	4407	836.4	23.90
		4233	4458	846.6	23.70
	Subtest 3	4132	4357	826.4	23.89
		4182	4407	836.4	23.96
		4233	4458	846.6	23.75
	Subtest 4	4132	4357	826.4	23.40
		4182	4407	836.4	23.40
		4233	4458	846.6	23.20
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.40
		9400	9800	1880.0	24.50
		9538	9938	1907.6	24.40
	Subtest 2	9262	9662	1852.4	24.50
		9400	9800	1880.0	24.40
		9538	9938	1907.6	24.00
	Subtest 3	9262	9662	1852.4	23.90
		9400	9800	1880.0	24.00
		9538	9938	1907.6	23.90
	Subtest 4	9262	9662	1852.4	24.00
		9400	9800	1880.0	23.90
		9538	9938	1907.6	23.50

7.6. UMTS Rel 6 HDPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	24.20
		4182	4407	836.4	24.20
		4233	4458	846.6	24.10
	Subtest 2	4132	4357	826.4	22.20
		4182	4407	836.4	22.20
		4233	4458	846.6	22.10
	Subtest 3	4132	4357	826.4	23.20
		4182	4407	836.4	23.20
		4233	4458	846.6	23.10
	Subtest 4	4132	4357	826.4	21.20
		4182	4407	836.4	21.20
		4233	4458	846.6	21.10
	Subtest 5	4132	4357	826.4	24.20
		4182	4407	836.4	24.30
		4233	4458	846.6	24.20
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.30
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.20
	Subtest 2	9262	9662	1852.4	22.30
		9400	9800	1880.0	22.30
		9538	9938	1907.6	22.20
	Subtest 3	9262	9662	1852.4	23.30
		9400	9800	1880.0	23.30
		9538	9938	1907.6	23.20
	Subtest 4	9262	9662	1852.4	21.30
		9400	9800	1880.0	21.30
		9538	9938	1907.6	21.20
	Subtest 5	9262	9662	1852.4	24.40
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.20

8. WORST-CASE CONFIGURATION AND MODE

Worst-case determine based on the highest output power. Referring the baseline investigation measurements, see Section 7 the. RF POWER OUTPUT VERIFCATION, the highest out power in different modulations for both cell and PCS bands are as follow:

Worst case modes:

- For Cellular and PCS band: GPRS
- For Cellular and PCS band: EGPRS
- For Cellular and PCS band: 1xRTT (RC3 32(+F-SCH))
- For Cellular and PCS band: WCDMA (UMTS RELEASE 99)

9. LIMITS AND RESULTS

9.1. CONDUCTED TEST RESULTS

9.1.1. RF POWER OUTPUT

LIMIT

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
24.232(b) & RSS133 § 6.4 Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.
RSS-132 § 4.4 The maximum ERP shall be 6.3 Watts for mobile stations.

TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.17

RESULTS

CELL, GPRS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	824.2	32.35	1717.91
Middle	836.5	32.54	1794.73
High	848.8	32.46	1761.98

PCS, GPRS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	1850.20	29.45	881.05
Middle	1880.00	29.55	901.57
High	1909.80	29.36	862.98

CELL, EGPRS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	824.2	30.34	1081.43
Middle	836.5	30.44	1106.62
High	848.8	30.49	1119.44

PCS, EGPRS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	1850.20	29.51	893.31
Middle	1880.00	29.56	903.65
High	1909.80	29.26	843.33

CELL, 1xRTT Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	824.7	27.63	579.43
Middle	836.5	27.83	606.74
High	848.3	27.66	583.45

PCS, 1xRTT Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	1851.25	27.81	603.95
Middle	1880.00	28.29	674.53
High	1908.75	27.47	558.47

CELL, WCDMA Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	826.4	26.38	434.51
Middle	836.5	26.30	426.58
High	846.6	26.28	424.62

PCS, WCDMA Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	1852.40	26.44	440.55
Middle	1880.00	26.81	479.73
High	1907.50	26.42	438.53

9.1.2. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235
IC: RSS-132, 4.3; RSS-133, 6.3

LIMITS

- §22.355 & RSS-132 4.3 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.
- RSS-133 6.3 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.
- §24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use Agilent 8960 with Frequency Error measurement capability.

- Temp. = −20° to +50°C
- Voltage = 115 Vdc (85% - 115%)

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.
Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

MODES TESTED

- EV-DO – Rev A

RESULTS

See the following pages.

CELL, EVDO Rev A – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.6000307MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
115.00	50	836.600037	-0.007	2.5
115.00	40	836.600035	-0.005	2.5
115.00	30	836.600032	-0.001	2.5
115.00	***20***	***836.600031***	***0***	2.5
115.00	10	836.600030	0.001	2.5
115.00	0	836.600028	0.003	2.5
115.00	-10	836.600028	0.003	2.5
115.00	-20	836.600027	0.004	2.5
115.00	-30	836.600030	0.000	2.5

Reference Frequency: Cellular Mid Channel 835.838330MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
100%	***20***	***836.600031***	***0***	***2.5***
85%	20	836.600032	*-0.001*	2.5
115%	20	836.600049	*-0.022*	2.5

PCS, EVDO-REV A – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.949899MHz @ 20°C Limit: within the authorized block or +- 2.5 ppm = 4699.875 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.949327	0.304	2.5
115.00	40	1879.949675	0.119	2.5
115.00	30	1879.949944	-0.024	2.5
115.00	***20***	***1879.94990***	***0***	***2.5***
115.00	10	1879.949956	-0.030	2.5
115.00	0	1879.949803	0.051	2.5
115.00	-10	1879.949725	0.093	2.5
115.00	-20	1879.949624	0.146	2.5
115.00	-30	1879.949958	-0.031	2.5

Reference Frequency: PCS Mid Channel 1879.316833MHz @ 20°C Limit: within the authorized block or +- 2.5 ppm = 4699.875 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
100%	***20***	***1879.949899***	***0***	***2.5***
85%	20	1879.949258	*0.341*	2.5
115%	20	1879.949319	*0.309*	2.5

9.2. RADIATED TEST RESULTS

9.2.1. OUTPUT POWER

LIMIT

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
24.232(b) & RSS133 § 6.4 Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.
RSS-132 § 4.4 The maximum ERP shall be 6.3 Watts for mobile stations.

TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.17

RESULTS

850 MHz GPRS Mode

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	27.40	549.54
Middle	836.6	29.30	851.14
High	848.8	30.70	1174.90

850 MHz EGPRS Mode

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	26.90	489.78
Middle	836.6	27.60	575.44
High	848.8	28.90	776.25

850 MHz CDMA 2000 1xRTT Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	23.80	239.88
Middle	836.5	25.00	316.23
High	848.3	26.00	398.11

850 MHz WCDMA Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	826.4	23.00	199.53
Middle	836.4	24.20	263.03
High	846.6	24.70	295.12

1900 MHz GPRS Mode

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	26.90	489.78
Middle	1880.0	27.70	588.84
High	1909.8	28.20	660.69

1900 MHz EGPRS Mode

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	26.70	467.74
Middle	1880.0	28.50	707.95
High	1909.8	28.50	707.95

1900 MHz CDMA 2000 1xRTT Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	25.20	331.13
Middle	1880.00	25.90	389.05
High	1908.75	27.70	588.84

1900 MHz WCDMA Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1852.4	24.60	288.40
Middle	1880.0	25.00	316.23
High	1907.6	25.20	331.13

CELL BAND GPRS OUTPUT POWER (ERP)

High Frequency Substitution Measurement
Compliance Certification Services 3m Chamber

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND GPRS MODE

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	-3.4	V	30.8	27.4	38.5	-11.1	
824.20	-2.2	H	28.9	26.6	38.5	-11.8	
836.60	-2.6	V	31.8	29.3	38.5	-9.2	
836.60	-1.4	H	28.8	27.5	38.5	-11.0	
848.31	-2.2	V	32.8	30.7	38.5	-7.8	
848.31	-1.4	H	29.6	28.2	38.5	-10.2	

Rev. 1.24.7

CELL BAND EGPRS OUTPUT POWER (ERP)

High Frequency Substitution Measurement
Compliance Certification Services 3m Chamber

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND EGPRS MODE

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	-3.9	V	30.8	26.9	38.5	-11.6	
824.20	-3.7	H	28.9	25.2	38.5	-13.3	
836.60	-4.2	V	31.8	27.6	38.5	-10.8	
836.60	-3.0	H	28.8	25.9	38.5	-12.6	
848.31	-3.9	V	32.8	28.9	38.5	-9.5	
848.31	-3.0	H	29.6	26.6	38.5	-11.8	

Rev. 1.24.7

CELL BAND CDMA 2000 1xRTT OUTPUT POWER (ERP)

High Frequency Substitution Measurement
Compliance Certification Services 3m Chamber

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND 1xRTT MODE

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	-7.0	V	30.8	23.8	38.5	-14.6	
824.70	-6.9	H	28.9	22.0	38.5	-16.4	
836.52	-6.9	V	31.8	25.0	38.5	-13.5	
836.52	-6.1	H	28.8	22.8	38.5	-15.7	
848.31	-6.8	V	32.8	26.0	38.5	-12.4	
848.31	-6.7	H	29.6	22.9	38.5	-15.6	

Rev. 1.24.7

CELL BAND WCDMA OUTPUT POWER (ERP)

High Frequency Substitution Measurement
Compliance Certification Services 3m Chamber

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND WCDMA MODE

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	-7.8	V	30.8	23.0	38.5	-15.4	
826.40	-7.2	H	28.9	21.6	38.5	-16.8	
836.40	-7.7	V	31.8	24.2	38.5	-14.3	
836.40	-6.6	H	28.8	22.2	38.5	-16.2	
846.40	-8.1	V	32.8	24.7	38.5	-13.7	
846.40	-6.9	H	29.6	22.7	38.5	-15.7	

Rev. 1.24.7

PCS BAND GPRS OUTPUT POWER (EIRP)

High Frequency Fundamental Measurement
Compliance Certification Services 3m Chamber

Company: TOHSIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND GPRS MODE

Test Equipment:
Receiving: Horn T60, and 3m Camber SMA Cables
Substitution: Horn T72 Substitution, 6ft SMA Cable (SN # 208947003) Warehouse

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	-11.8	V	38.7	26.9	33.0	-6.1	
1.850	-12.9	H	36.8	24.0	33.0	-9.0	
1.880	-12.2	V	39.9	27.7	33.0	-5.3	
1.880	-11.6	H	38.8	27.2	33.0	-5.8	
1.910	-12.7	V	40.9	28.2	33.0	-4.8	
1.910	-12.1	H	37.6	25.5	33.0	-7.6	

Rev. 1.24.7

PCS BAND EGPRS OUTPUT POWER (EIRP)

High Frequency Fundamental Measurement
Compliance Certification Services 3m Chamber

Company: TOHSIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND EGPRS MODE

Test Equipment:
Receiving: Horn T60, and 3m Camber SMA Cables
Substitution: Horn T72 Substitution, 6ft SMA Cable (SN # 208947003) Warehouse

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	-12.0	V	38.7	26.7	33.0	-6.3	
1.850	-12.7	H	36.8	24.2	33.0	-8.8	
1.880	-11.3	V	39.9	28.5	33.0	-4.5	
1.880	-11.4	H	38.8	27.4	33.0	-5.6	
1.910	-12.4	V	40.9	28.5	33.0	-4.5	
1.910	-11.8	H	37.6	25.8	33.0	-7.2	

Rev. 1.24.7

PCS BAND CDMA 2000 1xRTT OUTPUT POWER (EIRP)

High Frequency Fundamental Measurement
Compliance Certification Services 3m Chamber

Company: TOHSIBA
Project #: 09U12710
Date: 7/11/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND 1xRTT MODE

Test Equipment:
Receiving: Horn T60, and 3m Camber SMA Cables
Substitution: Horn T72 Substitution, 6ft SMA Cable (SN # 208947003) Warehouse

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	-13.5	V	38.7	25.2	33.0	-7.8	
1.851	-15.2	H	36.8	21.6	33.0	-11.4	
1.880	-13.9	V	39.9	25.9	33.0	-7.1	
1.880	-15.8	H	38.8	23.0	33.0	-10.0	
1.909	-13.2	V	40.9	27.7	33.0	-5.3	
1.909	-13.5	H	37.6	24.0	33.0	-9.0	

Rev. 1.24.7

PCS BAND WCDMA OUTPUT POWER (EIRP)

High Frequency Fundamental Measurement
Compliance Certification Services 3m Chamber

Company: TOHSIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND WCDMA MODE

Test Equipment:
Receiving: Horn T60, and 3m Camber SMA Cables
Substitution: Horn T72 Substitution, 6ft SMA Cable (SN # 208947003) Warehouse

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	-14.1	V	38.7	24.6	33.0	-8.4	
1.852	-15.5	H	36.8	21.3	33.0	-11.7	
1.880	-14.9	V	39.9	25.0	33.0	-8.0	
1.880	-15.6	H	38.8	23.3	33.0	-9.7	
1.908	-15.7	V	40.9	25.2	33.0	-7.8	
1.908	-15.1	H	37.6	22.5	33.0	-10.5	

Rev. 1.24.7

9.2.2. FIELD STRENGTH OF SPURIOUS EMISSION

LIMIT

§22.917 (e), §24.238 (a), RSS-132 § 4.5, & RSS-133 § 6.5 Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.12

RESULTS

Note: No emissions were found within 30-1000MHz & after the third harmonic of 20dB below the system noise.

CELL BAND GPRS SPURIOUS & HARMONIC (ERP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/13/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND GPRS MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 22

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (824.20 MHz)										
1.648	-47.9	V	3.0	36.9	37.4	1.0	-47.4	-13.0	-34.4	
2.473	-48.4	V	3.0	41.6	36.4	1.0	-42.2	-13.0	-29.2	
3.297	-57.9	V	3.0	43.6	35.8	1.0	-49.0	-13.0	-36.0	
4.121	-65.0	V	3.0	46.2	35.1	1.0	-52.9	-13.0	-39.9	
1.648	-50.4	H	3.0	36.6	37.4	1.0	-50.2	-13.0	-37.2	
2.473	-48.4	H	3.0	40.0	36.4	1.0	-43.8	-13.0	-30.8	
3.297	-58.7	H	3.0	43.4	35.8	1.0	-50.1	-13.0	-37.1	
4.121	-64.1	H	3.0	45.9	35.1	1.0	-52.3	-13.0	-39.3	
Mid Ch. (836.60 MHz)										
1.673	-46.4	V	3.0	37.1	37.3	1.0	-45.6	-13.0	-32.6	
2.510	-47.7	V	3.0	41.8	36.4	1.0	-41.2	-13.0	-28.2	
3.346	-60.1	V	3.0	43.8	35.8	1.0	-51.1	-13.0	-38.1	
4.183	-62.2	V	3.0	46.3	35.0	1.0	-50.0	-13.0	-37.0	
1.673	-50.4	H	3.0	36.9	37.3	1.0	-49.8	-13.0	-36.8	
2.510	-43.3	H	3.0	40.2	36.4	1.0	-38.4	-13.0	-25.4	
3.346	-61.5	H	3.0	43.6	35.8	1.0	-52.7	-13.0	-39.7	
4.183	-62.2	H	3.0	46.1	35.0	1.0	-50.1	-13.0	-37.1	
Hi Ch (848.80 MHz)										
1.698	-45.2	V	3.0	37.4	37.3	1.0	-44.1	-13.0	-31.1	
2.546	-42.1	V	3.0	41.9	36.3	1.0	-35.5	-13.0	-22.5	
3.395	-61.2	V	3.0	43.9	35.7	1.0	-52.0	-13.0	-39.0	
4.244	-63.7	V	3.0	46.4	35.0	1.0	-51.3	-13.0	-38.3	
1.698	-47.4	H	3.0	37.1	37.3	1.0	-46.6	-13.0	-33.6	
2.546	-39.4	H	3.0	40.4	36.3	1.0	-34.4	-13.0	-21.4	
3.395	-59.9	H	3.0	43.7	35.7	1.0	-50.8	-13.0	-37.8	
4.244	-59.9	H	3.0	46.3	35.0	1.0	-47.6	-13.0	-34.6	

Rev. 03.03.09

CELL BAND EGPRS SPURIOUS & HARMONIC (ERP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/13/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND EGPRS MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 22

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (824.20 MHz)										
1.648	-55.4	V	3.0	36.9	37.4	1.0	-54.9	-13.0	-41.9	
2.473	-45.5	V	3.0	41.6	36.4	1.0	-39.3	-13.0	-26.3	
3.297	-63.3	V	3.0	43.6	35.8	1.0	-54.4	-13.0	-41.4	
1.648	-52.2	H	3.0	36.6	37.4	1.0	-51.9	-13.0	-38.9	
2.473	-52.7	H	3.0	40.0	36.4	1.0	-48.0	-13.0	-35.0	
3.297	-64.4	H	3.0	43.4	35.8	1.0	-55.8	-13.0	-42.8	
Mid Ch. (836.60 MHz)										
1.673	-54.4	V	3.0	37.1	37.3	1.0	-53.6	-13.0	-40.6	
2.510	-43.2	V	3.0	41.8	36.4	1.0	-36.7	-13.0	-23.7	
3.346	-61.7	V	3.0	43.8	35.8	1.0	-52.7	-13.0	-39.7	
1.673	-51.6	H	3.0	36.9	37.3	1.0	-51.0	-13.0	-38.0	
2.510	-53.8	H	3.0	40.2	36.4	1.0	-48.9	-13.0	-35.9	
3.346	-62.1	H	3.0	43.6	35.8	1.0	-53.3	-13.0	-40.3	
Hi Ch (848.80 MHz)										
1.698	-52.4	V	3.0	37.4	37.3	1.0	-51.3	-13.0	-38.3	
2.546	-41.4	V	3.0	41.9	36.3	1.0	-34.9	-13.0	-21.9	
3.395	-59.9	V	3.0	43.9	35.7	1.0	-50.6	-13.0	-37.6	
1.698	-51.6	H	3.0	37.1	37.3	1.0	-50.8	-13.0	-37.8	
2.546	-51.4	H	3.0	40.4	36.3	1.0	-46.3	-13.0	-33.3	
3.395	-60.4	H	3.0	43.7	35.7	1.0	-51.4	-13.0	-38.4	

Rev. 03.03.09

CELL BAND CDMA 2000 1xRTT SPURIOUS & HARMONIC (ERP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA CORPORATION
Project #: 09U12710
Date: 7/13/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND 1xRTT MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 22

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (824.7MHz)										
1.649	-49.9	V	3.0	36.9	37.4	1.0	-49.4	-13.0	-36.4	
2.474	-47.1	V	3.0	41.6	36.4	1.0	-40.9	-13.0	-27.9	
3.299	-53.7	V	3.0	43.6	35.8	1.0	-44.8	-13.0	-31.8	
1.649	-48.8	H	3.0	36.6	37.4	1.0	-48.5	-13.0	-35.5	
2.474	-40.6	H	3.0	40.0	36.4	1.0	-36.0	-13.0	-23.0	
3.299	-55.3	H	3.0	43.4	35.8	1.0	-46.7	-13.0	-33.7	
Mid Ch. (836.52 MHz)										
1.673	-49.2	V	3.0	37.1	37.3	1.0	-48.4	-13.0	-35.4	
2.510	-42.9	V	3.0	41.8	36.4	1.0	-36.5	-13.0	-23.5	
3.346	-52.4	V	3.0	43.8	35.8	1.0	-43.3	-13.0	-30.3	
1.673	-47.5	H	3.0	36.9	37.3	1.0	-46.9	-13.0	-33.9	
2.510	-37.3	H	3.0	40.2	36.4	1.0	-32.4	-13.0	-19.4	
3.346	-54.0	H	3.0	43.6	35.8	1.0	-45.1	-13.0	-32.1	
Hi Ch (848.31MHz)										
1.697	-46.7	V	3.0	37.4	37.3	1.0	-45.6	-13.0	-32.6	
2.545	-43.3	V	3.0	41.9	36.3	1.0	-36.8	-13.0	-23.8	
3.393	-53.0	V	3.0	43.9	35.7	1.0	-43.8	-13.0	-30.8	
1.697	-45.7	H	3.0	37.1	37.3	1.0	-44.9	-13.0	-31.9	
2.545	-39.0	H	3.0	40.4	36.3	1.0	-34.0	-13.0	-21.0	
3.393	-53.3	H	3.0	43.7	35.7	1.0	-44.3	-13.0	-31.3	

Rev. 03.03.09

CELL BAND WCDMA SPURIOUS & HARMONIC (ERP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/13/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX CELL BAND WCDMA MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 22

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (826.40 MHz)										
1.653	-58.4	V	3.0	36.9	37.4	1.0	-57.8	-13.0	-44.8	
2.479	-56.7	V	3.0	41.6	36.4	1.0	-50.5	-13.0	-37.5	
3.306	-63.2	V	3.0	43.7	35.8	1.0	-54.3	-13.0	-41.3	
4.132	-65.6	V	3.0	46.2	35.1	1.0	-53.4	-13.0	-40.4	
4.958	-59.6	V	3.0	48.0	34.8	1.0	-45.4	-13.0	-32.4	
5.785	-61.2	V	3.0	49.6	34.7	1.0	-45.4	-13.0	-32.4	
1.653	-58.3	H	3.0	36.7	37.4	1.0	-58.0	-13.0	-45.0	
2.479	-57.4	H	3.0	40.1	36.4	1.0	-52.7	-13.0	-39.7	
3.306	-63.2	H	3.0	43.5	35.8	1.0	-54.5	-13.0	-41.5	
4.132	-62.5	H	3.0	45.9	35.1	1.0	-50.7	-13.0	-37.7	
4.958	-63.1	H	3.0	48.3	34.8	1.0	-48.6	-13.0	-35.6	
5.785	-63.2	H	3.0	50.2	34.7	1.0	-46.7	-13.0	-33.7	
Mid Ch. (836.40 MHz)										
1.673	-57.2	V	3.0	37.1	37.3	1.0	-56.4	-13.0	-43.4	
2.509	-54.2	V	3.0	41.8	36.4	1.0	-47.8	-13.0	-34.8	
3.346	-63.2	V	3.0	43.8	35.8	1.0	-54.2	-13.0	-41.2	
4.182	-63.5	V	3.0	46.3	35.0	1.0	-51.2	-13.0	-38.2	
5.018	-56.2	V	3.0	48.2	34.8	1.0	-41.7	-13.0	-28.7	
5.855	-61.2	V	3.0	49.7	34.7	1.0	-45.3	-13.0	-32.3	
1.673	-56.1	H	3.0	36.9	37.3	1.0	-55.6	-13.0	-42.6	
2.509	-59.2	H	3.0	40.2	36.4	1.0	-54.3	-13.0	-41.3	
3.346	-64.2	H	3.0	43.6	35.8	1.0	-55.3	-13.0	-42.3	
4.182	-62.8	H	3.0	46.1	35.0	1.0	-50.8	-13.0	-37.8	
5.018	-64.4	H	3.0	48.5	34.8	1.0	-49.7	-13.0	-36.7	
5.855	-62.6	H	3.0	50.3	34.7	1.0	-46.0	-13.0	-33.0	
Hi Ch (846.40 MHz)										
1.693	-57.0	V	3.0	37.4	37.3	1.0	-55.9	-13.0	-42.9	
2.539	-55.4	V	3.0	41.9	36.3	1.0	-48.9	-13.0	-35.9	
3.386	-61.9	V	3.0	43.9	35.7	1.0	-52.7	-13.0	-39.7	
4.232	-62.5	V	3.0	46.4	35.0	1.0	-50.1	-13.0	-37.1	
5.078	-56.0	V	3.0	48.3	34.7	1.0	-41.4	-13.0	-28.4	
5.925	-61.0	V	3.0	49.8	34.8	1.0	-44.9	-13.0	-31.9	
1.693	-57.3	H	3.0	37.1	37.3	1.0	-56.5	-13.0	-43.5	
2.539	-58.8	H	3.0	40.3	36.3	1.0	-53.8	-13.0	-40.8	
3.386	-62.7	H	3.0	43.7	35.7	1.0	-53.7	-13.0	-40.7	
4.232	-64.4	H	3.0	46.2	35.0	1.0	-52.1	-13.0	-39.1	
5.078	-62.1	H	3.0	48.7	34.7	1.0	-47.2	-13.0	-34.2	
5.925	-62.0	H	3.0	50.5	34.8	1.0	-45.3	-13.0	-32.3	

Rev. 03.03.09

PCS BAND GPRS SPURIOUS & HARMONIC (EIRP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND GPRS MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 24

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (1850.20MHz)										
3.700	-62.4	V	3.0	44.9	35.4	1.0	-51.9	-13.0	-38.9	
5.551	-60.5	V	3.0	49.2	34.7	1.0	-45.1	-13.0	-32.1	
9.251	-58.1	V	3.0	54.5	35.2	1.0	-37.8	-13.0	-24.8	
3.700	-64.5	H	3.0	44.7	35.4	1.0	-54.2	-13.0	-41.2	
5.551	-63.5	H	3.0	49.7	34.7	1.0	-47.5	-13.0	-34.5	
9.251	-65.7	H	3.0	55.3	35.2	1.0	-44.6	-13.0	-31.6	
Mid Ch. (1880.00 MHz)										
3.760	-60.0	V	3.0	45.1	35.3	1.0	-49.2	-13.0	-36.2	
5.640	-57.0	V	3.0	49.3	34.7	1.0	-41.4	-13.0	-28.4	
9.400	-59.8	V	3.0	54.7	35.3	1.0	-39.4	-13.0	-26.4	
3.760	-59.5	H	3.0	44.8	35.3	1.0	-49.0	-13.0	-36.0	
5.640	-56.7	H	3.0	49.9	34.7	1.0	-40.5	-13.0	-27.5	
9.400	-66.1	H	3.0	55.5	35.3	1.0	-44.9	-13.0	-31.9	
Hi Ch (1909.80 MHz)										
3.820	-55.4	V	3.0	45.3	35.3	1.0	-44.3	-13.0	-31.3	
5.729	-53.2	V	3.0	49.5	34.7	1.0	-37.5	-13.0	-24.5	
9.549	-62.0	V	3.0	54.8	35.3	1.0	-41.4	-13.0	-28.4	
3.820	-59.8	H	3.0	45.0	35.3	1.0	-49.0	-13.0	-36.0	
5.729	-53.4	H	3.0	50.1	34.7	1.0	-37.1	-13.0	-24.1	
9.549	-65.5	H	3.0	55.7	35.3	1.0	-44.2	-13.0	-31.2	

Rev. 03.03.09

PCS BAND EGPRS SPURIOUS & HARMONIC (EIRP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/12/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND EGPRS MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 24

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (1850.20MHz)										
3.700	-56.3	V	3.0	44.9	35.4	1.0	-45.8	-13.0	-32.8	
5.551	-55.4	V	3.0	49.2	34.7	1.0	-39.9	-13.0	-26.9	
9.251	-55.4	V	3.0	54.5	35.2	1.0	-35.2	-13.0	-22.2	
3.700	-58.4	H	3.0	44.7	35.4	1.0	-48.2	-13.0	-35.2	
5.551	-55.3	H	3.0	49.7	34.7	1.0	-39.3	-13.0	-26.3	
9.251	-60.6	H	3.0	55.3	35.2	1.0	-39.5	-13.0	-26.5	
Mid Ch. (1880.00 MHz)										
3.760	-55.5	V	3.0	45.1	35.3	1.0	-44.7	-13.0	-31.7	
5.640	-54.1	V	3.0	49.3	34.7	1.0	-38.5	-13.0	-25.5	
9.400	-56.9	V	3.0	54.7	35.3	1.0	-36.5	-13.0	-23.5	
3.760	-58.1	H	3.0	44.8	35.3	1.0	-47.6	-13.0	-34.6	
5.640	-53.6	H	3.0	49.9	34.7	1.0	-37.4	-13.0	-24.4	
9.400	-62.8	H	3.0	55.5	35.3	1.0	-41.5	-13.0	-28.5	
Hi Ch (1909.80 MHz)										
3.820	-54.8	V	3.0	45.3	35.3	1.0	-43.8	-13.0	-30.8	
5.729	-53.4	V	3.0	49.5	34.7	1.0	-37.7	-13.0	-24.7	
9.549	-55.6	V	3.0	54.8	35.3	1.0	-35.0	-13.0	-22.0	
3.820	-57.3	H	3.0	45.0	35.3	1.0	-46.6	-13.0	-33.6	
5.729	-52.5	H	3.0	50.1	34.7	1.0	-36.1	-13.0	-23.1	
9.549	-60.8	H	3.0	55.7	35.3	1.0	-39.4	-13.0	-26.4	

Rev. 03.03.09

PCS BAND CDMA 2000 1xRTT SPURIOUS & HARMONIC (EIRP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA
Project #: 09U12710
Date: 7/13/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND 1xRTT MODE

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	FCC PART 24

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (1851.25MHz)										
3.703	-50.3	V	3.0	44.9	35.4	1.0	-39.8	-13.0	-26.8	
5.554	-57.3	V	3.0	49.2	34.7	1.0	-41.8	-13.0	-28.8	
7.405	-59.0	V	3.0	52.1	34.9	1.0	-40.8	-13.0	-27.8	
3.703	-42.7	H	3.0	44.7	35.4	1.0	-32.4	-13.0	-19.4	
5.554	-57.0	H	3.0	49.7	34.7	1.0	-41.0	-13.0	-28.0	
7.405	-54.8	H	3.0	53.1	34.9	1.0	-35.6	-13.0	-22.6	
Mid Ch. (1880.00 MHz)										
3.760	-42.0	V	3.0	45.1	35.3	1.0	-31.2	-13.0	-18.2	
5.640	-56.9	V	3.0	49.3	34.7	1.0	-41.3	-13.0	-28.3	
7.520	-59.3	V	3.0	52.3	34.9	1.0	-40.9	-13.0	-27.9	
3.760	-39.3	H	3.0	44.8	35.3	1.0	-28.8	-13.0	-15.8	
5.640	-56.7	H	3.0	49.9	34.7	1.0	-40.5	-13.0	-27.5	
7.520	-55.2	H	3.0	53.3	34.9	1.0	-35.9	-13.0	-22.9	
Hi Ch (1908.75MHz)										
3.818	-43.1	V	3.0	45.3	35.3	1.0	-32.1	-13.0	-19.1	
5.726	-57.8	V	3.0	49.5	34.7	1.0	-42.1	-13.0	-29.1	
7.635	-55.9	V	3.0	52.4	34.9	1.0	-37.4	-13.0	-24.4	
3.818	-40.4	H	3.0	45.0	35.3	1.0	-29.7	-13.0	-16.7	
5.726	-59.0	H	3.0	50.1	34.7	1.0	-42.7	-13.0	-29.7	
7.635	-53.6	H	3.0	53.4	34.9	1.0	-34.2	-13.0	-21.2	

Rev. 03.03.09

PCS BAND WCDMA SPURIOUS & HARMONIC (EIRP)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: TOSHIBA CORPORATION
Project #: 09U12710
Date: 7/14/2009
Test Engineer: MENGISTU MEKURIA
Configuration: EUT INSTALLED INSIDE TOSHIBA LAPTOP
Mode: TX PCS BAND WCDMA MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	FCC PART 24

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch. (1852.4 MHz)										
3.705	-48.8	V	3.0	45.1	35.4	1.0	-38.1	-13.0	-25.1	
5.557	-53.0	V	3.0	49.2	35.4	1.0	-38.2	-13.0	-25.2	
7.410	-61.2	V	3.0	51.3	35.7	1.0	-44.6	-13.0	-31.6	
9.262	-62.5	V	3.0	53.6	35.6	1.0	-43.5	-13.0	-30.5	
3.705	-45.7	H	3.0	45.3	35.4	1.0	-34.7	-13.0	-21.7	
5.557	-52.9	H	3.0	50.0	35.4	1.0	-37.3	-13.0	-24.3	
7.410	-57.5	H	3.0	53.0	35.7	1.0	-39.2	-13.0	-26.2	
9.262	-65.4	H	3.0	55.1	35.6	1.0	-44.9	-13.0	-31.9	
Mid Ch. (1880.00 MHz)										
3.760	-42.9	V	3.0	45.3	35.3	1.0	-31.9	-13.0	-18.9	
5.640	-55.1	V	3.0	49.3	35.4	1.0	-40.2	-13.0	-27.2	
7.520	-64.5	V	3.0	51.4	35.7	1.0	-47.7	-13.0	-34.7	
9.400	-61.2	V	3.0	53.7	35.6	1.0	-42.0	-13.0	-29.0	
3.760	-39.7	H	3.0	45.5	35.3	1.0	-28.5	-13.0	-15.5	
5.640	-52.6	H	3.0	50.2	35.4	1.0	-36.9	-13.0	-23.9	
7.520	-64.7	H	3.0	53.1	35.7	1.0	-46.3	-13.0	-33.3	
9.400		H	3.0	55.2	35.6	1.0	20.7	-13.0	33.7	
Hi Ch (1907.6 MHz)										
3.815	-42.7	V	3.0	45.4	35.3	1.0	-31.6	-13.0	-18.6	
5.723	-55.1	V	3.0	49.4	35.4	1.0	-40.2	-13.0	-27.2	
7.630	-58.6	V	3.0	51.6	35.7	1.0	-41.7	-13.0	-28.7	
9.538	-63.4	V	3.0	53.9	35.6	1.0	-44.0	-13.0	-31.0	
3.815	-39.2	H	3.0	45.7	35.3	1.0	-27.8	-13.0	-14.8	
5.723	-52.9	H	3.0	50.3	35.4	1.0	-37.0	-13.0	-24.0	
7.630	-55.8	H	3.0	53.2	35.7	1.0	-37.2	-13.0	-24.2	
9.538	-66.0	H	3.0	55.4	35.6	1.0	-45.2	-13.0	-32.2	

Rev. 03.03.09

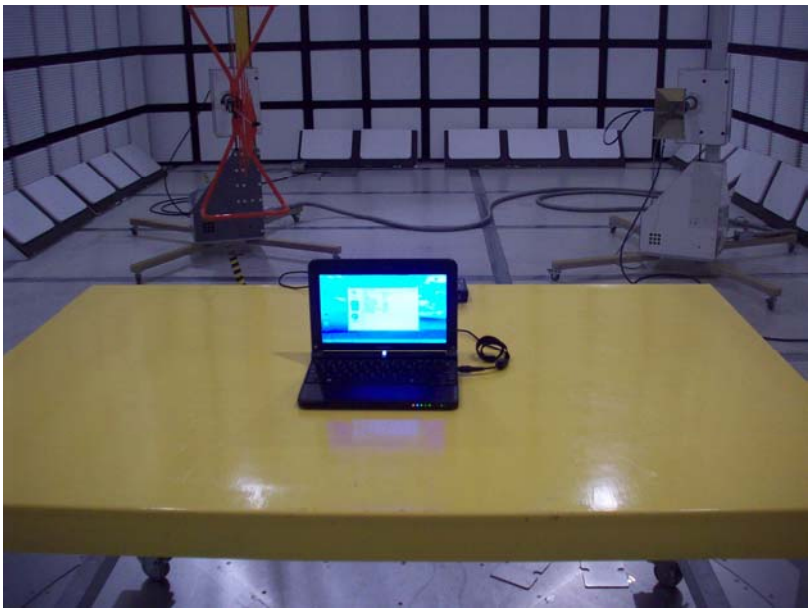
10. SETUP PHOTOS

RF CONDUCTED MEASUREMENT AT ANTENNA PORT

TEMPERATURE CHAMBER

RADIATED RF MEASUREMENT SETUP

RADIATED FRONT POSITION



RADIATED BACK POSITION

END OF REPORT