



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: HS 30001 M2M Module



FCC ID: MIVCNN0301

IC Certification Number: 4160A-CNN0301

To: FCC Part 22: 2011, Part 24: 2011, & Industry Canada RSS-132 Issue 2
and RSS-133 Issue 5

Test Report Serial No.:
RFI-RPT-RP86318JD02A V3.0

Version 3.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:	 pp
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Date of Issue:	10 May 2012

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RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number:2117901



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1. Customer Information





















Company Name:	Enfora Inc.
Address:	251 Renner Parkway Richardson Texas TX 75080

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 22 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 24 Subpart E (Personal Communication Services)
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
Specification Reference:	RSS-GEN Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radiocommunication Equipment
Specification Reference:	RSS-132 Issue 2 Sep 2005
Specification Title:	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
Specification Reference:	SRSP-503 Issue 7 Sep 2008
Specification Title:	Technical Requirements for Cellular Radiotelephone Systems Operating in the Bands 824 – 849 MHz and 869 – 894 MHz
Specification Reference:	RSS-133 Issue 5 Feb 2009
Specification Title:	2 GHz Personal Communications Services
Specification Reference:	SRSP-510 Issue 5 Feb 2009
Specification Title:	Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	03 April 2012 to 25 April 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 22 & RSS-132			
Part 15.107(a)	RSS-Gen 7.2.2	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109	RSS-Gen 4.10/6 RSS-132 4.6	Receiver/Idle Mode Radiated Spurious Emissions	
Part 22.913(a)	RSS-132 4.4 SRSP-503 5.1.3	Transmitter Output Power (Conducted)	
Part 2.1055/22.355	RSS-132 4.3 RSS-Gen 4.7	Transmitter Frequency Stability (Temperature and Voltage Variation)	
Part 2.1049	RSS-Gen 4.6.1	Transmitter Occupied Bandwidth	
Part 2.1051/22.917	RSS-132 4.5	Transmitter Out of Band Conducted Emissions	
Part 2.1053/22.917	RSS-132 4.5	Transmitter Out of Band Radiated Emissions	
Part 2.1051/22.917	RSS-132 4.5	Transmitter Band Edge Conducted Emissions	
Part 2.1053/22.917	RSS-132 4.5	Transmitter Band Edge Radiated Emissions	
Part 24 & RSS-133			
Part 15.107(a)	RSS-Gen 7.2.2	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109	RSS-Gen 4.10/6 RSS-133 4.6	Receiver/Idle Mode Radiated Spurious Emissions	
Part 24.232	RSS-133 6.4 SRSP-510 5.1.2	Transmitter Output Power (Conducted)	
Part 2.1055/24.235	RSS-133 6.3 RSS Gen 4.7	Transmitter Frequency Stability (Temperature and Voltage Variation)	
Part 2.1049	RSS-Gen 4.6.1	Transmitter Occupied Bandwidth	
Part 2.1051/24.238	RSS-133 6.5	Transmitter Out of Band Conducted Emissions	
Part 2.1053/24.238	RSS-133 6.5	Transmitter Out of Band Radiated Emissions	
Part 2.1051/24.238	RSS-133 6.5	Transmitter Band Edge Conducted Emissions	
Part 2.1053/24.238	RSS-133 6.5	Transmitter Band Edge Radiated Emissions	
Key to Results			
 = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-C-2004
Title:	Land Mobile Communications Equipment, Measurements and performance Standards
Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Enabler HS 30001
Model Name or Number:	CNN0301-10
Electronic Serial Number:	804777A6
Hardware Version Number:	1
Software Version Number:	10.1
FCC ID:	MIVCNN0301
IC Certification Number:	4160A-CNN0301

Brand Name:	Enabler HS 30001
Model Name or Number:	CNN0301-10
Electronic Serial Number:	807FD690
Hardware Version Number:	1
Software Version Number:	10.1
FCC ID:	MIVCNN0301
IC Certification Number:	4160A-CNN0301

3.2. Description of EUT

The equipment under test was a CDMA2000 module working in the 850/1900 bands. The EUT did not support EV-DO.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Type of Radio Device:	Transceiver		
Mode:	CDMA2000		
Modulation Type:	O-QPSK		
Channel Spacing:	1.25 MHz		
Power Supply Requirement(s):	Nominal	3.7 V	
Technology Tested:	US Cellular 850		
Transmit Frequency Range:	824 MHz to 849 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1013	824.70
	Middle	384	836.51
	Top	777	848.31
Technology Tested:	PCS 1900		
Transmit Frequency Range:	1850 MHz to 1910 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	25	1851.25
	Middle	600	1880.00
	Top	1175	1908.75

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Development Board
Brand Name:	Enfora
Model Name or Number:	HDK0301MG900
Serial Number:	111220

Description:	Development Board PSU
Brand Name:	CUI
Model Name or Number:	EPS050200U-P7P-DB
Serial Number:	Not marked or stated

Description:	Laptop PC
Brand Name:	Dell D610
Model Name or Number:	PC480NT
Serial Number:	CN-0C4708-48643-625-3186
Software Version Number:	Windows XP

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Receiver/Idle mode.
- Constantly transmitting at full power on bottom, middle and top channels as required.
- Occupied bandwidth, ERP/EIRP and band edge tests were performed with the EUT in SO55 and SO02 modes.
- Transmitter radiated spurious emissions were checked in all modes during pre-scans. SO02 was found to be the worst case and all final measurements were performed with the EUT in this mode.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- The EUT was attached to the development board and configured using the test laptop detailed in section 3.5.
- The development board was powered from 115 V / 60 Hz via a switch mode power supply. Although not part of the EUT, this power supply was tested for AC conducted emissions since it was deemed a representative configuration of a final product into which the module may be installed.
- The EUT antenna port U.FL connector was connected to either the test antenna on the development board or directly to a CDMA2000 system simulator
- The CDMA2000 system simulator was configured operating in transceiver mode.
- For radiated spurious emissions tests the USB and serial ports of the development board were terminated via suitable cables connected to the laptop computer. The customer declared that all other ports on the PCB were suitably terminated.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results - Part 22 & RSS-132**5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Mark Percival	Test Date:	11 April 2012
Test Sample ESN:	804777A6		

FCC Part:	15.107(a)
Industry Canada Reference:	RSS-Gen 7.2.4
Test Method Used:	As detailed in ANSI C63.4 Section 7

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	29

Results: Live Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.856500	Live	24.0	56.0	32.0	Complied
1.108500	Live	21.2	56.0	34.8	Complied
1.122000	Live	20.0	56.0	36.0	Complied
1.158000	Live	20.1	56.0	35.9	Complied
1.414500	Live	20.7	56.0	35.3	Complied
2.643000	Live	22.4	56.0	33.6	Complied
14.752500	Live	22.6	60.0	37.4	Complied

Results: Live Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.271500	Live	27.9	51.1	23.2	Complied
1.459500	Live	20.1	46.0	25.9	Complied
1.473000	Live	14.5	46.0	31.5	Complied
1.500000	Live	23.8	46.0	22.2	Complied
6.000000	Live	17.7	50.0	32.3	Complied

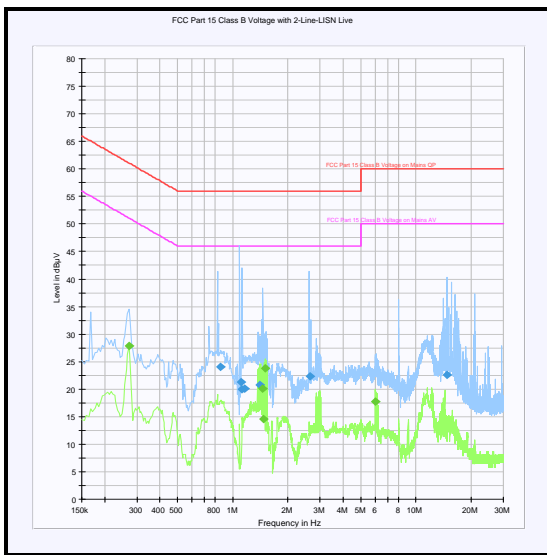
Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

Results: Neutral Quasi Peak

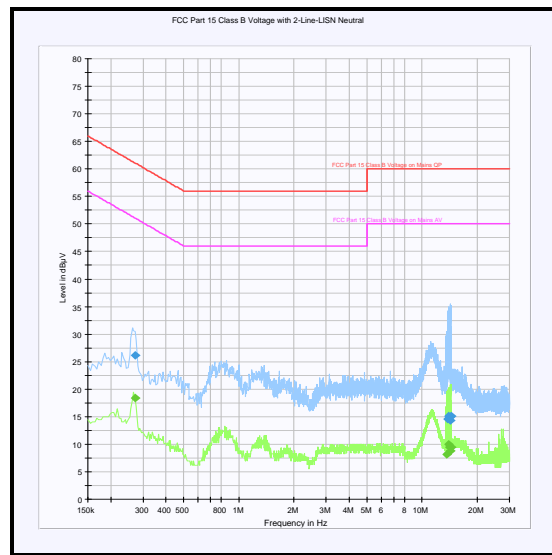
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.271500	Neutral	26.1	61.1	35.0	Complied
13.789500	Neutral	14.5	60.0	45.5	Complied
13.911000	Neutral	15.1	60.0	44.9	Complied
14.095500	Neutral	14.9	60.0	45.1	Complied
14.262000	Neutral	14.3	60.0	45.7	Complied
14.374500	Neutral	15.2	60.0	44.8	Complied

Results: Neutral Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.271500	Neutral	18.4	51.1	32.7	Complied
13.668000	Neutral	8.2	50.0	41.8	Complied
13.960500	Neutral	9.9	50.0	40.1	Complied
14.064000	Neutral	9.4	50.0	40.6	Complied
14.262000	Neutral	8.9	50.0	41.1	Complied
14.361000	Neutral	9.4	50.0	40.6	Complied



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample ESN:	807FD690		

FCC Part:	15.109
Industry Canada Reference:	RSS-Gen 4.10/6 RSS-132 4.6
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	29

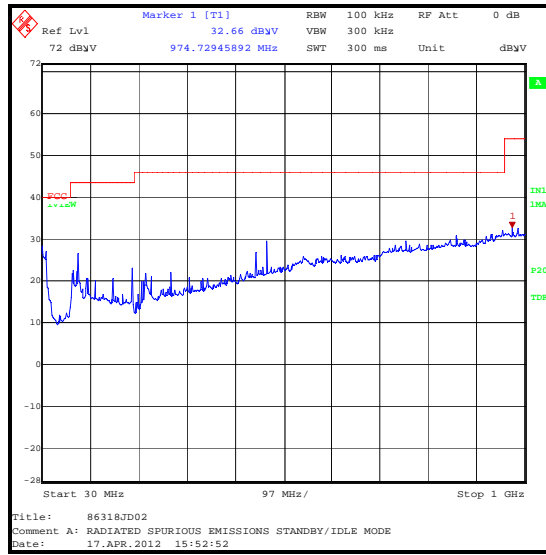
Results:

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
974.729	Vertical	32.7	54.0	21.3	Complied

Note(s):

1. All emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor. Therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
2. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	04 April 2012
Test Sample ESN:	804777A6		

FCC Part:	15.109
Industry Canada Reference:	RSS-Gen 4.10/6 RSS-132 4.6
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 5 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	20

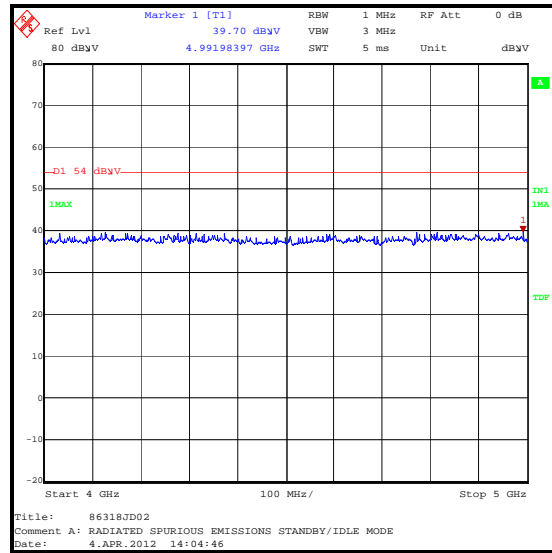
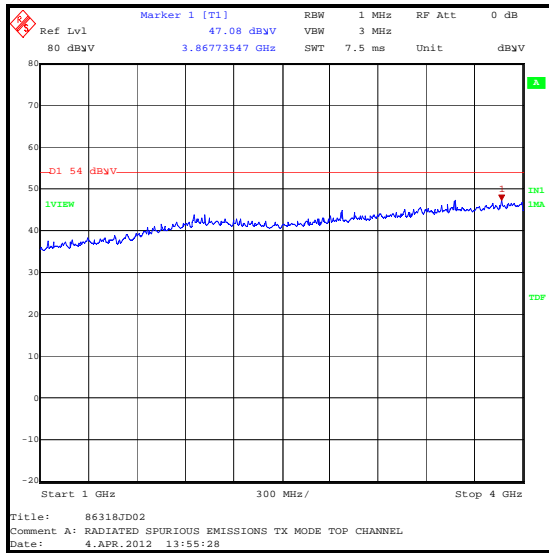
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
3867.735	Horizontal	47.1	54.0	6.9	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All spurious emissions were >20 dB below the limit or below the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit (as opposed to being compared to the peak limit) because this is the more onerous limit.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
4. A wireless communications test set was used to establish a CDMA2000 link with the EUT.
5. The EUT was tested in two service options: SO55 and SO02.
6. The 1 GHz to 4 GHz plot below incorrectly states Tx mode. This is mislabelled and should state standby/idle mode.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.2.3. Transmitter Output Power (Conducted)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 April 2012
Test Sample ESN:	807FD690		

FCC Part:	22.913(a)
Industry Canada Reference:	RSS-132 4.4 SRSP-503 5.1.3
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	33

Results: CDMA2000 SO55

Channel	Frequency (MHz)	Conducted Power (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.70	23.22	38.45	19.05	Complied
Middle	836.51	23.12	38.45	18.90	Complied
Top	848.31	22.88	38.45	19.08	Complied

Results: CDMA2000 SO02

Channel	Frequency (MHz)	Conducted Power (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.70	23.33	38.45	18.94	Complied
Middle	836.51	23.21	38.45	18.81	Complied
Top	848.31	23.12	38.45	18.84	Complied

Note(s):

1. SRSP-503 states the limit as an EIRP value of 11.5 Watts (40.6 dBm) which equates to an ERP limit of 7 Watts (38.45 dBm)
2. A wireless communications test set was used to establish a CDMA2000 link with the EUT.
3. The EUT was tested in two service options: SO55 and SO02
4. Conducted measurements were taken using the power measuring function of the communications test set.
5. The conducted power was compared with the ERP limit.

5.2.4. Transmitter Frequency Stability (Temperature Variation)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 April 2012
Test Sample ESN:	807FD690		

FCC Part:	2.1055 & 22.355
Industry Canada Reference:	RSS-132 4.3 RSS Gen 4.7
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Nominal Temperature (°C):	23
Relative Humidity (%):	27

Results: Middle Channel (836.51 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	836.510018	18	0.0215	2.5	2.4785	Complied
-20	836.510011	11	0.0131	2.5	2.4869	Complied
-10	836.510012	12	0.0143	2.5	2.4857	Complied
0	836.510014	14	0.0167	2.5	2.4833	Complied
10	836.510009	09	0.0108	2.5	2.4892	Complied
20	836.510007	07	0.0084	2.5	2.4916	Complied
30	836.510010	10	0.0120	2.5	2.4880	Complied
40	836.510016	16	0.0191	2.5	2.4809	Complied
50	836.510013	13	0.0155	2.5	2.4845	Complied

Note(s):

1. Temperature was monitored throughout the test with a calibrated digital thermometer.
2. Frequency stability was measured using the frequency error function on the communications test set.

5.2.5. Transmitter Frequency Stability (Voltage Variation)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 April 2012
Test Sample ESN:	807FD690		

FCC Part:	2.1055 & 22.355
Industry Canada Reference:	RSS-132 4.3 RSS-Gen 4.7
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	27

Results: Middle Channel (836.51 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.3	836.510011	11	0.0131	2.5	2.4869	Complied
4.2	836.510015	15	0.0179	2.5	2.4821	Complied

Note(s):

1. Voltage was monitored throughout the test with a calibrated digital voltmeter.
2. Frequency stability was measured using the frequency error function on the communications test set.

5.2.6. Transmitter Occupied Bandwidth**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	03 April 2012
Test Sample ESN:	804777A6		

FCC Part:	2.1049
Industry Canada Reference:	RSS-Gen 4.6.1
Test Method Used:	As detailed in ANSI C63.4 Section 13.7 referencing FCC CFR Part 2.1049

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	26

Results: CDMA2000 SO55 Voice

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.70	1286.573
Middle	836.51	1286.573
Top	848.31	1286.573

Results: CDMA2000 SO02 Data

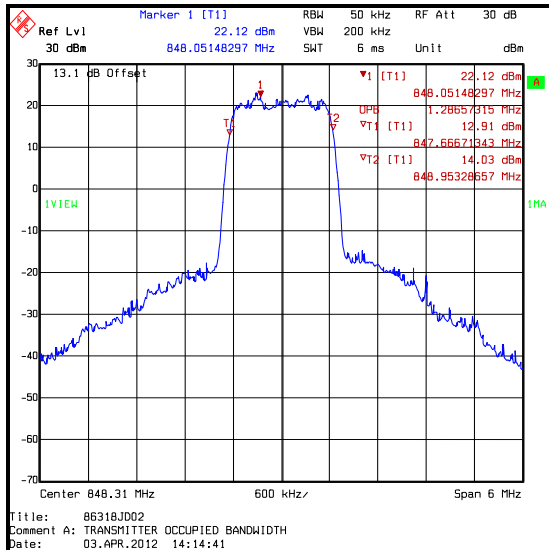
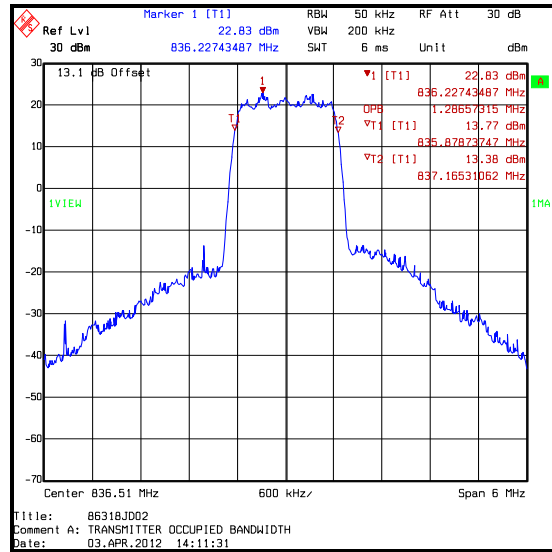
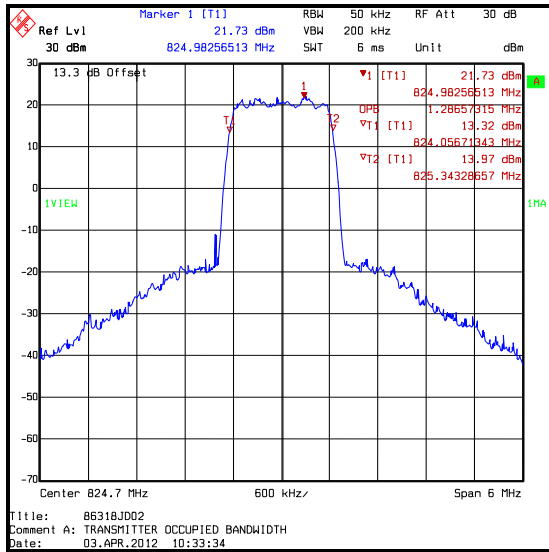
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.70	1298.597
Middle	836.51	1310.621
Top	848.31	1310.621

Note(s):

1. In lieu of the test method detailed in ANSI C63.4 Section 13.7, the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.
2. A wireless communications test set was used to establish a CDMA2000 link with the EUT.
3. The EUT was tested in two service options: SO55 and SO02.
4. A suitable power coupler was used to maintain a link between the communication test set and the EUT. The coupled port along with RF cables was calibrated and the resulting loss added as a reference offset to the measurements.

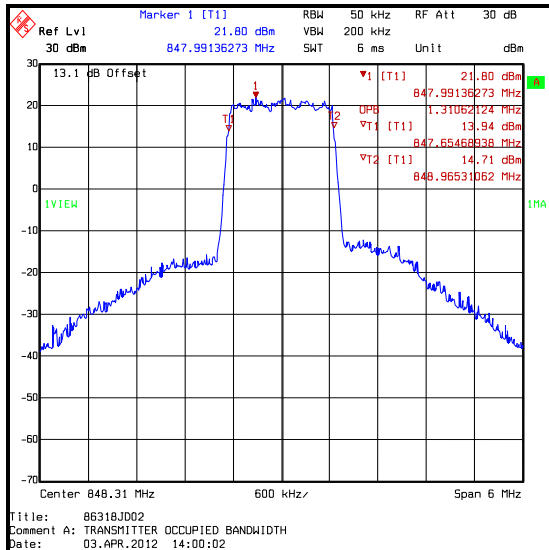
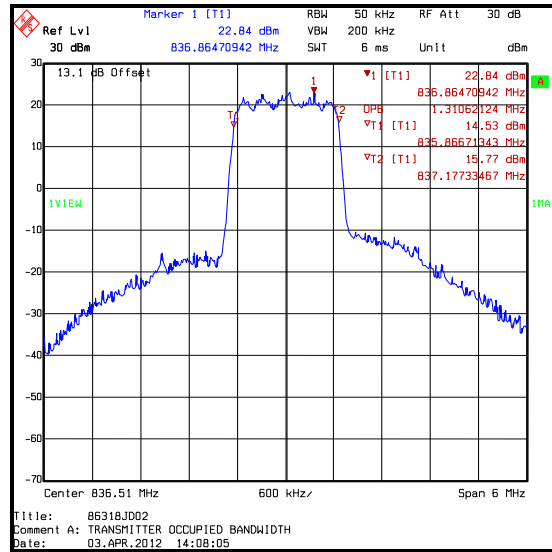
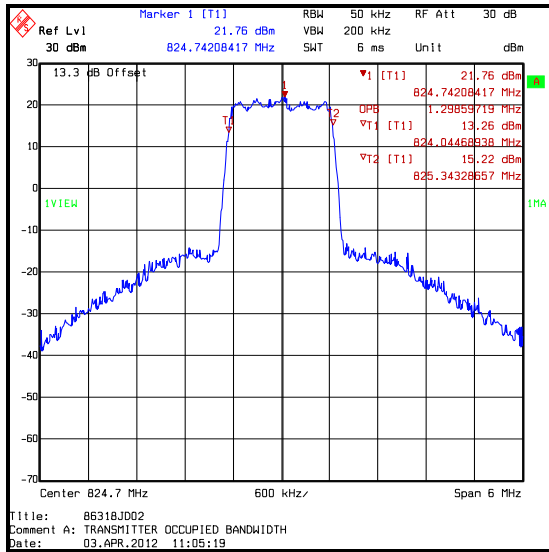
Transmitter Occupied Bandwidth (continued)

CDMA2000 SO55 (Voice)



Transmitter Occupied Bandwidth (continued)

CDMA2000 SO02 (Data)



5.2.7. Transmitter Conducted Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample IMEI:	807FD690		

FCC Part:	2.1051 & 22.917
Industry Canada Reference:	RSS-132 4.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 22.917
Frequency Range:	1 MHz to 9 GHz
Configuration:	CDMA 2000 Service Option 02

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	29

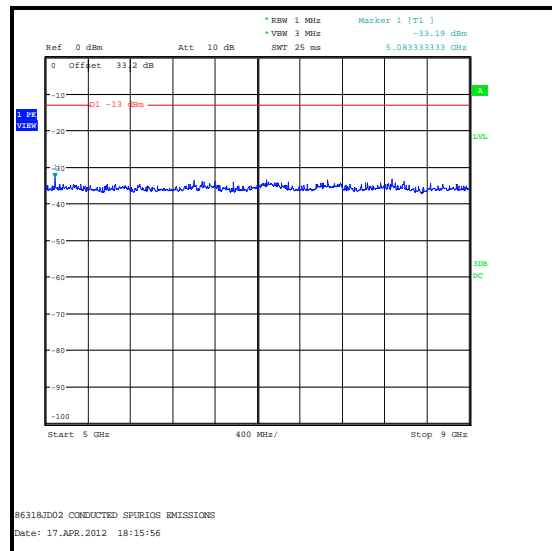
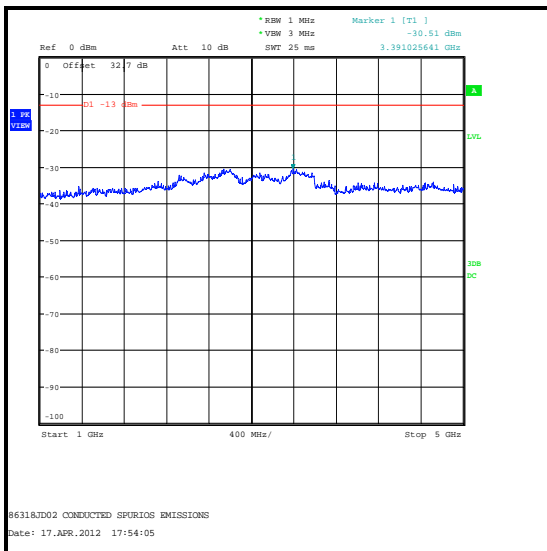
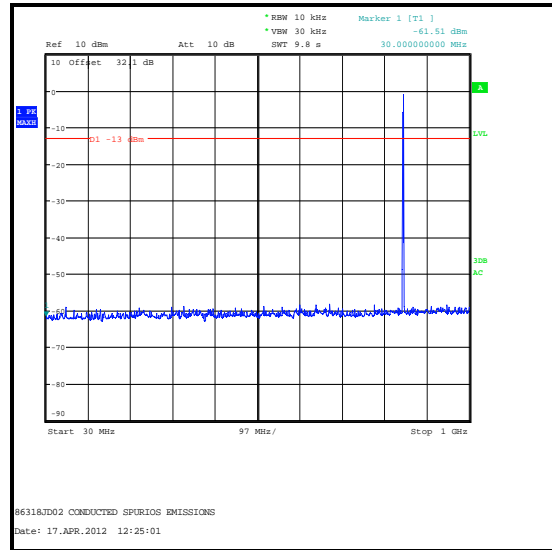
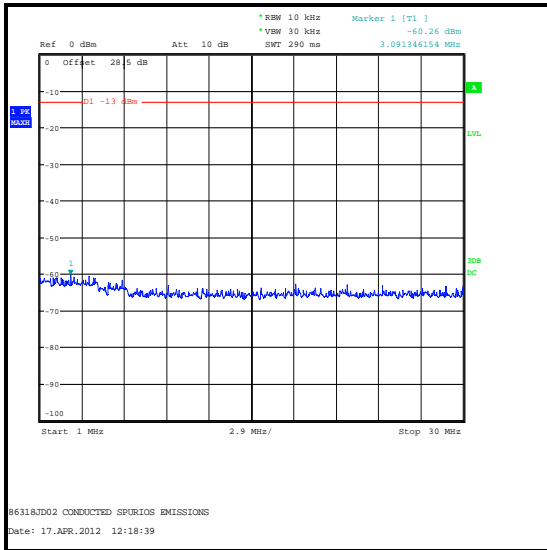
Results:

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3391.026	-30.5	-13.0	17.5	Complied

Note(s):

1. The uplink traffic channel is shown on the 30 MHz to 1 GHz plot.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.

Transmitter Conducted Emissions (Continued)



5.2.8. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	04 April 2012 & 17 April 2012
Test Sample ESN:	804777A6		

FCC Part:	2.1053 & 22.917
Industry Canada Reference:	RSS-132 4.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 2.1053
Frequency Range:	30 MHz to 9 GHz
Configuration:	CDMA2000 Service Option 02

Environmental Conditions:

Temperature (°C):	24 & 23
Relative Humidity (%):	20 & 28

Results: Bottom Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4965.931	-48.7	-13.0	35.7	Complied

Results: Middle Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
5015.529	-46.1	-13.0	33.1	Complied

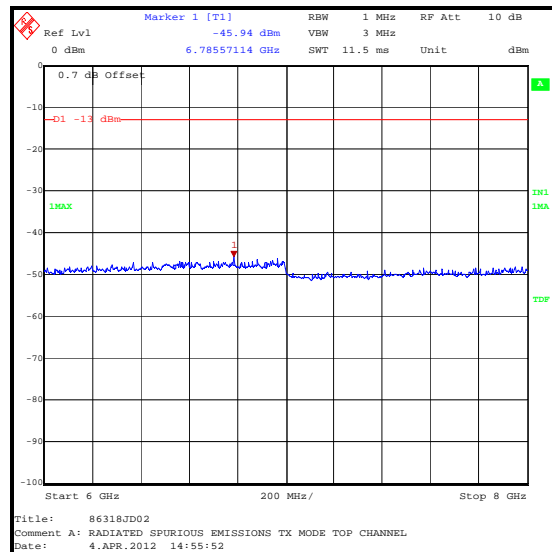
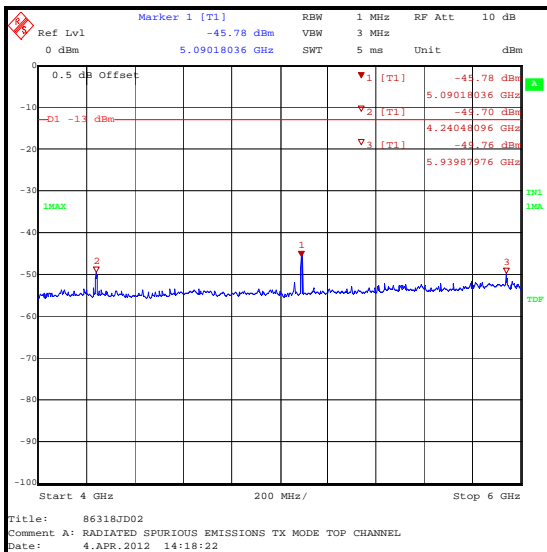
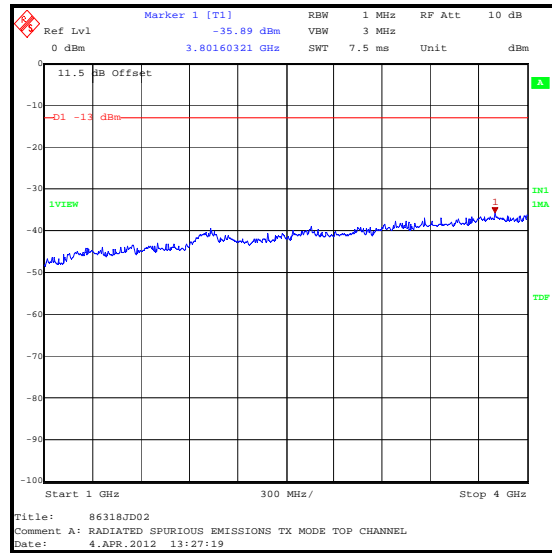
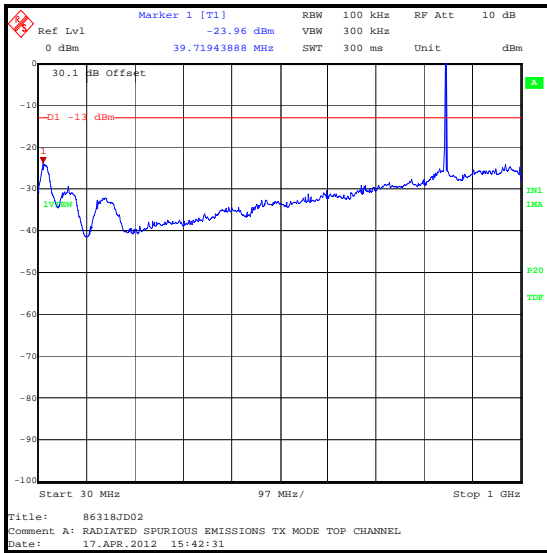
Results: Top Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
5087.926	-44.4	-13.0	31.4	Complied

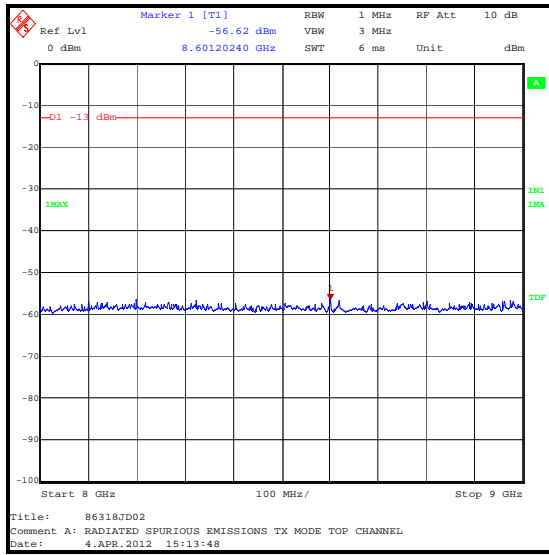
Transmitter Out of Band Radiated Emissions (continued)**Note(s):**

1. The uplink traffic channel is shown on the 30 MHz to 1 GHz plot.
2. All other emissions were >20 dB below the limit or below the noise floor of the measuring receiver.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



5.2.9. Transmitter Band Edge Conducted Emissions

Test Summary:

Test Engineer:	Patrick Jones	Test Date:	04 April 2012 & 05 April 2012
Test Sample ESN:	804777A6		

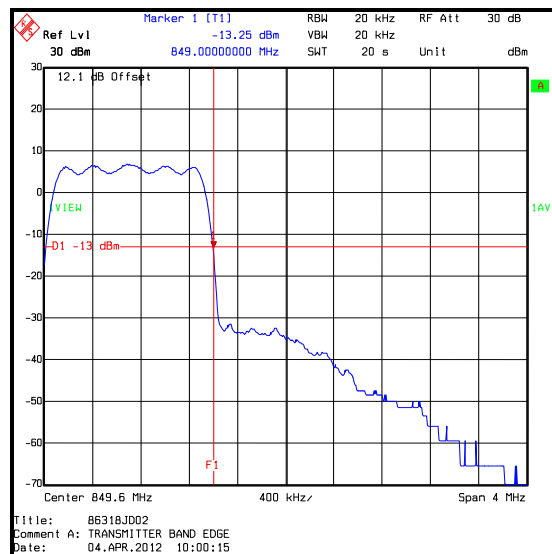
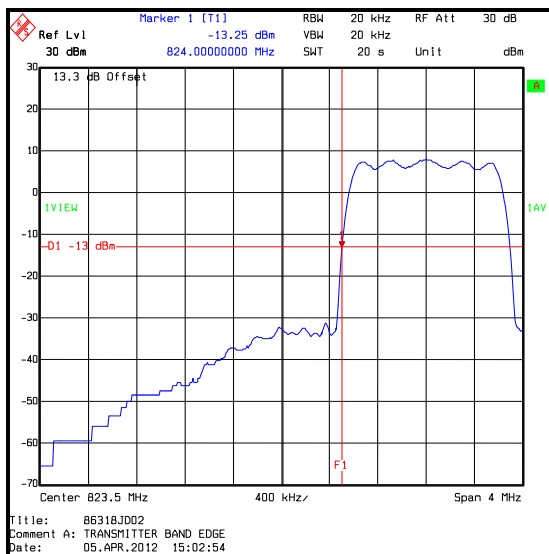
FCC Part:	2.1051 & 22.917
Industry Canada Reference:	RSS-132 4.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 22.917

Environmental Conditions:

Temperature (°C):	24 & 25
Relative Humidity (%):	20 & 27

Results: CDMA2000 SO55

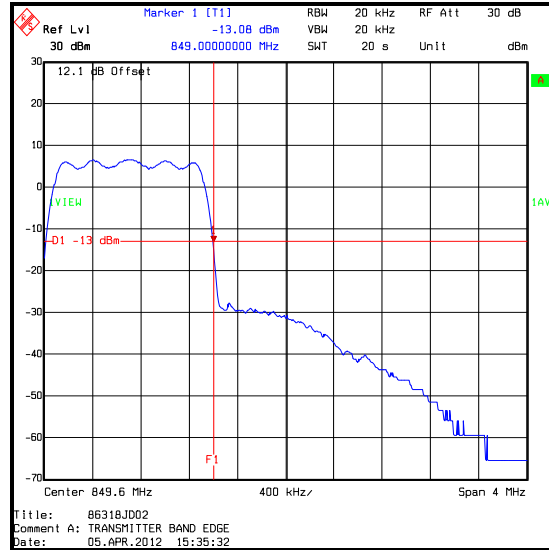
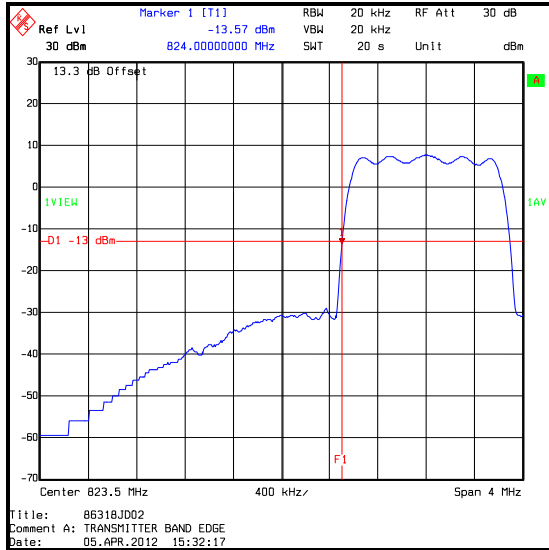
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-13.3	-13.0	0.3	Complied
849	-13.3	-13.0	0.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA2000 S002

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-13.8	-13.0	0.8	Complied
849	-13.1	-13.0	0.1	Complied



5.2.10. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample ESN:	807FD690		

FCC Part:	2.1053 & 22.917
Industry Canada Reference:	RSS-132 4.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 22.917

Environmental Conditions:

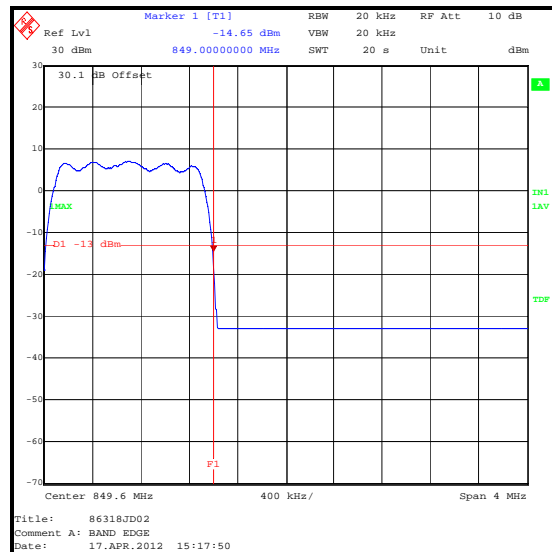
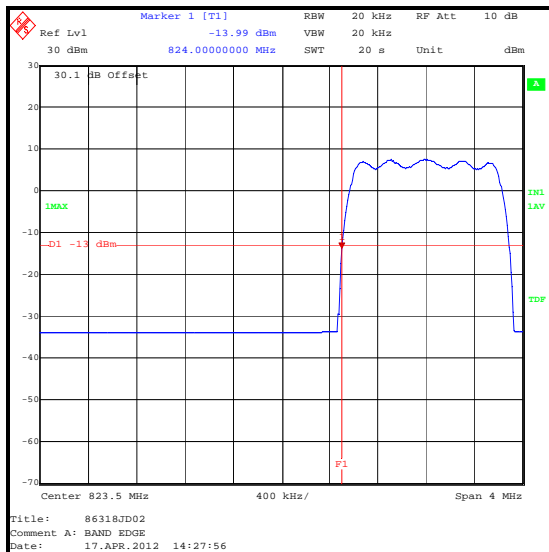
Temperature (°C):	23
Relative Humidity (%):	28

Results: CDMA2000 SO55

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.0	-13.0	1.0	Complied
849	-14.7	-13.0	1.7	Complied

Note(s):

- For the above measurements the EUT was fitted with an antenna with a gain of -1.67 dBi on the lowest channel, and -1.36 dBi on the top channel.



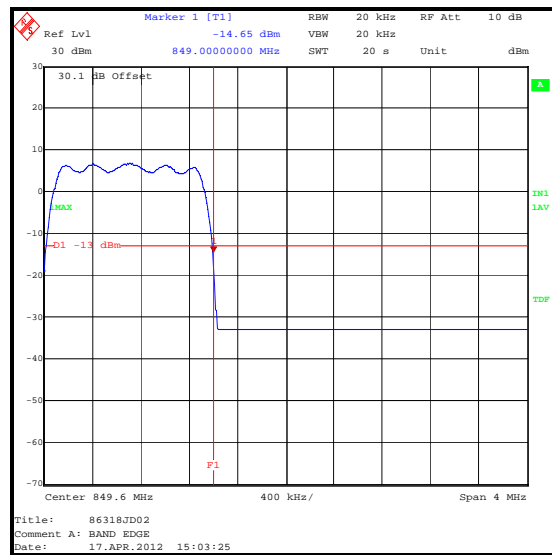
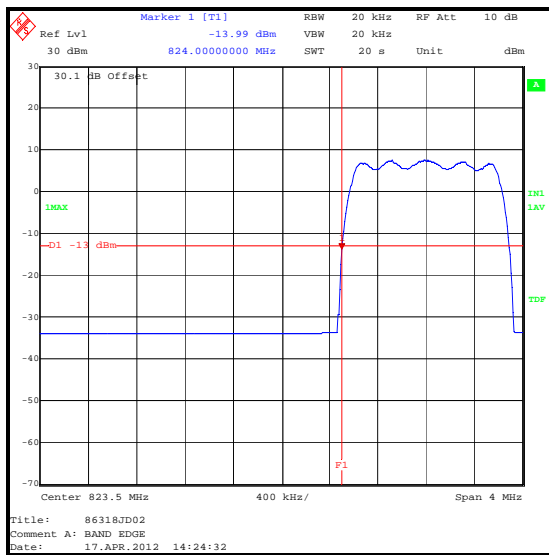
Transmitter Band Edge Radiated Emissions (continued)

Results: CDMA2000 S002

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.0	-13.0	1.0	Complied
849	-14.7	-13.0	1.7	Complied

Note(s):

- For the above measurements the EUT was fitted with an antenna with a gain of -1.67 dBi on the lowest channel, and -1.36 dBi on the top channel.



5.3. Test Results - Part 24 & RSS-133**5.3.1. Receiver/Idle Mode Radiated Spurious Emissions****Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample ESN:	807FD690		

FCC Part:	15.109
Industry Canada Reference:	RSS-Gen 4.10/6 RSS-133 4.6
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	29

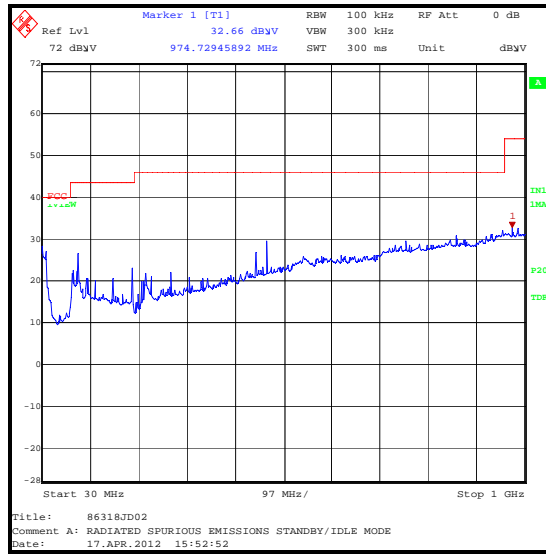
Results:

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
974.729	Vertical	32.7	54.0	21.3	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor therefore the highest noise floor level was recorded in the above table.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	04 April 2012
Test Sample ESN:	804777A6		

FCC Part:	15.109
Industry Canada Reference:	RSS-Gen 4.10/6 RSS-133 4.6
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 10 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	20

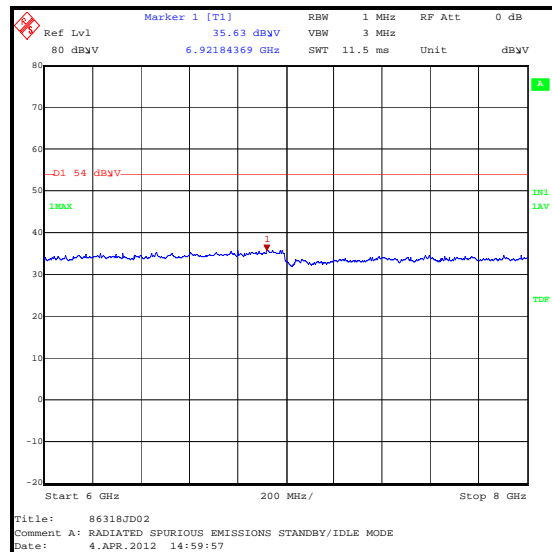
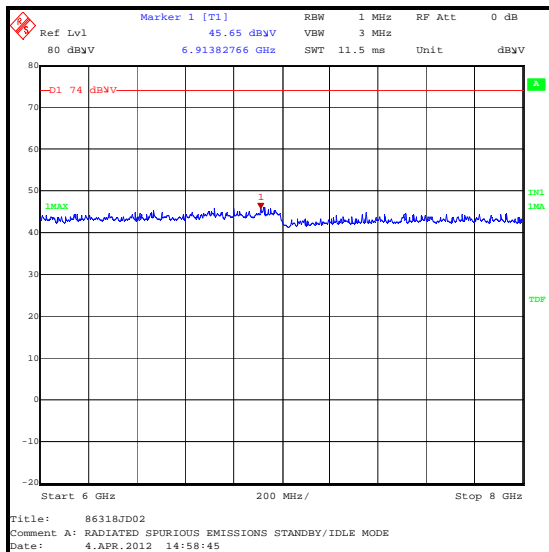
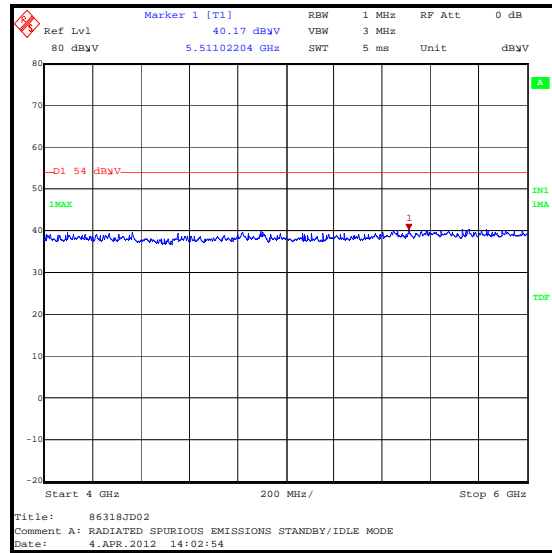
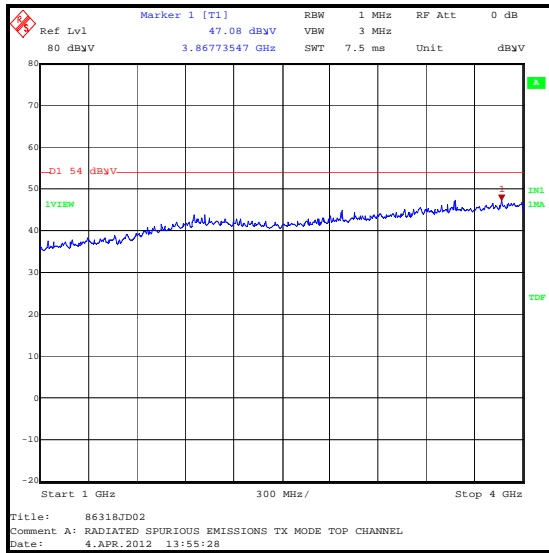
Results:

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
6921.843	Horizontal	35.6	54.0	18.4	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All spurious emissions were >20 dB below the limit or were below the noise floor of the measuring receiver and therefore the highest noise floor reading of the measuring receiver was recorded as shown in the table above.
3. For the plots below the peak level was compared to the average limit because this is the more onerous limit, with the exception of the 6 GHz to 8 GHz plot which compared the average level to the average limit (due to the highest noise floor).
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
5. The 1 GHz to 4 GHz plot below incorrectly states Tx mode. This is mislabelled and should state standby/idle mode.

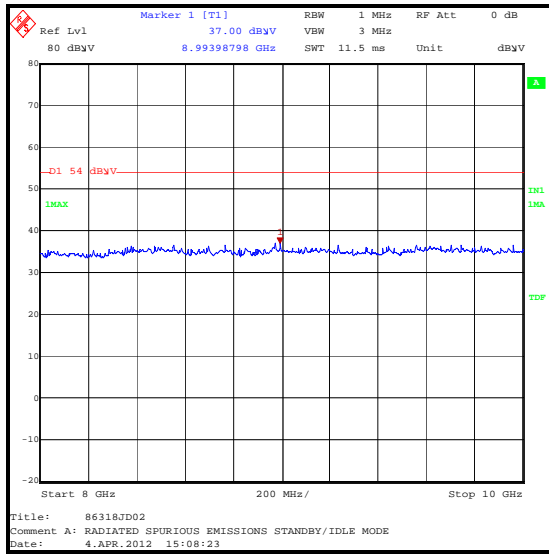
Receiver/Idle Mode Radiated Spurious Emissions (continued)



Peak Detector

Average Detector

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.3.2. Transmitter Output Power (Conducted)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 April 2012
Test Sample ESN:	807FD690		

FCC Part:	24.232
Industry Canada Reference:	RSS-133 6.4 SRSP-510 5.1.2
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	33

Results: CDMA2000 SO55

Channel	Frequency (MHz)	Conducted Power (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
Bottom	1851.25	22.8	33.0	10.2	Complied
Middle	1880.00	22.7	33.0	10.3	Complied
Top	1908.75	22.5	33.0	10.5	Complied

Results: CDMA2000 SO02

Channel	Frequency (MHz)	Conducted Power (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
Bottom	1851.25	22.9	33.0	10.1	Complied
Middle	1880.00	22.6	33.0	10.4	Complied
Top	1908.75	22.6	33.0	10.4	Complied

Note(s):

1. A wireless communications test set was used to establish a CDMA2000 link with the EUT.
2. The EUT was tested in two service options: SO55 and SO02
3. Conducted measurements were taken using the power measuring function of the communications test set.
4. The conducted power was compared with the EIRP limit.

5.3.3. Transmitter Frequency Stability (Temperature Variation)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 April 2012
Test Sample ESN:	807FD690		

FCC Part:	2.1055 & 24.235
Industry Canada Reference:	RSS-133 6.3 RSS Gen 4.7
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	27

Results: Middle Channel (1880.00 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	1879.999980	-20	0.0106	2.5	2.4894	Complied
-20	1879.999983	-17	0.0090	2.5	2.4910	Complied
-10	1879.999988	-12	0.0064	2.5	2.4936	Complied
0	1879.999986	-14	0.0074	2.5	2.4926	Complied
10	1879.999982	-18	0.0096	2.5	2.4904	Complied
20	1879.999987	-13	0.0069	2.5	2.4931	Complied
30	1879.999983	-17	0.0090	2.5	2.4910	Complied
40	1879.999982	-18	0.0096	2.5	2.4904	Complied
50	1879.999985	-15	0.0080	2.5	2.4920	Complied

Note(s):

1. Temperature was monitored throughout the test with a calibrated digital thermometer.
2. Frequency stability was measured using the frequency error function on the communications test set.

5.3.4. Transmitter Frequency Stability (Voltage Variation)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 April 2012
Test Sample ESN:	807FD690		

FCC Part:	2.1055 & 24.235
Industry Canada Reference:	RSS-133 6.3 RSS Gen 4.7
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	27

Results: Middle Channel (1880.00 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.3	1879.999986	-14	0.0074	2.5	2.4926	Complied
4.2	1879.999981	-19	0.0101	2.5	2.4899	Complied

Note(s):

1. Voltage was monitored throughout the test with a calibrated digital voltmeter.
2. Frequency stability was measured using the frequency error function on the communications test set.

5.3.5. Transmitter Occupied Bandwidth**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	03 April 2012
Test Sample ESN:	804777A6		

FCC Part:	2.1049
Industry Canada Reference:	RSS-Gen 4.6.1
Test Method Used:	As detailed in ANSI C63.4 Section 13.7 referencing FCC CFR Part 2.1049

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	26

Results: CDMA2000 SO55 (Voice)

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1851.25	1286.573
Middle	1880.00	1286.573
Top	1908.75	1286.573

Results: CDMA2000 SO02 Data

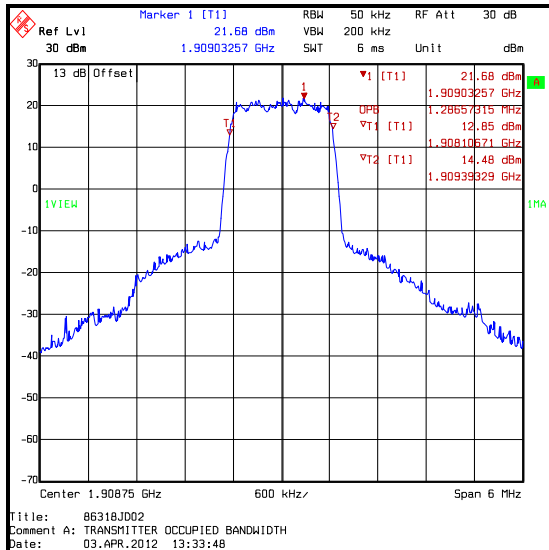
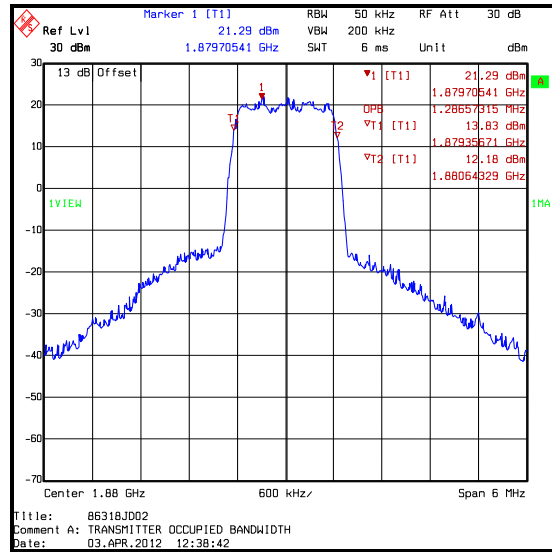
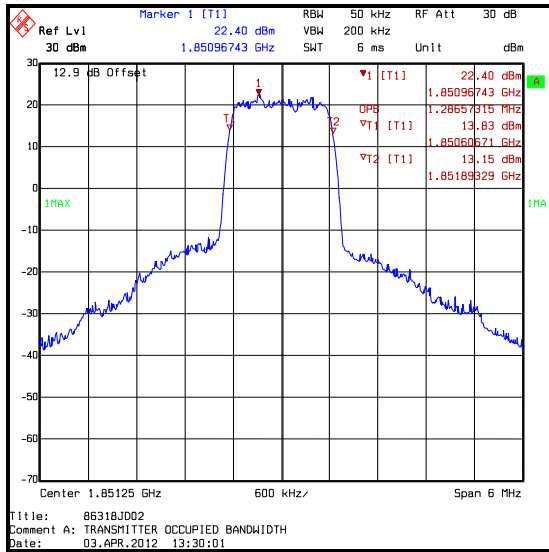
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1851.25	1310.621
Middle	1880.00	1310.621
Top	1908.75	1310.621

Note(s):

1. In lieu of the test method detailed in ANSI C63.4 Section 13.7, the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.
2. A wireless communications test set was used to establish a CDMA2000 link with the EUT.
3. The EUT was tested in two service options: SO55 and SO02.
4. A suitable power coupler was used to maintain a link between the communication test set and the EUT. The coupled port along with RF cables was calibrated and the resulting loss added as a reference offset to the measurements.

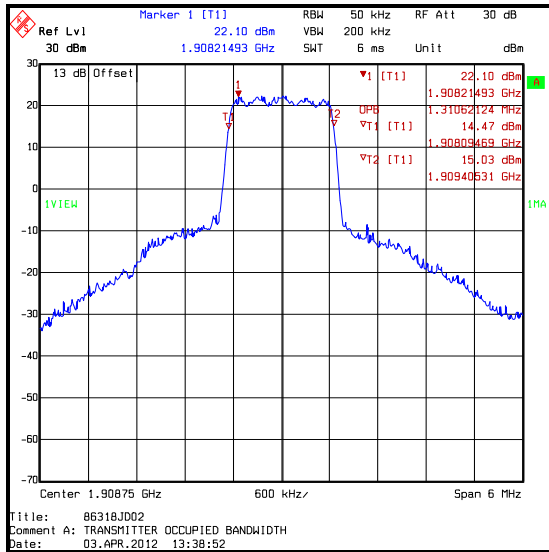
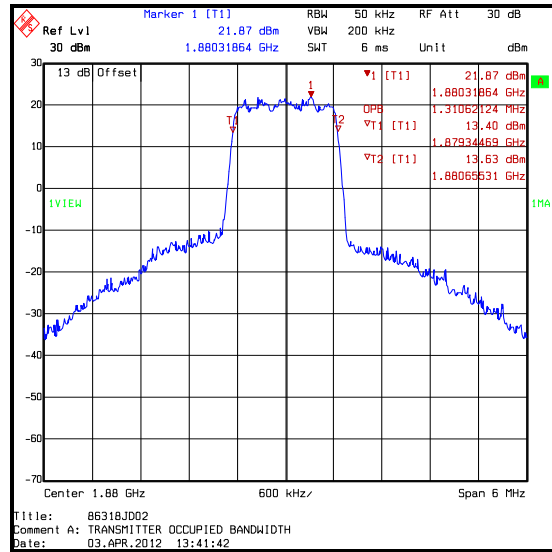
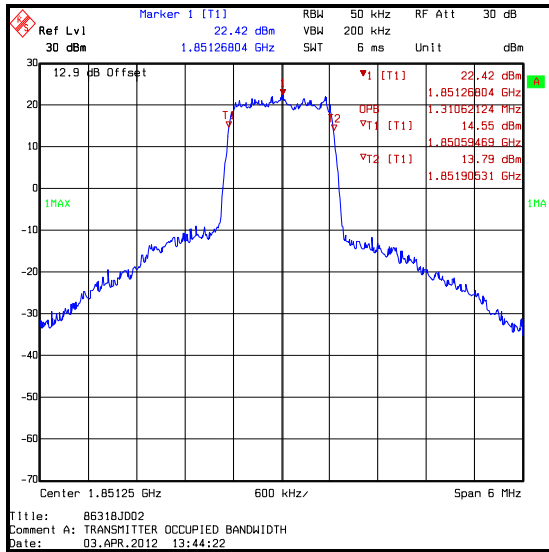
Transmitter Occupied Bandwidth (continued)

CDMA2000 SO55 (Voice)



Transmitter Occupied Bandwidth (continued)

CDMA2000 SO02 (Data)



5.3.6. Transmitter Conducted Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample IMEI:	807FD690		

FCC Part:	2.1051 & 24.238
Industry Canada Reference:	RSS-133 6.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 24.238
Frequency Range:	1 MHz to 20 GHz
Configuration:	CDMA2000 SO02

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	29

Results: Bottom Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3702.612	-29.6	-13.0	16.6	Complied

Results: Middle Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3760.449	-29.1	-13.0	16.1	Complied

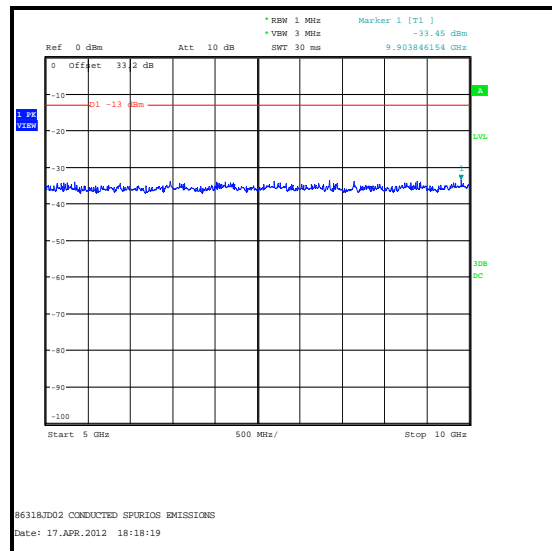
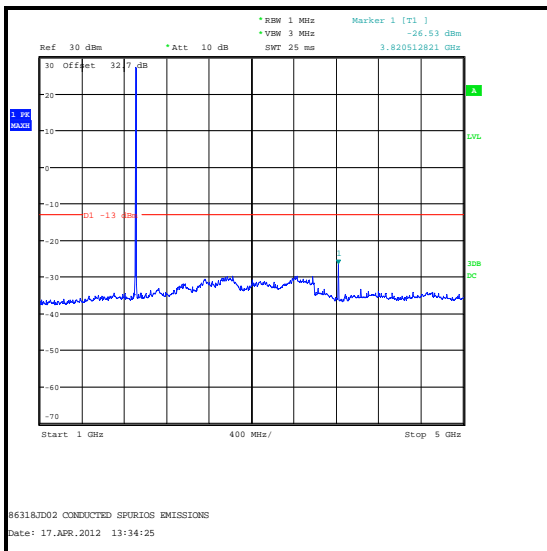
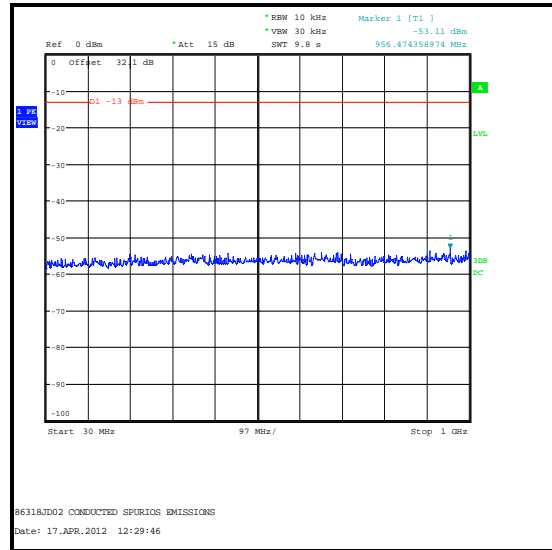
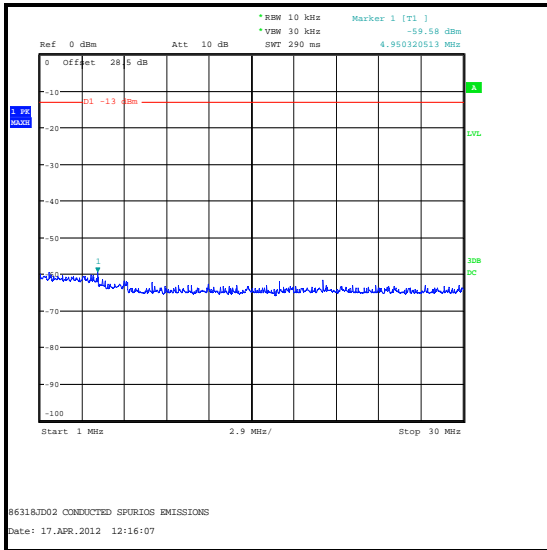
Results: Top Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3818.109	-28.0	-13.0	15.0	Complied

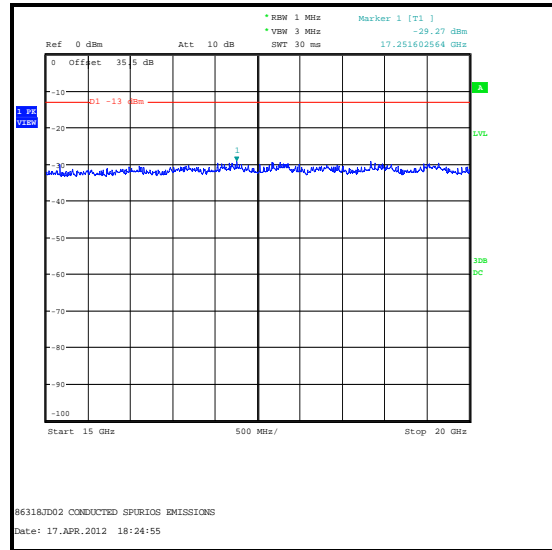
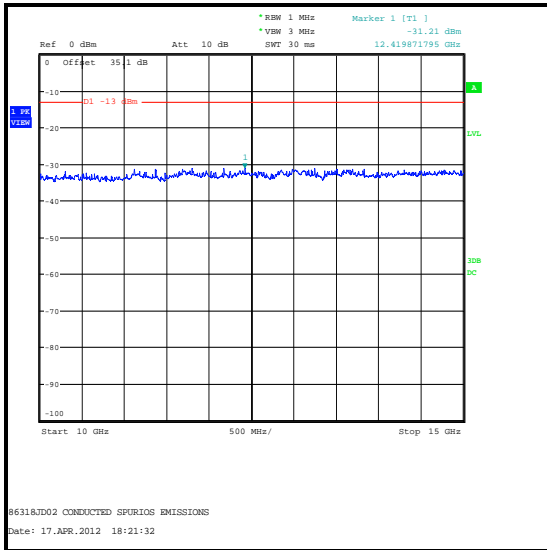
Note(s):

1. The emission at 1908.75 shown on the 1 GHz to 5 GHz plot is the EUT fundamental.

Transmitter Conducted Emissions (Continued)



Transmitter Conducted Emissions (Continued)



5.3.7. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	04 April 2012 & 17 April 2012
Test Sample ESN:	804777A6		

FCC Part:	2.1053 & 24.238
Industry Canada Reference:	RSS-133 6.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238
Frequency Range:	30 MHz to 20 GHz
Configuration:	CDMA2000 SO02

Environmental Conditions:

Temperature (°C):	24 & 23
Relative Humidity (%):	20 & 28

Results: Bottom Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3702.236	-34.1	-13.0	21.1	Complied
5554.982	-40.4	-13.0	27.4	Complied
7403.818	-29.4	-13.0	16.4	Complied
9257.789	-36.5	-13.0	23.5	Complied
11109.480	-37.3	-13.0	24.3	Complied

Results: Middle Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3759.899	-32.5	-13.0	19.5	Complied
5641.058	-38.8	-13.0	25.8	Complied
7519.802	-30.5	-13.0	17.5	Complied
9399.934	-35.2	-13.0	22.2	Complied
11279.857	-35.9	-13.0	22.9	Complied

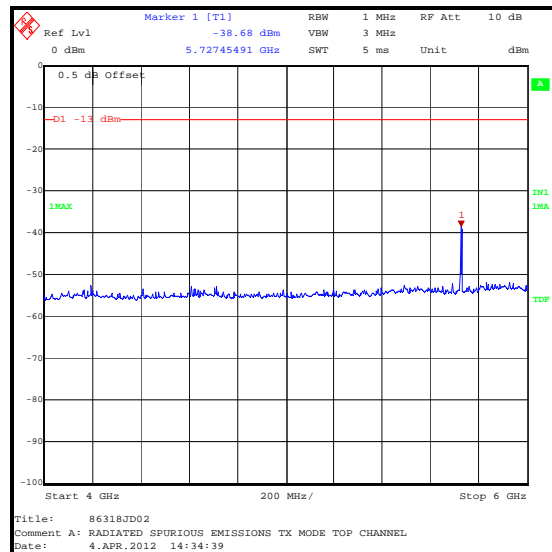
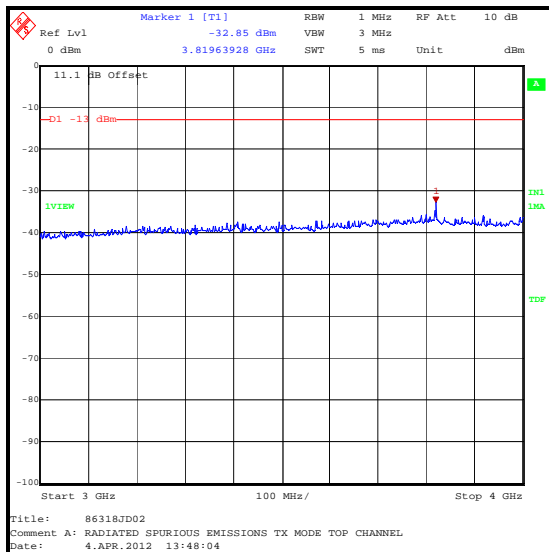
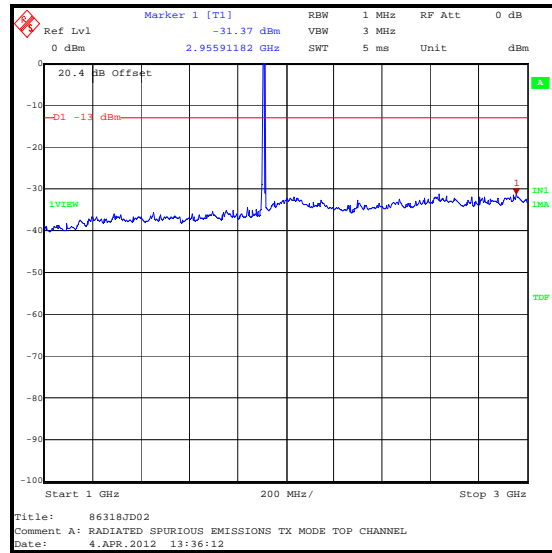
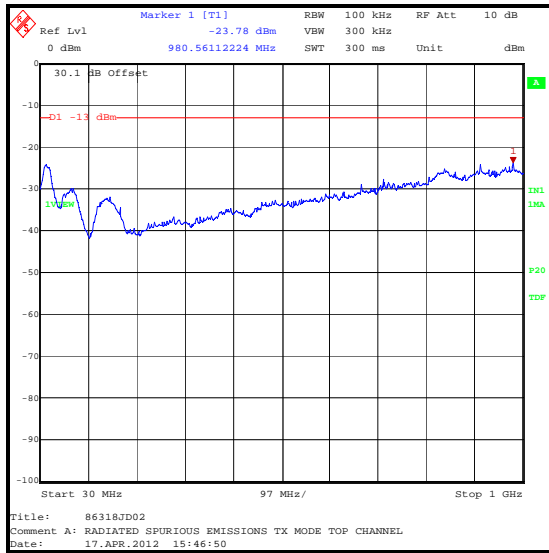
Transmitter Out of Band Radiated Emissions (continued)**Results: Top Channel**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3818.327	-31.0	-13.0	18.0	Complied
5726.201	-37.8	-13.0	24.8	Complied
7635.421	-28.1	-13.0	15.1	Complied
9543.513	-32.1	-13.0	19.1	Complied
11452.626	-31.9	-13.0	18.9	Complied

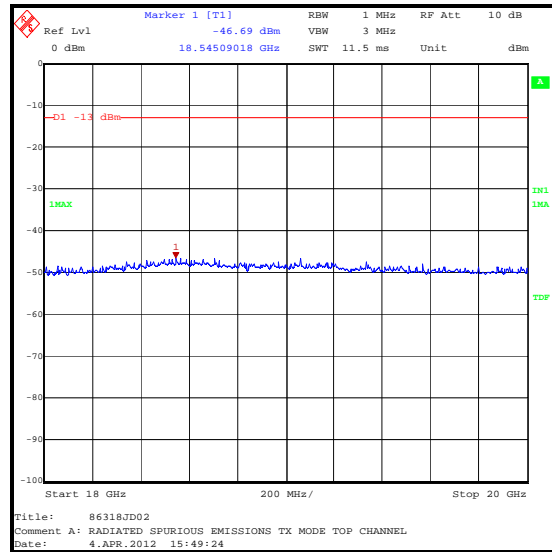
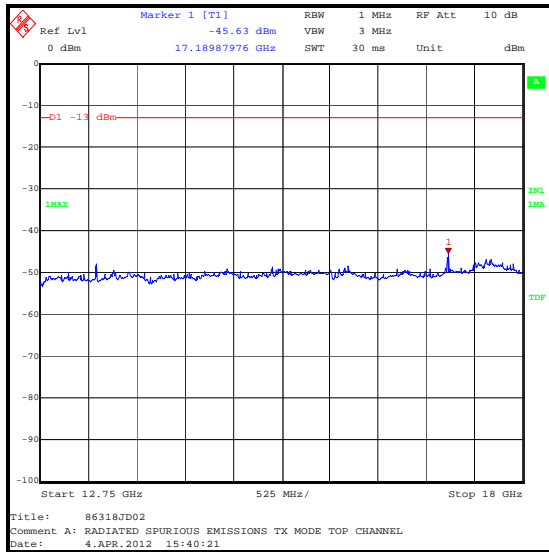
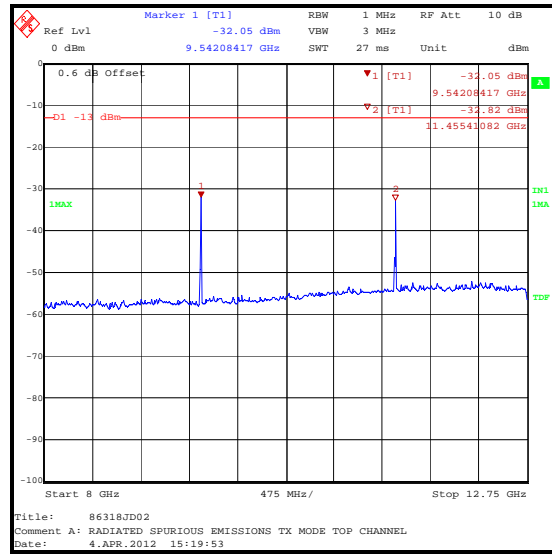
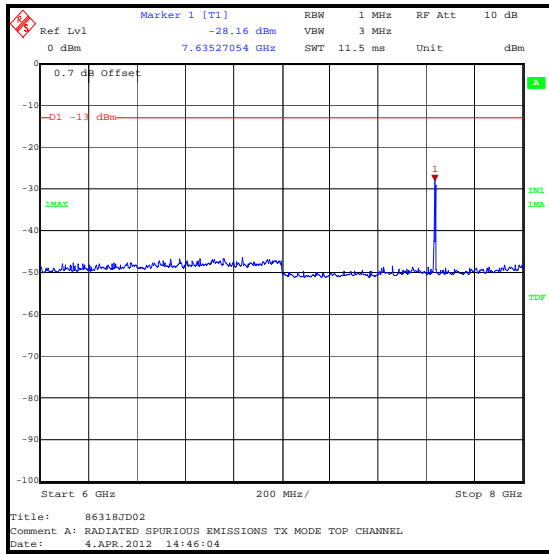
Note(s):

1. The uplink traffic channel is shown on the 1 GHz to 3 GHz plot.
2. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



5.3.8. Transmitter Band Edge Conducted Emissions

Test Summary:

Test Engineer:	Patrick Jones	Test Date:	17 April 2012
Test Sample ESN:	807FD690		

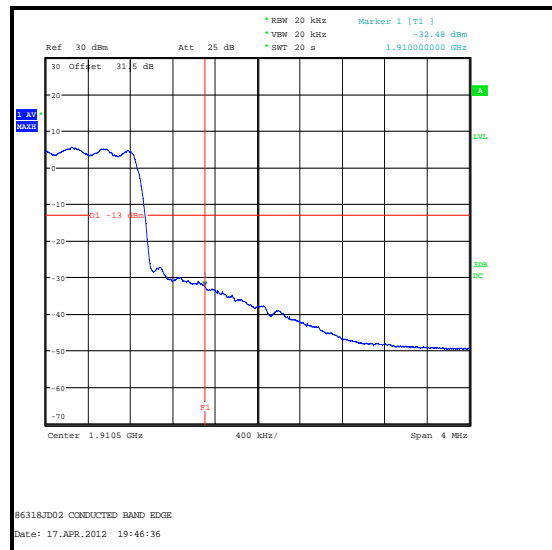
FCC Part:	2.1051 & 24.238
Industry Canada Reference:	RSS-133 6.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 24.238

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	28

Results: CDMA2000 SO55

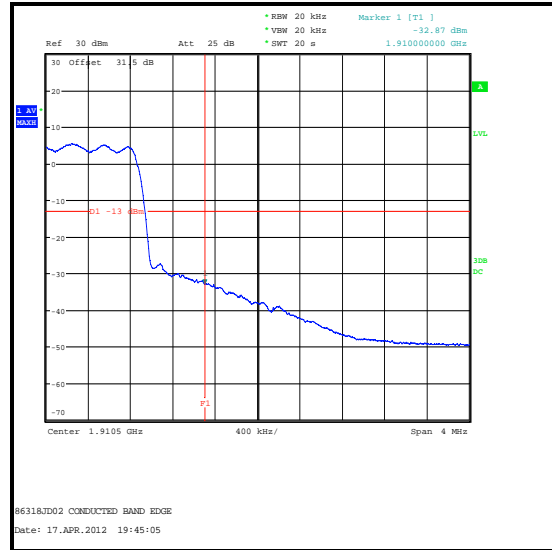
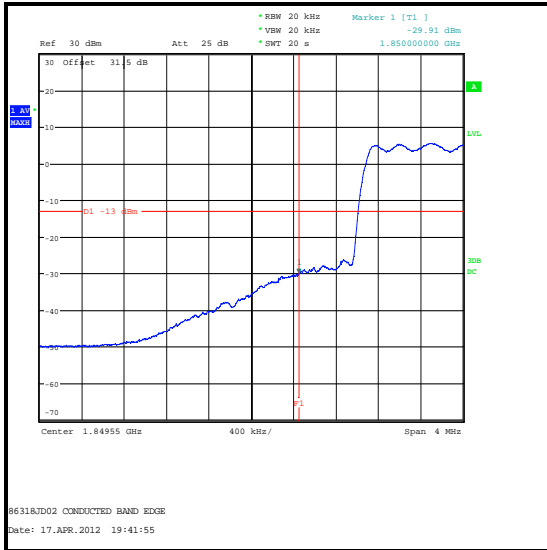
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-30.5	-13.0	17.5	Complied
1910	-32.5	-13.0	19.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA2000 S002

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-29.9	-13.0	16.9	Complied
1910	-32.9	-13.0	19.9	Complied



5.3.9. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Patrick Jones	Test Date:	04 April 2012
Test Sample ESN:	804777A6		

FCC Part:	2.1053 & 24.238
Industry Canada Reference:	RSS-133 6.5
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238

Environmental Conditions:

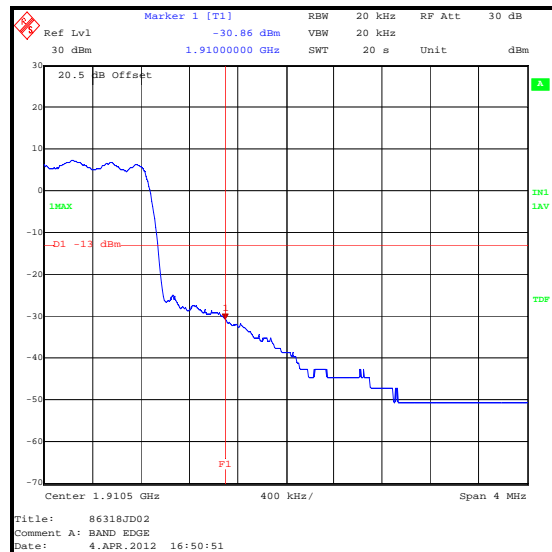
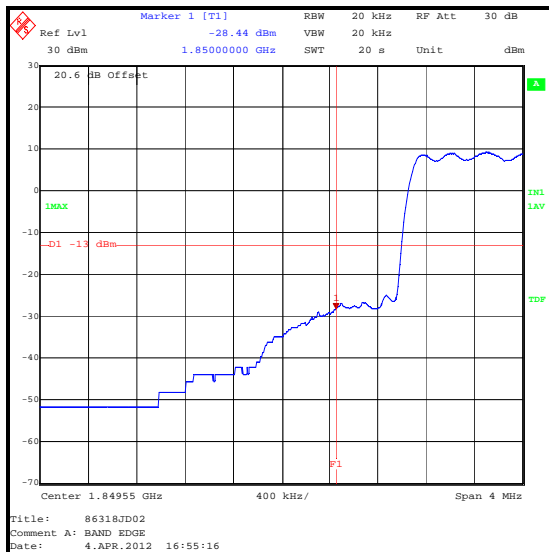
Temperature (°C):	24
Relative Humidity (%):	20

Results: CDMA2000 SO55

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-28.4	-13.0	15.4	Complied
1910	-30.9	-13.0	17.9	Complied

Note(s):

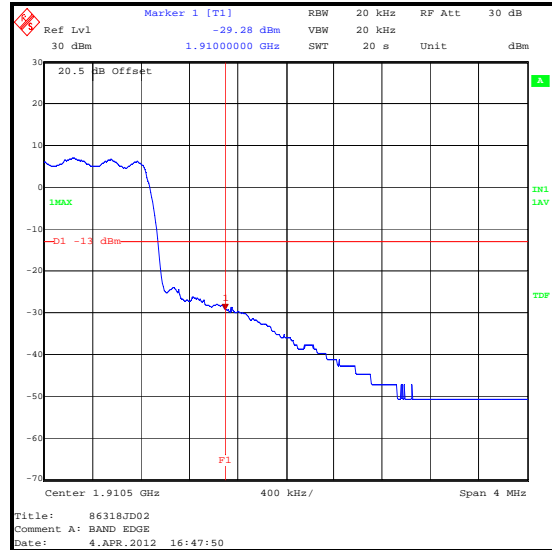
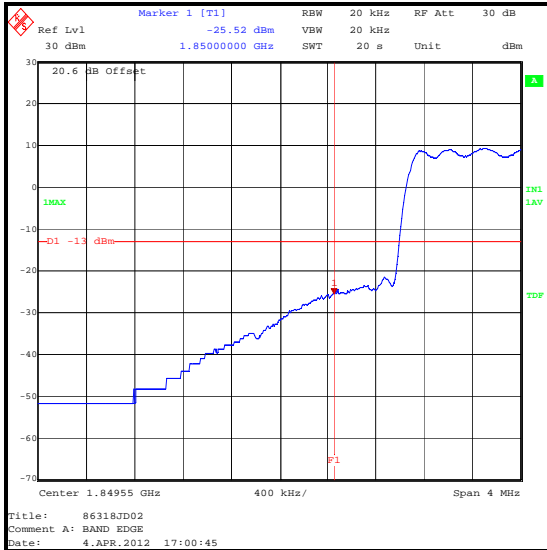
- For the above measurements the EUT was fitted with an antenna with a gain of -2.37 dBi on the lowest channel, and -2.04 dBi on the top channel.



Transmitter Band Edge Radiated Emissions (continued)

Results: CDMA2000 S002

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-25.5	-13.0	12.5	Complied
1910	-29.3	-13.0	16.3	Complied



6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Effective Radiated Power (ERP)	824 to 849 MHz	95%	±2.94 dB
Effective Isotropic Radiated Power (EIRP)	1850 to 1910 MHz	95%	±2.94 dB
Conducted Output Power	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.27 dB
Frequency Stability	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Occupied Bandwidth	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Conducted Spurious Emissions	1 MHz to 20 GHz	95%	±2.64 dB
Radiated Spurious Emissions	30 MHz to 20 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1537	Dual Directional Coupler	Hewlett Packard	778D	1144A05122	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A1974	High Pass Filter	AtlanTec RF	AFH-01000	090000283	15 Mar 2013	12
A1975	High Pass Filter	AtlanTec RF	AFH-03000	090424010	15 Mar 2013	12
A1981	High Pass Filter	AtlanTec RF	AFH-05000	09110200090	15 Mar 2013	12
A1996	10 dB Attenuator	Huber & Suhner	6810.17.B	301749	03 Apr 2013	12
A1998	20 dB Attenuator	Huber & Suhner	6820.17.B	07101	03 Apr 2013	12
A2001	30 dB Attenuator	Huber & Suhner	6830.17.B	07031	20 Mar 2013	12
A2056	10 dB Attenuator	Atlantic Microwave	WA-54-10-12	A2056	15 Jun 2012	12
A2072	Directional Coupler	Narda	4242B	03549	Calibrated before use	-
A253	Antenna	Flann	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann	18240-20	400	09 Oct 2012	12
A288	Antenna	Chase	CBL6111A	1589	19 Aug 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
G0543	Amplifier	Sonoma	310N	230801	13 Apr 2013	12
K0001	5 m RSE Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3 m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
L1058	Comms. Test Set	Rohde & Schwarz	CMU 200	111379	16 Mar 2013	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1251	Digital Multimeter	Fluke	175	89170179	29 Jul 2012	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	08 Nov 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Sep 2012	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	06 Feb 2013	12

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
M1643	Digital Thermometer	Fluke	52II	18890136	16 Mar 2013	12
A032	Antenna	EMCO	3115	2874	13 Mar 2013	36
A1299	Antenna	Schaffner	CBL6143	5094	25 Aug 2012	12
G017	Signal Generator	Rohde & Schwarz	SMH	863 771/023	13 Jun 2012	24
G085	Signal Generator	Hewlett Packard	83650L	3614A00104	09 Nov 2012	24

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All test equipment was within the current or previous calibration period on the date of testing.