EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 2, 22 and 24
&
Industry Canada (IC), RSS-GEN, 132 and 133

A division of Research In Motion Limited

REPORT NO.: RTS-6012-1211-38

PRODUCT MODEL NO.:	RFH121LW
TYPE NAME:	BlackBerry® smartphone
FCC ID:	L6ARFH120LW
IC:	2503A-RFH120LW
EMISSION DESIGNATOR (GSM):	246KGXW
EMISSION DESIGNATOR (EDGE):	245KG7W
EMISSION DESIGNATOR (WCDMA):	4M15F9W

DATE: November 29, 2012

RTS is accredited
according to
EN ISO/IEC 17025 by:

592

Statement of Performance:

The BlackBerry® smartphone, model RFH121LW, part number CER-52836-001 Rev 3 and accessories when configured and operated per RIM's operation instructions, and performs within the requirements of the test standards.

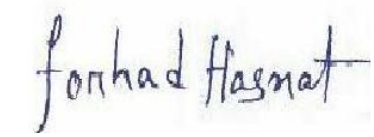
Declaration:

We hereby certify that:
The test data reported herein is an accurate record of the performance of the sample(s) tested.
The test results are valid for the tested unit (s) only.
The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Documented by:

Heng. Lin
Regulatory Compliance Specialist

Reviewed by:



Forhad Hasnat
Regulatory Compliance Specialist

Reviewed and Approved by:

Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance

Table of Contents

A. Scope

This report details the results of compliance tests which were performed in accordance to the requirements of:

- FCC CFR 47 Part 2, Oct, 2011.
- FCC CFR 47 Part 22, Subpart H, Cellular Radiotelephone Services, Oct., 2011.
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct., 2011.
- Industry Canada, RSS-132 Issue 2, September 2005, Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz.
- Industry Canada, RSS-133 Issue 5, February 2009, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 3, December 2010, General Requirements and Information for the Certification of Radio communication Equipment.

B. Associated Documents

1. RFH121LW_HW_Declaration_CER-52836-001_Rev2
2. RFH121LW_HW_Declaration_CER-52836-001_Rev3
3. MultiSourceDeclaration_RFH121LW_b1998-10.0.09.380
4. MultiSourceDeclaration_RFH121LW_10.0.9.299
5. MultiSourceDeclaration_RFH121LW_10.0.9.785
6. MultiSourceDeclaration_RFH121LW_10.0.9.1107

C. Product Identification

Manufactured by Research In Motion Limited whose headquarters is located at:
295 Phillip Street
Waterloo, Ontario
Canada, N2L 3W8
Phone: 519 888 7465
Fax: 519 888 6906

The equipment under test (EUT) was tested at the following locations:

RIM Testing Services EMI test facilities

305 Phillip Street	440 Phillip Street
Waterloo, Ontario	Waterloo, Ontario,
Canada, N2L 3W8	Canada , N2L 5R9
Phone: 519 888 7465	Phone: 519 888 7465
Fax: 519 888 6906	Fax: 519 888 6906

The testing was performed from September 14 – November 29, 2012.

BlackBerry® smartphone Samples Tested

Sample	Model	CER NUMBER	PIN	Software Information
1A	RFH121LW	CER-52836-001 Rev1	2A781880	OS: 127.0.1.1998
1B	RFH121LW	CER-52836-001 Rev1	2A781880	OS: 10.0.9.299
1C	RFH121LW	CER-52836-001 Rev1	2A781880	OS: 10.0.9.380
2	RFH121LW	CER-52836-001 Rev1	2A76E9A6	OS: 10.0.9.229
3	RFH121LW	CER-52836-001 Rev1	2A76E98C	OS: 10.0.9.229
4	RFH121LW	CER-52836-001 Rev2	25B217A7	OS: 10.0.9.785
5	RFH121LW	CER-52836-001 Rev1	2A76E9A2	OS: 10.0.9.380
6	RFH121LW	CER-52836-001 Rev2	257B184C	OS: 10.0.9.785
7	RFH121LW	CER-52836-001 Rev3	25B217AC	OS: 10.0.9.1107
8	RFH121LW	CER-52836-001 Rev3	25B217AF	OS: 10.0.9.1107

RF Conducted Emissions testing was performed on samples 1A, 1B, 1C, 2 and 7.
RF Radiated Emissions testing was performed on samples 3, 4, 5, 6 and 8.

Only the characteristics that may have been affected by the changes from RFH121LW Rev1 to RFH121LW Rev3 were re-tested.
For more details, refer to RFH121LW_HW_Declaration_CER-52836-001_Rev2 and RFH121LW_HW_Declaration_CER-52836-001_Rev3.

To view the differences between OS: 10.0.9.299 and OS: 10.0.9.785 see documents MultiSourceDeclaration_RFH121LW_b1998-10.0.09.380, MultiSourceDeclaration_RFH121LW_10.0.9.299, MultiSourceDeclaration_RFH121LW_10.0.9.785 and MultiSourceDeclaration_RFH121LW_10.0.9.1107

BlackBerry® smartphone Accessories Tested

1) Bat. LS1, part number BAT-47277-001.

D. Support Equipment Used for the Testing of the EUT

No support equipment required; for list of equipment refer to section G, Compliance Test Equipment Used.

E. Test Results Chart

SPECIFICATION		TEST TYPE	RESULT	TEST DATA APPENDIX
FCC CFR 47	IC			
Part 2.1051 Part 22.917 Part 24.238	RSS-Gen, 4.9 RSS-132, 4.5 RSS-133, 6.5	GSM850 / PCS1900 Conducted Spurious Emissions	Pass	1A
Part 2.1049 Part 22.917 Part 24.238	RSS-GEN, 4.6	GSM 850 / PCS1900 Occupied Bandwidth and Channel Mask	Pass	1A
Part 2.1046(a)	RSS-132, 4.4 RSS-133, 6.4	GSM850 / PCS1900 Conducted RF Output Power	Pass	1B
Part 2.1055 Part 24.235	RSS-132, 4.3 RSS-133, 6.3	GSM 850 /PCS 1900 Frequency Stability vs. Temperature and Voltage	Pass	1C
Part 22.913(a)(2) Part 24.232(c)	RSS-132, 4.4 RSS-133, 6.4	GSM850 ERP PCS1900 EIRP	Pass	1D
Part 2.1053 Part 22.917 Part 24.238	RSS-Gen, 4.9 RSS-132, 4.5 RSS-133, 6.5	GSM850 / PCS1900 Radiated Spurious/Harmonic Emissions	Pass	1D
Part 2.1051 Part 22.917	RSS-Gen, 4.9 RSS-132, 4.5	WCDMA Band 5 Conducted Spurious Emissions	Pass	2A
Part 2.1049 Part 22.917	RSS-GEN, 4.6	WCDMA Band 5 Occupied Bandwidth and Channel Mask	Pass	2A
Part 2.1046(a)	RSS-132, 4.4	WCDMA Band 5 Conducted RF Output Power	Pass	2B
Part 2.1055	RSS-132, 4.3	WCDMA Band 5 Frequency Stability vs. Temperature and Voltage	Pass	2C
Part 22.913(a)(2)	RSS-132, 4.4	WCDMA Band 5 ERP WCDMA	Pass	2D
Part 2.1053 Part 22.917	RSS-Gen, 4.9 RSS-132, 4.5	WCDMA Band 5 Radiated Spurious/Harmonic Emissions	Pass	2D

F. Summary of Results

1) Conducted Emission Measurements

- The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the GSM850 as per 47 CFR 2.1051, CFR 22.917, and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 10 GHz.
See APPENDIX 1A for test data.

The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the PCS1900 as per 47 CFR 2.1051, CFR 24.238(a) and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 20 GHz.
See APPENDIX 1A for test data

- The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the GSM850 as per 47 CFR 2.1049, CFR 22.917 and RSS-GEN, 4.6. The EUT was measured in CALL and EDGE mode on the low, middle and high channels. The worst case occupied bandwidth was 246.0 kHz on the mid channel in CALL mode, and 245.0 kHz on the low and mid channels in EDGE mode.
See APPENDIX 1A for test data.

The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the PCS1900 as per 47 CFR 2.1049, CFR 24.238 and RSS-GEN, 4.6. The EUT was measured in CALL and EDGE mode on the low, middle and high channels. The worst case occupied bandwidth was 242.0 kHz on the low and high channels in CALL mode, and 243.0 kHz on the mid and high channels in EDGE mode.
See APPENDIX 1A for test data.

- The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the GSM850 as per 47 CFR 2.1046, and RSS-132, 4.4. The EUT was measured on the low, middle and high channels.
See APPENDIX1B for test data.

The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the PCS1900 as per 47 CFR 2.1046, and RSS-132, 6.4. The EUT was measured on the low, middle and high channels.
See APPENDIX 1B for test data

The BlackBerry® smartphone met the requirements of the Frequency Stability in the GSM850 as per 47 CFR 2.1055 and RSS-132, 4.3. The EUT was measured in GSM850 mode on the low, middle and high channels.
See APPENDIX 1C for test data.

The BlackBerry® smartphone met the requirements of the Frequency Stability in the PCS1900 as per 47 CFR 2.1055 and RSS-133, 6.3. The EUT was measured in PCS1900 mode on the low, middle and high channels.
See APPENDIX1C for test data.

- The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the WCDMA Band 5 as per 47 CFR 2.1051, CFR 22.917 and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 10 GHz.
See APPENDIX 2A for test data.

- The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the WCDMA Band 5 as per 47 CFR 2.1049, CFR 22.917 and RSS-GEN, 4.6. The EUT was measured in Voice and HSUPA mode on the low, middle and high channels. The worst case occupied bandwidth was 4.142 MHz on the low and high channels in Voice mode, and 4.150 MHz on the mid channel in HSUPA mode.
See APPENDIX 2A for test data.

- The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the WCDMA Band 5 as per 47 CFR 2.1046, and RSS-132, 4.4. The EUT was measured on the low, middle and high channels.
See APPENDIX 2B for test data.

- The BlackBerry® smartphone met the requirements of the Frequency Stability in the WCDMA Band 5 as per 47 CFR 2.1055 and RSS-132, 4.3. The EUT was measured in WCDMA Band 5 mode on the low, middle and high channels.
See APPENDIX 2C for test data.

2) Radiated Emission Measurements

The radiated spurious emissions/harmonics and ERP/EIRP were measured. The emissions were maximized by elevating the antenna in the range of 1 to 4 meters. The signal generator output was then adjusted to match the BlackBerry® smartphone output reading. The signal generator output was recorded. Both the horizontal and vertical polarizations of the emissions were measured.

The following measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a Semi-anechoic Chamber ((SAC) with floor absorber) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The SAC with floor absorber's FCC registration number is **959115** and the IC file number is **2503C-1**. The BlackBerry® smartphone was measured on the low, middle and high channels.

a) The radiated spurious emissions/harmonics and ERP/EIRP were measured for GSM 850 and PCS 1900. The results are within the limits.

- The highest ERP in the 850 band Call mode measured was 33.13 dBm (2.06 W) at 824.20 MHz (channel 128)

- The highest ERP in the 850 band EDGE mode measured was 28.69 dBm (0.74 W) at 824.20 MHz (channel 128).

- The highest EIRP in the PCS band Call mode measured was 32.65 dBm (1.30 W) at 1909.80 MHz (channel 810).

- The highest EIRP in the PCS band EDGE mode measured was 31.35 dBm (1.14 W) at 1909.80 MHz (channel 810).

The radiated spurious emission and carrier harmonics were measured up to the 10^{th} harmonic for low, middle, and high channels in the GSM 850 and PCS 1900. Each band was measured in CALL and EDGE modes, with both the horizontal and vertical polarizations.

- The worst margin was 18.8dB below the limit at 1673.092MHz in the GSM850 band in CALL mode.

- The worst margin was 24.0dB below the limit at 3819.984MHz in the PCS1900 band in call mode.

See Appendix 1D for test data.

b) The radiated spurious emissions/harmonics and ERP/EIRP were measured for WCDMA Band 5.

The highest ERP in the WCDMA Band 5, Call Service mode was 20.76 dBm (0.12 W) at 826.40 MHz (channel 4132).

The highest ERP in the WCDMA Band 5, HSUPA mode was 20.14 dBm (0.1 W) at 836.40 MHz (channel 4182).

The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the WCDMA Band 5. Each band was measured in Call, and HSUPA modes. Both the horizontal and vertical polarizations were measured.

- All emissions were greater than 25 dB below the accepted limits for all test frequencies.

See Appendix 2D for test data.

3) Co-Location Radiated Measurements

The radiated emissions were measured up to 18 GHz for middle channels for simultaneous transmission in the following test configuration combinations:

- GSM 850 + Bluetooth(DH5) + 802.11b + NFC
- PCS 1900 + BLE + 802.11g
- WCDMA B5 + Bluetooth(DH5) + 802.11a

Both the horizontal and vertical polarizations were measured. The emissions due to different simultaneous transmission did not increase the amplitude of any emissions nor did it produce any new inter-modulation products as a result of mixing.

Sample Calculation:

Corrected Signal level (CSL) is calculated as follows:
CSL (dBm) = Measured Level (dBµV) – Antenna Gain (dBi) + Free Space loss (dB) – 107(dB) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB) -2.15(dB)

Measurement Uncertainty ±4.5 dB

G. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	13-10-17	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	13-10-17	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	13-09-01	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	13-09-01	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017301	13-08-23	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	13-03-15	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030201	14-09-22	Radiated Emissions
Horn Antenna	Emco	3117	47563	14-08-04	Radiated Emissions
Horn Antenna	ETS	3116	2538	14-09-24	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	14-06-03	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	12-11-30	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	13-11-24	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	109747	13-11-18	RF Conducted Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	12-12-08	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESU-40	100162	12-12-07	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	13-10-05	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	13-09-27	RF Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0380561	13-10-20	Radiated Emissions

Compliance Test Equipment Used cont'd

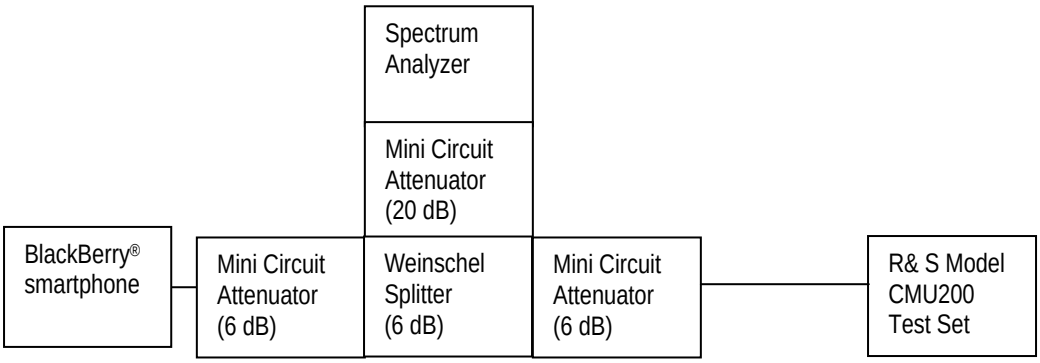
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Environment Monitor	Omega	iTHX-SD	0340060	13-10-20	RF Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0380567	13-10-20	Radiated Emissions
Signal Generator	Rohde & Schwarz	SMA100A	101540	13-12-03	Radiated Emissions
Signal Generator	Rohde & Schwarz	SMA100A	102106	13-12-02	Radiated Emissions
Spectrum Analyzer	Rohde & Schwarz	FSV	101820	12-12-06	RF Conducted Emissions
Spectrum Analyzer	Rohde & Schwarz	FSP	100884	12-12-03	RF Conducted Emissions

APPENDIX 1A – GSM CONDUCTED RF EMISSIONS TEST DATA/PLOTS

GSM Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, –26 dBc bandwidth, 99% power bandwidth and the channel mask on BlackBerry® smartphone.

Test Setup Diagram



Date of Test: September 25, 2012

The environmental test conditions were:

Temperature: 24.9 ºC
Relative Humidity: 27.4 %

The following measurements were performed by Berkin Can.

GSM Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 22.917, CFR 24.238 and RSS-132 4.5 and RSS-133, 6.5 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.
See figures 1-1a to 1-12a for the plots of the conducted spurious emissions.

–26 dBc Bandwidth and Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth.
The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.
The worst case –26dBc bandwidth for the GSM850 band was measured to be 282 kHz, and for the PCS1900 band was measured to be 274 kHz as shown below. Results were derived in a 3.0 kHz resolution bandwidth.
On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

Test Data for GSM850 band and PCS1900 band in Call mode

GSM850 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
824.2	269	243
837.6	274	246
848.8	282	244

PCS1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	274	242
1880.0	269	240
1909.8	265	242

Measurement Plots for 850 and 1900 bands in Call mode

See Figures 1-1a to 1-12a for the plots of the conducted spurious emissions.
See Figures 1-13a to 1-24a for the plots of 26dBc/99% Occupied Bandwidth.
See Figures 1-25a to 1-28a for the plots of the Channel mask.

GSM Conducted RF Emission Test Data cont'd

Test Data for GSM850 and PCS1900 bands in EDGE mode

GSM850 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
824.2	245
837.6	245
848.8	243

PCS1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	242
1880.0	243
1909.8	243

Measurement Plots for GSM850 and PCS1900 bands in EDGE mode

See Figures 1-29a to 1-34a for the plots of the 99% Occupied Bandwidth EDGE results.
See Figures 1-35a to 1-38a for the plots of channel mask EDGE results.
See Figures 1-39a to 1-50a for the plots of the conducted spurious emissions EDGE results

GSM Conducted RF Emission Test Data cont'd

Figure 1-1a: GSM850 band, Spurious Conducted Emissions, Low channel

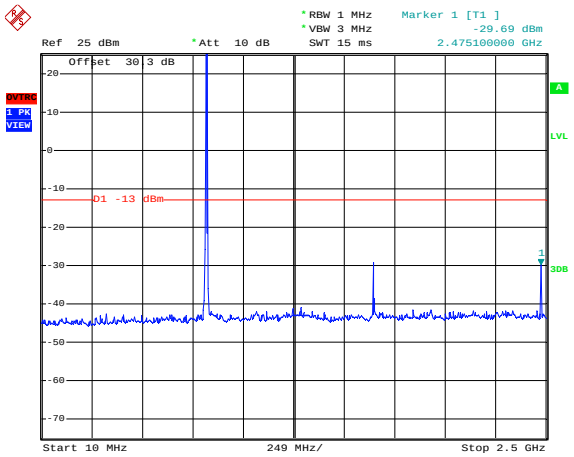


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Figure 1-2a: GSM850 band, Spurious Conducted Emissions, Low channel

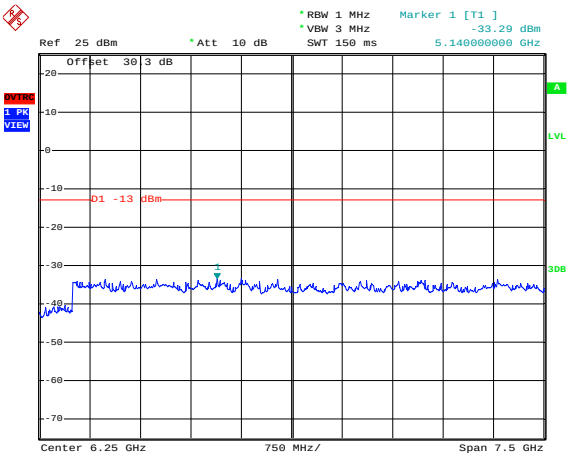

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Figure 1-3a: GSM850 band, Spurious Conducted Emissions, Middle Channel

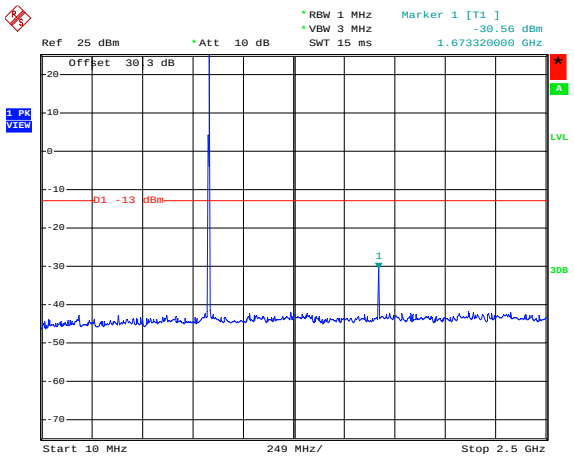

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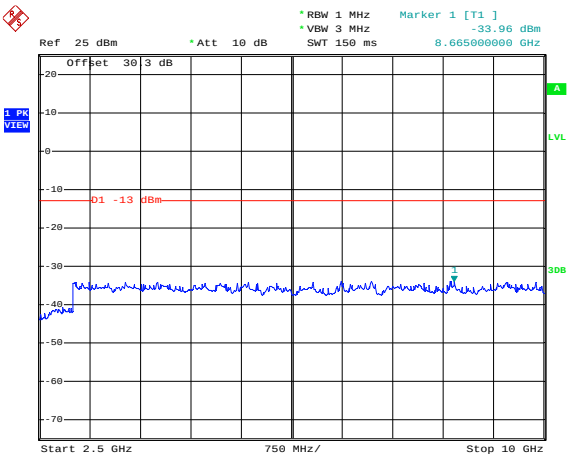
Figure 1-4a: GSM850 band, Spurious Conducted Emissions, Middle Channel



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GSM Conducted RF Emission Test Data cont'd

Figure 1-5a: GSM850 band, Spurious Conducted Emissions, High Channel

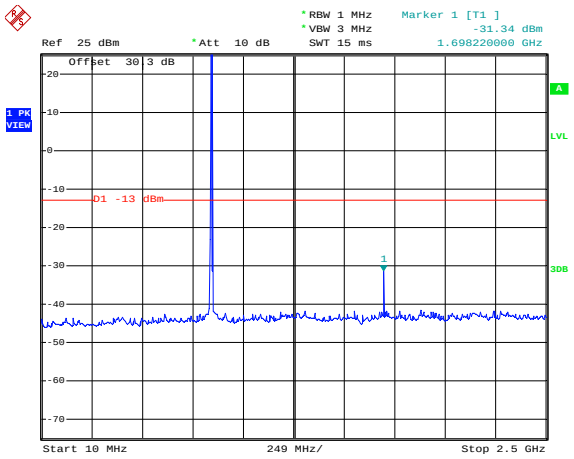

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Figure 1-6a: GSM850 band, Spurious Conducted Emissions, High Channel

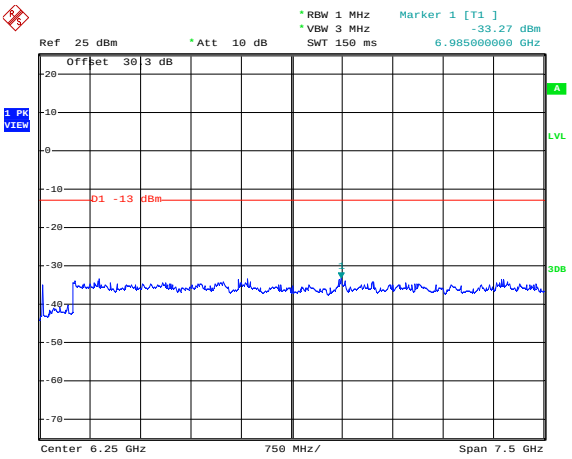

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Figure 1-7a: PCS1900 band, Spurious Conducted Emissions, Low Channel

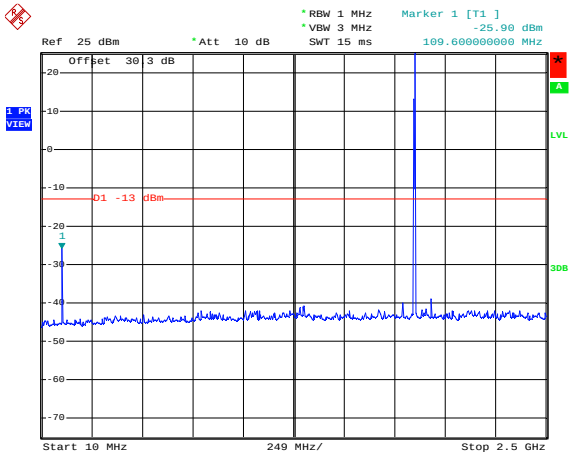

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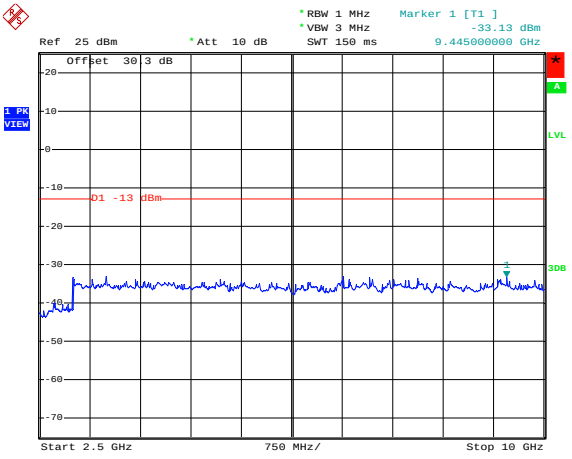
Figure 1-8a: PCS1900 band, Spurious Conducted Emissions, Low Channel



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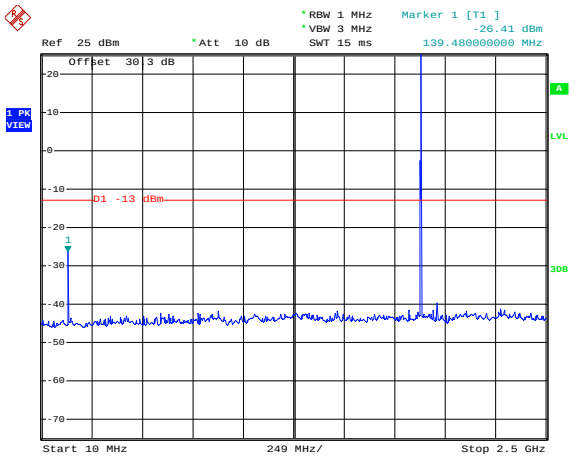
GSM Conducted RF Emission Test Data cont'd

Figure 1-9a: PCS1900 band, Spurious Conducted Emissions, Middle Channel



Date: 26.SEP.2012 11:48:18

Figure 1-10a: PCS1900 band, Spurious Conducted Emissions, Middle Channel

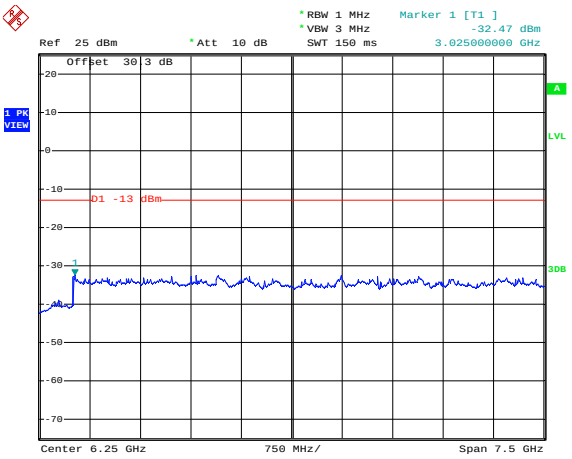


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Figure 1-11a: PCS1900 band, Spurious Conducted Emissions, High Channel

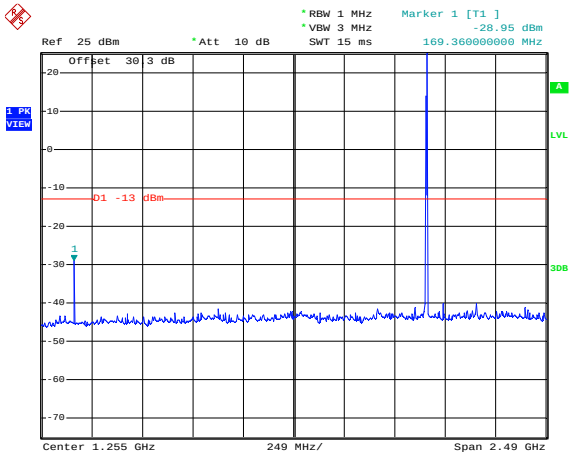

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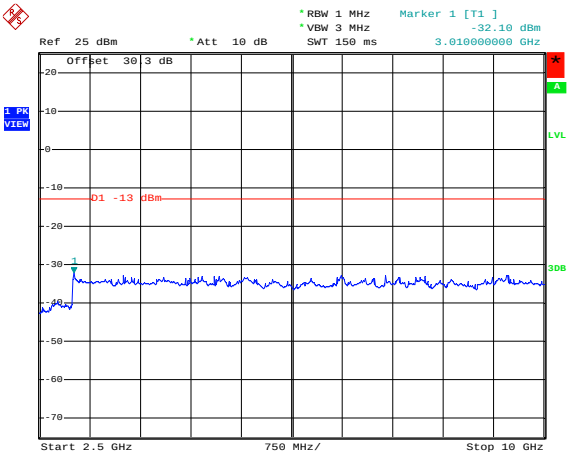
Figure 1-12a: PCS1900 band, Spurious Conducted Emissions, High Channel



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GSM Conducted RF Emission Test Data cont'd

Figure 1-13a: -26dBc bandwidth, GSM850 band Low Channel in GSM mode

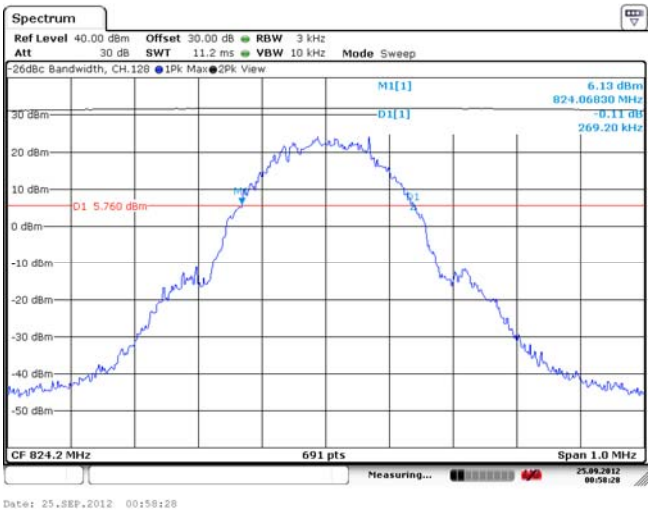


Figure 1-14a: Occupied Bandwidth, GSM850 band Low Channel in GSM mode

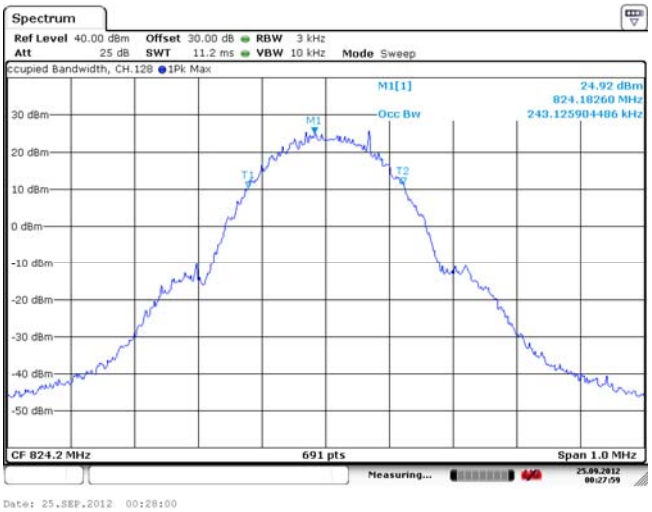


Figure 1-15a: -26dBc bandwidth, GSM850 band Middle Channel in GSM mode

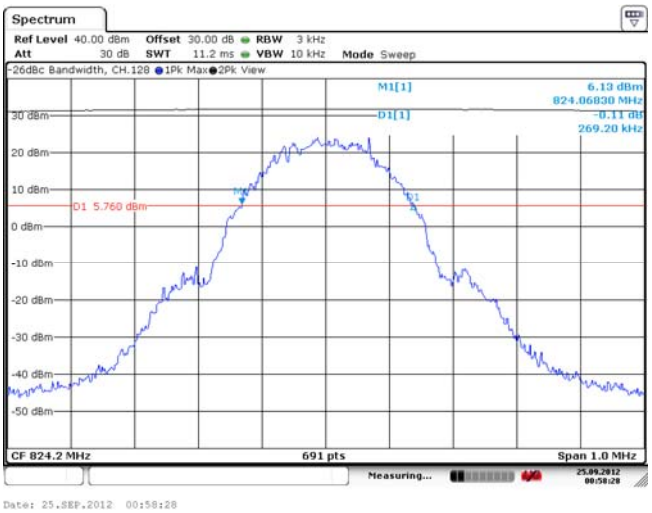
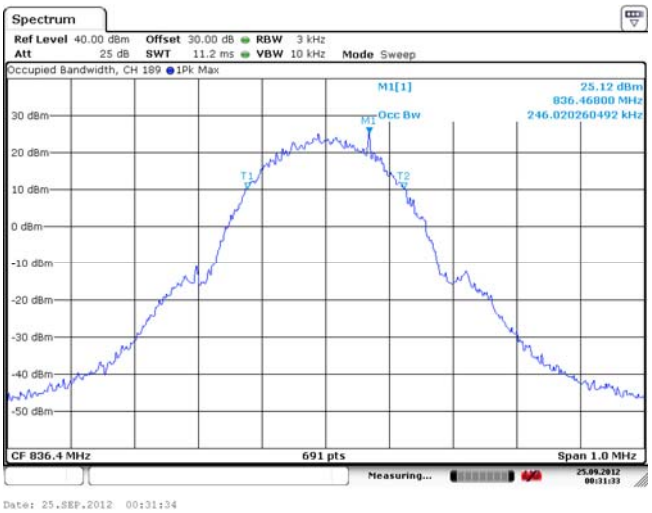


Figure 1-16a: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-17a: -26dBc bandwidth, GSM850 band High Channel in GSM mode

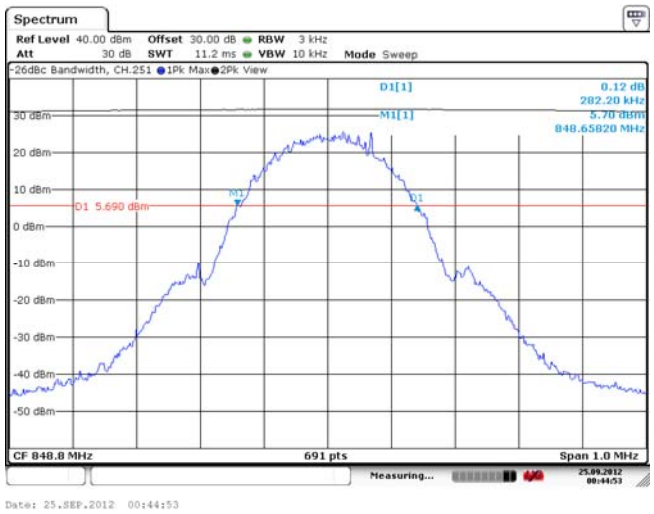


Figure 1-18a: Occupied Bandwidth, GSM850 band High Channel in GSM mode

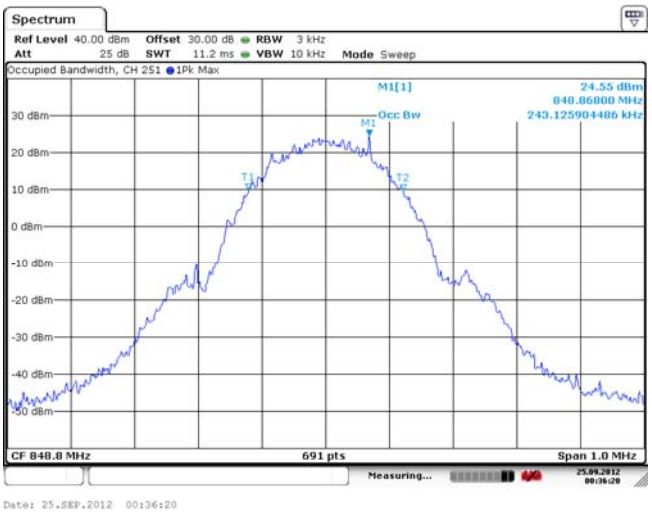


Figure 1-19a: -26dBc bandwidth, PCS1900 Low Channel in GSM mode

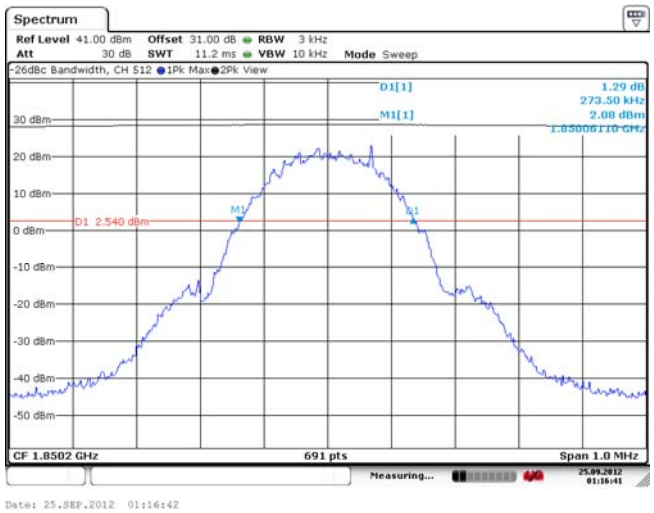
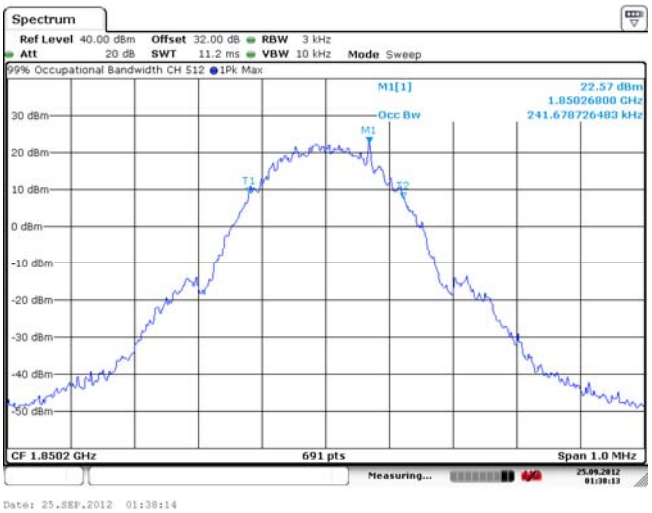


Figure 1-20a: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-21a: -26dBc bandwidth, PCS1900 Middle Channel in GSM mode

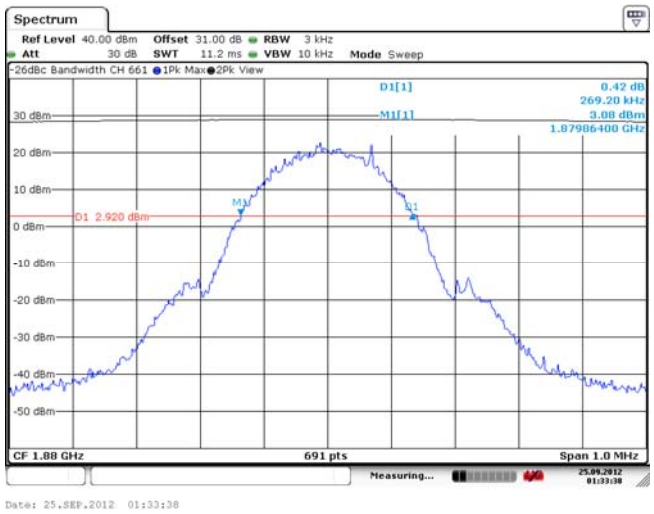


Figure 1-22a: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode

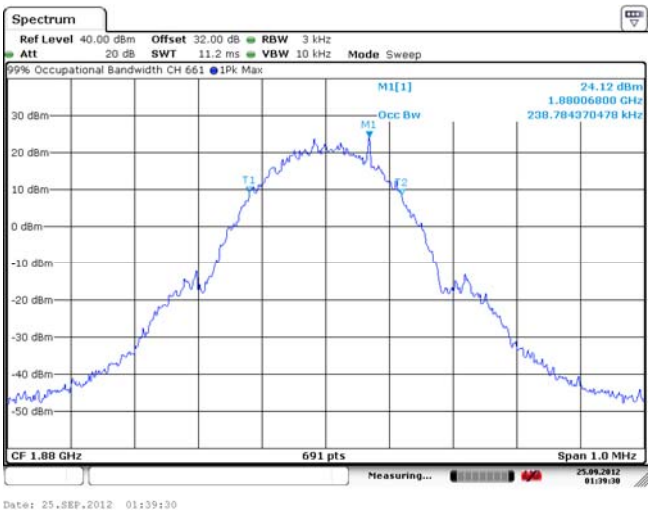


Figure 1-23a: -26dBc bandwidth, PCS1900 High Channel in GSM mode

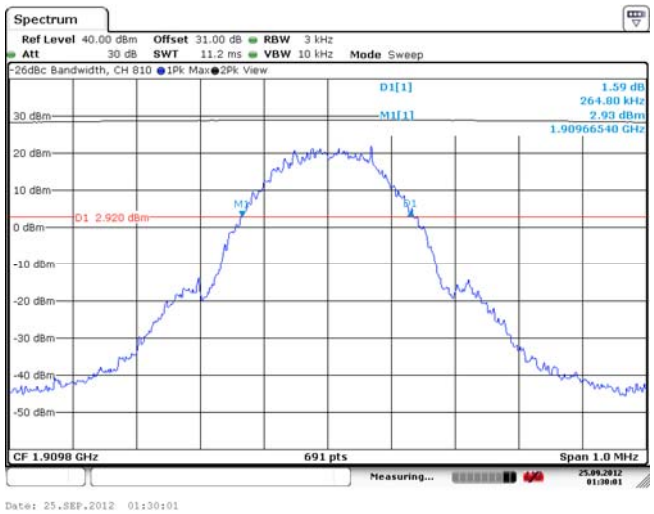
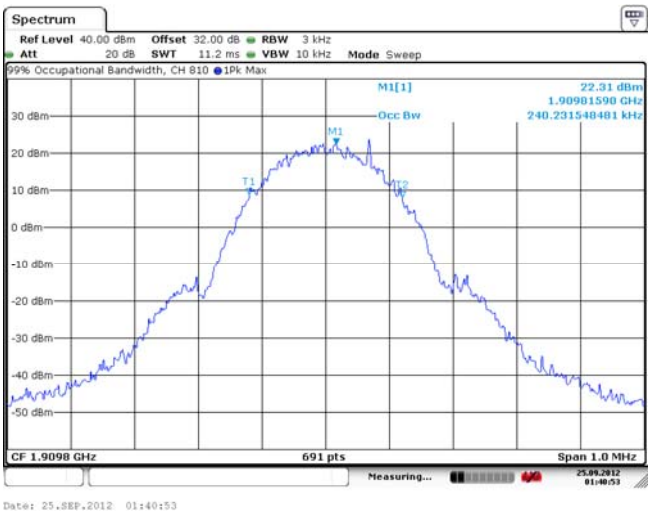


Figure 1-24a: Occupied Bandwidth, PCS1900 High Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-25a: GSM850 band, Low Channel Mask in GSM mode

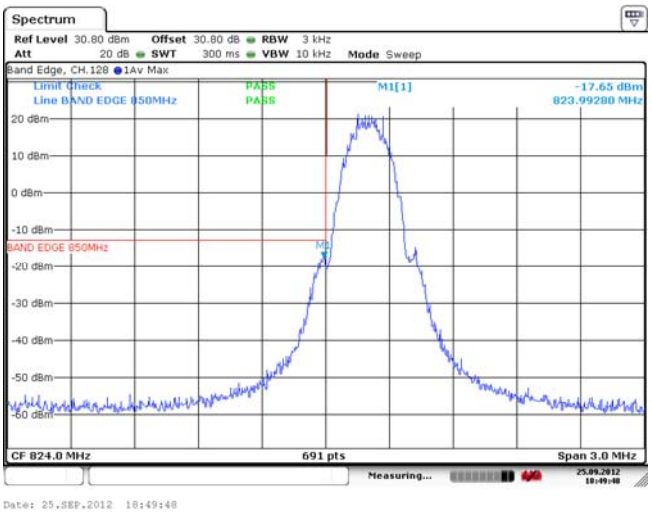


Figure 1-26a: GSM850 band High Channel Mask in GSM mode

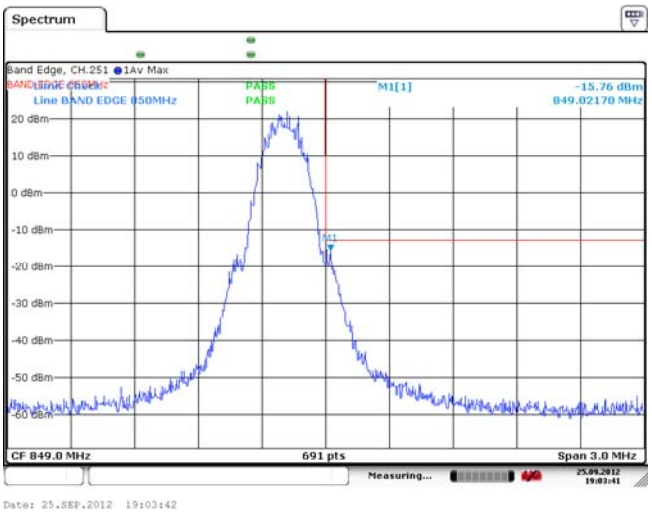


Figure 1-27a: PCS1900, Low Channel Mask in GSM mode

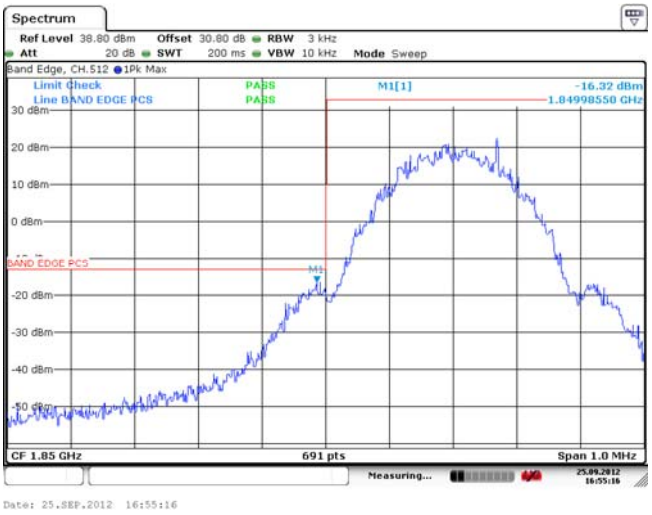
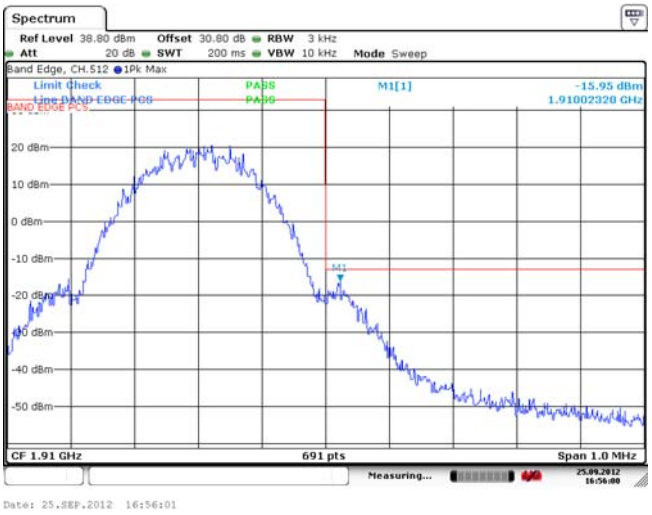


Figure 1-28a: PCS1900, High Channel Mask in GSM mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-29a: Occupied Bandwidth, GSM850 Band, Low Channel in EDGE mode

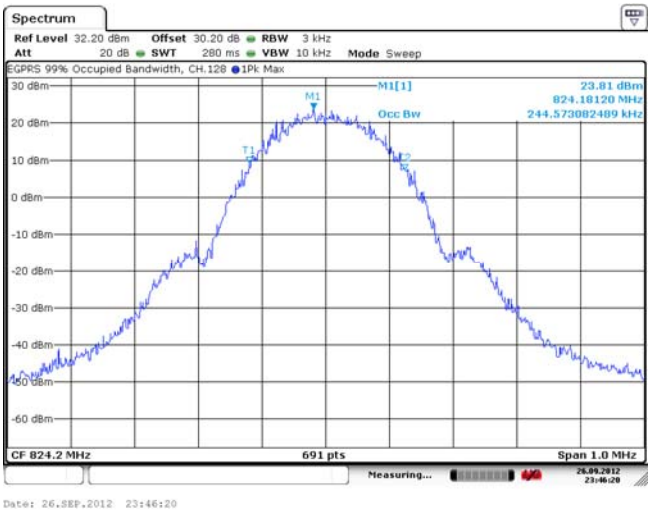


Figure 1-30a: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode

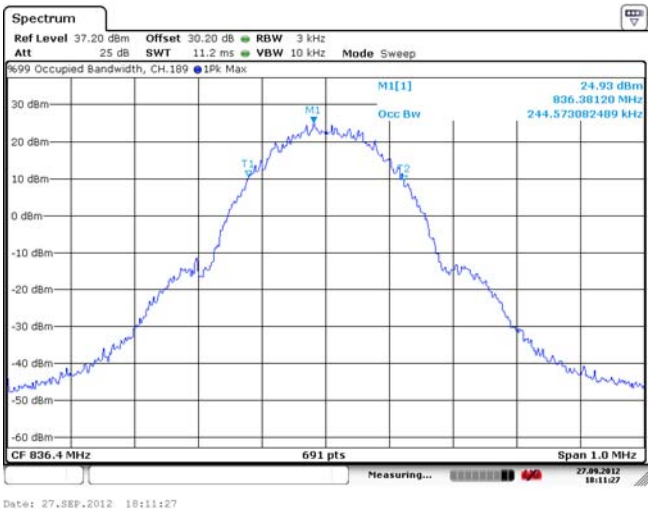


Figure 1-31a: Occupied Bandwidth, GSM850 band, High Channel in EDGE mode

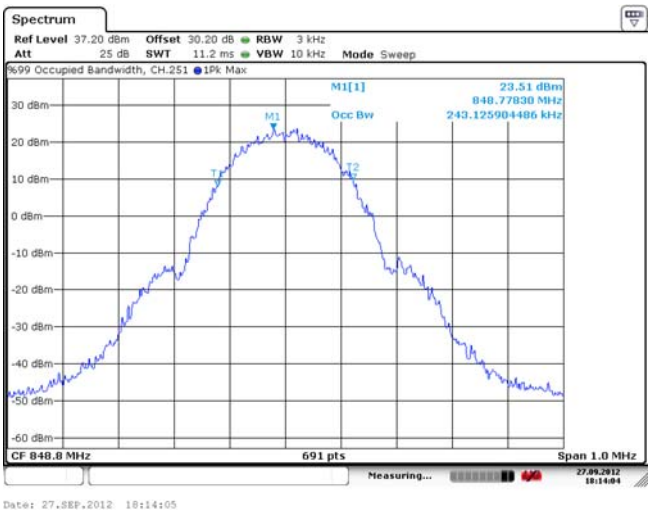
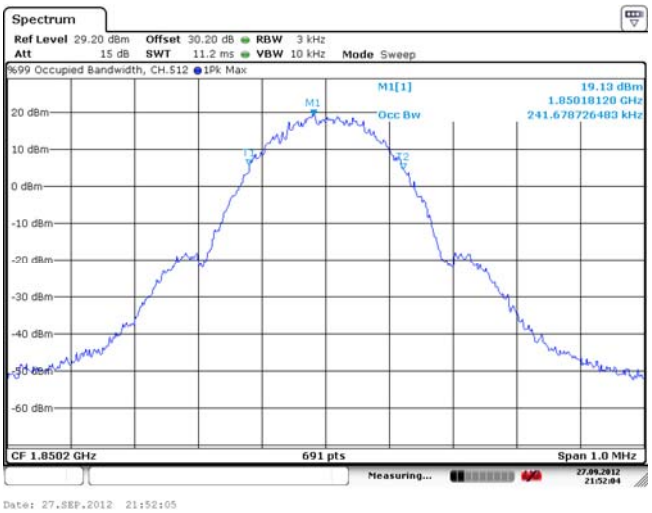


Figure 1-32a: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-33a: Occupied Bandwidth, PCS1900 Band, Middle Channel in EDGE mode

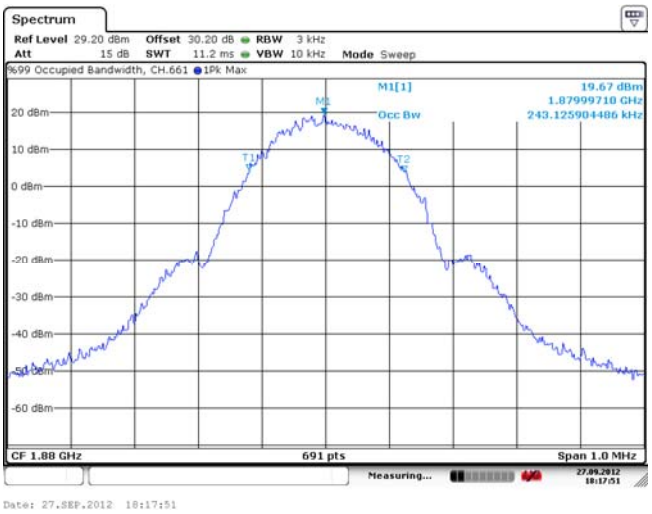


Figure 1-34a: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode

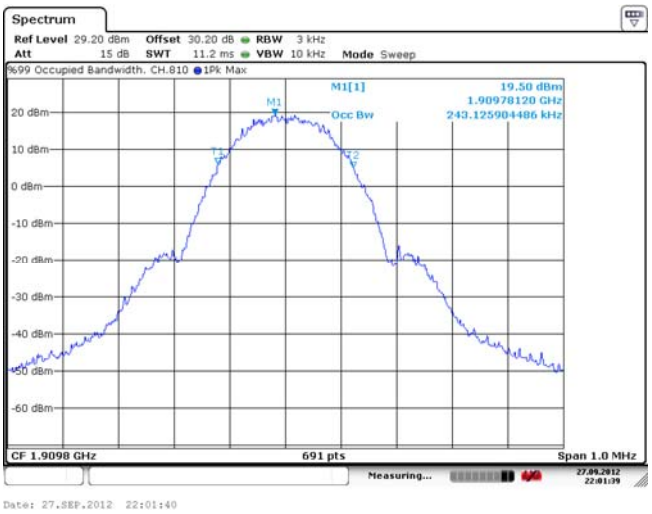


Figure 1-35a: GSM850 Band, Low Channel Mask in EDGE mode

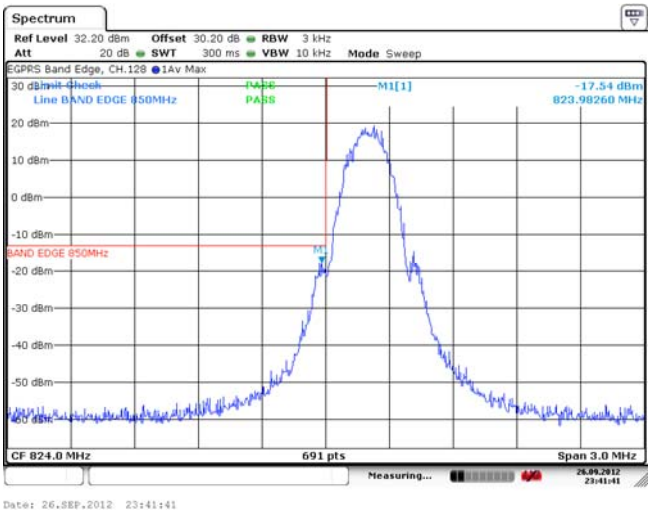
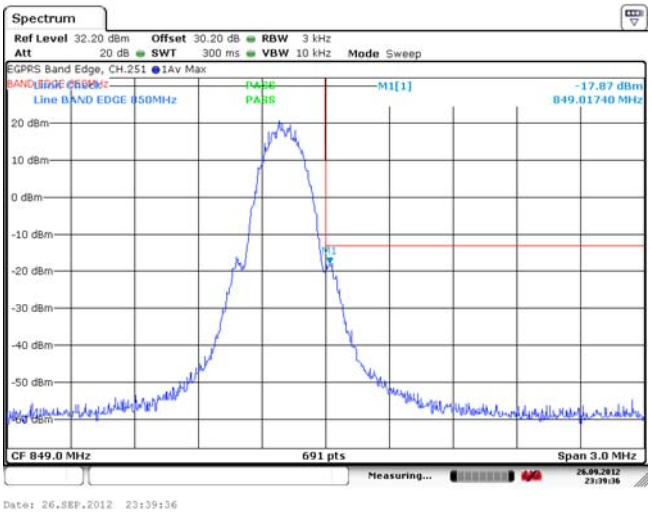


Figure 1-36a: GSM850 Band, High Channel Mask in EDGE mode



GSM Conducted RF Emission Test Data cont'd

Figure 1-37a: PCS1900 Band, Low Channel Mask in EDGE mode

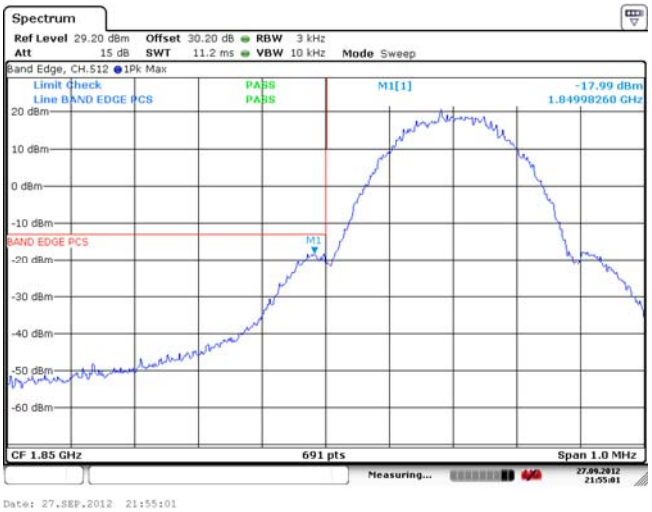
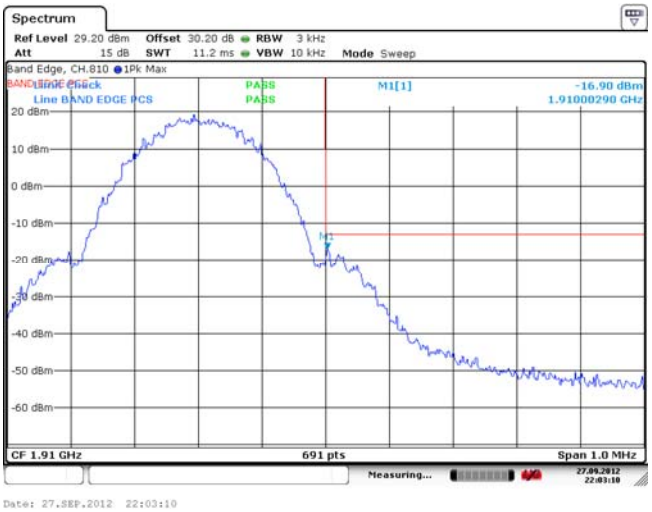
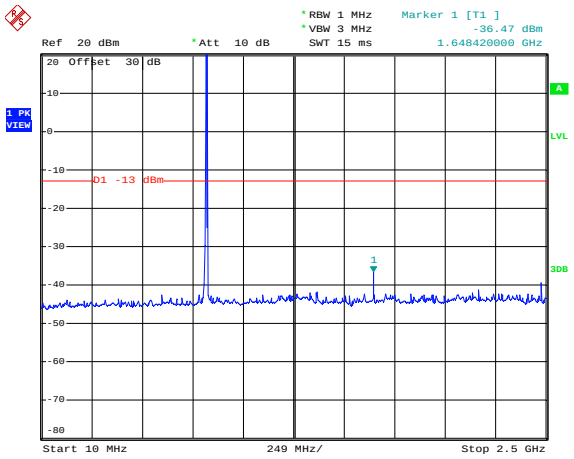


Figure 1-38a: PCS1900 Band, High Channel Mask in EDGE mode



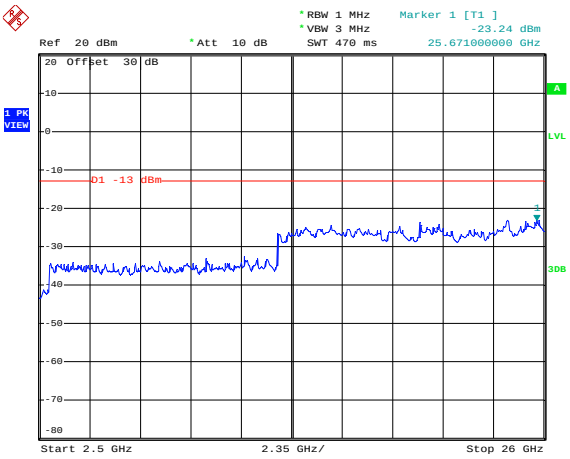
GSM Conducted RF Emission Test Data cont'd

Figure 1-39a: GSM850 band, Spurious Conducted Emissions, Low channel in EDGE Mode



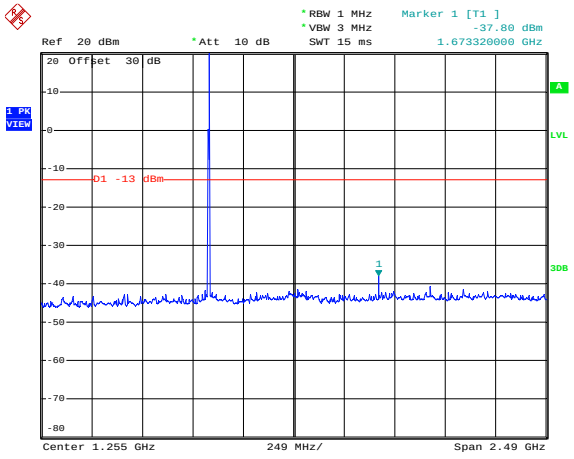
Date: 7.NOV.2012 14:45:54

Figure 1-40a: GSM850 band, Spurious Conducted Emissions, Low channel in EDGE Mode



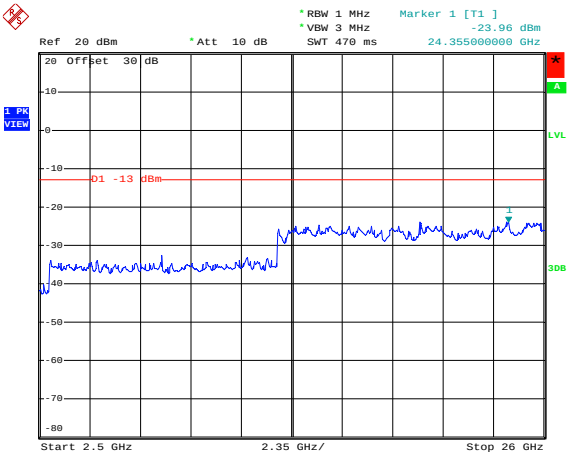
Date: 7.NOV.2012 14:45:05

Figure 1-41a: GSM850 band, Spurious Conducted Emissions, Middle channel in EDGE Mode



Date: 7.NOV.2012 14:47:06

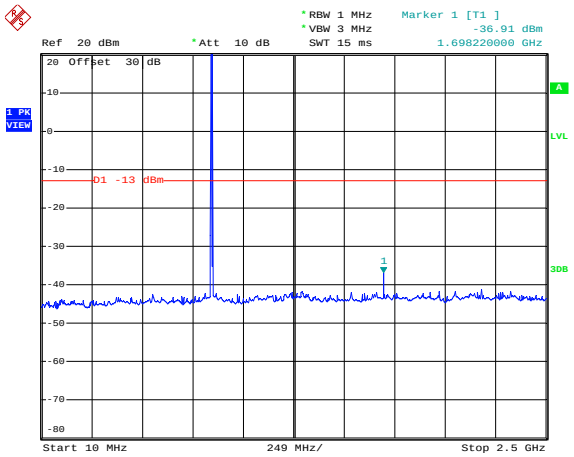
Figure 1-42a: GSM850 band, Spurious Conducted Emissions, Middle channel in EDGE Mode



Date: 7.NOV.2012 14:48:27

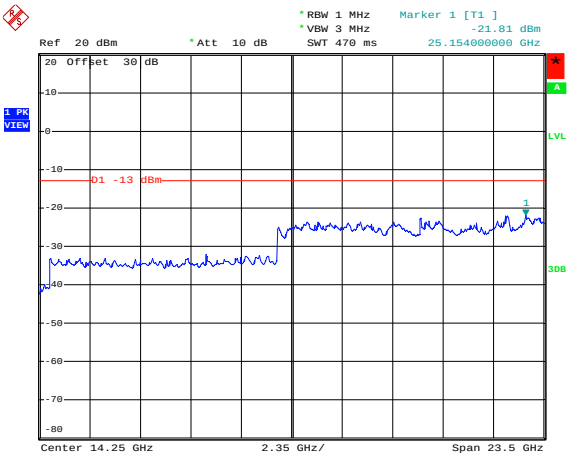
GSM Conducted RF Emission Test Data cont'd

Figure 1-43a: GSM850 band, Spurious Conducted Emissions, High channel in EDGE Mode



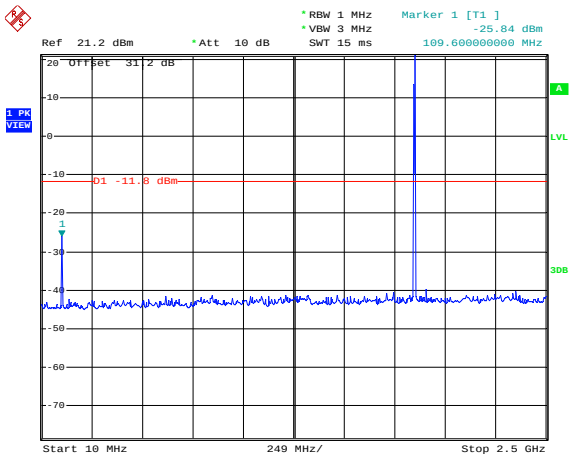
Date: 7.NOV.2012 14:57:17

Figure 1-44a: GSM850 band, Spurious Conducted Emissions, High channel in EDGE Mode



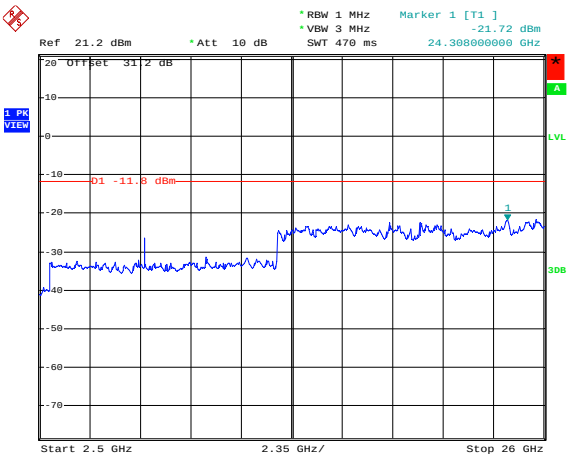
Date: 7.NOV.2012 14:56:05

Figure 1-45a: PCS1900 band, Spurious Conducted Emissions, Low channel in EDGE Mode



Date: 7.NOV.2012 15:03:14

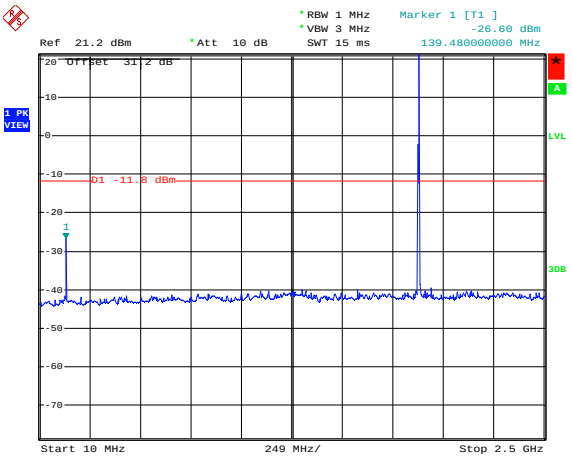
Figure 1-46a: PCS1900 band, Spurious Conducted Emissions, Low channel in EDGE Mode



Date: 7.NOV.2012 15:05:01

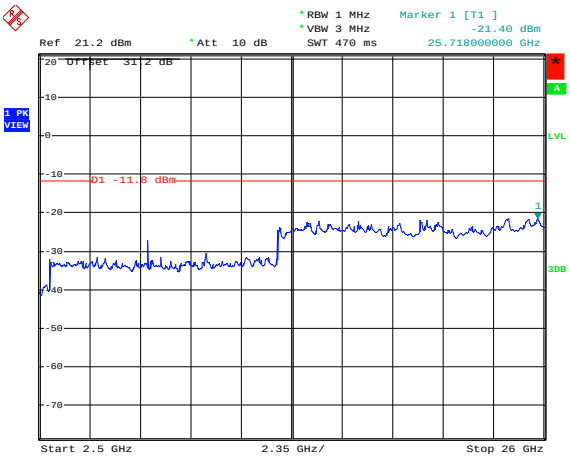
GSM Conducted RF Emission Test Data cont'd

Figure 1-47a: PCS1900 band, Spurious Conducted Emissions, middle channel in EDGE Mode



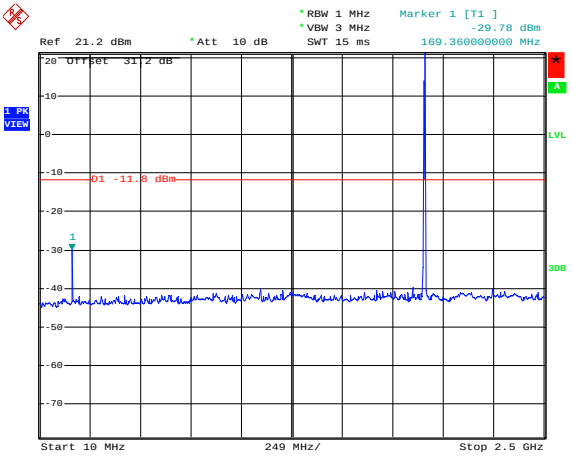
Date: 7.NOV.2012 15:09:42

Figure 1-48a: PCS1900 band, Spurious Conducted Emissions, middle channel in EDGE Mode



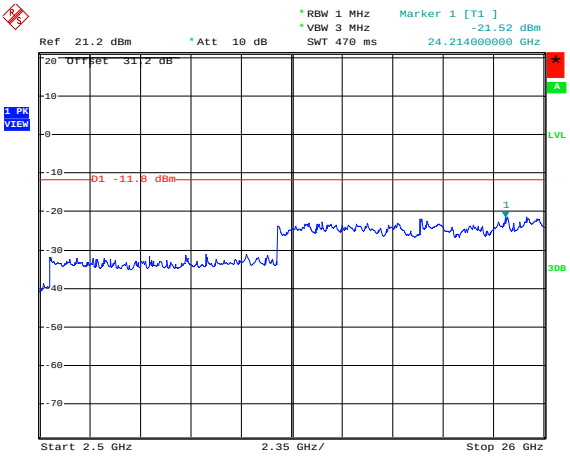
Date: 7.NOV.2012 15:07:48

Figure 1-49a: PCS1900 band, Spurious Conducted Emissions, High channel in EDGE Mode



Date: 7.NOV.2012 15:11:24

Figure 1-50a: PCS1900 band, Spurious Conducted Emissions, High channel in EDGE Mode



Date: 7.NOV.2012 15:15:50

APPENDIX 1B – GSM CONDUCTED RF OUTPUT POWER TEST DATA

GSM Conducted RF Output Power Test Data

The conducted RF output power was measured on the BlackBerry® smartphone using the Communication Tester, Rohde & Schwarz, model CMU 200. The low, middle and high channels were measured at maximum output power. The insertion loss of the coaxial cable from the CMU 200 to the BlackBerry® smartphone was compensated for in the measurements.

Date of Test: September 14 and November 27, 2012

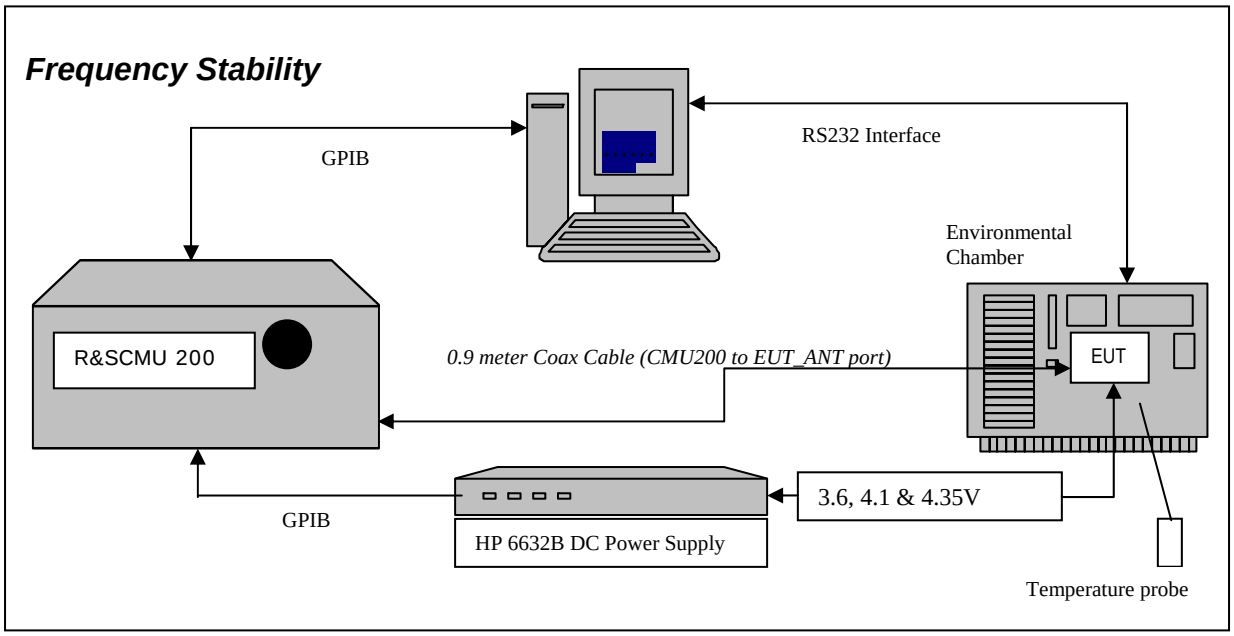
The environmental conditions were: Temperature: 22.0 -25.0 °C
Humidity: 24.0 – 46 %

The measurements were performed by Daoud Attayi

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)	Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
GSM850				GSM850 EDGE			
128	824.20	33.8	2.40	128	824.20	31.7	1.48
189	837.60	33.5	2.24	189	837.60	31.2	1.32
251	848.80	33.4	2.19	251	848.80	31.0	1.26
PCS				PCS EDGE			
512	1850.2	28.3	0.84	512	1850.2	28.4	0.85
661	1880.0	28.4	0.85	661	1880.0	28.4	0.85
810	1909.8	28.2	0.84	810	1909.8	28.2	0.84

APPENDIX 1C – GSM FREQUENCY STABILITY TEST DATA

GSM Frequency Stability Test Data



The measurements were performed by Berkin Can.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements
2.1055 Frequency Stability - Procedures
(a,b) Frequency Stability - Temperature Variation
(d) Frequency Stability - Voltage Variation

The EUT meets the requirements as stated in CFR 47 chapter 1, RSS-132, 4.3 Frequency Stability.
Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMU 200 and the EUT antenna port.
Calibration for the Cable Loss was performed in the RF Laboratory using the Agilent power meter and Agilent Signal Generator.

Test setup:

The EUT was placed in the Temperature chamber and connected to CMU 200 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the measurements were to be made.

The chamber was switched on and the temperature was set to -30°C.
After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled.
The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMU 200 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 4.1 and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 824.2, 836.4, and 848.8 MHz for the GSM850 band, 1850.2, 1880.0 and 1909.8 MHz for the PCS1900 band. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.
After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

Procedure:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.6 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.1 volts
15. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 3.7, 4.2 and 4.35 volts.

The maximum frequency error in the GSM850 band measured was **0.0764 PPM**.
The maximum frequency error in the PCS1900 band measured was **0.1451PPM**.

Date of Test: October 25, 2012

GSM850 results: channels 128, 189 and 251 @ 20°C maximum transmitted power

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	30.03	0.0364
189	836.40	3.6	20	36.42	0.0435
251	848.60	3.6	20	40.87	0.0482
Traffic Channel Number	**GSM850 Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
128	824.20	4.1	20	32.22	0.0391
189	836.40	4.1	20	34.80	0.0416
251	848.60	4.1	20	34.29	0.0404
Traffic Channel Number	**GSM850 Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
128	824.20	4.35	20	26.28	0.0319
189	836.40	4.35	20	23.57	0.0282
251	848.60	4.35	20	27.38	0.0323

GSM850 Results: channel 128 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	-30	21.76	0.0264
128	824.20	3.6	-20	41.84	0.0508
128	824.20	3.6	-10	48.56	0.0589
128	824.20	3.6	0	55.98	0.0679
128	824.20	3.6	10	30.41	0.0369
128	824.20	3.6	20	30.03	0.0364
128	824.20	3.6	30	8.52	0.0103
128	824.20	3.6	40	15.05	0.0183
128	824.20	3.6	50	7.94	0.0096
128	824.20	3.6	60	26.41	0.0320
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
128	824.20	4.1	-30	39.13	0.0475
128	824.20	4.1	-20	34.48	0.0418
128	824.20	4.1	-10	44.88	0.0545
128	824.20	4.1	0	52.69	0.0639
128	824.20	4.1	10	30.35	0.0368
128	824.20	4.1	20	32.22	0.0391
128	824.20	4.1	30	6.26	0.0076
128	824.20	4.1	40	-6.72	-0.0082
128	824.20	4.1	50	-10.78	-0.0131
128	824.20	4.1	60	11.95	0.0145
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
128	824.20	4.35	-30	12.59	0.0153
128	824.20	4.35	-20	30.28	0.0367
128	824.20	4.35	-10	51.33	0.0623
128	824.20	4.35	0	48.56	0.0589
128	824.20	4.35	10	23.70	0.0288
128	824.20	4.35	20	26.28	0.0319
128	824.20	4.35	30	-8.98	-0.0109
128	824.20	4.35	40	-9.81	-0.0119
128	824.20	4.35	50	12.01	0.0146
128	824.20	4.35	60	14.92	0.0181

GSM850 Results: channel 189 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.6	-30	19.24	0.0230
189	836.40	3.6	-20	44.55	0.0533
189	836.40	3.6	-10	49.53	0.0592
189	836.40	3.6	0	61.60	0.0736
189	836.40	3.6	10	28.80	0.0344
189	836.40	3.6	20	36.42	0.0435
189	836.40	3.6	30	9.62	0.0115
189	836.40	3.6	40	12.91	0.0154
189	836.40	3.6	50	8.01	0.0096
189	836.40	3.6	60	28.93	0.0346
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
189	836.40	4.1	-30	26.47	0.0316
189	836.40	4.1	-20	30.28	0.0362
189	836.40	4.1	-10	46.69	0.0558
189	836.40	4.1	0	52.50	0.0628
189	836.40	4.1	10	26.73	0.0320
189	836.40	4.1	20	34.80	0.0416
189	836.40	4.1	30	8.46	0.0101
189	836.40	4.1	40	7.81	0.0093
189	836.40	4.1	50	5.55	0.0066
189	836.40	4.1	60	13.88	0.0166
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
189	836.40	4.35	-30	11.11	0.0133
189	836.40	4.35	-20	30.48	0.0364
189	836.40	4.35	-10	47.01	0.0562
189	836.40	4.35	0	51.98	0.0621
189	836.40	4.35	10	19.89	0.0238
189	836.40	4.35	20	23.57	0.0282
189	836.40	4.35	30	6.91	0.0083
189	836.40	4.35	40	-8.65	-0.0103
189	836.40	4.35	50	13.69	0.0164
189	836.40	4.35	60	17.05	0.0204

GSM850 Results: channel 251 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
251	848.8	3.6	-30	17.11	0.0202
251	848.8	3.6	-20	48.75	0.0574
251	848.8	3.6	-10	58.37	0.0688
251	848.8	3.6	0	**64.83**	**0.0764**
251	848.8	3.6	10	38.29	0.0451
251	848.8	3.6	20	40.87	0.0482
251	848.8	3.6	30	14.72	0.0173
251	848.8	3.6	40	14.46	0.0170
251	848.8	3.6	50	12.01	0.0141
251	848.8	3.6	60	26.73	0.0315
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
251	848.8	4.1	-30	21.63	0.0255
251	848.8	4.1	-20	32.22	0.0380
251	848.8	4.1	-10	47.52	0.0560
251	848.8	4.1	0	54.63	0.0644
251	848.8	4.1	10	28.80	0.0339
251	848.8	4.1	20	34.29	0.0404
251	848.8	4.1	30	15.30	0.0180
251	848.8	4.1	40	13.24	0.0156
251	848.8	4.1	50	17.31	0.0204
251	848.8	4.1	60	19.18	0.0226
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
251	848.8	4.35	-30	7.49	0.0088
251	848.8	4.35	-20	35.39	0.0417
251	848.8	4.35	-10	49.91	0.0588
251	848.8	4.35	0	59.86	0.0705
251	848.8	4.35	10	22.99	0.0271
251	848.8	4.35	20	27.38	0.0323
251	848.8	4.35	30	7.23	0.0085
251	848.8	4.35	40	14.66	0.0173
251	848.8	4.35	50	13.50	0.0159
251	848.8	4.35	60	18.85	0.0222

PCS results: channels 512, 661, & 810 @ 20°C maximum transmitted power

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	3.6	20	30.03	0.0162
661	1880.00	3.6	20	36.42	0.0194
810	1909.80	3.6	20	40.87	0.0214
Traffic Channel Number	**PCS Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
512	1850.20	4.1	20	32.22	0.0174
661	1880.00	4.1	20	34.80	0.0185
810	1909.80	4.1	20	34.29	0.0180
Traffic Channel Number	**PCS Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
512	1850.20	4.35	20	26.28	0.0142
661	1880.00	4.35	20	23.57	0.0125
810	1909.80	4.35	20	27.38	0.0143

PCS frequency stability on Rev 1

PCS1900 Results: channel 512 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	3.6	-30	21.76	0.0118
512	1850.20	3.6	-20	41.84	0.0226
512	1850.20	3.6	-10	48.56	0.0262
512	1850.20	3.6	0	55.98	0.0303
512	1850.20	3.6	10	30.41	0.0164
512	1850.20	3.6	20	30.03	0.0162
512	1850.20	3.6	30	8.52	0.0046
512	1850.20	3.6	40	15.05	0.0081
512	1850.20	3.6	50	7.94	0.0043
512	1850.20	3.6	60	26.41	0.0143
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
512	1850.20	4.1	-30	39.13	0.0211
512	1850.20	4.1	-20	34.48	0.0186
512	1850.20	4.1	-10	44.88	0.0243
512	1850.20	4.1	0	52.69	0.0285
512	1850.20	4.1	10	30.35	0.0164
512	1850.20	4.1	20	32.22	0.0174
512	1850.20	4.1	30	6.26	0.0034
512	1850.20	4.1	40	-6.72	-0.0036
512	1850.20	4.1	50	-10.78	-0.0058
512	1850.20	4.1	60	11.95	0.0065
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
512	1850.20	4.35	-30	12.59	0.0068
512	1850.20	4.35	-20	30.28	0.0164
512	1850.20	4.35	-10	51.33	0.0277
512	1850.20	4.35	0	48.56	0.0262
512	1850.20	4.35	10	23.70	0.0128
512	1850.20	4.35	20	26.28	0.0142
512	1850.20	4.35	30	-8.98	-0.0049
512	1850.20	4.35	40	-9.81	-0.0053
512	1850.20	4.35	50	12.01	0.0065
512	1850.20	4.35	60	14.92	0.0081

PCS frequency stability on Rev 1

PCS1900 Results: channel 661 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880.00	3.6	-30	19.24	0.0102
661	1880.00	3.6	-20	44.55	0.0237
661	1880.00	3.6	-10	49.53	0.0263
661	1880.00	3.6	0	61.60	0.0328
661	1880.00	3.6	10	28.80	0.0153
661	1880.00	3.6	20	36.42	0.0194
661	1880.00	3.6	30	9.62	0.0051
661	1880.00	3.6	40	12.91	0.0069
661	1880.00	3.6	50	8.01	0.0043
661	1880.00	3.6	60	28.93	0.0154
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
661	1880.00	4.1	-30	26.47	0.0141
661	1880.00	4.1	-20	30.28	0.0161
661	1880.00	4.1	-10	46.69	0.0248
661	1880.00	4.1	0	52.50	0.0279
661	1880.00	4.1	10	26.73	0.0142
661	1880.00	4.1	20	34.80	0.0185
661	1880.00	4.1	30	8.46	0.0045
661	1880.00	4.1	40	7.81	0.0042
661	1880.00	4.1	50	5.55	0.0030
661	1880.00	4.1	60	13.88	0.0074
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
661	1880.00	4.35	-30	11.11	0.0059
661	1880.00	4.35	-20	30.48	0.0162
661	1880.00	4.35	-10	47.01	0.0250
661	1880.00	4.35	0	51.98	0.0276
661	1880.00	4.35	10	19.89	0.0106
661	1880.00	4.35	20	23.57	0.0125
661	1880.00	4.35	30	6.91	0.0037
661	1880.00	4.35	40	-8.65	-0.0046
661	1880.00	4.35	50	13.69	0.0073
661	1880.00	4.35	60	17.05	0.0091

PCS frequency stability on Rev 1

PCS1900 Results: channel 810 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.80	3.6	-30	17.11	0.0090
810	1909.80	3.6	-20	48.75	0.0255
810	1909.80	3.6	-10	58.37	0.0306
810	1909.80	3.6	0	64.83	0.0339
810	1909.80	3.6	10	38.29	0.0200
810	1909.80	3.6	20	40.87	0.0214
810	1909.80	3.6	30	14.72	0.0077
810	1909.80	3.6	40	14.46	0.0076
810	1909.80	3.6	50	12.01	0.0063
810	1909.80	3.6	60	26.73	0.0140
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
810	1909.80	4.1	-30	21.63	0.0113
810	1909.80	4.1	-20	32.22	0.0169
810	1909.80	4.1	-10	47.52	0.0249
810	1909.80	4.1	0	54.63	0.0286
810	1909.80	4.1	10	28.80	0.0151
810	1909.80	4.1	20	34.29	0.0180
810	1909.80	4.1	30	15.30	0.0080
810	1909.80	4.1	40	13.24	0.0069
810	1909.80	4.1	50	17.31	0.0091
810	1909.80	4.1	60	19.18	0.0100
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
810	1909.80	4.35	-30	7.49	0.0039
810	1909.80	4.35	-20	35.39	0.0185
810	1909.80	4.35	-10	49.91	0.0261
810	1909.80	4.35	0	59.86	0.0313
810	1909.80	4.35	10	22.99	0.0120
810	1909.80	4.35	20	27.38	0.0143
810	1909.80	4.35	30	7.23	0.0038
810	1909.80	4.35	40	14.66	0.0077
810	1909.80	4.35	50	13.50	0.0071
810	1909.80	4.35	60	18.85	0.0099

PCS frequency stability on Rev 1

PCS results: channels 512, 661, & 810 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	3.6	-30	14.41	0.0281
512	1850.20	3.6	0	**74.32**	**0.1451**
512	1850.20	3.6	30	34.55	0.067
512	1850.20	3.6	60	21.24	0.0414
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
512	1850.20	4.35	-30	35.24	0.0688
512	1850.20	4.35	0	68.58	0.1339
512	1850.20	4.35	30	18.53	0.0362
512	1850.20	4.35	60	8.39	0.0164
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
661	1880.00	3.6	-30	25.03	0.0379
661	1880.00	3.6	0	74.84	0.1132
661	1880.00	3.6	30	30.41	0.0460
661	1880.00	3.6	60	22.47	0.0340
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
661	1880.00	4.35	-30	19.89	0.0300
661	1880.00	4.35	0	66.19	0.1001
661	1880.00	4.35	30	19.44	0.0294
661	1880.00	4.35	60	7.3	0.0110
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
810	1909.80	3.6	-30	21.95	0.0271
810	1909.80	3.6	0	73.87	0.0912
810	1909.80	3.6	30	21.95	0.0271
810	1909.80	3.6	60	19.63	0.0242
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
810	1909.80	4.35	-30	22.53	0.0278
810	1909.80	4.35	0	66.38	0.0820
810	1909.80	4.35	30	16.53	0.0204
810	1909.80	4.35	60	-6.01	-0.0074

PCS frequency stability on Rev 3

APPENDIX 1D – GSM RADIATED EMISSIONS TEST DATA

Radiated Power Test Data Results

Date of test: November 15, 2012

The following measurements were performed by Feras Obeid.
The environmental tests conditions were: Temperature: 24.7 °C
Relative Humidity: 29.8 %

The BlackBerry® smartphone was standalone, USB up with LCD facing to RX antenna when the turntable is at 0 degree position.
Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

GSM850 Band in Call Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
F0	128	824.20	850	Dipole	V	77.35	87.54	V-V	15.60	**33.13**	**2.06**	38.50	-5.37
F0	128	824.20	850	Dipole	H	87.54		H-H	13.58				
F0	190	836.60	850	Dipole	V	75.04	86.35	V-V	14.46	31.66	1.47	38.50	-6.84
F0	190	836.60	850	Dipole	H	86.35		H-H	13.12				
F0	251	848.80	850	Dipole	V	74.77	86.35	V-V	14.61	31.79	1.51	38.50	-6.71
F0	251	848.80	850	Dipole	H	86.35		H-H	14.38				

GSM850 Band in EDGE Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
F0	128	824.20	850	Dipole	V	72.64	83.11	V-V	11.16	**28.69**	**0.74**	38.50	-9.81
F0	128	824.20	850	Dipole	H	83.11		H-H	9.12				
F0	190	836.60	850	Dipole	V	70.68	82.48	V-V	10.56	27.76	0.60	38.50	-10.74
F0	190	836.60	850	Dipole	H	82.48		H-H	9.19				
F0	251	848.80	850	Dipole	V	74.49	82.18	V-V	10.42	27.60	0.58	38.50	-10.90
F0	251	848.80	850	Dipole	H	82.18		H-H	10.19				

Radiated Power Test Data Results cont'd

Date of test: November 27, 2012
The following measurements were performed by Heng Lin.

The environmental tests conditions were: Temperature: 25.2 °C
Relative Humidity: 34.4 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing down and head pointing to RX antenna when the turntable is at 0 degree position.
Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

PCS1900 Band in Call Mode

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
F0	512	1850.20	1900	Horn	V	72.89	90.13	V-V	-3.7	31.71	1.19	33.00	-1.29
F0	512	1850.20	1900	Horn	H	90.13		H-H	-3.1				
F0	661	1880.00	1900	Horn	V	72.93	89.53	V-V	-3.10	32.00	1.22	33.00	-1.00
F0	661	1880.00	1900	Horn	H	89.53		H-H	-2.90				
F0	810	1909.80	1900	Horn	V	73.67	90.08	V-V	-1.3	**32.65**	**1.30**	33.00	-0.35
F0	810	1909.80	1900	Horn	H	90.08		H-H	-1.7				

PCS1900 Band in EDGE Mode

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
F0	512	1850.20	1900	Horn	V	72.56	88.73	V-V	-5.1	30.31	1.03	33.00	-2.69
F0	512	1850.20	1900	Horn	H	88.73		H-H	-4.5				
F0	661	1880.00	1900	Horn	V	72.28	88.17	V-V	-4.10	30.80	1.08	33.00	-2.20
F0	661	1880.00	1900	Horn	H	88.17		H-H	-4.20				
F0	810	1909.80	1900	Horn	V	72.53	88.55	V-V	-2.6	**31.35**	**1.14**	33.00	-1.65
F0	810	1909.80	1900	Horn	H	88.55		H-H	-3.3				

Radiated Emissions Test Data Results cont'd

GSM850 Call Mode

Date of Test: September 24 - 27, 2012

The following measurements were performed by Feras Obeid.
The environmental test conditions were: Temperature: 24.1 – 24.4ºC
Relative Humidity: 25.5 – 27.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, USB Down with LCD pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in GSM850 Call Tx mode, channels 128, 190, 251.
All emissions had test margins greater than 25.0 dB.

Date of Test: October 01, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 25.4 ºC
Relative Humidity: 41.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

The measurements were performed in GSM850 Call Tx mode, channels 128, 190, 251.

BlackBerry® smartphone PIN 2A8C6FD6										
Frequency (MHz)	Channel Of Occurrence	Antenna		Test Angle (Deg.)	Detector (PK or QP)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB)	Field Strength Level (reading+corr) (dBm)	Limit @ 3.0 m (dBm)	Test Margin (dB)
		Pol. (V/H)	Height (meters)							
1647.936	128	H	1.18	174	PK	59.68	-91.68	-31.99	-13.00	-19.0
1673.092	190	H	1.14	181	PK	59.75	-91.55	-31.81	-13.00	**-18.8**
1697.448	251	H	1.13	181	PK	59.08	-91.49	-32.41	-13.00	-19.4
2509.624	190	H	1.00	130	PK	50.29	-86.71	-36.42	-13.00	-23.4

All other emissions had test margins greater than 25.0 dB

Radiated Emissions Test Data Results cont'd

GSM850 EDGE Mode

Date of Test: September 24 - 27, 2012

The following measurements were performed by Feras Obeid.
The environmental test conditions were: Temperature: 24.1 – 24.4ºC
Relative Humidity: 25.5 – 27.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, USB Down with LCD pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in GSM850 EDGE Tx mode, channels 128, 190, 251.
All emissions had test margins greater than 25.0 dB.

Date of Test: October 01, 2012

The environmental test conditions were: Temperature: 25.4 ºC
Relative Humidity: 41.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

The measurements were performed in GSM850 EDGE Tx mode, channels 128, 190, 251.

BlackBerry® smartphone PIN 2A76E9A2										
Frequency (MHz)	Channel Of Occurrence	Antenna Pol. (V/H)	Antenna Height (meters)	Test Angle (Deg.)	Detector (PK or QP)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB)	Field Strength Level (reading+corr) (dBm)	Limit @ 3.0 m (dBm)	Test Margin (dB)
1648.356	128	H	1.18	181	PK	56.18	-91.69	-35.50	-13.00	**-22.5**

All other emissions had test margins greater than 25.0 dB

Radiated Emissions Test Data Results cont'd

PCS1900 CALL Mode

Date of Test: September 21, 2012

The environmental test conditions were: Temperature: 24.6 ºC
Relative Humidity: 29.8 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, Vertical Upside down with LCD facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 Call Tx mode, channels 512, 661, 810.
All emissions had test margins greater than 25.0 dB.

Date of Test: October 01 – 09, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 24.3 – 25.4 ºC
Relative Humidity: 38.7 – 42.5 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 20 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 Call Tx mode, channels 512, 661, 810.

BlackBerry® smartphone PIN 2A76E9A2										
Frequency (MHz)	Channel Of Occurrence	Antenna Pol. (V/H)	Antenna Height (meters)	Test Angle (Deg.)	Detector (PK or QP)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB)	Field Strength Level (reading+corr) (dBm)	Limit @ 3.0 m (dBm)	Test Margin (dB)
3819.984	810	H	1.39	12	PK	43.58	-80.62	-37.04	-13.00	**-24.0**

All other emissions had test margins greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900 EDGE Mode

Date of Test: September 21, 2012

The environmental test conditions were: Temperature: 24.6 ºC
Relative Humidity: 29.8 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, Vertical Upside down with LCD facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661, 810.
All emissions had test margins greater than 25.0 dB.

Date of Test: October 01 – 09, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 24.3 – 25.4 ºC
Relative Humidity: 38.7 – 42.5 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 20 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661, 810.

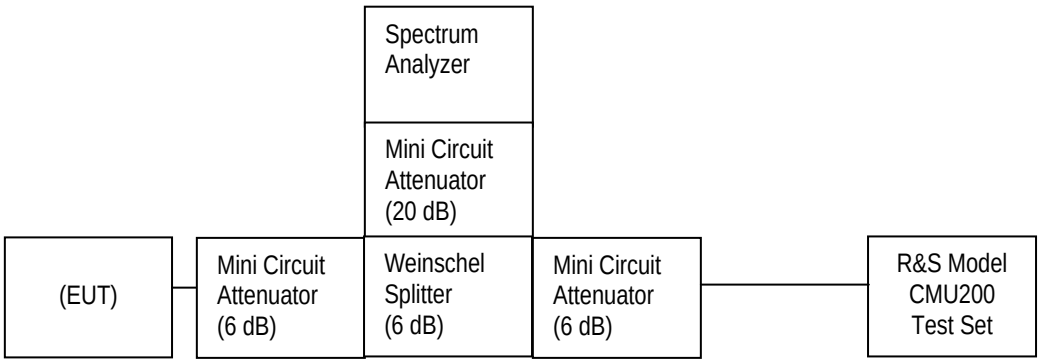
All emissions had test margins greater than 25.0 dB.

APPENDIX 2A– WCDMA Band 5 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

WCDMA BAND 5 Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask.

Test Setup Diagram



Date of Test: October 26, 2012

The environmental test conditions were: Temperature: 24.0ºC
Relative Humidity: 23.8 %

The following measurements were performed by Berkin Can.

WCDMA Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 22 917 and RSS-132, 4.5 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.

–26 dBc Bandwidth and Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth.
The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.
The worst case –26dBc bandwidth for WCDMA Band 5 was measured to be 4.583 MHz, as shown below. Results were derived in a 3.0 kHz resolution bandwidth.
On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

Test Data for WCDMA Band 5 selected Frequencies in Voice mode

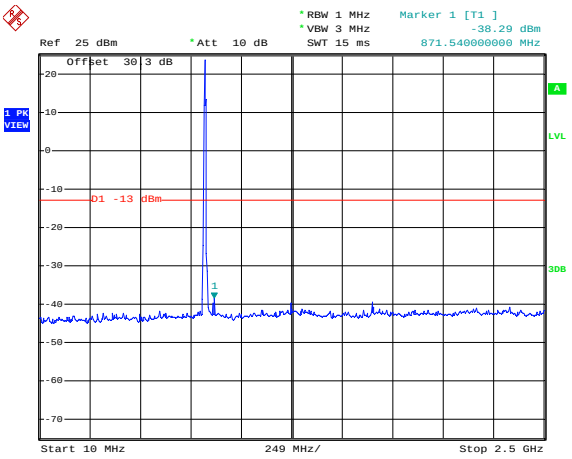
WCDMA Band 5 Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
826.400	4.583	4.142
836.400	4.575	4.133
846.600	4.542	4.142

Measurement Plots for WCDMA Band 5 in Voice mode
Refer to the following measurement plots for more detail:

See Figures 1-1b to 1-6b for the plots of the conducted spurious emissions.
See Figures 1-7b to 1-9b for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.
See Figures 1-10b to 1-11b for the plots of the Channel mask.

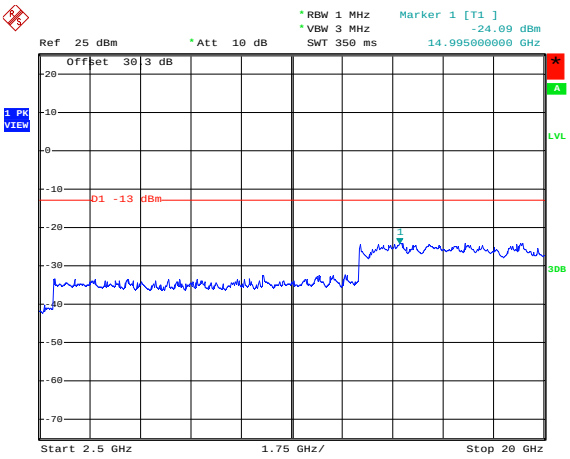
WCDMA Conducted RF Emission Test Data cont'd

Figure 1-1b: Spurious Conducted Emissions Band 5, Low channel in Voice Mode



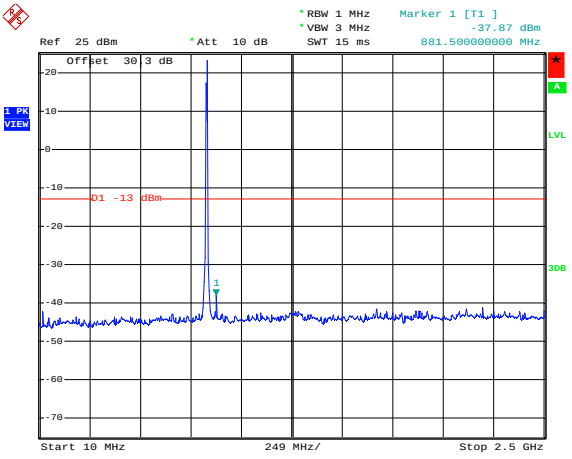
Date: 26.SEP.2012 12:02:46

Figure 1-2b: Spurious Conducted Emissions Band 5, Low channel in Voice Mode



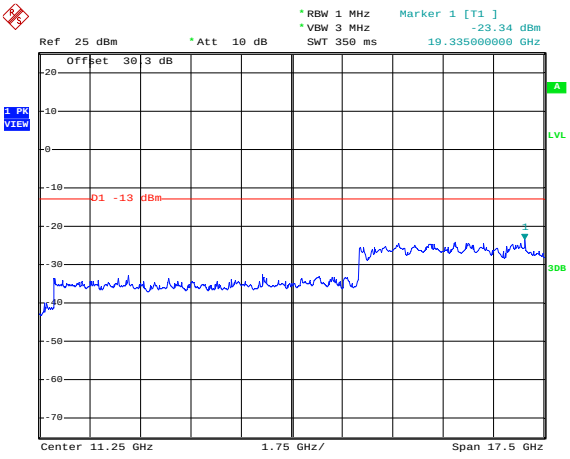
Date: 26.SEP.2012 12:04:59

Figure 1-3b: Spurious Conducted Emissions Band5, Middle channel in in Voice Mode



Date: 26.SEP.2012 14:07:02

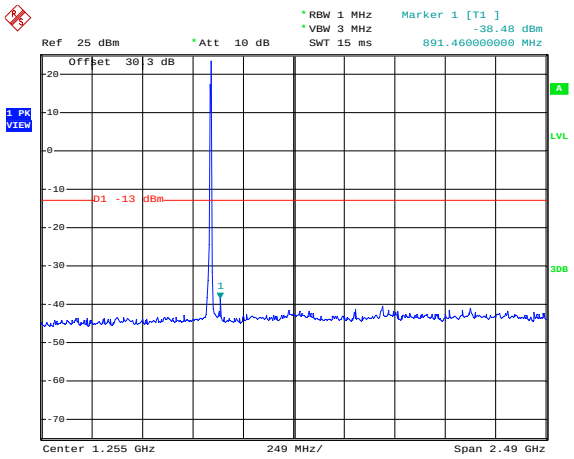
Figure 1-4b: Spurious Conducted Emissions Band 5, Middle channel in Voice Mode



Date: 26.SEP.2012 14:05:57

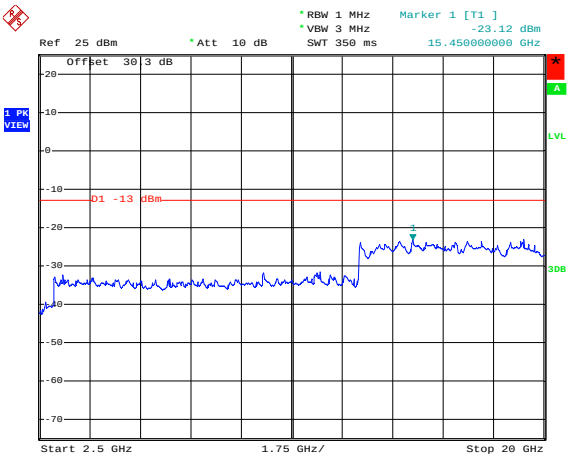
WCDMA Conducted RF Emission Test Data cont'd

Figure 1-5b: Spurious Conducted Emissions
Band 5, High Channel in Voice Mode



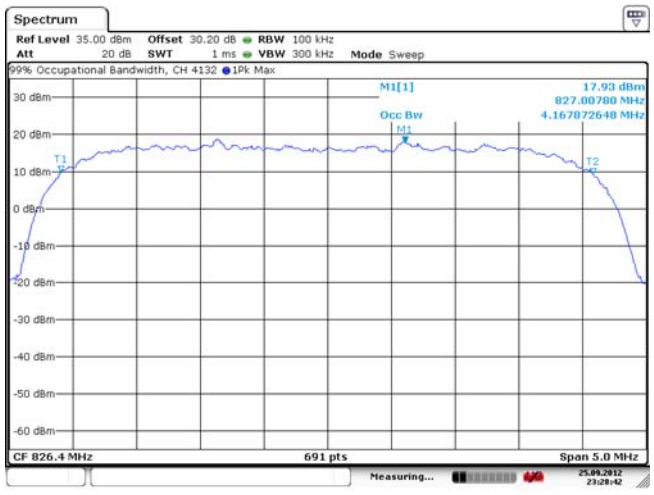
Date: 26.SEP.2012 14:08:07

Figure 1-6b: Spurious Conducted Emissions
Band 5, High Channel in Voice Mode



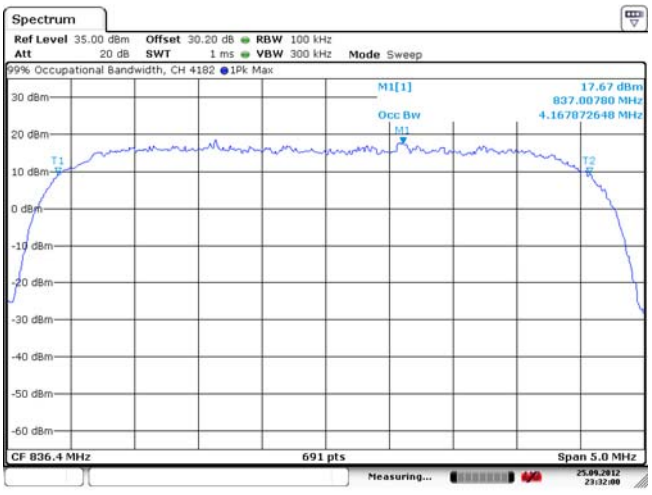
Date: 26.SEP.2012 14:11:02

Figure 1-7b: Occupied Bandwidth
Band 5, Low Channel in Voice Mode



Date: 25.SEP.2012 23:28:43

Figure 1-8b: Occupied Bandwidth
Band 5, Middle Channel in Voice Mode



Date: 25.SEP.2012 23:32:01

WCDMA Conducted RF Emission Test Data cont'd

Figure 1-9b: Occupied Bandwidth
Band 5, High Channel in Voice Mode

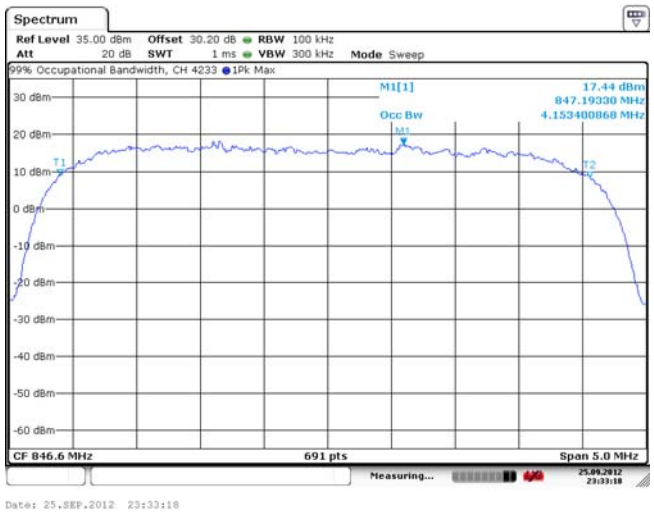


Figure 1-10b: Low Channel Mask
Band 5, Low Channel in Voice Mode

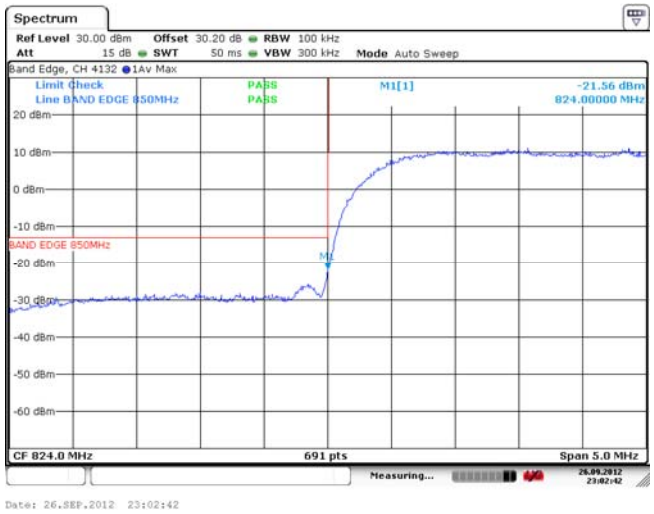
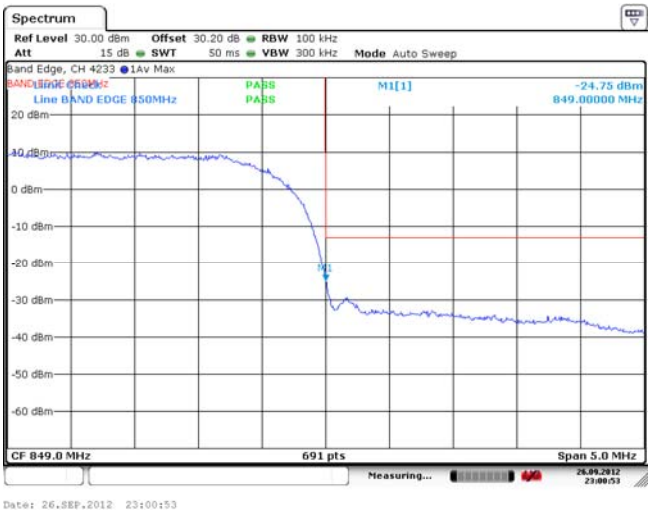


Figure 1-11b: High Channel Mask
Band 5, High Channel in Voice Mode



WCDMA Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 22 917 and RSS-132, 4.5 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.

Date of Test: October 26, 2012

The environmental test conditions were: Temperature: 25.0 ºC
Relative Humidity: 37.0 %

Test Data for WCDMA Band 5 selected Frequencies in HSUPA mode

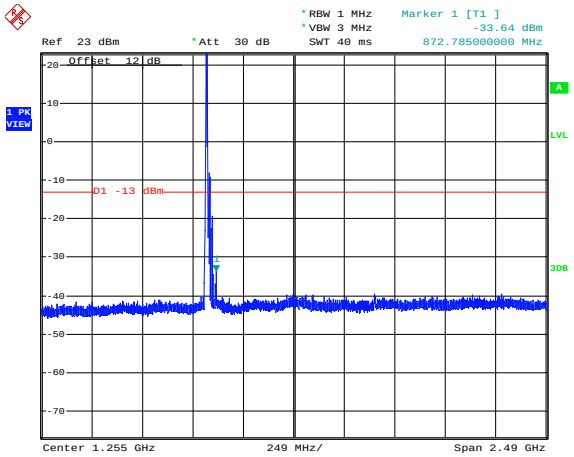
WCDMA Band 5 Frequency (MHz)	99% Occupied Bandwidth (MHz)
826.400	4.133
836.400	4.150
846.600	4.142

Measurement Plots for WCDMA Band 5 in HSUPA mode
Refer to the following measurement plots for more detail:

See Figures 1-12b to 1-17b for the plots of the conducted spurious emissions.
See Figures 1-18b to 1-20b for the plots of 99% Occupied Bandwidth.
See Figures 1-21b to 1-22b for the plots of the Channel mask.

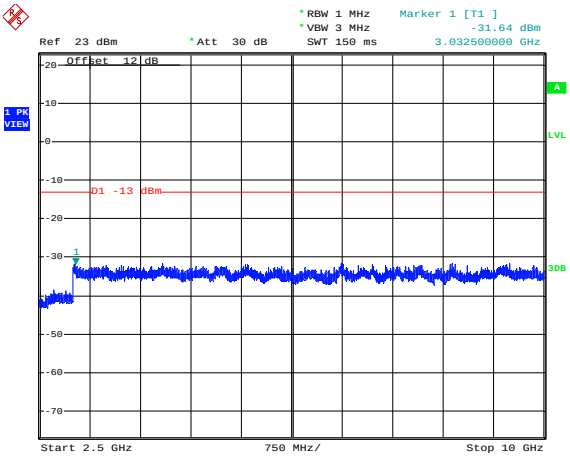
WCDMA Conducted RF Emission Test Data cont'd

Figure 1-12b: Spurious Conducted Emissions Band 5, Low channel in HSUPA mode



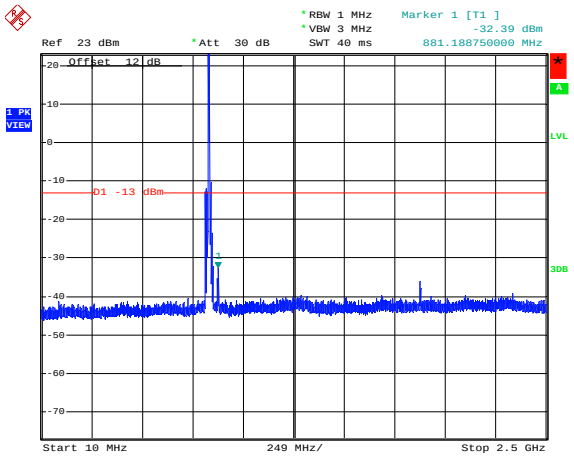
Date: 16.NOV.2012 10:16:24

Figure 1-13b: Spurious Conducted Emissions Band 5, Low channel in HSUPA mode



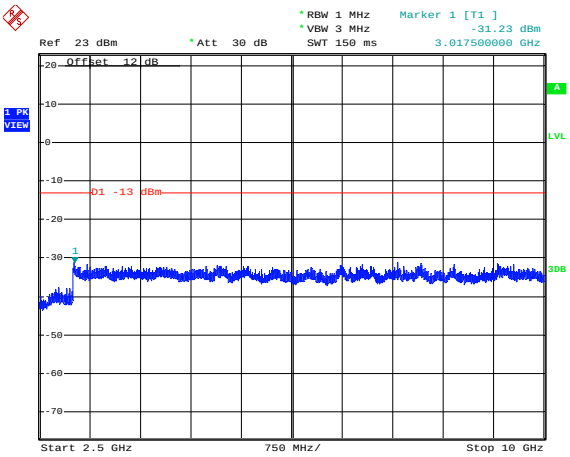
Date: 16.NOV.2012 10:17:58

Figure 1-14b: Spurious Conducted Emissions, Band 5, Middle channel in HSUPA mode



Date: 16.NOV.2012 10:21:51

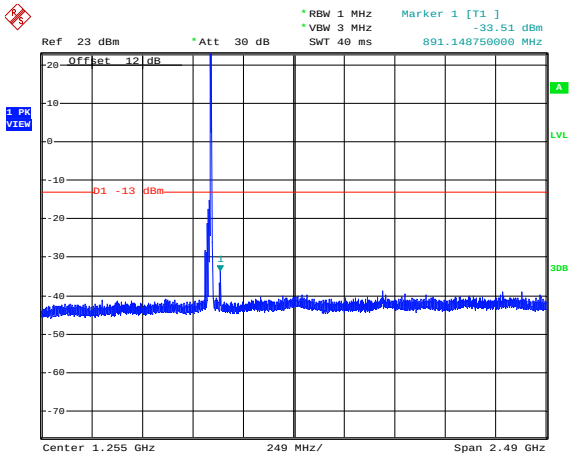
Figure 1-15b: Spurious Conducted Emissions, Band 5, Middle channel in HSUPA mode



Date: 16.NOV.2012 10:20:42

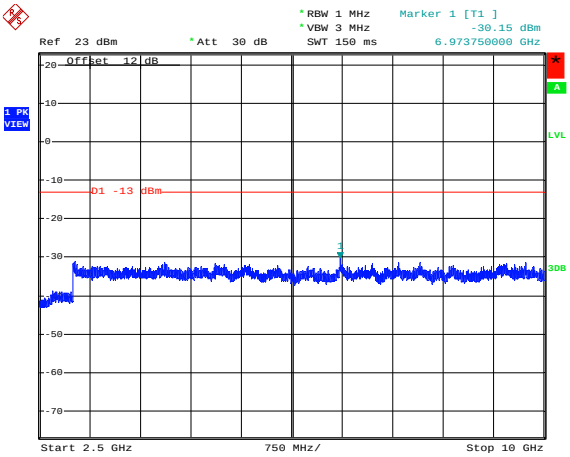
WCDMA Conducted RF Emission Test Data cont'd

Figure 1-16b: Spurious Conducted Emissions
Band 5, High Channel in HSUPA mode



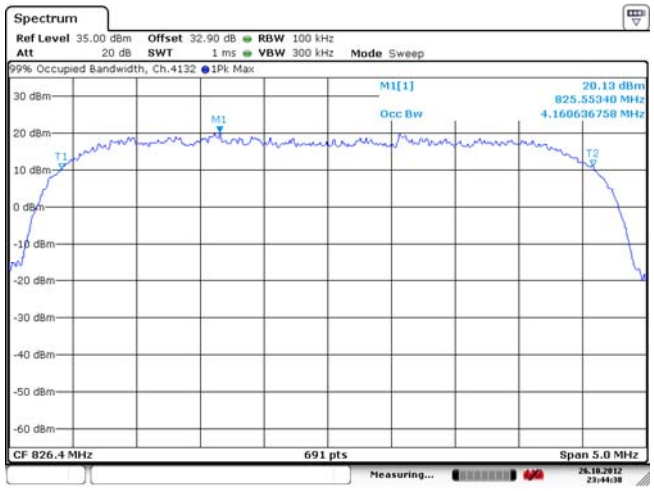
Date: 16.NOV.2012 10:25:31

Figure 1-17b: Spurious Conducted Emissions
Band 5, High Channel in HSUPA mode



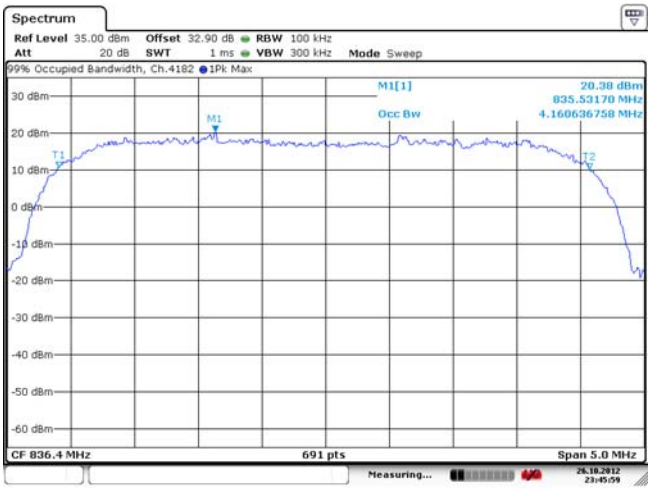
Date: 16.NOV.2012 10:27:04

Figure 1-18b: Occupied Bandwidth
Band 5, Low Channel in HSUPA mode



Date: 26.OCT.2012 23:44:38

Figure 1-19b: Occupied Bandwidth
Band 5, Middle Channel in HSUPA mode



Date: 26.OCT.2012 23:45:59

WCDMA Conducted RF Emission Test Data cont'd

Figure 1-20b: Occupied Bandwidth
Band 5, High Channel in HSUPA mode

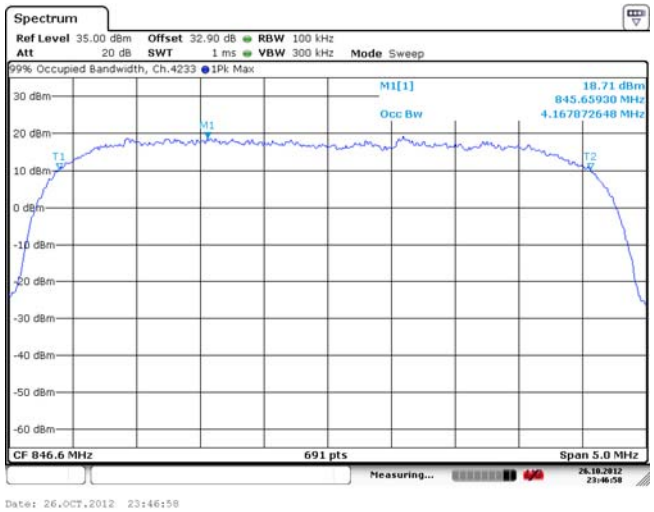


Figure 1-21b: Low Channel Mask
Band 5, Low Channel in HSUPA mode

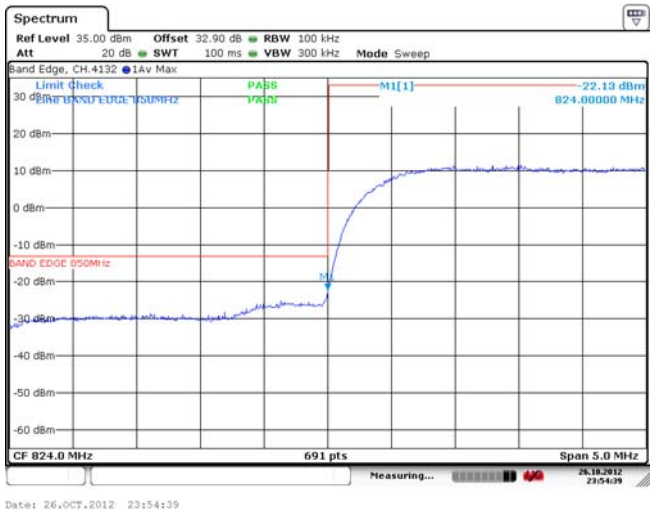
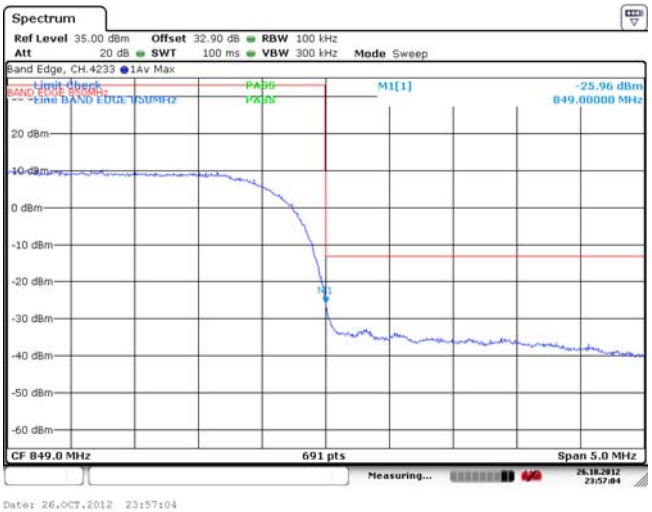


Figure 1-22b: High Channel Mask
Band 5, High Channel in HSUPA mode



APPENDIX 2B – WCDMA Band 5 CONDUCTED RF OUTPUT POWER TEST DATA

WCDMA Band 5 Conducted RF Output Power Test Data

The conducted RF output power was measured using the CMU200 base station simulator. Low, middle and high channels were measured at maximum radio output power at different service options and modes.

Date of Test: September 14, 2012
The environmental conditions were: Temperature: 23.0 °C
Humidity: 37.6 %

The measurements were performed by Daoud Attayi.

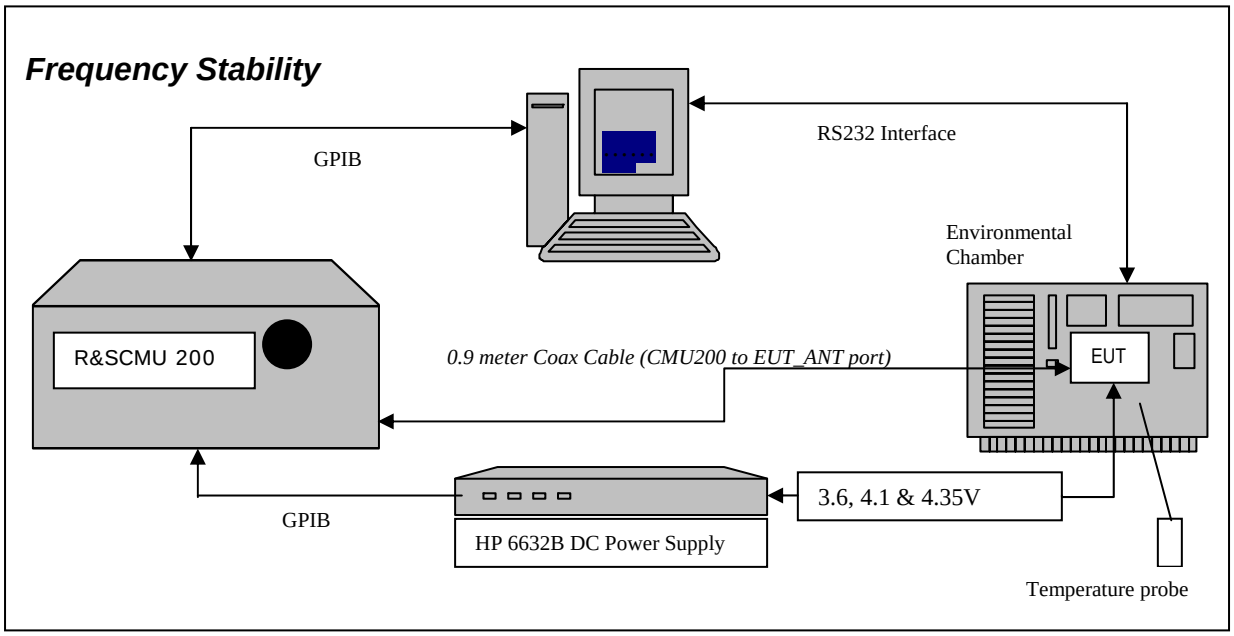
WCDMA Band 5 RF Conducted RF Output Power

	Band	**WCDMA Band 5 (850)**		
	Channel	4132	4182	4233
	Freq (MHz)	826.4	836.4	846.6
Mode	**Subtest**	**Max burst averaged conducted power (dBm)**		
Rel99	12.2 kbps RMC	24.5	24.3	24.2
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps	24.6	24.4	24.2
Rel6 HSUPA	1	23.6	23.4	23.3
Rel6 HSUPA	2	22.2	22.0	21.7
Rel6 HSUPA	3	23.1	23.0	22.7
Rel6 HSUPA	4	23.4	23.3	23.0
Rel6 HSUPA	5	21.2	21.3	21.1
Rel7 HSDPA+	1	23.7	23.4	23.2
Rel7 HSDPA+	2	23.3	23.1	22.9
Rel7 HSDPA+	3	23.3	23.1	22.9
Rel7 HSDPA+	4	21.9	21.7	21.9

WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements

APPENDIX 2C – WCDMA Band 5 FREQUENCY STABILITY TEST DATA

WCDMA Frequency Stability Test Data



The following measurements were performed by Berkin Can.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements
2.1055 Frequency Stability - Procedures
(a,b) Frequency Stability - Temperature Variation
(d) Frequency Stability - Voltage Variation

24.235 *Frequency Stability*.
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
The EUT meets the requirements as stated in CFR 47 chapter 1, 2.1055 RSS-132, 4.3 Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMU 200 and the EUT antenna port.

Test Setup:

The EUT was placed in the Temperature chamber and connected to CMU 200 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

The chamber was switched on and the temperature was set to -30°C.
After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled.
The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMU 200 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 1852.4, 1880.0 and 1907.6 MHz for the WCDMA band 2. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.
After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

Procedure:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.6 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.1 volts
15. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 3.7, 4.2 and 4.35 volts

The maximum frequency error in the WCDMA band 5 measured was **0.0484 PPM**.

Date of test: October 26, 2012

WCDMA Band 5 results: channels 4132, 4182 and 4233 @ 20°C maximum transmitted power

Traffic Channel Number	WCDMA Band 5 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4132	826.4	3.6	20	36.00	0.0436
4182	836.4	3.6	20	37.00	0.0442
4233	846.6	3.6	20	28.00	0.0331

Traffic Channel Number	WCDMA Band 5 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4132	826.4	4.1	20	25.00	0.0303
4182	836.4	4.1	20	-8.00	-0.0096
4233	846.6	4.1	20	20.00	0.0236

Traffic Channel Number	WCDMA Band 5 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4132	826.4	4.35	20	-12.00	-0.0145
4182	836.4	4.35	20	-22.00	-0.0263
4233	846.6	4.35	20	**41.00**	**0.0484**

WCDMA Band 5 Results: channel 4132 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4132	826.4	3.6	-30	25.00	0.0303
4132	826.4	3.6	-20	-13.00	-0.0157
4132	826.4	3.6	-10	-7.00	-0.0085
4132	826.4	3.6	0	-3.00	-0.0036
4132	826.4	3.6	10	22.00	0.0266
4132	826.4	3.6	20	36.00	0.0436
4132	826.4	3.6	30	34.00	0.0411
4132	826.4	3.6	40	37.00	0.0448
4132	826.4	3.6	50	-8.00	-0.0097
4132	826.4	3.6	60	26.00	0.0315
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4132	826.4	4.1	-30	-20.00	-0.0242
4132	826.4	4.1	-20	-25.00	-0.0303
4132	826.4	4.1	-10	21.00	0.0254
4132	826.4	4.1	0	12.00	0.0145
4132	826.4	4.1	10	5.00	0.0061
4132	826.4	4.1	20	25.00	0.0303
4132	826.4	4.1	30	36.00	0.0436
4132	826.4	4.1	40	17.00	0.0206
4132	826.4	4.1	50	12.00	0.0145
4132	826.4	4.1	60	32.00	0.0387
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4132	826.4	4.35	-30	39.00	0.0472
4132	826.4	4.35	-20	-2.00	-0.0024
4132	826.4	4.35	-10	19.00	0.0230
4132	826.4	4.35	0	27.00	0.0327
4132	826.4	4.35	10	21.00	0.0254
4132	826.4	4.35	20	-12.00	-0.0145
4132	826.4	4.35	30	15.00	0.0182
4132	826.4	4.35	40	24.00	0.0290
4132	826.4	4.35	50	-9.00	-0.0109
4132	826.4	4.35	60	-11.00	-0.0133

WCDMA Band 5 Results: channel 4182 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4182	836.4	3.6	-30	-5.00	-0.0060
4182	836.4	3.6	-20	18.00	0.0215
4182	836.4	3.6	-10	-28.00	-0.0335
4182	836.4	3.6	0	23.00	0.0275
4182	836.4	3.6	10	6.00	0.0072
4182	836.4	3.6	20	37.00	0.0442
4182	836.4	3.6	30	-12.00	-0.0143
4182	836.4	3.6	40	6.00	0.0072
4182	836.4	3.6	50	15.00	0.0179
4182	836.4	3.6	60	25.00	0.0299
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4182	836.4	4.1	-30	-16.00	-0.0191
4182	836.4	4.1	-20	-19.00	-0.0227
4182	836.4	4.1	-10	23.00	0.0275
4182	836.4	4.1	0	19.00	0.0227
4182	836.4	4.1	10	24.00	0.0287
4182	836.4	4.1	20	-8.00	-0.0096
4182	836.4	4.1	30	-11.00	-0.0132
4182	836.4	4.1	40	7.00	0.0084
4182	836.4	4.1	50	20.00	0.0239
4182	836.4	4.1	60	38.00	0.0454
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4182	836.4	4.35	-30	-4.00	-0.0048
4182	836.4	4.35	-20	11.00	0.0132
4182	836.4	4.35	-10	37.00	0.0442
4182	836.4	4.35	0	-4.00	-0.0048
4182	836.4	4.35	10	-15.00	-0.0179
4182	836.4	4.35	20	-22.00	-0.0263
4182	836.4	4.35	30	26.00	0.0311
4182	836.4	4.35	40	8.00	0.0096
4182	836.4	4.35	50	10.00	0.0120
4182	836.4	4.35	60	22.00	0.0263

WCDMA Band 5 Results: channel 4233 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
4233	846.6	3.6	-30	-14.00	-0.0165
4233	846.6	3.6	-20	-4.00	-0.0047
4233	846.6	3.6	-10	22.00	0.0260
4233	846.6	3.6	0	16.00	0.0189
4233	846.6	3.6	10	29.00	0.0343
4233	846.6	3.6	20	28.00	0.0331
4233	846.6	3.6	30	39.00	0.0461
4233	846.6	3.6	40	20.00	0.0236
4233	846.6	3.6	50	16.00	0.0189
4233	846.6	3.6	60	19.00	0.0224
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4233	846.6	4.1	-30	30.00	0.0354
4233	846.6	4.1	-20	21.00	0.0248
4233	846.6	4.1	-10	31.00	0.0366
4233	846.6	4.1	0	26.00	0.0307
4233	846.6	4.1	10	27.00	0.0319
4233	846.6	4.1	20	20.00	0.0236
4233	846.6	4.1	30	29.00	0.0343
4233	846.6	4.1	40	-6.00	-0.0071
4233	846.6	4.1	50	14.00	0.0165
4233	846.6	4.1	60	-1.00	-0.0012
Traffic Channel Number	**Frequency (MHz)**	**Voltage (Volts)**	**Temperature (Celsius)**	**Frequency Error (Hz)**	**PPM**
4233	846.6	4.35	-30	17.00	0.0201
4233	846.6	4.35	-20	23.00	0.0272
4233	846.6	4.35	-10	0.00	0.0000
4233	846.6	4.35	0	29.00	0.0343
4233	846.6	4.35	10	18.00	0.0213
4233	846.6	4.35	20	41.00	0.0484
4233	846.6	4.35	30	20.00	0.0236
4233	846.6	4.35	40	18.00	0.0213
4233	846.6	4.35	50	25.00	0.0295
4233	846.6	4.35	60	5.00	0.0059

APPENDIX 2D – WCDMA Band 5 RADIATED EMISSIONS TEST DATA

Radiated Power Test Data Results

Date of Test: September 25, 2012

The following measurements were performed by Feras Obeid.
The environmental tests conditions were: Temperature: 24.2 °C
Relative Humidity: 31.4 %

The BlackBerry® smartphone was standalone vertical, top down, with LCD facing the RX antenna when the turntable is at 0 degree position.
Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

WCDMA Band 5 Voice Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBm)	Max (V,H) (dBm)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	Corrected Reading (relative to Dipole) (W)	Limit (dBm)	Diff. To Limit (dB)
F0	4132	826.40	5	Dipole	V	-36.74	-29.61	V-V	-2.45	**20.76**	**0.12**	38.5	-17.74
F0	4132	826.40	5	Dipole	H	-29.61		H-H	3.02				
F0	4182	836.40	5	Dipole	V	-37.36	-30.13	V-V	-3.31	18.72	0.07	38.5	-19.78
F0	4182	836.40	5	Dipole	H	-30.13		H-H	1.28				
F0	4233	846.60	5	Dipole	V	-37.45	-31.47	V-V	-3.02	19.96	0.10	38.5	-18.54
F0	4233	846.60	5	Dipole	H	-31.47		H-H	2.51				

WCDMA Band 5 HSUPA Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	Corrected Reading (relative to Dipole) (W)	Limit (dBm)	Diff. To Limit (dB)
F0	4132	826.40	5	Dipole	V	-39.08	-31.06	V-V	-4.88	19.41	0.09	38.50	-19.09
F0	4132	826.40	5	Dipole	H	-31.06		H-H	1.67				
F0	4182	836.40	5	Dipole	V	-38.72	-31.55	V-V	-4.73	**20.14**	**0.10**	38.50	-18.36
F0	4182	836.40	5	Dipole	H	-31.55		H-H	2.70				
F0	4233	846.60	5	Dipole	V	-39.39	-32.81	V-V	-5.08	18.53	0.07	38.50	-19.97
F0	4233	846.60	5	Dipole	H	-32.81		H-H	1.08				

Radiated Emissions Test Data Results cont'd

WCDMA Band 5 Voice Mode

Date of Test: September 27, 2012

The following measurements were performed by Feras Obeid.

The environmental test conditions were: Temperature: 23.8 ºC
Relative Humidity: 28.1 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and the frequency range scanned was 30MHz – 1GHz.

Measurements were performed in WCDMA Band 5 Call mode on channels 4132, 4182, and 4233.

All emissions had test margins greater than 25.0 dB.

Date of Test: October 01 and 10, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 23.2 - 25.4 ºC
Relative Humidity: 37.6 - 41.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in WCDMA Band 5 Call mode on channels 4132, 4182, and 4233.

All emissions had test margins greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

WCDMA 5 HSUPA Mode

Date of Test: September 27, 2012

The following measurements were performed by Feras Obeid.

The environmental test conditions were: Temperature: 23.8 ºC
Relative Humidity: 28.1 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and the frequency range scanned was 30MHz – 1GHz.

Measurements were performed in WCDMA band 5 HSUPA mode on channels 4132, 4182, and 4233.

All emissions had test margins greater than 25.0 dB.

Date of Test: October 01 and 10, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 23.2 - 25.4 ºC
Relative Humidity: 37.6 - 41.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in WCDMA Band 5 HSUPA mode on channels 4132, 4182, and 4233.

All emissions had test margins greater than 25.0 dB.