

Test report

286279-2TRFWL

Date of issue: September 4, 2015

Applicant:

Spotwave Wireless Limited

Product:

SpotCell 1000 Coverage Unit

Model:

100-10097-10

FCC ID:

P3YSPOTCELL0030

Specifications:

FCC 47 CFR Part 24

Personal communications services; Subpart E – Broadband PCS

FCC 47 CFR Part 22

Public Mobile Services; Subpart H – Cellular Radiotelephone Service

Test location

Company name	Nemko Canada Inc.
Address	303 River Road
City	Ottawa
Province	Ontario
Postal code	K1V 1H2
Country	Canada
Telephone	+1 613 737 9680
Facsimile	+1 613 737 9691
Toll free	+1 800 563 6336
Website	www.nemko.com
Site number	FCC test site registration number: 176392, IC: 2040A-4 (3 m semi anechoic chamber)

Tested by	Kevin Rose, Wireless/EMC Specialist
Reviewed by	Andrey Adelberg, Senior Wireless/EMC Specialist
Date	September 4, 2015
Signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. © Nemko Canada Inc.

Table of contents

Table of contents	3
Section 1. Report summary	4
1.1 Applicant and manufacturer	4
1.2 Test specifications	4
1.3 Statement of compliance	4
1.4 Exclusions	4
1.5 Test report revision history	4
Section 2. Summary of test results	5
2.1 FCC Part 24 Subpart E test results	5
2.2 FCC Part 22 Subpart H test results	5
Section 3. Equipment under test (EUT) details	6
3.1 Sample information	6
3.2 EUT information	6
3.3 Technical information	6
3.4 Product description and theory of operation	6
3.5 EUT exercise details	6
3.6 EUT setup diagram	7
Section 4. Engineering considerations	8
4.1 Modifications incorporated in the EUT	8
4.2 Technical judgment	8
4.3 Deviations from laboratory tests procedures	8
Section 5. Test conditions	9
5.1 Atmospheric conditions	9
5.2 Power supply range	9
Section 6. Measurement uncertainty	10
6.1 Uncertainty of measurement	10
Section 7. Test equipment	11
7.1 Test equipment list	11
Section 8. Testing data	12
8.1 Clause 24.232(a) (d) Equivalent isotropically radiated power limits	12
8.2 Clause 22.913(a) Effective radiated power limits	14
8.3 Clause 24.238(a) (b) Spurious emissions at antenna terminal	16
8.4 Clause 22.917(a) (b) Out of band emissions at antenna terminal	22
8.5 Clause 24.238(a) (b) Field strength of spurious radiation	27
8.6 Clause 22.917(a) (b) Field strength of emissions	29
8.7 Clause 2.1049 Occupied bandwidth	31
Section 9. Setup Photos	39
9.1 Set-up	39
Section 10. Block diagrams of test set-ups	40
10.1 Radiated emissions set-up	40

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Spotwave Wireless Limited
Address	500 Van Buren St. Box 550
City	Kemptville
Province/State	ON
Postal/Zip code	K0G 1J0
Country	Canada

1.2 Test specifications

FCC 47 CFR Part 22	Public Mobile Services Subpart H – Cellular Radiotelephone Service
FCC 47 CFR Part 24	Personal communications services Subpart E – Broadband PCS
935210 D02 Signal Boosters Certification v02r01	Appendix D booster, amplifier, and repeater interim basic authorization procedures
KDB 935210 D04	Provider Specific Booster Measurements v01

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

1.4 Exclusions

None

1.5 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued

Section 2. Summary of test results

2.1 FCC Part 24 Subpart E test results

Part	Test description	Verdict
\$24.232(a)(d)	EIRP limits	Pass
\$24.238(a)(b)	Spurious emissions at the antenna terminal	Pass
\$24.238(a)(b)	Field strength of spurious radiation	Pass
\$24.235	Frequency stability	Not applicable
\$2.0149	Occupied bandwidth	Pass

Note: EUT doesn't translate the signal

2.2 FCC Part 22 Subpart H test results

Part	Test description	Verdict
Clause 22.913(a)(b)	Effective radiated power limits	Pass
Clause 22.917(a)(b)	Out of band emissions at antenna terminal	Pass
Clause 22.917(a)(b)	Field strength of emissions	Pass
Clause 22.355	Frequency tolerance	Not applicable
Clause 2.1049	Occupied bandwidth	Pass

Note: EUT doesn't translate the signal

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	June 1, 2015
Nemko sample ID number	133-000327

3.2 EUT information

Product name	SpotCell 1000 Coverage Unit
Model	100-10097-10
Serial number	A01507090A01270064

3.3 Technical information

Operating band	869–894 MHz DL (CELL band), 1930–1990 MHz DL (PCS band)
Modulation type	CDMA 1xRTT, CDMA 3xRTT, WCDMA, GSM, TDMA
Channel Spacing	Standard
Power requirements	115 V _{AC}
Emission designator	CDMA, F9W, GSM, GXW TDMA, FXD
Gain	15 dB
Antenna information	CELL band: 0 dBi nominal; 3 dBi maximum PCS band: 0 dBi nominal; 2 dBi maximum

3.4 Product description and theory of operation

The SpotCell 1000Xe adaptive system is capable of dual band and split band coverage and provides band-selective, on-frequency, in-building coverage in the Cellular and PCS bands.

3.5 EUT exercise details

The input signal from a signal generator was provided to EUT.

3.6 EUT setup diagram

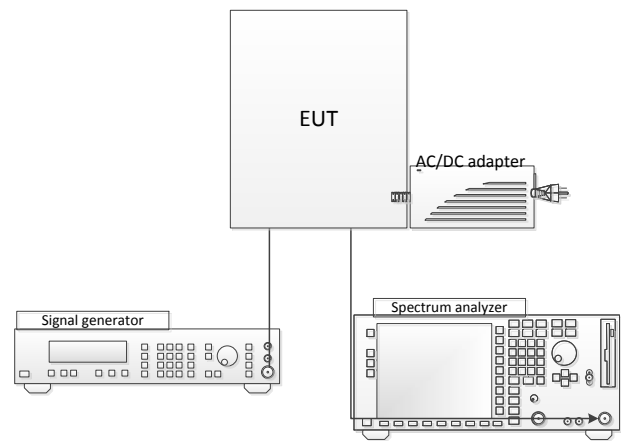


Figure 3.6-1: Setup diagram

Table 3.6-1: Support equipment

Description	Manufacturer	Model/Part number	Serial number	Rev.
Power Supply	CINCON	TRG100A240-01E13 Level V	100240-023637	-

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

There was no control of the AGC. The end user has no ability to turn AGC off.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.



Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Feb. 25/16
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 7/16
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Mar. 27/16
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Apr. 12/16
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Apr. 01/16
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	June 23/15
50 Ω coax cable	C.C.A.	None	FA002555	1 year	June 23/15
Signal generator	Rohde & Schwarz	SMIQ03E	FA001269	1 year	June 15/15
Signal generator	Rohde & Schwarz	SMIQ06B	FA001878	1 year	June 15/15
50 Ω coax cable	Huber + Suhner	None	FA002074	1 year	June 23/15

Note: NCR - no calibration required,

Section 8. Testing data

8.1 Clause 24.232(a) (d) Equivalent isotropically radiated power limits

8.1.1 Definitions and limits

(a)(1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.

(d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

8.1.2 Test summary

Test date	June 2, 2015	Temperature	24 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	47 %

8.1.3 Observations, settings and special notes

There was no control of the AGC. The end user has no ability to turn AGC off.
Test receiver settings:

Detector mode	RMS (for average), Peak (for peak)
Resolution bandwidth	> OBW per modulation variation
Integration bandwidth	>OBW
Video bandwidth	>RBW
Trace mode	Power Average (for average), Max Hold (for peak)
Measurement time	Auto

8.1.4 Test data

Table 8.1-1: Peak to Average ratio results

Modulation	Frequency, MHz	RF output power AVG, dBm	RF output power Peak, dBm	Peak to Average Ratio, dB	Peak to Average Ratio Limit, dBm	Peak to Average Margin, dB
TDMA	1960	4.13	11.92	7.79	13.00	5.21
GSM	1960	4.13	13.25	9.12	13.00	3.88
CDMA 1xRTT	1960	4.16	12.80	8.64	13.00	4.36
CDMA 3xRTT	1960	4.31	12.54	8.23	13.00	4.77
WCDMA	1960	4.09	12.87	8.78	13.00	4.22

Table 8.1-2: EIRP results

Modulation	Frequency, MHz	RF output power AVG, dBm	Antenna Gain, dBi	EIRP, dBm	Limit, dBm/MHz	Margin, dBm
TDMA	1960	4.13	2.00	6.13	62.15	56.02
GSM	1960	4.13	2.00	6.13	62.15	56.02
CDMA 1xRTT	1960	4.16	2.00	6.16	62.15	55.99
CDMA 3xRTT	1960	4.31	2.00	6.31	62.15	55.84
WCDMA	1960	4.09	2.00	6.09	62.15	56.06

Note: The results were measured using a higher resolution bandwidth integrated power. 1 MHz limit is the lowest limit
The actual limit may be increased by $10 \times \log_{10}(\text{actual bandwidth} / 1 \text{ MHz})$

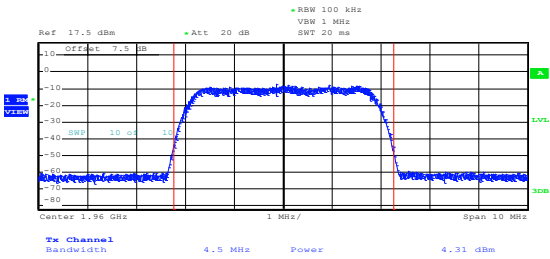


Figure 8.1-1: Conducted Average power example

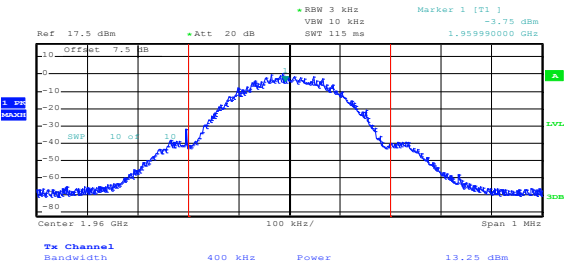


Figure 8.1-2: Conducted Peak power example

8.2 Clause 22.913(a) Effective radiated power limits

8.2.1 Definitions and limits

The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(a) Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts (57 dBm). However, for those systems operating in areas more than 72 km (45 miles) from international borders that:

(1) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or,

(2) Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts (60 dBm). The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts (38.45 dBm).

8.2.2 Test summary

Test date	June 2, 2015	Temperature	24 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	47 %

8.2.3 Observations, settings and special notes

There was no control of the AGC. The end user has no ability to turn AGC off.

Test receiver settings:

Detector mode	RMS (for average), Peak (for peak)
Resolution bandwidth	100 kHz
Integration bandwidth	>OBW
Video bandwidth	>RBW
Trace mode	Power Average (for average), Max Hold (for peak)
Measurement time	Auto

8.2.4 Test data

Table 8.2-1: ERP results

Modulation	Frequency, MHz	RF output power AVG, dBm	Antenna Gain, dBd	ERP, dBm	Limit, dBm	Margin, dBm
TDMA	881	4.05	0.85	4.90	57.00	52.10
GSM	881	4.17	0.85	5.02	57.00	51.98
CDMA 1xRTT	881	4.25	0.85	5.10	57.00	51.90
CDMA 3xRTT	881	4.18	0.85	5.03	57.00	51.97
WCDMA	881	4.26	0.85	5.11	57.00	51.89

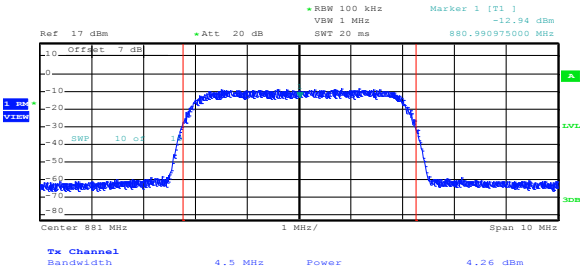


Figure 8.2-1: Conducted Average power DL example

8.3 Clause 24.238(a) (b) Spurious emissions at antenna terminal

8.3.1 Definitions and limits

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.3.2 Test summary

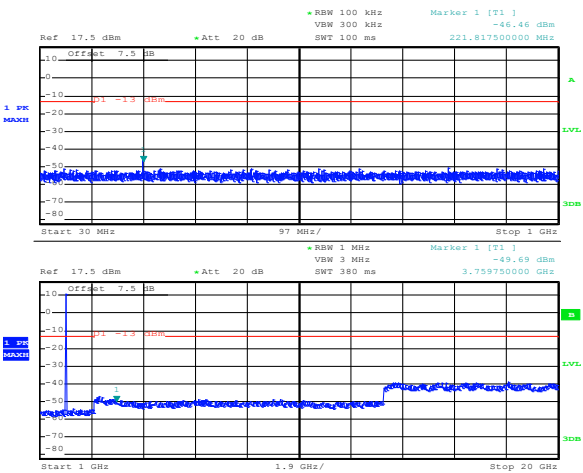
Test date	June 2, 2015	Temperature	24 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	47 %

8.3.3 Observations, settings and special notes

KDB 935210 D04 Provider Specific Booster Measurements used to perform the testing.

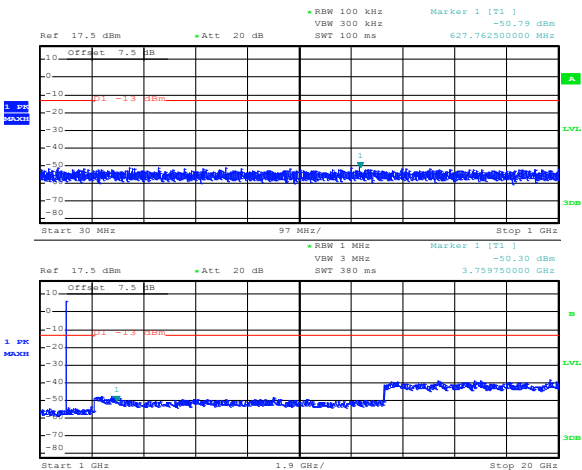
Frequency range	30 MHz to 10 th harmonic
Detector mode	Peak
Resolution bandwidth sweep	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Resolution bandwidth band edge	> 1 % of OBW
Video bandwidth	>RBW
Trace mode	Max Hold
Measurement time	Auto

8.3.4 Test data



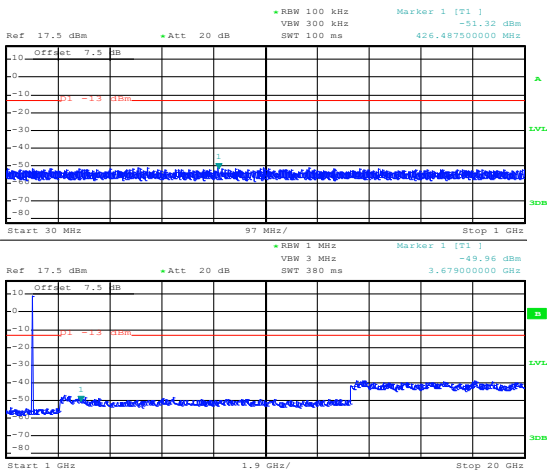
Date: 2.JUN.2015 17:16:29

Figure 8.3-1: TDMA DL 30 MHz – 20 GHz



Date: 2.JUN.2015 17:17:00

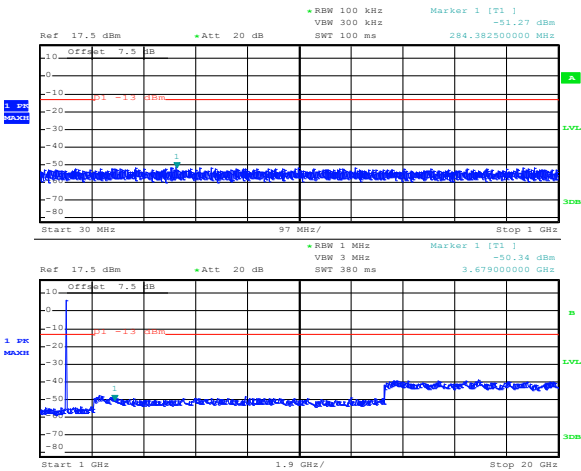
Figure 8.3-2: GSM DL 30 MHz – 20 GHz



Date: 2.JUN.2015 17:17:35

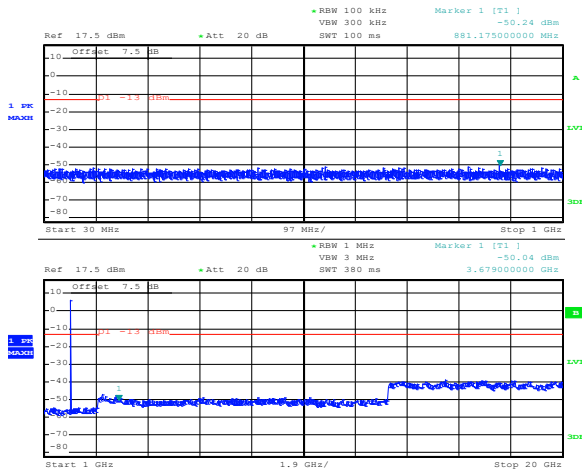
Figure 8.3-3: CDMA 1xRTT DL 30 MHz – 20 GHz

8.3.4 Test data continued



Date: 2.JUN.2015 17:18:01

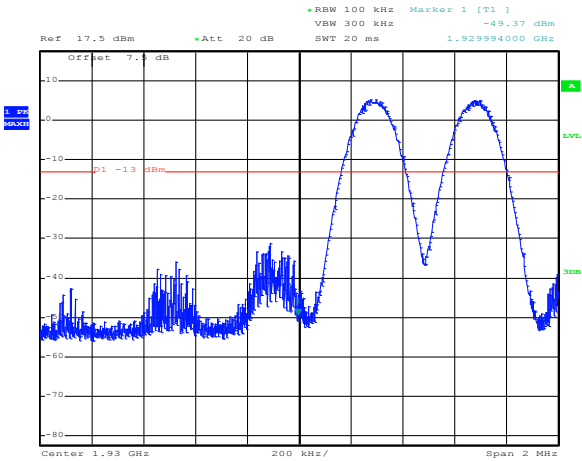
Figure 8.3-4: CDMA 3xRTT DL 30 MHz – 20 GHz



Date: 2.JUN.2015 17:18:33

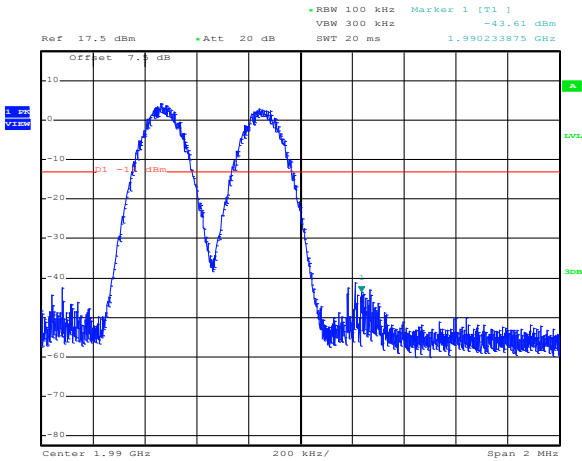
Figure 8.3-5: WCDMA DL 30 MHz – 20 GHz

8.3.4 Test data continued



Date: 2.JUN.2015 17:27:06

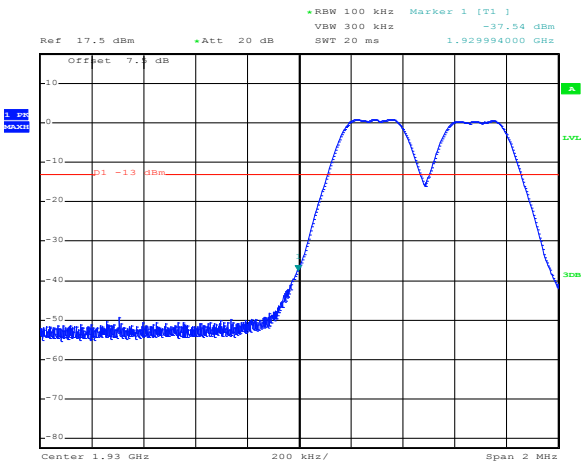
Figure 8.3-6: TDMA DL Lower Band edge



Date: 2.JUN.2015 18:01:55

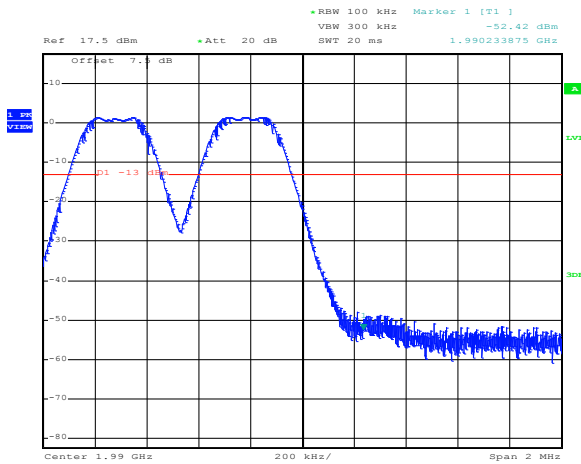
Figure 8.3-7: TDMA DL Upper Band edge

8.3.4 Test data continued



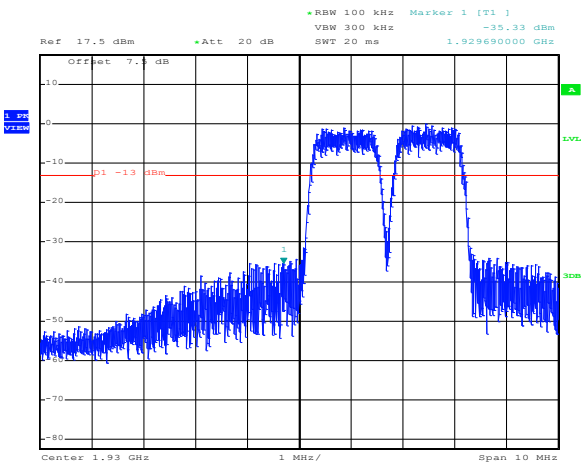
Date: 2.JUN.2015 17:25:36

Figure 8.3-8: GSM DL Lower Band edge



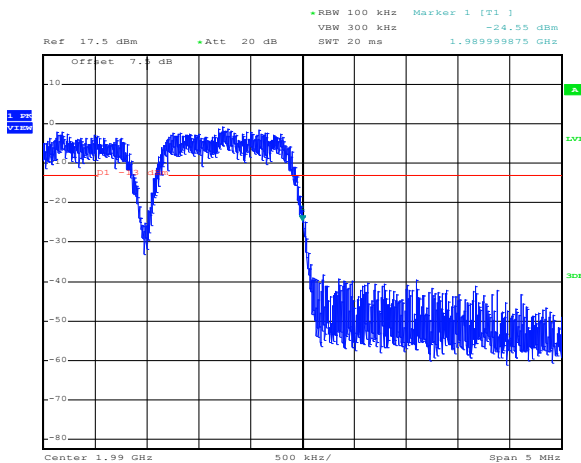
Date: 2.JUN.2015 18:02:53

Figure 8.3-9: GSM DL Upper Band edge



Date: 2.JUN.2015 17:23:22

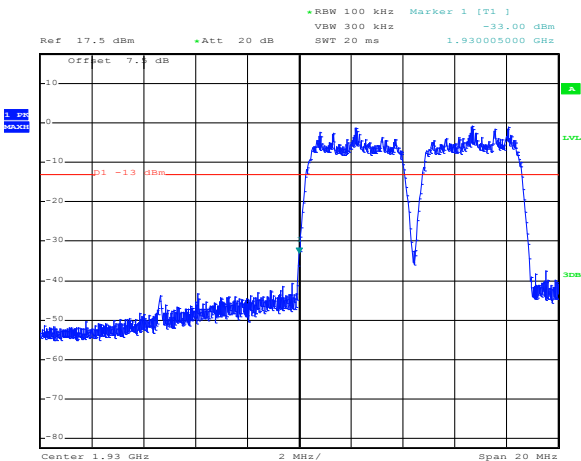
Figure 8.3-10: CDMA 1xRTT DL Lower Band edge



Date: 2.JUN.2015 18:05:10

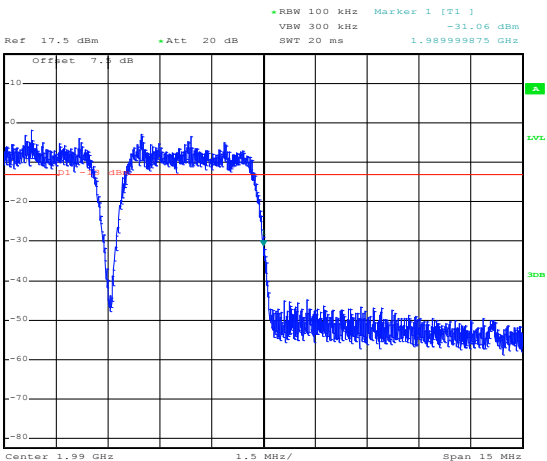
Figure 8.3-11: CDMA 1xRTT DL Upper Band edge

8.3.4 Test data continued



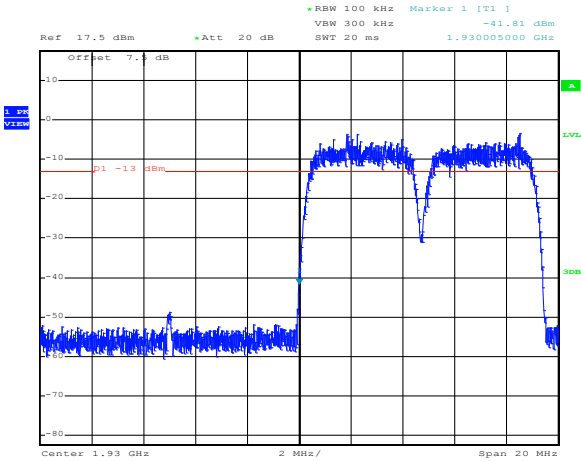
Date: 2.JUN.2015 17:22:00

Figure 8.3-12: CDMA 3xRTT DL Lower Band edge



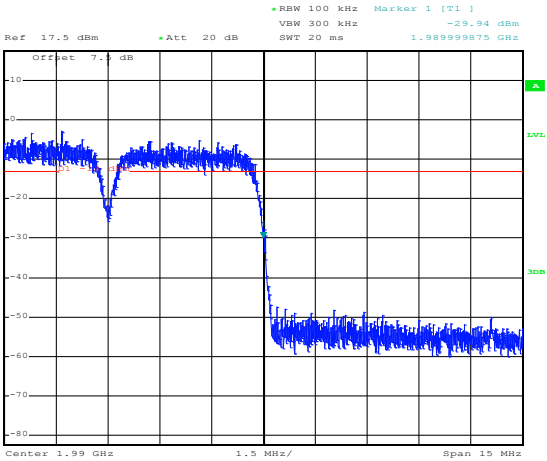
Date: 2.JUN.2015 18:06:04

Figure 8.3-13: CDMA 3xRTT DL Upper Band edge



Date: 2.JUN.2015 17:21:08

Figure 8.3-14: WCDMA DL Lower Band edge



Date: 2.JUN.2015 18:06:46

Figure 8.3-15: WCDMA DL Upper Band edge

8.4 Clause 22.917(a) (b) Out of band emissions at antenna terminal

8.4.1 Definitions and limits

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log_{10}(P)$ dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.4.2 Test summary

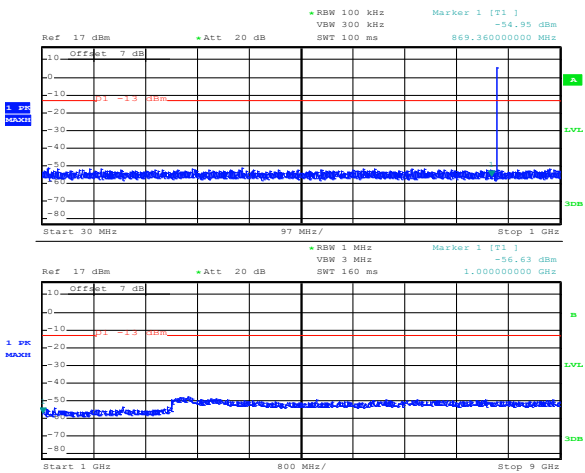
Test date	June 2, 2015	Temperature	24 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	47 %

8.4.3 Observations, settings and special notes

KDB 935210 D04 Provider Specific Booster Measurements used to perform the testing.

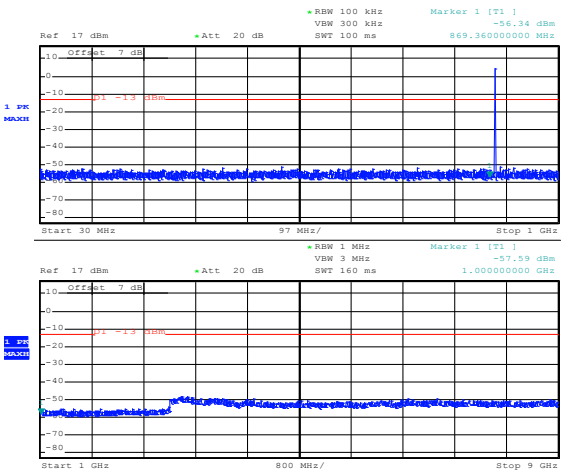
Frequency range	30 MHz to 10 th harmonic
Detector mode	Peak
Resolution bandwidth sweep	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Resolution bandwidth band edge	> 1 % of OBW
Video bandwidth	>RBW
Trace mode	Max Hold
Measurement time	Auto

8.4.4 Test data



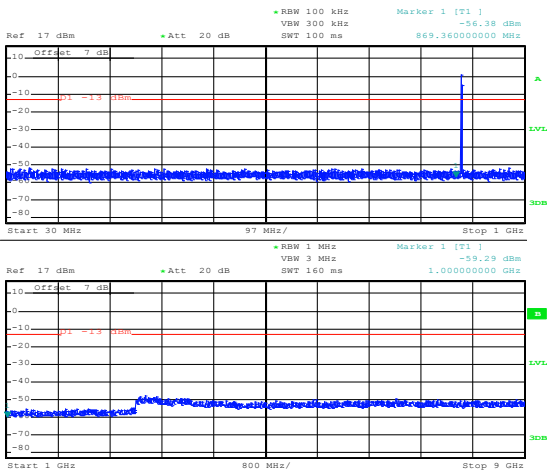
Date: 2.JUN.2015 18:37:16

Figure 8.4-1: TDMA DL 30 MHz – 9 GHz



Date: 2.JUN.2015 18:37:44

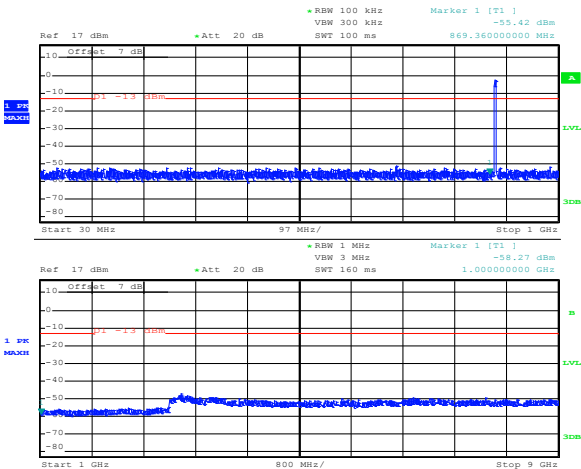
Figure 8.4-2: GSM DL 30 MHz – 20 GHz



Date: 2.JUN.2015 18:38:29

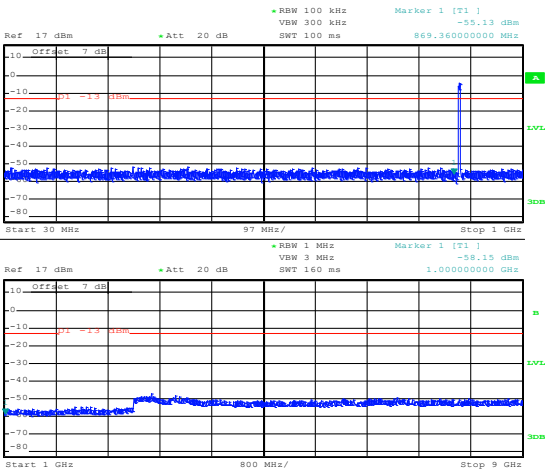
Figure 8.4-3: CDMA 1xRTT DL 30 MHz – 9 GHz

8.4.4 Test data continued



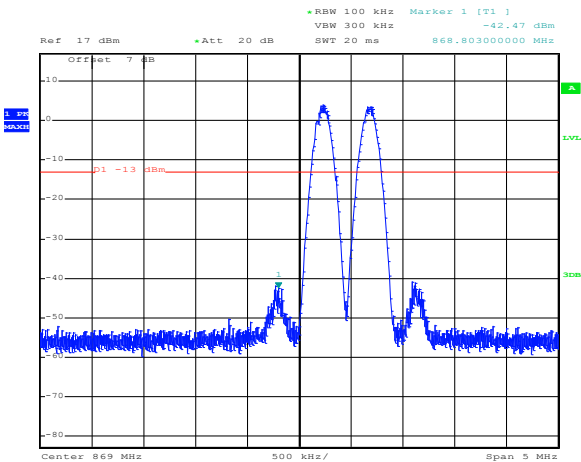
Date: 2.JUN.2015 18:38:49

Figure 8.4-4: CDMA 3xRTT DL 30 MHz - 9 GHz



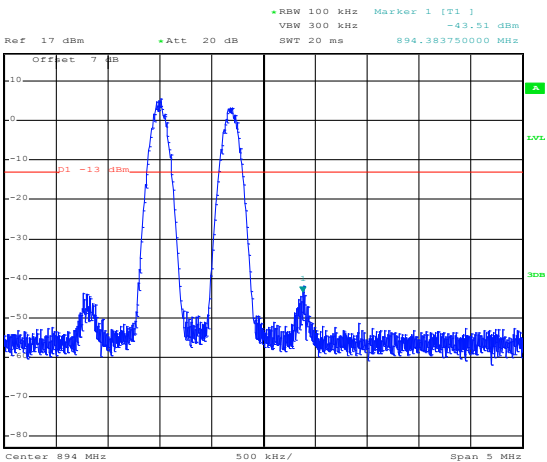
Date: 2.JUN.2015 18:38:06

Figure 8.4-5: WCDMA DL 30 MHz - 9 GHz



Date: 2.JUN.2015 18:47:18

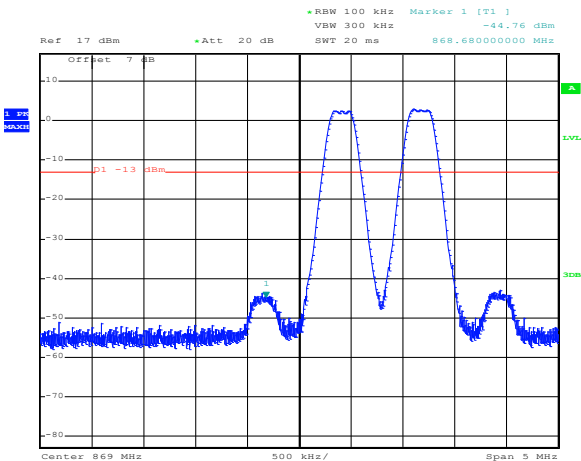
Figure 8.4-6: TDMA DL Lower Band edge



Date: 2.JUN.2015 18:48:09

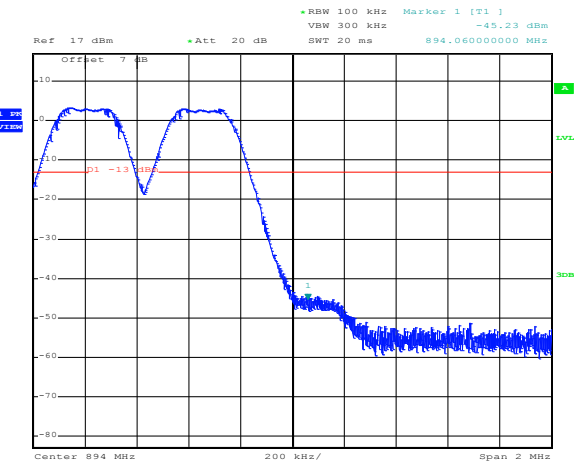
Figure 8.4-7: TDMA DL Upper Band edge

8.4.4 Test data continued



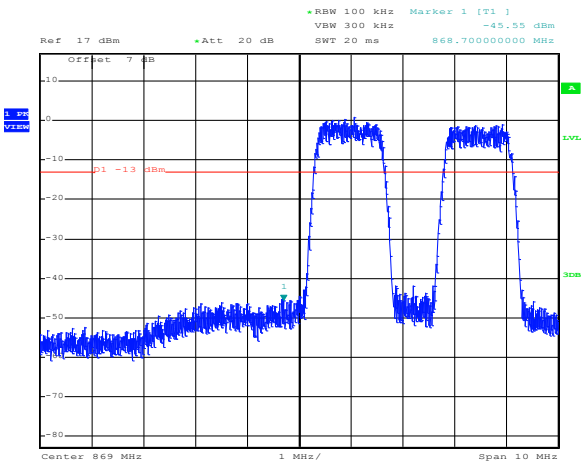
Date: 2.JUN.2015 18:44:45

Figure 8.4-8: GSM DL Lower Band edge



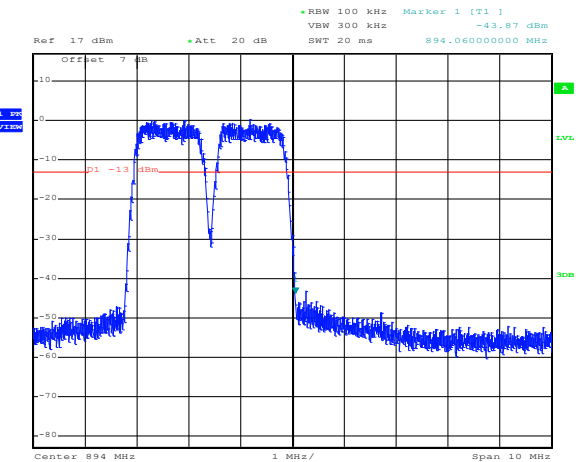
Date: 2.JUN.2015 18:50:42

Figure 8.4-9: GSM DL Upper Band edge



Date: 2.JUN.2015 18:43:21

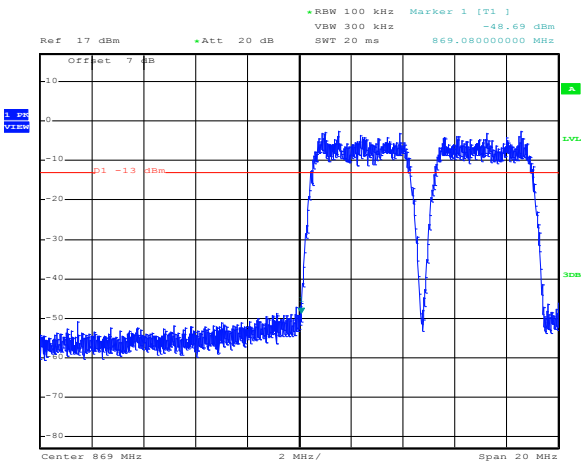
Figure 8.4-10: CDMA 1xRTT DL Lower Band edge



Date: 2.JUN.2015 18:51:48

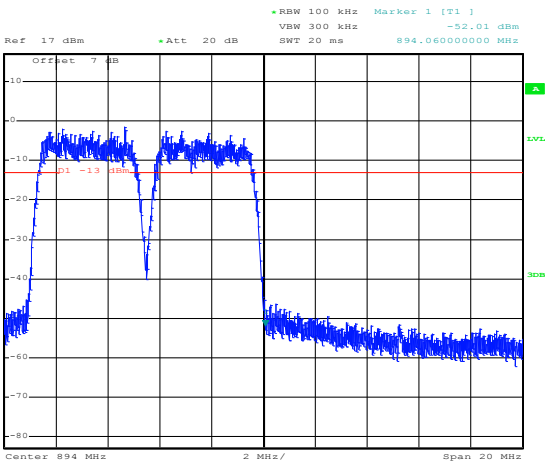
Figure 8.4-11: CDMA 1xRTT DL Upper Band edge

8.4.4 Test data continued



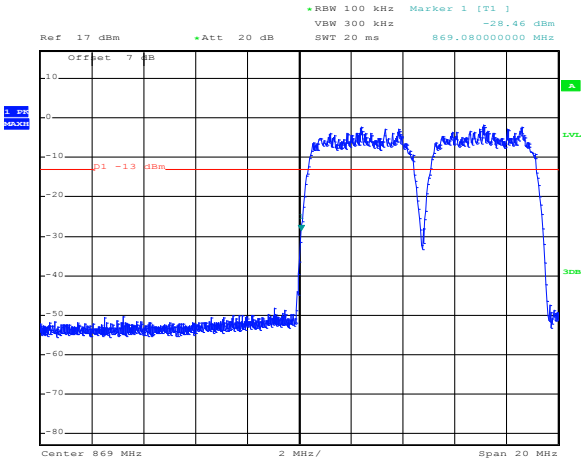
Date: 2.JUN.2015 18:42:20

Figure 8.4-12: CDMA 3xRTT DL Lower Band edge



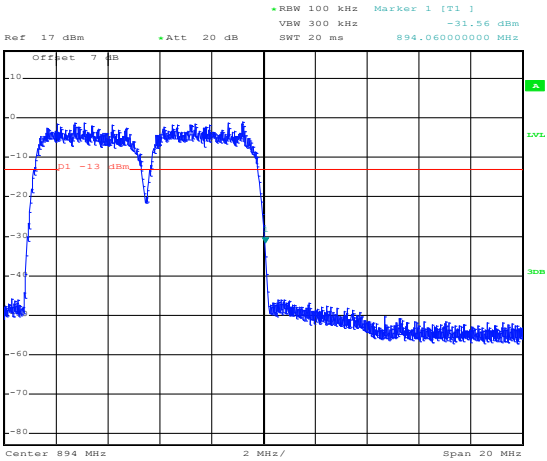
Date: 2.JUN.2015 18:52:31

Figure 8.4-13: CDMA 3xRTT DL Upper Band edge



Date: 2.JUN.2015 18:41:42

Figure 8.4-14: WCDMA DL Lower Band edge



Date: 2.JUN.2015 18:53:02

Figure 8.4-15: WCDMA DL Upper Band edge

8.5 Clause 24.238(a) (b) Field strength of spurious radiation

8.5.1 Definitions and limits

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.5.2 Test summary

Test date	June 3, 2015	Temperature	25 °C
Test engineer	Kevin Rose	Air pressure	1002 mbar
Verdict	Pass	Relative humidity	50 %

8.5.3 Observations, settings and special notes

Low, Mid, and High channels were investigated. Worst case examples are provided.
935210 D02 Signal Boosters Certification v02r01 was used for Radiated Emissions

Frequency range	30 MHz to 10 th harmonic
Detector mode	Peak
Resolution bandwidth	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Video bandwidth	>RBW
Trace mode	Max Hold

8.5.4 Test data

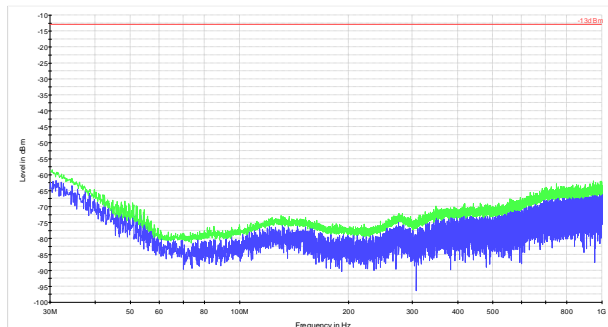


Figure 8.5-1: DL 30–1000 MHz

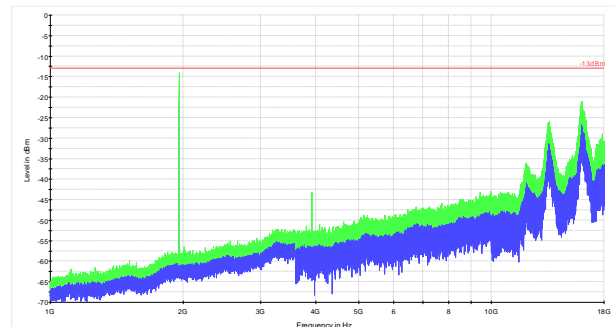


Figure 8.5-2: DL 1–18 GHz

All other emissions were more than 15 dB below the limit.

8.6 Clause 22.917(a) (b) Field strength of emissions

8.6.1 Definitions and limits

- a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log_{10}(P)$ dB.
- b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified).

8.6.2 Test summary

Test date	June 3, 2015	Temperature	25 °C
Test engineer	Kevin Rose	Air pressure	1002 mbar
Verdict	Pass	Relative humidity	50 %

8.6.3 Observations, settings and special notes

Low, Mid, and High channels were investigated. Worst case examples are provided.
935210 D02 Signal Boosters Certification v02r01 was used for Radiated Emissions
Receiver settings were:

Frequency range	30 MHz to 10 th harmonic
Detector mode	Peak
Resolution bandwidth	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Video bandwidth	>RBW
Trace mode	Max Hold

8.6.4 Test data

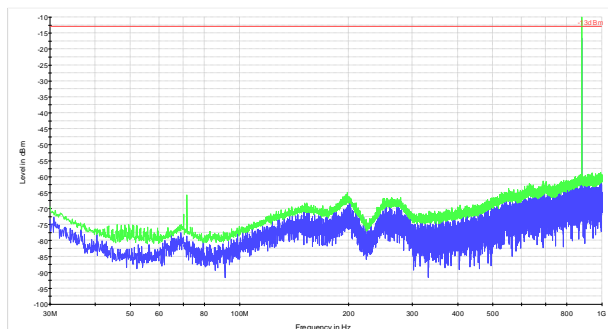


Figure 8.6-1: DL 30-1000 MHz

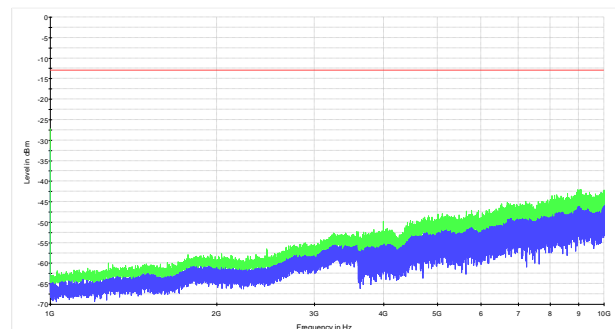


Figure 8.6-2: DL 1-10 GHz

All other emissions were more than 15 dB below the limit.

8.7 Clause 2.1049 Occupied bandwidth

8.7.1 Definitions and limits

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.7.2 Test summary

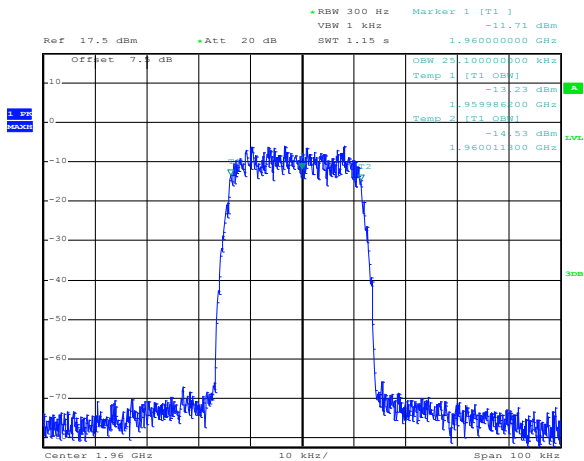
Test date	June 2, 2015	Temperature	24 °C
Test engineer	Kevin Rose	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	47 %

8.7.3 Observations, settings and special notes

There was no control of the AGC. The end user has no ability to turn AGC off.
Spectrum analyzer settings:

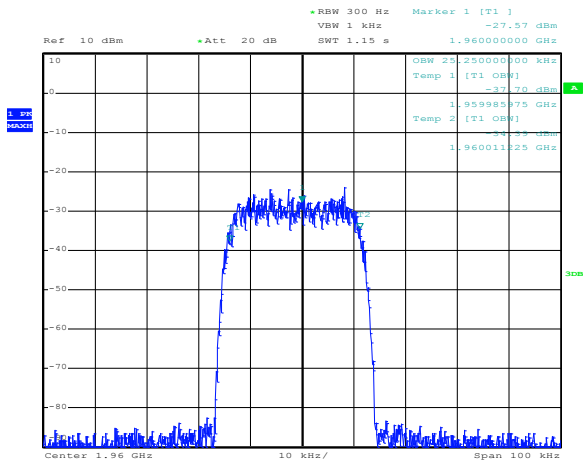
Detector mode	Peak
Resolution bandwidth	≥1 % of OBW
Video bandwidth	≥ RBW
Trace mode	Max Hold

8.7.4 Test data



Date: 2.JUN.2015 18:14:29

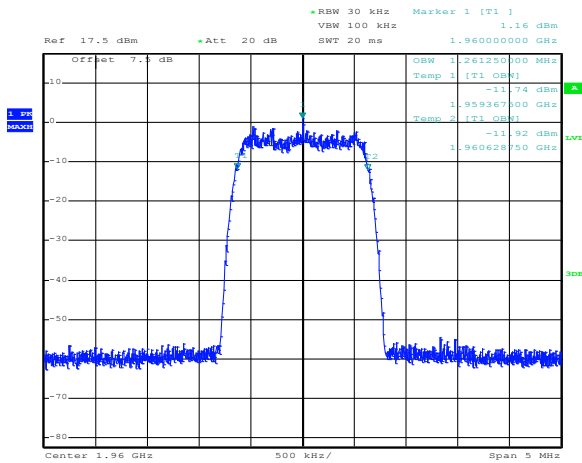
Figure 8.7-1: PCS TDMA DL output



Date: 2.JUN.2015 18:15:07

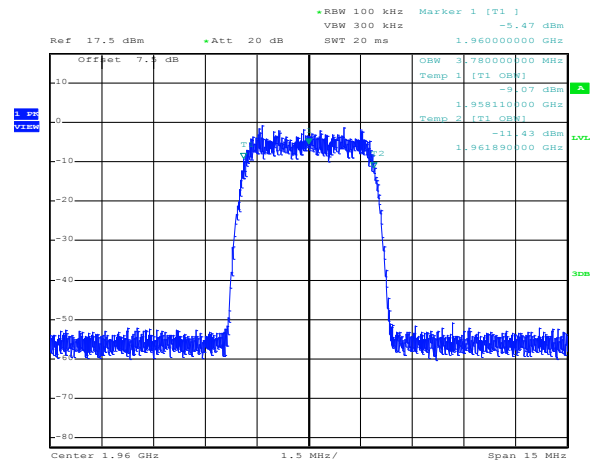
Figure 8.7-2: PCS TDMA DL input

8.7.4 Test data continued



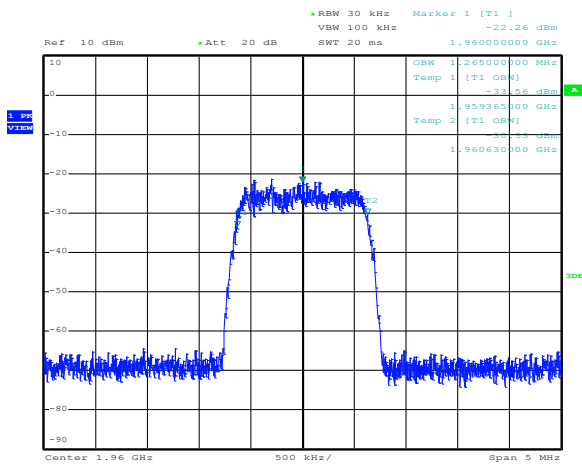
Date: 2.JUN.2015 18:10:24

Figure 8.7-3: PCS CDMA 1xRTT DL output



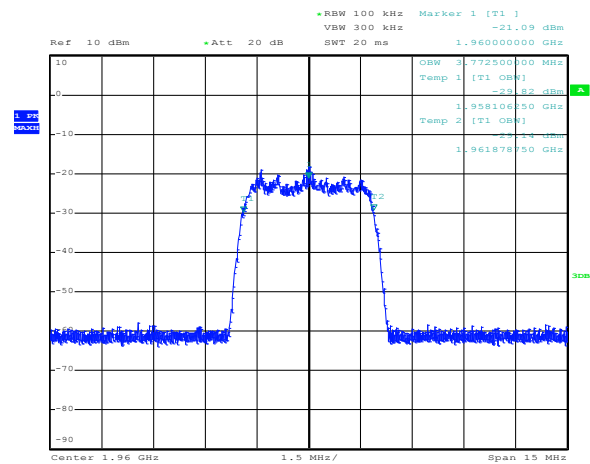
Date: 2.JUN.2015 18:09:59

Figure 8.7-4: PCS CDMA 3xRTT DL output



Date: 2.JUN.2015 18:12:16

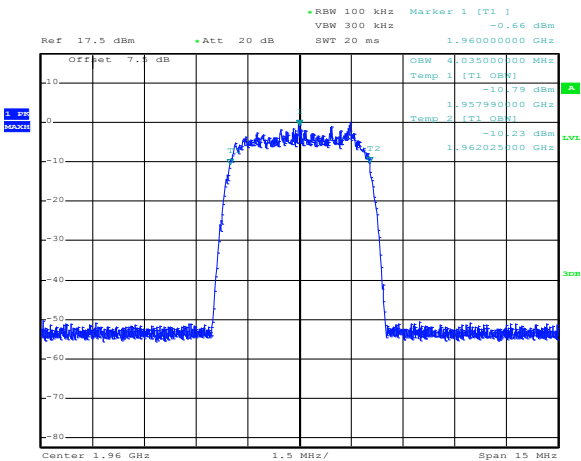
Figure 8.7-5: PCS CDMA 1xRTT DL input



Date: 2.JUN.2015 18:09:13

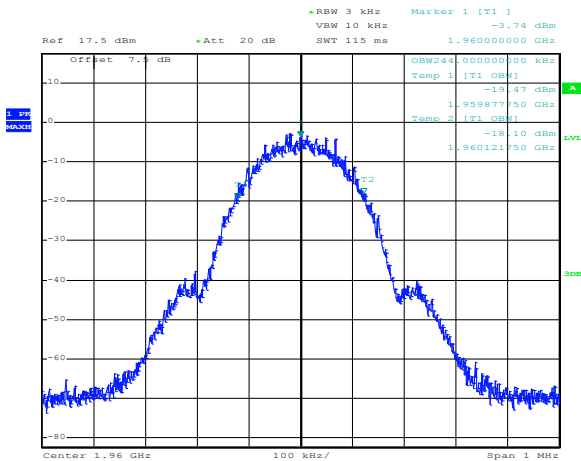
Figure 8.7-6: PCS CDMA 3xRTT DL input

8.7.4 Test data continued



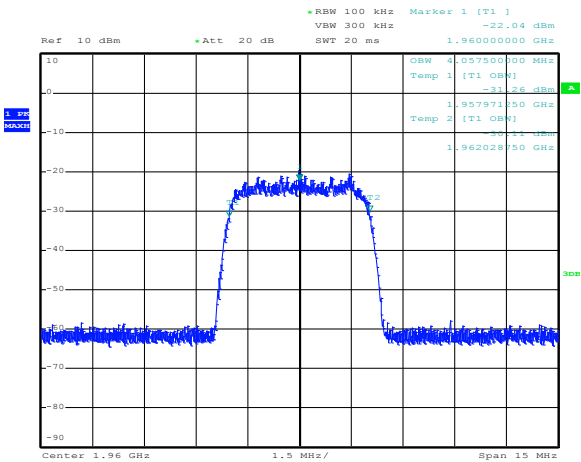
Date: 2.JUN.2015 18:08:03

Figure 8.7-7: PCS WCDMA DL output



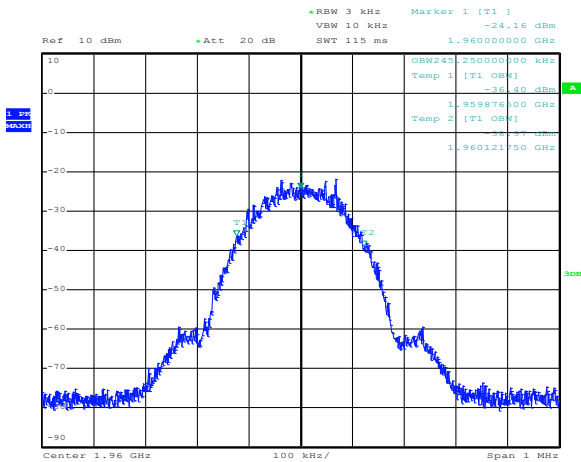
Date: 2.JUN.2015 18:13:34

Figure 8.7-8: PCS GSM DL output



Date: 2.JUN.2015 18:08:41

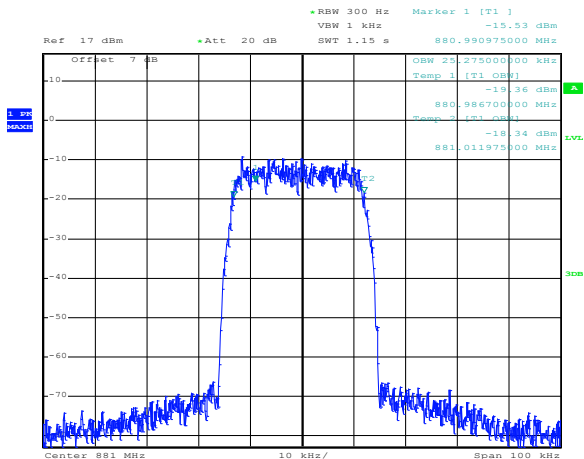
Figure 8.7-9: 5 PCS WCDMA DL input



Date: 2.JUN.2015 18:12:54

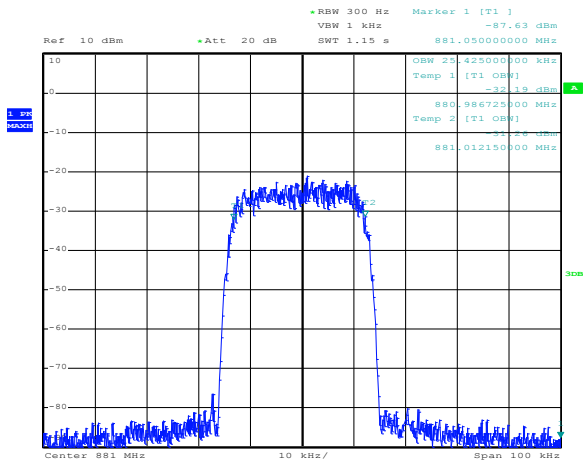
Figure 8.7-10: PCS GSM DL input

8.7.4 Test data



Date: 2.JUN.2015 18:16:55

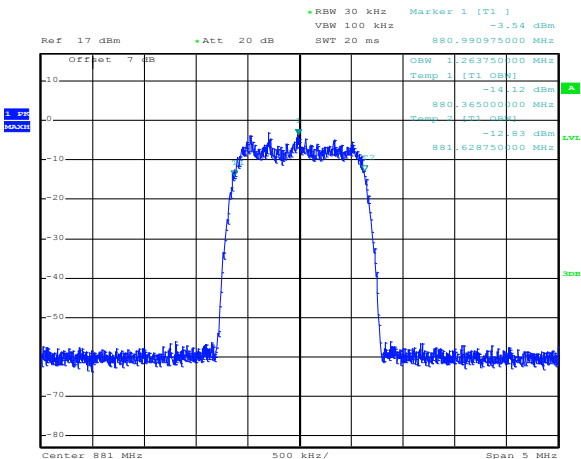
Figure 8.7-11: Cell TDMA DL output



Date: 2.JUN.2015 18:16:00

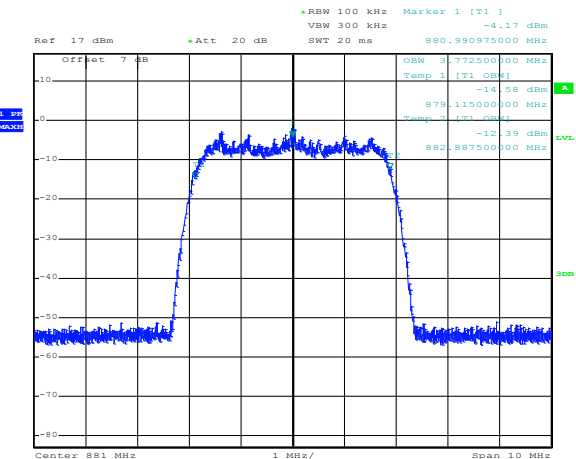
Figure 8.7-12: Cell TDMA DL input

8.7.4 Test data continued



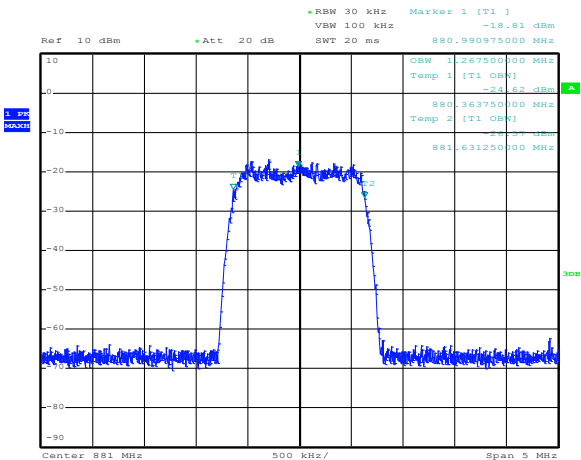
Date: 2.JUN.2015 18:19:28

Figure 8.7-13: Cell CDMA 1xRTT DL output



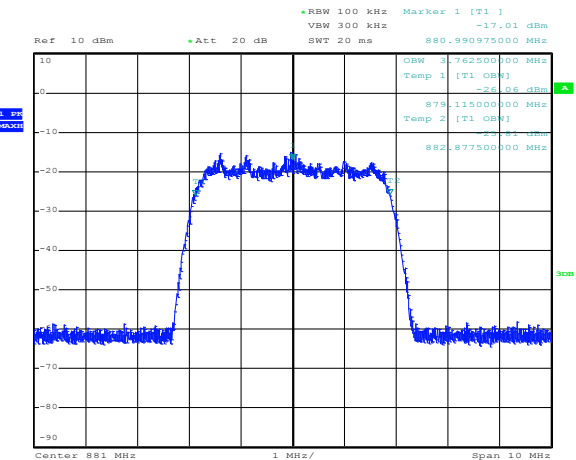
Date: 2.JUN.2015 18:19:54

Figure 8.7-14: Cell CDMA 3xRTT DL output



Date: 2.JUN.2015 18:18:50

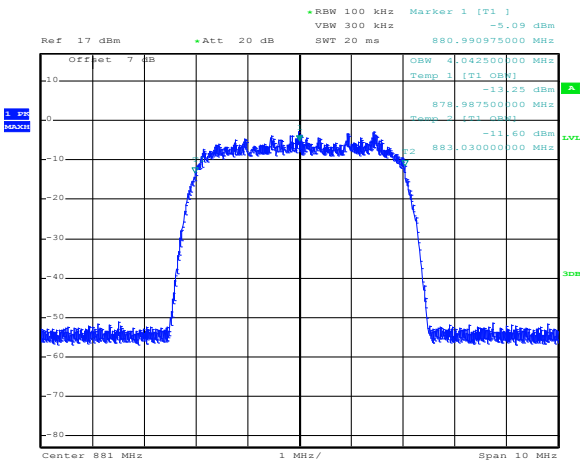
Figure 8.7-15: Cell CDMA 1xRTT DL input



Date: 2.JUN.2015 18:20:26

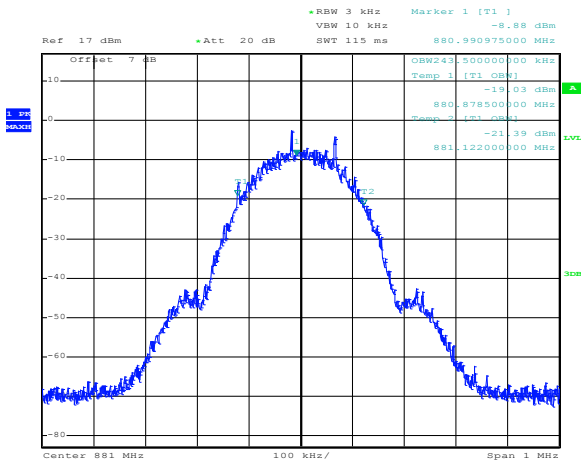
Figure 8.7-16: Cell CDMA 3xRTT DL input

8.7.4 Test data continued



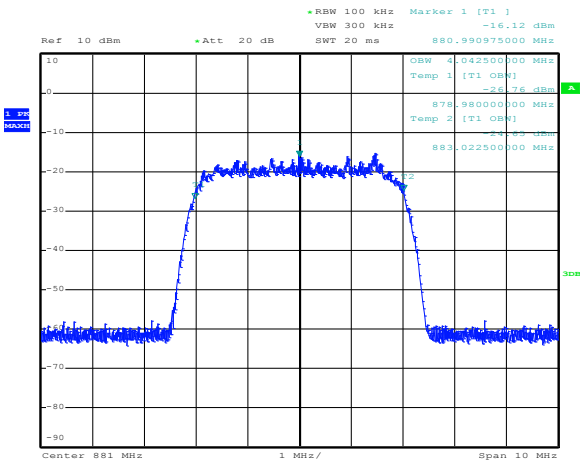
Date: 2.JUN.2015 18:21:36

Figure 8.7-17: Cell WCDMA DL output



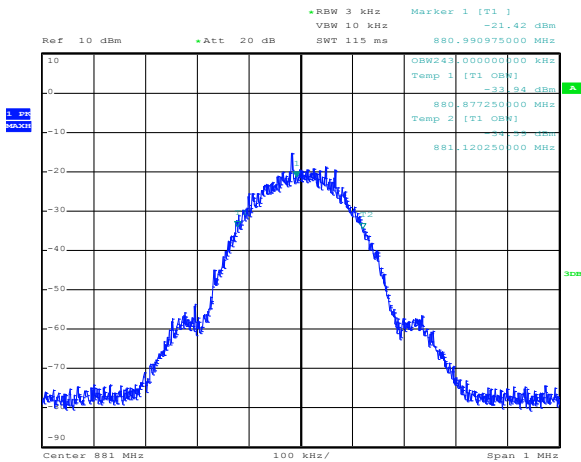
Date: 2.JUN.2015 18:17:33

Figure 8.7-18: Cell GSM DL output



Date: 2.JUN.2015 18:20:51

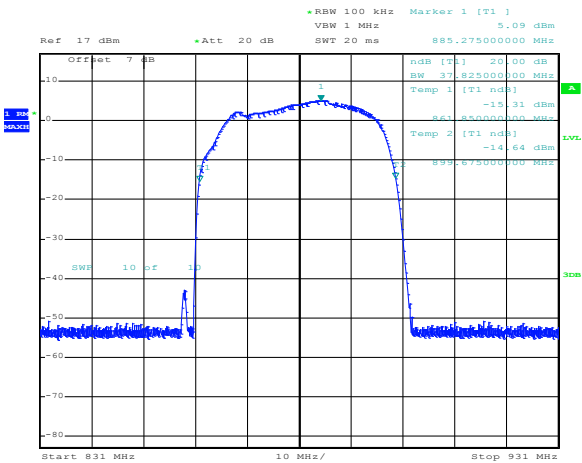
Figure 8.7-19: 5 Cell WCDMA DL input



Date: 2.JUN.2015 18:18:09

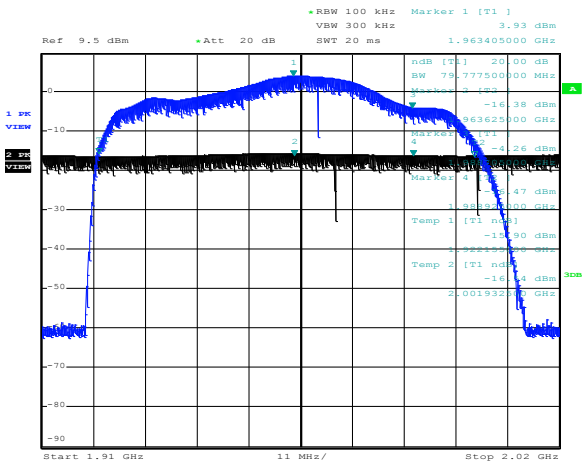
Figure 8.7-20: Cell GSM DL input

8.7.4 Test data continued



Date: 2.JUN.2015 18:32:21

Figure 8.7-21: Cell DL Filter response



Date: 4.JUN.2015 09:29:01

Figure 8.7-22: PCS DL Filter response

Section 9. Setup Photos

9.1 Set-up



Figure 9.1-1: Radiated setup photo



Figure 9.1-2: Conducted setup photo

Section 10. Block diagrams of test set-ups

10.1 Radiated emissions set-up

