



**MOBILE DEVICES BUSINESS**

**PRODUCT SAFETY AND COMPLIANCE  
EMC LABORATORY**

**EMC TEST REPORT - Addendum**

Test Report Number – 23513-1

Report Date – 2009-12-17

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signature:

Name: Lei Yang

Title: EMC Project Manager

Test: 2009-12-01 to 2009-12-17

As the responsible test lab manager, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature:

Name: Yilin Zhao

Title: Test Lab Manager

Date: 2009-12-17

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FCC Registration Number: 177885  
IC Registration Number: 109AW-1

ADR Testing Service location ADR BJ  
ISO/IEC-17025:2005 accredited by UKAS



2404

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## **Test Report Details**

Tests Performed By: Motorola (China) Technologies Ltd.  
Asia Global Compliance Labs  
No.1 Wang Jing East Road  
Chao Yang District  
Beijing, 100102, P. R. China  
Phone: +86 10 8473 2610  
FCC Registration Number: 177885  
IC Registration Number: 109AW-1

Tests Requested By: Motorola Inc.  
Mobile Devices Business  
600 North US Hwy 45  
Libertyville, IL 60048

Product Type: Cellular Phone

Signaling Capability: WCDMA 1700/2100, GSM 850/900/1800/1900,  
HSDPA 10.2 Mbps (Category 9/10)/7.2 Mbps  
(Category 7/8), EDGE Class 12, GPRS Class 12,  
HSUPA 5.76 Mbps, Standalone GPS/eCompass,  
Bluetooth, Version 2.0+EDR, 802.11b/802.11g

ESN: KSTB0A0211, KSTB0A0686

FCC ID: IHDP56KC6

Project number: 23513-1

Testing Complete Date: 12-17-2009

## **Applicable Standards**

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

- Part 2
- Part 22 Subpart H - Public Mobile Services
- Part 24 Subpart E – Personal Communications Services
- Part 27 Subpart L – Miscellaneous Wireless Communications Services

Applicable Standards: ANSI C63.4-2003, ANSI/TIA-603-C-2004, RSS-Gen Issue 2, RSS-132 Issue2, RSS-133 Issue 5, RSS-139 Issue 2.

**Summary of Testing**

Test #	Test Name	Pass/Fail
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	Pass
3	EIRP (Effective Isotropic Radiated Power)	Pass
4	Occupied Bandwidth	Pass
5	Spurious Emissions at Antenna Terminal	Pass
6	Field Strength of Spurious Emissions	Pass
7	Frequency Stability	Pass

Test #	Test Name	Margin with respect to the Limit
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	See results
3	EIRP (Effective Isotropic Radiated Power)	See results
4	Occupied Bandwidth	See Plots
5	Spurious Emissions at Antenna Terminal	See results
6	Field Strength of Spurious Emissions	See results
7	Frequency Stability	See results

The margin with respect to the limit is the minimum margin for all modes and bands.

**General and Special Conditions**

The EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4-2003 Standard requirements during the entire duration of testing.

**Equipment and Cable Configurations**

The EUT was tested in a stand-alone configuration that is representative of typical use.

<b>Equipment</b>	<b>Model/type</b>	<b>Serial number</b>	<b>Operational range</b>	<b>Date of calibration</b>
EMI analyzers	ESU 40	100036	20 Hz – 40 GHz	05.05.2009
Pre Amplifiers	PA-02-0001:	2007343	(10 kHz – 3 GHz)	06.26.2009
	PA-02-218	2007344	3 GHz – 18 GHz	06.26.2009
	PA-02-5	2007345	18 GHz – 40 GHz	06.26.2009
Radio com. Tester	CMU 200	112790	GSM 850/900/1800/1900  UMTS, CDMA, Bluetooth	N/A
Band Reject Filter	WRCD	N/A	GSM 850/900/1800/1900  UMTS, CDMA	N/A
	4N45-24241/3/6	N/A	WLAN	N/A
EMI analyzers	R&S ESCI	100650	9 kHz – 3 GHz	02.22.2009
Environment Chamber	Votsch VT4004	3546270300000 20	-50 <sup>0</sup> C -150 <sup>0</sup> C	12.16.2009
DC Power Supply	Agilent E3632A	My40021519	15V/7A	12.15.2009
Power meter	Agilent E4416A	MY451000906	NA	03.03.2009
Power sensor	Agilent E9323A	MY44420783	50MHz-6GHz	03.03.2009

The antennas used in the various tests are listed in the below table.

<b>Antenna</b>	<b>Type</b>	<b>Serial number</b>	<b>Operational range</b>	<b>Date of calibration</b>
Hybrid-log periodic	TDK HLP 3003C	130361	30 MHz – 3 GHz	11.07.08
Double ridged Horn	TDK HRN0118	130303	1 GHz – 18 GHz	03.26.09
Double ridged Horn	ETS HRN3116	00071938	18 GHz – 40 GHz	10.17.08

All test equipments was within their calibration date during the time of testing. When equipment went out of calibration during testing it was replaced using a similar piece of calibrated equipment. All these equipments are listed in the equipment list.

Note that the Agilent power meter, power sensor and the preamplifier are on a two-year calibration cycle. All other equipments are on a one-year calibration cycle.

**Measurement Procedures and Data**

**RF POWER OUTPUT**

**Measurement Procedure**

The RF output port of the equipment under test is directly coupled to the input of an Agilent power meter through a 20dB passive attenuator, adaptor (if needed), and specialized RF connector.

**Measurement Results**

**GSM 850**

Frequency (MHz)	Power (dBm)
824.2	32.98
836.6	33.06
848.8	33.04

**GSM 1900**

Frequency (MHz)	Power (dBm)
1850.2	29.98
1880.0	29.87
1909.8	29.86

**EDGE 850**

Frequency (MHz)	Power (dBm)
824.2	27.48
836.6	27.45
848.8	27.38

**EDGE 1900**

Frequency (MHz)	Power (dBm)
1850.2	26.73
1880.0	26.56
1909.8	26.36

**WCDMA 1700**

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 1700	1312	24.21	24.21	23.99	23.99	23.98	23.96	24.11	24.21	23.19	24.2	24.16
	1413	23.95	23.95	23.89	23.9	23.9	23.9	23.97	24.04	23.85	23.9	23.85
	1513	23.84	23.94	23.9	23.89	23.87	23.9	23.86	23.86	23.81	23.82	23.8

All WCDMA testing was done in RMC mode

**RADIATED POWER (EIRP AND ERP)****Measurement Procedure**

The phone was tested in a 16' anechoic chamber with a 2-axis position system that permits taking complete spherical scans of the EUT's radiation patterns. For all tests, the phone was supported in a free space type environment, vertically oriented in the chamber.

All measurements were made with the phone placed in a call using a mobile station test set. The phone was weakly coupled to the test set and configured to transmit in full data rate mode. Radiated power was measured at each 15 degree step. The radiated power was measured using a peak detector for all bands in the Spectrum Analyzers. From these measurements, the software calculates the angle at which maximum radiated power occurs for each case, and the radiated power at this angle was extracted from the data. To get ERP (effective radiated power referenced to a half-wave dipole), subtract 2.1 dB from these

A peak detector was used for measurements in the GSM 850, Edge 850, GSM 1900, Edge 1900, and WCDMA 1700 bands.

**Measurement Results**

<b>Band</b>	<b>EIRP dBm</b>	<b>ERP dBm</b>
GSM 850	26.13	<b>24.03</b>
GSM 1900	<b>28.2</b>	26.1
EDGE 850	21.76	<b>19.66</b>
EDGE 1900	<b>25.45</b>	23.35
WCDMA 1700	<b>25.3</b>	22.2

**OCCUPIED BANDWIDTH****Measurement Procedure**

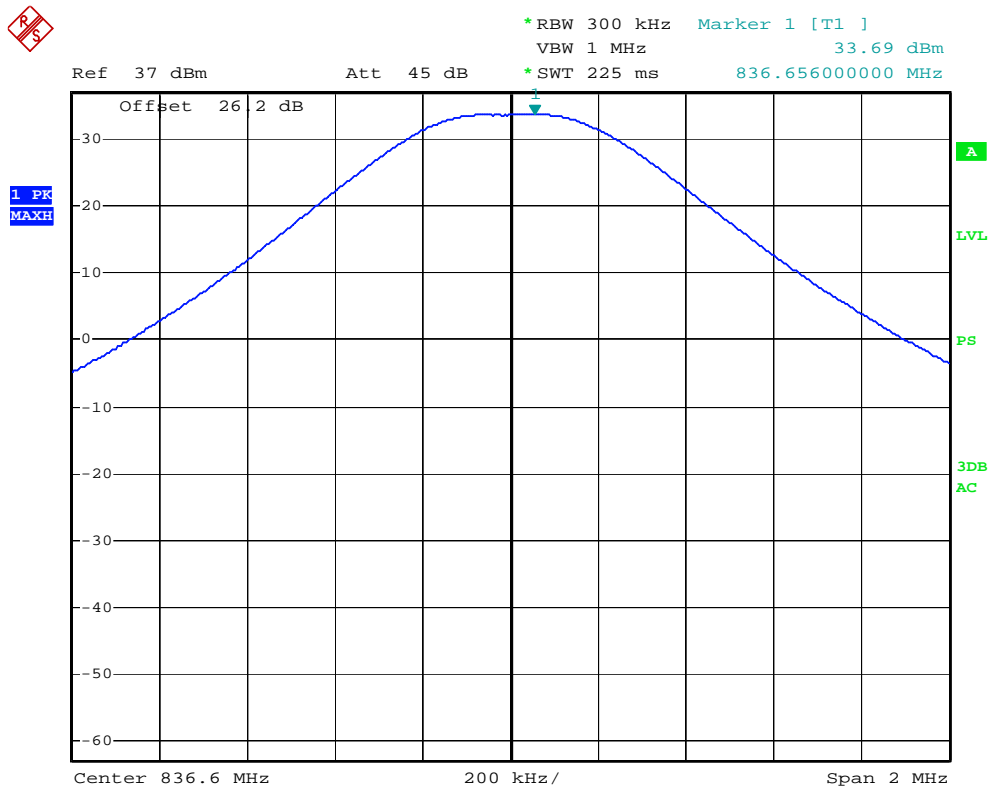
The RF output port of the equipment under test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector for reference level, occupied bandwidth and band edge. Each trace is set for Max Hold. For all testing the EUT was powered through the computer's USB port.

The middle channel within the designated frequency block was measured. For digital modulation, the lower and upper band edge plots are displayed.

**Measurement Results**

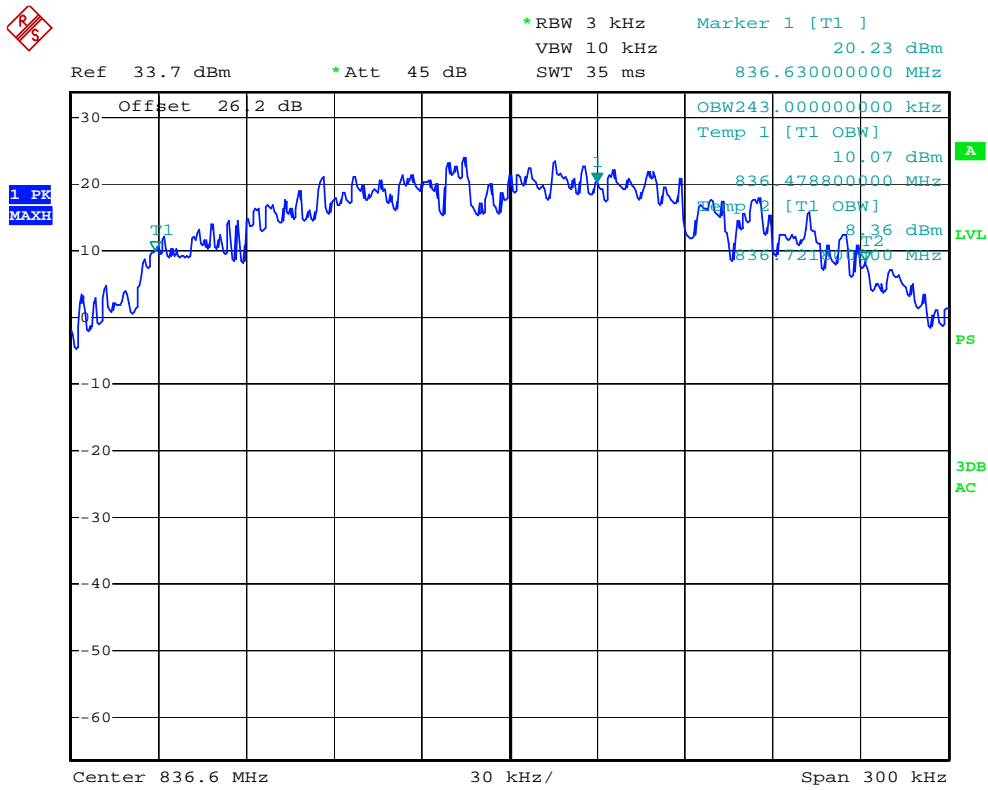
Attached

### Measurement Results – GSM 850



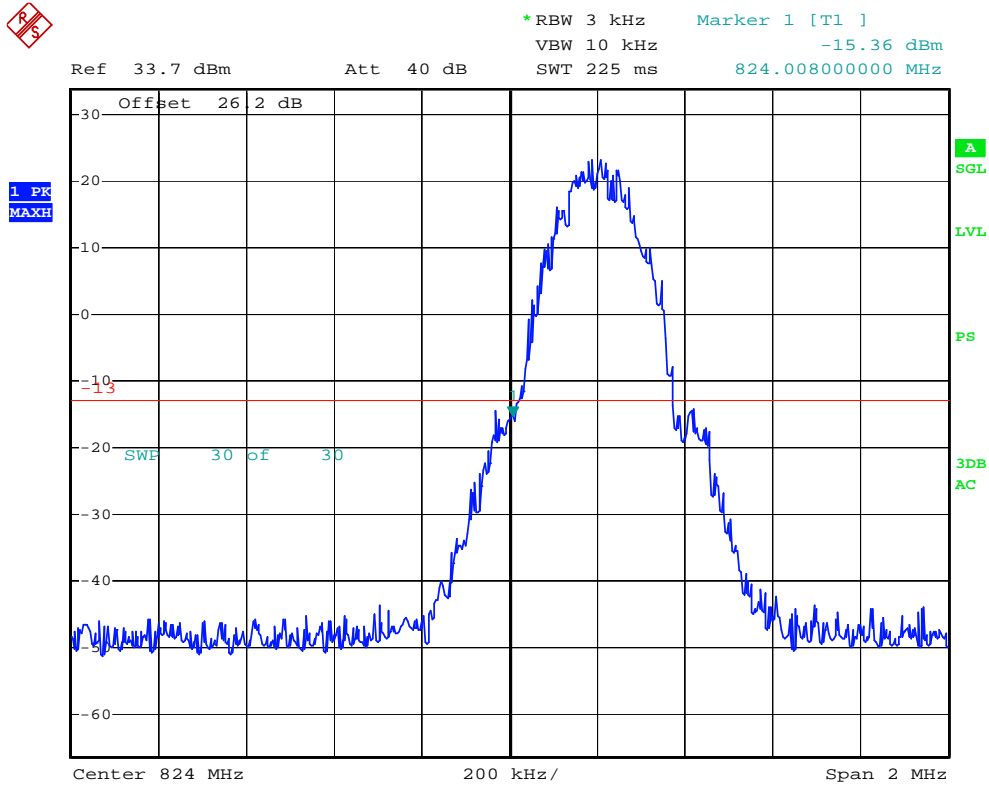
Date: 7.DEC.2009 10:53:08

### GSM 850 – Reference Level Plot – Channel 190 (836.6 MHz)



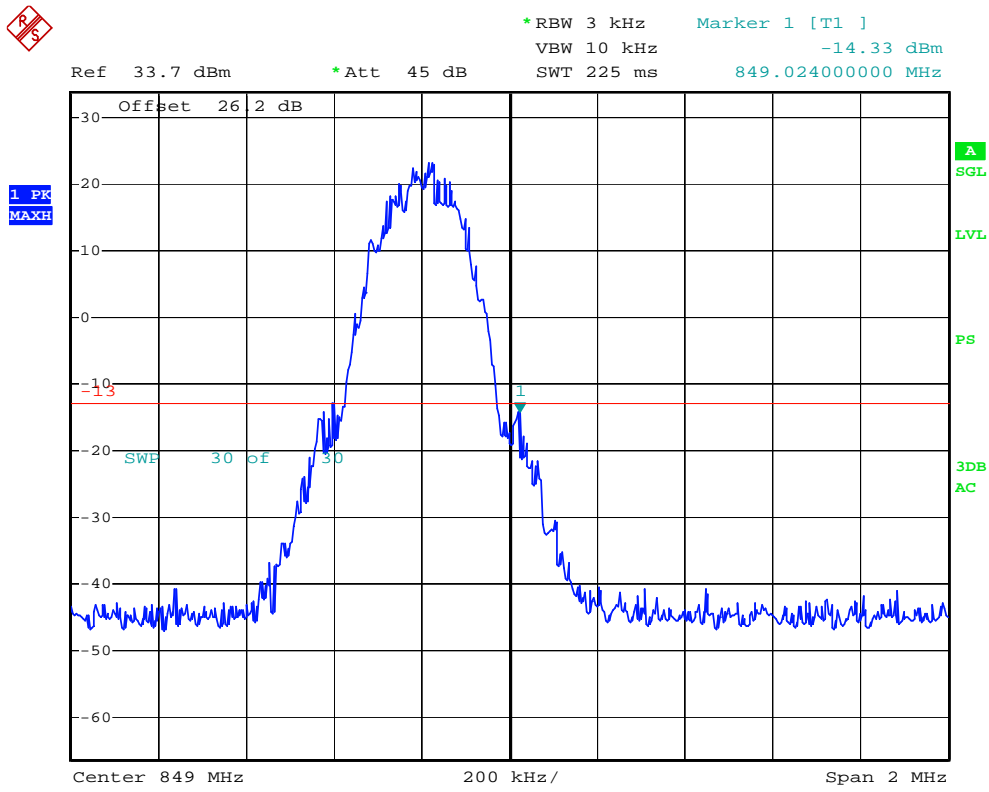
Date: 15.DEC.2009 10:45:23

**GSM 850 – Channel 190 (836.6 MHz)– Occupied Bandwidth**



Date: 7.DEC.2009 10:57:13

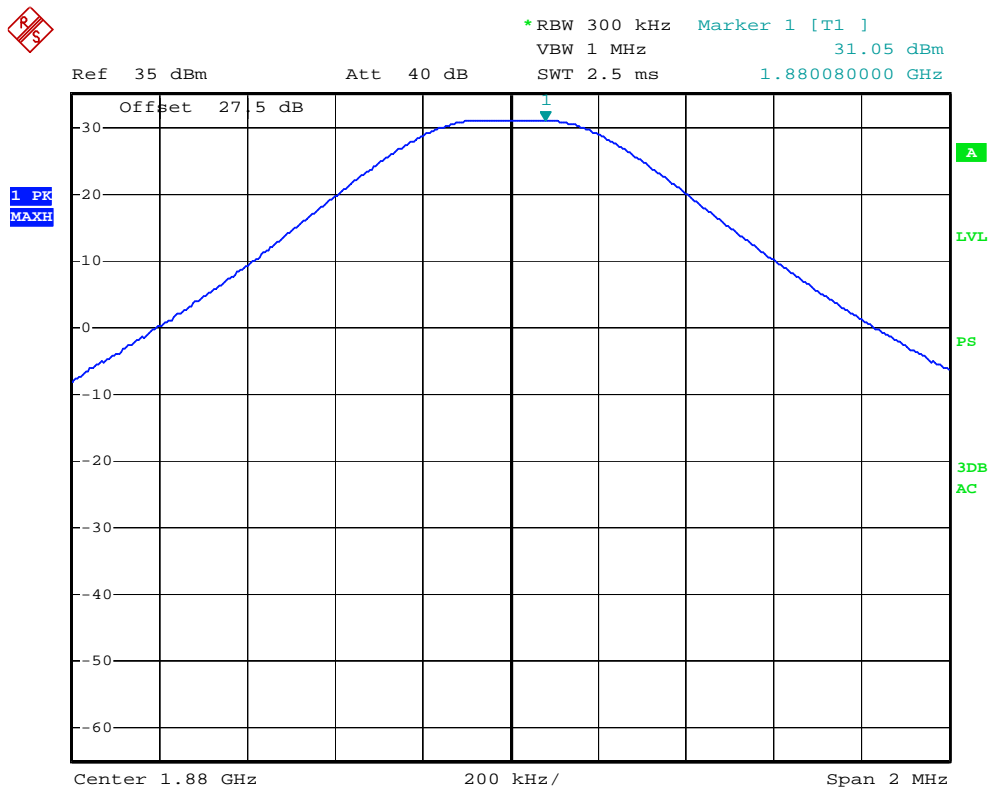
**GSM 850 – Lower Band Edge – Channel 128 (824.2 MHz)**



Date: 15.DEC.2009 10:49:15

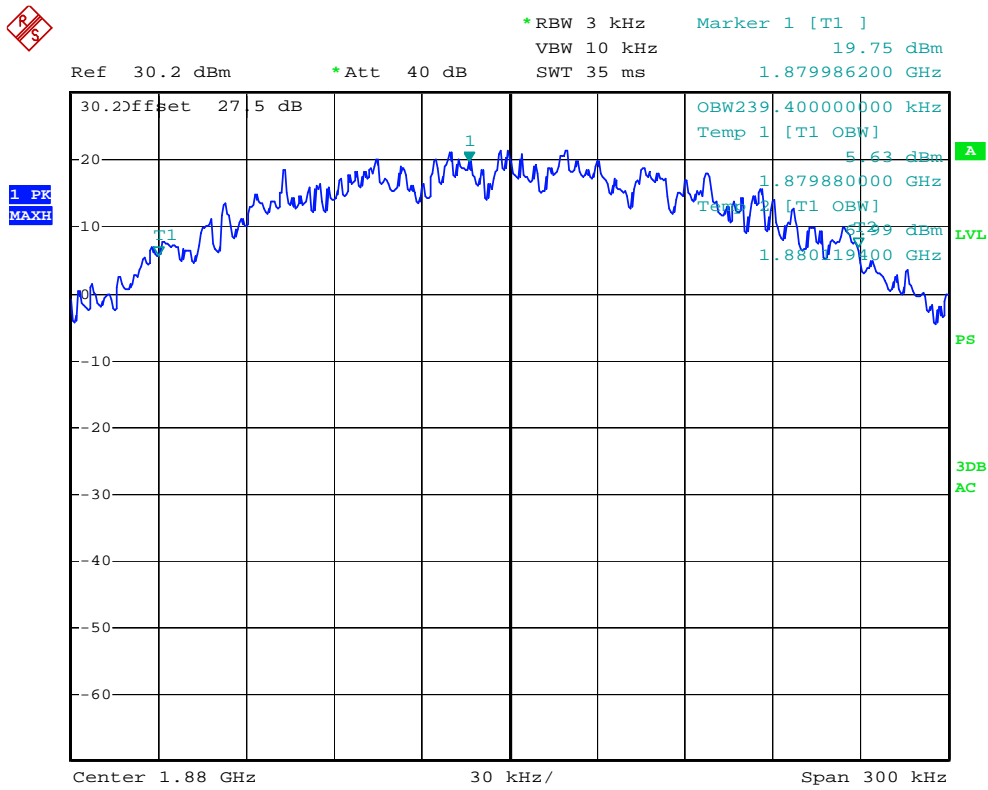
**GSM 850 – Upper Band Edge – Channel 251 (848.8 MHz)**

### Measurement Results – PCS 1900



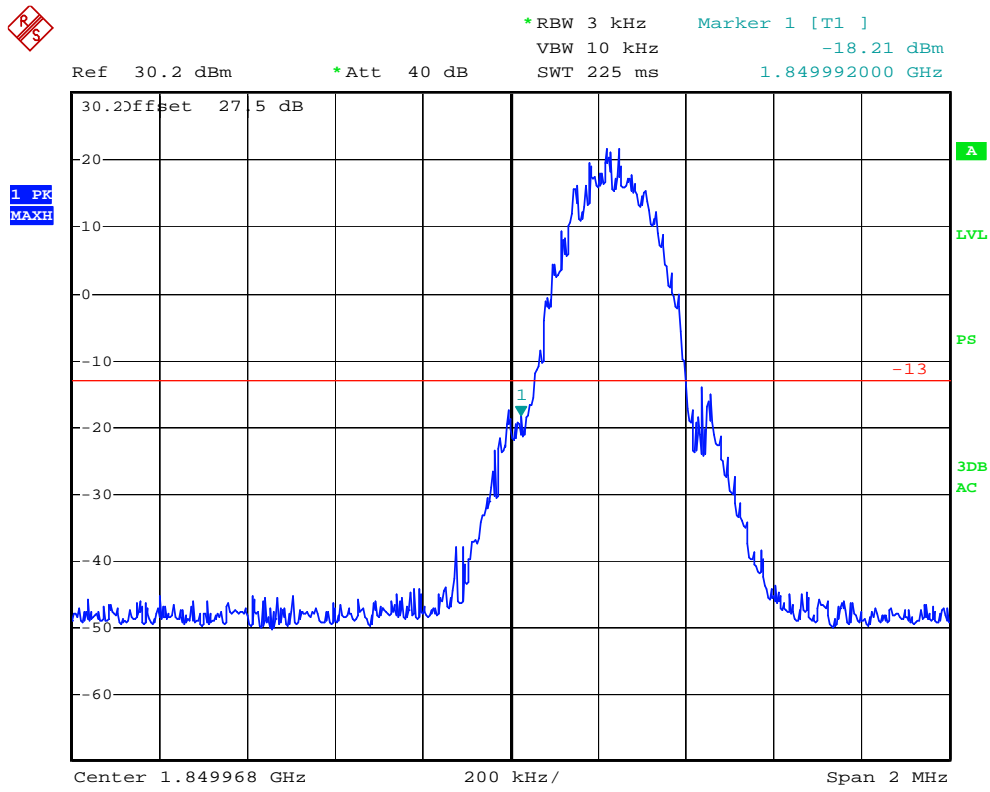
Date: 7.DEC.2009 11:08:07

### GSM 1900(PCS) – Reference Level Plot – Channel 661 (1880.00 MHz)



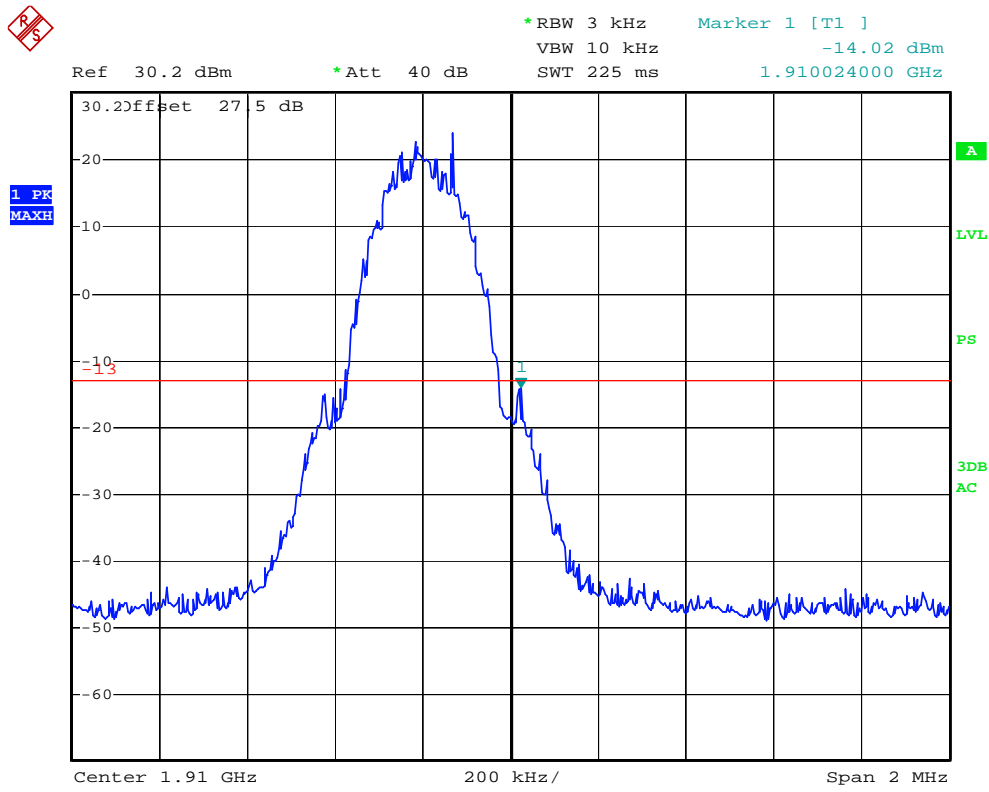
Date: 7.DEC.2009 11:14:35

**GSM 1900(PCS) – Channel 661 (1880.00 MHz) – Occupied Bandwidth**



Date: 7.DEC.2009 11:22:29

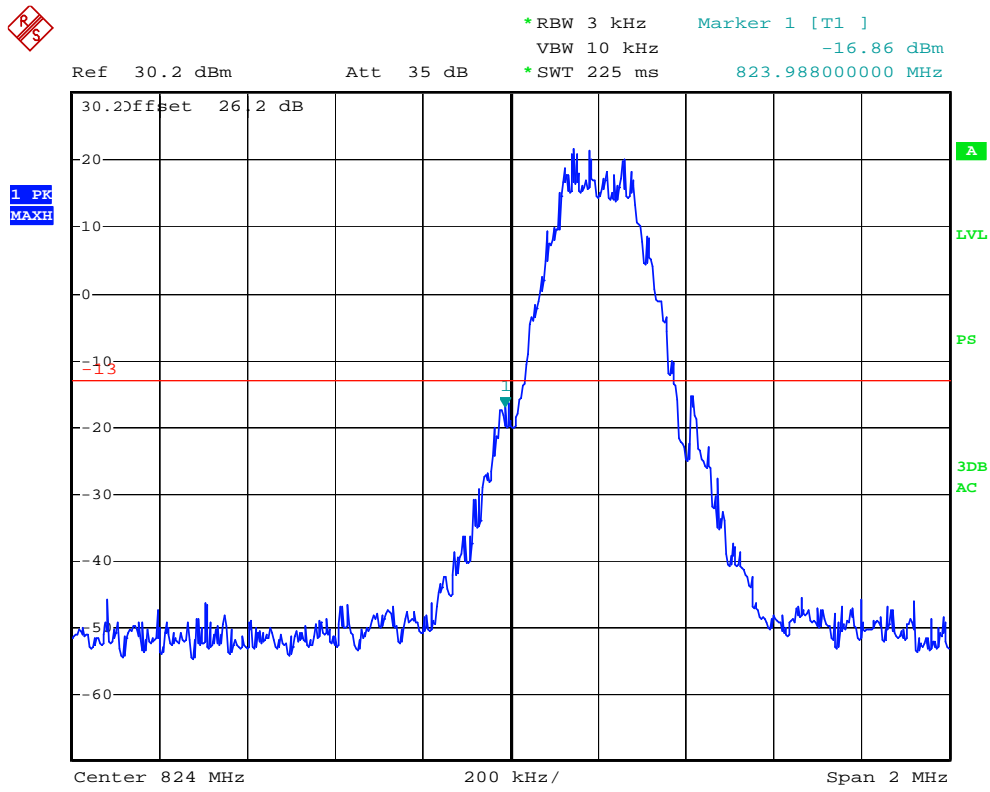
**GSM 1900(PCS) – Lower Band Edge – Channel 512 (1850.2 MHz)**



Date: 7.DEC.2009 11:24:10

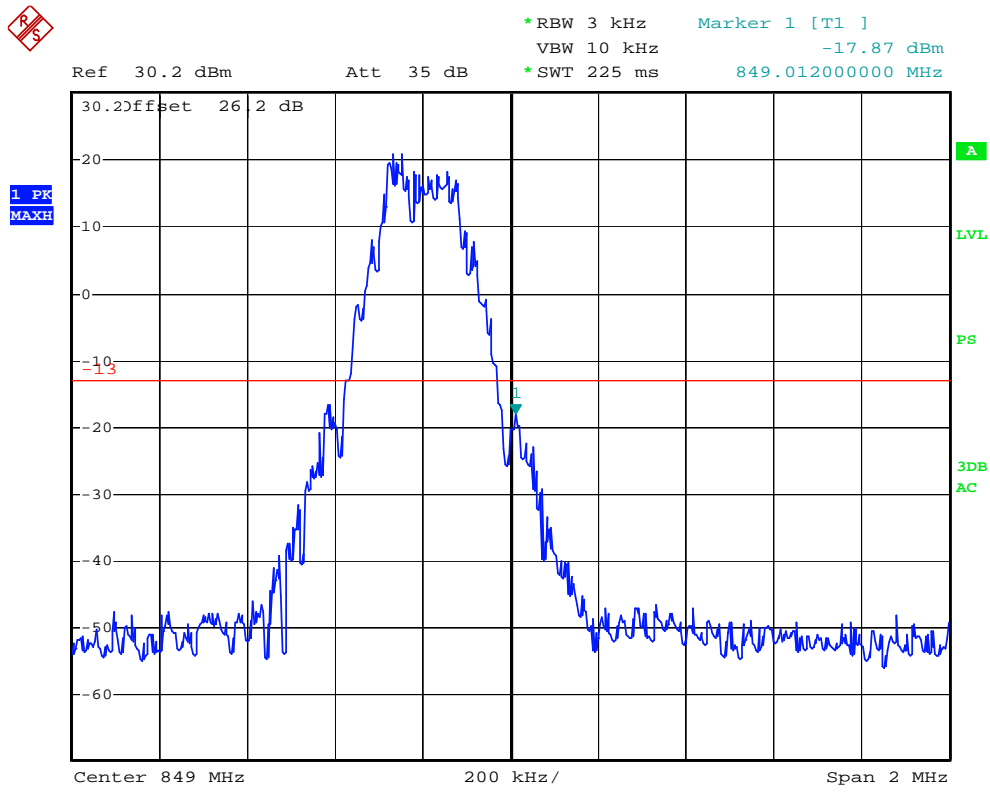
**GSM 1900(PCS) – Upper Band Edge – Channel 810 (1909.8 MHz)**





Date: 7.DEC.2009 10:39:10

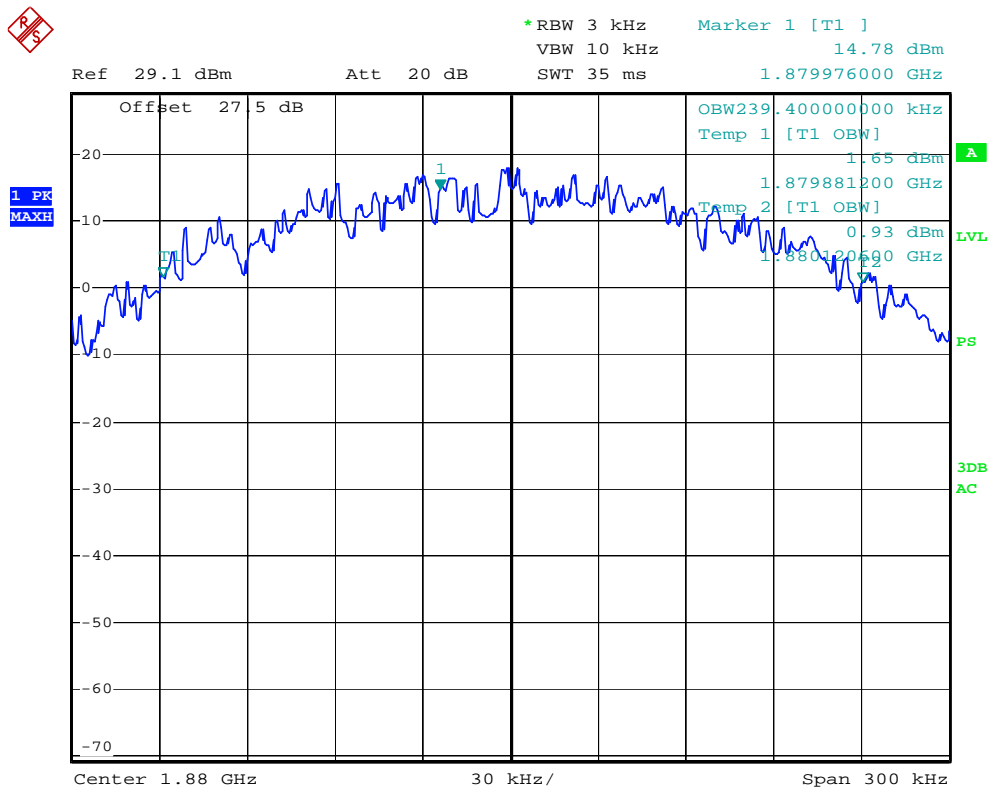
**Edge 850 – Lower Band Edge – Channel 128 (824.2 MHz)**



Date: 7.DEC.2009 10:40:06

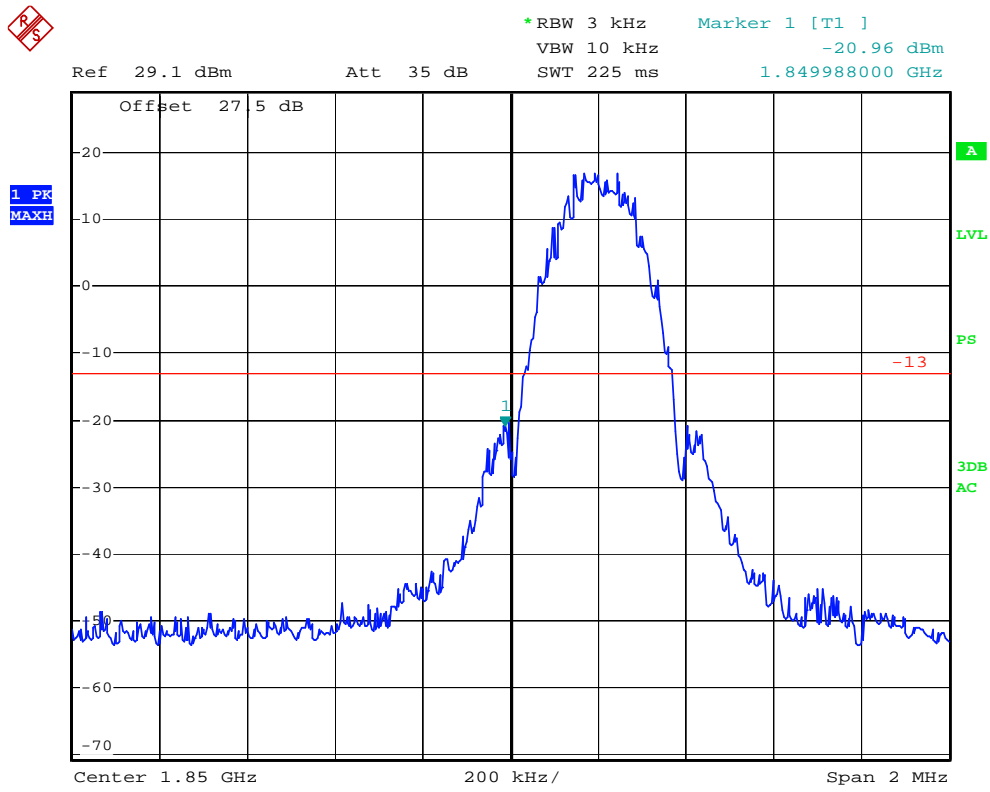
**Edge 850 – Upper Band Edge -Channel 251 (848.8 MHz)**

**Measurement Results – Edge 1900**



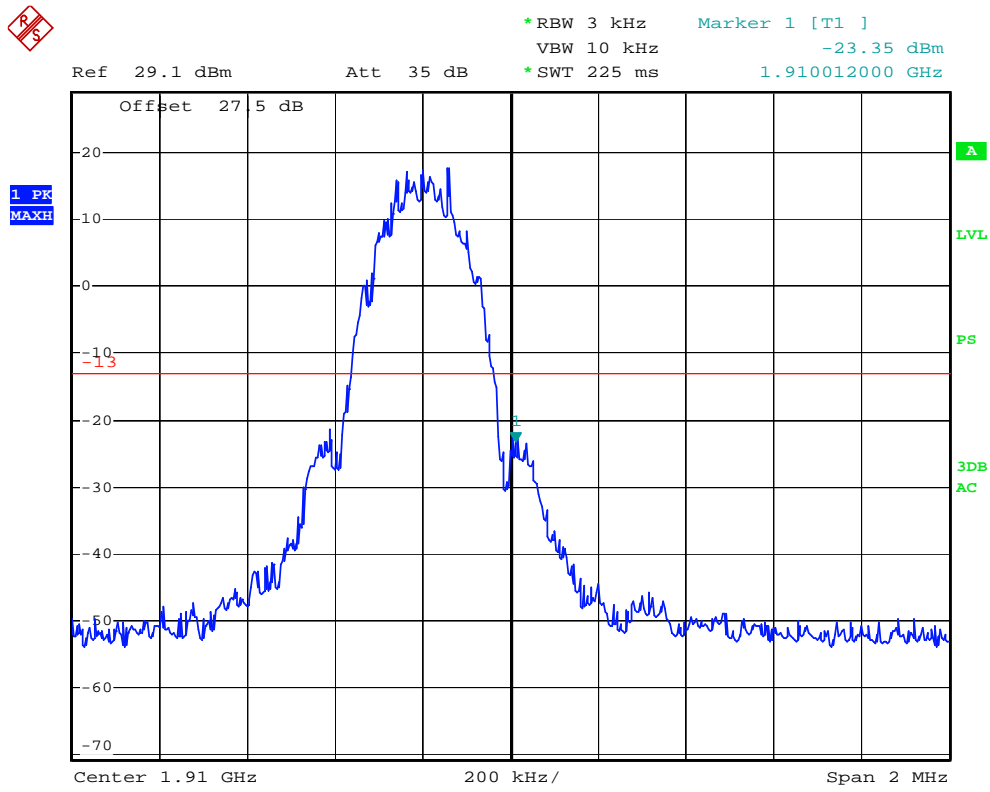
Date: 7.DEC.2009 10:14:23

**Edge 1900(PCS) – Channel 661 (1880.00 MHz) – Occupied Bandwidth**



Date: 7.DEC.2009 10:20:15

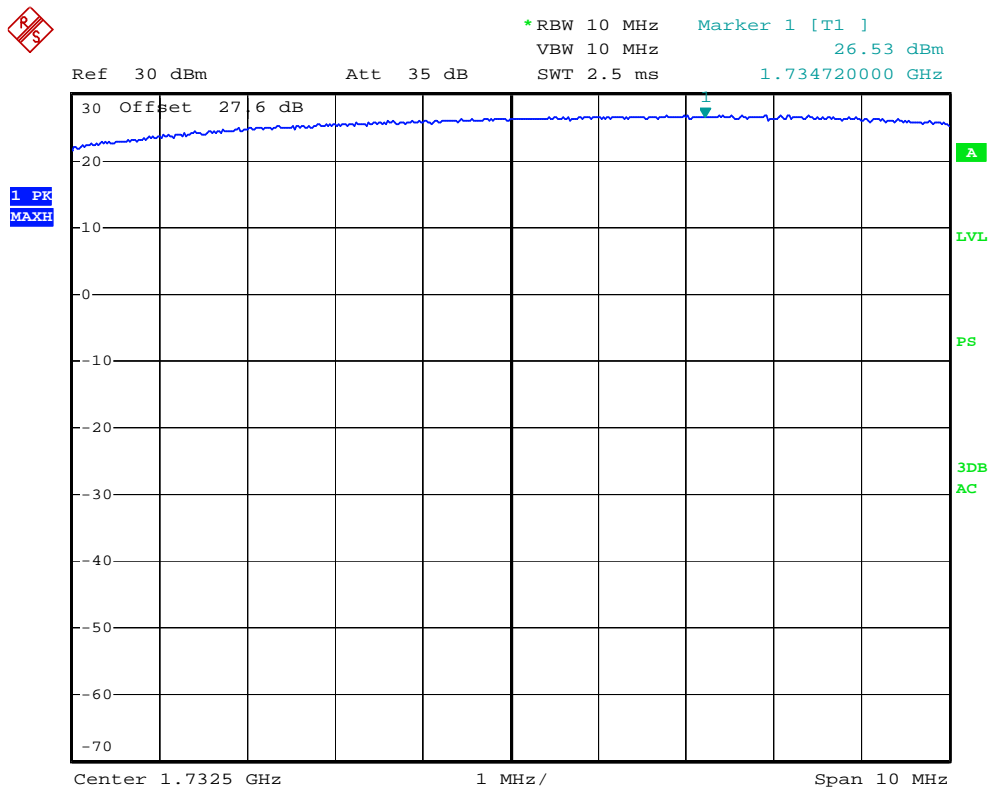
**Edge 1900(PCS) – Lower Band Edge – Channel 512 (1850.2 MHz)**



Date: 7.DEC.2009 10:23:07

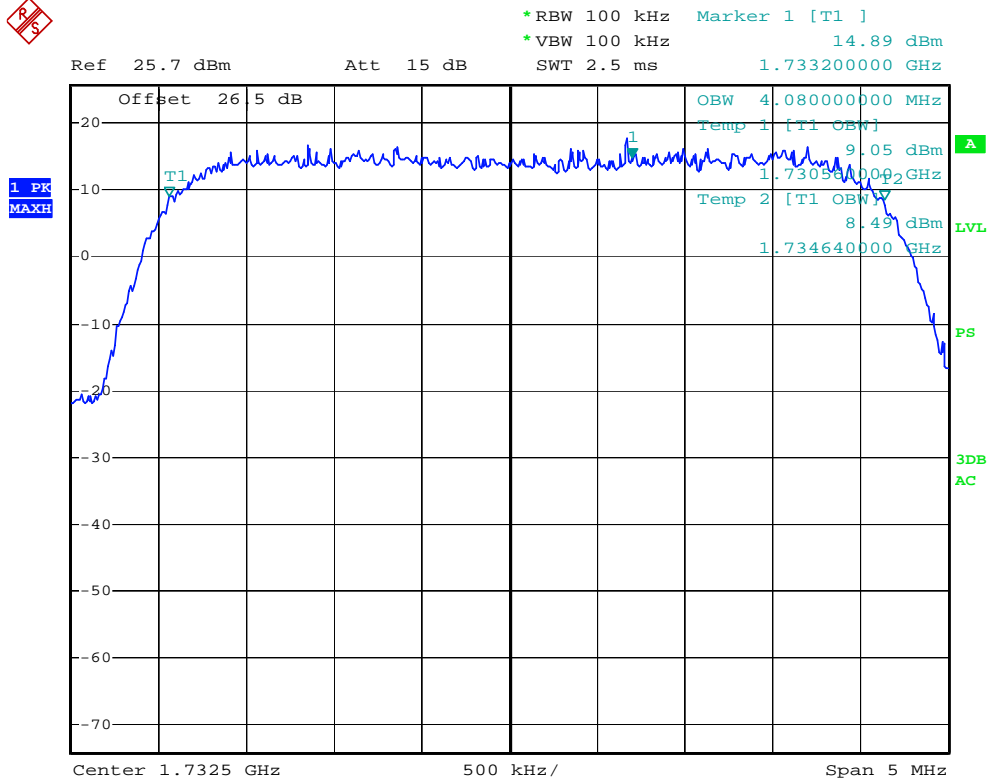
**Edge 1900(PCS) – Upper Band Edge – Channel 810 (1909.8 MHz)**

### Measurement Results – WCDMA 1700



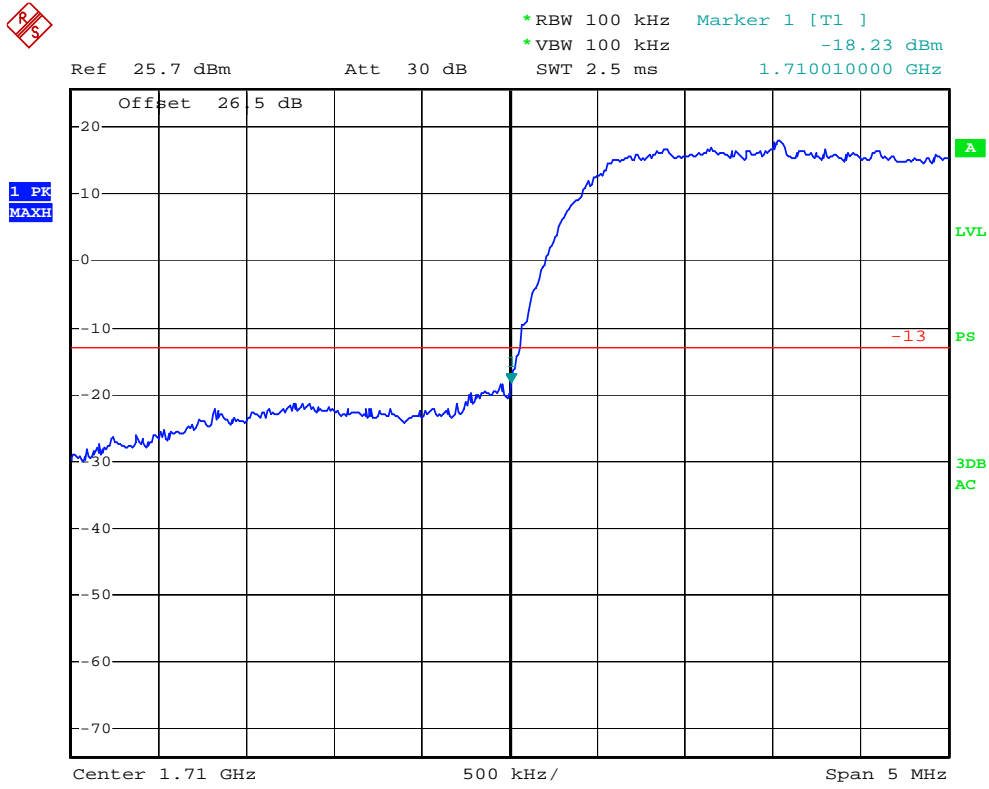
Date: 7.DEC.2009 09:44:25

### WCDMA 1900 – Reference Level Plot – Channel 1413 (1732.50 MHz)



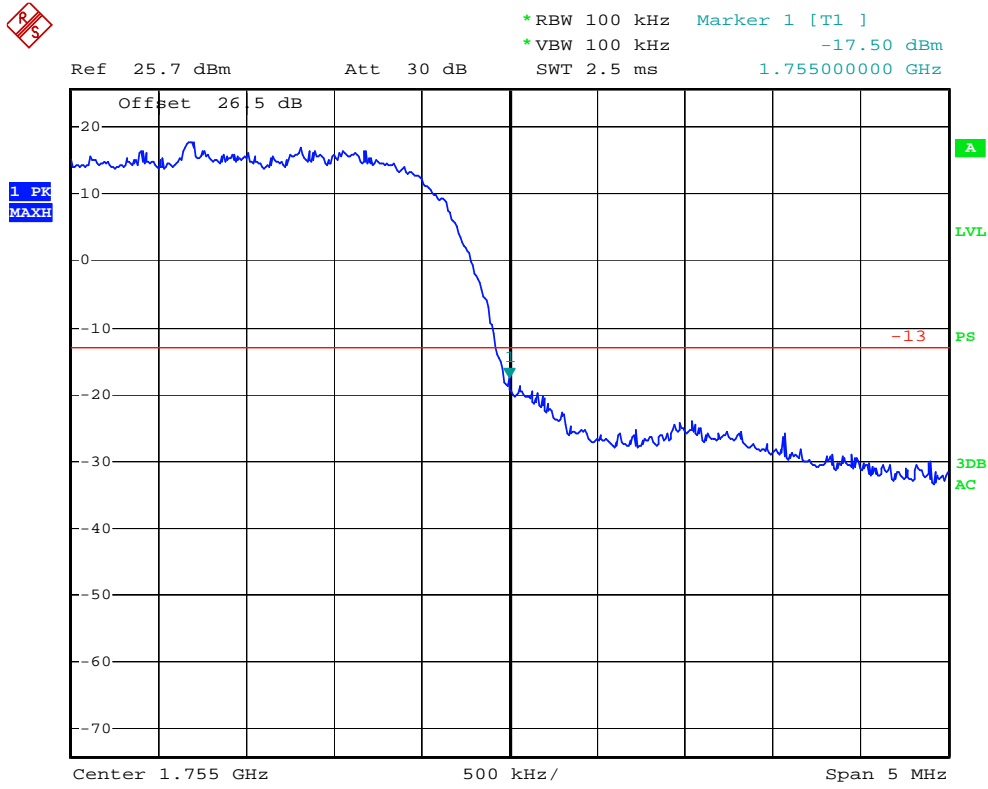
Date: 7.DEC.2009 09:58:05

**WCDMA 1900 – Channel 1413 (1732.50 MHz) – Occupied Bandwidth**



Date: 7.DEC.2009 09:56:57

**WCDMA 1700 – Lower Band Edge – Channel 1312 (1712.4 MHz)**



Date: 7.DEC.2009 09:54:44

**WCDMA 1700 – Upper Band Edge – Channel 1513 (1752.6 MHz)**

**SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

**Measurement Procedure**

The RF output port of the Equipment under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20dB passive attenuator. For all testing the EUT was powered through the computer's USB.

The spectrum was investigated from the lowest frequency signal generated, without going below 9 kHz, up to at least the tenth harmonic of the fundamental or 40 GHz, whichever is lower.

The spectrum analyzer settings were as follows:

Units	dBm
Divisions	10 dB
Detector	Peak Detector
Resolution Bandwidth	1 MHz
Video Bandwidth (AVG)	Auto
Sweep Time	Auto

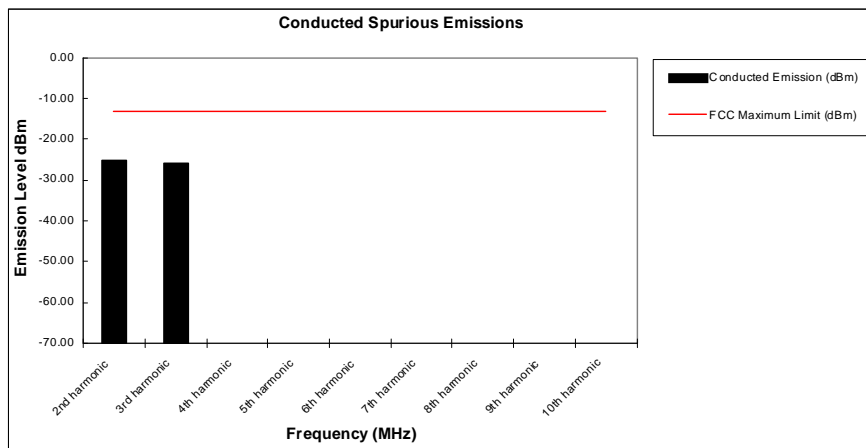
**Measurement Results**

Attached

**Measurement Results – GSM 850**

**Conducted Spurious and Harmonic Emissions**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	-25.20
3rd harmonic	-13	-25.99
4th harmonic	-13	*
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



**Notes:**

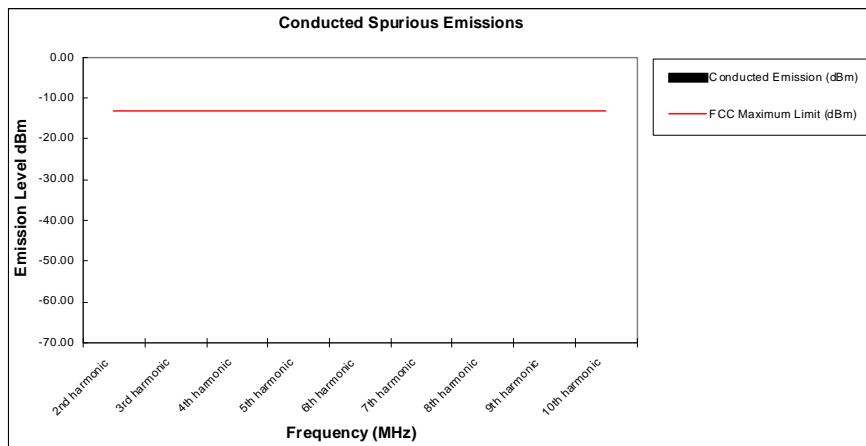
1. \* Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – GSM 1900**

**Conducted Spurious and Harmonic Emissions**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	*
3rd harmonic	-13	*
4th harmonic	-13	*
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



Notes:

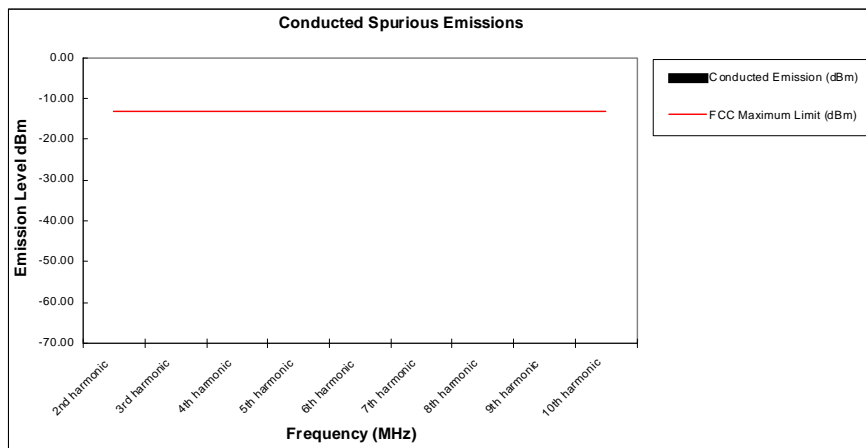
1. \* Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – EDGE 850**

**Conducted Spurious and Harmonic Emissions**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	*
3rd harmonic	-13	*
4th harmonic	-13	*
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



**Notes:**

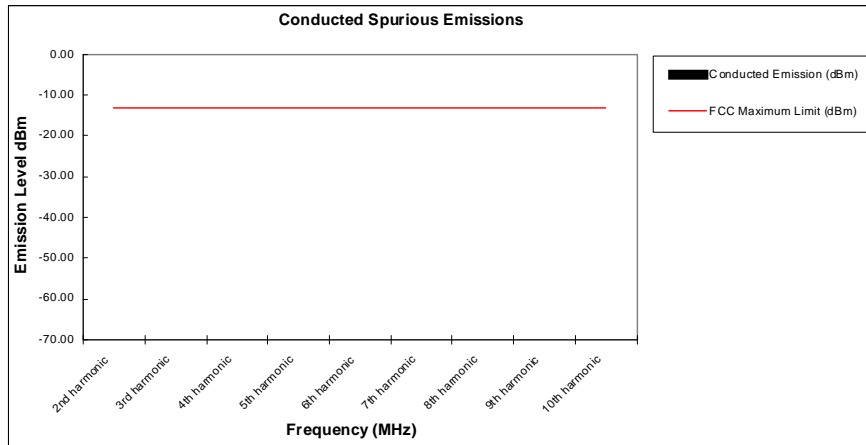
1. \* Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – EDGE 1900**

**Conducted Spurious and Harmonic Emissions**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	*
3rd harmonic	-13	*
4th harmonic	-13	*
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



**Notes:**

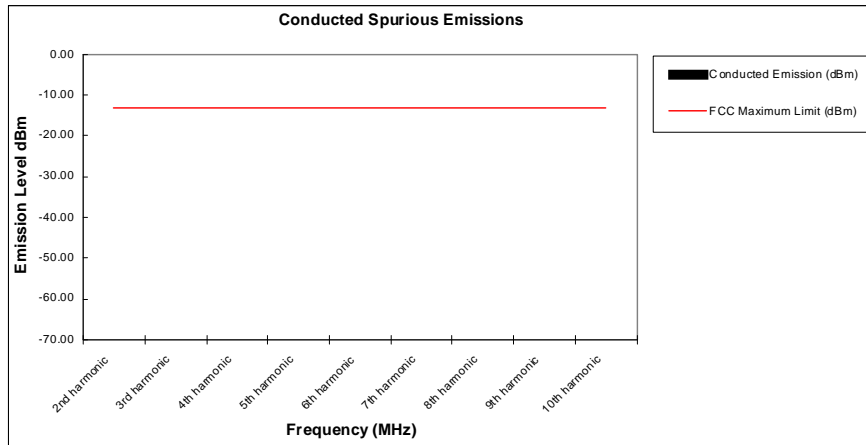
1. \* Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results –WCDMA 1700**

**Conducted Spurious and Harmonic Emissions**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	*
3rd harmonic	-13	*
4th harmonic	-13	*
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



Notes:

1. \* Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**FIELD STRENGTH OF SPURIOUS EMISSIONS**

**Measurement Procedure**

The equipment under test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. A fully charged battery was used for the supply voltage.

The settings of the receiver were as follows:

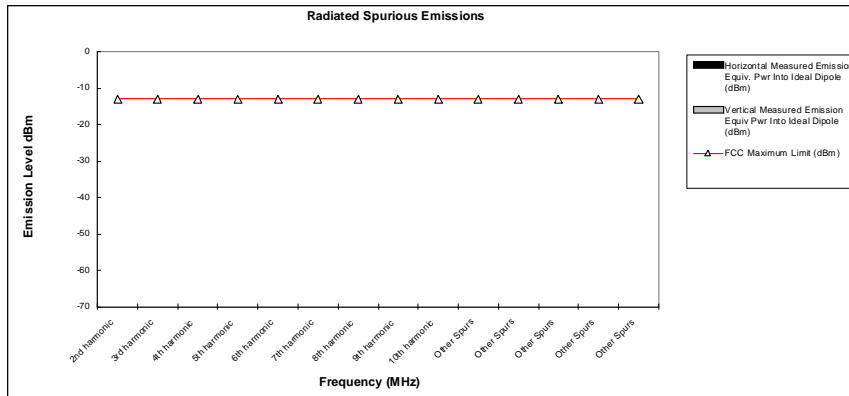
Units	dBm
Divisions	5 dB
Detector	Peak Detector
Resolution Bandwidth	1 MHz
Video Bandwidth (AVG)	Auto
Sweep Time	Auto

Measurement Results  
Attached

**Measurement Results – GSM 850**

**Radiated Spurious and Harmonic Emissions**

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

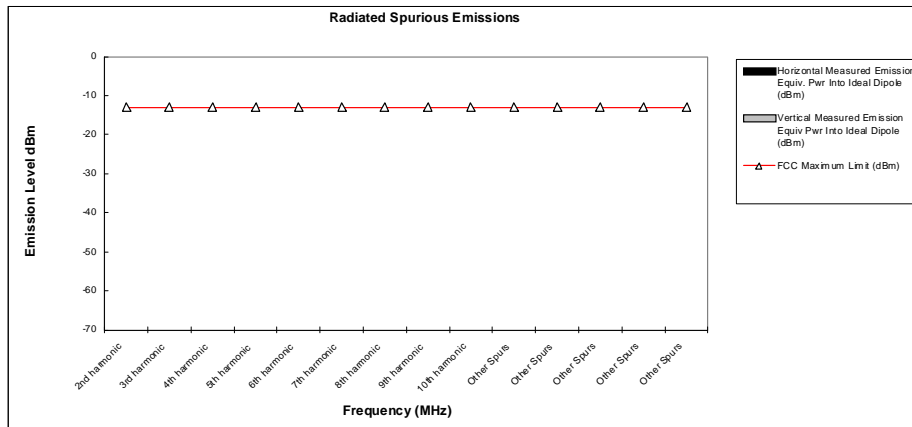
- \* Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – GSM 1900**

**Radiated Spurious and Harmonic Emissions**

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

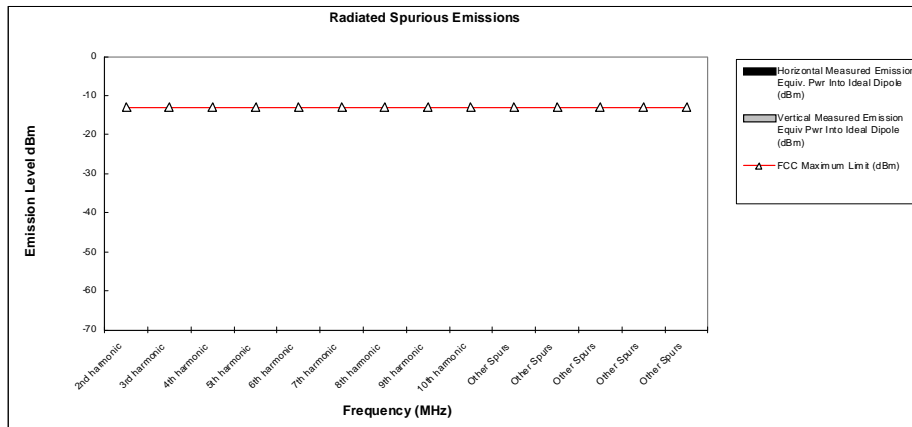
- \* Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – EDGE 850**

**Radiated Spurious and Harmonic Emissions**

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

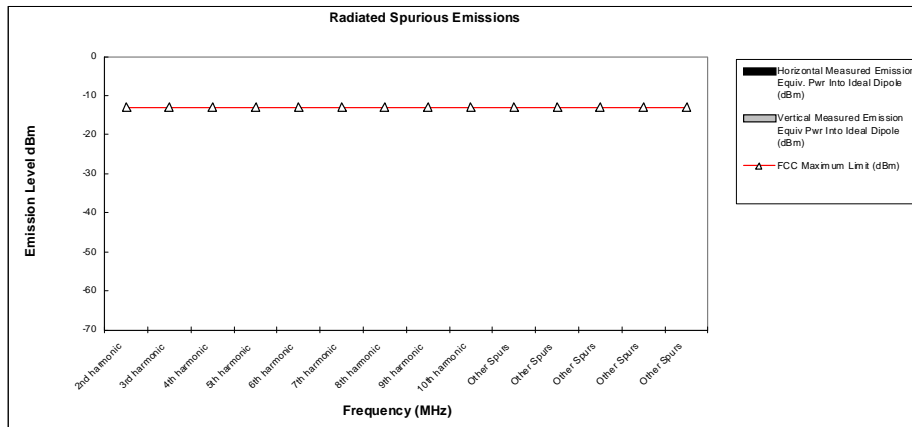
- \* Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – EDGE 1900**

**Radiated Spurious and Harmonic Emissions**

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

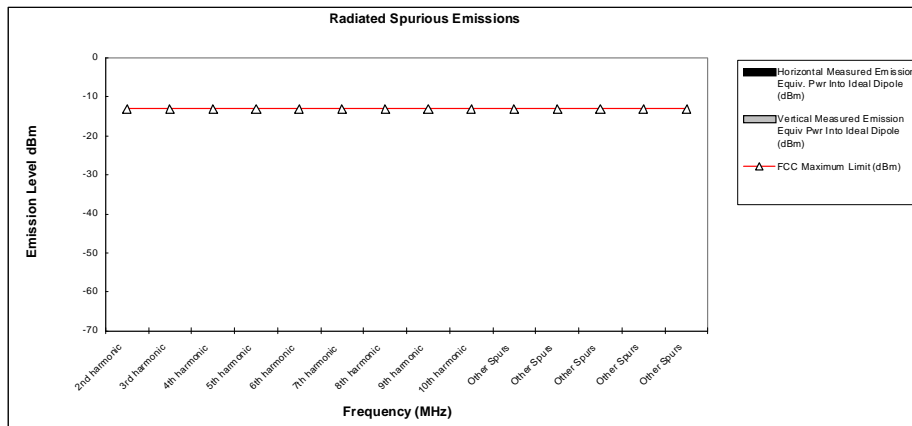
- \* Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results – WCDMA 1700**

**Radiated Spurious and Harmonic Emissions**

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

- \* Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**FREQUENCY STABILITY****Measurement Procedure**

The equipment under test is placed in an environmental chamber. The antenna port of the Equipment under Test is directly coupled to the input of the measurement equipment through a specialized RF connector. A power supply is attached as the primary voltage supply.

Frequency measurements are made at the extremes of the temperature range  $-30^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  and at intervals of  $10^{\circ}\text{C}$  with the primary supply voltage set to the nominal battery operating voltage. A period of time sufficient to stabilize all components of the equipment is allowed at each frequency measurement. The maximum variation of frequency is measured.

At room temperature, the primary supply voltage is reduced to the battery operating endpoint of the equipment under test. The maximum variation of frequency is measured. A battery eliminator was used for the input supply voltage.

**Measurement Results**

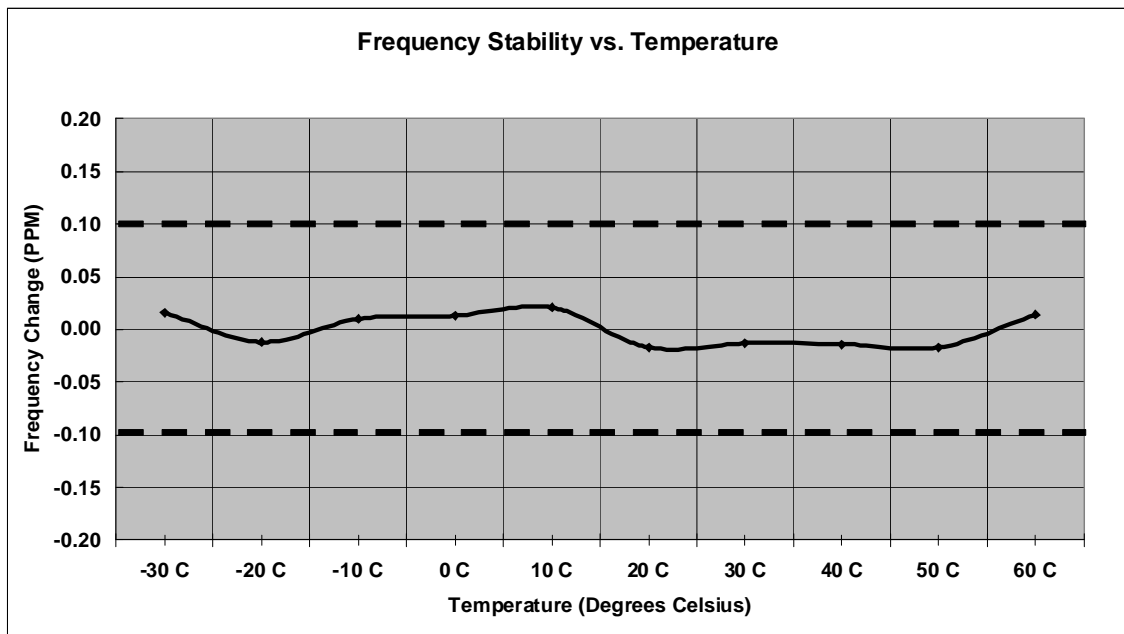
Attached

**Measurement Results – GSM 850**

**Frequency Stability**

Mode: GSM 850      Operating Frequency: 836.6 MHz  
 Channel: 190      Deviation Limit (PPM): 0.1 ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	13.39	0.016	100%	3.80
-20 C	-10.04	-0.012	100%	3.80
-10 C	8.37	0.010	100%	3.80
0 C	10.88	0.013	100%	3.80
10 C	17.57	0.021	100%	3.80
20 C	-14.22	-0.017	100%	3.80
30 C	-10.88	-0.013	100%	3.80
40 C	-11.71	-0.014	100%	3.80
50 C	-14.22	-0.017	100%	3.80
60 C	11.71	0.014	100%	3.80
20 C	-11.71	-0.014	Battery Endpoint	3.47

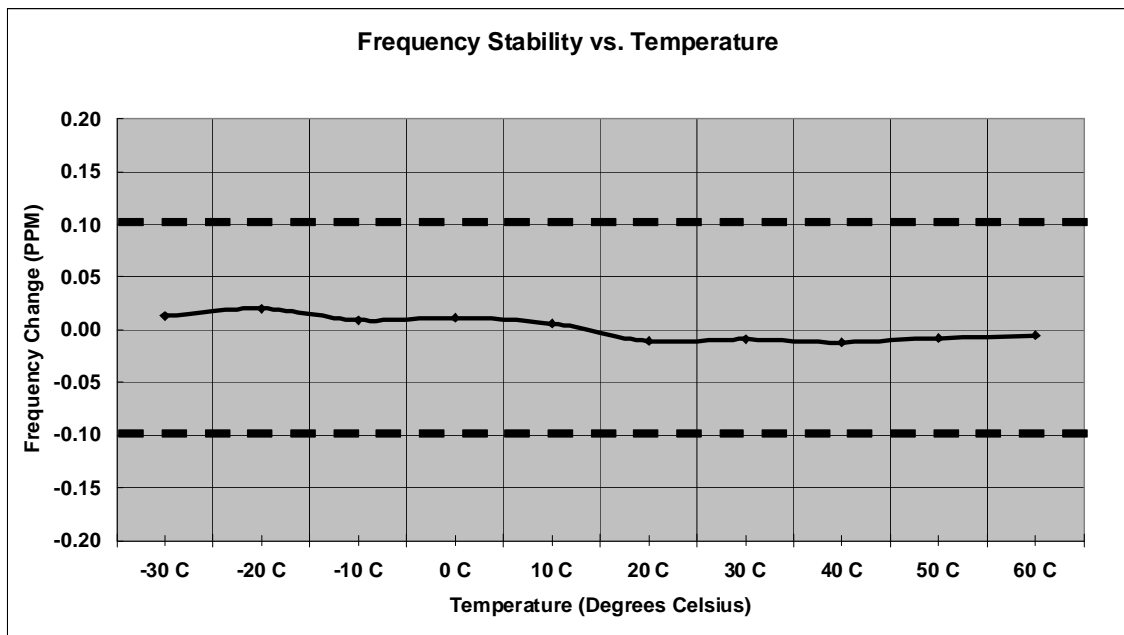


**Measurement Results – GSM 1900**

## Frequency Stability

**Mode:** GSM 1900      **Operating Frequency:** 1880.0 MHz  
**Channel:** 661      **Deviation Limit (PPM):** 0.1ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	24.44	0.013	100%	3.80
-20 C	37.60	0.020	100%	3.80
-10 C	16.92	0.009	100%	3.80
0 C	20.68	0.011	100%	3.80
10 C	11.28	0.006	100%	3.80
20 C	-20.68	-0.011	100%	3.80
30 C	-16.92	-0.009	100%	3.80
40 C	-22.56	-0.012	100%	3.80
50 C	-15.04	-0.008	100%	3.80
60 C	-9.40	-0.005	100%	3.80
20 C	-18.80	-0.010	Battery Endpoint	3.47

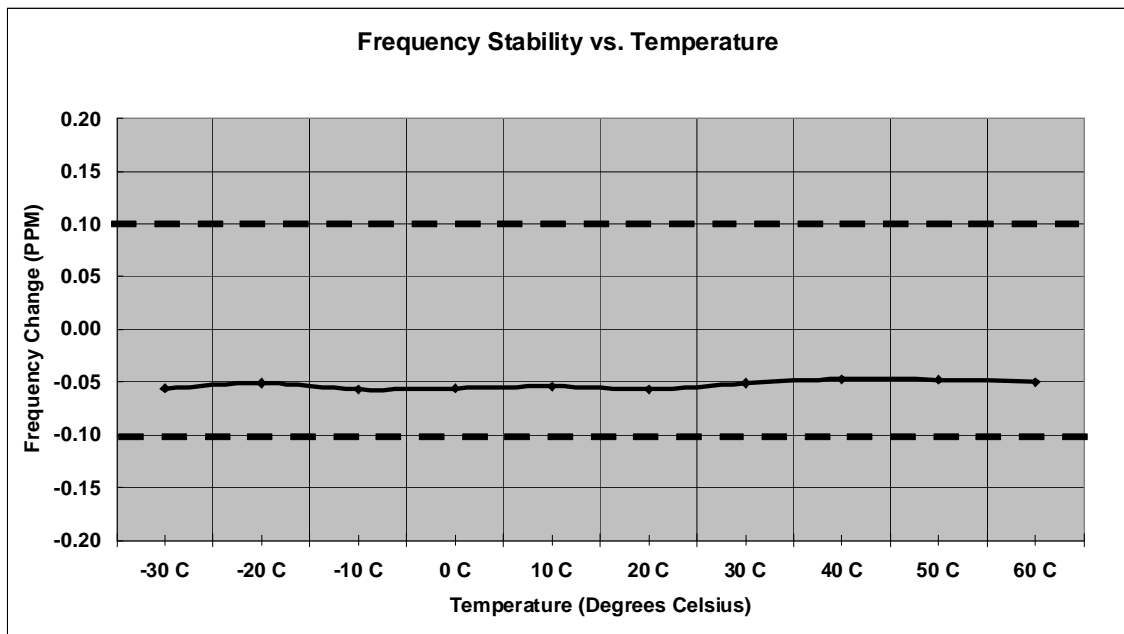


**Measurement Results – EDGE 850**

## Frequency Stability

**Mode:** EDGE 850      **Operating Frequency:** 836.6  
**Channel:** 190      **Deviation Limit (PPM):** 0.1 ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	-46.85	-0.056	100%	3.80
-20 C	-42.67	-0.051	100%	3.80
-10 C	-47.69	-0.057	100%	3.80
0 C	-46.85	-0.056	100%	3.80
10 C	-45.18	-0.054	100%	3.80
20 C	-47.69	-0.057	100%	3.80
30 C	-42.67	-0.051	100%	3.80
40 C	-39.32	-0.047	100%	3.80
50 C	-40.16	-0.048	100%	3.80
60 C	-41.83	-0.050	100%	3.80
20 C	-51.87	-0.062	Battery Endpoint	3.47

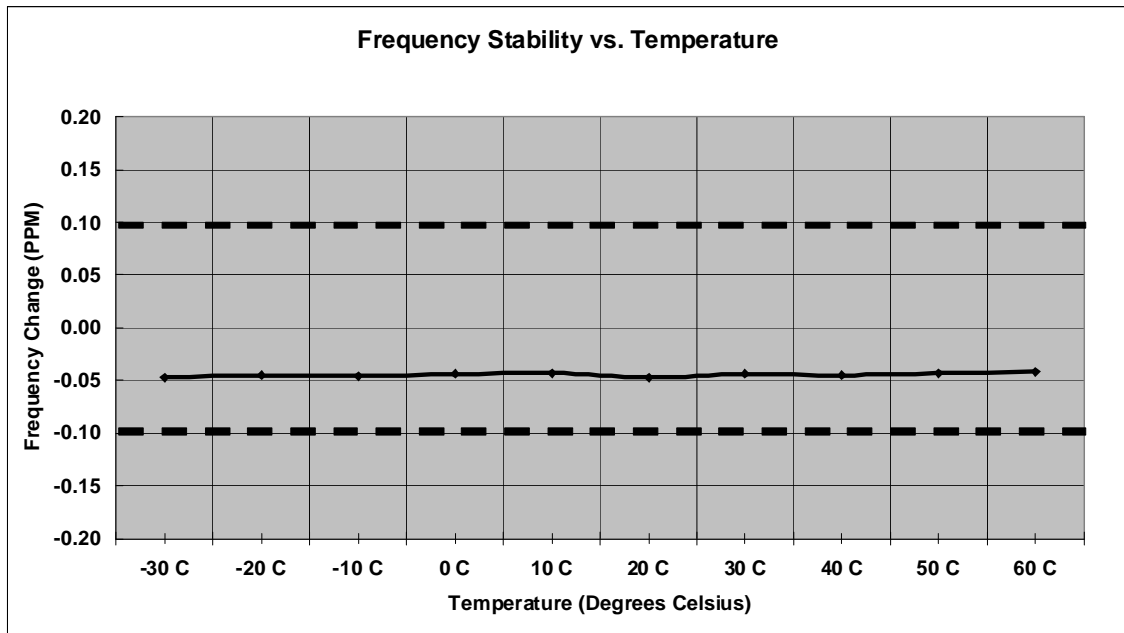


**Measurement Results – EDGE 1900**

## Frequency Stability

**Mode:** EDGE 1900      **Operating Frequency:** 1880.0 MHz  
**Channel:** 661      **Deviation Limit (PPM):** 0.1ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	-88.36	-0.047	100%	3.80
-20 C	-84.60	-0.045	100%	3.80
-10 C	-86.48	-0.046	100%	3.80
0 C	-82.72	-0.044	100%	3.80
10 C	-80.84	-0.043	100%	3.80
20 C	-88.36	-0.047	100%	3.80
30 C	-82.72	-0.044	100%	3.80
40 C	-84.60	-0.045	100%	3.80
50 C	-80.84	-0.043	100%	3.80
60 C	-78.96	-0.042	100%	3.80
20 C	-84.60	-0.045	Battery Endpoint	3.47

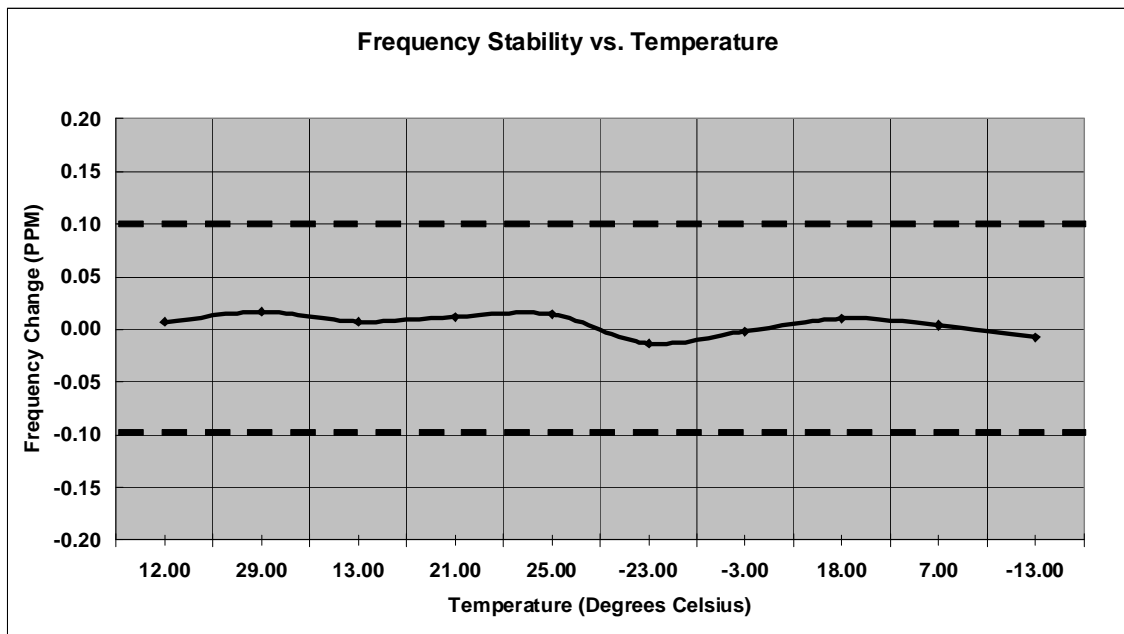


**Measurement Results – WCDMA1900**

**Frequency Stability**

Mode: WCDMA 1700      Operating Frequency: 1732.5  
 Channel: 1413      Deviation Limit (PPM): 0.1ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	12.00	0.007	100%	3.80
-20 C	29.00	0.017	100%	3.80
-10 C	13.00	0.008	100%	3.80
0 C	21.00	0.012	100%	3.80
10 C	25.00	0.014	100%	3.80
20 C	-23.00	-0.013	100%	3.80
30 C	-3.00	-0.002	100%	3.80
40 C	18.00	0.010	100%	3.80
50 C	7.00	0.004	100%	3.80
60 C	-13.00	-0.008	100%	3.80
20 C	-22.00	-0.013	Battery Endpoint	3.47



**End of Test Report**