

# Variant FCC RF Test Report

APPLICANT : Sagemcom SAS  
EQUIPMENT : Quad-Band GSM/GPRS/EDGE and  
Tri-Band WCDMA/HSDPA MODULE  
BRAND NAME : Sagemcom  
MODEL NAME : HiLo3G-850  
FCC ID : VW3HILO3G850  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)  
Tx/Rx FREQUENCY RANGE : GSM850 : 824.2 ~ 848.8 MHz /  
869.2 ~ 893.8 MHz  
GSM1900 : 1850.2 ~ 1909.8 MHz /  
1930.2 ~ 1989.8 MHz  
WCDMA Band V : 826.4 ~ 846.6 MHz /  
871.4 ~ 891.6 MHz  
WCDMA Band II : 1852.4 ~ 1907.6 MHz /  
1932.4 ~ 1987.6 MHz  
MAX. ERP/EIRP POWER : <Sample 1>  
WCDMA Band V (RMC 12.2Kbps) : 0.01 W  
WCDMA Band II (RMC 12.2Kbps) : 0.01 W  
<Sample 2>  
WCDMA Band V (RMC 12.2Kbps) : 0.01 W  
WCDMA Band II (RMC 12.2Kbps) : 0.01 W  
EMISSION DESIGNATOR : QPSK : 4M16F9W

This is a variant report which is only valid combined with the original test report. The product was received on Mar. 02, 2011 and completely tested on Mar. 10, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



## SPORTON INTERNATIONAL INC.

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FCC ID : VW3HILO3G850

Page Number : 1 of 43

Report Issued Date : Mar. 24, 2011

Report Version : Rev. 01

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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG071404-01	Rev. 01	This is a variant report which can be referred to Appendix C for Change Note. All the test cases were performed on original report which can be referred to Sporton Report No. FG071404 as Appendix D. The tests of WCDMA Band V and WCDMA Band II were verified for the changes.	Mar. 24, 2011

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	N/A	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.2	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.3	§2.1049 §22.917(a) §24.238(a)	N/A	Occupied Bandwidth	N/A	PASS	-
3.4	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Band Edge Measurement	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Conducted Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.6	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 30.25 dB at 1672 MHz
3.7	§2.1055 §22.355 §24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-

# **1 General Description**

## **1.1 Applicant**

**Sagemcom SAS**

250 Route de l'Empereur, 92848 Rueil Malmaison Cedex France

## **1.2 Manufacturer**

**Wistron NeWeb Corporation**

20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

### 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Quad-Band GSM/GPRS/EDGE and Tri-Band WCDMA/HSDPA MODULE
<b>Brand Name</b>	Sagemcom
<b>Model Name</b>	HiLo3G-850
<b>FCC ID</b>	VW3HILO3G850
<b>EUT Configuration</b>	Sample 1 : IPEX transfer to SMA interface Sample 2 : Antenna Pad transfer to SMA interface Note: These two RF interfaces won't work at the same time; we seal the Antenna PAD with low loss RF cable which has SMA connector for this time's test.
<b>Tx Frequency</b>	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz WCDMA Band II : 1850 MHz ~ 1910 MHz
<b>Rx Frequency</b>	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz WCDMA Band II : 1930 MHz ~ 1990 MHz
<b>Maximum Output Power to Antenna</b>	<Sample 1> WCDMA Band V : 22.68 dBm WCDMA Band II : 22.92 dBm <Sample 2> WCDMA Band V : 23.34 dBm WCDMA Band II : 23.19 dBm
<b>Maximum ERP/EIRP</b>	<Sample 1> WCDMA Band V (RMC 12.2Kbps) : 0.01 W (7.89 dBm) WCDMA Band II (RMC 12.2Kbps) : 0.01 W (10.00 dBm) <Sample 2> WCDMA Band V (RMC 12.2Kbps) : 0.01 W (8.27 dBm) WCDMA Band II (RMC 12.2Kbps) : 0.01 W (9.52 dBm)
<b>Antenna Type</b>	Fixed External Antenna
<b>HW Version</b>	55.UMCMC.SGA
<b>SW Version</b>	HI3GC_A_000_34_GENERIC_V01
<b>Type of Modulation</b>	WCDMA : QPSK HSDPA : QPSK / 16QAM
<b>Type of Emission</b>	QPSK : 4M16F9W
<b>EUT Stage</b>	Identical Prototype

**Remark:**

1. This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	TH02-HY	03CH06-HY	722060/4086B-1

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ IC RSS-132 Issue 2
- ♦ IC RSS-133 Issue 5

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

## 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m
2.	Dipole Antenna	N/A	N/A	N/A	N/A	N/A
3.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for WCDMA Band V.
2. 30 MHz to 19000 MHz for WCDMA Band II.

Test Modes		
Band	Radiated TCs	Conducted TCs
WCDMA Band V	<ul style="list-style-type: none"> <li>■ RMC 12.2Kbps Link for Sample 1</li> <li>■ RMC 12.2Kbps Link for Sample 2</li> </ul>	■ RMC 12.2Kbps Link
WCDMA Band II	■ N/A	■ RMC 12.2Kbps Link

**Note:** The maximum power levels are RMC 12.2Kbps mode for WCDMA band V and WCDMA band II, only these modes were used for all tests.

The conducted power tables are as follows:

<Sample 1>

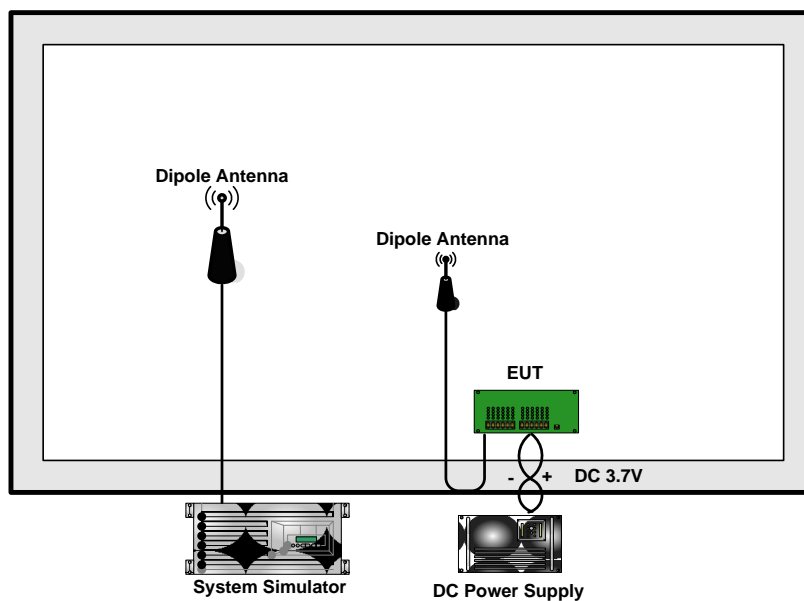
Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
RMC 12.2K	22.68	22.61	22.58	22.92	22.89	22.77
HSDPA Subtest-1	22.48	22.43	22.52	22.83	22.82	22.71
HSDPA Subtest-2	22.51	22.41	22.43	22.80	22.84	22.88
HSDPA Subtest-3	22.47	22.42	22.37	22.71	22.65	22.62
HSDPA Subtest-4	22.55	22.45	22.45	22.69	22.72	22.74

<Sample 2>

Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
RMC 12.2K	23.16	23.16	23.34	23.19	23.09	22.93
HSDPA Subtest-1	23.13	23.04	23.07	23.04	23.03	22.80
HSDPA Subtest-2	23.18	22.87	23.01	23.10	23.02	22.75
HSDPA Subtest-3	23.02	22.91	22.92	23.02	22.97	22.69
HSDPA Subtest-4	22.91	22.83	22.85	22.94	22.83	22.51



## 2.2 Connection Diagram of Test System



### 3 Test Result

#### 3.1 Conducted Output Power Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

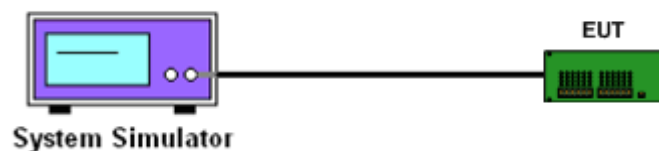
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

##### 3.1.4 Test Setup



### 3.1.5 Test Result of Conducted Output Power

Cellular Band				
Modes	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
WCDMA Band V (RMC 12.2Kbps)	4132 (Low)	826.4	23.16	0.21
	4182 (Mid)	836.4	23.16	0.21
	4233 (High)	846.6	23.34	0.22

PCS Band				
Modes	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
WCDMA Band II (RMC 12.2Kbps)	9262 (Low)	1852.4	23.19	0.21
	9400 (Mid)	1880.0	23.09	0.20
	9538 (High)	1907.6	22.93	0.20

## 3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

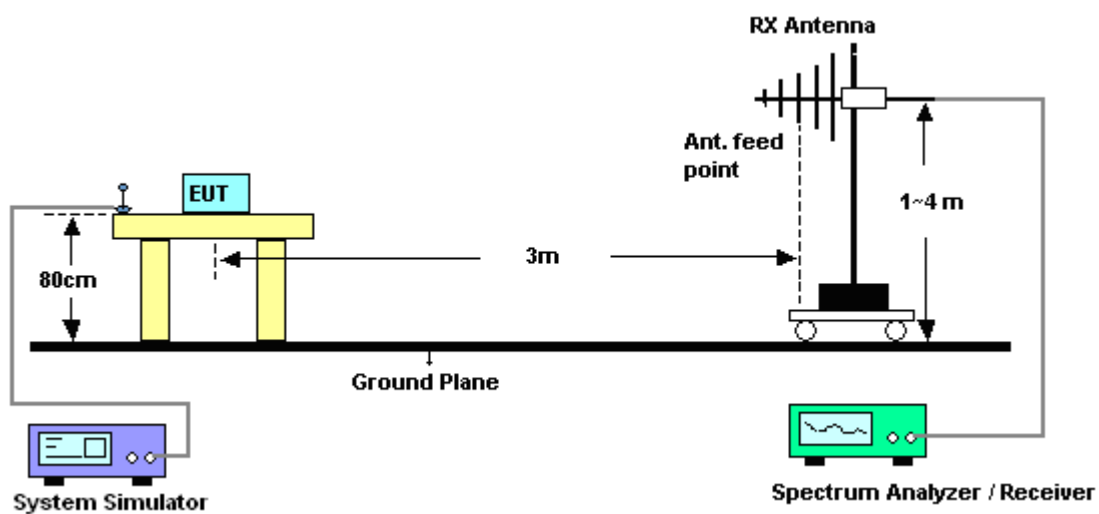
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 3MHz,VBW= 3MHz, and peak detector settings.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ .

### 3.2.4 Test Setup



### 3.2.5 Test Result of ERP

#### <Sample 1>

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-29.05	28.19	-3.01	0.00
836.40	-29.14	28.22	-3.07	0.00
846.60	-29.13	28.38	-2.90	0.00
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-23.47	31.46	5.84	0.00
836.40	-21.98	31.5	7.37	0.01
846.60	-21.39	31.43	7.89	0.01

\* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

#### <Sample 2>

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-28.43	28.19	-2.39	0.00
836.40	-27.62	28.22	-1.55	0.00
846.60	-27.11	28.38	-0.88	0.00
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-23.34	31.46	5.97	0.00
836.40	-21.68	31.5	7.67	0.01
846.60	-21.01	31.43	8.27	0.01

\* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

### 3.2.6 Test Result of EIRP

#### <Sample 1>

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-36.68	41.93	5.25	0.00
1880.00	-35.49	42.33	6.84	0.00
1907.60	-35.64	42.04	6.40	0.00
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-33.48	41.18	7.70	0.01
1880.00	-32.59	42.59	10.00	0.01
1907.60	-32.55	41.92	9.37	0.01

\* EIRP = LVL (dBm) + Correction Factor (dB)

#### <Sample 2>

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-37.12	41.93	4.81	0.00
1880.00	-37.04	42.33	5.29	0.00
1907.60	-37.01	42.04	5.03	0.00
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-34.05	41.18	7.13	0.01
1880.00	-33.87	42.59	8.72	0.01
1907.60	-32.40	41.92	9.52	0.01

### 3.3 Occupied Bandwidth Measurement

#### 3.3.1 Description of Occupied Bandwidth Measurement

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

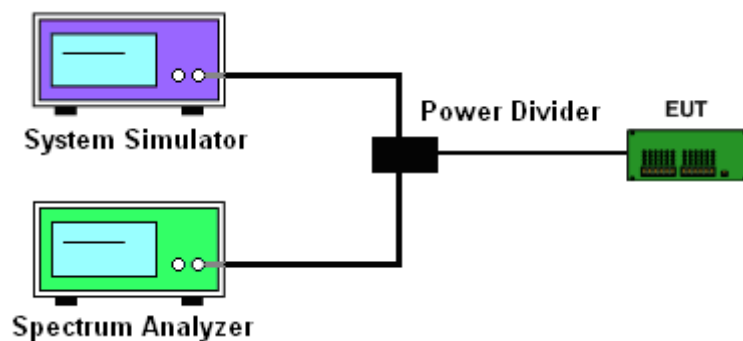
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.

#### 3.3.4 Test Setup

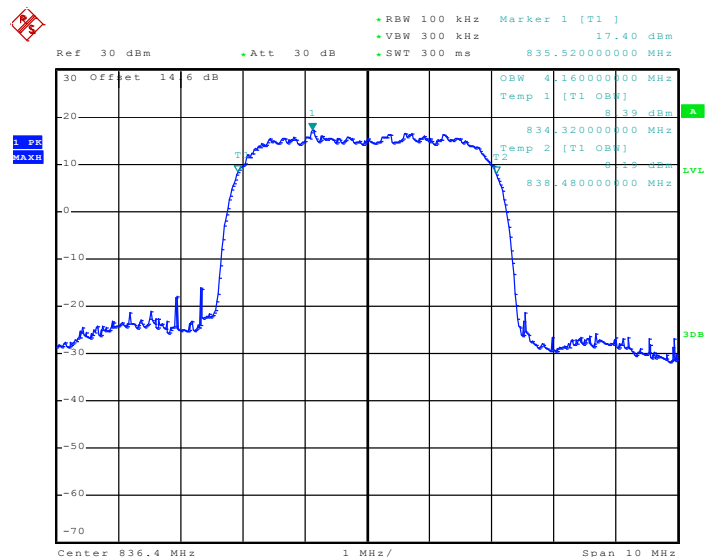




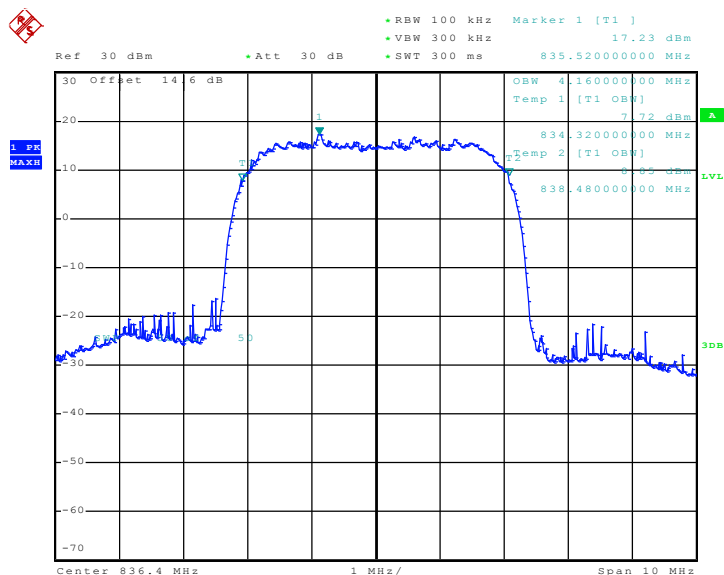
### 3.3.5 Test Result (Plots) of Occupied Bandwidth

<b>Band :</b>	WCDMA Band V	<b>Power Stage :</b>	High
<b>Test Mode :</b>	RMC 12.2Kbps Link		

**99% Occupied Bandwidth Plot on Channel 4182**



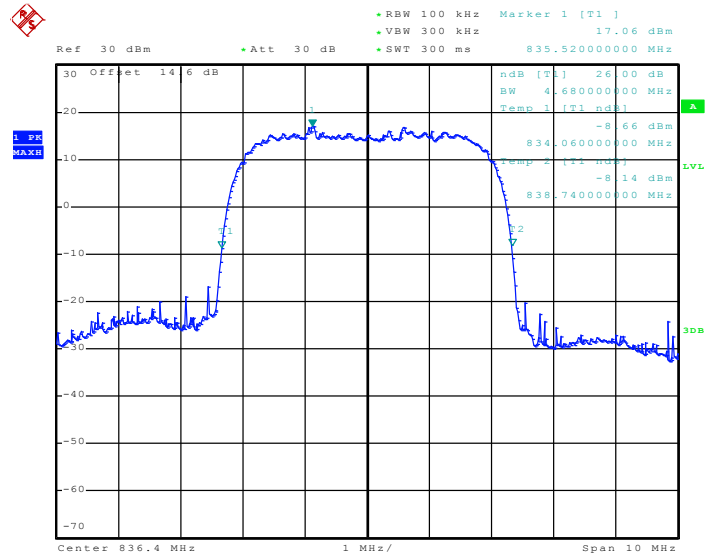
Date: 8.MAR.2011 12:10:29



Date: 8.MAR.2011 12:11:36



26dB Bandwidth Plot on Channel 4182

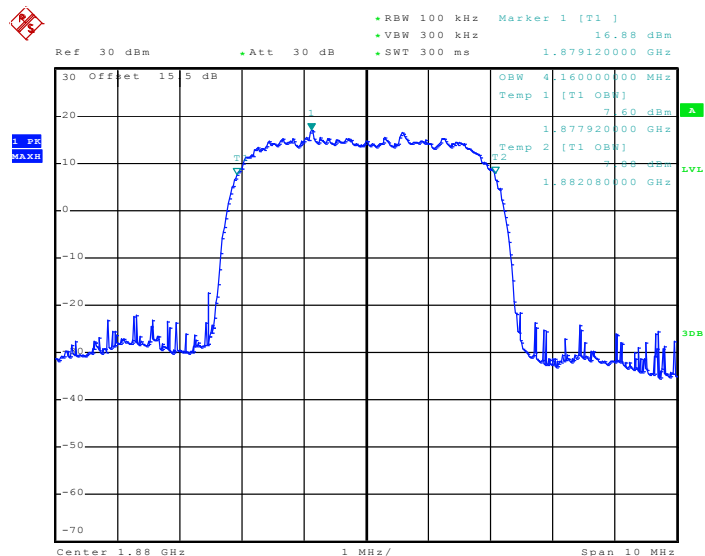


Date: 8.MAR.2011 12:09:11

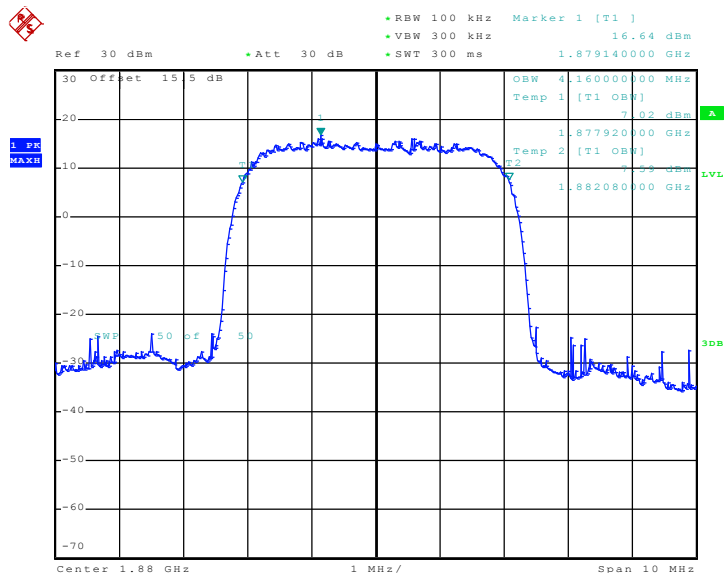


Band :	WCDMA Band II	Power Stage :	High
Test Mode :	RMC 12.2Kbps Link		

99% Occupied Bandwidth Plot on Channel 9400



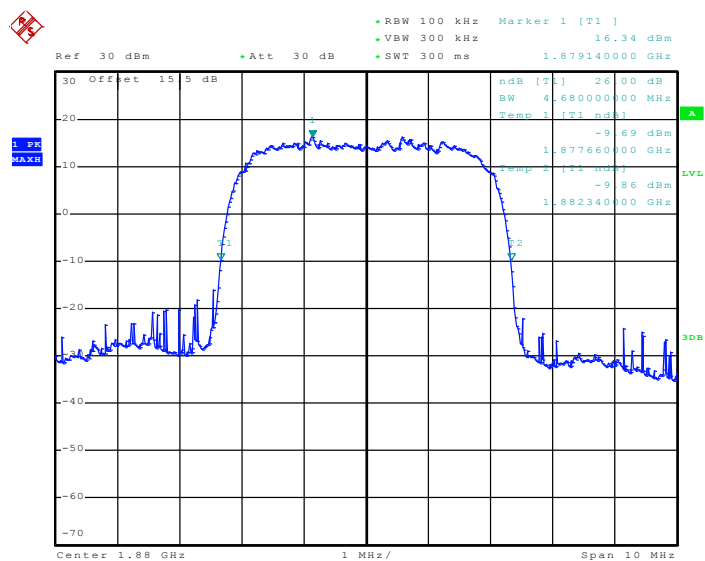
Date: 8.MAR.2011 11:59:25



Date: 8.MAR.2011 12:00:32



26dB Bandwidth Plot on Channel 9400



Date: 8.MAR.2011 11:58:07

## 3.4 Band Edge Measurement

### 3.4.1 Description of Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

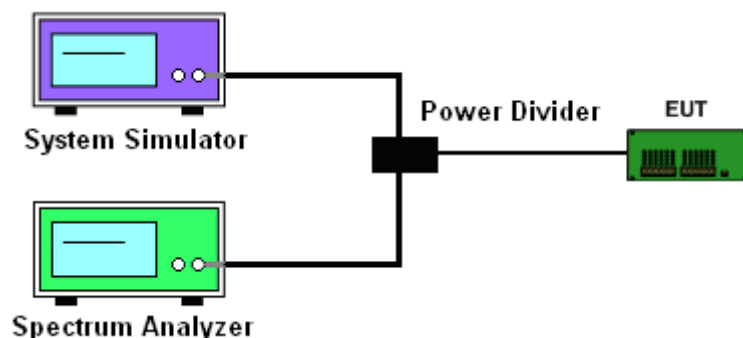
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.

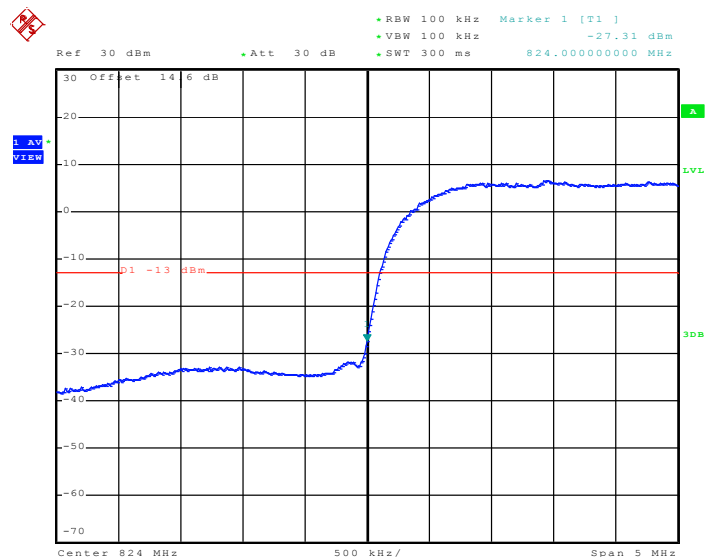
### 3.4.4 Test Setup



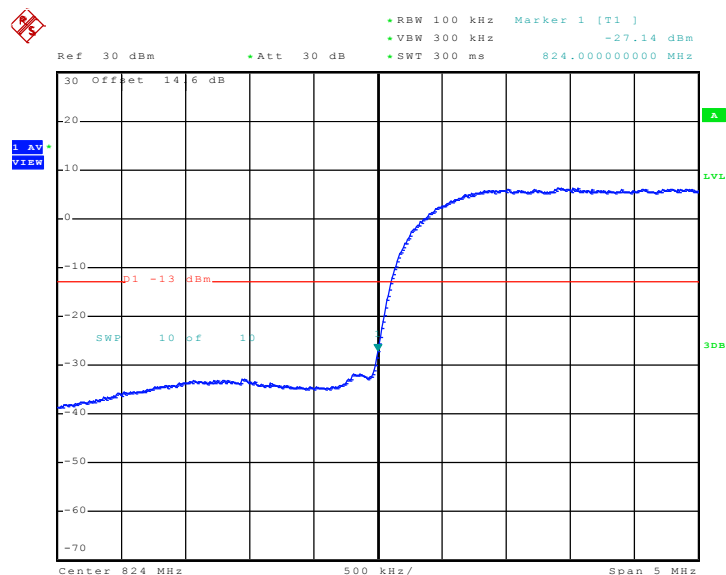
### 3.4.5 Test Result (Plots) of Conducted Band Edge

<b>Band :</b>	WCDMA Band V	<b>Power Stage :</b>	High
<b>Test Mode :</b>	RMC 12.2Kbps Link		

**Lower Band Edge Plot on Channel 4132**



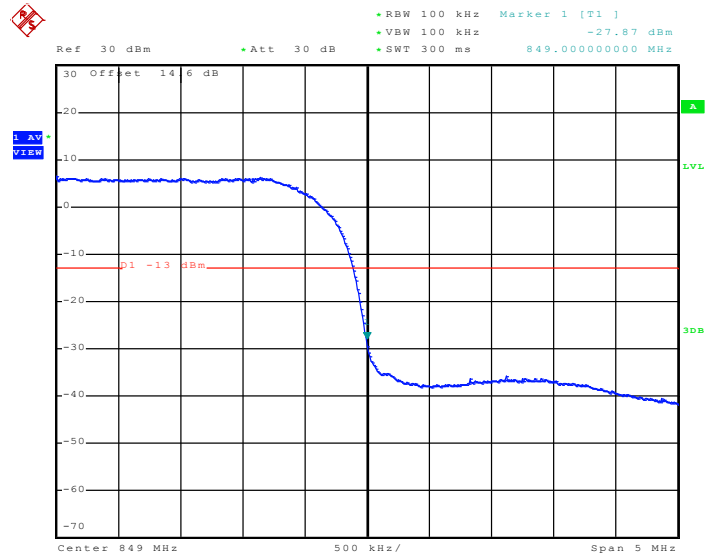
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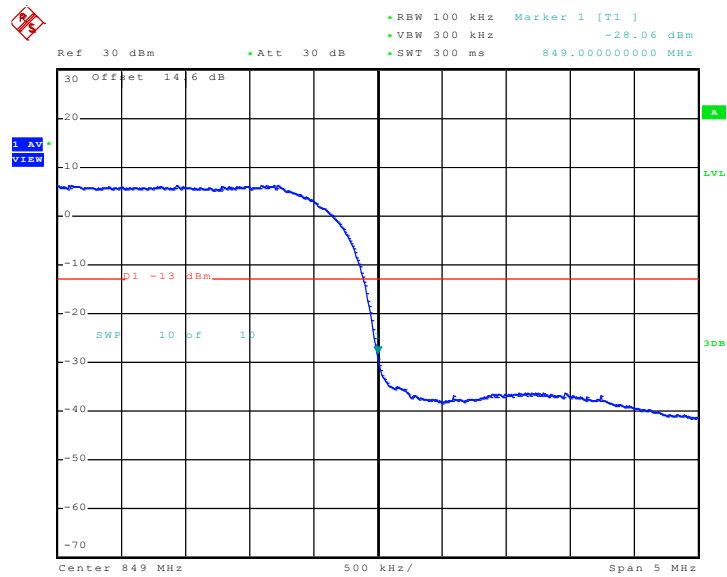
Date: 8.MAR.2011 12:13:19



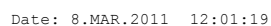
### Higher Band Edge Plot on Channel 4233



Date: 8.MAR.2011 12:12:50

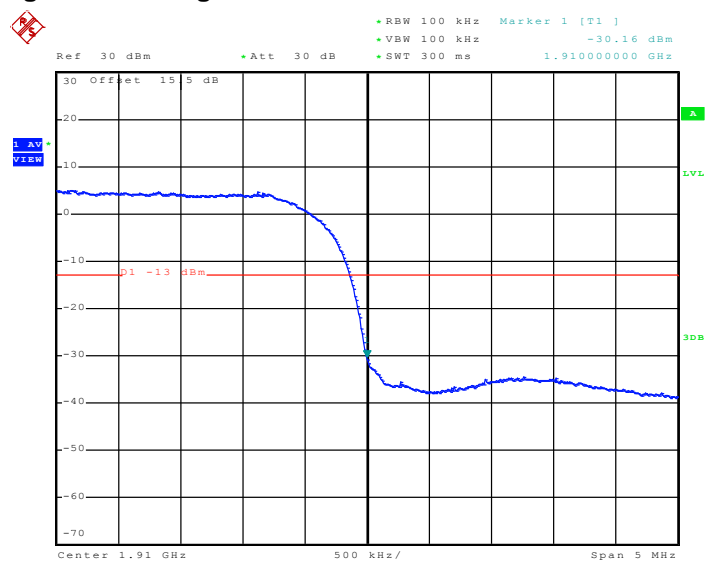


Date: 8.MAR.2011 12:13:49

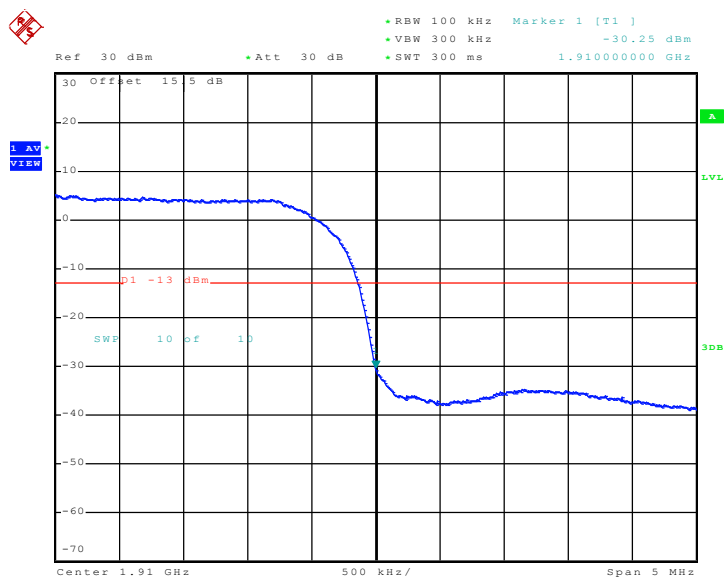




### Higher Band Edge Plot on Channel 9538



Date: 8.MAR.2011 12:01:45



Date: 8.MAR.2011 12:02:45

### 3.5 Conducted Emission Measurement

#### 3.5.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

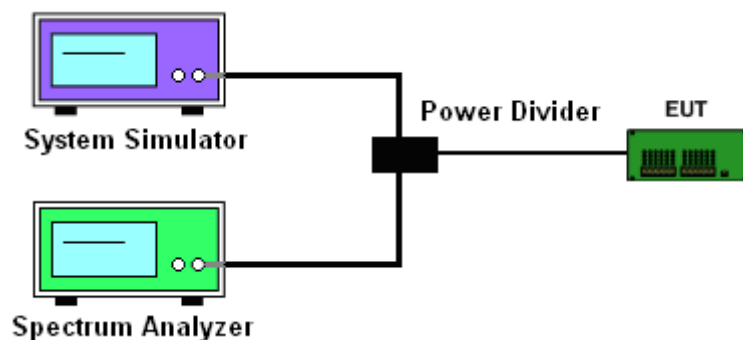
#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

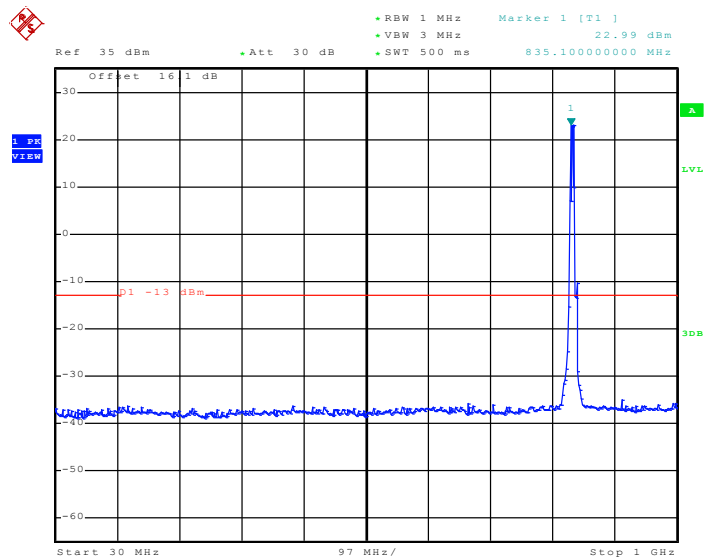
1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

#### 3.5.4 Test Setup

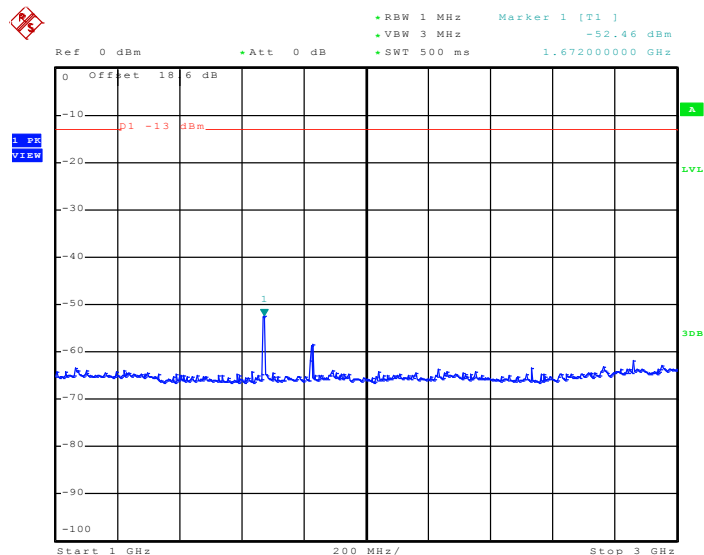


### 3.5.5 Test Result (Plots) of Conducted Emission

<b>Band :</b>	WCDMA Band V	<b>Channel :</b>	CH4182
<b>Test Mode :</b>	RMC 12.2Kbps Link		

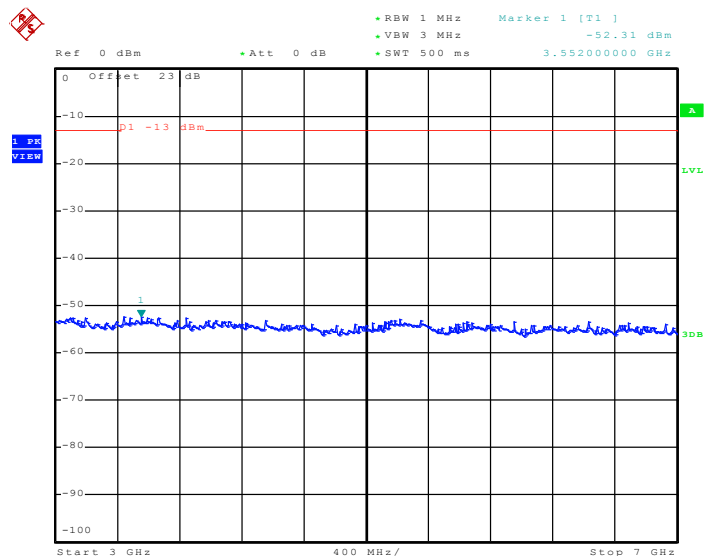
**Conducted Emission Plot between 30MHz ~ 1GHz**


Date: 8.MAR.2011 12:28:38

**Conducted Emission Plot between 1GHz ~ 3GHz**


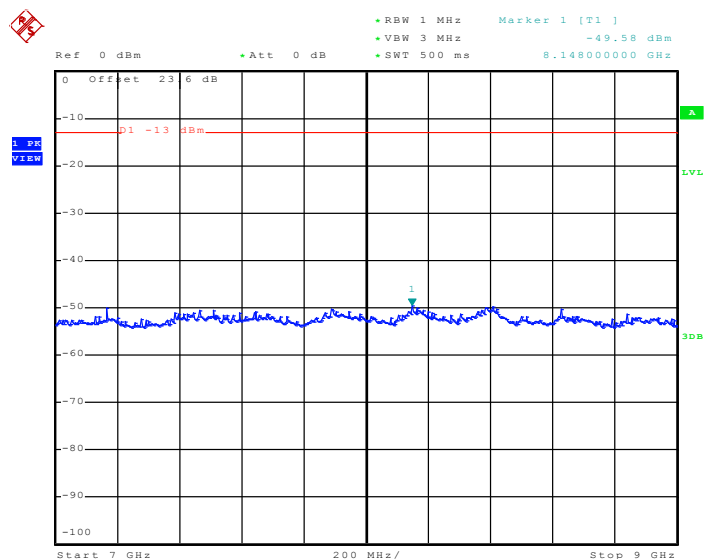
Date: 8.MAR.2011 12:28:58

## Conducted Emission Plot between 3GHz ~ 7GHz



Date: 8.MAR.2011 12:29:11

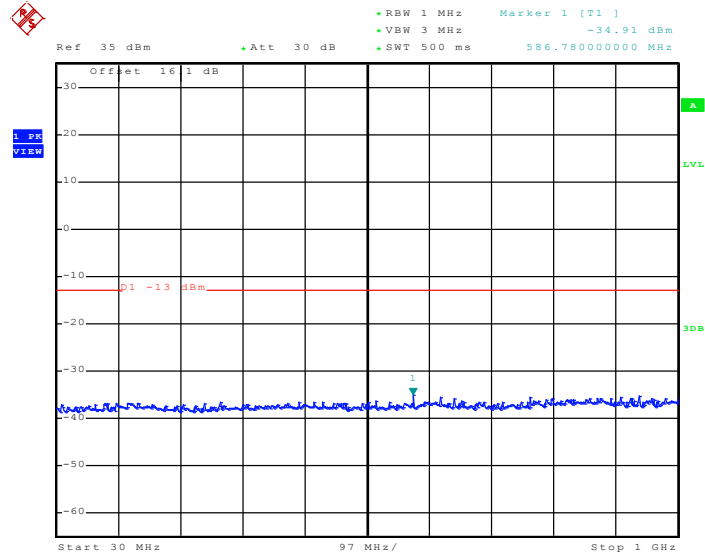
## Conducted Emission Plot between 7GHz ~ 9GHz



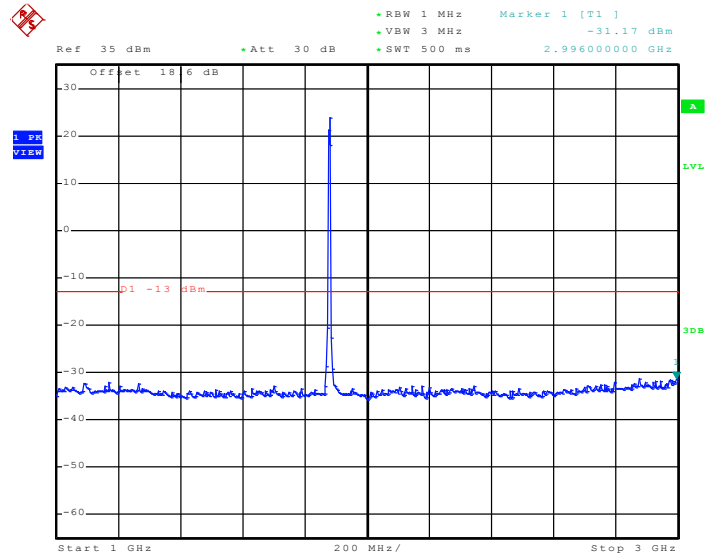
Date: 8.MAR.2011 12:29:23



<b>Band :</b>	WCDMA Band II	<b>Channel :</b>	CH9400
<b>Test Mode :</b>	RMC 12.2Kbps Link		

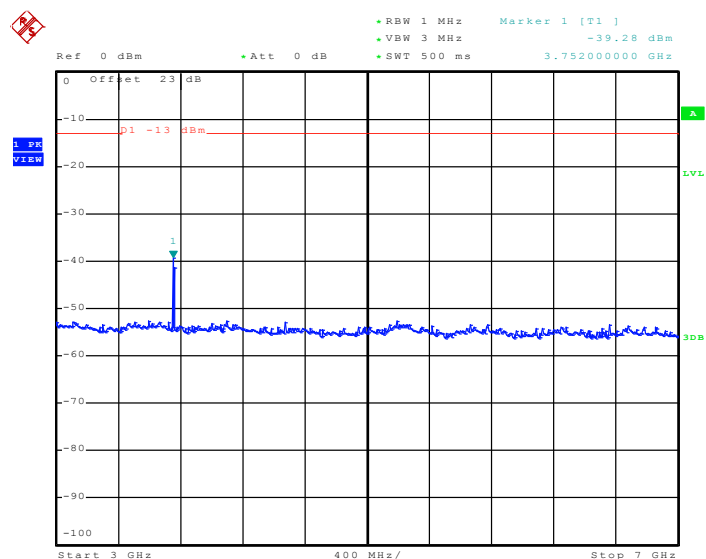
**Conducted Emission Plot between 30MHz ~ 1GHz**

Date: 8.MAR.2011 12:04:34

**Conducted Emission Plot between 1GHz ~ 3GHz**

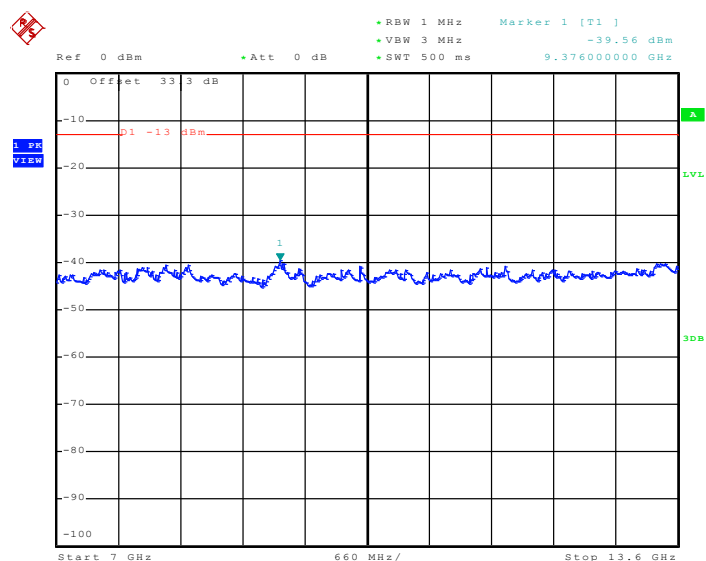
Date: 8.MAR.2011 12:04:46

### Conducted Emission Plot between 3GHz ~ 7GHz



Date: 8.MAR.2011 12:05:02

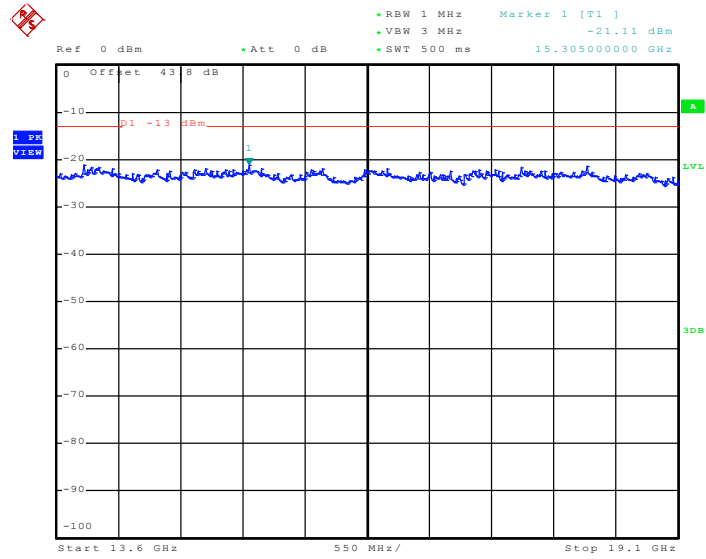
### Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 8.MAR.2011 12:05:15



Conducted Emission Plot between 13.6GHz ~ 19.1GHz



Date: 8.MAR.2011 12:05:27

## **3.6 Field Strength of Spurious Radiation Measurement**

### **3.6.1 Description of Field Strength of Spurious Radiated Measurement**

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### **3.6.2 Measuring Instruments**

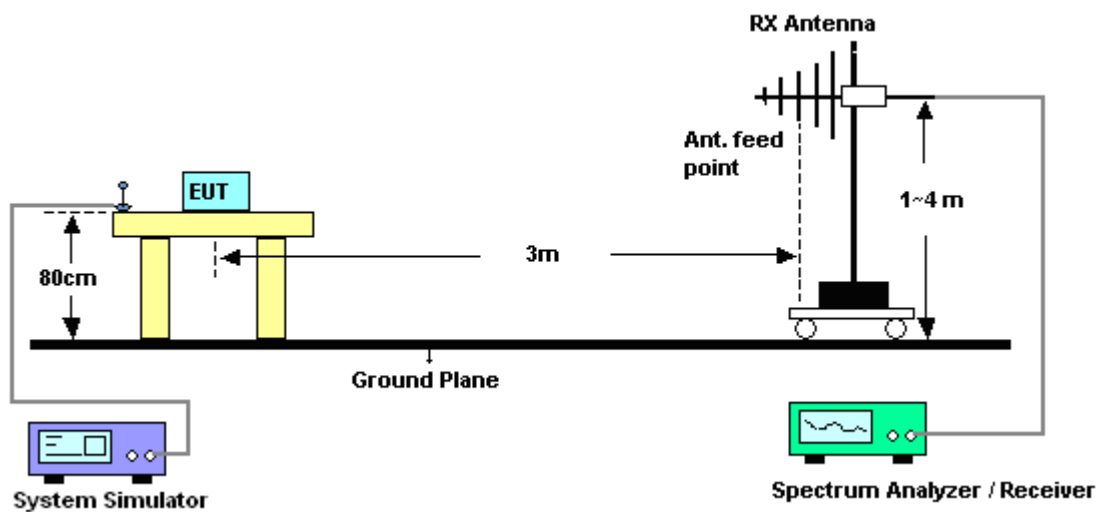
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11.  $ERP \text{ (dBm)} = EIRP - 2.15$

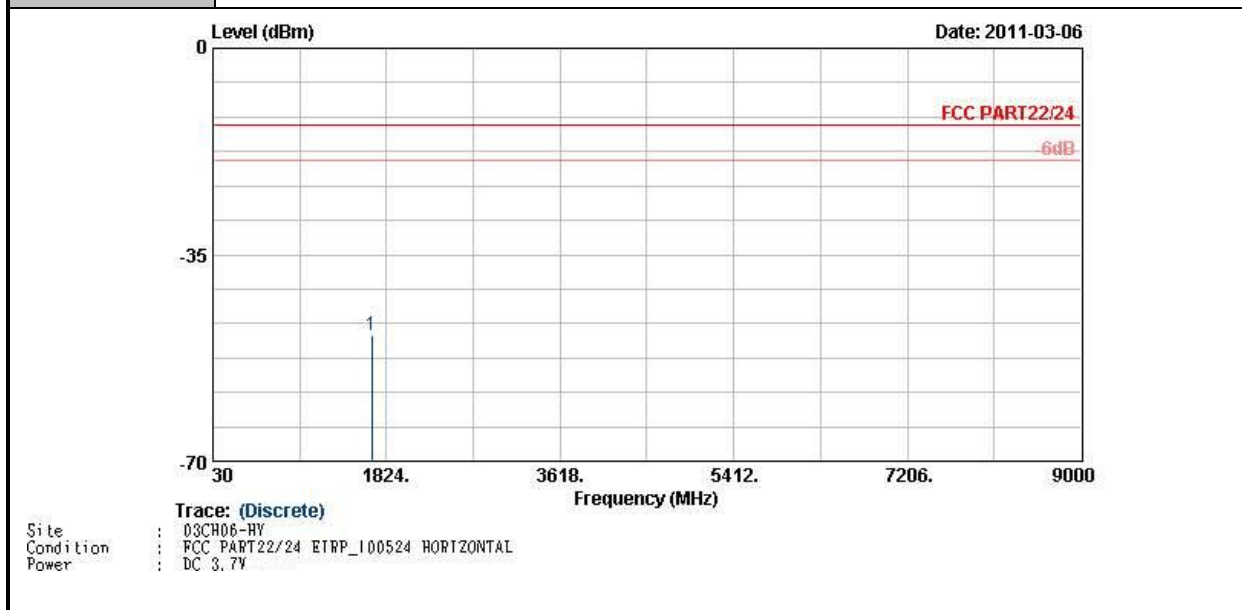


### 3.6.4 Test Setup



**3.6.5 Test Result of Field Strength of Spurious Radiated**

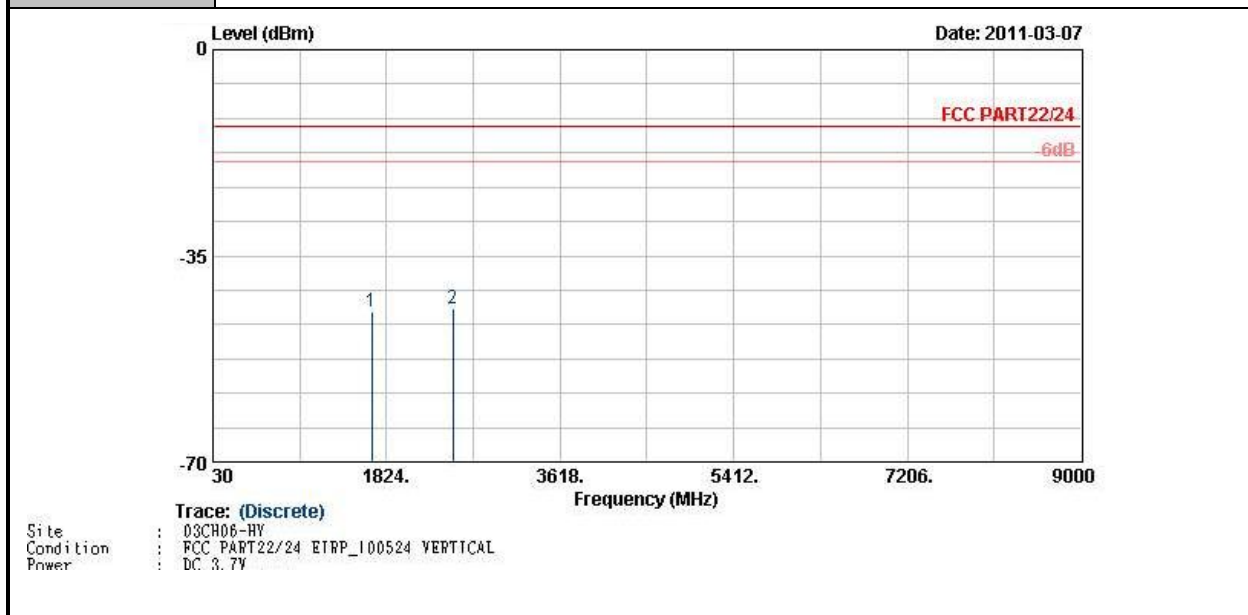
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	17~18 °C
<b>Test Mode :</b>	RMC 12.2Kbps Link for Sample 1	<b>Relative Humidity :</b>	48~49%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-48.61	-13	-35.61	-61.15	-50.33	1.62	5.49	H	Pass



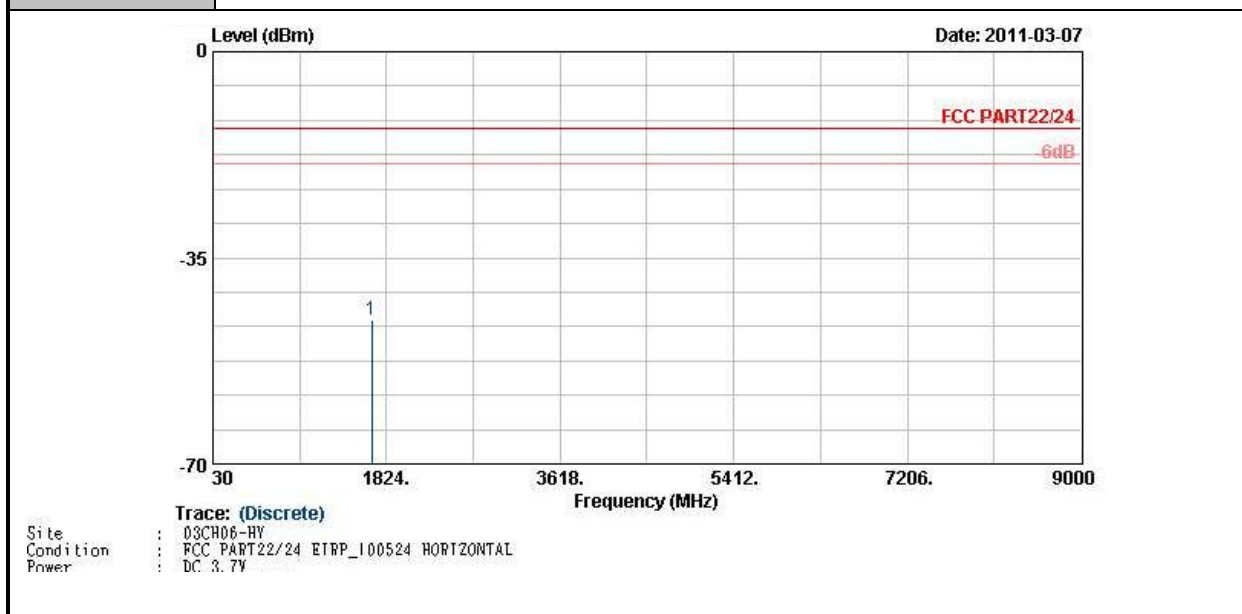
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	17~18 °C
<b>Test Mode :</b>	RMC 12.2Kbps Link for Sample 1	<b>Relative Humidity :</b>	48~49%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1672	-44.55	-13	-31.55	-57.09	-46.27	1.62	5.49	V	Pass
2509	-43.94	-13	-30.94	-58.53	-45.91	2.1	6.22	V	Pass



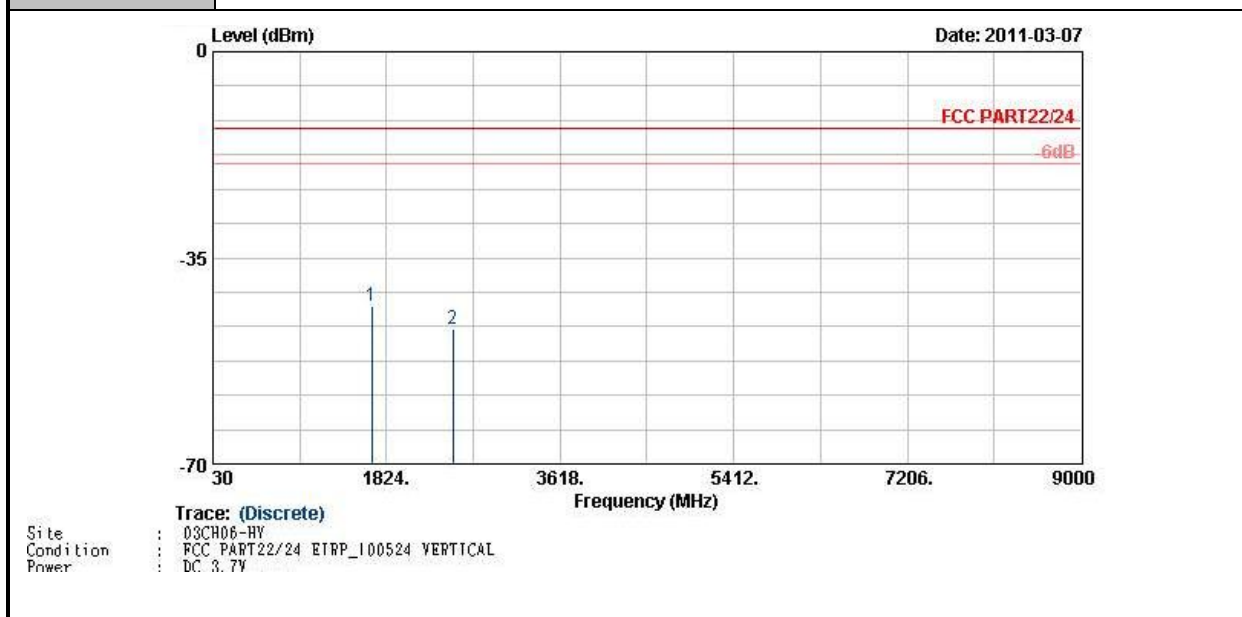
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	17~18 °C
<b>Test Mode :</b>	RMC 12.2Kbps Link for Sample 2	<b>Relative Humidity :</b>	48~49%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1672	-45.61	-13	-32.61	-58.17	-47.33	1.62	5.49	H	Pass



<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	17~18 °C
<b>Test Mode :</b>	RMC 12.2Kbps Link for Sample 2	<b>Relative Humidity :</b>	48~49%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1672	-43.25	-13	-30.25	-55.81	-44.97	1.62	5.49	V	Pass
2509	-47.07	-13	-34.07	-61.64	-49.04	2.1	6.22	V	Pass

### **3.7 Frequency Stability Measurement**

#### **3.7.1 Description of Frequency Stability Measurement**

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

#### **3.7.2 Measuring Instruments**

See list of measuring instruments of this test report.

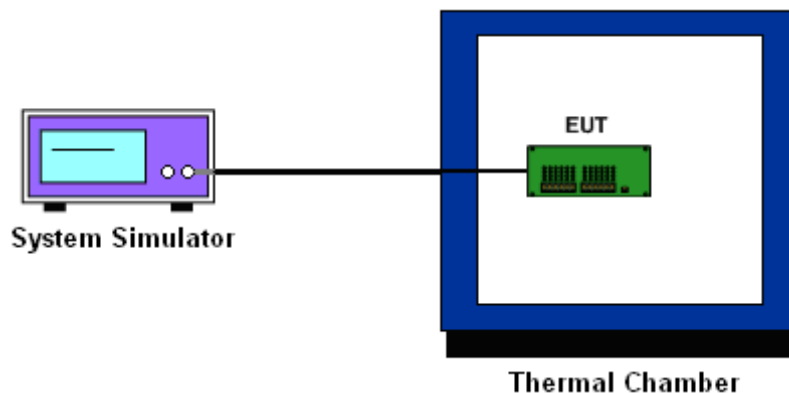
#### **3.7.3 Test Procedures for Temperature Variation**

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at  $-30^{\circ}\text{C}$ , the testing lowest temperature will be raised in  $10^{\circ}\text{C}$  step until the EUT can be turned on.

#### **3.7.4 Test Procedures for Voltage Variation**

1. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

### 3.7.5 Test Setup



### 3.7.6 Test Result of Temperature Variation

<b>Band :</b>	WCDMA Band V	<b>Channel :</b>	4182
<b>Limit (ppm) :</b>	2.5		
Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	40	0.05	
-10	37	0.04	
0	32	0.04	
10	-28	-0.03	
20	34	0.04	
30	-17	-0.02	
40	21	0.02	
50	16	0.02	

**Note:**

1. The EUT stops transmitting at temperatures -30°C.
2. The manufacturer declared that the EUT could work properly between temperatures -20°C~55°C.

<b>Band :</b>	WCDMA Band II	<b>Channel :</b>	9400
<b>Limit (ppm) :</b>	2.5		

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	-59	-0.03	
-10	53	0.03	
0	42	0.02	
10	35	0.02	
20	33	0.02	
30	26	0.01	
40	39	0.02	
50	-35	-0.02	

**Note:**

1. The EUT stops transmitting at temperatures -30°C.
2. The manufacturer declared that the EUT could work properly between temperatures -20°C~55°C.



**3.7.7 Test Result of Voltage Variation**

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band V CH4182	RMC 12.2Kbps	3.7	43	0.05	2.5	PASS
		3.2	-34	-0.04		
		4.2	-27	-0.03		
WCDMA Band II CH9400	RMC 12.2Kbps	3.7	-59	-0.03		
		3.2	-63	-0.03		
		4.2	-59	-0.03		

**Note:** Normal Voltage = 3.7V.

## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Mar. 19, 2009	Mar. 18, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 25, 2010	Oct. 24, 2011	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000MHz	Apr. 28, 2010	Apr. 27, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 15, 2010	Apr. 14, 2011	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 15, 2010	Apr. 14, 2011	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	117997	N/A	May 14, 2009	May 13, 2011	Radiation (03CH06-HY)

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	$\pm 0.10$	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	$\pm 1.70$	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	$\pm 0.50$	Normal (k=2)	0.25	1	0.25
Receiver Correction	$\pm 2.00$	Rectangular	1.15	1	1.15
Antenna Factor Directional	$\pm 1.50$	Rectangular	0.87	1	0.87
Site Imperfection	$\pm 2.80$	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP071404-01 as below.



## **Appendix C. Change Note**

Please see the change note as below.



## **Appendix D. Original Report**

Please refer to Sporton Report Number FG071404 as below.