



# FCC RF Test Report

APPLICANT : NetComm Wireless Limited  
EQUIPMENT : M2M Router  
BRAND NAME : NetComm Wireless  
MODEL NAME : NTC-6908-02  
MARKETING NAME : M2M Router  
FCC ID : XIA-NTC6908  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Sep. 17, 2012 and completely tested on Oct. 02, 2012. 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:

Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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SPORTON INTERNATIONAL INC.

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FCC ID : XIA-NTC6908

Page Number : 1 of 92

Report Issued Date : Oct. 29, 2012

Report Version : Rev. 01



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG291705	Rev. 01	Initial issue of report	Oct. 29, 2012



### 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	-
3.1	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.1	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.2	§24.232(d)	N/A	Peak-to-Average Ratio	< 13 dB	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 Spurious 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 22.36 dB at 5640.000 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**

**NetComm Wireless Limited**

Level 2, 18-20 Orion Road Lane Cove, NSW Australia

## **1.2 Manufacturer**

**NetComm Wireless Limited**

Level 2, 18-20 Orion Road Lane Cove, NSW Australia

### 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	M2M Router
Brand Name	NetComm Wireless
Model Name	NTC-6908-02
Marketing Name	M2M Router
Integrated Module	Brand Name : Sierra Wireless Model Name : MC8704 FCC ID: N7NMC8705
FCC ID	XIA-NTC6908
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/WLAN 11bgn
HW Version	V1.3
SW Version	V1.9.79.6
EUT Stage	Identical Prototype

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	GSM850 : 31.87 dBm GSM1900 : 30.20 dBm WCDMA Band V : 22.36 dBm WCDMA Band II : 22.93 dBm
Antenna Type	Fixed External Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)

### 1.4 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (% , Hz, ppm)	Emission Designator
Part 22	GSM850 GPRS 8	GMSK	1.746	0.05 ppm	244KGXW
Part 22	GSM850 EDGE 8	GMSK / 8PSK	0.649	0.04 ppm	250KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.195	0.03 ppm	4M20F9W
Part 24	GSM1900 GPRS 10	GMSK	1.950	0.06 ppm	248KGXW
Part 24	GSM1900 EDGE 8	GMSK / 8PSK	1.023	0.05 ppm	252KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.366	0.02 ppm	4M20F9W

### 1.5 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	03CH05-HY	722060/4086B-1



## 1.6 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)
- FCC KDB 971168 D01 Power Meas. License Digital Systems v01
- FCC KDB 412172 D01 Determining ERP and EIRP v01
- 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, recorded in a separate test report.

## 1.7 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 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 GSM850 and WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

Test Modes		
Band	Radiated TCs	Conducted TCs
<b>GSM 850</b>	<ul style="list-style-type: none"> <li>■ GPRS 8 Link</li> <li>■ EDGE 8 Link</li> </ul>	<ul style="list-style-type: none"> <li>■ GPRS 8 Link</li> <li>■ EDGE 8 Link</li> </ul>
<b>GSM 1900</b>	<ul style="list-style-type: none"> <li>■ GPRS 10 Link</li> <li>■ EDGE 8 Link</li> </ul>	<ul style="list-style-type: none"> <li>■ GPRS 10 Link</li> <li>■ EDGE 8 Link</li> </ul>
<b>WCDMA Band V</b>	<ul style="list-style-type: none"> <li>■ RMC 12.2Kbps Link</li> </ul>	<ul style="list-style-type: none"> <li>■ RMC 12.2Kbps Link</li> </ul>
<b>WCDMA Band II</b>	<ul style="list-style-type: none"> <li>■ RMC 12.2Kbps Link</li> </ul>	<ul style="list-style-type: none"> <li>■ RMC 12.2Kbps Link</li> </ul>

**Note:**

1. The maximum power levels are GPRS multi-slot class 8 or GPRS multi-slot class 10 mode for GMSK link, EDGE multi-slot class 8 mode for 8PSK link, RMC 12.2Kbps mode for WCDMA band V, and RMC 12.2Kbps mode for WCDMA band II, only these modes were used for all tests.
2. Because there are individual antennas for each WWAN, and WLAN, the co-location test modes are not required.

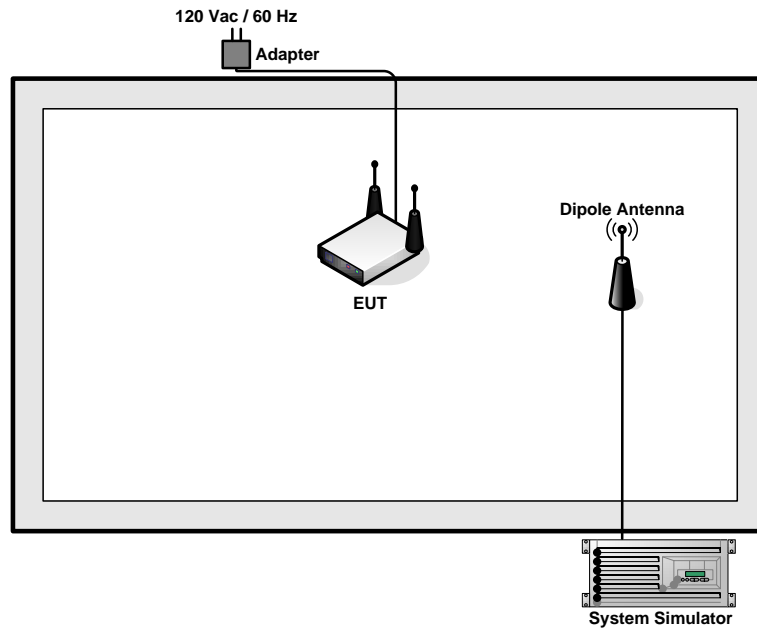


The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GPRS 8	31.81	31.87	31.85	29.50	29.78	30.19
GPRS 10	31.70	31.75	31.73	29.46	29.81	30.20
GPRS 12	26.60	26.64	26.61	25.61	25.92	26.43
EGPRS 8	27.55	27.57	27.56	26.50	26.80	27.40
EGPRS 10	27.05	27.09	27.10	26.01	26.41	26.93
EGPRS 12	26.05	26.58	26.53	25.58	25.91	26.31

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	22.36	22.29	22.27	22.93	22.92	22.87
HSDPA Subtest-1	22.27	22.25	21.98	22.84	22.82	22.77
HSDPA Subtest-2	22.32	22.28	22.04	22.92	22.90	22.87
HSDPA Subtest-3	21.91	21.87	21.63	22.51	22.47	22.44
HSDPA Subtest-4	21.87	21.83	21.59	22.64	22.60	22.57
HSUPA Subtest-1	21.91	21.87	21.58	22.34	22.28	22.23
HSUPA Subtest-2	20.98	20.93	20.67	21.33	21.27	21.22
HSUPA Subtest-3	21.44	21.39	21.13	22.24	22.18	22.13
HSUPA Subtest-4	21.37	21.32	21.06	22.26	22.20	22.15
HSUPA Subtest-5	21.93	21.88	21.62	22.36	22.30	22.25

## 2.2 Connection Diagram of Test System



### 3 Test Result

#### 3.1 Conducted Output Power and ERP/EIRP Measurement

##### 3.1.1 Description of the Conducted Output Power and ERP/EIRP 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.

The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts. According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$ ,  $ERP = EIRP - 2.15$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB

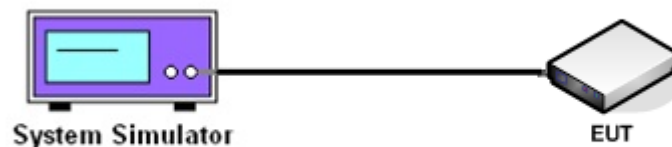
##### 3.1.2 Measuring Instruments

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.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

##### 3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band ( $G_T - L_C = 2.7\text{dB}$ )									
Modes	GSM850 (GPRS 8)			GSM850 (EDGE 8)			WCDMA Band V (RMC 12.2Kbps)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	826.4	836.4	846.6
Conducted Power (dBm)	31.81	31.87	31.85	27.55	27.57	27.56	22.36	22.29	22.27
Conducted Power (Watts)	1.52	1.54	1.53	0.57	0.57	0.57	0.17	0.17	0.17
ERP(dBm)	32.36	32.42	32.4	28.1	28.12	28.11	22.91	22.84	22.82
ERP(Watts)	1.722	1.746	1.738	0.646	0.649	0.647	0.195	0.192	0.191

PCS Band ( $G_T - L_C = 2.7\text{dB}$ )									
Modes	GSM1900 (GPRS 10)			GSM1900 (EDGE 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Conducted Power (dBm)	29.46	29.81	30.2	26.5	26.8	27.4	22.93	22.92	22.87
Conducted Power (Watts)	0.88	0.96	1.05	0.45	0.48	0.55	0.20	0.20	0.19
EIRP(dBm)	32.16	32.51	32.9	29.2	29.5	30.1	25.63	25.62	25.57
EIRP(Watts)	1.644	1.782	1.950	0.832	0.891	1.023	0.366	0.365	0.361

**Note:** maximum burst average power for GSM, and maximum average power for WCDMA.

$EIRP = P_T + G_T - L_C$ ,  $ERP = EIRP - 2.15$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB



## **3.2 Peak-to-Average Ratio**

### **3.2.1 Description of the PAR Measurement**

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

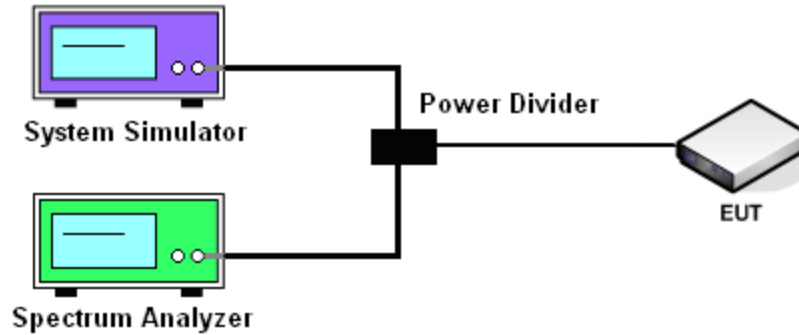
### **3.2.2 Measuring Instruments**

See list of measuring instruments of this test report.

### **3.2.3 Test Procedures**

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
3. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak-to-Average Ratio

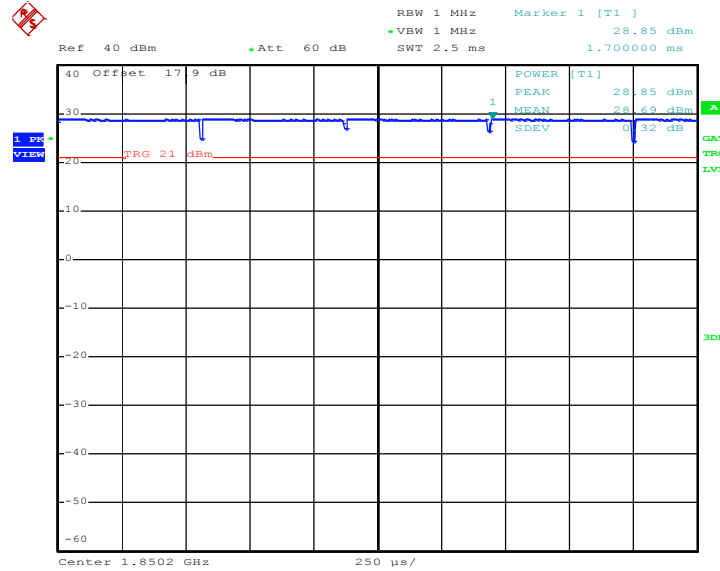
PCS Band									
Modes	GSM1900 (GPRS 10)			GSM1900 (EDGE 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Peak-to-Average Ratio (dB)	0.16	0.15	0.11	0.49	0.48	0.42	3.12	3.20	3.20



3.2.6 Test Result (Plots) of Peak-to-Average Ratio

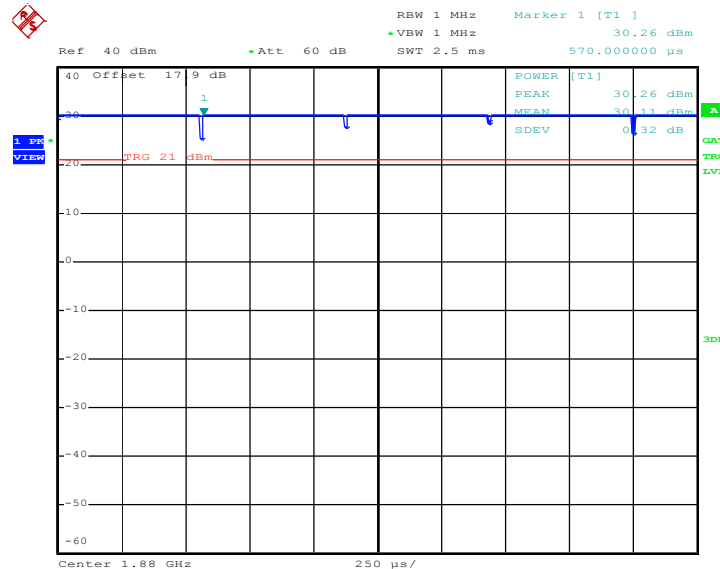
Band :	GSM 1900	Test Mode :	GPRS 10 Link
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 09:54:43

Peak-to-Average Ratio on Channel 661 (1880.0 MHz)

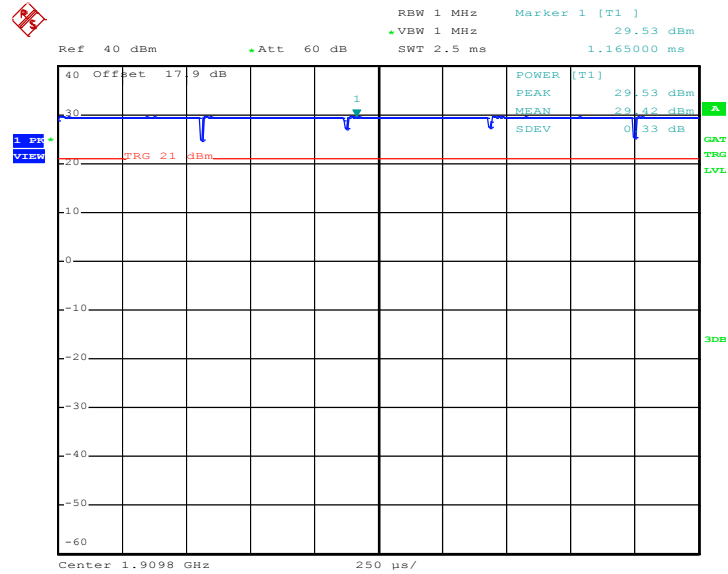


Date: 2.OCT.2012 09:55:33





Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

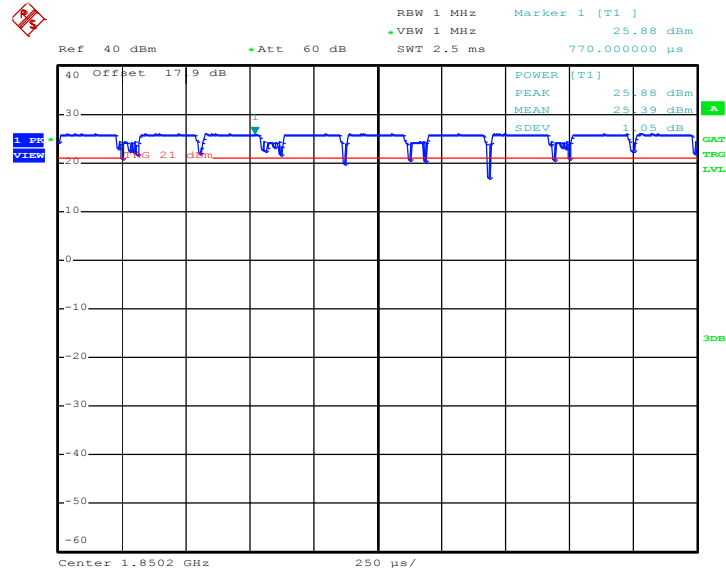


Date: 2.OCT.2012 09:56:11



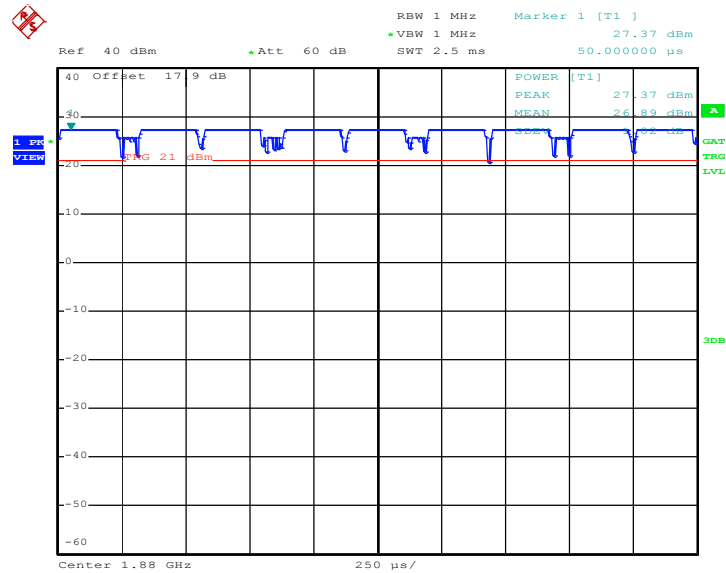
Band :	GSM 1900	Test Mode :	EDGE 8 Link
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 10:06:03

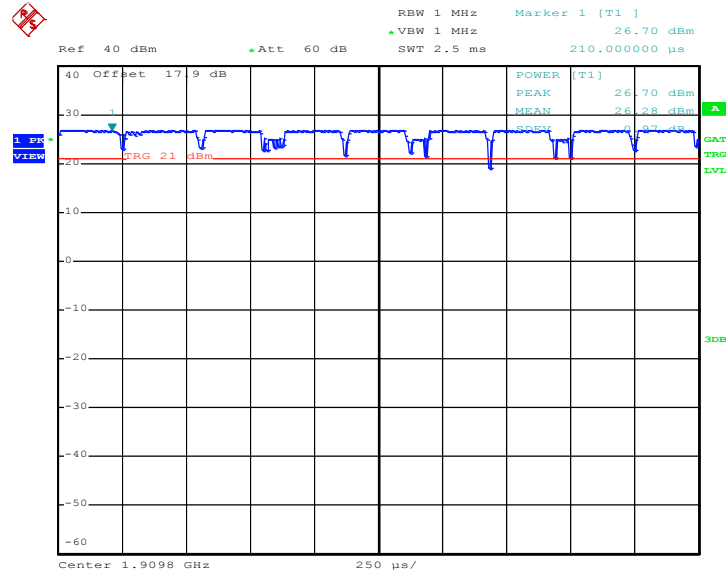
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 2.OCT.2012 10:02:19



Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

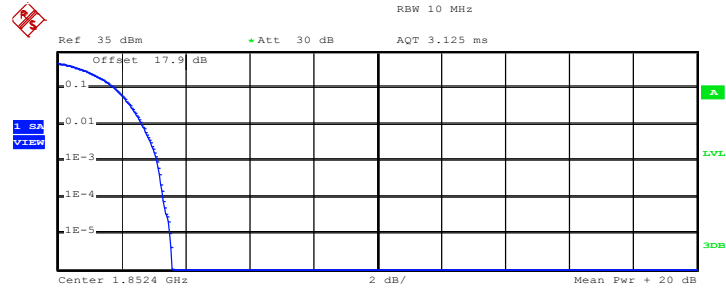


Date: 2.OCT.2012 10:01:07



<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
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**Peak-to-Average Ratio on Channel 9262 (1852.4 MHz)**

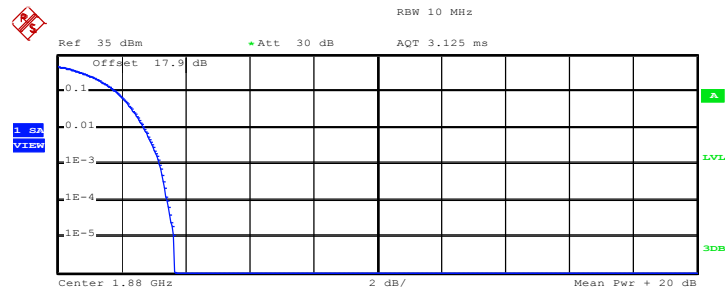


Complementary Cumulative Distribution Function (100000 samples)  
 Trace 1  
 Mean 22.36 dBm  
 Peak 25.94 dBm  
 Crest 3.59 dB

10 %	1.80 dB
1 %	2.64 dB
.1 %	3.12 dB
.01 %	3.32 dB

Date: 28.SEP.2012 12:01:04

**Peak-to-Average Ratio on Channel 9400 (1880.0 MHz)**



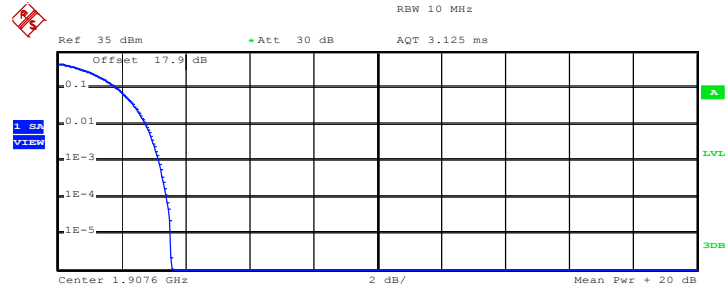
Complementary Cumulative Distribution Function (100000 samples)  
 Trace 1  
 Mean 22.69 dBm  
 Peak 26.37 dBm  
 Crest 3.67 dB

10 %	1.84 dB
1 %	2.72 dB
.1 %	3.20 dB
.01 %	3.44 dB

Date: 28.SEP.2012 12:00:00



Peak-to-Average Ratio on Channel 9538 (1907.6 MHz)



Complementary Cumulative Distribution Function (100000 samples)

Trace 1	
Mean	22.39 dBm
Peak	25.94 dBm
Crest	3.56 dB
10 %	1.88 dB
1 %	2.76 dB
.1 %	3.20 dB
.01 %	3.44 dB

Date: 28.SEP.2012 12:15:07

### 3.3 Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.3.1 Description of Occupied Bandwidth and 26dB Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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.

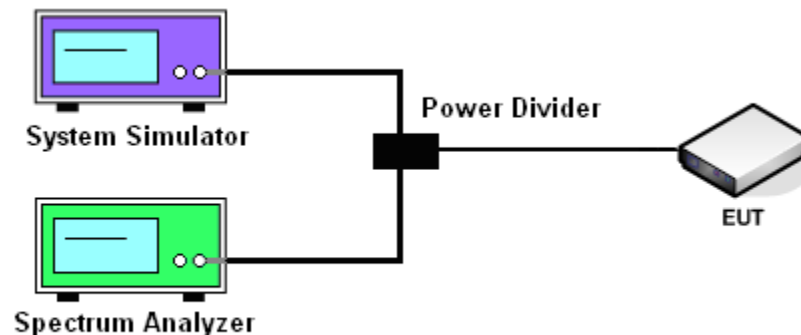
#### 3.3.2 Measuring Instruments

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% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.
3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;  
UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.

#### 3.3.4 Test Setup



3.3.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

Cellular Band						
Modes	GSM850 (GPRS 8)			GSM850 (EDGE 8)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
99% OBW (KHz)	244.00	244.00	244.00	244.00	250.00	240.00
26dB BW (KHz)	300.00	302.00	302.00	304.00	308.00	312.00

PCS Band						
Modes	GSM1900 (GPRS 10)			GSM1900 (EDGE 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
99% OBW (KHz)	248.00	248.00	246.00	246.00	252.00	244.00
26dB BW (KHz)	296.00	300.00	302.00	308.00	310.00	308.00

Cellular Band			
Modes	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
99% OBW (MHz)	4.20	4.16	4.20
26dB BW (MHz)	4.70	4.68	4.68

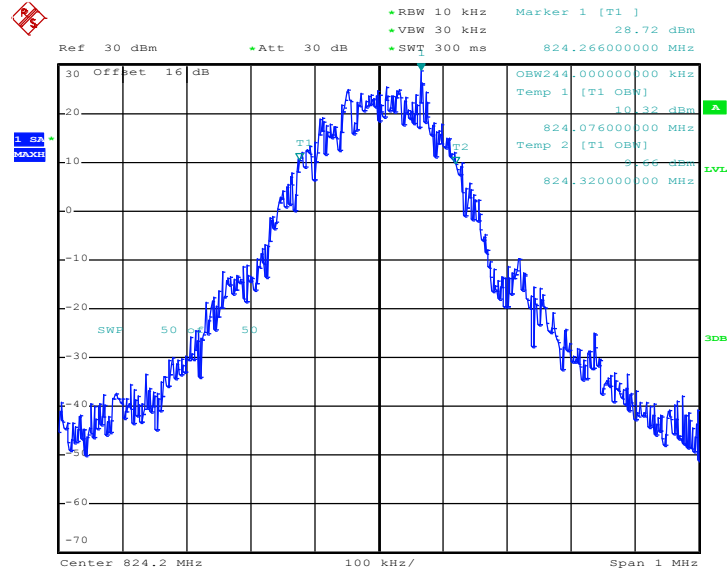
PCS Band			
Modes	WCDMA Band II (RMC 12.2Kbps)		
Channel	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1852.4	1880	1907.6
99% OBW (MHz)	4.18	4.20	4.20
26dB BW (MHz)	4.68	4.68	4.70



3.3.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

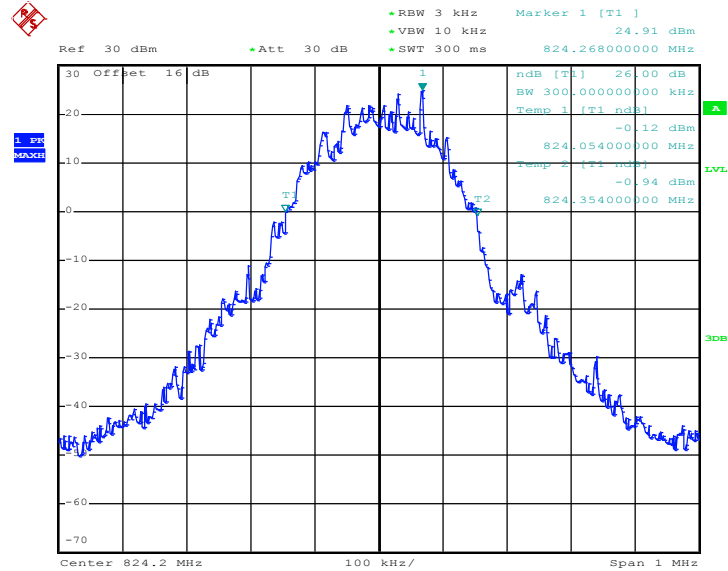
Band :	GSM 850	Test Mode :	GPRS 8 Link
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99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 27.SEP.2012 10:44:42

26dB Bandwidth Plot on Channel 128 (824.2 MHz)

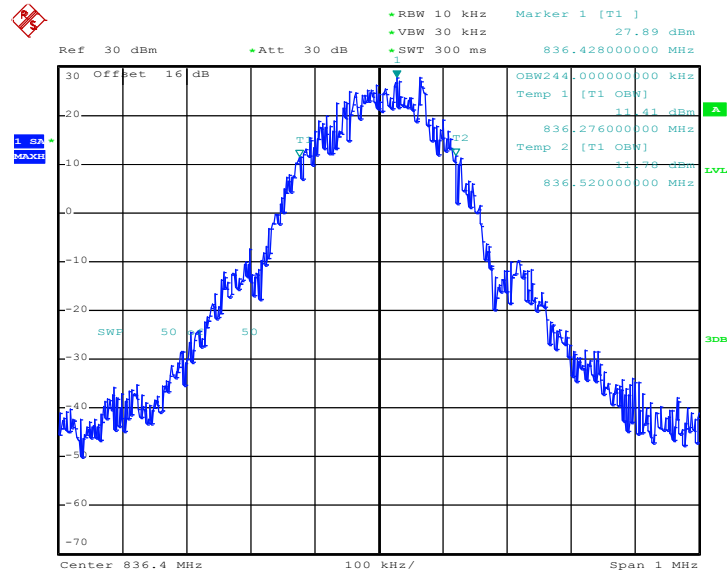


Date: 27.SEP.2012 10:26:09



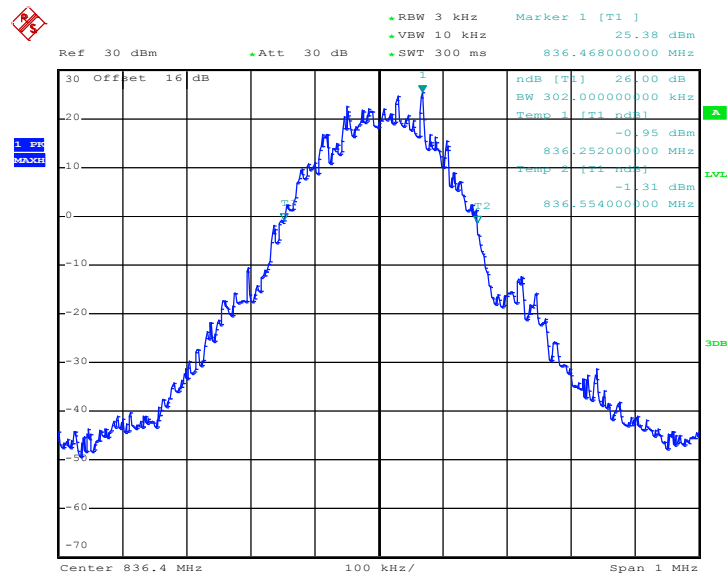


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 27.SEP.2012 10:45:01

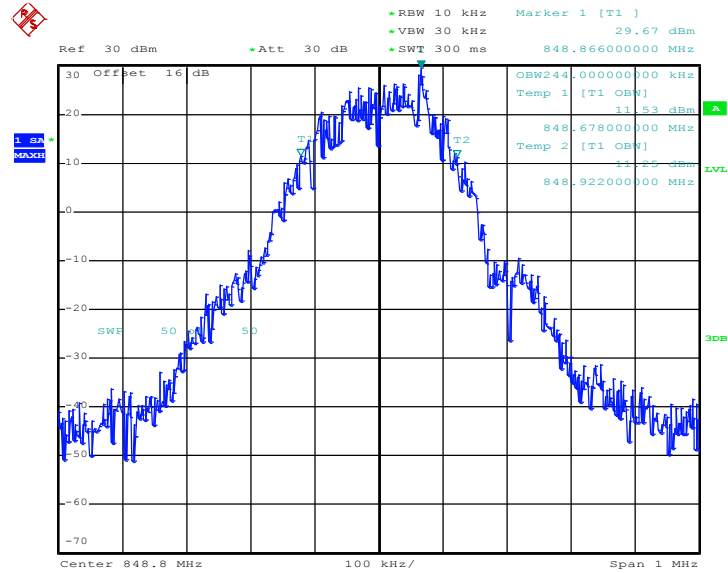
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 27.SEP.2012 10:26:35

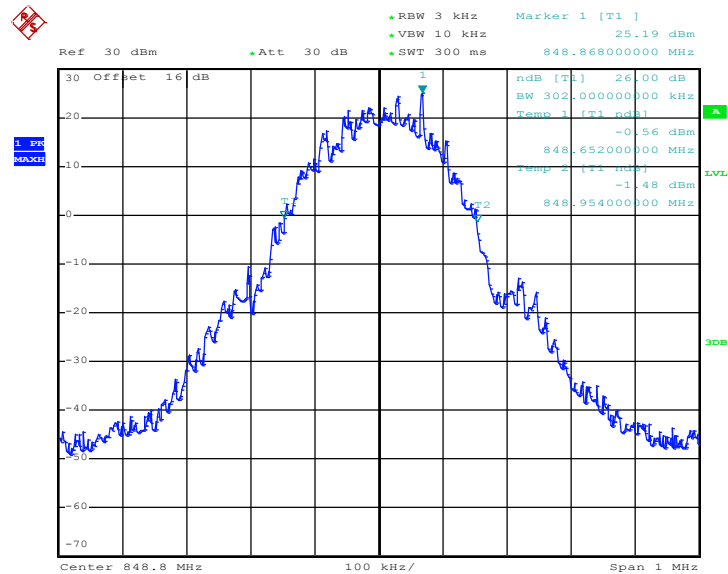


### 99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 27.SEP.2012 10:45:21

### 26dB Bandwidth Plot on Channel 251 (848.8 MHz)

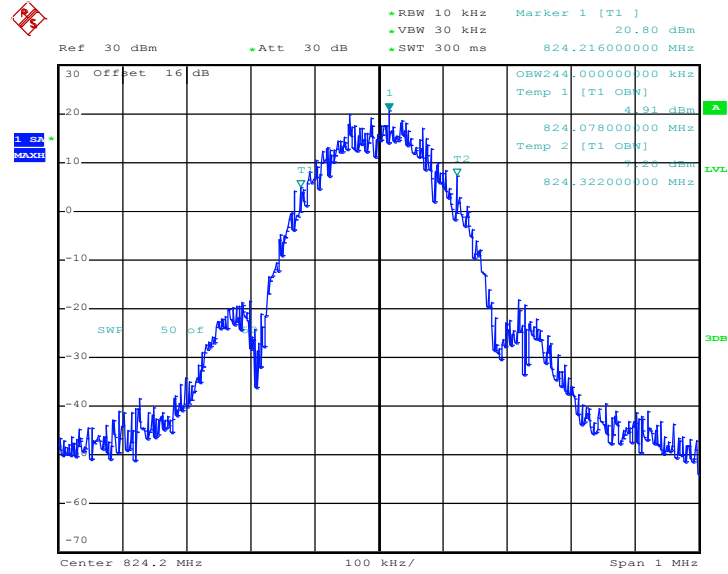


Date: 27.SEP.2012 10:27:02



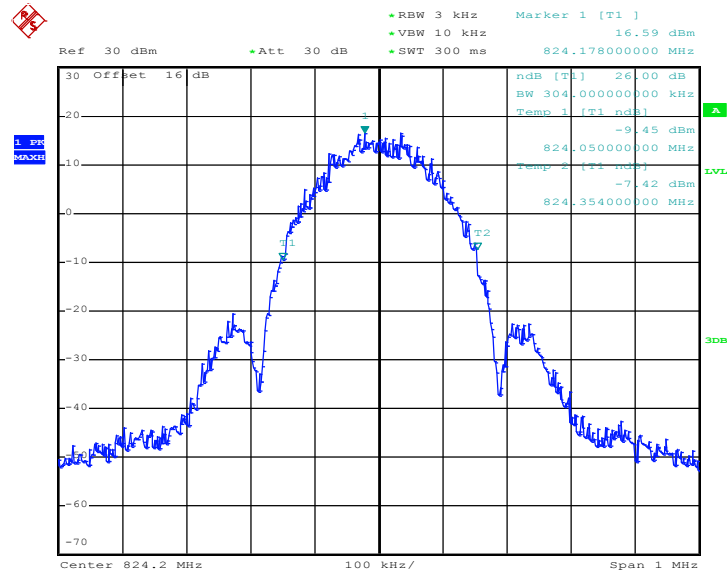
Band :	GSM 850	Test Mode :	EDGE 8 Link
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99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 27.SEP.2012 11:47:11

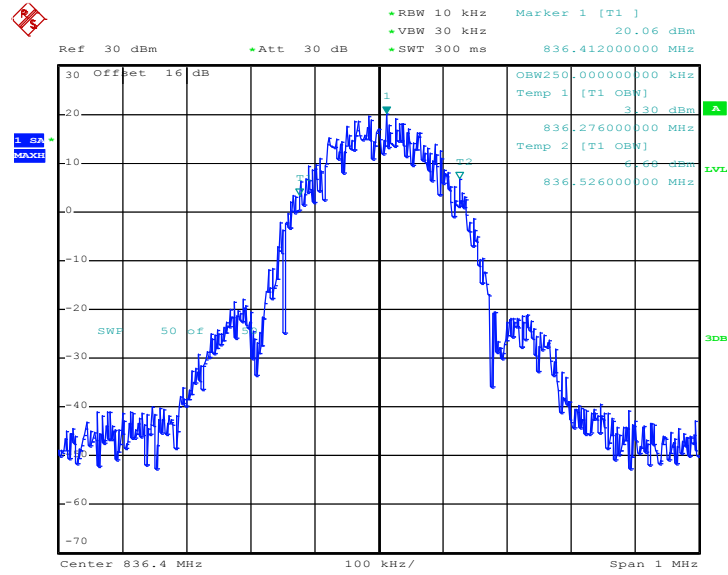
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 27.SEP.2012 11:44:40

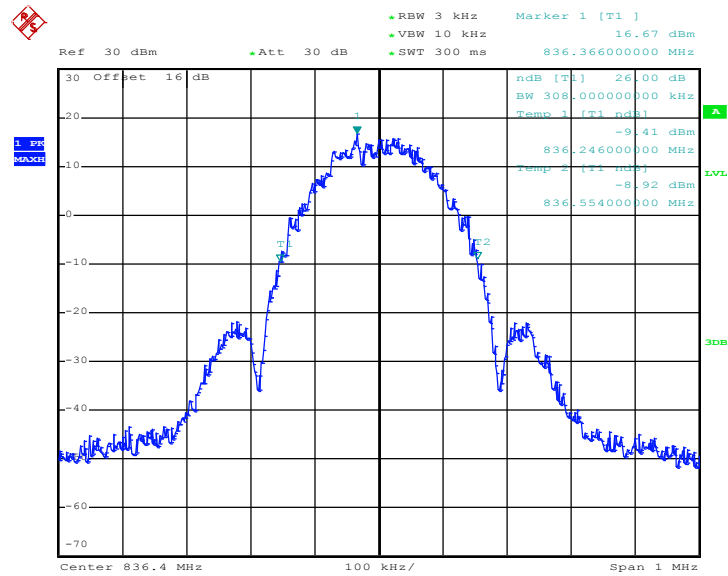


### 99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 27.SEP.2012 11:47:30

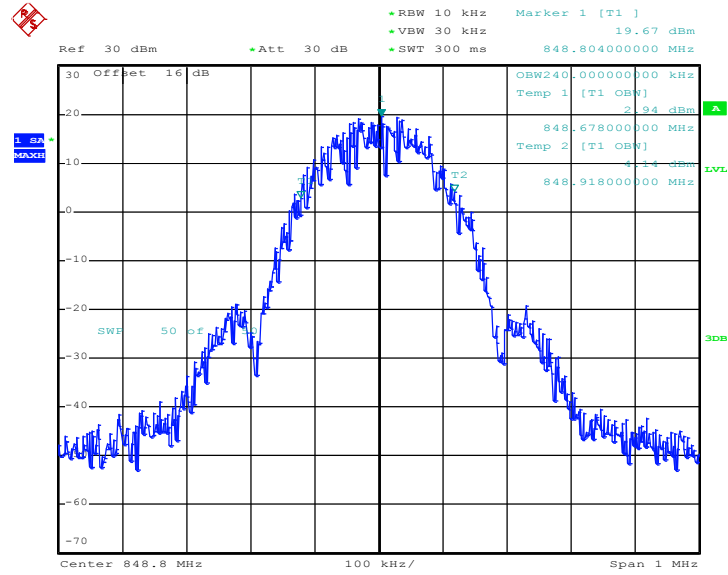
### 26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 27.SEP.2012 11:45:06

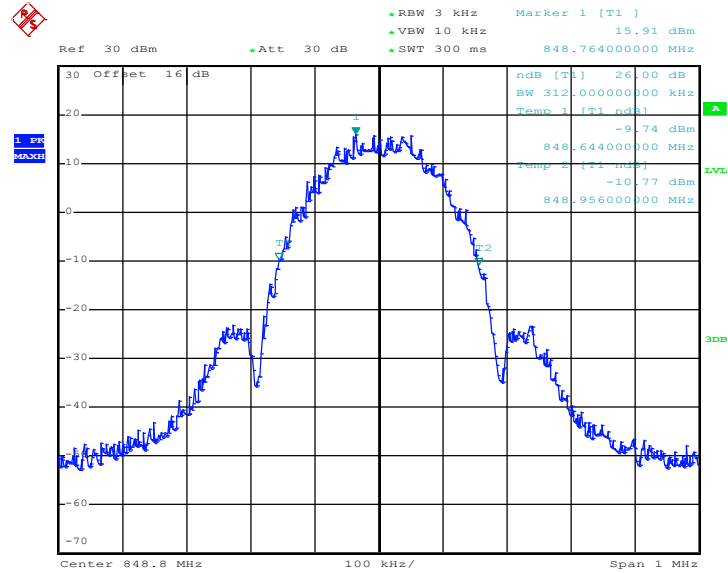


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 27.SEP.2012 11:47:50

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

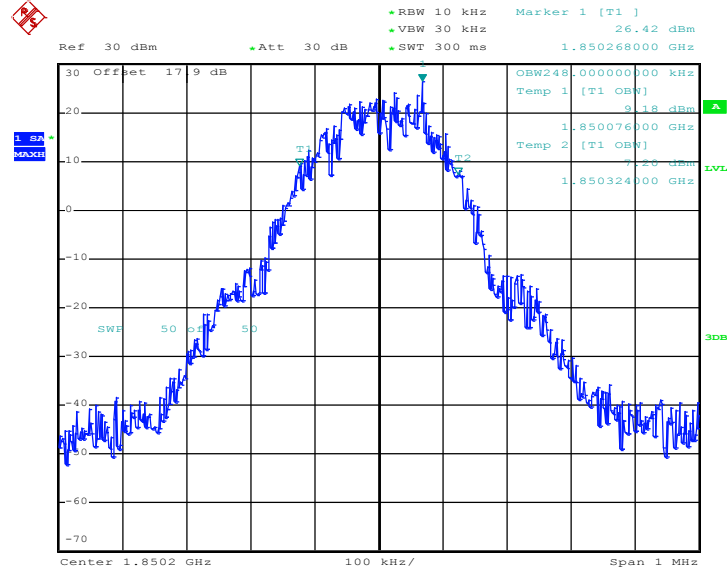


Date: 27.SEP.2012 11:45:32



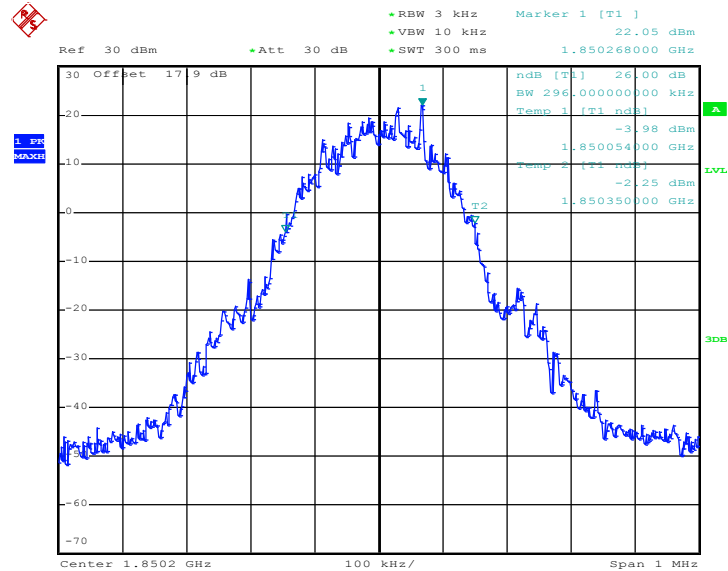
Band :	GSM 1900	Test Mode :	GPRS 10 Link
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 09:44:55

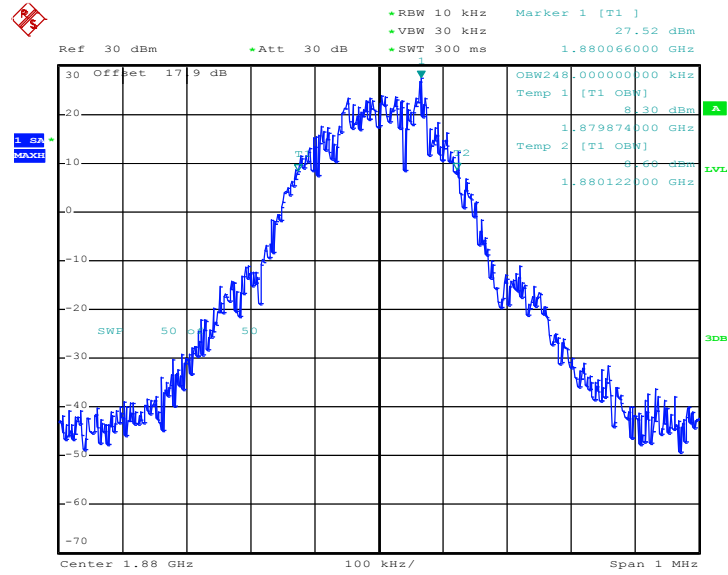
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 09:42:25

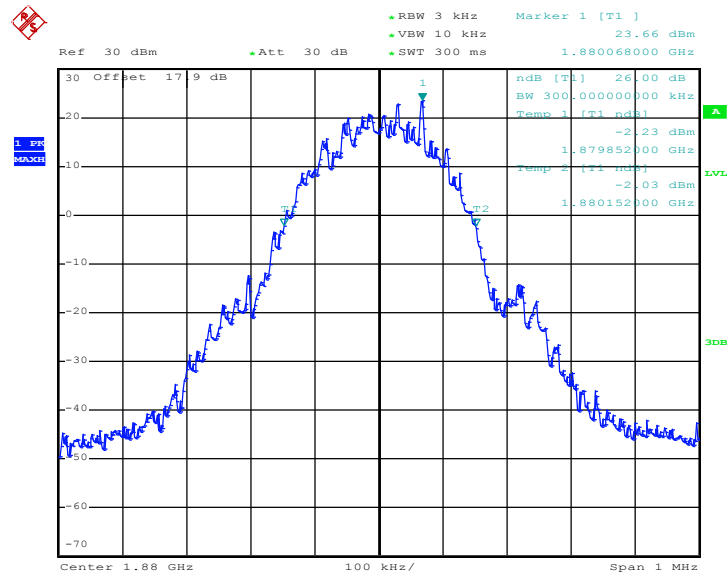


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 2.OCT.2012 09:45:15

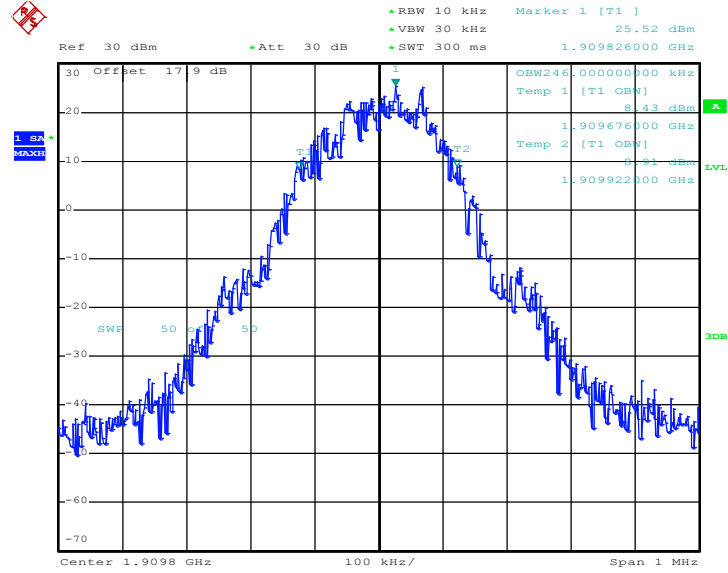
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 2.OCT.2012 09:42:51

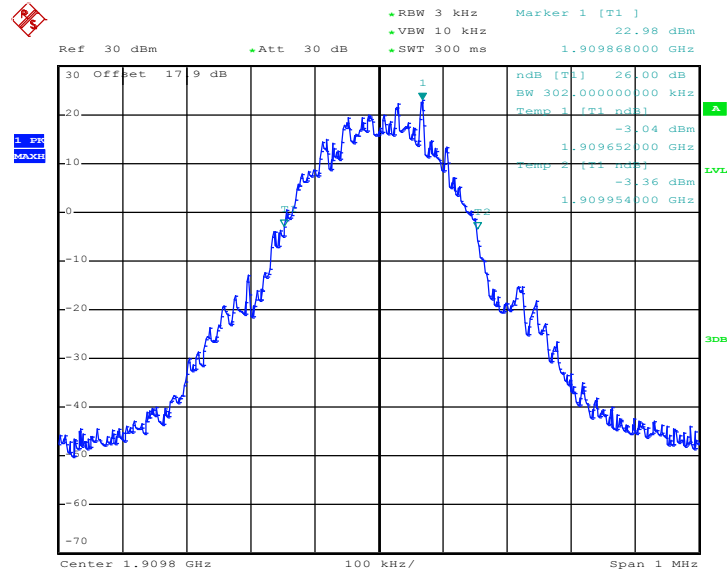


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 2.OCT.2012 09:45:34

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)



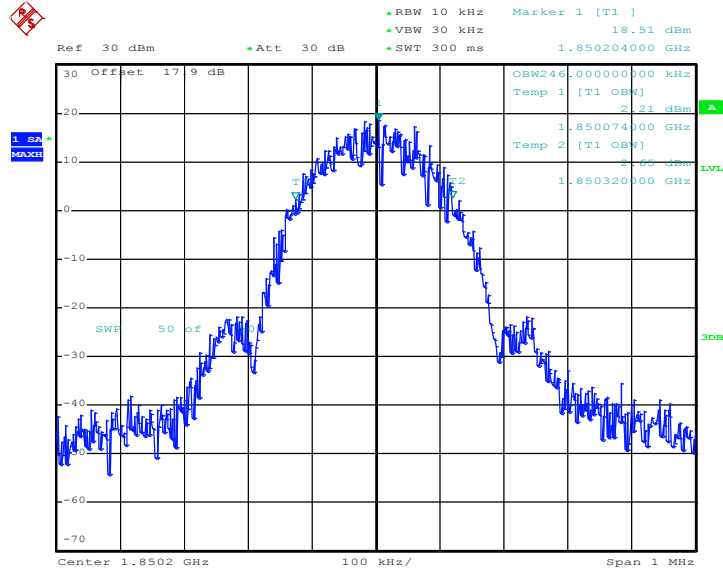
Date: 2.OCT.2012 09:43:17





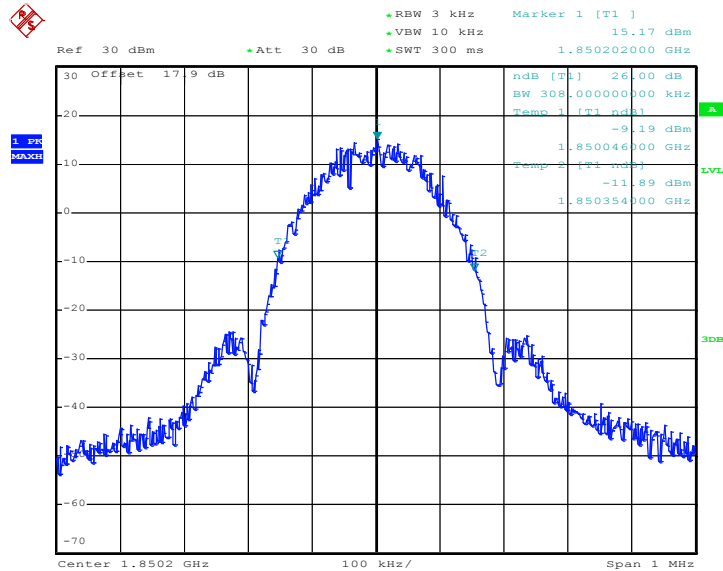
<b>Band :</b>	GSM 1900	<b>Test Mode :</b>	EDGE 8 Link
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 10:17:44

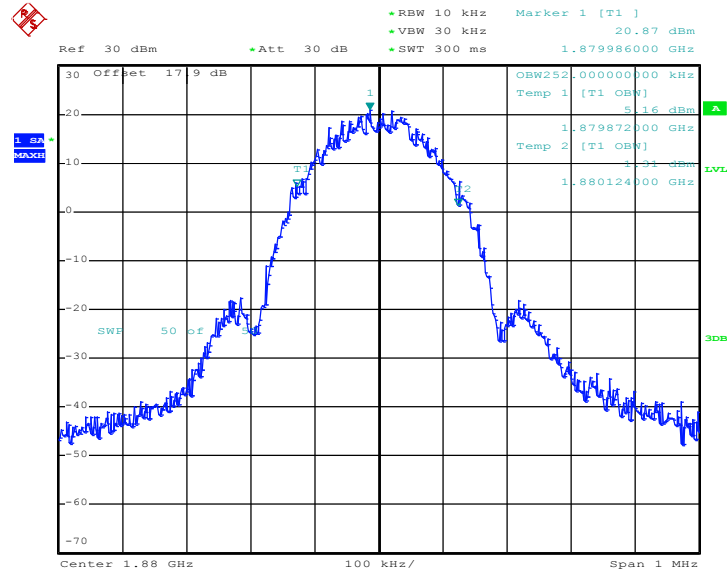
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 2.OCT.2012 10:19:19

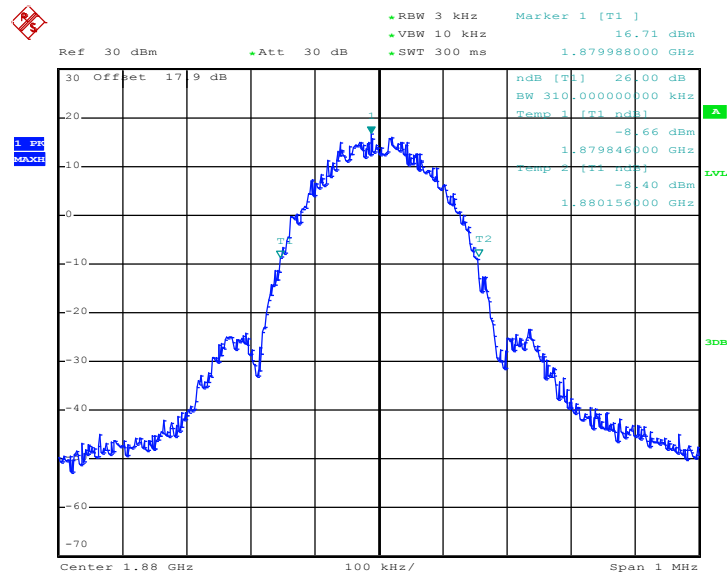


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 2.OCT.2012 10:31:58

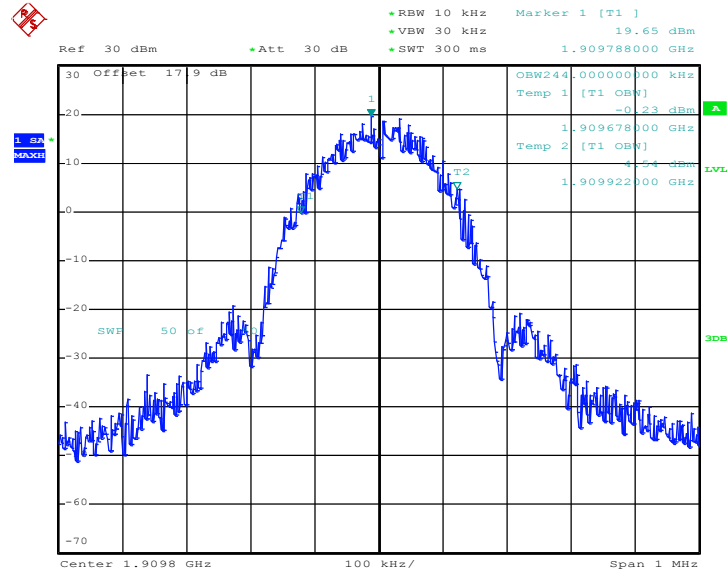
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 2.OCT.2012 10:19:46

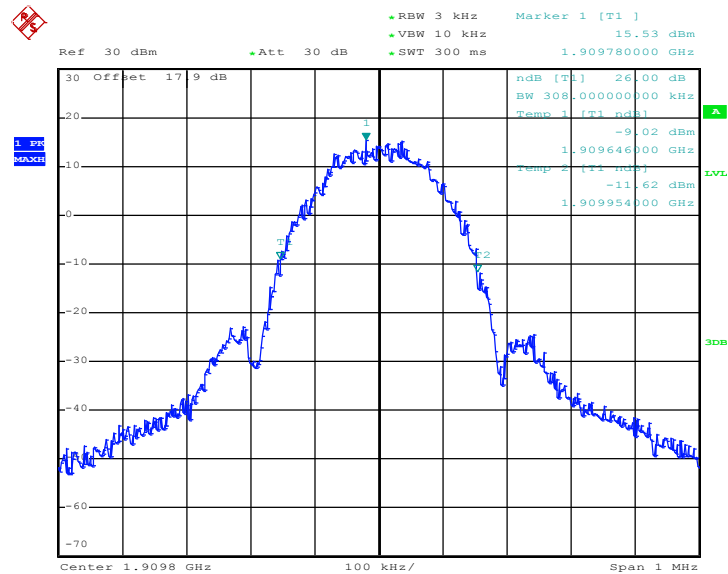


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 2.OCT.2012 10:18:23

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

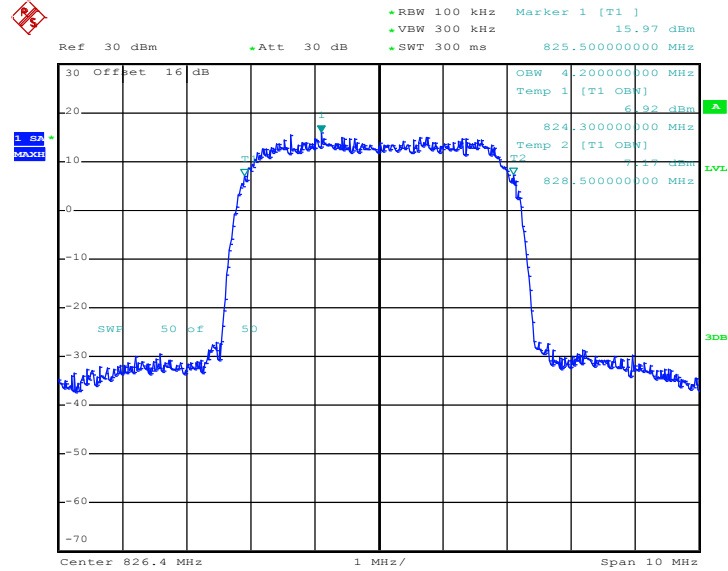


Date: 2.OCT.2012 10:20:12



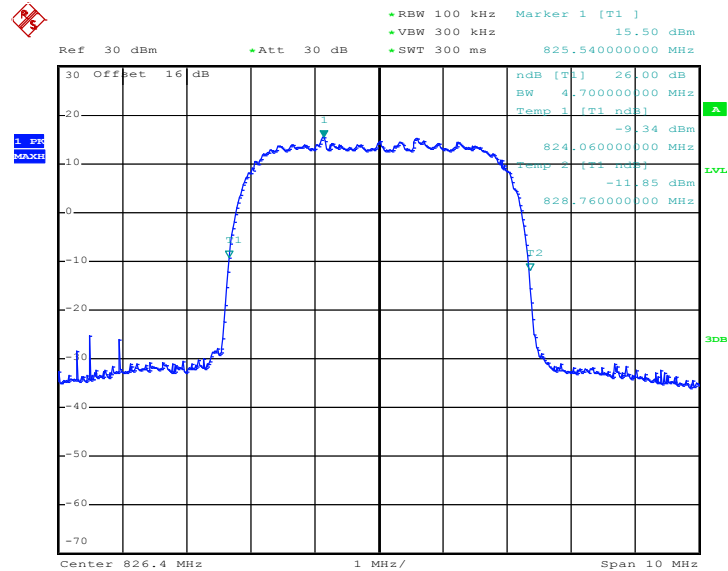
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link
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99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 28.SEP.2012 11:24:25

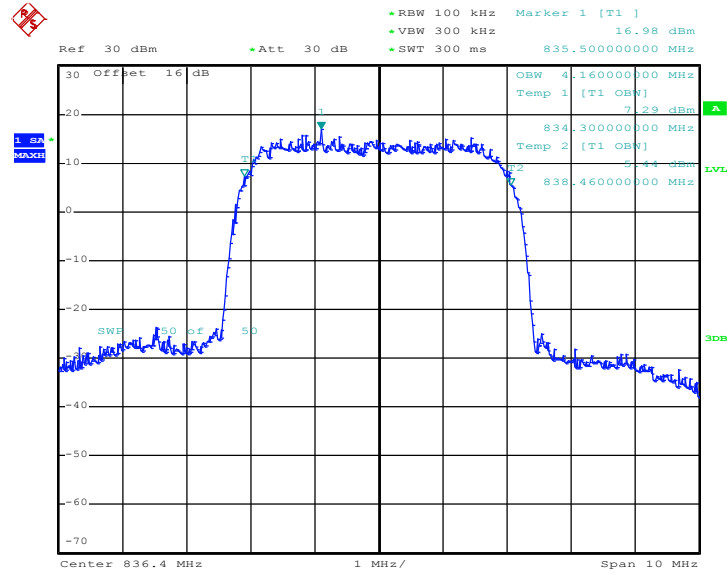
26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 28.SEP.2012 10:17:18

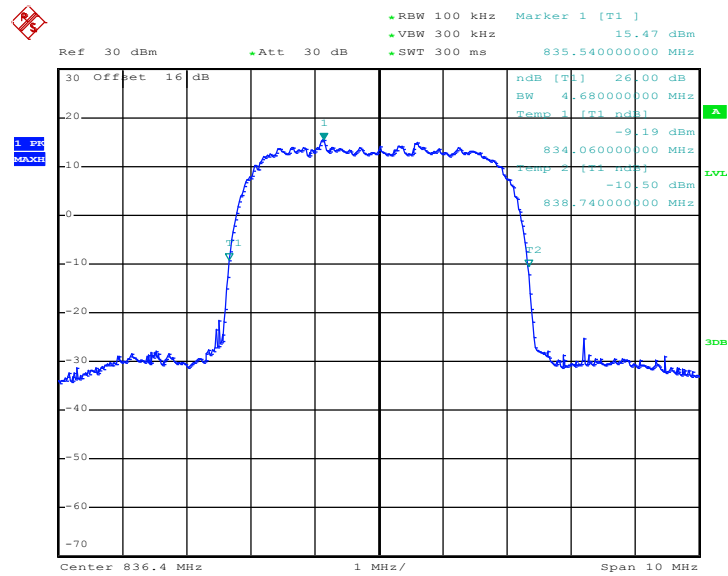


99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 28.SEP.2012 11:28:41

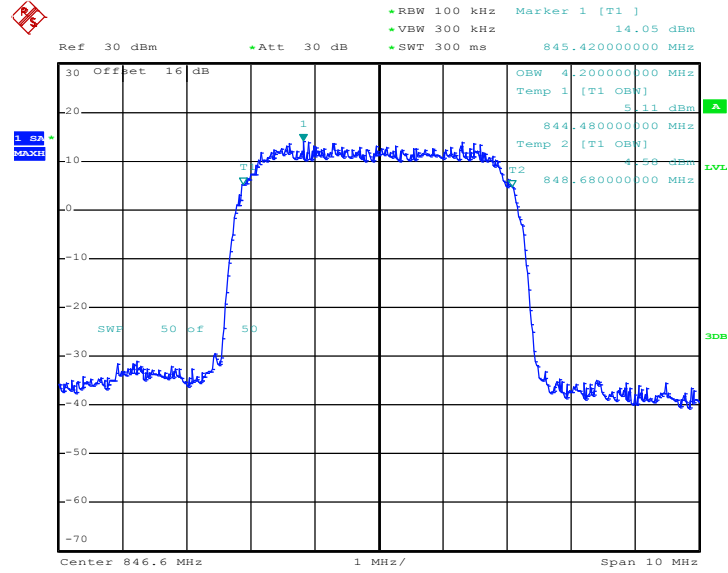
26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 28.SEP.2012 10:18:46

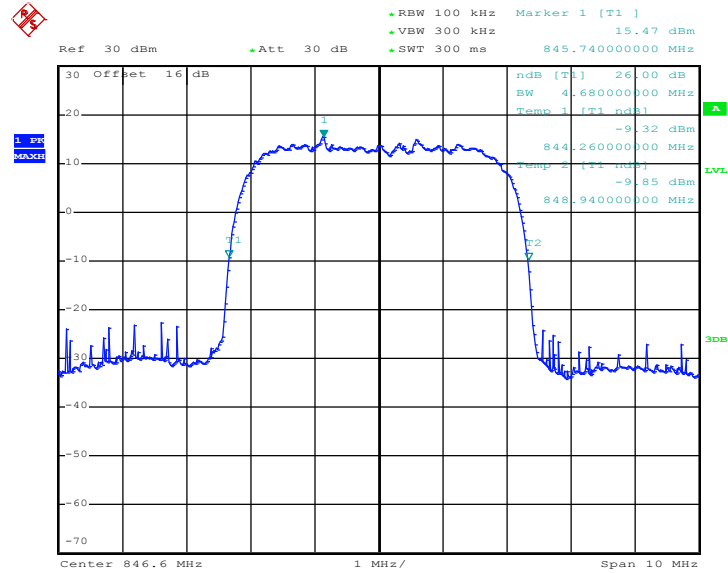


### 99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 28.SEP.2012 10:27:06

### 26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

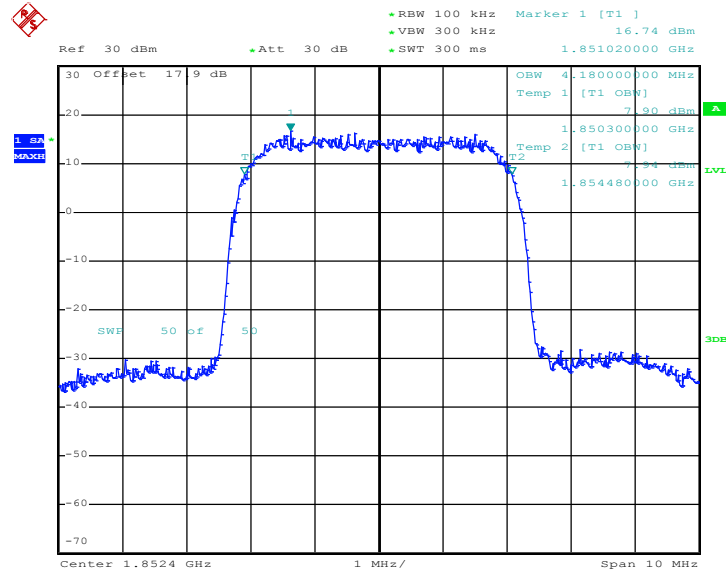


Date: 28.SEP.2012 10:20:02



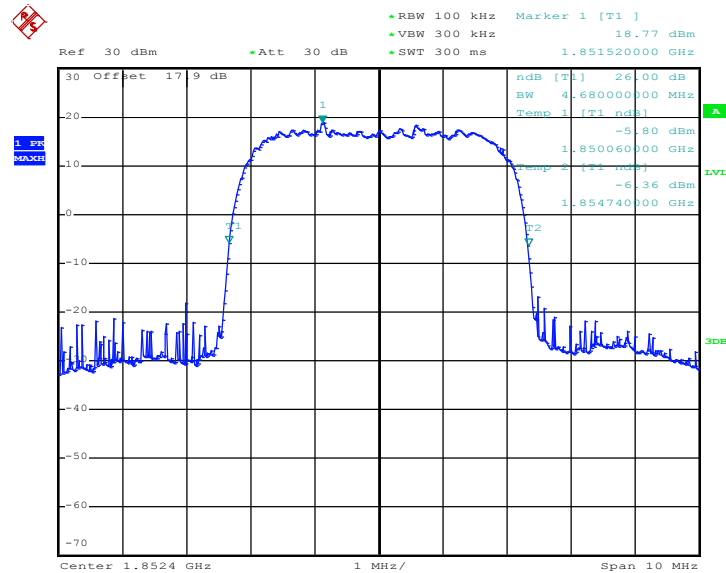
<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
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99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 28.SEP.2012 12:05:50

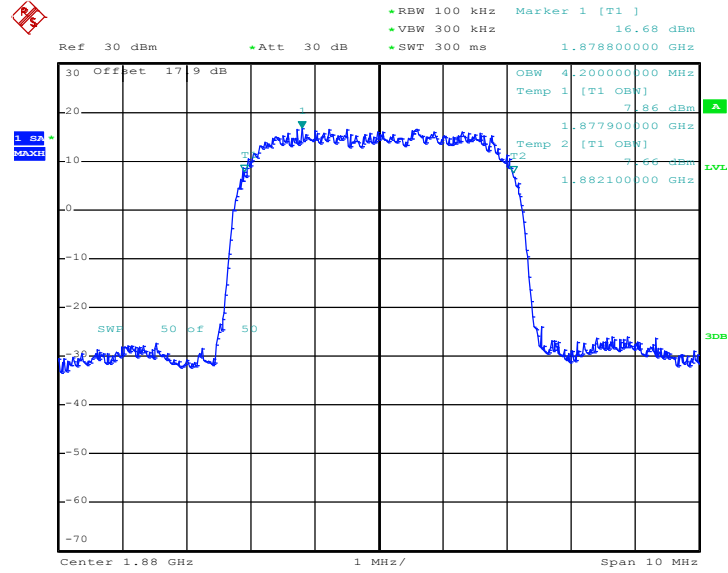
26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 28.SEP.2012 12:03:36

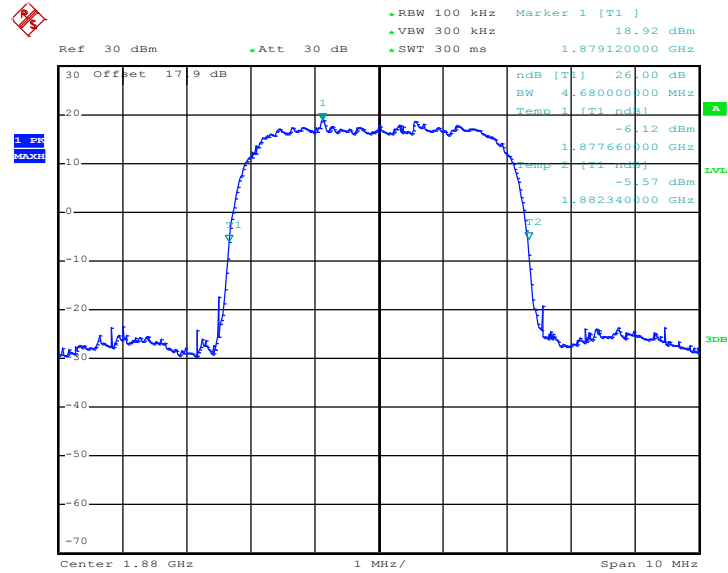


99% Occupied Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 28.SEP.2012 11:55:02

26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)

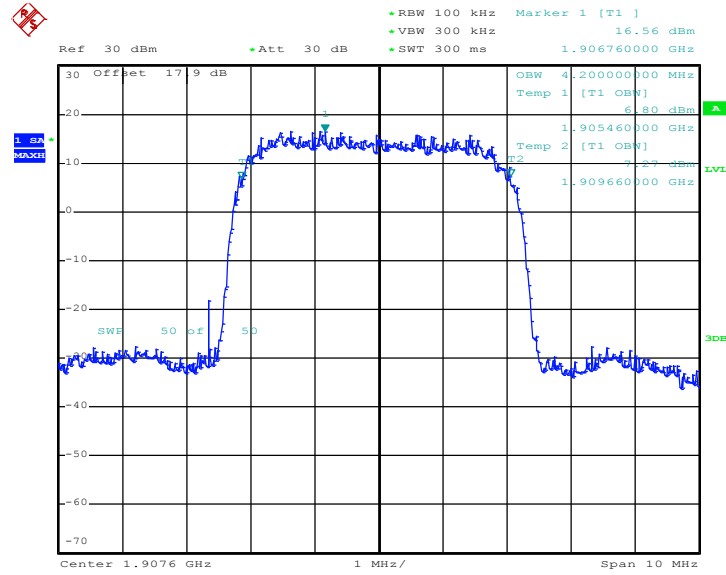


Date: 28.SEP.2012 11:58:52



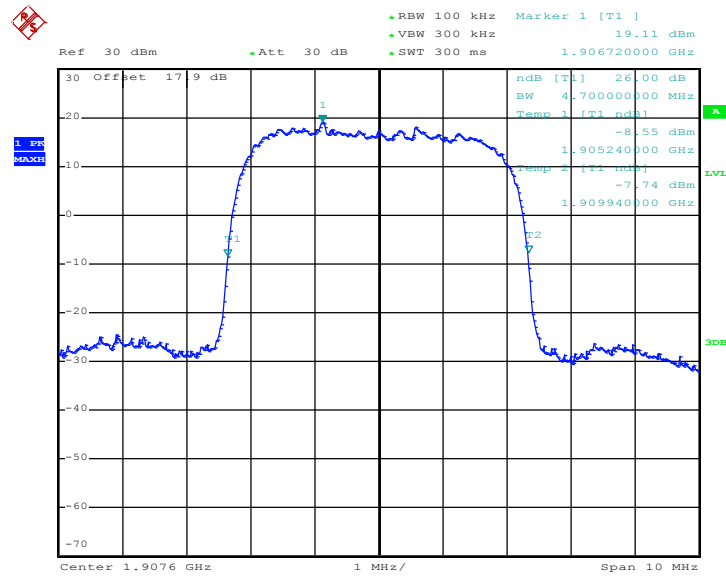


99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 28.SEP.2012 12:13:18

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 28.SEP.2012 12:14:30

## 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.

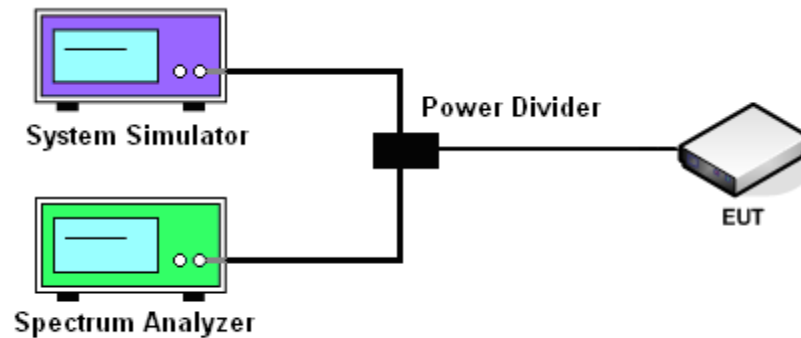
### 3.4.2 Measuring Instruments

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.

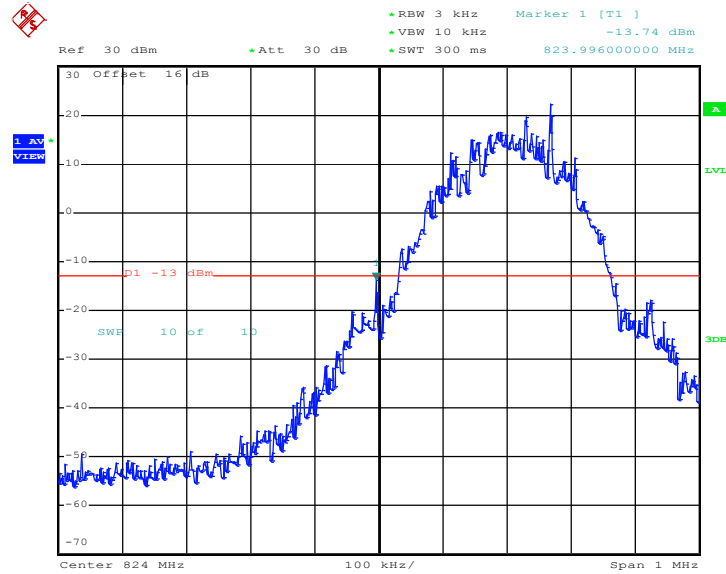
### 3.4.4 Test Setup



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

Band :	GSM850	Test Mode :	GPRS 8 Link
Correction Factor :	0.03dB	Maximum 26dB Bandwidth :	0.302MHz
Band Edge :	-13.71dBm	Measurement Value :	-13.74dBm

Lower Band Edge Plot on Channel 128 (824.2 MHz)



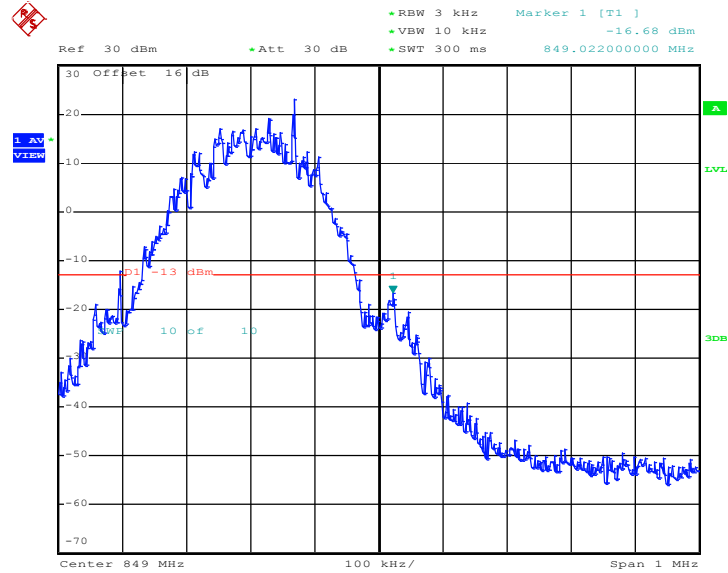
Date: 27.SEP.2012 10:30:42

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
  2. Band Edge= Measurement Value + Correction Factor(dB)
- For example,  $-13.74\text{dBm} + 0.03\text{dB} = -13.71\text{dBm}$



Band :	GSM850	Test Mode :	GPRS 8 Link
Correction Factor :	0.03dB	Maximum 26dB Bandwidth :	0.302MHz
Band Edge :	-16.65dBm	Measurement Value :	-16.68dBm

Higher Band Edge Plot on Channel 251 (848.8 MHz)



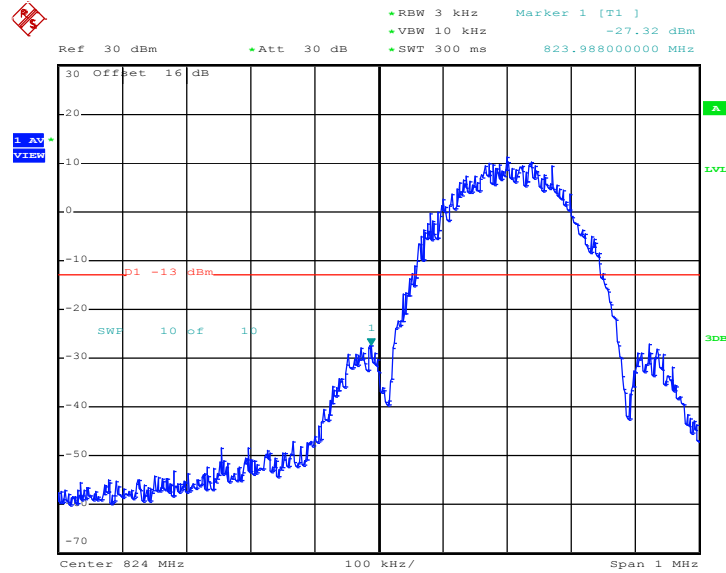
Date: 27.SEP.2012 10:31:11

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	GSM850	Test Mode :	EDGE 8 Link
Correction Factor :	0.17dB	Maximum 26dB Bandwidth :	0.312MHz
Band Edge :	-27.15dBm	Measurement Value :	-27.32dBm

Lower Band Edge Plot on Channel 128 (824.2 MHz)



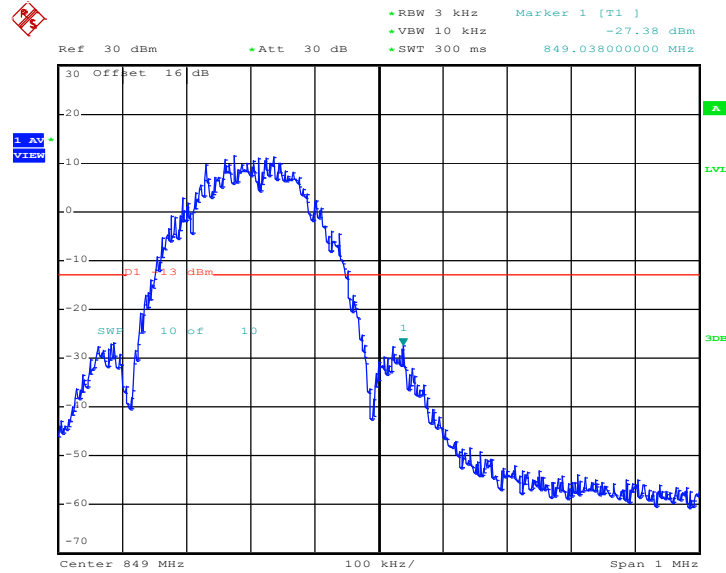
Date: 27.SEP.2012 11:49:12

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	GSM850	Test Mode :	EDGE 8 Link
Correction Factor :	0.17dB	Maximum 26dB Bandwidth :	0.312MHz
Band Edge :	-27.21dBm	Measurement Value :	-27.38dBm

Higher Band Edge Plot on Channel 251 (848.8 MHz)



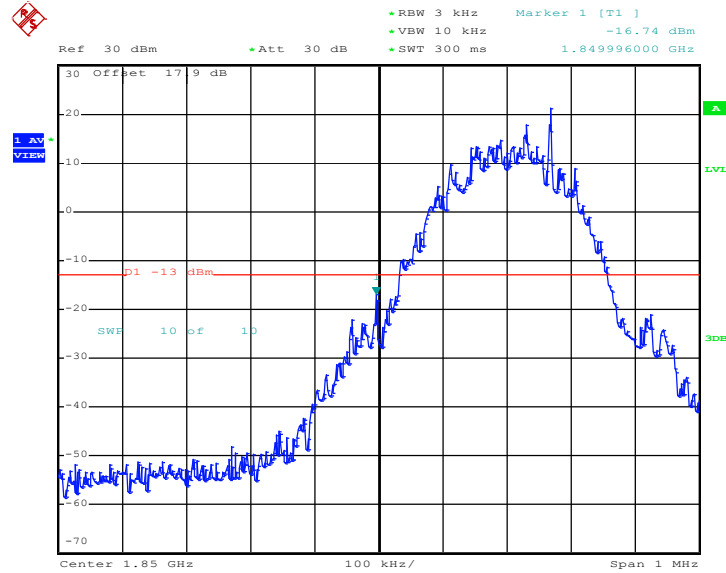
Date: 27.SEP.2012 11:49:42

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	GSM1900	Test Mode :	GPRS 10 Link
Correction Factor :	0.03dB	Maximum 26dB Bandwidth :	0.302MHz
Band Edge :	-16.71dBm	Measurement Value :	-16.74dBm

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



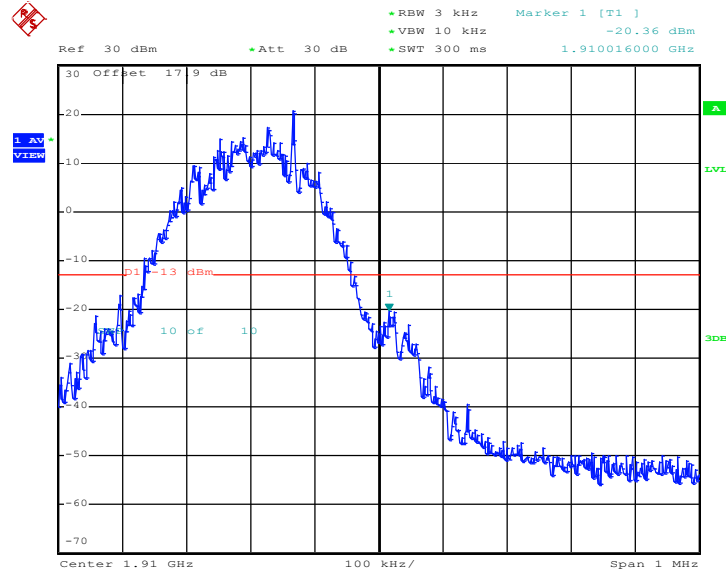
Date: 2.OCT.2012 09:46:54

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	GSM1900	Test Mode :	GPRS 10 Link
Correction Factor :	0.03dB	Maximum 26dB Bandwidth :	0.302MHz
Band Edge :	-20.33dBm	Measurement Value :	-20.36dBm

Higher Band Edge Plot on Channel 810 (1909.8 MHz)



Date: 2.OCT.2012 09:47:23

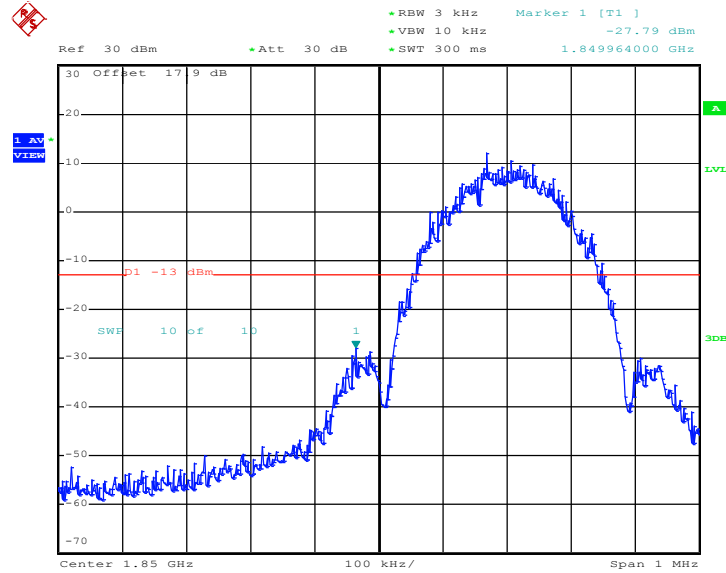
1. Correction Factor(dB)= 10log(1% Emission BW/RBW)
2. Band Edge= Measurement Value + Correction Factor(dB)





Band :	GSM1900	Test Mode :	EDGE 8 Link
Correction Factor :	0.14dB	Maximum 26dB Bandwidth :	0.310MHz
Band Edge :	-27.65dBm	Measurement Value :	-27.79dBm

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



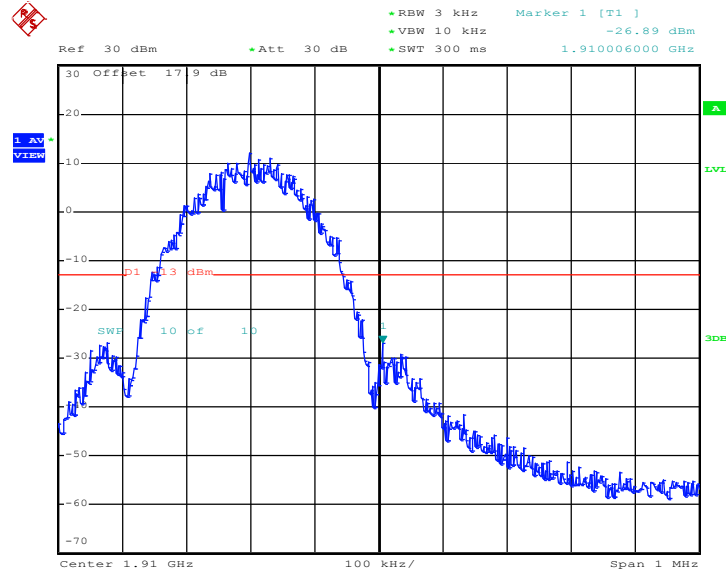
Date: 2.OCT.2012 10:22:53

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	GSM1900	Test Mode :	EDGE 8 Link
Correction Factor :	0.14dB	Maximum 26dB Bandwidth :	0.310MHz
Band Edge :	-26.75dBm	Measurement Value :	-26.89dBm

Higher Band Edge Plot on Channel 810 (1909.8 MHz)



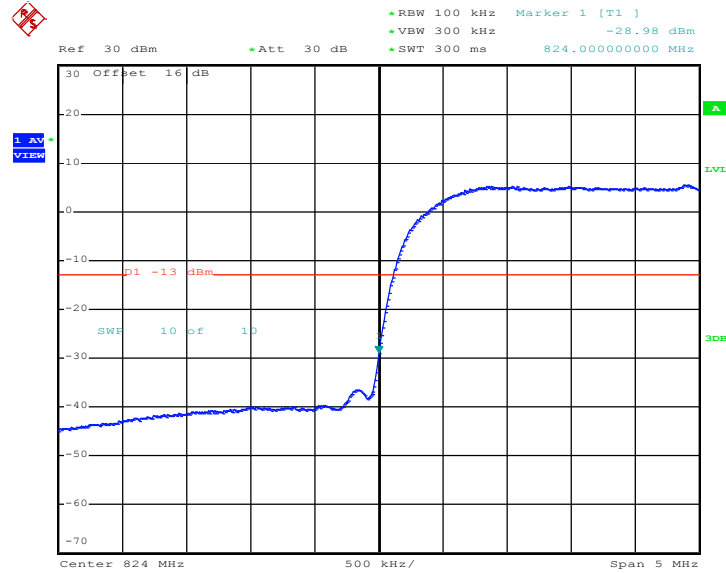
Date: 2.OCT.2012 10:23:22

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.70MHz
Band Edge :	-32.26dBm	Measurement Value :	-28.98dBm

Lower Band Edge Plot on Channel 4132 (826.4 MHz)



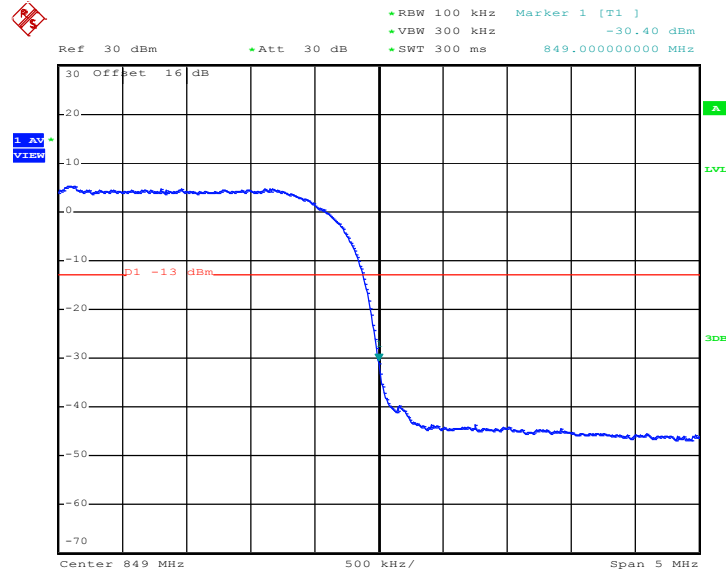
Date: 28.SEP.2012 11:12:57

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.70MHz
Band Edge :	-33.68dBm	Measurement Value :	-30.40dBm

Higher Band Edge Plot on Channel 4233 (846.6 MHz)



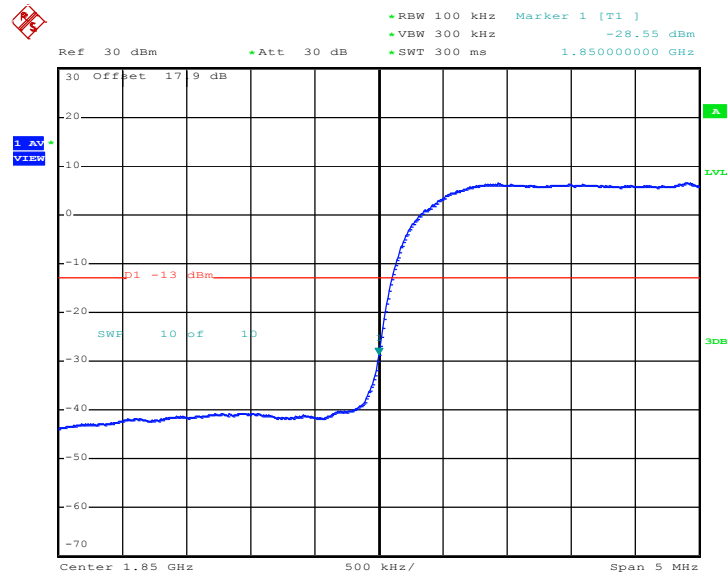
Date: 28.SEP.2012 10:28:45

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.70MHz
Band Edge :	-31.83dBm	Measurement Value :	-28.55dBm

Lower Band Edge Plot on Channel 9262 (1852.4 MHz)



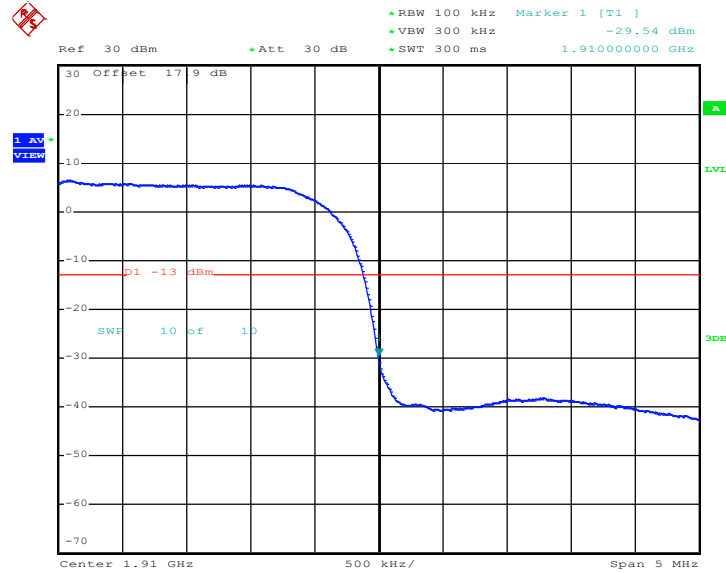
Date: 28.SEP.2012 12:07:31

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.70MHz
Band Edge :	-32.82dBm	Measurement Value :	-29.54dBm

Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 28.SEP.2012 12:10:46

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)

### 3.5 Conducted Spurious Emission Measurement

#### 3.5.1 Description of Conducted Spurious 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.

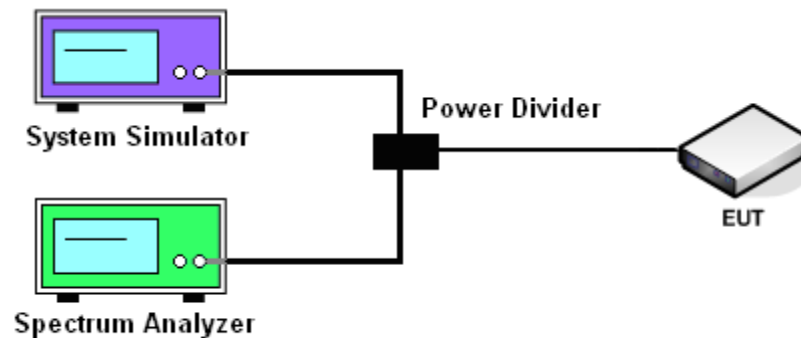
#### 3.5.2 Measuring Instruments

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.

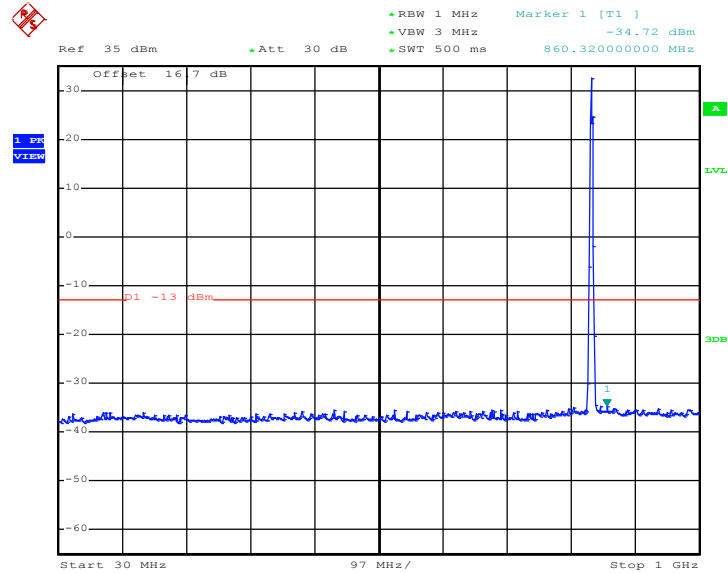
#### 3.5.4 Test Setup



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

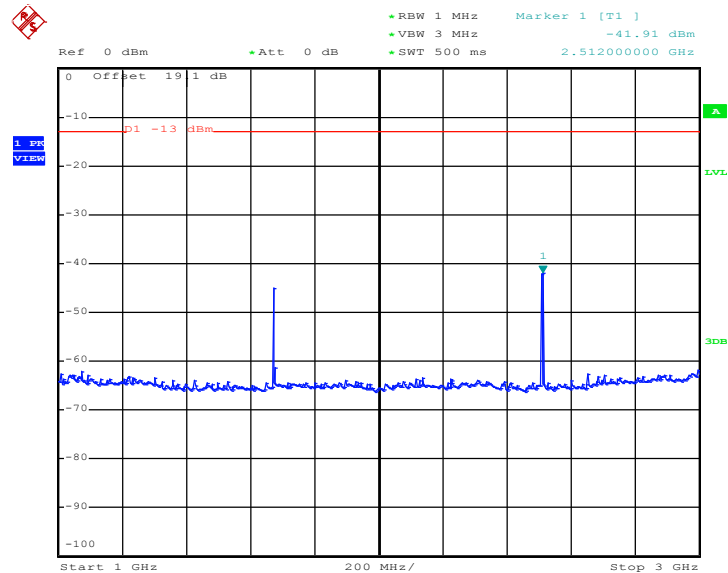
Band :	GSM850	Channel :	CH189
Test Mode :	GPRS 8 Link	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 27.SEP.2012 10:35:15

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

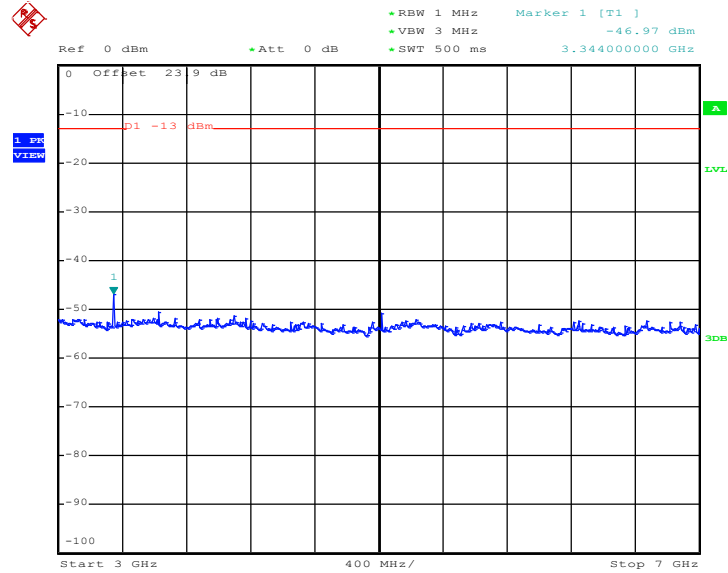


Date: 27.SEP.2012 10:35:34



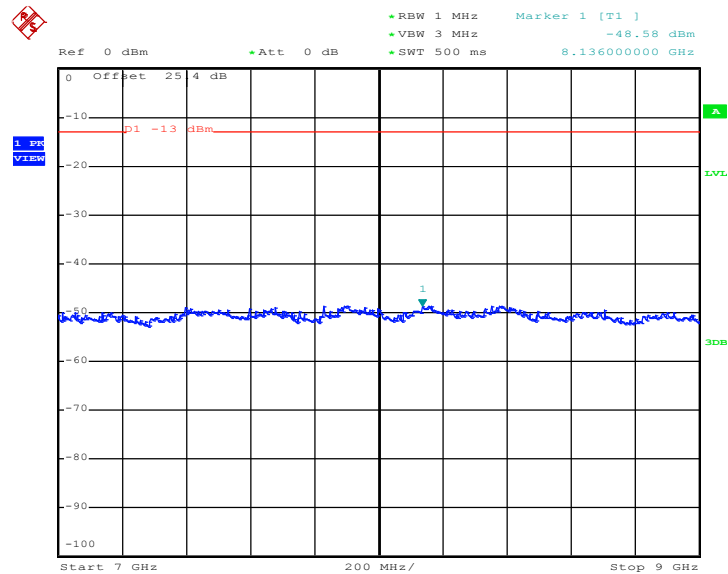


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 27.SEP.2012 10:35:46

### Conducted Spurious Emission Plot between 7GHz ~ 9GHz

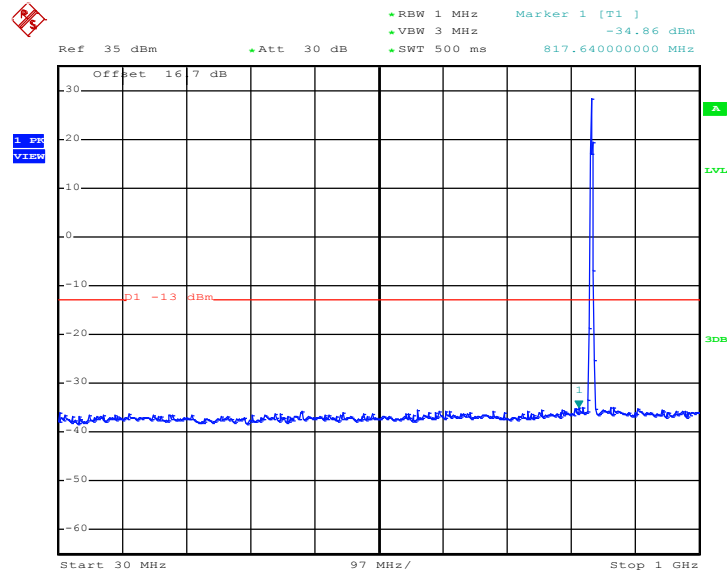


Date: 27.SEP.2012 10:35:59



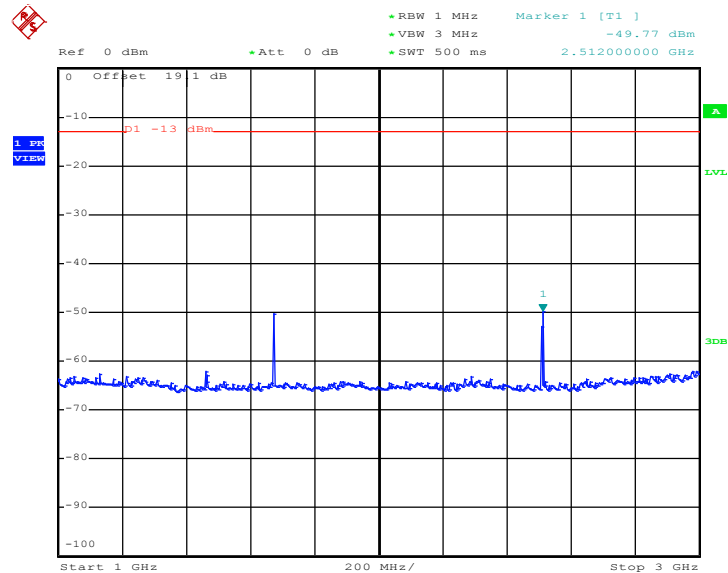
Band :	GSM850	Channel :	CH189
Test Mode :	EDGE 8 Link	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 27.SEP.2012 11:43:10

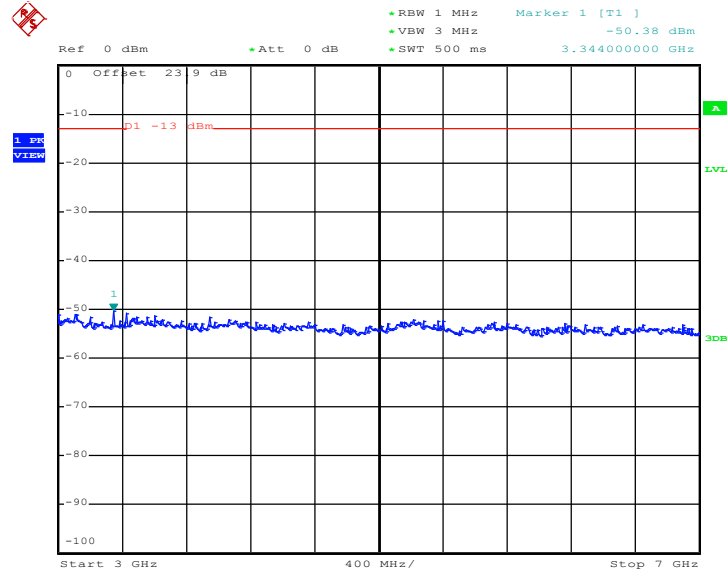
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 27.SEP.2012 11:43:28

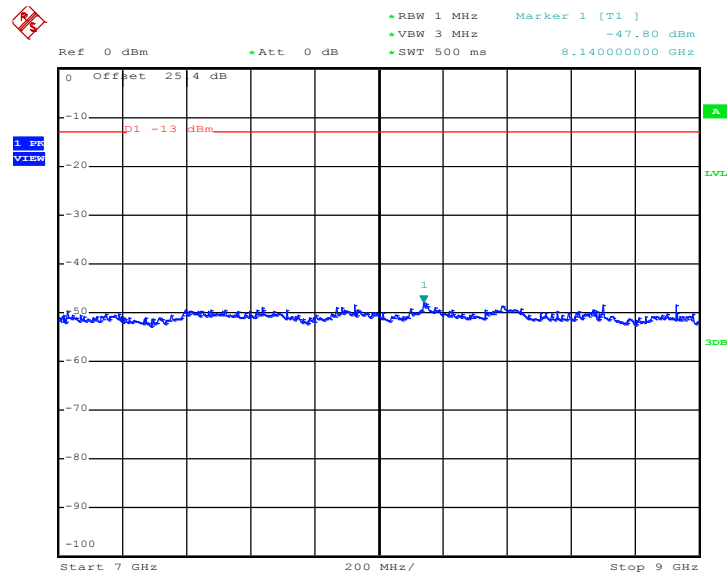


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 27.SEP.2012 11:43:41

### Conducted Spurious Emission Plot between 7GHz ~ 9GHz

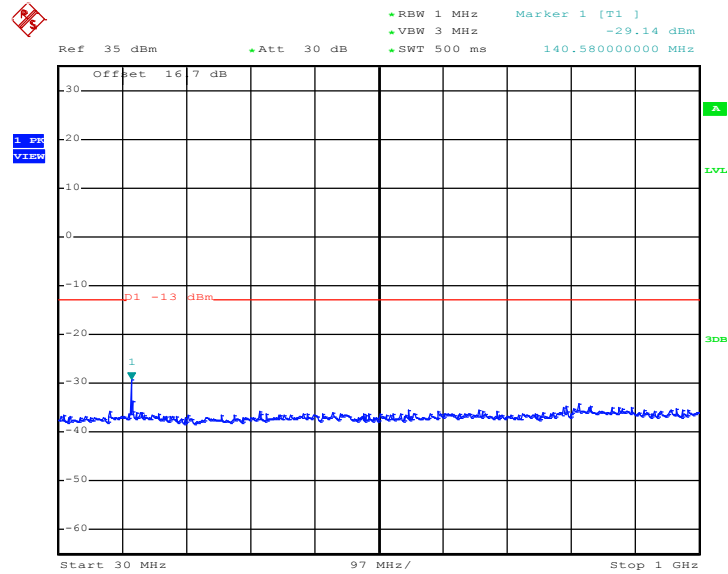


Date: 27.SEP.2012 11:43:53



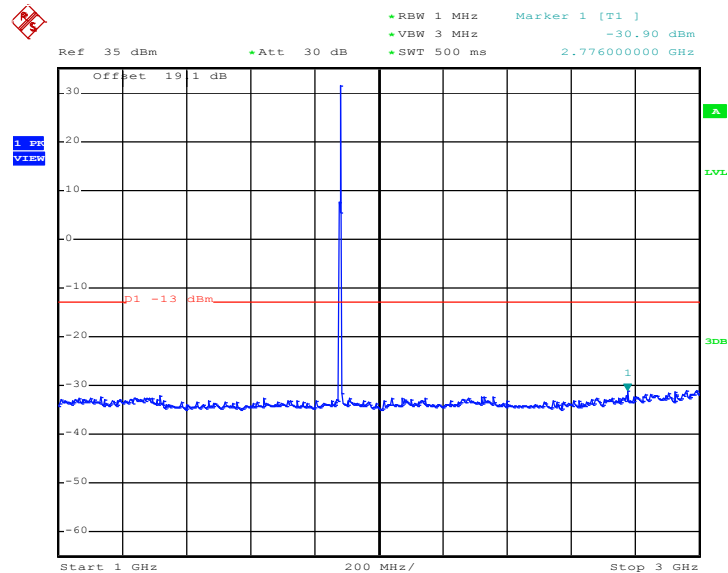
Band :	GSM1900	Channel :	CH661
Test Mode :	GPRS 10 Link	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 2.OCT.2012 09:51:09

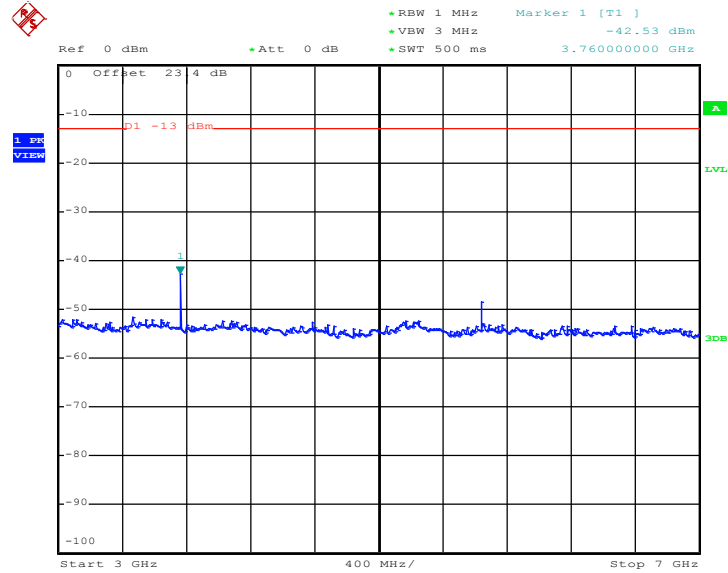
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 2.OCT.2012 09:51:21

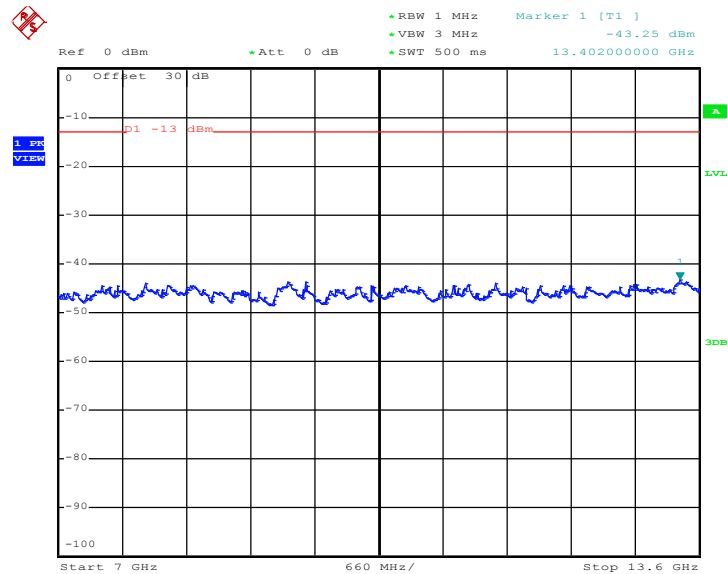


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 2.OCT.2012 09:51:40

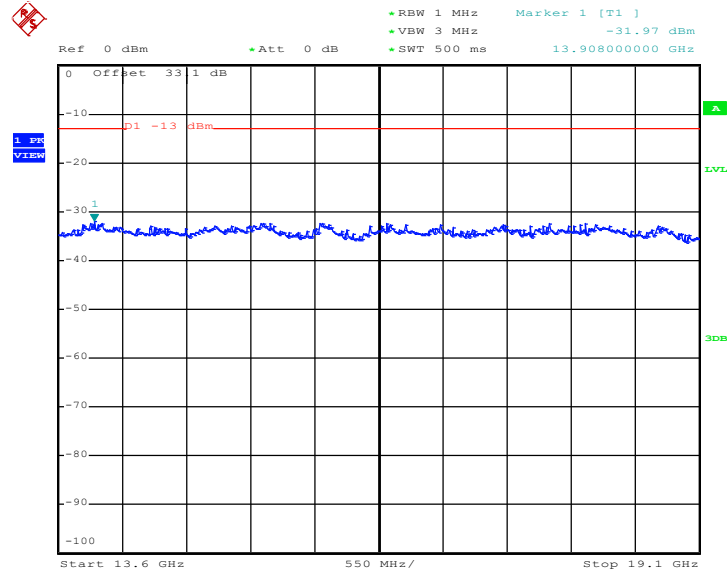
### Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 2.OCT.2012 09:51:52



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

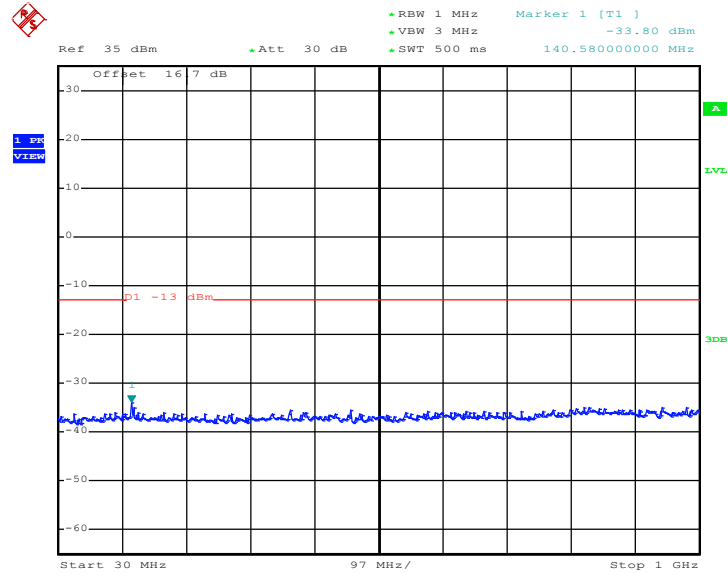


Date: 2.OCT.2012 09:52:04



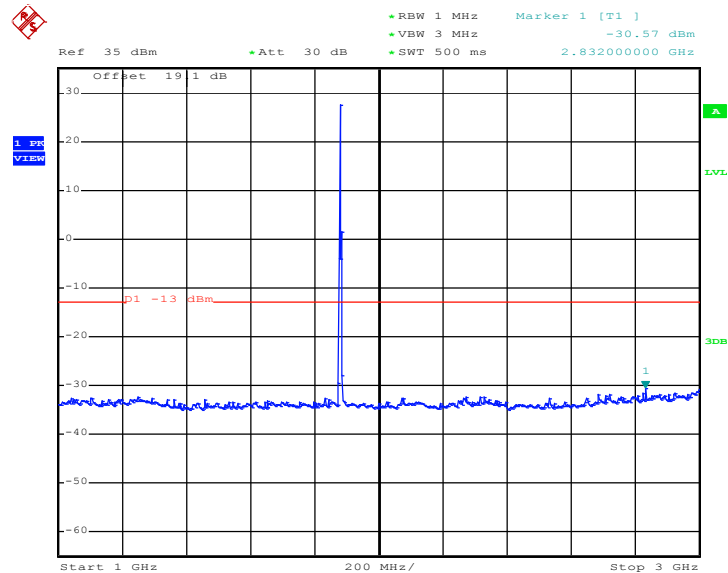
Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE 8 Link	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 2.OCT.2012 10:06:45

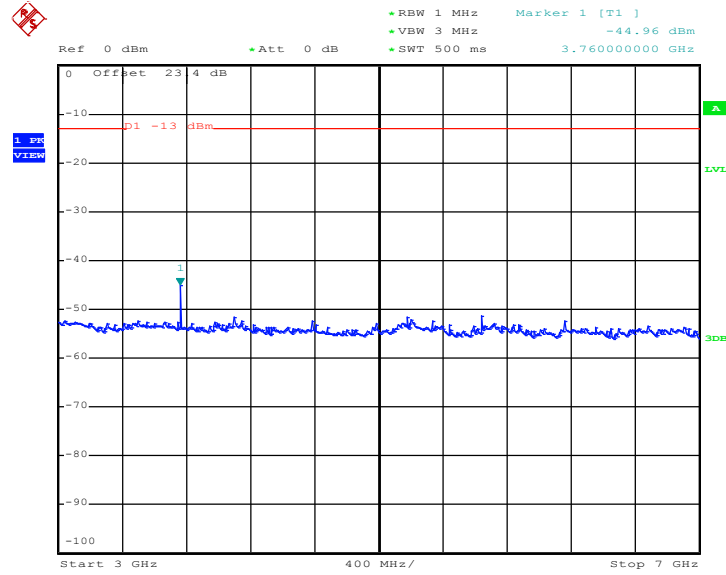
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 2.OCT.2012 10:06:57

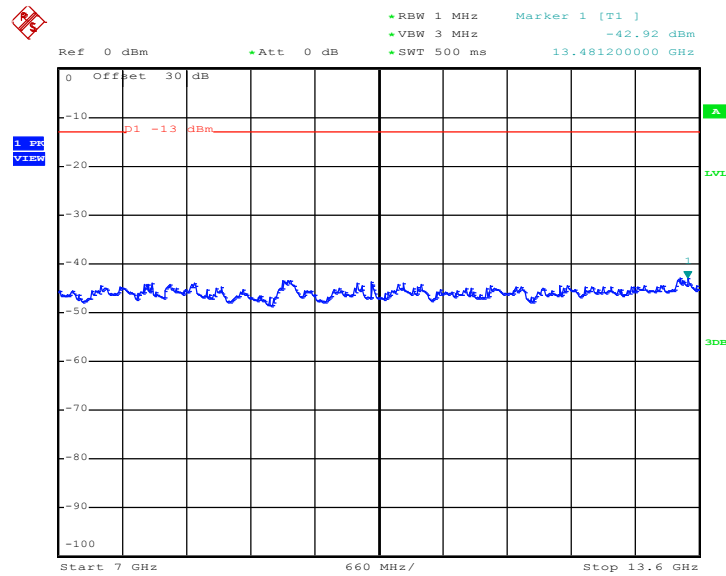


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 2.OCT.2012 10:07:14

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

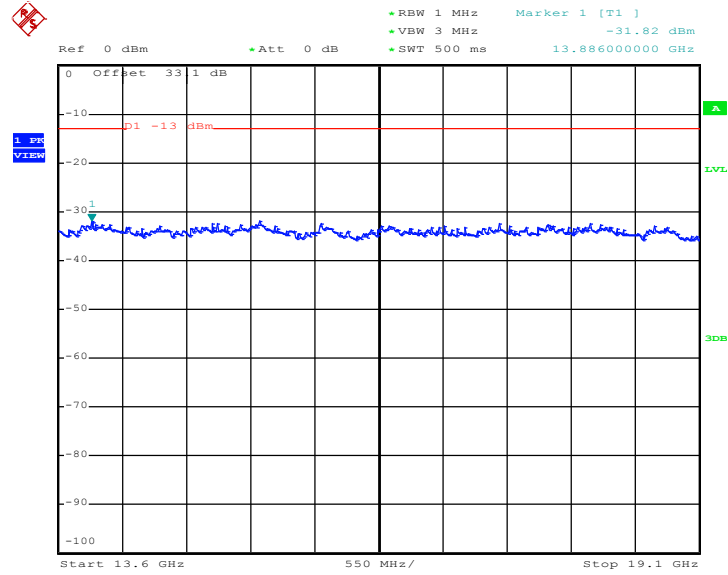


Date: 2.OCT.2012 10:07:26





Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

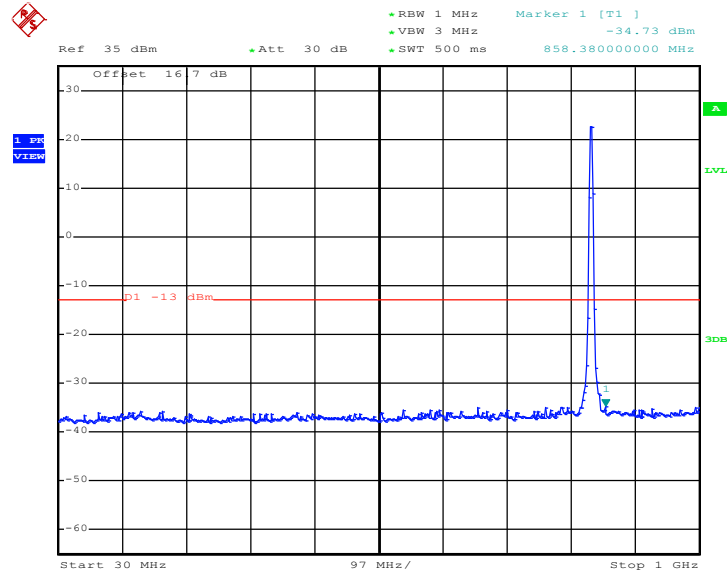


Date: 2.OCT.2012 10:07:39



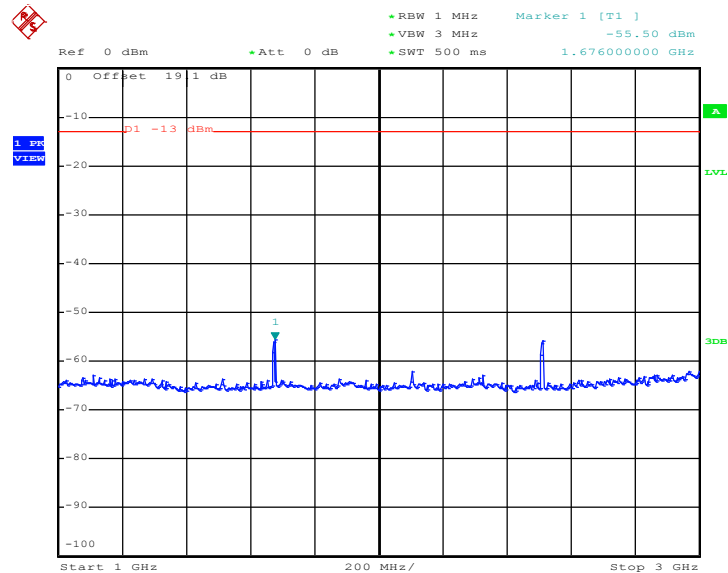
Band :	WCDMA Band V	Channel :	CH4182
Test Mode :	RMC 12.2Kbps Link	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 28.SEP.2012 09:46:01

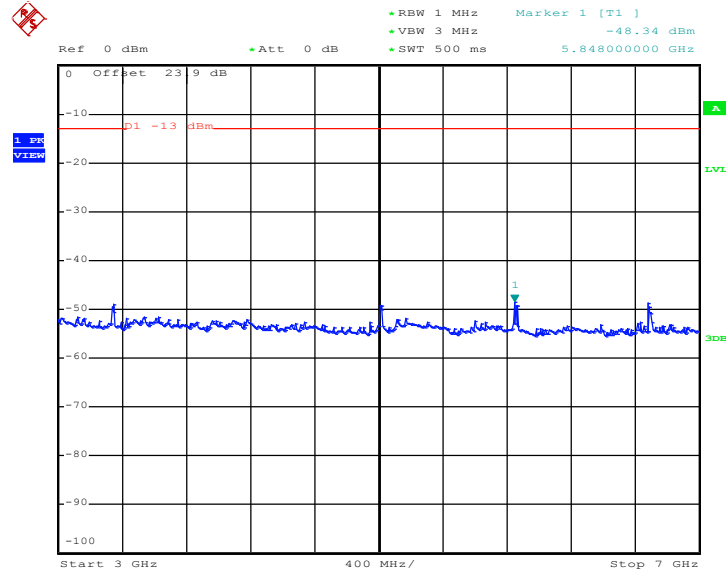
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 28.SEP.2012 09:46:19

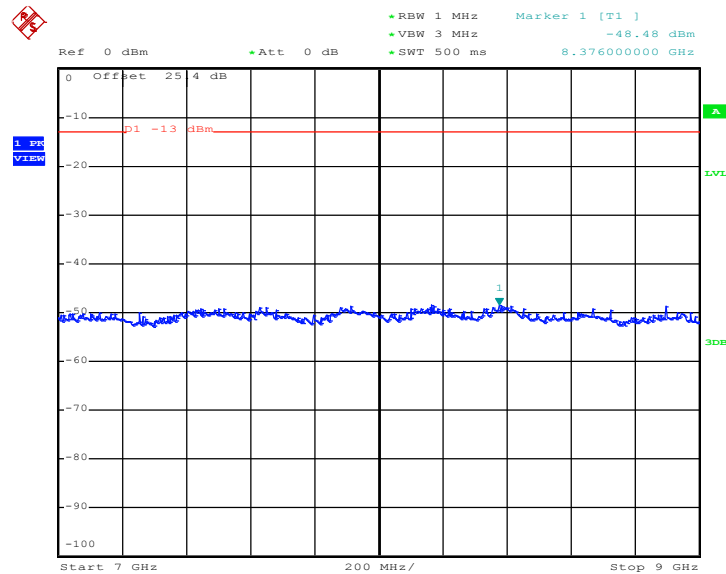


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 28.SEP.2012 09:46:31

### Conducted Spurious Emission Plot between 7GHz ~ 9GHz

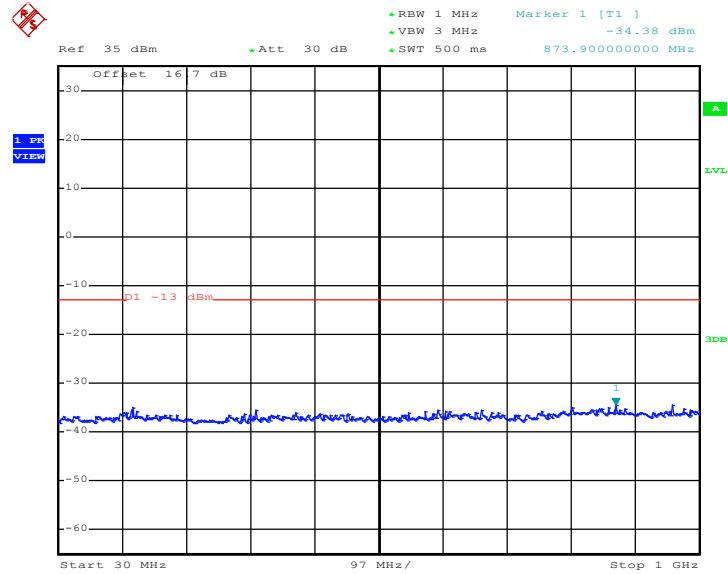


Date: 28.SEP.2012 09:46:44



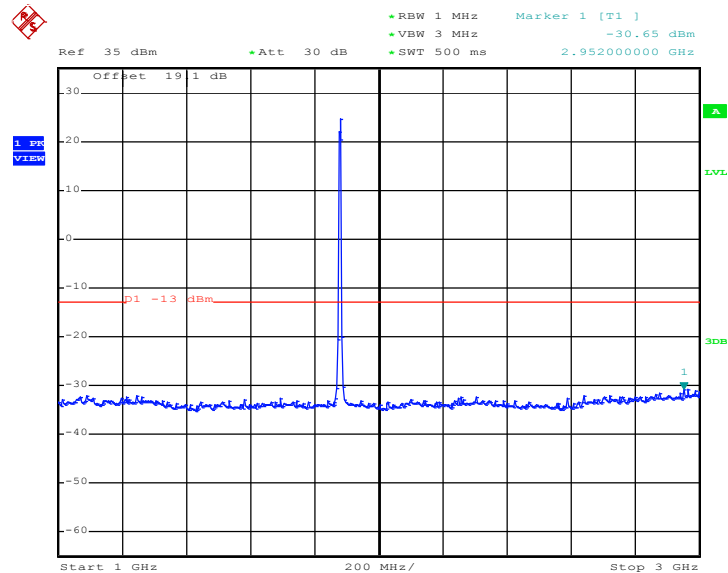
Band :	WCDMA Band II	Channel :	CH9400
Test Mode :	RMC 12.2Kbps Link	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 28.SEP.2012 11:43:55

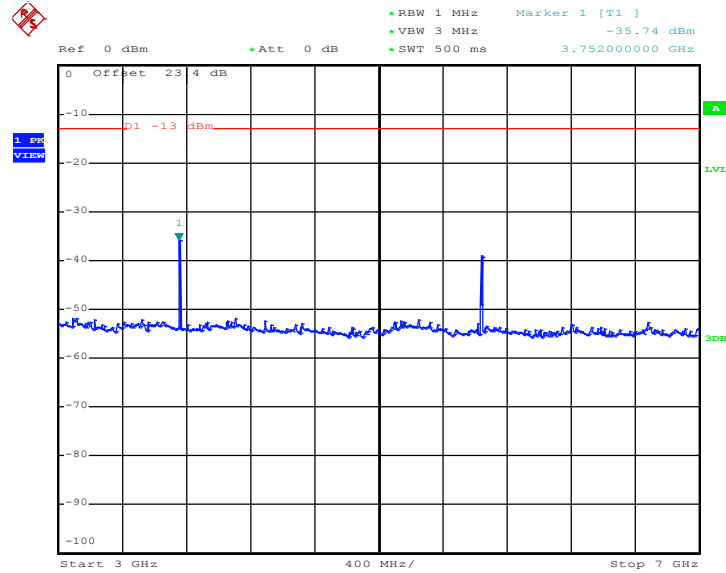
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 28.SEP.2012 11:44:07

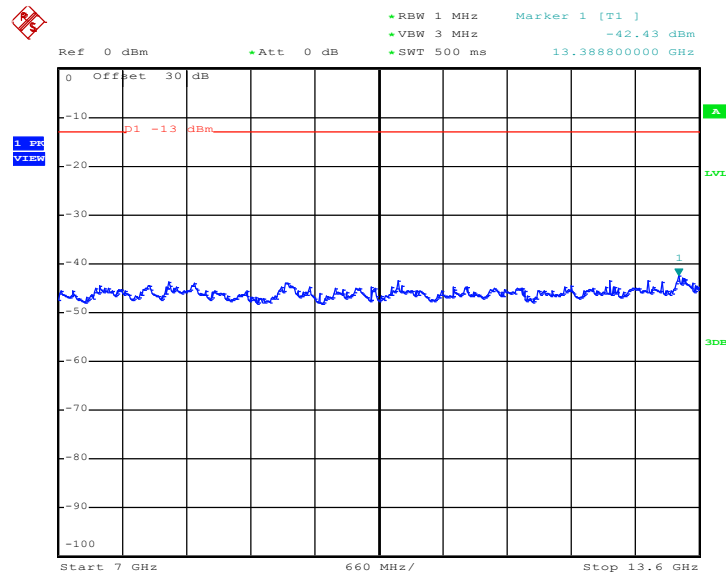


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 28.SEP.2012 11:44:29

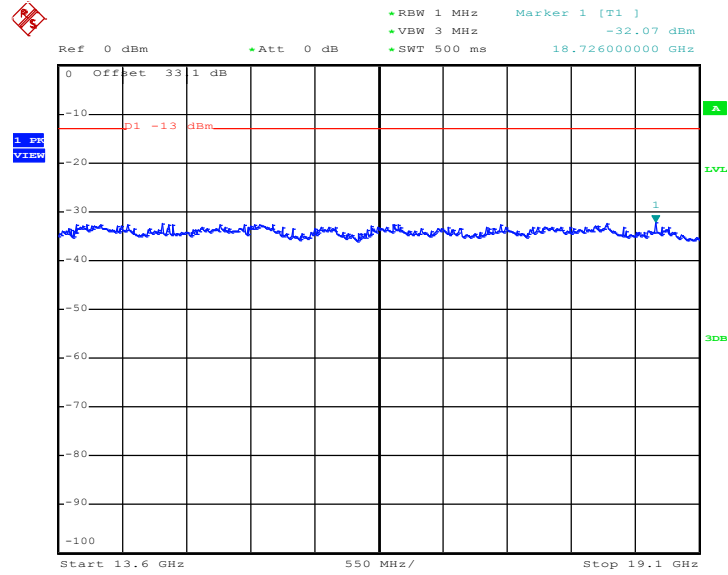
### Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 28.SEP.2012 11:44:41



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 28.SEP.2012 11:44:53

## 3.6 Field Strength of Spurious Radiation Measurement

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

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

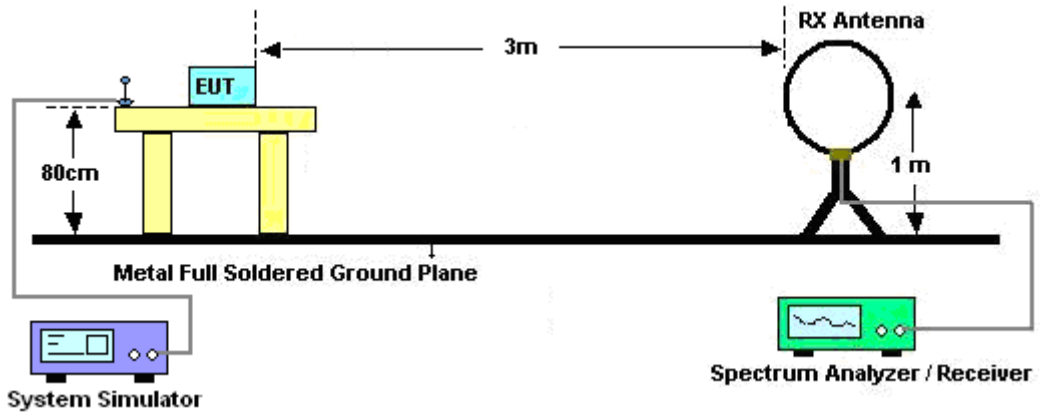
See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

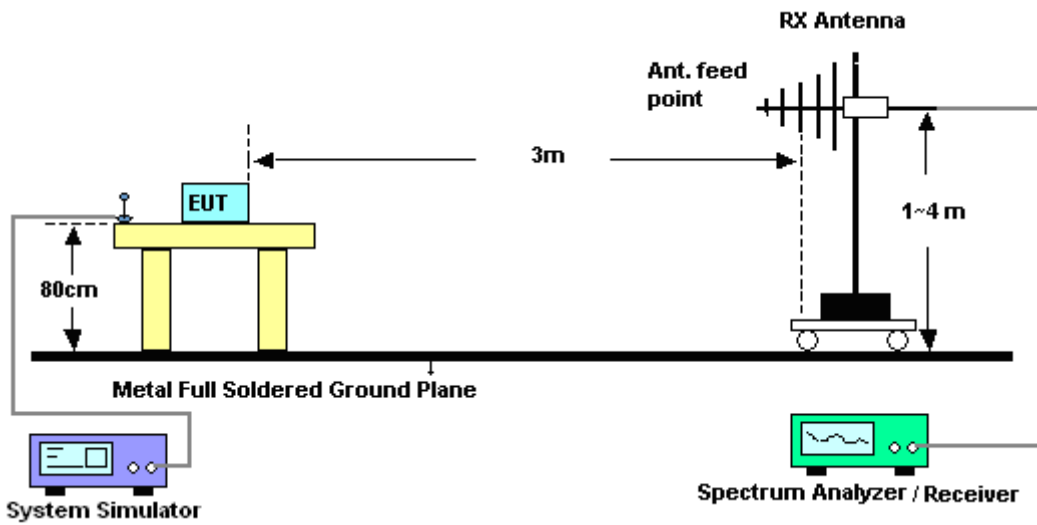
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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, 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

For radiated emissions below 30MHz

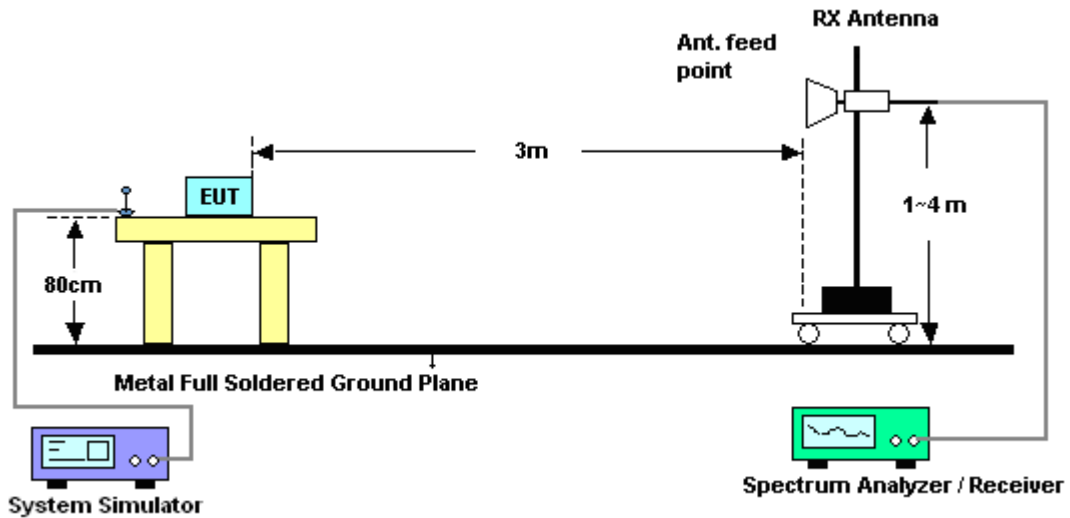


For radiated emissions from 30MHz to 1GHz





For radiated emissions above 1GHz



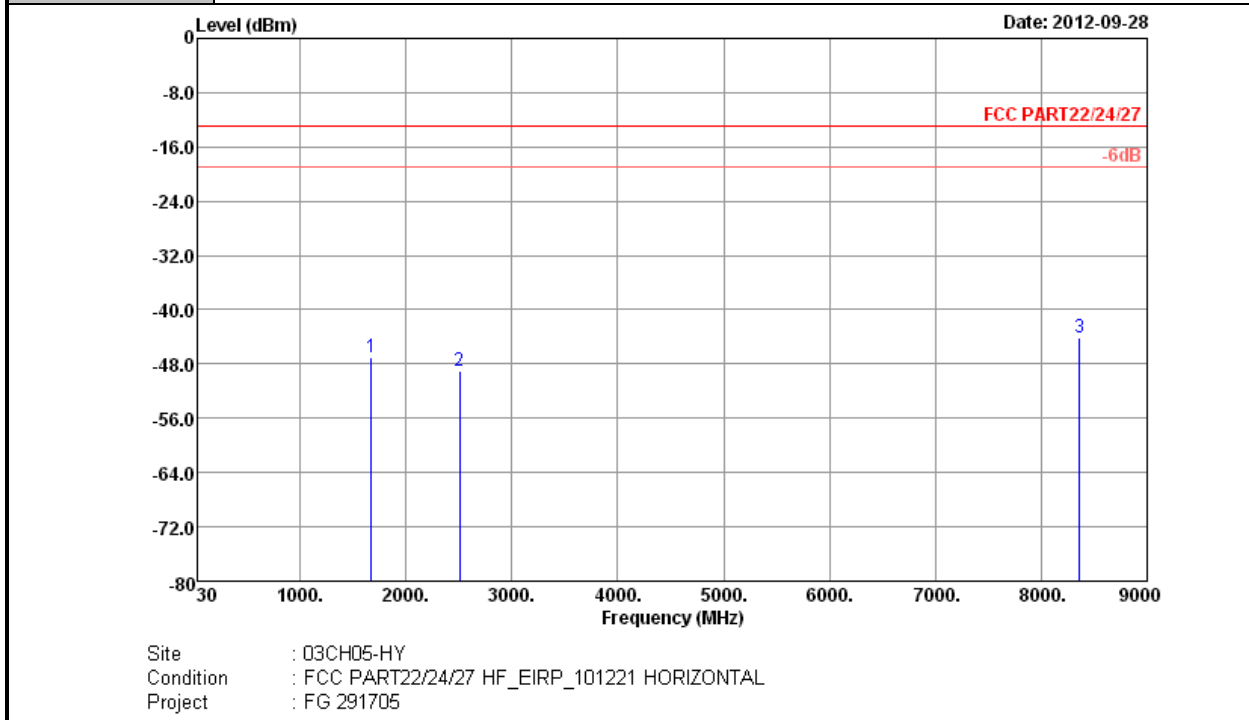
### 3.6.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



3.6.6 Test Result of Field Strength of Spurious Radiated

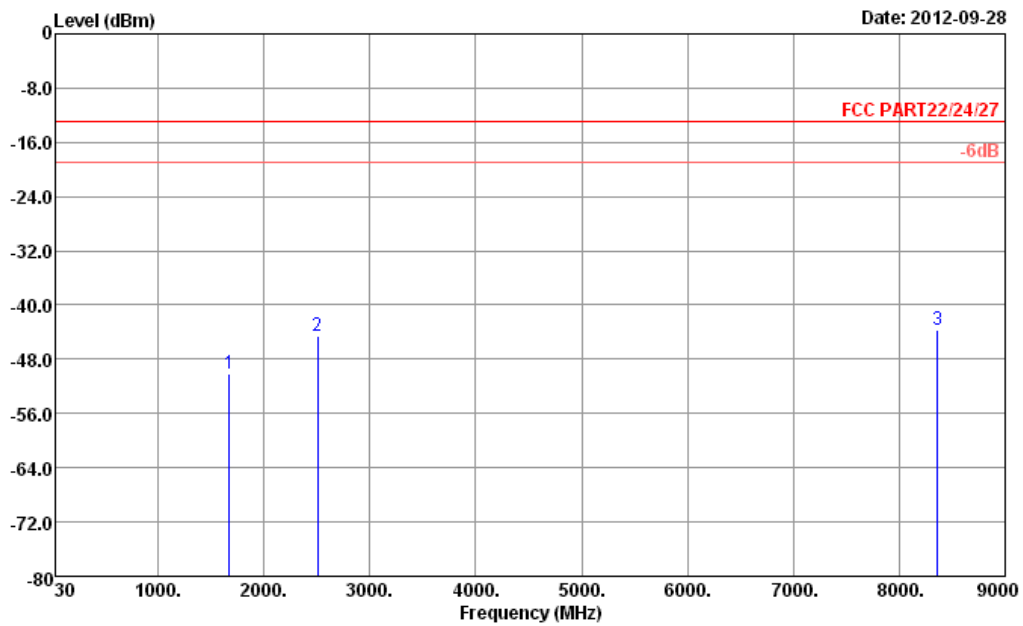
<b>Band :</b>	GSM850	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-47.04	-13	-34.04	-53.01	-48.8	1.35	5.25	H	Pass
2509	-49.02	-13	-36.02	-58.54	-51.4	1.58	6.11	H	Pass
8364	-44.22	-13	-31.22	-67.43	-52.3	2.67	12.89	H	Pass



<b>Band :</b>	GSM850	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

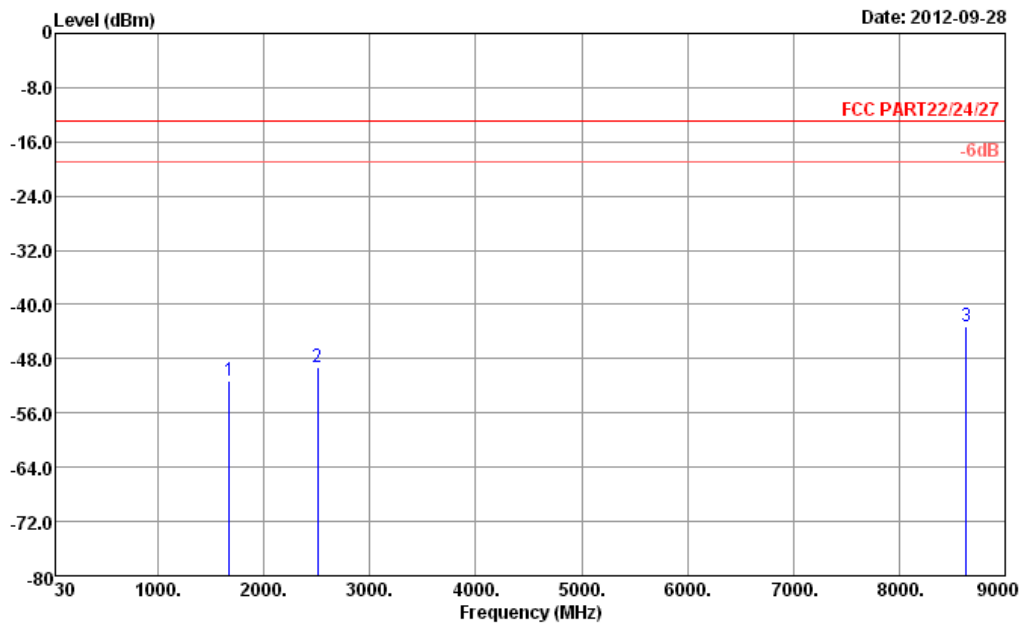


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

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	-50.24	-13	-37.24	-56.89	-52	1.35	5.25	V	Pass
2509	-44.62	-13	-31.62	-53.96	-47	1.58	6.11	V	Pass
8364	-43.72	-13	-30.72	-66.91	-51.8	2.67	12.89	V	Pass



<b>Band :</b>	GSM850	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

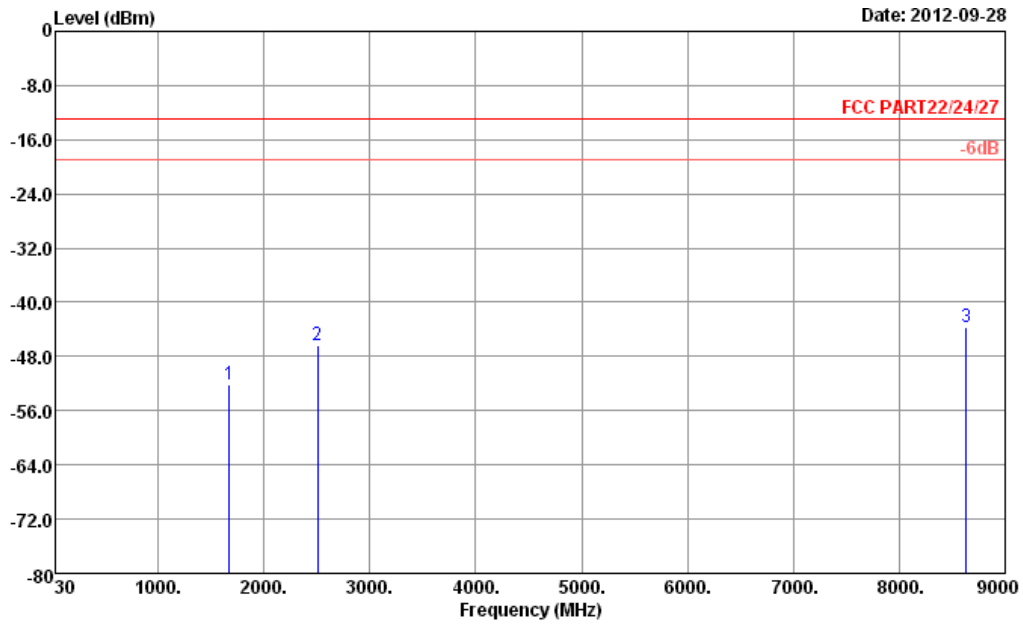


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 291705

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	-51.24	-13	-38.24	-57.38	-53	1.35	5.25	H	Pass
2509	-49.32	-13	-36.32	-58.68	-51.7	1.58	6.11	H	Pass
8364	-43.22	-13	-30.22	-66.71	-51.3	2.67	12.89	H	Pass



<b>Band :</b>	GSM850	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

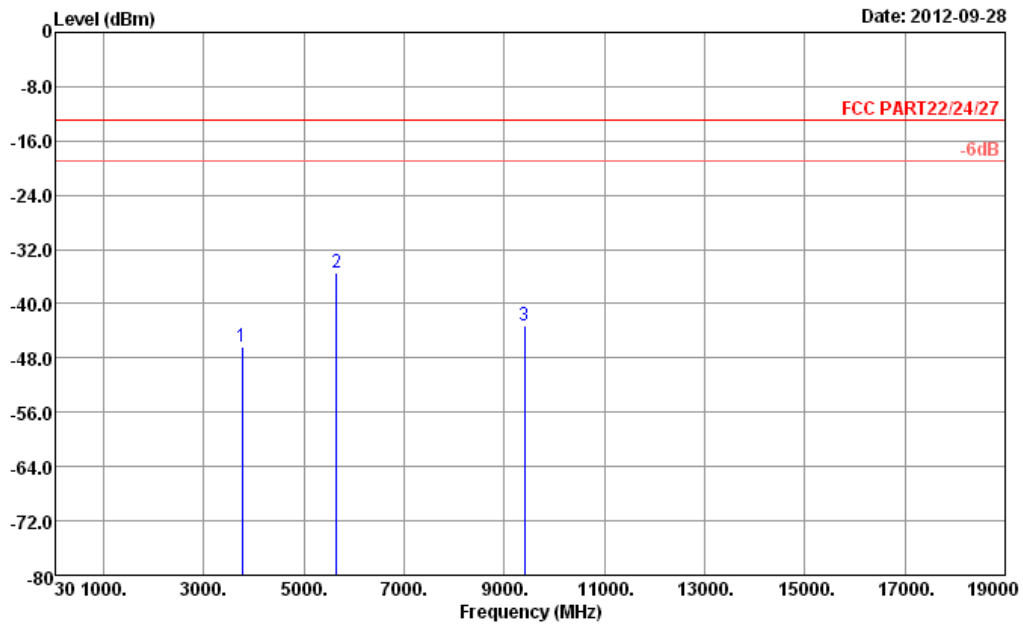


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

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	-52.24	-13	-39.24	-58.6	-54	1.35	5.25	V	Pass
2509	-46.32	-13	-33.32	-55.69	-48.7	1.58	6.11	V	Pass
8364	-43.72	-13	-30.72	-67.21	-51.8	2.67	12.89	V	Pass



<b>Band :</b>	GSM1900	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	GPRS 10 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

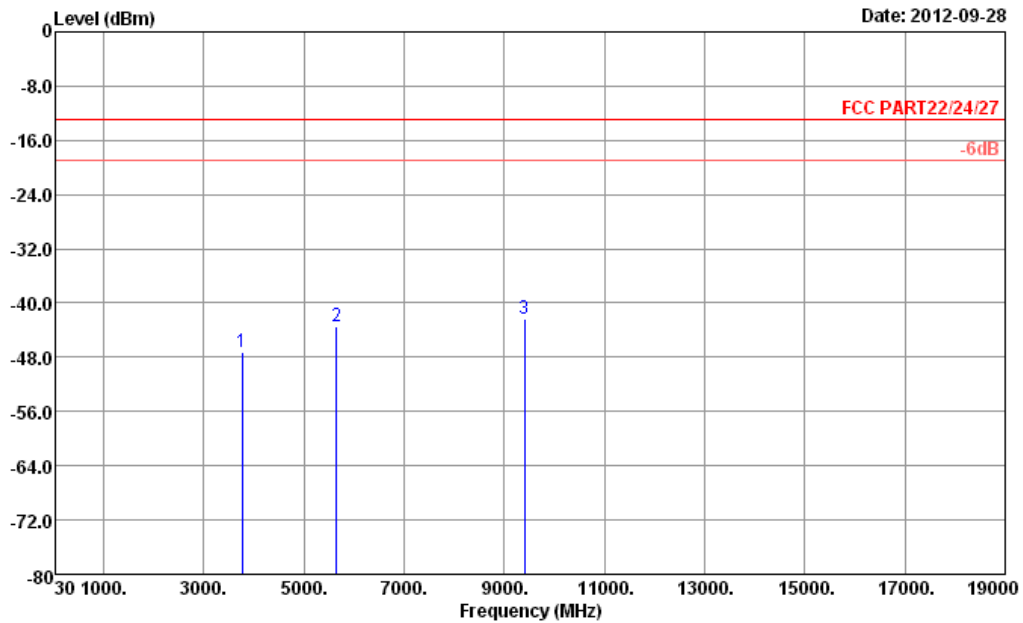


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-46.29	-13	-33.29	-59.91	-53	2.00	8.71	H	Pass
5640	-35.36	-13	-22.36	-54.31	-44	2.13	10.77	H	Pass
9400	-43.19	-13	-30.19	-67.11	-53.7	2.87	13.38	H	Pass



<b>Band :</b>	GSM1900	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	GPRS 10 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

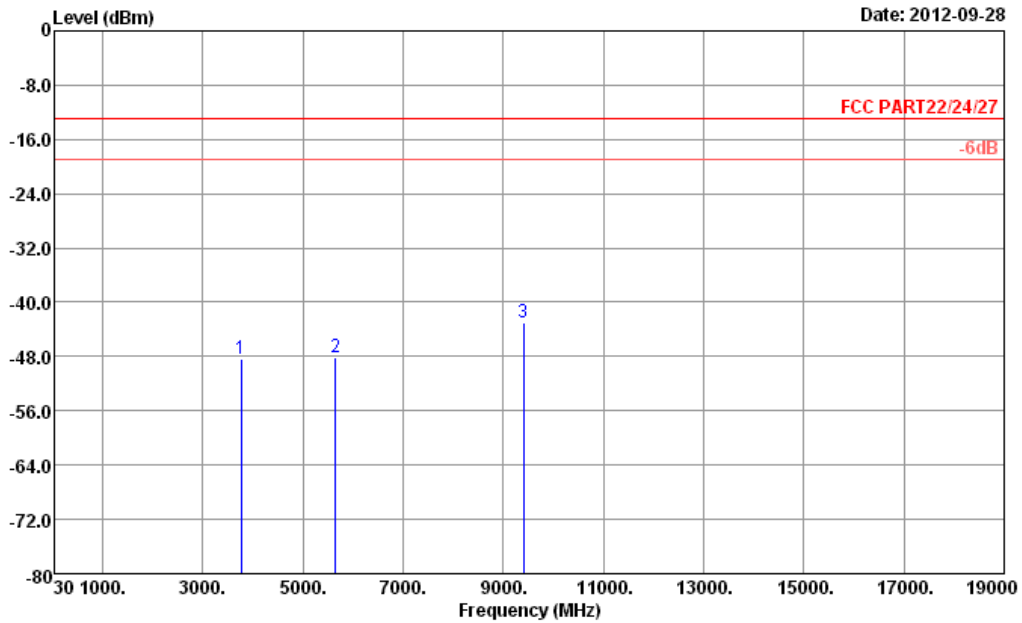


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-47.29	-13	-34.29	-60.81	-54	2.00	8.71	V	Pass
5640	-43.36	-13	-30.36	-62.59	-52	2.13	10.77	V	Pass
9400	-42.26	-13	-29.26	-66.12	-51.8	2.68	12.22	V	Pass



<b>Band :</b>	GSM1900	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



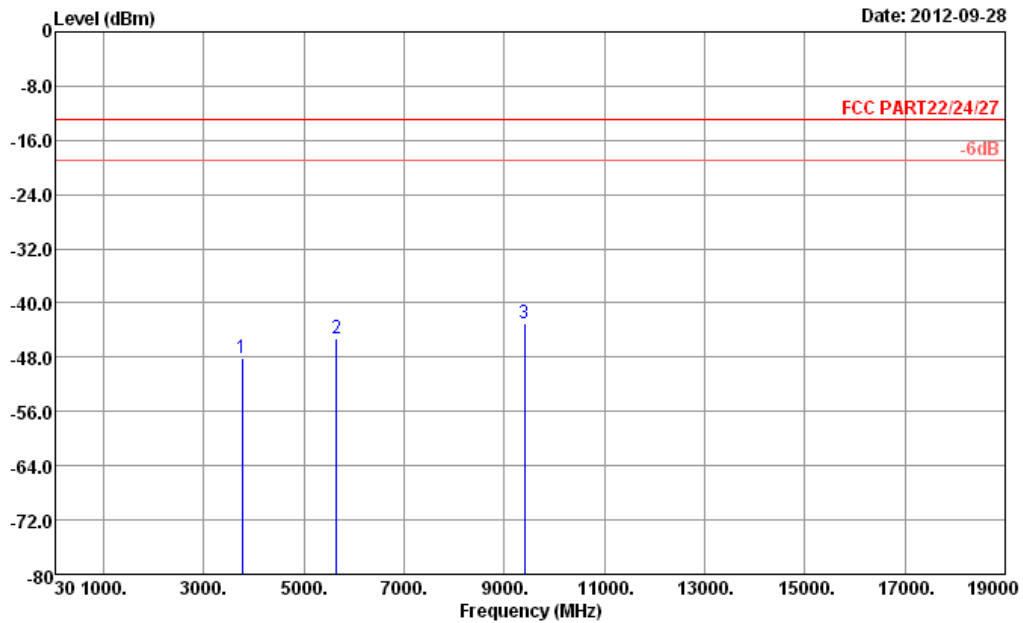
Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-48.29	-13	-35.29	-62.31	-55	2.00	8.71	H	Pass
5640	-48.06	-13	-35.06	-66.93	-56.7	2.13	10.77	H	Pass
9400	-43.09	-13	-30.09	-66.98	-53.6	2.87	13.38	H	Pass





<b>Band :</b>	GSM1900	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

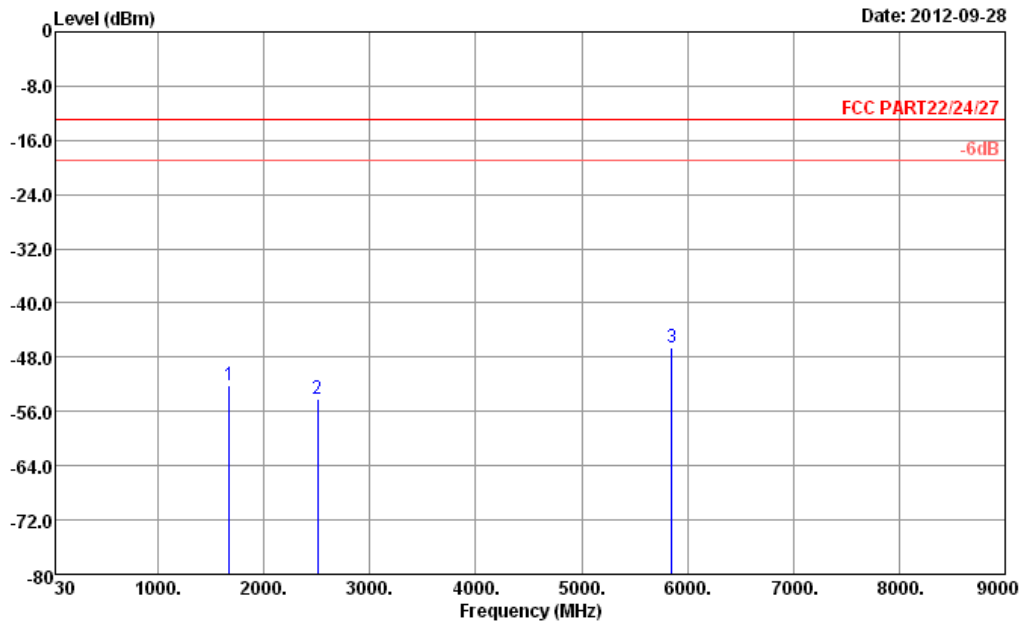


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-48.19	-13	-35.19	-62.08	-54.9	2.00	8.71	V	Pass
5640	-45.26	-13	-32.26	-66.42	-53.9	2.13	10.77	V	Pass
9400	-42.99	-13	-29.99	-67.01	-53.5	2.87	13.38	V	Pass



<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

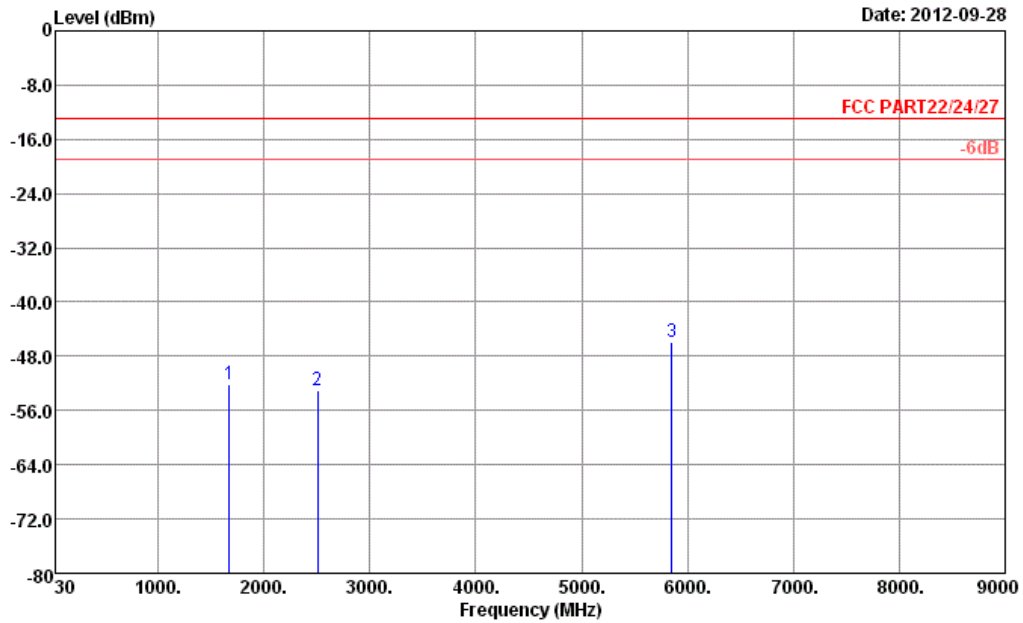


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 291705

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	-52.24	-13	-39.24	-58.77	-54	1.35	5.25	H	Pass
2509	-54.12	-13	-41.12	-63.44	-56.5	1.58	6.11	H	Pass
5854	-46.59	-13	-33.59	-65.88	-53	2.17	10.73	H	Pass



<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

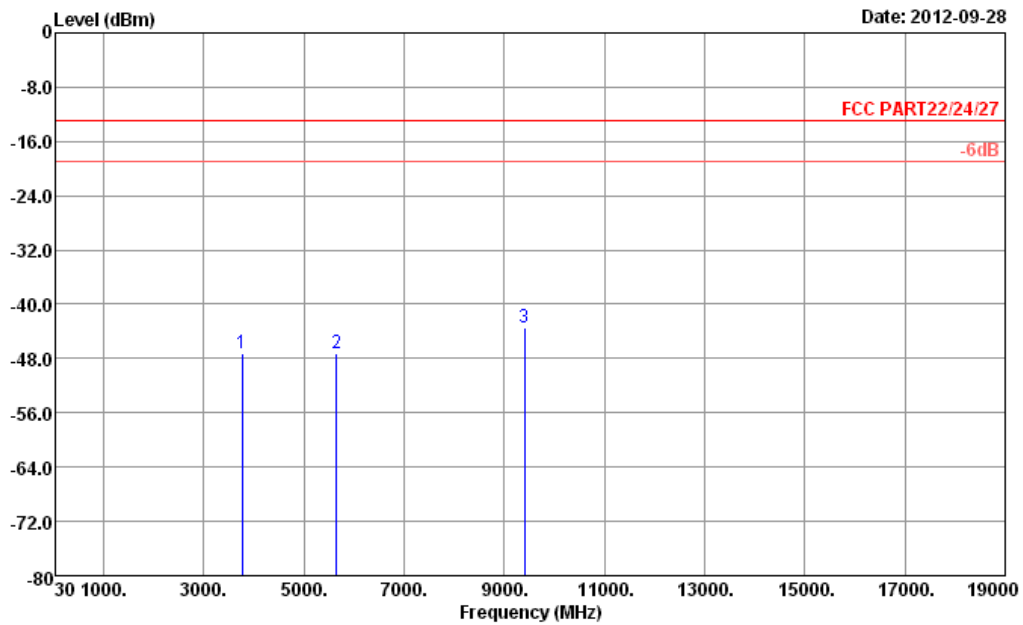


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

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	-53.24	-13	-40.24	-59.32	-55	1.35	5.25	V	Pass
2509	-53.02	-13	-40.02	-62.4	-55.4	1.58	6.11	V	Pass
5854	-45.99	-13	-32.99	-65.19	-52.4	2.17	10.73	V	Pass



<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

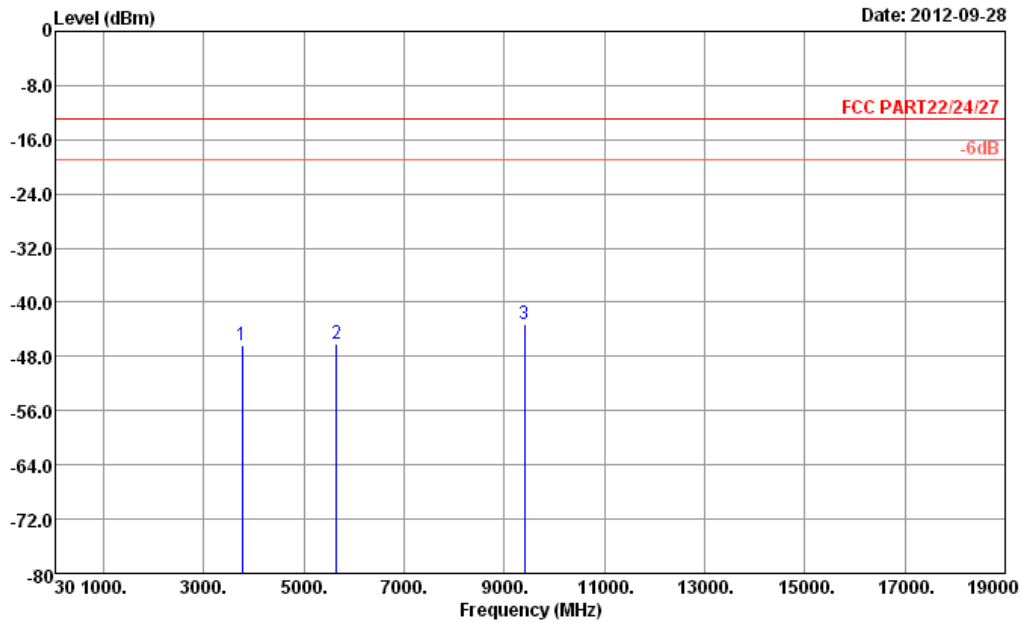


Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-47.29	-13	-34.29	-60.9	-54	2.00	8.71	H	Pass
5640	-47.16	-13	-34.16	-66.09	-55.8	2.13	10.77	H	Pass
9400	-43.49	-13	-30.49	-67.46	-54	2.87	13.38	H	Pass



<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Hayden Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY  
 Condition : FCC PART22/24/27 HF\_EIRP\_101221 VERTICAL  
 Project : FG 291705

Frequency ( MHz )	EIRP ( 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
3760	-46.29	-13	-33.29	-59.94	-53	2.00	8.71	V	Pass
5640	-46.06	-13	-33.06	-64.9	-54.7	2.13	10.77	V	Pass
9400	-43.29	-13	-30.29	-67.24	-53.8	2.87	13.38	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.

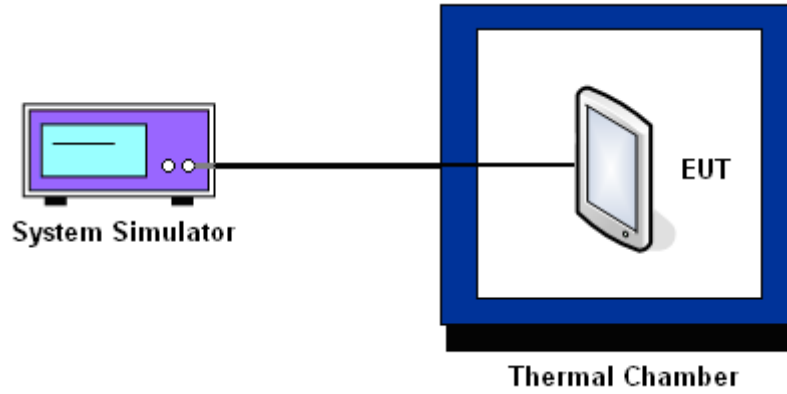
#### 3.7.3 Test Procedures for Temperature Variation

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 before testing. 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 cannot 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

Band :	GSM 850	Channel :	189
Limit (ppm) :	2.5	Frequency :	836.4 MHz

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-39	-0.05	-35	-0.04	PASS
-20	-36	-0.04	33	0.04	
-10	-37	-0.04	24	0.03	
0	-38	-0.04	31	0.04	
10	-40	-0.05	28	0.03	
20	-37	-0.04	27	0.03	
30	-42	-0.05	-36	-0.04	
40	-45	-0.05	27	0.03	
50	-42	-0.05	-37	-0.04	

Band :	GSM 1900	Channel :	661
Limit (ppm) :	2.5	Frequency :	1880.0 MHz

Temperature (°C)	GPRS 10		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-91	-0.05	-76	-0.04	PASS
-20	-87	-0.05	-64	-0.03	
-10	-88	-0.05	-78	-0.04	
0	-96	-0.05	-75	-0.04	
10	-99	-0.05	-93	-0.05	
20	-106	-0.06	-97	-0.05	
30	-95	-0.05	-87	-0.05	
40	97	0.05	-84	-0.04	
50	-83	-0.04	-81	-0.04	





<b>Band :</b>	WCDMA Band V	<b>Channel :</b>	4182
<b>Limit (ppm) :</b>	2.5	<b>Frequency :</b>	836.4 MHz

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-12	-0.01	PASS
-20	-11	-0.01	
-10	-15	-0.02	
0	-18	-0.02	
10	-17	-0.02	
20	-21	-0.02	
30	-18	-0.02	
40	-18	-0.02	
50	-27	-0.03	

<b>Band :</b>	WCDMA Band II	<b>Channel :</b>	9400
<b>Limit (ppm) :</b>	2.5	<b>Frequency :</b>	1880.0 MHz

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-42	-0.02	PASS
-20	-40	-0.02	
-10	-39	-0.02	
0	-39	-0.02	
10	-46	-0.02	
20	-45	-0.02	
30	-46	-0.02	
40	-39	-0.02	
50	-38	-0.02	



3.7.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GPRS 8	12	-47	-0.06	2.5	PASS
		BEP	-51	-0.06		
		28	-54	-0.06		
	EDGE 8	12	-24	-0.03		
		BEP	-28	-0.03		
		28	-32	-0.04		
GSM 1900 CH661	GPRS 10	12	-91	-0.05		
		BEP	-89	-0.05		
		28	-97	-0.05		
	EDGE 8	12	-60	-0.03		
		BEP	-63	-0.03		
		28	-55	-0.03		
WCDMA Band V CH4182	RMC 12.2Kbps	12	-19	-0.02		
		BEP	-17	-0.02		
		28	-19	-0.02		
WCDMA Band II CH9400	RMC 12.2Kbps	12	-40	-0.02		
		BEP	-42	-0.02		
		28	-40	-0.02		

Note:

1. Normal Voltage = 12V.
2. Battery End Point (BEP) = 8 V.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Jul. 30, 2012	Sep. 27, 2012~ Oct. 02, 2012	Jul. 29, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Sep. 27, 2012~ Oct. 02, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 23, 2012	Sep. 27, 2012~ Oct. 02, 2012	Jul. 22, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	Sep. 28, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	Sep. 28, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Sep. 28, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Sep. 28, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 10, 2012	Sep. 28, 2012	Aug. 09, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A02665	1GHz~26.5GHz	Aug. 28, 2012	Sep. 28, 2012	Aug. 27, 2013	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBEC K	BBHA 9170	BBHA917025 1	15GHz ~ 40GHz	Oct. 21, 2011	Sep. 28, 2012	Oct. 20, 2012	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103	161075	10-1000MHz.32dB. GAIN	Feb. 27, 2012	Sep. 28, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	100315	9KHz ~ 30MHz	May 14, 2012	Sep. 28, 2012	May 13, 2013	Radiation (03CH05-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Sep. 03, 2012	Sep. 28, 2012	Sep. 02, 2013	Radiation (03CH05-HY)
System Simulator	R&S	CMU200	117997	N/A	Aug. 22, 2011	Sep. 28, 2012	Aug. 21, 2013	Radiation (03CH05-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.54
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.72
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## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP291705 as below.