

# FCC RF Test Report

APPLICANT : Commtiva Technology Limited  
EQUIPMENT : GSM/WCDMA Single SIM  
BRAND NAME : SHARP  
MODEL NAME : SH837Wi  
MARKETING NAME : SH837WI  
FCC ID : X7H-SH837WI  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Nov. 09, 2012 and completely tested on Nov. 22, 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:



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Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG2N0915	Rev. 01	Initial issue of report	Dec. 10, 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	-
3.2	§24.232(d)	N/A	Peak-to-Average Ratio	< 13 dB	PASS	-
3.3	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.3	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.4	§2.1049 §22.917(a) §24.238(a)	N/A	Occupied Bandwidth	N/A	PASS	-
3.5	§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	-
3.6	§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	-
3.7	§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 21.85 dB at 1672.000 MHz
3.8	§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**

**Commtiva Technology Limited**

4F., No. 32, Zhongcheng Rd., Tucheng District, New Taipei City 236, Taiwan

## **1.2 Manufacturer**

**Chi Mei Communication Systems, Inc.**

No. 4, Minsheng St., Tucheng Dist., New Taipei City 236, Taiwan (R.O.C.)

### 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	GSM/WCDMA Single SIM
Brand Name	SHARP
Model Name	SH837Wi
Marketing Name	SH837Wi
FCC ID	X7H-SH837WI
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA WLAN 11bgn / Bluetooth
HW Version	PR3
SW Version	V 0.041
EUT Stage	Production Unit

**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 : 32.19 dBm GSM1900 : 30.78 dBm WCDMA Band V : 23.22 dBm WCDMA Band II : 23.91 dBm
Antenna Type	Monopole Antenna + ground resonantor
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	0.3724	0.02 ppm	248KGXW
Part 22	GSM850 EDGE 8	GMSK / 8PSK	0.1062	0.02 ppm	254KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.0509	0.01 ppm	4M10F9W
Part 24	GSM1900 GPRS 8	GMSK	0.6950	0.01 ppm	248KGXW
Part 24	GSM1900 EDGE 8	GMSK / 8PSK	0.2270	0.01 ppm	256KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.1403	0.01 ppm	4M12F9W

## 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	03CH06-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)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems 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, and EUT is rotated on three test planes to find out the worst emission.

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
GSM 850	■ GPRS 8 Link ■ EDGE 8 Link	■ GPRS 8 Link ■ EDGE 8 Link
GSM 1900	■ GPRS 8 Link ■ EDGE 8 Link	■ GPRS 8 Link ■ EDGE 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

**Note:**

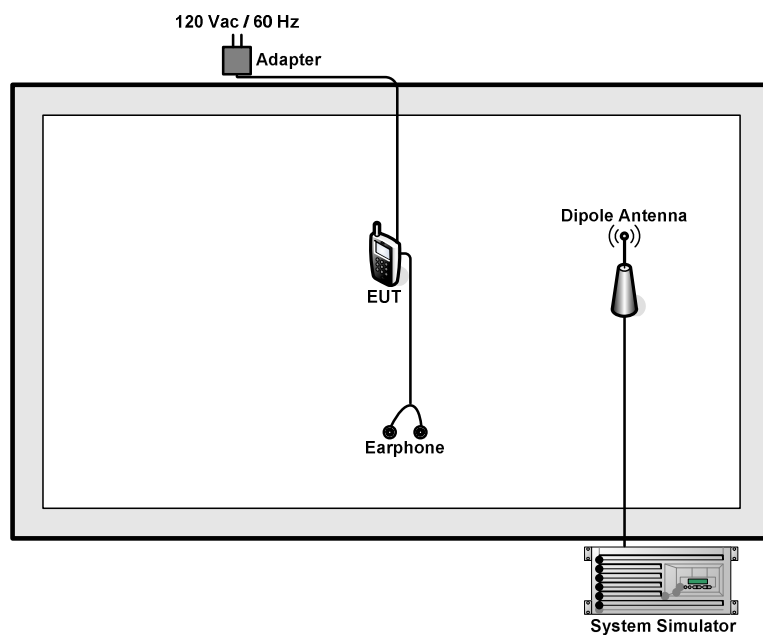
1. The maximum power levels are GSM mode for GMSK link, EDGE multi-slot class 8 mode for 8PSK link, RMC 12.2Kbps mode for WCDMA band V, and RMC 12.2Kbps mode for WCDMA band II, only these modes were used for all tests.
2. Because there are individual antennas for each WWAN, WLAN, and Bluetooth, the co-location 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
GSM	32.17	32.15	32.19	30.50	30.54	30.78
GPRS 8	32.15	32.13	32.17	30.46	30.53	30.77
GPRS 10	32.14	32.12	32.16	30.45	30.51	30.75
GPRS 12	30.06	30.13	30.16	28.49	28.55	28.81
EGPRS 8	26.37	26.35	26.43	25.66	25.73	26.02
EGPRS 10	26.35	26.34	26.41	25.64	25.72	25.99
EGPRS 12	24.30	24.33	24.38	23.54	23.61	23.89

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	23.19	23.22	23.13	23.58	23.53	23.91
HSDPA Subtest-1	22.96	22.98	22.88	23.31	23.30	23.64
HSDPA Subtest-2	22.52	22.54	22.48	22.84	22.82	23.20
HSDPA Subtest-3	22.16	22.19	22.11	22.64	22.64	22.98
HSDPA Subtest-4	22.07	22.11	22.05	22.43	22.37	22.72
HSUPA Subtest-1	21.78	21.80	21.68	22.38	22.32	22.65
HSUPA Subtest-2	19.70	19.74	19.68	20.41	20.48	20.79
HSUPA Subtest-3	20.47	20.51	20.45	21.14	21.20	21.55
HSUPA Subtest-4	19.73	19.82	19.76	20.74	20.77	20.97
HSUPA Subtest-5	21.87	21.89	21.82	22.46	22.50	22.86

## 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.

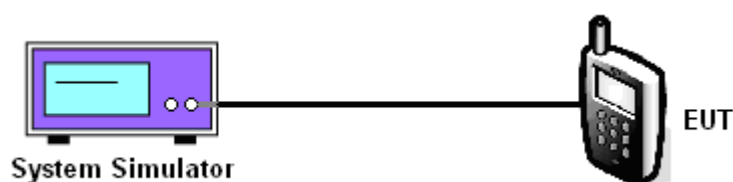
##### 3.1.2 Measuring Instruments

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. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. 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									
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)	32.17	32.15	32.19	26.37	26.35	26.43	23.19	23.22	23.13
Conducted Power (Watts)	1.65	1.64	1.66	0.43	0.43	0.44	0.21	0.21	0.21

PCS Band									
Modes	GSM1900 (GPRS 8)			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)	30.50	30.54	30.78	25.66	25.73	26.02	23.58	23.53	23.91
Conducted Power (Watts)	1.12	1.13	1.20	0.37	0.37	0.40	0.23	0.23	0.25

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

## 3.2 Peak-to-Average Ratio

### 3.2.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

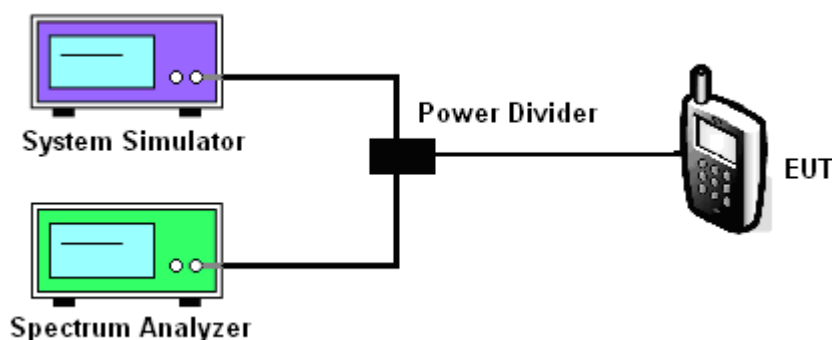
### 3.2.2 Measuring Instruments

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. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. 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.
4. 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

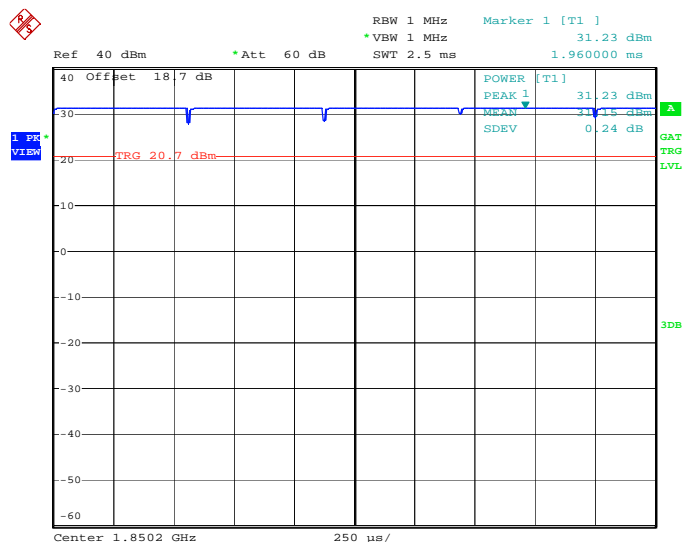


### 3.2.5 Test Result of Peak-to-Average Ratio

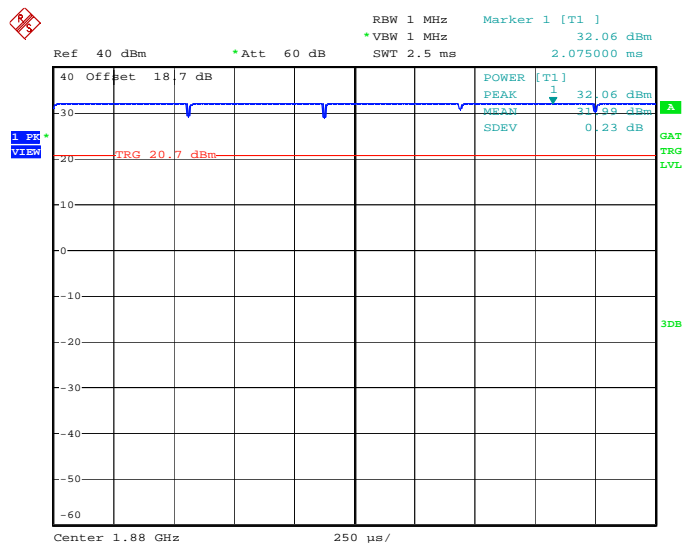
PCS Band									
Modes	GSM1900 (GPRS 8)			GSM1900 (EDGE 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Peak-to-Average Ratio (dB)	0.08	0.07	0.08	0.51	0.46	0.48	2.56	2.64	2.52

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

<b>Band :</b>	GSM 1900	<b>Test Mode :</b>	GPRS 8 Link
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**Peak-to-Average Ratio on Channel 512 (1850.2 MHz)**


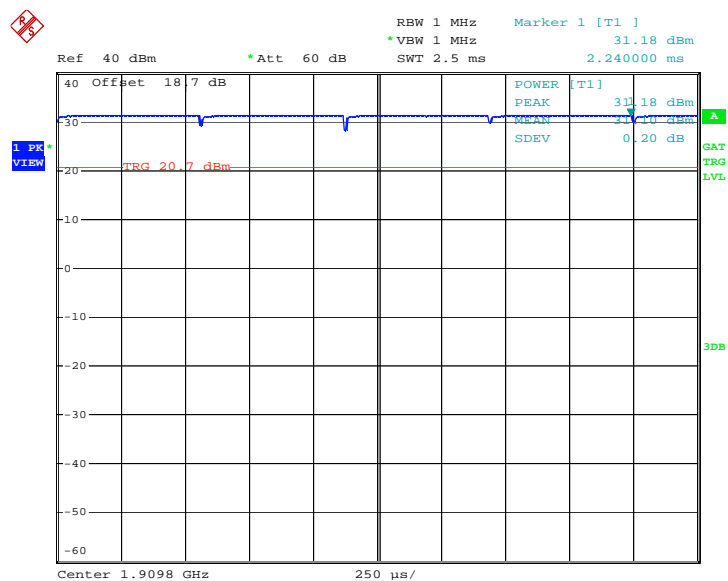
Date: 20.NOV.2012 10:14:36

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


Date: 20.NOV.2012 10:13:18



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

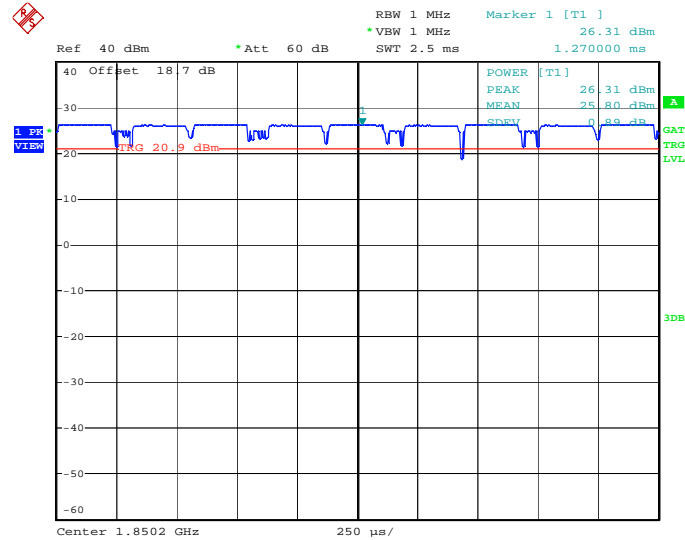


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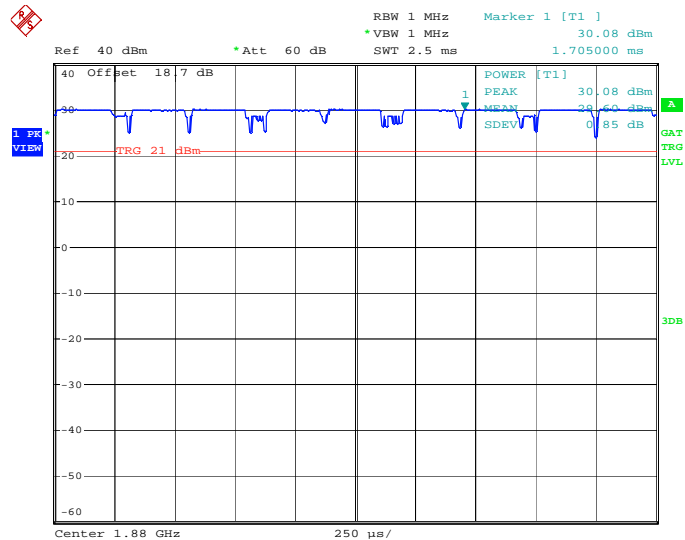
Band :	GSM 1900	Test Mode :	EDGE 8 Link
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 20.NOV.2012 12:18:54

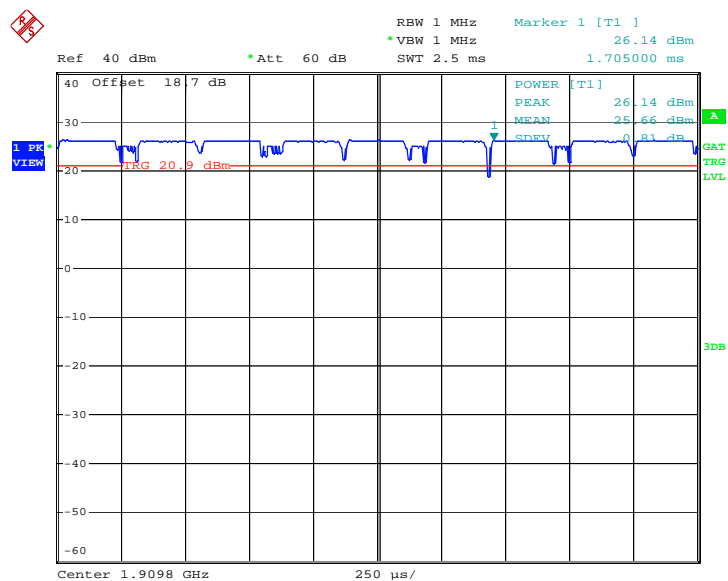
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 22.NOV.2012 14:39:11



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

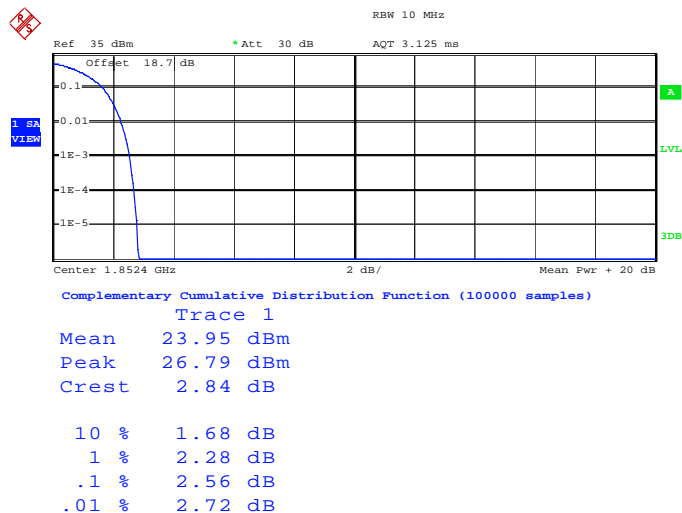


Date: 20.NOV.2012 12:19:28



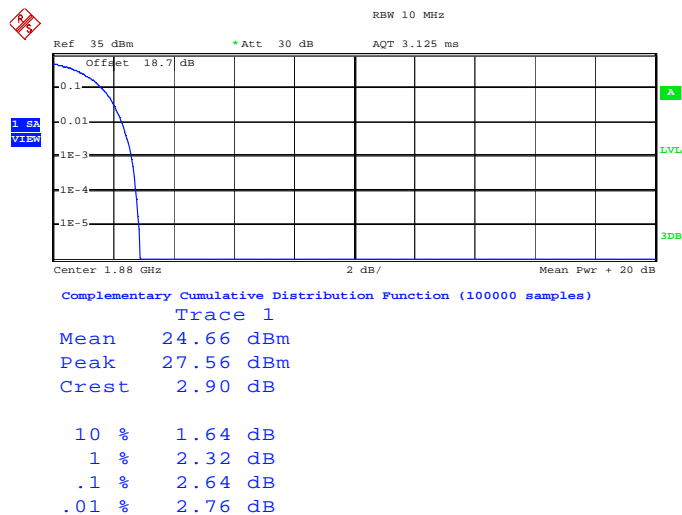
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link
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Peak-to-Average Ratio on Channel 9262 (1852.4 MHz)



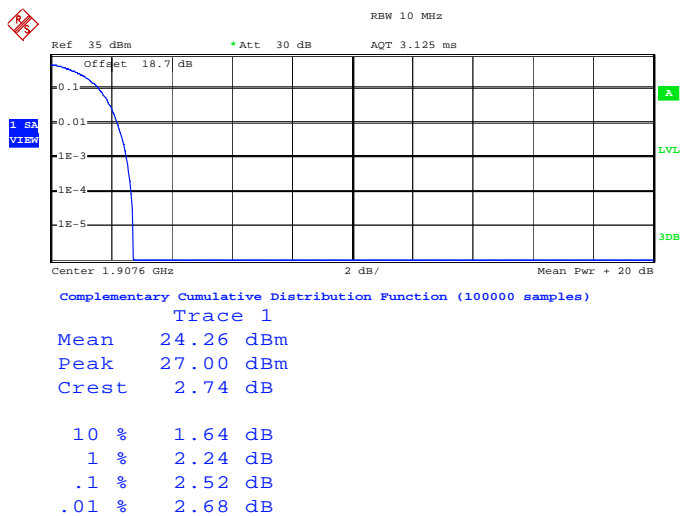
Date: 20.NOV.2012 13:37:56

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



Date: 20.NOV.2012 13:37:17

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



Date: 20.NOV.2012 13:38:36

### 3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

#### 3.3.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

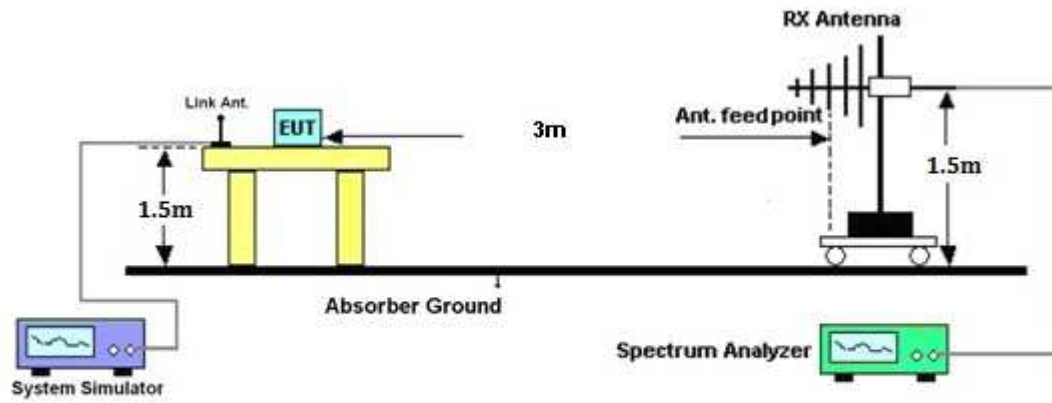
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
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.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$   
 $P_s$  (dBm) : Input power to substitution antenna.  
 $G_s$  (dBi or dBd) : Substitution antenna Gain.  
 $E_t = R_t + AF$   
 $E_s = R_s + AF$   
 $AF$  (dB/m) : Receive antenna factor  
 $R_t$  : The highest received signal in spectrum analyzer for EUT.  
 $R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

### 3.3.4 Test Setup



**3.3.5 Test Result of ERP**

<b>GSM850 (GPRS 8) Radiated Power ERP</b>						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-23.84	-48.12	0.00	-1.08	23.20	0.2089
836.40	-22.92	-48.28	0.00	-0.93	24.43	0.2773
848.80	-21.88	-48.35	0.00	-0.76	25.71	0.3724
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-37.28	-47.97	0.00	-1.08	9.61	0.0091
836.40	-35.64	-48.01	0.00	-0.93	11.44	0.0139
848.80	-33.87	-48.05	0.00	-0.76	13.42	0.0220

<b>GSM850 (EDGE 8) Radiated Power ERP</b>						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-29.53	-48.12	0.00	-1.08	17.51	0.0564
836.40	-28.52	-48.28	0.00	-0.93	18.83	0.0764
848.80	-27.33	-48.35	0.00	-0.76	20.26	0.1062
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-42.82	-47.97	0.00	-1.08	4.07	0.0026
836.40	-40.97	-48.01	0.00	-0.93	6.11	0.0041
848.80	-39.07	-48.05	0.00	-0.76	8.22	0.0066



WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-31.76	-48.12	0.00	-1.08	15.28	0.0337
836.40	-32.19	-48.28	0.00	-0.93	15.16	0.0328
846.60	-30.52	-48.35	0.00	-0.76	17.07	0.0509
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-45.37	-47.97	0.00	-1.08	1.52	0.0014
836.40	-44.94	-48.01	0.00	-0.93	2.14	0.0016
846.60	-42.99	-48.05	0.00	-0.76	4.30	0.0027

**3.3.6 Test Result of EIRP**

<b>GSM1900 (GPRS 8) Radiated Power EIRP</b>						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-26.96	-51.88	0.00	1.96	26.88	0.4875
1880.00	-27.62	-52.99	0.00	2.00	27.37	0.5458
1909.80	-27.84	-54.28	0.00	1.98	28.42	0.6950
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-28.96	-52.13	0.00	1.96	25.13	0.3258
1880.00	-29.50	-53.17	0.00	2.00	25.67	0.3690
1909.80	-29.99	-54.13	0.00	1.98	26.12	0.4093

<b>GSM1900 (EDGE 8) Radiated Power EIRP</b>						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-32.16	-51.88	0.00	1.96	21.68	0.1472
1880.00	-32.61	-52.99	0.00	2.00	22.38	0.1730
1909.80	-32.70	-54.28	0.00	1.98	23.56	0.2270
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-33.72	-52.13	0.00	1.96	20.37	0.1089
1880.00	-34.43	-53.17	0.00	2.00	20.74	0.1186
1909.80	-34.73	-54.13	0.00	1.98	21.38	0.1374



WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-32.98	-51.88	0.00	1.96	20.86	0.1219
1880.00	-34.61	-52.99	0.00	2.00	20.38	0.1091
1907.60	-34.79	-54.28	0.00	1.98	21.47	0.1403
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-35.38	-52.13	0.00	1.96	18.71	0.0743
1880.00	-36.89	-53.17	0.00	2.00	18.28	0.0673
1907.60	-37.27	-54.13	0.00	1.98	18.84	0.0766

### 3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% 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.

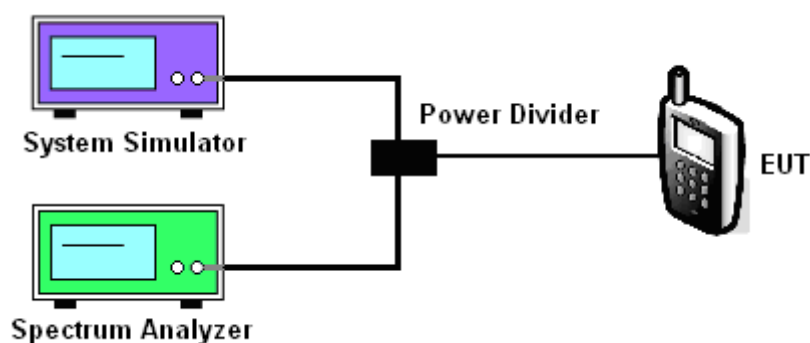
#### 3.4.2 Measuring Instruments

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 RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The 99% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.

#### 3.4.4 Test Setup



**3.4.5 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	248.00	252.00	254.00	248.00
26dB BW (KHz)	316.00	308.00	304.00	312.00	312.00	316.00

PCS Band						
Modes	GSM1900 (GPRS 8)			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	244.00	246.00	250.00	252.00	256.00
26dB BW (KHz)	300.00	310.00	312.00	308.00	308.00	318.00

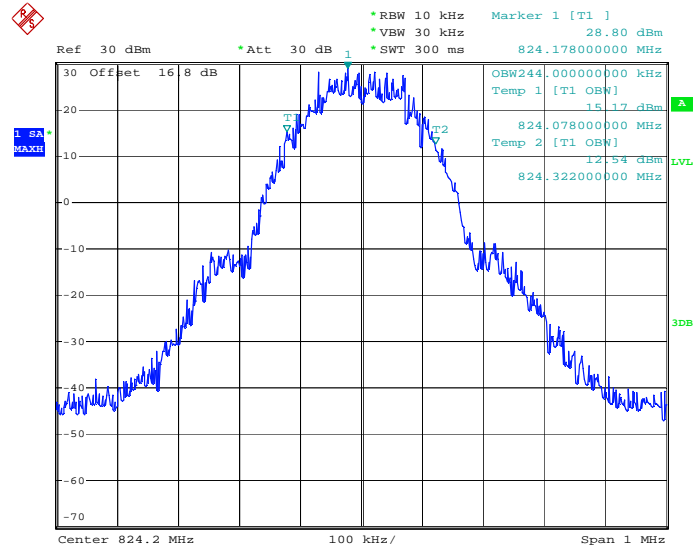
Cellular Band			
Modes	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
99% OBW (MHz)	4.10	4.08	4.08
26dB BW (MHz)	4.68	4.66	4.68

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)	4.12	4.06	4.10
26dB BW (MHz)	4.78	4.70	4.70

### 3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

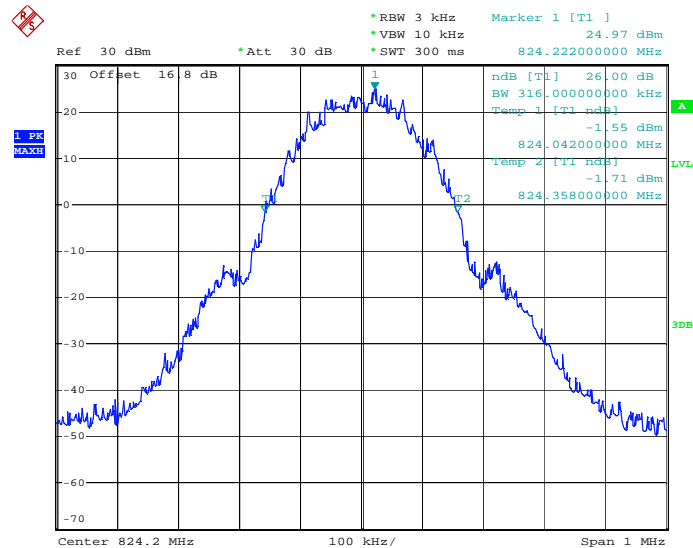
<b>Band :</b>	GSM 850	<b>Test Mode :</b>	GPRS 8 Link
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#### 99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 20.NOV.2012 09:41:46

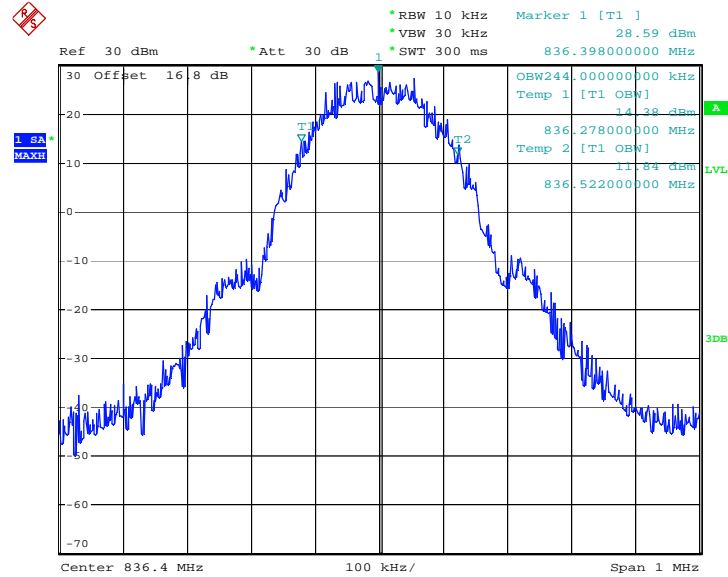
#### 26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 20.NOV.2012 09:33:31

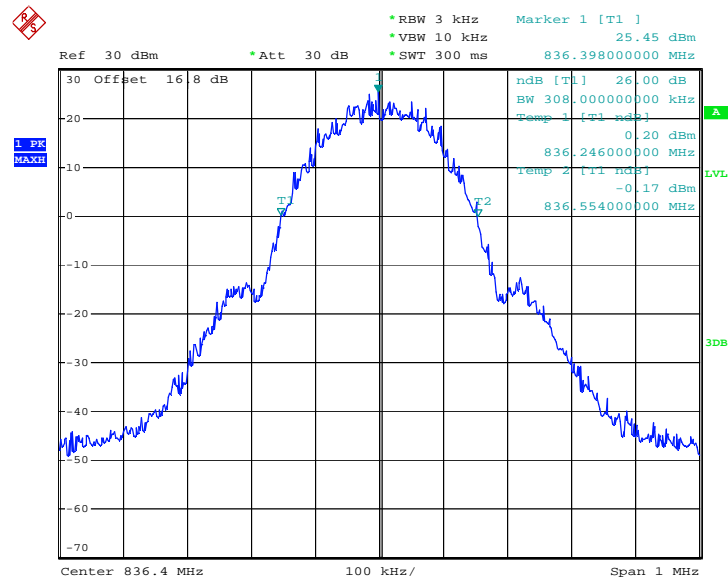


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 20.NOV.2012 09:35:15

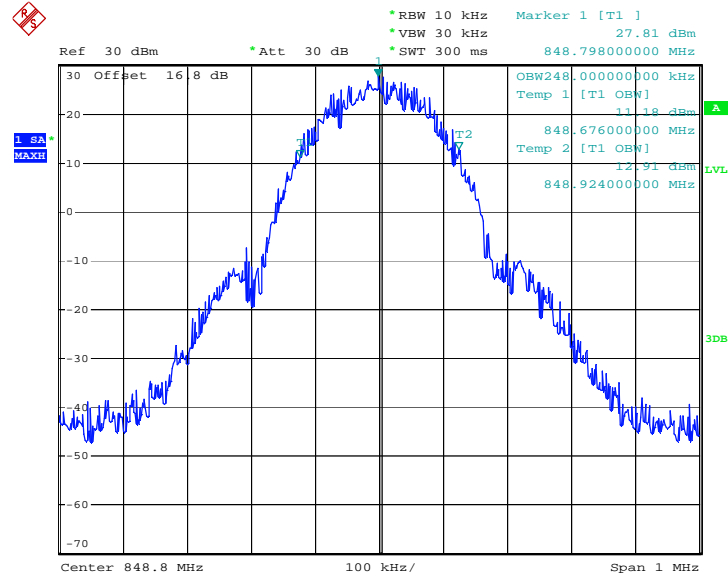
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 20.NOV.2012 09:33:57

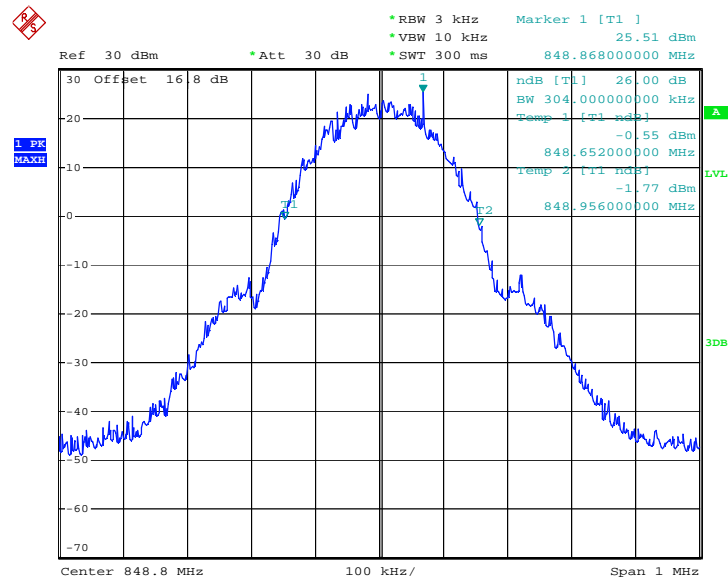


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 20.NOV.2012 09:42:38

26dB Bandwidth Plot on Channel 251 (848.8 MHz)



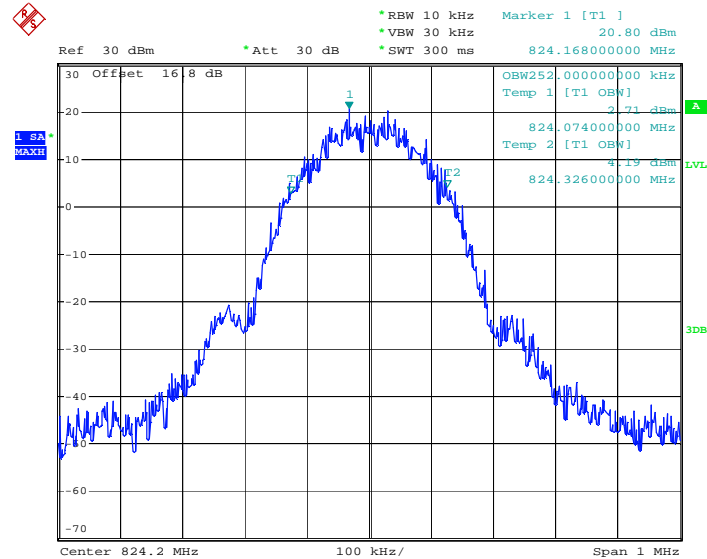
Date: 20.NOV.2012 09:34:23





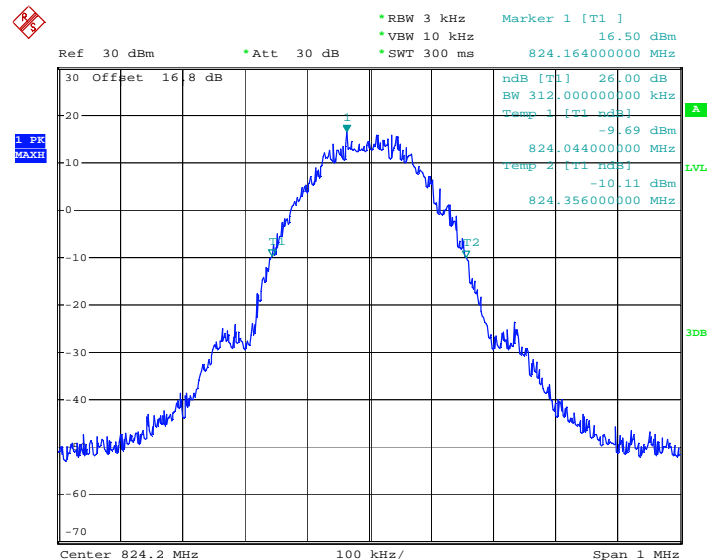
Band :	GSM 850	Test Mode :	EDGE 8 Link
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99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)

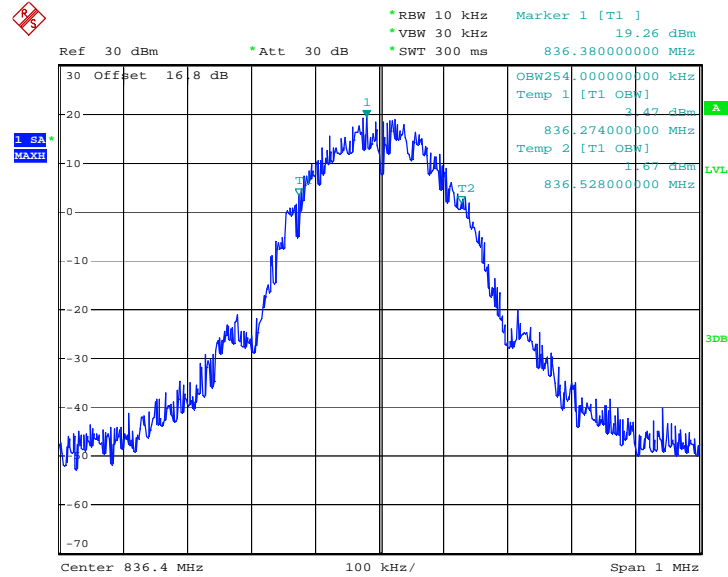


Date: 20.NOV.2012 11:03:06

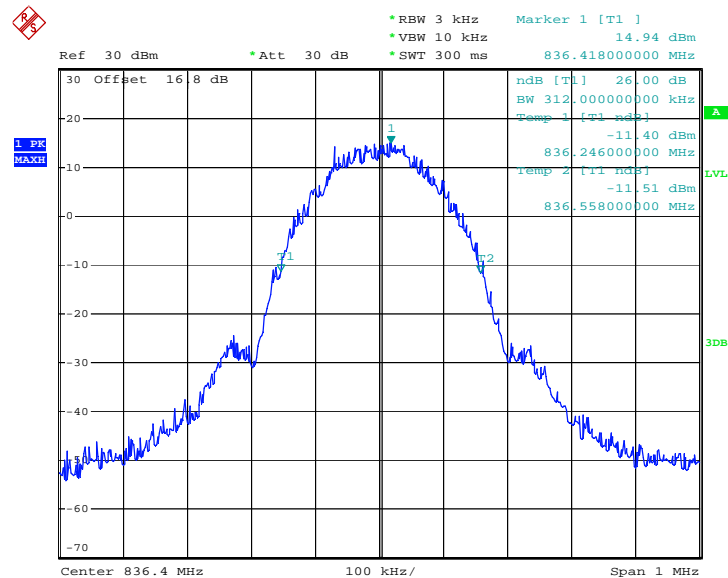
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



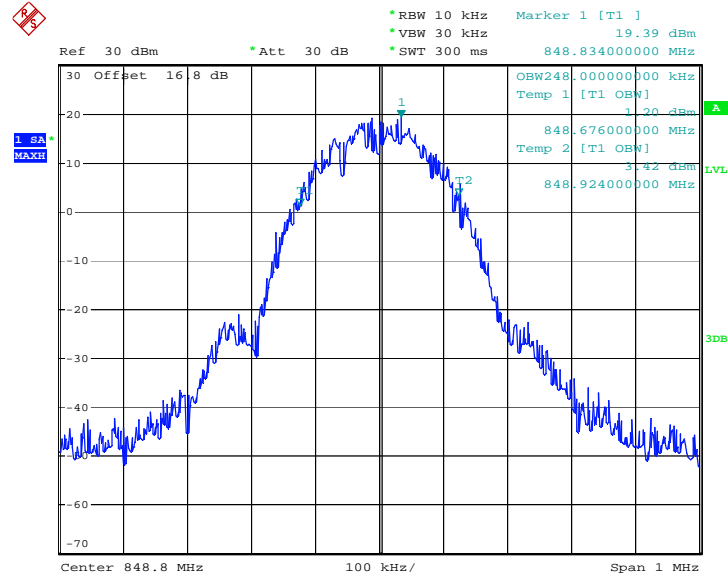
Date: 20.NOV.2012 11:01:47

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


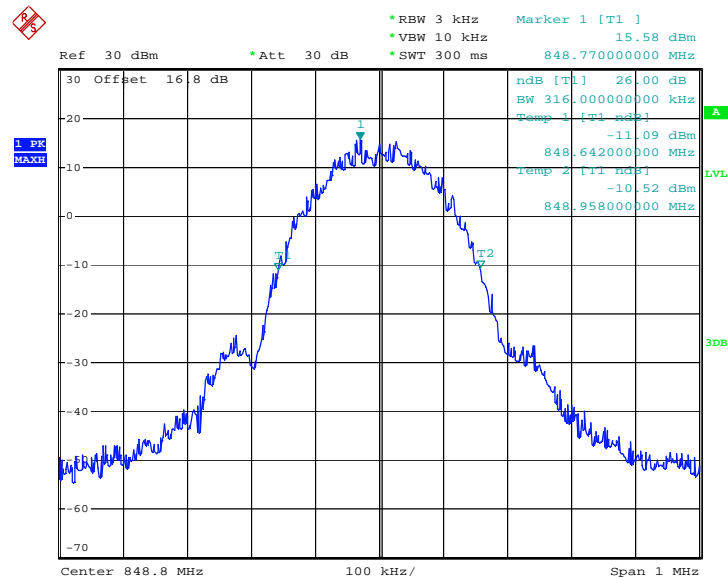
Date: 20.NOV.2012 11:03:32

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


Date: 20.NOV.2012 11:02:13

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


Date: 20.NOV.2012 11:03:57

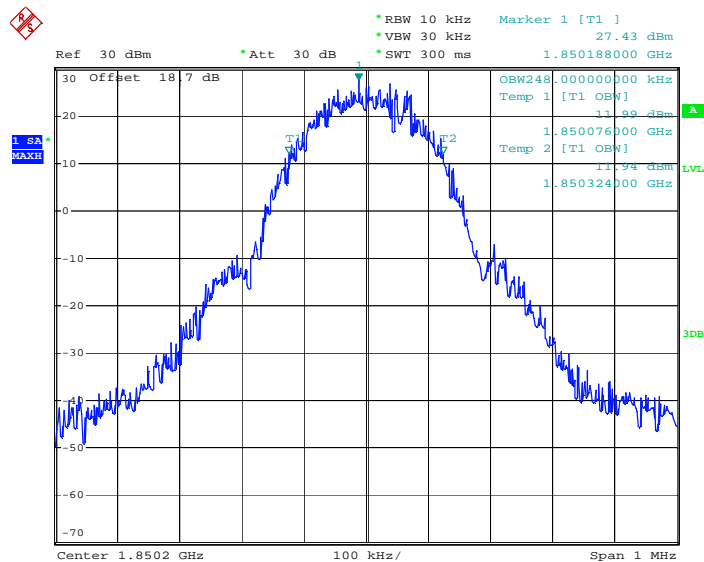
**26dB Bandwidth Plot on Channel 251 (848.8 MHz)**


Date: 20.NOV.2012 11:02:39



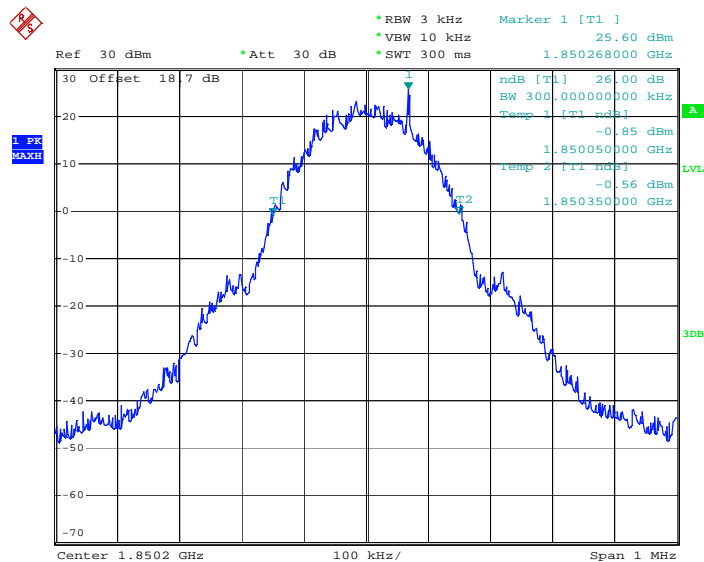
Band :	GSM 1900	Test Mode :	GPRS 8 Link
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)

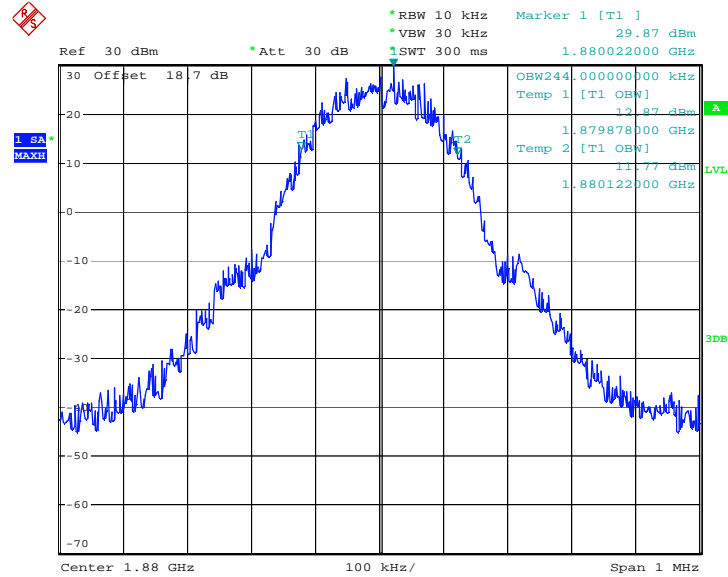


Date: 20.NOV.2012 10:21:40

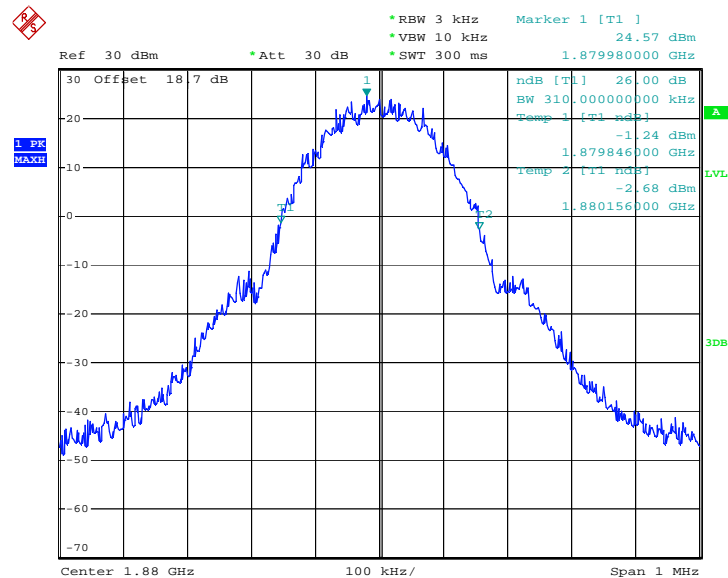
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



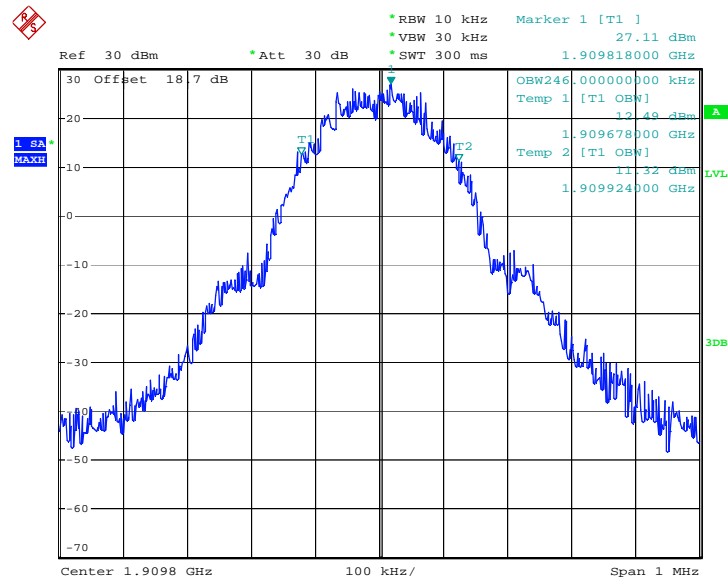
Date: 20.NOV.2012 10:20:21

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


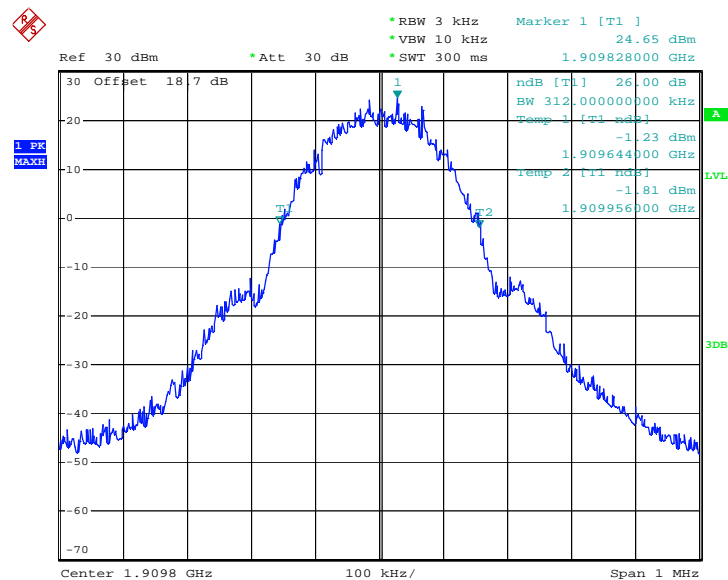
Date: 20.NOV.2012 10:22:06

**26dB Bandwidth Plot on Channel 661 (1880.0 MHz)**


Date: 20.NOV.2012 10:20:47

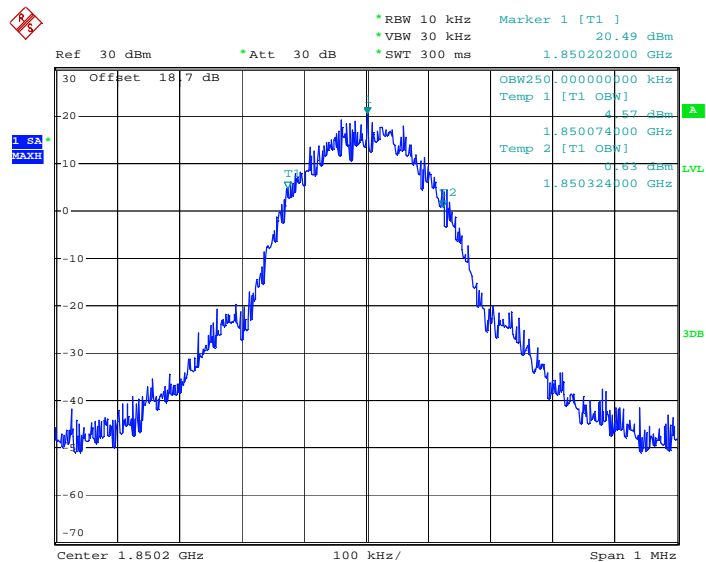
**99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)**


Date: 20.NOV.2012 10:22:32

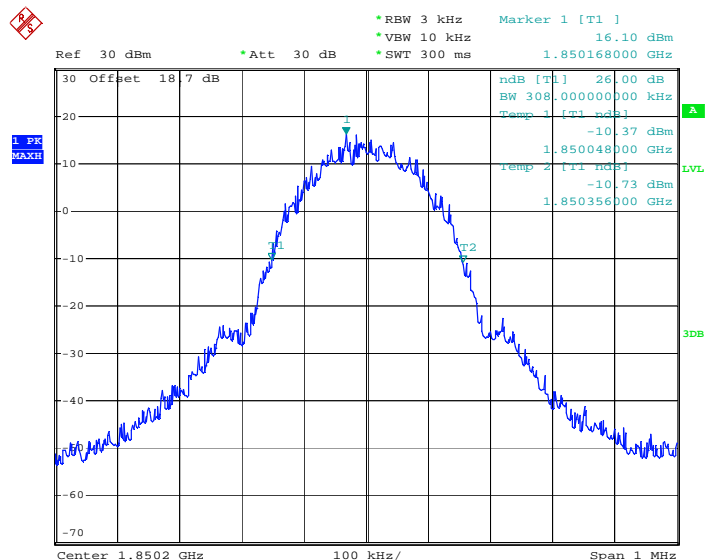
**26dB Bandwidth Plot on Channel 810 (1909.8 MHz)**


Date: 20.NOV.2012 10:21:13

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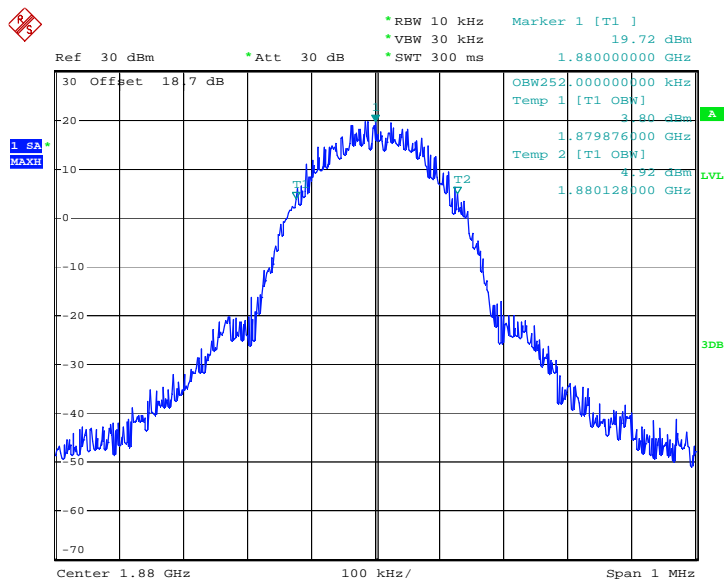
**99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)**


Date: 20.NOV.2012 12:43:45

**26dB Bandwidth Plot on Channel 512 (1850.2 MHz)**


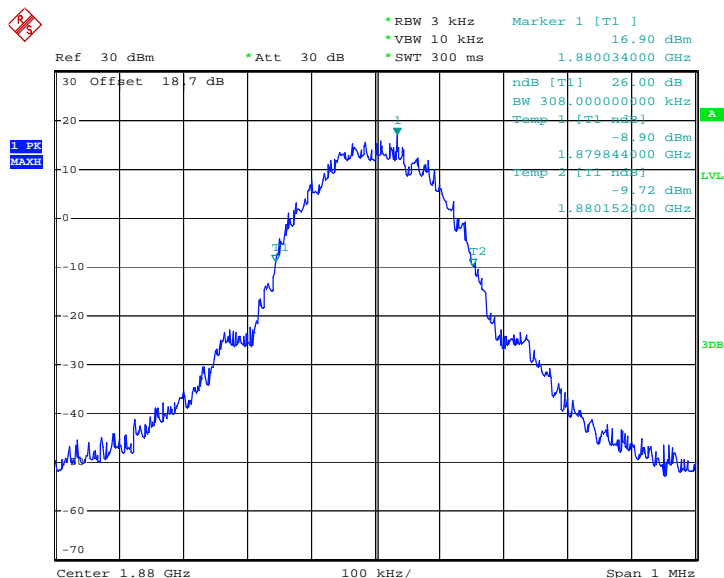
Date: 20.NOV.2012 12:42:27

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



Date: 20.NOV.2012 12:44:11

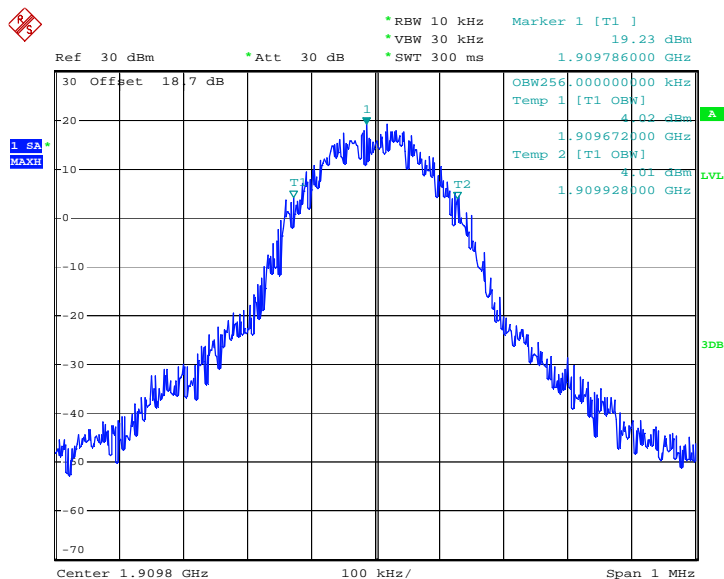
### 26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 20.NOV.2012 12:42:53

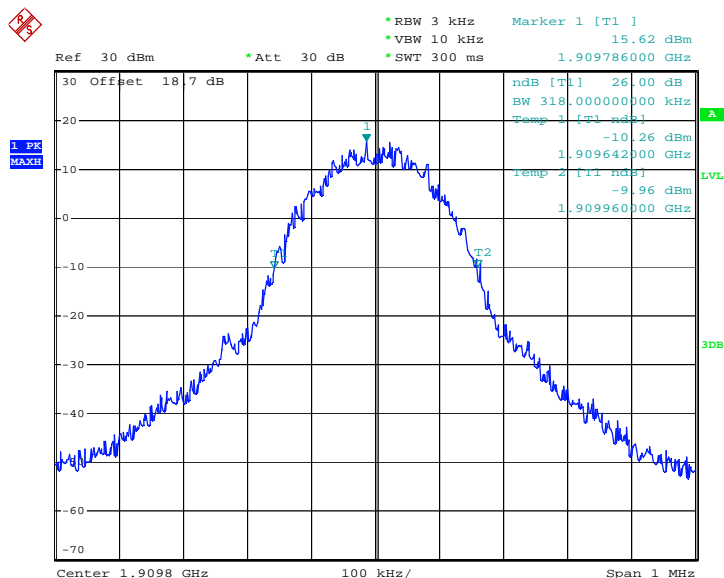


### 99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



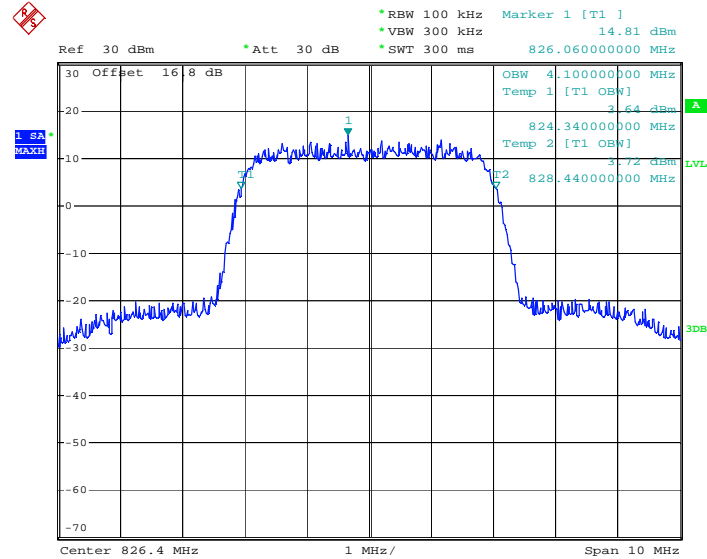
Date: 20.NOV.2012 12:44:37

### 26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

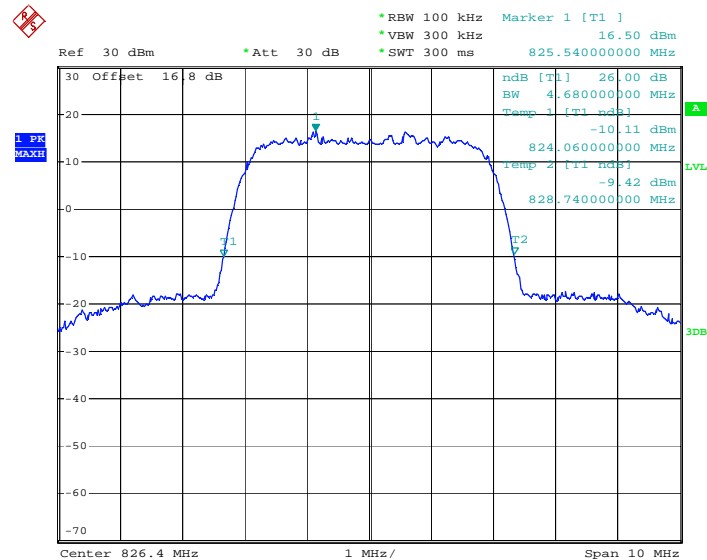


Date: 20.NOV.2012 12:43:19

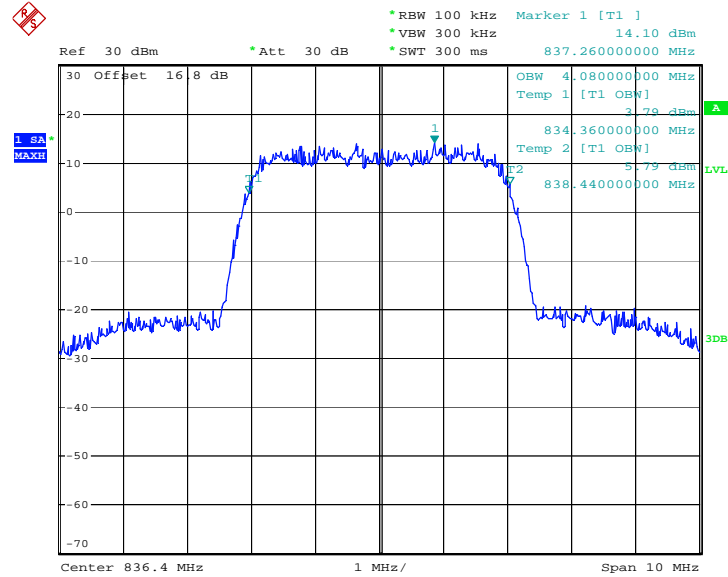
<b>Band :</b>	WCDMA Band V	<b>Test Mode :</b>	RMC 12.2Kbps Link
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**99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)**


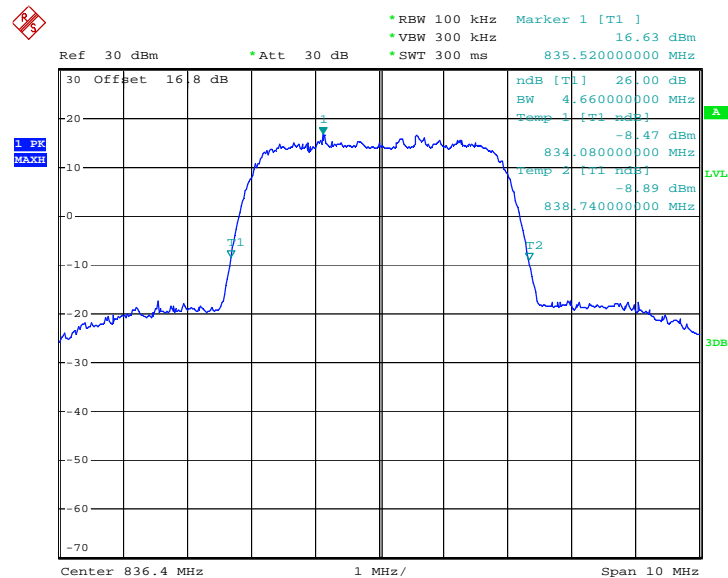
Date: 20.NOV.2012 13:27:31

**26dB Bandwidth Plot on Channel 4132 (826.4 MHz)**


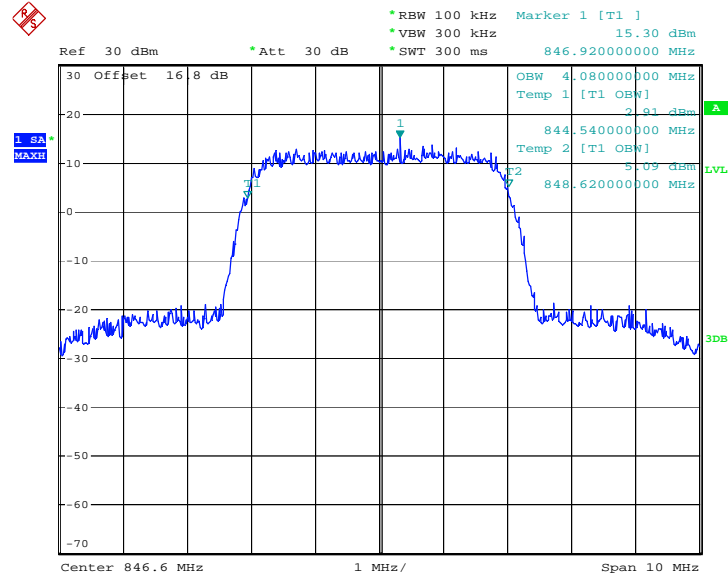
Date: 20.NOV.2012 13:26:13

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


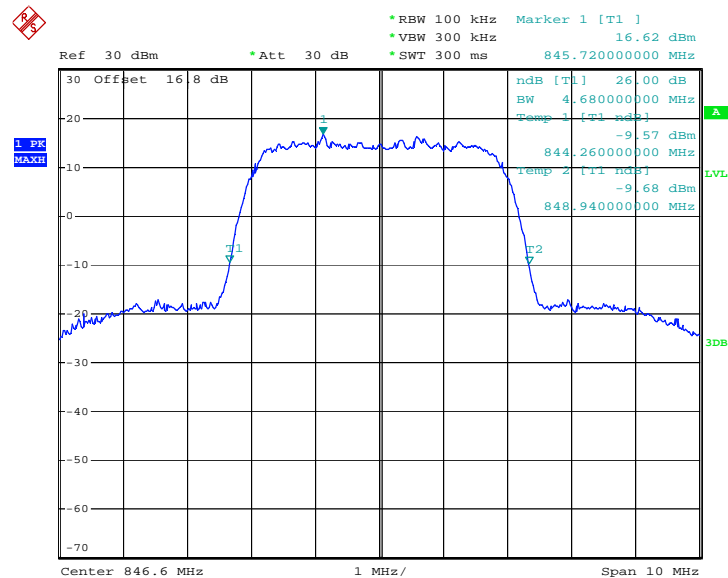
Date: 20.NOV.2012 13:27:57

**26dB Bandwidth Plot on Channel 4182 (836.4 MHz)**


Date: 20.NOV.2012 13:26:39

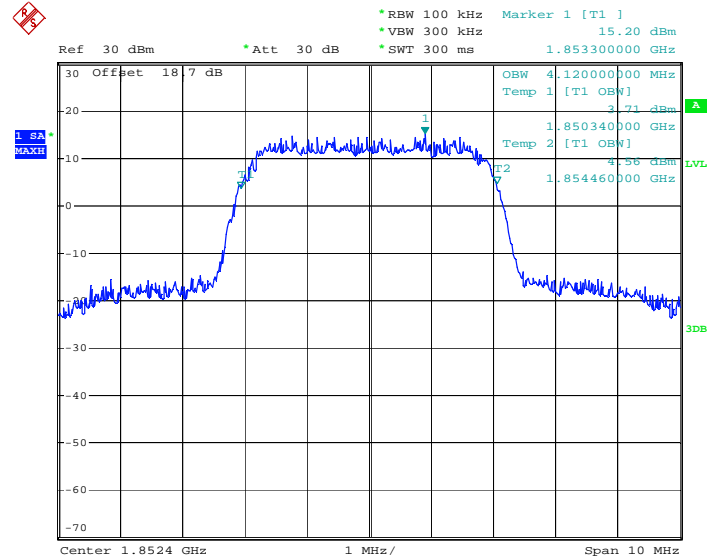
**99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)**


Date: 20.NOV.2012 13:28:23

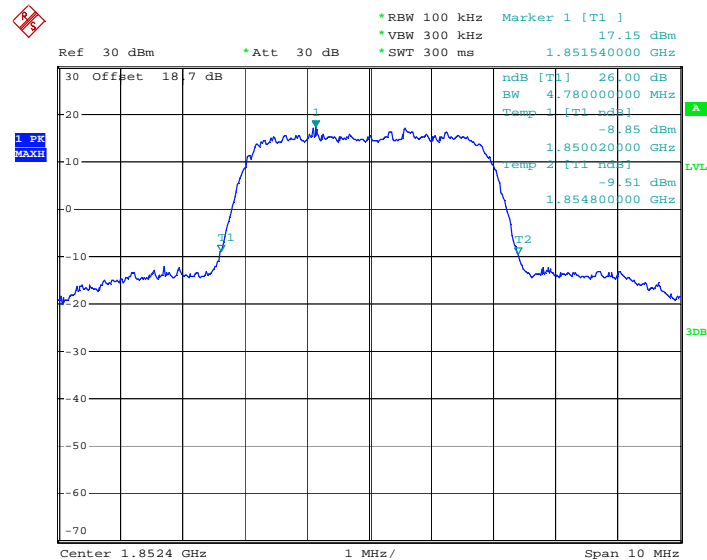
**26dB Bandwidth Plot on Channel 4233 (846.6 MHz)**


Date: 20.NOV.2012 13:27:05

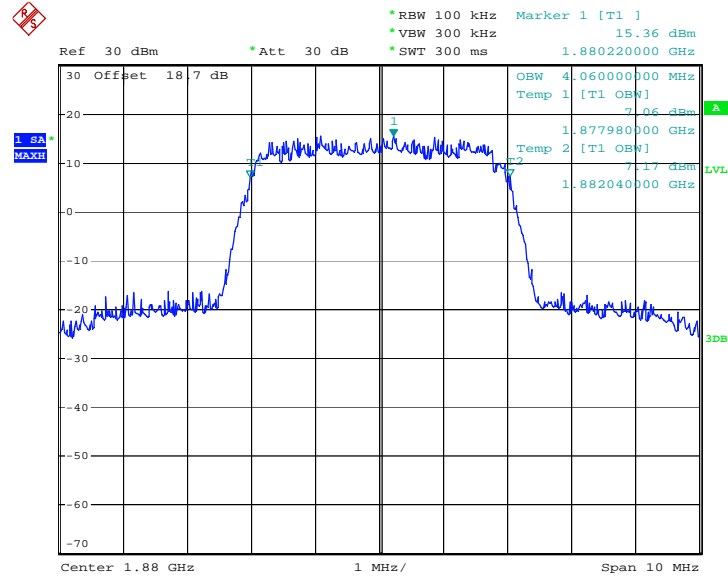
<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
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**99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)**


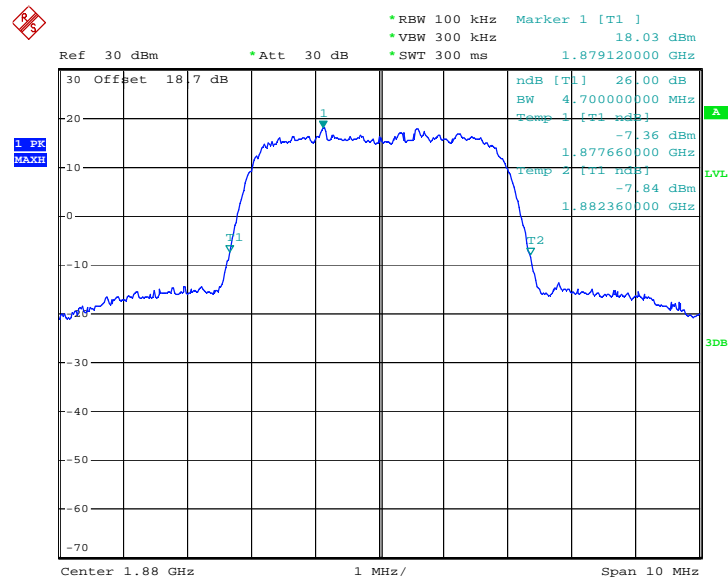
Date: 20.NOV.2012 13:41:41

**26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)**


Date: 20.NOV.2012 13:40:23

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


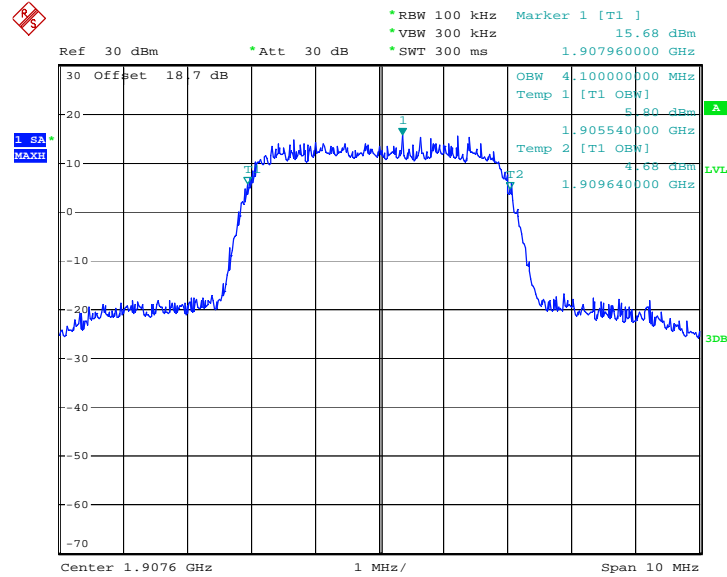
Date: 20.NOV.2012 13:42:07

**26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)**


Date: 20.NOV.2012 13:40:49

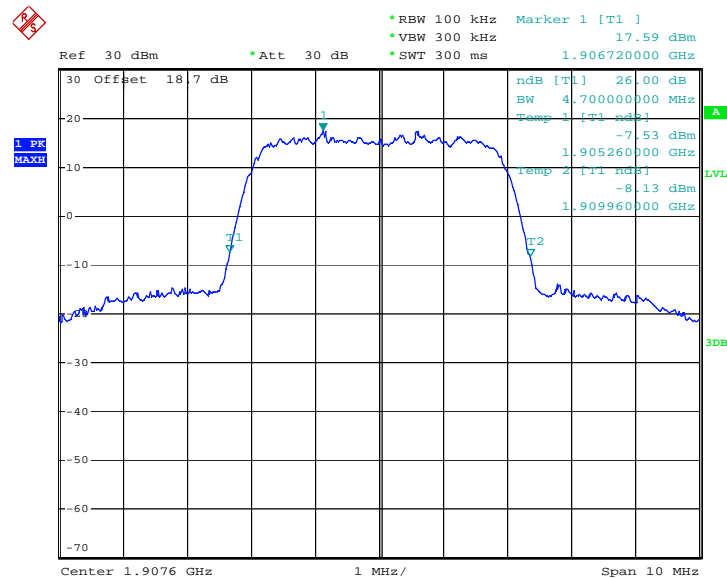


99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 20.NOV.2012 13:42:33

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 20.NOV.2012 13:41:15

## 3.5 Band Edge Measurement

### 3.5.1 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.

### 3.5.2 Measuring Instruments

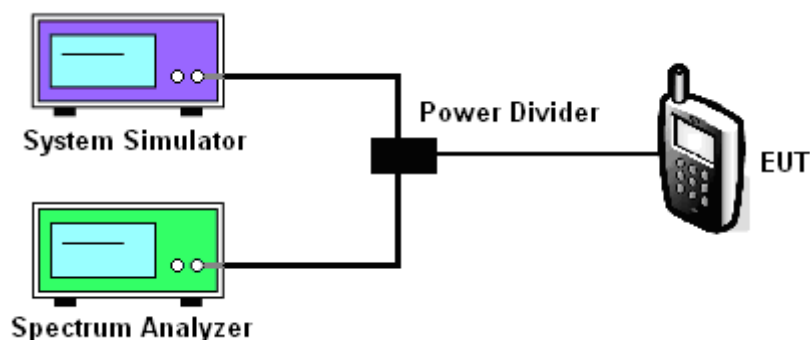
See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.

### 3.5.4 Test Setup

<Conducted Band Edge >

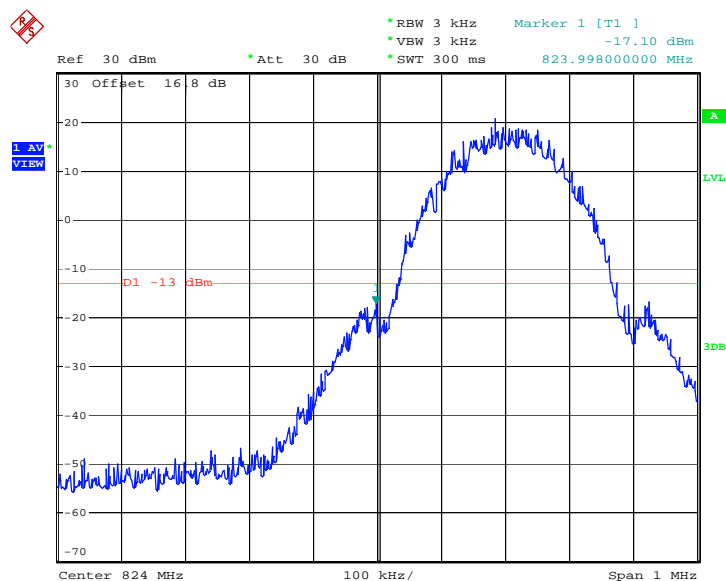




### 3.5.5 Test Result (Plots) of Conducted Band Edge

<b>Band :</b>	GSM850	<b>Test Mode :</b>	GPRS 8 Link
<b>Correction Factor :</b>	0.23dB	<b>Maximum 26dB Bandwidth :</b>	0.316MHz
<b>Band Edge :</b>	-16.87dBm	<b>Measurement Value :</b>	-17.10dBm

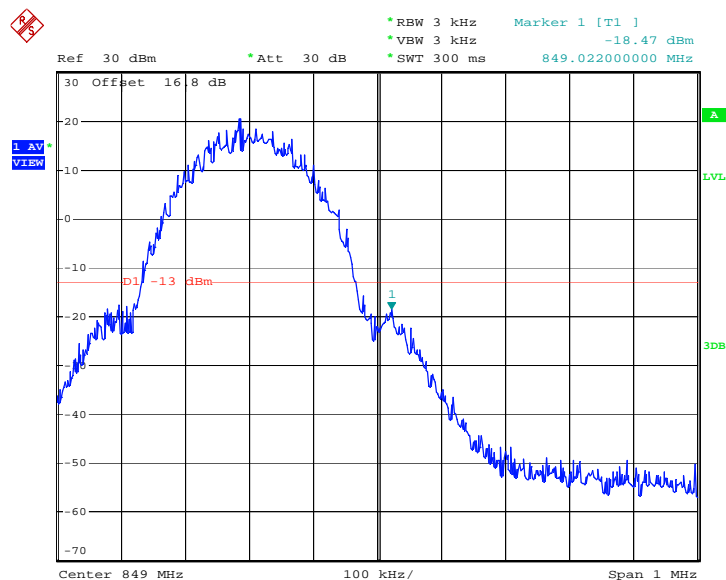
**Lower Band Edge Plot on Channel 128 (824.2 MHz)**



Date: 20.NOV.2012 09:37:07

1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
  2. Band Edge= Measurement Value + Correction Factor(dB)
- For example,  $-17.10\text{dBm} + 0.23\text{dB} = -16.87\text{dBm}$

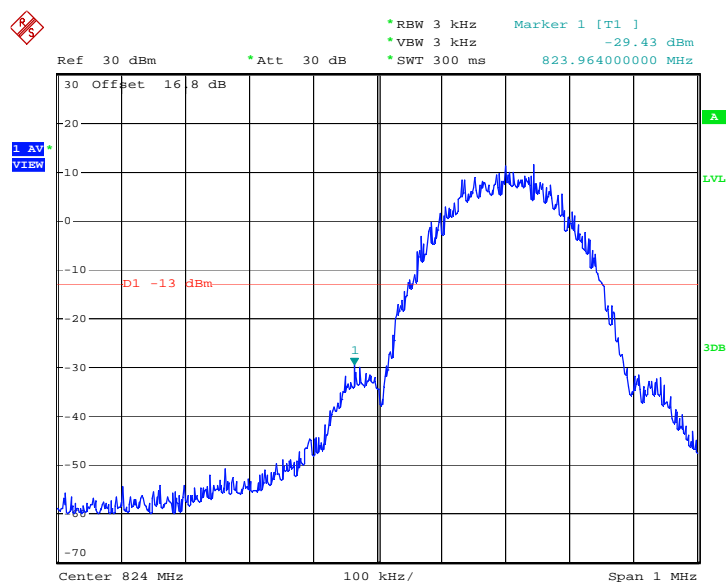
<b>Band :</b>	GSM850	<b>Test Mode :</b>	GPRS 8 Link
<b>Correction Factor :</b>	0.23dB	<b>Maximum 26dB Bandwidth :</b>	0.316MHz
<b>Band Edge :</b>	-18.24dBm	<b>Measurement Value :</b>	-18.47dBm

**Higher Band Edge Plot on Channel 251 (848.8 MHz)**


Date: 20.NOV.2012 09:37:34

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

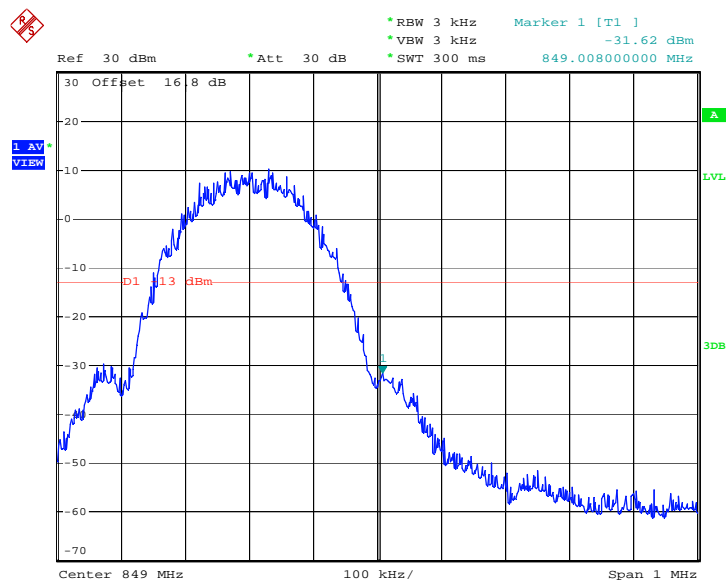
<b>Band :</b>	GSM850	<b>Test Mode :</b>	EDGE 8 Link
<b>Correction Factor :</b>	0.23dB	<b>Maximum 26dB Bandwidth :</b>	0.316MHz
<b>Band Edge :</b>	-29.20dBm	<b>Measurement Value :</b>	-29.43dBm

**Lower Band Edge Plot on Channel 128 (824.2 MHz)**


Date: 20.NOV.2012 11:05:23

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

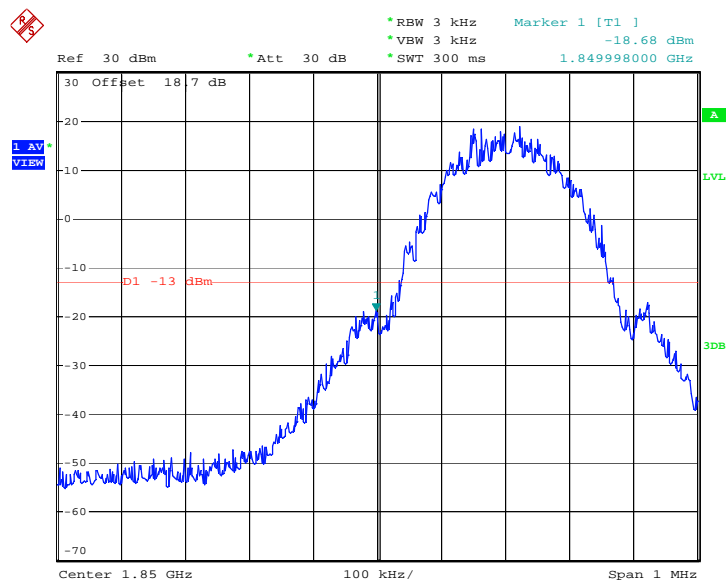
<b>Band :</b>	GSM850	<b>Test Mode :</b>	EDGE 8 Link
<b>Correction Factor :</b>	0.23dB	<b>Maximum 26dB Bandwidth :</b>	0.316MHz
<b>Band Edge :</b>	-31.39dBm	<b>Measurement Value :</b>	-31.62dBm

**Higher Band Edge Plot on Channel 251 (848.8 MHz)**


Date: 20.NOV.2012 11:05:50

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

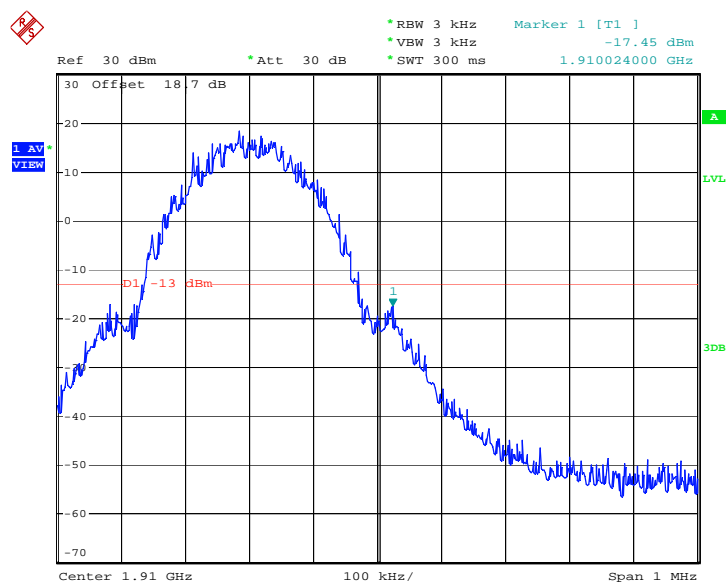
<b>Band :</b>	GSM1900	<b>Test Mode :</b>	GPRS 8 Link
<b>Correction Factor :</b>	0.17dB	<b>Maximum 26dB Bandwidth :</b>	0.312MHz
<b>Band Edge :</b>	-18.51dBm	<b>Measurement Value :</b>	-18.68dBm

**Lower Band Edge Plot on Channel 512 (1850.2 MHz)**


Date: 20.NOV.2012 10:33:53

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

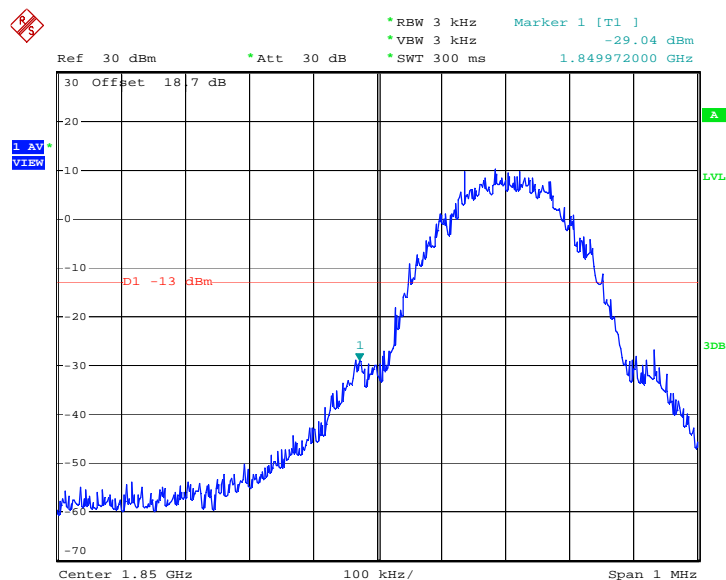
<b>Band :</b>	GSM1900	<b>Test Mode :</b>	GPRS 8 Link
<b>Correction Factor :</b>	0.17dB	<b>Maximum 26dB Bandwidth :</b>	0.312MHz
<b>Band Edge :</b>	-17.28dBm	<b>Measurement Value :</b>	-17.45dBm

**Higher Band Edge Plot on Channel 810 (1909.8 MHz)**


Date: 20.NOV.2012 10:34:19

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

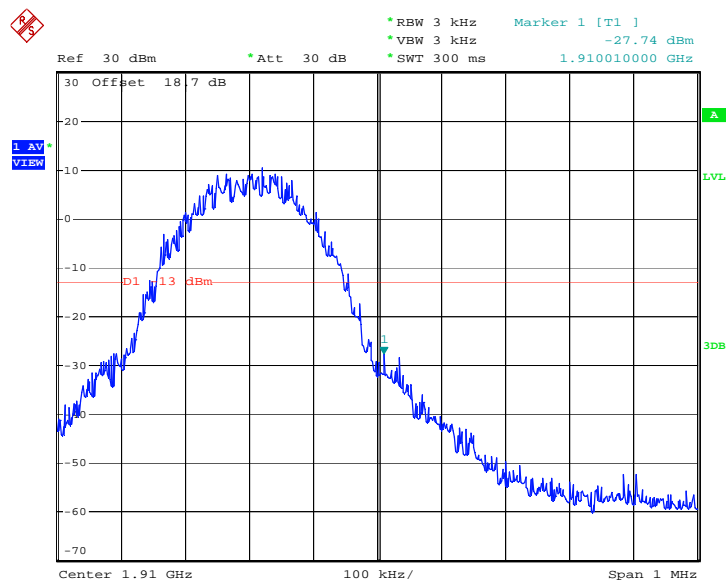
<b>Band :</b>	GSM1900	<b>Test Mode :</b>	EDGE 8 Link
<b>Correction Factor :</b>	0.25dB	<b>Maximum 26dB Bandwidth :</b>	0.318MHz
<b>Band Edge :</b>	-28.79dBm	<b>Measurement Value :</b>	-29.04dBm

**Lower Band Edge Plot on Channel 512 (1850.2 MHz)**


Date: 20.NOV.2012 12:54:07

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

<b>Band :</b>	GSM1900	<b>Test Mode :</b>	EDGE 8 Link
<b>Correction Factor :</b>	0.25dB	<b>Maximum 26dB Bandwidth :</b>	0.318MHz
<b>Band Edge :</b>	-27.49dBm	<b>Measurement Value :</b>	-27.74dBm

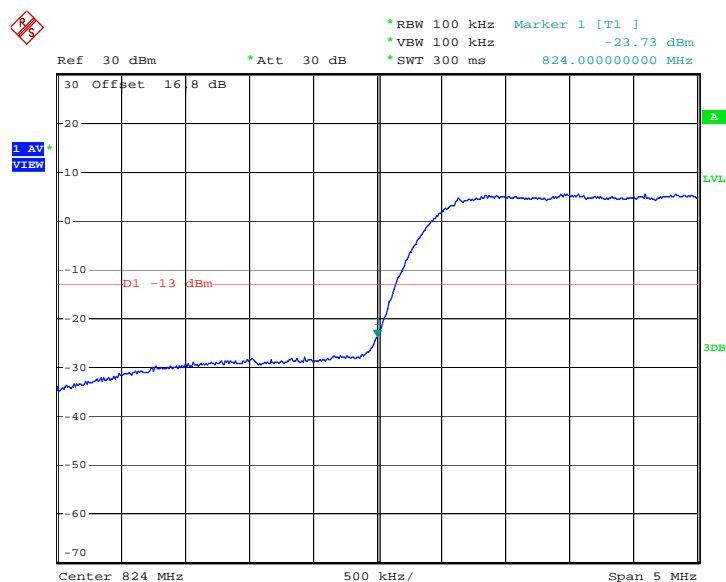
**Higher Band Edge Plot on Channel 810 (1909.8 MHz)**


Date: 20.NOV.2012 12:54:33

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



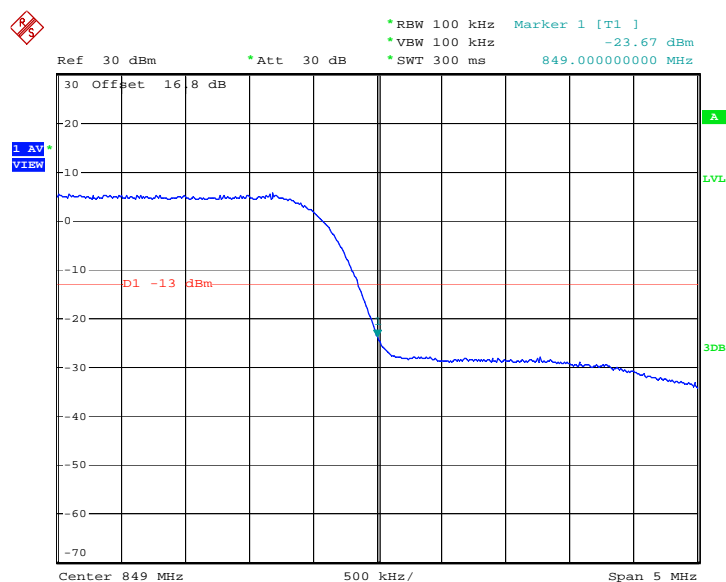
<b>Band :</b>	WCDMA Band V	<b>Test Mode :</b>	RMC 12.2Kbps Link
<b>Correction Factor :</b>	-3.30dB	<b>Maximum 26dB Bandwidth :</b>	4.68MHz
<b>Band Edge :</b>	-27.03dBm	<b>Measurement Value :</b>	-23.73dBm

**Lower Band Edge Plot on Channel 4132 (826.4 MHz)**


Date: 20.NOV.2012 13:29:51

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

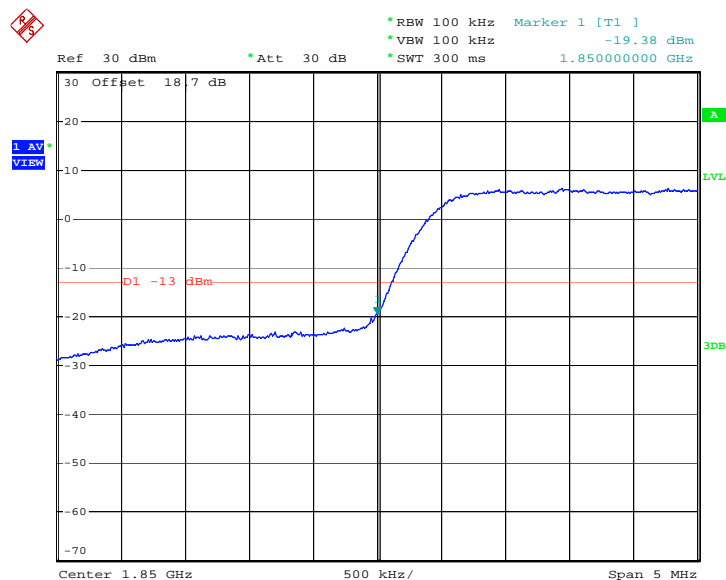
<b>Band :</b>	WCDMA Band V	<b>Test Mode :</b>	RMC 12.2Kbps Link
<b>Correction Factor :</b>	-3.30dB	<b>Maximum 26dB Bandwidth :</b>	4.68MHz
<b>Band Edge :</b>	-26.97dBm	<b>Measurement Value :</b>	-23.67dBm

**Higher Band Edge Plot on Channel 4233 (846.6 MHz)**


Date: 20.NOV.2012 13:30:17

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

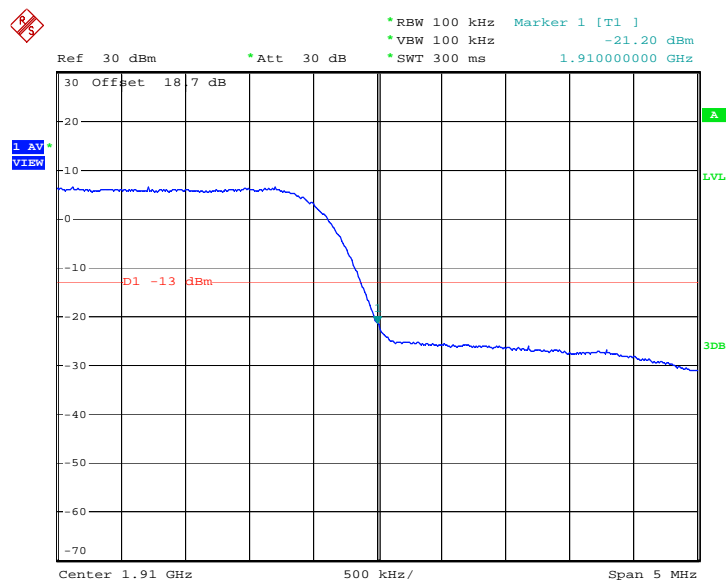
<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
<b>Correction Factor :</b>	-3.21dB	<b>Maximum 26dB Bandwidth :</b>	4.78MHz
<b>Band Edge :</b>	-22.59dBm	<b>Measurement Value :</b>	-19.38dBm

**Lower Band Edge Plot on Channel 9262 (1852.4 MHz)**


Date: 20.NOV.2012 13:44:01

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

<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
<b>Correction Factor :</b>	-3.21dB	<b>Maximum 26dB Bandwidth :</b>	4.78MHz
<b>Band Edge :</b>	-24.41dBm	<b>Measurement Value :</b>	-21.20dBm

**Higher Band Edge Plot on Channel 9538 (1907.6 MHz)**


Date: 20.NOV.2012 13:44:27

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

## 3.6 Conducted Spurious Emission Measurement

### 3.6.1 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.

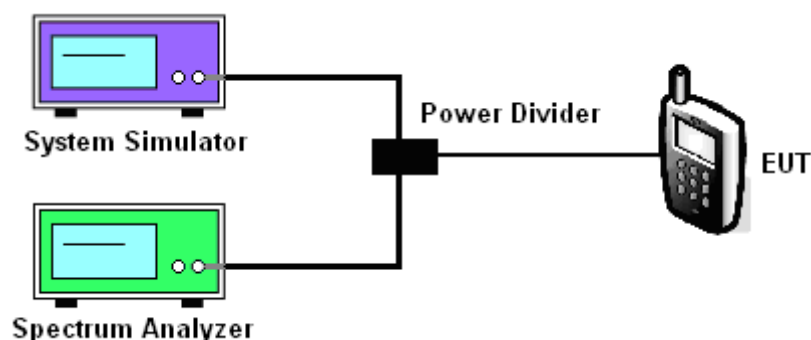
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

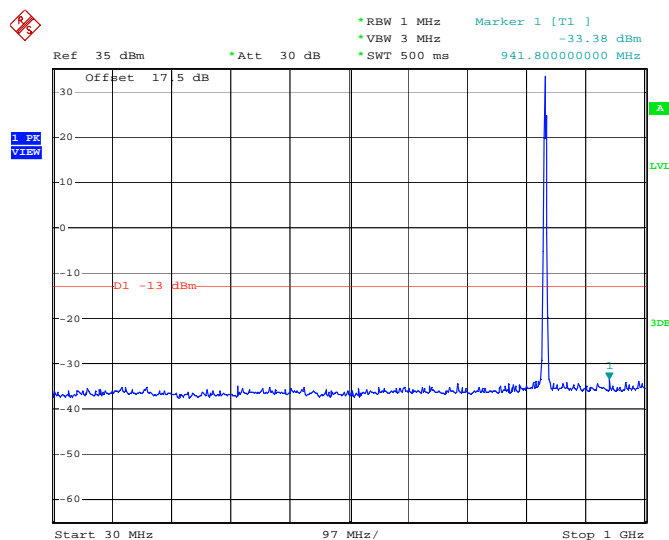
1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.

### 3.6.4 Test Setup

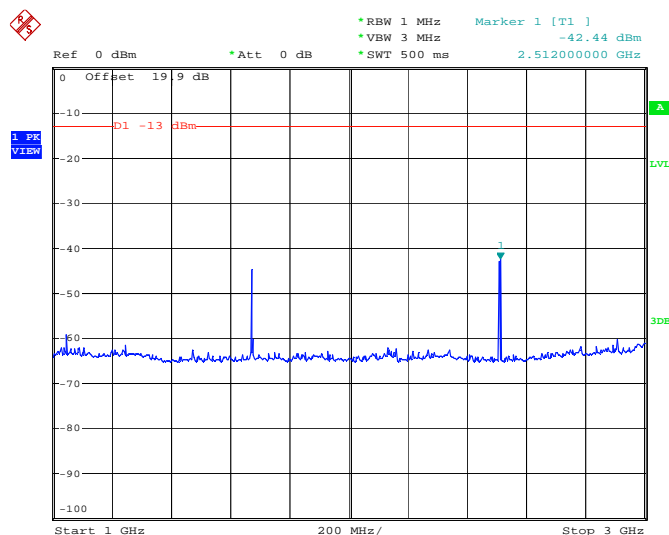


### 3.6.5 Test Result (Plots) of Conducted Spurious Emission

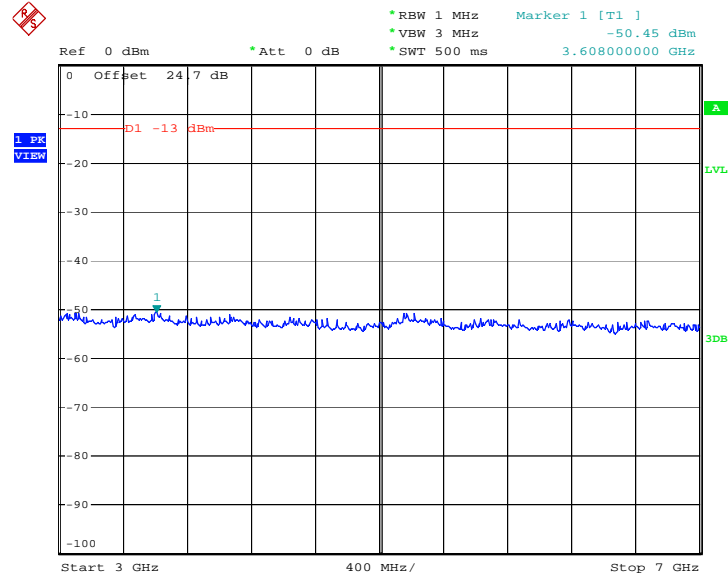
<b>Band :</b>	GSM850	<b>Channel :</b>	CH189
<b>Test Mode :</b>	GPRS 8 Link	<b>Frequency :</b>	836.4 MHz

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


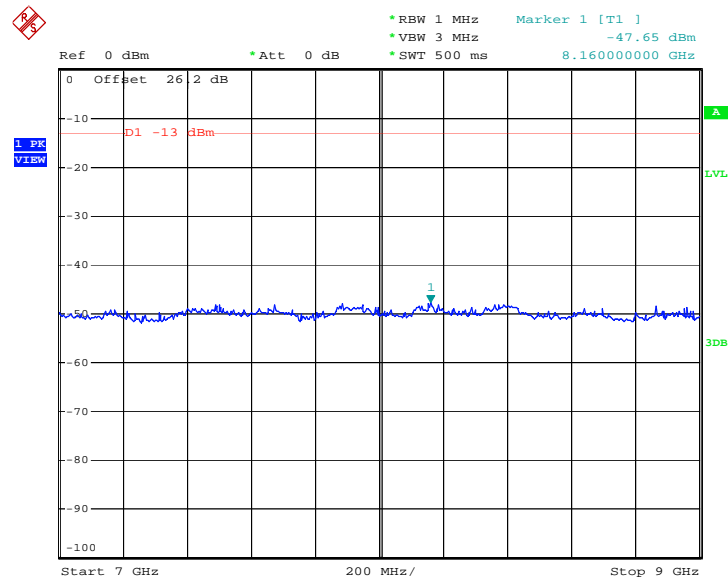
Date: 20.NOV.2012 09:25:40

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


Date: 20.NOV.2012 09:25:58

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


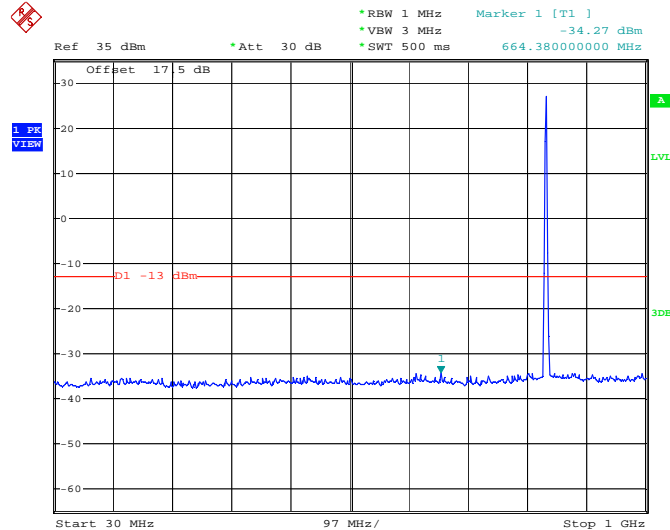
Date: 20.NOV.2012 09:26:10

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


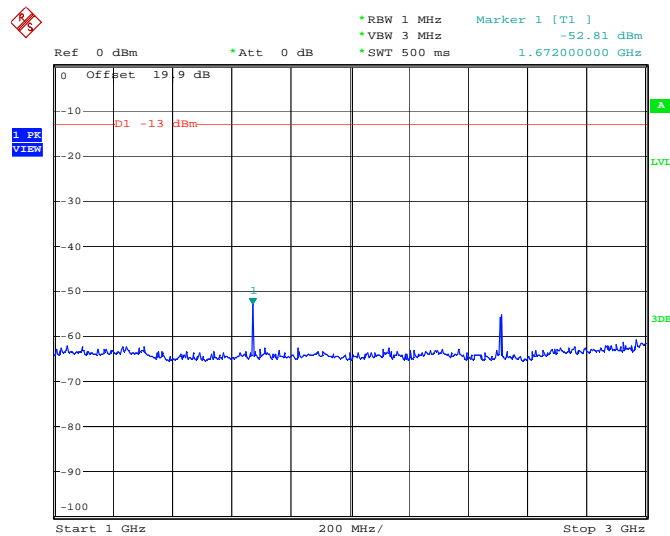
Date: 20.NOV.2012 09:26:23



<b>Band :</b>	GSM850	<b>Channel :</b>	CH189
<b>Test Mode :</b>	EDGE 8 Link	<b>Frequency :</b>	836.4 MHz

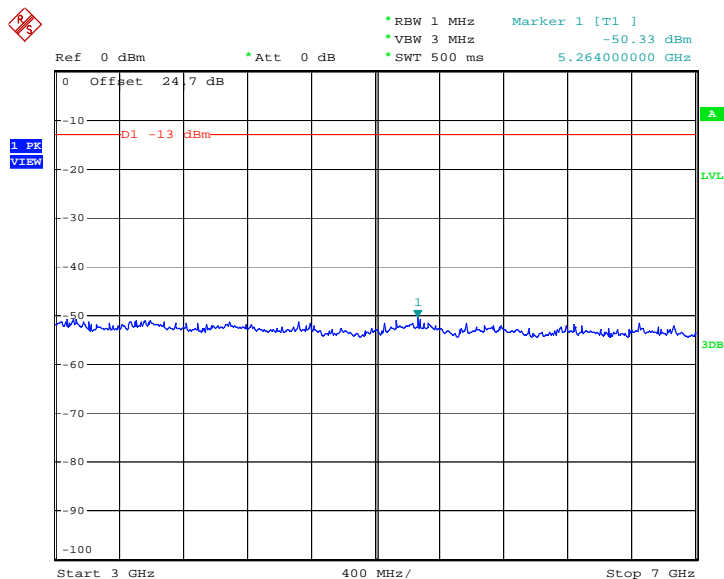
**Conducted Spurious Emission Plot between 30MHz ~ 1GHz**

Date: 20.NOV.2012 10:39:05

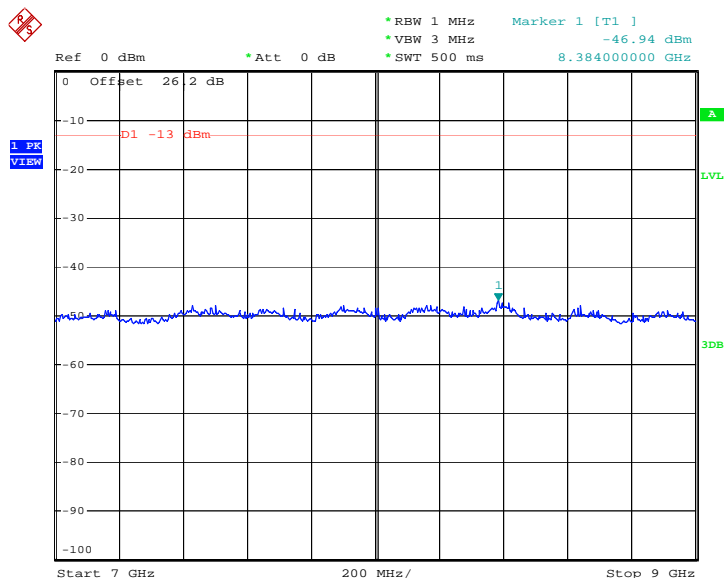
**Conducted Spurious Emission Plot between 1GHz ~ 3GHz**

Date: 20.NOV.2012 10:39:24



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


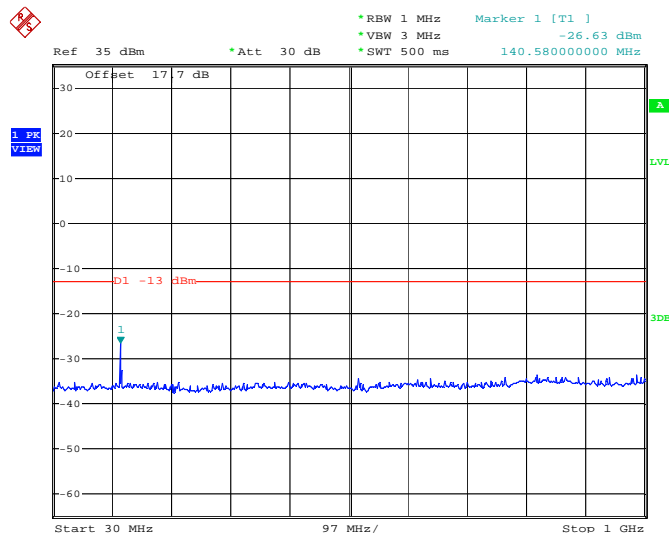
Date: 20.NOV.2012 10:39:37

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


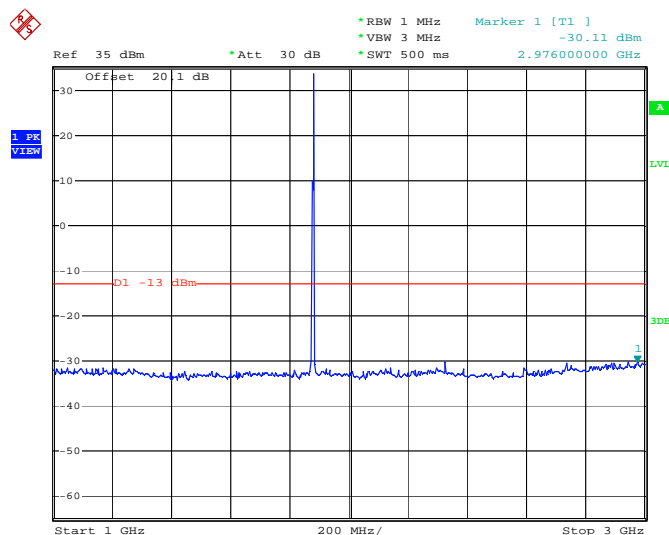
Date: 20.NOV.2012 10:39:49



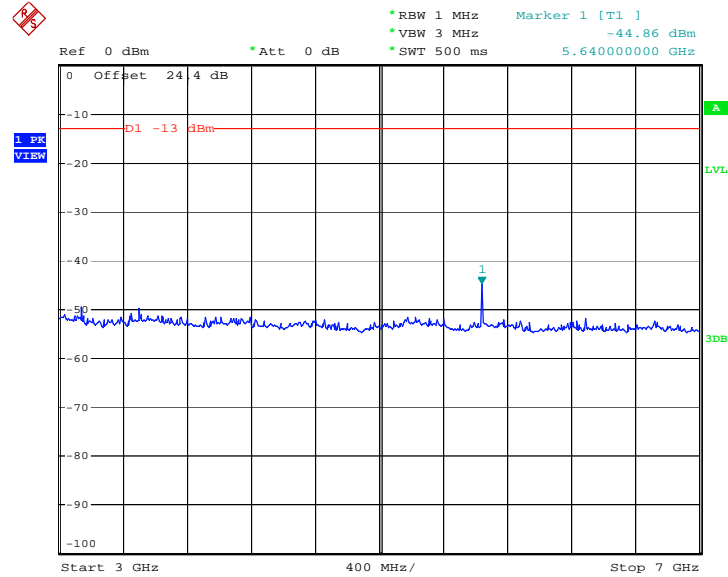
<b>Band :</b>	GSM1900	<b>Channel :</b>	CH661
<b>Test Mode :</b>	GPRS 8 Link	<b>Frequency :</b>	1880.0 MHz

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

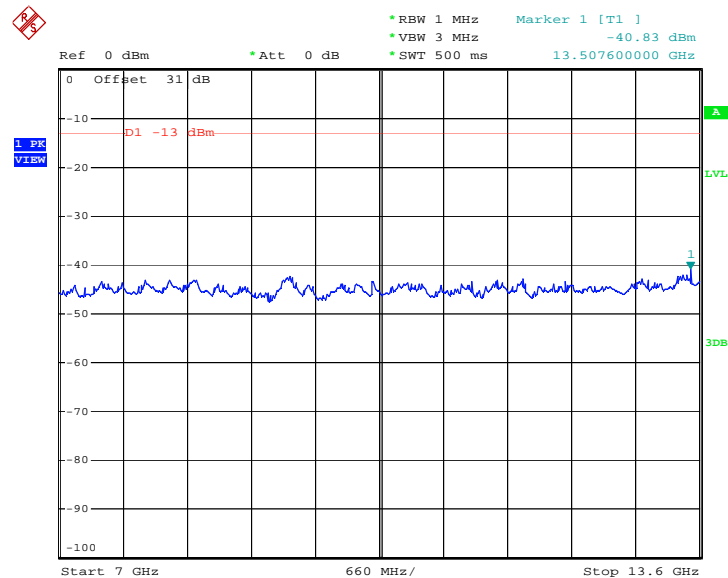
Date: 20.NOV.2012 10:03:39

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

Date: 20.NOV.2012 10:03:52

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


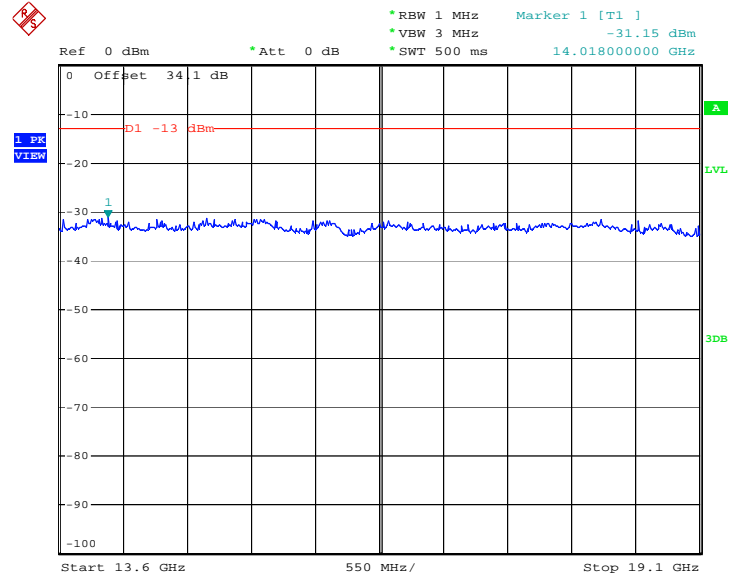
Date: 20.NOV.2012 10:04:09

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


Date: 20.NOV.2012 10:04:22

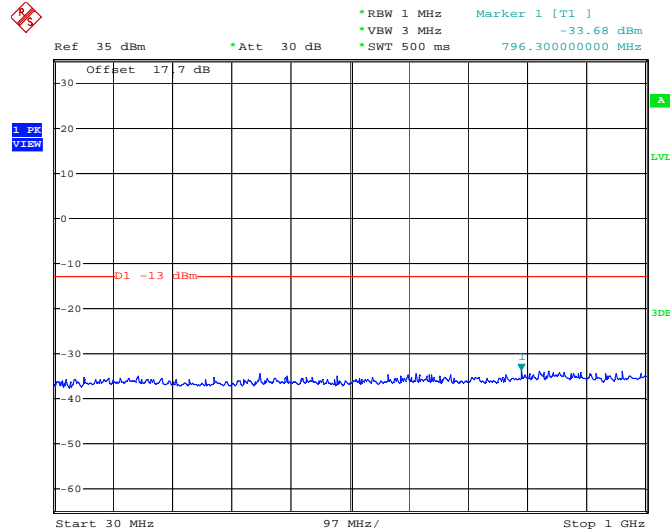


Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

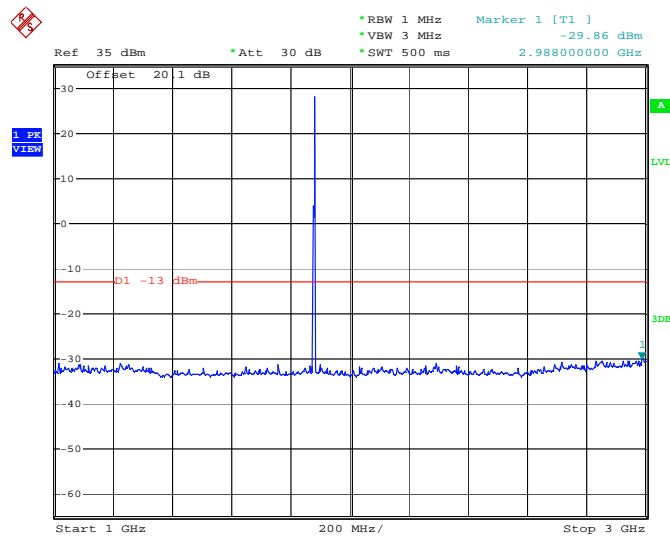


Date: 20.NOV.2012 10:04:34

<b>Band :</b>	GSM1900	<b>Channel :</b>	CH661
<b>Test Mode :</b>	EDGE 8 Link	<b>Frequency :</b>	1880.0 MHz

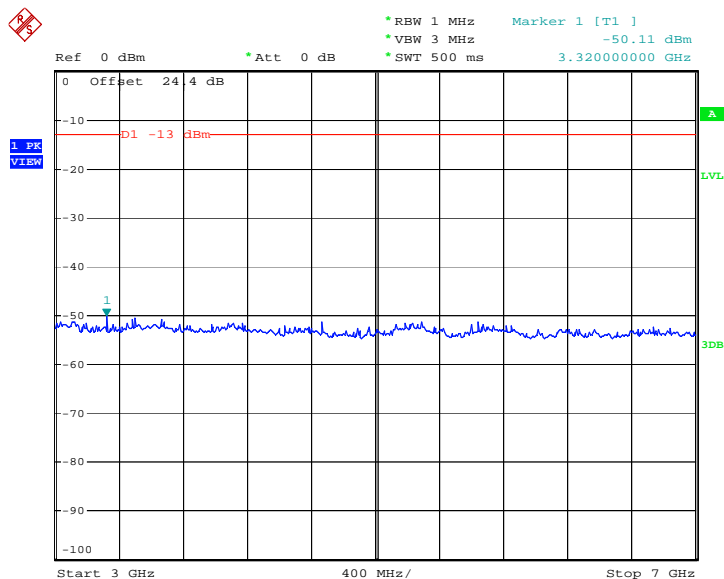
**Conducted Spurious Emission Plot between 30MHz ~ 1GHz**


Date: 20.NOV.2012 12:14:47

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


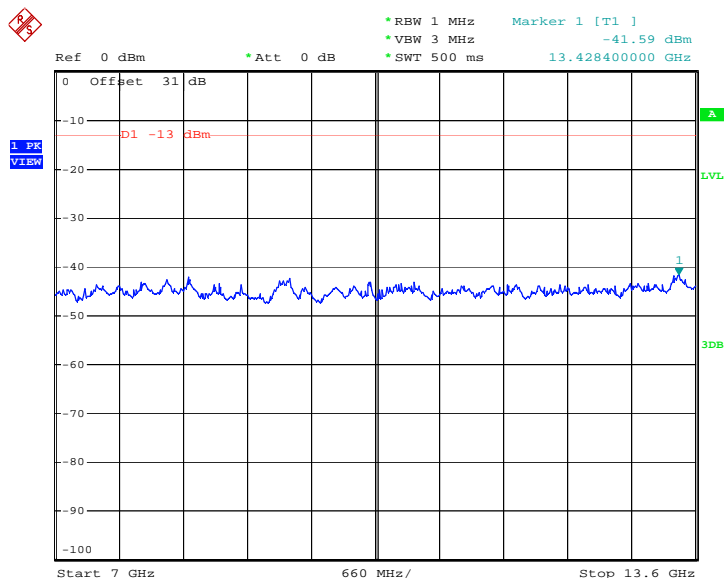
Date: 20.NOV.2012 12:14:59

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



Date: 20.NOV.2012 12:15:16

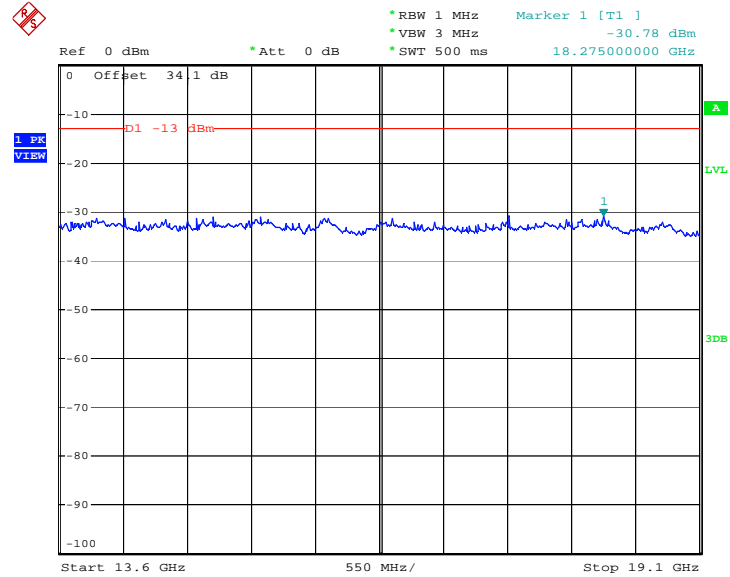
### Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 20.NOV.2012 12:15:29

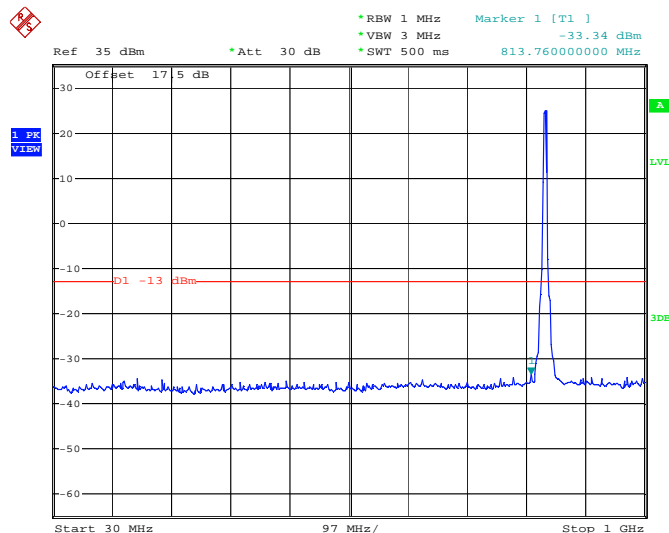


Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

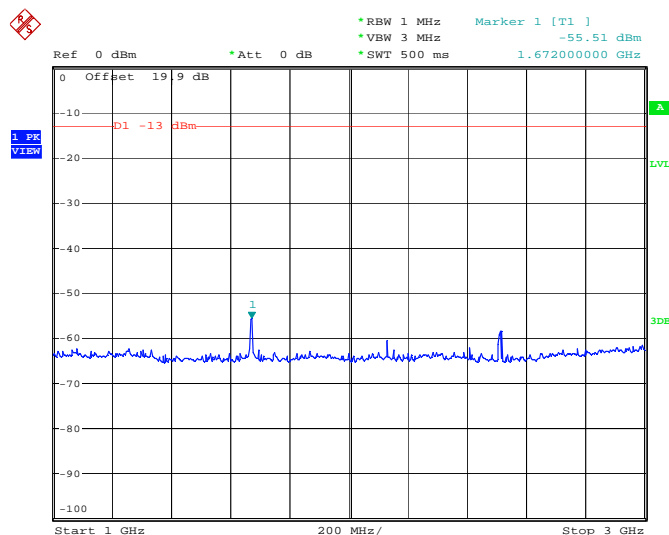


Date: 20.NOV.2012 12:15:41

<b>Band :</b>	WCDMA Band V	<b>Channel :</b>	CH4182
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Frequency :</b>	836.4 MHz

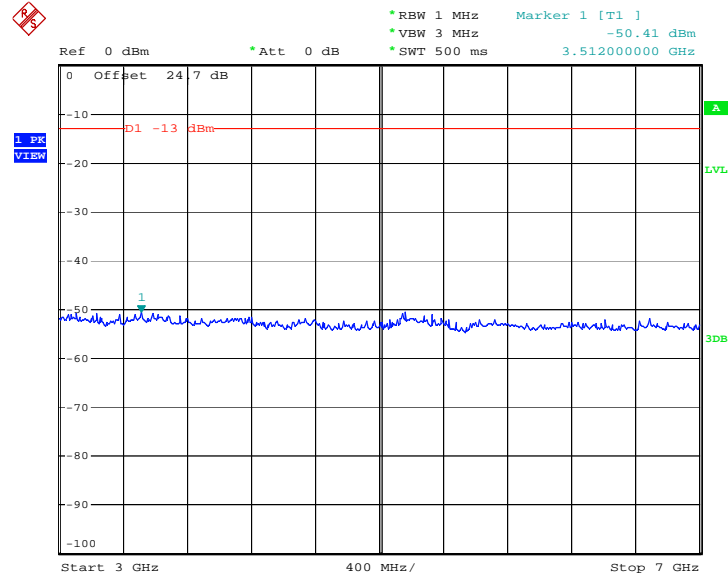
**Conducted Spurious Emission Plot between 30MHz ~ 1GHz**


Date: 20.NOV.2012 13:11:28

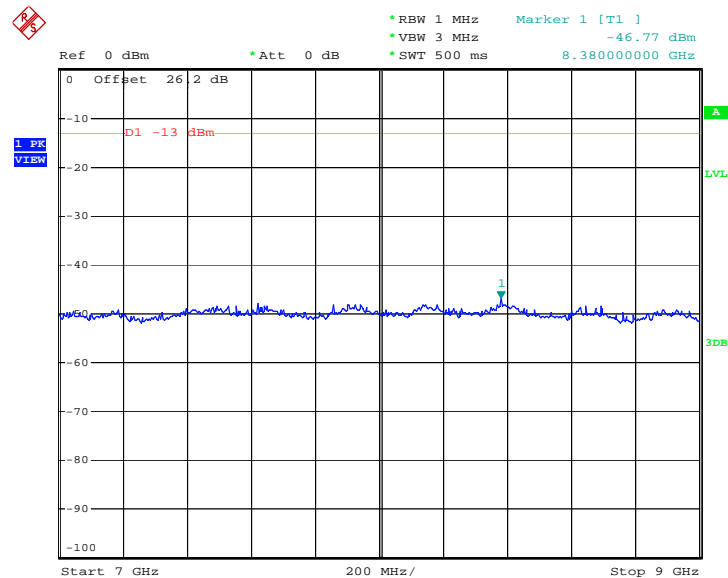
**Conducted Spurious Emission Plot between 1GHz ~ 3GHz**


Date: 20.NOV.2012 13:11:48



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


Date: 20.NOV.2012 13:12:00

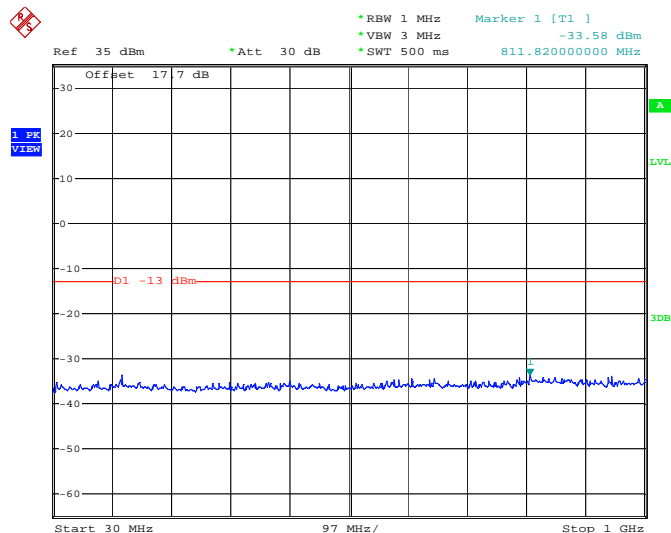
**Conducted Spurious Emission Plot between 7GHz ~ 9GHz**


Date: 20.NOV.2012 13:12:13



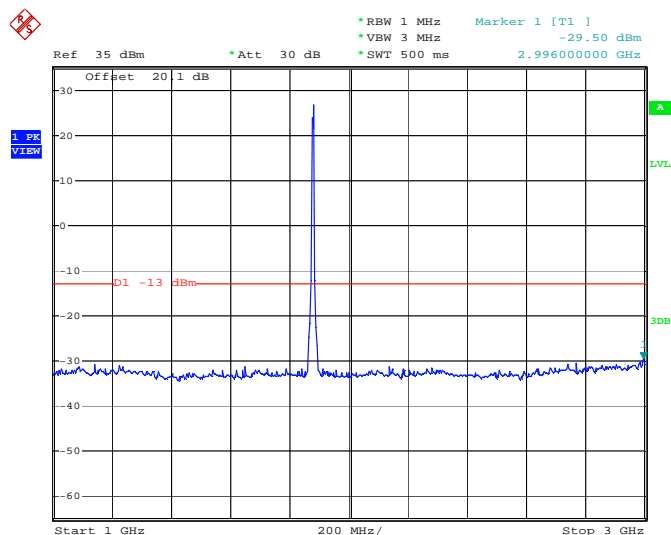
Band :	WCDMA Band II	Channel :	CH9400
Test Mode :	RMC 12.2Kbps Link	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

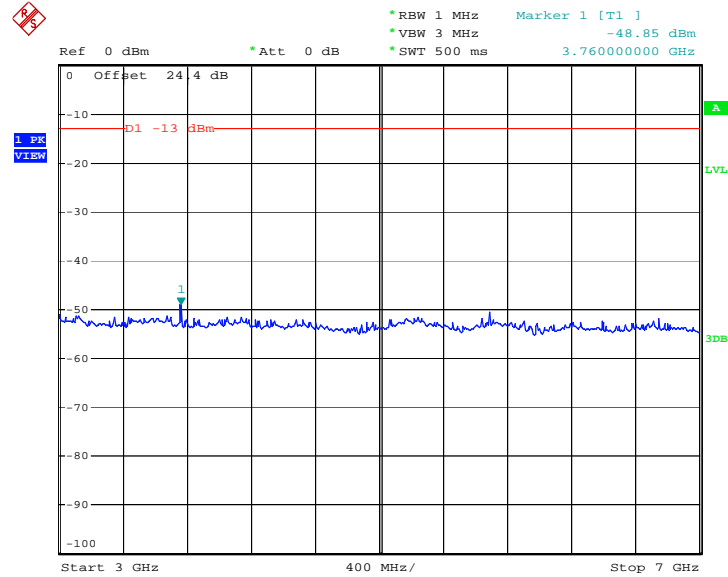


Date: 20.NOV.2012 13:35:12

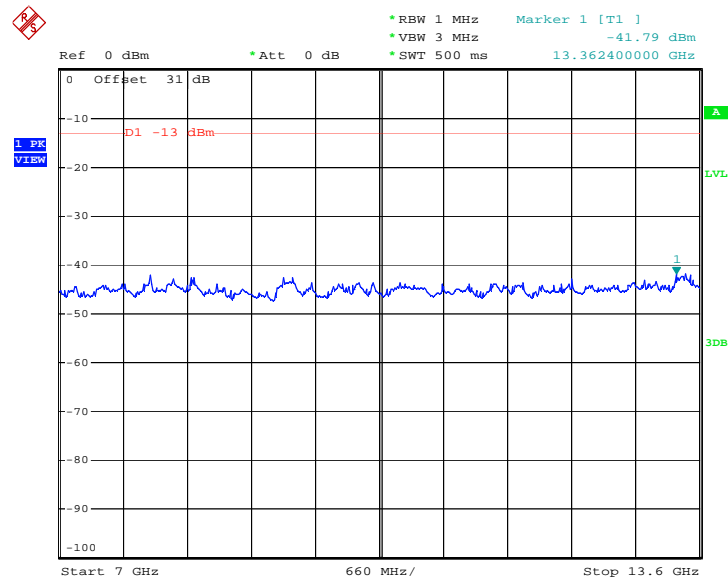
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 20.NOV.2012 13:35:25

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


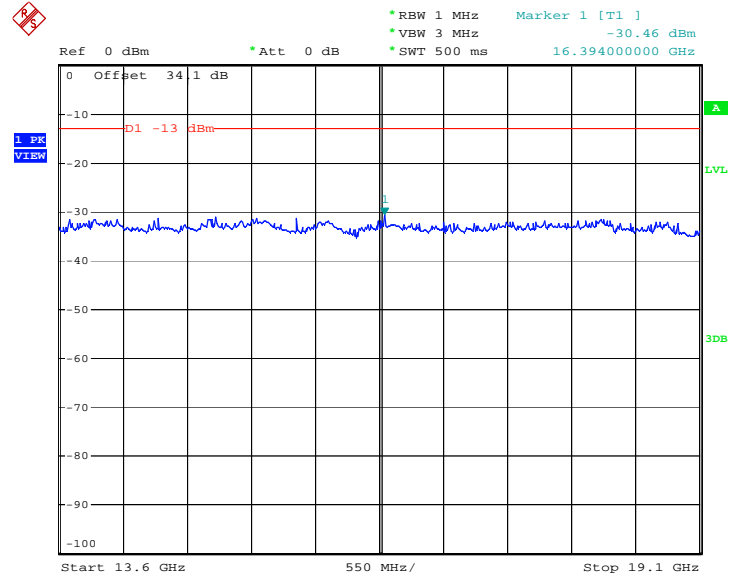
Date: 20.NOV.2012 13:35:42

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


Date: 20.NOV.2012 13:35:55



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 20.NOV.2012 13:36:07

### 3.7 Field Strength of Spurious Radiation Measurement

#### 3.7.1 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.

#### 3.7.2 Measuring Instruments

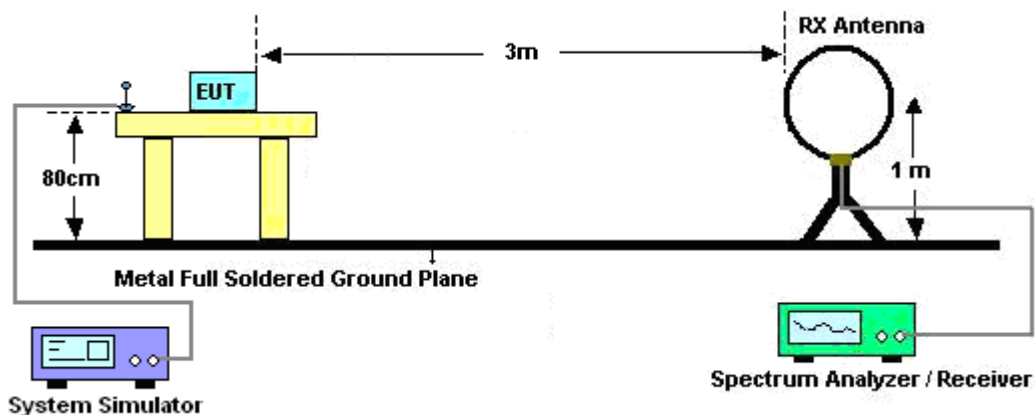
See list of measuring instruments of this test report.

#### 3.7.3 Test Procedures

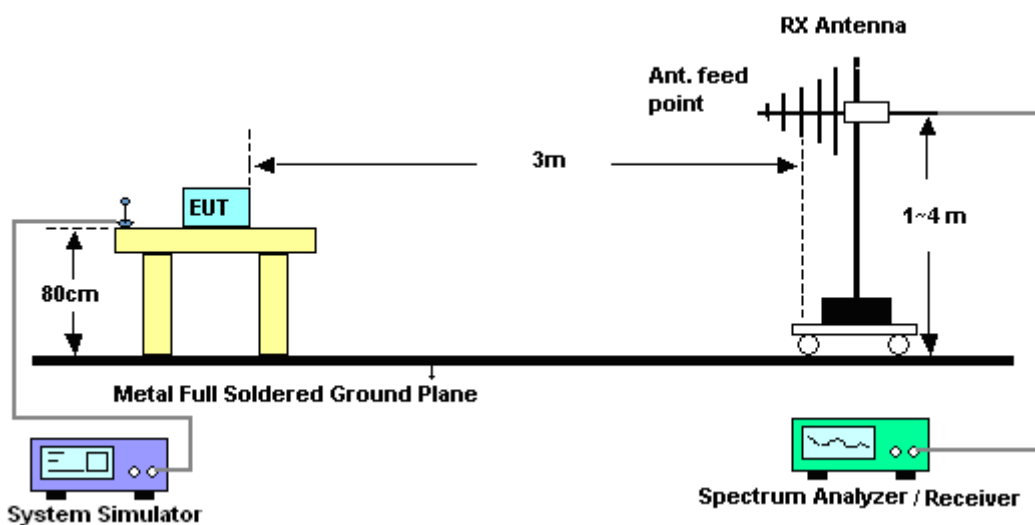
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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.  $ERP \text{ (dBm)} = EIRP - 2.15$

### 3.7.4 Test Setup

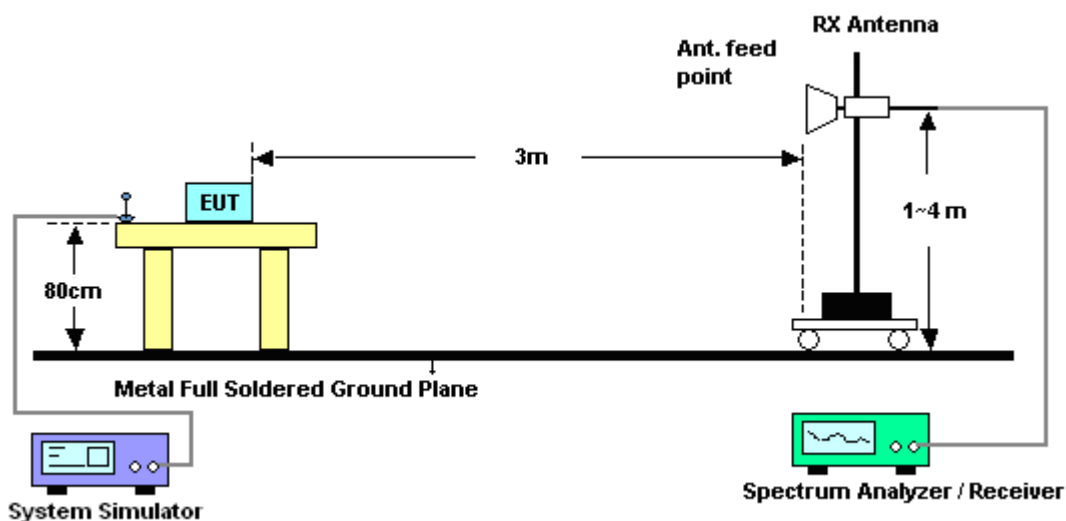
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

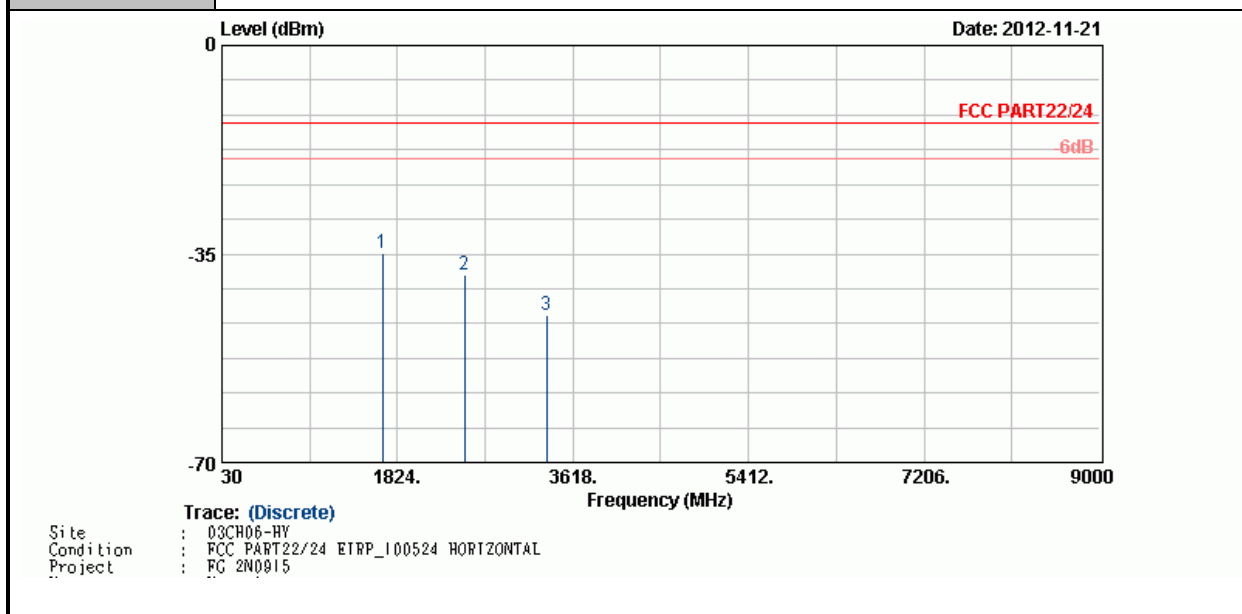


### 3.7.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

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.

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

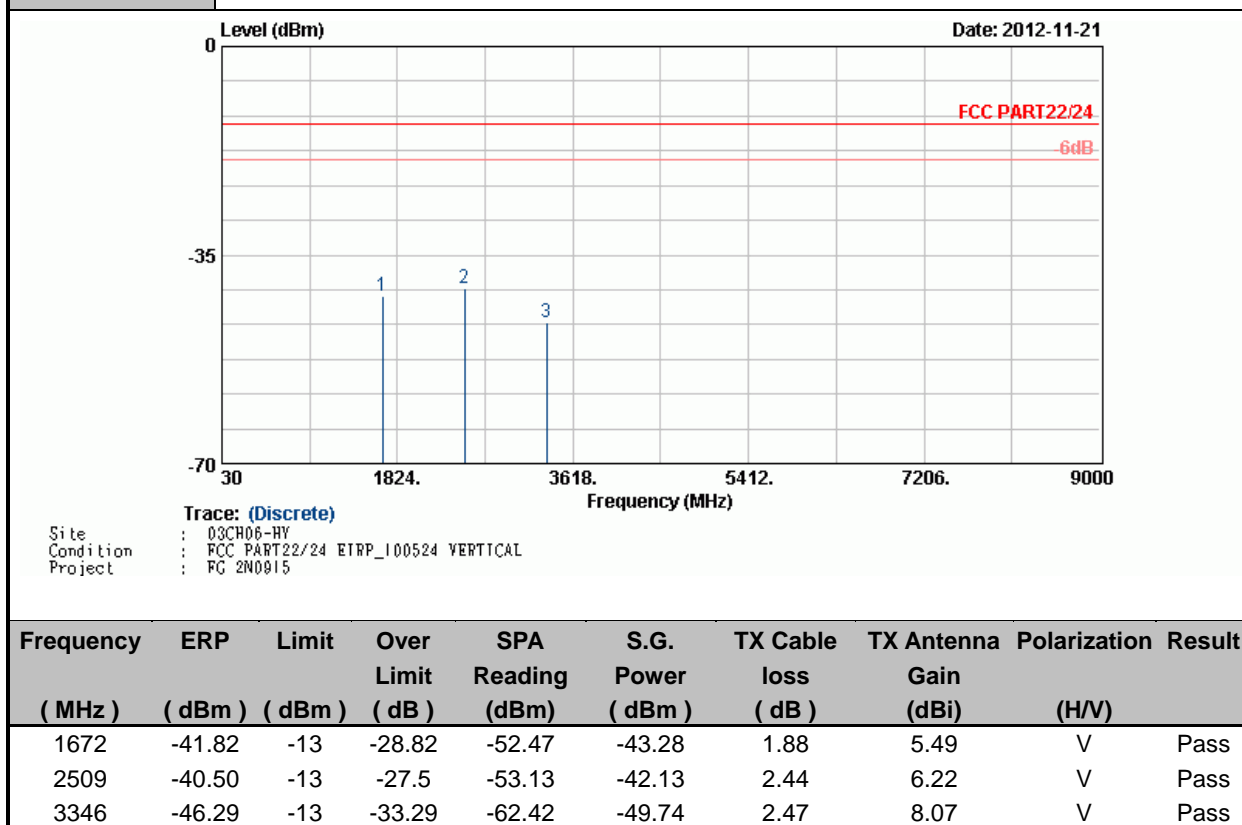
<b>Band :</b>	GSM850	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



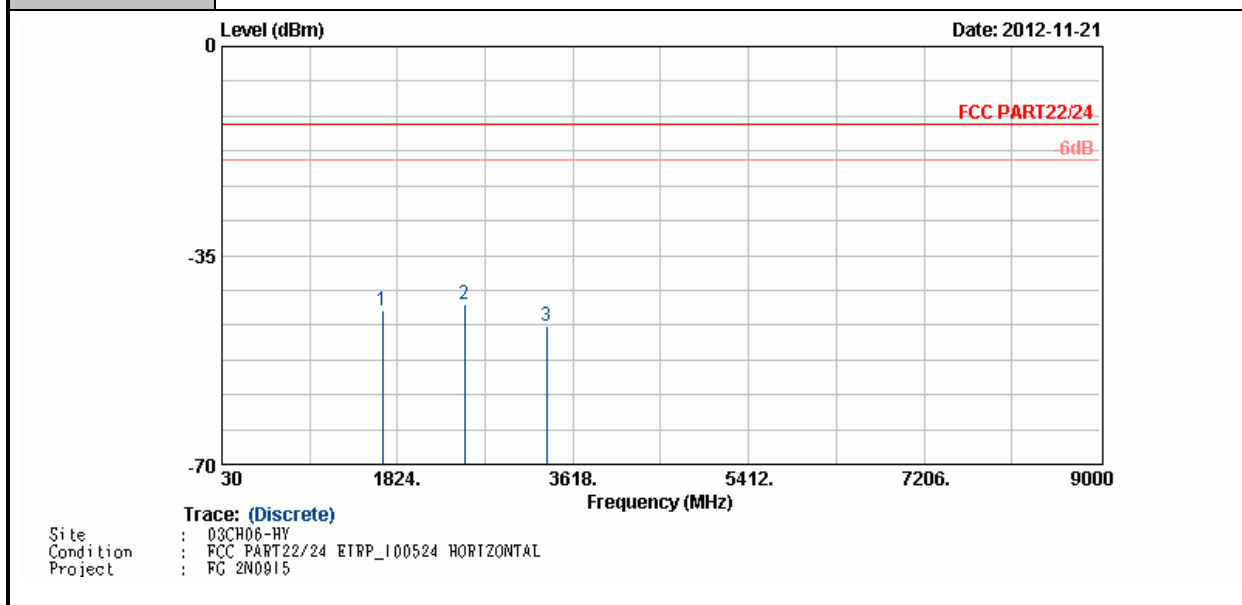
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-34.85	-13	-21.85	-45.56	-36.31	1.88	5.49	H	Pass
2509	-38.42	-13	-25.42	-51.05	-40.05	2.44	6.22	H	Pass
3346	-45.39	-13	-32.39	-61.63	-48.84	2.47	8.07	H	Pass



<b>Band :</b>	GSM850	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



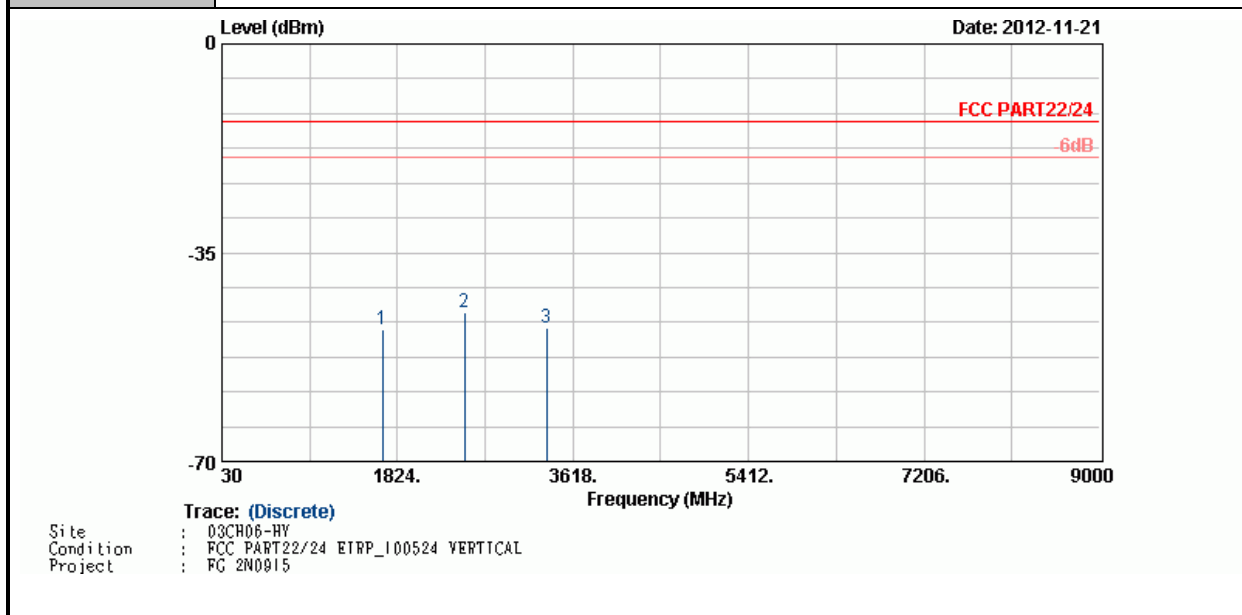
<b>Band :</b>	GSM850	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-44.31	-13	-31.31	-55.07	-45.77	1.88	5.49	H	Pass
2509	-43.21	-13	-30.21	-55.83	-44.84	2.44	6.22	H	Pass
3346	-46.97	-13	-33.97	-62.98	-50.42	2.47	8.07	H	Pass

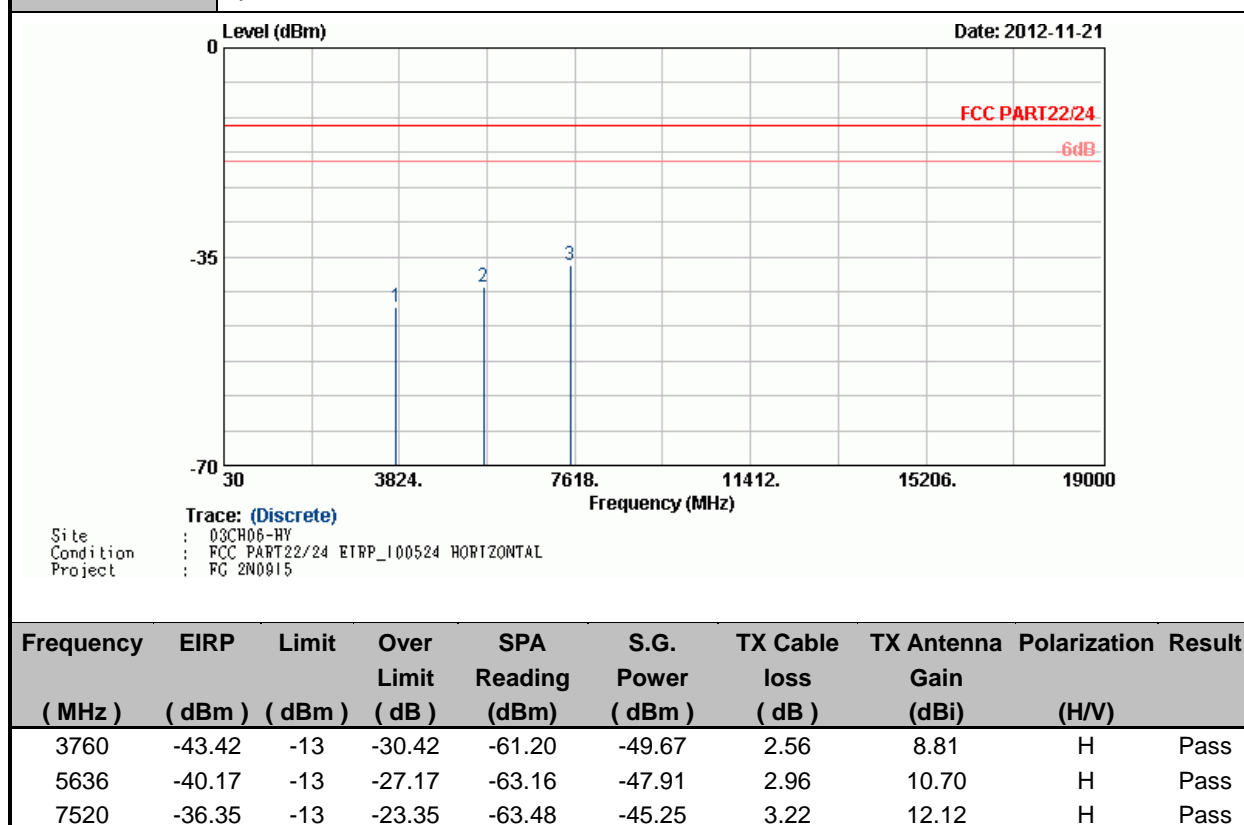


<b>Band :</b>	GSM850	<b>Temperature :</b>	26~27°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

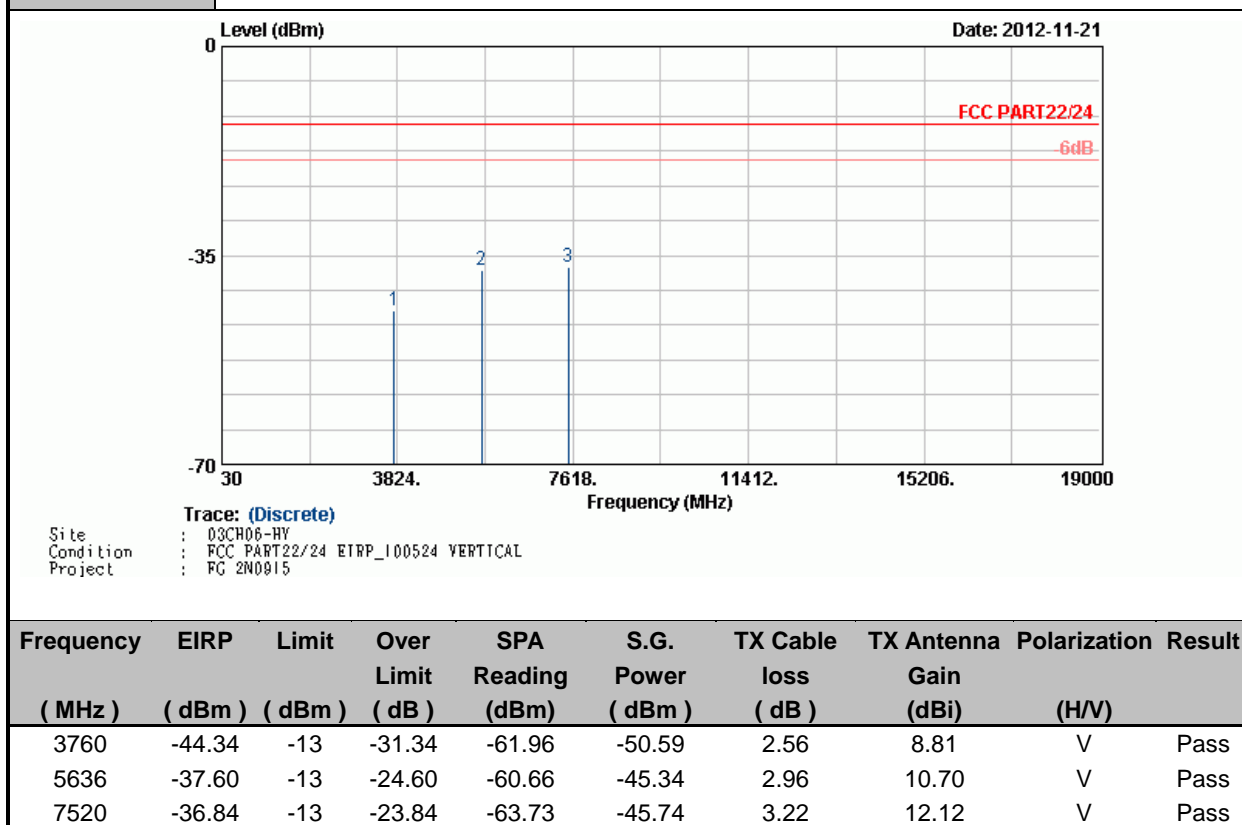


Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-47.79	-13	-34.79	-58.46	-49.25	1.88	5.49	V	Pass
2509	-45.05	-13	-32.05	-57.57	-46.68	2.44	6.22	V	Pass
3346	-47.73	-13	-34.73	-63.88	-51.18	2.47	8.07	V	Pass

<b>Band :</b>	GSM1900	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

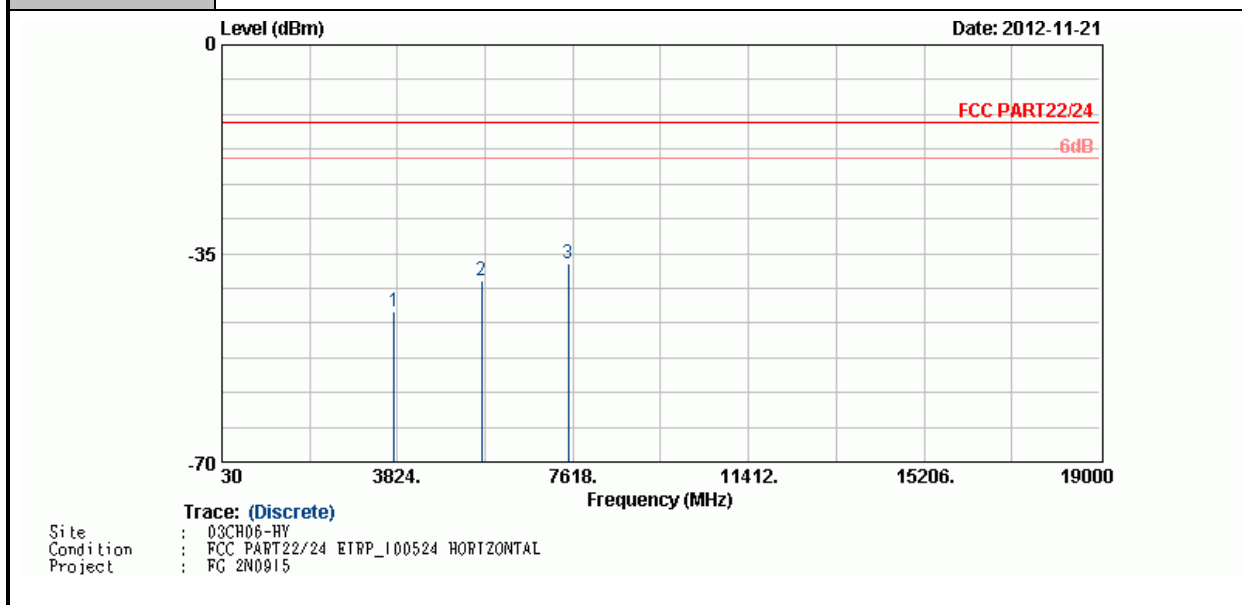


<b>Band :</b>	GSM1900	<b>Temperature :</b>	26~27°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		





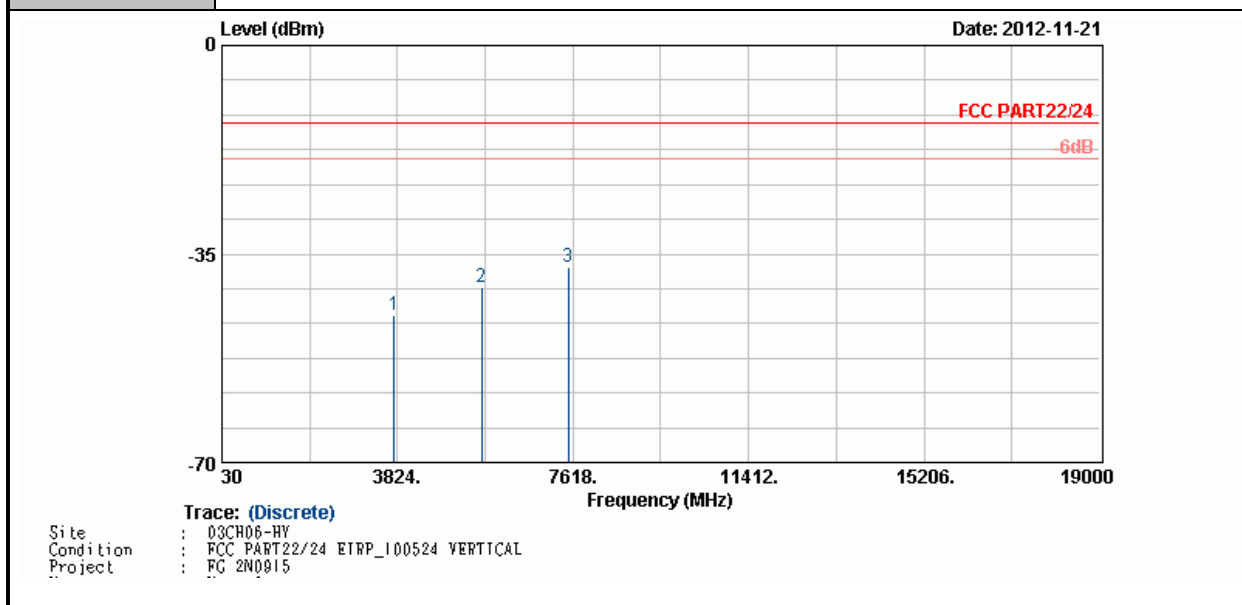
<b>Band :</b>	GSM1900	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-44.71	-13	-31.71	-62.32	-50.96	2.56	8.81	H	Pass
5636	-39.57	-13	-26.57	-62.48	-47.31	2.96	10.70	H	Pass
7520	-36.65	-13	-23.65	-63.63	-45.55	3.22	12.12	H	Pass

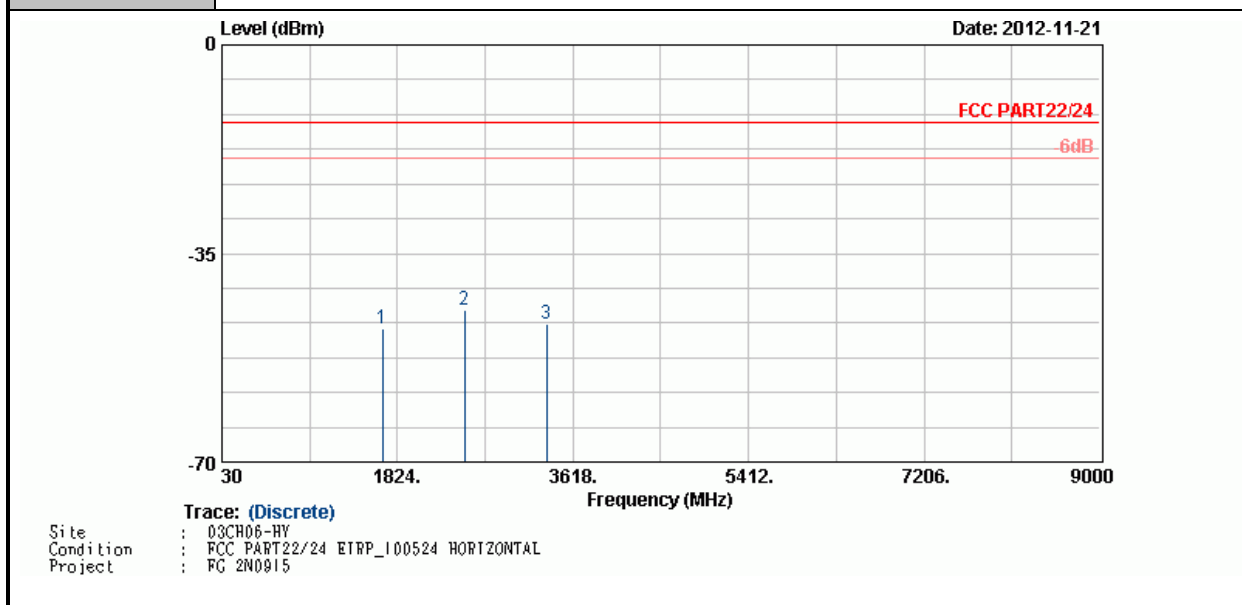


<b>Band :</b>	GSM1900	<b>Temperature :</b>	26~27°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-45.19	-13	-32.19	-62.81	-51.44	2.56	8.81	V	Pass
5636	-40.49	-13	-27.49	-63.57	-48.23	2.96	10.70	V	Pass
7520	-37.15	-13	-24.15	-64.06	-46.05	3.22	12.12	V	Pass

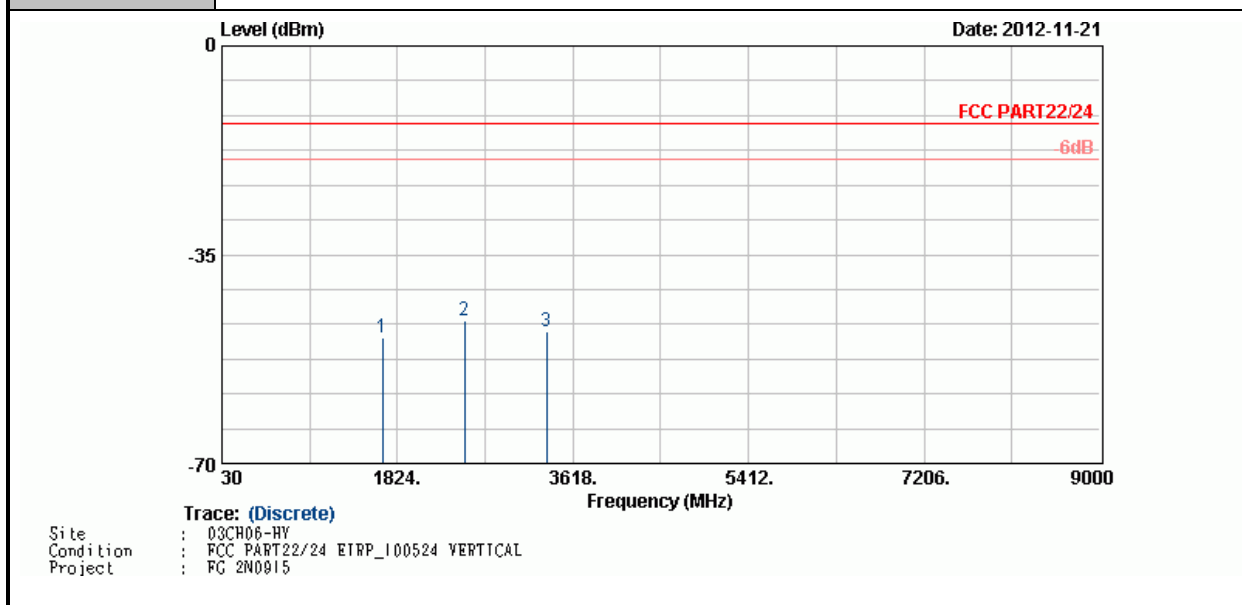
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-47.75	-13	-34.75	-58.34	-49.21	1.88	5.49	H	Pass
2509	-44.62	-13	-31.62	-57.20	-46.25	2.44	6.22	H	Pass
3346	-46.83	-13	-33.83	-62.86	-50.28	2.47	8.07	H	Pass



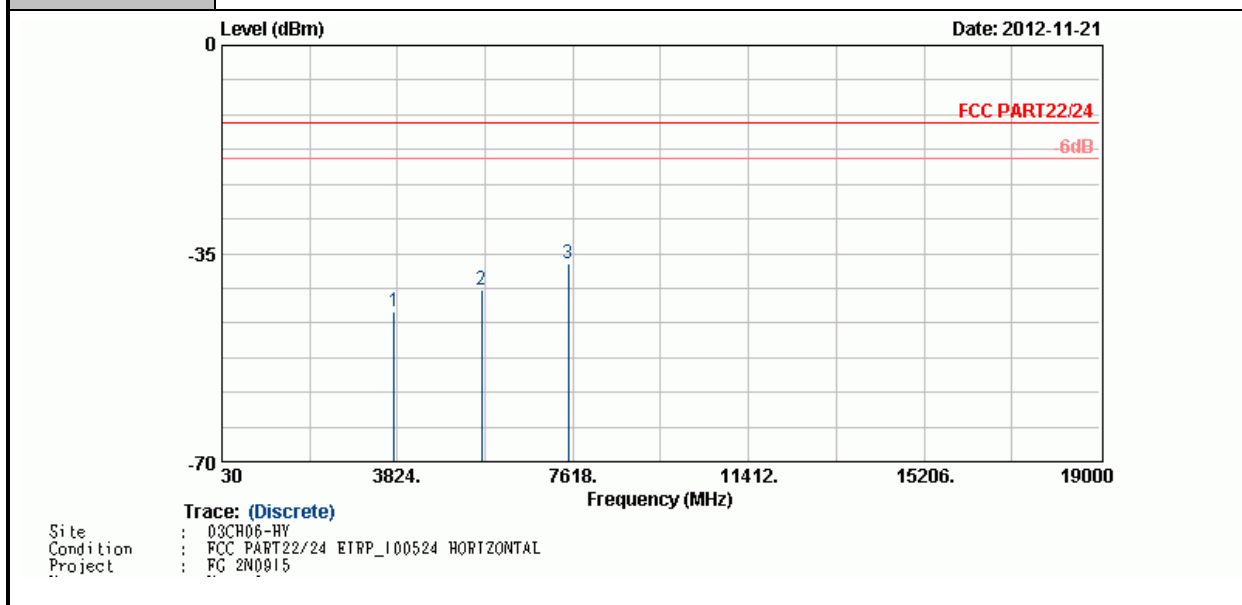
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	26~27°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-48.88	-13	-35.88	-59.40	-50.34	1.88	5.49	V	Pass
2509	-46.13	-13	-33.13	-58.63	-47.76	2.44	6.22	V	Pass
3346	-47.49	-13	-34.49	-63.68	-50.94	2.47	8.07	V	Pass

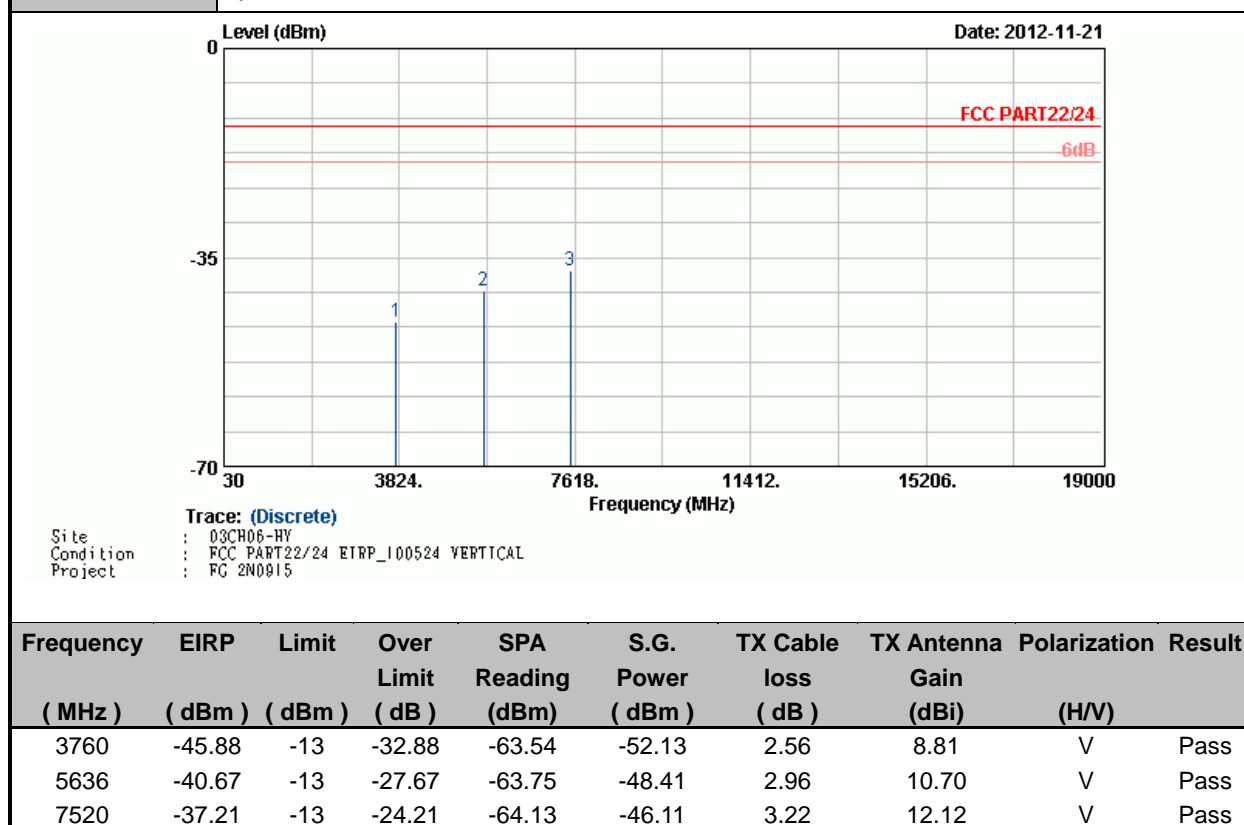


<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-44.79	-13	-31.79	-62.49	-51.04	2.56	8.81	H	Pass
5636	-41.05	-13	-28.05	-63.92	-48.79	2.96	10.70	H	Pass
7520	-36.72	-13	-23.72	-63.84	-45.62	3.22	12.12	H	Pass

<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	26~27℃
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



## **3.8 Frequency Stability Measurement**

### **3.8.1 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.

### **3.8.2 Measuring Instruments**

See list of measuring instruments of this test report.

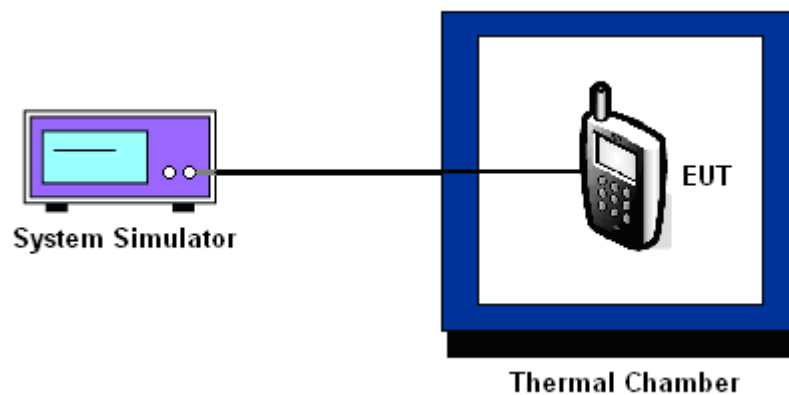
### **3.8.3 Test Procedures for Temperature Variation**

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.

### **3.8.4 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.

### 3.8.5 Test Setup



**3.8.6 Test Result of Temperature Variation**

<b>Band :</b>	GSM 850	<b>Channel :</b>	189
<b>Limit (ppm) :</b>	2.5	<b>Frequency :</b>	836.4 MHz

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	18	0.02	-16	-0.02	PASS
-20	16	0.02	-15	-0.02	
-10	15	0.02	-14	-0.02	
0	15	0.02	-14	-0.02	
10	16	0.02	-11	-0.01	
20	14	0.02	-15	-0.02	
30	12	0.01	-12	-0.01	
40	11	0.01	-10	-0.01	
50	10	0.01	-15	-0.02	

<b>Band :</b>	GSM 1900	<b>Channel :</b>	661
<b>Limit (ppm) :</b>	2.5	<b>Frequency :</b>	1880.0 MHz

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	27	0.01	-25	-0.01	PASS
-20	24	0.01	-22	-0.01	
-10	20	0.01	-21	-0.01	
0	22	0.01	-18	-0.01	
10	18	0.01	-19	-0.01	
20	19	0.01	-18	-0.01	
30	22	0.01	-19	-0.01	
40	23	0.01	-20	-0.01	
50	25	0.01	-24	-0.01	

<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	-10	-0.01	
-10	-11	-0.01	
0	-9	-0.01	
10	-8	-0.01	
20	-8	-0.01	
30	-9	-0.01	
40	-10	-0.01	
50	-11	-0.01	

<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	-23	-0.01	PASS
-20	-18	-0.01	
-10	-17	-0.01	
0	-15	-0.01	
10	-12	-0.01	
20	-14	-0.01	
30	-13	-0.01	
40	-18	-0.01	
50	-20	-0.01	

**3.8.7 Test Result of Voltage Variation**

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GPRS 8	3.8	14	0.02	2.5	PASS
		BEP	13	0.02		
		4.35	15	0.02		
	EDGE 8	3.8	-13	-0.02		
		BEP	-11	-0.01		
		4.35	-12	-0.01		
GSM 1900 CH661	GPRS 8	3.8	19	0.01		
		BEP	21	0.01		
		4.35	23	0.01		
	EDGE 8	3.8	-16	-0.01		
		BEP	-20	-0.01		
		4.35	-14	-0.01		
WCDMA Band V CH4182	RMC 12.2Kbps	3.8	-8	-0.01		
		BEP	-8	-0.01		
		4.35	-9	-0.01		
WCDMA Band II CH9400	RMC 12.2Kbps	3.8	-16	-0.01		
		BEP	-14	-0.01		
		4.35	-13	-0.01		

**Note:**

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.5 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	Nov. 20, 2012 ~ Nov. 22, 2012	Jul. 29, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Nov. 20, 2012 ~ Nov. 22, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 23, 2012	Nov. 20, 2012 ~ Nov. 22, 2012	Jul. 22, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz~30GHz	Nov. 07, 2012	Nov. 21, 2012	Nov. 06, 2013	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1000MHz	May 04, 2012	Nov. 21, 2012	May. 03, 2013	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz ~ 2GHz	Oct. 06, 2012	Nov. 21, 2012	Oct. 05, 2013	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 01, 2012	Nov. 21, 2012	Jul. 31, 2013	Radiation (03CH06-HY)
Double Ridge Horn Antenna	COM-POWER	AH-118	071025	1GHz~18GHz	Aug. 09, 2012	Nov. 21, 2012	Aug. 08, 2013	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz ~ 40GHz	Sep. 28, 2012	Nov. 21, 2012	Sep. 27, 2013	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 13, 2012	Nov. 21, 2012	Apr. 12, 2013	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz ~ 1GHz	Apr. 11, 2012	Nov. 21, 2012	Apr. 10, 2013	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 21, 2012	Nov. 21, 2012	Jul. 20, 2013	Radiation (03CH06-HY)
Pre Amplifier	MITEQ	AMF-7D-00 101800-30-1	159087	1GHz~18GHz	Feb. 27, 2012	Nov. 21, 2012	Feb. 26, 2013	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 03, 2012	Nov. 21, 2012	Jul. 02, 2014	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	Nov. 21, 2012	Jul. 27, 2013	Radiation (03CH06-HY)

## 5 Uncertainty of Evaluation

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

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

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

Please refer to Sporton report number EP2N0915 as below.