

# FCC RF Test Report

APPLICANT : NetComm Wireless Limited  
EQUIPMENT : HSPA+ M2M WiFi Router  
BRAND NAME : NetComm Wireless Limited  
MODEL NAME : NTC-40WV  
FCC ID : XIA-NTC40WV  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)  
Tx/Rx FREQUENCY RANGE : GSM850 : 824.2 ~ 848.8 MHz /  
869.2 ~ 893.8 MHz  
GSM1900 : 1850.2 ~ 1909.8 MHz /  
1930.2 ~ 1989.8 MHz  
WCDMA Band V : 826.4 ~ 846.6 MHz /  
871.4 ~ 891.6 MHz  
WCDMA Band II : 1852.4 ~ 1907.6 MHz /  
1932.4 ~ 1987.6 MHz  
MAX. ERP/EIRP POWER : GSM850 (GPRS 8) : 1.371 W  
GSM850 (EDGE 8) : 0.479 W  
GSM1900 (GPRS 8) : 1.143 W  
GSM1900 (EDGE 8) : 1.023 W  
WCDMA Band V (RMC 12.2Kbps) : 0.149 W  
WCDMA Band II (RMC 12.2Kbps) : 0.315 W

The product was received on May 07, 2012 and completely tested on Jun. 19, 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.

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
FG250708	Rev. 01	Initial issue of report	Sep. 06, 2012
FG250708	Rev. 02	Update report of revising HW Version	Sep. 27, 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 31.17 dB at 7520.000 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

**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 & Specification	
<b>Equipment</b>	HSPA+ M2M WiFi Router
<b>Brand Name</b>	NetComm Wireless Limited
<b>Model Name</b>	NTC-40WV
<b>FCC ID</b>	XIA-NTC40WV
<b>Integrated Module</b>	Brand Name : SIERRA Model Name : MC8704 FCC ID : N7NMC8705
<b>Tx Frequency</b>	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
<b>Rx Frequency</b>	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
<b>Maximum Output Power to Antenna</b>	GSM850 : 31.24 dBm GSM1900 : 28.95 dBm WCDMA Band V : 22.82 dBm WCDMA Band II : 22.85 dBm
<b>Antenna Type</b>	Fixed External Antenna
<b>HW Version</b>	V1.3
<b>SW Version</b>	1.9.81.0
<b>Type of Modulation</b>	GSM: GMSK GPRS: GMSK EDGE: 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)
<b>EUT Stage</b>	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.

## 1.4 Emission Designator and Maximum ERP/EIRP Power

FCC Rule	System	Type of Modulation	Emission Designator	Maximum ERP/EIRP
Part 22	GSM850 GPRS 8	GMSK	250KGXW	1.371 W
Part 22	GSM850 EDGE 8	8PSK	246KG7W	0.479 W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	4M22F9W	0.149 W
Part 24	GSM1900 GPRS 8	GMSK	248KGXW	1.143 W
Part 24	GSM1900 EDGE 8	8PSK	250KG7W	1.023 W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	4M22F9W	0.315 W

## 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)
- ♦ 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.

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 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>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 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.

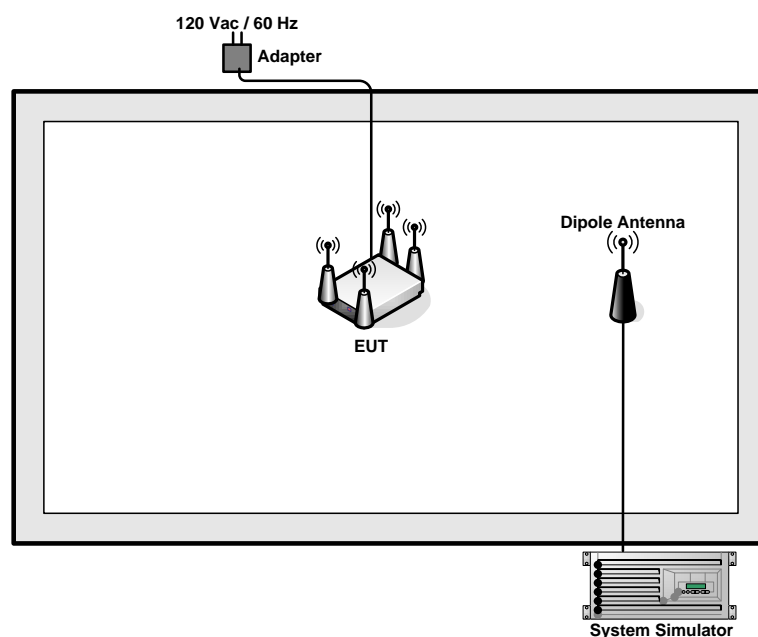
The conducted power tables are as follows:

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
<b>GPRS 8</b>	31.18	<b>31.24</b>	31.21	<b>28.95</b>	28.83	28.56
<b>GPRS 10</b>	31.14	31.19	31.18	28.93	28.81	28.54
<b>GPRS 12</b>	25.71	25.73	25.69	24.94	24.80	24.52
<b>EGPRS 8</b>	26.70	<b>26.73</b>	26.67	<b>25.93</b>	25.79	25.51
<b>EGPRS 10</b>	26.21	26.23	26.18	25.43	25.30	25.02
<b>EGPRS 12</b>	24.93	24.96	24.91	24.91	24.78	24.50



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	22.80	22.82	22.80	22.82	22.85	22.80
HSDPA Subtest-1	22.70	22.73	22.78	22.80	22.63	22.66
HSDPA Subtest-2	22.67	22.63	22.68	22.76	22.50	22.46
HSDPA Subtest-3	22.45	22.37	22.44	22.58	22.33	22.25
HSDPA Subtest-4	22.41	22.34	22.41	22.64	22.31	22.29
HSUPA Subtest-1	22.61	22.20	22.31	22.56	22.42	22.30
HSUPA Subtest-2	21.25	21.17	20.96	21.27	21.08	21.16
HSUPA Subtest-3	21.91	21.78	21.82	21.70	21.61	21.69
HSUPA Subtest-4	21.35	21.18	20.93	21.28	21.14	21.20
HSUPA Subtest-5	22.55	22.62	22.62	22.63	22.42	22.51

## 2.2 Connection Diagram of Test System



### 3 Test Result

#### 3.1 Conducted Output Power Measurement

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

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

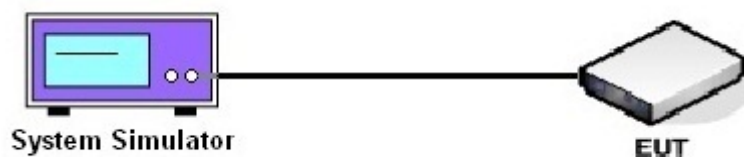
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

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

##### 3.1.4 Test Setup



### 3.1.5 Test Result of Conducted Output Power

Cellular Band									
Modes	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)	31.18	31.24	31.21	26.70	26.73	26.67	22.80	22.82	22.80
Conducted Power (Watts)	1.31	1.33	1.32	0.47	0.47	0.46	0.19	0.19	0.19

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)	28.95	28.83	28.56	25.93	25.79	25.51	22.82	22.85	22.80
Conducted Power (Watts)	0.79	0.76	0.72	0.39	0.38	0.36	0.19	0.19	0.19

**Note:** Bust average for GSM/GPRS and average for WCDMA.

## 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. The following guidelines are offered for performing a CCDF measurement.

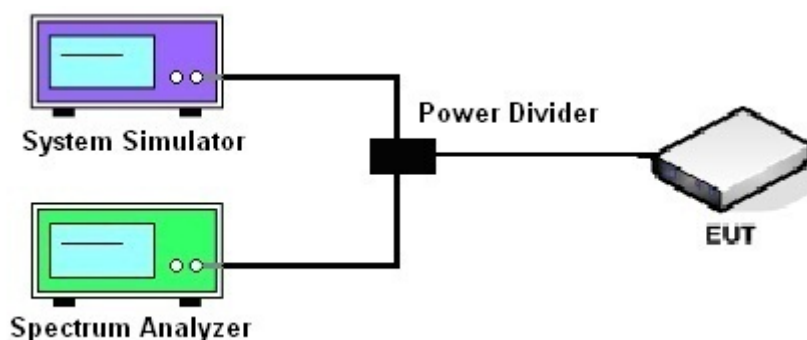
### 3.2.2 Measuring Instruments

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 CCDF (Complementary Cumulative Distribution Function) of the middle channel for the highest RF powers were measured.

### 3.2.4 Test Setup



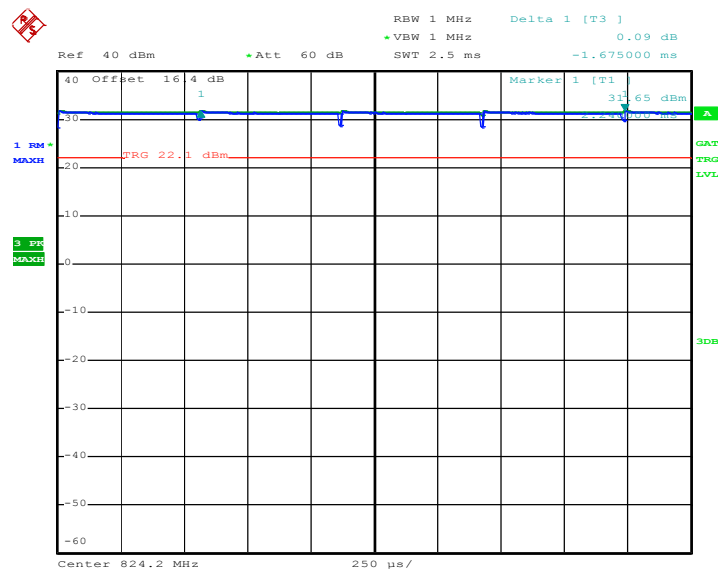
### 3.2.5 Test Result of Peak-to-Average Ratio

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
Peak-to-Average Ratio (dB)	0.09	0.08	0.09	0.18	0.07	0.10	3.08	3.16	3.16

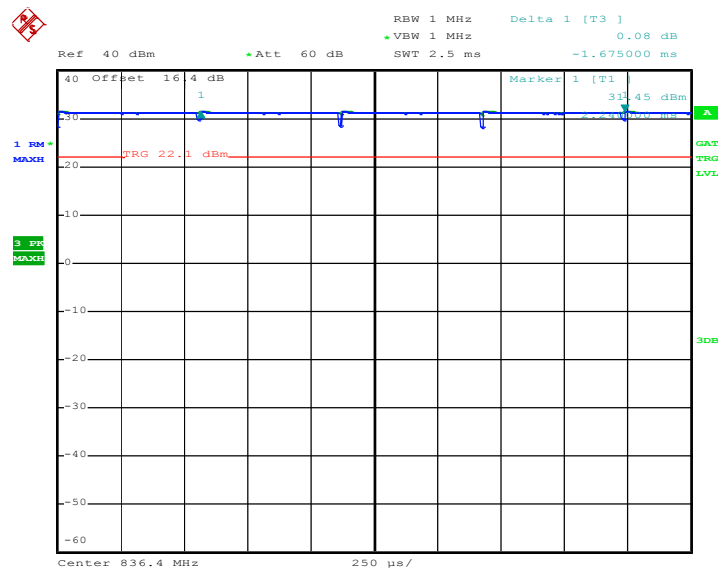
PCS Band									
Modes	GSM1900 (GPRS 8)			GSM1900 (EDGE 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Peak-to-Average Ratio (dB)	0.12	0.14	0.15	0.08	0.04	0.07	3.24	3.32	3.44

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

<b>Band :</b>	GSM 850	<b>Test Mode :</b>	GPRS 8 Link
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**Peak-to-Average Ratio on Channel 128**


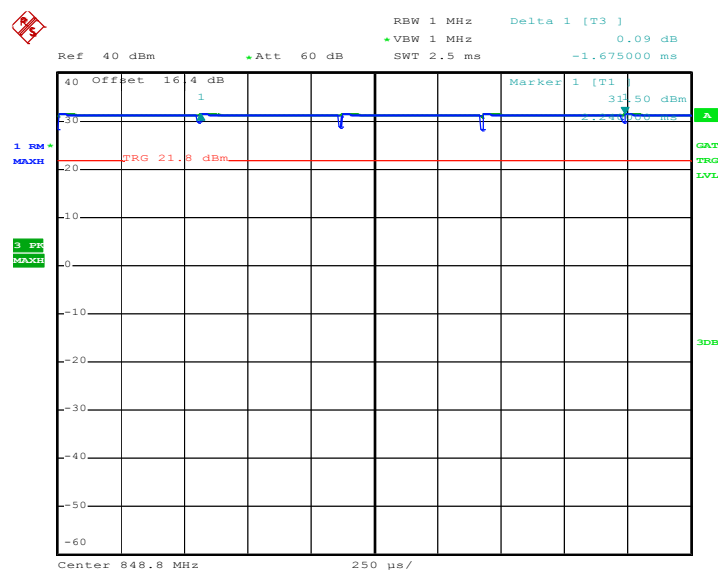
Date: 17.MAY.2012 18:18:45

**Peak-to-Average Ratio on Channel 189**


Date: 17.MAY.2012 18:17:00



Peak-to-Average Ratio on Channel 251

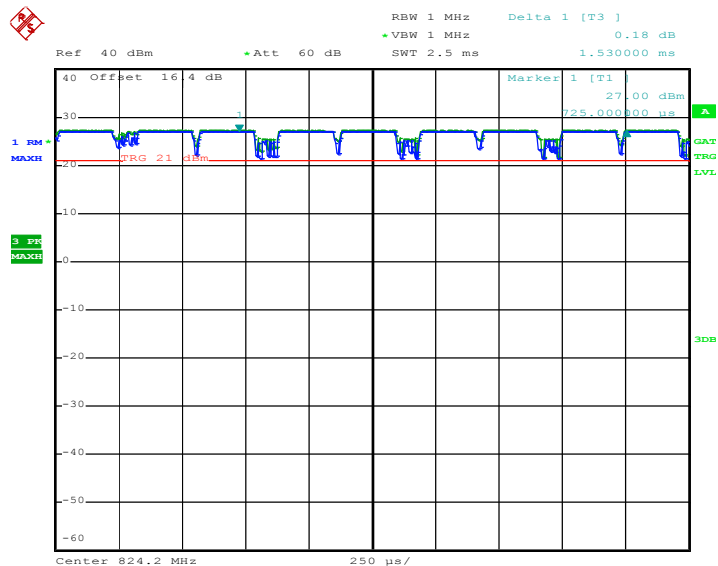


Date: 17.MAY.2012 18:16:09



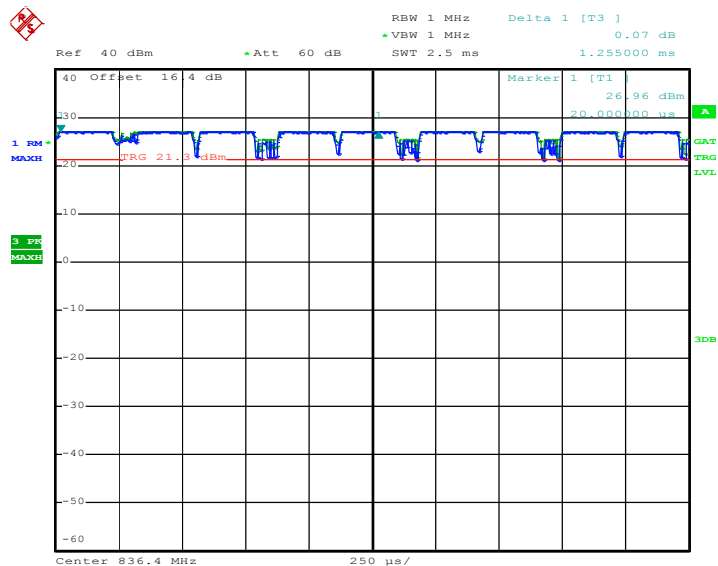
Band :	GSM 850	Test Mode :	EDGE 8 Link
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Peak-to-Average Ratio on Channel 128



Date: 17.MAY.2012 18:40:57

Peak-to-Average Ratio on Channel 189

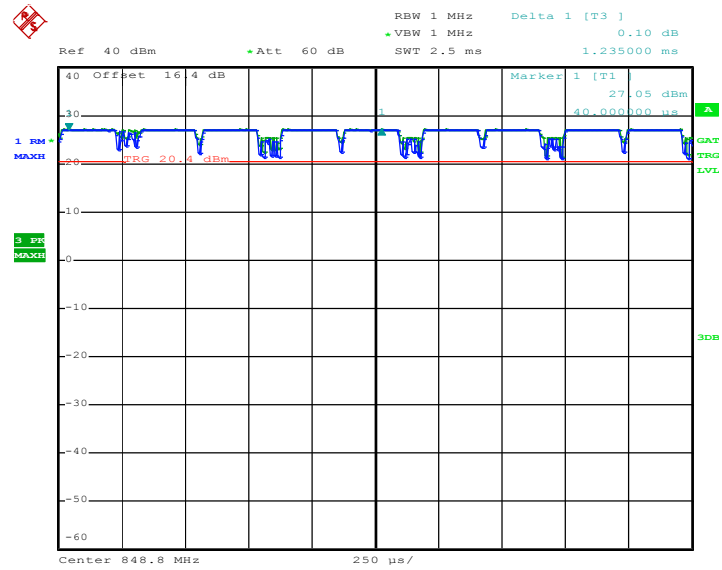


Date: 17.MAY.2012 18:43:02





Peak-to-Average Ratio on Channel 251

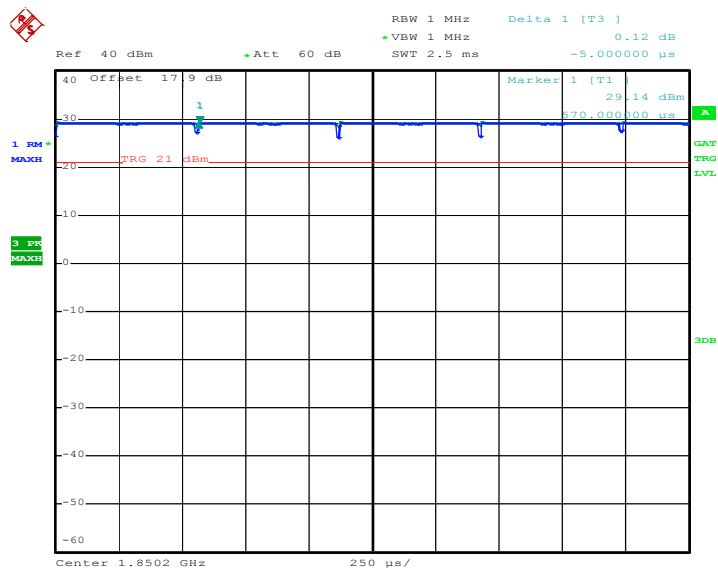


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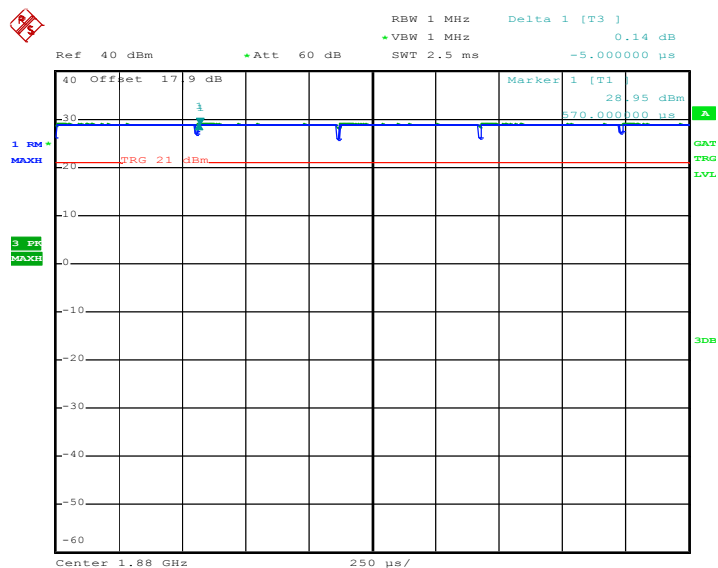
Band :	GSM 1900	Test Mode :	GPRS 8 Link
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Peak-to-Average Ratio on Channel 512



Date: 17.MAY.2012 20:08:11

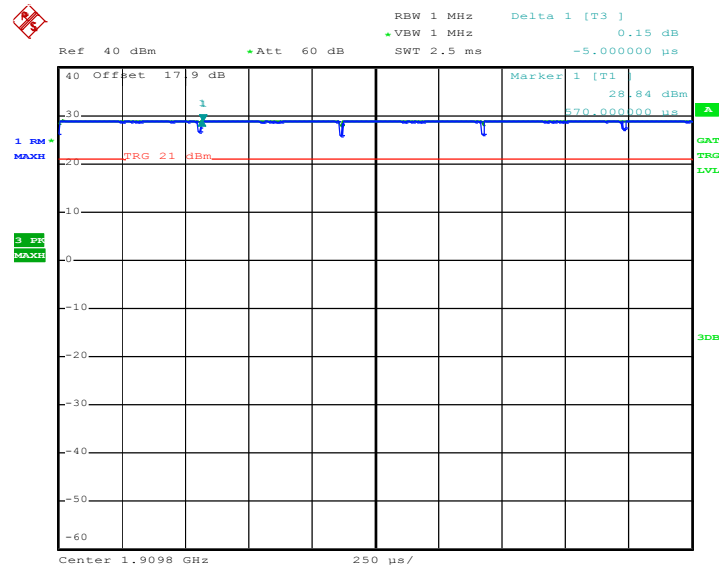
Peak-to-Average Ratio on Channel 661



Date: 17.MAY.2012 20:08:38



Peak-to-Average Ratio on Channel 810

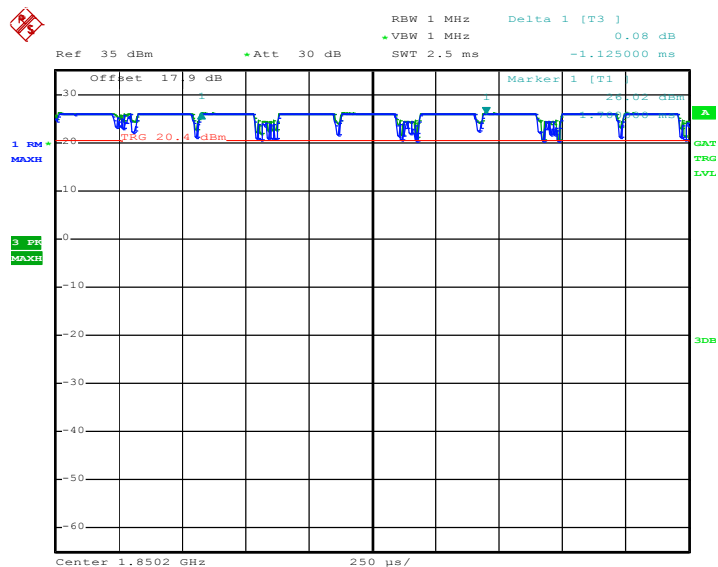


Date: 17.MAY.2012 20:09:11



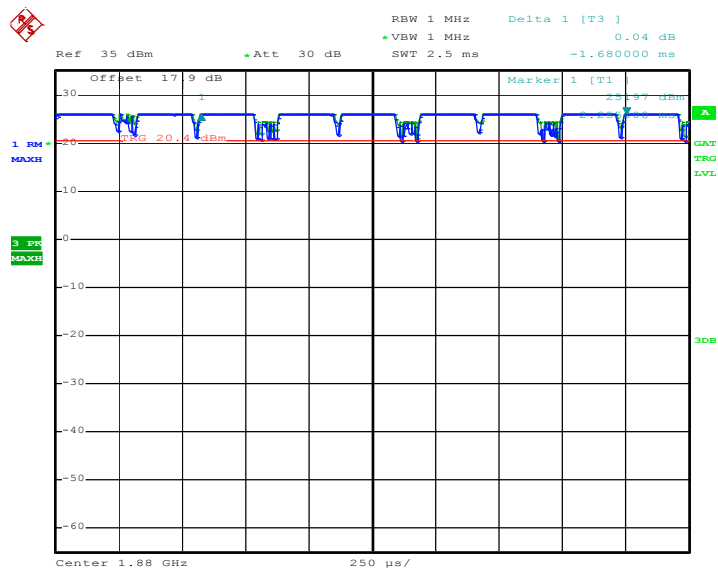
Band :	GSM 1900	Test Mode :	EDGE 8 Link
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Peak-to-Average Ratio on Channel 512



Date: 17.MAY.2012 20:33:24

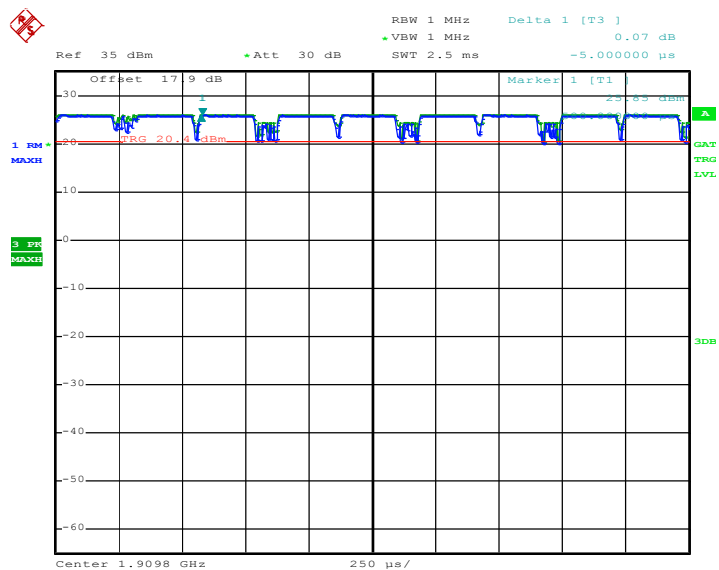
Peak-to-Average Ratio on Channel 661



Date: 17.MAY.2012 20:32:59



Peak-to-Average Ratio on Channel 810

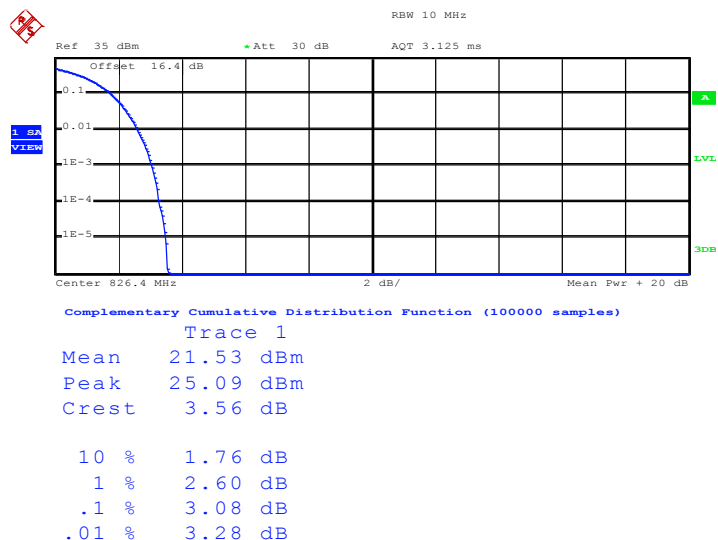


Date: 17.MAY.2012 20:32:32



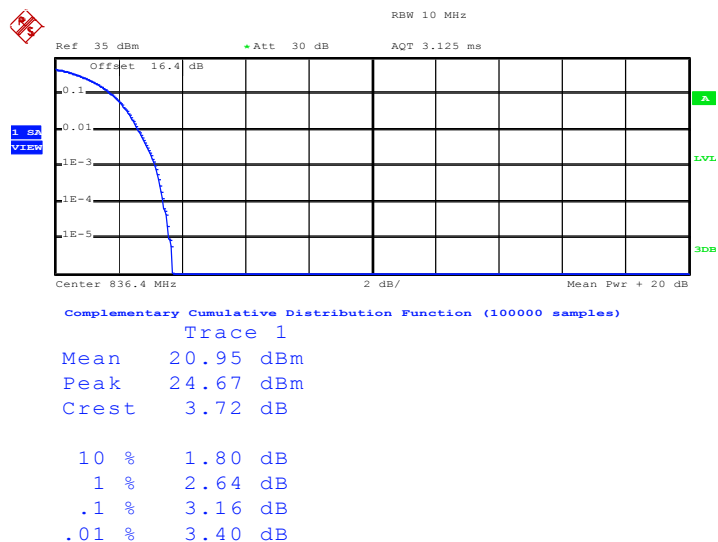
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link
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Peak-to-Average Ratio on Channel 4132



Date: 17.MAY.2012 19:36:00

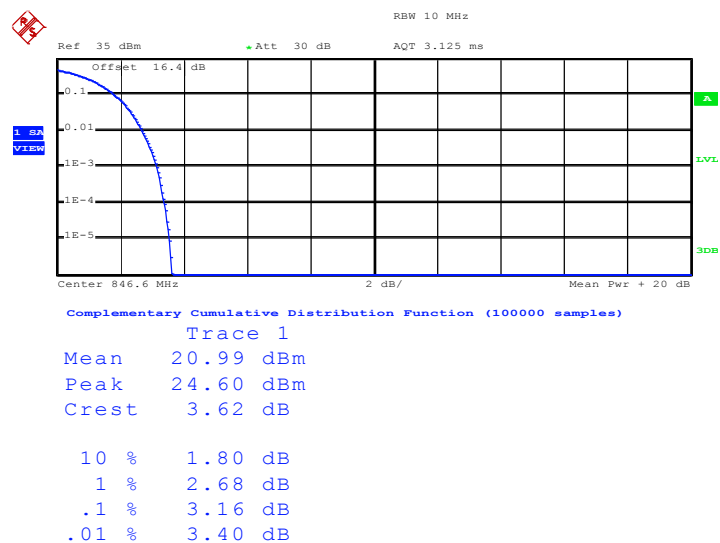
Peak-to-Average Ratio on Channel 4182



Date: 17.MAY.2012 19:35:21



Peak-to-Average Ratio on Channel 4233

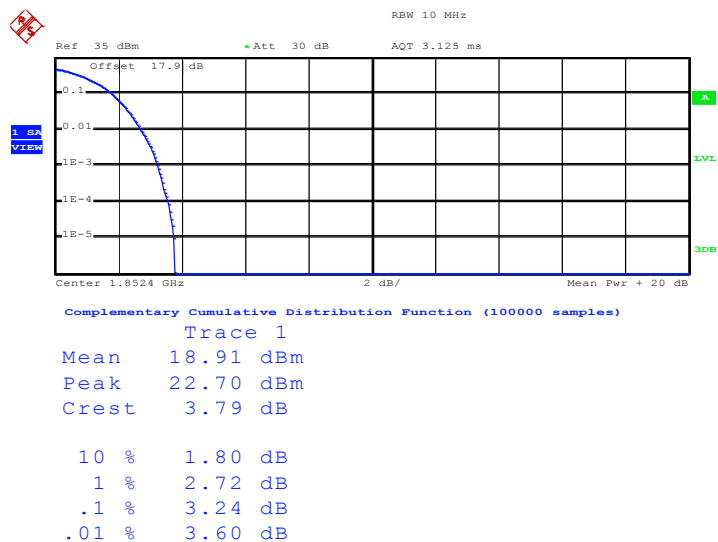


Date: 17.MAY.2012 19:34:50



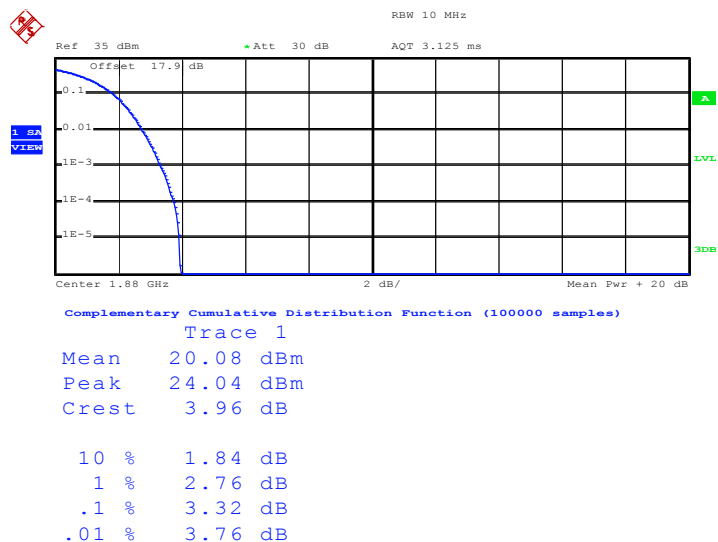
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link
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Peak-to-Average Ratio on Channel 9262



Date: 17.MAY.2012 20:39:26

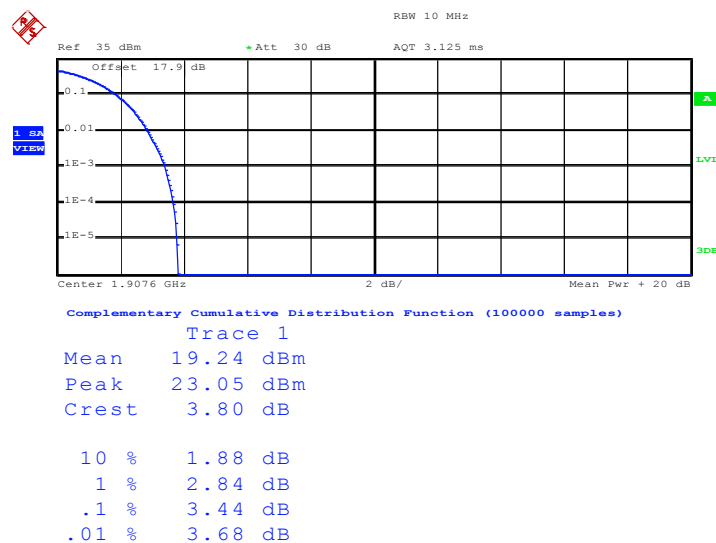
Peak-to-Average Ratio on Channel 9400



Date: 17.MAY.2012 19:54:42



### Peak-to-Average Ratio on Channel 9538



Date: 17.MAY.2012 19:54:13

### **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.

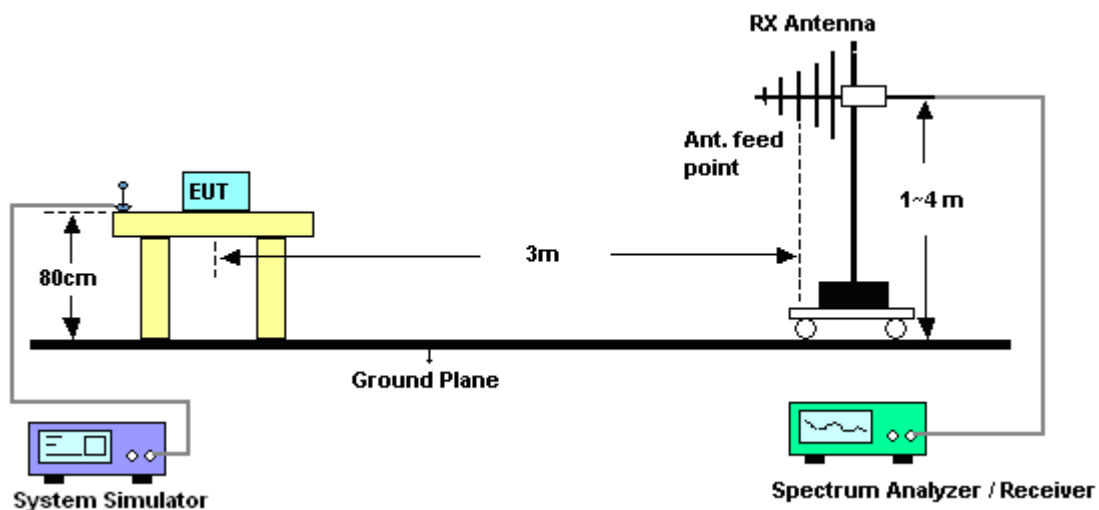
#### **3.3.2 Measuring Instruments**

See list of measuring instruments of this test report.

#### **3.3.3 Test Procedures**

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 1MHz, VBW= 3MHz for GSM, RBW= 300KHz, VBW= 1MHz for WCDMA, and RMS detector settings per section 4.0 of KDB 971168 D01.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ .

### 3.3.4 Test Setup



### 3.3.5 Test Result of ERP

<b>GSM850 (GPRS 8) Radiated Power ERP</b>				
Horizontal Polarization				
<b>Frequency (MHz)</b>	<b>LVL (dBm)</b>	<b>Correction Factor (dB)</b>	<b>ERP (dBm)</b>	<b>ERP (W)</b>
824.2	-2.48	30.99	26.36	0.433
836.4	-2.00	30.89	26.74	0.472
848.8	-2.44	31.22	26.63	0.460
Vertical Polarization				
<b>Frequency (MHz)</b>	<b>LVL (dBm)</b>	<b>Correction Factor (dB)</b>	<b>ERP (dBm)</b>	<b>ERP (W)</b>
824.2	-1.52	34.67	31.00	1.259
836.4	-1.36	34.88	31.37	1.371
848.8	-1.73	34.74	30.86	1.219

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

<b>GSM850 (EDGE 8) Radiated Power ERP</b>				
Horizontal Polarization				
<b>Frequency (MHz)</b>	<b>LVL (dBm)</b>	<b>Correction Factor (dB)</b>	<b>ERP (dBm)</b>	<b>ERP (W)</b>
824.2	-7.69	30.99	21.15	0.130
836.4	-7.51	30.89	21.23	0.133
848.8	-7.95	31.22	21.12	0.129
Vertical Polarization				
<b>Frequency (MHz)</b>	<b>LVL (dBm)</b>	<b>Correction Factor (dB)</b>	<b>ERP (dBm)</b>	<b>ERP (W)</b>
824.2	-5.93	34.67	26.59	0.456
836.4	-5.93	34.88	26.80	0.479
848.8	-6.01	34.74	26.58	0.455

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

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-11.94	30.74	16.65	0.046
836.40	-12.58	30.89	16.16	0.041
846.60	-13.07	31.29	16.07	0.040
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-11.05	34.94	21.74	0.149
836.40	-11.07	34.88	21.66	0.147
846.60	-12.03	34.67	20.49	0.112

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

### 3.3.6 Test Result of EIRP

GSM1900 (GPRS 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-15.20	40.70	25.50	0.355
1880.0	-15.16	41.91	26.75	0.473
1909.8	-16.16	41.73	25.57	0.361
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-12.57	42.78	30.21	1.050
1880.0	-13.17	43.75	30.58	1.143
1909.8	-13.00	43.06	30.06	1.014

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

GSM1900 (EDGE 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-16.33	40.70	24.37	0.274
1880.0	-16.55	41.91	25.36	0.344
1909.8	-16.82	41.73	24.91	0.310
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-13.10	42.78	29.68	0.929
1880.0	-13.65	43.75	30.10	1.023
1909.8	-13.44	43.06	29.62	0.916

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

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-21.96	40.40	18.44	0.070
1880.00	-21.98	41.91	19.93	0.098
1907.60	-22.87	41.59	18.72	0.074
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-18.74	42.69	23.95	0.248
1880.00	-18.77	43.75	24.98	0.315
1907.60	-19.42	43.02	23.60	0.229

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

### 3.4 Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 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.

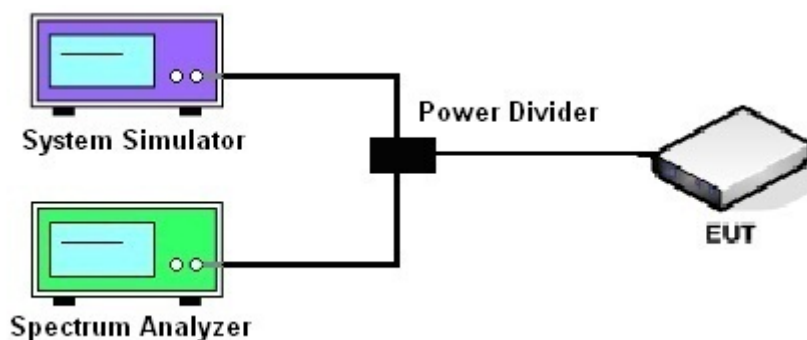
#### 3.4.2 Measuring Instruments

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 99% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.

#### 3.4.4 Test Setup

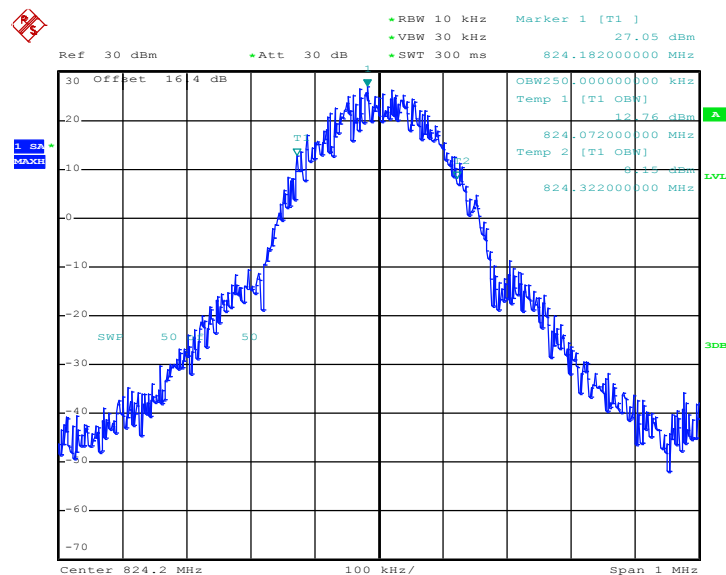




### 3.4.5 Test Result (Plots) of Occupied Bandwidth

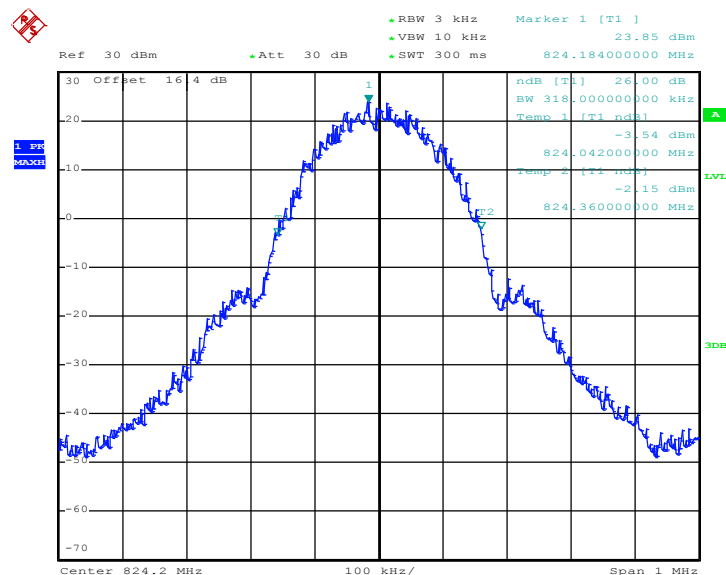
<b>Band :</b>	GSM 850	<b>Test Mode :</b>	GPRS 8 Link
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#### 99% Occupied Bandwidth Plot on Channel 128



Date: 17.MAY.2012 18:27:43

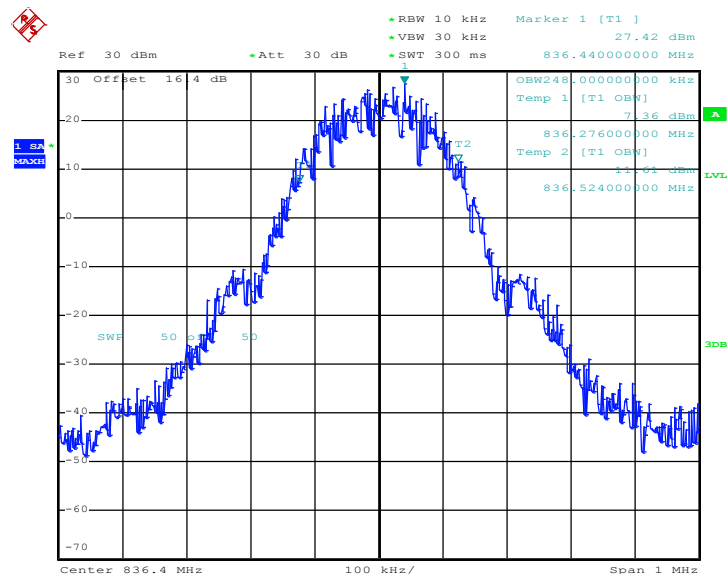
#### 26dB Bandwidth Plot on Channel 128



Date: 17.MAY.2012 18:00:16

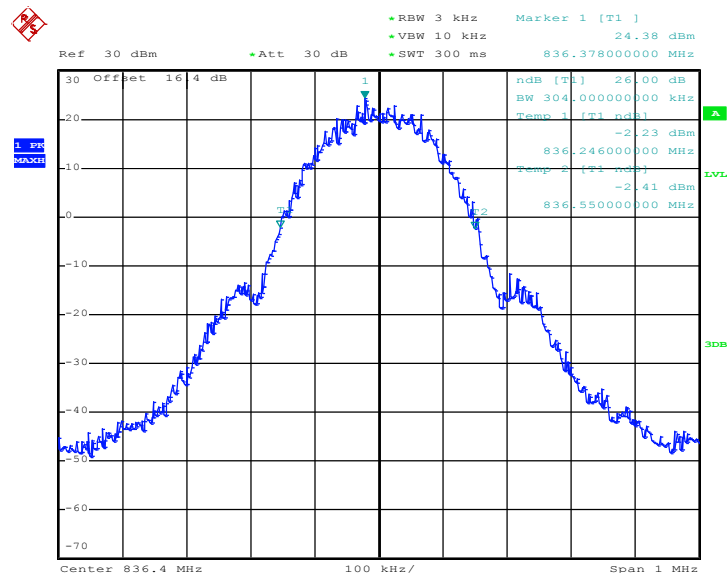


### 99% Occupied Bandwidth Plot on Channel 189

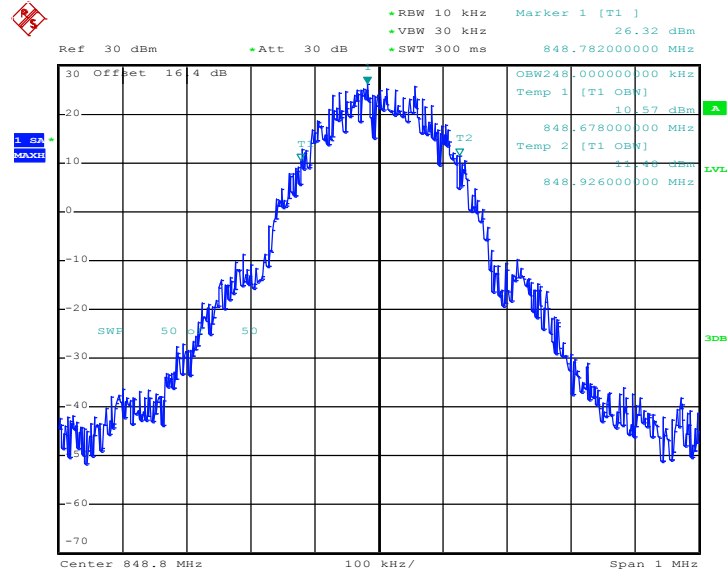


Date: 17.MAY.2012 18:03:08

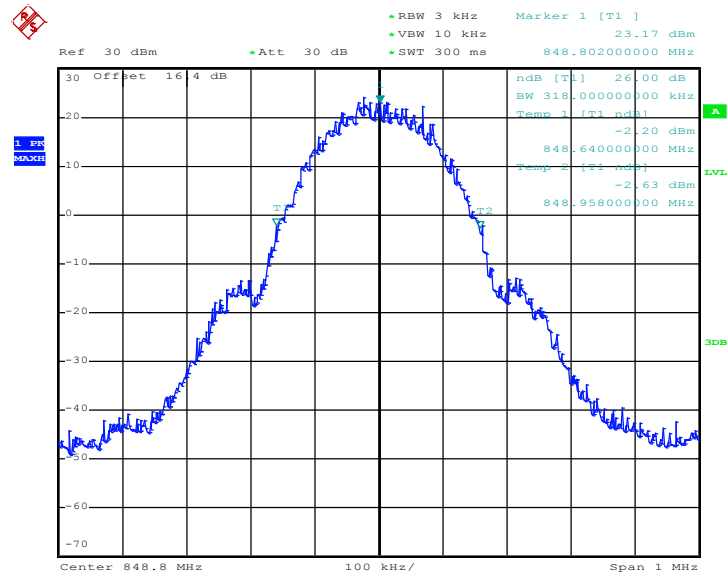
### 26dB Bandwidth Plot on Channel 189



Date: 17.MAY.2012 18:00:42

**99% Occupied Bandwidth Plot on Channel 251**


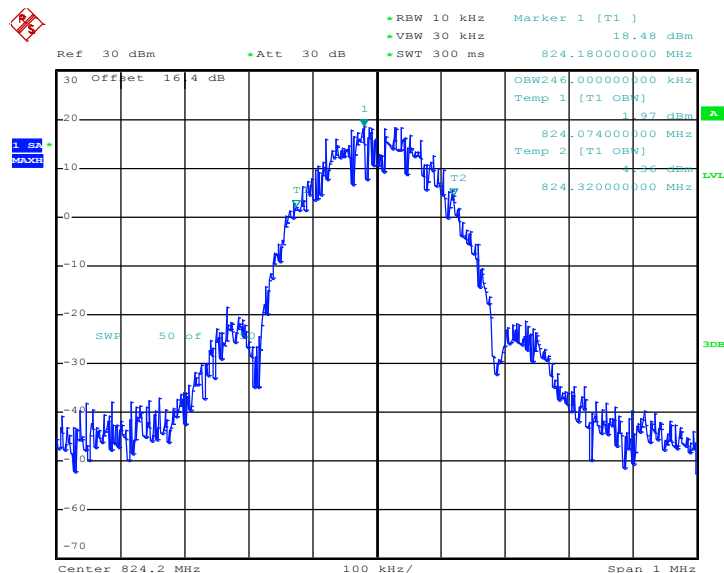
Date: 17.MAY.2012 18:28:23

**26dB Bandwidth Plot on Channel 251**


Date: 17.MAY.2012 18:01:09

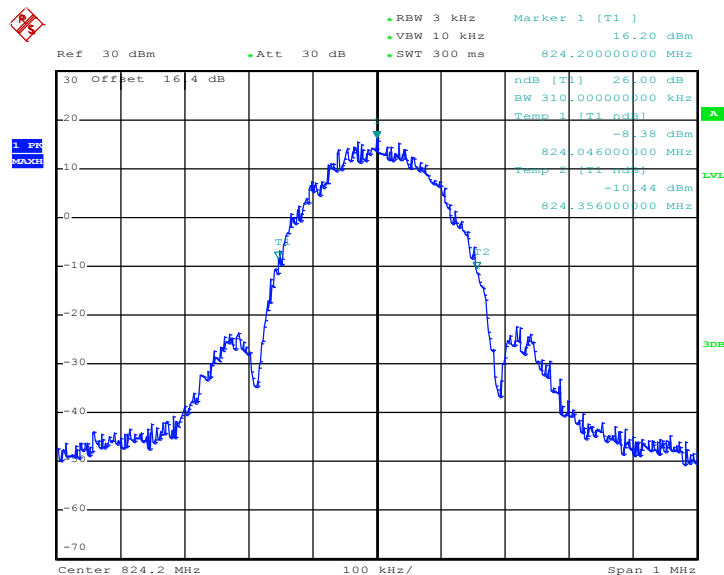
<b>Band :</b>	GSM 850	<b>Test Mode :</b>	EDGE 8 Link
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### 99% Occupied Bandwidth Plot on Channel 128



Date: 18.MAY.2012 10:36:36

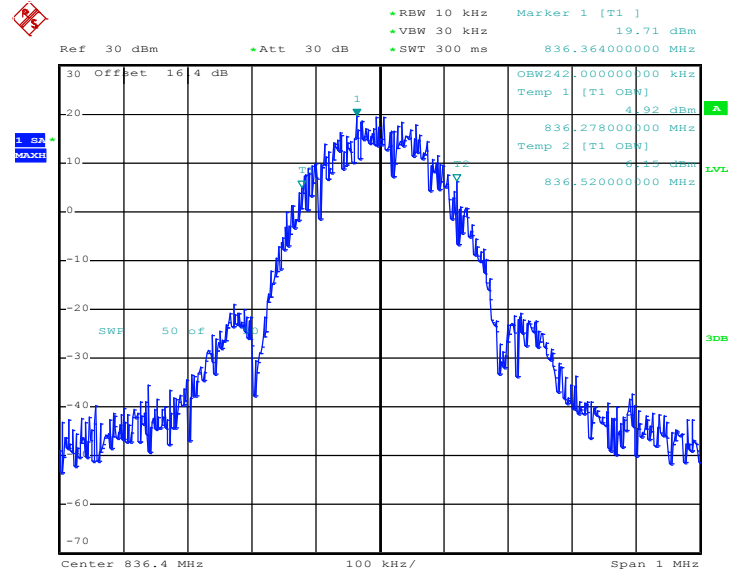
### 26dB Bandwidth Plot on Channel 128



Date: 18.MAY.2012 10:25:08

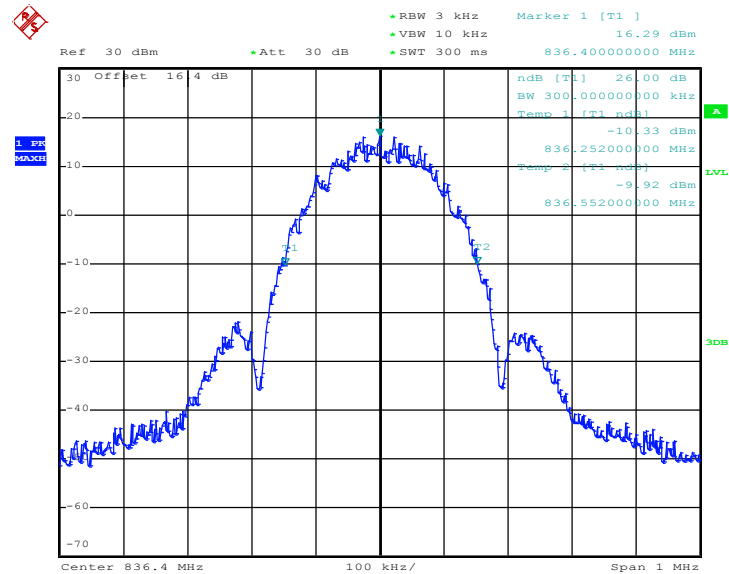


### 99% Occupied Bandwidth Plot on Channel 189



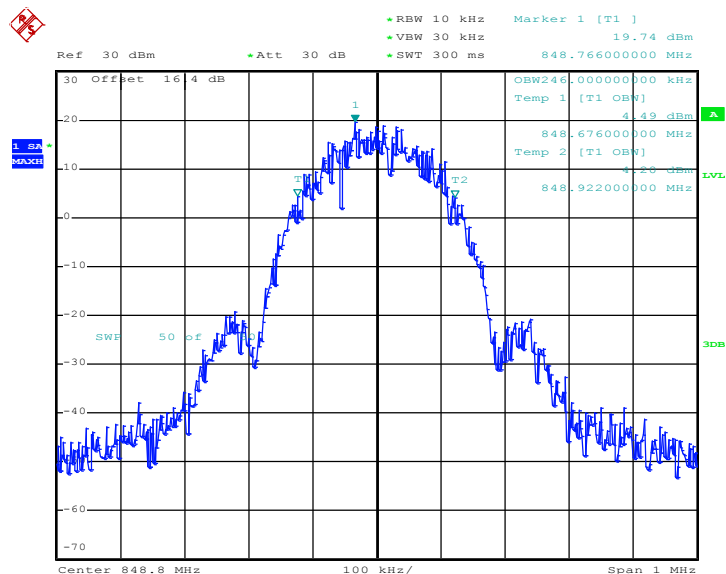
Date: 18.MAY.2012 10:36:56

### 26dB Bandwidth Plot on Channel 189



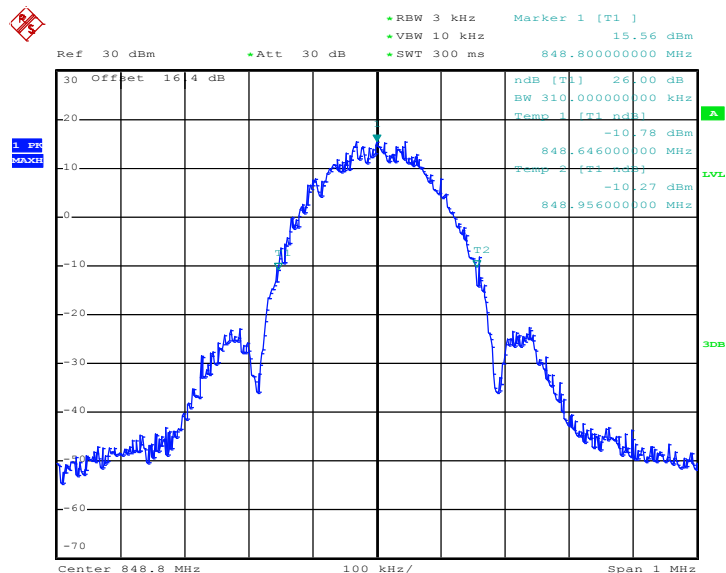
Date: 18.MAY.2012 10:25:34

### 99% Occupied Bandwidth Plot on Channel 251



Date: 18.MAY.2012 10:34:04

### 26dB Bandwidth Plot on Channel 251

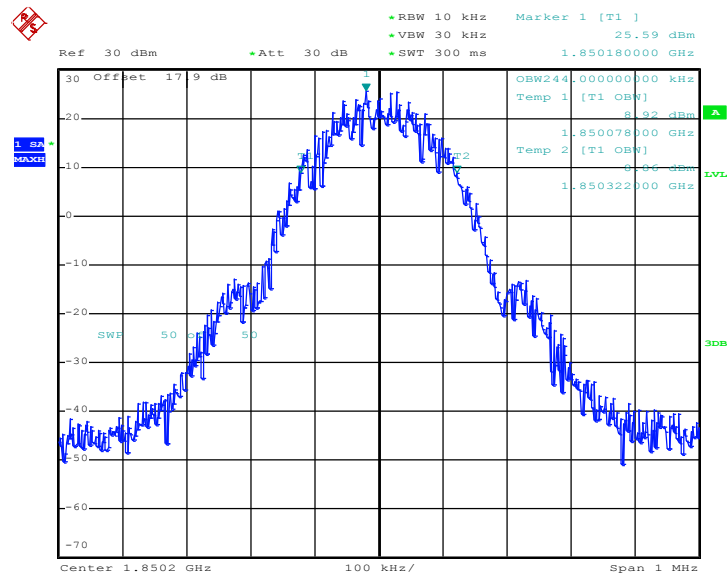


Date: 18.MAY.2012 10:26:01



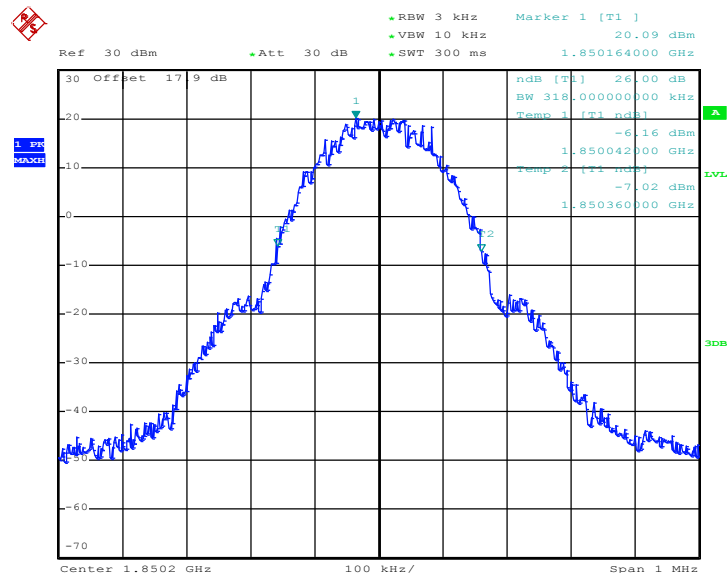
Band :	GSM 1900	Test Mode :	GPRS 8 Link
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99% Occupied Bandwidth Plot on Channel 512



Date: 17.MAY.2012 20:15:51

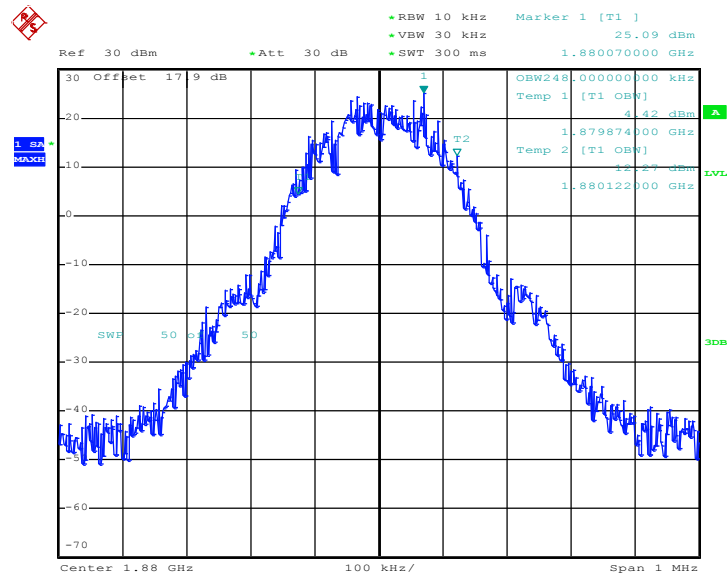
26dB Bandwidth Plot on Channel 512



Date: 17.MAY.2012 20:09:56

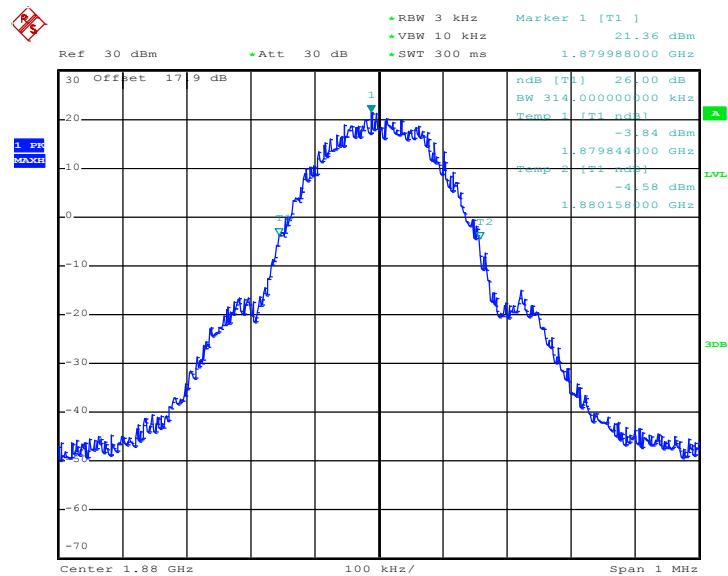


### 99% Occupied Bandwidth Plot on Channel 661



Date: 17.MAY.2012 20:19:06

### 26dB Bandwidth Plot on Channel 661

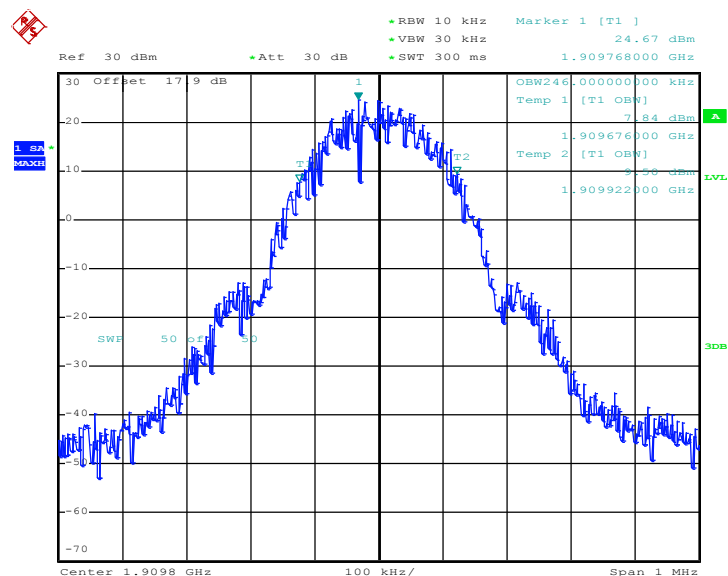


Date: 17.MAY.2012 20:10:23



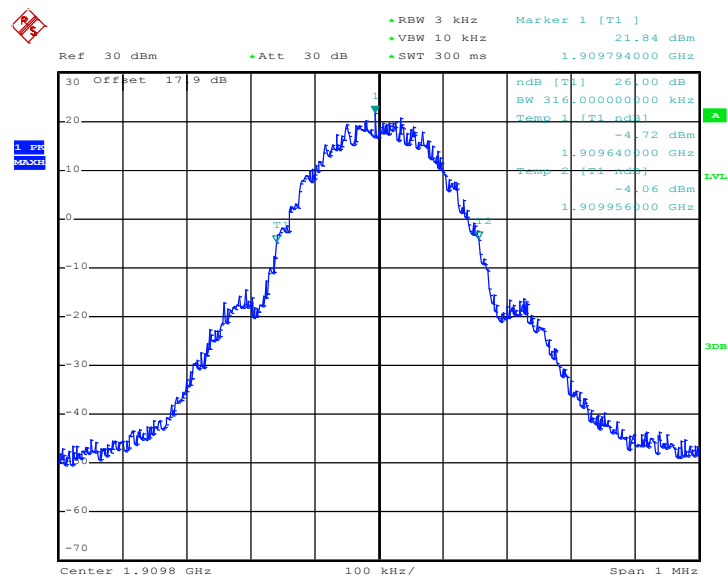


### 99% Occupied Bandwidth Plot on Channel 810



Date: 17.MAY.2012 20:16:31

### 26dB Bandwidth Plot on Channel 810

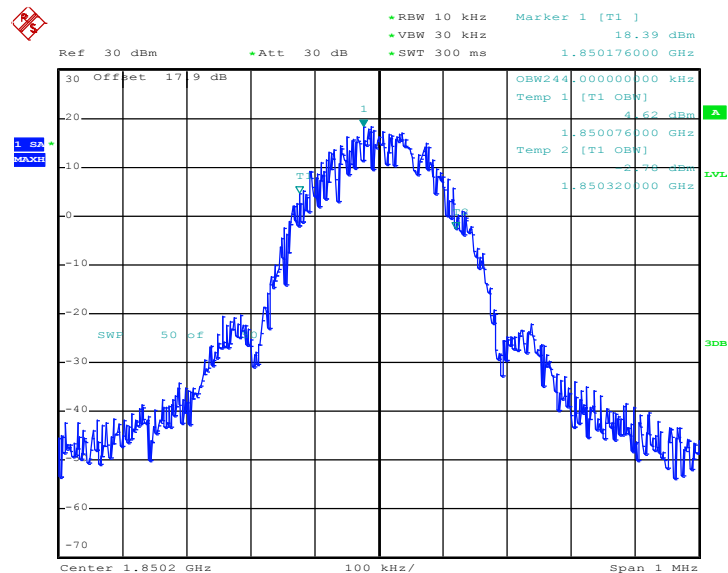


Date: 17.MAY.2012 20:10:49



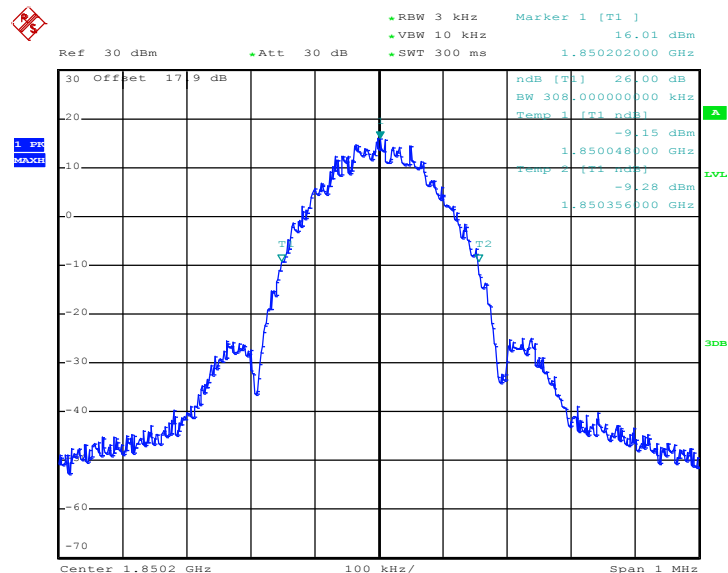
Band :	GSM 1900	Test Mode :	EDGE 8 Link
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99% Occupied Bandwidth Plot on Channel 512



Date: 18.MAY.2012 10:48:35

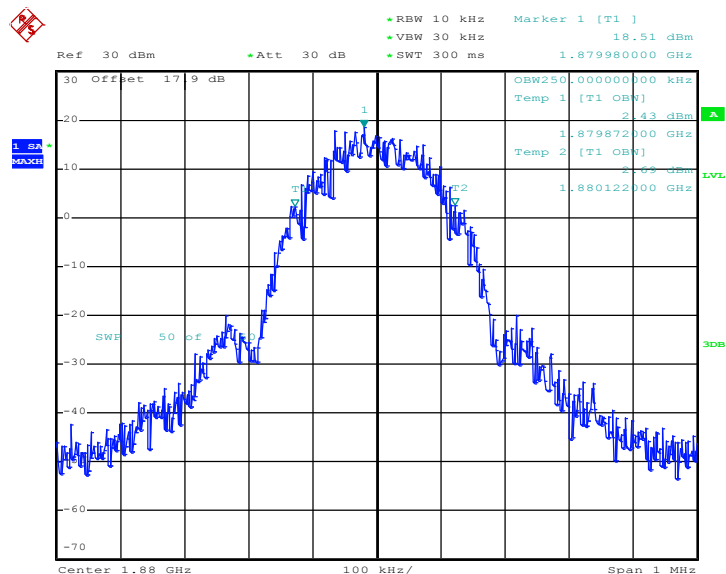
26dB Bandwidth Plot on Channel 512



Date: 17.MAY.2012 20:23:11

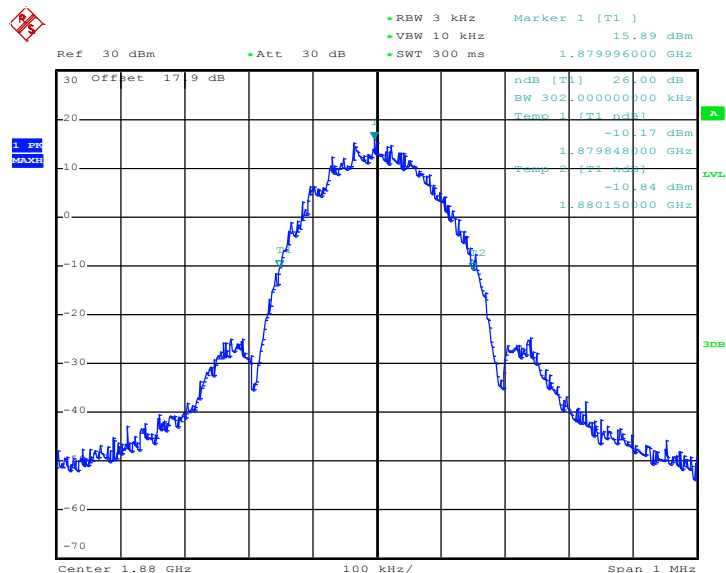


### 99% Occupied Bandwidth Plot on Channel 661



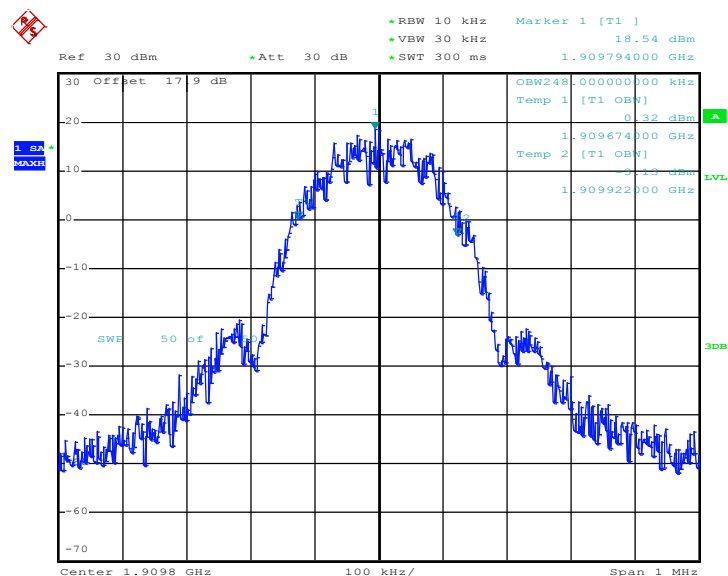
Date: 18.MAY.2012 10:48:54

### 26dB Bandwidth Plot on Channel 661



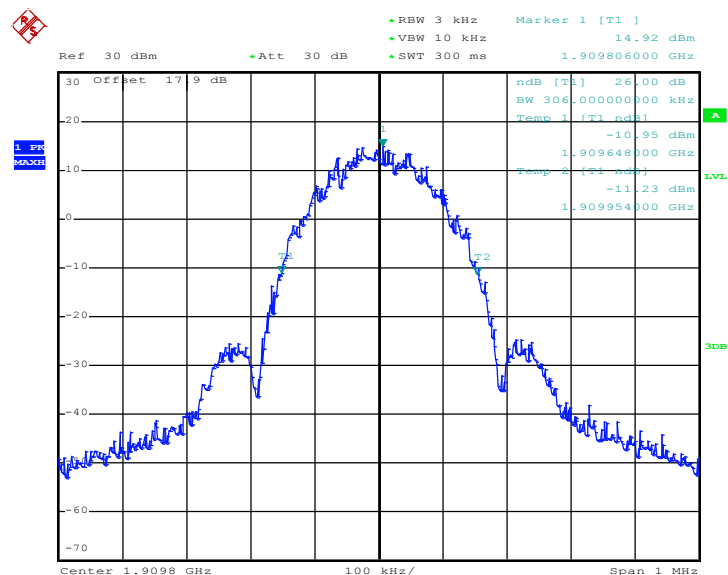
Date: 17.MAY.2012 20:23:37

### 99% Occupied Bandwidth Plot on Channel 810



Date: 18.MAY.2012 10:49:14

### 26dB Bandwidth Plot on Channel 810

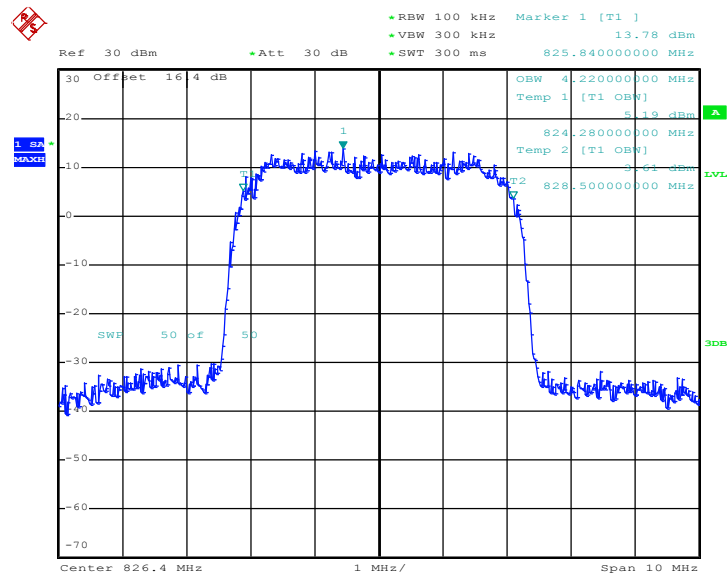


Date: 17.MAY.2012 20:24:04



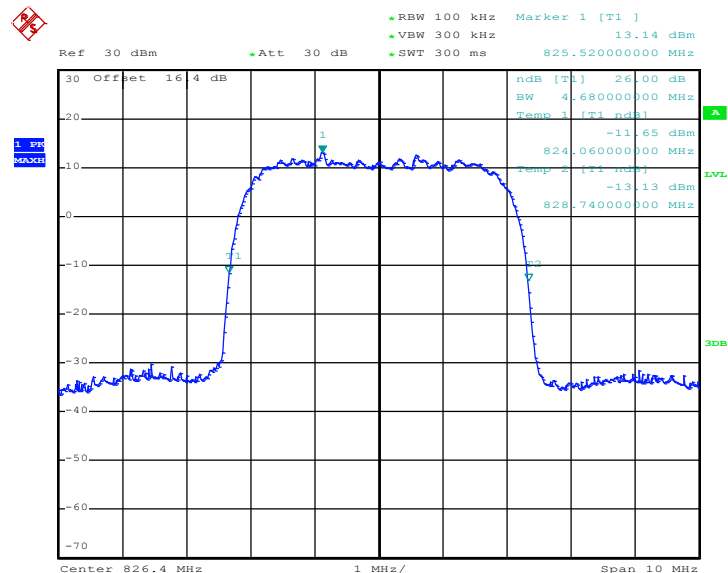
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link
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99% Occupied Bandwidth Plot on Channel 4132

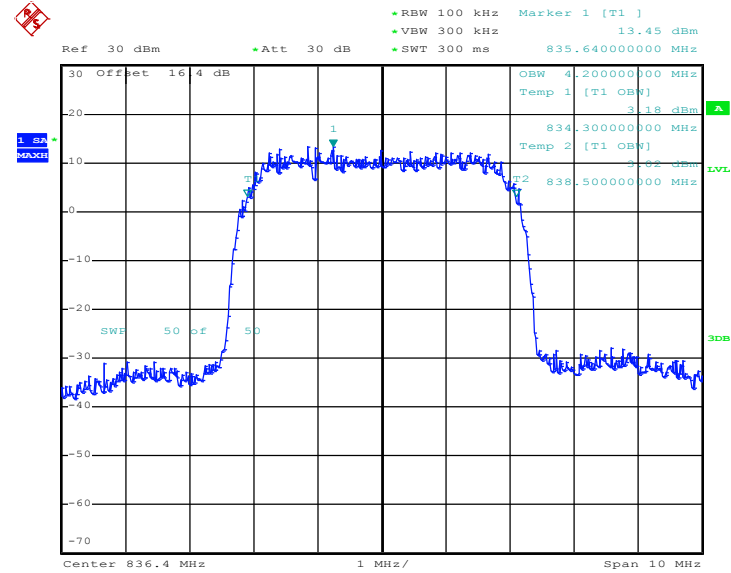


Date: 17.MAY.2012 19:25:50

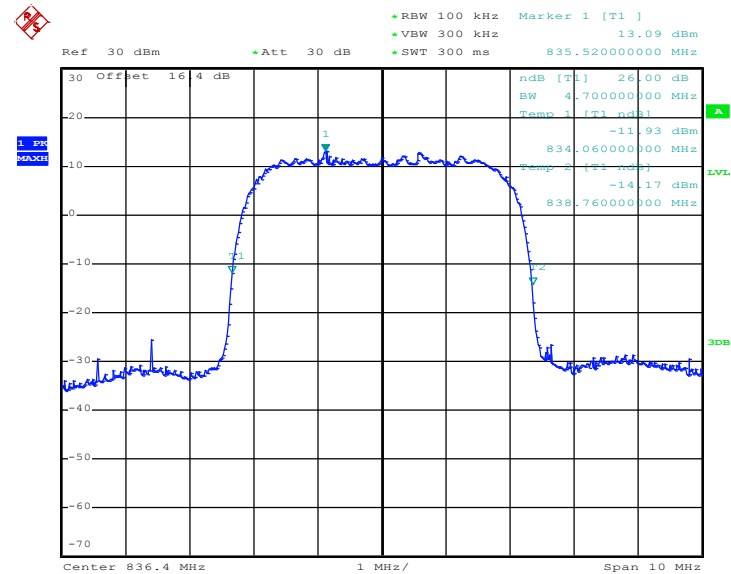
26dB Bandwidth Plot on Channel 4132



Date: 18.MAY.2012 10:41:05

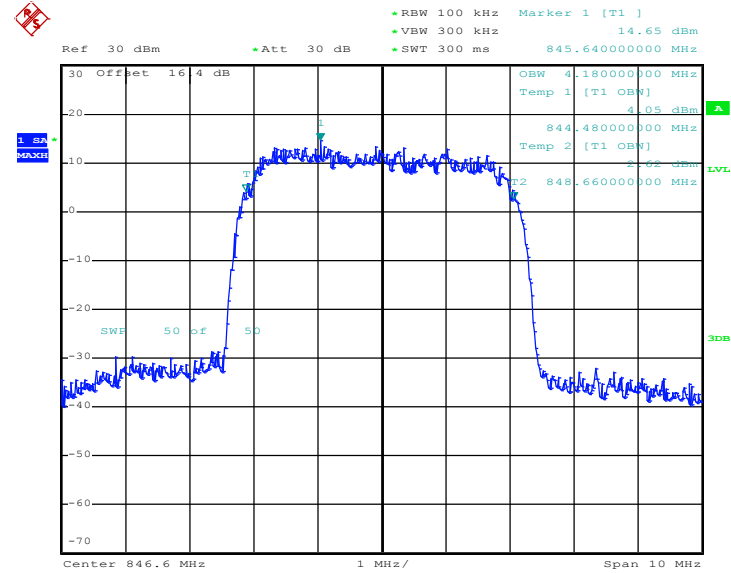
**99% Occupied Bandwidth Plot on Channel 4182**


Date: 17.MAY.2012 19:26:11

**26dB Bandwidth Plot on Channel 4182**


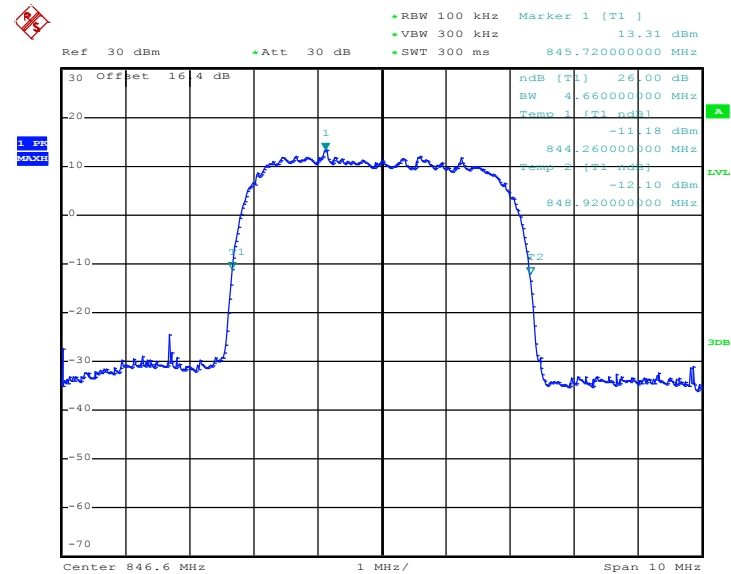
Date: 18.MAY.2012 10:41:31

### 99% Occupied Bandwidth Plot on Channel 4233



Date: 17.MAY.2012 19:26:32

### 26dB Bandwidth Plot on Channel 4233

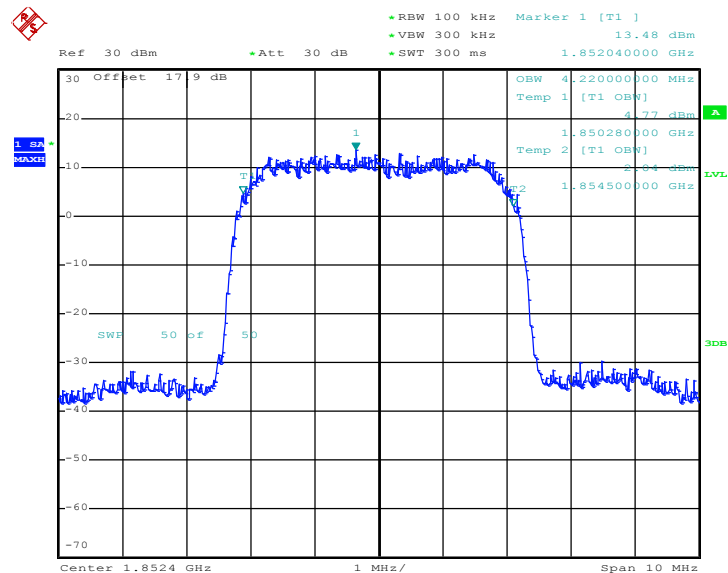


Date: 18.MAY.2012 10:41:58



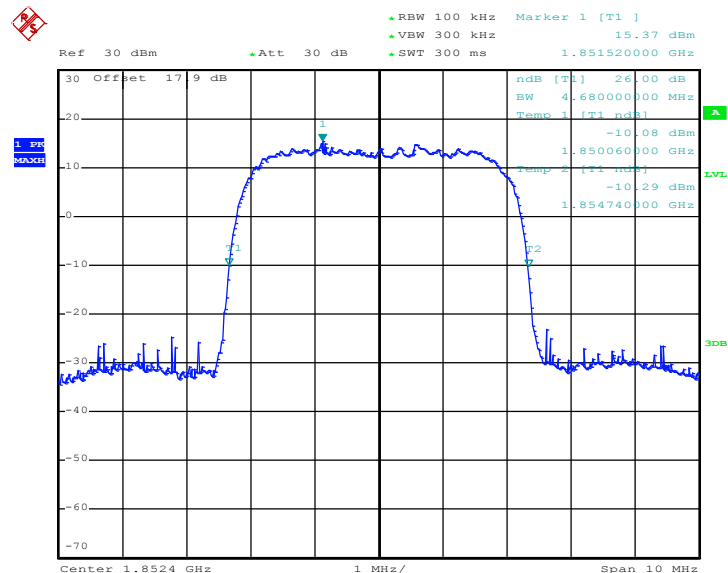
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link
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99% Occupied Bandwidth Plot on Channel 9262



Date: 17.MAY.2012 19:46:15

26dB Bandwidth Plot on Channel 9262

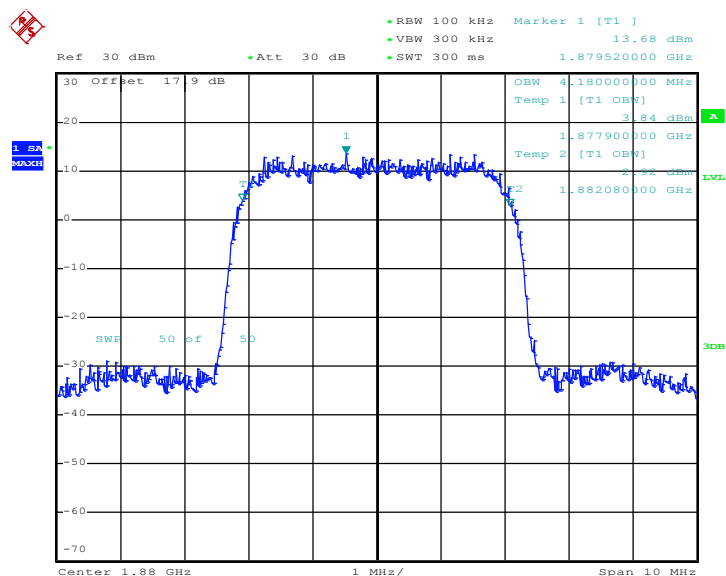


Date: 17.MAY.2012 19:43:42



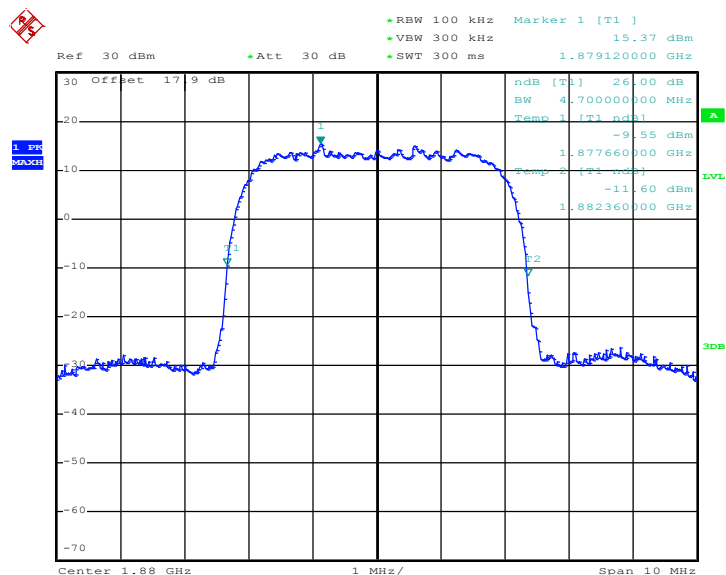


### 99% Occupied Bandwidth Plot on Channel 9400



Date: 17.MAY.2012 19:46:36

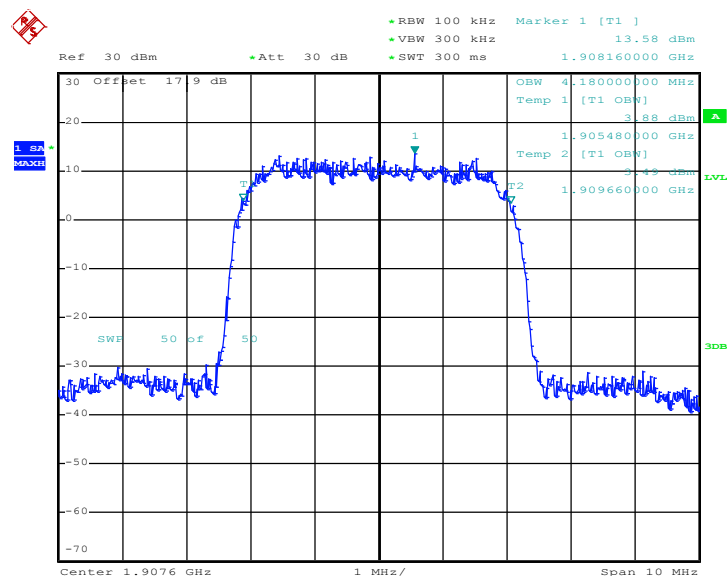
### 26dB Bandwidth Plot on Channel 9400



Date: 17.MAY.2012 19:44:09

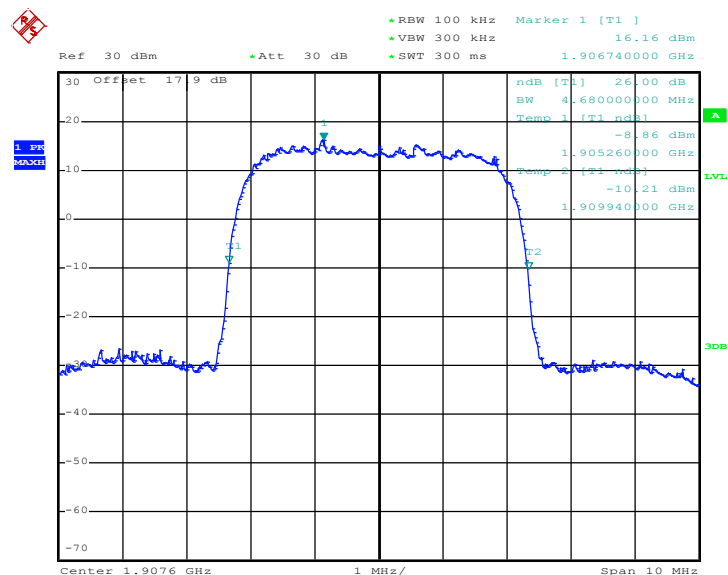


### 99% Occupied Bandwidth Plot on Channel 9538



Date: 17.MAY.2012 19:46:57

### 26dB Bandwidth Plot on Channel 9538



Date: 17.MAY.2012 19:44:35

### 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

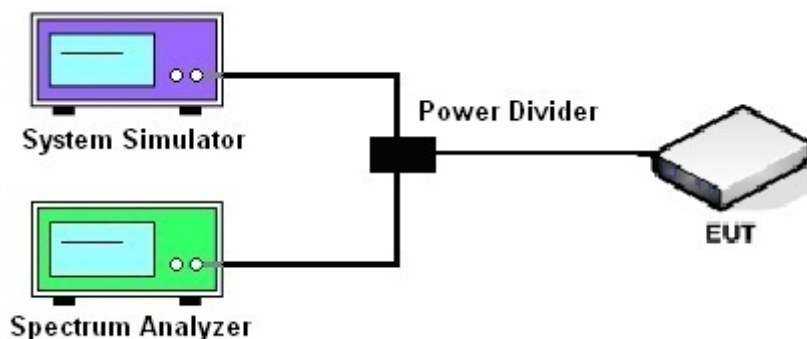
See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 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

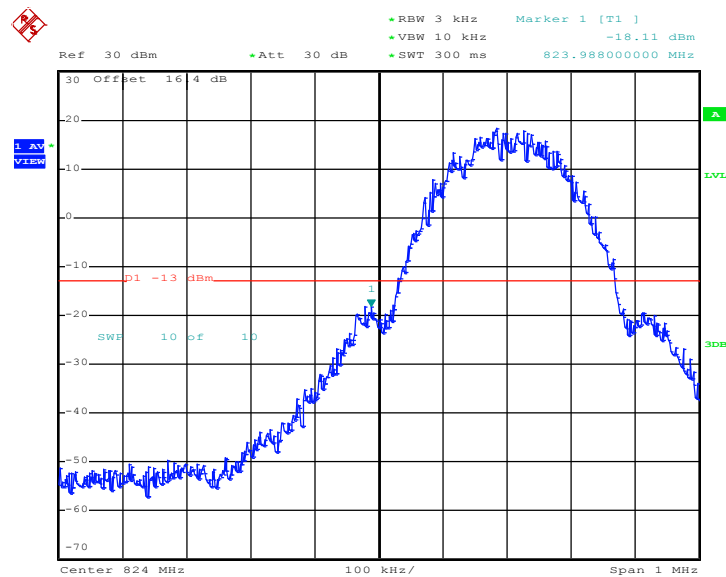
<Conducted Band Edge >



### 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>	0.25dB	<b>Maximum 26dB Bandwidth :</b>	0.318MHz
<b>Band Edge :</b>	-17.86dBm	<b>Measurement Value :</b>	-18.11dBm

**Lower Band Edge Plot on Channel 128**



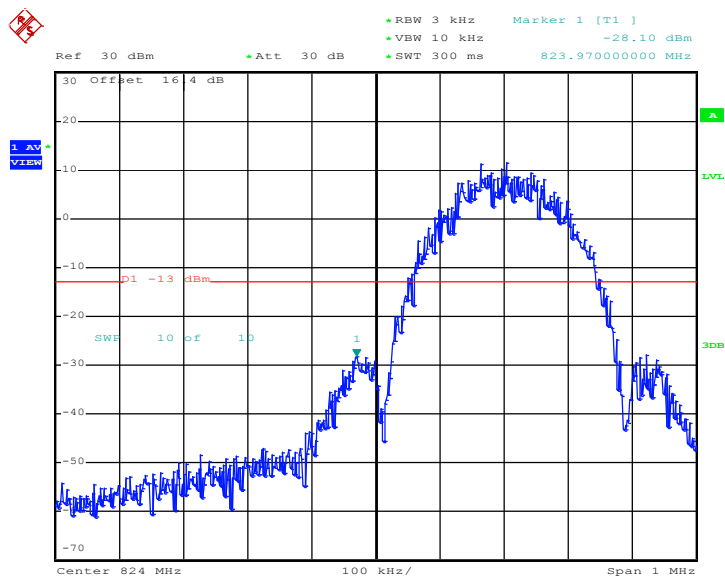
Date: 17.MAY.2012 18:04:52

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



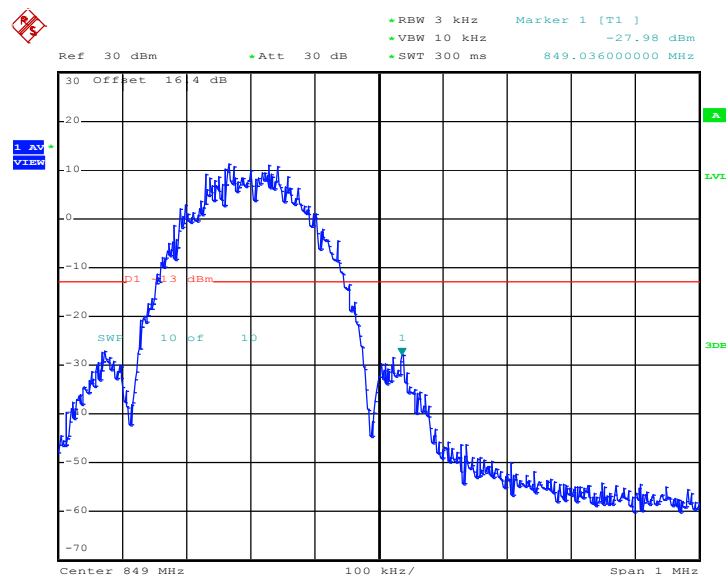
- Page Number : 53 of 101  
Report Issued Date : Sep. 27, 2012  
Report Version : Rev. 02

<b>Band :</b>	GSM850	<b>Test Mode :</b>	EDGE 8 Link
<b>Correction Factor :</b>	0.14dB	<b>Maximum 26dB Bandwidth :</b>	0.310MHz
<b>Band Edge :</b>	-27.96dBm	<b>Measurement Value :</b>	-28.10dBm

**Lower Band Edge Plot on Channel 128**


Date: 18.MAY.2012 10:29:44

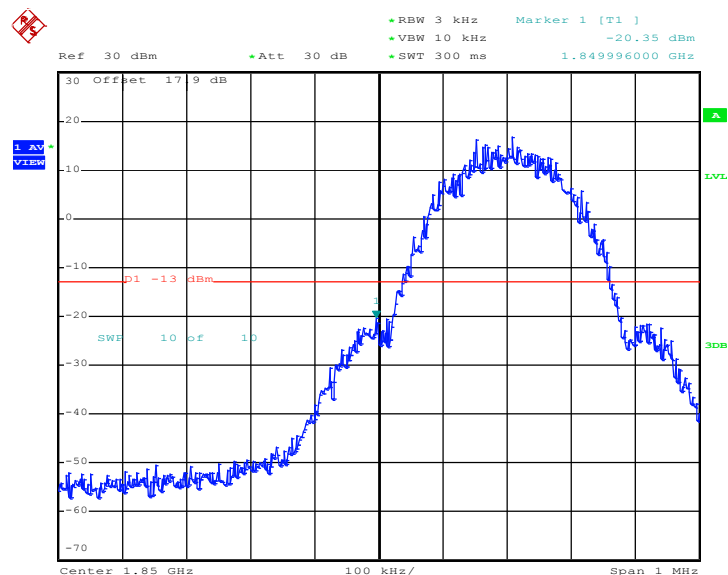
1. Correction Factor(dB)=  $10\log(1\% \text{ Emission BW/RBW})$
2. Band Edge= Measurement Value + Correction Factor(dB)



Date: 18.MAY.2012 10:30:13

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>	GPRS 8 Link
<b>Correction Factor :</b>	0.25dB	<b>Maximum 26dB Bandwidth :</b>	0.318MHz
<b>Band Edge :</b>	-20.10dBm	<b>Measurement Value :</b>	-20.35dBm

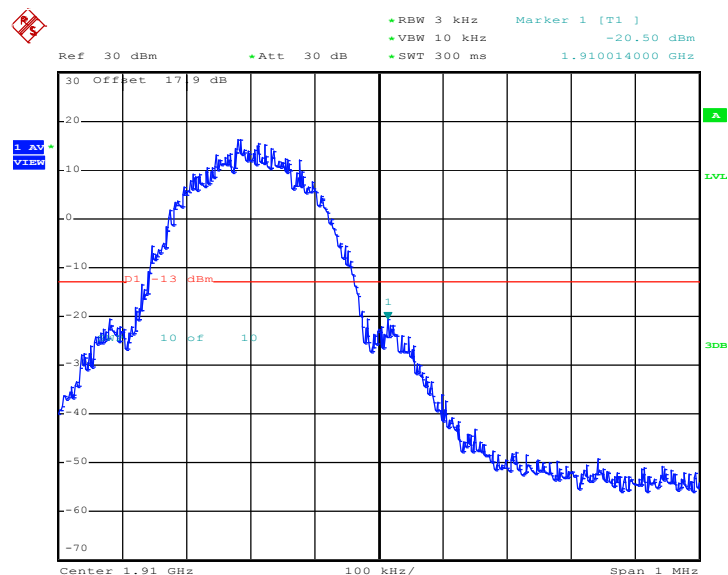
**Lower Band Edge Plot on Channel 512**


Date: 17.MAY.2012 20:17:01

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



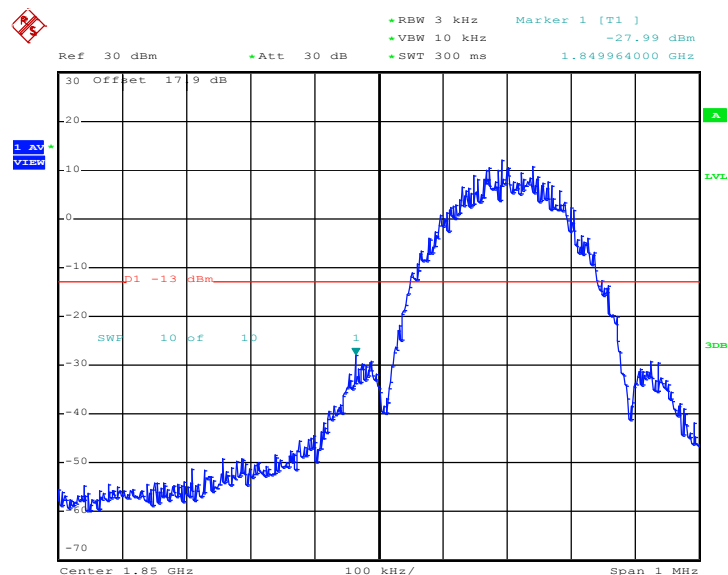
<b>Band :</b>	GSM1900	<b>Test Mode :</b>	GPRS 8 Link
<b>Correction Factor :</b>	0.25dB	<b>Maximum 26dB Bandwidth :</b>	0.318MHz
<b>Band Edge :</b>	-20.25dBm	<b>Measurement Value :</b>	-20.50dBm

**Higher Band Edge Plot on Channel 810**


Date: 17.MAY.2012 20:17:30

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>	0.11dB	<b>Maximum 26dB Bandwidth :</b>	0.308MHz
<b>Band Edge :</b>	-27.88dBm	<b>Measurement Value :</b>	-27.99dBm

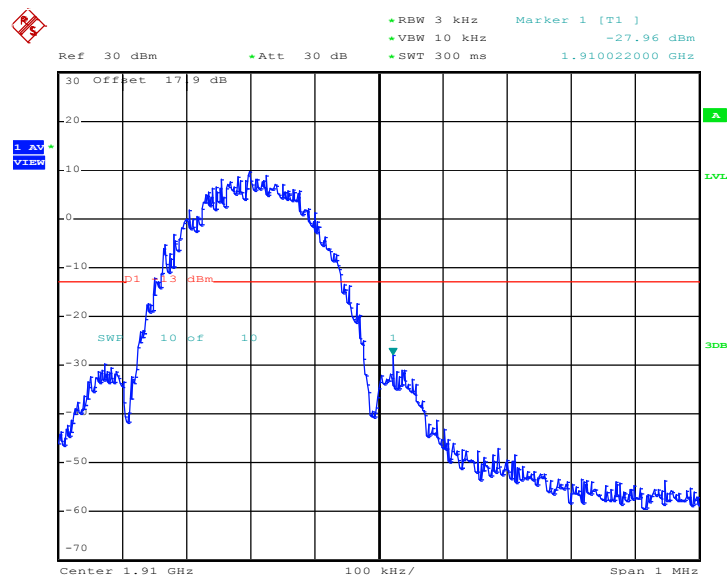
**Lower Band Edge Plot on Channel 512**


Date: 17.MAY.2012 20:27:47

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>	0.11dB	<b>Maximum 26dB Bandwidth :</b>	0.308MHz
<b>Band Edge :</b>	-27.85dBm	<b>Measurement Value :</b>	-27.96dBm

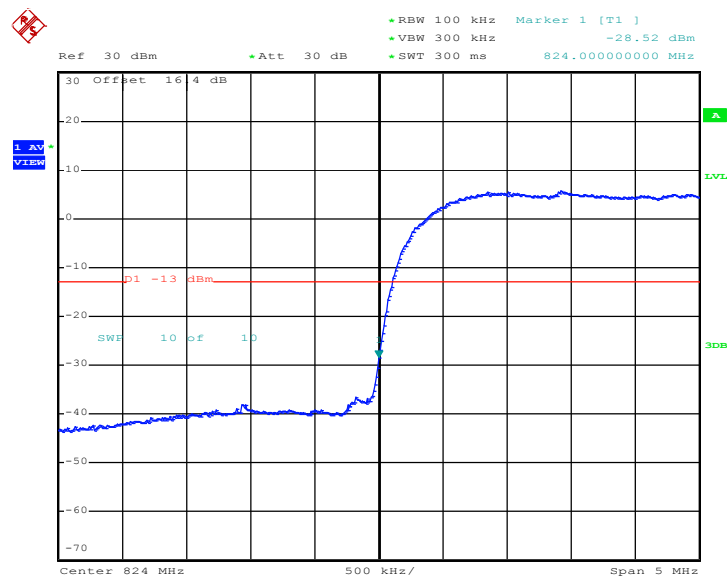
### Higher Band Edge Plot on Channel 810



Date: 17.MAY.2012 20:28:16

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>	-3.28dB	<b>Maximum 26dB Bandwidth :</b>	4.70MHz
<b>Band Edge :</b>	-31.80dBm	<b>Measurement Value :</b>	-28.52dBm

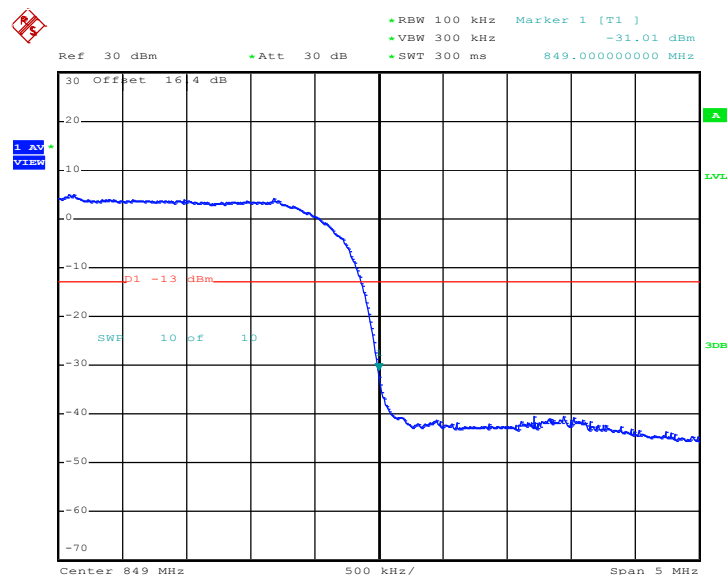
**Lower Band Edge Plot on Channel 4132**


Date: 17.MAY.2012 19:27:55

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>	-3.28dB	<b>Maximum 26dB Bandwidth :</b>	4.70MHz
<b>Band Edge :</b>	-34.29dBm	<b>Measurement Value :</b>	-31.01dBm

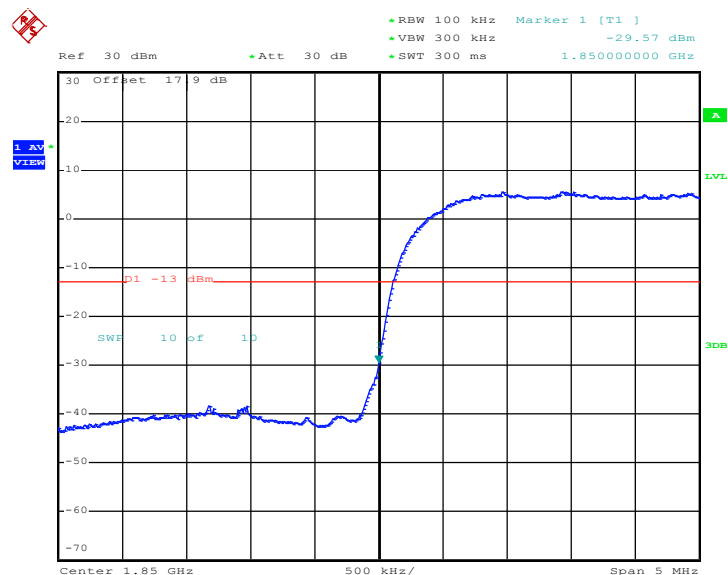
### Higher Band Edge Plot on Channel 4233



Date: 17.MAY.2012 19:28:25

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

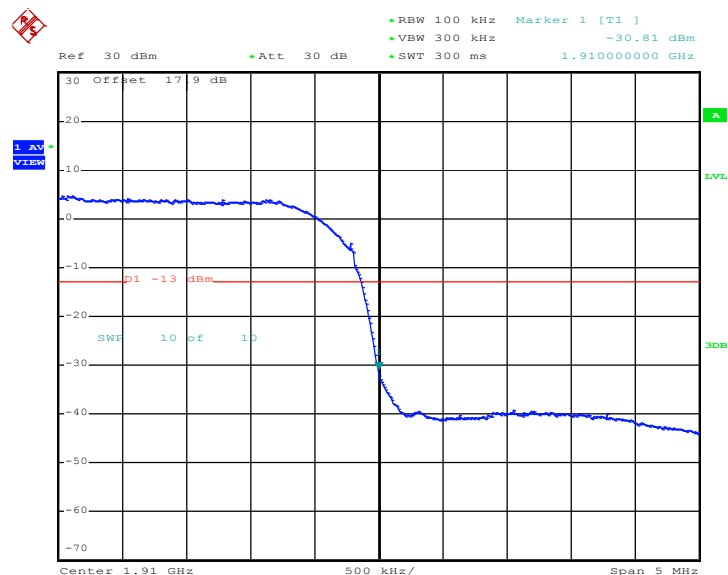
<b>Band :</b>	WCDMA Band II	<b>Test Mode :</b>	RMC 12.2Kbps Link
<b>Correction Factor :</b>	-3.28dB	<b>Maximum 26dB Bandwidth :</b>	4.70MHz
<b>Band Edge :</b>	-32.85dBm	<b>Measurement Value :</b>	-29.57dBm

**Lower Band Edge Plot on Channel 9262**


Date: 17.MAY.2012 19:48:20

1. Correction Factor(dB)= 10log(1% 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>	-3.28dB	<b>Maximum 26dB Bandwidth :</b>	4.70MHz
<b>Band Edge :</b>	-34.09dBm	<b>Measurement Value :</b>	-30.81dBm

**Higher Band Edge Plot on Channel 9538**


Date: 17.MAY.2012 19:48:50

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.

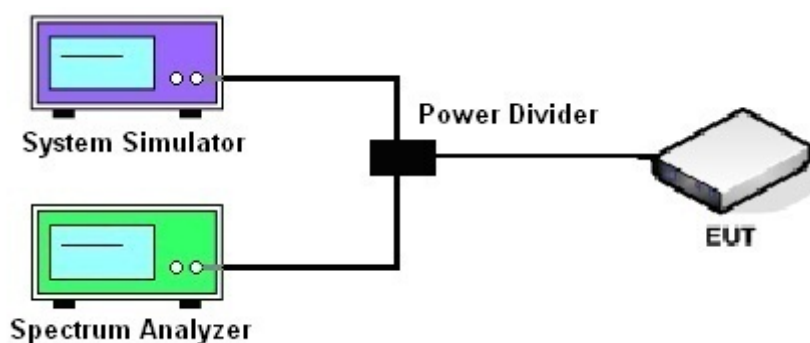
#### 3.6.2 Measuring Instruments

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 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.

#### 3.6.4 Test Setup

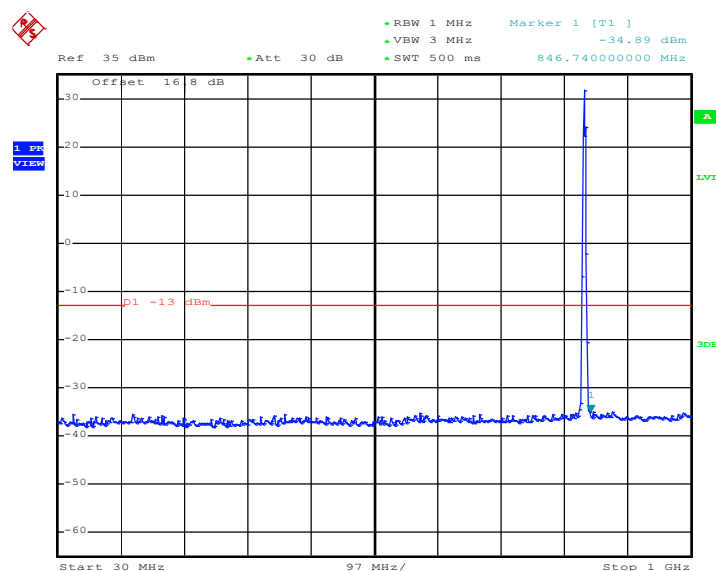






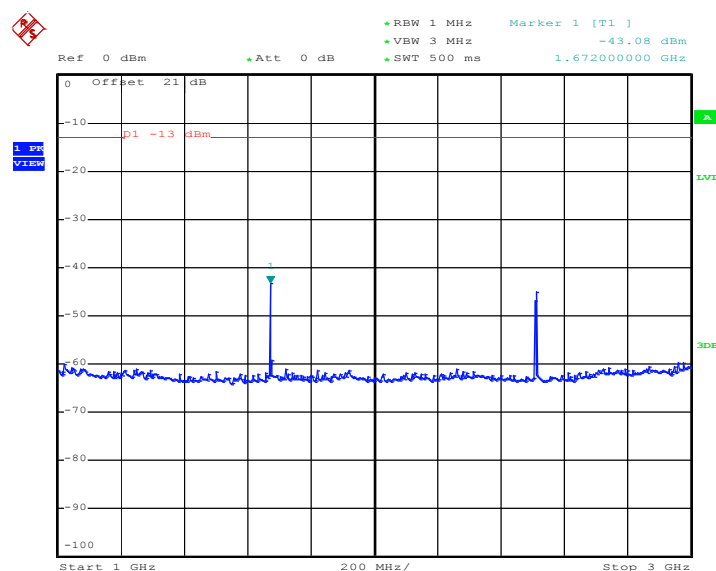
<b>Band :</b>	GSM850	<b>Channel :</b>	CH189
<b>Test Mode :</b>	GPRS 8 Link		

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



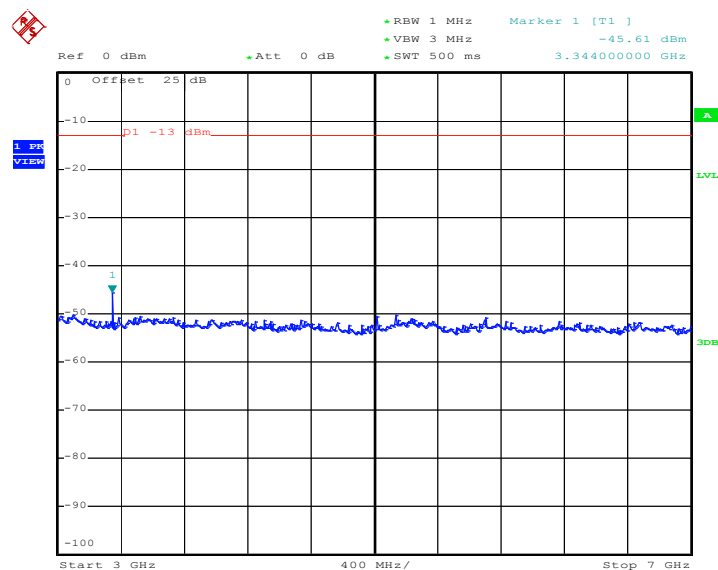
Date: 19.JUN.2012 14:40:25

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



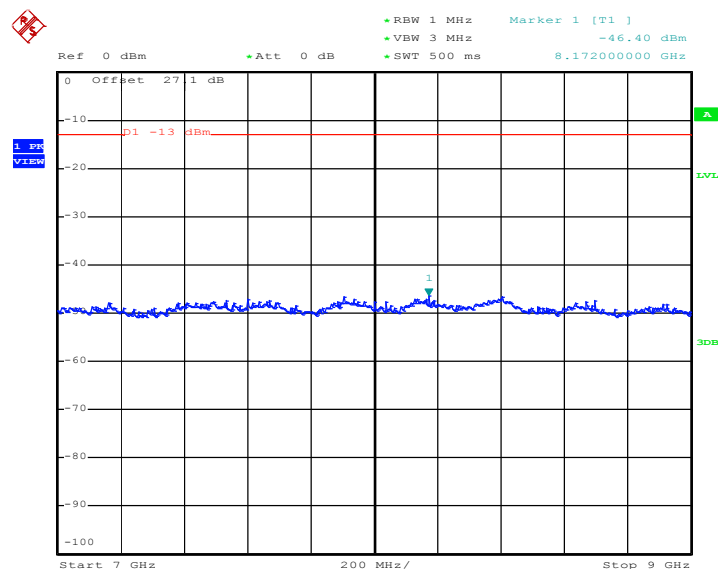
Date: 19.JUN.2012 14:40:43

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



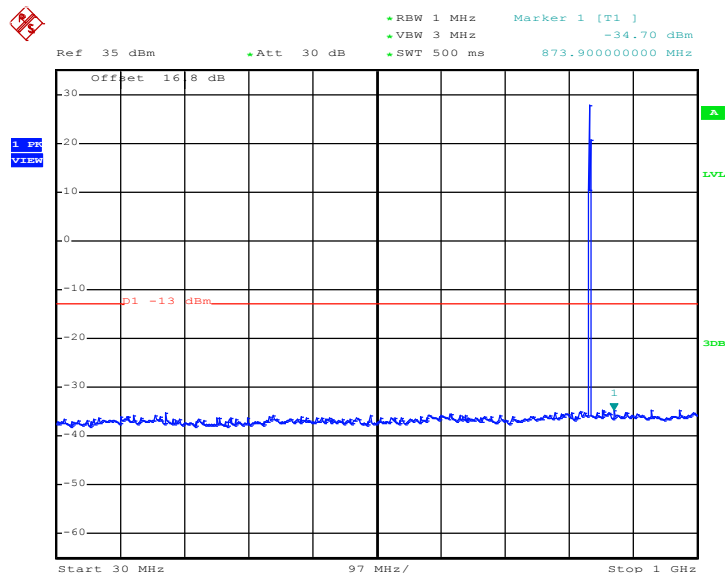
Date: 19.JUN.2012 14:40:55

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

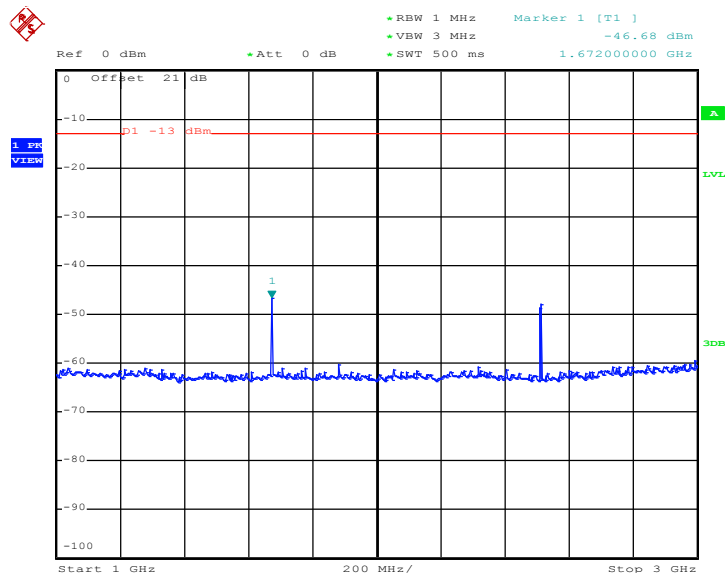


Date: 19.JUN.2012 14:41:08

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

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


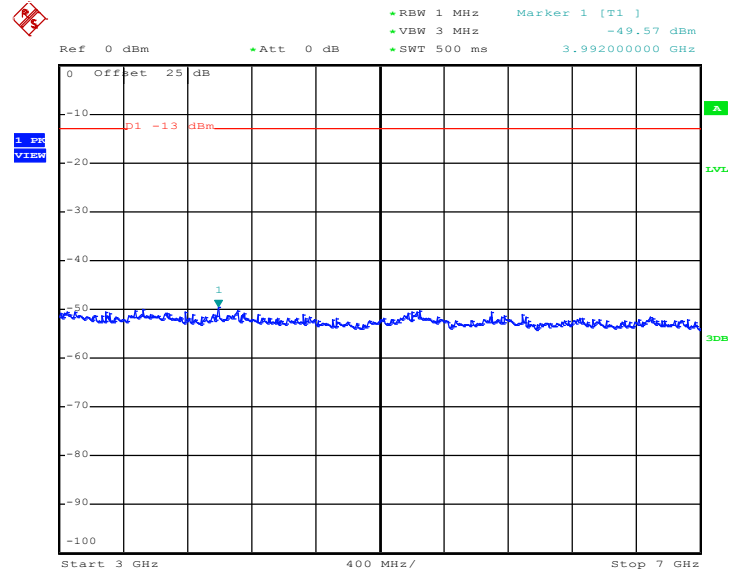
Date: 17.MAY.2012 18:38:01

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


Date: 17.MAY.2012 18:38:24

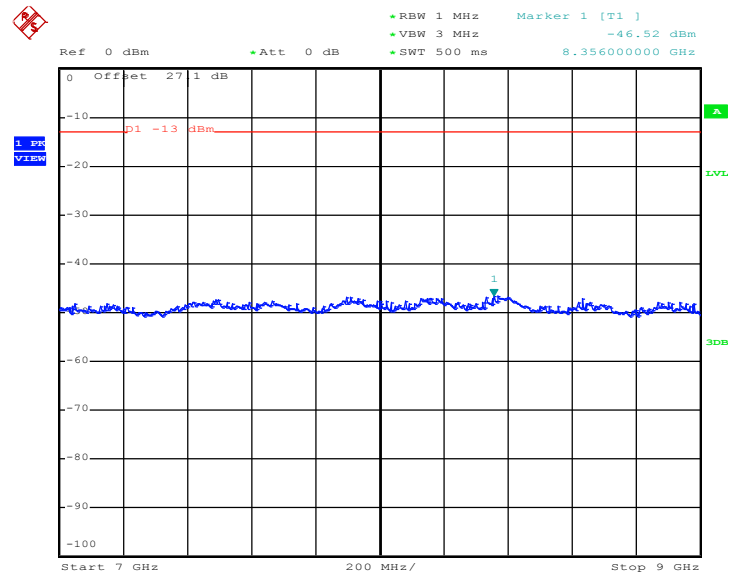


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



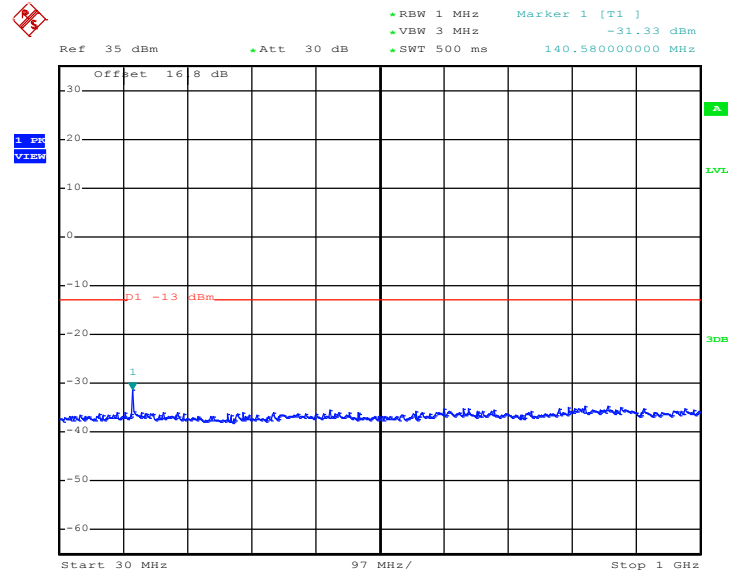
Date: 17.MAY.2012 18:38:37

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

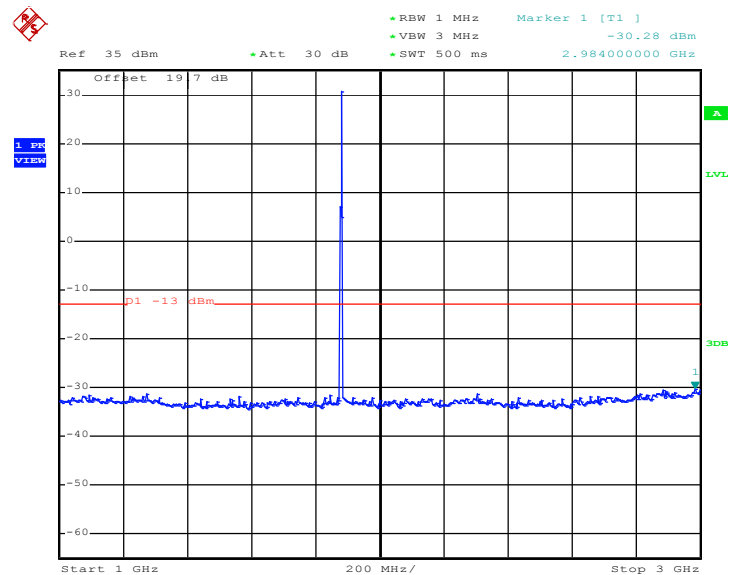


Date: 17.MAY.2012 18:38:49

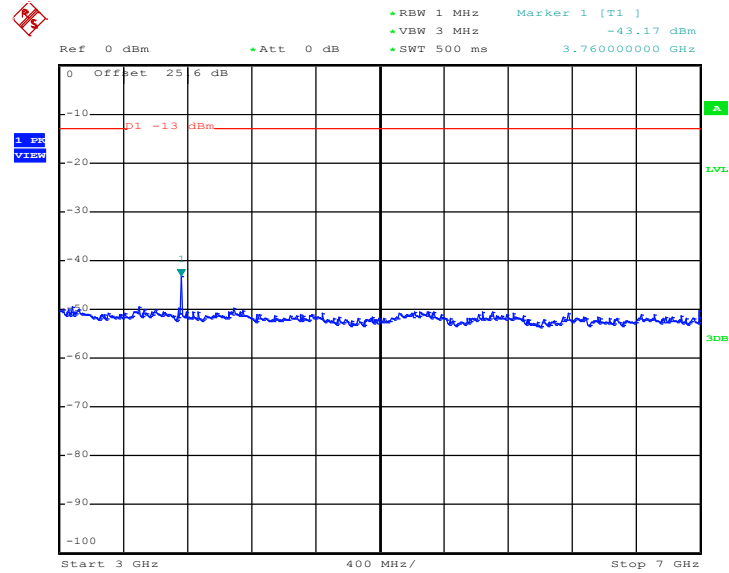
<b>Band :</b>	GSM1900	<b>Channel :</b>	CH661
<b>Test Mode :</b>	GPRS 8 Link		

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


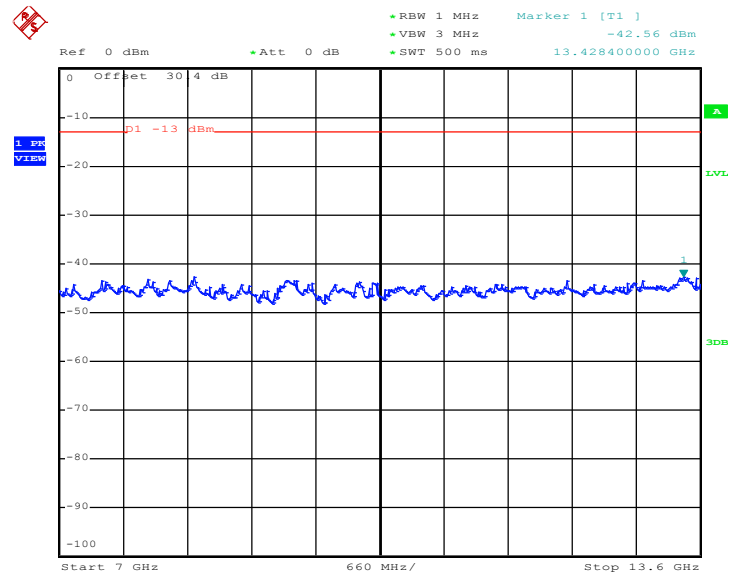
Date: 17.MAY.2012 20:02:23

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


Date: 17.MAY.2012 20:02:36

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


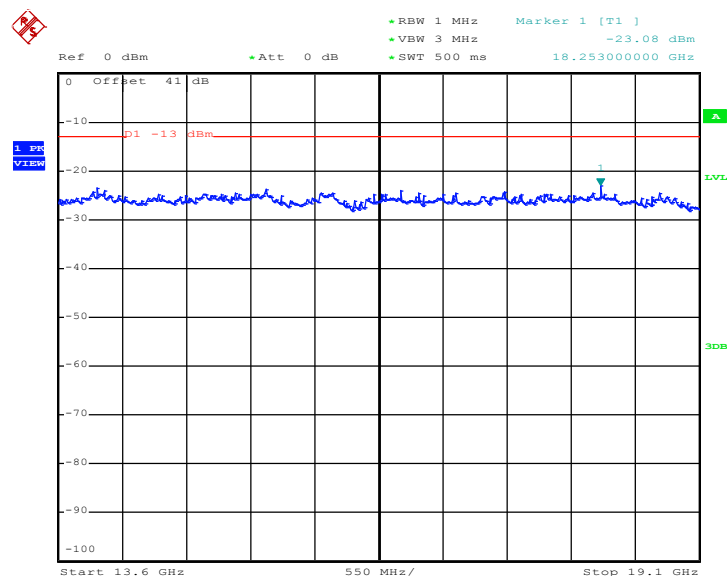
Date: 17.MAY.2012 20:02:52

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


Date: 17.MAY.2012 20:03:04



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

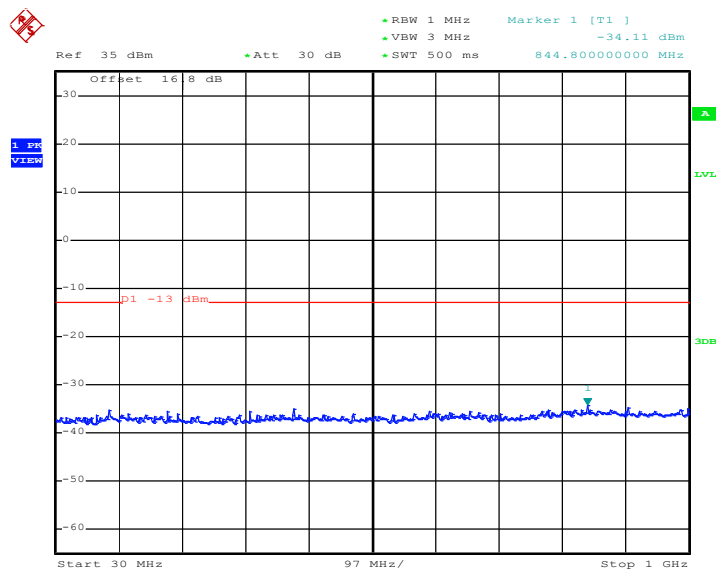


Date: 17.MAY.2012 20:03:17



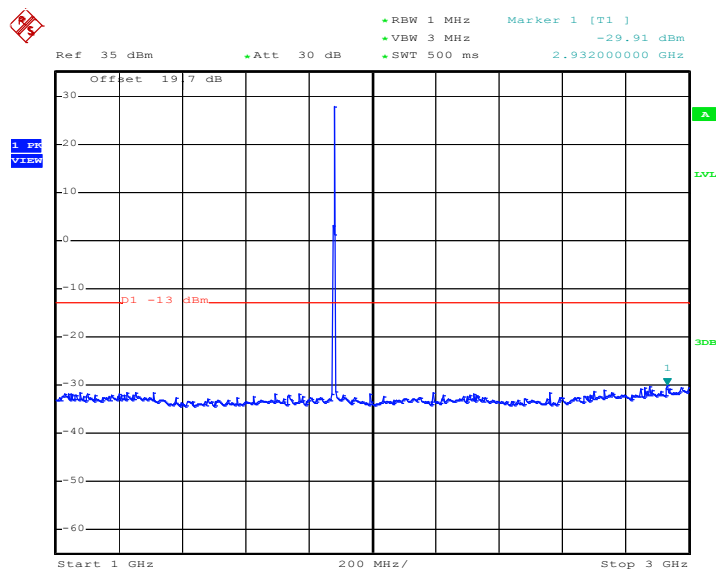
Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE 8 Link		

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 19.JUN.2012 16:52:23

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 19.JUN.2012 16:52:36



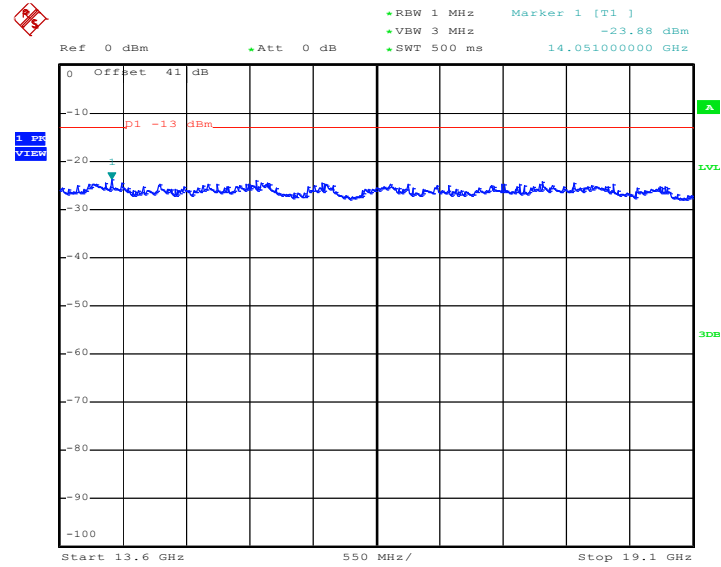


### Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz





Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

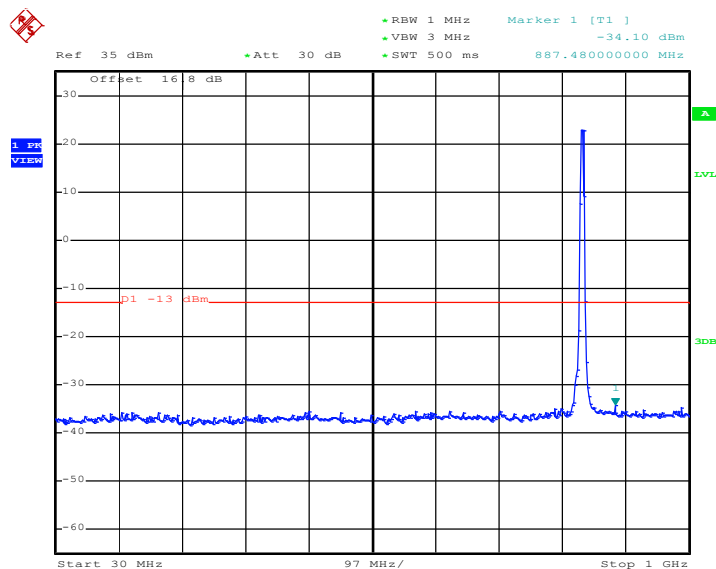


Date: 19.JUN.2012 16:53:17



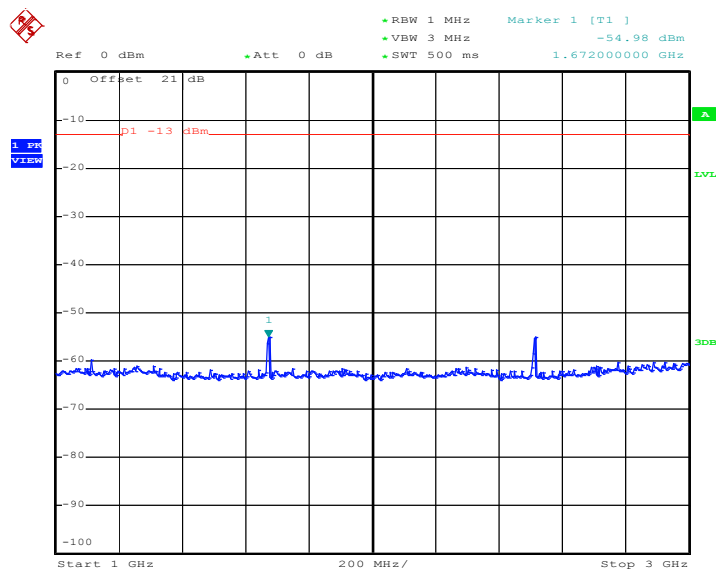
Band :	WCDMA Band V	Channel :	CH4182
Test Mode :	RMC 12.2Kbps Link		

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 19.JUN.2012 14:49:34

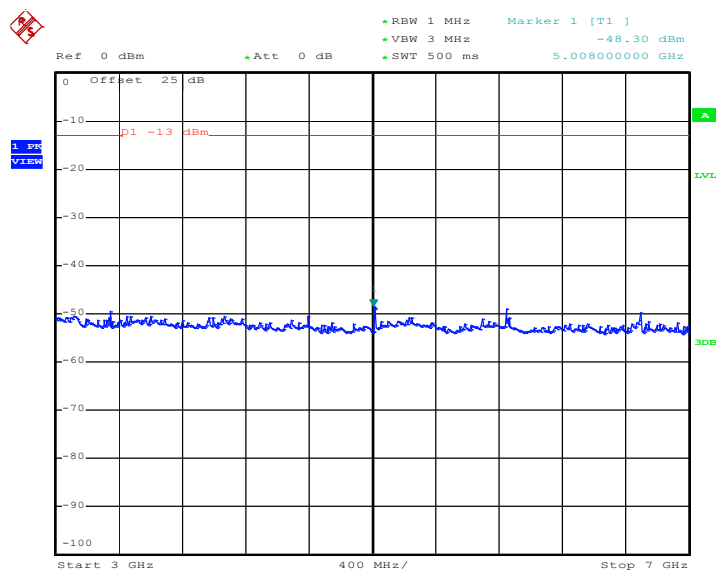
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 19.JUN.2012 14:49:53

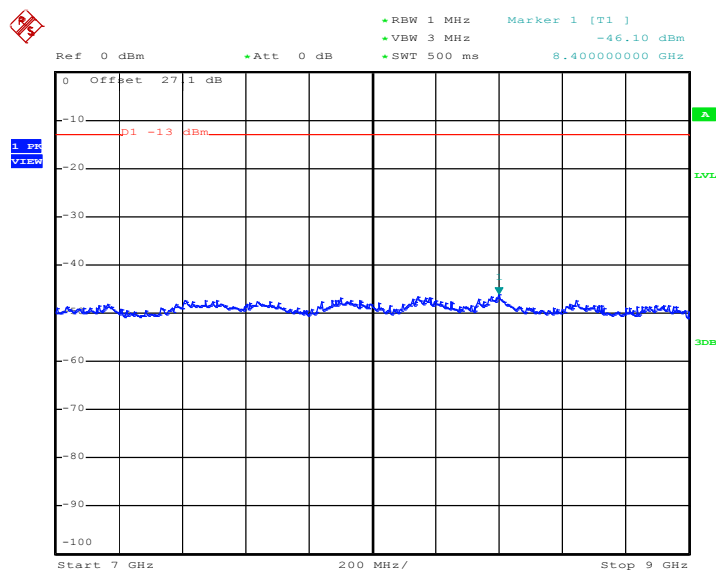


### Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 19.JUN.2012 14:50:06

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



Date: 19.JUN.2012 14:50:18



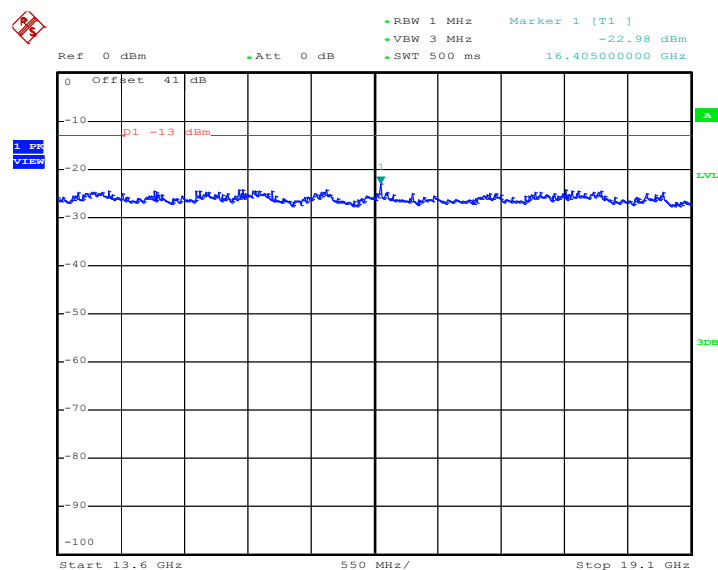
Date: 19.JUN.2012 14:23:47



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



### Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 19.JUN.2012 14:24:37

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

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

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

#### **3.7.2 Measuring Instruments**

See list of measuring instruments of this test report.

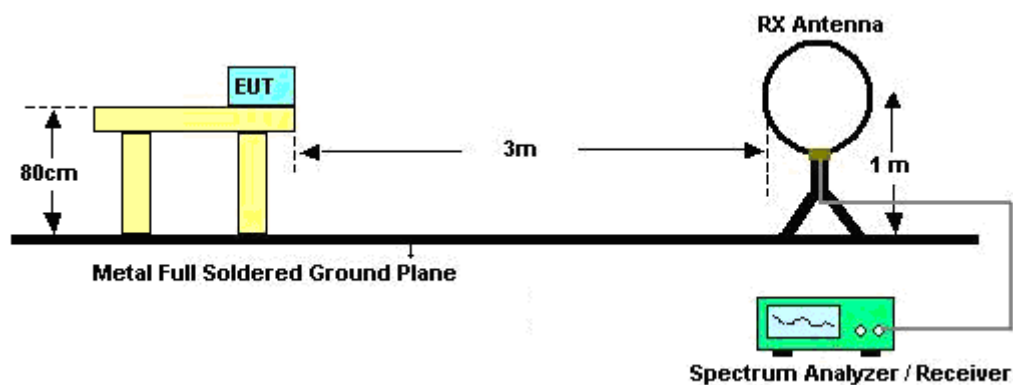
#### **3.7.3 Test Procedures**

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

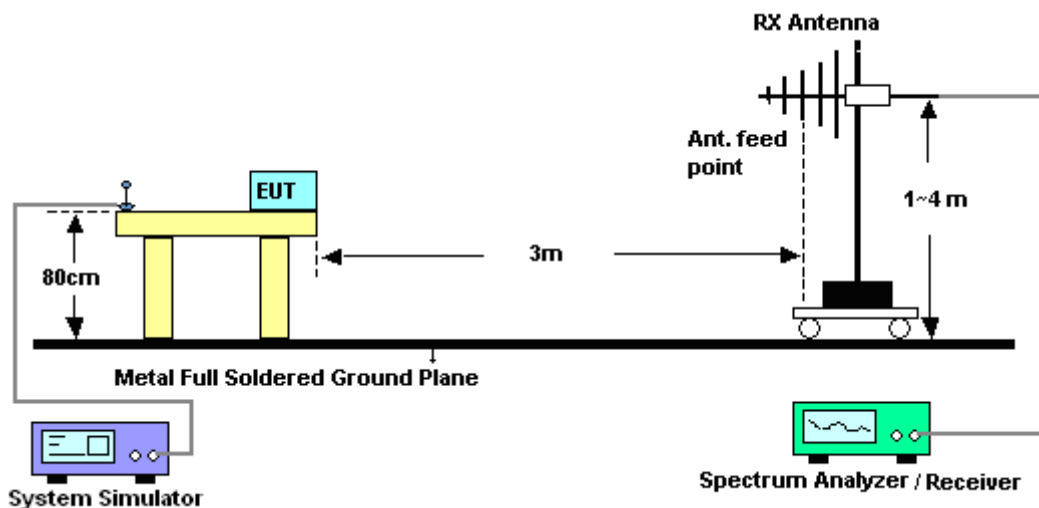


### 3.7.4 Test Setup

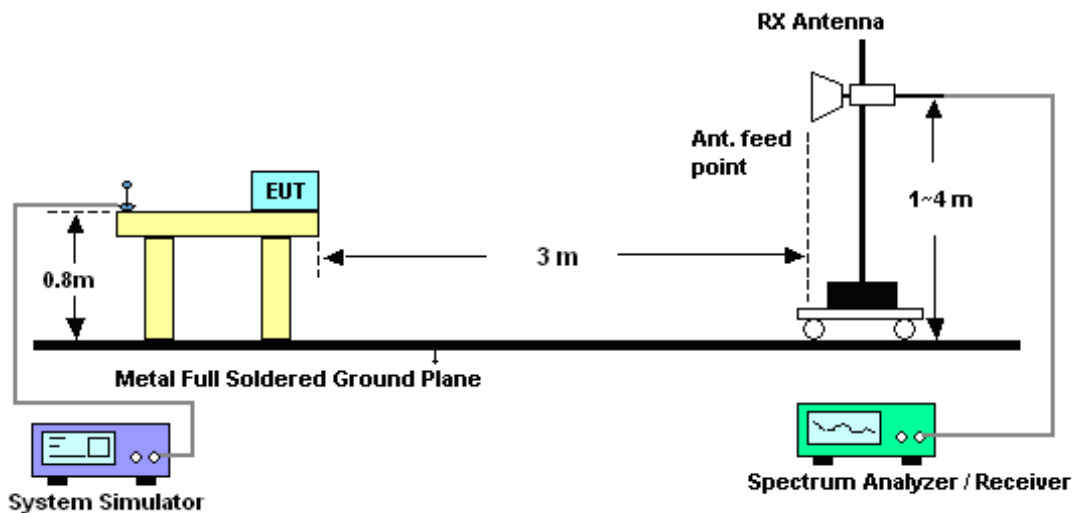
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

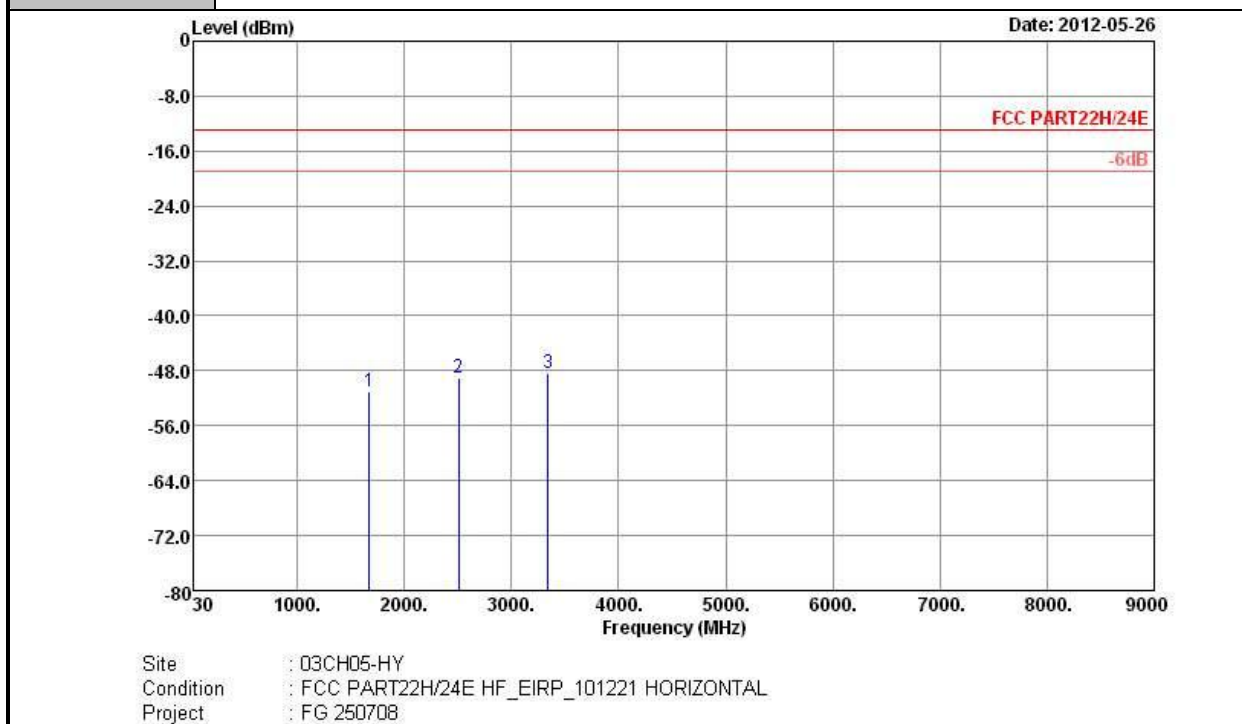


### 3.7.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

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**

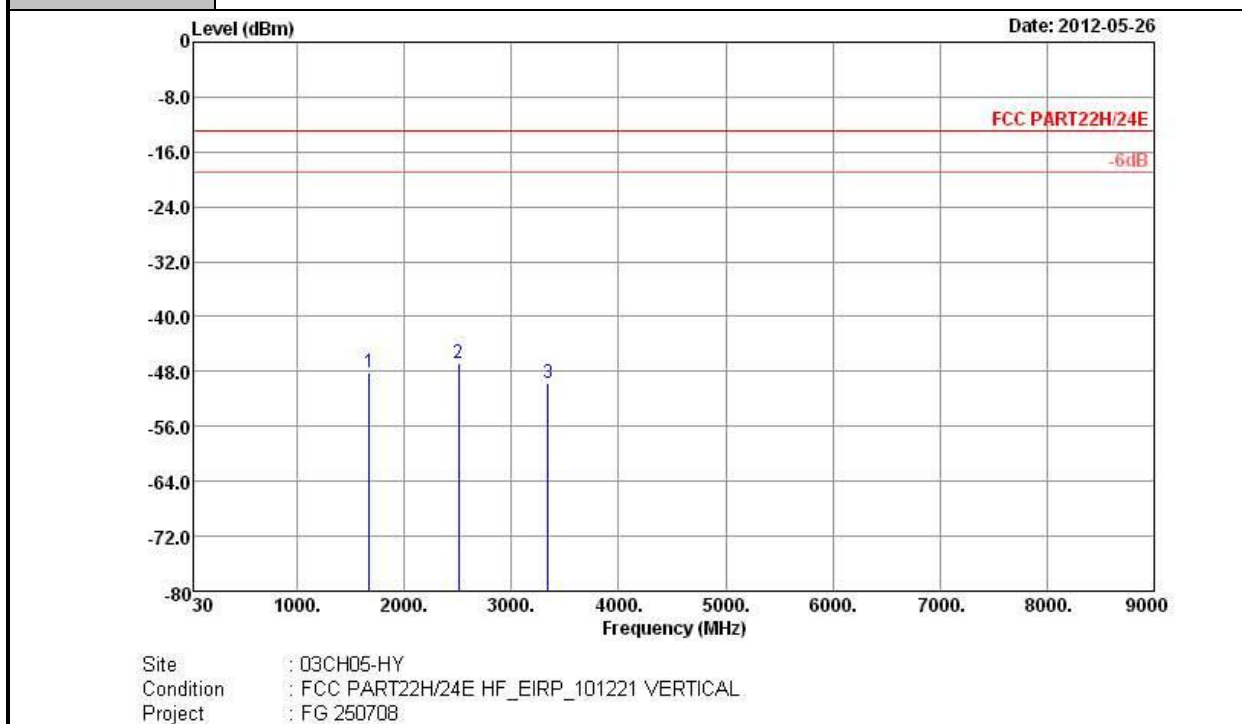
<b>Band :</b>	GSM850	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-51.04	-13	-38.04	-57.17	-52.23	2.15	5.49	H	Pass
2509	-49.00	-13	-36.00	-58.23	-50.89	2.38	6.41	H	Pass
3345	-48.29	-13	-35.29	-59.85	-51.62	2.86	8.34	H	Pass



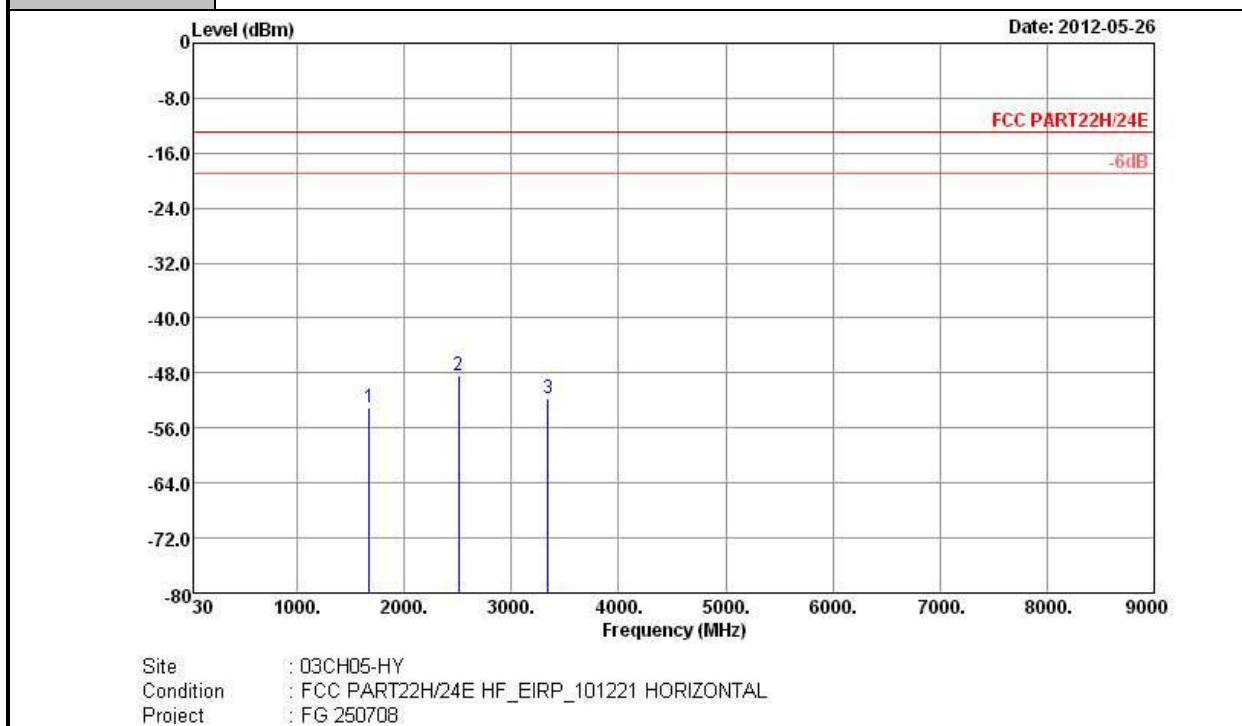
<b>Band :</b>	GSM850	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-48.13	-13	-35.13	-54.21	-49.32	2.15	5.49	V	Pass
2509	-46.72	-13	-33.72	-55.97	-48.61	2.38	6.41	V	Pass
3345	-49.67	-13	-36.67	-61.27	-53	2.86	8.34	V	Pass

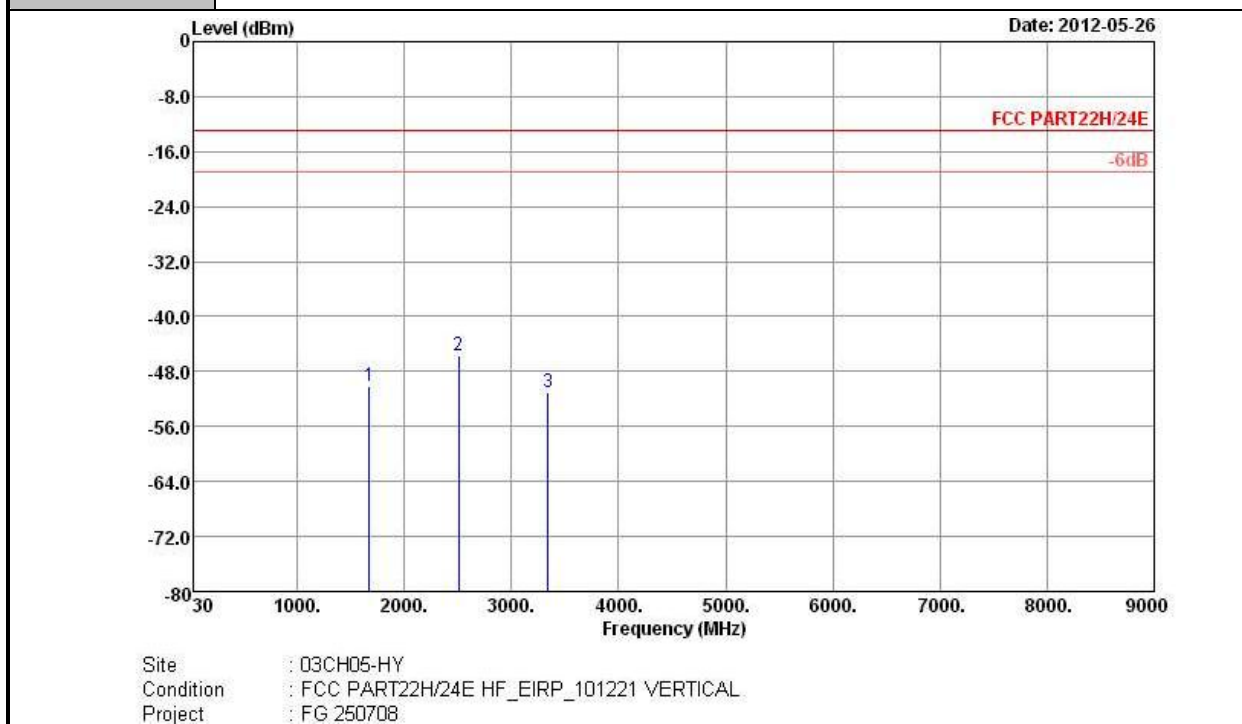


<b>Band :</b>	GSM850	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-53.03	-13	-40.03	-59.01	-54.22	2.15	5.49	H	Pass
2509	-48.46	-13	-35.46	-57.76	-50.35	2.38	6.41	H	Pass
3345	-51.74	-13	-38.74	-63.24	-55.07	2.86	8.34	H	Pass

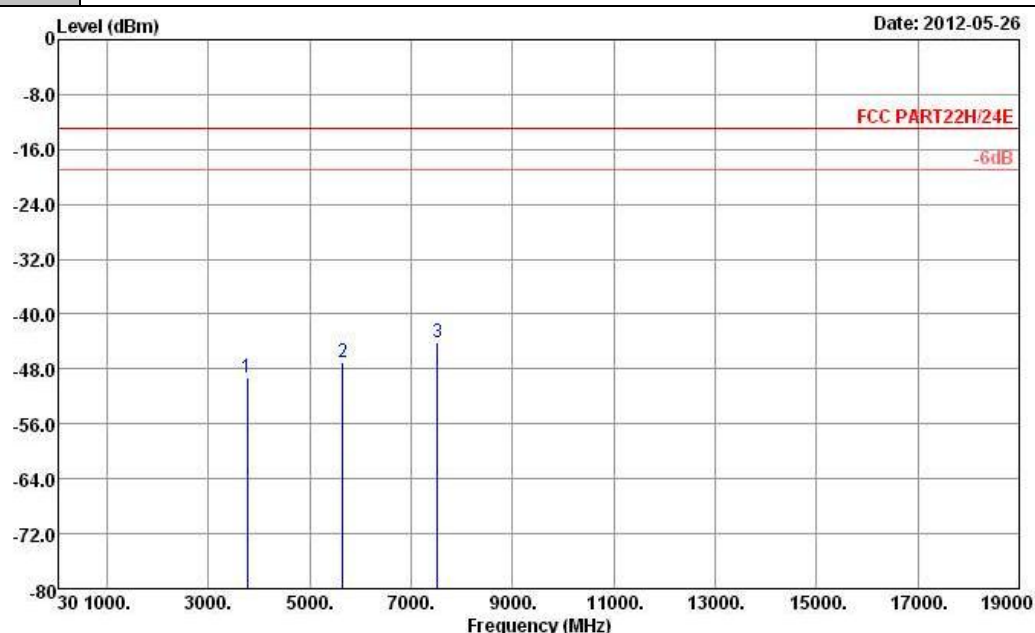
<b>Band :</b>	GSM850	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-50.16	-13	-37.16	-56.27	-51.35	2.15	5.49	V	Pass
2509	-45.72	-13	-32.72	-55	-47.61	2.38	6.41	V	Pass
3345	-51.01	-13	-38.01	-62.52	-54.34	2.86	8.34	V	Pass



<b>Band :</b>	GSM1900	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

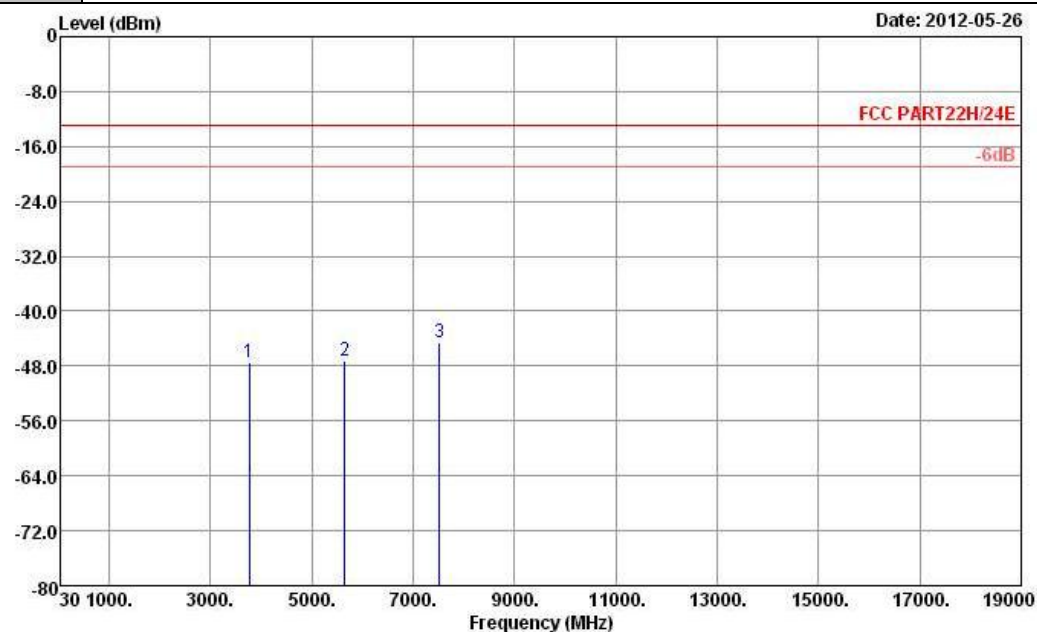


Site : 03CH05-HY  
 Condition : FCC PART22H/24E HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 250708

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	-49.18	-13	-36.18	-62.68	-55.31	2.9292	9.06	H	Pass
5640	-47.09	-13	-34.09	-66.08	-54.01	3.9072	10.83	H	Pass
7520	-44.17	-13	-31.17	-66.08	-52.19	4.5988	12.62	H	Pass



<b>Band :</b>	GSM1900	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	GPRS 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



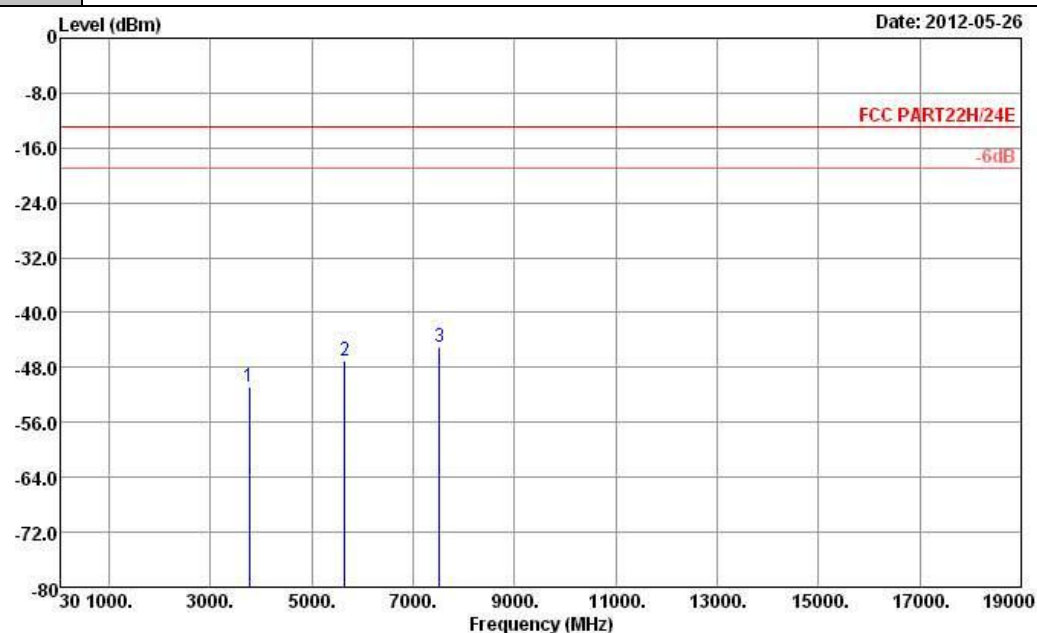
Site : 03CH05-HY  
Condition : FCC PART22H/24E HF\_EIRP\_101221 VERTICAL  
Project : FG 250708

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	-47.38	-13	-34.38	-60.81	-53.51	2.9292	9.06	V	Pass
5640	-47.19	-13	-34.19	-66.04	-54.11	3.9072	10.83	V	Pass
7520	-44.56	-13	-31.56	-66.5	-52.58	4.5988	12.62	V	Pass





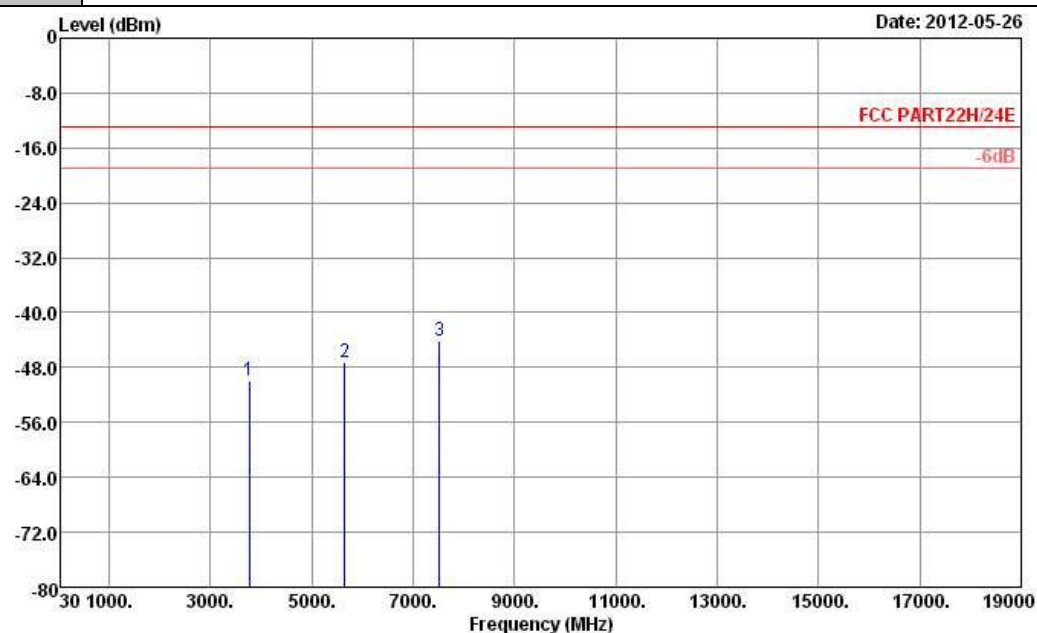
<b>Band :</b>	GSM1900	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-50.78	-13	-37.78	-64.21	-56.91	2.9292	9.06	H	Pass
5640	-47.11	-13	-34.11	-65.99	-54.03	3.9072	10.83	H	Pass
7520	-45.01	-13	-32.01	-66.93	-53.03	4.5988	12.62	H	Pass



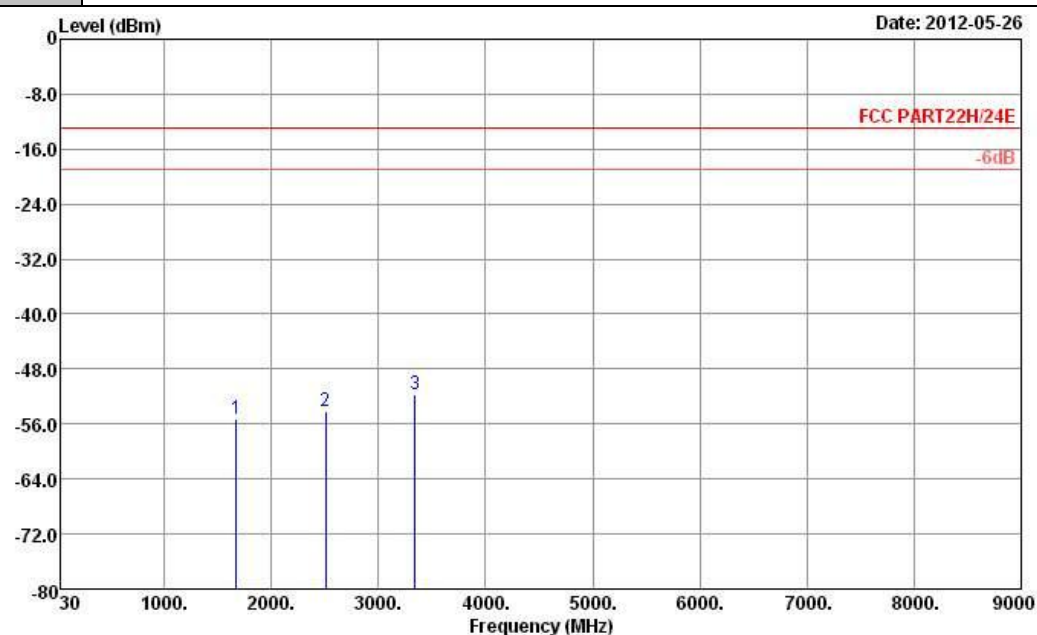
<b>Band :</b>	GSM1900	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	EDGE 8 Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY  
Condition : FCC PART22H/24E HF\_EIRP\_101221 VERTICAL  
Project : FG 250708

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	-49.92	-13	-36.92	-63.39	-56.05	2.9292	9.06	V	Pass
5640	-47.21	-13	-34.21	-66.28	-54.13	3.9072	10.83	V	Pass
7520	-44.22	-13	-31.22	-66.25	-52.24	4.5988	12.62	V	Pass

<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

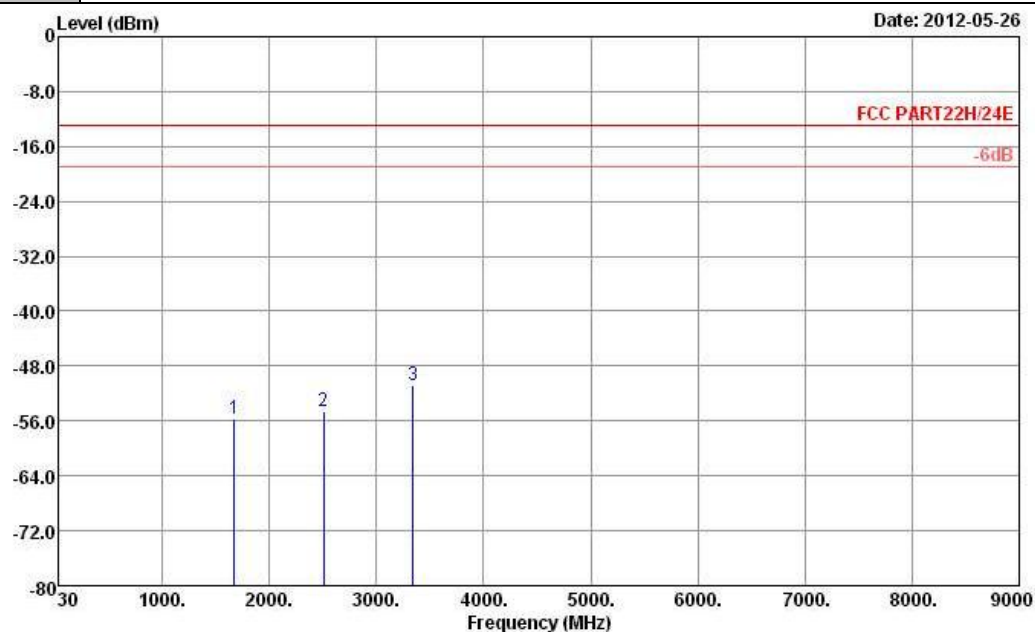


Site : 03CH05-HY  
 Condition : FCC PART22H/24E HF\_EIRP\_101221 HORIZONTAL  
 Project : FG 250708

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	-55.32	-13	-42.32	-61.5	-56.51	2.15	5.49	H	Pass
2509	-54.23	-13	-41.23	-63.62	-56.12	2.38	6.41	H	Pass
3345	-51.70	-13	-38.70	-63.33	-55.03	2.86	8.34	H	Pass



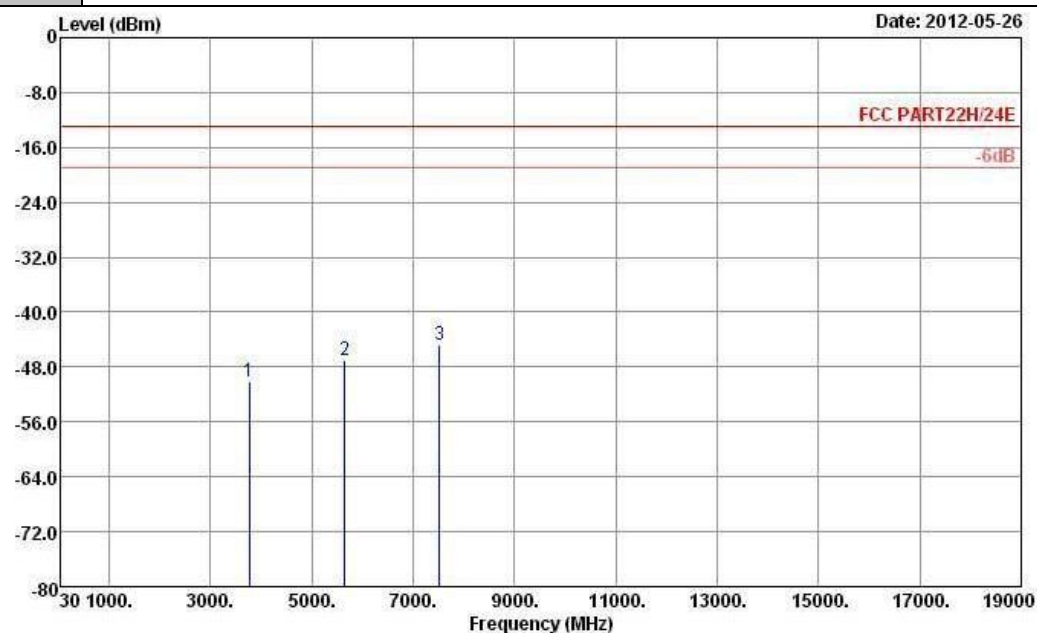
<b>Band :</b>	WCDMA Band V	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-55.81	-13	-42.81	-61.73	-57	2.15	5.49	V	Pass
2509	-54.57	-13	-41.57	-64.01	-56.46	2.38	6.41	V	Pass
3345	-50.70	-13	-37.70	-62.32	-54.03	2.86	8.34	V	Pass



<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

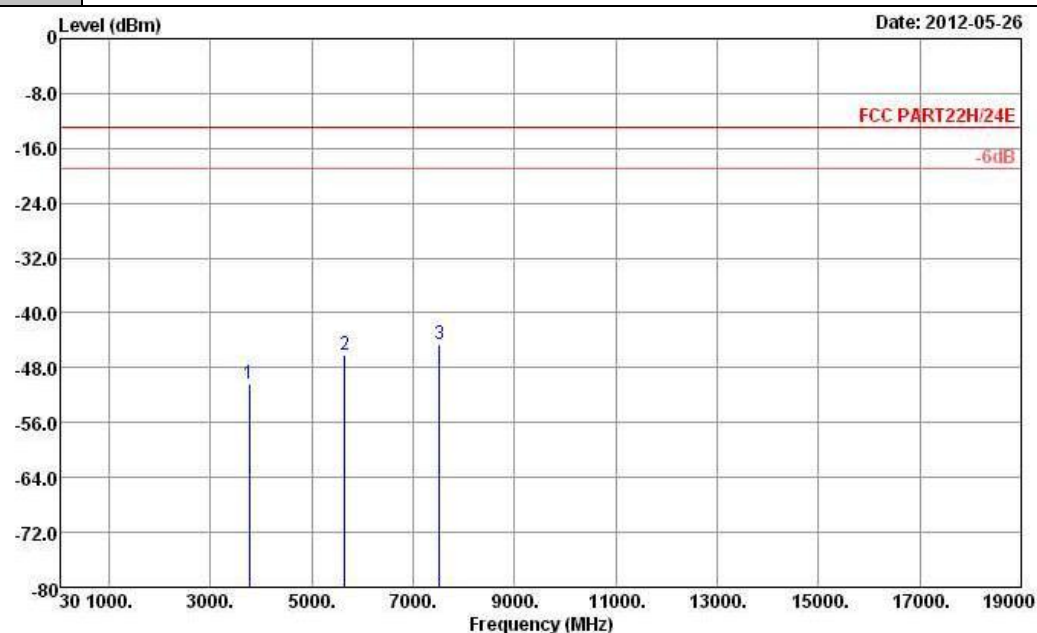


Site : 03CH05-HY  
Condition : FCC PART22H/24E HF\_EIRP\_101221 HORIZONTAL  
Project : FG 250708

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	-50.25	-13	-37.25	-63.97	-56.38	2.9292	9.06	H	Pass
5640	-47.11	-13	-34.11	-66.07	-54.03	3.9072	10.83	H	Pass
7520	-44.89	-13	-31.89	-66.8	-52.91	4.5988	12.62	H	Pass



<b>Band :</b>	WCDMA Band II	<b>Temperature :</b>	22~24°C
<b>Test Mode :</b>	RMC 12.2Kbps Link	<b>Relative Humidity :</b>	50~52%
<b>Test Engineer :</b>	David Yang	<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 PART22H/24E HF\_EIRP\_101221 VERTICAL  
Project : FG 250708

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	-50.28	-13	-37.28	-63.78	-56.41	2.9292	9.06	V	Pass
5640	-46.08	-13	-33.08	-64.91	-53	3.9072	10.83	V	Pass
7520	-44.49	-13	-31.49	-66.62	-52.51	4.5988	12.62	V	Pass

### **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.

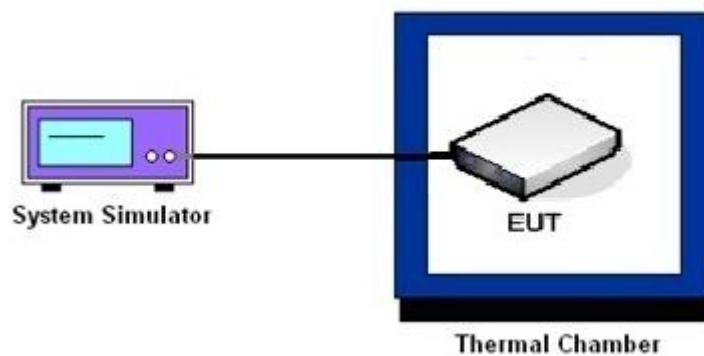
#### **3.8.3 Test Procedures for Temperature Variation**

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		

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	33	0.04	-30	-0.04	PASS
-20	29	0.03	28	0.03	
-10	-35	-0.04	34	0.04	
0	-29	-0.03	29	0.03	
10	-37	-0.04	24	0.03	
20	-40	-0.05	25	0.03	
30	-45	-0.05	27	0.03	
40	-47	-0.06	22	0.03	
50	-37	-0.04	-28	-0.03	

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

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-62	-0.03	-45	-0.02	PASS
-20	-59	-0.03	-42	-0.02	
-10	-55	-0.03	-38	-0.02	
0	-74	-0.04	-46	-0.02	
10	-64	-0.03	-52	-0.03	
20	-69	-0.04	-48	-0.03	
30	-75	-0.04	-46	-0.02	
40	-76	-0.04	-51	-0.03	
50	-79	-0.04	-51	-0.03	

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

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-21	-0.02	PASS
-20	-18	-0.02	
-10	-14	-0.02	
0	-16	-0.02	
10	-12	-0.01	
20	-21	-0.02	
30	-20	-0.02	
40	-16	-0.02	
50	-19	-0.02	

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

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-37	-0.02	PASS
-20	-34	-0.02	
-10	-32	-0.02	
0	-37	-0.02	
10	-36	-0.02	
20	-38	-0.02	
30	-43	-0.02	
40	-42	-0.02	
50	-45	-0.02	

**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	12	-34	-0.04	2.5	PASS
		BEP	-41	-0.05		
		28	-39	-0.05		
	EDGE 8	12	28	0.03		
		BEP	24	0.03		
		28	-43	-0.05		
GSM 1900 CH661	GPRS 8	12	-69	-0.04		
		BEP	-73	-0.04		
		28	-81	-0.04		
	EDGE 8	12	-45	-0.02		
		BEP	-48	-0.03		
		28	-59	-0.03		
WCDMA Band V CH4182	RMC 12.2Kbps	12	-23	-0.03		
		BEP	-19	-0.02		
		28	-16	-0.02		
WCDMA Band II CH9400	RMC 12.2Kbps	12	-33	-0.02		
		BEP	-40	-0.02		
		28	-49	-0.03		

**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. 28, 2011	May 17, 2012 ~ Jun. 19, 2012	Jul. 27, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	May 17, 2012 ~ Jun. 19, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	May 17, 2012 ~ Jun. 19, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 27, 2011	May 17, 2012 ~ Jun. 19, 2012	Jul. 26, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	May 26, 2012 ~ Jun. 08, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	May 26, 2012 ~ Jun. 08, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	May 26, 2012 ~ Jun. 08, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	May 26, 2012 ~ Jun. 08, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz ~ 18GHz	Aug. 04, 2011	May 26, 2012 ~ Jun. 08, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103A	161075	10Hz ~ 1000MHz Gain:32dB	Feb. 27, 2012	May 26, 2012 ~ Jun. 08, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-00 101800-30-1	159087	1GHz~18GHz	Feb. 27, 2012	May 26, 2012 ~ Jun. 08, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Aug. 30, 2011	May 26, 2012 ~ Jun. 08, 2012	Aug. 29, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	May 26, 2012 ~ Jun. 08, 2012	Jul. 28, 2012	Radiation (03CH05-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 21, 2011	May 26, 2012 ~ Jun. 08, 2012	Oct. 20, 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 EP250708 as below.