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## Report On

Application for Grant of Equipment Authorization of the  
Novatel Wireless Inc.

MiFi 5792 Personal Wireless Router

FCC CFR 47 Part 2, Part 22 and Part 24  
IC RSS-Gen, RSS-132 and RSS-133

Report No. SC1206183B-1

July 2012

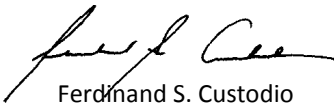


**REPORT ON** Radio Testing of the  
Novatel Wireless Inc.  
Personal Wireless Router

**TEST REPORT NUMBER** SC1206183B-1

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**DATED** July 12, 2012



**Revision History**

SC1206183B-1 Novatel Wireless Inc. MiFi 5792 Personal Wireless Router					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
07/12/12	Initial Release				Ferdinand Custodio
07/20/12	Initial Release	1	Minor information updates	9,10,17,23,26	Chip Fleury



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## **SECTION 1**

### **REPORT SUMMARY**

Radio Testing of the  
Novatel Wireless Inc.  
Personal Wireless Router



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. Personal Wireless Router to the requirements of the following:

- FCC CFR 47 Part 2, Part 22 and Part 24
- IC RSS-Gen, RSS-132 and RSS-133.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Novatel Wireless Inc.
Model Number(s)	MiFi-5792
FCC ID Number	PKRNVWMIFI5792
IC Number	3229A-MIFI5792
Serial Number(s)	SA310512700012
Number of Samples Tested	1
Test Specification/Issue/Date	<ul style="list-style-type: none"><li>• FCC CFR 47 Part 2, Part 22 and Part 24 (October 1, 2011).</li><li>• RSS-132 - Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz (Issue 2, September 2005).</li><li>• RSS-133 – 2 GHz Personal Communications Services (Issue 5, February 2009).</li><li>• RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).</li></ul>
Start of Test	June 28, 2012
Finish of Test	July 12, 2012
Name of Engineer(s)	Juan Manuel Gonzalez Ferdie Custodio Chip Fleury
Related Document(s)	None. Supporting documents for EUT certification are separate exhibits.



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2, Part 22 and Part 24 with cross-reference to the corresponding IC RSS standard is shown below.

Section	FCC Part Sections(s)	RSS Section(s)	Test Description	Result
2.1	2.1046	RSS-132(4.4),RSS-133(4.1)	Transmitter Conducted Output Power	Compliant (RF Exposure Test Report)
2.2	22.913(a)(2), 2.1046	RSS-132(4.4),SRSP-503(5.1.3)	Effective Radiated Power	Compliant
2.3	24.232(c),2.1046	RSS-133(6.4),SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	Compliant
2.4	2.1049,22.917(b), 24.238(b)	RSS-Gen(4.6.1)	Occupied Bandwidth	Compliant
2.5	24.232(d)	RRSS-133(6.4)	Peak-Average Ratio	Compliant
2.6	2.1051,22.917(a), 24.238(a)	RSS-132(4.5.1),RSS-133(6.5.1)	Band Edge/Conducted Spurious Emissions	Compliant
2.7	2.1053,22.917(a), 24.238(a)	RSS-132(4.5.1),RSS-133(6.5.1)	Field Strength Of Spurious Radiation	Compliant
2.8	2.1055,22.355,24.235	RSS-132(4.3),RSS-133(6.3)	Frequency Stability	Compliant
2.9		RSS-132(4.6),RSS-133(6.6)	Receiver Spurious Emissions	Compliant
2.10		RSS-Gen 7.2.4	Power Line Conducted Emission	Compliant



### **1.3 PRODUCT INFORMATION**

#### **1.3.1 EUT General Description**

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MiFi 5792 Personal Wireless Router as shown in the photograph below. The EUT creates a personal Wi-Fi cloud, capable of sharing high-speed 4G LTE and 3G Mobile Broadband Internet connectivity with up to 10 Wi-Fi-enabled devices simultaneously.





### 1.3.2 EUT General Description

EUT Description	MiFi 5792 Personal Wireless Router
Model Number(s)	MiFi 5792
FCC Classification	PCB - PCS Licensed Transmitter
Rated Voltage	4.35VDC Nominal voltage.
Mode	GSM/EGPRS/UMTS/4G-LTE
Capability	850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 2,4,5 and 17 LTE, 802.11 b/g/n WLAN
Frequency Tolerance	±0.00025% (2.5ppm)
Primary Unit (EUT)	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
Antenna Type	Integral. Planar Inverted F type
Antenna Gain	[17]700MHz = -3.4dBi [B5]800MHz = -1.8dBi [B4]1700MHz = 0.6dBi [B2]1900MHz = 0.4dBi [B1]2100MHz = -1.2dBi



**1.3.3 Transmit Frequency Table**

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (dBm)	Max. Power (W)
GSM850	824.2-848.8	240KGXW	30.00	1.000
EDGE850	824.2-848.8	248KG7W	29.72	0.938
GSM1900	1850.2-1909.8	240GXW	32.79	1.900
EDGE1900	1850.2-1909.8	249G7W	32.74	1.880
WCDMA850	824-849	4M17F9W	22.62	0.138
WCDMA1900	1850-1910	4M17F9W	24.81	0.303
<b>LTE Band 2</b>				
1.4 MHz BW	1850-1910	1M10G7D	24.41	0.276
1.4 MHz BW	1850-1910	1M10W7D	25.50	0.355
3.0 MHz BW	1850-1910	2M70G7D	24.66	0.292
3.0 MHz BW	1850-1910	2M68W7D	25.00	0.316
5.0 MHz BW	1850-1910	4M52G7D	25.35	0.343
5.0 MHz BW	1850-1910	4M52W7D	25.56	0.360
10.0 MHz BW	1850-1910	9M07G7D	25.64	0.366
10.0 MHz BW	1850-1910	9M07W7D	25.67	0.369
15.0 MHz BW	1850-1910	13M6G7D	24.67	0.293
15.0 MHz BW	1850-1910	13M6W7D	25.91	0.390
20.0 MHz BW	1850-1910	18M3G7D	25.74	0.375
20.0 MHz BW	1850-1910	18M3W7D	25.78	0.378
<b>LTE Band 5</b>				
1.4 MHz BW	824-849	1M10G7D	24.51	0.282
1.4 MHz BW	824-849	1M10W7D	24.99	0.316
3.0 MHz BW	824-849	2M69G7D	23.84	0.242
3.0 MHz BW	824-849	2M68W7D	23.65	0.232
5.0 MHz BW	824-849	4M50G7D	24.52	0.283
5.0 MHz BW	824-849	4M50W7D	24.67	0.293
10.0 MHz BW	824-849	9M00G7D	24.34	0.272
10.0 MHz BW	824-849	9M00W7D	24.48	0.281

**1.4 EUT TEST CONFIGURATION**

**1.4.1 Test Configuration Description**

Test Configuration	Description
A	Conducted Emission test setup. EUT powered by USB AC adapter/charger. EUT transmitting max. power.
B	Radiated Emission test setup. Fresh batteries installed before each test. EUT transmitting max. power.
C	Conducted antenna port test setup. EUT powered via battery and USB connected to support laptop.

**Note:** Antenna port is for service function only and is not accessible to the end user.

**1.4.2 EUT Exercise Software**

Test mode of the EUT is updated using QUALCOMM eXtensible Diagnostic Monitor Version 03.14.184 (Production Build) using the support laptop via USB cable.

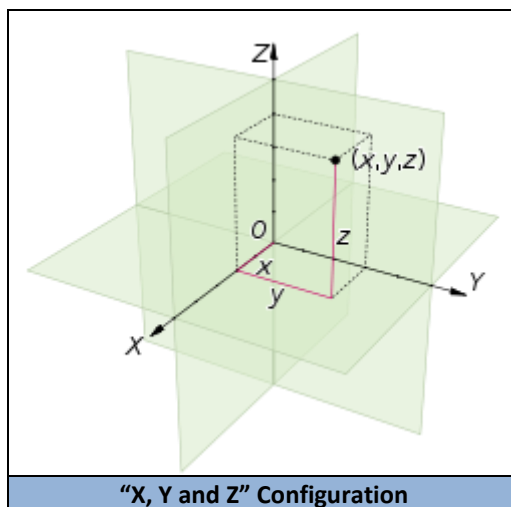
**1.4.3 Support Equipment and I/O cables**

Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	Novatel Wireless Test configuration Laptop #2 PAL50-PC/E396_E362_E371
ASAP	USB cable	0.9m, shielded, Type A to Mini-A connector, style 2725, USB Revision 2.0

**1.4.4 Worst Case Configuration**

Worst-case configuration used in this test report provided by the manufacturer and based from SAR Test Report #: 20120702 (RF Exposure Labs)

EUT is a portable device. For radiated measurements X,Y and Z orientations were verified. Worst case position is "Z".



### 1.4.5 Simplified Test Configuration Diagram

#### Radiated Emissions Setup (Test Configuration A)



#### Conducted Emissions Setup (Test Configuration B)





**1.5 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standards or test plan were made during testing.

**1.6 MODIFICATION RECORD**

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number SA310512700012		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

**1.7 TEST METHODOLOGY**

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements by Substitution method were conducted according to ANSI/TIA/EIA-603-C-2004, August 17,2004. Land Mobile FM or PM -Communications Equipment -Measurement and Performance Standards.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

**1.8 TEST FACILITY**

**1.8.1 FCC – Registration No.: US5281**

TUV SUD America Inc. (San Diego), a §2.498 listed test firm operates the EMC Laboratory registered under Sony Electronics Inc. Product Quality Division EMC. This laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is US5281.

**1.8.2 Industry Canada (IC) Registration No.: 3067A**

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.



**1.9 SAMPLE CALCULATIONS**

**1.9.1 GSM Emission Designator**

Emission Designator = 250KGXW  
 GSM BW = 250 kHz  
 G = Phase Modulation  
 X = Cases not otherwise covered  
 W = Combination (Audio/Data)

**1.9.2 WCDMA Emission Designator**

Emission Designator = 4M15F9W  
 WCDMA BW = 4.15 MHz  
 F = Frequency Modulation  
 9= Composite Digital Info  
 W = Combination (Audio/Data)

**1.9.3 CDMA Emission Designator**

Emission Designator = 1M30F9W  
 F = Frequency Modulation  
 9= Composite Digital Info  
 W = Combination (Audio/Data)

**1.9.4 LTE Emission Designator (QPSK)**

Emission Designator = 4M51G7D  
 G = Phase Modulation  
 7= Quantized/Digital Info  
 D = Combination (Audio/Data)

**1.9.5 LTE Emission Designator (16QAM)**

Emission Designator = 4M52W7D  
 W = Frequency Modulation  
 7= Quantized/Digital Info  
 D = Combination (Audio/Data)

**1.9.6 Spurious Radiated Emission (below 1GHz)**

Measuring equipment raw measurement (dBµV/m) @ 30 MHz		24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3
	Asset# 1172 (cable)	0.3
	Asset# 1016 (preamplifier)	-30.7
	Asset# 1175(cable)	0.3
	Asset# 1002 (antenna)	17.2
Reported QuasiPeak Final Measurement (dBµV/m) @ 30MHz		<b>11.8</b>

**1.9.7 Spurious Radiated Emission – Substitution Method**

Example = 84dBµV/m @ 1413 MHz (numerical sample only)



The field strength reading of 84dB $\mu$ V/m @ 1413 MHz (2<sup>nd</sup> Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dB $\mu$ V/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

$$\begin{aligned} P_{\text{EIRP}} &= -18 \text{ dBm} + 7.8 \text{ dBi} - 1 \text{ dB} \\ &= 11.2 \text{ dBm} \\ P_{\text{ERP}} &= P_{\text{EIRP}} - 2.15 \text{ dB} \\ &= 11.2 \text{ dBm} - 2.15 \text{ dB} \\ &= 9.05 \text{ dBm} \end{aligned}$$



## **SECTION 2**

### **TEST DETAILS**

Radio Testing of the  
Novatel Wireless Inc.  
Personal Wireless Router





## **2.1 TRANSMITTER CONDUCTED POWER MEASUREMENTS**

### **2.1.1 Specification Reference**

Part 2.1046

### **2.1.2 Standard Applicable**

The conducted power measurements were made in accordance to FCC Part 2.1046, RSS-132 and RSS-133

### **2.1.3 Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration B

### **2.1.4 Date of Test/Initial of test personnel who performed the test**

See SAR report #: 20120702 (RF Exposure Labs)

### **2.1.5 Test Equipment Used**

See SAR report #: 20120702 (RF Exposure Labs)

### **2.1.6 Additional Observations**

- The following data was taken directly from the SAR report.

### **2.1.7 Test Results**

See attached table. These are the Conducted port measurements at provided by the RF exposure SAR laboratory and inserted into this report for completion. The data was used to help in determining worst case testing conditions for the remainder of the report.



GPRS-GMSK/1 slot				GPRS-GMSK/2 slot			
Band	Channel	Peak Power	Frame Average	Band	Channel	Peak Power	Frame Average
Cellular	128	33.81	24.78	Cellular	128	30.82	24.80
	190	33.83	24.80		190	30.81	24.79
	251	33.82	24.79		251	30.83	24.81
PCS	512	30.85	21.82	PCS	512	27.82	21.80
	661	30.83	21.80		661	27.85	21.83
	810	30.88	21.85		810	27.86	21.84

GPRS-GMSK/3 slot				GPRS-GMSK/4 slot			
Band	Channel	Peak Power	Frame Average	Band	Channel	Peak Power	Frame Average
Cellular	128	28.97	24.71	Cellular	128	27.79	24.78
	190	28.98	24.71		190	27.76	24.75
	251	28.96	24.70		251	27.77	24.76
PCS	512	25.91	21.65	PCS	512	24.73	21.72
	661	25.93	21.67		661	24.75	21.74
	810	25.92	21.66		810	24.74	21.73

EDGE-8PSK/1 slot				EDGE-8PSK/2 slot			
Band	Channel	Peak Power	Frame Average	Band	Channel	Peak Power	Frame Average
Cellular	128	27.98	18.95	Cellular	128	24.33	18.31
	190	28.01	18.98		190	24.61	18.59
	251	27.99	18.96		251	24.98	18.96
PCS	512	26.49	17.46	PCS	512	23.73	17.71
	661	26.74	17.71		661	23.88	17.86
	810	26.70	17.67		810	23.85	17.83

EDGE-8PSK/3 slot				EDGE-8PSK/4 slot			
Band	Channel	Peak Power	Frame Average	Band	Channel	Peak Power	Frame Average
Cellular	128	22.37	18.11	Cellular	128	21.47	18.46
	190	22.91	18.65		190	21.95	18.94
	251	22.99	18.73		251	21.99	18.98
PCS	512	21.90	17.64	PCS	512	20.76	17.75
	661	21.99	17.73		661	20.94	17.93
	810	21.98	17.72		810	20.98	17.97

3GPP Release Version	Mode	Cellular Band [dBm]			Sub-Test (See Table Below)	MPR
		4132	4183	4233		
99	WCDMA	23.89	23.91	23.87	-	-
6	HSDPA	23.86	23.87	23.79	1	0
6		23.82	23.89	23.85	2	0
6		23.39	23.42	23.37	3	0.5
6		23.94	23.49	23.40	4	0.5
6	HSUPA	23.80	23.90	23.83	1	0
6		21.95	21.99	21.96	2	2
6		22.97	23.08	22.99	3	1
6		22.06	22.01	22.04	4	2
6		23.82	23.84	23.87	5	0



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Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	
						QPSK	16QAM
2	1.4 MHz	6	0	18607	1850.7	23.2	22.1
				18900	1880	23.1	21.9
				19193	1909.3	23.0	22.0
		3	1	18607	1850.7	24.0	23.0
				18900	1880	24.0	22.9
				19193	1909.3	23.8	23.0
		1	0	18607	1850.7	24.0	23.2
				18900	1880	24.0	23.3
				19193	1909.3	23.9	23.1
		1	5	18607	1850.7	24.0	23.0
				18900	1880	24.0	22.9
				19193	1909.3	23.8	23.0
	3 MHz	15	0	18615	1851.5	23.1	22.2
				18900		23.1	22.0
				19185	1908.5	22.9	22.2
		8	3	18615	1851.5	23.4	22.2
				18900	1880	23.3	21.9
				19185	1908.5	23.2	22.1
		1	0	18615	1851.5	24.0	23.2
				18900	1880	24.0	23.3
				19185	1908.5	23.9	23.1
		1	14	18615	1851.5	24.0	23.0
				18900	1880	24.0	23.2
				19185	1908.5	23.9	23.1
	5 MHz	25	0	18625	1852.5	23.1	22.3
				18900	1880	23.0	22.2
				19175	1907.5	22.9	22.2
		12	6	18625	1852.5	23.2	22.0
				18900	1880	23.0	22.0
				19175	1907.5	23.1	22.2
1		0	18625	1852.5	24.0	23.1	
			18900	1880	24.0	23.0	
			19175	1907.5	24.0	23.0	
1		24	18625	1852.5	24.0	22.9	
			18900	1880	24.0	23.1	
			19175	1907.5	23.8	23.0	



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Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	
						QPSK	16QAM
2	10 MHz	50	0	18650	1855	23.2	22.2
				18900	1880	23.0	22.3
				19150	1905	23.0	22.1
		25	12	18650	1855	23.2	22.3
				18900	1880	23.0	22.2
				19150	1905	23.1	22.1
		1	0	18650	1855	24.0	23.1
				18900	1880	24.0	23.3
				19150	1905	24.0	23.2
		1	24	18650	1855	24.0	23.2
				18900	1880	24.0	23.0
				19150	1905	23.9	23.0
	15 MHz	75	0	18675	1857.5	23.2	22.0
				18900	1880	23.0	22.1
				19125	1902.5	23.1	21.9
				18675	1857.5	23.2	22.1
				18900	1880	23.0	22.1
				19125	1902.5	23.0	21.9
		36	19	18675	1857.5	24.0	23.2
				18900	1880	24.0	23.3
				19125	1902.5	24.0	23.3
		1	74	18675	1857.5	24.0	23.1
				18900	1880	24.0	23.2
				19125	1902.5	23.8	23.0
	20 MHz	100	0	18625	1852.5	23.0	22.1
				18900	1880	23.0	22.0
				19175	1907.5	23.2	21.9
		50	25	18700	1860	22.9	22.1
				18900	1880	23.0	22.2
				19100	1900	23.1	22.1
		1	0	18700	1860	24.0	23.3
				18900	1880	24.0	23.3
				19100	1900	24.0	23.2
1		99	18700	1860	24.0	23.1	
			18900	1880	24.0	23.2	
			19100	1900	23.9	23.0	



Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	Power
5	1.4 MHz	6	0	20407	824.7	23.0	22.1
				20525	836.5	23.0	22.2
				20643	848.3	23.1	22.2
		3	1	20407	824.7	24.0	22.9
				20525	836.5	23.9	23.0
				20643	848.3	24.0	23.1
		1	0	20407	824.7	23.9	23.1
				20525	836.5	24.0	23.2
				20643	848.3	24.0	23.2
	1	5	20407	824.7	24.0	23.2	
			20525	836.5	23.9	23.2	
			20643	848.3	24.0	23.4	
	3 MHz	15	0	20415	825.5	23.0	22.0
				20525	836.5	22.9	22.1
				20635	847.5	23.1	22.1
		8	3	20415	825.5	23.0	21.9
				20525	836.5	23.1	22.1
				20635	847.5	23.1	22.0
		1	0	20415	825.5	23.9	23.0
				20525	836.5	24.0	23.1
				20635	847.5	24.0	23.1
	1	14	20415	825.5	24.0	23.4	
			20525	836.5	24.0	23.3	
			20635	847.5	24.0	23.4	
	5 MHz	25	0	20425	826.5	23.1	21.9
				20525	836.5	22.9	21.9
				20625	846.5	23.1	21.9
12		6	20425	826.5	23.0	22.1	
			20525	836.5	23.1	22.1	
			20625	846.5	23.1	22.3	
1		0	20425	826.5	23.8	23.0	
			20525	836.5	24.0	23.2	
			20625	846.5	24.0	23.2	
1	24	20425	826.5	24.0	23.3		
		20525	836.5	24.0	23.3		
		20625	846.5	24.0	23.4		
5	10 MHz	50	0	20450	829	22.9	21.8
				20525	836.5	22.8	21.8
				20600	844	22.8	21.9
		25	12	20450	829	23.0	21.9
				20525	836.5	22.9	21.9
				20600	844	23.0	21.9
		1	0	20450	829	24.0	23.1
				20525	836.5	24.0	23.4
				20600	844	23.9	23.2
		1	24	20450	829	23.9	23.1
				20525	836.5	24.0	23.3
				20600	844	24.0	23.3



## **2.2 EFFECTIVE RADIATED POWER**

### **2.2.1 Specification Reference**

Part 22 Subpart H §22.913(a)(2)

### **2.2.2 Standard Applicable**

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

### **2.2.3 Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration B

### **2.2.4 Date of Test/Initial of test personnel who performed the test**

July 04, 2012/JMG

### **2.2.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.2.6 Environmental Conditions**

Ambient Temperature	22.6°C
Relative Humidity	55.6%
ATM Pressure	99.0 kPa

### **2.2.7 Additional Observations**

- This is a radiated test as per Radiated Power Output method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- The Substitute level reported is the signal generator level with all correction factors (+ transmit antenna gain – transmit cable loss).
- The EUT was verified under all configurations (RB size and offset) and the worst case radiated power reported for each modulation/channel bandwidth.

### **2.2.8 Test Results**

See attached table.



GSM850							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	ERP (dBm)	ERP (Watts)	ERP Limit (dBm)	Margin (dB)
824.2	128.04	31.91	H	29.76	0.946	38.45	8.69
836.6	128.06	32.09	H	29.94	0.986	38.45	8.51
848.8	128.11	32.15	H	30.00	1.000	38.45	8.45
EDGE850							
836.6	127.84	31.87	H	29.72	0.938	38.45	8.73

WCDMA850							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	ERP (dBm)	ERP (Watts)	ERP Limit (dBm)	Margin (dB)
826.4	119.73	23.51	H	21.36	0.137	38.45	17.09
836.6	119.27	23.30	H	21.15	0.130	38.45	17.30
846.6	120.78	24.77	H	22.62	0.183	38.45	15.83

LTE BAND 5							
Freq. (MHz)	Channel BW (MHz)	Mod.	RB Size/Offset	Pol (H/V)	EIRP (dBm)	EIRP (Watt)	Limit (Watt)
824.7	1.4	QPSK	1/0	H	21.98	0.158	2
836.5	1.4	QPSK	1/0	H	24.02	0.252	2
848.3	1.4	QPSK	1/0	H	24.51	0.282	2
824.7	1.4	16-QAM	1/0	H	22.41	0.174	2
836.5	1.4	16-QAM	1/0	H	24.14	0.259	2
848.3	1.4	16-QAM	1/0	H	24.99	0.316	2
825.5	3	QPSK	1/14	H	22.90	0.195	2
836.5	3	QPSK	1/14	H	23.27	0.212	2
847.5	3	QPSK	1/14	H	23.84	0.242	2
825.5	3	16-QAM	1/14	H	22.90	0.195	2
836.5	3	16-QAM	1/14	H	23.28	0.213	2
847.5	3	16-QAM	1/14	H	23.65	0.232	2
826.5	5	QPSK	1/24	H	24.52	0.283	2
836.5	5	QPSK	1/24	H	23.39	0.218	2
846.5	5	QPSK	1/24	H	23.53	0.225	2
826.5	5	16-QAM	1/24	H	24.67	0.293	2
836.5	5	16-QAM	1/24	H	23.45	0.221	2
846.5	5	16-QAM	1/24	H	23.58	0.228	2
829	10	QPSK	1/0	H	21.47	0.140	2
836.5	10	QPSK	1/0	H	24.34	0.272	2
844	10	QPSK	1/0	H	24.31	0.270	2
829	10	16-QAM	1/0	H	21.68	0.147	2
836.5	10	16-QAM	1/0	H	24.48	0.281	2
844	10	16-QAM	1/0	H	24.40	0.275	2



## **2.3 EQUIVALENT ISOTROPIC RADIATED POWER**

### **2.3.1 Specification Reference**

Part 24 Subpart E §24.234(c)

### **2.3.2 Standard Applicable**

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

### **2.3.3 Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration B

### **2.3.4 Date of Test/Initial of test personnel who performed the test**

July 04, 2012/JMG

### **2.3.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.3.6 Environmental Conditions**

Ambient Temperature	22.6°C
Relative Humidity	55.6%
ATM Pressure	99.0 kPa

### **2.3.7 Additional Observations**

- This is a radiated test as per Radiated Power Output method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- The Substitute level reported is the signal generator level with all correction factors (+ transmit antenna gain – transmit cable loss). This level is then converted to ERP using a factor of 2.15.
- The EUT was verified under all configurations (RB size and offset) and the worst case radiated power reported for each modulation/channel bandwidth.

### **2.3.8 Test Results**

See attached table.





America

GSM1900							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	EIRP (dBm)	EIRP (Watts)	EIRP Limit (Watts)	Margin (Watts)
1850.2	129.21	30.78	H	30.94	1.24	2	0.76
1880.0	130.98	32.83	H	32.79	1.90	2	0.10
1909.8	128.95	30.60	H	30.57	1.14	2	0.86
EDGE1900							
1880.0	130.93	32.78	H	32.74	1.88	2	0.12

WCDMA1900							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	EIRP (dBm)	EIRP (Watts)	EIRP Limit (Watts)	Margin (Watts)
1852.4	123.08	24.84	H	25.00	0.303	2	1.697
1880.0	122.97	24.82	H	24.78	0.301	2	1.699
1907.6	122.98	24.94	H	24.91	0.288	2	1.712



America

LTE BAND 2							
Freq. (MHz)	Channel BW (MHz)	Mod.	RB Size/Offset	Pol (H/V)	EIRP (dBm)	EIRP (Watt)	Limit (Watt)
1850.7	1.4	QPSK	1/0	H	24.41	0.276	2
1880	1.4	QPSK	1/0	H	23.61	0.230	2
1909.3	1.4	QPSK	1/0	H	22.12	0.163	2
1850.7	1.4	16-QAM	1/0	H	25.50	0.355	2
1880	1.4	16-QAM	1/0	H	23.41	0.219	2
1909.3	1.4	16-QAM	1/0	H	22.37	0.173	2
1851.5	3	QPSK	1/14	H	24.66	0.292	2
1880	3	QPSK	1/14	H	23.59	0.229	2
1908.5	3	QPSK	1/14	H	20.84	0.121	2
1851.5	3	16-QAM	1/14	H	25	0.316	2
1880	3	16-QAM	1/14	H	23.88	0.244	2
1908.5	3	16-QAM	1/14	H	21.83	0.152	2
1852.5	5	QPSK	1/0	H	25.35	0.343	2
1880	5	QPSK	1/0	H	23.64	0.231	2
1907.5	5	QPSK	1/0	H	22.19	0.166	2
1852.5	5	16-QAM	1/0	H	25.56	0.360	2
1880	5	16-QAM	1/0	H	23.83	0.242	2
1907.5	5	16-QAM	1/0	H	22.26	0.168	2
1855	10	QPSK	1/0	H	25.64	0.366	2
1880	10	QPSK	1/0	H	23.85	0.243	2
1905	10	QPSK	1/0	H	21.50	0.141	2
1855	10	16-QAM	1/0	H	25.67	0.369	2
1880	10	16-QAM	1/0	H	24.16	0.261	2
1905	10	16-QAM	1/0	H	21.61	0.145	2
1857.5	15	QPSK	1/0	H	25.89	0.388	2
1880	15	QPSK	1/0	H	24.67	0.293	2
1902.5	15	QPSK	1/0	H	23.38	0.218	2
1857.5	15	16-QAM	1/0	H	25.91	0.390	2
1880	15	16-QAM	1/0	H	24.95	0.313	2
1902.5	15	16-QAM	1/0	H	23.39	0.218	2
1860	20	QPSK	1/0	H	25.74	0.375	2
1880	20	QPSK	1/0	H	25.50	0.355	2
1900	20	QPSK	1/0	H	24.54	0.284	2
1860	20	16-QAM	1/0	H	25.78	0.378	2
1880	20	16-QAM	1/0	H	25.62	0.365	2
1900	20	16-QAM	1/0	H	24.66	0.292	2



## **2.4 OCCUPIED BANDWIDTH**

### **2.4.1 Specification Reference**

Part 22 Subpart H §22.917(b) and Part 24 Subpart E §24.238(b)

### **2.4.2 Standard Applicable**

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

### **2.4.3 Equipment Under Test and Modification State**

Serial No: SA310512700012 / Default Test Configuration

### **2.4.4 Date of Test/Initial of test personnel who performed the test**

July 2, 3, and 9, 2012/FSC, JMG

### **2.4.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.4.6 Environmental Conditions**

Ambient Temperature	23.9°C
Relative Humidity	45.9%
ATM Pressure	98.9 kPa

### **2.4.7 Additional Observations**

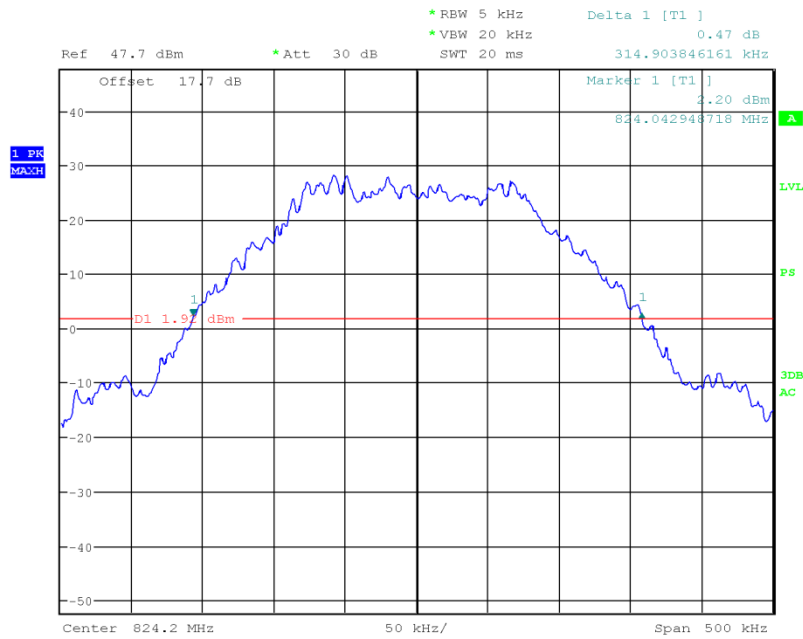
- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- All channels for emission bandwidth verification verified.
- For 26 dB bandwidth, the span was set to encompass the whole emission.
- The RBW is set to 1% of the span while the VBW is 3X RBW.
- The highest level is recorded and 26dBc is drawn from this level.
- The bandwidth where the fundamental emission intersected this line is the 26dB bandwidth.
- For 99% BW, the SA built-in emission bandwidth measurement feature is utilized. The power level setting is set to 99%.

### **2.4.8 Test Results**

See attached plots.

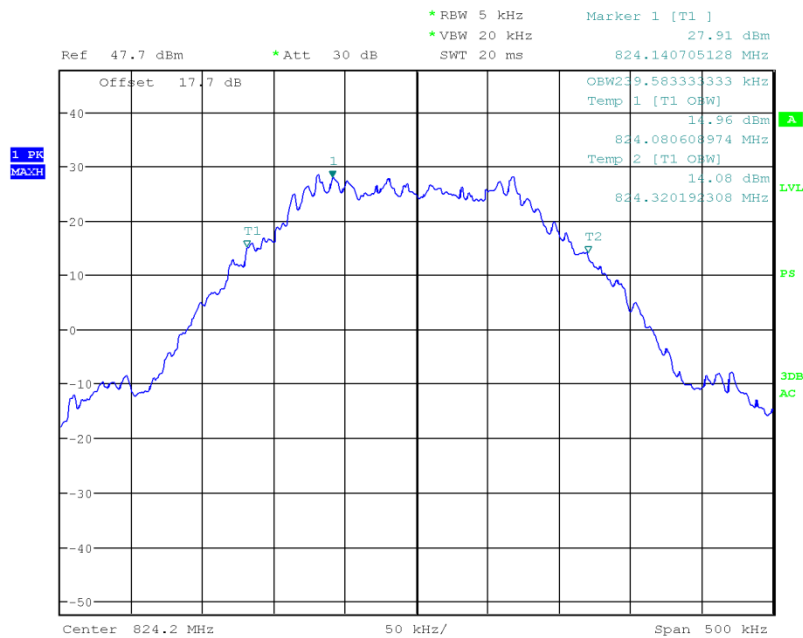


### GSM850 Low Channel -26dB BW



Date: 2.JUL.2012 11:26:34

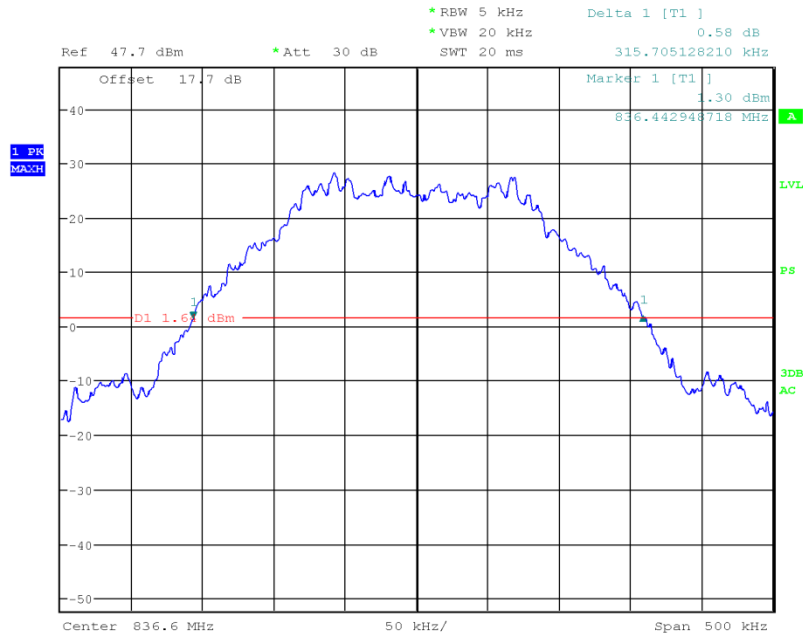
### GSM850 Low Channel 99% BW



Date: 2.JUL.2012 12:16:32

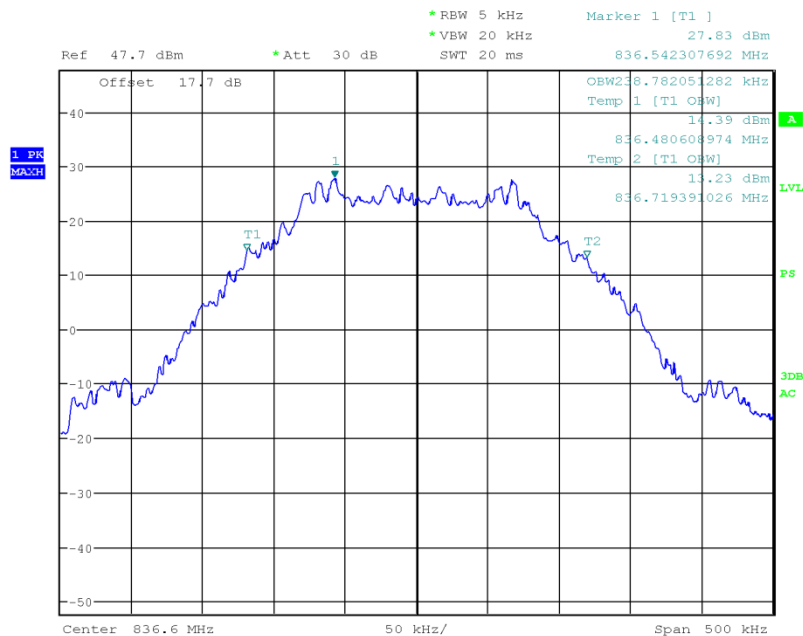


### GSM850 Mid Channel -26dB BW

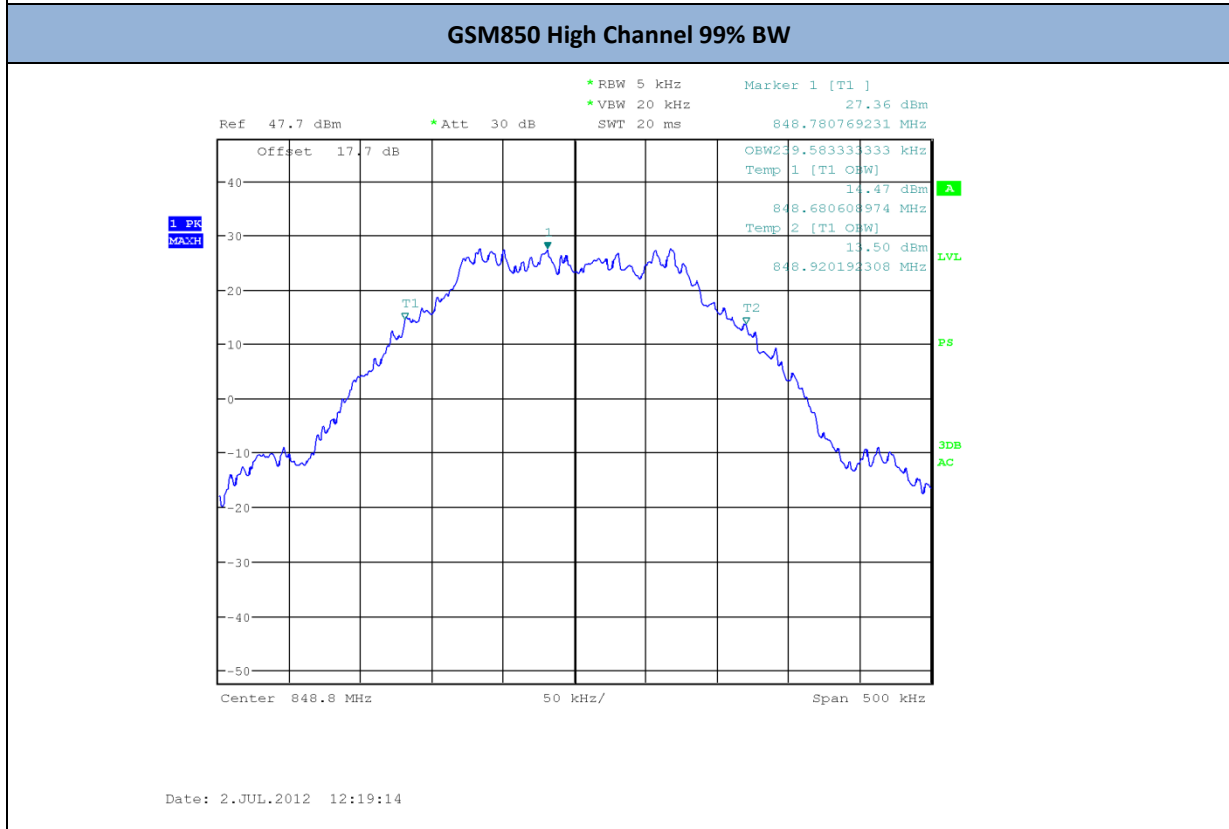
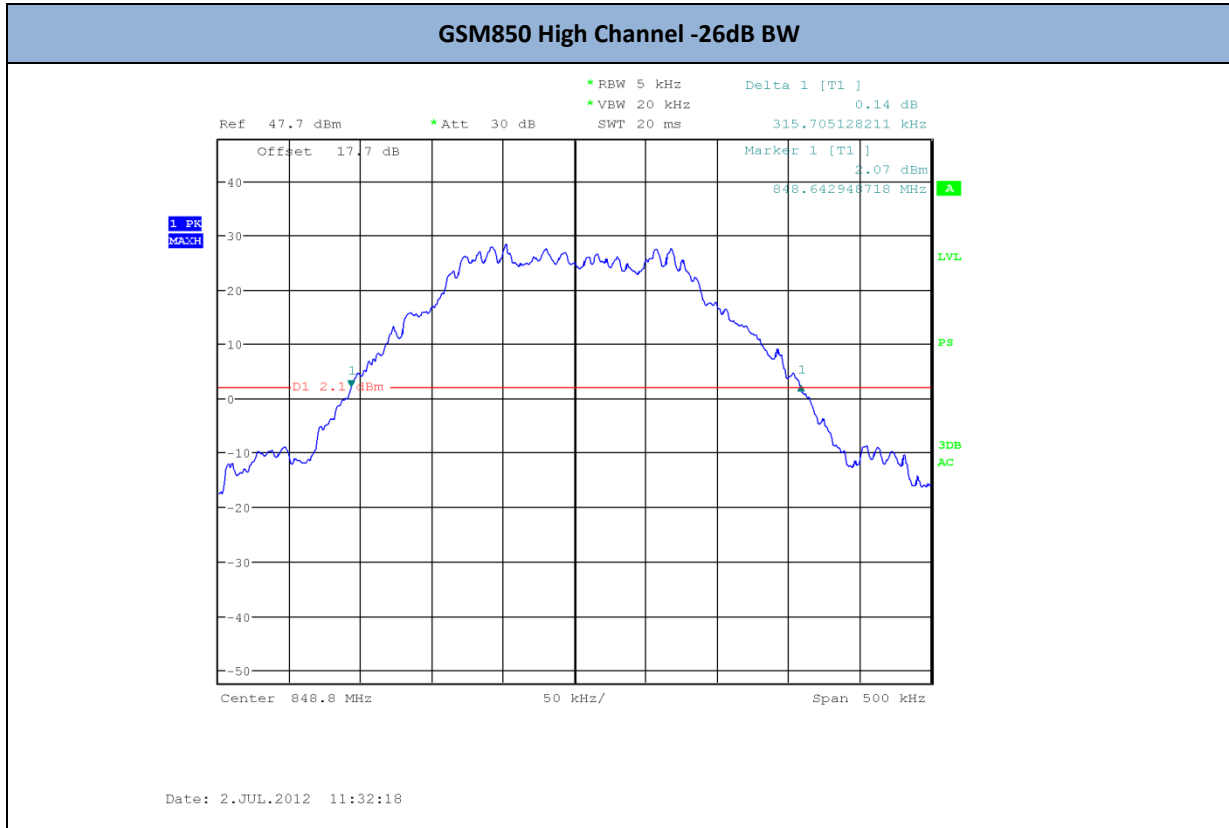


Date: 2.JUL.2012 11:28:18

### GSM850 Mid Channel 99% BW

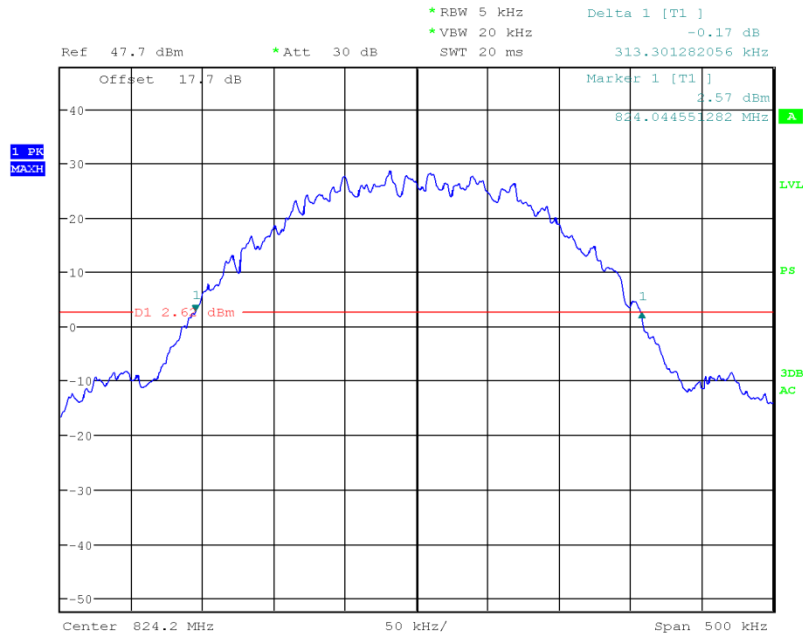


Date: 2.JUL.2012 12:17:40



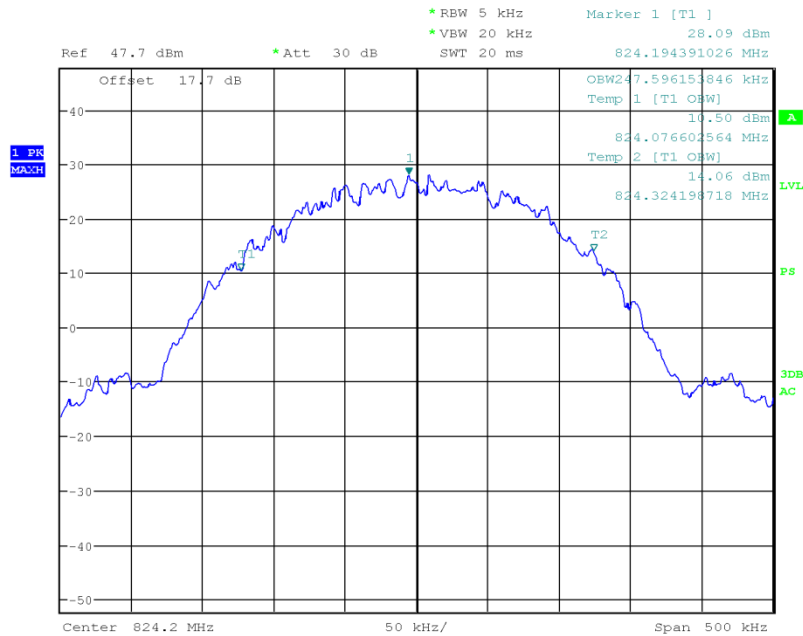


**EDGE850 Low Channel -26dB BW**



Date: 2.JUL.2012 11:43:27

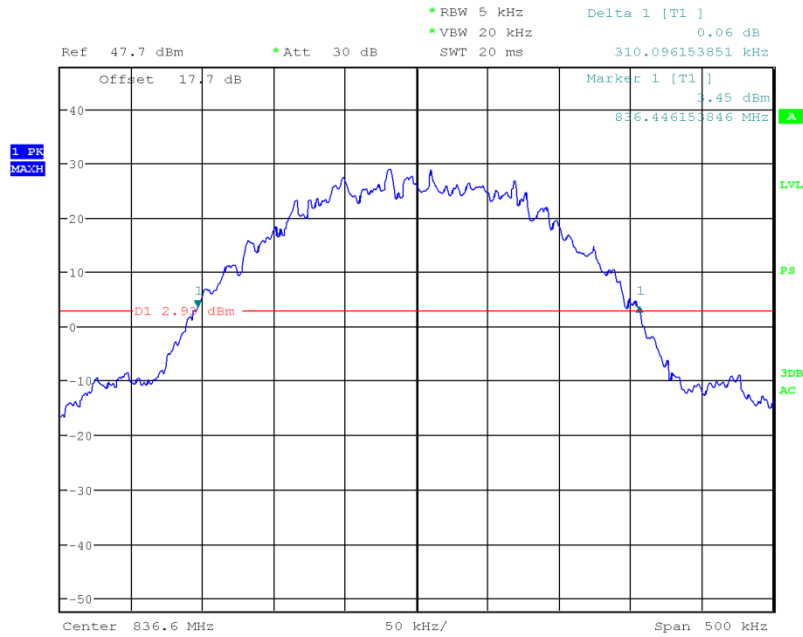
**EDGE850 Low Channel 99% BW**



Date: 2.JUL.2012 12:22:46

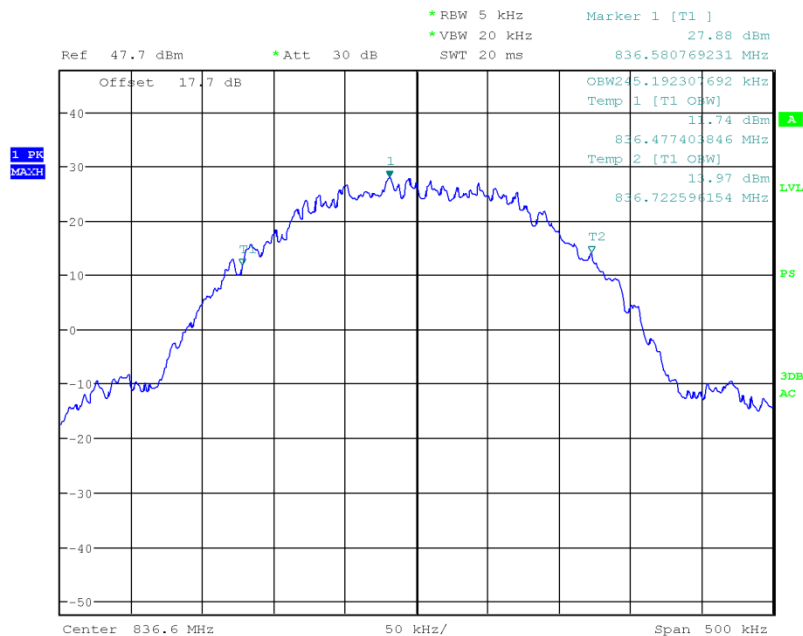


**EDGE850 Mid Channel -26dB BW**



Date: 2.JUL.2012 11:41:02

**EDGE850 Mid Channel 99% BW**

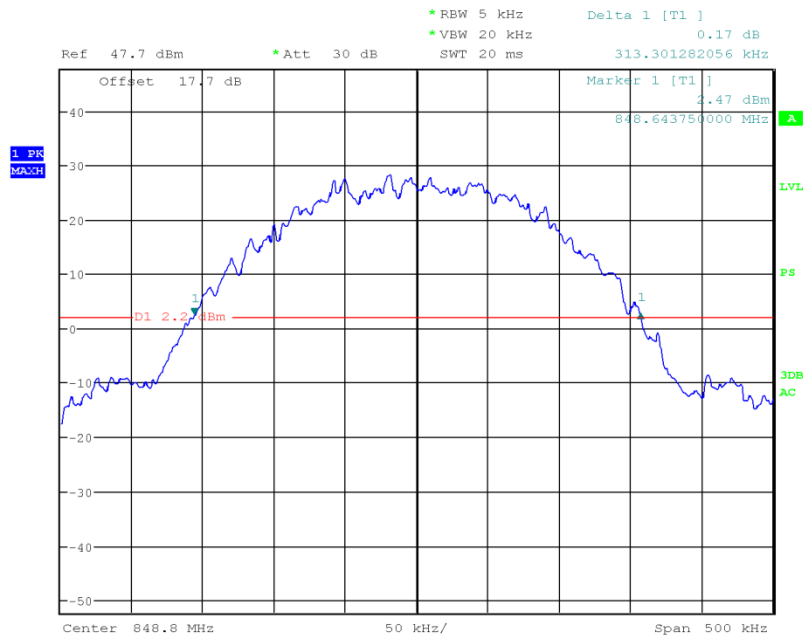


Date: 2.JUL.2012 12:21:40



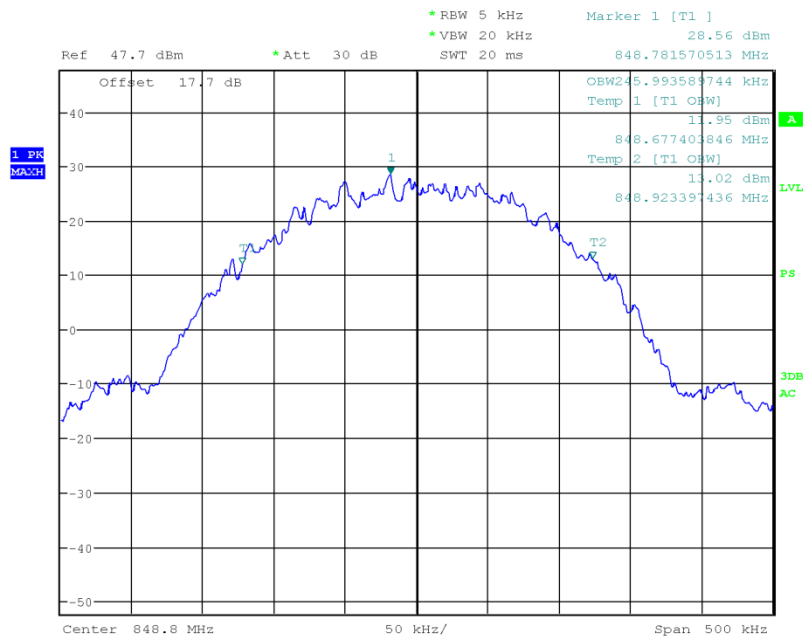


### EDGE850 High Channel -26dB BW



Date: 2.JUL.2012 11:36:22

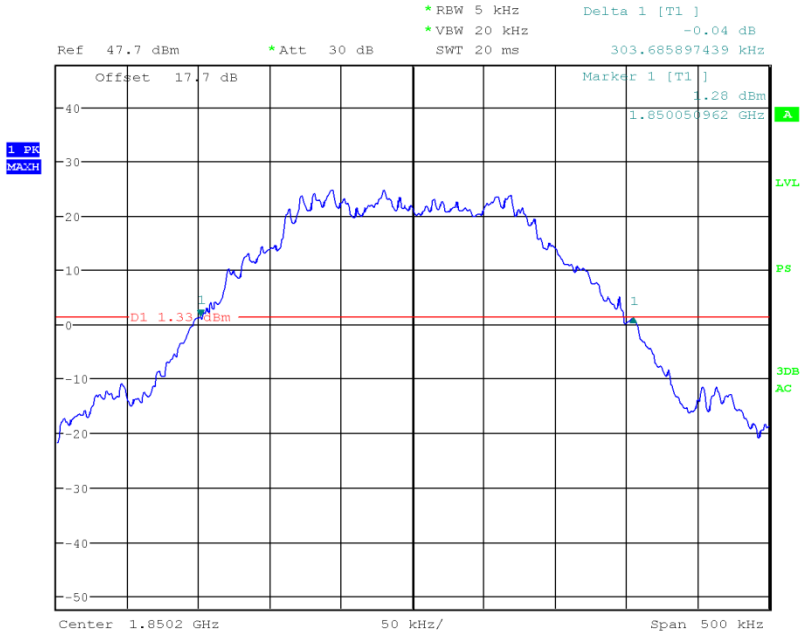
### EDGE850 High Channel 99% BW



Date: 2.JUL.2012 12:20:40

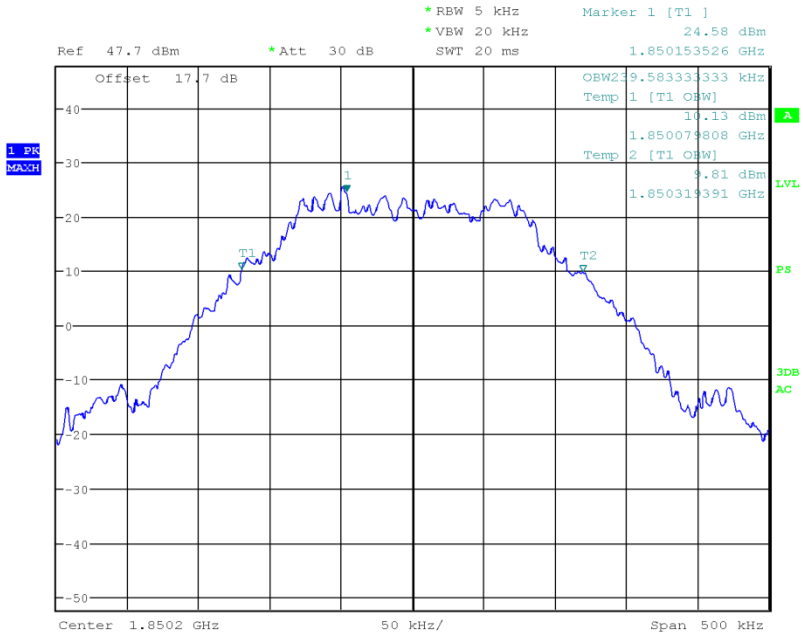


**GSM1900 Low Channel -26dB BW**



Date: 2.JUL.2012 11:49:03

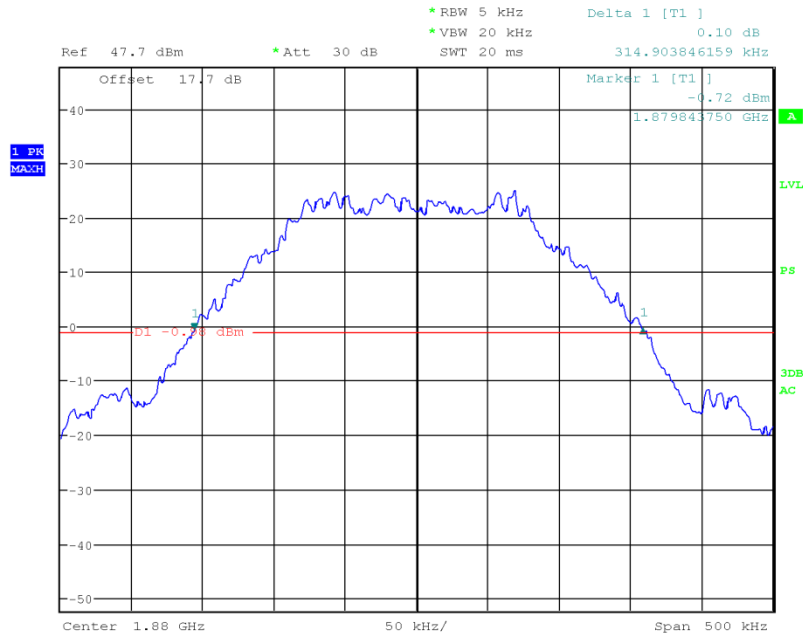
**GSM1900 Low Channel 99% BW**



Date: 2.JUL.2012 12:10:01

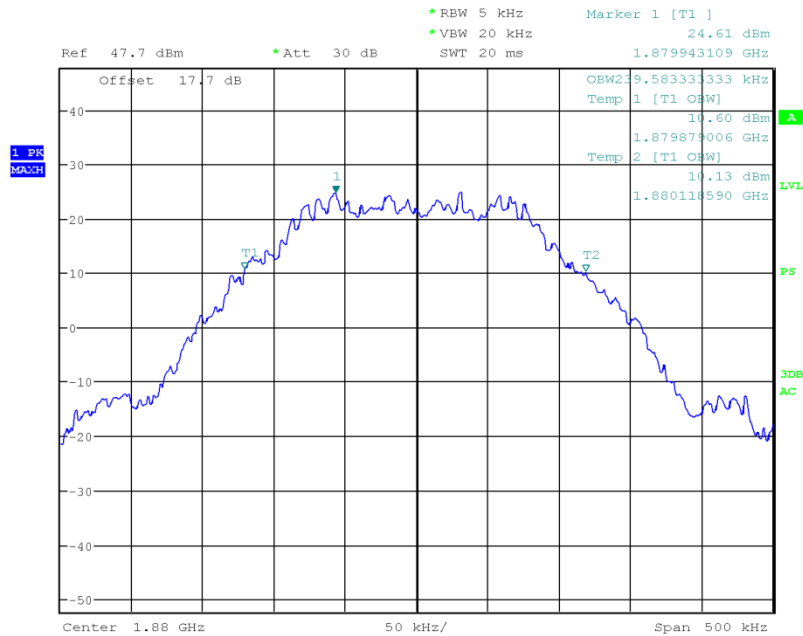


**GSM1900 Mid Channel -26dB BW**



Date: 2.JUL.2012 11:51:38

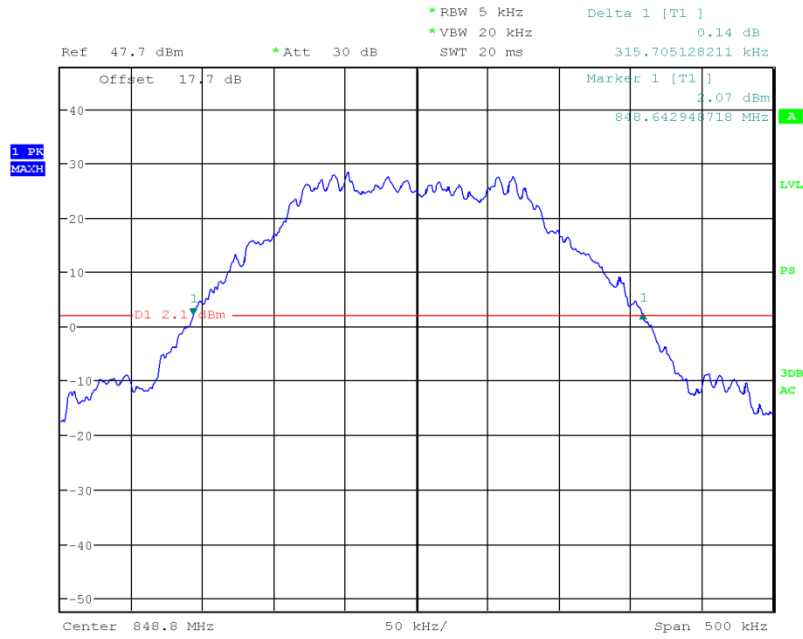
**GSM1900 Mid Channel 99% BW**



Date: 2.JUL.2012 12:08:54

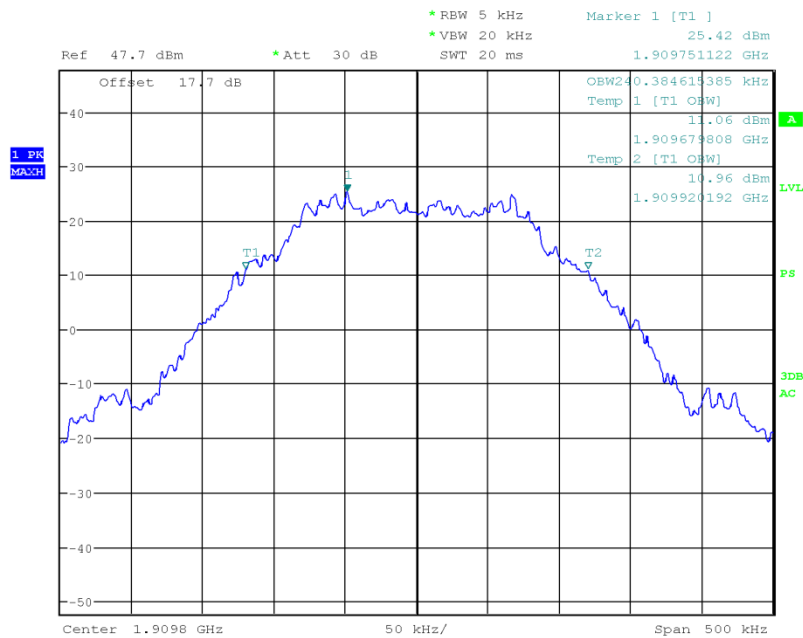


### GSM1900 High Channel -26dB BW



Date: 2.JUL.2012 11:32:18

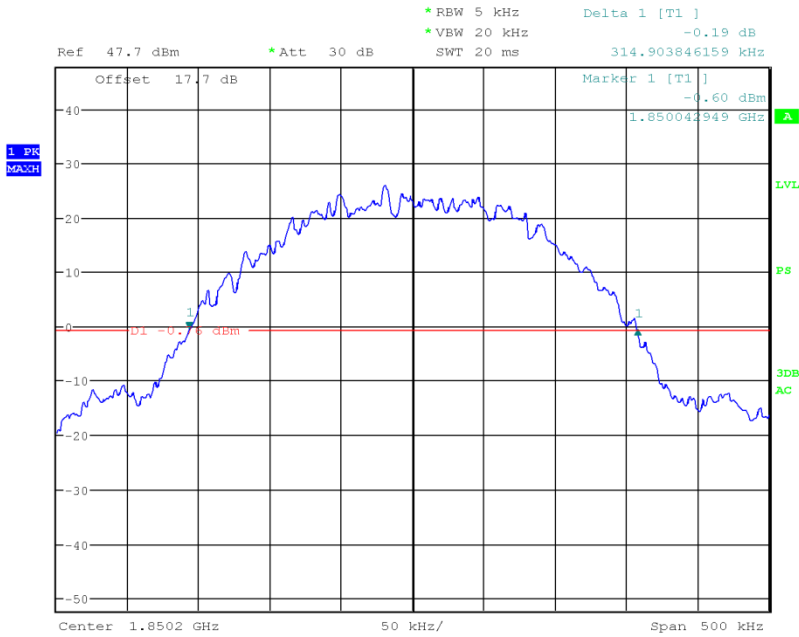
### GSM1900 High Channel 99% BW



Date: 2.JUL.2012 12:07:32

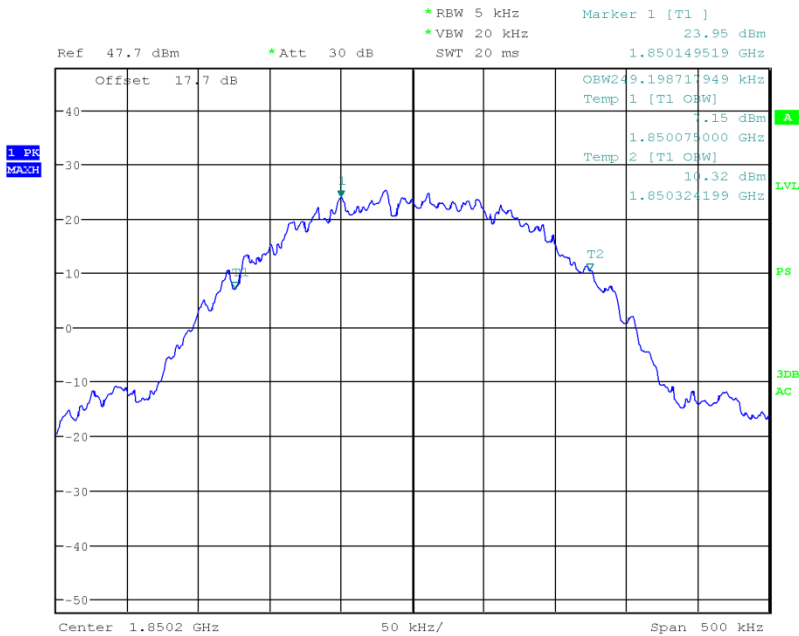


**EDGE1900 Low Channel -26dB BW**



Date: 2.JUL.2012 11:58:42

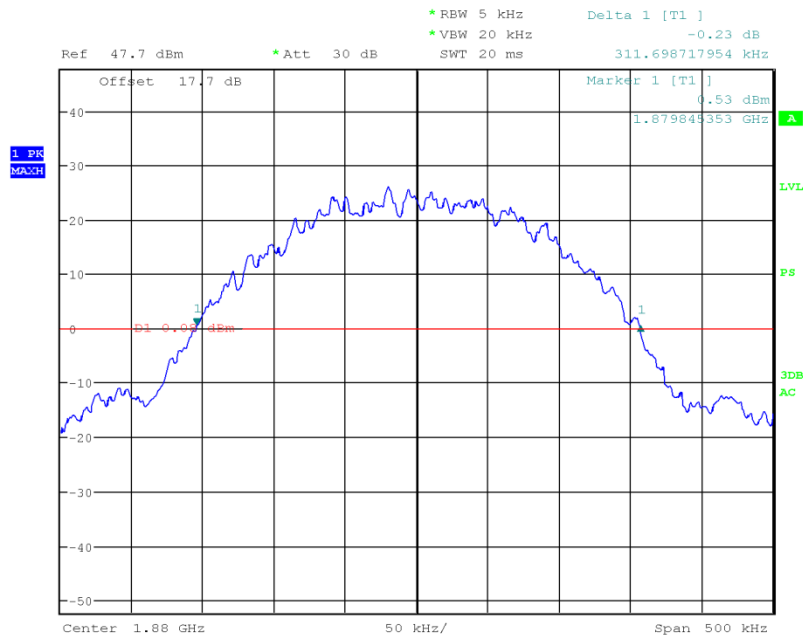
**EDGE1900 Low Channel 99% BW**



Date: 2.JUL.2012 12:03:01

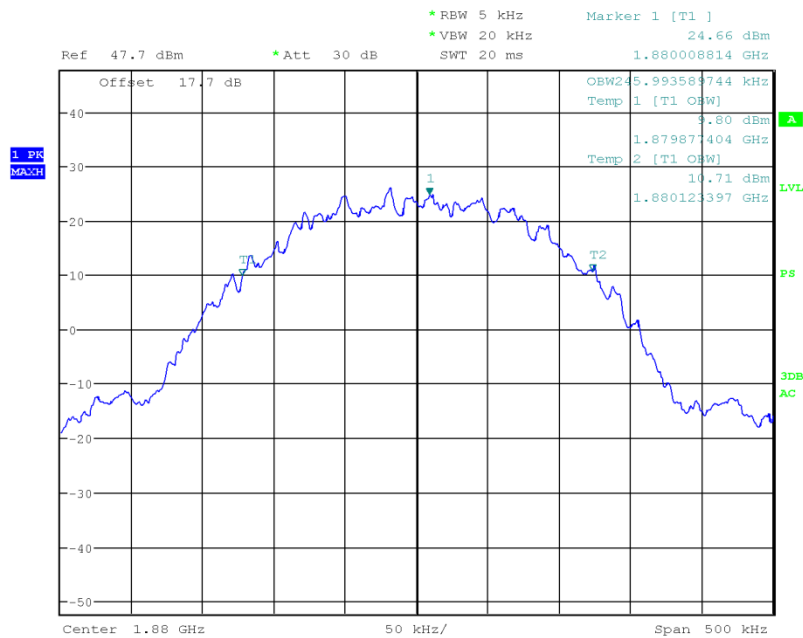


**EDGE1900 Mid Channel -26dB BW**



Date: 2.JUL.2012 11:57:30

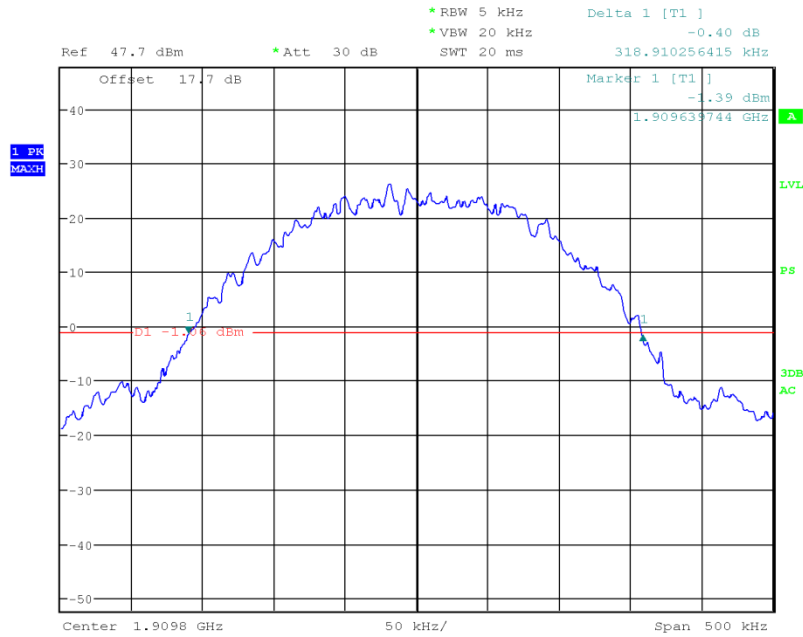
**EDGE1900 Mid Channel 99% BW**



Date: 2.JUL.2012 12:04:49

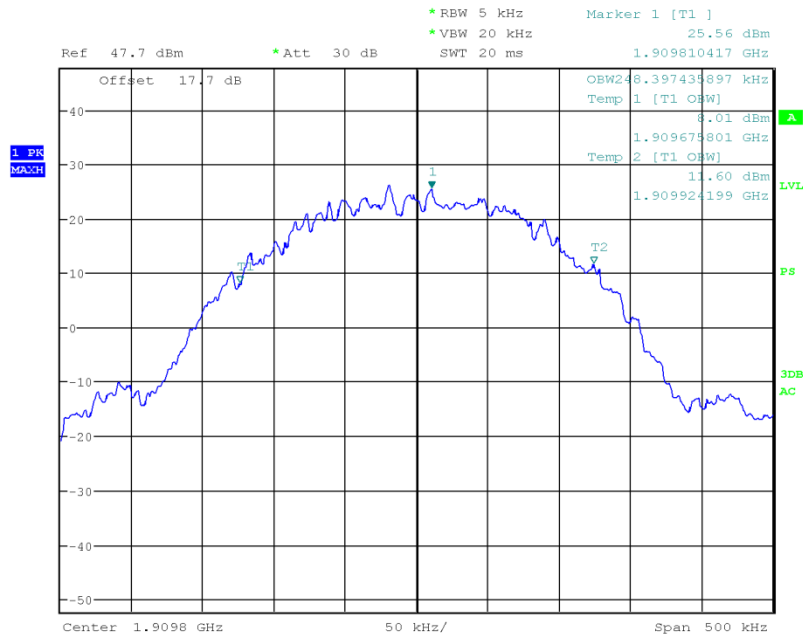


**EDGE1900 High Channel -26dB BW**



Date: 2.JUL.2012 11:55:56

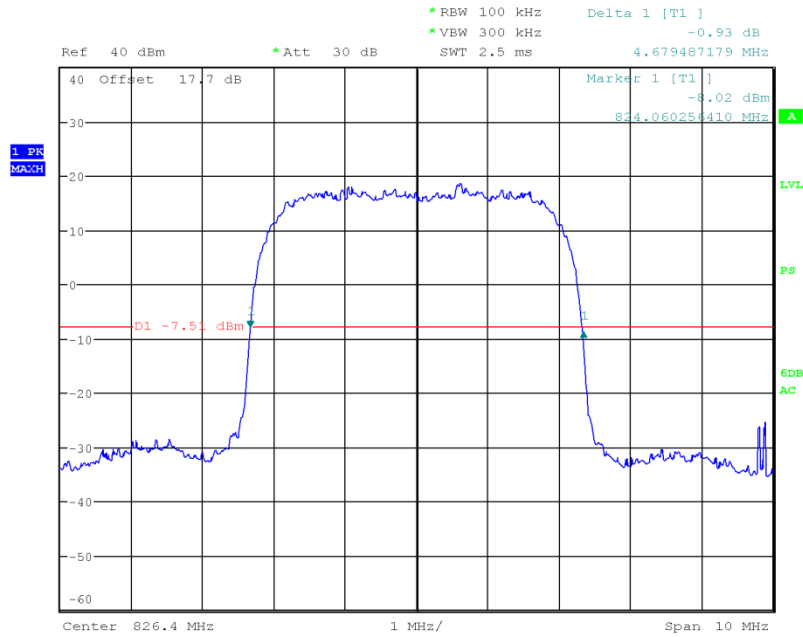
**EDGE1900 High Channel 99% BW**



Date: 2.JUL.2012 12:06:00

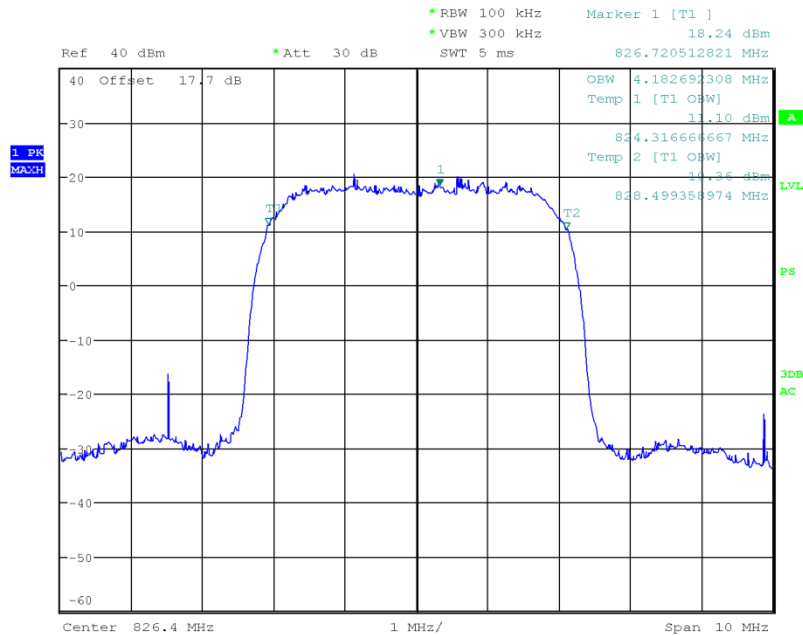


**WCDMA Cell Low Channel -26dB BW**



Date: 3.JUL.2012 11:12:22

**WCDMA Cell Low Channel 99% BW**

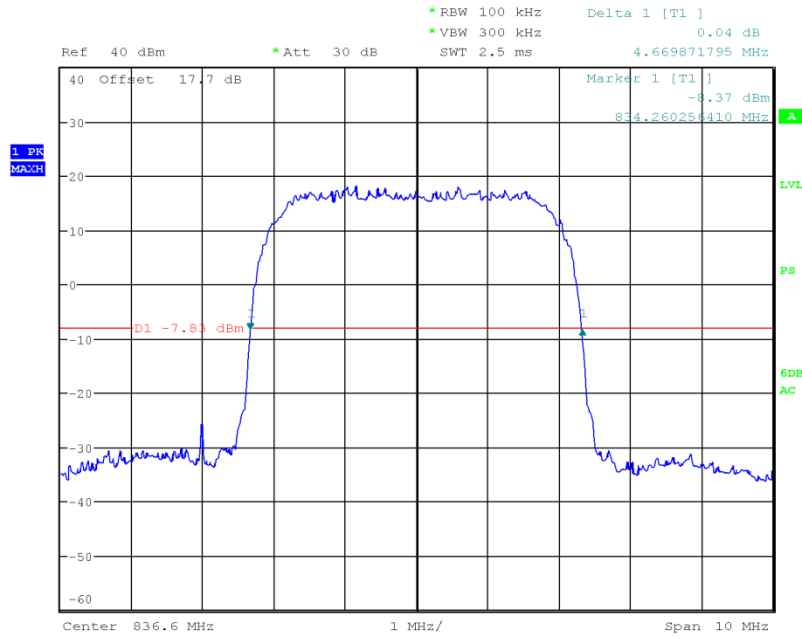


Date: 3.JUL.2012 20:52:16



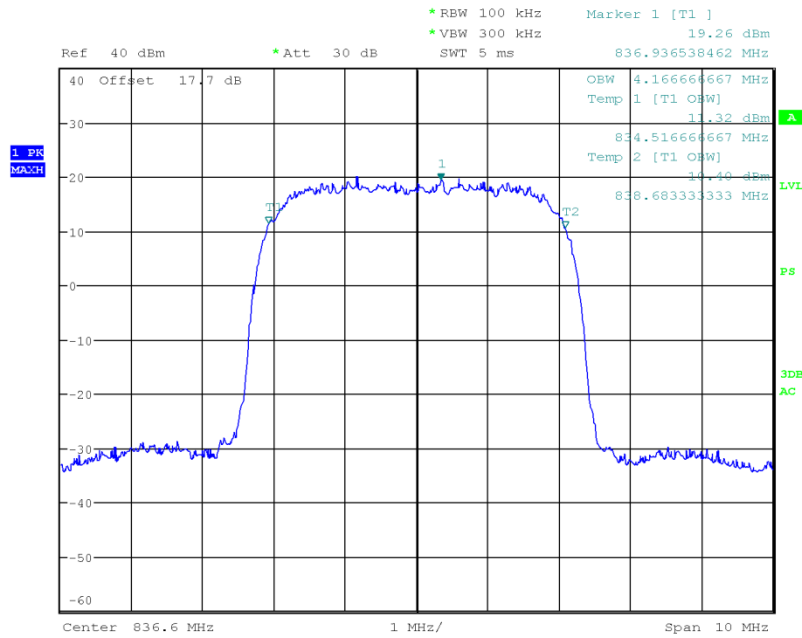


### WCDMA Cell Mid Channel -26dB BW



Date: 3.JUL.2012 11:14:06

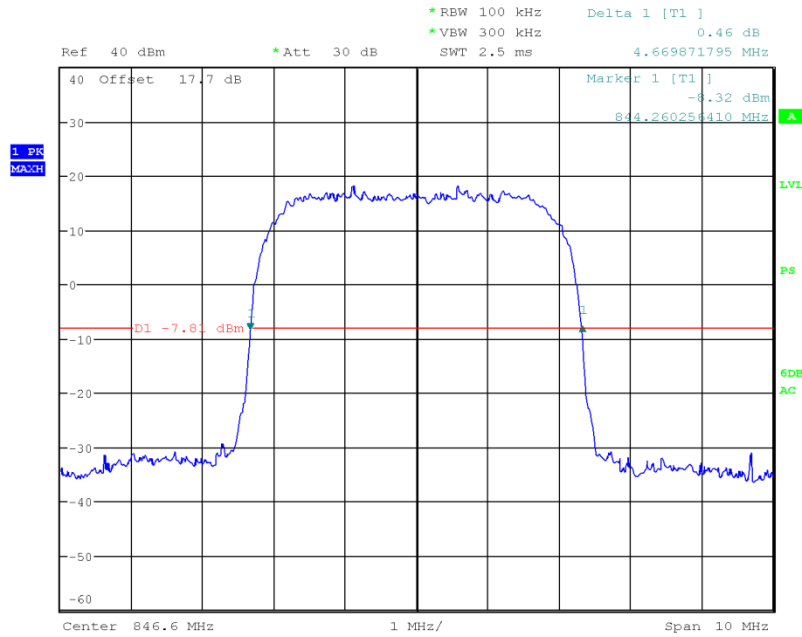
### WCDMA Cell Mid Channel 99% BW



Date: 3.JUL.2012 20:54:03

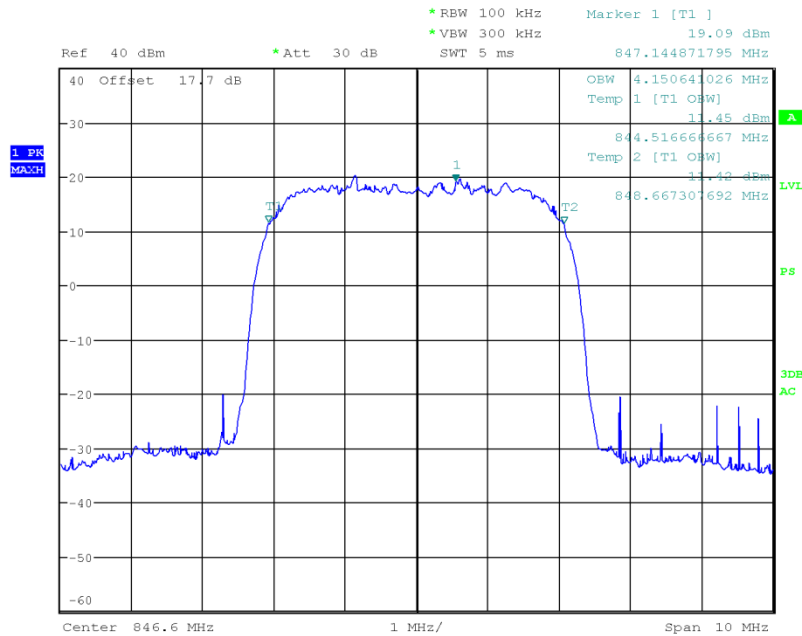


**WCDMA Cell High Channel -26dB BW**

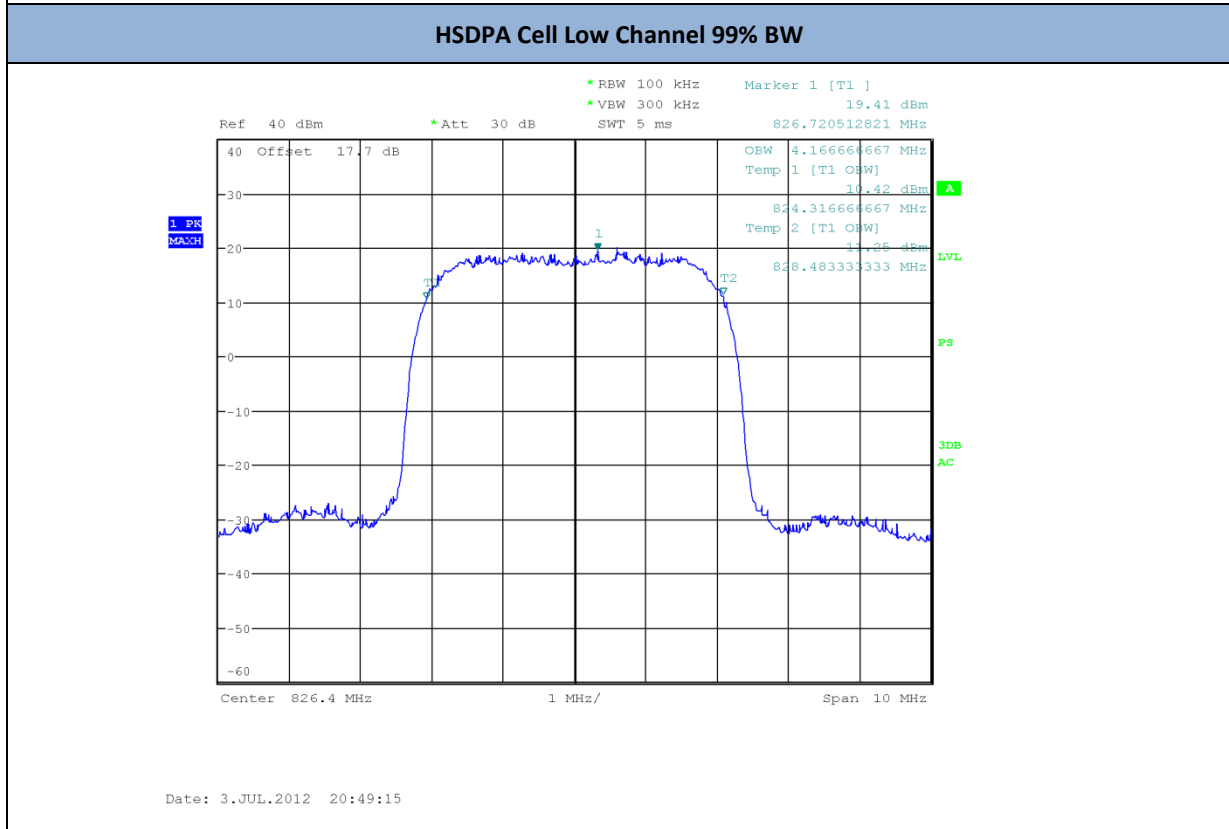
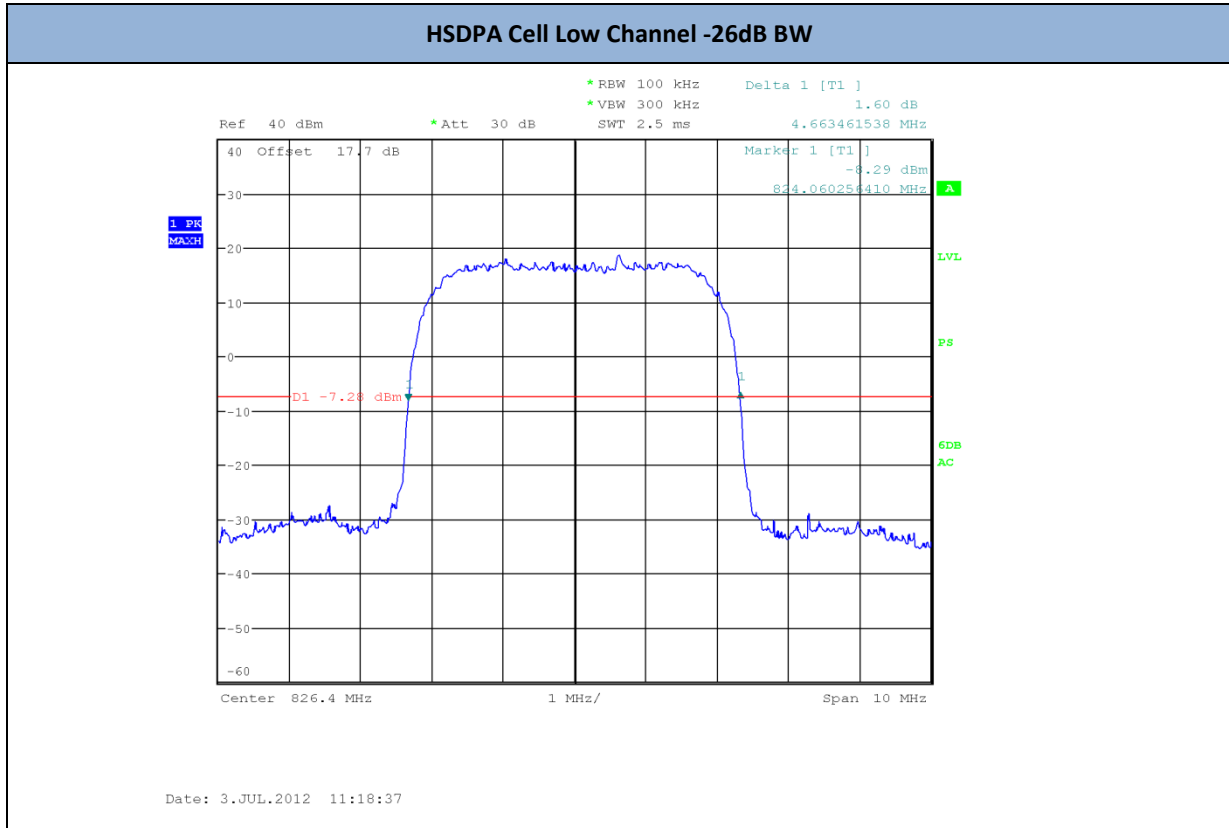


Date: 3.JUL.2012 11:16:06

**WCDMA Cell High Channel 99% BW**

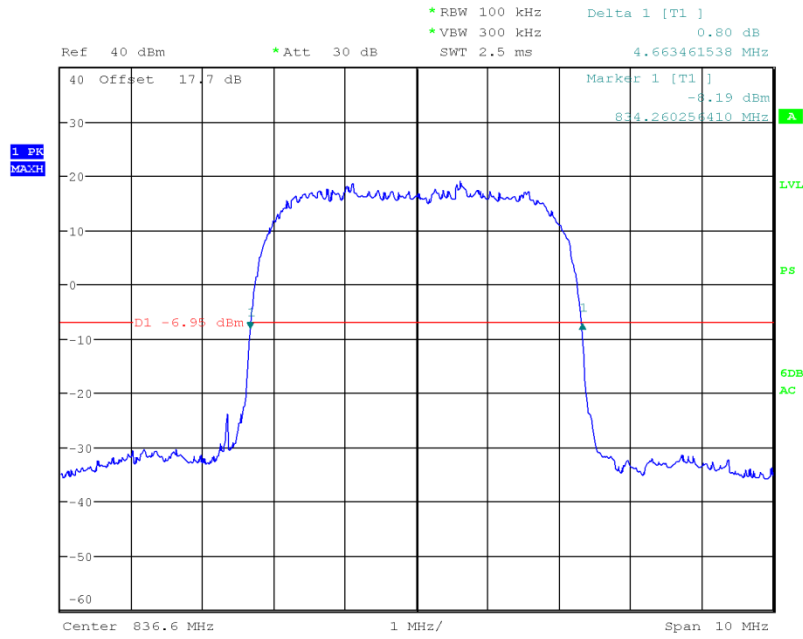


Date: 3.JUL.2012 20:55:56



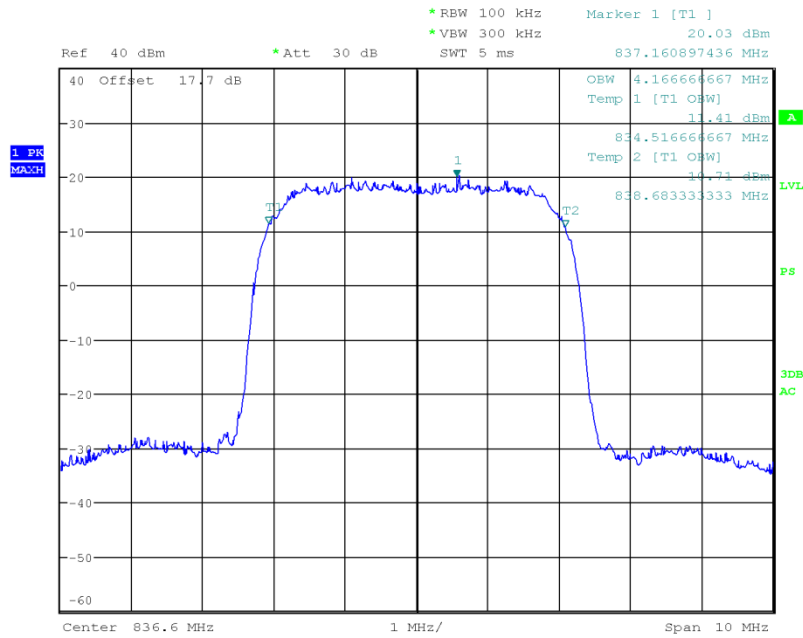


### HSDPA Cell Mid Channel -26dB BW

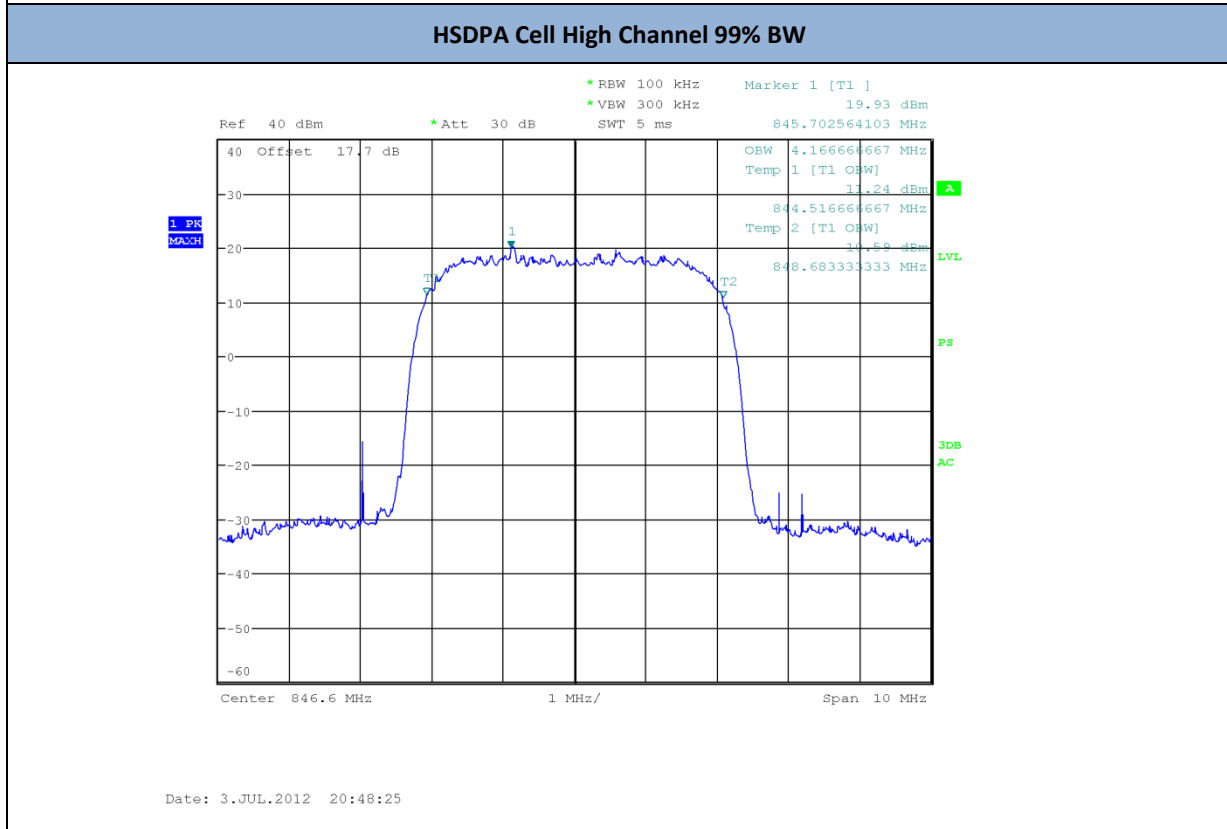
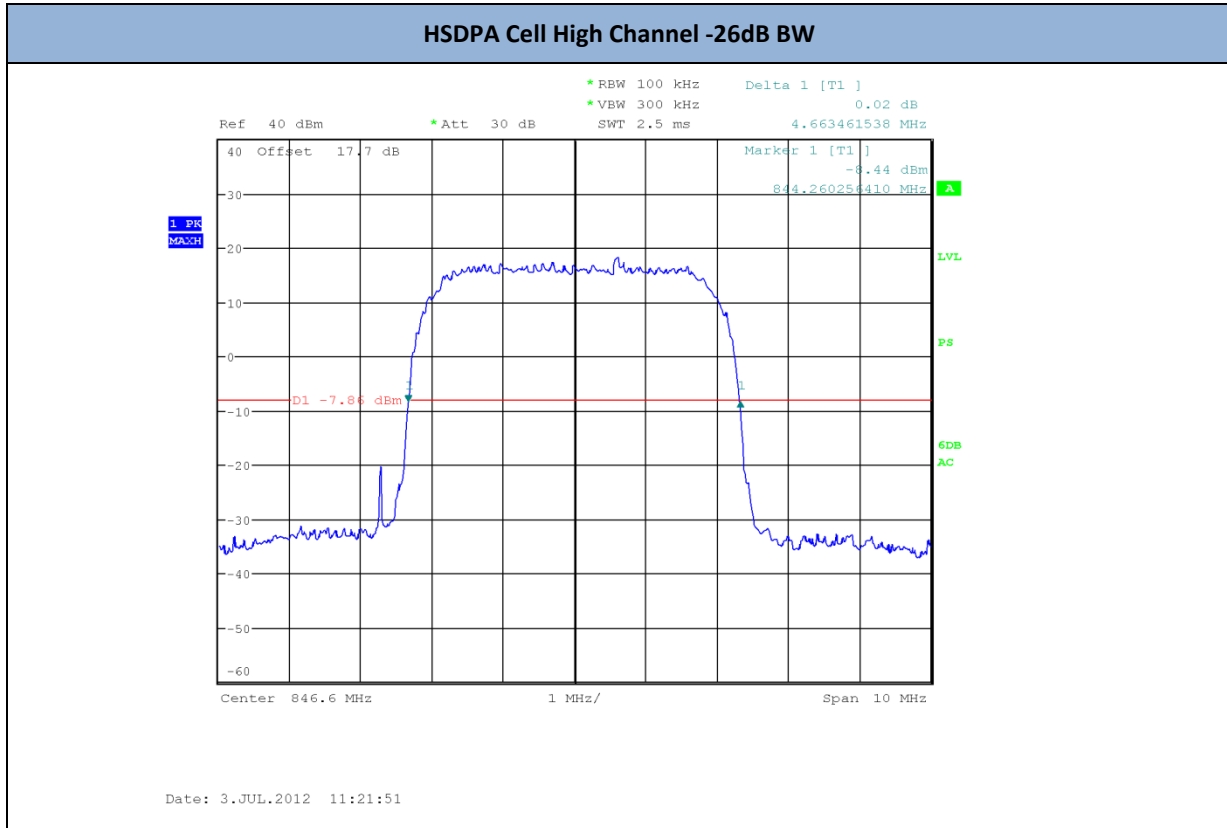


Date: 3.JUL.2012 11:20:28

### HSDPA Cell Mid Channel 99% BW

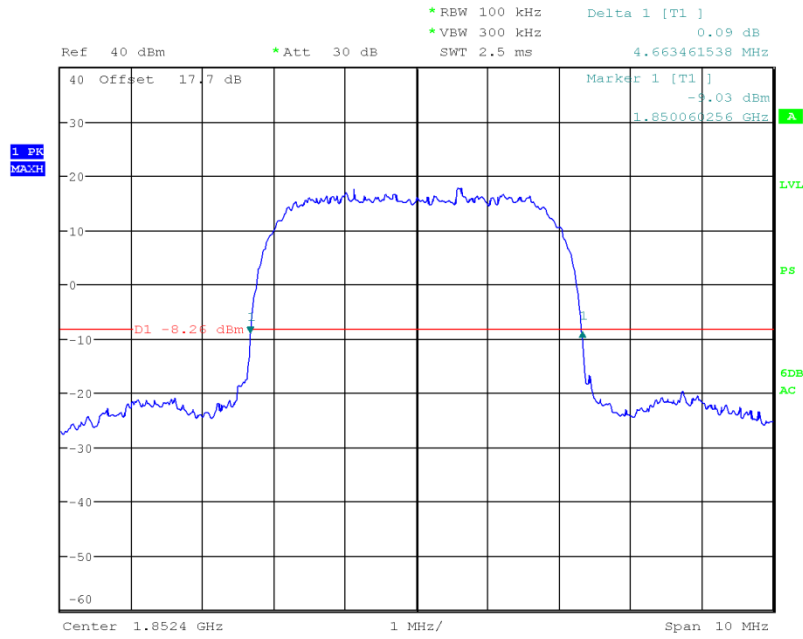


Date: 3.JUL.2012 20:46:44



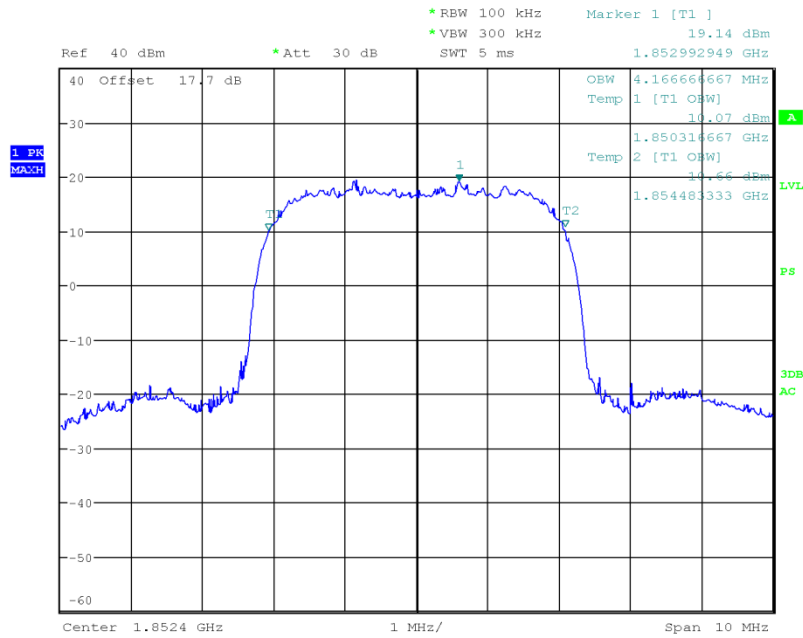


### WCDMA PCS Low Channel -26dB BW



Date: 3.JUL.2012 11:06:12

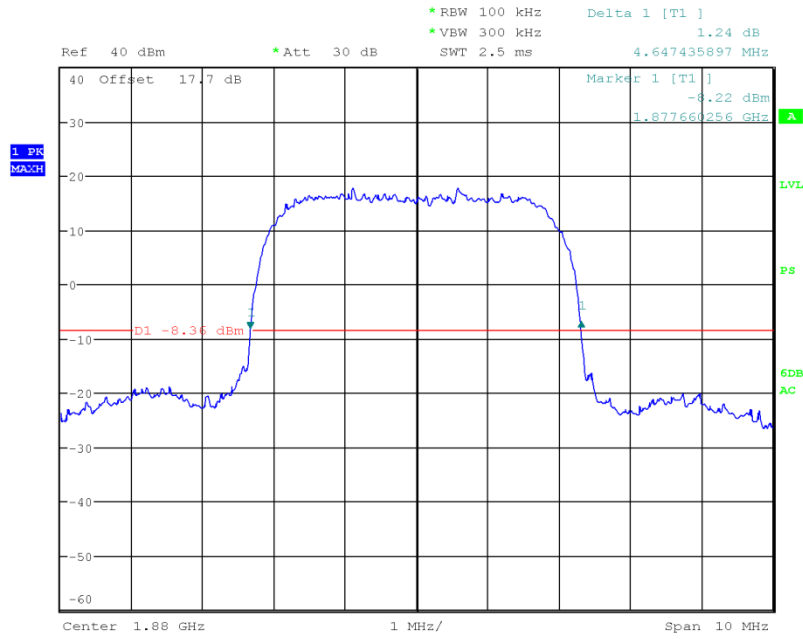
### WCDMA PCS Low Channel 99% BW



Date: 3.JUL.2012 20:57:25

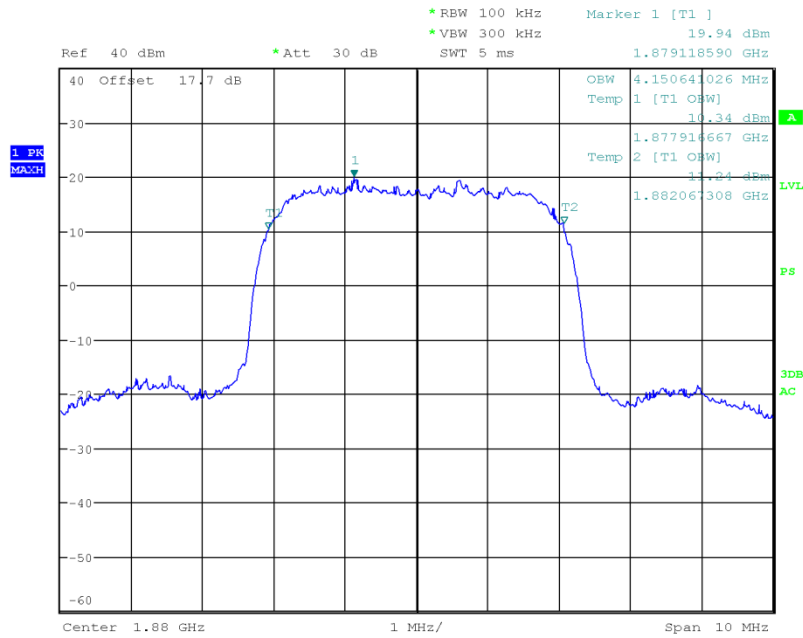


### WCDMA PCS Mid Channel -26dB BW

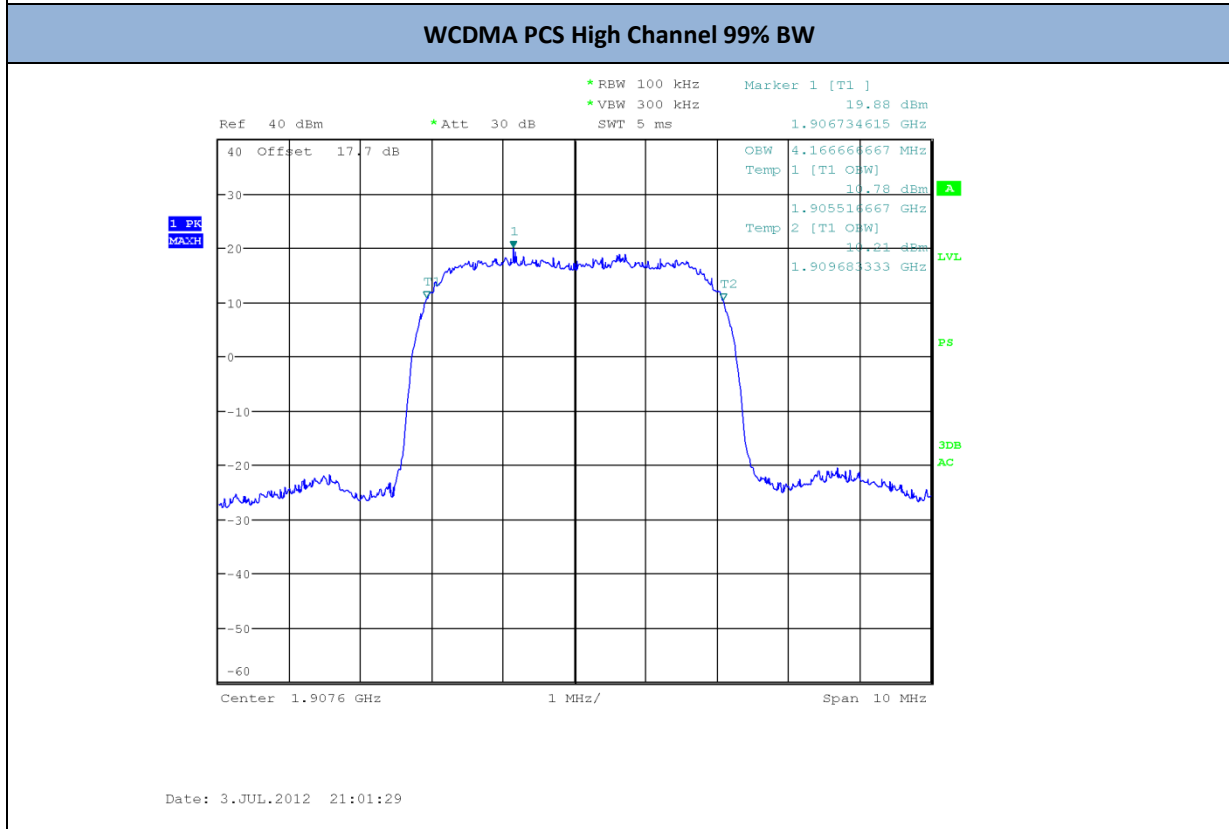
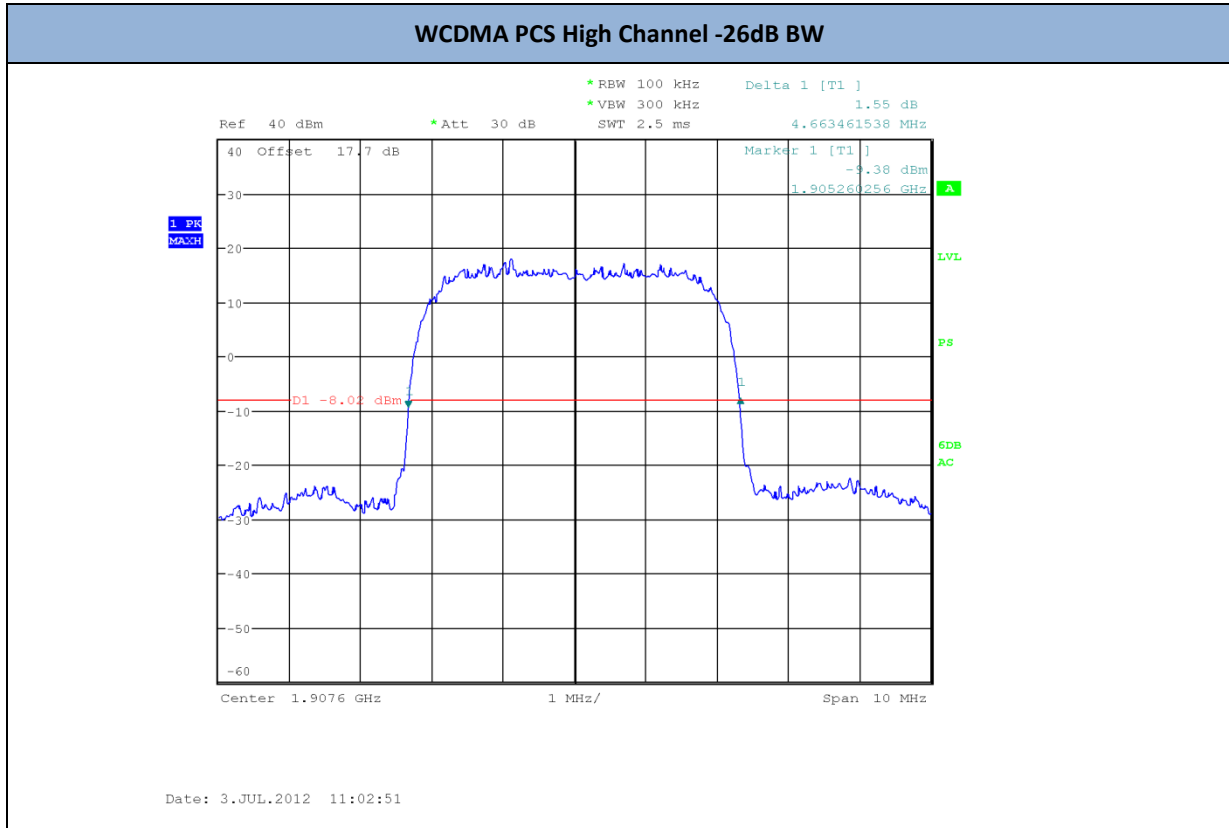


Date: 3.JUL.2012 10:59:16

### WCDMA PCS Mid Channel 99% BW



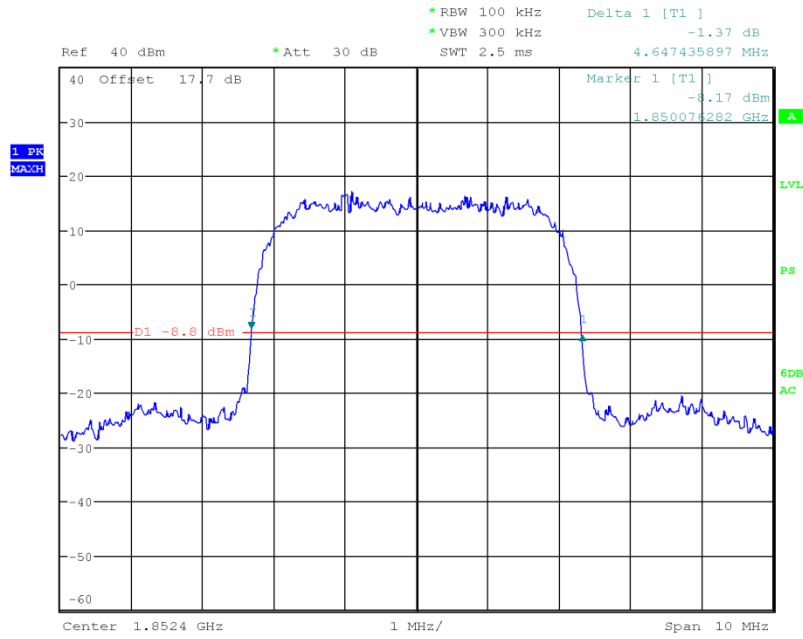
Date: 3.JUL.2012 20:59:13





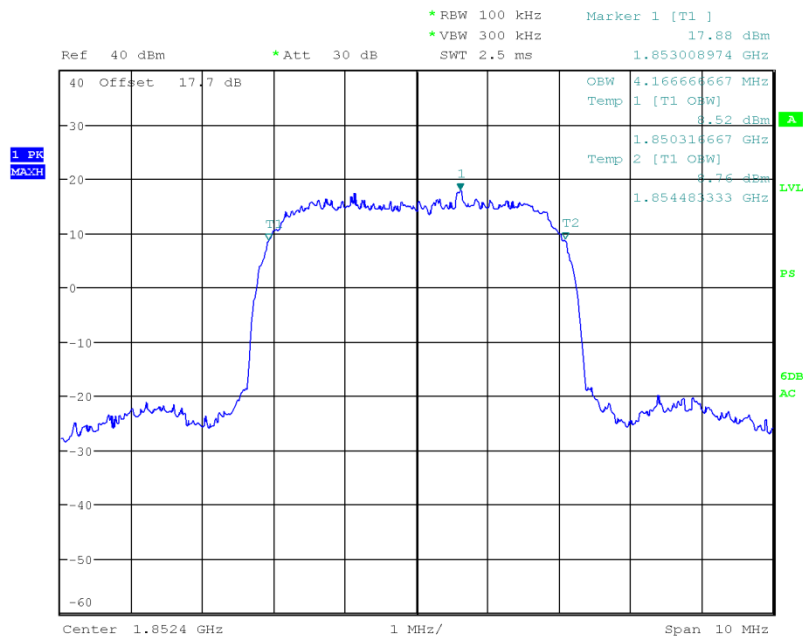


### HSDPA PCS Low Channel -26dB BW



Date: 3.JUL.2012 11:32:39

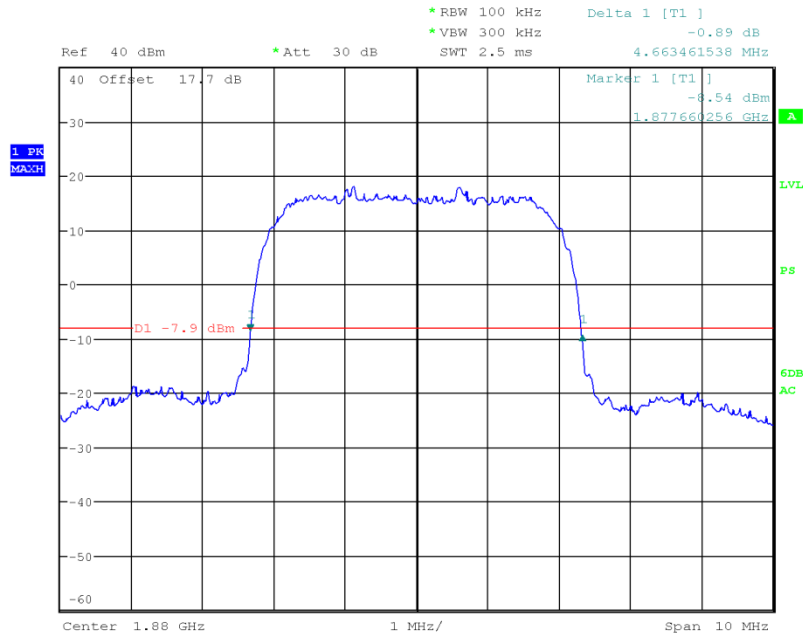
### HSDPA PCS Low Channel 99% BW



Date: 3.JUL.2012 11:51:14

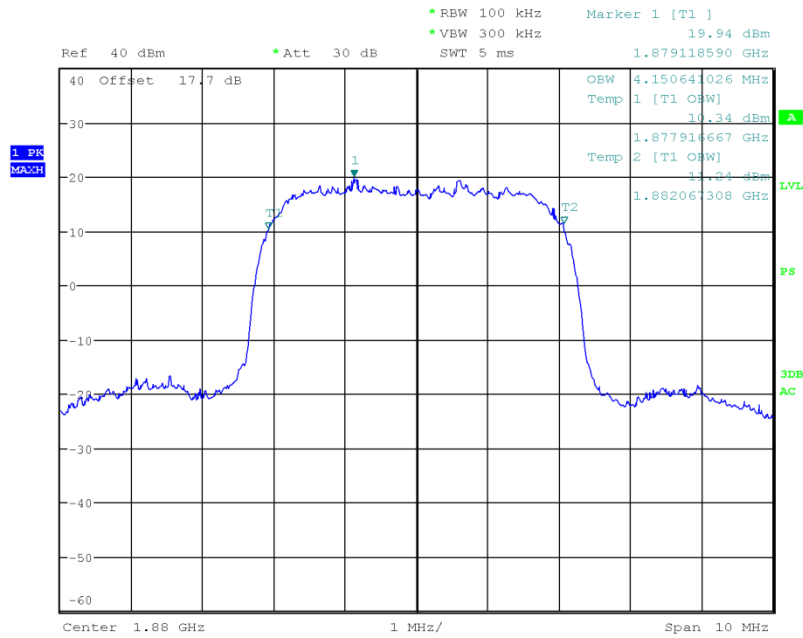


**HSDPA PCS Mid Channel -26dB BW**



Date: 3.JUL.2012 11:35:54

**HSDPA PCS Mid Channel 99% BW**



Date: 3.JUL.2012 20:59:13