SGS-CSTC Standards Technical Services Ltd.

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FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No. :	GLEMO081103422RF(SZEMO081004989RF)
Applicant:	ADC Telecommunications Inc.
FCC ID:	NOO- F0650-311
Frequency Band	Celluar band and PCS band
Equipment Under Test (EUT):	
Name:	FSN-8519-1 Remote Unit
Model No.:	FSN-8519-1
Serial No.:	Not supplied by client
Standards:	FCC part 22H , FCC part 24E
	Please refer to section 2 for further details.
Date of Receipt:	17 September, 2008
Date of Test:	17 September to 11 November 2008
Date of Issue:	28 November 2008
Test Result :	**PASS ***

In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Stephen Guo
Manager

2 Test Summary

Test Item	Test Requirement	Test Method	Result
Output Power	FCC part 22.913 FCC part 24.232	FCC part 2.1046 2-11-04/EAB/RF	PASS
Conducted Spurious Emissions	FCC part 22.917 FCC part 24.238	FCC part 2.1051 2-11-04/EAB/RF	PASS
Band Edge	FCC part 22.917 FCC part 24.238	FCC part 2.1051 2-11-04/EAB/RF	PASS
Radiated Spurious Emissions	FCC part 22.917 FCC part 24.238	FCC part 2.1053 2-11-04/EAB/RF	PASS
Occupied Bandwidth	2-11-04/EAB/RF	FCC part 2.1049 2-11-04/EAB/RF	PASS
Intermodulation	FCC part 22.917 FCC part 24.238	2-11-04/EAB/RF	PASS
Out of Band Rejection	2-11-04/EAB/RF	2-11-04/EAB/RF	PASS
Frequency Stablility	FCC part 22.355 FCC part 24.235	FCC part 2.1055	PASS

Remark:

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

3 Contents

4 General Information

4.1 Client Information

Applicant Name:	ADC Telecommunications Inc.
Applicant Address:	P.O. Box 1101

4.2 General Description of E.U.T.

Name:	FSN-8519-1 Remote Unit
Model No.:	FSN-8519-1
Power Supply:	120~230V AC
Adaptor:	N/A
Power Cord:	1.5m unscreed AC power cord

4.3 Description of EUT operation

Type of Modulation	AMPS,TDMA,GSM,EDGE,CDMA,WCDMA in Celluar Band TDMA,GSM,EDGE,CDMA,WCDMA in PCS Band
Emission Designator:	F1D(AMPS), DXW(TDMA),F9W(CDMA), GXW (GSM),GXW (EDGE),GXW (WCDMA)
Frequency Band	Celluar Band (869MHz to 894MHz downlink, 824MHz to 849MHz uplink) PCS Band (1930MHz to 1990MHz downlink, 1850MHz to 1910MHz uplink)
Antenna Type	N/A

4.4 Standards Applicable for Testing

The standard used was FCC part 22 & FCC part 24.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, Guangdong, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC 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. Registration 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorized test laboratory for the DoC process.

5 Equipments Used during Test

	RE in Chamber					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	28-01-2008	28-01-2009
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2007	04-12-2008
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	12-08-2008	12-08-2009
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	12-08-2008	12-08-2009
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	12-08-2008	12-08-2009
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2008	05-12-2009
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	11-03-2008	11-03-2009
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	11-03-2008	11-03-2009
EMC0075	310N Amplifier	Sonama	310N	272683	10-09-2008	10-09-2009
EMC0523	Active Loop Antenna	EMCO	6502	00042963	09-08-2008	09-08-2010
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	10-08-2008	10-08-2009

	Conducted Emission					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m^3	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	14-12-2008	14-12-2009
EMC0118	Two-line v-netwok	Rohde & Schwarz	ENV216	3560.6550.02	28-07-2008	28-07-2009
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	14-12-2008	14-12-2009
EMC0107	Coaxial Cable	SGS	2m	N/A	26-11-2008	26-11-2009
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	N/A
EMC0120	8 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	20550	21-02-2008	21-02-2009
EMC0121	4 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	20549	21-02-2008	21-02-2009
EMC0122	2 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	20548	21-02-2008	21-02-2009

	General used equipment					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0006	DMM	Fluke	73	70681569	27-09-2008	27-09-2009
EMC0007	DMM	Fluke	73	70671122	27-09-2008	27-09-2009

6 Test Result

6.1 E.U.T. Operation

Input voltage:	120VAC 60Hz
Operating Environment:	
Temperature:	26°C
Humidity:	56% RH
Atmospheric Pressure:	1005mbar

Test Requirement:

FIBER-OPTIC AND OTHER SIMILAR RF DISTRIBUTION SYSTEMS

Fiber-optic distribution systems are a type of in-building radiation system that receives RF signals from an antenna, distributes the signal over fiber-optic cable, and then retransmits at another location for example within a building or tunnel. Most fiber-optic systems are signal boosters; however, some may be repeaters. These systems generally have two enclosures typically called host (or local or donor unit) and remote. Some systems may also have an optional expander box for fan-out to multiple remotes. The system transmits downlink signals from the remote unit to handsets, portables, or clients, and transmits uplink signals via from the host unit. Usually but not always the uplink goes through an intermediate amplifier to a "donor" antenna. Therefore both uplink and downlink must be tested, unless filing effectively documents how connection of uplink to donor antenna with or without an intermediate amplifier will be prevented, such as for always only a cabled connection to a base station. Fiber-optic systems are not amplifiers (AMP equipment class) – they are equipment class TNB or PCB. The same approval procedures also apply for multiple-enclosure systems connected by coax cable.

Synonyms and related terms: in-building radiation system, coverage enhancer, distributed antenna system, fiber-optic distribution system, converter, donor anten

Typical in-building or distributed antenna systems can consist of five different components (enclosures), not counting antennas:

1) host unit
a) transmits uplink to base station via antenna thru coax, ***passive interface unit*** , or ***active interface unit*** (amplifier)
b) sends base-station downlink via fiber-optic or coax to ***remote***
c) receives handset uplink via fiber-optic or coax from ***remote***
d) optional connection to ***expansion unit*** via fiber-optic
e) separate FCC ID from ***remote***, unless electrically identical
f) ***non-transmitting host unit***
i) connects directly to a base station via coax cable but does not connect to antenna or amplifier
ii) Part 15 digital device subject to Verification, no FCC ID

2) remote unit
a) receives base-station downlink via fiber-optic or coax from ***host***, transmits via antenna to handsets
b) returns handset uplink via fiber-optic or coax to ***host***
c) separate FCC ID from ***remote***, unless electrically identical

3) expansion unit
a) fiber-optic or coax from ***host***
b) fiber-optic or coax fan-out to ***remote(s)***
c) Part 15 digital device subject to Verification, no FCC ID

4) *passive interface unit*
a) contains attenuators, splitters, combiners

b) coax cable connection between ***host*** and base-station
c) passive device, no FCC ID
5) *active interface unit*
a) amplifies uplink signal from ***host unit*** for transmit by donor antenna
b) attenuates downlink from donor antenna
c) coax cable connection between ***host*** and ***active interface unit***
d) usually has separate FCC ID; in some cases could be combined/included with ***host*** as one enclosure

GENERAL DEFINITIONS FOR CERTIFICATION PURPOSES
The following three general definitions follow from those stated in the Part 22, 24, and 90 rule sections as listed above. Two of the definitions replace previous EAB internal definitions given for booster, repeater and extender. The general term “extender” is the same as booster, but booster should be used rather than extender. The general term “translator” is the same as repeater, but repeater should be used rather than translator.
External radio frequency power amplifier (ERFPA) - any device which, (1) when used in conjunction with a radio transmitter signal source, is capable of amplification of that signal, and (2) is not an integral part of a radio transmitter as manufactured. The EAS equipment class AMP is used only for an ERFPA device inserted between a transmitter (TNB/PCB) and an antenna (has only one antenna port)
Booster is a device that automatically reradiates signals from base transmitters without channel translation, for the purpose of improving the reliability of existing service by increasing the signal strength in dead spots. An “in-building radiation system” is a signal booster. These devices are not intended to extend the size of coverage from the originating base station. A booster can be either single or multiple channels**.**
Repeater is a device that retransmits the signals of other stations. Repeaters are different from boosters in that they can include frequency translation and can extend coverage beyond the design of the original base station. A repeater is typically single channel but can also be multiple channels.
ERFPA (AMP) and boosters/repeaters (TNB/PCB) can generally be authorized for all rule parts except 15 and 18.
Tests should be done with each typical signal. e.g., for F3E emissions use 2500 Hz with 2.5 or 5 kHz deviation. Use of CW signal for some tests is acceptable in lieu of actual emission, in some cases when CW signal gives worst case.

The EUT include Host unit, expansion unit and remote unit.

Only remote unit need FCC ID. Host unit and expansion unit do not need separate FCC ID.

The EUT belongs to repeater(PCB) class.

6.2 Test Procedure & Measurement Data

6.2.1 RF Output Power

Test Date:	10 to 12 November 2008
Test Requirement:	FCC part 22.913(a) & FCC part 24.232(c)
	22.913(a):Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.
	24.232(c):Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.
Test Method:	FCC part 2.1046
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Cellular Band DL and UL ports, PCS Band DL and UL ports
Test Configuration:	

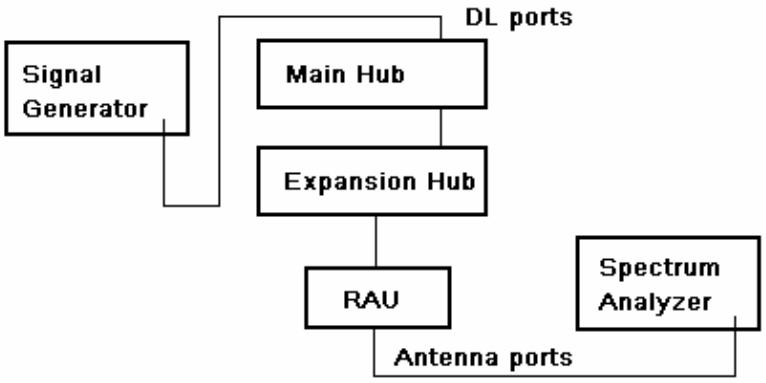


Fig.1 Down link configuration

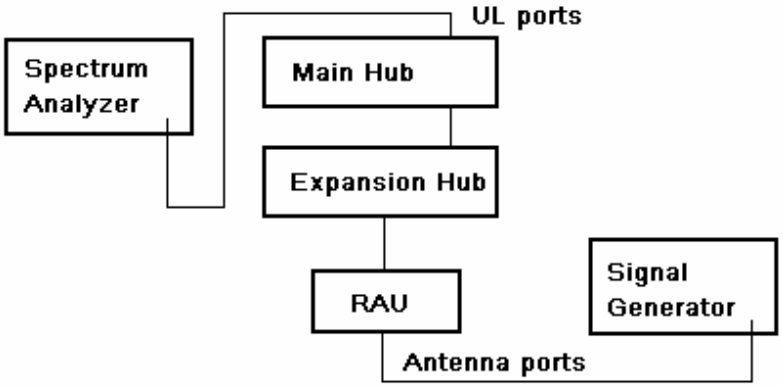


Fig.2 Up link configuration

Test Procedure: RF out put power test procedure:

a) Connect the equipment as illustrated, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d1) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth >> the carrier bandwidth,

2) Video Bandwidth refer to standard requirement.

d2) Use spectrum analyzer channel power measurement function;

e) Record the frequencies and levels of carrier power;

f) Calculate the signal link way loss and final power value.

Remark: Output power –

. Power on Form 731 should be clearly understood as either composite of multichannels or per carrier. If power is composite include in comments field: "Power output listed is composite for multi-channel operation."

. Check that the input drive level is at maximum input rating and maximum gain settings for all tests. Check both uplink and downlink input levels. See manual or brochures/technical description for maximum rating. May need to check FCC identifier of transmitter used for tests.

. Confirm device cannot operate in saturation. Are there means to control maximum power and to assure linear operation (use in system configuration may be necessary)? How is saturation or over-modulation prevented for pulsed signal inputs?

6.2.1.1 Measurement Record:

Down Link						
	AMPS	TDMA	GSM	EDGE	CDMA	WCDMA
Frequency Band(869MHz ~ 894MHz),Measure Max Out put power(dBm)						
869MHz	25.4	27.7	25.4	27.5	27.9	28.6
881.5MHz	25.5	27.3	25.8	27.8	28.0	28.3
894MHz	25.5	27.3	25.6	27.3	28.1	28.2
Max value in W						
Cellular Band	0.35	0.59	0.38	0.6	0.65	0.72

Down Link						
	--	TDMA	GSM	EDGE	CDMA	WCDMA
Frequency Band(1930MHz ~ 1990MHz),Measure Max Out put power(dBm)						
1930MHz	--	27.6	23.2	27.9	28.6	28.9
1960MHz	--	27.4	25.7	27.6	28.2	28.5
1990MHz	--	27.8	23.1	27.8	28.3	28.8
Max value in W						
PCS Band	--	0.6	0.37	0.62	0.72	0.78

Remark: test in single channel status, output power is test in full amplifying status.

6.2.2 Conducted Spurious Emissions

Test Date:	10 to 12 November 2008
Test Requirement:	FCC part 22.917(a) & FCC part 24.238(a) **§22.917 Emission limitations for cellular equipment.** 22.917(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. **§24.238 Emission limitations for Broadband PCS equipment** 24.238(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Test Method:	FCC part 2.1051
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Cellular Band DL and UL ports,PCS Band DL and UL ports
Test Configuration:	

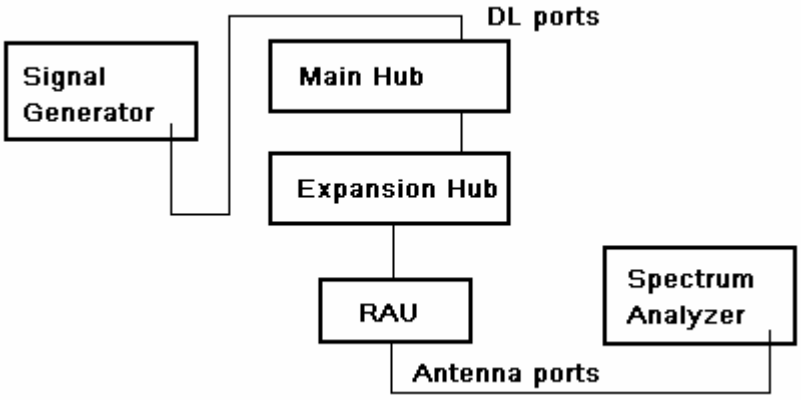


Fig.1 Down link configuration

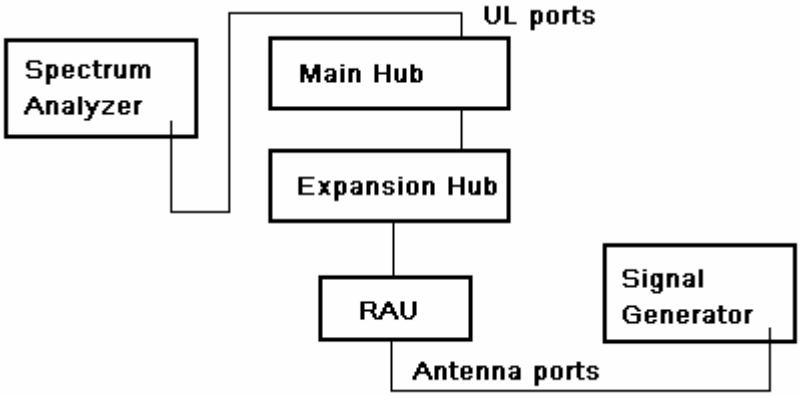
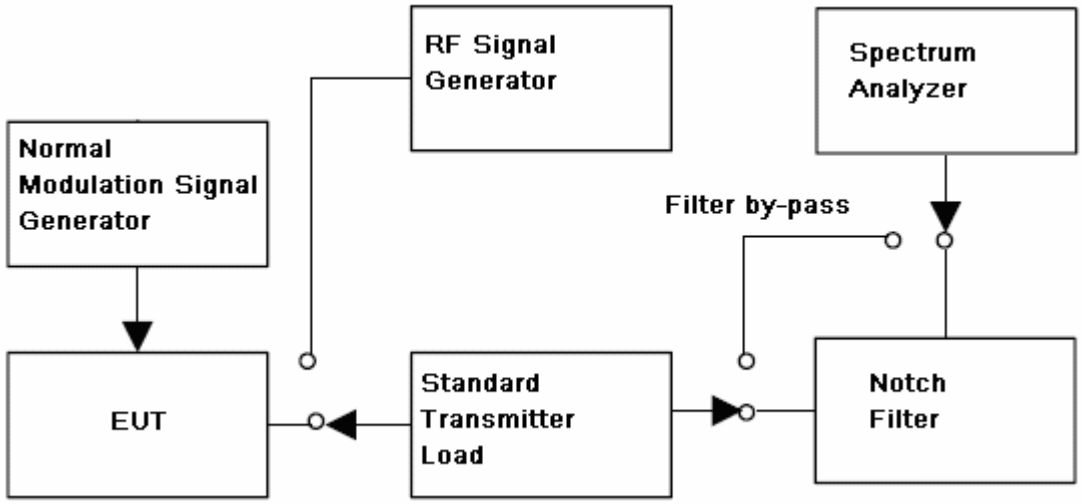


Fig.2 Up link configuration



Test Procedure: Conducted Emissions test procedure:

a) Connect the equipment as illustrated, with the notch filter by-passed, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth,(base the standard, apply the different set),her is 100KHz for frequency band less than 1GHz, 1MHz for frequency over 1GHz;

2) Video Bandwidth refer to standard requirement.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) the lowest radio frequency generated in the equipment, it can be 9KHz base the test method, here select 30MHz as lowest frequency start point;

2) the highest radion frequency shall higher than 10 times of carrier frequency;

f) Record the frequencies and levels of spurious emissions from step e)

Remark:

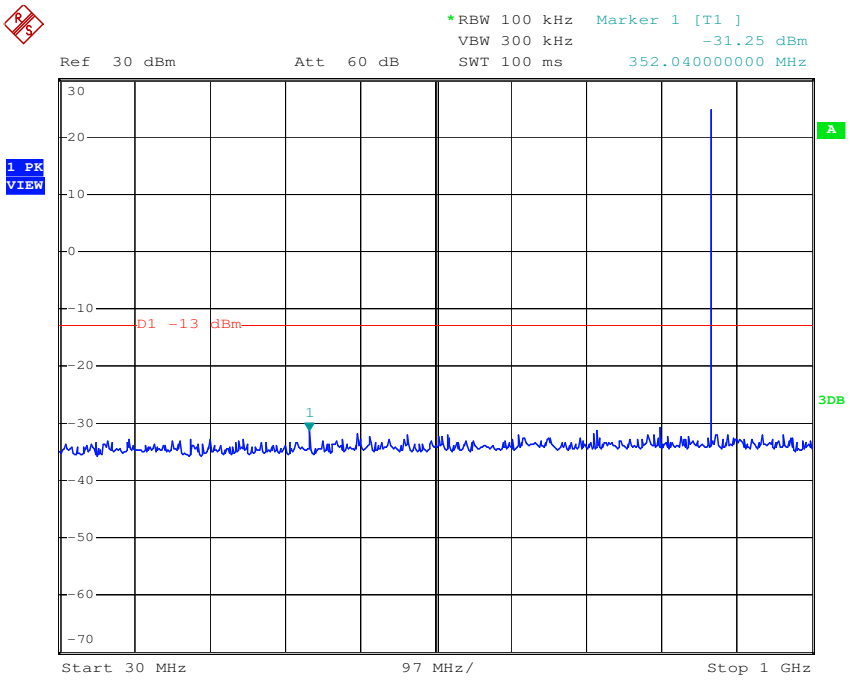
The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

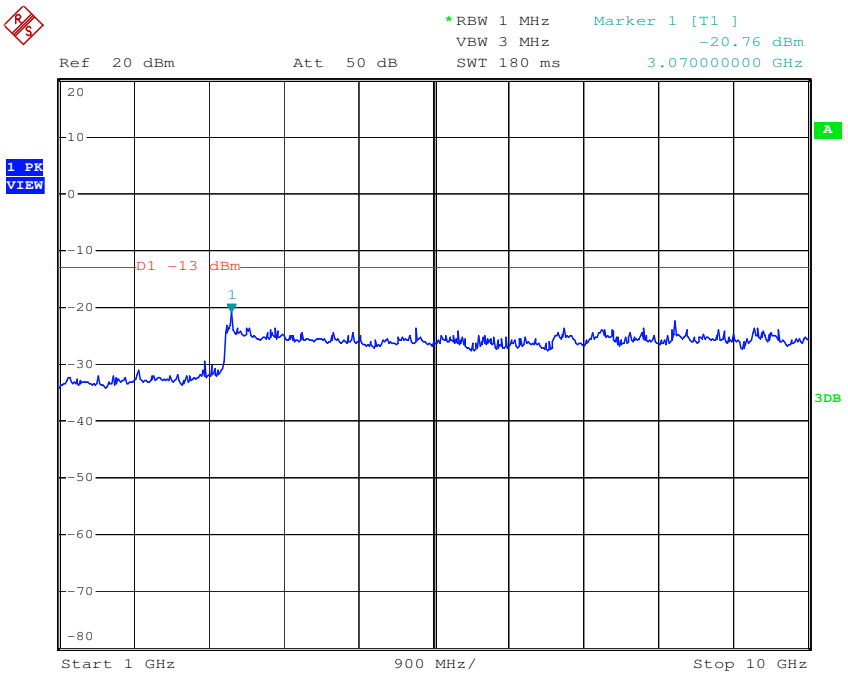
6.2.2.1 Measurement Record:

Cellular Band

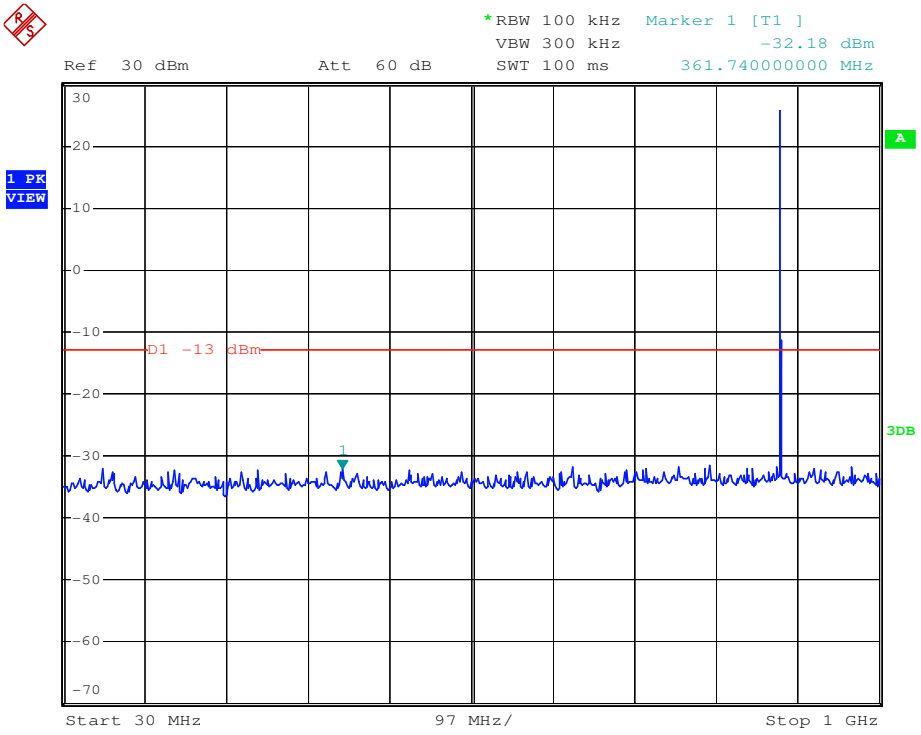
Cellular—AMPS down link(lowest frequency)



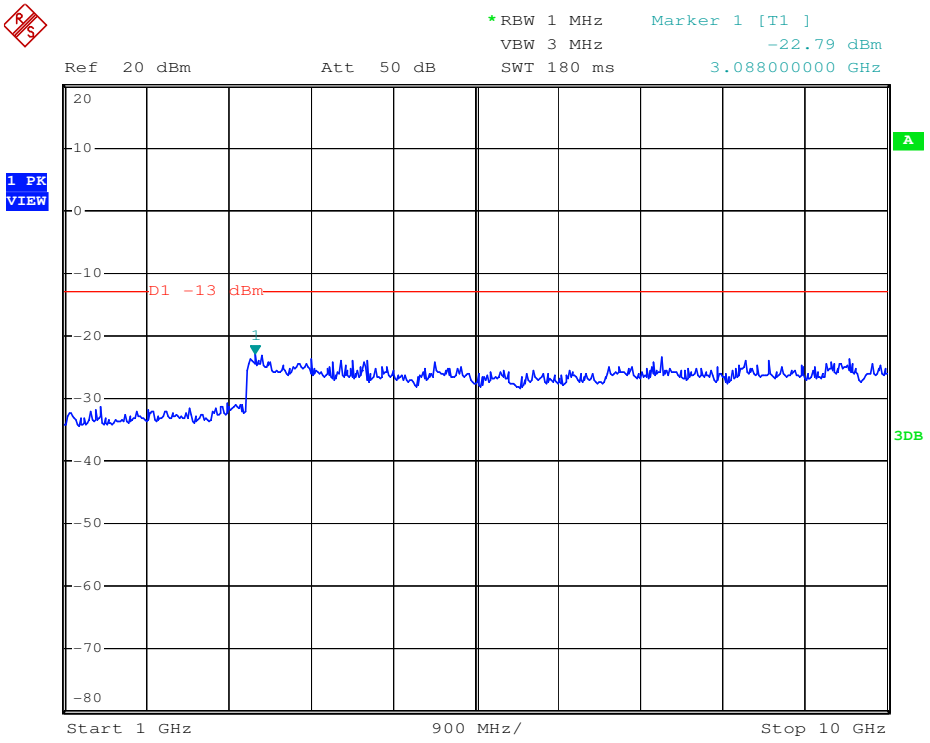
Cellular—AMPS down link(lowest frequency)



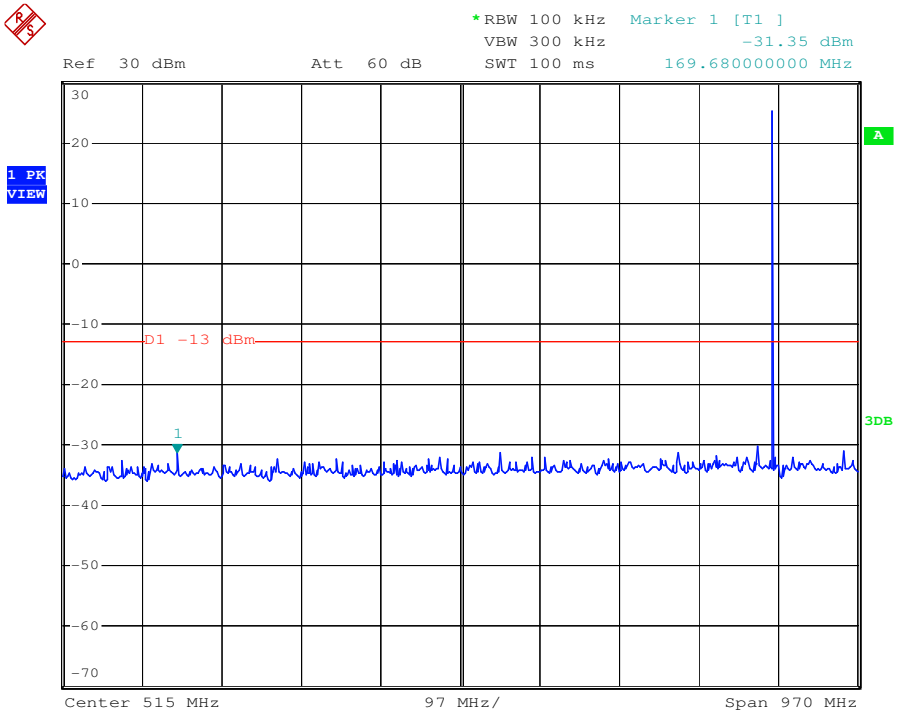
Cellular—AMPS down link(middle frequency)



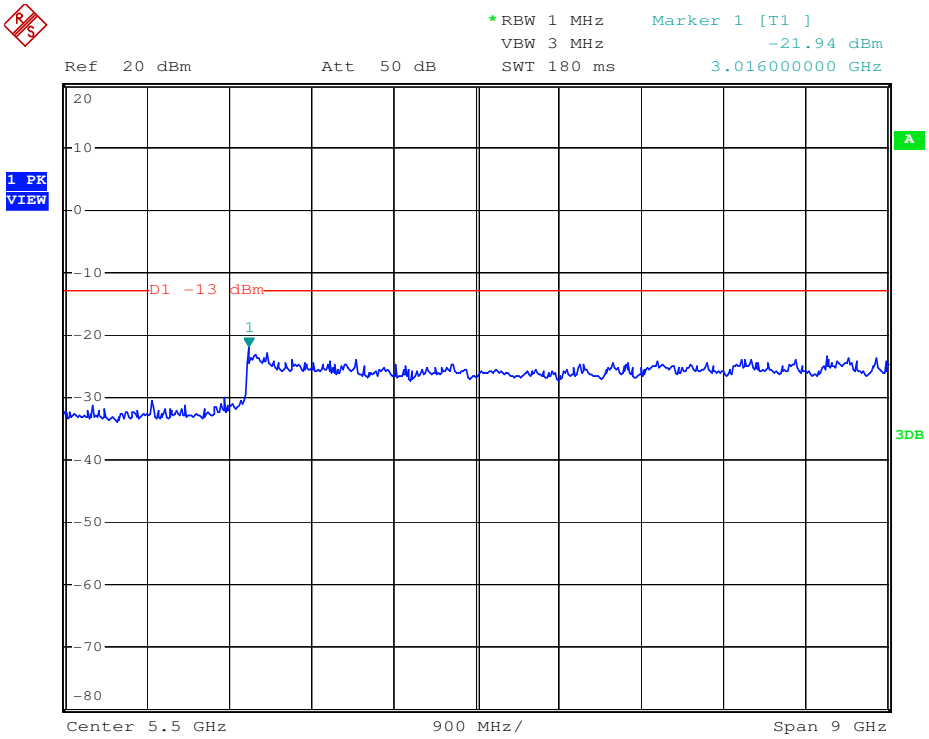
Cellular—AMPS down link(middle frequency)



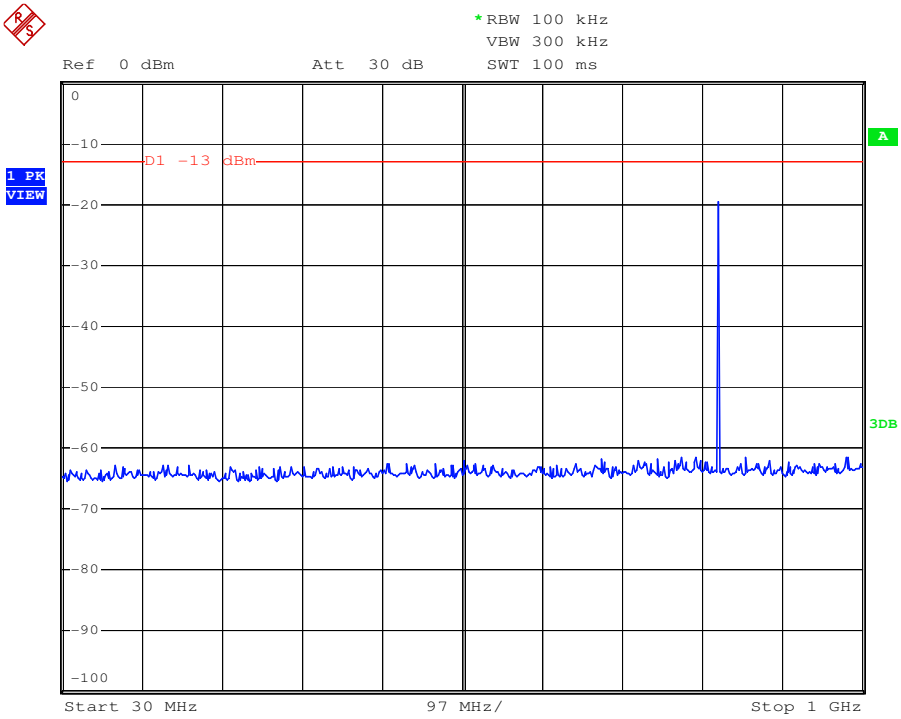
Cellular— AMPS down link(highest frequency)



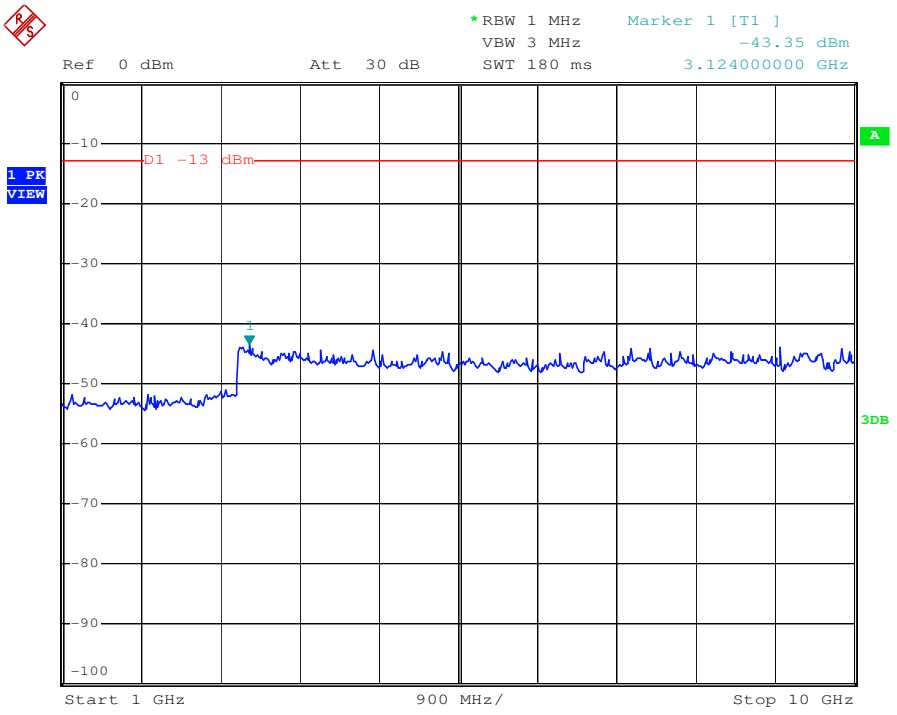
Cellular—AMPS down link(highest frequency)



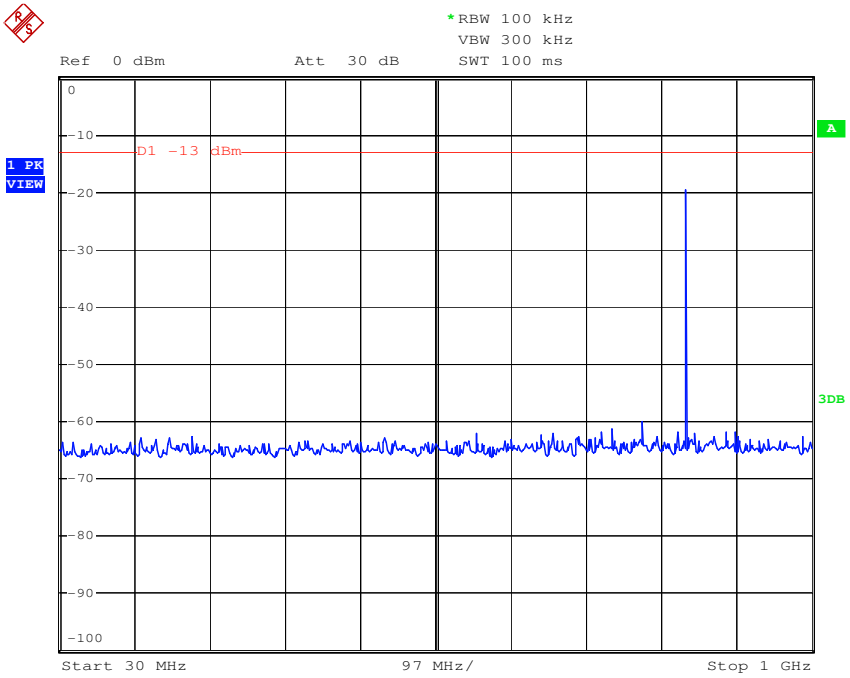
Cellular—AMPS up link(lowest frequency)



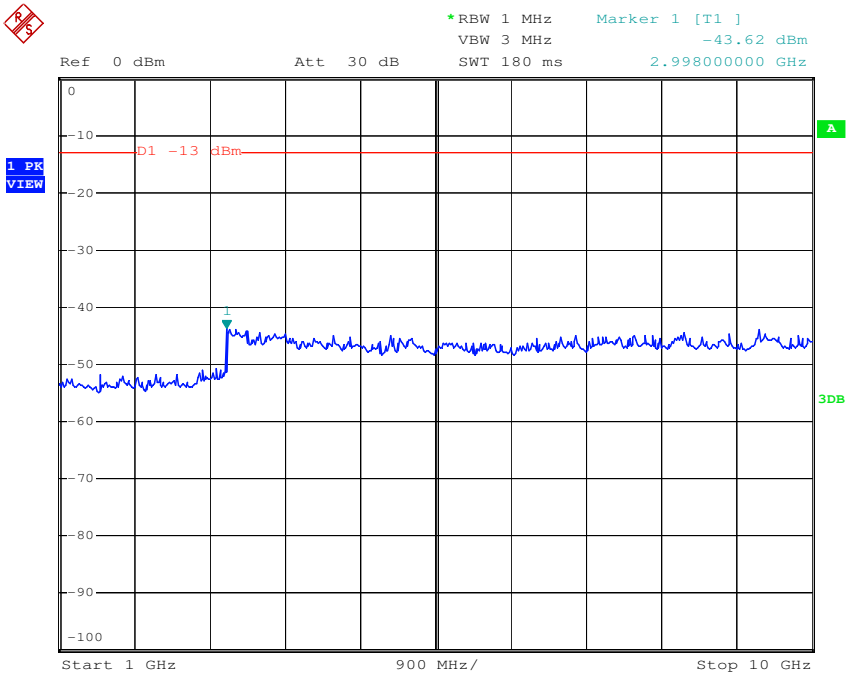
Cellular—AMPS up link(lowest frequency)



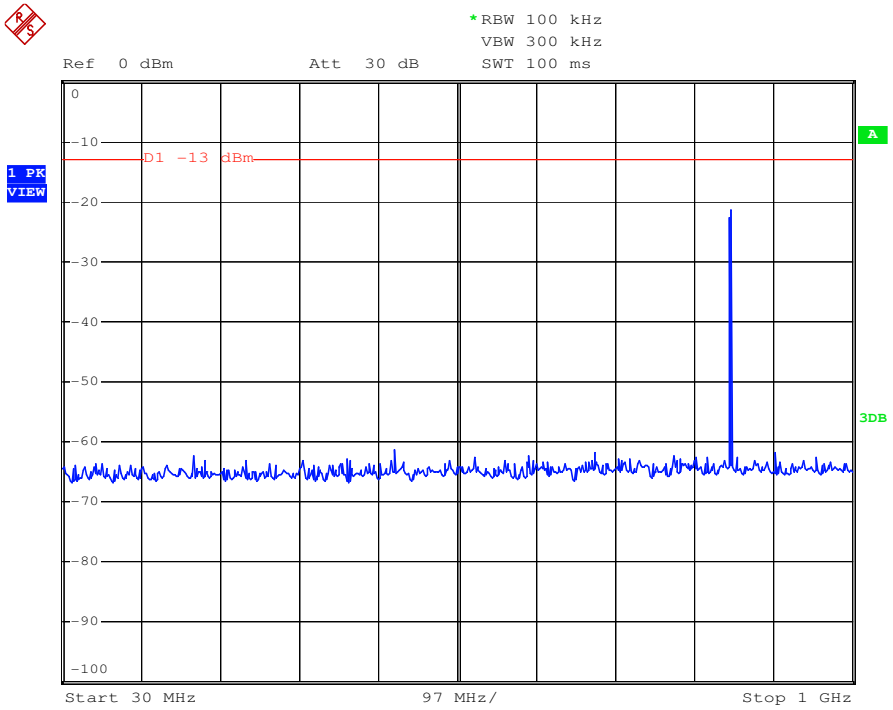
Cellular—AMPS up link(middle frequency)



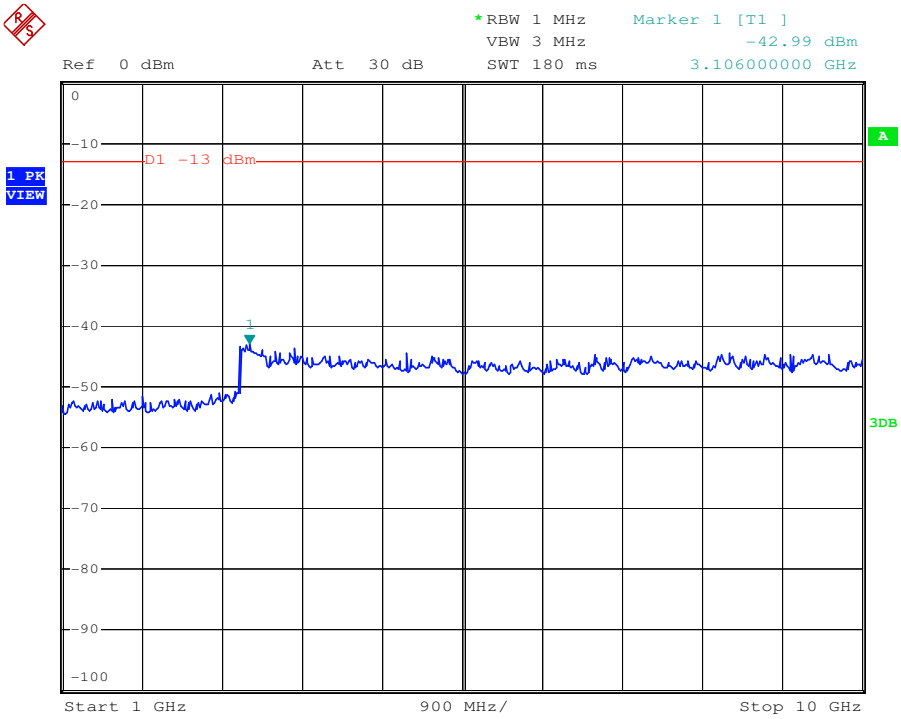
Cellular—AMPS up link(middle frequency)



Cellular—AMPS up link(highest frequency)

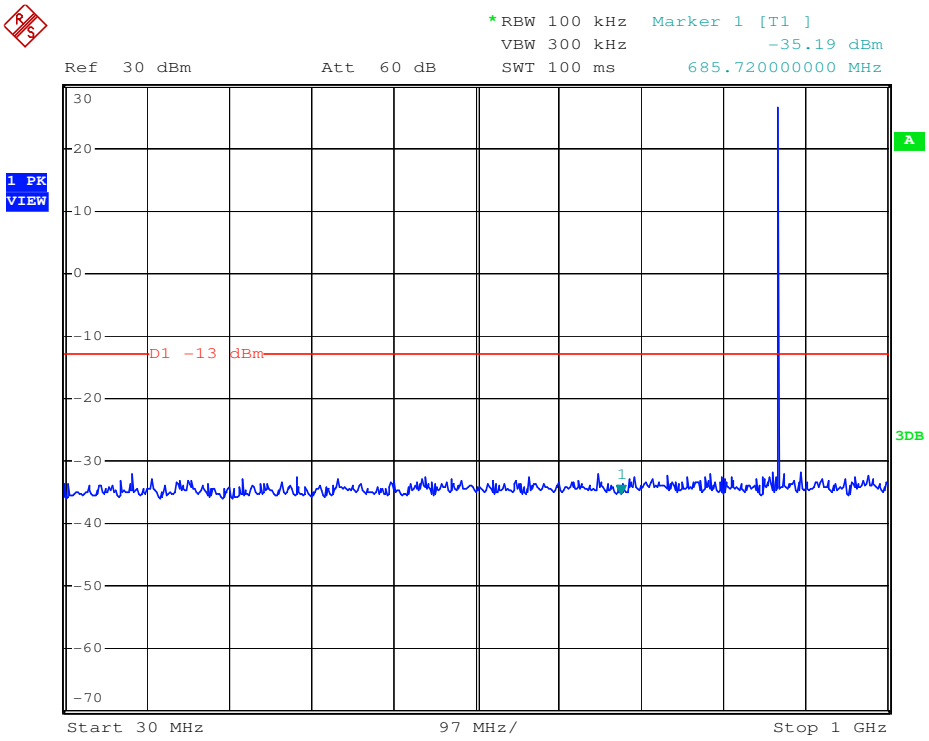


Cellular—AMPS up link(highest frequency)

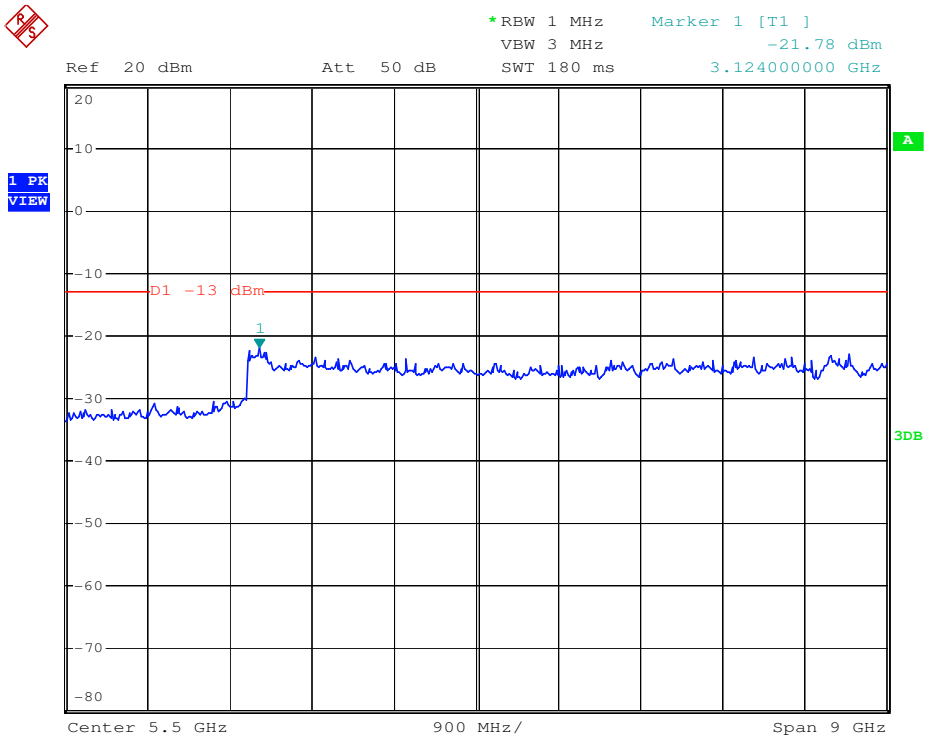


Cellular Band

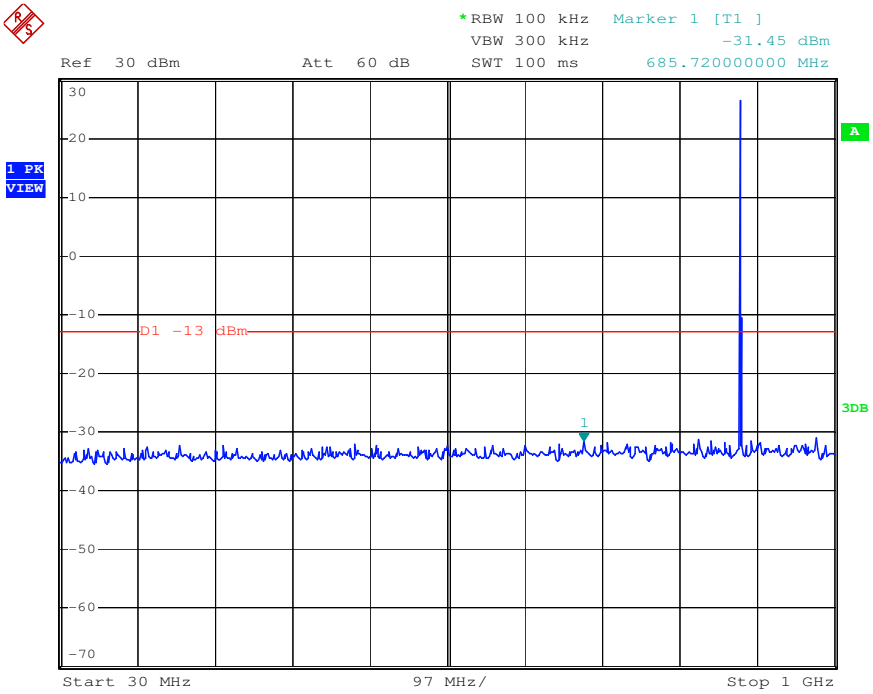
Cellular—TDMA down link(lowest frequency)



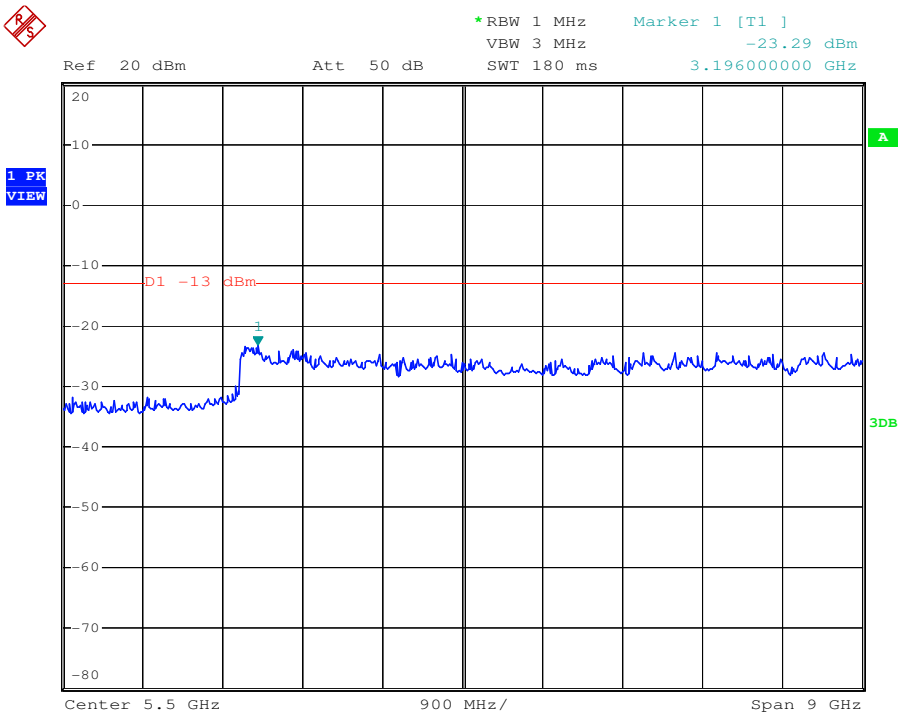
Cellular—TDMA down link(lowest frequency)



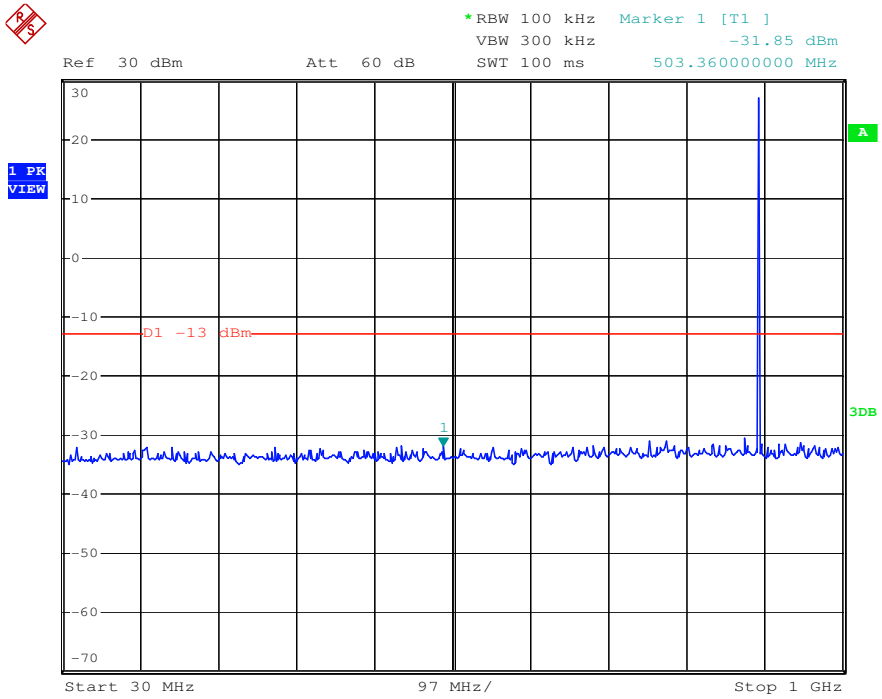
Cellular—TDMA down link(middle frequency)



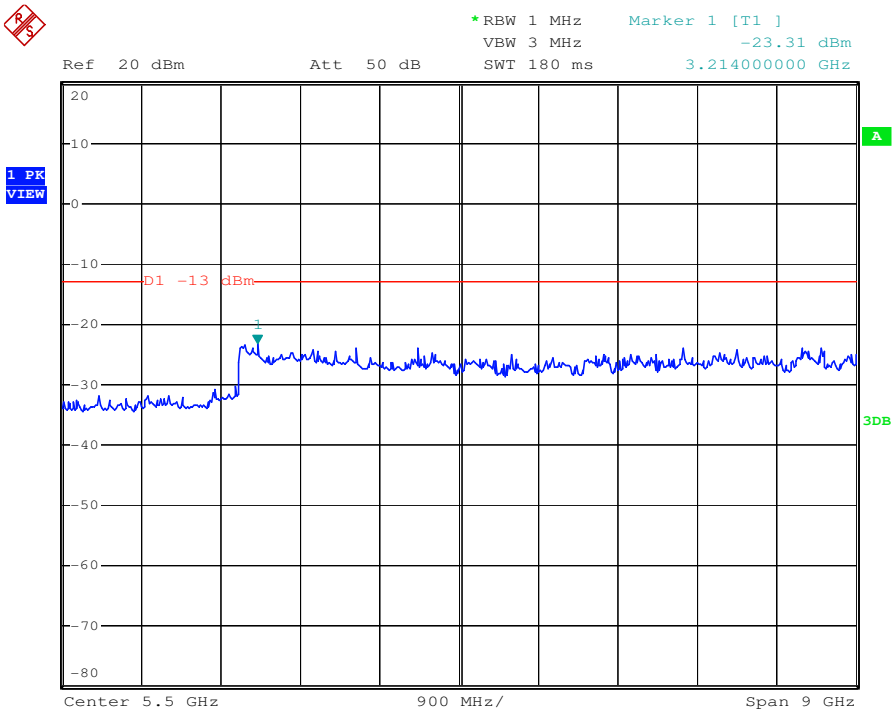
Cellular—TDMA down link(middle frequency)



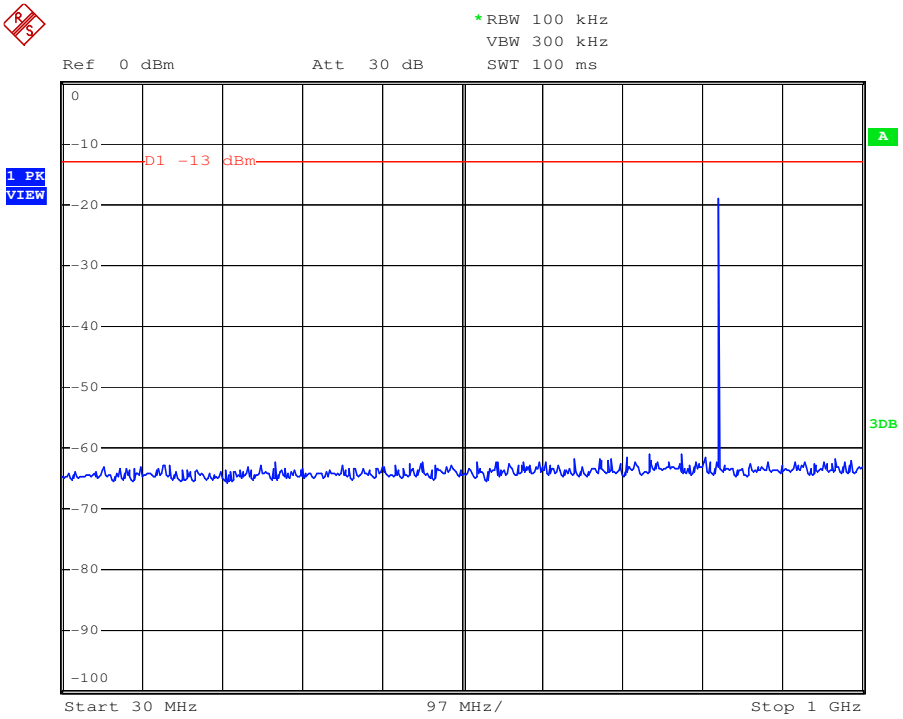
Cellular—TDMA down link(highest frequency)



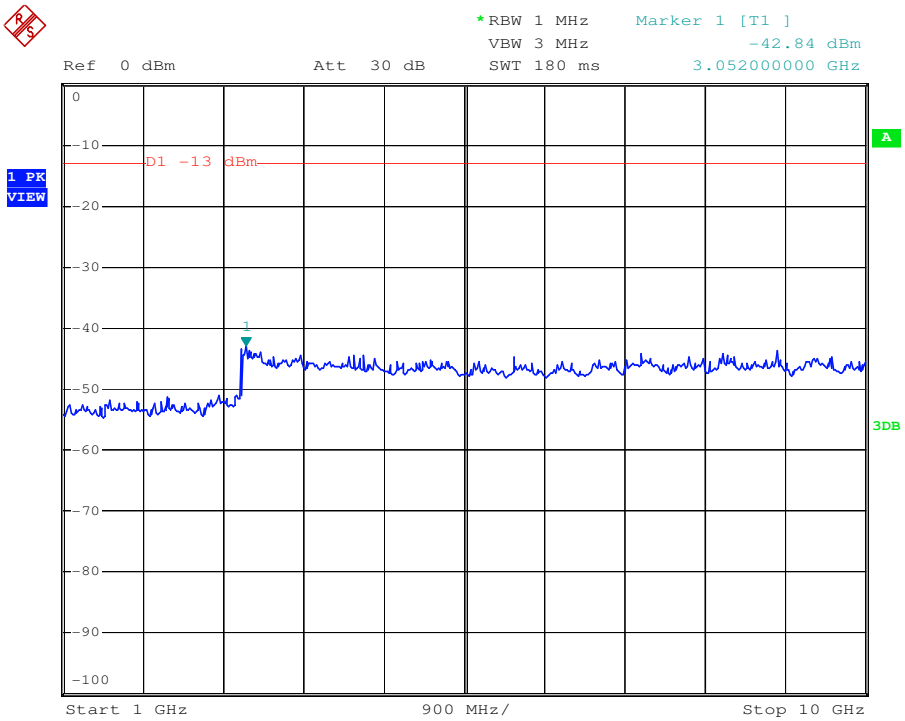
Cellular—TDMA down link(highest frequency)



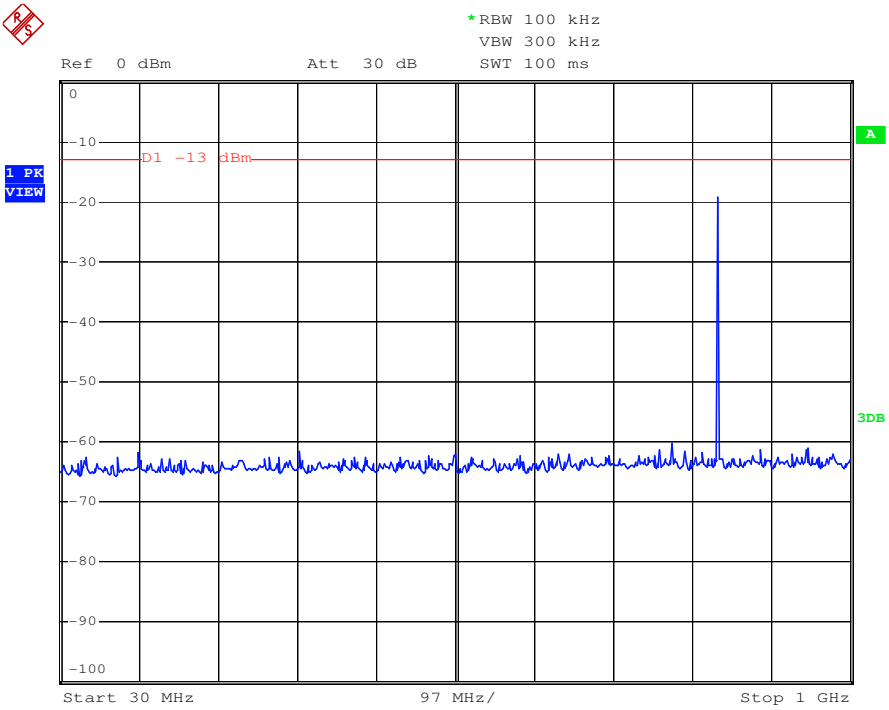
Cellular—TDMA up link(lowest frequency)



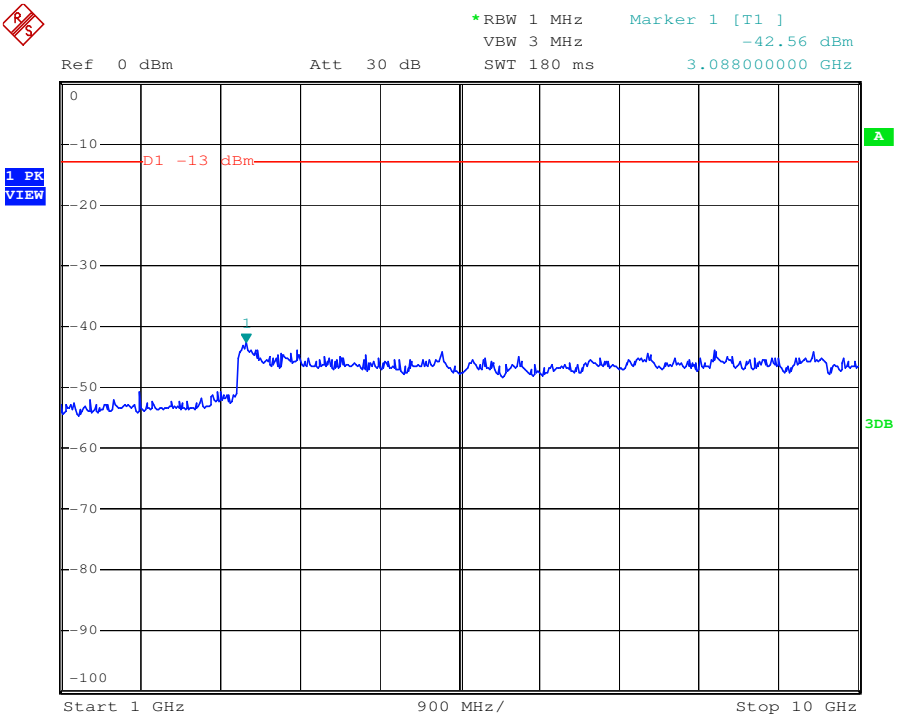
Cellular—TDMA up link(lowest frequency)



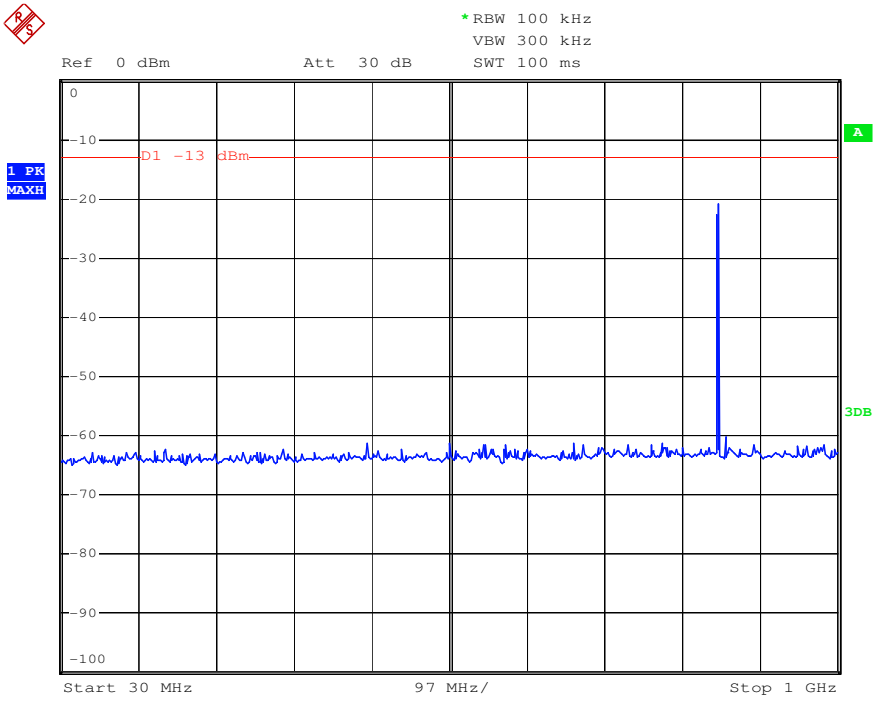
Cellular—TDMA up link(middle frequency)



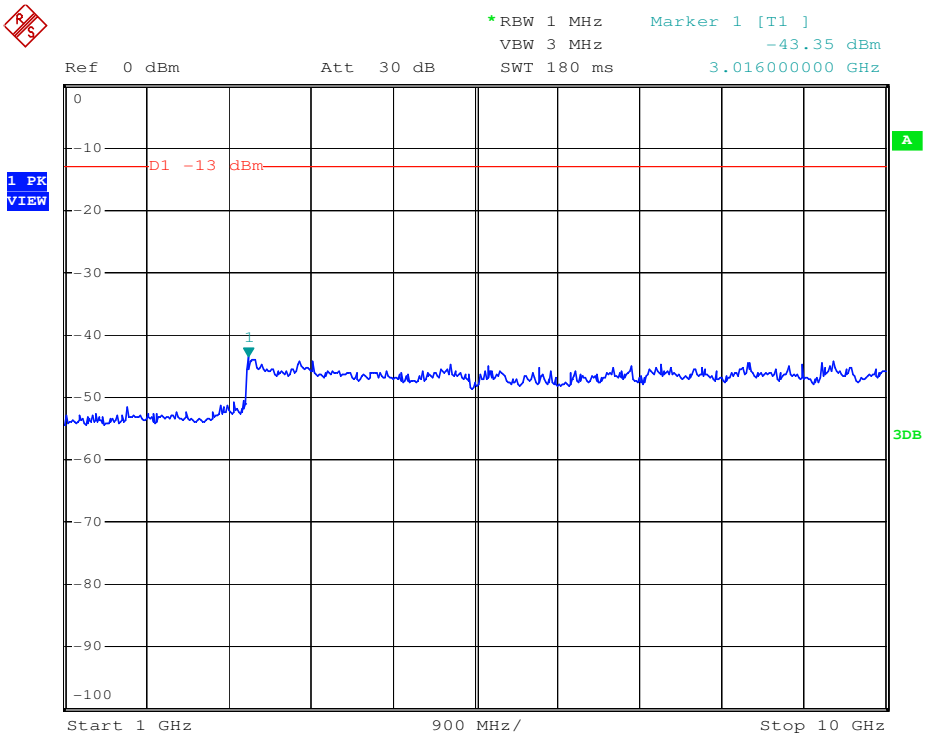
Cellular—TDMA up link(middle frequency)



Cellular—TDMA up link(highest frequency)

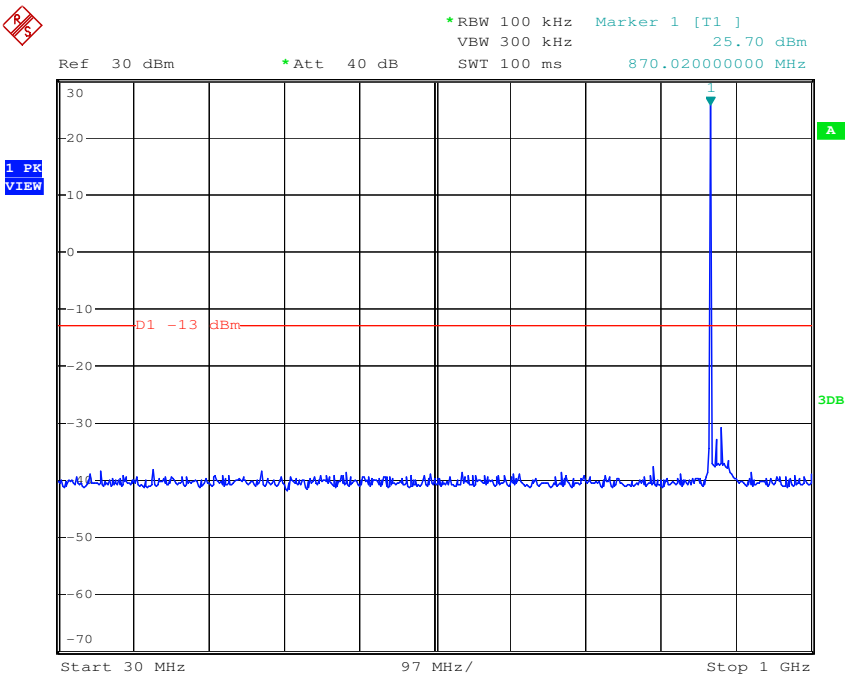


Cellular—TDMA up link(highest frequency)

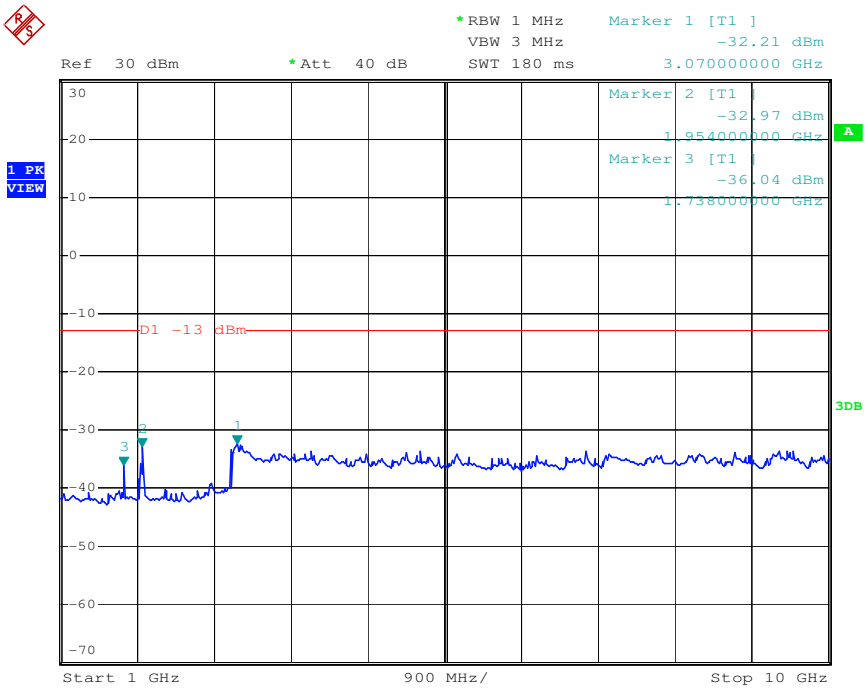


Cellular Band

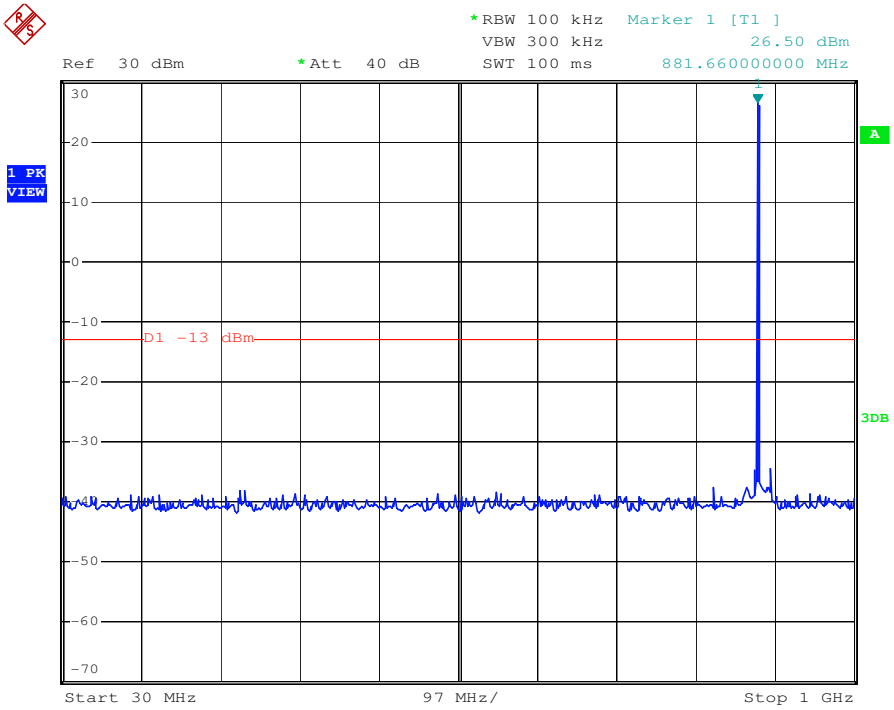
Cellular—GSM down link(lowest frequency)



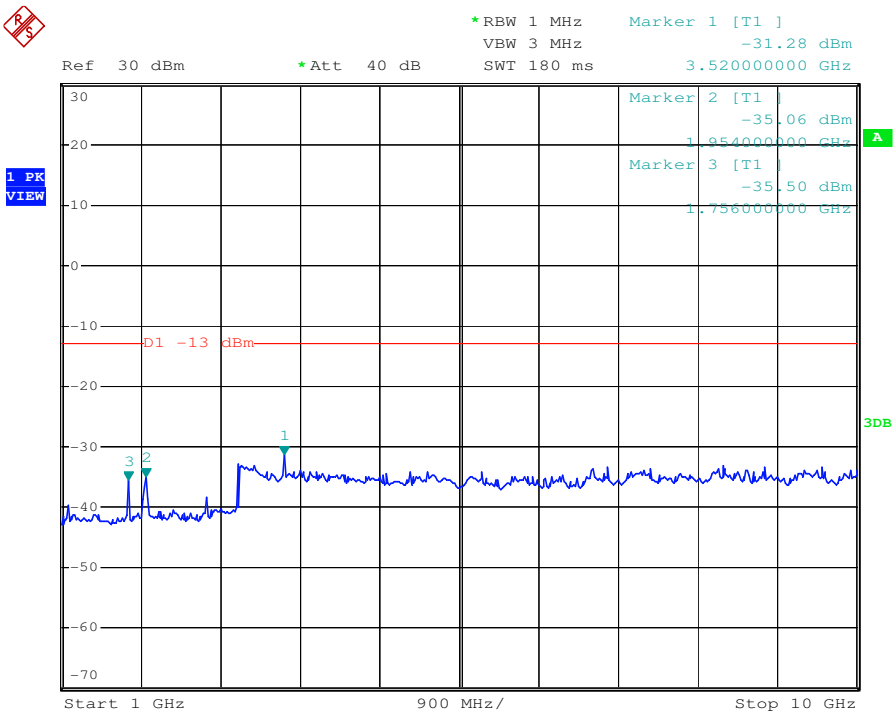
Cellular—GSM down link(lowest frequency)



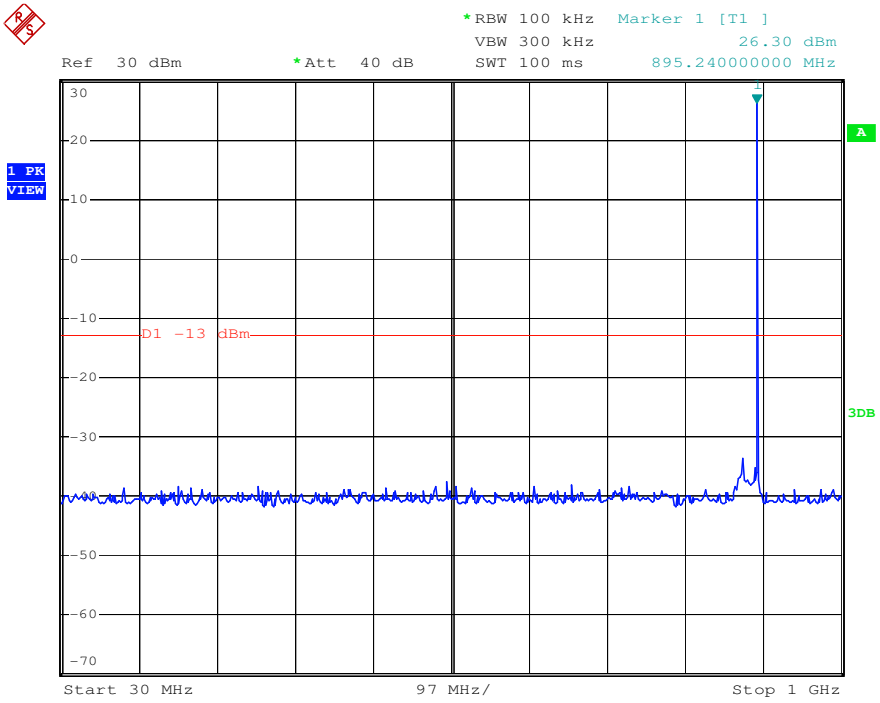
Cellular—GSM down link(middle frequency)



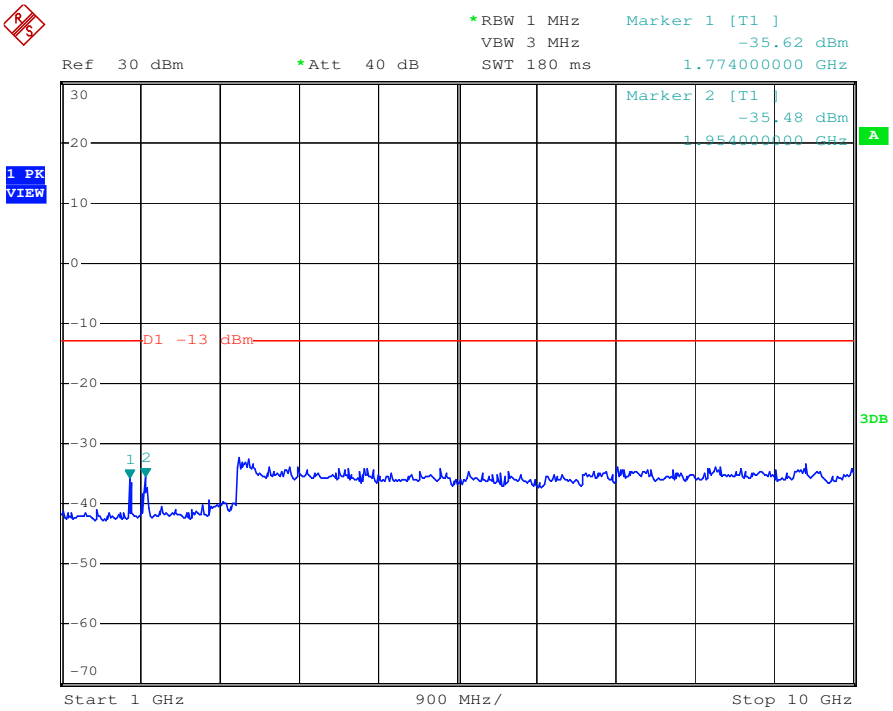
Cellular—GSM down link(middle frequency)



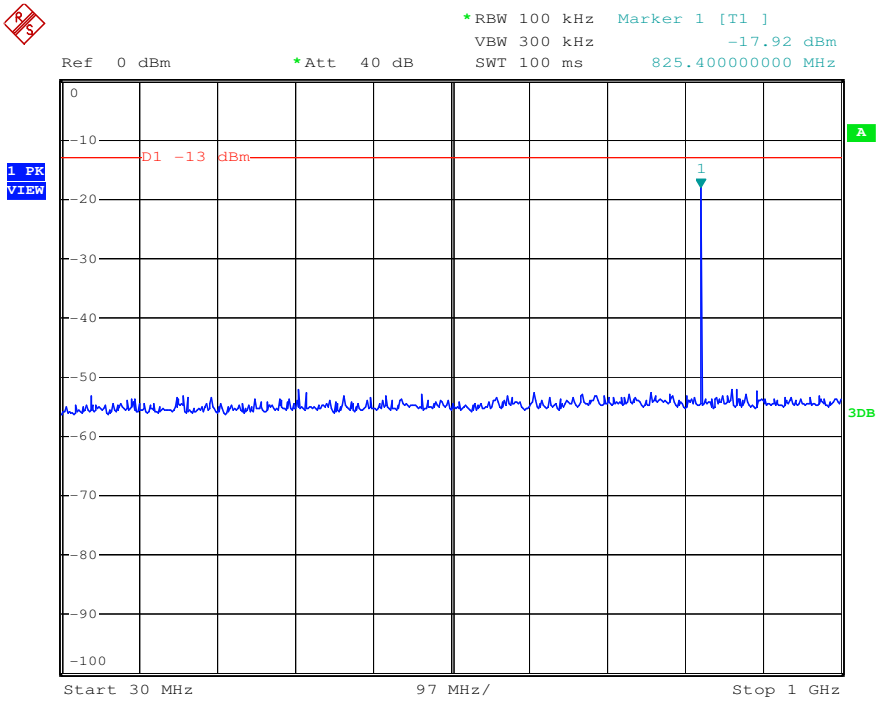
Cellular—GSM down link(highest frequency)



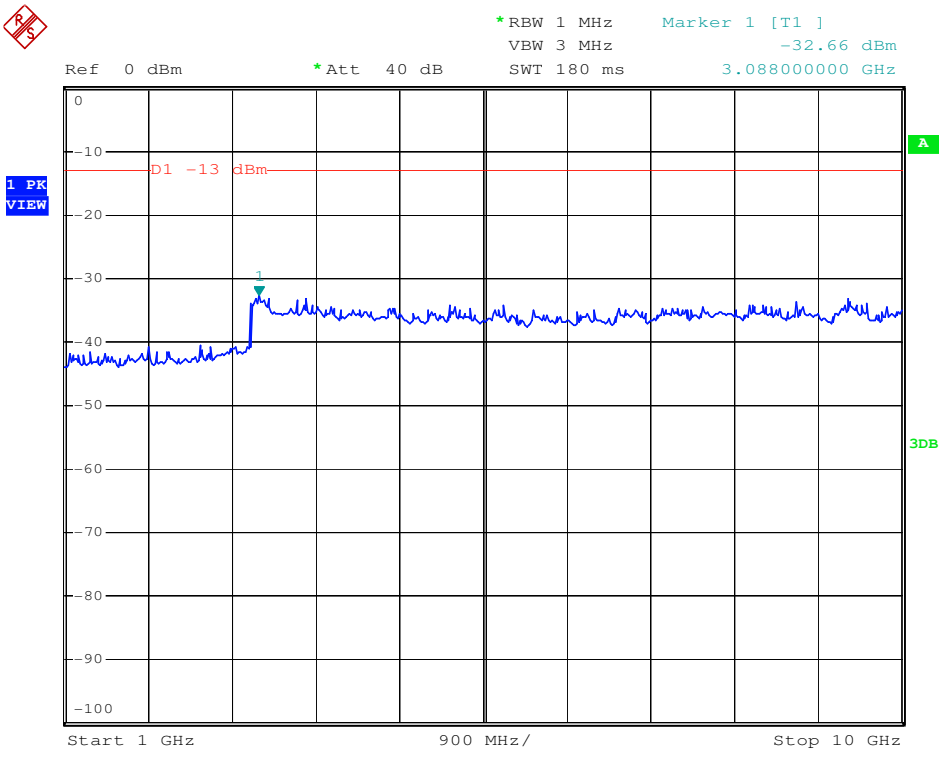
Cellular—GSM down link(highest frequency)



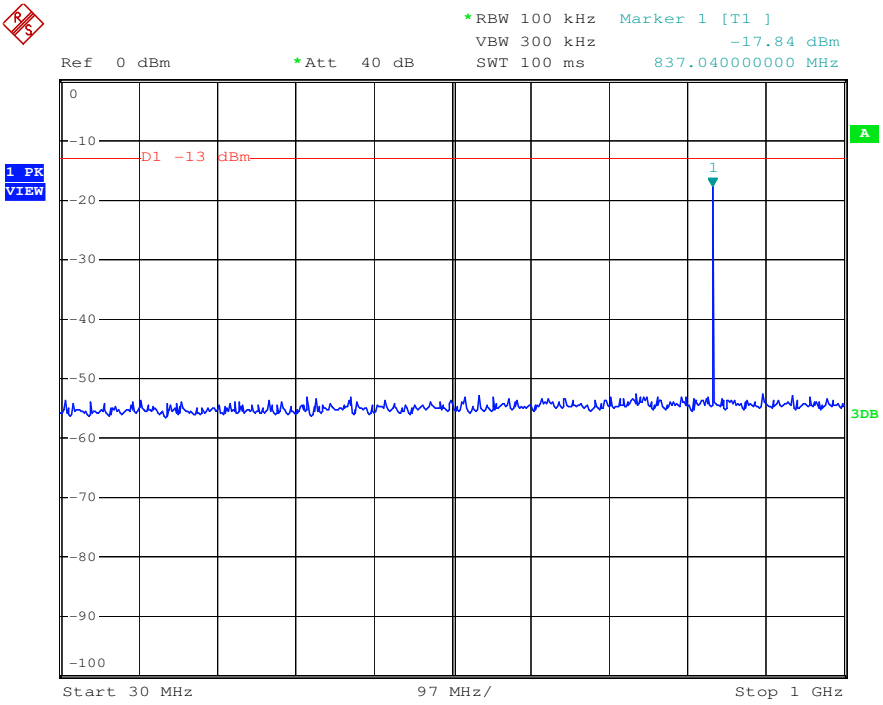
Cellular—GSM up link(lowest frequency)



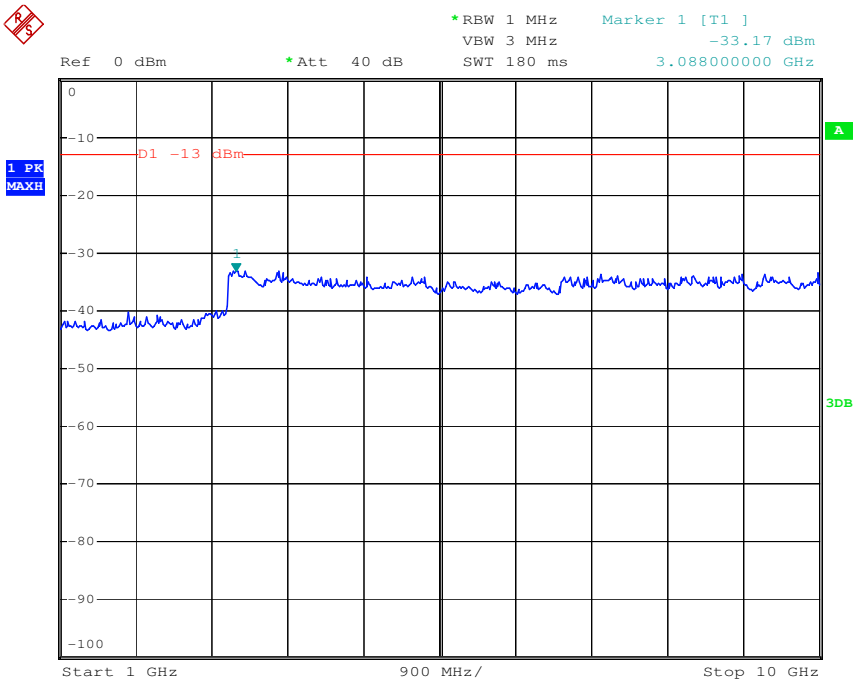
Cellular—GSM up link(lowest frequency)



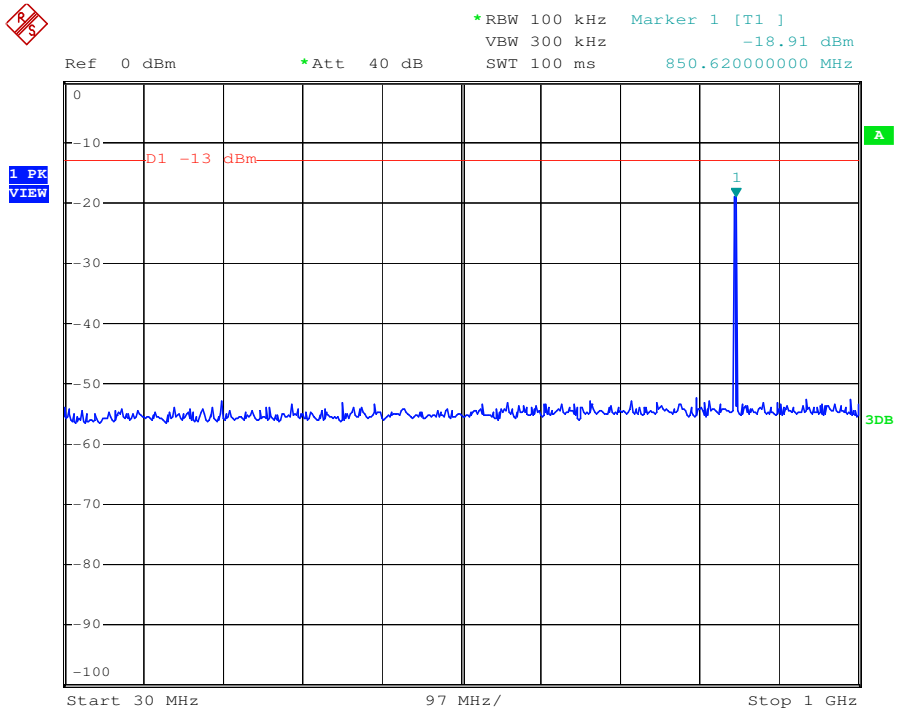
Cellular—GSM up link(middle frequency)



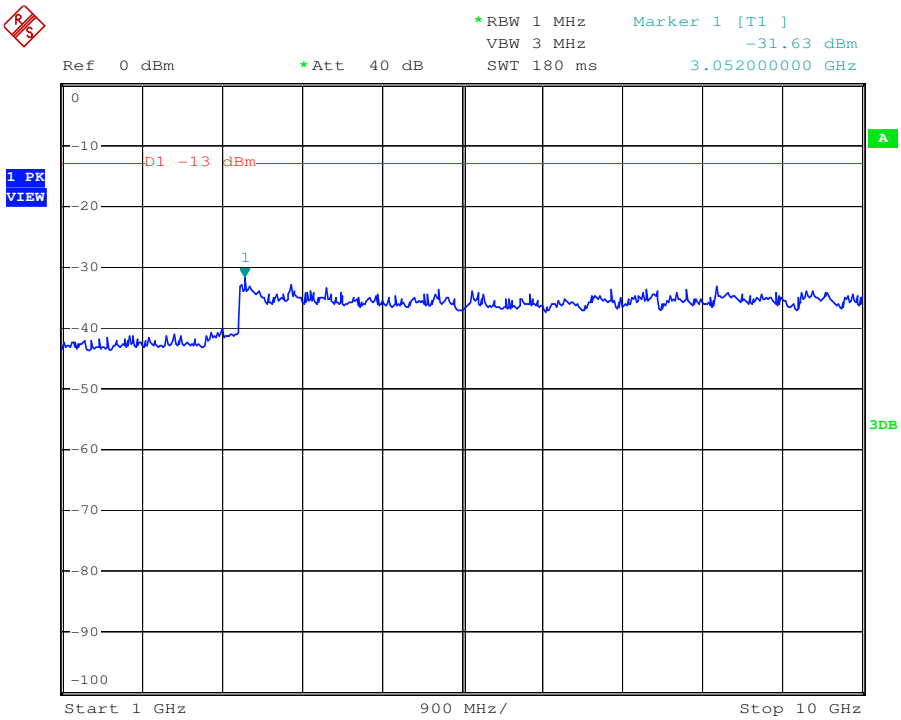
Cellular—GSM up link(middle frequency)



Cellular—GSM up link(highest frequency)

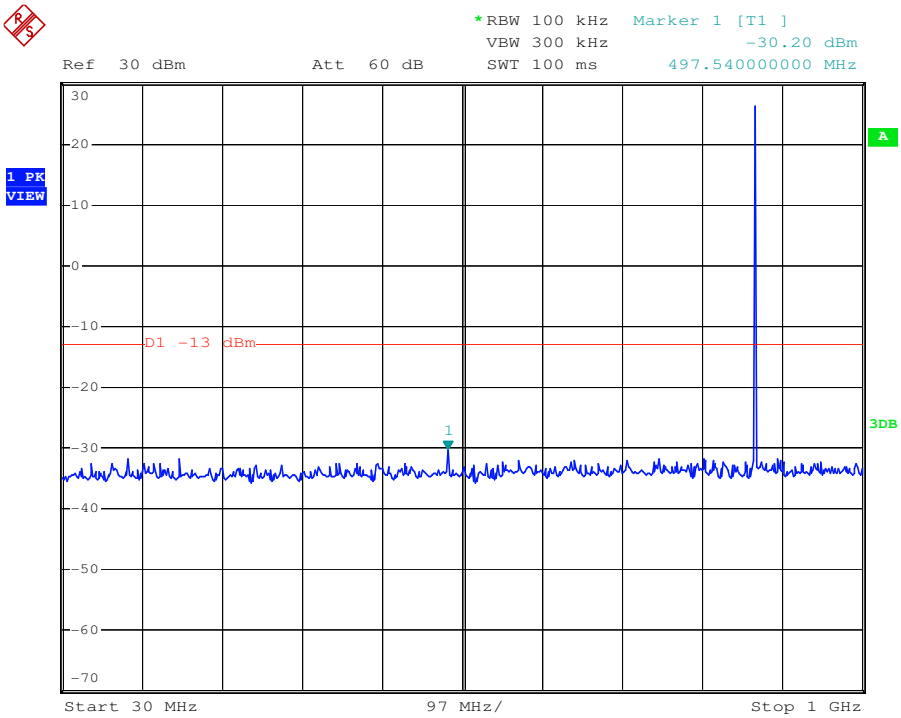


Cellular—GSM up link(highest frequency)

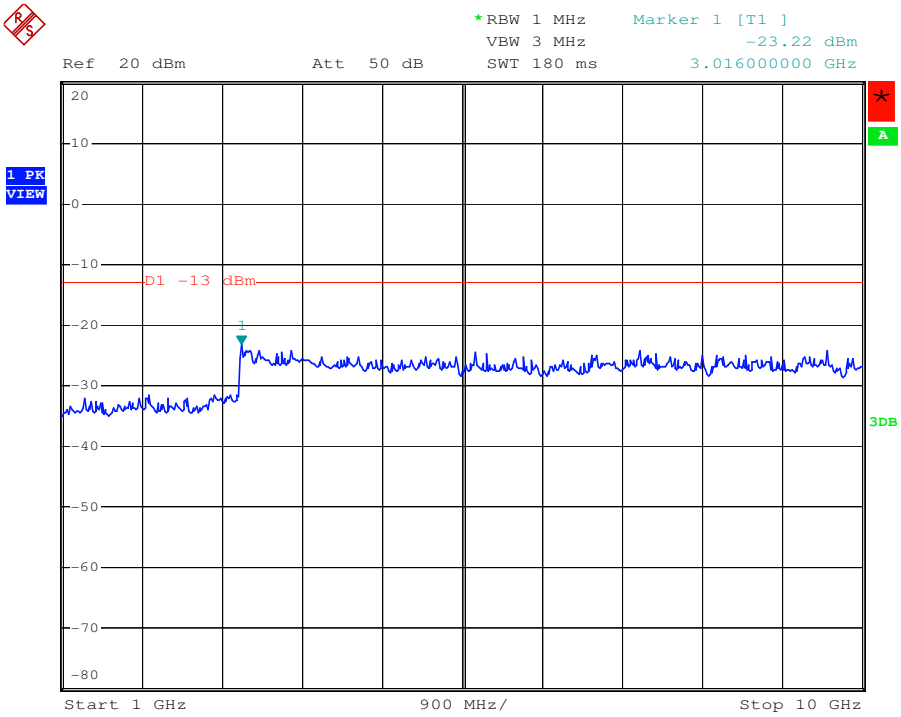


Cellular Band

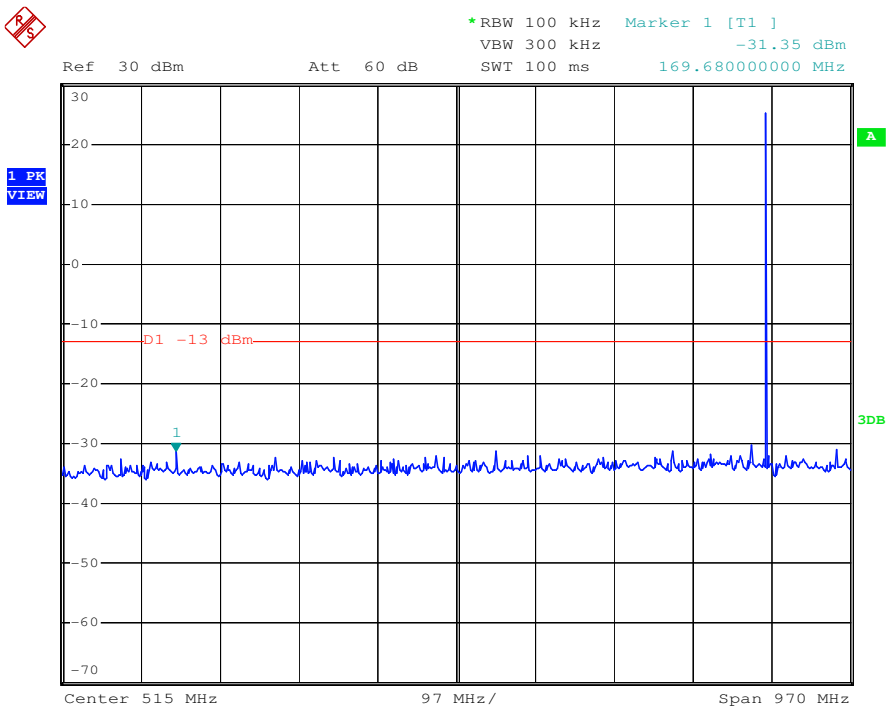
Cellular—EDGE down link(lowest frequency)



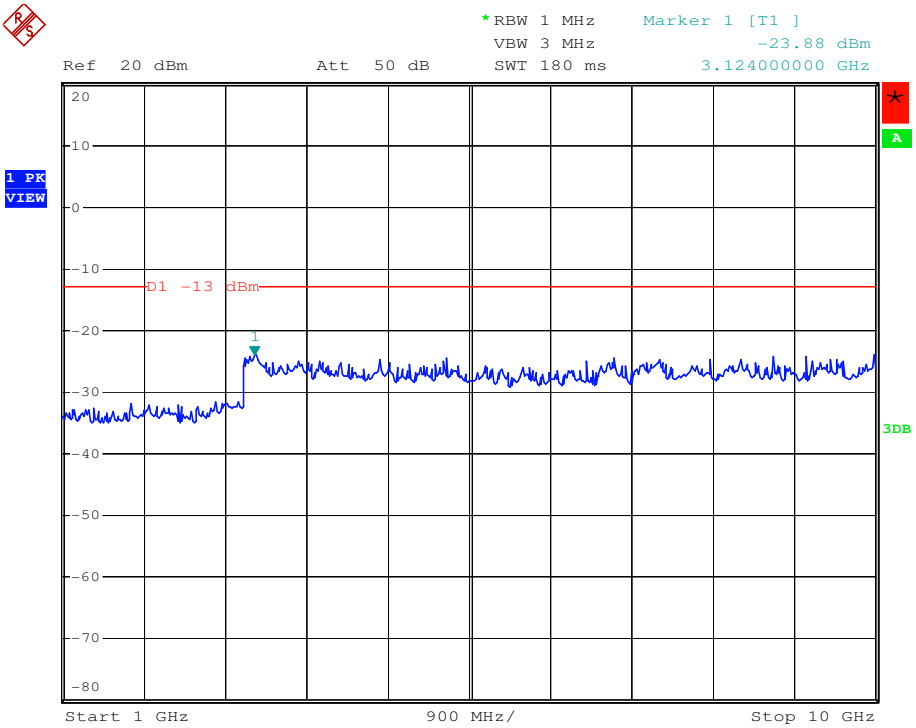
Cellular—EDGE down link(lowest frequency)



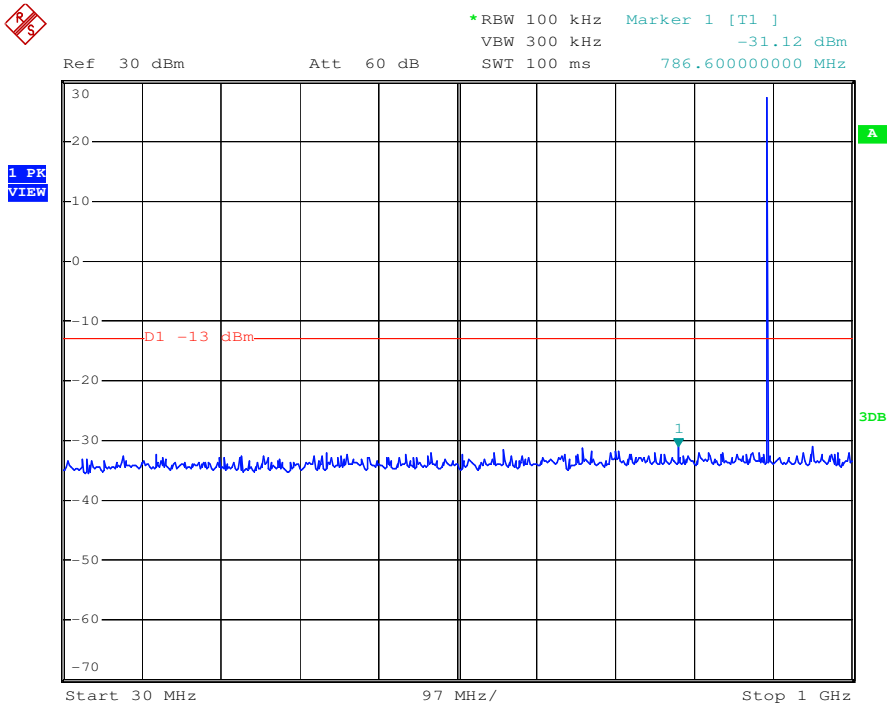
Cellular—EDGE down link(middle frequency)



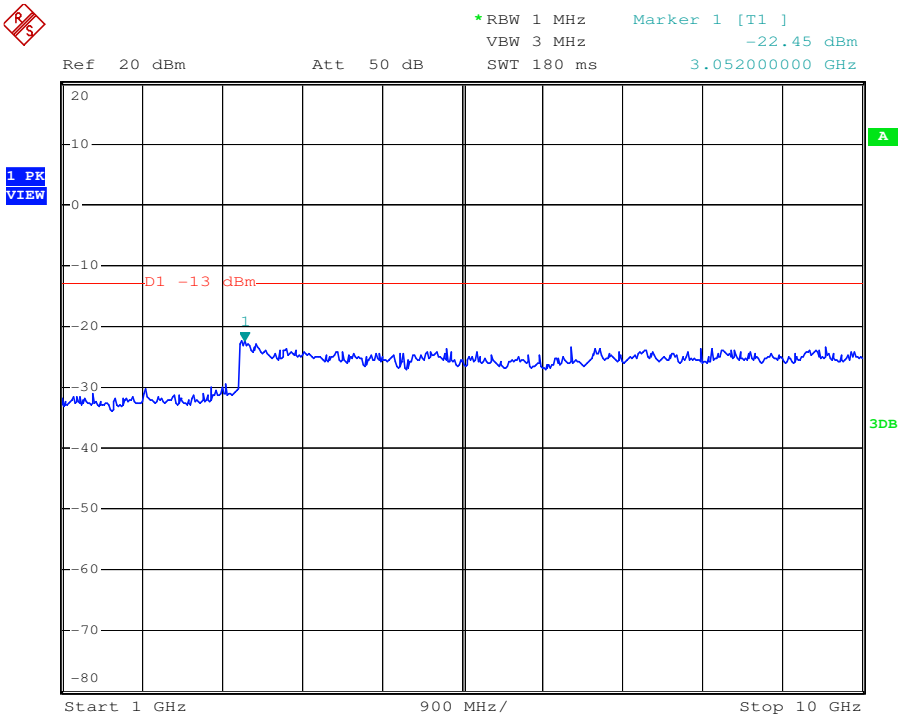
Cellular—EDGE down link(middle frequency)



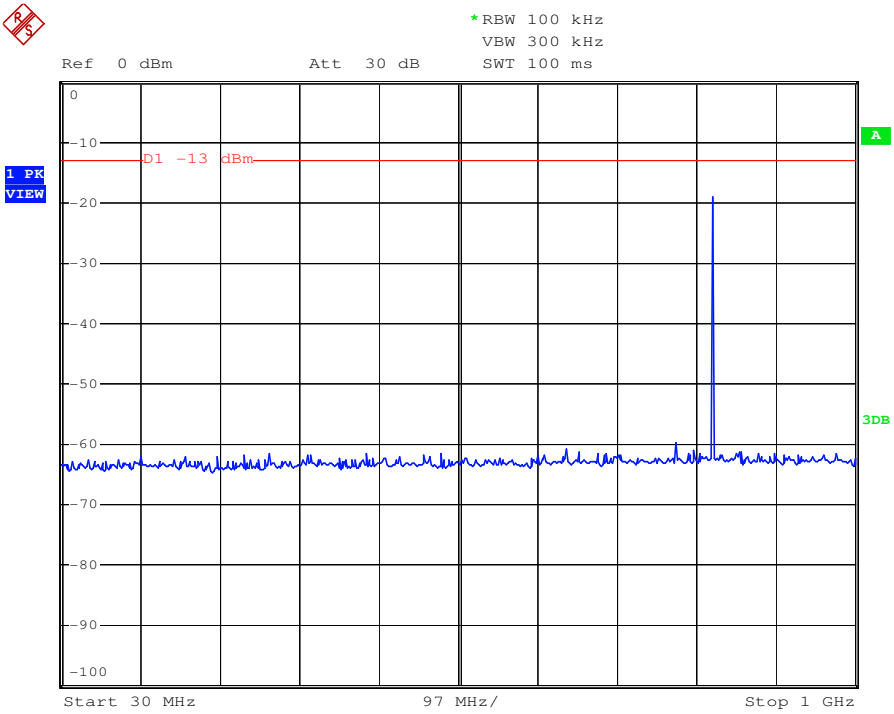
Cellular—EDGE down link(highest frequency)



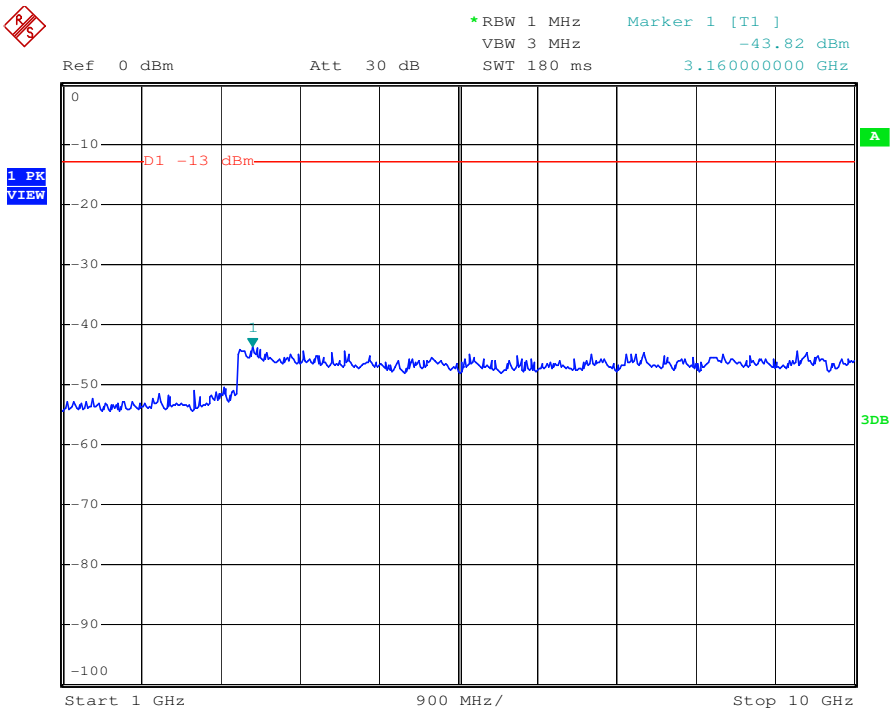
Cellular—EDGE down link(highest frequency)



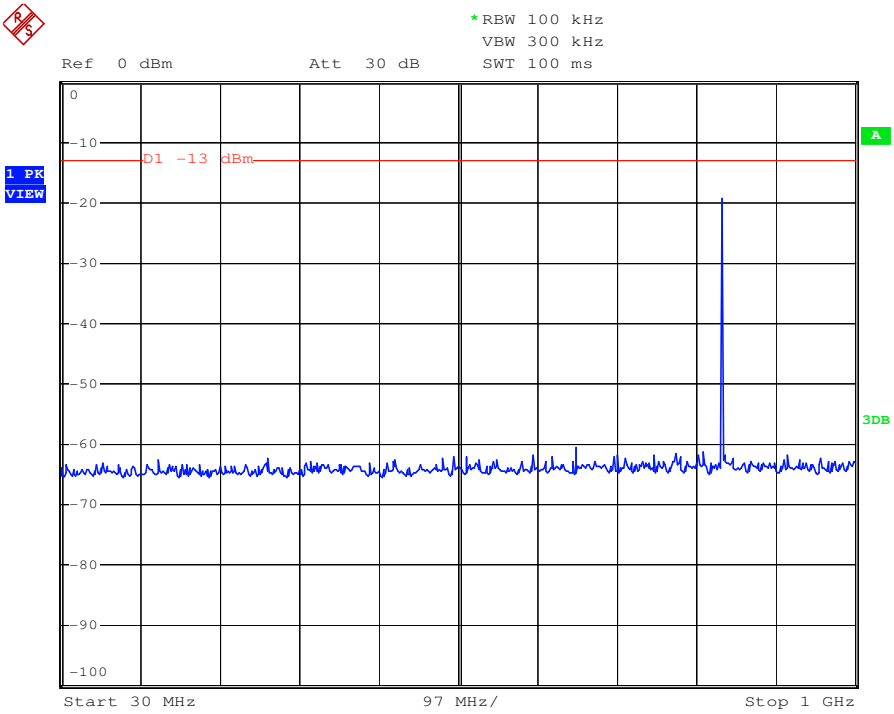
Cellular—EDGE up link(lowest frequency)



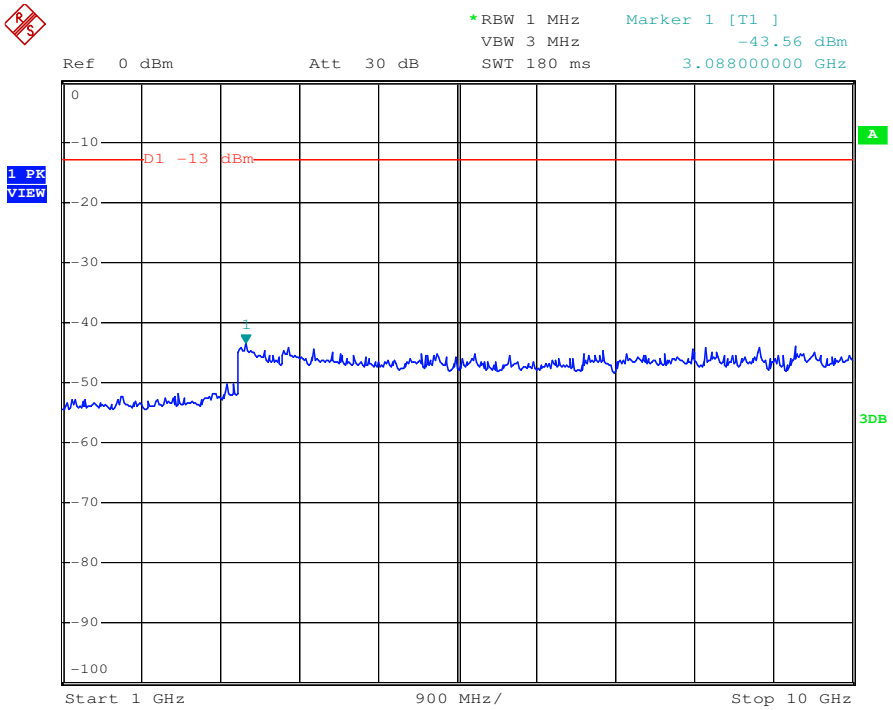
Cellular—EDGE up link(lowest frequency)



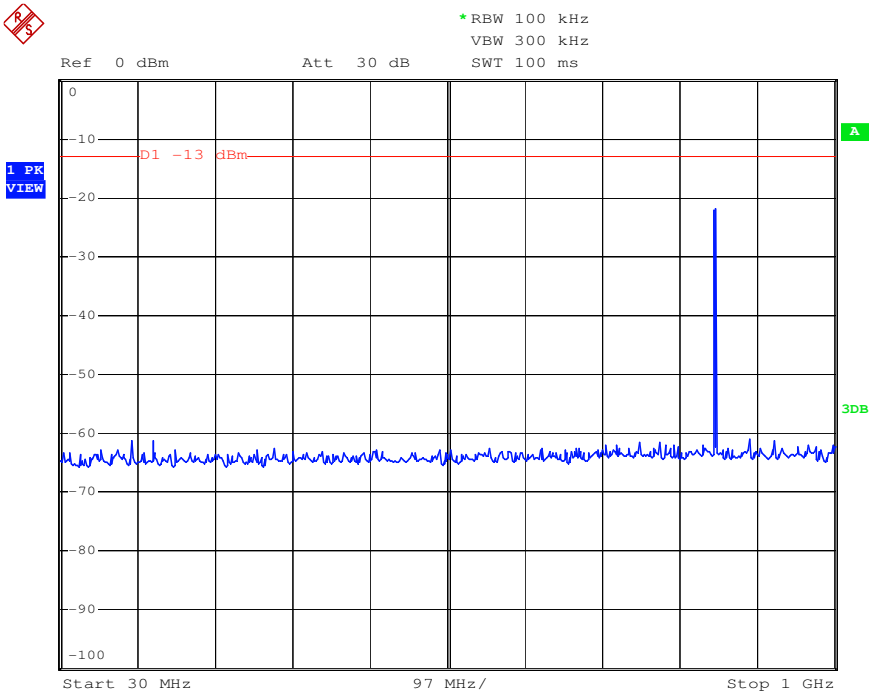
Cellular—EDGE up link(middle frequency)



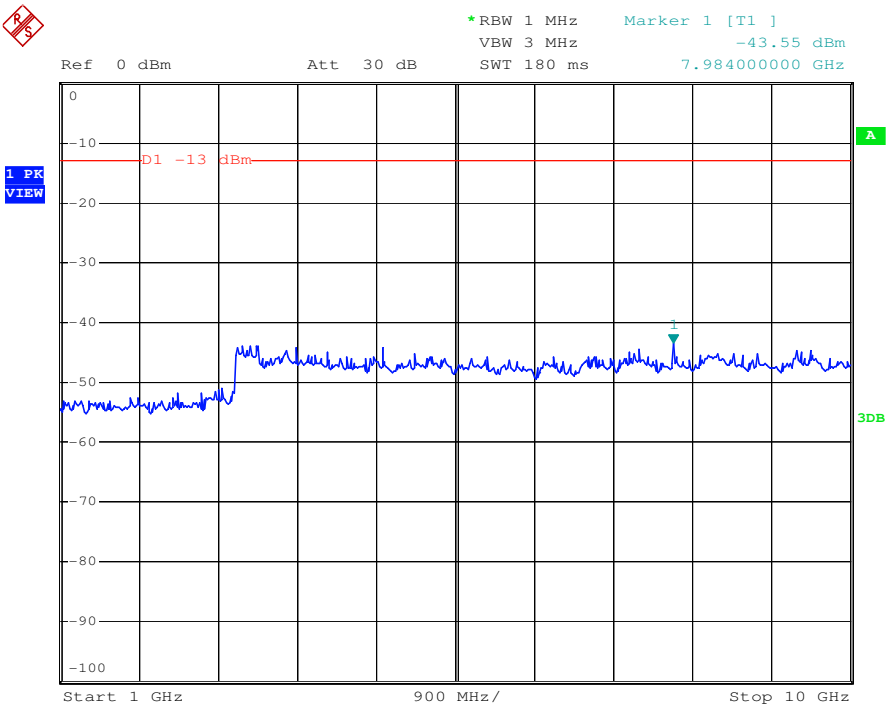
Cellular—EDGE up link(middle frequency)



Cellular—EDGE up link(highest frequency)

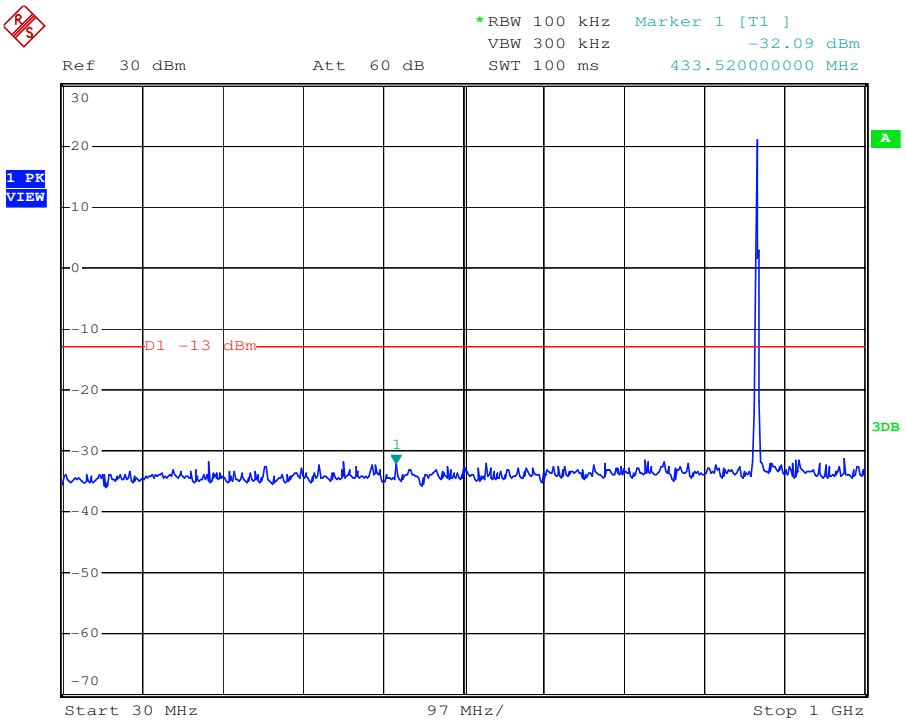


Cellular—EDGE up link(highest frequency)

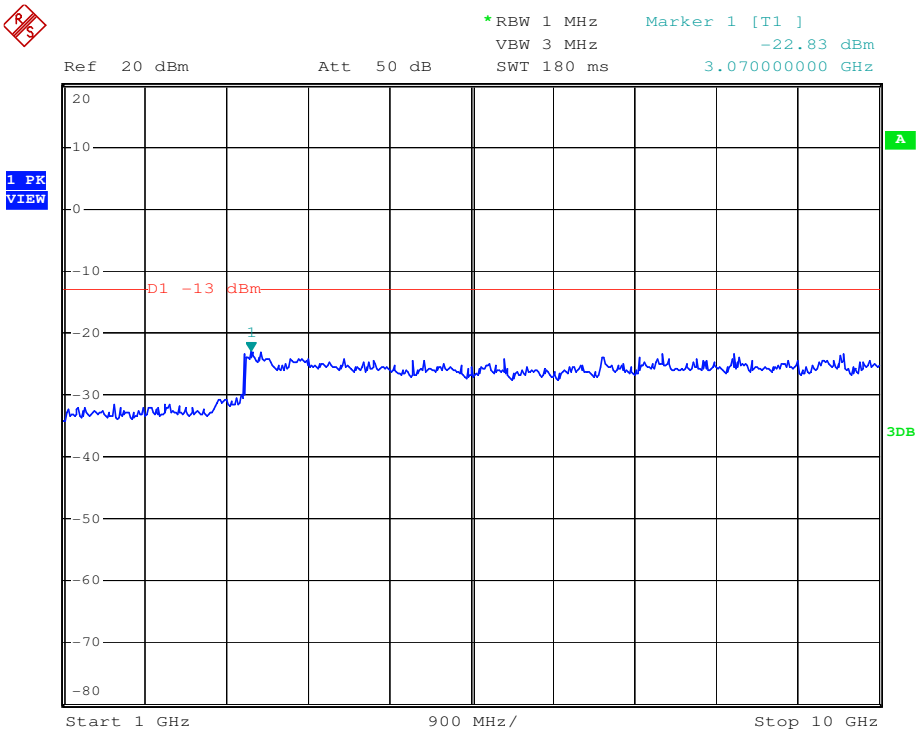


Cellular Band

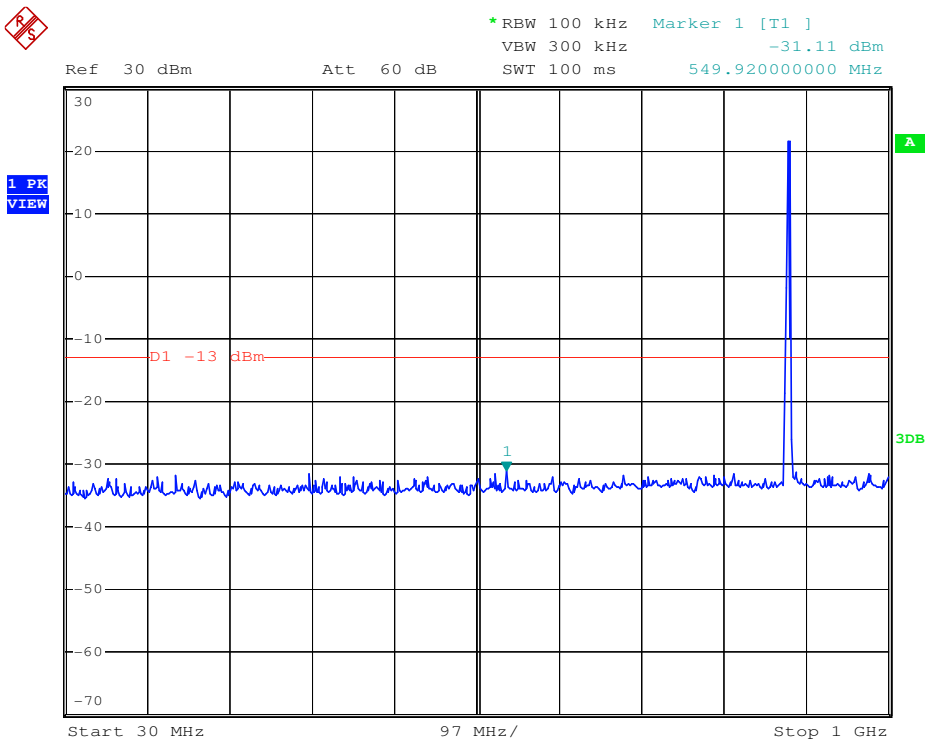
Cellular—CDMA down link(lowest frequency)



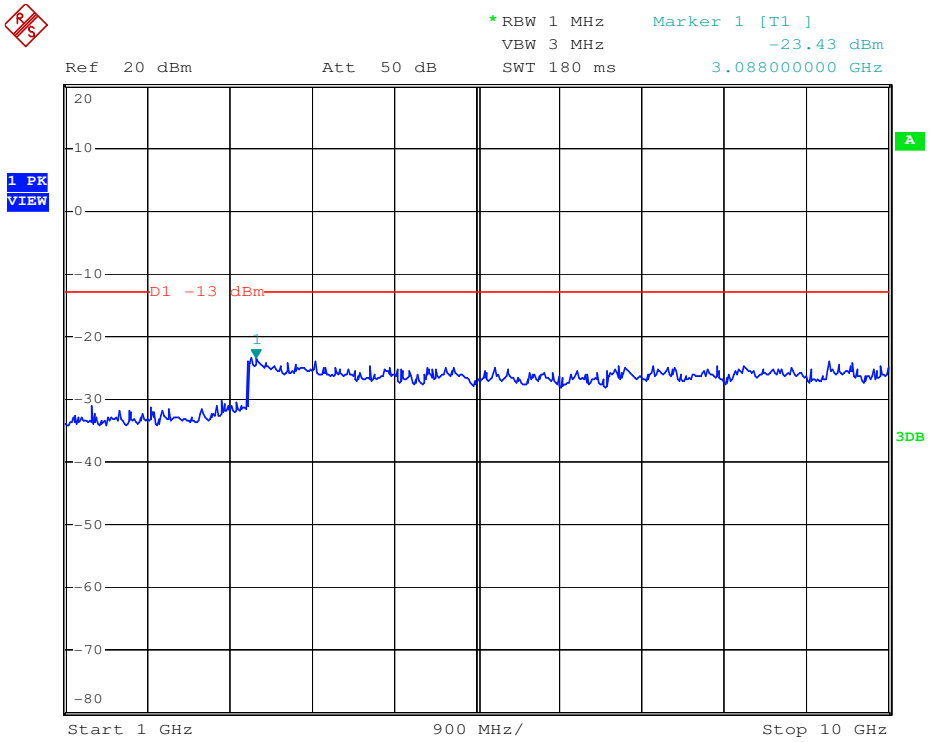
Cellular—CDMA down link(lowest frequency)



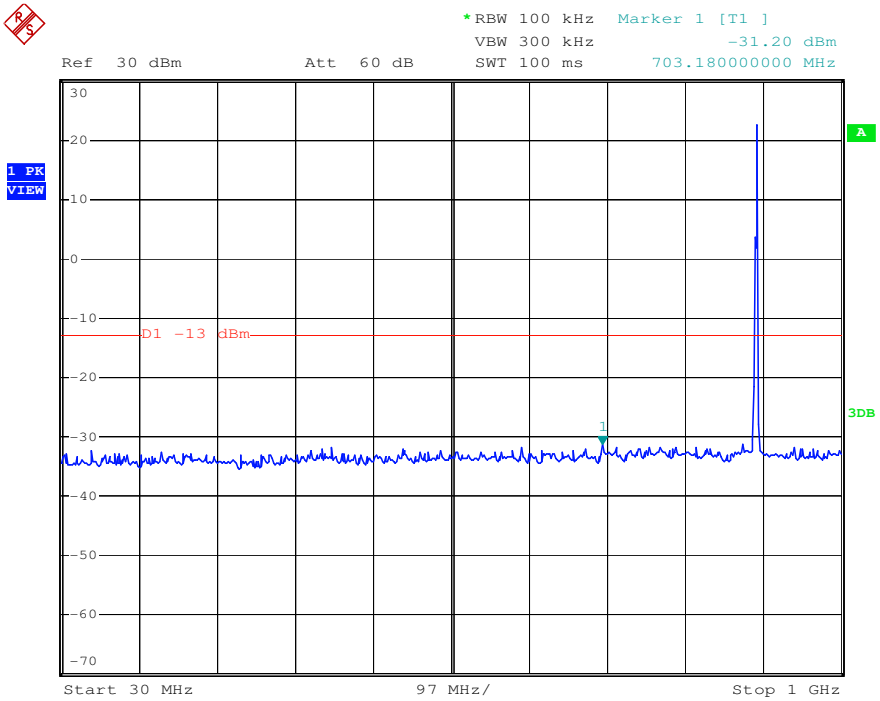
Cellular—CDMA down link(middle frequency)



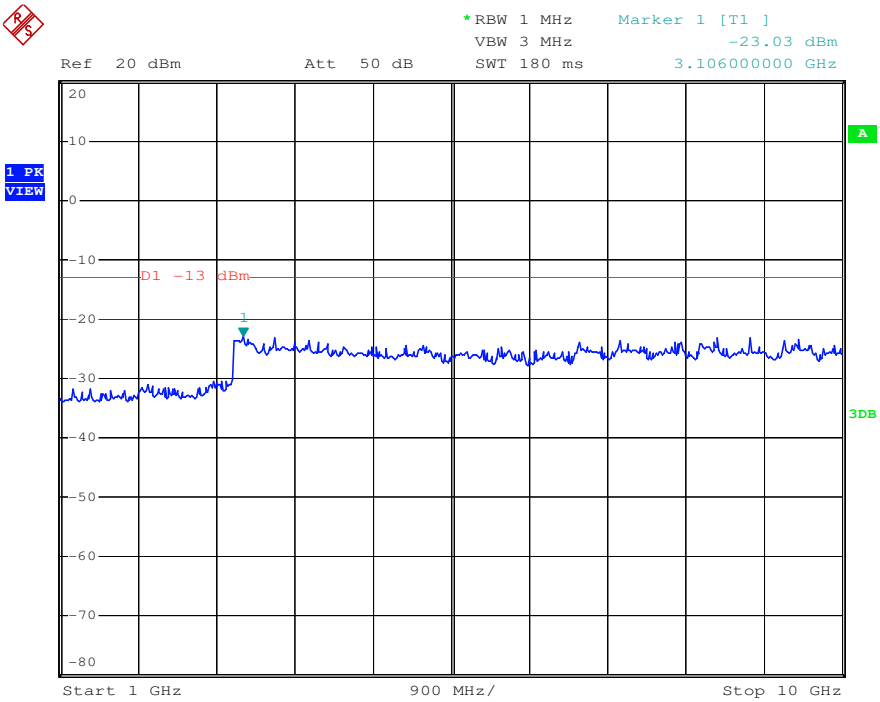
Cellular—CDMA down link(middle frequency)



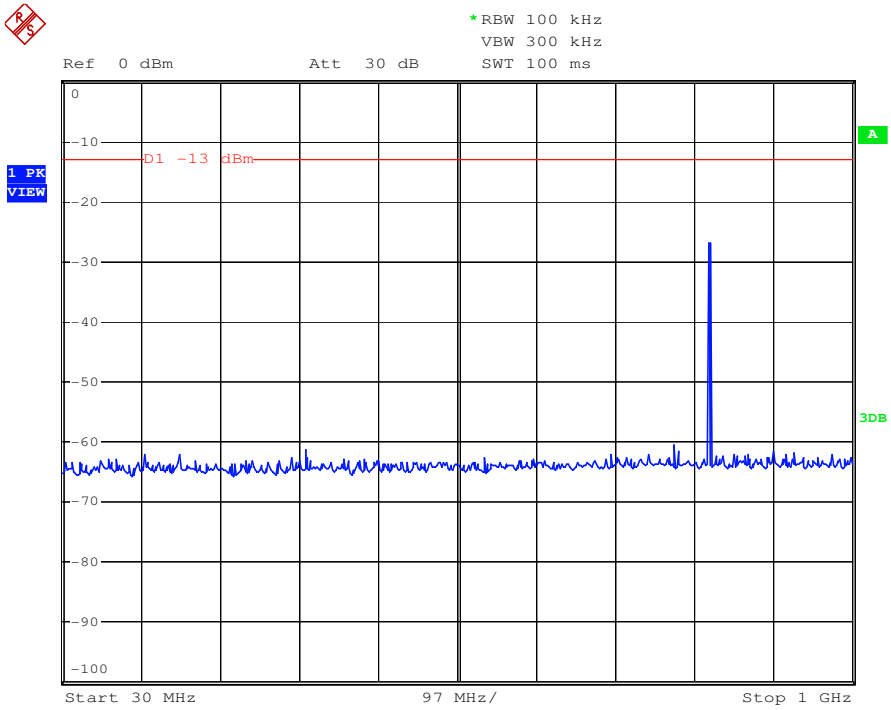
Cellular—CDMA down link(highest frequency)



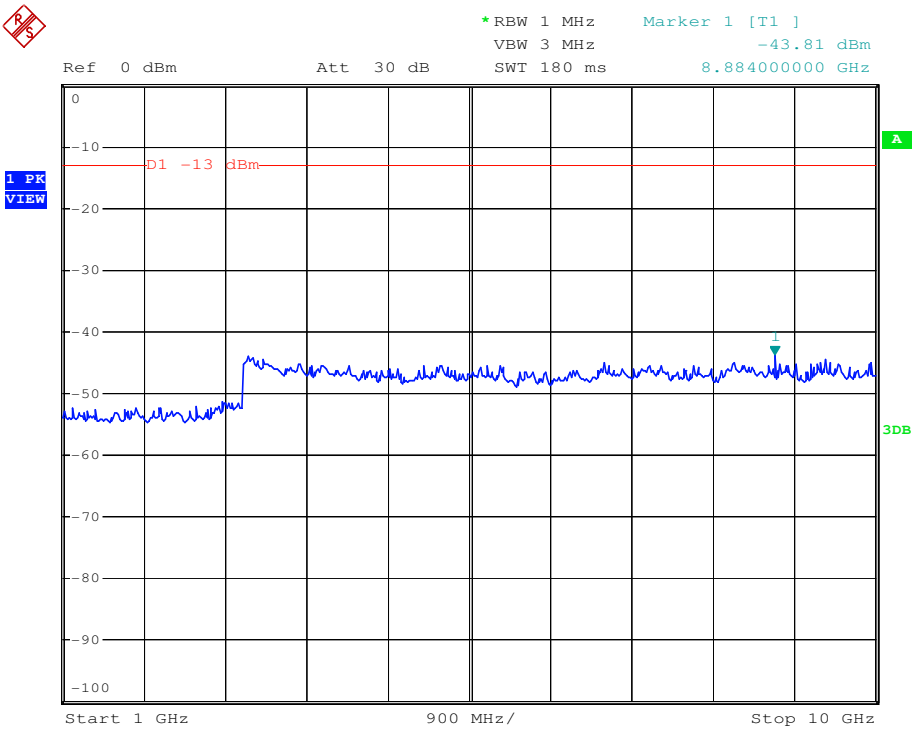
Cellular—CDMA down link(highest frequency)



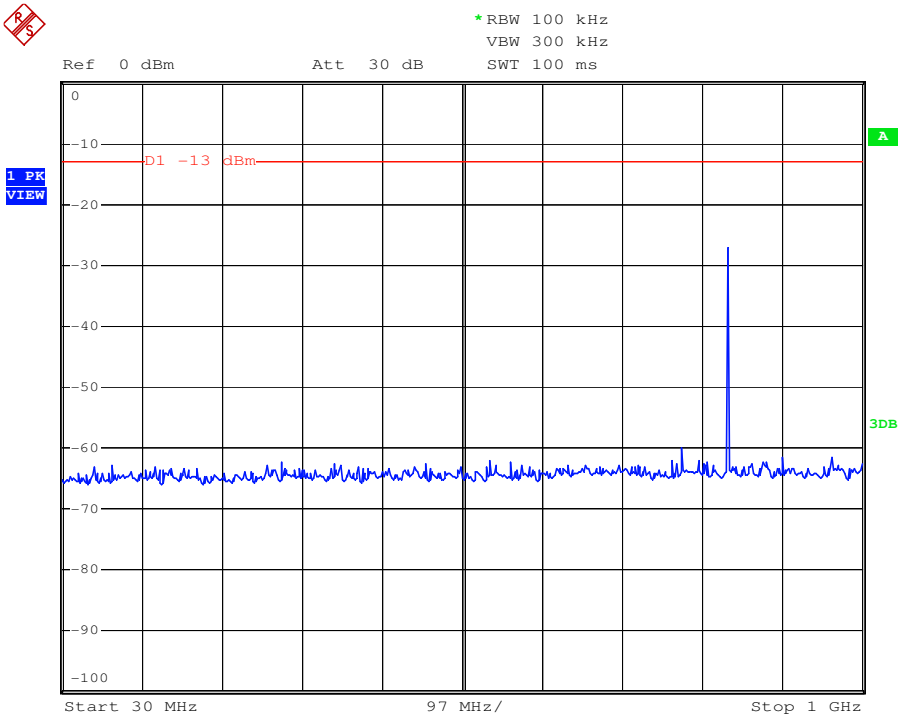
Cellular—CDMA up link(lowest frequency)



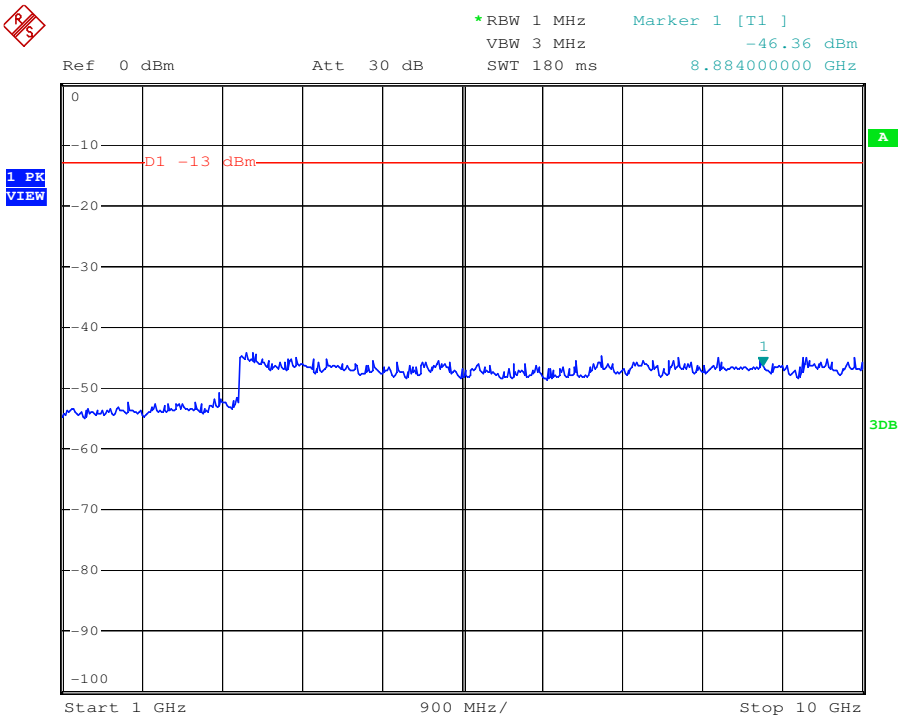
Cellular—CDMA up link(lowest frequency)



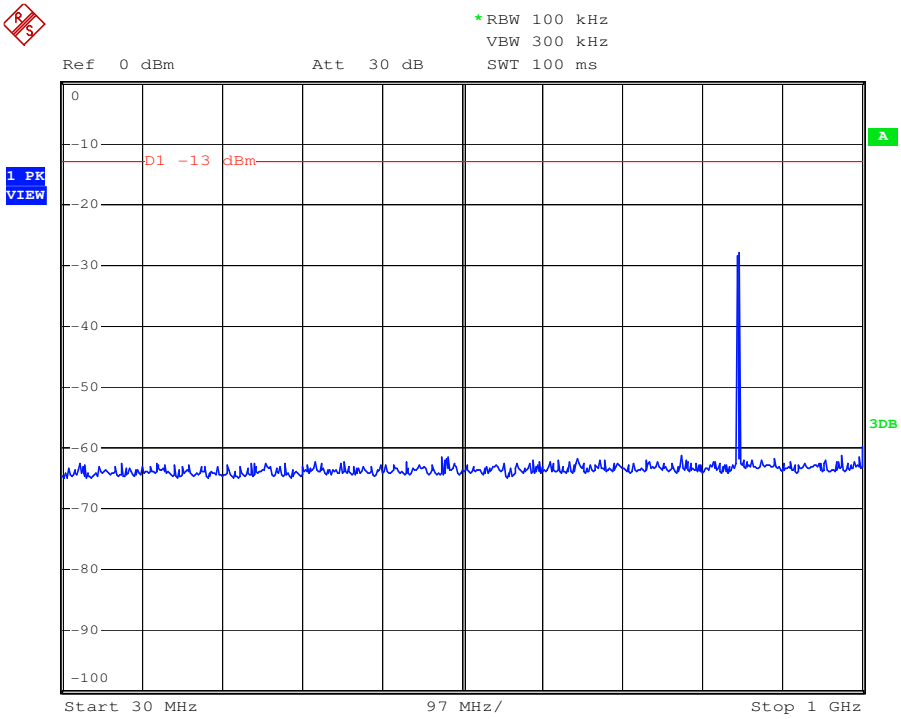
Cellular—CDMA up link(middle frequency)



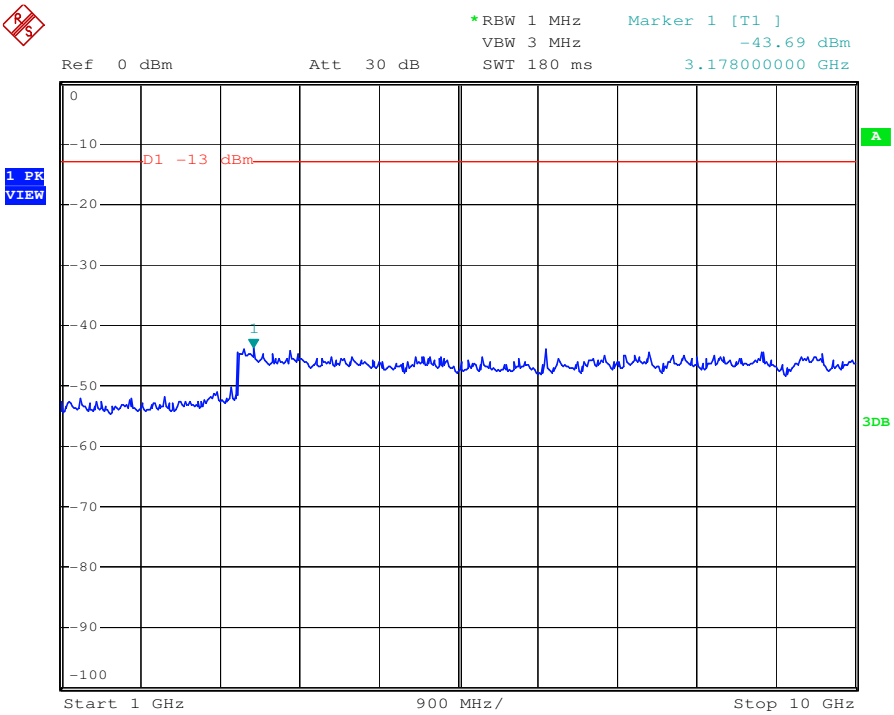
Cellular—CDMA up link(middle frequency)



Cellular—CDMA up link(highest frequency)

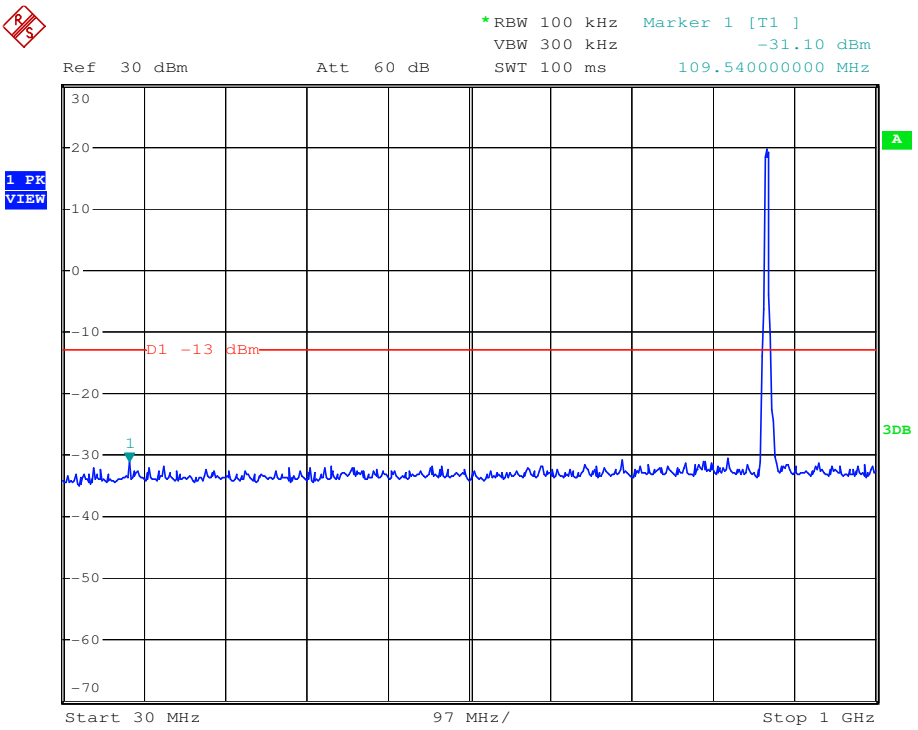


Cellular—CDMA up link(highest frequency)

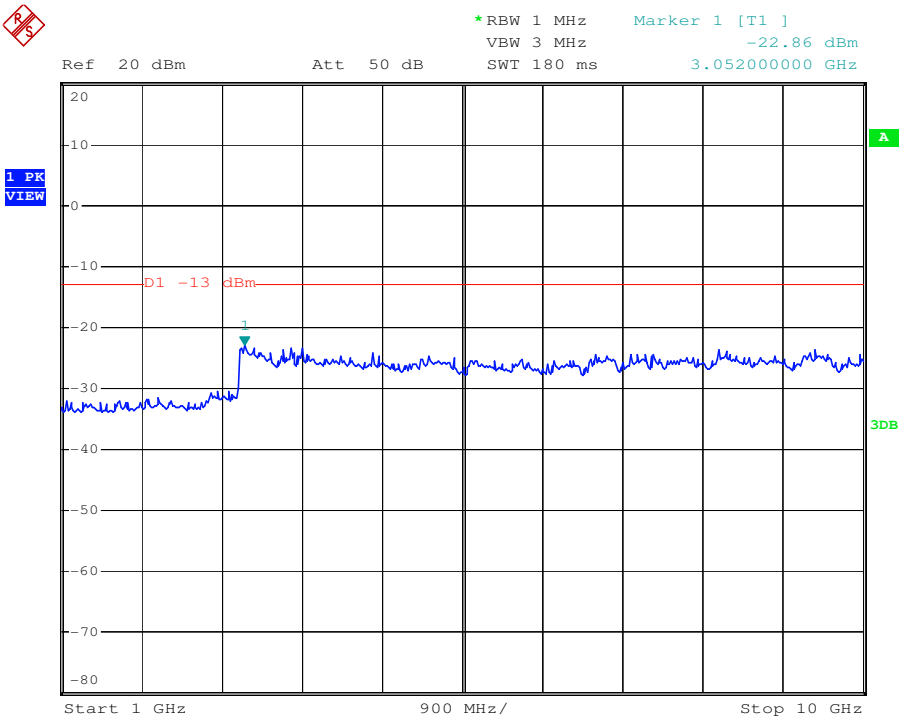


Cellular Band

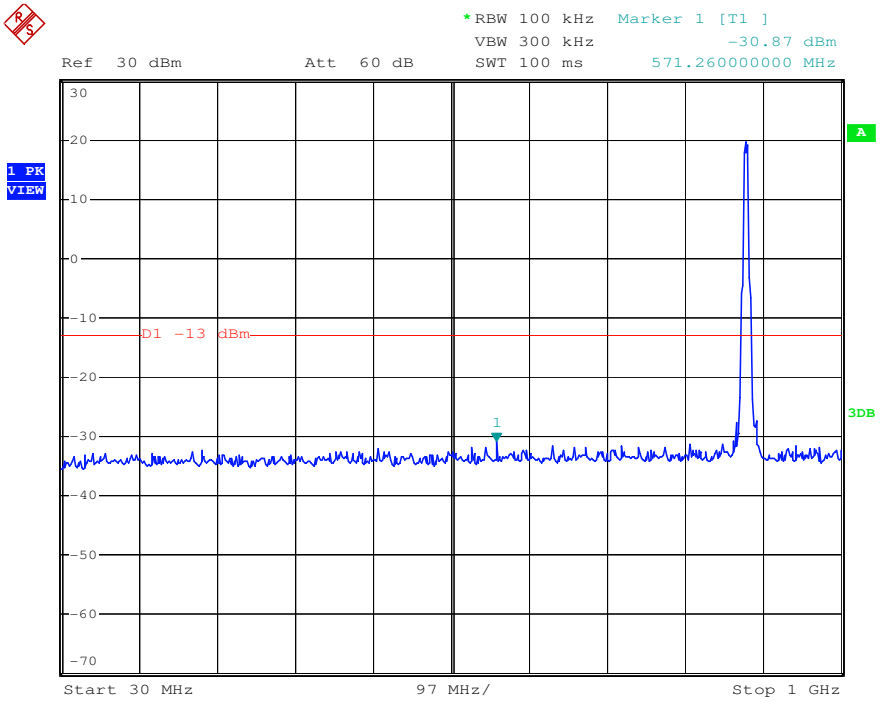
Cellular—WCDMA down link(lowest frequency)



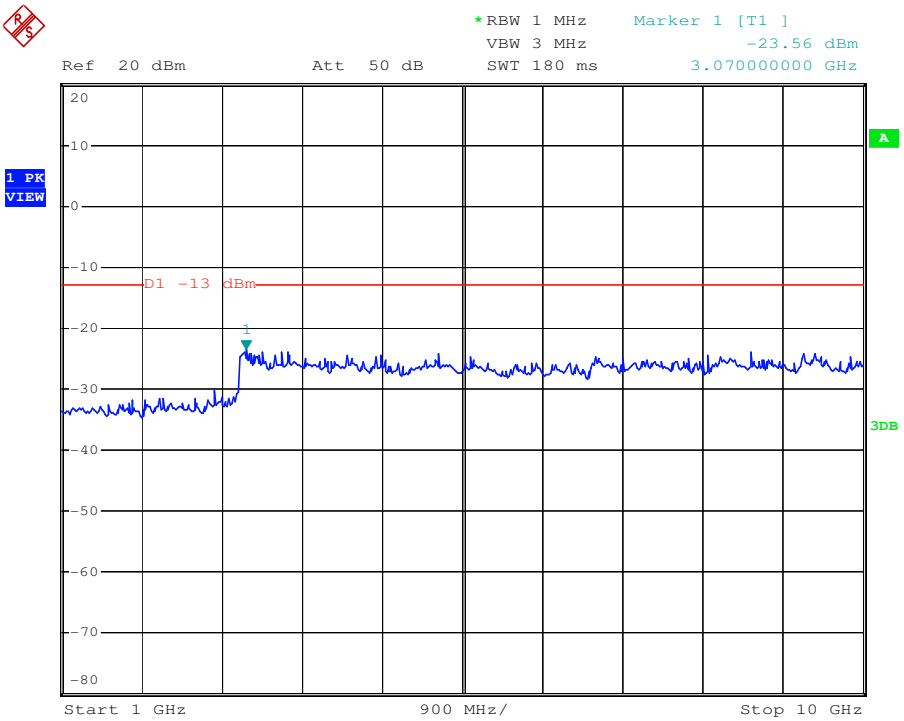
Cellular—WCDMA down link(lowest frequency)



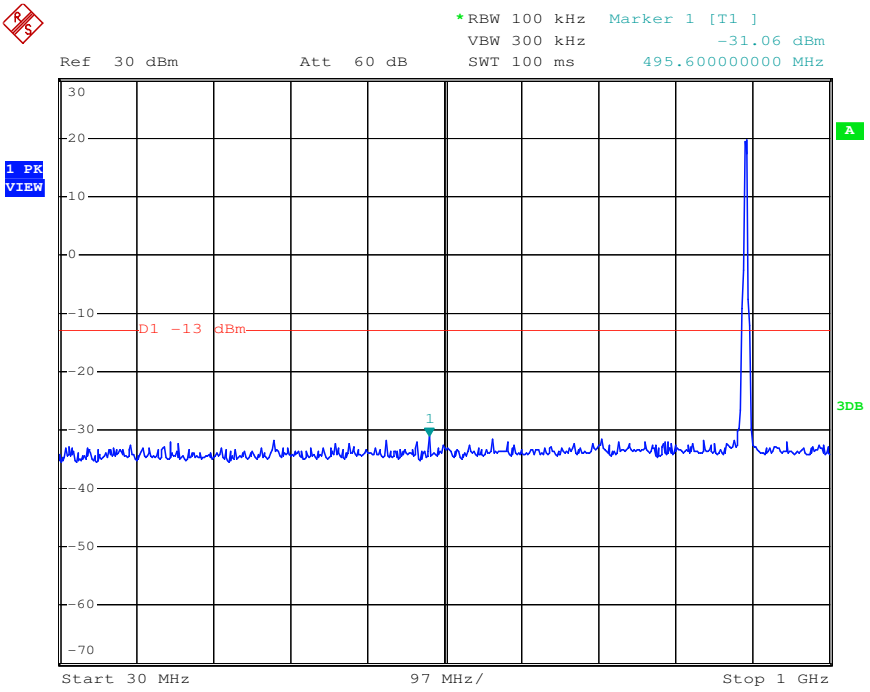
Cellular—WCDMA down link(middle frequency)



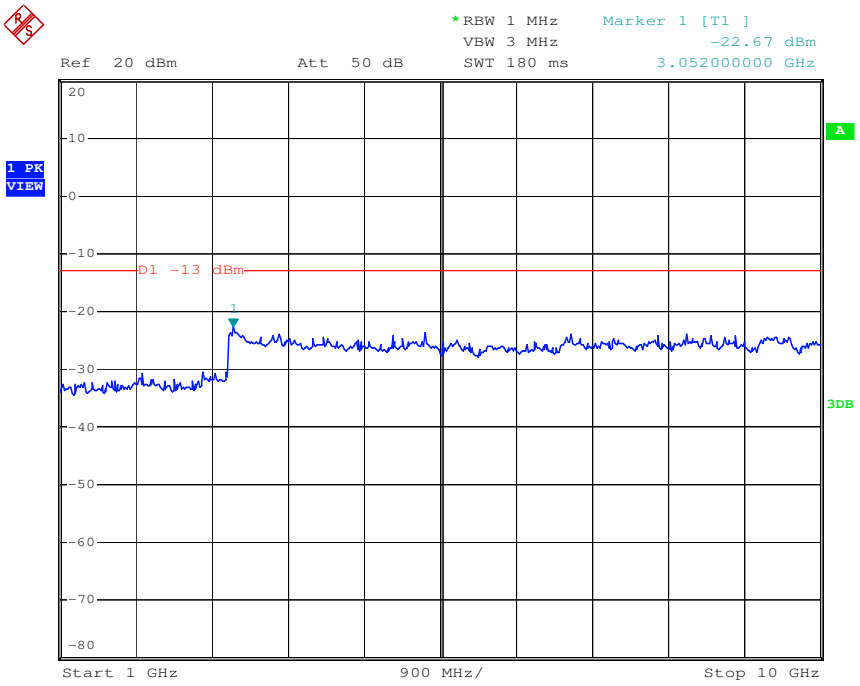
Cellular—WCDMA down link(middle frequency)



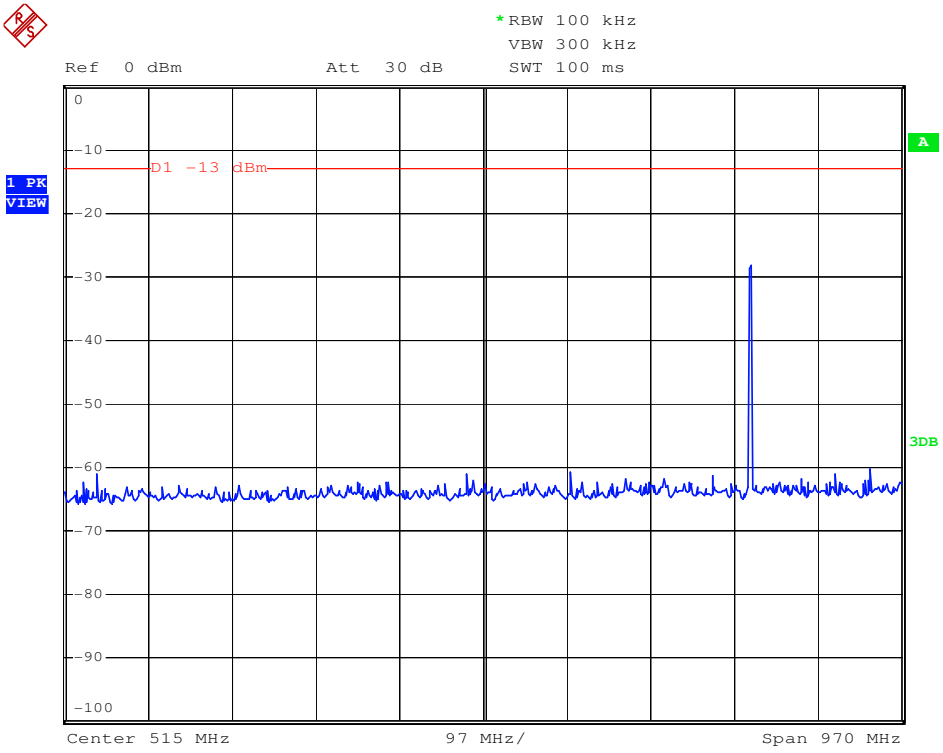
Cellular—WCDMA down link(highest frequency)



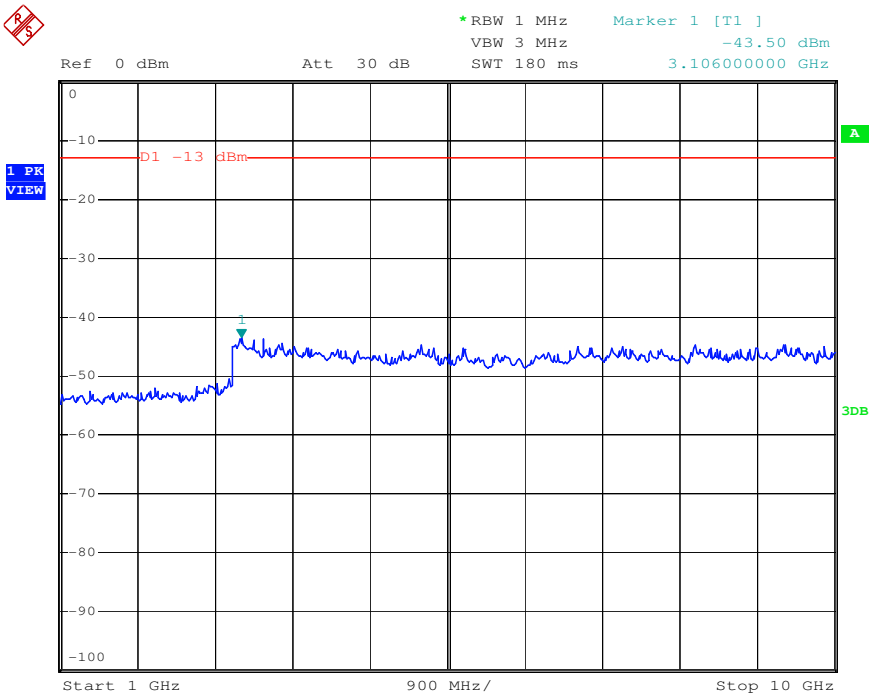
Cellular—WCDMA down link(highest frequency)



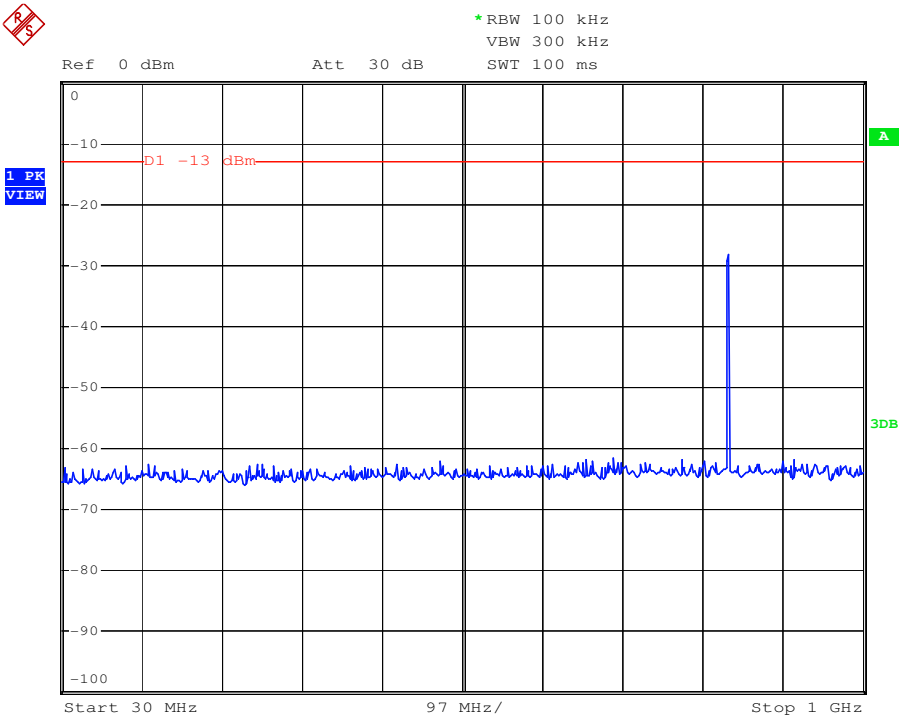
Cellular—WCDMA up link(lowest frequency)



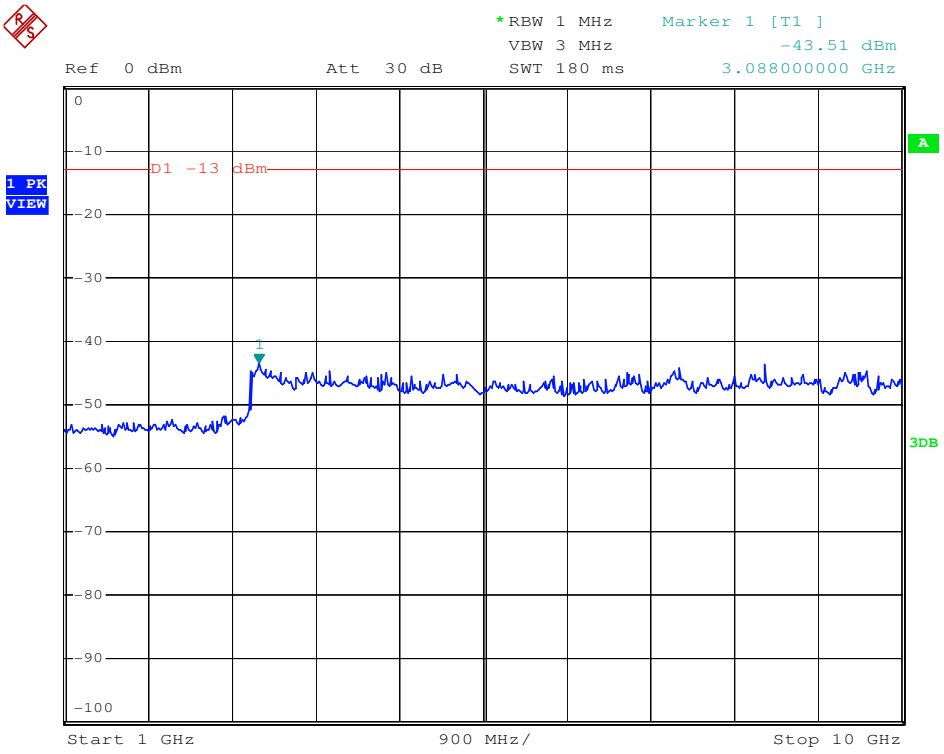
Cellular—WCDMA up link(lowest frequency)



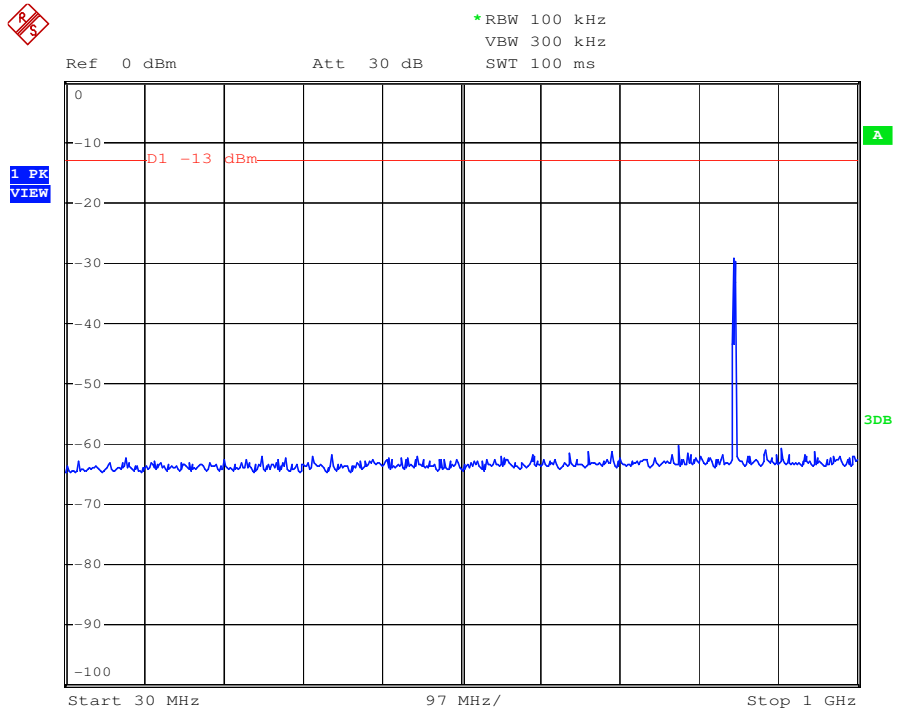
Cellular—WCDMA up link(middle frequency)



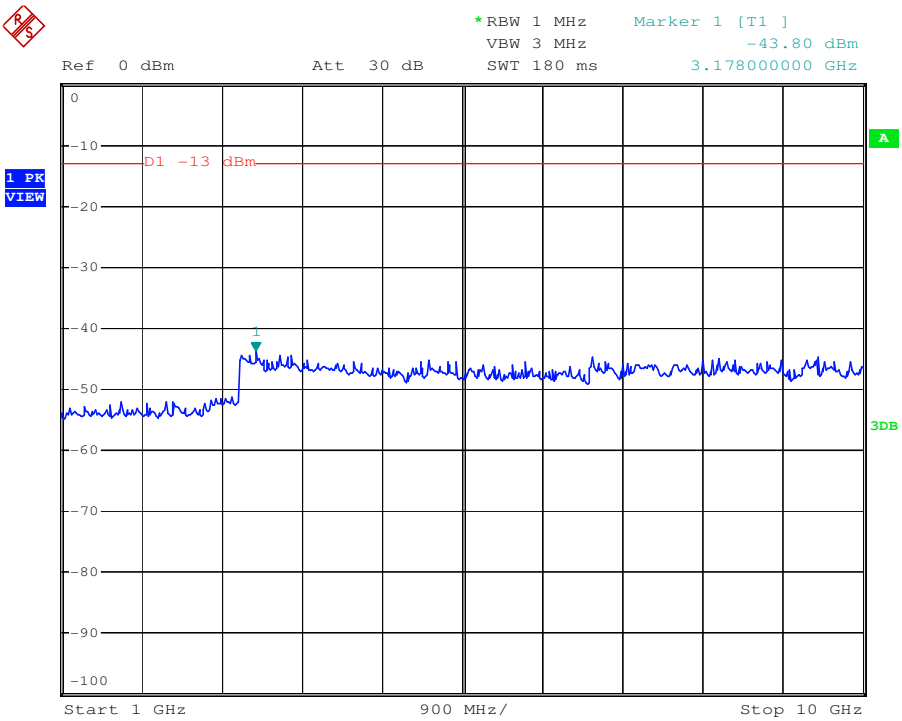
Cellular—WCDMA up link(middle frequency)



Cellular—WCDMA up link(highest frequency)

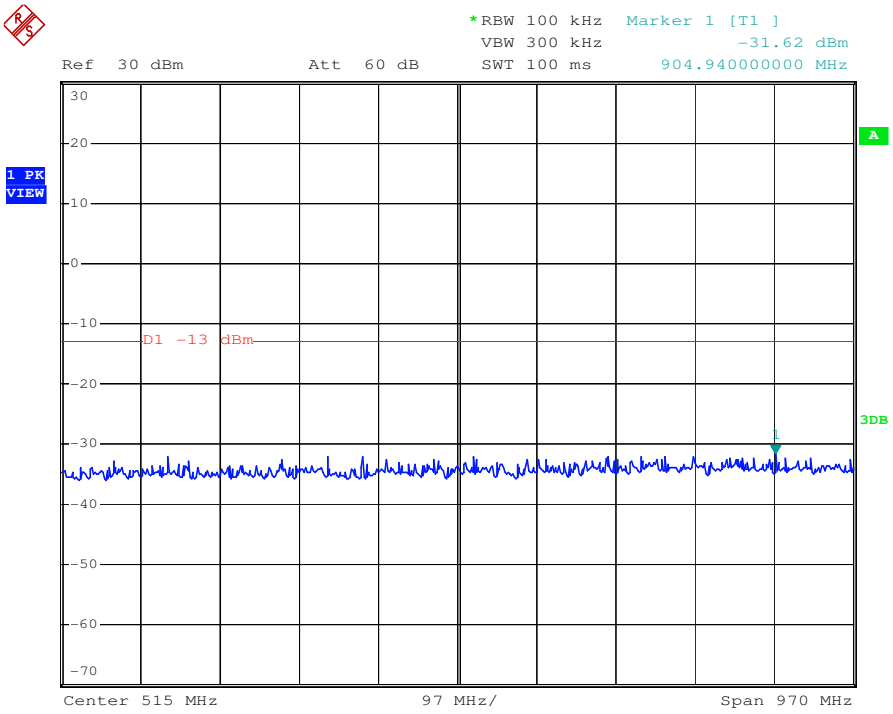


Cellular—WCDMA up link(highest frequency)

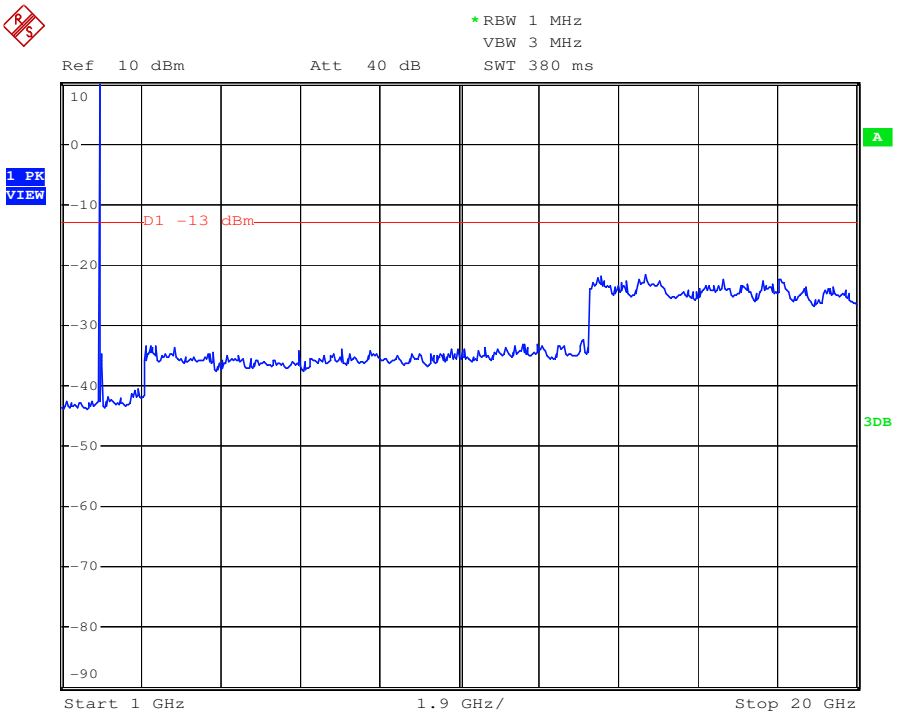


PCS Band

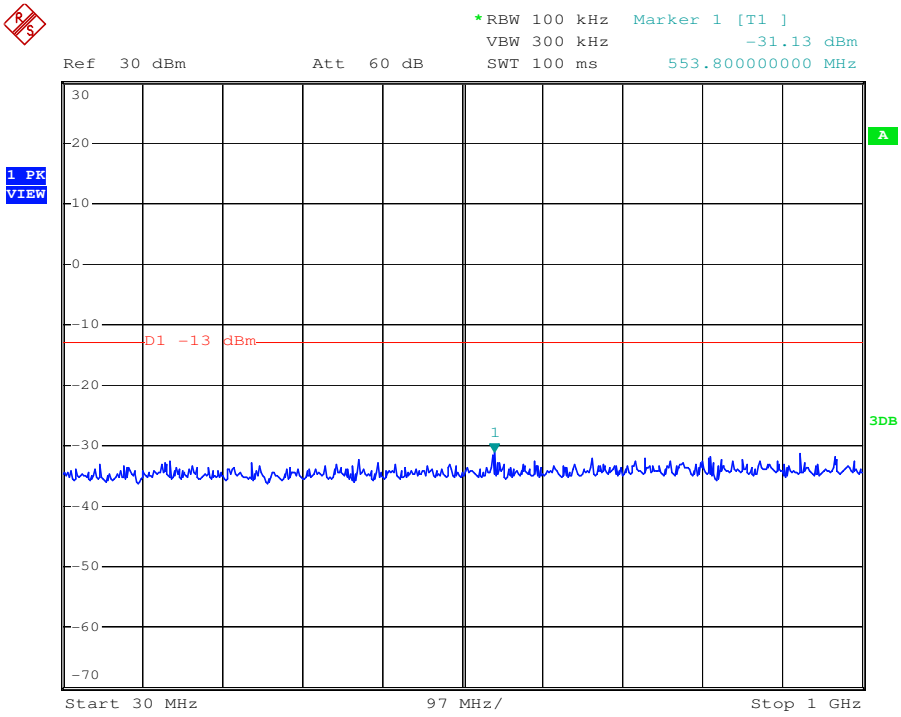
PCS—TDMA down link(lowest frequency)



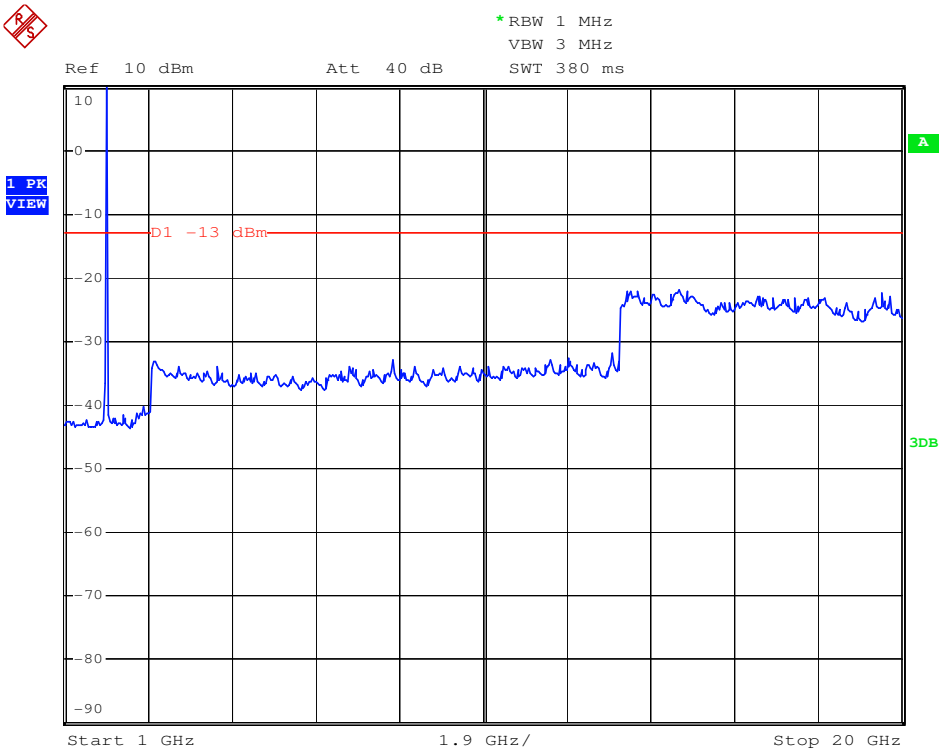
PCS—TDMA down link(lowest frequency)



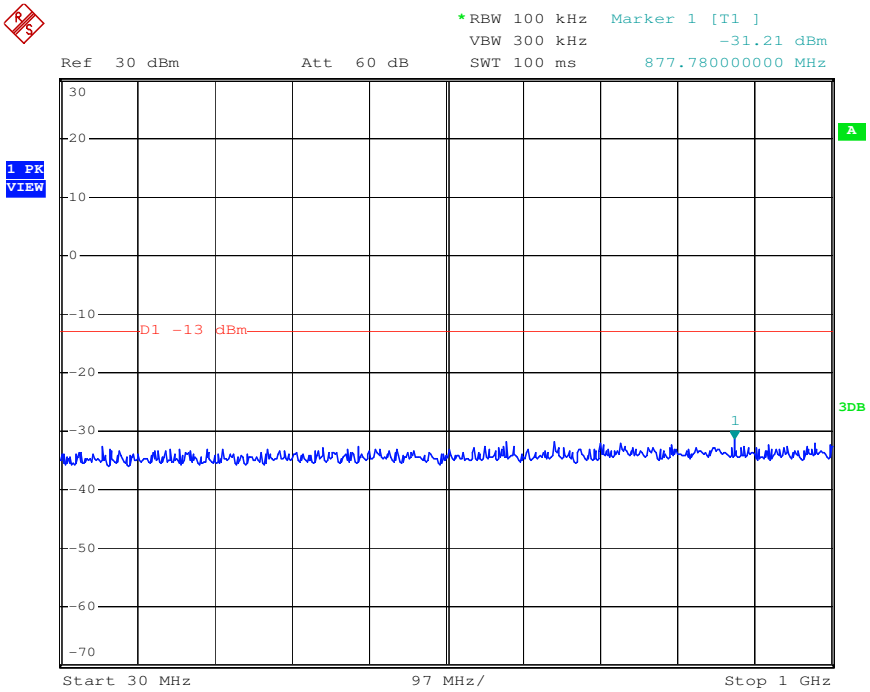
PCS—TDMA down link(middle frequency)



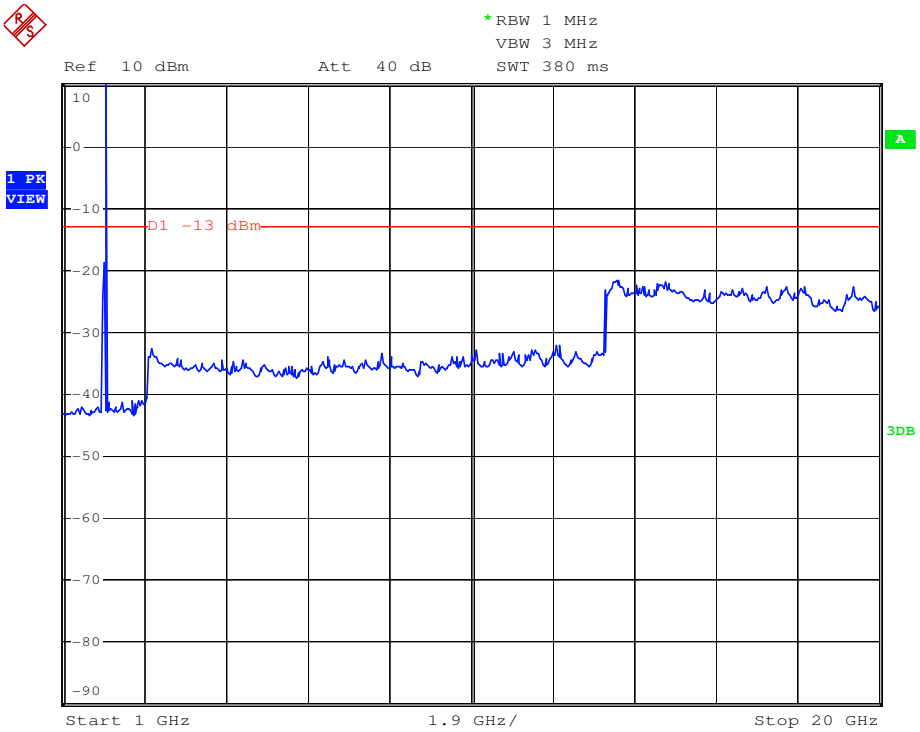
PCS—TDMA down link(middle frequency)



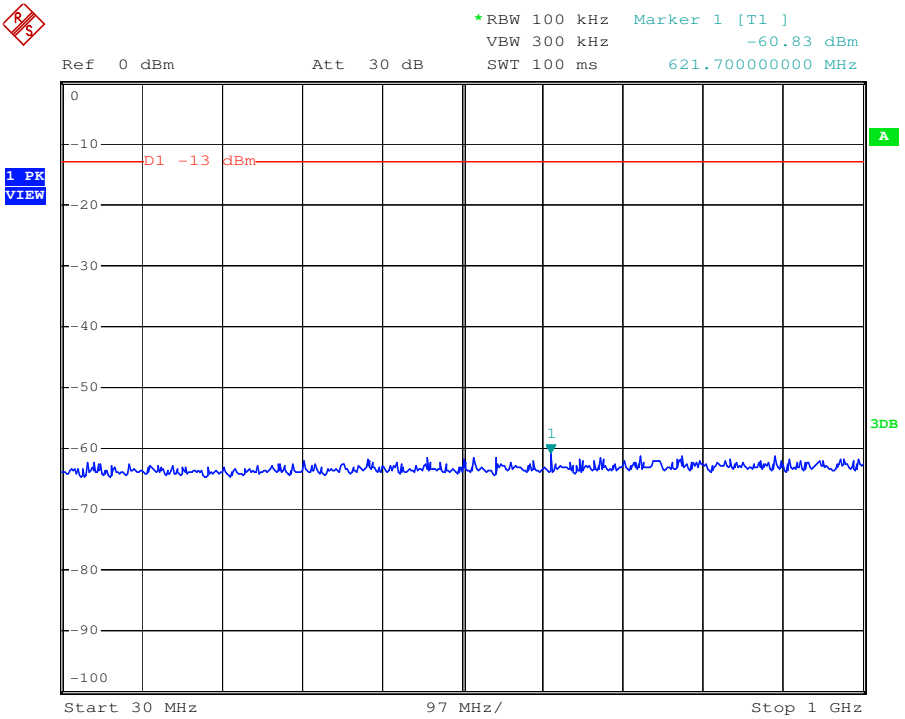
PCS—TDMA down link(highest frequency)



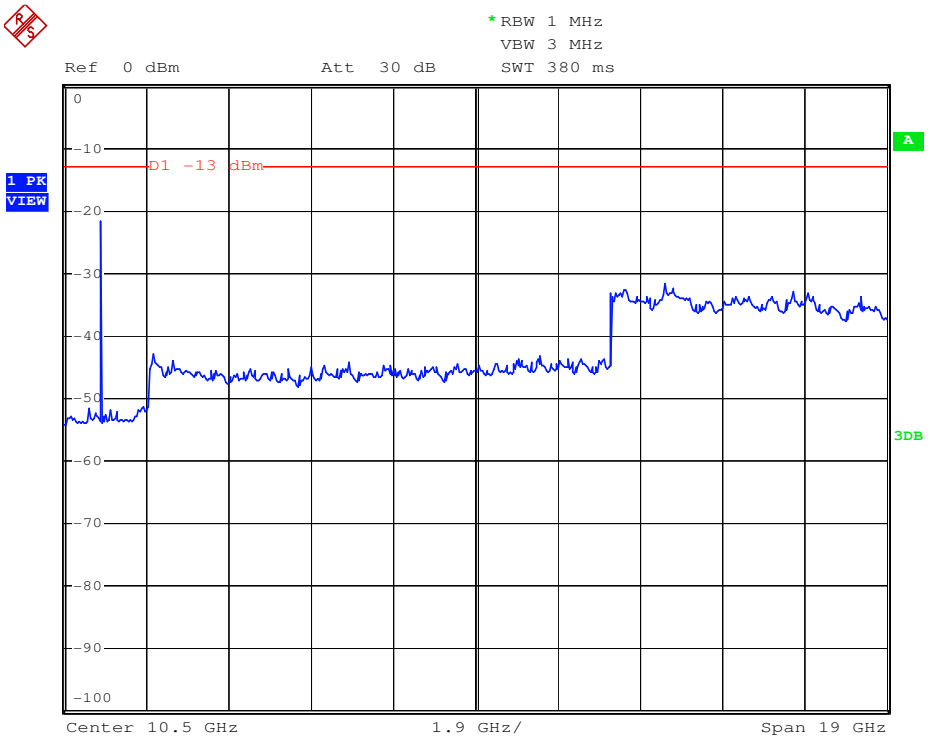
PCS—TDMA down link(highest frequency)



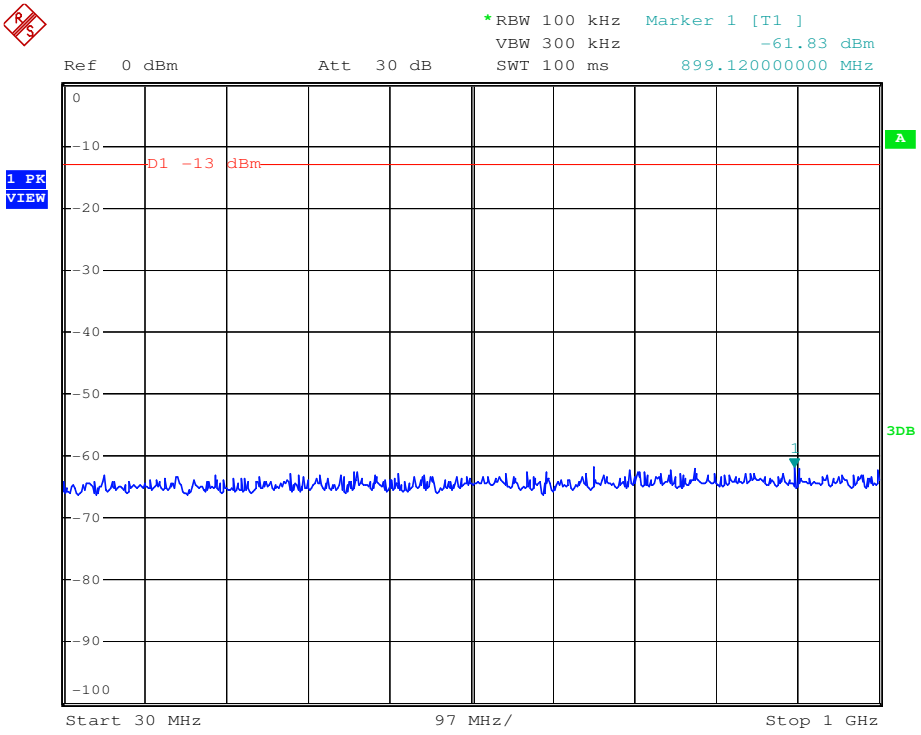
PCS—TDMA up link(lowest frequency)



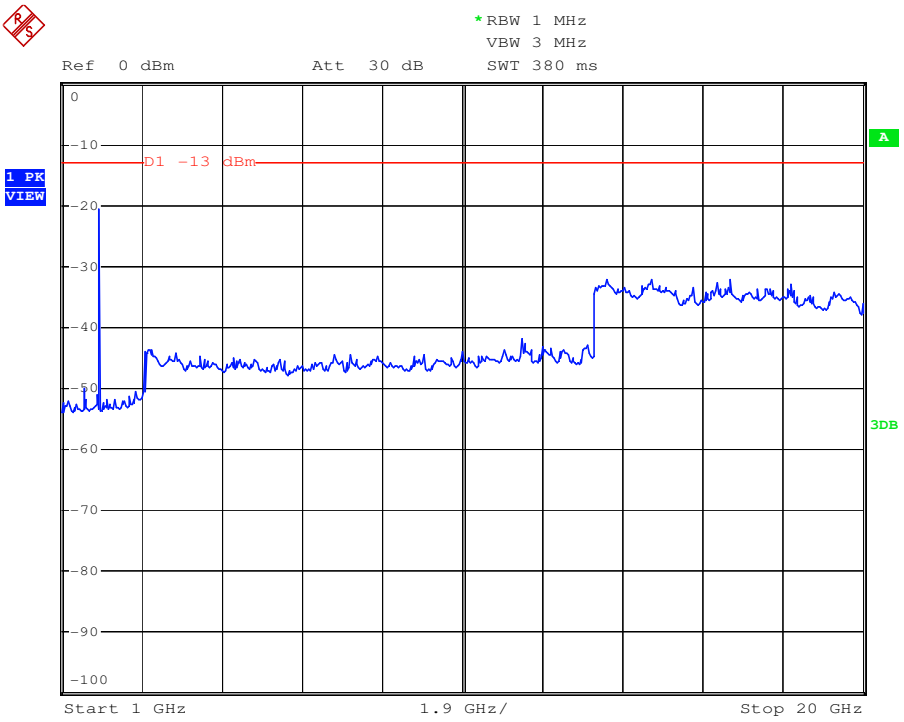
PCS—TDMA up link(lowest frequency)



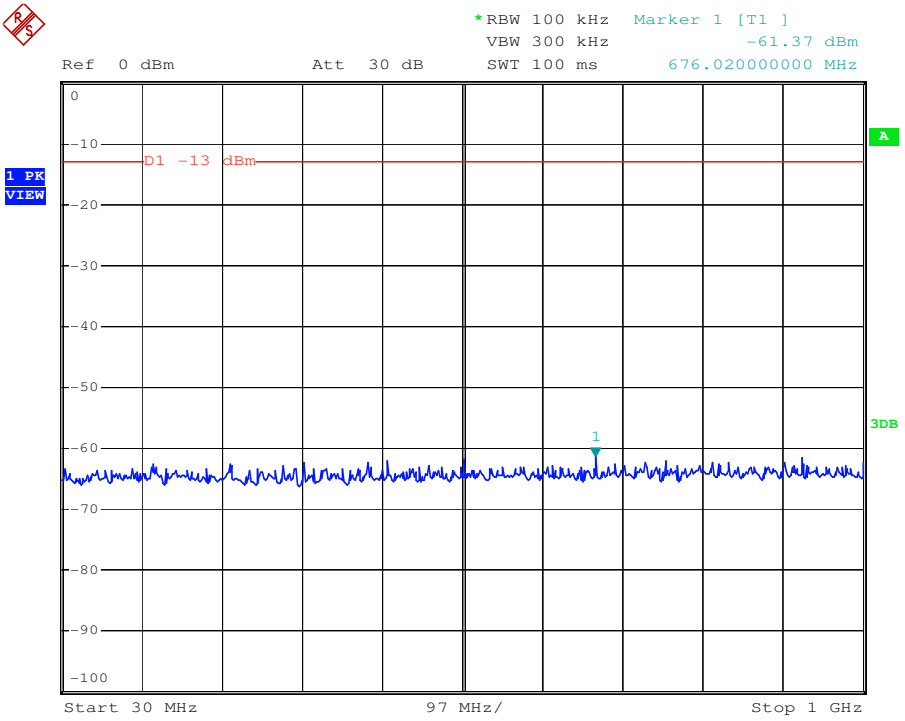
PCS—TDMA up link(middle frequency)



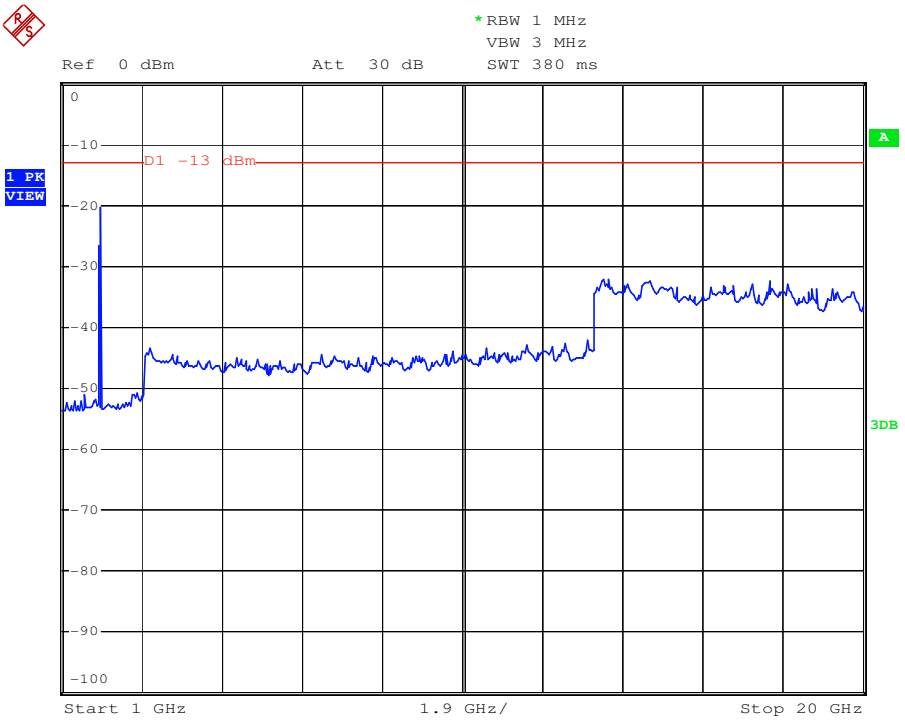
PCS—TDMA up link(middle frequency)



PCS—TDMA up link(highest frequency)

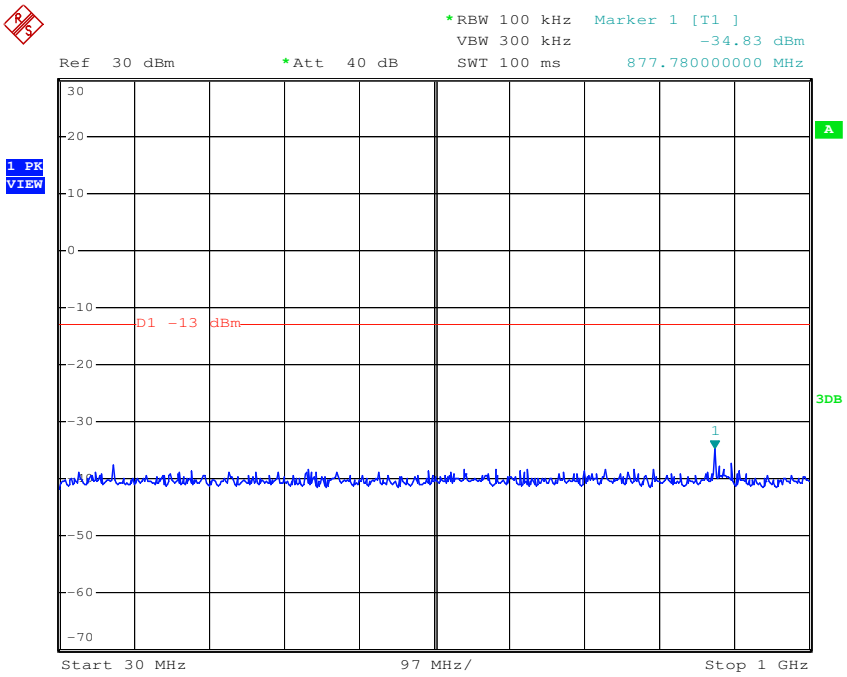


PCS—TDMA up link(highest frequency)

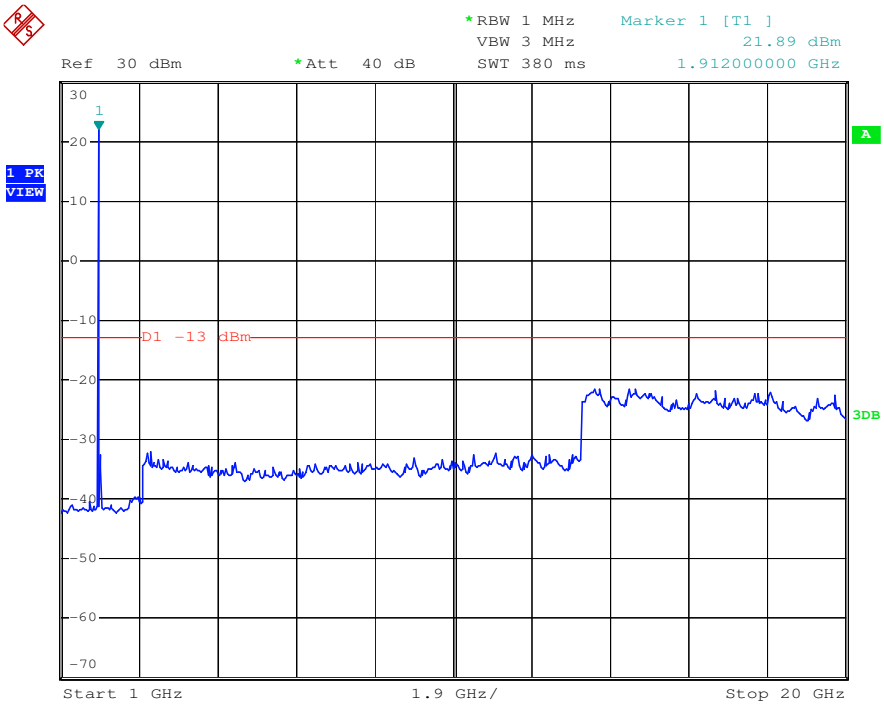


PCS Band

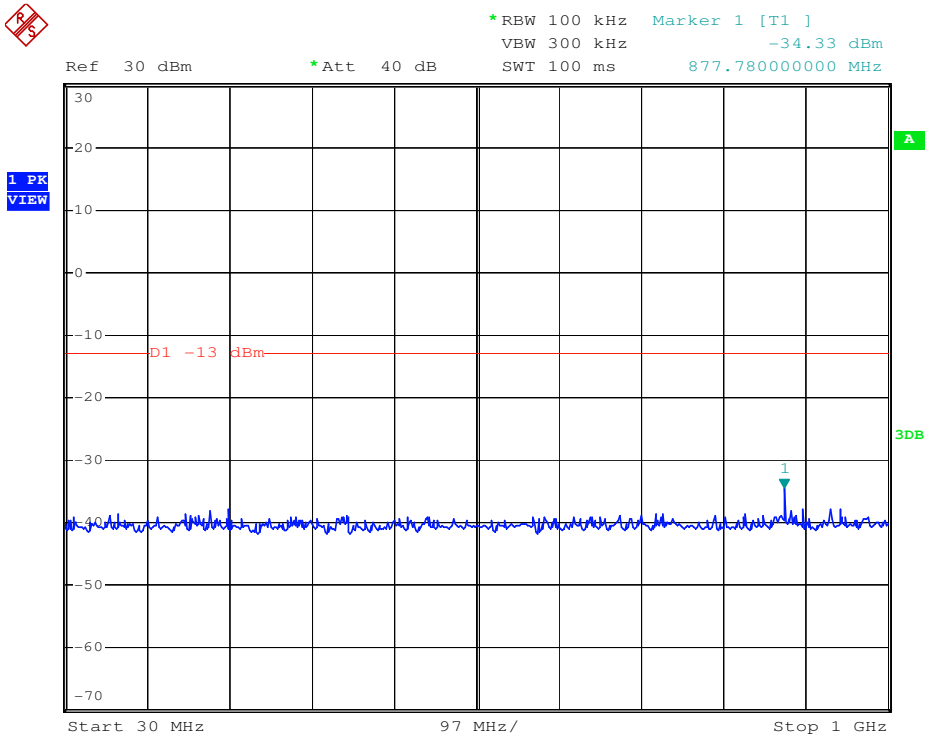
PCS—GSM down link(lowest frequency)



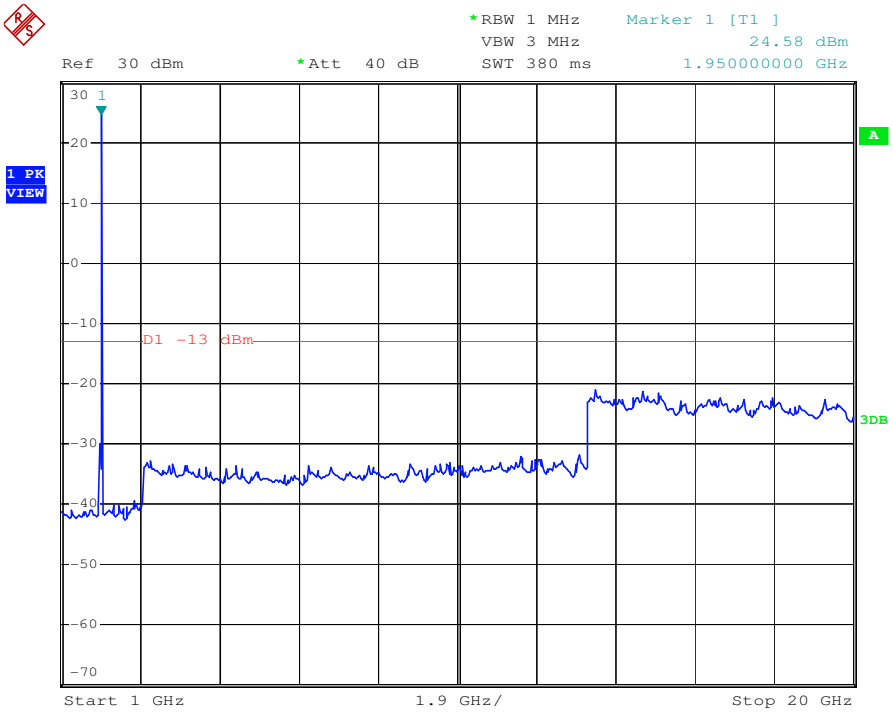
PCS—GSM down link(lowest frequency)



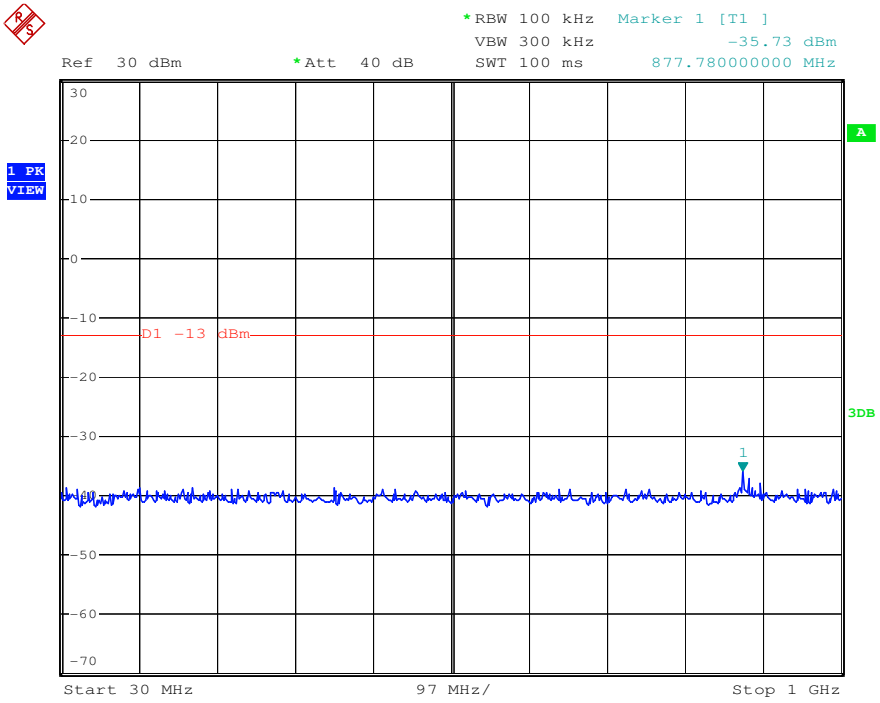
PCS—GSM down link(middle frequency)



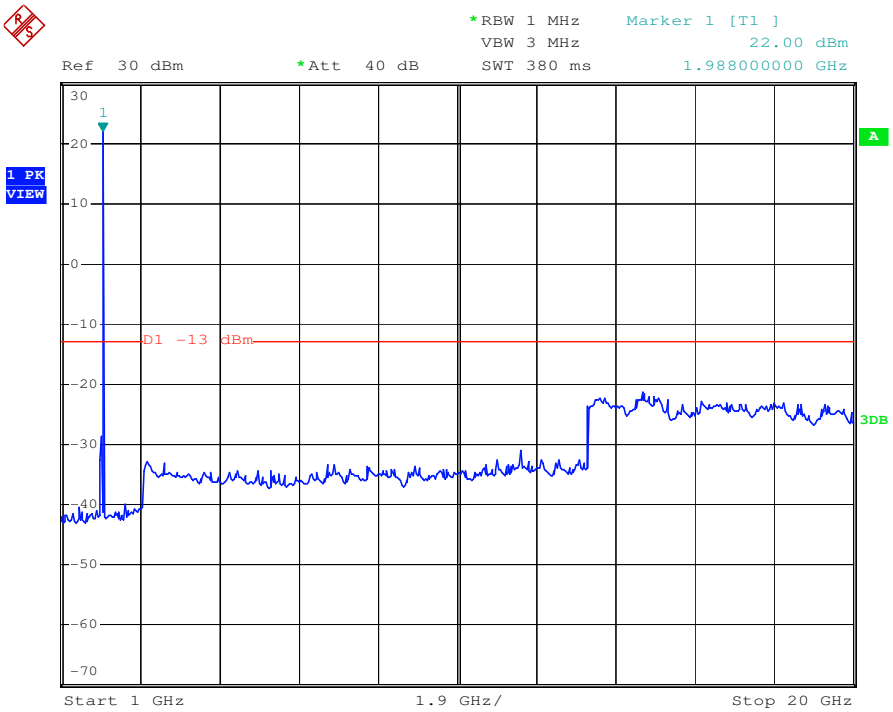
PCS—GSM down link(middle frequency)



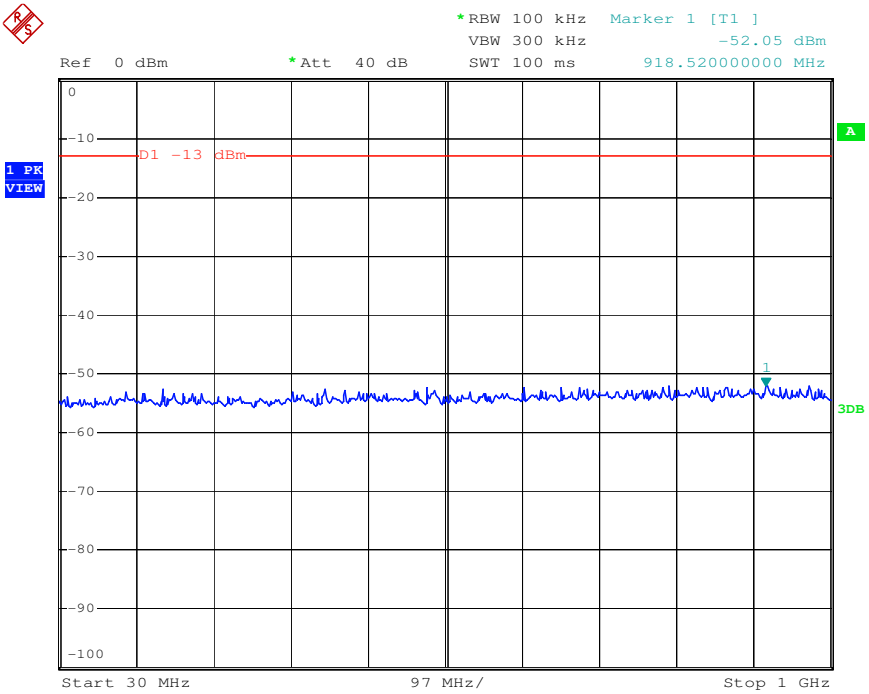
PCS—GSM down link(highest frequency)



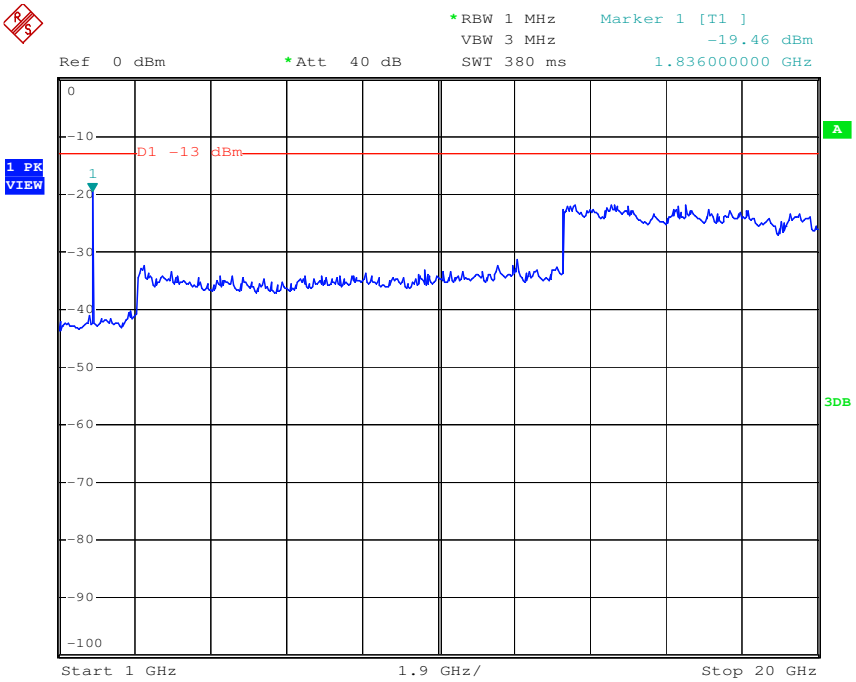
PCS—GSM down link(highest frequency)



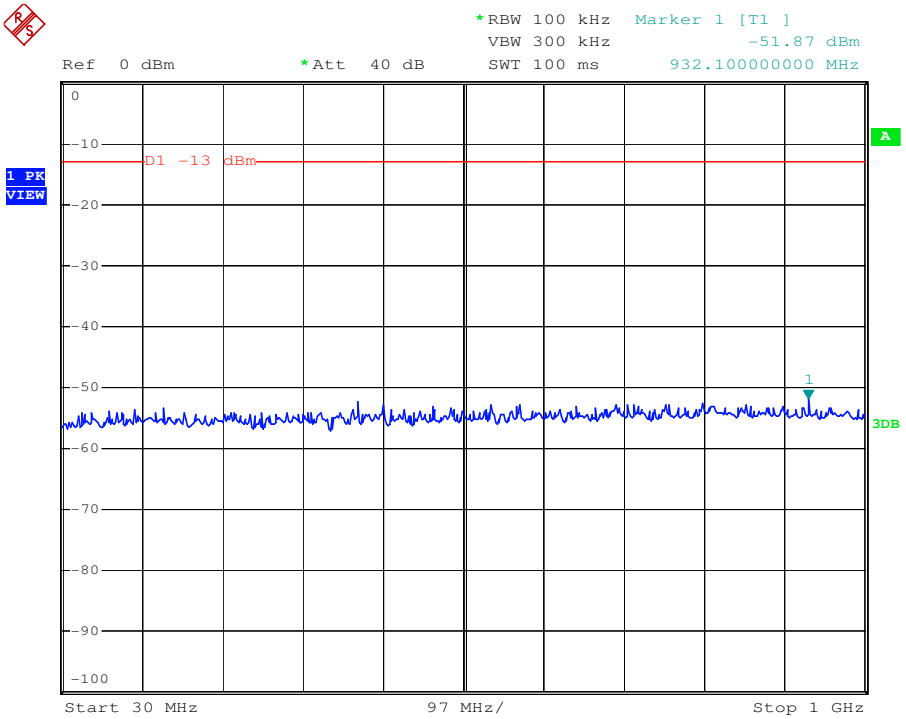
PCS—GSM up link(lowest frequency)



PCS—GSM up link(lowest frequency)



PCS—GSM up link(middle frequency)



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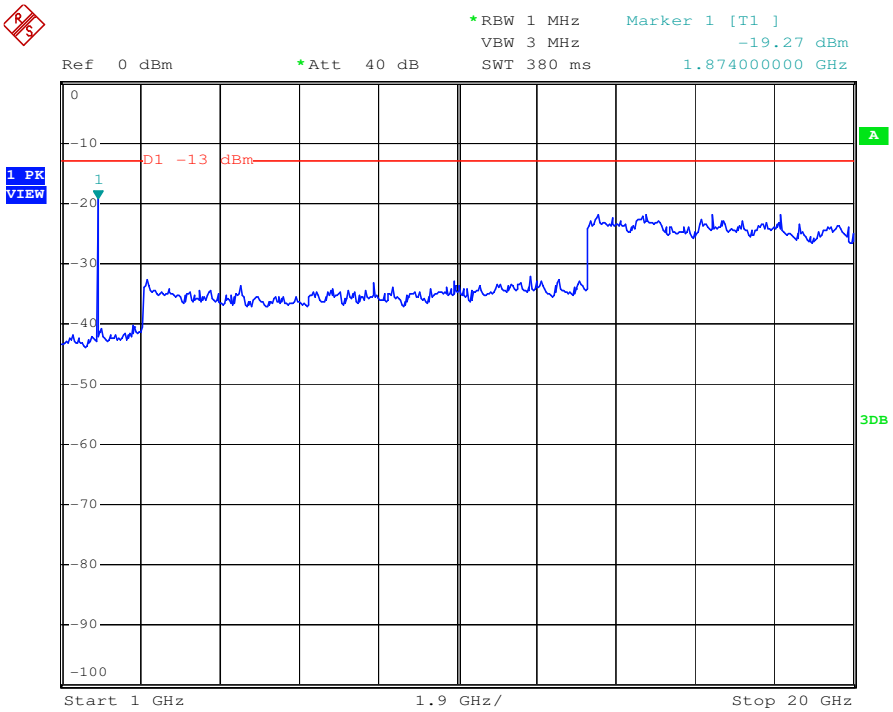

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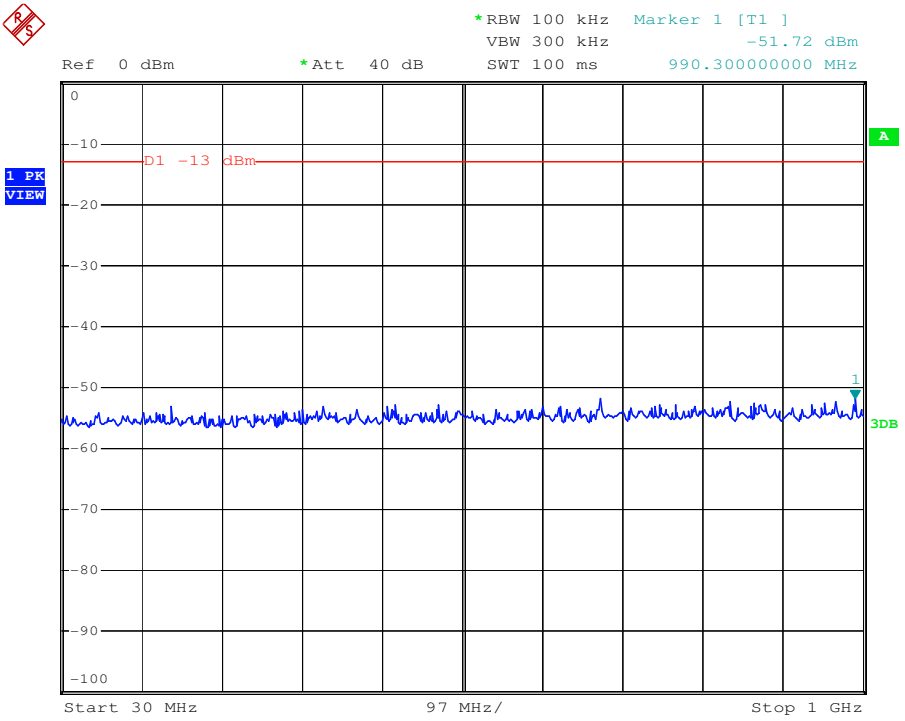

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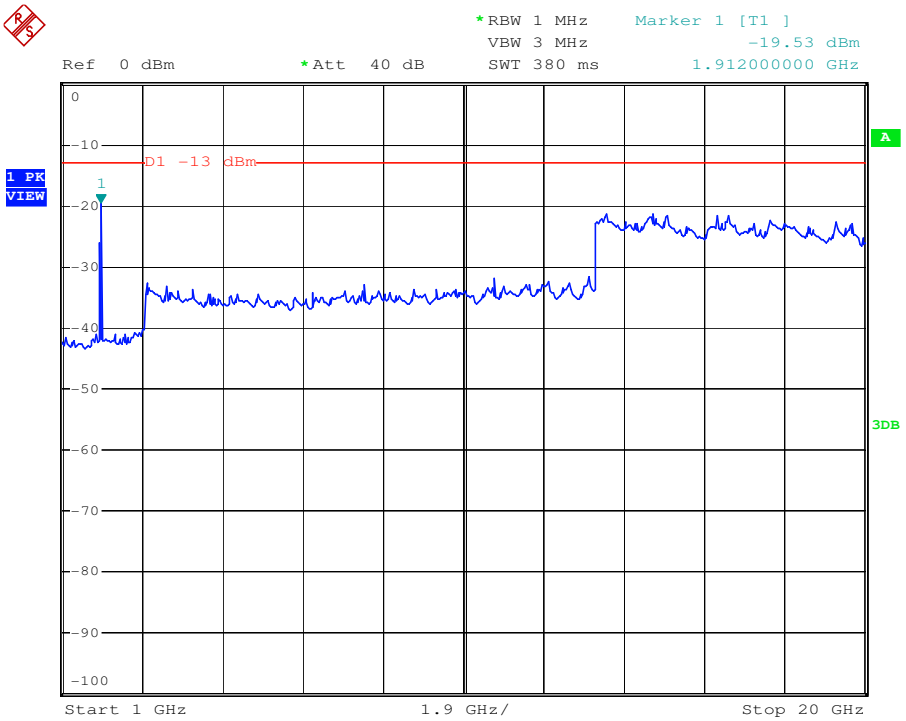
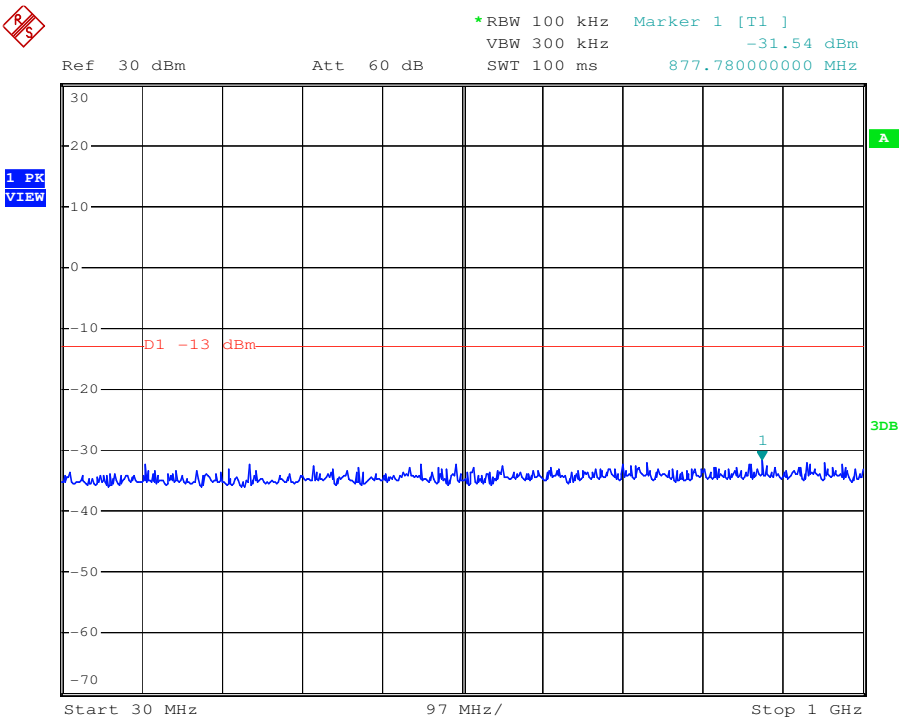
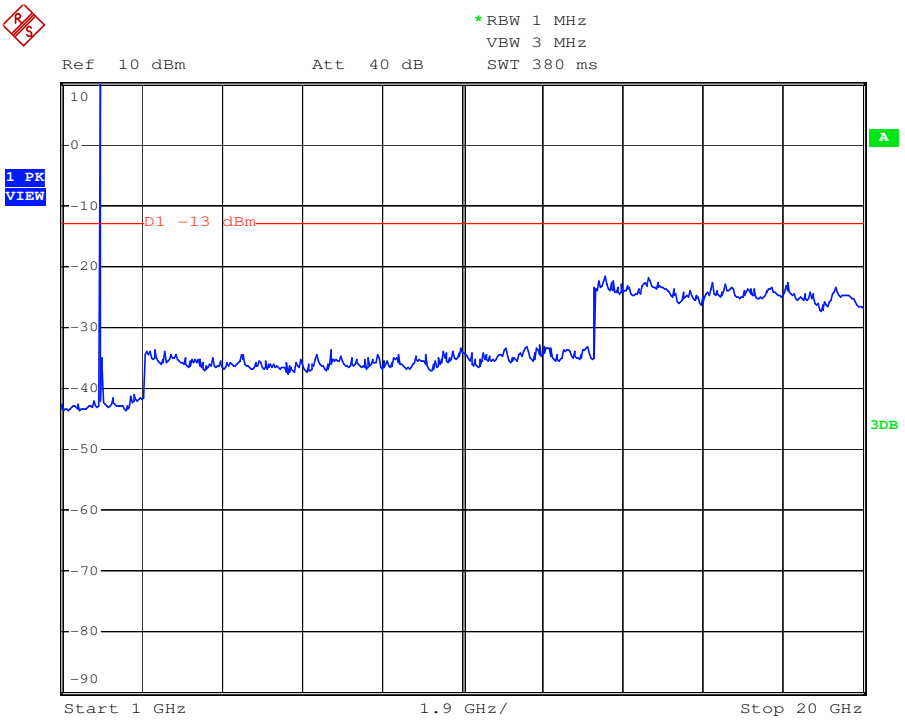


PCS Band

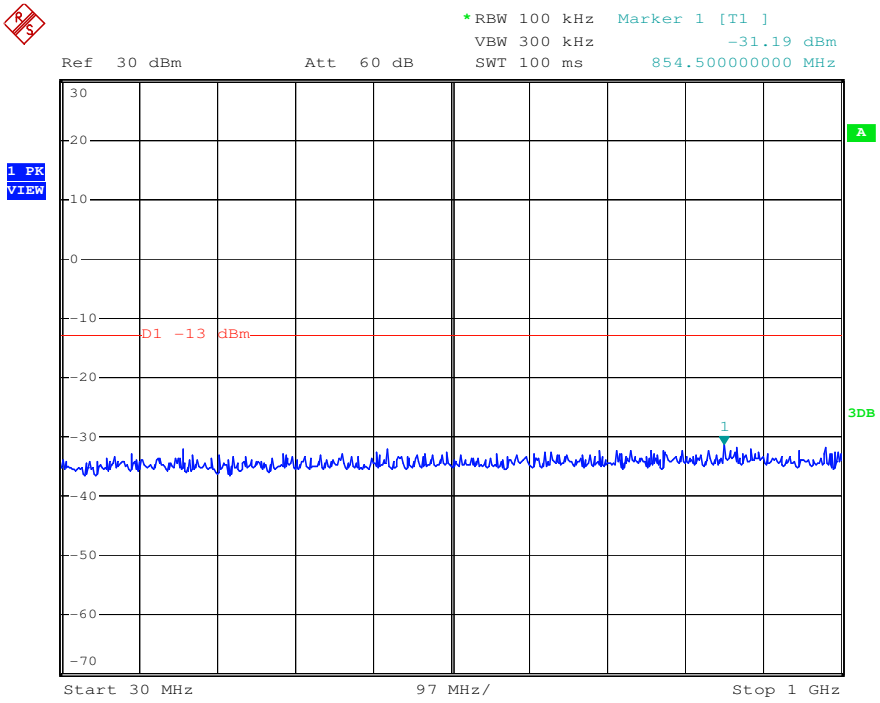
PCS—EDGE down link(lowest frequency)



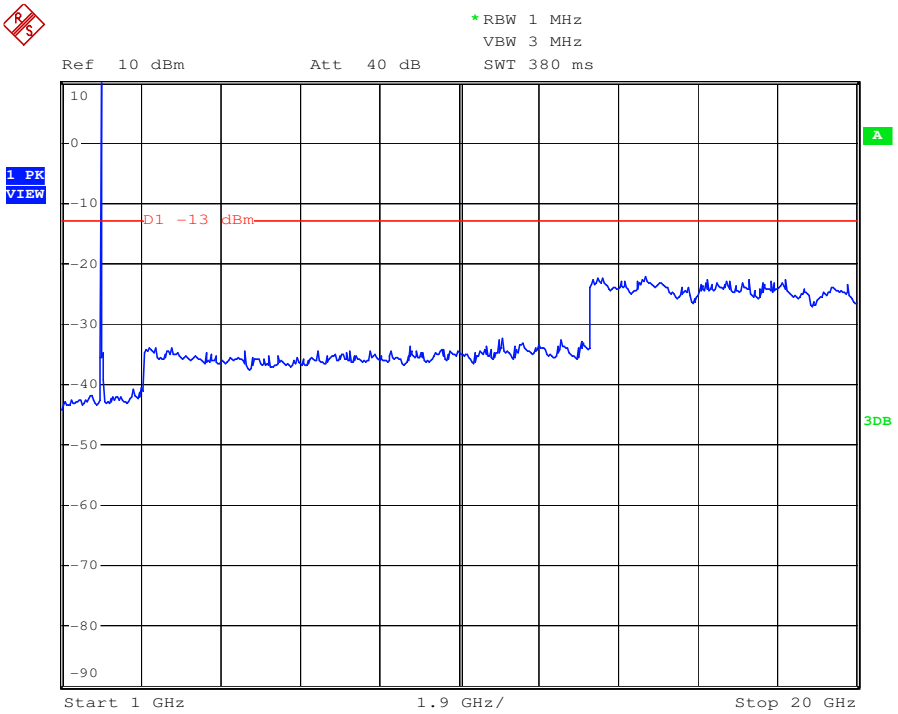
PCS—EDGE down link(lowest frequency)



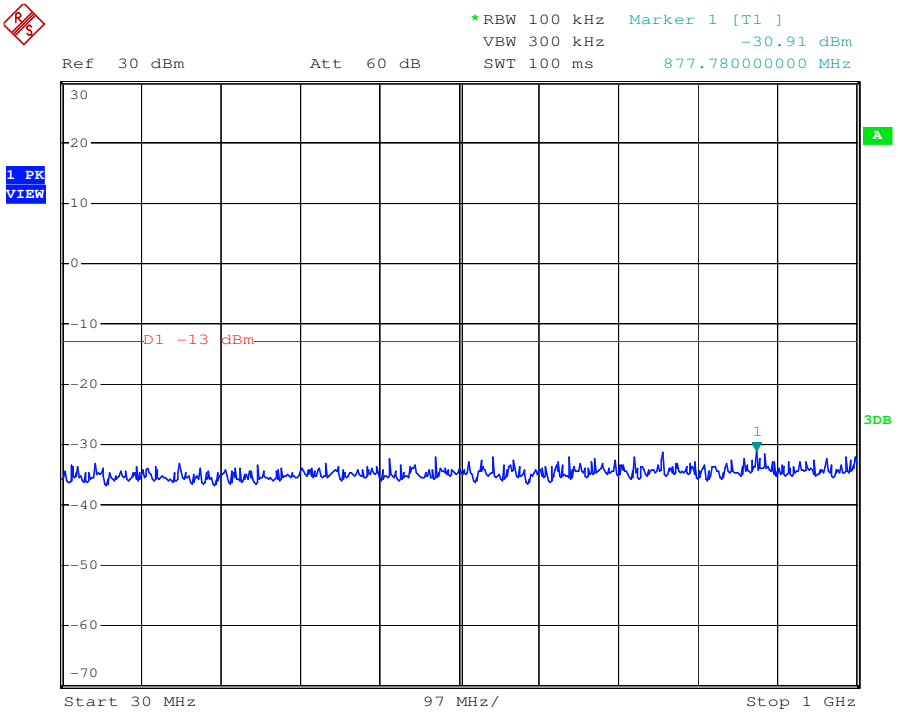
PCS—EDGE down link(middle frequency)



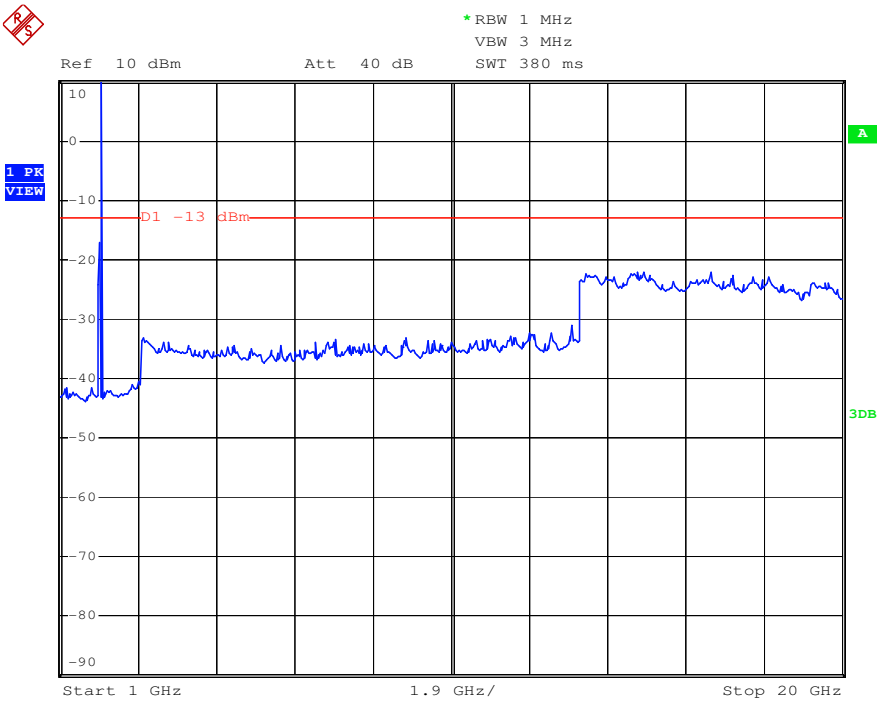
PCS—EDGE down link(middle frequency)



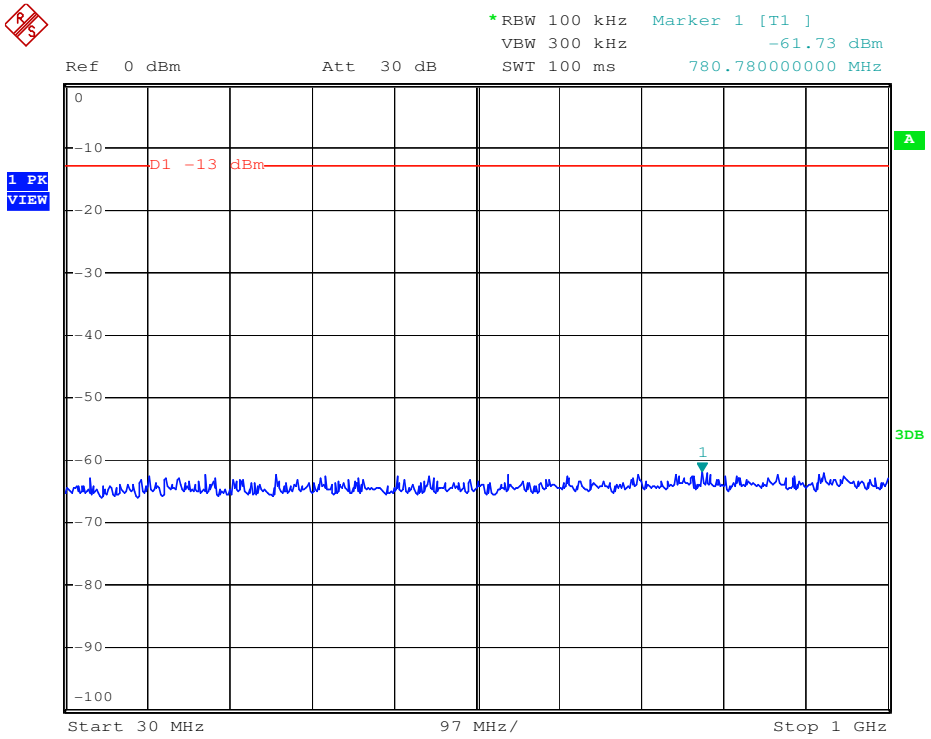
PCS—EDGE down link(highest frequency)



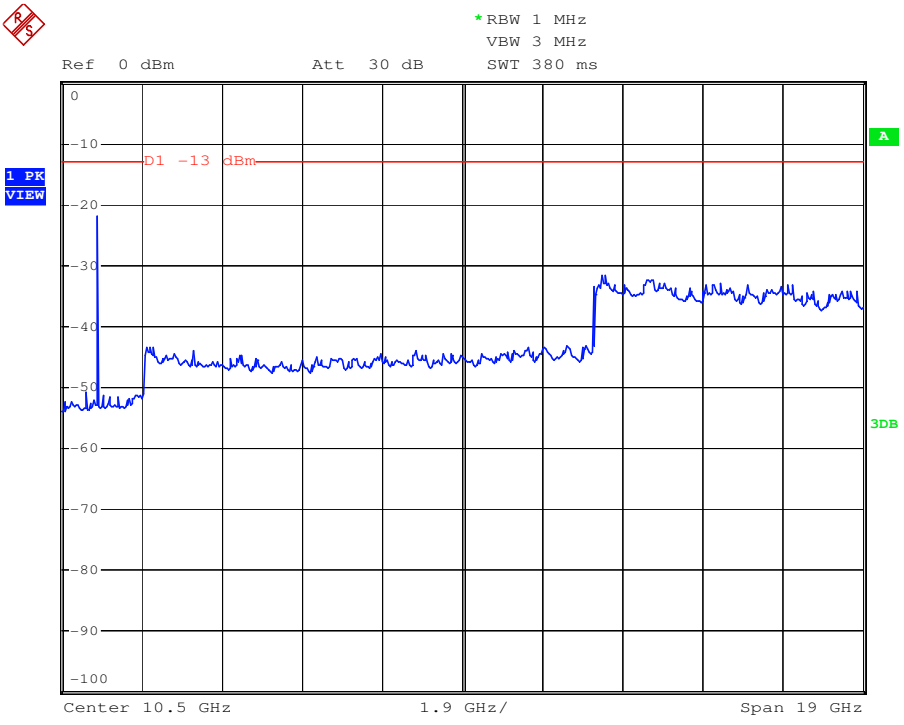
PCS—EDGE down link(highest frequency)



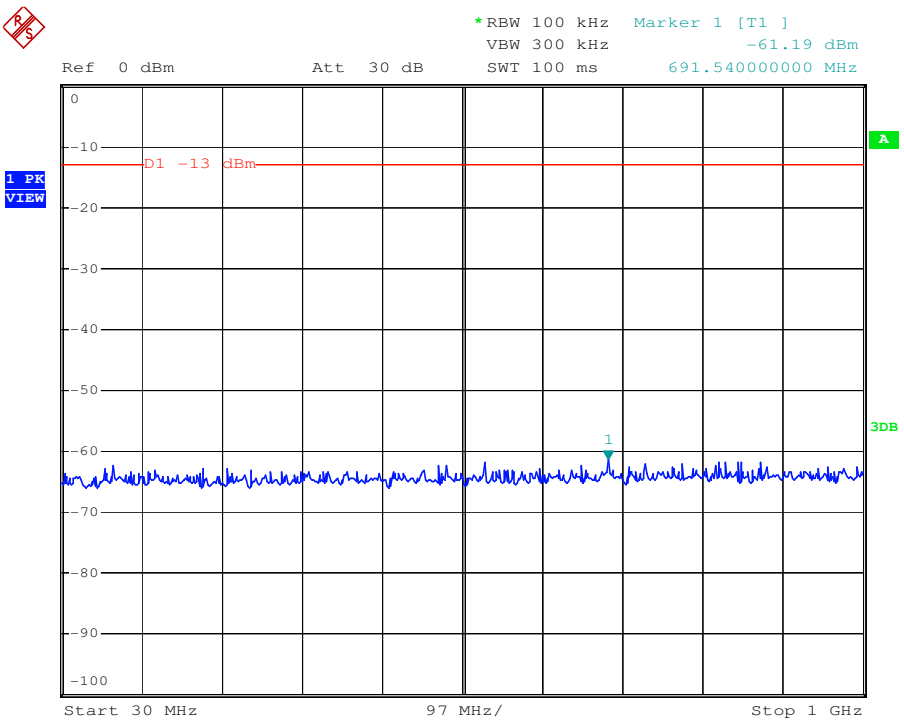
PCS—EDGE up link(lowest frequency)



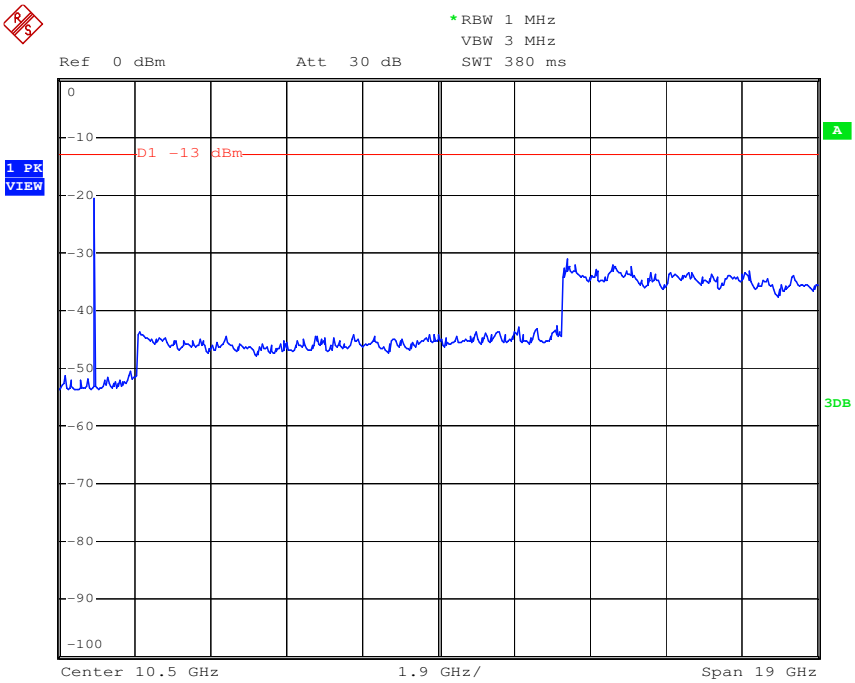
PCS—EDGE up link(lowest frequency)



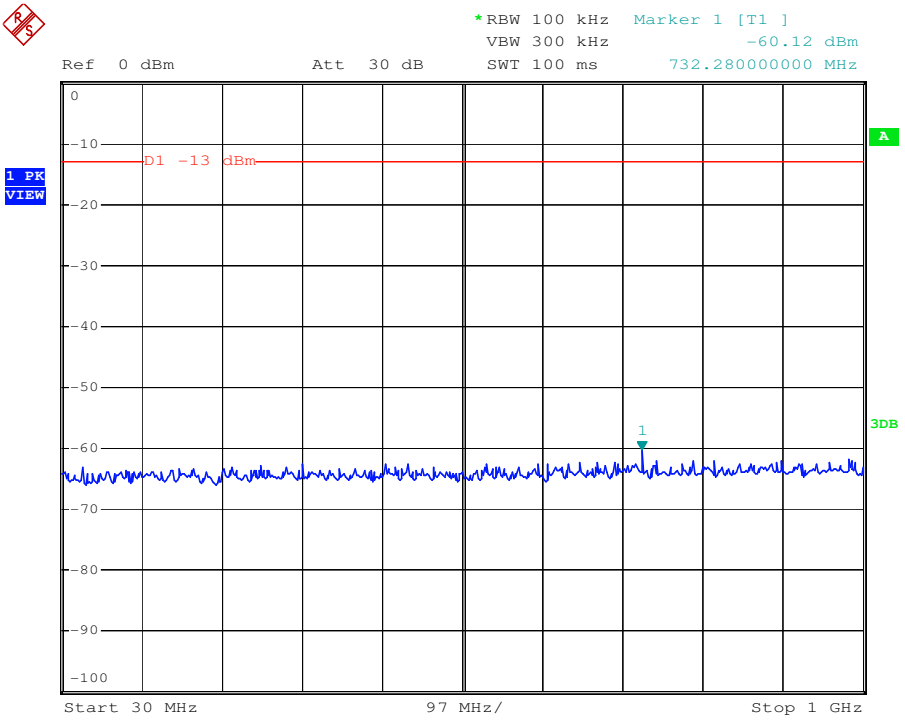
PCS—EDGE up link(middle frequency)



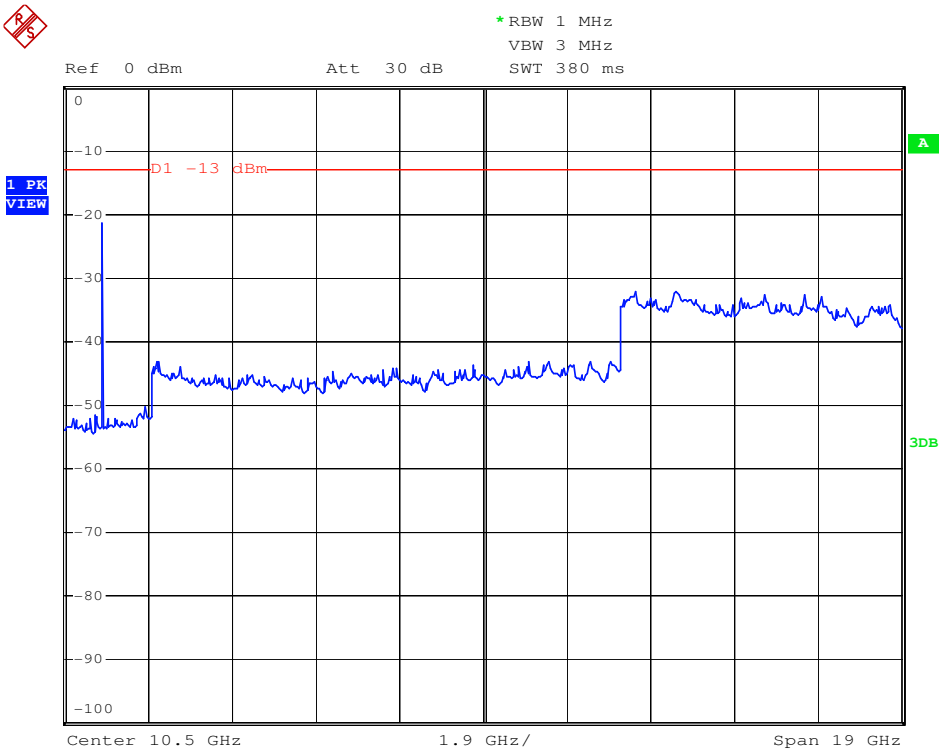
PCS—EDGE up link(middle frequency)



PCS—EDGE up link(highest frequency)

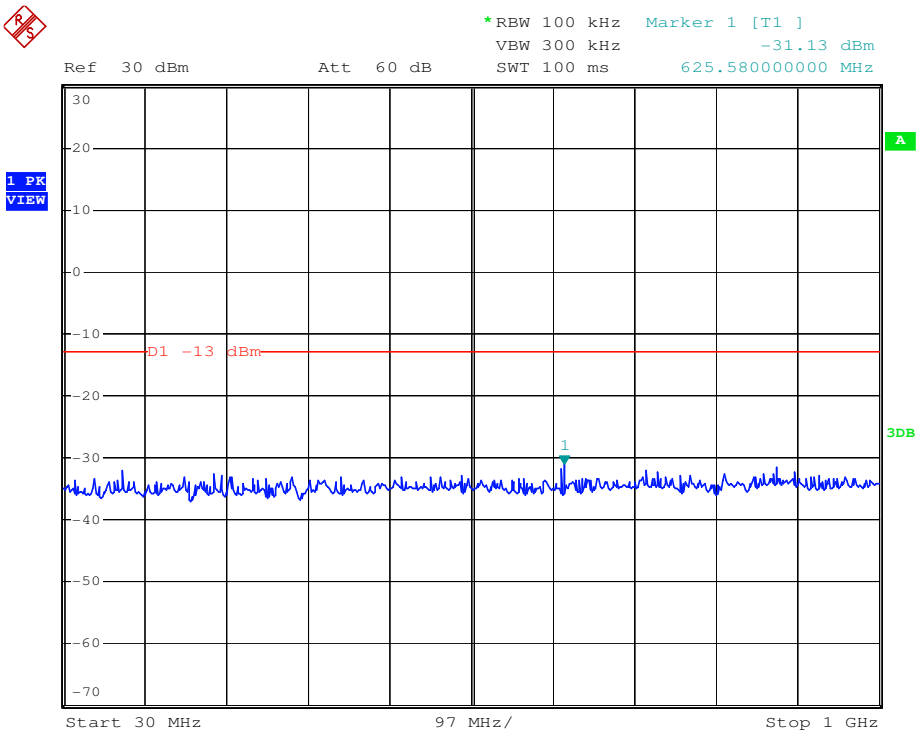


PCS—EDGE up link(highest frequency)

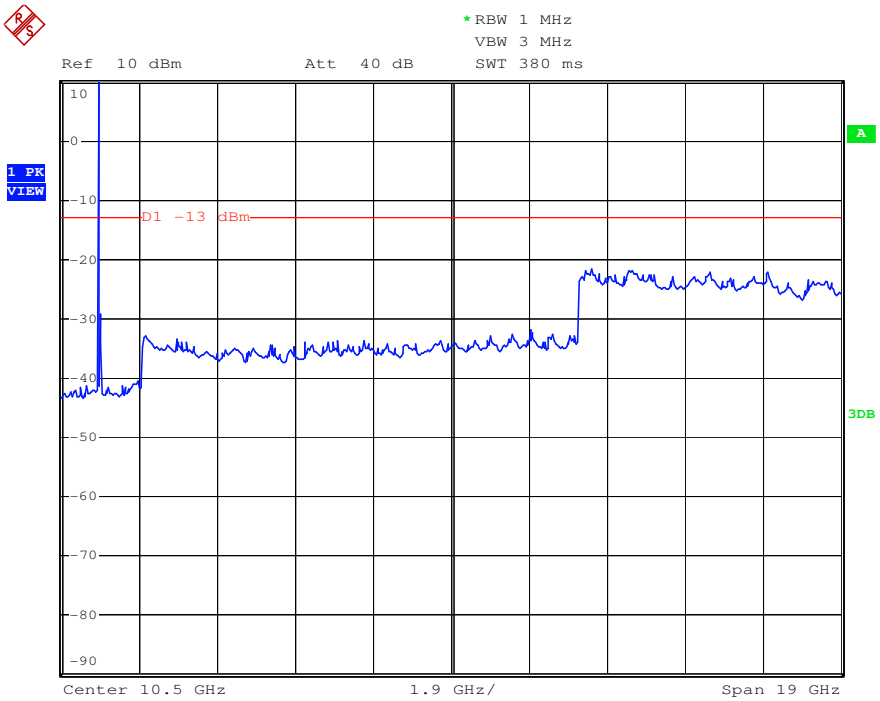


PCS Band

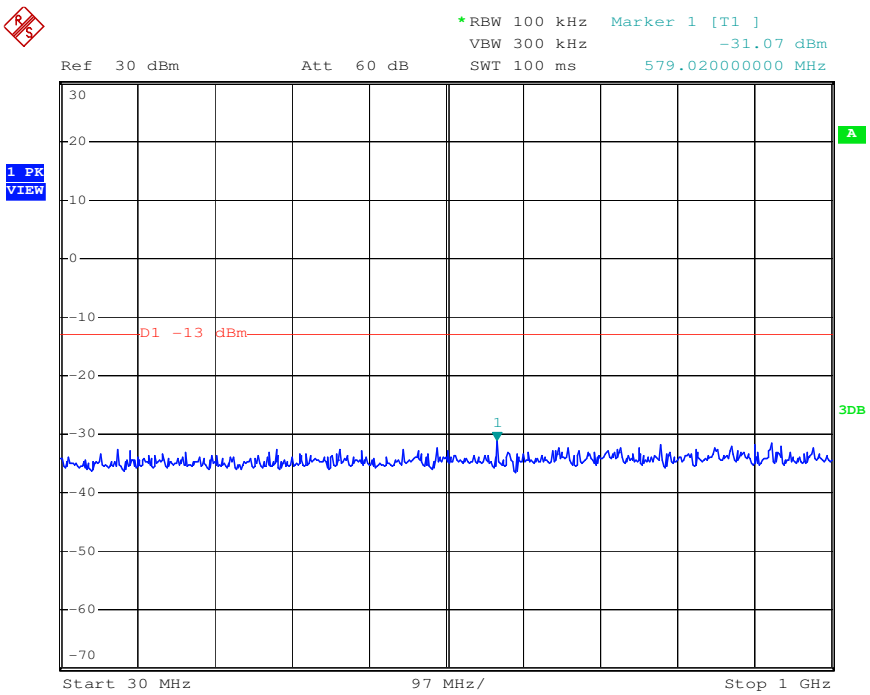
PCS—CDMA down link(lowest frequency)



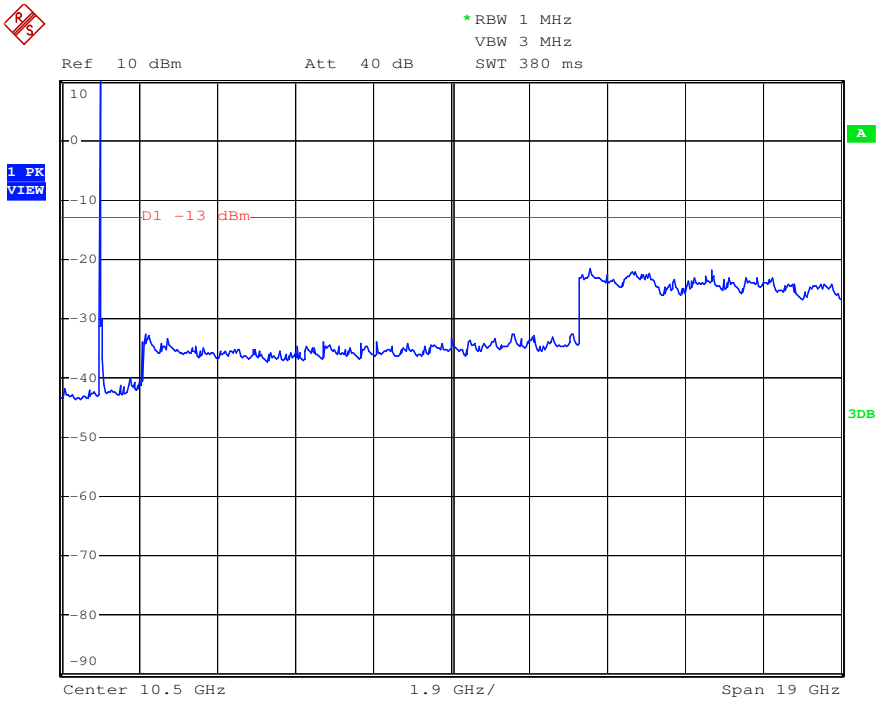
PCS—CDMA down link(lowest frequency)



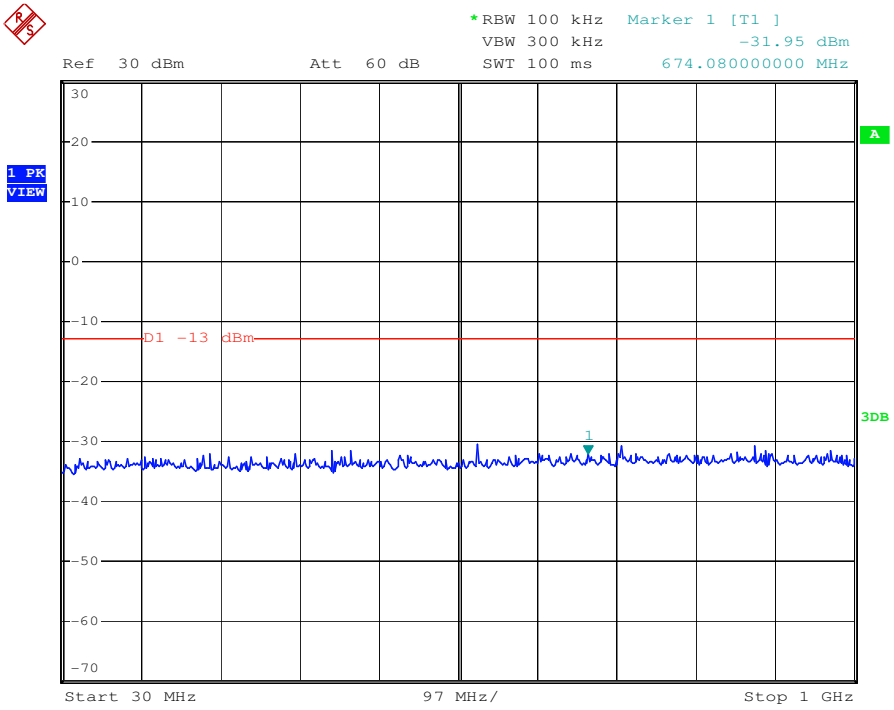
PCS—CDMA down link(middle frequency)



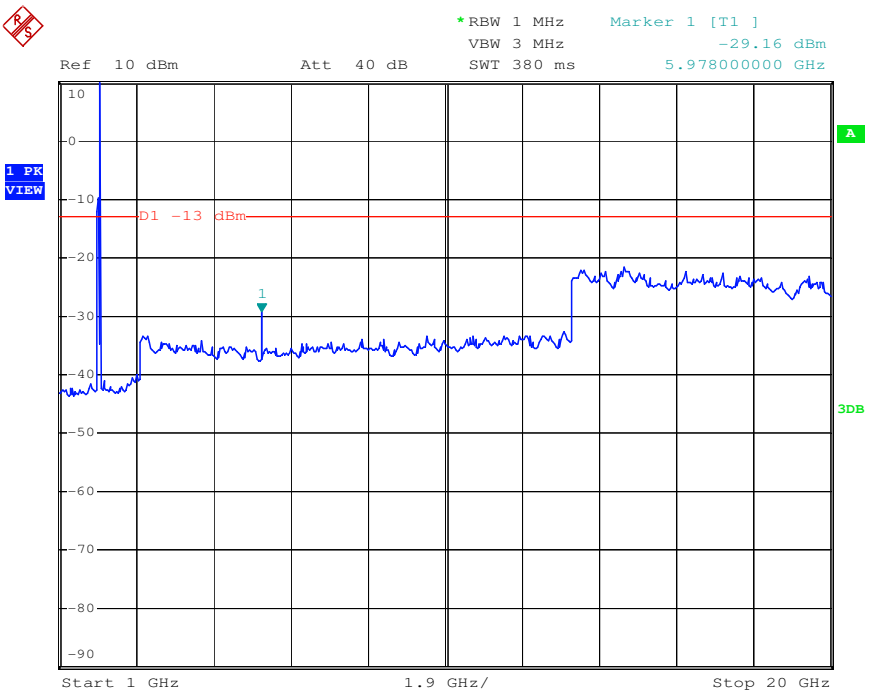
PCS—CDMA down link(middle frequency)



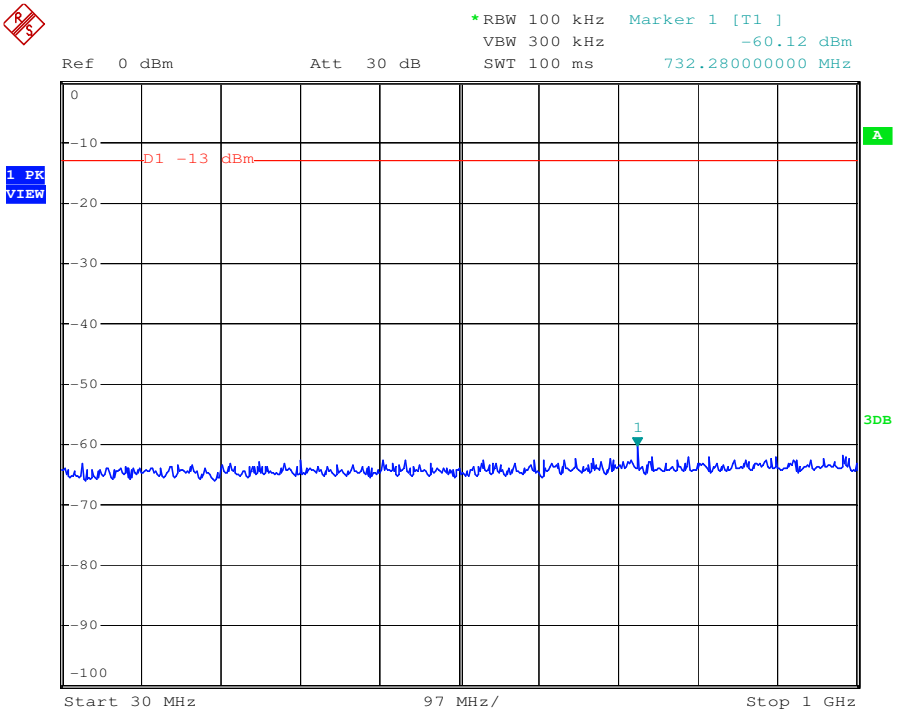
PCS—CDMA down link(highest frequency)



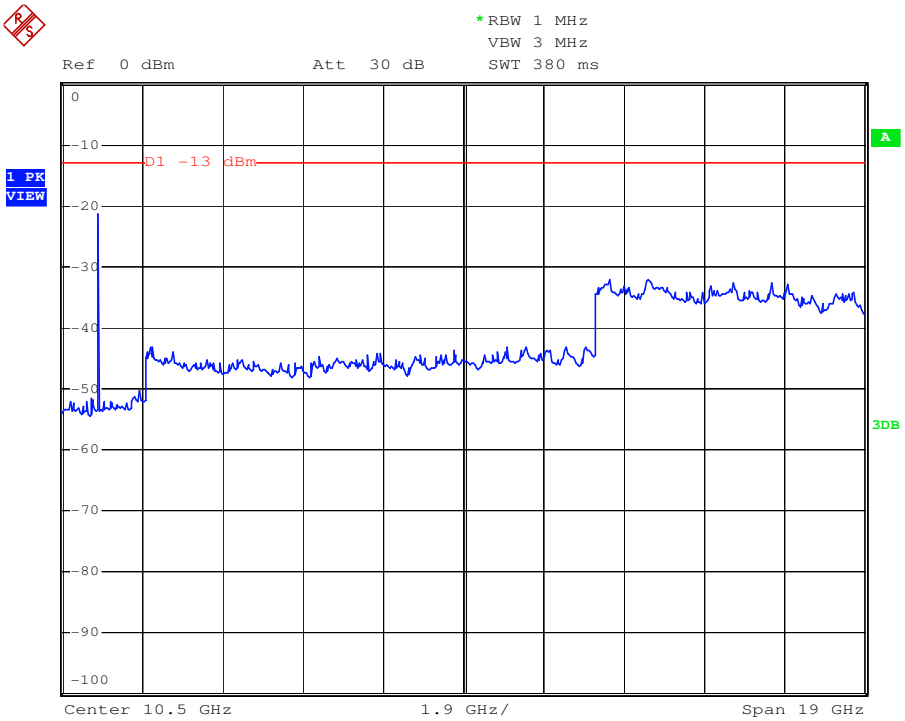
PCS—CDMA down link(highest frequency)



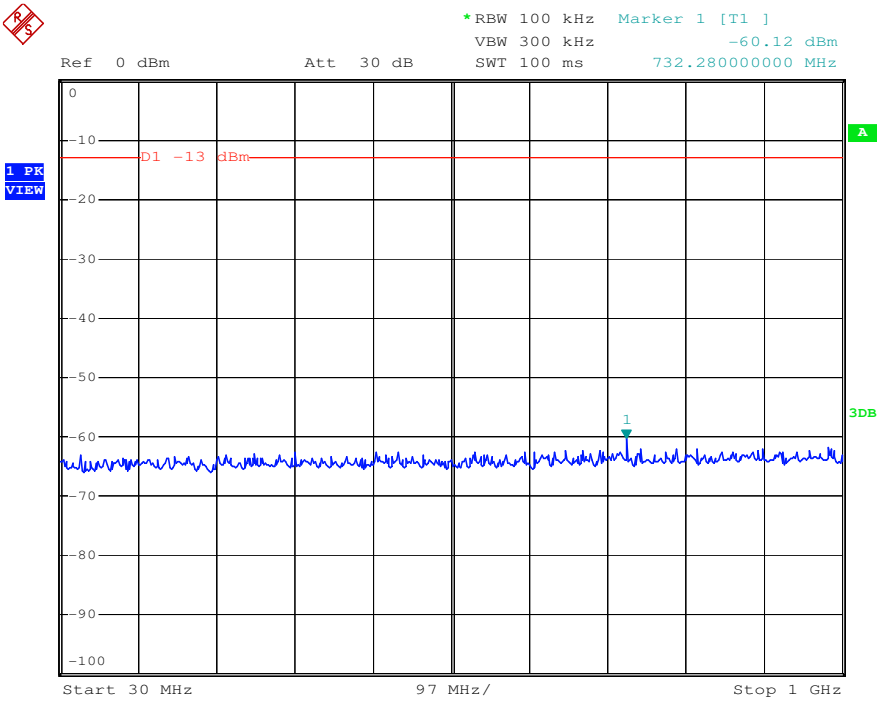
PCS—CDMA up link(lowest frequency)



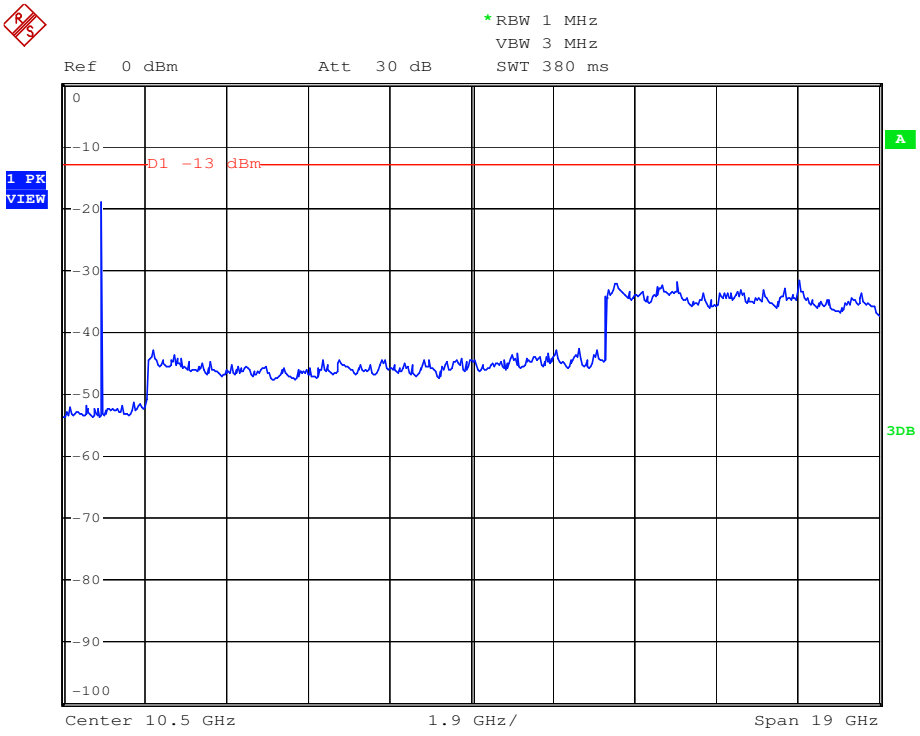
PCS—CDMA up link(lowest frequency)



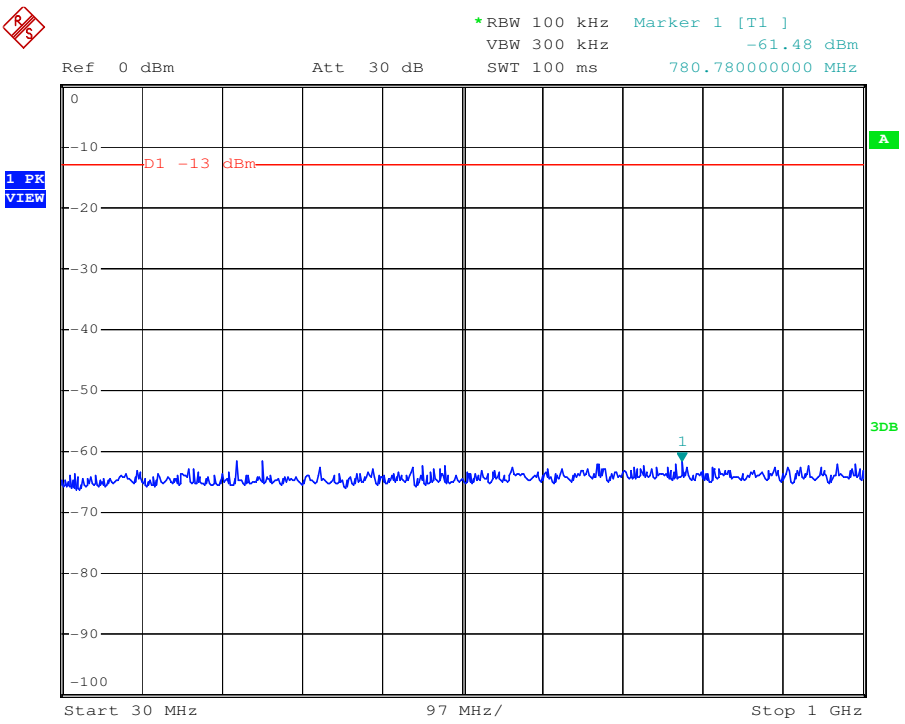
PCS—CDMA up link(middle frequency)



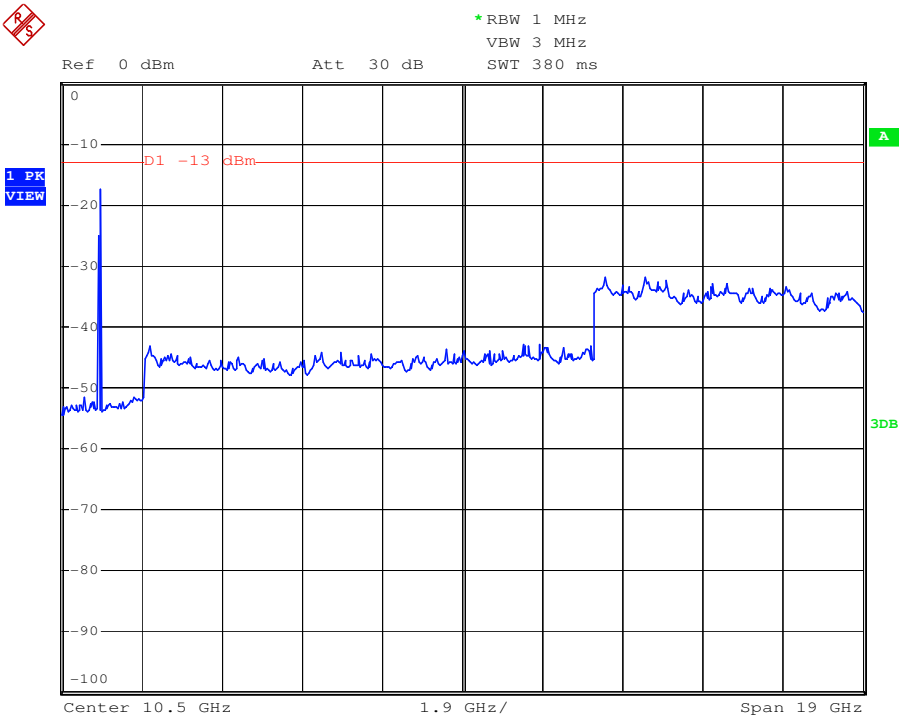
PCS—CDMA up link(middle frequency)



PCS—CDMA up link(highest frequency)

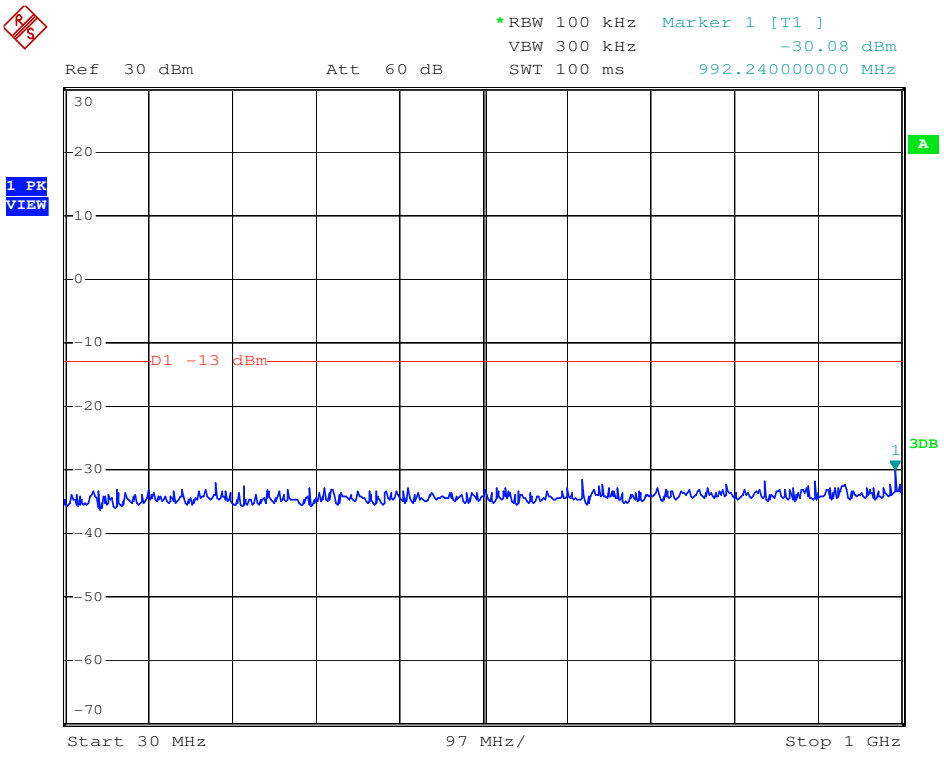


PCS—CDMA up link(highest frequency)

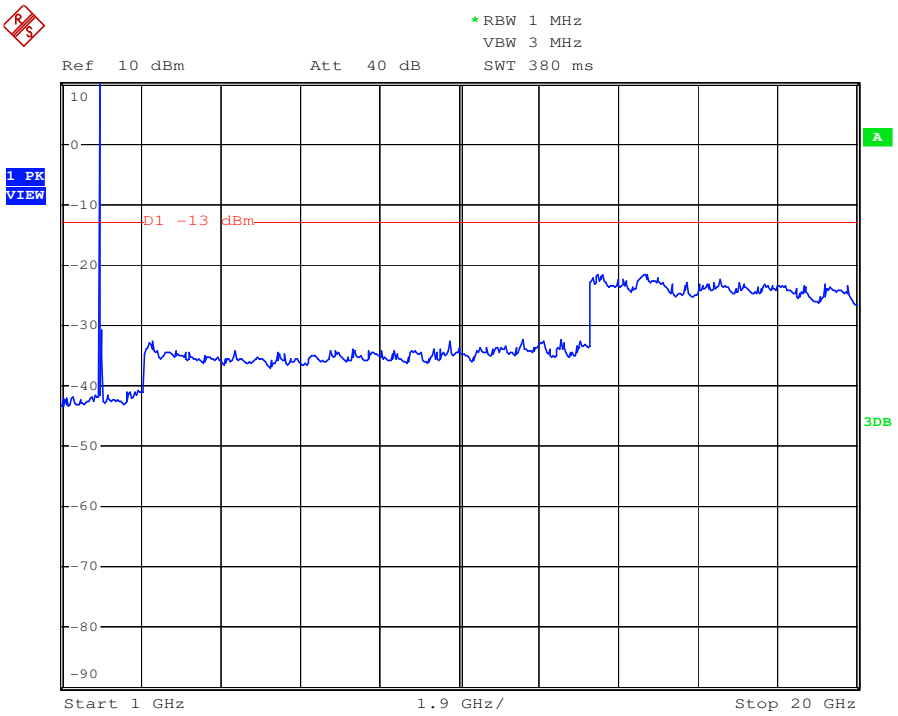


PCS Band

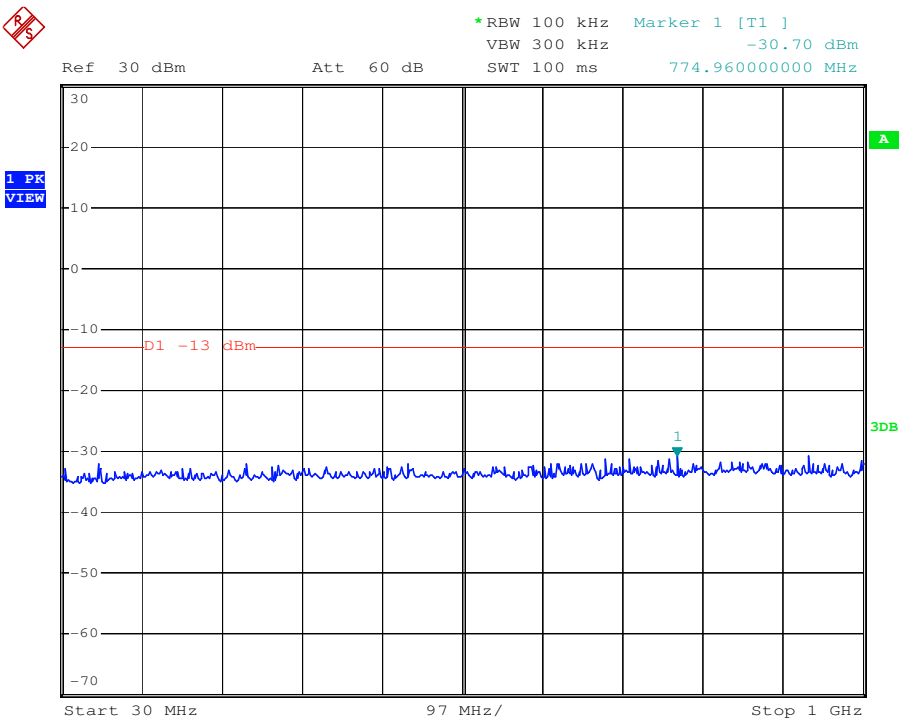
PCS—WCDMA down link(lowest frequency)



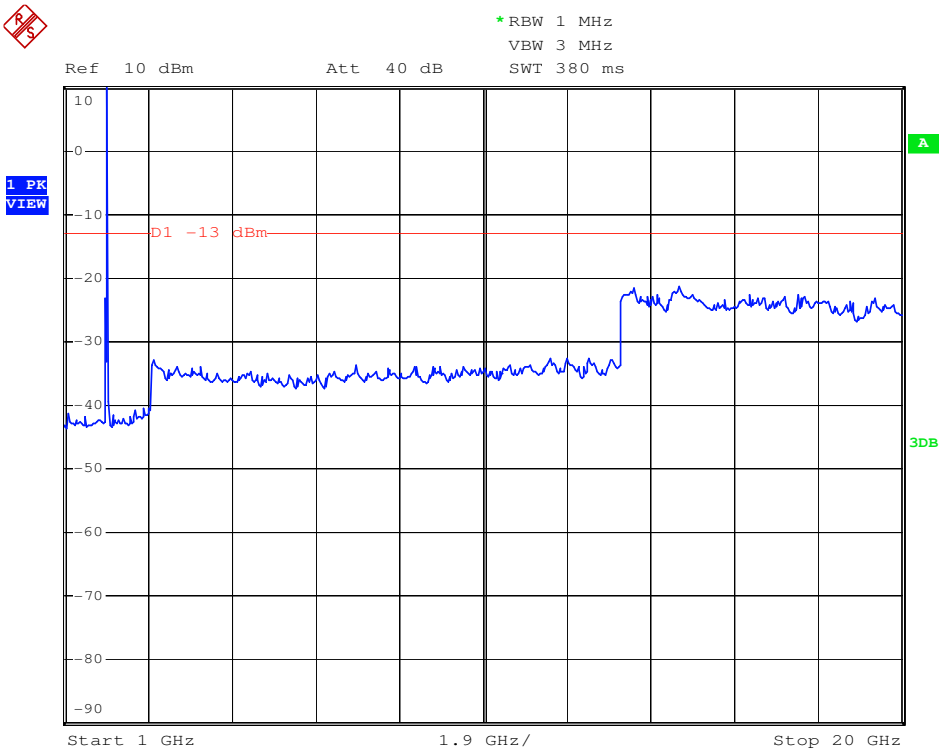
PCS—WCDMA down link(lowest frequency)



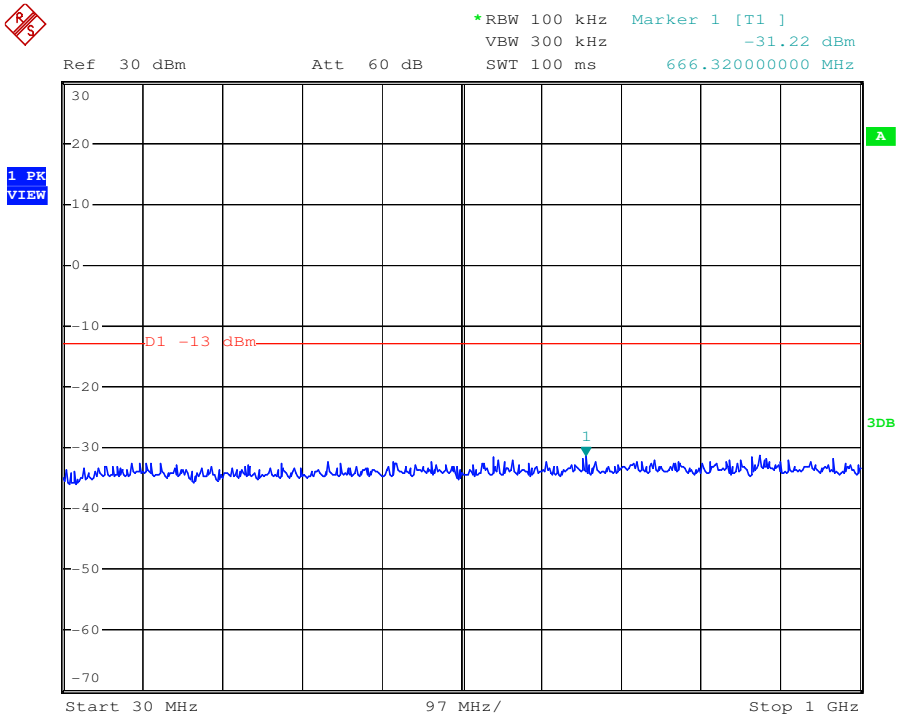
PCS—WCDMA down link(middle frequency)



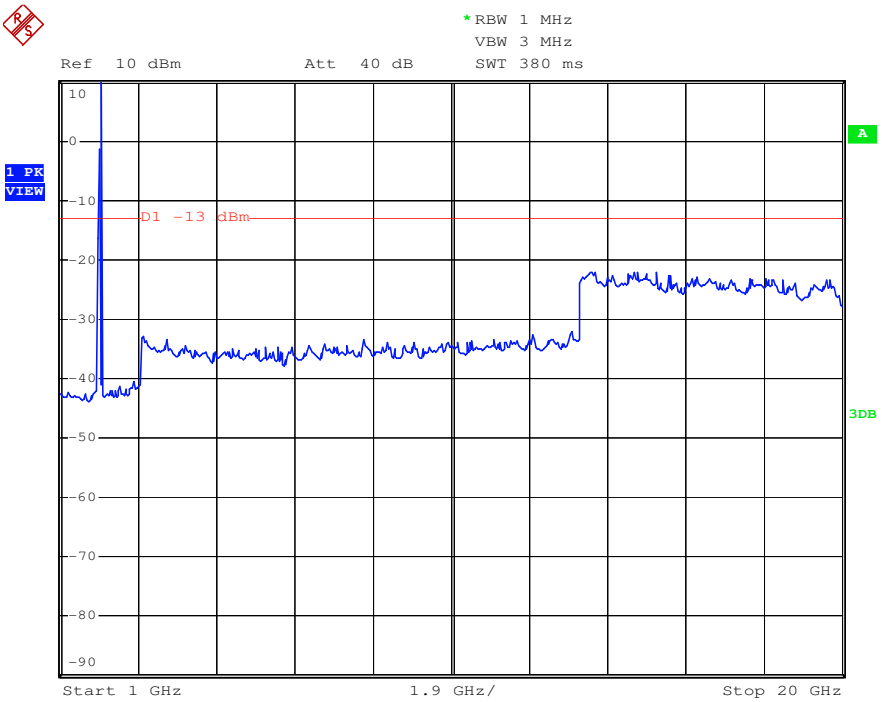
PCS—WCDMA down link(middle frequency)



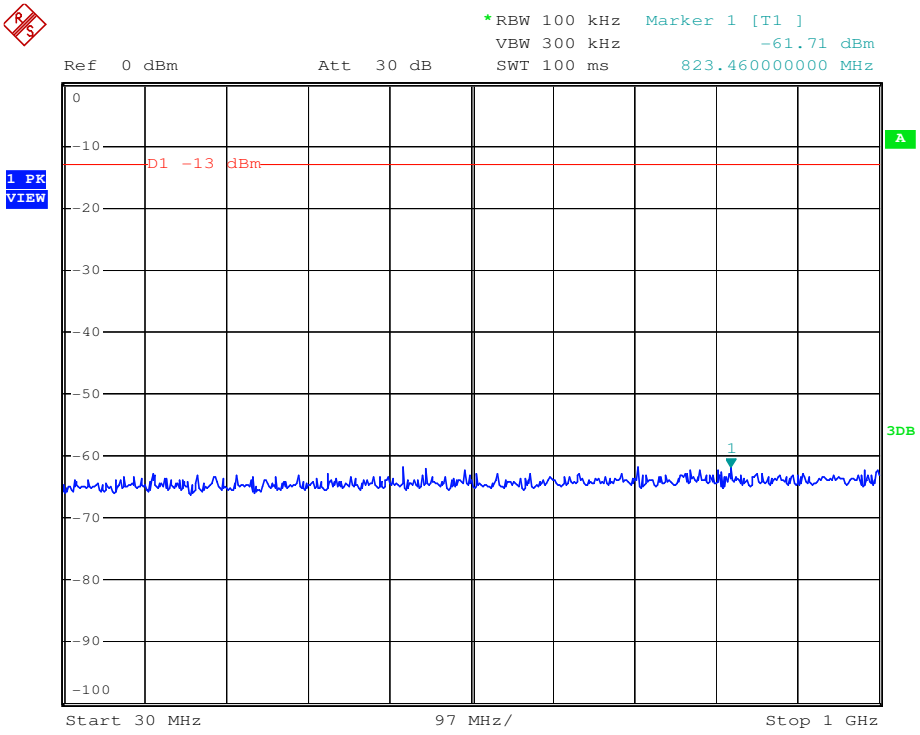
PCS—WCDMA down link(highest frequency)



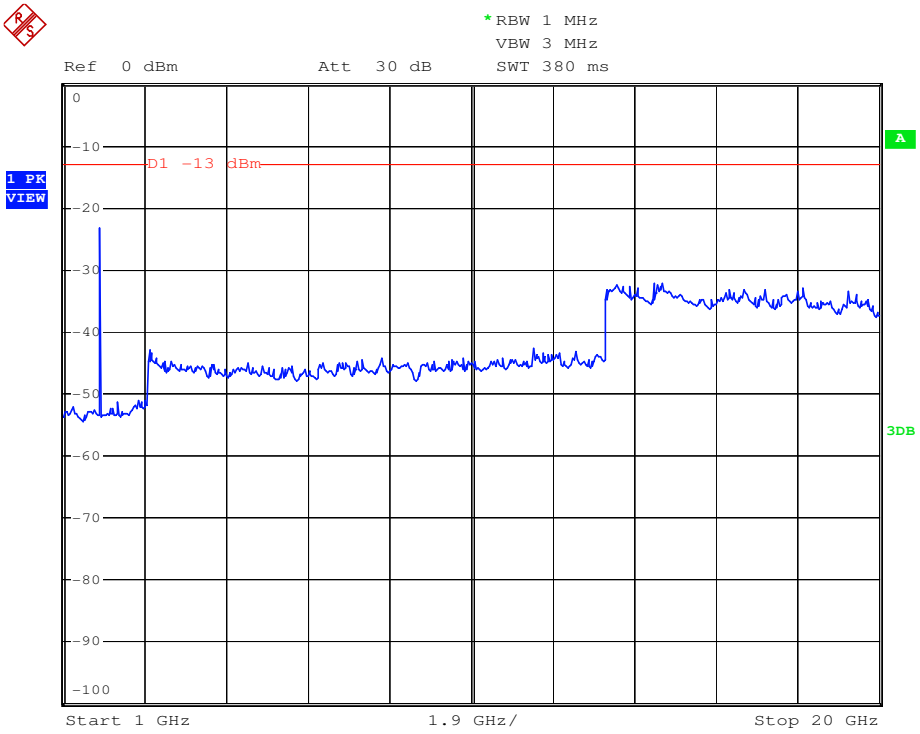
PCS—WCDMA down link(highest frequency)



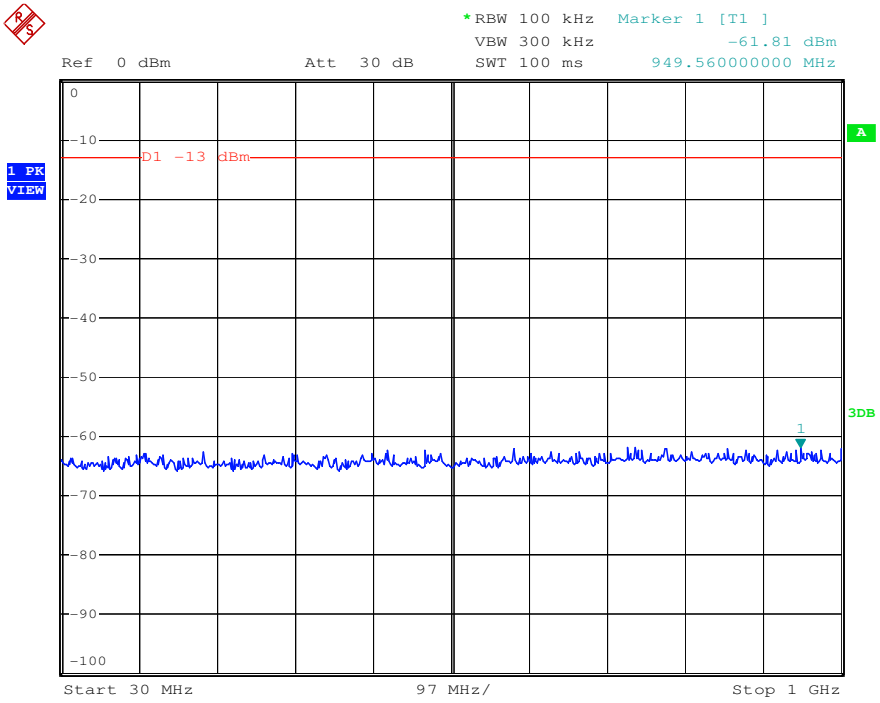
PCS—WCDMA up link(lowest frequency)



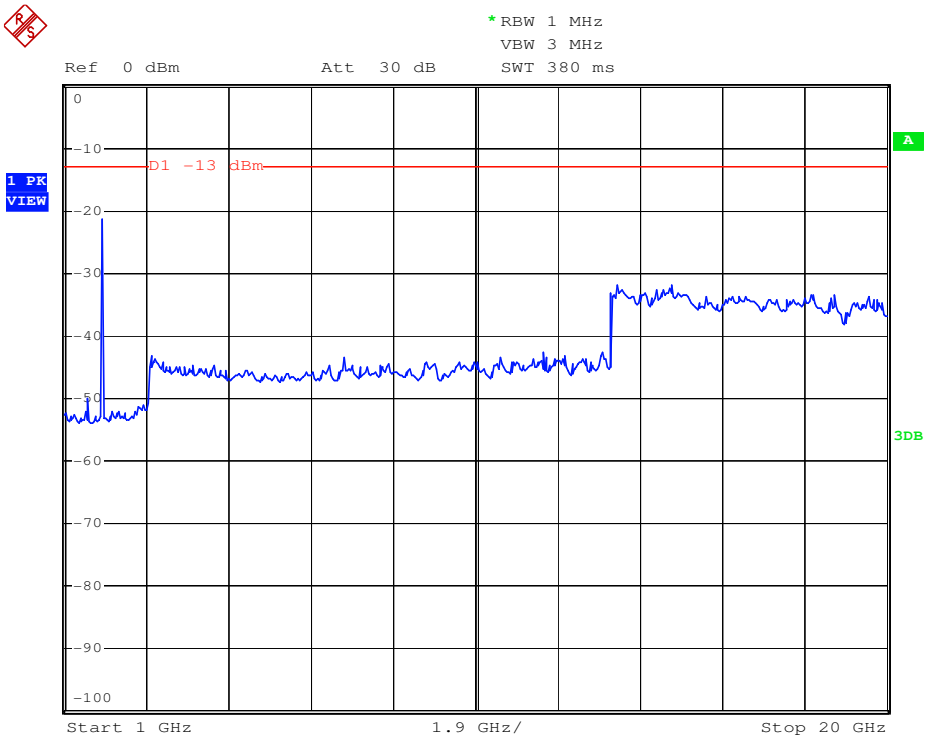
PCS—WCDMA up link(lowest frequency)



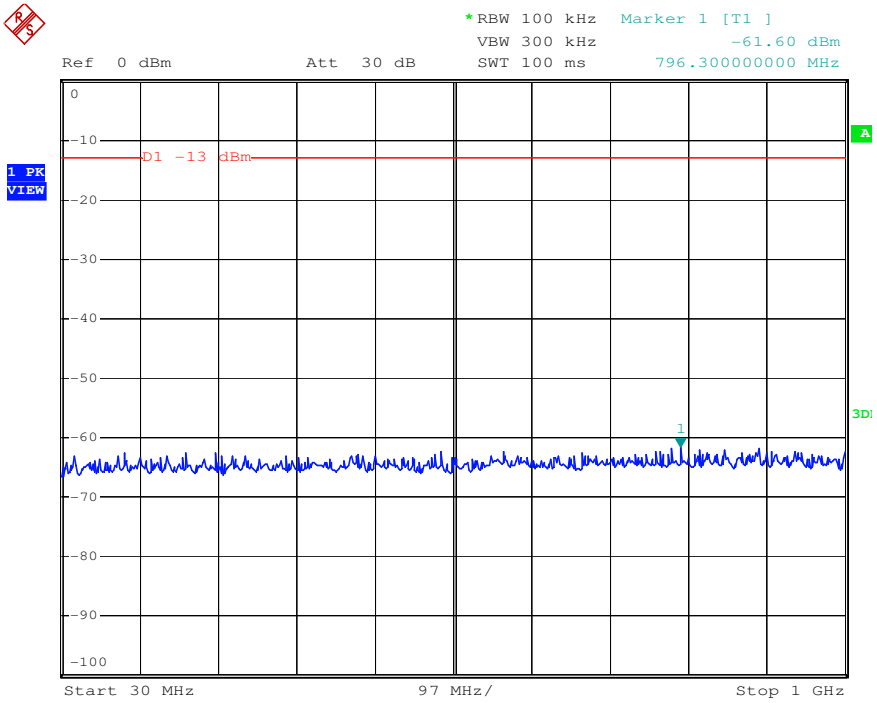
PCS—WCDMA up link(middle frequency)



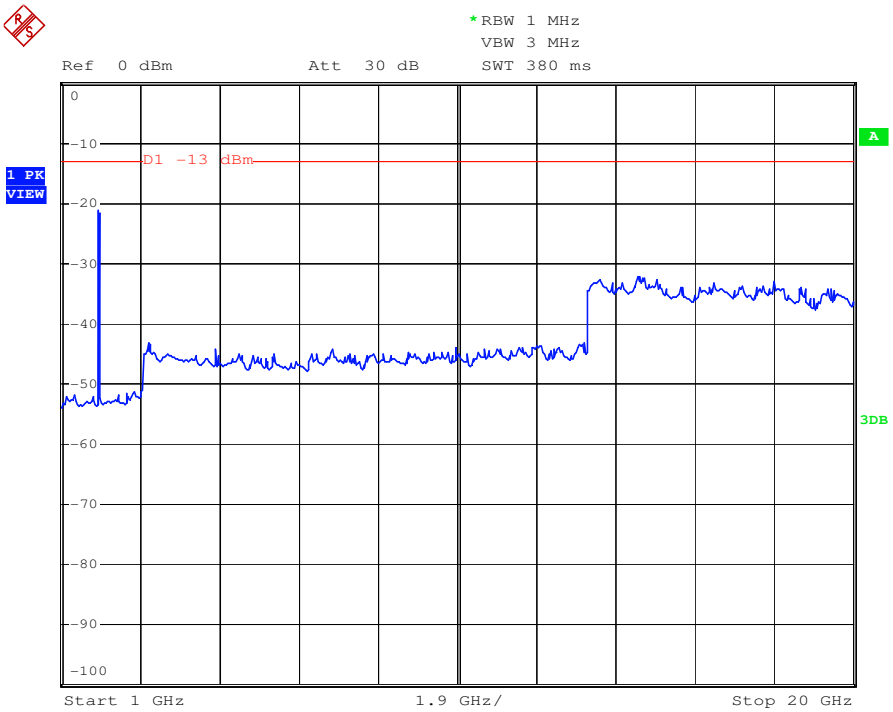
PCS—WCDMA up link(middle frequency)



PCS—WCDMA up link(highest frequency)



PCS—WCDMA up link(highest frequency)



6.2.3 Band Edge

Test Date: 10 to 12 November 2008

Test Requirement: FCC part 22.917(b) & FCC part 24.238(b)

§22.917 Emission limitations for cellular equipment.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). 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.

§24.238 Emission limitations for Broadband PCS equipment

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.

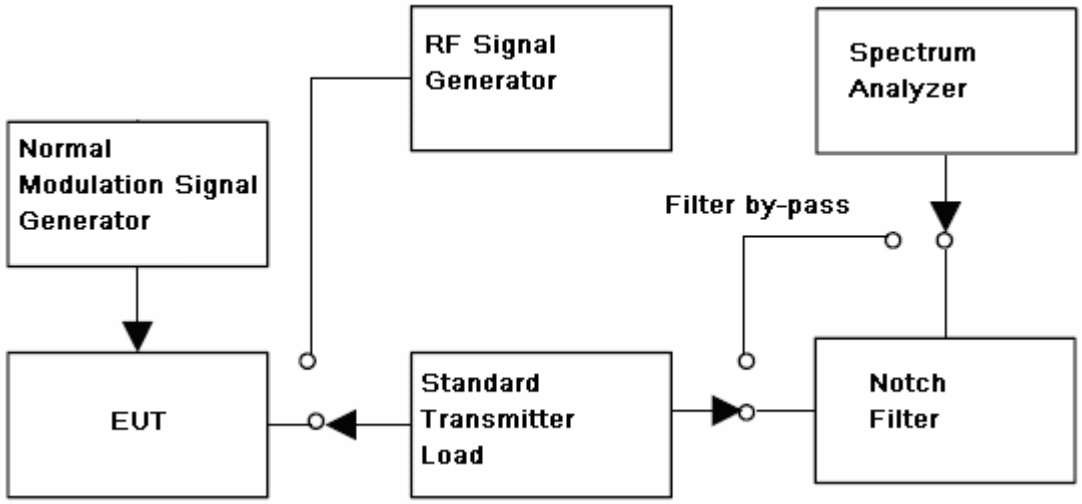
Test Method: FCC part 2.1051

EUT Operation:

Status: The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.

Conditions: Normal conditions

Application: Cellular Band DL and UL ports,PCS Band DL and UL ports



Test Procedure: Conducted Emissions test procedure:

a) Connect the equipment as illustrated, with the notch filter by-passed, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth,(base the standard, apply the different set),her is 100KHz for frequency band less than 1GHz, 1MHz for frequency over 1GHz;

2) Video Bandwidth refer to standard requirement.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) the lowest radio frequency generated in the equipment, it can be 9KHz base the test method, here select 30MHz as lowest frequency start point;

2) the highest radion frequency shall higher than 10 times of carrier frequency;

f) Record the frequencies and levels of spurious emissions from step e)

Remark:

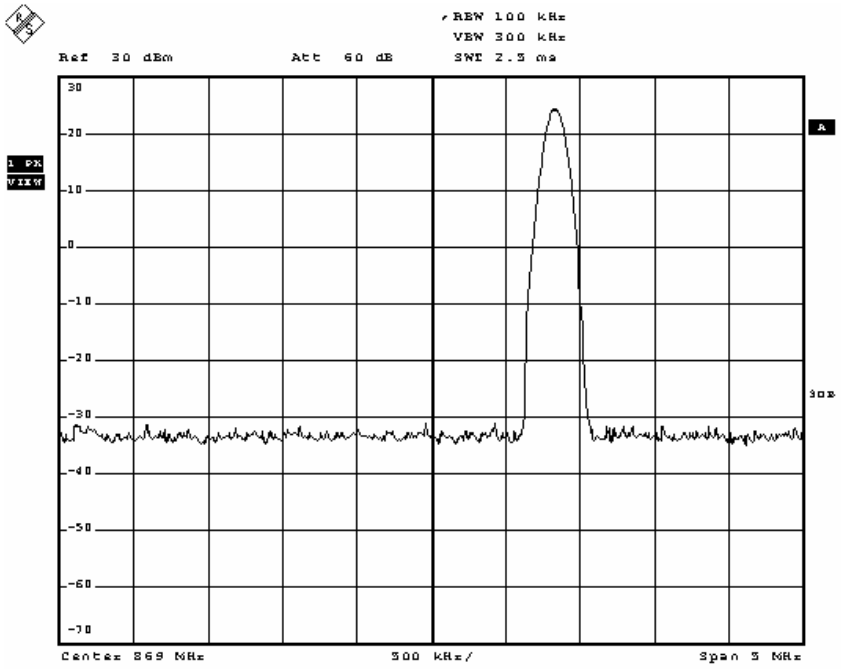
The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

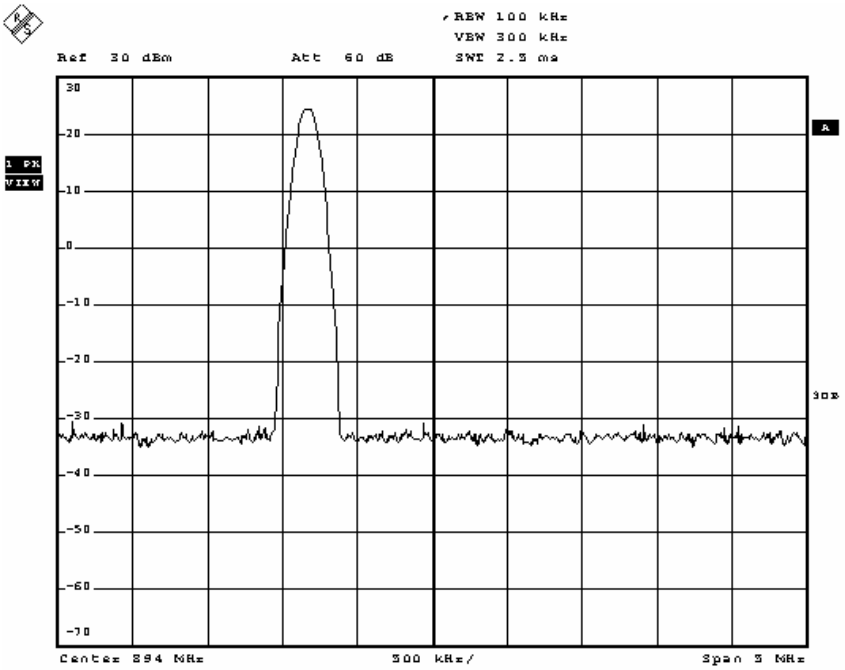
6.2.3.1 Measurement Record:

Cellular Band

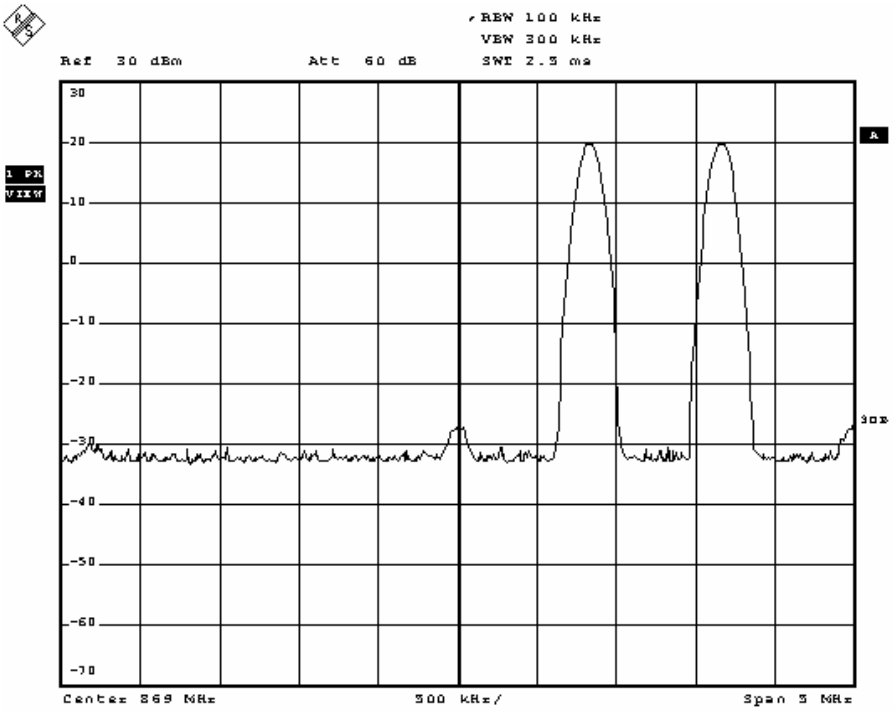
Cellular—AMPS one signal input down link– Lower Edge



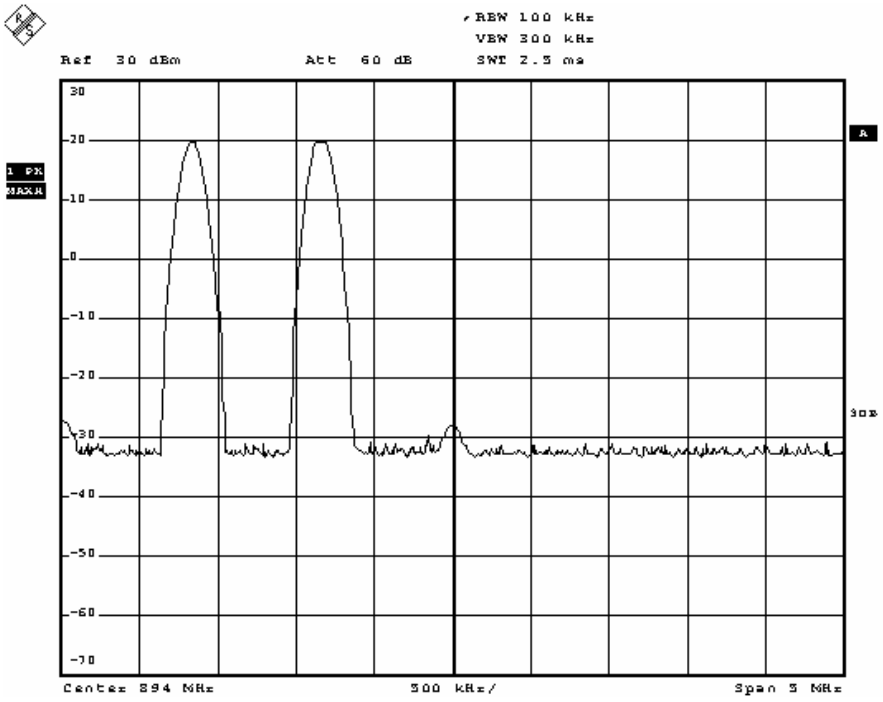
Cellular—AMPS one signal input down link– Upper Edge



Cellular—AMPS two input signal down link—Lower Edge

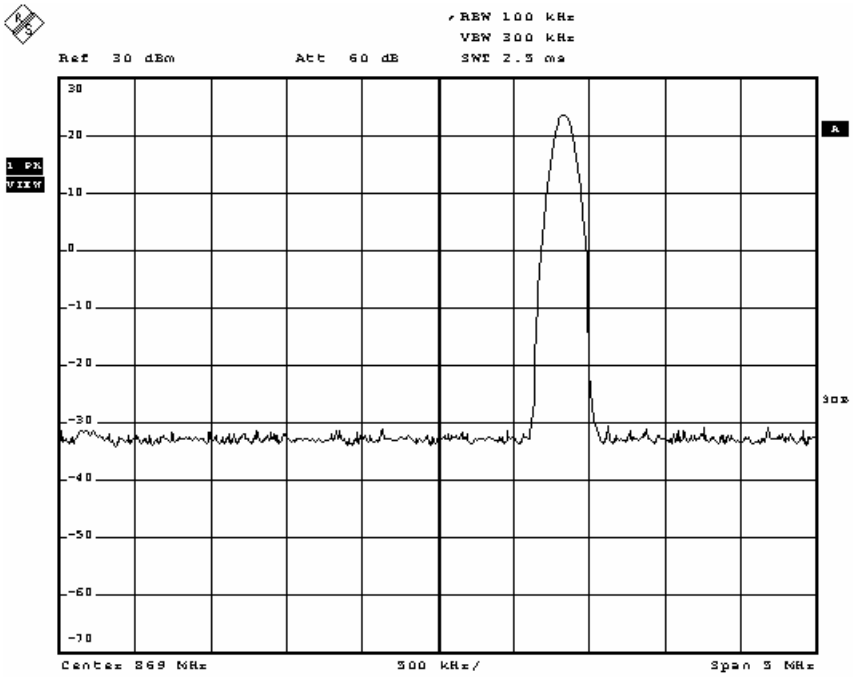


Cellular—AMPS two input signal down link—Upper Edge

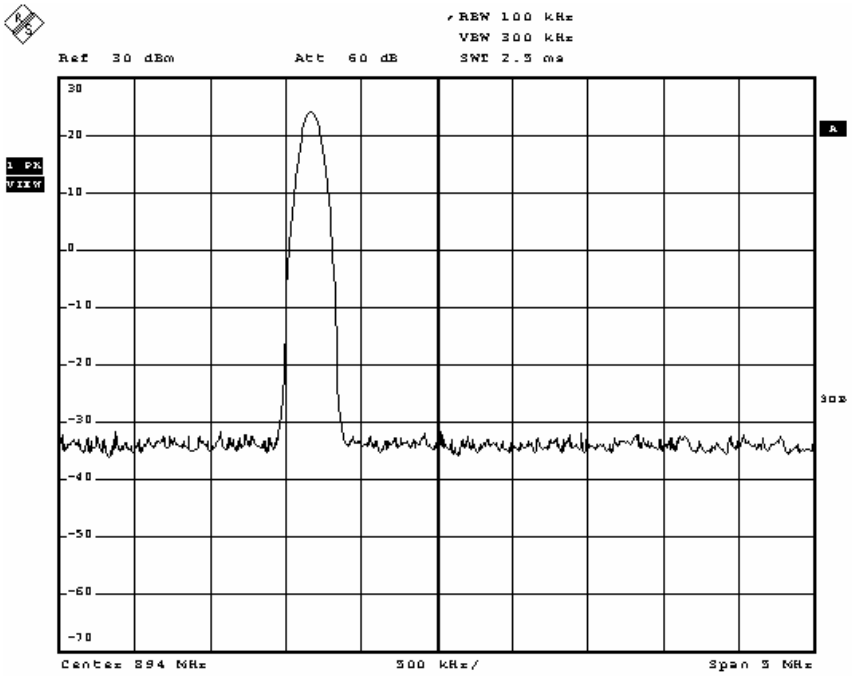


Cellular Band

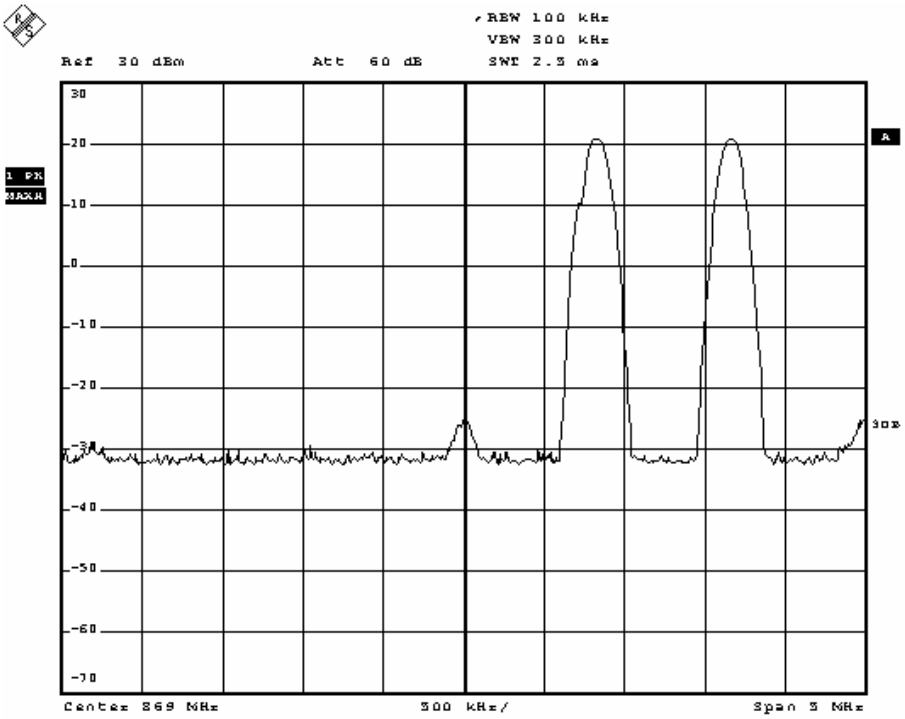
Cellular—TDMA one signal input down link– Lower Edge



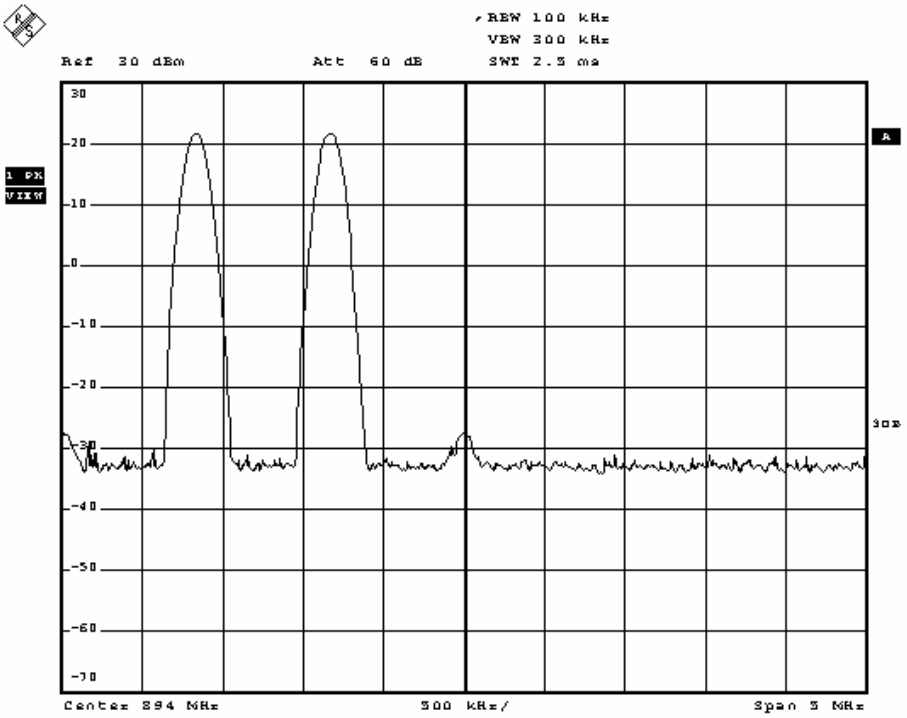
Cellular—TDMA one signal input down link– Upper Edge



Cellular—TDMA two signal input down link—Lower Edge

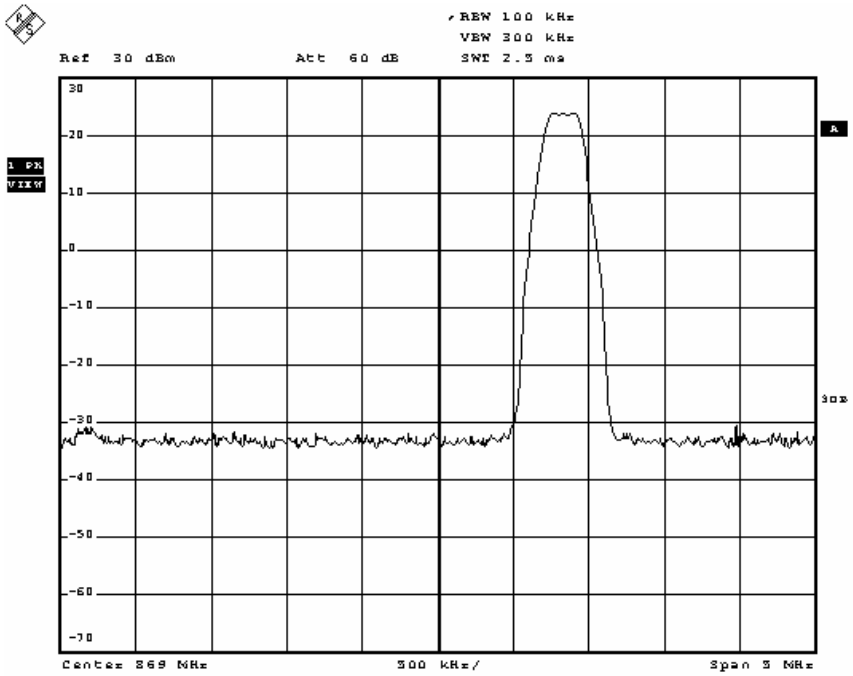


Cellular—TDMA two signal input down link—Upper Edge

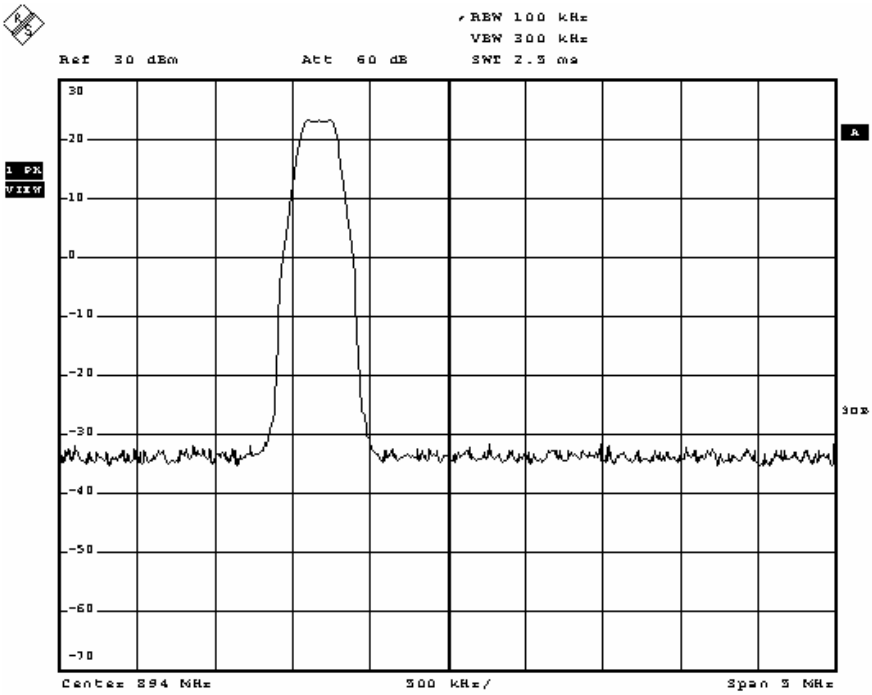


Cellular Band

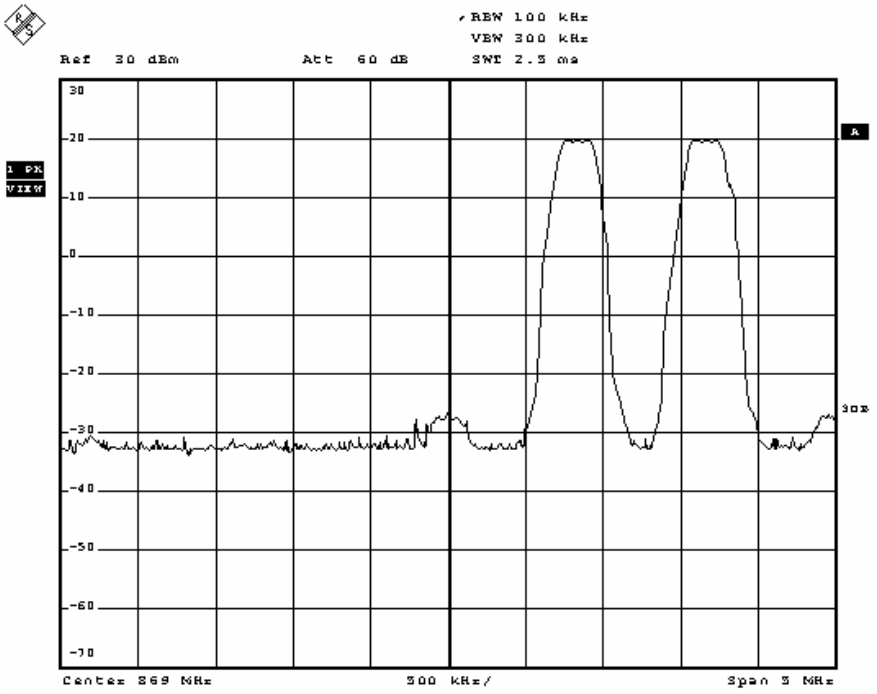
Cellular—GSM one signal input down link– Lower Edge



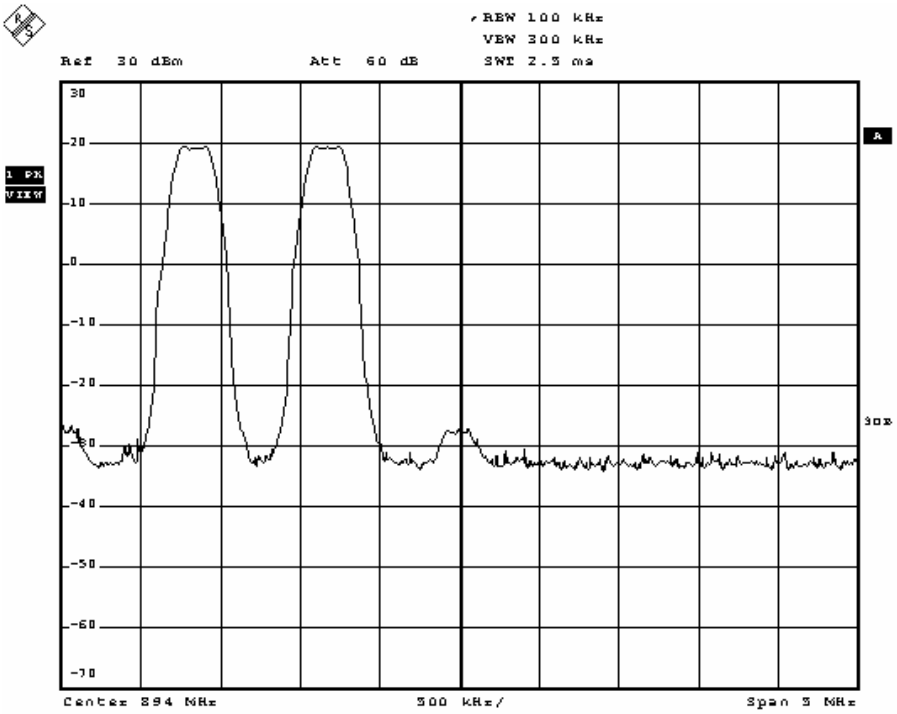
Cellular—GSM one signal input down link– Upper Edge



Cellular—GSM two signal input down link—Lower Edge

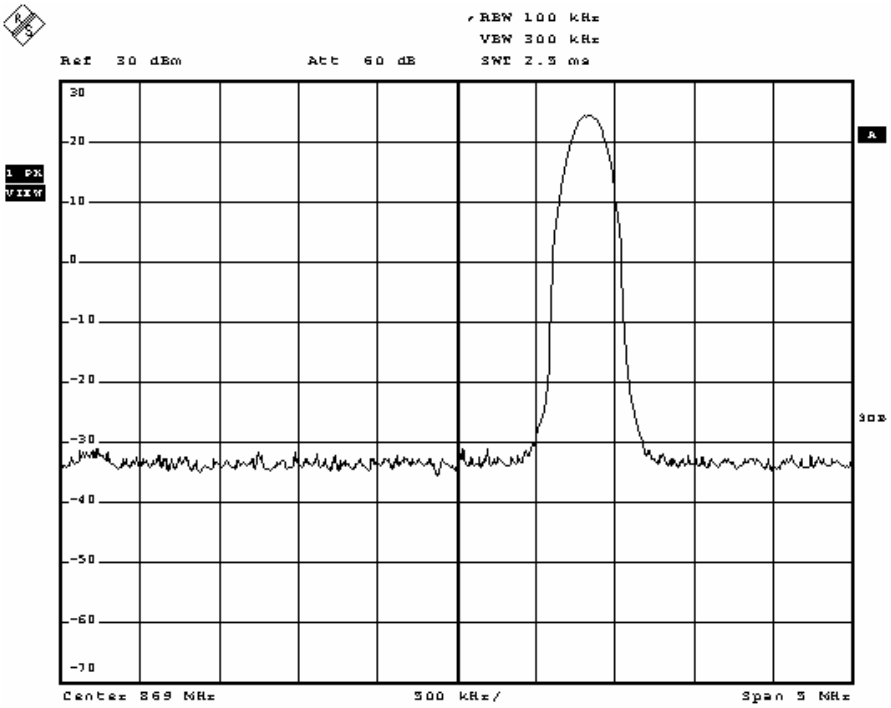


Cellular—GSM two signal input down link—Upper Edge

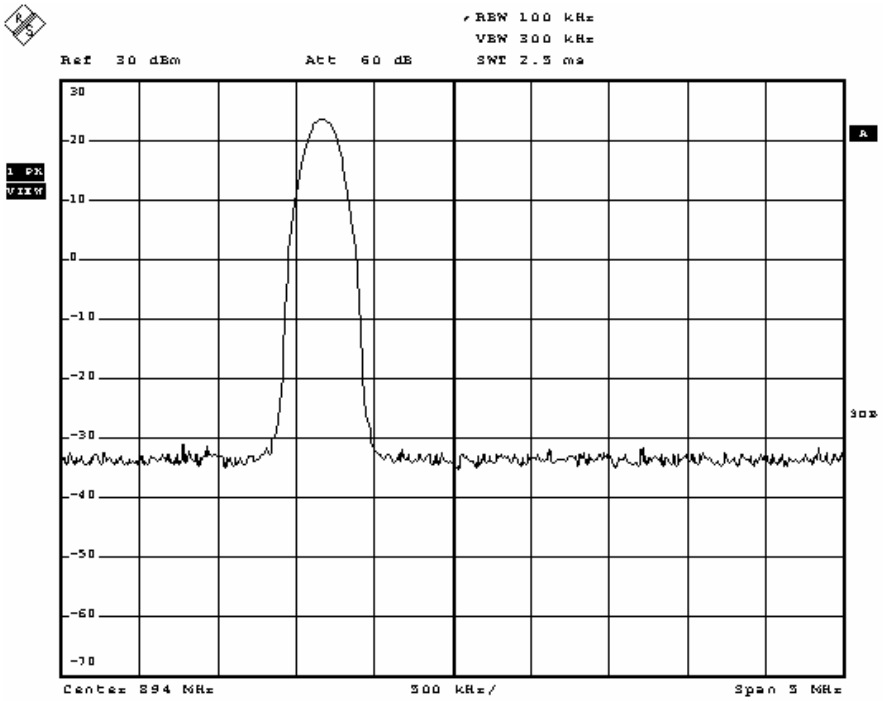


Cellular Band

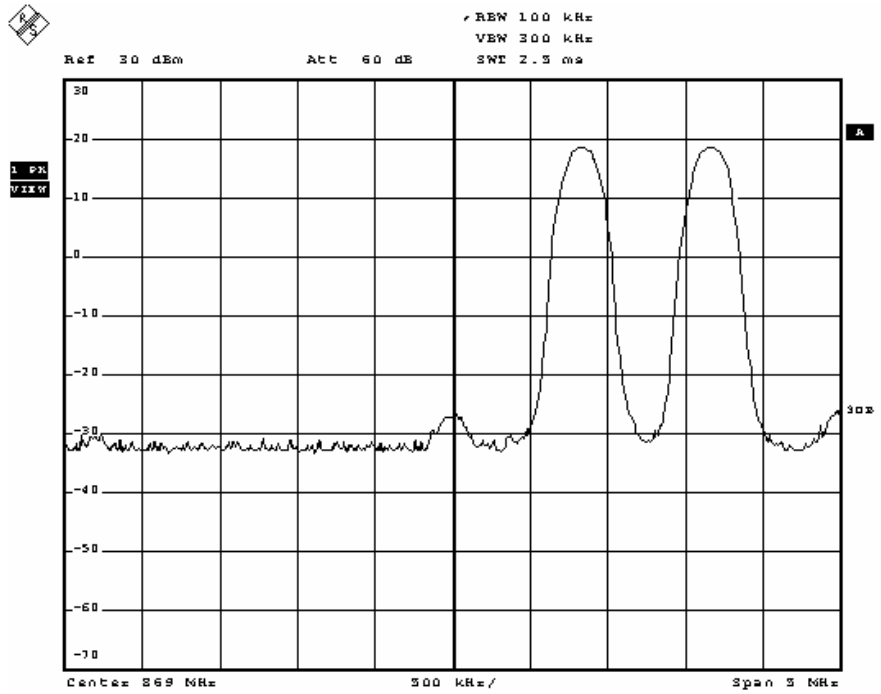
Cellular—EDGE one signal input down link– Lower Edge



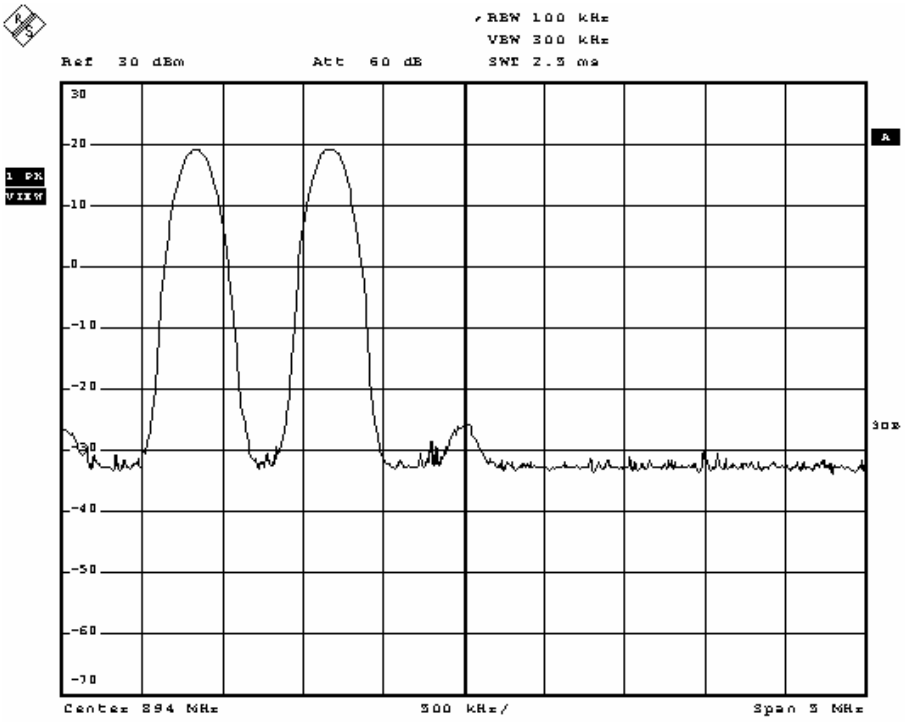
Cellular—EDGE one signal input down link– Upper Edge



Cellular—EDGE two signal input down link—Lower Edge

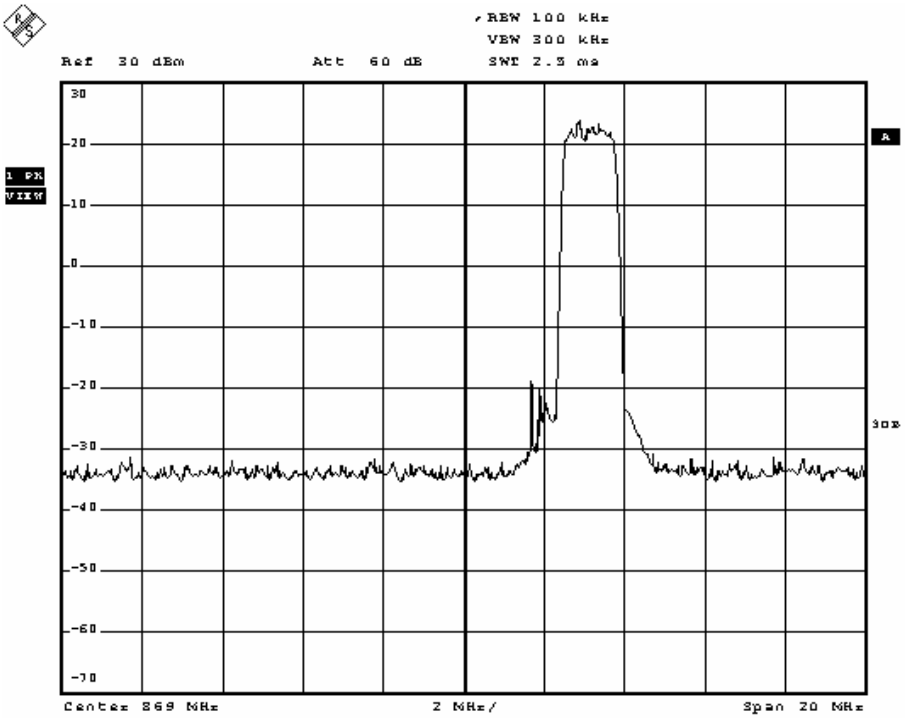


Cellular—EDGE two signal input down link—Upper Edge

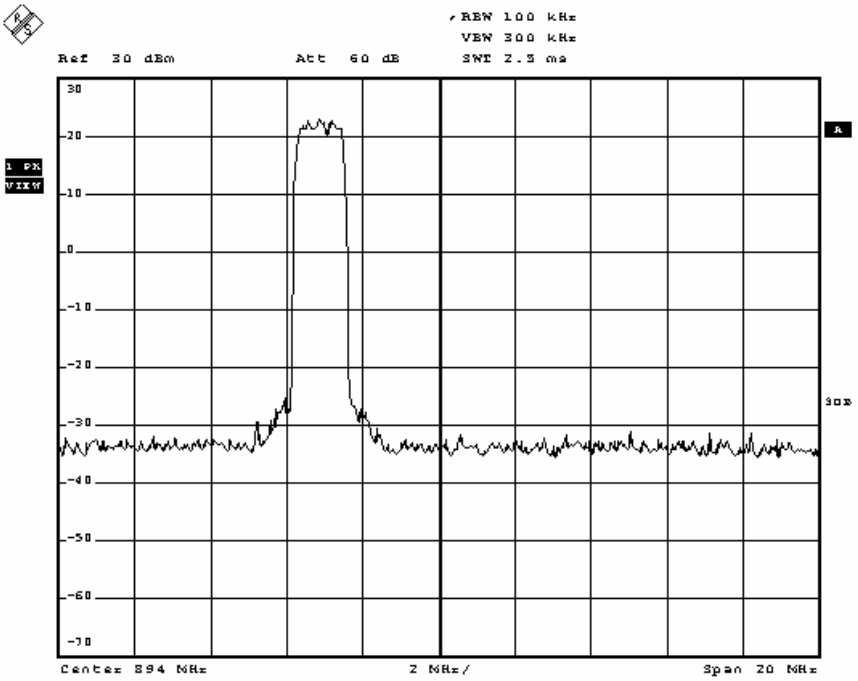


Cellular Band

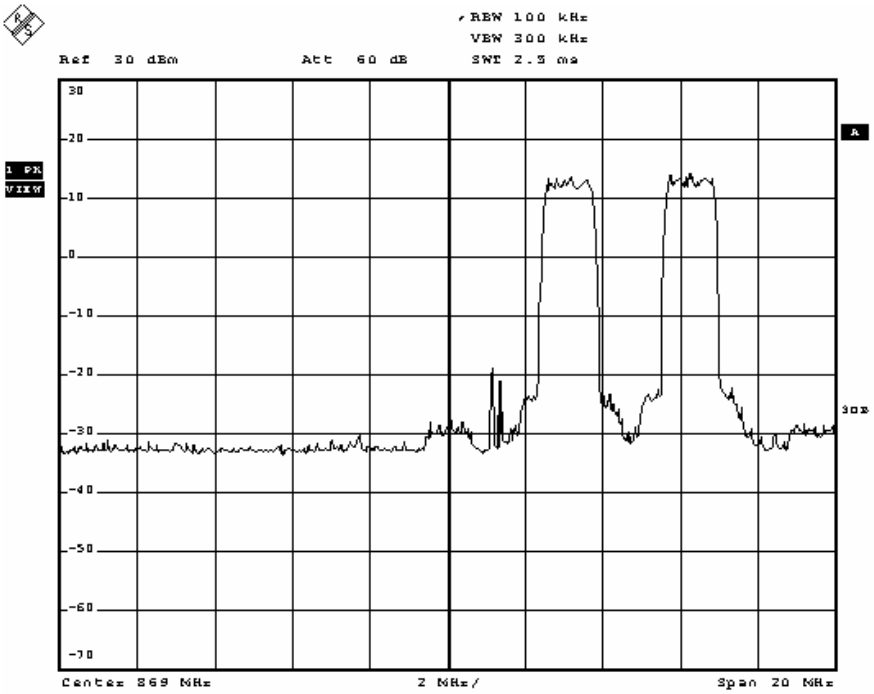
Cellular—CDMA one signal input down link– Lower Edge



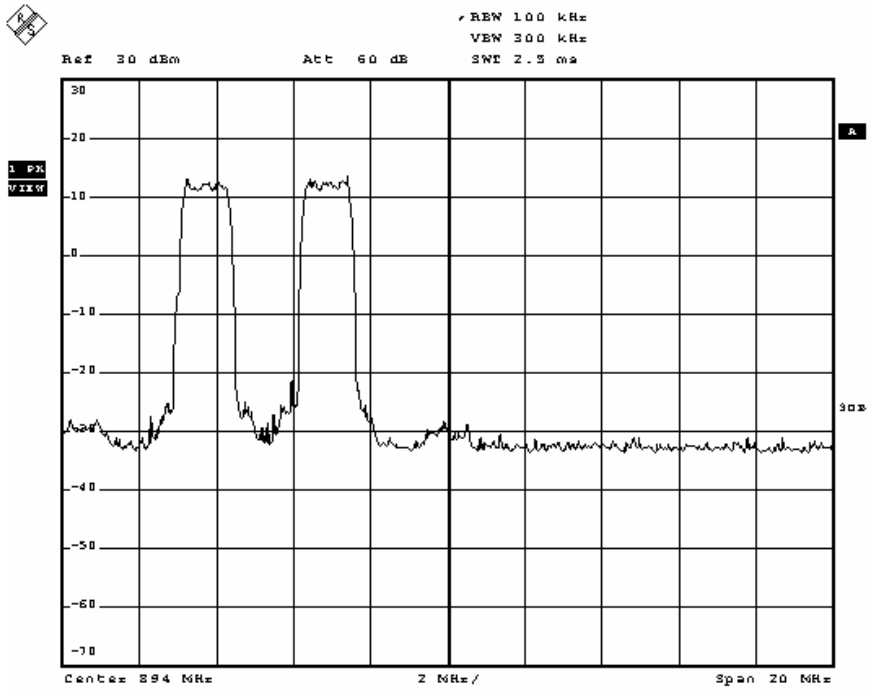
Cellular—CDMA one signal input down link– Upper Edge



Cellular—CDMA two signal input down link—Lower Edge

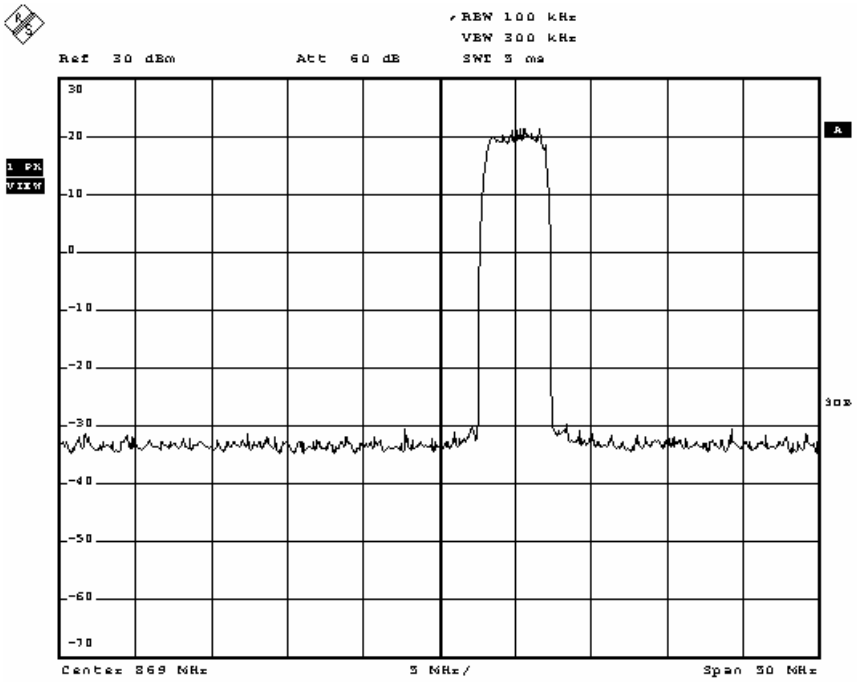


Cellular—CDMA two signal input down link—Upper Edge

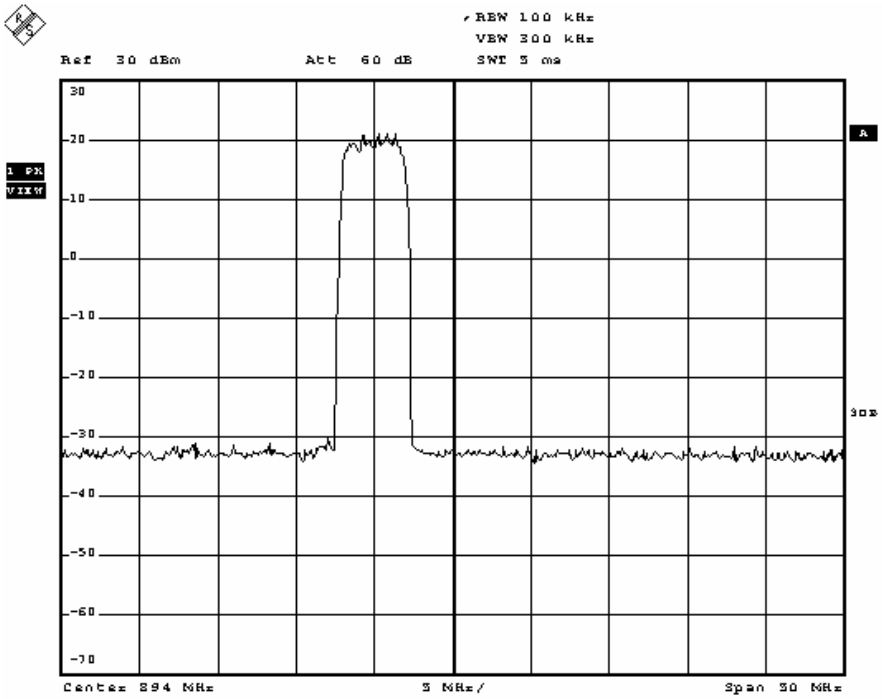


Cellular Band

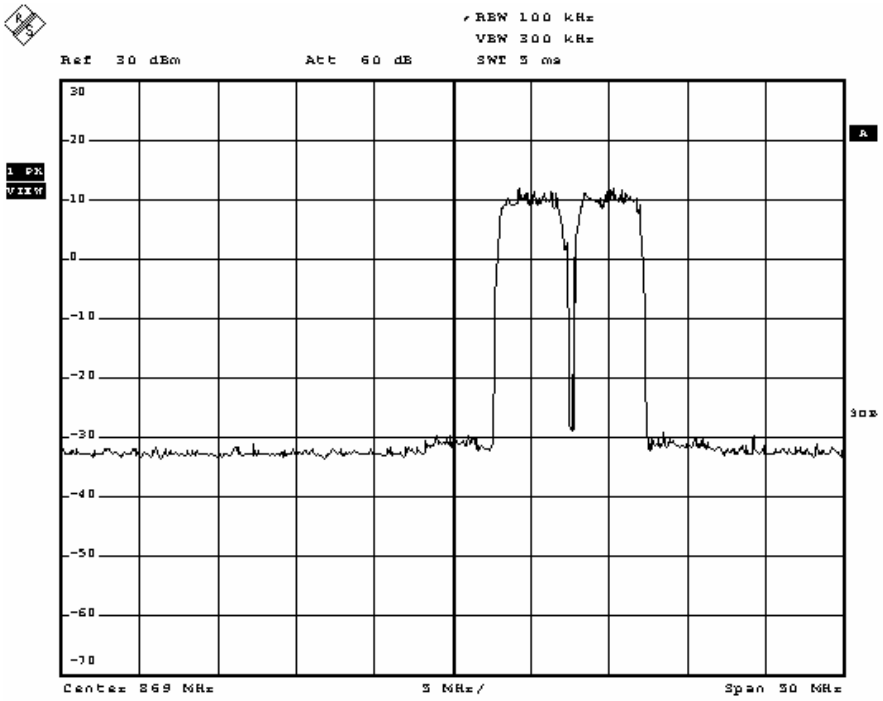
Cellular—WCDMA on signal input down link– Lower Edge



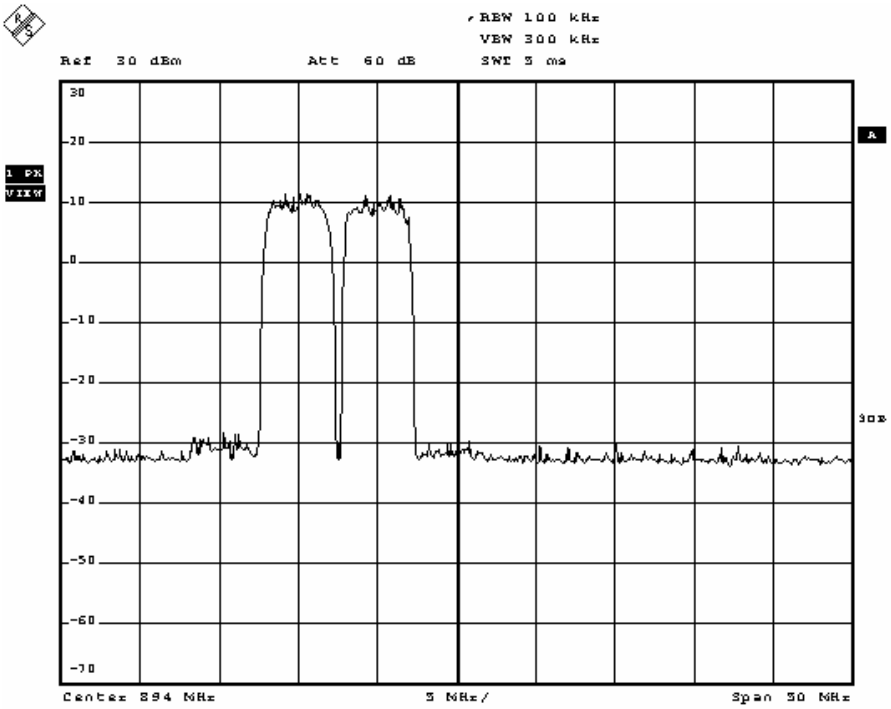
Cellular—WCDMA one signal input down link– Upper Edge



Cellular—WCDMA two signal input down link—Lower Edge

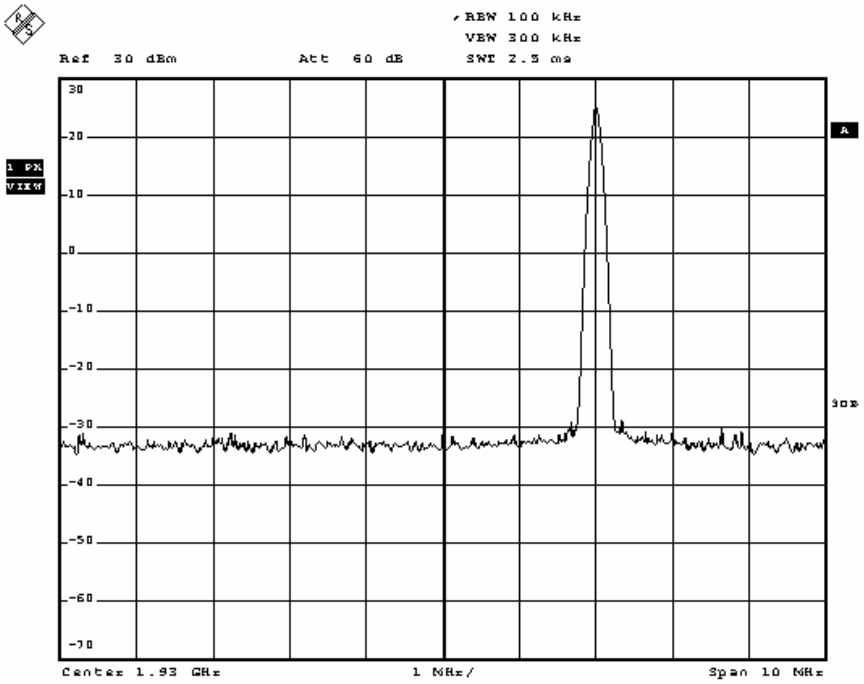


Cellular—WCDMA two signal input down link—Upper Edge

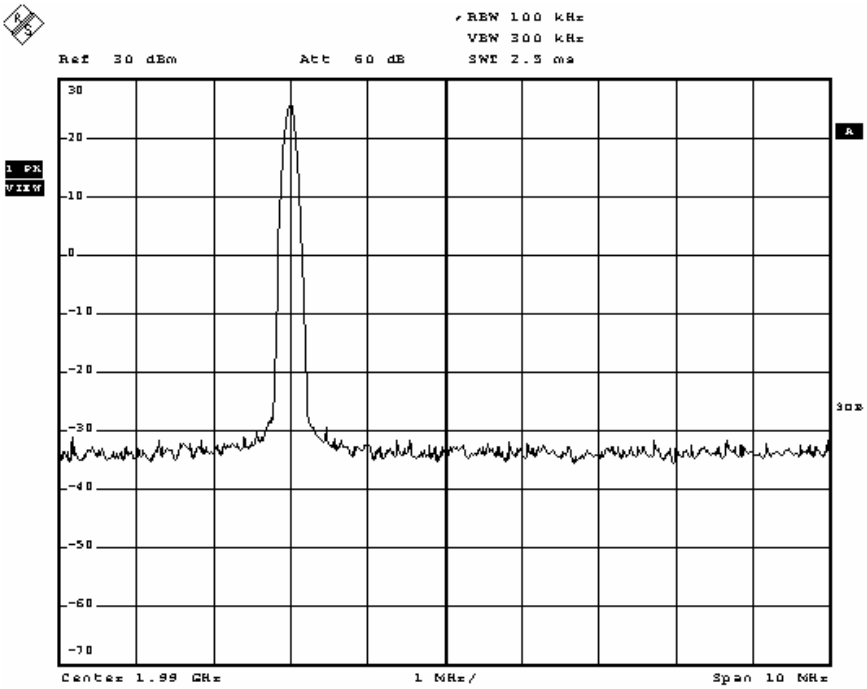


PCS Band

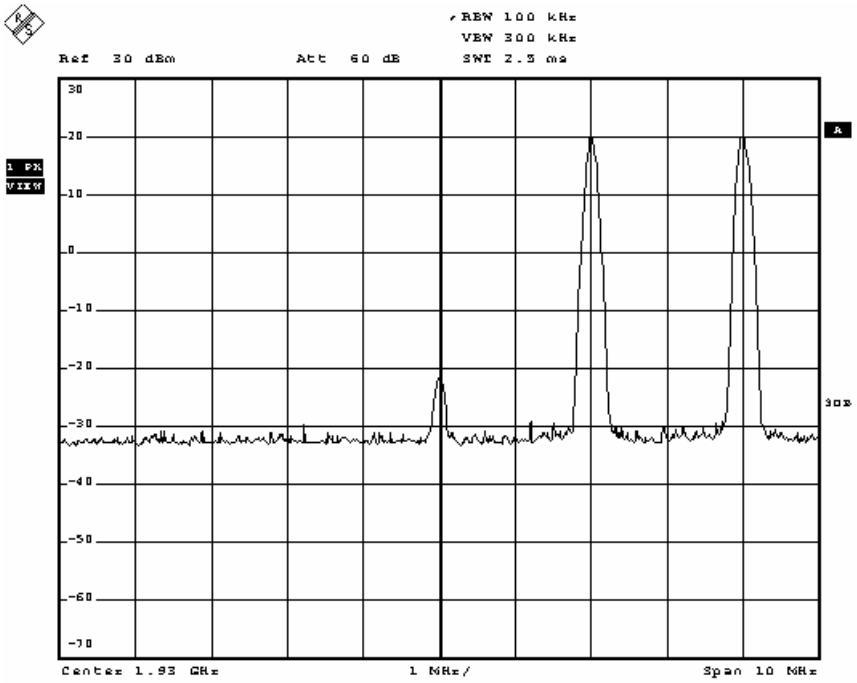
PCS—TDMA one signal input down link—Lower Edge



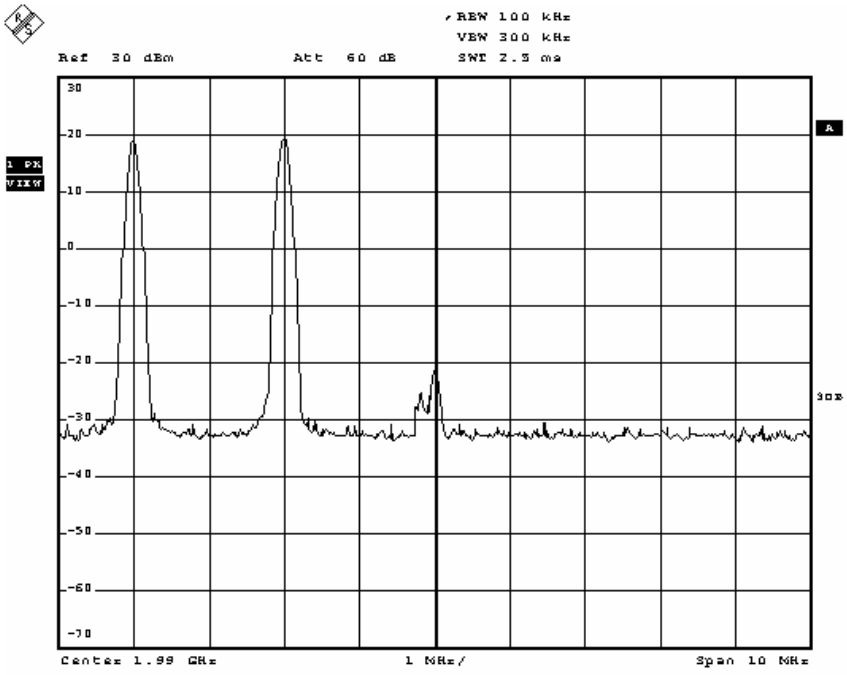
PCS—TDMA one signal input down link—Upper Edge



PCS—TDMA two signal input down link—Lower Edge

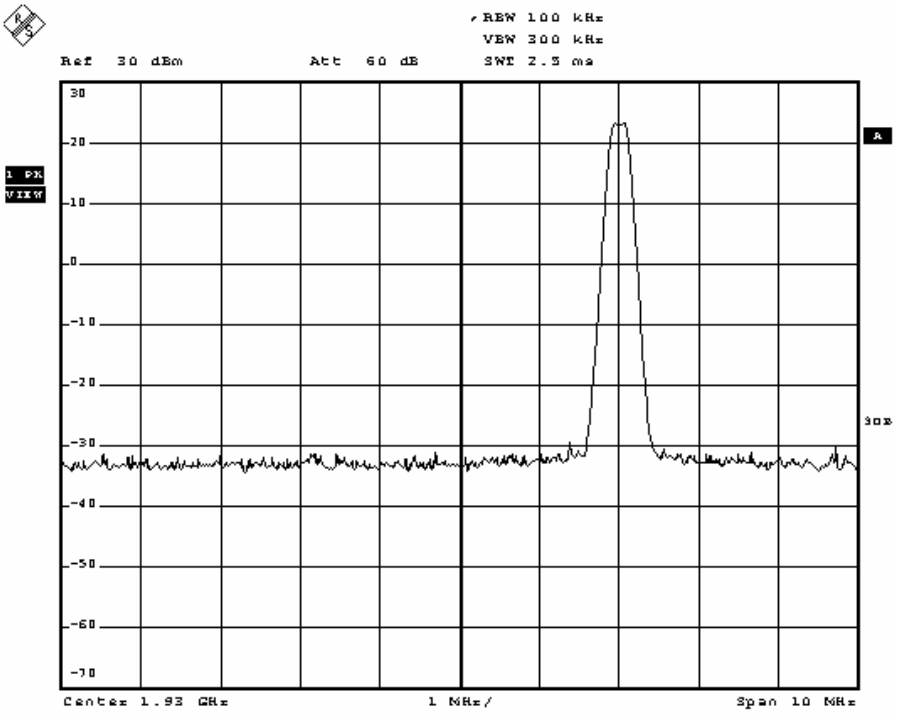


PCS—TDMA two signal input down link—Upper Edge

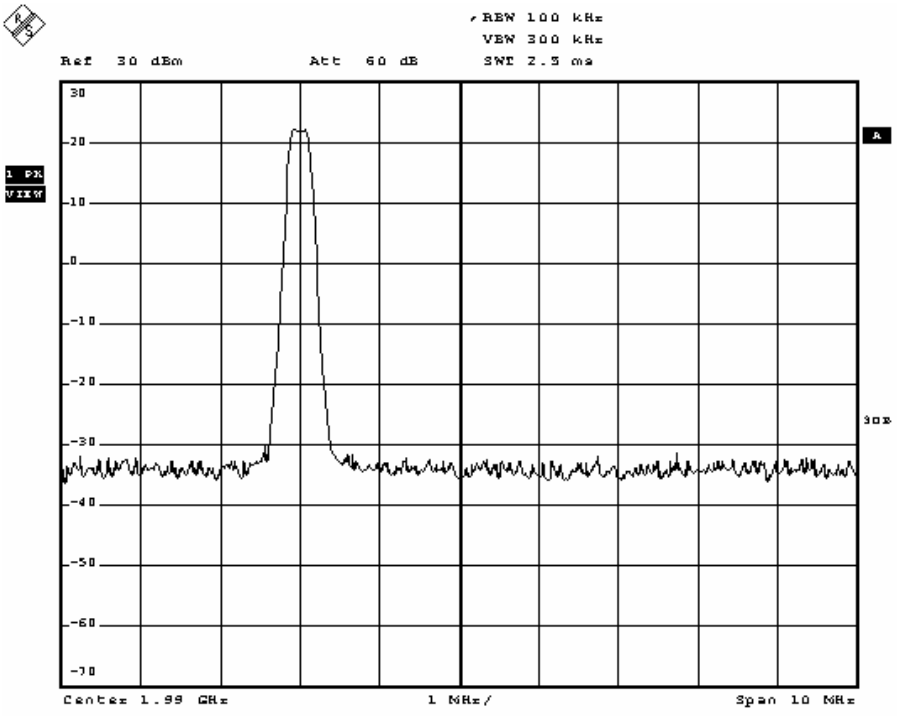


PCS Band

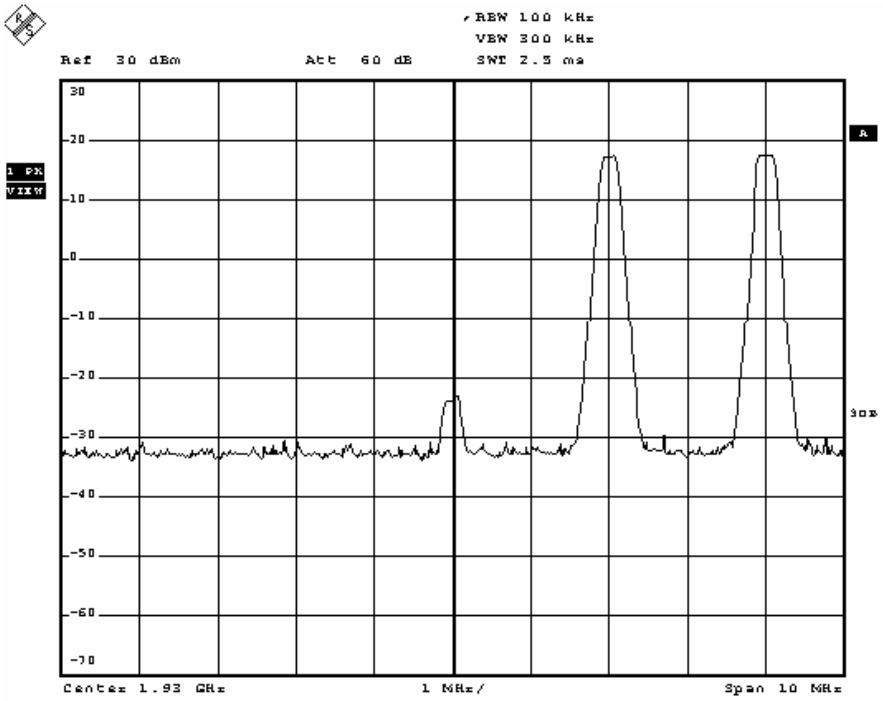
PCS—GSM one signal input down link—Lower Edge



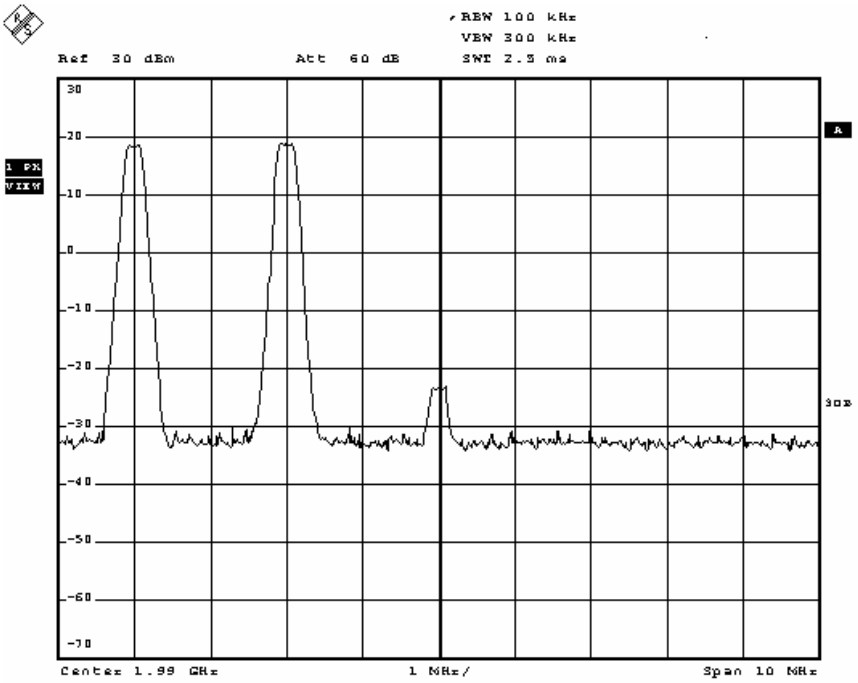
PCS—GSM one signal input down link—Upper Edge



PCS—GSM two signal input down link—Lower Edge

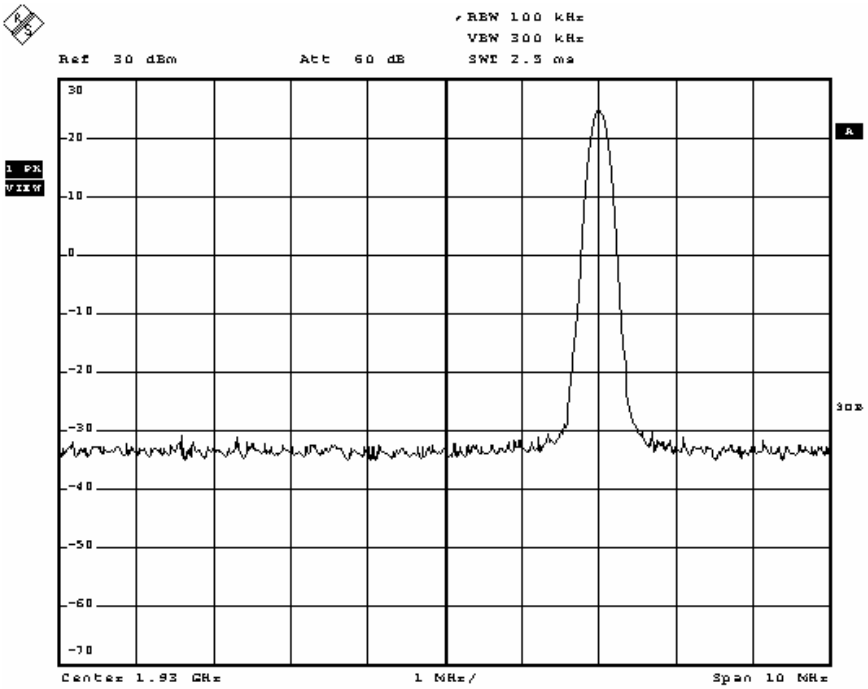


PCS—GSM two signal input down link—Upper Edge

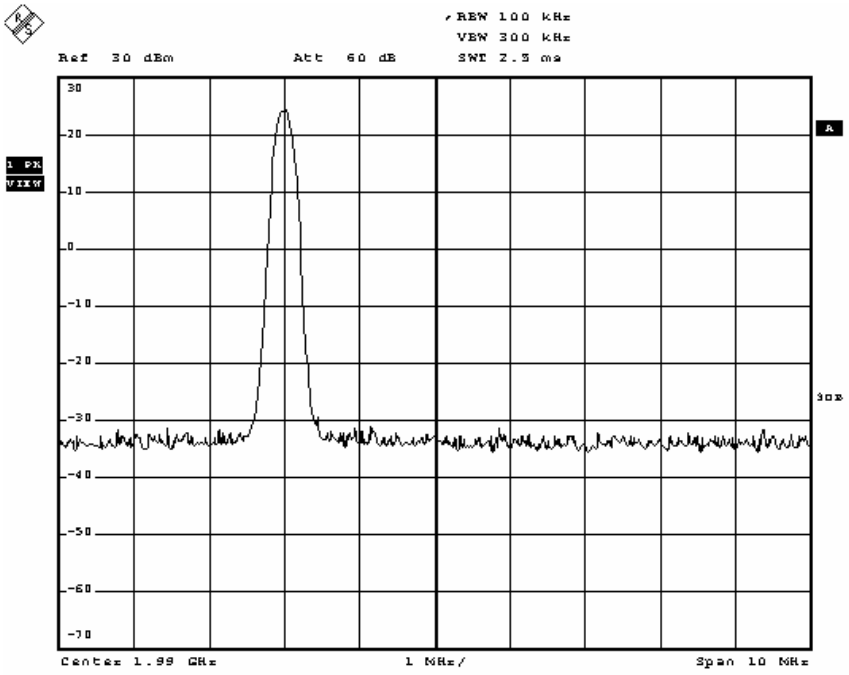


PCS Band

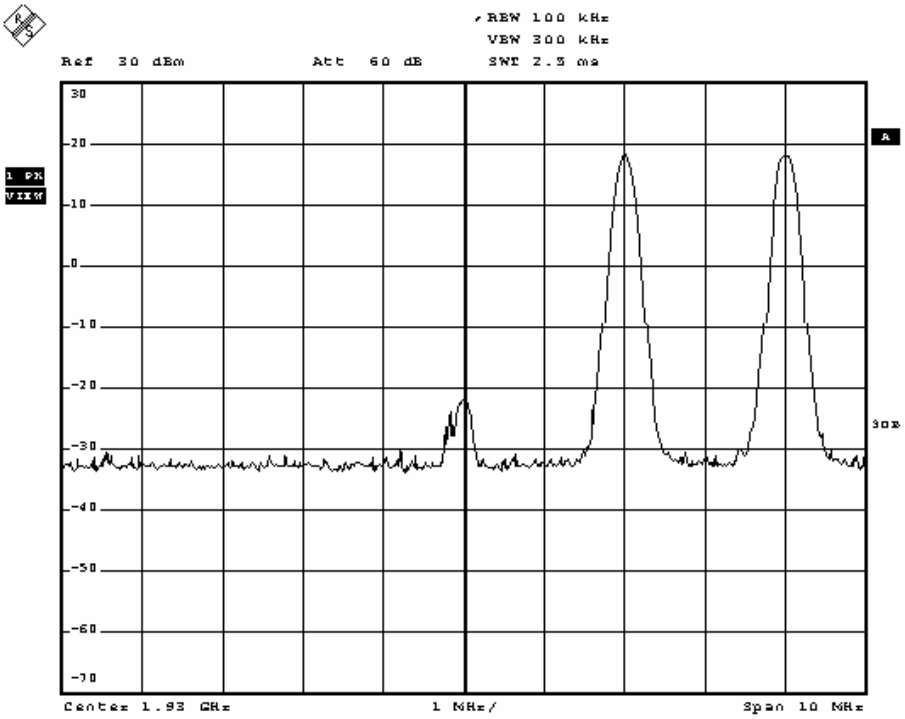
PCS—EDGE one signal input down link—Lower Edge



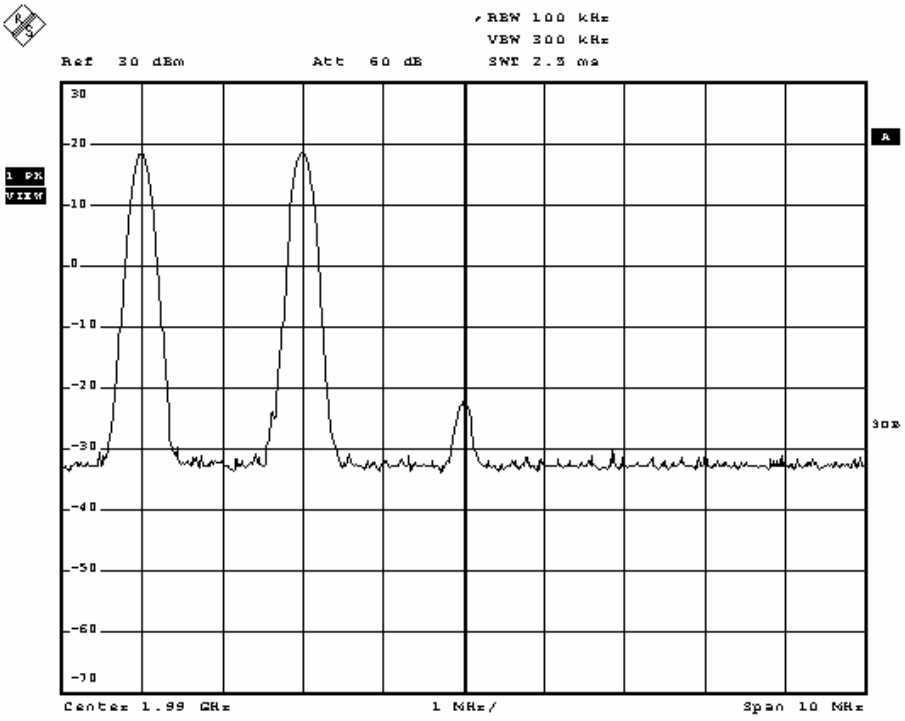
PCS—EDGE one signal input down link—Upper Edge



PCS—EDGE two signal input down link—Lower Edge

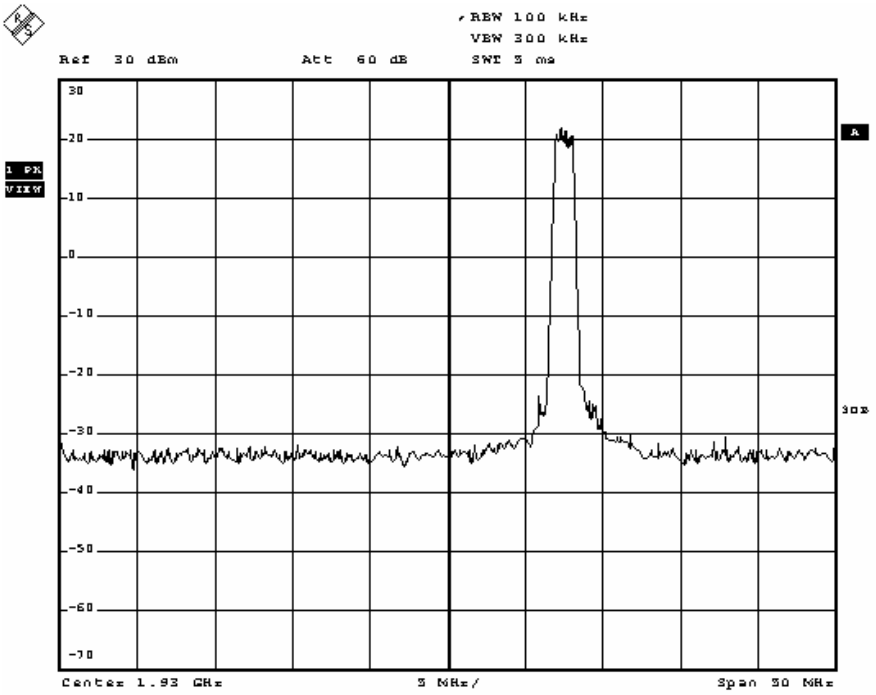


PCS—EDGE two signal input down link—Upper Edge

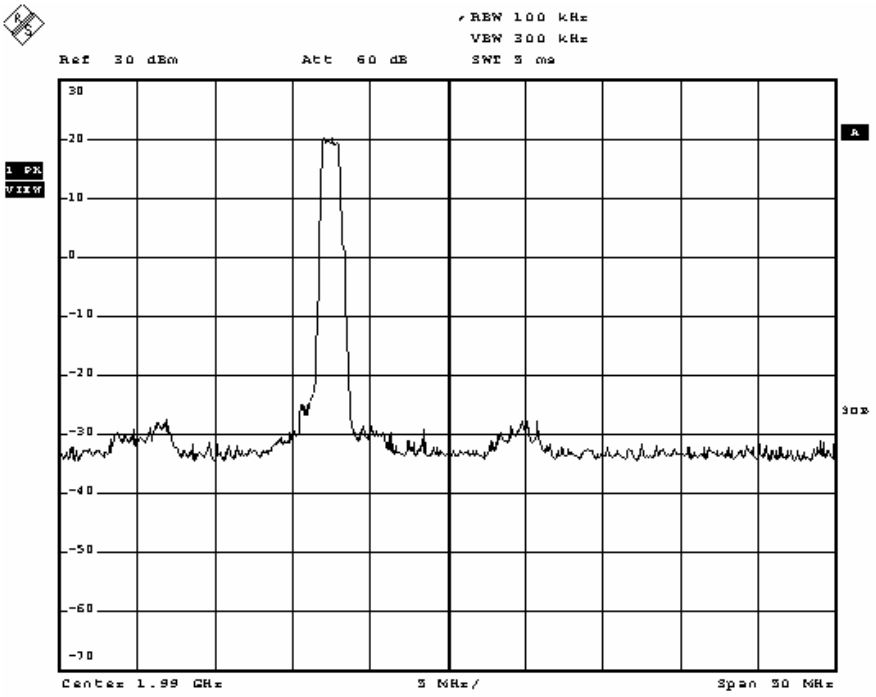


PCS Band

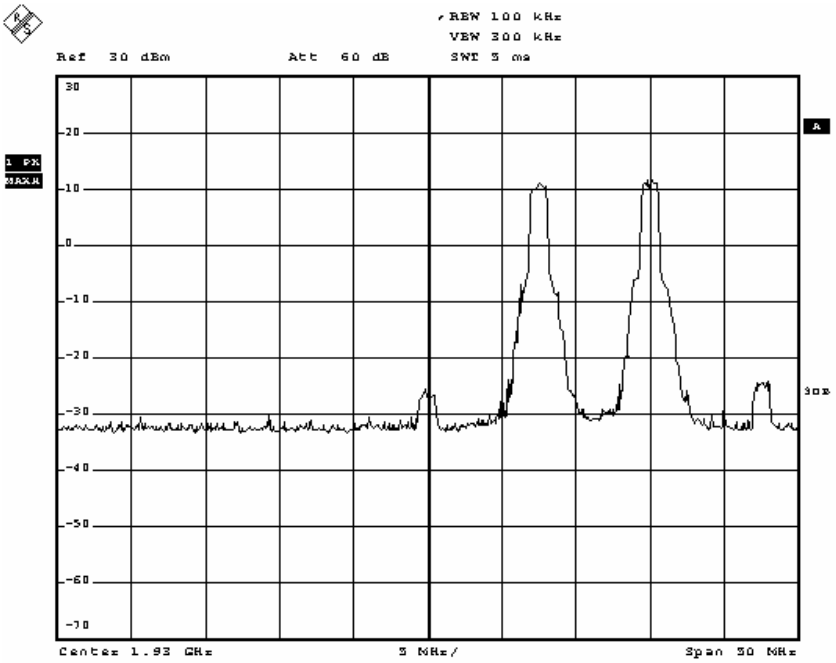
PCS—CDMA one signal input down link—Lower Edge



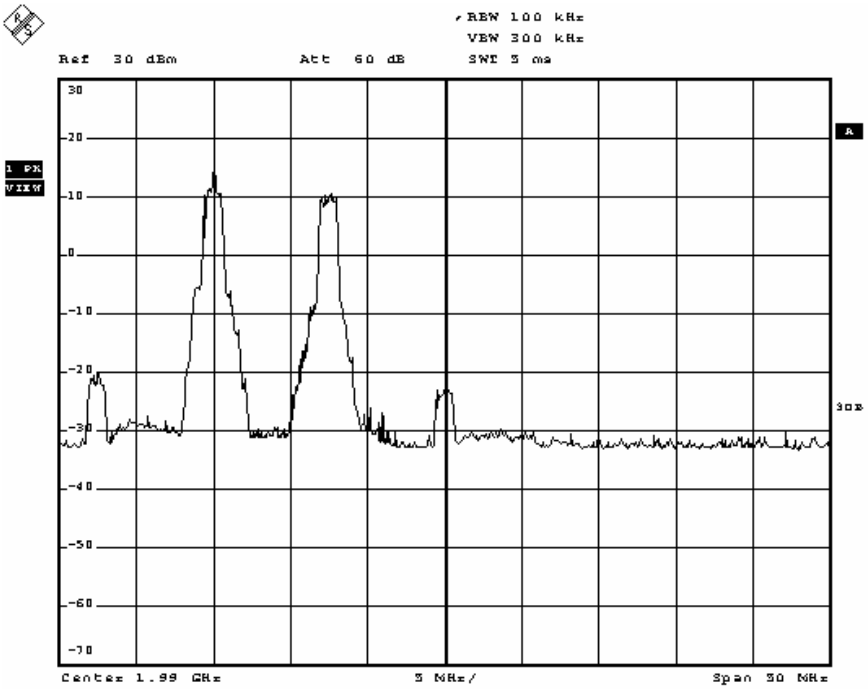
PCS—CDMA one signal input down link—Upper Edge



PCS—CDMA two signal input dwon link—Lower Edge

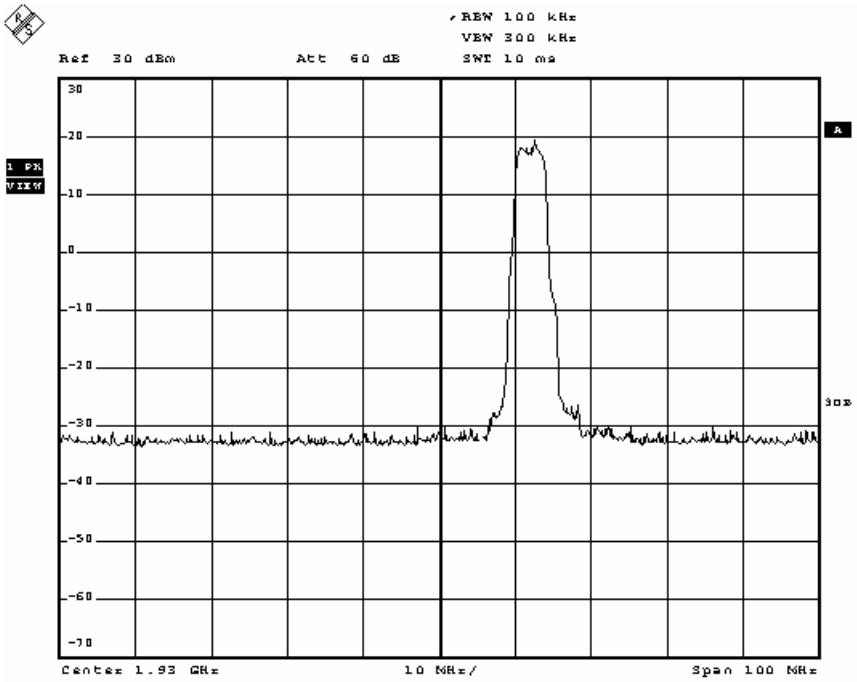


PCS—CDMA two signal input dwon link—Upper Edge

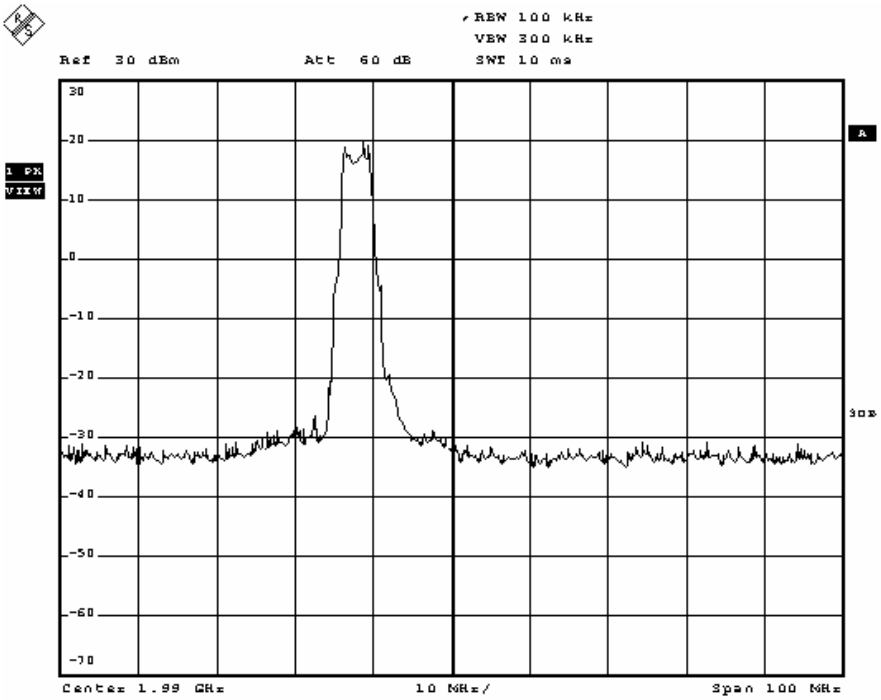


PCS Band

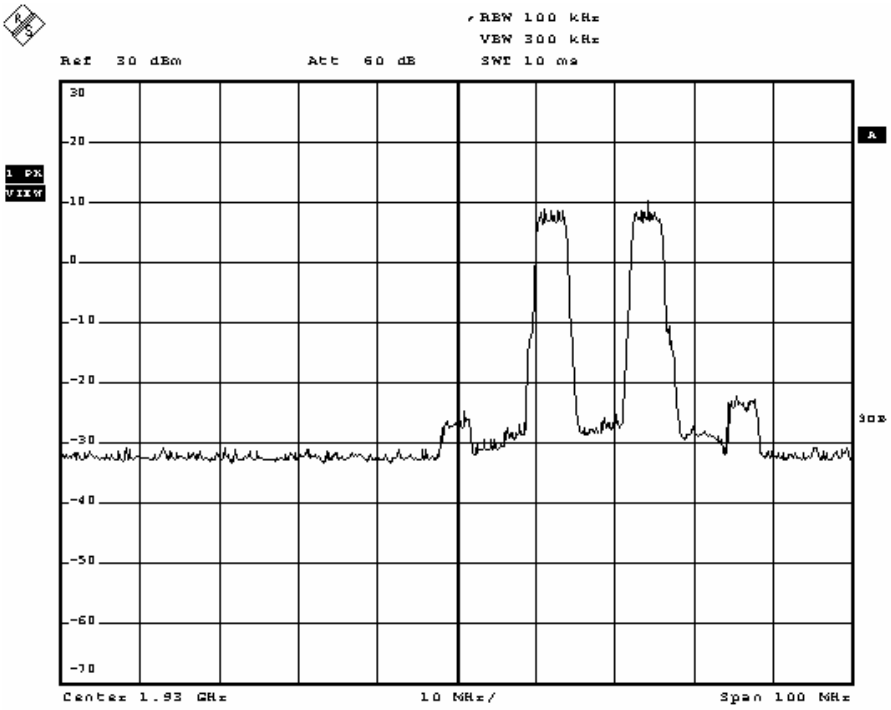
PCS—WCDMA one signal input down link—Lower Edge



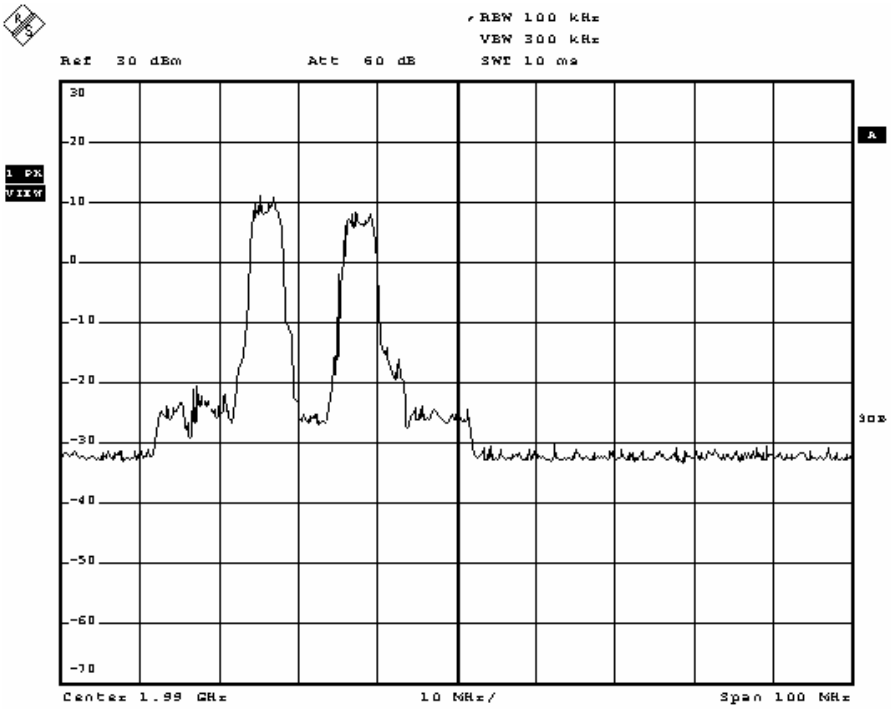
PCS—WCDMA one signal input down link—Upper Edge



PCS—WCDMA two signal input down link—Lower Edge



PCS—WCDMA two signal input down link—Upper Edge



Remark:

For the test in two signal input or intermodulation, test input signal f1 and f2 will consider as follows conditions:

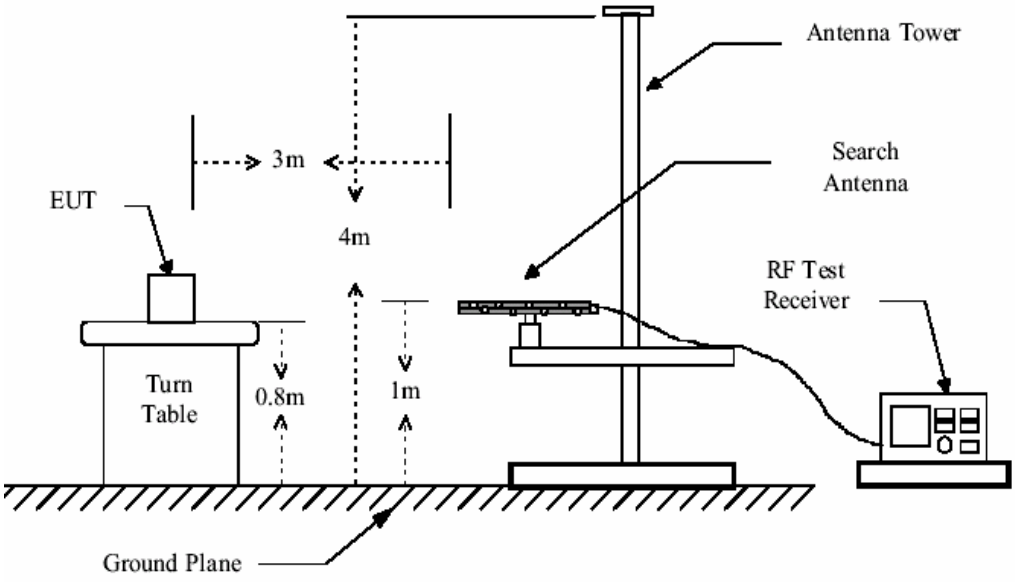
1) EUT frequency band span and the amount of channels;
2) f1 is the frequency lower, f2 is the frequency higher, △f is the channel spacing;
3) in lower edge test, f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency;
4) in higher edge test, f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency;
5) according to the amplifier characteristic, the 3rd product will appear when two signals input;
6) base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,
   a) in lower edge test, F1=2f1-(f1+△f)=f1-△f=lower edge frequency;
   b) in higher edge test, F2=2f2-(f2-△f)=f2+△f=higher edge frequency.

The worse case in two signal input status, more details of the uplink ports refer to the intermodulation test result.

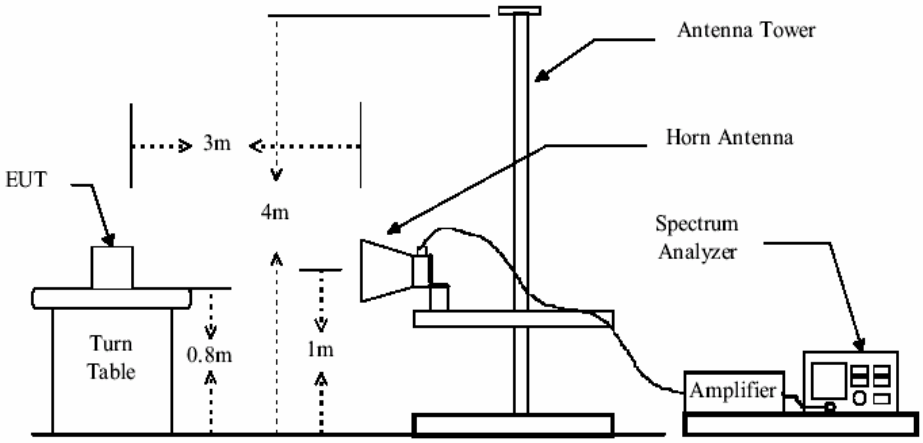
6.2.4 Radiated Spurious Emissions

Test Date:	10 to 12 November 2008
Test Requirement:	FCC part 22.917(a) & FCC part 24.238(a) **§22.917 Emission limitations for cellular equipment.** 22.917(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. **§24.238 Emission limitations for Broadband PCS equipment** 24.238(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Test Method:	FCC part 2.1053
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Enclosure
Test Configuration:	

30MHz to 1GHz:



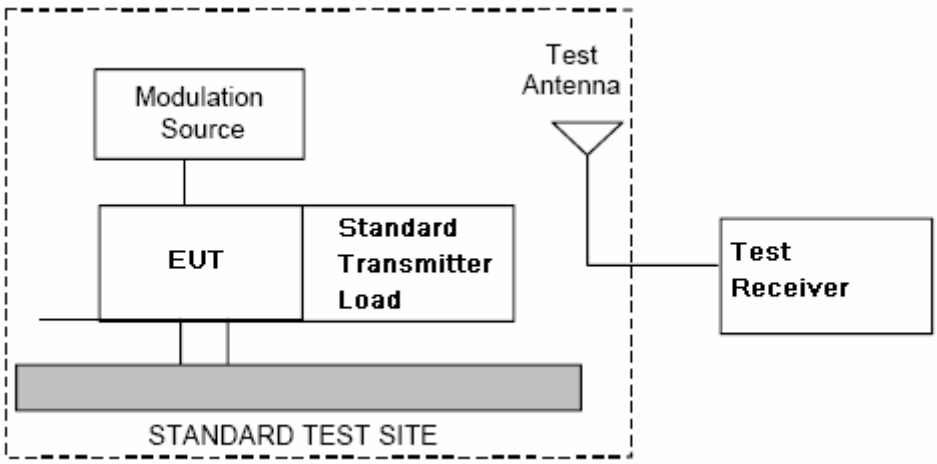
Above 1GHz:



Test Procedure:

1. Test the background noise level with all the test facilities;
2. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
3. Select the suitable RF notch filter to avoid the test receiver or spectrum analyzer produce unwanted spurious emissions;
4. Keep the EUT continuously transmitting in max power;
5. Read the radiated emissioins of the EUT enclosure.

Radiated Emissions Test Procedure:



a) Connect the equipment as illustrated.

b) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious

emissions above 1 GHz.

3) Sweep Speed slow enough to maintain measurement calibration.

4) Detector Mode = Positive Peak.

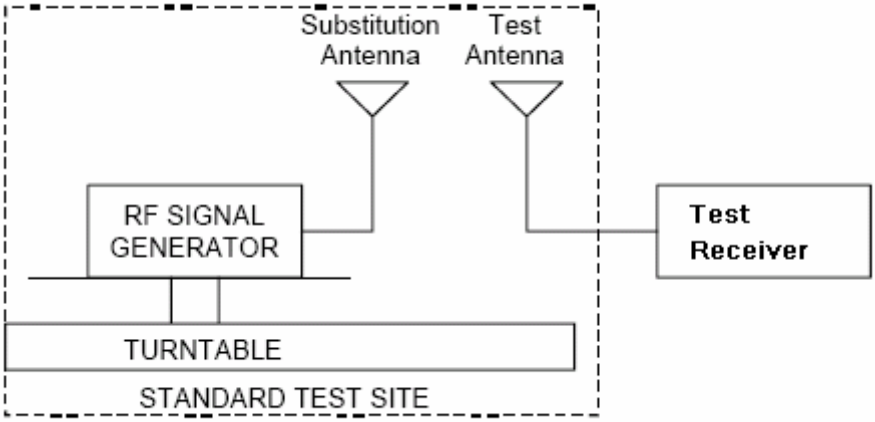
c) Place the transmitter to be tested on the turntable in the standard test site, The transmitter is transmitting into a nonradiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

d) Measurements shall be made from30MHz to 10 tims of fundamental carrier, except for the region close to the carrier equal to ± the carrier bandwidth.

e) Key the transmitter without modulation or normal modulation base the standard.

f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.



h) Reconnect the equipment as illustrated.

i) Keep the spectrum analyzer adjusted as in step b).

j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to

obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

l) Repeat step k) with both antennas vertically polarized for each spurious frequency.

m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

Pd(dBm) = *Pg*(dBm) – *cable loss* (dB) + *antenna gain* (dB)

where:

Pd is the dipole equivalent power and

Pg is the generator output power into the substitution antenna.

NOTE: It is permissible to use other antennas provided they can be referenced to a dipole.
NOTE: Effective radiated power (e.r.p) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.
e.r.p (dBm) = e.i.r.p. (dBm) – 2.15

6.2.4.1 Measurement Record:

Test Frequency (MHz)	Measuring Level (dBm)		Limits (dBm)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
30	N/A	N/A	-13.0	N/A	N/A
500	N/A	N/A	-13.0	N/A	N/A
1000	N/A	N/A	-13.0	N/A	N/A
2000	N/A	N/A	-13.0	N/A	N/A
5000	N/A	N/A	-13.0	N/A	N/A
10000	N/A	N/A	-13.0	N/A	N/A
15000	N/A	N/A	-13.0	N/A	N/A
20000	N/A	N/A	-13.0	N/A	N/A

Remark:
N/A,not applicable or the level is too weak to be detected.
Sweap all the modulation types emissions in Cellular band and PCS band, find the worse case to report it.

6.2.5 Occupied Bandwidth

Test Date:	10 to 12 November 2008
Test Requirement:	2-11-04/EAB/RF
Test Method:	FCC part 2.1049, 2-11-04/EAB/RF
	The spectral shape of the outputshould look similar to input for all modulations.
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Cellular Band DL and UL ports,PCS Band DL and UL ports
Test Configuration:	

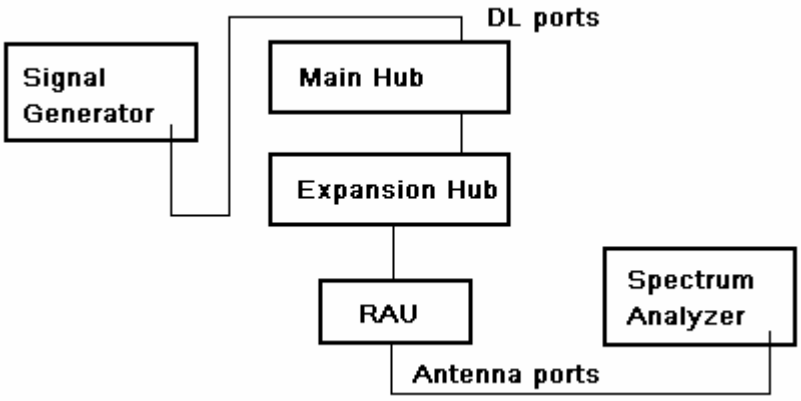


Fig.1 Down link configuration

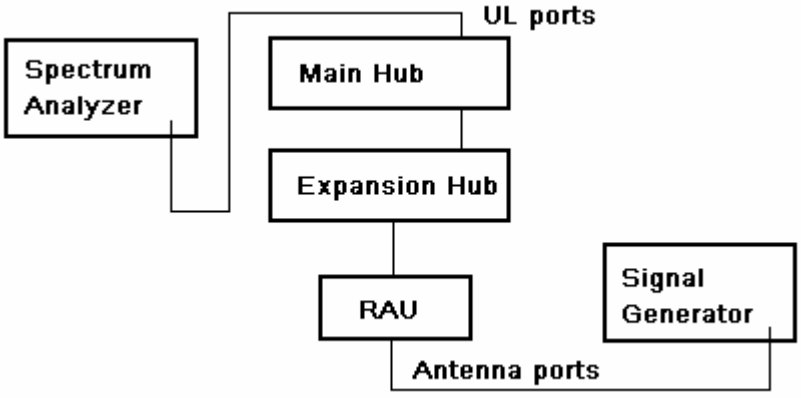


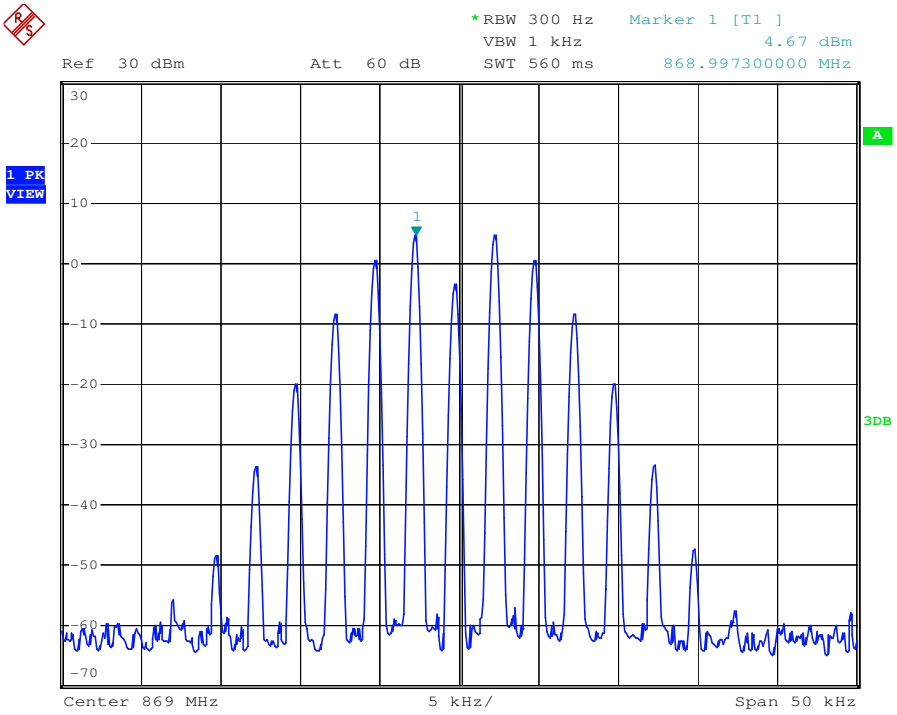
Fig.2 Up link configuration

Test Procedure:
a) Set the spectrum analyzer RBW 300 Hz or >1% bandwidth of carrier.
b) Capture the trace of input signal;
c) Connect the equipment as illustrated;
b) Capture the trace of output signal;

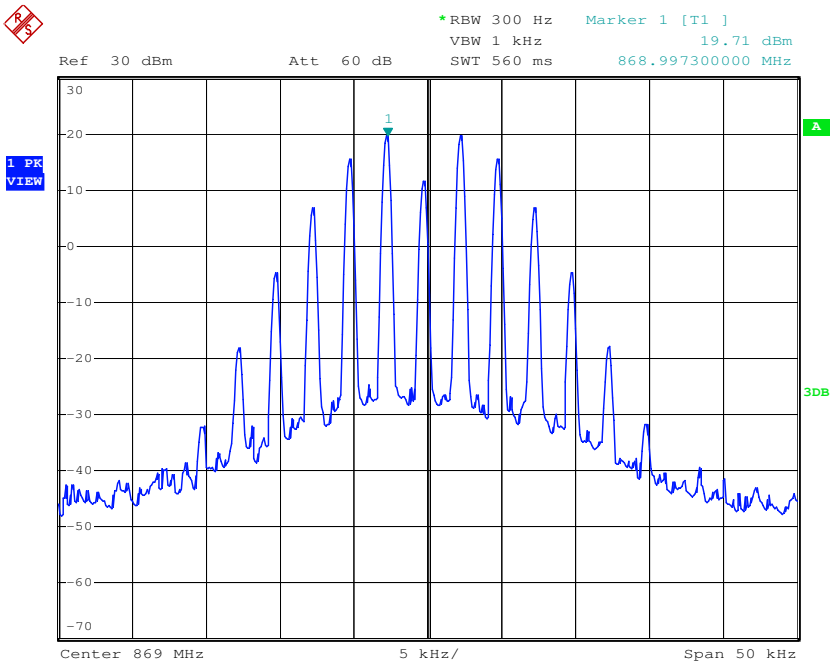
6.2.5.1 Measurement Record:

Cellular Band

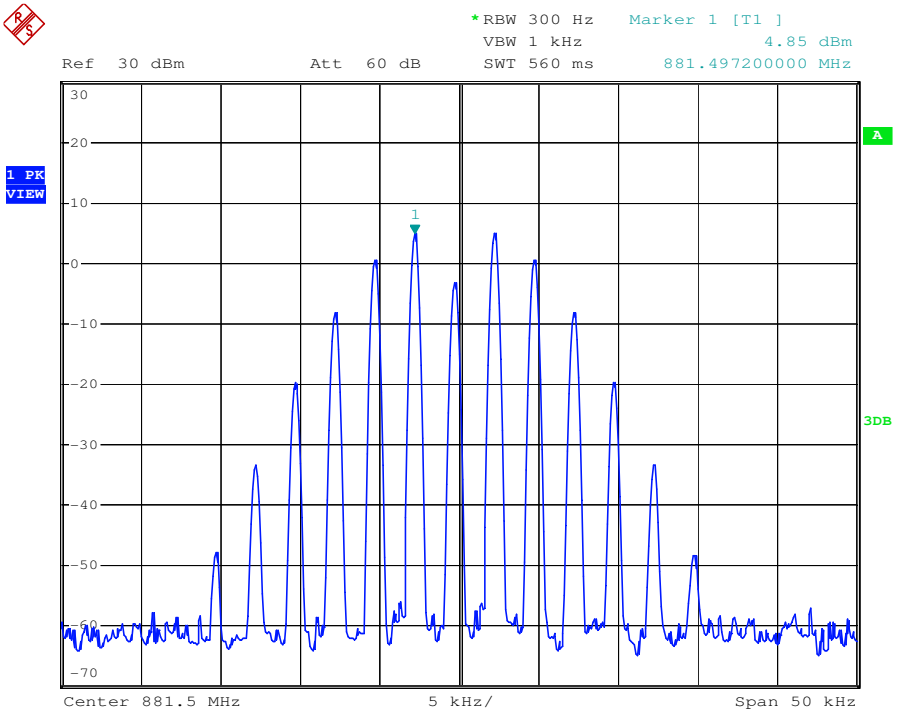
Cellular—AMPS down link(lowest frequency) -- Input



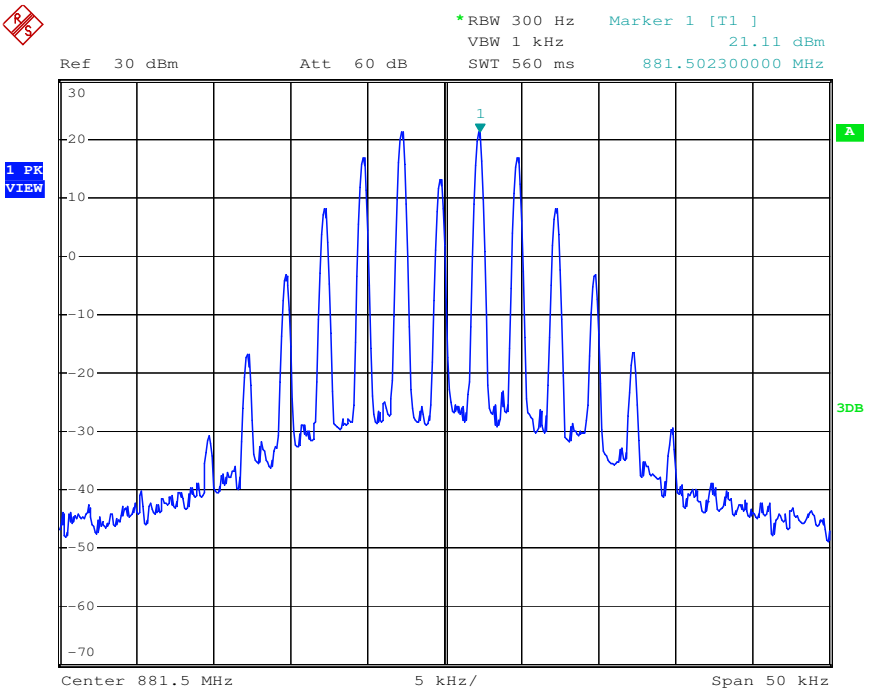
Cellular—AMPS down link(lowest frequency) -- Output



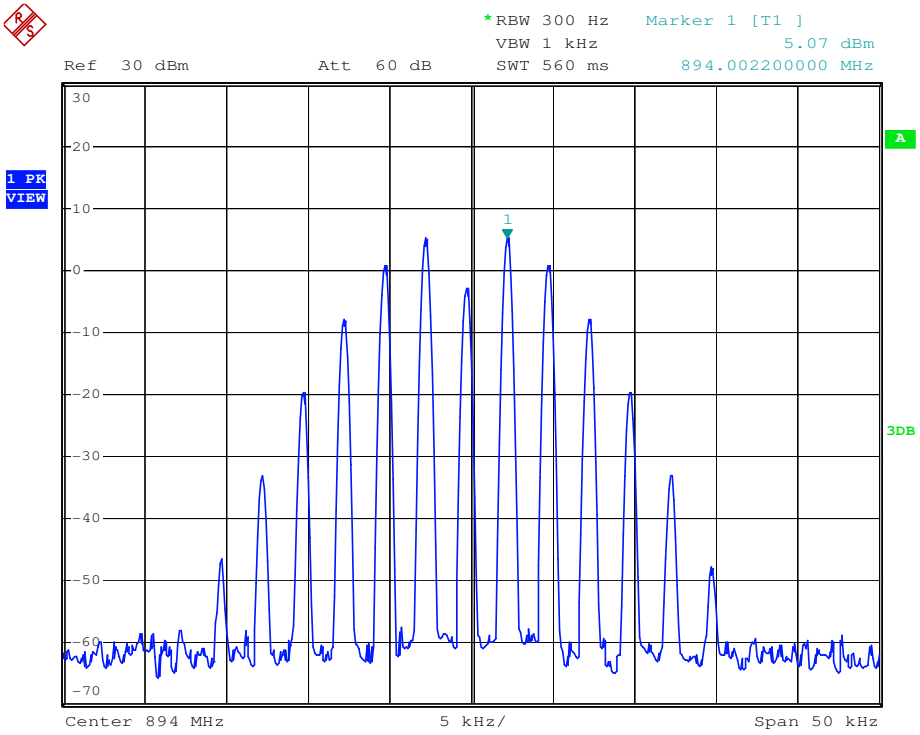
Cellular—AMPS down link(middle frequency)-- Input



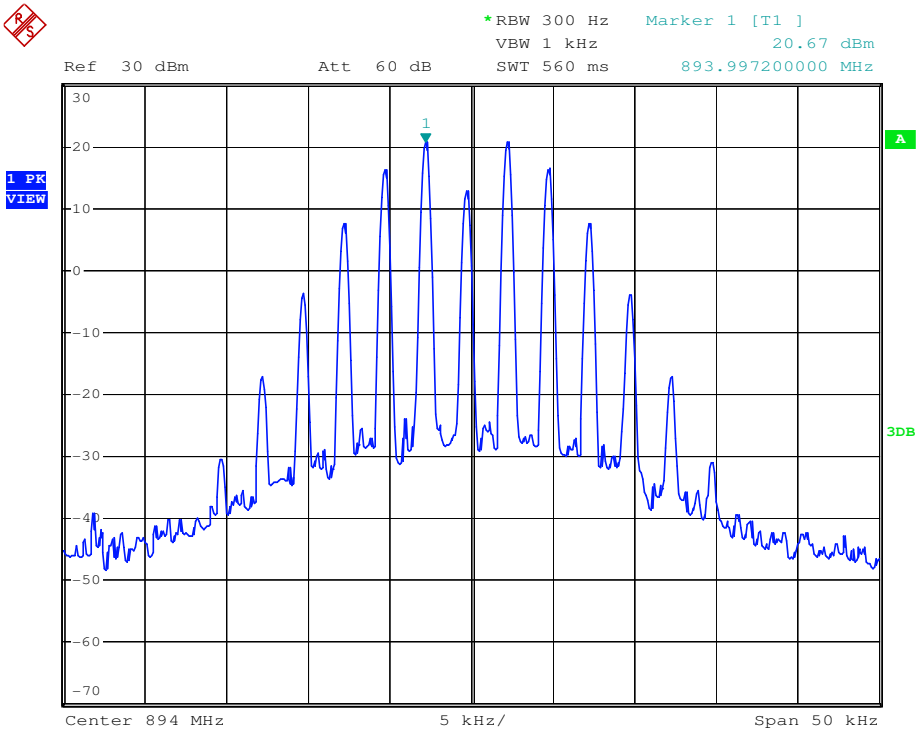
Cellular—AMPS down link(middle frequency)-- Output



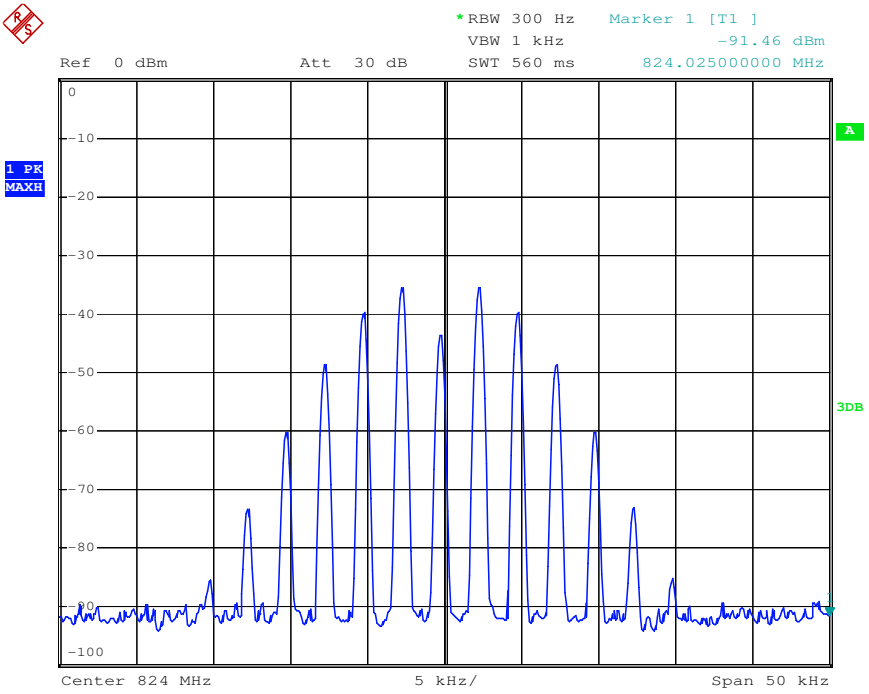
Cellular—AMPS down link(highest frequency)—Input



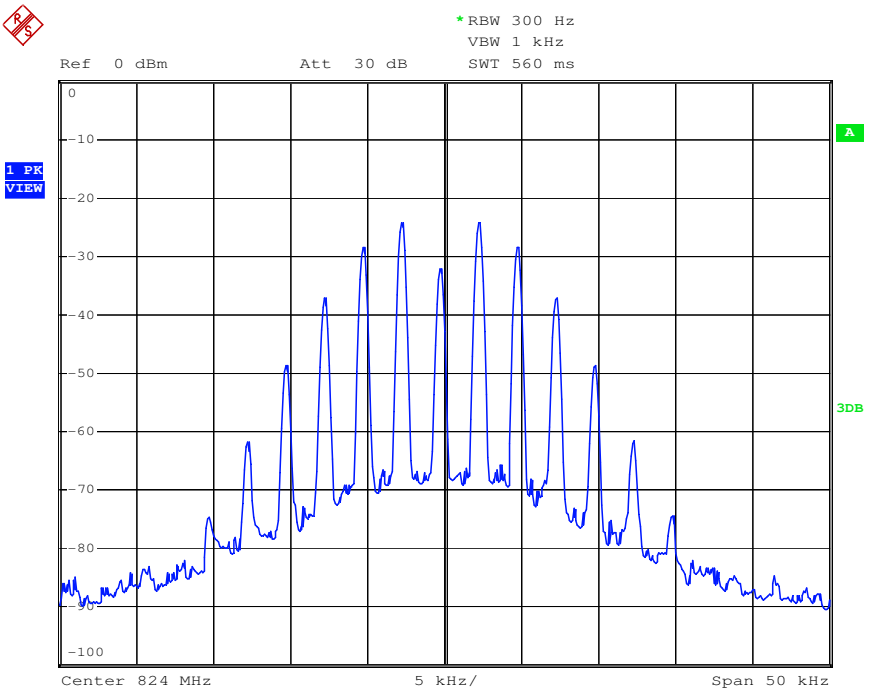
Cellular—AMPS down link(highest frequency)--Output



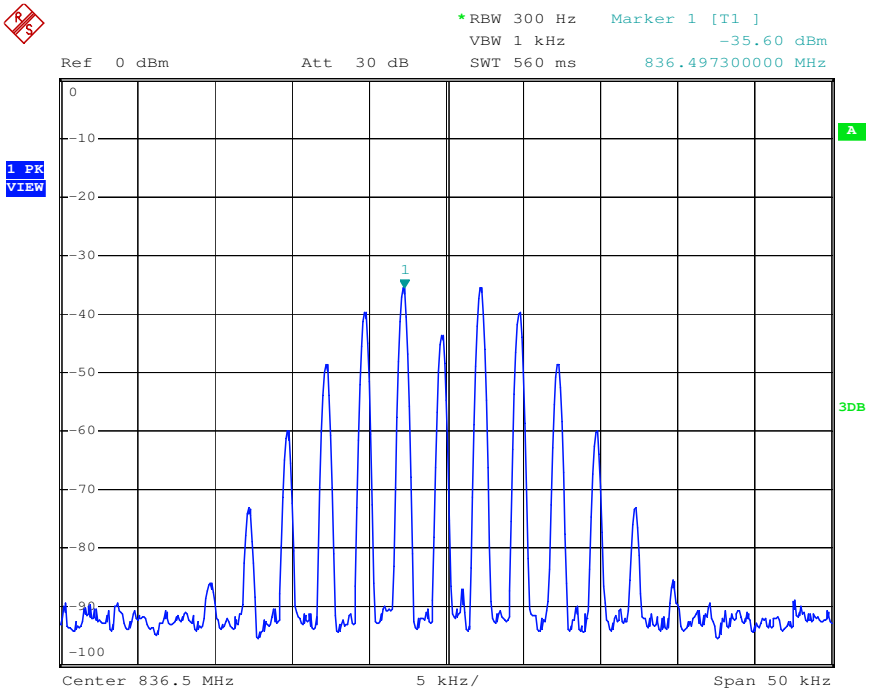
Cellular—AMPS up link(lowest frequency)—Input



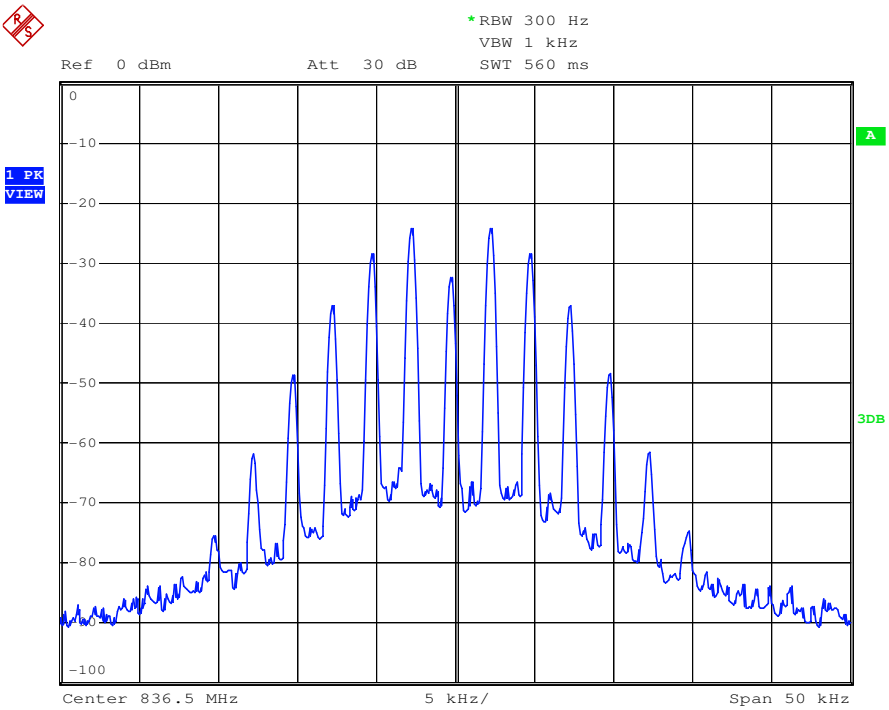
Cellular—AMPS up link(lowest frequency)--Output



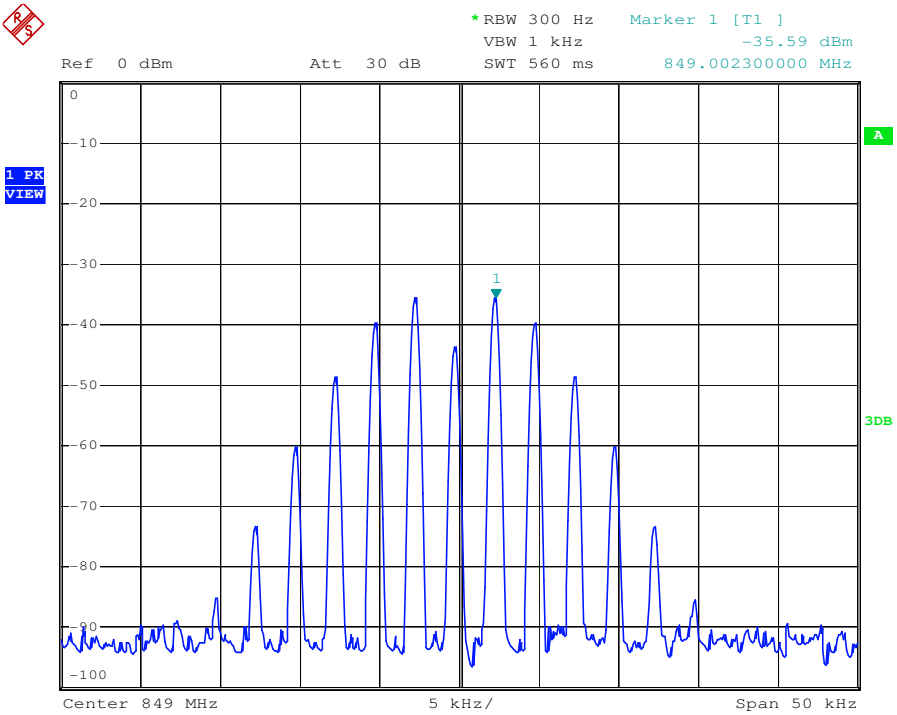
Cellular—AMPS up link(middle frequency)--Input



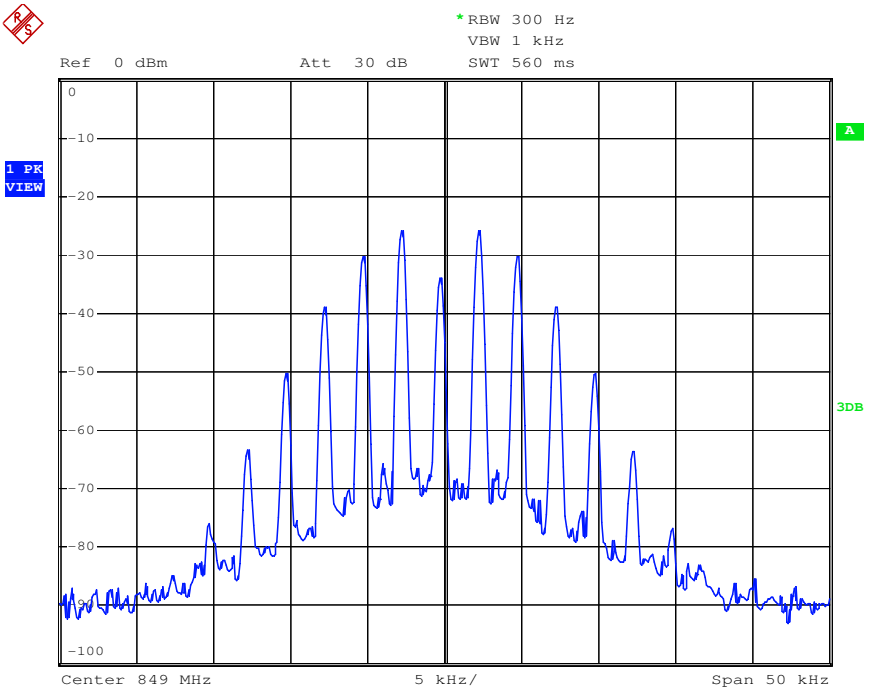
Cellular—AMPS up link(middle frequency)--Output



Cellular—AMPS up link(highest frequency)—Input



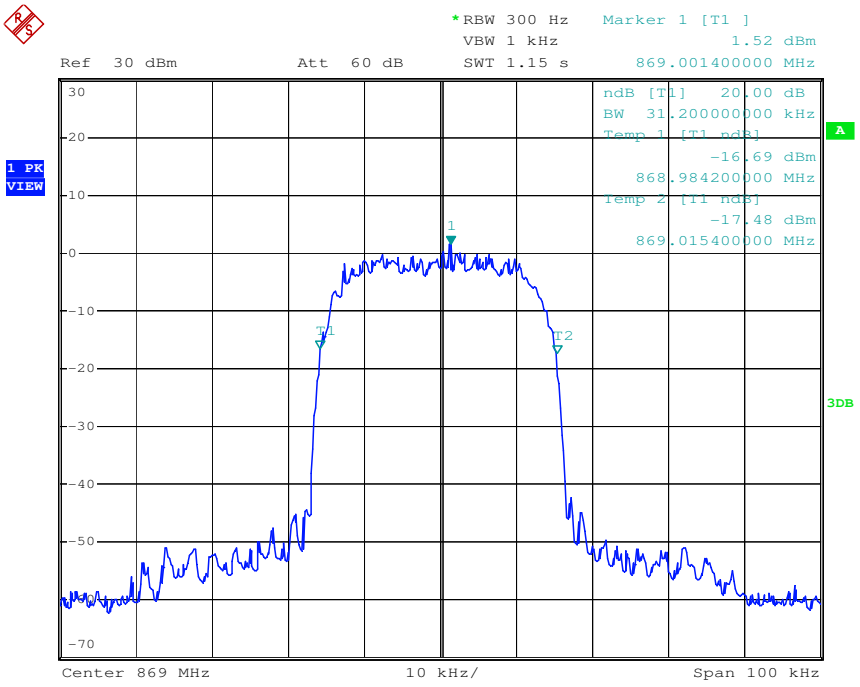
Cellular—AMPS up link(highest frequency)--Output



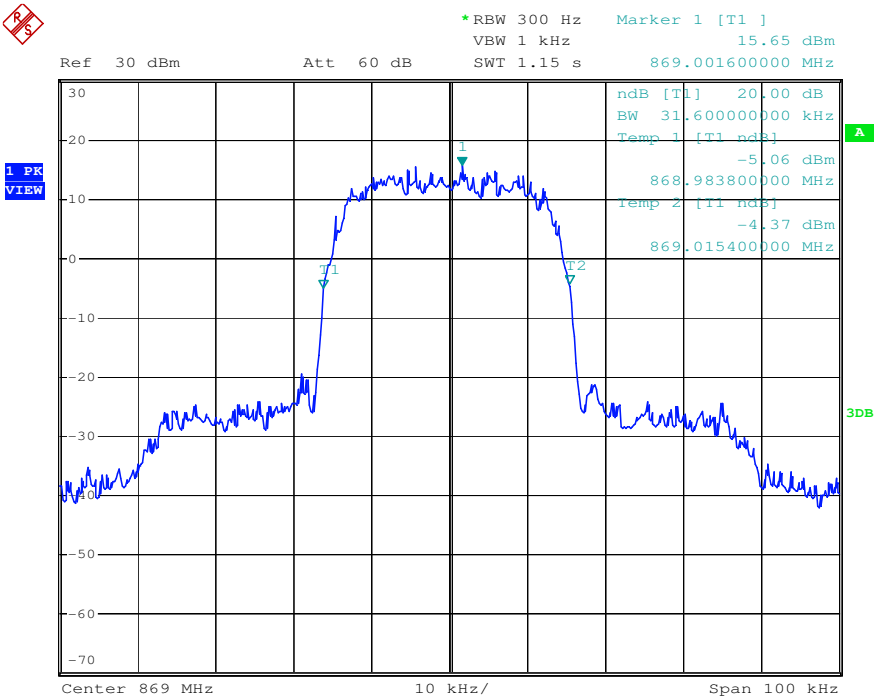
Remark:use 2500Hz modulated with 5KHz to take place the AMPS signal.

Cellular Band

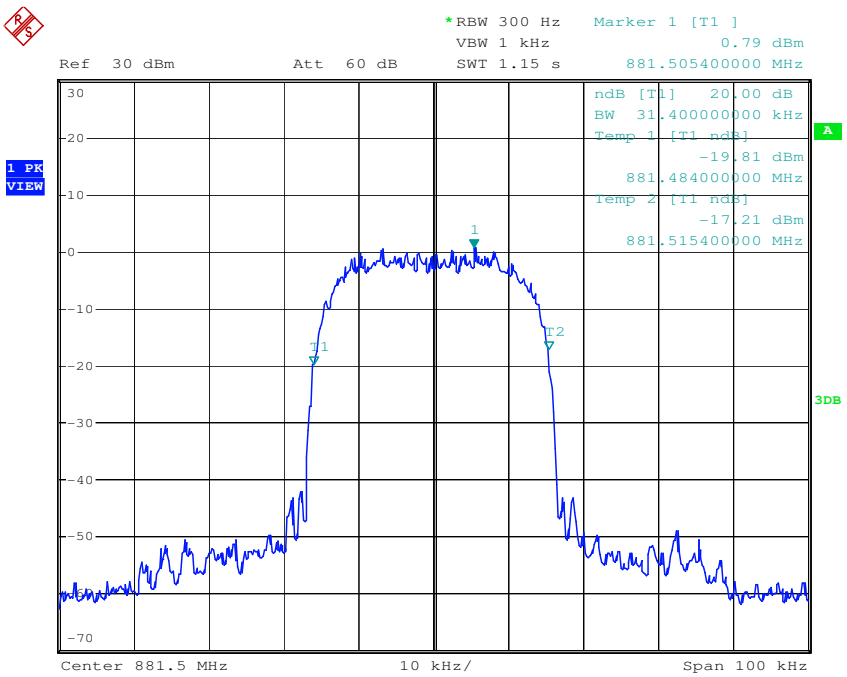
Cellular—TDMA down link(lowest frequency) -- Input



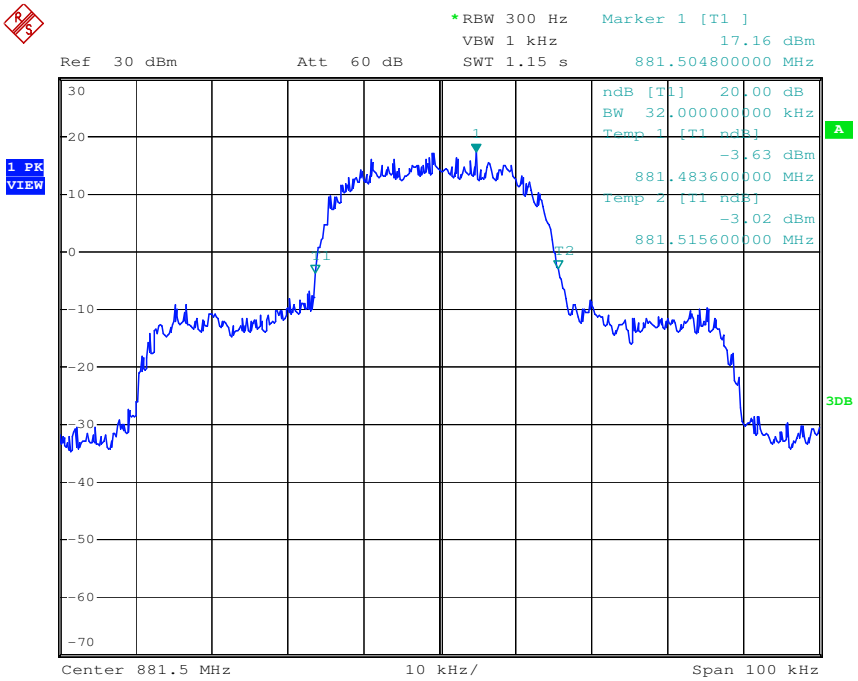
Cellular—TDMA down link(lowest frequency) -- Output



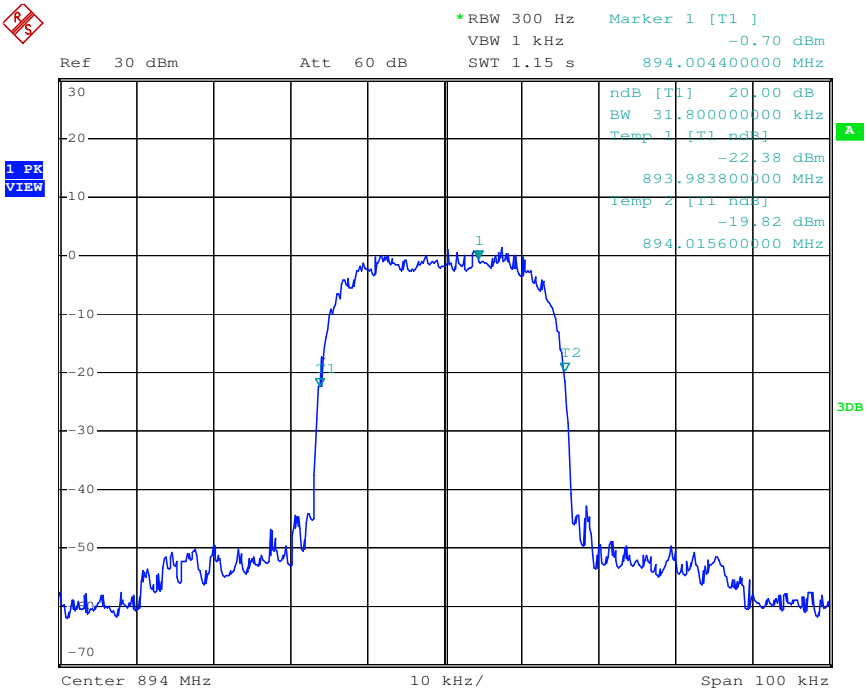
Cellular—TDMA down link(middle frequency)-- Input



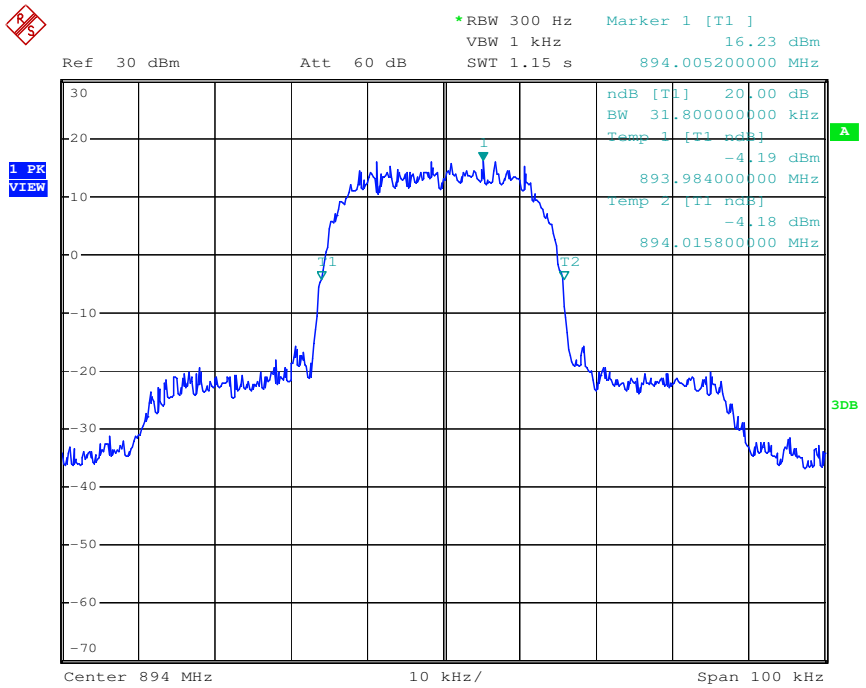
Cellular—TDMA down link(middle frequency)-- Output



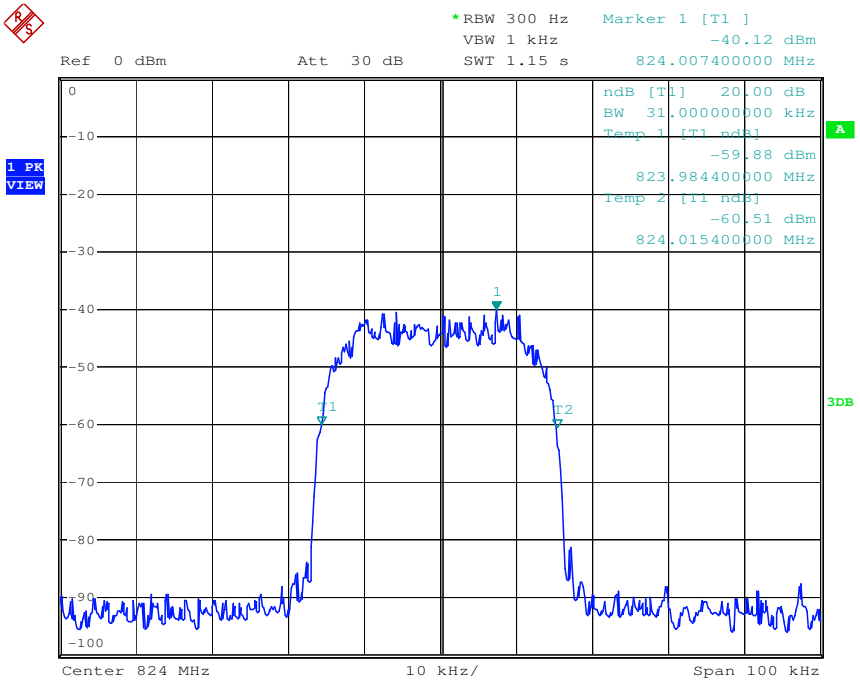
Cellular—TDMA down link(highest frequency)—Input



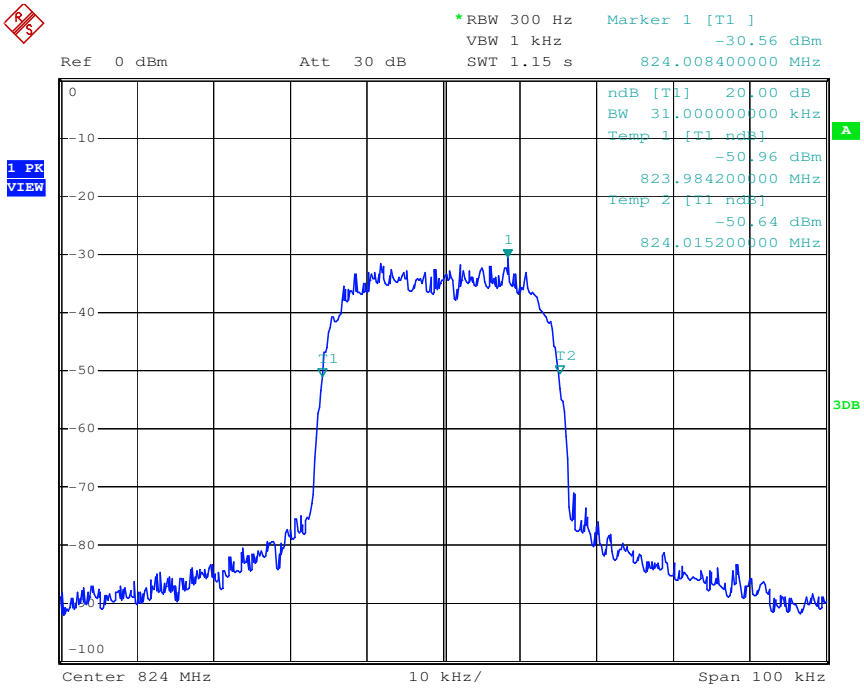
Cellular—TDMA down link(highest frequency)--Output



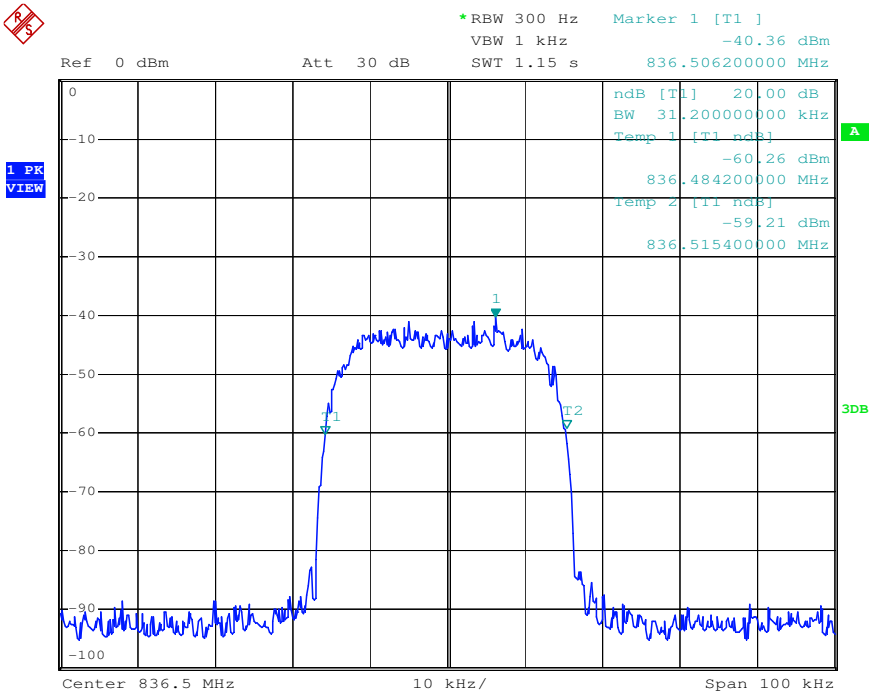
Cellular—TDMA up link(lowest frequency)—Input



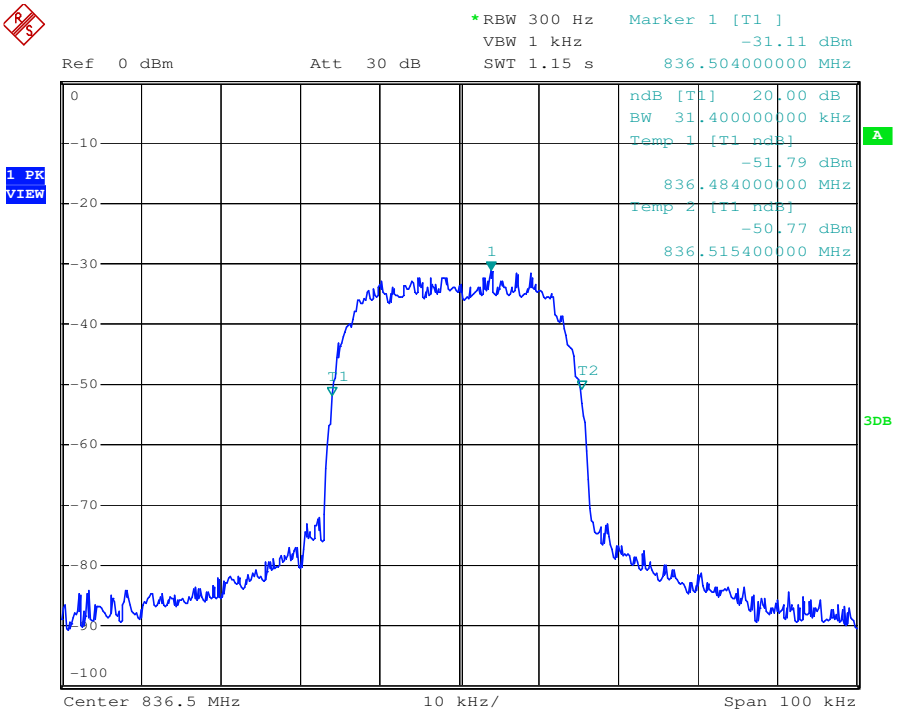
Cellular—TDMA up link(lowest frequency)--Output



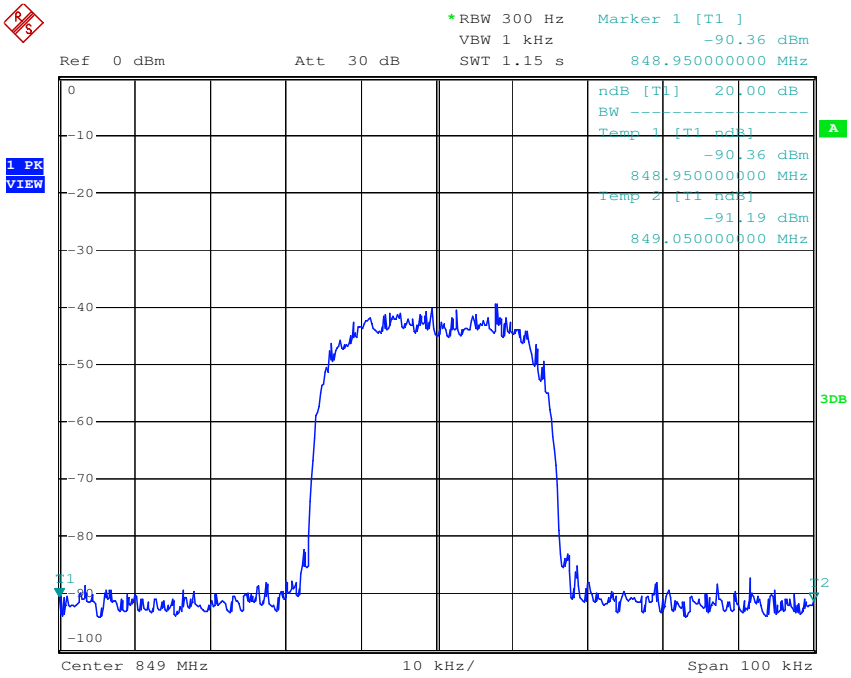
Cellular—TDMA up link(middle frequency)--Input



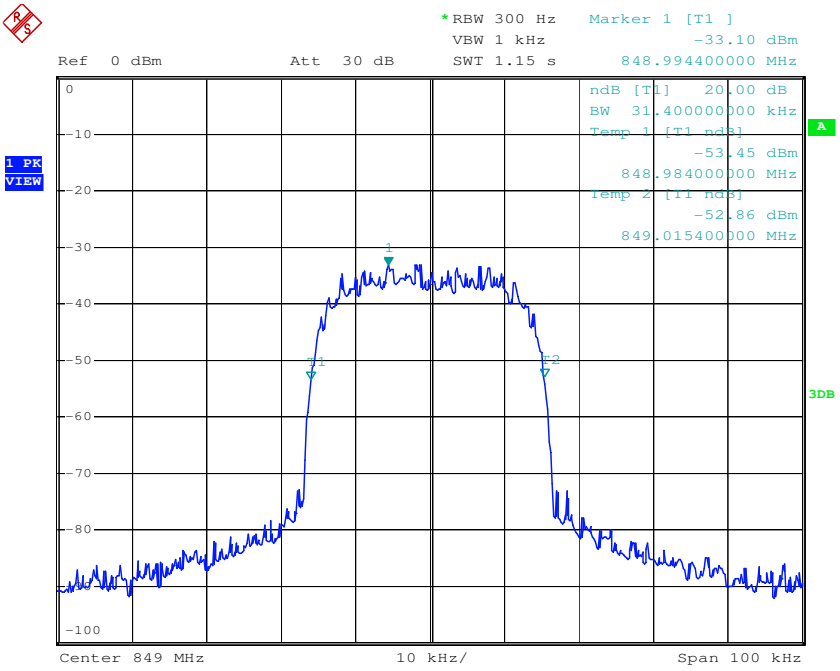
Cellular—TDMA up link(middle frequency)--Output



Cellular—TDMA up link(highest frequency)—Input

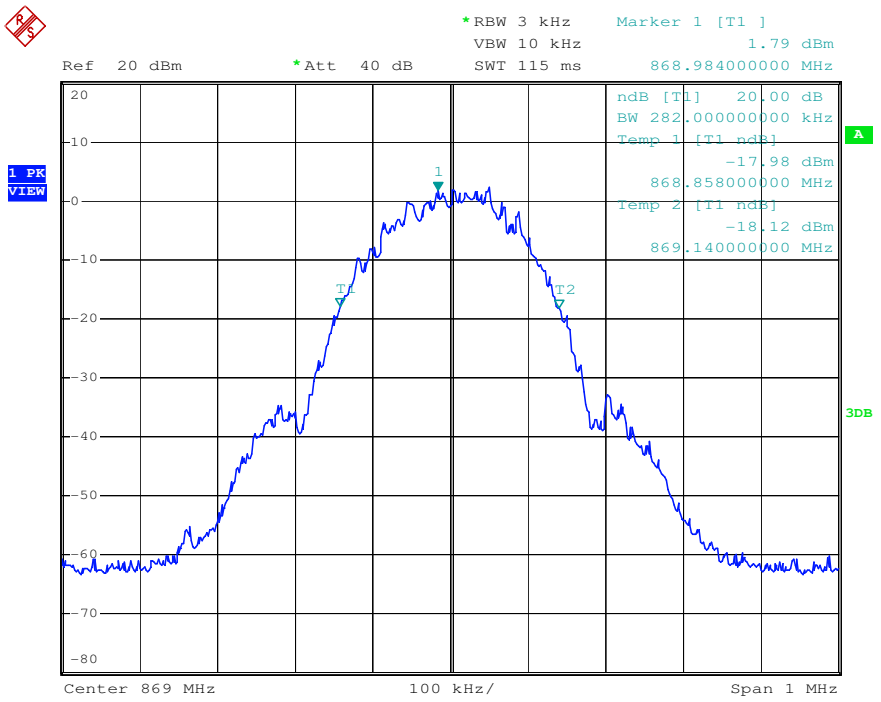


Cellular—TDMA up link(highest frequency)--Output

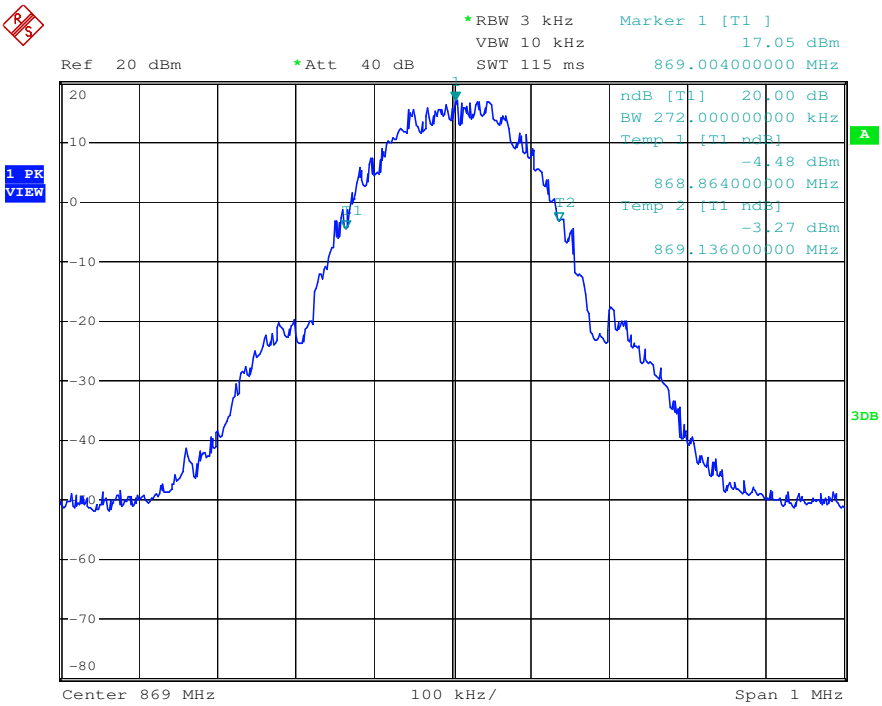


Cellular Band

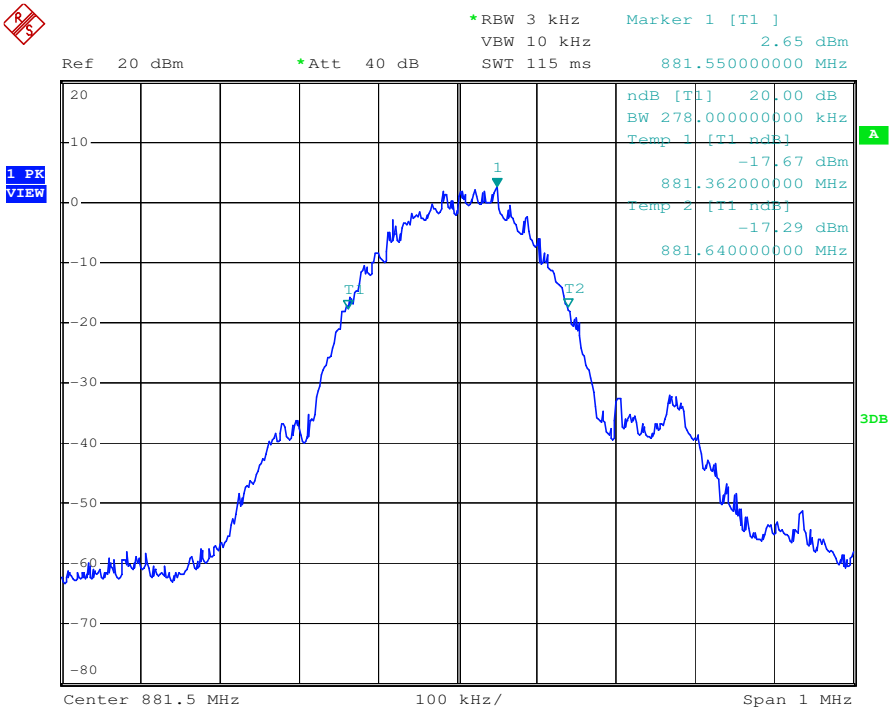
Cellular—GSM down link(lowest frequency) -- Input



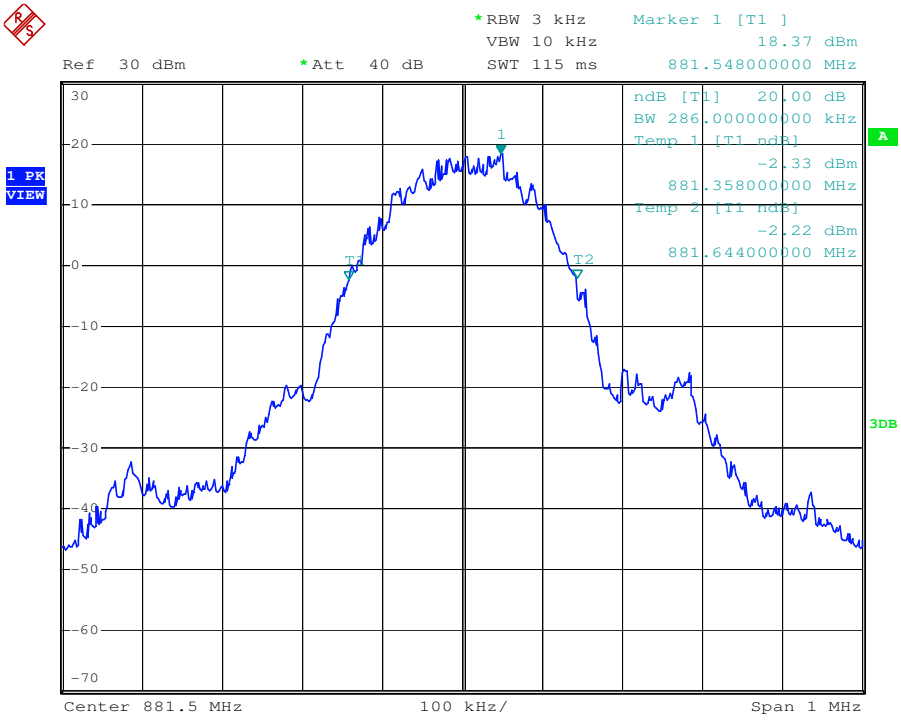
Cellular—GSM down link(lowest frequency) -- Output



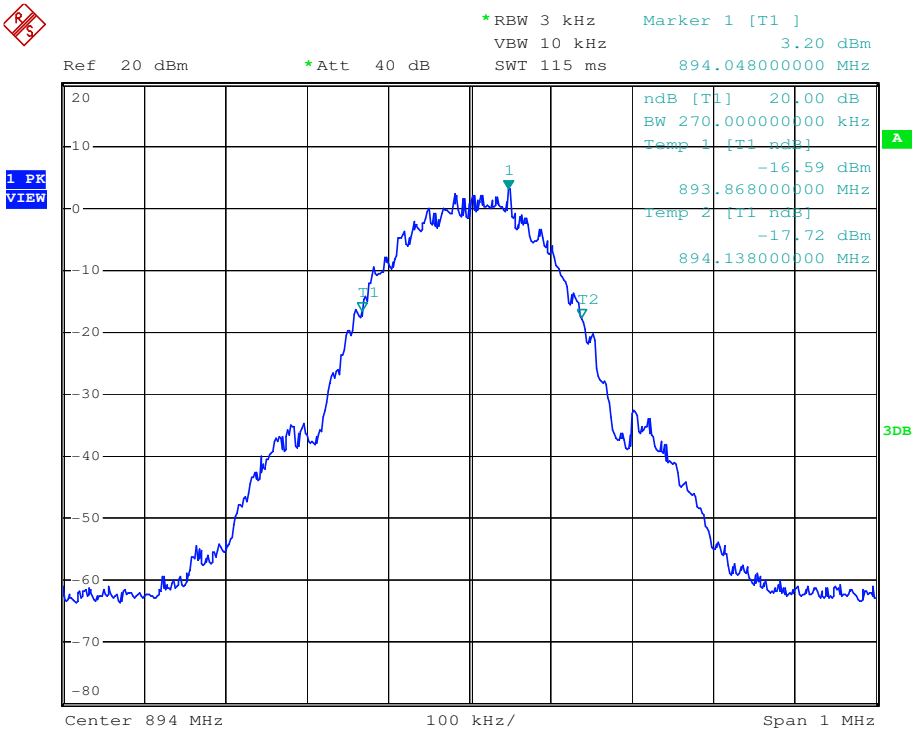
Cellular—GSM down link(middle frequency)-- Input



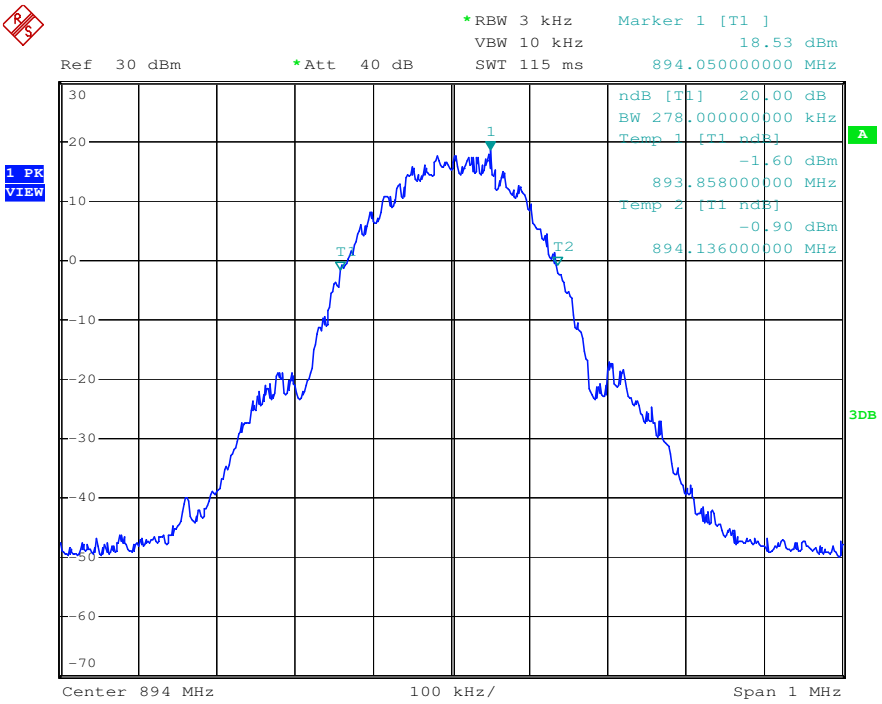
Cellular—GSM down link(middle frequency)-- Output



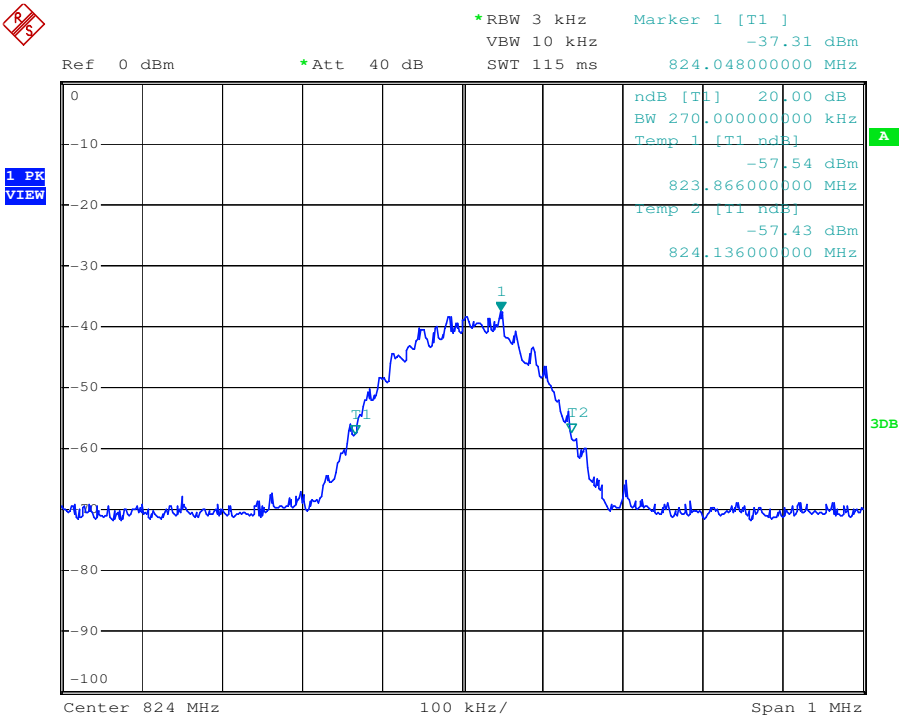
Cellular—GSM down link(highest frequency)—Input



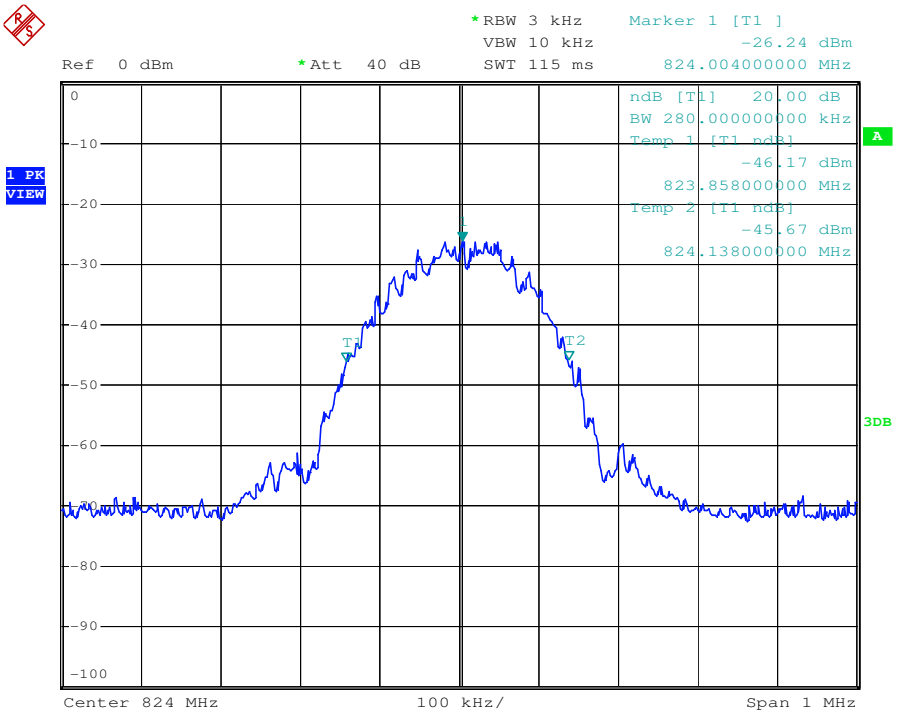
Cellular—GSM down link(highest frequency)--Output



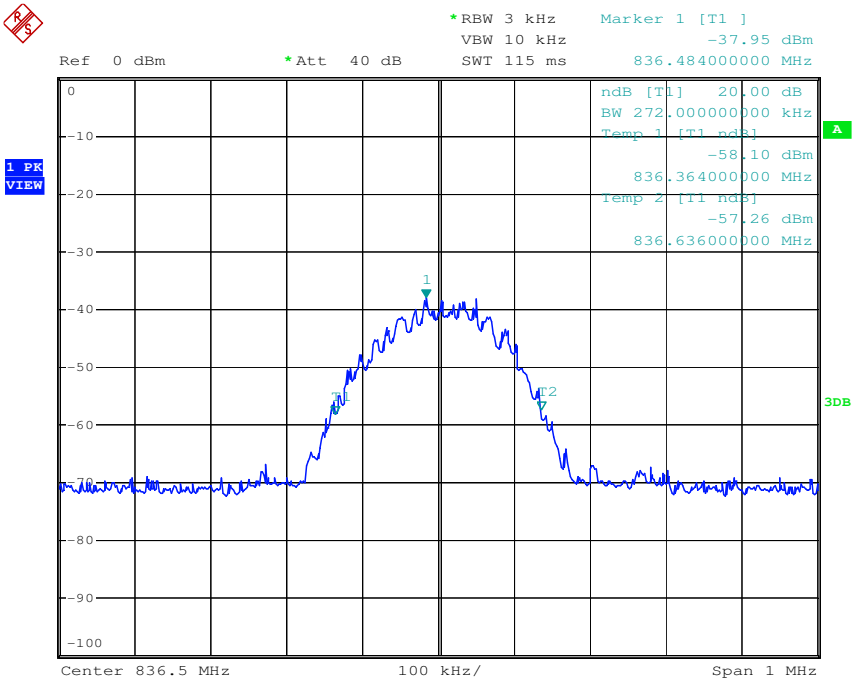
Cellular—GSM up link(lowest frequency)—Input



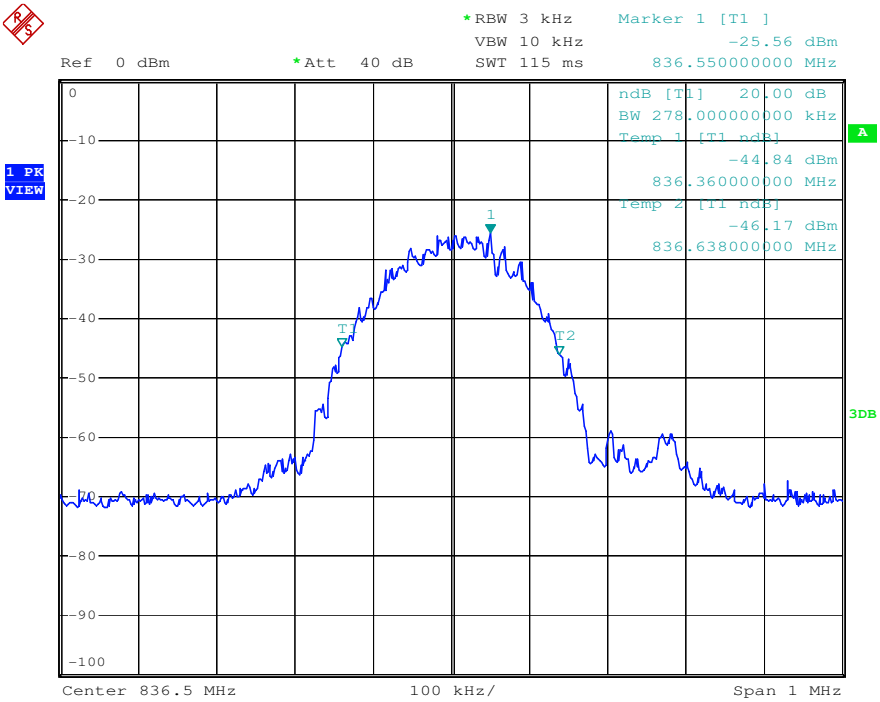
Cellular—GSM up link(lowest frequency)--Output



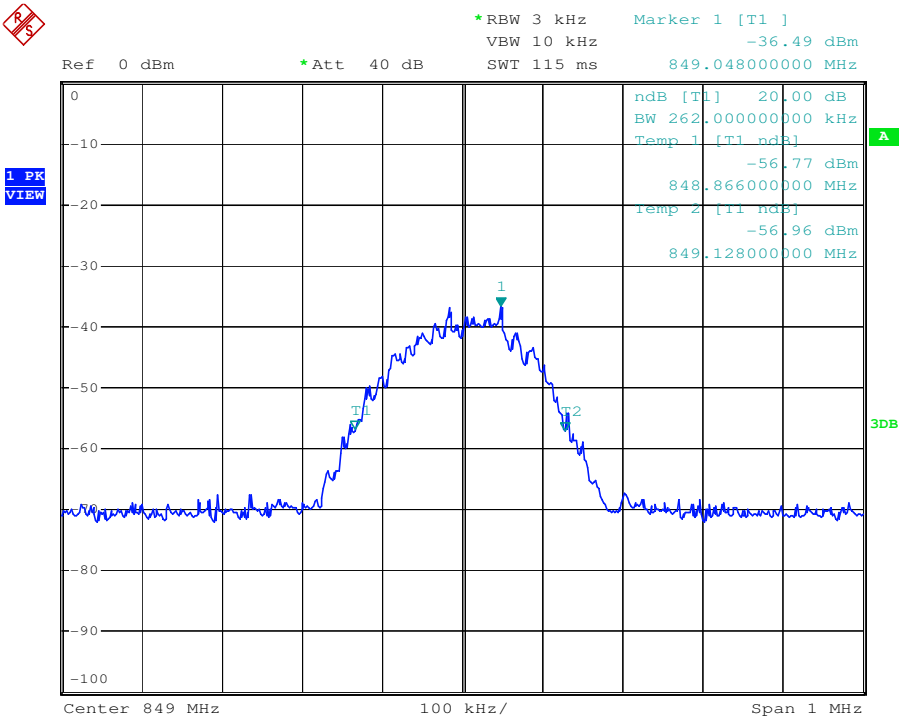
Cellular—GSM up link(middle frequency)--Input



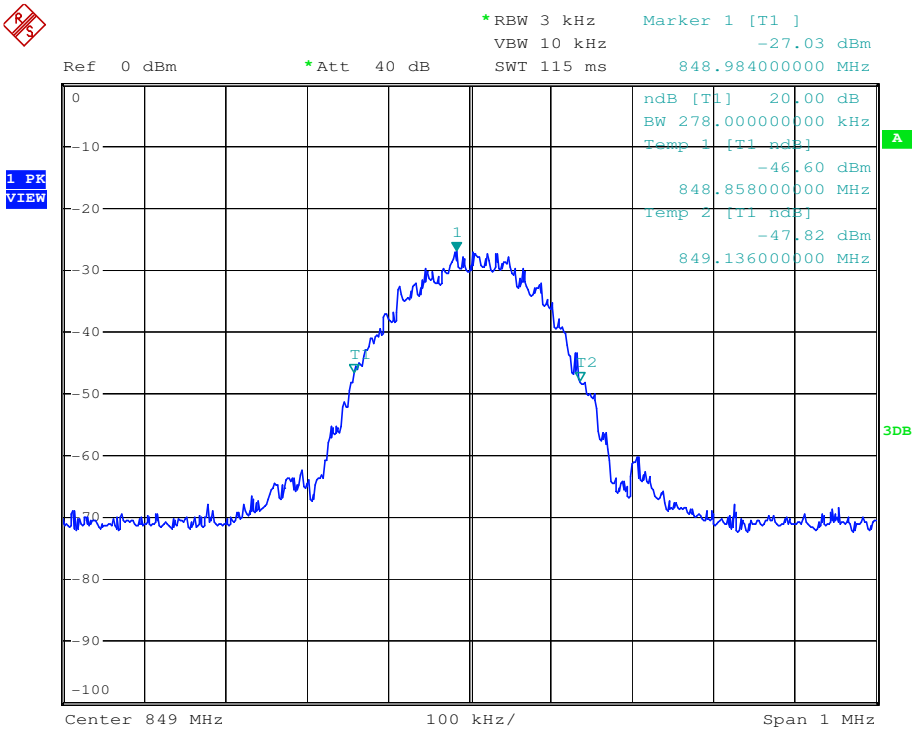
Cellular—GSM up link(middle frequency)--Output



Cellular—GSM up link(highest frequency)—Input

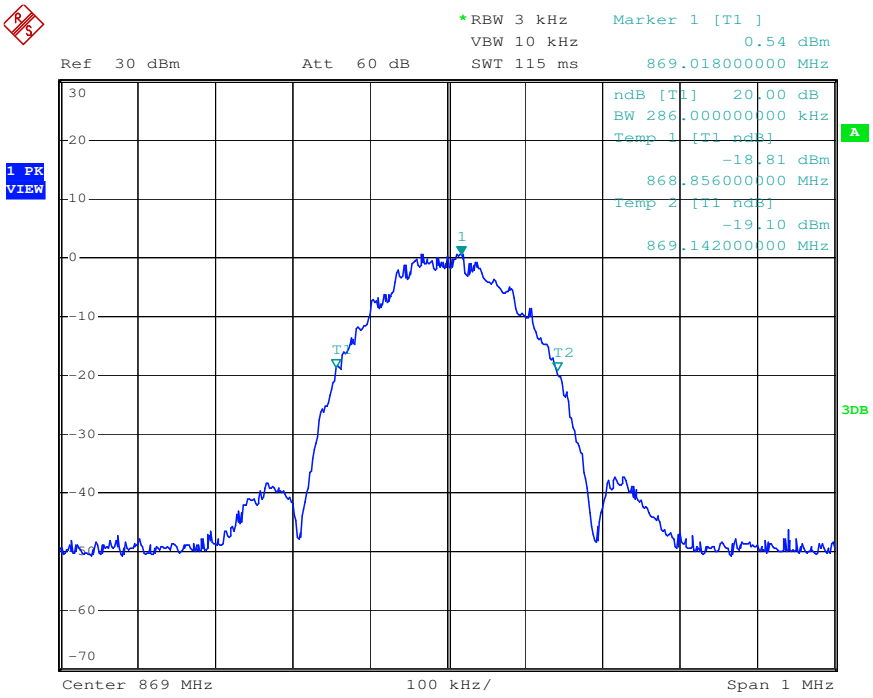


Cellular—GSM up link(highest frequency)--Output

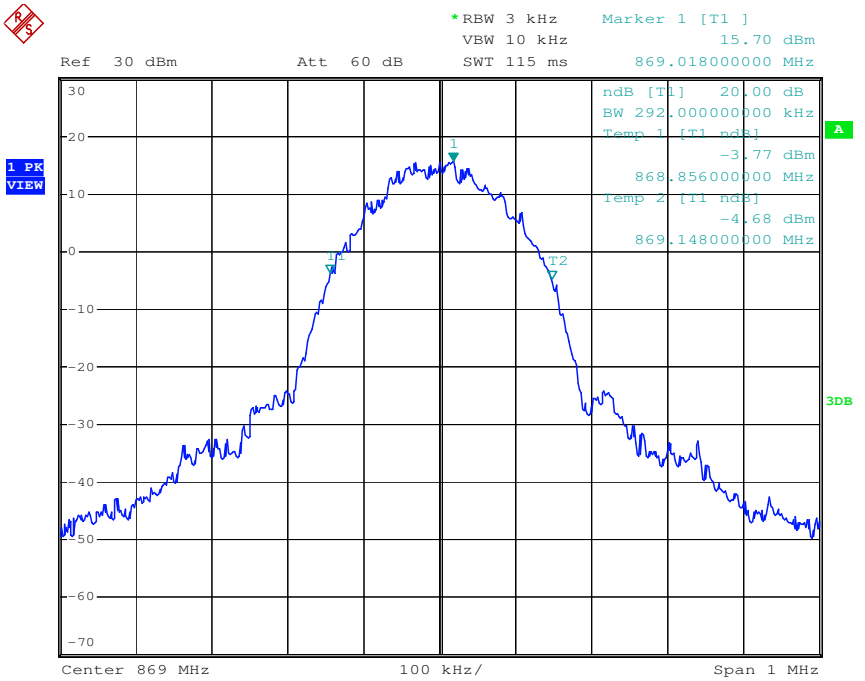


Cellular Band

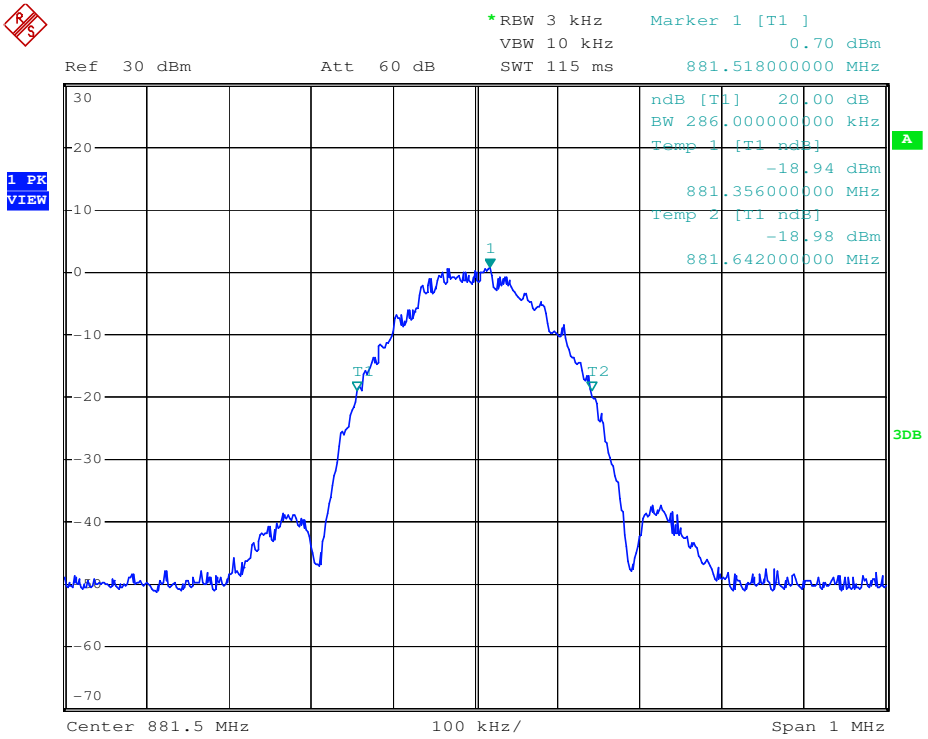
Cellular—EDGE down link(lowest frequency) -- Input



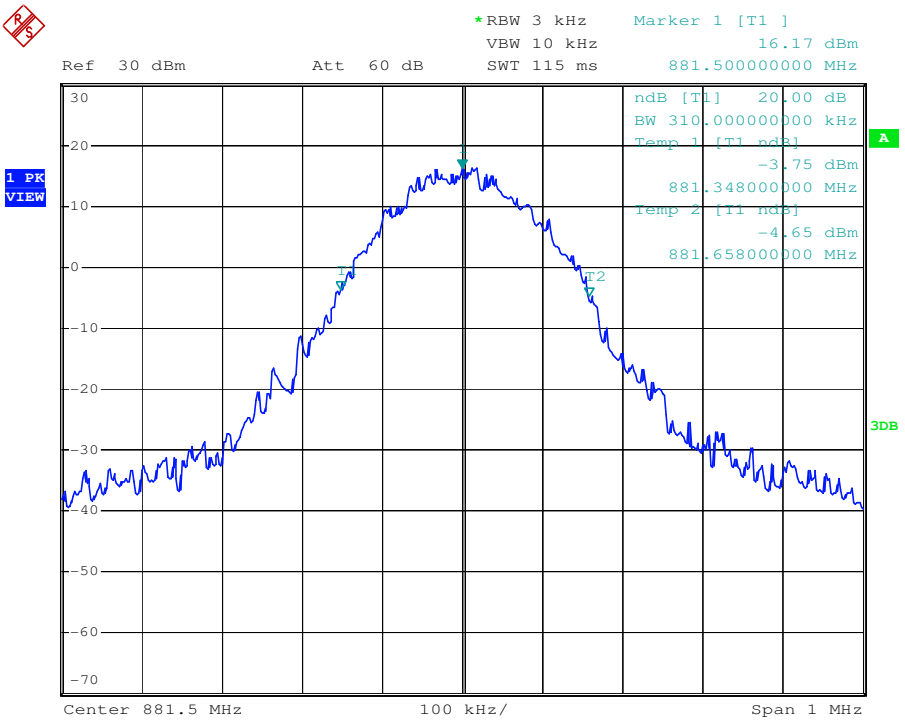
Cellular—EDGE down link(lowest frequency) -- Output



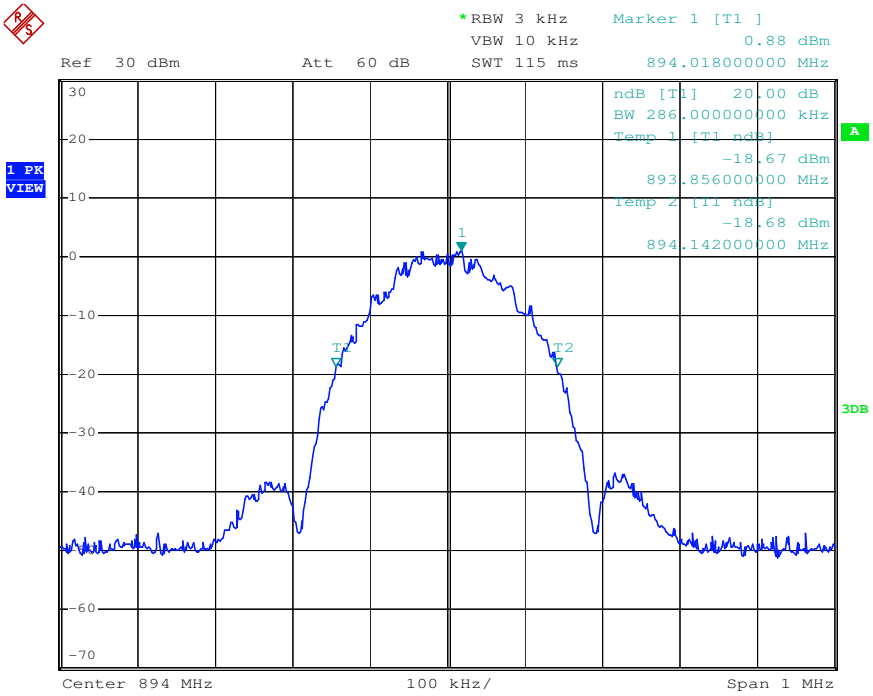
Cellular—EDGE down link(middle frequency)-- Input



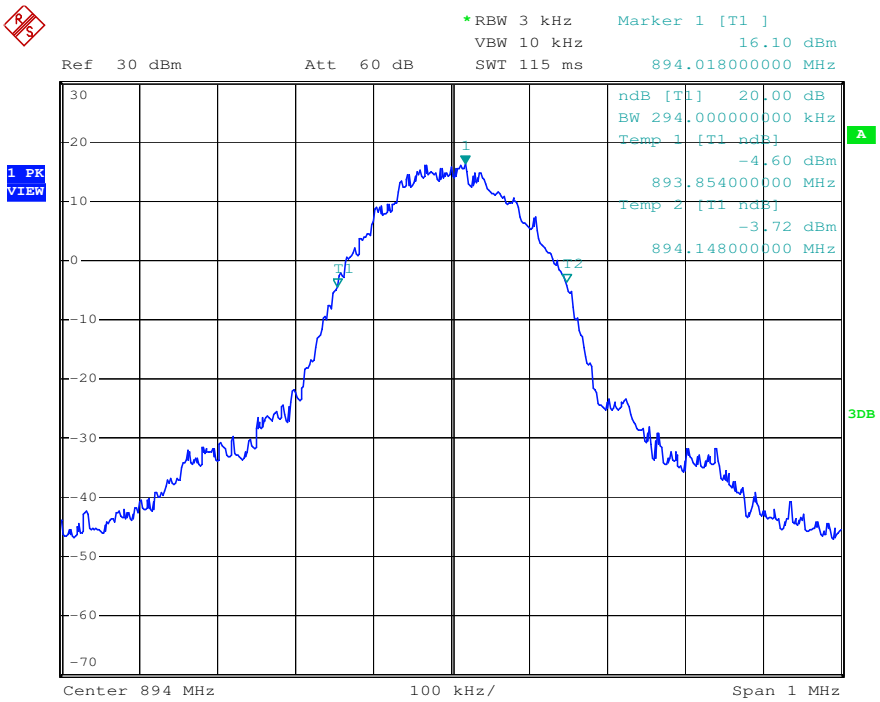
Cellular—EDGE down link(middle frequency)-- Output



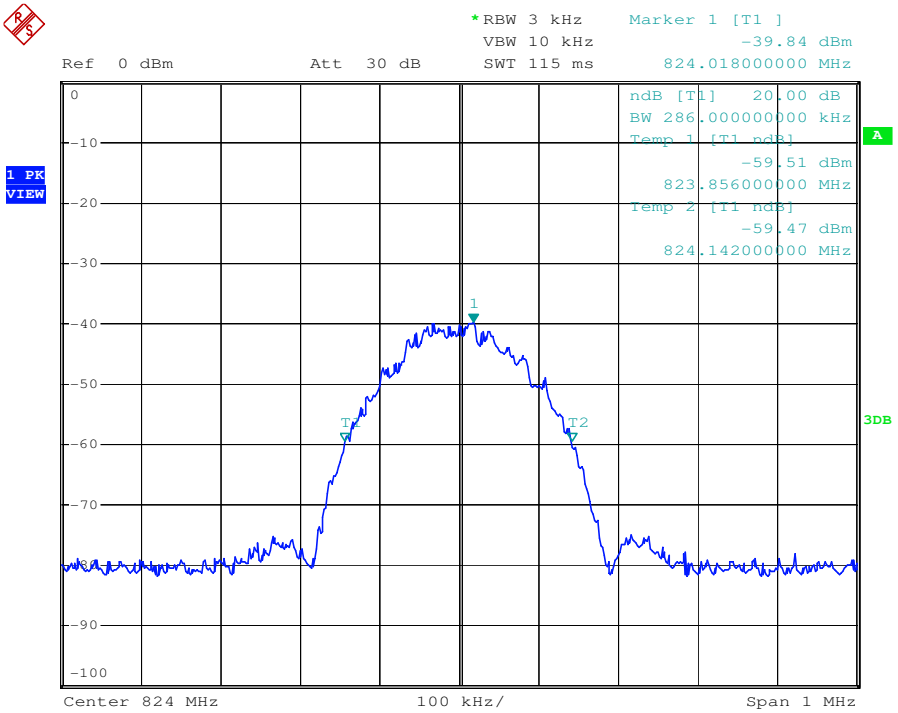
Cellular—EDGE down link(highest frequency)—Input



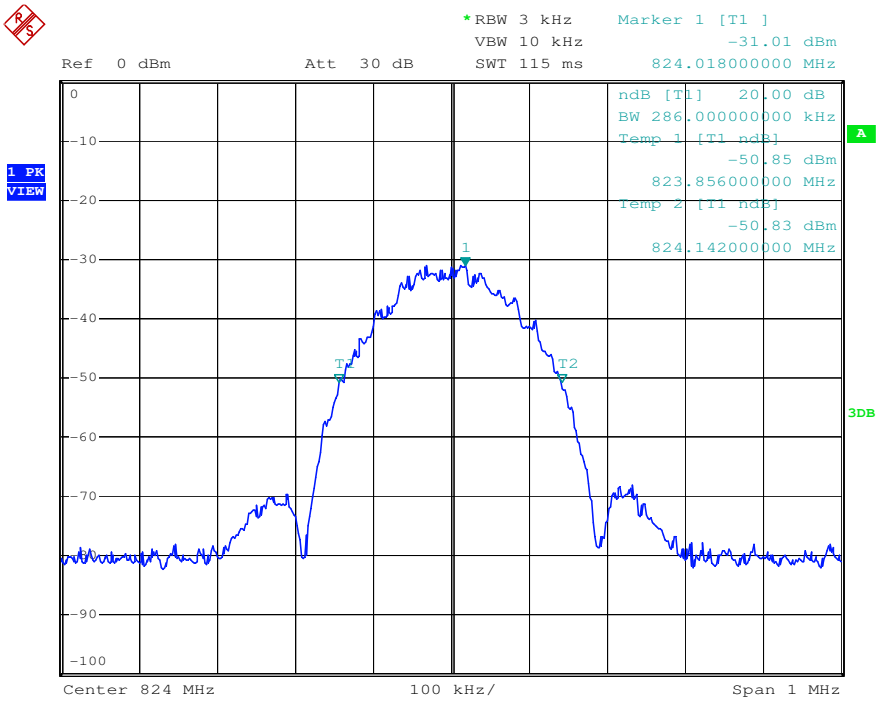
Cellular—EDGE down link(highest frequency)--Output



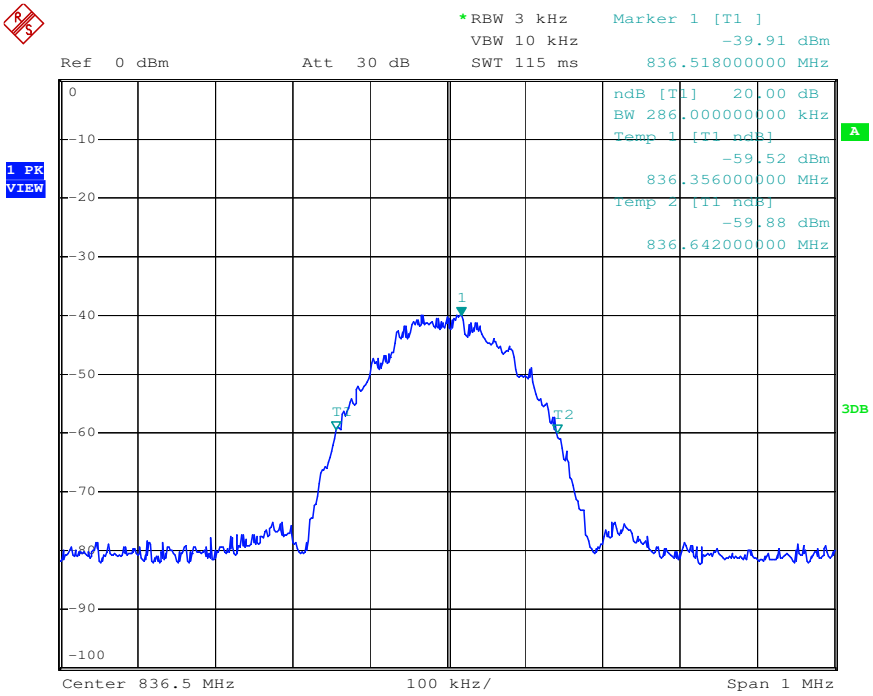
Cellular—EDGE up link(lowest frequency)—Input



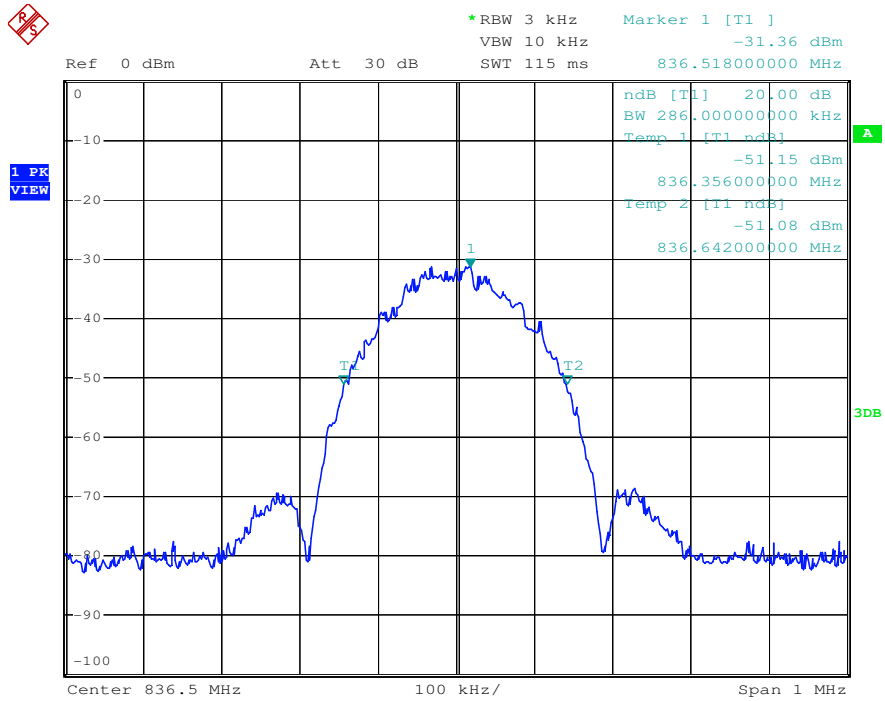
Cellular—EDGE up link(lowest frequency)--Output



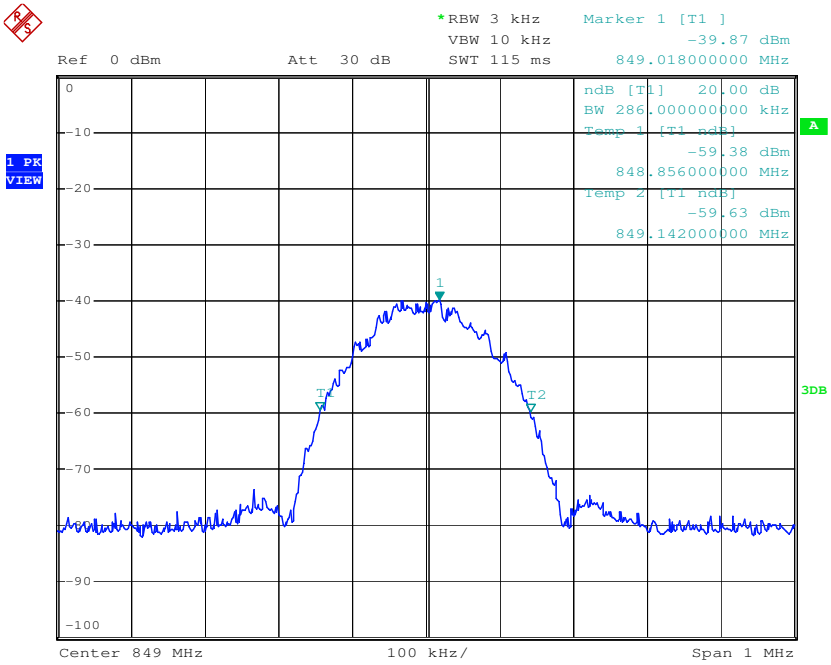
Cellular—EDGE up link(middle frequency)--Input



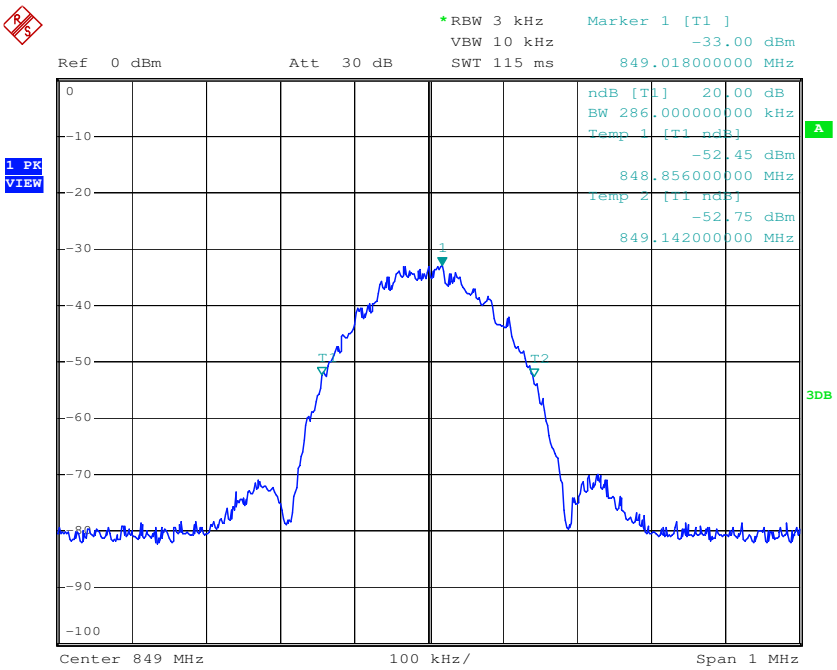
Cellular—EDGE up link(middle frequency)--Output



Cellular—EDGE up link(highest frequency)—Input

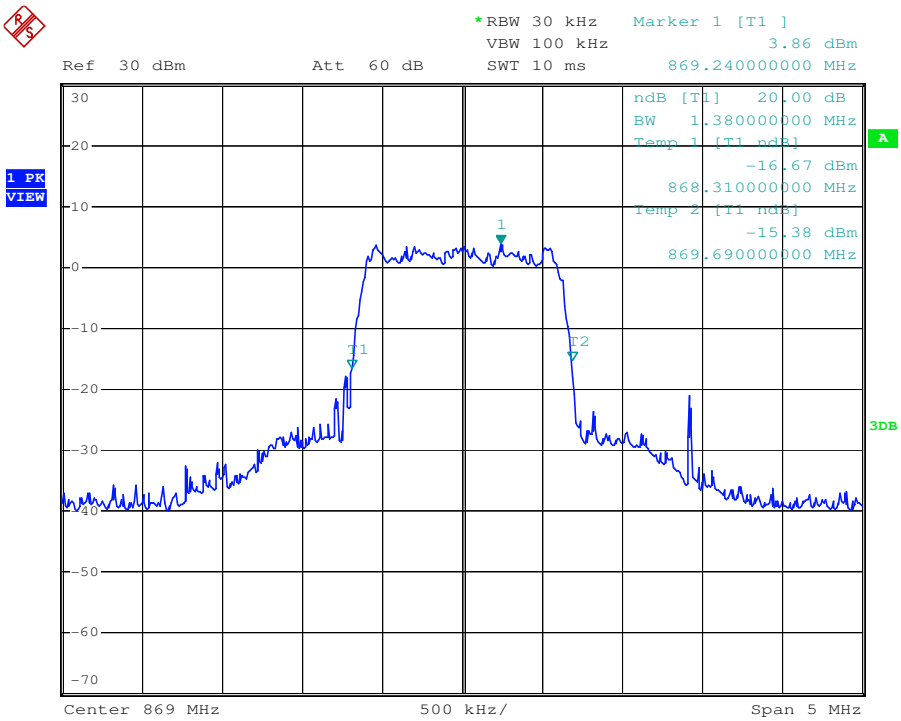


Cellular—EDGE up link(highest frequency)--Output

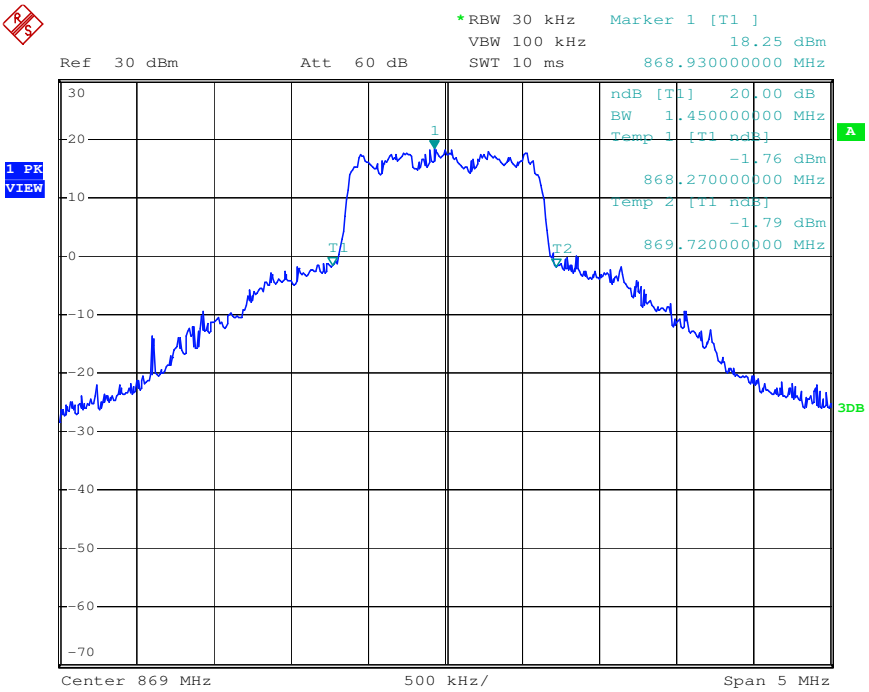


Cellular Band

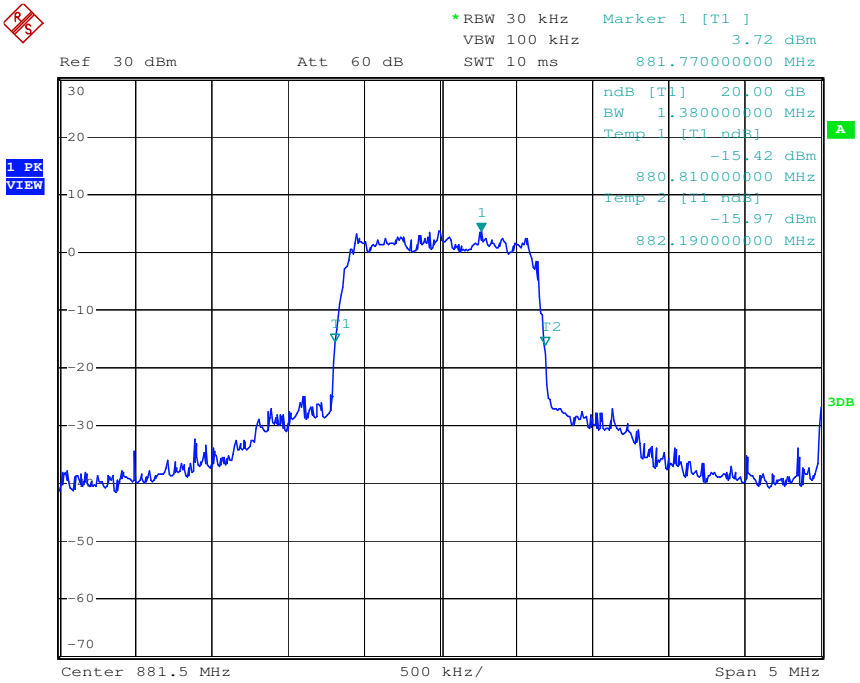
Cellular—CDMA down link(lowest frequency) -- Input



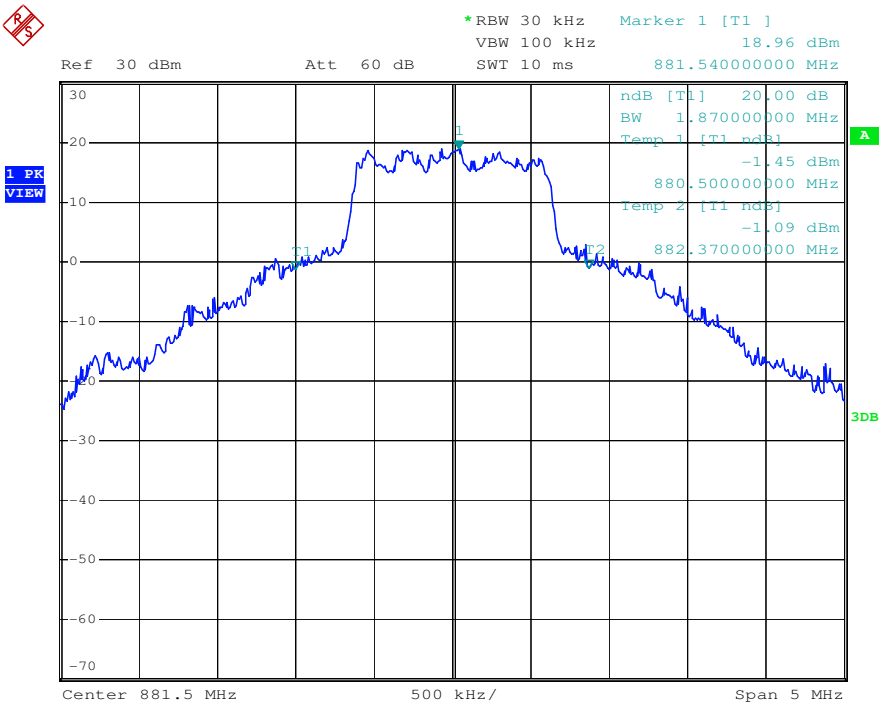
Cellular—CDMA down link(lowest frequency) -- Output



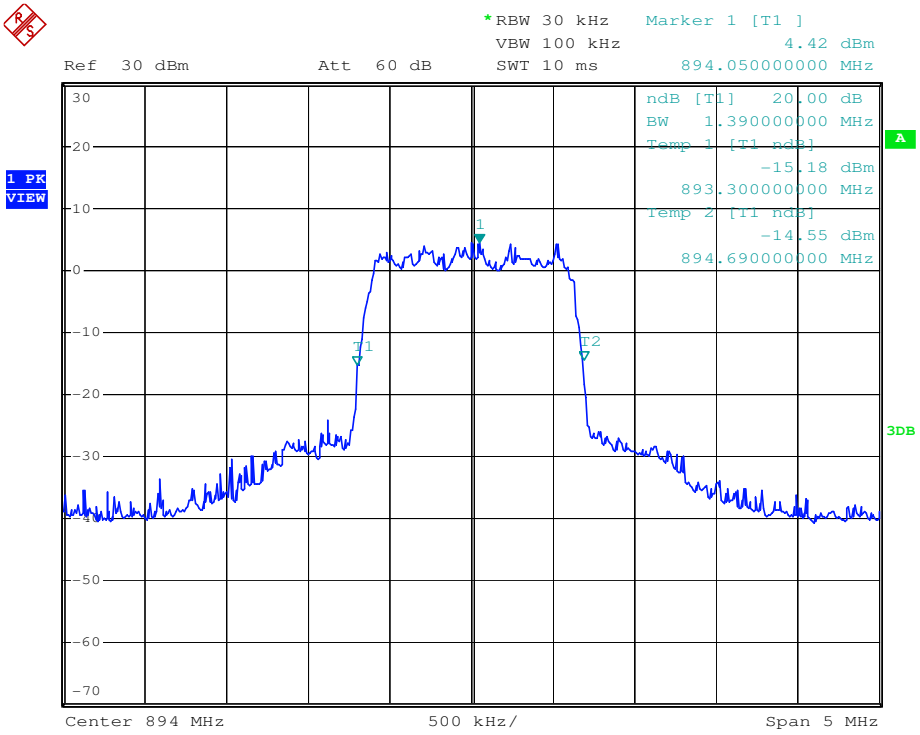
Cellular—CDMA down link(middle frequency)-- Input



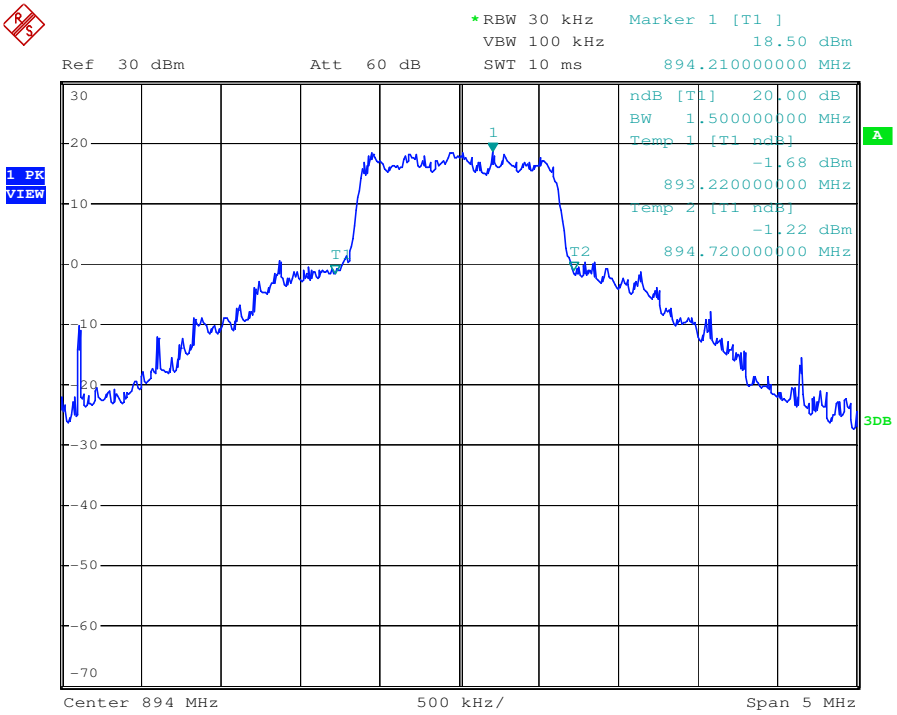
Cellular—CDMA down link(middle frequency)-- Output



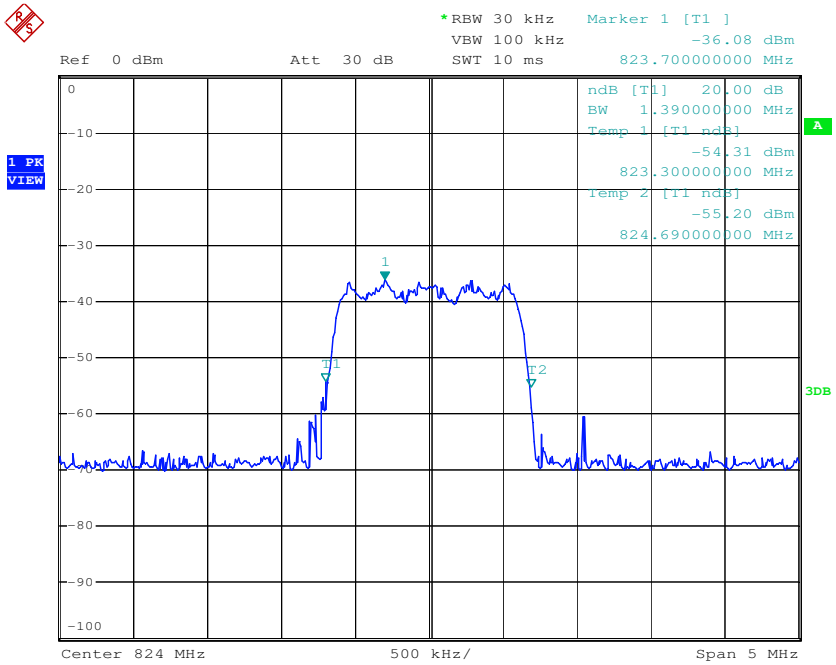
Cellular—CDMA down link(highest frequency)—Input



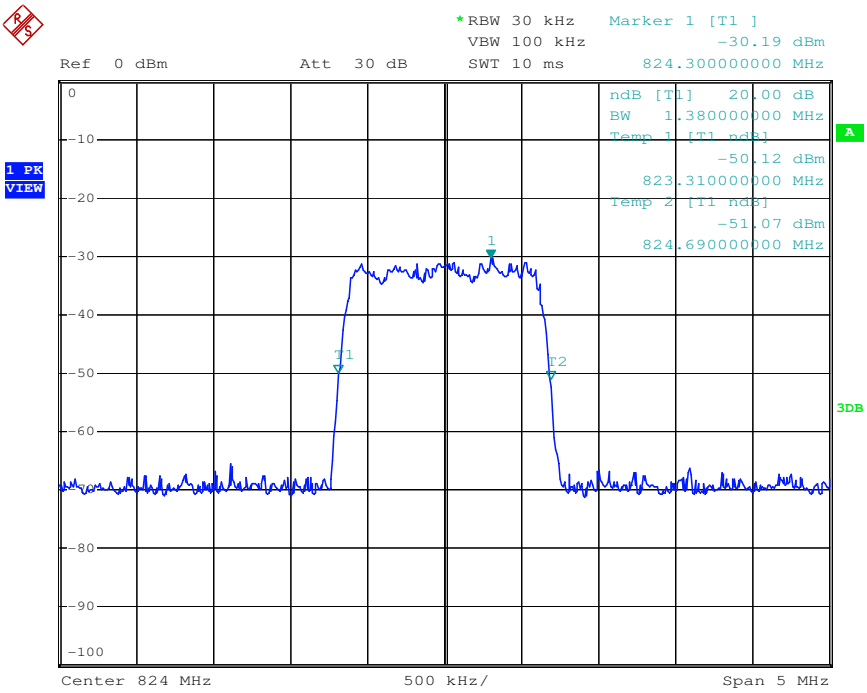
Cellular—CDMA down link(highest frequency)--Output



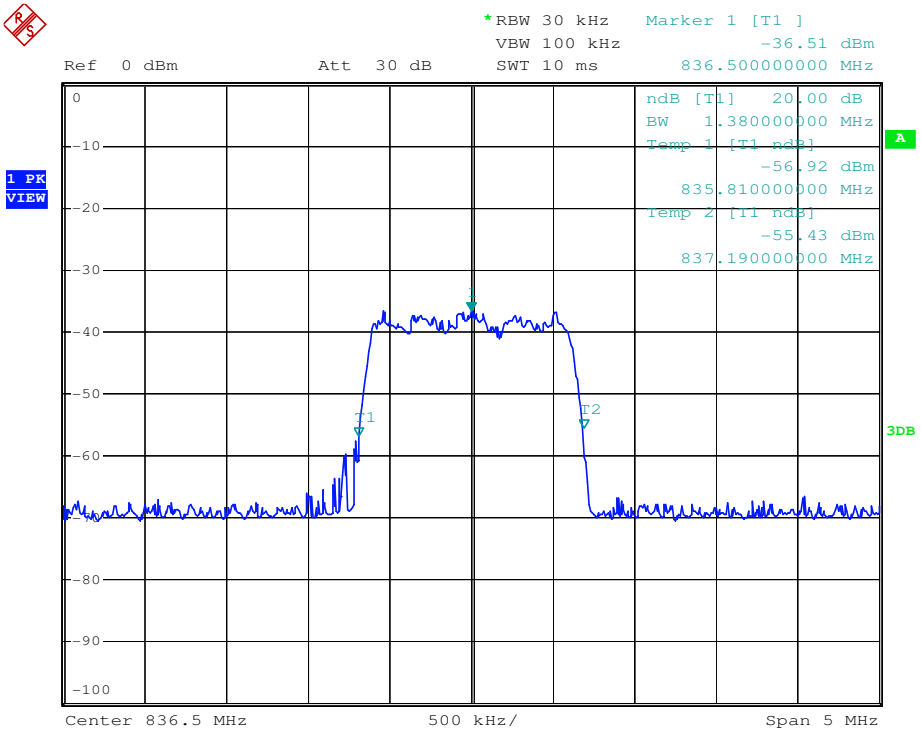
Cellular—CDMA up link(lowest frequency)—Input



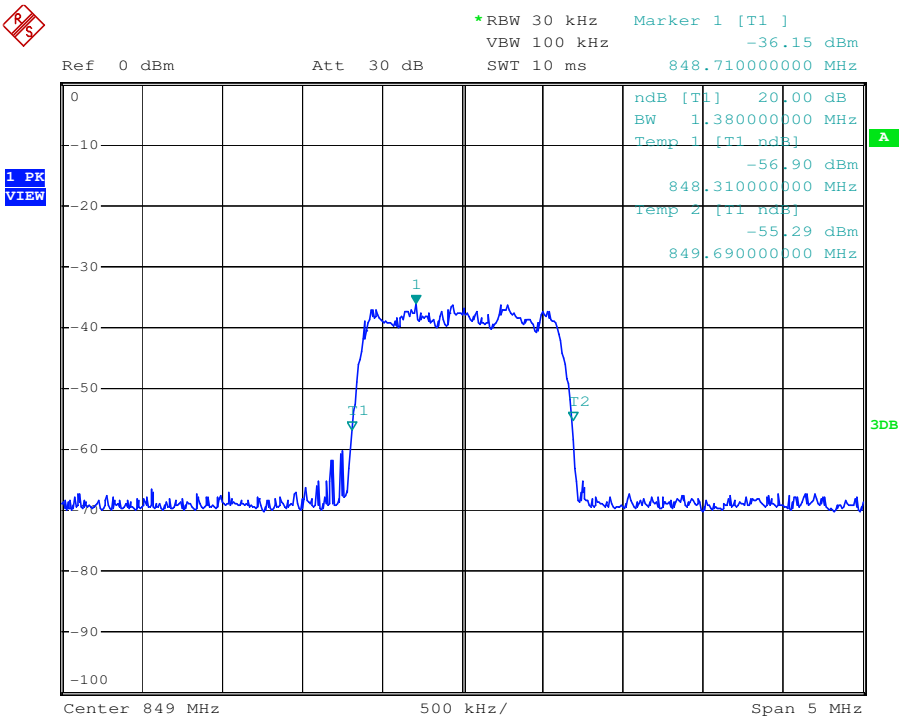
Cellular—CDMA up link(lowest frequency)--Output



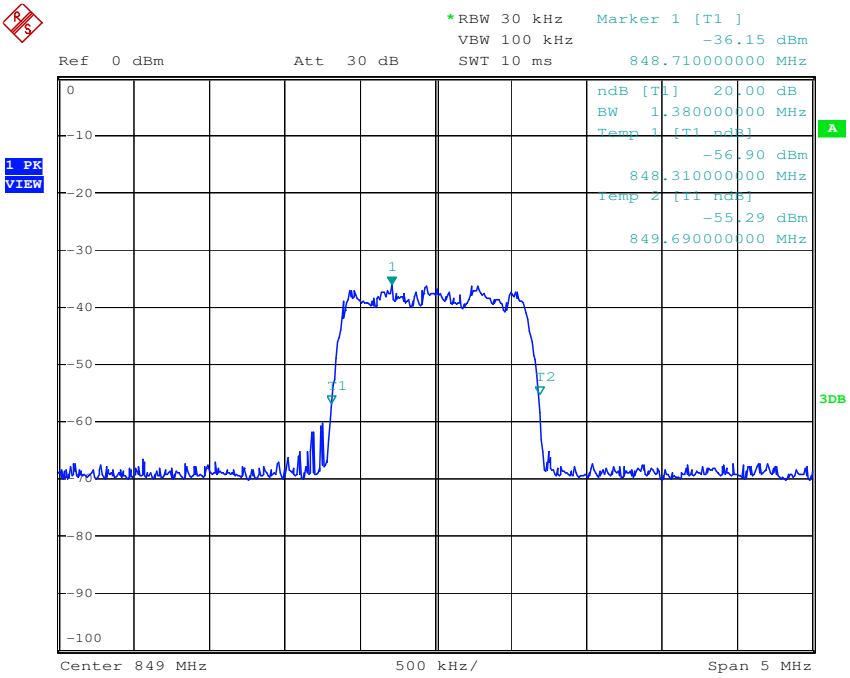
Cellular—CDMA up link(middle frequency)--Input



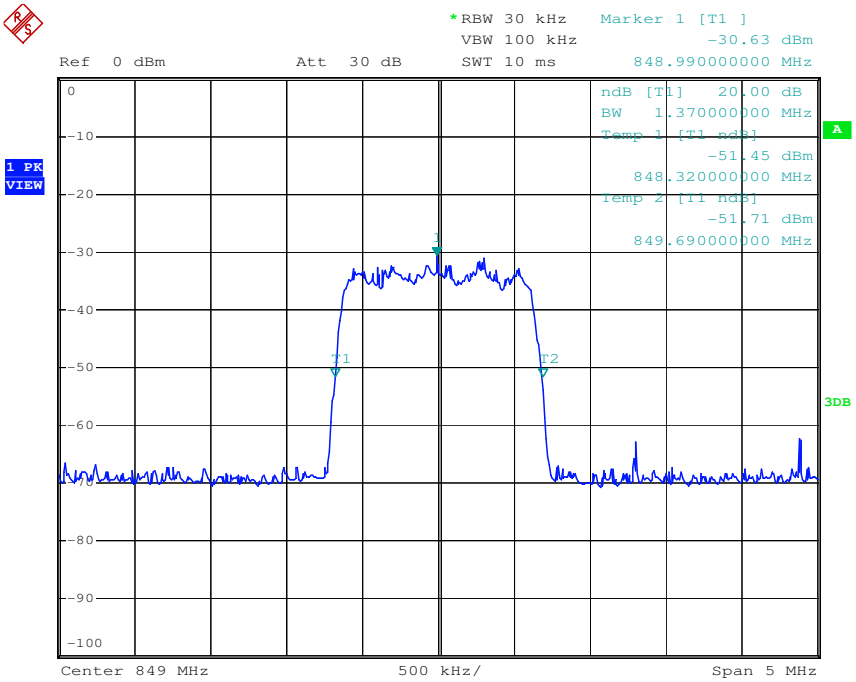
Cellular—CDMA up link(middle frequency)--Output



Cellular—CDMA up link(highest frequency)—Input

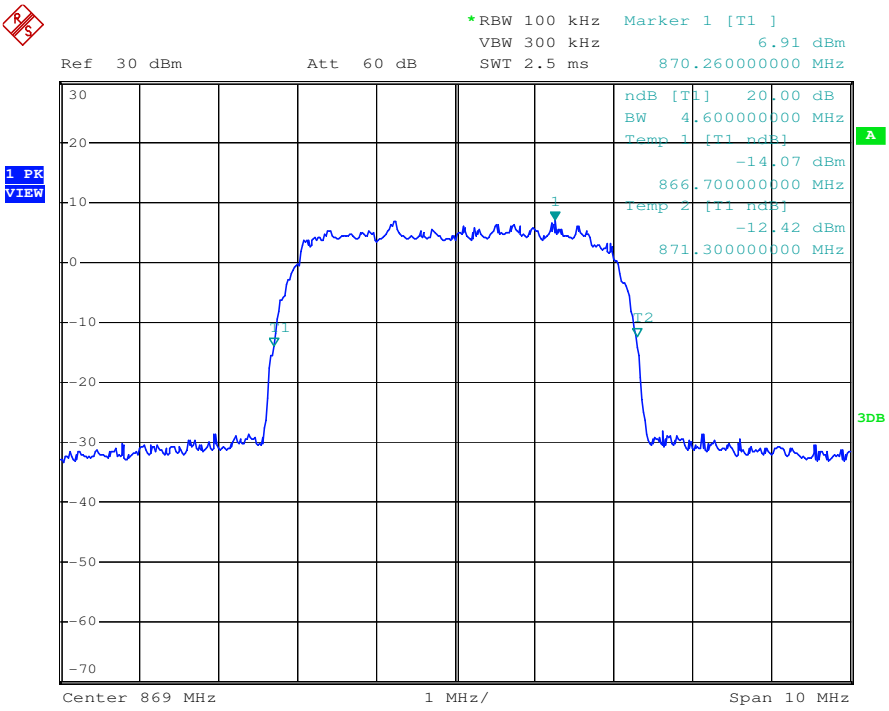


Cellular—CDMA up link(highest frequency)--Output

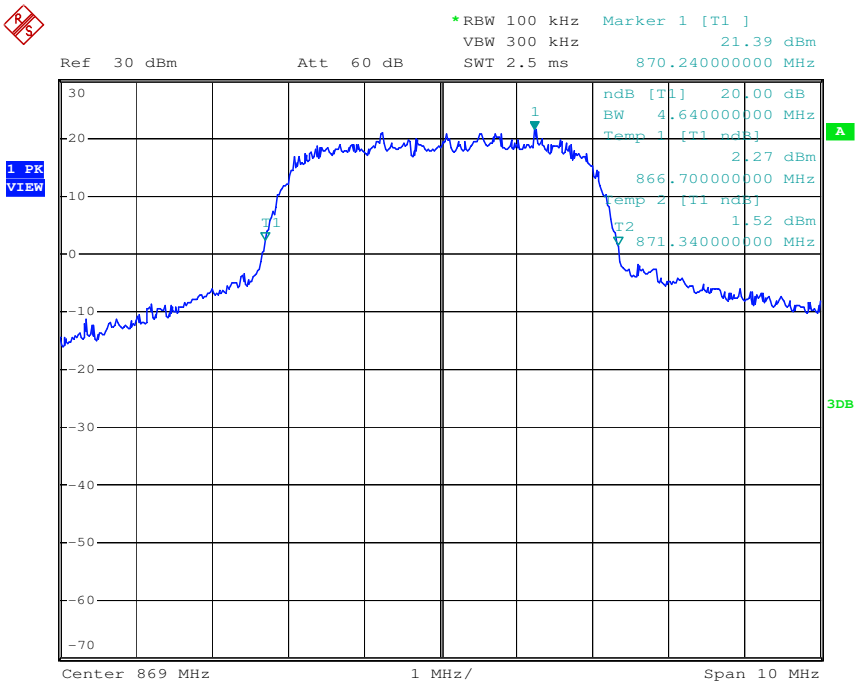


Cellular Band

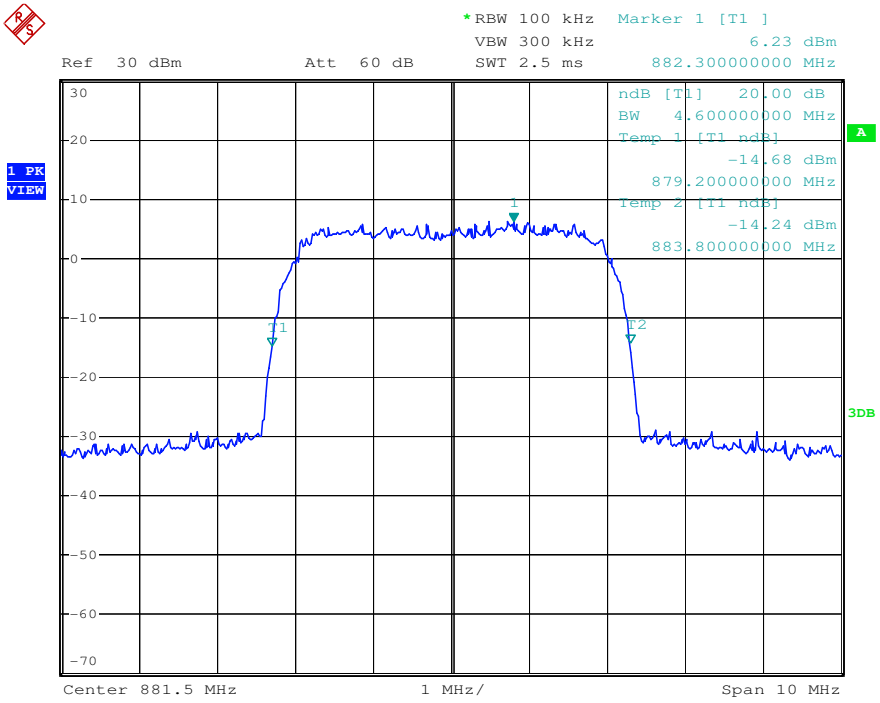
Cellular—WCDMA down link(lowest frequency) -- Input



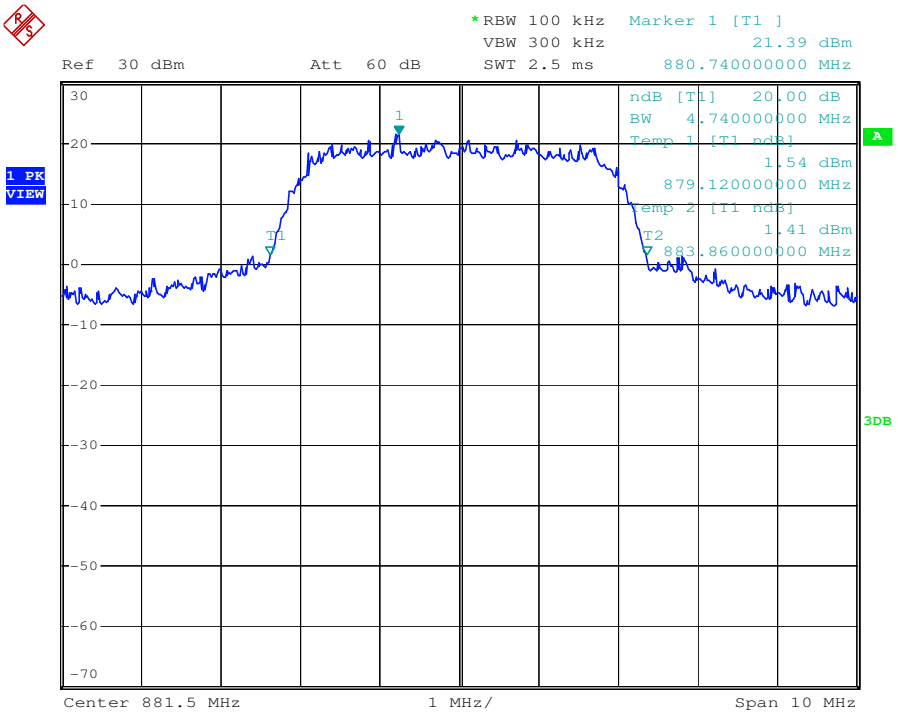
Cellular—WCDMA down link(lowest frequency) -- Output



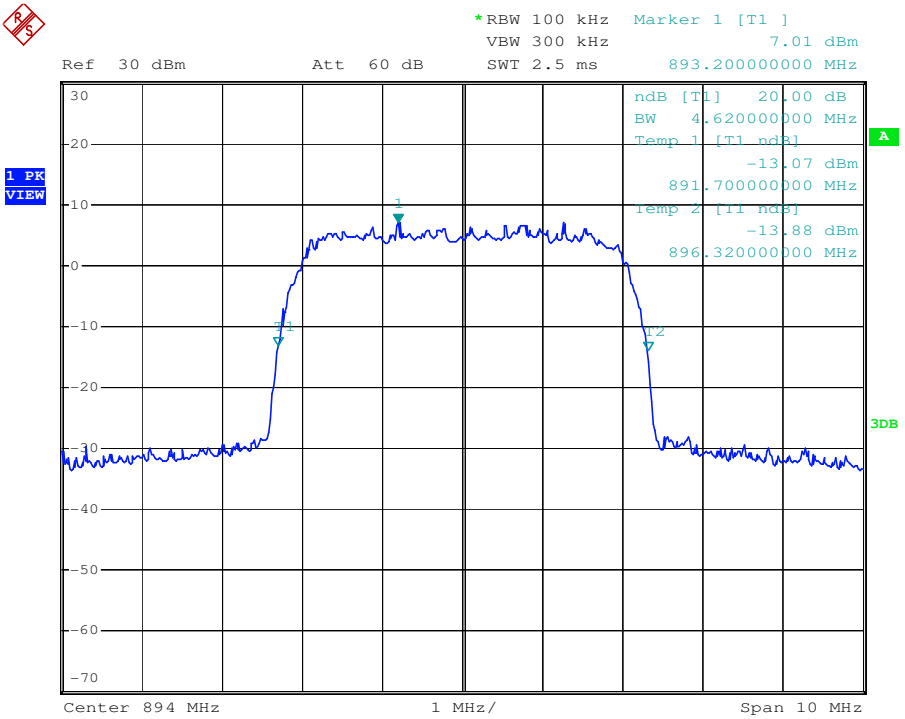
Cellular—WCDMA down link(middle frequency)-- Input



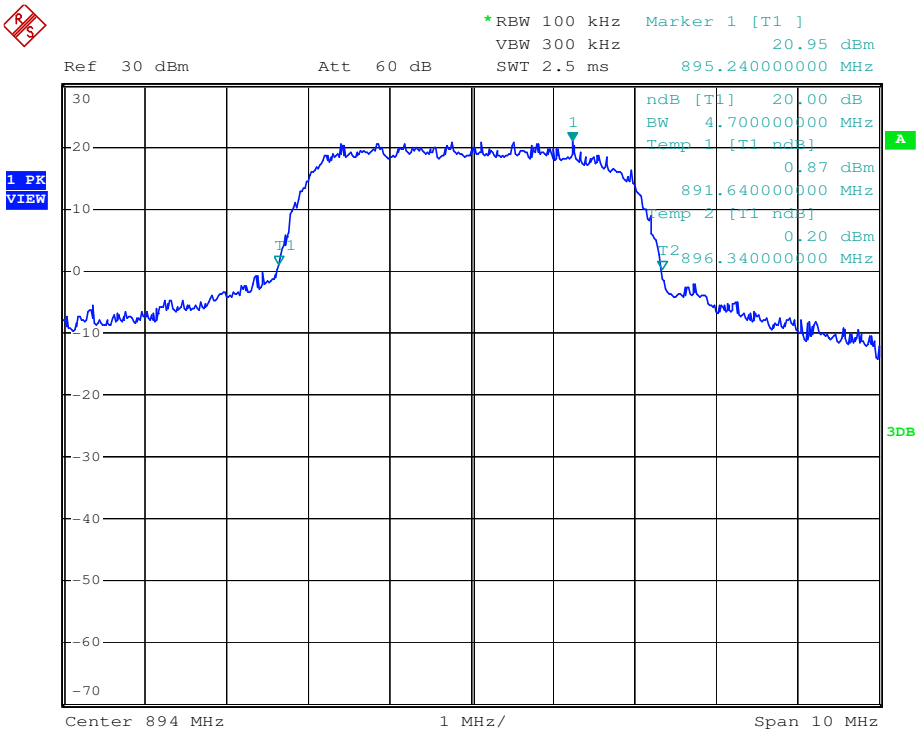
Cellular—WCDMA down link(middle frequency)-- Output



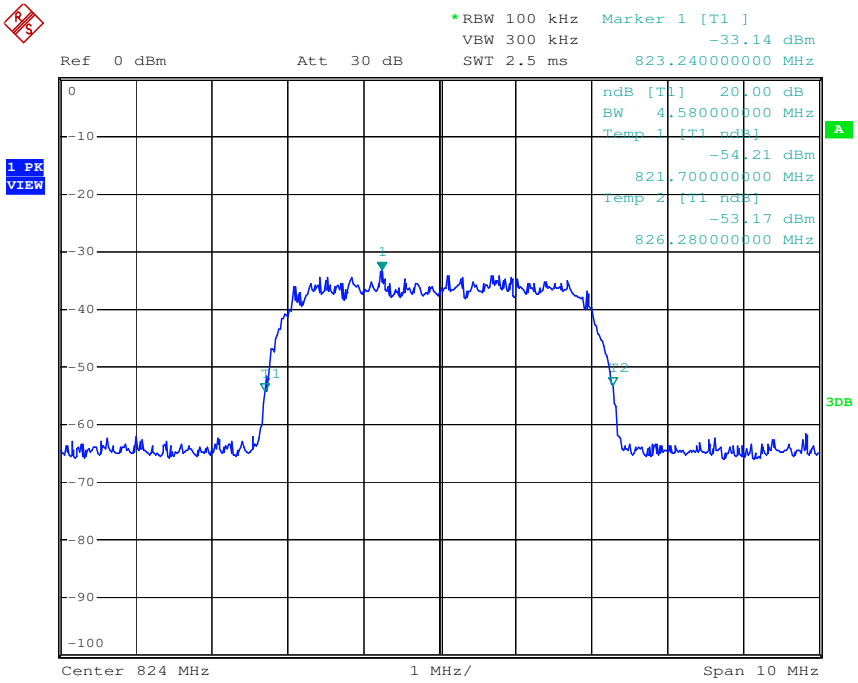
Cellular—WCDMA down link(highest frequency)—Input



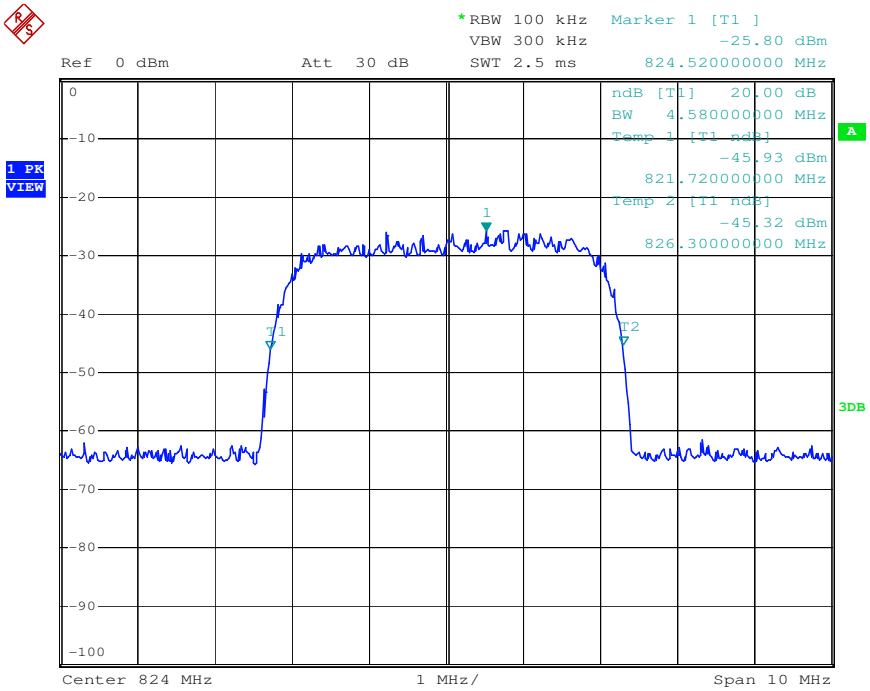
Cellular—WCDMA down link(highest frequency)--Output



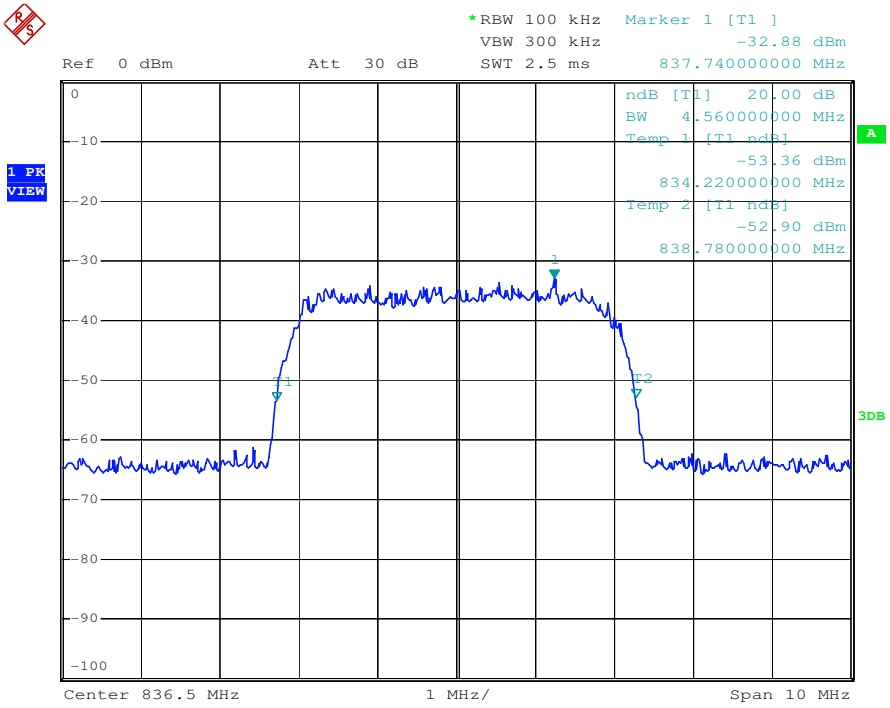
Cellular—WCDMA up link(lowest frequency)—Input



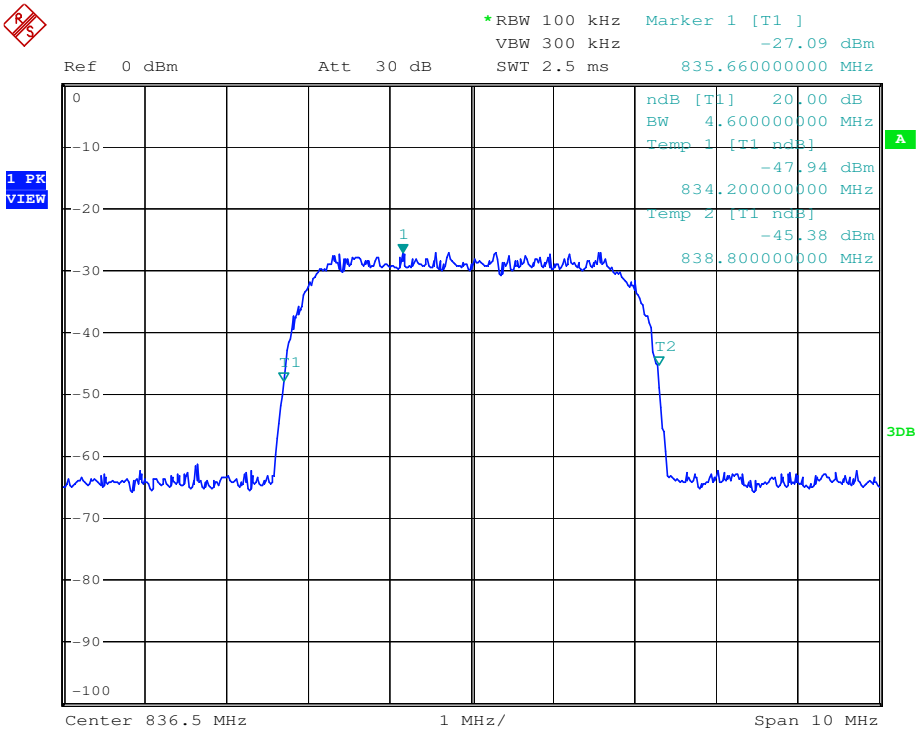
Cellular—WCDMA up link(lowest frequency)--Output



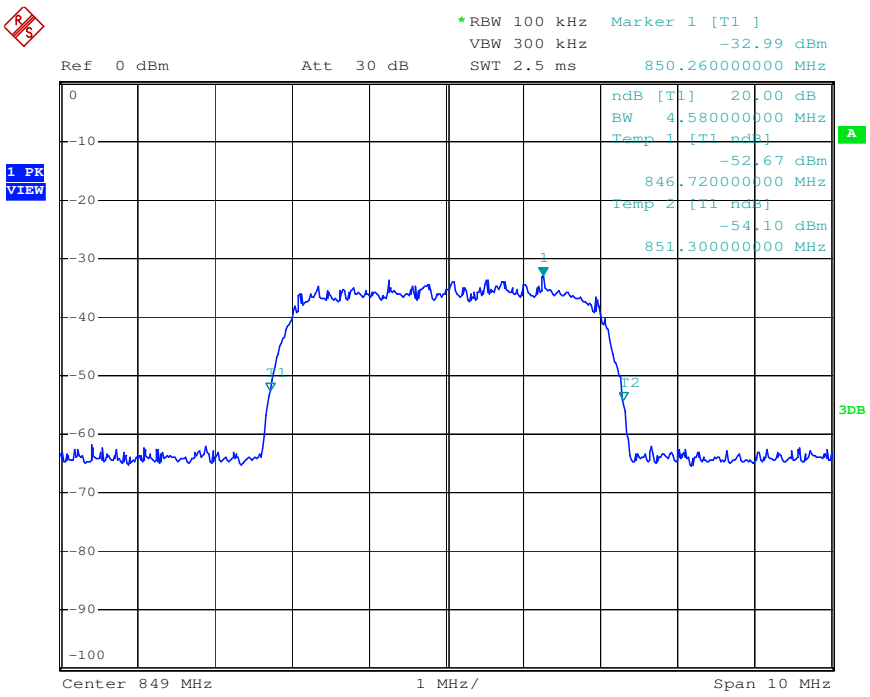
Cellular—WCDMA up link(middle frequency)--Input



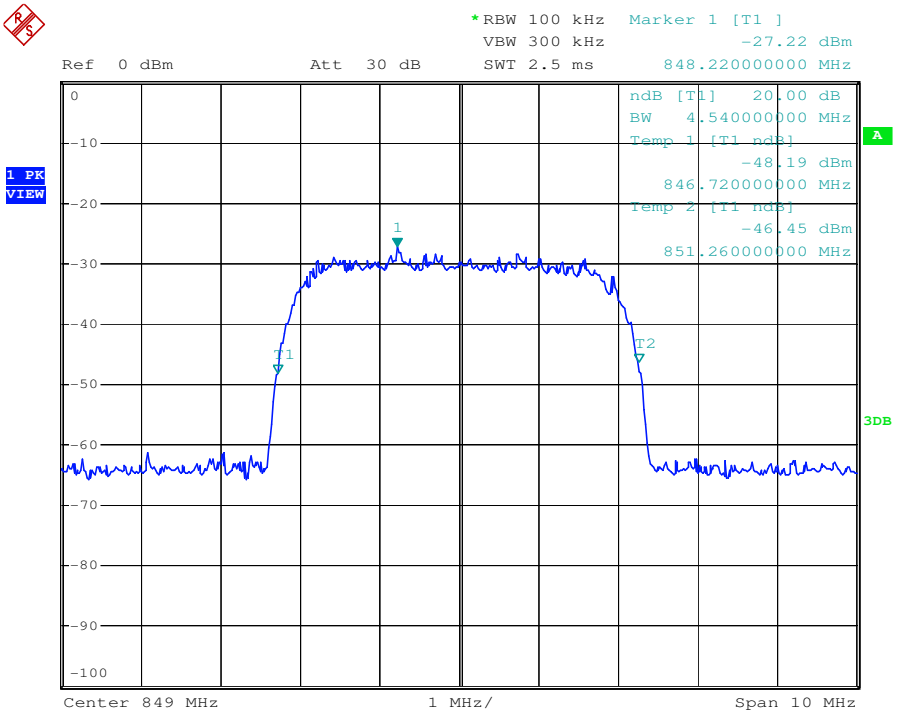
Cellular—WCDMA up link(middle frequency)--Output



Cellular—WCDMA up link(highest frequency)—Input

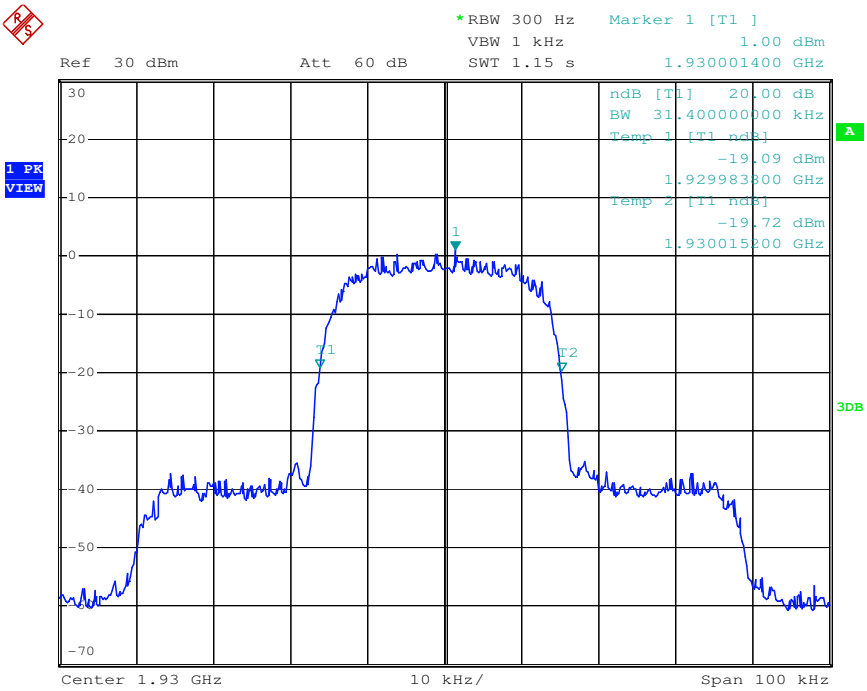


Cellular—WCDMA up link(highest frequency)--Output

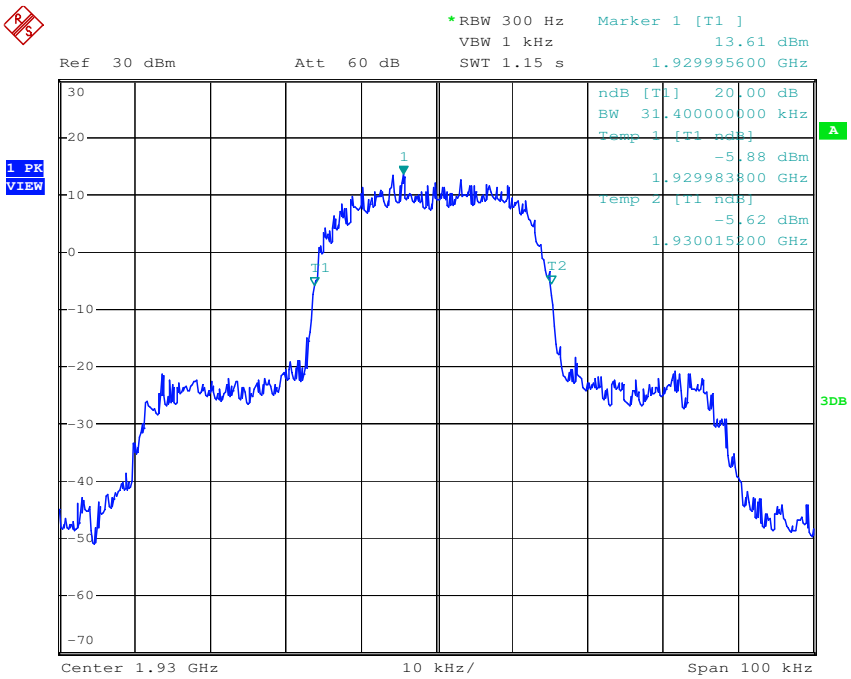


PCS Band

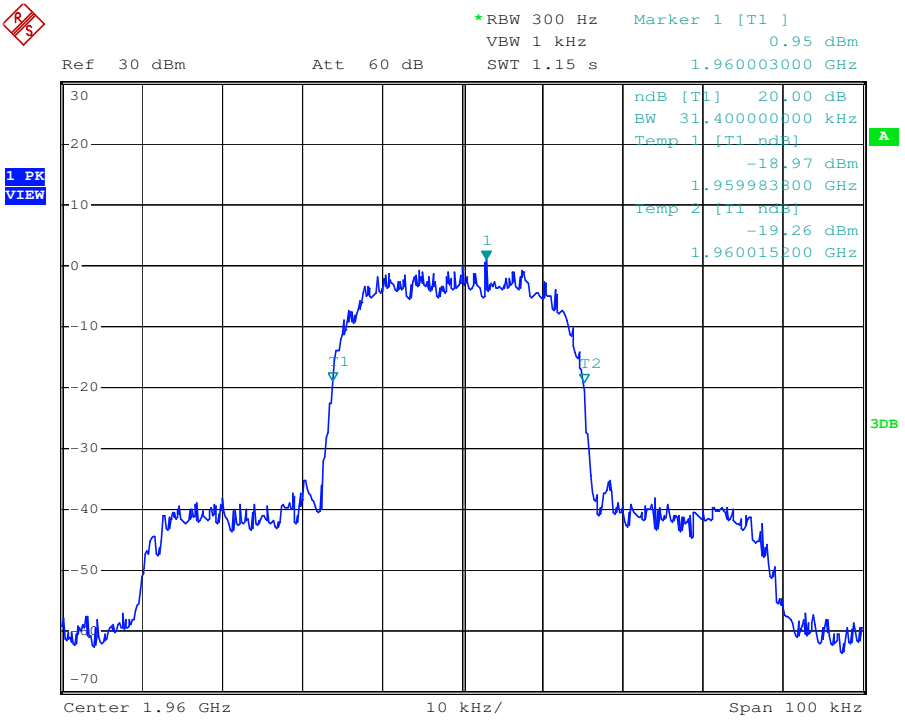
PCS—TDMA down link(lowest frequency)—Input



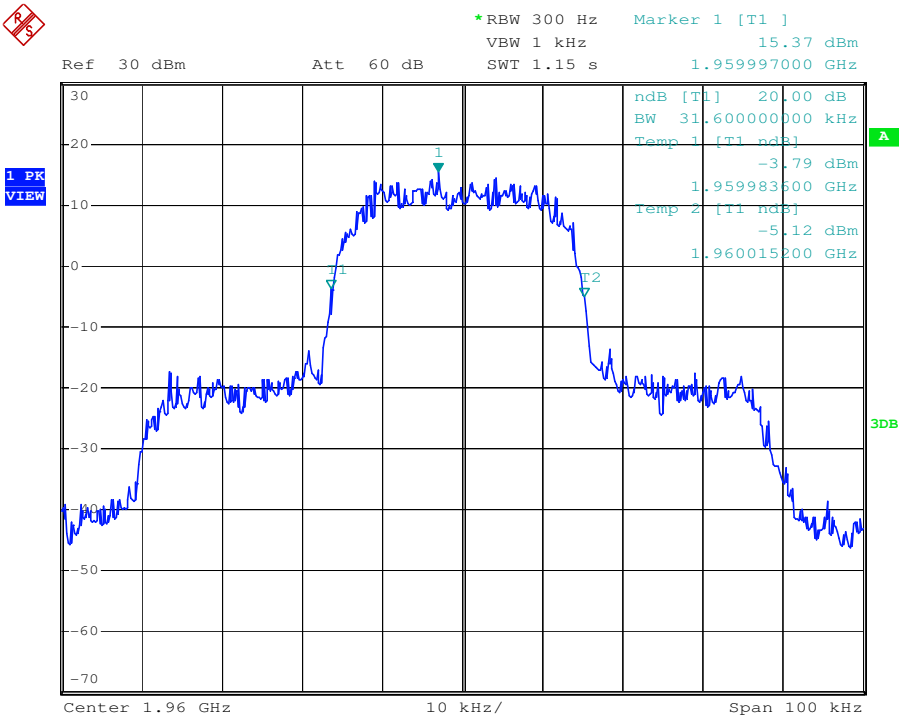
PCS—TDMA down link(lowest frequency)--Output



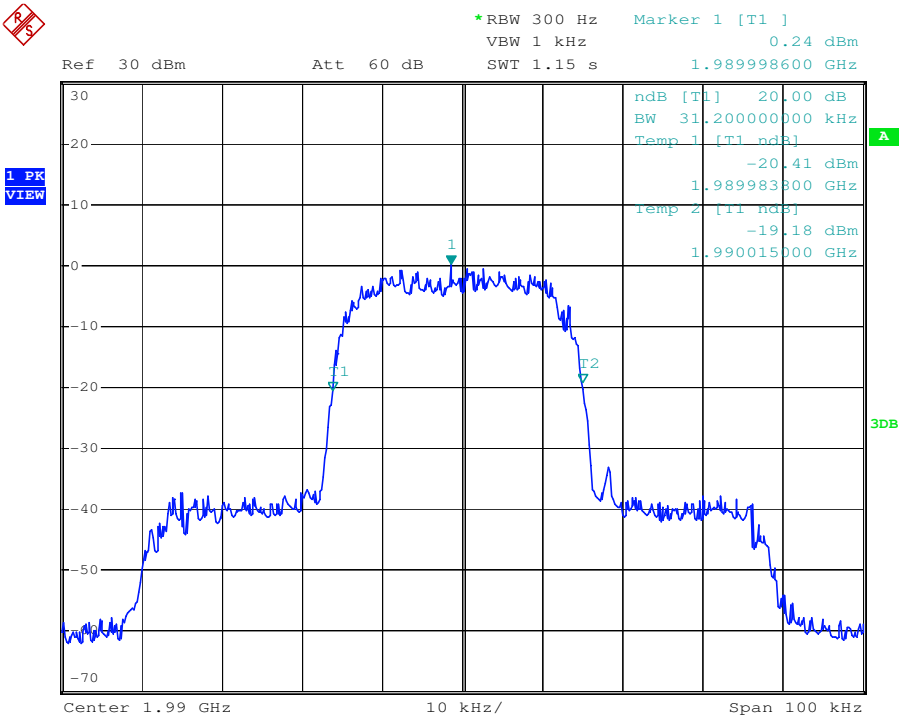
PCS—TDMA down link(middle frequency)—Input



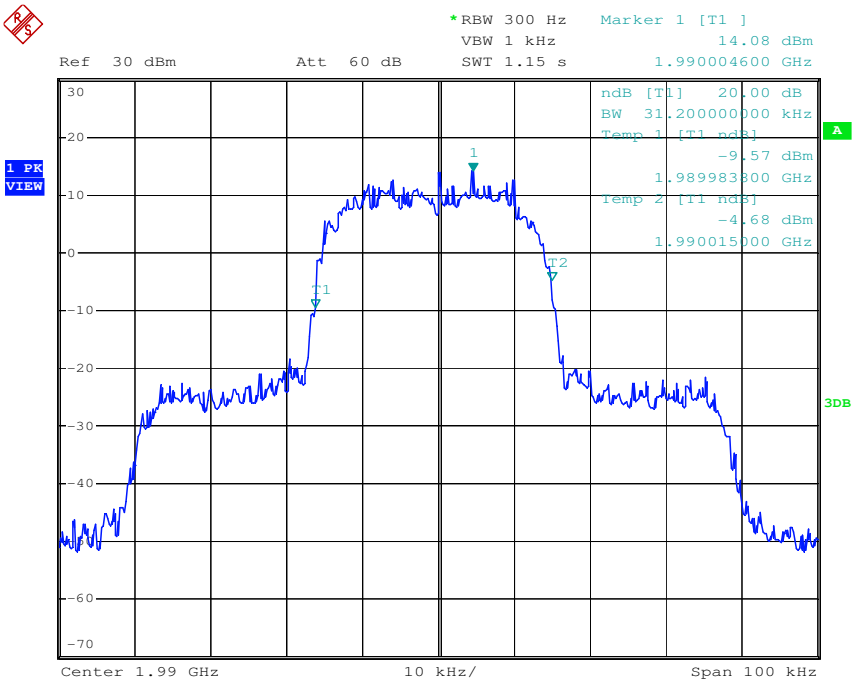
PCS—TDMA down link(middle frequency)--Output



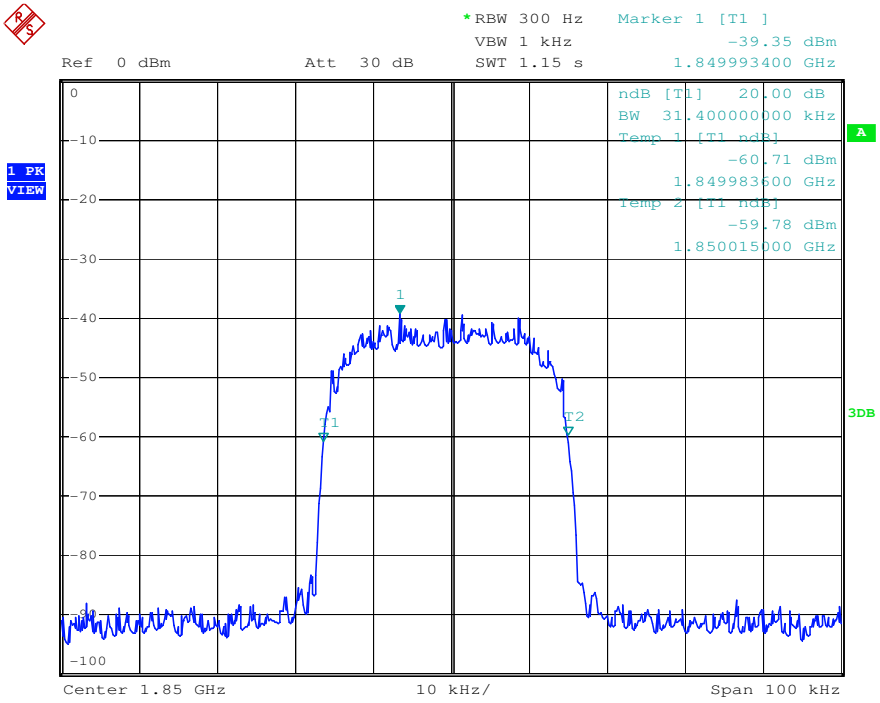
PCS—TDMA down link(highest frequency)—Input



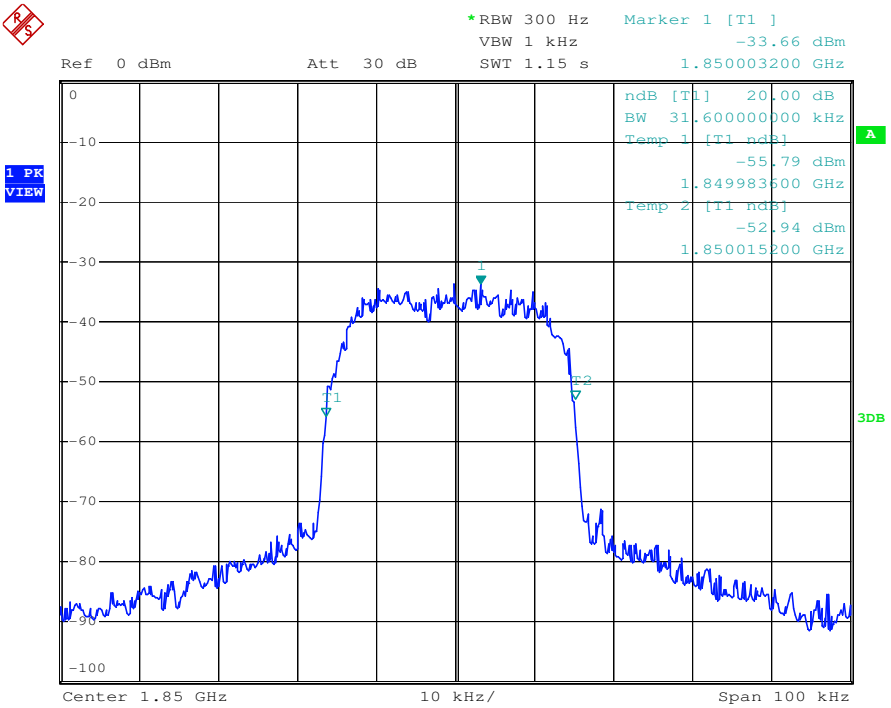
PCS—TDMA down link(highest frequency)--Output



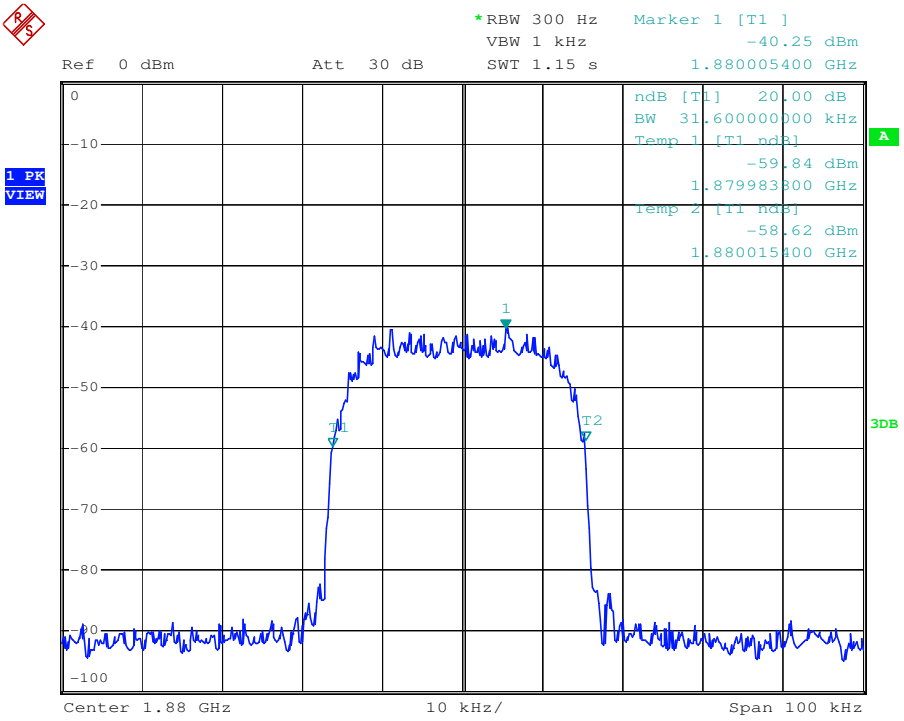
PCS—TDMA up link(lowest frequency)--Input



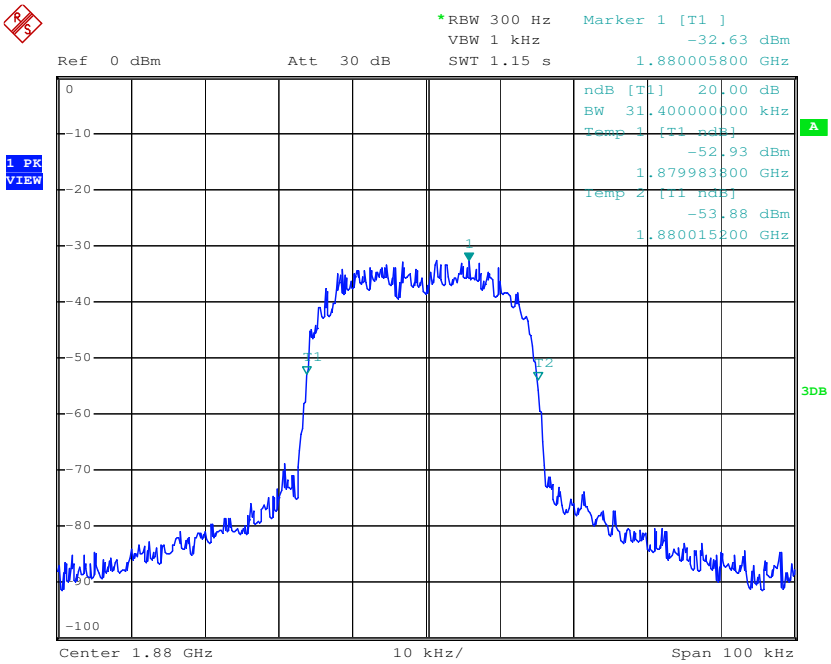
PCS—TDMA up link(lowest frequency)--Output



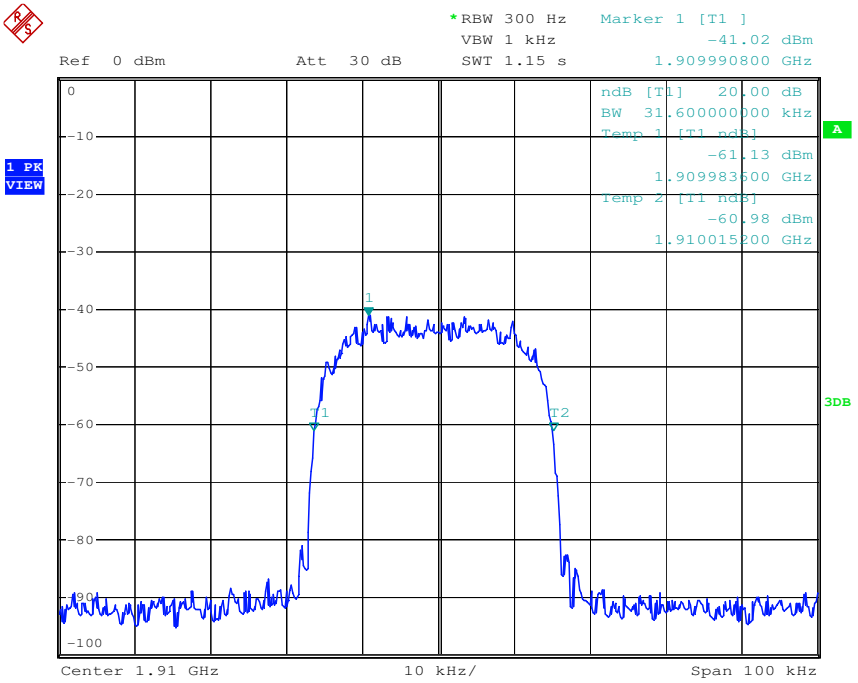
PCS—TDMA up link(middle frequency)—Input



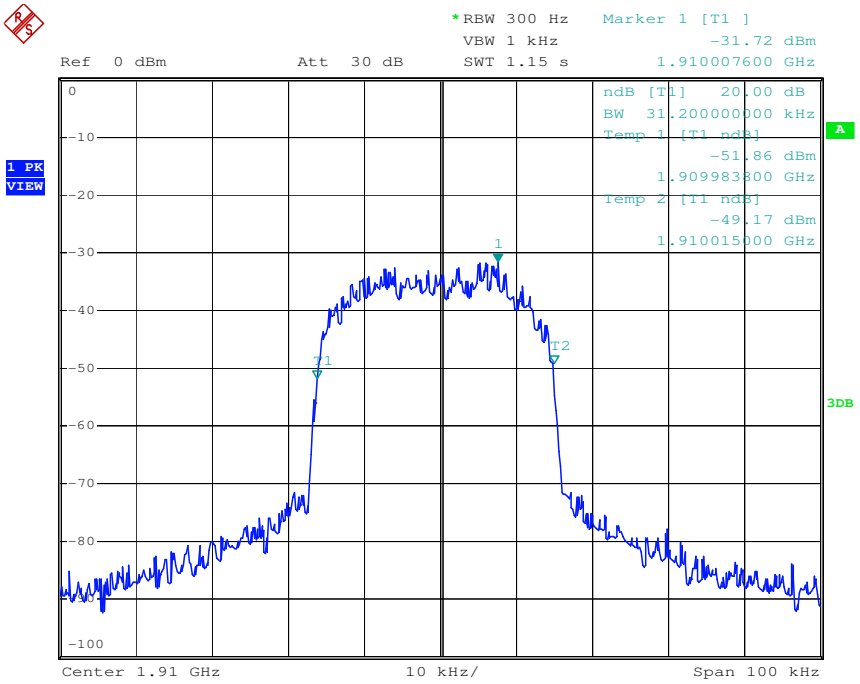
PCS—TDMA up link(middle frequency)--Output



PCS—TDMA up link(highest frequency)

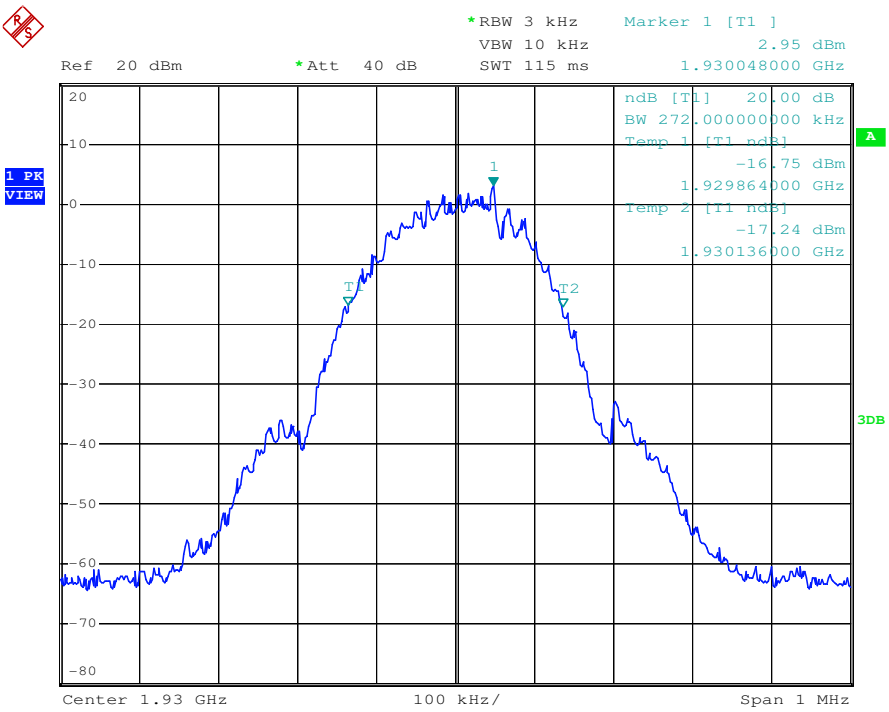


PCS—TDMA up link(highest frequency)

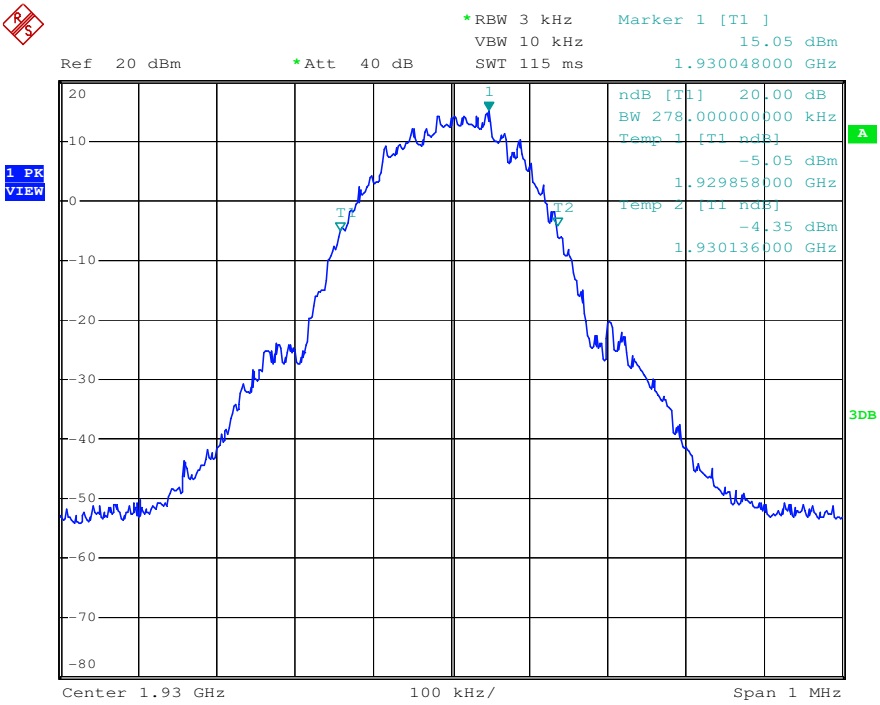


PCS Band

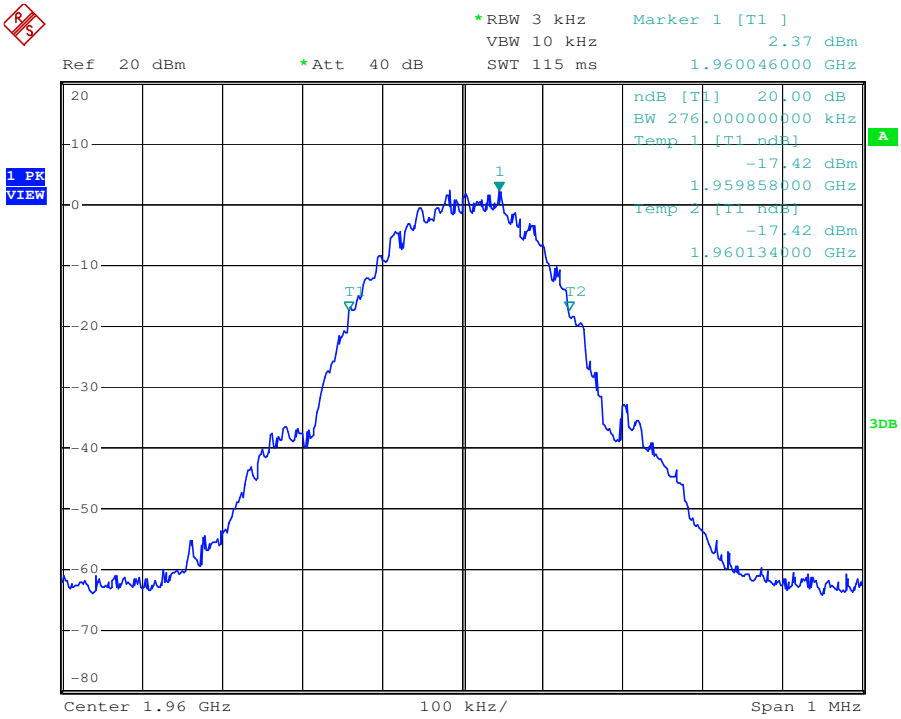
PCS—GSM down link(lowest frequency)—Input



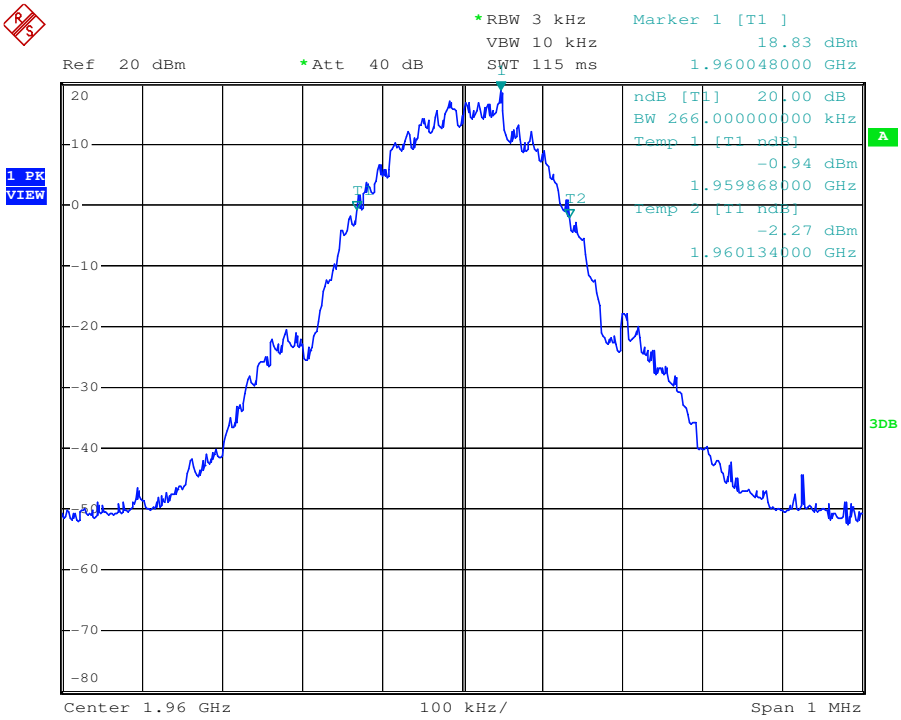
PCS—GSM down link(lowest frequency)--Output



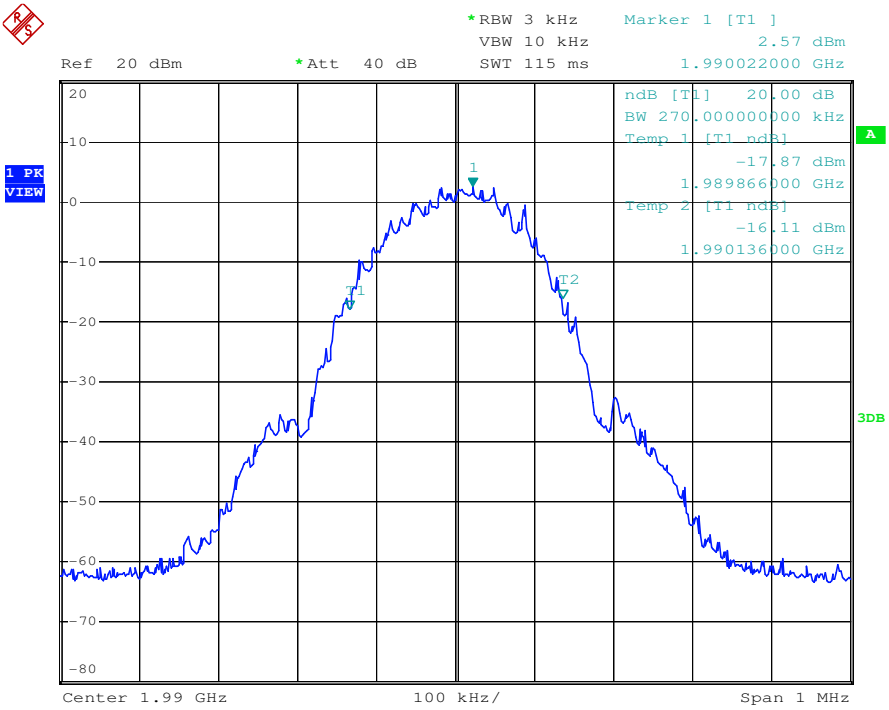
PCS—GSM down link(middle frequency)—Input



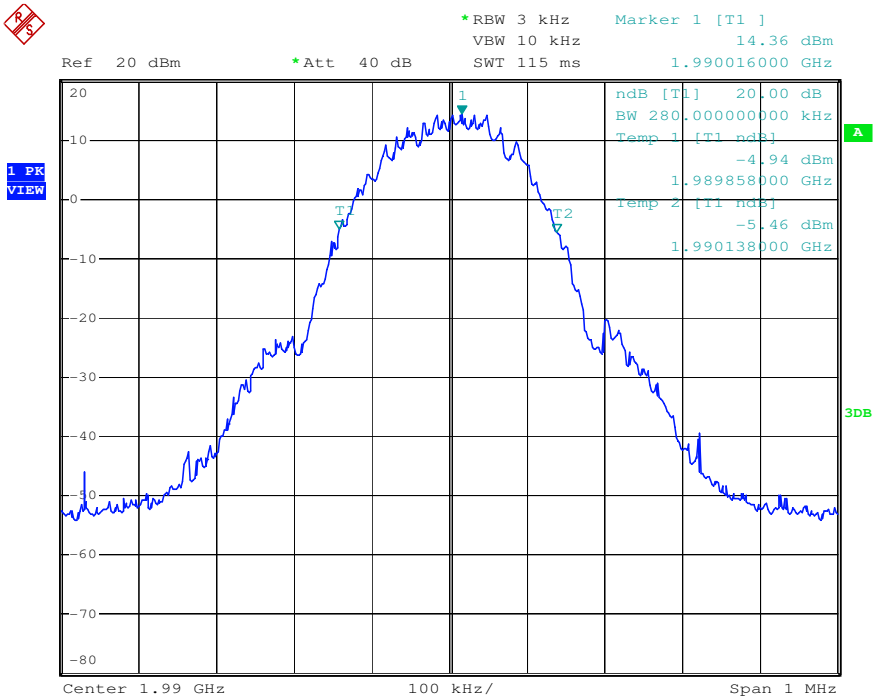
PCS—GSM down link(middle frequency)--Output



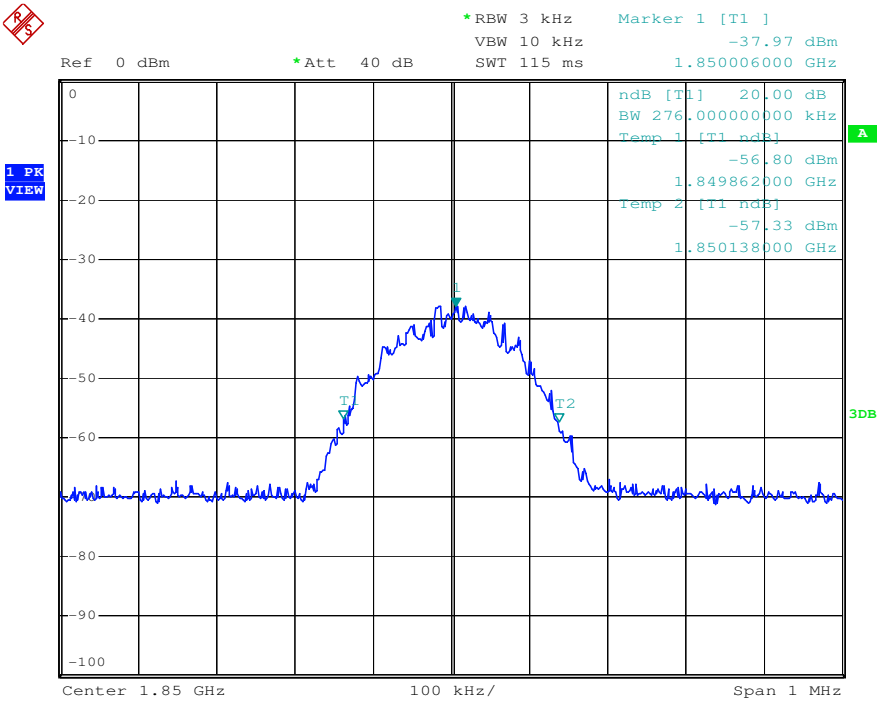
PCS—GSM down link(highest frequency)—Input



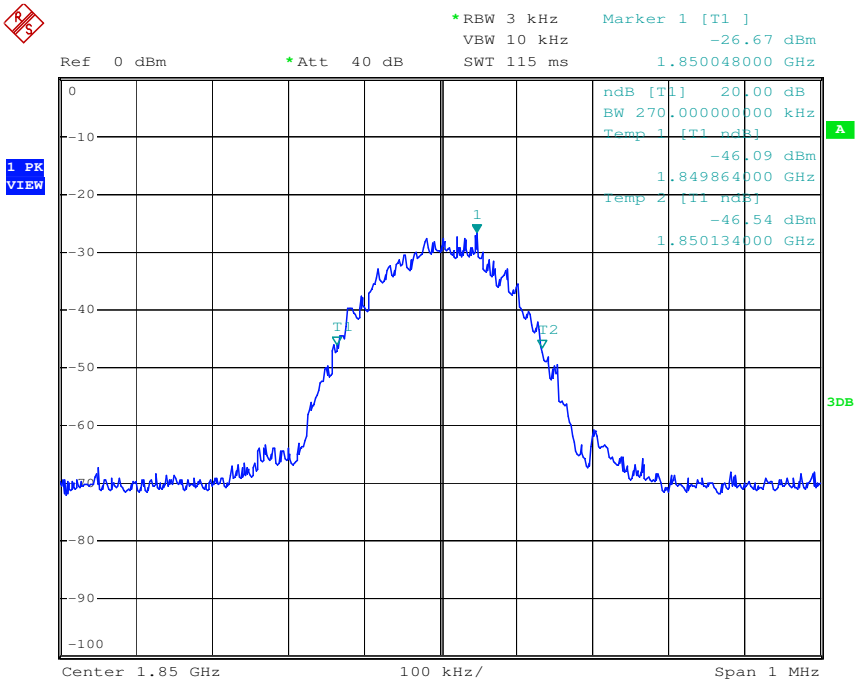
PCS—GSM down link(highest frequency)--Output



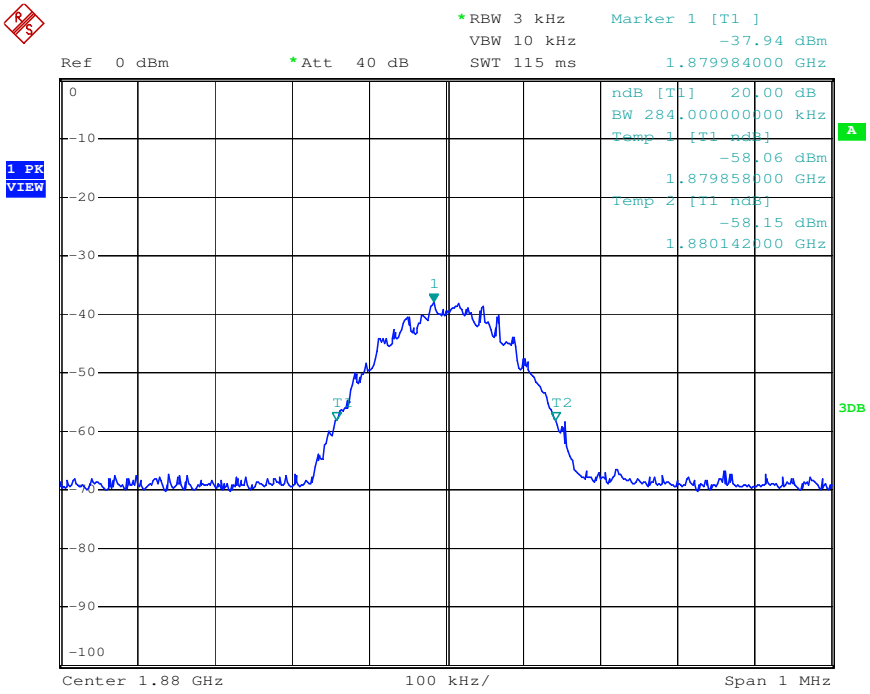
PCS—GSM up link(lowest frequency)--Input



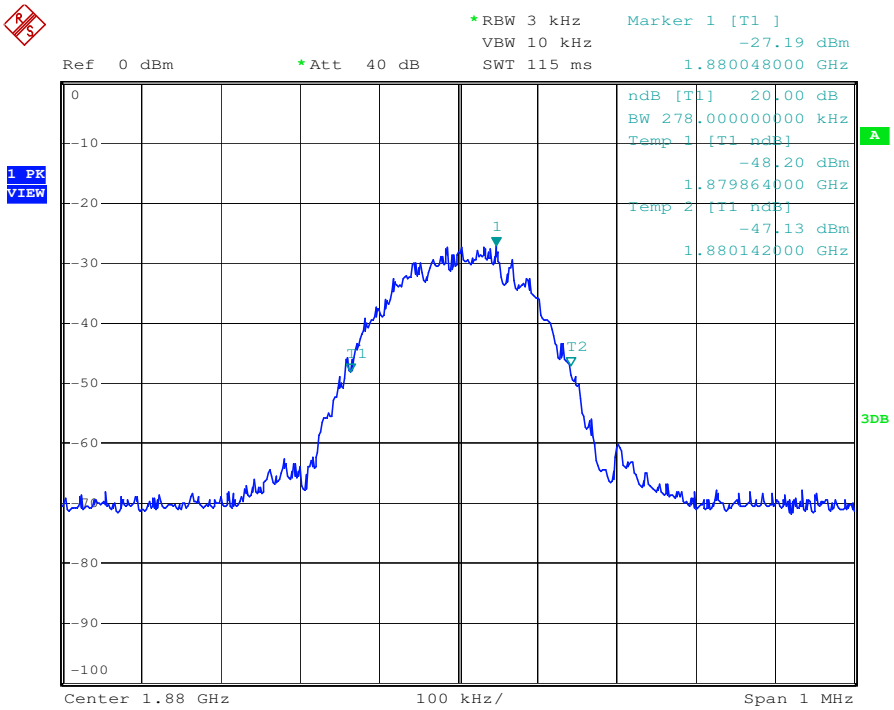
PCS—GSM up link(lowest frequency)--Output



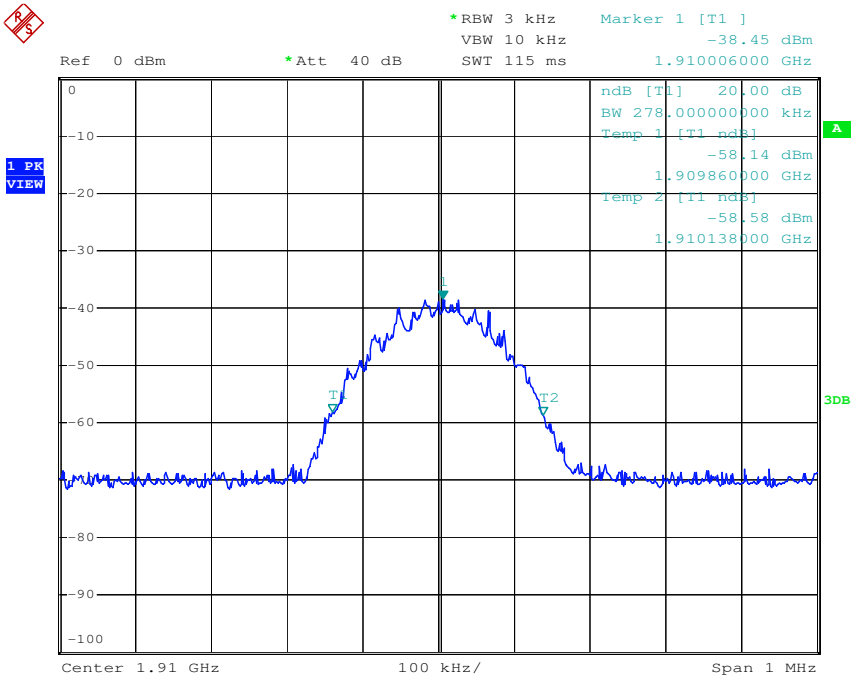
PCS—GSM up link(middle frequency)—Input



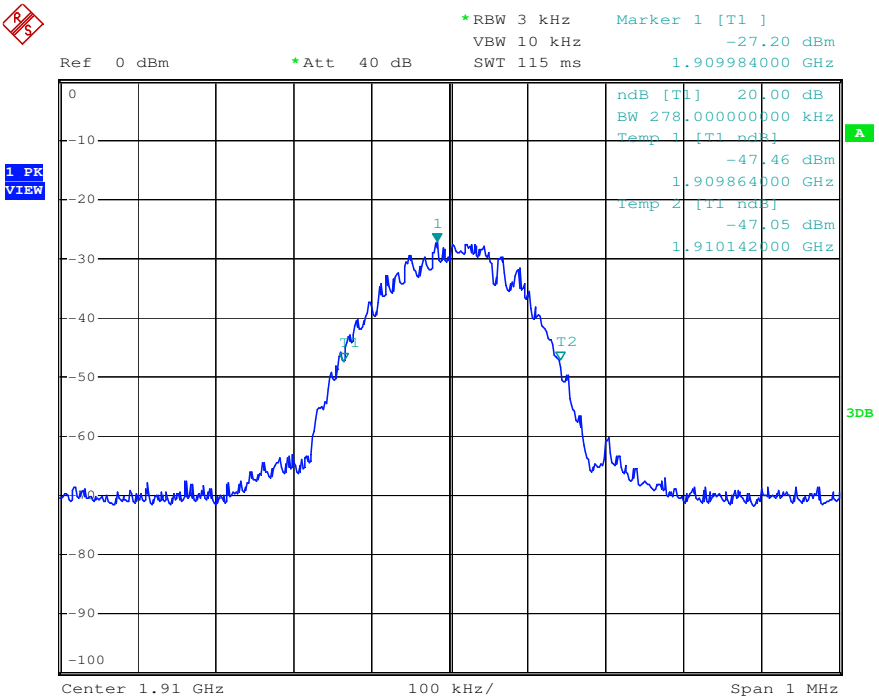
PCS—GSM up link(middle frequency)--Output



PCS—GSM up link(highest frequency)

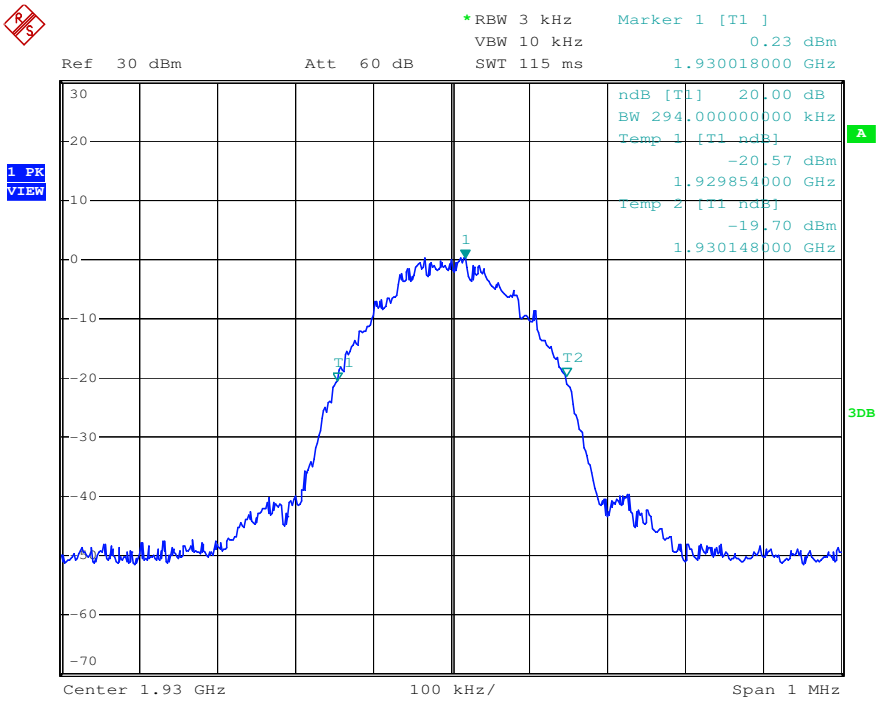


PCS—GSM up link(highest frequency)

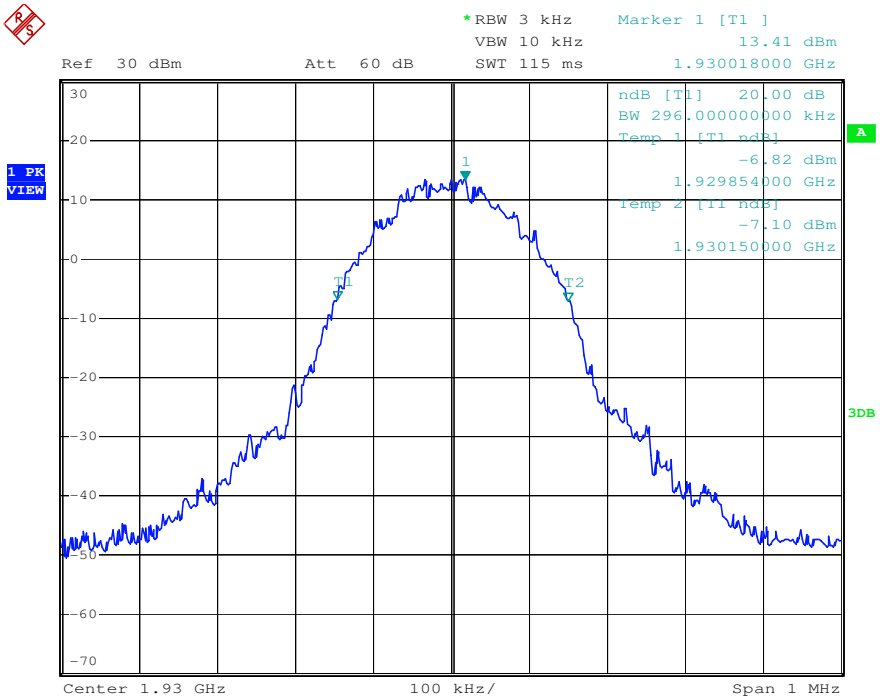


PCS Band

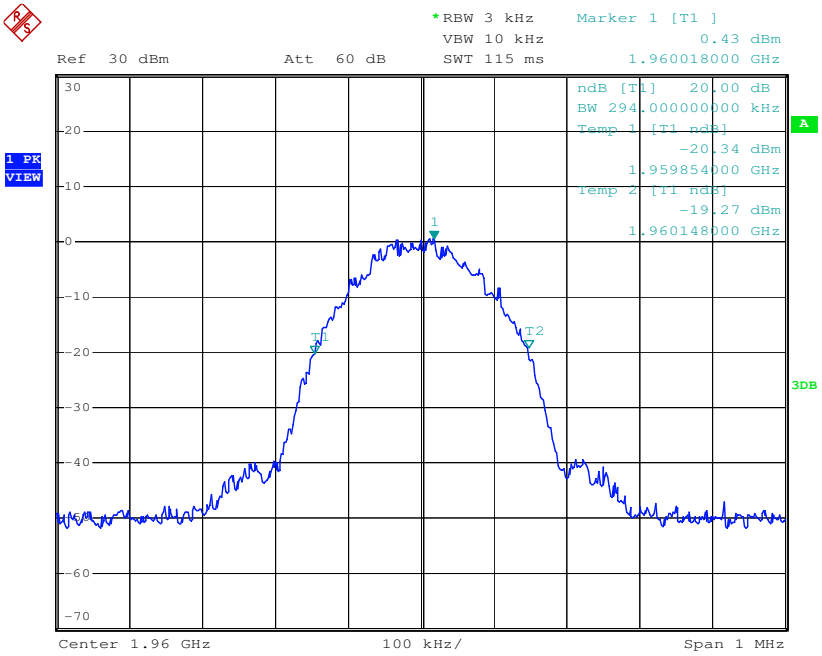
PCS—EDGE down link(lowest frequency)—Input



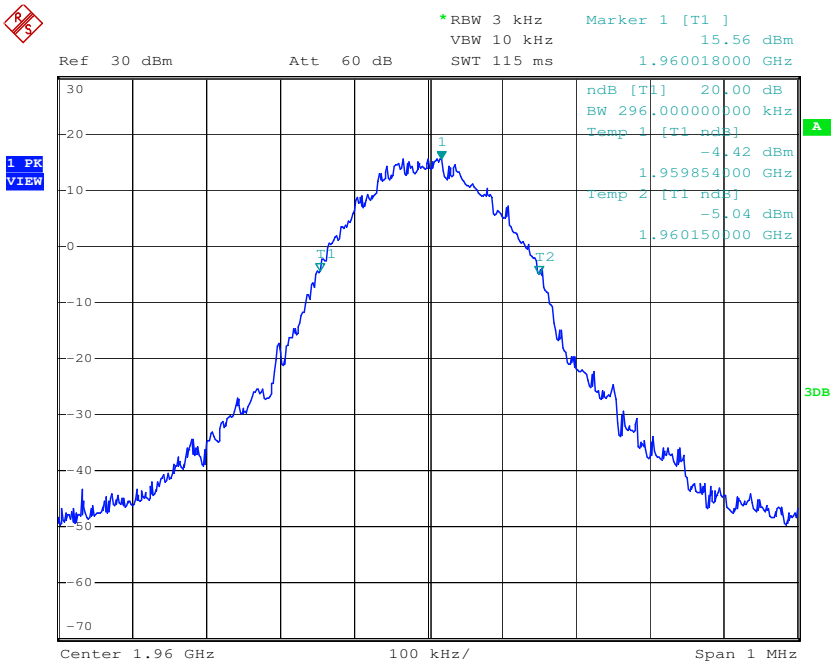
PCS—EDGE down link(lowest frequency)--Output



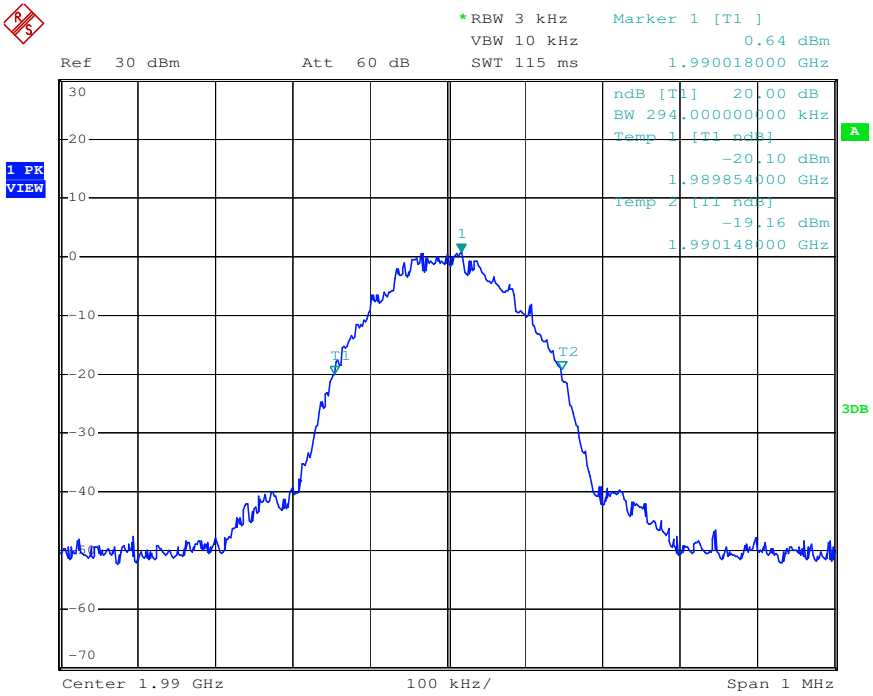
PCS—EDGE down link(middle frequency)—Input



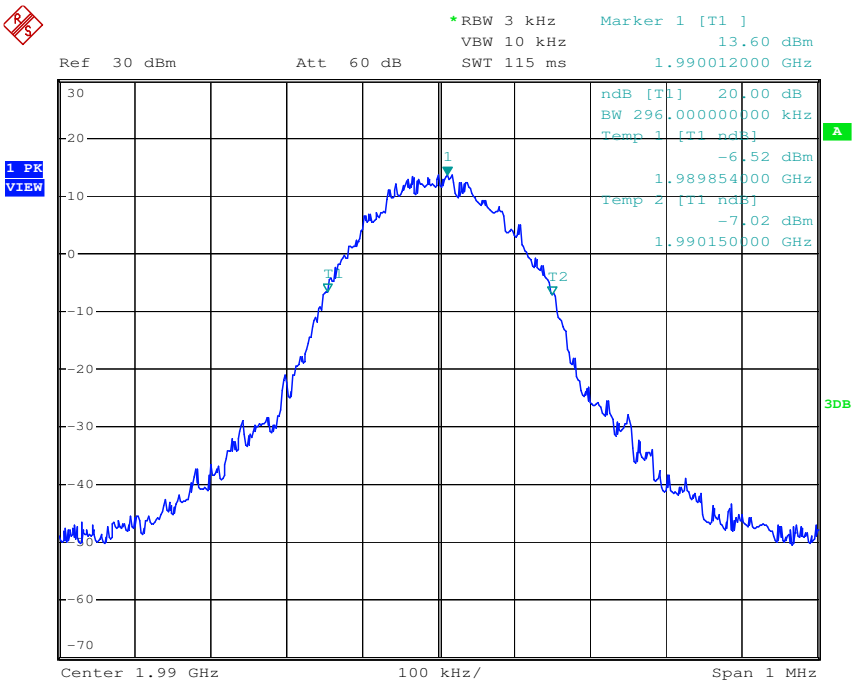
PCS—EDGE down link(middle frequency)--Output



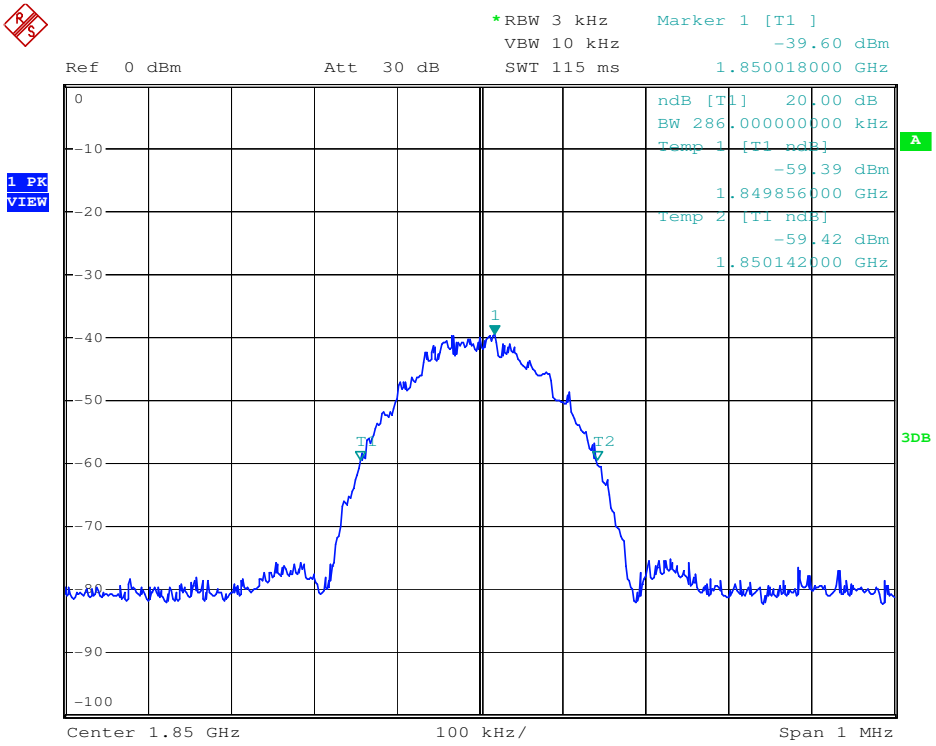
PCS—EDGE down link(highest frequency)—Input



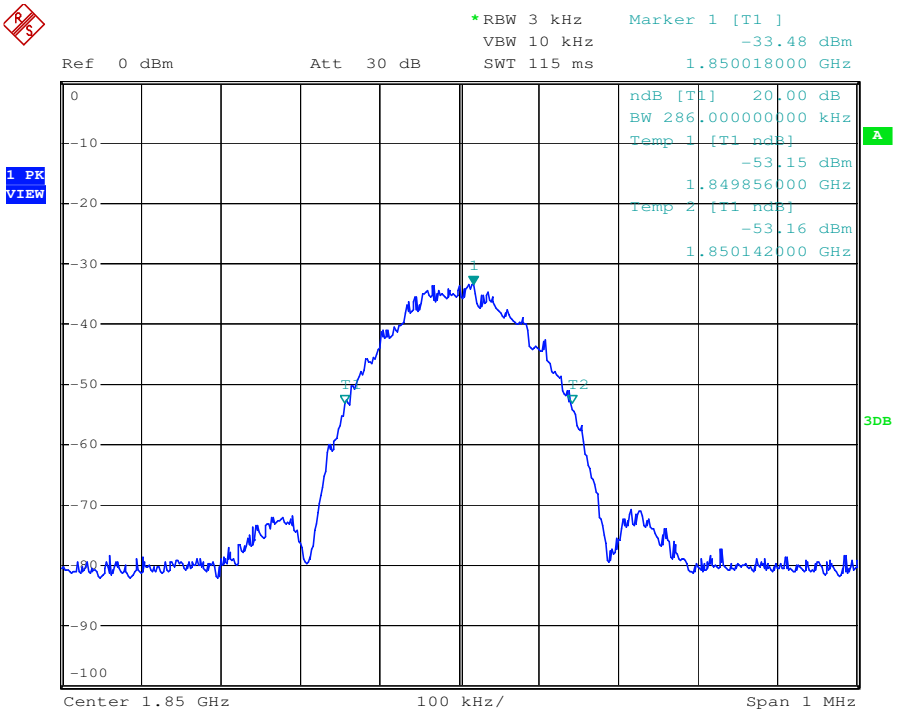
PCS—EDGE down link(highest frequency)--Output



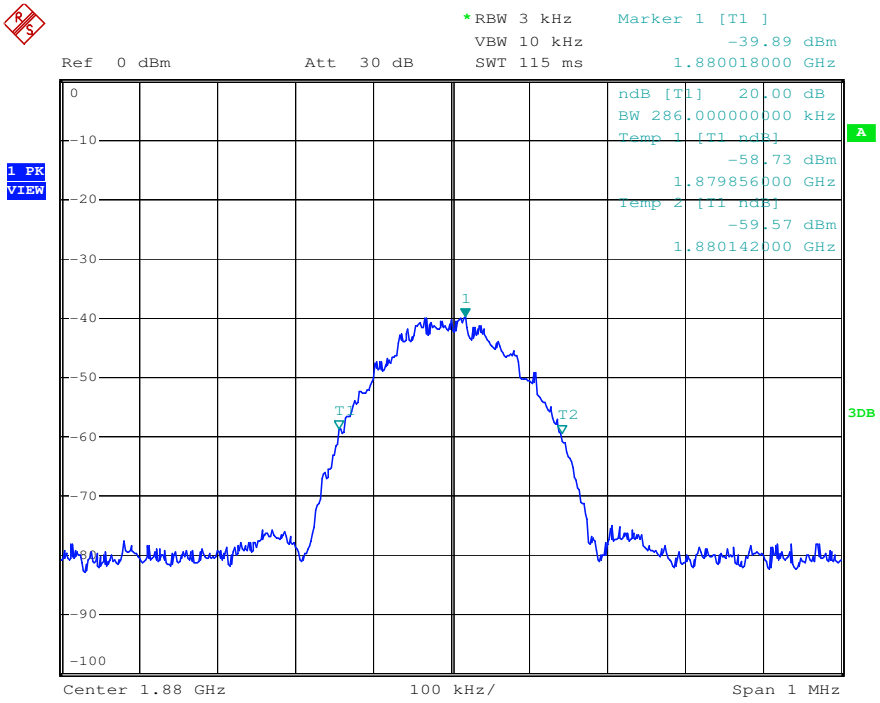
PCS—EDGE up link(lowest frequency)--Input



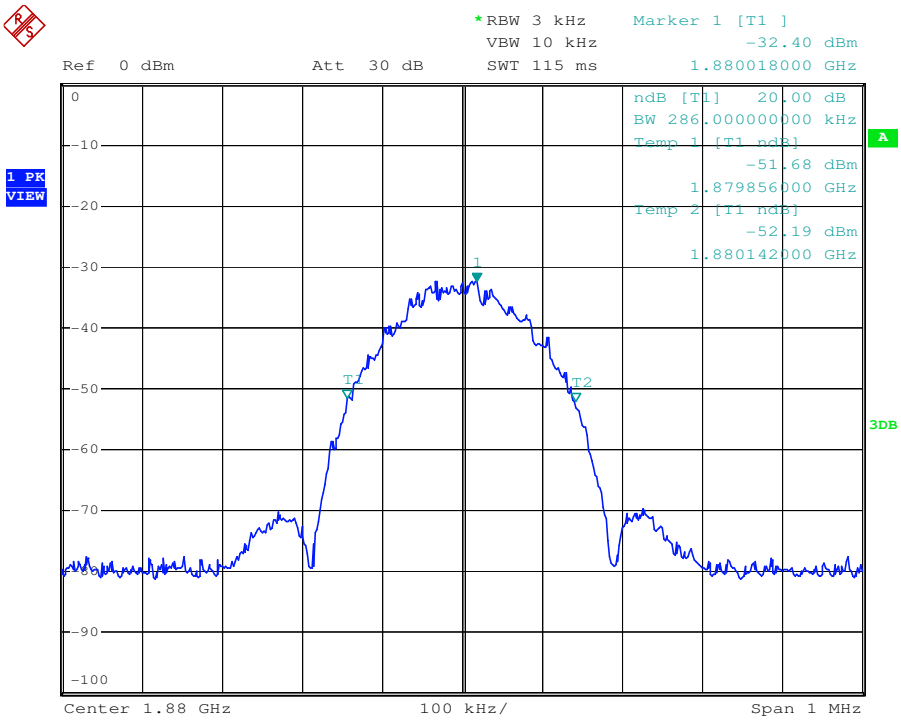
PCS—EDGE up link(lowest frequency)--Output



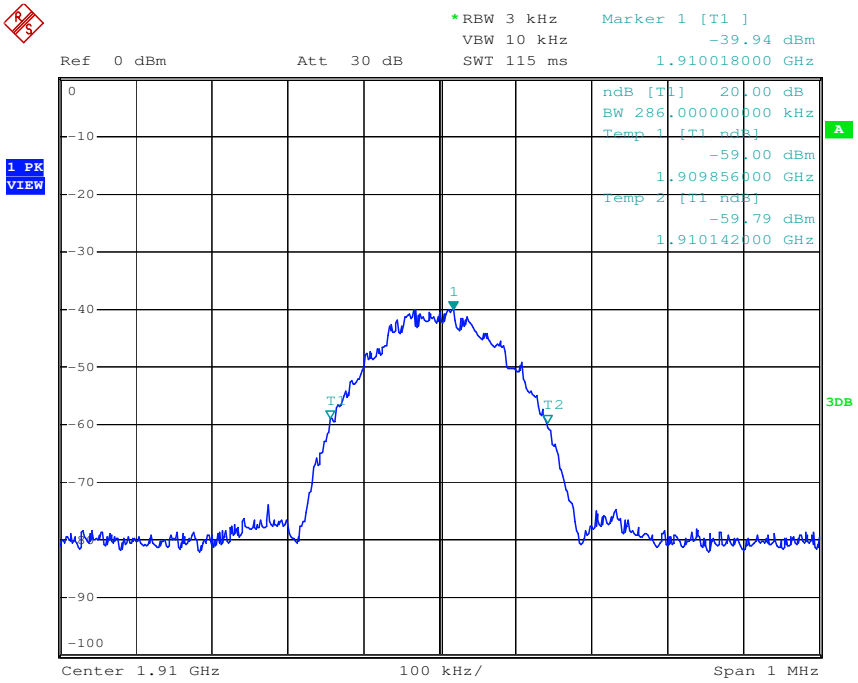
PCS—EDGE up link(middle frequency)—Input



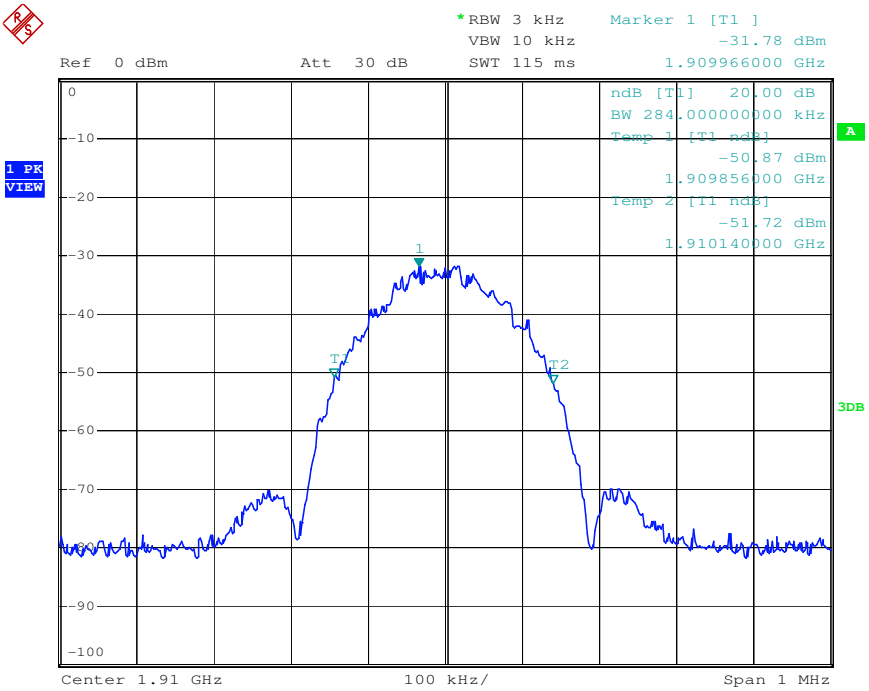
PCS—EDGE up link(middle frequency)--Output



PCS—EDGE up link(highest frequency)

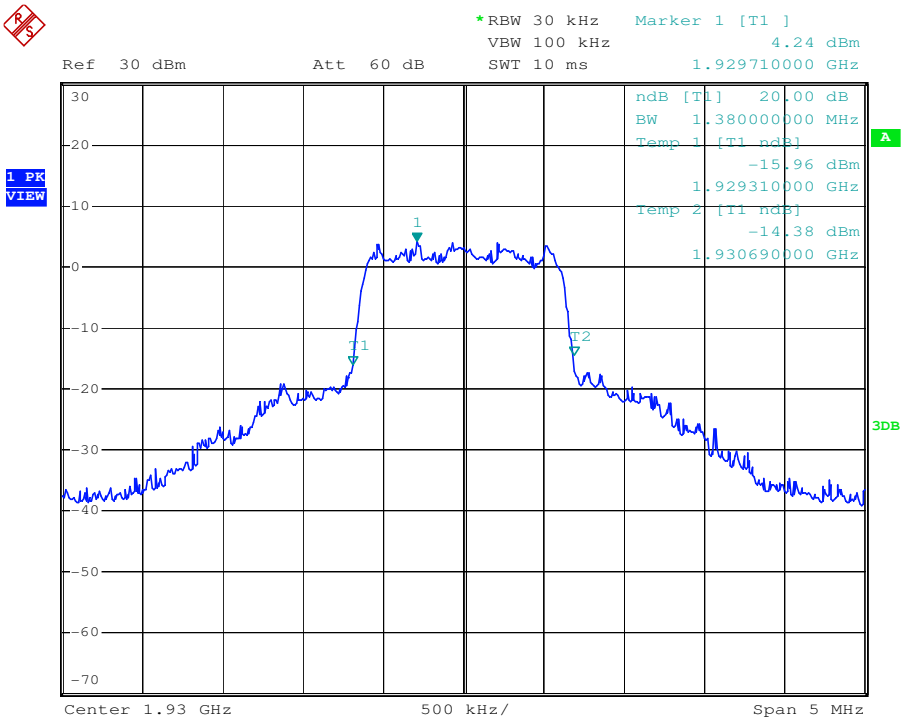


PCS—EDGE up link(highest frequency)

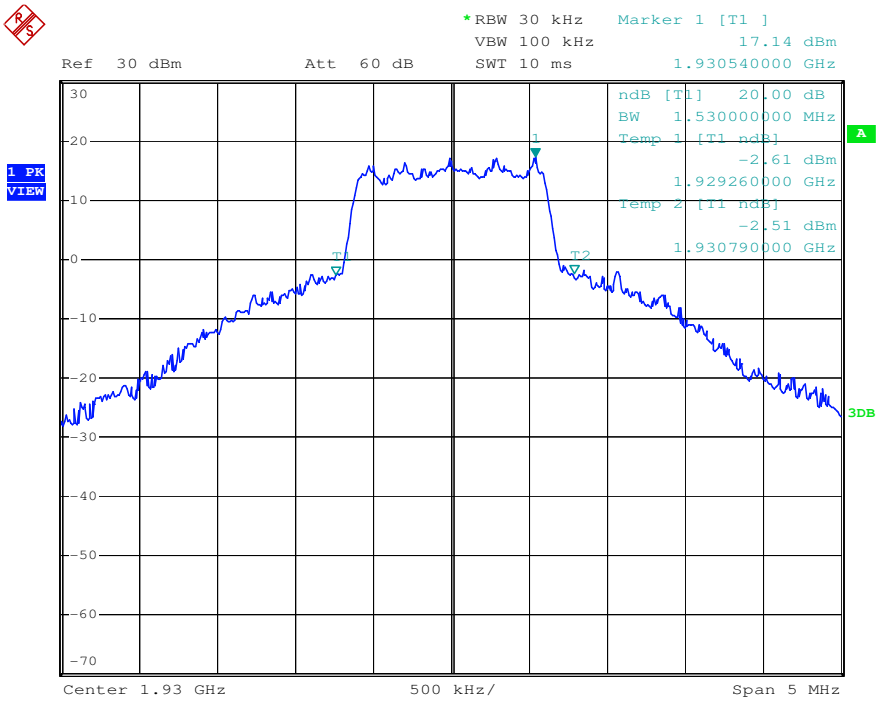


PCS Band

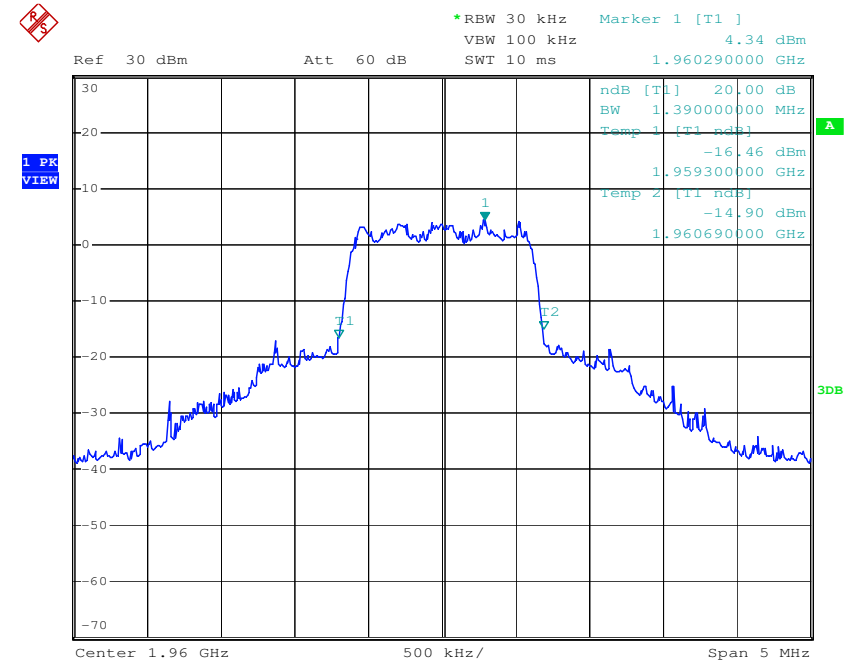
PCS—CDMA down link(lowest frequency)—Input



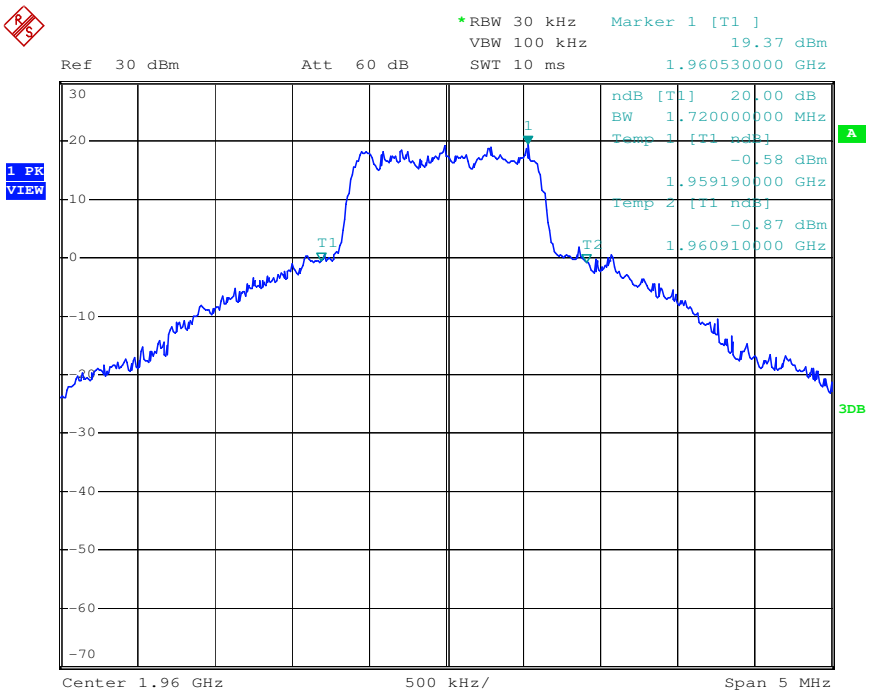
PCS—CDMA down link(lowest frequency)--Output



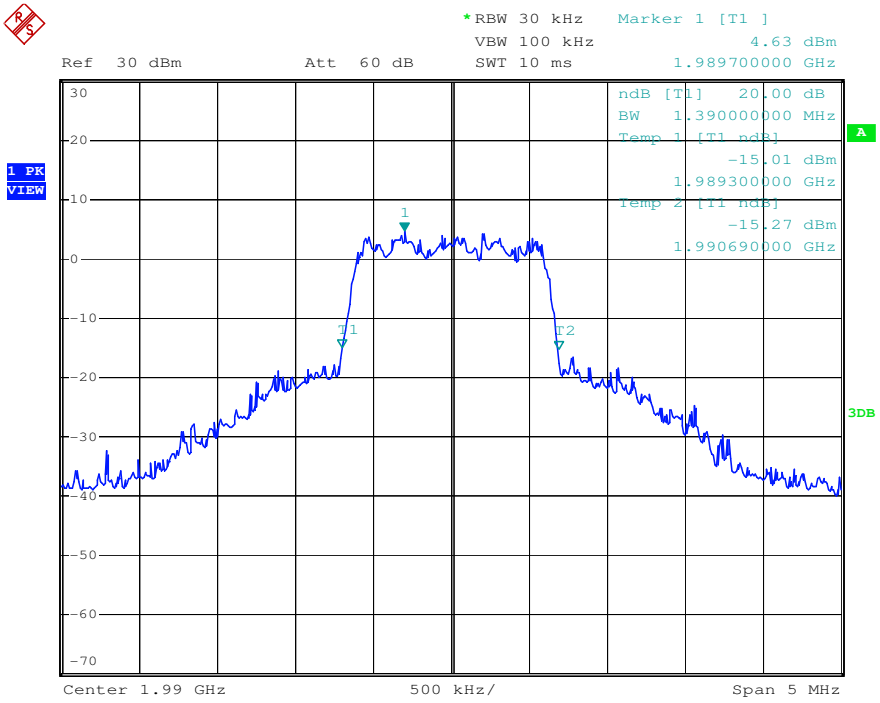
PCS—CDMA down link(middle frequency)—Input



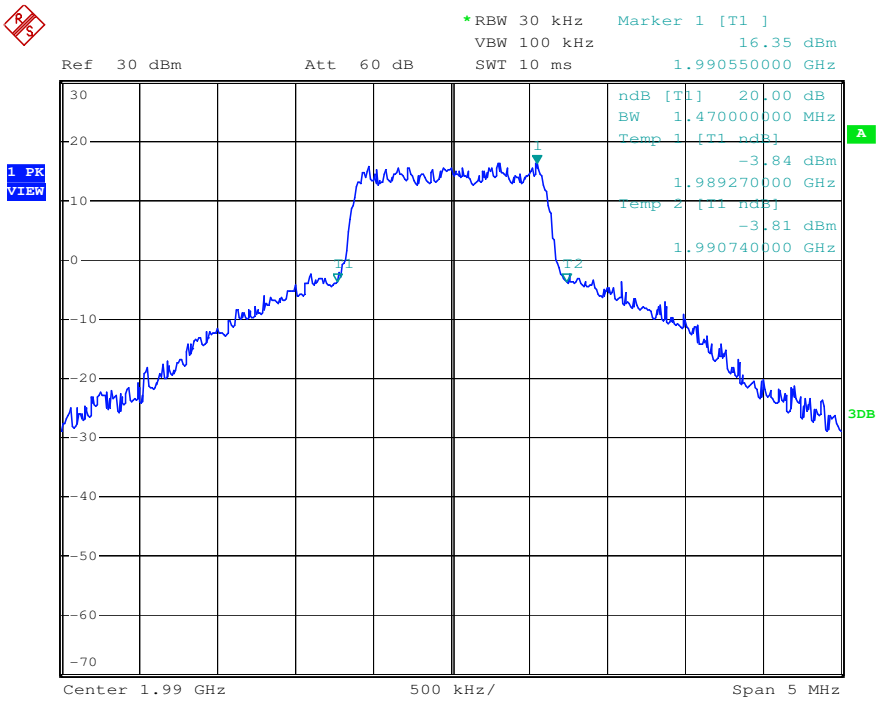
PCS—CDMA down link(middle frequency)--Output



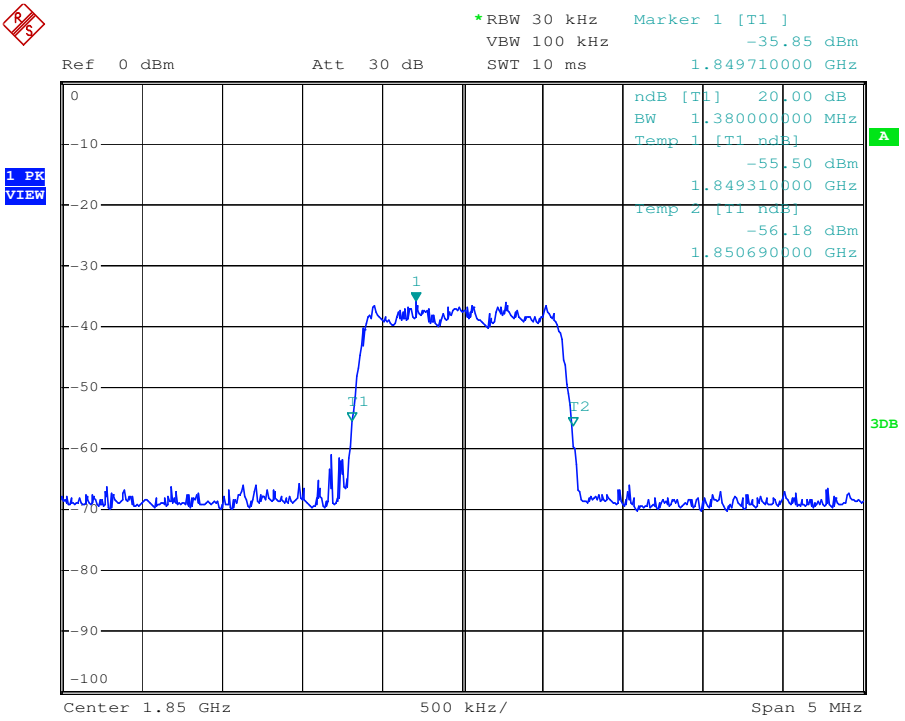
PCS—CDMA down link(highest frequency)—Input



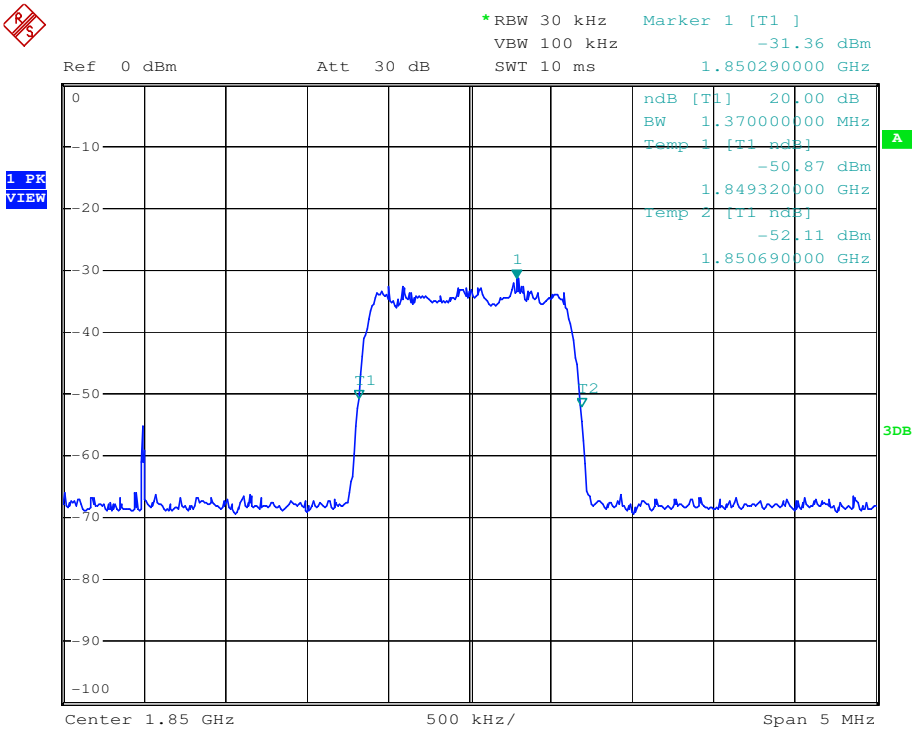
PCS—CDMA down link(highest frequency)--Output



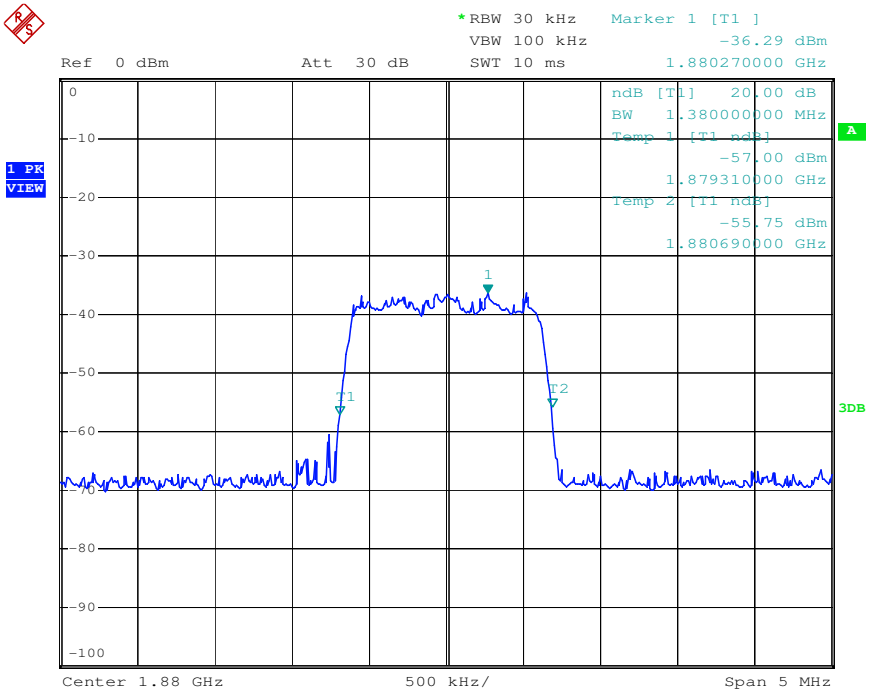
PCS—CDMA up link(lowest frequency)--Input



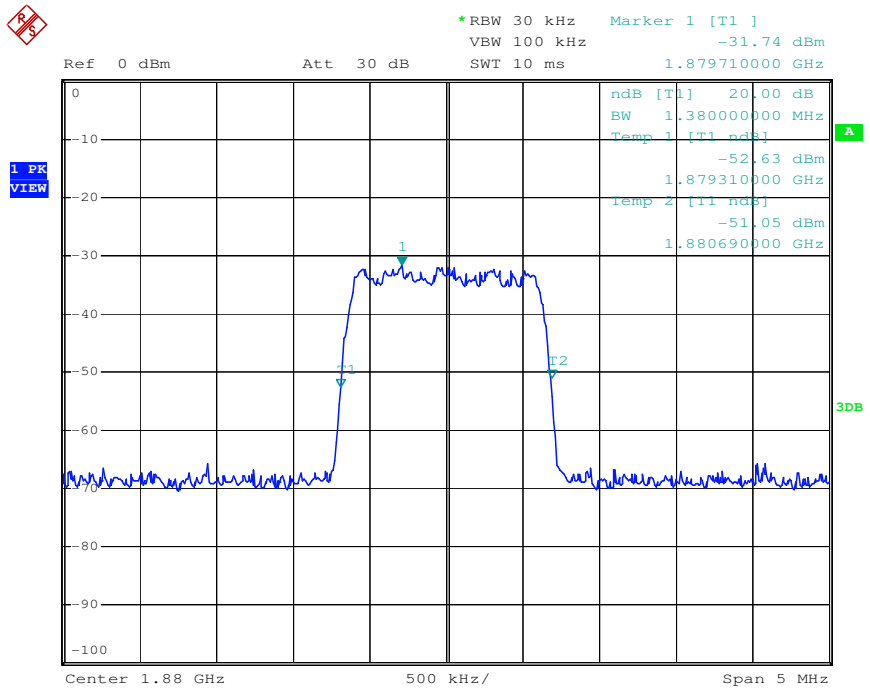
PCS—CDMA up link(lowest frequency)--Output



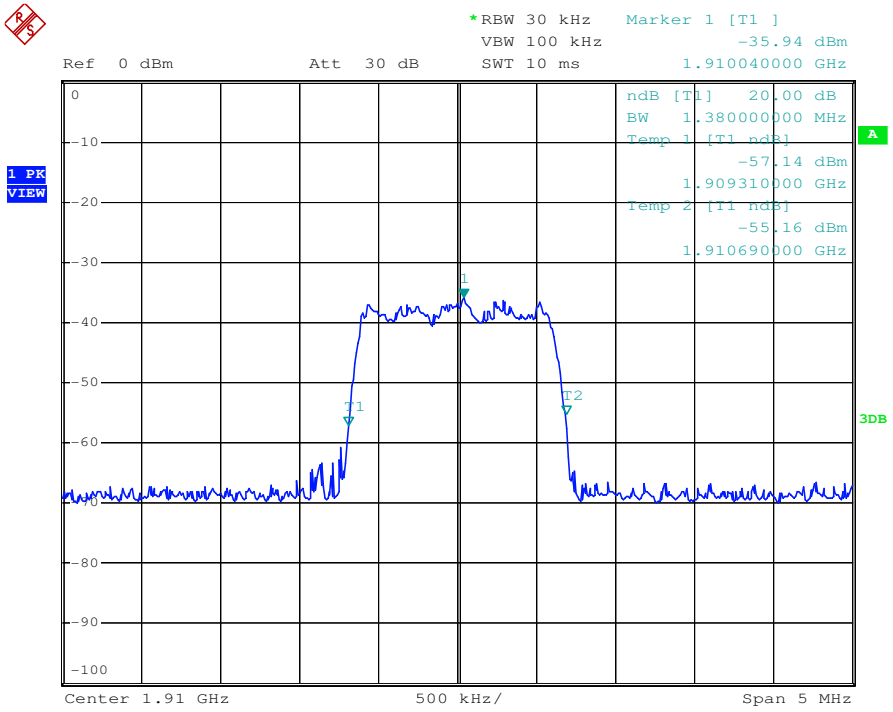
PCS—CDMA up link(middle frequency)—Input



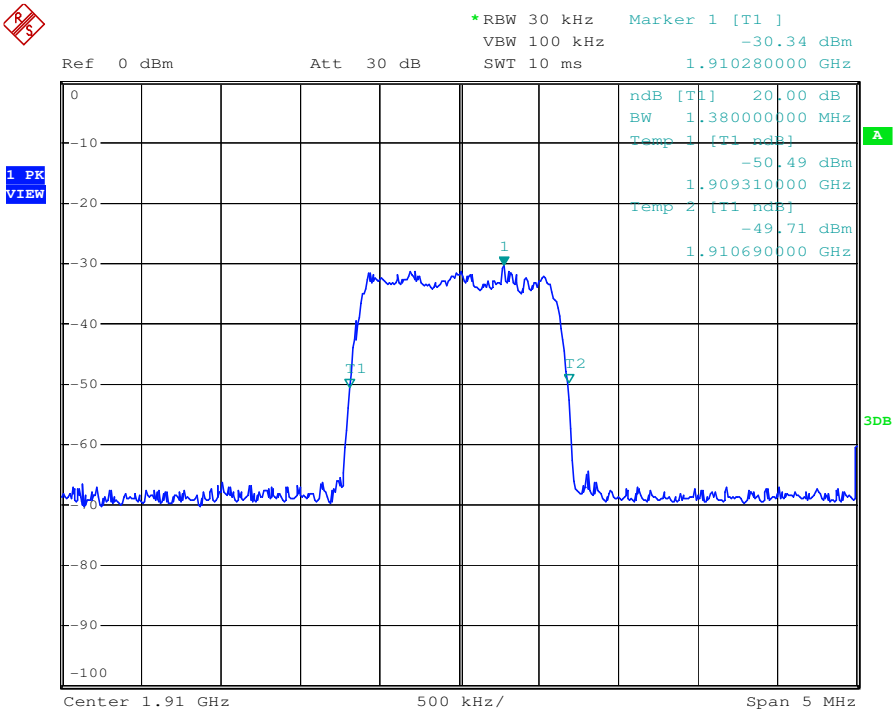
PCS—CDMA up link(middle frequency)--Output



PCS—CDMA up link(highest frequency)

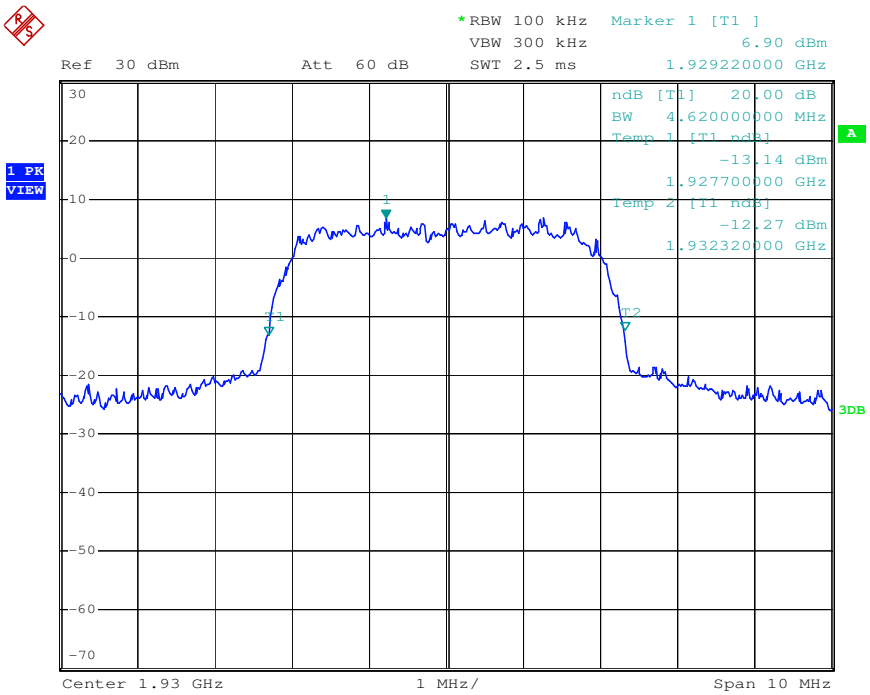


PCS—CDMA up link(highest frequency)

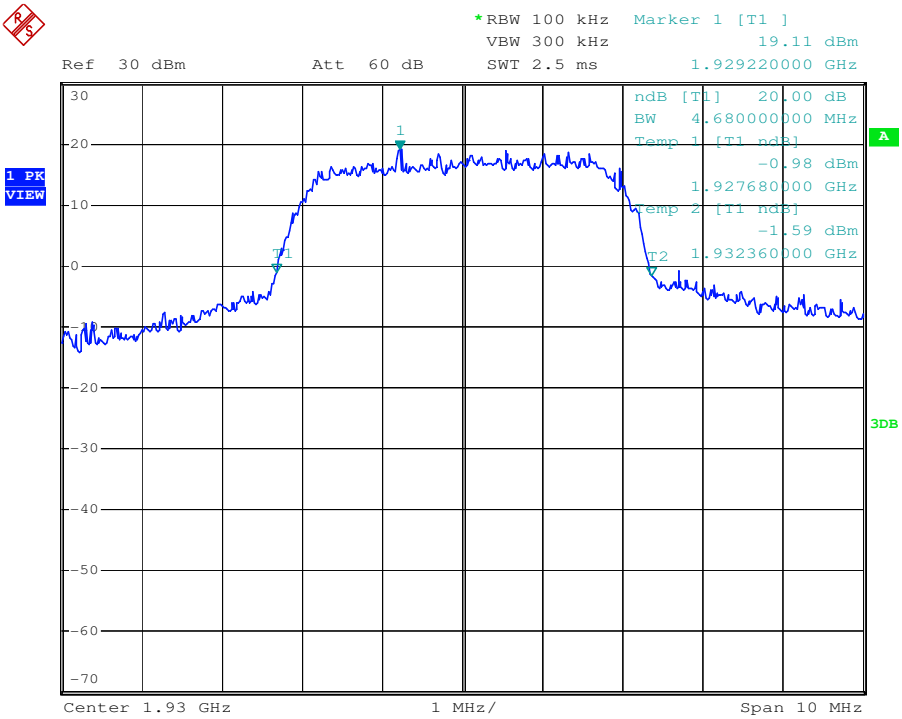


PCS Band

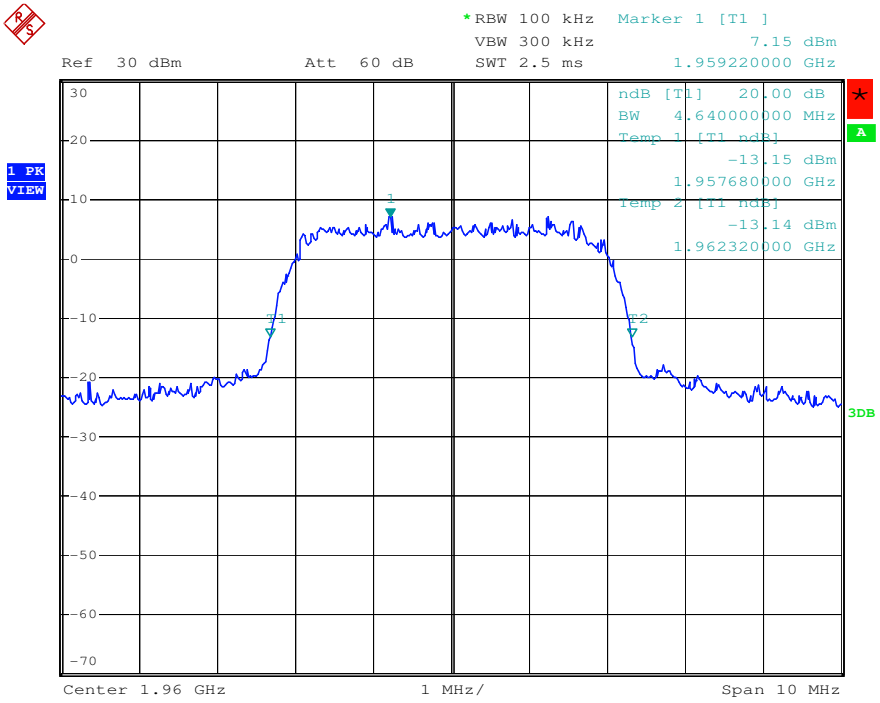
PCS—WCDMA down link(lowest frequency)—Input



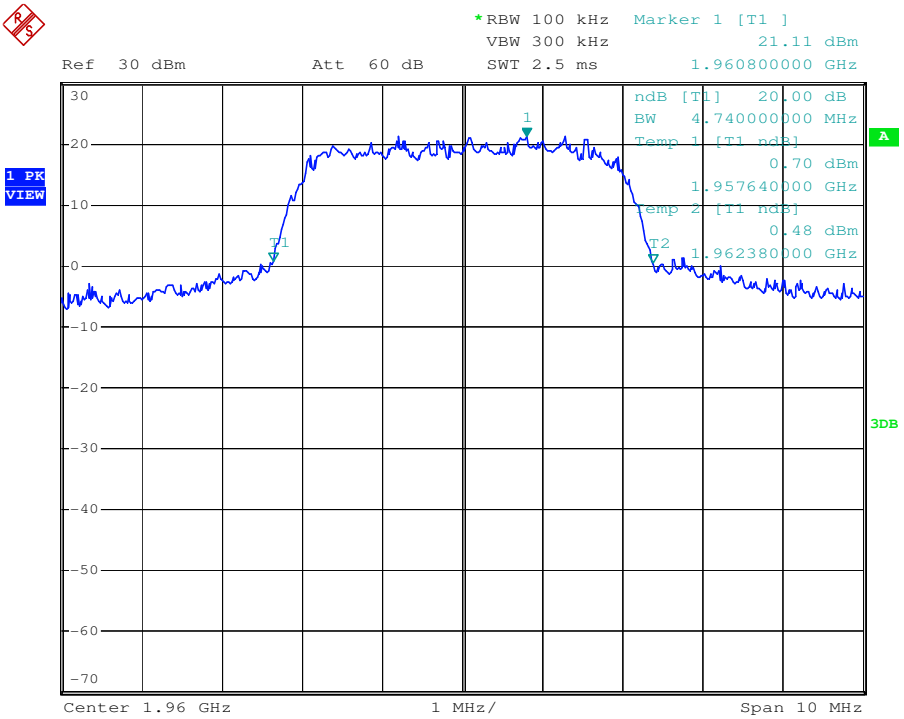
PCS—WCDMA down link(lowest frequency)--Output



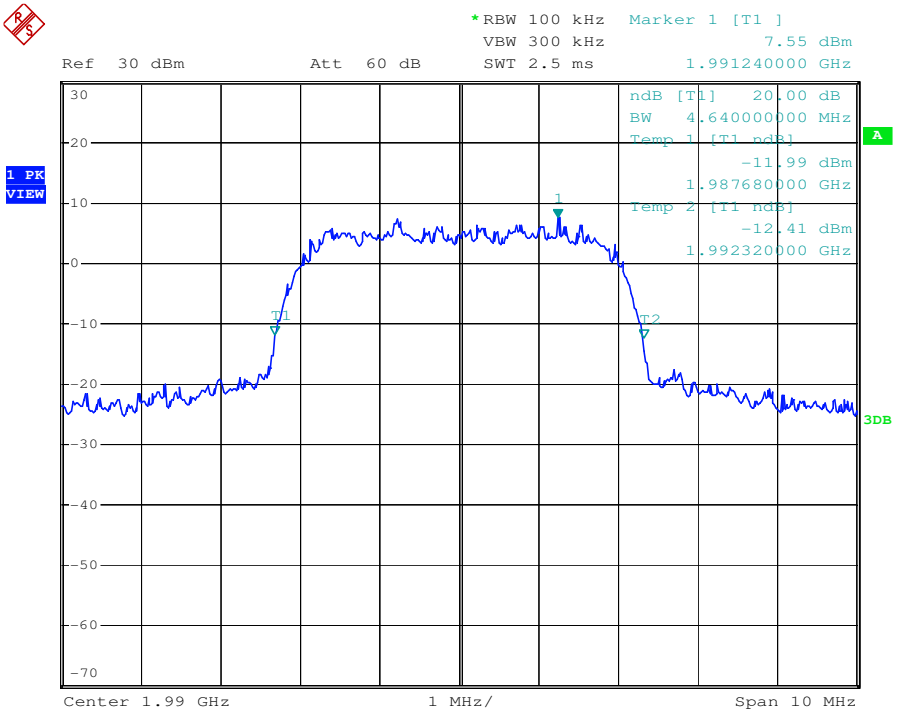
PCS—WCDMA down link(middle frequency)—Input



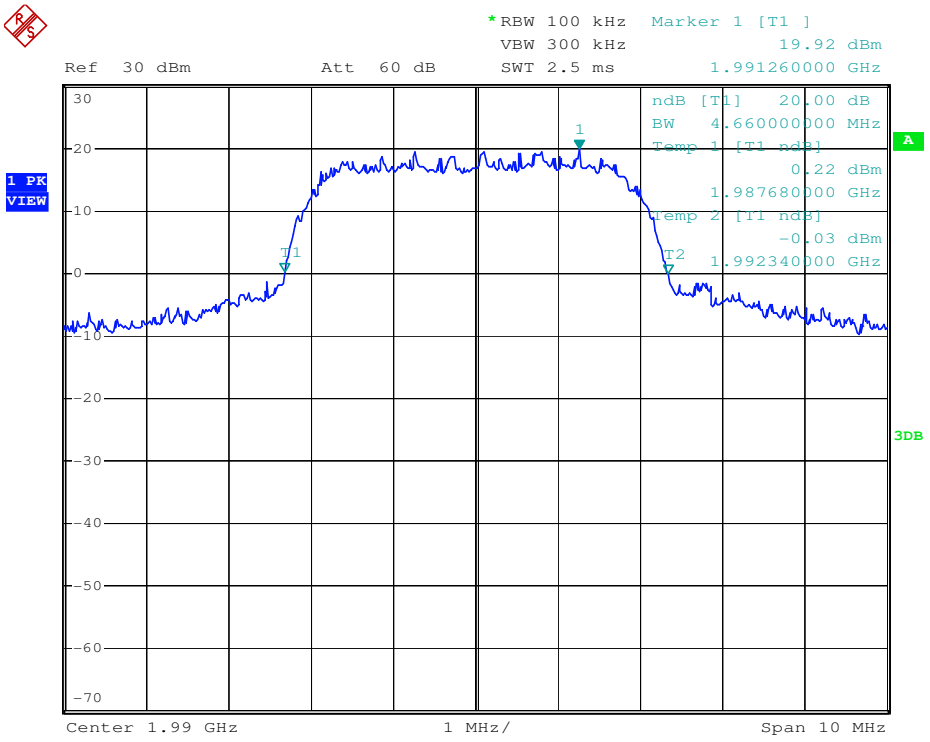
PCS—WCDMA down link(middle frequency)--Output



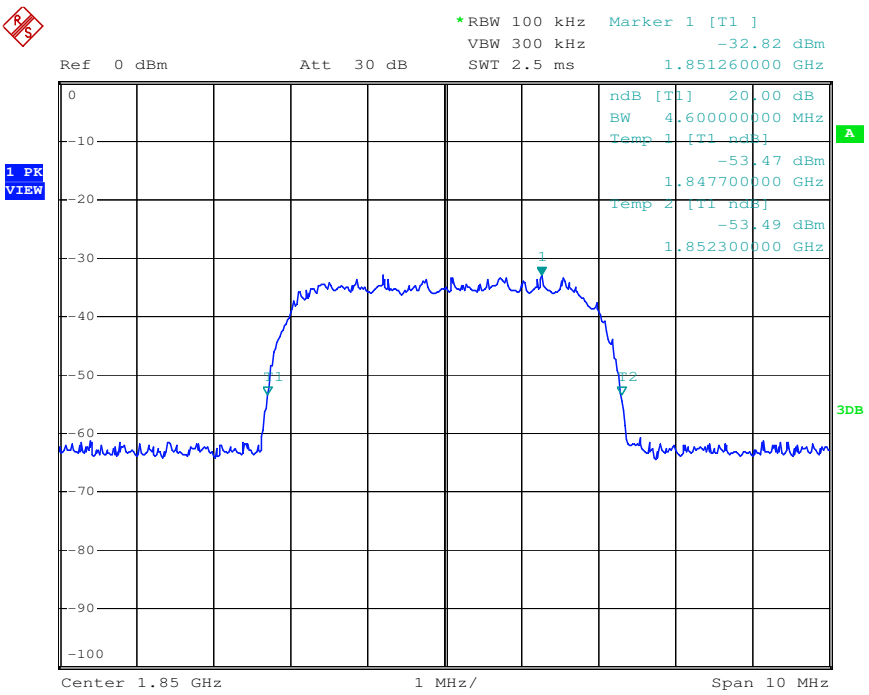
PCS—WCDMA down link(highest frequency)—Input



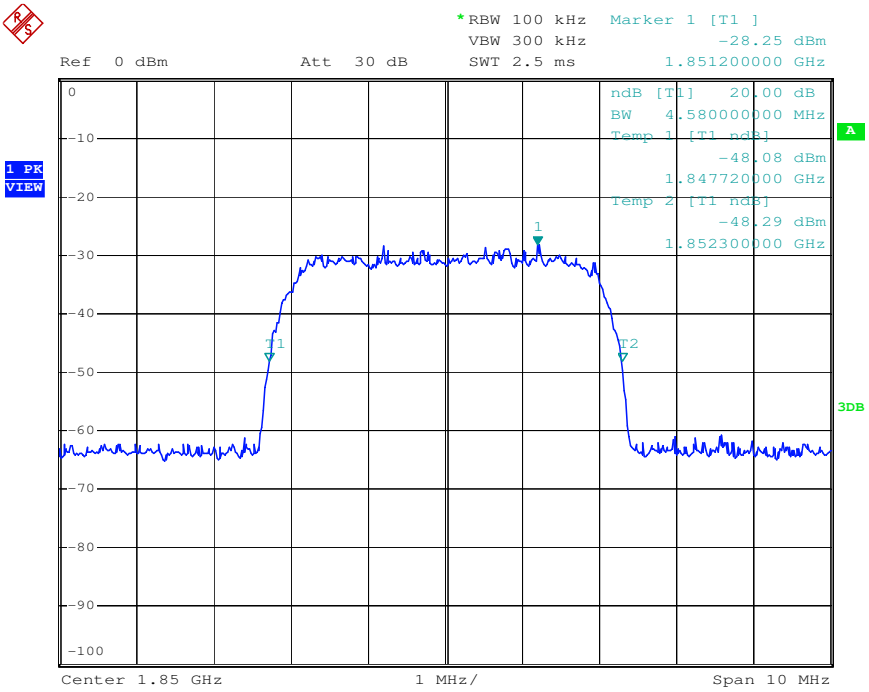
PCS—WCDMA down link(highest frequency)--Output



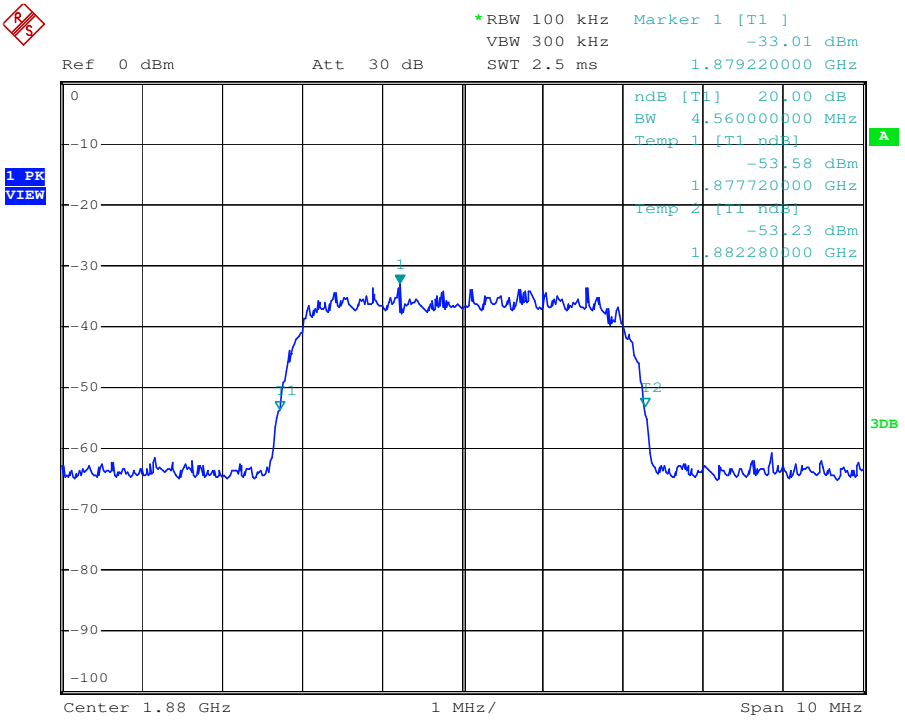
PCS—WCDMA up link(lowest frequency)--Input



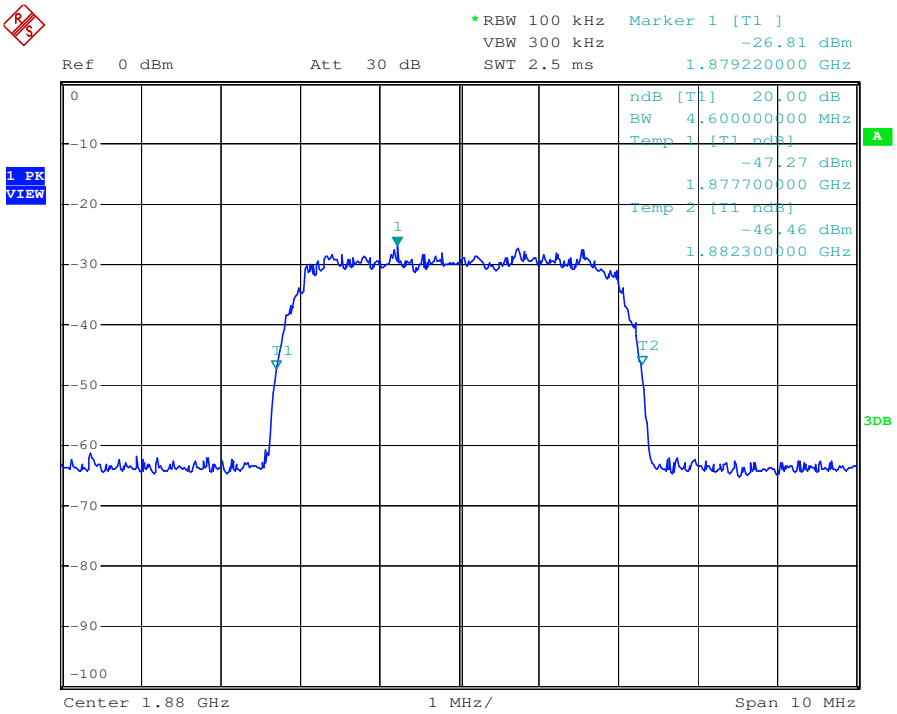
PCS—WCDMA up link(lowest frequency)--Output



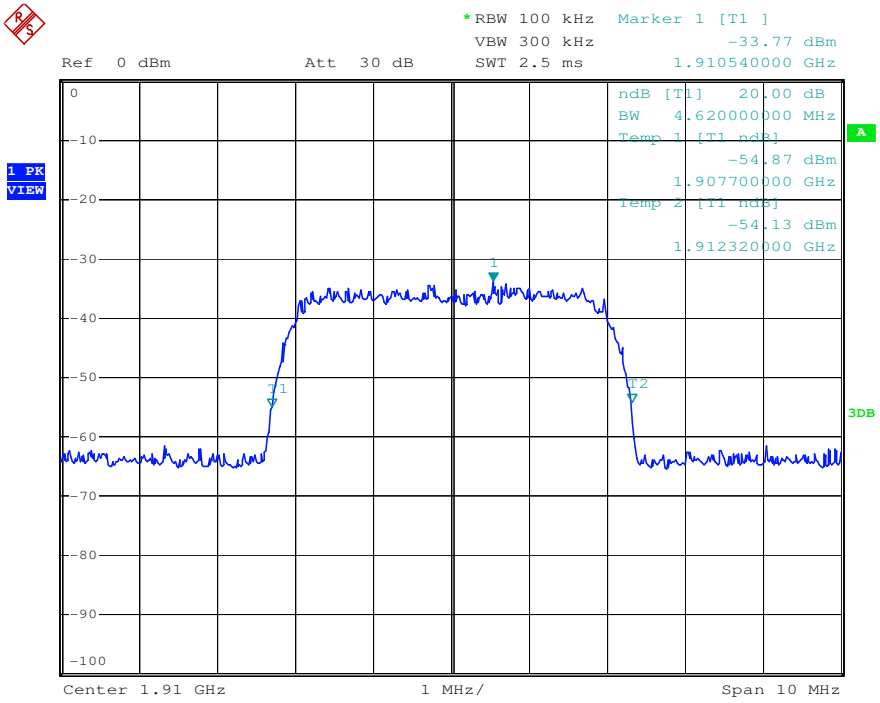
PCS—WCDMA up link(middle frequency)—Input



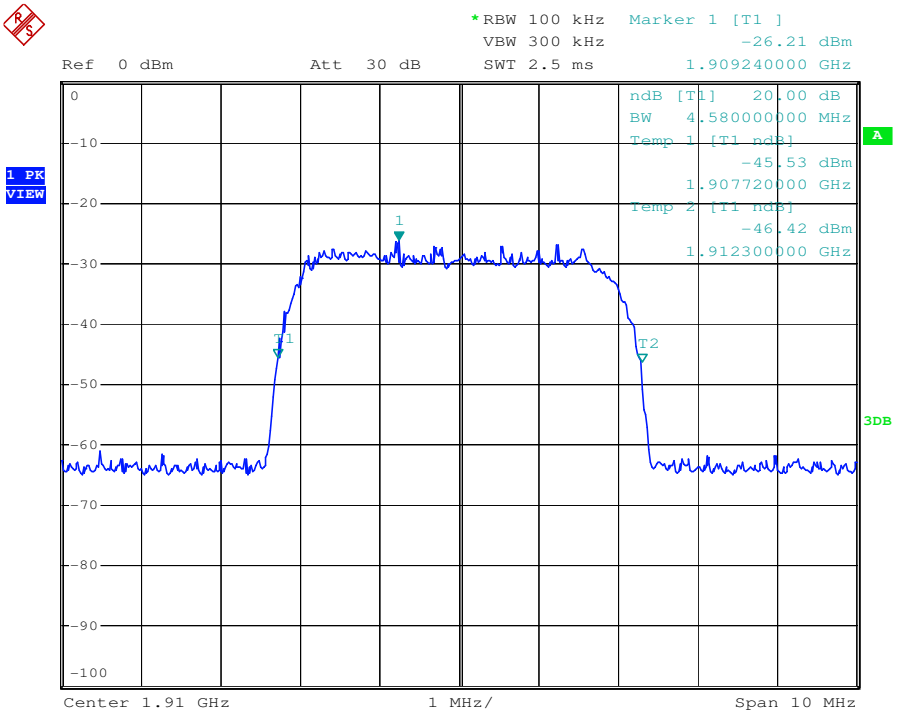
PCS—WCDMA up link(middle frequency)--Output



PCS—WCDMA up link(highest frequency)



PCS—WCDMA up link(highest frequency)



6.2.6 Intermodulation

Test Date:	10 to 12 November 2008
Test Requirement:	FCC part 22.917(a) & FCC part 24.238(a) **§22.917 Emission limitations for cellular equipment.** 22.917(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. **§24.238 Emission limitations for Broadband PCS equipment** 24.238(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Test Method:	2-11-04/EAB/RF
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Cellular Band DL and UL ports,PCS Band DL and UL ports
Test Configuration:	

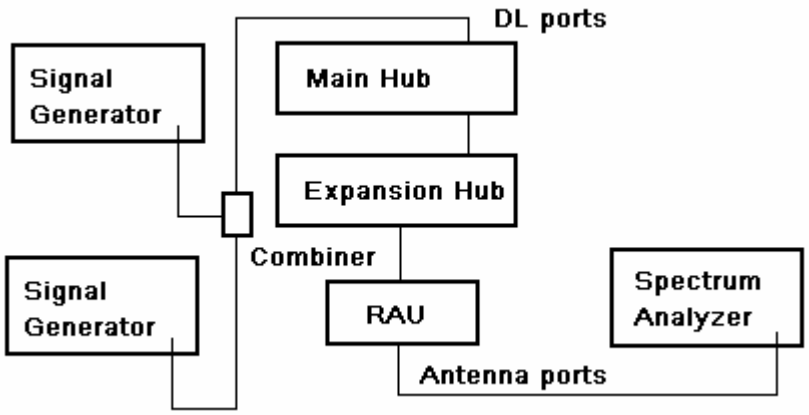


Fig.1 Down link Intermodulation

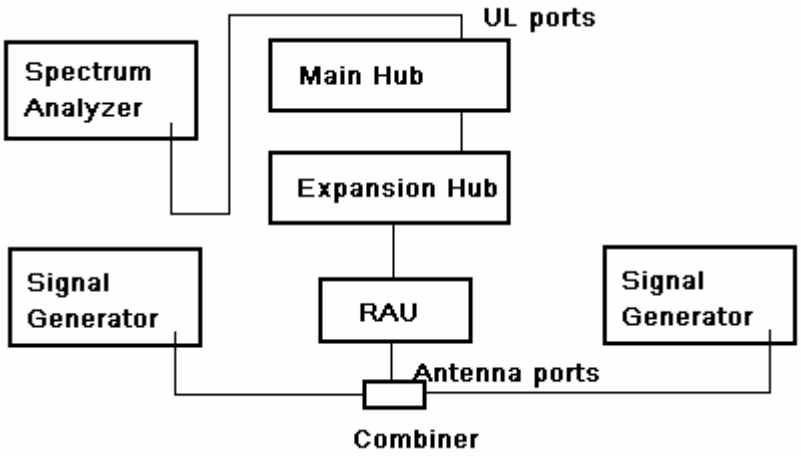


Fig 2.Up link intermodulation

Test Procedure:

1. Connect the equipment as illustrated;
2. Test the background noise level with all the test facilities;
3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroied;
5. Keep the EUT continuously transmitting in max power;
6. Keep two signal generator produce two signals are same in modulation type and level;
7. Measure the 3 order intermodulated product by the EUT(the sum of the two unwanted signal should be rated power);
6. Correct for all losses in the RF path;
7. Read the conducted spurious emissioins of the EUT antenna port.

· CW signal rather than typical signal is acceptable (for FM).

· At maximum drive level, for each modulation: one test with three tones, or two tests (high-, low-band edge) with two tones

· Limit usually is -13dBm conducted.

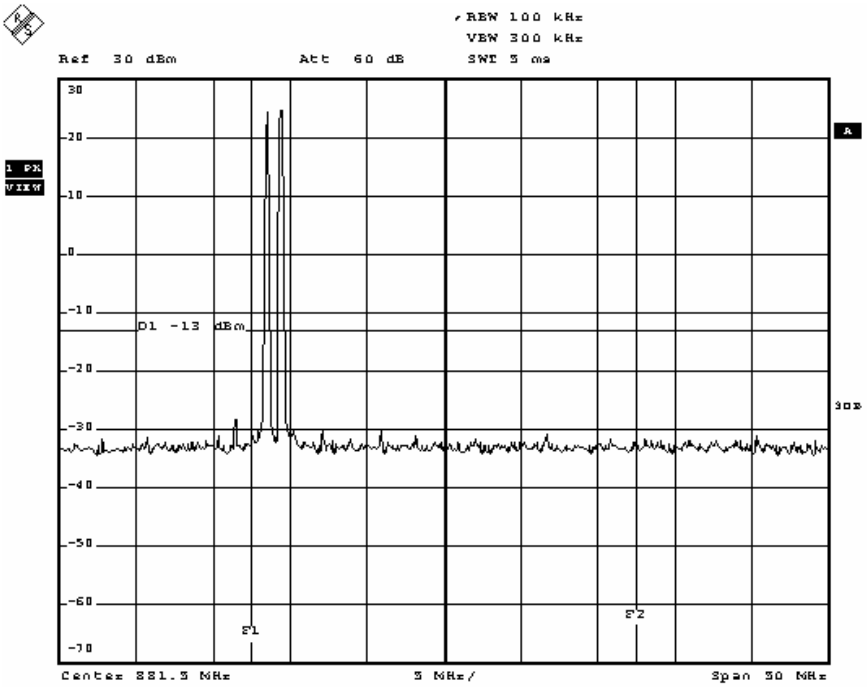
· Not needed for Single Channel systems.

· Combination of modulation types not needed.

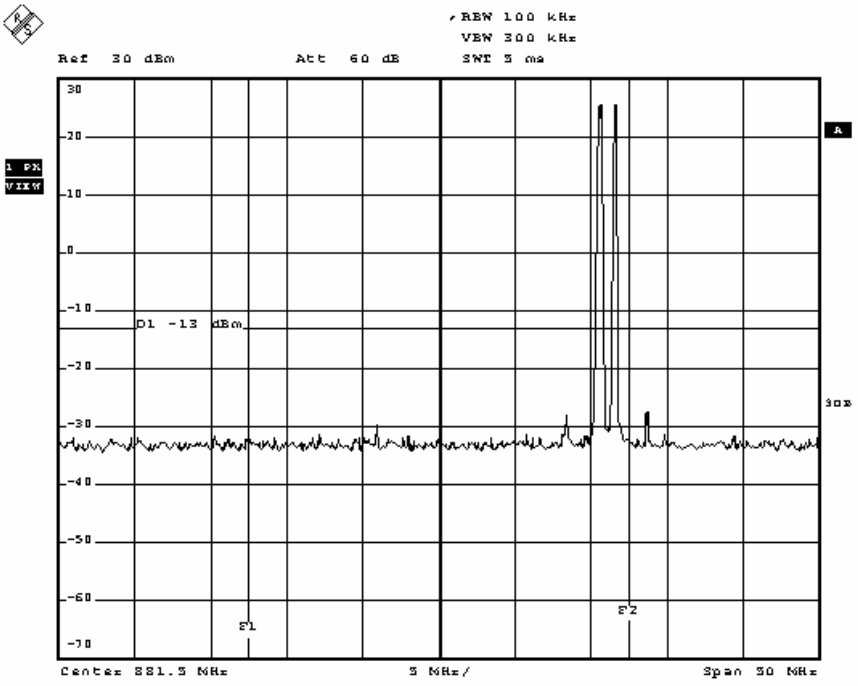
6.2.6.1 Measurement Record:

Cellular Band

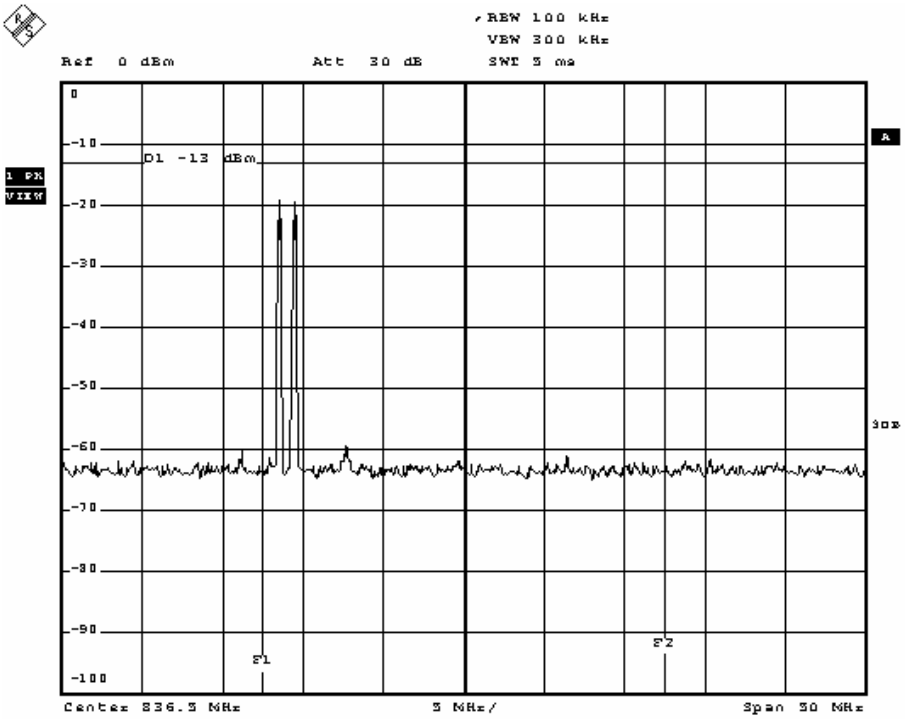
Cellular—AMPS down link– Lower Edge



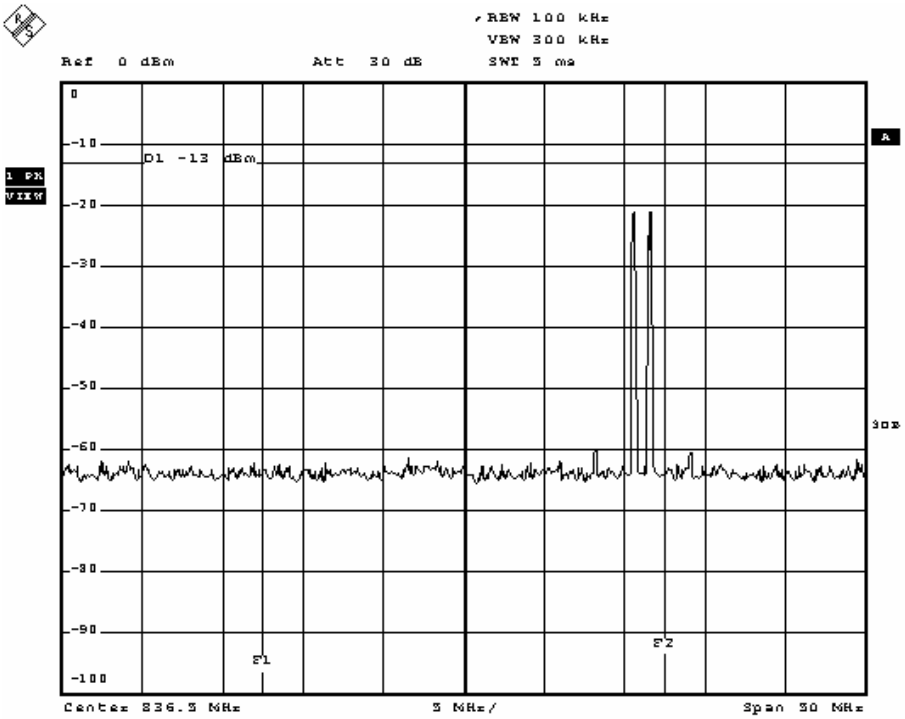
Cellular—AMPS down link– Upper Edge



Cellular—AMPS up link—Lower Edge

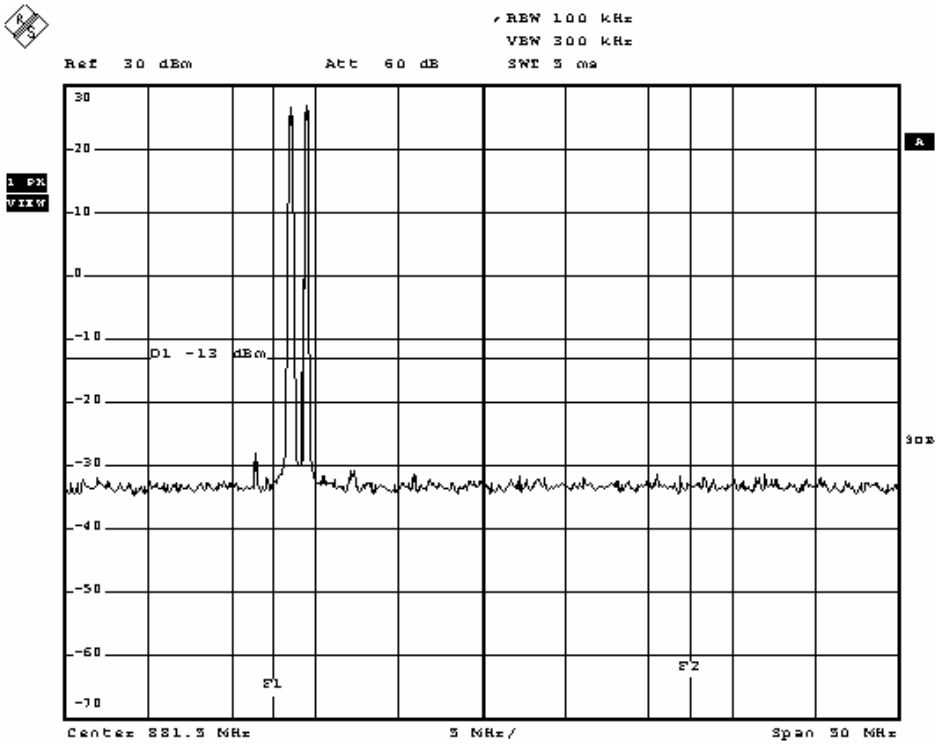


Cellular—AMPS up link—Upper Edge

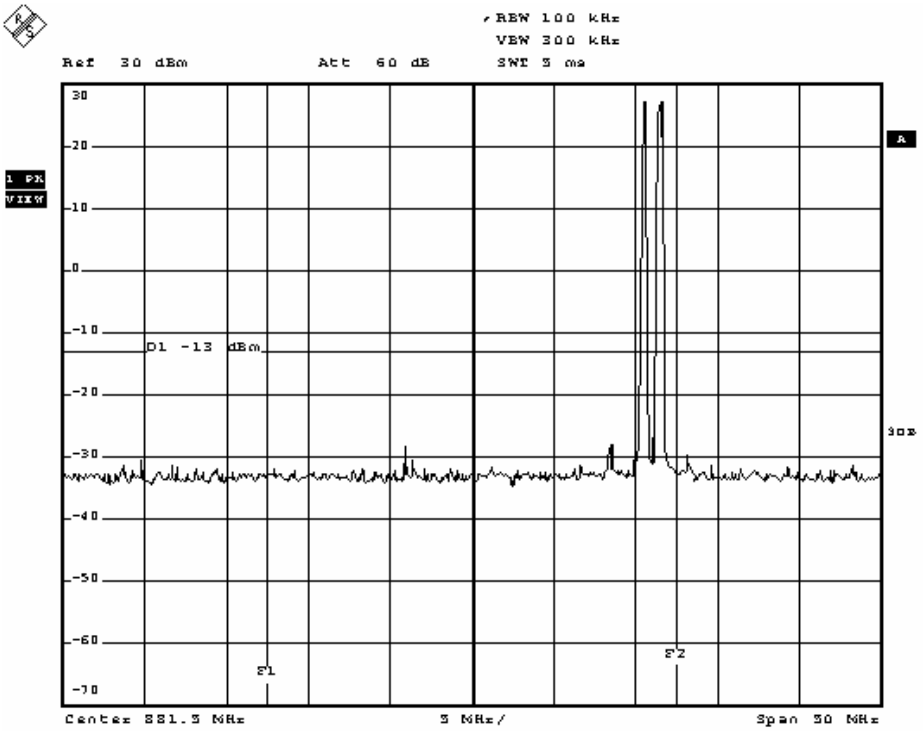


Cellular Band

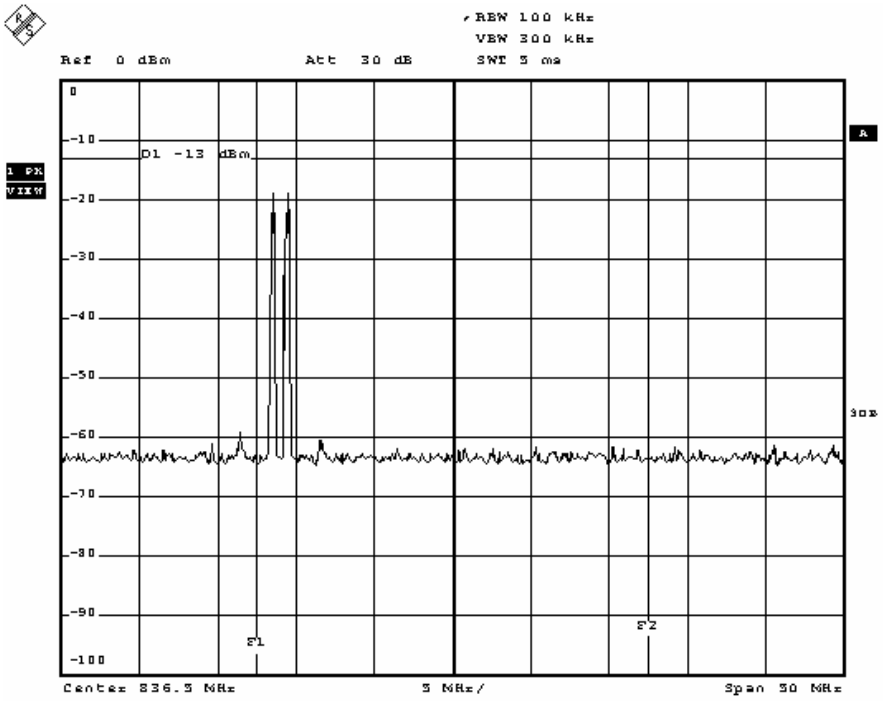
Cellular—TDMA down link– Lower Edge



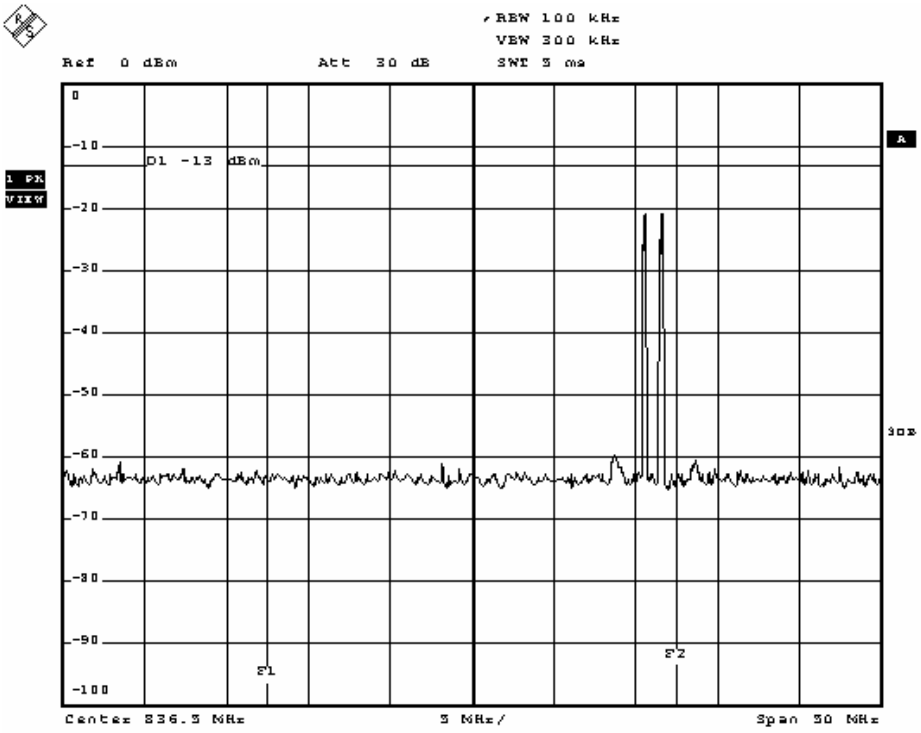
Cellular—TDMA down link– Upper Edge



Cellular—TDMA up link—Lower Edge

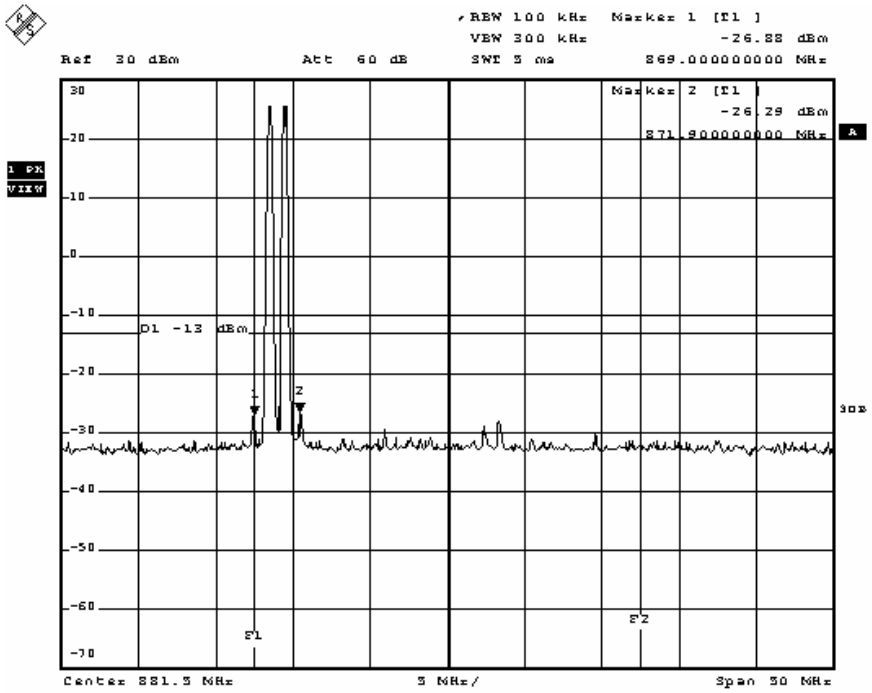


Cellular—TDMA link—Upper Edge

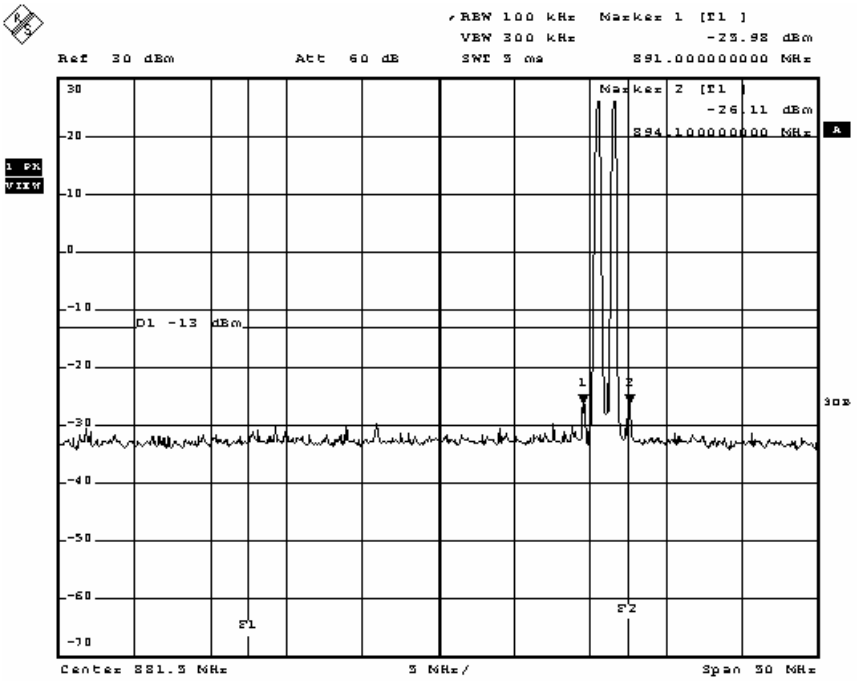


Cellular Band

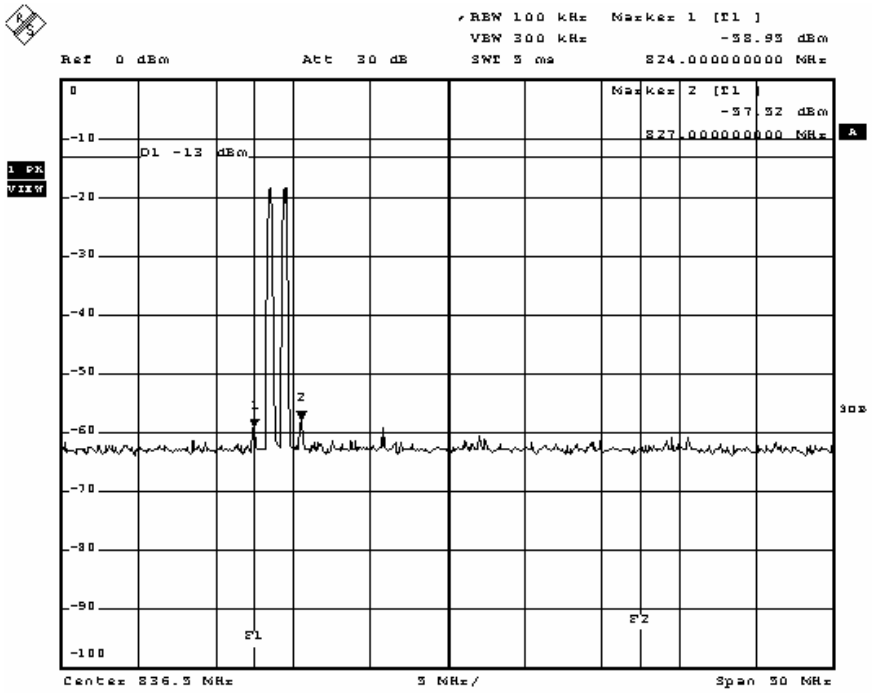
Cellular—GSM down link– Lower Edge



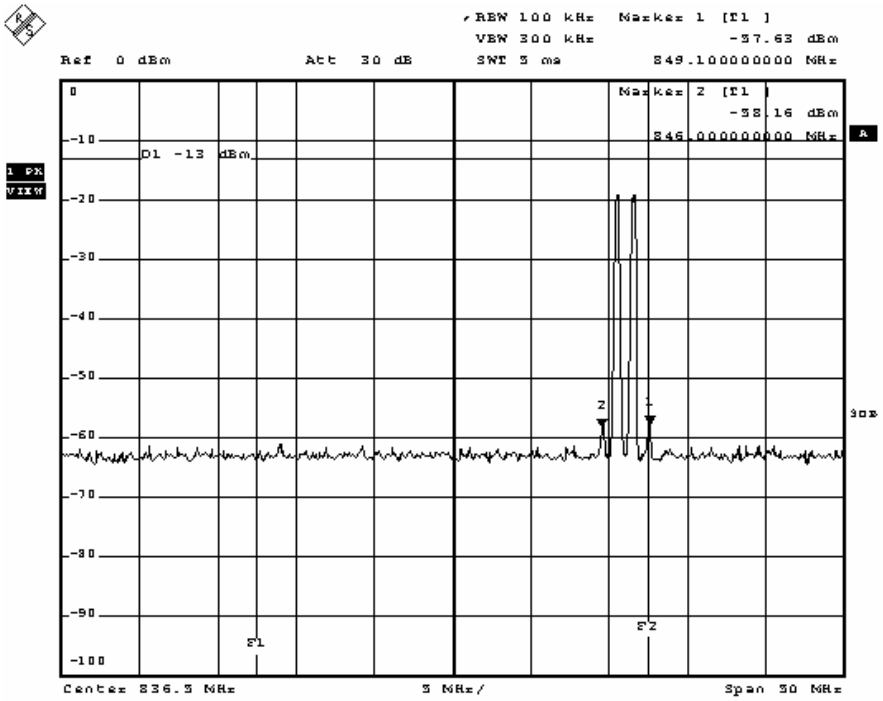
Cellular—GSM down link– Upper Edge



Cellular—GSM up link—Lower Edge

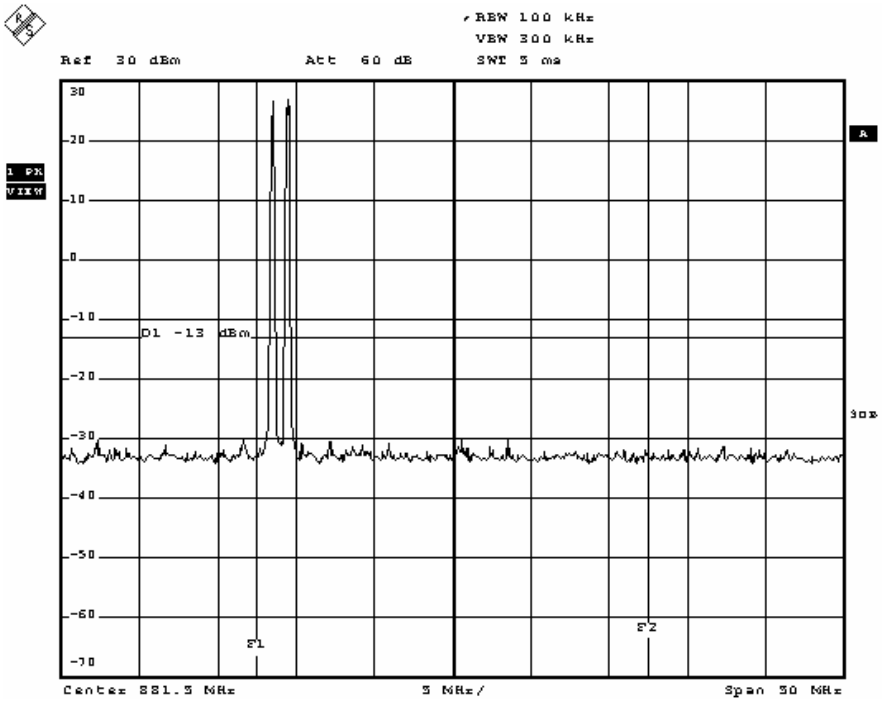


Cellular—GSM up link—Upper Edge

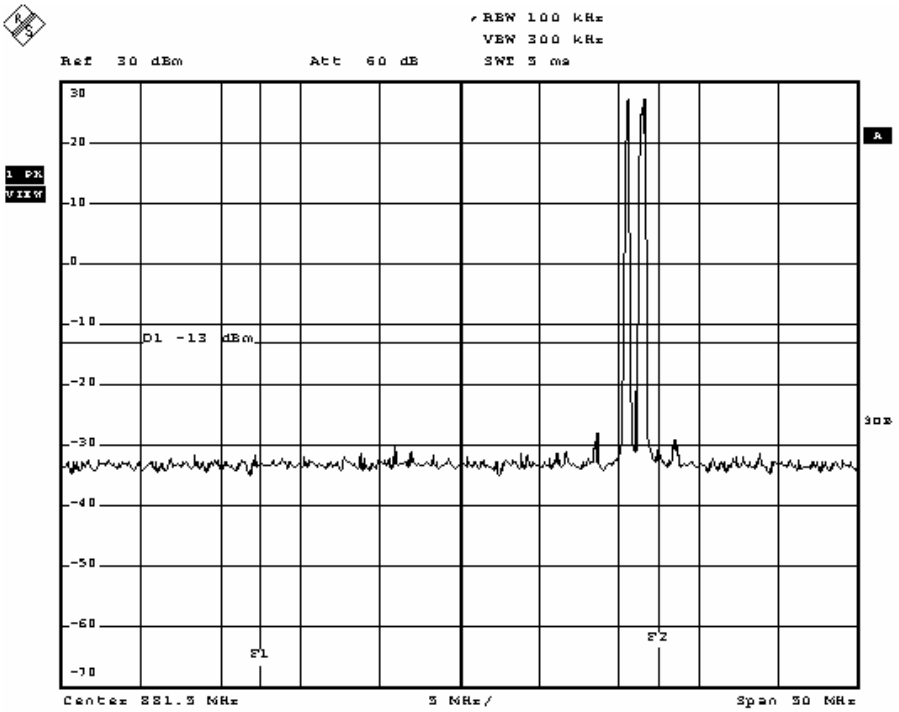


Cellular Band

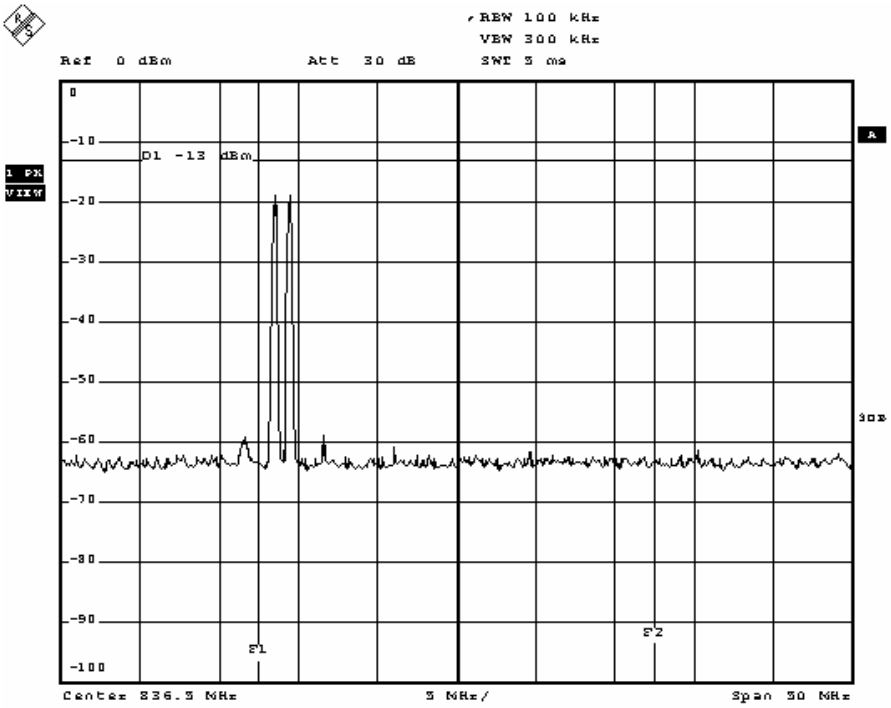
Cellular—EDGE down link– Lower Edge



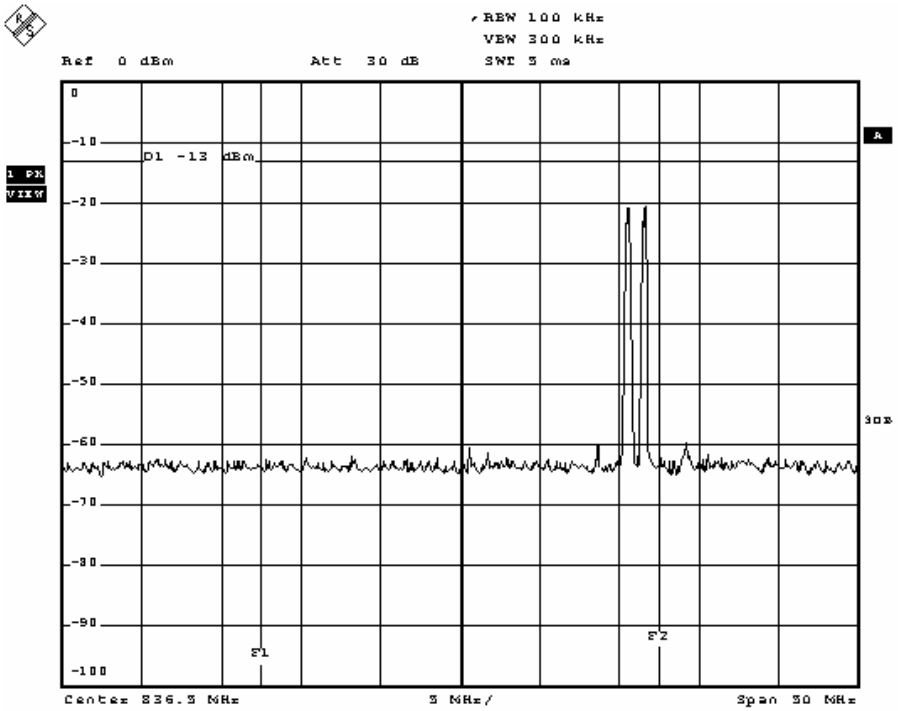
Cellular—EDGE down link– Upper Edge



Cellular—EDGE up link—Lower Edge

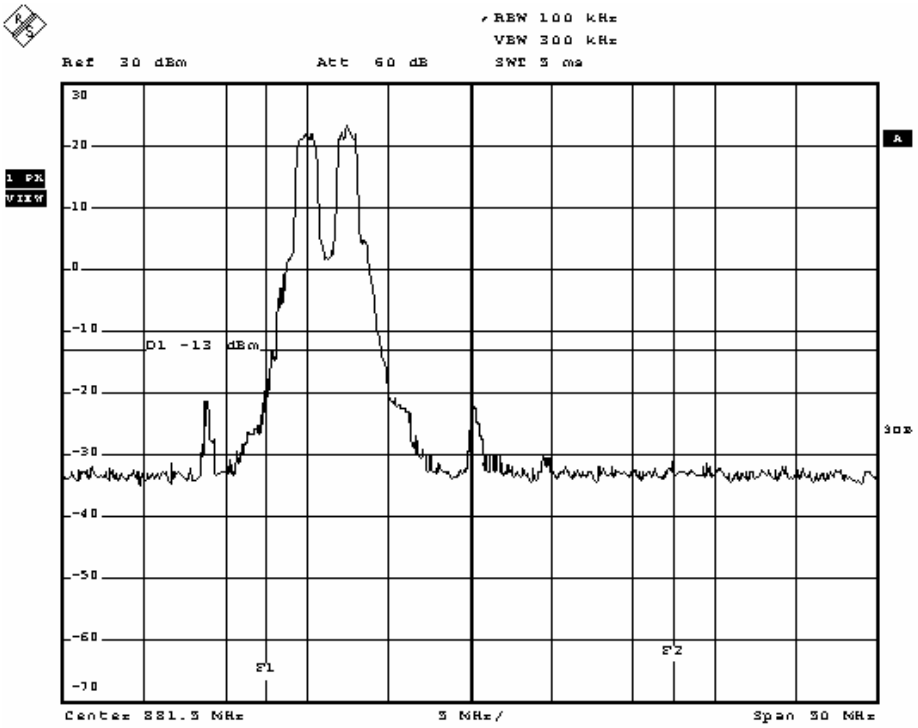


Cellular—EDGE up link—Upper Edge

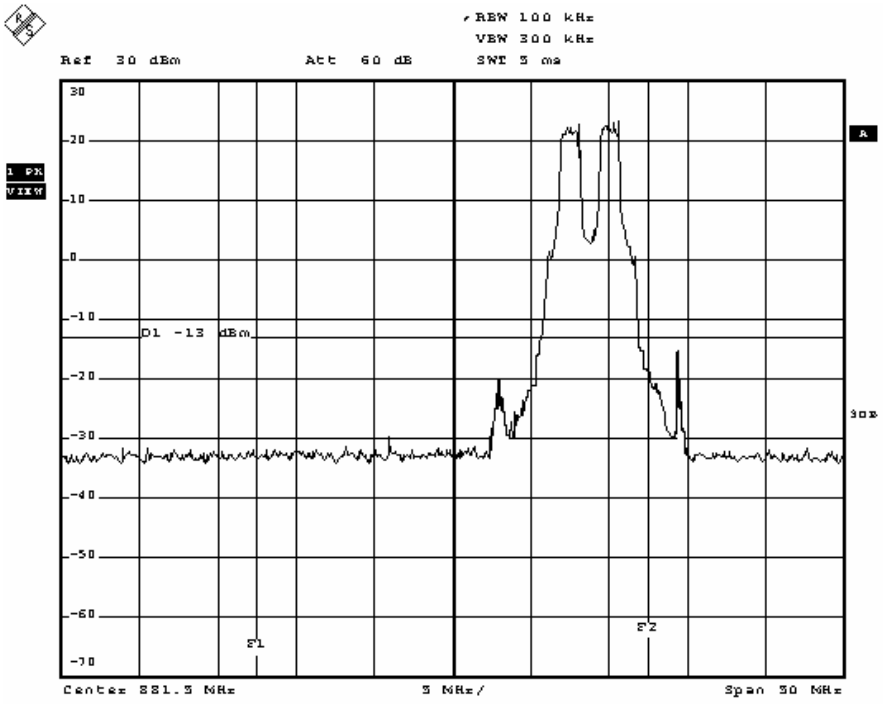


Cellular Band

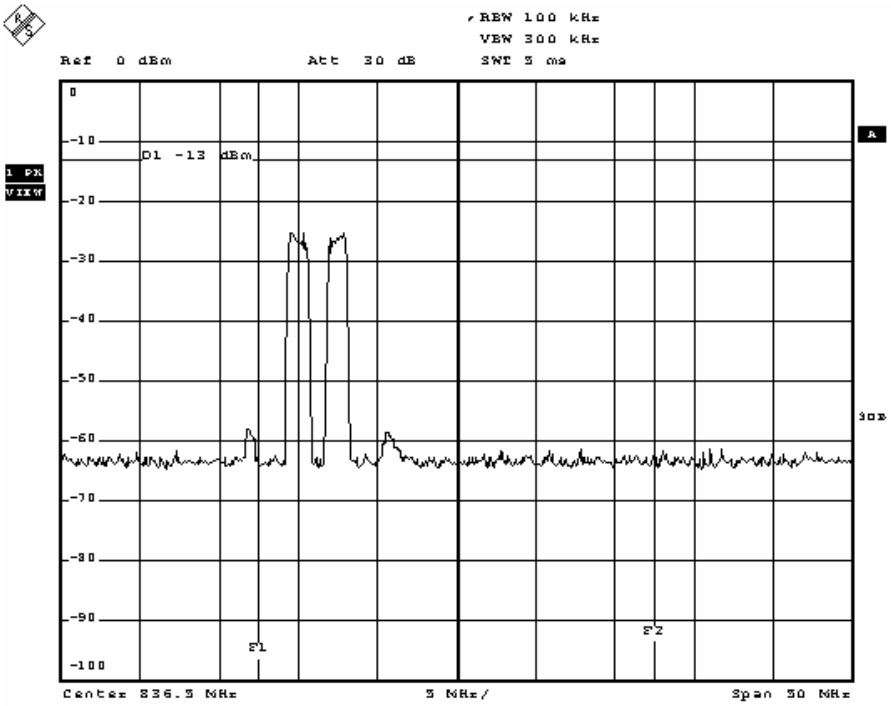
Cellular—CDMA down link– Lower Edge



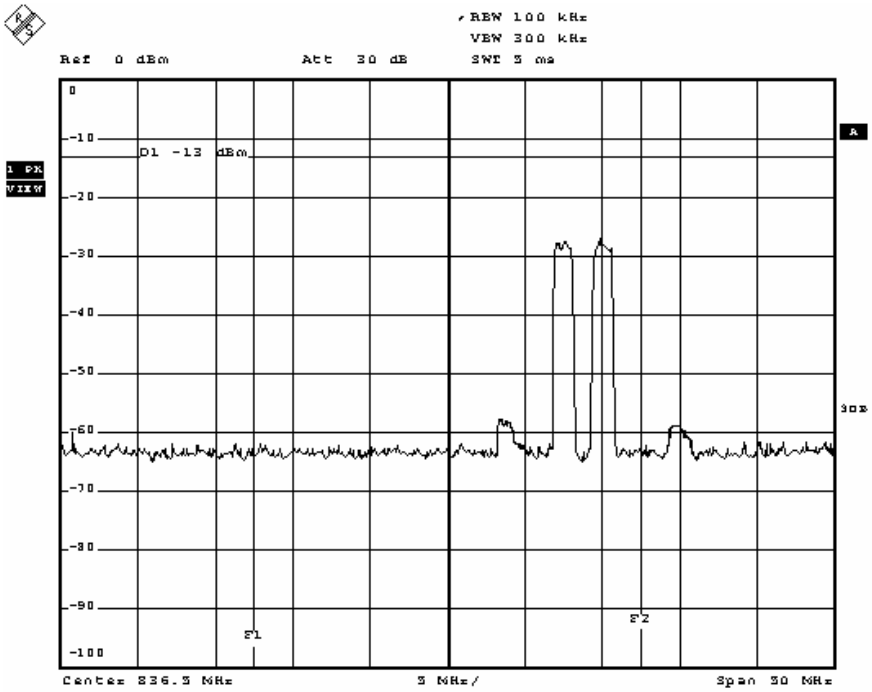
Cellular—CDMA down link– Upper Edge



Cellular—CDMA up link—Lower Edge

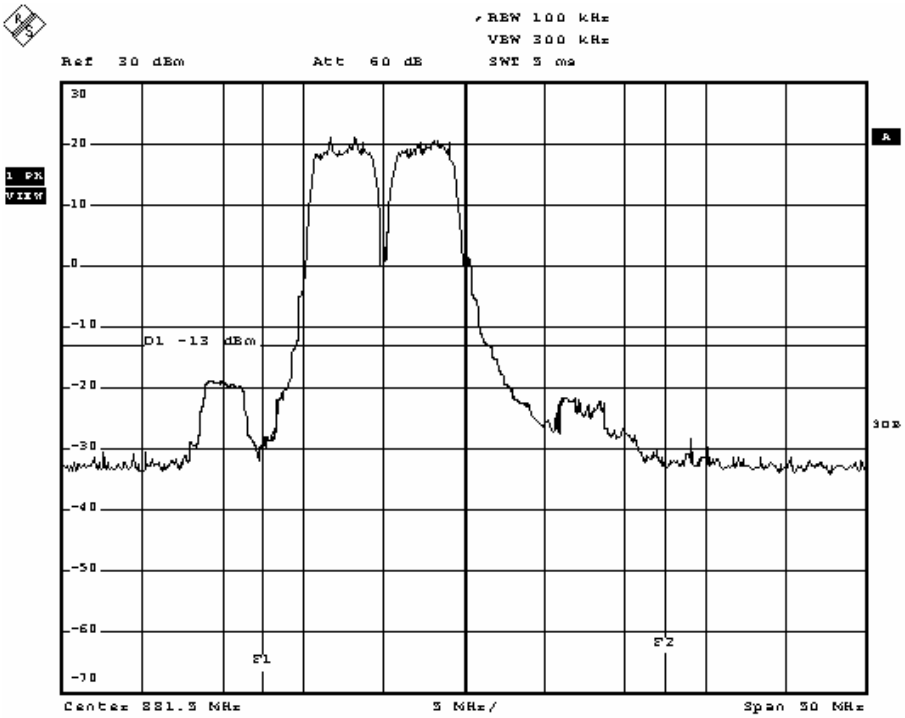


Cellular—CDMA up link—Upper Edge

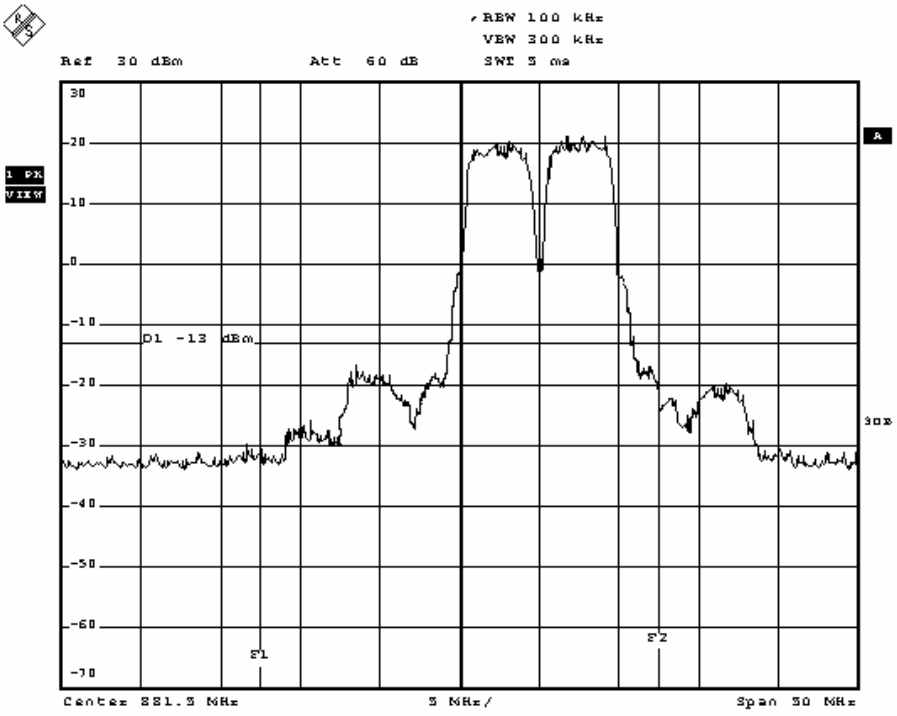


Cellular Band

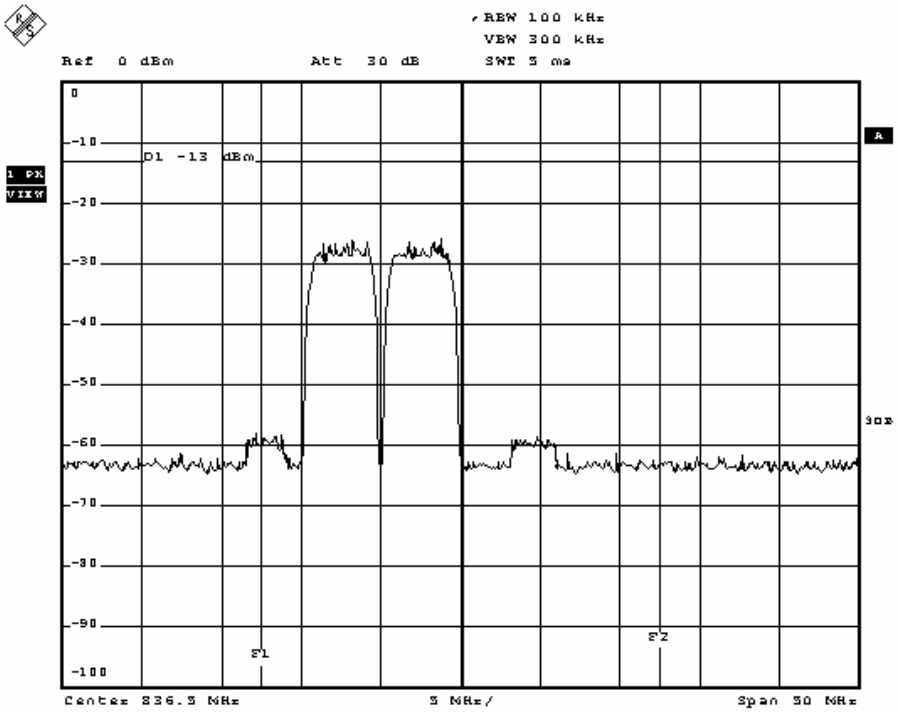
Cellular—WCDMA down link– Lower Edge



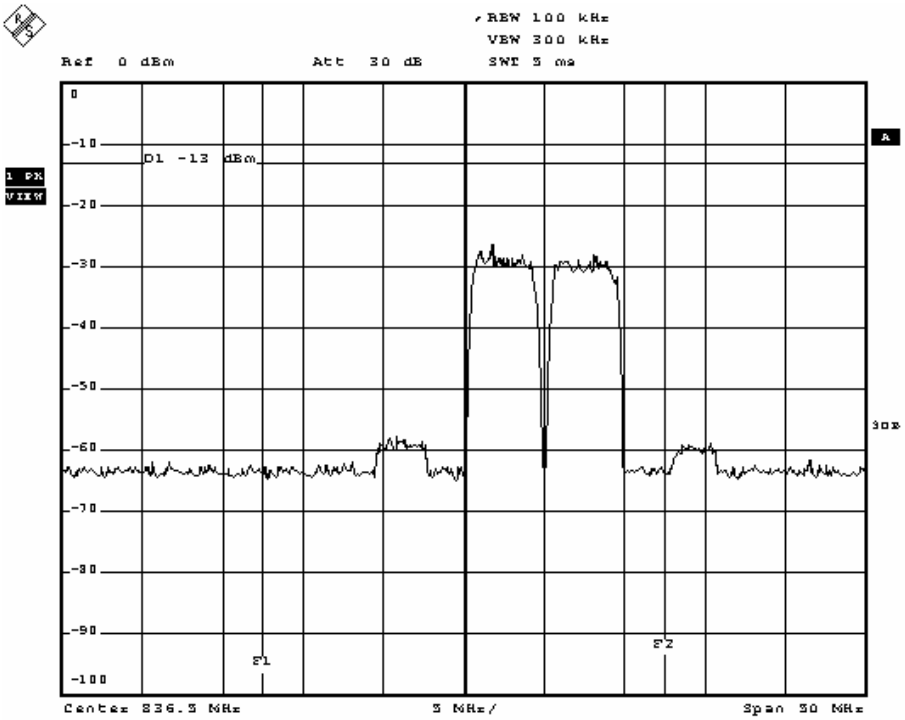
Cellular—WCDMA down link– Upper Edge



Cellular—WCDMA up link—Lower Edge

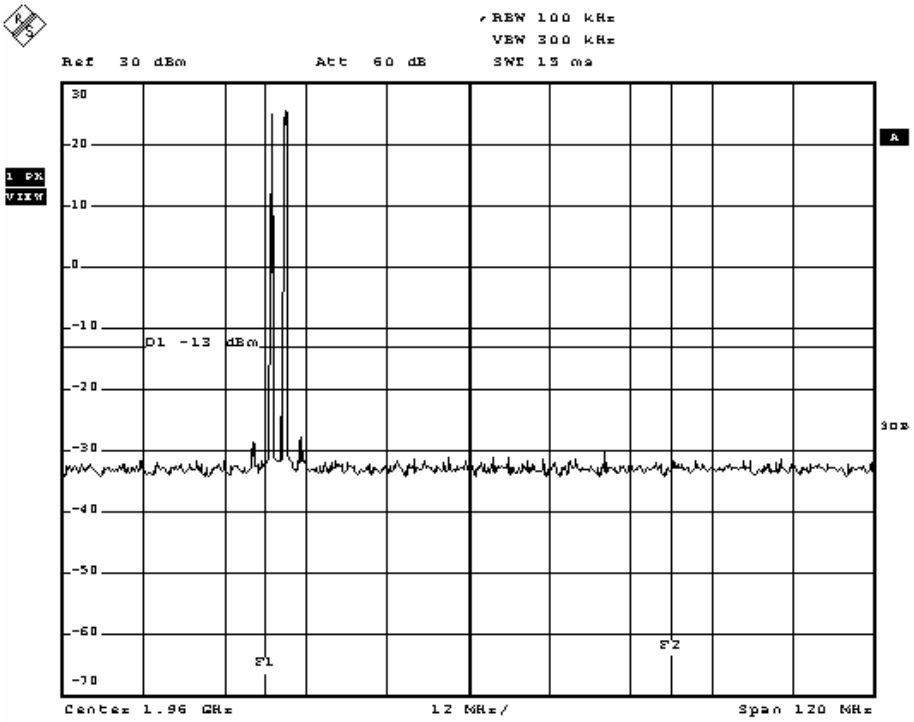


Cellular—WCDMA up link—Upper Edge

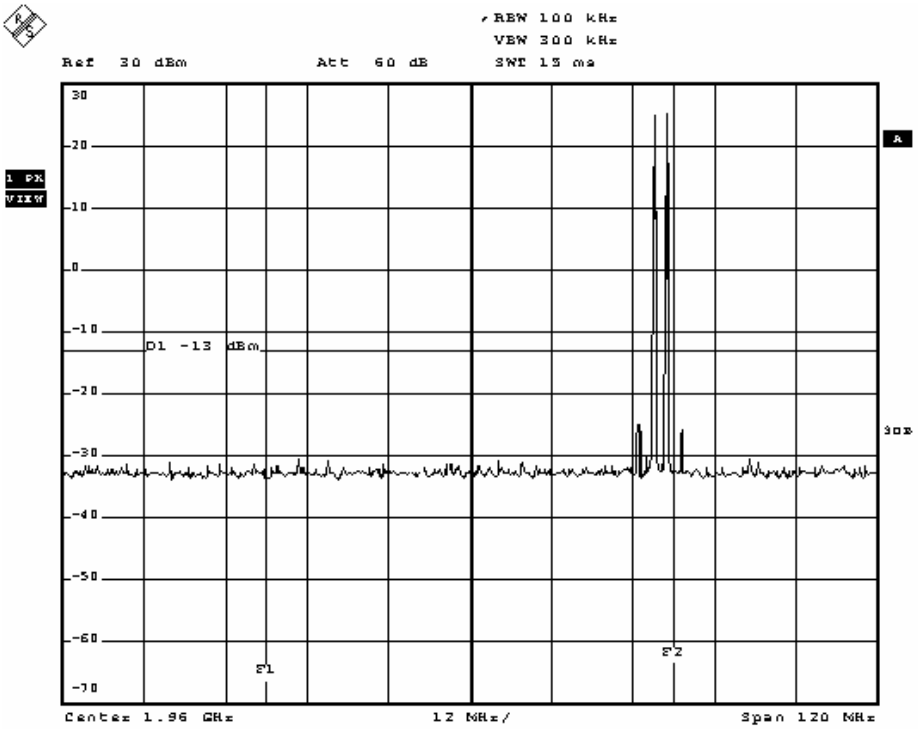


PCS Band

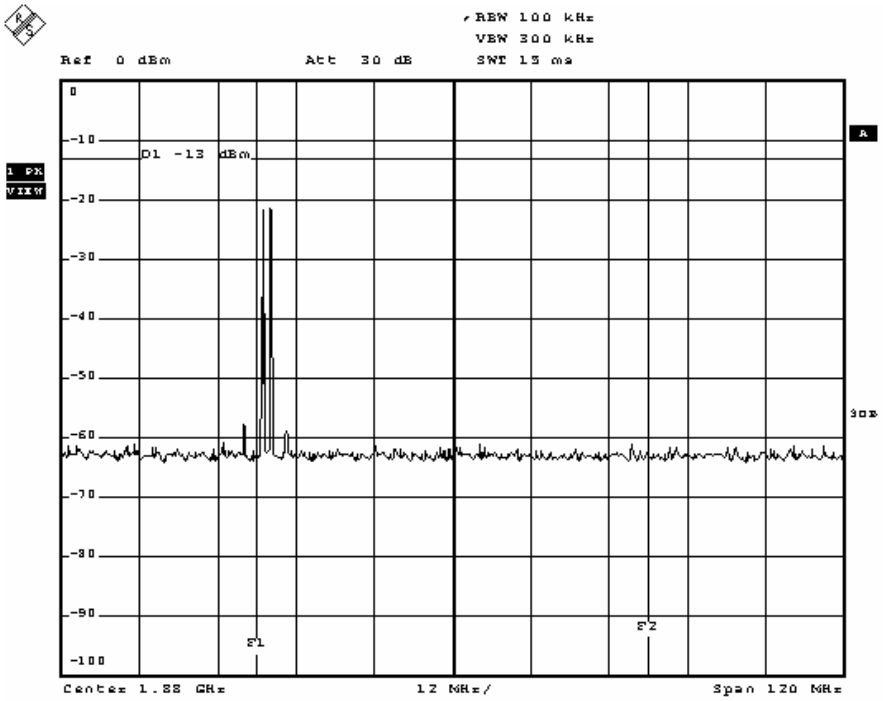
PCS—TDMA down link—Lower Edge



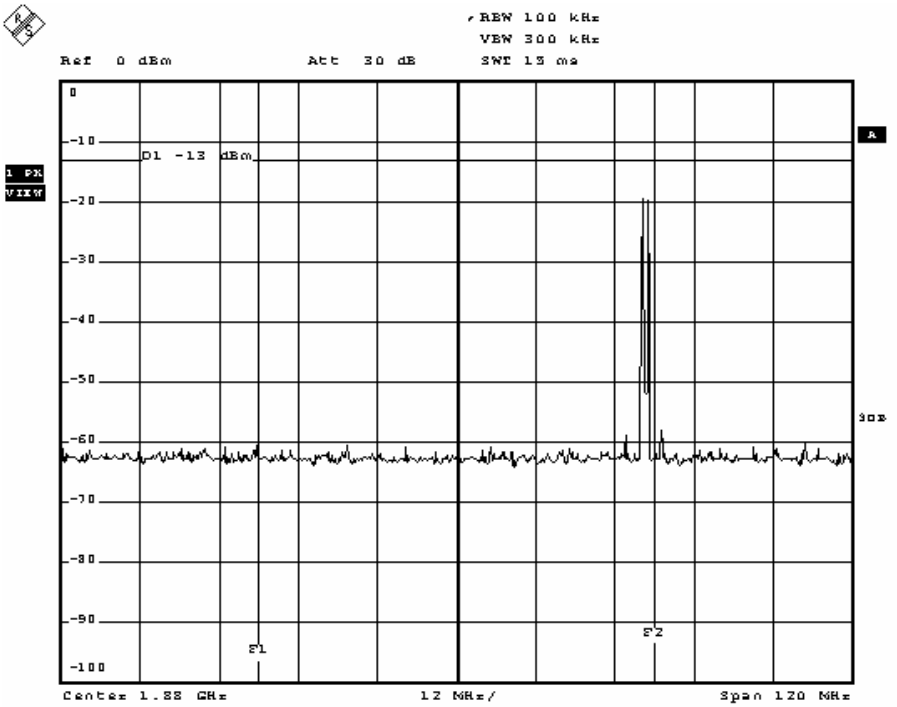
PCS—TDMA down link—Upper Edge



PCS—TDMA up link—Lower Edge

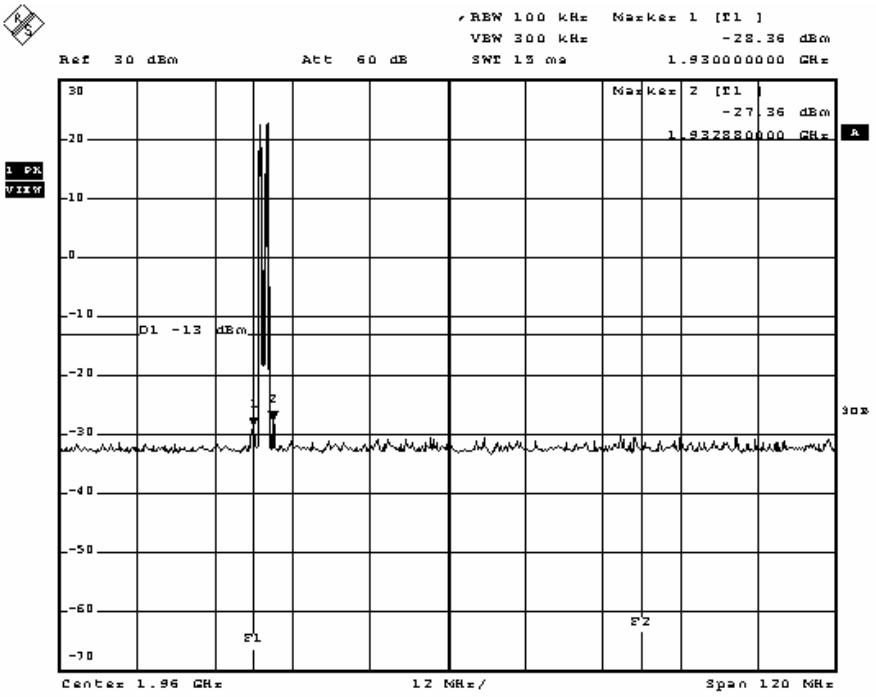


PCS—TDMA up link—Upper Edge

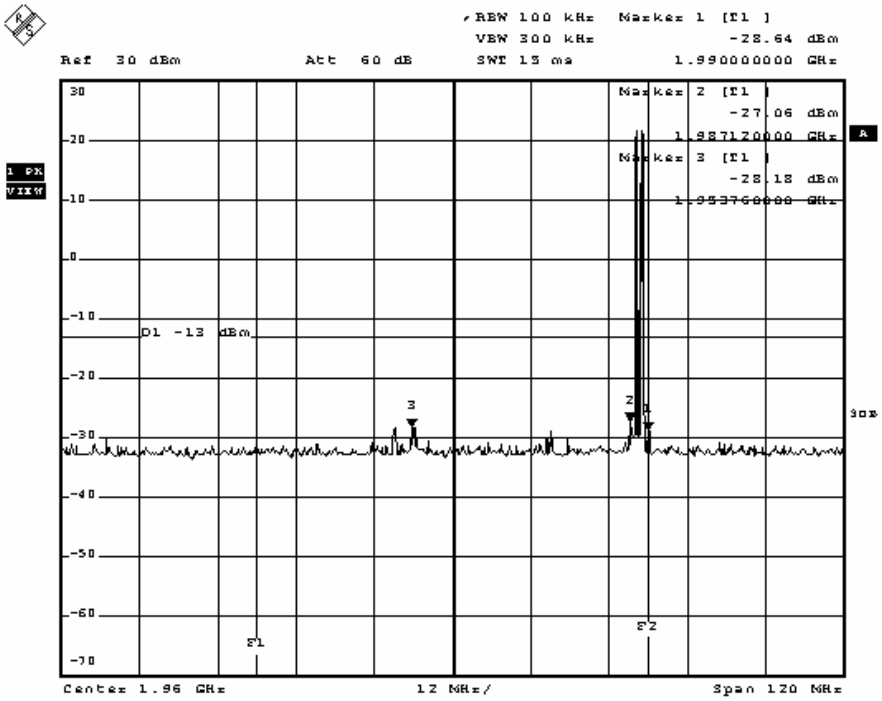


PCS Band

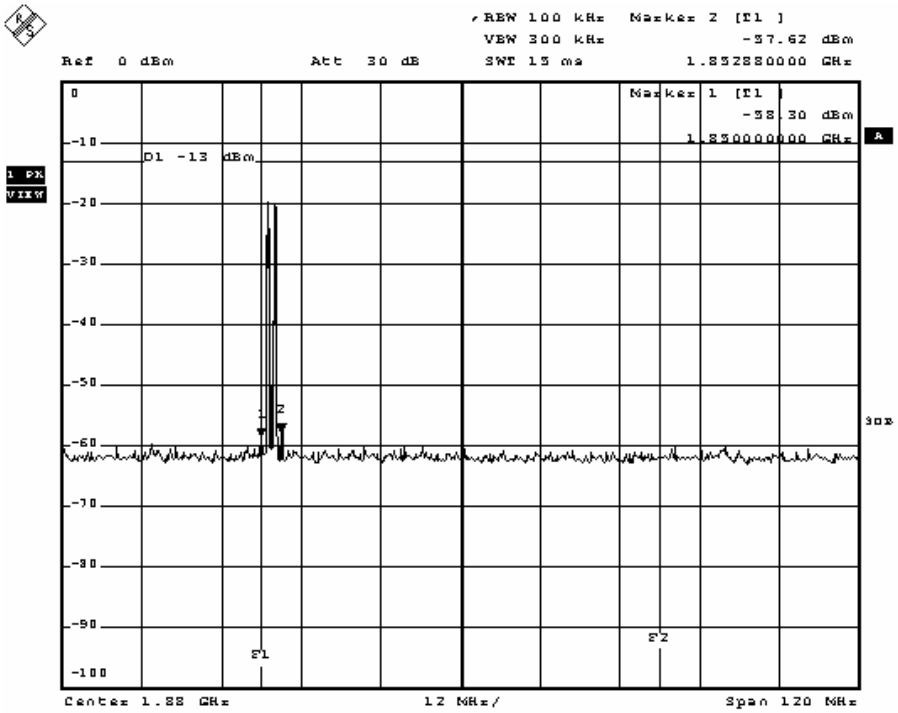
PCS—GSM down link—Lower Edge



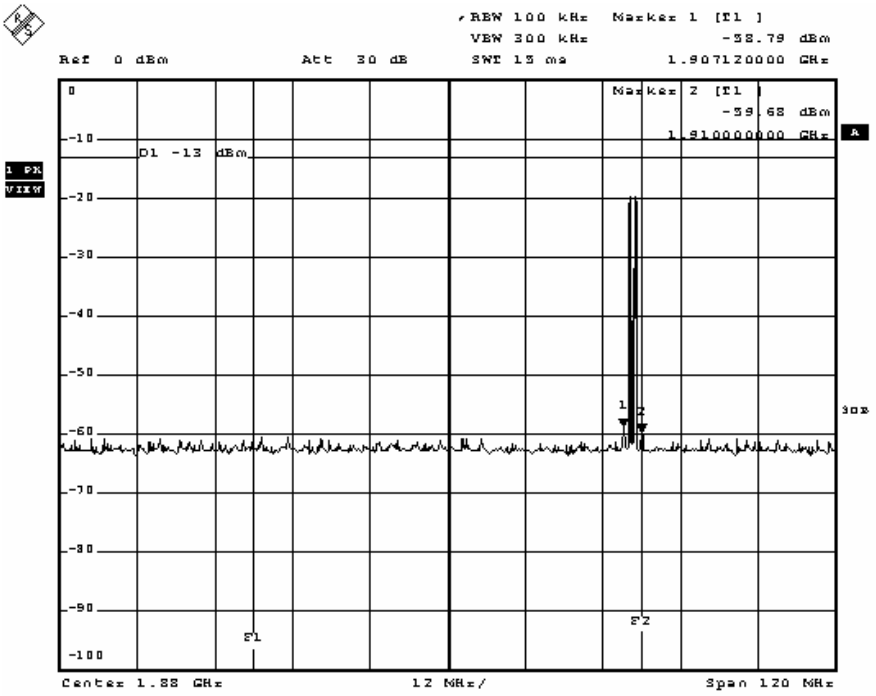
PCS—GSM down link—Upper Edge



PCS—GSM up link—Lower Edge

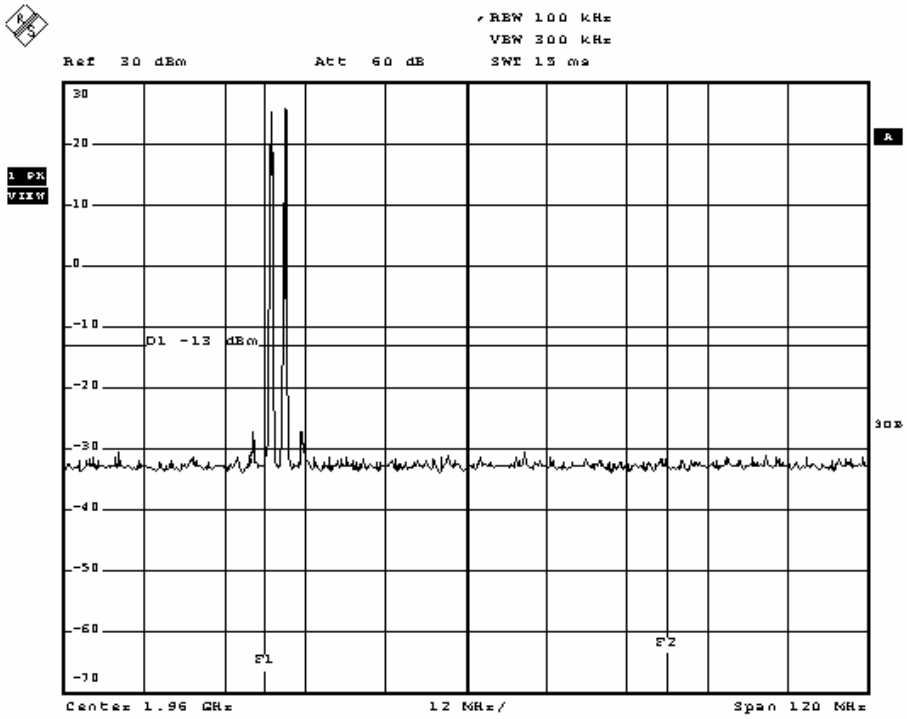


PCS—GSM up link—Upper Edge

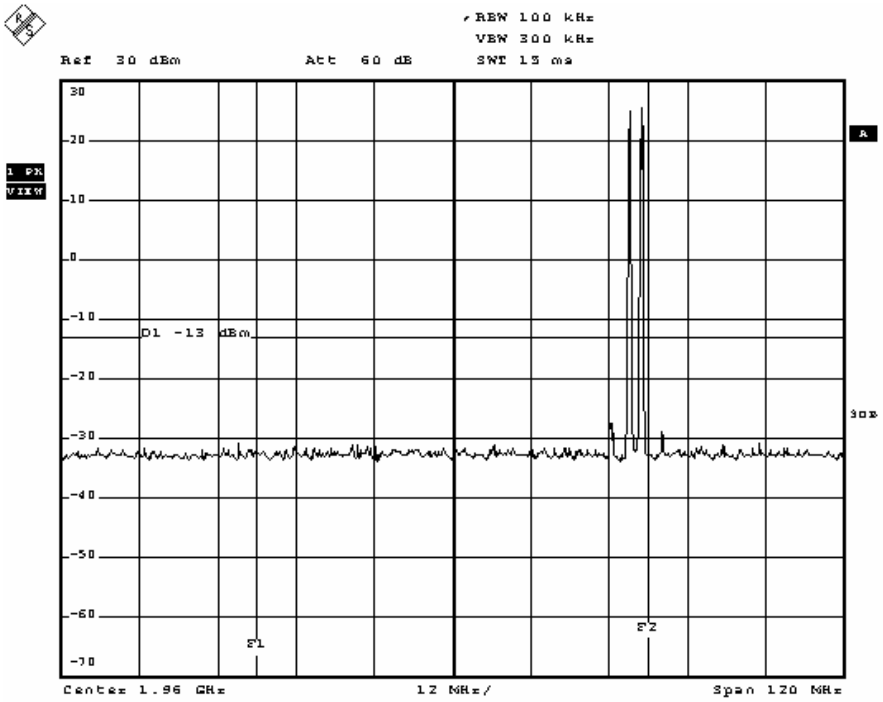


PCS Band

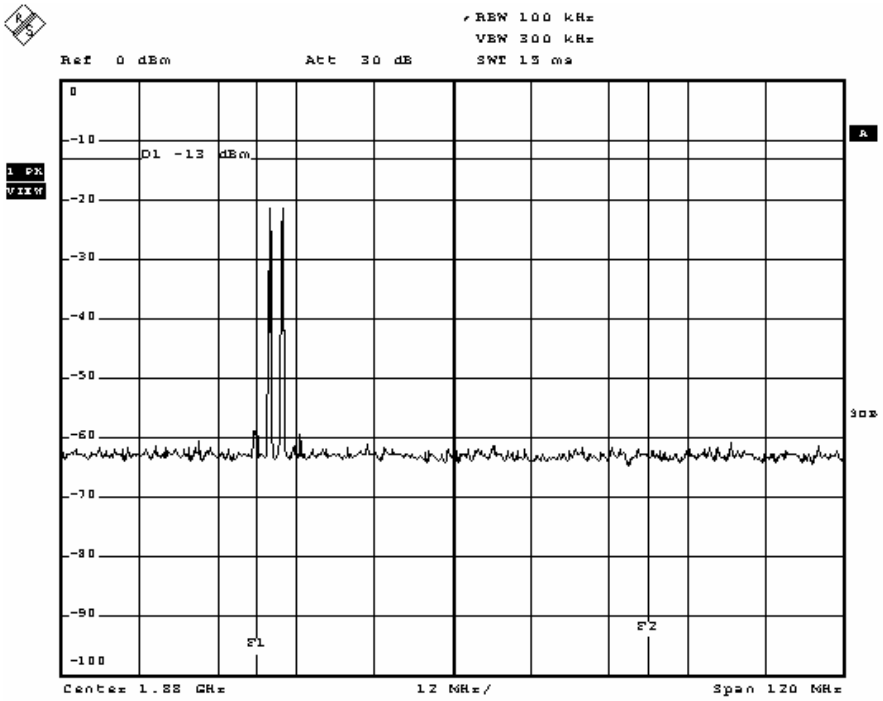
PCS—EDGE down link—Lower Edge



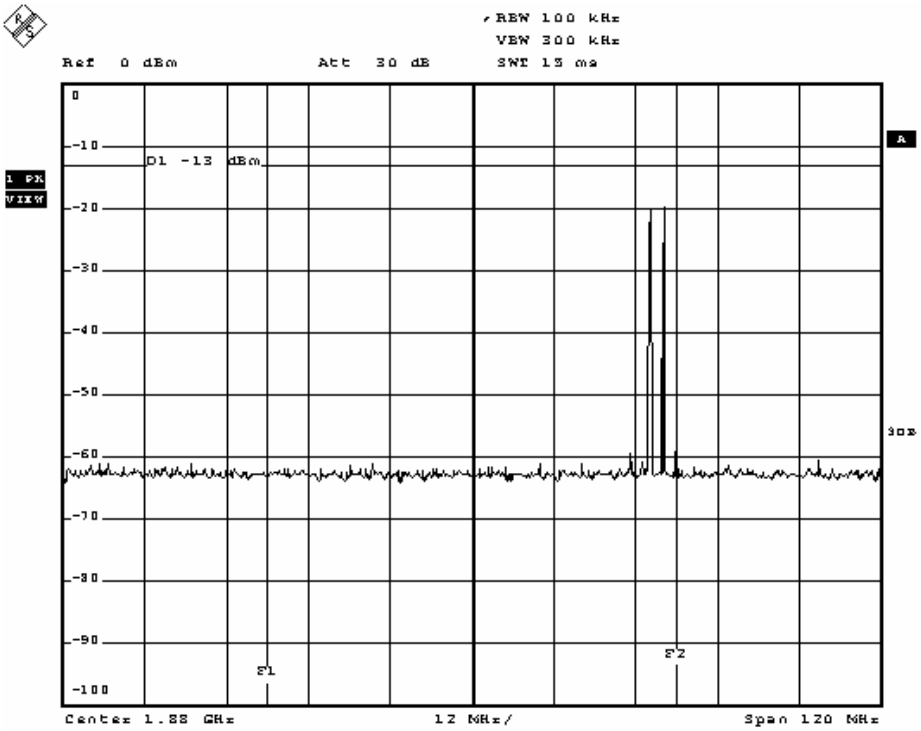
PCS—EDGE down link—Upper Edge



PCS—EDGE up link—Lower Edge

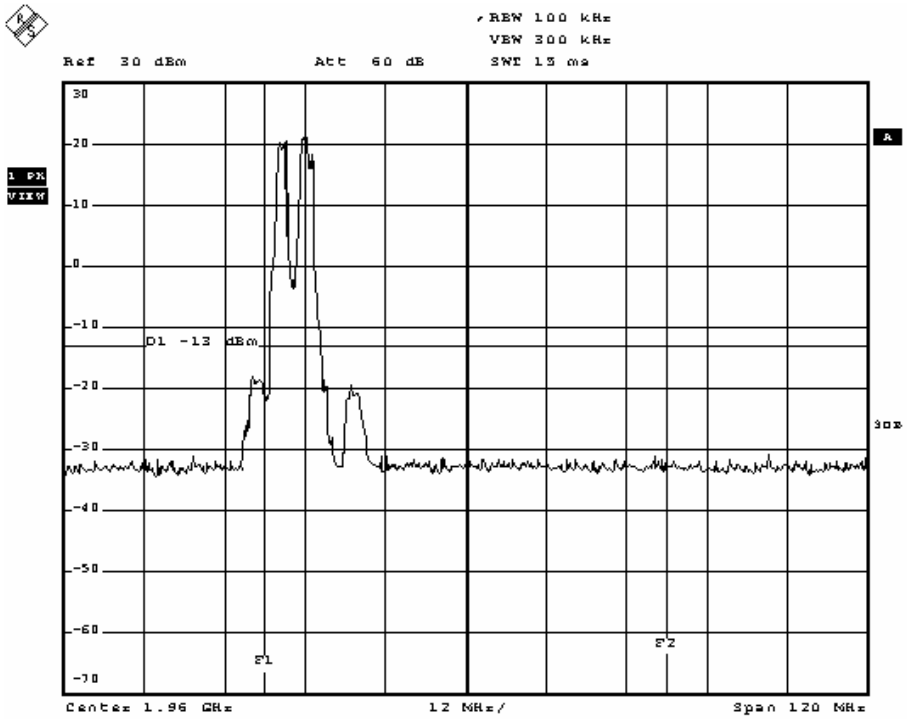


PCS—EDGE up link—Upper Edge

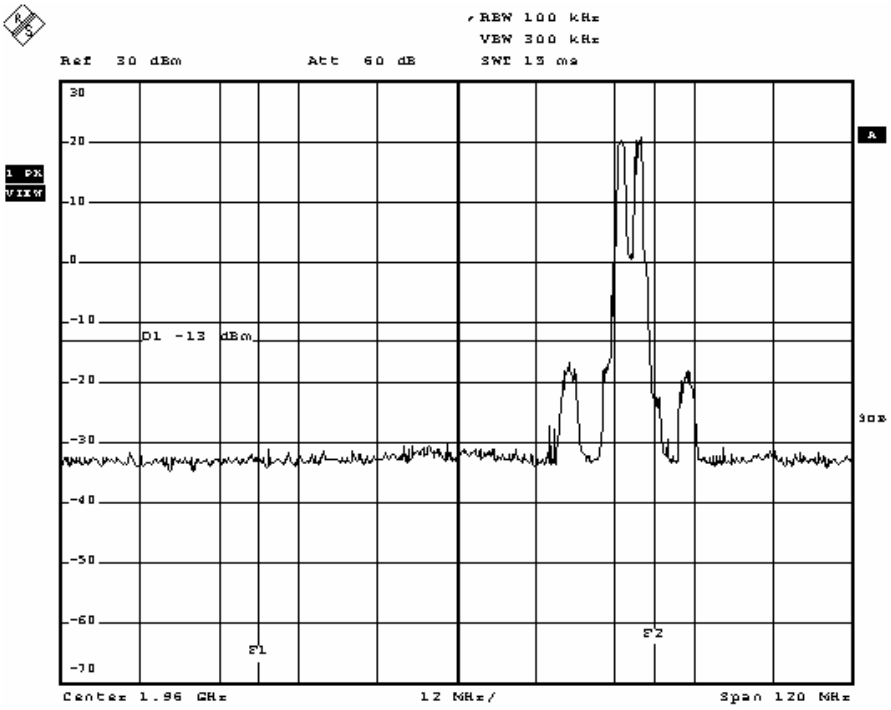


PCS Band

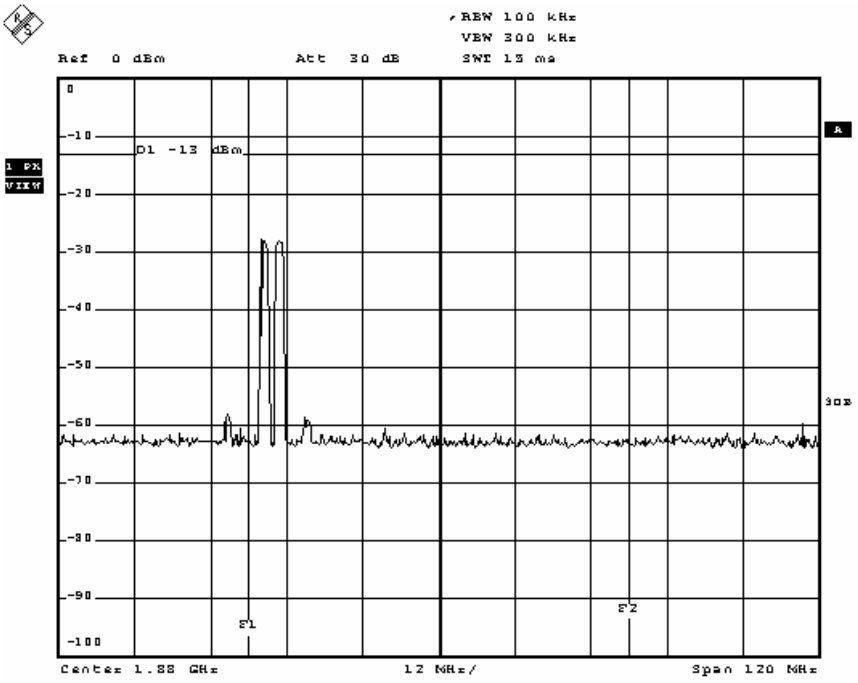
PCS—CDMA down link—Lower Edge



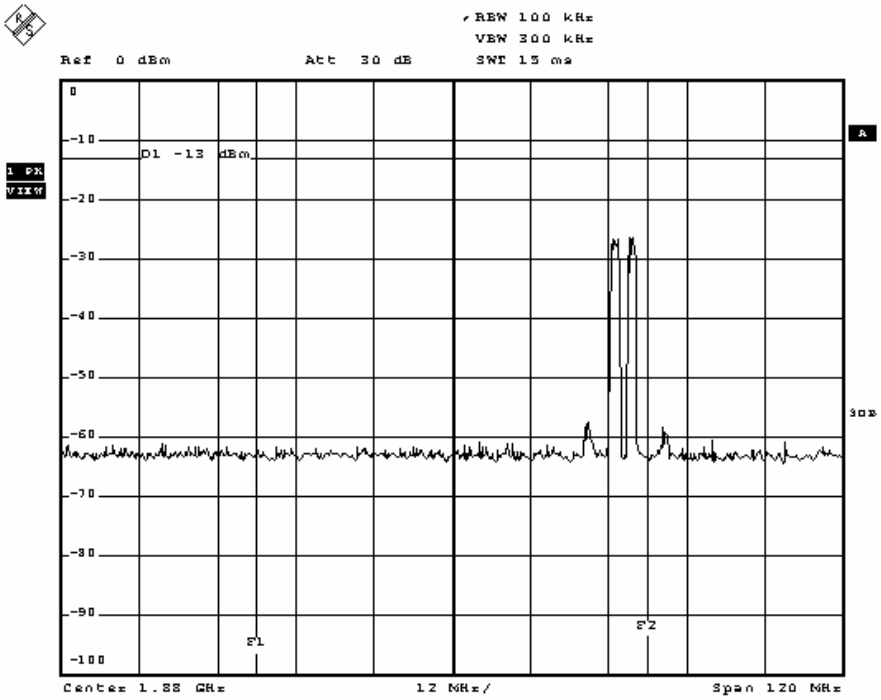
PCS—CDMA down link—Upper Edge



PCS—CDMA up link—Lower Edge

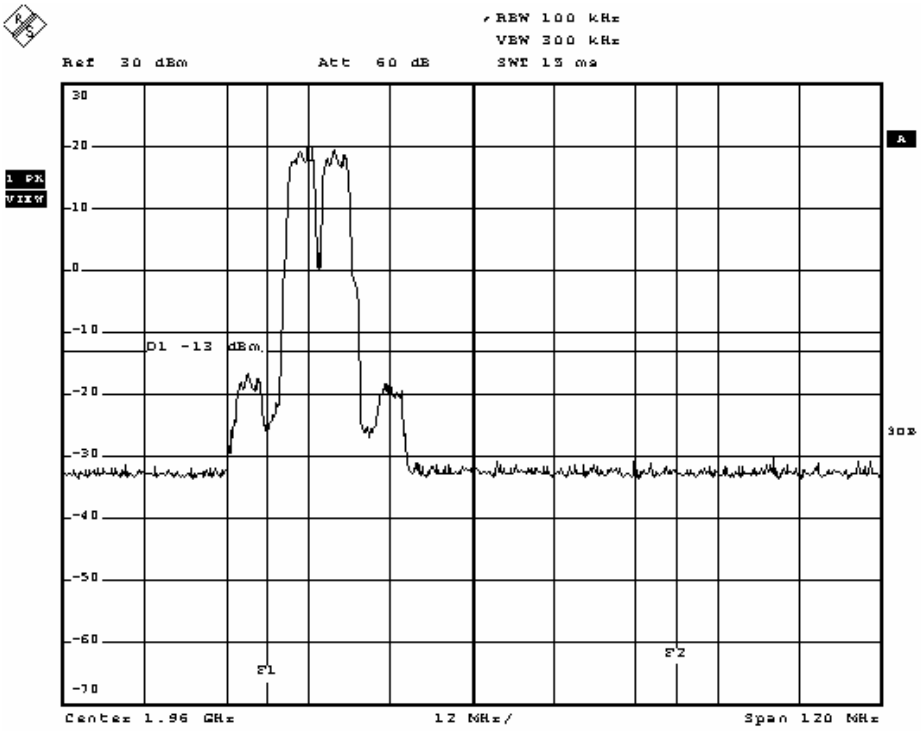


PCS—CDMA up link—Upper Edge

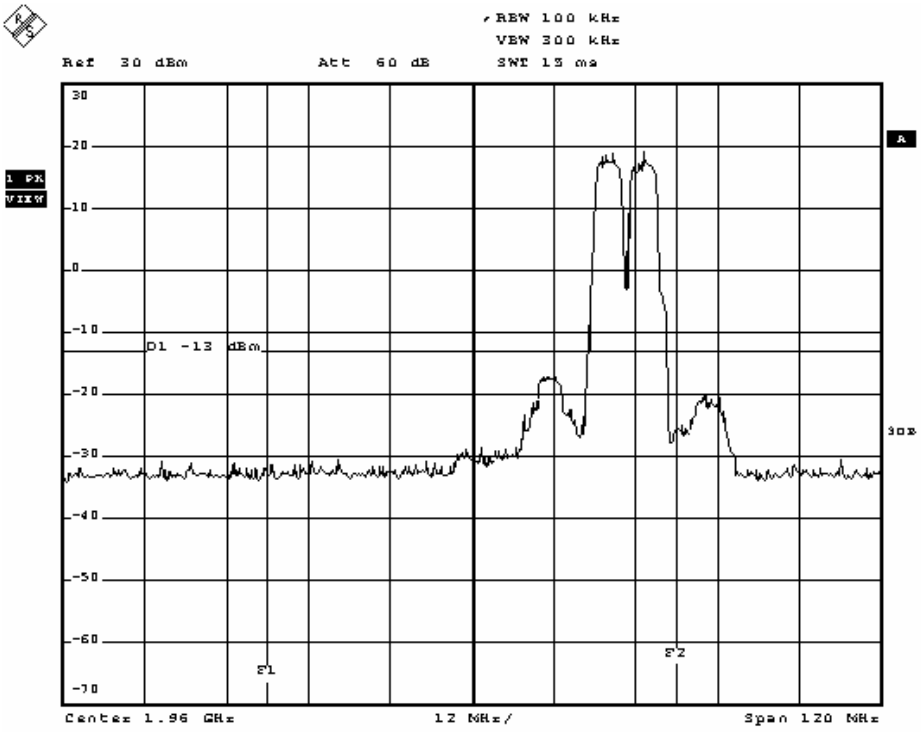


PCS Band

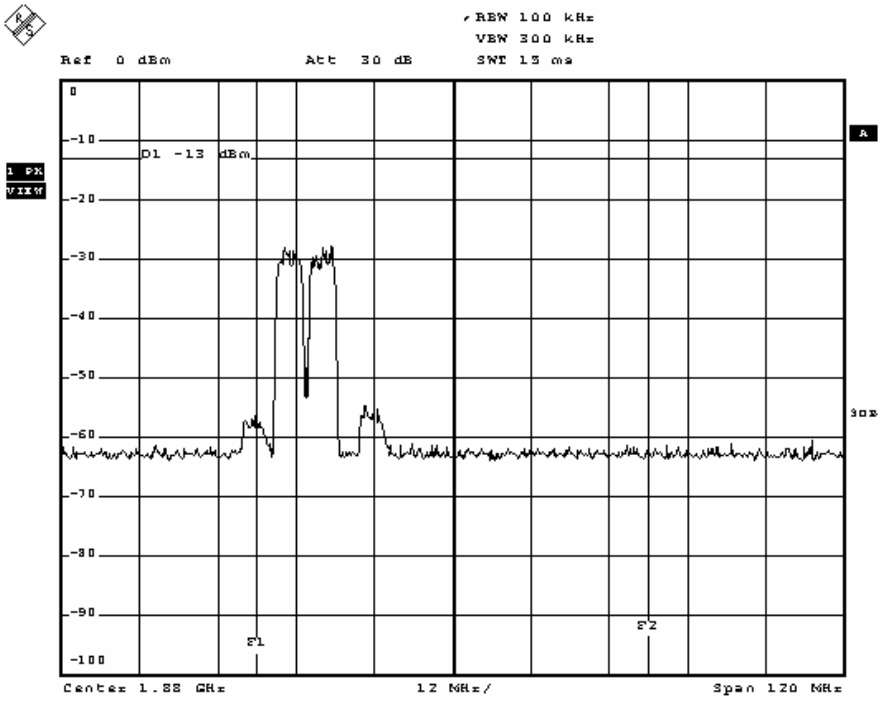
PCS—WCDMA down link—Lower Edge



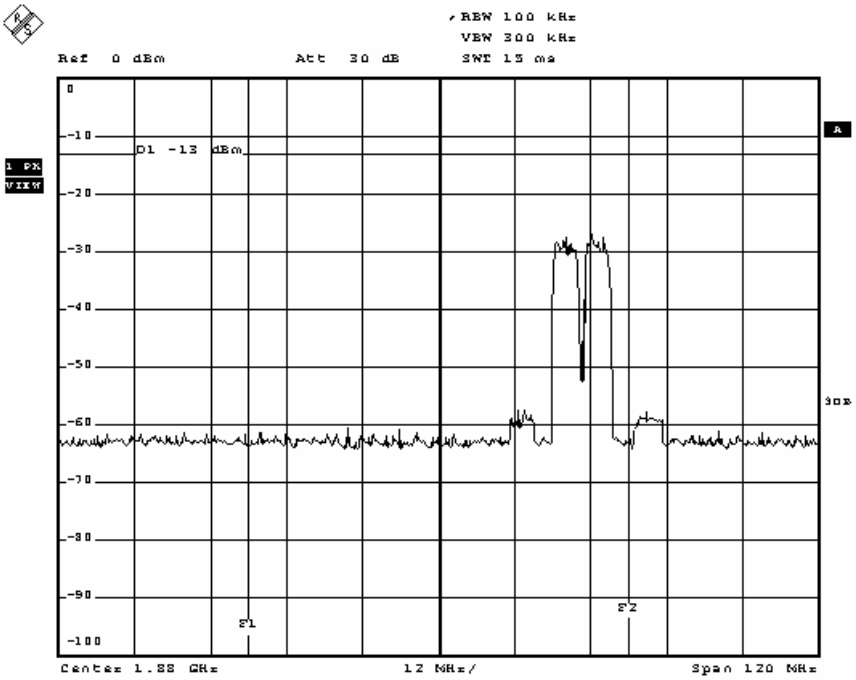
PCS—WCDMA down link—Upper Edge



PCS—WCDMA up link—Lower Edge



PCS—WCDMA up link—Upper Edge



Remark:

For the test in two signal input or intermodulation, test input signal f1 and f2 will consider as follows conditions:

7) EUT frequency band span and the amount of channels;
8) f1 is the frequency lower, f2 is the frequency higher, △f is the channel spacing;
9) in lower edge test, f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency;
10) in higher edge test, f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency;
11) according to the amplifier characteristic, the 3rd product will appear when two signals input;
12) base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,
    a) in lower edge test, F1=2f1-(f1+△f)=f1-△f=lower edge frequency;
    b) in higher edge test, F2=2f2-(f2-△f)=f2+△f=higher edge frequency.

6.2.7 Out of Band Rejection

Test Date:	10 to 12 November 2008
Test Requirement:	2-11-04/EAB/RF
	Test for rejection of out of band signals. Filter freq. response plots are acceptable.
Test Method:	2-11-04/EAB/RF
EUT Operation:	
Status:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.
Conditions:	Normal conditions
Application:	Cellular Band DL and UL ports,PCS Band DL and UL ports
Test Configuration:	

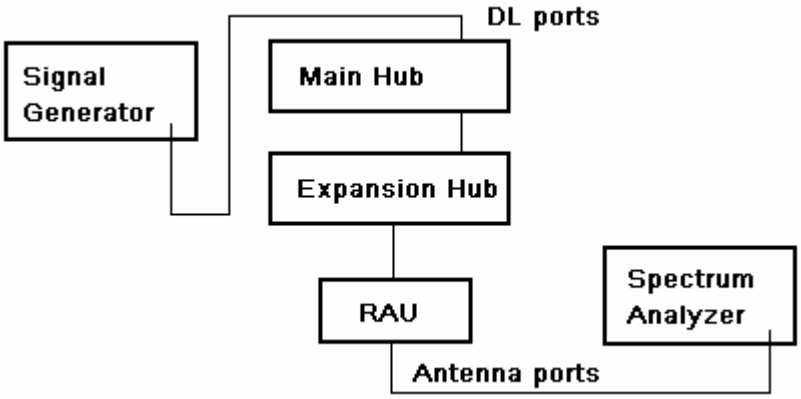


Fig.1 Down link configuration

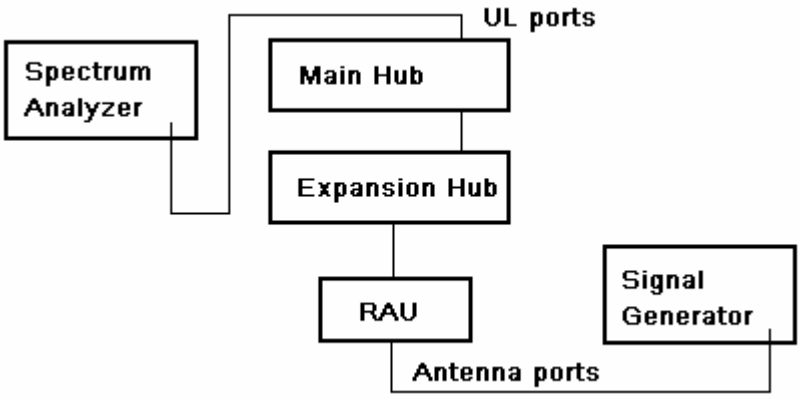


Fig.2 Up link configuration

Test Procedure:

1. Connect the equipment as illustrated;
2. Test the background noise level with all the test facilities;
3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroied;
5. Keep the EUT continuously transmitting in max power;
6. Signal generator sweep from the frequency more lower than the product frequency to the frequency more higher than it, find the product band filter characteristic;

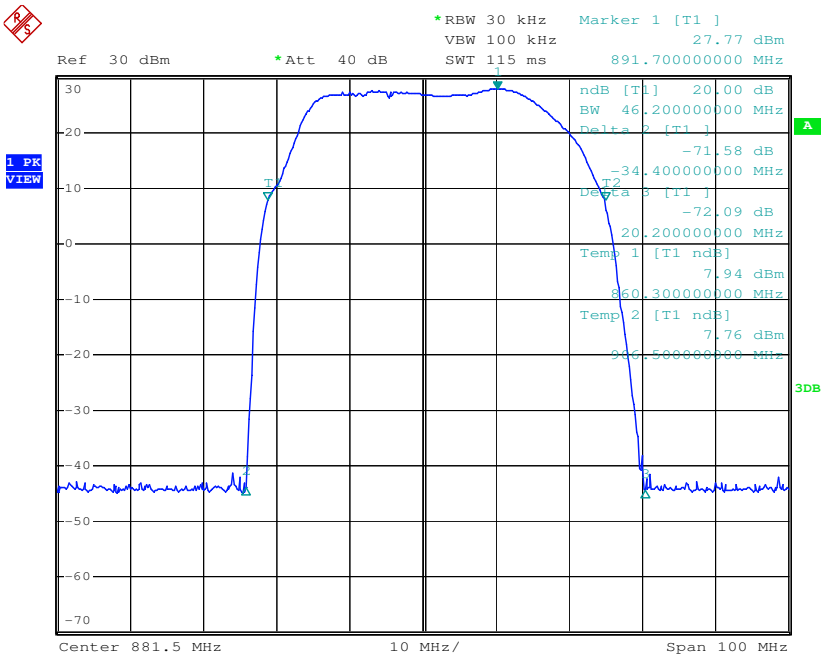
· CW signal rather than typical signal is acceptable (for FM).

· Multiple band filter will need test each other.

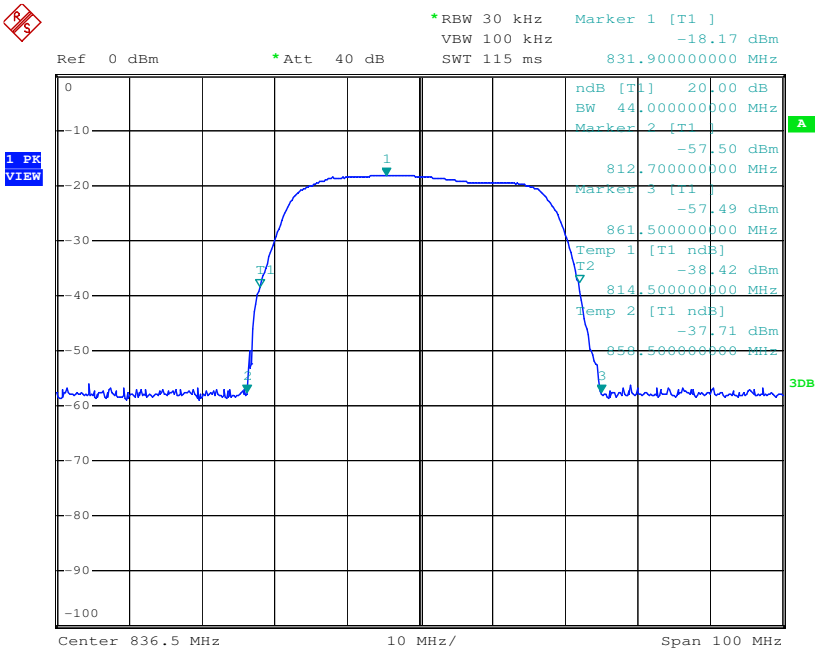
6.2.7.1 Measurement Record:

Cellular Band

Cellular—down link

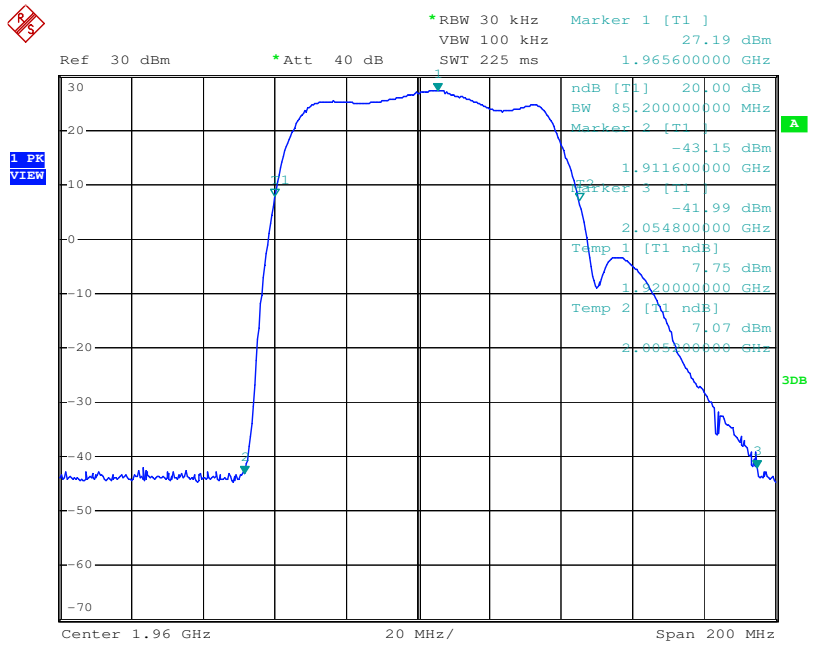


Cellular—up link

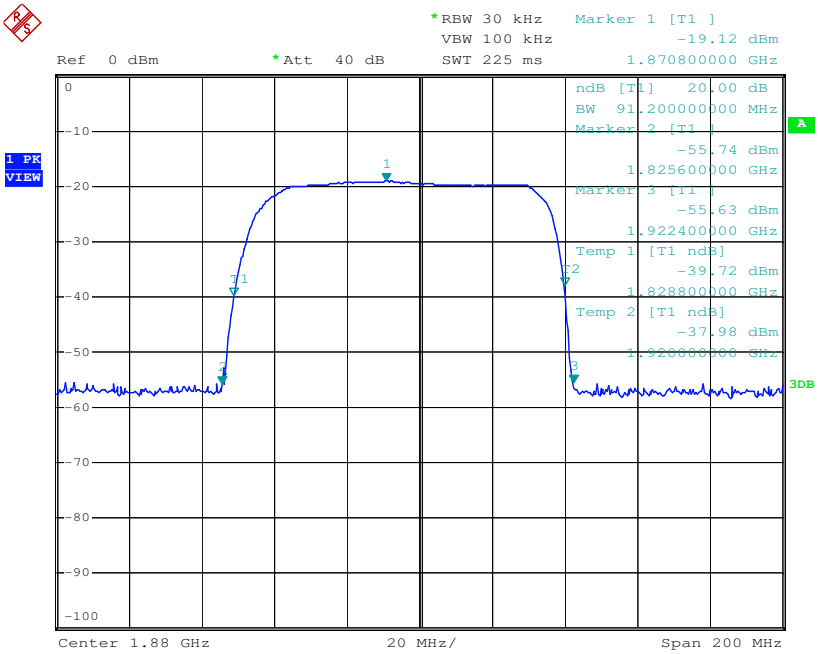


PCS Band

PCS—down link



PCS—Up link



6.2.8 Frequency Stability

Test Date: 10 to 12 November 2008

Test Requirement: FCC part 22.355&FCC part 24.235

Test Method: FCC part 2.1055

EUT Operation:

Status: The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by sofeware through the manufacturer.

Conditions: Temperature conditions, voltage conditions

Application: Cellular Band DL and UL ports,PCS Band DL and UL ports

Test Procedure:

1. Temperature conditions:
   a) record the 20℃ and norminal voltage frequency value as reference point;
   b) vary the temperature from -30℃ to 60℃ with step 10℃
   c) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
   d) read the frequency at the relative temperature.
2. Voltage conditions:
   a) record the 20℃ and norminal voltage frequency value as reference point;
   b) vary the voltage from -15% norminal voltage to +15% voltage;
   c) read the frequency at the relative voltage.

6.2.8.1 Measurement Record:

1. Frequency Stability vs temperature:
   Cellular Band:

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
60	881.500489	0.009
50	881.500476	-0.006
40	881.500503	0.025
30	881.500492	0.012
20	881.500481	Reference
10	881.500468	-0.015
0	881.500429	-0.059
-10	881.500431	-0.057
-20	881.500410	-0.081
-30	881.500417	-0.073

PCS band:

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
60	1960.000483	0.015
50	1960.000465	0.006
40	1960.000472	0.009
30	1960.000462	0.004
20	1960.000454	Reference
10	1960.000501	0.024
0	1960.000489	0.018
-10	1960.000287	-0.085
-20	1960.000398	-0.029
-30	1960.000380	-0.038

2. Frequency Stability vs voltage:

Cellular Band:

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	881.500466	-0.017
120	881.500481	Reference
138 (120*1.15)	881.500457	-0.027

PCS band:

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	1960.000477	0.012
120	1960.000454	0
138 (120*1.15)	1960.000469	0.008

--End of the Report--