TEST REPORT

REPORT NUMBER: I11GC5267-FCC-RF

ON

Type of Equipment: HSUPA USB Stick
Type of Designation: MF193
Manufacturer: ZTE CORPORATION

ACCORDING TO

FCC CFR Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS. Oct, 1, 2009
PART 22, PUBLIC MOBILE SERVICES. Oct 1, 2009

China Telecommunication Technology Labs.

Month date, year
April 14, 2011

Signature

He Guili
Director

FCC ID: Q78-MF193

Report Date: 2011-04-14

Test Firm Name: China Telecommunication Technology Labs

Registration Number: 840587

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2, and 22. The sample tested was found to comply with the requirements defined in the applied rules.

CONTENTS

1 General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2 and 22.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex C.

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1.2 Testers

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Signature:

Name: Lv Ke

Position: Engineer

Department: Department of EMC test
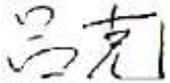
Signature:

Editor of this test report:

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Date: 2011-04-14

Signature:

Technical responsibility for area of testing:

Name: Zou Dongyi

Position: Manager

Department: Department of EMC test

Date: 2011-04-14

Signature:

1.3 Testing Laboratory information

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District
	BEIJING
	P. R. CHINA, 100083
Tel:	+86 10 68094053
Fax:	+86 10 68011404
Email:	emc@chinattl.com

1.3.2 Details of accreditation status

Accredited by:	China National Accreditation Service for Conformity Assessment (CNAS)
Registration number:	CNAS Registration No. CNAS L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Street:	------
City:	------
Country:	------
Telephone:	------
Fax:	------
Postcode:	------

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,
	Nanshan District, Shenzhen, Guangdong, 518057,
	P.R.China
Country:	China
Telephone:	86-21-68895196
Fax:	86-21-68895196
Contact:	Chen Yanli
Telephone:	86-21-68895196
Email:	chen.yanli1@zte.com.cn

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	--
Address:	--

2 Test Item

2.1 General Information

Manufacturer: ZTE Corporation
Name: HSUPA USB Stick
Model Number: MF193
Serial Number: 35739040000928
Production Status: Product
Receipt date of test item: 2011-03-29

2.2 Outline of EUT

EUT is a HSUPA USB Stick supporting GPRS/EGPRS 850/1900 bands and HSDPA/HSUPA FDD II/V bands. For GPRS, the multi class is 10 (maximum 2 up timeslots) and for EGPRS, it is 12 (maximum 4 up timeslots). It does not support voice mode.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	handset	ZTE CORPORATION	MF193	3573904 0000928	None
B	adapter	--	--	--	None
C	battery	--	--	--	None
D	Earphone	--	--	--	None

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	USB	--	--	--	--	--

2.5 Other Information

Version of hardware and software:

HW Version: MF193-2.0.0

SW Version: EN_ZTE_MF193V1.0.0B01

3 Summary of Test Results

A brief summary of the tests carried out is shown as following.

GPRS/EGPRS mode:

Specification Clause	Name of Test	Result
2.1051, 24.238, 2.1053,22.917	Radiated Spurious Emission	Pass
2.1046,24.232, 22.913(a)	Radiated RF Power Output Effective Radiated Power (ERP)	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 1
2.1055,22.355, 24.235	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917	Band Edge	Pass
Note 1: No applicable performance criteria.		

HSDPA/HSUPA mode:

Specification Clause	Name of Test	Result
2.1051, 24.238, 2.1053,22.917	Radiated Spurious Emission	Pass
2.1046,24.232, 22.913(a)	Radiated RF Power Output Effective Radiated Power (ERP)	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 2
2.1055,22.355, 24.235	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917	Band Edge	Pass
Note 2: No applicable performance criteria.		

4 Test Results

4.1 Radiated Spurious Emission

Specifications:	2.1051, 24.238, 2.1053, 22.917
Date of Tests	2011-03-31~2011-04-06
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GPRS and EGPRS mode 850 and 1900 band respectively; and channel 9400 and 4175 for HSPA FDD II and V band respectively.
Test Results:	Pass
Test equipment Used:	

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESI26	100211	2012-01-12	Normal
7330	Ultra Broadband Antenna	SCHWARZBECK	VULB 9160	--	2013-11-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100037	2013-01-24	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2013-11-16	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:
According to Part 22.917 (a), i.e., 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, so the limit level is:
$$P(dBm) – (43 + 10 \log(P)) \, dB = -13dBm$$

Limits for Radiated spurious emissions(UE)	
Frequency range	**Limit Level /Resolution Bandwidth**
30 MHz to 20000 MHz	-13dBm/1MHz

Test Setup:
The EUT was placed in an anechoic chamber, see figure SP. The Wireless Communications Test Set was used to set the TX channel and power level and modulate the TX signal with different bit patterns.
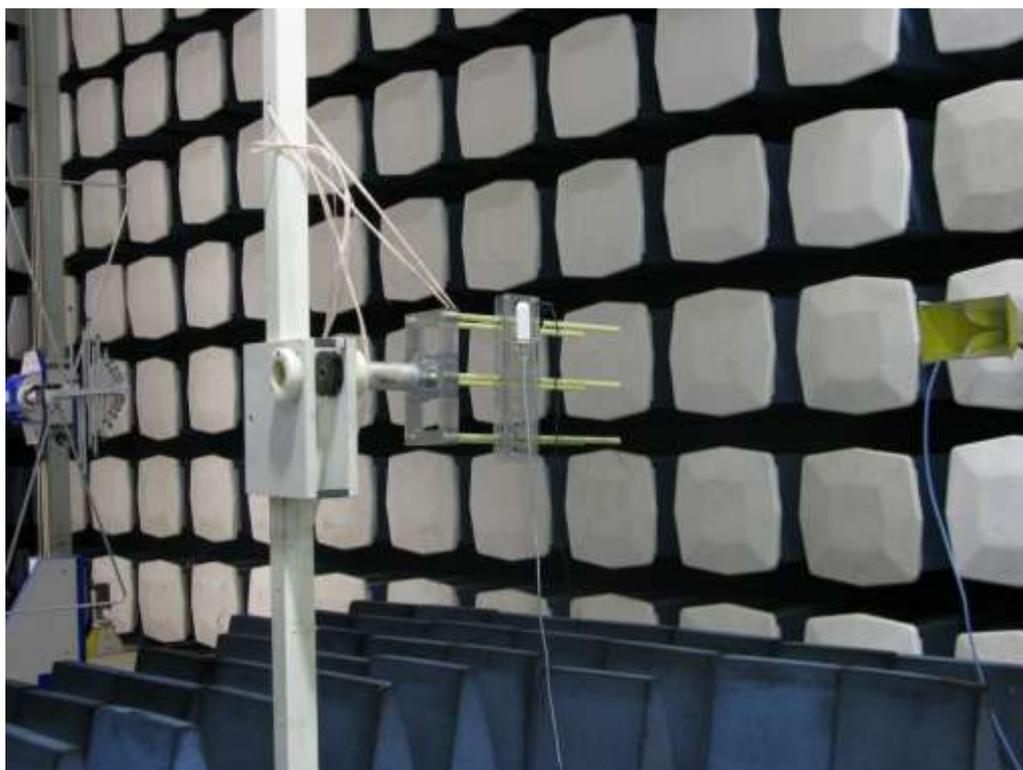
Figure SP

Test Method:

The measurement method is substitution method accordance with section 2.2.12 of ANSI/TIA-603-C: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

(a) Connect the equipment as illustrated and measure the spurious emissions as the method as above.
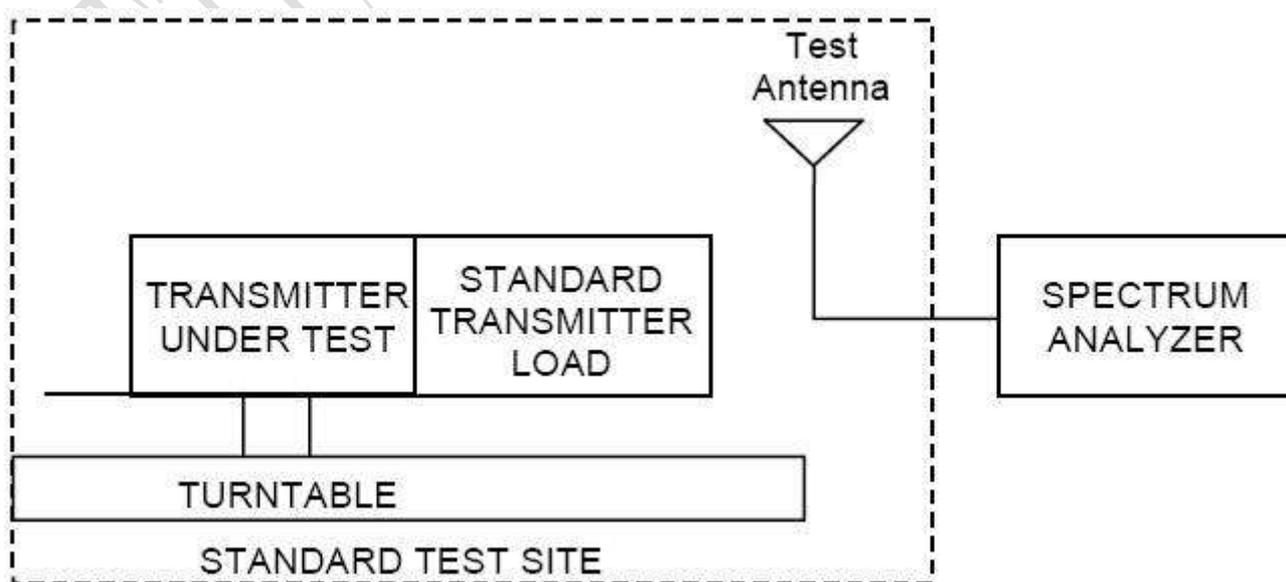
(b) Reconnect the equipment as illustrated.
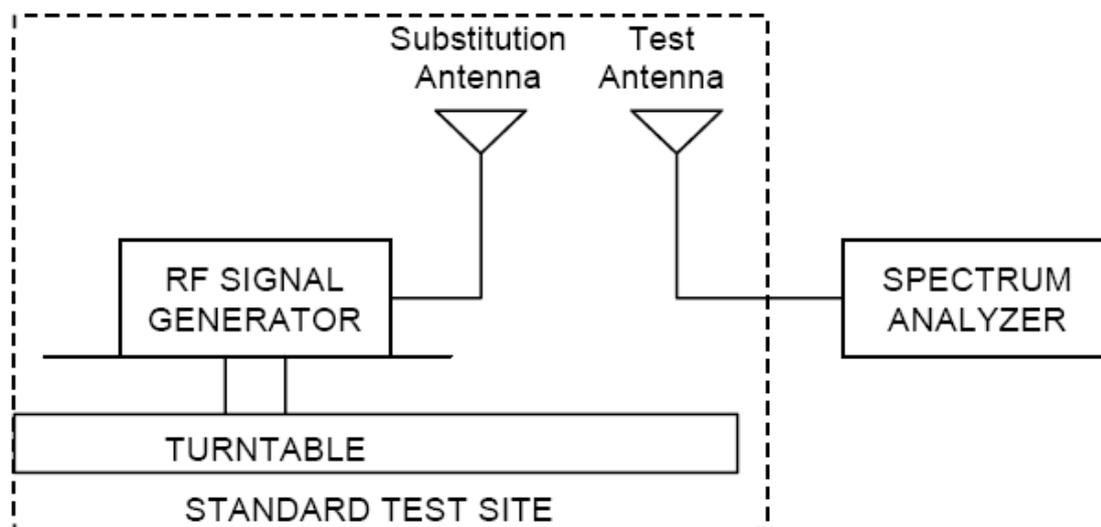
(c) Remove the transmitter and replace it with a substitution antenna. The center of the substitution antenna should be approximately at the same location as the center of the transmitter.

(d) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating 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.

(e) Repeat step d) with both antennas vertically polarized for each spurious frequency.

(f) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps d) and e) 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:

P_d(dBm) = P_g(dBm) − *cable loss* (dB) + *antenna gain* (dB)
where:
P_d is the dipole equivalent power and
P_g is the generator output power into the substitution antenna.
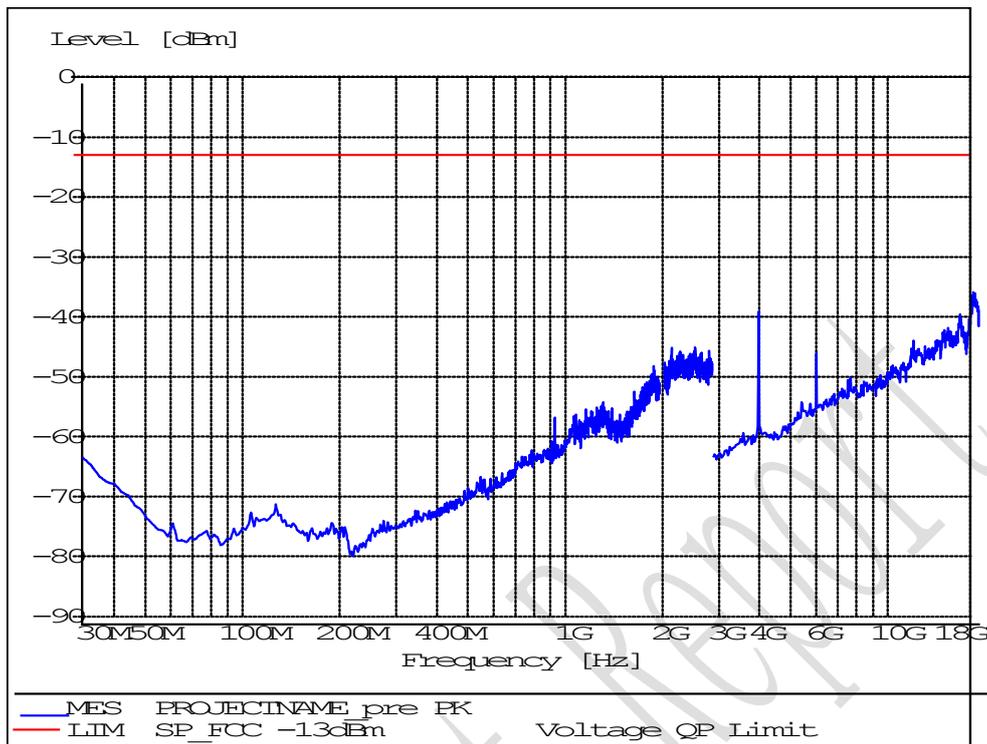
Test Results for GPRS mode:
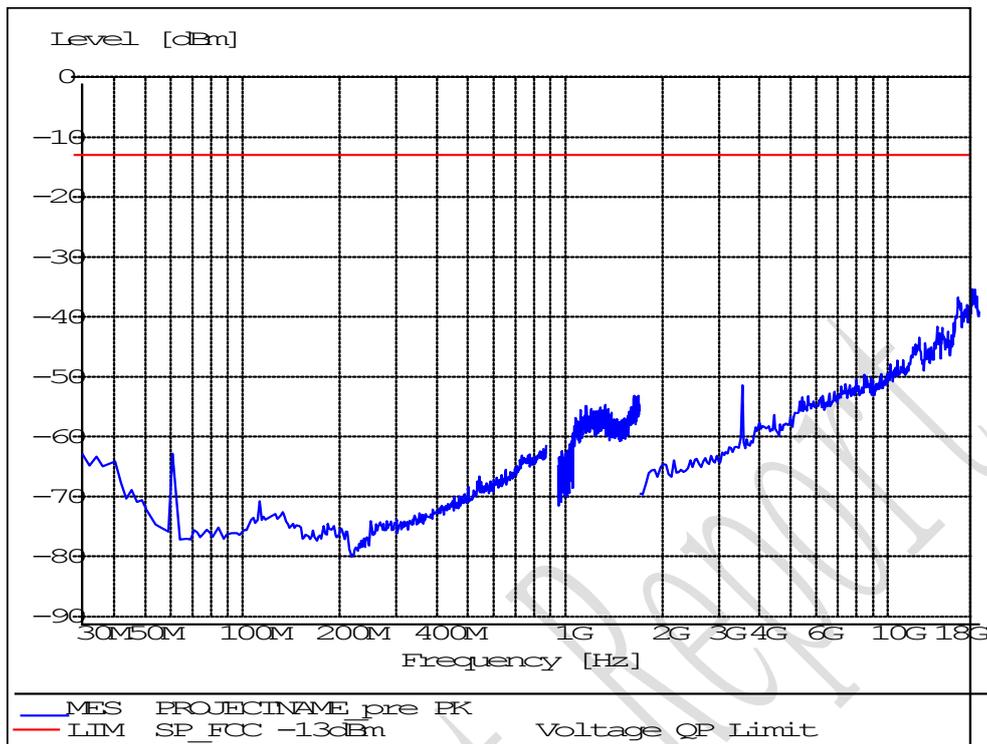
S190VF for GPRS850 mode
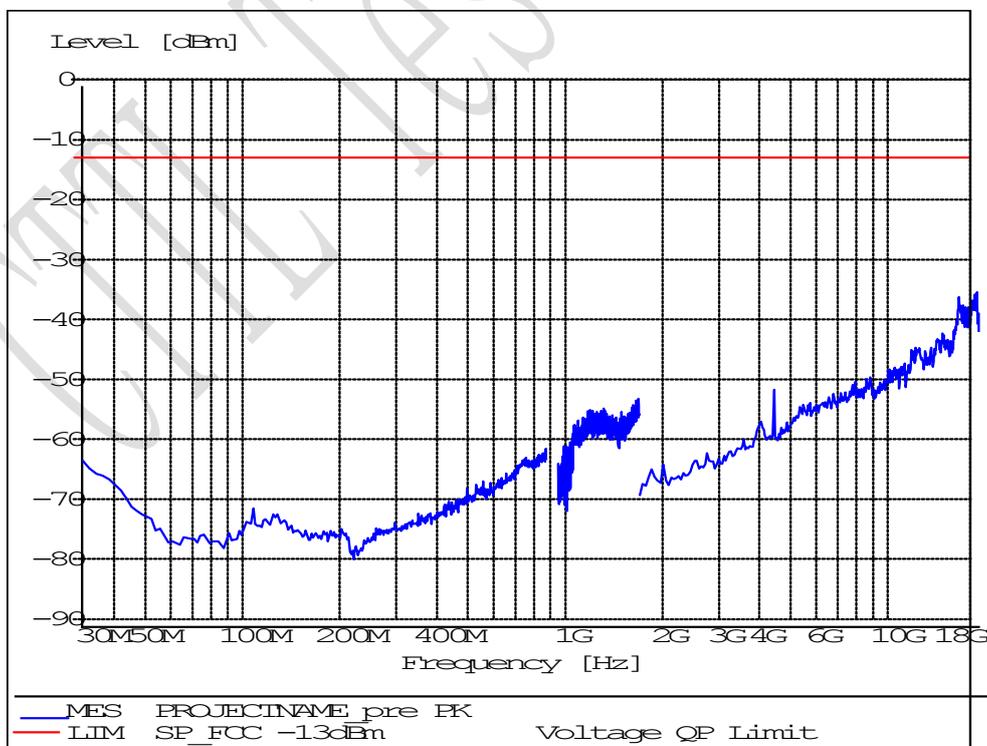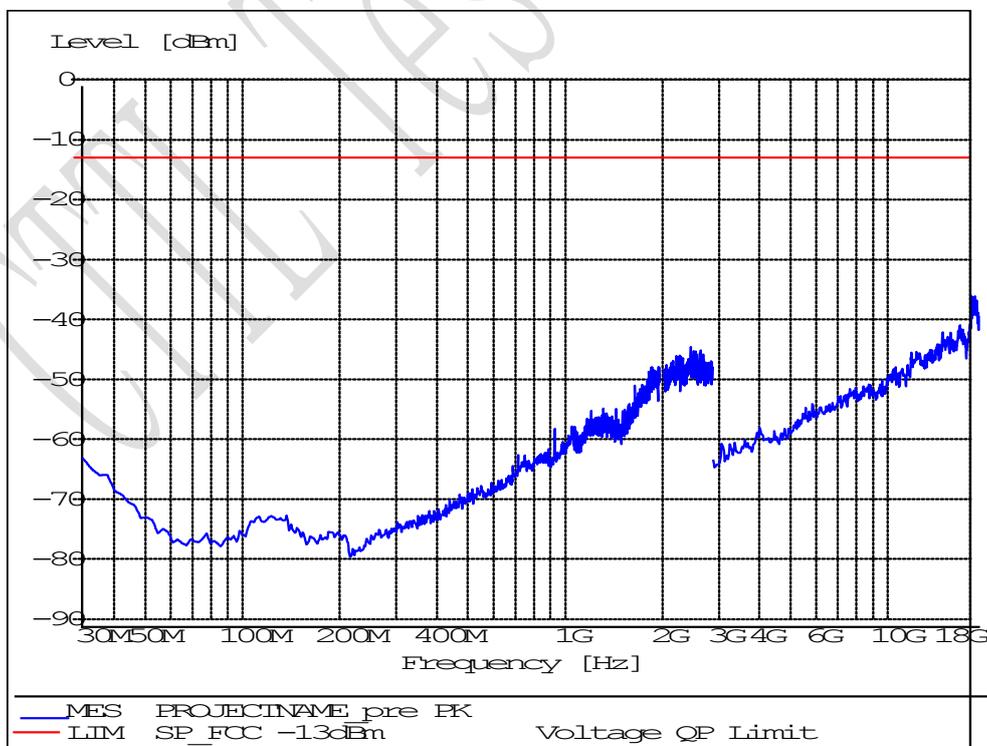

S190HF for GPRS850 mode
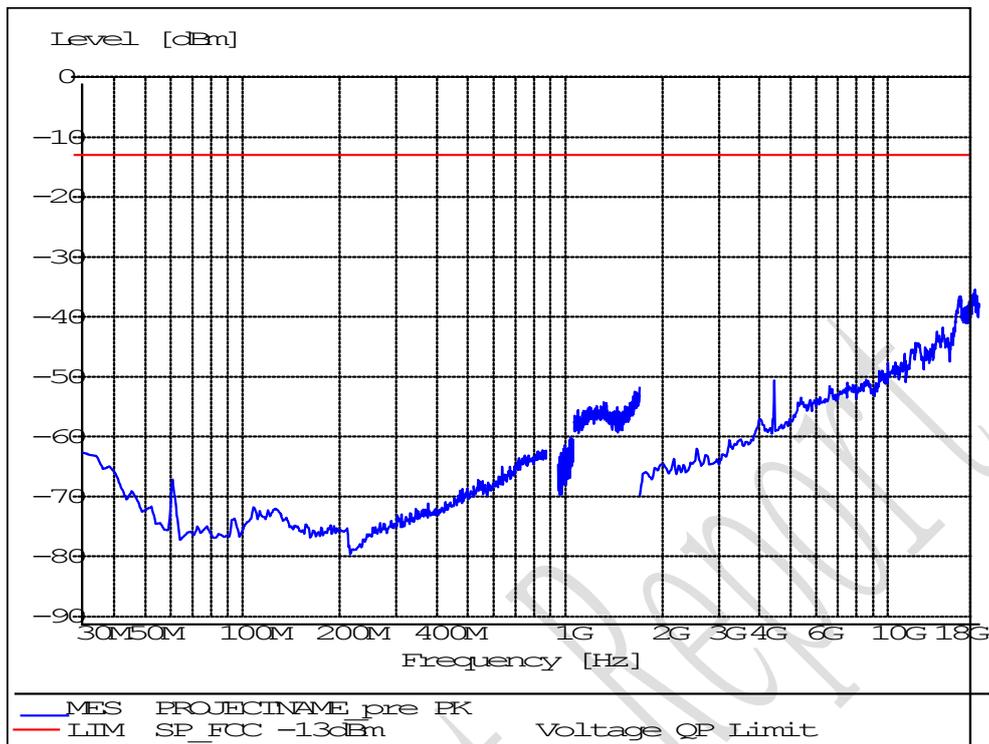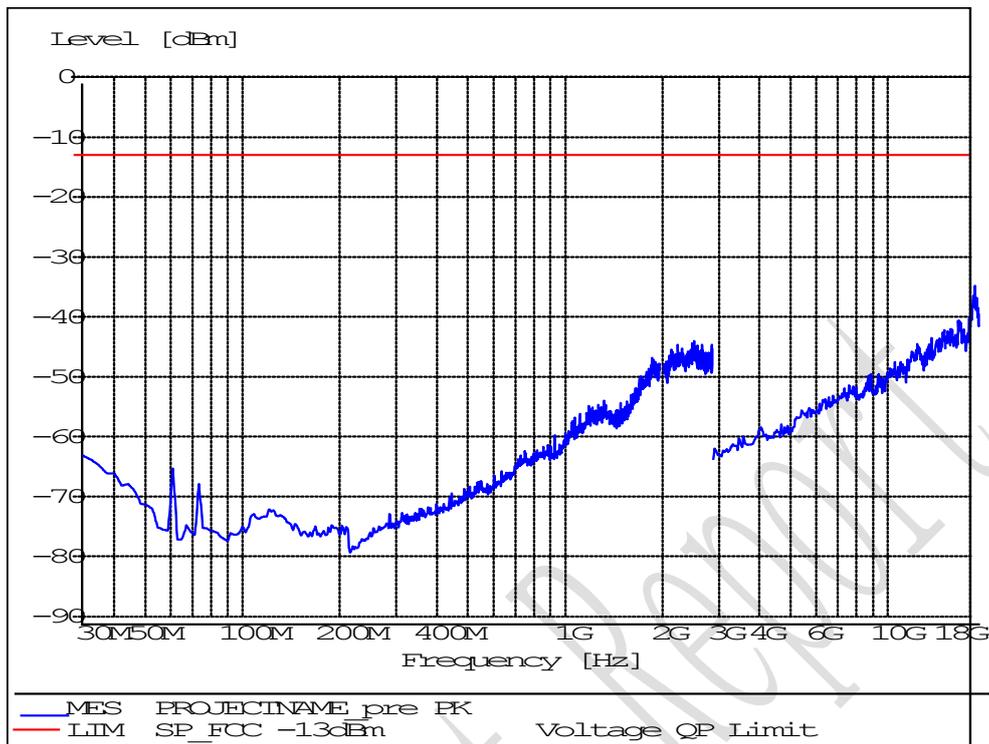
S190VT for GPRS850 mode
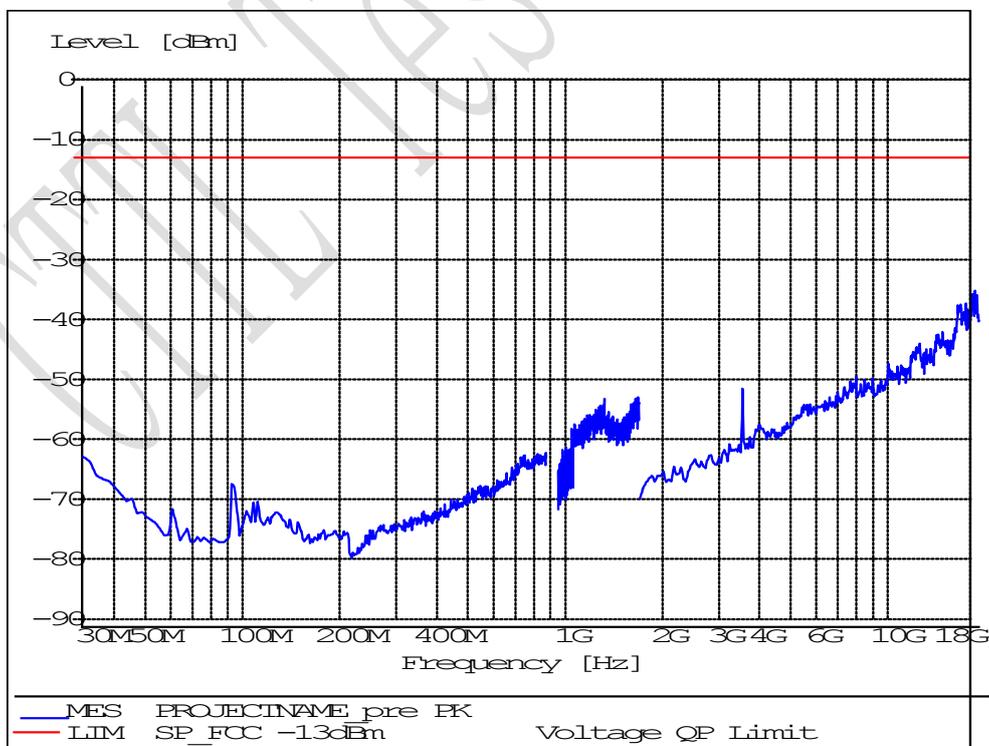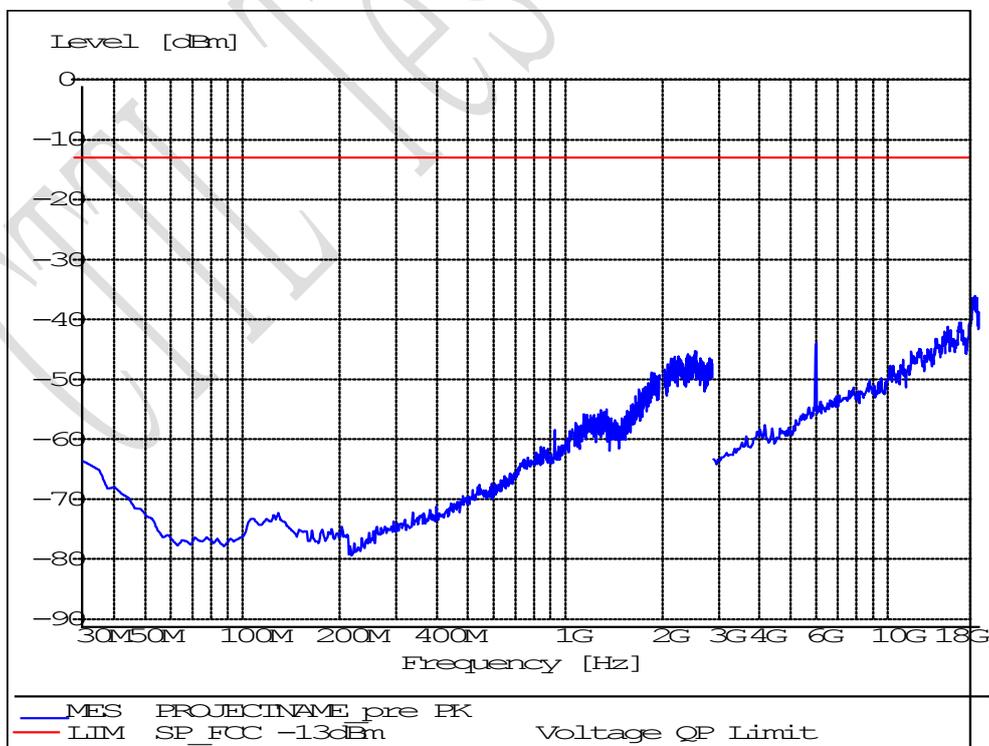

S190HT for GPRS850 mode

S661VF for GPRS1900 mode
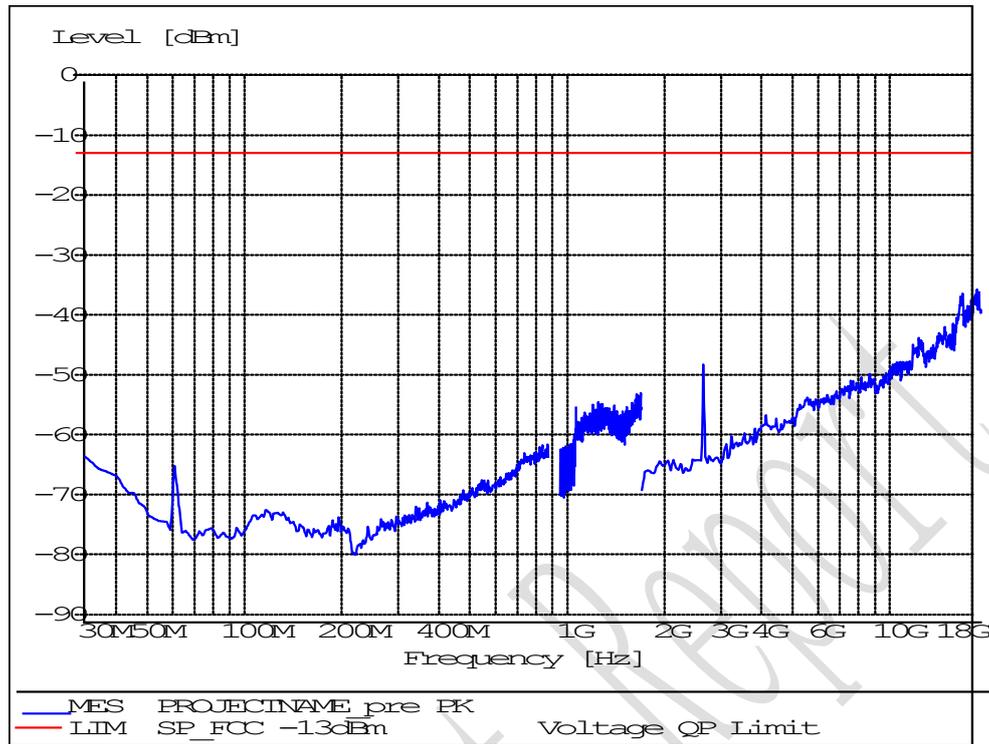

S661HF for GPRS1900 mode
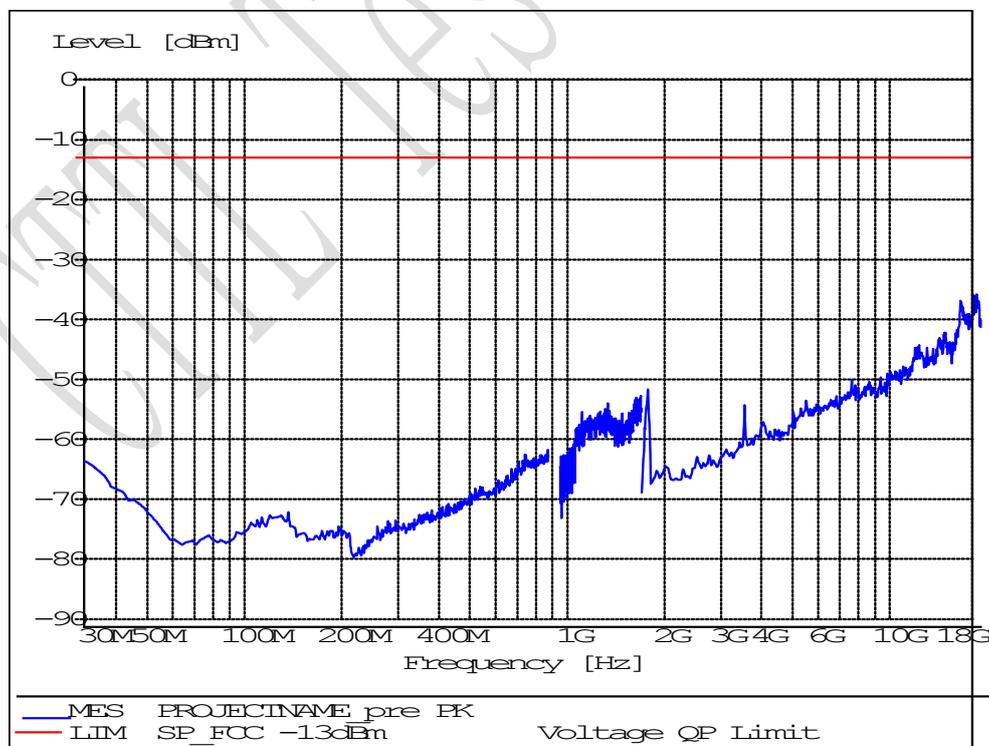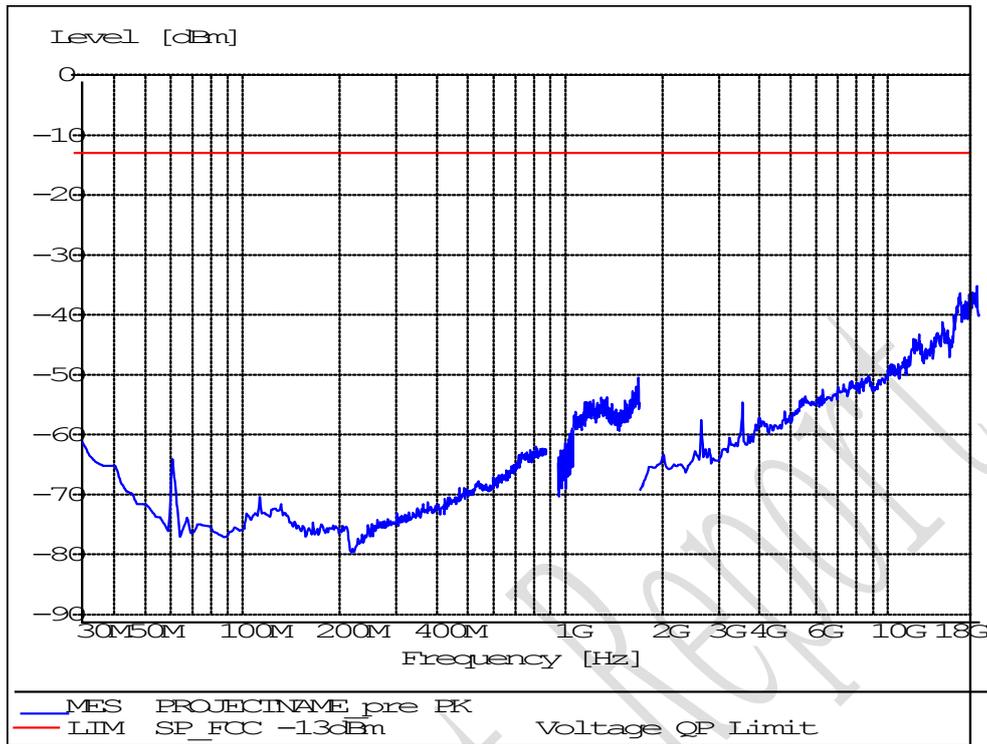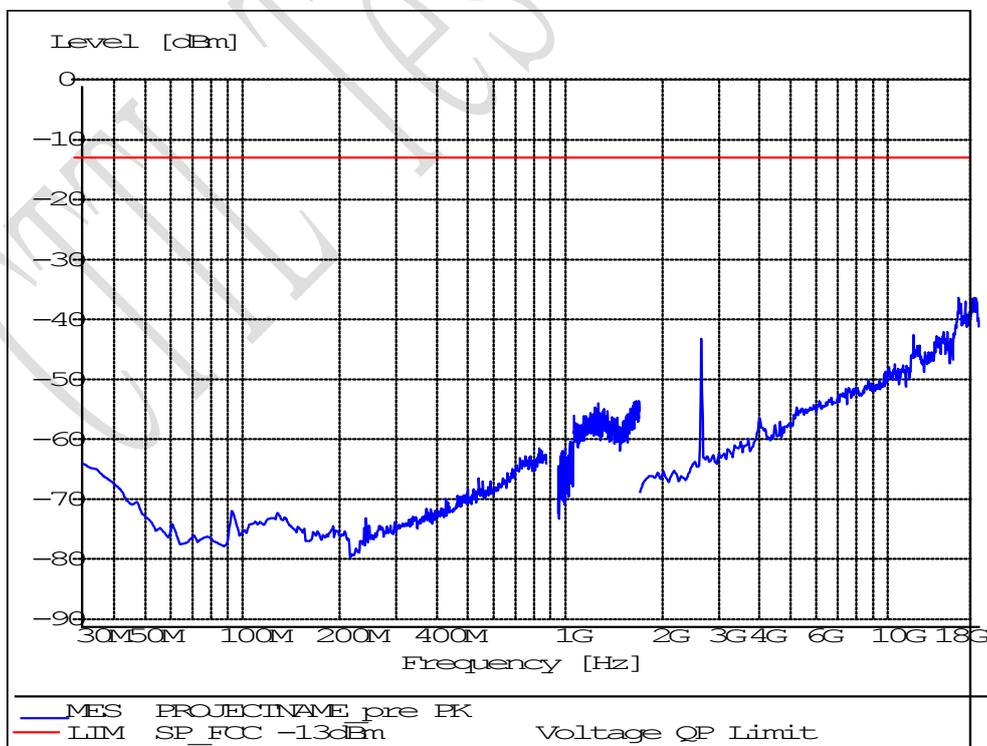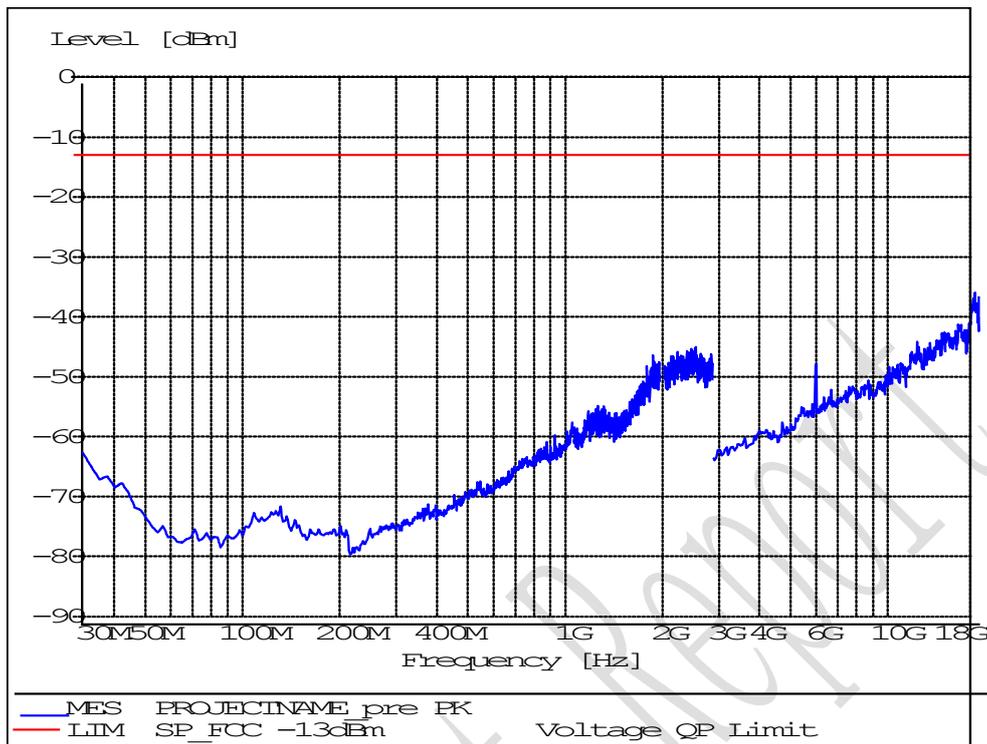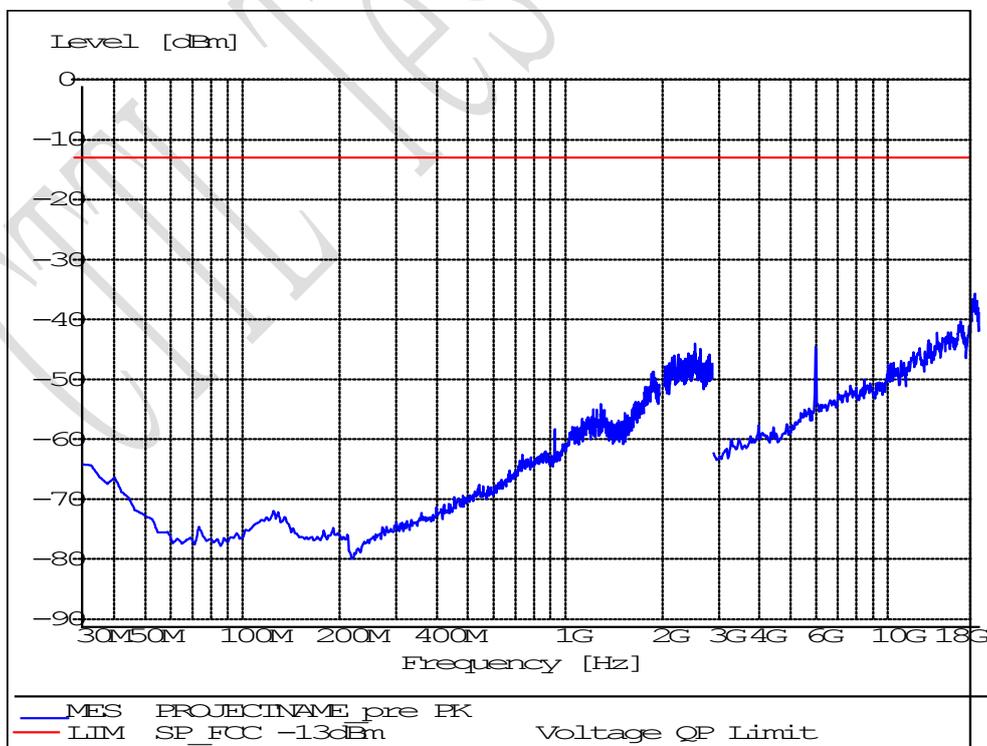
S661VT for GPRS1900 mode

S661HT for GPRS1900 mode

Test Results for EGPRS mode:

S190VF for EGPRS850 mode

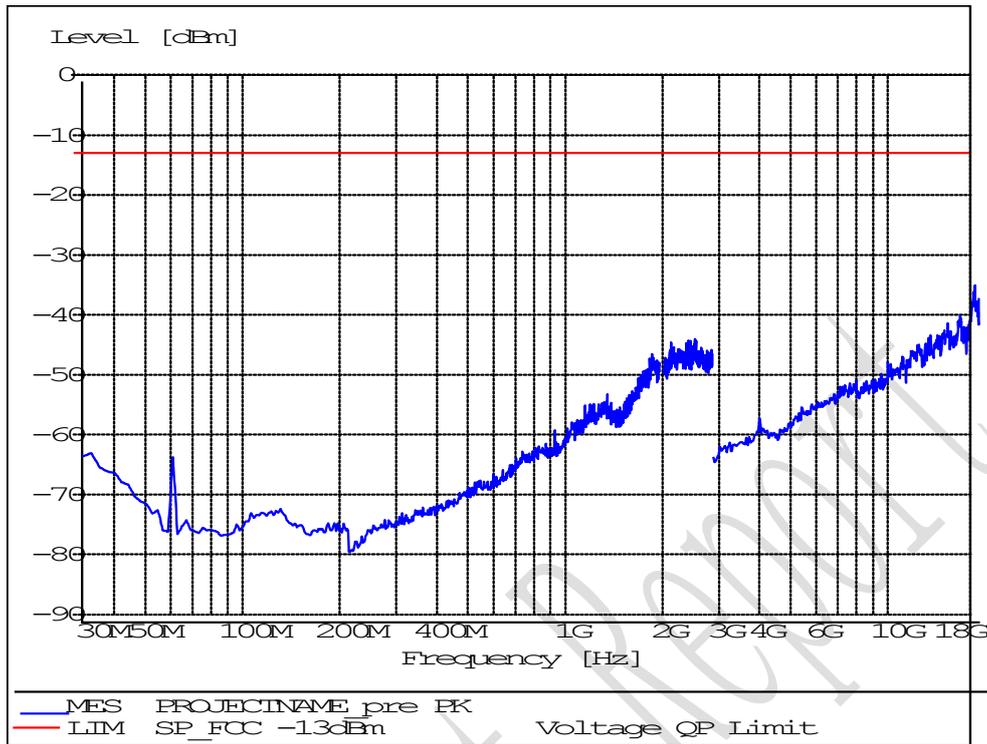**S190HF for EGPRS850 mode**

S190VT for EGPRS850 mode
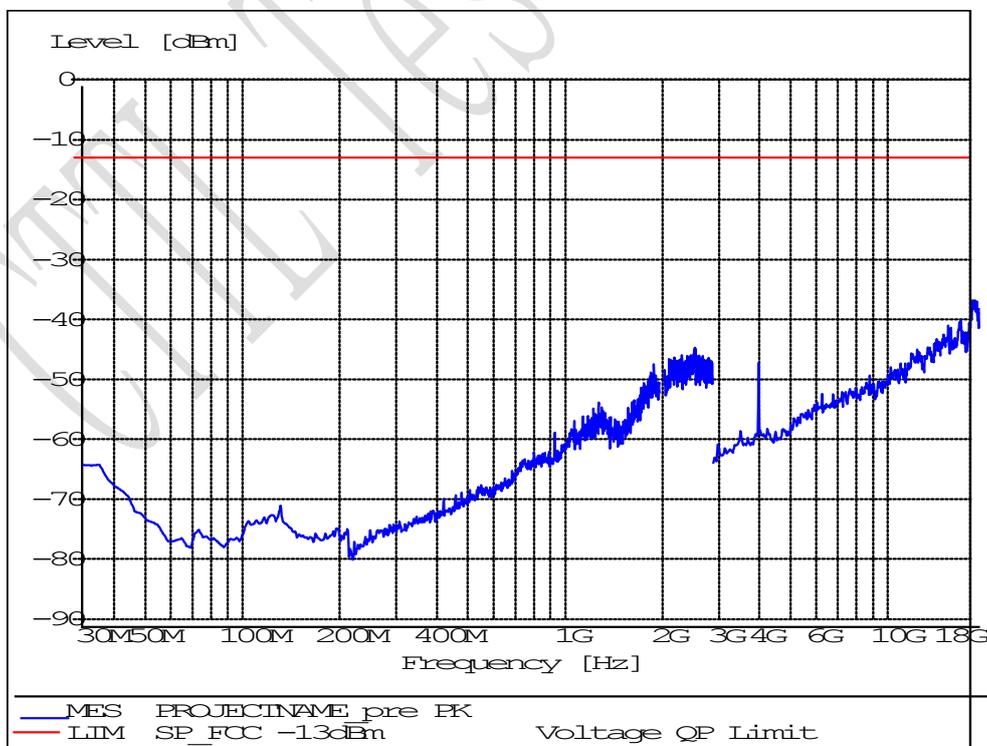

S190HT for EGPRS850 mode

S661VF for EGPRS1900 mode
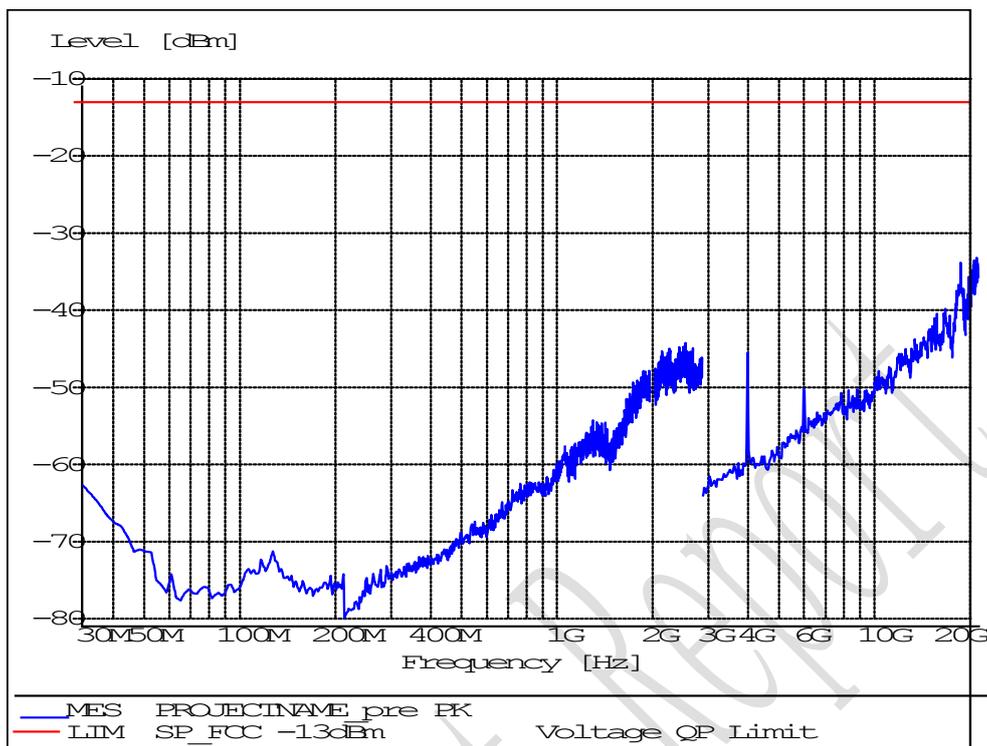

S661HF for EGPRS1900 mode

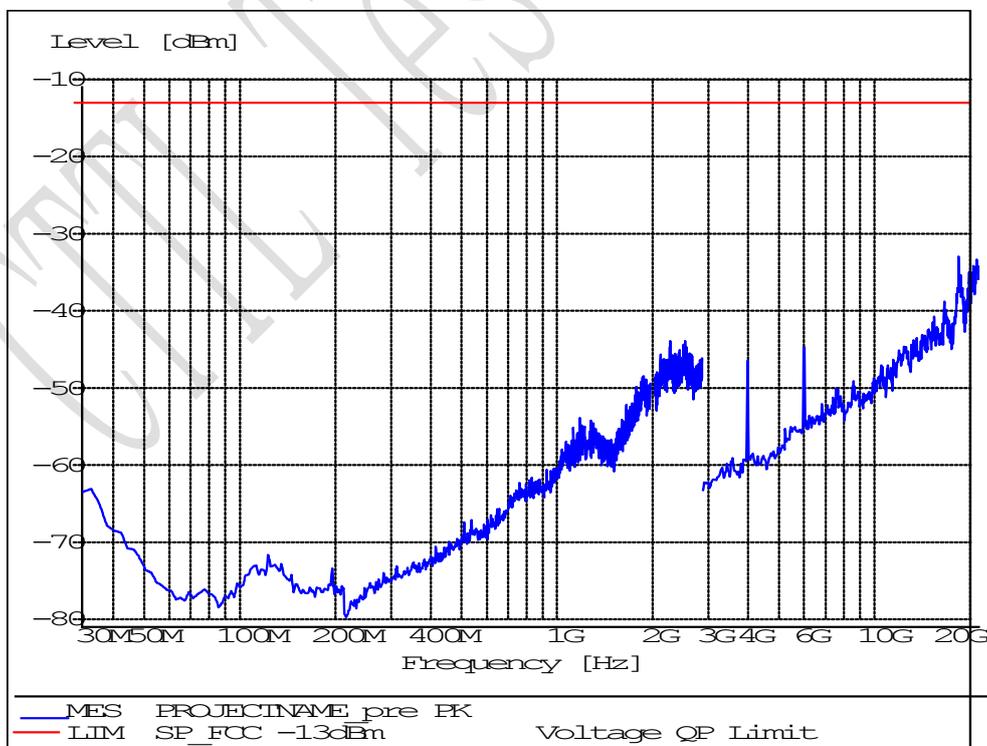**S661VT for EGPRS1900 mode**

S661HT for EGPRS1900 mode

Test Results for HSDPA mode:

S9400VF for HSDPA FDD II mode

S9400HF for HSDPA FDD II mode

S9400VT for HSDPA FDD II mode

S9400HT for HSDPA FDD II mode

S4175VF for HSDPA FDD V mode

S4175HF for HSDPA FDD V mode

S4175VT for HSDPA FDD V mode
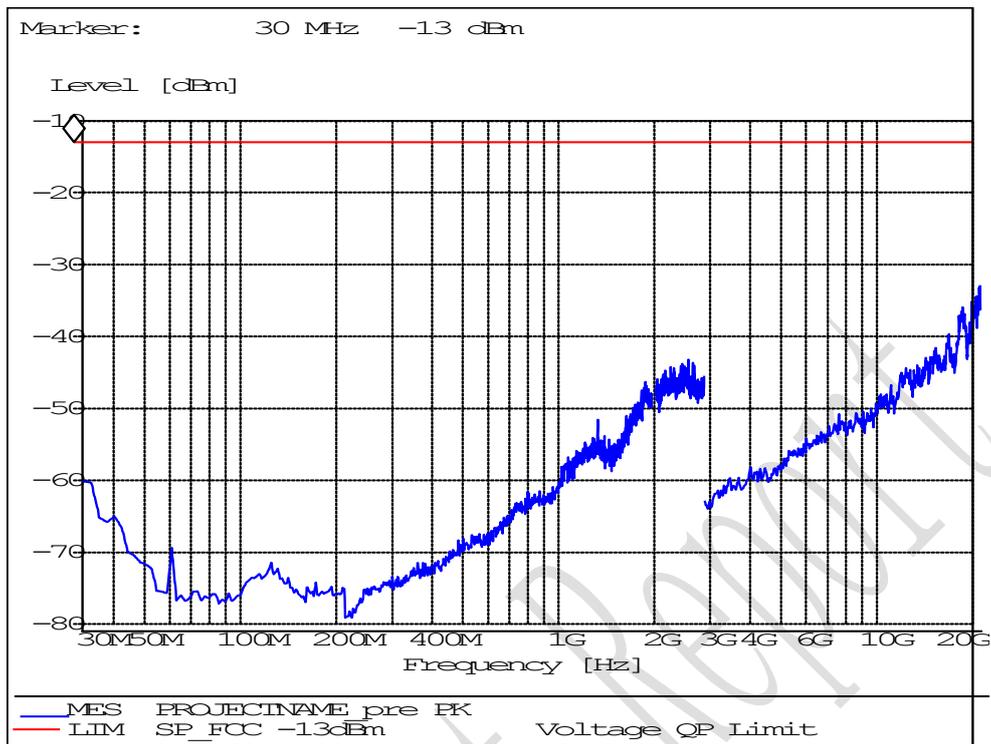

S4175HT for HSDPA FDD V mode

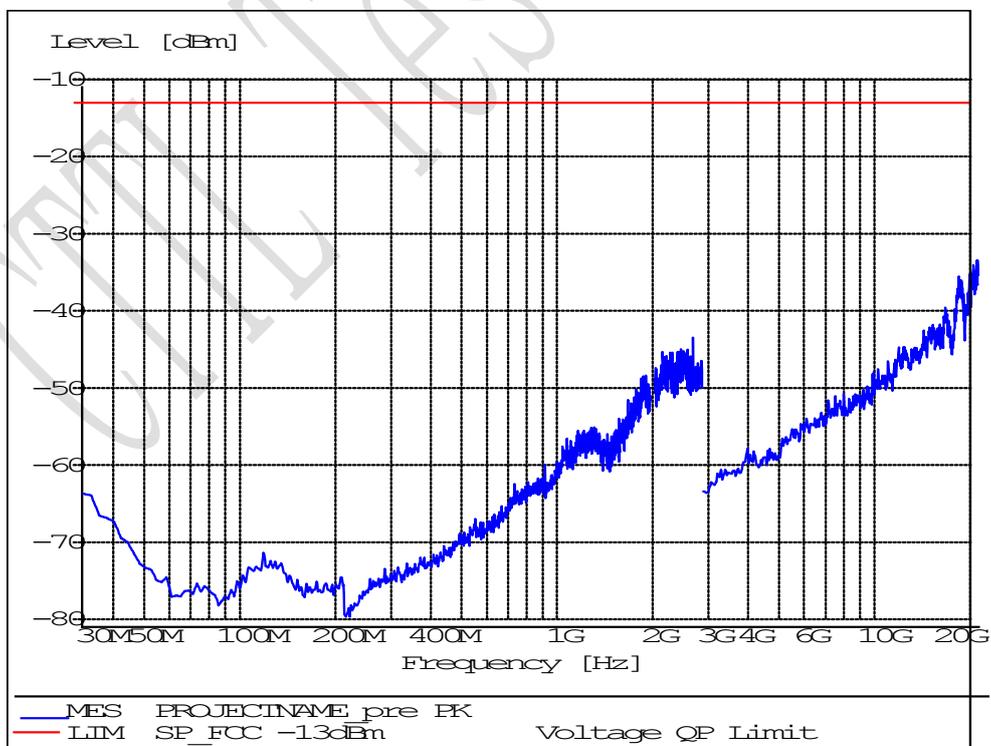**Test Results for HSUPA mode:**

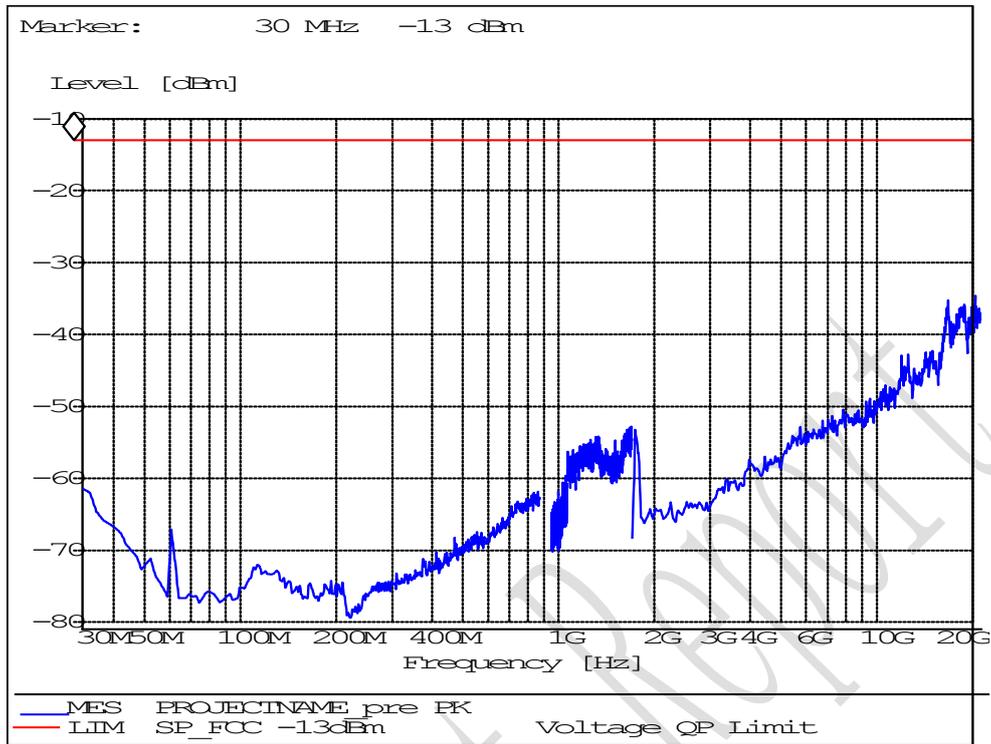**S9400VF for HSUPA FDD II mode**

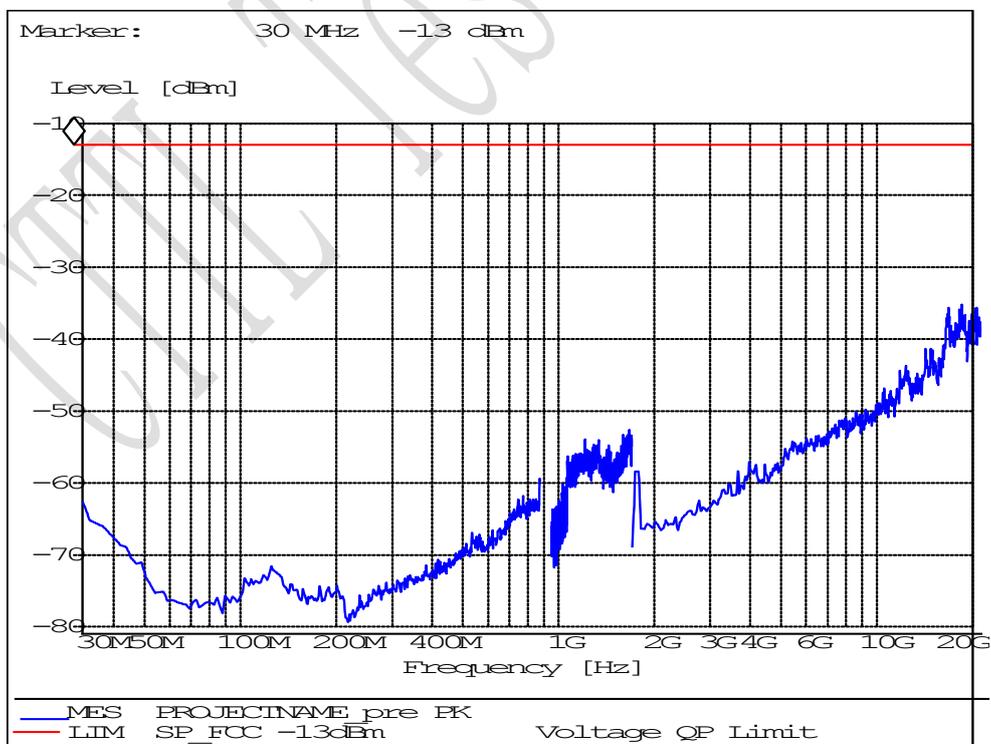

S9400HF for HSUPA FDD II mode
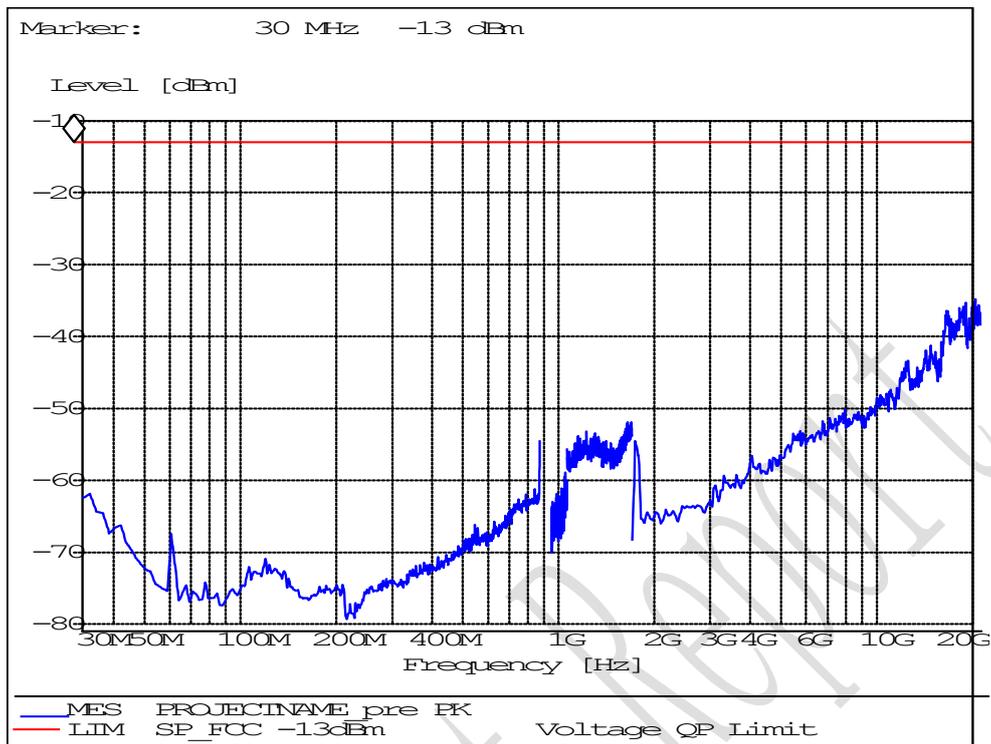
S9400VT for HSUPA FDD II mode
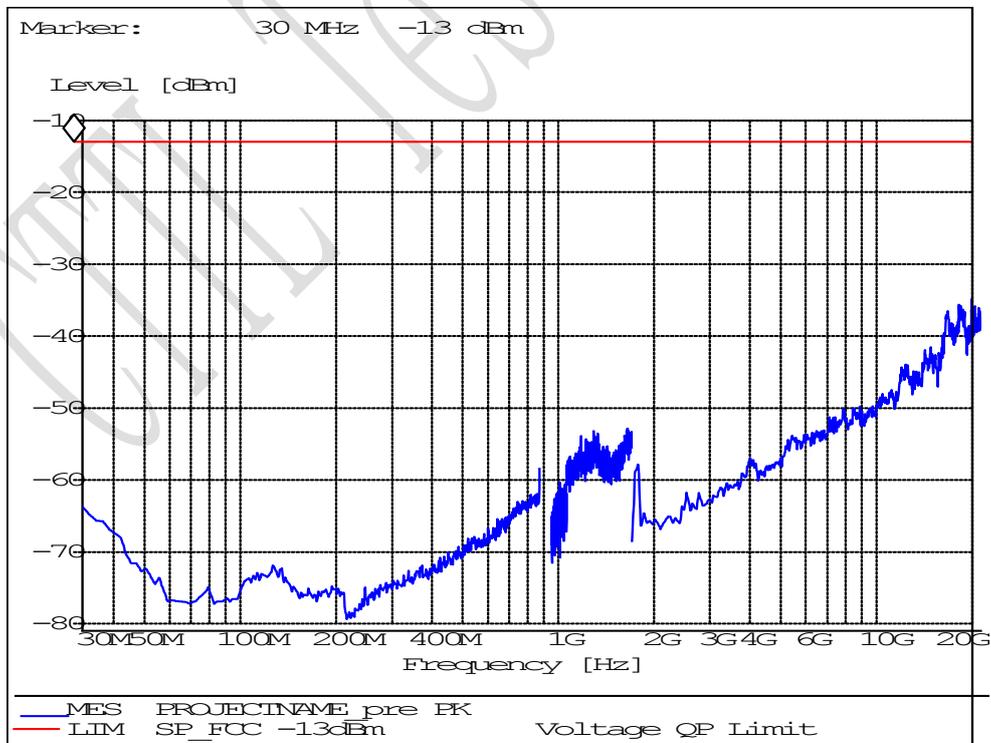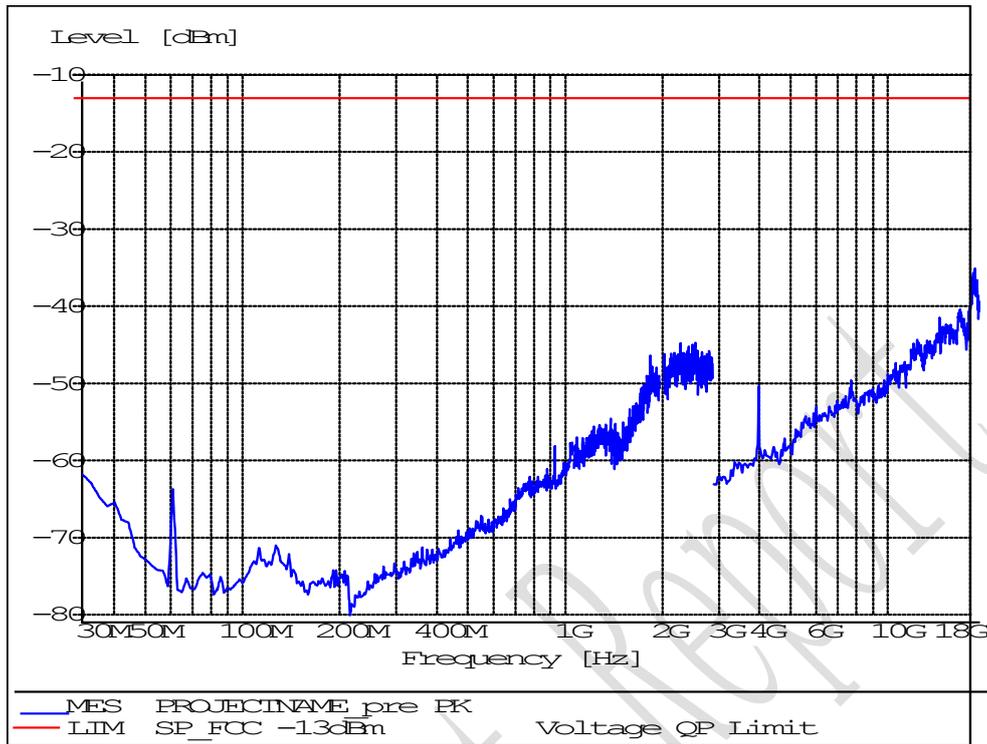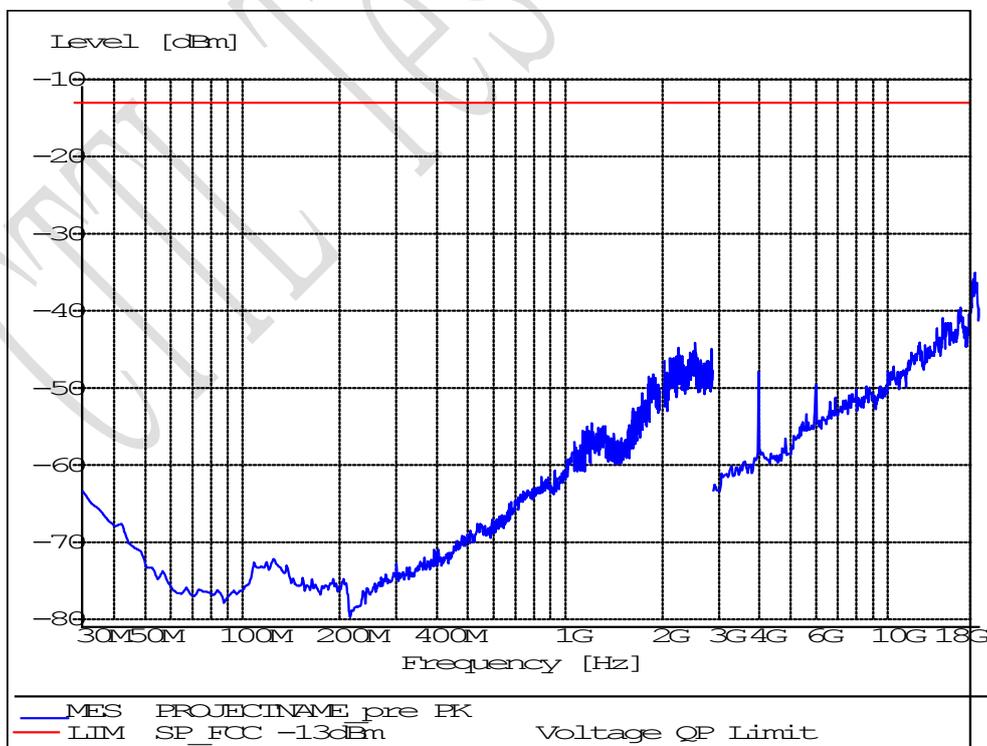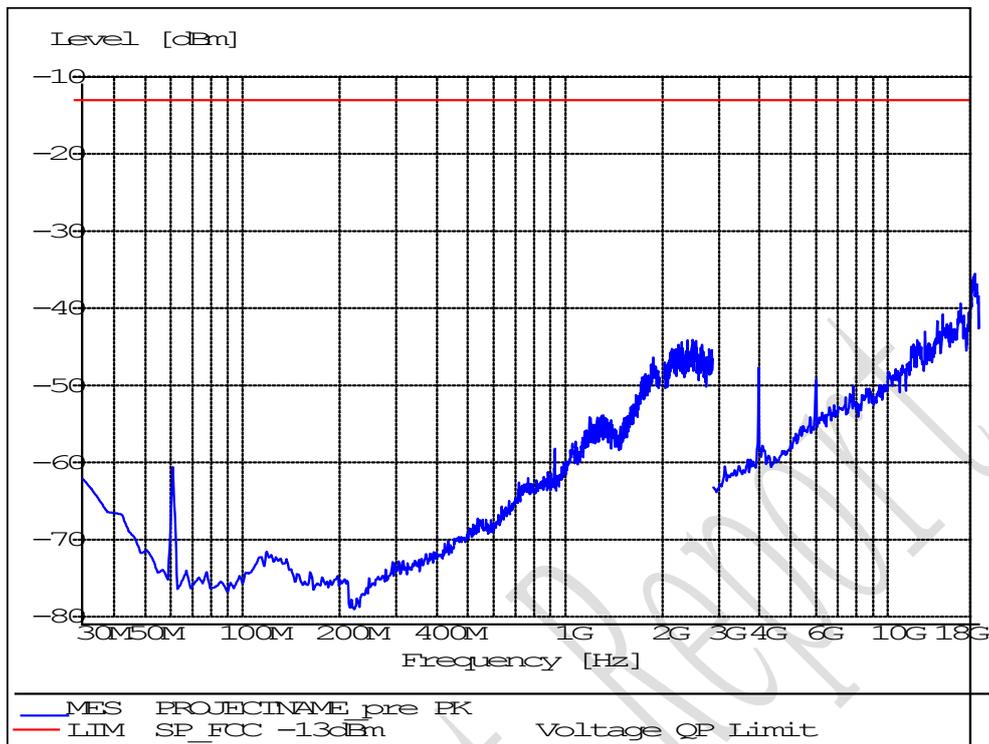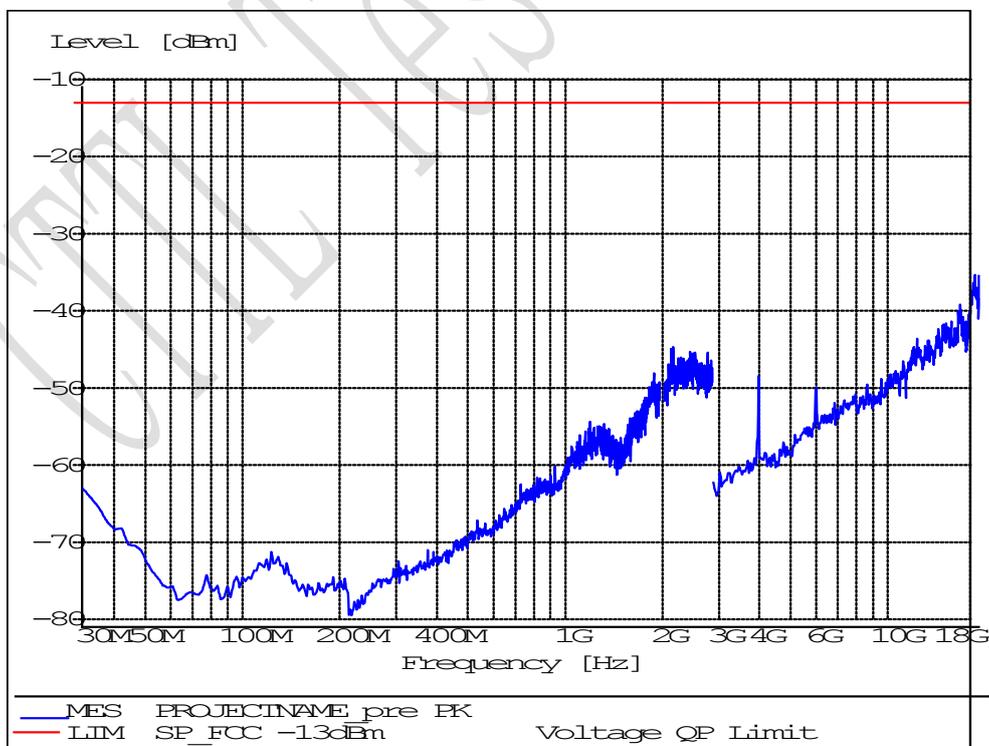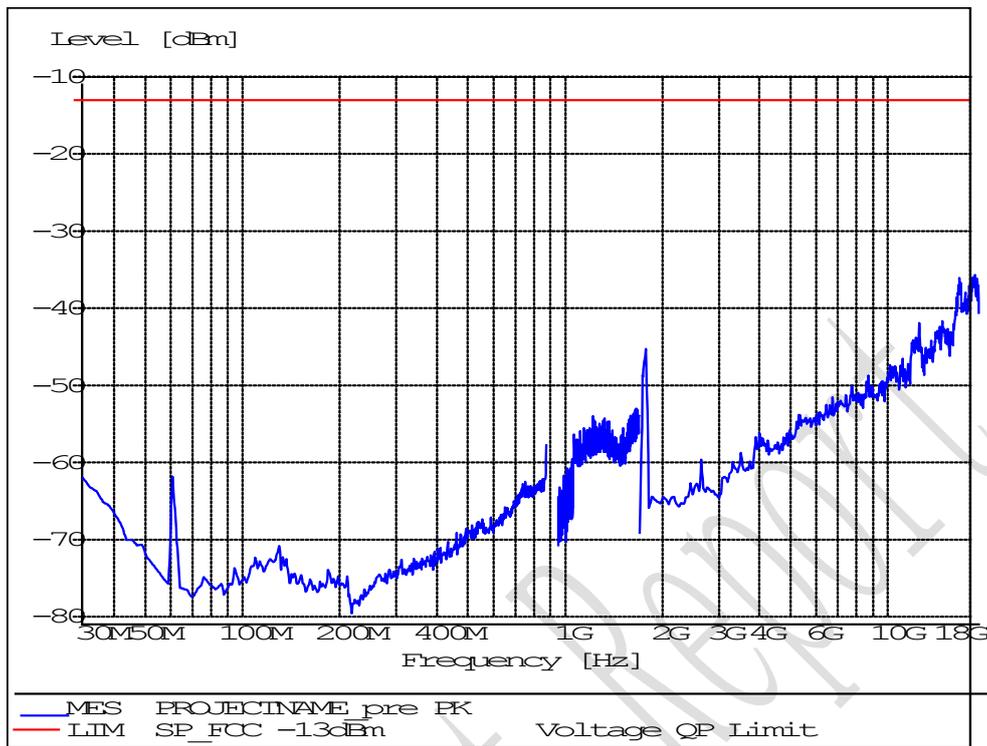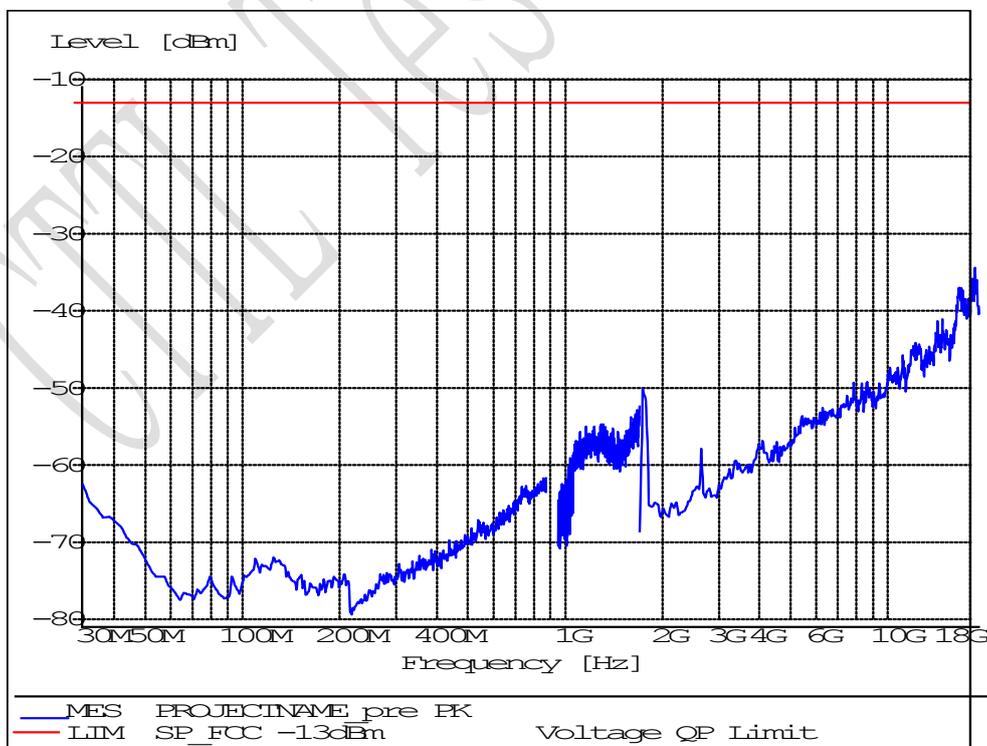

S9400HT for HSUPA FDD II mode

S4175VF for HSUPA FDD V mode

S4175HF for HSUPA FDD V mode
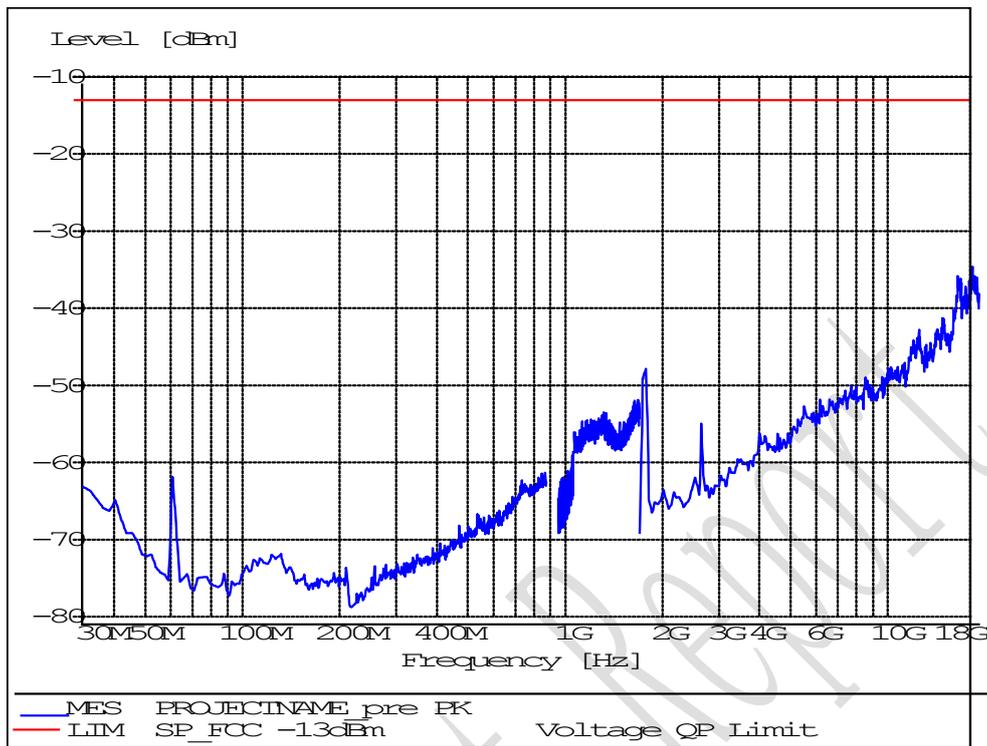
S4175VT for HSUPA FDD V mode
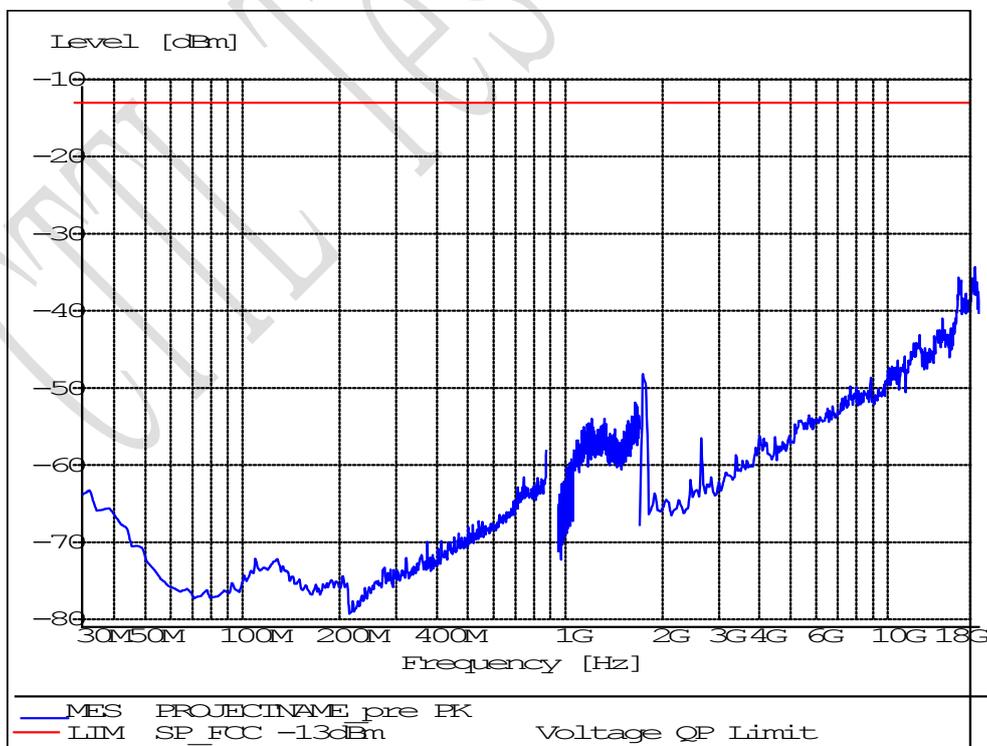
S4175HT for HSUPA FDD V mode

4.2 Radiated RF Power Output and ERP

Specifications:	2.1046,24.232,22.913(a)
Date of Tests	2011-04-01~2011-04-06
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 9262, 9400, 9538, 4132, 4175 and 4233, for HSPA.
Test Results:	Pass
Test equipment Used:	

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESI26	100211	2012-01-12	Normal
7330	Ultra Broadband Antenna	SCHWARZBECK	VULB 9160	--	2013-11-24	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2013-11-16	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:
ERP: According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Limits for ERP

Frequency range	Limit Level (ERP)
TX channel	7W or 38.5dBm

Test Setup:

The EUT was set in an anechoic chamber, which is connected to the Wireless Communications Test Set located outside the chamber. The test was done using an automated test system, where all test equipments were controlled by a computer. The test distance separation from the receive antenna is 3 meters.

Test Method

The measurement was performed accordance with section 2.2.17 of ANSI/TIA-603-C: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.
a) Connect the equipment as illustrated. Mount the equipment in a vertical orientation on a multi-axis plastic holder in a RF anechoic chamber.
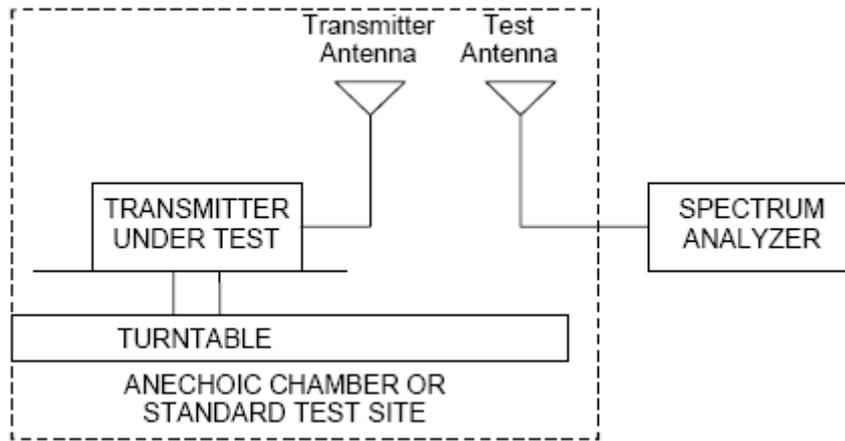
b) Key the transmitter on, then rotate the EUT 360 degree azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks.

c) Replace the transmitter under test with a vertically polarized half-wave dipole, or an antenna whose gain is known relative to an ideal half-wave dipole, illustrated as following. The center of the antenna should be at the same location as the center of the antenna under test.
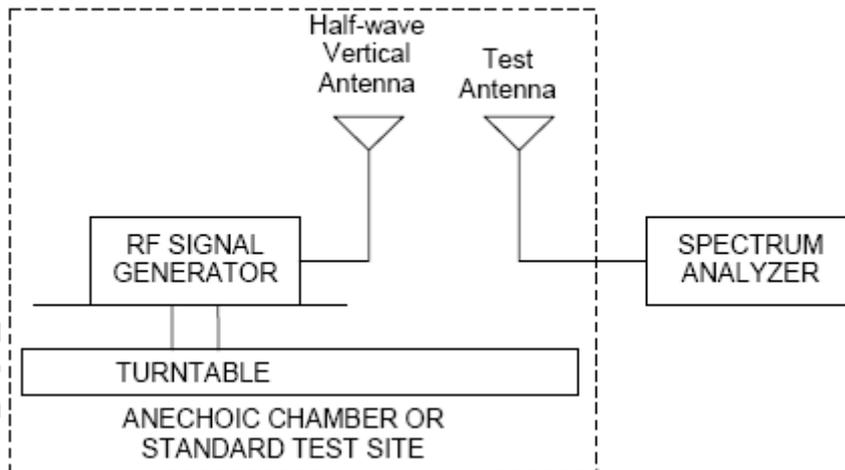
d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS.

LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

Method of Calculation

ERP can then be calculated as follows:

P_d (dBm) = P_g (dBm) - Losses (dB) + Antenna Gain (dBd)

where:

dBd refers to gain relative to an ideal dipole.

Test Data:

GPRS 850 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
128 (824.2MHz)	19.62	0.3	2.73	19.90
190 (836.6MHz)	20.57	0.5	2.80	20.72
251 (848.8MHz)	22.73	0.5	2.87	22.95

GPRS 1900 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	EIRP (P_d) [dBm]
512 (1850.2MHz)	21.71	0.3	2.73	23.86
661 (1880.0MHz)	22.48	0.5	2.80	24.63
810 (1909.8MHz)	21.50	0.5	2.87	23.65

EGPRS 850 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
128 (824.2MHz)	22.26	0.3	2.73	22.54
190 (836.6MHz)	22.99	0.5	2.80	23.14
251 (848.8MHz)	19.23	0.5	2.87	19.45

EGPRS 1900 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	EIRP (P_d) [dBm]
512 (1850.2MHz)	20.94	0.3	2.73	23.37
661 (1880.0MHz)	22.00	0.5	2.80	24.30
810 (1909.8MHz)	21.41	0.5	2.87	23.78

HSDPA FDD II band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	EIRP (P_d) [dBm]
9262 (1852.4MHz)	4.37	0.3	2.73	6.80
9400 (1880.0MHz)	3.54	0.5	2.80	5.84
9538 (1907.6MHz)	4.20	0.5	2.87	6.57

HSDPA FDD V band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
4132 (826.4MHz)	4.25	0.3	2.73	4.53
4175 (835.0MHz)	1.29	0.5	2.80	1.44
4233 (846.6MHz)	6.24	0.5	2.87	5.95

HSUPA FDD II band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	EIRP (P_d) [dBm]
9262 (1852.4MHz)	13.18	0.3	2.73	15.61
9400 (1880.0MHz)	14.02	0.5	2.80	16.32
9538 (1907.6MHz)	13.30	0.5	2.87	15.67

HSUPA FDD V band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
4132 (826.4MHz)	9.75	0.3	2.73	10.03
4175 (835.0MHz)	10.18	0.5	2.80	10.33
4233 (846.6MHz)	11.63	0.5	2.87	11.85

4.3 Occupied bandwidth

Specifications:	2.1049,22.917(b),24.238(b)
Date of Test	2011-03-31~2011-04-09
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 9262, 9400, 9538, 4132, 4175 and 4233, for HSPA.
Test Results:	--
Test equipment Used:	

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal

Test Setup

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.

```
          ┌───────────┐
          │    EUT    │
          └─────┬─────┘
                │
┌───────────┐ ┌─┴───────┐
│ Wireless  │─│  Power  │
│ Simulator │ │ Divider │
└───────────┘ └─┬───────┘
                │
          ┌─────┴─────┐
          │ Spectrum  │
          │ Analyzer  │
          └───────────┘
```
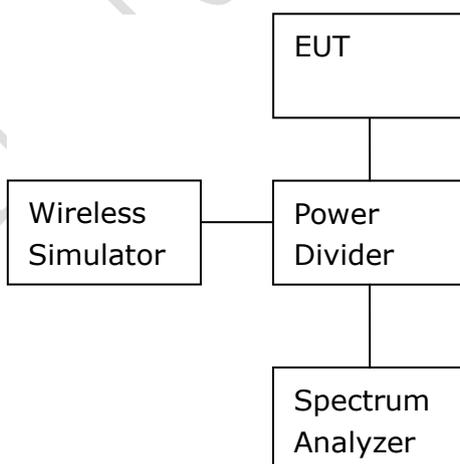
Test Method

The 99% occupied bandwidth was calculated form the spectrum analyzer. Markers in the spectrum analyzer were then placed between the calculated frequencies to show the calculated 99% power band.
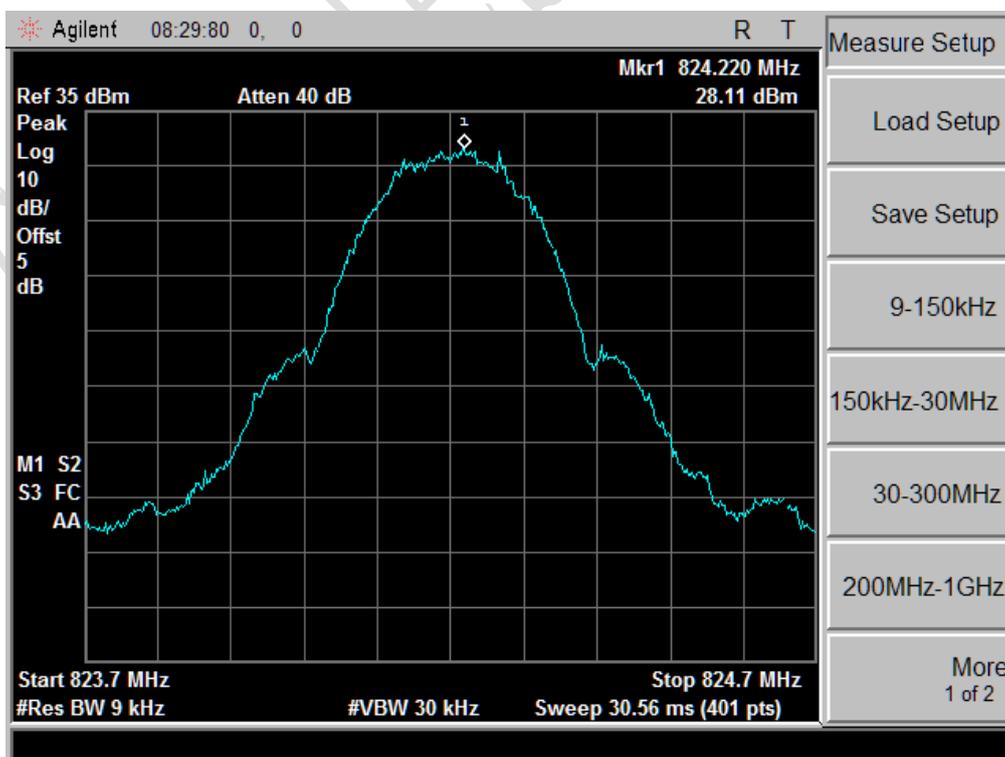
Note:

None

Test Data:

GPRS 850 band mode

EUT channel no.	99% occupied bandwidth [kHz]
128 (824.2MHz)	245.0
190 (836.6MHz)	245.0
251 (848.8MHz)	247.5

GPRS 1900 band mode

EUT channel no.	99% occupied bandwidth [kHz]
512 (1850.2MHz)	245.0
661 (1880.0MHz)	247.5
810 (1909.8MHz)	245.0

Graphical results for GPRS mode:

GPRS850 Channel 128
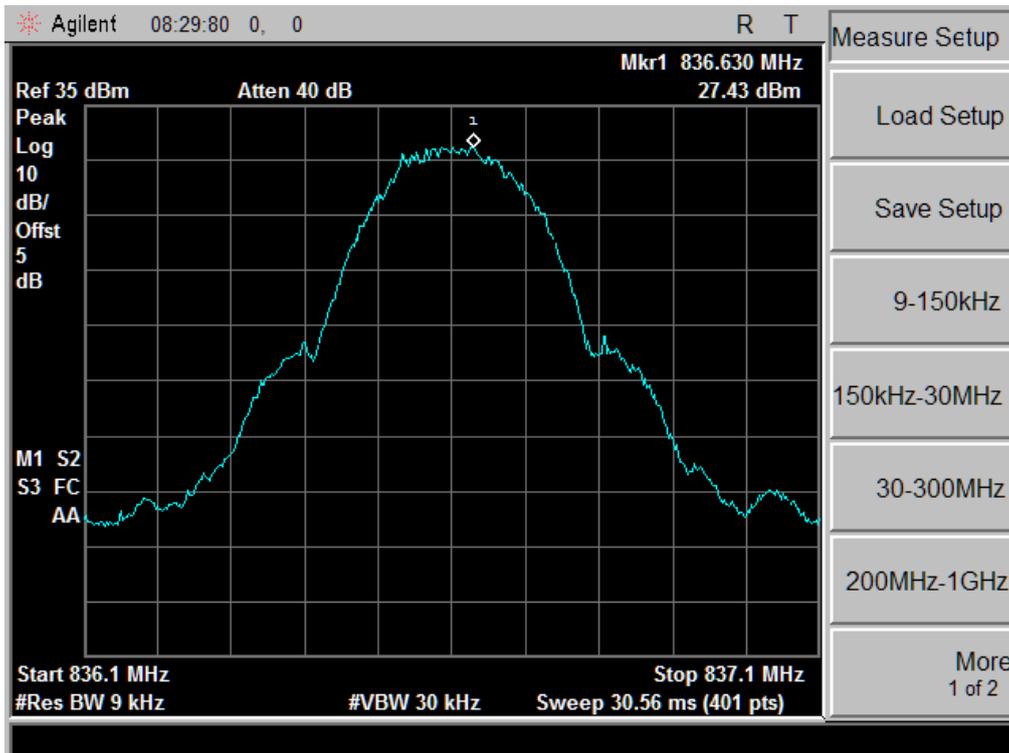
GPRS850 Channel 190

GPRS850 Channel 251

GPRS1900 Channel 512

GPRS1900 Channel 661

GPRS1900 Channel 810

EGPRS 850 band mode

EUT channel no.	99% occupied bandwidth [kHz]
128 (824.2MHz)	247.5
190 (836.6MHz)	242.5
251 (848.8MHz)	245.0

EGPRS 1900 band mode

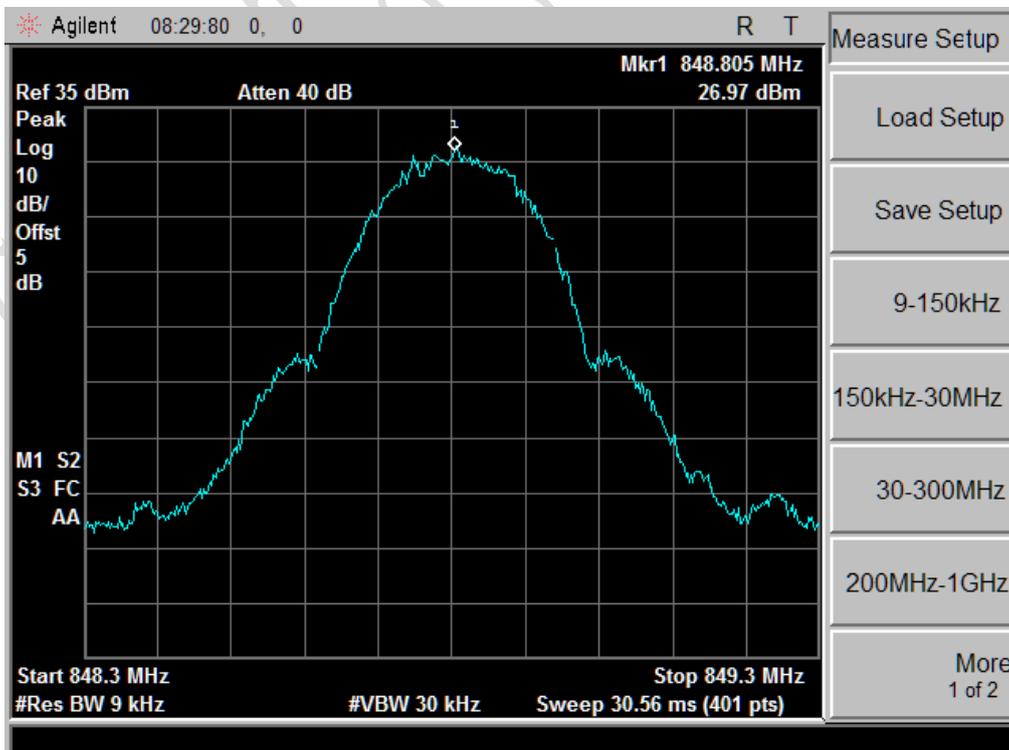| EUT channel no.	99% occupied bandwidth [kHz]
512 (1850.2MHz)	240.0
661 (1880.0MHz)	245.0
810 (1909.8MHz)	240.0

Graphical results for EGPRS mode:
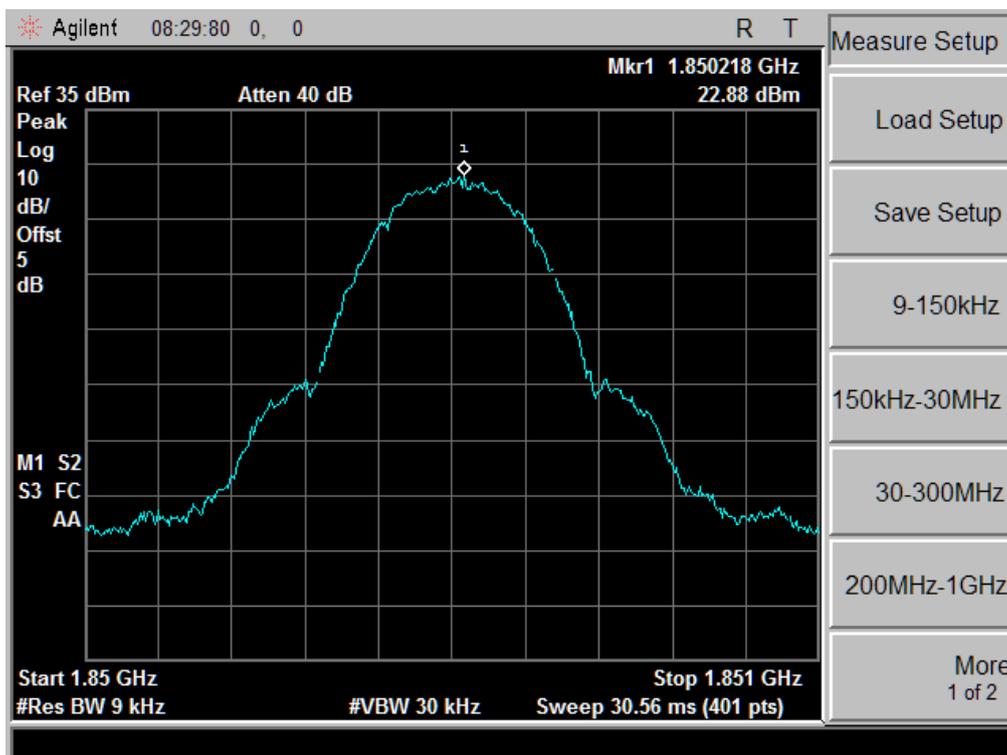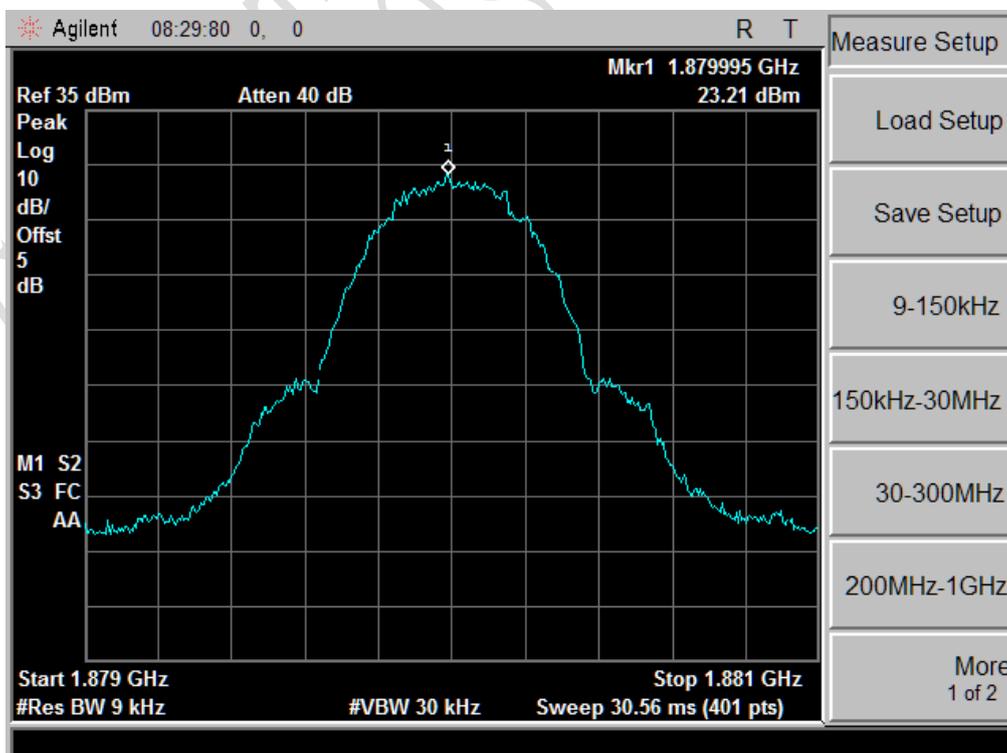

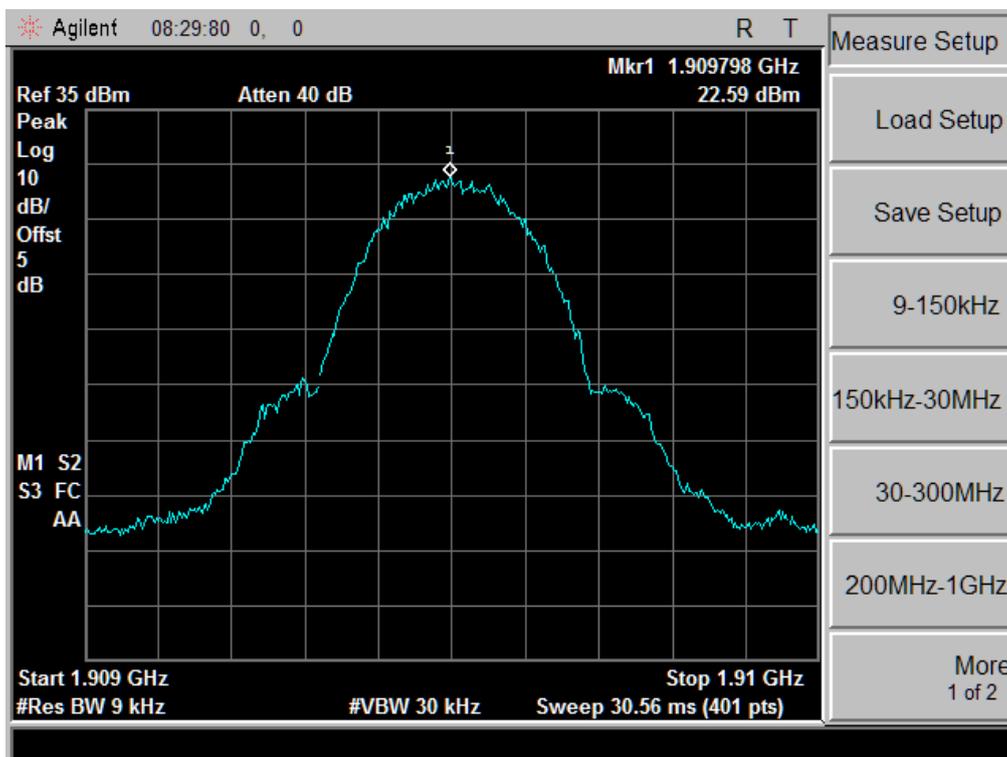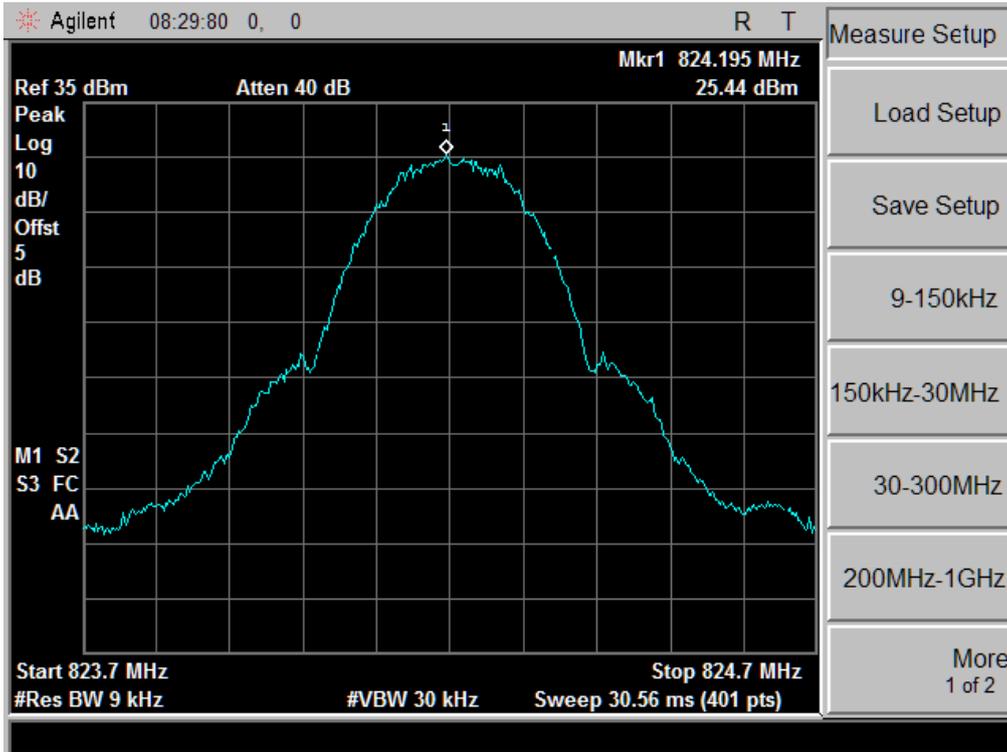EGPRS850 Channel 128
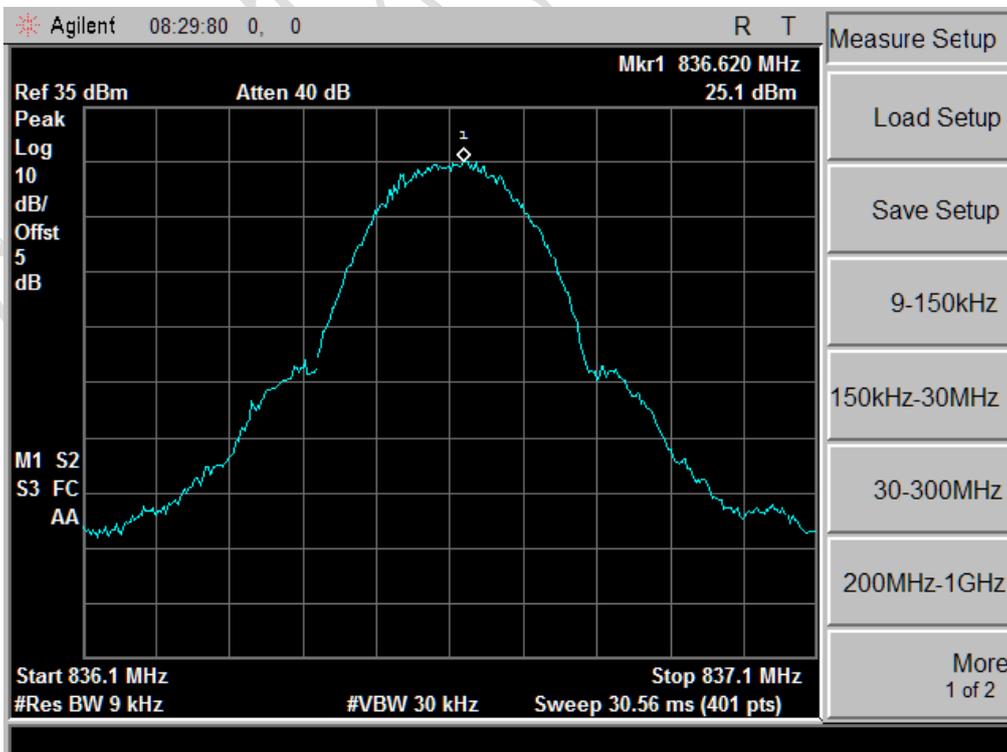
EGPRS850 Channel 190
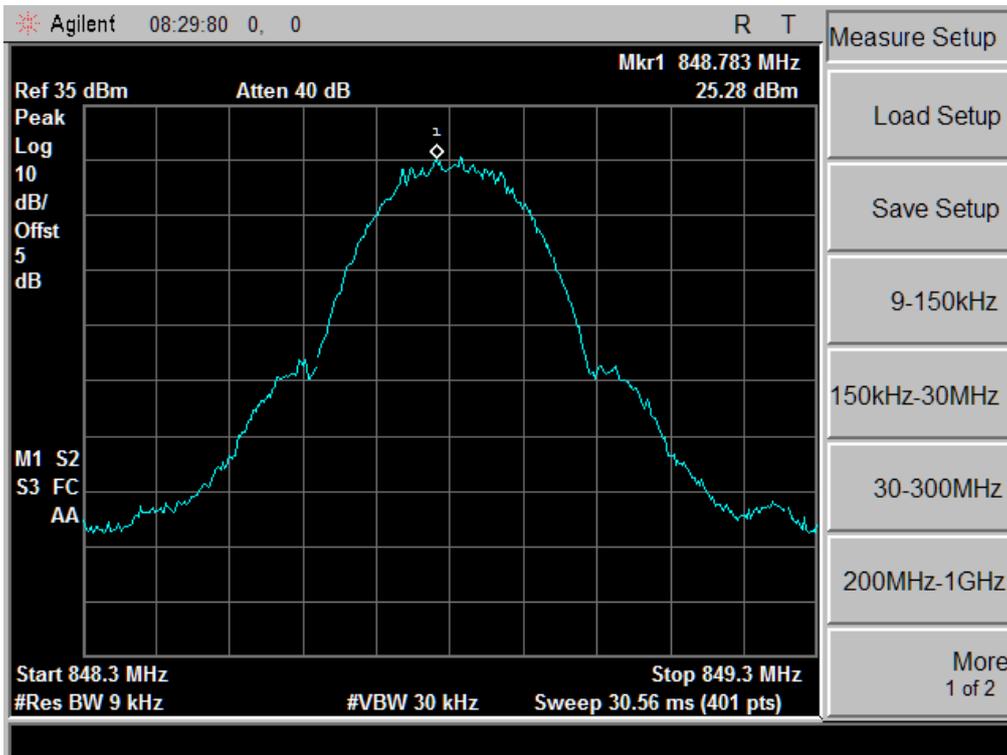
EGPRS850 Channel 251
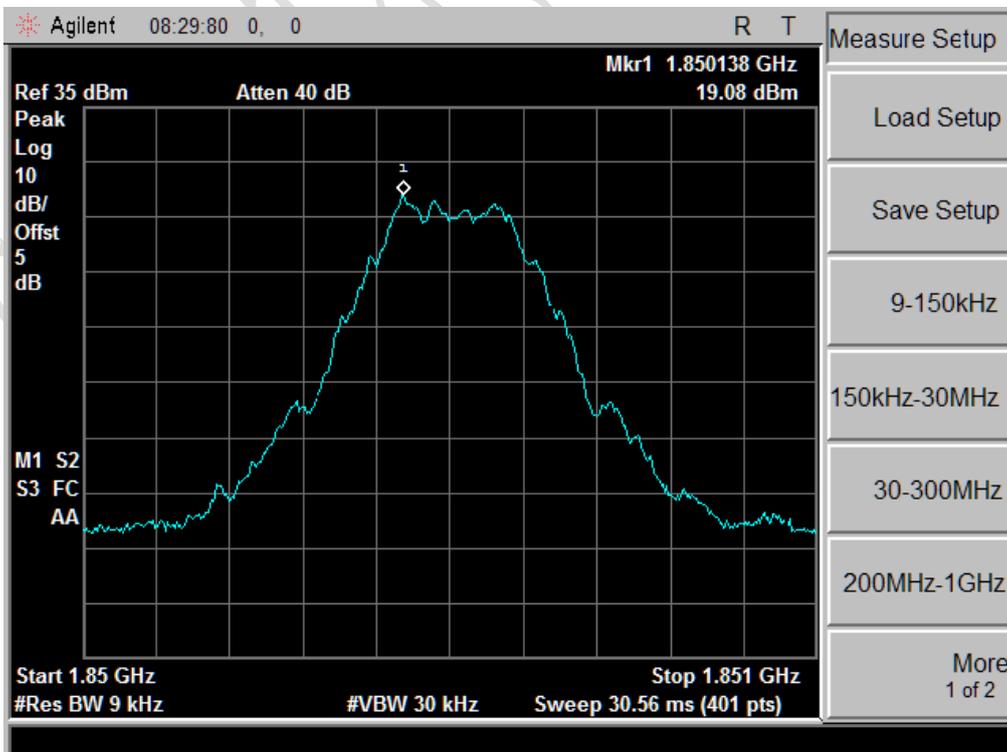
EGPRS1900 Channel 512
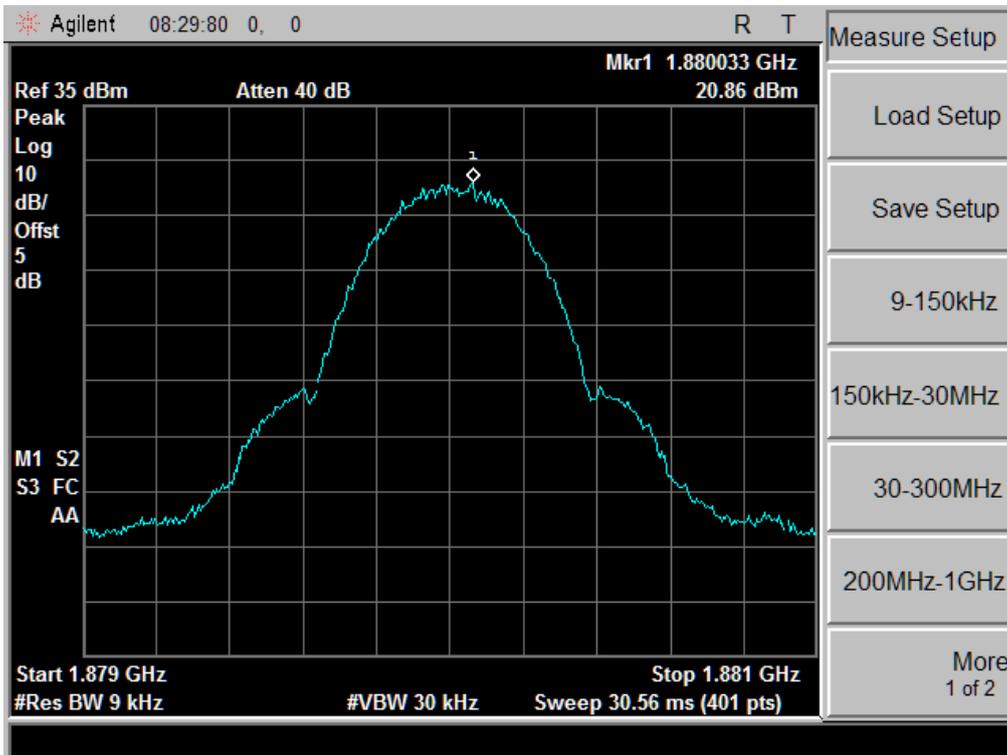
EGPRS1900 Channel 661
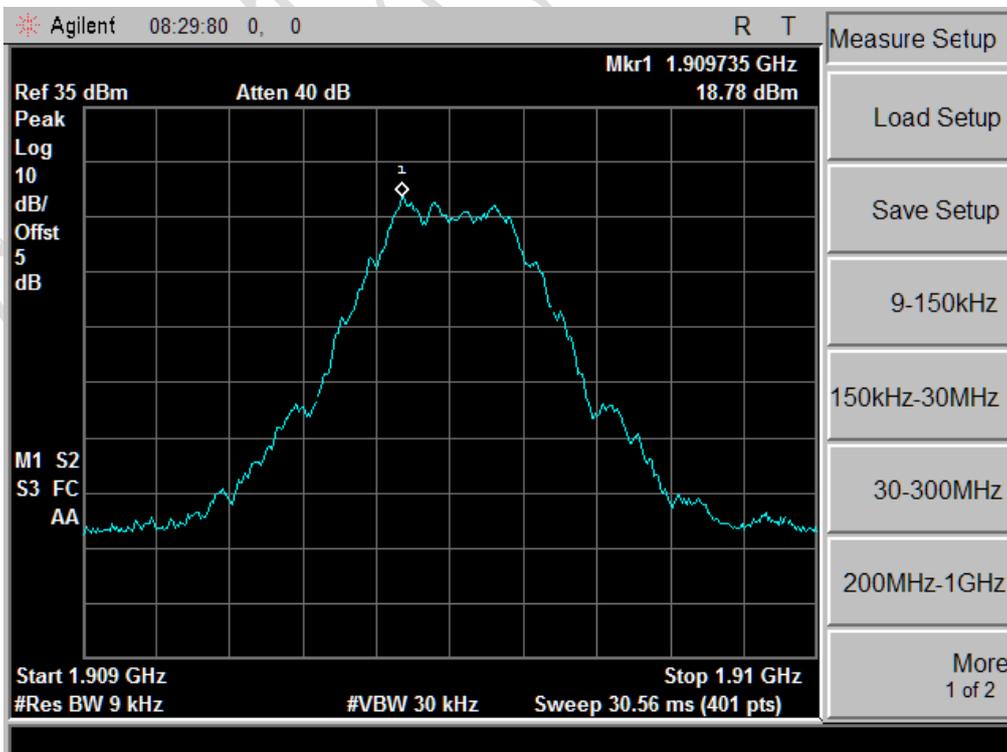
EGPRS1900 Channel 810

HSDPA FDD II band mode

EUT channel no.	99% occupied bandwidth [kHz]
9262 (1852.4MHz)	4175.0
9400 (1880.0MHz)	4175.0
9538 (1907.6MHz)	4175.0

HSDPA FDD V band mode:

EUT channel no.	99% occupied bandwidth [kHz]
4132 (826.4MHz)	4175.0
4175 (835.0MHz)	4150.0
4233 (846.6MHz)	4150.0

Graphical results for HSDPA mode:
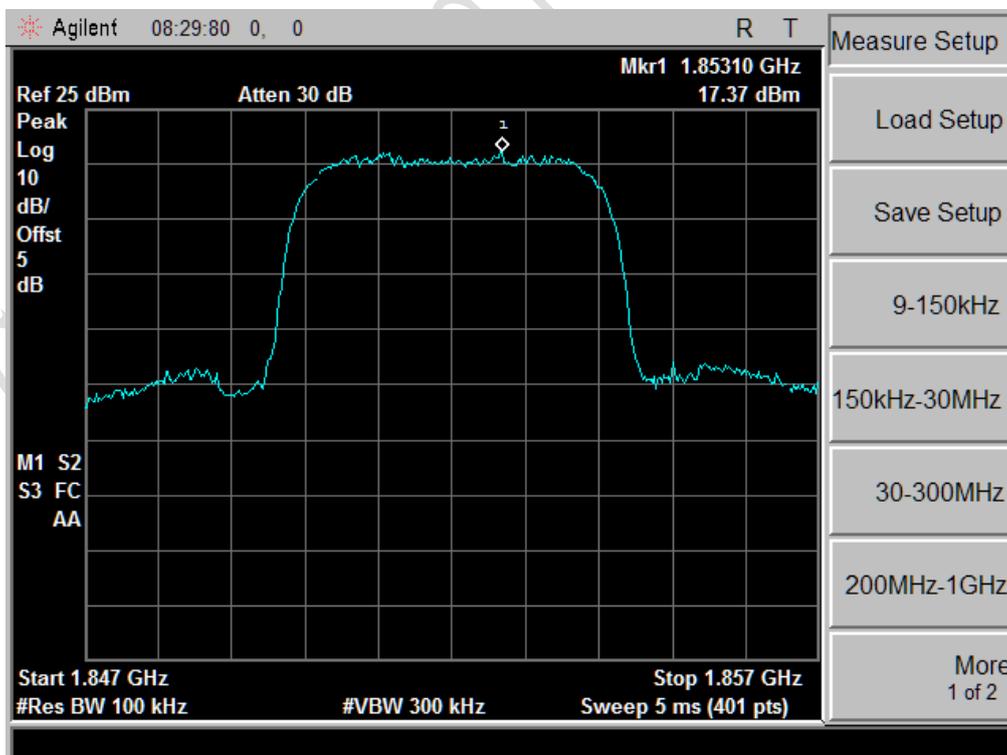
HSDPA FDD II Channel 9262
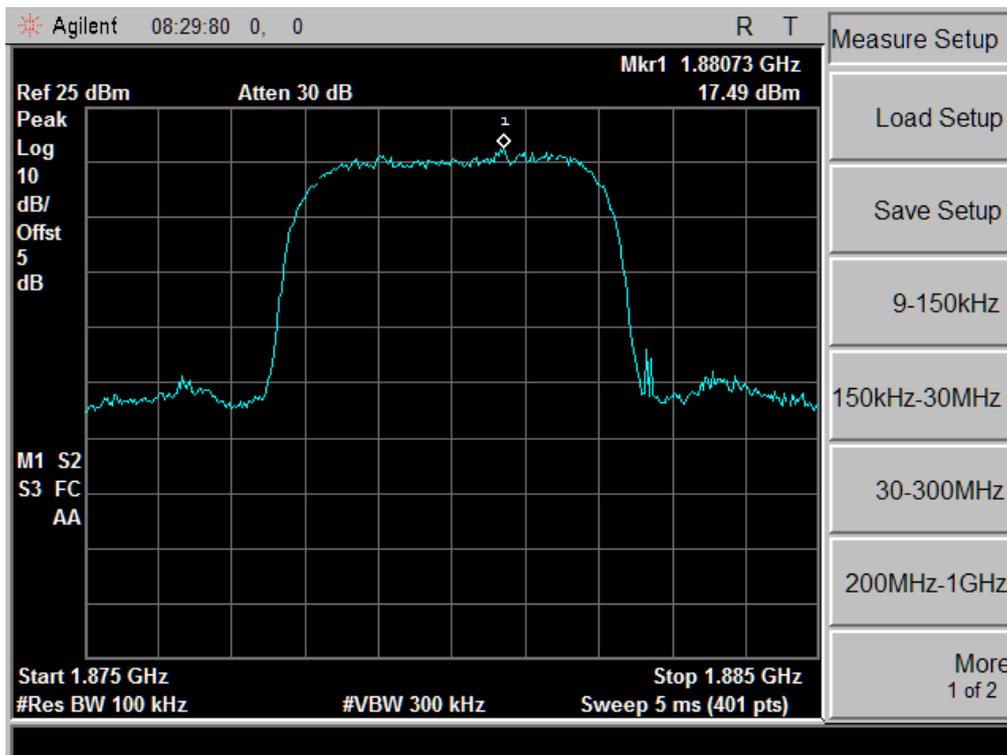
HSDPA FDD II Channel 9400

HSDPA FDD II Channel 9538

China Telecommunication Technology Labs.
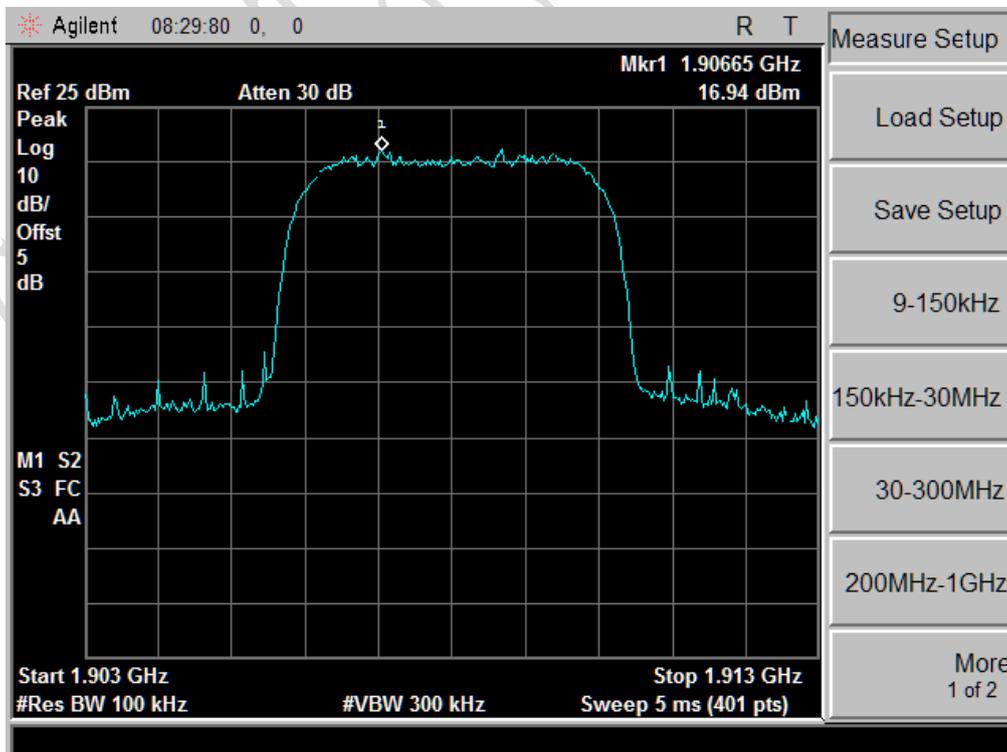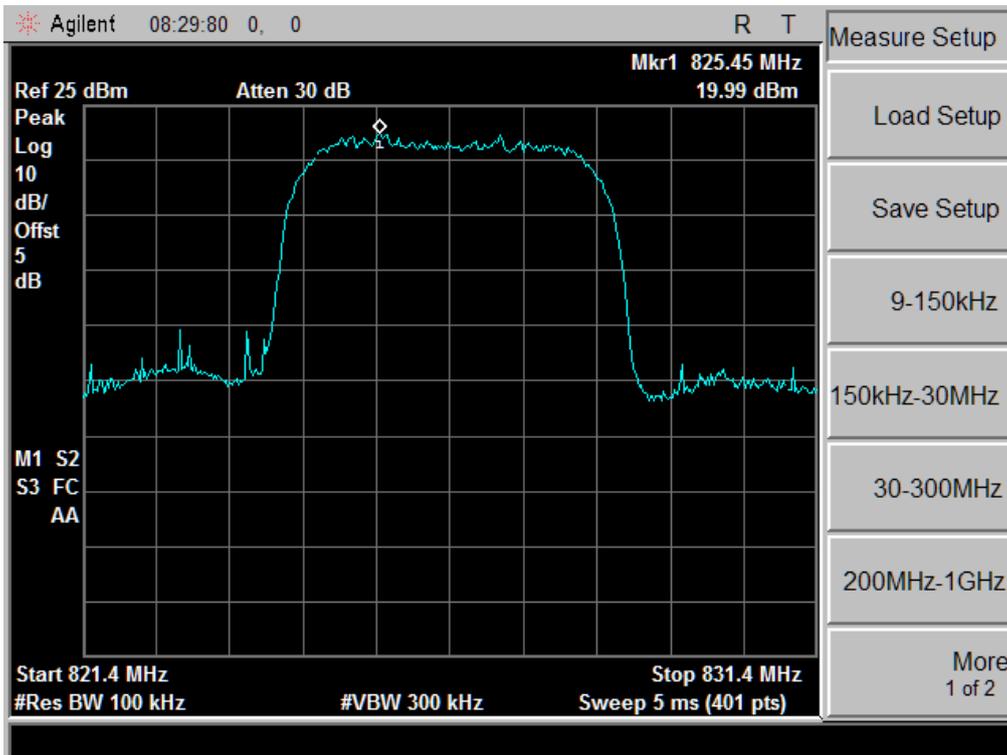
HSDPA FDD V Channel 4132
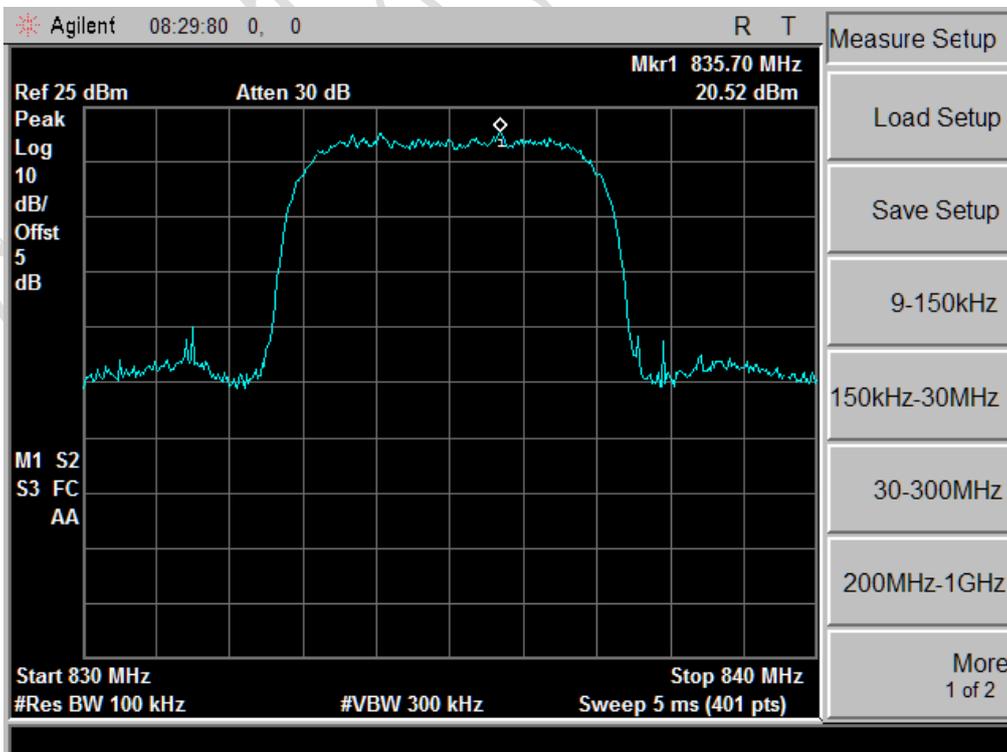
HSDPA FDD V Channel 4175
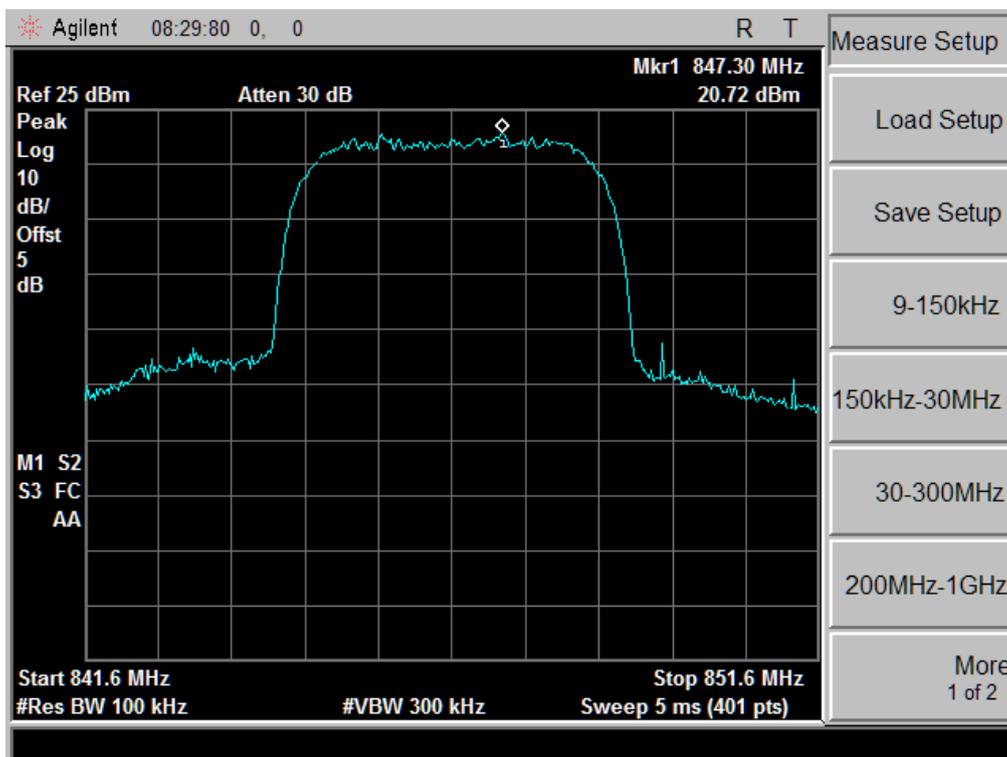
HSDPA FDD V Channel 4233

HSUPA FDD II band mode

EUT channel no.	99% occupied bandwidth [kHz]
9262 (1852.4MHz)	4175.0
9400 (1880.0MHz)	4175.0
9538 (1907.6MHz)	4175.0

HSUPA FDD V band mode:

EUT channel no.	99% occupied bandwidth [kHz]
4132 (826.4MHz)	4150.0
4175 (835.0MHz)	4150.0
4233 (846.6MHz)	4150.0

Graphical results for HSUPA mode:
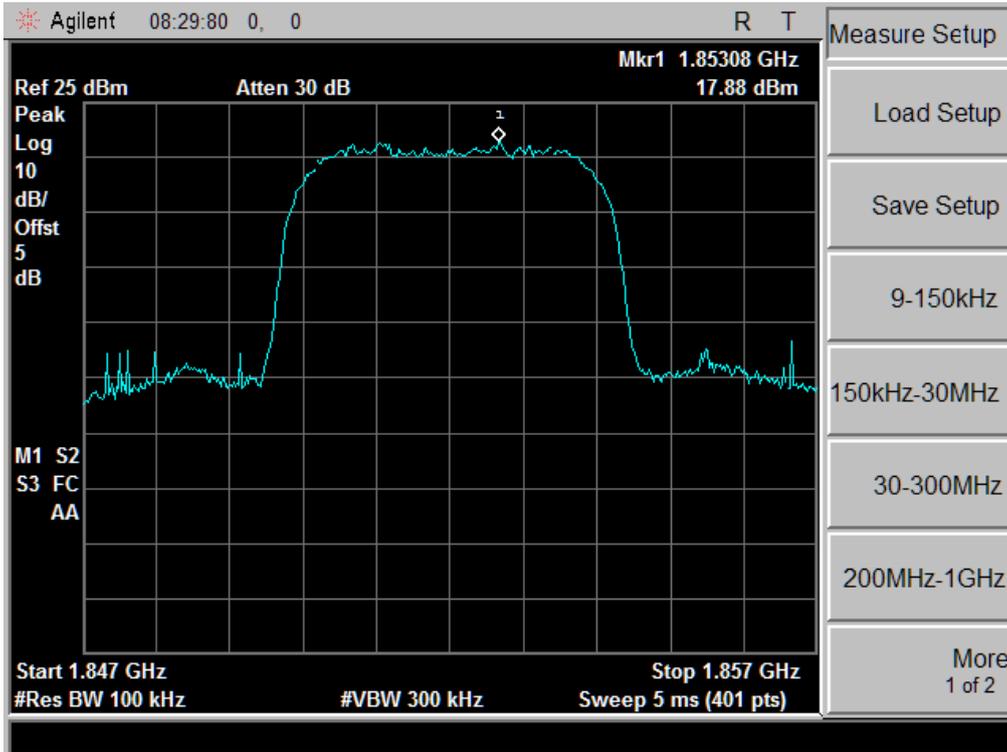
HSUPA FDD II Channel 9262
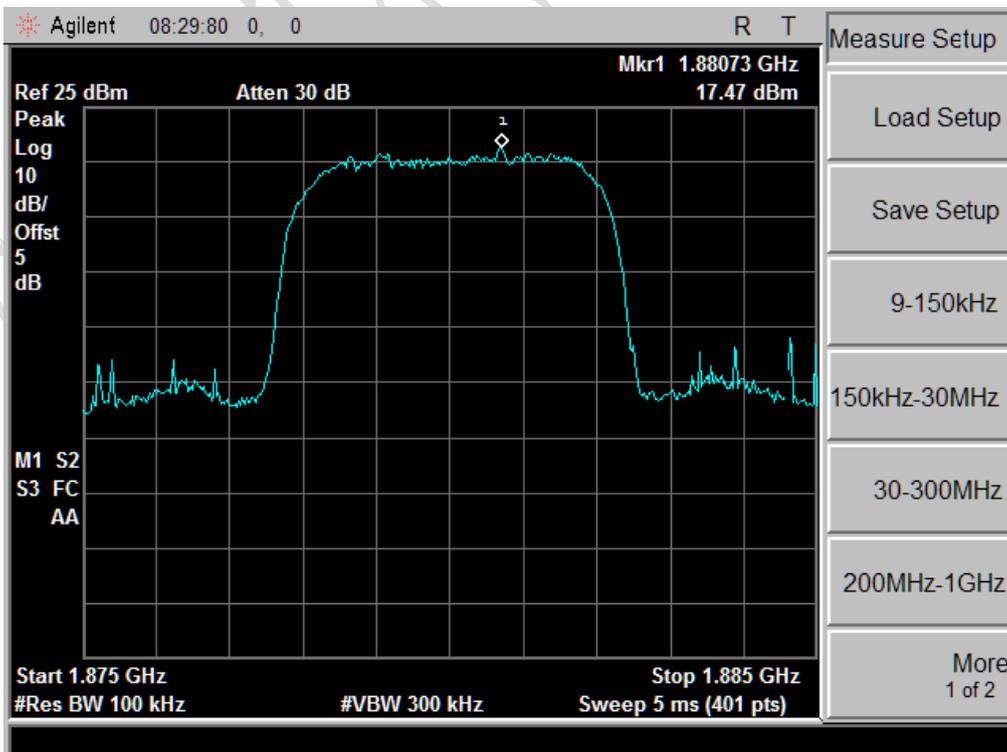
HSUPA FDD II Channel 9400
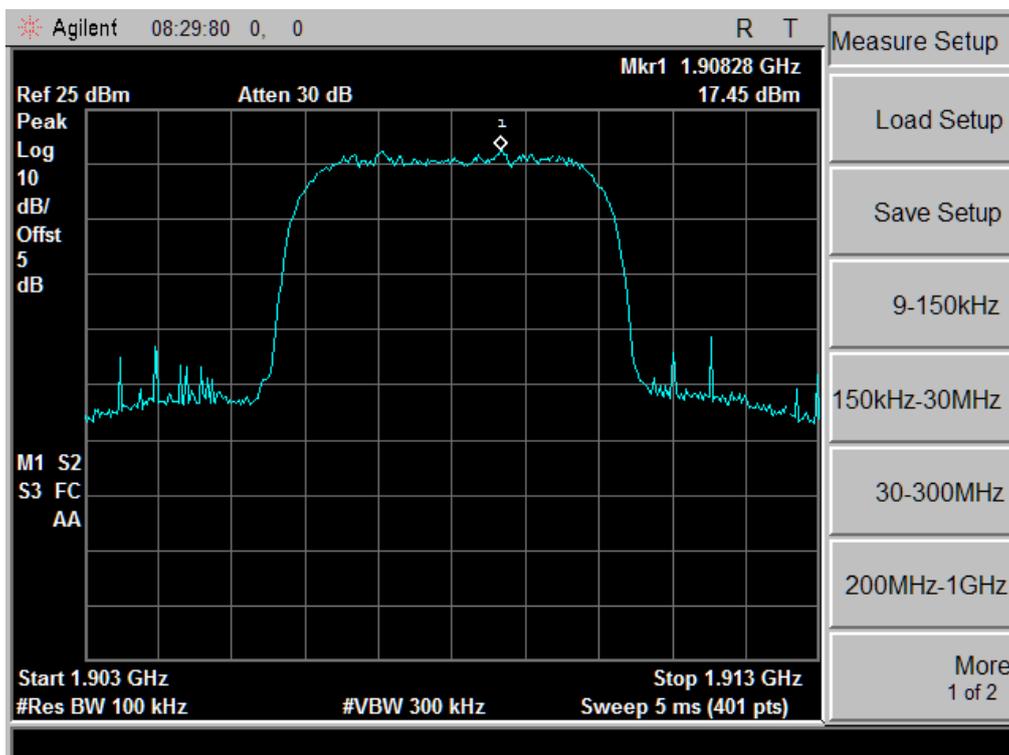
HSUPA FDD II Channel 9538

HSUPA FDD V Channel 4132

China Telecommunication Technology Labs.
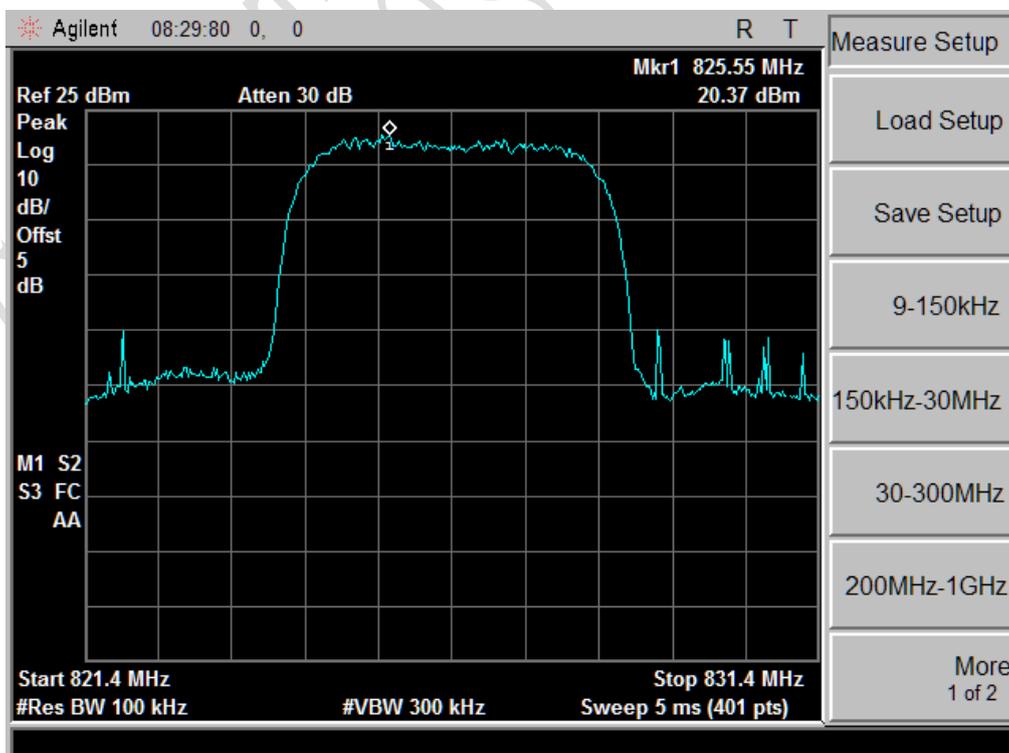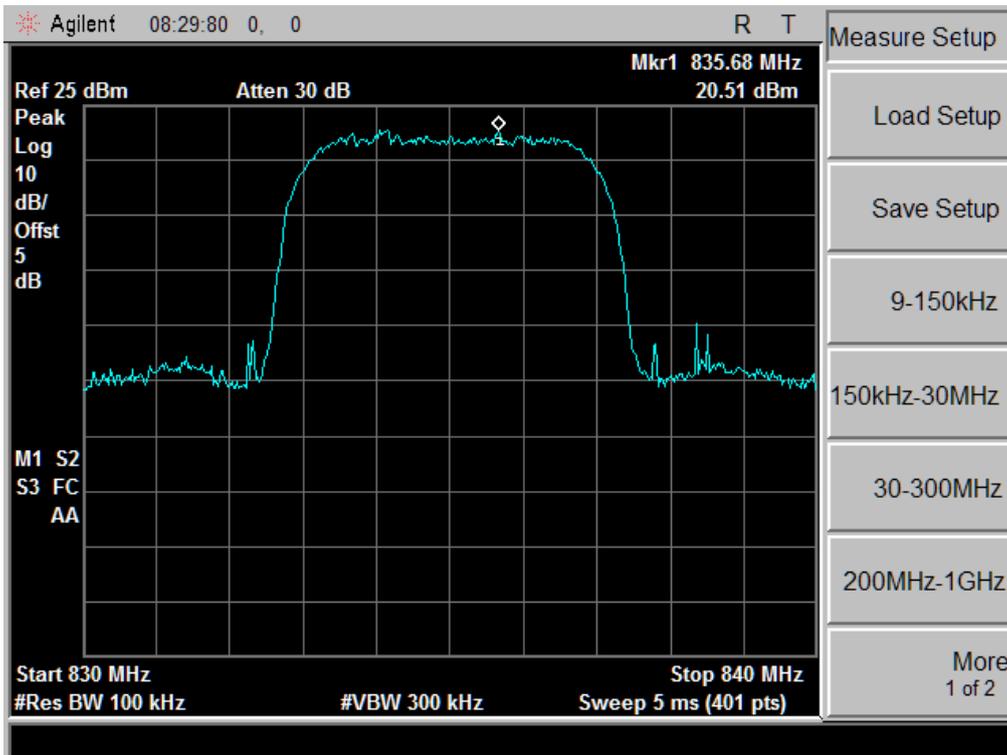
HSUPA FDD V Channel 4175
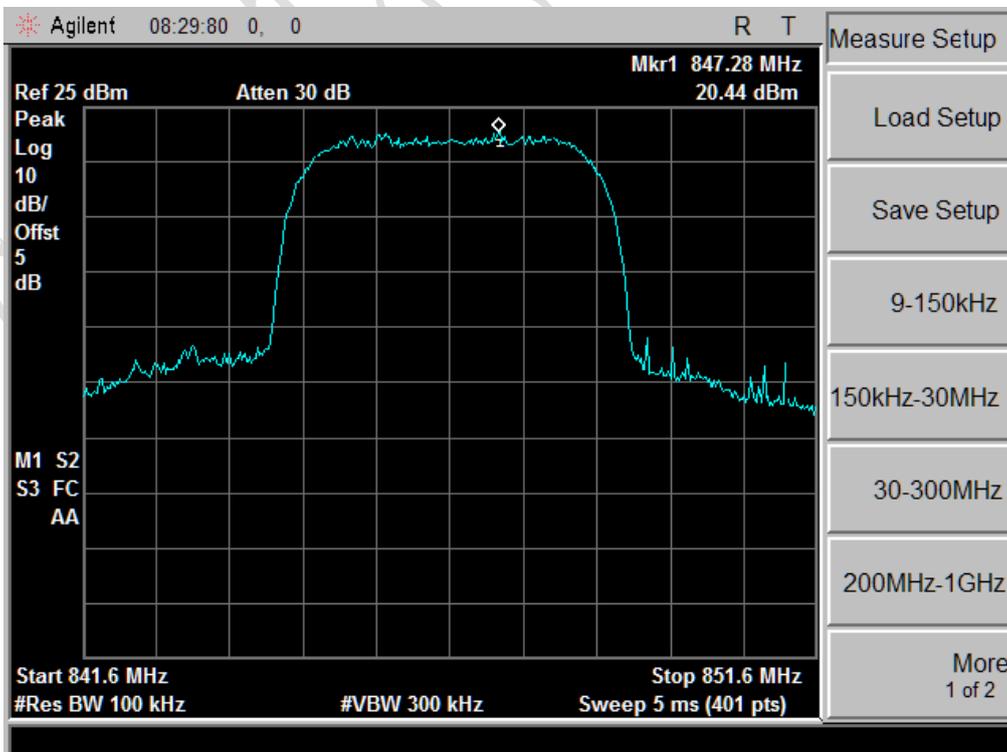
HSUPA FDD V Channel 4233

4.4 Frequency Stability over Temperature Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2011-04-07~2011-04-11
Test conditions:	Ambient Temperature:-30℃-50℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GPRS and EGPRS mode 850 and 1900 band respectively; and channel 9400 and 4175 for HSPA FDD II and V band respectively.
Test Results:	Pass

Test equipment Used:

| Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal
561	Temperature Chamber	Terchy Environmental Technology LTD.	MHU-800SR	84121202	2013-01-06	Normal

Limit

Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.
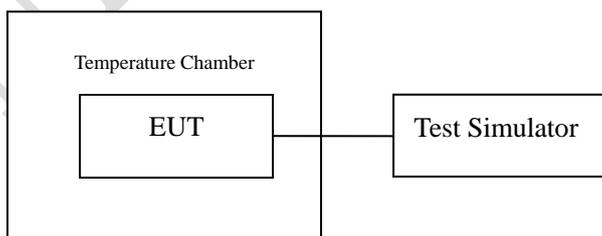
Figure T: setup for measurement of frequency stability
over temperature variation

Test Method

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30℃ and allowed to stabilize.
3. The EUT temperature was allowed to stabilize for 45 minutes.

4. The EUT was turned on and set to transmit with Wireless Telecommunications Test Set.
5. The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.
6. The steps 3-5 were repeated for -20℃, -10℃, 0℃, 10℃, 20℃, 30℃, 40℃ and 50℃.

Test data：

GPRS 850 band mode
Compliance windows: ±2091.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	24	Pass
-20	26	Pass
-10	23	Pass
0	21	Pass
10	16	Pass
20	21	Pass
30	27	Pass
40	37	Pass
50	32	Pass

GPRS 1900 band mode
Compliance windows: ±4700.0Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	32	Pass
-20	19	Pass
-10	43	Pass
0	28	Pass
10	68	Pass
20	50	Pass
30	31	Pass
40	36	Pass
50	34	Pass

EGPRS 850 band mode

Compliance windows: ±2091.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	17	Pass
-20	20	Pass
-10	22	Pass
0	16	Pass
10	22	Pass
20	17	Pass
30	19	Pass
40	28	Pass
50	40	Pass

EGPRS 1900 band mode

Compliance windows: ±4700.0Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	43	Pass
-20	74	Pass
-10	88	Pass
0	76	Pass
10	31	Pass
20	32	Pass
30	39	Pass
40	33	Pass
50	79	Pass

HSDPA FDD II band mode:

Compliance windows: ±4700.0Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-34	Pass
-20	-32	Pass
-10	38	Pass
0	35	Pass
10	42	Pass
20	38	Pass
30	32	Pass
40	-28	Pass
50	-24	Pass

HSDPA FDD V band mode:

Compliance windows: ±2087.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-19	Pass
-20	-14	Pass
-10	-16	Pass
0	-20	Pass
10	-17	Pass
20	-20	Pass
30	-14	Pass
40	-19	Pass
50	-22	Pass

HSUPA FDD II band mode:

Compliance windows: ±4700Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-33	Pass
-20	-27	Pass
-10	-32	Pass
0	-32	Pass
10	23	Pass
20	-24	Pass
30	22	Pass
40	26	Pass
50	-24	Pass

HSUPA FDD V band mode:

Compliance windows: ±2087.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	17	Pass
-20	18	Pass
-10	15	Pass
0	15	Pass
10	16	Pass
20	19	Pass
30	17	Pass
40	16	Pass
50	13	Pass

4.5 Frequency Stability over Voltage Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2011-04-11~2011-04-12
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GPRS and EGPRS mode 850 and 1900 band respectively; and channel 9400 and 4175 for HSPA FDD II and V band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal
7982	DC Power Source	4NIC	DH1715A-3	004224	--	Normal

Limit

Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.

```
┌─────────────┐          ┌─────┐          ┌──────────────┐
│  Adjustable │          │     │          │              │
│    Power    │──────────│ EUT │──────────│ Agilent 8960 │
│   Supply    │          │     │          │              │
└─────────────┘          └─────┘          └──────────────┘
```
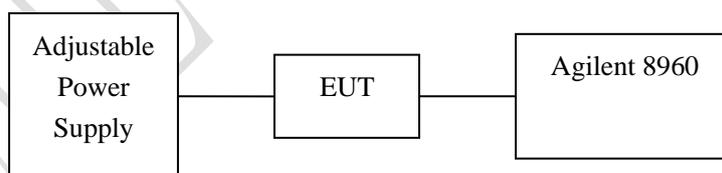
Figure V: test setup for measurement of frequency stability
over voltage variation

Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

Test data:

GPRS 850 band mode

Compliance windows: ±2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	15	Pass
Cut-off Point	4.5	25	Pass

GPRS 1900 band mode

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	21	Pass
Cut-off Point	4.5	19	Pass

EGPRS 850 band mode

Compliance windows: ±2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	24	Pass
Cut-off Point	4.5	21	Pass

EGPRS 1900 band mode

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	40	Pass
Cut-off Point	4.5	31	Pass

HSDPA FDD II band mode:

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	23	Pass
Cut-off Point	4.5	-28	Pass

HSDPA FDD V band mode:

Compliance windows: ±2087.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	19	Pass
Cut-off Point	4.5	-11	Pass

HSUPA FDD II band mode:

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	-30	Pass
Cut-off Point	4.5	-24	Pass

HSUPA FDD V band mode:

Compliance windows: ±2087.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5.0	19	Pass
Cut-off Point	4.5	-18	Pass

4.6 Conducted RF Power Output

Specifications:	2.1046,22.913(a),24.232(c)
Date of Tests	2011-03-31~2011-04-09
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 9262, 9400, 9538, 4132, 4175 and 4233, for HSPA.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal

Limit Level Construction:
ERP: According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Limits for ERP

Frequency range	Limit Level (ERP)
TX channel	7W or 38.5dBm

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.

Test Method

1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

Note:

None

Test Results:

GPRS 850 band mode

Channel No.	Peak output power [dBm]
128 (824.2MHz)	32.33
190 (836.6MHz)	31.98
251 (848.8MHz)	31.85

GPRS 1900 band mode

Channel No.	Peak output power [dBm]
512 (1850.2MHz)	26.90
661 (1880.0MHz)	27.24
810 (1909.8MHz)	26.60

EGPRS 850 band mode

Channel No.	Peak output power [dBm]
128 (824.2MHz)	29.23
190 (836.6MHz)	29.05
251 (848.8MHz)	28.84

EGPRS 1900 band mode

Channel No.	Peak output power [dBm]
512 (1850.2MHz)	24.06
661 (1880.0MHz)	24.31
810 (1909.8MHz)	23.76

HSDPA FDD II band mode:

Channel No.	Peak output power [dBm]
9262 (1852.4MHz)	23.53
9400 (1880.0MHz)	23.88
9538 (1907.6MHz)	23.29

HSDPA FDD V band mode:

Channel No.	Peak output power [dBm]
4132 (826.4MHz)	25.82
4175 (835.0MHz)	26.42
4233 (846.6MHz)	26.63

HSUPA FDD II band mode:

Channel No.	Peak output power [dBm]
9262 (1852.4MHz)	24.01
9400 (1880.0MHz)	23.58
9538 (1907.6MHz)	23.70

HSUPA FDD V band mode:

Channel No.	Peak output power [dBm]
4132 (826.4MHz)	26.32
4175 (835.0MHz)	26.48
4233 (846.6MHz)	26.53

4.7 Conducted Spurious Emission

Specifications:	2.1051,22.917,24.238
Date of Tests	2011-03-31~2011-04-09
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GPRS and EGPRS mode 850 and 1900 band respectively; and channel 9400 and 4175 for HSPA FDD II and V band respectively.
Test Results:	Pass

Test equipment Used:

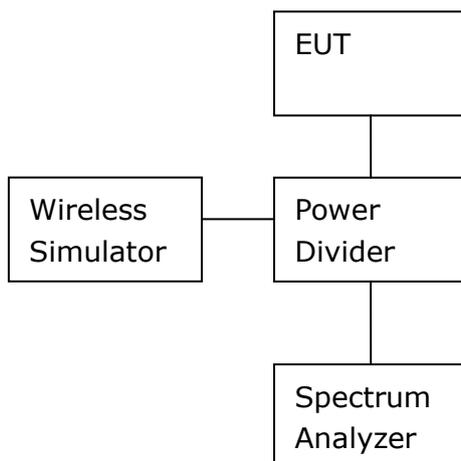| Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal

Limit Level Construction:
According to Part 24.238 (a), i.e., 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, so the limit level is:
$$P(dBm) - (43 + 10 \log(P)) \ dB = -13dBm$$

Limits for Radiated spurious emissions(UE)

Frequency range	Limit Level /Resolution Bandwidth
30 MHz to 20000 MHz	-13dBm/1MHz

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.

```
        ┌──────────┐
        │   EUT    │
        └────┬─────┘
             │
┌──────────┐ │ ┌──────────┐
│ Wireless │ │ │  Power   │
│Simulator │─┼─│ Divider  │
└──────────┘   └────┬─────┘
                    │
               ┌──────────┐
               │ Spectrum │
               │ Analyzer │
               └──────────┘
```

Test Method

The measurement was performed accordance with section 2.2.13 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.
The following steps outline the procedure used to measure the conducted emissions from the EUT.
1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
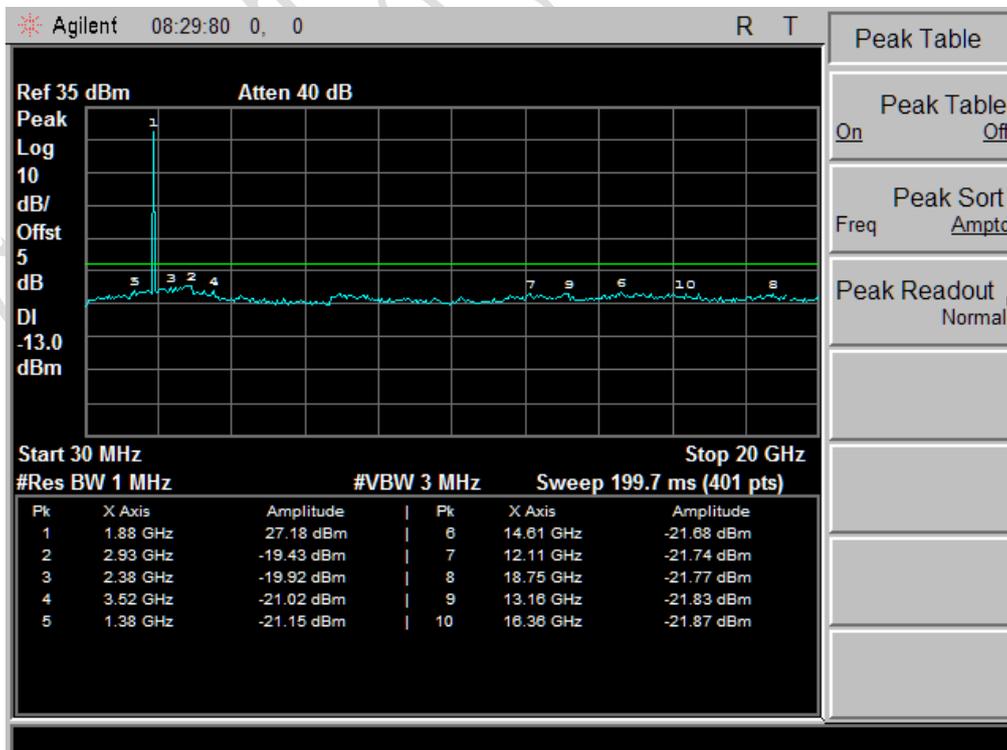
Note:

None

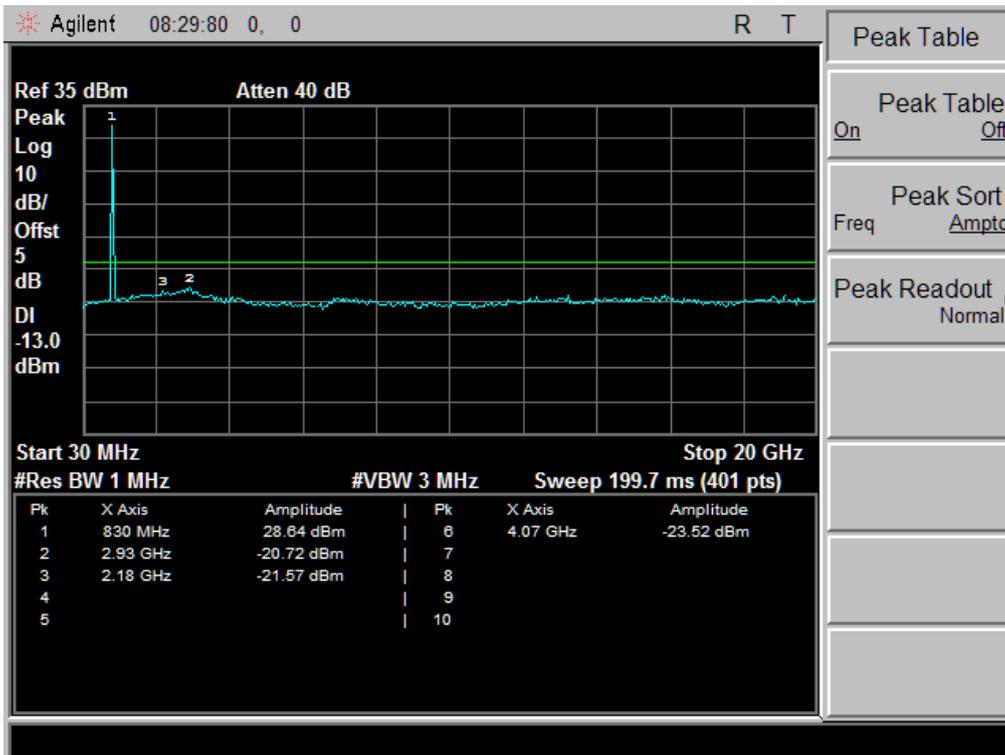### Graphical results for GPRS mode:
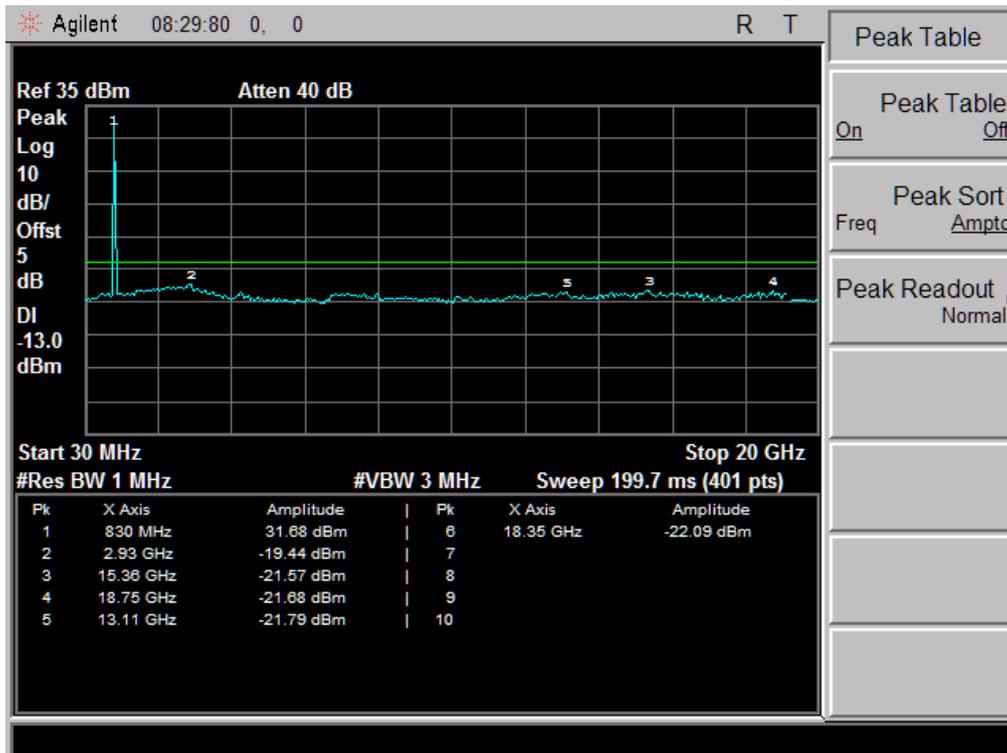
GPRS850 Channel 190

Note: 830 MHz is the EUT's operating frequency point.
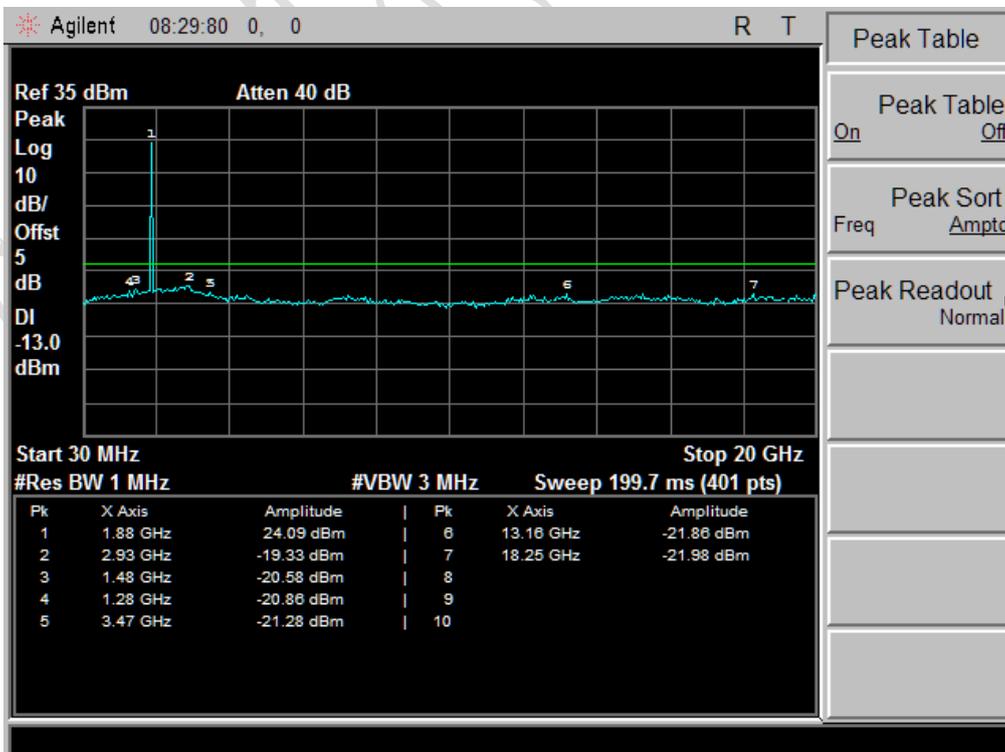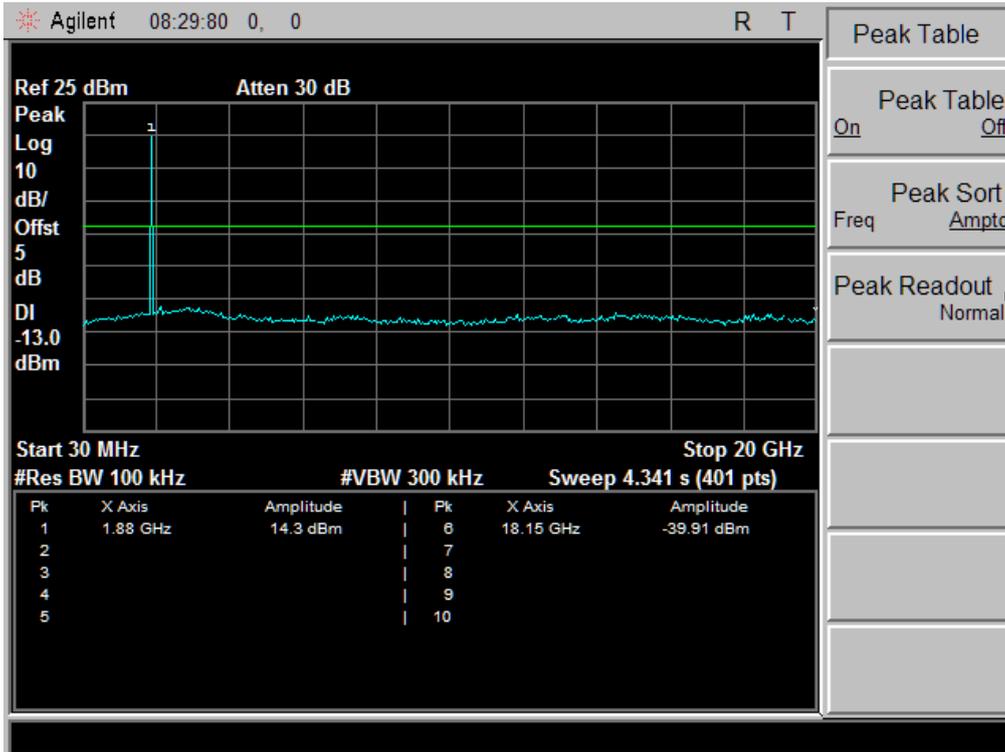

GPRS1900 Channel 661

Note: 1880 MHz is the EUT's operating frequency point.

Graphical results for EGPRS mode:

EGPRS850 Channel 190
Note: 830 MHz is the EUT's operating frequency point.
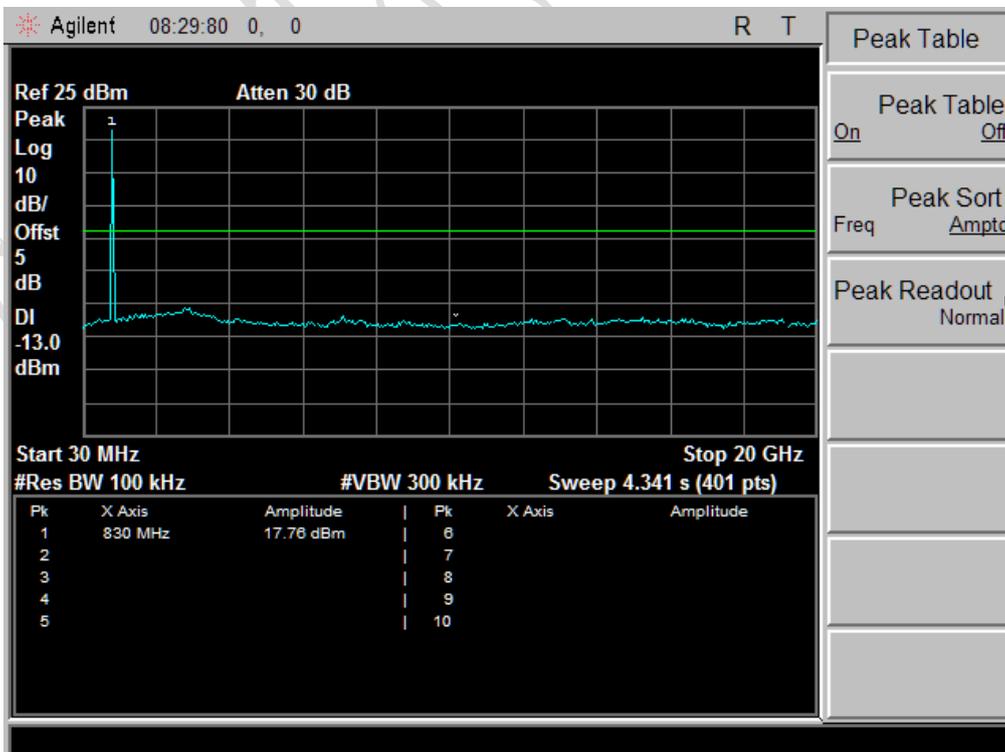

EGPRS1900 Channel 661
Note: 1880 MHz is the EUT's operating frequency point.

Graphical results for HSDPA mode:
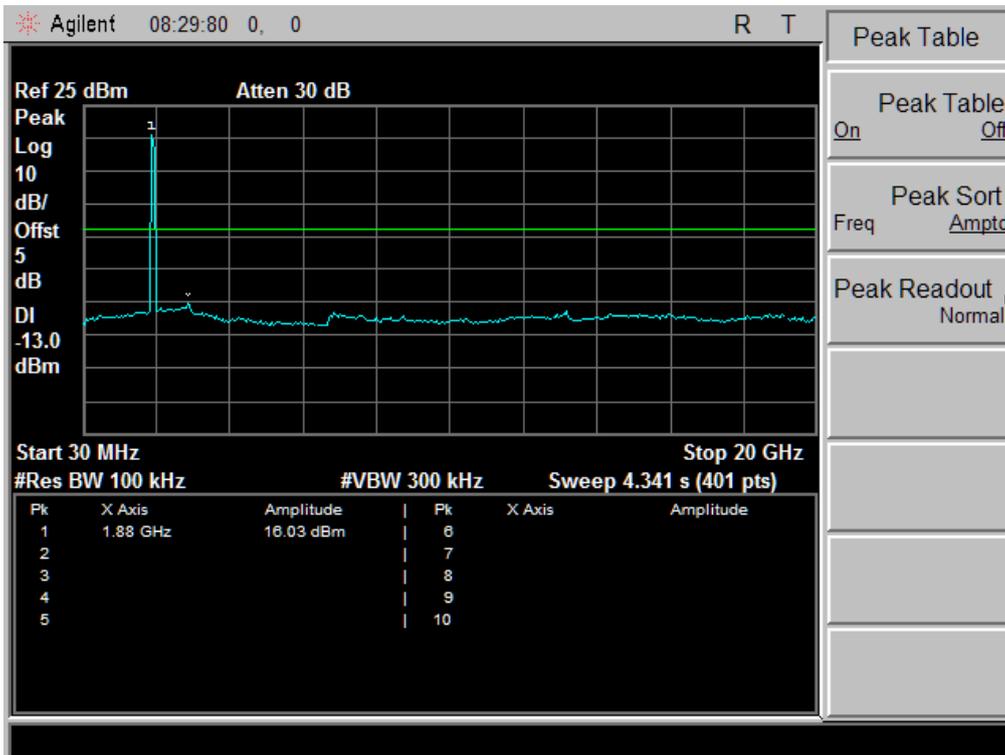

HSDPA FDD II Channel 9400
Note: 1880 MHz is the EUT's operating frequency point.
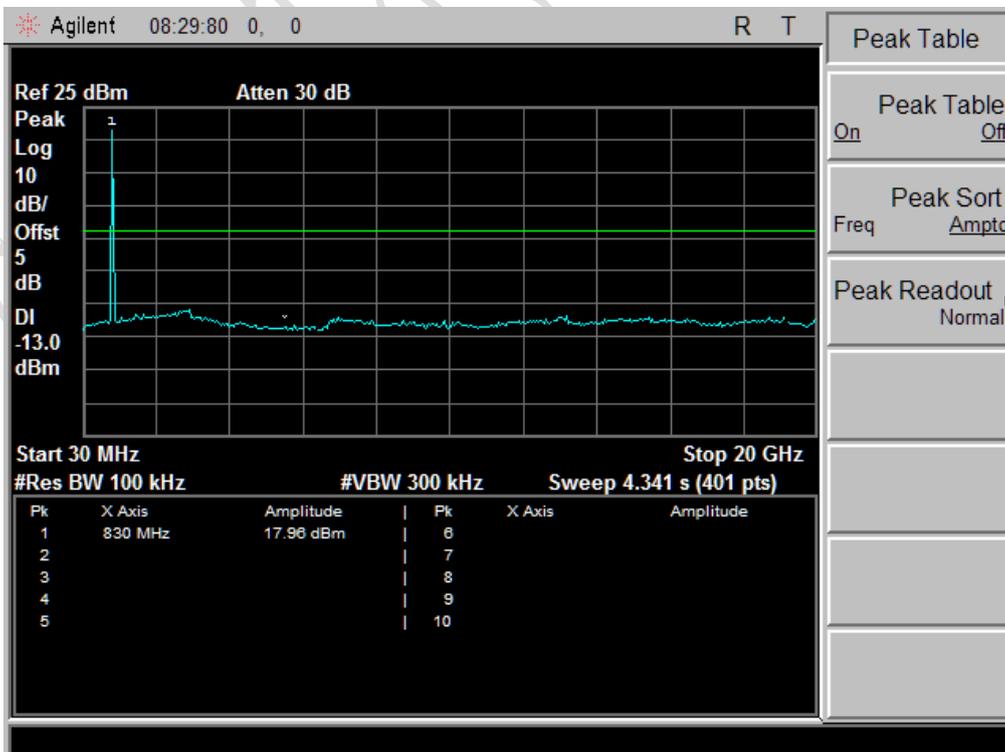

HSDPA FDD V Channel 4175
Note: 830 MHz is the EUT's operating frequency point.

Graphical results for HSUPA mode:

HSUPA FDD II Channel 9400
Note: 1880 MHz is the EUT's operating frequency point.

HSUPA FDD V Channel 4175
Note: 830 MHz is the EUT's operating frequency point.

4.8 Band Edge

Specifications:	2.1051, 24.238, 2.1053, 22.917
Date of Tests	2011-03-31~2011-04-13
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 128, 251, 512 and 810 for GPRS and EGPRS; 1312, 1513, 4132, 4233, 9262 and 9538 for HSPA.
Test Results:	Pass

Test equipment Used:

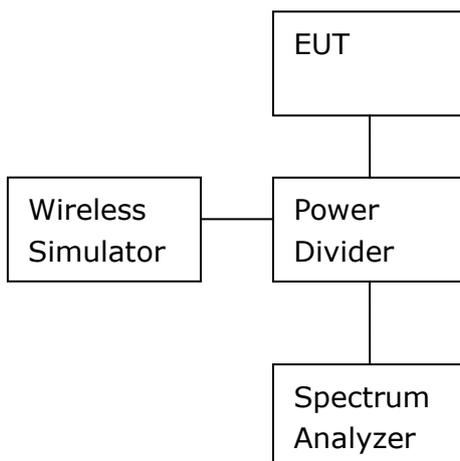| Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESI26	100211	2012-01-12	Normal
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2012-04-01	Normal

Limit Level Construction:
According to Part 24.238 (a), i.e., 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, so the limit level is:
$$P(dBm) – (43 + 10 \log(P)) \ dB= -13dBm$$

Limits for Radiated spurious emissions	
Frequency range	**Limit Level**
Band edge	-13dBm

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.

```
                    ┌──────────┐
                    │   EUT    │
                    └────┬─────┘
                         │
┌──────────┐        ┌────┴─────┐
│ Wireless │────────│  Power   │
│Simulator │        │ Divider  │
└──────────┘        └────┬─────┘
                         │
                    ┌────┴─────┐
                    │ Spectrum │
                    │ Analyzer │
                    └──────────┘
```

Test Method

1) The EUT was coupled to the EMI test receiver analyzer mode and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution bandwidth of the spectrum analyzer was a little greater than 1% of the 26dB emission bandwidth.

Note: --

Test Results:

GPRS 850 band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
128 left band edge (824.2MHz)	823.986	-13.72
251 right band edge (848.8MHz)	849.008	-14.00

GPRS 1900 band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
512 left band edge (1850.2MHz)	1849.998	-17.46
810 right band edge (1909.8MHz)	1910.015	-18.16

EGPRS 850 band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
128 left band edge (824.2MHz)	823.998	-13.76
251 right band edge (848.8MHz)	849.005	-14.99

EGPRS 1900 band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
512 left band edge (1850.2MHz)	1849.998	-21.23
810 right band edge (1909.8MHz)	1910.014	-20.43

HSDPA FDD II band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
9262 left band edge (1852.4MHz)	1850.000	-16.54
9538 right band edge (1907.6MHz)	1910.015	-16.49

HSDPA FDD V band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
4132 left band edge (826.4MHz)	824.000	-13.37
4233 right band edge (846.6MHz)	849.015	-13.32

HSUPA FDD II band mode：

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
9262 left band edge (1852.4MHz)	1850.000	-16.04
9538 right band edge (1907.6MHz)	1910.015	-16.59

HSUPA FDD V band mode：

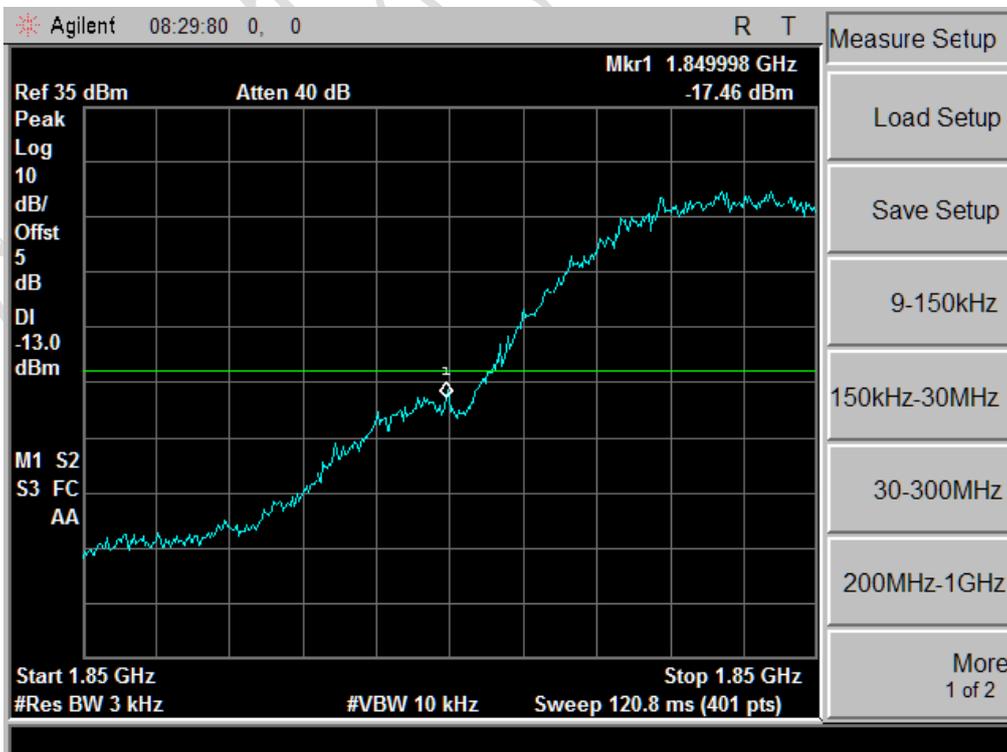| Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
4132 left band edge (826.4MHz)	823.985	-17.09
4233 right band edge (846.6MHz)	849.015	-13.56

Graphical results for GPRS mode:

Marker 1 [T1]		RBW	3 kHz	RF Att	60 dB
Ref Lvl	-13.72 dBm	VBW	10 kHz		
43 dBm	823.98557114 MHz	SWT	560 ms	Unit	dBm

```
 43
 40  13 dB Offset                                                  A

 30

 20

 10  1MAX                                                         IN1
                                                                  1MA
  0

-10  D1 -13 dBm

-20

-30

-40

-50

-57
     Center 824.2 MHz        200 kHz/              Span 2 MHz
```
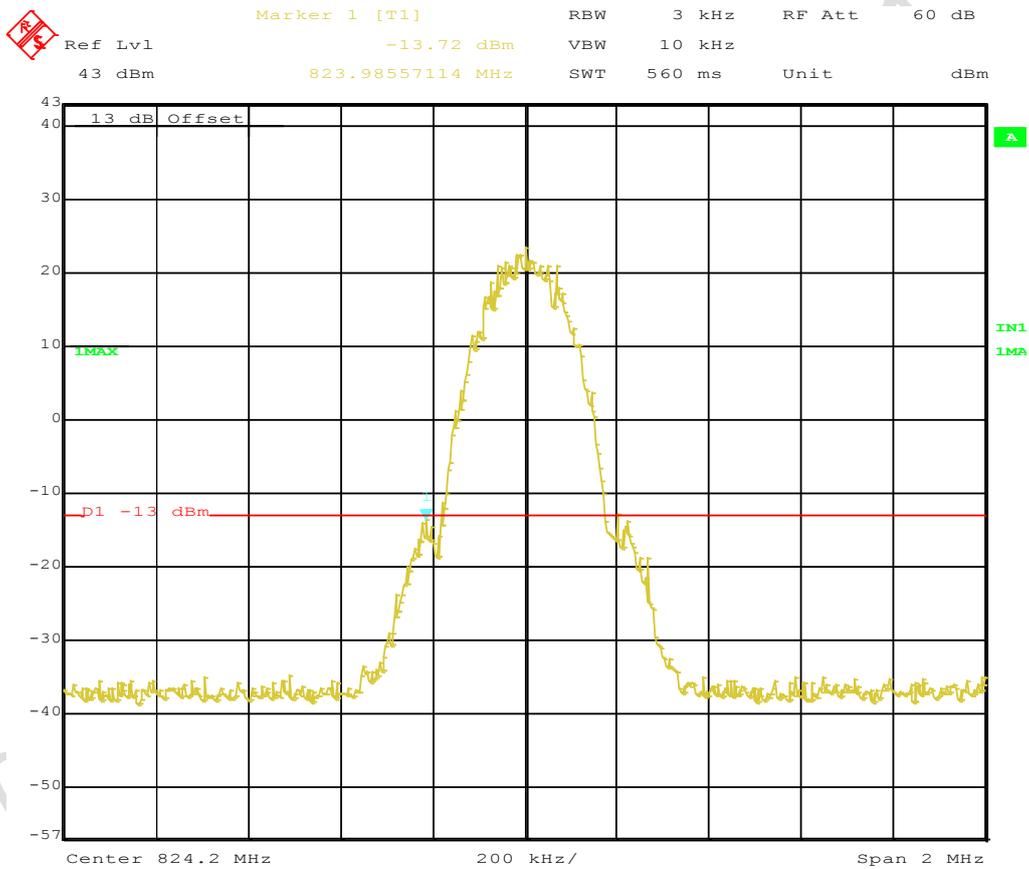
Date: 13.APR.2011 17:01:29

GPRS850 Channel 128 Left band edge

China Telecommunication Technology Labs.
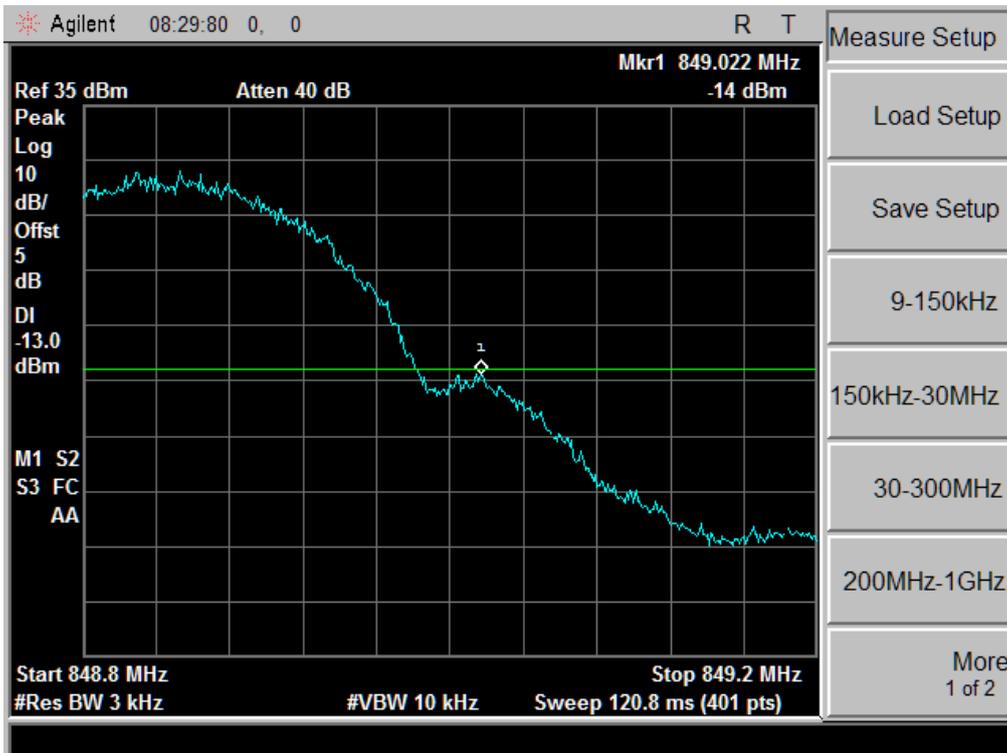
GPRS850 Channel 251 Right band edge

GPRS1900 Channel 512 Left band edge
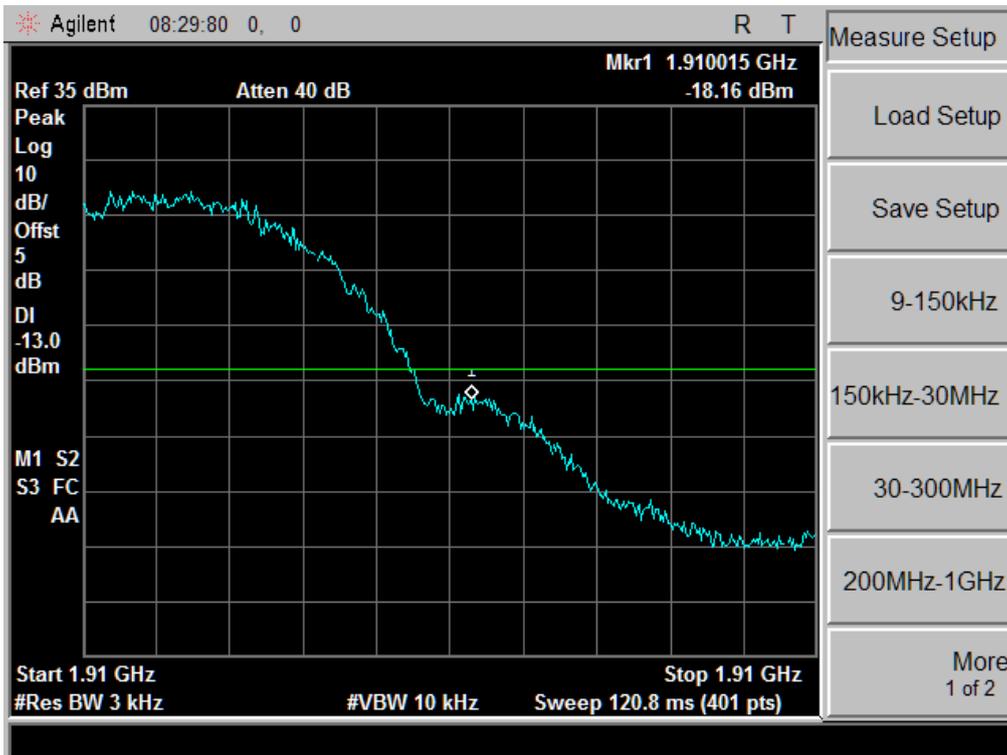
GPRS1900 Channel 810 Right band edge

Graphical results for EGPRS mode:
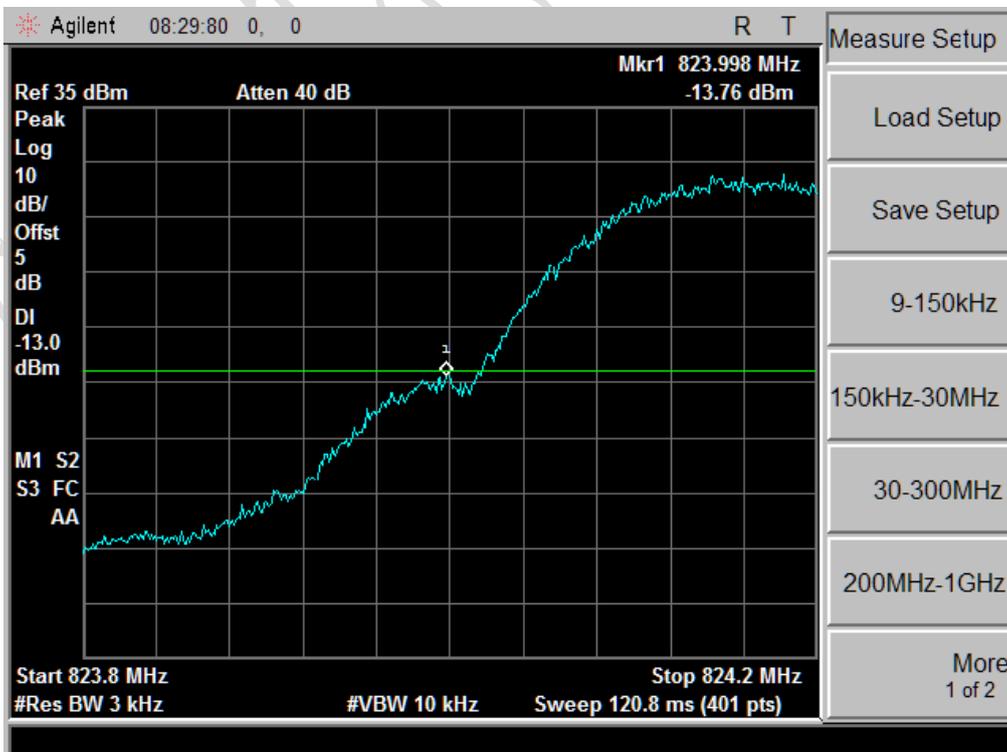
EGPRS850 Channel 128 Left band edge
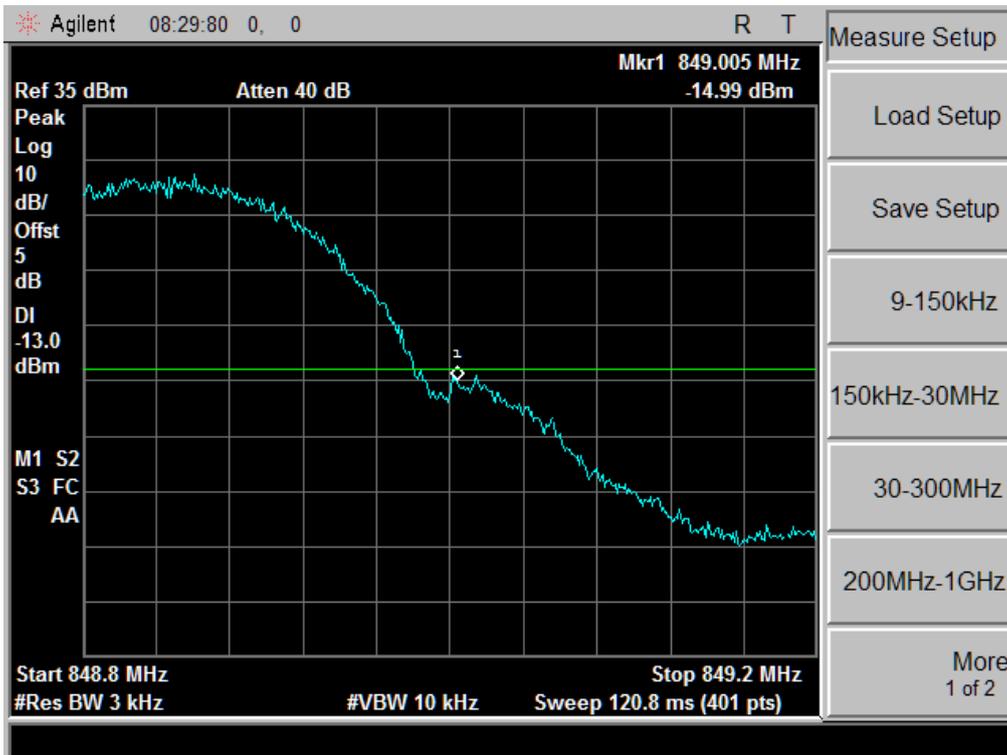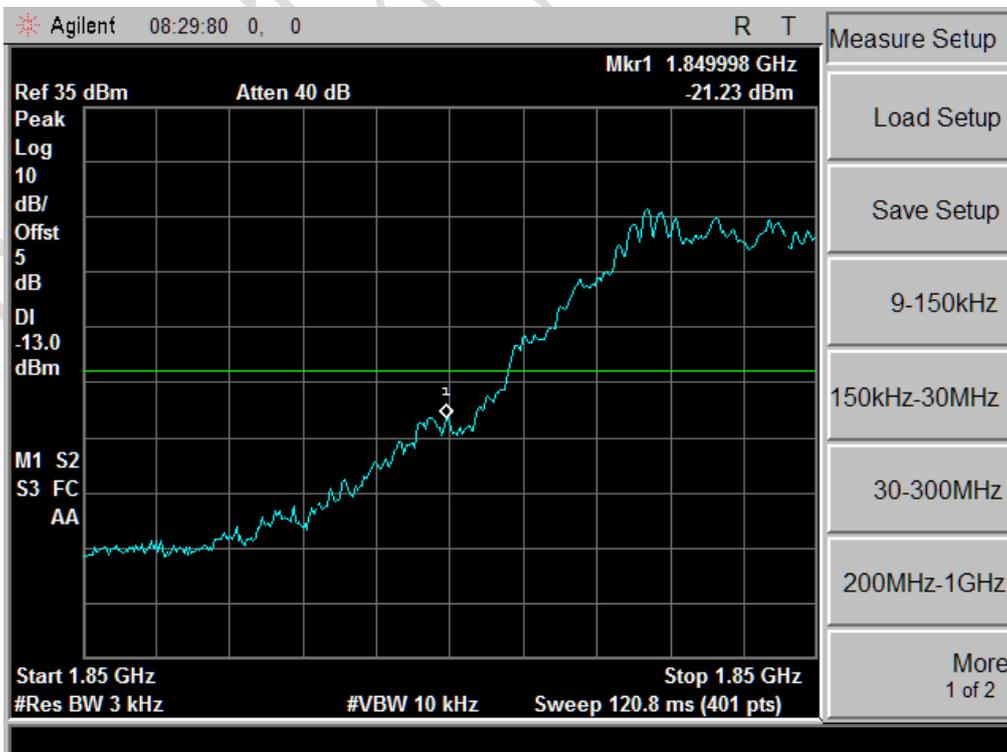
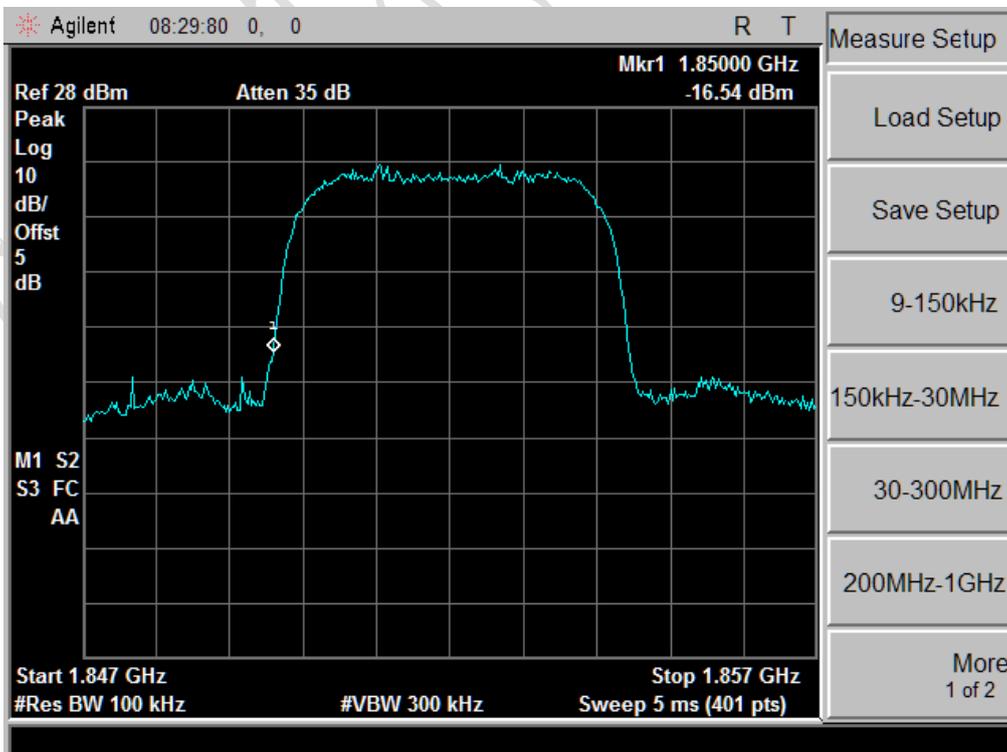EGPRS850 Channel 251 Right band edge
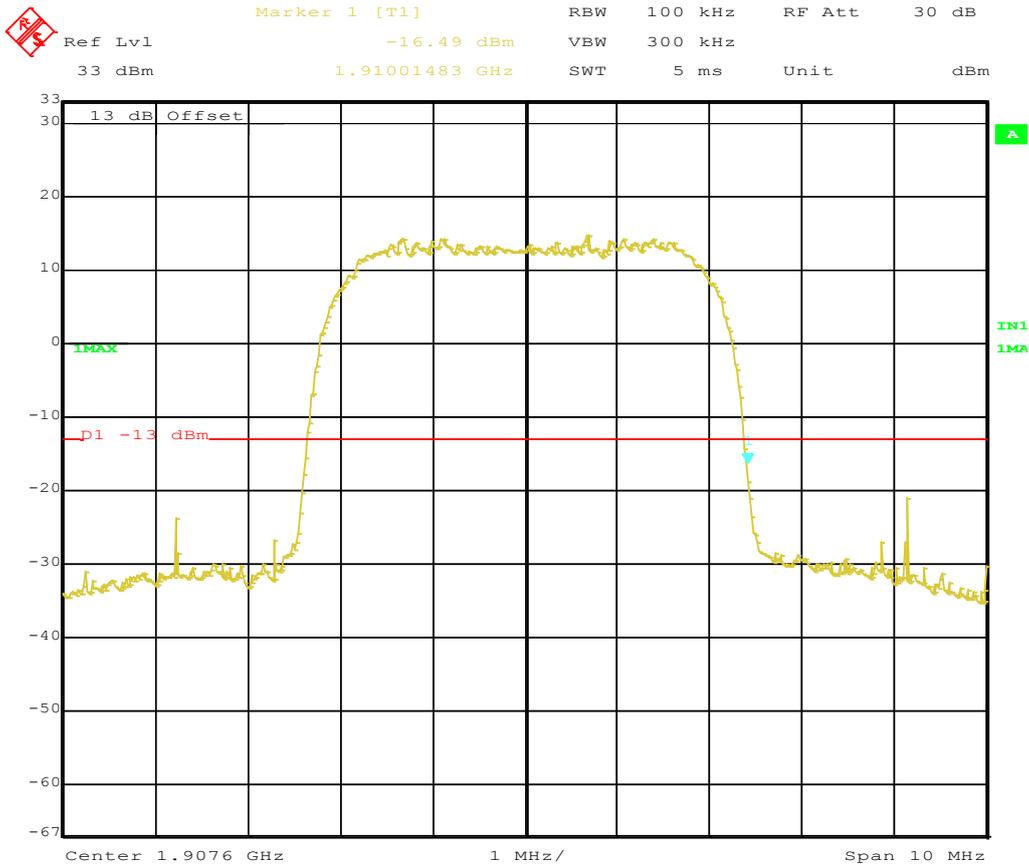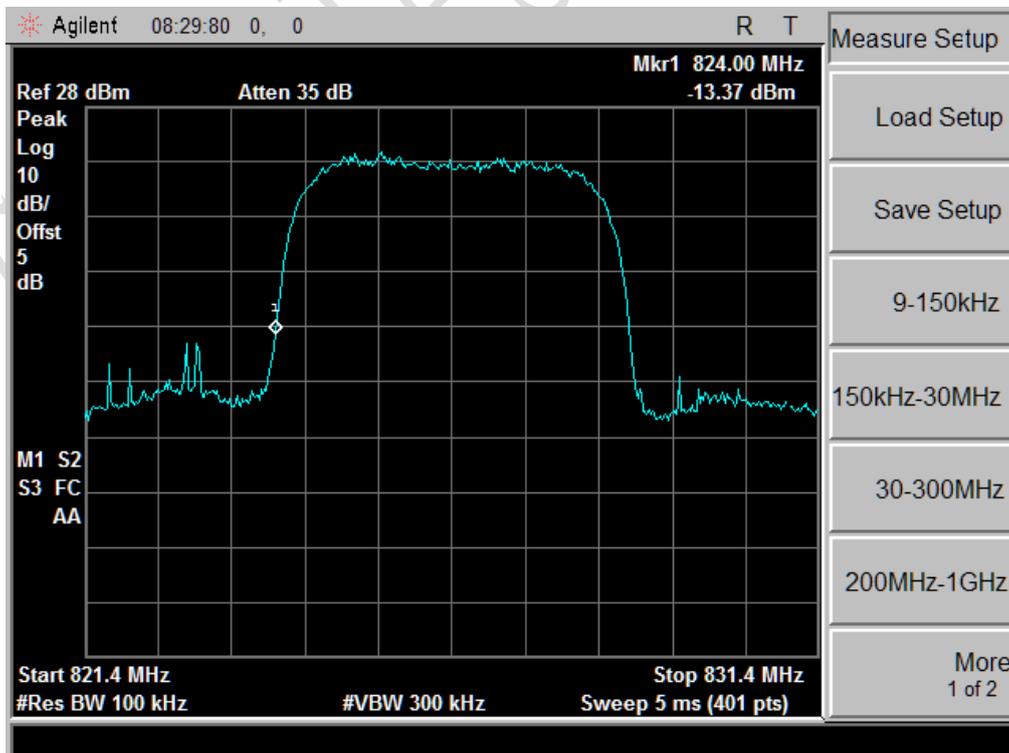

EGPRS1900 Channel 512 Left band edge
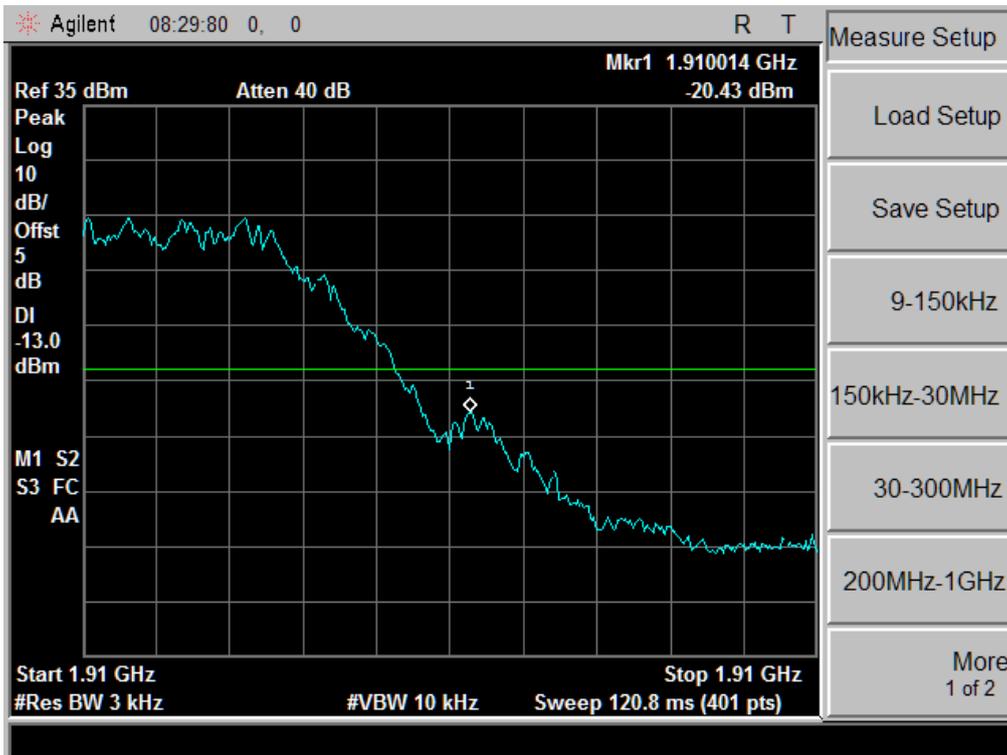
China Telecommunication Technology Labs.

EGPRS1900 Channel 810 Right band edge

Graphical results for HSDPA mode:

HSDPA FDD II channel 9262 left band edge

HSDPA FDD II channel 9538 right band edge

HSDPA FDD V channel 4132 left band edge
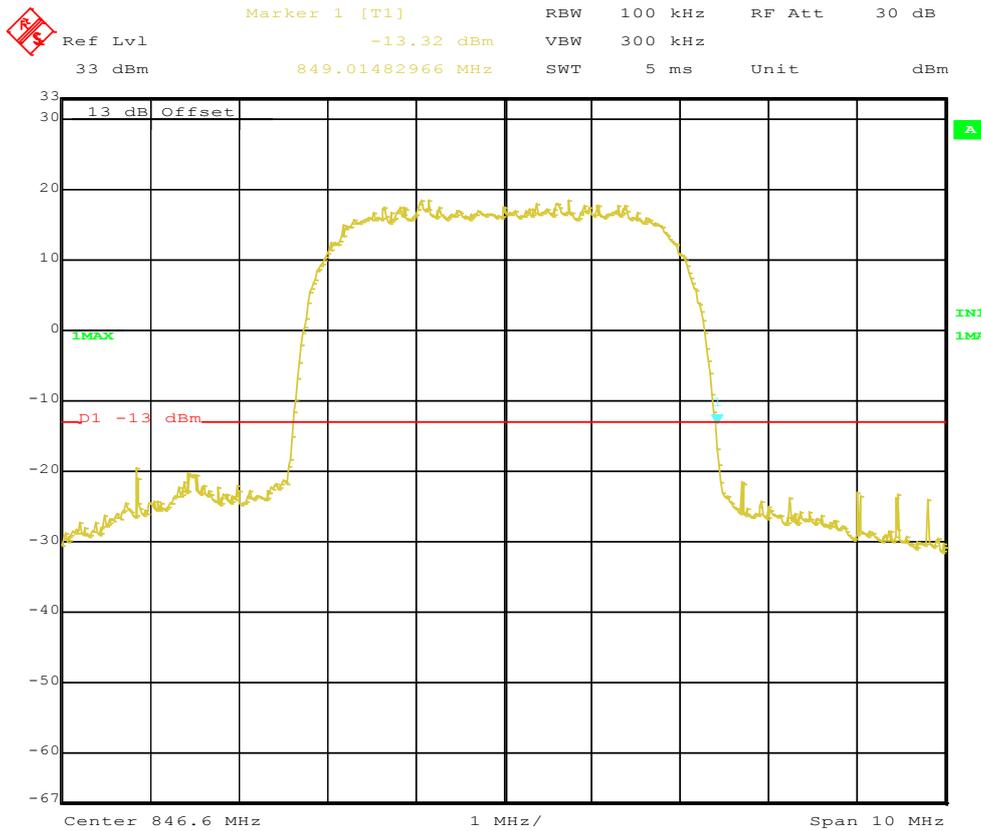
HSDPA FDD V channel 4233 left band edge

Graphical results for HSUPA mode:
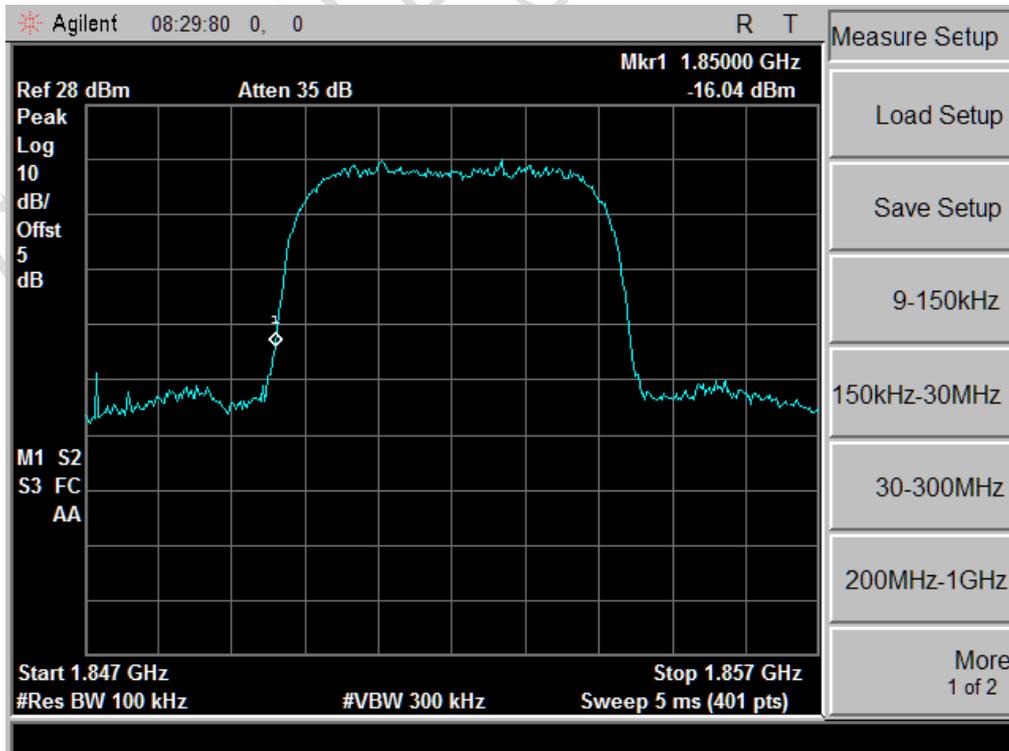
HSUPA FDD II channel 9262 left band edge

HSUPA FDD II channel 9538 right band edge
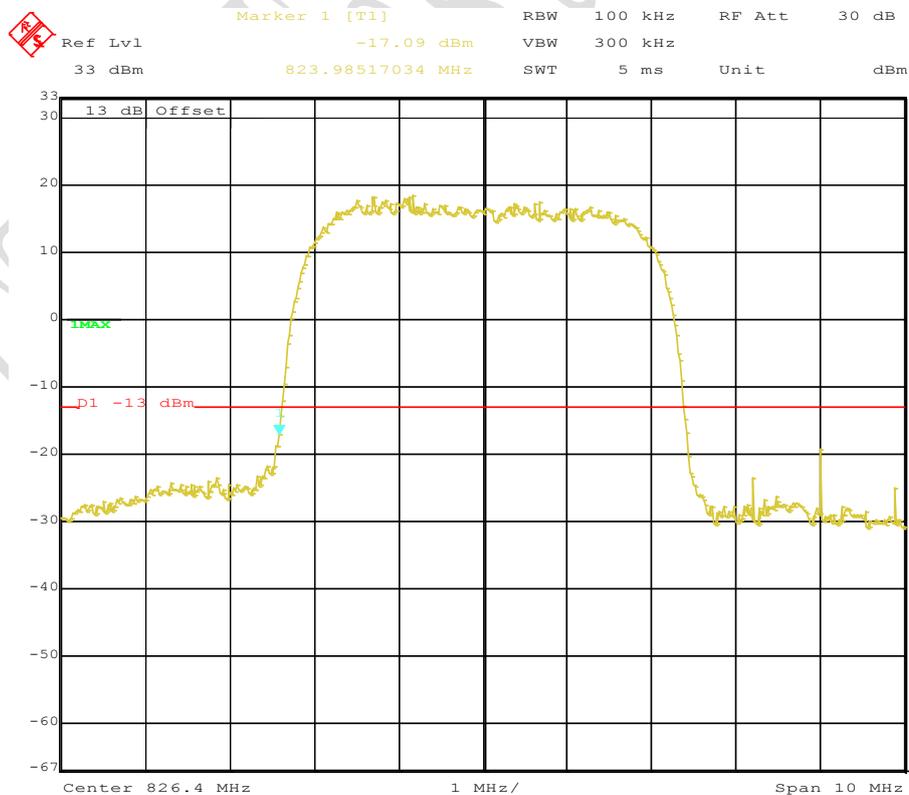

HSUPA FDD V channel 4132 left band edge

```
            Marker 1 [T1]              RBW    100 kHz    RF Att    30 dB
  Ref Lvl              -13.56 dBm      VBW    300 kHz
  33 dBm          849.01482966 MHz     SWT    5 ms      Unit      dBm
```



```
Center 846.6 MHz              1 MHz/              Span 10 MHz
```
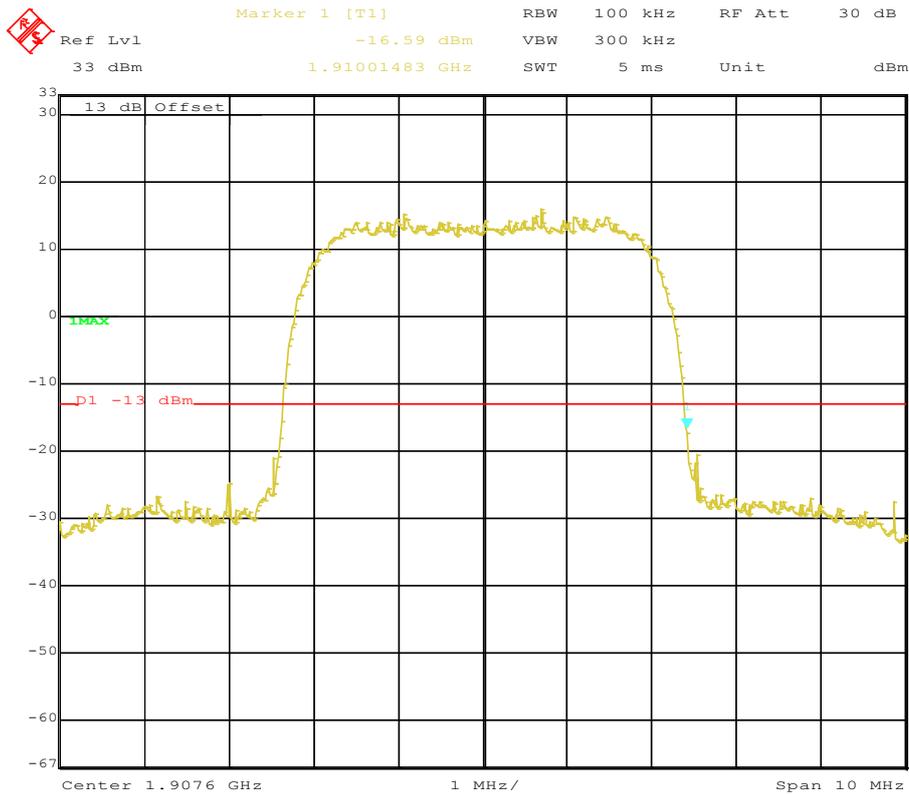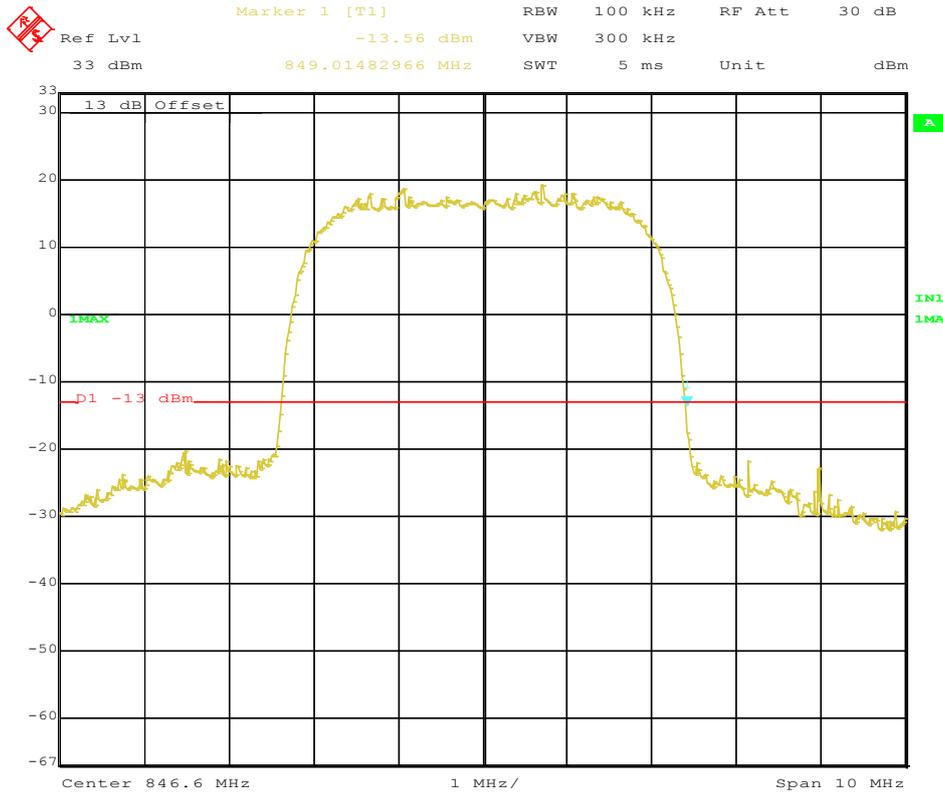
Date: 13.APR.2011 17:25:08

HSUPA FDD V channel 4233 left band edge

Annex A External Photos

See Annex A External Photos.

Annex B Internal Photos

See Annex B Internal Photos.

ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

——————— **The End of this Report** ———————