

TEST REPORT

REPORT NUMBER: I10GC9112-FCC-RF-1

ON

Type of Equipment: USB MODEM
Type of Designation: MF659
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

PART 24, PERSONAL COMMUNICATIONS SERVICES, Oct 1, 2009

Part 27, MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES, Oct 1, 2009

China Telecommunication Technology Labs.

Month date, year

Mar 15, 2011

Signature



He Guili

Director

FCC ID: Q78-MF659

Report Date: 2011-03-15

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, 22, and 24. The sample tested was found to comply with the requirements defined in the applied rules.

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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, 22, 24 and 27.

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

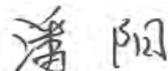
Name: Li Guoqing
Position: Engineer
Department: Department of EMC test

Signature: 

Name: Lv Ke
Position: Engineer
Department: Department of EMC test

Signature: 

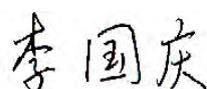
Name: Pan Yang
Position: Engineer
Department: Department of EMC test

Signature: 

Editor of this test report:

Name: Li Guoqing
Position: Engineer
Department: Department of EMC test

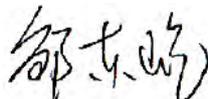
Date: 2011-03-15

Signature: 

Technical responsibility for area of testing:

Name: Zou Dongyi
Position: Manager
Department: Department of EMC test

Date: 2011-03-15

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, 100045
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: Zhao Yang
Telephone: +86-21-68895196
Email: zhao.yangxia@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: USB MODEM
 Model Number: MF659
 Serial Number: EMC1
 Production Status: Product
 Receipt date of test item: 2010-12-21

2.2 Outline of EUT

EUT is a USB modem supporting GPRS/EGPRS 850/900/1800/1900 bands and HSDPA/HSUPA FDD I/II/IV/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.

Upon the applicant's request, only GPRS/EGPRS 850/1900 and HSDPA/HSUPA FDD II/IV/V bands are tested.

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	MF659	EMC1	None
B	adapter	--	--	--	None
C	battery	--	--	--	None
D	Earphone	--	--	--	None

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	DC cable on Adapter	--	--	--	--	None

2.5 Other Information

Version of hardware and software

HW Version: dh6B

SW Version: --

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, 27.53(h)	Radiated Spurious Emission	Pass
2.1046,24.232, 22.913(a), 27.50(d)(2)	Radiated RF Power Output, Or Effective Radiated Power (ERP)	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 2
2.1055,22.355, 24.235, 27.54	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235, 27.54	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c), 27.50(d)(2)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238, , 27.53(h)	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917, 27.53(h)	Band Edge	Pass
Note 2: No applicable performance criteria.		

4 Test Results of mode

4.1 Radiated Spurious Emission

Specifications:	2.1051, 24.238, 2.1053, 22.917, 27.53(h)					
Date of Tests	2010-12-23~2011-1-20					
Test conditions:	Ambient Temperature: 15°C-35°C 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 1412, 4175 and 9400 for HSPA FDD IV, V and II 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	R/S	VULB 9160	vulb9160-3252	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×6.3 m	--	2013-11-16	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-04-01	Normal

Limit Level Construction:

Part 22:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 24:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 27:

According to Part 27.53(h), i.e., for operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB, so the limit level is:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Limits for Radiated spurious emissions(UE)	
Frequency range	Limit Level /Resolution Bandwidth
30 MHz to 1 GHz	-13dBm/100 kHz
1 GHz to 20 GHz	-13dBm/1 MHz

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. The test was done using an automated test system, where all test equipments were controlled by a computer.



Figure SP

Test Method:

The measurement was performed accordance with section 2.2.12 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

1 The maximum spurious emissions were searched by turning the azimuth of the turntable, shifting the polarization of the measuring antenna and changing the pose of the EUT.

2 Levels of EUT's transmitter harmonics and suspicious signals were recorded.

3 The recorded levels were corrected in the automated test system with the correction factors given by a substitution calibration made before the measurement. The calibration was made separately for vertical and horizontal polarization and the system uses different correction factors depending on the measuring antenna polarization.

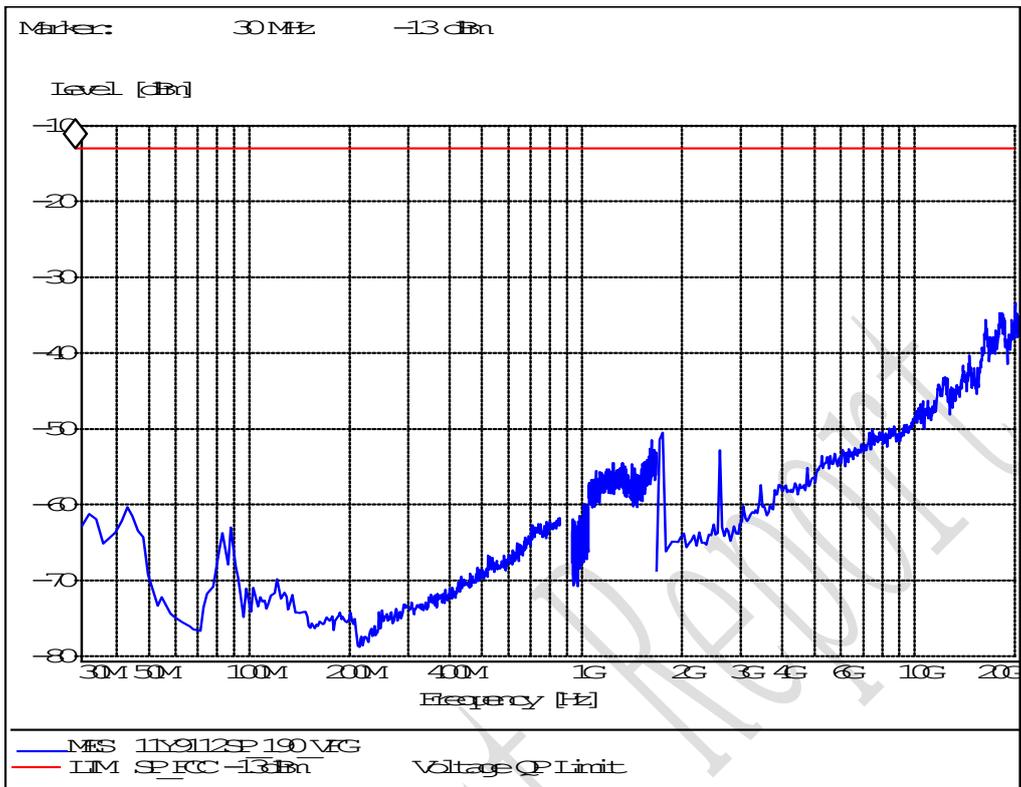
4 The corrected values of radiated spurious emissions indicated as EIRP are reported.

Note:

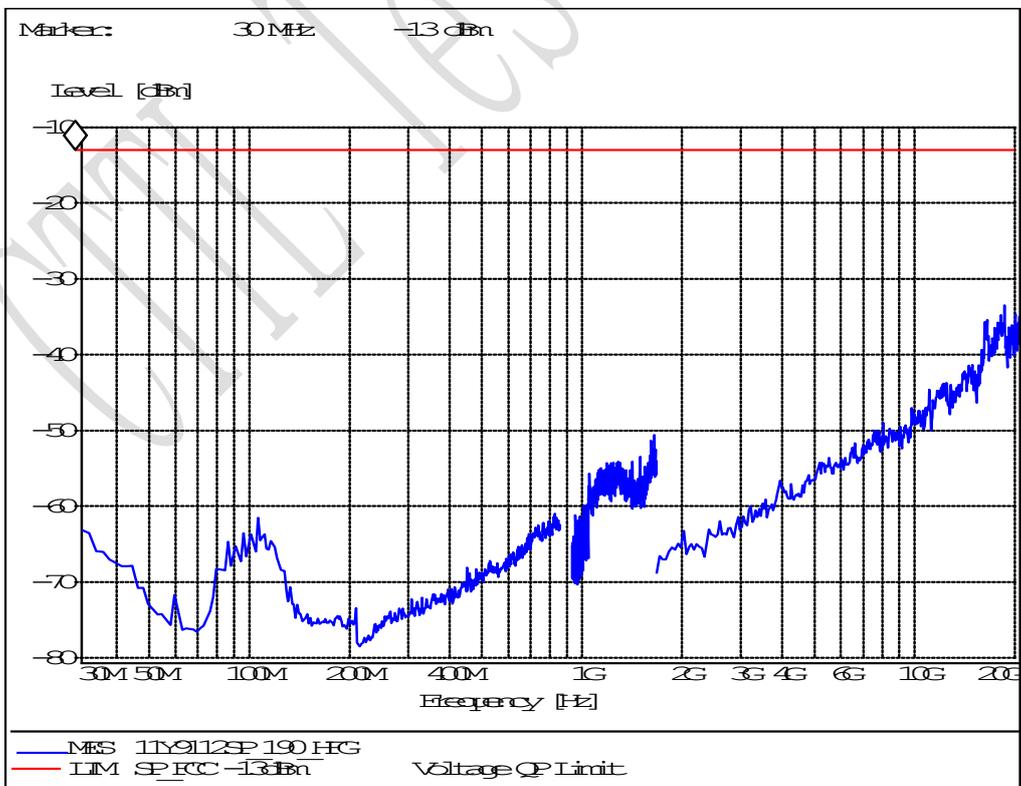
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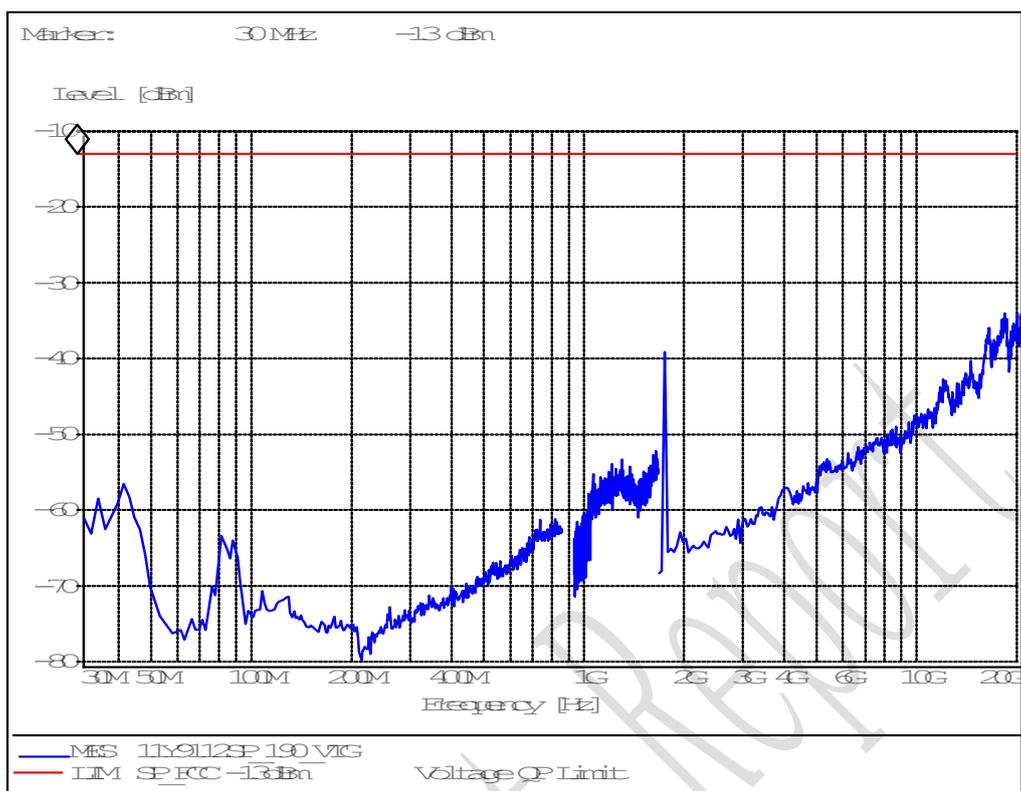
Test Results for GPRS mode:



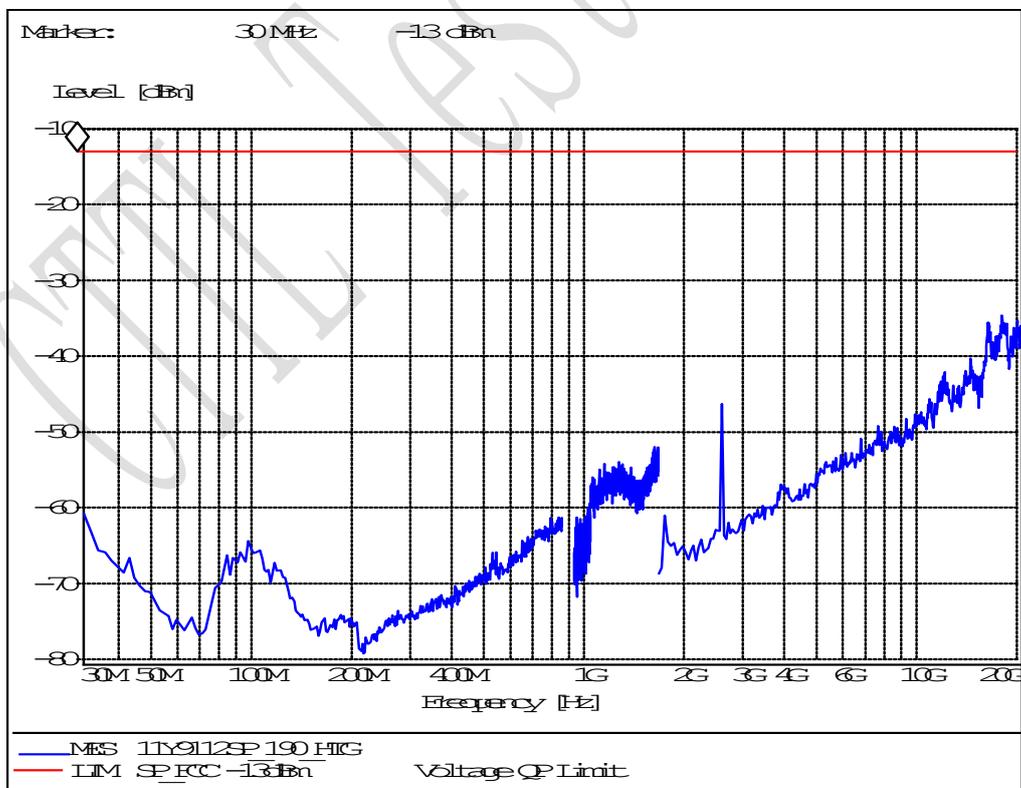
S190VF for GPRS850 mode



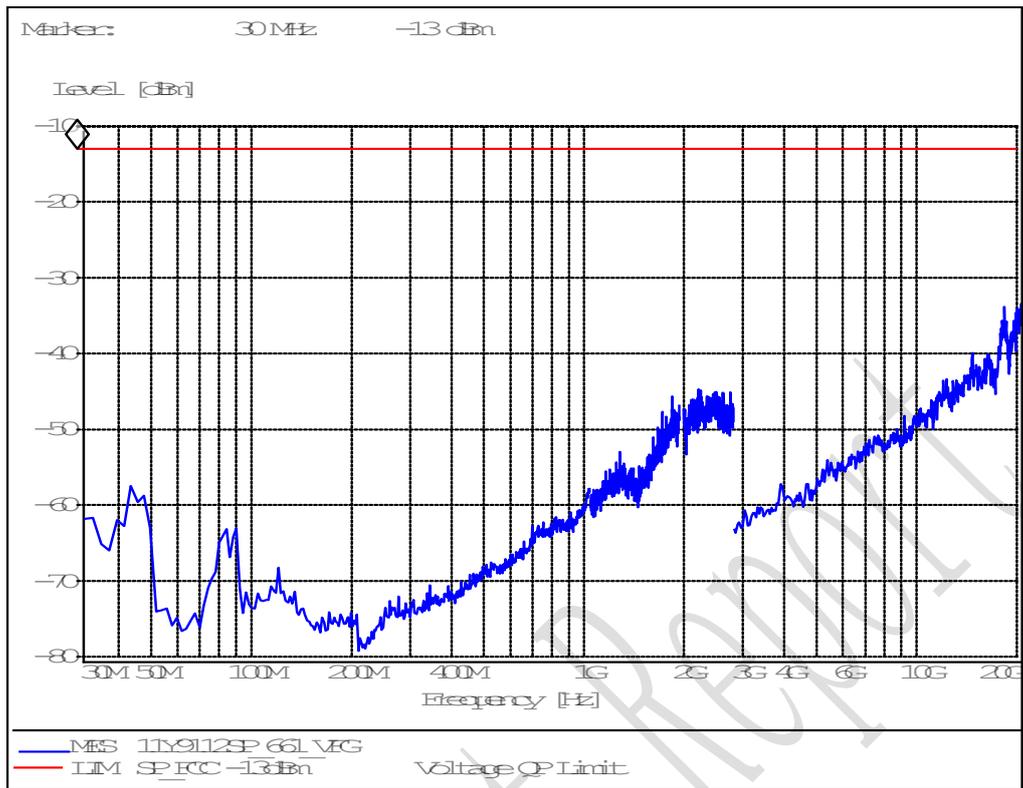
S190HF for GPRS850 mode



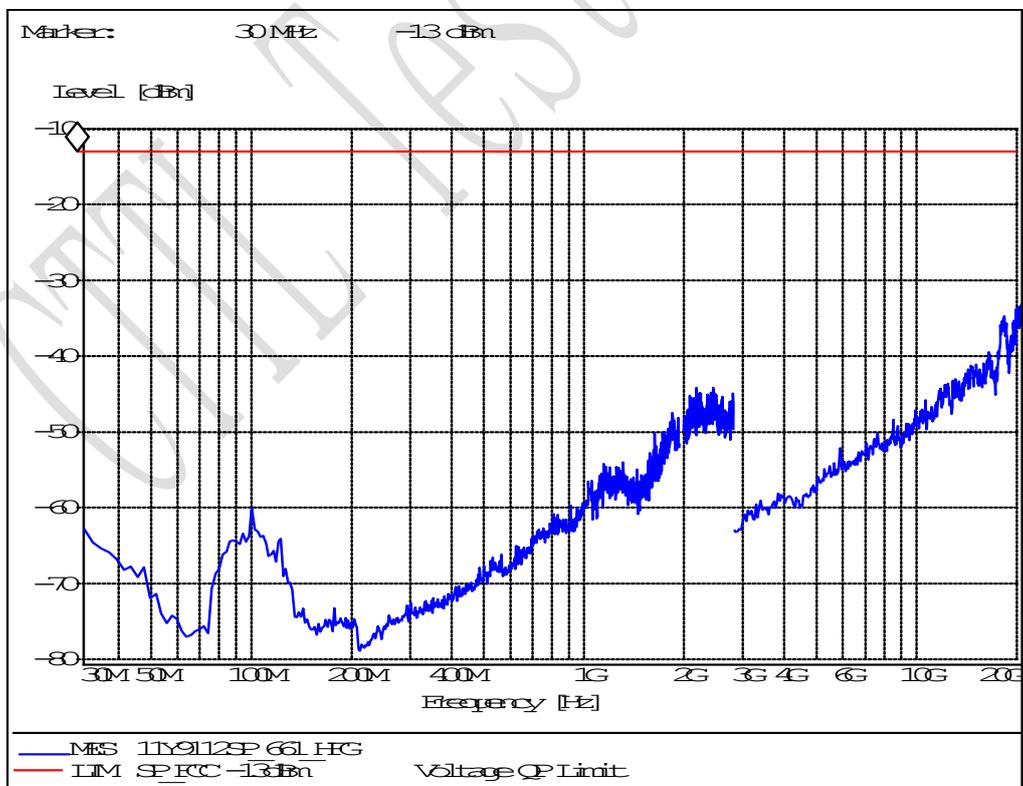
S190VT for GPRS850 mode



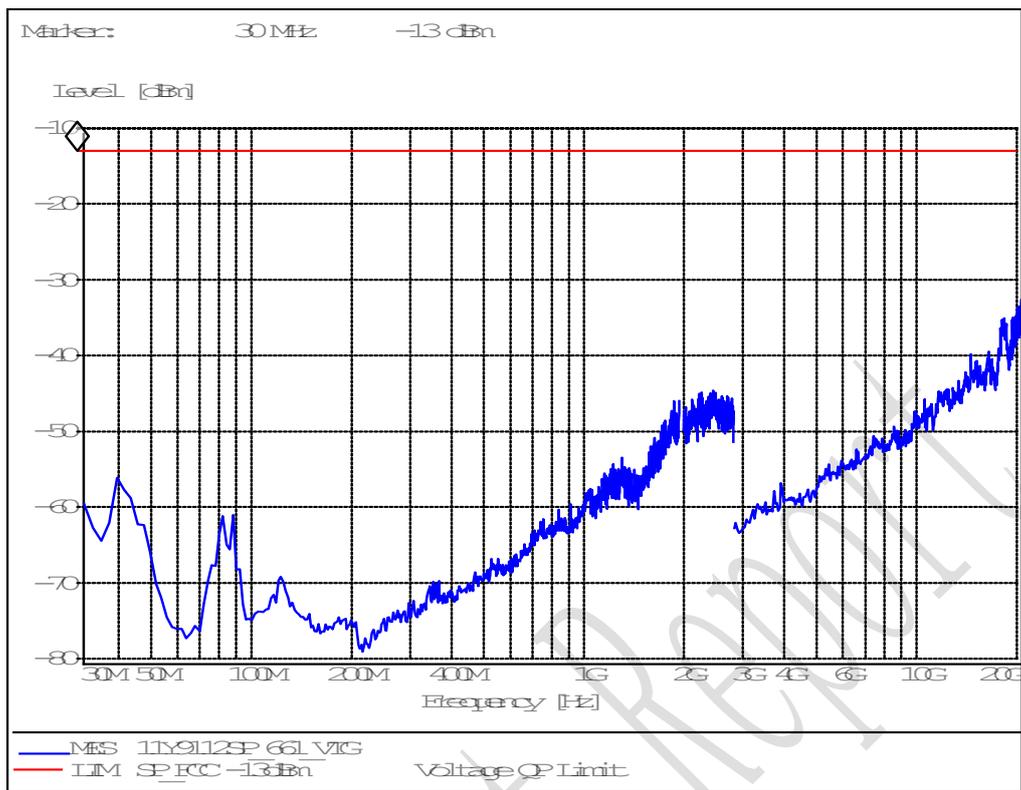
S190HT for GPRS850 mode



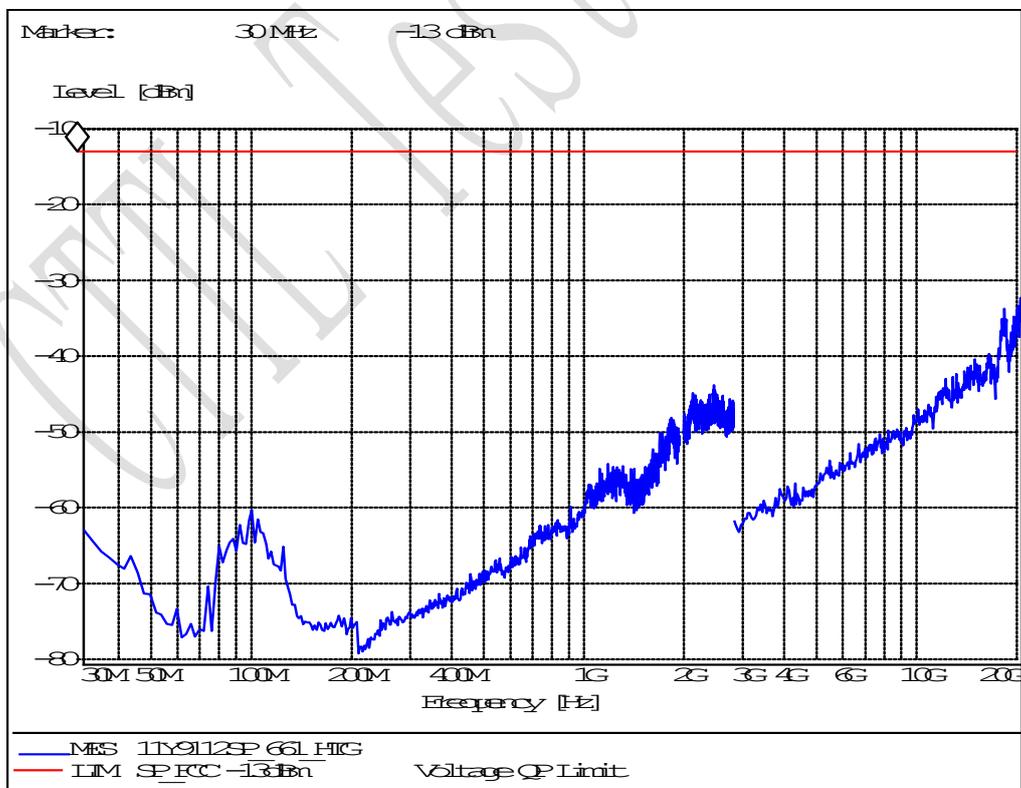
S661VF for GPRS1900 mode



S661HF for GPRS1900 mode

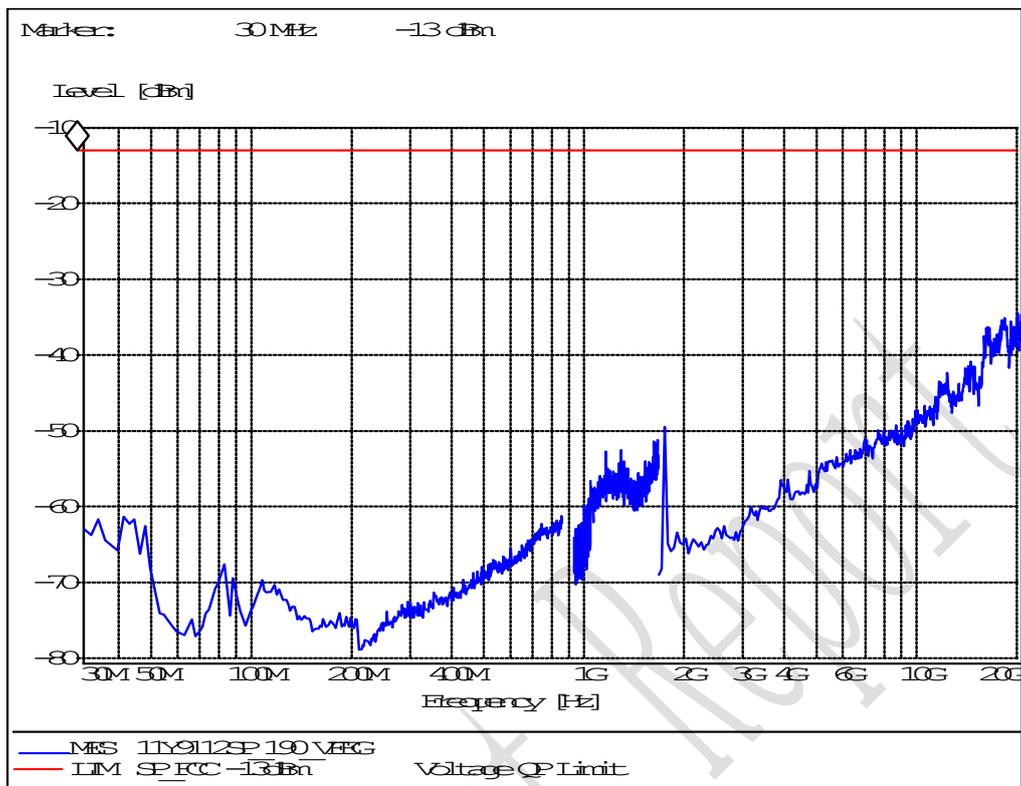


S661VT for GPRS1900 mode

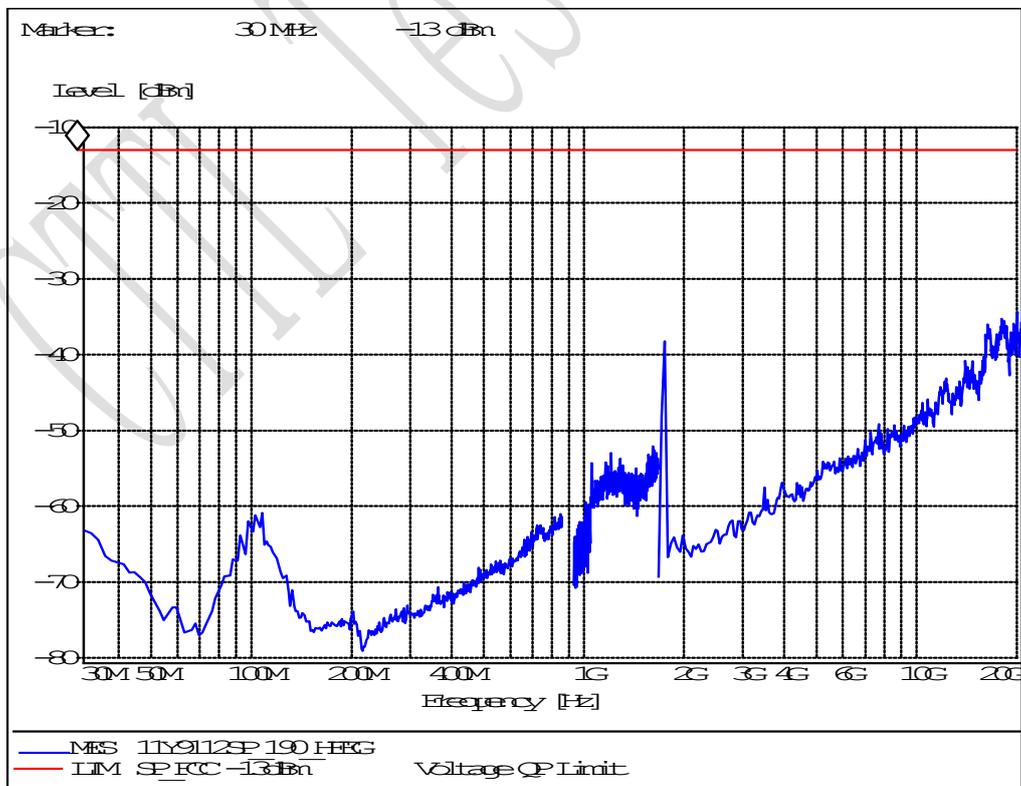


S661HT for GPRS1900 mode

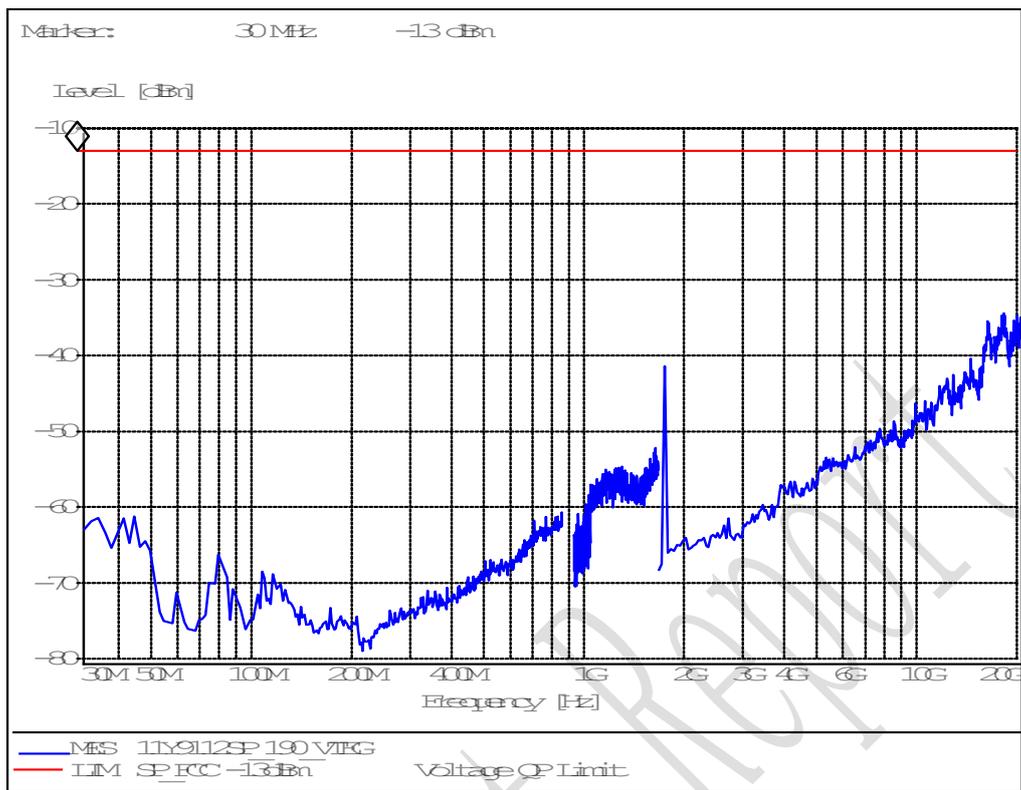
Test Results for EGPRS mode:



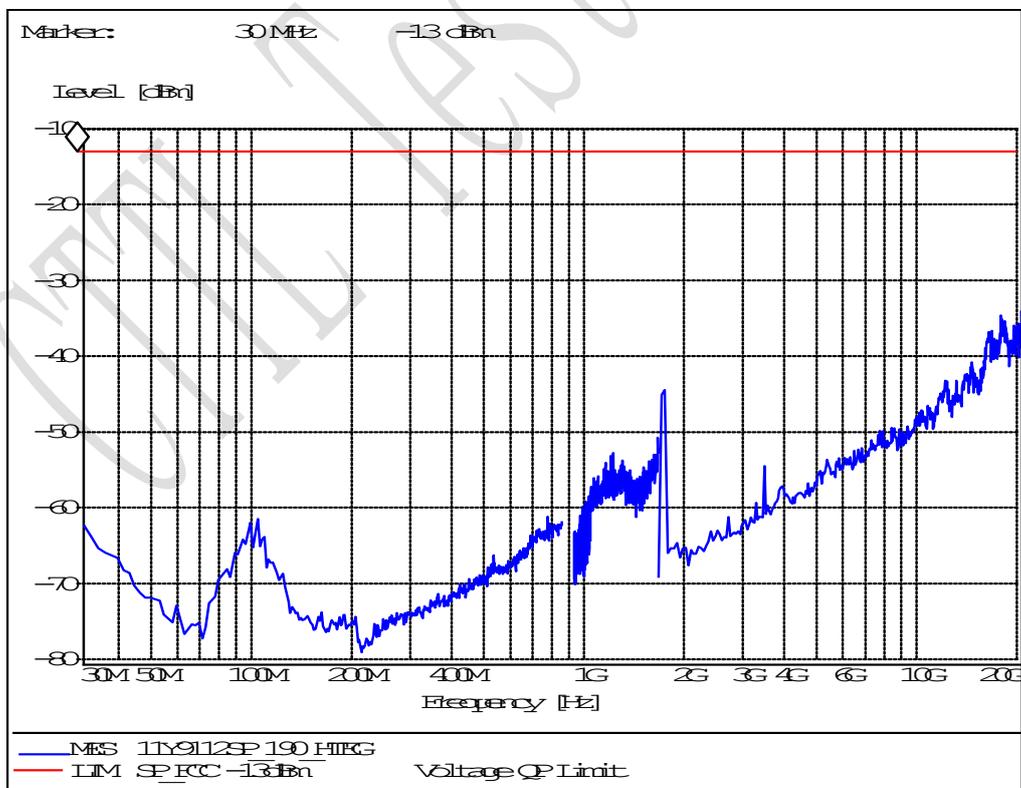
S190VF for EGPRS850 mode



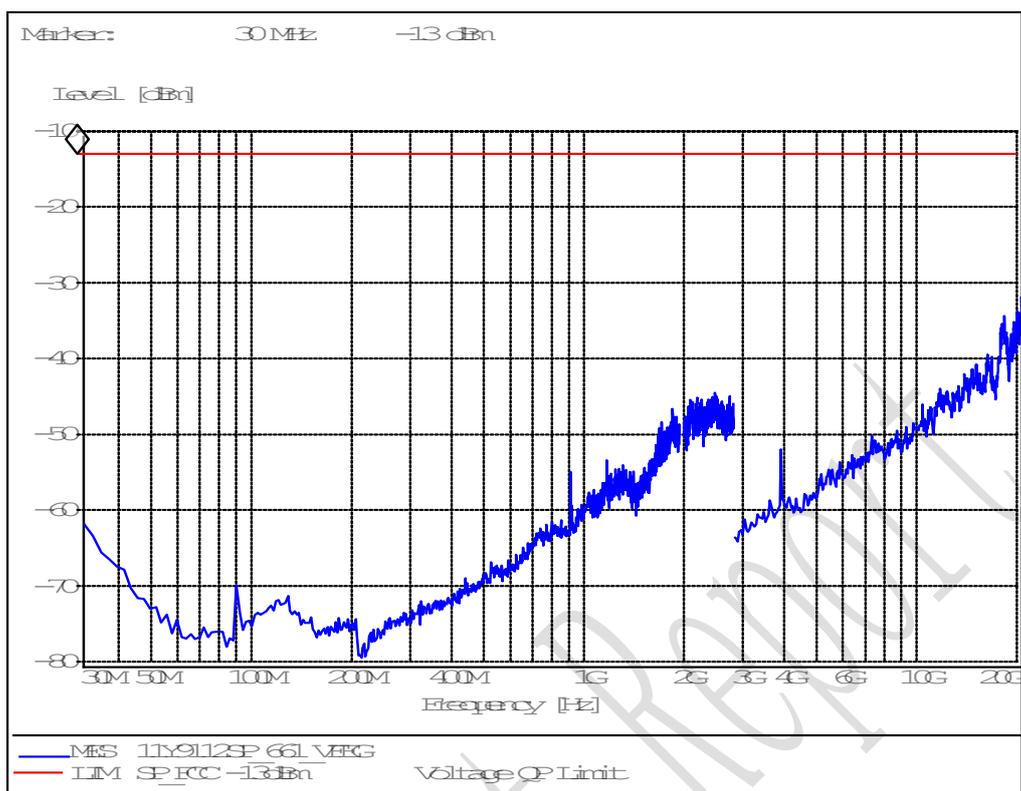
S190HF for EGPRS850 mode



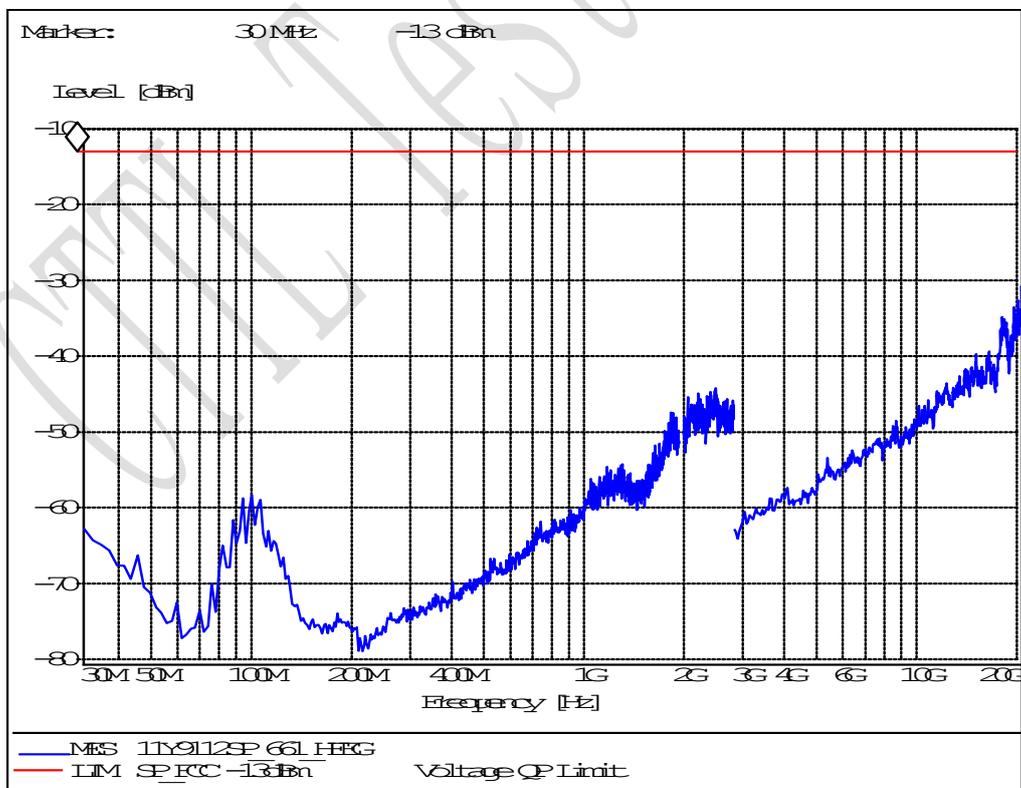
S190VT for EGPRS850 mode



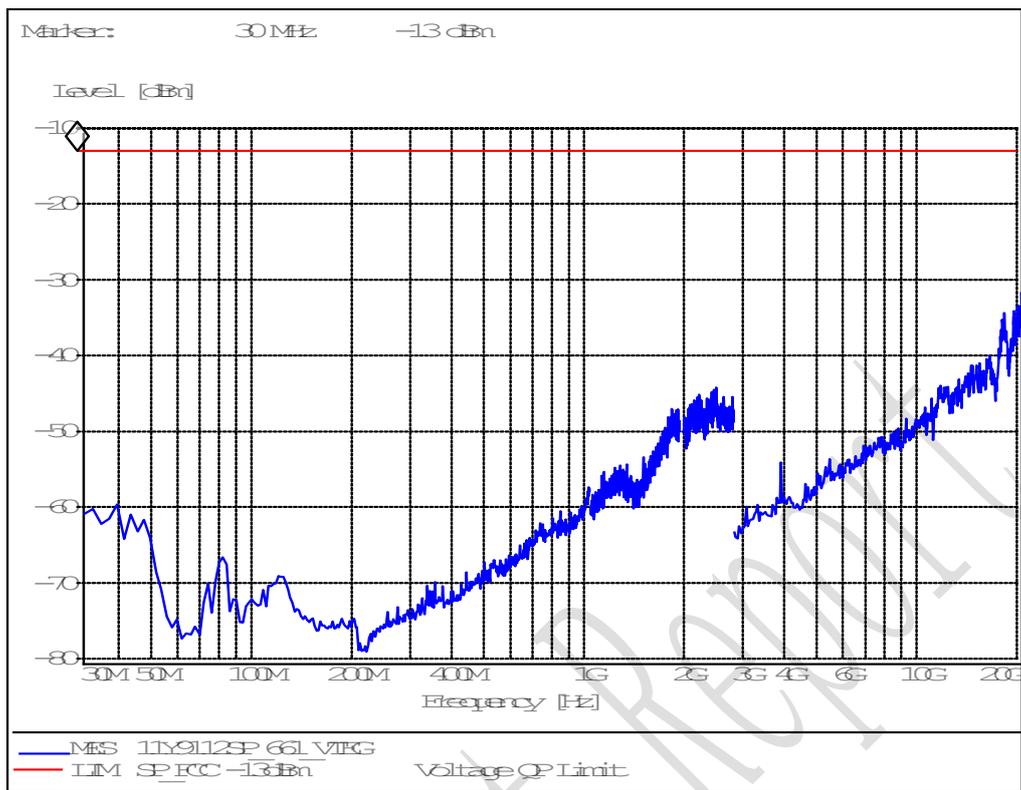
S190HT for EGPRS850 mode



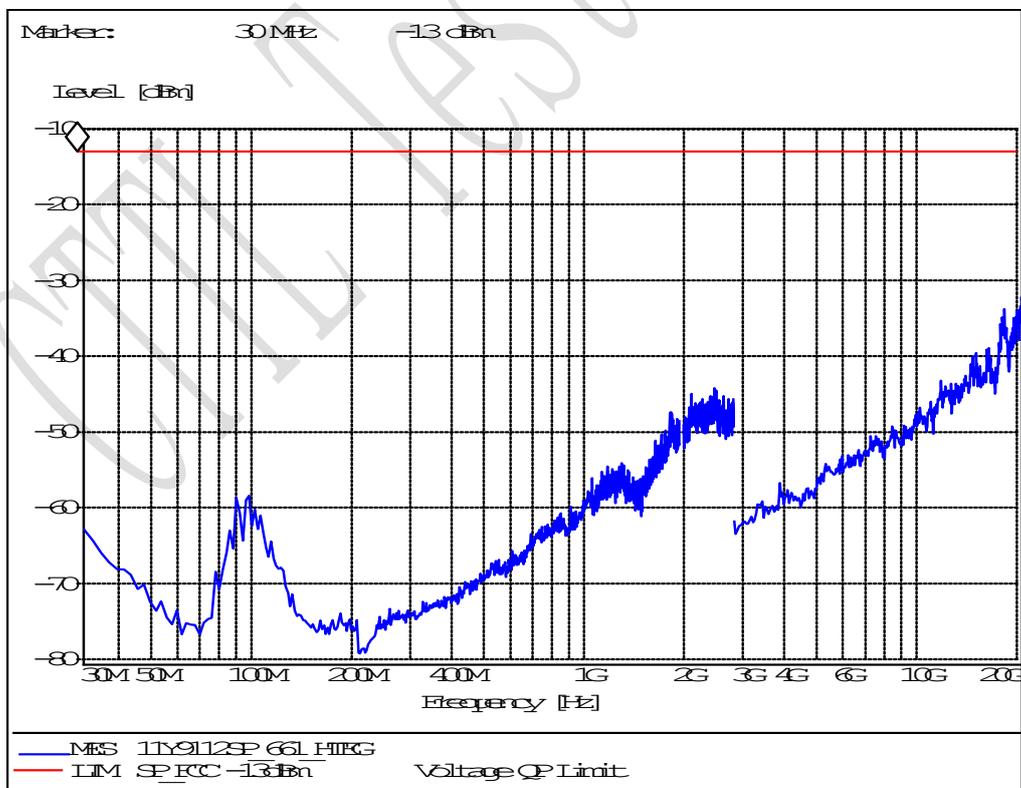
S661VF for EGPRS1900 mode



S661HF for EGPRS1900 mode

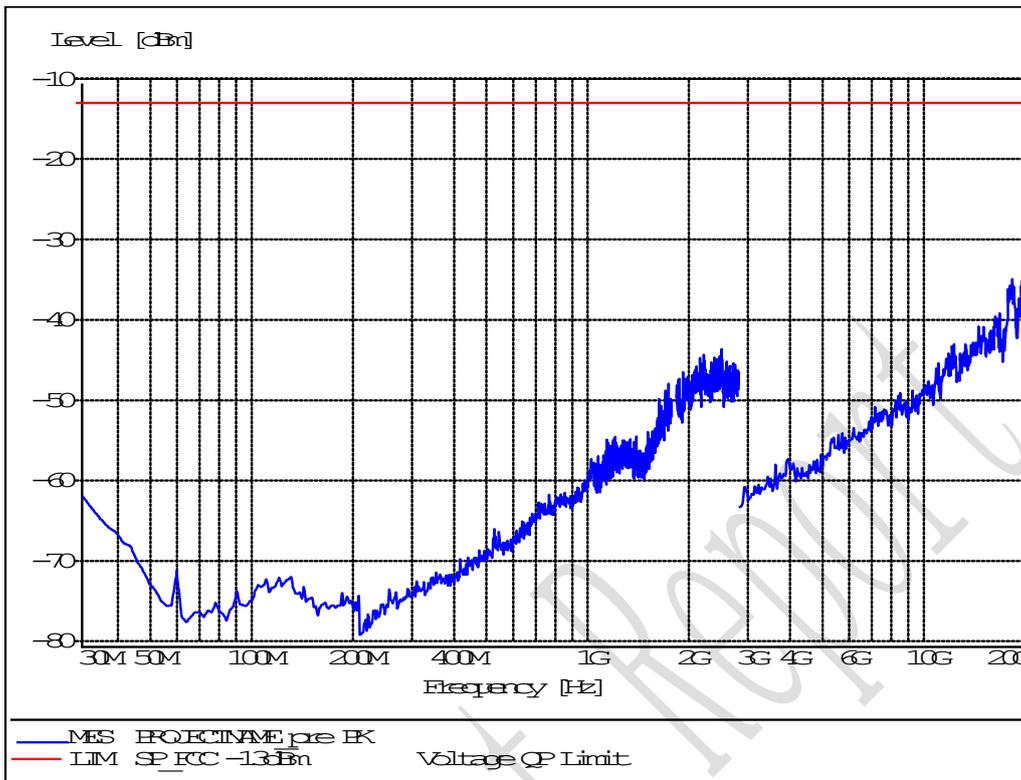


S661VT for EGPRS1900 mode

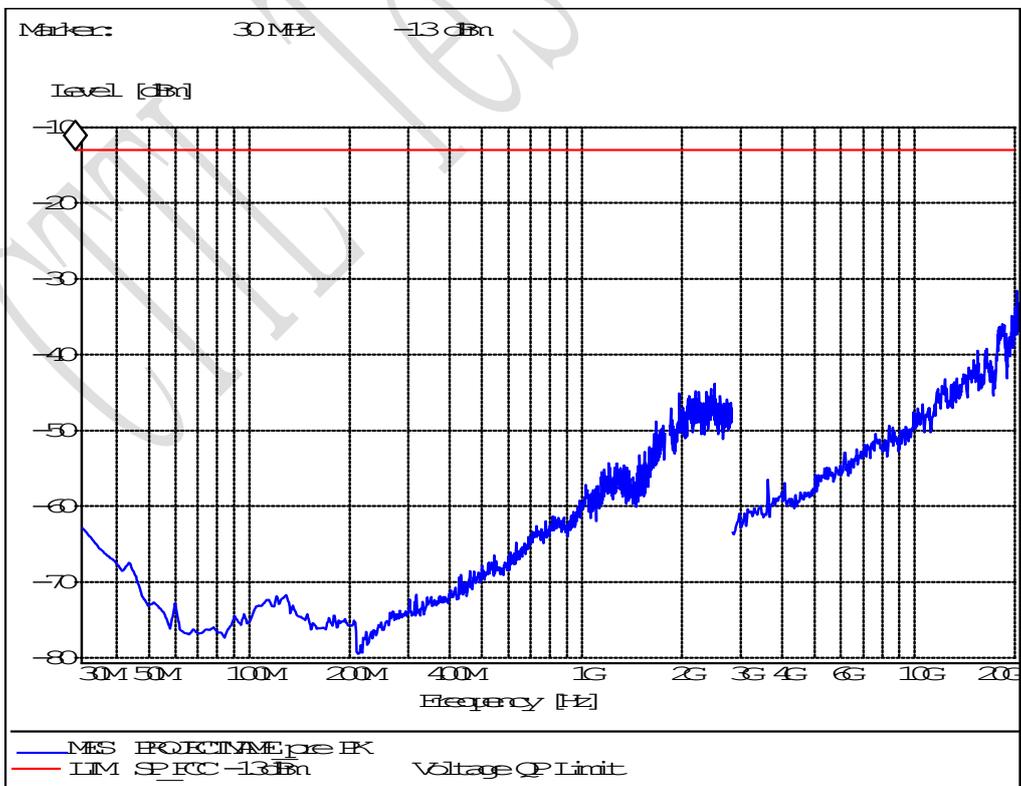


S661HT for EGPRS1900 mode

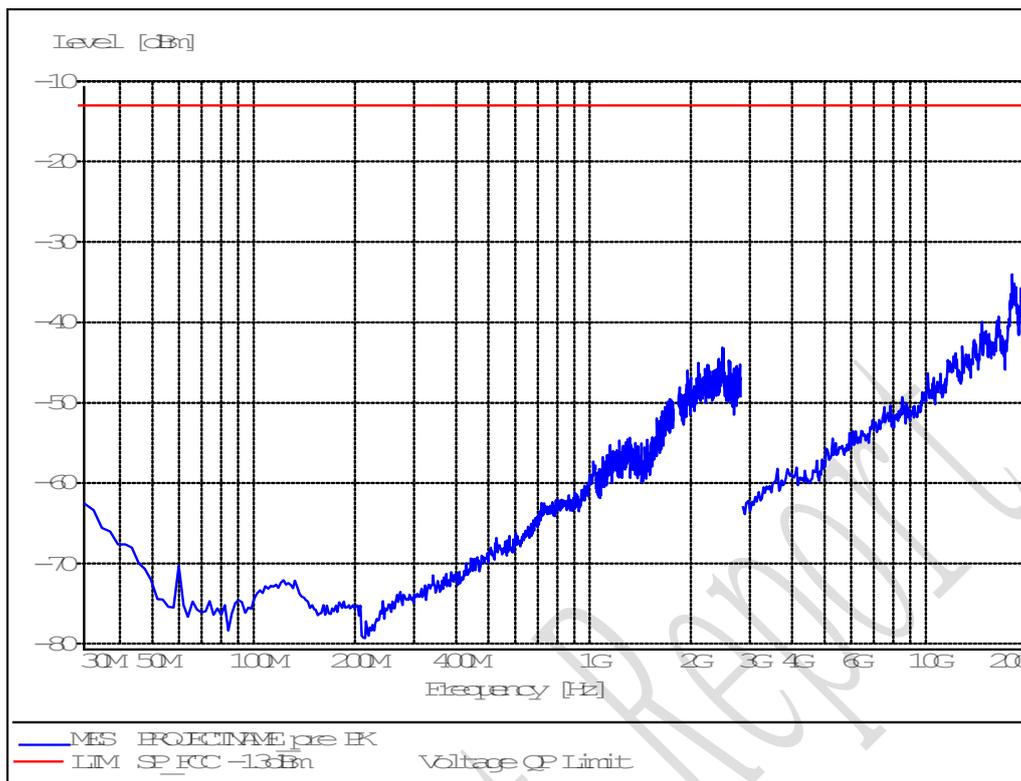
Test Results for HSDPA mode:



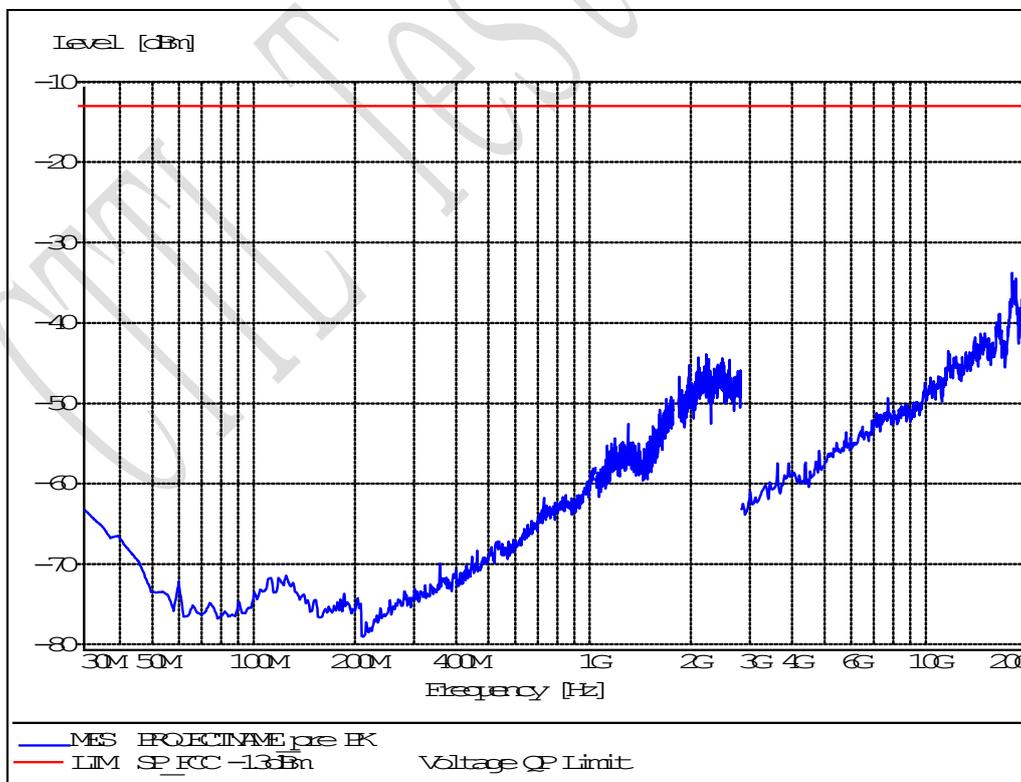
S1412VF for HSDPA FDD IV mode



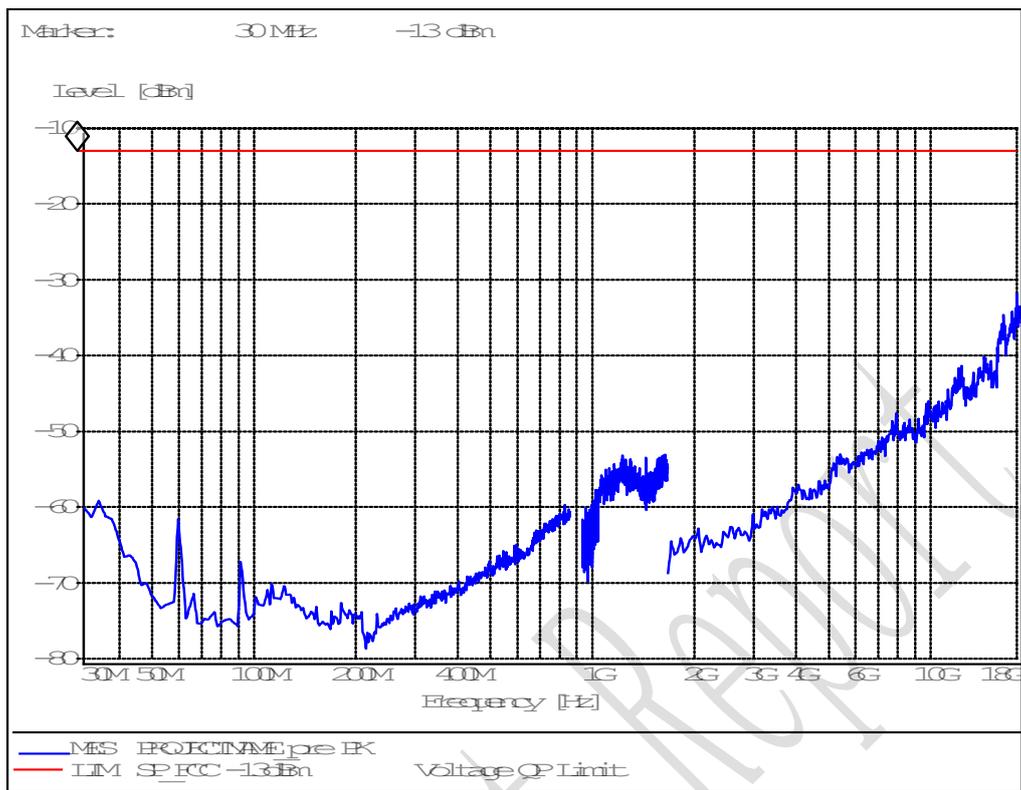
S1412HF for HSDPA FDD IV mode



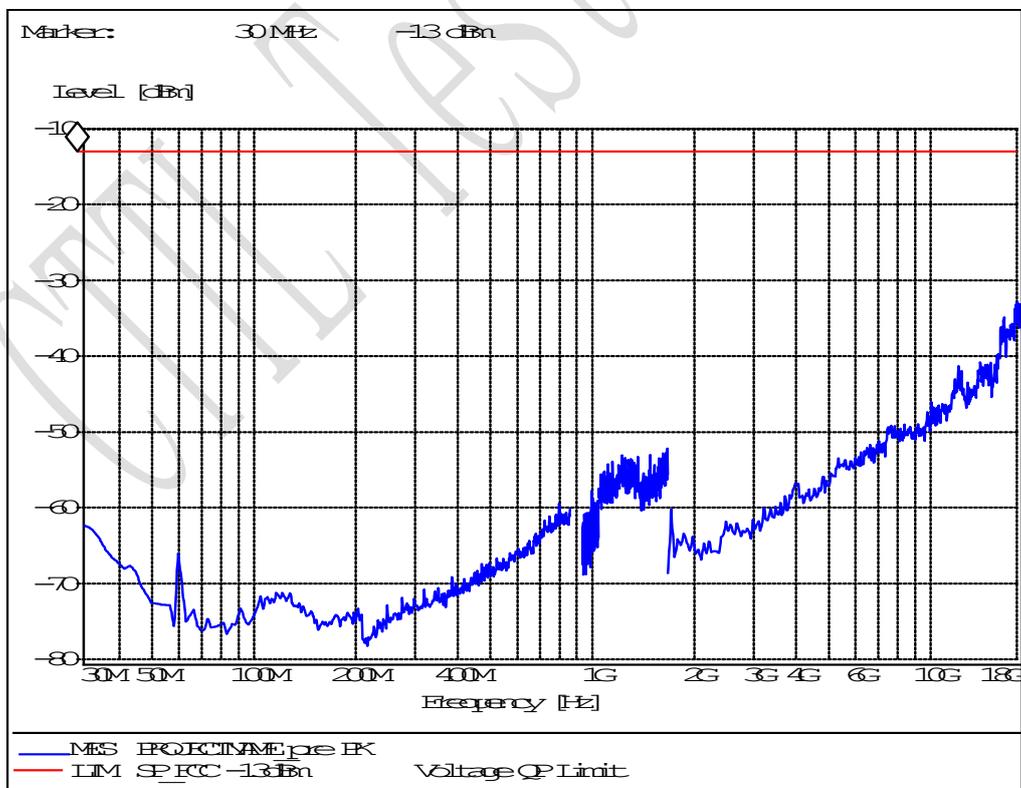
S1412VT for HSDPA FDD IV mode



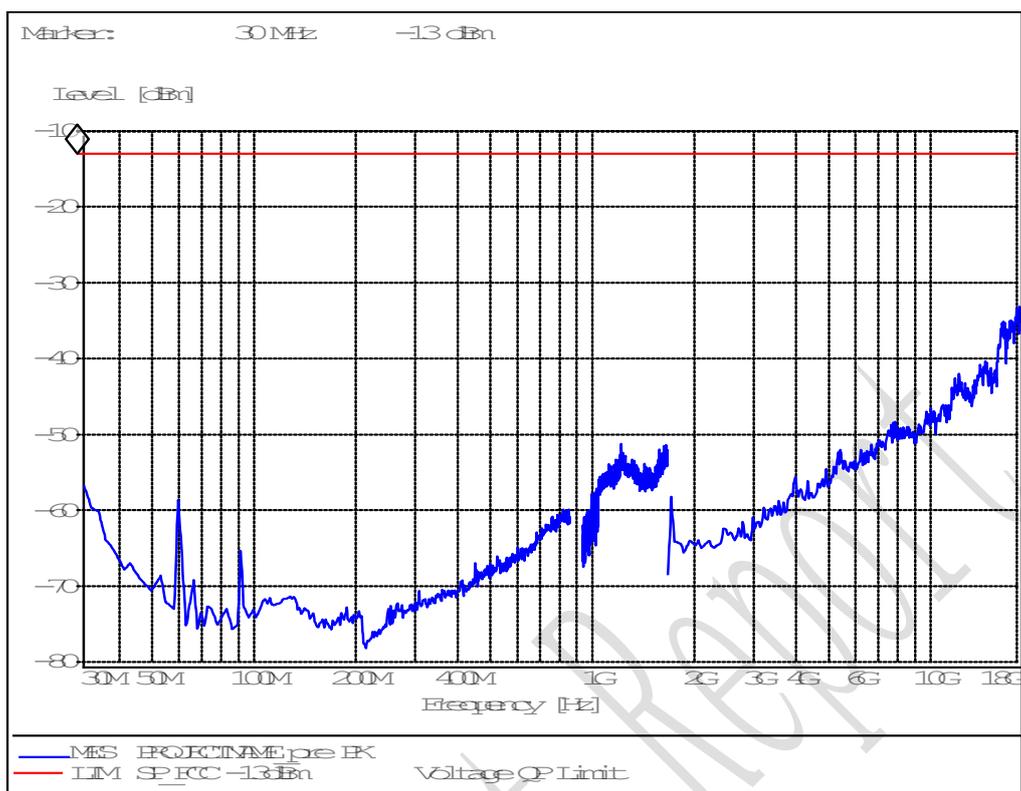
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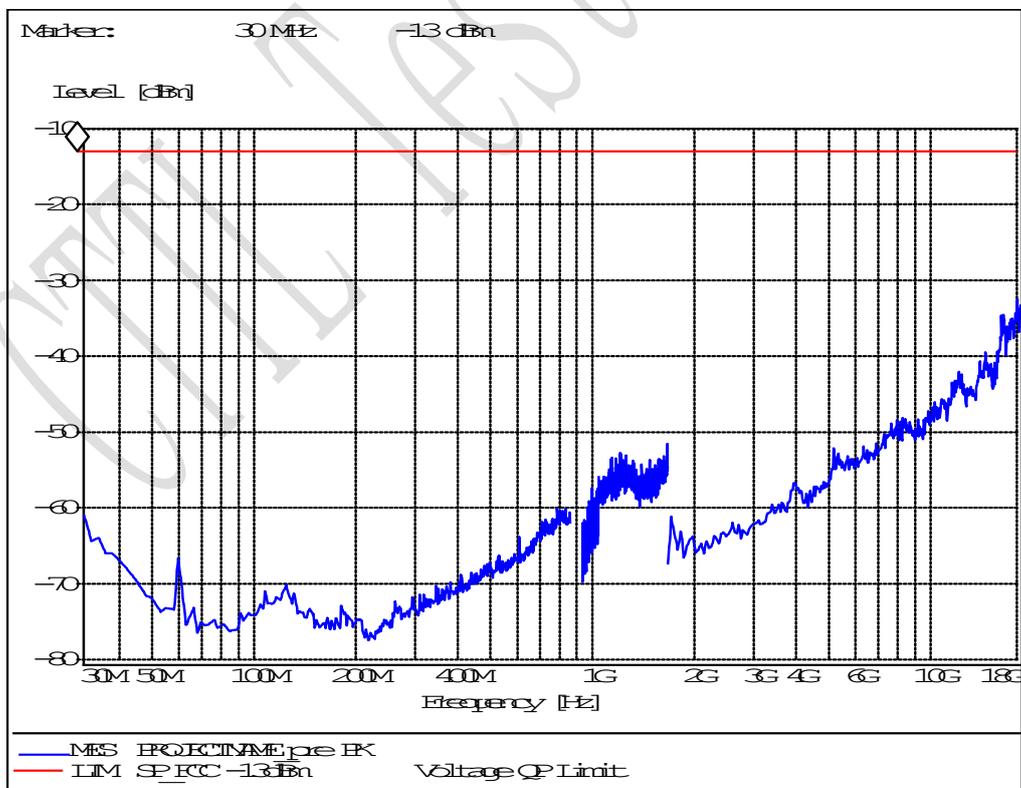
S4175VF for HSDPA FDD V mode



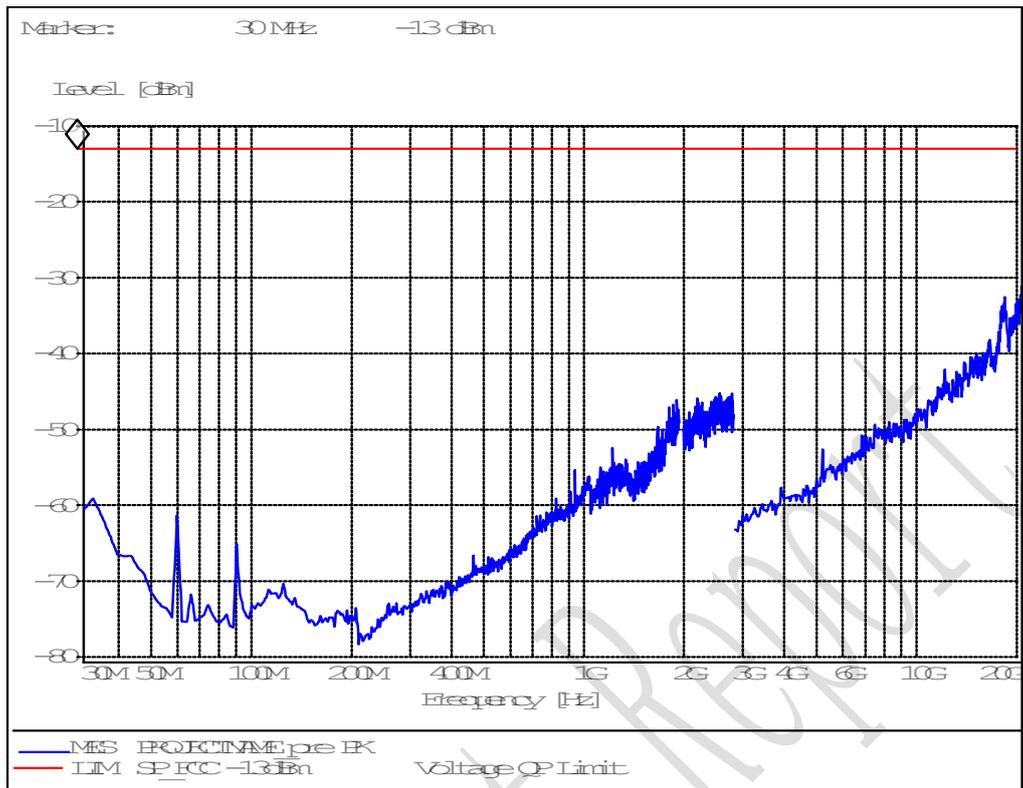
S4175HF for HSDPA FDD V mode



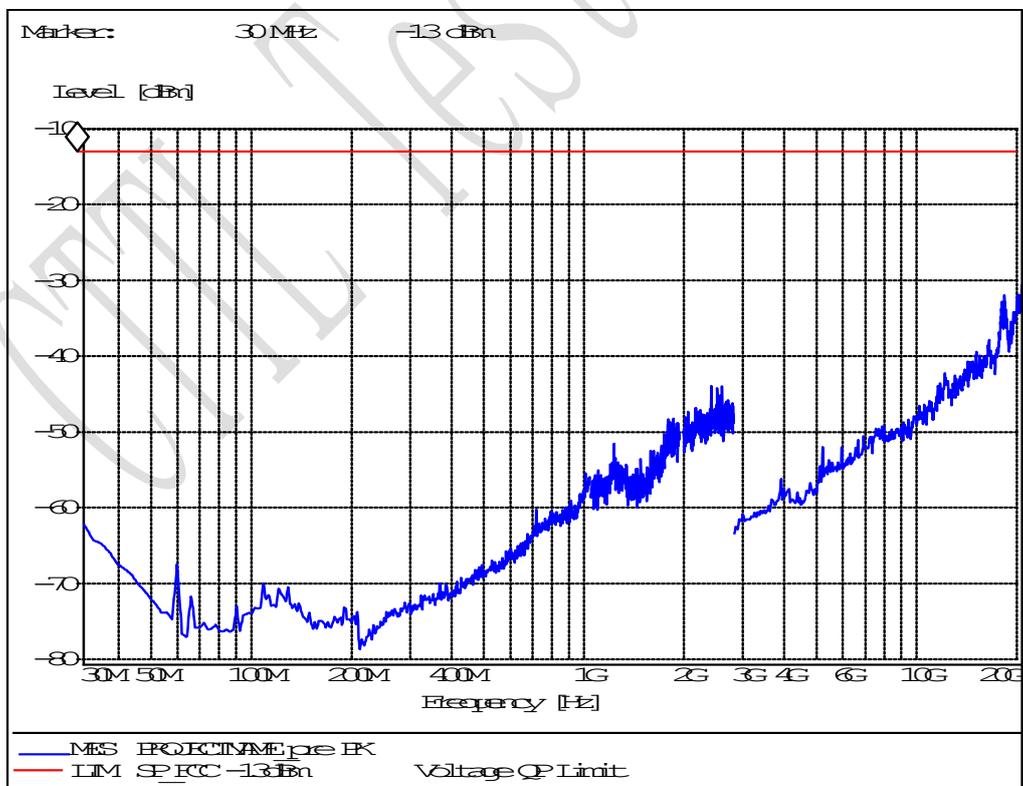
S4175VT for HSDPA FDD V mode



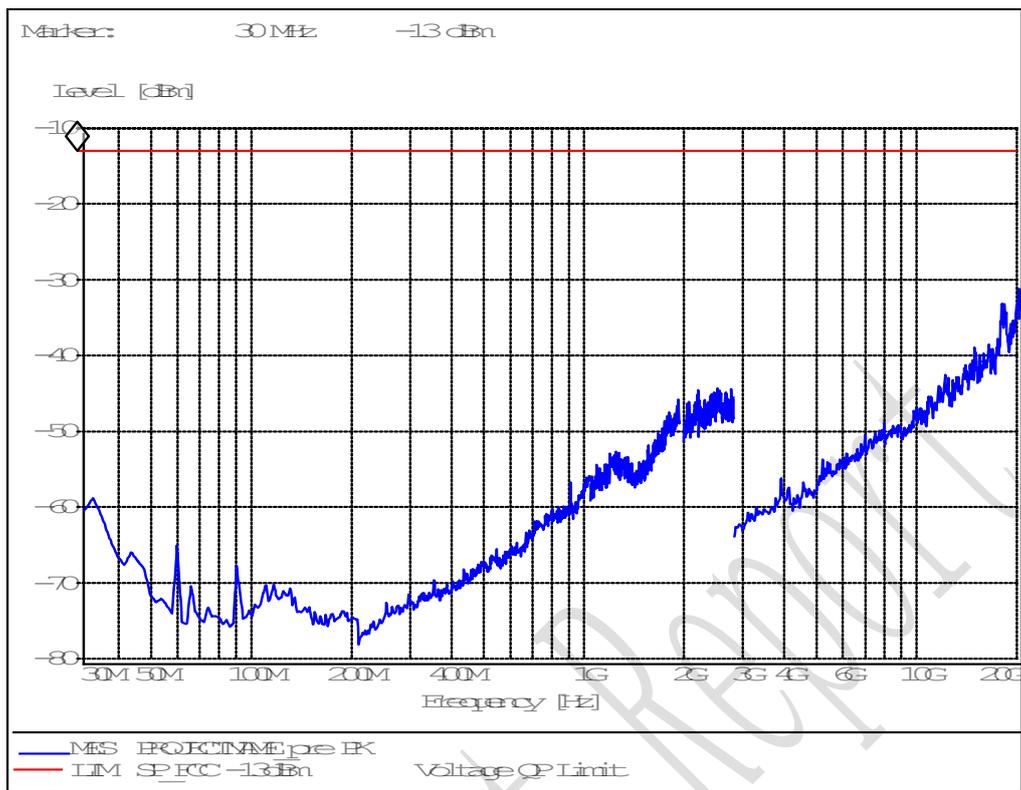
S4175HT for HSDPA FDD V mode



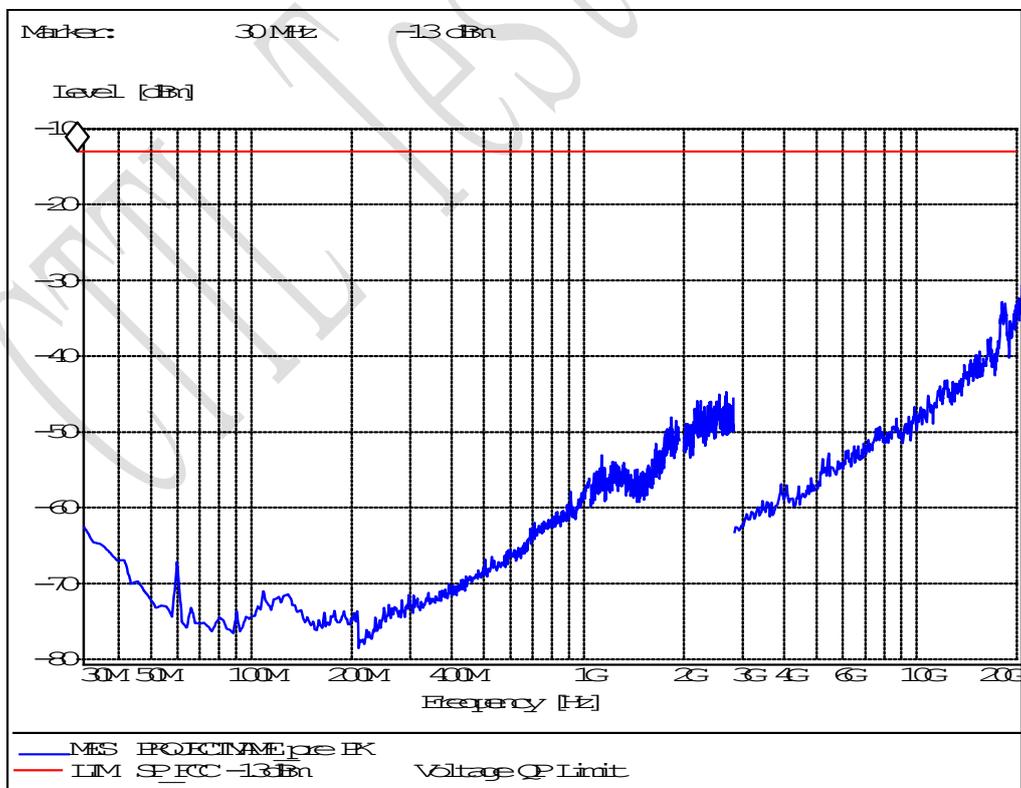
S9400VF for HSDPA FDD II mode



S9400HF for HSDPA FDD II mode

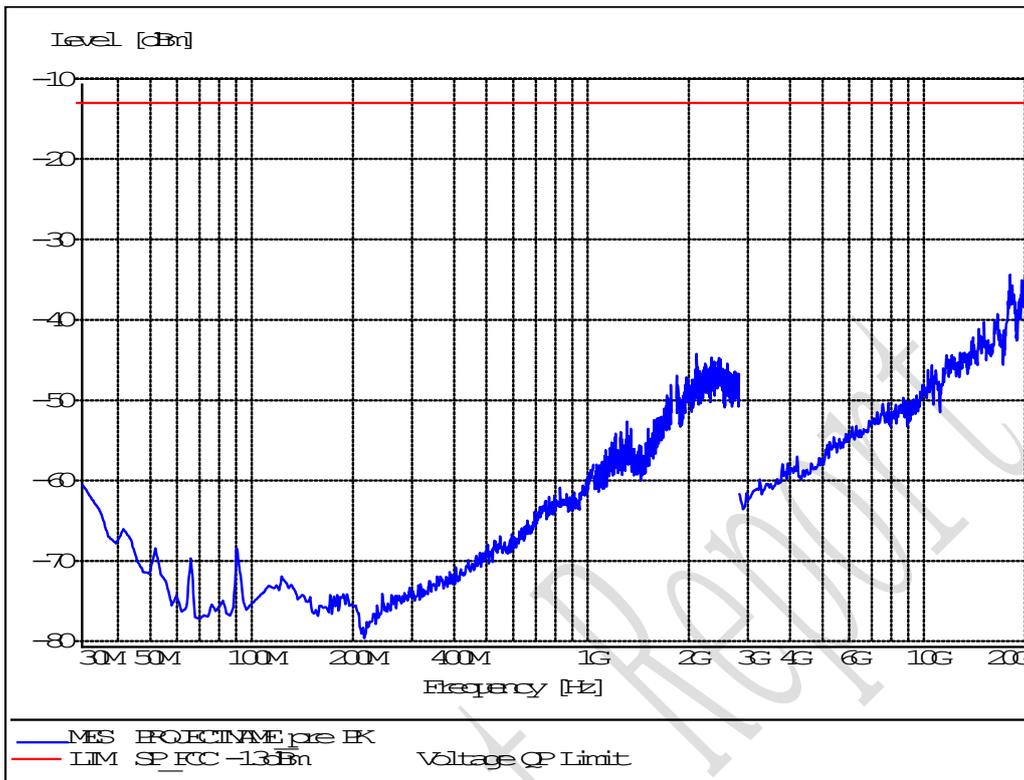


S9400VT for HSDPA FDD II mode

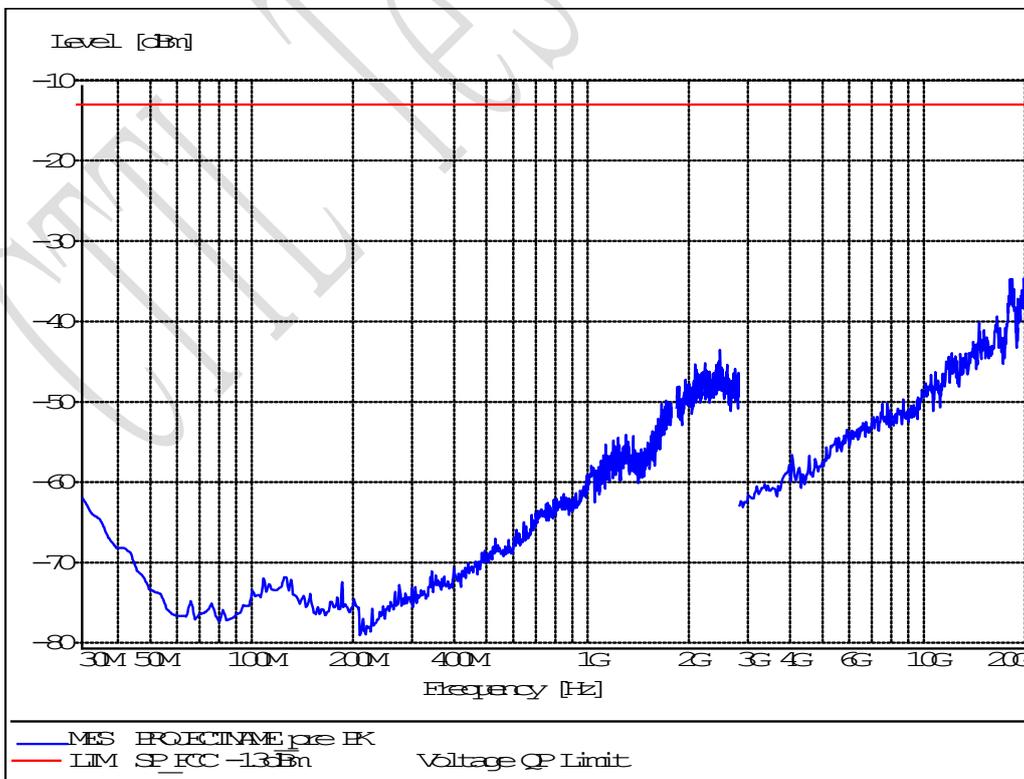


S9400HT for HSDPA FDD II mode

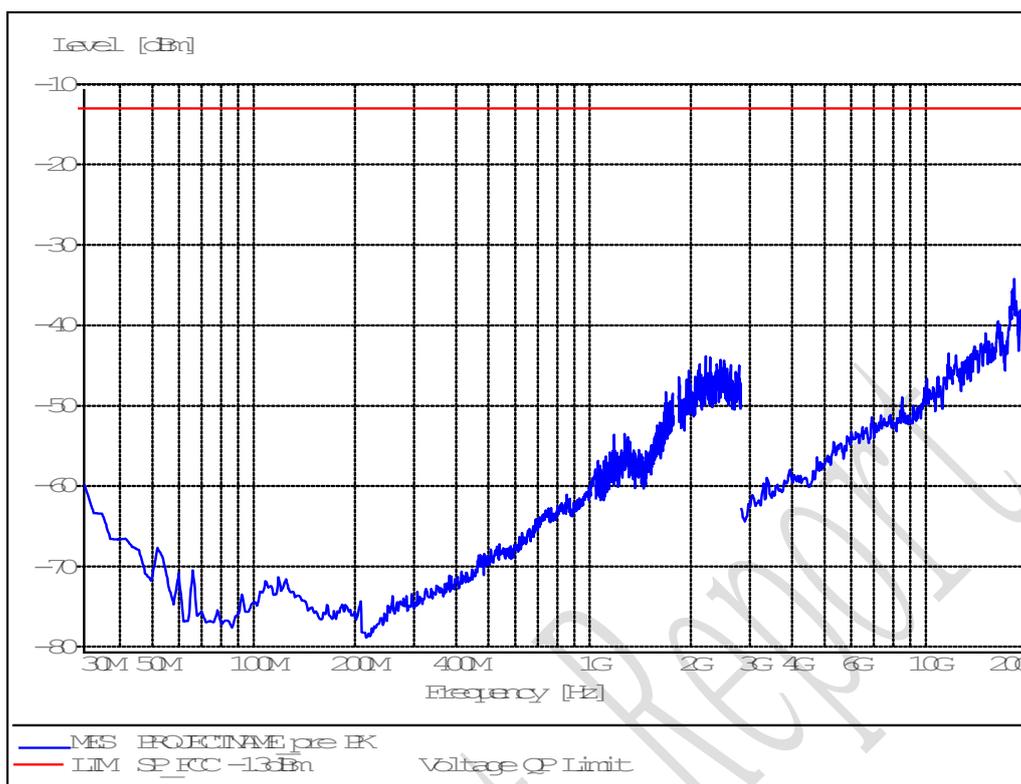
Test Results for HSUPA mode:



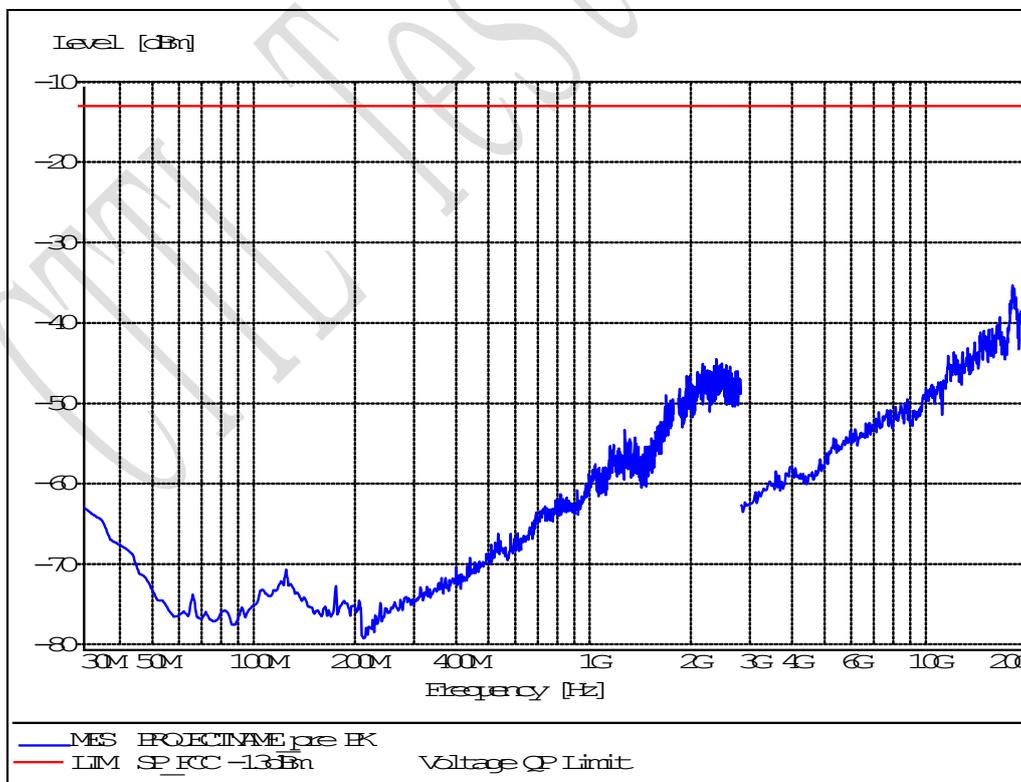
S1412VF for HSUPA FDD IV mode



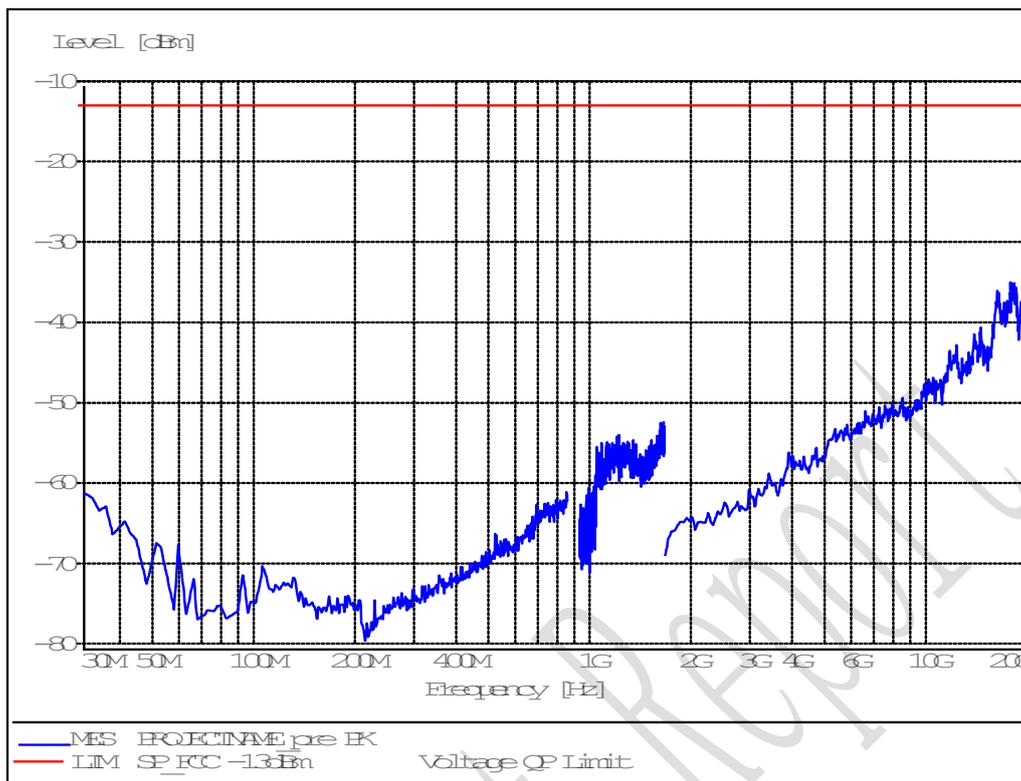
S1412HF for HSUPA FDD IV mode



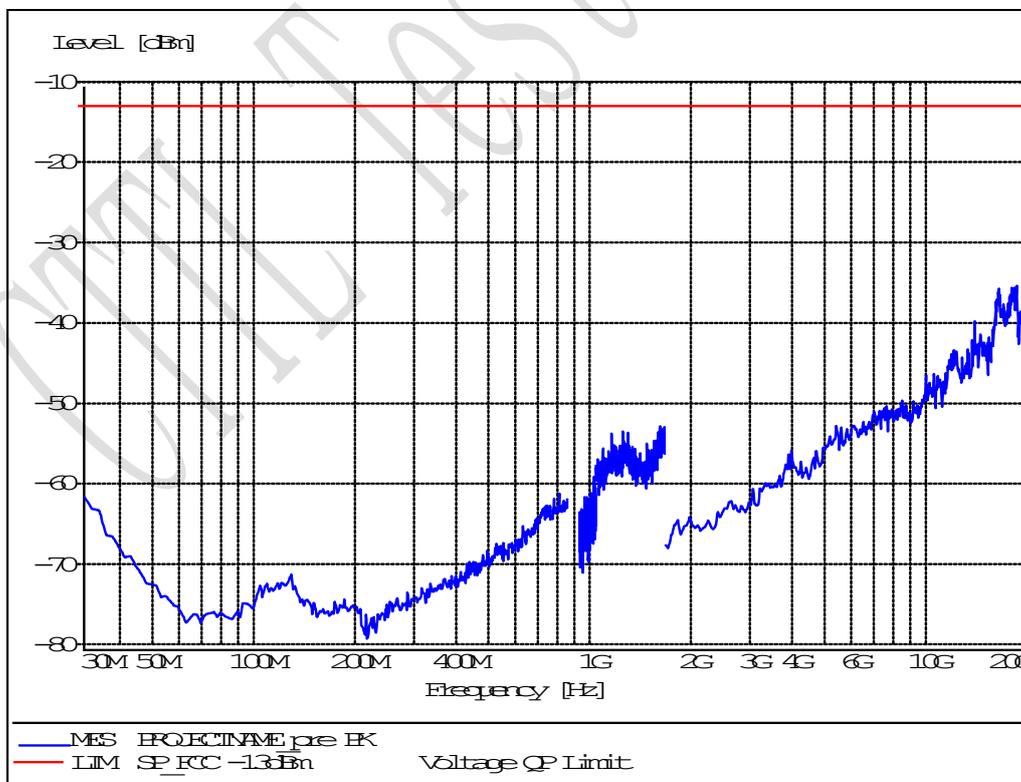
S1412VT for HSUPA FDD IV mode



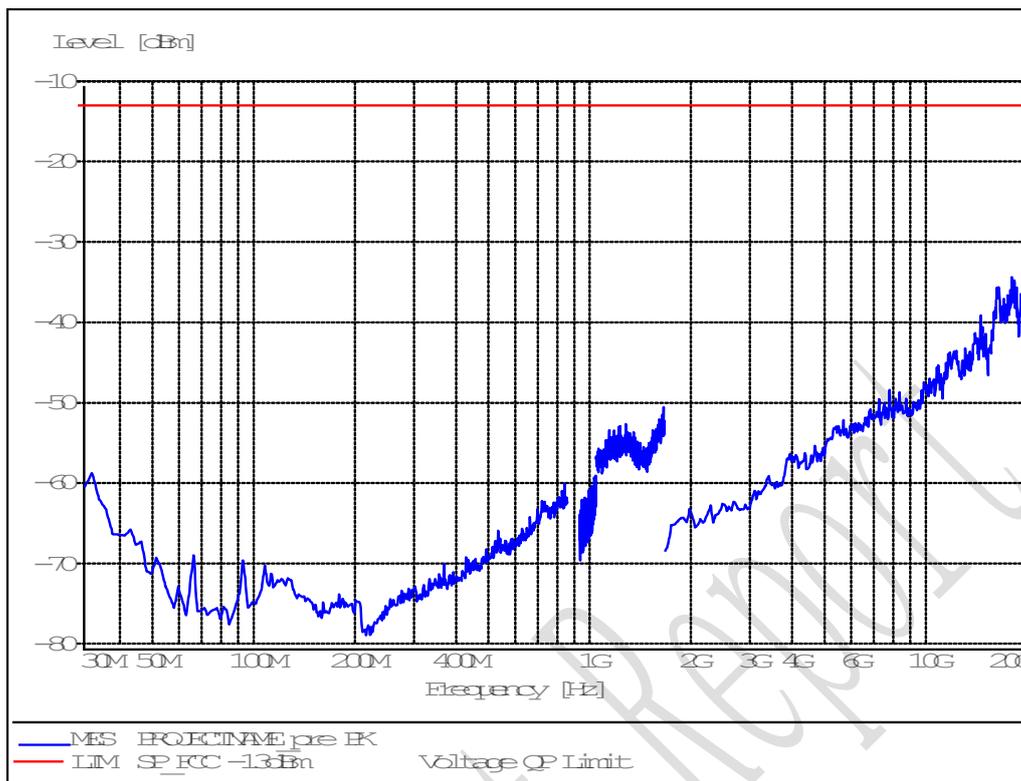
S1412HT for HSUPA FDD IV mode



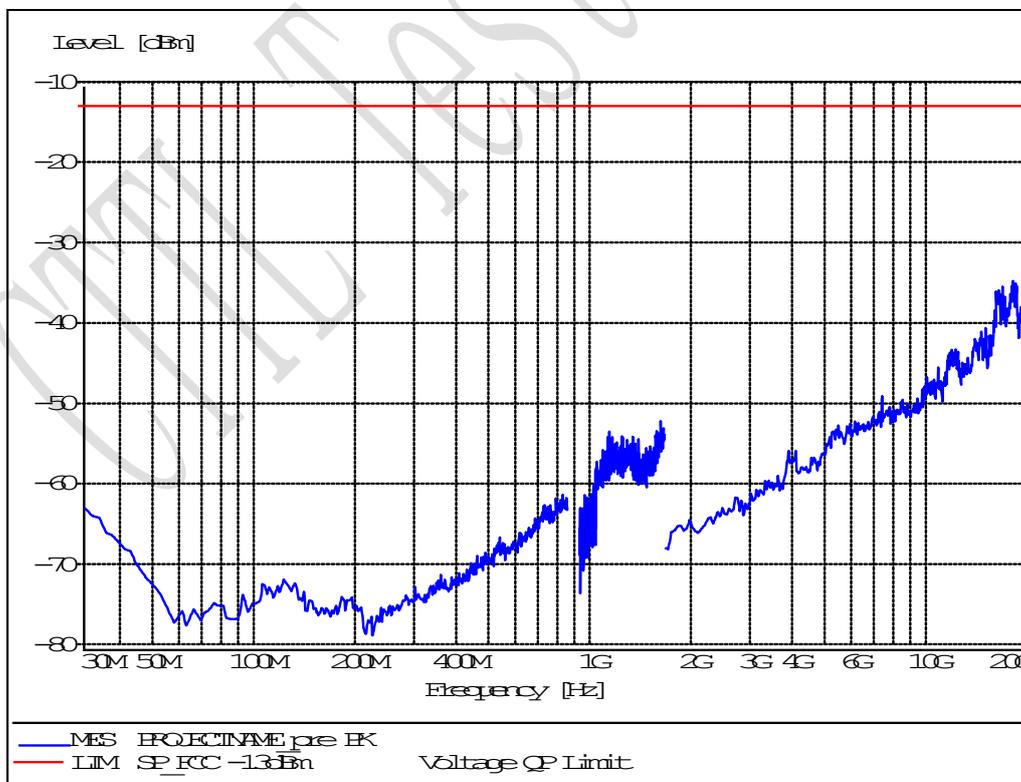
S4175VF for HSUPA FDD V mode



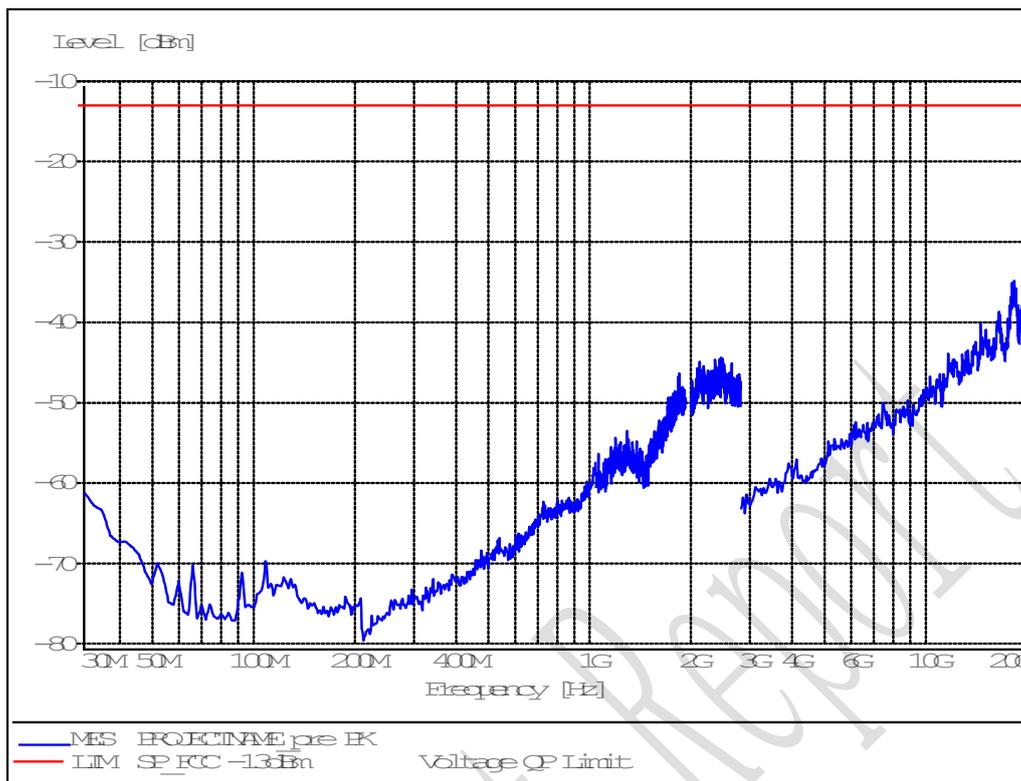
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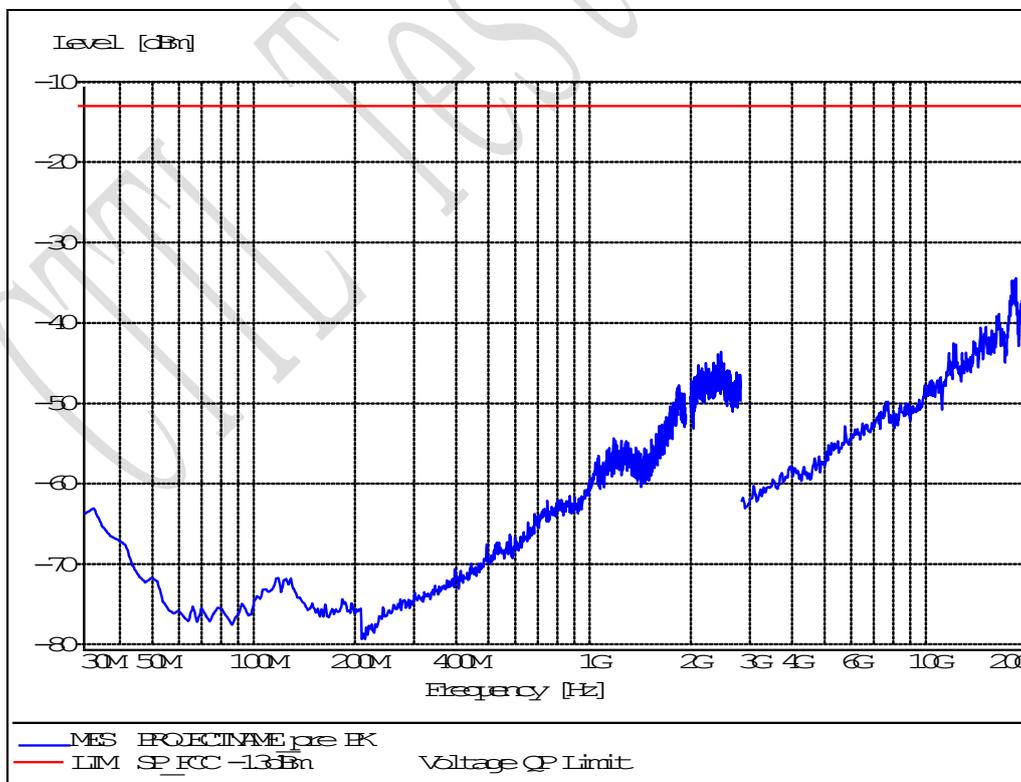
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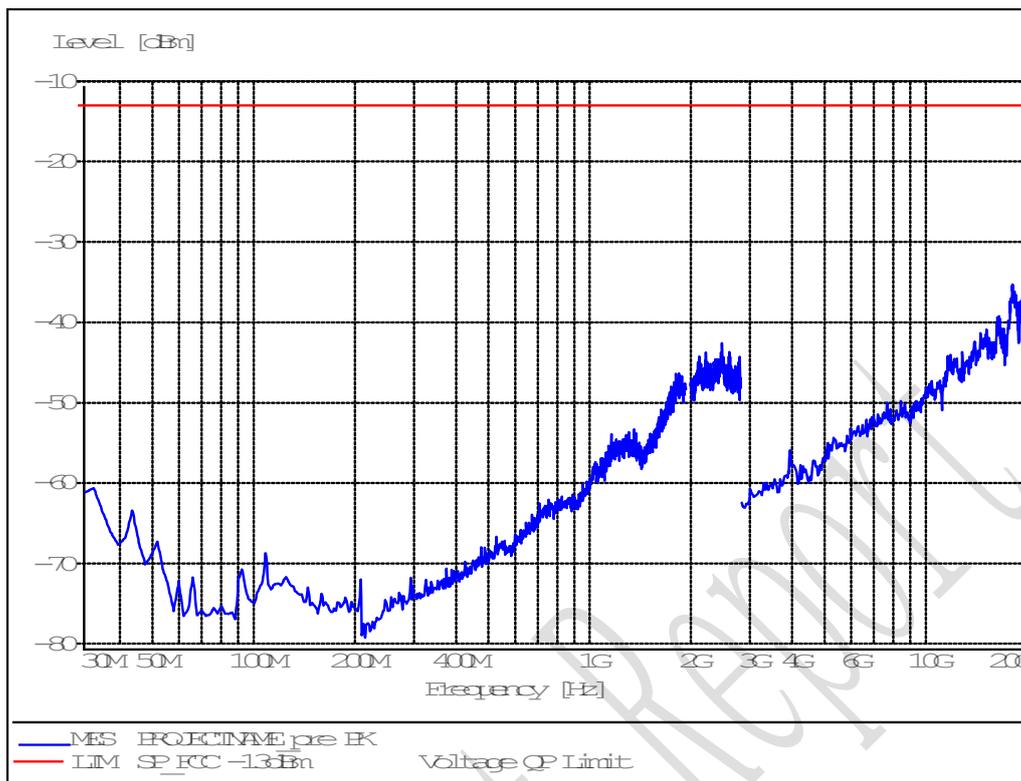
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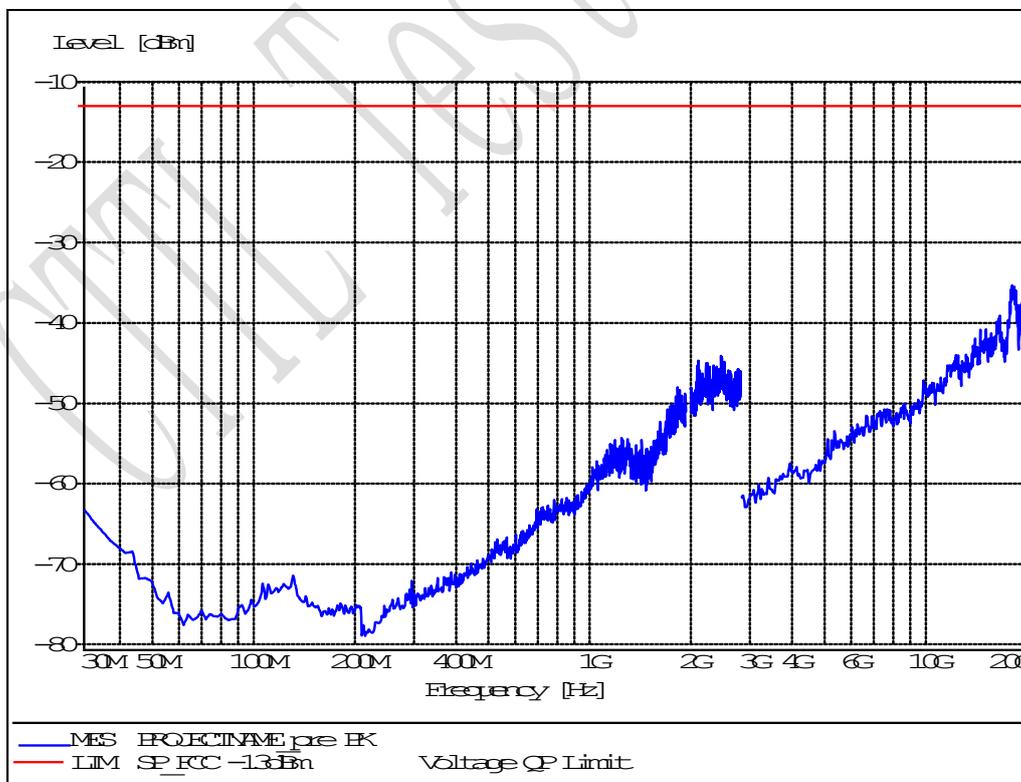
S9400VF for HSUPA FDD II mode



S9400HF for HSUPA FDD II mode



S9400VT for HSUPA FDD II mode



S9400HT for HSUPA FDD II mode

4.2 Radiated RF Power Output and ERP

Specifications:	2.1046, 24.232, 22.913(a), 27.50(d) (2)					
Date of Tests	2011-01-11 ~ 2011-01-20					
Test conditions:	Ambient Temperature: 15°C-35°C Relative Humidity: 30%-60% Air pressure: 86-106kPa					
Operation Mode	TX on, channel 128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 1312, 1412, 1513, 4132, 4175, 4233, 9262, 9400 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	Ultra Broadband Antenna	SCHWARZBECK	VULB 9160	vulb9160-3252	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	2011-04-01	Normal

Limit Level Construction:

(a) Radiated RF Power Output
According to Part 24.232(b), i.e., 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, so the limit level is 2 W or 33 dBm.

(b) ERP
According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, or 38.5 dBm.

(c) EIRP
According to Part 27.50(d)(2), Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to a peak EIRP of 1 watt, or 30 dBm.

Test Setup:

The EUT was set in an anechoic chamber, which is connected to the Wireless Communications Test Set located outside the chamber over the air. The test was done using an automated test system, where all test equipments were controlled by a computer.

Test Method:

The measurement was performed accordance with section 2.2.17 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

1 The maximum power was searched by turning the azimuth of the turntable, shifting the polarization of the measuring antenna and changing the pose of the EUT.

2 The measured levels are EIRP values corrected in the automated test system with the correction factors given by a substitution calibration made before the measurement. The calibration is made separately for vertical and horizontal polarization and the system uses different correction factors depending on the measuring antenna polarization.

3 The corrected maximum levels were reported for EIRP values, and ERP values can be calculated from EIRP values.

Note:

ERP dBm = EIRP dBm - 2.15dB.

ERP Value for GPRS 850 band mode:

ARFCN	Frequency [MHz]	ERP [dBm]
128	824.128	26.10
190	836.553	26.19
251	848.778	26.27

EIRP Value for GPRS 1900 band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
512	1850.581	20.96
661	1880.281	20.88
810	1909.980	21.19

ERP Value for EGPRS 850 band mode:

ARFCN	Frequency [MHz]	ERP [dBm]
128	824.128257	21.25
190	836.553106	22.12
251	848.777555	26.27

EIRP Value for EGPRS 1900 band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
512	1850.581	21.09
661	1880.361	21.21
810	1909.980	22.92

EIRP Value for HSDPA FDD IV band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
1312	1712.545	16.17
1412	1733.467	15.18
1513	1752.224	13.78

ERP Value for HSDPA FDD V band mode:

ARFCN	Frequency [MHz]	ERP [dBm]
4132	826.533	8.94
4175	834.148	11.22
4233	846.072	10.64

EIRP Value for HSDPA FDD II band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
9262	1851.783	16.14
9400	1881.362	14.45
9538	1908.777	15.15

EIRP Value for HSUPA FDD IV band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
1312	1711.824	9.85
1412	1733.467	10.32
1513	1751.503	9.85

ERP Value for HSUPA FDD V band mode:

ARFCN	Frequency [MHz]	ERP [dBm]
4132	827.034	10.72
4175	833.848	9.75
4233	847.475	9.20

EIRP Value for HSUPA FDD II band mode:

ARFCN	Frequency [MHz]	EIRP [dBm]
9262	1851.784	9.46
9400	1881.363	10.23
9538	1908.778	10.67

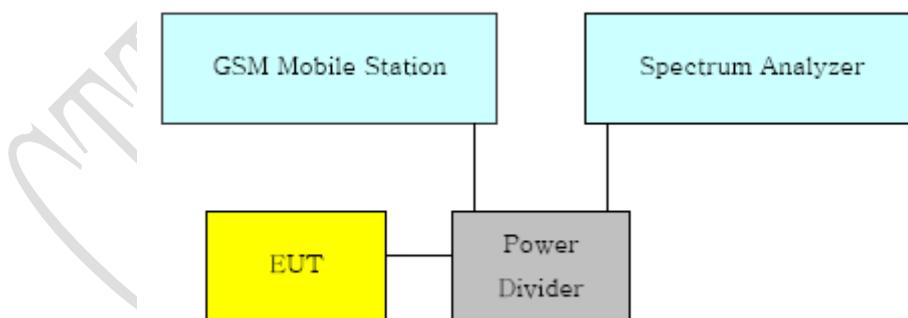
TTL Test Report

4.3 Occupied bandwidth

Specifications:	2.1049,22.917(b),24.238(b)					
Date of Test	2011-01-12~2011-01-17					
Test conditions:	Ambient Temperature: 15°C-35°C Relative Humidity: 30%-60% Air pressure: 86-106kPa					
Operation Mode	TX on, channel128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 1312, 1412, 1513, 4132, 4175, 4233, 9262, 9400 and 9538 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 splitter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-04-01	Normal

Test Setup:

During the process of testing, the EUT was controlled via Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by Aglient EMC Analyzer (E7405A)



Test Method

The 99% occupied bandwidth was calculated form the spectrum analyzer.

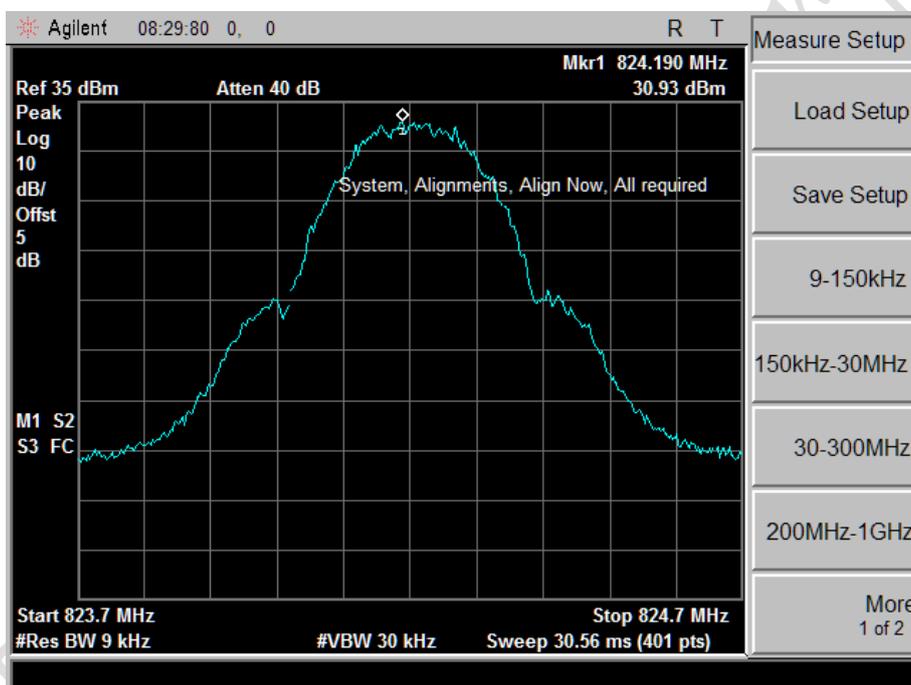
Note:

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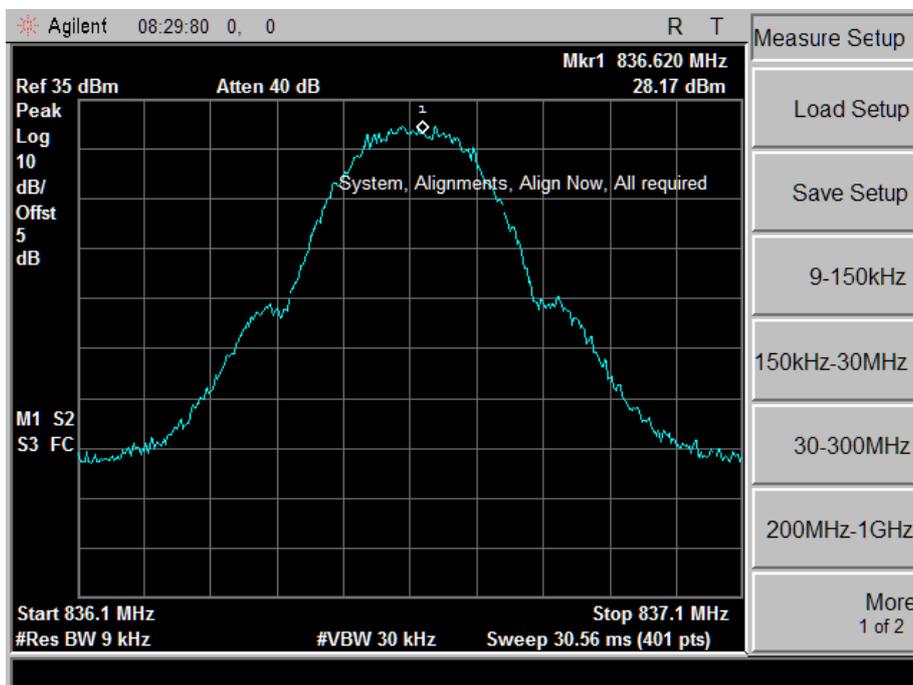
Results data of GRPS mode:

EUT channel	99% occupied bandwidth [kHz]
GPRS850 Channel 128	247.5
GPRS850 Channel 190	250.0
GPRS850 Channel 251	250.0
GPRS1900 Channel 512	250.0
GPRS1900 Channel 661	247.5
GPRS1900 Channel 810	247.5

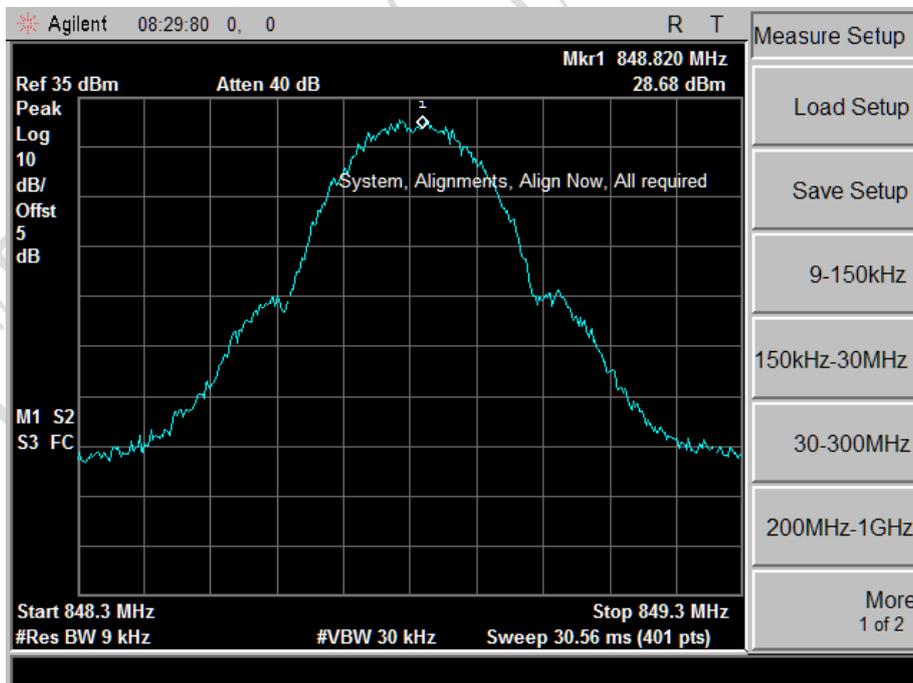
Graphical results for GPRS mode:



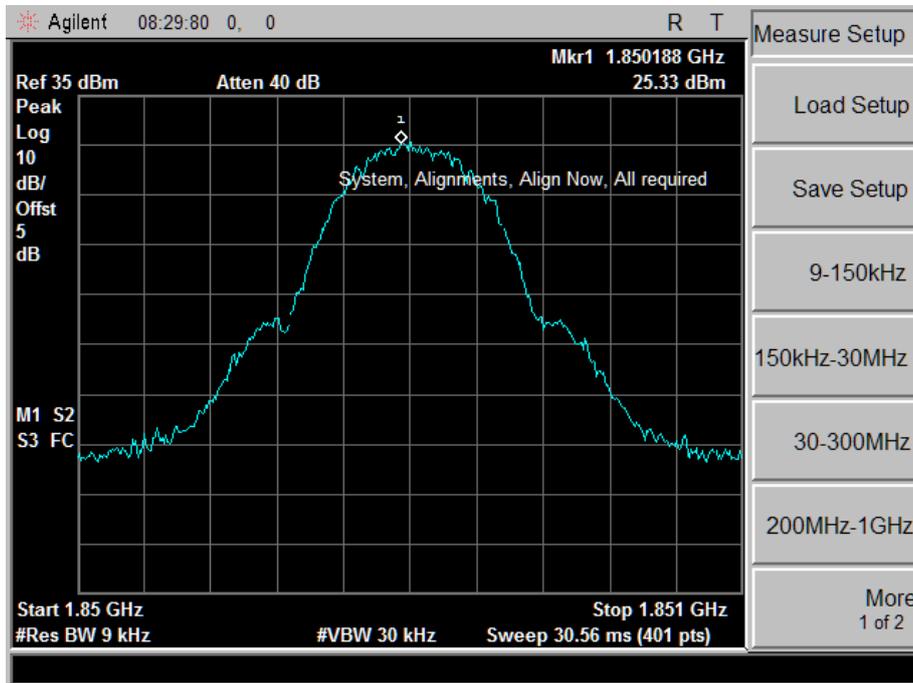
GPRS850 Channel 128



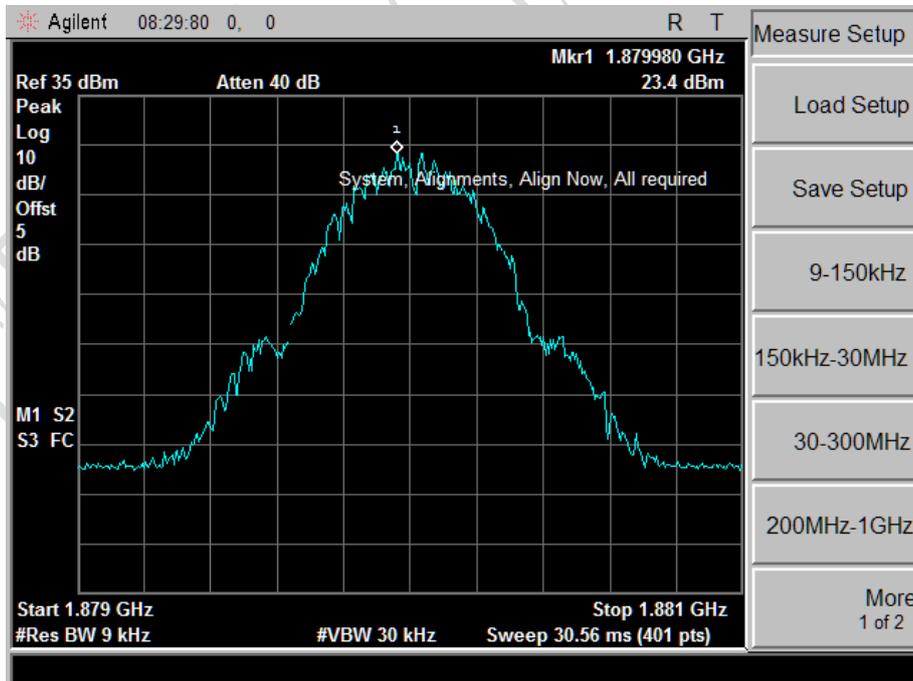
GPRS850 Channel 190



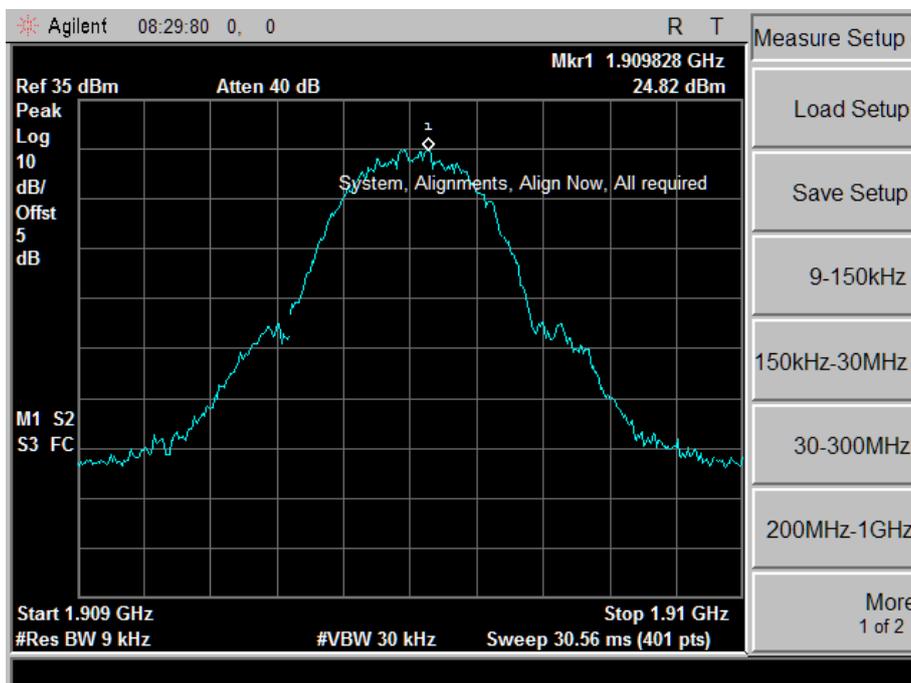
GPRS 850 Channel 251



GPRS1900 Channel 512



GPRS1900 Channel 661

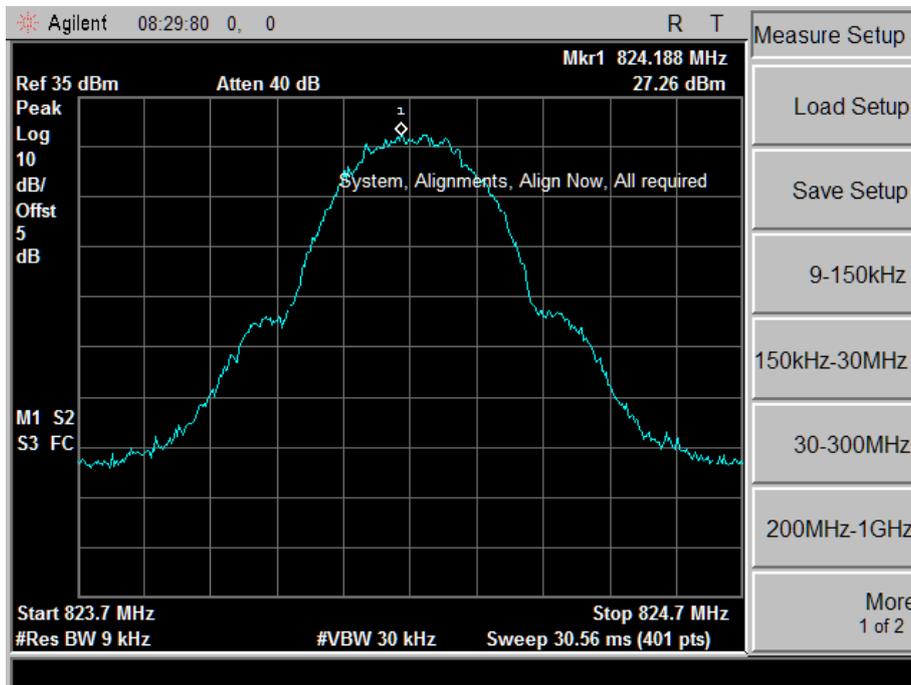


GPRS1900 Channel 810

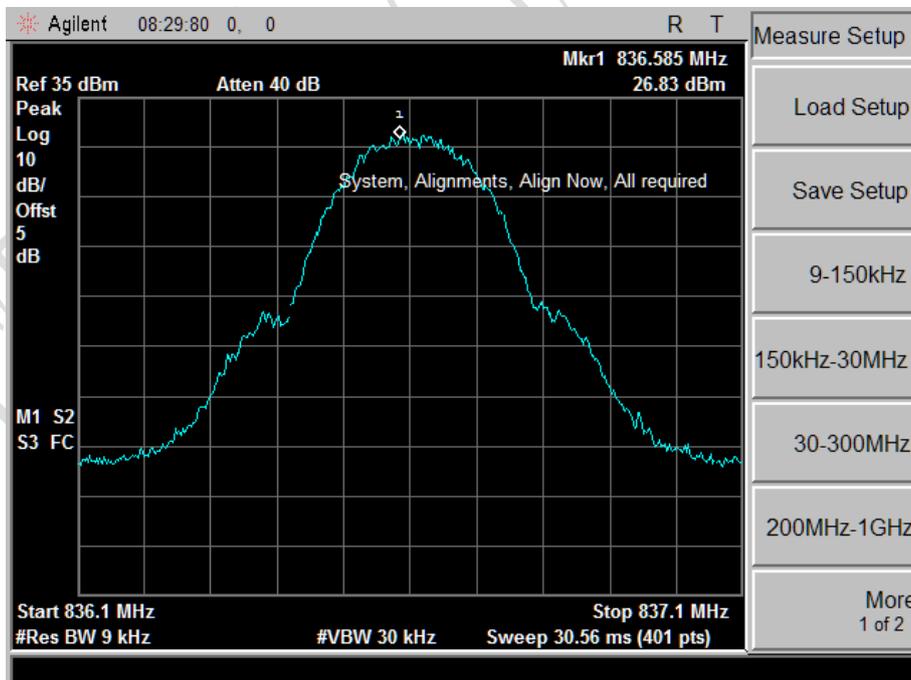
Results data of EGPRS mode:

EUT channel	99% occupied bandwidth [kHz]
EGPRS850 Channel 128	252.5
EGPRS850 Channel 190	250.0
EGPRS850 Channel 251	250.0
EGPRS1900 Channel 512	250.0
EGPRS1900 Channel 661	247.5
EGPRS1900 Channel 810	247.5

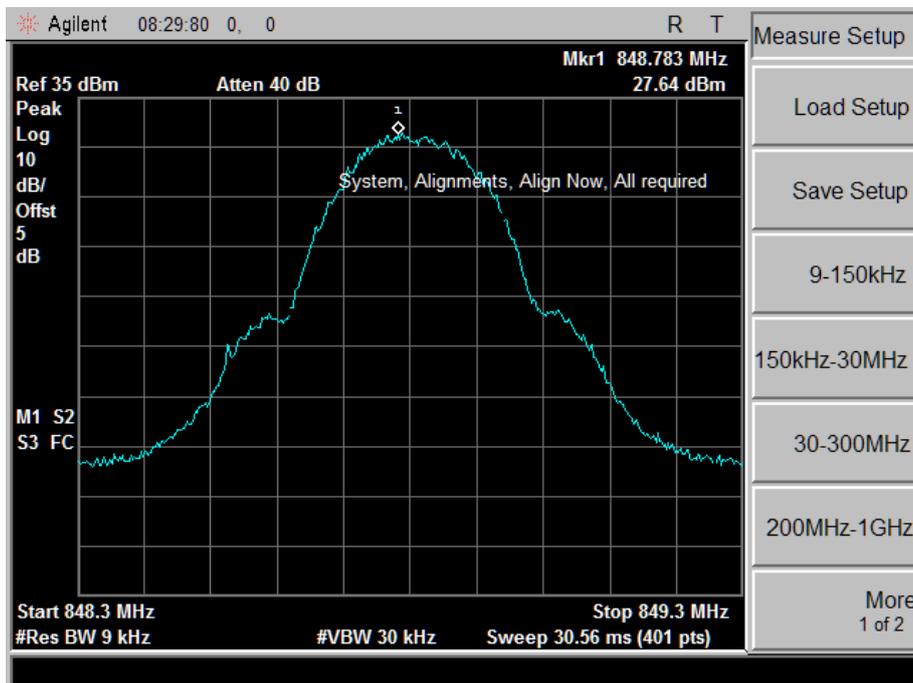
Graphical results for EGPRS mode:



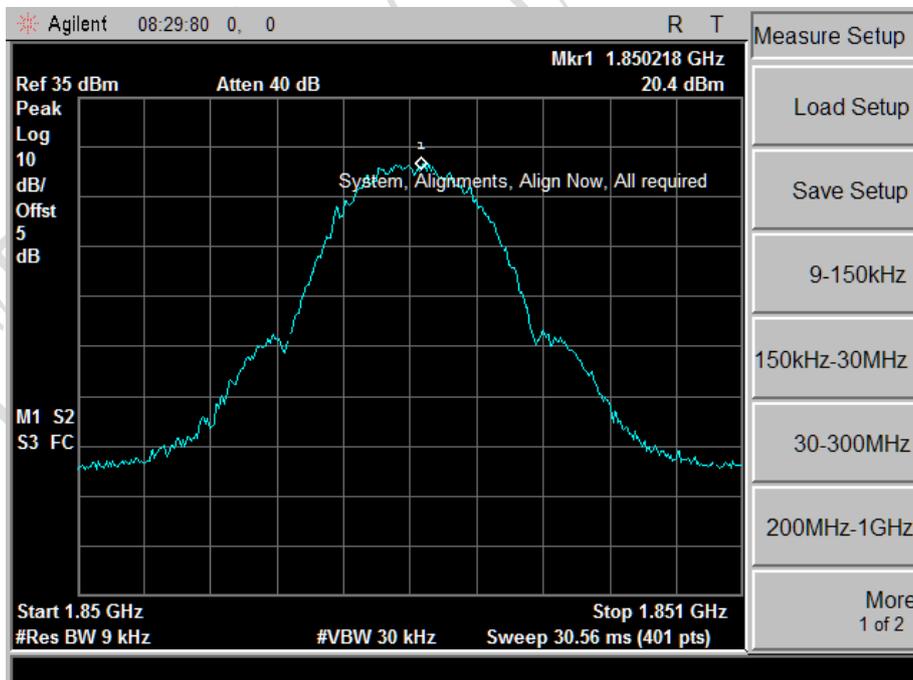
EGPRS850 Channel 128



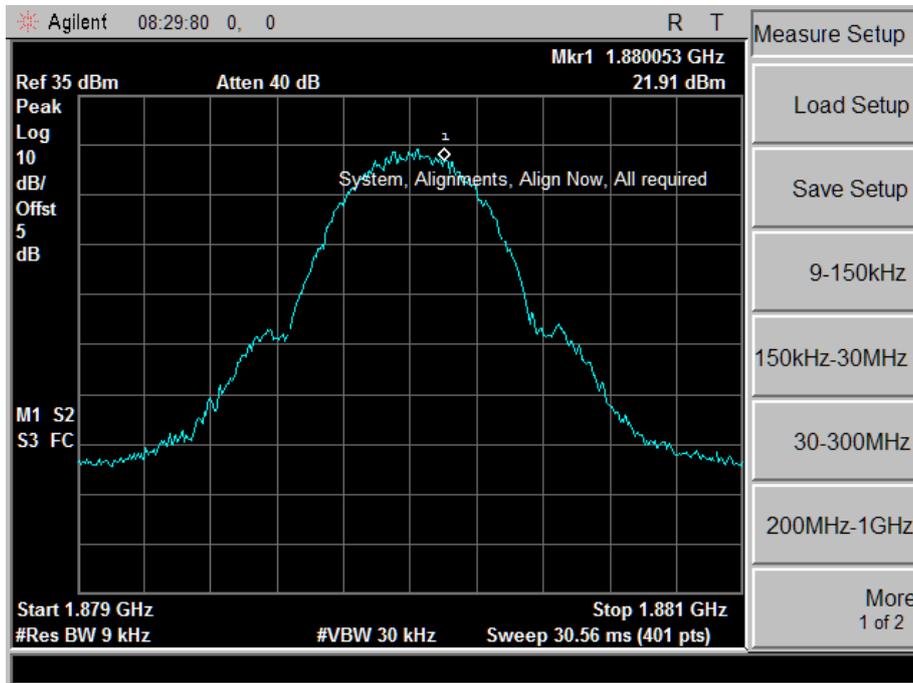
EGPRS850 Channel 190



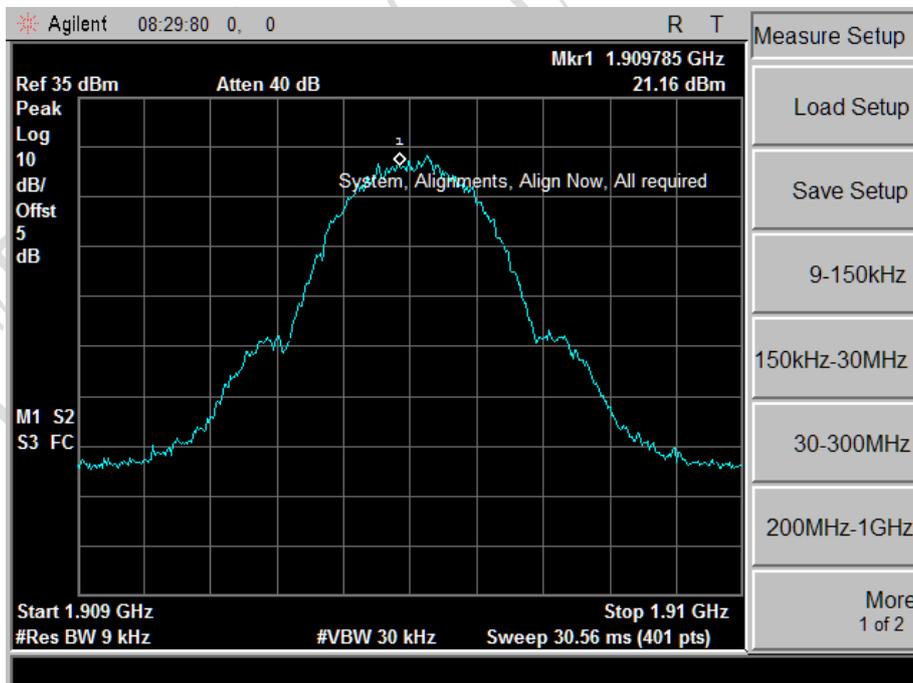
EGPRS850 Channel 251



EGPRS1900 Channel 512



EGPRS1900 Channel 661

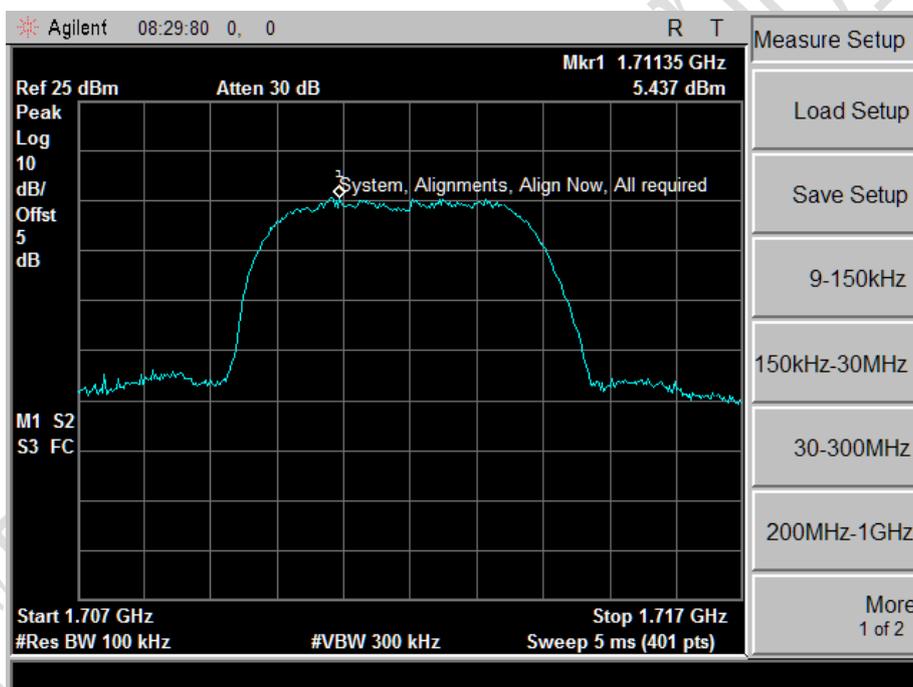


EGPRS1900 Channel 810

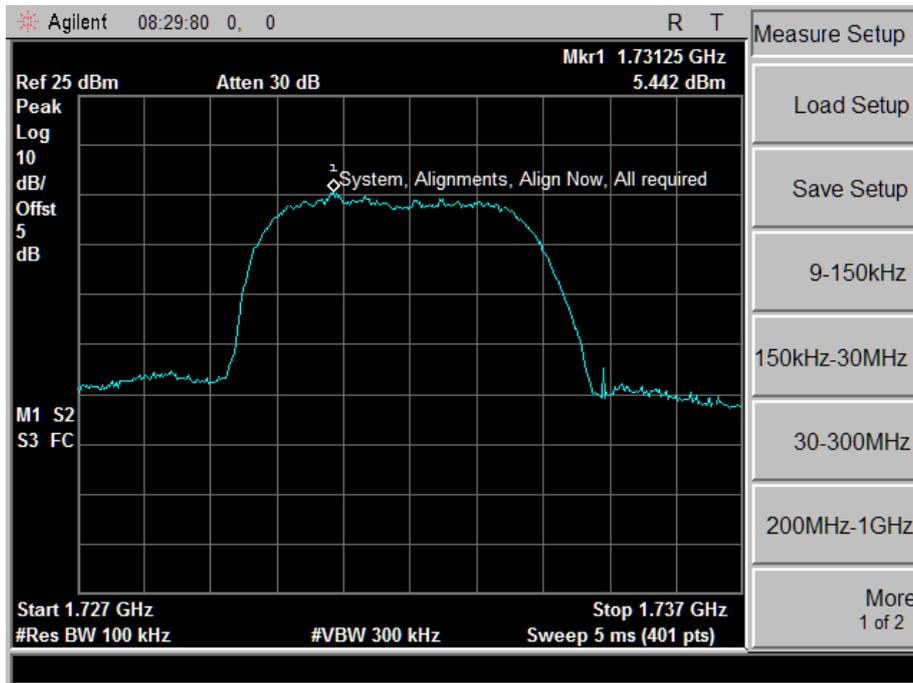
4.3.3 Results for HSDPA mode:

EUT channel	99% occupied bandwidth [kHz]
FDD IV Channel 1312	4275.0
FDD IV Channel 1412	4250.0
FDD IV Channel 1513	4275.0
FDD V Channel 4132	4275.0
FDD V Channel 4175	4250.0
FDD V Channel 4233	4250.0
FDD II Channel 9262	4250.0
FDD II Channel 9400	4275.0
FDD II Channel 9538	4275.0

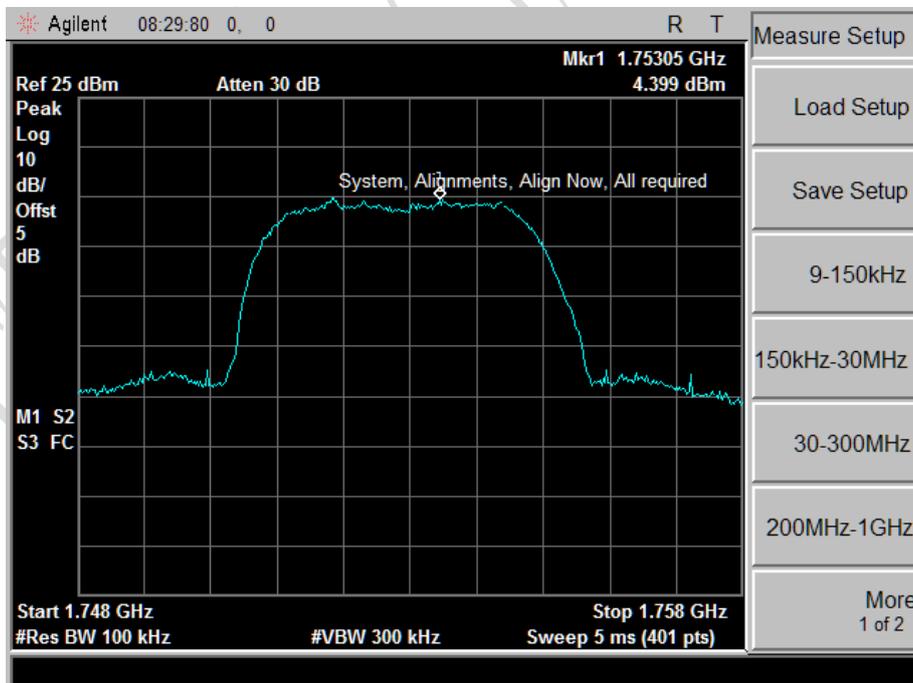
Graphical results for HSDPA mode:



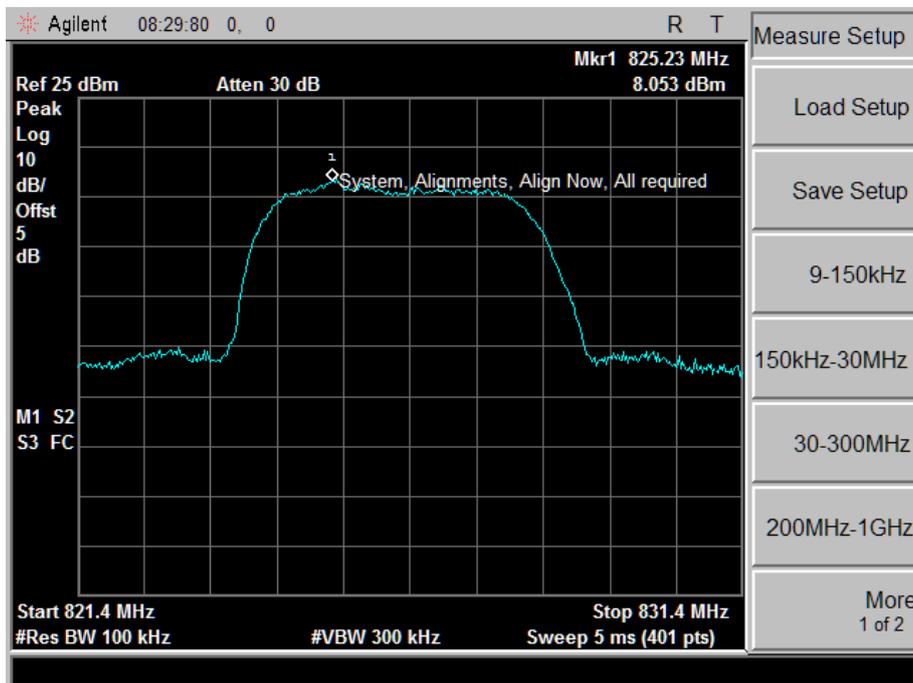
FDD IV Channel 1312



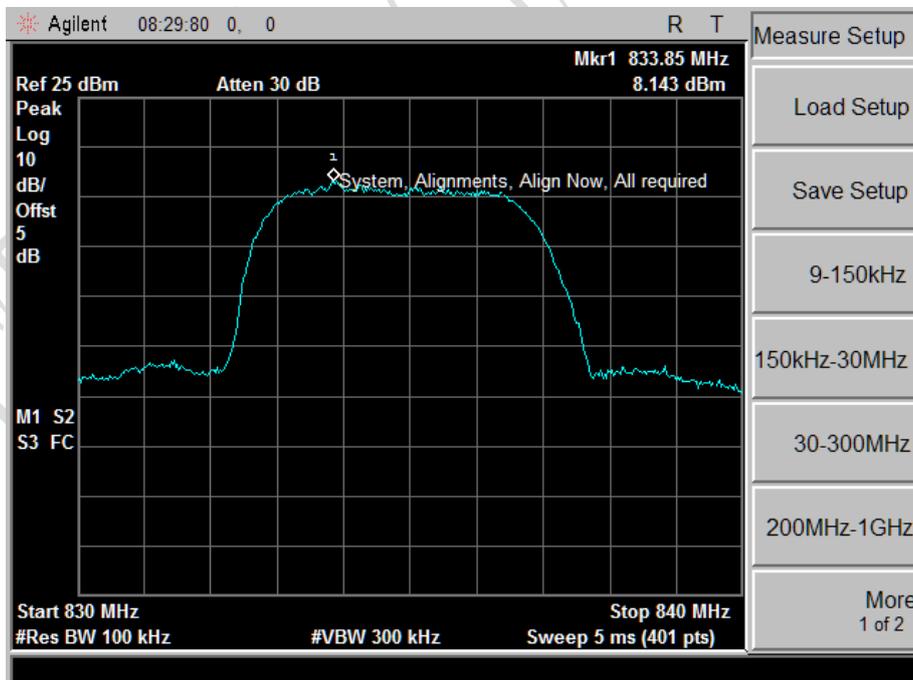
FDD IV Channel 1412



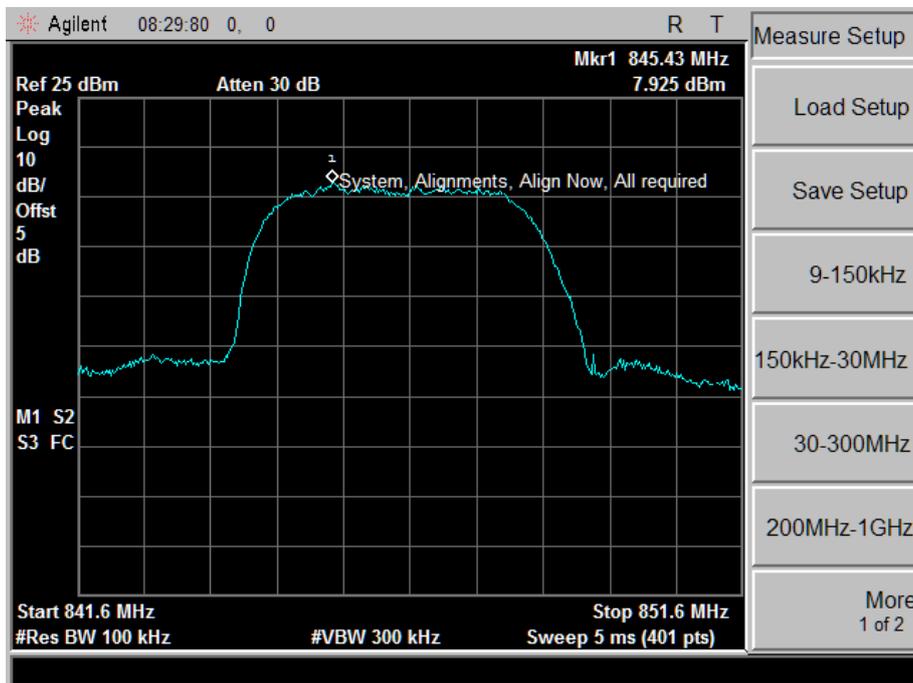
FDD IV Channel 1513



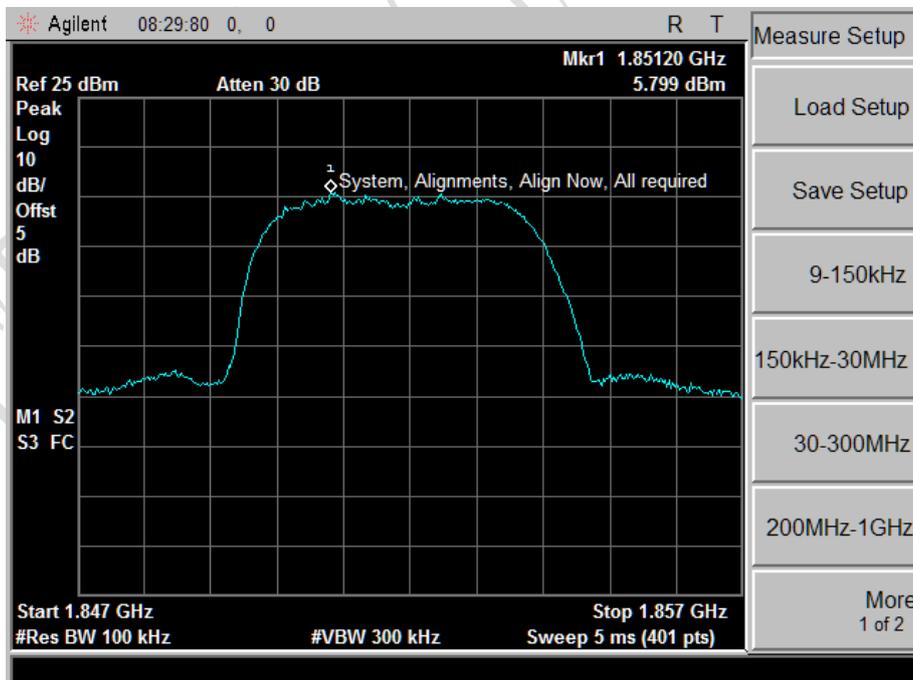
FDD V Channel 4132



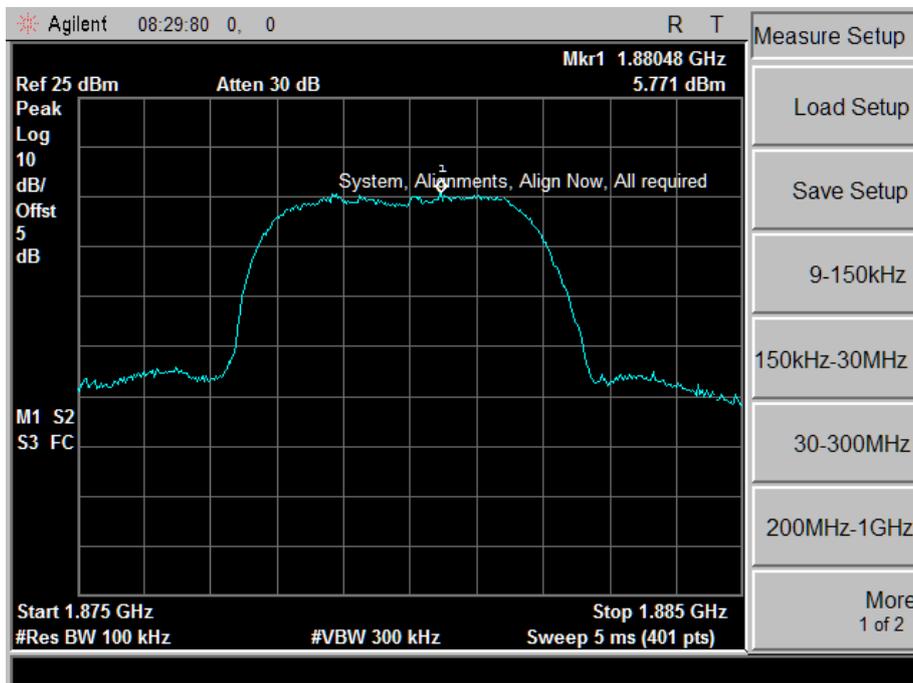
FDD V Channel 4175



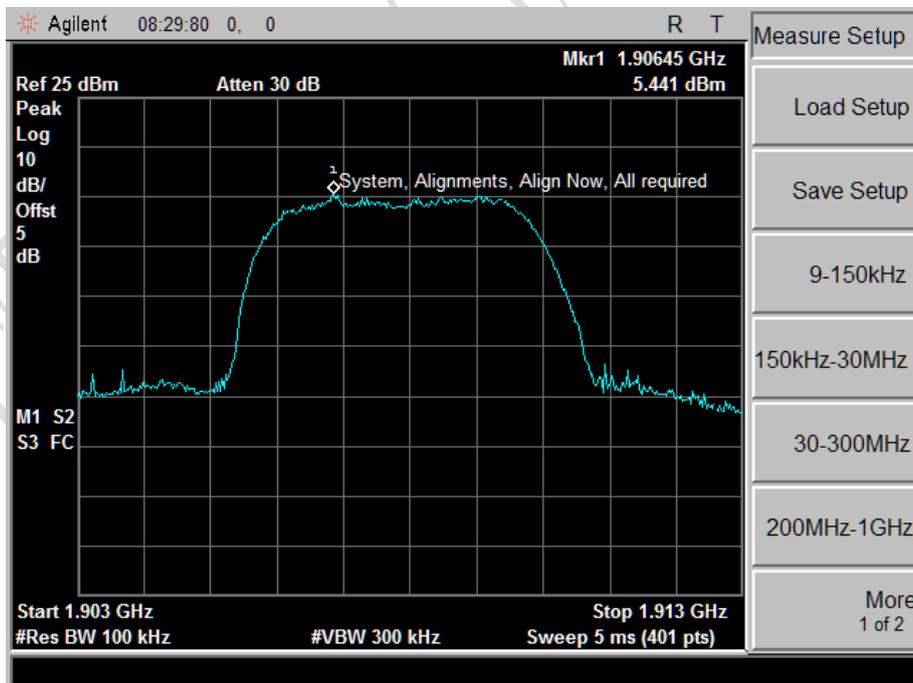
FDD V Channel 4233



FDD II Channel 9262



FDD II Channel 9400

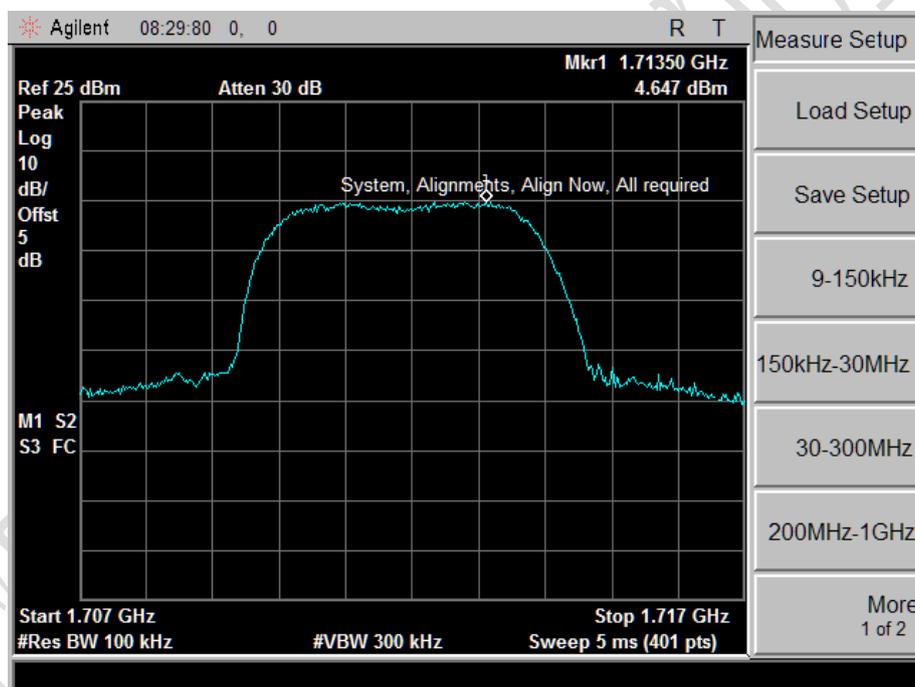


FDD II Channel 9538

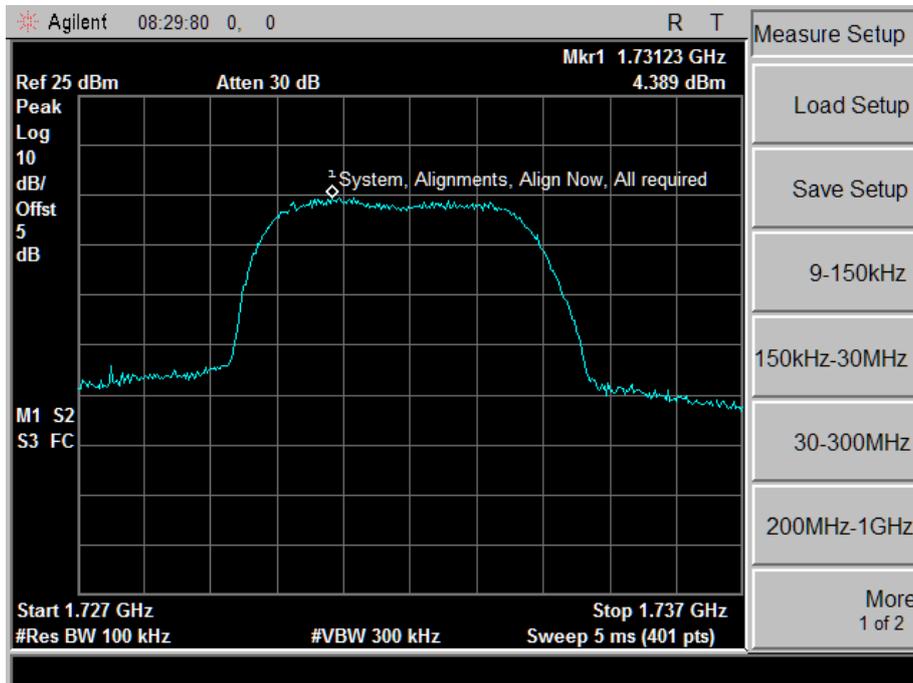
Results data of HSUPA mode:

EUT channel	99% occupied bandwidth [MHz]
FDD IV Channel 1312	4275.0
FDD IV Channel 1412	4300.0
FDD IV Channel 1513	4275.0
FDD V Channel 4132	4275.0
FDD V Channel 4175	4275.0
FDD V Channel 4233	4250.0
FDD II Channel 9262	4275.0
FDD II Channel 9400	4275.0
FDD II Channel 9538	4275.0

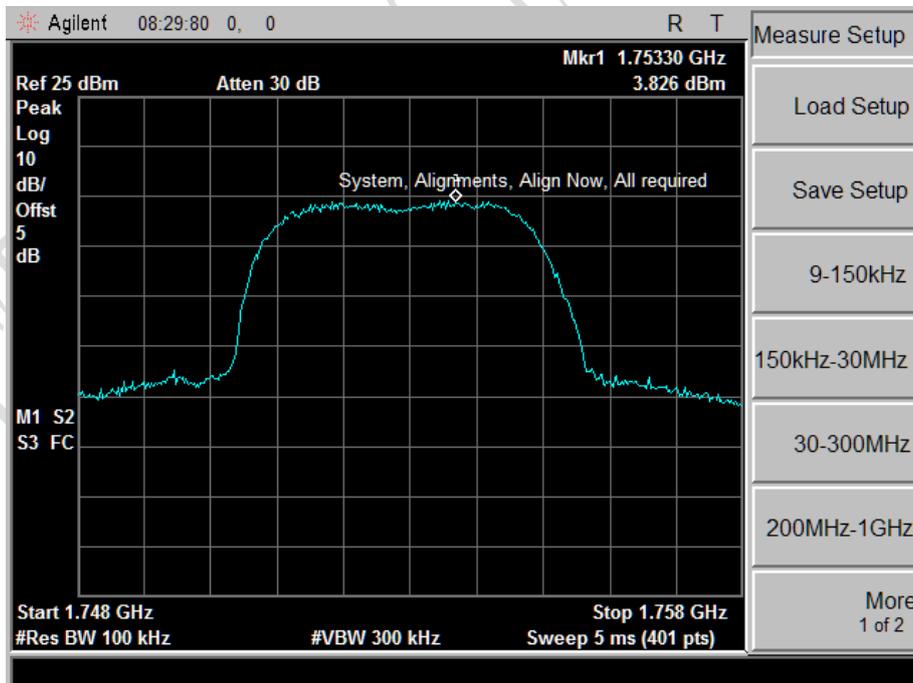
Graphical results for HSUPA mode:



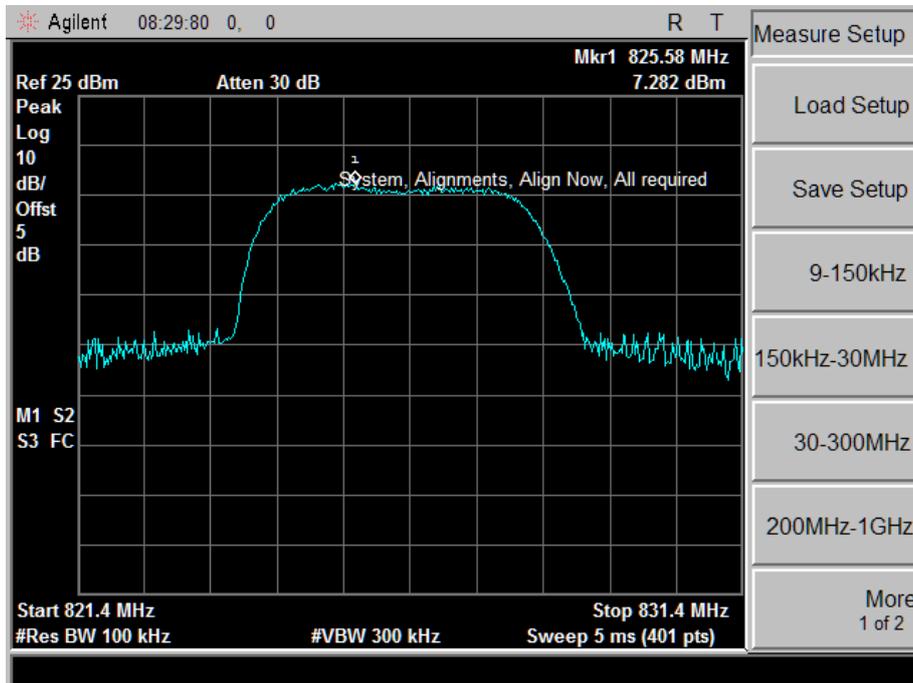
FDD IV Channel1312



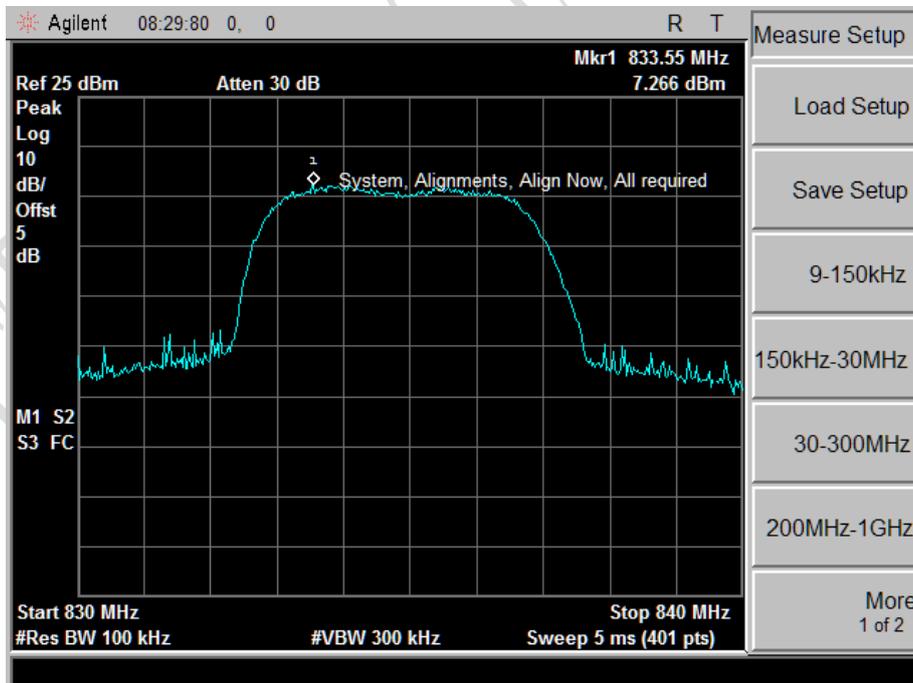
FDD IV Channel1412



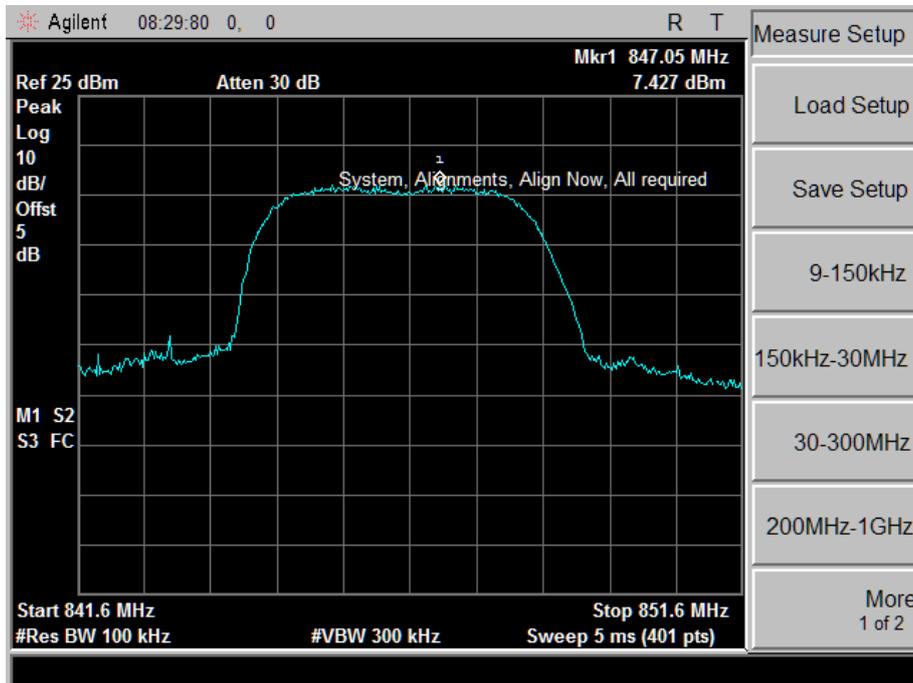
FDD IV Channel1513



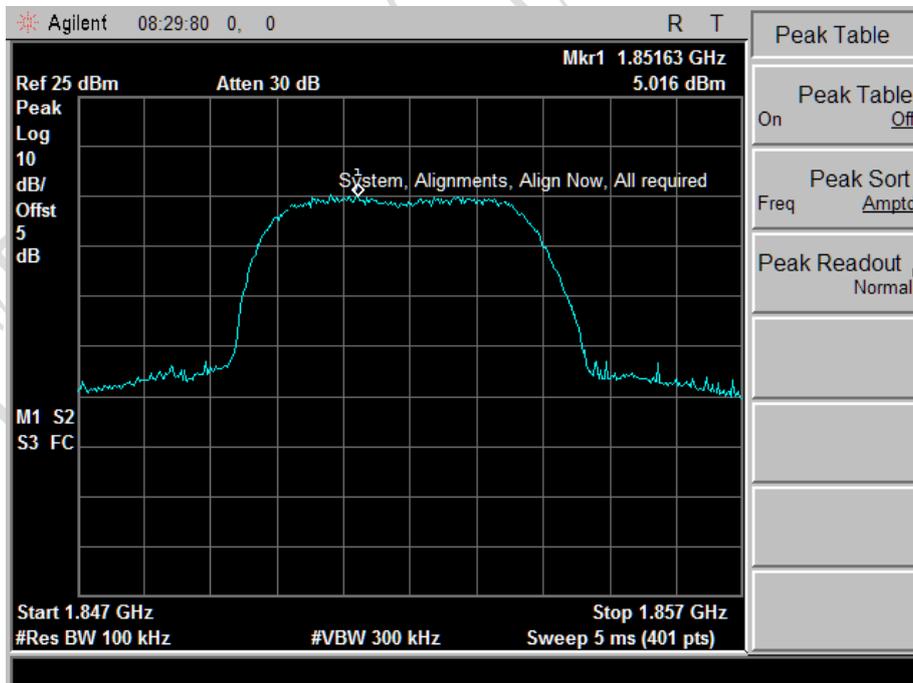
FDD V Channel 4132



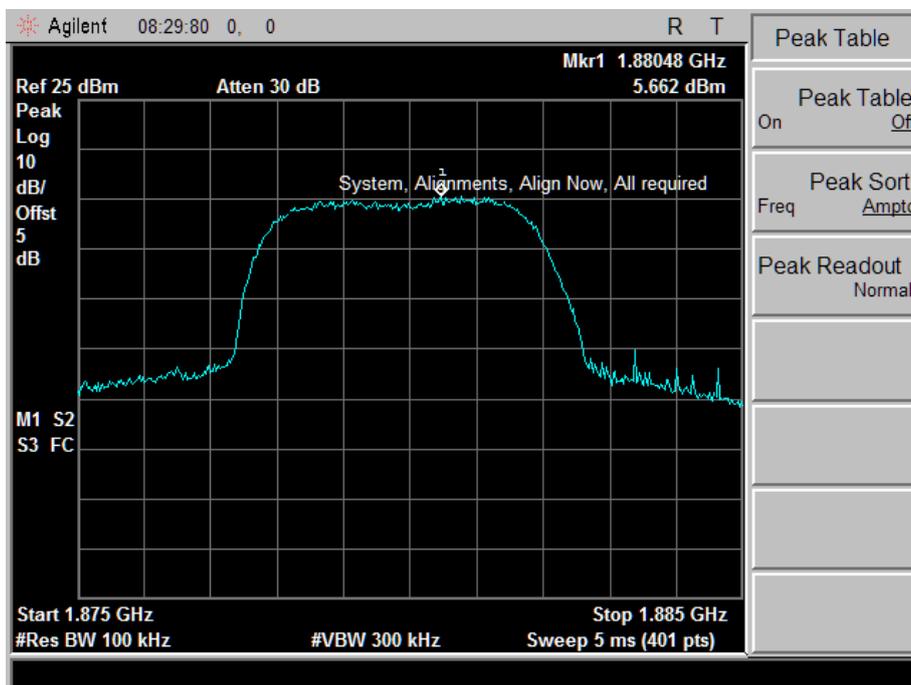
FDD V Channel 4175



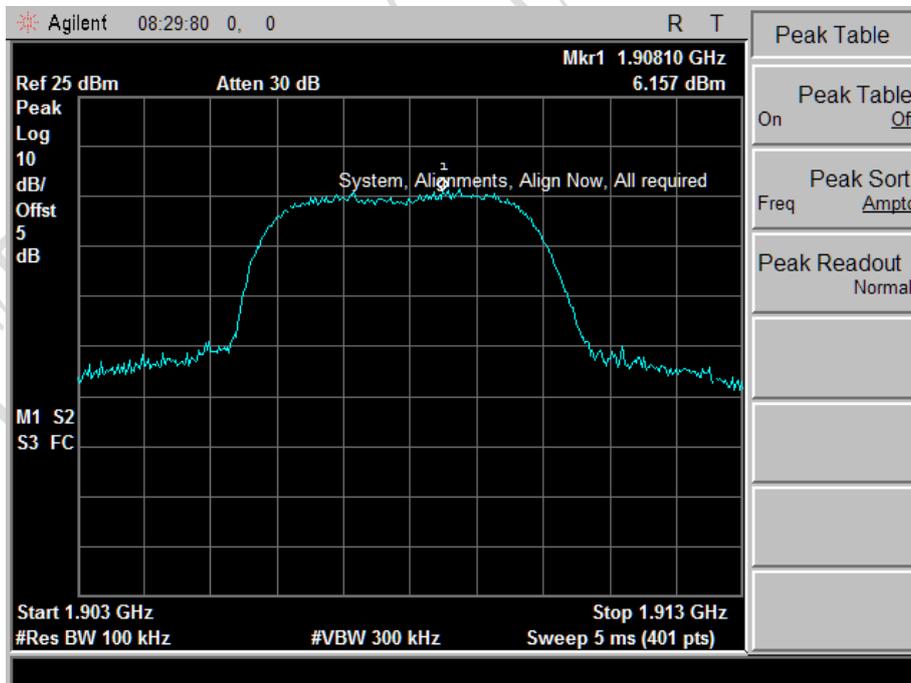
FDD V Channel 4233



FDD II Channel 9262



FDD II Channel 9400



FDD II Channel 9538

4.4 Frequency Stability over Temperature Variation

Specifications:	2.1055,22.355,24.235, 27.54					
Date of Test	2011-01-19					
Test conditions:	Ambient Temperature: -30°C-50°C 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 1412, 4175 and 9400 for HSPA FDD IV, V and II 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	2011-04-01	Normal
561	Temperature Chamber	Terchy Environmental Technology LTD.	MHU-800SR	84121202	2013-01-06	Normal
Limit						
Frequency deviation [ppm]	±2.5(*Note)					
Note: for part 27.54, the requirement is: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.						

Test Setup:

The EUT was placed in a temperature chamber, demonstrated as figure T. The wireless communications test set (test simulator) was used to set the TX channel and power levels, modulate the TX signal with different bit patterns and measure the frequency of TX.

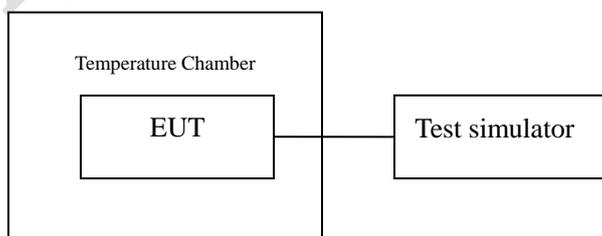


Figure T: setup for measurement of frequency stability over temperature variation

Test Method:

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30°C 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 Simulator.
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°C, -10°C, 0°C, 10°C, 20°C, 30°C, 40°C and 50°C.

Test results data for GPRS mode:

GPRS850 Channel 190: Compliance windows: +/-2091.5Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-54	Pass
-20	-27	Pass
-10	-48	Pass
0	-80	Pass
10	-38	Pass
20	-29	Pass
30	-46	Pass
40	-52	Pass
50	-74	Pass

GPRS1900 Channel 661: Compliance windows: +/-4700Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-107	Pass
-20	-60	Pass
-10	-40	Pass
0	-31	Pass
10	-18	Pass
20	-23	Pass
30	-17	Pass
40	-28	Pass
50	-19	Pass

Test results data for EGPRS mode:

EGPRS850 Channel 190: Compliance windows: +/-2091.5Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	50	Pass
-20	30	Pass
-10	-20	Pass
0	-67	Pass
10	-20	Pass
20	10	Pass
30	-12	Pass
40	21	Pass
50	12	Pass

EGPRS1900 Channel 661: Compliance windows: +/-4700Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	41	Pass
-20	30	Pass
-10	32	Pass
0	26	Pass
10	23	Pass
20	30	Pass
30	28	Pass
40	32	Pass
50	46	Pass

Test results data for HSDPA mode:

FDD IV Channel 1412: Compliance windows: +/-4331Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	22	Pass
-20	18	Pass
-10	-10	Pass
0	-21	Pass
10	-23	Pass
20	-16	Pass
30	-27	Pass
40	-30	Pass
50	-22	Pass

FDD V Channel 4175: Compliance windows: +/-2087.5Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-12	Pass
-20	-18	Pass
-10	20	Pass
0	16	Pass
10	28	Pass
20	13	Pass
30	21	Pass
40	-12	Pass
50	-18	Pass

FDD II Channel 9400: Compliance windows: +/-4700Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-39	Pass
-20	-18	Pass
-10	-20	Pass
0	-25	Pass
10	-15	Pass
20	-23	Pass
30	-17	Pass
40	-26	Pass
50	-24	Pass

Test results data for HSUPA mode:

FDD IV Channel 1412: Compliance windows: +/-4331Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-30	Pass
-20	-32	Pass
-10	-18	Pass
0	-20	Pass
10	-14	Pass
20	-21	Pass
30	-18	Pass
40	27	Pass
50	29	Pass

FDD V Channel 4175: Compliance windows: +/-2087.5Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-19	Pass
-20	10	Pass
-10	18	Pass
0	14	Pass
10	19	Pass
20	22	Pass
30	-13	Pass
40	-21	Pass
50	-16	Pass

FDD II Channel 9400: Compliance windows: +/-4700Hz

Temperature[°C]	Deviation[Hz]	Remarks
-30	-27	Pass
-20	-18	Pass
-10	-26	Pass
0	-24	Pass
10	-11	Pass
20	-18	Pass
30	-21	Pass
40	-37	Pass
50	-31	Pass

4.5 Frequency Stability over Voltage Variation

Specifications:	2.1055,22.355,24.235, 27.54					
Date of Test	2011-01-19					
Test conditions:	Ambient Temperature: 15°C-35°C 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 1412, 4175 and 9400 for HSPA FDD IV, V and II 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	2011-04-01	Normal
7982	DC Power Source	4NIC	DH1715A-3	004224	--	Normal
Limit						
Frequency deviation [ppm]	±2.5(*Note)					
Note: for part 27.54, the requirement is: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.						

Test Setup:

The EUT was placed in a shielding chamber and powered by the dummy battery which is connected to a DC power source, demonstrated as figure V. The wireless communications 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.

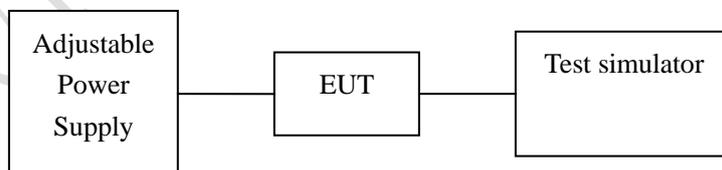


Figure V: test setup for measurement of frequency stability over voltage variation

Test Results data for GPRS mode:

GPRS850 Channel 190: Compliance windows: +/-2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-7	Pass
Cut-off point	3.5	-52	Pass

GPRS1900 Channel 661: Compliance windows: +/-4700Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	8	Pass
Cut-off point	3.5	24	Pass

Test Results data for EGPRS mode:

EGPRS850 Channel 190: Compliance windows: +/-2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	20	Pass
Cut-off point	3.5	29	Pass

EGPRS1900 Channel 661: Compliance windows: +/-4700Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	50	Pass
Cut-off point	3.5	60	Pass

Test Results data for HSDPA mode:

FDD IV Channel 1412: Compliance windows: +/-4331Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	21	Pass
Cut-off point	3.5	22	Pass

FDD V Channel 4175: Compliance windows: +/-2087.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-24	Pass
Cut-off point	3.5	-19	Pass

FDD II Channel 9400: Compliance windows: +/-4700Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-26	Pass
Cut-off point	3.5	-24	Pass

Test Results data for HSUPA mode:

FDD IV Channel 1412: Compliance windows: +/-4331Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-29	Pass
Cut-off point	3.5	-26	Pass

FDD V Channel 4175: Compliance windows: +/-2087.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-17	Pass
Cut-off point	3.5	-15	Pass

FDD II Channel 9400: Compliance windows: +/-4700Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	5	-25	Pass
Cut-off point	3.5	-19	Pass

4.6 Conducted RF Power Output

Specifications:	2.1046,22.913(a),24.232(c), 27.50(d)(2)					
Date of Tests	2011-01-12~2011-01-17					
Test conditions:	Ambient Temperature: 15°C-35°C Relative Humidity: 30%-60% Air pressure: 86-106kPa					
Operation Mode	TX on, channel128, 190, 251, 512, 661 and 810 for GPRS and EGPRS; channel 1312, 1412, 1513, 4132, 4175, 4233, 9262, 9400 and 9538 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 splitter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-04-01	Normal

Limit Level Construction:

(a) Radiated RF Power Output

According to Part 24.232(b), i.e., 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, so the limit level is 2 W or 33 dBm.

(b) ERP

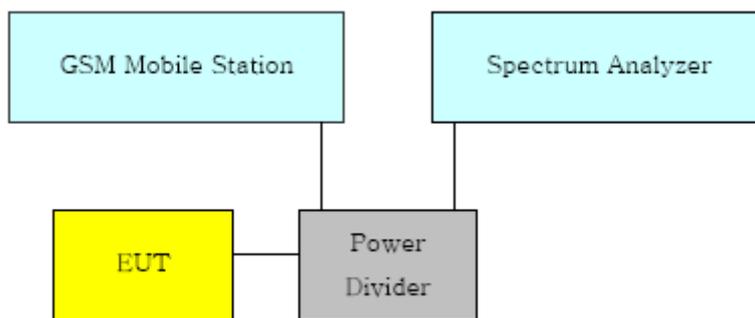
According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, or 38.5 dBm.

(c) EIRP

According to Part 27.50(d)(2), Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to a peak EIRP of 1 watt, or 30 dBm.

Test Setup:

During the process of testing, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by Agilent EMC Analyzer (E7405A).



Test Method:

- 1) The EUT was coupled to the EMC Analyzer mode and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. 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: --

Test Results for GPRS mode:

ARFCN	Peak output power 2 slot [dBm]
GPRS850 Channel 128	31.22
GPRS850 Channel 190	31.40
GPRS850 Channel 251	31.05
GPRS1900 Channel 512	25.84
GPRS1900 Channel 661	26.52
GPRS1900 Channel 810	25.40

Test Results for EGPRS mode:

ARFCN	Peak output power 4 slot [dBm]
EGPRS850 Channel 128	26.71
EGPRS850 Channel 190	27.04
EGPRS850 Channel 251	27.02
EGPRS1900 Channel 512	20.92

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EGPRS1900 Channel 661	22.09
EGPRS1900 Channel 810	21.26

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Test Results for HSDPA mode:

ARFCN	Peak output power [dBm] – HSDPA(Sub-test1)
FDD IV Channel 1312	28.15
FDD IV Channel 1412	27.16
FDD IV Channel 1513	27.83
FDD V Channel 4132	30.55
FDD V Channel 4175	30.20
FDD V Channel 4233	30.50
FDD II Channel 9262	28.12
FDD II Channel 9400	28.49
FDD II Channel 9538	28.14

Test Results for HSUPA mode:

ARFCN	Peak output power [dBm] – HSUPA(Sub-test5)
FDD IV Channel 1312	29.05
FDD IV Channel 1412	27.95
FDD IV Channel 1513	28.70
FDD V Channel 4132	31.40
FDD V Channel 4175	31.11
FDD V Channel 4233	31.31
FDD II Channel 9262	29.12
FDD II Channel 9400	29.35
FDD II Channel 9538	29.33

4.7 Conducted Spurious Emission

Specifications:	2.1051,22.917,24.238, 27.53(h)					
Date of Tests	2011-01-12~2011-01-17					
Test conditions:	Ambient Temperature: 15°C-35°C 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 1412, 4175 and 9400 for HSPA FDD IV, V and II 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 splitter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-04-01	Normal

Limit Level Construction:

Part 22:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 24:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 27:

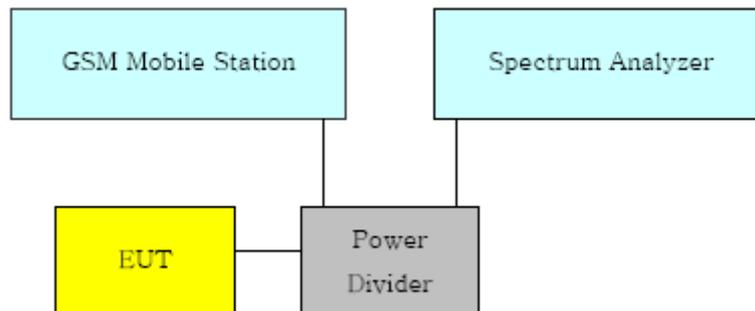
According to Part 27.53(h), i.e., for operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB, so the limit level is:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

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

Test Setup:

During the process of testing, the EUT was controlled via Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by Aglient EMC Analyzer (E7405A).

**Test Method:**

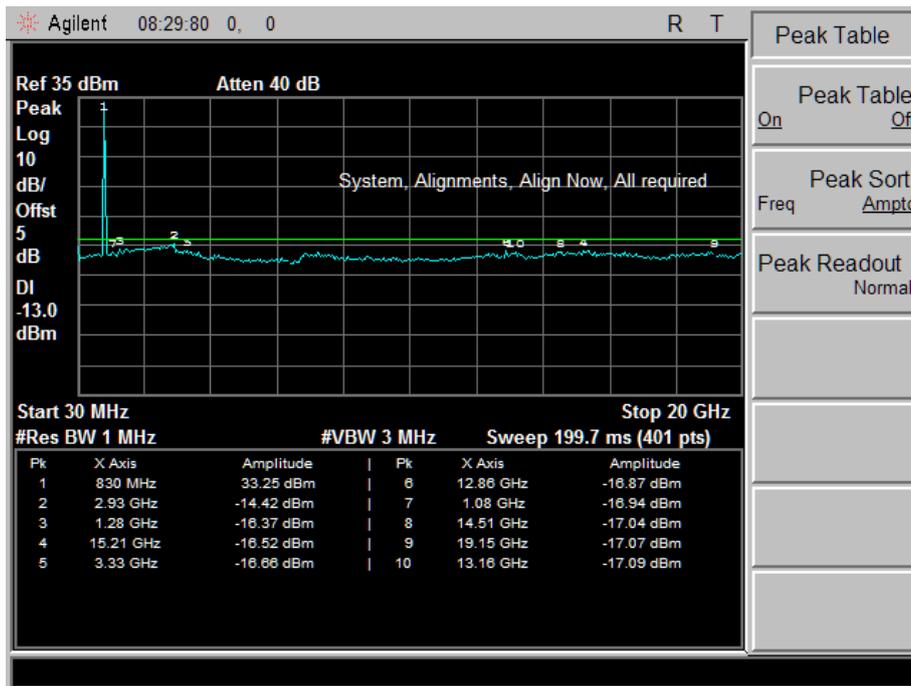
The measurement was performed accordance with section 2.2.13 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

The following steps outline the procedure used to measure the conducted emissions from the EUT.

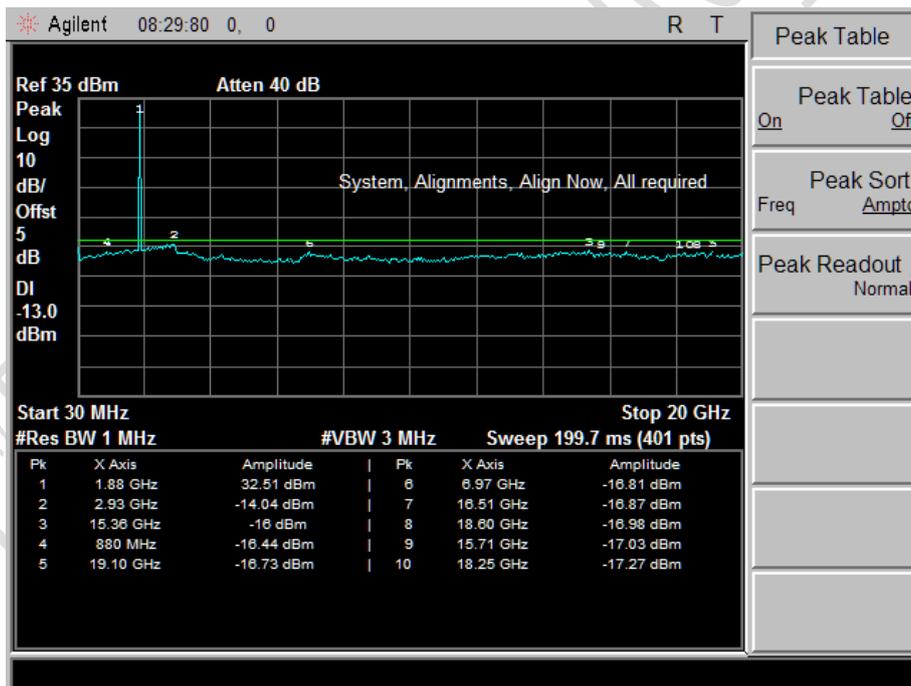
1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment under test, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

Note: --

Graphical results for GPRS mode:

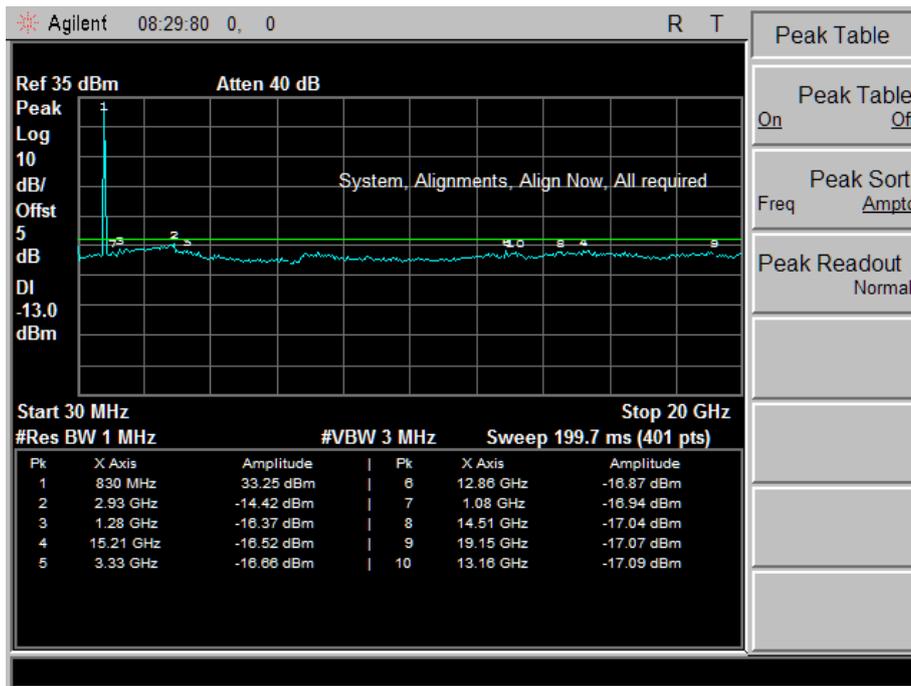


GPRS850 Channel 190

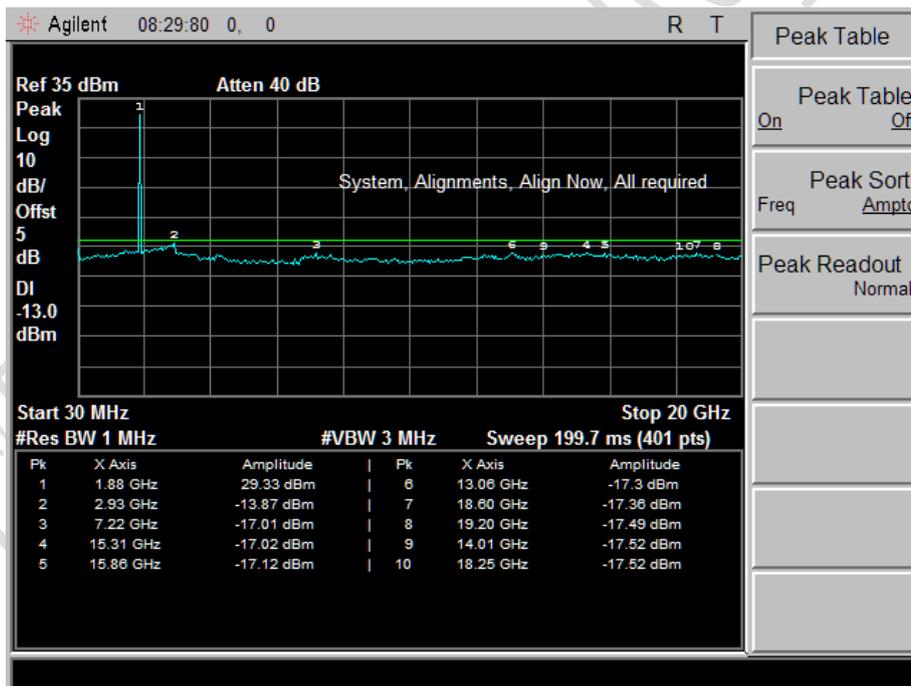


GPRS1900 Channel 661

Graphical results for EGPRS mode:

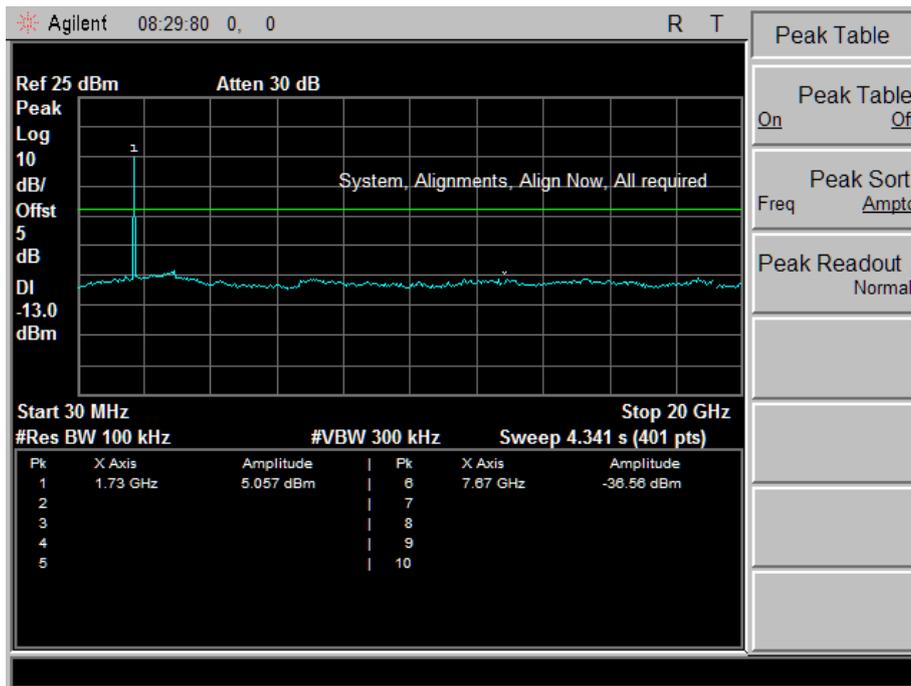


EGPRS850 Channel 190



EGPRS1900 Channel 661

Graphical results for HSDPA mode:



FDD IV Channel 1412

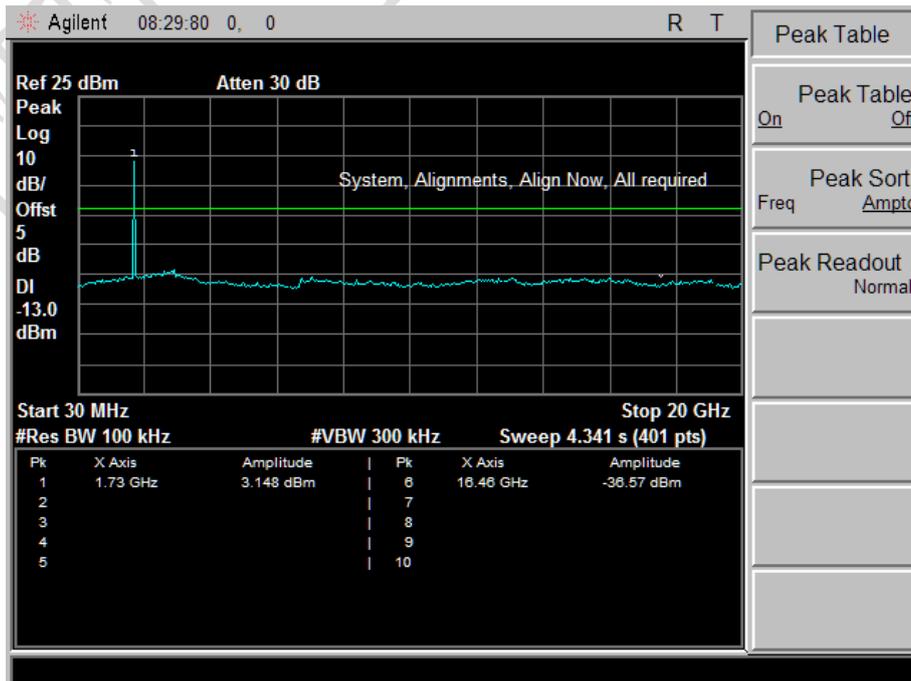


FDD V Channel 4175

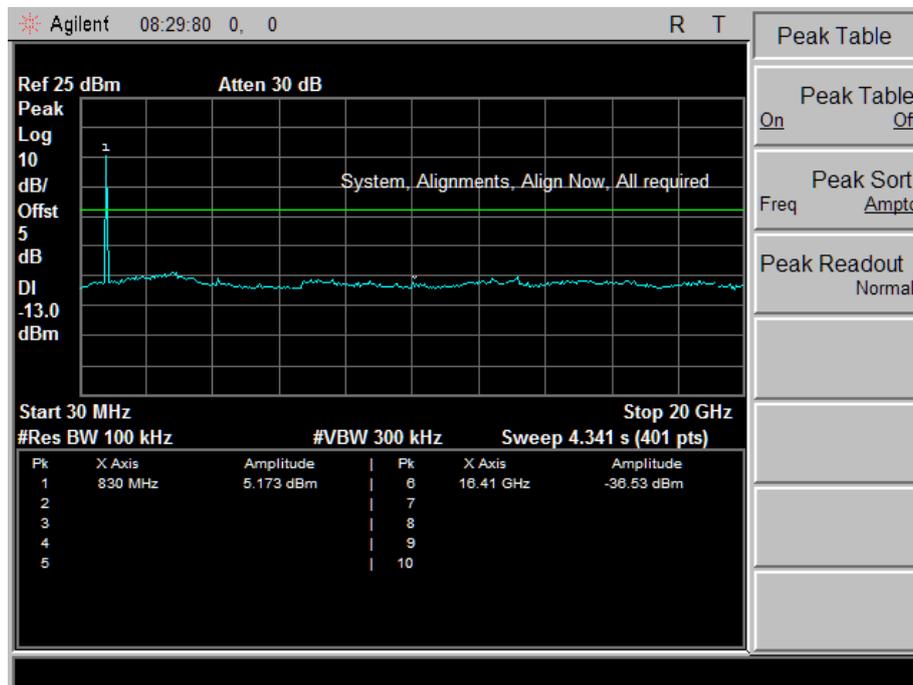


FDD II Channel 9400

Graphical results for HSUPA mode:



FDD IV Channel 1412



FDD V Channel 4175



FDD II Channel 9400

4.8 Band Edge

Specifications:	2.1051, 24.238, 2.1053, 22.917, 27.53(h)					
Date of Tests	2011-01-18					
Test conditions:	Ambient Temperature: 15°C-35°C 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
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-04-01	Normal
---	Power splitter	Jie sai	---	1000132	2012-01-04	Normal

Limit Level Construction:

Part 22:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 24:

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:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

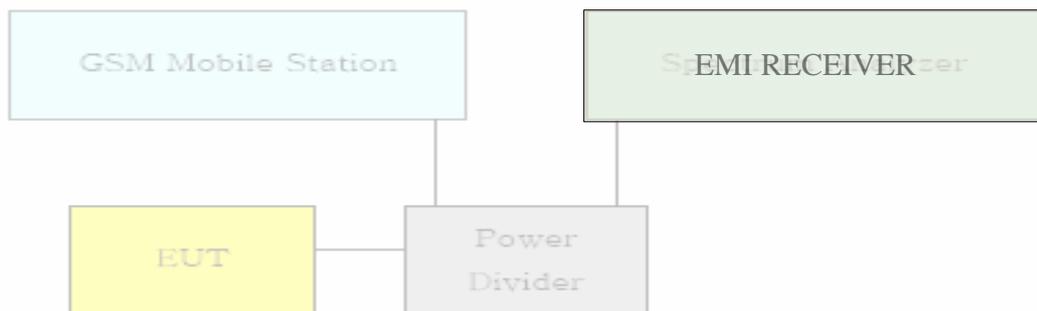
Part 27:

According to Part 27.53(h), i.e., for operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB, so the limit level is:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Test Setup:

During the process of testing, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by Rhode & Schwarz EMI test receiver (ESI26).



Test Method:

- 1) The EUT was coupled to the EMI test receiver analyzer mode and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The loss 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: --

Test Results for GPRS mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
GPRS850 Channel 128 Left band edge	823.996	-16.46
GPRS850 Channel 251 Right band edge	849.023	-15.32
GPRS1900 Channel 512 Left band edge	1849.999	-22.22
GPRS1900 Channel 810 Right band edge	1910.021	-21.44

Test Results for EGPRS mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
EGPRS850 Channel 128 Left band edge	823.997	-20.20
EGPRS850 Channel 251 Right band edge	849.004	-17.67
EGPRS1900 Channel 512 Left band edge	1849.996	-25.83
EGPRS1900 Channel 810 Right band edge	1910.005	-24.31

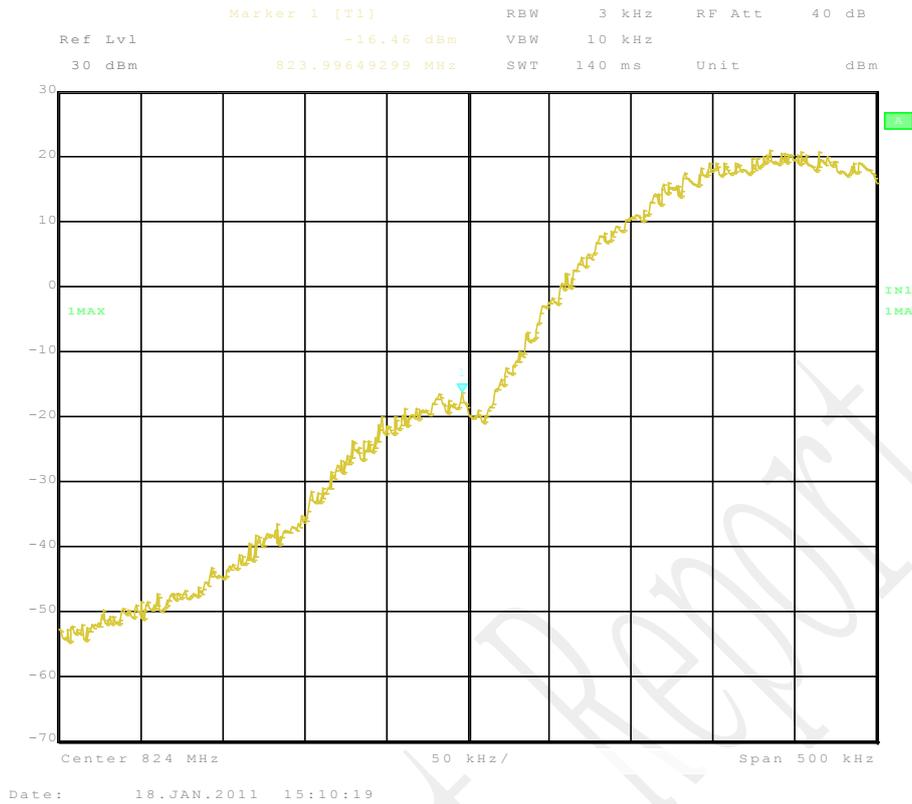
Test Results for HSDPA mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
FDD IV Channel 1312 Left band edge	1709.945	-22.01
FDD IV Channel 1513 Right band edge	1755.055	-22.52
FDD V Channel 4132 Left band edge	823.966	-15.81
FDD V Channel 4233 Right band edge	849.055	-19.93
FDD II Channel 9262 Left band edge	1849.965	-20.10
FDD II Channel 9538 Right band edge	1910.055	-23.00

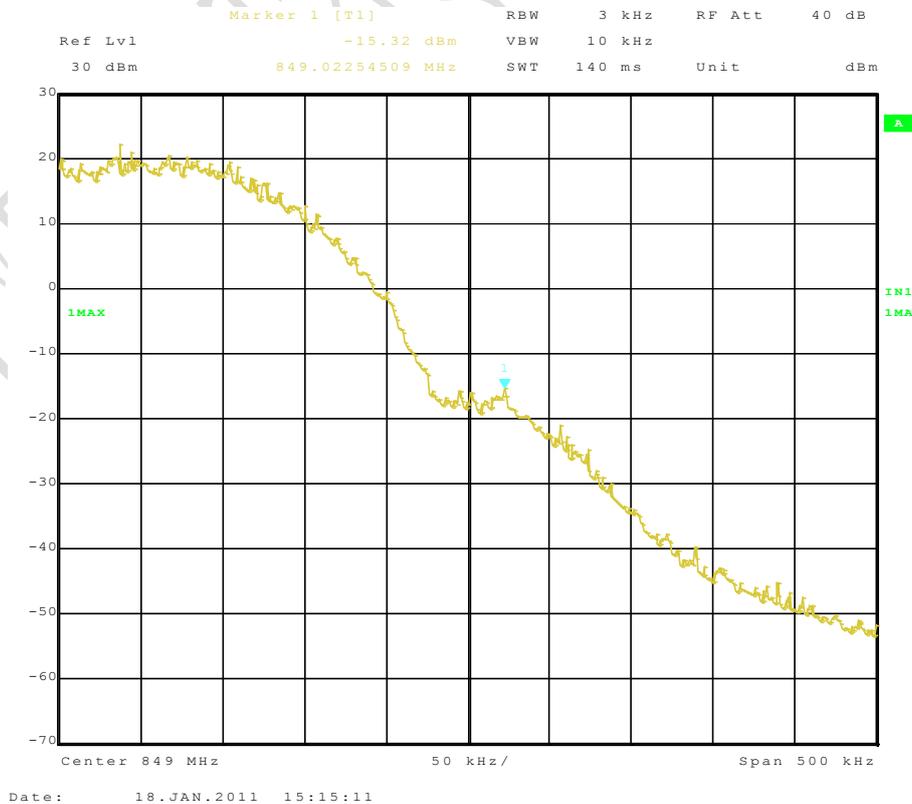
Test Results for HSUPA mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
FDD IV Channel 1312 Left band edge	1709.865	-20.57
FDD IV Channel 1513 Right band edge	1755.055	-22.49
FDD V Channel 4132 Left band edge	823.865	-14.86
FDD V Channel 4233 Right band edge	848.995	-18.62
FDD II Channel 9262 Left band edge	1849.865	-20.60
FDD II Channel 9538 Right band edge	1910.195	-15.61

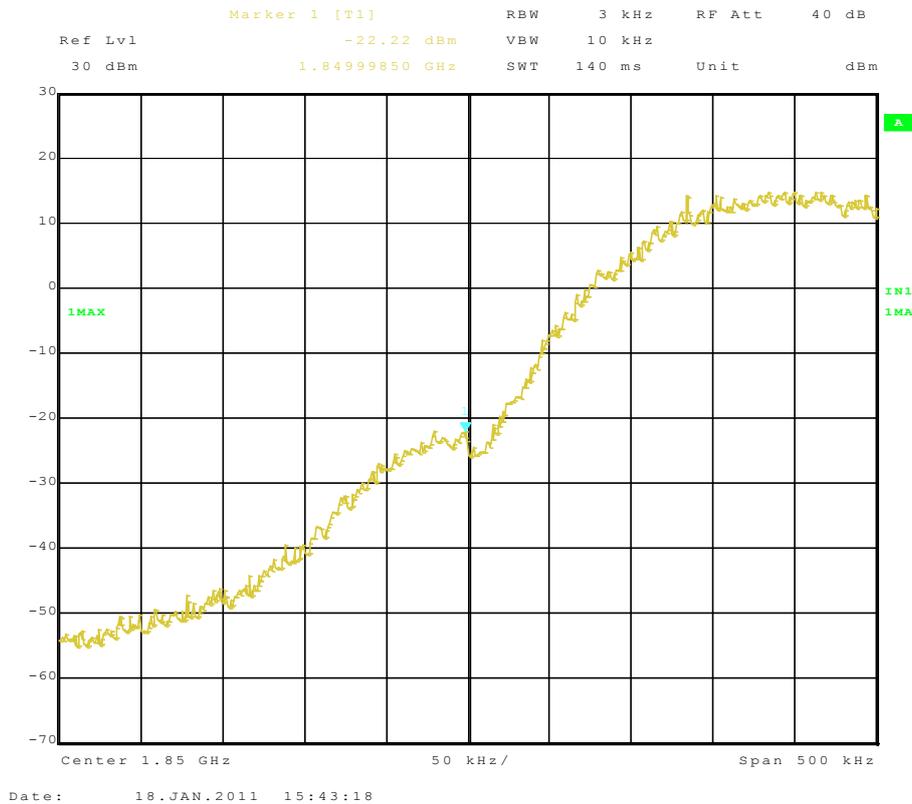
Graphical results for GPRS mode:



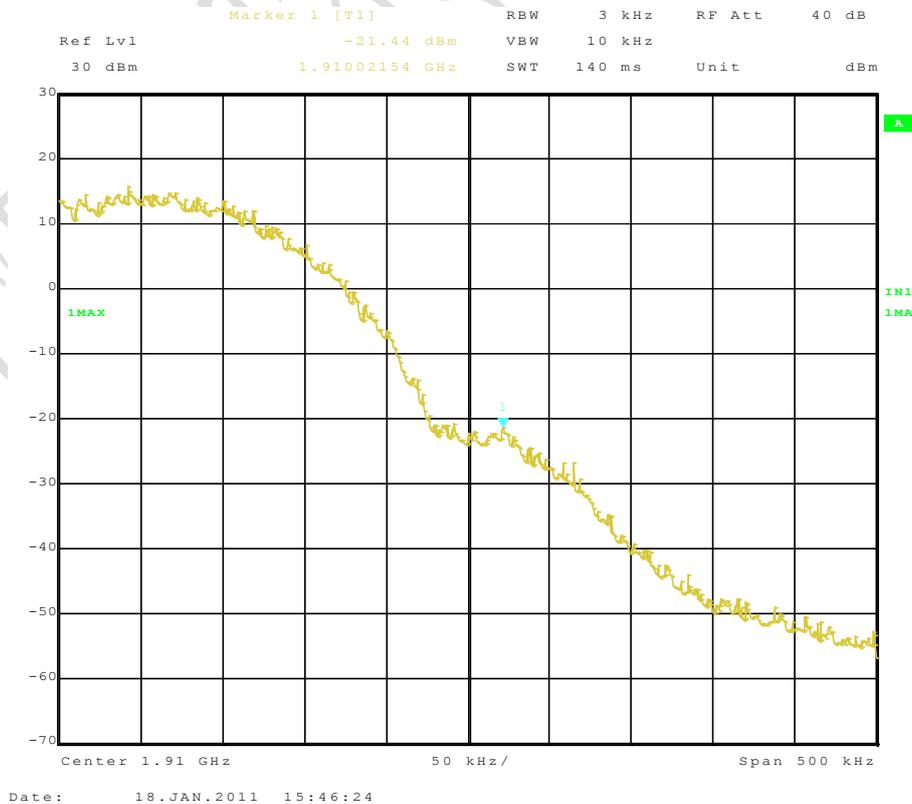
GPRS850 channel 128 Left band edge



GPRS850 channel 251 Right band edge

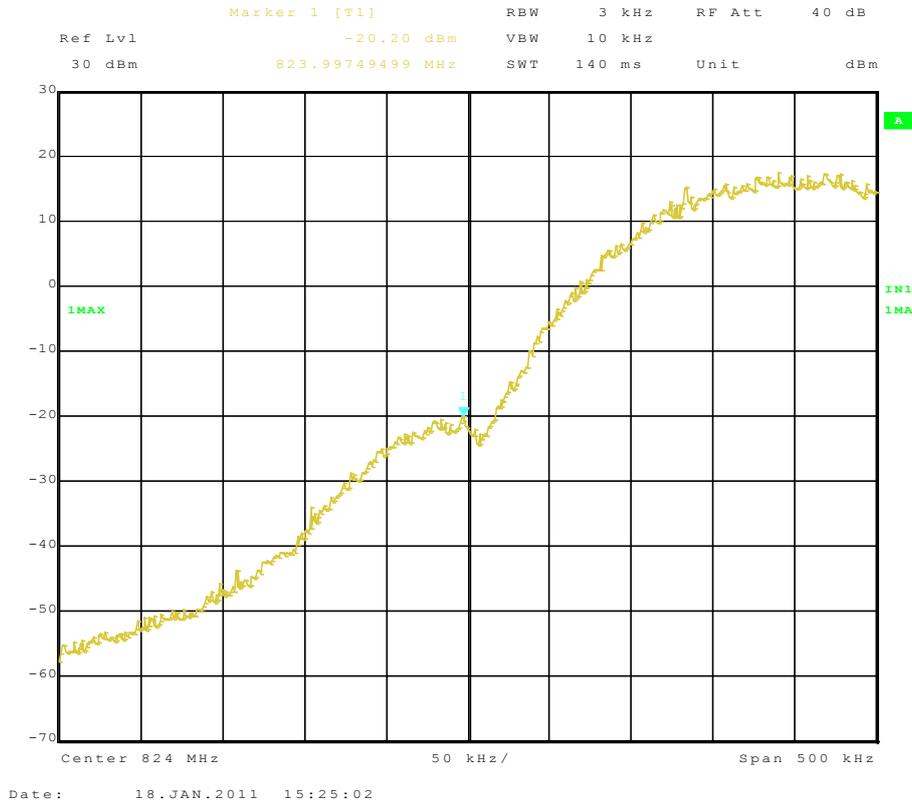


GPRS1900 channel 512 Left band edge

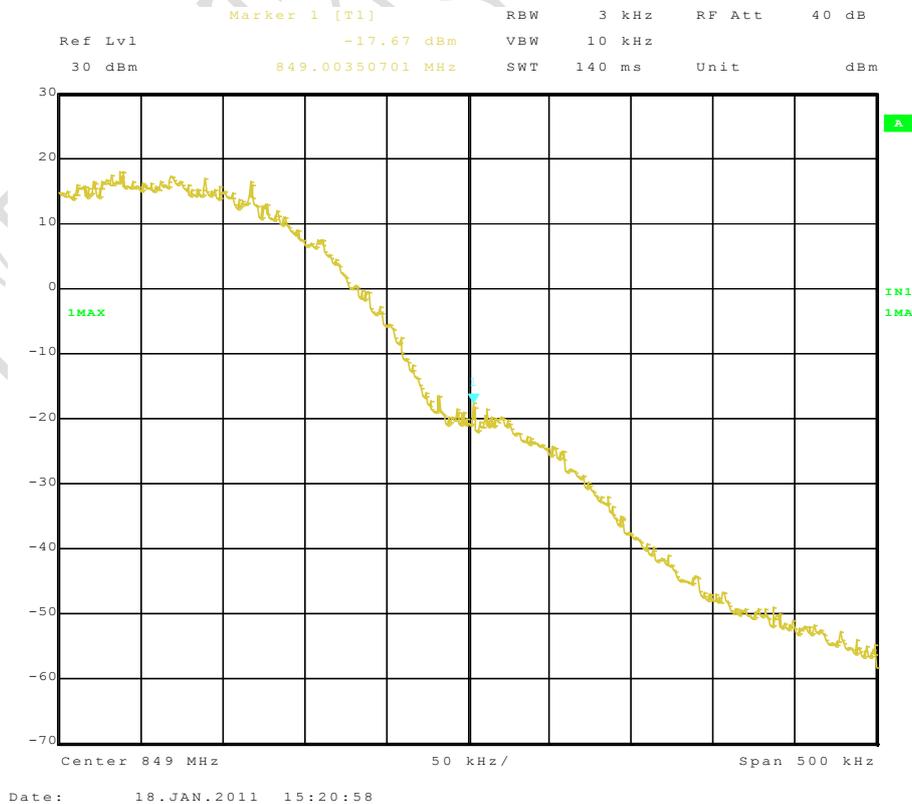


GPRS1900 channel 810 Right band edge

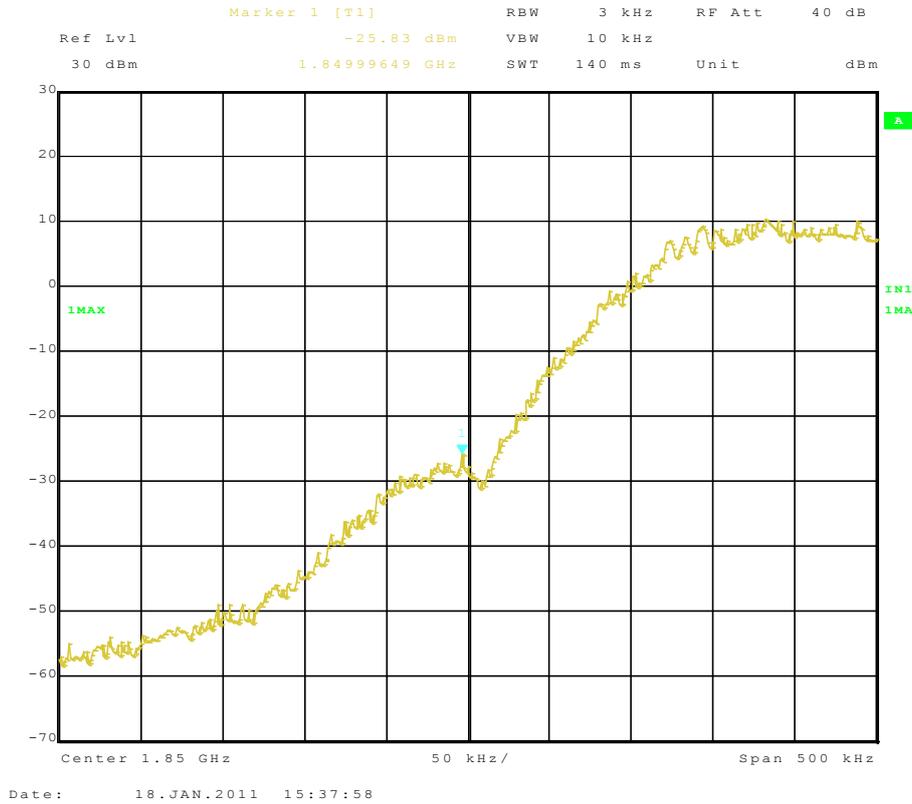
Graphical results for EGPRS mode:



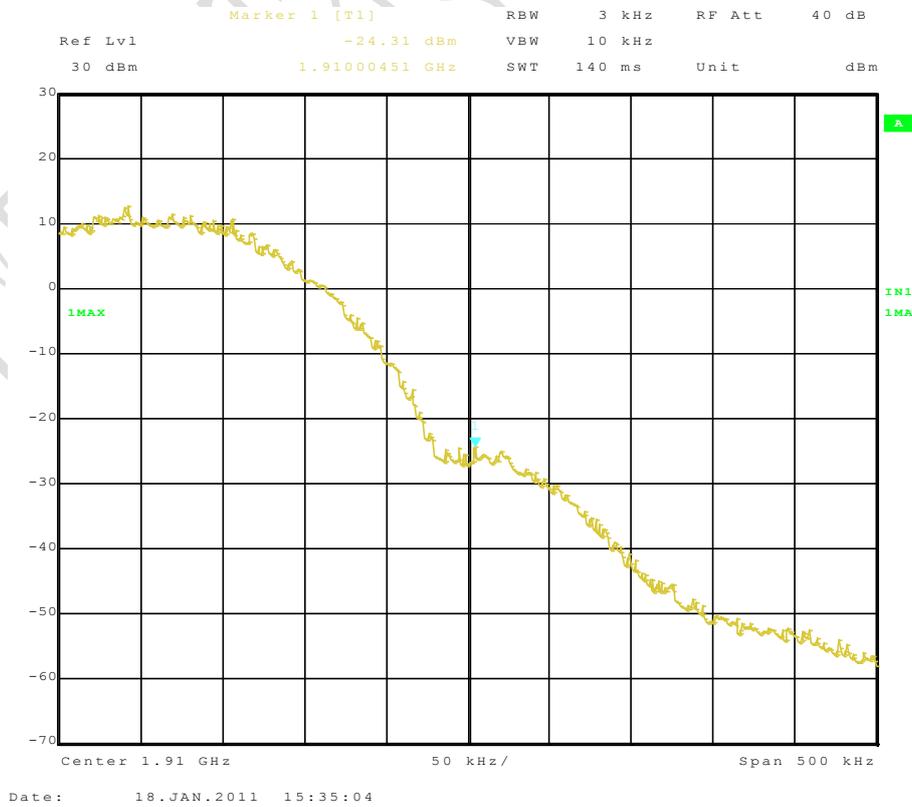
EGPRS850 channel 128 Left band edge



EGPRS850 channel 251 Right band edge

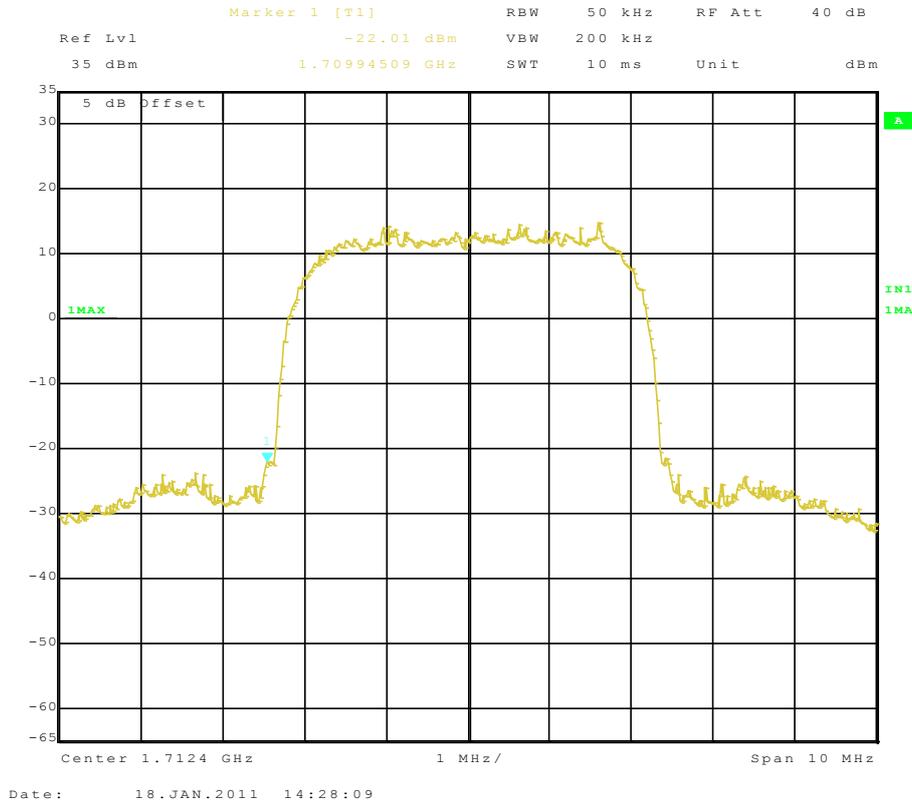


EGPRS1900 channel 512 Left band edge

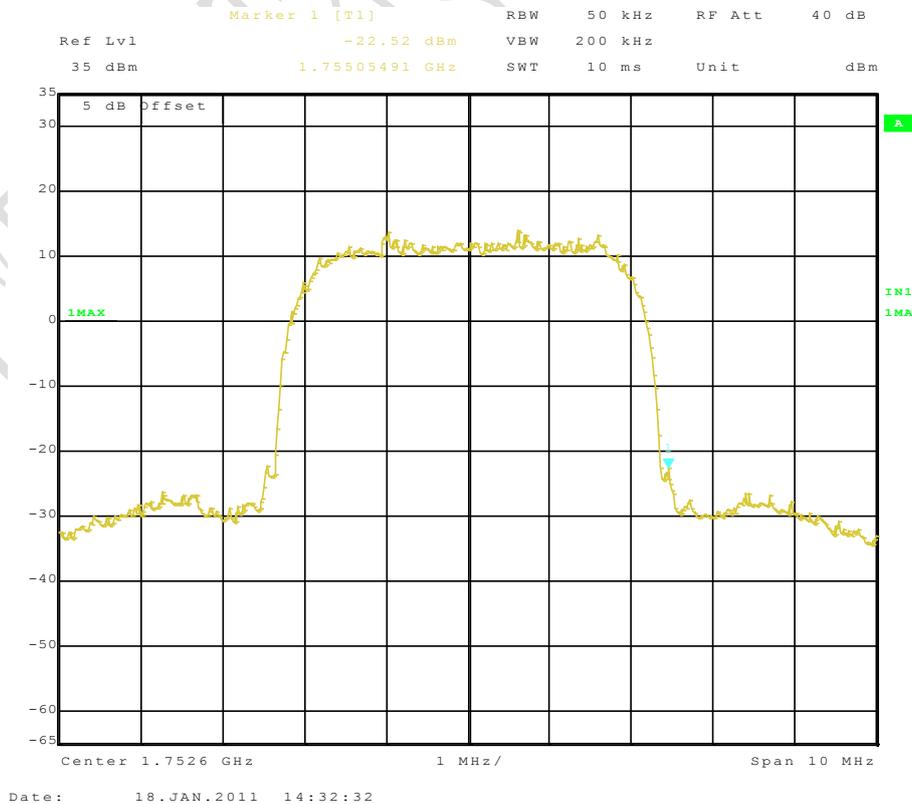


EGPRS1900 channel 810 Right band edge

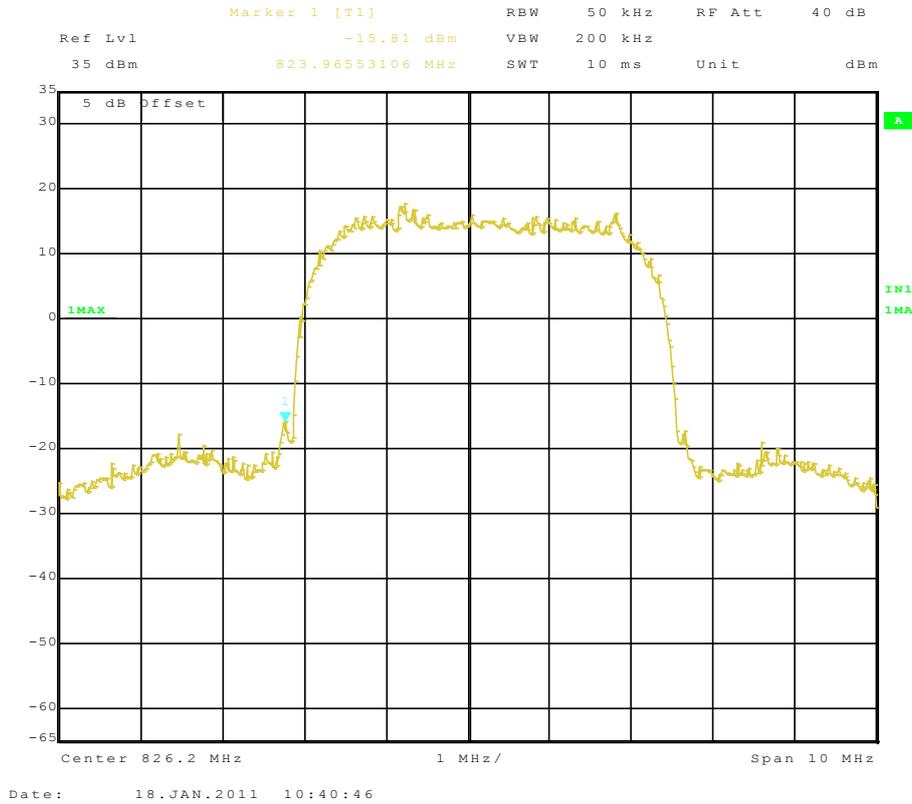
Graphical results for HSDPA mode:



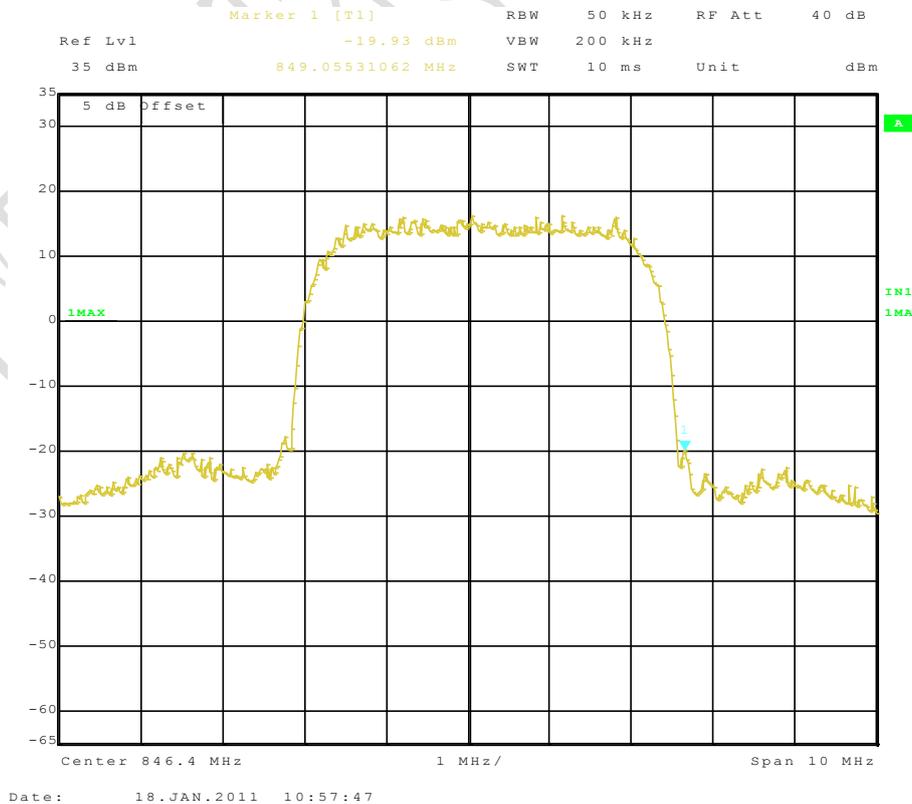
FDD IV channel 1312 left band edge



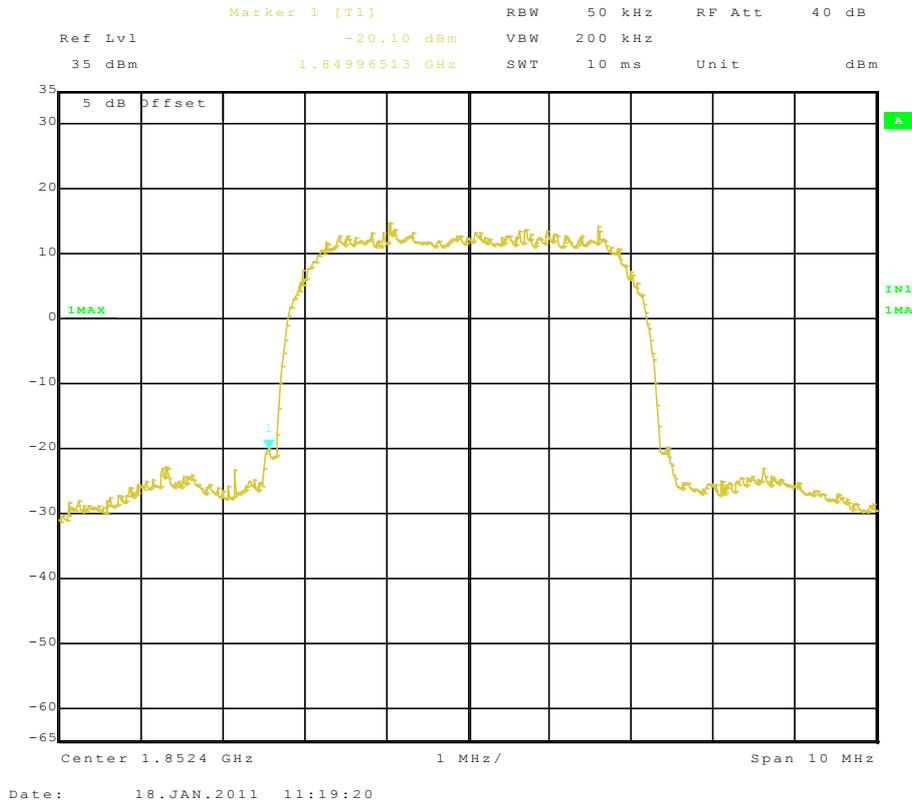
FDD IV channel 1513 right band edge



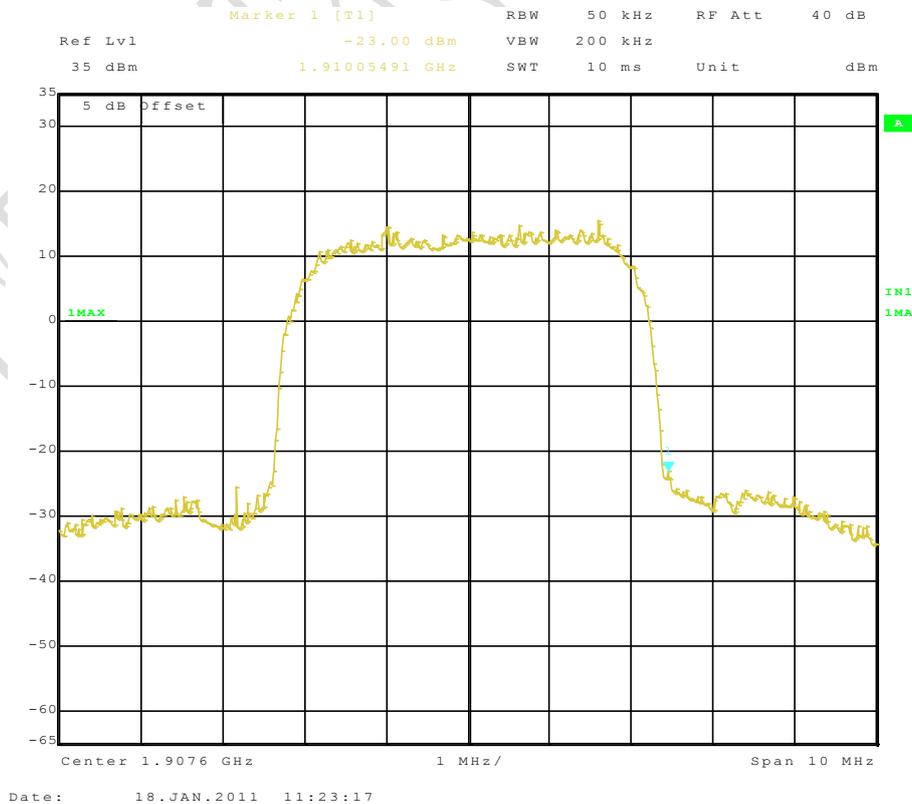
FDD V channel 4132 left band edge



FDD V channel 4233 right band edge

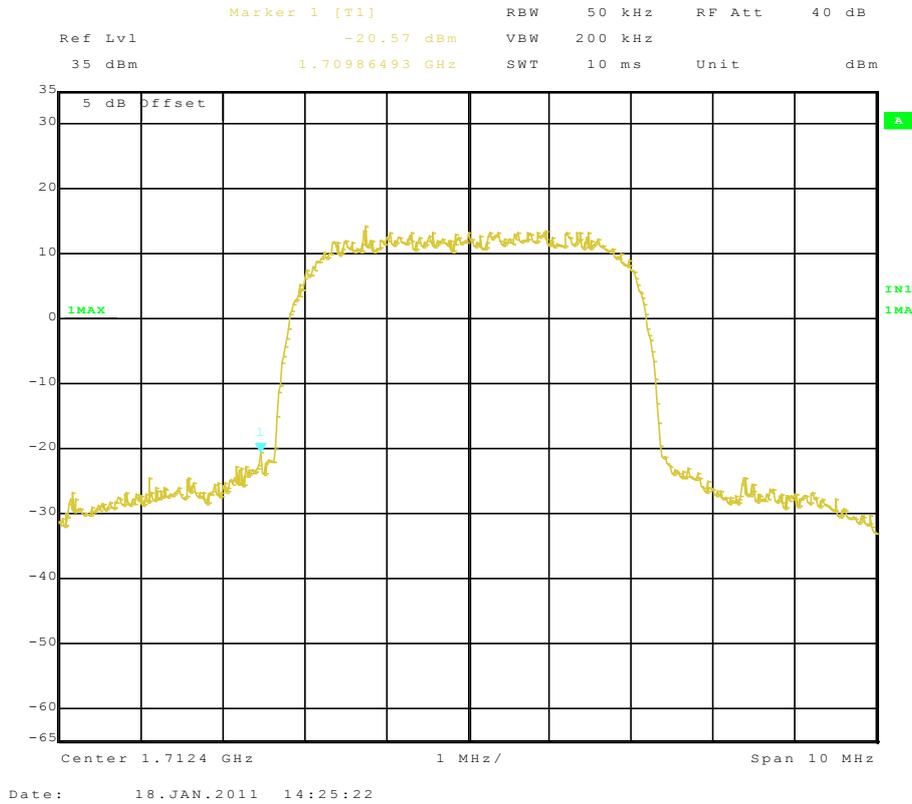


FDD II channel 9262 left band edge

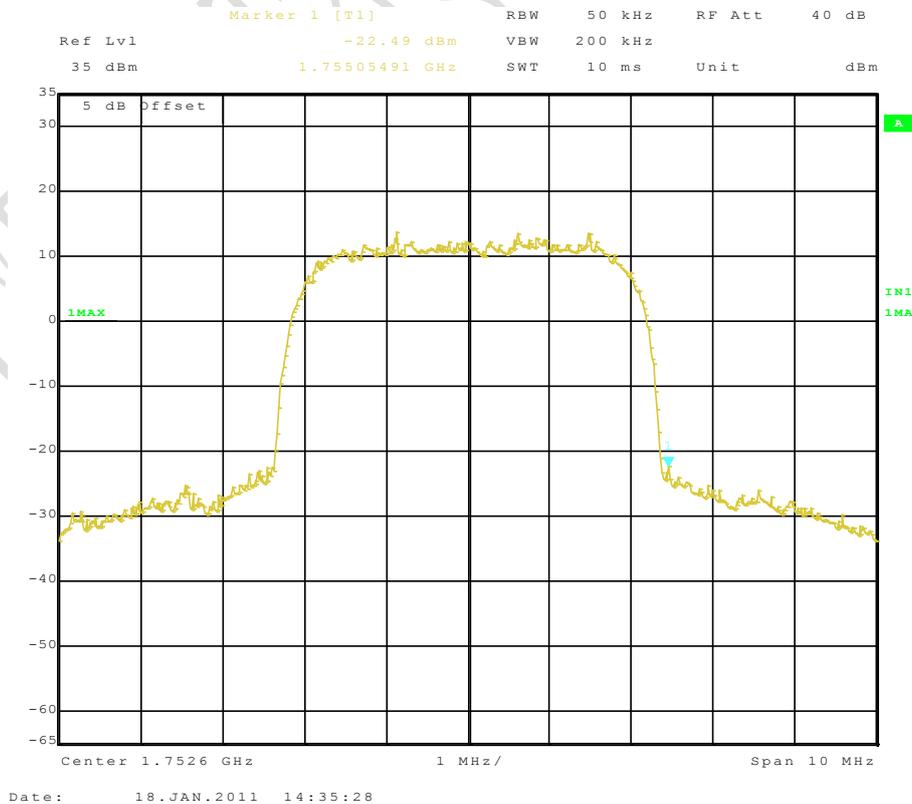


FDD II channel 9538 right band edge

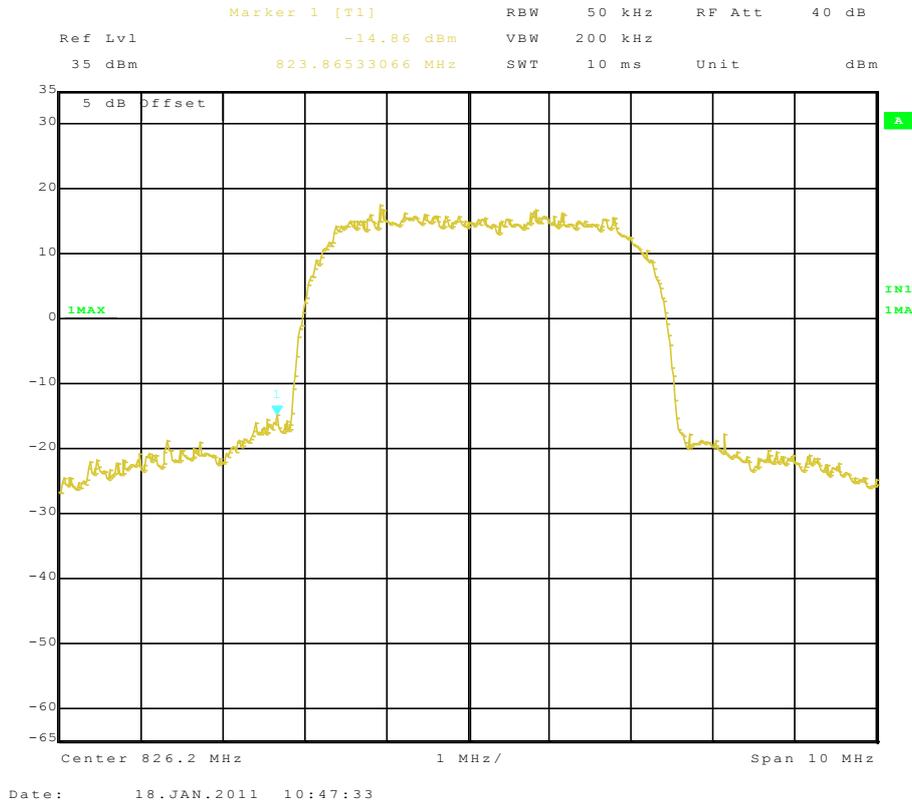
Graphical results for HSUPA mode:



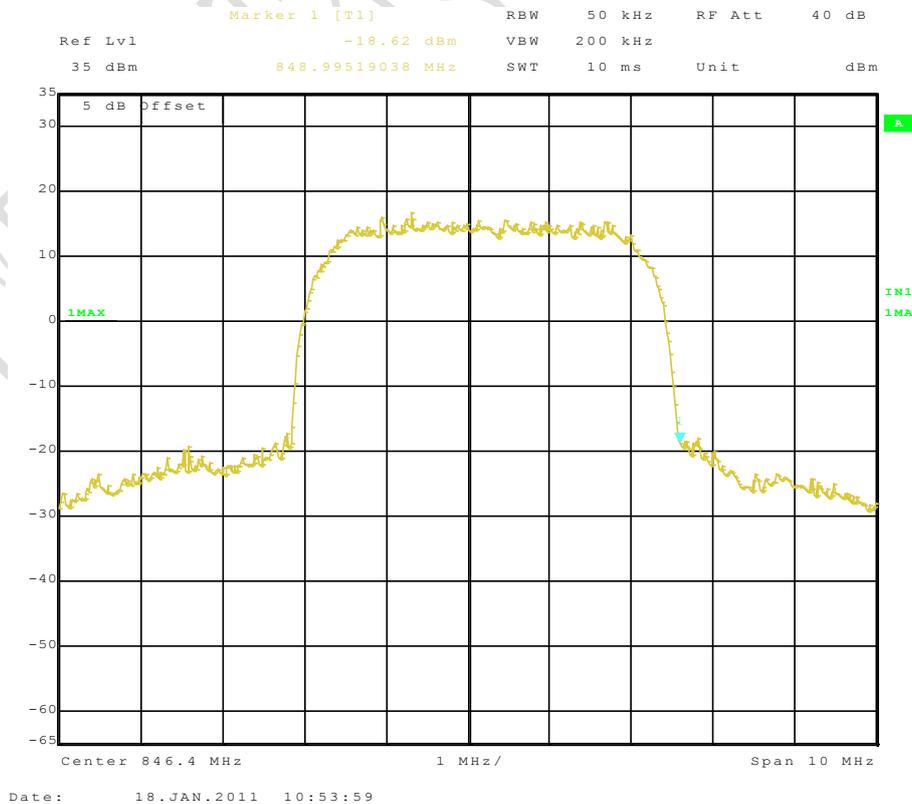
FDD IV channel 1312 left band edge



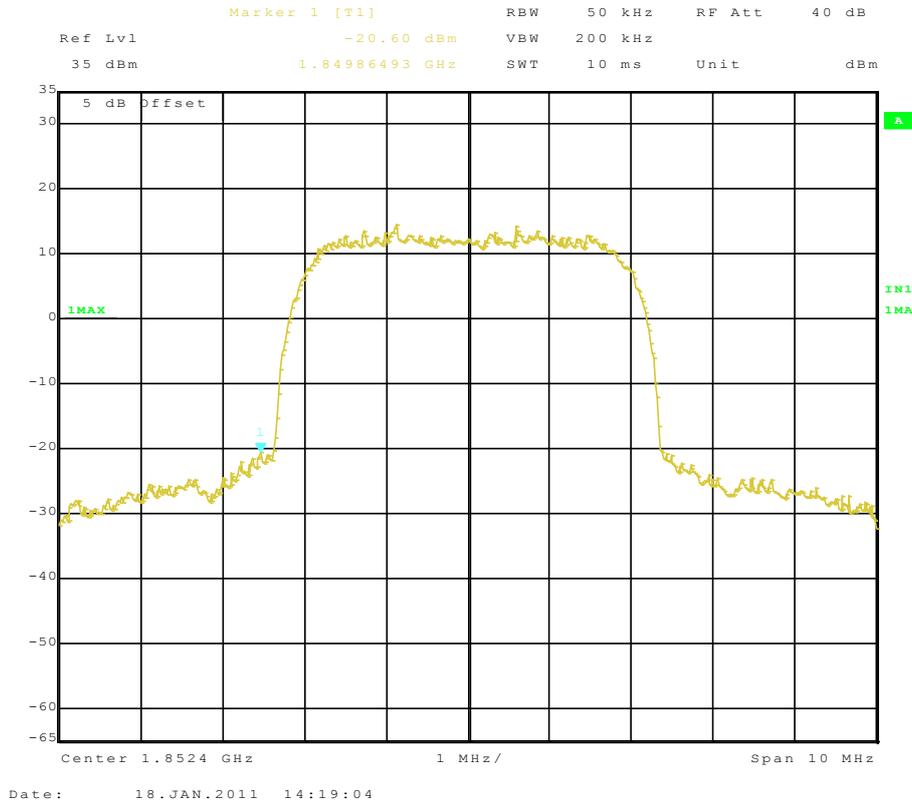
FDD IV channel 1513 right band edge



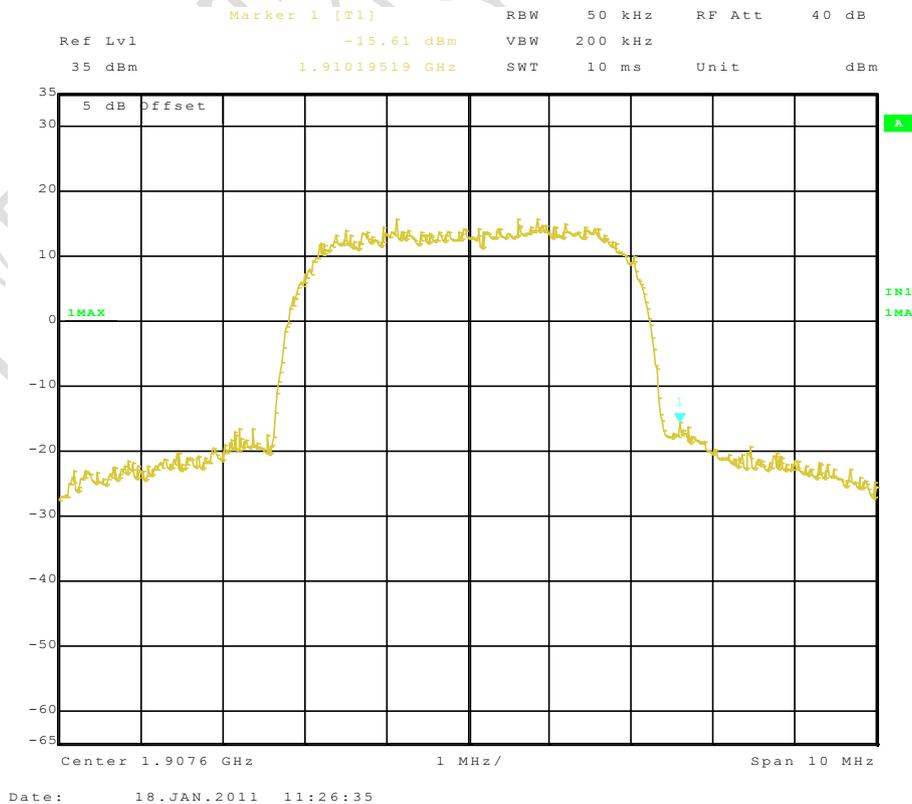
FDD V channel 4132 left band edge



FDD V channel 4233 right band edge



FDD II channel 9262 left band edge



FDD II channel 9538 right band edge

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Annex A External Photos

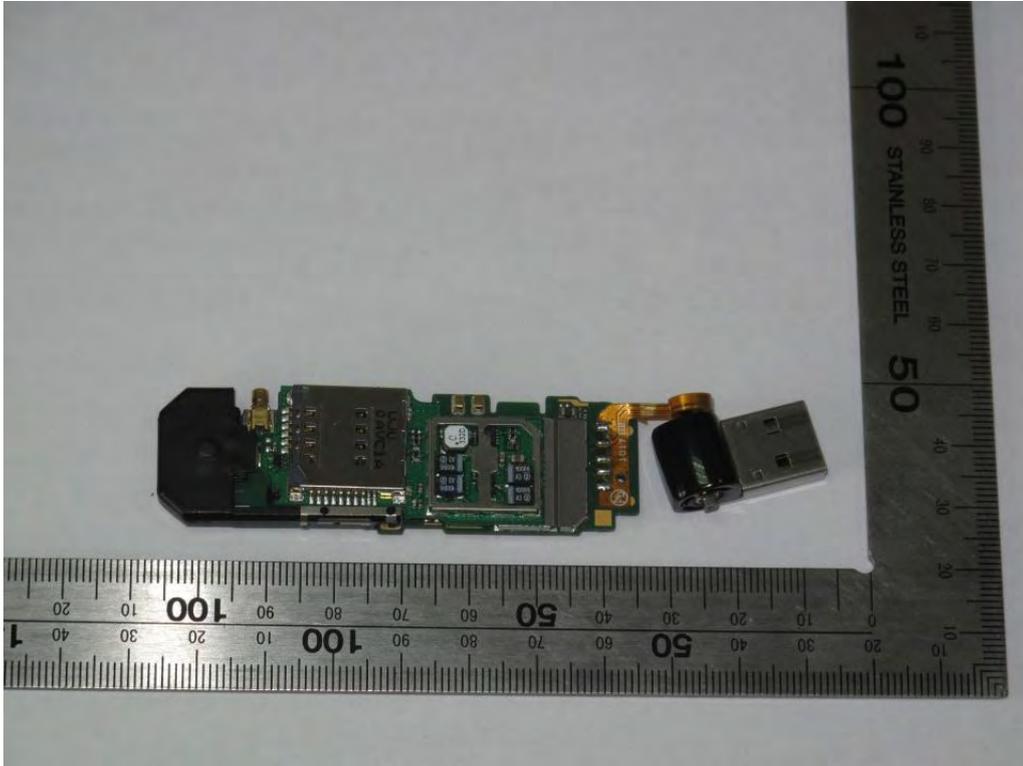


Picture 1 Front view of the handset

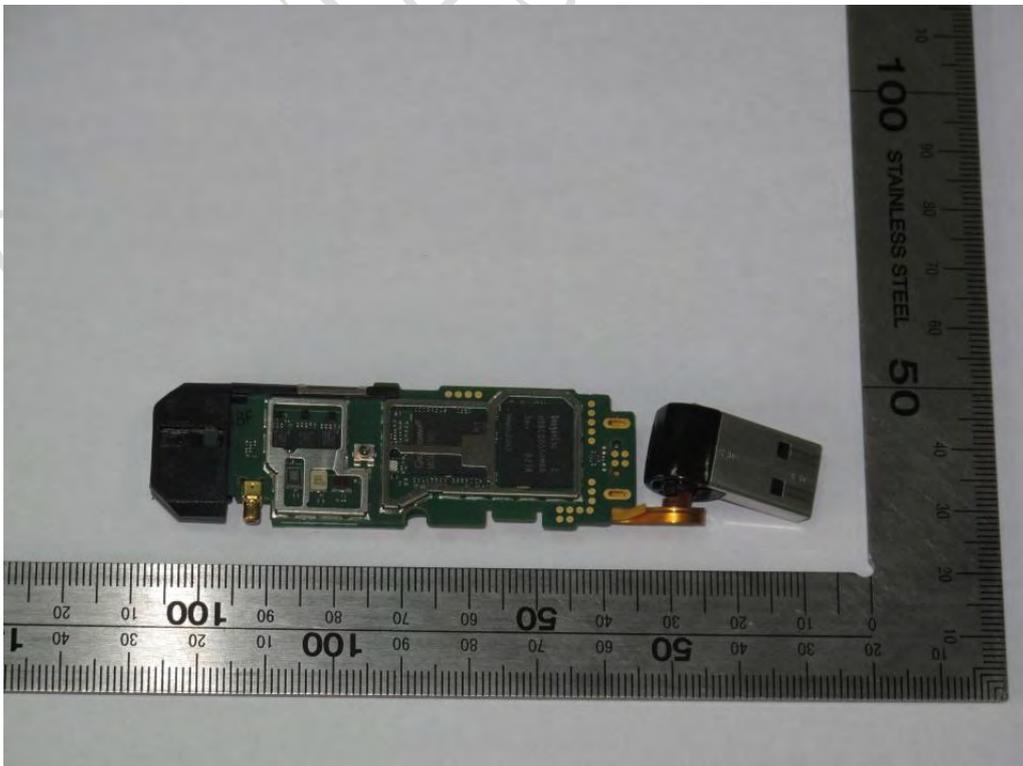


Picture 2 Back view of the handset

Annex B Internal Photos



Main board (face)



Main board (back)

ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

————— The End of this Report —————

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