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FCC PART 22 AND PART 24 TEST REPORT

FCC Part 22 Subpart H / Part 24 Subpart E

Report Reference No......: **CTL130122127-WU**

Compiled by

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Date of issue.....: Mar. 08, 2013

Representative Laboratory Name. : **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

Address.....: Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China.

Test Firm.....: **Bontek Compliance Testing Laboratory Ltd**

Address.....: 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

Applicant's name.....: **SHENZHEN SANGFEI CONSUMER COMMUNICATIONS CO., LTD**

Address.....: 11 Science and Technology Road, Shenzhen Hi-tech Industrial Park Nanshan District. Shenzhen, PRC

Test specification:

Standard.....: **FCC CFR Title 47 Part 2, Part 22H and Part 24E**

EIA/TIA 603-C: 2004

Master TRF.....: Dated 2011-01

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Test item description.....: **Smartphone**

FCC ID.....: **VQR-W5510**

Trade Mark.....: PHILIPS

Model/Type reference.....: W5510

GSM/WCDMA

Transmit: 2G:GSM 850: 824~849MHz, PCS 1900: 1850~1910MHz

3G:WCDMA Band II: 1850-1910MHz,

WCDMA Band V: 824~849MHz

Receive: 2G:GSM 850: 869~894MHz, PCS 1900: 1930~1990MHz

3G:WCDMA Band II: 1930~1990MHz,

WCDMA Band V: 869~894MHz

Release Version: 2G:R99
3G:UMTS FDD: Rel-6
Type of modulation.....: 2G: GMSK for GSM/GPRS/EDGE
3G: QPSK
GPRS Type: Class B
GPRS Class: Class 12

GPS

work frequency.....: 1575.42MHz
Type of modulation.....: BPSK

Bluetooth

Work frequency.....: 2402~2480MHz
Version.....: V3.0
Type of modulation.....: FHSS
Data Rate.....: 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK)

Wi-Fi

Work frequency.....: 802.11b/g/n(20MHz): 2412~2462MHz
Type of modulation.....: 802.11b DSSS, 802.11g/n: OFDM
Data Rate.....: 802.11b: 1/2/5.5/11 Mbps
802.11g: 6/9/12/18/24/36/48/54 Mbps
802.11n: up to 65 Mbps
Antenna Gain: -1.5 dBi for GSM850 and WCDMA Band V
-0.5 dBi for PCS1900 and WCDMA Band II
-2.5 dBi for Bluetooth and Wi-Fi
Antenna type.....: Internal
IMEI.....: 911131205416242
Hardware version.....: SR701_V2.0
Software version.....: PhilipsW5510-user 4.0.4 IMM76D eng.root.20130122.224030 test-keys
Result.....: **Positive**

TEST REPORT

Test Report No. :	CTL130122127-WU	Mar. 08, 2013
		Date of issue

Equipment under Test : Smartphone

Model /Type : W5510

Applicant : **SHENZHEN SANGFEI CONSUMER COMMUNICATIONS CO.,LTD**

Address : 11 Science and Technology Road, Shenzhen Hi-tech Industrial Park Nanshan District.Shenzhen,PRC

Manufacturer **SHENZHEN SANGFEI CONSUMER COMMUNICATIONS CO.,LTD**

Address 11 Science and Technology Road, Shenzhen Hi-tech Industrial Park Nanshan District.Shenzhen,PRC

Test Result according to the standards on page 5:

Positive

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22 Subpart H:](#) Public Mobile Services

[FCC Part 24 Subpart E:](#) Personal Communications Services

[EIA/TIA 603-C: 2004](#)

[FCC CFR Title 47 Part 2](#)



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Jan. 28, 2013

Testing commenced on : Jan. 29, 2013

Testing concluded on : Feb. 28, 2013

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ☒ 120V / 60 Hz ☐ 115V / 60Hz
☐ 12 V DC ☐ 24 V DC
☒ Other (specified in blank below)

DC 3.7V from battery

2.3. Short description of the Equipment under Test (EUT)

A Smartphone (W5510) with UMTS/GSM, Bluetooth, GPS and wifi function.
For more details, refer to the user's manual of the EUT.
Serial number: Prototype

2.4. EUT operation mode

CTL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: GSM850
Mode 2: PCS1900
Mode 3: GPRS850
Mode 4: GPRS1900
Mode 5: WCDMA Band II
Mode 6: WCDMA Band V
Mode 7: HSDPA Band II
Mode 8: HSUPA Band II
Mode 9: HSDPA Band V
Mode 10: HSUPA Band V

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst result on this report.
3. Radiated power output working at GSM link was higher than that working at GPRS link, so all of test items were done working at GSM mode. Refer to peak power output for more details.

4. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is CTL130122127-WD.

5. EDGE mode test result is not shown in this report, because it just supports GMSK modulation and CS1~CS4 data rate, and also transmit power is lower than GSM/GPRS mode.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- o - supplied by the manufacturer
- o - supplied by the lab

0 Manufacturer :
Model No. :

0 Manufacturer :
Model No. :

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **VQR-W5510** filing to comply with of the FCC Part 22 and Part 24 Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

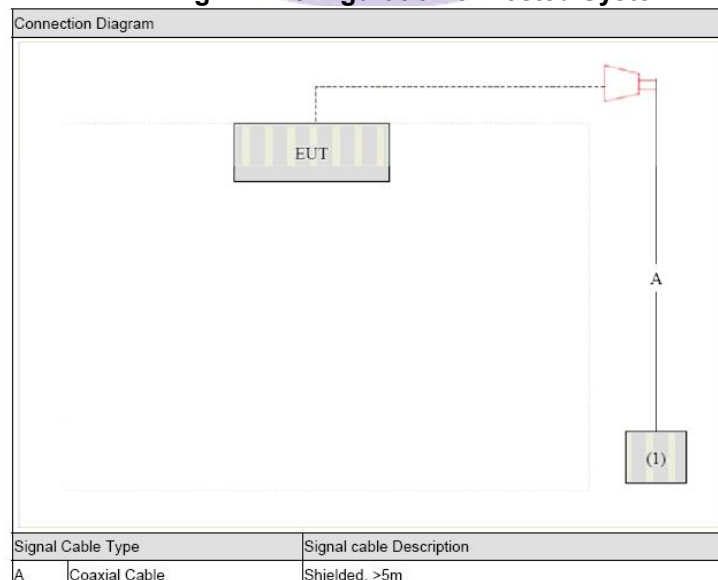
Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. EUT Exercise Software

1. Setup the EUT and simulators as shown on above.
2. Turn on the power of all equipment.
3. EUT Communicate with CMU200, then select channel to test.

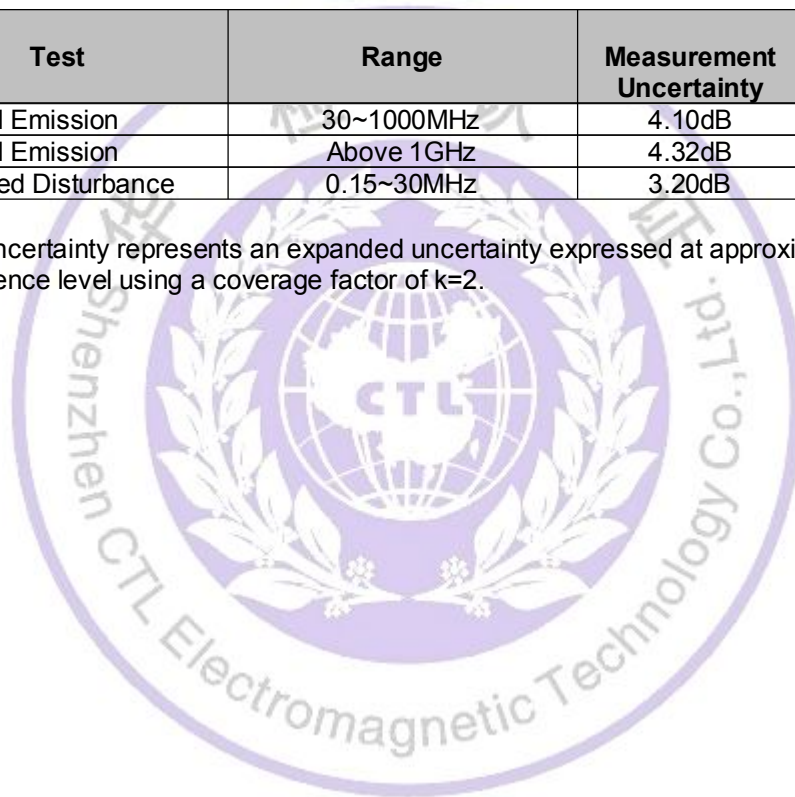
3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



3.7. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2012/04/14	2013/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2012/04/14	2013/04/13
3	Dual Directional Coupler	Agilent	778D	2012/04/14	2013/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2012/04/14	2013/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2012/04/14	2013/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2012/04/14	2013/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2012/04/14	2013/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2012/04/14	2013/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2012/04/14	2013/04/13
10	AC Power Supply	IDRC	CF-500TP	2012/04/14	2013/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2012/04/14	2013/04/13
12	RF Current Probe	FCC	F-33-4	2012/04/14	2013/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2012/04/14	2013/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2012/04/14	2013/04/13
15	Amplifier	HP	8447D	2012/04/14	2013/04/13
16	SIGNAL GENERATOR	HP	8647A	2012/04/14	2013/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2012/04/14	2013/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2012/04/14	2013/04/13
19	EMI Test Receiver	R&S	ESPI	2012/04/14	2013/04/13
20	Loop Antenna	ZHINAN	ZN30900A	2012/04/14	2013/04/13
21	Horn Antenna	Schwarzbeck	BBHA9120D	2012/04/14	2013/04/13
22	Horn Antenna	Schwarzbeck	BBHA9170	2012/04/14	2013/04/13
23	Spectrum Analyzer	Agilent	E4446A	2012/04/14	2013/04/13
24	Wideband Peak Power Meter	Anritsu	ML2495A	2012/04/14	2013/04/13
25	Power Sensor	Anritsu	MA2411B	2012/04/14	2013/04/13
26	Climate Chamber	ESPEC	EL-10KA	2012/04/14	2013/04/13

3.8. Summary of Test Result

No deviations from the test standards

For GSM 850/WCDMA Band V (FCC Part 22H & Part 2)

Emission			
Performed Item	Normative References	Test Performed	Deviation
Peak Output Power	FCC Part 22.913(a)(2) and Part 2.1046 EIA/TIA 603-C	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	Yes	No
Occupied Bandwidth	FCC Part 2.1049	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 22.917(a) and Part 2.1049	Yes	No
Spurious Emission	FCC Part 22.917(b) and Part 2.1051, 2.1053 EIA/TIA 603-C	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC Part 22.355 and 2.1055 EIA/TIA 603-C	Yes	No

For PCS 1900/WCDMA Band II (FCC Part 24E & Part 2)

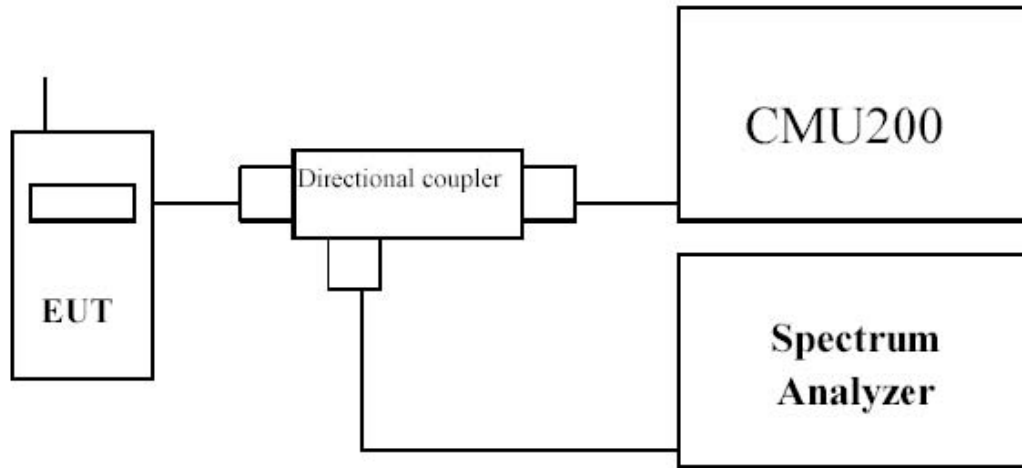
Emission			
Performed Item	Normative References	Test Performed	Deviation
Peak Output Power	FCC Part 24.232(b) and Part 2.1046 EIA/TIA 603-C	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	Yes	No
Occupied Bandwidth	FCC Part 24.238(b) and Part 2.1049	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 24.238(a) and Part 2.1049	Yes	No
Spurious Emission	FCC Part 24.238(b) and Part 2.1051, 2.1053 EIA/TIA 603-C	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC Part 24.235 and 2.1055 EIA/TIA 603-C	Yes	No

4. TEST CONDITIONS AND RESULTS

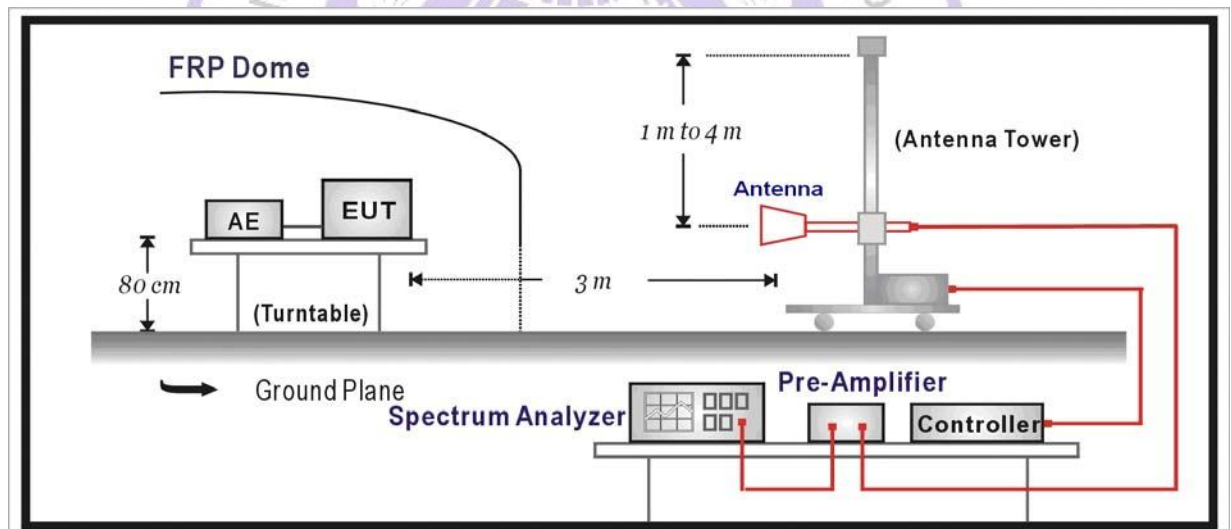
4.1. Peak Output Power

TEST CONFIGURATION

Conducted Power Measurement:



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q) Test site anechoic chamber refer to ANSI C63.4: 2003.

Base station simulator settings for each test mode:

1. For GSM/GPRS/EDGE
Configure R&S CMU200 to support GMSK and 8PSK call respectively, and set one timeslot transmission for GMSK GSM/GPRS and 8PSK EDGE.
Measure and record power outputs for both modulations.
2. For WCDMA
Configure the CMU-200 to support all WCDMA tests in respect to the 3GPP 34.121.
Measure the EUT output power at 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V and 1852.4MHz, 1880MHz and 1907.6MHz for WCDMA Band II.

For Rel 99

- Set a Test Mode 1 loop back with a 12.2kbps Reference Measurement Channel (RMC)
- Set and send continuously Up power control commands to the Gobi2000
- Measure the power at the Gobi2000 Module antenna connector by using CMU-200.

LIMIT

For FCC Part 22.913(a)(2):

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

For FCC Part 24.232(b):

The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

TEST RESULTS**Conducted Measurement**

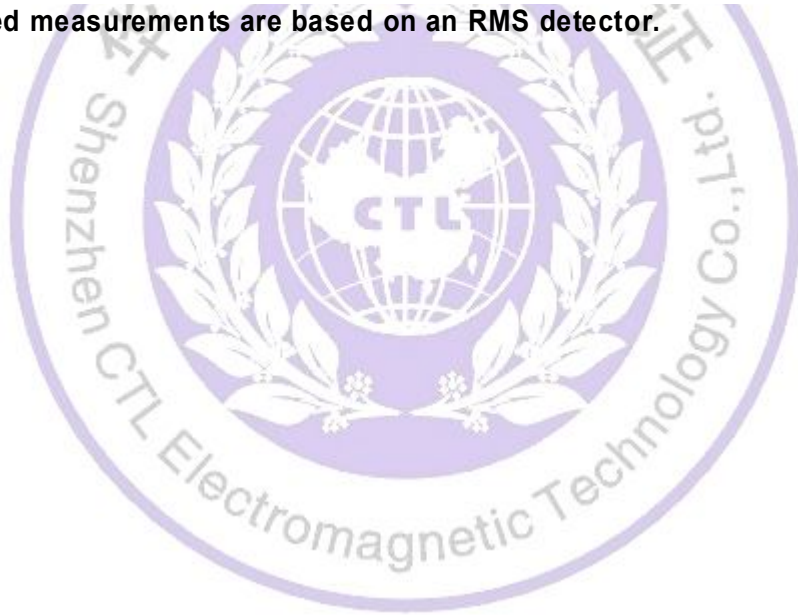
Mode	Frequency (MHz)	Avg. Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Max. Power (dBm)	Scaling Factor
GSM850	824.2	31.88	-9	22.88	32.5	1.15
	836.4	31.98	-9	22.98	32.5	1.13
	848.8	32.06	-9	23.06	32.5	1.11
GPRS/EDGE850 (1 Slot)	824.2	31.88	-9	22.88	32.5	1.15
	836.4	31.95	-9	22.95	32.5	1.14
	848.8	32.05	-9	23.05	32.5	1.11
GPRS/EDGE850 (2 Slot)	824.2	30.75	-6	24.75	31.0	1.06
	836.4	30.85	-6	24.85	31.0	1.04
	848.8	30.98	-6	24.98	31.0	1.00
GPRS/EDGE850 (3 Slot)	824.2	29.05	-4.25	24.80	29.5	1.11
	836.4	29.12	-4.25	24.87	29.5	1.09
	848.8	29.26	-4.25	25.01	29.5	1.06
GPRS/EDGE850 (4 Slot)	824.2	27.54	-3	24.54	28.0	1.11
	836.4	27.61	-3	24.61	28.0	1.09
	848.8	27.74	-3	24.74	28.0	1.06
PCS1900	1850.2	29.07	-9	20.07	29.5	1.10
	1880.0	29.16	-9	20.16	29.5	1.08
	1909.8	29.20	-9	20.20	29.5	1.07
GPRS/EDGE1900 (1 Slot)	1850.2	29.04	-9	20.04	29.5	1.11
	1880.0	29.10	-9	20.10	29.5	1.10
	1909.8	29.16	-9	20.16	29.5	1.08
GPRS/EDGE1900 (2 Slot)	1850.2	27.36	-6	21.36	28.0	1.16
	1880.0	27.48	-6	21.48	28.0	1.13
	1909.8	27.54	-6	21.54	28.0	1.11
GPRS/EDGE1900 (3 Slot)	1850.2	25.70	-4.25	21.45	26.0	1.07
	1880.0	25.82	-4.25	21.57	26.0	1.04
	1909.8	25.84	-4.25	21.59	26.0	1.04
GPRS/EDGE1900 (4 Slot)	1850.2	23.99	-3	20.99	24.5	1.12
	1880.0	24.12	-3	21.12	24.5	1.09
	1909.8	24.27	-3	21.27	24.5	1.05

Note: All conducted measurements are based on a peak detector.

WCDMA

Mode	3GPP Subtest	Band II (1900MHz)			Band V (850MHz)			MPR
		Conducted Power (dBm)			Conducted Power (dBm)			
		9262	9400	9538	4132	4182	4233	
WCDMA R99	1	22.48	22.74	22.81	23.03	23.11	23.19	N/A
Rel5 HSDPA	1	22.18	22.44	22.63	22.88	22.98	23.00	0
	2	22.15	22.43	22.61	22.86	22.93	22.96	0
	3	21.74	21.97	22.15	22.47	22.45	22.60	0.5
	4	21.71	21.94	22.12	22.44	22.43	22.58	0.5
Rel6 HSUPA	1	22.07	22.31	22.38	22.79	22.87	22.84	0.0
	2	20.10	20.34	20.37	20.77	20.86	20.83	2.0
	3	21.05	21.28	21.35	21.81	21.91	21.81	1.0
	4	20.08	20.32	20.33	20.75	20.83	20.82	2.0
	5	22.05	22.26	22.36	22.76	22.83	22.80	0.0

Note: All conducted measurements are based on an RMS detector.



Radiated Measurement Power

GSM850

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.2MHz)								
824.2	-12.68	H	21.08	1.76	-0.02	19.30	38.5	-19.20
824.2	-2.64	V	31.86	1.76	-0.02	30.08	38.5	-8.42
Middle Channel 189 (836.4MHz)								
836.4	-13.11	H	20.79	1.75	0.1	19.14	38.5	-19.36
836.4	-3.12	V	31.64	1.75	0.1	29.99	38.5	-8.51
High Channel 251 (848.8MHz)								
848.8	-11.80	H	22.21	1.78	0.13	20.56	38.5	-17.94
848.8	-3.27	V	31.34	1.78	0.13	29.69	38.5	-8.81

PCS1900

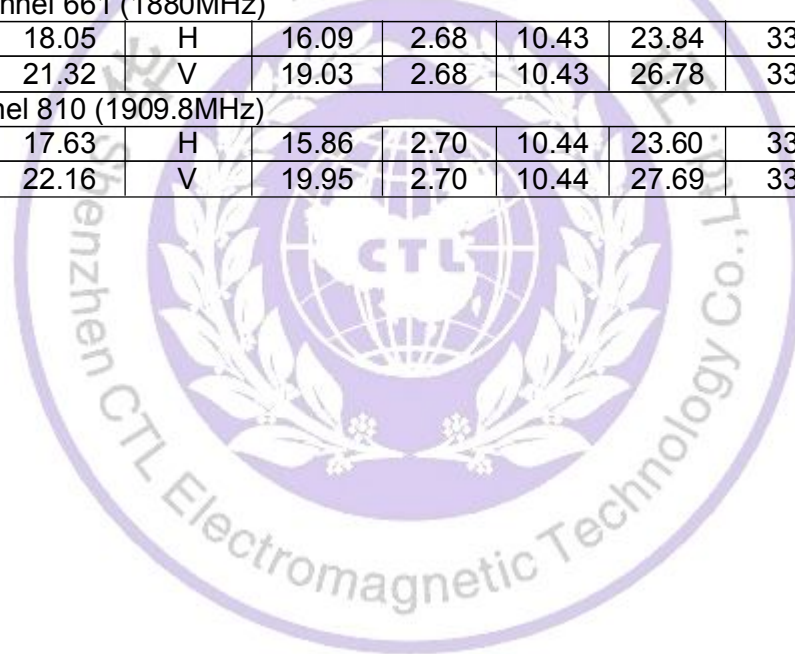
Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512 (1850.2MHz)								
1850.2	16.21	H	14.28	2.68	10.4	22.00	33	-11.00
1850.2	21.58	V	19.46	2.68	10.4	27.18	33	-5.82
Middle Channel 661 (1880MHz)								
1880	21.22	H	19.27	2.68	10.43	27.02	33	-5.98
1880	21.37	V	19.08	2.68	10.43	26.83	33	-6.17
High Channel 810 (1909.8MHz)								
1909.8	22.22	H	20.45	2.70	10.44	28.19	33	-4.81
1909.8	22.96	V	20.75	2.70	10.44	28.49	33	-4.51

GPRS850

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.2MHz)								
824.2	-12.85	H	20.91	1.76	-0.02	19.13	38.5	-19.37
824.2	-2.73	V	31.76	1.76	-0.02	29.98	38.5	-8.52
Middle Channel 189 (836.4MHz)								
836.4	-12.88	H	21.01	1.75	0.10	19.36	38.5	-19.14
836.4	-3.15	V	31.61	1.75	0.10	29.96	38.5	-8.54
High Channel 251 (848.8MHz)								
848.8	-11.92	H	22.10	1.78	0.13	20.45	38.5	-18.05
848.8	-3.27	V	31.34	1.78	0.13	29.69	38.5	-8.81

GPRS1900

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512 (1850.2MHz)								
1850.2	17.17	H	15.24	2.68	10.4	22.96	33	-10.04
1850.2	21.00	V	18.87	2.68	10.4	26.59	33	-6.41
Middle Channel 661 (1880MHz)								
1880	18.05	H	16.09	2.68	10.43	23.84	33	-9.16
1880	21.32	V	19.03	2.68	10.43	26.78	33	-6.22
High Channel 810 (1909.8MHz)								
1909.8	17.63	H	15.86	2.70	10.44	23.60	33	-9.40
1909.8	22.16	V	19.95	2.70	10.44	27.69	33	-5.31

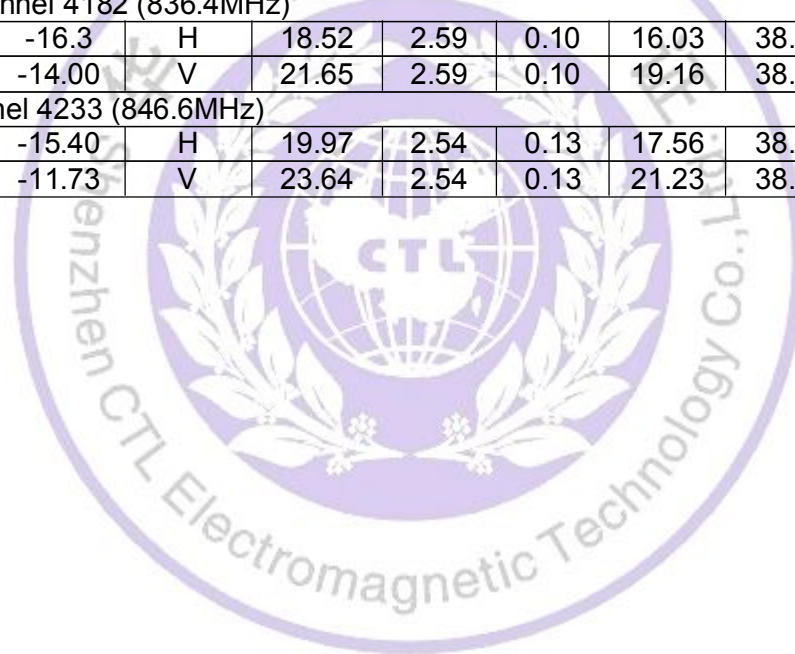


WCDMA Band II

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.4MHz)								
1852.4	14.84	H	13.78	3.55	10.40	20.63	33	-12.37
1852.4	15.45	V	14.19	3.55	10.40	21.04	33	-11.96
Middle Channel 9400 (1880MHz)								
1880	15.23	H	14.13	3.53	10.43	21.03	33	-11.97
1880	16.64	V	15.20	3.53	10.43	22.10	33	-10.90
High Channel 9538 (1907.6MHz)								
1907.6	14.91	H	13.96	3.56	10.44	20.84	33	-12.16
1907.6	15.78	V	14.39	3.56	10.44	21.27	33	-11.73

WCDMA Band V

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.4MHz)								
826.4	-18.47	H	16.07	2.56	-0.02	13.49	38.5	-25.01
826.4	-12.40	V	22.98	2.56	-0.02	20.4	38.5	-18.10
Middle Channel 4182 (836.4MHz)								
836.4	-16.3	H	18.52	2.59	0.10	16.03	38.5	-22.47
836.4	-14.00	V	21.65	2.59	0.10	19.16	38.5	-19.34
High Channel 4233 (846.6MHz)								
846.6	-15.40	H	19.97	2.54	0.13	17.56	38.5	-20.94
846.6	-11.73	V	23.64	2.54	0.13	21.23	38.5	-17.27



HSDPA Band II

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.4MHz)								
1852.4	14.51	H	13.45	3.55	10.40	20.30	33	-12.70
1852.4	15.12	V	13.86	3.55	10.40	20.71	33	-12.29
Middle Channel 9400 (1880MHz)								
1880	14.90	H	13.80	3.53	10.43	20.70	33	-12.30
1880	16.31	V	14.87	3.53	10.43	21.77	33	-11.23
High Channel 9538 (1907.6MHz)								
1907.6	14.58	H	13.63	3.56	10.44	20.51	33	-12.49
1907.6	15.45	V	14.06	3.56	10.44	20.94	33	-12.06

HSDPA Band V

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.4MHz)								
826.4	-18.80	H	15.74	2.56	-0.02	13.16	38.5	-25.34
826.4	-12.73	V	22.65	2.56	-0.02	20.07	38.5	-18.43
Middle Channel 4182 (836.4MHz)								
836.4	-16.63	H	18.19	2.59	0.10	15.70	38.5	-22.80
836.4	-14.33	V	21.32	2.59	0.10	18.83	38.5	-19.67
High Channel 4233 (846.6MHz)								
846.6	-15.73	H	19.64	2.54	0.13	17.23	38.5	-21.27
846.6	-12.06	V	23.31	2.54	0.13	20.90	38.5	-17.60

HSUPA Band II

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.4MHz)								
1852.4	13.68	H	12.62	3.55	10.40	19.47	33	-13.53
1852.4	14.29	V	13.03	3.55	10.40	19.88	33	-13.12
Middle Channel 9400 (1880MHz)								
1880	14.07	H	12.97	3.53	10.43	19.87	33	-13.13
1880	15.48	V	14.04	3.53	10.43	20.94	33	-12.06
High Channel 9538 (1907.6MHz)								
1907.6	13.75	H	12.80	3.56	10.44	19.68	33	-13.32
1907.6	14.62	V	13.23	3.56	10.44	20.11	33	-12.89

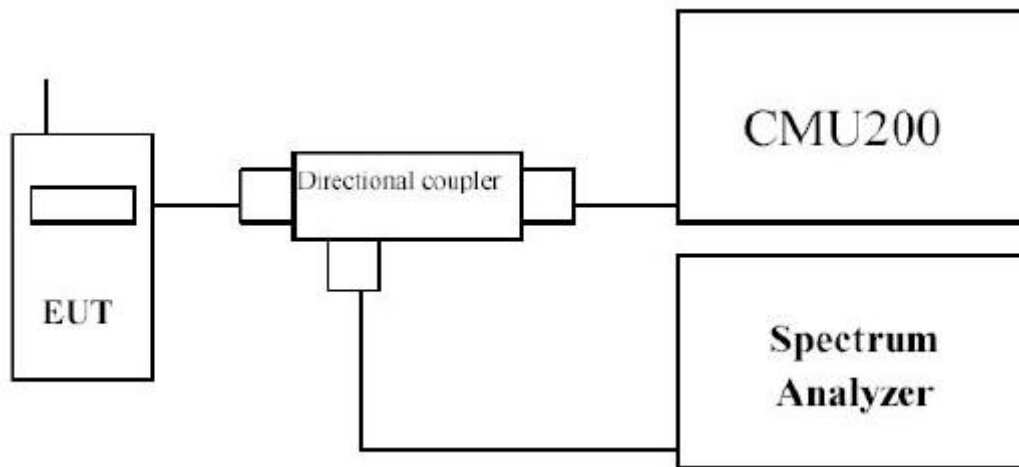
HSUPA Band V

Frequency (MHz)	SA Reading (dBm)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.4MHz)								
826.4	-19.63	H	14.91	2.56	-0.02	12.33	38.5	-26.17
826.4	-13.56	V	21.82	2.56	-0.02	19.24	38.5	-19.26
Middle Channel 4182 (836.4MHz)								
836.4	-17.46	H	17.36	2.59	0.10	14.87	38.5	-23.63
836.4	-15.16	V	20.49	2.59	0.10	18.00	38.5	-20.50
High Channel 4233 (846.6MHz)								
846.6	-16.56	H	18.81	2.54	0.13	16.40	38.5	-22.10
846.6	-12.89	V	22.48	2.54	0.13	20.07	38.5	-18.43

Note: All conducted measurements are based on an RMS detector.

4.2. Modulation Characteristic

TEST CONFIGURATION



LIMIT

N/A

TEST PROCEDURE

GMSK is a form of binary signaling schemes which represent digital states as a shift between discrete sinusoidal frequencies called Frequency Shift Keying (FSK). Minimum Shift Keying (MSK) is continuous phase FSK with the smallest possible modulation index h . Modulation index is defined as:
 $h = 2 \cdot F \cdot T_b$
where F = Peak frequency deviation in Hz and T_b = Bit period in seconds

Two discrete frequencies, representing two distinct digital states, with equal phases at switch time $t = 0$ requires a minimum value of $h = 0.5$. The Gaussian part of GMSK describes the fact that the digital pulses are filtered in the time domain. This results in bits which are sinusoidal rather than square. The effective spectrum is then compressed with the average carrier frequency in the center of the passband. This is a great advantage because of the significantly reduced bandwidth. GMSK is utilized because of these bandwidth conservation properties.

The bandwidth for GSM is a 60 MHz up-link at 1850-1910 MHz and down-link at 1930-1990 MHz. The 65 MHz is divided into 299 channels, each of which is 200 kHz wide. Slight spectral spillage is allowed into neighboring channels (which is minimized by GMSK). This separated transmit/receive frequencies scheme under GSM enables easier duplex filtering.

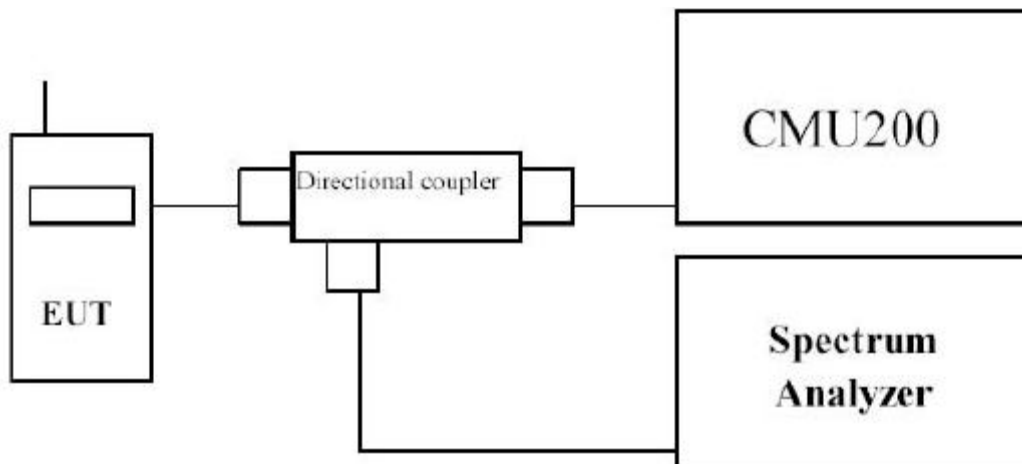
Within the bandwidth, individual channels are subdivided into multiframes (made of 26 frames), frames (made of 8 time slots), and time slots (made of 8 fields). The time slots are 0.57 ms long allowing 156.25 bits of information including overhead.

TEST RESULTS

The modulation of GSM/WCDMA was verified and confirmed compliance with requirement.

4.3. Occupied Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

Using Occupied Bandwidth measurement function of spectrum analyzer, and setting as follows:

For GPRS/EDGE 850/1900 test --- RBW = 3 kHz and VBW = 10 kHz

For WCDMA FDD Band II/V test --- RBW = 50 kHz and VBW = 200 kHz

LIMIT

N/A

TEST RESULTS

Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	GSM850 GPRS Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
128	824.20	311.379	244.200
189	836.40	317.281	242.600
251	848.80	314.308	243.050

Figure Channel 128 (824.20MHz)

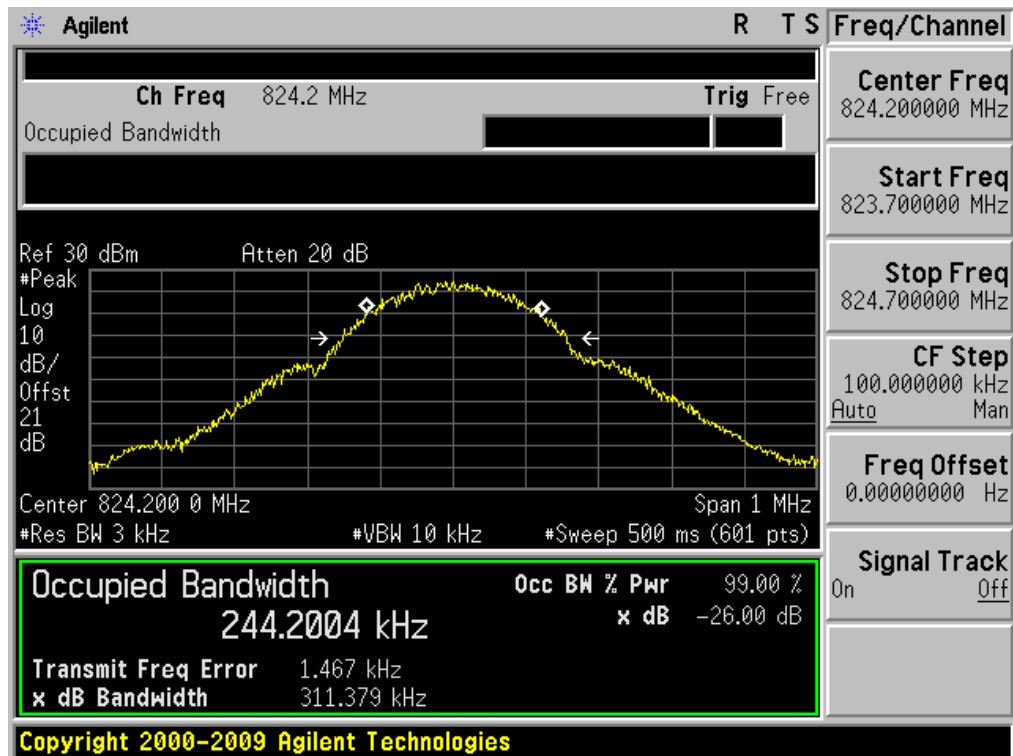


Figure Channel 189 (836.40MHz)

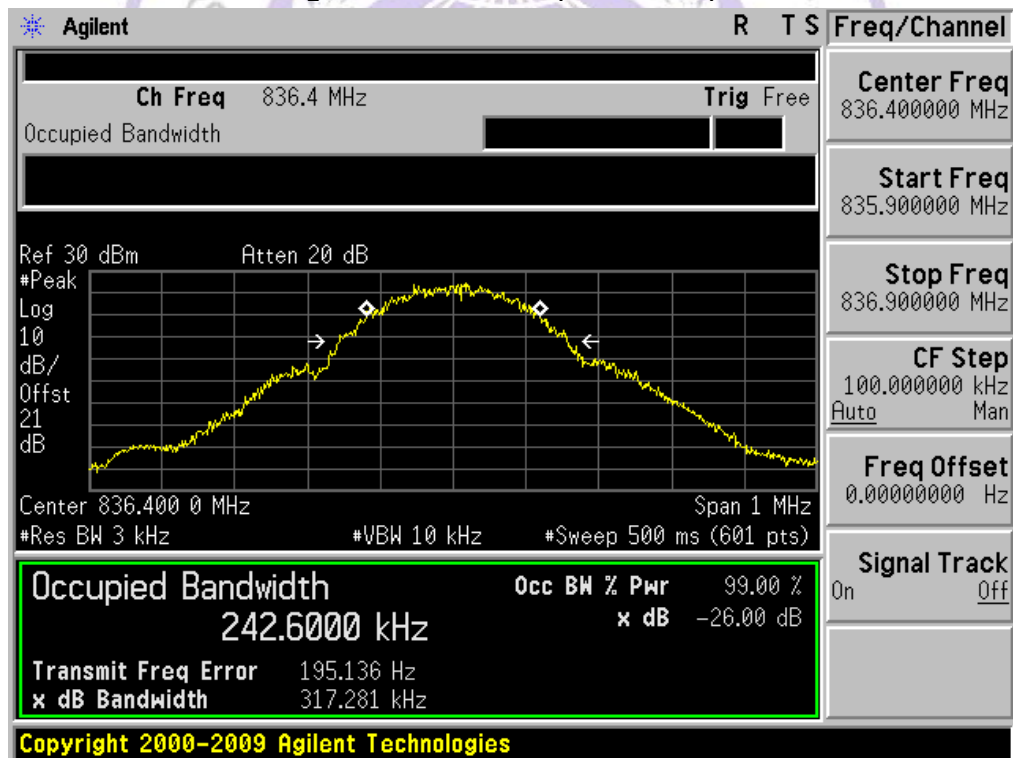
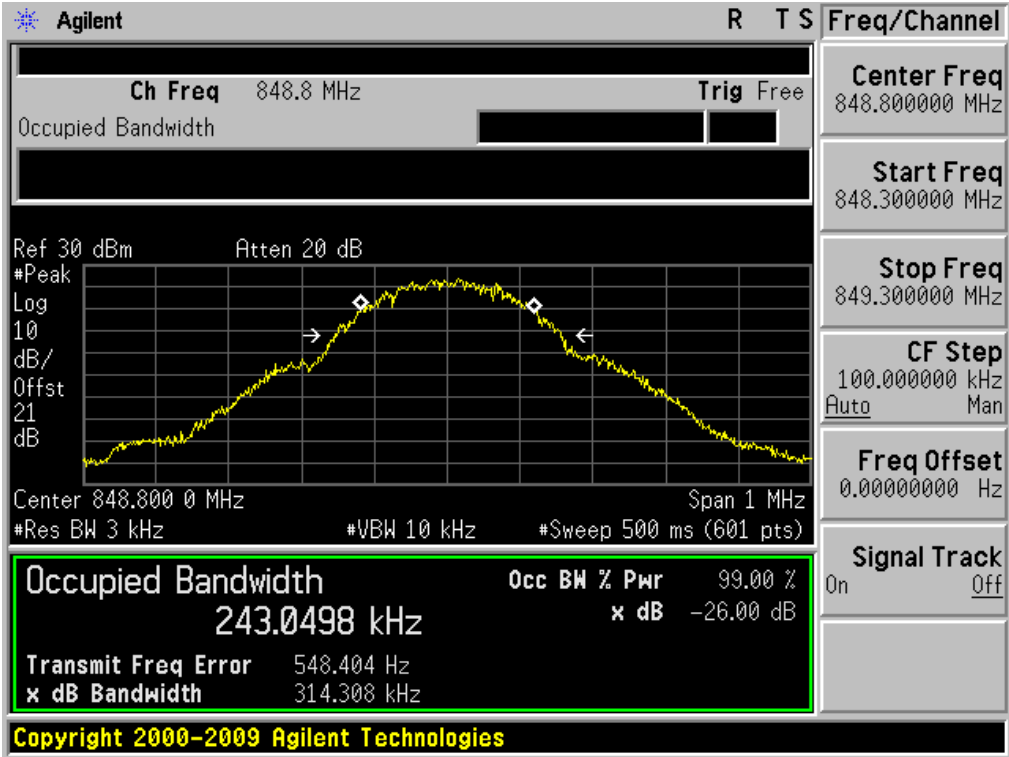


Figure Channel 251 (848.80MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	PCS1900 GPRS Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	313.028	246.972
661	1880.00	313.417	248.437
810	1909.80	317.658	246.471

Figure Channel 512 (1850.20MHz)

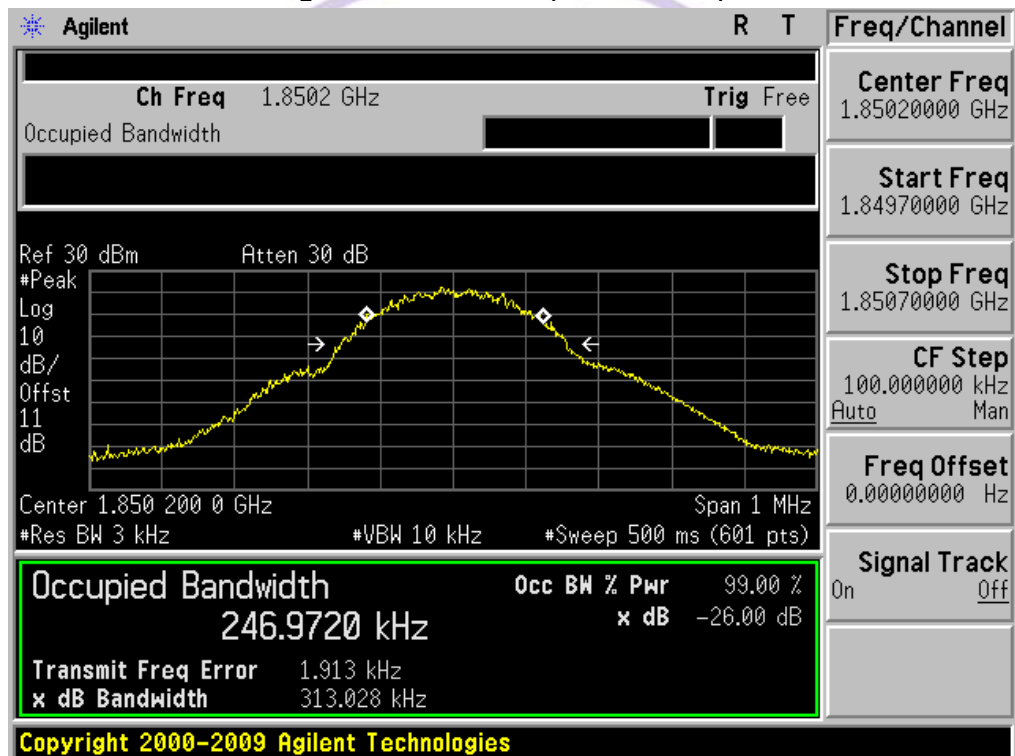


Figure Channel 661 (1880.00MHz)

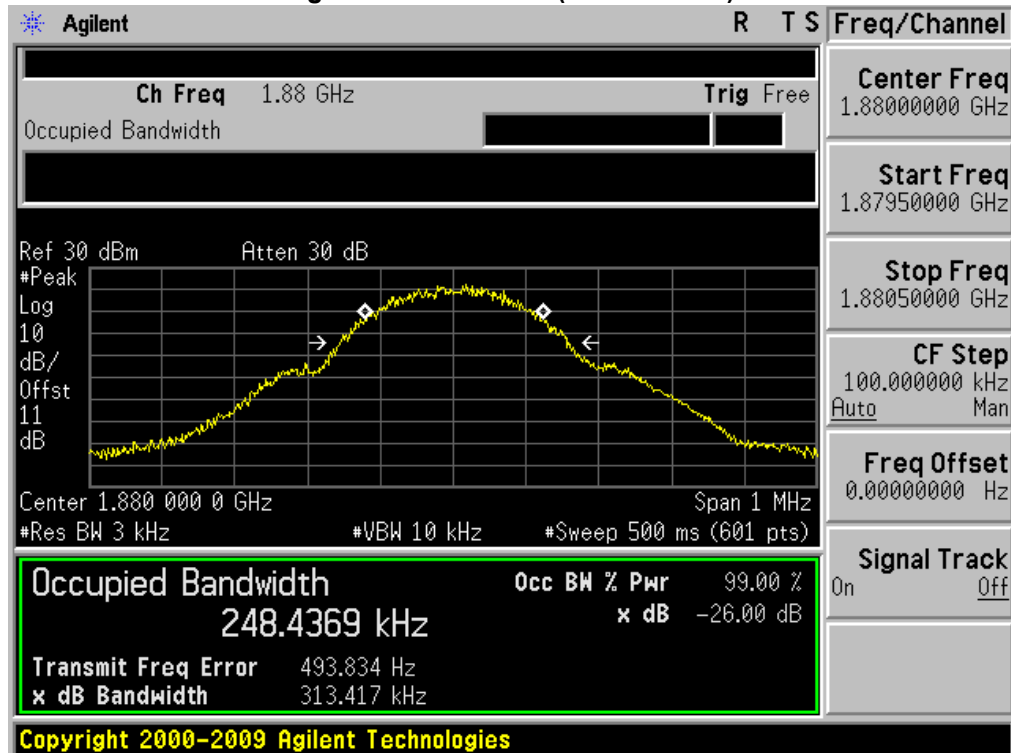
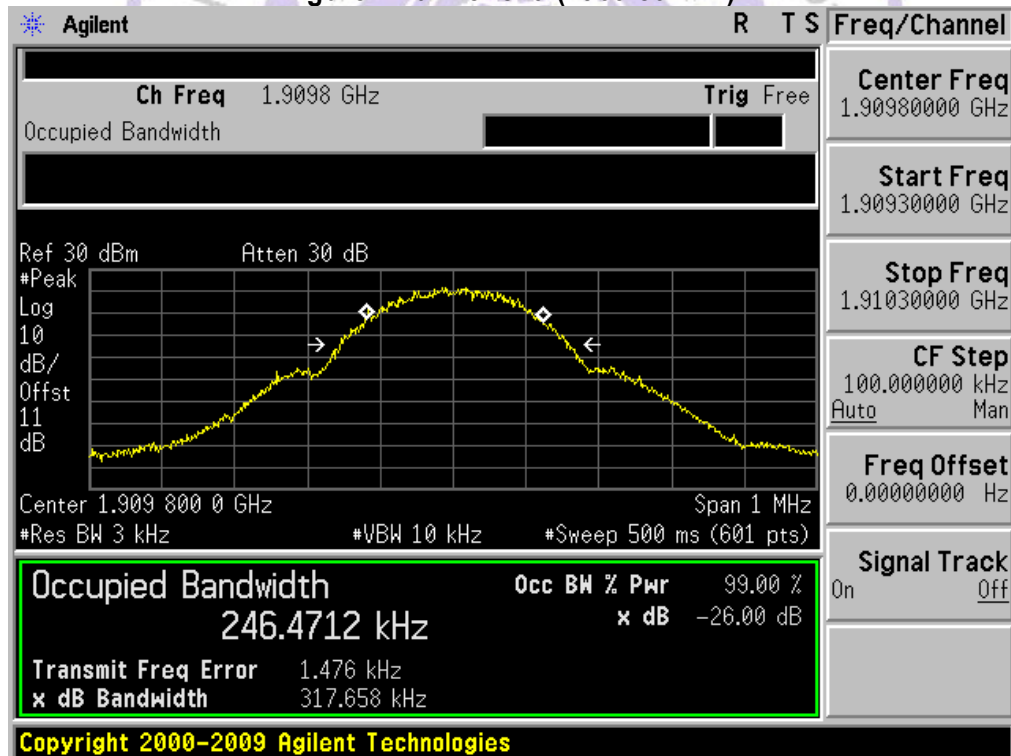


Figure Channel 810 (1909.80MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	WCDMA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
9262	1852.4	4.622	4.151
9400	1880.0	4.641	4.147
9538	1907.6	4.632	4.133

Figure Channel 9262 (1852.4MHz)

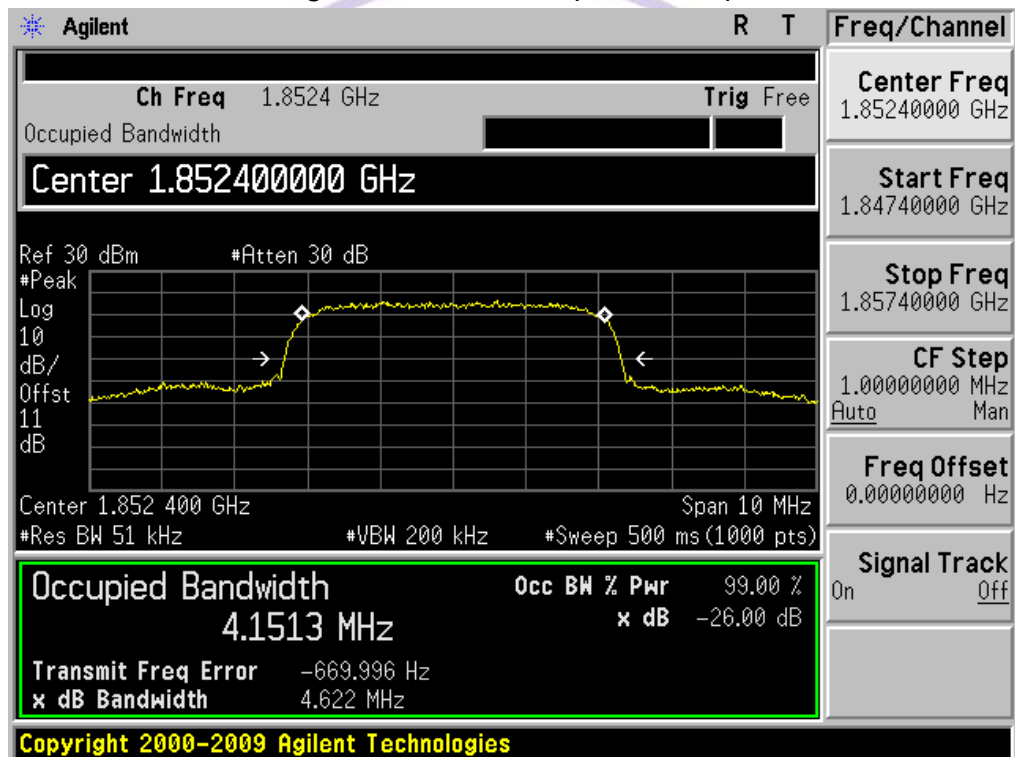


Figure Channel 9400 (1880.00MHz)

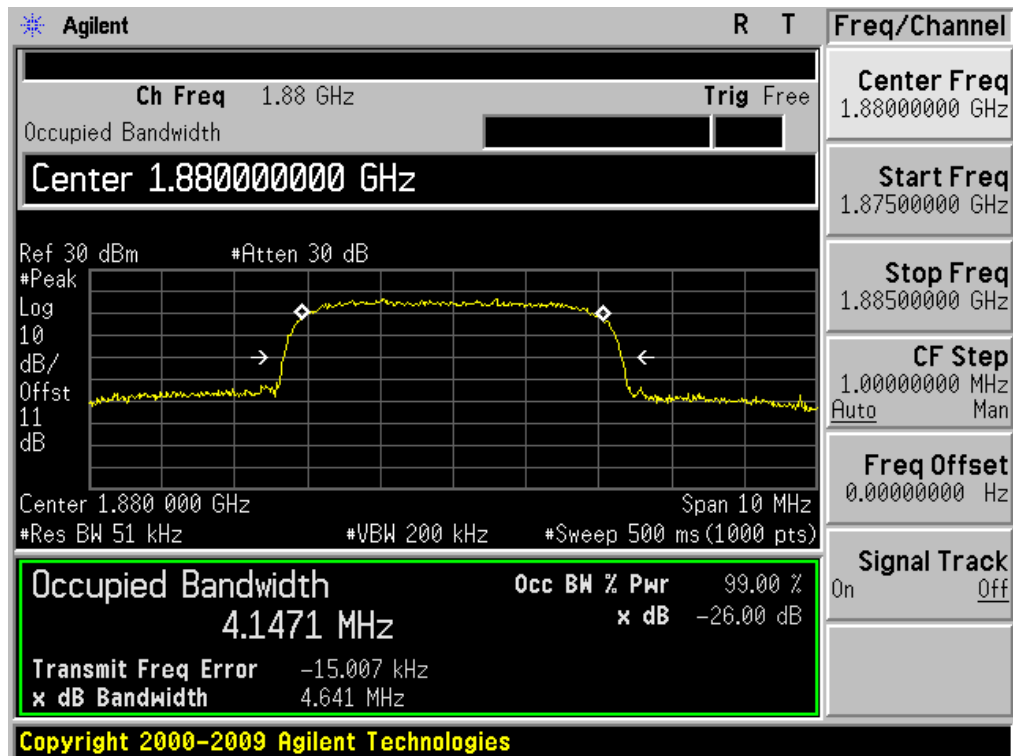
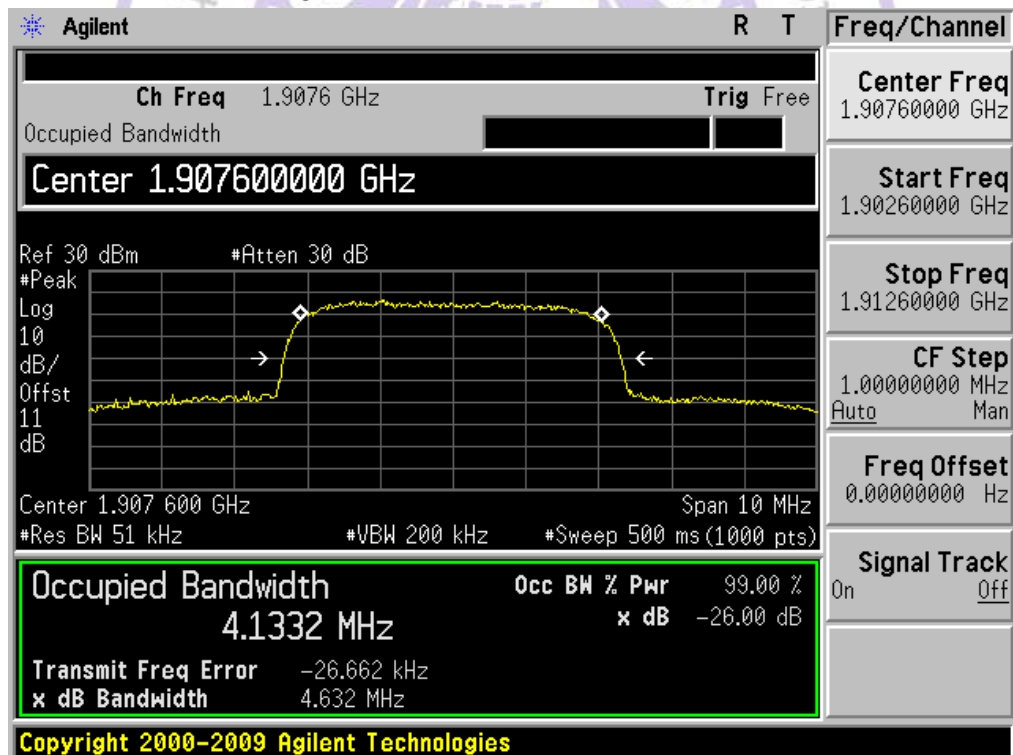


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	WCDMA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
4132	826.4	4.621	4.133
4182	836.4	4.626	4.139
4233	846.6	4.614	4.136

Figure Channel 4132 (826.4MHz)

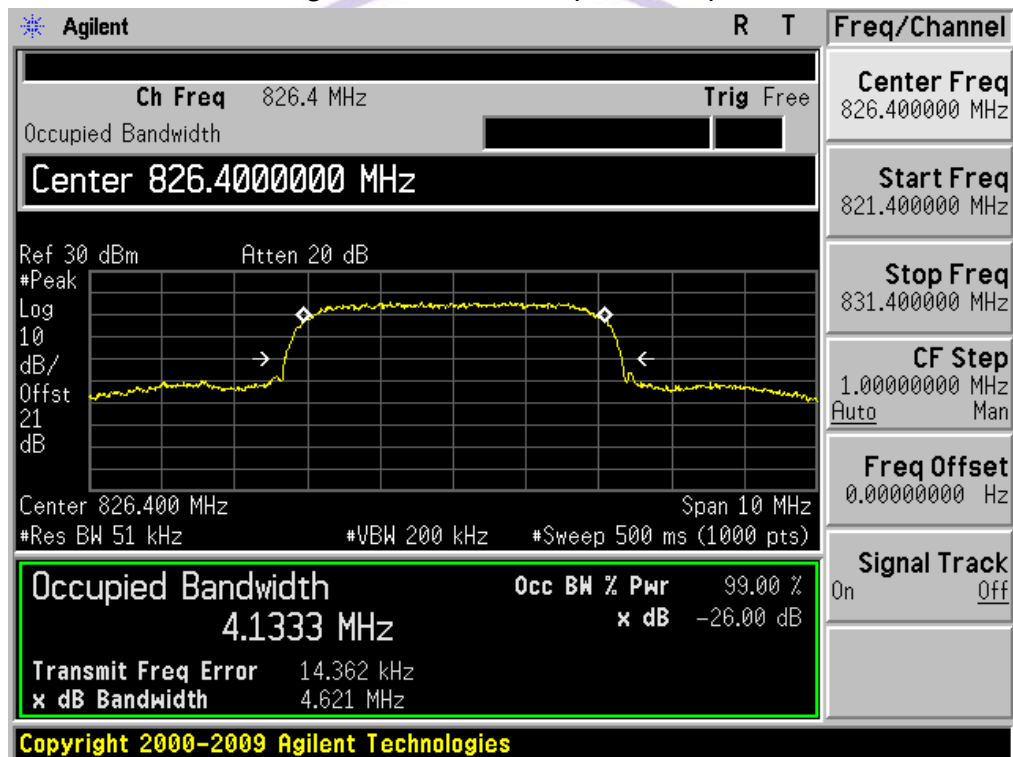


Figure Channel 4182 (836.40MHz)

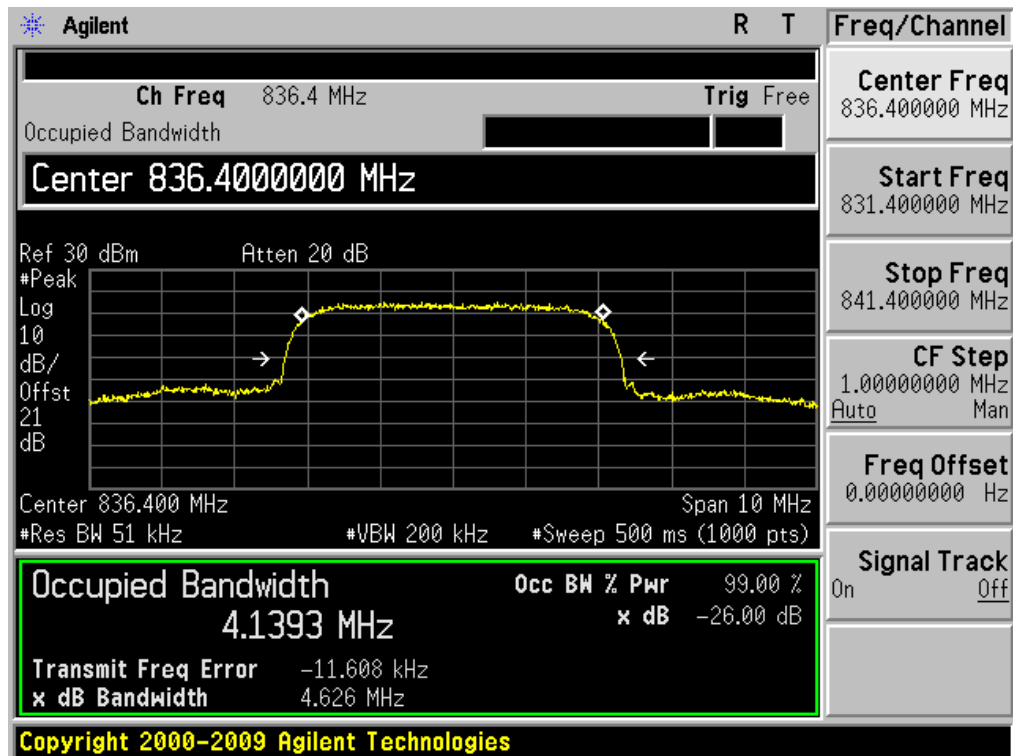
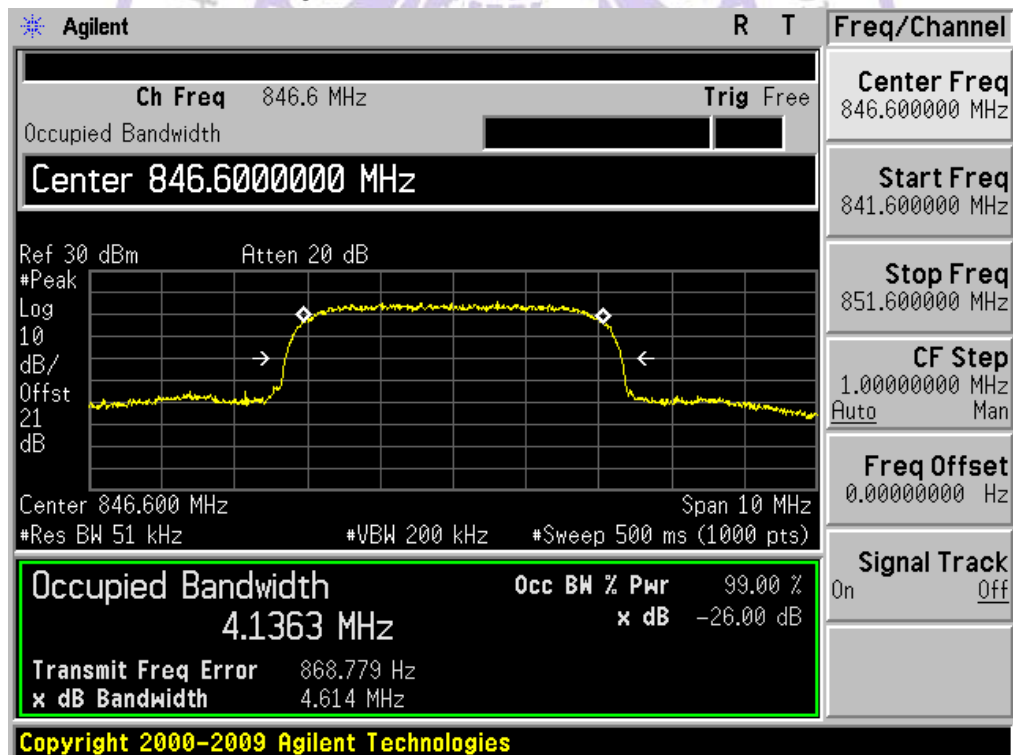


Figure Channel 4233 (846.60MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	HSDPA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
9262	1852.4	4.620	4.145
9400	1880.0	4.622	4.144
9538	1907.6	4.620	4.137

Figure Channel 9262 (1852.4MHz)

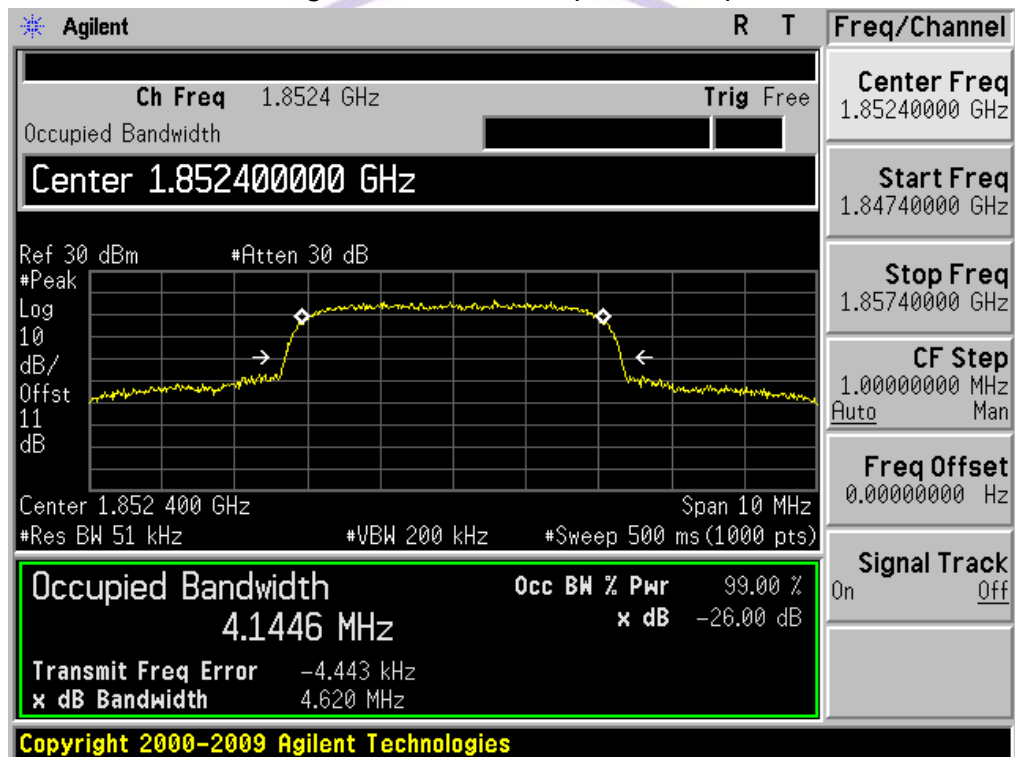


Figure Channel 9400 (1880.00MHz)

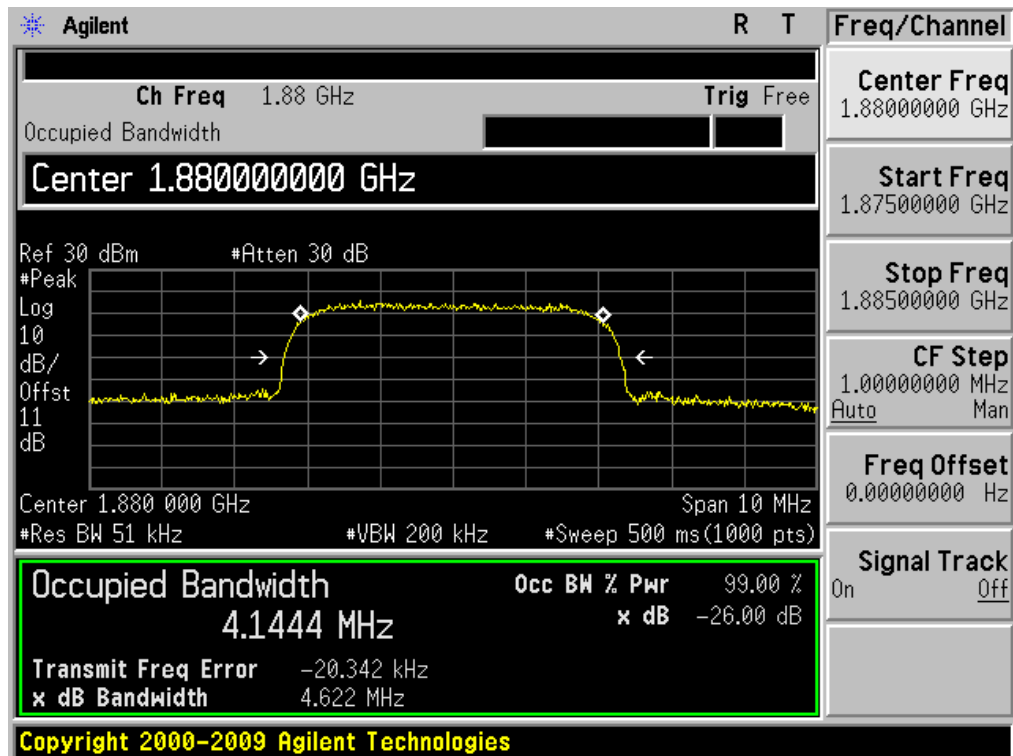
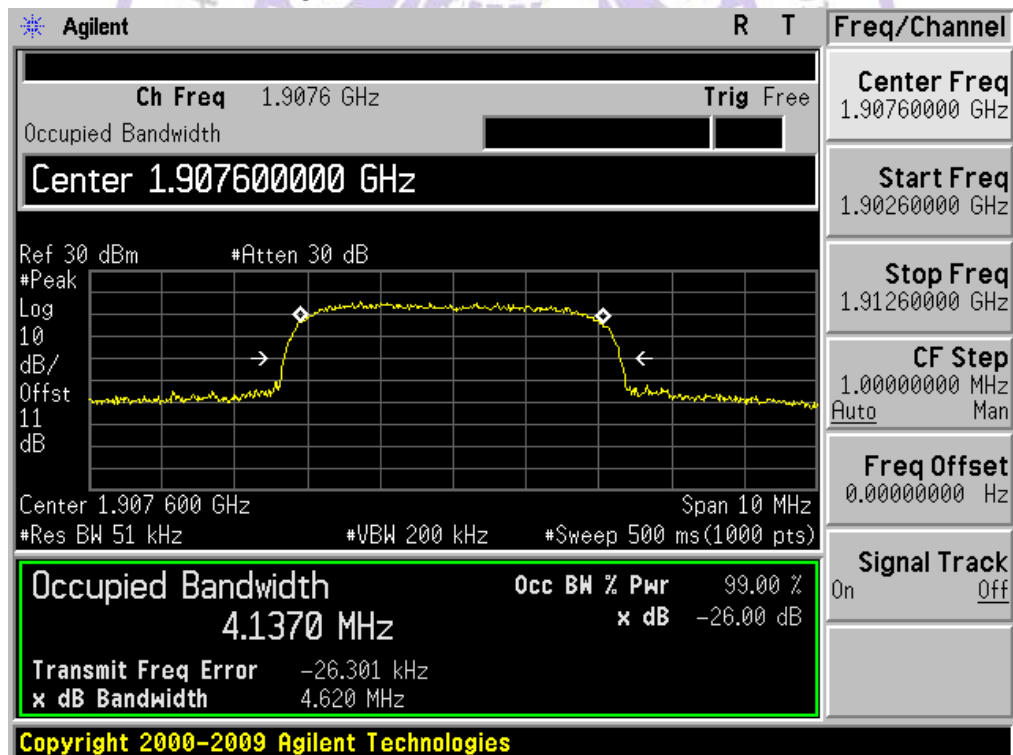


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	HSDPA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
4132	826.4	4.625	4.137
4182	836.4	4.623	4.146
4233	846.6	4.621	4.118

Figure Channel 4132 (826.4MHz)

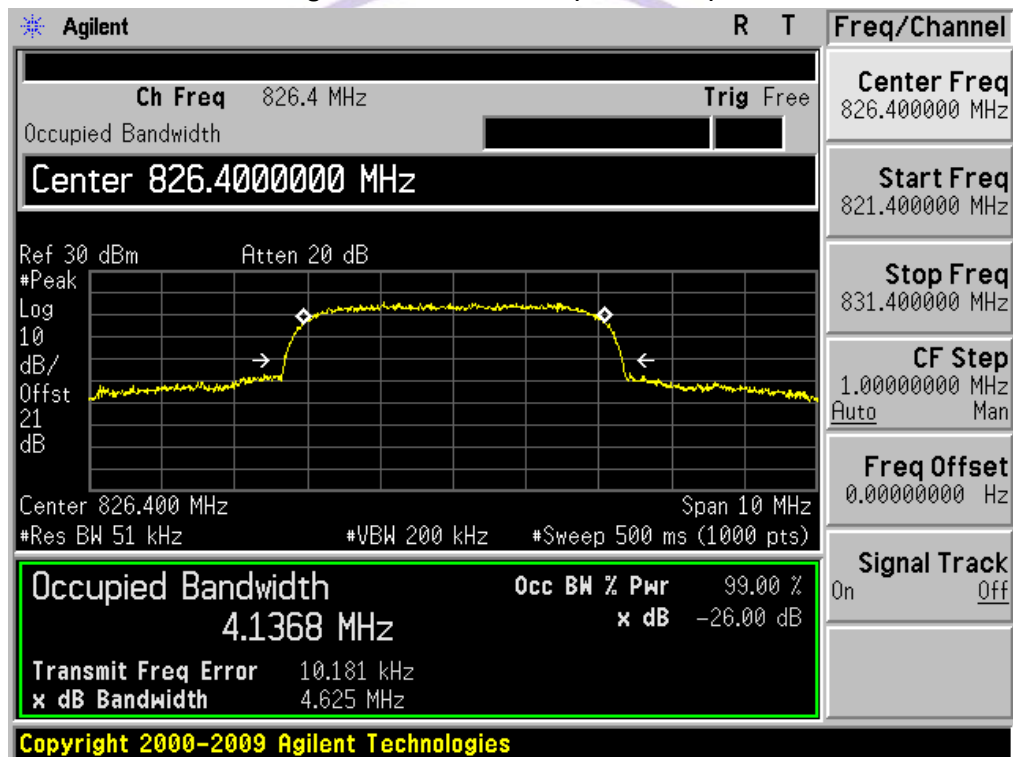


Figure Channel 4182 (836.40MHz)

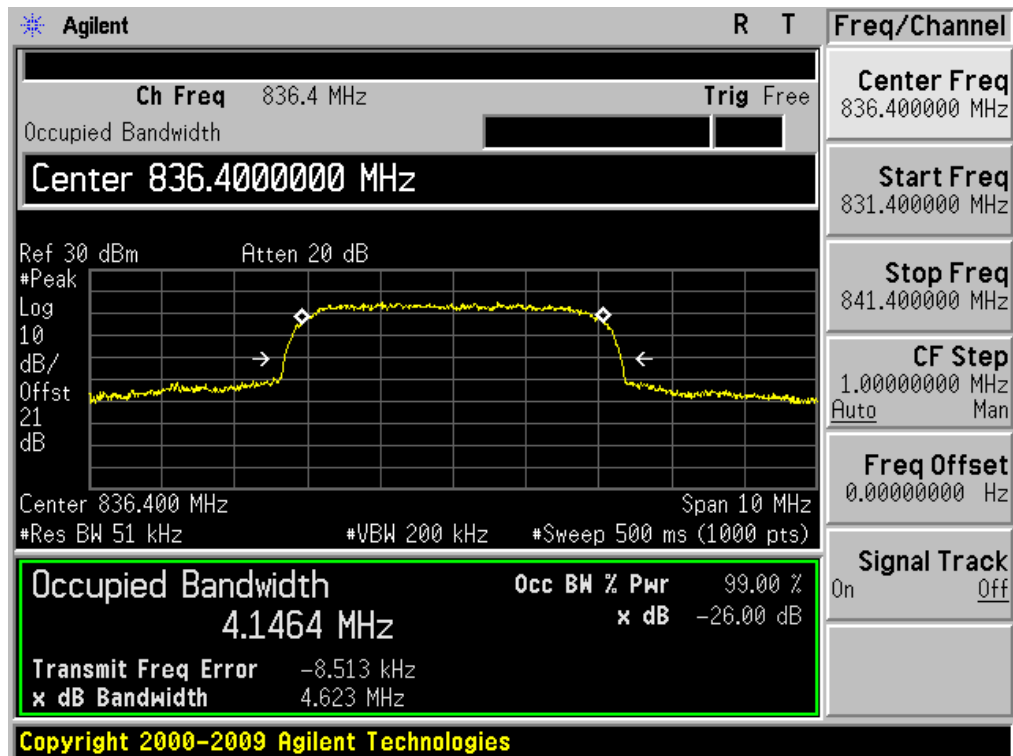
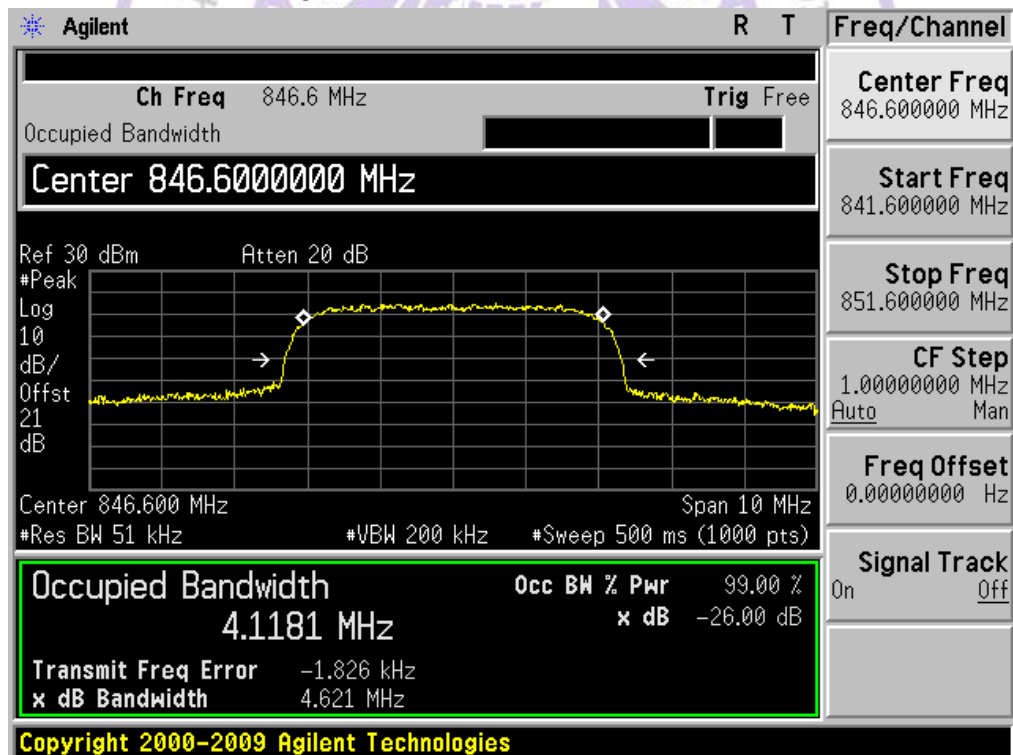


Figure Channel 4233 (846.60MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	HSUPA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
9262	1852.4	4.677	4.177
9400	1880.0	4.628	4.155
9538	1907.6	4.626	4.164

Figure Channel 9262 (1852.4MHz)

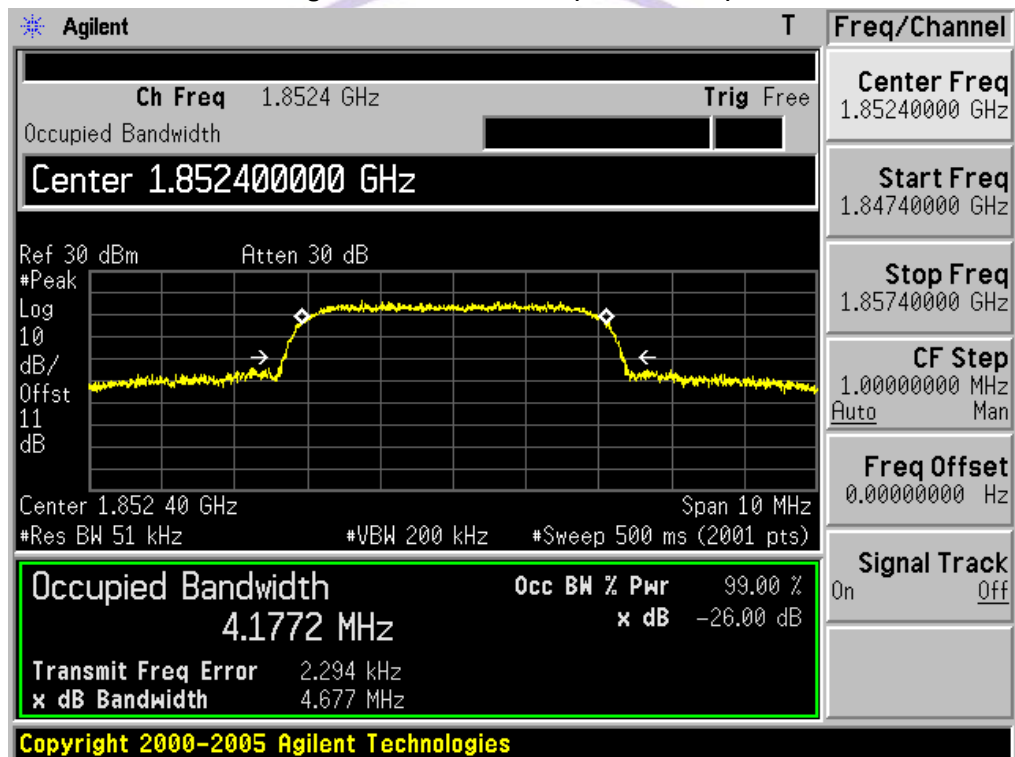


Figure Channel 9400 (1880.00MHz)

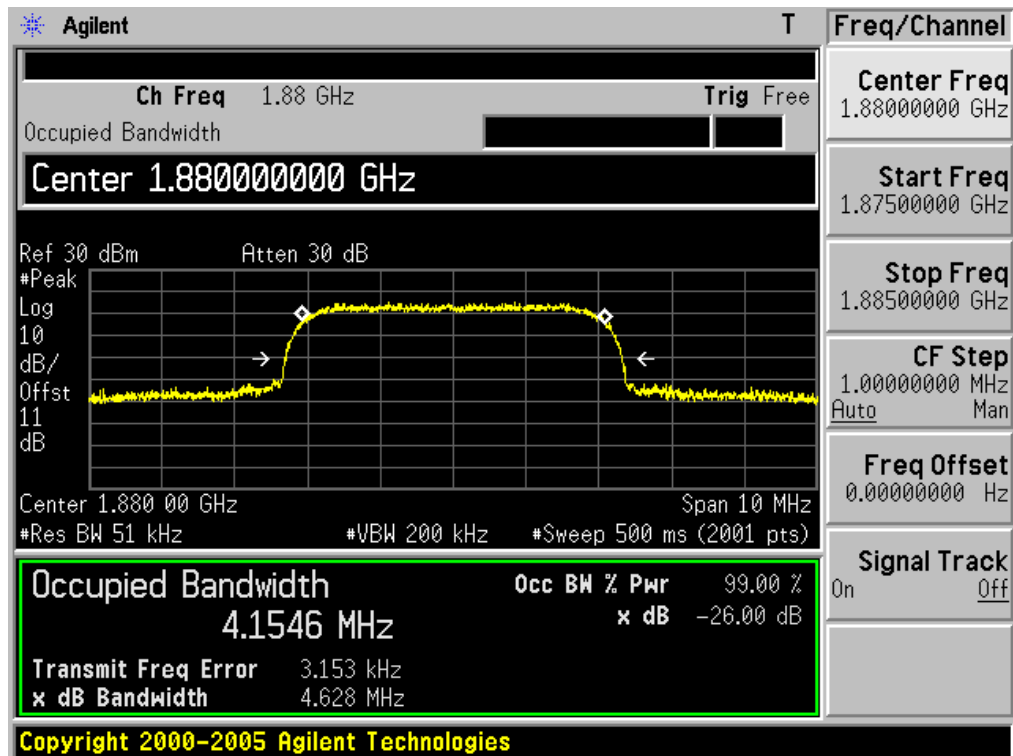
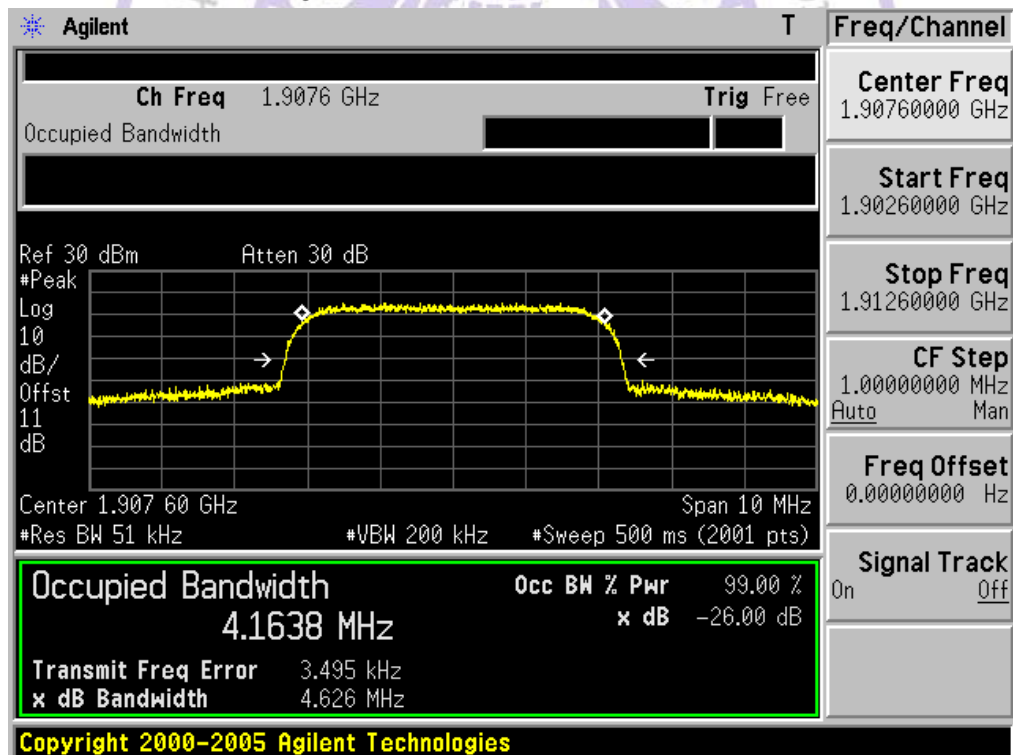


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Occupied Bandwidth		
Test Mode	HSUPA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
4132	826.4	4.642	4.172
4182	836.4	4.639	4.170
4233	846.6	4.634	4.175

Figure Channel 4132 (826.4MHz)

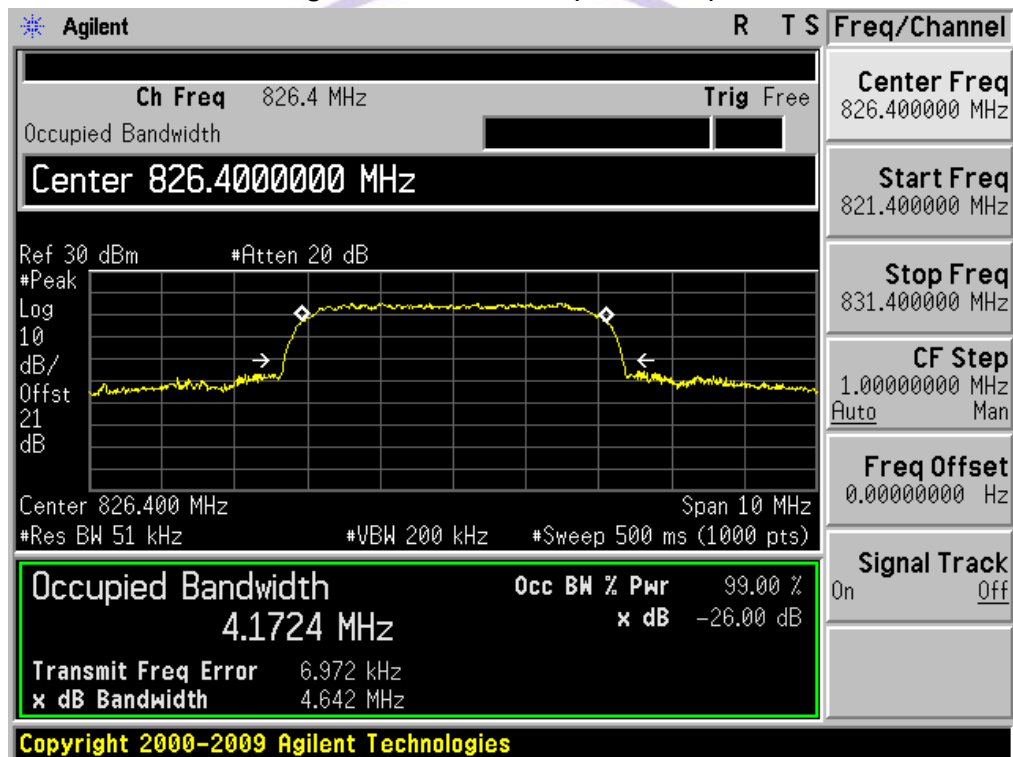


Figure Channel 4182 (836.40MHz)

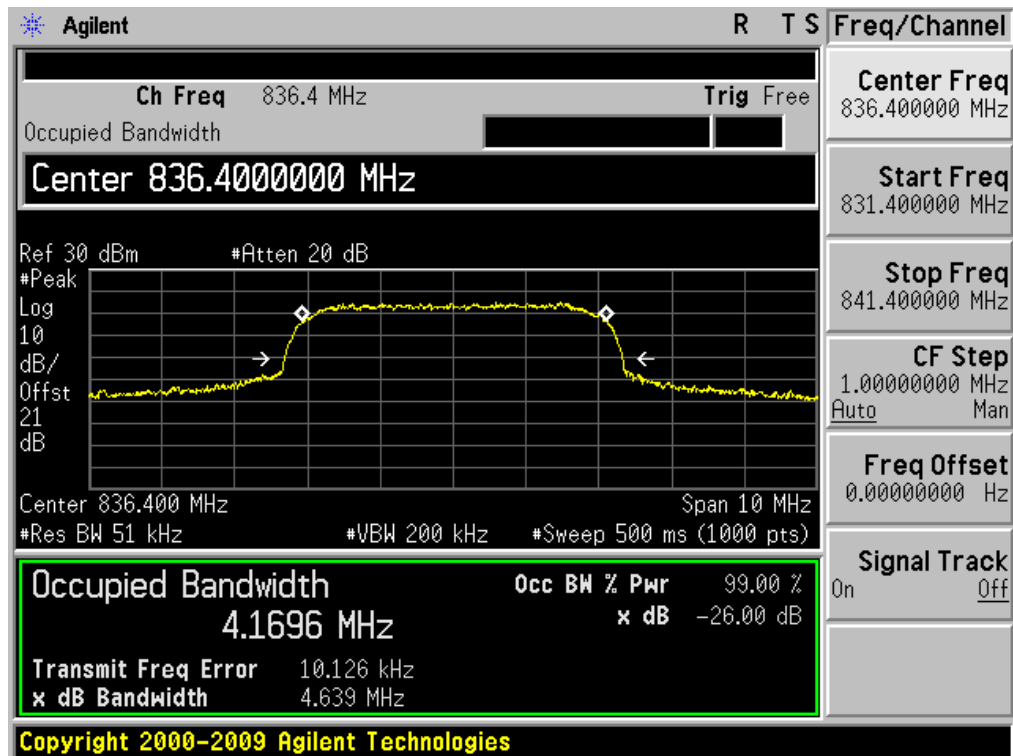
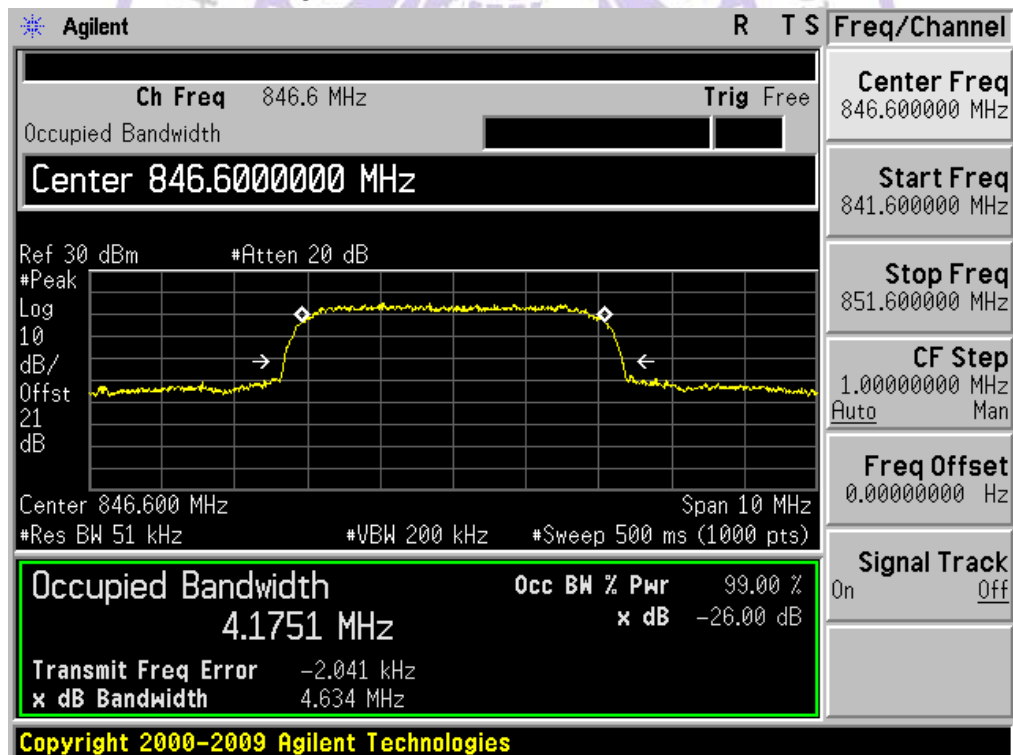
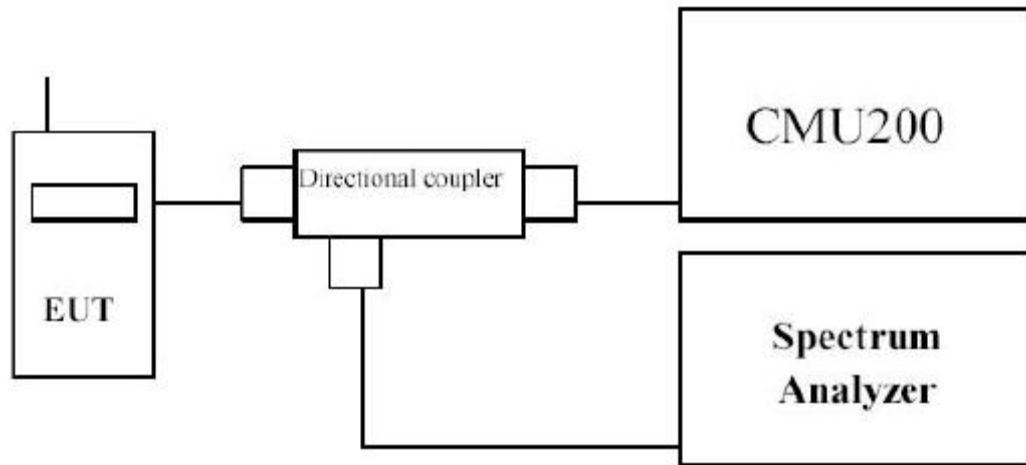


Figure Channel 4233 (846.60MHz)



4.4. Spurious Emission At Antenna Terminals (+/- 1MHz)

TEST CONFIGURATION



TEST PROCEDURE

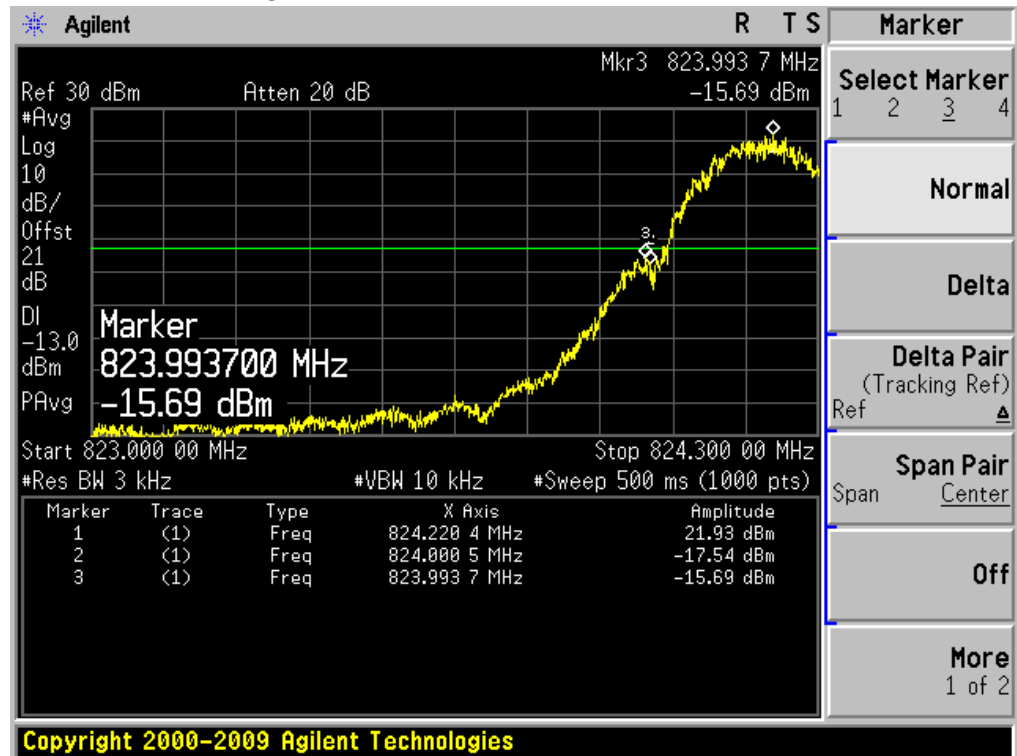
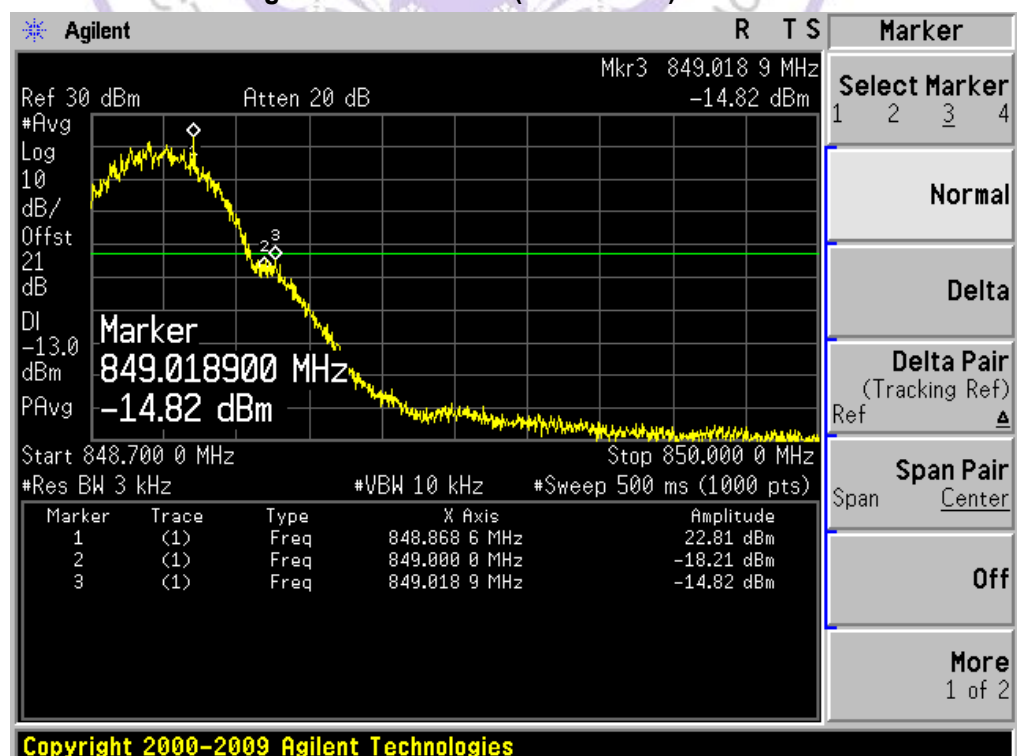
In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

TEST RESULTS

Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	GSM850 GPRS Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 128 (824.20MHz)**Figure Channel 251 (848.80MHz)**

Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	PCS1900 GPRS Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 512 (1850.20MHz)

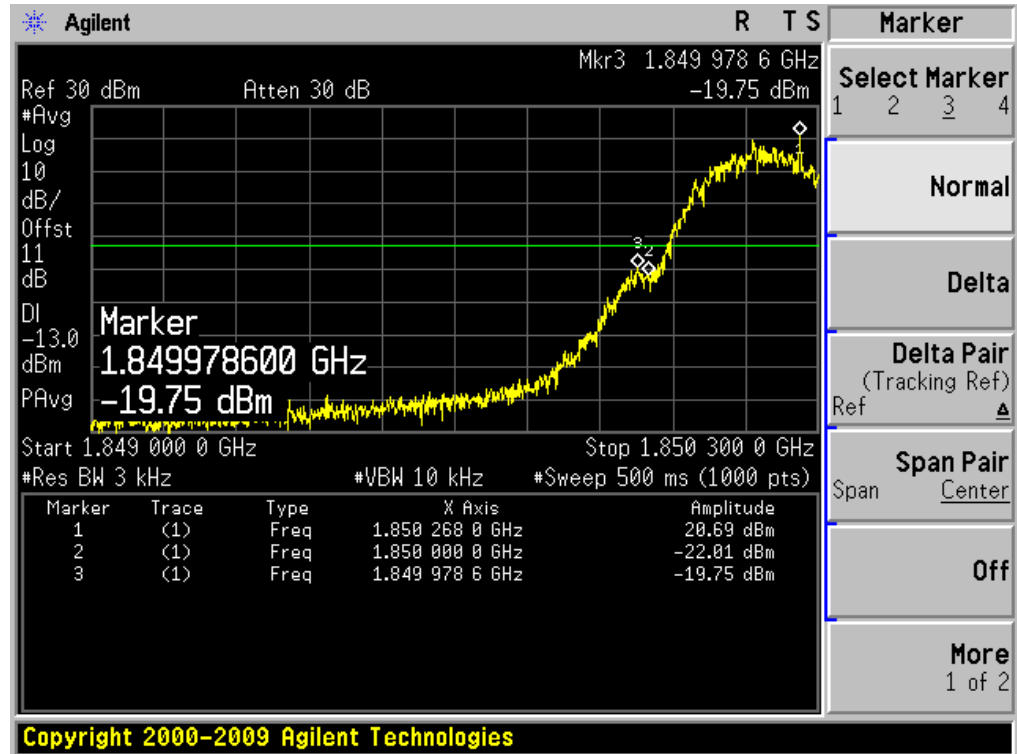


Figure Channel 810 (1909.80MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	WCDMA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 9262 (1852.4MHz)

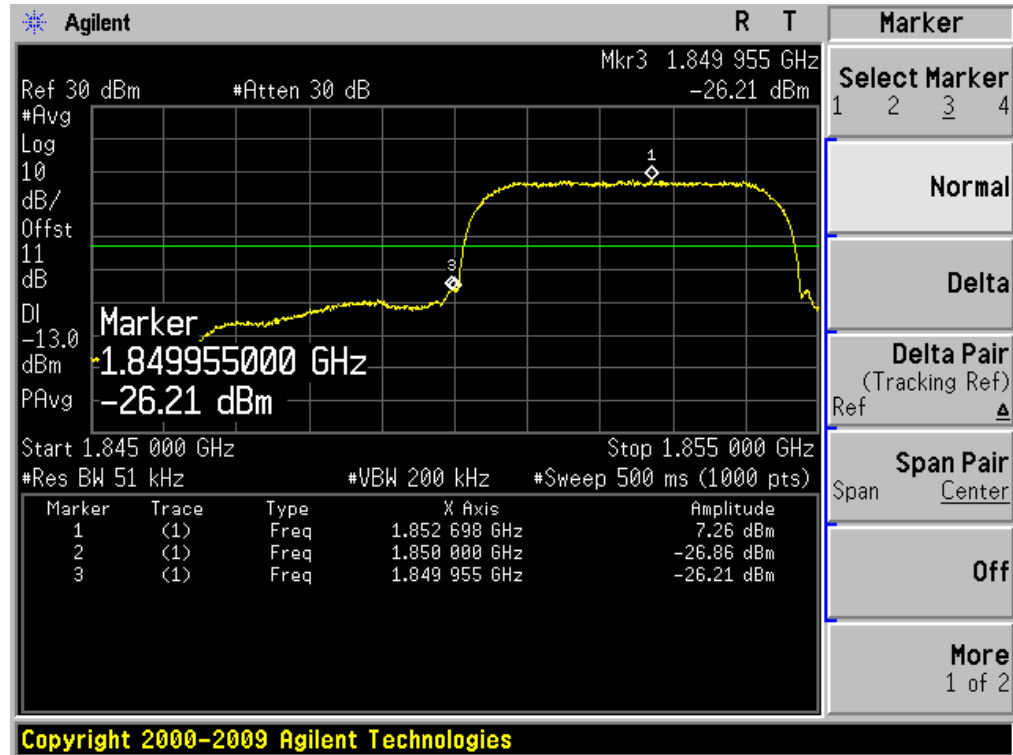
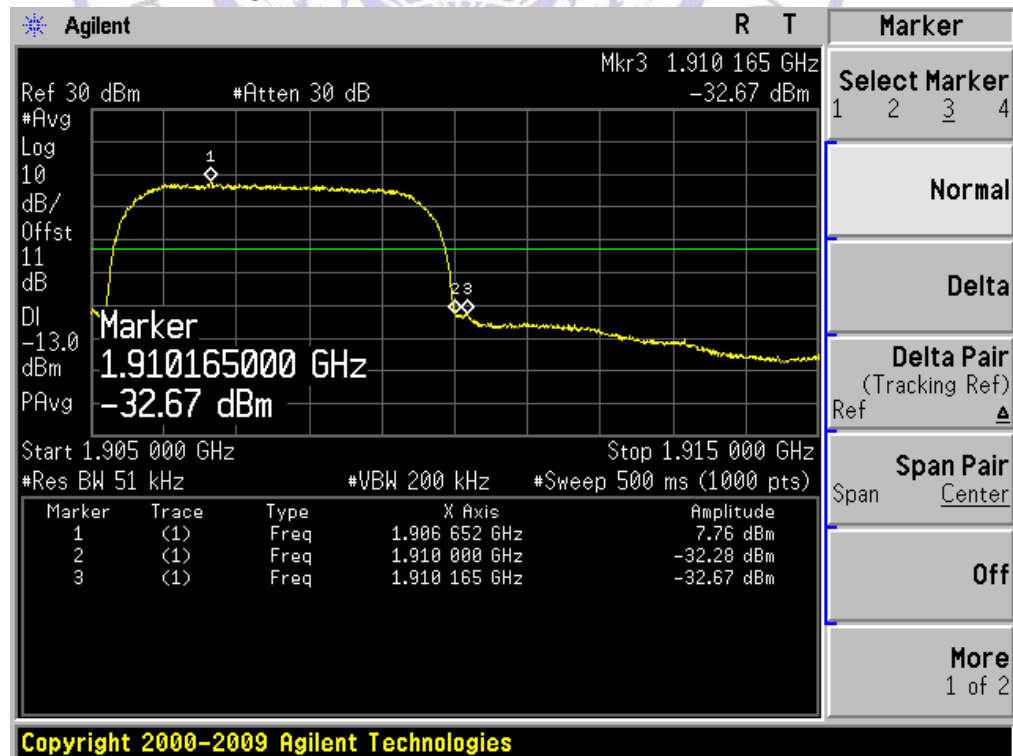


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	WCDMA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 4132 (1852.4MHz)

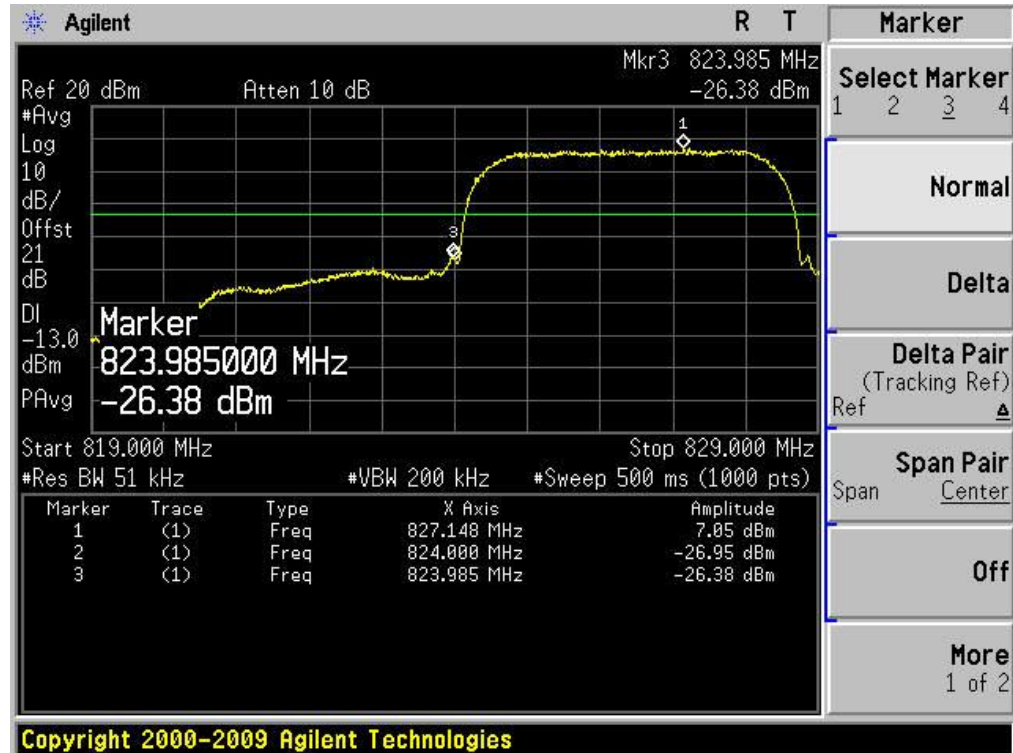


Figure Channel 4233 (1907.60MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	HSDPA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 9262 (1852.4MHz)

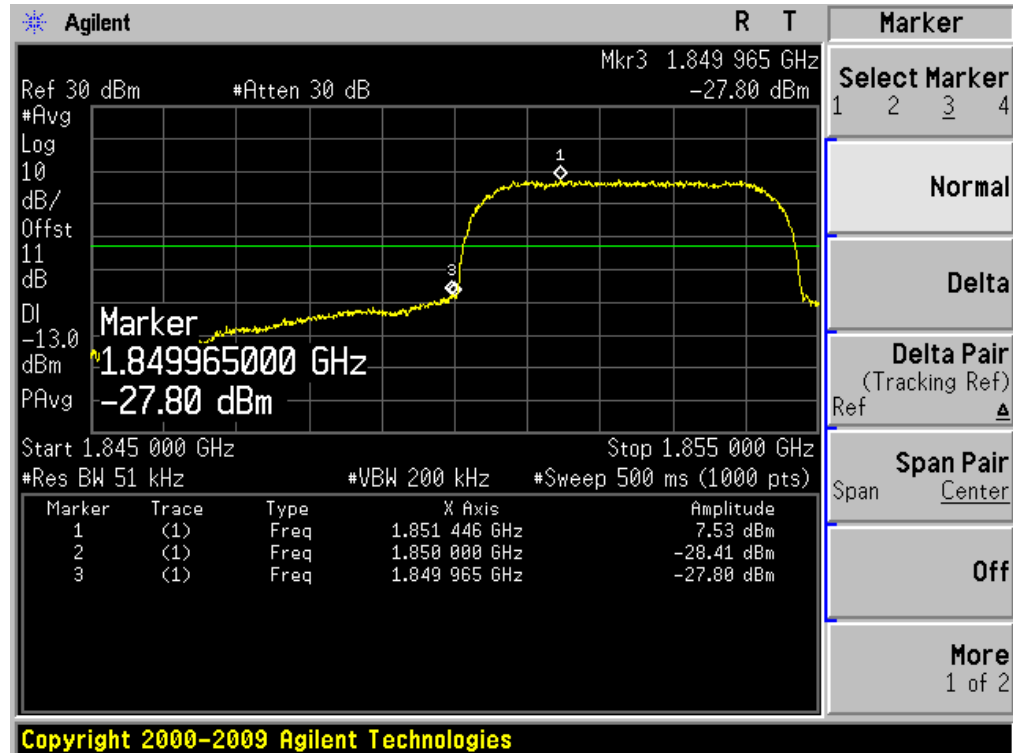
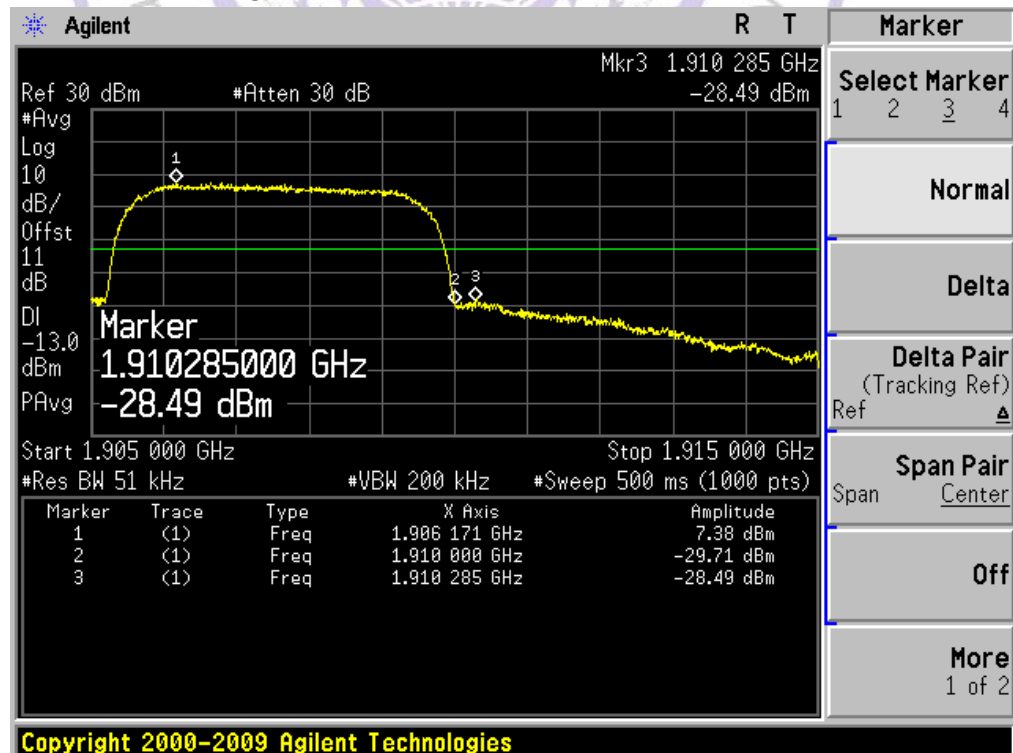


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	HSDPA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 4132 (826.4MHz)

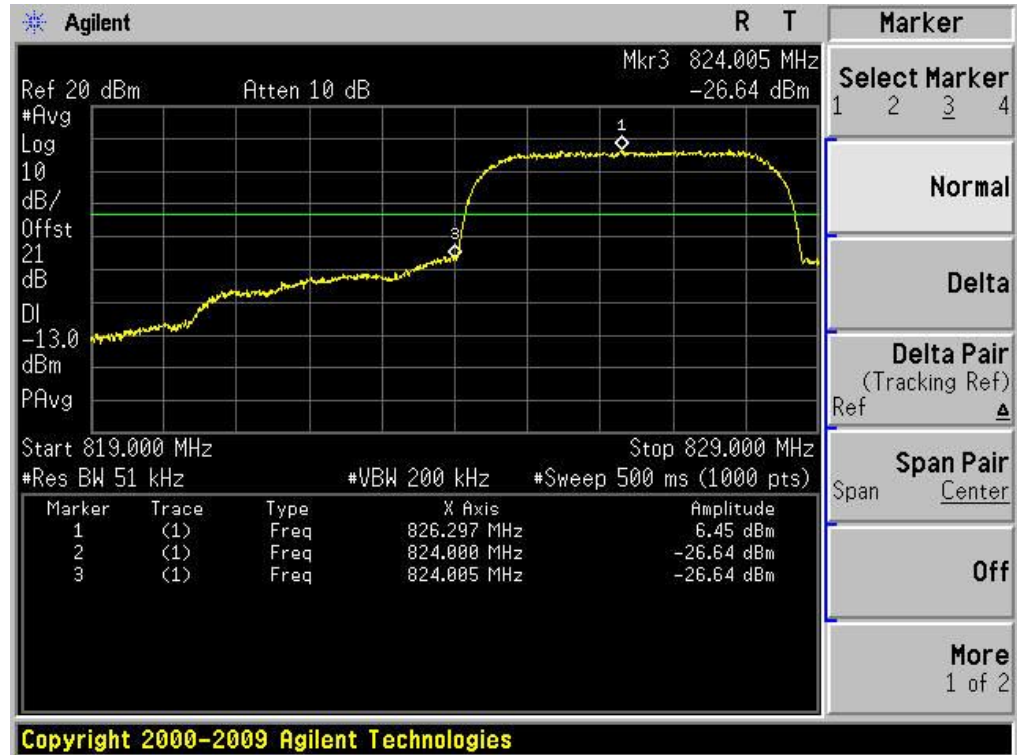


Figure Channel 4233 (846.6MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	HSUPA Band II Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 9262 (1852.4MHz)

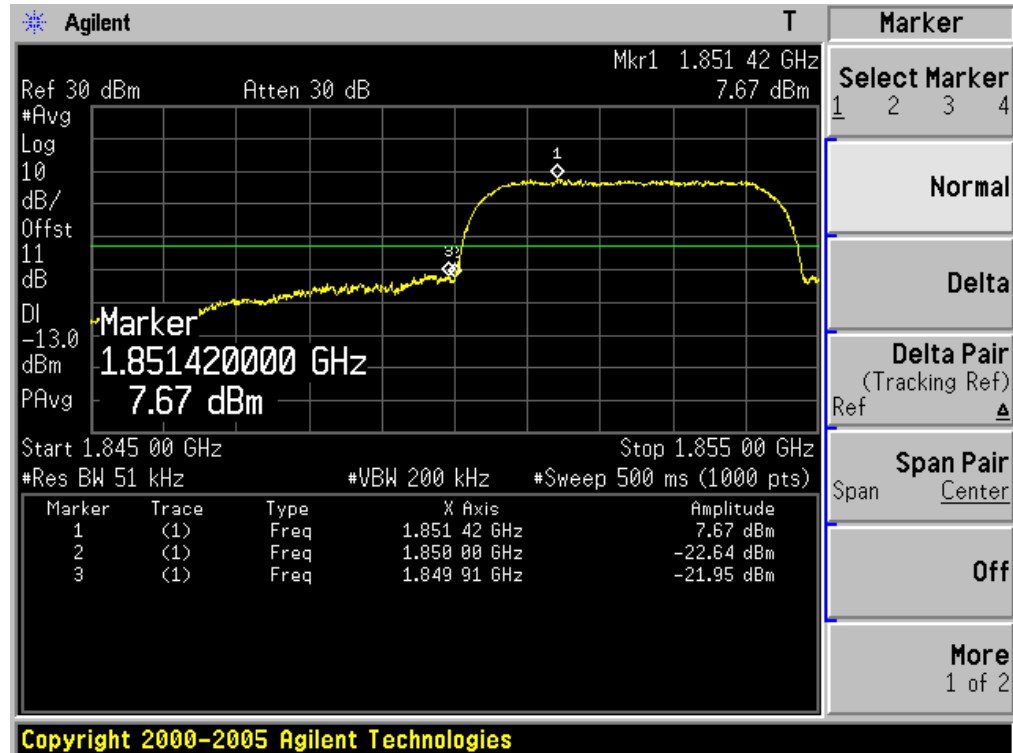
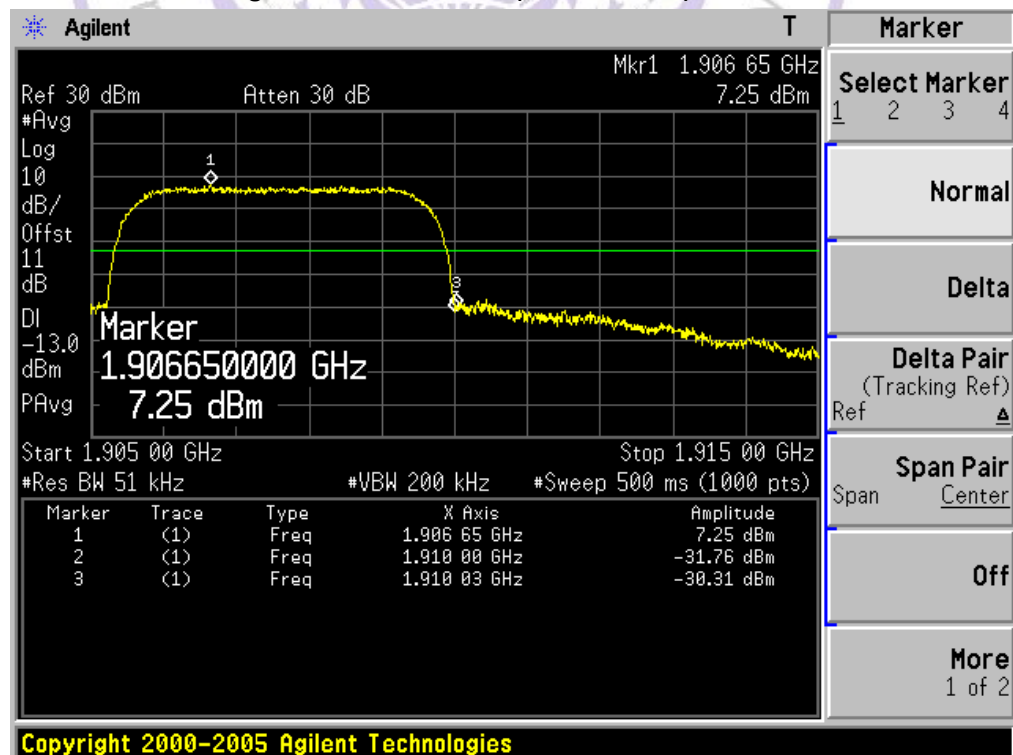


Figure Channel 9538 (1907.60MHz)



Product	Smartphone		
Test Item	Spurious Emission At Antenna Terminals (+/- 1MHz)		
Test Mode	HSUPA Band V Link		
Date of Test	2013/02/06	Test Site	AC-6

Figure Channel 4132 (826.4MHz)

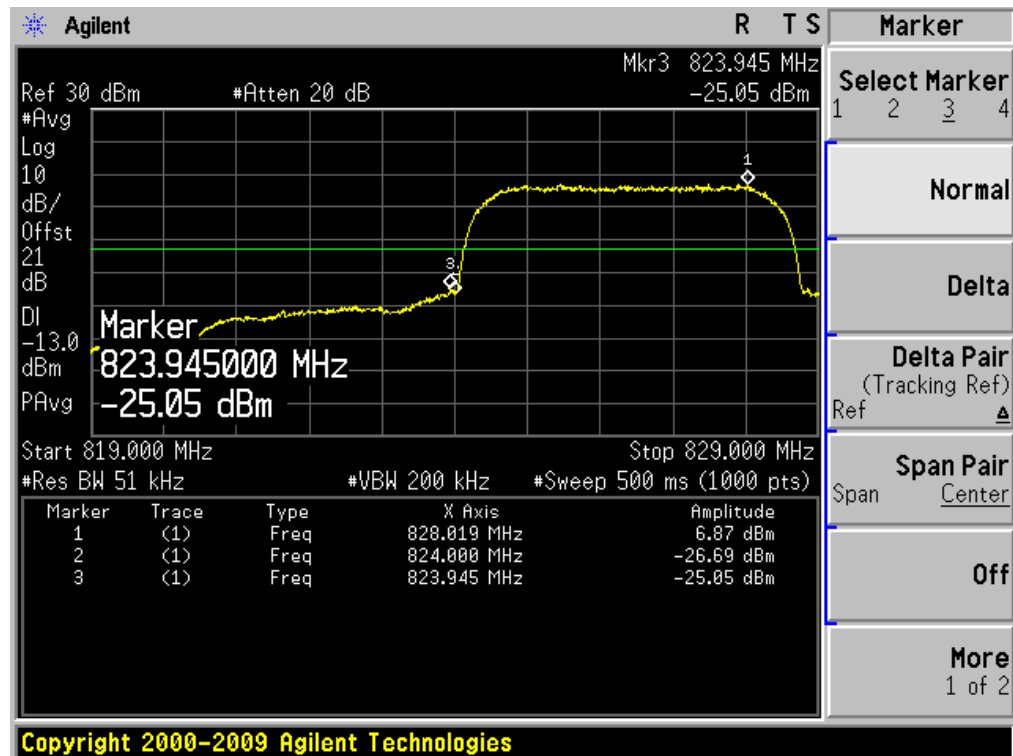
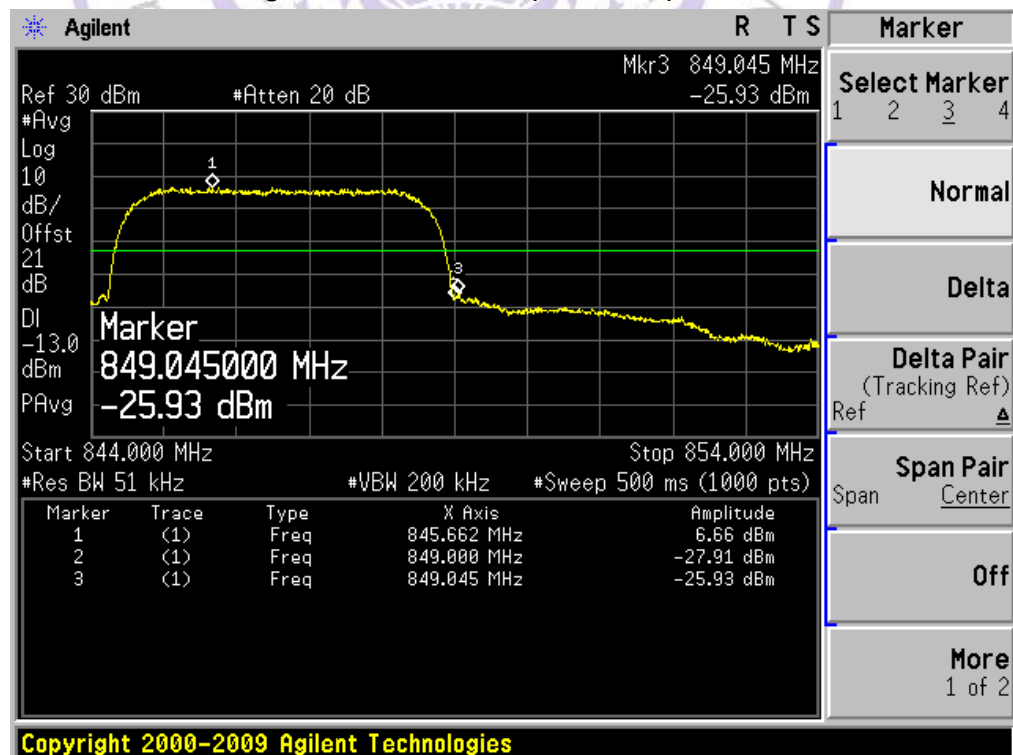


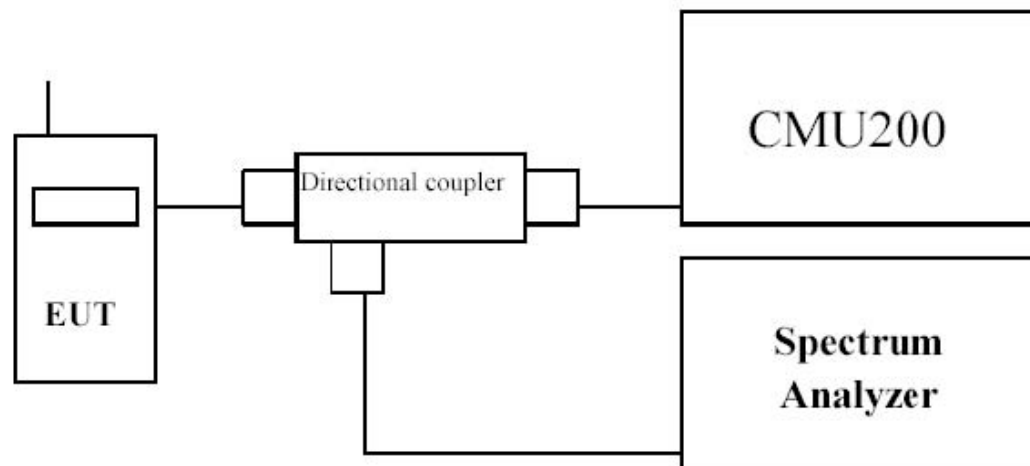
Figure Channel 4233 (846.6MHz)



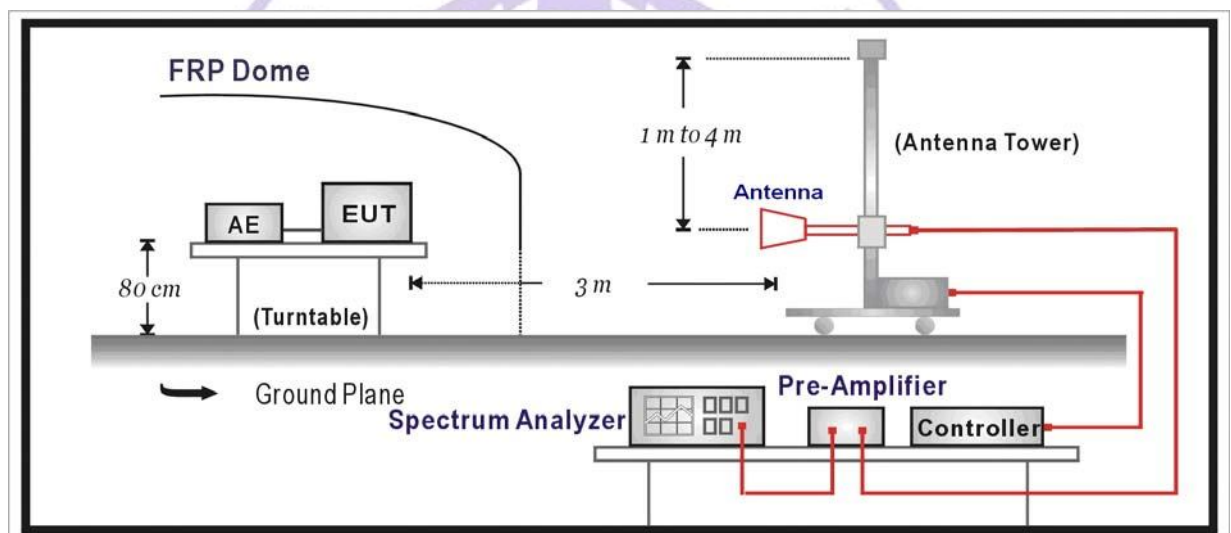
4.5. Spurious Emission

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

Radiated Spurious Measurement:

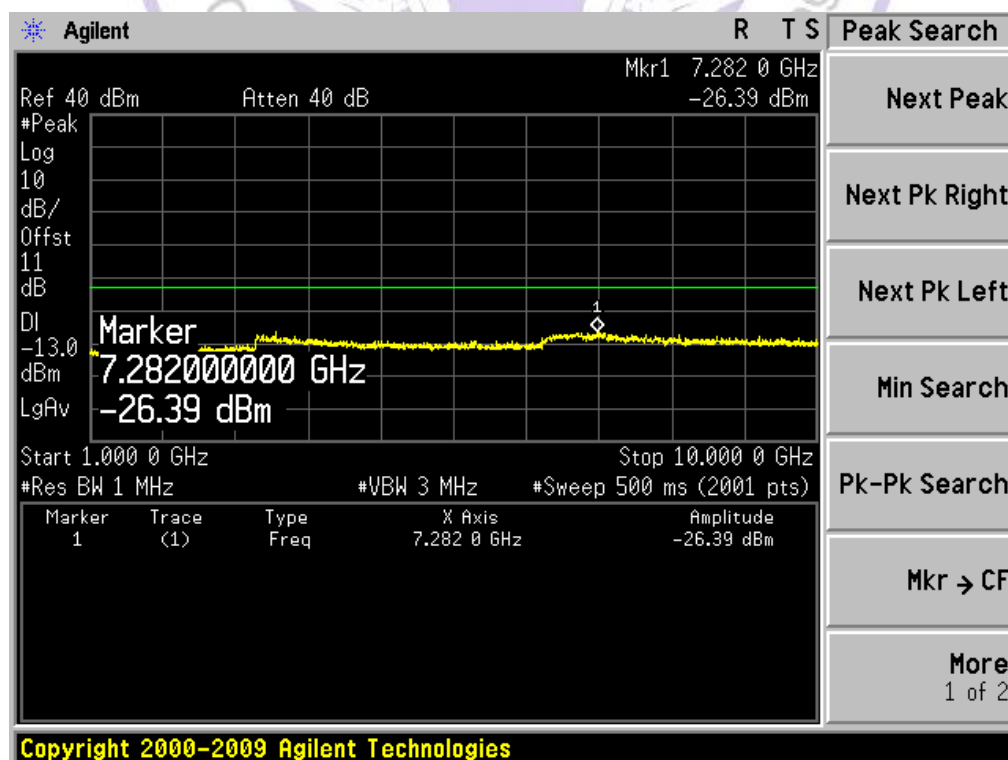
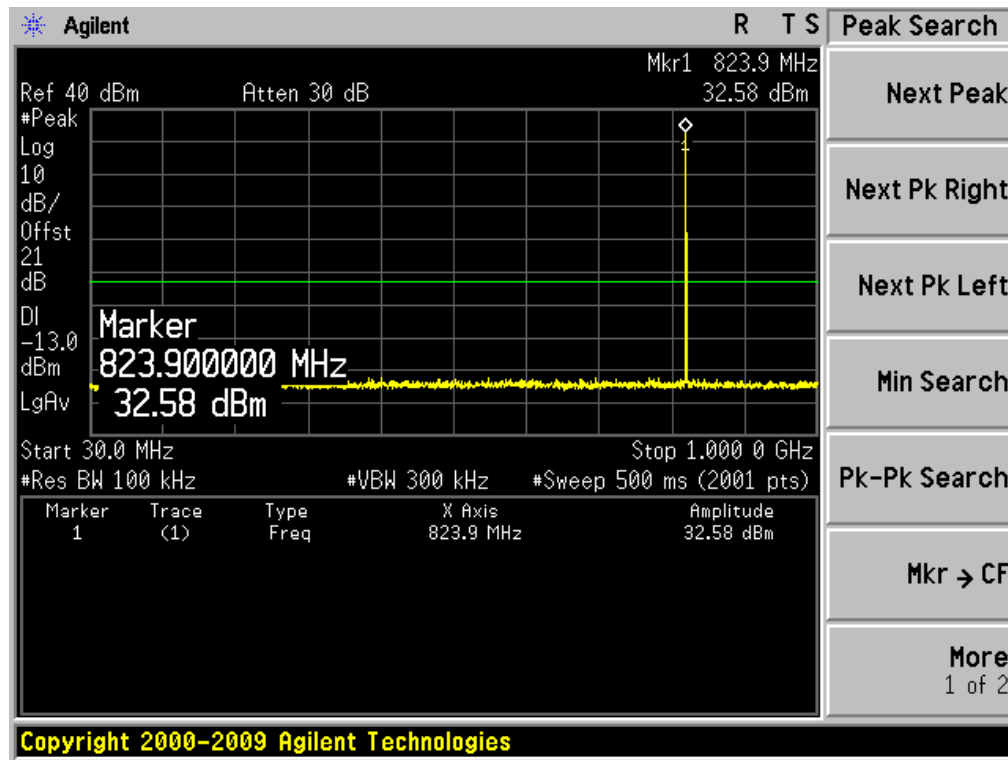
- a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- q) The maximum signal level detected by the measuring receiver shall be noted.
- h) The transmitter shall be replaced by a substitution antenna.
- i) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- j) The substitution antenna shall be connected to a calibrated signal generator.
- k) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- l) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- m) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- n) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- o) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- p) The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
- q) Test site anechoic chamber refer to ANSI C63.4: 2009

LIMIT

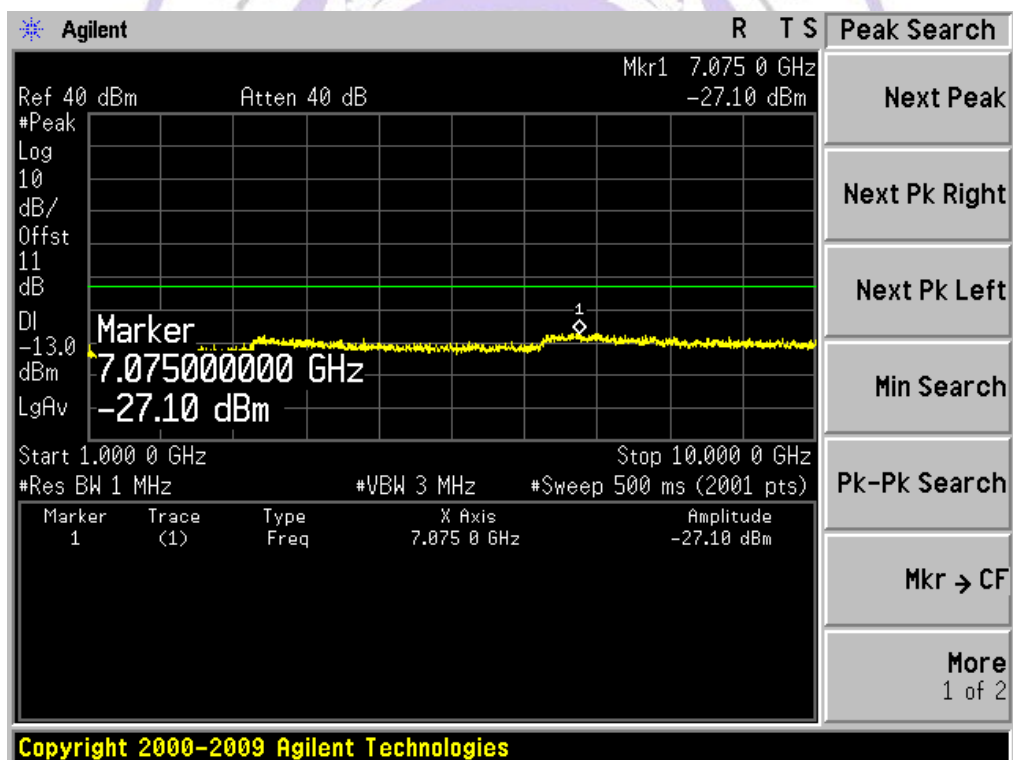
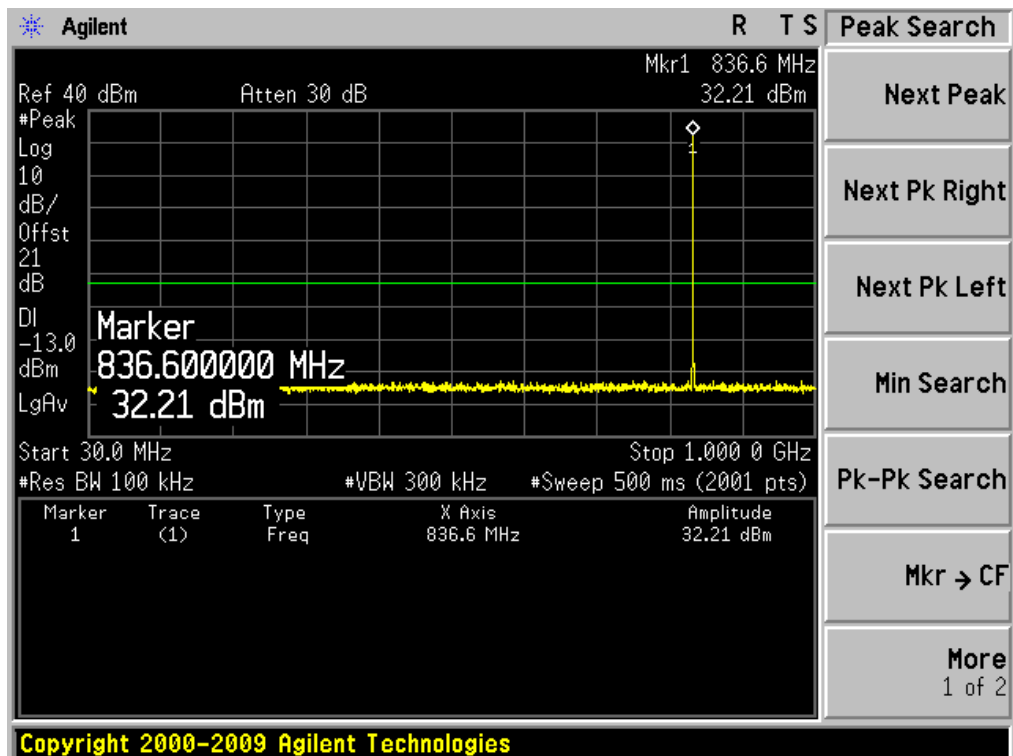
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

TEST RESULTS**Conducted Measurement**

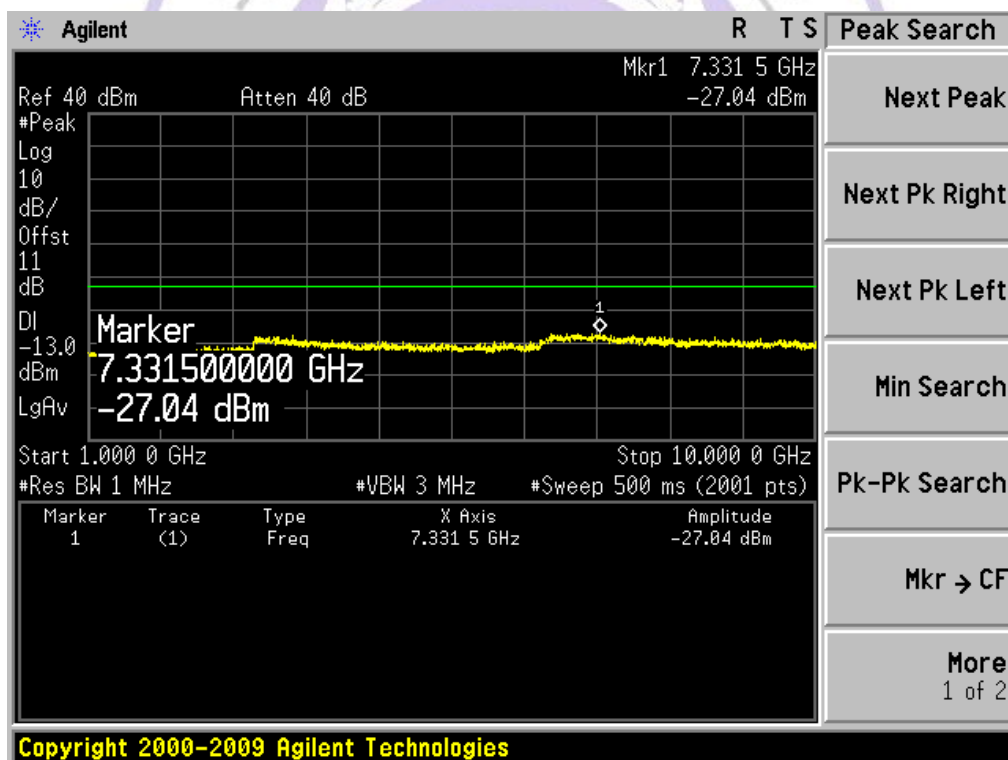
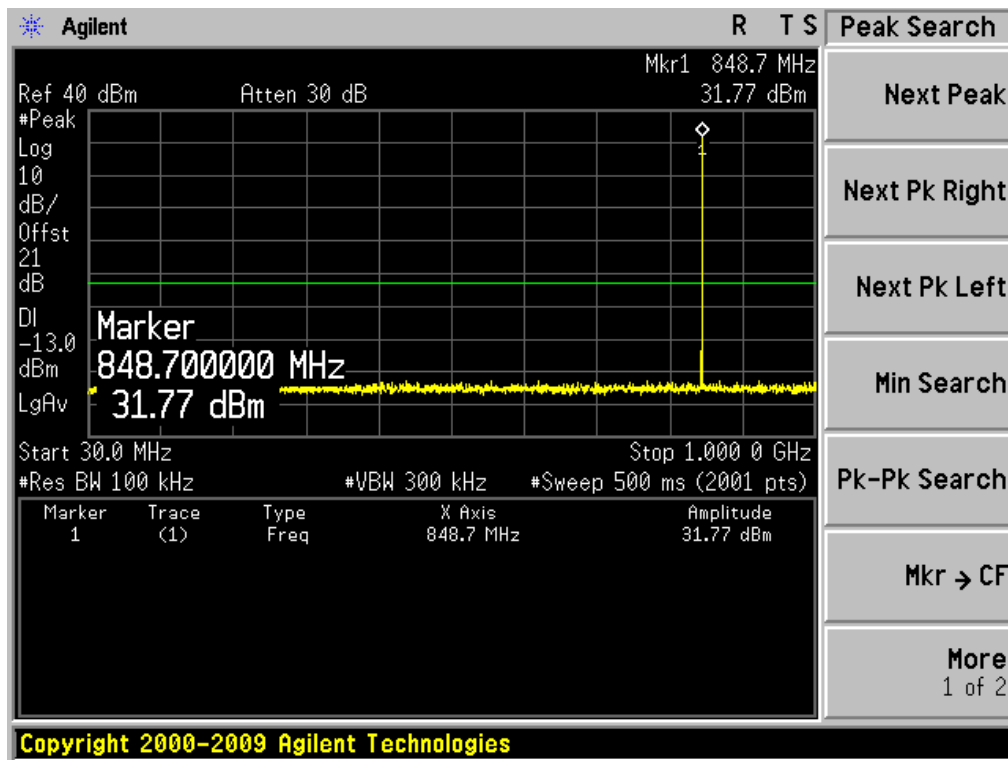
Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	GSM850 Traffic		
Date of Test	2013/02/06	Test Site	AC-5

Low Channel 128(824.2MHz)

Mid Channel 189(836.4MHz)

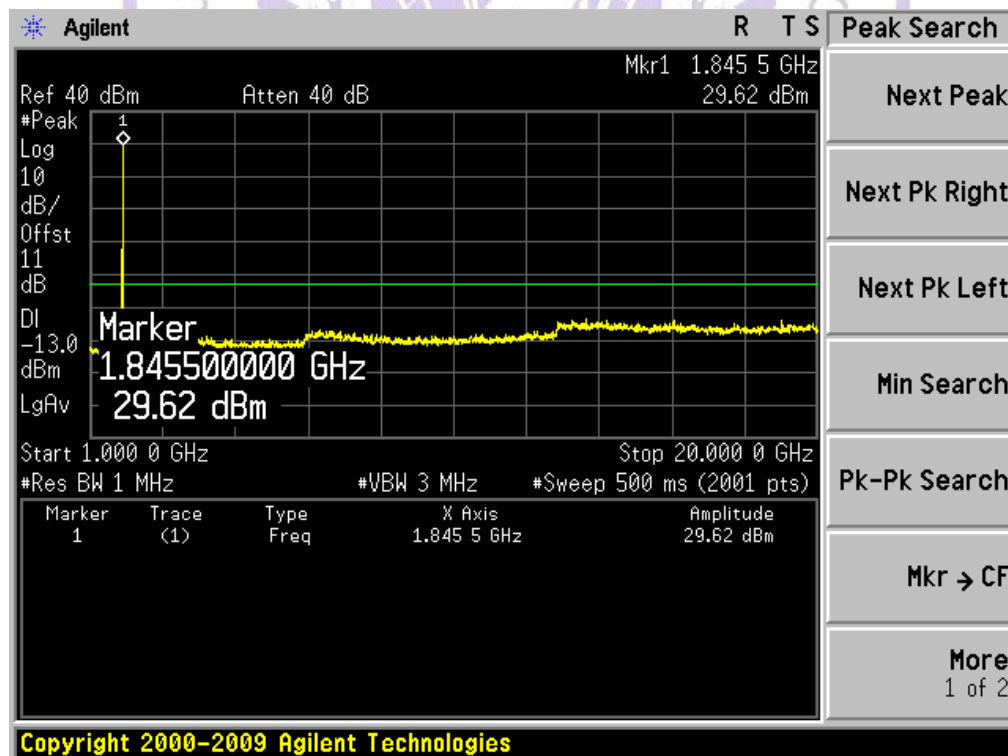
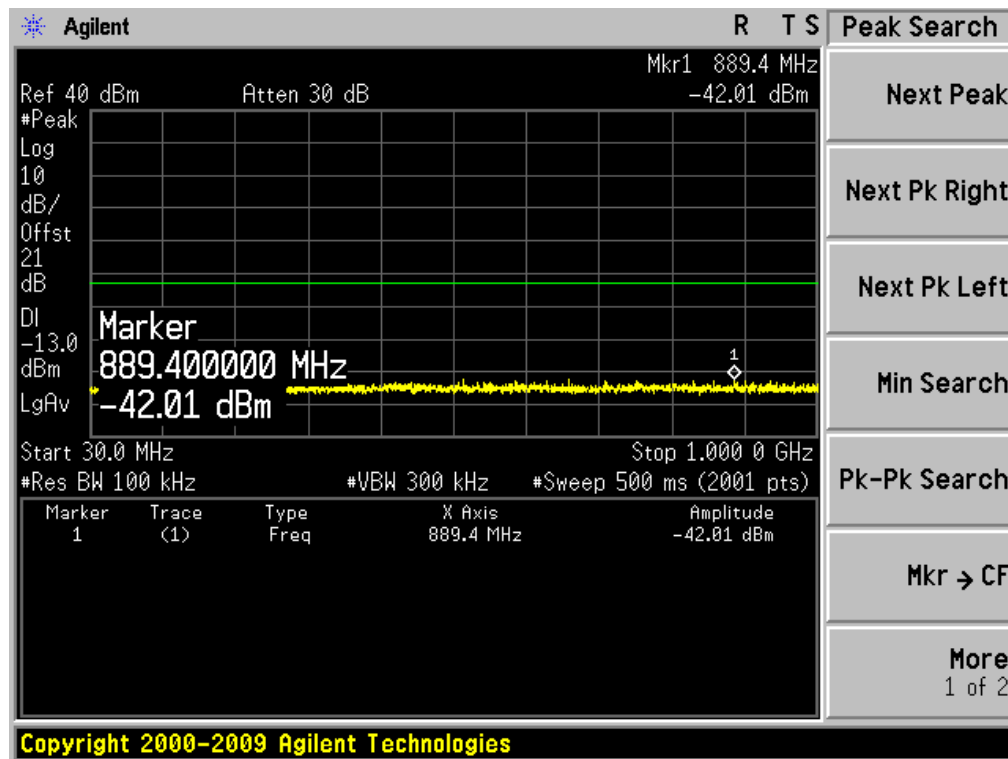


High Channel 251(848.8MHz)

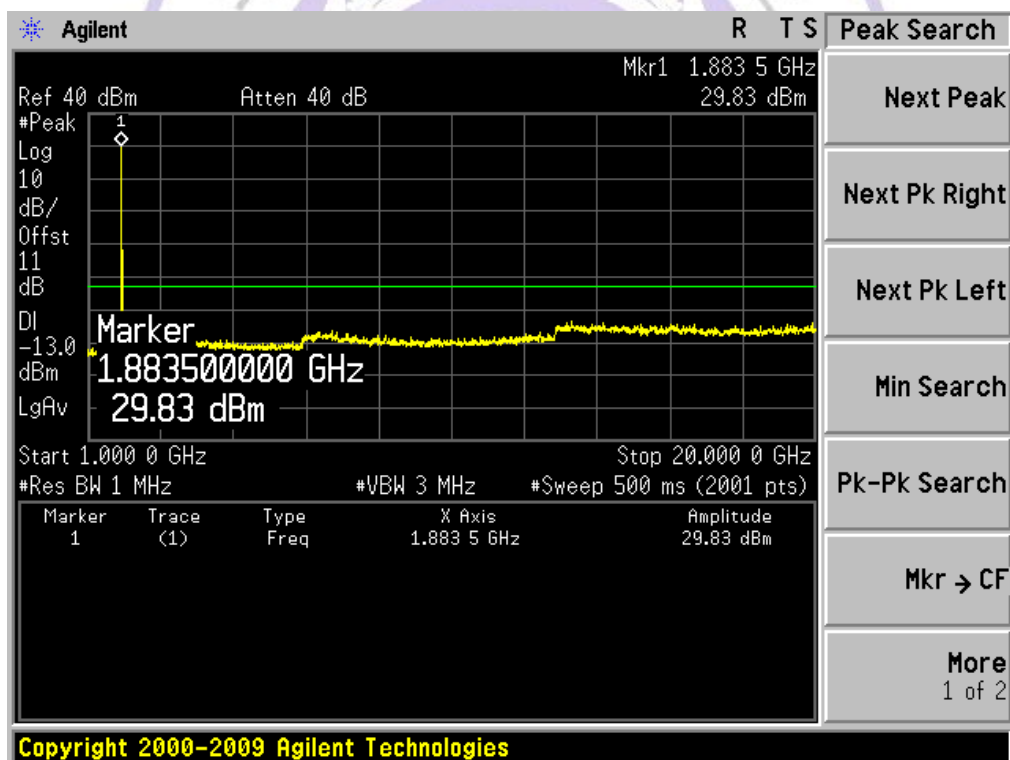
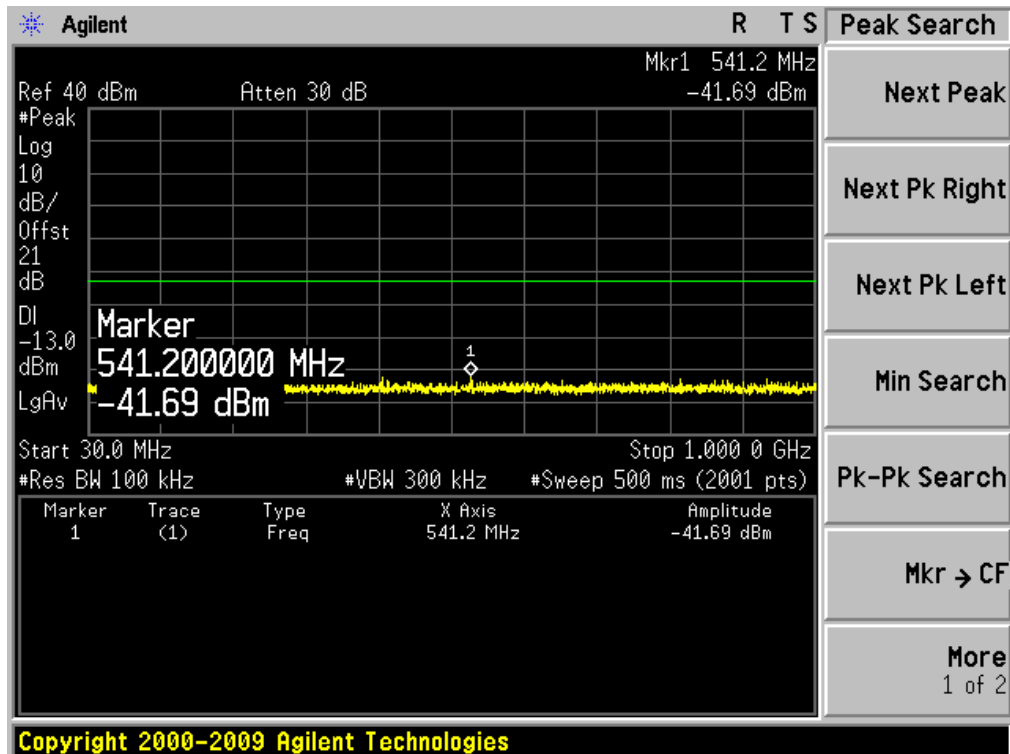


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	PCS1900 Traffic		
Date of Test	2013/02/06	Test Site	AC-5

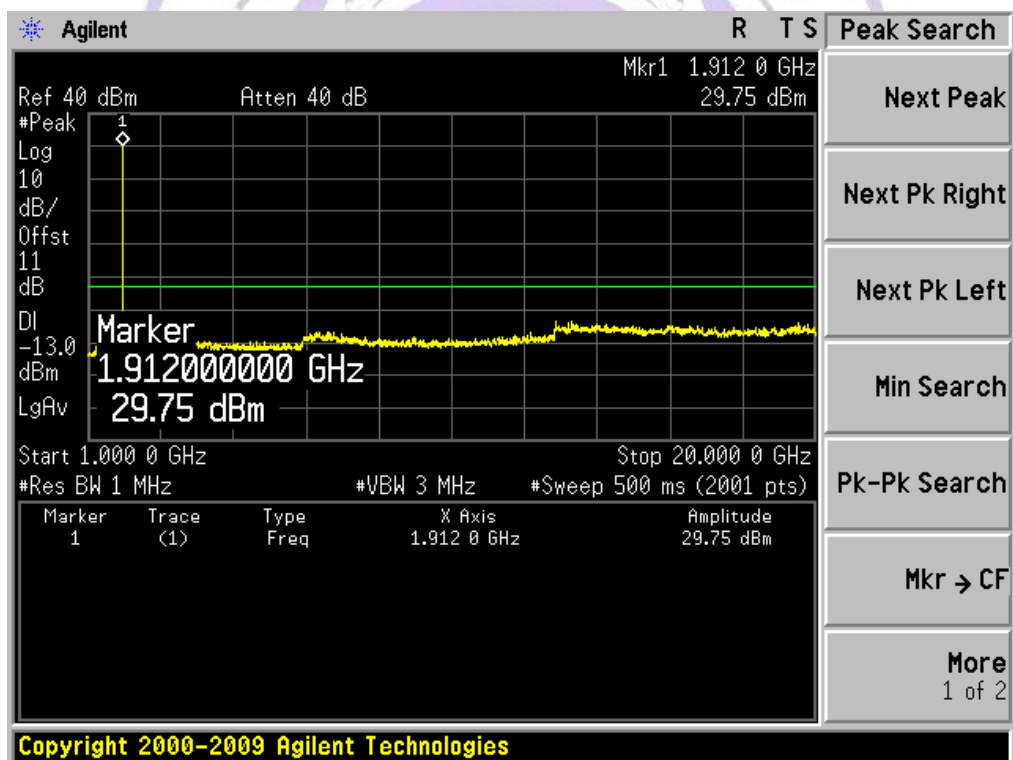
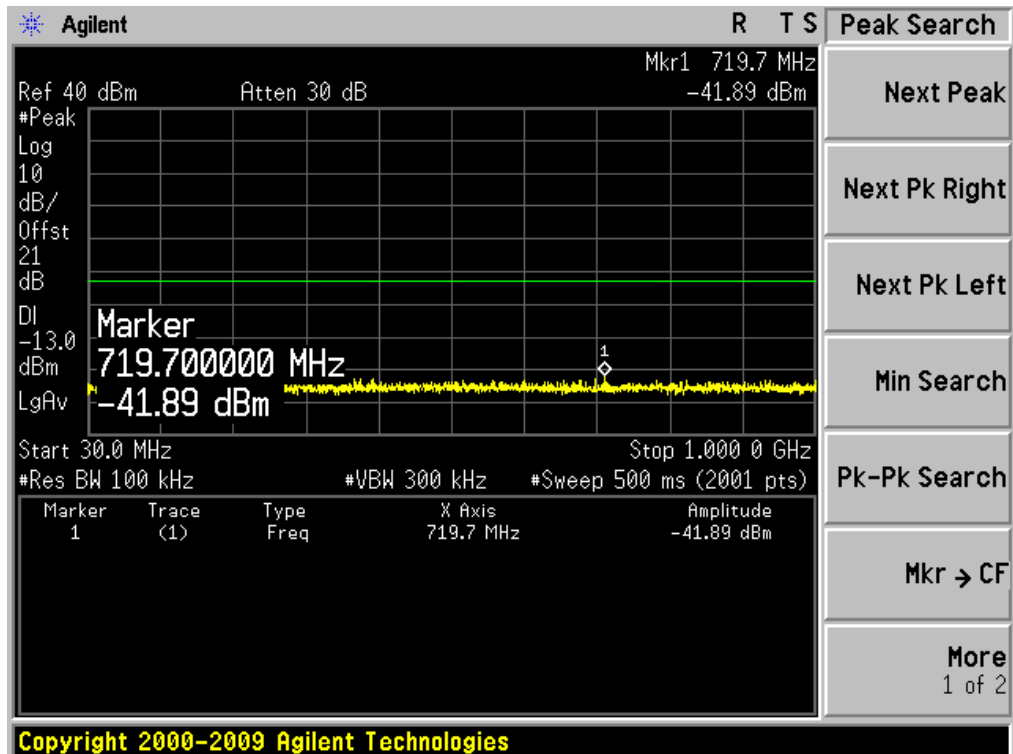
Low Channel 512(1850.2MHz)



Mid Channel 661(1880.0MHz)

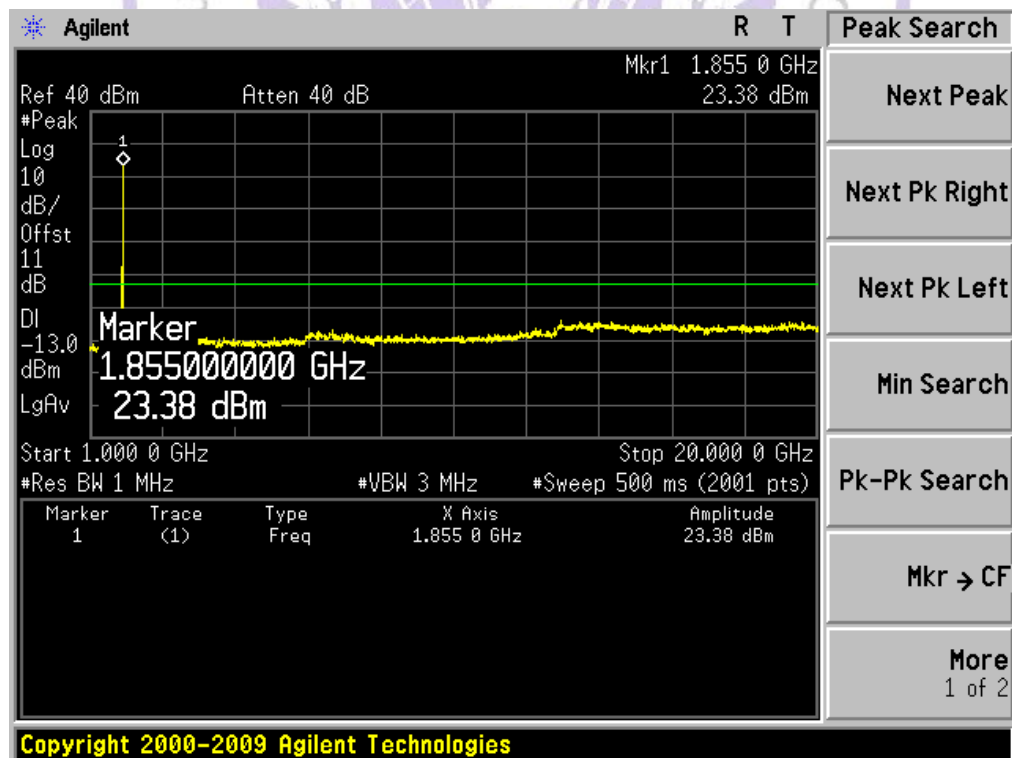
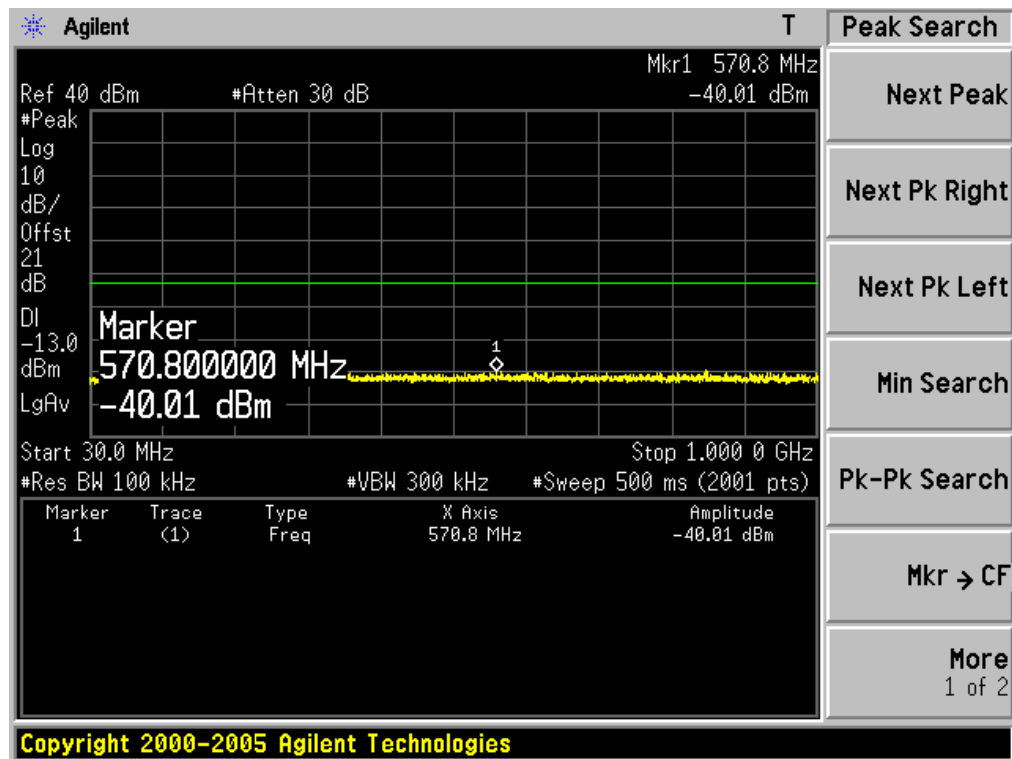


High Channel 810(1909.8MHz)

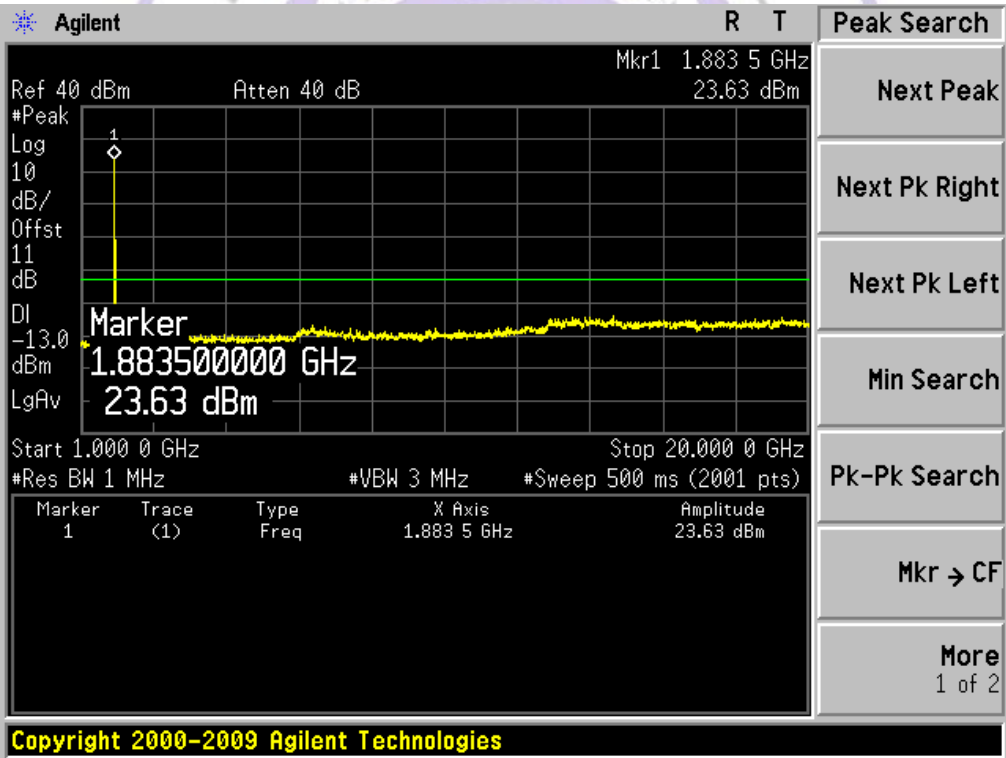
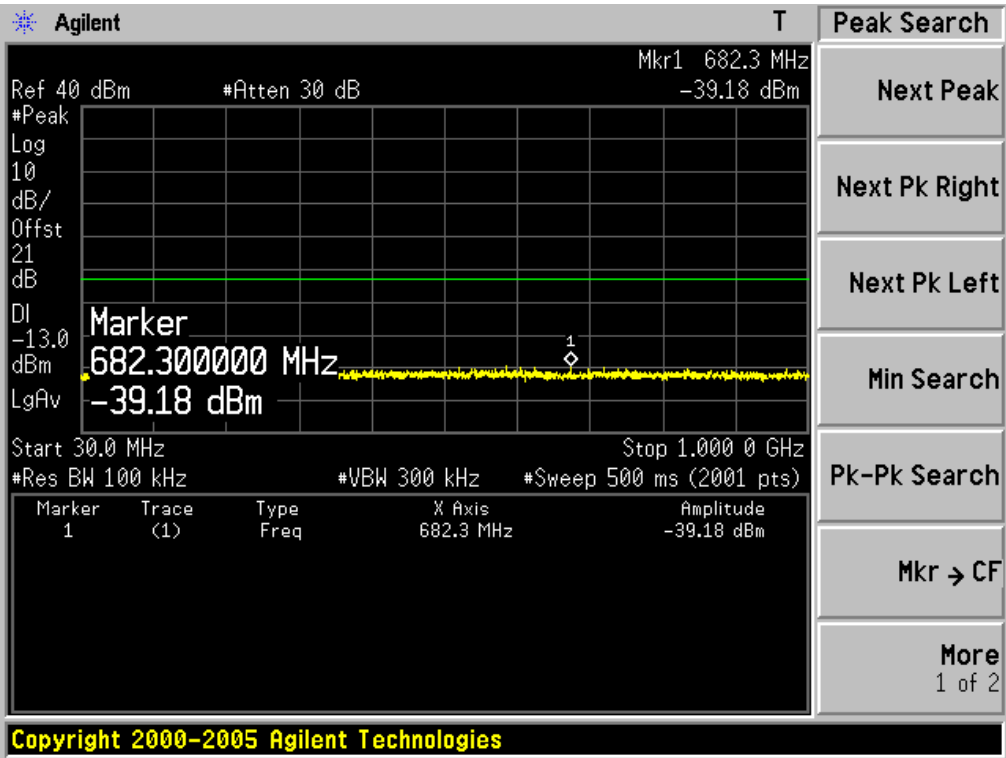


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	WCDMA Band II Traffic		
Date of Test	2013/02/06	Test Site	AC-5

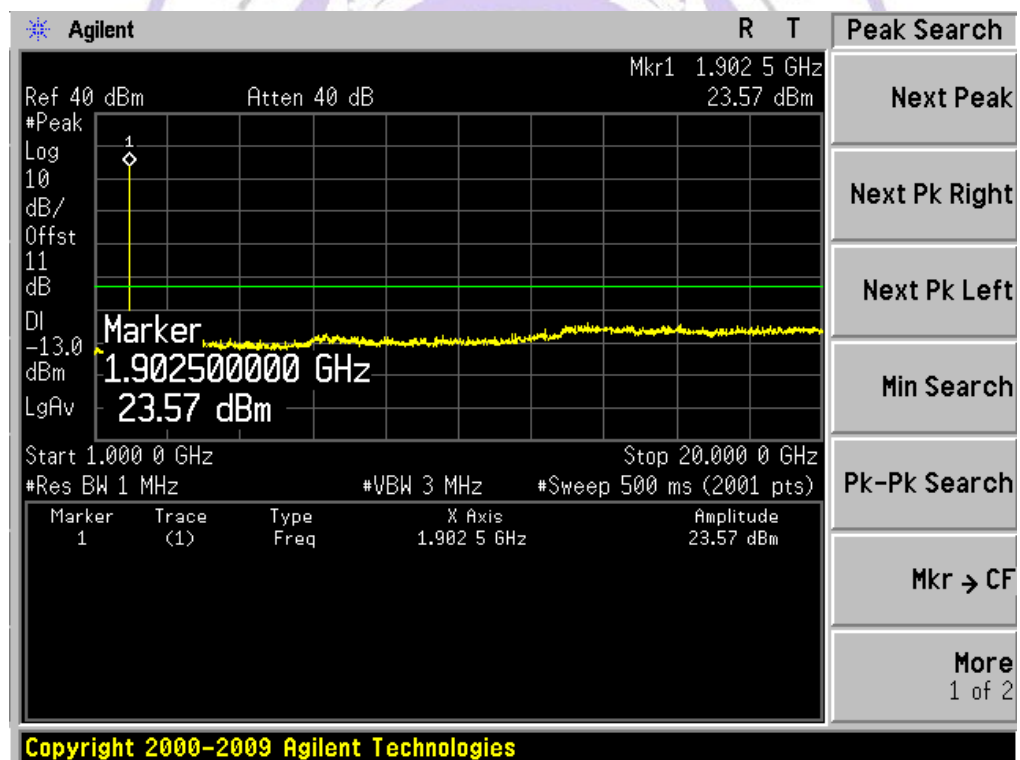
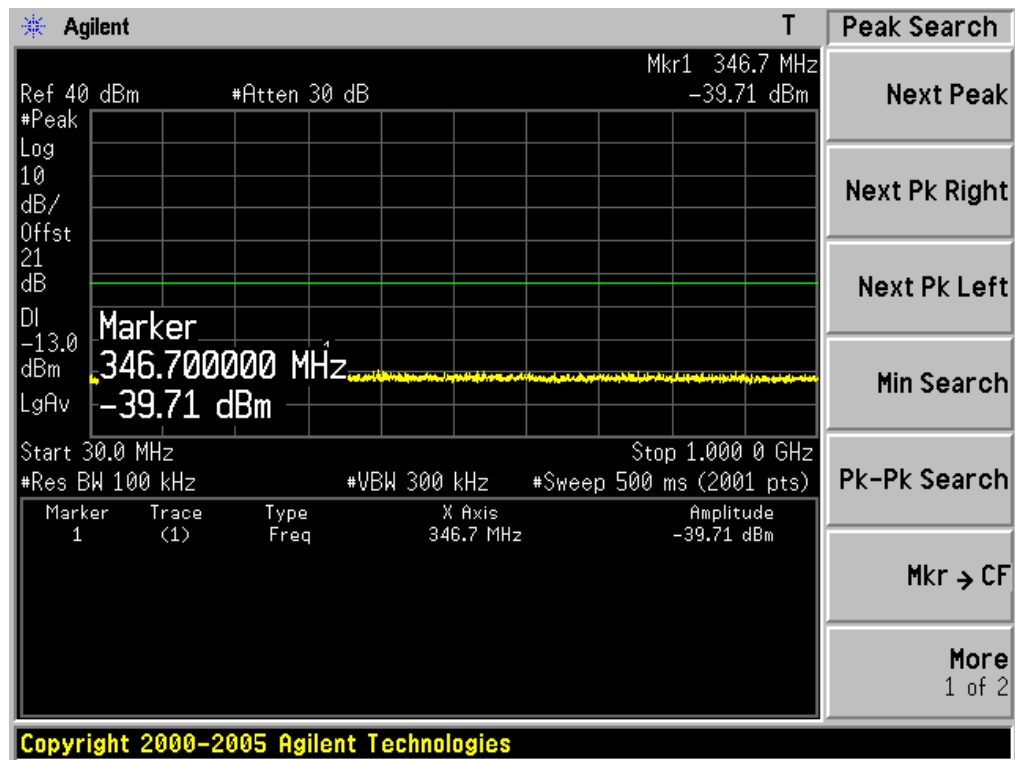
Low Channel 9262(1852.4MHz)



Mid Channel 9400(1880.0MHz)

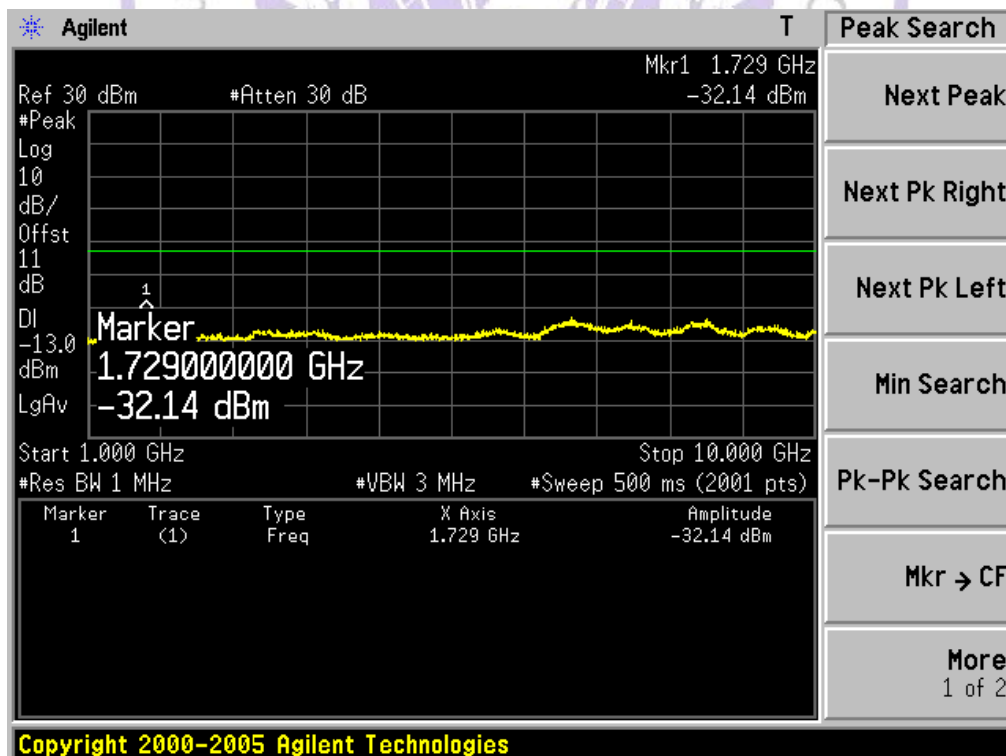
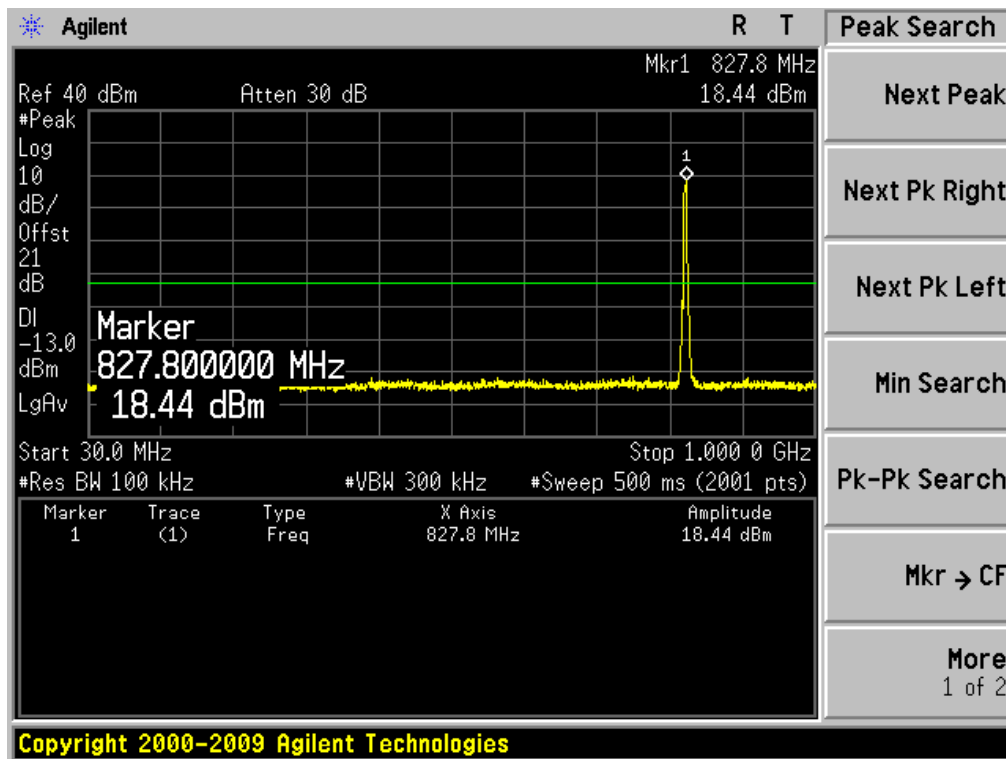


High Channel 9538(1907.6MHz)

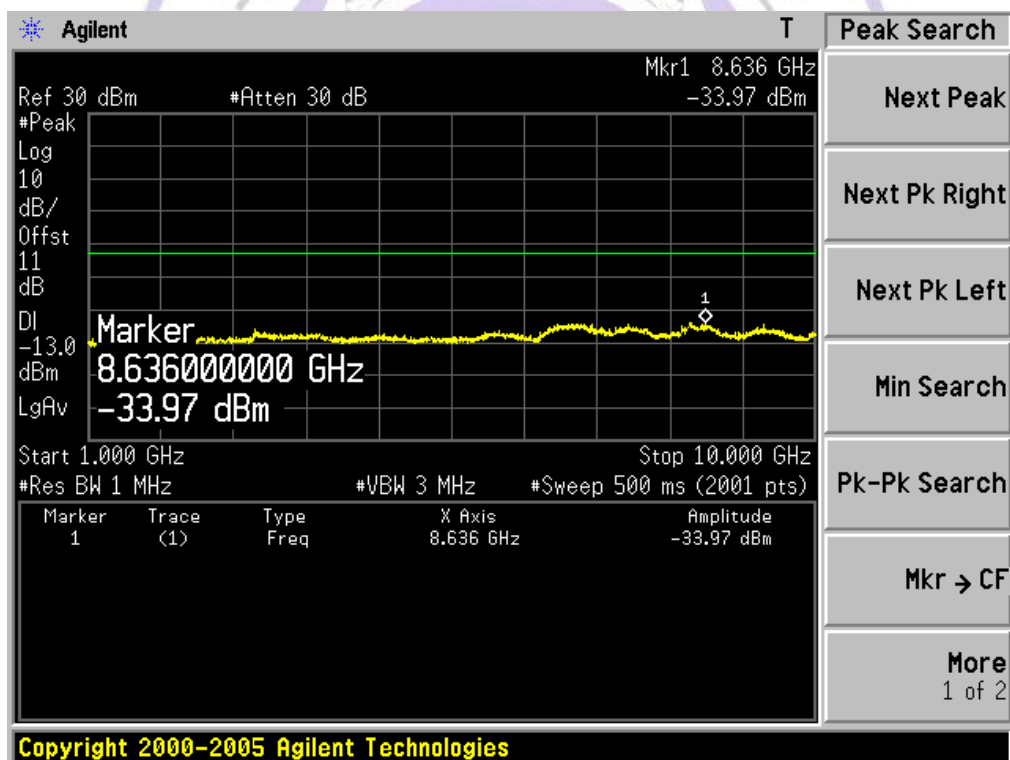
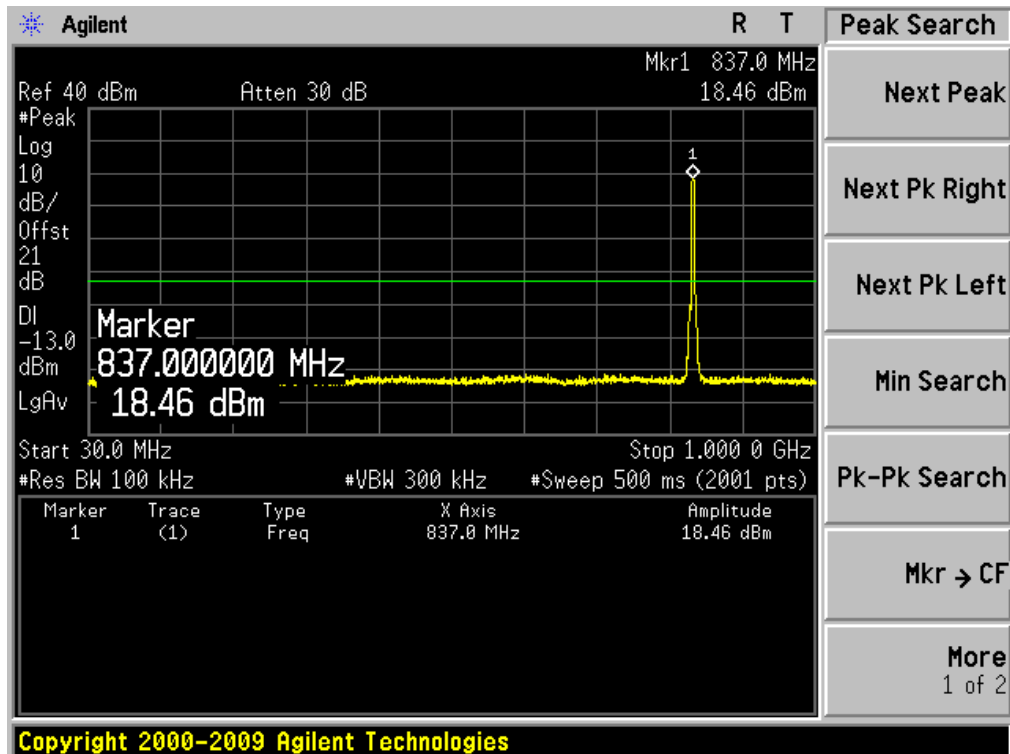


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	WCDMA Band V Traffic		
Date of Test	2013/02/06	Test Site	AC-5

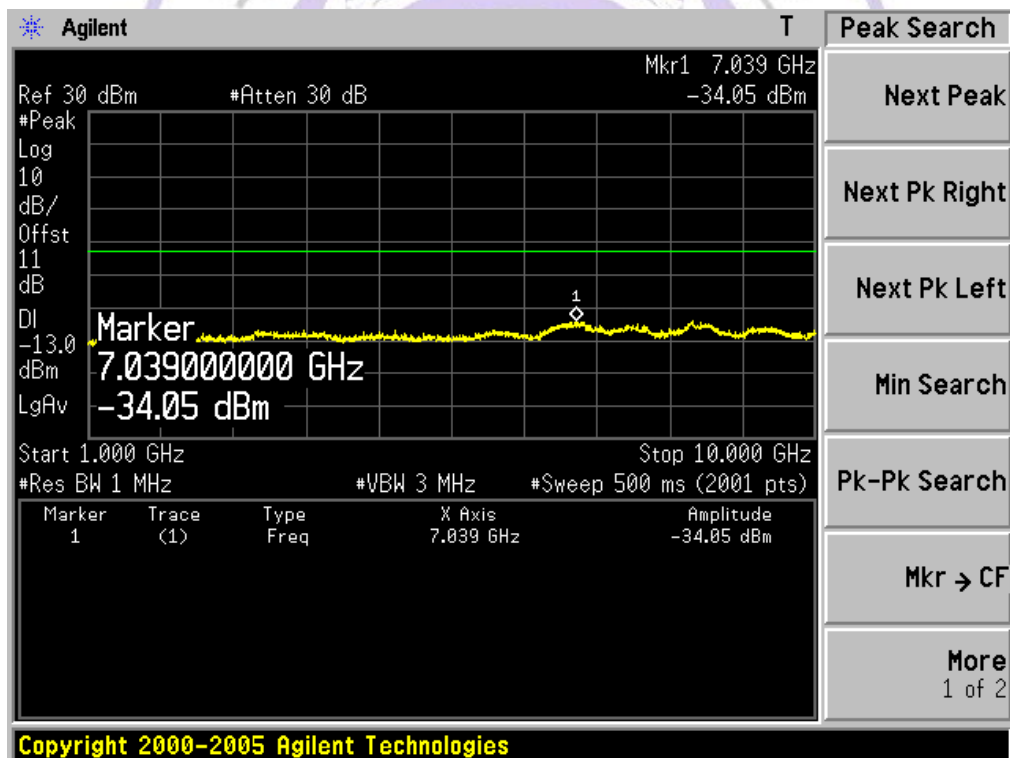
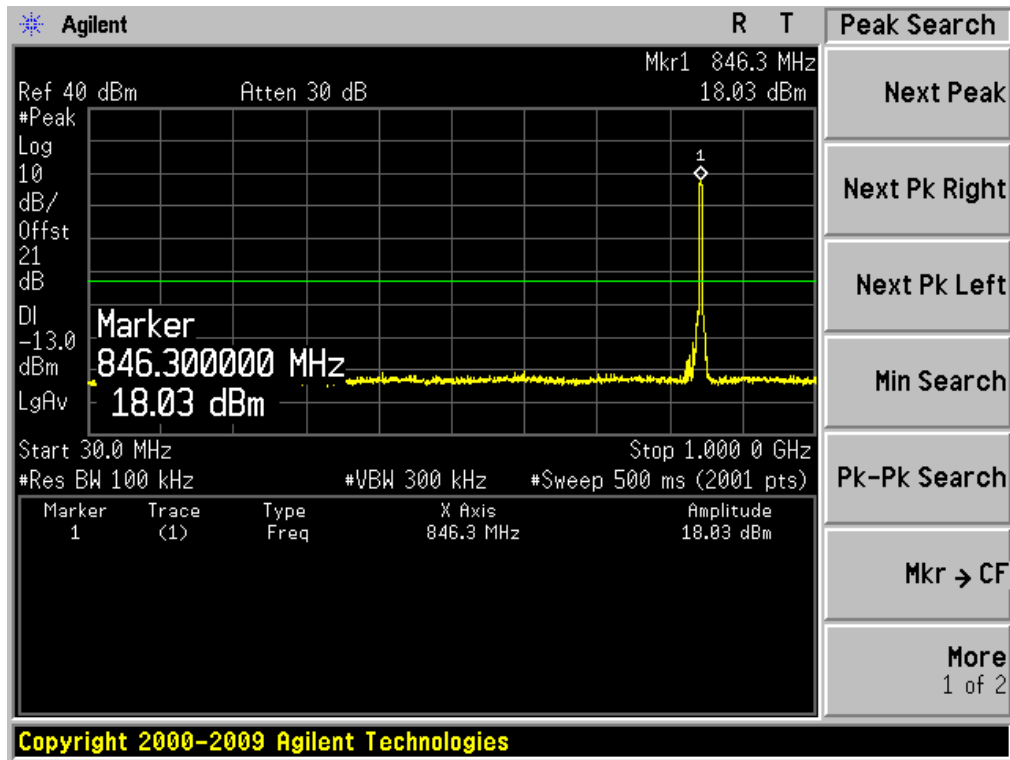
Low Channel 4132(826.4MHz)



Mid Channel 4182(836.4MHz)

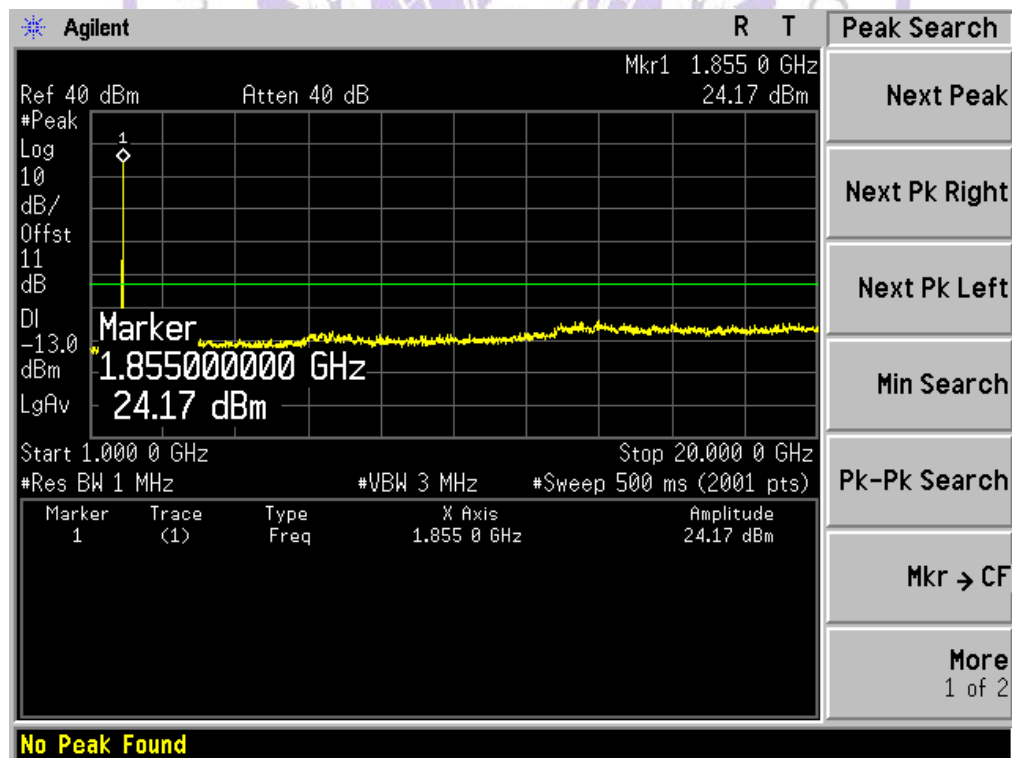
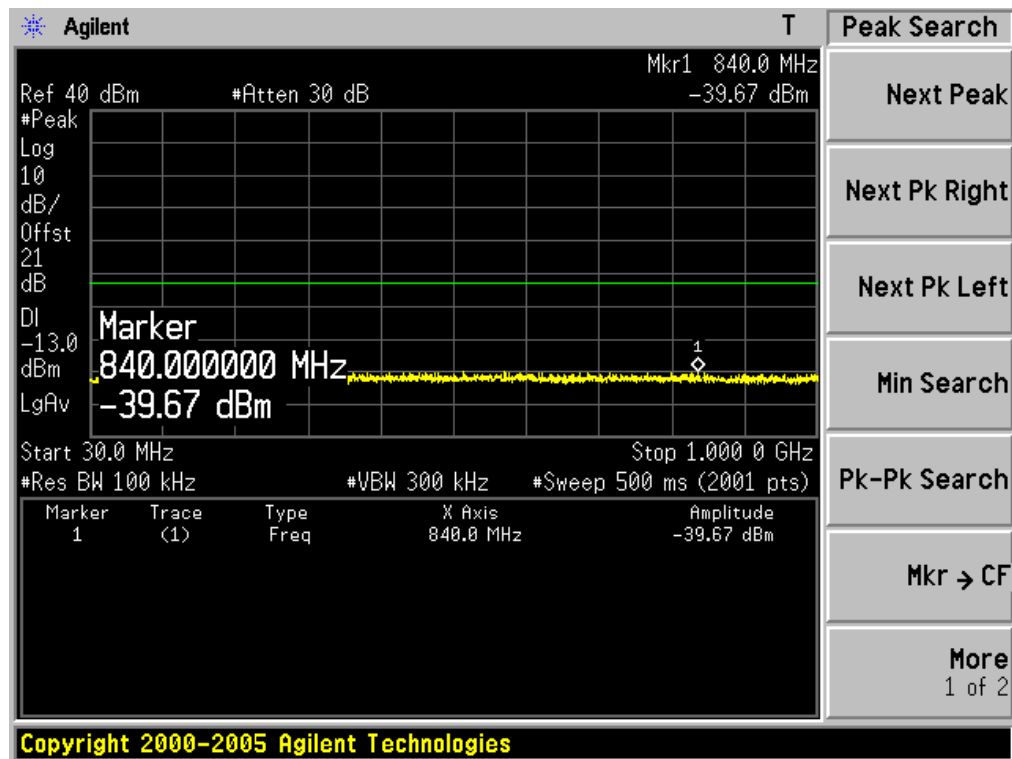


High Channel 4233(846.6MHz)

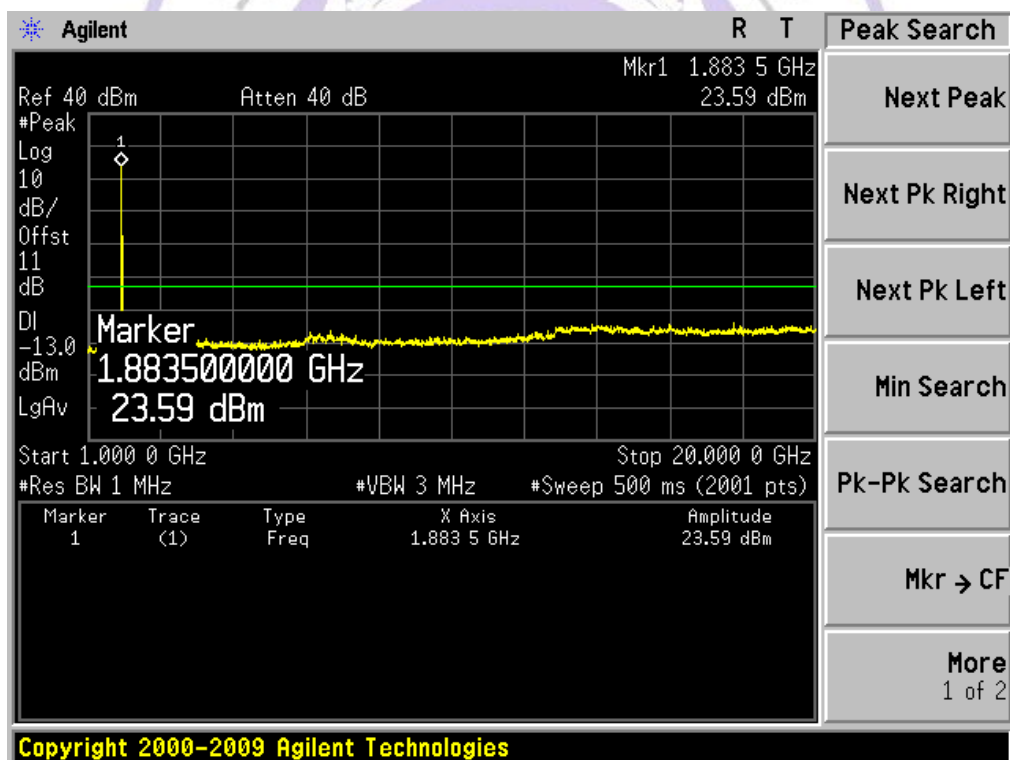
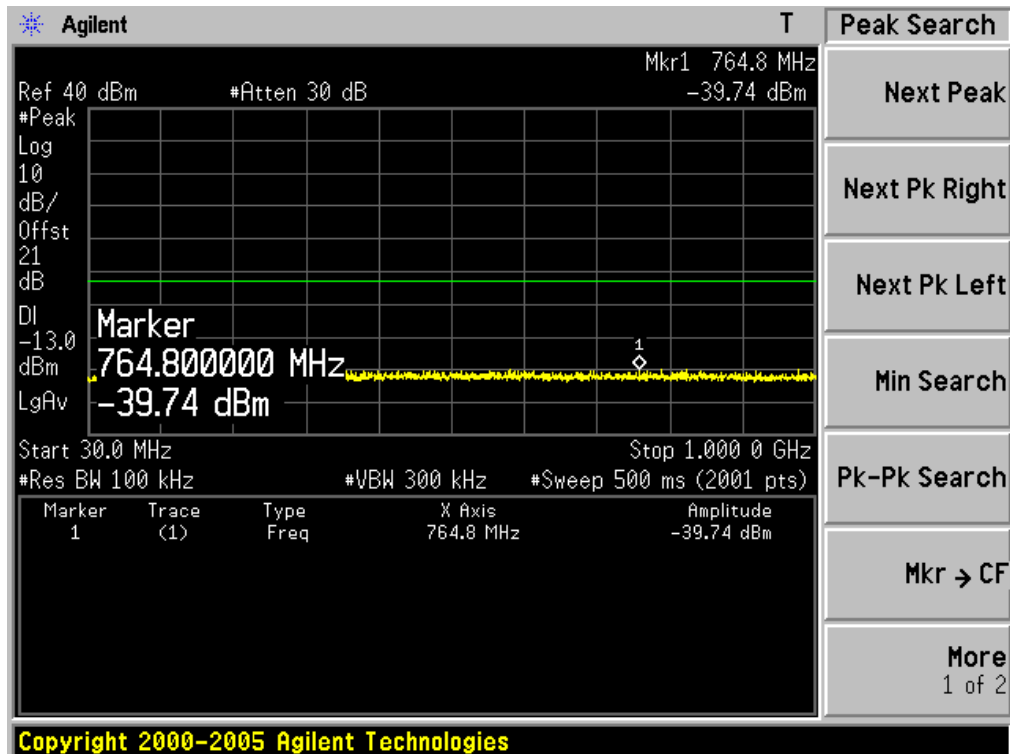


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	HSDPA Band II Traffic		
Date of Test	2013/02/06	Test Site	AC-5

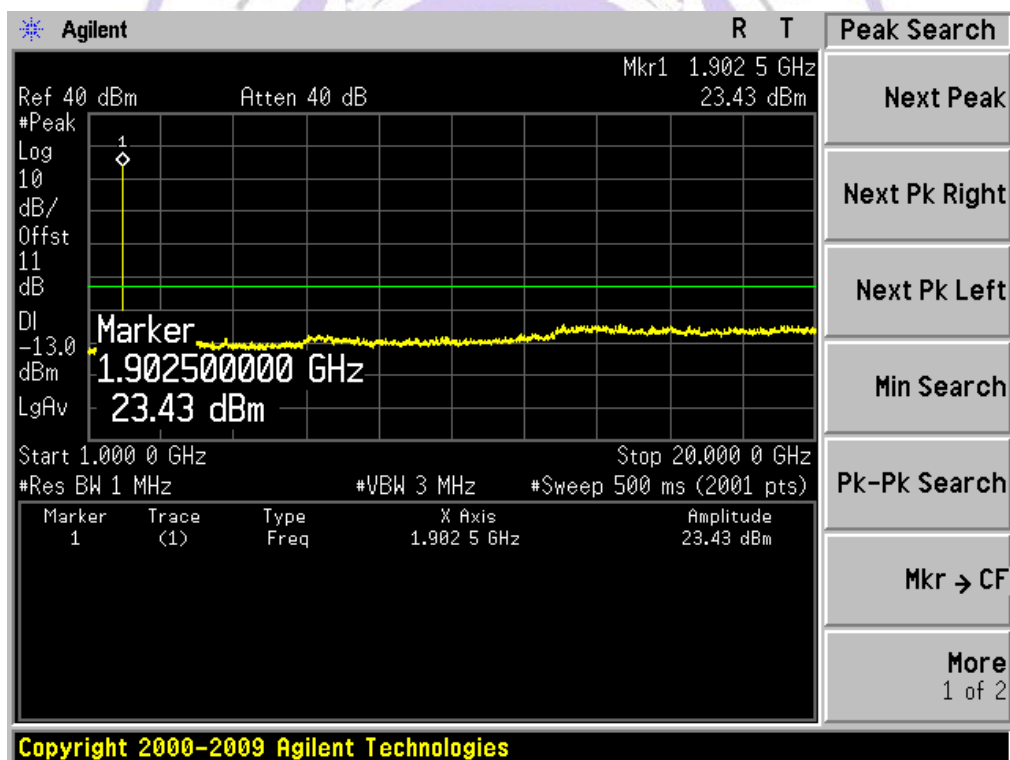
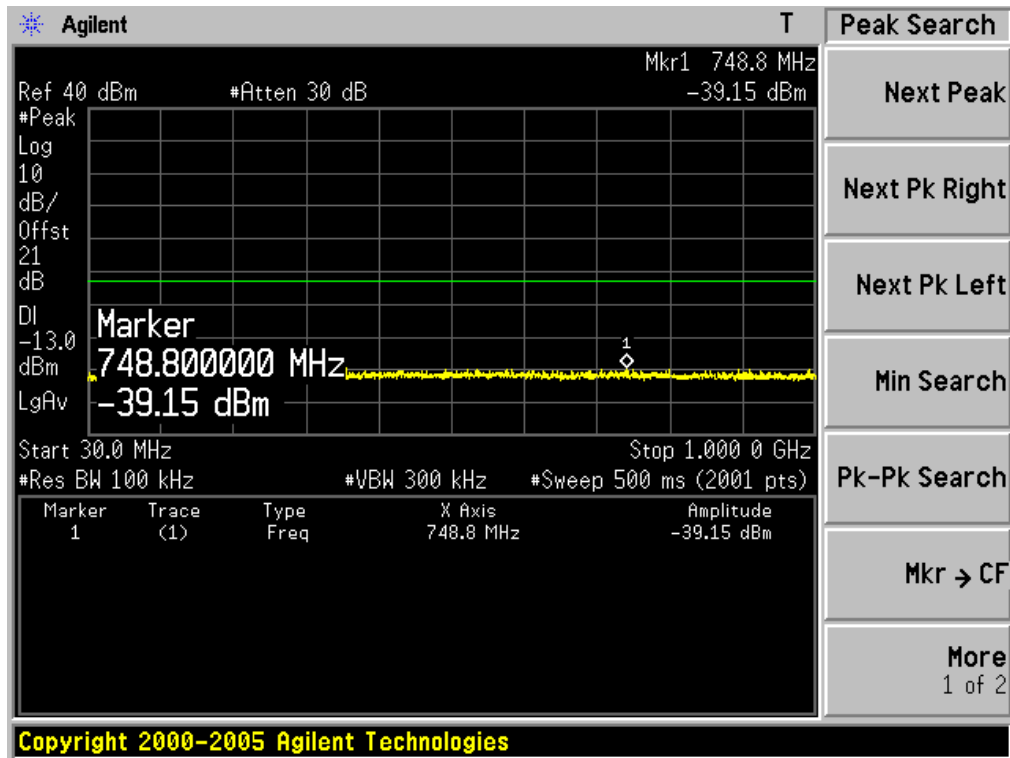
Low Channel 9262(1852.4MHz)



Mid Channel 9400(1880.0MHz)

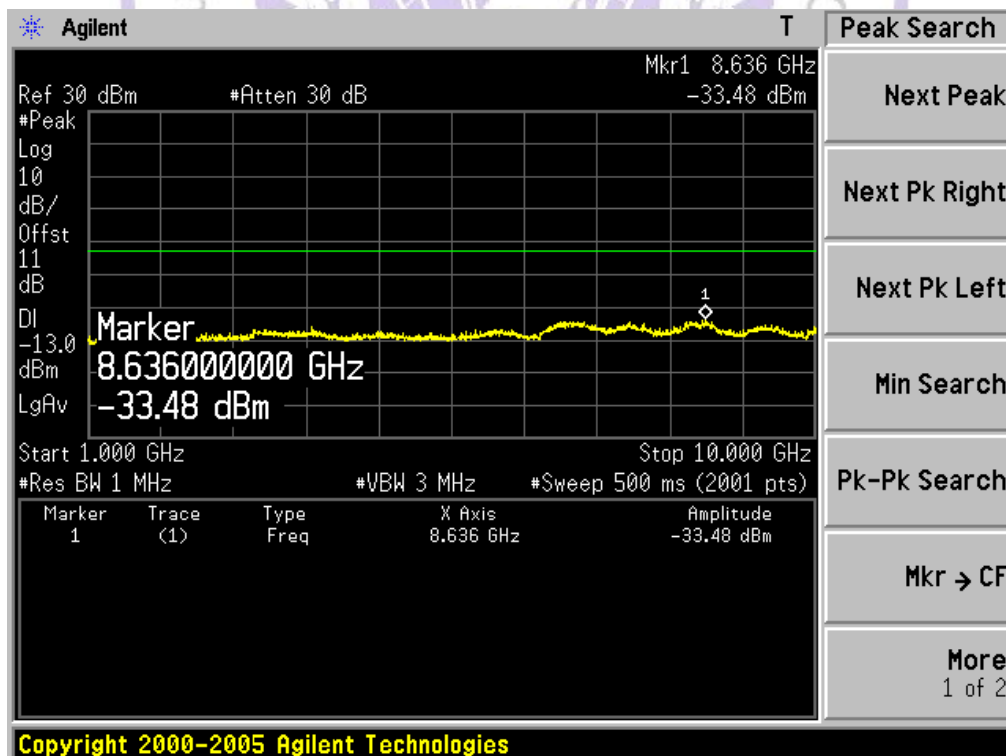
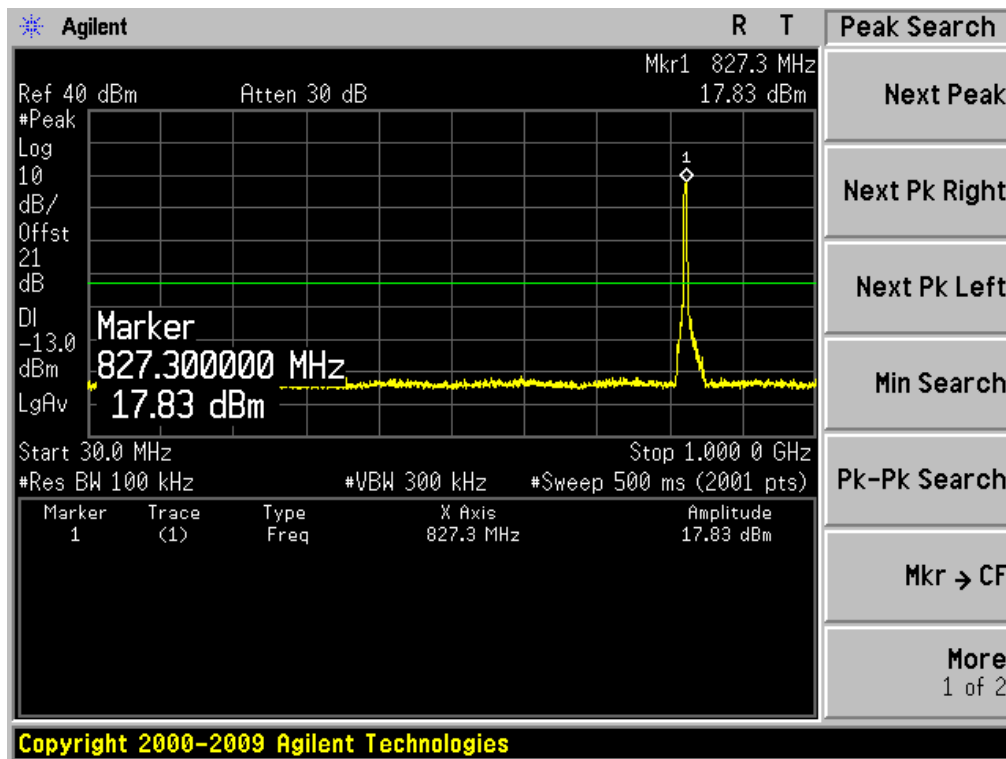


High Channel 9538(1907.6MHz)

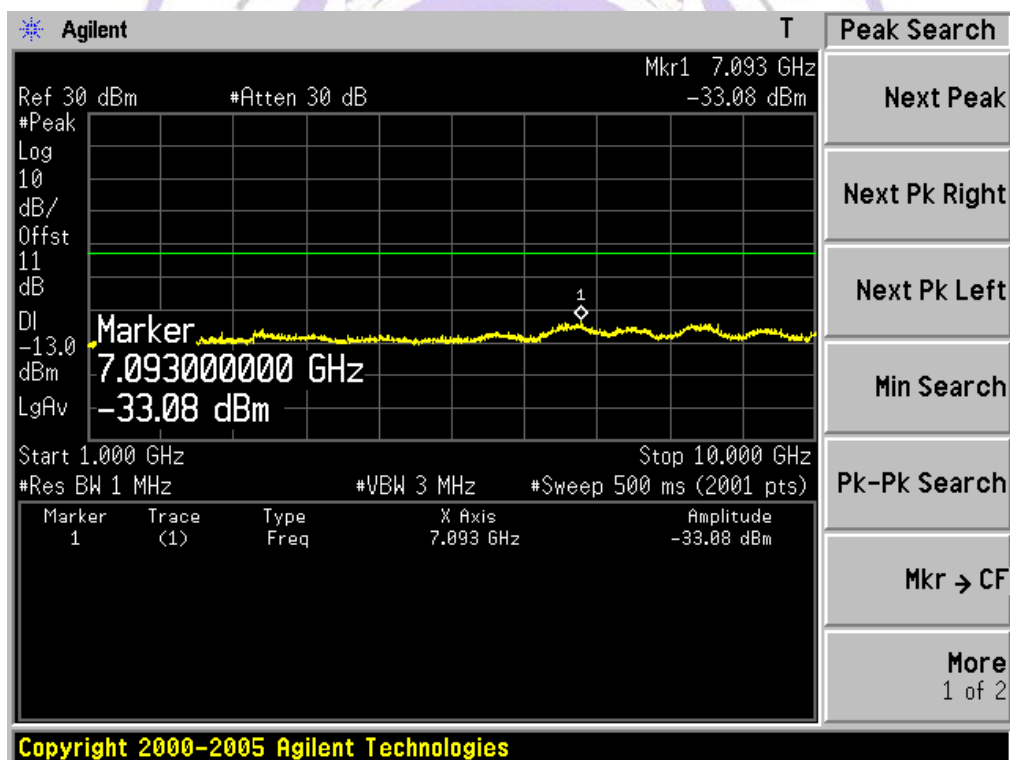
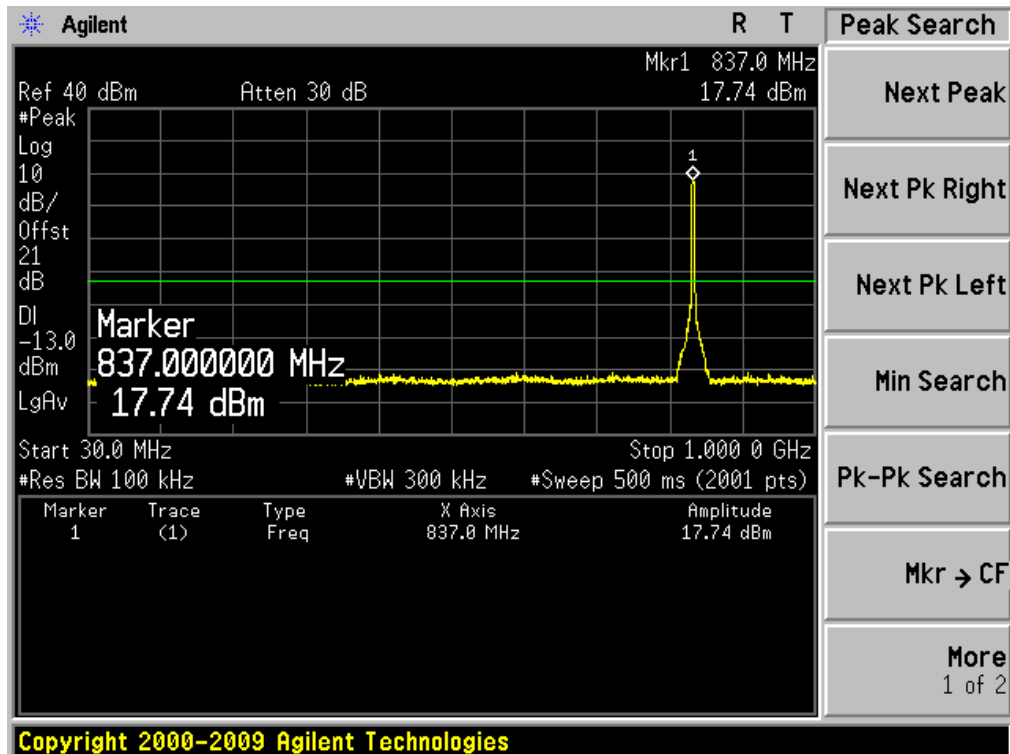


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	HSDPA Band V Traffic		
Date of Test	2013/02/06	Test Site	AC-5

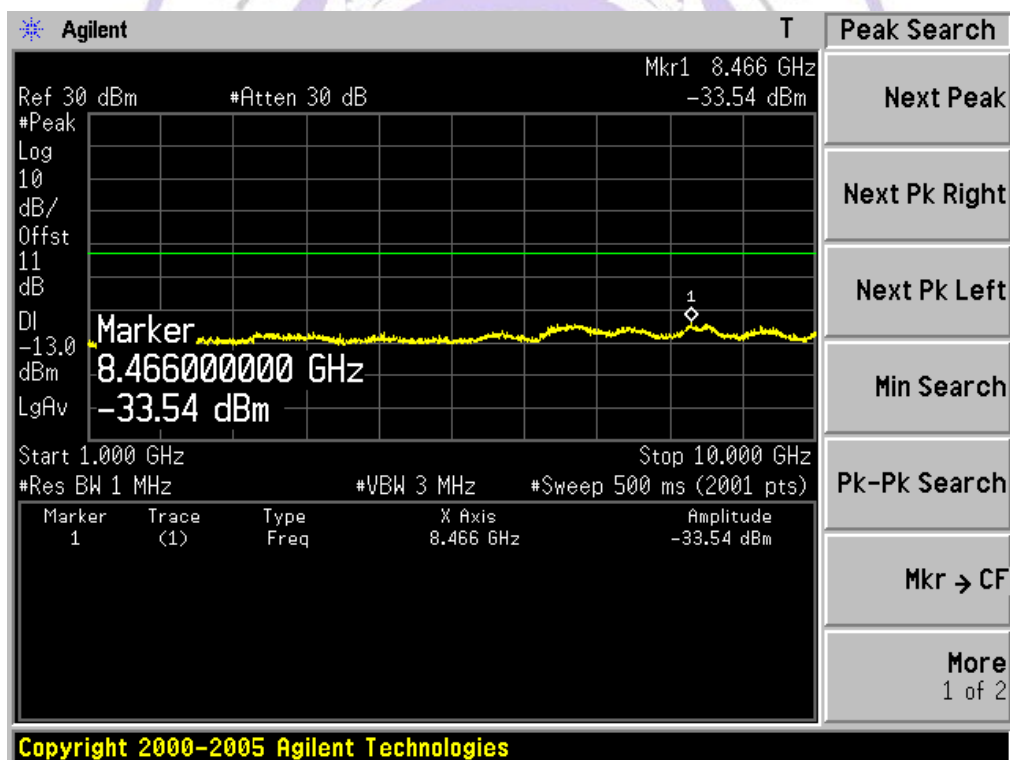
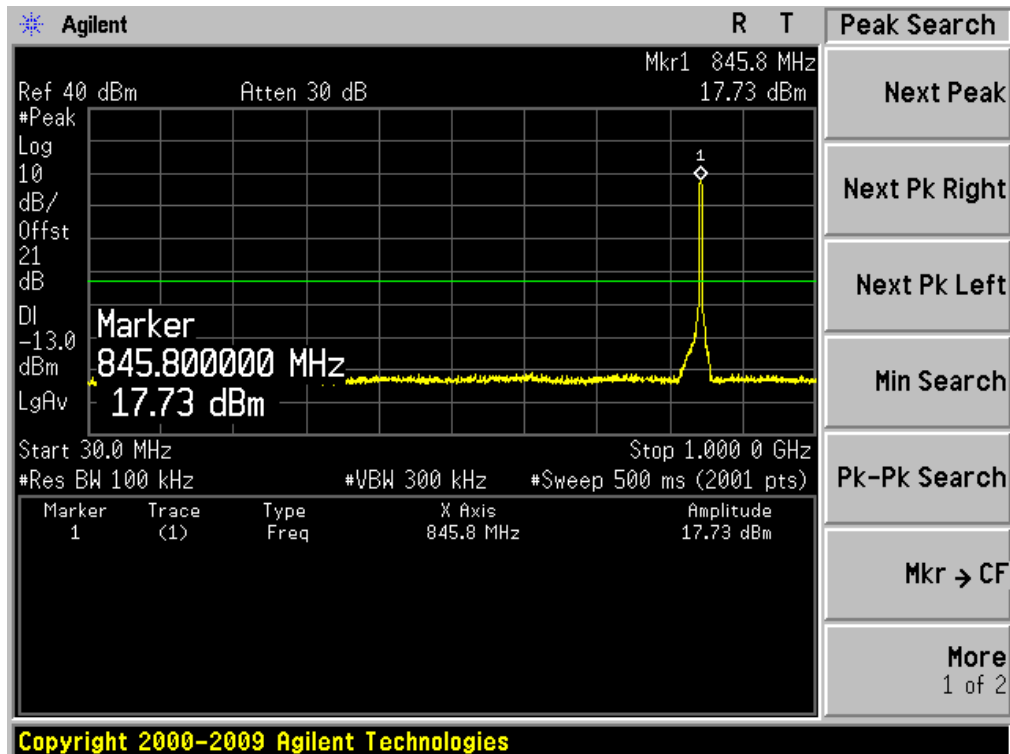
Low Channel 4132(826.4MHz)



Mid Channel 4182(836.4MHz)

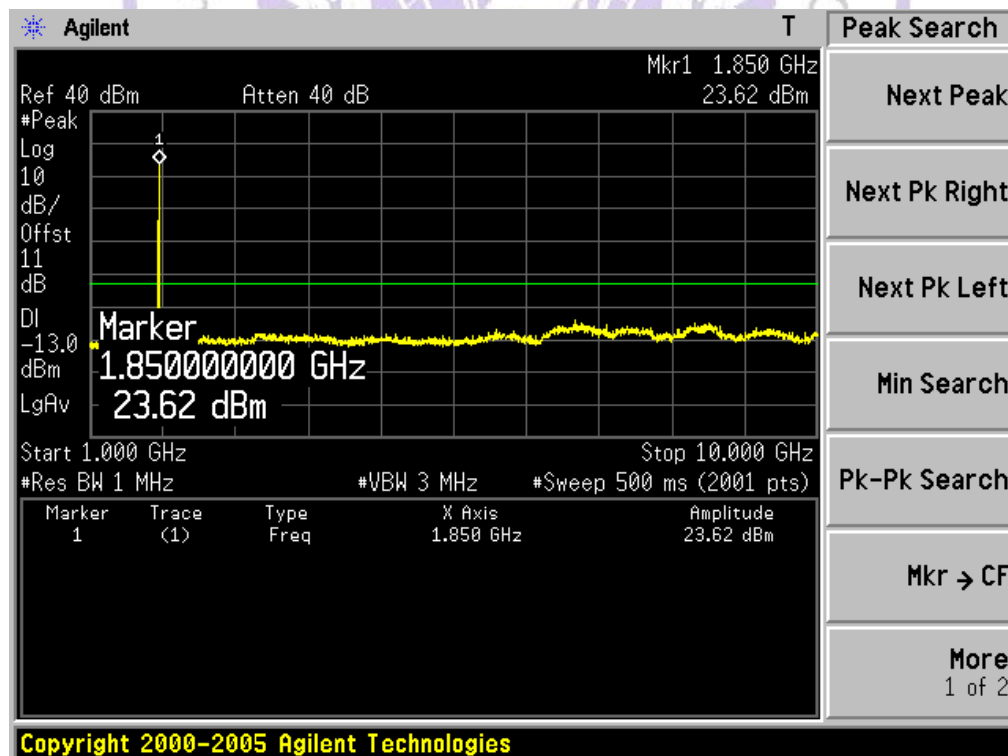
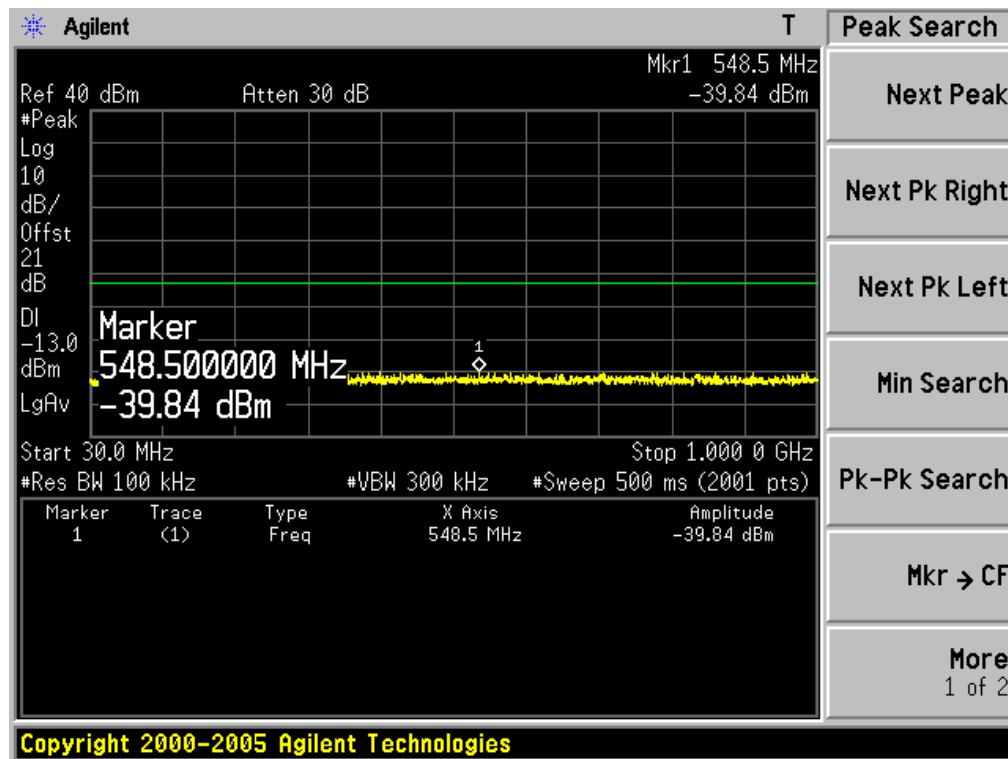


High Channel 4233(846.6MHz)

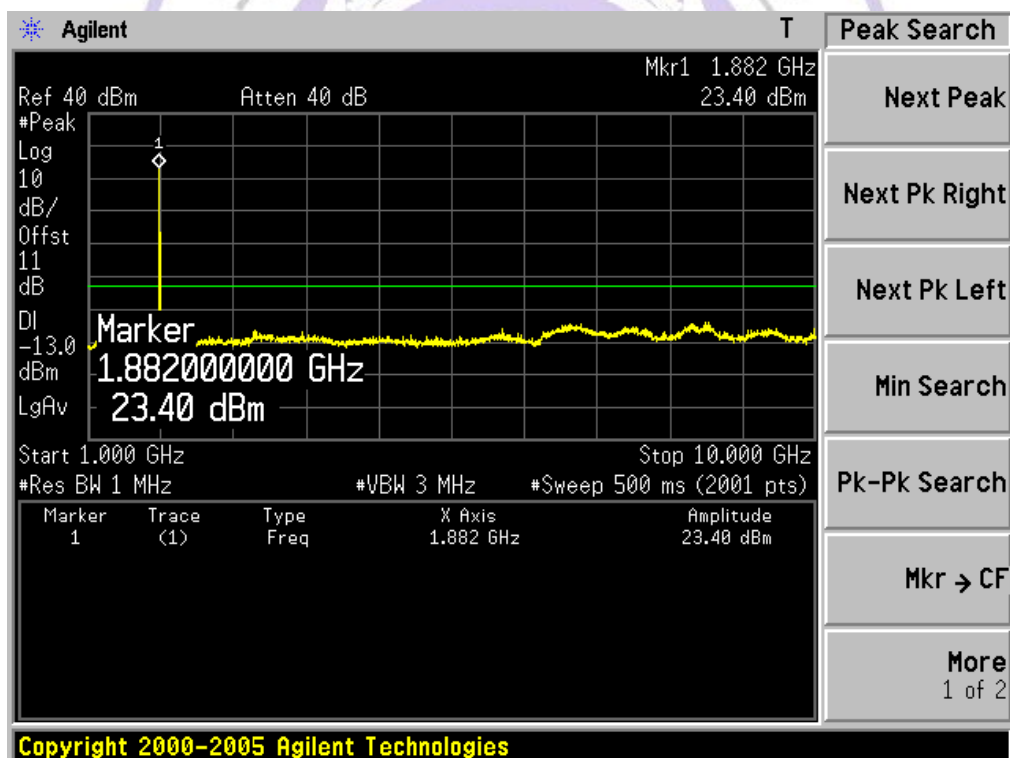
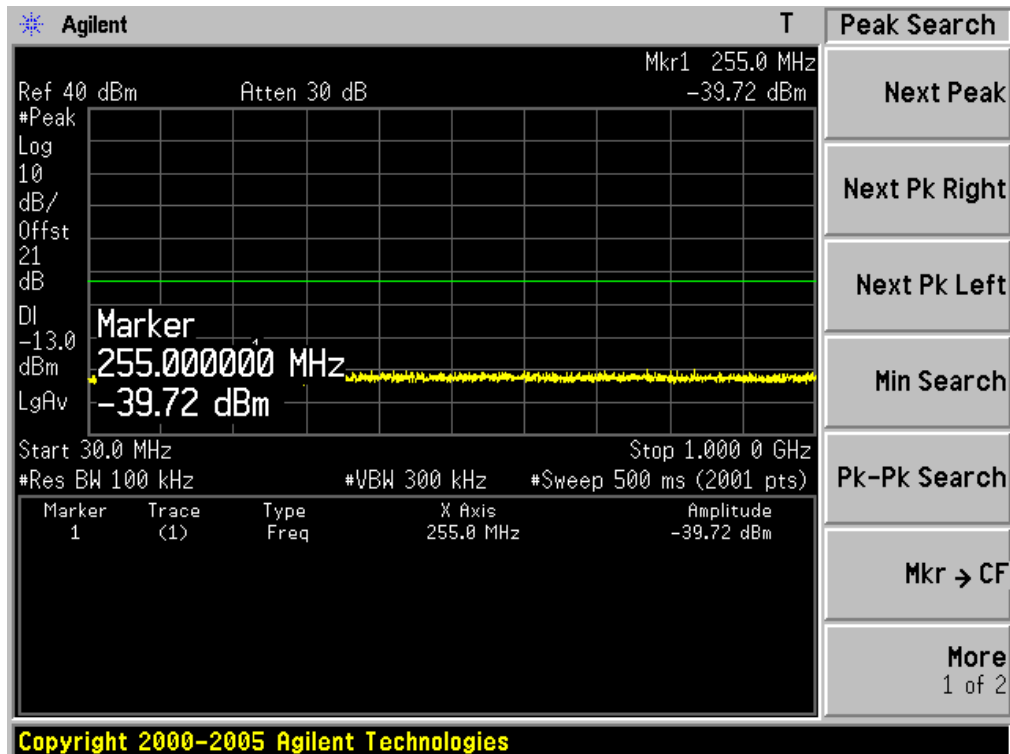


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	HSUPA Band II Traffic		
Date of Test	2013/02/06	Test Site	AC-5

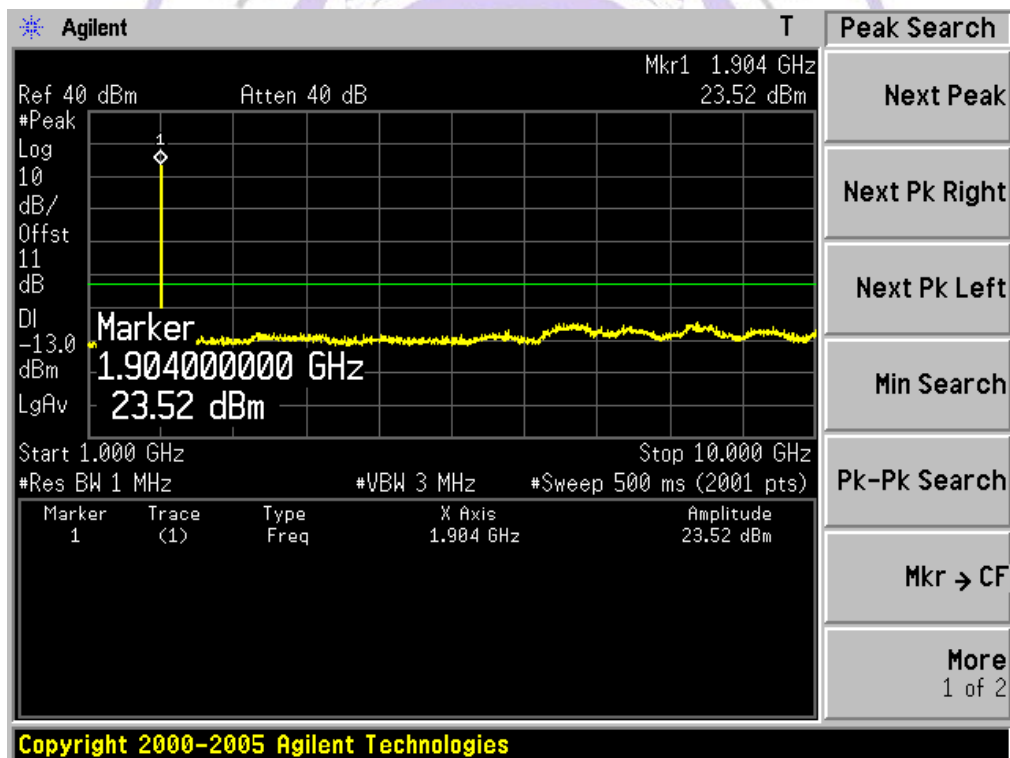
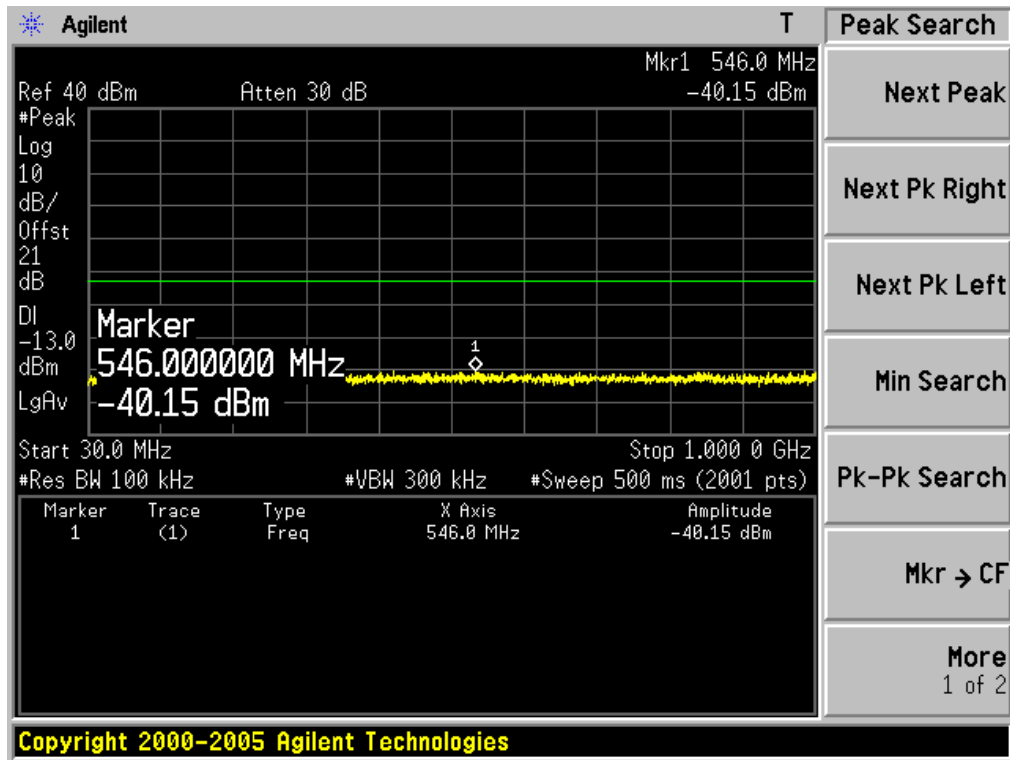
Low Channel 9262(1852.4MHz)



Mid Channel 9400(1880.0MHz)

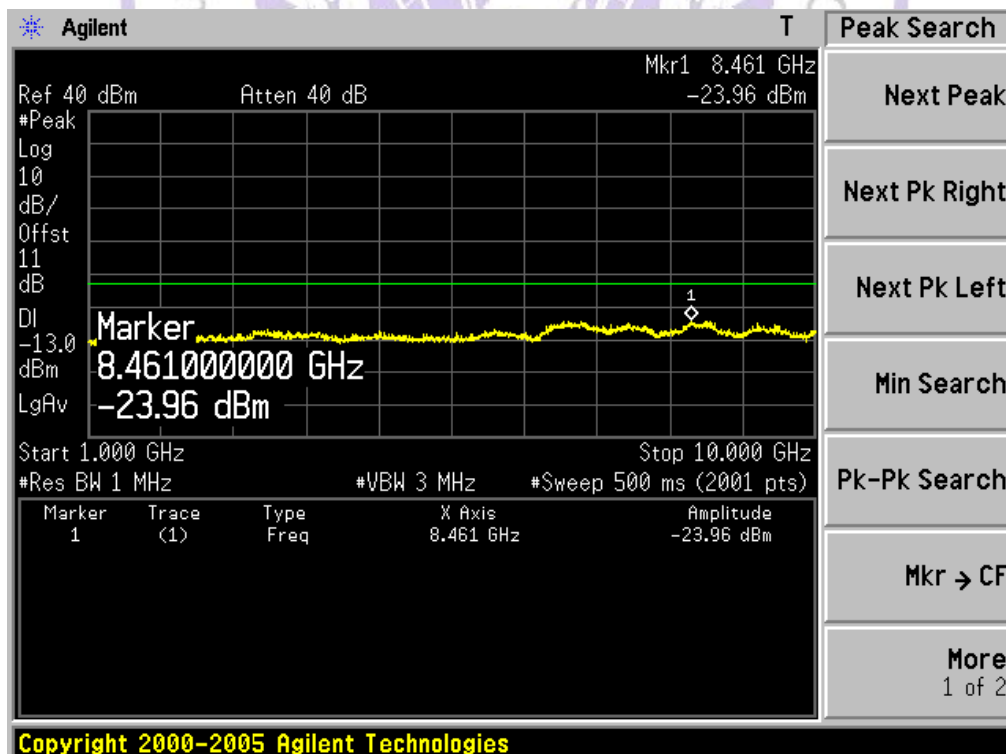
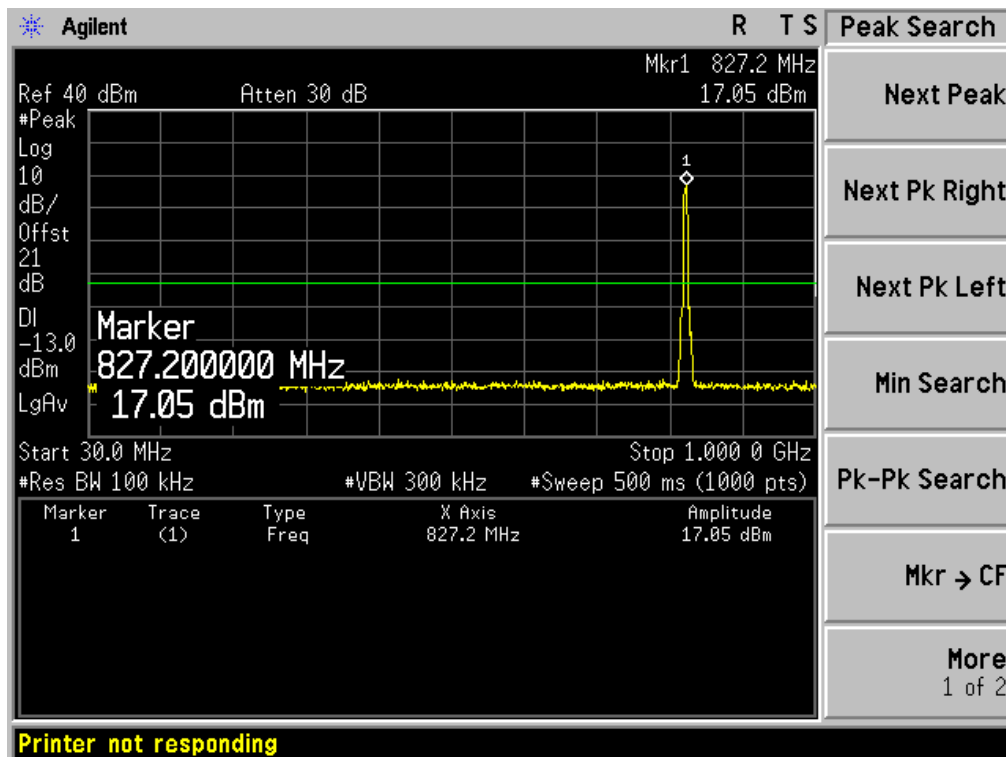


High Channel 9538(1907.6MHz)

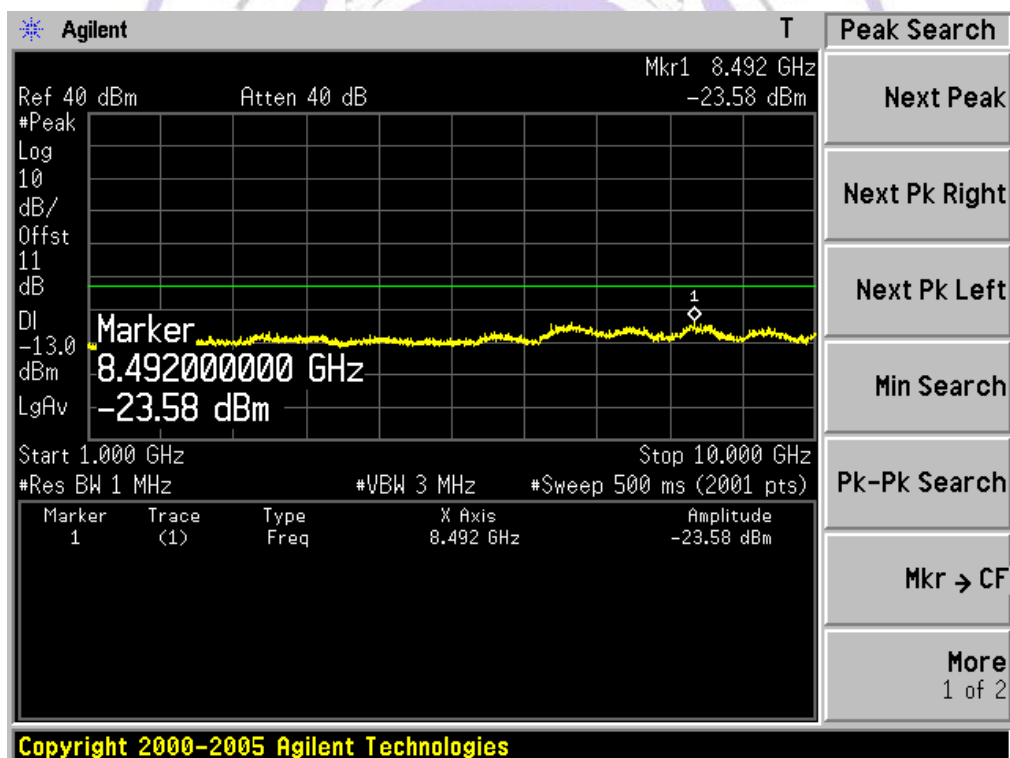
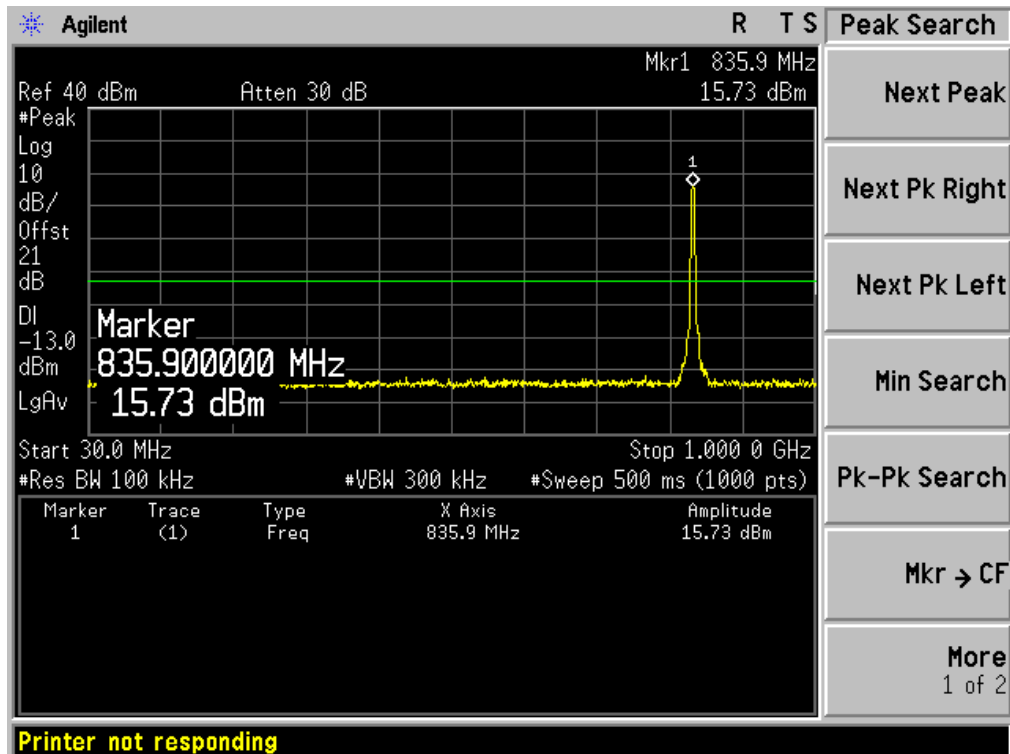


Product	Smartphone		
Test Item	Spurious Emission		
Test Mode	HSUPA Band V Traffic		
Date of Test	2013/02/06	Test Site	AC-5

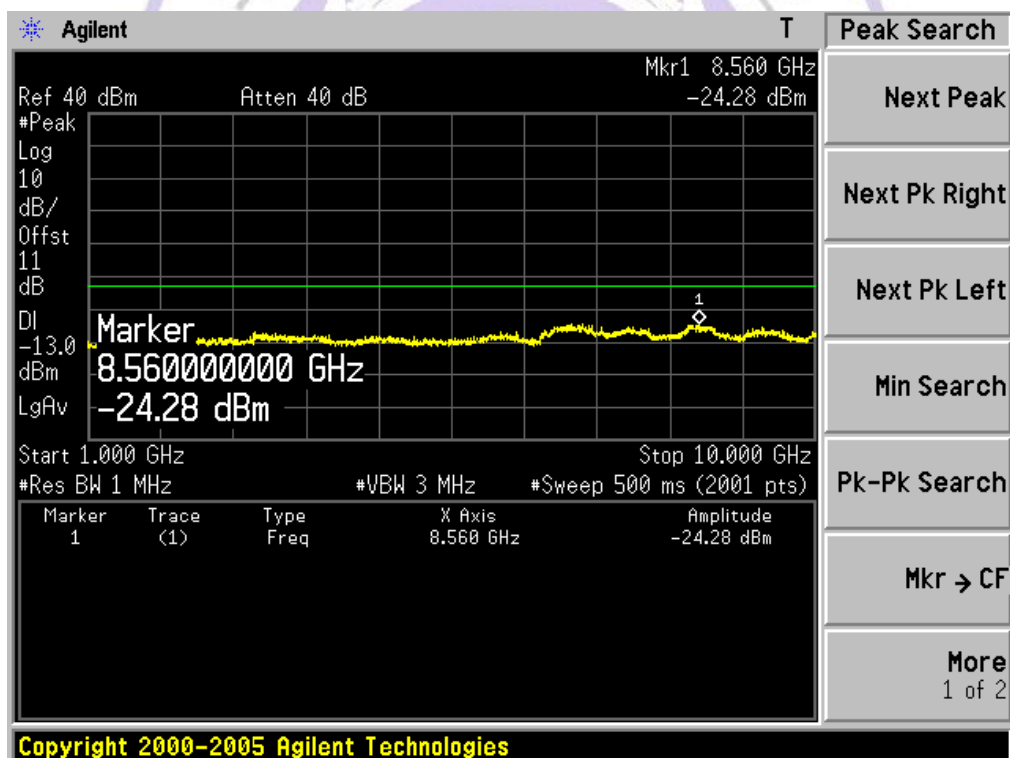
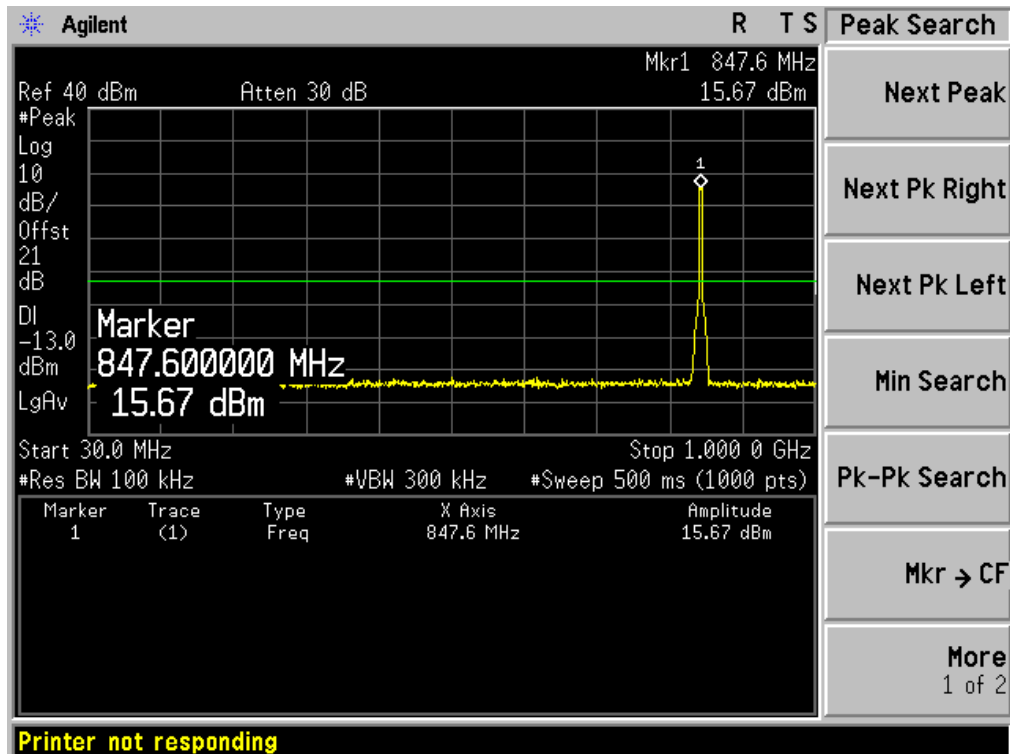
Low Channel 4132(826.4MHz)



Mid Channel 4182(836.4MHz)



High Channel 4233(846.6MHz)



Radiated Measurement RSE

Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	GSM 850 Link		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)								
1646.00	-49.68	V	-52.25	2.50	9.75	-45.00	-13.00	-32.00
2470.50	-55.75	V	-54.78	3.12	10.48	-47.42	-13.00	-34.42
1646.00	-55.95	H	-58.52	2.50	9.75	-51.27	-13.00	-38.27
2470.50	-54.15	H	-53.18	3.12	10.48	-45.82	-13.00	-32.82
Middle Channel 189 (836.40MHz)								
1671.50	-54.58	V	-57.24	2.52	9.95	-49.81	-13.00	-36.81
2513.00	-54.20	V	-53.52	3.18	10.62	-46.08	-13.00	-33.08
1671.50	-60.25	H	-62.67	2.52	9.95	-55.24	-13.00	-42.24
2513.00	-54.29	H	-53.22	3.18	10.62	-45.78	-13.00	-32.78
High Channel 251 (848.80MHz)								
1697.00	-56.85	V	-59.58	2.54	10.06	-52.06	-13.00	-39.06
2547.00	-54.35	V	-52.78	3.14	10.68	-45.24	-13.00	-32.24
1697.00	-60.14	H	-62.14	2.54	10.06	-54.62	-13.00	-41.62
2547.00	-54.61	H	-52.79	3.14	10.68	-45.25	-13.00	-32.25



Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	PCS 1900 Link		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512 (1850.20MHz)								
3703.00	-60.80	V	-57.34	3.84	12.69	-48.49	-13.00	-35.49
5547.50	-63.06	V	-54.56	4.82	13.15	-46.23	-13.00	-33.23
3703.00	-61.04	H	-58.77	3.84	12.69	-49.92	-13.00	-36.92
5547.50	-63.36	H	-55.47	4.82	13.15	-47.14	-13.00	-34.14
Middle Channel 661 (1880.00MHz)								
3762.50	-61.75	V	-58.53	3.73	12.72	-49.54	-13.00	-36.54
5641.00	-61.17	V	-53.24	4.93	13.14	-45.03	-13.00	-32.03
3762.50	-61.29	H	-57.99	3.73	12.72	-49.00	-13.00	-36.00
5641.00	-64.36	H	-55.75	4.93	13.14	-47.54	-13.00	-34.54
High Channel 810 (1909.80MHz)								
3822.00	-61.01	V	-57.30	4.02	12.73	-48.59	-13.00	-35.59
5726.00	-61.67	V	-53.06	4.87	13.11	-44.82	-13.00	-31.82
3822.00	-63.43	H	-59.56	4.02	12.73	-50.85	-13.00	-37.85
5726.00	-62.05	H	-53.81	4.87	13.11	-45.57	-13.00	-32.57



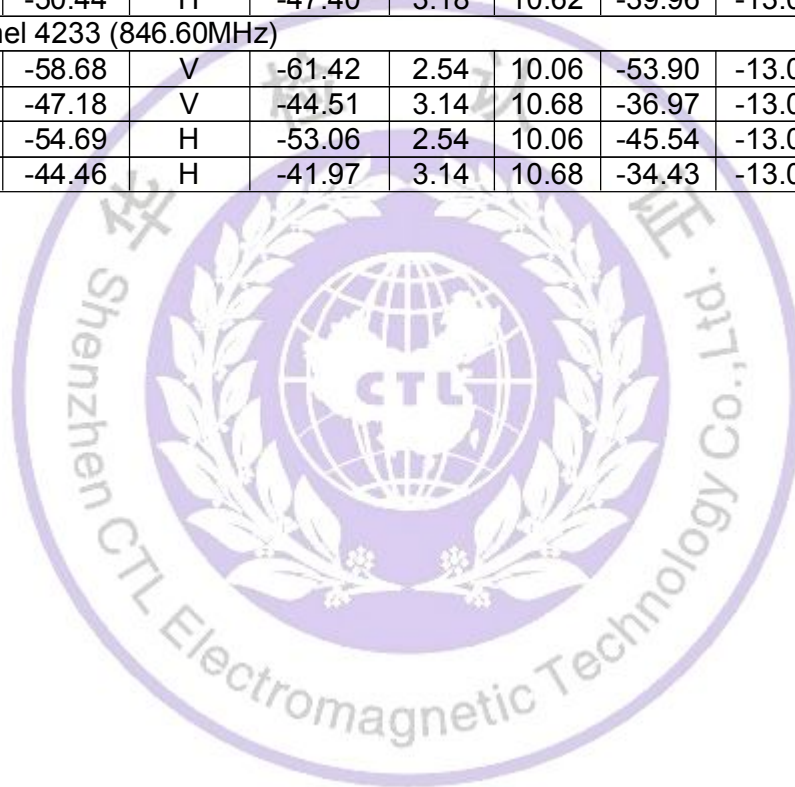
Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	WCDMA Band II Link		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.40MHz)								
3704.80	-58.32	V	-54.87	3.84	12.69	-46.02	-13.00	-33.02
5557.20	-65.26	V	-56.76	4.82	13.15	-48.43	-13.00	-35.43
3704.80	-58.54	H	-55.16	3.84	12.69	-46.31	-13.00	-33.31
5557.20	-65.58	H	-57.70	4.82	13.15	-49.37	-13.00	-36.37
Middle Channel 9400 (1880.00MHz)								
3760.00	-63.22	V	-60.01	3.73	12.72	-51.02	-13.00	-38.02
5640.00	-65.90	V	-57.97	4.93	13.14	-49.76	-13.00	-36.76
3760.00	-64.68	H	-61.40	3.73	12.72	-52.41	-13.00	-39.41
5640.00	-65.52	H	-57.90	4.93	13.14	-49.69	-13.00	-36.69
High Channel 9538 (1907.60MHz)								
3815.20	-62.06	V	-58.33	4.02	12.73	-49.62	-13.00	-36.62
5722.80	-65.36	V	-56.35	4.87	13.11	-48.11	-13.00	-35.11
3815.20	-62.16	H	-58.26	4.02	12.73	-49.55	-13.00	-36.55
5722.80	-65.67	H	-57.16	4.87	13.11	-48.92	-13.00	-35.92



Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	WCDMA Band V Traffic		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.40MHz)								
1652.80	-58.12	V	-60.65	2.50	9.75	-53.40	-13.00	-40.40
3312.00	-50.41	V	-47.23	3.12	10.48	-39.87	-13.00	-26.87
1652.80	-59.74	H	-62.28	2.50	9.75	-55.03	-13.00	-42.03
3312.00	-49.86	H	-46.54	3.12	10.48	-39.18	-13.00	-26.18
Middle Channel 4182 (836.40MHz)								
1672.80	-60.56	V	-63.22	2.52	9.95	-55.79	-13.00	-42.79
3346.00	-51.51	V	-48.62	3.18	10.62	-41.18	-13.00	-28.18
1672.80	-61.46	H	-63.71	2.52	9.95	-56.28	-13.00	-43.28
3346.00	-50.44	H	-47.40	3.18	10.62	-39.96	-13.00	-26.96
High Channel 4233 (846.60MHz)								
1693.20	-58.68	V	-61.42	2.54	10.06	-53.90	-13.00	-40.90
2539.80	-47.18	V	-44.51	3.14	10.68	-36.97	-13.00	-23.97
2538.50	-54.69	H	-53.06	2.54	10.06	-45.54	-13.00	-32.54
3388.50	-44.46	H	-41.97	3.14	10.68	-34.43	-13.00	-21.43



Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	HSDPA Band II Traffic		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.40MHz)								
3704.80	-58.52	V	-55.06	3.84	12.69	-46.21	-13.00	-33.21
5557.20	-64.31	V	-55.96	4.82	13.15	-47.63	-13.00	-34.63
3704.80	-59.68	H	-56.30	3.84	12.69	-47.45	-13.00	-34.45
5557.20	-65.06	H	-56.61	4.82	13.15	-48.28	-13.00	-35.28
Middle Channel 9400 (1880.00MHz)								
3760.00	-62.51	V	-59.34	3.73	12.72	-50.35	-13.00	-37.35
5640.00	-64.27	V	-56.18	4.93	13.14	-47.97	-13.00	-34.97
3760.00	-63.81	H	-60.53	3.73	12.72	-51.54	-13.00	-38.54
5640.00	-66.24	H	-58.62	4.93	13.14	-50.41	-13.00	-37.41
High Channel 9538 (1907.60MHz)								
3815.20	-61.98	V	-58.25	4.02	12.73	-49.54	-13.00	-36.54
5722.80	-65.88	V	-57.97	4.87	13.11	-49.73	-13.00	-36.73
3815.20	-61.79	H	-57.90	4.02	12.73	-49.19	-13.00	-36.19
5722.80	-65.72	H	-57.50	4.87	13.11	-49.26	-13.00	-36.26



Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	HSDPA Band V Traffic		
Date of Test	2013/02/16	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.40MHz)								
1652.80	-59.32	V	-61.85	2.50	9.75	-54.60	-13.00	-41.60
3312.00	-51.12	V	-47.91	3.12	10.48	-40.55	-13.00	-27.55
1652.80	-59.97	H	-62.50	2.50	9.75	-55.25	-13.00	-42.25
3312.00	-50.83	H	-47.51	3.12	10.48	-40.15	-13.00	-27.15
Middle Channel 4182 (836.40MHz)								
1672.80	-59.82	V	-62.48	2.52	9.95	-55.05	-13.00	-42.05
3346.00	-50.26	V	-47.38	3.18	10.62	-39.94	-13.00	-26.94
1672.80	-61.13	H	-63.79	2.52	9.95	-56.36	-13.00	-43.36
3346.00	-48.26	H	-45.17	3.18	10.62	-37.73	-13.00	-24.73
High Channel 4233 (846.60MHz)								
2538.50	-56.74	V	-55.40	2.54	10.06	-47.88	-13.00	-34.88
3380.00	-46.34	V	-43.65	3.14	10.68	-36.11	-13.00	-23.11
2538.50	-53.04	H	-51.20	2.54	10.06	-43.68	-13.00	-30.68
3380.00	-42.59	H	-40.10	3.14	10.68	-32.56	-13.00	-19.56



Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	HSUPA Band II Traffic		
Date of Test	2013/02/16	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 9262 (1852.40MHz)								
3704.80	-64.10	V	-60.65	3.84	12.69	-51.80	-13.00	-38.80
5557.20	-64.35	V	-55.85	4.82	13.15	-47.52	-13.00	-34.52
3704.80	-63.93	H	-60.56	3.84	12.69	-51.71	-13.00	-38.71
5557.20	-64.48	H	-56.60	4.82	13.15	-48.27	-13.00	-35.27
Middle Channel 9400 (1880.00MHz)								
3760.00	-64.95	V	-61.75	3.73	12.72	-52.76	-13.00	-39.76
5640.00	-64.87	V	-56.93	4.93	13.14	-48.72	-13.00	-35.72
3760.00	-64.00	H	-60.73	3.73	12.72	-51.74	-13.00	-38.74
5640.00	-65.84	H	-58.21	4.93	13.14	-50.00	-13.00	-37.00
High Channel 9538 (1907.60MHz)								
3815.20	-64.79	V	-61.07	4.02	12.73	-52.36	-13.00	-39.36
5722.80	-65.20	V	-56.63	4.87	13.11	-48.39	-13.00	-35.39
3815.20	-64.54	H	-60.65	4.02	12.73	-51.94	-13.00	-38.94
5722.80	-66.01	H	-57.79	4.87	13.11	-49.55	-13.00	-36.55



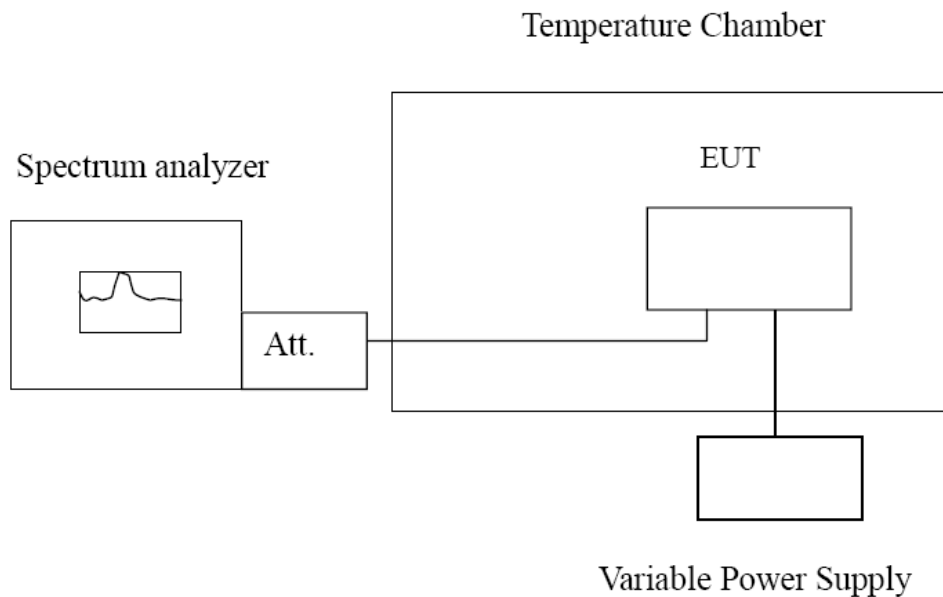
Product	Smartphone		
Test Item	Radiated Spurious Emission		
Test Mode	HSUPA Band V Traffic		
Date of Test	2013/02/16	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132 (826.40MHz)								
1654.50	-52.86	V	-55.39	2.50	9.75	-48.14	-13.00	-35.14
2479.20	-63.84	V	-63.04	3.12	10.48	-55.68	-13.00	-42.68
1654.50	-56.67	H	-59.20	2.50	9.75	-51.95	-13.00	-38.95
2479.20	-62.33	H	-61.30	3.12	10.48	-53.94	-13.00	-40.94
Middle Channel 4182 (836.40MHz)								
1671.50	-53.11	V	-55.77	2.52	9.95	-48.34	-13.00	-35.34
2509.20	-63.55	V	-62.93	3.18	10.62	-55.49	-13.00	-42.49
1671.50	-54.77	H	-57.19	2.52	9.95	-49.76	-13.00	-36.76
2509.20	-62.81	H	-61.81	3.18	10.62	-54.37	-13.00	-41.37
High Channel 4233 (846.60MHz)								
1697.00	-51.21	V	-53.94	2.54	10.06	-46.42	-13.00	-33.42
2539.80	-62.70	V	-61.34	3.14	10.68	-53.80	-13.00	-40.80
1697.00	-53.32	H	-55.32	2.54	10.06	-47.80	-13.00	-34.80
2539.80	-61.76	H	-60.12	3.14	10.68	-52.58	-13.00	-39.58



4.6. Frequency Stability under Temperature & Voltage Variations

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Frequency Stability Under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

LIMIT

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Limit < ± 2.5 ppm

TEST RESULTS

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	GSM850 GPRS Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability Under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	52	± 2091
-20	836.40	-22	± 2091
-10	836.40	61	± 2091
0	836.40	57	± 2091
10	836.40	32	± 2091
20	836.40	16	± 2091
30	836.40	23	± 2091
40	836.40	61	± 2091
50	836.40	32	± 2091

Frequency Stability Under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-18	± 2091
3.700	836.40	-35	± 2091
3.400	836.40	38	± 2091

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	PCS1900 GPRS Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	42	± 4700
-20	1880.00	51	± 4700
-10	1880.00	57	± 4700
0	1880.00	19	± 4700
10	1880.00	33	± 4700
20	1880.00	39	± 4700
30	1880.00	26	± 4700
40	1880.00	31	± 4700
50	1880.00	60	± 4700

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	1880.00	28	± 4700
3.700	1880.00	31	± 4700
3.400	1880.00	45	± 4700

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	WCDMA Band II Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability Under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	61	± 4700
-20	1880.00	44	± 4700
-10	1880.00	52	± 4700
0	1880.00	37	± 4700
10	1880.00	28	± 4700
20	1880.00	21	± 4700
30	1880.00	33	± 4700
40	1880.00	20	± 4700
50	1880.00	45	± 4700

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	1880.00	-31	± 4700
3.700	1880.00	26	± 4700
3.400	1880.00	-53	± 4700

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	WCDMA Band V Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	-42	± 2091
-20	836.40	-31	± 2091
-10	836.40	-42	± 2091
0	836.40	-23	± 2091
10	836.40	-27	± 2091
20	836.40	-16	± 2091
30	836.40	-35	± 2091
40	836.40	-31	± 2091
50	836.40	-56	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-37	± 2091
3.700	836.40	-22	± 2091
3.400	836.40	-51	± 2091

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	HSDPA Band II Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	47	± 4700
-20	1880.00	35	± 4700
-10	1880.00	44	± 4700
0	1880.00	51	± 4700
10	1880.00	52	± 4700
20	1880.00	37	± 4700
30	1880.00	42	± 4700
40	1880.00	32	± 4700
50	1880.00	60	± 4700

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	1880.00	32	± 4700
3.700	1880.00	26	± 4700
3.400	1880.00	50	± 4700

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	HSDPA Band V Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	-44	± 2091
-20	836.40	-35	± 2091
-10	836.40	-38	± 2091
0	836.40	-34	± 2091
10	836.40	-18	± 2091
20	836.40	-22	± 2091
30	836.40	-41	± 2091
40	836.40	-38	± 2091
50	836.40	-55	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-46	± 2091
3.700	836.40	-36	± 2091
3.400	836.40	-51	± 2091

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	HSUPA Band II Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	39	± 4700
-20	1880.00	32	± 4700
-10	1880.00	41	± 4700
0	1880.00	46	± 4700
10	1880.00	50	± 4700
20	1880.00	35	± 4700
30	1880.00	42	± 4700
40	1880.00	45	± 4700
50	1880.00	62	± 4700

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	1880.00	32	± 4700
3.700	1880.00	23	± 4700
3.400	1880.00	52	± 4700

Product	Smartphone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	HSUPA Band V Link		
Date of Test	2013/02/06	Test Site	Shielding Room

Frequency Stability under Temperature

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	-58	± 2091
-20	836.40	-37	± 2091
-10	836.40	-32	± 2091
0	836.40	-46	± 2091
10	836.40	-31	± 2091
20	836.40	-26	± 2091
30	836.40	-43	± 2091
40	836.40	-31	± 2091
50	836.40	-52	± 2091

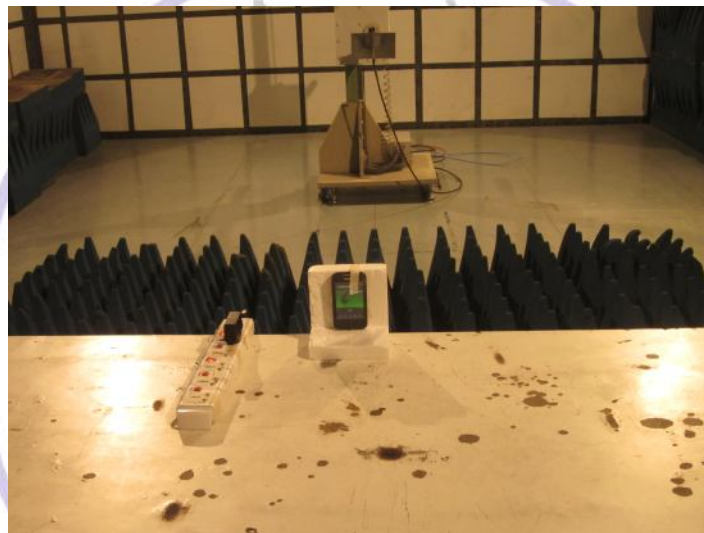
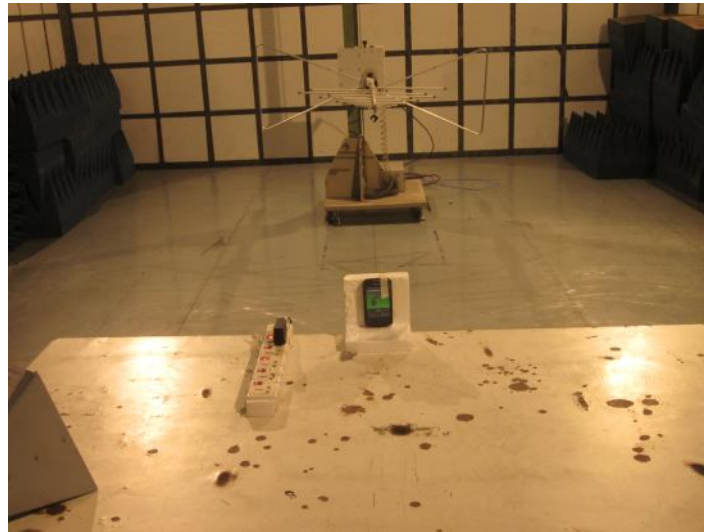
Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-51	± 2091
3.700	836.40	-32	± 2091
3.400	836.40	-55	± 2091

Note:

1. Normal Voltage: 3.7V
2. Battery End Point(BEP) = 3.4V

5. Test Setup Photos of the EUT



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6. External and Internal Photos of the EUT

External Photos of EUT

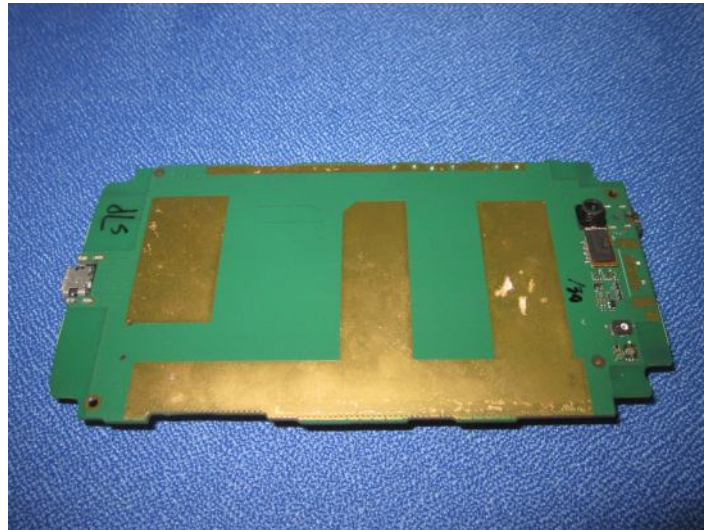


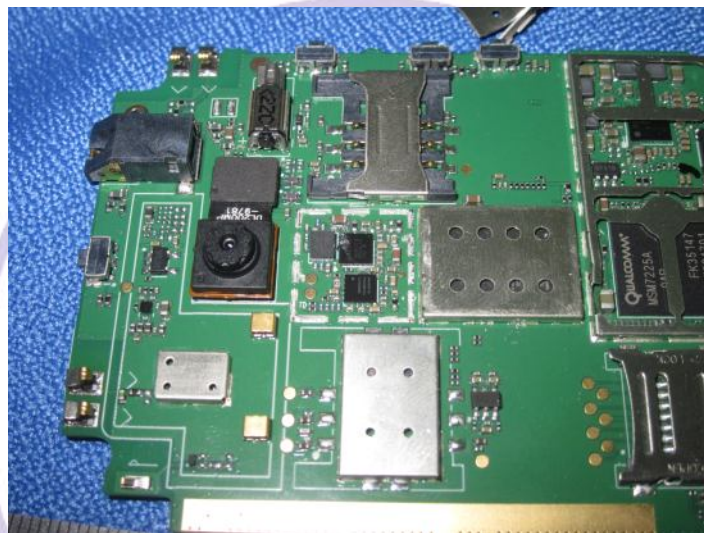




Internal Photos of EUT







.....End of Report.....

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