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FCC PART 22 AND PART 24 TEST REPORT

FCC Part 22 Subpart H / Part 24 Subpart E

Report Reference No.....:	**CTL1309121433-WU**
Compiled by (position+printed name+signature)..:	File administrators Jacky Chen
Name of the organization performing the tests (position+printed name+signature)..:	Test Engineer Tracy Qi
Approved by (position+printed name+signature)..:	Manager Tracy Qi
Date of issue.....:	Oct. 16, 2013
Representative Laboratory Name .:	**Shenzhen CTL Electromagnetic Technology Co., Ltd.**
Address.....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
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.....:	**Multilaser Industrial S.A.**
Address.....:	Av. Brigadeiro Faria Lima, 1811 - 15andar - Jardim Paulistano, Brazil
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 ..... :	**3G WCDMA+GSM Smart Phone**
FCC ID……..:	**2AAVQORION**
Trade Mark .....:	Multilaser
Model/Type reference.....:	Orion, Z600, Z606
GSM/WCDMA	
Transmit .....:	2G:GSM 850: 824~849MHz, PCS 1900: 1850~1910MHz 3G: WCDMA Band V: 824~849MHz
Receive .....:	2G:GSM 850: 869~894MHz, PCS 1900: 1930~1990MHz 3G: WCDMA Band V: 869~894MHz
Release Version .....:	2G:R99 3G:UMTS FDD: Rel-7

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.....:	V2.1+EDR
Type of modulation .....:	FHSS
Data Rate.....:	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK)
Wi-Fi	
Work frequency .....:	802.11b/g: 2412~2462MHz
Type of modulation .....:	802.11b DSSS, 802.11g: OFDM
Data Rate.....:	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
Antenna Gain .....:	0.5 dBi for GSM850 and WCDMA Band V
	0.5 dBi for PCS1900 and WCDMA Band II
	1.0 dBi for Bluetooth and Wi-Fi
Antenna type .....:	Internal
IMEI1 .....:	359020050080816
IMEI2 .....:	359020050080824
Result.....:	**Positive**

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TEST REPORT

Test Report No. :	CTL1309121433-WU	Oct. 16, 2013 Date of issue

Equipment under Test	:	**3G WCDMA+GSM Smart Phone**
Model /Type	:	Orion
Listed Models	:	Z600,Z606
Difference Description	:	Only the color and model's name is different.
Applicant	:	**Multilaser Industrial S.A.**
Address	:	Av. Brigadeiro Faria Lima, 1811 - 15andar - Jardim Paulistano, Brazil
Manufacturer		**Shenzhen ZIVI Communication & Electronics Co., Ltd**
Address		Room 8A-B, Konka R&D Building, No.28, Keji 12th Road South, Nanshan District, Shenzhen, China

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

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2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Sept. 18, 2013

Testing commenced on : Sept. 18, 2013

Testing concluded on : Oct. 15, 2013

2.2. Equipment Under Test

Power supply system utilised

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

DC 3.7V from battery

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

A 3G WCDMA+GSM Smart Phone, 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 V
Mode 6: HSDPA Band V
Mode 7: 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 CTL1309121433-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

o Manufacturer :
Model No. :

o Manufacturer :
Model No. :

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

This submittal(s) (test report) is intended for FCC ID: **2AAVQORION** filing to comply with of the FCC Part 22 and Part 24 Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

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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.

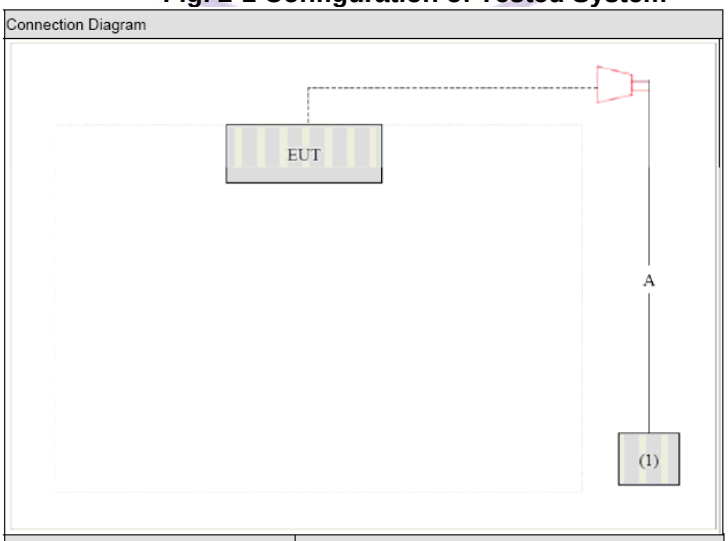
3.3. Environmental conditions

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



Signal Cable Type		Signal cable Description
A	Coaxial Cable	Shielded, >5m

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.

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3.7. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2013/04/14	2014/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2013/04/14	2014/04/13
3	Dual Directional Coupler	Agilent	778D	2013/04/14	2014/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2013/04/14	2014/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2013/04/14	2014/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2013/04/14	2014/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2013/04/14	2014/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2013/04/14	2014/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2013/04/14	2014/04/13
10	AC Power Supply	IDRC	CF-500TP	2013/04/14	2014/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2013/04/14	2014/04/13
12	RF Current Probe	FCC	F-33-4	2013/04/14	2014/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2013/04/14	2014/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2013/04/14	2014/04/13
15	Amplifier	HP	8447D	2013/04/14	2014/04/13
16	SIGNAL GENERATOR	HP	8647A	2013/04/14	2014/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2013/04/14	2014/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2013/04/14	2014/04/13
19	EMI Test Receiver	R&S	ESPI	2013/04/14	2014/04/13
20	Loop Antenna	ZHINAN	ZN30900A	2013/04/14	2014/04/13
21	Horn Antenna	Schwarzbeck	BBHA9120D	2013/04/14	2014/04/13
22	Horn Antenna	Schwarzbeck	BBHA9170	2013/04/14	2014/04/13
23	Spectrum Analyzer	Agilent	E4446A	2013/04/14	2014/04/13
24	Wideband Peak Power Meter	Anritsu	ML2495A	2013/04/14	2014/04/13
25	Power Sensor	Anritsu	MA2411B	2013/04/14	2014/04/13
26	Climate Chamber	ESPEC	EL-10KA	2013/04/14	2014/04/13

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
Out of band emissions	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 (FCC Part 24E & Part 2)

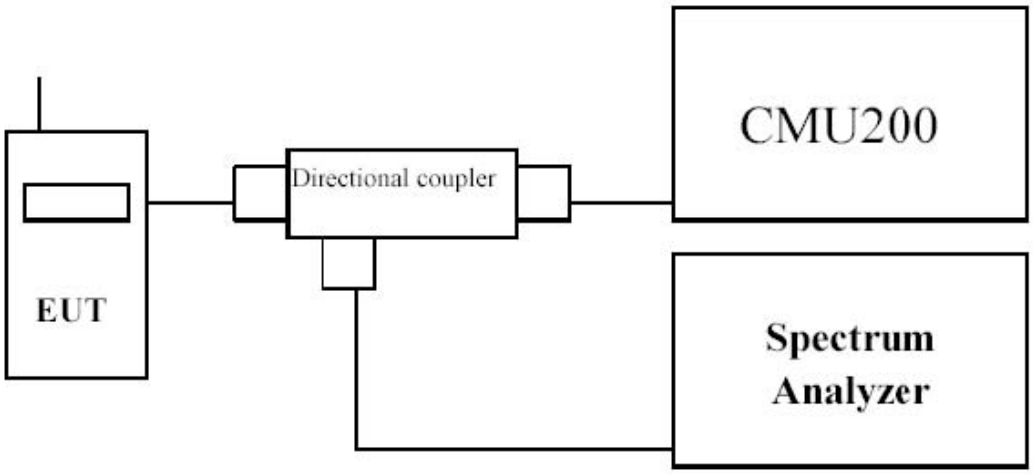
Emission			
Performed Item	Normative References	Test Performed	Deviation
Peak Output Power	FCC Part 24.232(b) and Part 2.1046 EIA/TIA 603-C	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	Yes	No
Occupied Bandwidth	FCC Part 24.238(b) and Part 2.1049	Yes	No
Out of band emissions	FCC Part 24.238(a) 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	FCC Part 24.235 and 2.1055 EIA/TIA 603-C	Yes	No

4. TEST CONDITIONS AND RESULTS

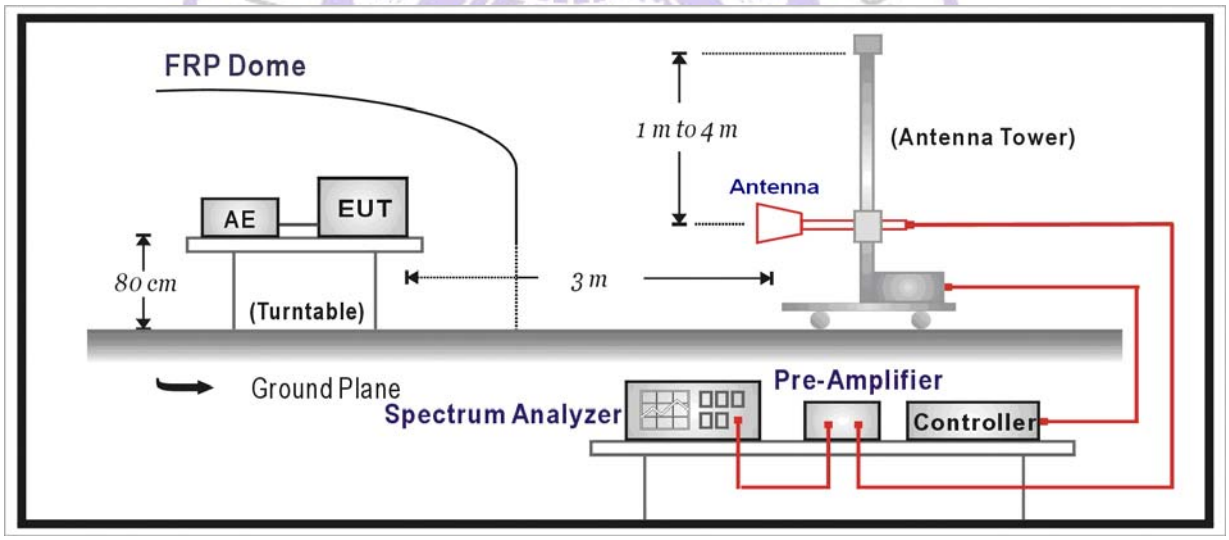
4.1. Peak Output Power

TEST CONFIGURATION

Conducted Power Measurement:



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
c) EUT Communicate with CMU200, then select a channel for testing.
d) 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
   Configure R&S CMU200 to support GMSK call respectively, and set one timeslot transmission for GMSK GSM/GPRS.
   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.

   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 Power Measurement

Mode	Frequency (MHz)	Avg. Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Max. Power (dBm)	Scaling Factor
GSM850	824.2	32.63	-9	23.63	33.0	1.089
	836.4	32.65	-9	23.65	33.0	1.084
	848.8	32.69	-9	23.69	33.0	1.074
GPRS850(1 Slot)	824.2	32.62	-9	23.62	33.0	1.091
	836.4	32.60	-9	23.60	33.0	1.096
	848.8	32.65	-9	23.65	33.0	1.084
GPRS850(2 Slot)	824.2	31.42	-6	25.42	31.5	1.019
	836.4	31.44	-6	25.44	31.5	1.014
	848.8	31.41	-6	25.41	31.5	1.021
GPRS850(3 Slot)	**824.2**	**29.71**	**-4.25**	**25.46**	**30.0**	**1.069**
	836.4	**29.70**	**-4.25**	**25.45**	**30.0**	**1.072**
	848.8	**29.68**	**-4.25**	**25.43**	**30.0**	**1.076**
GPRS850(4 Slot)	824.2	28.03	-3	25.03	28.5	1.114
	836.4	28.03	-3	25.03	28.5	1.114
	848.8	28.00	-3	25.00	28.5	1.122
PCS1900	1850.2	28.60	-9	19.60	29.5	1.230
	1880.0	29.19	-9	20.19	29.5	1.074
	1909.8	29.36	-9	20.36	29.5	1.033
GPRS1900(1 Slot)	1850.2	28.59	-9	19.59	29.5	1.233
	1880.0	29.16	-9	20.16	29.5	1.081
	1909.8	29.33	-9	20.33	29.5	1.040
GPRS1900(2 Slot)	**1850.2**	**27.05**	**-6**	**21.05**	**28.0**	**1.245**
	1880.0	**27.61**	**-6**	**21.61**	**28.0**	**1.094**
	1909.8	**27.77**	**-6**	**21.77**	**28.0**	**1.054**
GPRS1900(3 Slot)	1850.2	25.06	-4.25	20.81	26.0	1.242
	1880.0	25.63	-4.25	21.38	26.0	1.089
	1909.8	25.81	-4.25	21.56	26.0	1.045
GPRS1900(4 Slot)	1850.2	23.19	-3	20.19	24.0	1.205
	1880.0	23.76	-3	20.76	24.0	1.057
	1909.8	23.93	-3	20.93	24.0	1.016

Mode	3GPP Subtest	Band V (850MHz) Channel			MPR
		Conducted Power (dBm)			
		4132	4182	4233	
WCDMA R99	1	23.96	22.84	23.48	N/A
Rel5 HSDPA	1	23.57	22.53	23.35	0
	2	23.31	22.92	23.21	0
	3	22.85	22.76	22.71	0.5
	4	22.83	22.75	22.69	0.5
Rel6 HSUPA	1	23.77	22.58	23.38	0.0
	2	21.29	21.26	21.2	2.0
	3	22.28	22.25	22.21	1.0
	4	21.28	21.23	21.19	2.0
	5	23.29	22.86	23.18	0.0
Rel7 HSPA+	1	23.66	22.91	23.38	N/A

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

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Radiated Measurement

GSM850 ERP=SG Reading-Cable Loss+Gain

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 (824.20MHz)								
824.2	-14.48	H	19.28	1.76	-0.02	17.50	38.50	-21.00
824.2	-3.88	V	30.62	1.76	-0.02	28.84	38.50	-9.66
Middle Channel 189 (836.40MHz)								
836.4	-15.10	H	18.92	1.75	0.10	17.27	38.50	-21.23
836.4	-3.78	V	30.98	1.75	0.10	29.33	38.50	-9.17
High Channel 251 (848.80MHz)								
848.8	-15.10	H	18.92	1.78	0.13	17.27	38.50	-21.23
848.8	-2.89	V	31.72	1.78	0.13	30.07	38.50	-8.43

PCS1900 EIRP=SG Reading-Cable Loss+Gain

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)								
1850.2	23.69	H	22.29	2.68	10.40	30.01	33.00	-2.99
1850.2	13.38	V	11.79	2.68	10.40	19.51	33.00	-13.49
Middle Channel 661 (1880.00MHz)								
1880.0	23.50	H	22.00	2.68	10.43	29.75	33.00	-3.25
1880.0	13.36	V	11.52	2.68	10.43	19.27	33.00	-13.73
High Channel 810 (1909.80MHz)								
1909.8	23.05	H	21.70	2.70	10.44	29.44	33.00	-3.56
1909.8	12.48	V	10.68	2.70	10.44	18.42	33.00	-14.58

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GPRS850 ERP=SG Reading-Cable Loss+Gain

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 (824.20MHz)								
824.2	-14.83	H	18.93	1.76	-0.02	17.15	38.50	-21.35
824.2	-4.07	V	30.43	1.76	-0.02	28.65	38.50	-9.85
Middle Channel 189 (836.40MHz)								
836.4	-16.32	H	17.57	1.75	0.10	15.92	38.50	-22.58
836.4	-4.39	V	30.38	1.75	0.10	28.73	38.50	-9.77
High Channel 251 (848.80MHz)								
848.8	-16.48	H	17.54	1.78	0.13	15.89	38.50	-22.61
848.8	-3.02	V	31.59	1.78	0.13	29.94	38.50	-8.56

GPRS1900 EIRP=SG Reading-Cable Loss+Gain

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)								
1850.2	23.57	H	22.17	2.68	10.40	29.89	33.00	-3.11
1850.2	12.88	V	11.29	2.68	10.40	19.01	33.00	-13.99
Middle Channel 661 (1880.00MHz)								
1880.0	23.38	H	21.88	2.68	10.43	29.63	33.00	-3.37
1880.0	13.21	V	11.37	2.68	10.43	19.12	33.00	-13.88
High Channel 810 (1909.80MHz)								
1909.8	22.92	H	21.57	2.70	10.44	29.31	33.00	-3.51
1909.8	11.83	V	10.04	2.70	10.44	17.78	33.00	-15.22

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WCDMA Band V ERP=SG Reading-Cable Loss+Gain

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 (826.40MHz)								
826.40	-21.86	H	12.69	2.56	-0.02	10.11	38.50	-28.39
826.40	-8.29	V	26.43	2.56	-0.02	23.85	38.50	-14.65
Middle Channel 4182 (836.40MHz)								
836.40	-24.69	H	10.14	2.59	0.10	7.65	38.50	-30.86
836.40	-8.41	V	26.05	2.59	0.10	23.56	38.50	-14.94
High Channel 4233 (846.60MHz)								
846.60	-23.35	H	11.35	2.54	0.13	8.94	38.50	-29.56
846.60	-8.40	V	25.90	2.54	0.13	23.49	38.50	-15.01

HSDPA Band V ERP=SG Reading-Cable Loss+Gain

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 (826.40MHz)								
826.4	-21.27	H	13.59	2.56	-0.02	11.01	38.50	-27.49
826.4	-10.31	V	25.24	2.56	-0.02	22.66	38.50	-15.84
Middle Channel 4182 (836.40MHz)								
836.4	-22.71	H	11.97	2.59	0.10	9.48	38.50	-29.02
836.4	-10.53	V	25.02	2.59	0.10	22.53	38.50	-15.97
High Channel 4233 (846.60MHz)								
846.6	-22.37	H	12.32	2.54	0.13	9.91	38.50	-28.59
846.6	-10.08	V	25.30	2.54	0.13	22.89	38.50	-15.61

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HSUPA Band V ERP=SG Reading-Cable Loss+Gain

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 (826.40MHz)								
826.4	-21.23	H	13.31	2.56	-0.02	10.73	38.50	-27.77
826.4	-10.58	V	24.74	2.56	-0.02	22.16	38.50	-16.34
Middle Channel 4182 (836.40MHz)								
836.4	-22.54	H	12.11	2.59	0.10	9.62	38.50	-28.88
836.4	-10.67	V	24.93	2.59	0.10	22.44	38.50	-16.06
High Channel 4233 (846.60MHz)								
846.6	-17.93	H	17.44	2.54	0.13	15.03	38.50	-23.47
846.6	-9.38	V	25.34	2.54	0.13	22.93	38.50	-15.57

HSPA+ Band V ERP=SG Reading-Cable Loss+Gain

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 (826.40MHz)								
826.4	-21.13	H	13.20	2.56	-0.02	10.62	38.50	-27.88
826.4	-10.48	V	24.63	2.56	-0.02	22.05	38.50	-16.45
Middle Channel 4182 (836.40MHz)								
836.4	-22.44	H	12.00	2.59	0.10	9.51	38.50	-28.99
836.4	-10.67	V	24.92	2.59	0.10	22.33	38.50	-16.17
High Channel 4233 (846.60MHz)								
846.6	-17.83	H	17.33	2.54	0.13	14.92	38.50	-23.58
846.6	-9.28	V	25.23	2.54	0.13	22.82	38.50	-15.68

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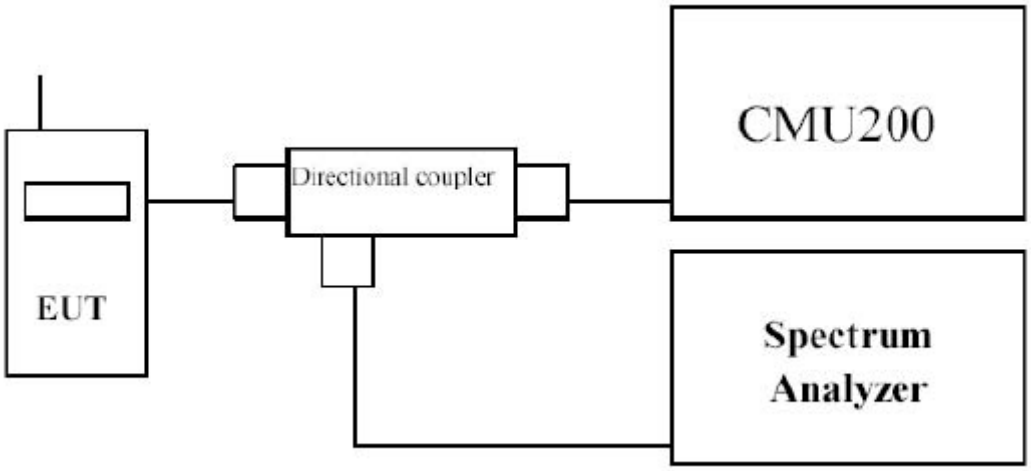
4.2. Modulation Characteristic

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*F*Tb
where F = Peak frequency deviation in Hz and Tb = 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.

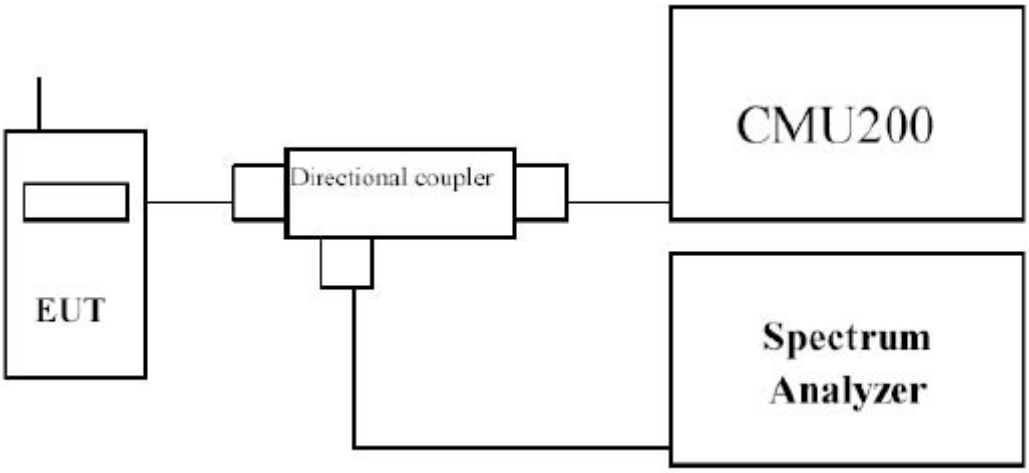
Within the bandwidth, individual channels are subdivided into multiframes (made of 26 frames), frames (made of 8 time slots), and time slots (made of 8 fields). The time slots are 0.57 ms long allowing 156.25 bits of information including overhead.

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	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	GSM 850 Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
128	824.20	312.40	245.65
189	836.40	311.33	250.75
251	848.80	310.36	246.16

Figure Channel 128 (824.20MHz)

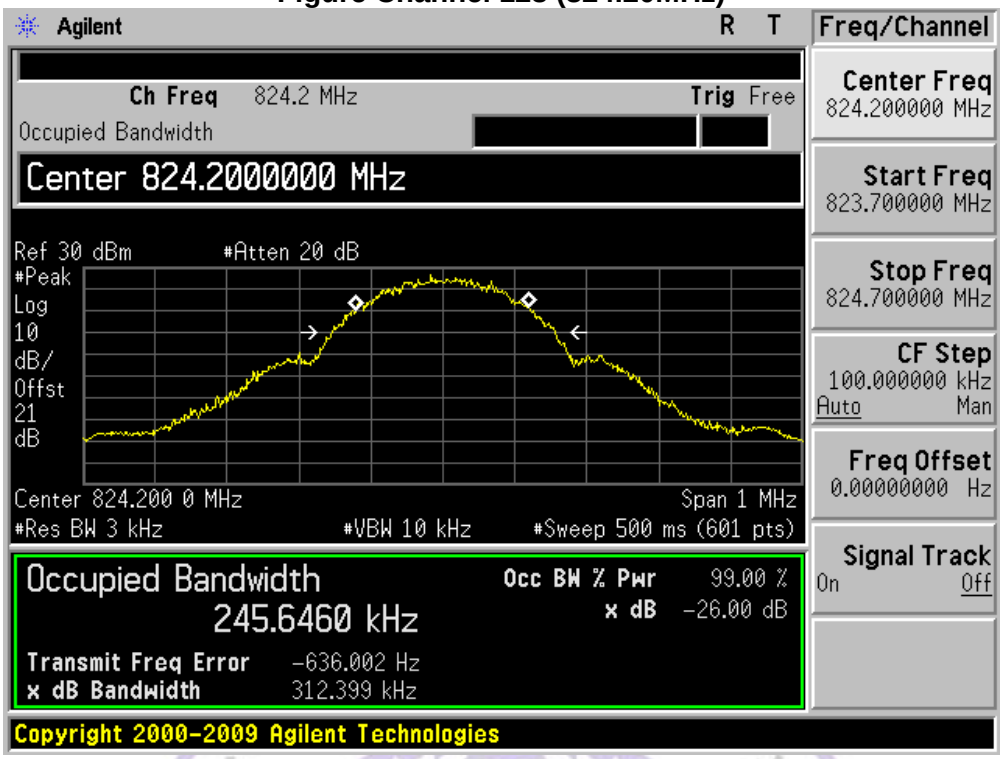


Figure Channel 189 (836.40MHz)

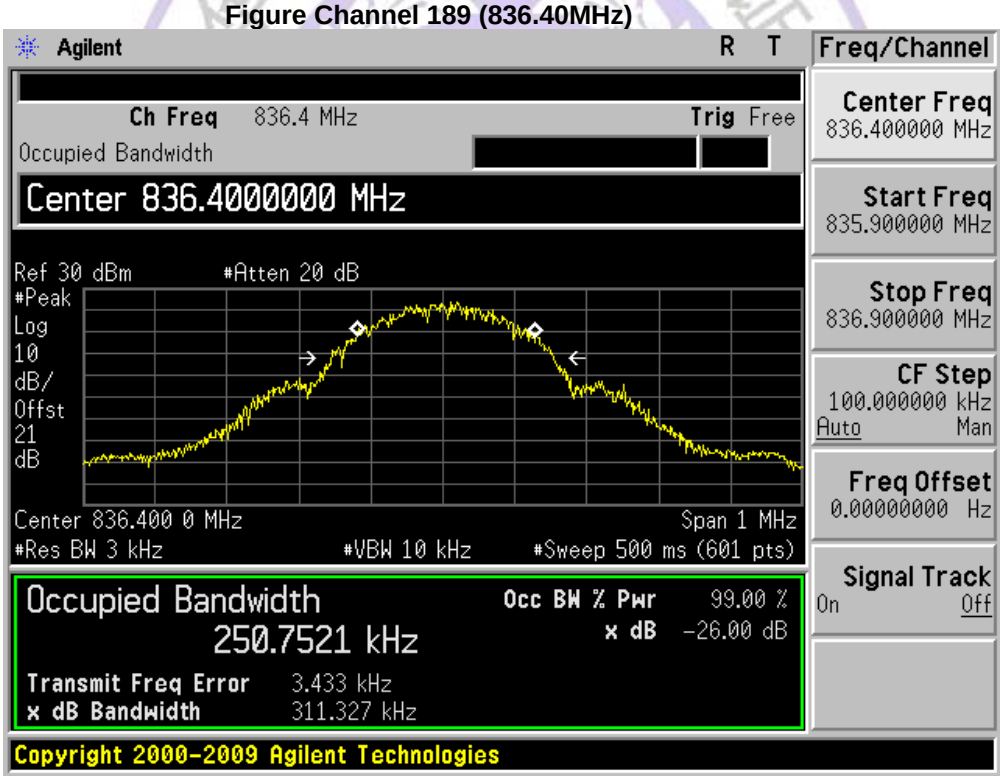
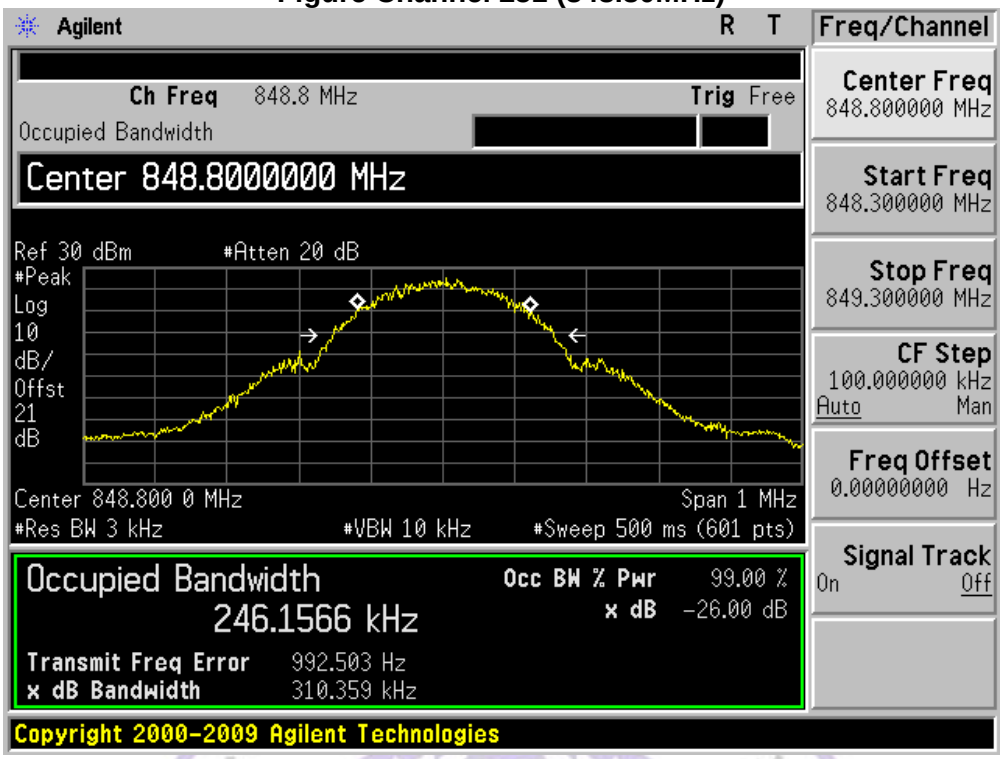


Figure Channel 251 (848.80MHz)



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Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	PCS 1900 Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	312.97	245.63
661	1880.00	310.29	244.80
810	1909.80	314.55	246.59

Figure Channel 512 (1850.20MHz)

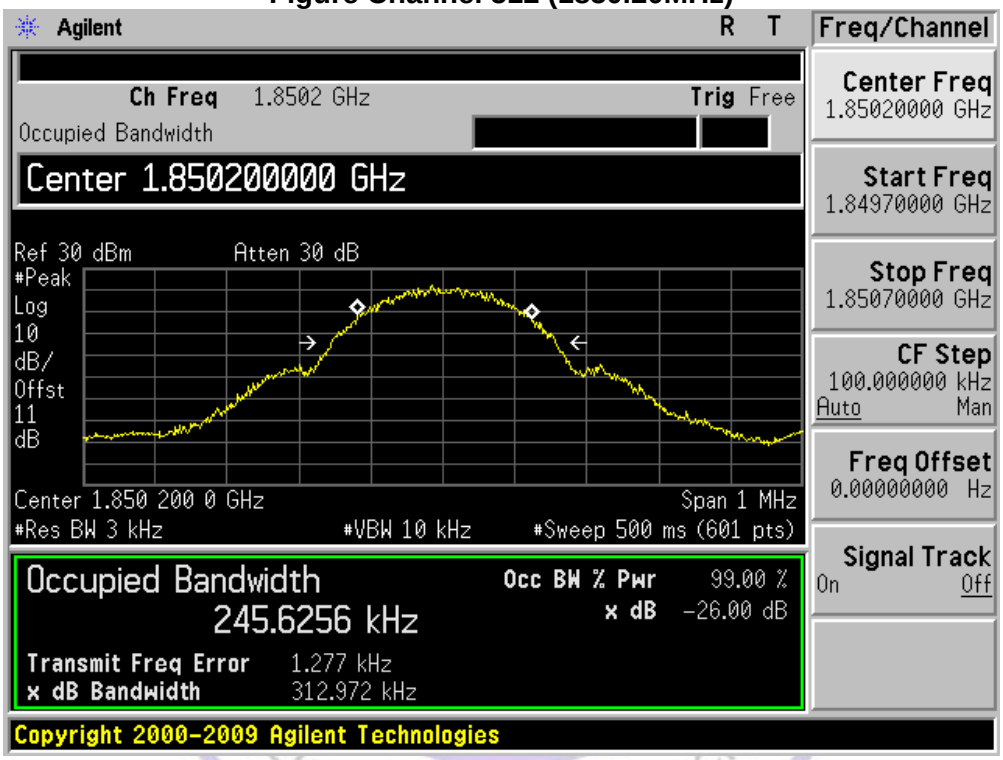


Figure Channel 661 (1880.00MHz)

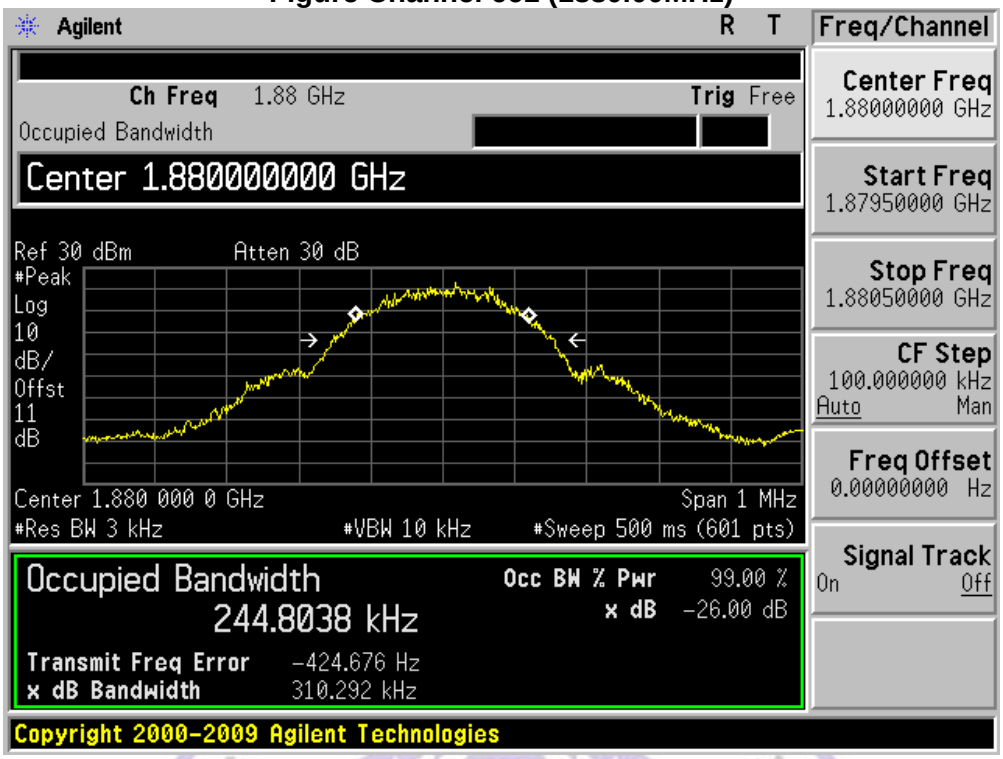
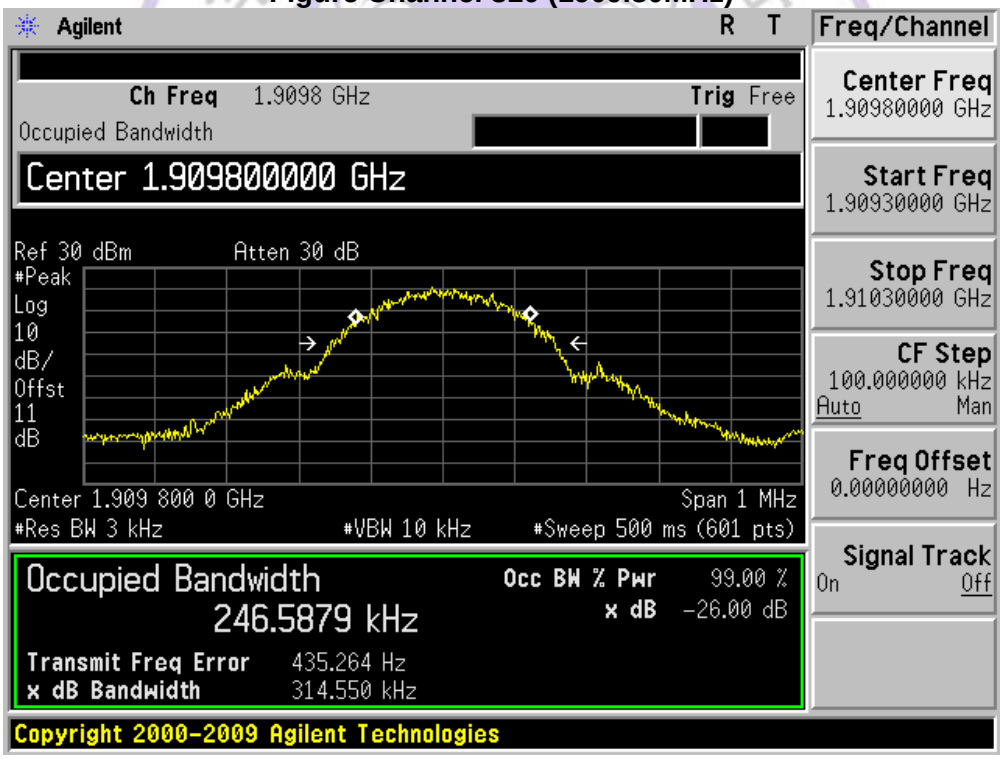


Figure Channel 810 (1909.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	GPRS 850 Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
128	824.20	312.40	245.65
189	836.40	311.33	250.75
251	848.80	310.36	246.16

Figure Channel 128 (824.20MHz)

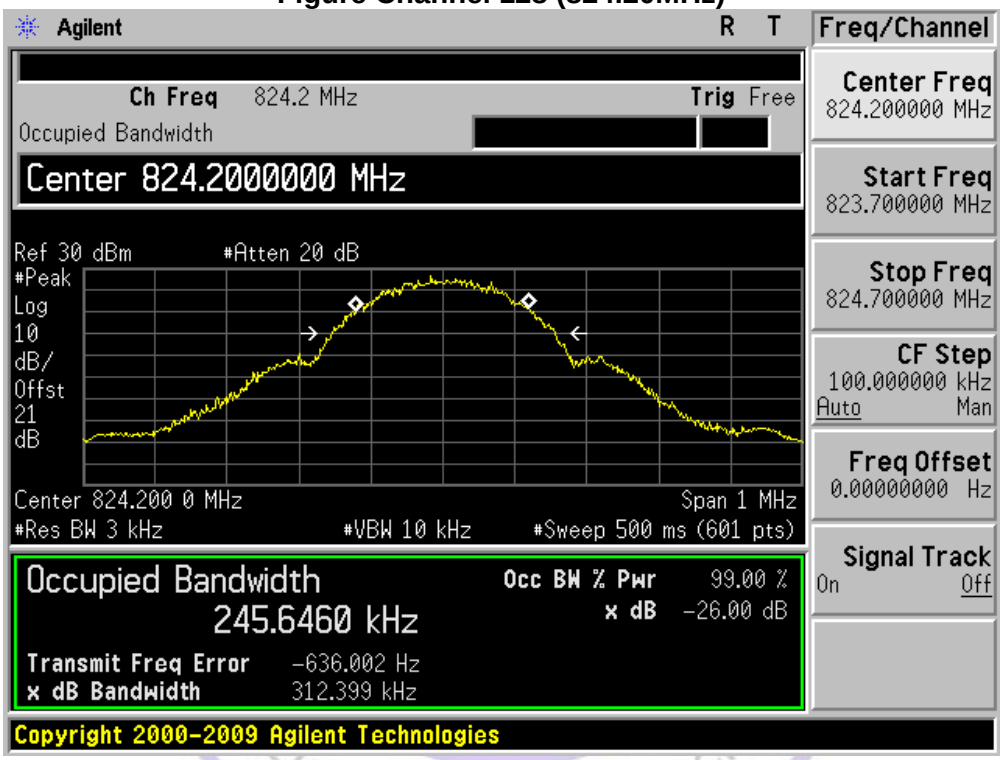


Figure Channel 189 (836.40MHz)

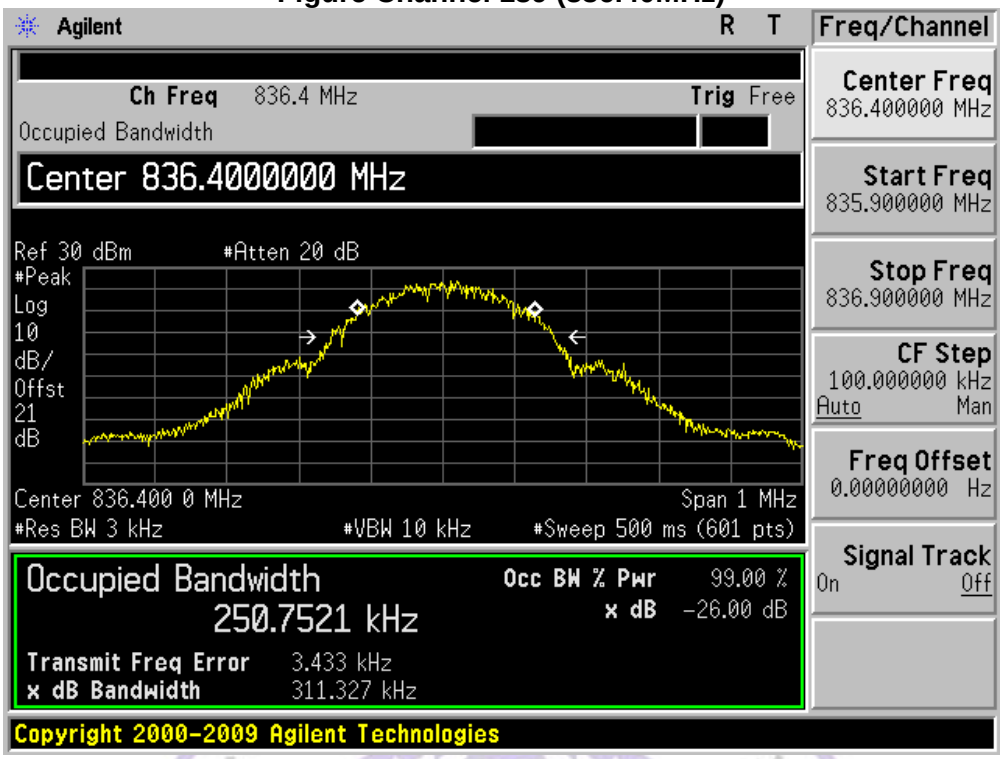
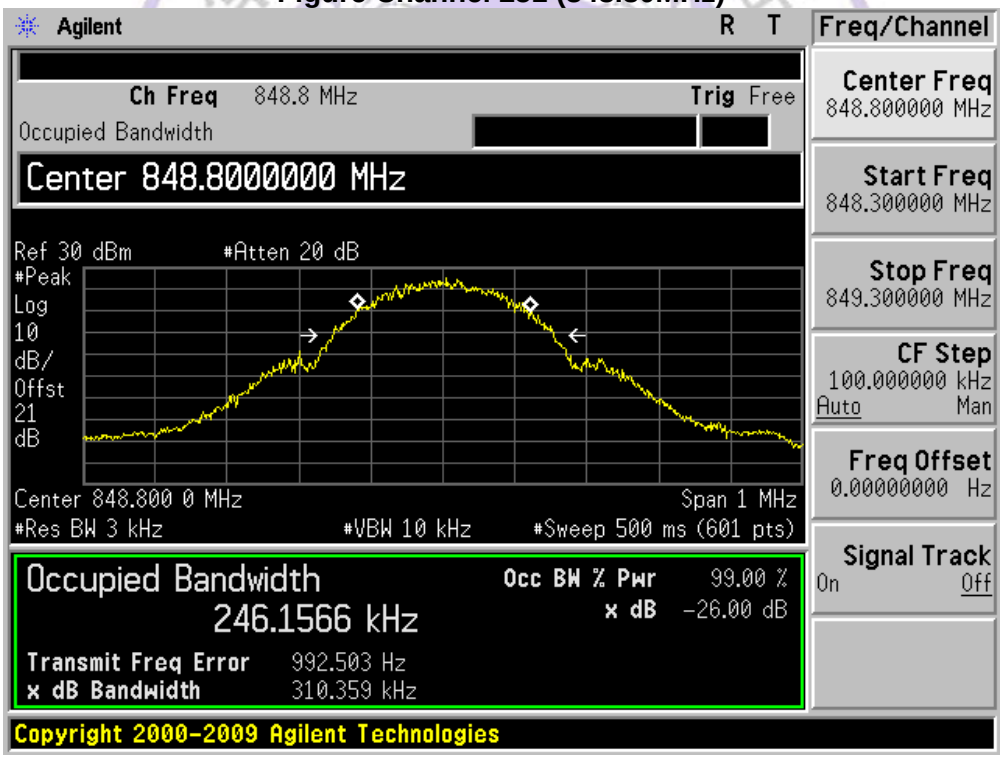


Figure Channel 251 (848.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	GPRS 1900 Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	312.97	245.63
661	1880.00	310.29	244.80
810	1909.80	314.55	246.59

Figure Channel 512 (1850.20MHz)

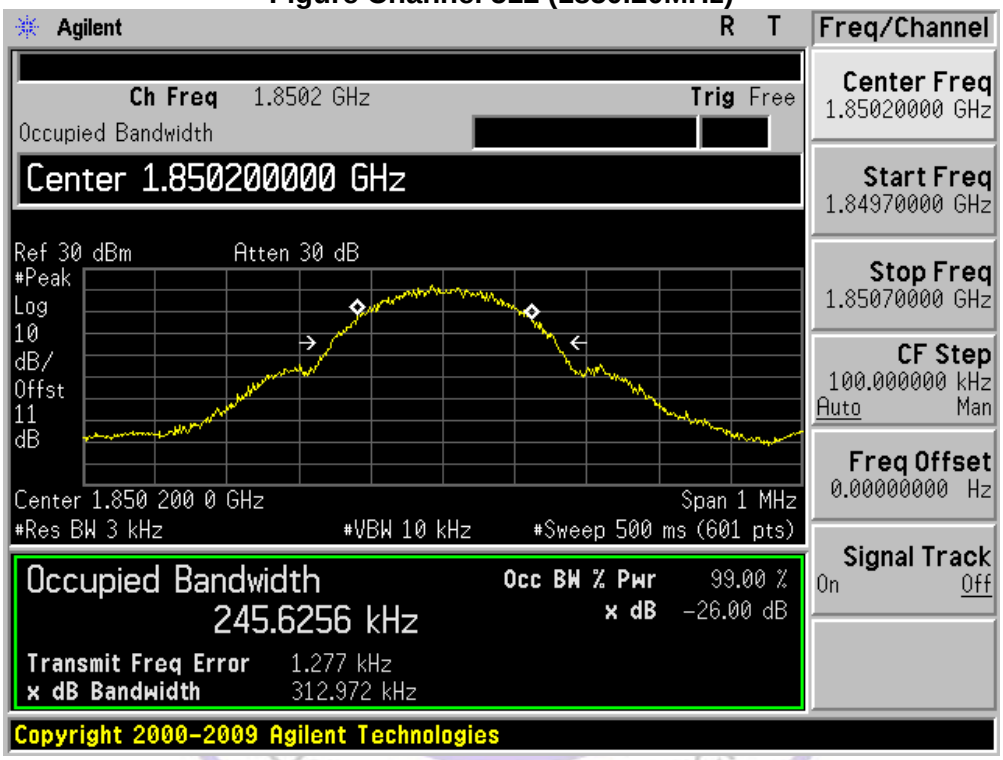


Figure Channel 661 (1880.00MHz)

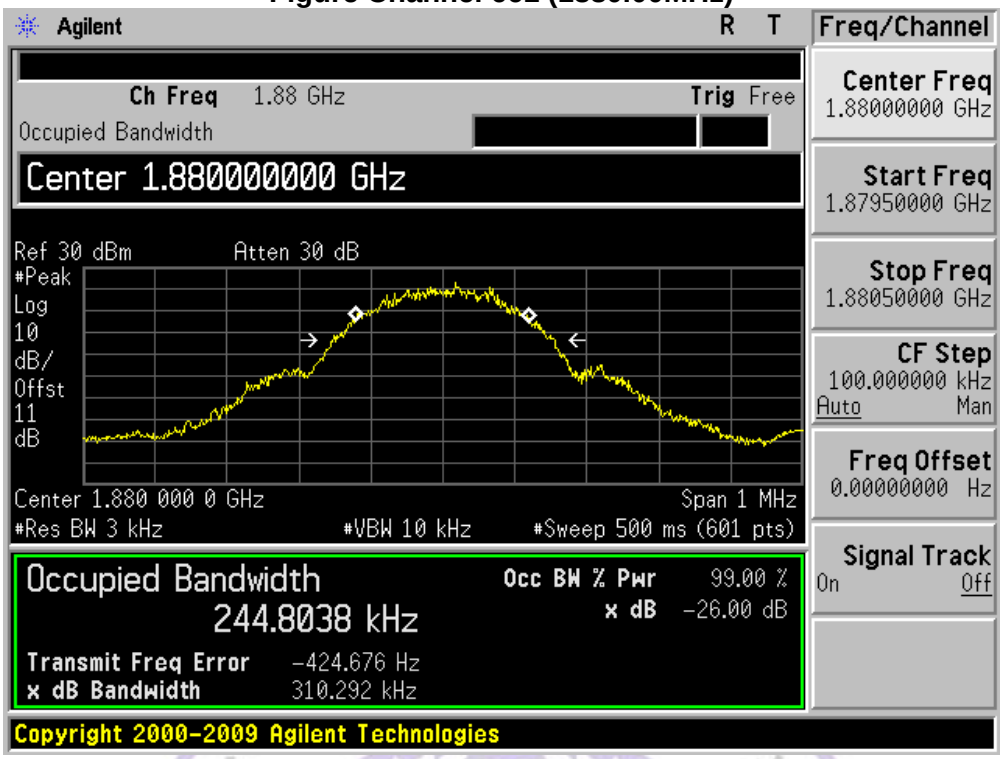
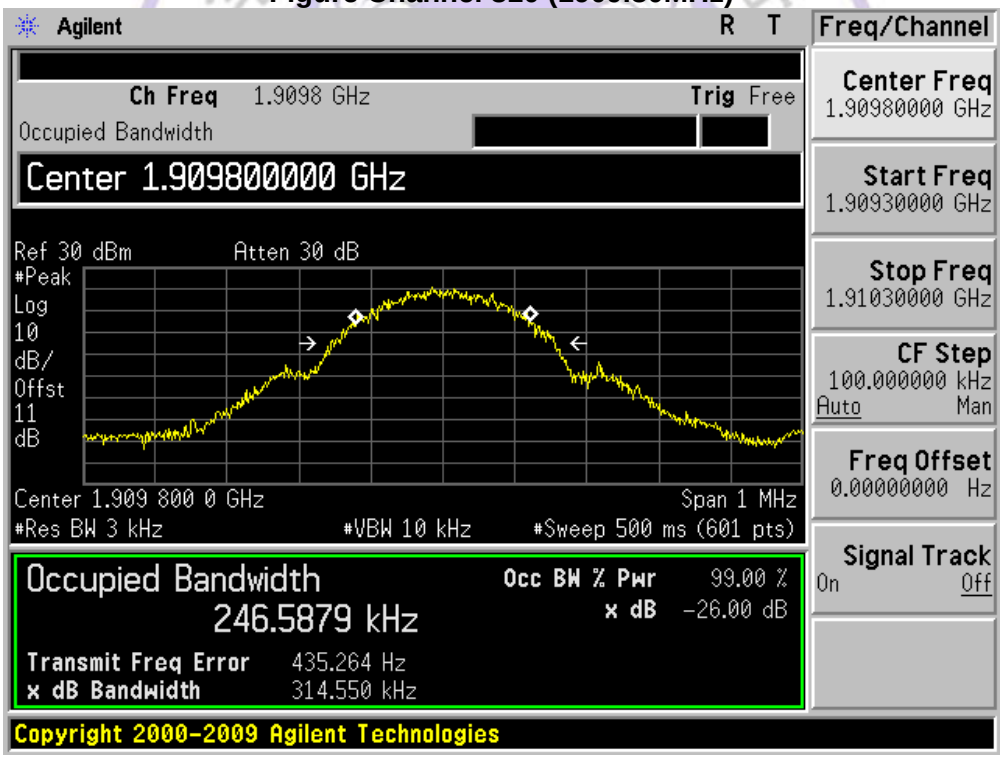


Figure Channel 810 (1909.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	WCDMA Band V Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
4132	826.4	4670.0	4151.5
4182	836.4	4660.0	4142.8
4233	846.6	4657.0	4146.8

Figure Channel 4132 (826.40MHz)

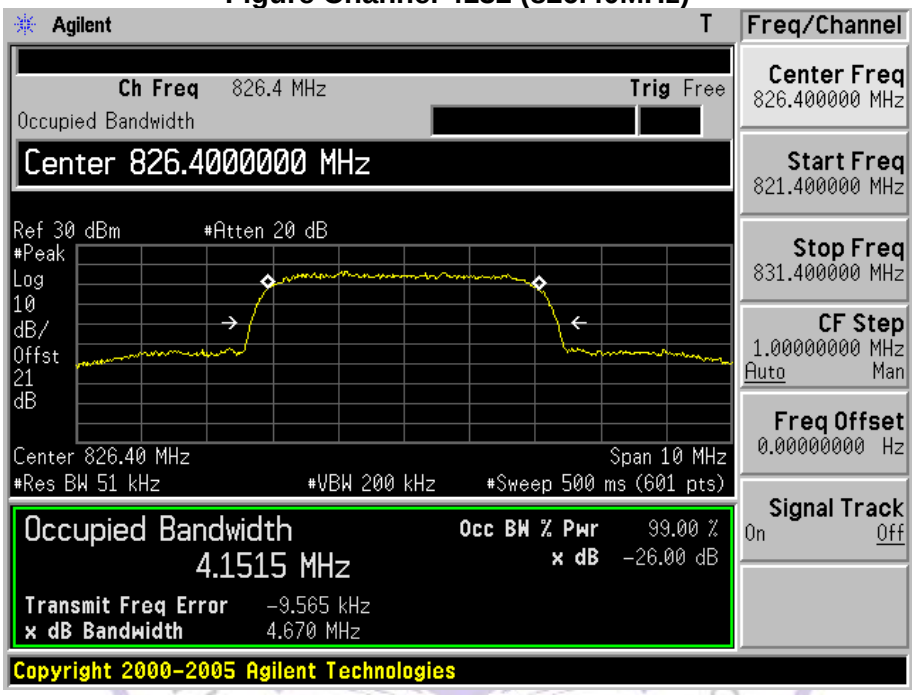


Figure Channel 4182 (836.40MHz)

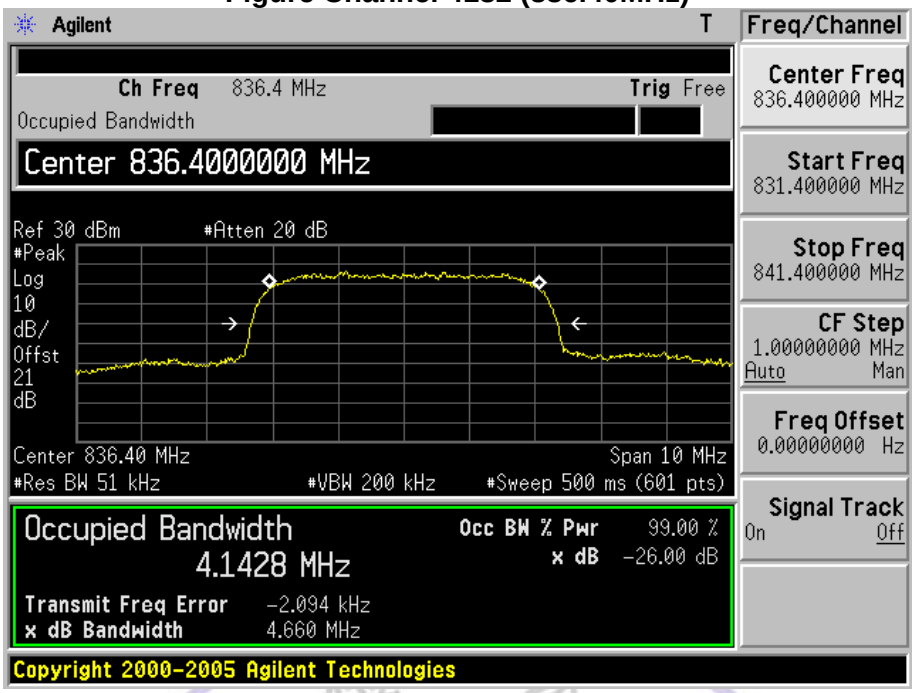
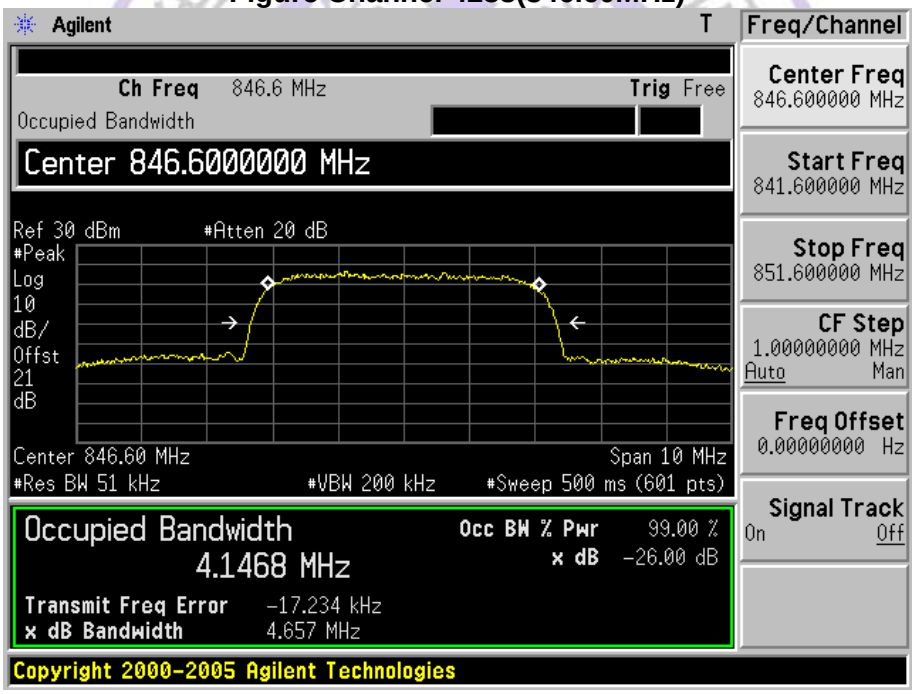


Figure Channel 4233(846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	HSDPA Band V Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
4132	826.4	4638.00	4135.60
4182	836.4	4636.00	4142.40
4233	846.6	4634.00	4143.20

Figure Channel 4132 (826.40MHz)

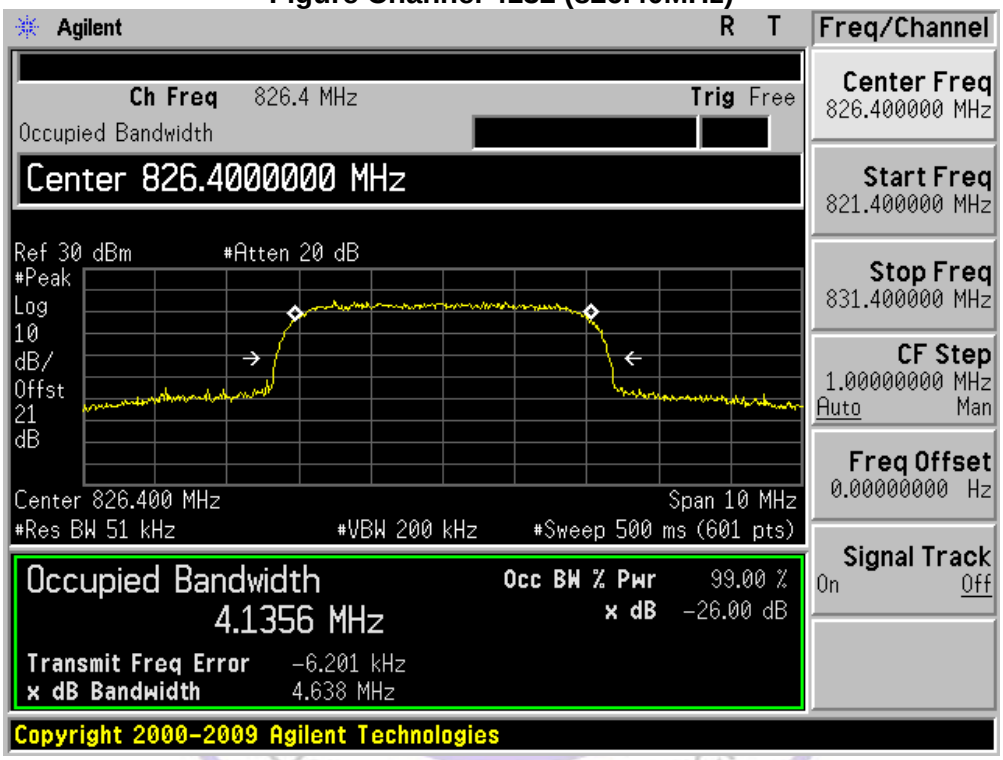


Figure Channel 4182 (836.40MHz)

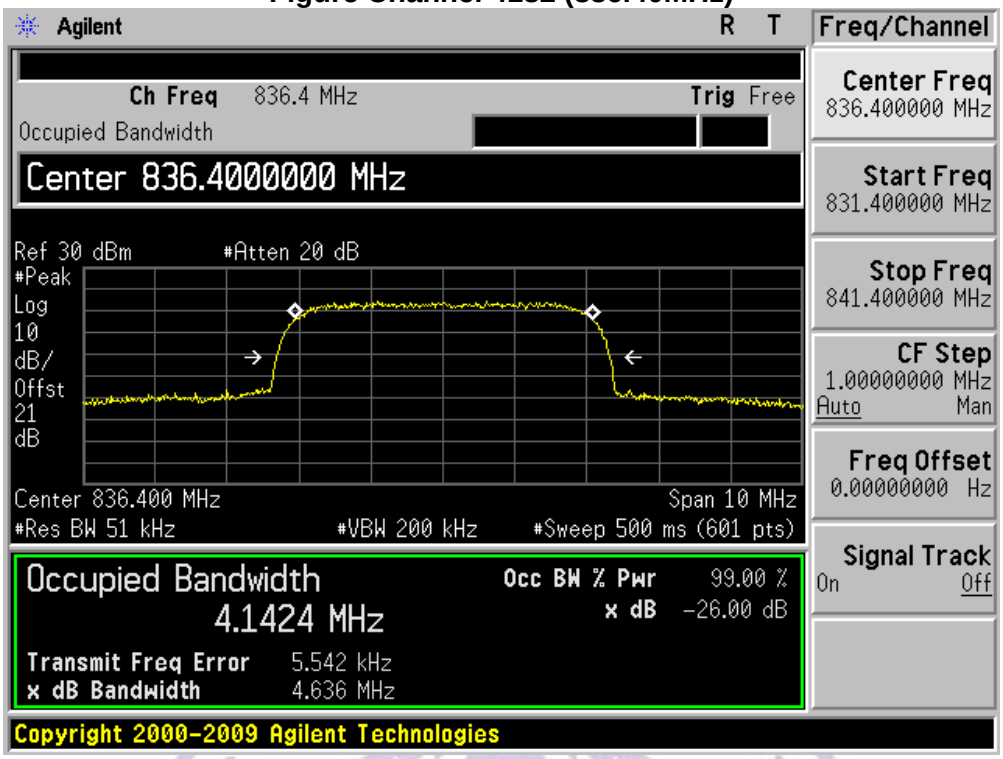
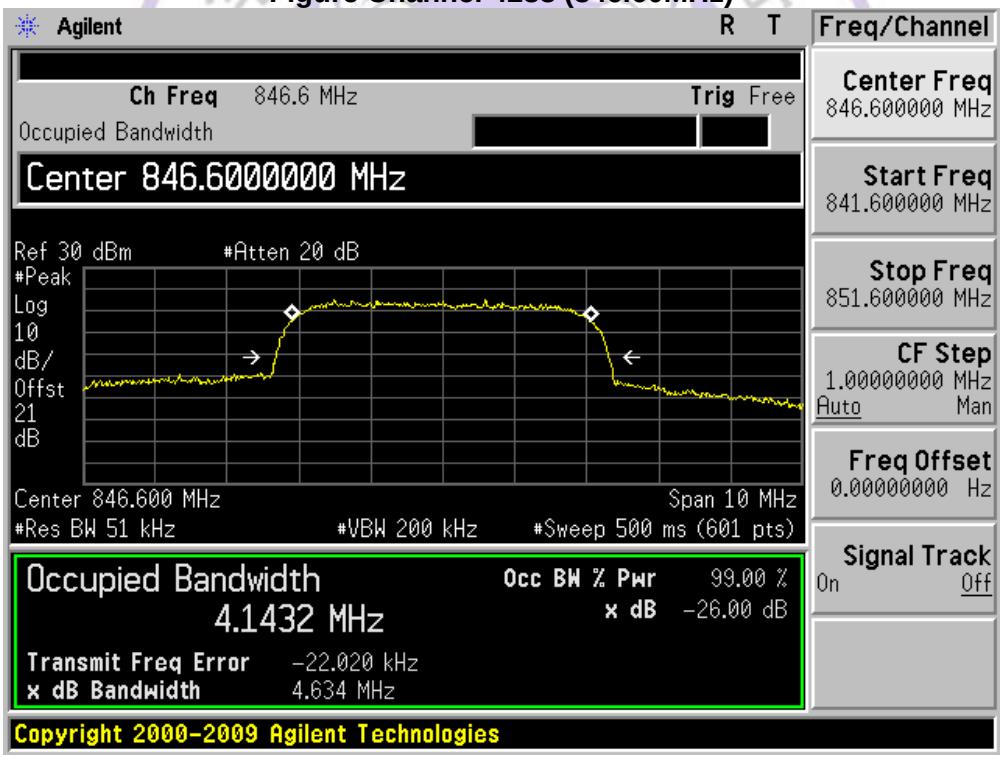


Figure Channel 4233 (846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	HSUPA Band V Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
4132	826.4	4638.00	4137.40
4182	836.4	4624.00	4135.20
4233	846.6	4623.00	4134.50

Figure Channel 4132 (826.40MHz)

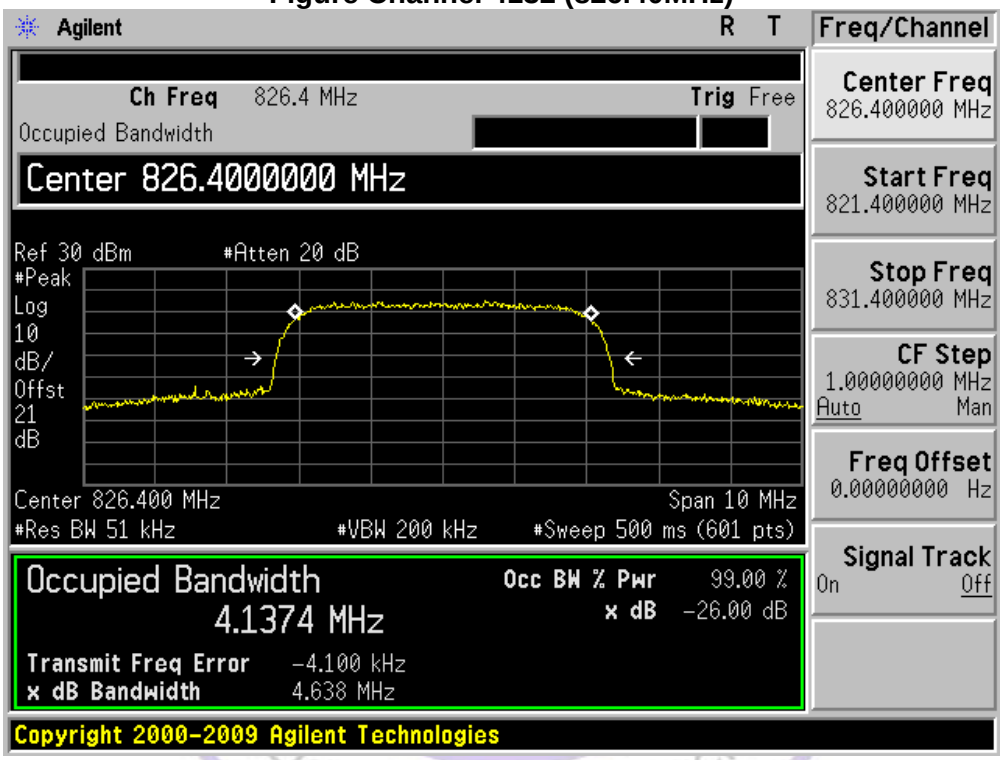


Figure Channel 4182 (836.40MHz)

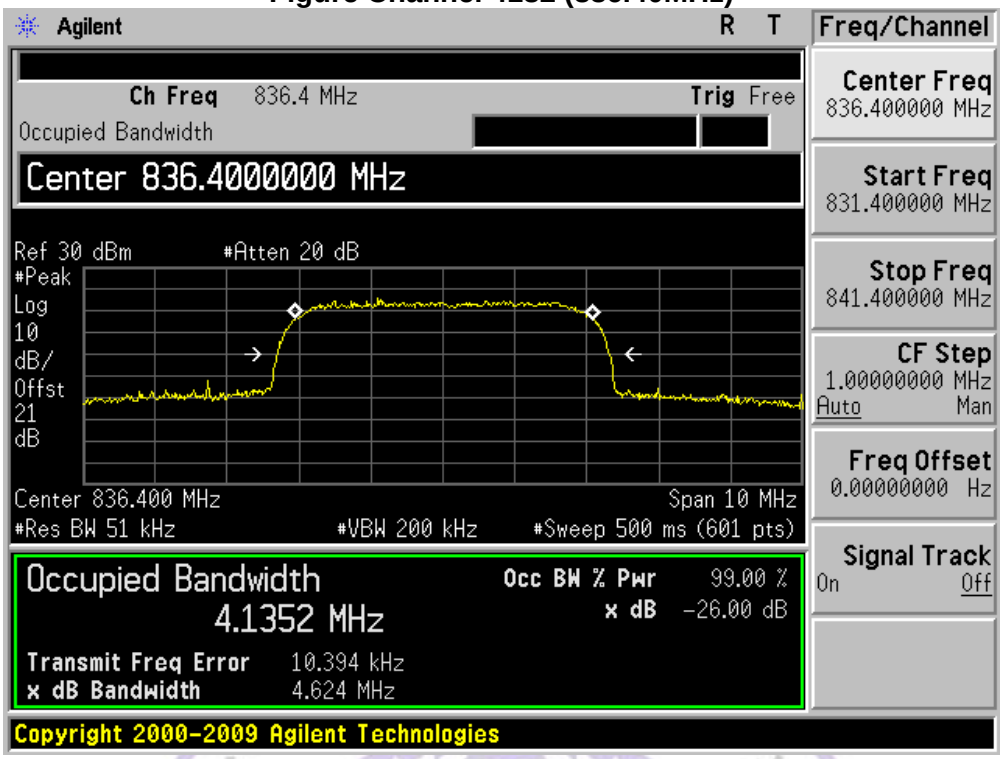
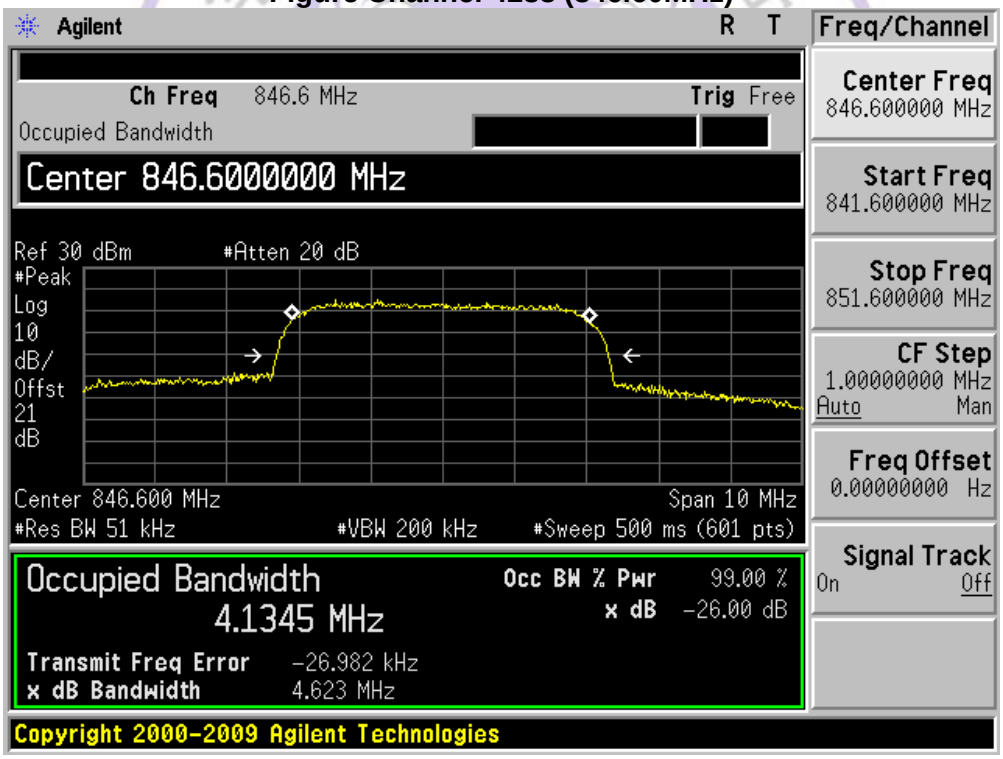


Figure Channel 4233 (846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Occupied Bandwidth
Test Mode	HSPA+ Band V Link

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
4132	826.4	4654.0	4146.4
4182	836.4	4664.0	4145.7
4233	846.6	4650.0	4149.1

Figure Channel 4132 (826.40MHz)

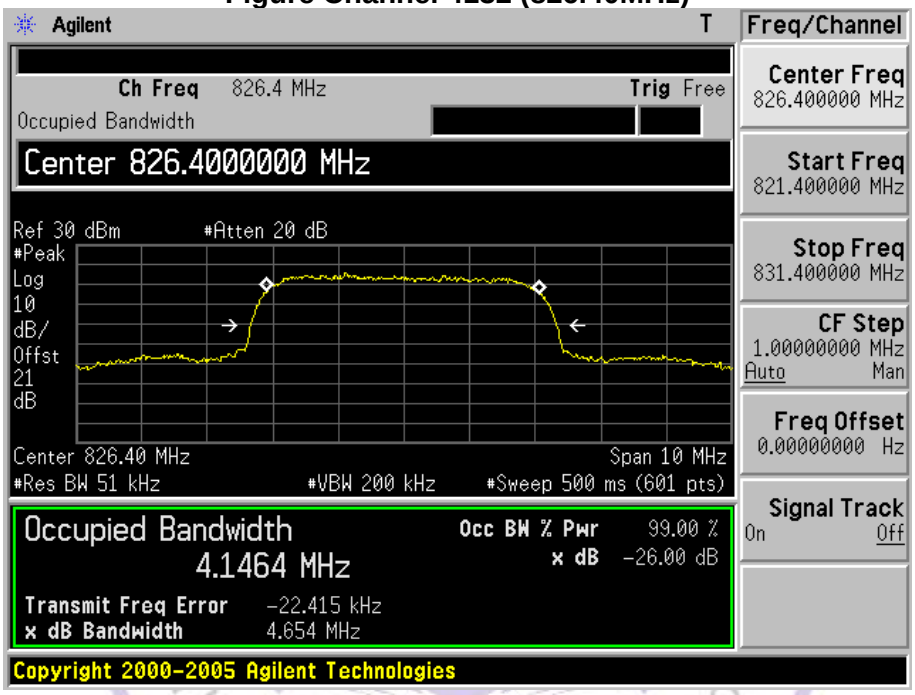


Figure Channel 4182 (836.40MHz)

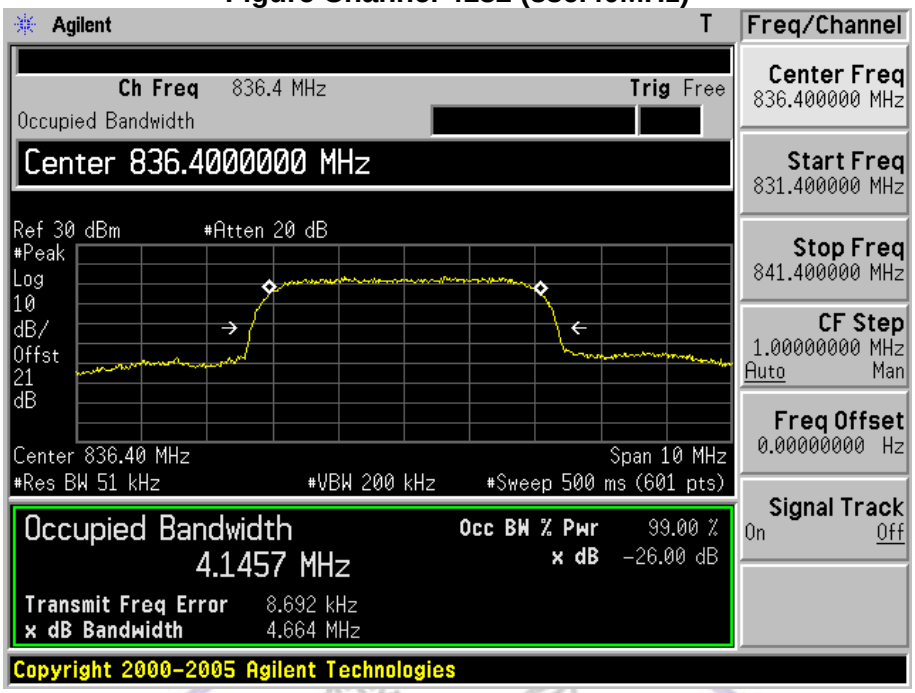
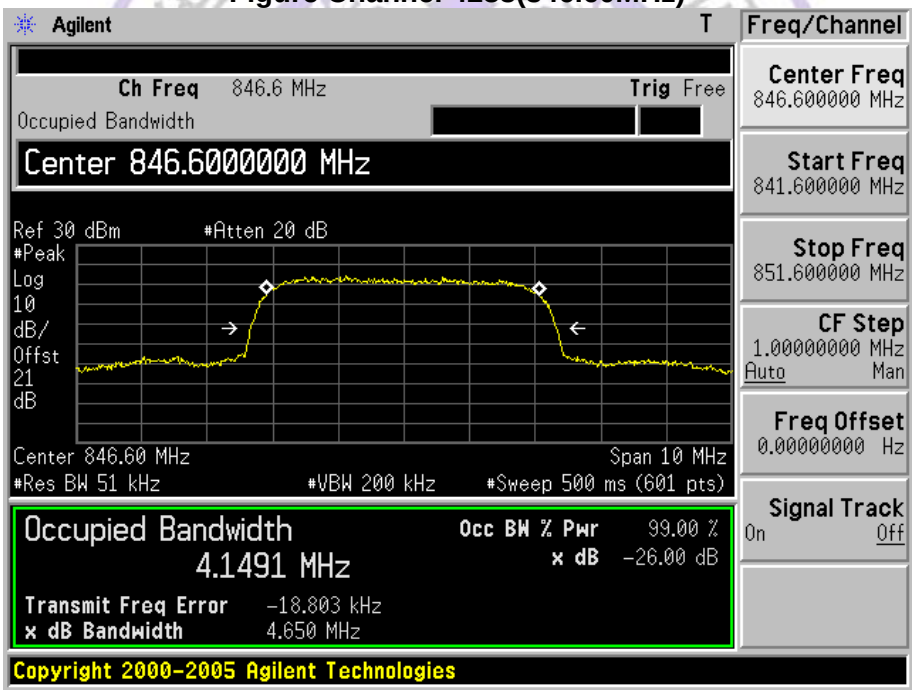
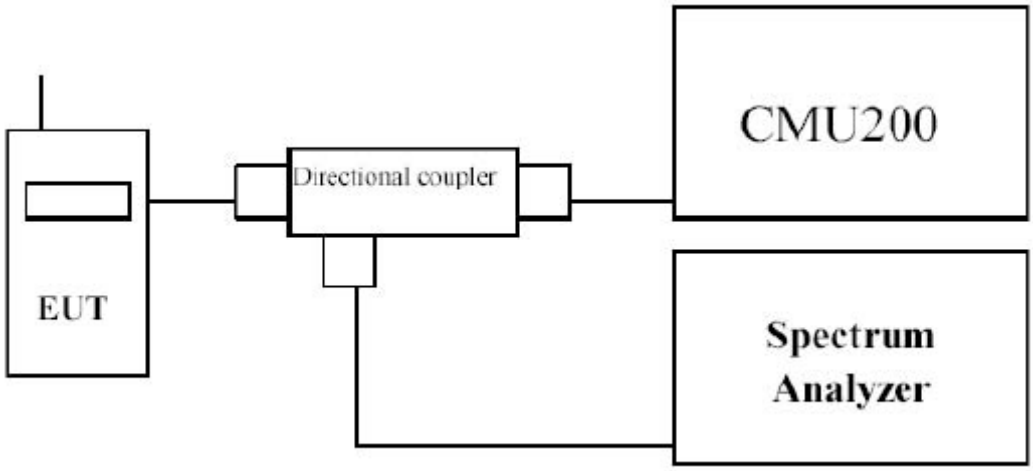


Figure Channel 4233(846.60MHz)



4.4. Emissions out of Band

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 + 10log(P) dB.

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Shenzhen CTL Electromagnetic Technology Co.,Ltd.

TEST RESULTS

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	GSM 850 Link

Figure Channel 128 (824.20MHz)

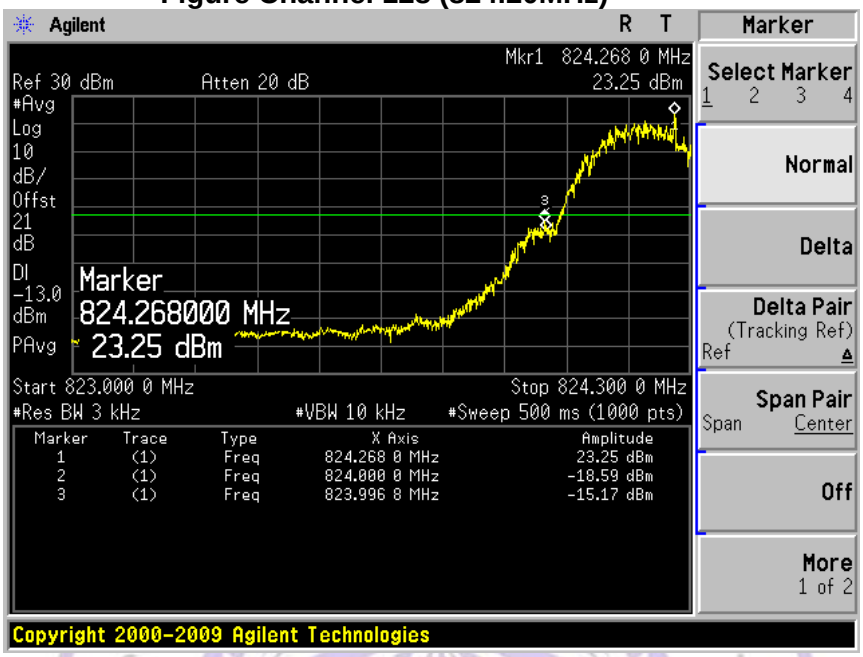
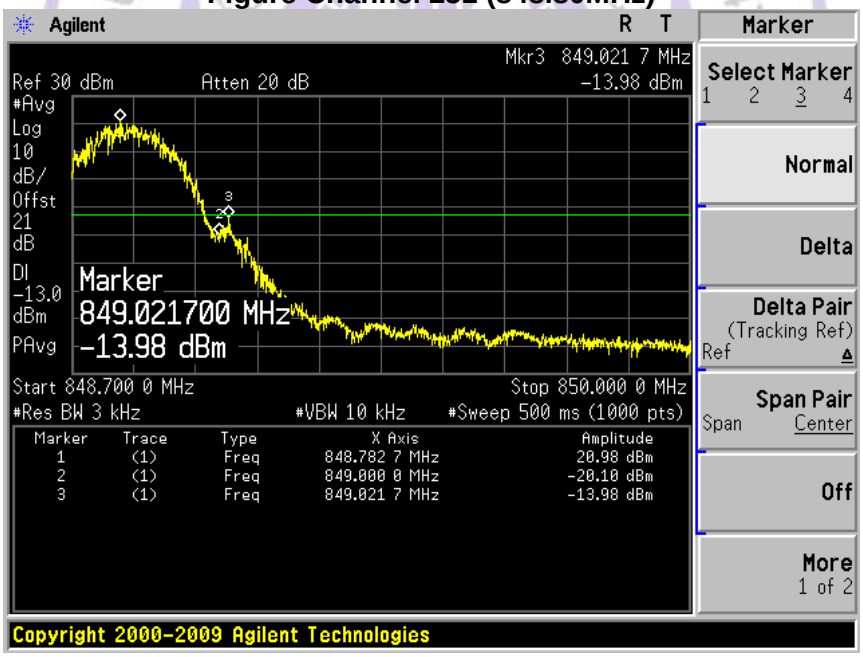


Figure Channel 251 (848.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	PCS1900 Link

Figure Channel 512 (1850.20MHz)

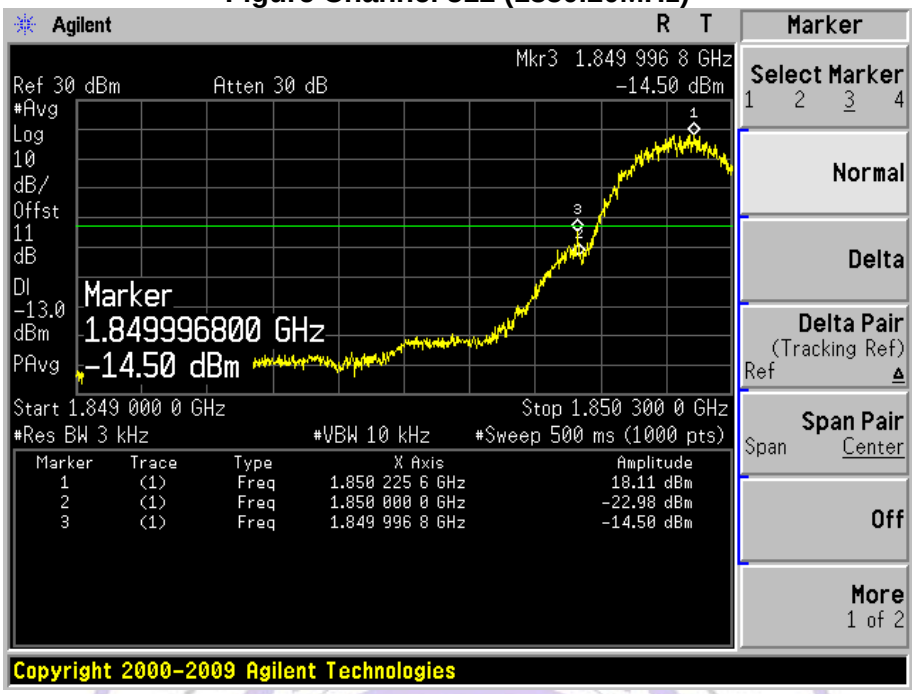
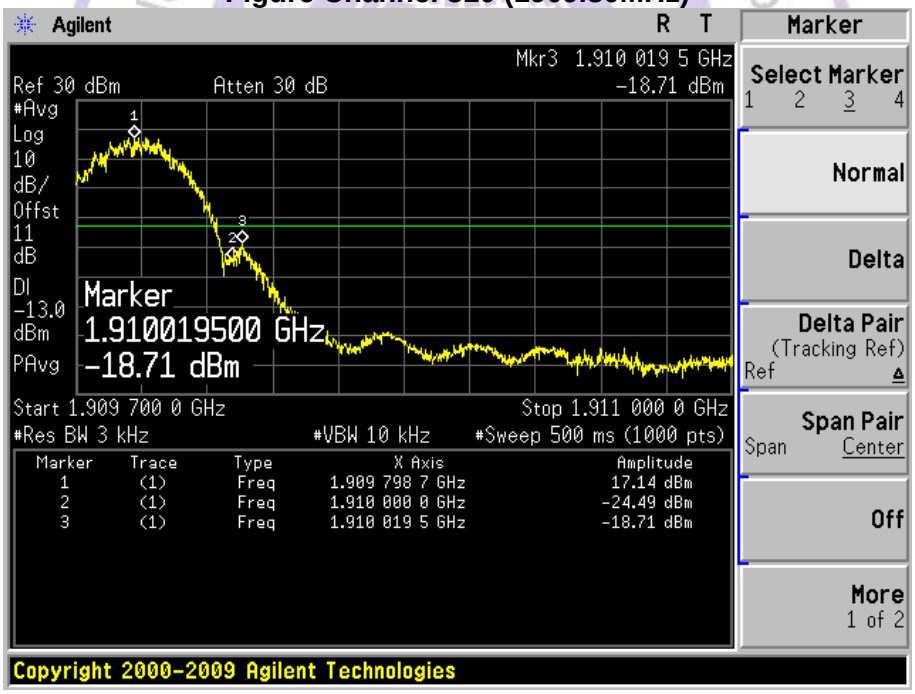


Figure Channel 810 (1909.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	GPRS 850 Link

Figure Channel 128 (824.20MHz)

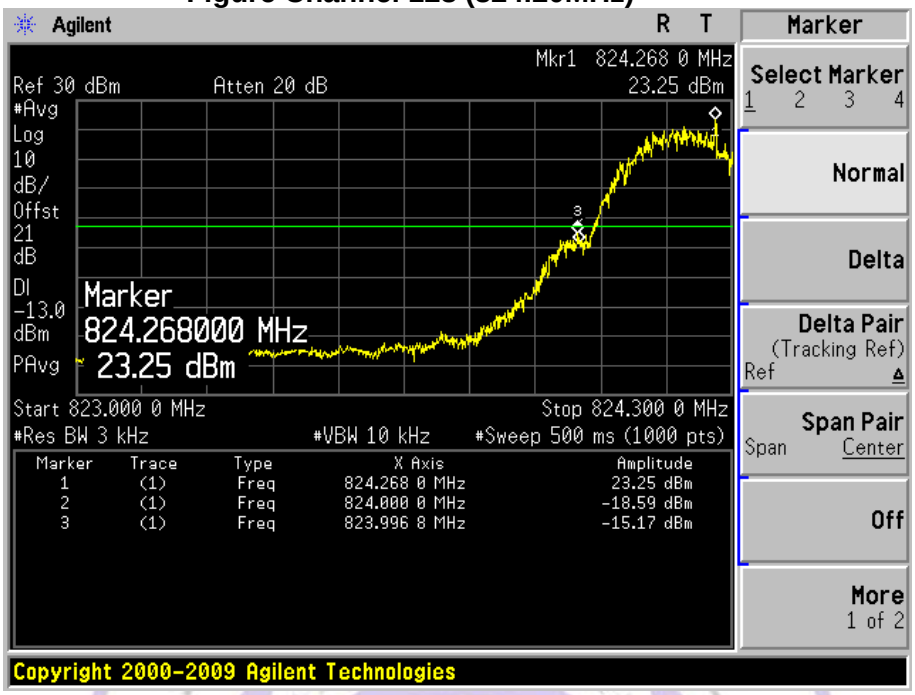
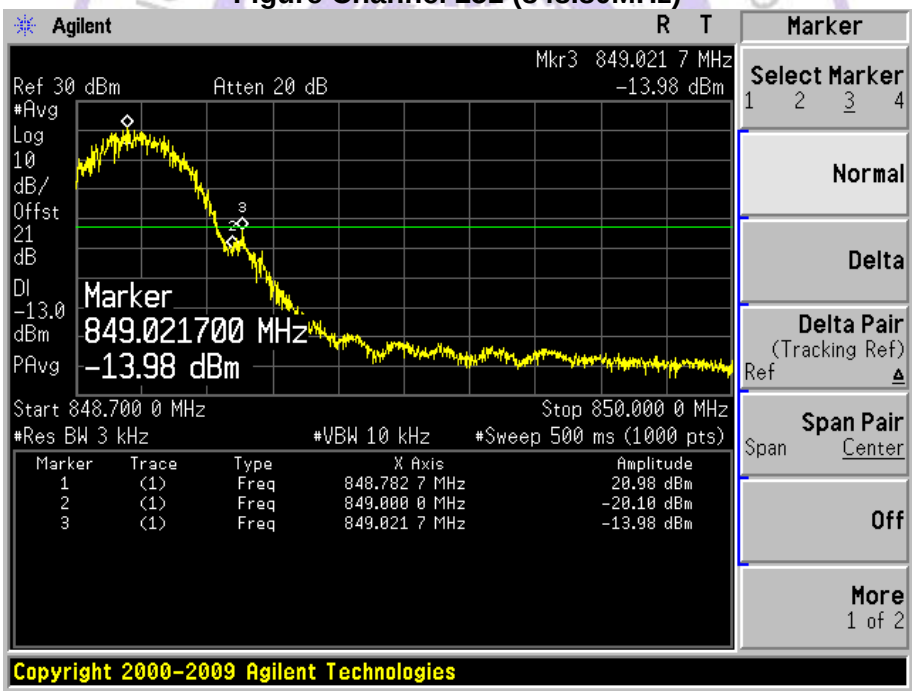


Figure Channel 251 (848.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	GPRS1900 Link

Figure Channel 512 (1850.20MHz)

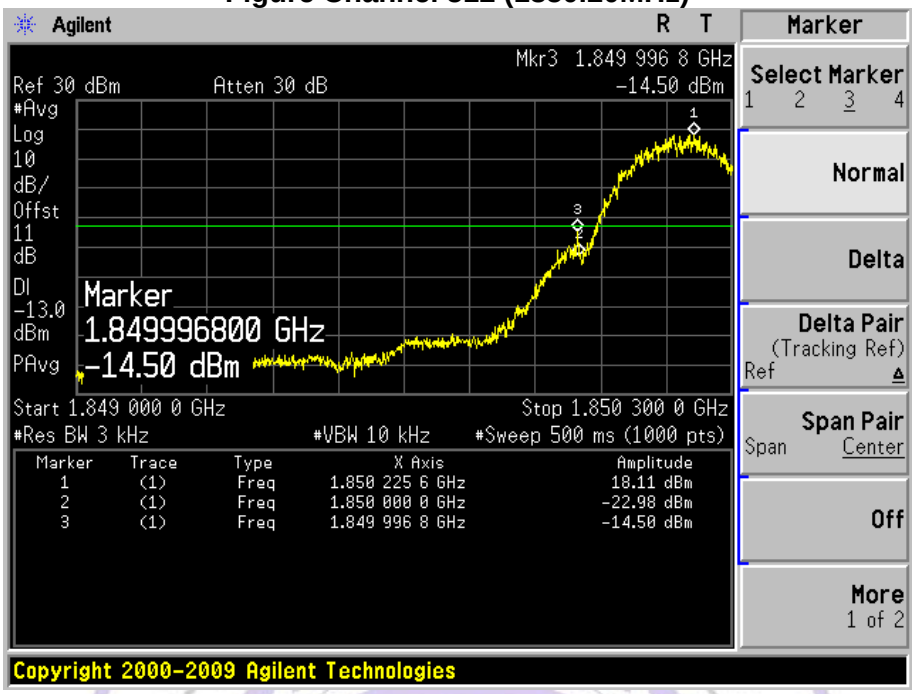
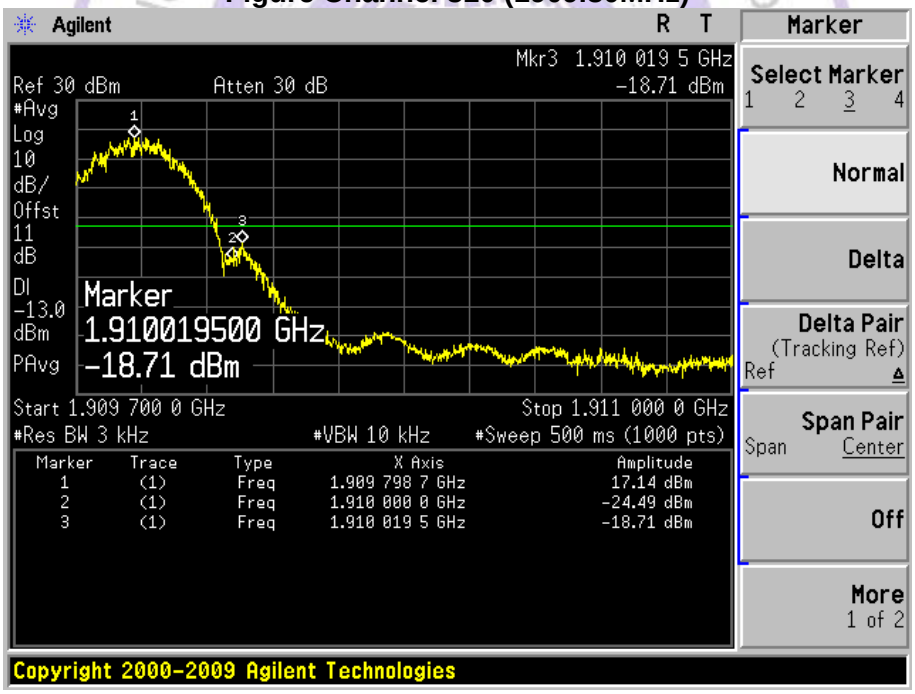


Figure Channel 810 (1909.80MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	WCDMA Band V Link

Figure Channel 4132 (826.40MHz)

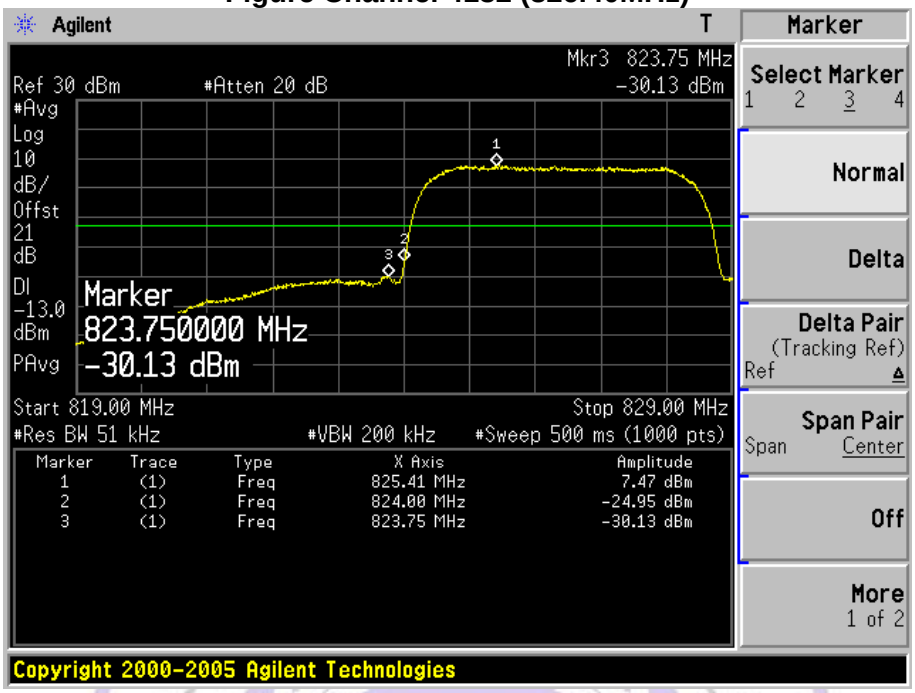
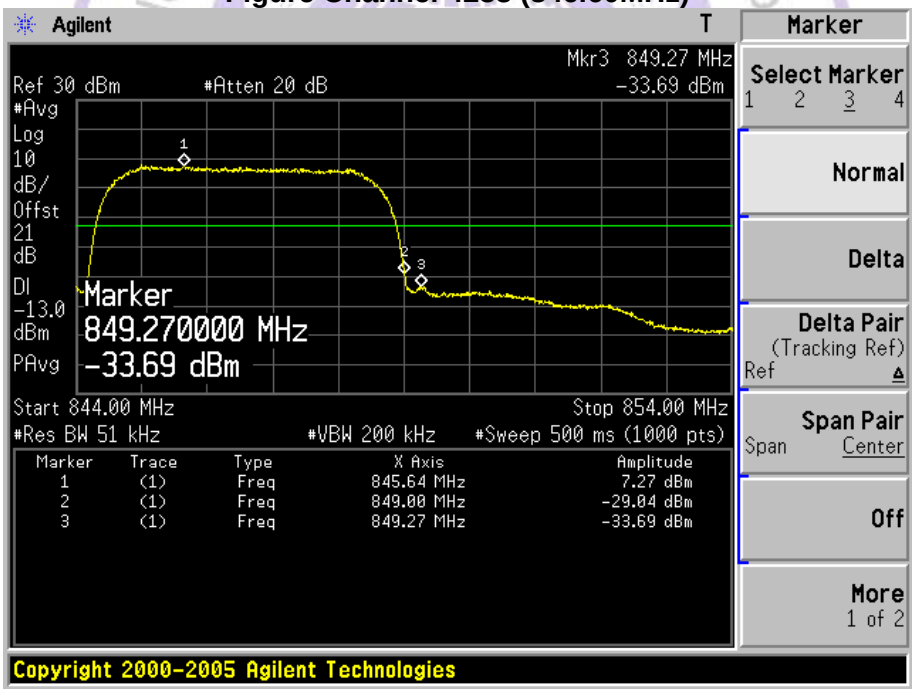


Figure Channel 4233 (846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	HSDPA Band V Link

Figure Channel 4132 (826.40MHz)

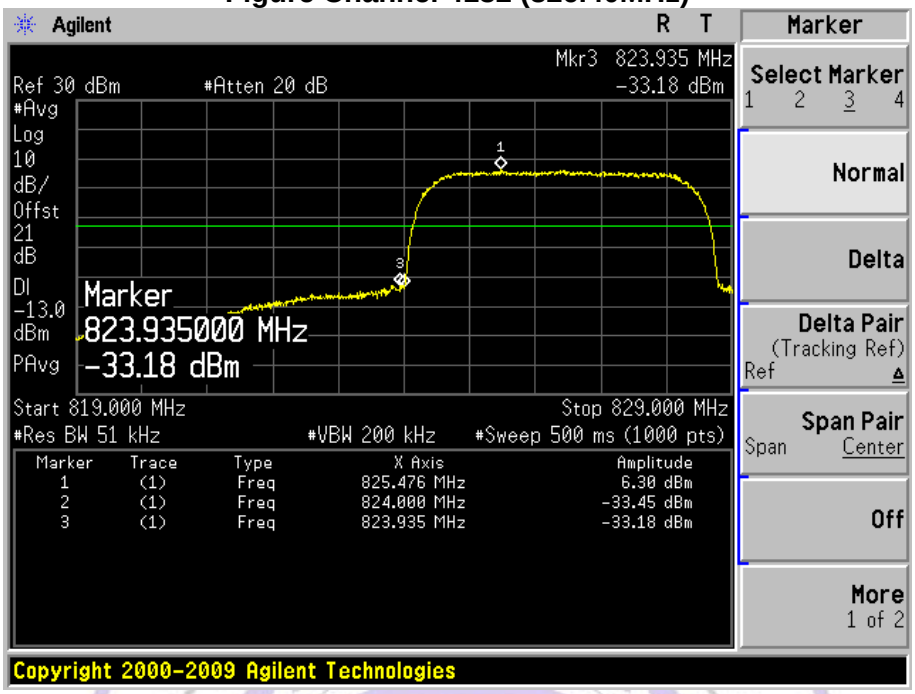
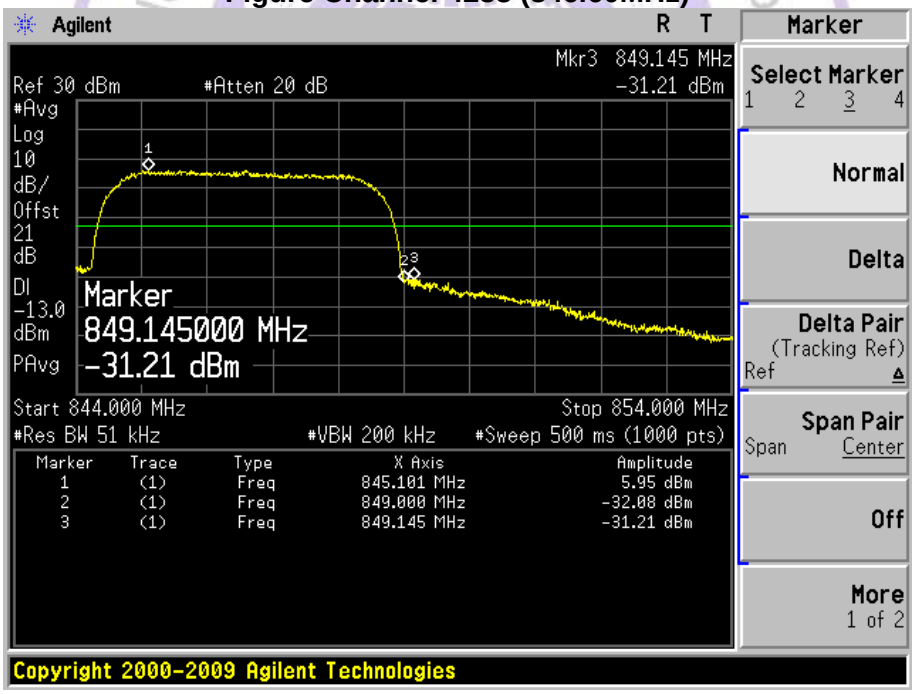


Figure Channel 4233 (846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	HSUPA Band V Link

Figure Channel 4132 (826.40MHz)

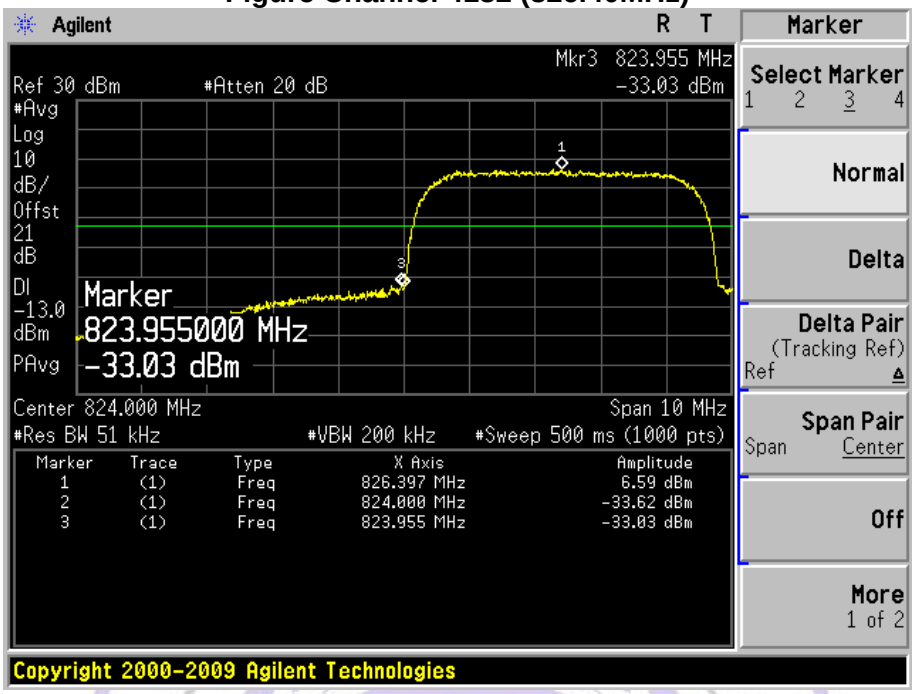
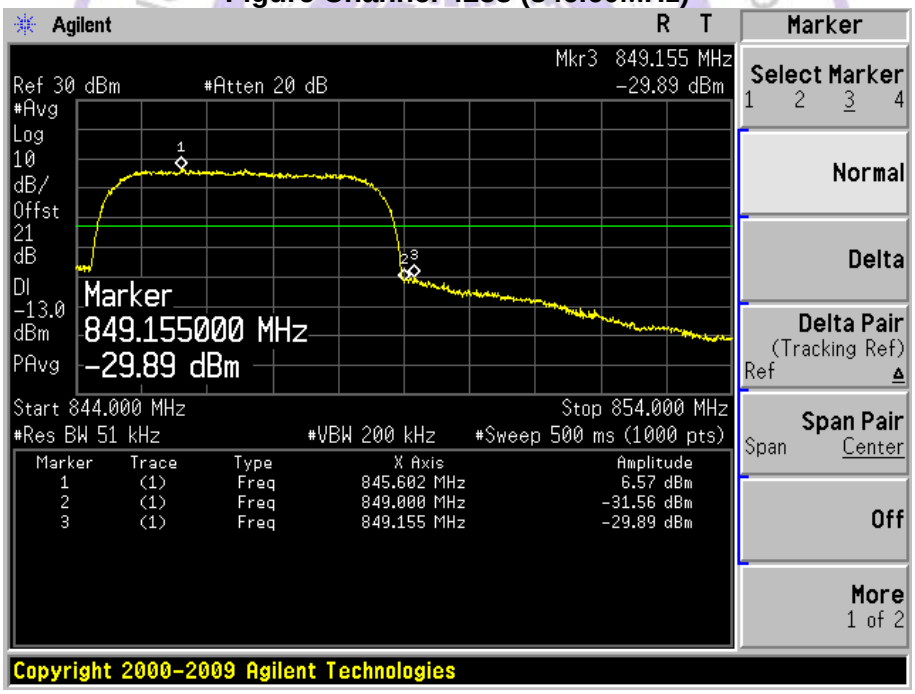


Figure Channel 4233 (846.60MHz)



Product	**3G WCDMA+GSM Smart Phone**
Test Item	Out of band emissions
Test Mode	HSPA+ Band V Link

Figure Channel 4132 (826.40MHz)

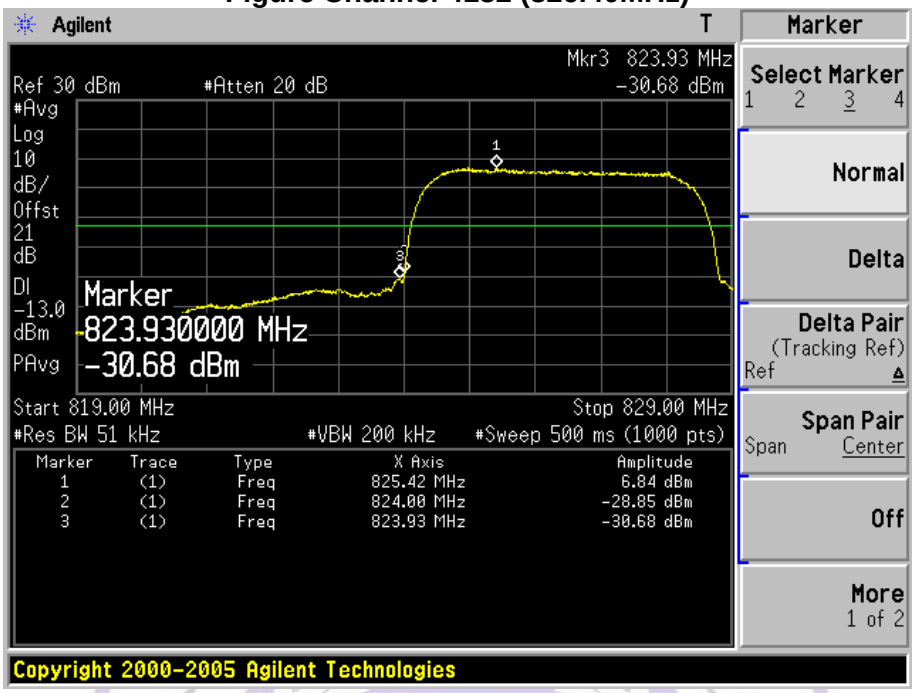
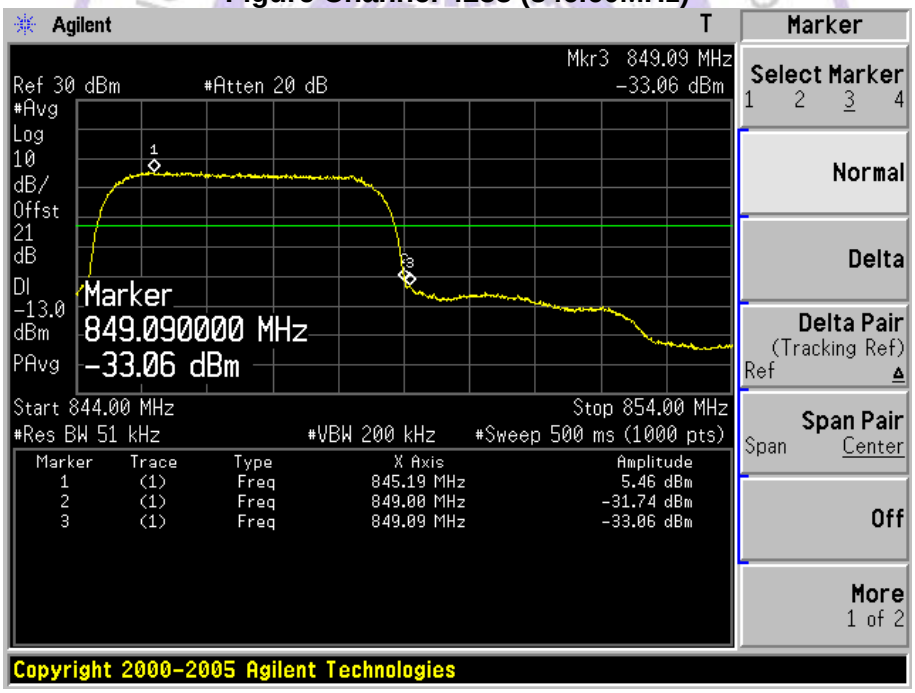


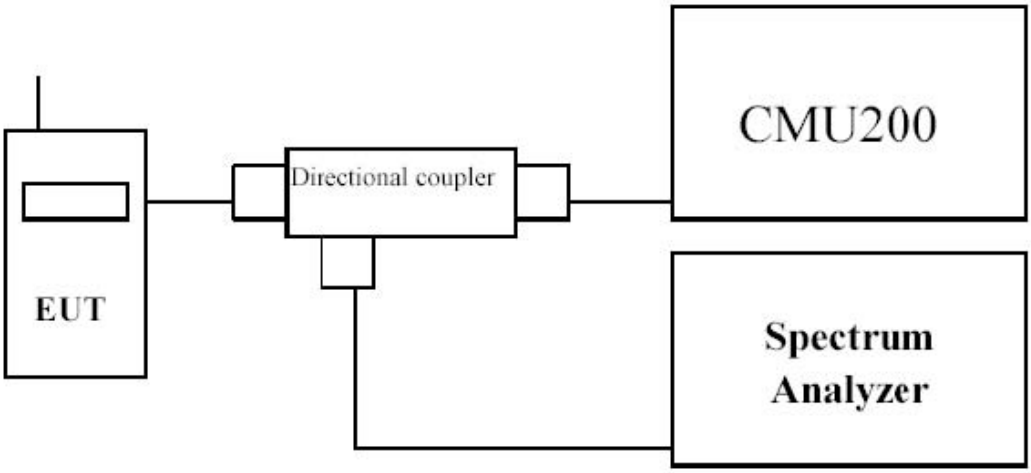
Figure Channel 4233 (846.60MHz)



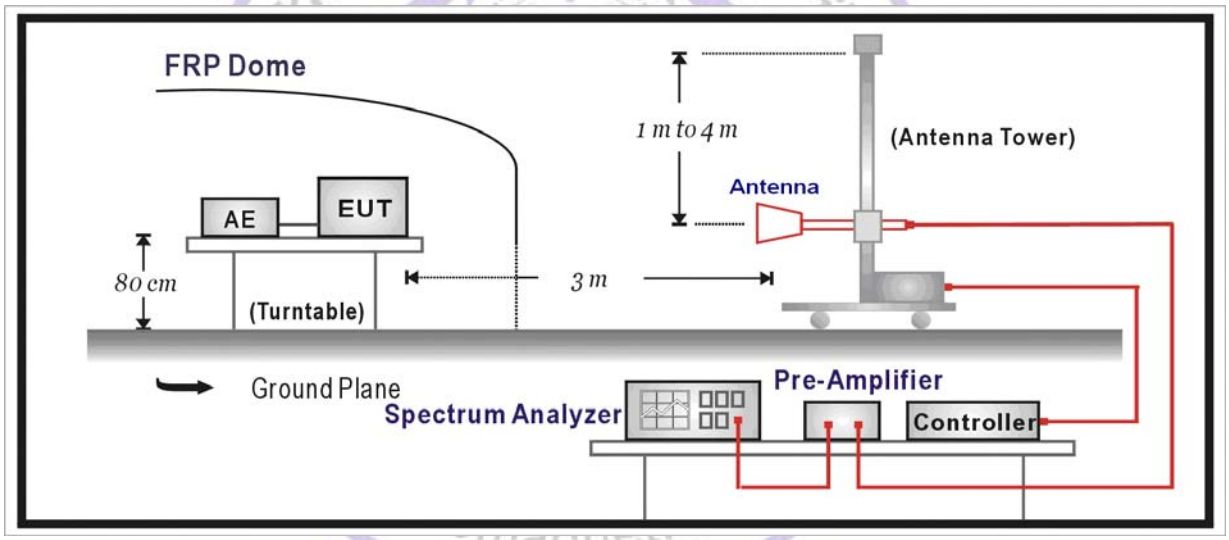
4.5. Spurious Emission

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Spurious Measurement:

a) Place the EUT on a bench and set it in transmitting mode.

b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.

c) EUT Communicate with CMU200, then select a channel for testing.

d) Add a correction factor to the display of spectrum, and then test.

e) 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 to10th 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

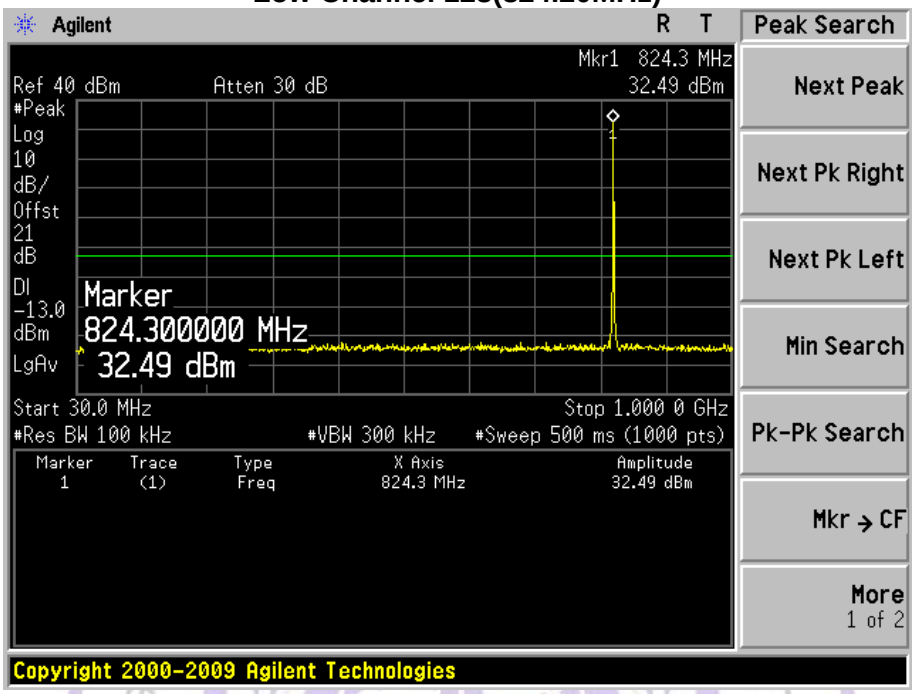
<u>LIMIT</u>

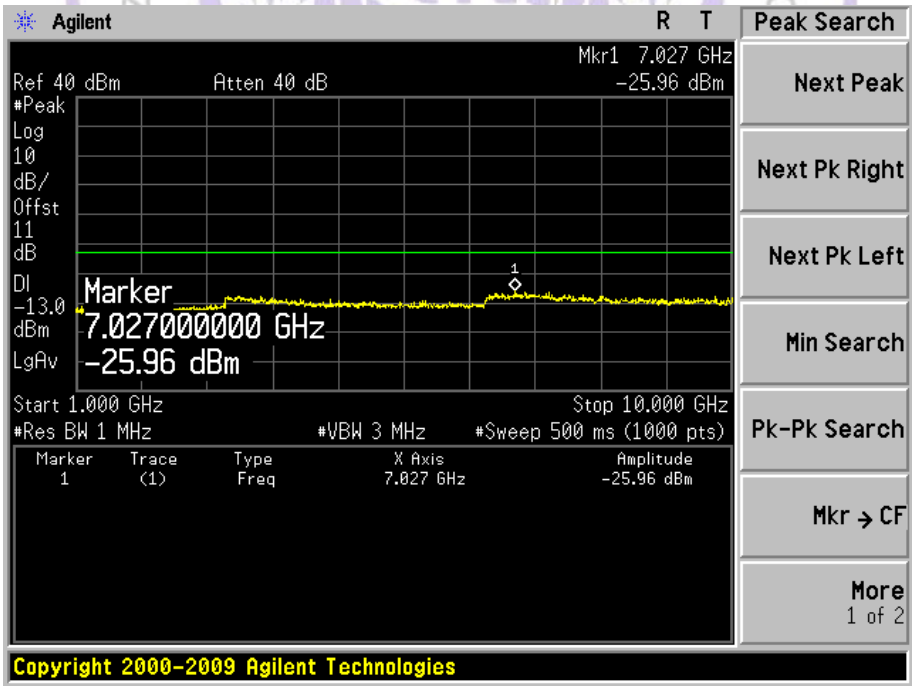
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

TEST RESULTS

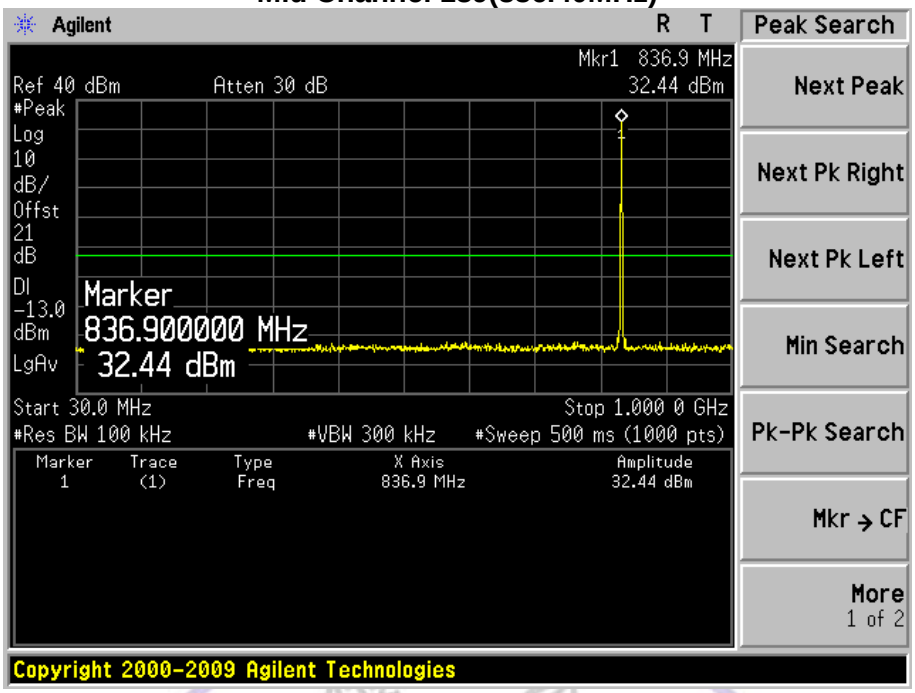
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	GSM 850 Link

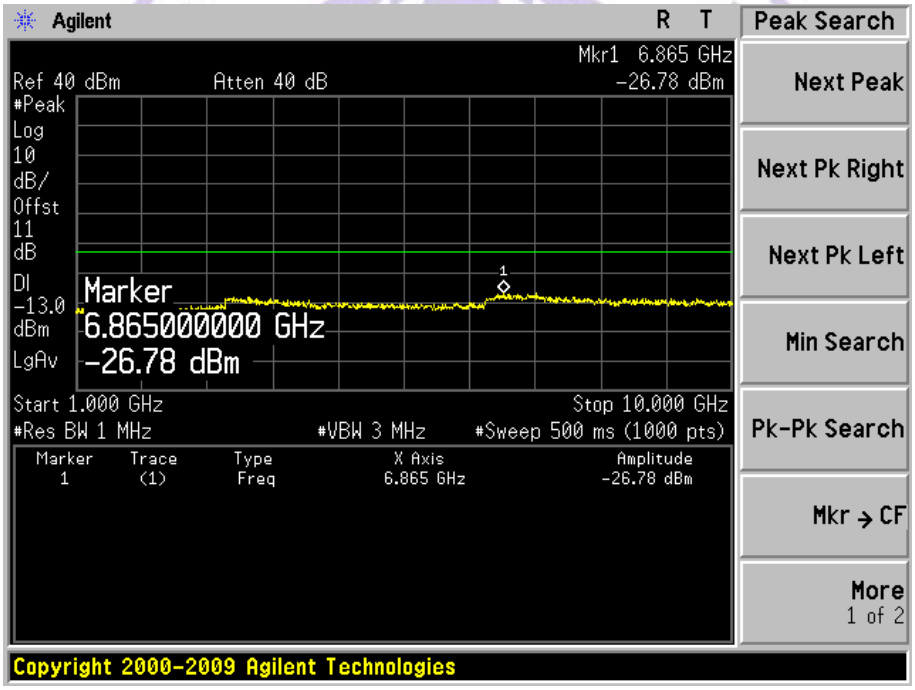
Low Channel 128(824.20MHz)



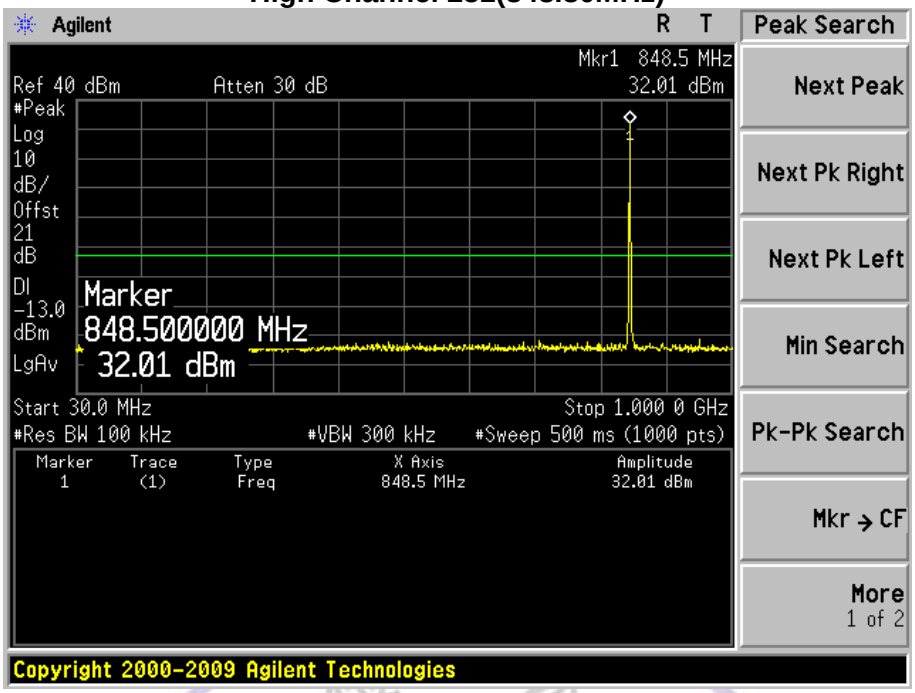


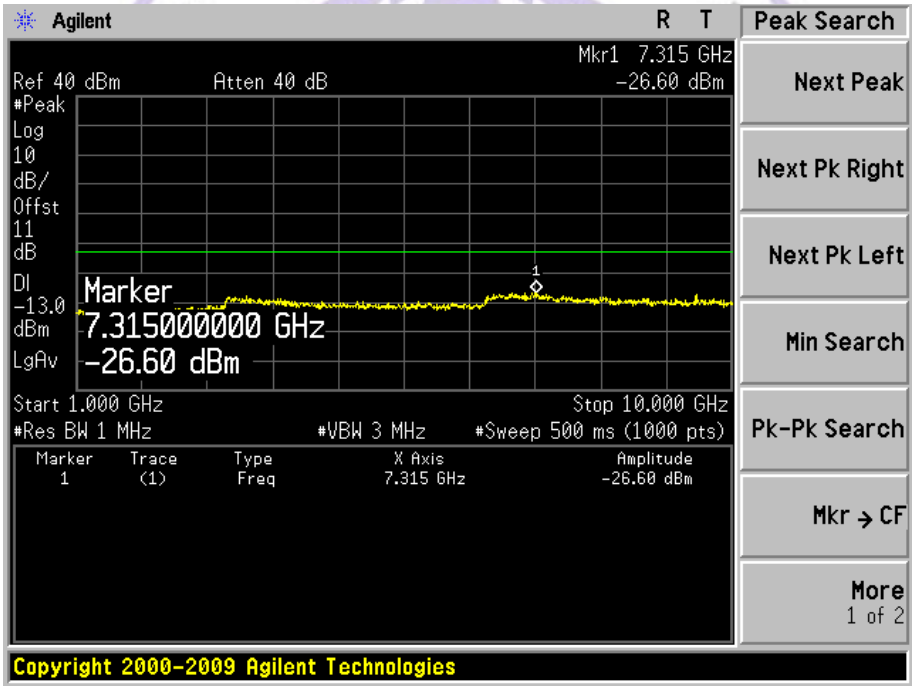
Mid Channel 189(836.40MHz)





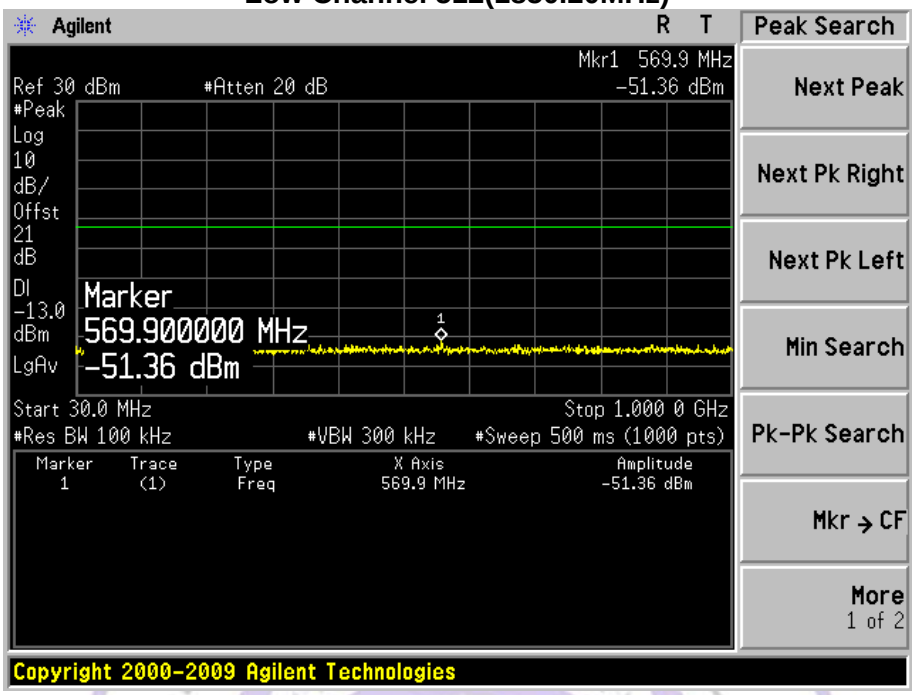
High Channel 251(848.80MHz)

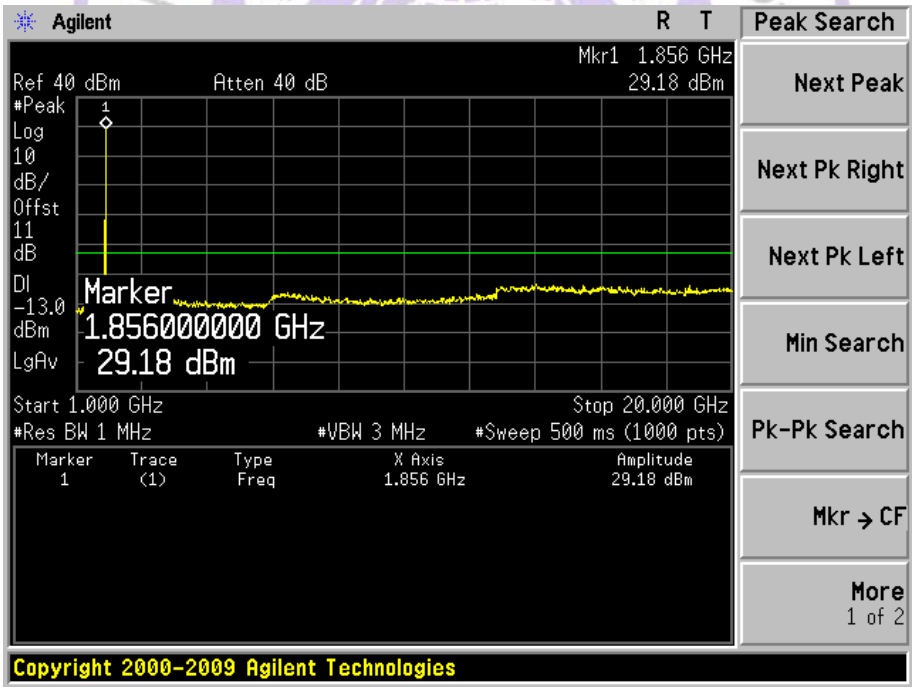




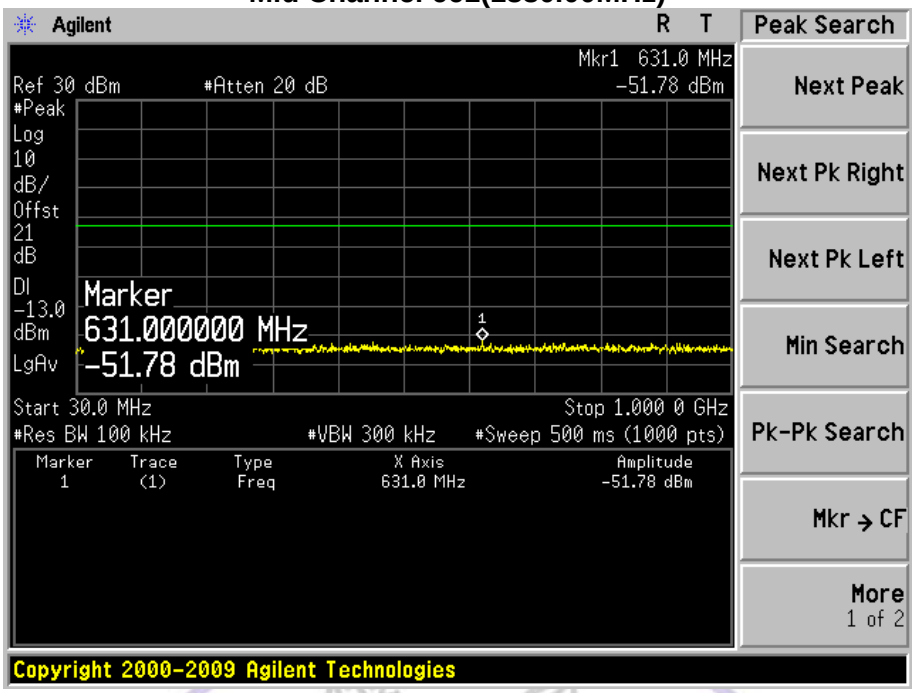
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	PCS 1900 Link

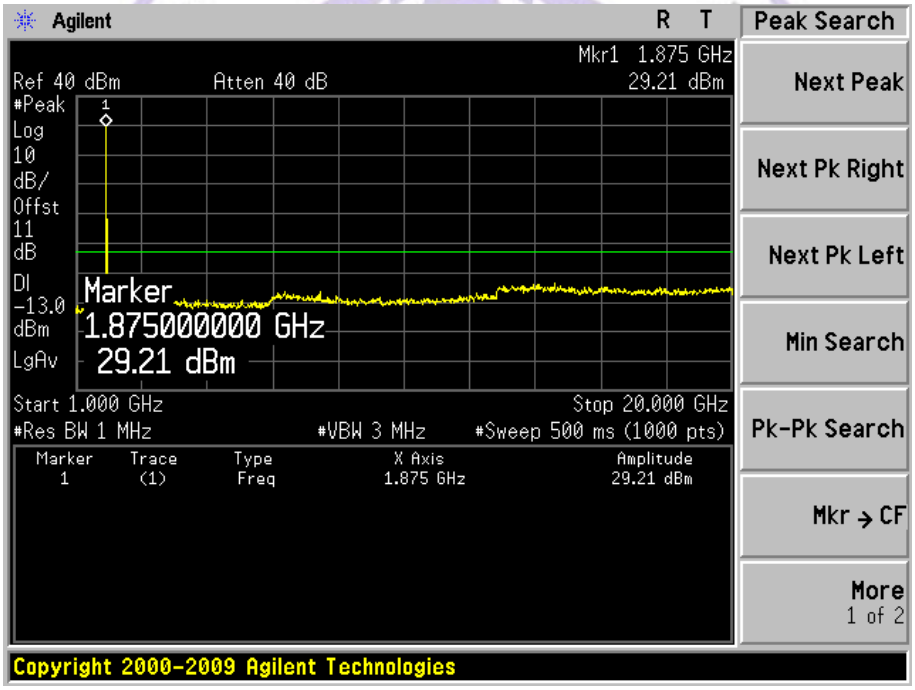
Low Channel 512(1850.20MHz)



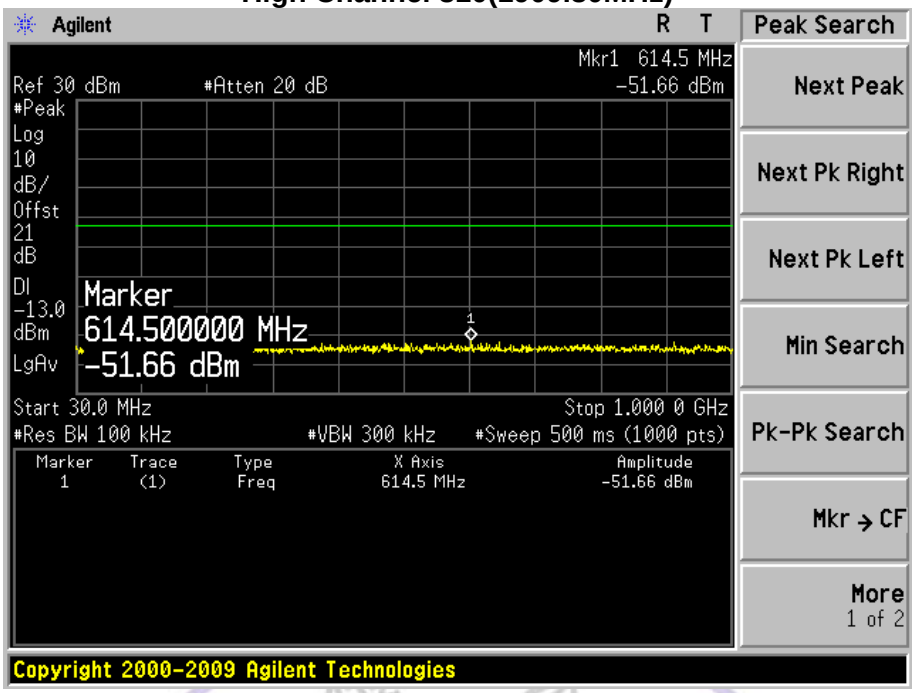


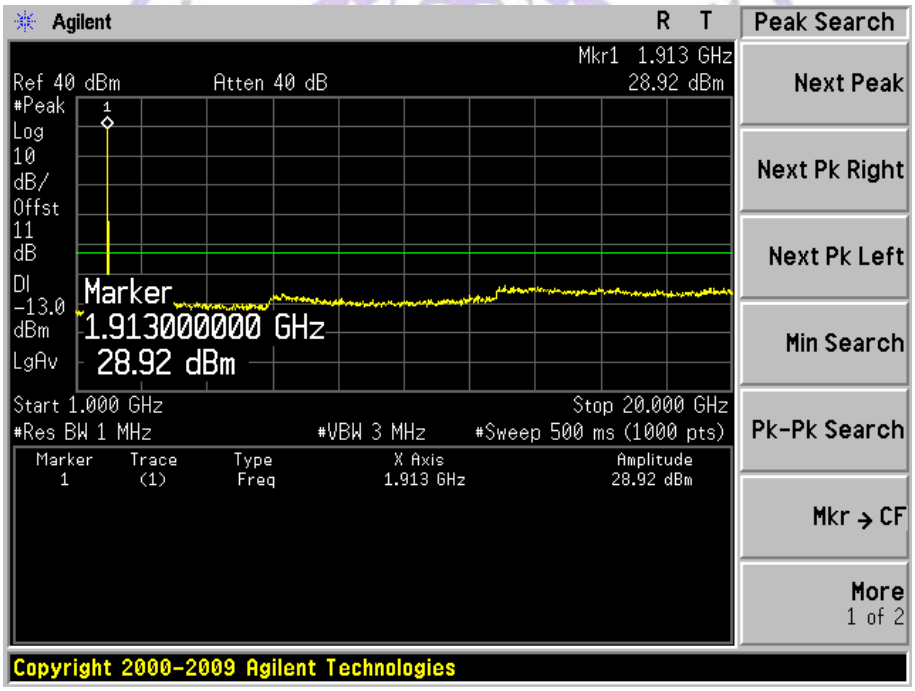
Mid Channel 661(1880.00MHz)





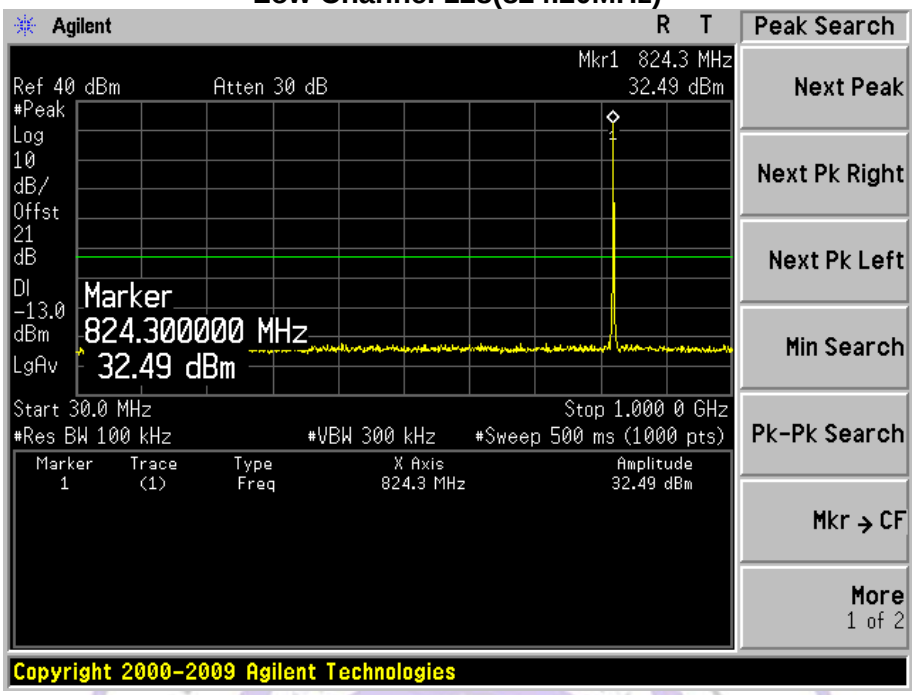
High Channel 810(1909.80MHz)

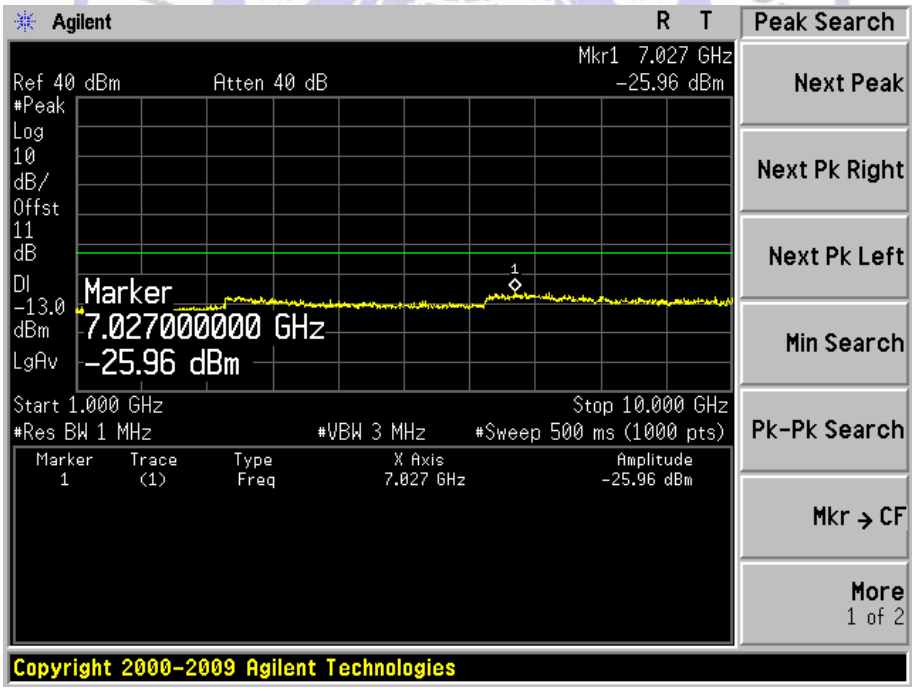




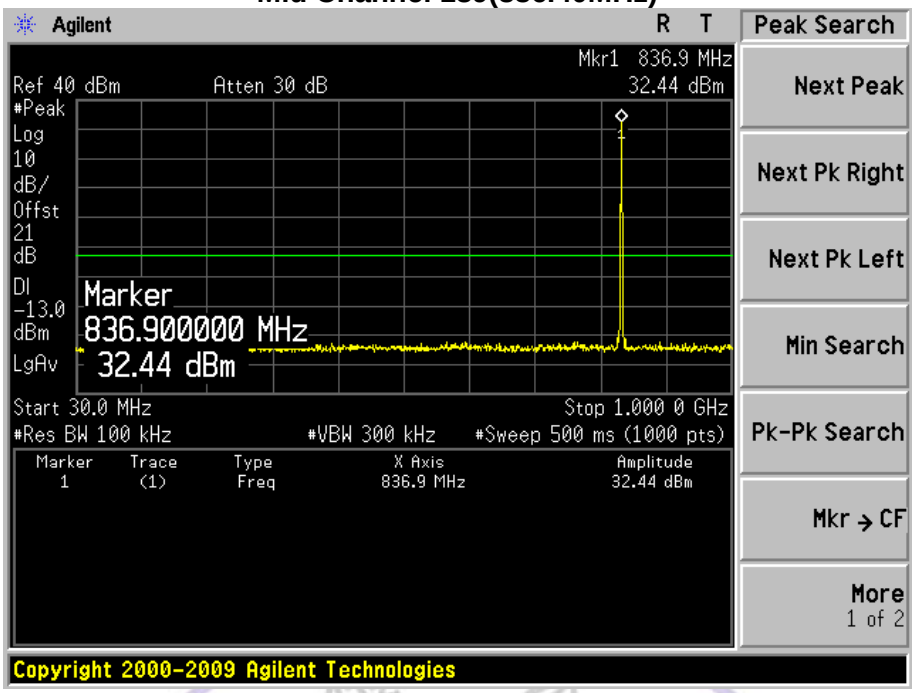
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	GPRS 850 Link

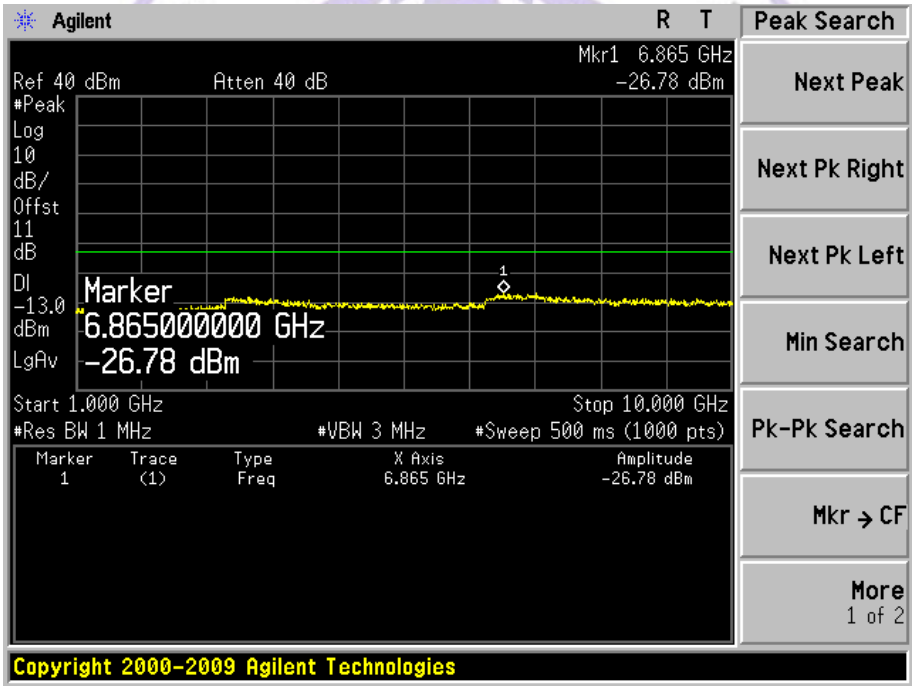
Low Channel 128(824.20MHz)



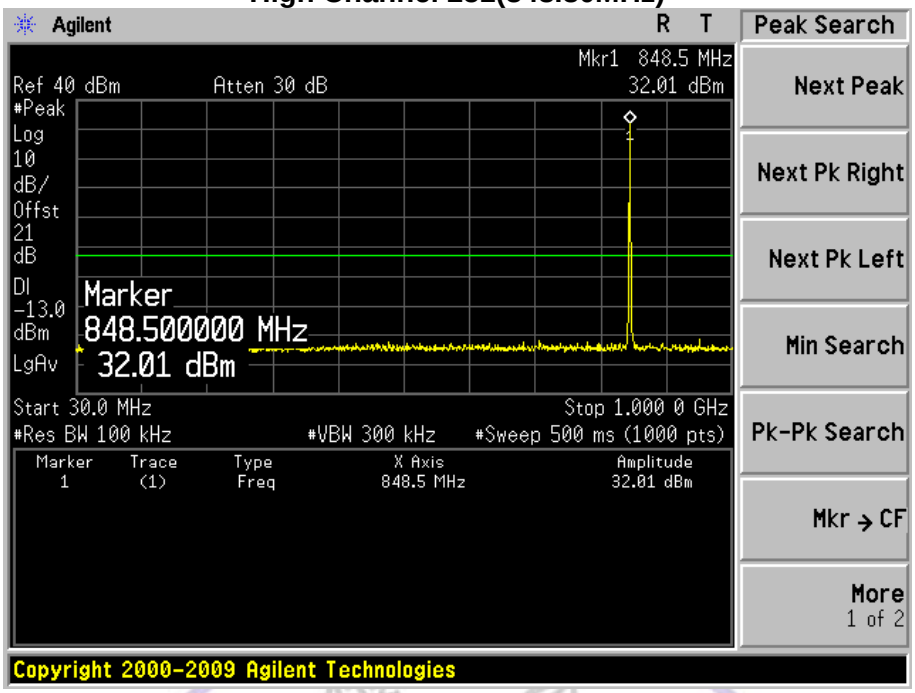


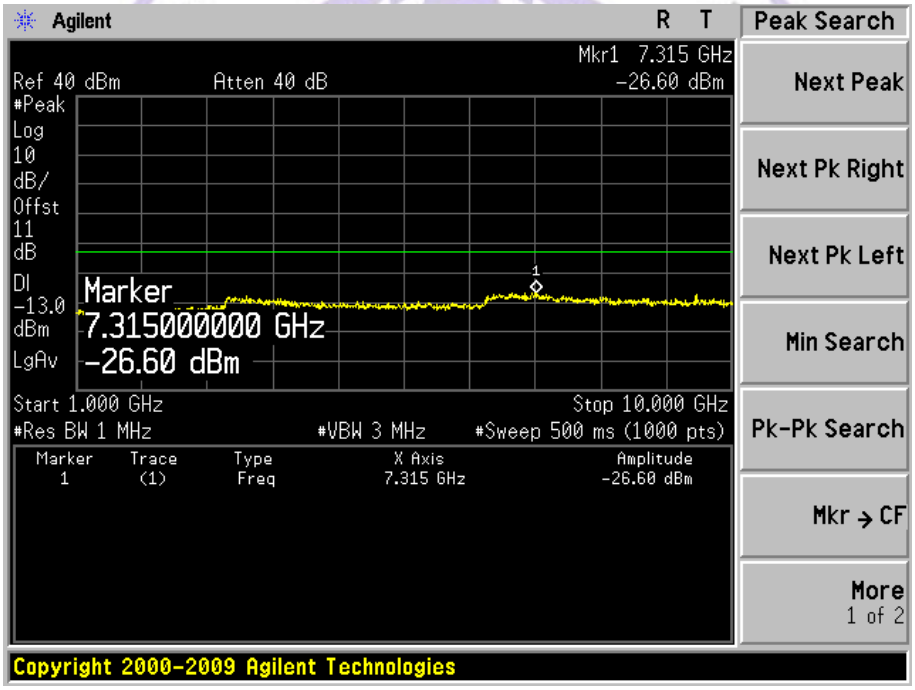
Mid Channel 189(836.40MHz)





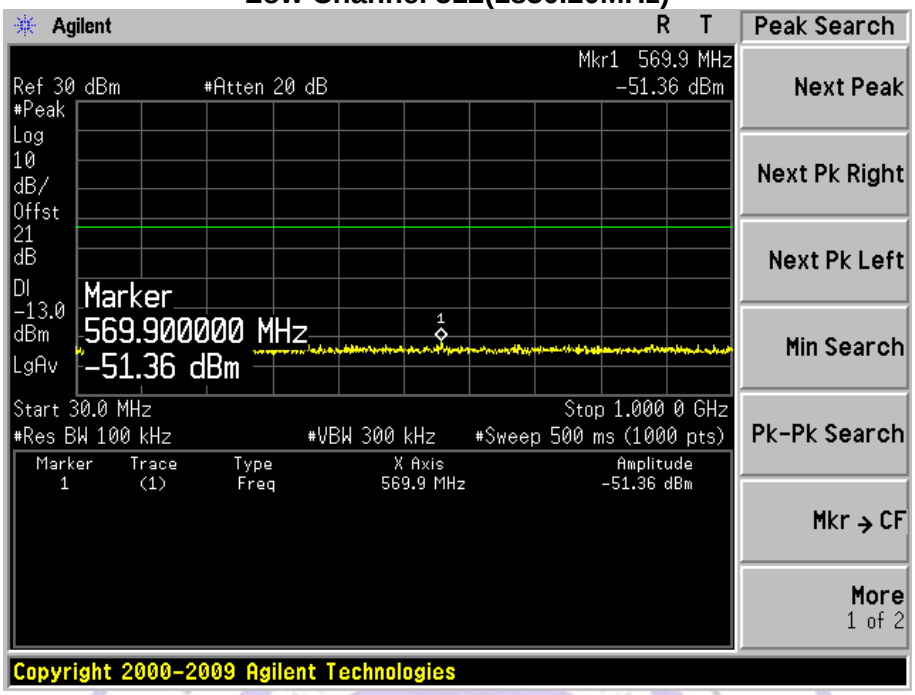
High Channel 251(848.80MHz)

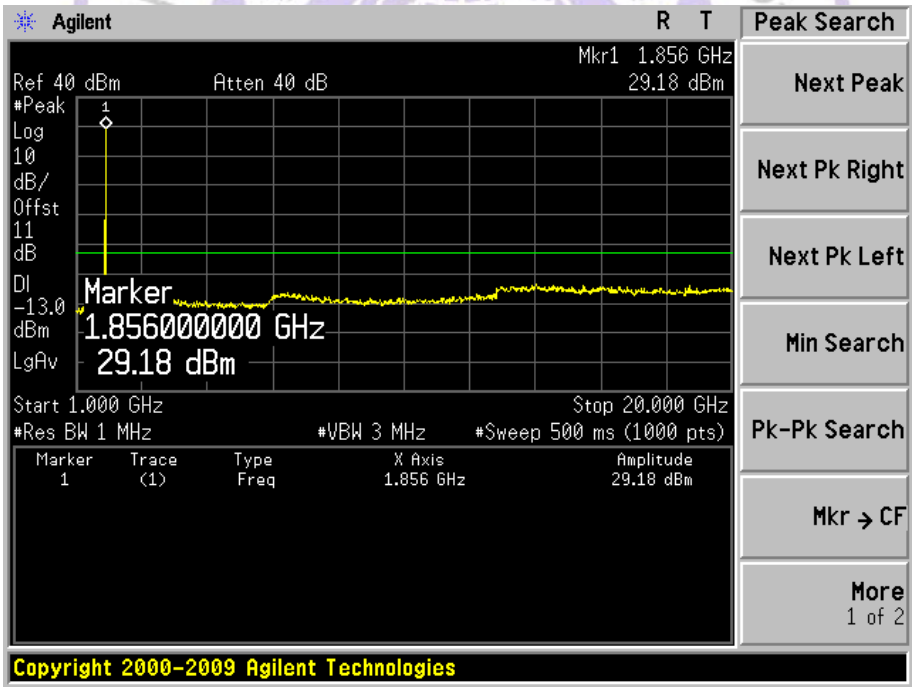




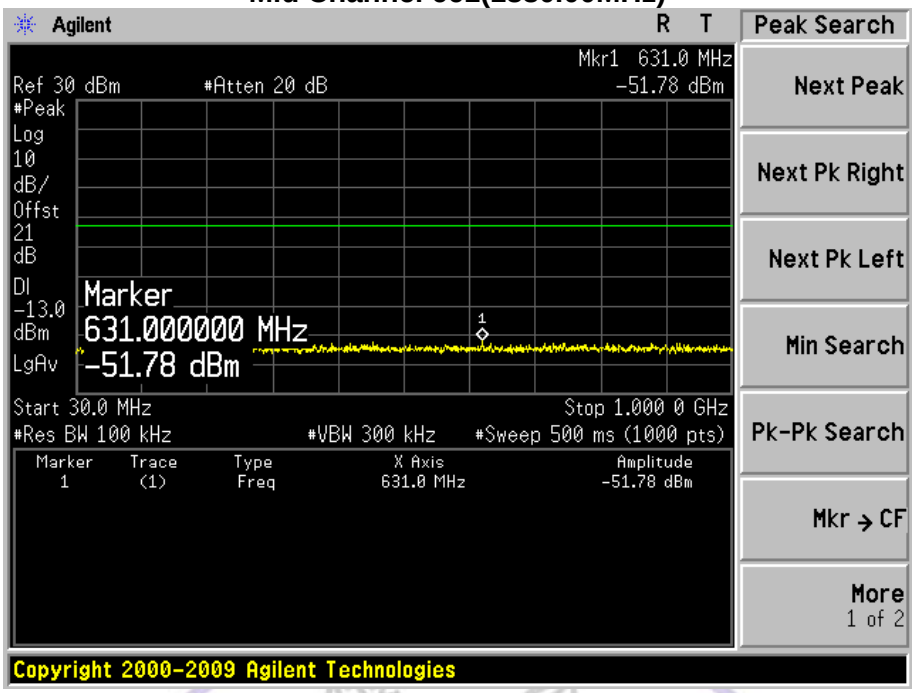
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	GPRS 1900 Link

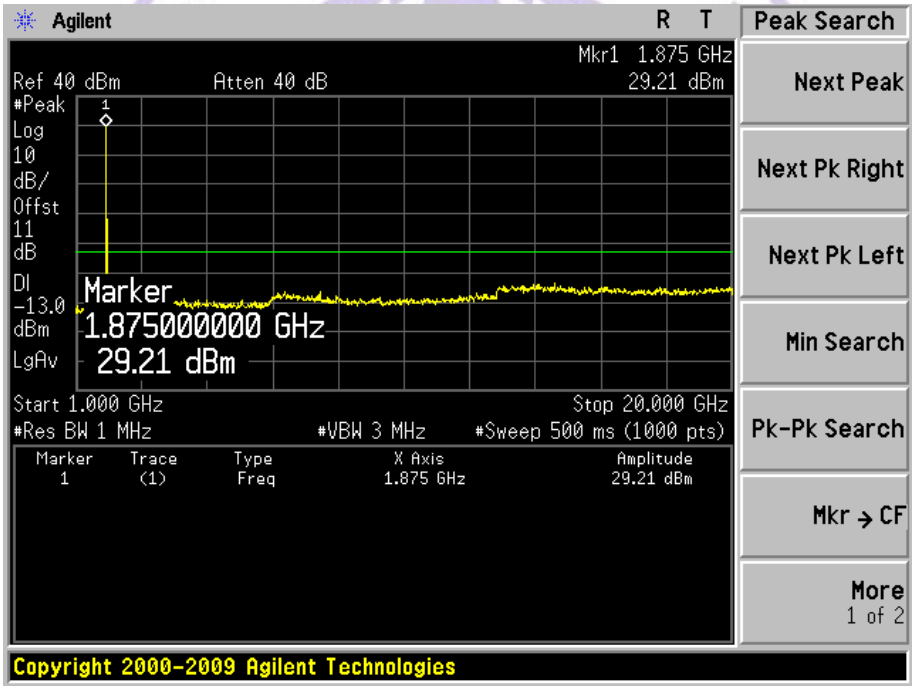
Low Channel 512(1850.20MHz)



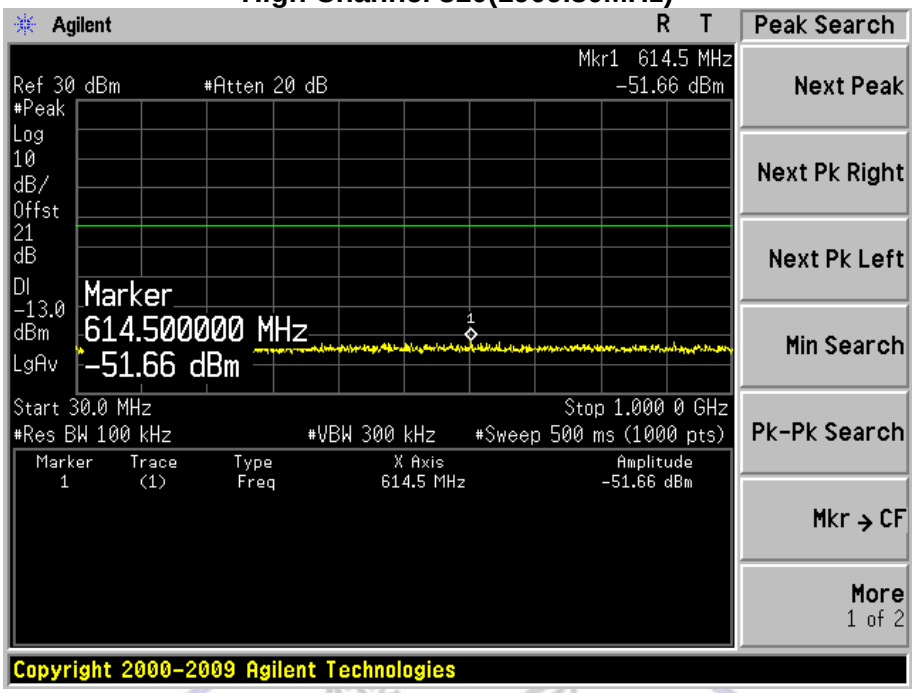


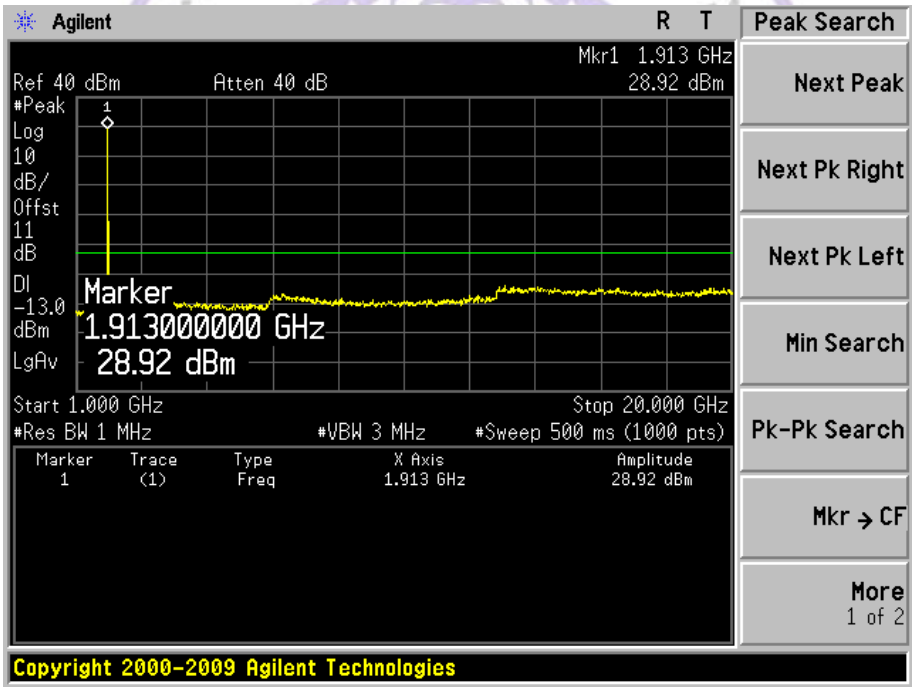
Mid Channel 661(1880.00MHz)





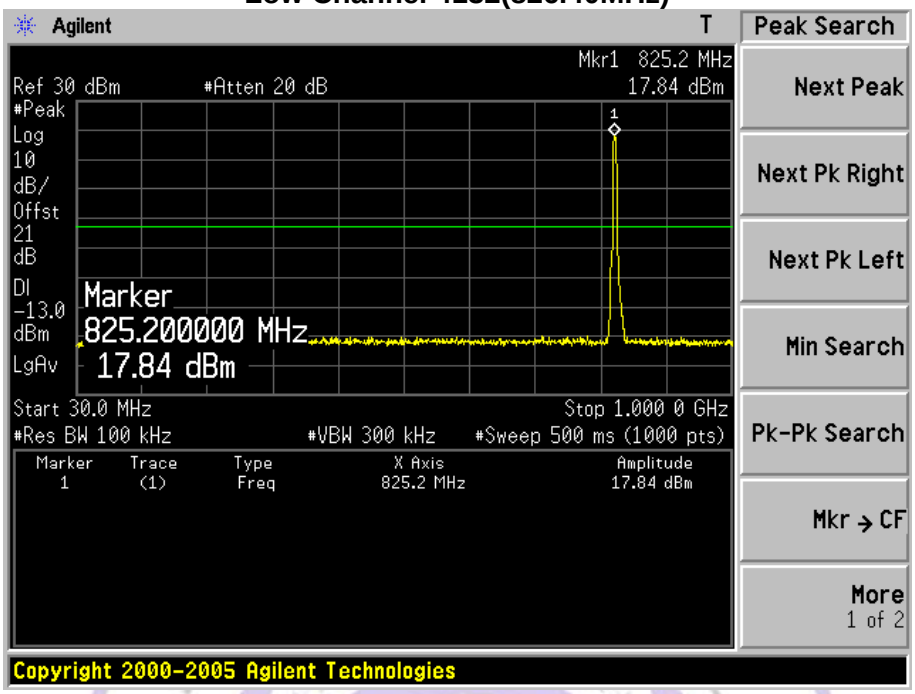
High Channel 810(1909.80MHz)

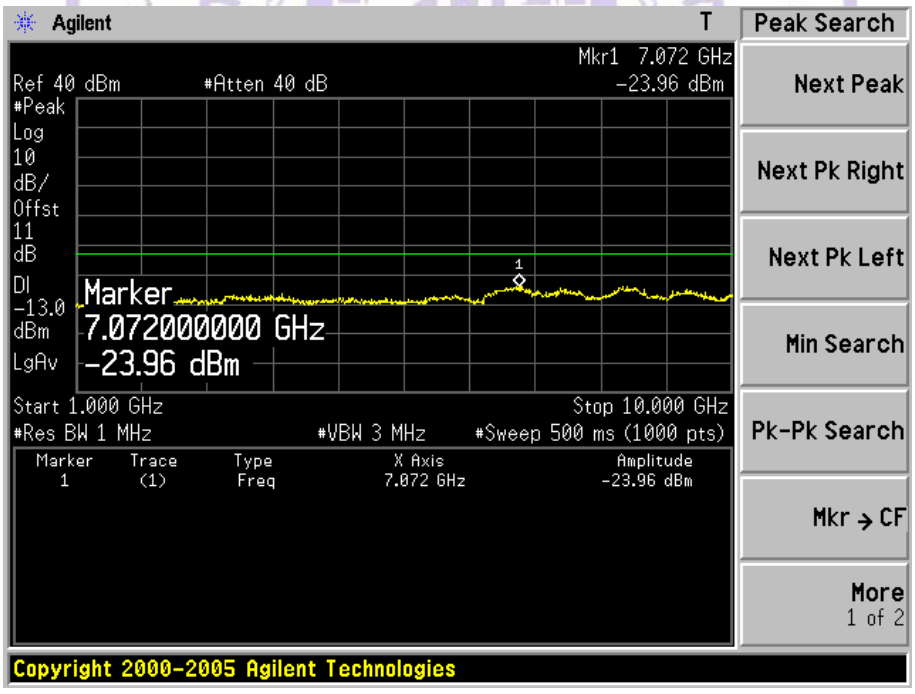




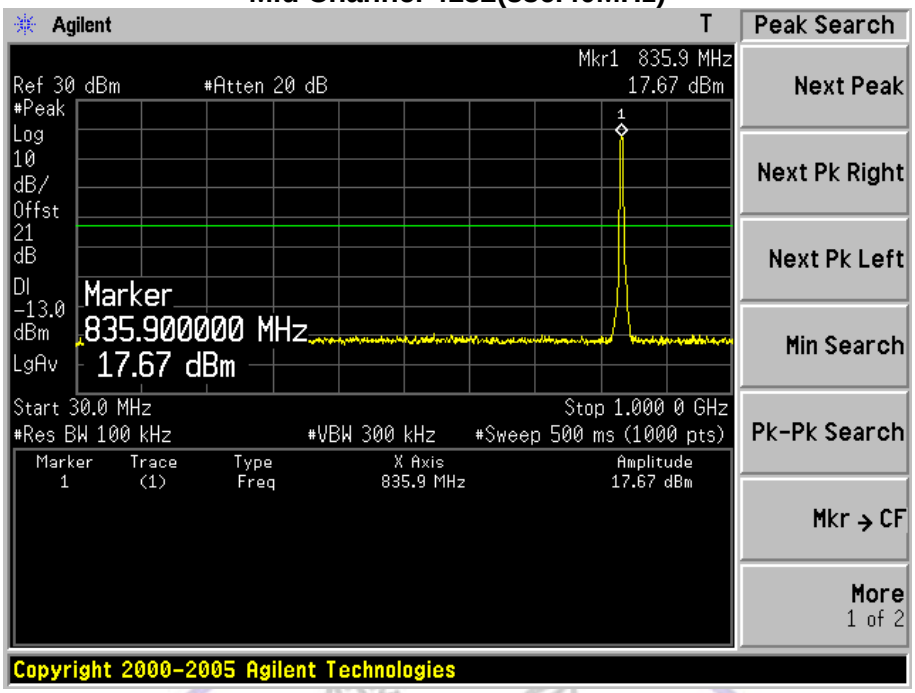
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	WCDMA Band V Link

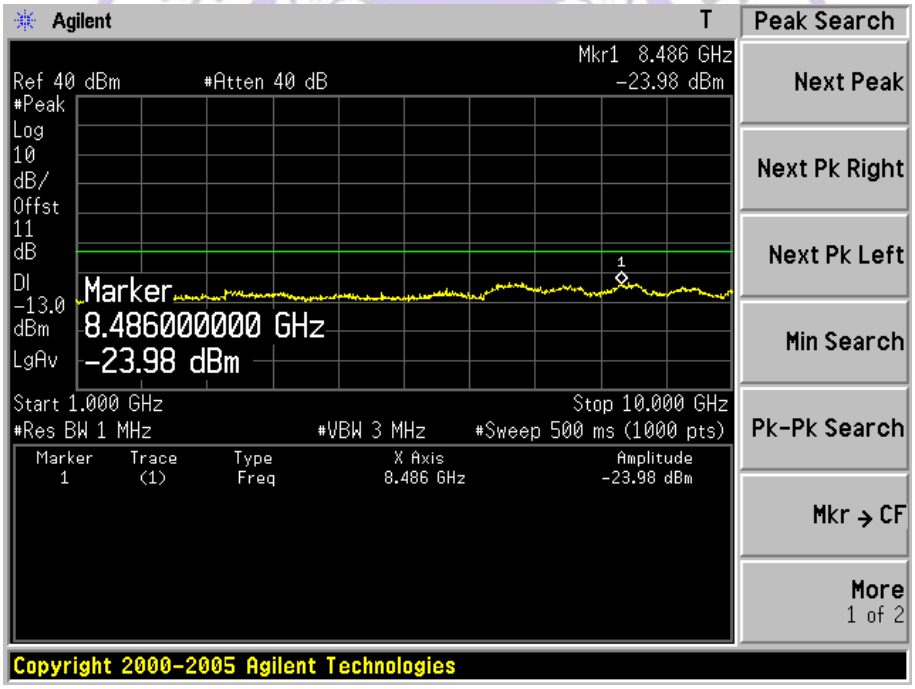
Low Channel 4132(826.40MHz)



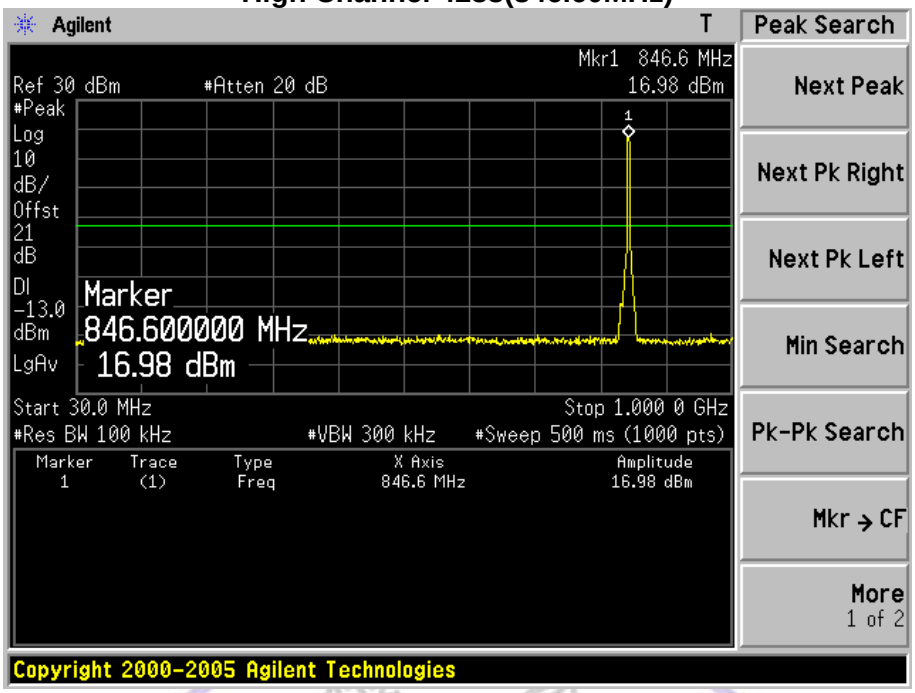


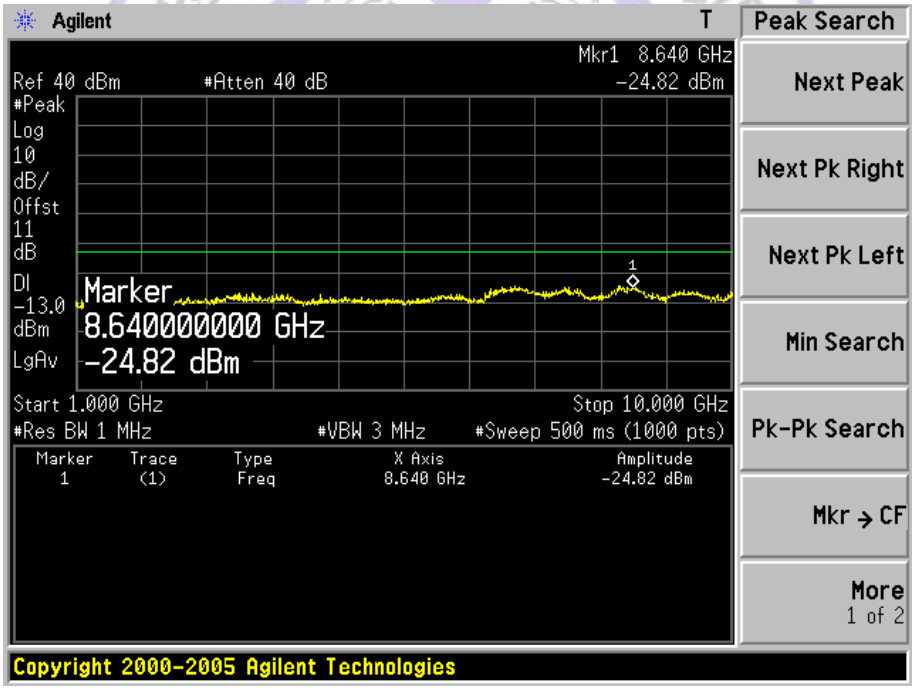
Mid Channel 4182(836.40MHz)





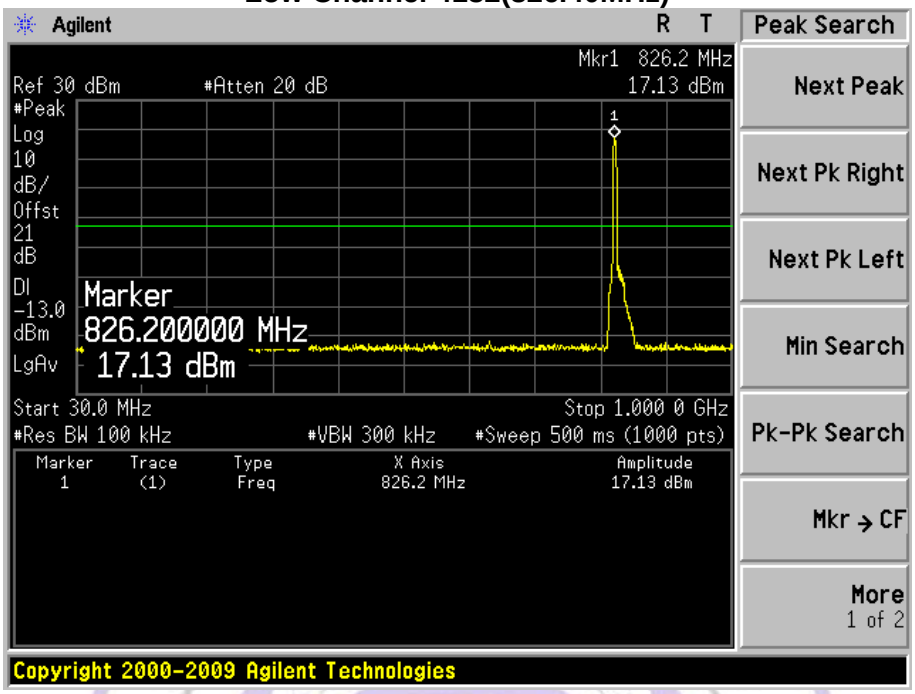
High Channel 4233(846.60MHz)

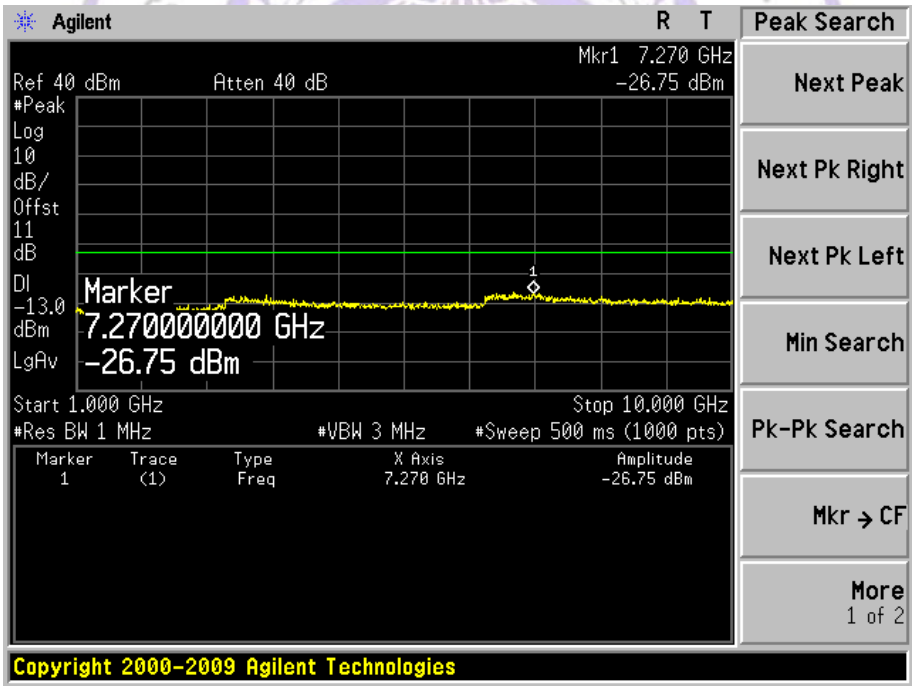




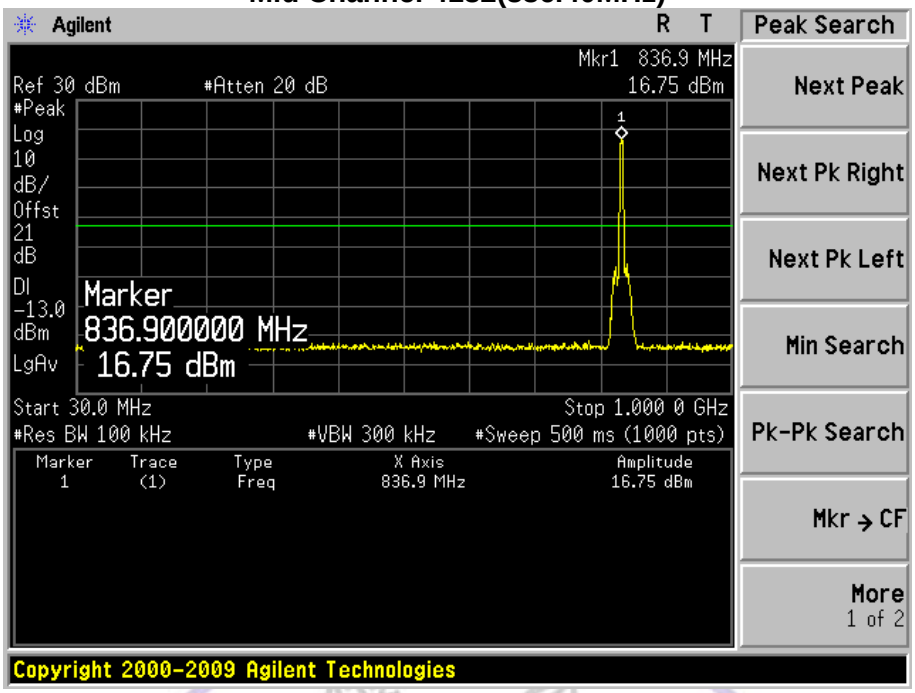
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	HSDPA Band V Link

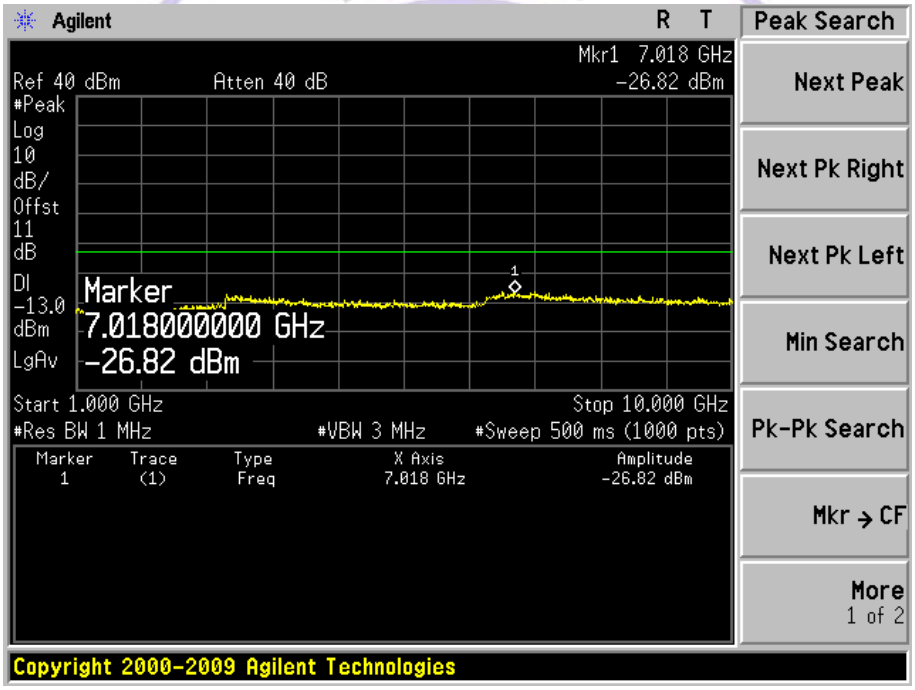
Low Channel 4132(826.40MHz)



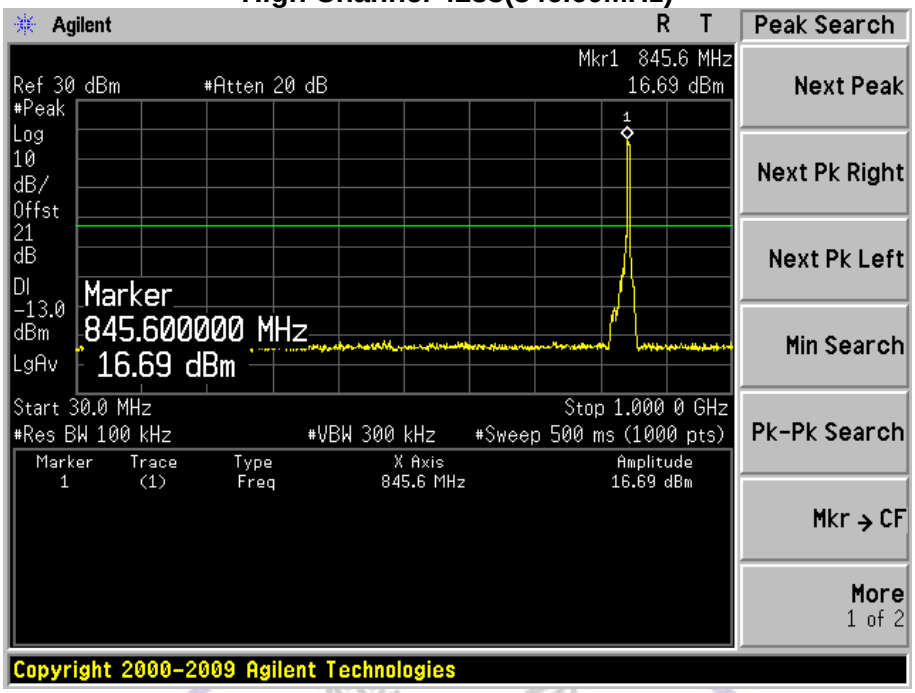


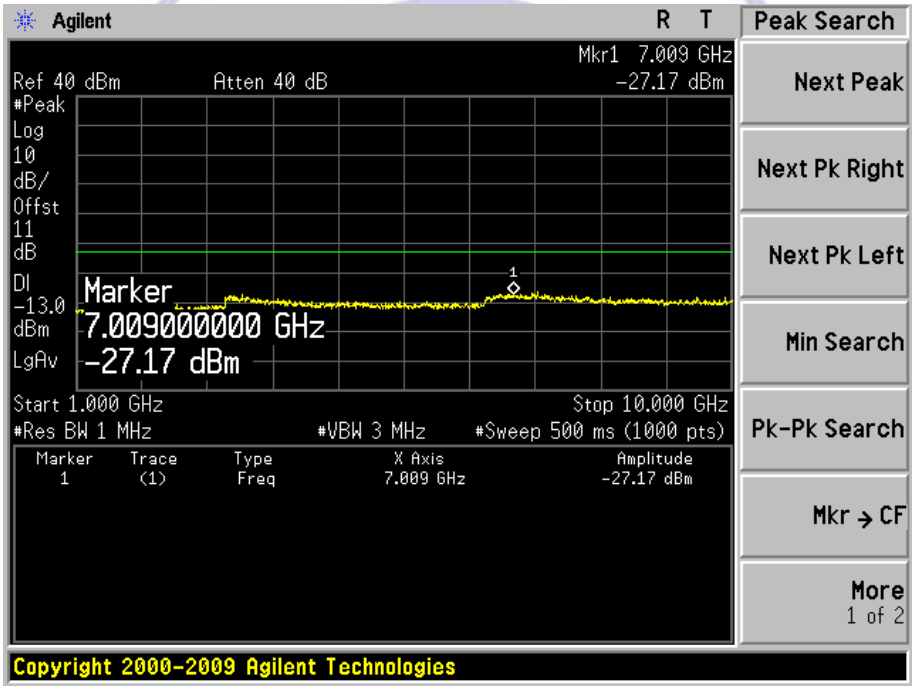
Mid Channel 4182(836.40MHz)





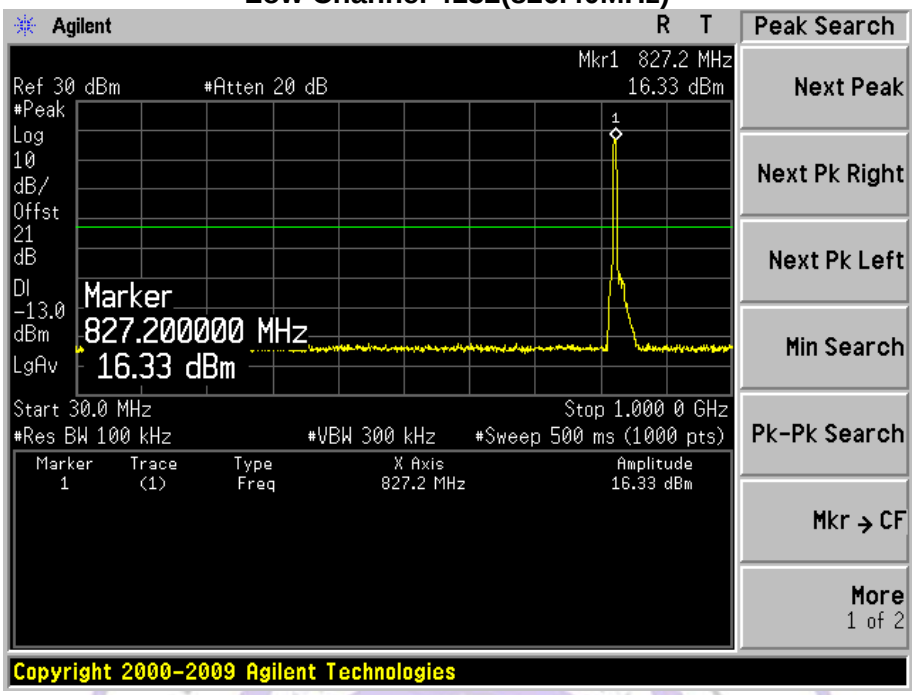
High Channel 4233(846.60MHz)

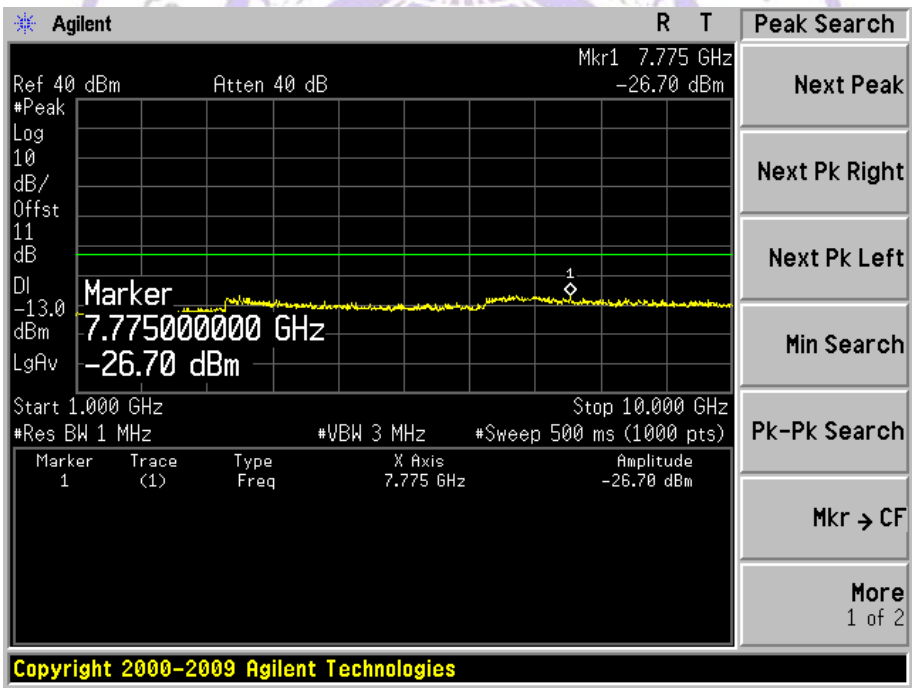




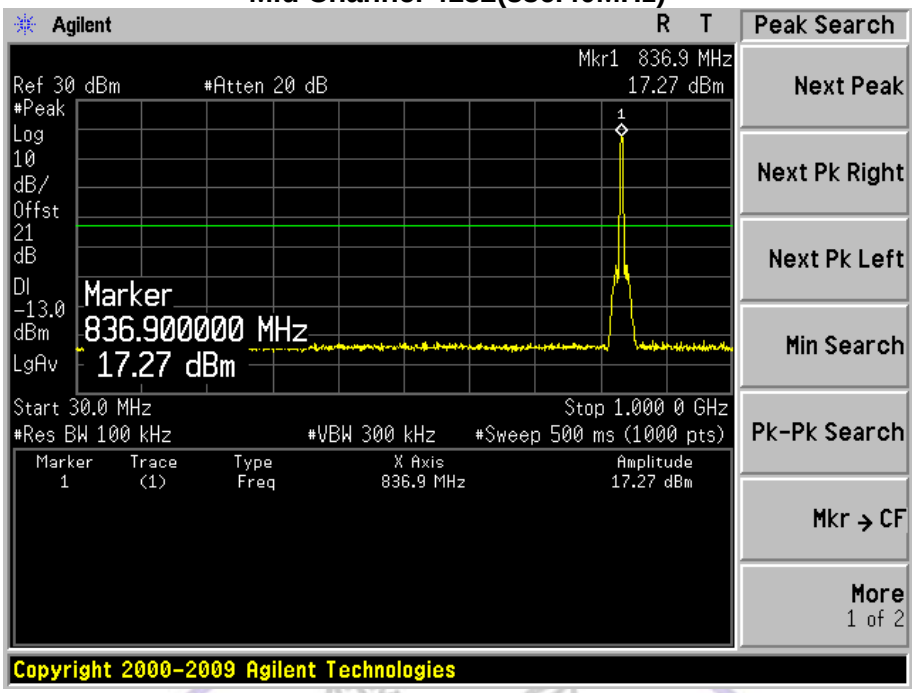
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	HSUPA Band V Link

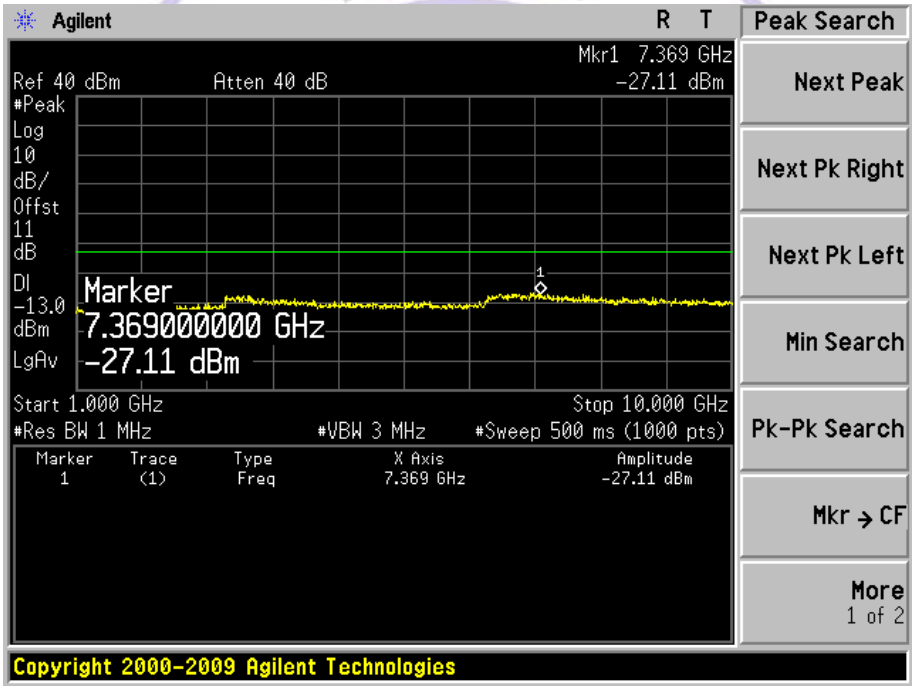
Low Channel 4132(826.40MHz)



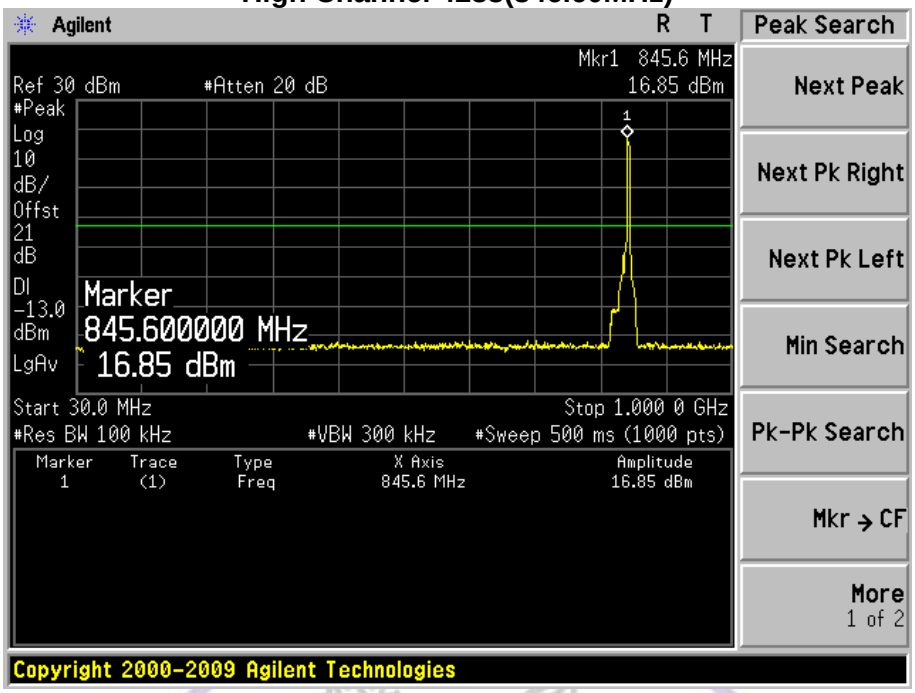


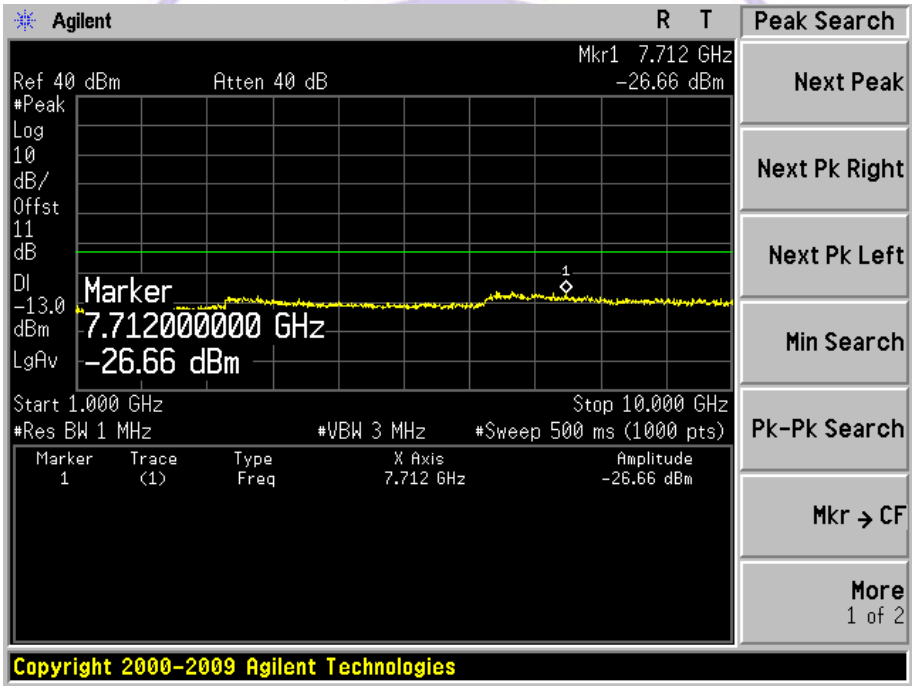
Mid Channel 4182(836.40MHz)





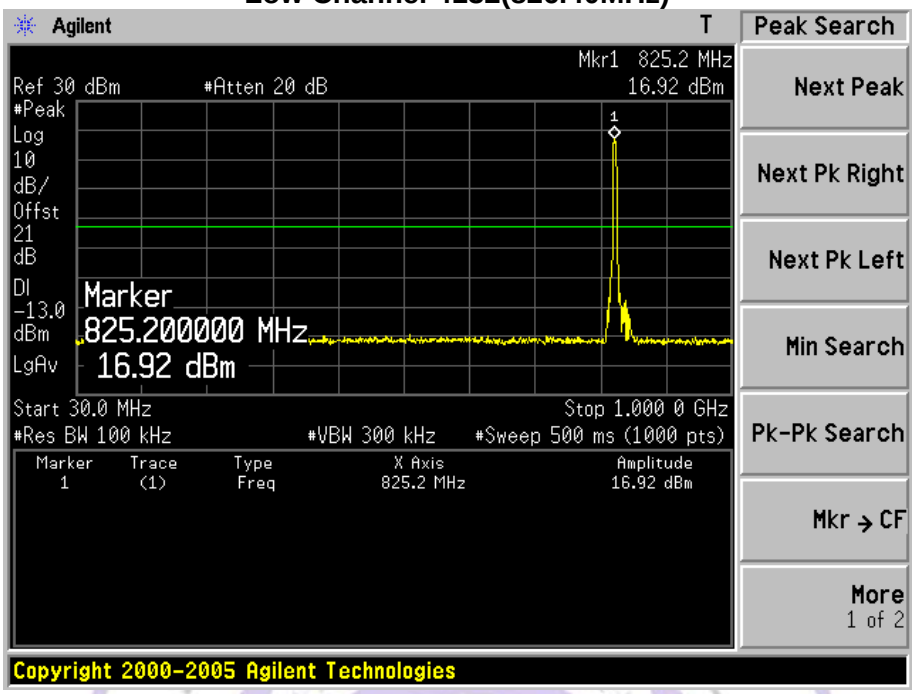
High Channel 4233(846.60MHz)

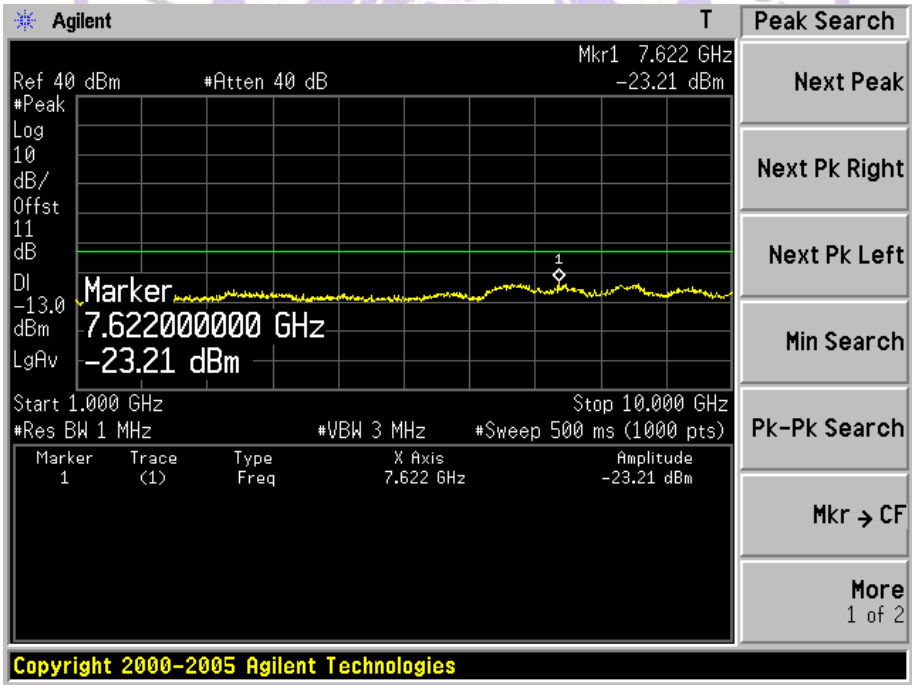




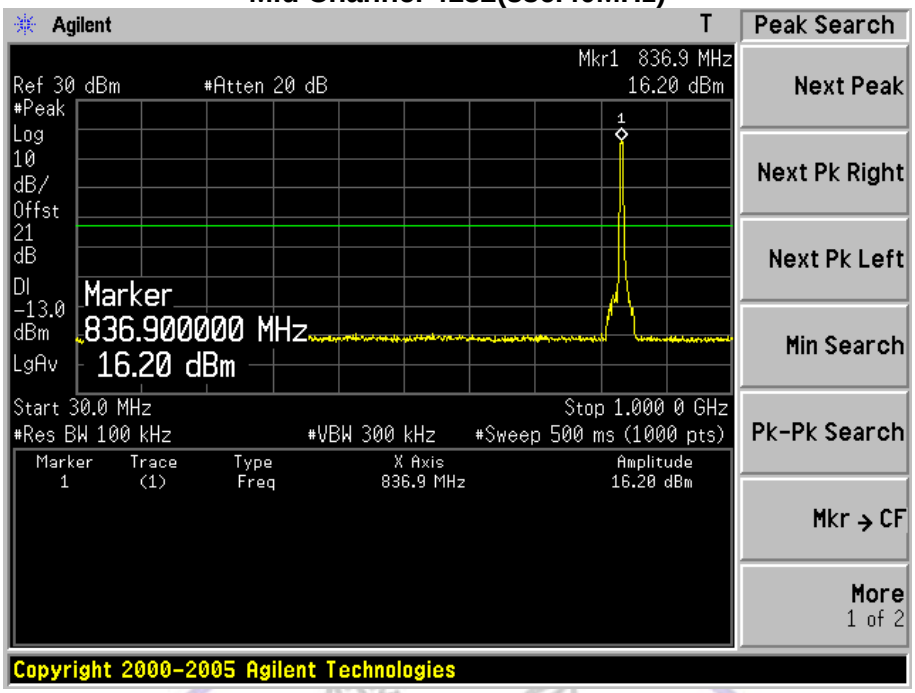
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Conducted Spurious Emission
Test Mode	HSPA+ Band V Link

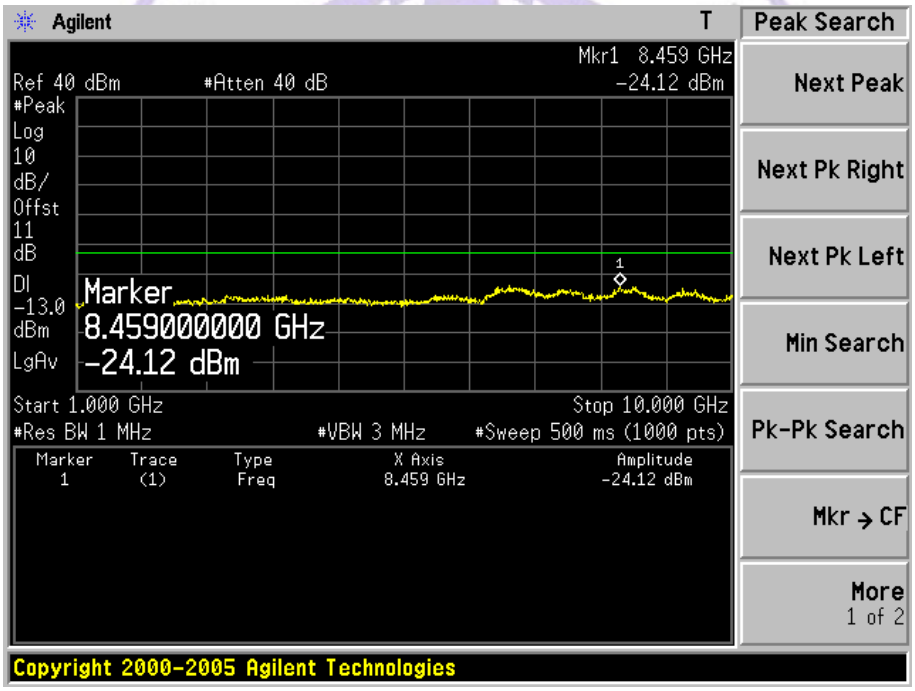
Low Channel 4132(826.40MHz)



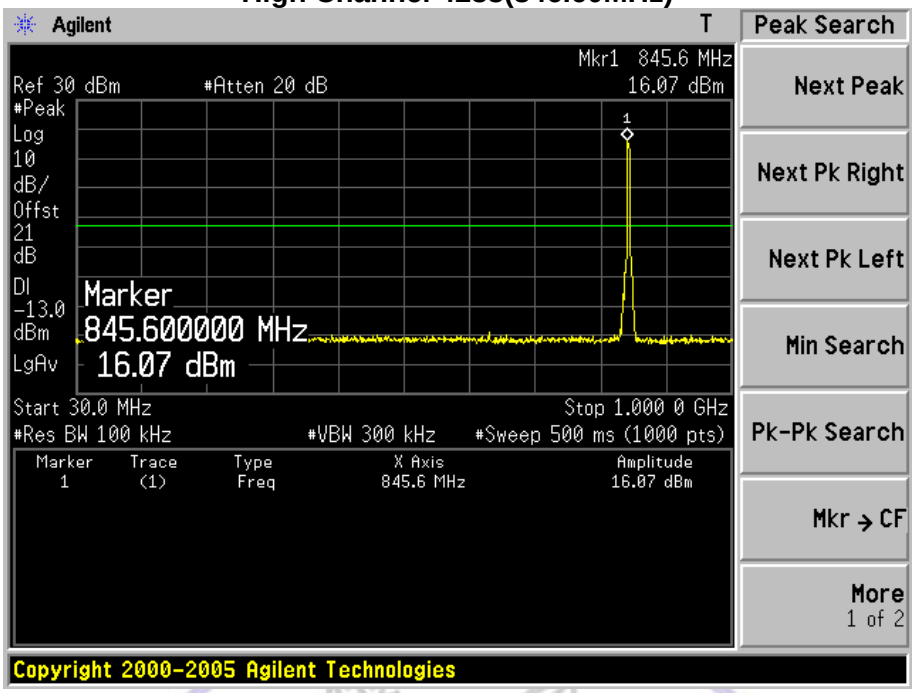


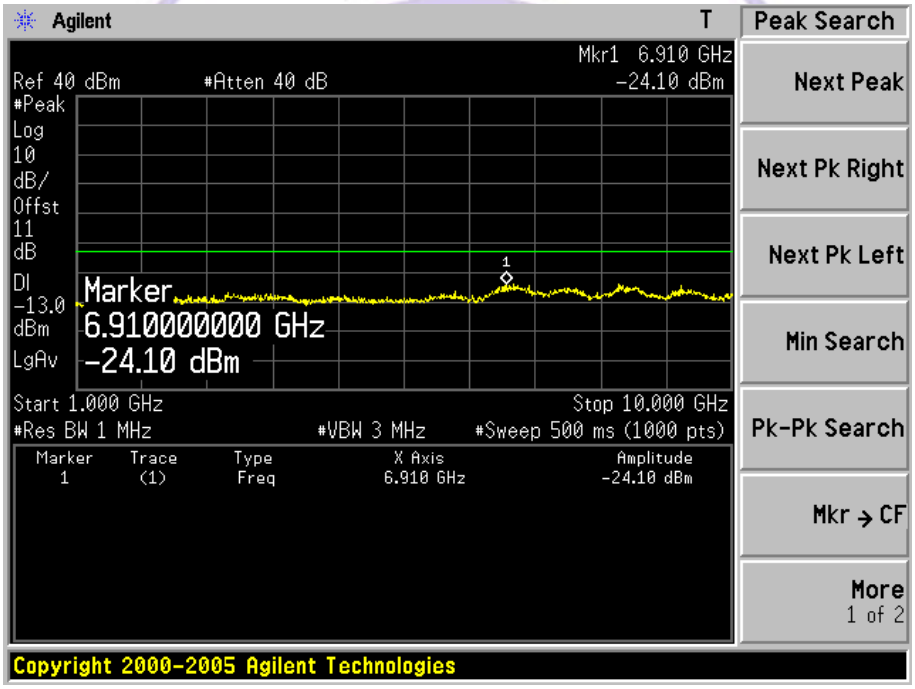
Mid Channel 4182(836.40MHz)





High Channel 4233(846.60MHz)





EIRP=SG Reading-Cable Loss+Gain

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	GSM 850 Link

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	-52.62	V	-55.19	2.50	9.75	-47.94	-13.00	-34.94
2470.50	-62.15	V	-61.20	3.12	10.48	-53.84	-13.00	-40.84
1646.00	-47.19	H	-49.85	2.50	9.75	-42.60	-13.00	-29.60
2470.50	-59.46	H	-58.36	3.12	10.48	-51.00	-13.00	-38.00
Middle Channel 189 (836.40MHz)								
1671.50	-57.26	V	-59.92	2.52	9.95	-52.49	-13.00	-39.49
2513.00	-63.62	V	-63.00	3.18	10.62	-55.56	-13.00	-42.56
1671.50	-50.08	H	-52.49	2.52	9.95	-45.06	-13.00	-32.06
2513.00	-60.54	H	-59.60	3.18	10.62	-52.16	-13.00	-39.16
High Channel 251 (848.80MHz)								
1697.00	-53.47	V	-56.20	2.54	10.06	-48.68	-13.00	-35.68
2547.00	-63.25	V	-61.70	3.14	10.68	-54.16	-13.00	-41.16
1697.00	-47.58	H	-49.58	2.54	10.06	-42.06	-13.00	-29.06
2547.00	-59.43	H	-57.62	3.14	10.68	-50.08	-13.00	-37.08

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	PCS 1900 Link

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)								
3700.00	-46.54	V	-43.09	3.84	12.69	-34.24	-13.00	-21.24
5550.00	-58.04	V	-45.07	4.82	13.15	-36.74	-13.00	-23.74
3700.00	-41.04	H	-37.66	3.84	12.69	-28.81	-13.00	-15.81
5550.00	-58.06	H	-45.36	4.82	13.15	-37.03	-13.00	-24.03
Middle Channel 661 (1880.00MHz)								
3760.00	-48.20	V	-44.98	3.73	12.72	-35.99	-13.00	-22.99
5640.00	-55.27	V	-42.19	4.93	13.14	-33.98	-13.00	-20.98
3760.00	-39.48	H	-36.16	3.73	12.72	-27.17	-13.00	-14.17
5640.00	-58.64	H	-45.57	4.93	13.14	-37.36	-13.00	-24.36
High Channel 810 (1909.80MHz)								
3818.00	-43.41	V	-39.70	4.02	12.73	-30.99	-13.00	-17.99
5727.00	-57.14	V	-44.35	4.87	13.11	-36.11	-13.00	-23.11
3818.00	-37.32	H	-33.46	4.02	12.73	-24.75	-13.00	-11.75
5727.00	-62.28	H	-49.86	4.87	13.11	-41.62	-13.00	-28.62

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	GPRS 850 Link

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	-52.62	V	-55.19	2.50	9.75	-47.94	-13.00	-34.94
2470.50	-62.15	V	-61.20	3.12	10.48	-53.84	-13.00	-40.84
1646.00	-47.19	H	-49.85	2.50	9.75	-42.60	-13.00	-29.60
2470.50	-59.46	H	-58.36	3.12	10.48	-51.00	-13.00	-38.00
Middle Channel 189 (836.40MHz)								
1671.50	-57.26	V	-59.92	2.52	9.95	-52.49	-13.00	-39.49
2513.00	-63.62	V	-63.00	3.18	10.62	-55.56	-13.00	-42.56
1671.50	-50.08	H	-52.49	2.52	9.95	-45.06	-13.00	-32.06
2513.00	-60.54	H	-59.60	3.18	10.62	-52.16	-13.00	-39.16
High Channel 251 (848.80MHz)								
1697.00	-53.47	V	-56.20	2.54	10.06	-48.68	-13.00	-35.68
2547.00	-63.25	V	-61.70	3.14	10.68	-54.16	-13.00	-41.16
1697.00	-47.58	H	-49.58	2.54	10.06	-42.06	-13.00	-29.06
2547.00	-59.43	H	-57.62	3.14	10.68	-50.08	-13.00	-37.08

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	GPRS 1900 Link

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)								
3700.00	-46.54	V	-43.09	3.84	12.69	-34.24	-13.00	-21.24
5550.00	-58.04	V	-45.07	4.82	13.15	-36.74	-13.00	-23.74
3700.00	-41.04	H	-37.66	3.84	12.69	-28.81	-13.00	-15.81
5550.00	-58.06	H	-45.36	4.82	13.15	-37.03	-13.00	-24.03
Middle Channel 661 (1880.00MHz)								
3760.00	-48.20	V	-44.98	3.73	12.72	-35.99	-13.00	-22.99
5640.00	-55.27	V	-42.19	4.93	13.14	-33.98	-13.00	-20.98
3760.00	-39.48	H	-36.16	3.73	12.72	-27.17	-13.00	-14.17
5640.00	-58.64	H	-45.57	4.93	13.14	-37.36	-13.00	-24.36
High Channel 810 (1909.80MHz)								
3818.00	-43.41	V	-39.70	4.02	12.73	-30.99	-13.00	-17.99
5727.00	-57.14	V	-44.35	4.87	13.11	-36.11	-13.00	-23.11
3818.00	-37.32	H	-33.46	4.02	12.73	-24.75	-13.00	-11.75
5727.00	-62.28	H	-49.86	4.87	13.11	-41.62	-13.00	-28.62

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	WCDMA Band V Traffic

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	-50.74	V	-52.50	3.28	9.75	-46.03	-13.00	-33.03
2479.20	-50.85	V	-49.07	4.10	10.48	-42.69	-13.00	-29.69
1654.50	-50.50	H	-52.25	3.28	9.75	-45.78	-13.00	-32.78
2479.00	-44.21	H	-42.20	4.10	10.48	-35.82	-13.00	-22.82
Middle Channel 4182 (836.40MHz)								
1671.50	-47.80	V	-49.67	3.32	9.95	-43.04	-13.00	-30.04
2513.00	-48.84	V	-47.17	4.31	10.62	-40.86	-13.00	-27.86
1671.50	-46.77	H	-48.39	3.32	9.95	-41.76	-13.00	-28.76
2513.00	-40.36	H	-38.30	4.31	10.62	-31.99	-13.00	-18.99
High Channel 4233 (846.60MHz)								
1697.00	-42.24	V	-44.16	3.35	10.06	-37.45	-13.00	-24.45
2539.80	-49.46	V	-46.77	3.91	10.33	-40.35	-13.00	-27.35
1697.00	-42.64	H	-43.61	4.19	10.68	-37.12	-13.00	-24.12
2538.50	-43.15	H	-40.25	4.33	10.79	-33.79	-13.00	-20.79

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	HSDPA Band V Traffic

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	-61.91	V	-63.67	3.28	9.75	-57.20	-13.00	-44.20
2479.20	-62.90	V	-61.12	4.10	10.48	-54.74	-13.00	-41.74
1654.50	-58.85	H	-60.72	3.28	9.75	-54.25	-13.00	-41.25
2479.20	-64.15	H	-62.14	4.10	10.48	-55.76	-13.00	-42.76
Middle Channel 4182 (836.40MHz)								
1671.50	-62.43	V	-64.29	3.32	9.95	-57.66	-13.00	-44.66
2509.20	-64.09	V	-62.84	3.81	10.62	-56.03	-13.00	-43.03
1671.50	-61.65	H	-63.24	3.32	9.95	-56.61	-13.00	-43.61
2509.20	-64.48	H	-62.84	3.81	10.62	-56.03	-13.00	-43.03
High Channel 4233 (846.60MHz)								
1697.00	-61.95	V	-63.88	3.35	10.06	-57.17	-13.00	-44.17
2538.50	-63.35	V	-60.94	4.19	10.68	-54.45	-13.00	-41.45
1697.00	-58.68	H	-59.87	3.35	10.06	-53.16	-13.00	-40.16
2538.50	-64.42	H	-61.73	4.19	10.68	-55.24	-13.00	-42.24

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	HSUPA Band V Traffic

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	-59.80	V	-61.59	3.28	9.75	-55.12	-13.00	-42.12
2479.20	-63.40	V	-61.63	4.10	10.48	-55.25	-13.00	-42.25
1654.50	-58.32	H	-60.20	3.28	9.75	-53.73	-13.00	-40.73
2479.20	-63.26	H	-61.25	4.10	10.48	-54.87	-13.00	-41.87
Middle Channel 4182 (836.40MHz)								
1671.50	-62.54	V	-64.40	3.32	9.95	-57.77	-13.00	-44.77
2509.20	-64.10	V	-62.85	3.81	10.62	-56.04	-13.00	-43.04
1671.50	-60.25	H	-61.86	3.32	9.95	-55.23	-13.00	-42.23
2509.20	-63.63	H	-61.99	3.81	10.62	-55.18	-13.00	-42.18
High Channel 4233 (846.60MHz)								
1697.00	-61.50	V	-63.42	3.35	10.06	-56.71	-13.00	-43.71
2539.80	-63.99	V	-61.58	4.19	10.68	-55.09	-13.00	-42.09
1697.00	-57.70	H	-58.89	3.35	10.06	-52.18	-13.00	-39.18
2539.80	-63.60	H	-60.91	4.19	10.68	-54.42	-13.00	-41.42

Shenzhen CTL Electromagnetic Technology Co., Ltd.

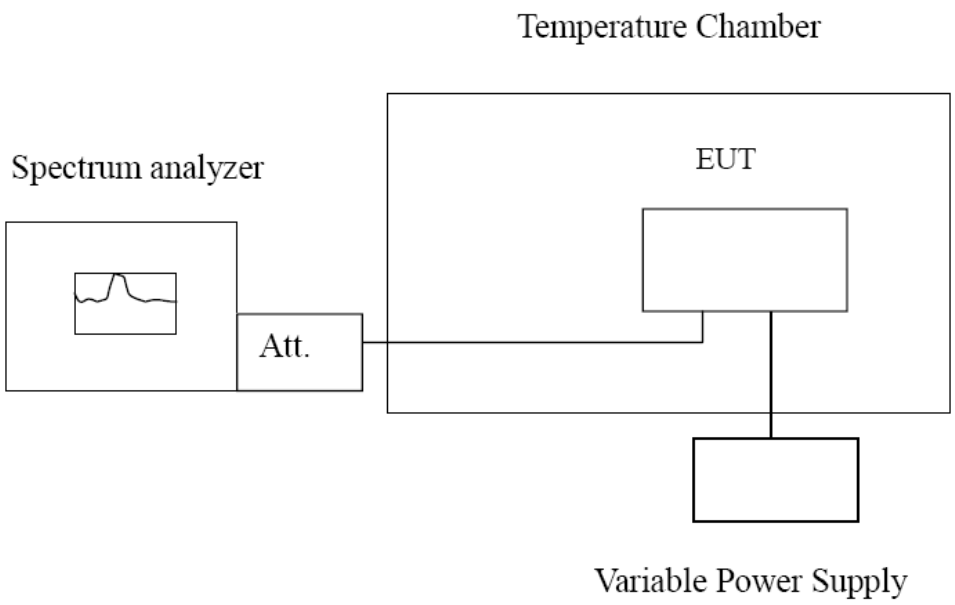
Product	**3G WCDMA+GSM Smart Phone**
Test Item	Radiated Spurious Emission
Test Mode	HSPA+ Band V Traffic

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	-60.86	V	-62.62	3.28	9.75	-56.15	-13.00	-43.15
2479.20	-64.09	V	-62.31	4.10	10.48	-55.93	-13.00	-42.93
1654.50	-61.50	H	-63.28	3.28	9.75	-56.81	-13.00	-43.81
2479.00	-63.73	H	-61.73	4.10	10.48	-55.35	-13.00	-42.35
Middle Channel 4182 (836.40MHz)								
1671.50	-59.20	V	-61.06	3.32	9.95	-54.43	-13.00	-41.43
2513.00	-64.36	V	-62.61	4.31	10.62	-56.30	-13.00	-43.30
1671.50	-61.04	H	-62.65	3.32	9.95	-56.02	-13.00	-43.02
2513.00	-64.01	H	-61.87	4.31	10.62	-55.56	-13.00	-42.56
High Channel 4233 (846.60MHz)								
1697.00	-56.01	V	-57.94	3.35	10.06	-51.23	-13.00	-38.23
2539.80	-64.13	V	-61.67	3.91	10.33	-55.25	-13.00	-42.25
1697.00	-58.88	H	-59.85	4.19	10.68	-53.36	-13.00	-40.36
2538.50	-64.01	H	-61.29	4.33	10.79	-54.83	-13.00	-41.83

Shenzhen CTL Electromagnetic Technology Co., Ltd.

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℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20℃. 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 (±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	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	GSM 850 Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	66	± 2091
-20	836.40	-33	± 2091
-10	836.40	-23	± 2091
0	836.40	-44	± 2091
10	836.40	69	± 2091
20	836.40	-22	± 2091
30	836.40	36	± 2091
40	836.40	-69	± 2091
50	836.40	45	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-11	± 2091
3.700	836.40	22	± 2091
3.600	836.40	-36	± 2091

Shenzhen CTL Electromagnetic Technology Co.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	PCS1900 Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	-44	± 4700
-20	1880.00	26	± 4700
-10	1880.00	-39	± 4700
0	1880.00	-56	± 4700
10	1880.00	44	± 4700
20	1880.00	35	± 4700
30	1880.00	43	± 4700
40	1880.00	-59	± 4700
50	1880.00	-74	± 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	-67	± 4700
3.600	1880.00	32	± 4700

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	GPRS 850 Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	66	± 2091
-20	836.40	-33	± 2091
-10	836.40	-23	± 2091
0	836.40	-44	± 2091
10	836.40	69	± 2091
20	836.40	-22	± 2091
30	836.40	36	± 2091
40	836.40	-69	± 2091
50	836.40	45	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	-11	± 2091
3.700	836.40	22	± 2091
3.600	836.40	-36	± 2091

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	GPRS1900 Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	-44	± 4700
-20	1880.00	26	± 4700
-10	1880.00	-39	± 4700
0	1880.00	-56	± 4700
10	1880.00	44	± 4700
20	1880.00	35	± 4700
30	1880.00	43	± 4700
40	1880.00	-59	± 4700
50	1880.00	-74	± 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	-67	± 4700

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	WCDMA Band V Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	16	± 2091
-20	836.40	-31	± 2091
-10	836.40	15	± 2091
0	836.40	-14	± 2091
10	836.40	22	± 2091
20	836.40	43	± 2091
30	836.40	61	± 2091
40	836.40	65	± 2091
50	836.40	-33	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.6	836.40	-13	± 2091
3.7	836.40	23	± 2091
4.2	836.40	-32	± 2091

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	HSDPA Band V Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	69	± 2091
-20	836.40	-33	± 2091
-10	836.40	26	± 2091
0	836.40	79	± 2091
10	836.40	-11	± 2091
20	836.40	-15	± 2091
30	836.40	-29	± 2091
40	836.40	-63	± 2091
50	836.40	48	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	26	± 2091
3.700	836.40	33	± 2091
3.600	836.40	-47	± 2091

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	HSUPA Band V Link

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	-52	± 2091
-20	836.40	26	± 2091
-10	836.40	46	± 2091
0	836.40	-52	± 2091
10	836.40	-54	± 2091
20	836.40	22	± 2091
30	836.40	67	± 2091
40	836.40	-36	± 2091
50	836.40	-74	± 2091

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
4.200	836.40	71	± 2091
3.700	836.40	-36	± 2091
3.600	836.40	-25	± 2091

Shenzhen CTL Electromagnetic Technology Co., Ltd.

Product	**3G WCDMA+GSM Smart Phone**
Test Item	Frequency Stability Under Temperature & Voltage Variations
Test Mode	HSPA+ Band V Link

Frequency Stability under Temperature

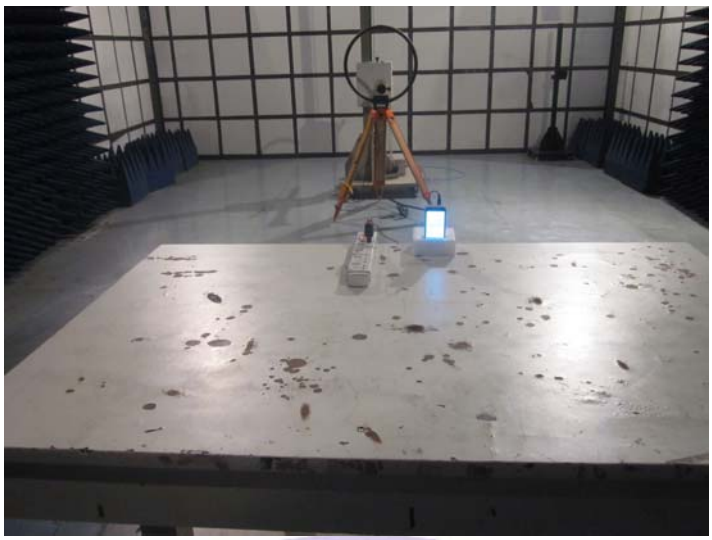
Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	35	± 2091
-20	836.40	-54	± 2091
-10	836.40	65	± 2091
0	836.40	33	± 2091
10	836.40	24	± 2091
20	836.40	33	± 2091
30	836.40	18	± 2091
40	836.40	-14	± 2091
50	836.40	-22	± 2091

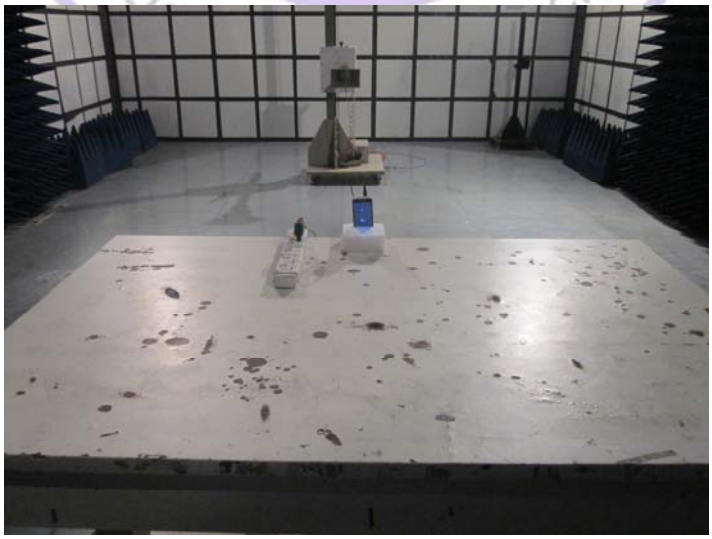
Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.5	836.40	-31	± 2091
3.7	836.40	-23	± 2091
4.2	836.40	56	± 2091

Shenzhen CTL Electromagnetic Technology Co., Ltd.

5. Test Setup Photos of the EUT





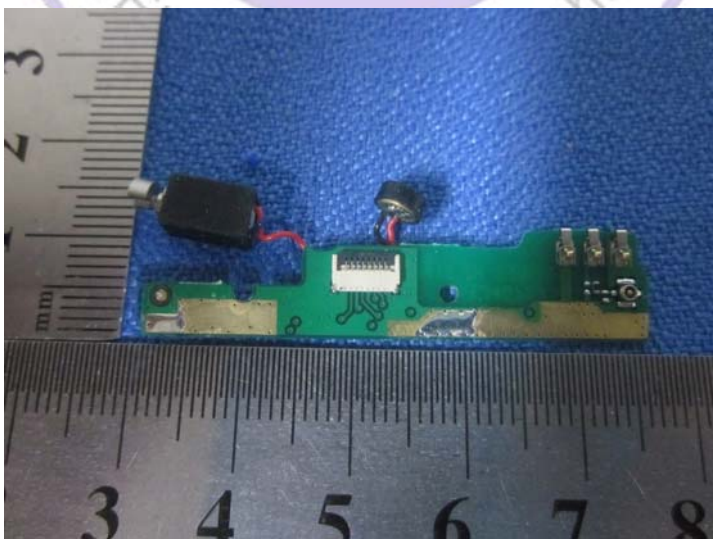
6. External and Internal Photos of the EUT

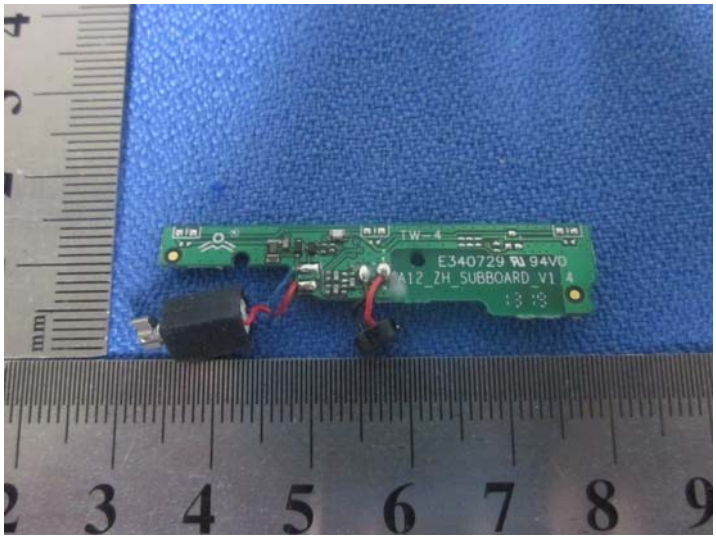
External Photos of EUT

MULTILASER

MAXTOUCH

Internal Photos of EUT

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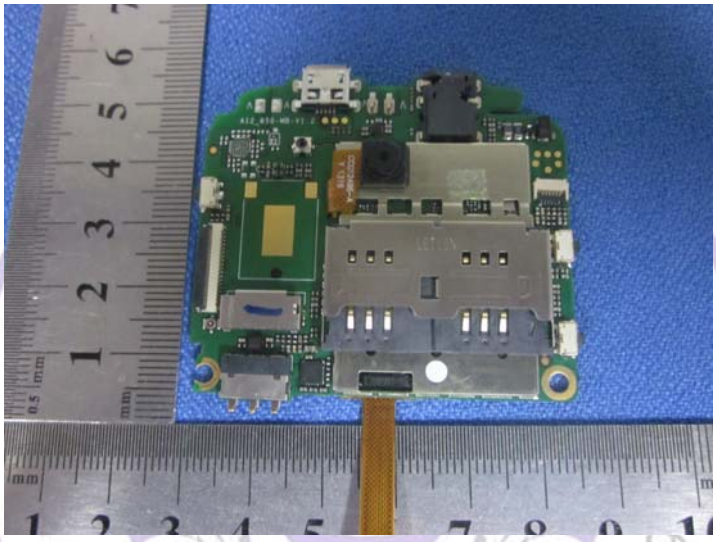

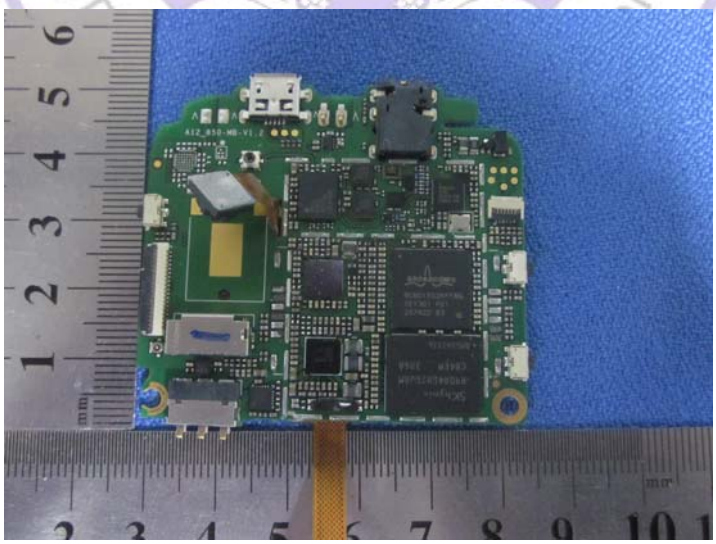

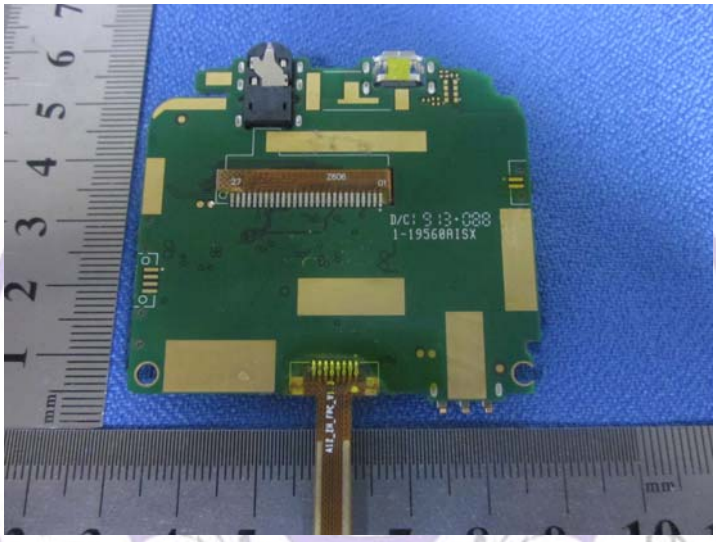

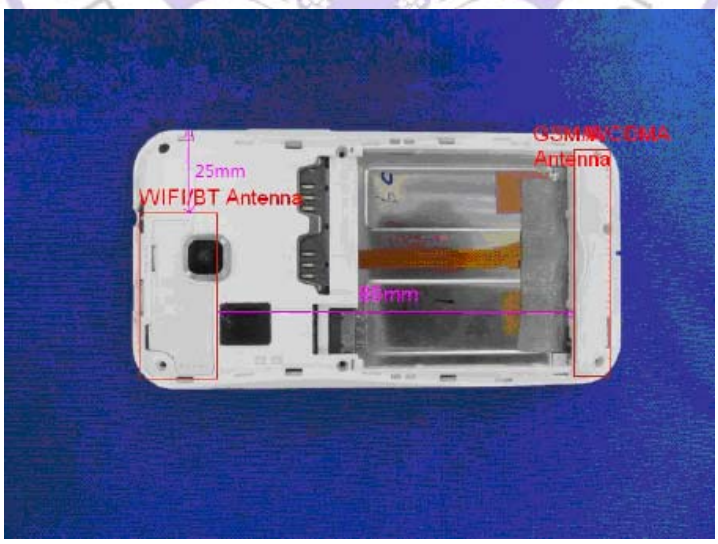

.....End of Report.....