TESTING
No. L2264

Part 22

TEST REPORT

Product Name	Smart Terminal
Model Name	ST5, ST5e, ST5ex
Brand Name	IRIS
FCC ID	UY9-ST5
Client	IRIS Corporation Berhad
Manufacturer	OPTIMA KLASIK SDN. BHD. (807783-T)
Date of issue	October 11, 2013

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC CFR47 Part 2 (2012)** Frequency Allocations And Radio Treaty Matters; General Rules And Regulations **FCC CFR 47 Part 22H (2012)** Public Mobile Services(850MHz) **ANSI/TIA-603-C(2004)** Land mobile FM or PM Communications Equipment Measurements and Performance Standards. **KDB 971168 D01 Power Meas License Digital Systems v02r01** Measurement Guidance for Certification of Licensed Digital Transmitters
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

Approved by 韩伟中 Director **Revised by** 唐凯 RF Manager **Performed by** RF Engineer

TABLE OF CONTENT

1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing laboratory

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Yang Weizhong
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company:	IRIS Corporation Berhad
Address:	IRIS Smart Technology Complex, Technology Park Malaysia, 57000 Kuala Lumpur, Malaysia.
City:	Kuala Lumpur
Postal Code:	57000
Country:	Malaysia

1.4. Manufacturer Information

Company:	OPTIMA KLASIK SDN. BHD. (807783-T)
Address:	IRIS Smart Technology Complex, Technology Park Malaysia, Bukit Jalil, 57000 Kuala Lumpur, Malaysia
City:	Kuala Lumpur
Postal Code:	57000
Country:	Malaysia

1.5. Information of EUT

General information

Product Name:	Smart Terminal		
S/N :	1302-P0001		
Hardware Version:	HW_ST5_V1.0		
Software Version:	SW_ST5_V1.0		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Operating Mode(s):	GSM 850:(tested) WCDMA Band V;(tested)		
Test Modulation:	(GSM)GMSK; (WCDMA)QPSK		
GPRS Multislot Class:	12		
EGPRS Multislot Class:	12		
HSDPA UE Category:	8		
HSUPA UE Category:	6		
Maximum E.R.P.	GSM 850: 29.2 dBm WCDMA Band V: 19.37 dBm		
Power Supply:	Battery or Charger (AC adaptor)		
Rated Power Supply Voltage:	7.4V		
Extreme Voltage:	Minimum: 6.8V Maximum: 8.2V		
Extreme Temperature:	Lowest: -10°C Highest: +55°C		
Test Channel: (Low - Middle - High)	128 - 190 - 251 (GSM 850) (tested) 4132 - 4183 - 4233 (WCDMA Band V) (tested)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824.2 ~ 848.8	869.2 ~ 893.8
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6

Auxiliary Equipment Details

AE1: Battery

Model:	963450P
Manufacture:	Shenzhen Cx-Power Electronic Co.,Ltd
S/N:	/

Equipment Under Test (EUT) is GSM/UMTS handheld rugged terminal with internal antenna. The EUT is tested GSM 850 band and UMTS Band V in this report.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from June 21, 2013 to June 26, 2013.

2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	22.917	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS

PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.

2.2. RF Power Output

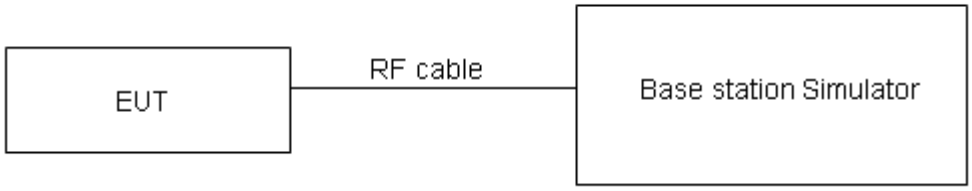
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the

normal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

GSM 850		Average Conducted Power(dBm)		
		Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GPRS (GMSK)	1TXslot	**32.44**	**32.48**	**32.19**
	2TXslots	29.29	29.25	29.1
	3TXslots	27.38	27.32	27.15
	4TXslots	25.24	25.2	25.03
EGPRS (8PSK)	1TXslot	**26.27**	**26.1**	**25.83**
	2TXslots	24.32	24.15	23.89
	3TXslots	22.28	22.15	21.91
	4TXslots	20.28	20.15	20.88

Note:

1) The maximum RF Output Power numbers are marks in bold.

2)The following testing in GPRS/EGPRS is set to 1TXslot based on the maximum RF Output Power.

WCDMA Band V		Average Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC		22.01	21.74	21.70
HSDPA	Sub - Test 1	20.40	20.10	20.04
	Sub - Test 2	20.35	20.05	20.03
	Sub - Test 3	20.33	20.01	20.00
	Sub - Test 4	20.20	20.04	20.01
HSUPA	Sub - Test 1	20.43	20.21	20.05
	Sub - Test 2	19.89	19.90	19.75
	Sub - Test 3	20.24	20.13	20.06
	Sub - Test 4	20.01	19.76	19.54
	Sub - Test 5	20.44	20.14	20.12

2.3. Effective Radiated Power

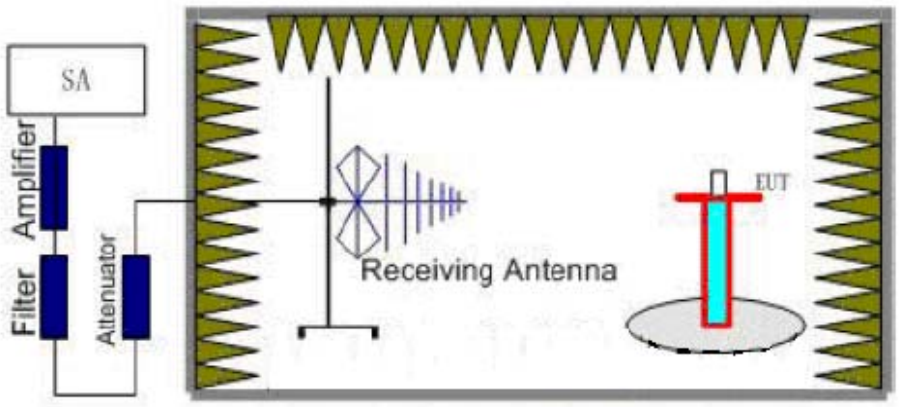
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The measurement procedures in TIA- 603C are used.
1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;
UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs
Ps (dBm)：Input power to substitution antenna.
Gs (dBi or dBd)：Substitution antenna Gain.
Et = Rt + AF
Es = Rs + AF
AF (dB/m)：Receive antenna factor
Rt：The highest received signal in spectrum analyzer for EUT.
Rs：The highest received signal in spectrum analyzer for substitution antenna.

Test Setup



Limits

Rule Part 22.913(a) specifies that "Mobile/portable stations are limited to 7 watts ERP”.

Limit	≤ 7 W (38.45 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 1.19 dB

Test Results:Pass

Mode	Channel	Polarization	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	E.R.P. (dBm)
GSM 850 GPRS(GMSK)	128	Vertical	-23.21	-45.65	0	-1.09	21.35
	190	Vertical	-22.81	-45.46	0	-0.91	21.74
	251	Vertical	-23.28	-45.49	0	-0.77	21.44
	128	Horizontal	-15.29	-45.53	0	-1.09	29.15
	190	Horizontal	-15.27	-45.38	0	-0.91	29.2
	251	Horizontal	-15.55	-45.37	0	-0.77	29.05
GSM 850 EGPRS(8-PSK)	128	Vertical	-27.15	-45.65	0	-1.09	17.41
	190	Vertical	-27.04	-45.46	0	-0.91	17.51
	251	Vertical	-27.29	-45.49	0	-0.77	17.43
	128	Horizontal	-21.79	-45.53	0	-1.09	22.65
	190	Horizontal	-21.80	-45.38	0	-0.91	22.67
	251	Horizontal	-21.96	-45.37	0	-0.77	22.64
WCDMA Band V	4132	Vertical	-30.11	-45.54	0	-1.02	14.41
	4183	Vertical	-30.12	-45.46	0	-0.91	14.43
	4233	Vertical	-30.18	-45.49	0	-0.8	14.51
	4132	Horizontal	-25.05	-45.44	0	-1.02	19.37
	4183	Horizontal	-25.40	-45.38	0	-0.91	19.07
	4233	Horizontal	-25.50	-45.38	0	-0.8	19.08

Note: 1. EIRP= E.R.P+2.15

2.4. Occupied Bandwidth

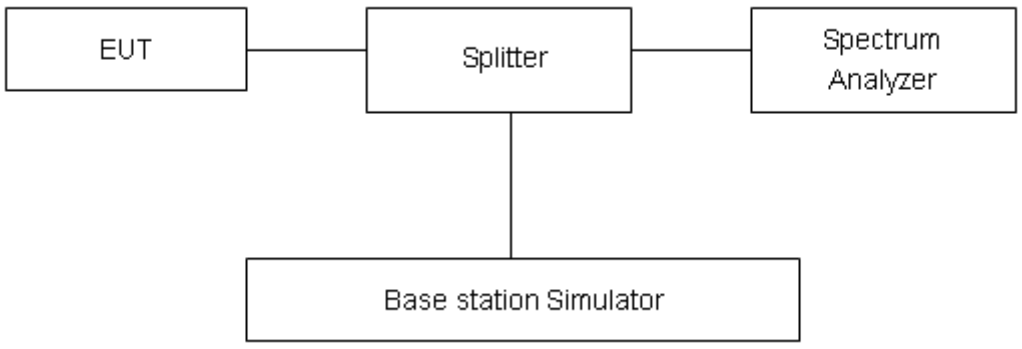
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz,VBW is set to 10kHz for GSM 850 and RBW is set to 51kHz,VBW is set to 100kHz for WCDMA Band V. 99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

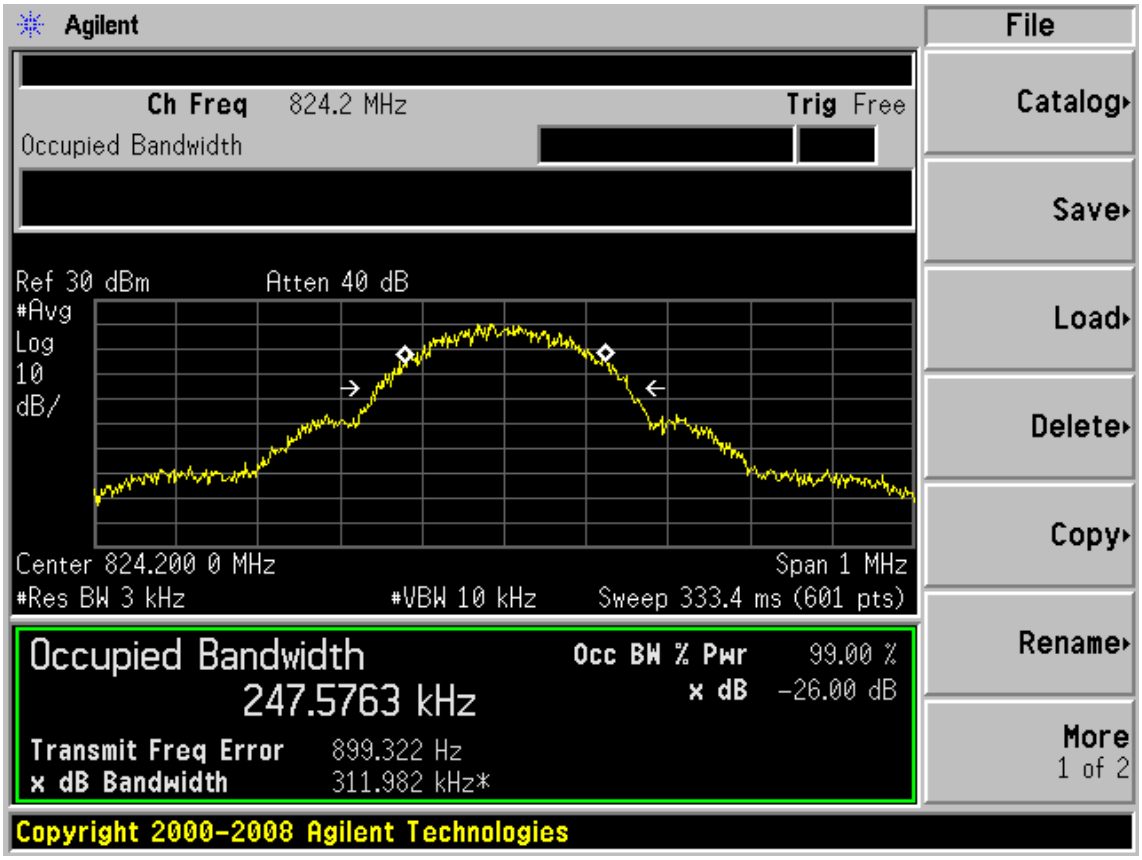
No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

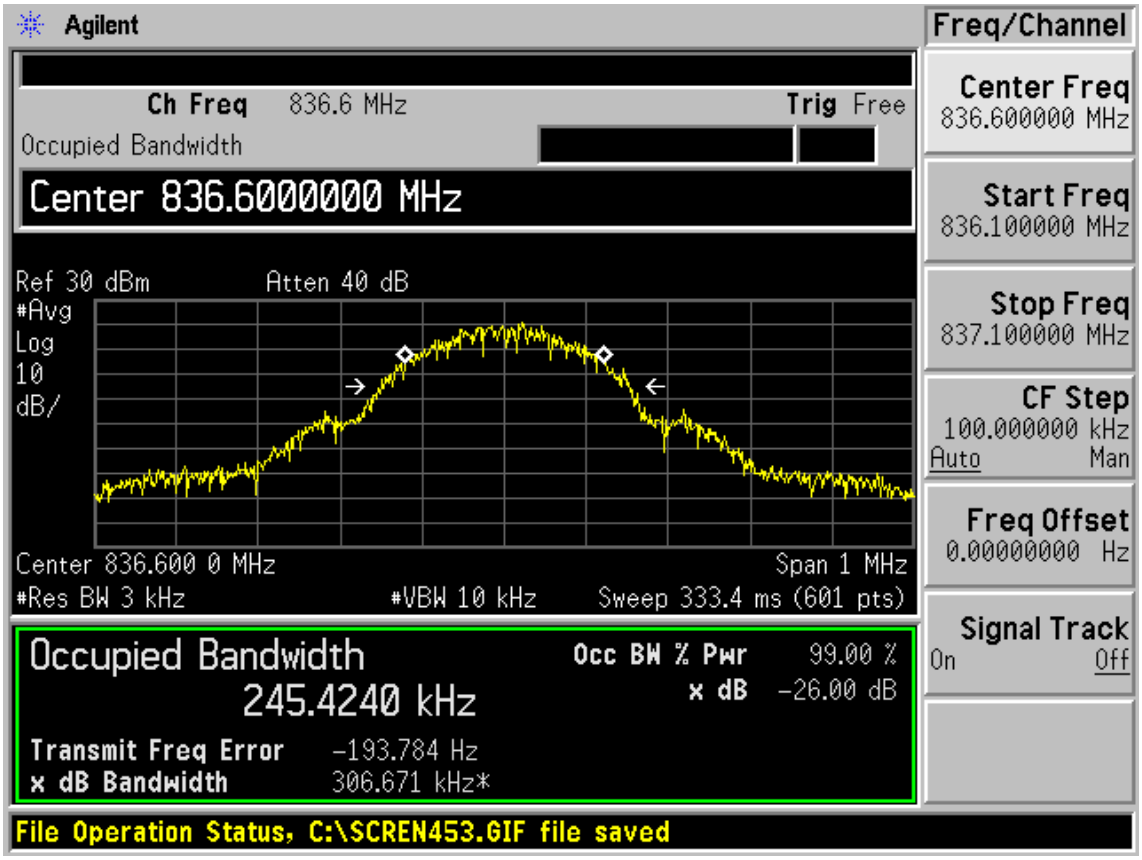
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 624Hz.

Test Result

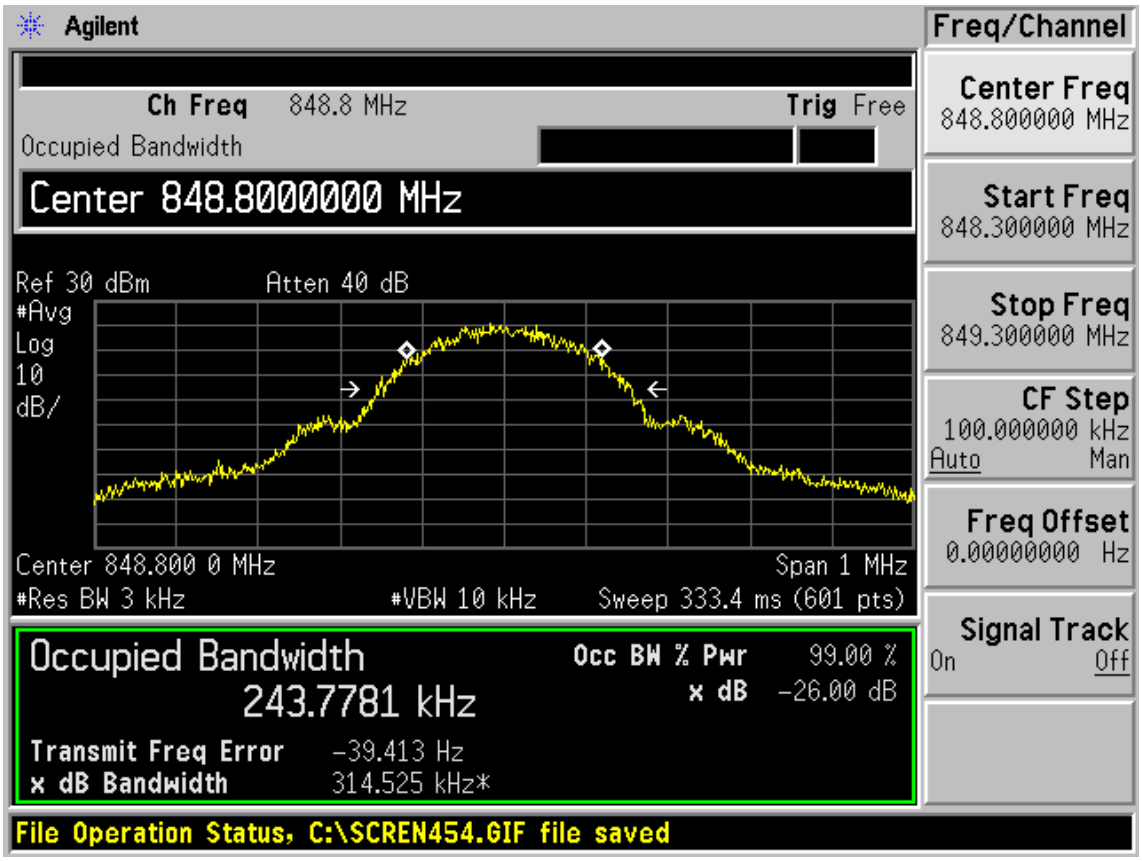
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
GSM 850+GPRS	128	824.2	247.5763	311.982
	190	836.6	245.4240	306.671
	251	848.8	243.7781	314.525
GSM 850+EGPRS	128	824.2	250.9189	310.659
	190	836.6	242.1058	305.893
	251	848.8	247.1549	301.016



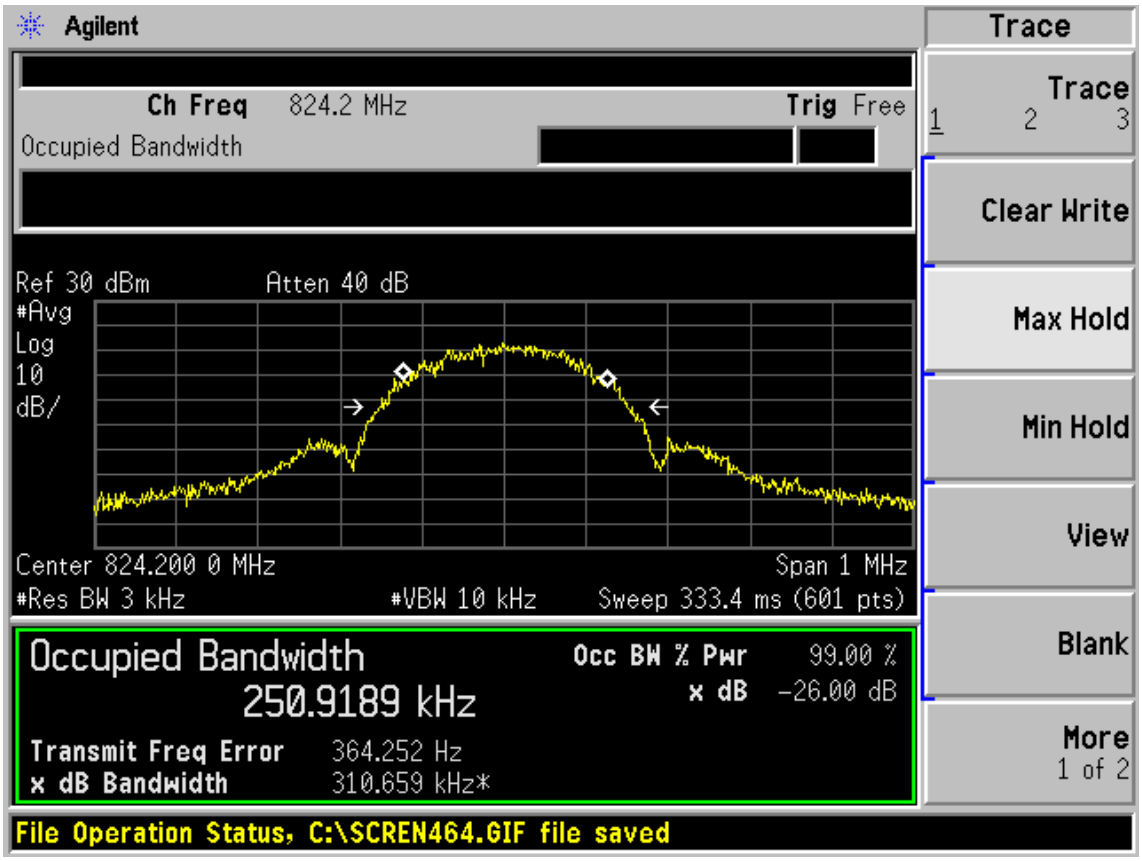
GSM 850+GPRS CH128 Occupied Bandwidth



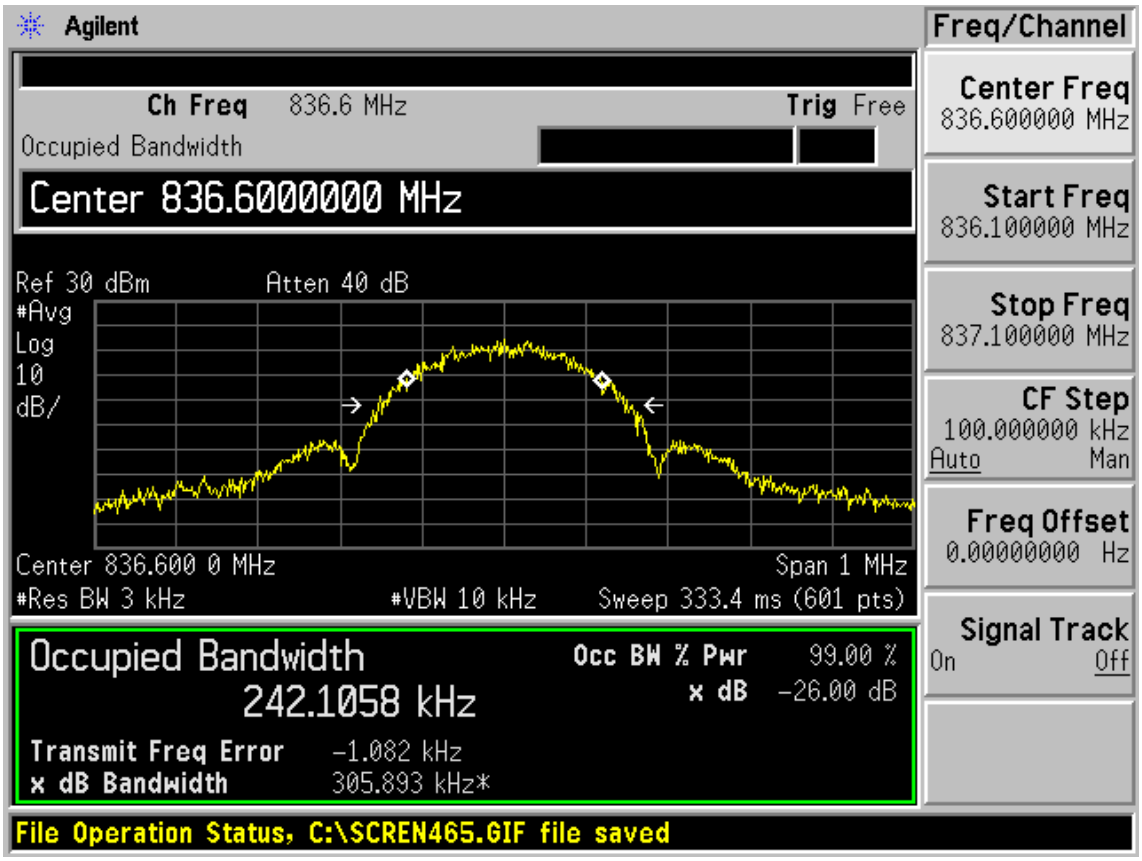
GSM 850+GPRS CH190 Occupied Bandwidth



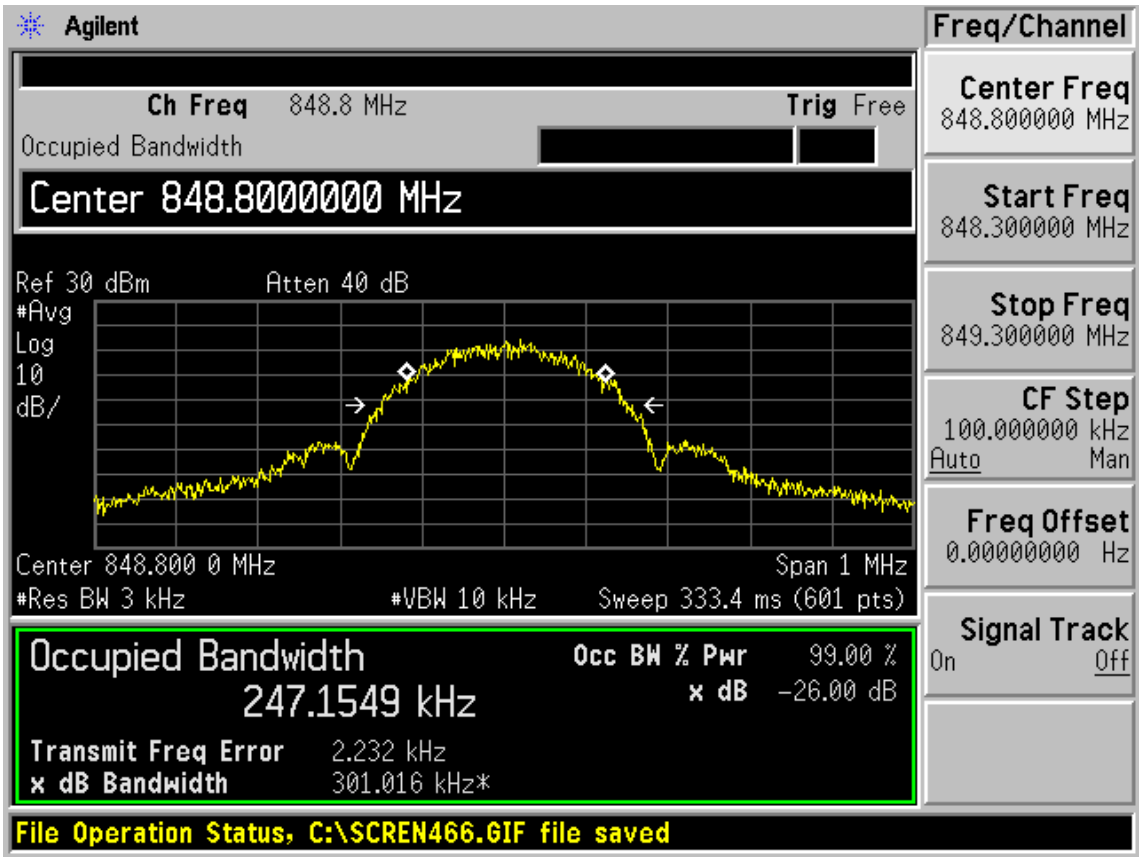
GSM 850+GPRS CH251 Occupied Bandwidth



GSM 850+EGPRS CH128 Occupied Bandwidth

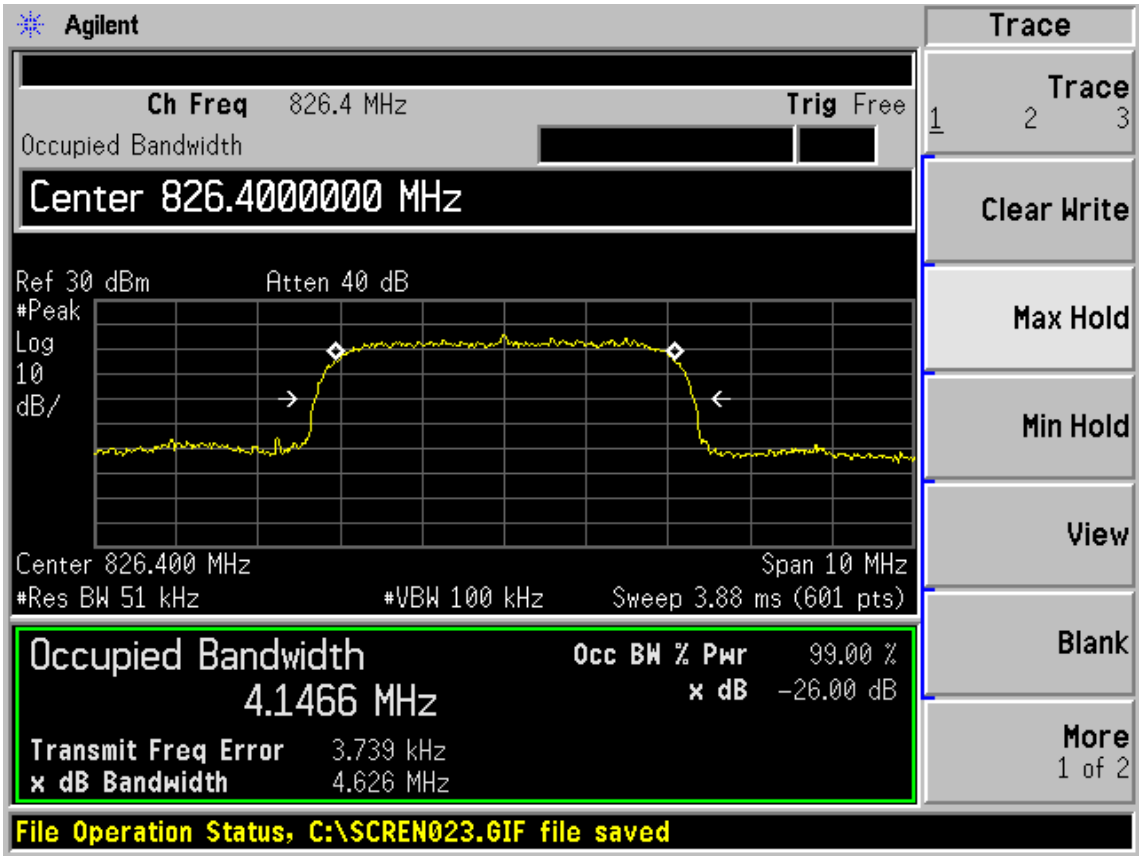


GSM 850+EGPRS CH190 Occupied Bandwidth

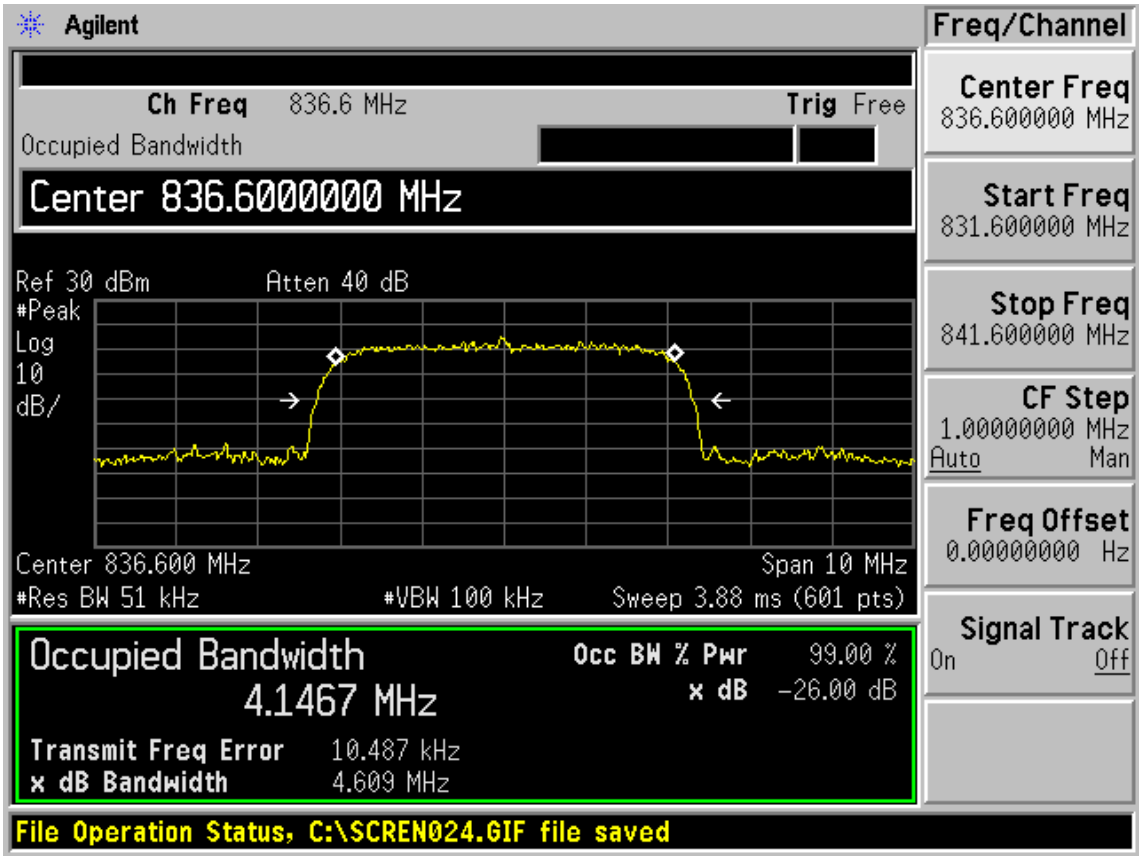


GSM 850+EGPRS CH251 Occupied Bandwidth

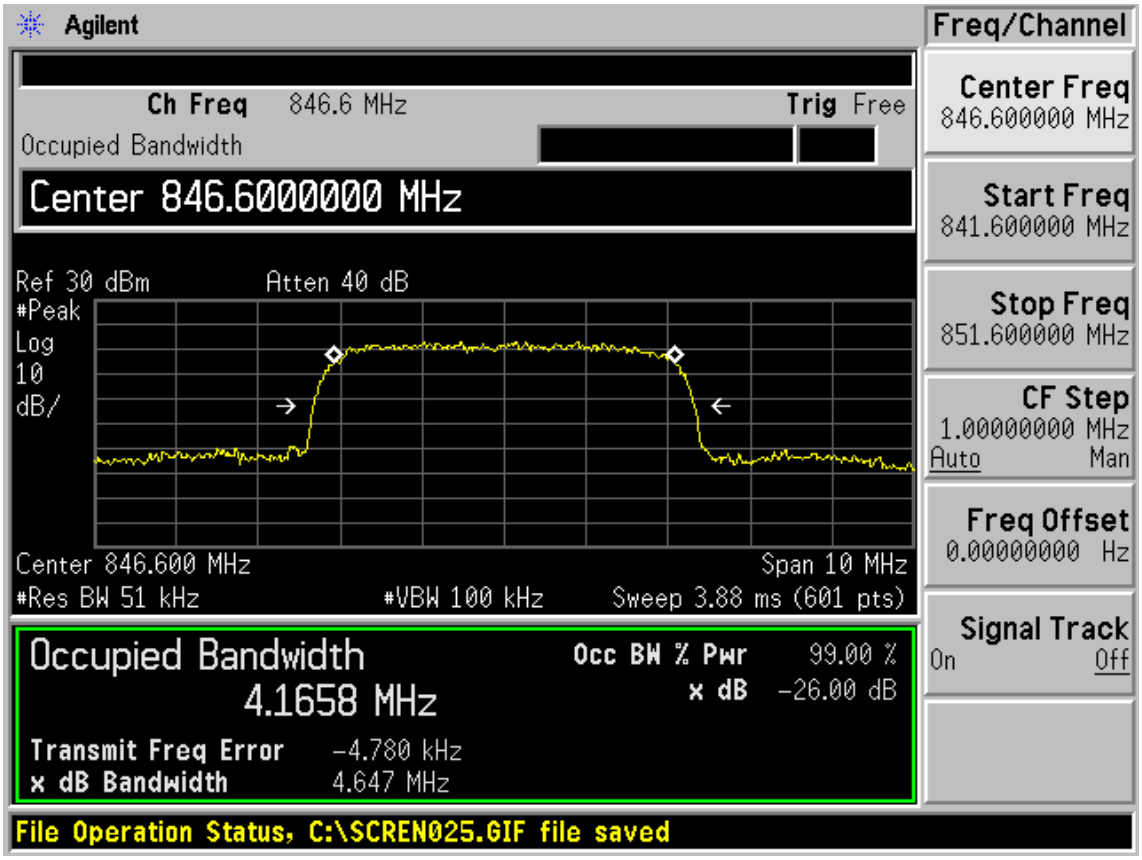
WCDMA Band V	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
RMC	4132	826.4	4.1466	4.626
	4183	836.6	4.1467	4.609
	4233	846.6	4.1658	4.647
HSDPA	4132	826.4	4.1767	4.648
	4183	836.6	4.1449	4.661
	4233	846.6	4.1671	4.656
HSUPA	4132	826.4	4.1357	4.604
	4183	836.6	4.1463	4.646
	4233	846.6	4.1585	4.601



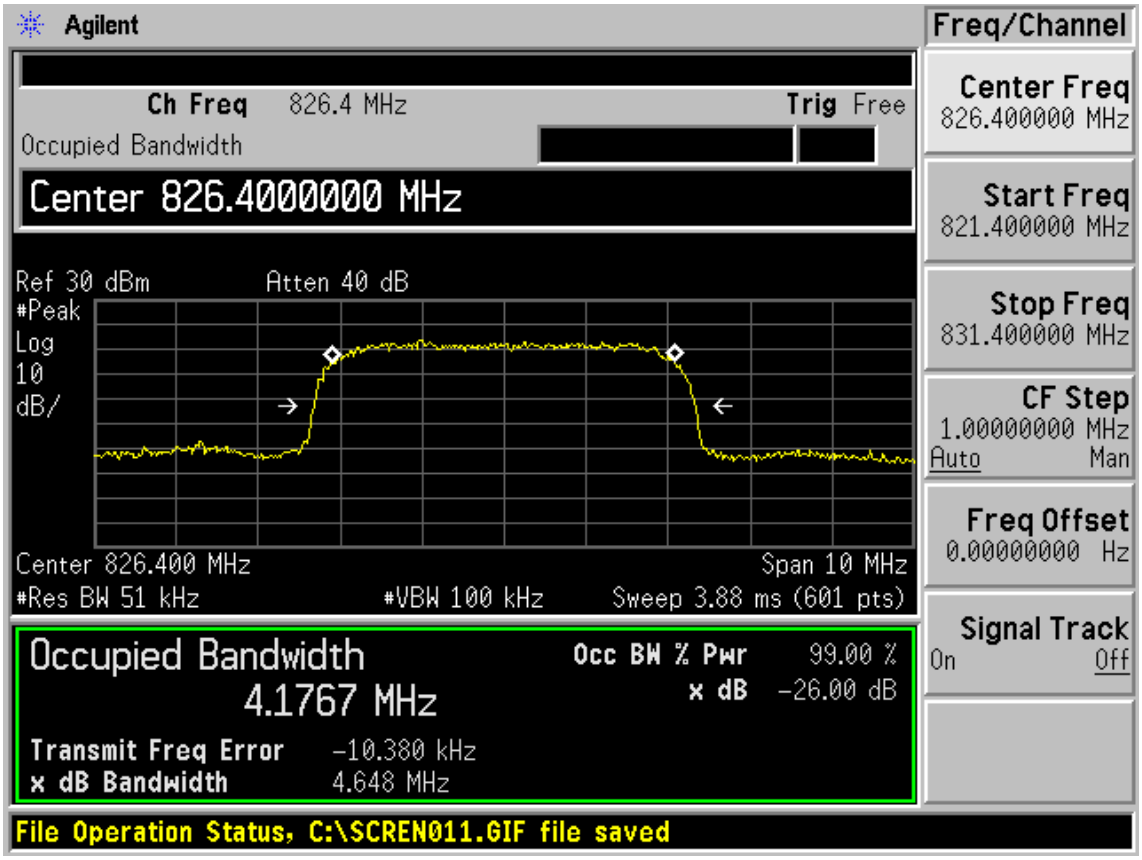
WCDMA Band V RMC CH4132 Occupied Bandwidth



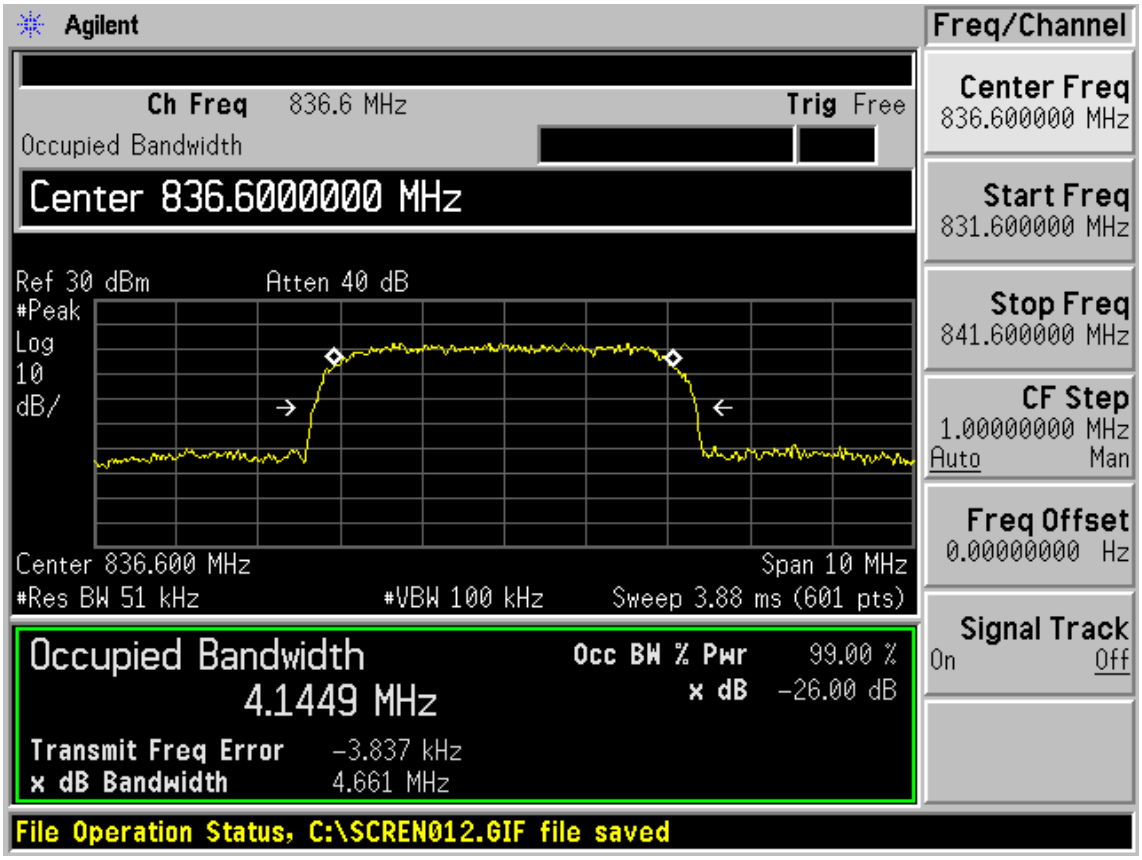
WCDMA Band V RMC CH4183 Occupied Bandwidth



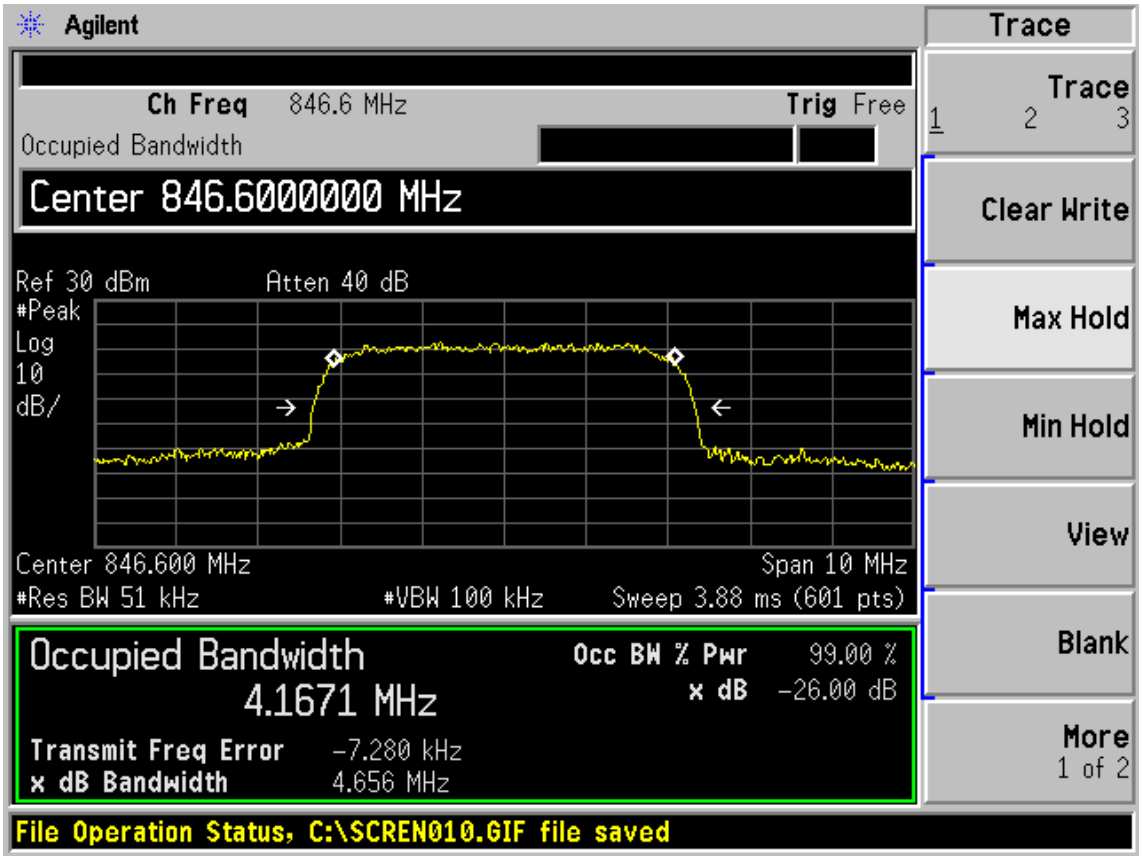
WCDMA Band V RMC CH4233 Occupied Bandwidth



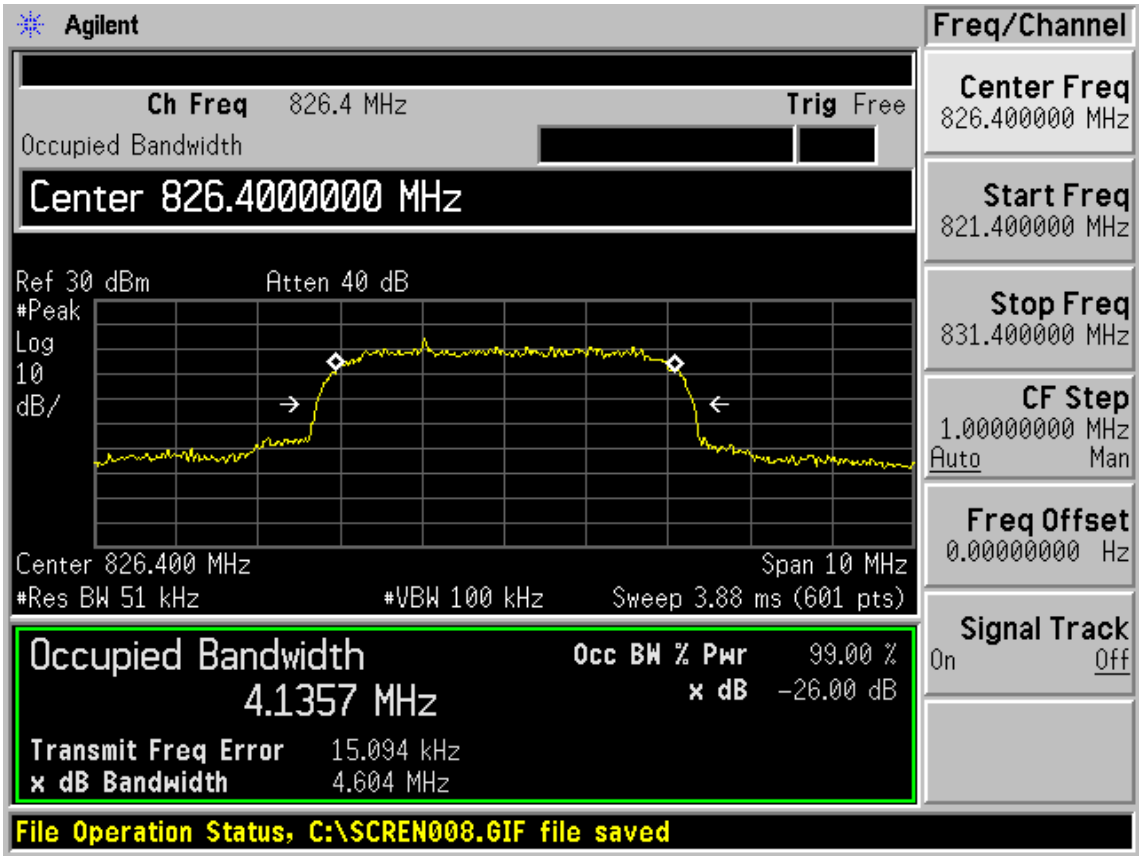
WCDMA Band V HSDPA CH4132 Occupied Bandwidth



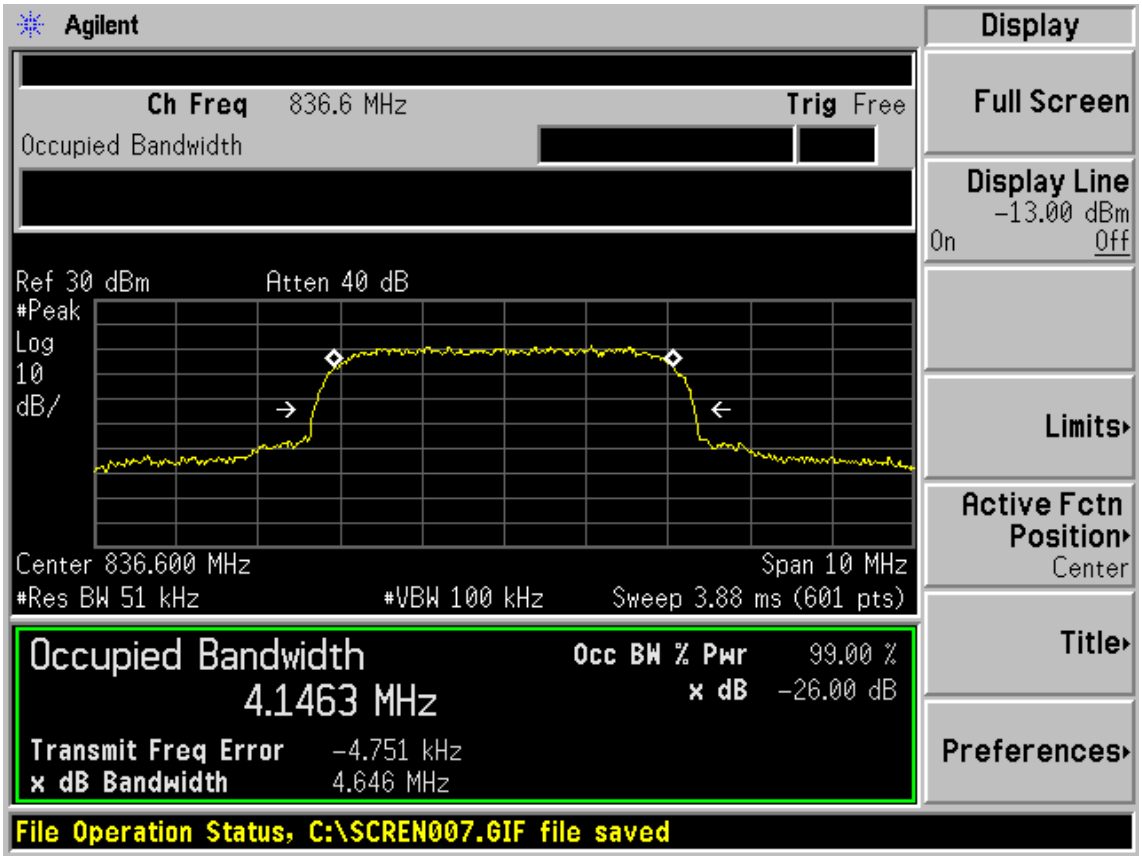
WCDMA Band V HSDPA CH4183 Occupied Bandwidth



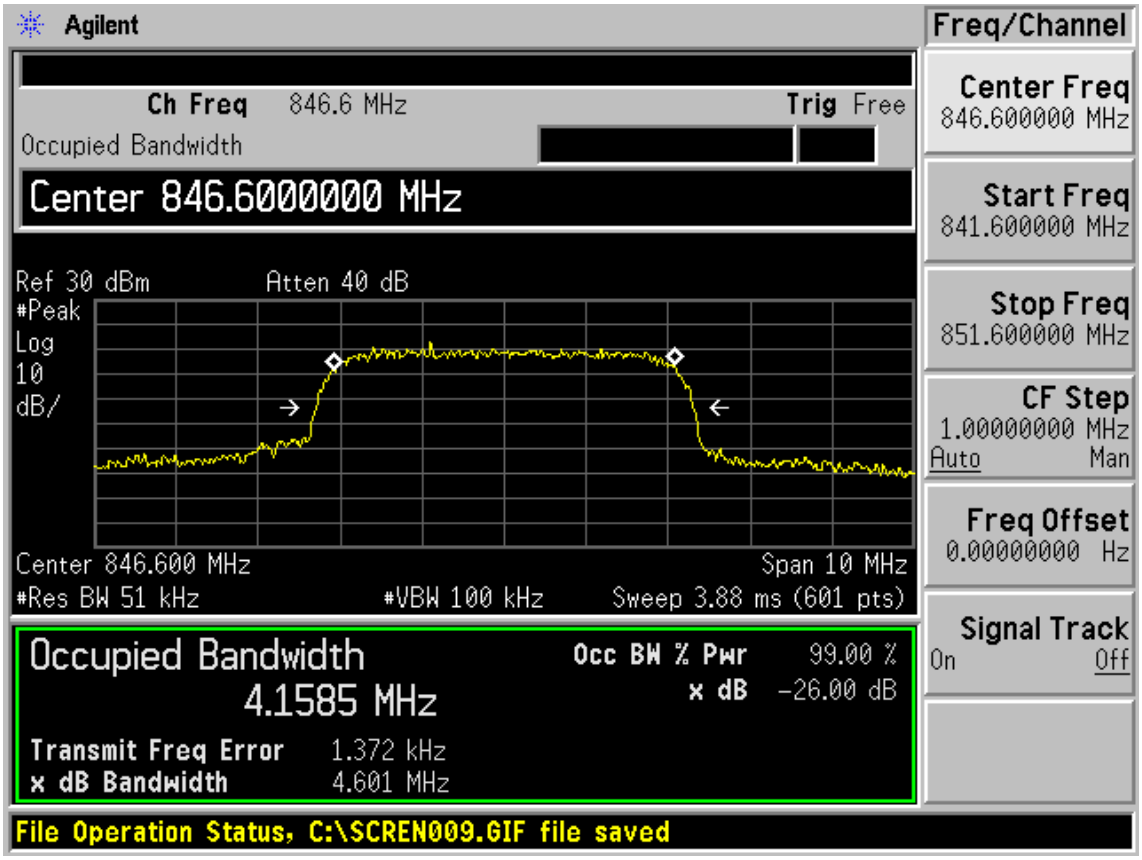
WCDMA Band V HSDPA CH4233 Occupied Bandwidth



WCDMA Band V HSUPA CH4132 Occupied Bandwidth



WCDMA Band V HSUPA CH4183 Occupied Bandwidth



WCDMA Band V HSUPA CH4233 Occupied Bandwidth

2.5. Band Edge Compliance

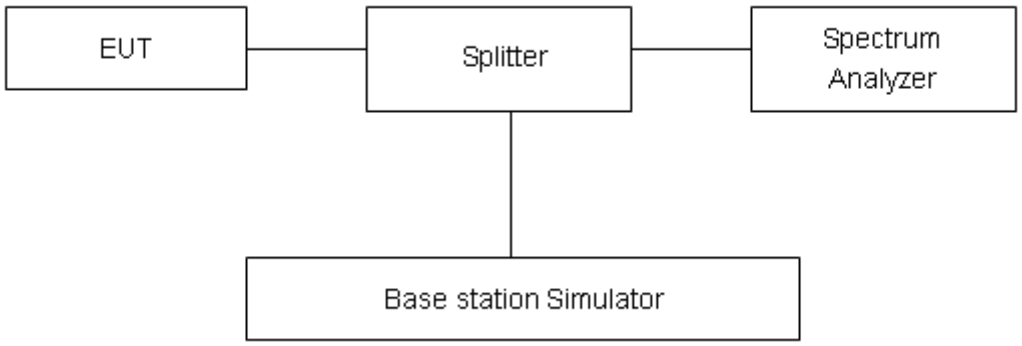
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used. RBW is set to 3kHz,VBW is set to 10kHz for GSM 850 and RBW is set to 51kHz,VBW is set to 100kHz for WCDMA Band V. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 22.917(a) specifies that “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.”

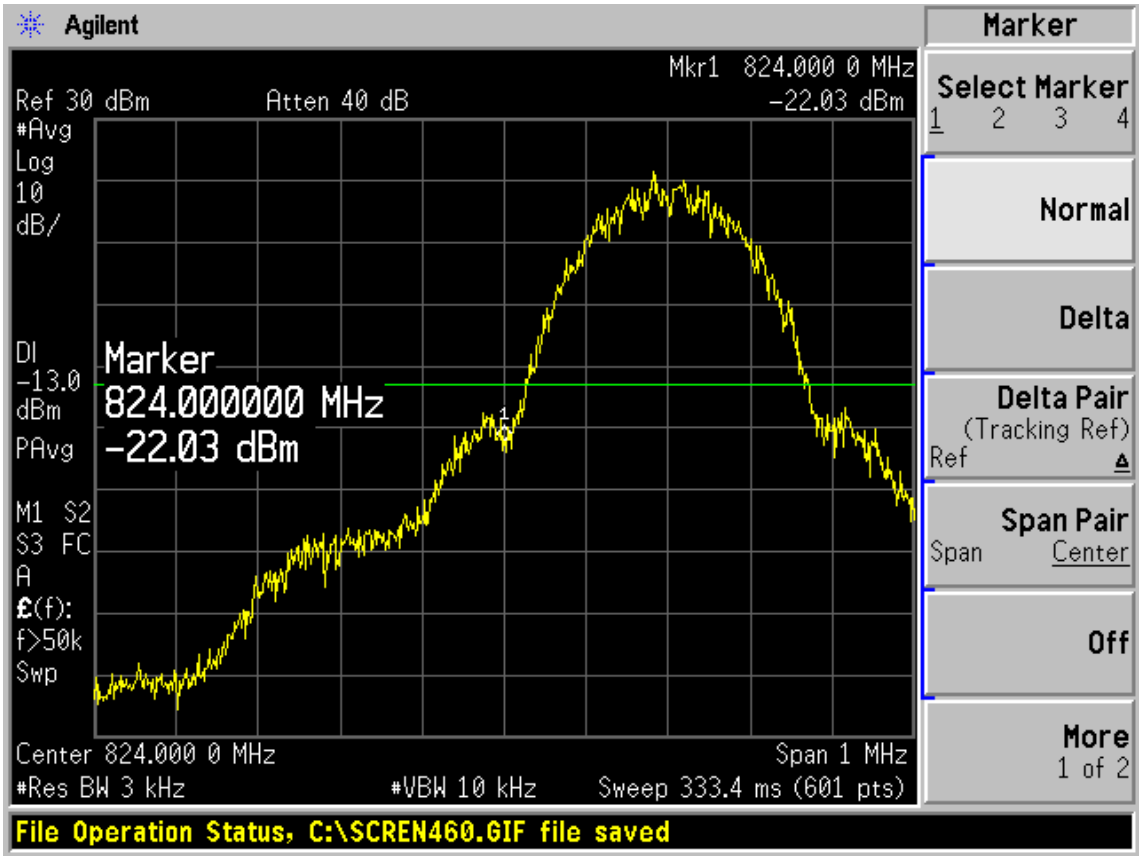
Limit	-13 dBm

Measurement Uncertainty

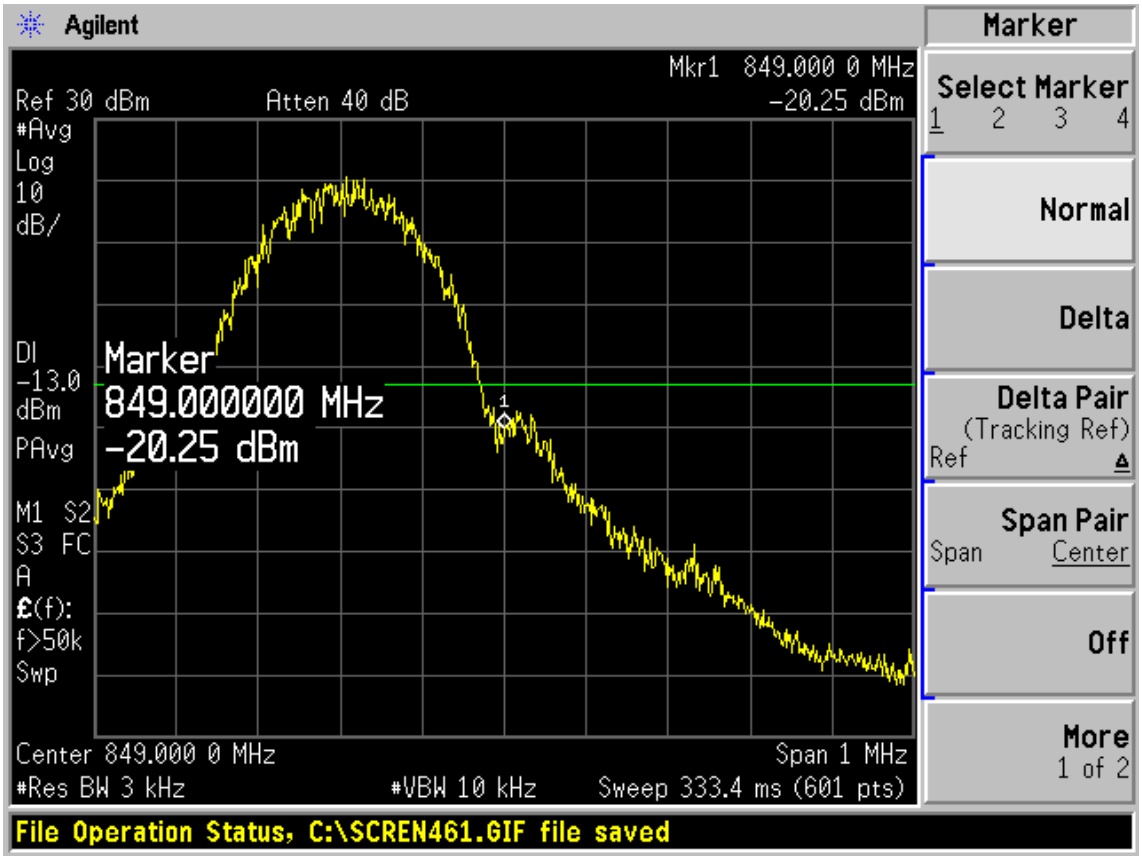
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U=0.684dB.

Test Result:

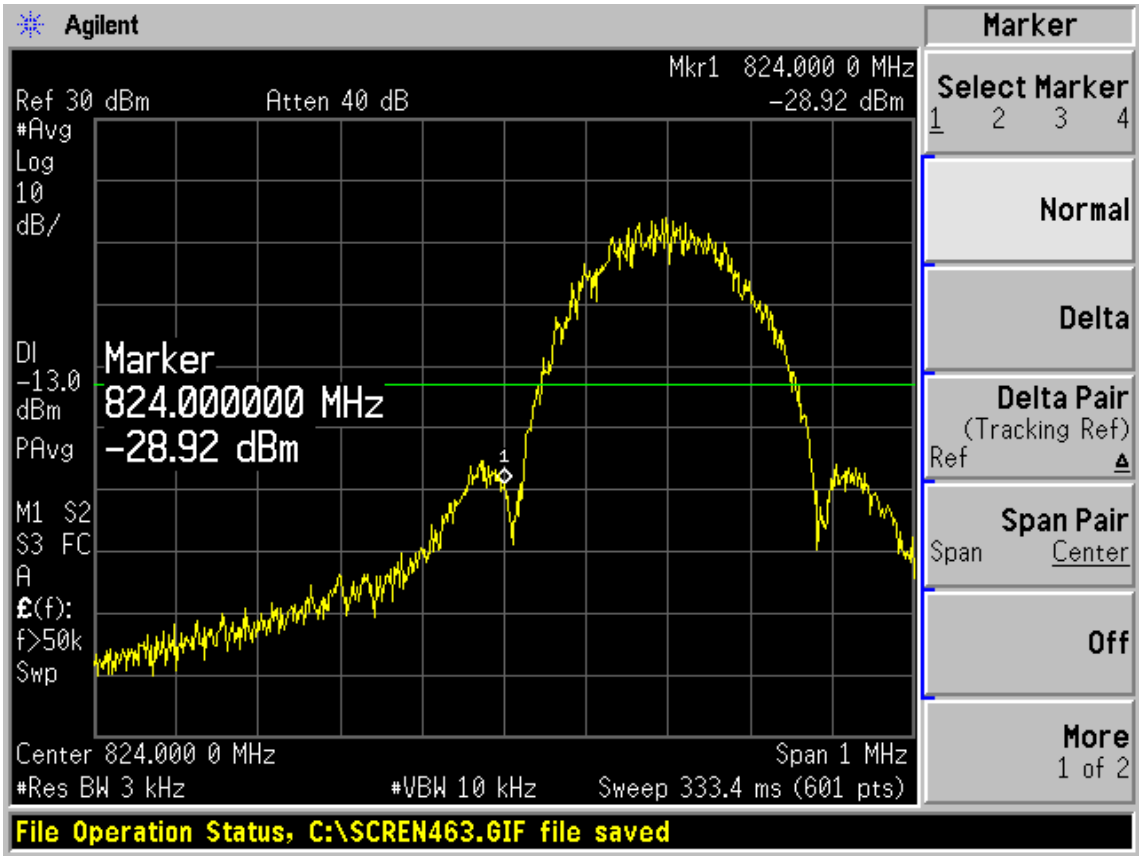
	Carrier frequency (MHz)	Reference value (dBm)	Limit	Conclusion
GSM 850+GPRS	824.0	-22.03	-13	PASS
	849.0	-20.25	-13	PASS
GSM 850+EGPRS	824.0	-28.92	-13	PASS
	849.0	-30.13	-13	PASS



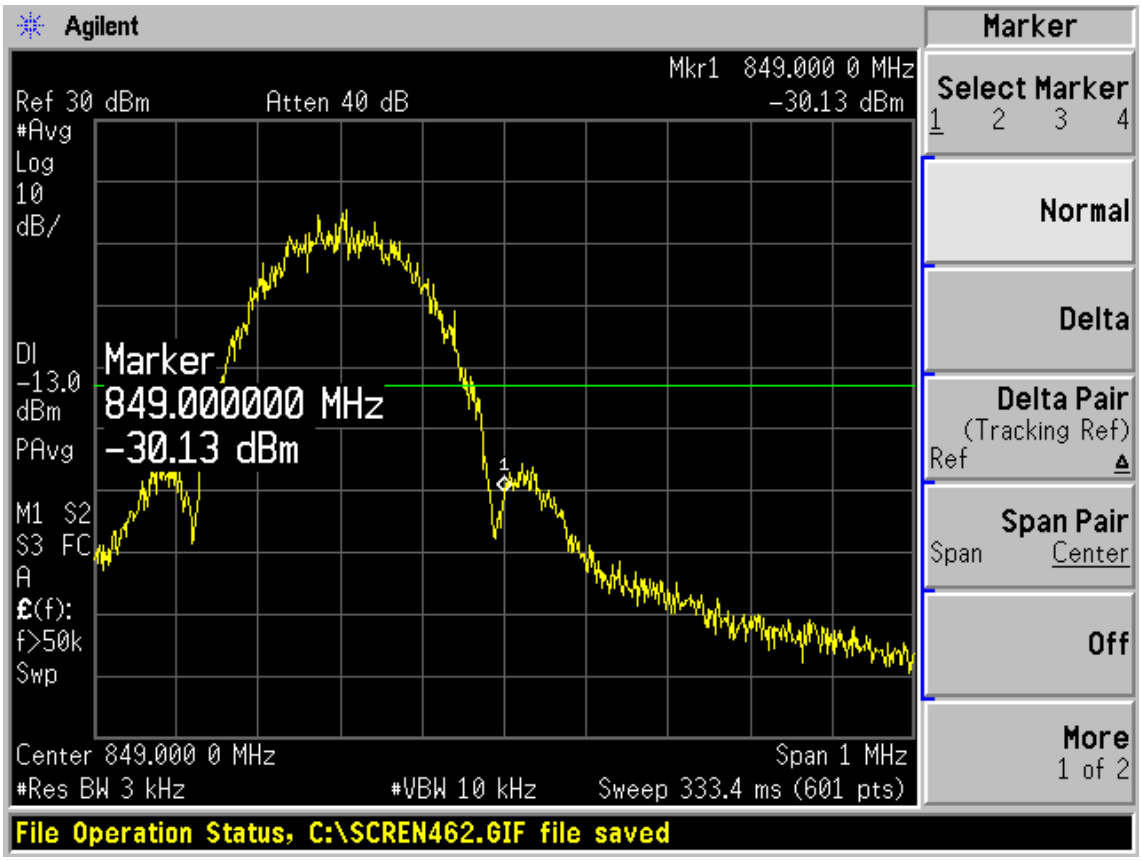
GSM 850+GPRS 128 Channel



GSM 850+GPRS 251 Channel

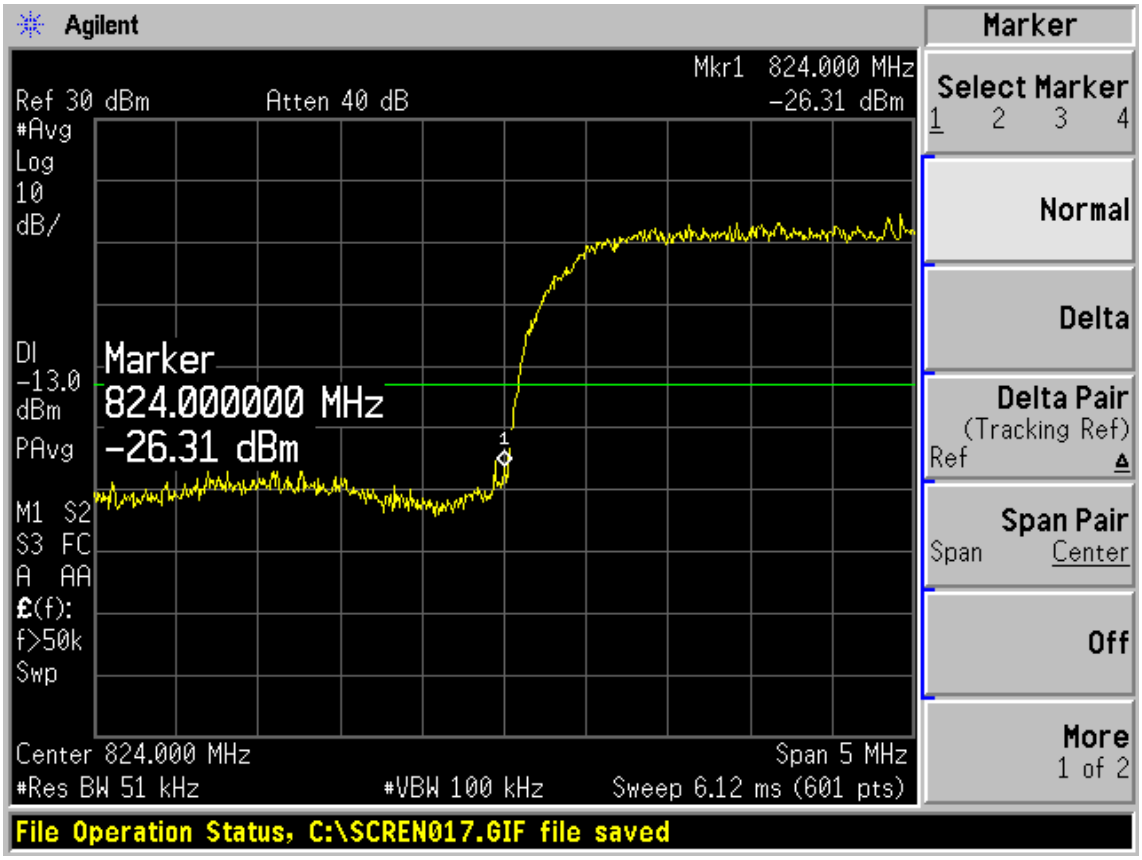


GSM 850+EGPRS 128 Channel

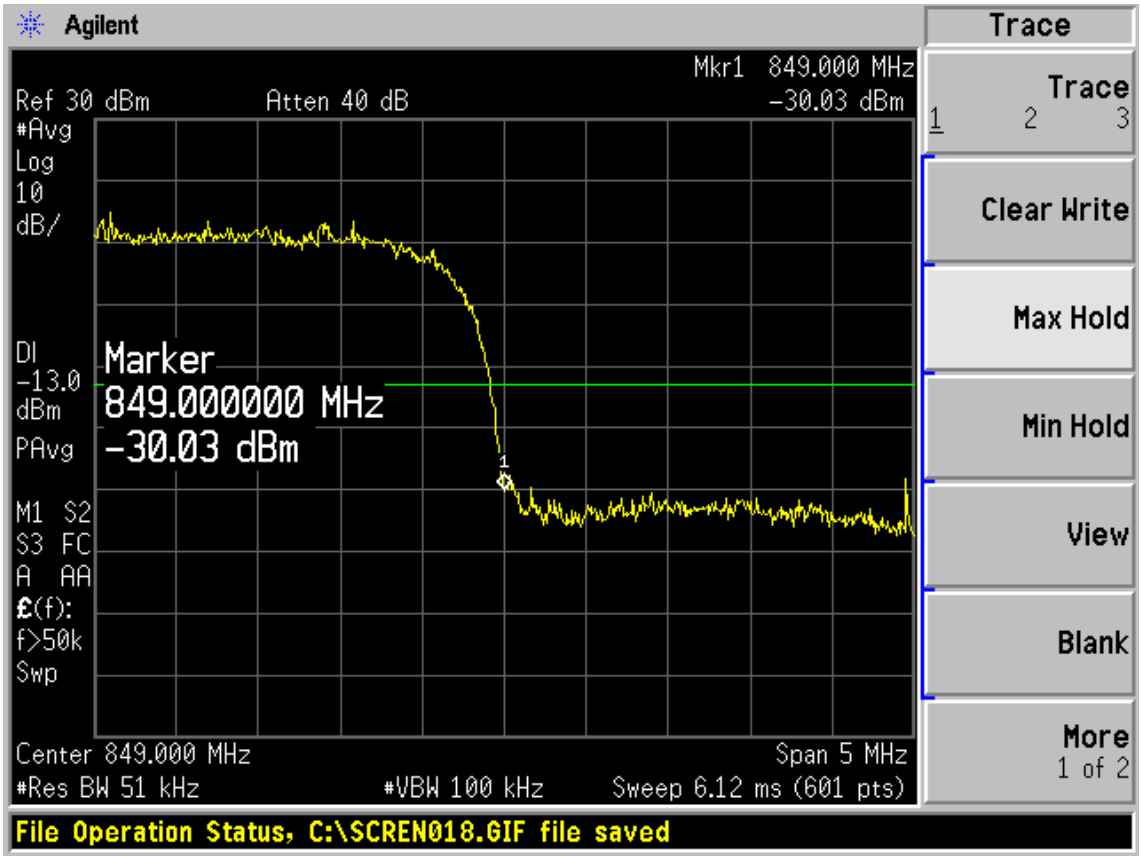


GSM 850+EGPRS 251 Channel

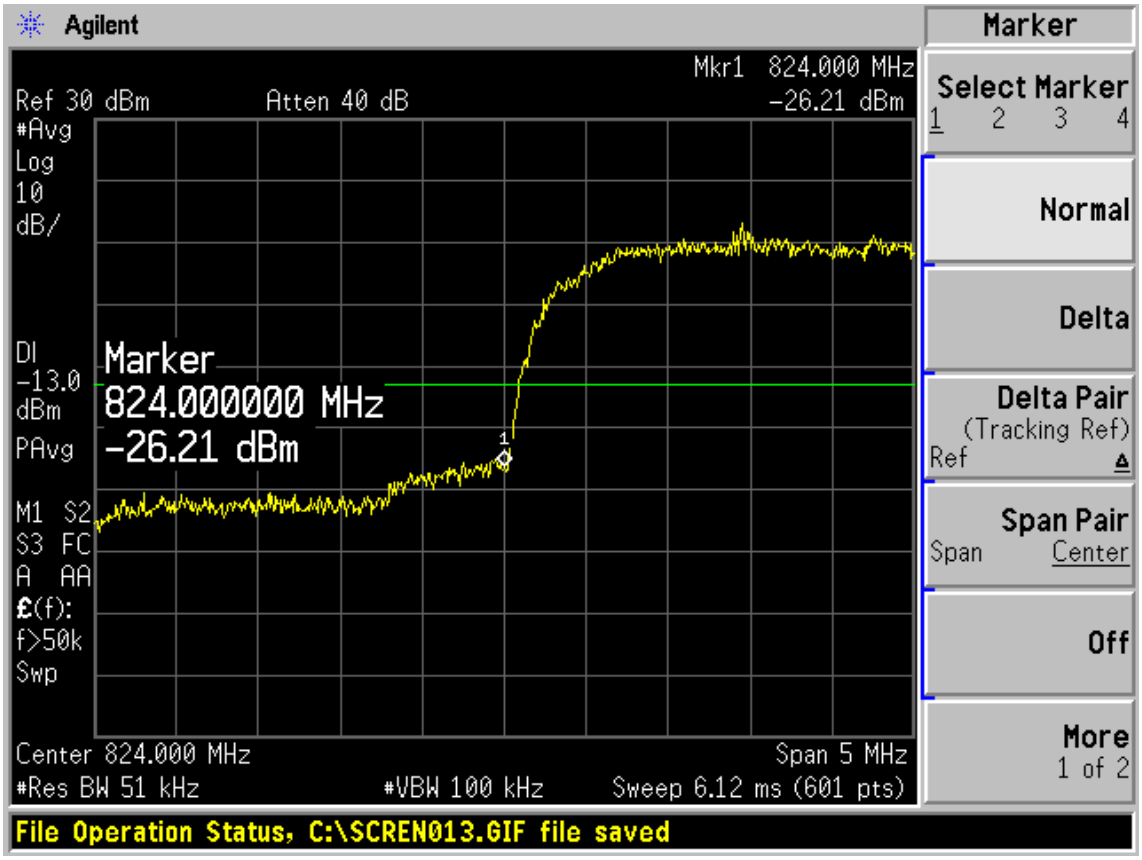
WCDMA Band V	Carrier frequency (MHz)	Reference value (dBm)	Limit	Conclusion
RMC	824	-26.31	-13	PASS
	849	-30.03	-13	PASS
HSDPA	824	-26.21	-13	PASS
	849	-29.58	-13	PASS
HSUPA	824	-25.92	-13	PASS
	849	-29.22	-13	PASS



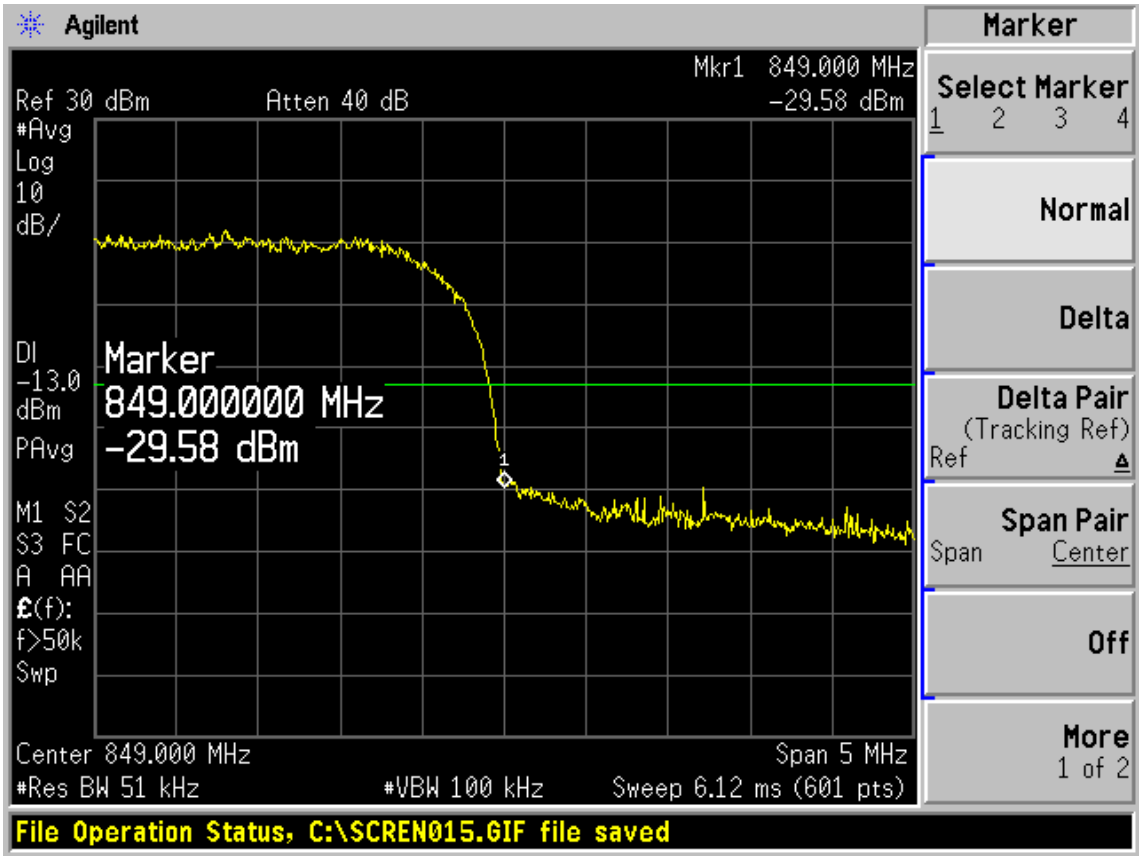
WCDMA Band V RMC 4132 Channel



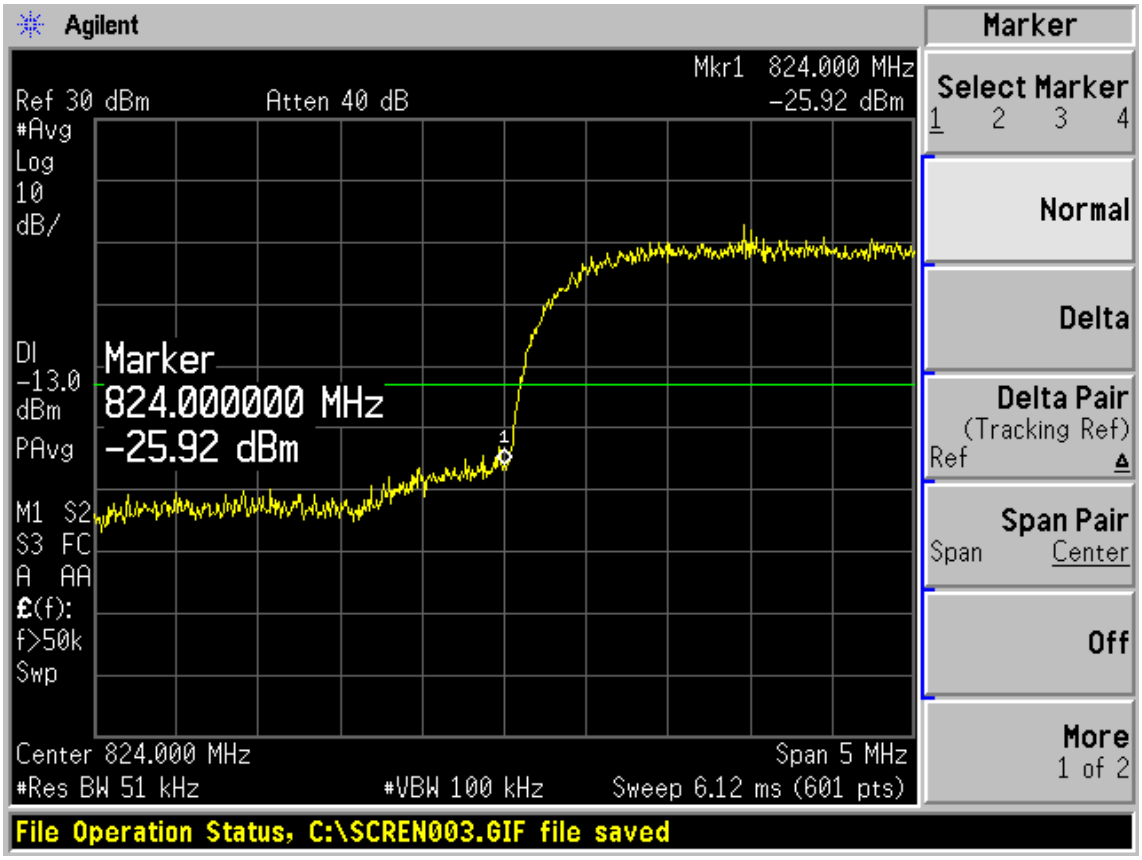
WCDMA Band V RMC 4233 Channel



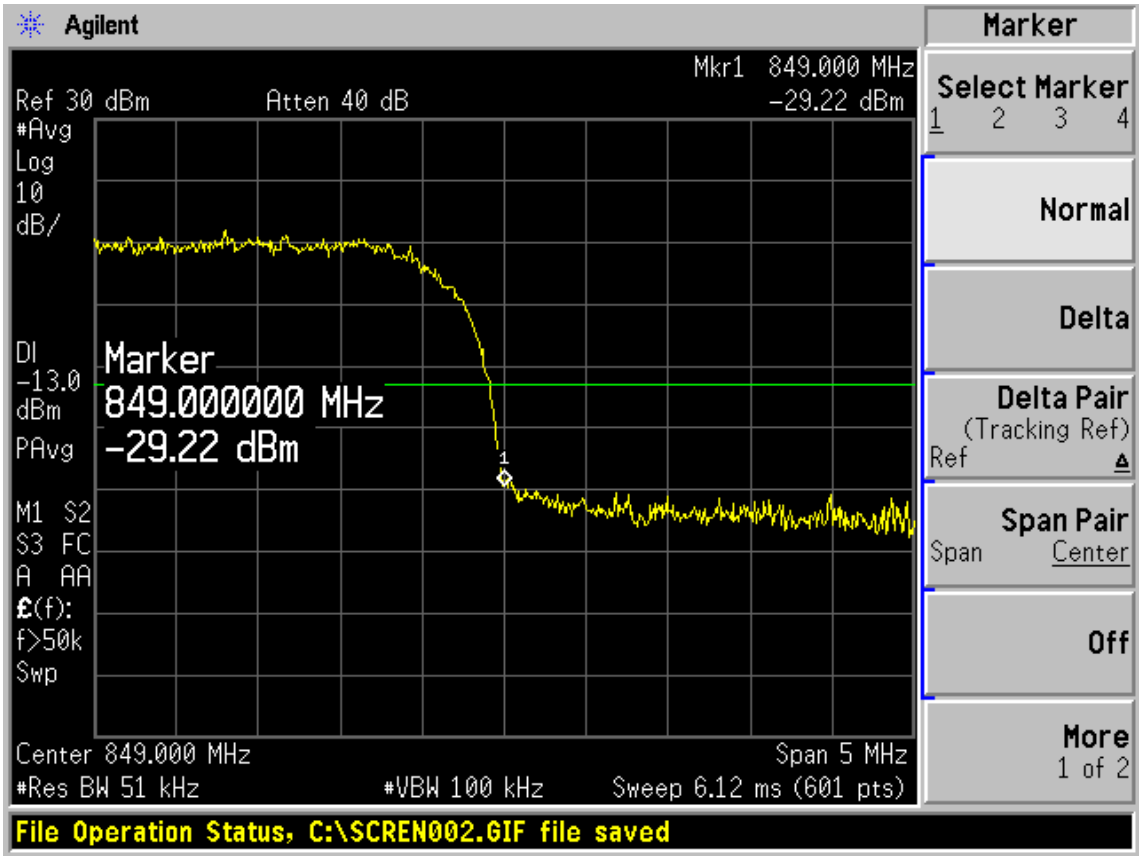
WCDMA Band V HSDPA 4132 Channel



WCDMA Band V HSDPA 4233 Channel



WCDMA Band V HSUPA 4132 Channel



WCDMA Band V HSUPA 4233 Channel

2.6. Peak-to-Average Power Ratio (PAPR)

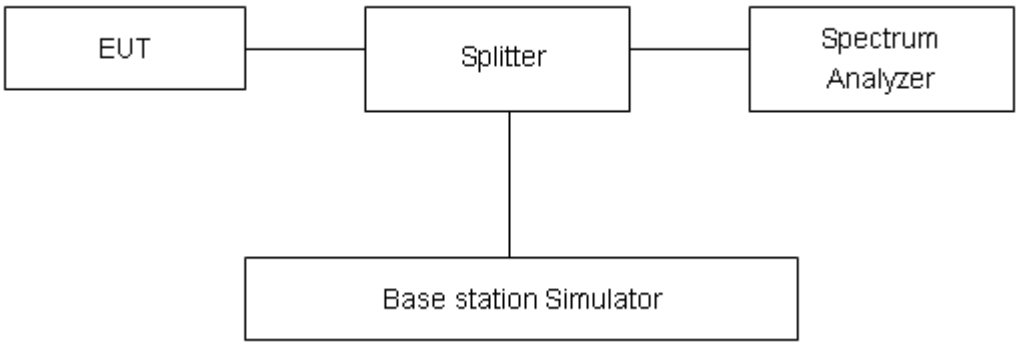
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The measurement procedures in KDB971168 are used.
The inherent randomness of the power peaks in a noise-like signal makes it difficult to quantify the peak power using traditional measurement techniques for determining the peak power of an analog signal. The peak power of a digitally-modulated signal is predictable only on a statistical basis. Thus, for these types of signals, a statistical measurement of the peak power is necessary.
Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.
Step 1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
Step 2. Set the CCDF option in Spectrum analyzer.
Step 3. Record the maximum PAPR level associated with a probability of 0.1%.

Test Setup



Limits

No specific Peak-to-Average Ratio requirements in KDB 971168.

Measurement Uncertainty

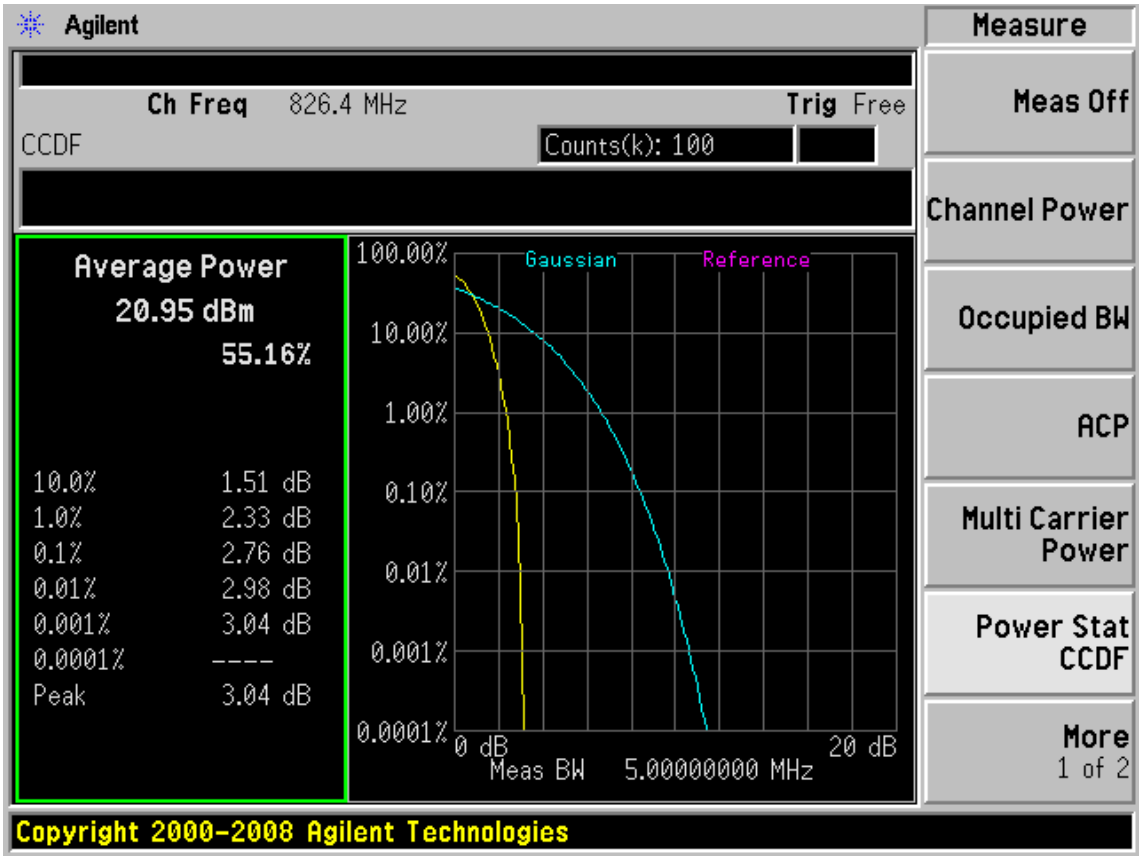
The assessed measurement uncertainty to ensure 95% confidence level for the

normal distribution is with the coverage factor k = 2, U= 0.4 dB.

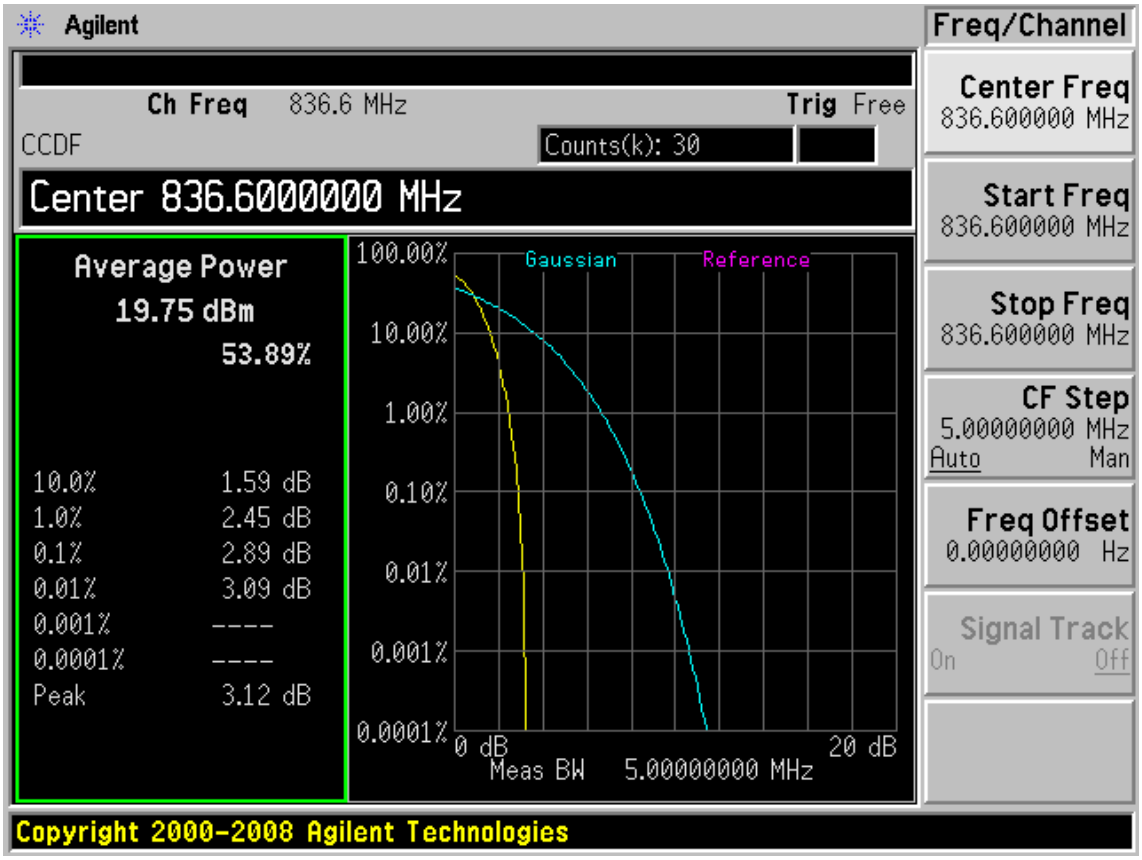
Test Result:

Test Results

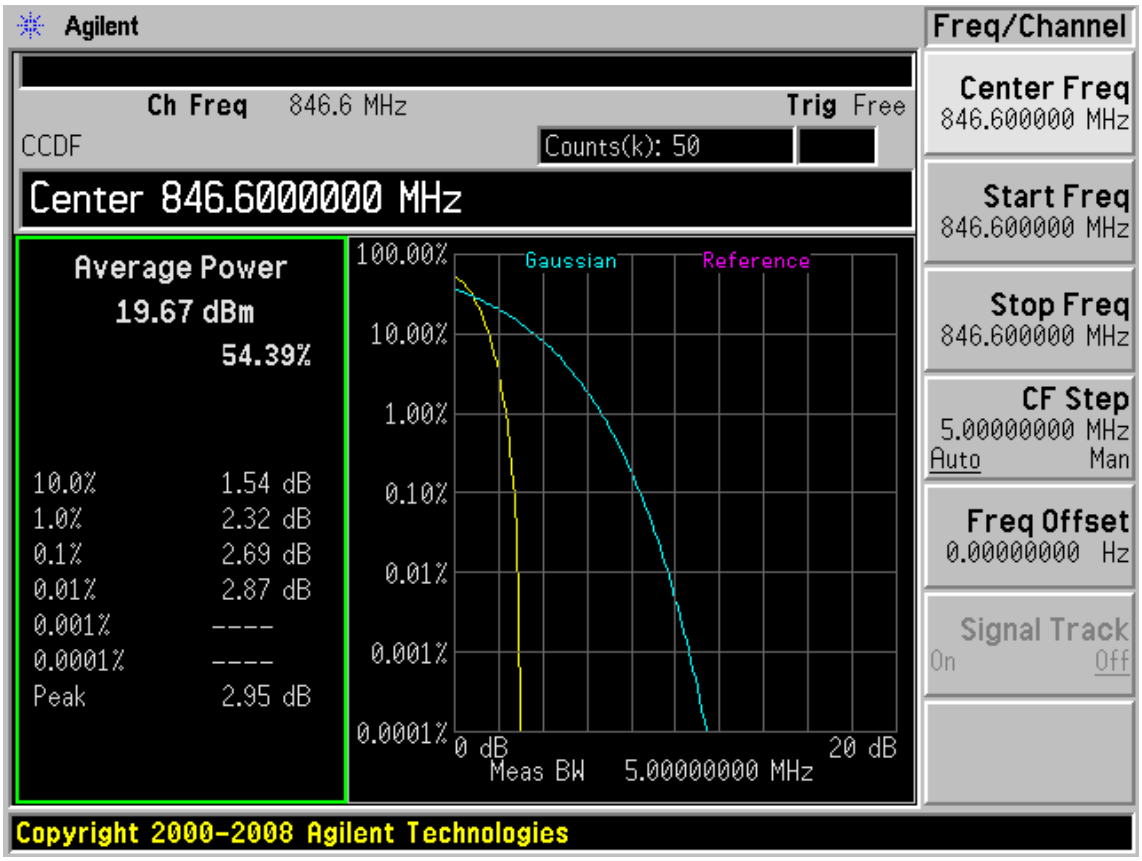
Mode	Channel	Frequency (MHz)	Test Result(dB)
WCDMA Band V	4132	826.4	2.76
	4183	836.6	2.89
	4233	846.6	2.69



WCDMA Band V CH4132



WCDMA Band V CH4183



WCDMA Band V CH4233

2.7. Frequency Stability

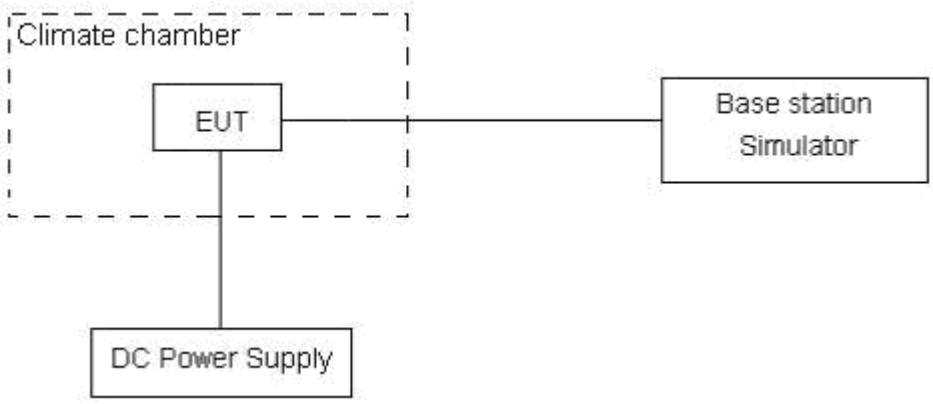
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

1. Frequency Stability (Temperature Variation)
   The temperature inside the climate chamber is varied from -10°C to +55°C in 10°C step size,
   (1) With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.
   (2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.
   (3) Repeat the above measurements at 10°C increments from -10°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.
2. Frequency Stability (Voltage Variation)
   The frequency stability shall be measured with variation of primary supply voltage as follows:
   (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
   (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.
   This transceiver is specified to operate with an input voltage of between 6.8 V and 8.2 V, with a nominal voltage of 7.4V.

Test setup



Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency for mobile stations.

Limits	≤ 2.5 ppm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 3,*U*= 0.01ppm.

Test Result

GPRS

Temperature (°C)	Test Results (ppm) / 7.4 V Power supply
	Channel 190
-30	-16.65
-20	-23.09
-10	-18.08
0	-20.1
10	-15.52
20	-15.93
30	-17.25
40	-12.65
50	-21.24

Voltage (V)	Test Results(ppm) / 20°C
	Channel 190
6.8	-16.65
7.4	-15.93
8.2	-19.44

EGPRS

Temperature (°C)	Test Results (ppm) / 7.4 V Power supply
	Channel 190
-30	-15.18
-20	-14.35
-10	-25.41
0	-15.92
10	-18.72
20	-17.41
30	-14.81
40	-12.34
50	-14.58

Voltage (V)	Test Results(ppm) / 20°C
	Channel 190
6.8	-15.79
7.4	-17.41
8.2	-13.21

WCDMA Band V

Temperature (°C)	Test Results (ppm) / 7.4 V Power supply
	Channel 4183
-30	-4.97
-20	0.10
-10	5.72
0	7.20
10	7.79
20	12.43
30	15.06
40	14.49
50	12.77

Voltage (V)	Test Results(ppm) / 20°C
	Channel 4183
6.8	9.79
7.4	12.43
8.2	5.45

2.8. Spurious Emissions at Antenna Terminals

Ambient condition

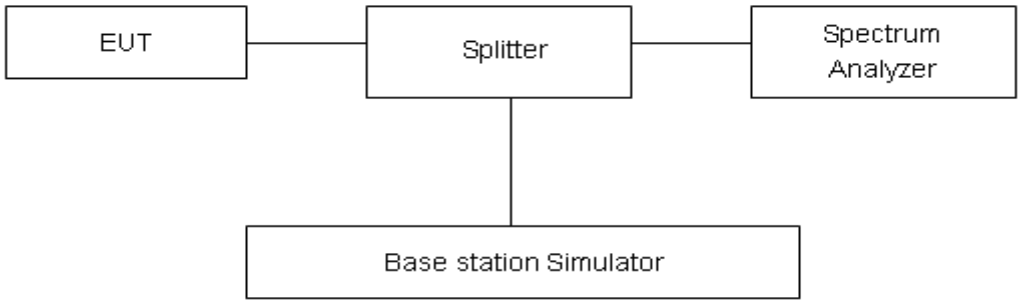
Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. For GSM 850, RBW and VBW are set to 100 kHz, Sweep is set to ATUO. For WCDMA Band V, RBW and VBW are set to 100 kHz for the carrier frequency, or RBW and VBW are set to 1MHz (other frequency), Sweep is set to ATUO.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT

Test setup



Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm

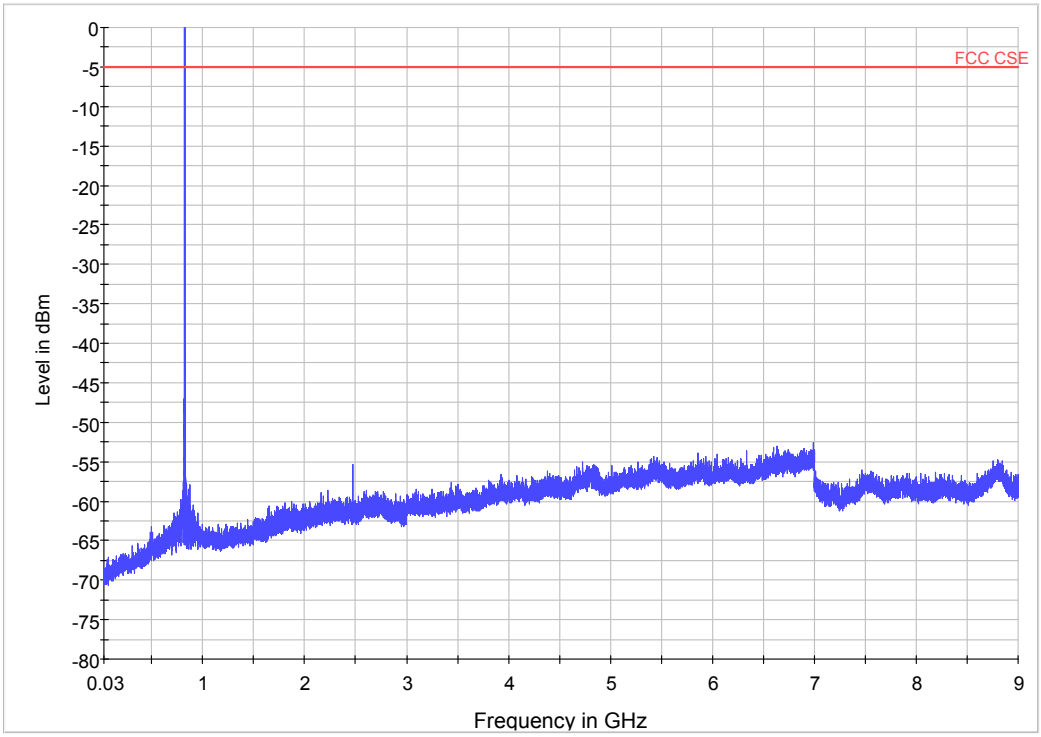
Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB

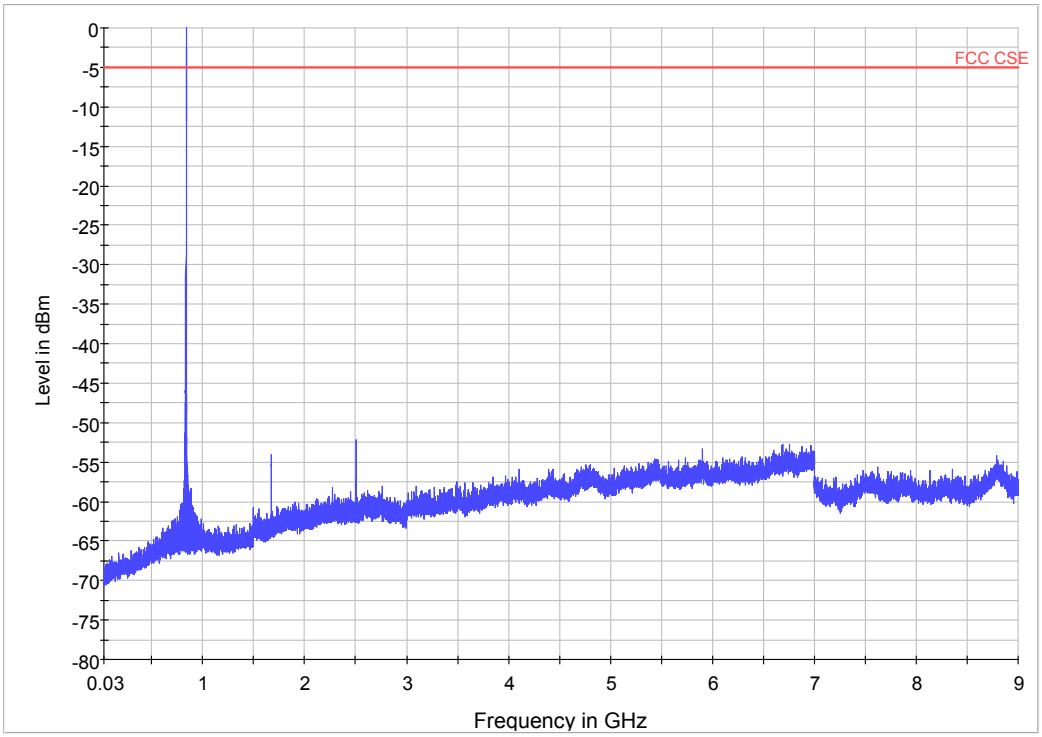
Test Result

GSM 850 CH128



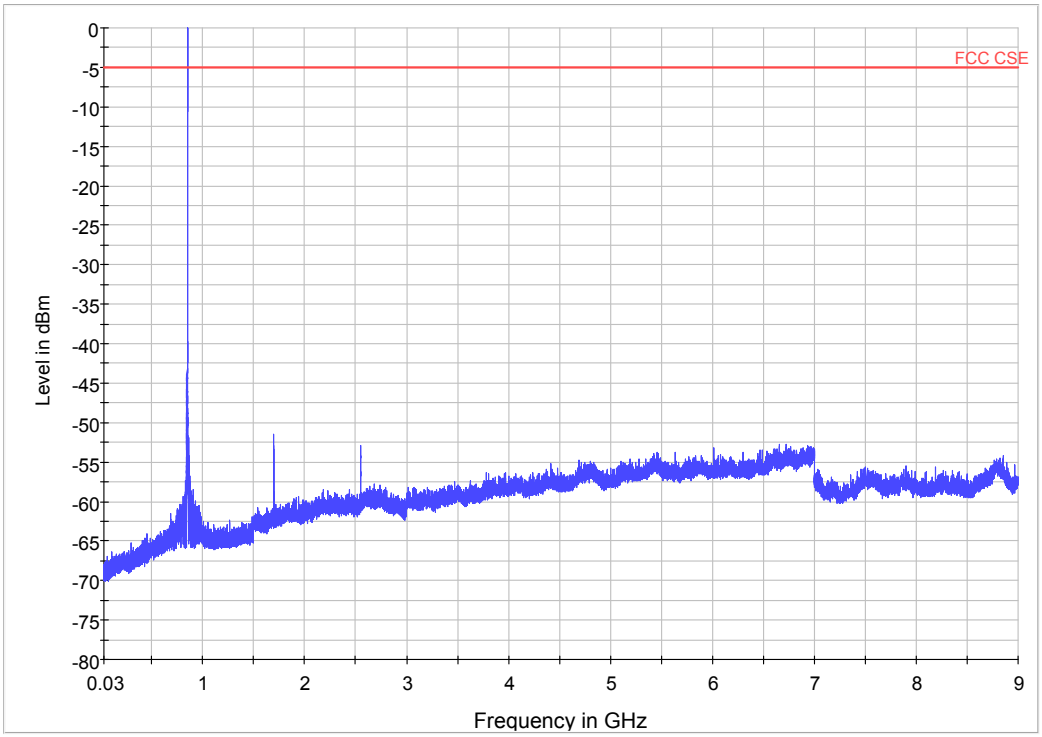
Note: The signal beyond the limit is carrier
GSM 850 128 Channel 30MHz~9GHz

GSM 850 CH190



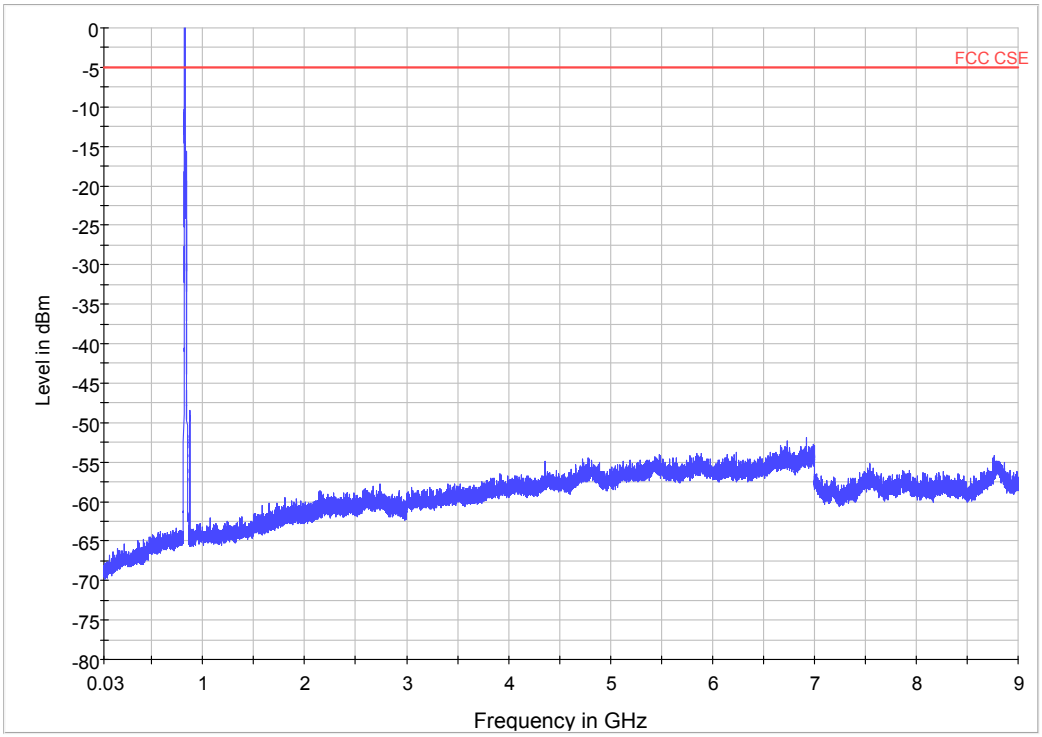
Note: The signal beyond the limit is carrier
GSM 850 190 Channel 30MHz~9GHz

GSM 850 CH251



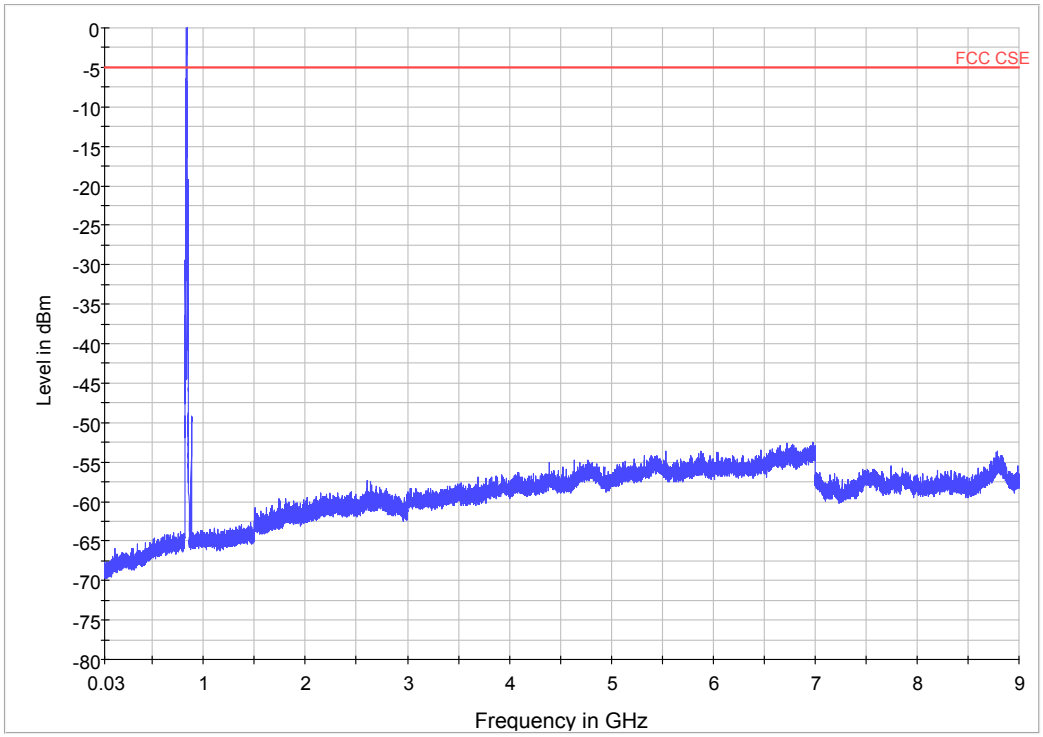
Note: The signal beyond the limit is carrier
GSM 850 251 Channel 30MHz~9GHz

WCDMA Band V CH4132



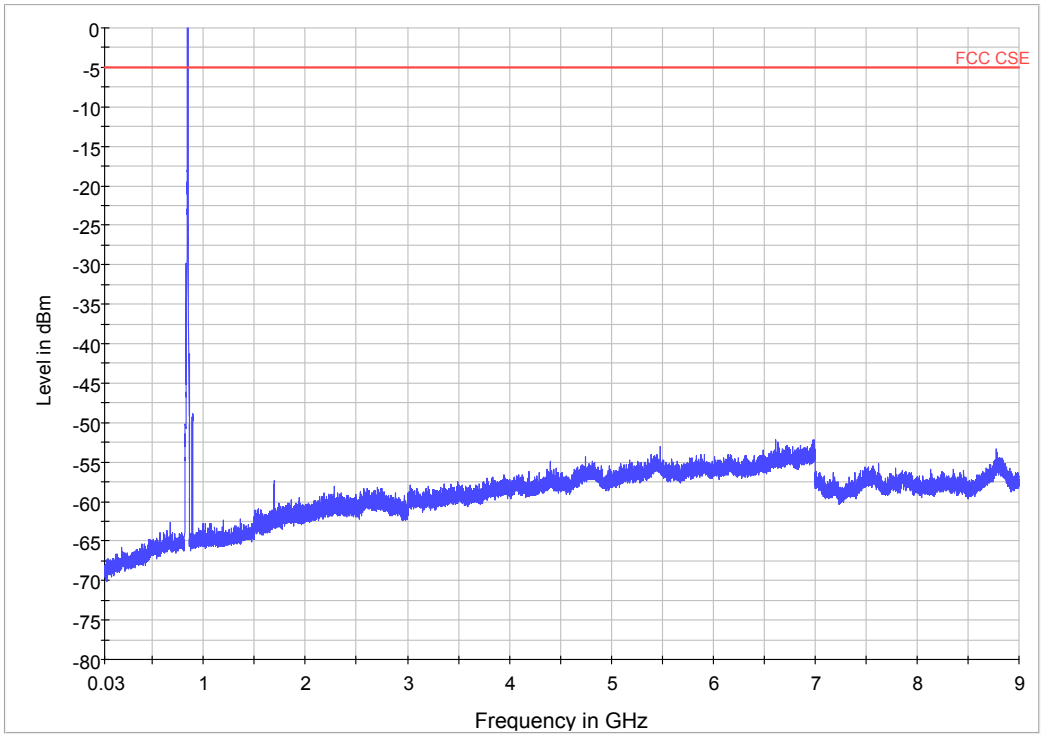
Note: The signal beyond the limit is carrier
WCDMA Band V 4132 Channel 30MHz~9GHz

WCDMA Band V CH4183



Note: The signal beyond the limit is carrier
WCDMA Band V 4183 Channel 30MHz~9GHz

WCDMA Band V CH4233



Note: The signal beyond the limit is carrier
WCDMA Band V 4233 Channel 30MHz~9GHz

2.9. Radiates Spurious Emission

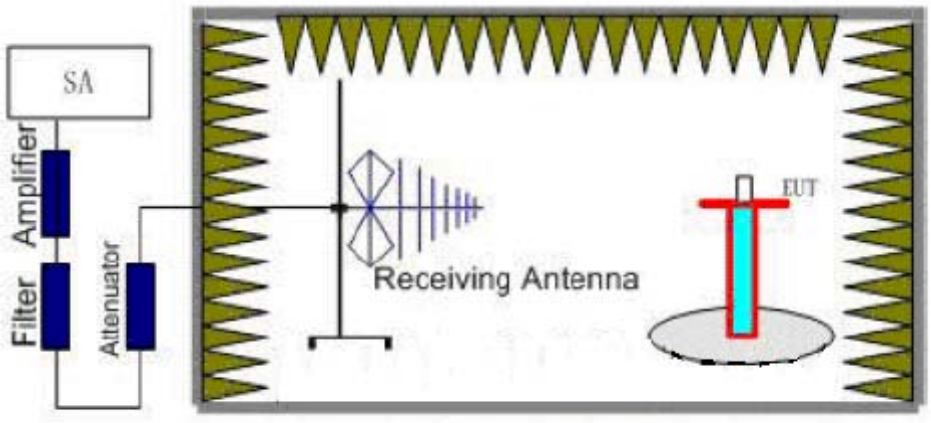
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

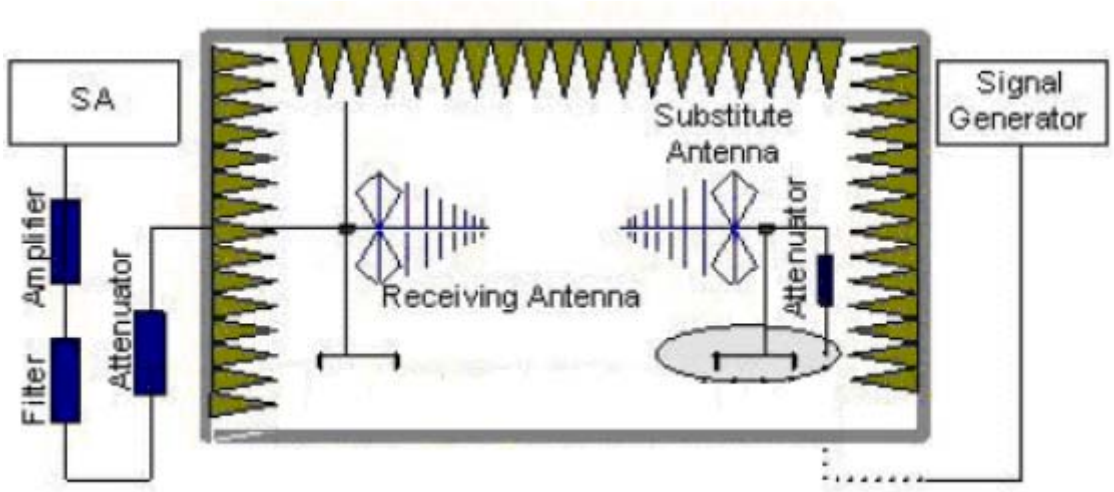
Method of Measurement

The measurements procedures in TIA -603C are used.
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The procedure of Radiates Spurious Emission is as follows:
Step 1:
The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 1.5 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:
A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL).Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



E.R.P（peak power）=S.G. - Tx Cable loss + Substitution antenna gain – 2.15.
EIRP= E.R.P+2.15

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the antenna is vertical.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT

Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor *k* = 1.96, *U*= 3.55 dB.

Test Result

GSM 850 CH128

Harmonic	TX ch.128 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1648.4	-69.24	2	10.15	-63.24	-13	50.24	180
3	2472.6	-66.74	2.51	11.35	-60.05	-13	47.05	0
4	3296.8	-64.45	4.2	10.85	-59.95	-13	46.95	180
5	4121	-62.89	5.2	11.35	-58.89	-13	45.89	90
6	4945.2	-63.43	5.5	11.95	-59.13	-13	46.13	0
7	5769.4	-61.76	5.7	13.55	-56.06	-13	43.06	270
8	6593.6	-61.10	6.3	13.75	-55.80	-13	42.80	180
9	7417.8	-61.08	6.8	13.85	-56.18	-13	43.18	0
10	8242	-61.86	6.9	14.25	-56.66	-13	43.66	180

GSM 850 CH190

Harmonic	TX ch.190 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.2	-66.58	2	10.75	-59.98	-13	46.98	0
3	2509.8	-62.78	2.51	11.05	-56.39	-13	43.39	0
4	3346.4	-64.61	4.2	11.15	-59.81	-13	46.81	180
5	4183	-62.67	5.2	11.15	-58.87	-13	45.87	90
6	5019.6	-61.23	5.5	11.95	-56.93	-13	43.93	0
7	5856.2	-62.70	5.7	13.55	-57.00	-13	44.00	270
8	6692.8	-61.77	6.3	13.75	-56.47	-13	43.47	180
9	7529.4	-60.26	6.8	13.85	-55.36	-13	42.36	0
10	8366	-61.88	6.9	14.25	-56.68	-13	43.68	90

GSM 850 CH251

Harmonic	TX ch.251 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1697.6	-60.63	2	10.15	-54.63	-13	41.63	0
3	2546.4	-56.6	2.51	11.05	-50.21	-13	37.21	0
4	3395.2	-64.16	4.2	11.15	-59.36	-13	46.36	0
5	4244	-61.50	5.2	11.15	-57.70	-13	44.70	180
6	5092.8	-62.89	5.5	11.95	-58.59	-13	45.59	90
7	5941.6	-63.04	5.7	13.55	-57.34	-13	44.34	0
8	6790.4	-60.84	6.3	13.75	-55.54	-13	42.54	270
9	7639.2	-60.52	6.8	13.85	-55.62	-13	42.62	180
10	8488	-62.22	6.9	14.25	-57.02	-13	44.02	0

WCDMA Band V CH4132

Harmonic	TX ch.4132 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1652.8	-69.24	2	10.15	-63.24	-13	50.24	180
3	2479.2	-66.74	2.51	11.35	-60.05	-13	47.05	135
4	3305.6	-64.45	4.2	10.85	-59.95	-13	46.95	90
5	4132	-62.89	5.2	11.35	-58.89	-13	45.89	180
6	4958.4	-63.43	5.5	11.95	-59.13	-13	46.13	270
7	5784.8	-61.76	5.7	13.55	-56.06	-13	43.06	0
8	6611.2	-61.10	6.3	13.75	-55.80	-13	42.80	180
9	7437.6	-61.08	6.8	13.85	-56.18	-13	43.18	90
10	8264	-61.86	6.9	14.25	-56.66	-13	43.66	0

WCDMA Band V CH4183

Harmonic	TX ch.4183 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.2	-66.58	2	10.75	-59.98	-13	46.98	0
3	2509.8	-62.78	2.51	11.05	-56.39	-13	43.39	90
4	3346.4	-64.61	4.2	11.15	-59.81	-13	46.81	180
5	4183	-62.67	5.2	11.15	-58.87	-13	45.87	270
6	5019.6	-61.23	5.5	11.95	-56.93	-13	43.93	0
7	5856.2	-62.70	5.7	13.55	-57.00	-13	44.00	180
8	6692.8	-61.77	6.3	13.75	-56.47	-13	43.47	90
9	7529.4	-60.26	6.8	13.85	-55.36	-13	42.36	0
10	8366	-61.88	6.9	14.25	-56.68	-13	43.68	270

WCDMA Band V CH4233

Harmonic	TX ch.4233 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1693.2	-60.63	2	10.15	-54.63	-13	41.63	180
3	2539.8	-56.6	2.51	11.05	-50.21	-13	37.21	270
4	3386.4	-64.16	4.2	11.15	-59.36	-13	46.36	0
5	4233	-61.50	5.2	11.15	-57.70	-13	44.70	180
6	5079.6	-62.89	5.5	11.95	-58.59	-13	45.59	90
7	5926.2	-63.04	5.7	13.55	-57.34	-13	44.34	0
8	6772.8	-60.84	6.3	13.75	-55.54	-13	42.54	90
9	7619.4	-60.52	6.8	13.85	-55.62	-13	42.62	0
10	8466	-62.22	6.9	14.25	-57.02	-13	44.02	0

3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	Base Station Simulator	CMU200	R&S	118133	2012-06-30	One year
02	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
03	Spectrum Analyzer	E4445A	Agilent	MY46181146	2012-06-30	One year
04	Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2012-06-30	One year
05	Signal Analyzer	FSV30	R&S	100815	2012-06-30	One year
06	Signal generator	SMB 100A	R&S	102594	2012-06-30	One year
07	EMI Test Receiver	ESCI	R&S	100948	2012-06-30	One year
08	Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-201	2011-06-19	Three years
09	Horn Antenna	HF907	R&S	100126	2012-07-01	Three years
10	Climatic Chamber	PT-30B	Re Ce	20101891	2010-09-10	Three years

*******END OF REPORT BODY*******

ANNEX A: EUT Appearance and Test Setup

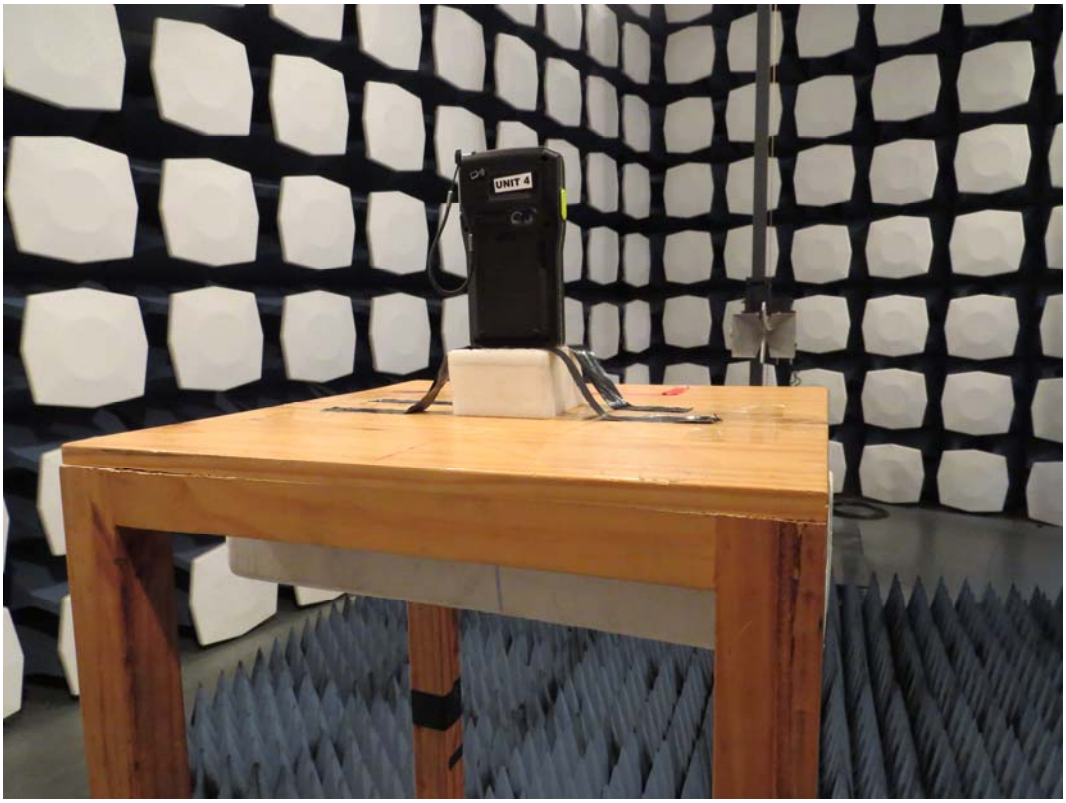
A.1 EUT Appearance

a: EUT

b: Battery

Picture 1 EUT and Auxiliary

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup