

FCC TEST REPORT

**Test report
On Behalf of
WAVE LYNK INC
For
WCDMA Digital Mobile Phone
Model No.: GS1**

FCC ID: 2ANGZ-GS1

**Prepared for : WAVE LYNK INC
25900 GREENFIELD ROAD suite 150 * OAK PARK MI 48237**

**Prepared By : Shenzhen WST Testing Co.,Ltd.
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Bao'an District, Shenzhen**

**Date of Test: Jun. 14, 2017 ~ Jun. 21, 2017
Date of Report: Jun. 21, 2017
Report Number: WST170618076-E**

TEST RESULT CERTIFICATION

Applicant's name : WAVE LYNK INC

Address : 25900 GREENFIELD ROAD suite 150 * OAK PARK MI 48237

Manufacture's Name..... : WAVE LYNK INC

Address : 25900 GREENFIELD ROAD suite 150 * OAK PARK MI 48237

Product description

Trade Mark: WAVE LYNK

Product name : WCDMA Digital Mobile Phone

Model and/or type reference : GS1

Standards : FCC Part 22H and 24E
ANSI C63.10: 2013

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Date of Test.....:

Date (s) of performance of tests : **Jun. 14, 2017 ~ Jun. 21, 2017**

Date of Issue..... : **Jun. 21, 2017**

Test Result..... : **Pass**

Testing Engineer :



(Eric Xie)

Technical Manager :



(Dora Qin)

Authorized Signatory :



(Kait Chen)

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
Conducted Output power	COMPLIANT
Radiated Output power(erp/eirp)	COMPLIANT
Peak-to-average Ratio (PAR) of Transmitter	COMPLIANT
Occupied bandwidth	COMPLIANT
Frequency stability	COMPLIANT
Conducted spurious emission	COMPLIANT
(Antenna terminal)	
Radiated spurious emissions	COMPLIANT
Block edge compliance	COMPLIANT
Power Line Conducted Emission Test	COMPLIANT
Conducted Output power	COMPLIANT

1.2 TEST FACILITY

Test Firm : QTC Certification & Testing Co., Ltd.
 Certificated by FCC, Registration No.: 588523

Address 2nd Floor,B1 Building,Fengyeyuan Industrial Plant, Liuxian 2st. Road,
 Xin'an Street, Bao'an District, Shenzhen, China

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty	
Conducted Emission Expanded Uncertainty	= 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	= 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	= 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	= 4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	WCDMA Digital Mobile Phone
Model Name	GS1
Serial No	N/A
Model Difference	N/A
FCC ID	2ANGZ-GS1
Antenna Type	Integral Antenna
Antenna Gain	1dBi
Operation frequency	GSM850, PCS1900 ,WCDMA Band V
Number of Channels	GSM/PCS: Band 850 and Band 1900; WCDMA: Band V
Modulation Type	GMSK for GSM/GPRS/EGPRS QPSK for WCDMA
Power Source	DC5V form Adapter with AC 120V/60Hz
Power Rating	DC5V form Adapter with AC 120V/60Hz or DC 3.8V from battery

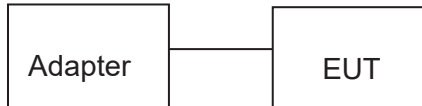
2.1.1 Carrier Frequency of Channels

During all testing, EUT is in link mode with base station emulator at maximum power level in each test mode and channel as below:

Mode	Channel	Frequency(MHz)
GSM/ GPRS 850	128	824.2
	190	836.6
	251	848.8
PCS/ GPRS 1900	512	1850.2
	661	1880.0
	810	1909.8
WCDAM Band V	4132	826.4
	4183	836.6
	4233	846.6

2.2 DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing:



Operation of EUT during Radiation testing:



2.3 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 18, 2017	1 Year
2.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 18, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 18, 2017	1 Year
4.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
5.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Feb. 18, 2017	1 Year
6.	Trilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Feb. 18, 2017	1 Year
7.	Pre-amplifier	Compliance Direction	PAP-0203	22008	Feb. 18, 2017	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
9.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 18, 2017	1 Year
10.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 18, 2017	1 Year
11.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 18, 2017	1 Year
12.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
13.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 18, 2017	1 Year
14.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 18, 2017	1 Year
15.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 18, 2017	1 Year
16.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 18, 2017	1 Year
17.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
18.	Power Meter	R&S	NRVD	SEL0069	Feb. 18, 2017	1 Year
19.	Power Sensor	R&S	URV5-Z2	SEL0071	Feb. 18, 2017	1 Year
20.	Power Sensor	R&S	URV5-Z2	SEL0072	Feb. 18, 2017	1 Year
21.	Software EMC32	R&S	EMC32-S	SEL0082	N/A	N/A
22.	Log-periodic Antenna	Amplifier Reasearch	AGS180	SEL0073	N/A	N/A
23.	Antenna Tripod	Amplifier Reasearch	TP1000A	SEL0074	N/A	N/A
24.	High Gain Horn Antenna(0.8-5GHz)	Amplifier Reasearch	AT4002A	SEL0075	N/A	N/A
25.	Spectrum analyzer	Agilent	N9020A	MY499110 048	Feb. 18, 2017	1 Year
26.	Spectrum analyzer	Agilent	E4407B	MY461843 26	Feb. 18, 2017	1 Year
27.	COMMUNICATION TESTER	R&S	CMU200	A0304247	Feb. 18, 2017	1 Year

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

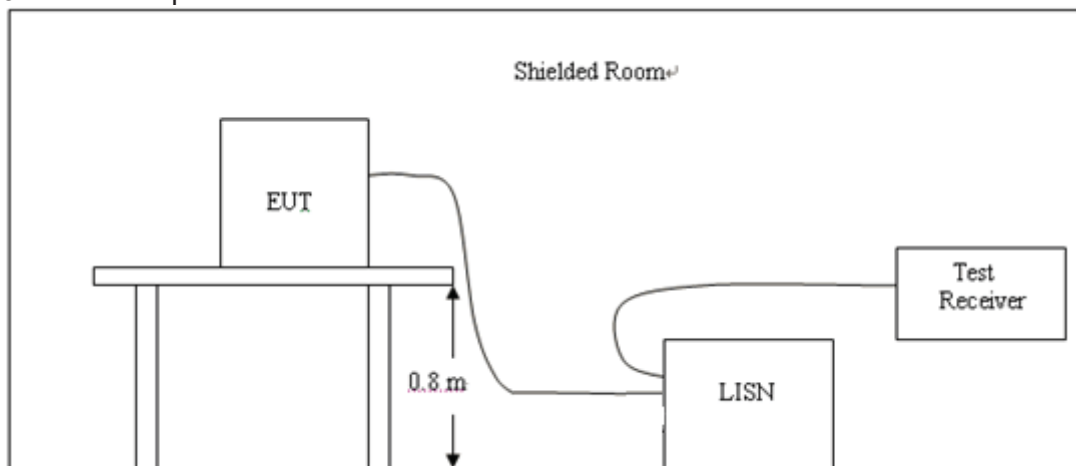
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dBµV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



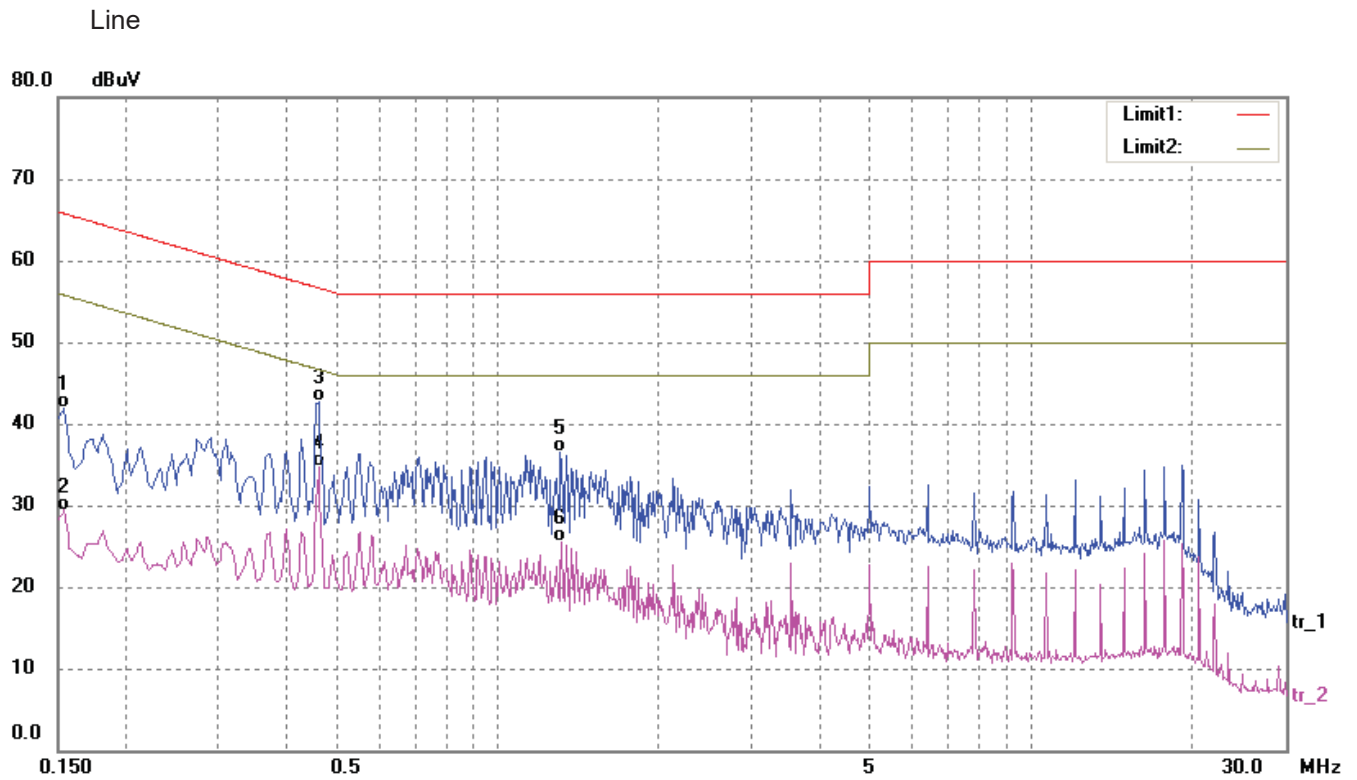
3.3 Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

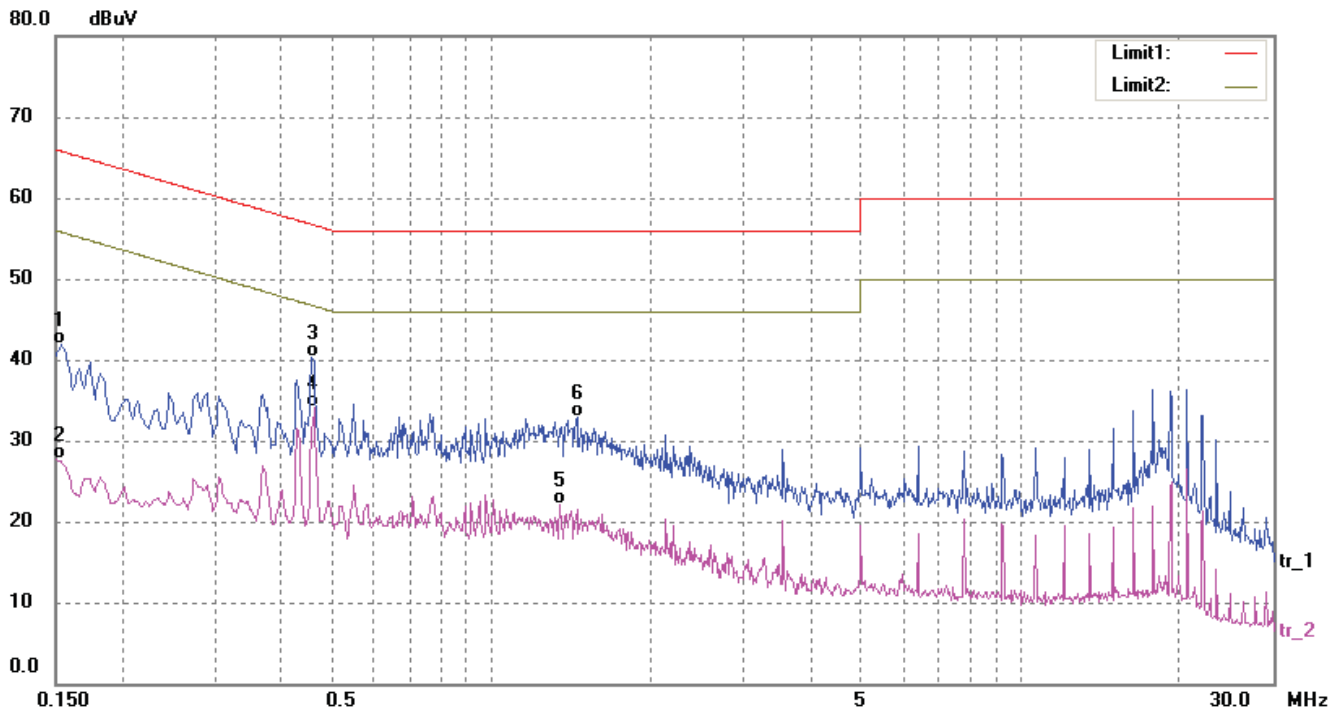
PASS

All the test modes completed for test.



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	32.10	9.85	41.95	65.78	-23.83	QP
2	0.1540	19.55	9.85	29.40	55.78	-26.38	AVG
3	0.4620	32.86	9.80	42.66	56.66	-14.00	QP
4*	0.4620	24.87	9.80	34.67	46.66	-11.99	AVG
5	1.3140	26.84	9.75	36.59	56.00	-19.41	QP
6	1.3180	15.75	9.75	25.50	46.00	-20.50	AVG

Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	32.05	9.85	41.90	65.78	-23.88	QP
2	0.1540	17.84	9.85	27.69	55.78	-28.09	AVG
3	0.4580	30.57	9.80	40.37	56.73	-16.36	QP
4*	0.4620	24.25	9.80	34.05	46.66	-12.61	AVG
5	1.3500	12.27	9.75	22.02	46.00	-23.98	AVG
6	1.4500	23.06	9.75	32.81	56.00	-23.19	QP

4 Conducted Output power

4.1 Test Limit

Cellular Telephone 850MHz	PCS 1900MHz
/	/

4.2 Test Procedure

- 1 The EUT's RF output port was connected to base station.
- 2 A call is set up by the SS according to the generic call set up procedure
- 3 Set EUT at maximum power level through base station by power level command
- 4 Measure the maximum output power of EUT at each frequency band and mode by base station.

4.3 Measurement Equipment Used

Same as Radiated Emission Measurement

4.4 Test Result

PASS. All the test modes completed for test.

GSM850 Mode			
Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)	LIMIT dBm
128	824.2	32.19	/
190	836.6	32.18	/
251	848.8	32.12	/
PCS 1900 Mode			
512	1850.2	30.05	/
661	1880	30.23	/
810	1909.8	30.14	/
GPRS 850 Mode			
128	824.2	32.07	/
190	836.6	32.04	/
251	848.8	32.18	/
GPRS 1900 Mode			
512	1850.2	30.17	/
661	1880	30.07	/
810	1909.8	30.28	/
WCDMA Band V Mode			
4132	826.4	28.29	/
4183	836.6	28.07	/
4233	846.6	28.29	/

5 Radiated Output power

5.1 Test Limit

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

Mode	Nominal Peak Power
GSM 850	≤ 38.45 dBm (7W)
PCS 1900	≤ 33 dBm (2W)
UMTS BAND V	≤ 38.45 dBm (7W)
UMTS BAND II	≤ 33 dBm (2W)

5.2 Test Procedure

1. The EUT was placed on a non-conductive rotating platform with 0.8 meter height in an anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 3MHz, VBW= 3MHz and peak detector settings.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (for frequency below 1GHz) or Horn antenna (for frequency above 1GHz) at same location with same polarization of receiver antenna and then a known power of each measured frequency from S.G. was applied into the dipole antenna or Horn antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Substitution antenna Loss (only for Dipole antenna) - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$

5.3 Measurement Equipment Used

Same as Radiated Emission Measurement

5.4 Test Result

Conclusion: PASS					
Mode	Channel	LVL (dBm)	Correction factor(dB)	ERP (dBm)	EIRP (dBm)
GSM 850	128	3.60	30.42	31.87	/
	190	3.78	30.21	31.84	/
	251	4.03	30.05	31.93	/
PCS 1900	512	-16.87	46.80	/	29.93
	661	-16.47	46.45	/	29.98
	810	-16.60	46.58	/	29.98
ERP=LVL + Correction factor -2.15					
EIRP=LVL+ Correction factor					

Conclusion: PASS					
Mode	Channel	LVL (dBm)	Correction factor(dB)	ERP (dBm)	EIRP (dBm)
WCDMA Band V	4132	-5.18	30.42	23.09	/
	4183	-4.97	30.21	23.09	/
	4233	-4.89	30.05	23.01	/
ERP=LVL + Correction factor -2.15 EIRP=LVL+ Correction factor					
Conclusion: PASS					
Mode	Channel	LVL (dBm)	Correction factor(dB)	ERP (dBm)	EIRP (dBm)
GPRS 850	128	3.68	30.42	31.95	/
	190	3.99	30.21	32.05	/
	251	4.01	30.05	31.91	/
GPRS 1900	512	-16.76	46.80	/	30.04
	661	-16.44	46.45	/	30.01
	810	-16.63	46.58	/	29.95
ERP=LVL + Correction factor -2.15 EIRP=LVL+ Correction factor					

6 PEAK-TO- AVERAGE RATIO(PAR) OF TRANSMITTER

6.1 Test Limit

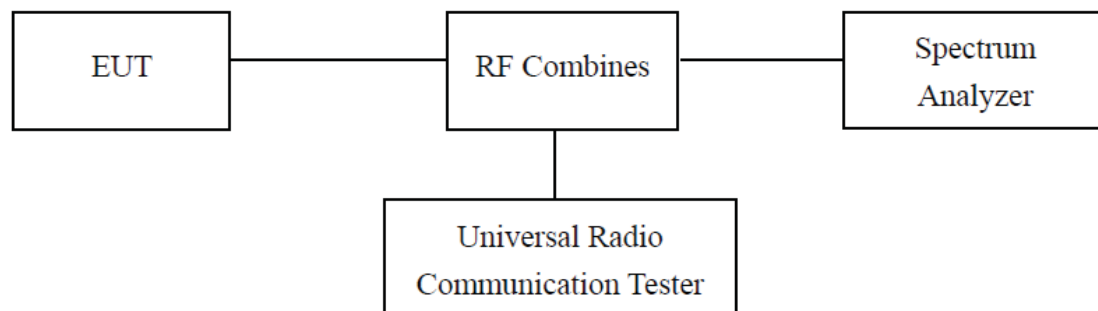
According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:



6.3 Measurement Equipment Used

Same as Radiated Emission Measurement

6.4 Test Result

Conclusion: **PASS**

GSM850 Mode			
Test Channel	Frequency (MHz)	PAR (dB)	LIMIT dB
128	824.2	1.50	13
190	836.6	1.44	13
251	848.8	1.31	13
PCS 1900 Mode			
512	1850.2	2.84	13
661	1880	2.58	13
810	1909.8	2.87	13
GPRS 850 Mode			
128	824.2	1.60	13
190	836.6	1.32	13
251	848.8	1.43	13
GPRS 1900 Mode			
512	1850.2	2.51	13
661	1880	2.74	13
810	1909.8	2.59	13
WCDMA Band V Mode			
4132	826.4	1.74	13
4183	836.6	1.92	13
4233	846.6	1.84	13

7 OCCUPIED BANDWIDTH MEASUREMENT

7.1 Test Limit

N/A

7.2 Test Procedure

1. The EUT' RF output port was connected to Spectrum Analyzer and Base Station via power divider.
2. Spectrum analyzer's occupied bandwidth measure function was used to measure 99% bandwidth and -26dBc bandwidth

7.3 Measurement Equipment Used

Same as Radiated Emission Measurement

7.4 Test Result

PASS

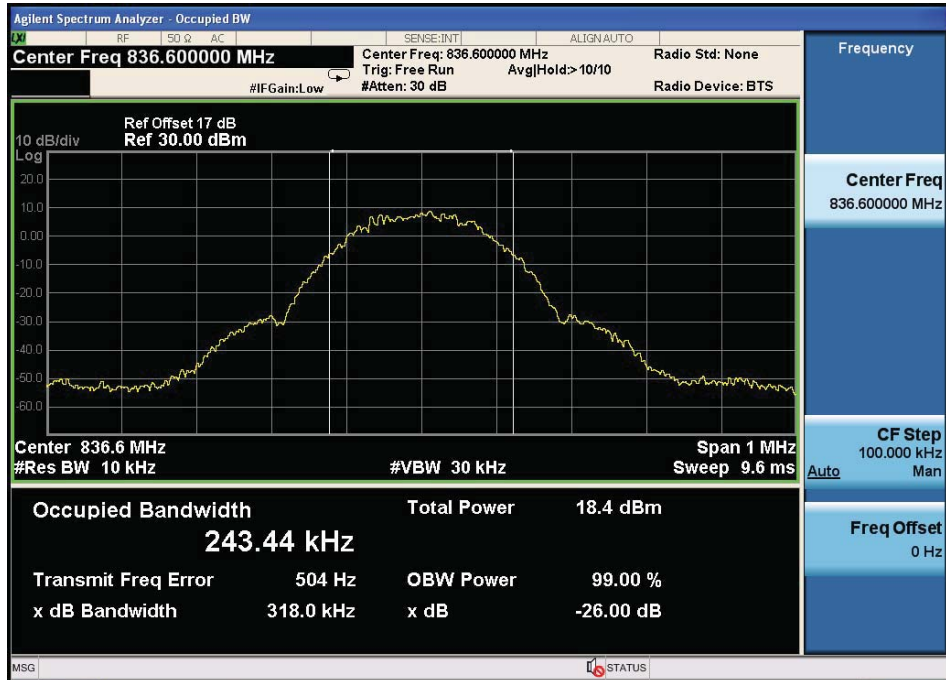
All the test modes completed for test.

GSM850 Mode			
Frequency (MHz)	26dB Bandwidth (KHz)	99% bandwidth (KHz)	Result
824.2	317.8	245.62	PASS
836.6	318.0	243.44	PASS
848.8	319.8	248.27	PASS

GSM 850 CH128



GSM 850 CH190

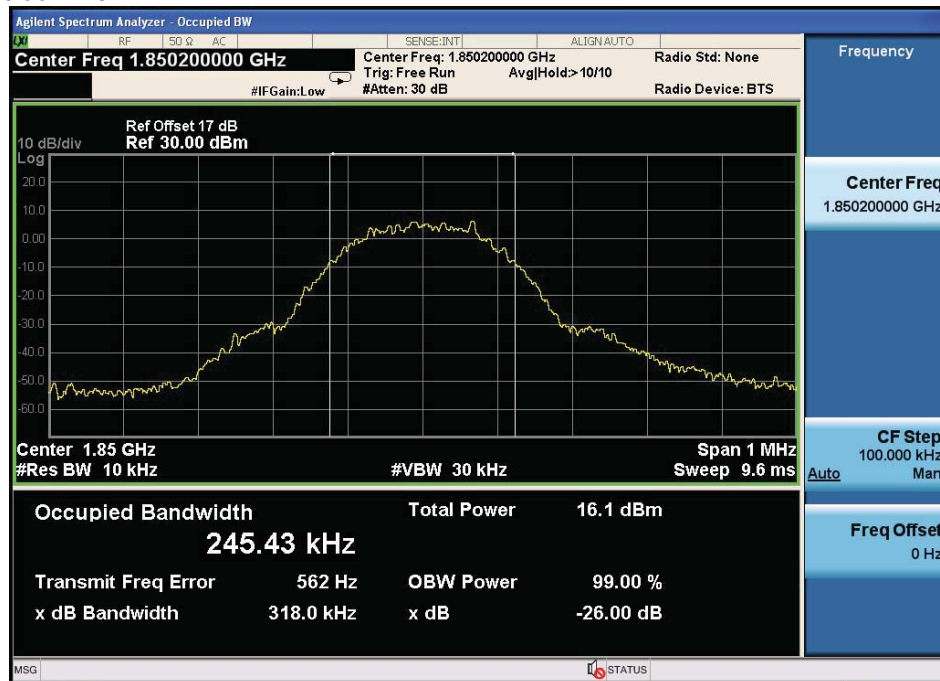


GSM 850 CH251



PCS1900 Mode			
Frequency (MHz)	26dB Bandwidth (KHz)	99% bandwidth (KHz)	Result
1850.2	318.0	245.43	PASS
1880	325.1	249.39	PASS
1909.8	315.7	245.55	PASS

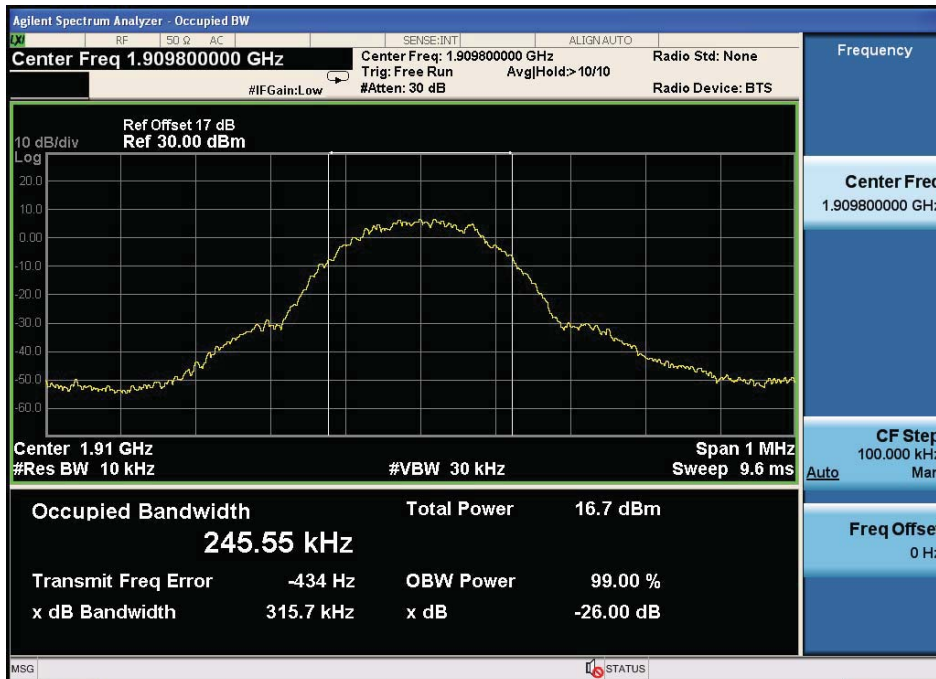
PCS 1900 CH512



PCS 1900 CH661

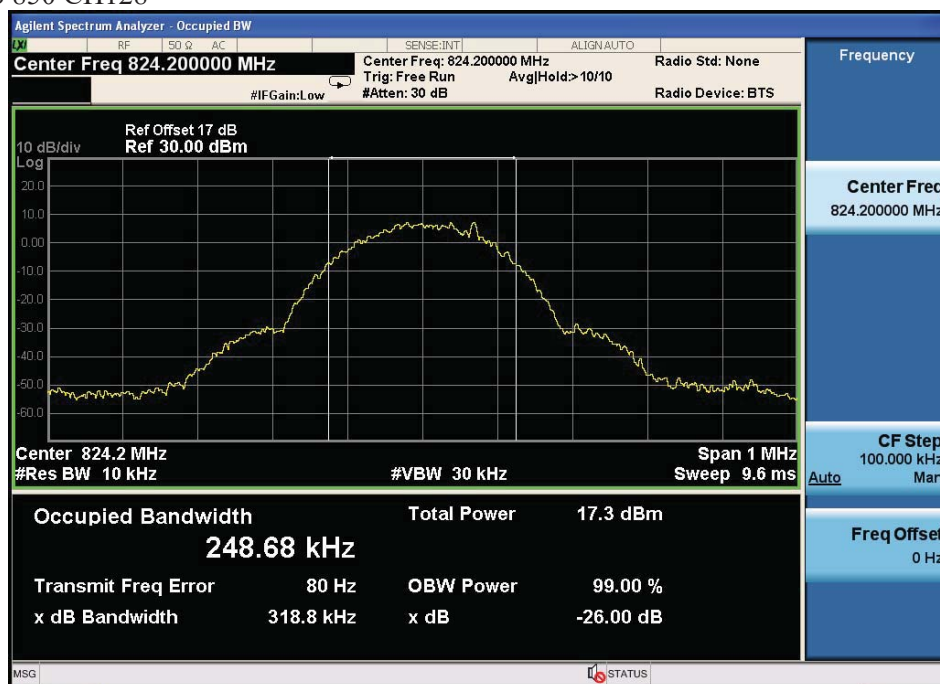


PCS 1900 CH810

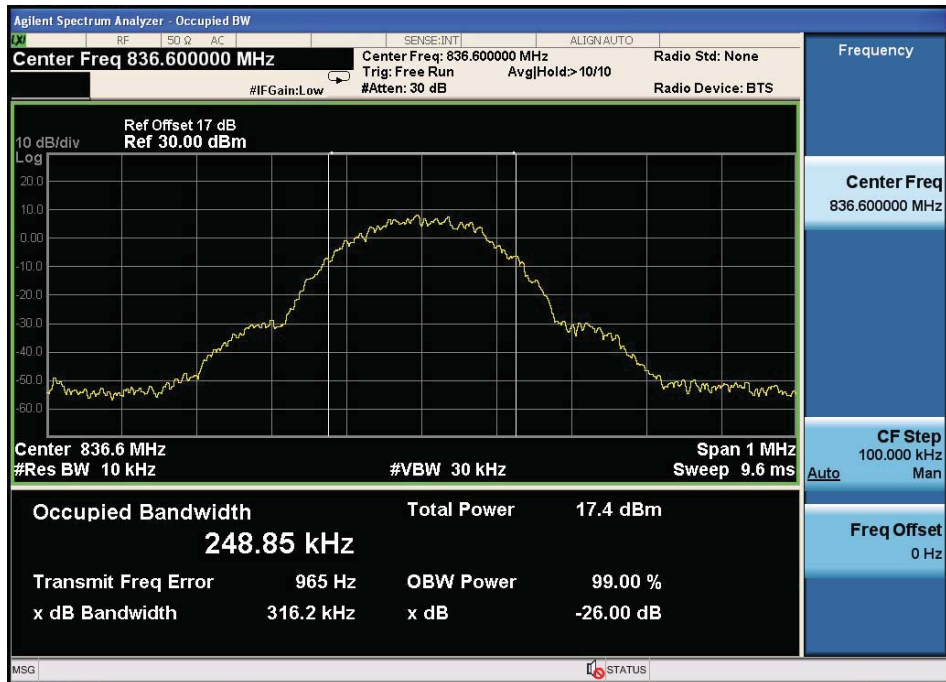


GPRS 850 Mode			
Frequency (MHz)	26dB Bandwidth (KHz)	99% bandwidth (KHz)	Result
824.2	318.8	248.68	PASS
836.6	316.2	248.85	PASS
848.8	319.4	246.49	PASS

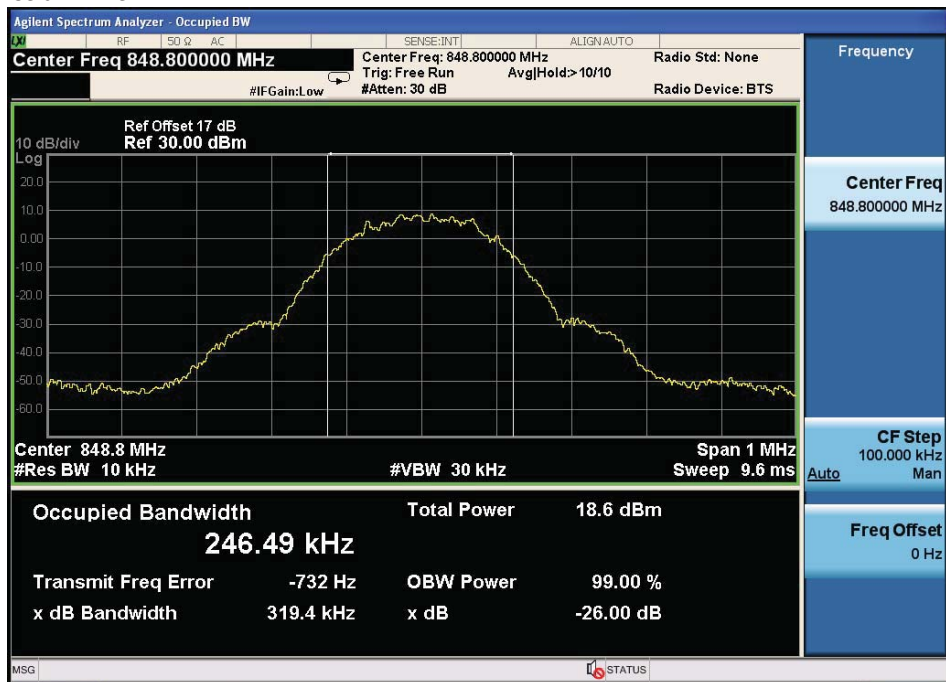
GPRS 850 CH128



GPRS 850 CH190

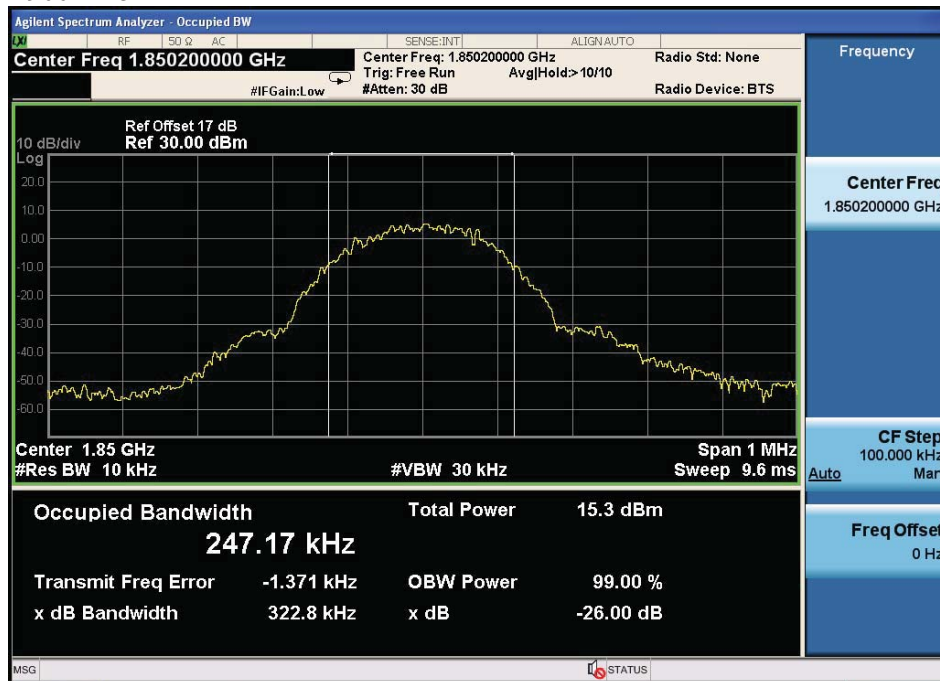


GPRS 850 CH251

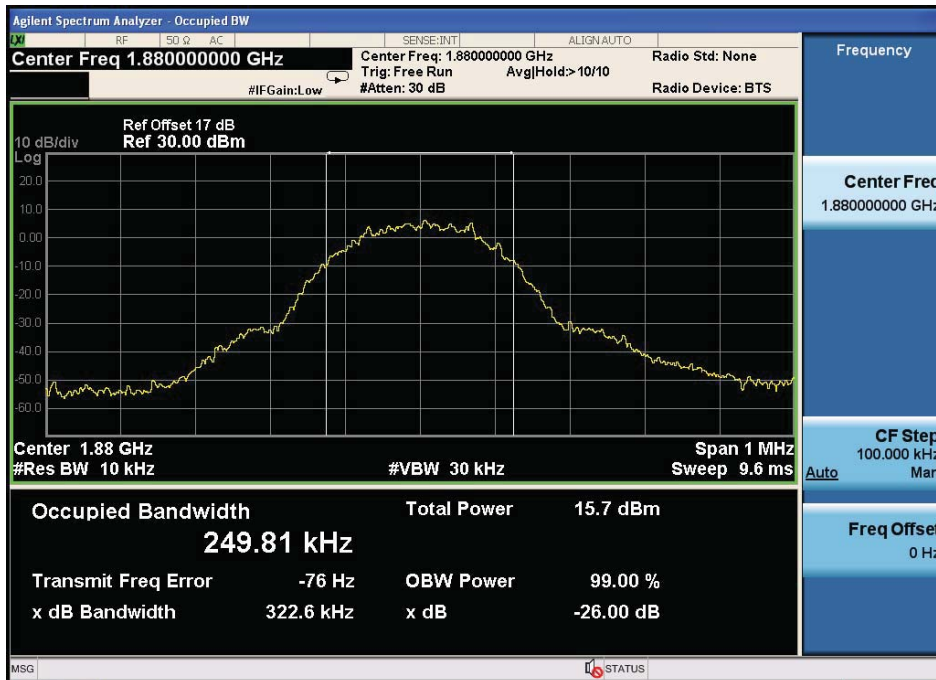


GPRS 1900 Mode			
Frequency (MHz)	26dB Bandwidth (KHz)	99% bandwidth (KHz)	Result
1850.2	322.8	247.17	PASS
1880	322.6	249.81	PASS
1909.8	320.0	244.37	PASS

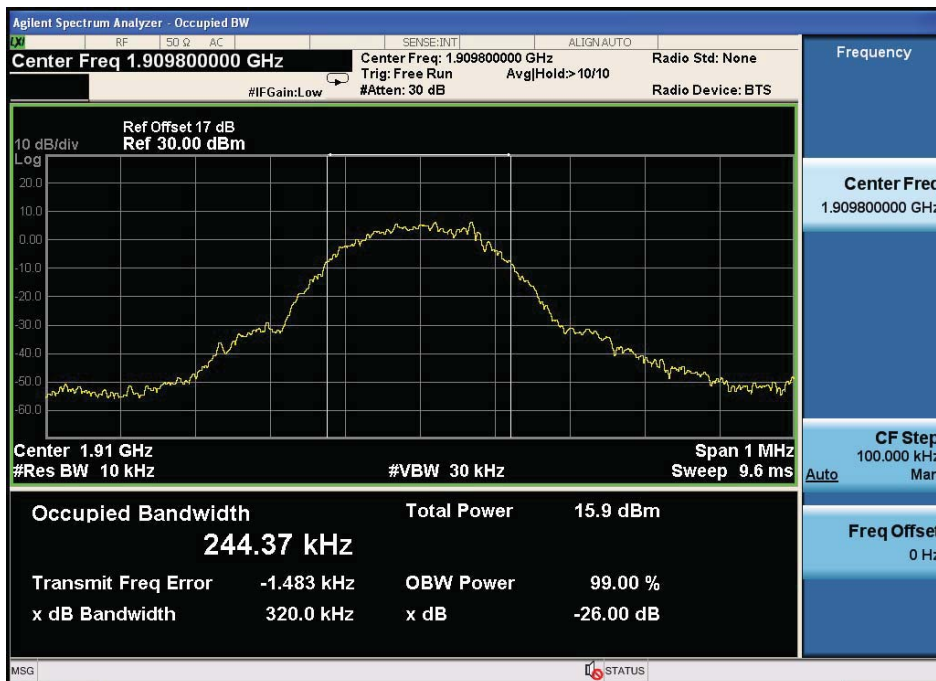
GPRS 1900 CH512



GPRS 1900 CH661

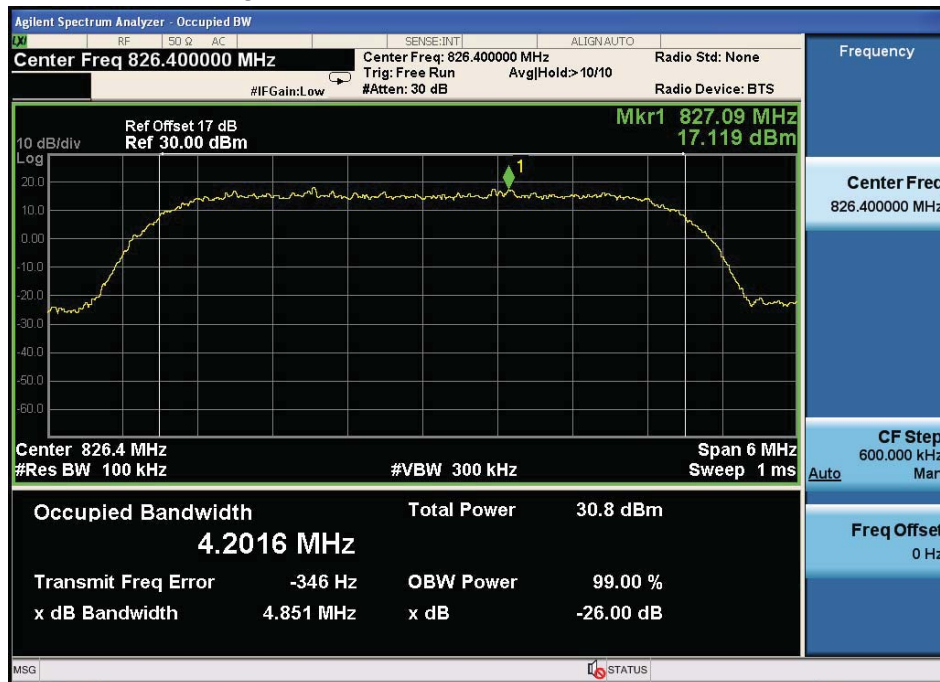


GPRS 1900 CH810

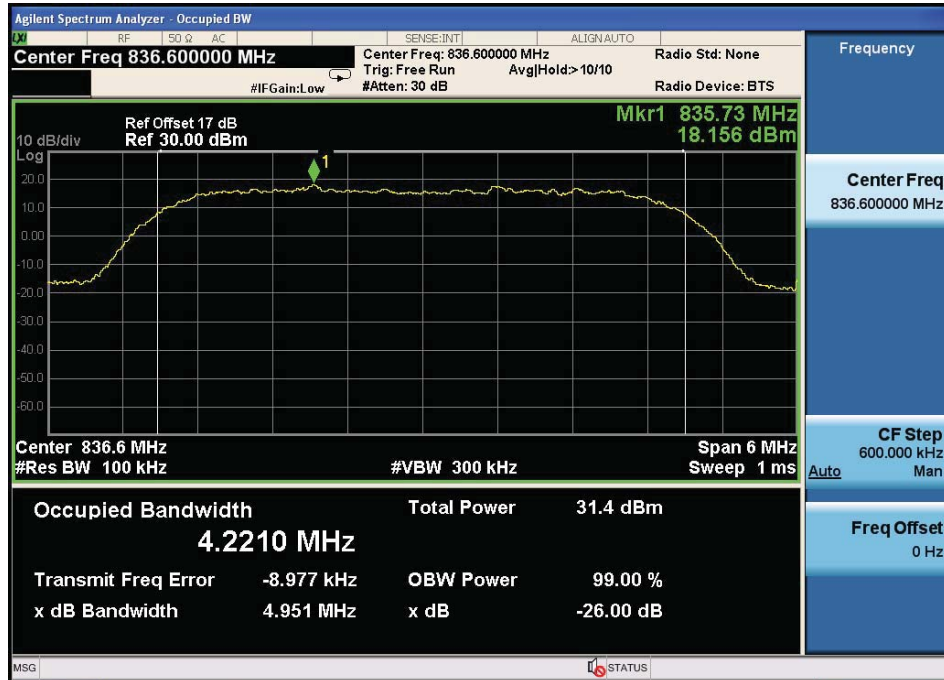


WCDMA Band V Mode			
Frequency (MHz)	26dB Bandwidth (MHz)	99% bandwidth (MHz)	Result
826.4	4.851	4.2016	PASS
836.6	4.951	4.2210	PASS
846.6	4.937	4.2132	PASS

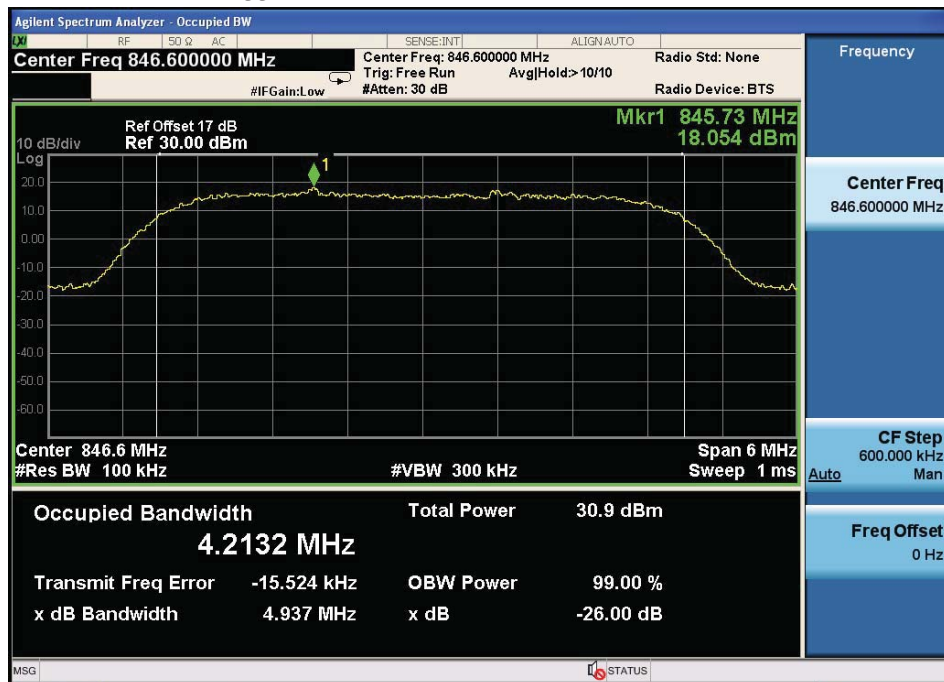
WCDMA BAND V CH4132



WCDMA BAND V CH4183



WCDMA BAND V CH4233



8 Frequency stability

8.1 Test Limit

GSM 850MHz	PCS 1900MHz
± 2.5 ppm	Must stay within the authorized frequency block

8.2 Test Procedure

Test Procedures for Temperature Variation:

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -10°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 45°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -10°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

Test Procedures for Voltage Variation:

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the base station.
2. The power supply voltage to the EUT was varied from DC 5V to 3V
3. The variation in frequency was measured for the worst case.

8.3 Measurement Equipment Used

Same as Radiated Emission Measurement

8.4 Test Result

PASS

All the test modes completed for test.

Mode	Voltage (V)	Frequency error (Hz)	frequency error (ppm)
GSM 850 CH190	5V	19.09	0.023
	4.5V	22.79	0.027
	4V	22.72	0.027
	3.5V	21.08	0.025
	3V	20.22	0.024
PCS 1900 CH661	5V	34.63	0.018
	4.5V	35.97	0.019
	4V	37.61	0.020
	3.5V	35.59	0.019
	3V	34.65	0.018
Conclusion: PASS			

Mode	Temperature (°C)	Frequency error (Hz)	frequency error (ppm)
GSM 850 CH190	-30	25.73	0.031
	-20	40.13	0.048
	-10	31.75	0.038
	0	27.48	0.033
	10	30.42	0.036
	20	43.80	0.052
	30	32.82	0.039
	40	38.77	0.021
	50	43.74	0.023
PCS 1900 CH661	-30	66.14	0.035
	-20	72.68	0.039
	-10	73.16	0.039
	0	68.55	0.036
	10	70.50	0.038
	20	66.41	0.035
	30	67.59	0.036
	40	76.43	0.041
	50	68.52	0.036
Conclusion: PASS			

Mode	Voltage (V)	Frequency error (Hz)	frequency error (ppm)
GPRS 850 CH190	5V	22.73	0.027
	4.5V	20.94	0.025
	4V	19.84	0.024
	3.5V	24.24	0.029
	3V	24.54	0.029
GPRS 1900 CH661	5V	35.26	0.019
	4.5V	37.66	0.020
	4V	34.41	0.018
	3.5V	37.32	0.020
	3V	33.50	0.018
Conclusion: PASS			

Mode	Temperature (°C)	Frequency error (Hz)	frequency error (ppm)
GPRS 850 CH190	-30	36.85	0.044
	-20	32.99	0.039
	-10	30.64	0.037
	0	25.93	0.031
	10	28.10	0.034
	20	45.85	0.055
	30	25.54	0.031
	40	38.66	0.021
	50	35.44	0.019
GPRS 1900 CH661	-30	79.49	0.042
	-20	75.88	0.040
	-10	78.41	0.042
	0	68.21	0.036
	10	69.34	0.037
	20	71.04	0.038
	30	79.94	0.043
	40	77.38	0.041
	50	69.51	0.037
Conclusion: PASS			

Mode	Voltage (V)	Frequency error (Hz)	frequency error (ppm)
WCDMA BAND V CH4183	5V	28.67	0.034
	4.5V	28.87	0.035
	4V	33.55	0.040
	3.5V	38.40	0.046
	3V	33.60	0.04
Conclusion: PASS			

Mode	Temperature (°C)	Frequency error (Hz)	frequency error (ppm)
WCDMA BAND V CH4182	-30	49.89	0.06
	-20	44.45	0.053
	-10	38.71	0.046
	0	35.45	0.042
	10	33.75	0.04
	20	28.57	0.034
	30	30.40	0.036
	40	39.34	0.021
	50	43.23	0.023
Conclusion: PASS			

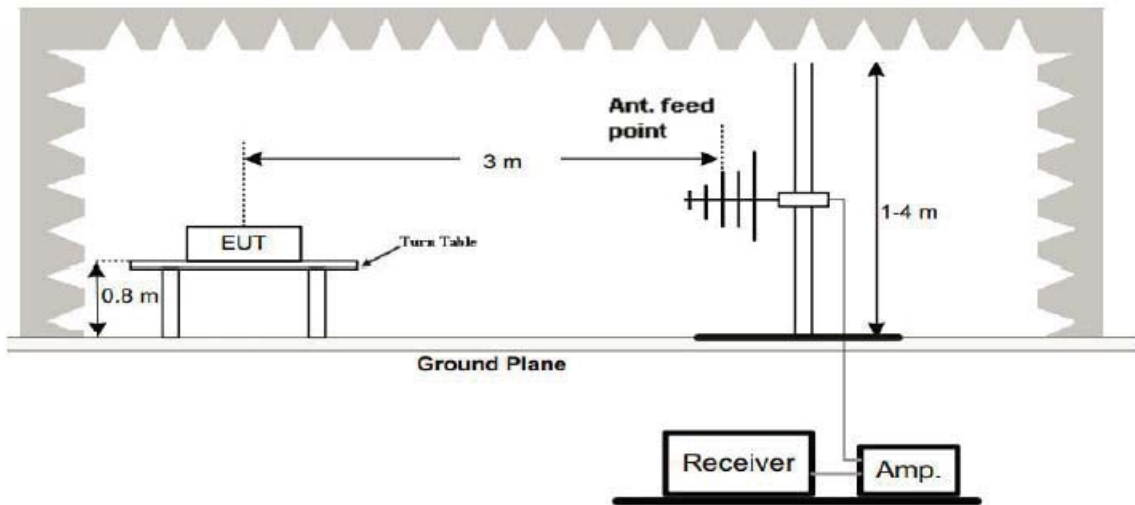
9 RADIATED EMISSION TEST

9.1 Radiation Limit

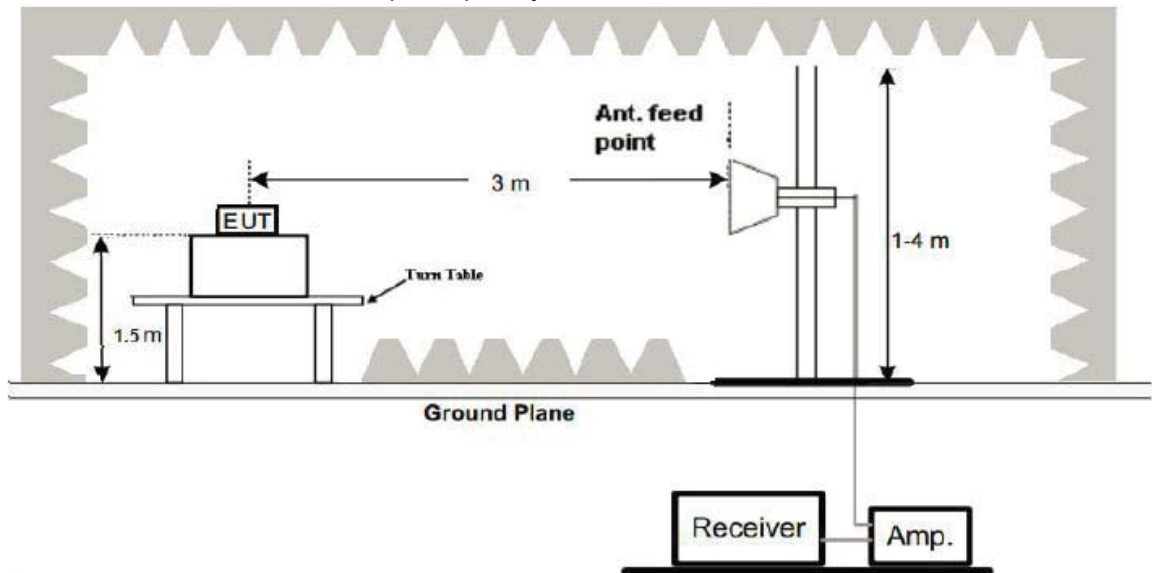
The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least $(43 + 10 \log P)$ dB, in this case, -13dBm.

9.2 Test Setup

(1) Radiated Emission Test-Up Frequency 30MHz~1GHz



(2) Radiated Emission Test-Up Frequency Above 1GHz



9.3 Test Procedure

1. The EUT was placed on a non-conductive rotating platform with 0.8 meter height in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3m with a test antenna and a spectrum analyzer with RBW= 1MHz,VBW= 1MHz ,peak detector settings.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions (record as LVL) at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Final spurious emissions levels were measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (for frequency below 1GHz) or Horn antenna (for frequency above 1GHz) at same location with same polarize of receiver antenna and then a known power of each measure frequency from S.G. was applied into the dipole antenna or Horn antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain –Substitution antenna Loss(only for Dipole antenna) - Analyzer reading. Then final spurious emissions were calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$

9.4 Test Result

PASS

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

GSM 850:

The Worst Test Results Channel 128/824.2 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1648.379	-22.72	-4.65	-27.37	-13.00	Horizontal
2471.322	-20.52	-2.10	-22.62	-13.00	Horizontal
4118.454	-29.7	11.80	-17.90	-13.00	Horizontal
1648.379	-21.53	-4.65	-26.18	-13.00	Vertical
2471.322	-21.5	-2.10	-23.60	-13.00	Vertical
4118.454	-30.33	11.80	-18.53	-13.00	Vertical
The Worst Test Results Channel 190/836.6 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1673.317	-21.23	-4.97	-26.20	-13.00	Horizontal
2506.234	-18.92	-2.10	-21.02	-13.00	Horizontal
3339.401	-20.06	3.46	-16.60	-13.00	Horizontal
1673.317	-21.95	-4.97	-26.92	-13.00	Vertical
2506.234	-20.51	-2.10	-22.61	-13.00	Vertical
3339.401	-20.89	3.46	-17.43	-13.00	Vertical
The Worst Test Results Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1698.254	-22.96	-4.94	-27.90	-13.00	Horizontal
2541.147	-19.98	-2.02	-22.00	-13.00	Horizontal
3384.835	-23.33	3.49	-19.84	-13.00	Horizontal
1698.254	-22.26	-4.94	-27.20	-13.00	Vertical
2541.147	-20.59	-2.02	-22.61	-13.00	Vertical
3384.835	-19.9	3.49	-16.41	-13.00	Vertical

PCS 1900:

The Worst Test Results for Channel 512/1850.2MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1793.017	-22.55	-3.54	-26.09	-13.00	Horizontal
3720.698	-34.66	13.01	-21.65	-13.00	Horizontal
5543.641	-31.57	14.7	-16.87	-13.00	Horizontal
1793.017	-23.94	-3.54	-27.48	-13.00	Vertical
3720.698	-34.86	13.01	-21.85	-13.00	Vertical
5543.641	-34.34	14.7	-19.64	-13.00	Vertical
The Worst Test Results for Channel 661/1880.0MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1822.943	-25.28	-3.48	-28.76	-13.00	Horizontal
3763.092	-35.12	13.8	-21.32	-13.00	Horizontal
5628.429	-34.12	15.4	-18.72	-13.00	Horizontal
1822.943	-25.04	-3.48	-28.52	-13.00	Vertical
3763.092	-36.49	13.8	-22.69	-13.00	Vertical
5628.429	-34.51	15.4	-19.11	-13.00	Vertical
The Worst Test Results for Channel 810/1909.8MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1967.581	-23.09	-3.26	-26.35	-13.00	Horizontal
3847.880	-34.59	12.4	-22.19	-13.00	Horizontal
5713.217	-34.53	15.75	-18.78	-13.00	Horizontal
1967.581	-22.68	-3.26	-25.94	-13.00	Vertical
3847.880	-36.22	12.4	-23.82	-13.00	Vertical
5713.217	-33.85	15.75	-18.10	-13.00	Vertical

GPRS 850:

The Worst Test Results Channel 128/824.2 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1648.379	-22.54	-4.65	-27.19	-13.00	Horizontal
2471.322	-21.38	-2.10	-23.48	-13.00	Horizontal
4118.454	-30.3	11.80	-18.50	-13.00	Horizontal
1648.379	-23.7	-4.65	-28.35	-13.00	Vertical
2471.322	-21.69	-2.10	-23.79	-13.00	Vertical
4118.454	-31.08	11.80	-19.28	-13.00	Vertical
The Worst Test Results Channel 190/836.6 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1673.317	-22.76	-4.97	-27.73	-13.00	Horizontal
2506.234	-19.99	-2.10	-22.09	-13.00	Horizontal
3339.401	-20.23	3.46	-16.77	-13.00	Horizontal
1673.317	-24.02	-4.97	-28.99	-13.00	Vertical
2506.234	-20.44	-2.10	-22.54	-13.00	Vertical
3339.401	-21.38	3.46	-17.92	-13.00	Vertical
The Worst Test Results Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1698.254	-23.75	-4.94	-28.69	-13.00	Horizontal
2541.147	-19.54	-2.02	-21.56	-13.00	Horizontal
3384.835	-23.42	3.49	-19.93	-13.00	Horizontal
1698.254	-22.03	-4.94	-26.97	-13.00	Vertical
2541.147	-20.55	-2.02	-22.57	-13.00	Vertical
3384.835	-23.17	3.49	-19.68	-13.00	Vertical

GPRS 1900:

The Worst Test Results for Channel 512/1850.2MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1793.017	-21.77	-3.54	-25.31	-13.00	Horizontal
3720.698	-36.39	13.01	-23.38	-13.00	Horizontal
5543.641	-30.88	14.7	-16.18	-13.00	Horizontal
1793.017	-23.6	-3.54	-27.14	-13.00	Vertical
3720.698	-36.89	13.01	-23.88	-13.00	Vertical
5543.641	-32.84	14.7	-18.14	-13.00	Vertical
The Worst Test Results for Channel 661/1880.0MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1822.943	-22.94	-3.48	-26.42	-13.00	Horizontal
3763.092	-37.54	13.8	-23.74	-13.00	Horizontal
5628.429	-33.03	15.4	-17.63	-13.00	Horizontal
1822.943	-24.03	-3.48	-27.51	-13.00	Vertical
3763.092	-35.5	13.8	-21.70	-13.00	Vertical
5628.429	-33.05	15.4	-17.65	-13.00	Vertical
The Worst Test Results for Channel 810/1909.8MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1967.581	-21.95	-3.26	-25.21	-13.00	Horizontal
3847.880	-35.21	12.4	-22.81	-13.00	Horizontal
5713.217	-34.93	15.75	-19.18	-13.00	Horizontal
1967.581	-23.83	-3.26	-27.09	-13.00	Vertical
3847.880	-34.1	12.4	-21.70	-13.00	Vertical
5713.217	-33.33	15.75	-17.58	-13.00	Vertical

WCDMA band V

Channel 4132/824.6MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1653.367	-23.45	-5.01	-28.46	-13.00	Horizontal
2481.297	-19.81	-2.08	-21.89	-13.00	Horizontal
4122.185	-29.7	11.80	-17.90	-13.00	Horizontal
1653.367	-23.91	-5.01	-28.92	-13.00	Vertical
2481.297	-19.43	-2.08	-21.51	-13.00	Vertical
4122.185	-31.37	11.80	-19.57	-13.00	Vertical
Channel 4183/836.6MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1675.329	-21.13	-4.97	-26.10	-13.00	Horizontal
2510.781	-19.59	-2.10	-21.69	-13.00	Horizontal
3339.401	-21.4	3.46	-17.94	-13.00	Horizontal
1675.329	-21.96	-4.97	-26.93	-13.00	Vertical
2510.781	-18.98	-2.10	-21.08	-13.00	Vertical
3339.401	-21.61	3.46	-18.15	-13.00	Vertical
Channel 4233/846.6MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	P _{Mea} (dBm)	Limit(dBm)	Polarity
1688.279	-21.18	-4.95	-26.13	-13.00	Horizontal
2536.160	-21.59	-2.02	-23.61	-13.00	Horizontal
3384.835	-23.37	3.49	-19.88	-13.00	Horizontal
1688.279	-22.67	-4.95	-27.62	-13.00	Vertical
2536.160	-19.23	-2.02	-21.25	-13.00	Vertical
3384.835	-22.63	3.49	-19.14	-13.00	Vertical

10 BAND EDGE

10.1 Limits

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least $(43 + 10 \log P)$ dB, in this case, -13dBm.

10.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured.

10.3 Test Result

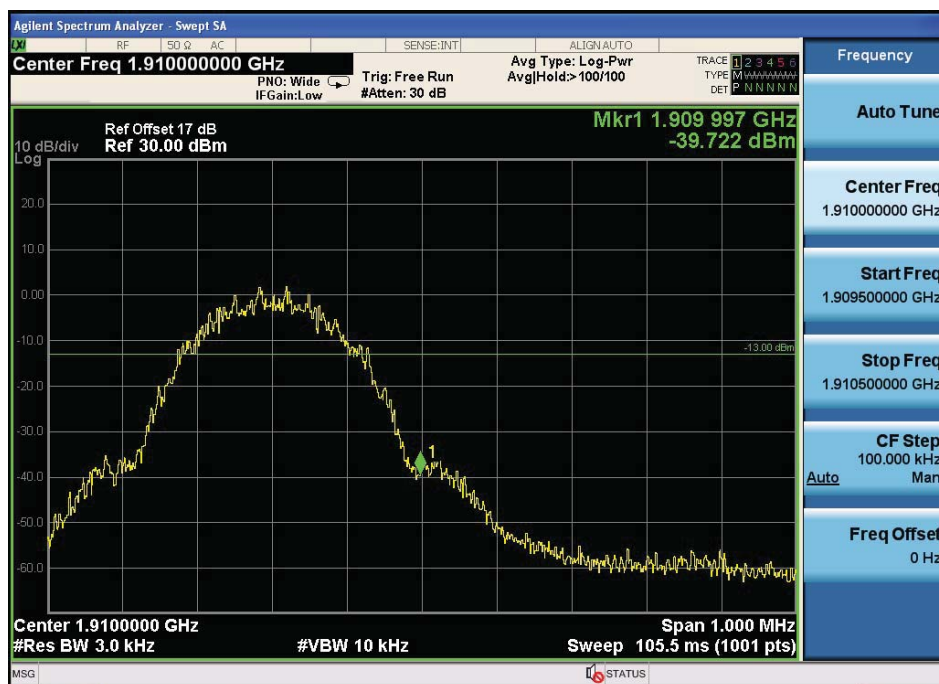
PASS

All the test modes completed for test. The test data of this mode was reported.

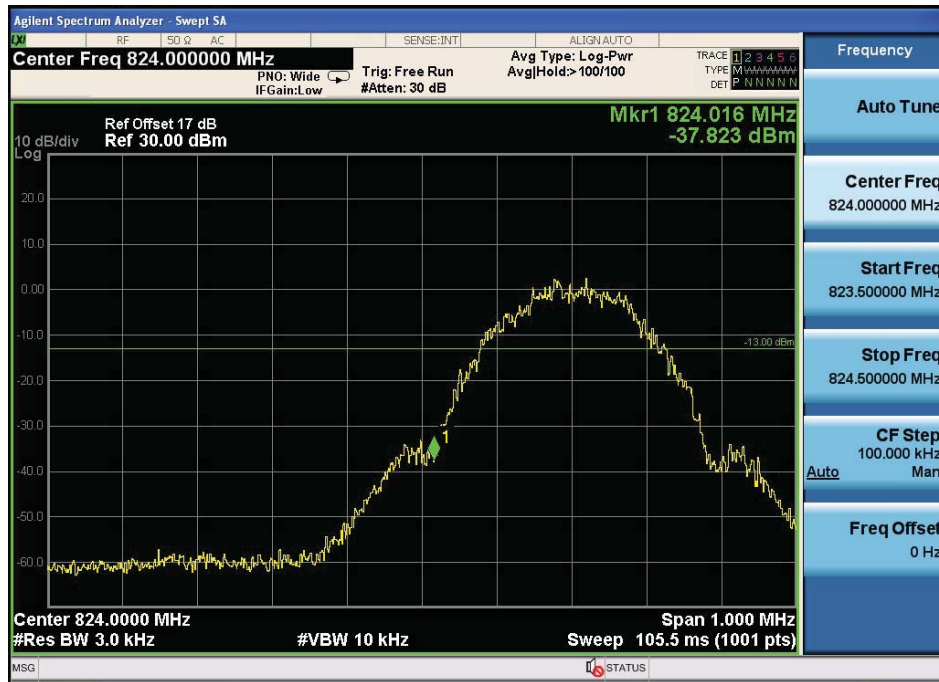
Test Mode: GSM 850



Test Mode: GSM 1900



Test Mode: GPRS 850



Agilent Spectrum Analyzer - Swept SA

Center Freq 1.85000000 GHz

PNO: Wide IFGain: Low

Trig: Free Run #Atten: 30 dB

Avg Type: Log-Pwr AvgHold: 100/100

TRACE 1 2 3 4 5 6 TYPE M DET P N N N N N

Ref Offset 17 dB Ref 30.00 dBm

Mkr1 1.850 005 GHz -39.857 dBm

Center 1.8500000 GHz

#Res BW 3.0 kHz

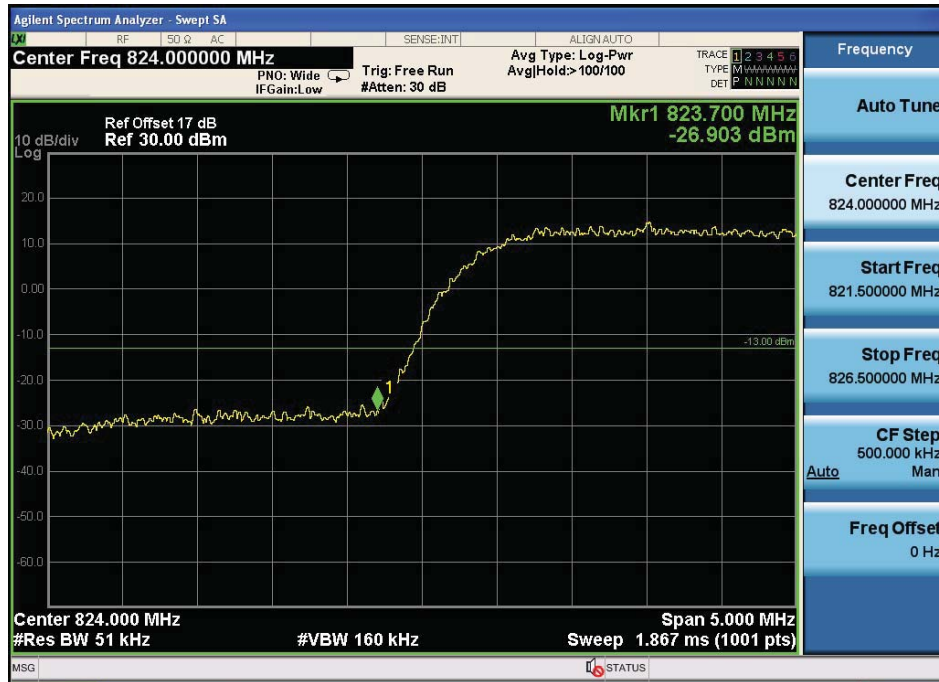
#VBW 10 kHz

Span 1.000 MHz

Sweep 105.5 ms (1001 pts)



Test Mode: WCDMA BAND V



11 Conducted spurious emissions

11.1 Test Limit

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least $(43 + 10 \log P)$ dB, in this case, -13dBm.

11.2 Test Procedure

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The low, middle and high channels of each band and mode's spurious emissions for 30MHz to 10th Harmonic were measured by Spectrum analyzer.

11.3 Measurement Equipment Used

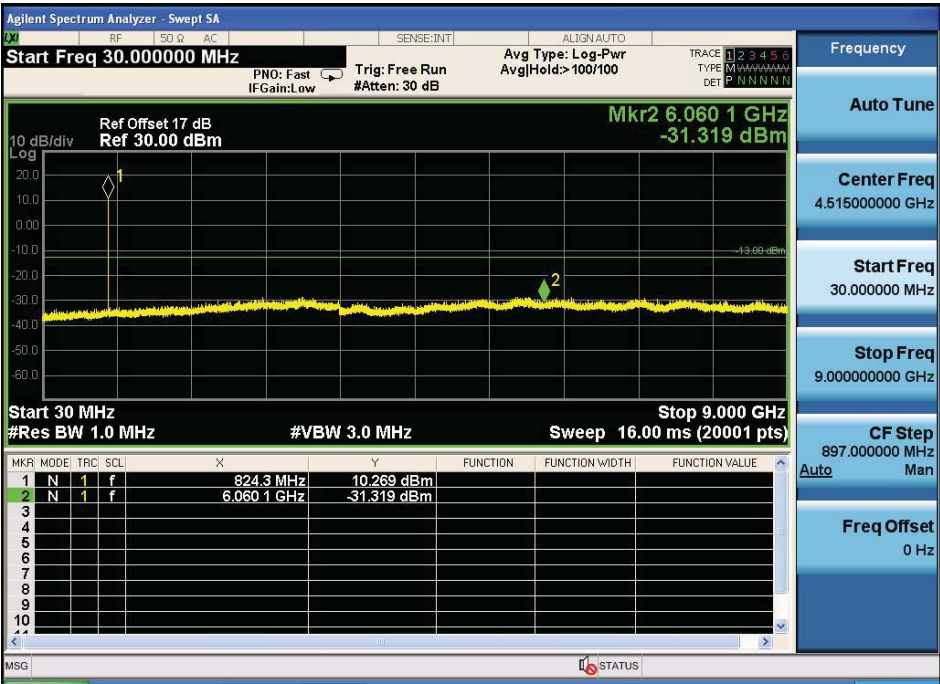
Same as Radiated Emission Measurement

11.4 Test Result

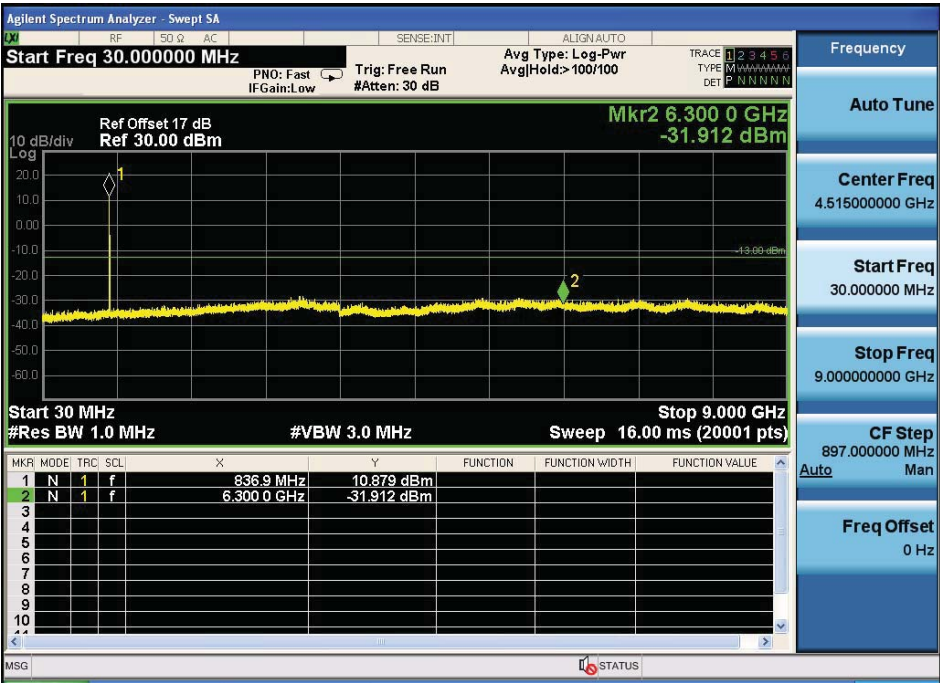
PASS

All the test modes completed for test.

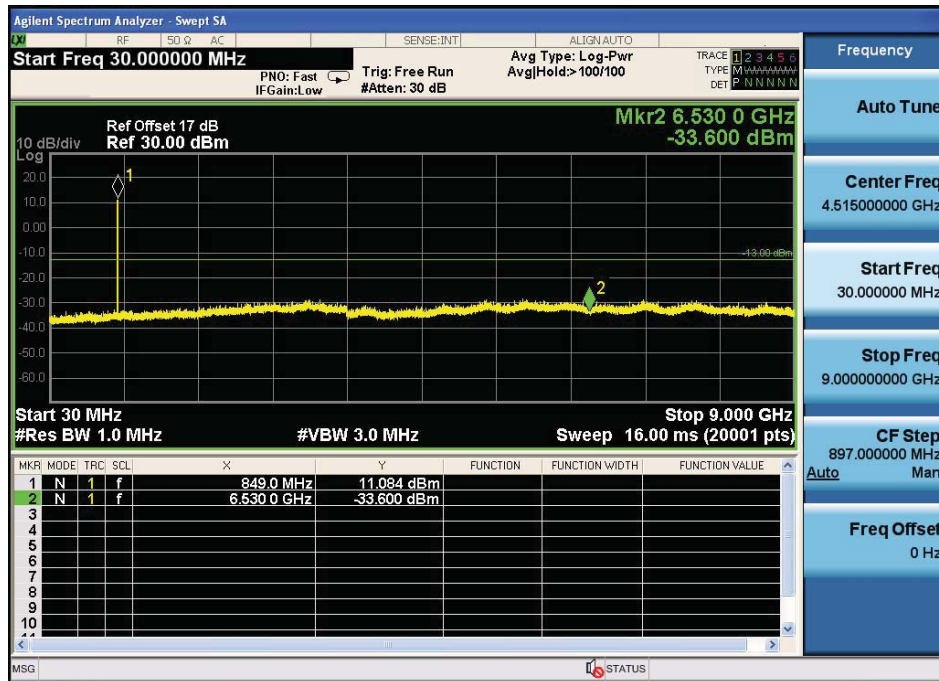
Test Mode: GSM 850 CH 128



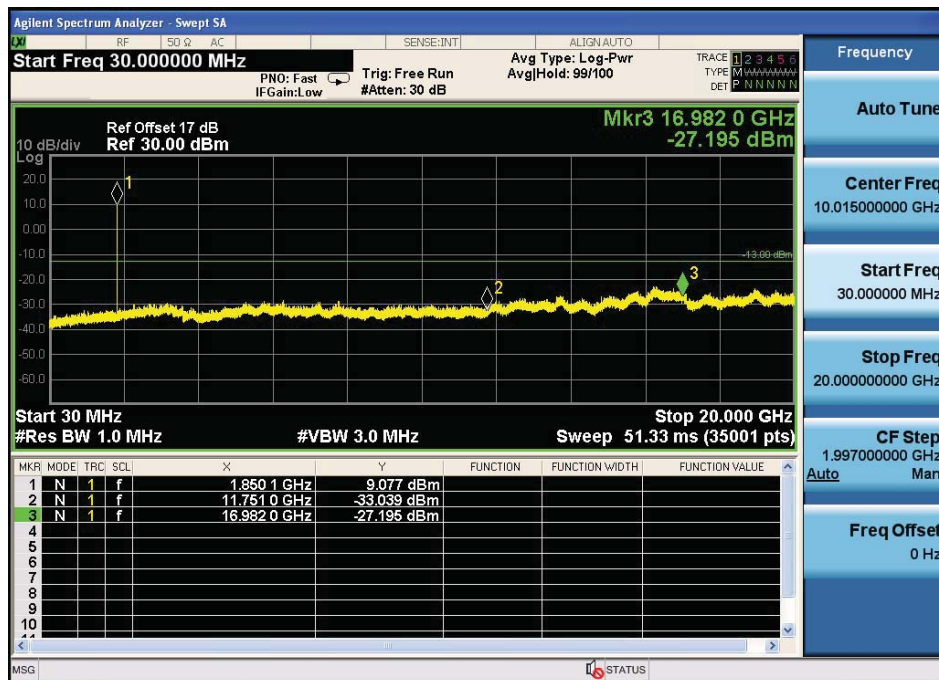
Test Mode: GSM 850 CH 190



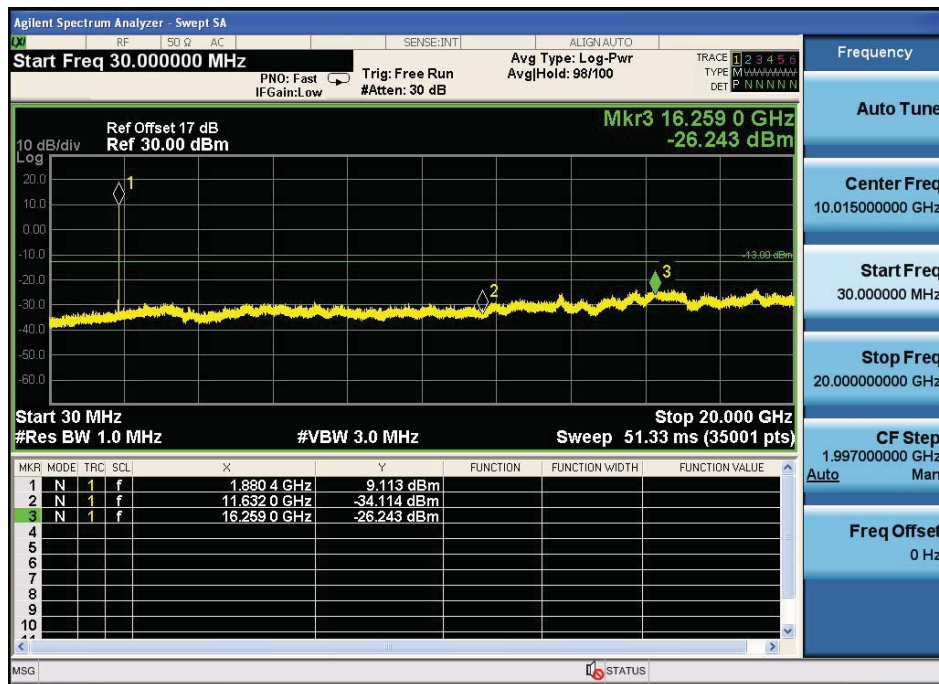
Test Mode: GSM 850 CH 251



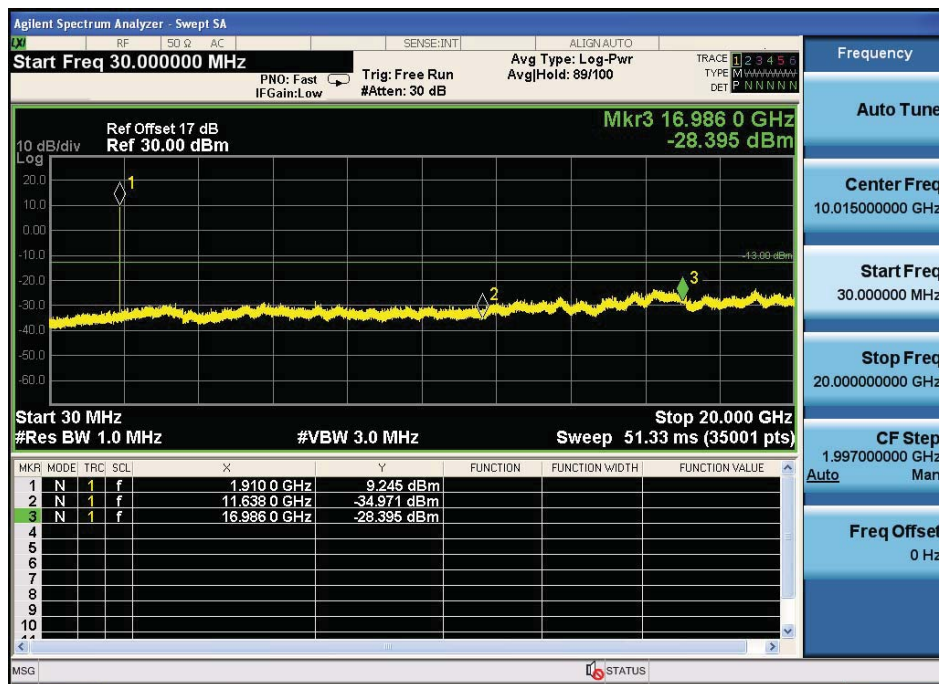
Test Mode: PCS 1900 CH 512



Test Mode: PCS 1900 CH 661



Test Mode: PCS 1900 CH 810



Agilent Spectrum Analyzer - Swept SA

Start Freq 30.000000 MHz

Ref Offset 17 dB
Ref 30.00 dBm

PN0: Fast
IFGain: Low

Trig: Free Run
#Atten: 30 dB

Avg Type: Log-Pwr
AvgHld: > 100/100

TRACE 1 2 3 4 5 6
TYPE 1 2 3 4 5 6
DET 1 2 3 4 5 6

Frequency

Auto Tune

Center Freq
4.515000000 GHz

Start Freq
30.000000 MHz

Stop Freq
9.000000000 GHz

CF Step
897.000000 MHz
Man

Freq Offset
0 Hz

Mkr2 7.320 0 GHz
-32.546 dBm

10 dB/div
Log

Start 30 MHz
#Res BW 1.0 MHz

Stop 9.000 GHz
Sweep 16.00 ms (20001 pts)

#VBW 3.0 MHz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	824.3 MHz	10.276 dBm			
2	N	1	f	7.320 0 GHz	-32.546 dBm			
3								
4								
5								
6								
7								
8								
9								
10								

MSG

STATUS

Agilent Spectrum Analyzer - Swept SA

Start Freq 30.000000 MHz

PNO: Fast IFGain: low

Trig: Free Run #Atten: 30 dB

Avg Type: Log-Pwr AvgHold: > 100/100

TRACE 1 2 3 4 5 6
TYPE M H L S P
DET P N N N N N

Frequency

Auto Tune

Center Freq
4.515000000 GHz

Start Freq
30.000000 MHz

Stop Freq
9.000000000 GHz

CF Step
897.000000 MHz
Man

Freq Offset
0 Hz

Ref Offset 17 dB
Ref 30.00 dBm

Mkr2 6.821 0 GHz
-34.237 dBm

10 dB/div
Log

20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0

Start 30 MHz
#Res BW 1.0 MHz

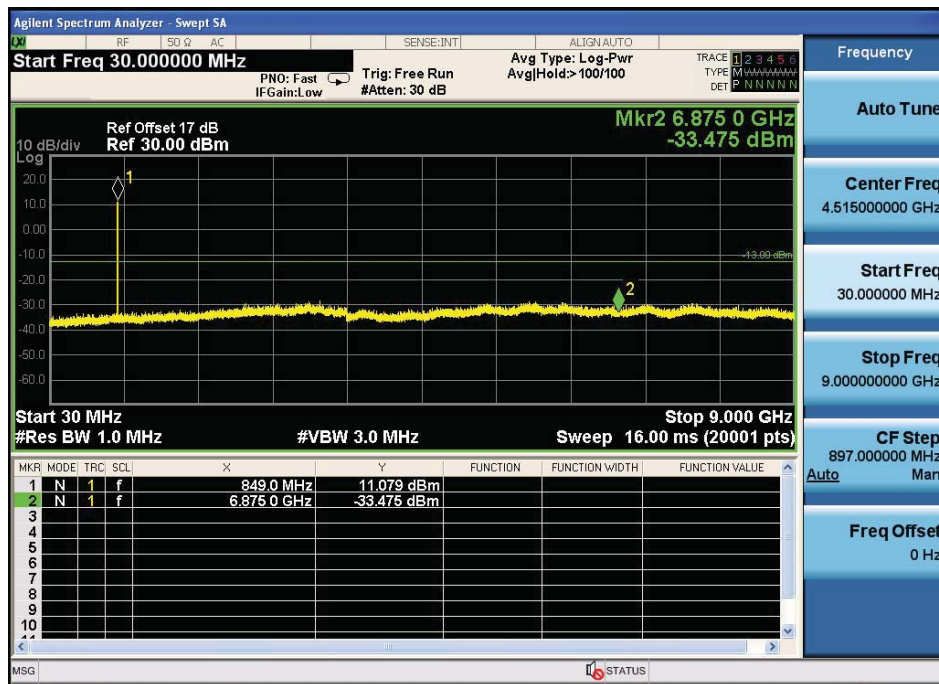
Stop 9.000 GHz
#VBW 3.0 MHz
Sweep 16.00 ms (20001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	836.9 MHz	-10.846 dBm			
2	N	1	f	6.821 0 GHz	-34.237 dBm			
3								
4								
5								
6								
7								
8								
9								
10								

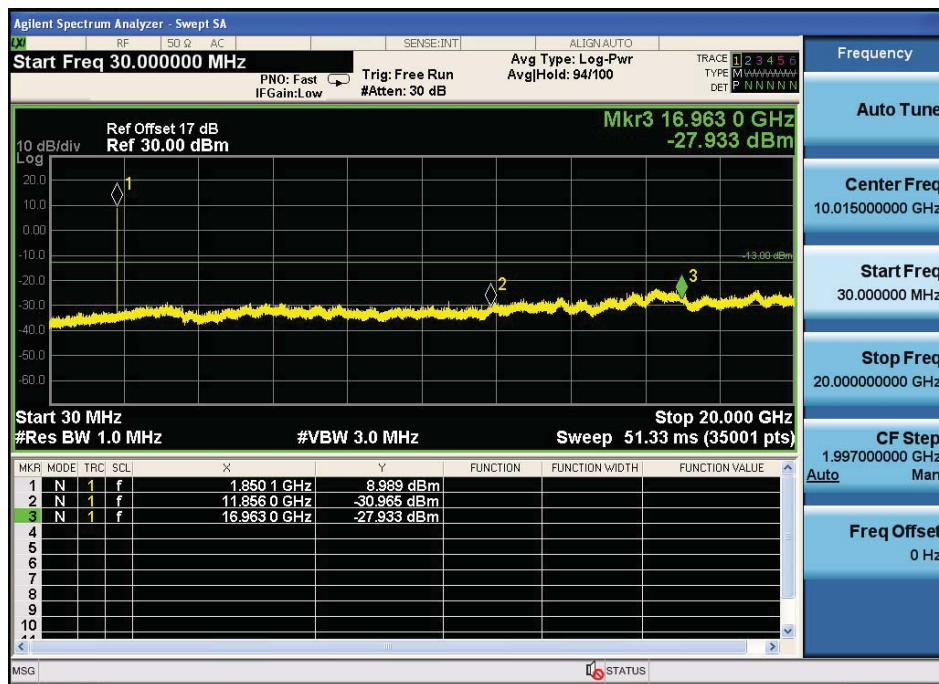
MSG

STATUS

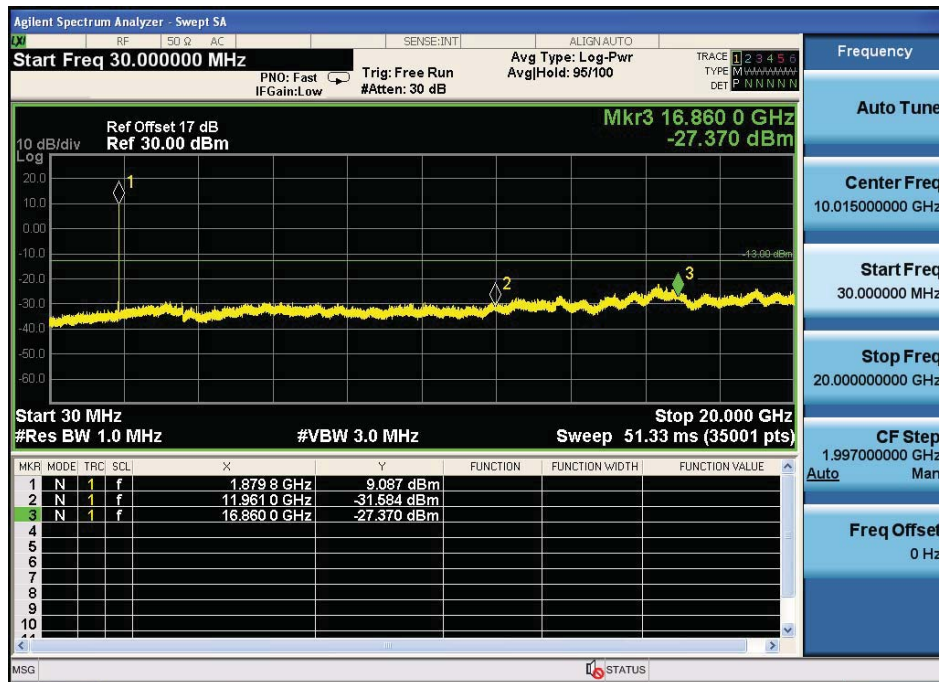
Test Mode: GPRS 850 CH 251



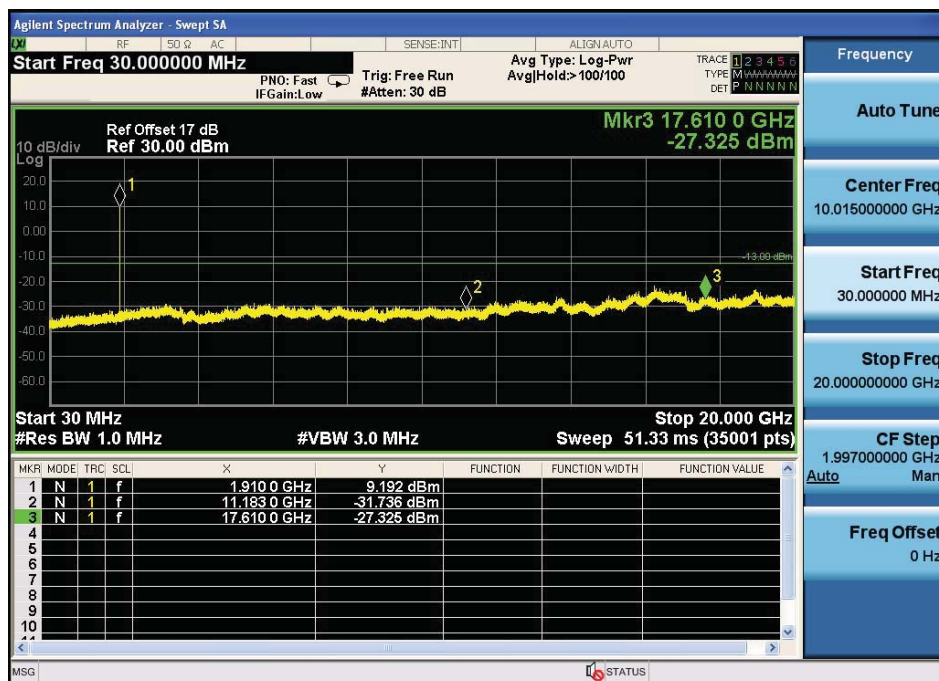
Test Mode: GPRS 1900 CH 512



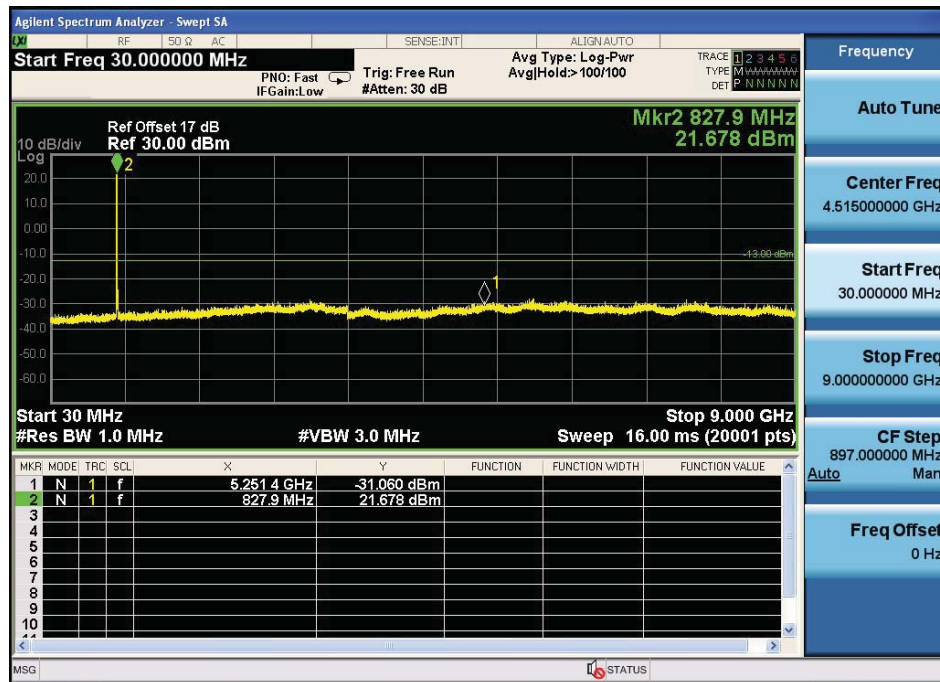
Test Mode: GPRS 1900 CH 661



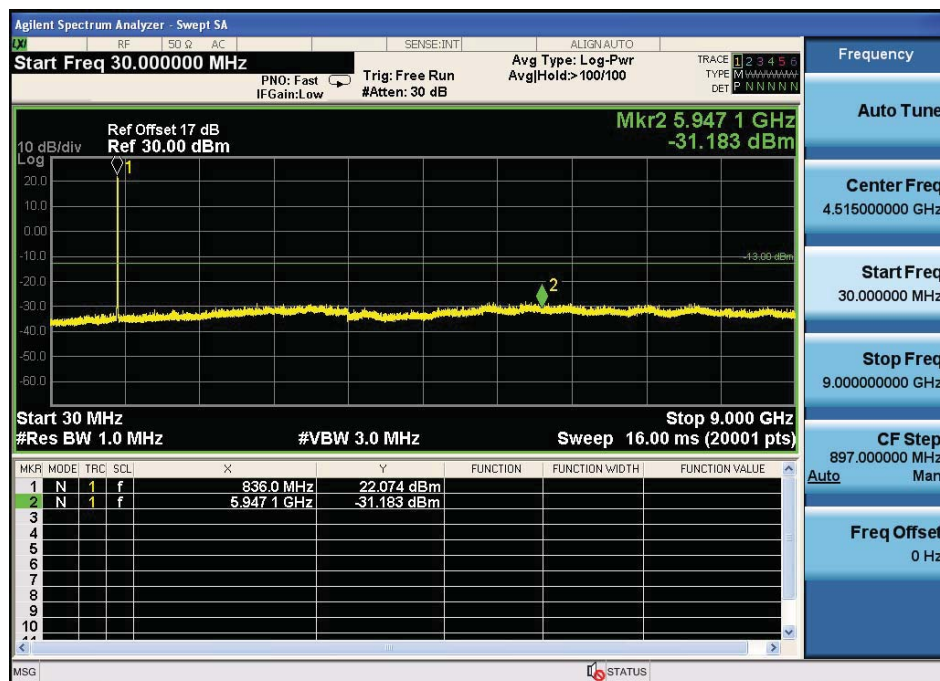
Test Mode: GPRS 1900 CH 810



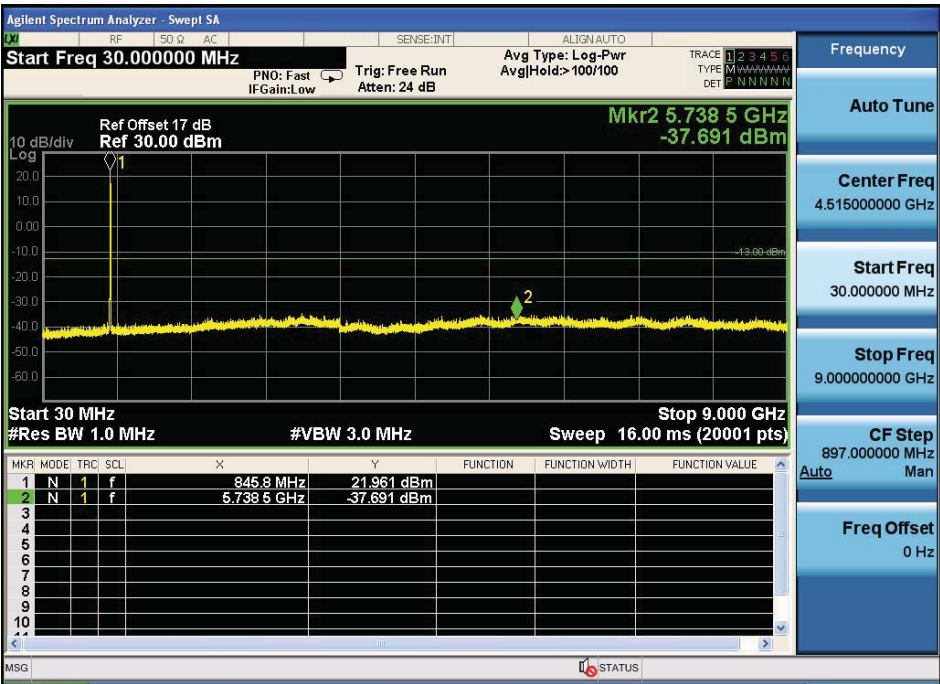
Test Mode: WCDMA BAND V CH4132



Test Mode: WCDMA BAND V CH4183

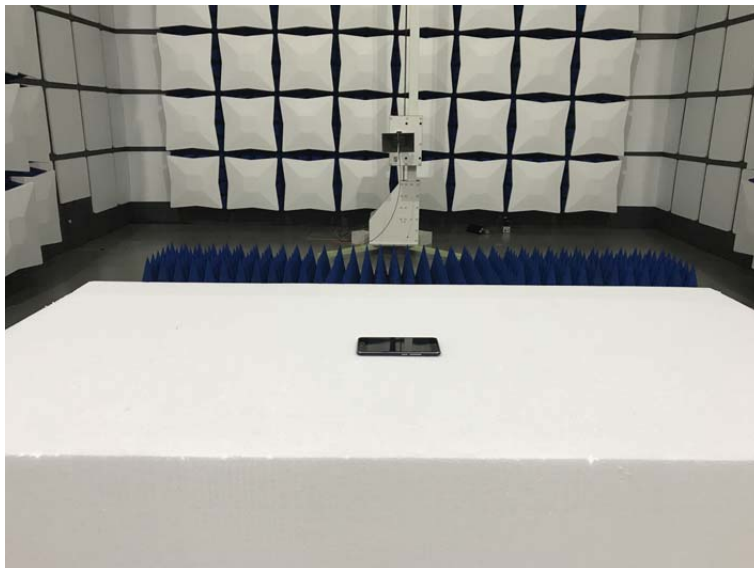


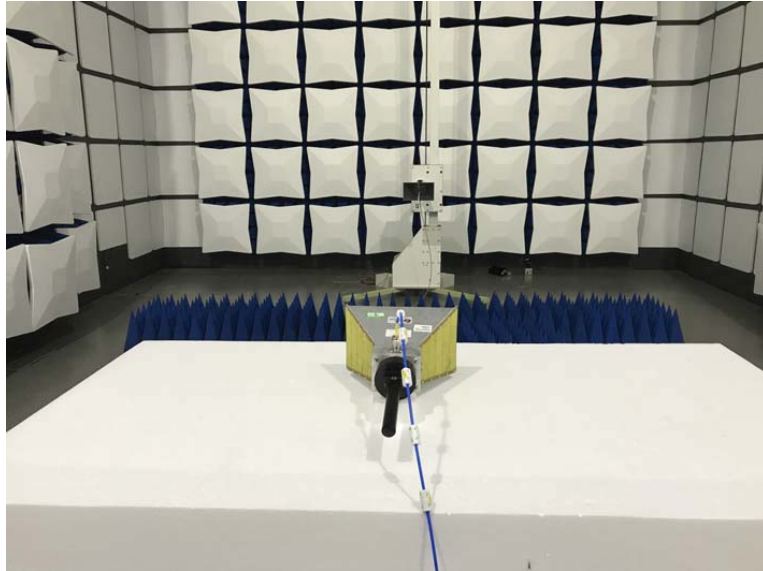
Test Mode: WCDMA BAND V CH4233



12 PHOTOGRAPH OF TEST

12.1 Radiated Emission





12.2 Conducted Emission

