

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Americhip Inc.

GSM Controller

Model No.: AMC000-007

FCC ID: WN7AMC000-007

Prepared for : Americhip Inc.
Room 212, Block 2, Nanhai Ecool No.6 Xing Hua Road,
She Kou, Shenzhen, China

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number : ACS-F14029

Date of Test : Jan.11, 2014

Date of Report : Apr.30, 2014

TABLE OF CONTENTS

Description	Page
1. SUMMARY OF STANDARDS AND RESULTS.....	1-1
1.1. Description of Standards and Results	1-1
2. GENERAL INFORMATION	2-1
2.1. Description of Device (EUT).....	2-1
2.2. Tested Supporting System Details	2-2
2.3. Block diagram of connection between the EUT and simulators	2-2
2.4. Test Facility	2-3
2.5. Measurement Uncertainty (95% confidence levels, k=2)	2-3
3. EFFECTIVE ISOTROPIC RADIATED POWER.....	3-1
3.1. Test Equipment	3-1
3.1. Limit.....	3-2
3.2. Test Procedure:	3-2
3.3. Test Results	3-3
4. OUT OF BAND EMISSIONS AT ANTENNA TERMINALS AND BAND EDGE ..	4-1
4.1. Test Equipment	4-1
4.2. Limit.....	4-1
4.3. Test Procedure.....	4-1
4.4. Test result.....	4-1
5. 99% & 26dB Occupied Bandwidth Test.....	5-1
5.1. Test Equipment	5-1
5.2. Test Procedure.....	5-1
5.3. Test Results	5-1
6. RF POWER OUTPUT TEST	6-1
6.1. Test Equipment	6-1
6.2. Limit.....	6-1
6.3. Test Procedure.....	6-1
6.4. Test Results	6-2
7. FIELD STRENGTH OF RADIATED SPURIOUS EMISSIONS.....	7-1
7.1. Test Equipment	7-1
7.2. Limit.....	7-2
7.3. Test Procedure.....	7-2
7.4. Test Results	7-1
8. FREQUENCY STABILITY V.S. TEMPERATURE AND VOLTAGE.....	8-1
8.1. Test Equipment	8-1
8.1. Limit.....	8-2
8.2. Test procedure:.....	8-2
9. DEVIATION TO TEST SPECIFICATIONS.....	9-1
10. PHOTOGRAPH OF TEST	10-1
11. PHOTOS OF THE EUT.....	11-3

FCC ID: WN7AMC000-007

TEST REPORT CERTIFICATION

Applicant : Americhip Inc.
Manufacturer : Americhip Inc.
EUT Description : GSM Controller
FCC ID : WN7AMC000-007
(A) MODEL NO. : AMC000-007
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : DC 3.7V; DC 5V
(D) TEST VOLTAGE : DC 3.7V

Tested for comply with:
FCC part 2, 22H & 24E

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC part 2, 22H & 24E requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements.

This Report is made under FCC part 2, 22H & 24E. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Jan.11, 2014 Report of date: Apr.30, 2014

Prepared by : Selina Liu Reviewed by : Sunny Lu
Selina Liu / Supervisor Sunny Lu / Assistant Manager



信華科技(深圳)有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章

Stamp only for EMC Dept. Report

Signature: David Jin

Approved & Authorized Signer :

David Jin / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Effective Isotropic Radiated Power	2.1046(a) 22.913(a) 24.232(b)	PASS
Out of Band Emissions at antenna Terminals and Band Edge	2.1051 22.917(a) 24.238(a)	PASS
99% & 26dB Occupied Bandwidth	2.1049(h)	PASS
RF Output Power	2.1046(a) 22.913(a) 24.232(b)	PASS
Field Strength of Spurious Emissions	2.1053 22.917(a) 24.238(a)	PASS
Frequency Stability vs. Temperature and Voltage	2.1055	PASS

2. GENERAL INFORMATION

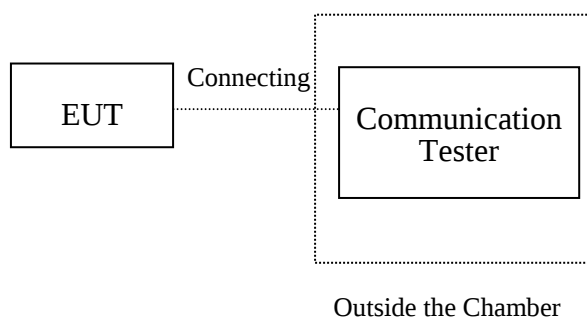
2.1. Description of Device (EUT)

Product Name	: GSM Controller
Model Number	: AMC000-007
FCC ID	: WN7AMC000-007
Operating Frequency	: GSM 850: 824-849MHz PCS 1900: 1850-1910MHz
Antenna Assembly Gain	: GSM :Integrated PCB Antenna, -4.1dBi PCS: Integrated PCB Antenna, -0.4dBi
Applicant	: Americhip Inc. Room 212, Block 2, Nanhai Ecool No.6 Xing Hua Road, She Kou, Shenzhen, China
Manufacturer	: Americhip Inc. Room 212, Block 2, Nanhai Ecool No.6 Xing Hua Road, She Kou, Shenzhen, China
Date of Test	: Jan.11, 2014
Date of Receipt	: Jan.10, 2013
Sample Type	: Prototype production

2.2. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1.	Wireless Communication Tester	---	Agilent	E5515C	GB44300243	---

2.3. Block diagram of connection between the EUT and simulators



(EUT: GSM Controller)

2.4. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block, Shenzhen
Science & Industrial Park, Nantou,
Shenzhen, Guangdong, China

3m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 90454
Valid Date: Feb.22, 2015

3m & 10m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 794232
Valid Date: Dec.31, 2015

EMC Lab. : Certificated by Industry Canada
Registration Number: IC 5183A-1
Valid Date: Jun.13, 2014

: Certificated by DAkkS, Germany
Registration No: D-PL-12151-01-01
Valid Date: Feb.01, 2014

: Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2014

2.5. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6°C
	3%

3. EFFECTIVE ISOTROPIC RADIATED POWER

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 13	1 Year
2.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1Year
3.	Signal Generator	HP	83732B	VS34490501	May.08, 13	1 Year
4.	Power meter	Anritsu	ML2487A	6K00002472	May.08, 13	1Year
5.	Power sensor	Anritsu	MA2491A	0033005	May.08, 13	1Year
6.	Attenuator(10dB)	Agilent	8491A	MY39264375	May.08, 13	1 Year
7.	Attenuator(20dB)	Agilent	8491B	MY39262165	May.08, 13	1 Year
8.	Universal Radio Communication Tester	R&S	CMU200	117194	Oct. 31,13	1 Year
9.	Network Analyzer	Agilent	E5071B	MY42403549	May.08, 13	1 Year
10.	Bluetooth Test set	Agilent	MT8852B	6K00005966	May.18, 13	1 Year
11.	Wireless Communication Tester	Agilent	E5515C	GB44300243	May.18. 13	1 Year
12.	DC Power supply	King	DPS-1303D	821956	N/A	N/A
13.	PreAmplifier	Agilent	8449B	3008A02495	May.08, 13	1 Year
14.	PreAmplifier	Agilent	8447D	2944A11159	May.08, 13	1Year
15.	Horn Antenna	EMCO	3115	9510-4580	May.28, 13	1 Year
16.	Bilog Antenna	Schaffner	CBL6111C	2598	Mar.14, 13	1 Year
17.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
18.	Power divider	Mini-Circuits	ZA3PD-4-S+	347100912	N/A	N/A
19.	Power divider	Mini-Circuits	ZA4PD-4-S+	544000937	N/A	N/A
20.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
21.	Temperature controller	Terchy	MHQ-120cluB	A60223	May.08, 13	1Year
22.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08, 13	1 Year
23.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1 Year
24.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1 Year
25.	RF Cable	Hubersuhner	SUCOFLEX102	274094/4	May.08,13	1 Year
26.	Loop Antenna	Chase	HLA6120	1062	May.21, 13	1 Year
27.	Horn Antenna	EMCO	3116	00060089	Aug.28, 13	1 Year

3.1.Limit

22.913(a) Mobile station are limited to 7W ERP.

Part 24.232(b) Mobile station are Limited to 2W EIRP.

3.2.Test Procedure:

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength(E in dBuV/m) was calculated.

ERP in frequency band 824.2-848.8MHz were measured using substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follow:

EIRP in frequency band 1850.2-1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss(dB)}$

$EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss(dB)}$

3.3. Test Results

EUT: GSM Controller		
M/N: AMC000-007		
Test date: 2014-01-11	Pressure: 101.2±1.0 kpa	Humidity: 48.4±3.0%
Tested by: Kevin_hu	Test site: RF site	Temperature: 20.7±0.6

GSM 850

Test Result :

The RBW, VBW of SPA for frequency

Below 1GHz was RBW=300KHz, VBW=1MHz;

Above 1GHz was RBW=1MHz, VBW=3MHz;

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuV/m)
GSM 850	824.2	128	V	105.83	22.5	3.67	132.00
			H	106.05	22.5	3.67	132.22
	836.6	190	V	103.97	22.7	3.69	130.36
			H	105.54	22.7	3.69	131.93
	848.8	251	V	103.56	22.8	3.70	130.06
			H	105.12	22.8	3.70	131.62

S.G.output (dBm)	Antenna Gain (dBd)	Tx Cable loss (dB)	Result ERP (dBm)	Limit
				ERP(dBm)
20.83	8.60	1.20	28.23	38.45
23.99	8.60	1.20	31.39	38.45
21.82	8.82	1.52	29.12	38.45
24.42	8.82	1.52	31.72	38.45
20.83	8.96	1.79	28.00	38.45
24.50	8.96	1.79	31.67	38.45

PCS 1900

Test Result :

The RBW,VBW of SPA for frequency

Below 1GHz was RBW=300KHz,VBW=1MHz;

Above 1GHz was RBW=1MHz,VBW=3MHz;

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuv)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuv/m)
PCS 1900	1850.2	512	V	98.78	22.77	5.79	127.34
			H	100.34	22.77	5.79	128.9
	1880.0	661	V	98.95	22.82	5.92	127.69
			H	101.54	22.82	5.92	130.28
	1909.8	810	V	98.64	22.89	6.05	127.58
			H	101.79	22.89	6.05	130.73

S.G.output (dBm)	Antenna Gain (dBi)	Tx Cable loss (dB)	Result EIRP (dBm)	Limit
				EIRP(dBm)
21.26	7.20	2.25	26.21	33
24.17	7.20	2.25	29.12	33
21.52	7.32	2.42	26.42	33
23.76	7.32	2.42	28.66	33
22.33	7.54	2.60	27.27	33
23.64	7.54	2.60	28.58	33

Conclusion: PASS

4. OUT OF BAND EMISSIONS AT ANTENNA TERMINALS AND BAND EDGE

4.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,13	1Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08, 13	1Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1Year
4.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08,13	1Year
6.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
7.	Wireless Communication Test set	Agilent	E5515C	GB44300243	May.08,13	1Year

4.2. Limit

FCC part 22.917(a), 24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than $43+10\log(\text{Mean power in watts})$ dBc below the mean power output outside a license's frequency block(-13dBm).

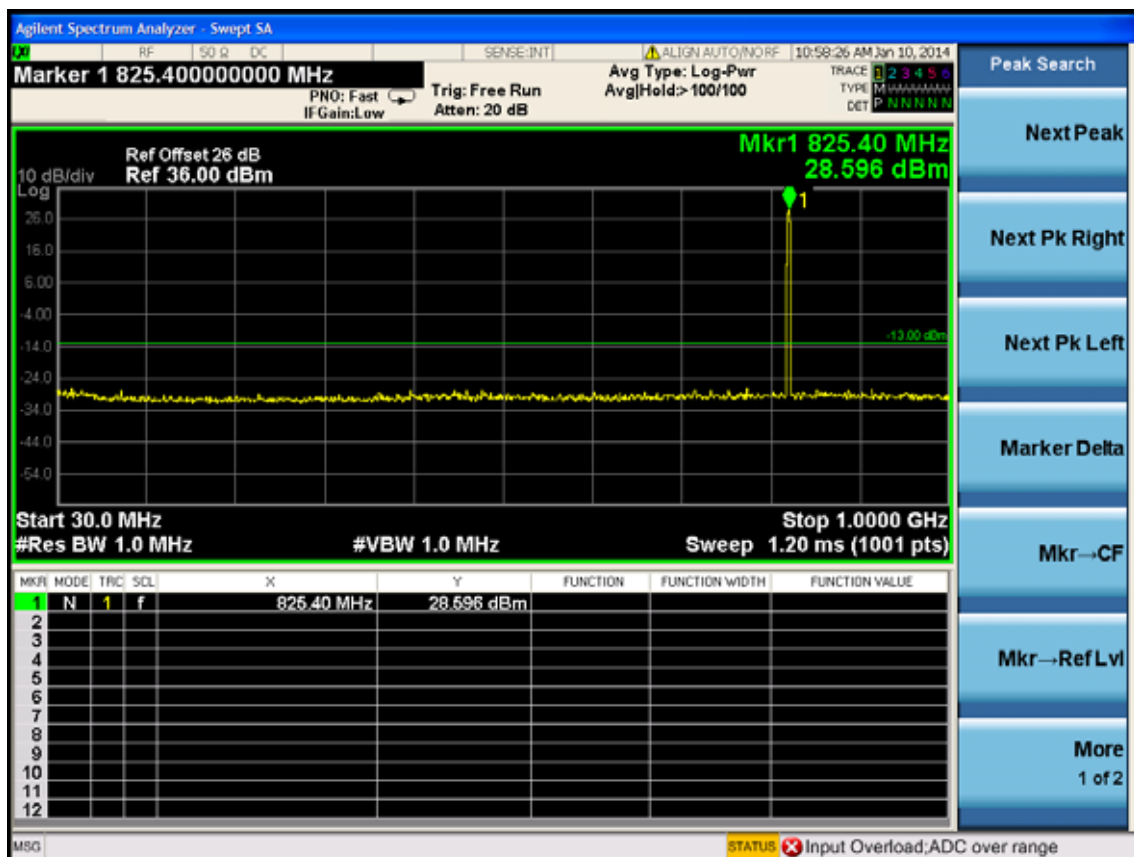
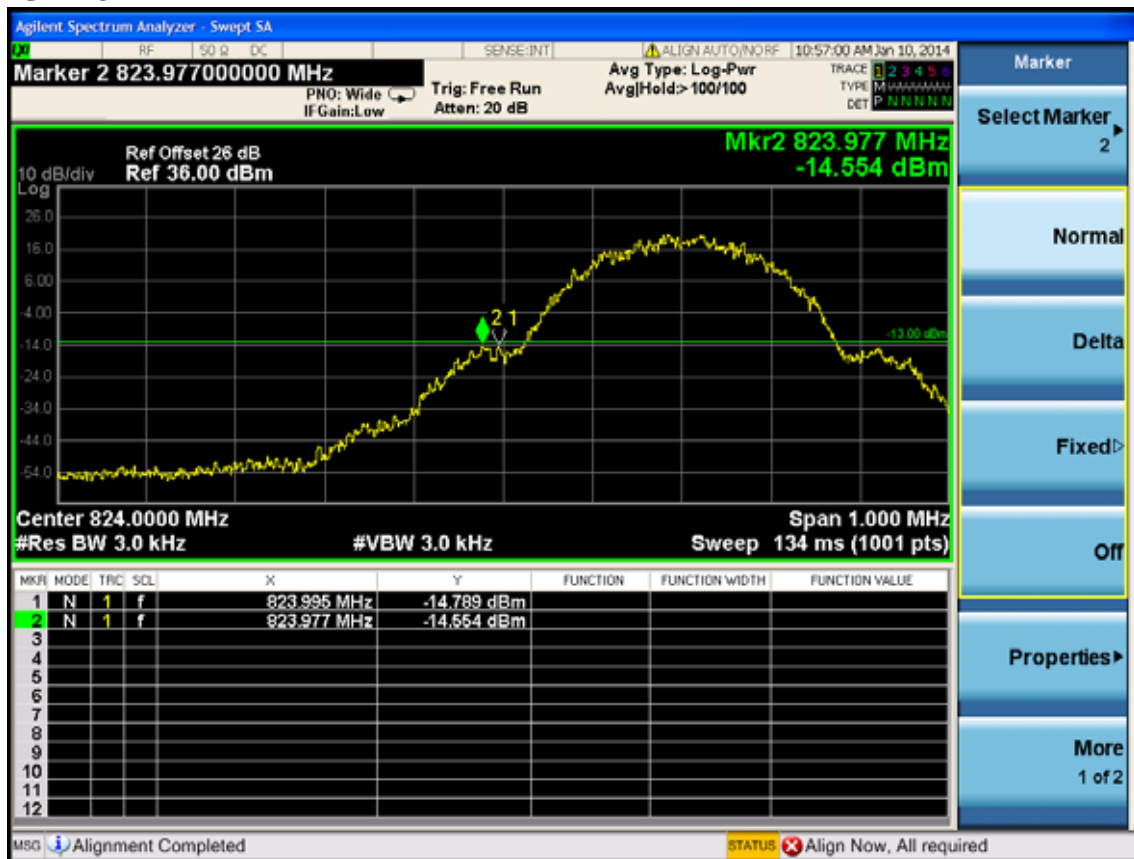
4.3. Test Procedure

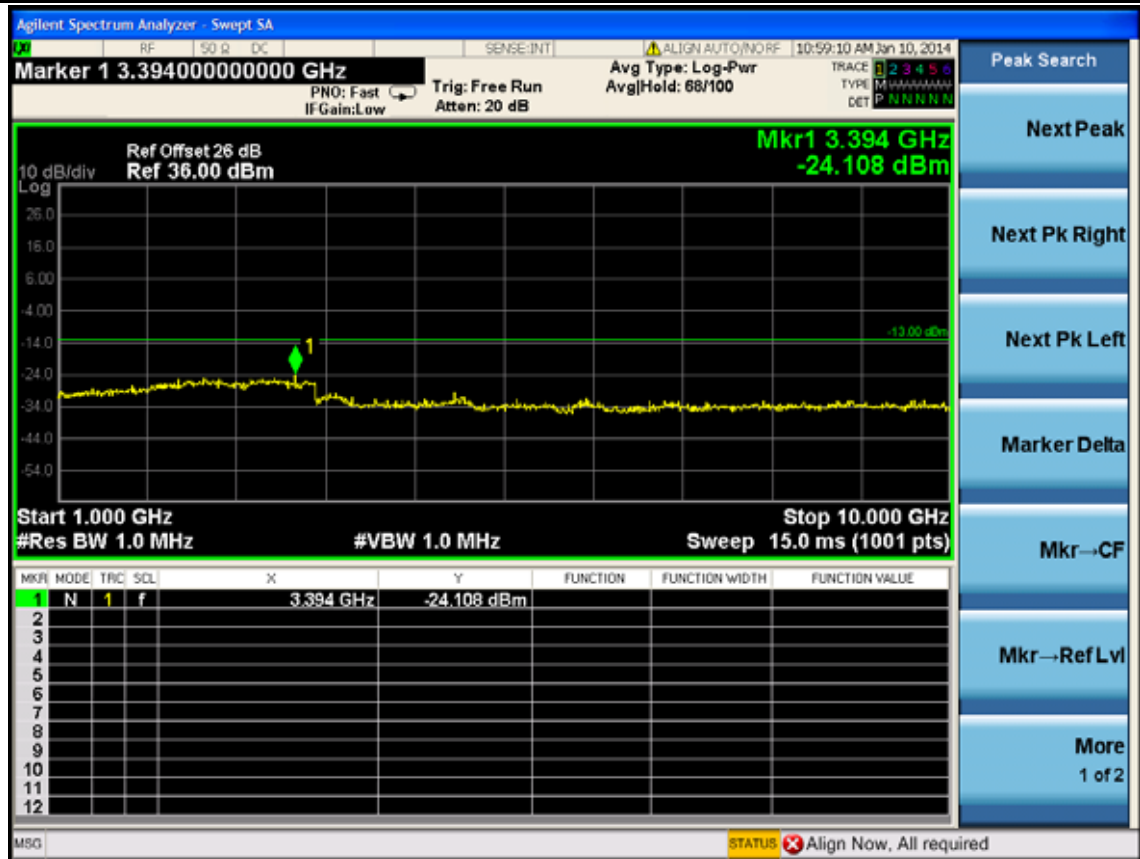
The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emission is any up to 10th harmonic. For the out of band: set RBW, VBW=1MHz, stat=30MHz, stop= 10 th harmonic. Limit=-13dBm Band Edge requirements: In 1Mhz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 % of bandwidth of fundamental emission of the transmitter any be employed to measure the out of band emission. Limit=-13dBm.

4.4. Test result

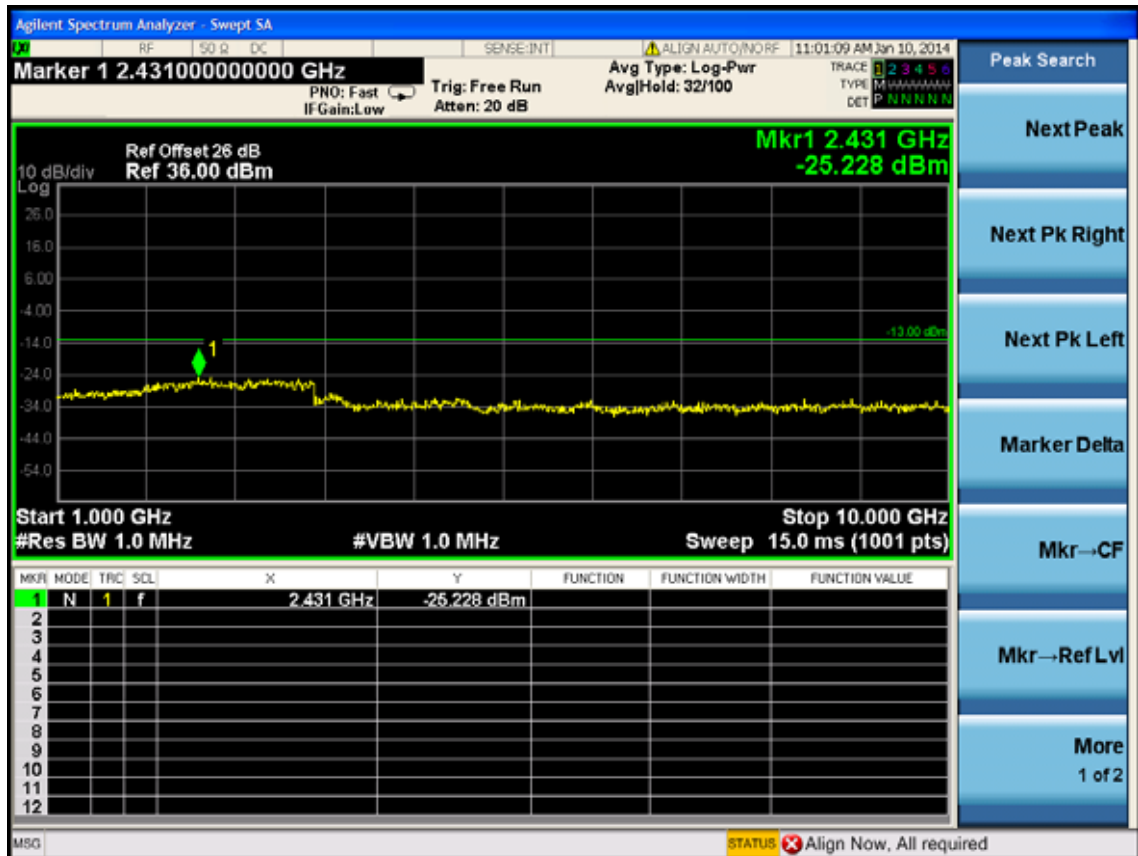
PASS (The testing data was attached in the next pages.)

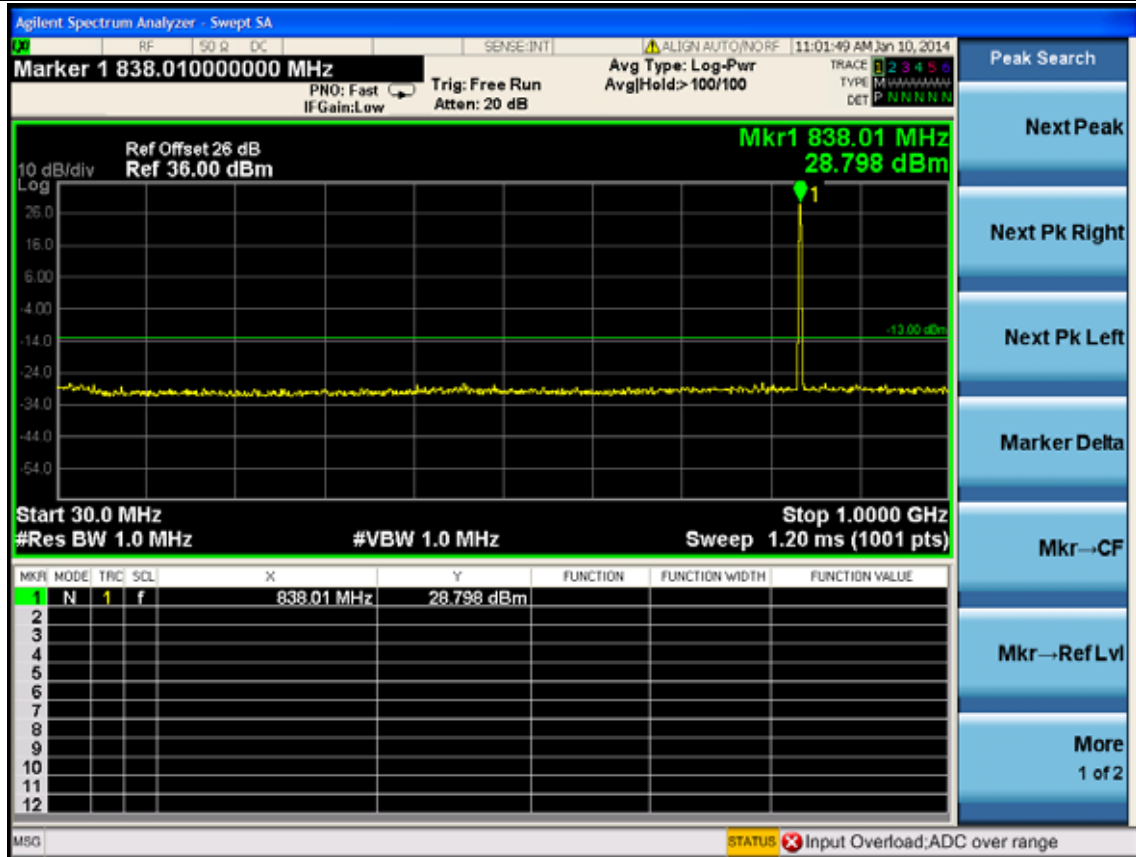
Test GSM 850
CH128



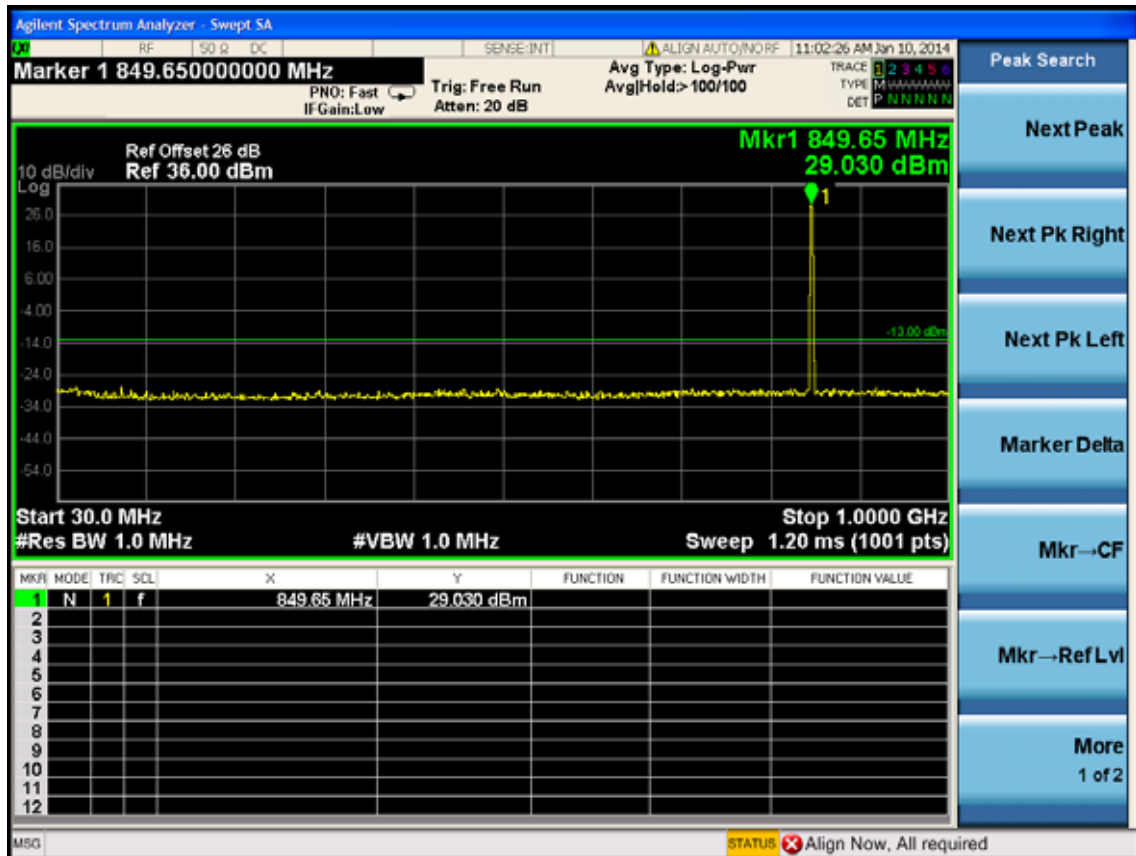


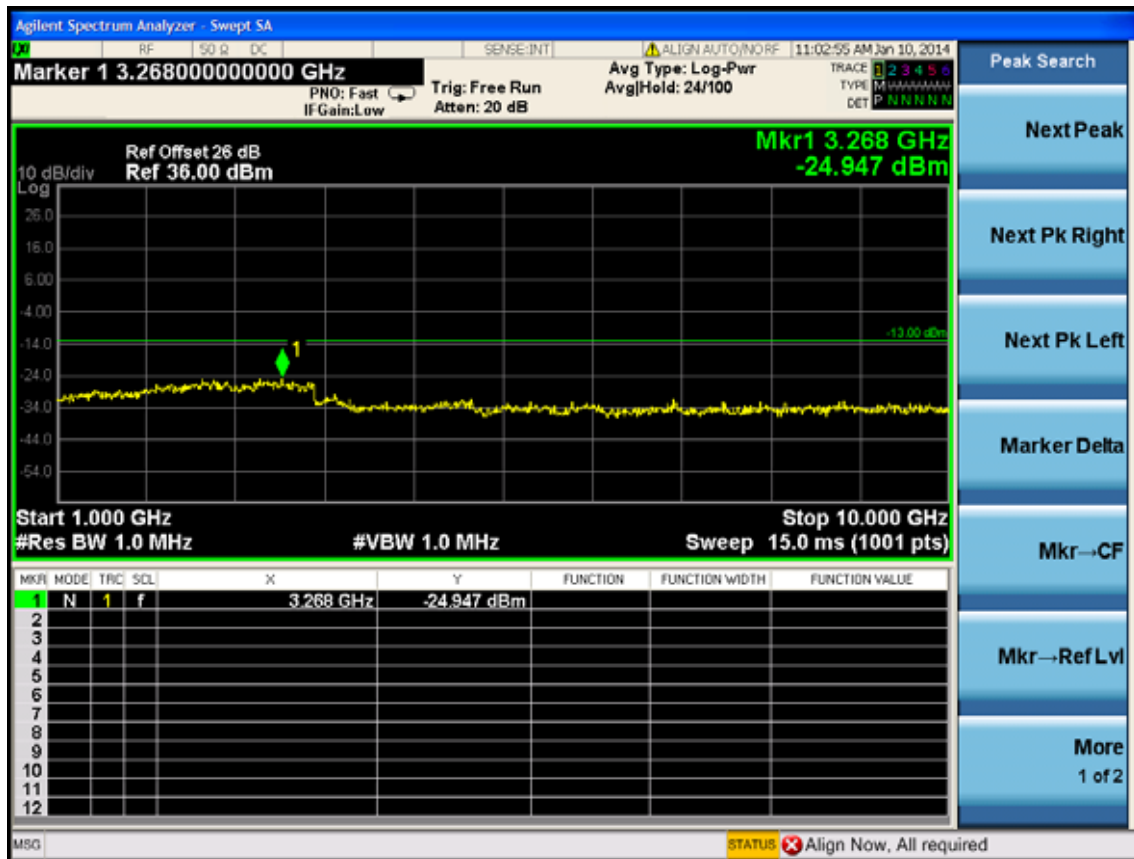
CH190



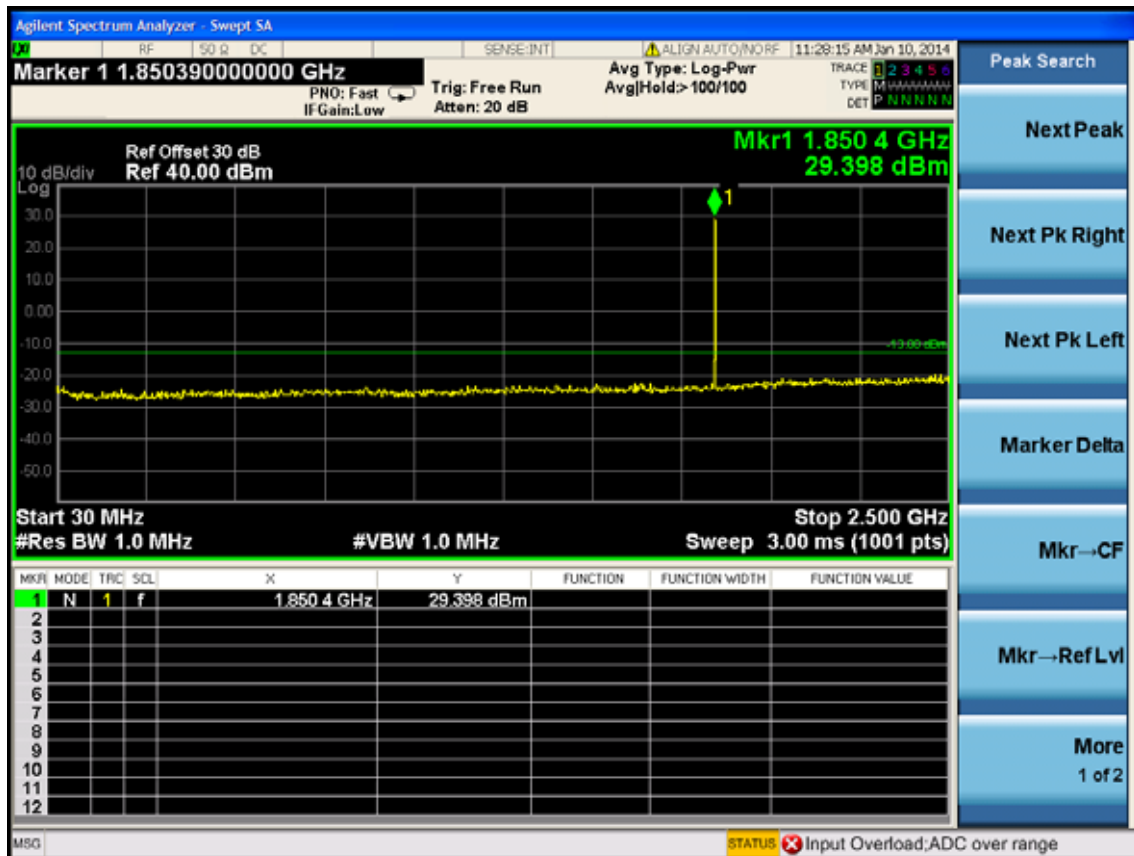
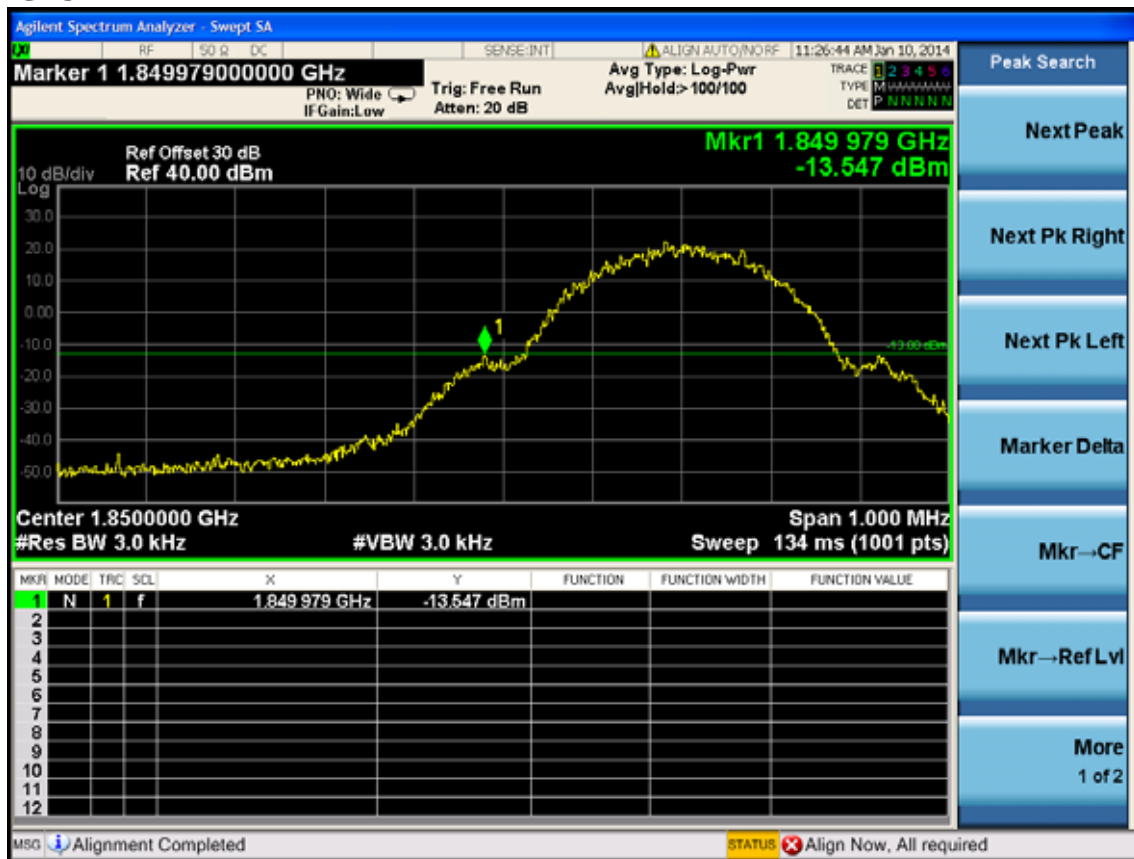


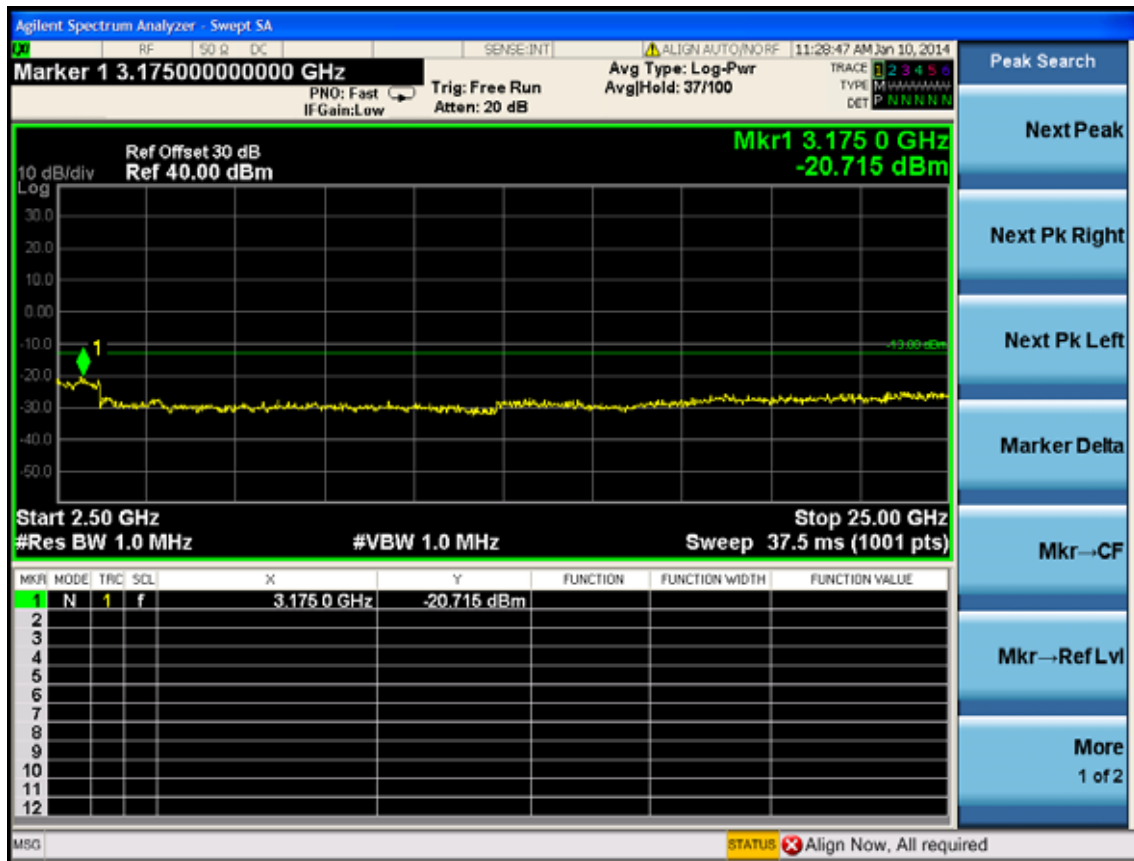
CH251



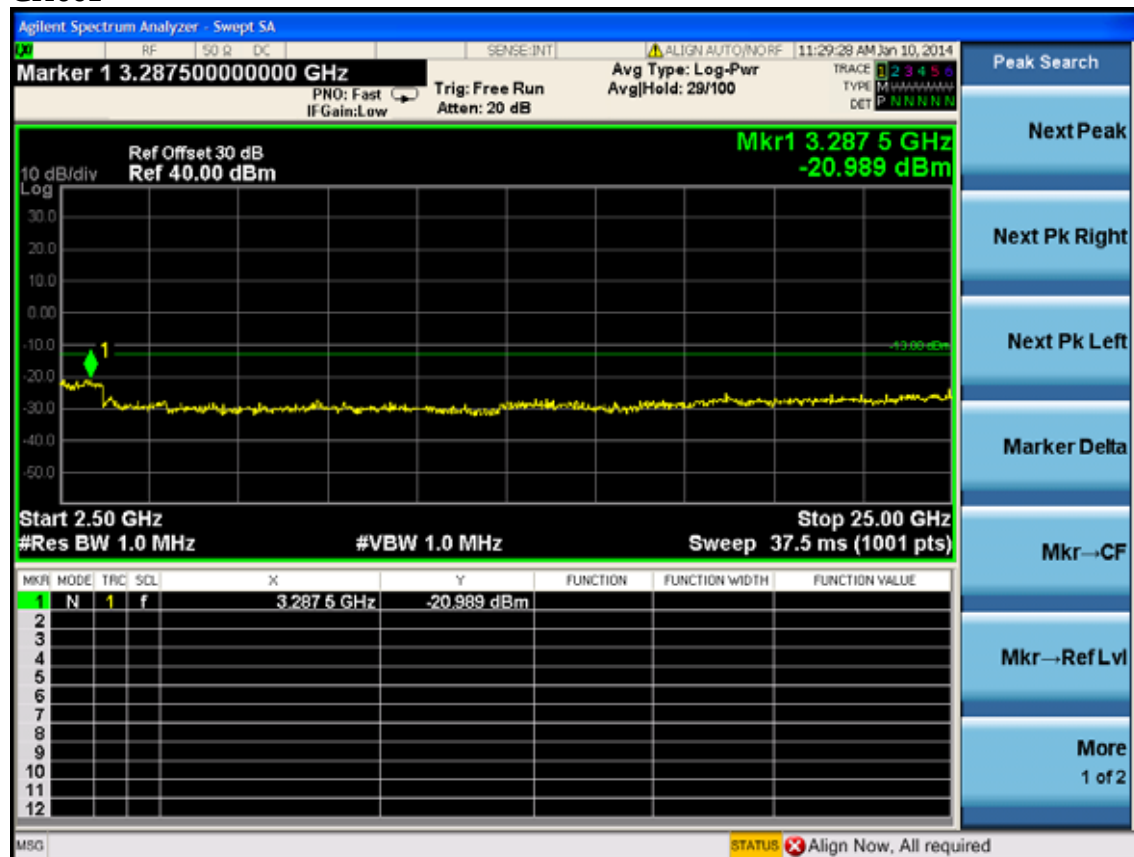


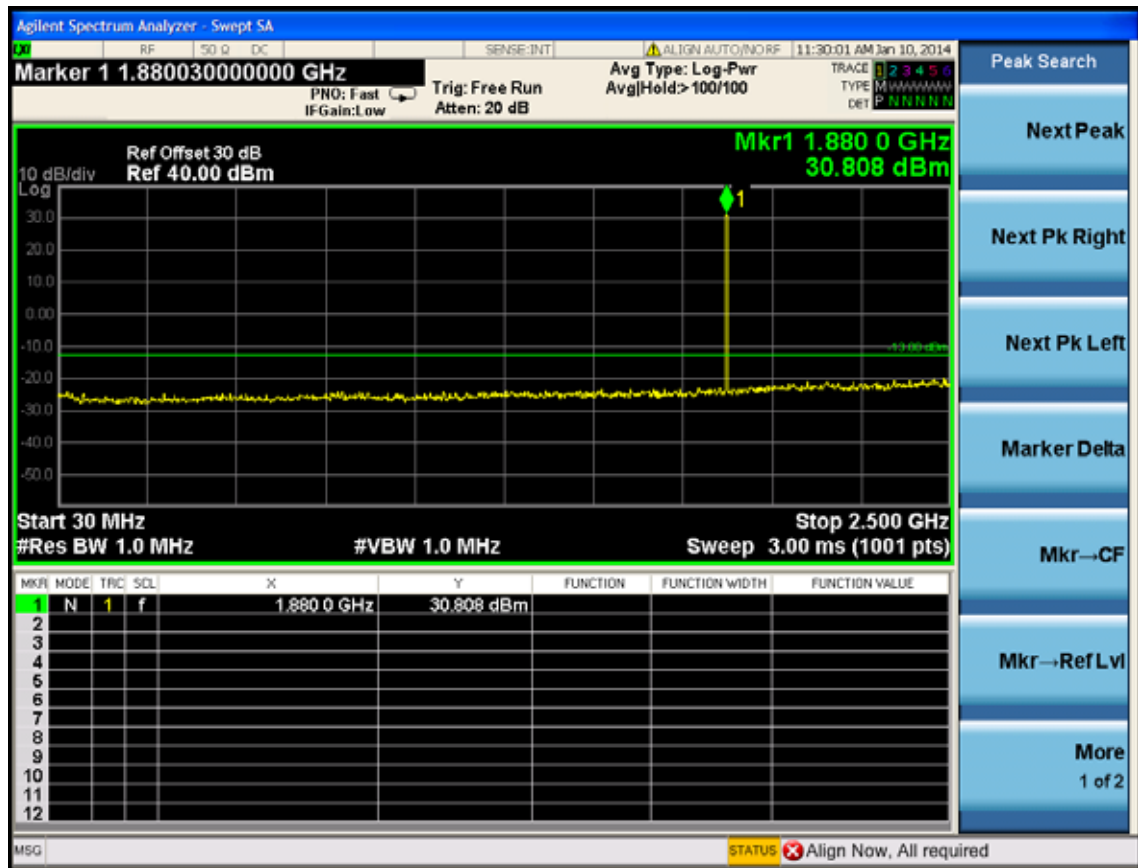
Test PCS 1900
CH512



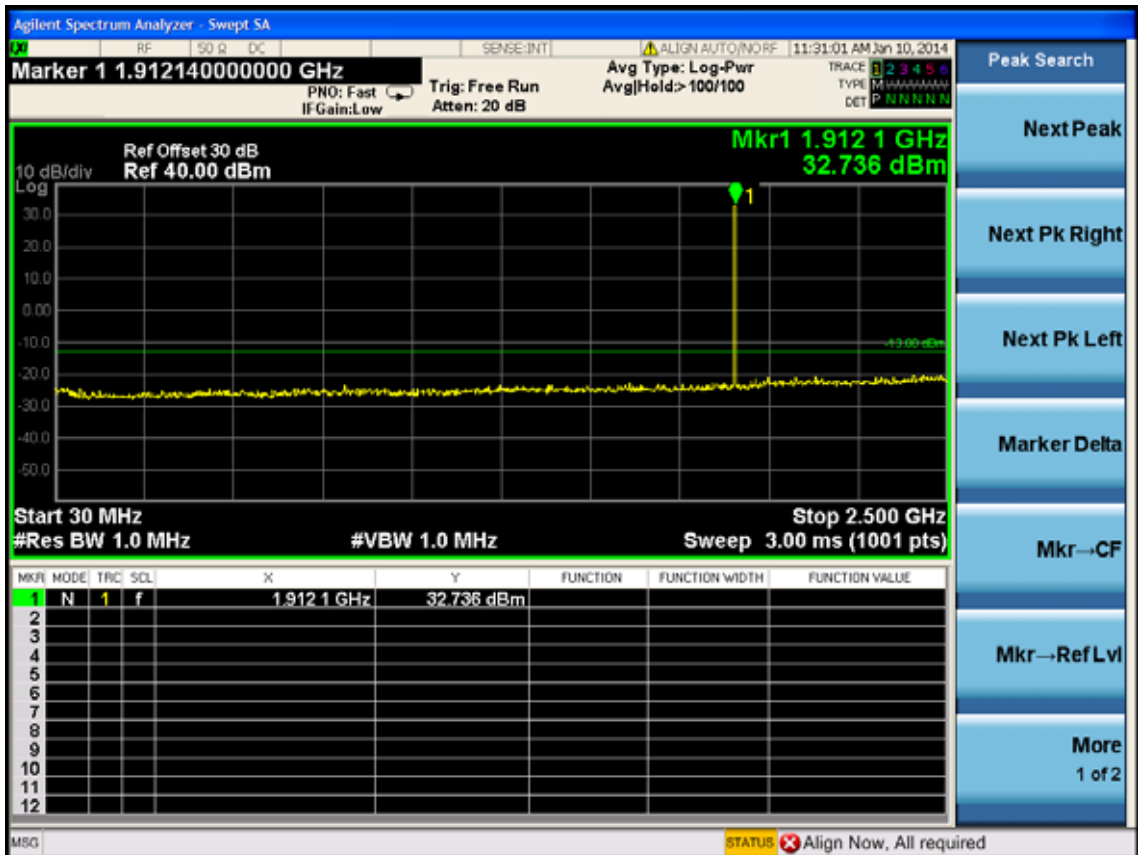


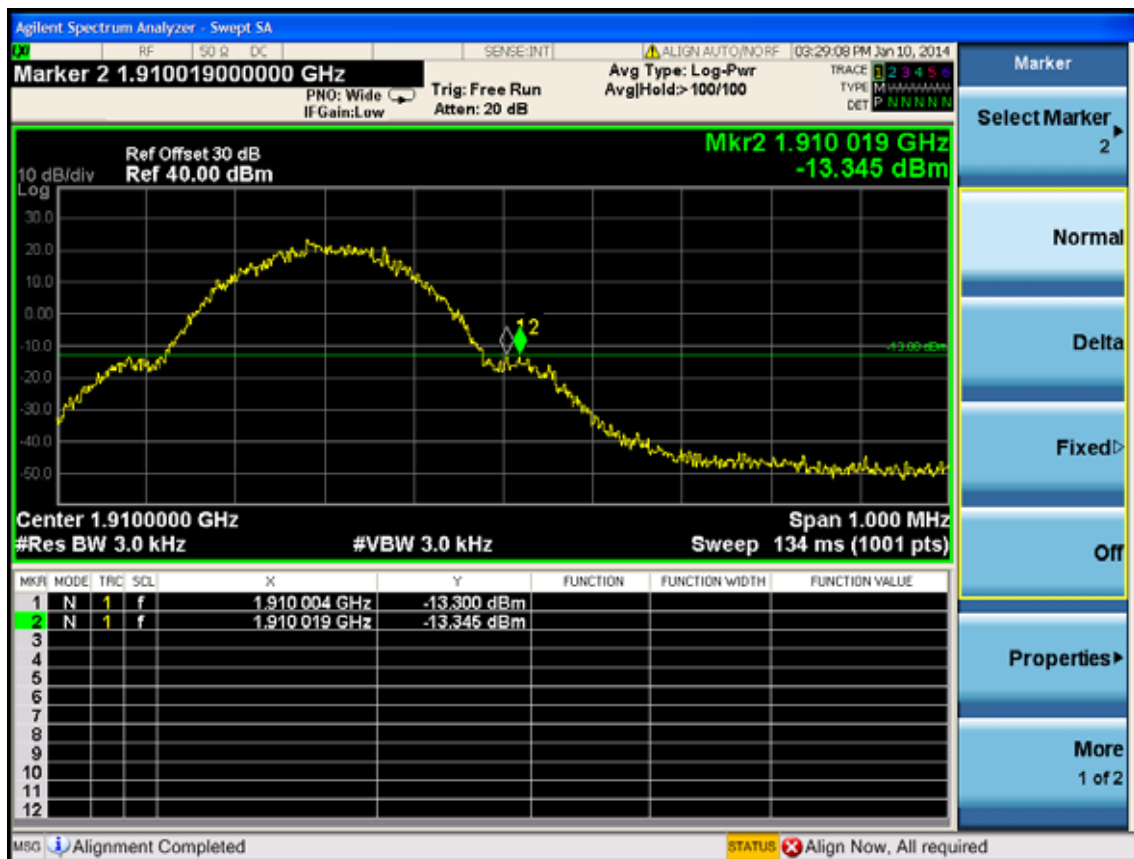
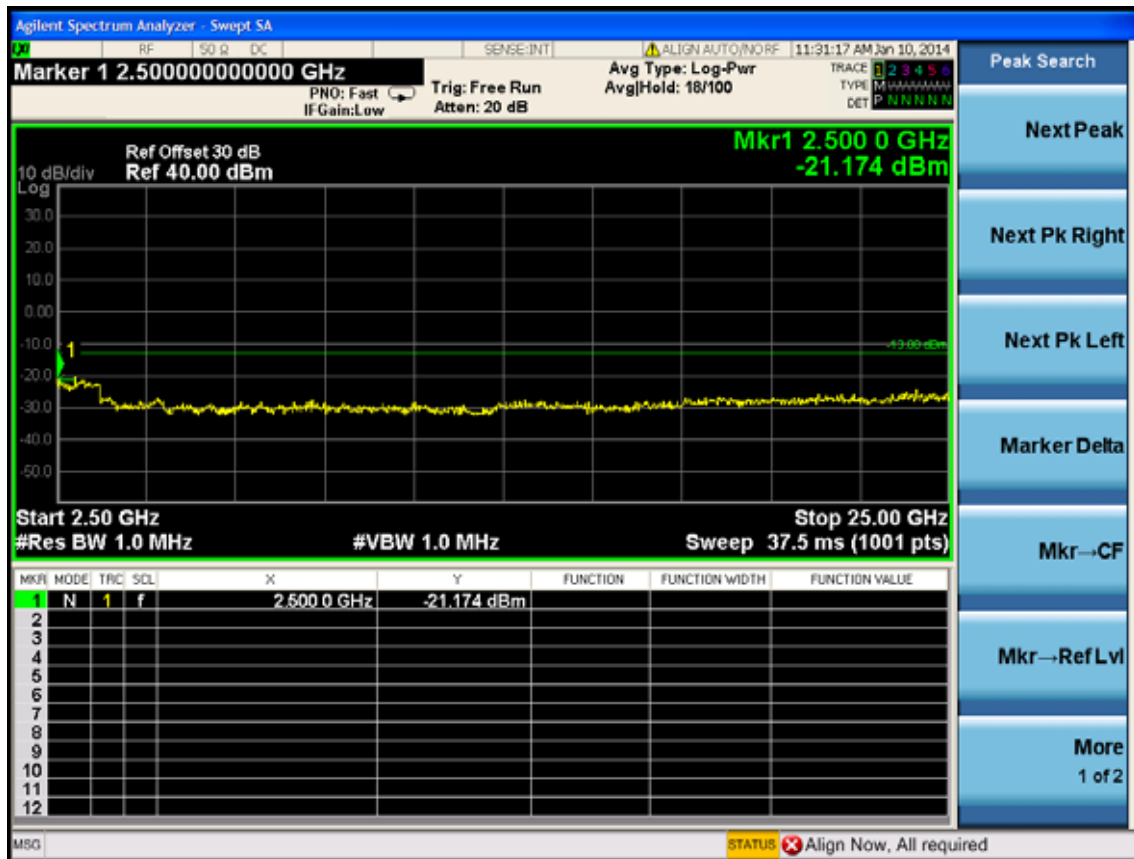
CH661





CH810





5. 99% & 26dB Occupied Bandwidth Test

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,13	1Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,13	1Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1Year
4.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08,13	1Year
6.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
7.	Wireless Communication Test set	Agilent	E5515C	GB44300243	May.08,13	1Year

5.2. Test Procedure

The EUT output RF connector was connected with a short a cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW>=3 times RBW, 99% bandwidth were measured, the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

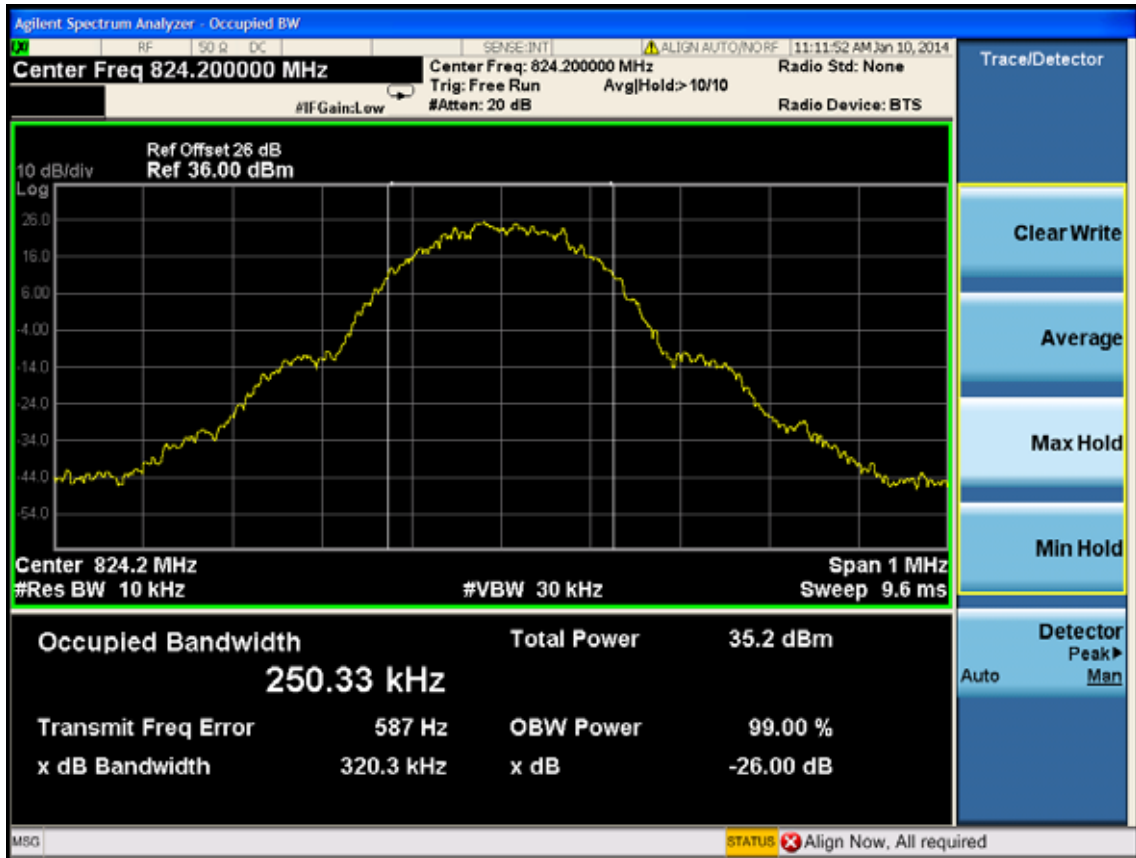
5.3. Test Results

99% Bandwidth

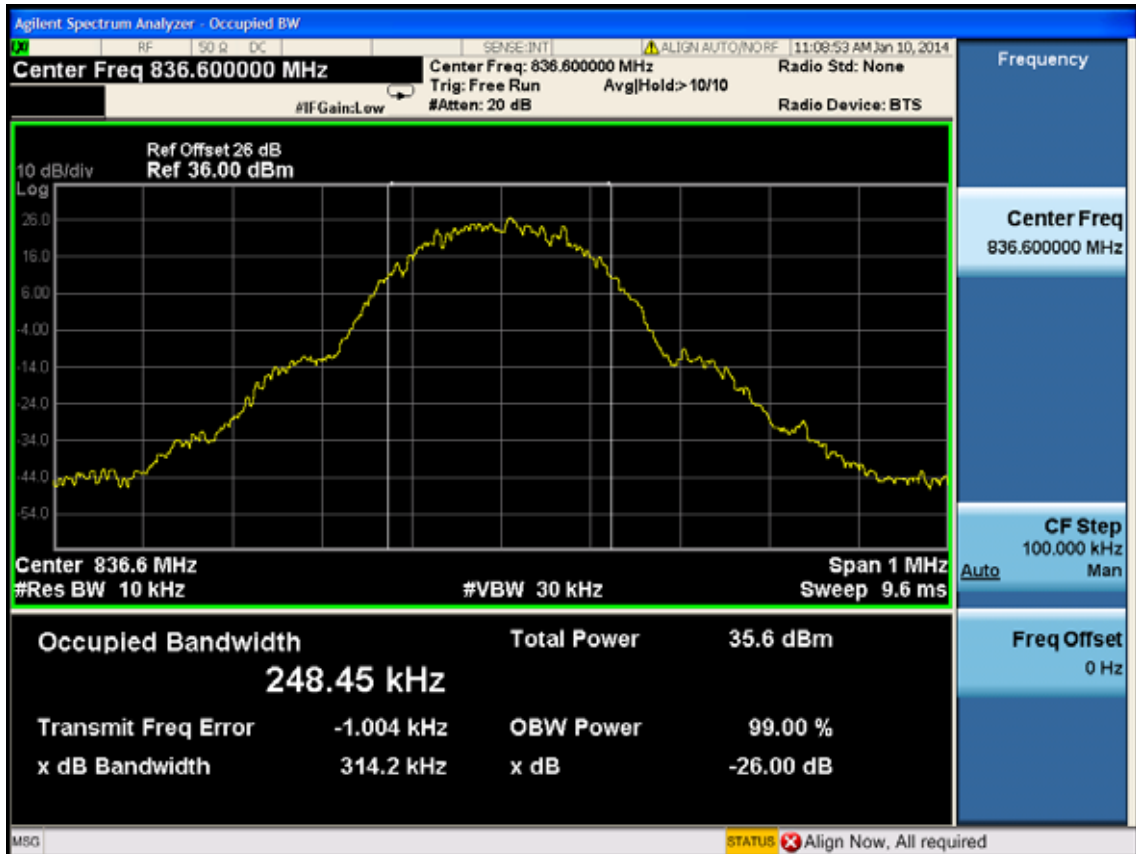
EUT:GSM Controller		
M/N: AMC000-007		
Test date: 2013-01-11	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Kevin_hu	Test site: RF Site	Temperature: 22.5±0.6℃

Test Mode	Frequency (MHz)	CH	99% bandwidth (KHz)	Limit (KHz)
GSM 850	824.2	128	250.33	N/A
	836.6	190	248.45	N/A
	848.8	251	249.84	N/A
PCS 1900	1850.2	512	245.89	N/A
	1880.0	661	248.05	N/A
	1909.8	810	248.38	N/A
Conclusion : PASS				

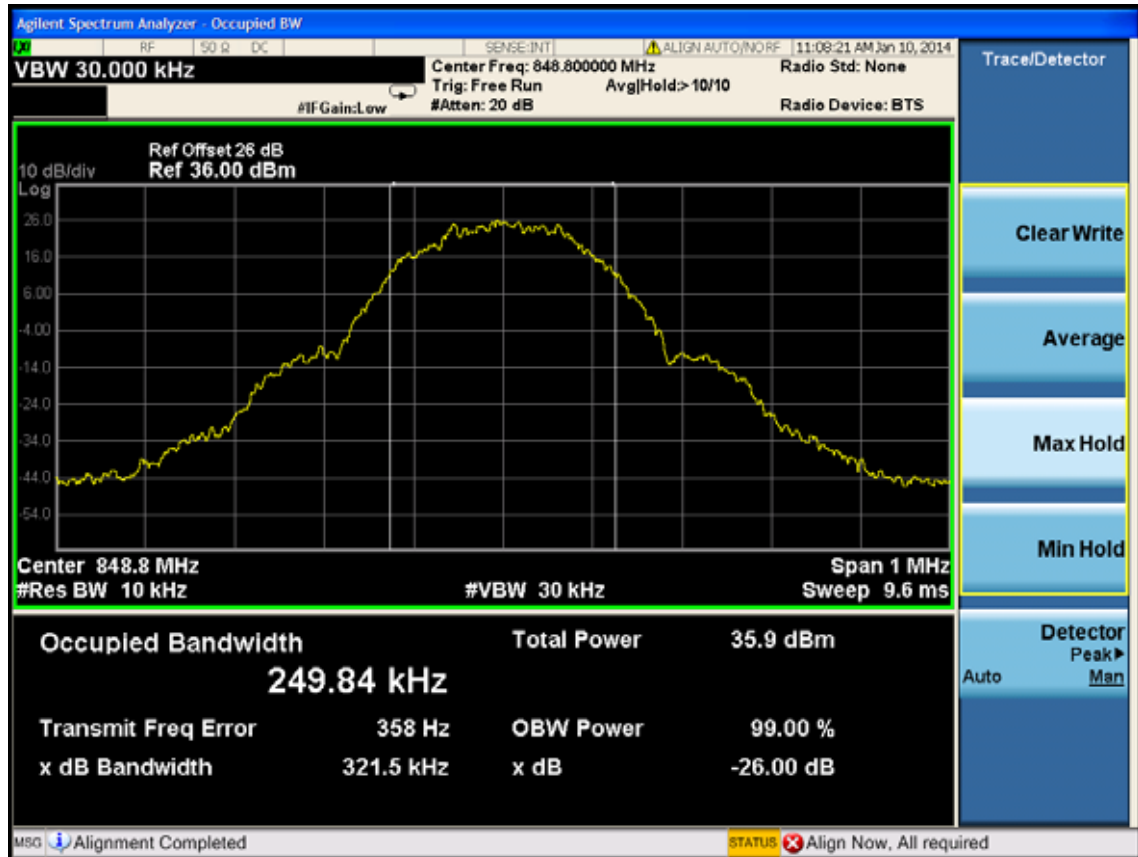
Test GSM 850
CH128



CH190

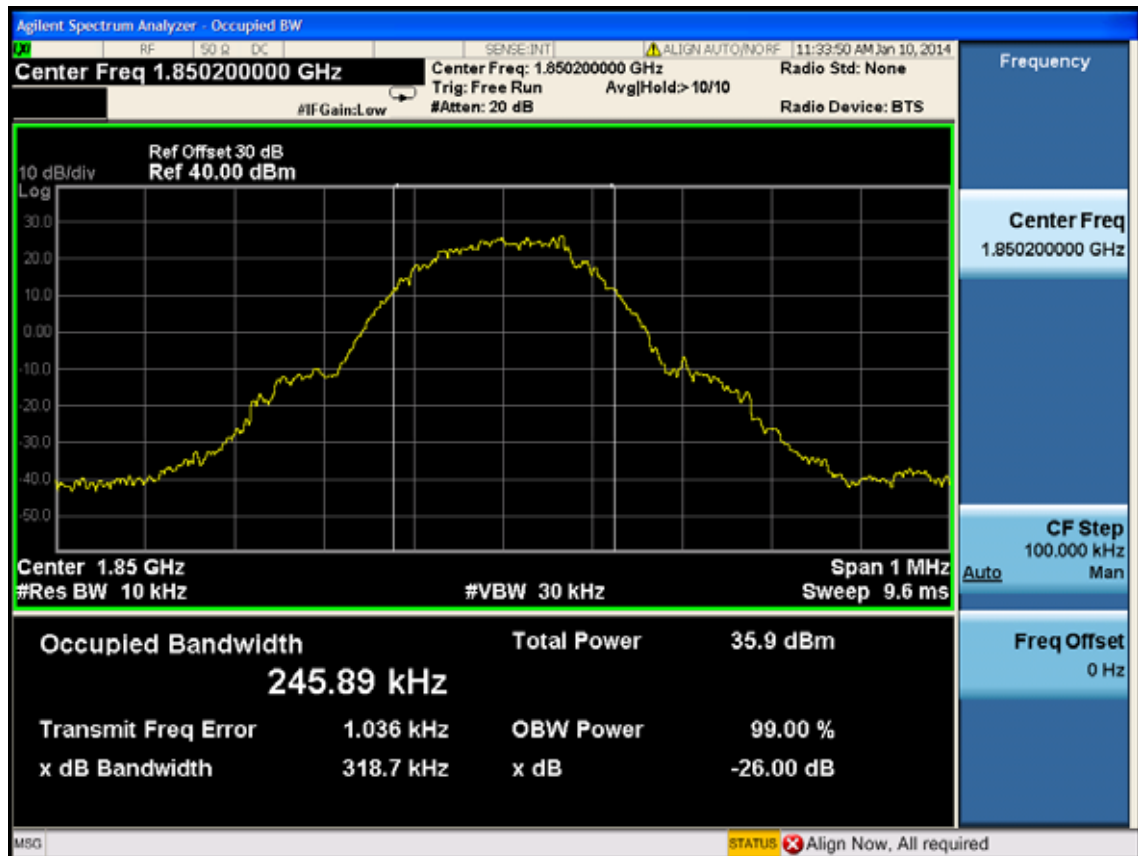


CH251

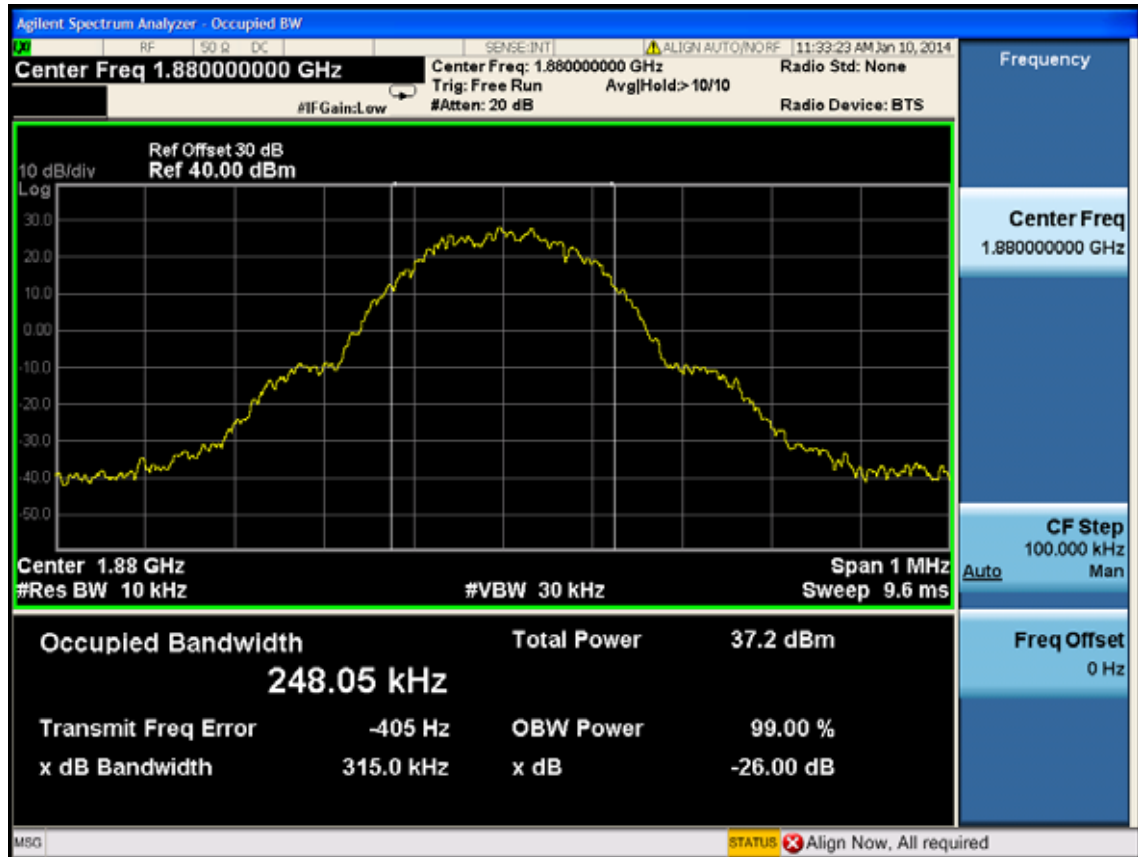


Test PCS 1900

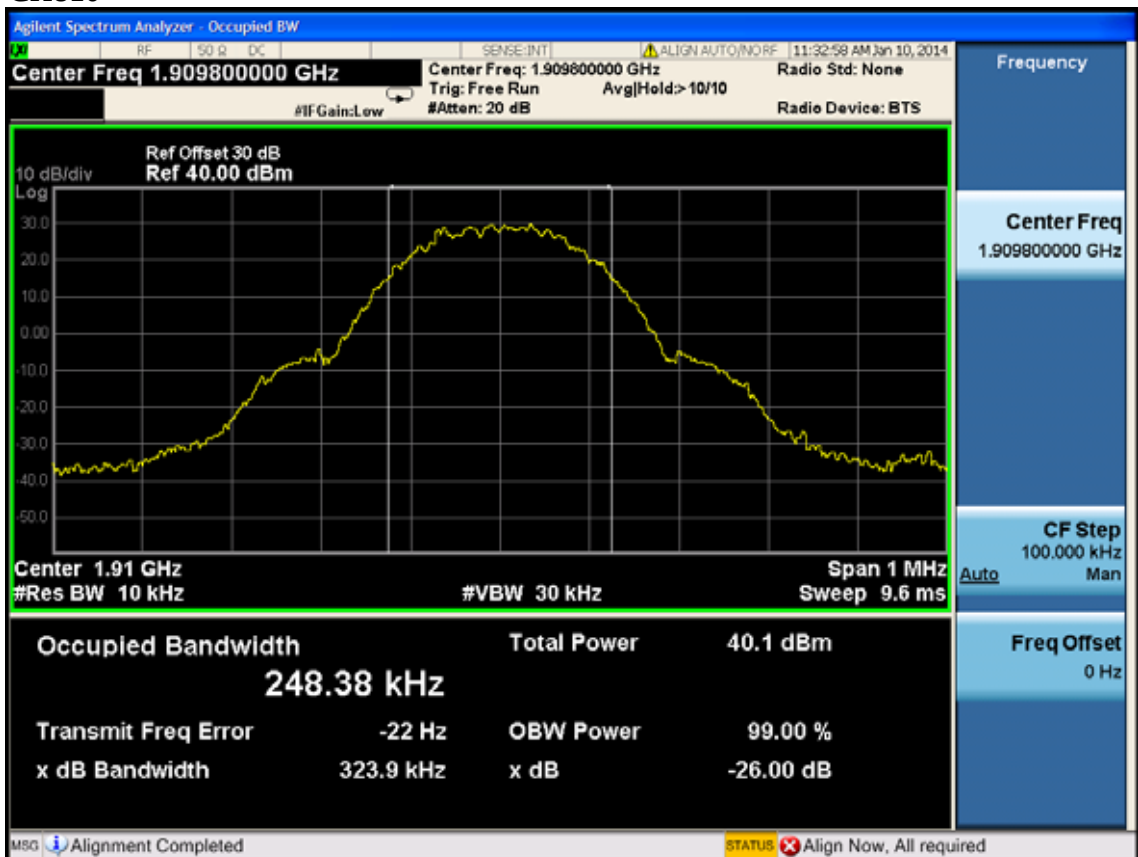
CH512



CH661



CH810



26dB Bandwidth

EUT: GSM Controller

M/N: AMC000-007

Test date: 2014-01-11

Pressure: 101.5±1.0 kpa

Humidity: 52.2±3.0%

Tested by: Kevin_hu

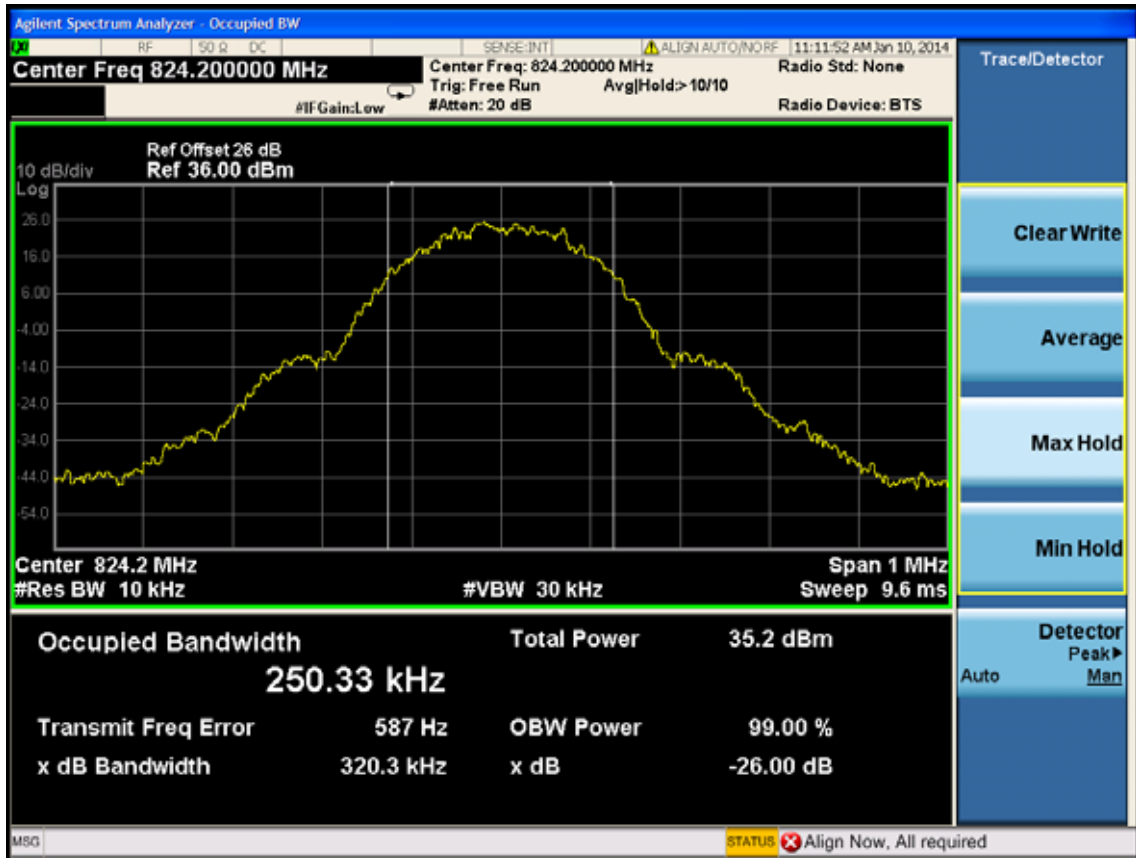
Test site: RF Site

Temperature: 22.5±0.6°C

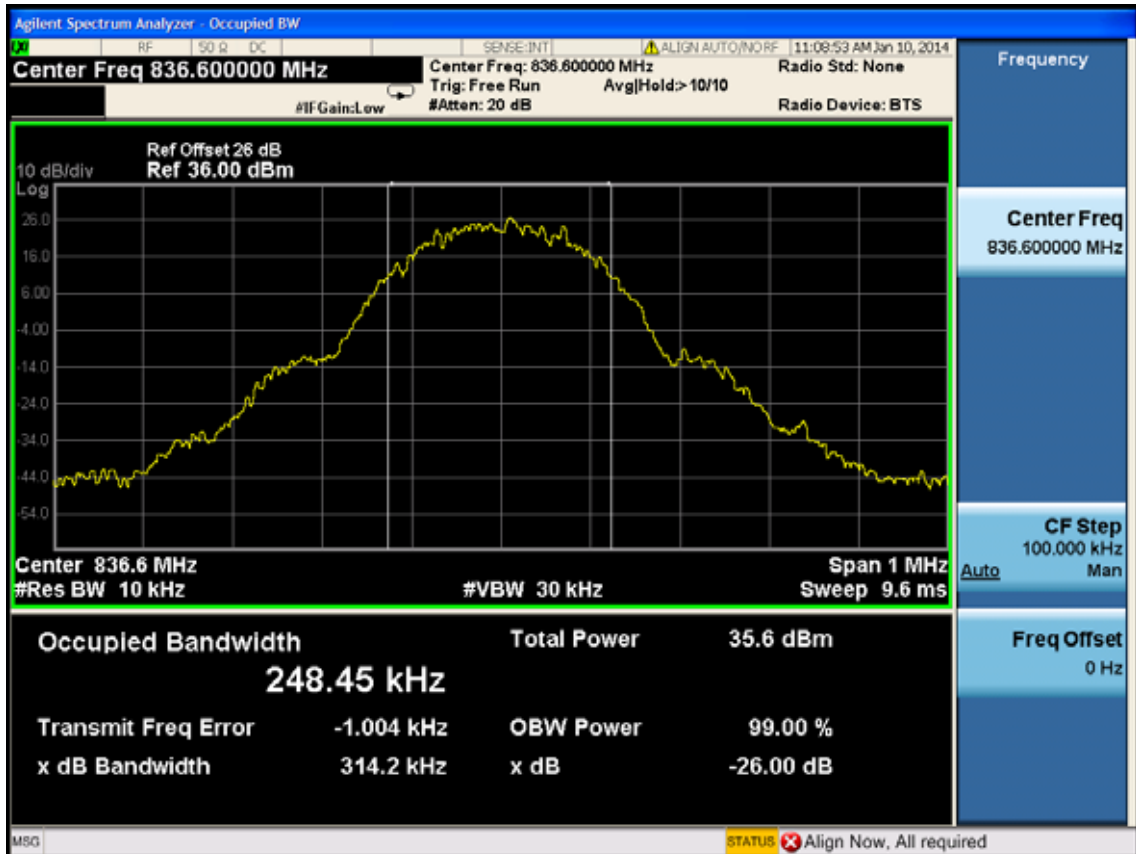
Test Mode	Frequency (MHz)	CH	26dB bandwidth (KHz)	Limit (KHz)
GSM 850	824.2	128	320.3	N/A
	836.6	190	314.2	N/A
	848.8	251	321.5	N/A
PCS 1900	1850.2	512	318.7	N/A
	1880.0	661	315.0	N/A
	1909.8	810	323.9	N/A

Conclusion : PASS

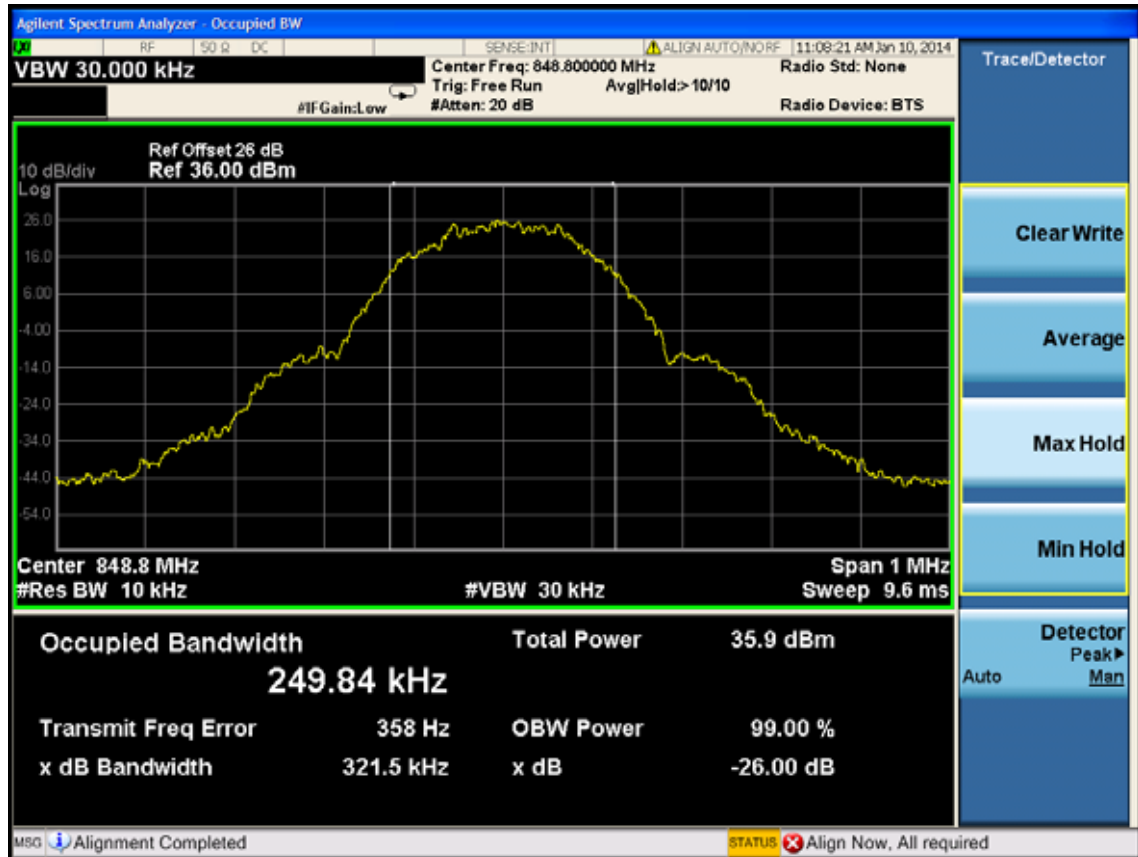
Test GSM 850
CH128



CH190

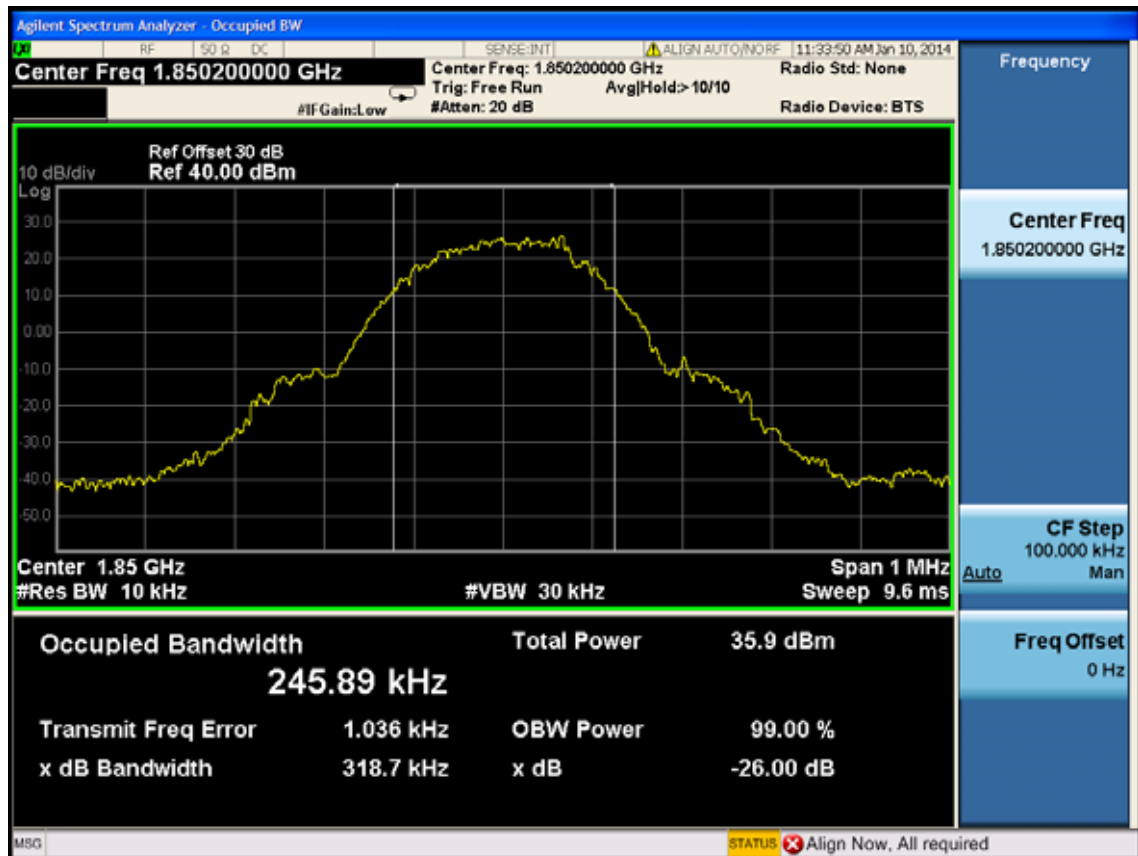


CH251

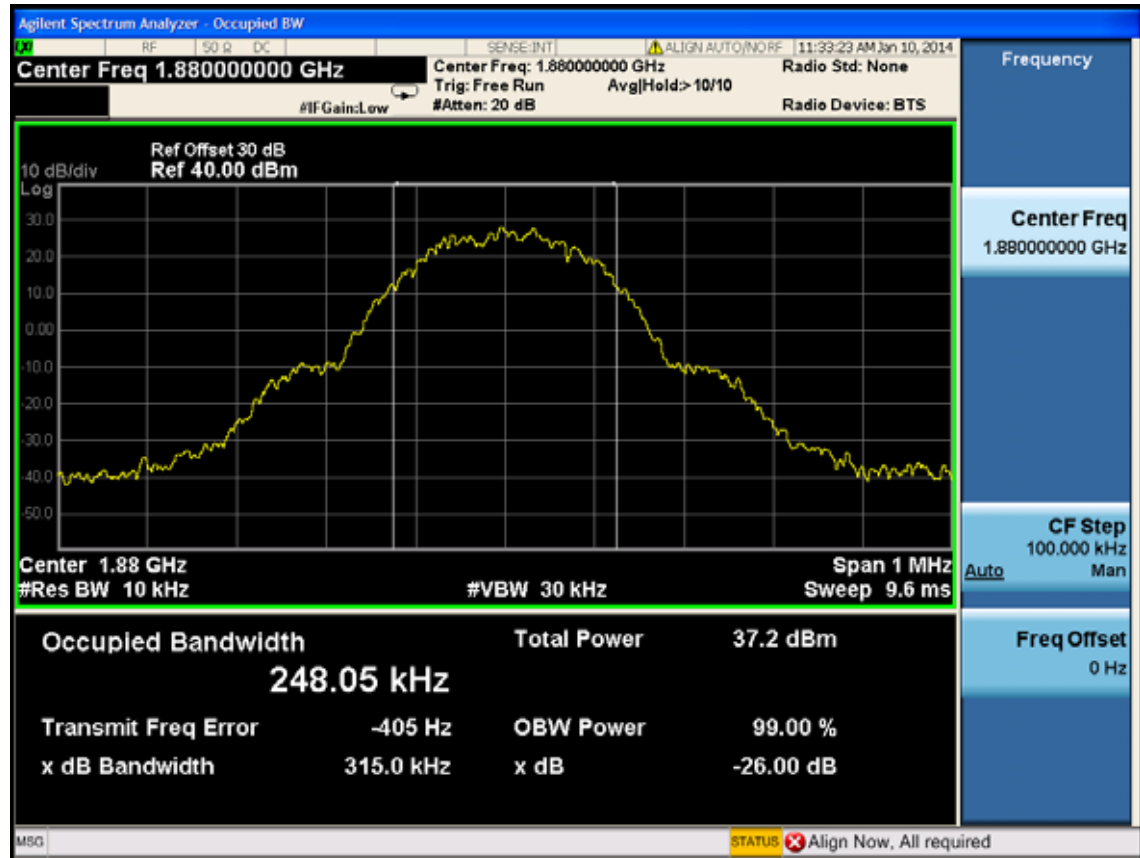


Test PCS 1900

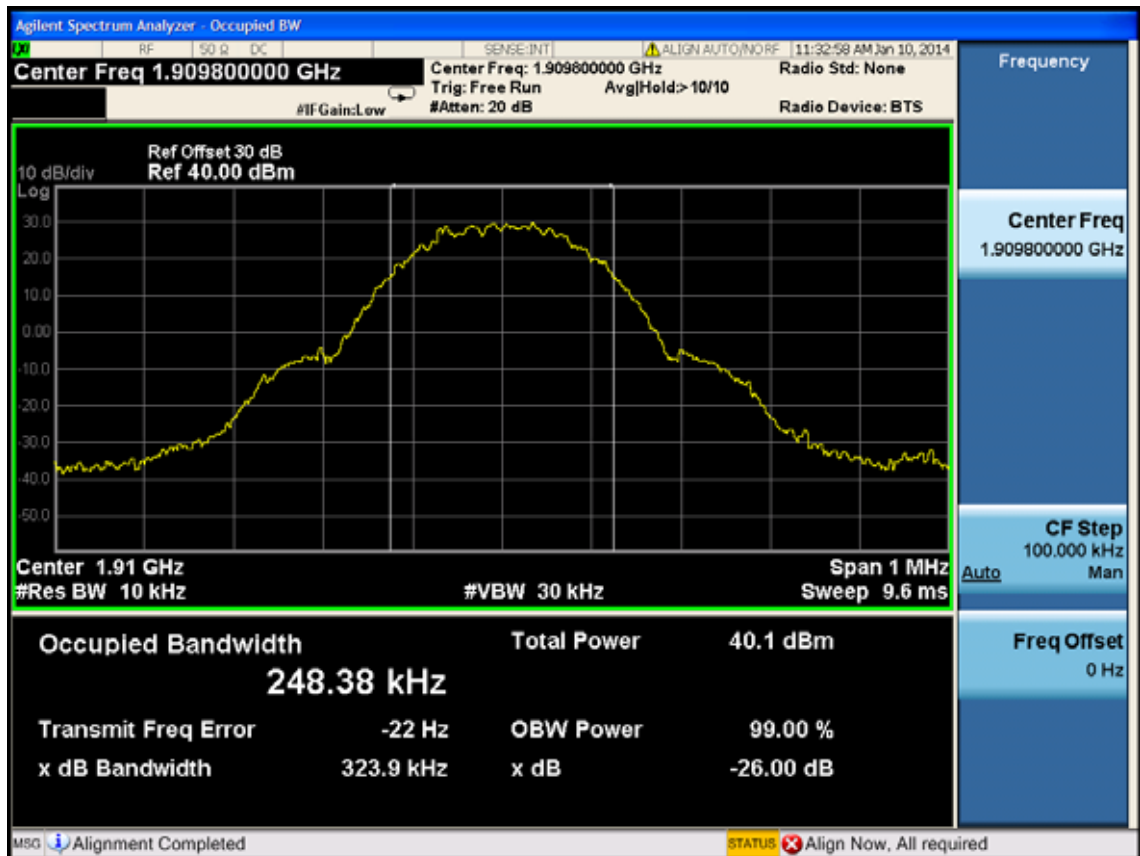
CH512



CH661



CH810



6. RF POWER OUTPUT TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,13	1Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,13	1Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1Year
4.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08,13	1Year
6.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
7.	Wireless Communication Test set	Agilent	E5515C	GB44300243	May.08,13	1Year

6.2. Limit

Part 22.913(a) Mobile station are limited to 7W

Part 24.232(b) Peak power measurement, Mobile station are limited to 2W

6.3. Test Procedure

The transmitter output was connected to calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power in dBm. The power output at the transmitter antenna port was determined by adding the value of attenuator to the power meter reading.

6.4. Test Results

EUT: GSM Controller		
M/N: AMC000-007		
Test date: 2014-01-11	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Kevin_hu	Test site: RF Site	Temperature: 22.5±0.6°C
Cable loss: 2dB	Attenuator loss: 20 dB	Splitter attenuation: 6dB

Mode	Frequency (MHz)	CH	Output power (dBm)	Limit (dBm)
GSM 850	824.2	128	31.70	38.45
	836.6	190	31.65	38.45
	848.8	251	31.72	38.45
PCS 1900	1850.2	512	28.32	33
	1880.0	661	28.40	33
	1909.8	810	28.49	33

Conclusion : PASS

7. FIELD STRENGTH OF RADIATED SPURIOUS EMISSIONS

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
28.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 13	1 Year
29.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
30.	Signal Generator	HP	83732B	VS34490501	May.08, 13	1 Year
31.	Power meter	Anritsu	ML2487A	6K00002472	May.08, 13	1 Year
32.	Power sensor	Anritsu	MA2491A	0033005	May.08, 13	1 Year
33.	Attenuator(10dB)	Agilent	8491A	MY39264375	May.08, 13	1 Year
34.	Attenuator(20dB)	Agilent	8491B	MY39262165	May.08, 13	1 Year
35.	Universal Radio Communication Tester	R&S	CMU200	117194	Oct. 31,13	1 Year
36.	Network Analyzer	Agilent	E5071B	MY42403549	May.08, 13	1 Year
37.	Bluetooth Test set	Agilent	MT8852B	6K00005966	May.18, 13	1 Year
38.	Wireless Communication Tester	Agilent	E5515C	GB44300243	May.18. 13	1 Year
39.	DC Power supply	King	DPS-1303D	821956	N/A	N/A
40.	PreAmplifier	Agilent	8449B	3008A02495	May.08, 13	1 Year
41.	PreAmplifier	Agilent	8447D	2944A11159	May.08, 13	1 Year
42.	Horn Antenna	EMCO	3115	9510-4580	May.28, 13	1 Year
43.	Bilog Antenna	Schaffner	CBL6111C	2598	Mar.14, 13	1 Year
44.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
45.	Power divider	Mini-Circuits	ZA3PD-4-S+	347100912	N/A	N/A
46.	Power divider	Mini-Circuits	ZA4PD-4-S+	544000937	N/A	N/A
47.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
48.	Temperature controller	Terchy	MHQ-120cluB	A60223	May.08, 13	1 Year
49.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08, 13	1 Year
50.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1 Year
51.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1 Year
52.	RF Cable	Hubersuhner	SUCOFLEX102	274094/4	May.08,13	1 Year
53.	Loop Antenna	Chase	HLA6120	1062	May.21, 13	1 Year
54.	Horn Antenna	EMCO	3116	00060089	Aug.28, 13	1 Year

7.2.Limit

FCC part 22.917(a), 24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than $43+10\log(\text{Mean power in watts})$ dBc below the mean power output outside a license's frequency block(-13dBm).

7.3.Test Procedure

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and lowering of the test antenna from 4m to 1m.

ERP in frequency band below 1GHz were measured using substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follow: ERP in frequency band above 1GHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and ERP was calculated as follows:

Below 1GHz:

$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$

Above 1GHz:

$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)} - 2.15$

7.4. Test Results

GSM 850 Mode

Spurious emissions								
EUT:GSM Controller								
M/N:AMC000-007								
Power: DC 3.7V								
Test Date: 2014-01-11			Test site: RF Chamber			Tested by: Kevin_hu		
Temperature: 22.8±0.6°C			Humidity: 50.3±3.0%			Pressure: 100.7±1.0kpa		
Test result								
Test Mode : GSM 850 TX CH Low Mode 824.2MHz								
Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
168	H	-57.64	2.41	1.2	-56.43	-13	43.43	PASS
195	H	-58.98	2.80	1.4	-57.58	-13	44.58	PASS
312	H	-56.75	2.84	1.5	-55.41	-13	42.41	PASS
444	H	-55.89	2.99	1.7	-54.6	-13	41.6	PASS
1618	H	-53.62	6.96	2.4	-51.21	-13	38.21	PASS
2209	H	-49.23	7.20	2.9	-47.08	-13	34.08	PASS
2845	H	-45.34	8.20	3.3	-42.59	-13	29.59	PASS
150	V	-56.87	2.09	1.0	-55.78	-13	42.78	PASS
169	V	-57.43	2.41	1.2	-56.22	-13	43.22	PASS
196	V	-55.22	2.80	1.4	-53.82	-13	40.82	PASS
444	V	-56.88	2.99	1.7	-55.59	-13	42.59	PASS
1618	V	-53.74	6.96	2.4	-51.33	-13	38.33	PASS
2209	V	-51.36	7.20	2.9	-49.21	-13	36.21	PASS
2845	V	-47.83	8.20	3.3	-45.08	-13	32.08	PASS

Test Mode : GSM 850 TX CH Mid Mode 836.6MHz

168	H	-56.54	2.41	1.2	-55.33	-13	42.33	PASS
195	H	-56.75	2.80	1.4	-55.35	-13	42.35	PASS
312	H	-57.57	2.84	1.5	-56.23	-13	43.23	PASS
444	H	-56.23	2.99	1.7	-54.94	-13	41.94	PASS
1628	H	-52.45	7.05	2.4	-49.95	-13	36.95	PASS
2214	H	-51.76	7.23	2.9	-49.58	-13	36.58	PASS
2846	H	-46.54	8.20	3.3	-43.79	-13	30.79	PASS
150	V	-54.45	2.09	1.0	-53.36	-13	40.36	PASS
169	V	-55.67	2.41	1.2	-54.46	-13	41.46	PASS
196	V	-57.58	2.80	1.4	-56.18	-13	43.18	PASS
444	V	-55.23	2.99	1.7	-53.94	-13	40.94	PASS
1628	V	-49.56	7.05	2.4	-47.06	-13	34.06	PASS
2214	V	-46.87	7.23	2.9	-44.69	-13	31.69	PASS
2846	V	-46.22	8.20	3.3	-43.47	-13	30.47	PASS

Test Mode : GSM 850 TX CH High Mode 848.8MHz

168	H	-56.45	2.41	1.2	-55.24	-13	42.24	PASS
195	H	-55.66	2.80	1.4	-54.26	-13	41.26	PASS
312	H	-57.55	2.84	1.5	-56.21	-13	43.21	PASS
444	H	-53.47	2.99	1.7	-52.18	-13	39.18	PASS
1668	H	-48.30	7.11	2.5	-45.84	-13	32.84	PASS
2209	H	-46.31	7.20	2.9	-44.16	-13	31.16	PASS
2845	H	-44.09	8.20	3.3	-41.34	-13	28.34	PASS
150	V	-57.34	2.09	1.0	-56.25	-13	43.25	PASS
169	V	-55.49	2.41	1.2	-54.28	-13	41.28	PASS
196	V	-57.57	2.80	1.4	-56.17	-13	43.17	PASS
444	V	-54.76	2.99	1.7	-53.47	-13	40.47	PASS
1668	V	-50.86	7.11	2.5	-48.40	-13	35.40	PASS
2209	V	-49.44	7.20	2.9	-47.29	-13	34.29	PASS
2845	V	-48.48	8.20	3.3	-45.73	-13	32.73	PASS

Remark: All the emission were detected belong to narrowband spurious emission

PCS 1900 Mode

Spurious emissions								
EUT:GSM Controller								
M/N:AMC000-007								
Power: DC 3.7V								
Test Date: 2014-01-11			Test site: RF Chamber			Tested by:Kevin_Hu		
Temperature: 22.8±0.6°C			Humidity: 50.3±3.0%			Pressure: 100.7±1.0kpa		
Test result								
Test Mode : PCS 1900 TX CH Low Mode 1850.2MHz								
Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
168	H	-57.98	2.41	1.2	-56.77	-13	43.77	PASS
195	H	-55.96	2.80	1.4	-54.56	-13	41.56	PASS
312	H	-54.24	2.84	1.5	-52.9	-13	39.9	PASS
444	H	-55.41	2.99	1.7	-54.12	-13	41.12	PASS
2208	H	-49.55	7.20	2.9	-47.40	-13	34.40	PASS
2844	H	-51.61	8.20	3.3	-48.86	-13	35.86	PASS
3670	H	-43.92	8.95	3.8	-40.92	-13	27.92	PASS
150	V	-56.45	2.09	1.0	-55.36	-13	42.36	PASS
169	V	-57.67	2.41	1.2	-56.46	-13	43.46	PASS
196	V	-56.64	2.80	1.4	-55.24	-13	42.24	PASS
444	V	-54.35	2.99	1.7	-53.06	-13	40.06	PASS
2208	V	-50.57	7.20	2.9	-48.42	-13	35.42	PASS
2844	V	-51.44	8.20	3.3	-48.69	-13	35.69	PASS
3670	V	-44.76	8.95	3.8	-41.76	-13	28.76	PASS

Test Mode : PCS 1900 TX CH Mid Mode 1880.0MHz								
168	H	-56.81	2.41	1.2	-55.6	-13	42.6	PASS
195	H	-57.42	2.80	1.4	-56.02	-13	43.02	PASS
312	H	-55.15	2.84	1.5	-53.81	-13	40.81	PASS
444	H	-54.98	2.99	1.7	-53.69	-13	40.69	PASS
1818	H	-46.53	7.15	2.7	-44.23	-13	31.23	PASS
2214	H	-51.91	7.23	2.9	-49.73	-13	36.73	PASS
3720	H	-45.34	9.01	3.9	-42.38	-13	29.38	PASS
150	V	-54.73	2.09	1.0	-53.64	-13	40.64	PASS
169	V	-53.18	2.41	1.2	-51.97	-13	38.97	PASS
196	V	-52.67	2.80	1.4	-51.27	-13	38.27	PASS
444	V	-52.19	2.99	1.7	-50.9	-13	37.9	PASS
1818	V	-46.65	7.15	2.7	-44.35	-13	31.35	PASS
2214	V	-44.66	7.23	2.9	-42.48	-13	29.48	PASS
3720	V	-43.14	9.01	3.9	-40.18	-13	27.18	PASS
Test Mode : PCS 1900 TX CH High Mode 1909.8MHz								
168	H	-54.45	2.41	1.2	-53.24	-13	40.24	PASS
195	H	-53.24	2.80	1.4	-51.84	-13	38.84	PASS
312	H	-56.43	2.84	1.5	-55.09	-13	42.09	PASS
444	H	-54.55	2.99	1.7	-53.26	-13	40.26	PASS
1918	H	-45.56	7.17	2.8	-43.34	-13	30.34	PASS
2209	H	-45.91	7.22	2.9	-43.74	-13	30.74	PASS
3820	H	-42.73	9.08	4.0	-39.80	-13	26.80	PASS
150	V	-55.57	2.09	1.0	-54.48	-13	41.48	PASS
169	V	-53.87	2.41	1.2	-52.66	-13	39.66	PASS
196	V	-52.76	2.80	1.4	-51.36	-13	38.36	PASS
444	V	-54.82	2.99	1.7	-53.53	-13	40.53	PASS
1918	V	-46.68	7.17	2.8	-44.46	-13	31.46	PASS
2209	V	-47.19	7.22	2.9	-45.02	-13	32.02	PASS
3820	V	-47.63	9.08	4.0	-44.70	-13	31.70	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

8. FREQUENCY STABILITY V.S. TEMPERATURE AND VOLTAGE

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
55.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 13	1 Year
56.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
57.	Signal Generator	HP	83732B	VS34490501	May.08, 13	1 Year
58.	Power meter	Anritsu	ML2487A	6K00002472	May.08, 13	1 Year
59.	Power sensor	Anritsu	MA2491A	0033005	May.08, 13	1 Year
60.	Attenuator(10dB)	Agilent	8491A	MY39264375	May.08, 13	1 Year
61.	Attenuator(20dB)	Agilent	8491B	MY39262165	May.08, 13	1 Year
62.	Universal Radio Communication Tester	R&S	CMU200	117194	Oct. 31,13	1 Year
63.	Network Analyzer	Agilent	E5071B	MY42403549	May.08, 13	1 Year
64.	Bluetooth Test set	Agilent	MT8852B	6K00005966	May.18, 13	1 Year
65.	Wireless Communication Tester	Agilent	E5515C	GB44300243	May.18. 13	1 Year
66.	DC Power supply	King	DPS-1303D	821956	N/A	N/A
67.	PreAmplifier	Agilent	8449B	3008A02495	May.08, 13	1 Year
68.	PreAmplifier	Agilent	8447D	2944A11159	May.08, 13	1Year
69.	Horn Antenna	EMCO	3115	9510-4580	May.28, 13	1 Year
70.	Bilog Antenna	Schaffner	CBL6111C	2598	Mar.14, 13	1 Year
71.	Power divider	Mini-Circuits	ZFRSC-183-S+	572800942	N/A	N/A
72.	Power divider	Mini-Circuits	ZA3PD-4-S+	347100912	N/A	N/A
73.	Power divider	Mini-Circuits	ZA4PD-4-S+	544000937	N/A	N/A
74.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
75.	Temperature controller	Terchy	MHQ-120cluB	A60223	May.08, 13	1 Year
76.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08, 13	1 Year
77.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1 Year
78.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,13	1 Year
79.	RF Cable	Hubersuhner	SUCOFLEX102	274094/4	May.08,13	1 Year
80.	Loop Antenna	Chase	HLA6120	1062	May.21, 13	1 Year
81.	Horn Antenna	EMCO	3116	00060089	Aug.28, 13	1 Year

8.1.Limit

Frequency Tolerance: $\pm 2.5\text{ppm}$ for 850MHz band
 $\pm 2.5\text{ppm}$ for 1900MHz band

8.2.Test procedure:

The equipment under test was connected to an external DC power supply and input rated voltage. Reference power supply voltage for these tests is DC 4.0V. 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 25 degree operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30 degree. After the temperature stabilized for approximately 30 minutes record the frequency. Repeat step measure with 10 degree per stage until the highest temperature of 50 degree reached.

Frequency Stability

EUT: GSM Controller

M/N: AMC000-007

Power: DC 3.7V

Test Date: 2014-01-11 Test site: RF Chamber Tested by: Kevin_hu

Temperature: 22.8 ± 0.6 Humidity: 50.3 ± 3.0% Pressure: 100.7 ± 1.0kpa

Frequency stability VS Voltage (Temperature: 25)

Test Mode: GSM 850 CH 128 824.2MHz

Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	128	824.2	824.1985	1.8	+/- 2.5	PASS
112	128	824.2	824.1986	1.7	+/- 2.5	PASS
120	128	824.2	824.1989	1.3	+/- 2.5	PASS
130	128	824.2	824.1996	0.5	+/- 2.5	PASS
138	128	824.2	824.1992	1.0	+/- 2.5	PASS

Test Mode: GSM 850 CH190 836.6MHz

Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	190	836.6	836.5996	0.5	+/- 2.5	PASS
112	190	836.6	836.5989	1.3	+/- 2.5	PASS
120	190	836.6	836.5992	1.0	+/- 2.5	PASS
130	190	836.6	836.5995	0.6	+/- 2.5	PASS
138	190	836.6	836.5991	1.1	+/- 2.5	PASS

Test Mode: GSM 850 CH251 848.8MHz

Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	251	848.8	848.7995	0.6	+/-2.5	PASS
112	251	848.8	848.7992	0.9	+/-2.5	PASS
120	251	848.8	848.7989	1.3	+/-2.5	PASS
130	251	848.8	848.7990	1.2	+/-2.5	PASS
138	251	848.8	848.7994	0.7	+/-2.5	PASS

Test Mode: PCS 1900 CH 512 1850.2MHz						
Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	512	1850.2	1850.1996	0.2	+/- 2.5	PASS
112	512	1850.2	1850.1992	0.4	+/- 2.5	PASS
120	512	1850.2	1850.1990	0.5	+/- 2.5	PASS
130	512	1850.2	1850.1899	0.5	+/- 2.5	PASS
138	512	1850.2	1850.1994	0.3	+/- 2.5	PASS
Test Mode: PCS 1900 CH 661 1880.0MHz						
Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	661	1880.0	1879.9986	0.7	+/- 2.5	PASS
112	661	1880.0	1879.9979	1.1	+/- 2.5	PASS
120	661	1880.0	1879.9989	0.6	+/- 2.5	PASS
130	661	1880.0	1879.9992	0.4	+/- 2.5	PASS
138	661	1880.0	1879.9987	0.7	+/- 2.5	PASS
Test Mode: PCS 1900 CH 810 1909.8MHz						
Supply Voltage (V)	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
102	810	1909.8	1909.7982	0.9	+/- 2.5	PASS
112	810	1909.8	1909.7980	1.0	+/- 2.5	PASS
120	810	1909.8	1909.7985	0.8	+/- 2.5	PASS
130	810	1909.8	1909.7979	1.1	+/- 2.5	PASS
138	810	1909.8	1909.7988	0.6	+/- 2.5	PASS

Frequency stability VS Temperature (Voltage:120V)						
Test Mode: GSM 850 CH 128 824.2MHz						
Temperature ()	CH	Frequency (MHz)	Test result (MHz)	Deviation (ppm)	Limit (ppm)	Conclusion
-30	128	824.2	824.1992	1.0	+/- 2.5	PASS
-20	128	824.2	824.1998	0.2	+/- 2.5	PASS
-10	128	824.2	824.1995	0.6	+/- 2.5	PASS
10	128	824.2	824.1996	0.5	+/- 2.5	PASS
20	128	824.2	824.1994	0.7	+/- 2.5	PASS
30	128	824.2	824.1991	1.0	+/- 2.5	PASS
40	128	824.2	824.1997	0.4	+/- 2.5	PASS
50	128	824.2	824.1999	0.1	+/- 2.5	PASS
Test Mode: GSM 850 CH190 836.6MHz						
-30	190	836.6	836.5998	0.2	+/- 2.5	PASS
-20	190	836.6	836.5994	0.7	+/- 2.5	PASS
-10	190	836.6	836.5995	0.6	+/- 2.5	PASS
10	190	836.6	836.5997	0.4	+/- 2.5	PASS
20	190	836.6	836.5993	0.8	+/- 2.5	PASS
30	190	836.6	836.5996	0.5	+/- 2.5	PASS
40	190	836.6	836.5992	1.0	+/- 2.5	PASS
50	190	836.6	836.5999	0.1	+/- 2.5	PASS
Test Mode: GSM 850 CH251 848.8MHz						
-30	251	848.8	848.7992	0.9	+/-2.5	PASS
-20	251	848.8	848.7995	0.6	+/-2.5	PASS
-10	251	848.8	848.7997	0.4	+/-2.5	PASS
10	251	848.8	848.7993	0.8	+/-2.5	PASS
20	251	848.8	848.7999	0.1	+/-2.5	PASS
30	251	848.8	848.7996	0.5	+/-2.5	PASS
40	251	848.8	848.7998	0.2	+/-2.5	PASS
50	251	848.8	848.7994	0.7	+/-2.5	PASS

Test Mode: PCS 1900 CH 512 1850.2MHz						
-30	512	1850.2	1850.1995	0.3	+/- 2.5	PASS
-20	512	1850.2	1850.1998	0.1	+/- 2.5	PASS
-10	512	1850.2	1850.1996	0.2	+/- 2.5	PASS
10	512	1850.2	1850.1997	0.2	+/- 2.5	PASS
20	512	1850.2	1850.1992	0.4	+/- 2.5	PASS
30	512	1850.2	1850.1991	0.5	+/- 2.5	PASS
40	512	1850.2	1850.1993	0.4	+/- 2.5	PASS
50	512	1850.2	1850.1994	0.3	+/- 2.5	PASS
Test Mode: PCS 1900 CH 661 1880.0MHz						
-30	661	1880.0	1879.9986	0.7	+/- 2.5	PASS
-20	661	1880.0	1879.9975	1.3	+/- 2.5	PASS
-10	661	1880.0	1879.9965	1.7	+/- 2.5	PASS
10	661	1880.0	1879.9962	2.0	+/- 2.5	PASS
20	661	1880.0	1879.9958	2.2	+/- 2.5	PASS
30	661	1880.0	1879.9964	1.9	+/- 2.5	PASS
40	661	1880.0	1879.9971	1.5	+/- 2.5	PASS
50	661	1880.0	1879.9982	1.0	+/- 2.5	PASS
Test Mode: PCS 1900 CH 810 1909.8MHz						
-30	810	1909.8	1909.7984	0.8	+/- 2.5	PASS
-20	810	1909.8	1909.7957	2.2	+/- 2.5	PASS
-10	810	1909.8	1909.7973	1.4	+/- 2.5	PASS
10	810	1909.8	1909.7982	0.9	+/- 2.5	PASS
20	810	1909.8	1909.7955	2.3	+/- 2.5	PASS
30	810	1909.8	1909.7963	1.9	+/- 2.5	PASS
40	810	1909.8	1909.7969	1.6	+/- 2.5	PASS
50	810	1909.8	1909.7966	1.8	+/- 2.5	PASS

9. DEVIATION TO TEST SPECIFICATIONS

[NONE]