FCC Part22H&24E Test Report

Product Name ： GPS Locator

Model No. ： GV55

FCC ID ： YQD-GV55

Applicant： Queclink Wireless Solutions Co., Ltd

Address ： Room 501, Building 9, No 99, TianZhou Road, Shanghai,China

Date of Receipt： 30/07/2012

Test Date ： 30/07/2012~07/08/2012

Issued Date ： 09/08/2012

Report No. ： UL126F2201

Report Version ： V 1.0

Test Report Certification

Issued Date : 09/08/2012
Report No. : UL126F2201

Unilab

Product Name : GPS Locator
Applicant : Queclink Wireless Solutions Co., Ltd
Address : Room 501, Building 9, No 99, TianZhou Road, Shanghai,China
Manufacturer : Queclink Wireless Solutions Co., Ltd
Address : Room 501, Building 9, No 99, TianZhou Road, Shanghai,China
Model No. : GV55
FCC ID : YQD-GV55
EUT Voltage : MIN: 8V, NOR: 12V, MAX: 32V
Brand Name : Queclink
Applicable Standard : FCC CFR Title 47 Part 2,TIA/EIA 603-C
FCC Part22 Subpart H, FCC Part24 Subpart E
Test Result : Complied
Performed Location : Unilab (Shanghai) Co.,Ltd.
No.1350 Lianxi Rd., Pudong., Shanghai, China
TEL:+86-21-5027-5125/FAX:+86-21-5027-5126-801
FCC Registration Number: 714465

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(Engineering: Moses Zhang)

Reviewed By : Jacky Fang
(Senior Engineer: Jacky Fang)

Approved By :
(Engineering Supervisor: Vincent Hu)

Laboratory Information

We, **Unilab (shanghai) Co.,Ltd**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025 EN 45001 and specified testing scope:

China	**: CMA**
USA	**: FCC**

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product Name	GPS Locator
Brand Name	Queclink
Model No.	GV55
Working Voltage	MIN: 8V, NOR: 12V, MAX: 32V
GPS Function	Yes
Support Band	GSM850/PCS1900
Tx Frequency Range	GSM 850: 824MHz to 849MHz
	PCS 1900: 1850MHz to 1910MHz
Rx Frequency Range	GSM 850: 869MHz to 894MHz
	PCS 1900: 1930MHz to 1990MHz
GPRS Class	10
Type of modulation	GMSK for GSM/GPRS
Peak Antenna Gain	GSM850: -3dBi
	PCS1900: -1dBi

1.2. Mode of Operation

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

Test Mode
Mode 1: GPRS850 Link
Mode 2: GPRS1900 Link

Note:

1. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. Radiated power output working at GPRS(1 slot) link was higher than that working at GPRS （2 slot） link, so all of test items were done working at GPRS(1 slot) mode. Refer to peak power output for more details.
3. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst (Z axis) result on this report.
4. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is UL126F2201.

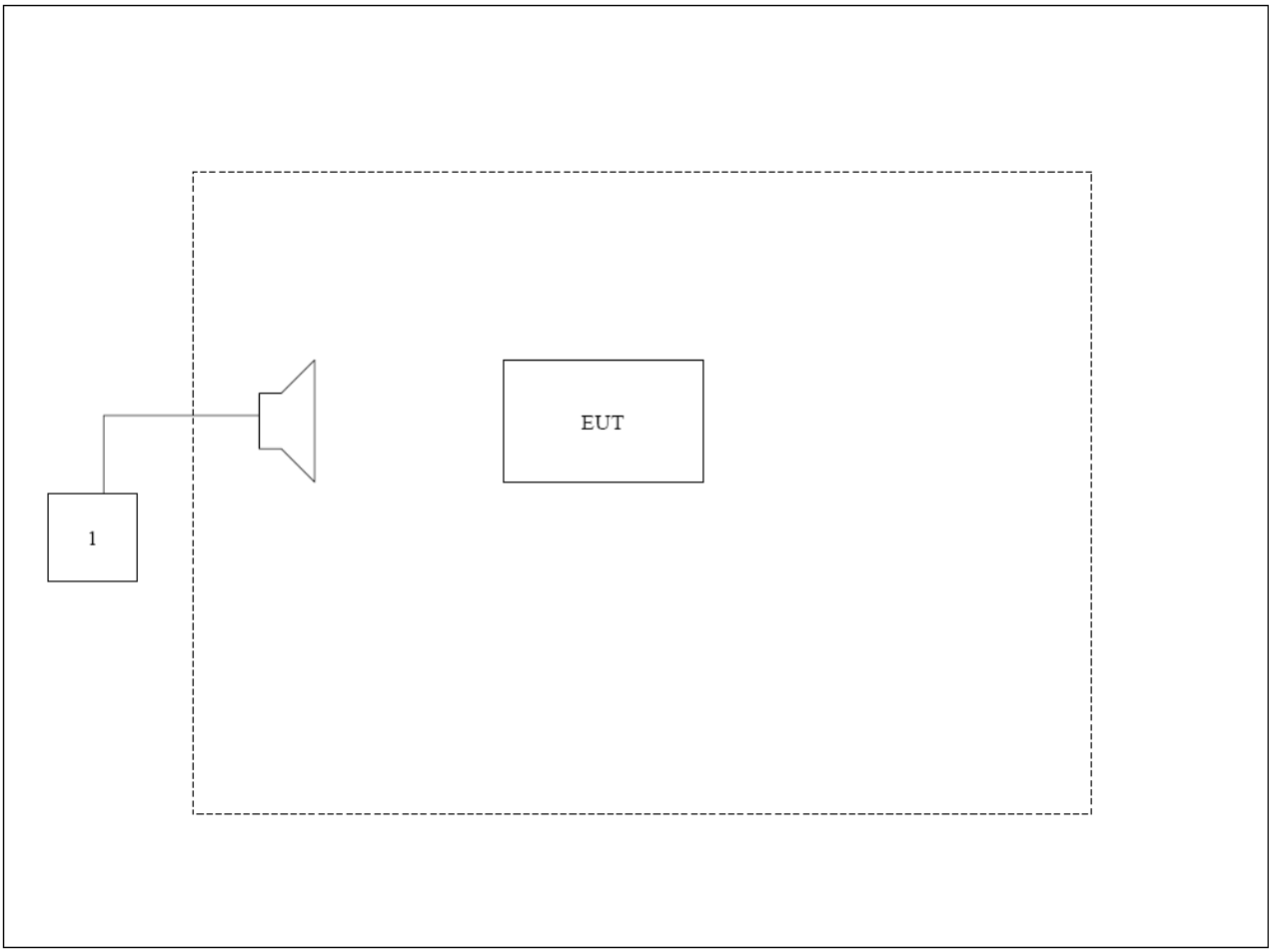
1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model	Serial No.	Power Cord
1	Agilent8960	Agilent	E5515C	GB46581718	N/A

1.4. Configuration of Tested System

Connection Diagram



1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	EUT Communicate with E5515C, then select channel to test.

2. Technical Test

2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

For GSM 850 (FCC Part 22H & Part 2)

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

For PCS 1900 (FCC Part 24E & Part 2)

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

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (_C)	15-35	23
Humidity (%RH)	25-75	52
Barometric pressure (mbar)	860-1060	950-1000

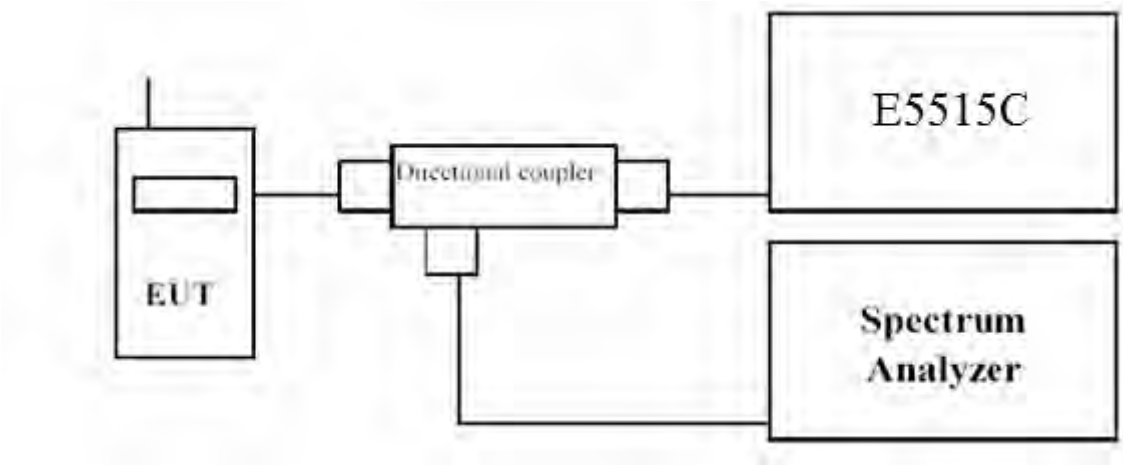
3. Peak Output Power

3.1. Test Equipment

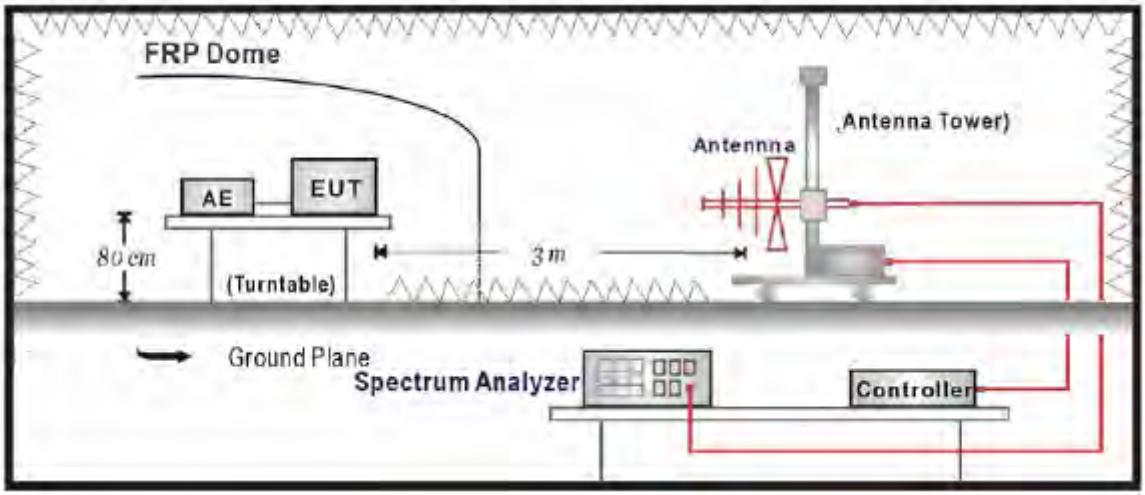
Instrument	Manufacturer	Model	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210142	2012.08.31
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
Signal Generator	Agilent	N5183A	MY50140938	2012.08.27
Preamplifier	CEM	EM30180	060550	2012.11.21
DC Power Supply	Agilent	6612C	MY43002989	2012.01.17
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2012.10.17
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2012.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2012.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2012.10.17

3.2. Test Setup

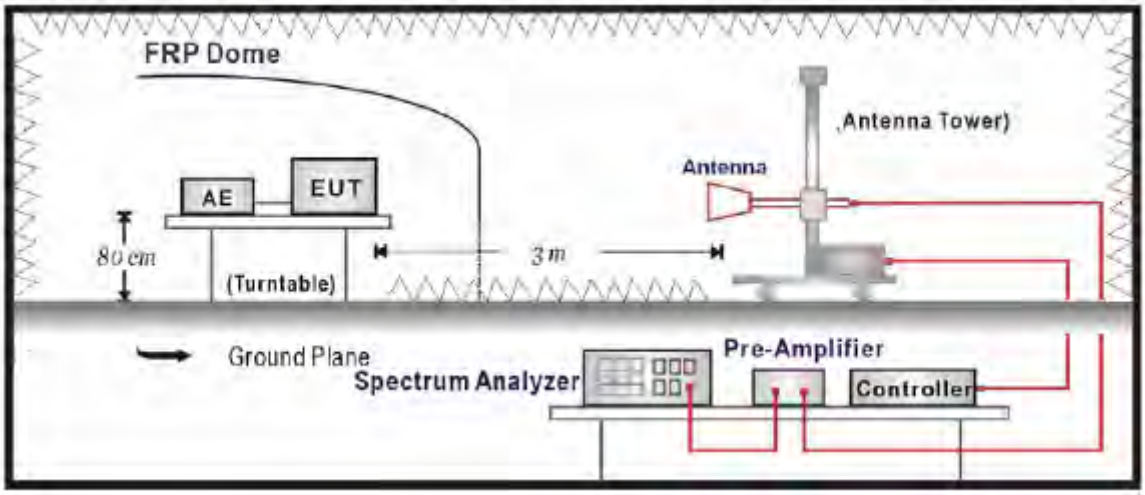
Conducted Power Measurement:



Radiated Power Measurement:
GPRS850



GPRS1900



3.3. Limit

For FCC Part 22.913(a)(2):
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC Part 24.232(b):
The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

3.4. Test Procedure

Conducted Power Measurement:

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

b.Connect a low loss RF cable from the antenna port to a spectrum analyzer and E5515C by a Directional Couple.

c. EUT Communicate with E5515C, then selects a channel for testing.

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

Radiated Power Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.

b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter

c. The output of the test antenna shall be connected to the measuring receiver.

d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.

e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

h. The maximum signal level detected by the measuring receiver shall be noted.

i.The transmitter shall be replaced by a substitution antenna.

j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

k. The substitution antenna shall be connected to a calibrated signal generator.

l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.

n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

q.Test site anechoic chamber refer to ANSI C63.4: 2009.

3.5. Uncertainty

The measurement uncertainty is defined as for Conducted Power Measurement±1.2 dB, for Radiated Power Measurement±3.2 dB

3.6. Test Result

Table 1

No. of timeslots	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Timebased avg. power compared to slotted avg. power	-9 dB	-6 dB	-4.25 dB	-3 dB

The following table shows the conducted power measured and time based average power calculated:

Table 2

GPRS 850 (1Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	GMSK	32.63	-9	23.63	38.50
189	836.4	GMSK	32.63	-9	23.63	38.50
251	848.8	GMSK	32.61	-9	23.61	38.50

GPRS 1900 (1Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	GMSK	30.03	-9	21.03	33.00
661	1880.0	GMSK	30.11	-9	21.11	33.00
810	1909.8	GMSK	30.16	-9	21.16	33.00

GPRS 850 (2Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	GMSK	32.58	-9	23.58	38.50
189	836.4	GMSK	32.56	-9	23.58	38.50
251	848.8	GMSK	32.54	-9	23.54	38.50

GPRS 1900 (2Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	GMSK	30.00	-9	21.00	33.00
661	1880.0	GMSK	30.09	-9	21.09	33.00
810	1909.8	GMSK	30.13	-9	21.13	33.00

Radiated Measurement

GPRS850

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)							
824.2	H	40.08	3.83	-2.99	33.26	38.50	-5.24
824.2	V	33.74	3.83	-2.99	26.92	38.50	-11.58
Middle Channel 189 (836.40MHz)							
836.4	H	39.32	3.96	-3.04	32.32	38.50	-6.18
836.4	V	33.61	3.96	-3.04	26.61	38.50	-11.89
High Channel 251 (848.80MHz)							
848.8	H	40.62	3.97	-3.10	33.55	38.50	-4.95
848.8	V	34.29	3.97	-3.10	27.22	38.50	-11.28

GPRS1900

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512(1850.20MHz)							
1850.2	H	17.64	6.26	10.40	21.78	33.00	-11.22
1850.2	V	34.44	6.26	10.40	27.58	33.00	-5.42
Middle Channel 661 (1880.00MHz)							
1880.0	H	16.98	6.19	10.43	21.22	33.00	-11.78
1880.0	V	23.17	6.19	10.43	27.41	33.00	-5.59
High Channel 810 (1909.80MHz)							
1909.8	H	15.02	6.15	10.44	19.31	33.00	-13.69
1909.8	V	20.62	6.15	10.44	24.91	33.00	-8.09

3.7. Test Photograph

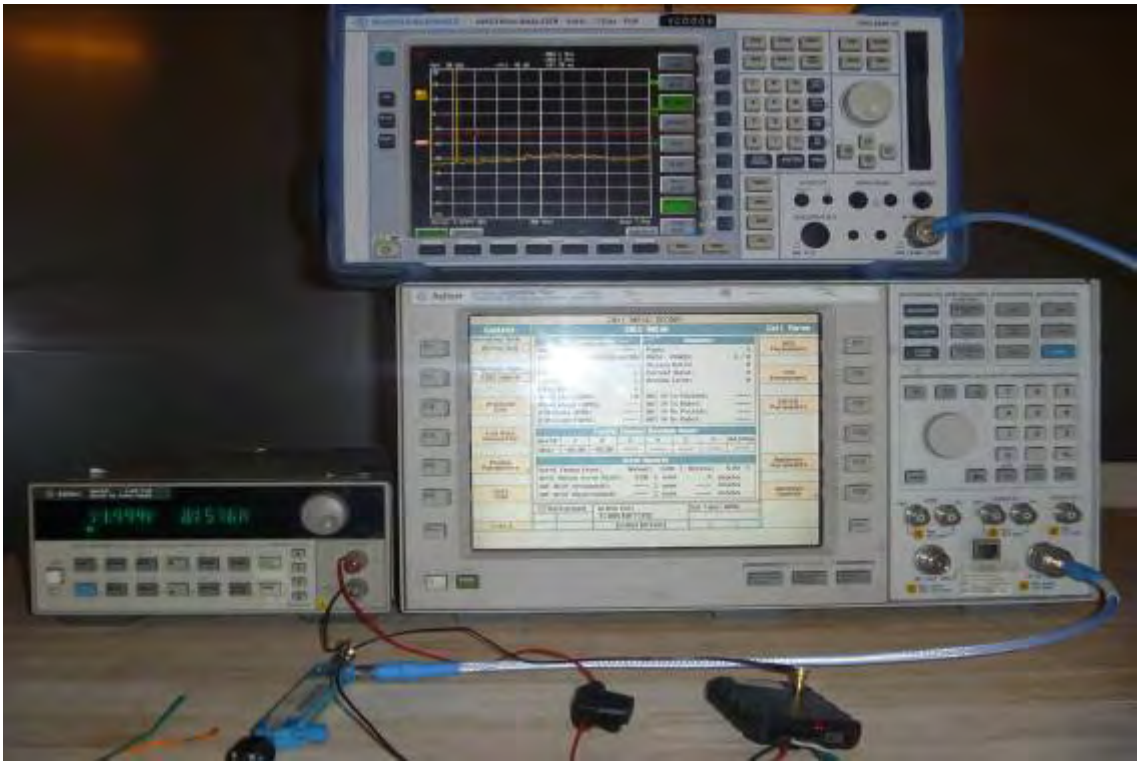
Description: ERP Test Setup

Description: Substitution Antenna for ERP Test

Description: EIRP Test Setup

Description: Substitution Antenna for EIRP Test

Description: Conducted Power Measurement Setup



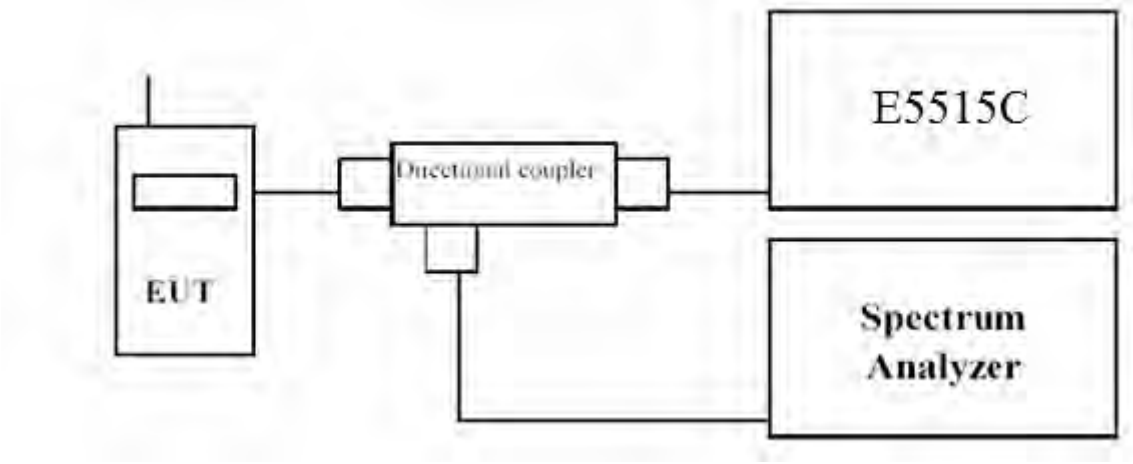
4. Modulation Characteristic

4.1. Test Equipment

Modulation Characteristic / AC-6

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
DC Power Supply	Agilent	6612C	MY43002989	2013.01.17

4.2. Test Setup



4.3. Limit

N/A

4.4. Test Procedure

GMSK is a form of binary signaling schemes which represent digital states as a shift between discrete sinusoidal frequencies called Frequency Shift Keying (FSK). Minimum Shift Keying (MSK) is continuous phase FSK with the smallest possible modulation index h. Modulation index is defined as: h = 2*F*Tb

where F = Peak frequency deviation in Hz and Tb = Bit period in seconds

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

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

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

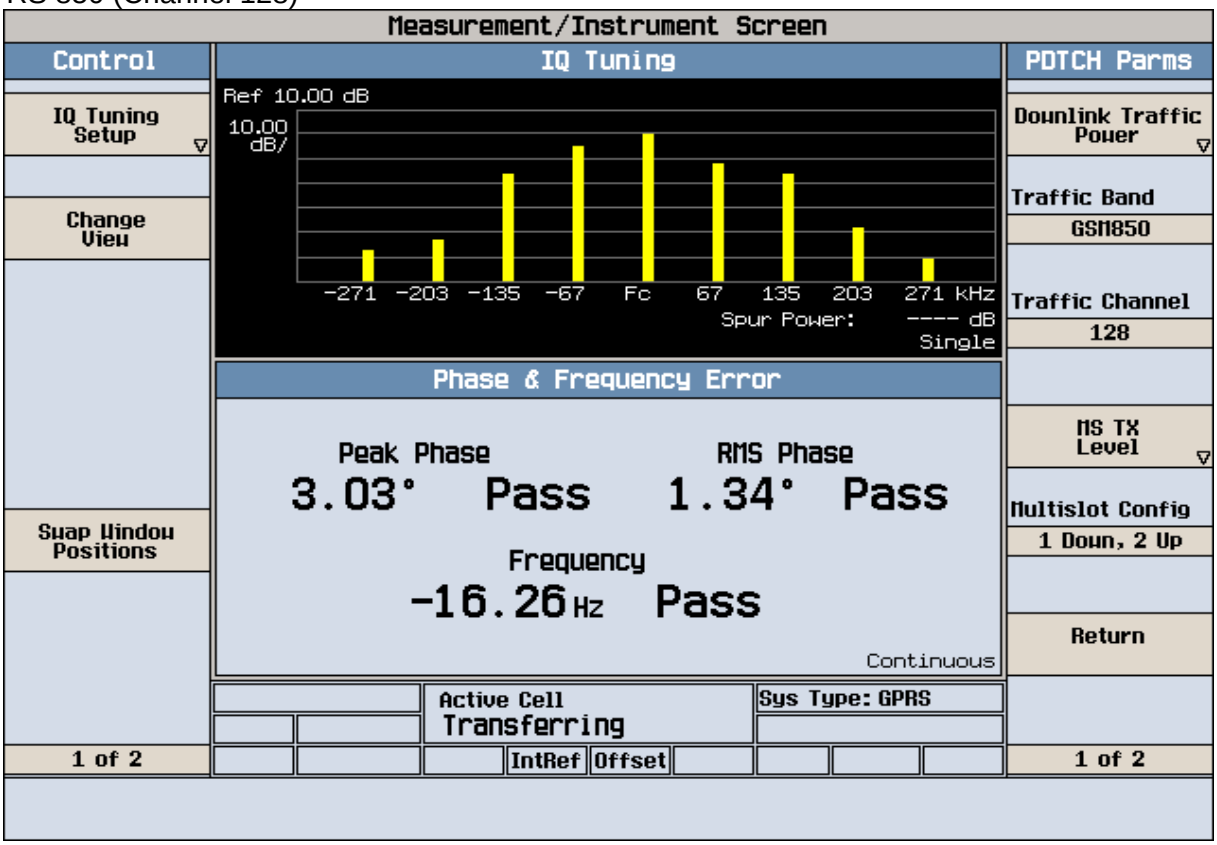
The modulation used in GPRS is the same used in GSM. A GSM channel contains eight timeslots, each timeslot is dedicated to one circuit switched call. For GPRS the timeslots are assigned on an as needed basis, and more than one timeslot can be assigned for a particular transmission depending on the network and the device.

4.5. Uncertainty

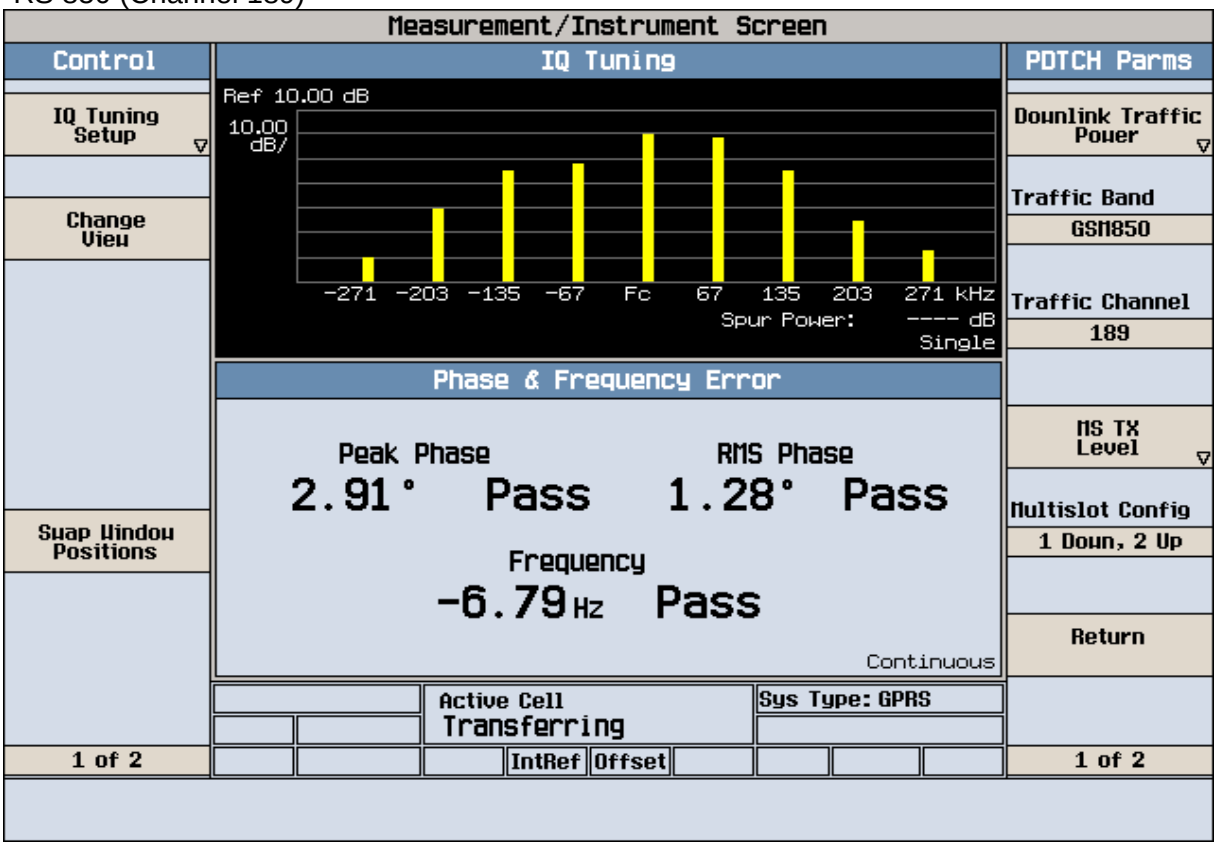
The measurement uncertainty is defined as 0.1%

4.6. Test Result

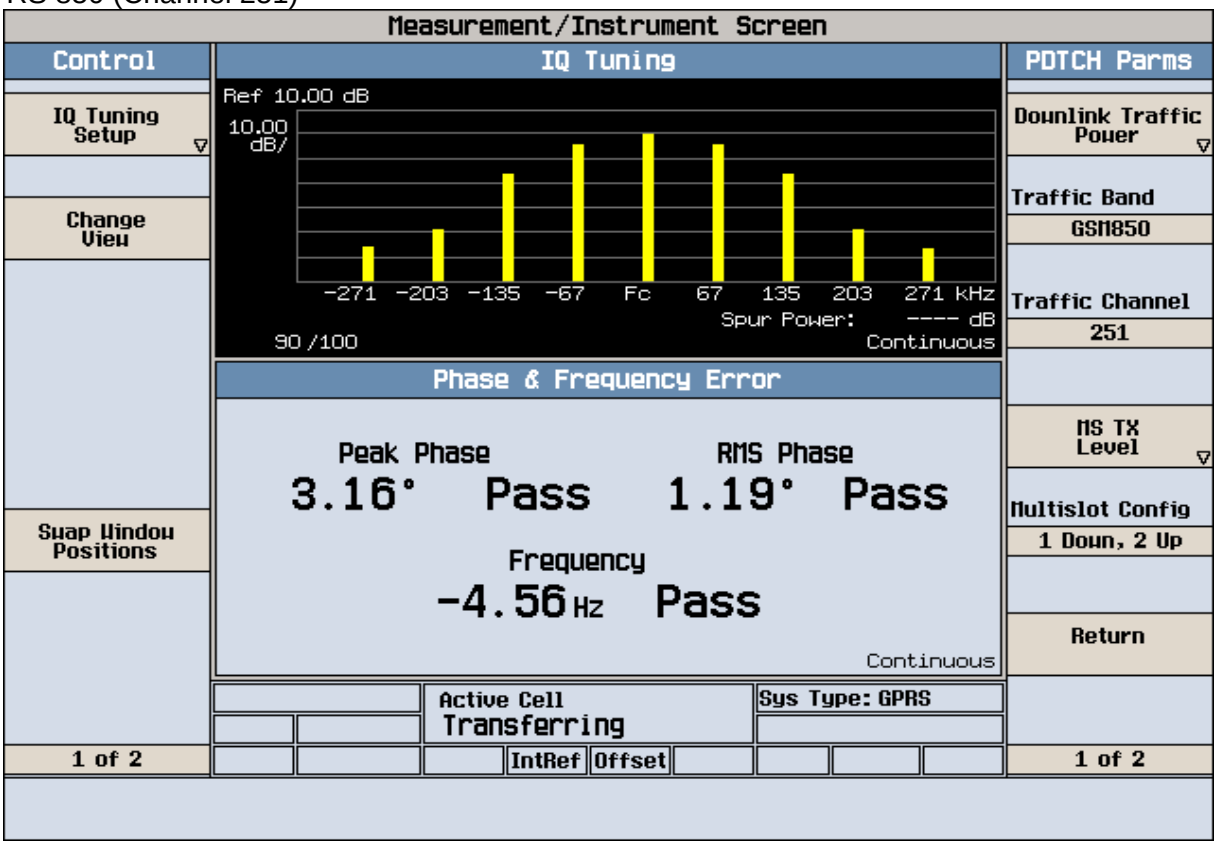
GPRS 850 (Channel 128)



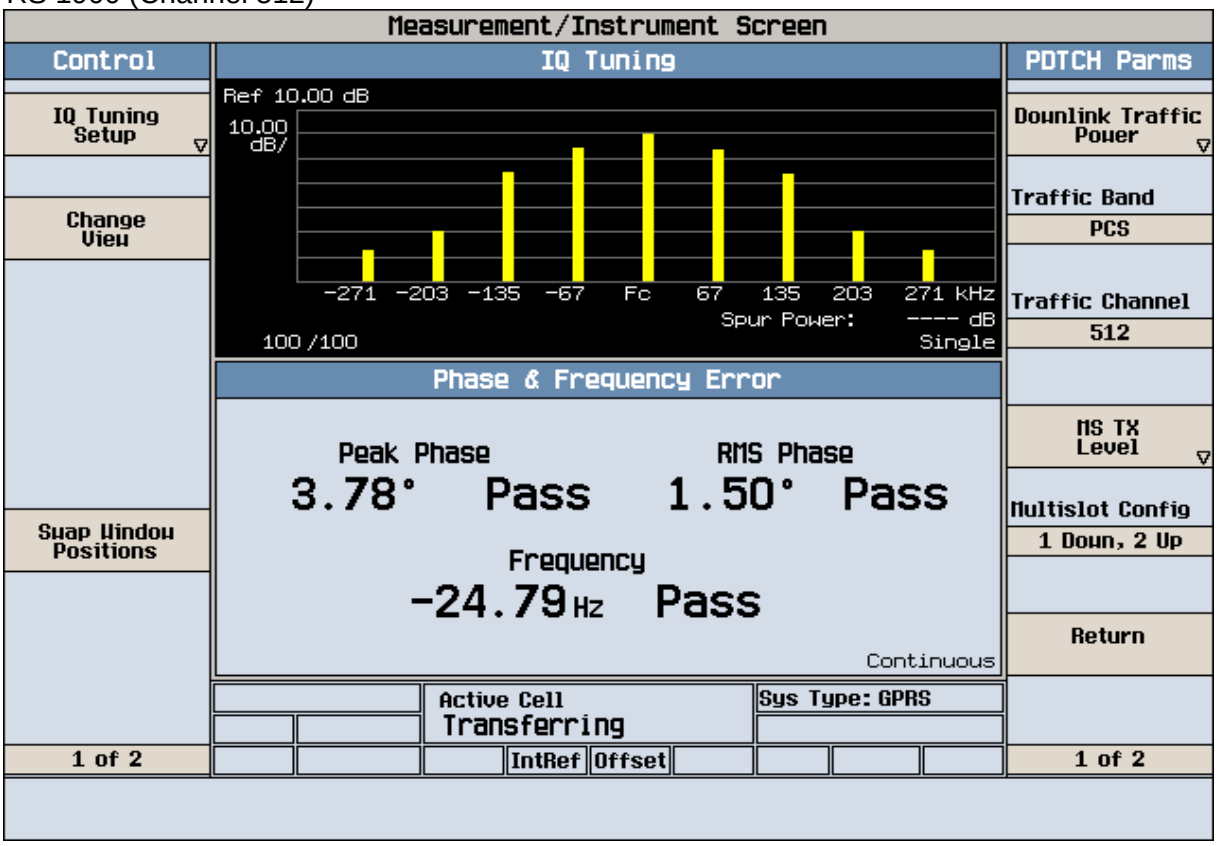
GPRS 850 (Channel 189)



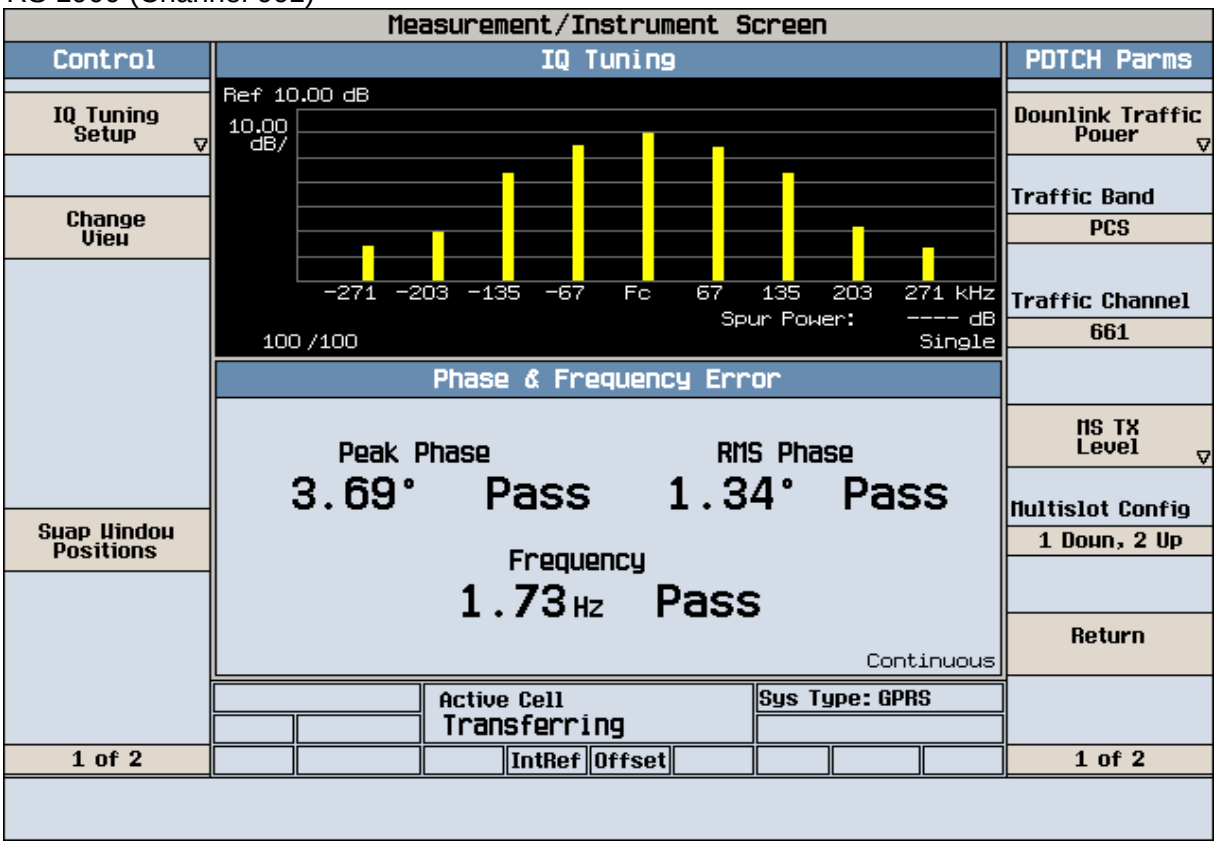
GPRS 850 (Channel 251)



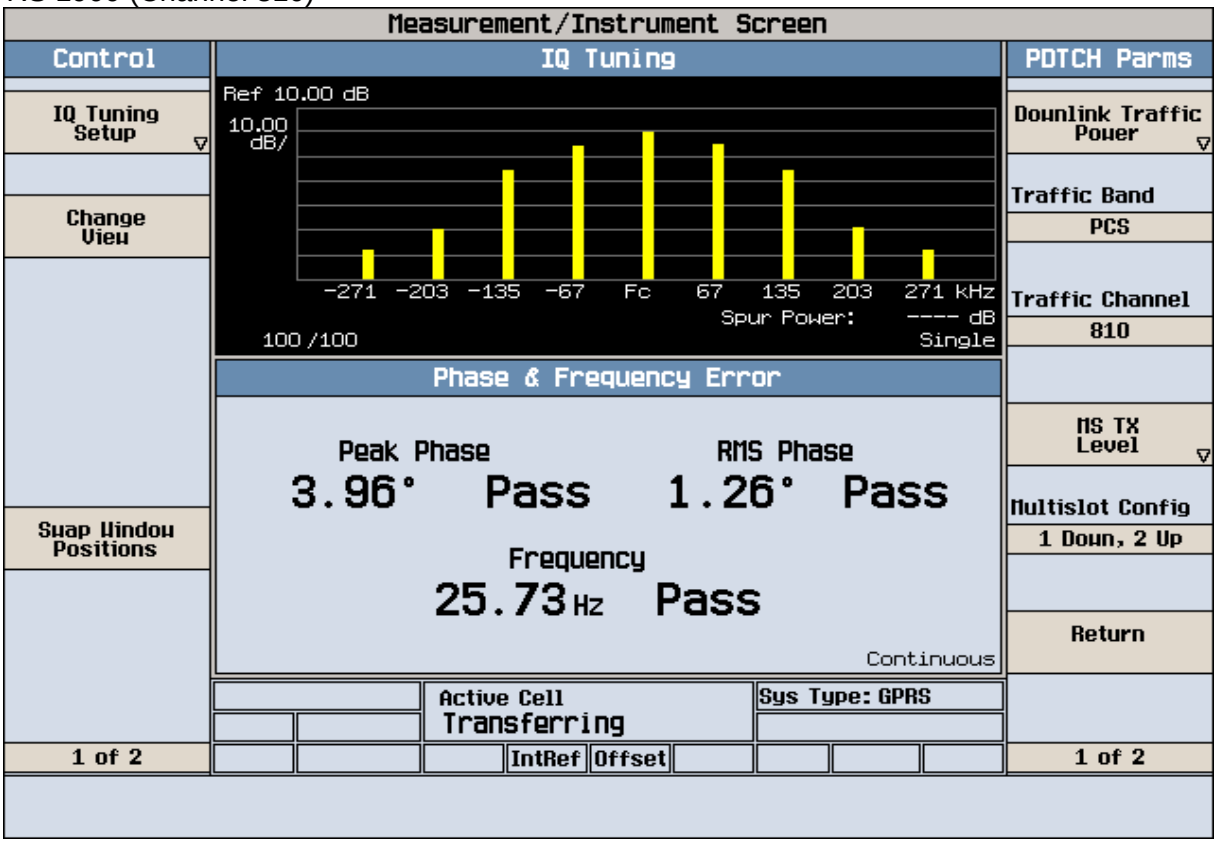
GPRS 1900 (Channel 512)



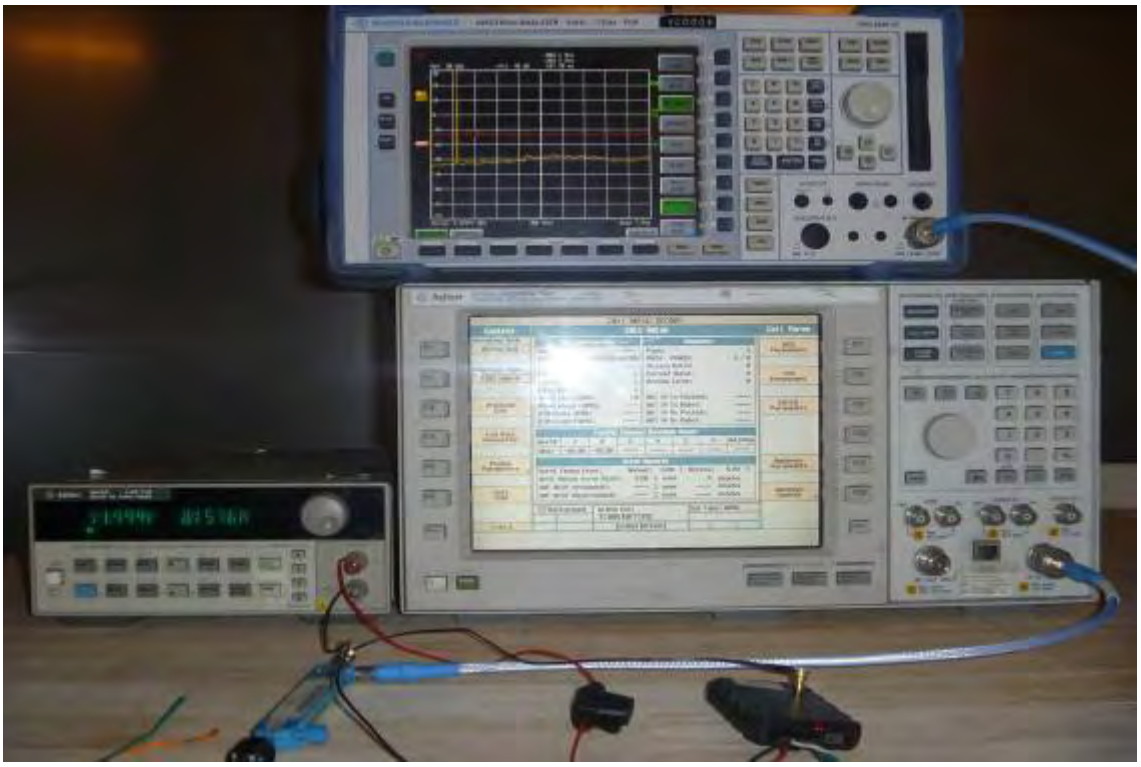
GPRS 1900 (Channel 661)



GPRS 1900 (Channel 810)



4.7. Test Photograph



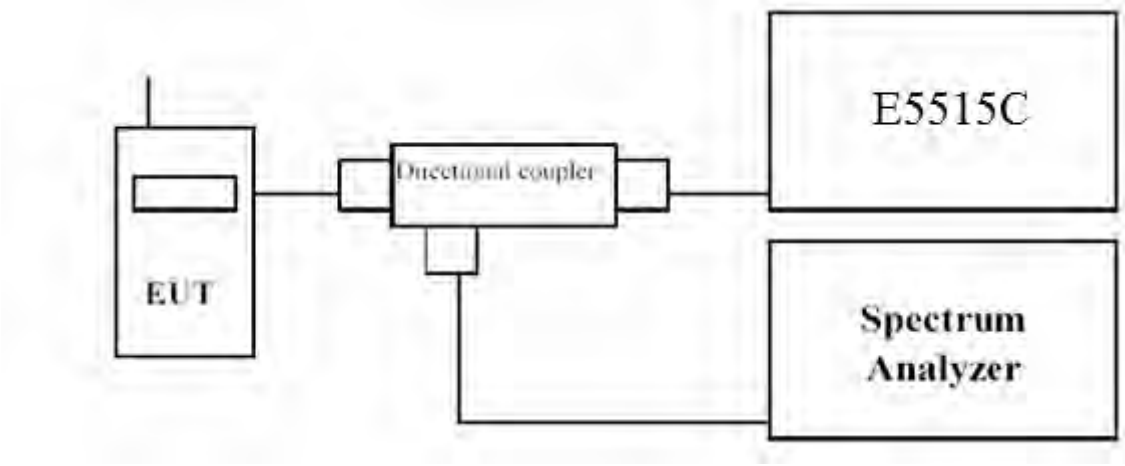
5. Occupied Bandwidth

5.1. Test Equipment

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
Spectrum Analyzer	R&S	FSP	1093.4495.07	2012.08.19
DC Power Supply	Agilent	6612C	MY43002989	2013.01.17

5.2. Test Setup



5.3. Limit

N/A

5.4. Test Procedure

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

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

5.5. Uncertainty

The measurement uncertainty is defined as ±10 Hz

5.6. Test Result

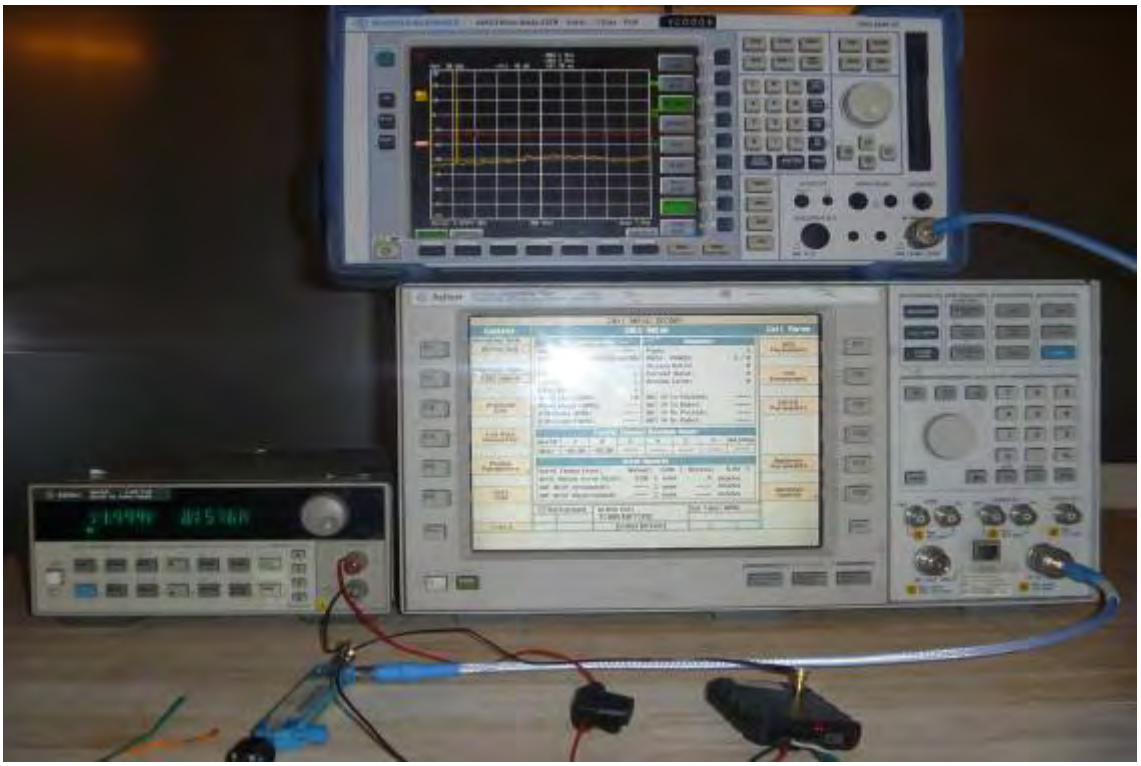
GPRS850

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
128	824.20	331	248
189	836.40	322	250
251	848.80	330	248

GPRS1900

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	318	252
661	1880.00	320	252
810	1909.80	328	248

5.7. Test Photograph

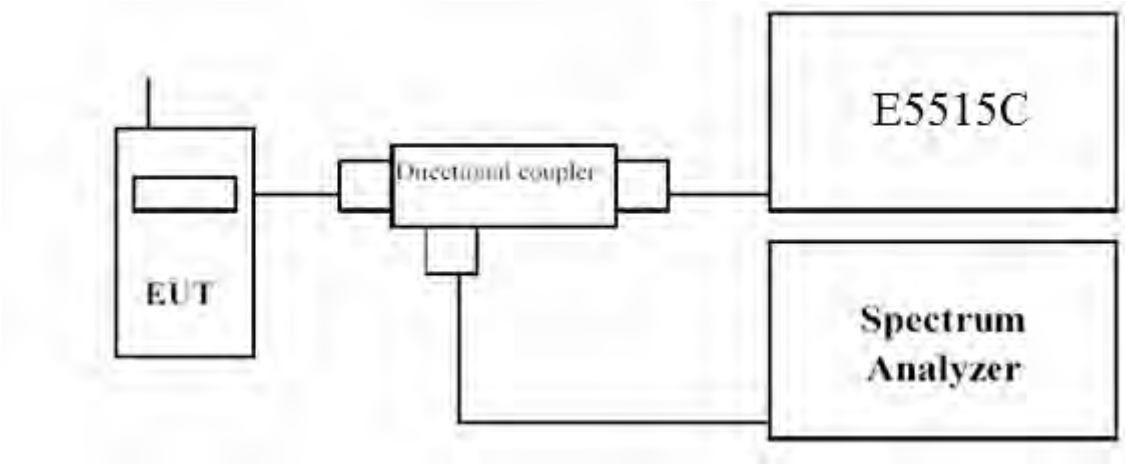


6. Spurious Emission At Antenna Terminals (+/- 1MHz)

6.1. Test Equipment

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
Spectrum Analyzer	R&S	FSP	1093.4495.07	2012.08.19
DC Power Supply	Agilent	6612C	MY43002989	2013.01.17

6.2. Test Setup



6.3. Limit

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

6.4. Test Procedure

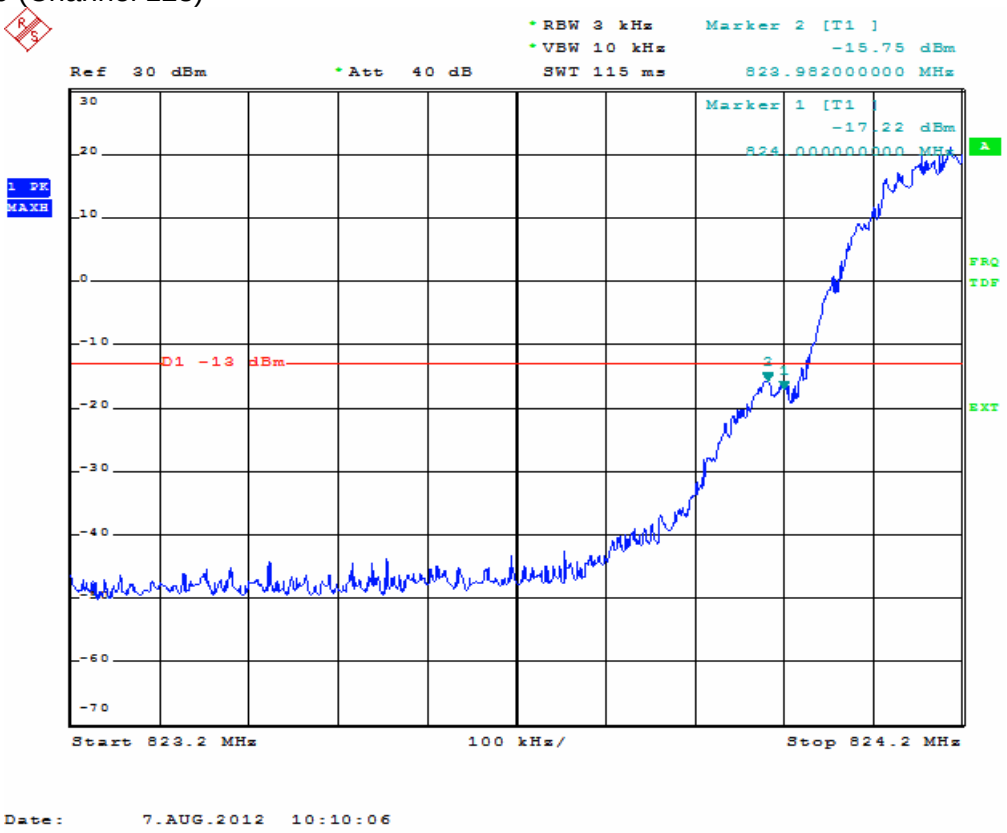
In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

6.5. Uncertainty

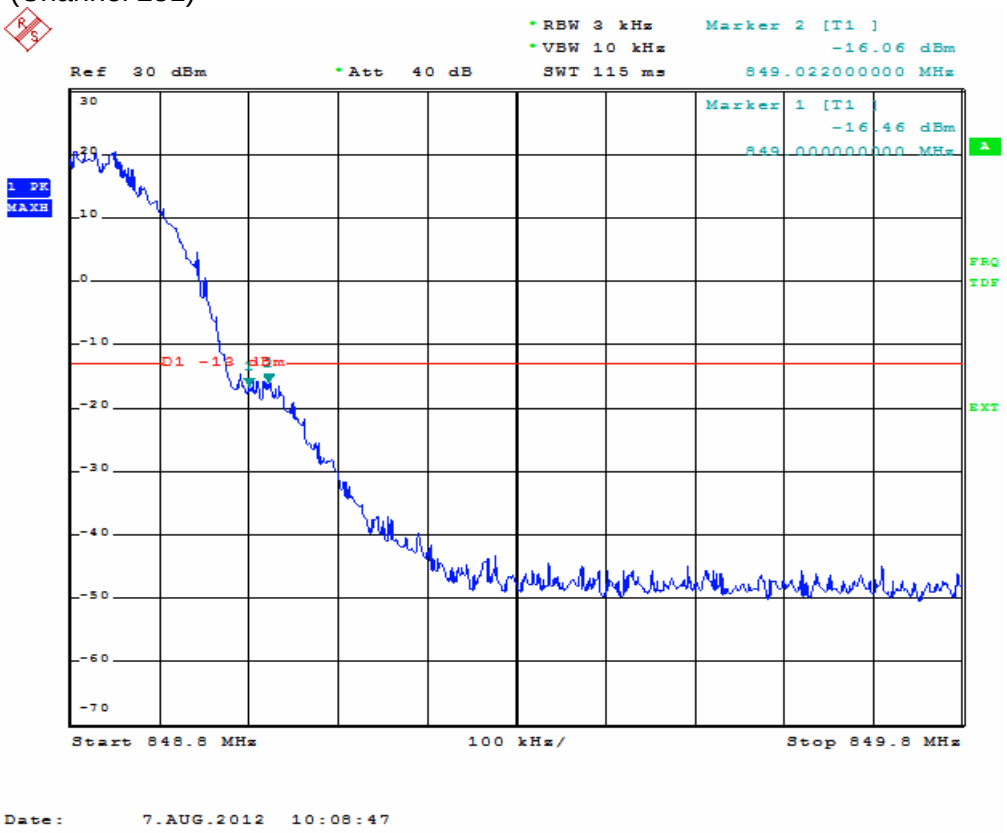
The measurement uncertainty is defined as ±1.2 dB.

6.6. Test Result

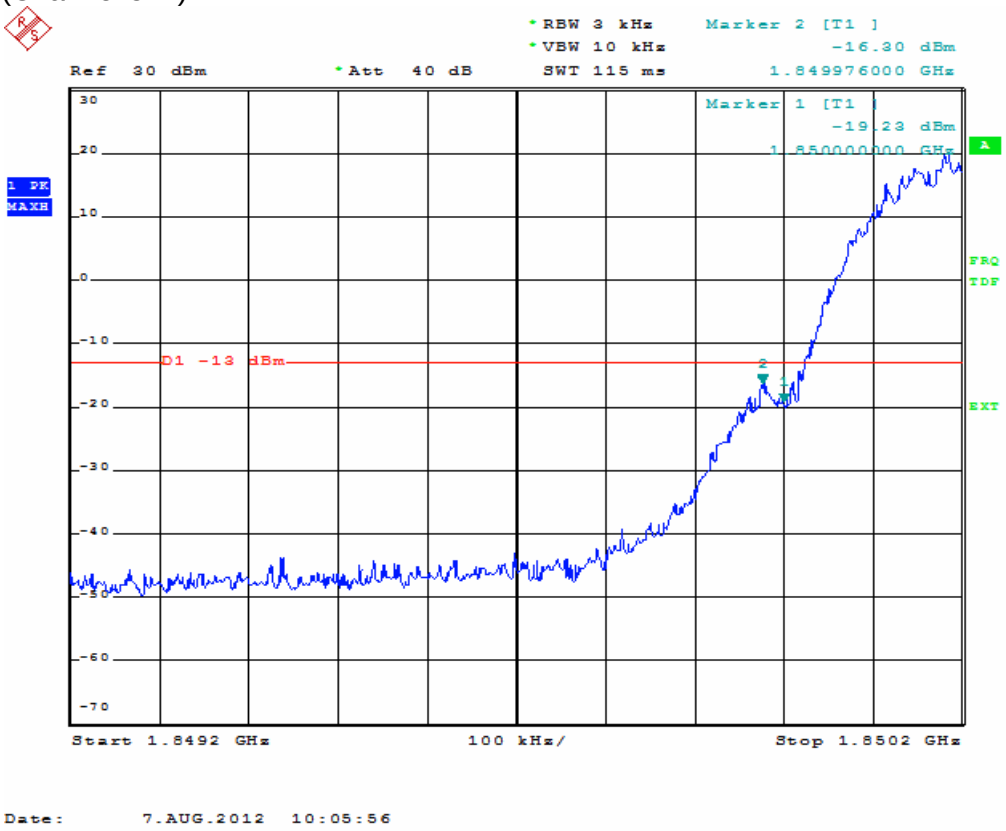
GPRS 850 (Channel 128)



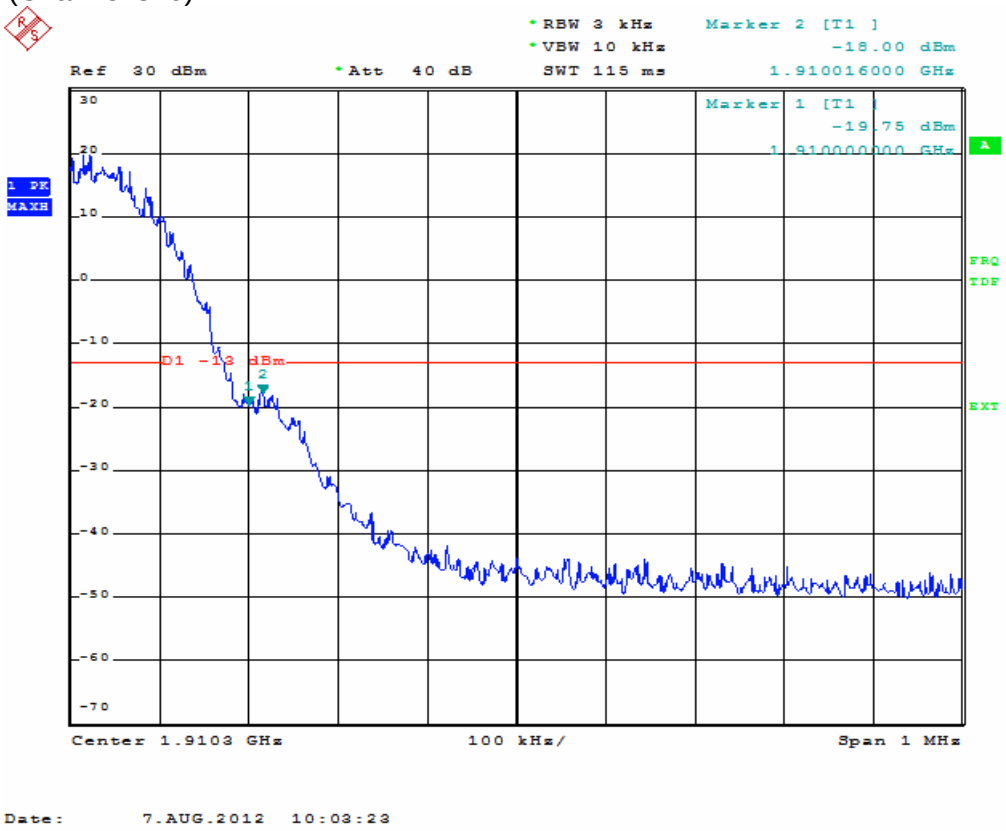
GPRS 850 (Channel 251)



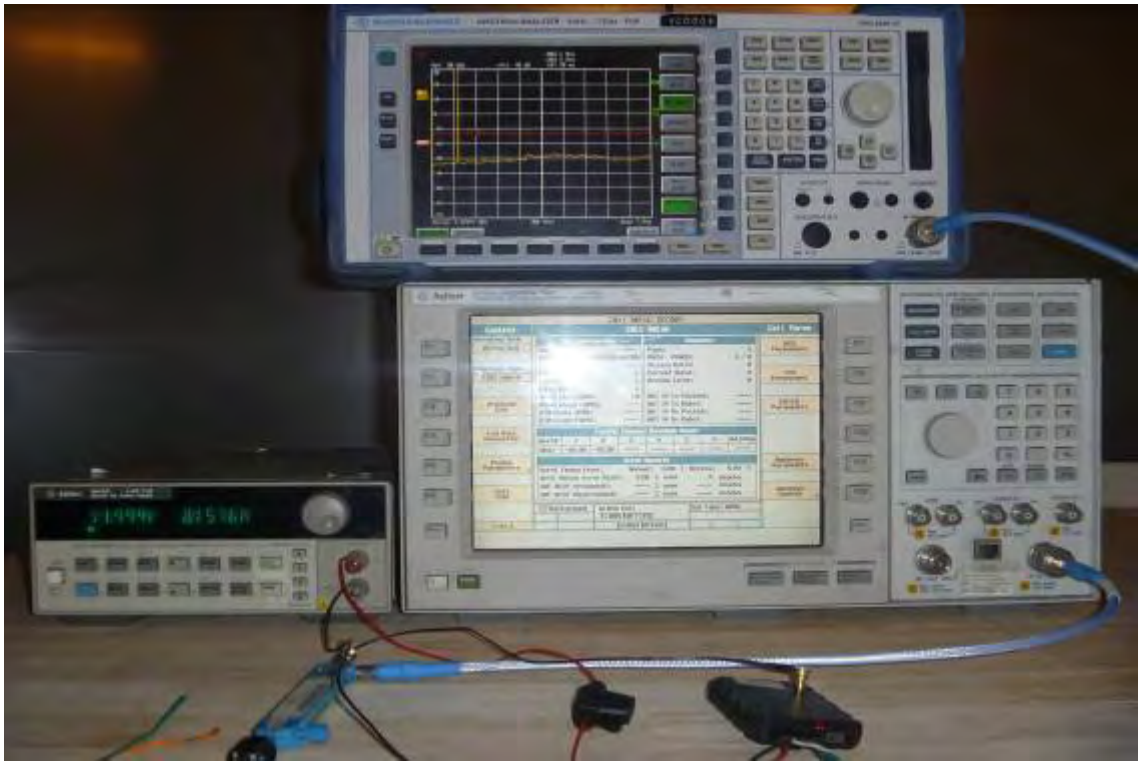
GPRS190 (Channel 512)



GPRS190 (Channel 810)



6.7. Test Photograph



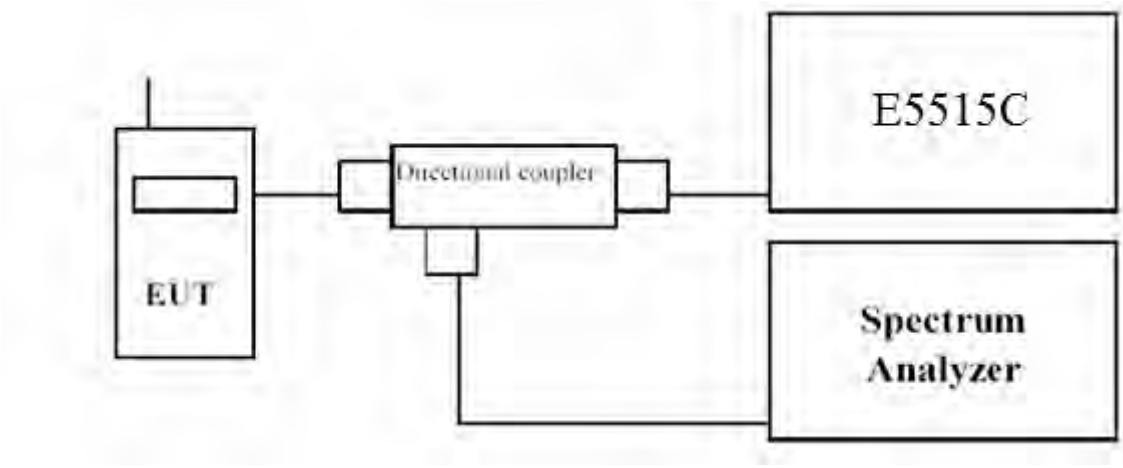
7. Spurious Emission

7.1. Test Equipment

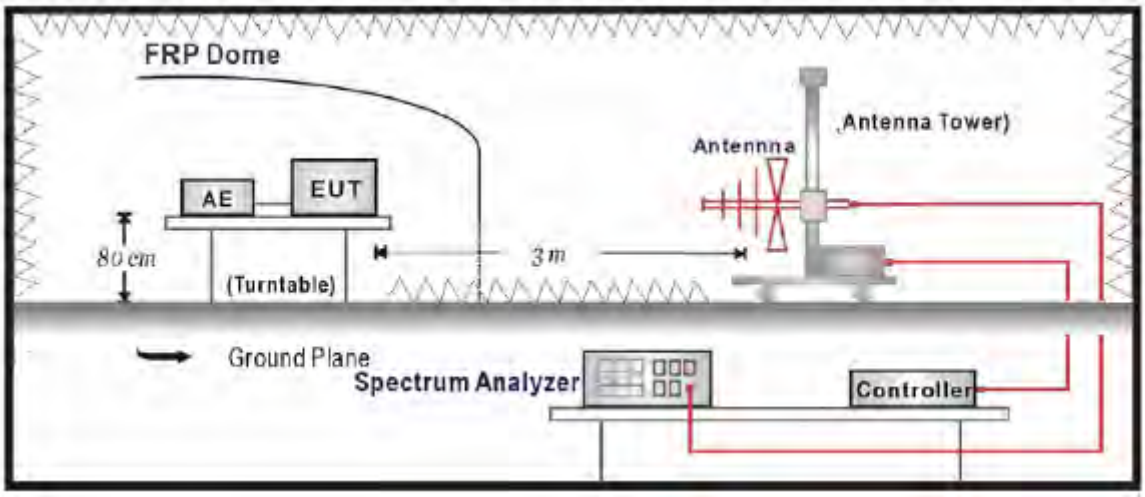
Instrument	Manufacturer	Model	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210142	2012.08.31
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
Signal Generator	Agilent	N5183A	MY50140938	2012.08.27
Preamplifier	CEM	EM30180	060550	2012.11.21
DC Power Supply	Agilent	6612C	MY43002989	2013.01.17
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2012.10.17
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2012.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2012.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2012.10.17

7.2. Test Setup

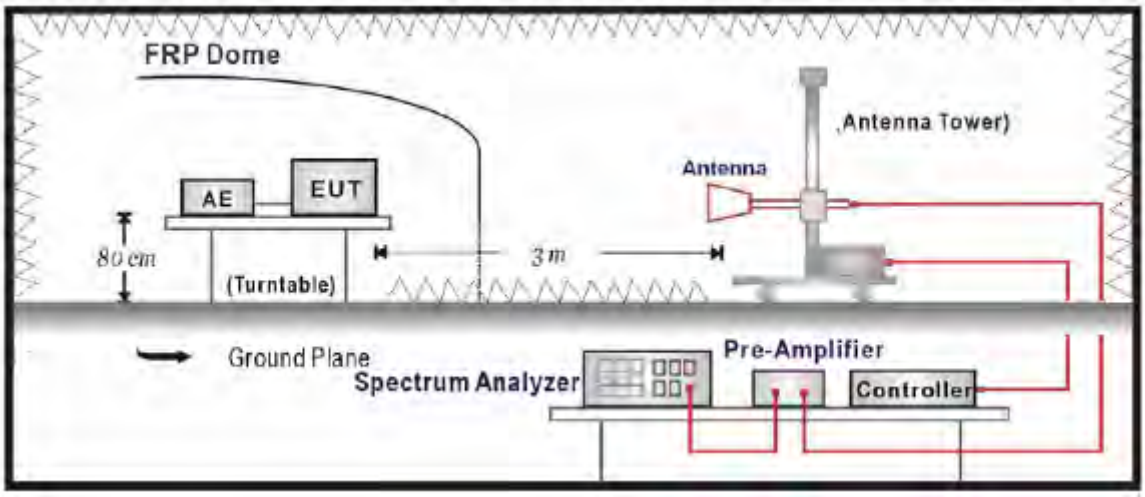
Conducted Spurious Emission Measurement:



Radiated Spurious Measurement: below 1GHz



Radiated Spurious Measurement: above 1GHz



7.3. Limit

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

7.4. Test Procedure

Conducted Spurious Measurement:

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

b. Connect a low loss RF cable from the antenna port to a spectrum analyzer and E5515C by a Directional Couple.

c. EUT Communicate with E5515C, then select a channel for testing.

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

e. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

Radiated Spurious Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.

b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter

c. The output of the test antenna shall be connected to the measuring receiver. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.

d. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

e. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

f. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

h. The maximum signal level detected by the measuring receiver shall be noted.

i. The transmitter shall be replaced by a substitution antenna.

j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

k. The substitution antenna shall be connected to a calibrated signal generator.

l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.

n.The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

p. The measure of the effective radiated power is the larger of the two levels recorded at the

input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

q. The frequency range was checked up to 10^{th} harmonic.

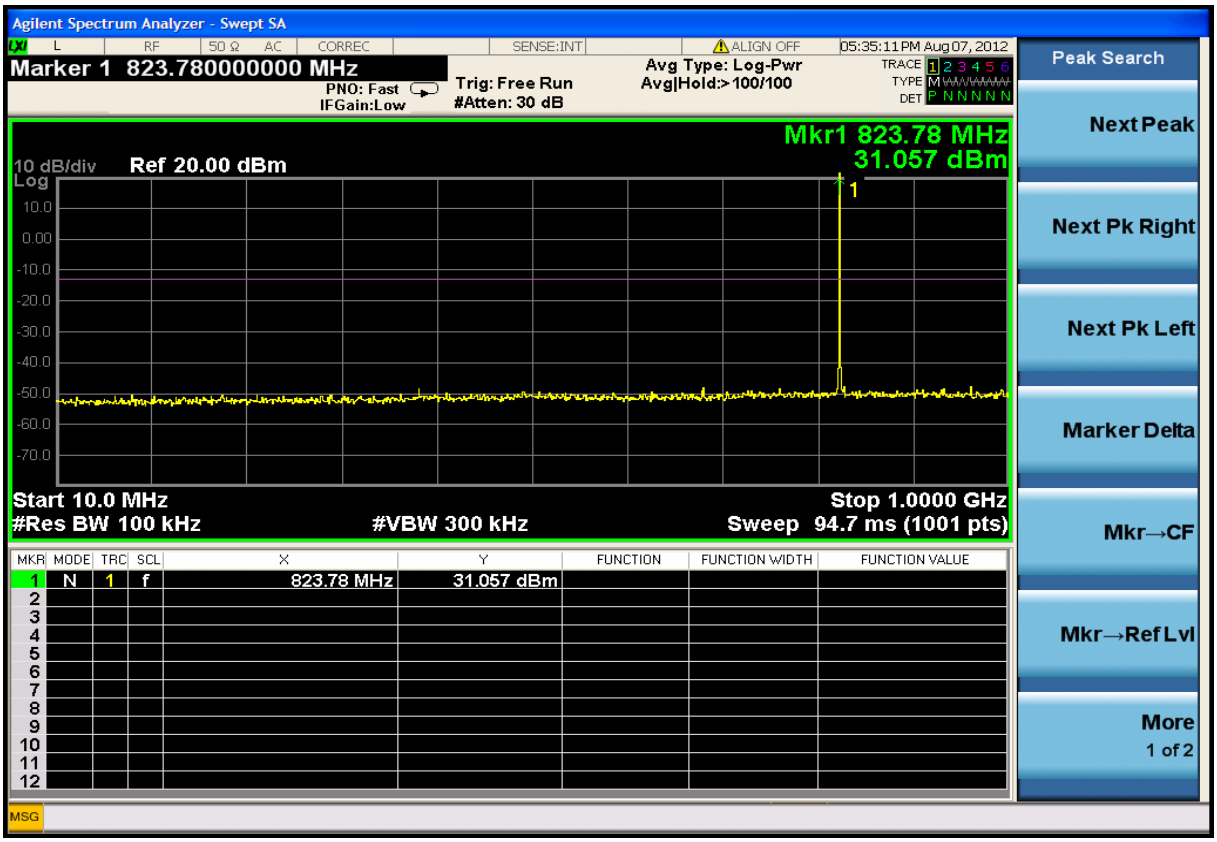
r. Test site anechoic chamber refer to ANSI C63.4: 2009

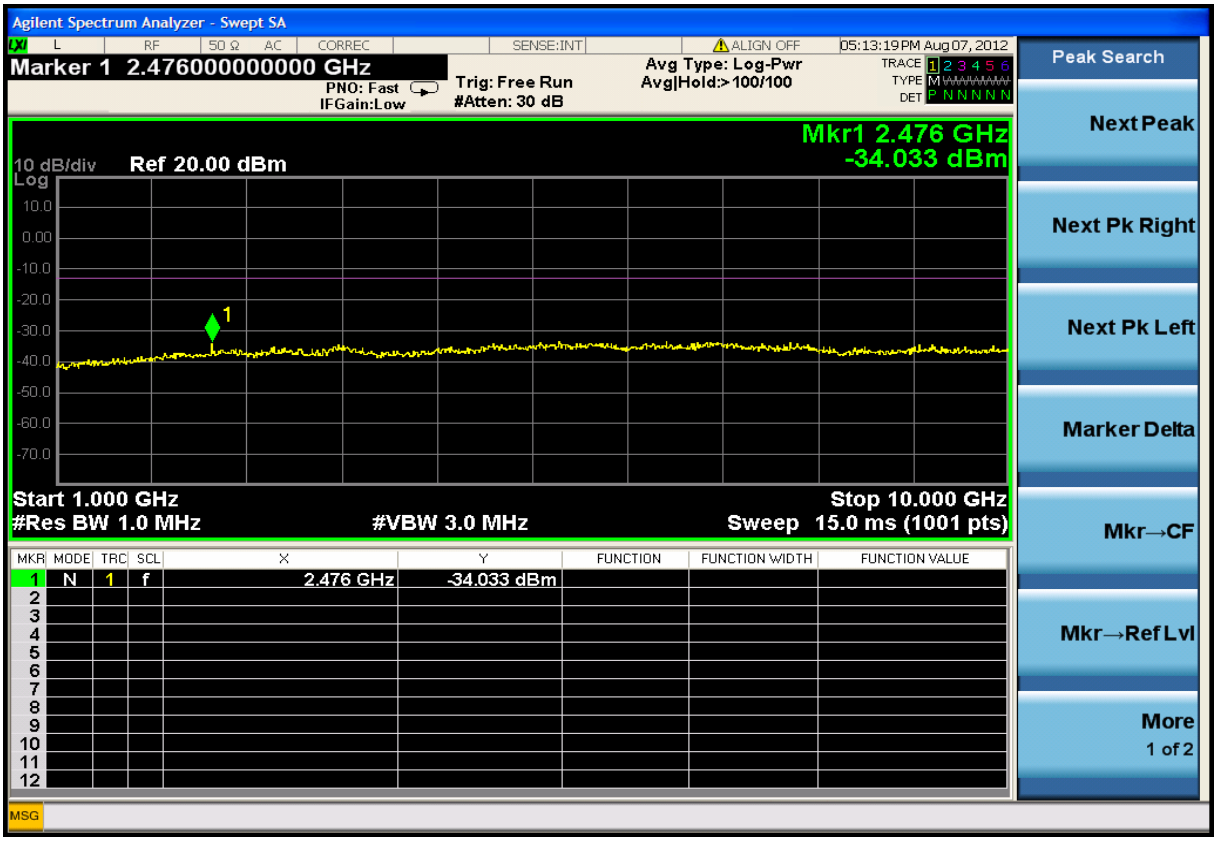
7.5. Uncertainty

The measurement uncertainty is defined as 3.2 dB for Radiated Power Measurement.

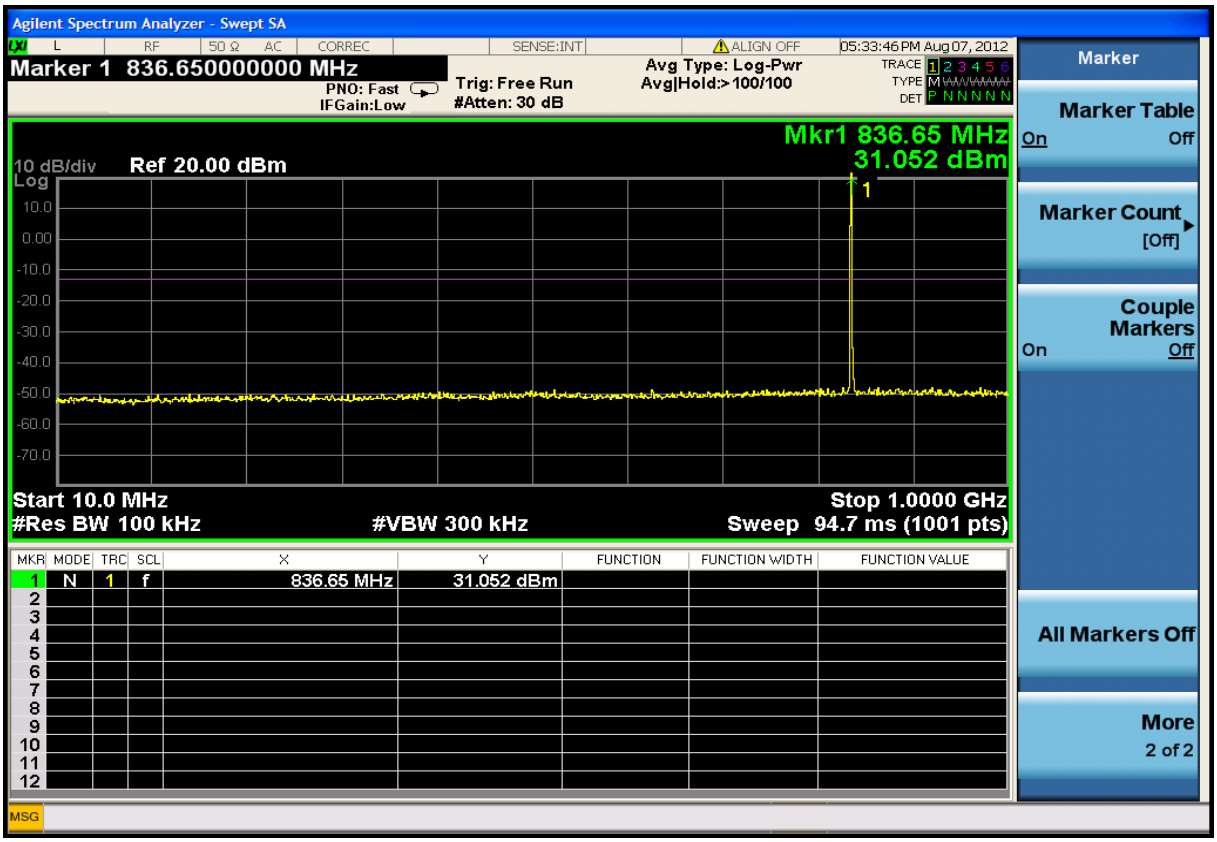
7.6. Test Result

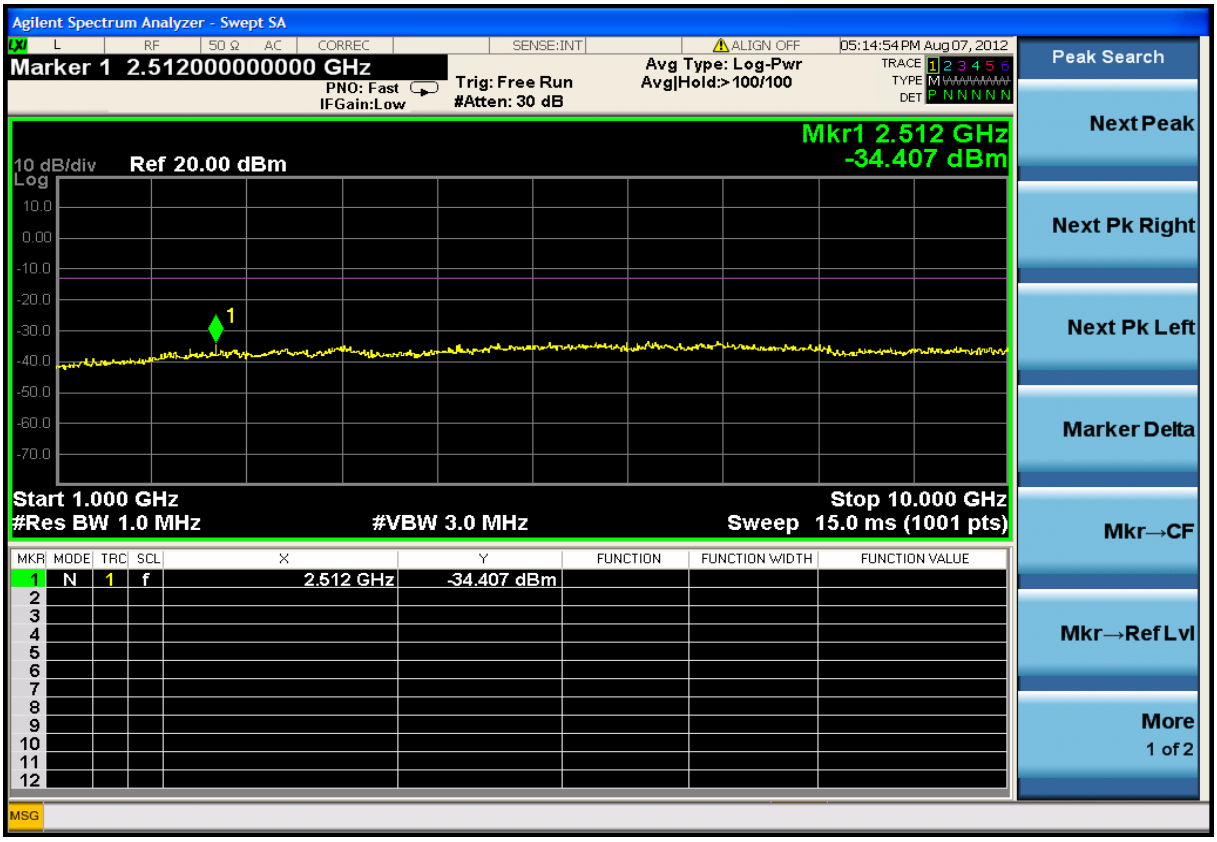
Conducted Spurious Measurement:
GPRS850 Channel 128



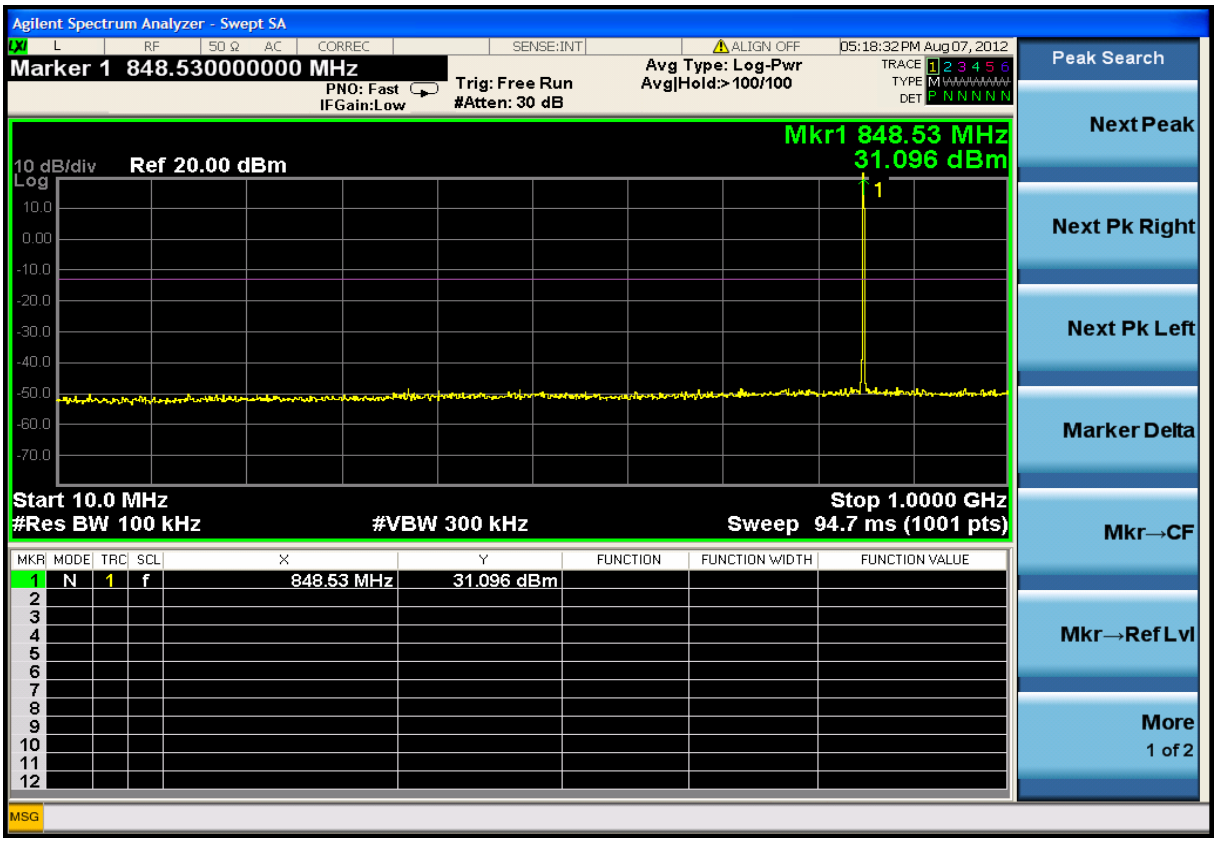


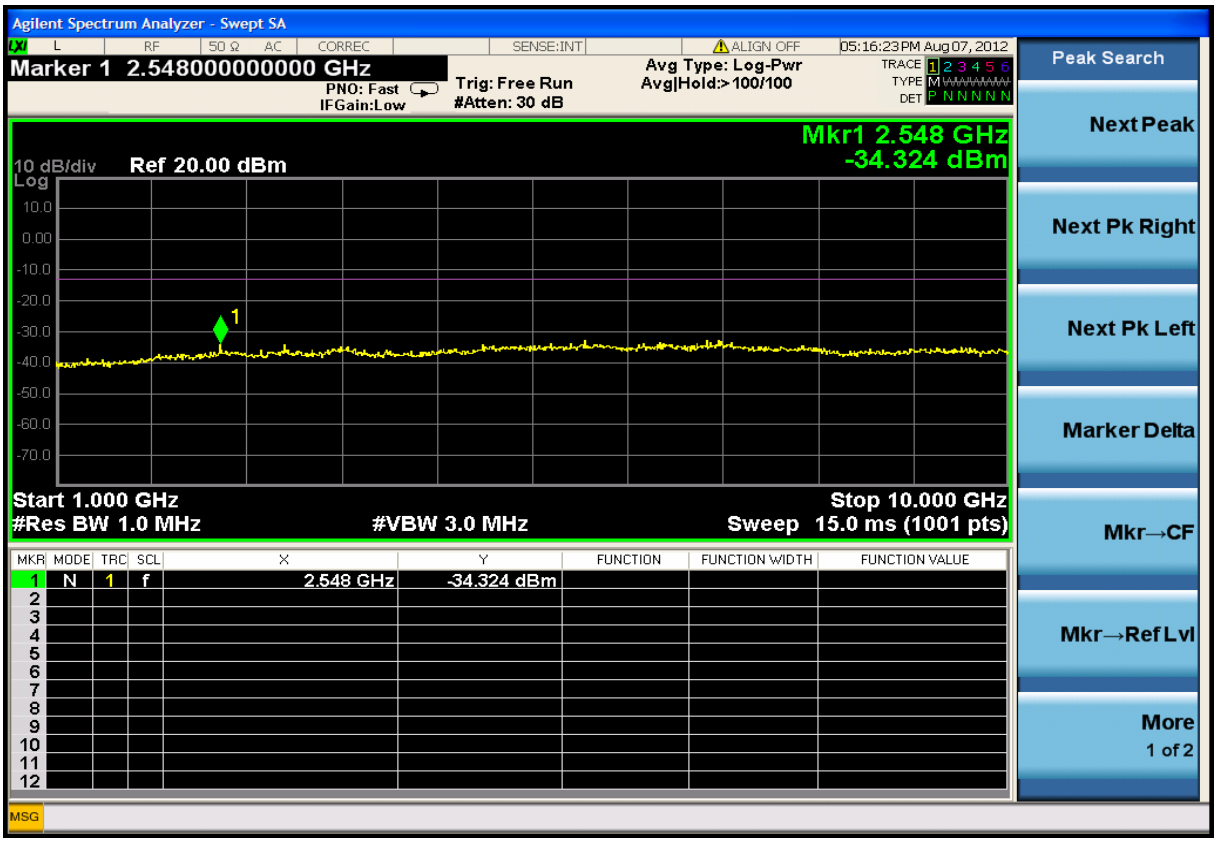
GPRS850 Channel 189



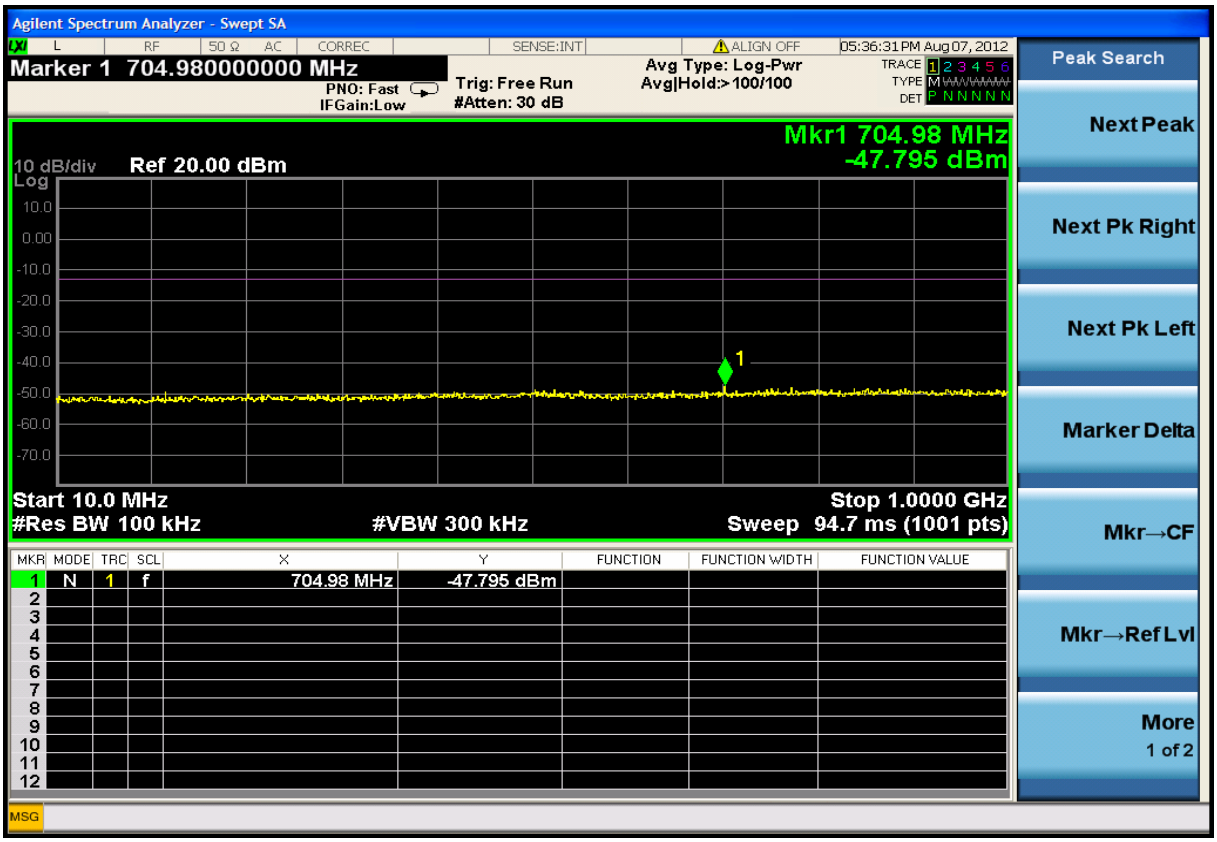


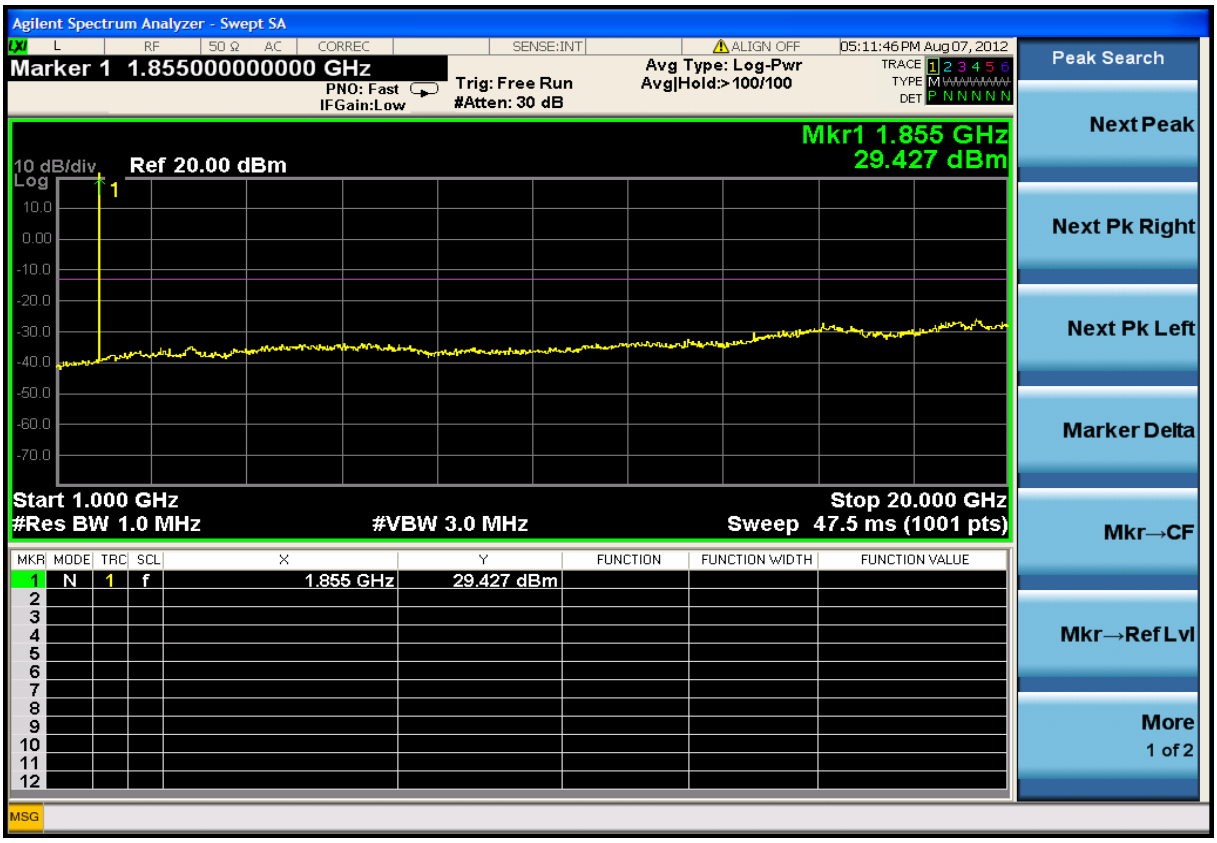
GPRS850 Channel 251



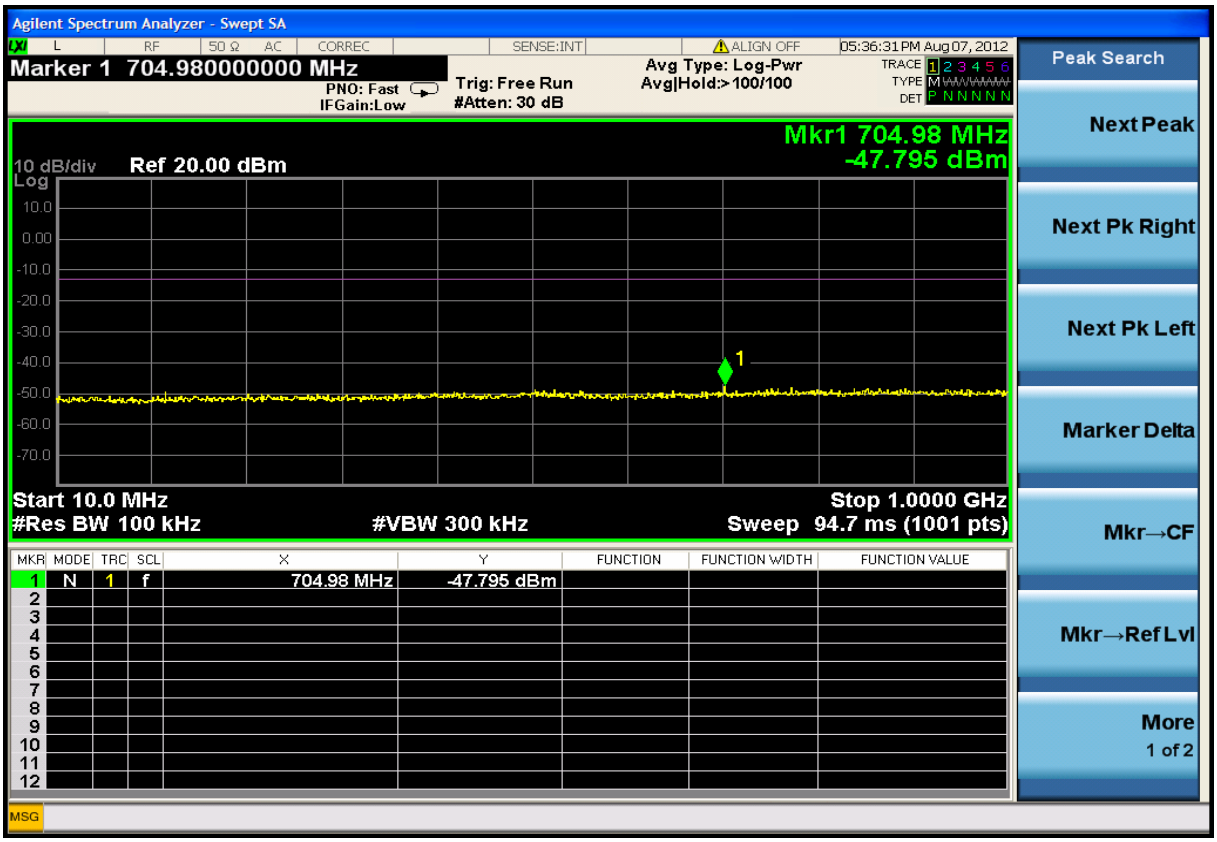


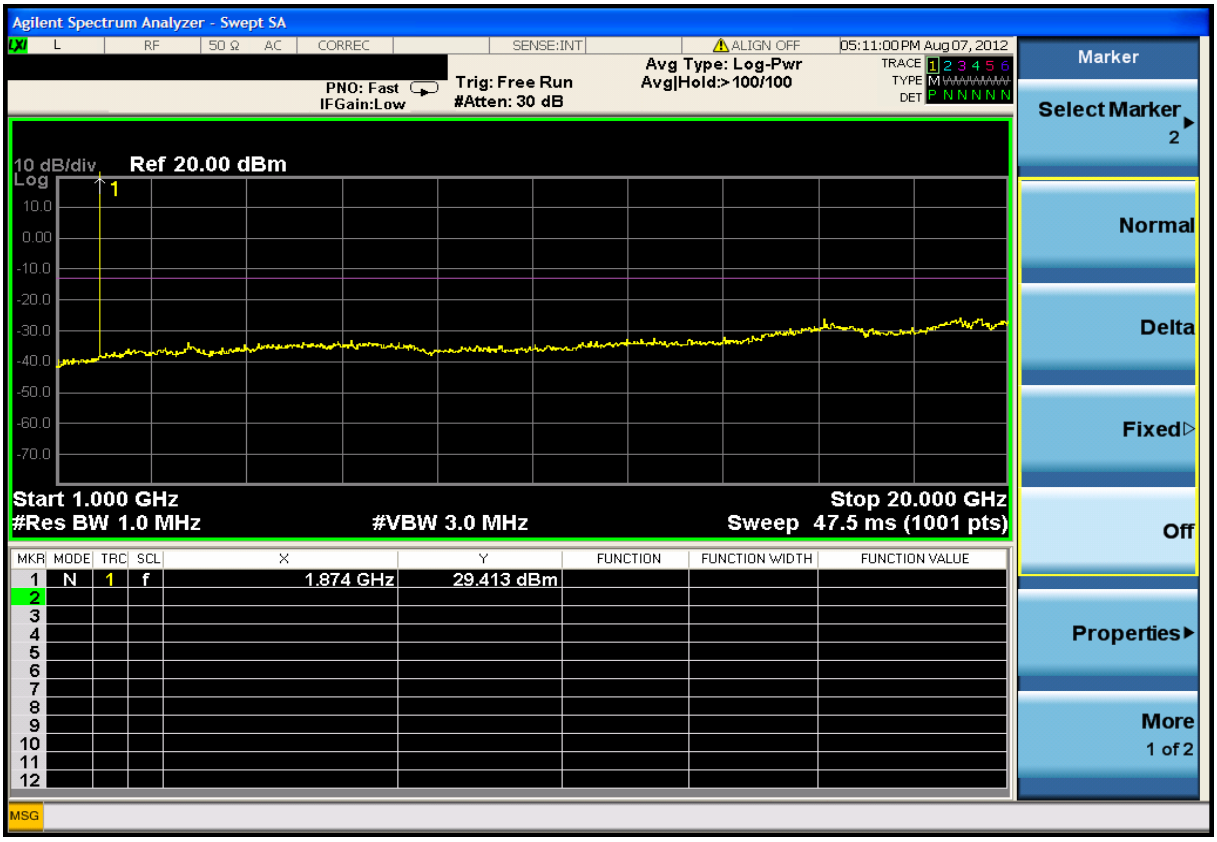
GPRS1900 Channel 512



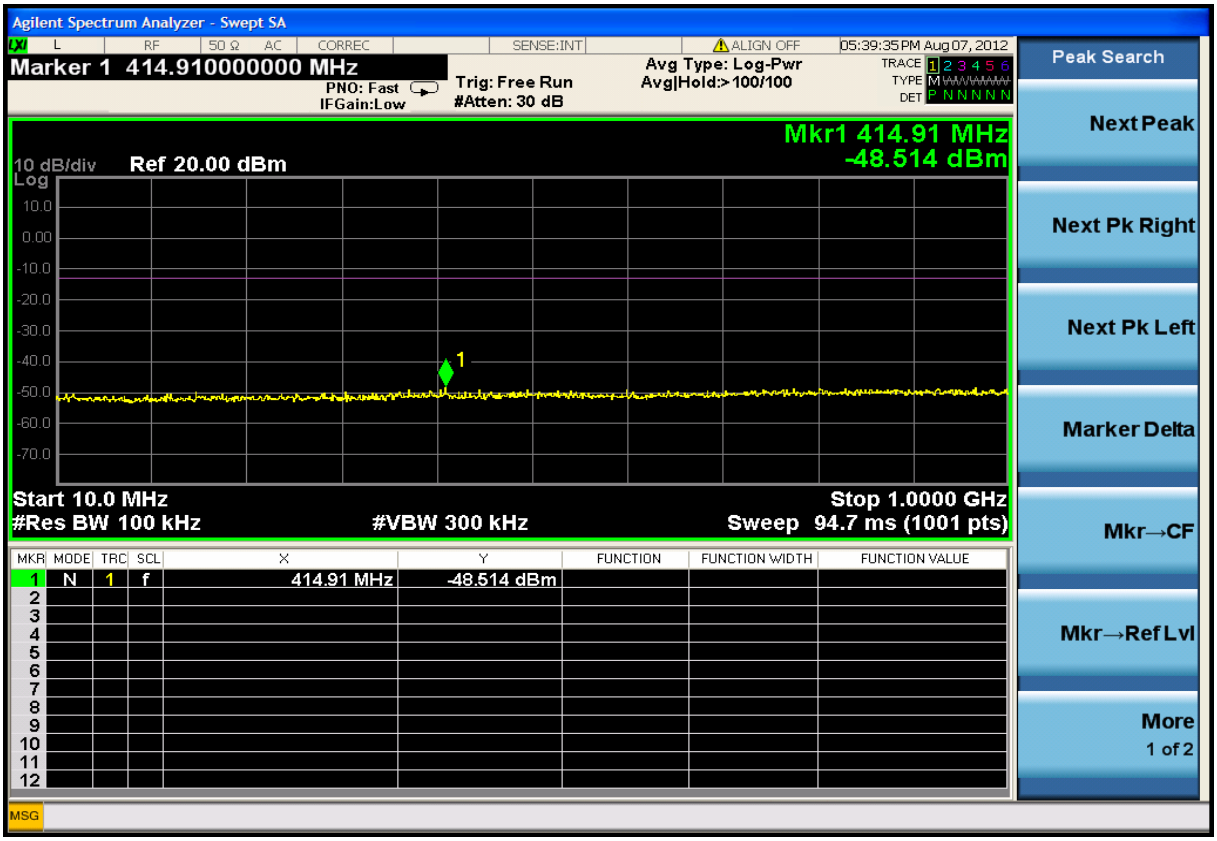


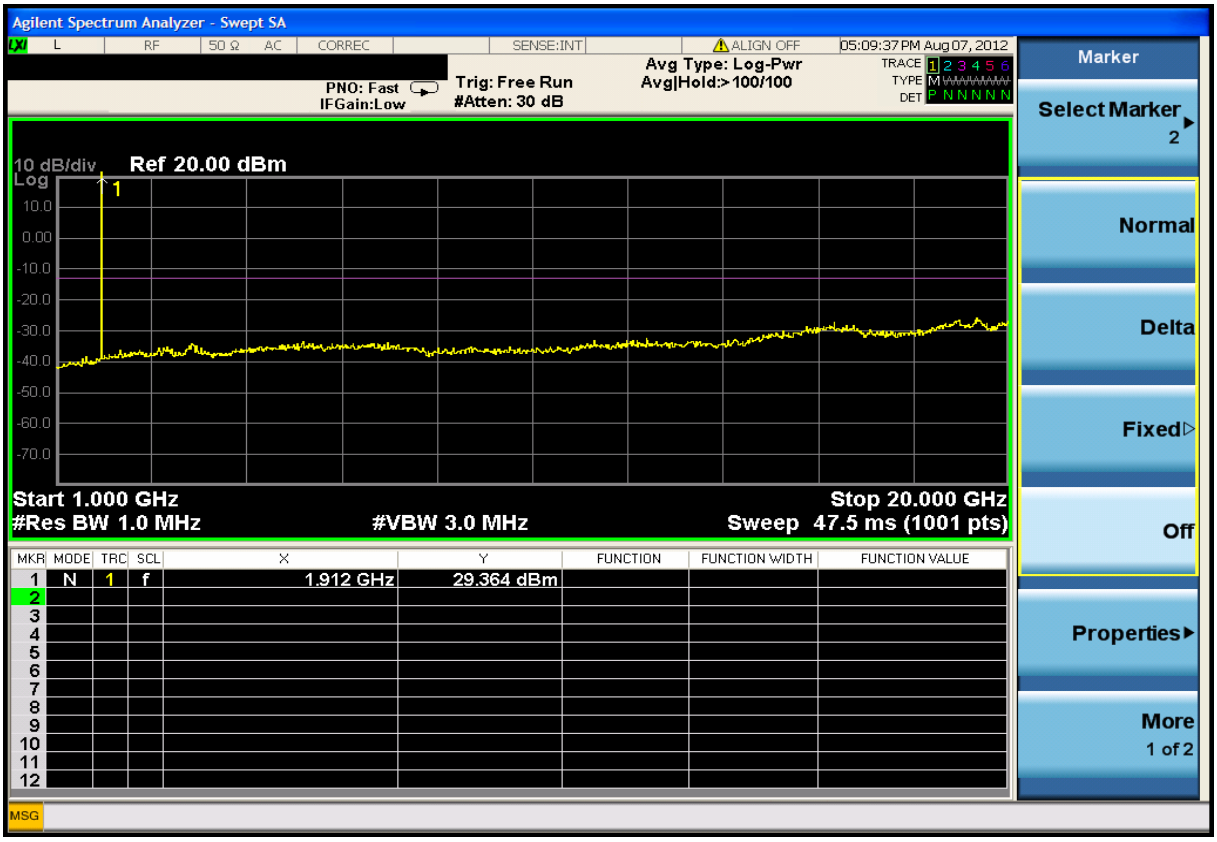
GPRS1900 Channel 661





GPRS1900 Channel 810





Radiated Spurious Measurement:

GPRS850 Below 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
224.9	H	-43.75	2.09	-0.71	-46.55	-13.00	-33.55
742.9	H	-41.93	3.78	-2.41	-48.12	-13.00	-35.12
224.9	V	-46.52	2.09	-0.71	-49.32	-13.00	-36.32
742.9	V	-45.03	3.78	-2.41	-51.22	-13.00	-38.22

GPRS850 Above 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
1673.4	H	-44.06	6.00	7.80	-42.26	-13.00	-29.26
2506.4	H	-47.41	7.36	8.46	-46.31	-13.00	-33.31
1673.4	V	-45.72	6.00	7.80	-43.92	-13.00	-30.92
2506.4	V	-49.93	7.36	8.46	-48.83	-13.00	-35.83

GPRS1900 Below 1GHz

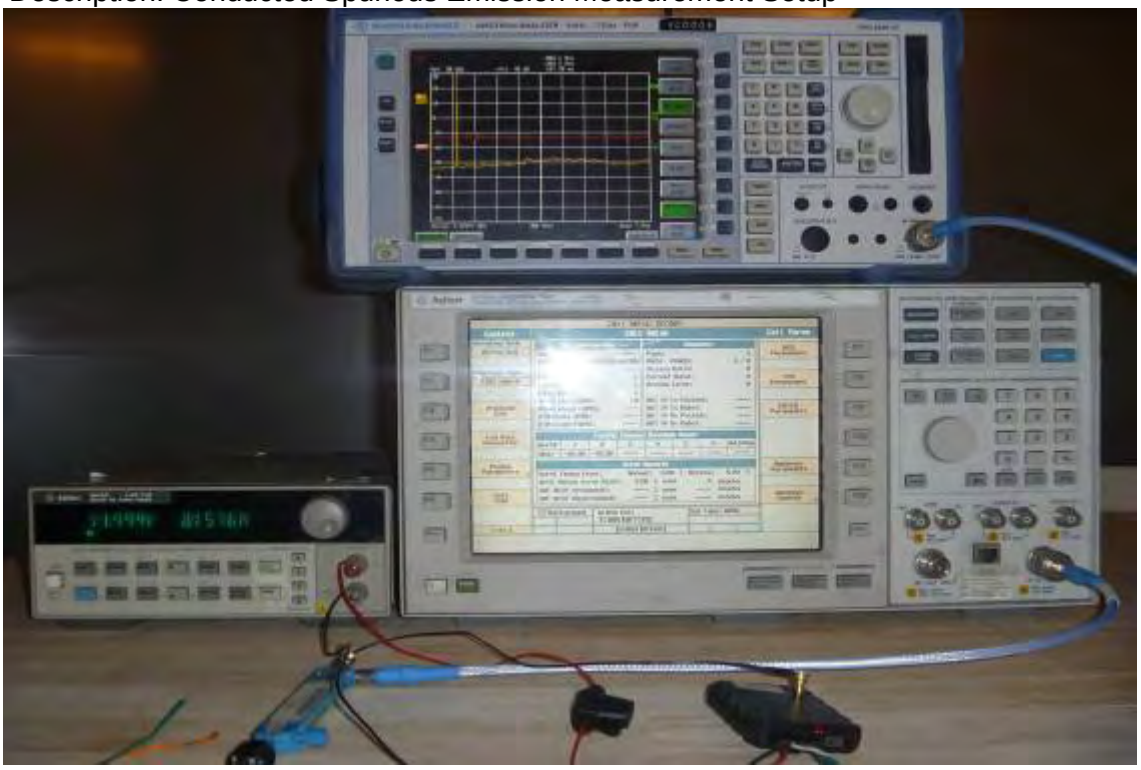
Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 661 (1880.00MHz)							
224.9	H	-47.81	2.09	1.45	-48.45	-13.00	-35.45
742.9	H	-46.13	3.78	-0.26	-50.17	-13.00	-37.17
224.9	V	-48.71	2.09	1.45	-51.44	-13.00	-38.44
742.9	V	-52.97	3.78	-0.26	-57.01	-13.00	-44.01

GPRS1900 Above 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 661 (1880.00MHz)							
3760.4	H	-52.33	8.95	12.73	-48.55	-13.00	-35.55
5462.8	H	-49.31	11.12	13.12	-47.31	-13.00	-34.31
3760.4	V	-48.48	8.95	12.73	-44.70	-13.00	-31.7
5462.8	V	-48.28	11.12	13.12	-46.28	-13.00	-33.28

7.7. Test Photograph

Description: Conducted Spurious Emission Measurement Setup



Description: Radiated Spurious Measurement Setup (Below 1GHz)

Description: Substitution Antenna for Radiated Spurious Measurement (Below 1GHz)

Description: Radiated Spurious Measurement Setup (Above 1GHz)

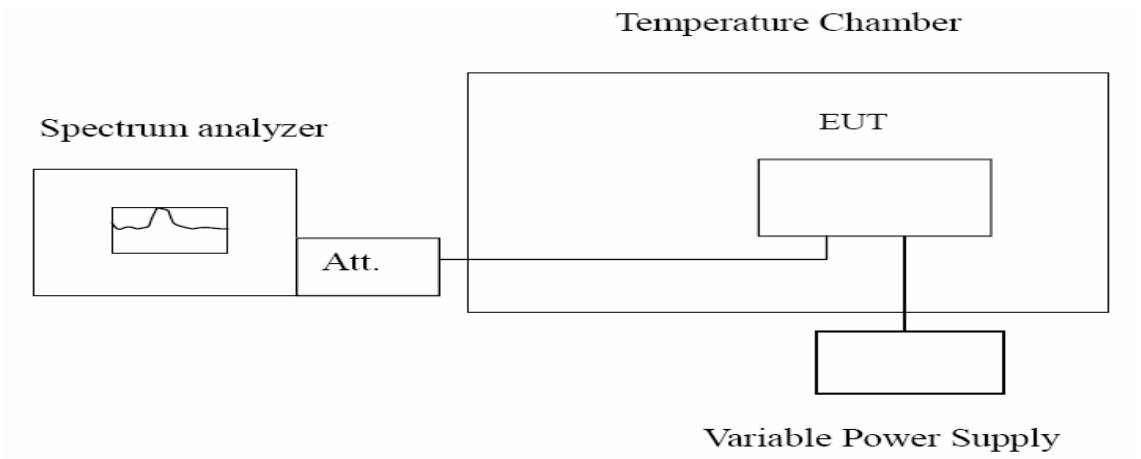
Description: Substitution Antenna for Radiated Spurious Measurement (Above 1GHz)

8. Frequency Stability Under Temperature & Voltage Variations

8.1. Test Equipment

Instrument	Manufacturer	Model	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210142	2012.08.31
Radio Communication Tester	Agilent	E5515C	GB46581718	2012.10.25
DC Power Supply	Agilent	6612C	MY43002989	2013.01.17
DC Power Supply	ITECH	IT5612	01600210661201014	2013.11.16
Temperature Chamber	WEISS	DU/20/40	58226017340050	2012.12.04

8.2. Test Setup



8.3. Limit

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

Limit	< ±2.5 ppm

8.4. Test Procedure

Frequency Stability Under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure

EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10 ℃ increased per stage until the highest temperature of +80℃ reached.

Frequency Stability Under Voltage Variations:

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

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

8.5. Uncertainty

The measurement uncertainty is defined as±10 Hz.

8.6. Test Result

GPRS850

Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation		Limit (ppm)
		(Hz)	(ppm)	
-30	836.40	26	0.03	< ±2.5
-20	836.40	39	0.05	< ±2.5
-10	836.40	36	0.04	< ±2.5
0	836.40	31	0.04	< ±2.5
10	836.40	25	0.03	< ±2.5
20	836.40	34	0.04	< ±2.5
30	836.40	12	0.01	< ±2.5
40	836.40	-11	-0.01	< ±2.5
50	836.40	15	0.02	< ±2.5
60	836.40	15	0.02	< ±2.5
70	836.40	-9	-0.01	< ±2.5
80	836.40	31	0.04	< ±2.5

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation		Limit (ppm)
		(Hz)	(ppm)	
32	836.40	14	0.02	< ±2.5
12	836.40	-17	-0.02	< ±2.5
8	836.40	-16	-0.02	< ±2.5

GPRS1900

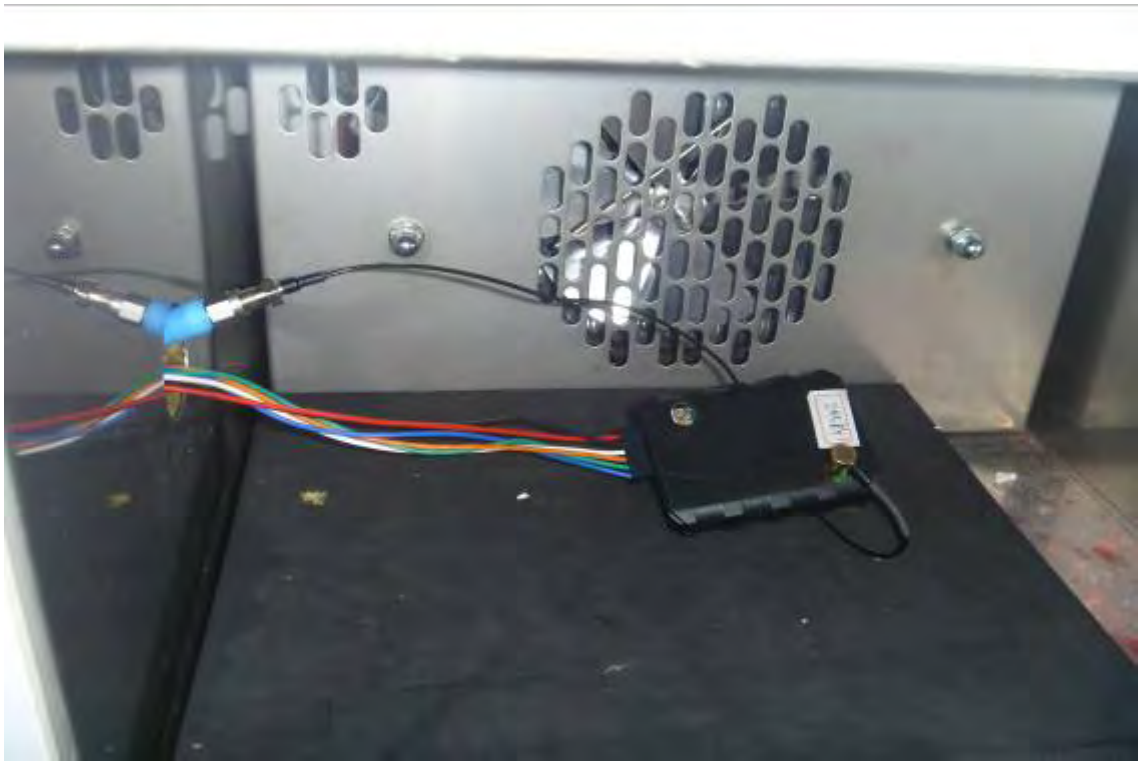
Frequency Stability under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation		Limit (ppm)
		(Hz)	(ppm)	
-30	1880.00	-38	-0.02	< ±2.5
-20	1880.00	57	0.03	< ±2.5
-10	1880.00	63	0.03	< ±2.5
0	1880.00	53	0.03	< ±2.5
10	1880.00	37	0.02	< ±2.5
20	1880.00	45	0.02	< ±2.5
30	1880.00	25	0.01	< ±2.5
40	1880.00	-50	-0.03	< ±2.5
50	1880.00	-40	-0.02	< ±2.5
60	1880.00	-39	-0.02	< ±2.5
70	1880.00	-53	-0.03	< ±2.5
80	1880.00	38	0.02	< ±2.5

Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation		Limit (ppm)
		(Hz)	(ppm)	
32	1880.00	-23	-0.01	< ±2.5
12	1880.00	-48	-0.03	< ±2.5
8	1880.00	-31	-0.02	< ±2.5

8.7. Test Photograph

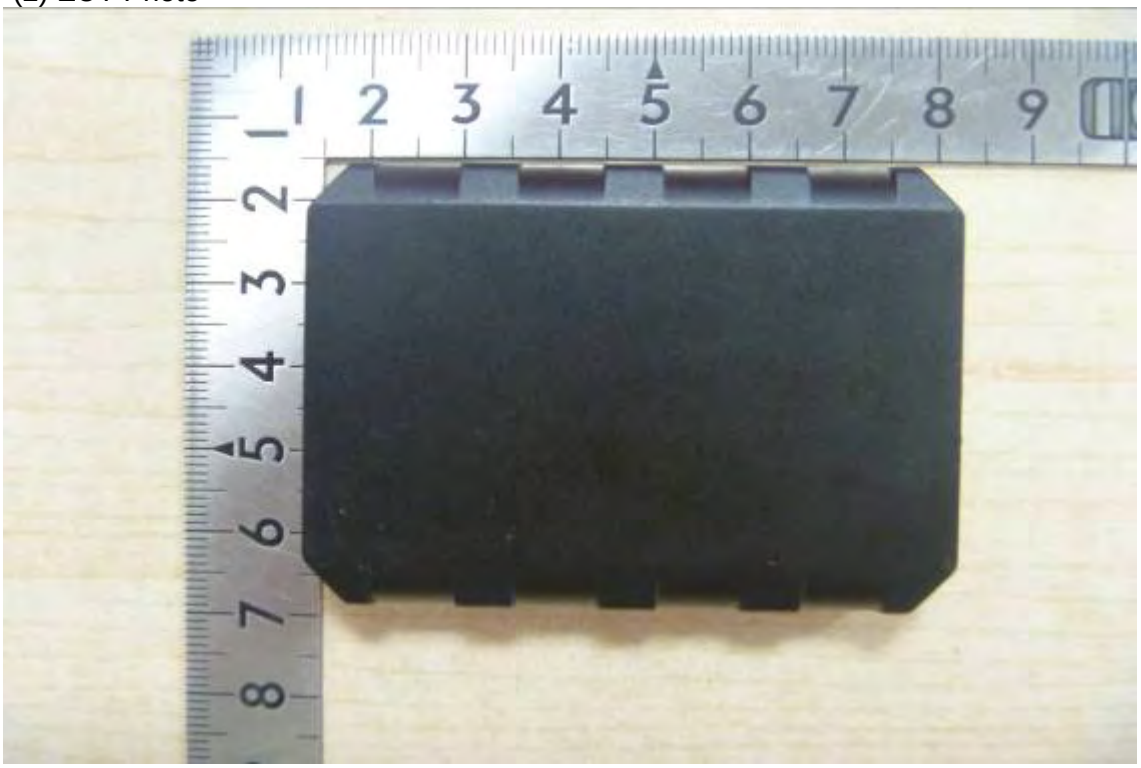


9. Attachment

EUT Photograph

(1) EUT Photo

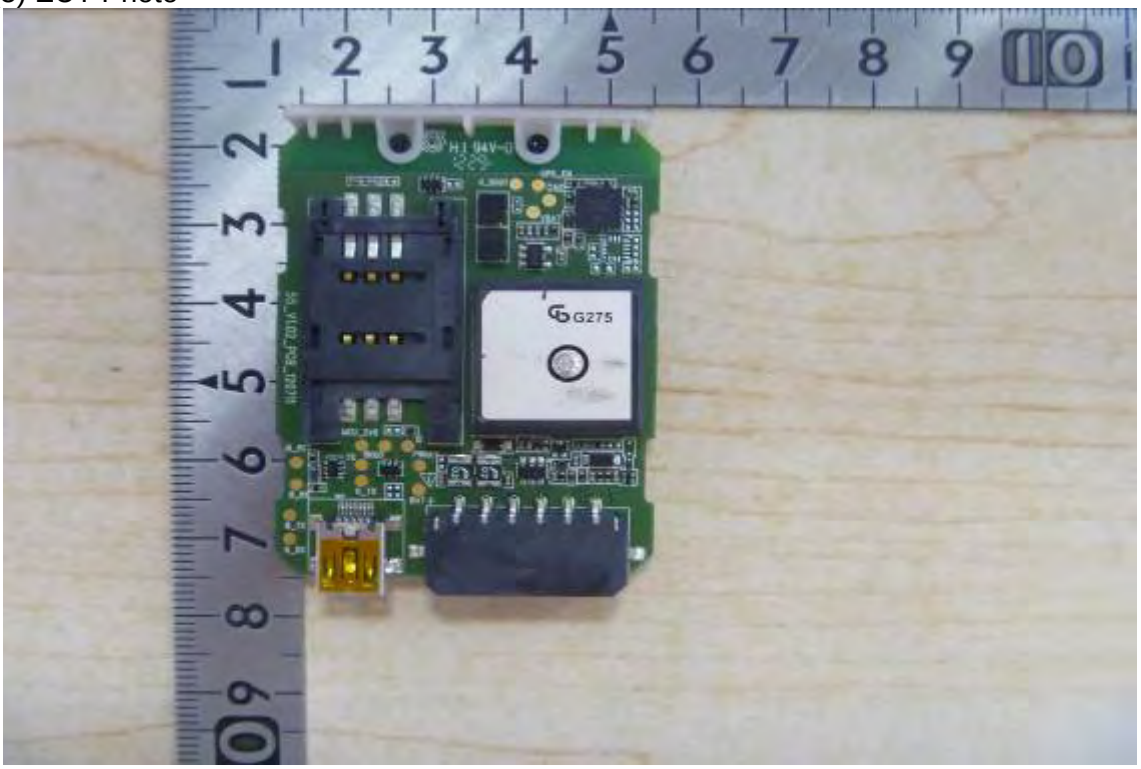
(2) EUT Photo



(3) EUT Photo

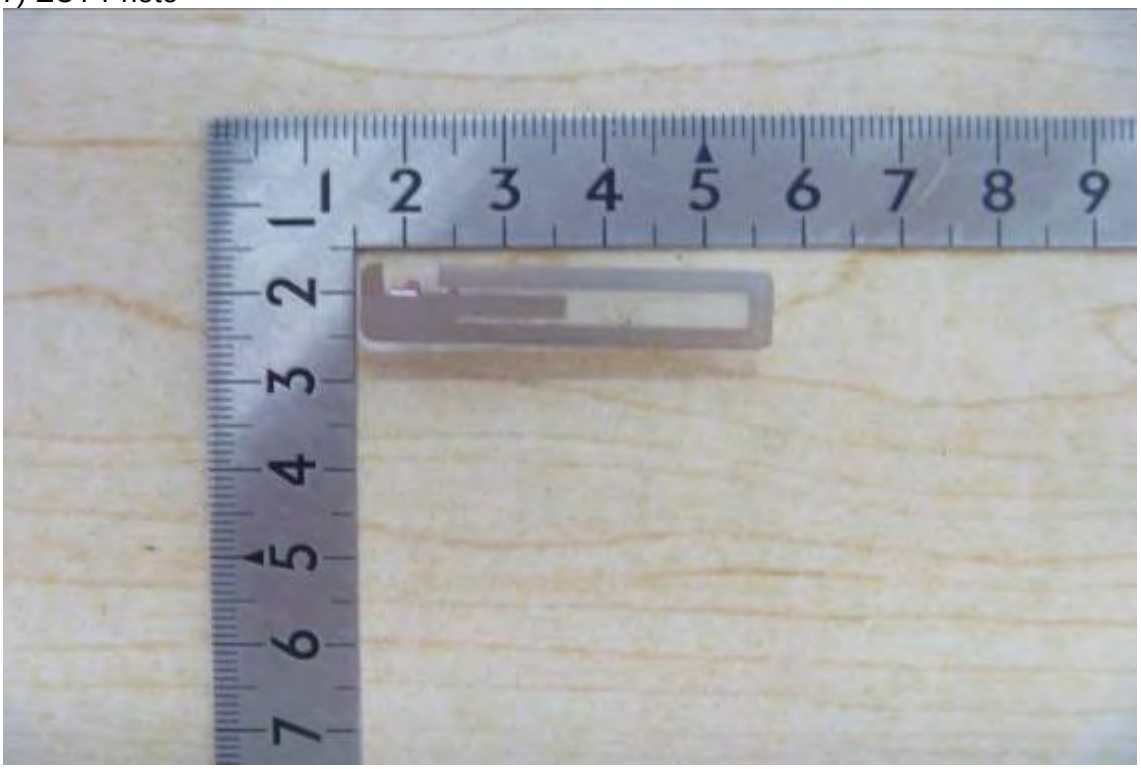
(4) EUT Photo

(5) EUT Photo

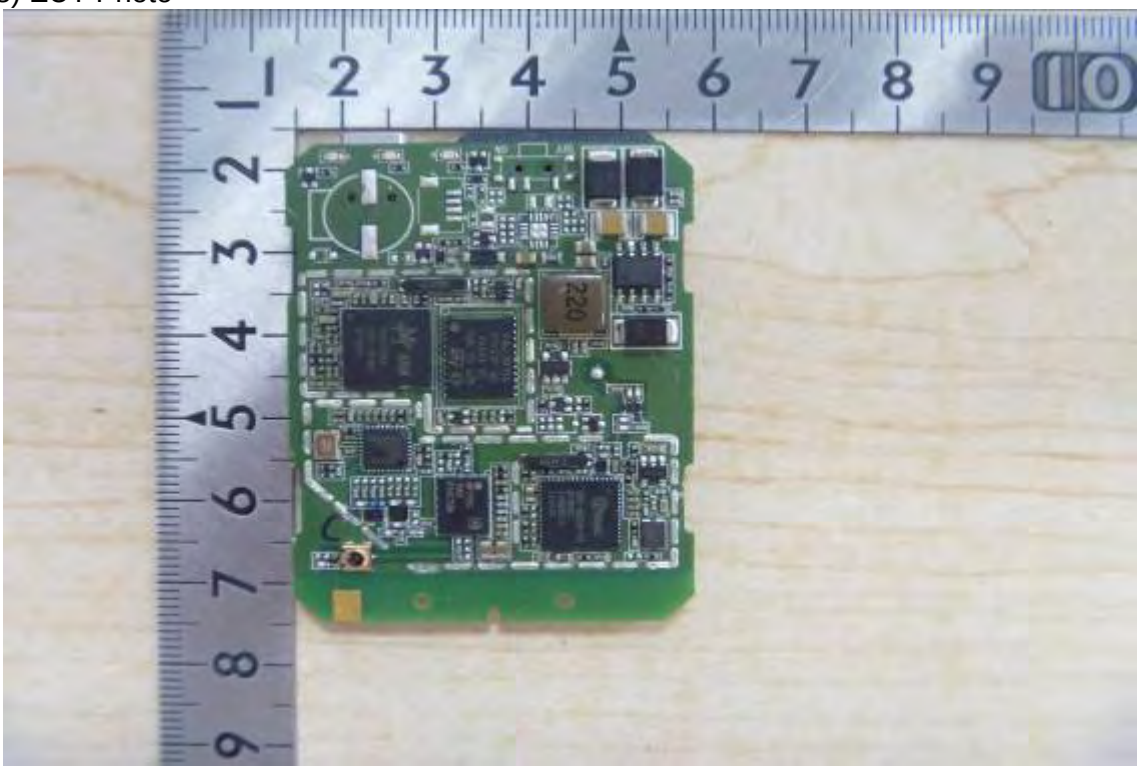


(6) EUT Photo

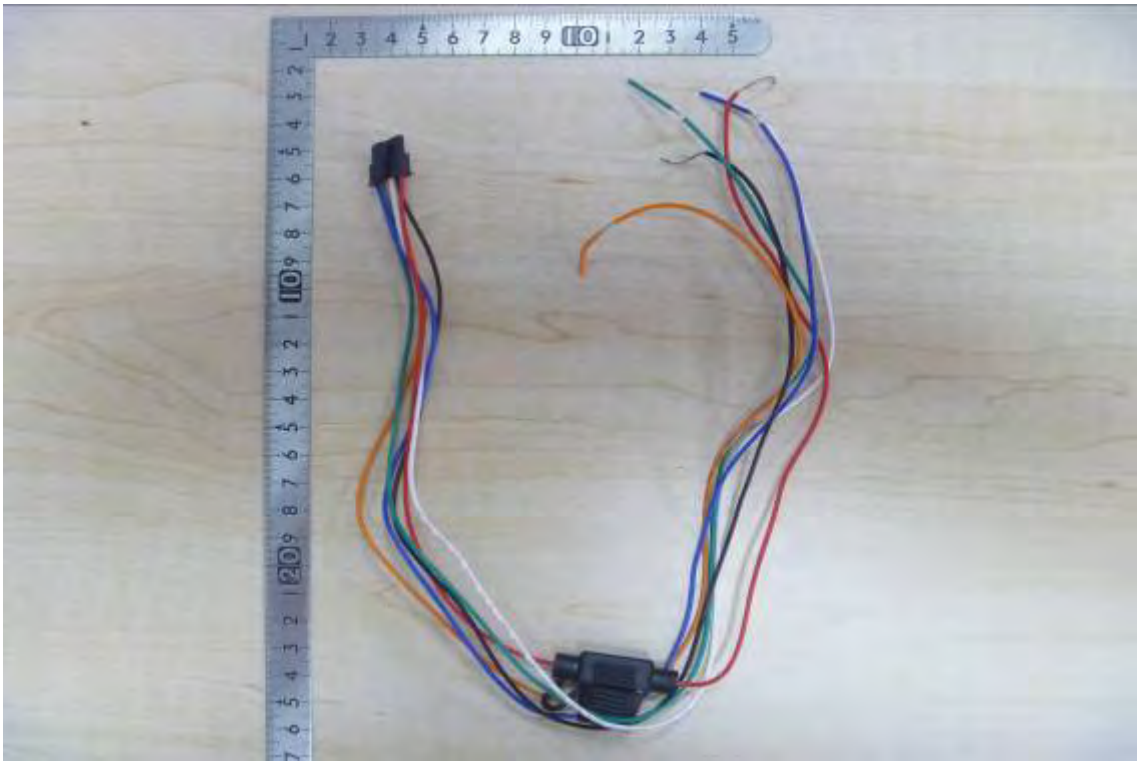
(7) EUT Photo



(8) EUT Photo



(9) EUT Photo



END OF THE REPORT