FCC Part22H&24E Test Report
Industry Canada RSS-132/RSS-133

Product Name : GIS Data collector

Model No. : loka/ XF300/ XF200/ MG868H, MG858W ,MG868N , MG868T, MG868HN, MG858E, MG838W

FCC ID : YYE-MG868001

IC ID : 10537A-000003

Applicant : Beijing Unistrong Science&Technology Co.,Ltd

Address : 204 Building,#10 Jiuxianqiao North Road,Chaoyang District,Beijing,PRC.

Date of Receipt : 15/05/2013

Test Date : 15/05/2013~19/05/2013

Issued Date : 20/05/2013

Report No. : ZZ20130515002-3

Report Version : V1.0

Test Report Certification

Issued Date : 20/05/2013
Report No. : ZZ20130515002-3

Product Name :	GIS Data collector
Applicant :	Beijing Unistrong Science&Technology Co.,Ltd
Address :	204 Building,#10 Jiuxianqiao North Road,Chaoyang District,Beijing,PRC
Manufacturer :	Beijing Unistrong Science&Technology Co.,Ltd
Address :	204 Building,#10 Jiuxianqiao North Road, Chaoyang District,Beijing, PRC
Model No. :	loka/ XF300/ XF200/ MG868H, MG858W , MG868N , MG868T, MG868HN, MG858E, MG838W
Model Difference:	All models are identical. The difference between them is for different customers or different marketed countries. The model under test is loka/ XF300/ XF200/MG868H and the test results are applicable to the others.
EUT Voltage :	MIN: 3.6V, NOR: 3.8V, MAX: 4.2V
Brand Name :	UniStrong
FCC ID:	YYE-MG868001
IC ID:	10537A-000003
Applicable Standard :	ANSI/TIA-603-D-2010; FCC CFR Title 47 Part 2 FCC CFR Title 47 Part24 Subpart E FCC CFR Title 47 Part 22 Subpart H RSS-GEN Issue2; Industry Canada RSS-132, Issue3 Industry Canada RSS-133, Issue6
Test Result :	Complied
Performed Location :	ZTE Corporation 1/F, B2 Wing, ZTE plaza, Keji Road South,Shenzhen Guangdong, China TEL: +86-755-26771609 FAX: +86-755-26770347

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(Senior Engineer: Jacky Zhang)

Approved By : Sky Shen
(Supervisor: Sky Shen)

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1.General Information

1.1. EUT Description

Product Name:	GIS Data collector
Model Name:	loka/XF300/XF200/MG868H
Hardware Version:	V0.6
Software Version:	R01.01.00.14
RF Exposure Environment:	Uncontrolled
GPRS	
Support Band:	GSM850/PCS1900
GPRS Class:	12
Tx Frequency Range:	GSM 850: 824.2MHz to 848.8MHz PCS 1900: 1850.2MHz to 1909.8MHz
Rx Frequency Range:	GSM 850: 869.2MHz to 893.8MHz PCS 1900: 1930.2MHz to 1989.8MHz
Type of modulation:	GMSK for GPRS
Antenna Type:	Internal
Antenna Peak Gain:	GSM 850: -2.0dBi PCS 1900: -0.5dBi
EDGE	
Support Band:	GSM850/PCS1900
GPRS Class:	12
Tx Frequency Range:	GSM 850: 824.2MHz to 848.8MHz PCS 1900: 1850.2MHz to 1909.8MHz
Rx Frequency Range:	GSM 850: 869.2MHz to 893.8MHz PCS 1900: 1930.2MHz to 1989.8MHz
Type of modulation:	8PSK for EDGE
Antenna Type:	Internal
Antenna Peak Gain:	GSM 850: -2.0dBi PCS 1900: -0.5dBi
WCDMA	
Support Band:	WCDMA Band V
Tx Frequency Range:	WCDMA(UMTS): 826.4-846.6MHz
Rx Frequency Range:	WCDMA(UMTS): 871.4-891.6MHz
Type of modulation:	WCDMA(UMTS): QPSK
Antenna Type:	Internal
Antenna Peak Gain:	WCDMA Band V: -0.5dBi

Component	
AC Adapter:	Model Name:P12USB050200
	Input: AC 100-240V 50/60Hz
	Output: DC 5V/2A

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: GPRS/EDGE 850 Link
Mode 2: GPRS/EDGE 1900 Link
Mode 3: WCDMA Band V

Note:
1. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. Radiated power output working at GPRS/EDGE(1 slot) link was higher than that working at GPRS/EDGE（2 slot）link, so all of test items were done working at GPRS/EDGE(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 ZZ20130515002-3.

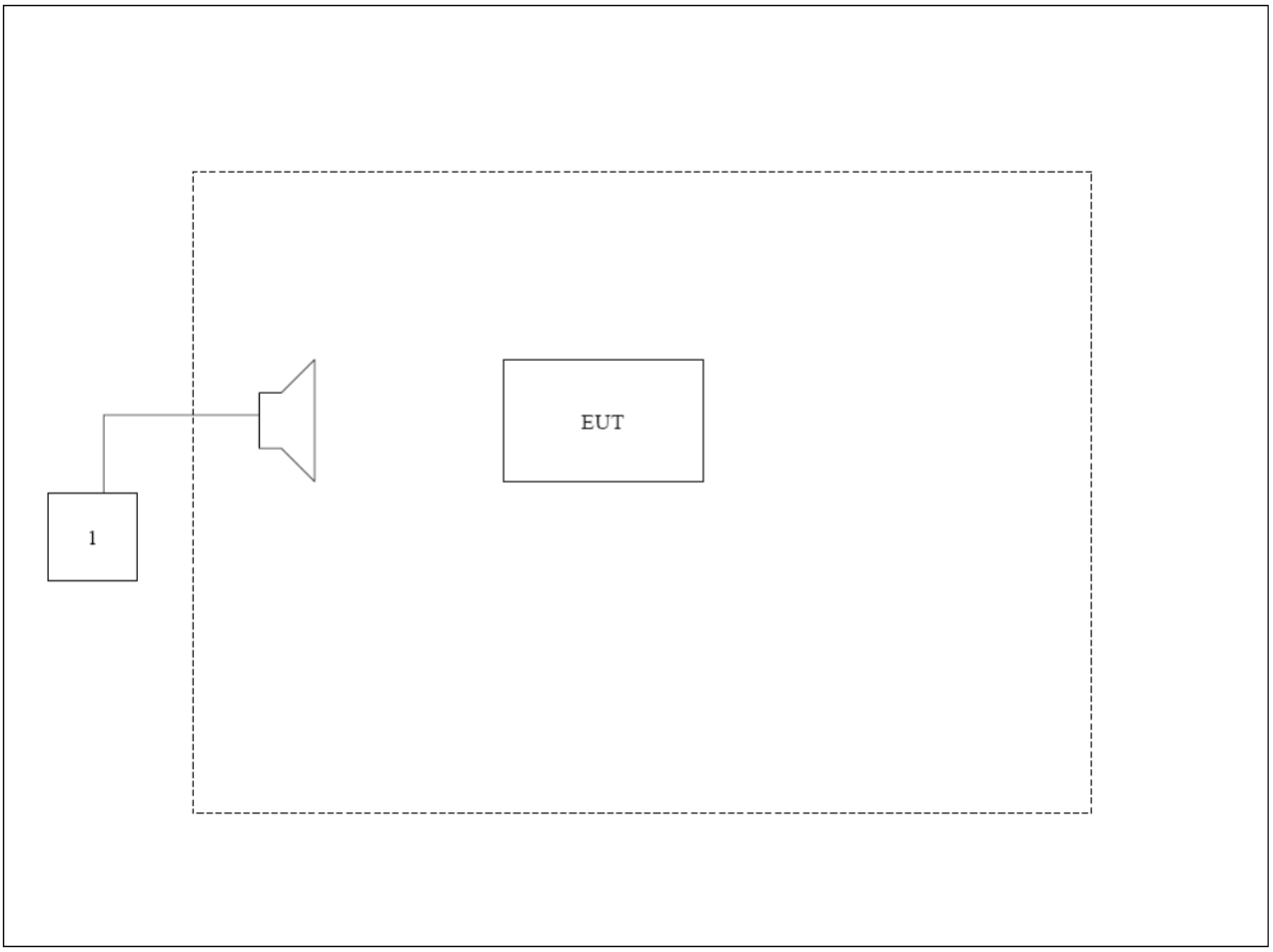
1.3. Tested System Details

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)

Performed Item	Normative References	Section in RSS GEN or RSS-132	Test Performed	Deviation
Peak Output Power	FCC Part 22.913(a)(2) and Part 2.1046	5.4	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	5.2	Yes	No
Occupied Bandwidth	FCC Part 2.1049	RSS GEN 4.6	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 22.917(a) and Part 2.1049	5.5	Yes	No
Spurious Emission	FCC Part 22.917(b) and Part 2.1051, 2.1053	5.5, 5.6	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC Part 22.355 and 2.1055	5.3	Yes	No

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

Performed Item	Normative References	Section in RSS GEN or RSS-133	Test Performed	Deviation
Peak Output Power	FCC Part 24.232(c) and Part 2.1046	6.4	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	6.2	Yes	No
Occupied Bandwidth	FCC Part 24.238(b) and Part 2.1049	RSS GEN 4.6	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 24.238(a) and Part 2.1049	6.5	Yes	No
Spurious Emission	FCC Part 24.238(b) and Part 2.1051, 2.1053	6.5, 6.6	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC Part 24.235 and 2.1055	6.3	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

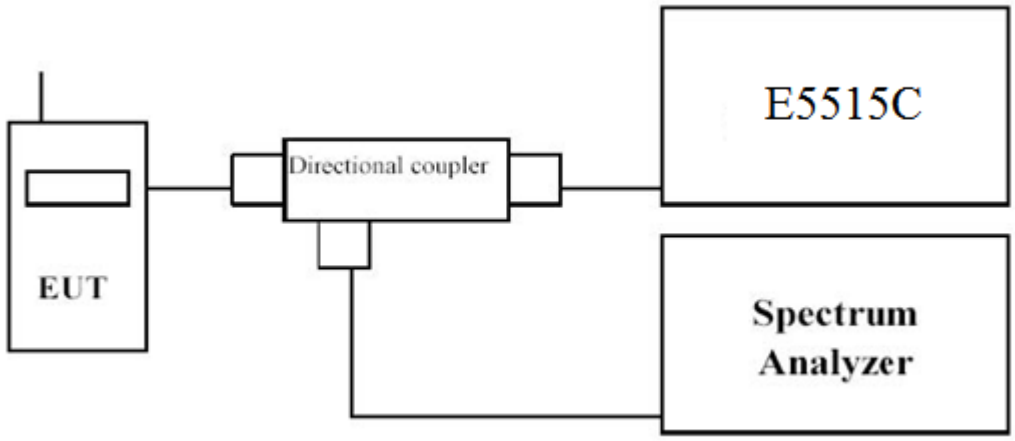
3. Peak Output Power

3.1. Test Equipment

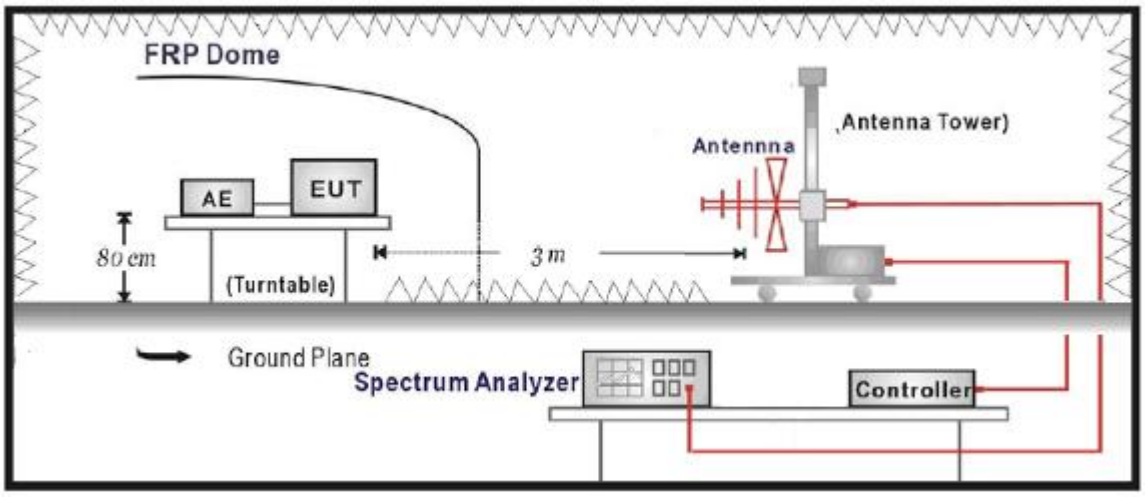
Instrument	Manufacturer	Model	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210142	2013.09.27
Radio Communication Tester	Agilent	E5515C	GB46581718	2013.10.25
Signal Generator	Agilent	N5183A	MY50140938	2013.10.08
Preamplifier	CEM	EM30180	3008A0245	2014.03.01
DC Power Supply	Agilent	6612C	MY43002989	2014.03.04
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2013.09.19
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2013.09.19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2013.09.19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2013.09.19

3.2. Test Setup

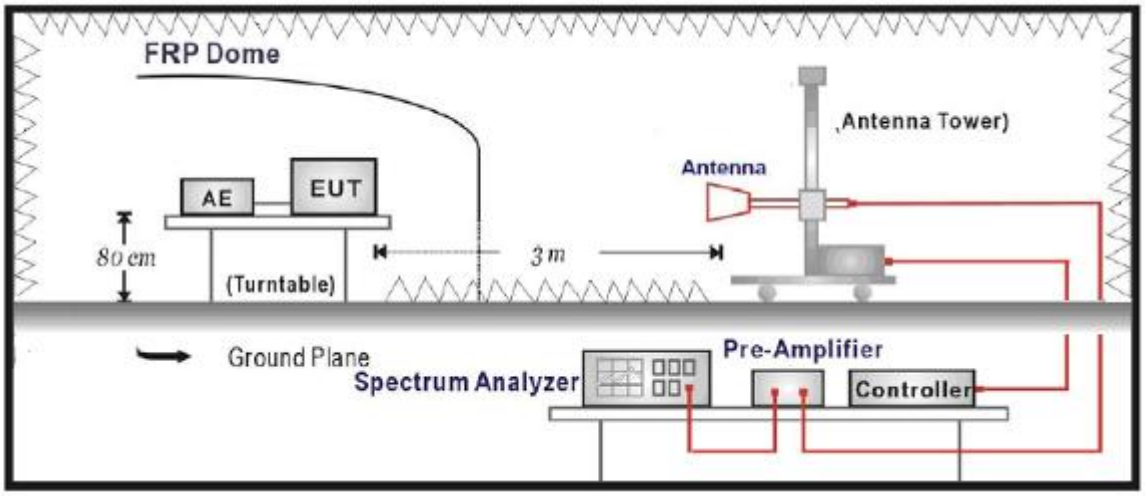
Conducted Power Measurement:



Radiated Spurious Measurement: below 1GHz



Radiated Spurious Measurement: above 1GHz



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(c):
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±1.1 dB,
for Radiated Power Measurement±3.1 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
Time based avg. power compared to slotted avg. power	-9 dB	-6 dB	-4.25 dB	-3 dB

The following table shows the conducted power measured:

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	30.86	-9	21.86	38.50
189	836.4	GMSK	30.92	-9	21.92	38.50
251	848.8	GMSK	31.56	-9	22.56	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	26.74	-9	17.74	33.00
661	1880.0	GMSK	26.87	-9	17.87	33.00
810	1909.8	GMSK	27.42	-9	18.42	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	30.13	-6	24.13	38.50
189	836.4	GMSK	30.04	-6	24.04	38.50
251	848.8	GMSK	30.76	-6	24.76	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	25.98	-6	19.98	33.00
661	1880.0	GMSK	26.38	-6	20.38	33.00
810	1909.8	GMSK	27.01	-6	21.01	33.00

GPRS 850 (3Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	GMSK	29.13	-4.25	24.89	38.50
189	836.4	GMSK	28.74	-4.25	24.49	38.50
251	848.8	GMSK	29.26	-4.25	25.01	38.50

GPRS 1900 (3Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	GMSK	24.76	-4.25	20.51	33.00
661	1880.0	GMSK	26.18	-4.25	21.93	33.00
810	1909.8	GMSK	26.12	-4.25	21.87	33.00

GPRS 850 (4Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	GMSK	28.34	-3	25.34	38.50
189	836.4	GMSK	28.01	-3	25.01	38.50
251	848.8	GMSK	28.74	-3	25.74	38.50

GPRS 1900 (4Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	GMSK	25.08	-3	22.08	33.00
661	1880.0	GMSK	25.88	-3	22.88	33.00
810	1909.8	GMSK	25.61	-3	22.61	33.00

EDGE850 (1Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	8PSK	28.35	-9	19.35	38.50
189	836.4	8PSK	27.99	-9	18.99	38.50
251	848.8	8PSK	28.74	-9	19.74	38.50

EDGE1900 (1Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	8PSK	24.54	-9	15.54	33.00
661	1880.0	8PSK	25.56	-9	16.56	33.00
810	1909.8	8PSK	26.31	-9	17.31	33.00

EDGE850 (2Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	8PSK	27.12	-6	21.12	38.50
189	836.4	8PSK	28.01	-6	22.01	38.50
251	848.8	8PSK	27.36	-6	21.36	38.50

EDGE1900 (2Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	8PSK	24.12	-6	18.12	33.00
661	1880.0	8PSK	24.58	-6	18.58	33.00
810	1909.8	8PSK	25.13	-6	19.13	33.00

EDGE850 (3Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	8PSK	27.11	-4.25	22.86	38.50
189	836.4	8PSK	26.53	-4.25	22.28	38.50
251	848.8	8PSK	25.86	-4.25	21.61	38.50

EDGE1900 (3Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	8PSK	23.98	-4.25	19.73	33.00
661	1880.0	8PSK	24.14	-4.25	19.89	33.00
810	1909.8	8PSK	24.11	-4.25	19.86	33.00

EDGE850 (4Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
128	824.2	8PSK	25.98	-3	22.98	38.50
189	836.4	8PSK	26.04	-3	23.04	38.50
251	848.8	8PSK	27.05	-3	24.05	38.50

EDGE1900 (4Slot)

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Limit (dBm)
512	1850.2	8PSK	23.06	-3	20.06	33.00
661	1880.0	8PSK	22.98	-3	19.98	33.00
810	1909.8	8PSK	23.56	-3	20.56	33.00

WCDMA Band V

Channel No.	Frequency (MHz)	Modulation	Avg.Burst Power (dBm)	Limit (dBm)
4132	826.4	QPSK	22.21	38.50
4182	836.4	QPSK	22.29	38.50
4233	846.6	QPSK	22.41	38.50

The following table shows the Radiated power measured :

Table 3

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	36.16	3.83	-2.99	29.34	38.50	-9.16
824.2	V	30.61	3.83	-2.99	23.79	38.50	-14.71
Middle Channel 189 (836.40MHz)							
836.4	H	33.21	3.96	-3.04	26.21	38.50	-12.29
836.4	V	30.54	3.96	-3.04	23.54	38.50	-14.96
High Channel 251 (848.80MHz)							
848.8	H	38.49	3.97	-3.10	31.42	38.50	-7.08
848.8	V	31.21	3.97	-3.10	24.14	38.50	-14.36

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	18.75	6.26	10.40	22.89	33.00	-10.11
1850.2	V	24.54	6.26	10.40	28.68	33.00	-4.32
Middle Channel 661 (1880.00MHz)							
1880.0	H	17.29	6.19	10.43	21.53	33.00	-11.47
1880.0	V	24.51	6.19	10.43	28.75	33.00	-4.25
High Channel 810 (1909.80MHz)							
1909.8	H	17.09	6.15	10.44	21.38	33.00	-11.62
1909.8	V	20.08	6.15	10.44	24.37	33.00	-8.63

DGE850

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	29.03	3.83	-2.99	22.21	38.50	-16.29
824.2	V	27.85	3.83	-2.99	21.03	38.50	-17.47
Middle Channel 189 (836.40MHz)							
836.4	H	27.13	3.96	-3.04	20.13	38.50	-18.37
836.4	V	28.23	3.96	-3.04	21.23	38.50	-17.27
High Channel 251 (848.80MHz)							
848.8	H	29.38	3.97	-3.10	22.31	38.50	-16.19
848.8	V	30.12	3.97	-3.10	23.05	38.50	-15.45

EDGE 1900

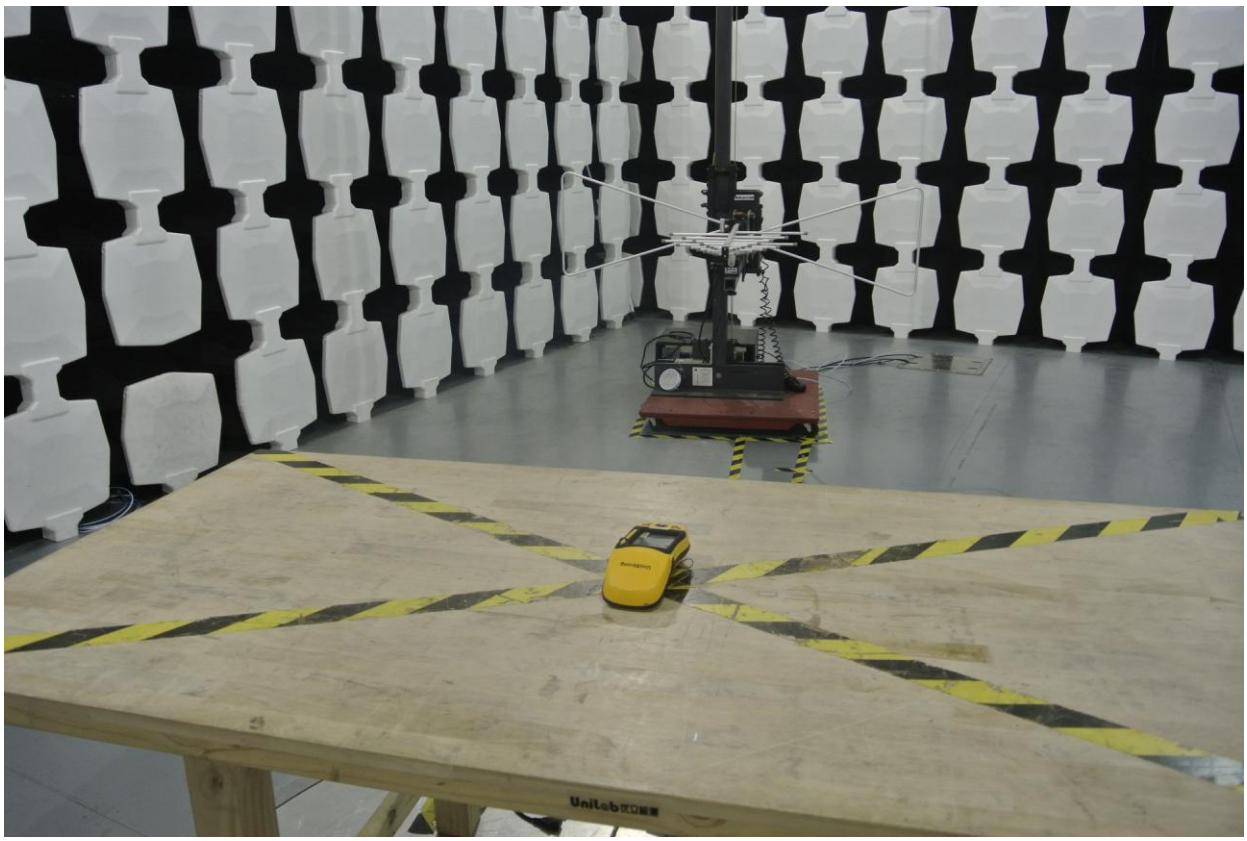
Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512(1850.20MHz)							
1850.2	H	18.18	6.26	10.40	22.32	33.00	-10.11
1850.2	V	19.33	6.26	10.40	23.47	33.00	-4.32
Middle Channel 661 (1880.00MHz)							
1880.0	H	16.08	6.19	10.43	20.32	33.00	-11.47
1880.0	V	18.32	6.19	10.43	22.56	33.00	-4.25
High Channel 810 (1909.80MHz)							
1909.8	H	17.02	6.15	10.44	21.31	33.00	-11.62
1909.8	V	19.04	6.15	10.44	23.33	33.00	-8.63

WCDMA Band V

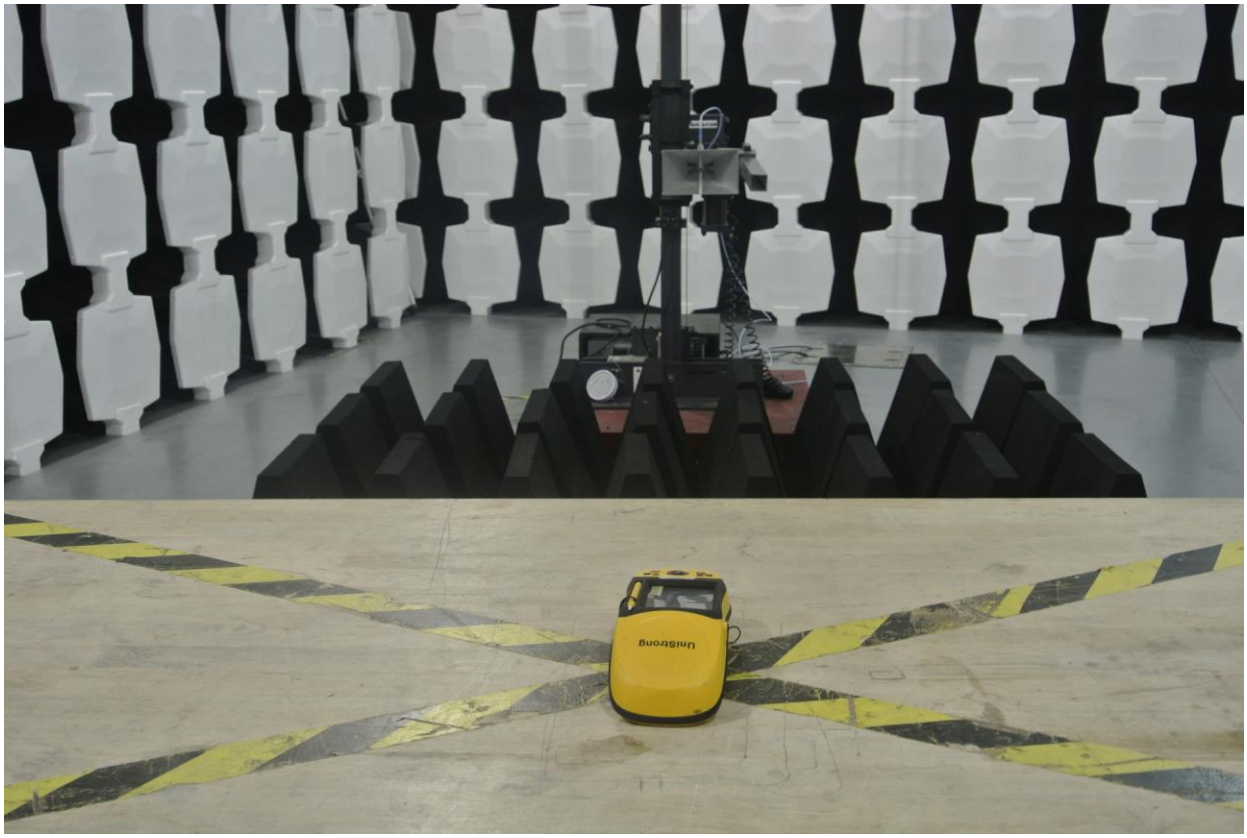
Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 4132(826.4MHz)							
826.4	H	22.46	3.83	-2.99	15.64	38.50	-12.86
826.4	V	21.34	3.83	-2.99	14.52	38.50	-23.98
Middle Channel 4182 (836.4MHz)							
836.4	H	24.84	3.96	-3.04	17.84	38.50	-20.66
836.4	V	21.51	3.96	-3.04	14.54	38.50	-23.96
High Channel 4233 (846.6MHz)							
846.6	H	23.13	3.97	-3.10	16.06	38.50	-22.44
846.6	V	22.29	3.97	-3.10	15.22	38.50	-23.28

3.7. Test Photograph

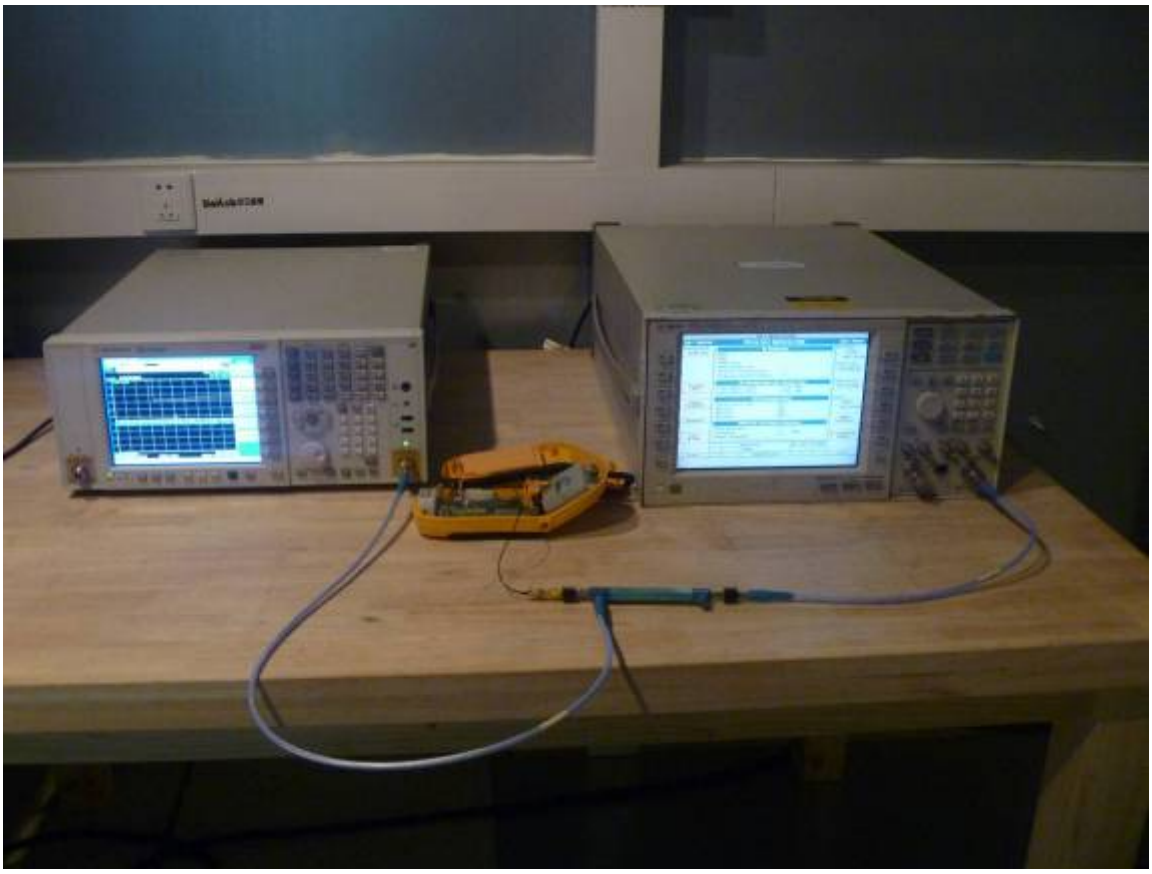
Description: ERP Test Setup



Description: EIRP Test Setup



Description: Conducted Power Measurement Setup



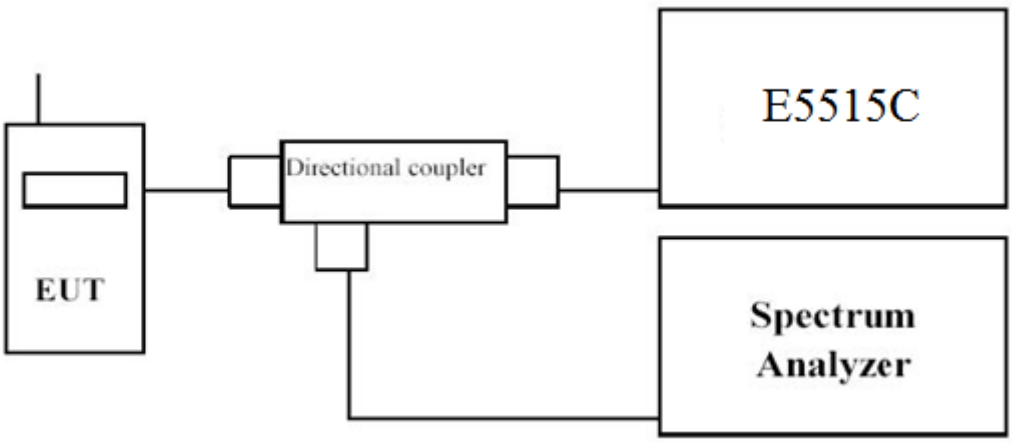
4. Modulation Characteristic

4.1. Test Equipment

Modulation Characteristic / AC-6

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2013.10.25
DC Power Supply	Agilent	6612C	MY43002989	2014.03.04

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/EDGE is the same used in GSM. A GSM channel contains eight timeslots, each timeslot is dedicated to one circuit switched call. For GPRS/EDGE 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.

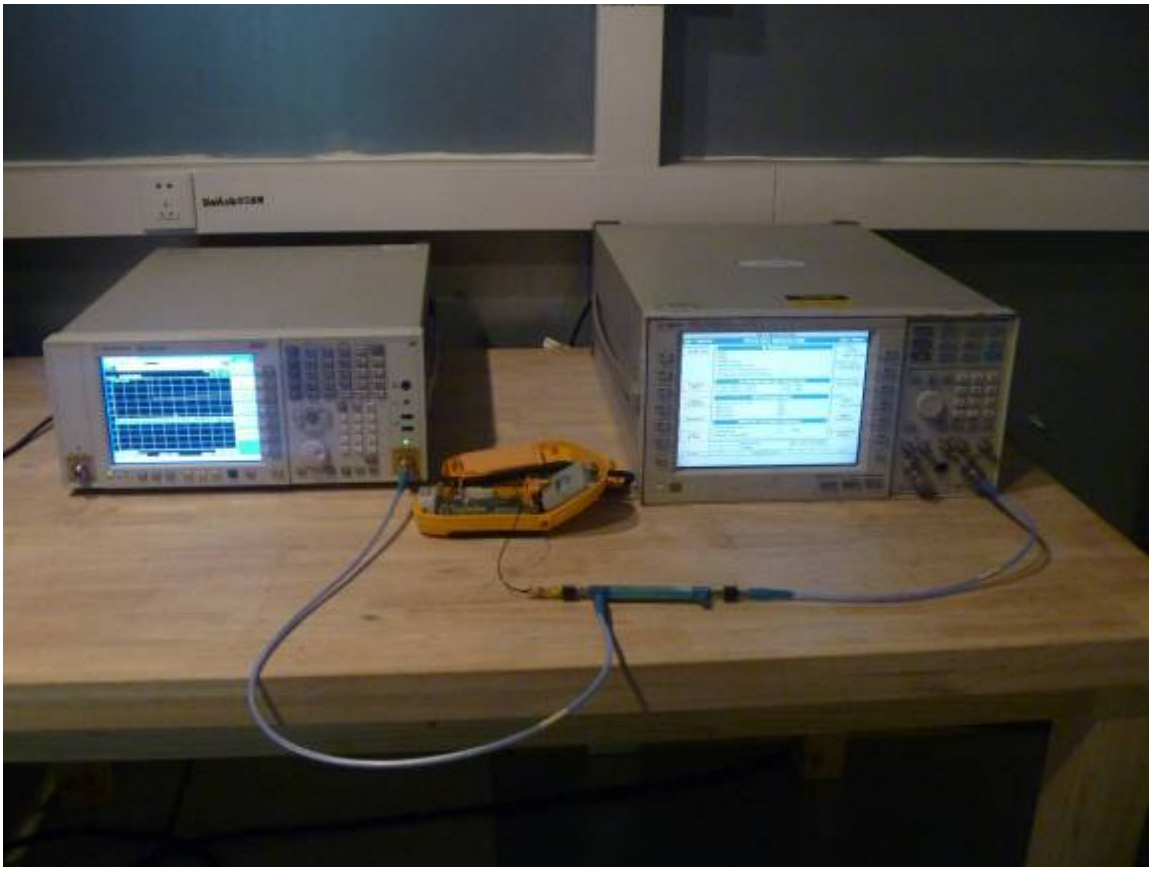
4.5. Uncertainty

The measurement uncertainty is defined as 0.1%

4.6. Test Result

The modulation of GPRS/EDGE/WCDMA Band V was verified and confirmed compliance with requirement.

4.7. Test Photograph



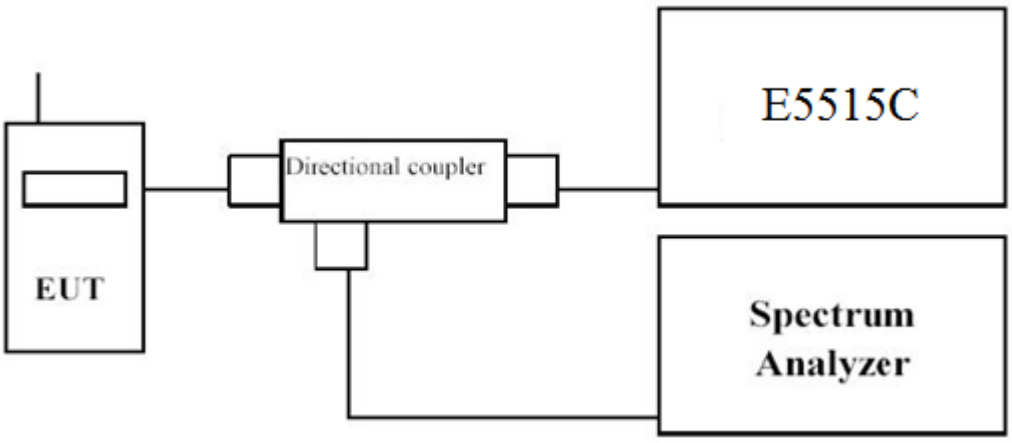
5. Occupied Bandwidth

5.1. Test Equipment

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2013.10.25
Spectrum Analyzer	Agilent	N9038A	MY51210142	2013.09.27
DC Power Supply	Agilent	6612C	MY43002989	2014.03.04

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	309	248
189	836.40	320	248
251	848.80	312	249

GPRS1900

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	314	248
661	1880.00	318	248
810	1909.80	317	248

EDGE850

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
128	824.20	324	253
189	836.40	328	248
251	848.80	327	247

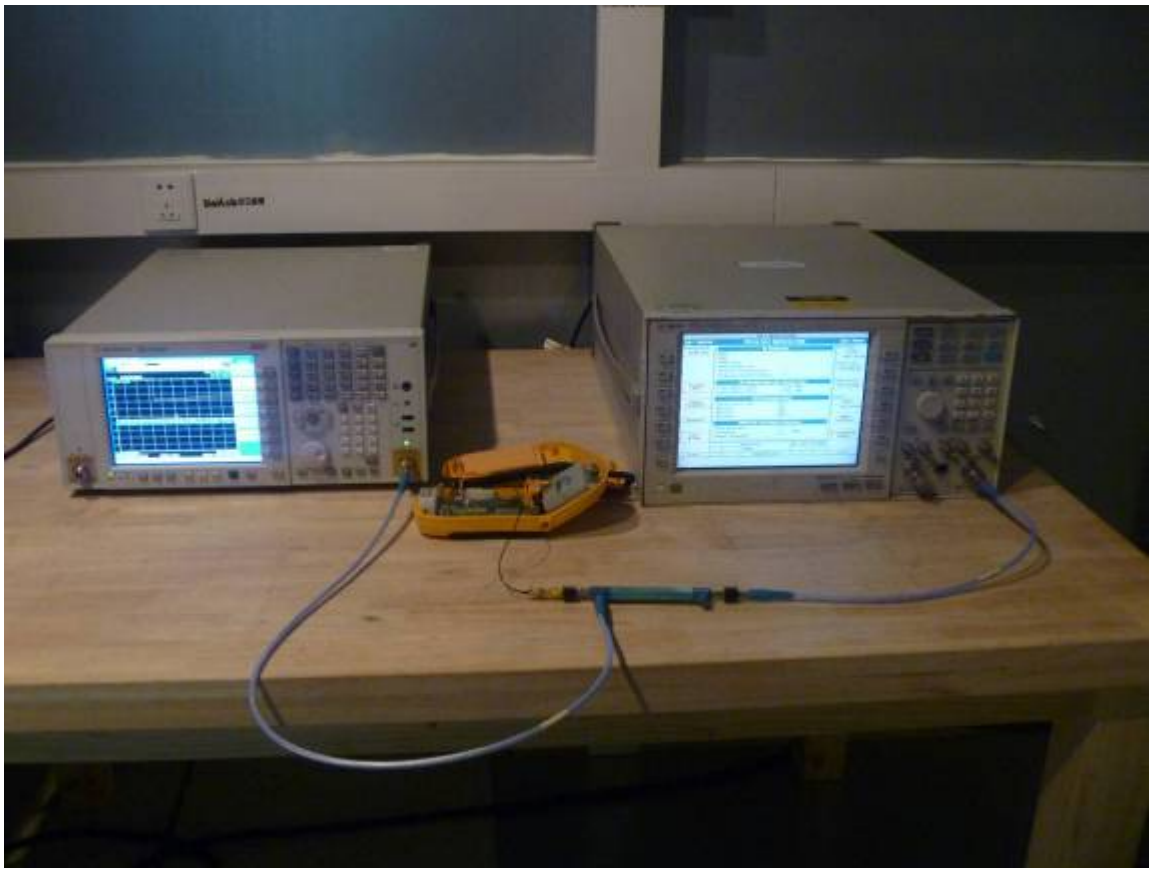
EDGE1900

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
512	1850.20	318	245
661	1880.00	318	246
810	1909.80	316	245

WCDMA Band V

Channel No.	Frequency (MHz)	-26dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
4132	826.40	4688	4173
4182	836.40	4682	4173
4233	846.60	4684	4172

5.7. Test Photograph

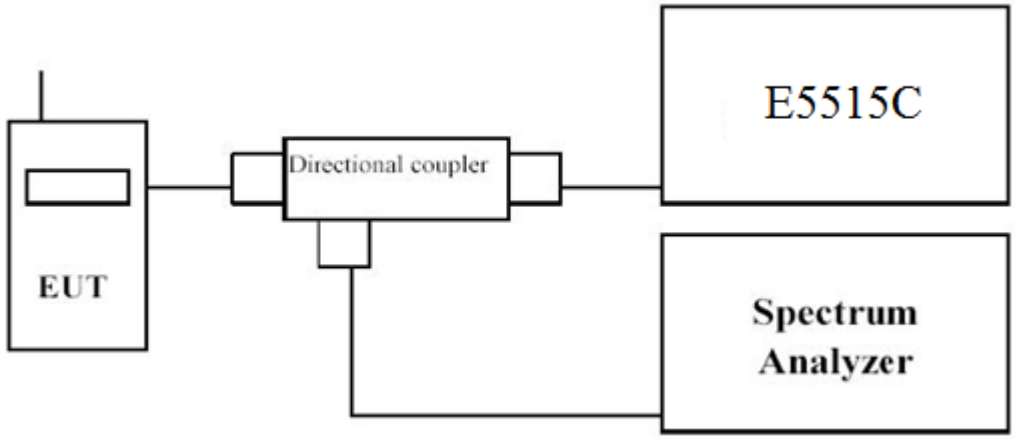


6.Spurious Emission At Antenna Terminals (+/- 1MHz)

6.1. Test Equipment

Instrument	Manufacturer	Model	Serial No	Cal. Date
Radio Communication Tester	Agilent	E5515C	GB46581718	2013.10.25
Spectrum Analyzer	Agilent	N9038A	MY51210142	2013.09.27
DC Power Supply	Agilent	6612C	MY43002989	2014.03.04

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

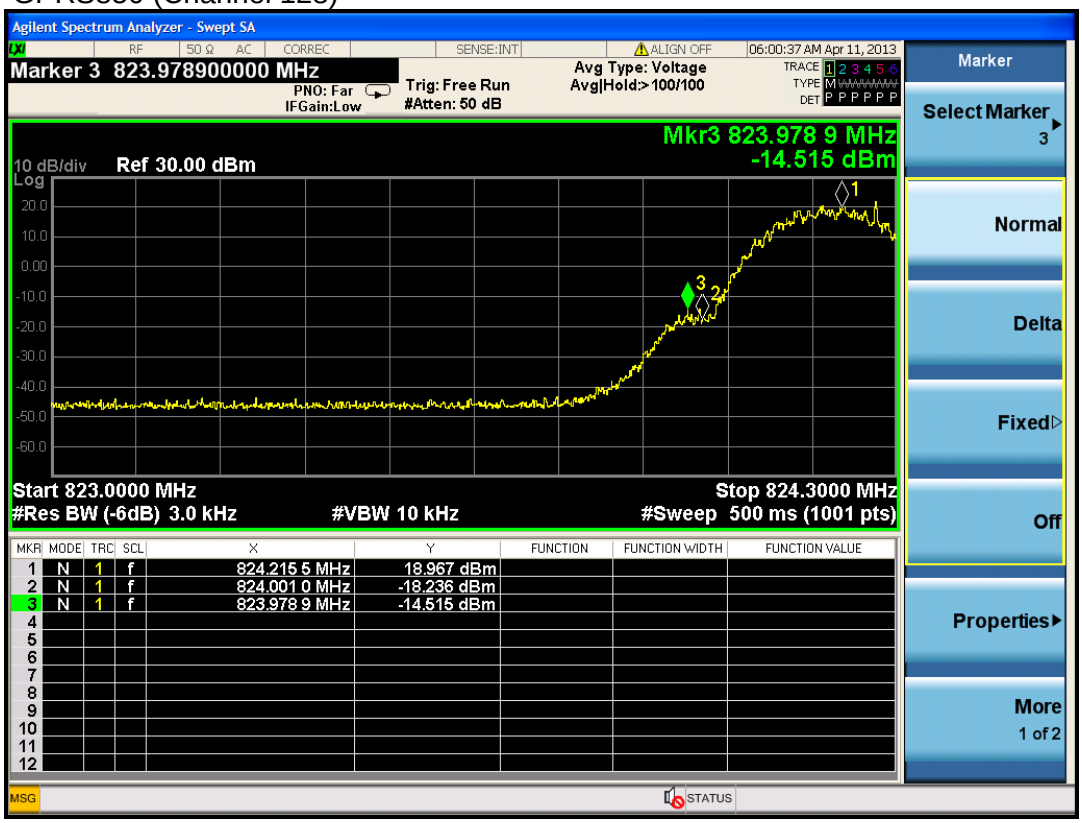
In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

6.5. Uncertainty

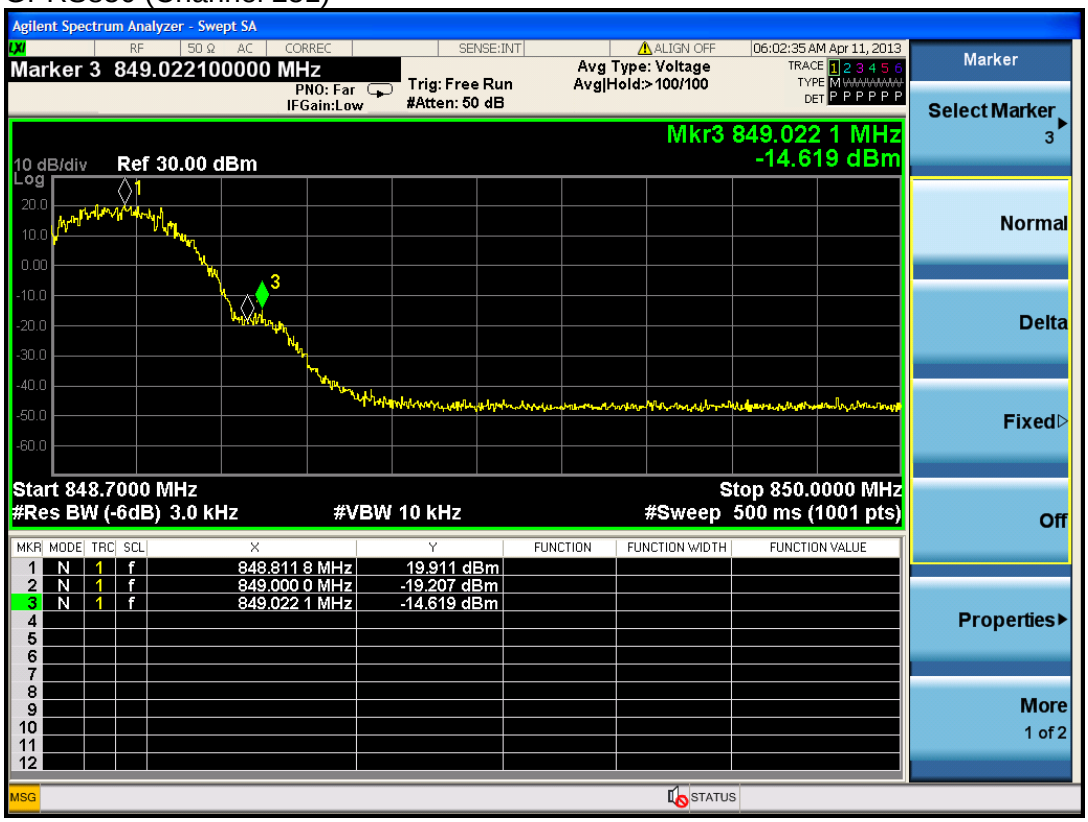
The measurement uncertainty is defined as ±1.2 dB.

6.6. Test Result

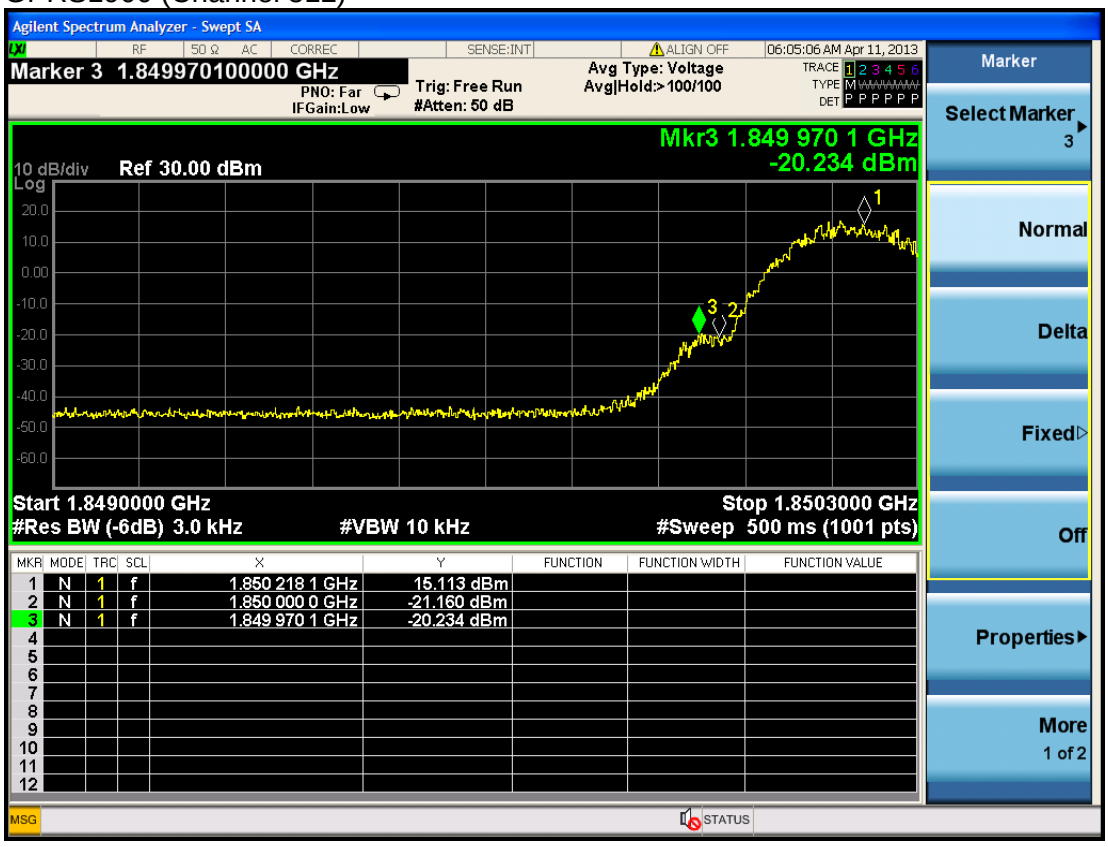
GPRS850 (Channel 128)



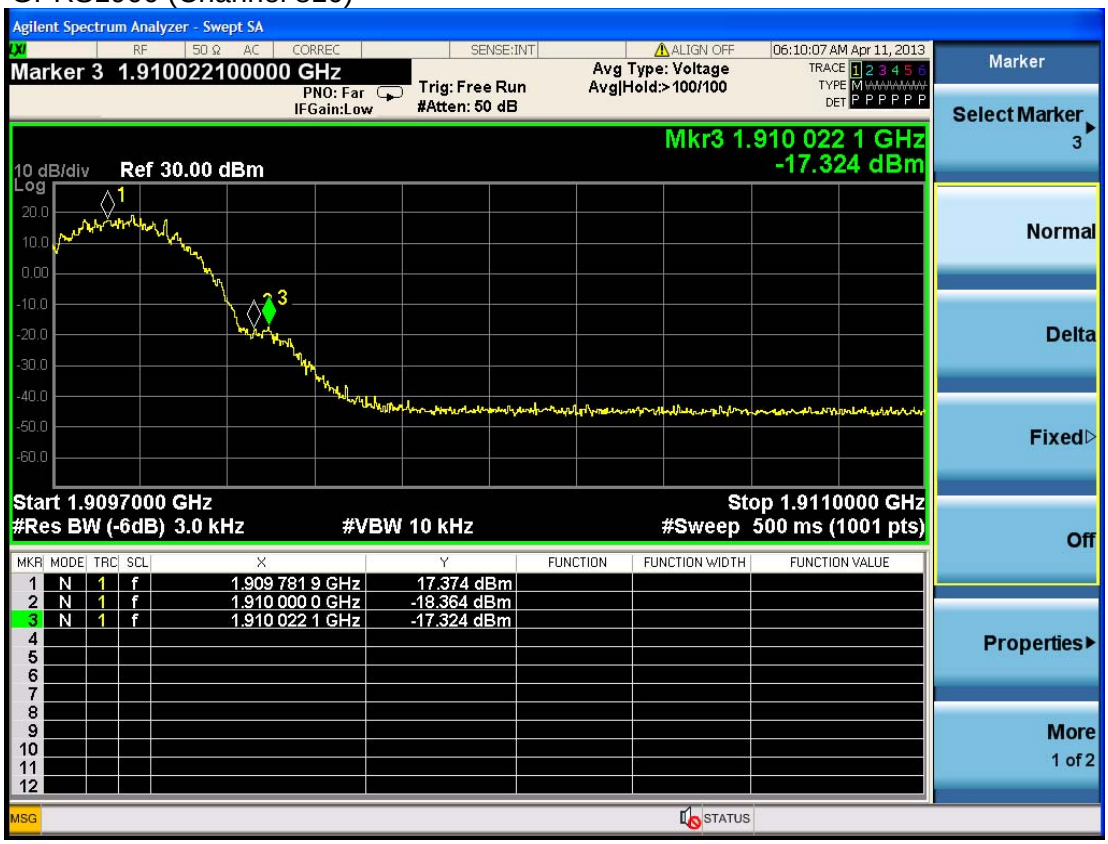
GPRS850 (Channel 251)



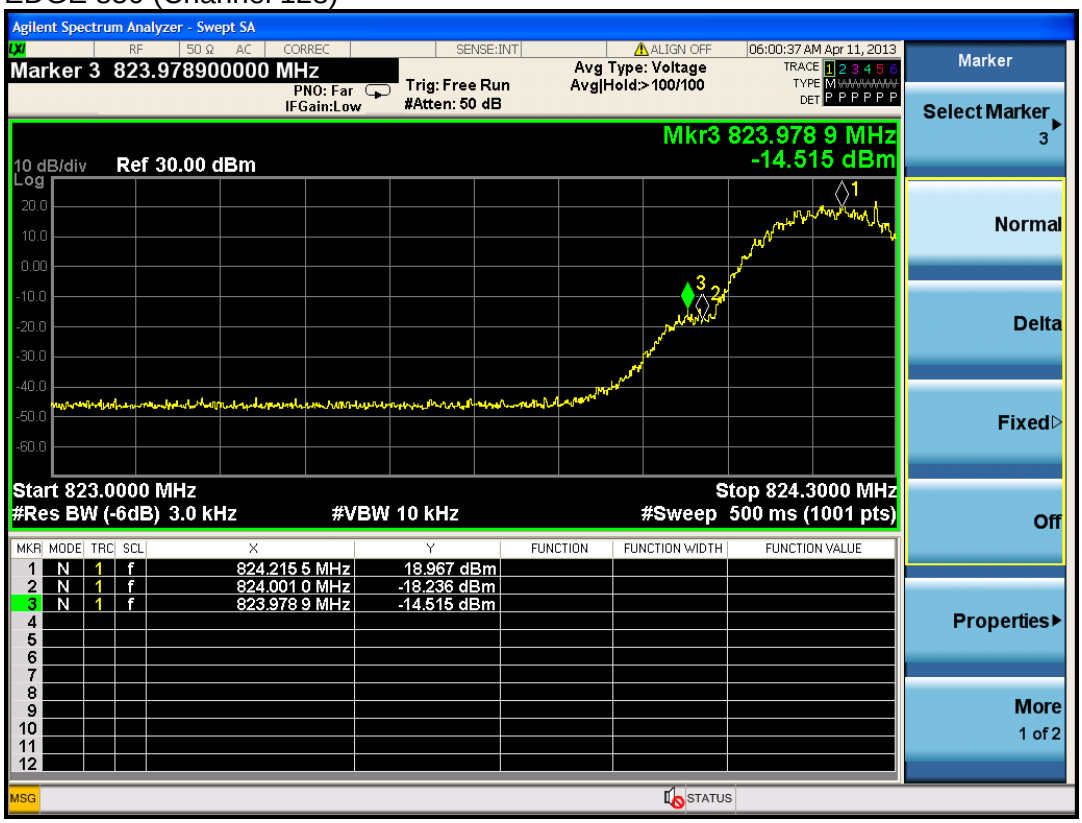
GPRS1900 (Channel 512)



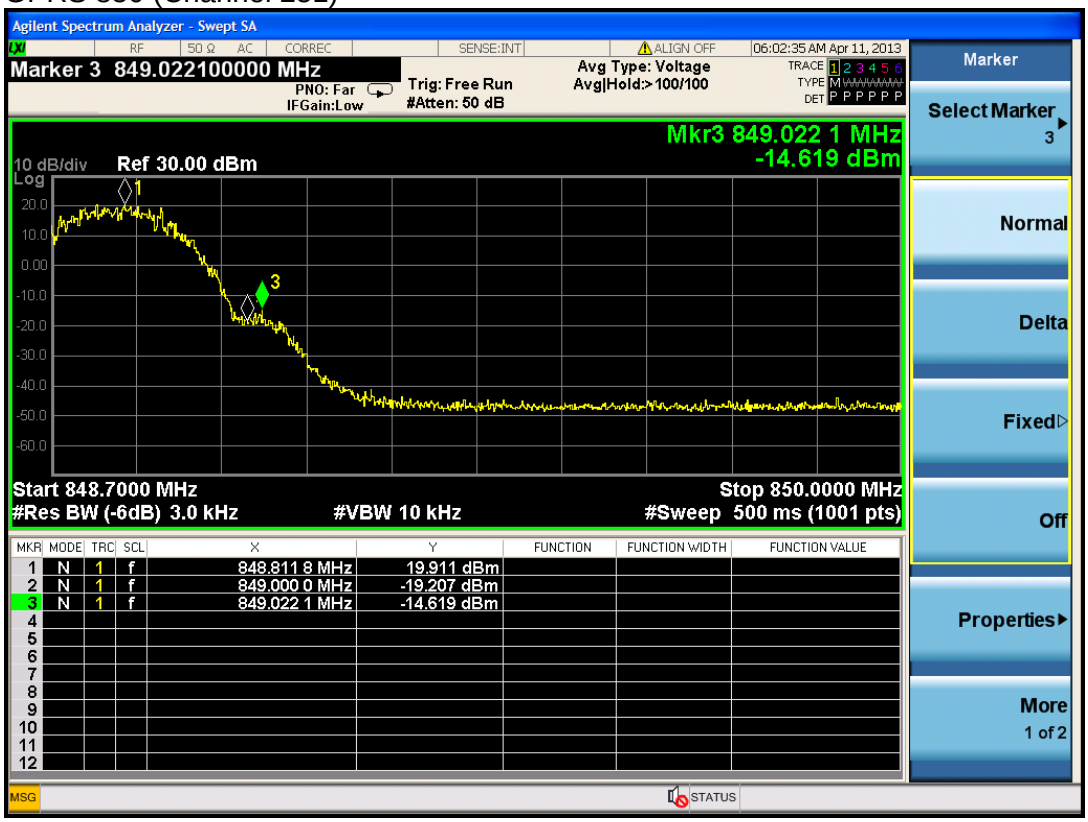
GPRS1900 (Channel 810)



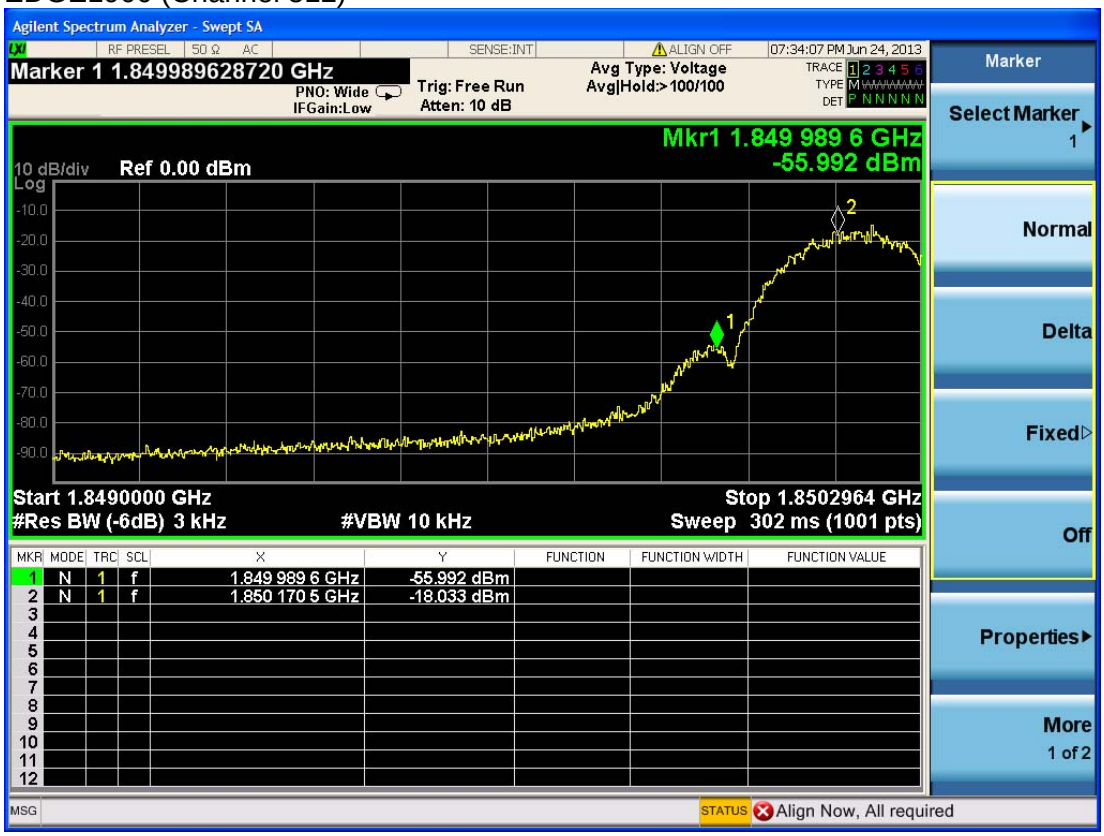
EDGE 850 (Channel 128)



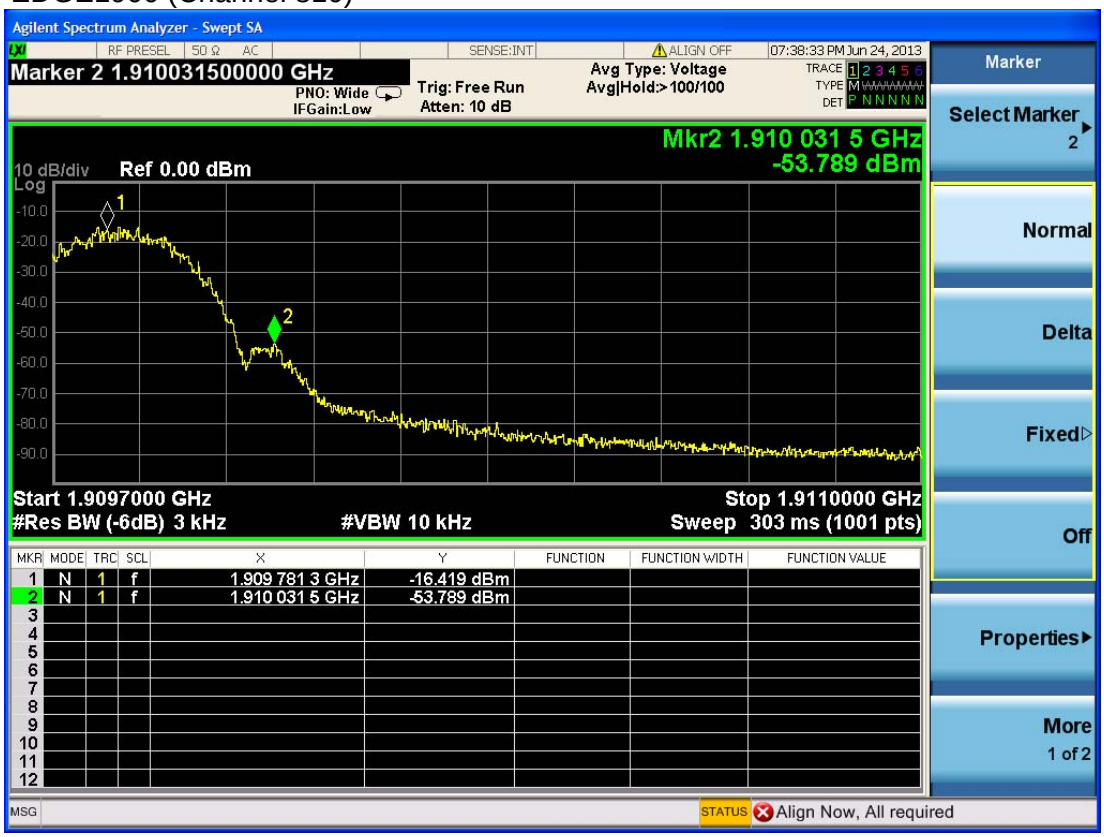
GPRS 850 (Channel 251)



EDGE1900 (Channel 512)



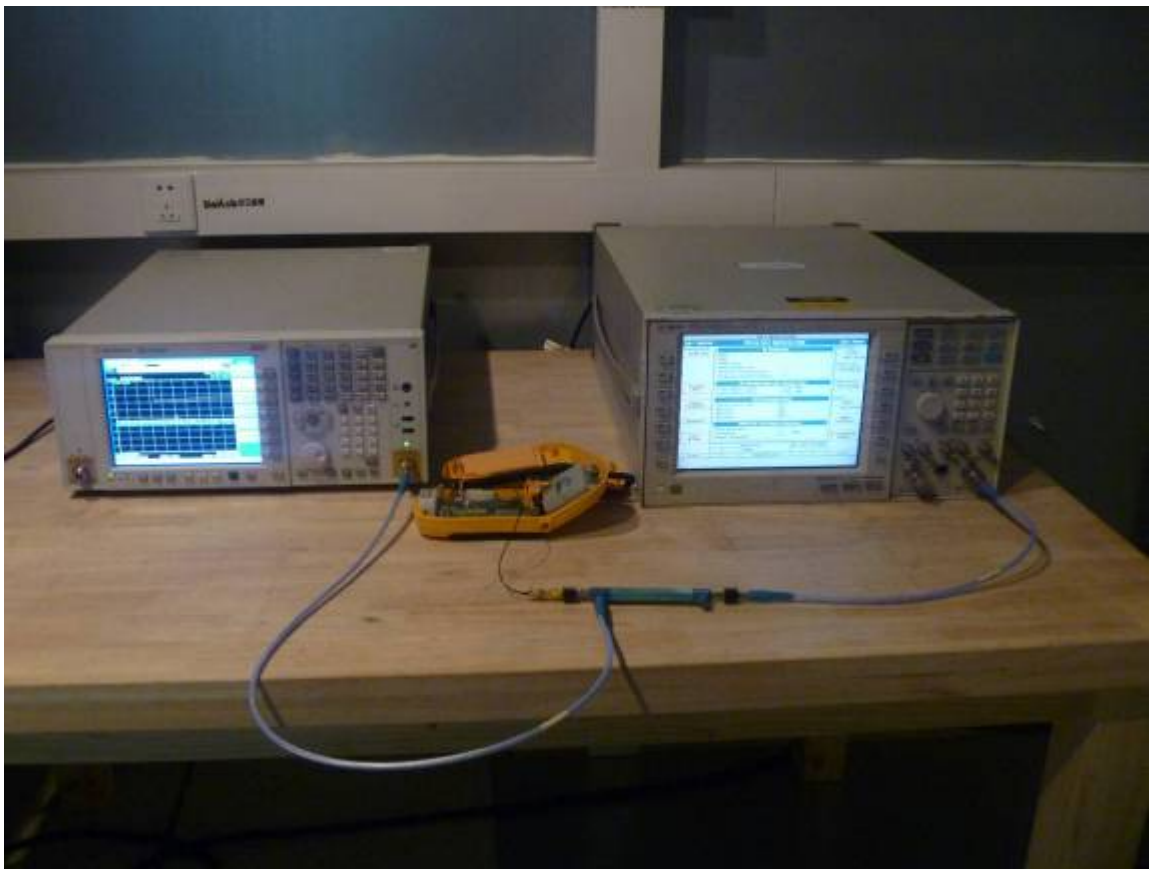
EDGE1900 (Channel 810)



WCDMA Band V (Channel 4132)

WCDMA Band V (Channel 4233)

6.7. Test Photograph



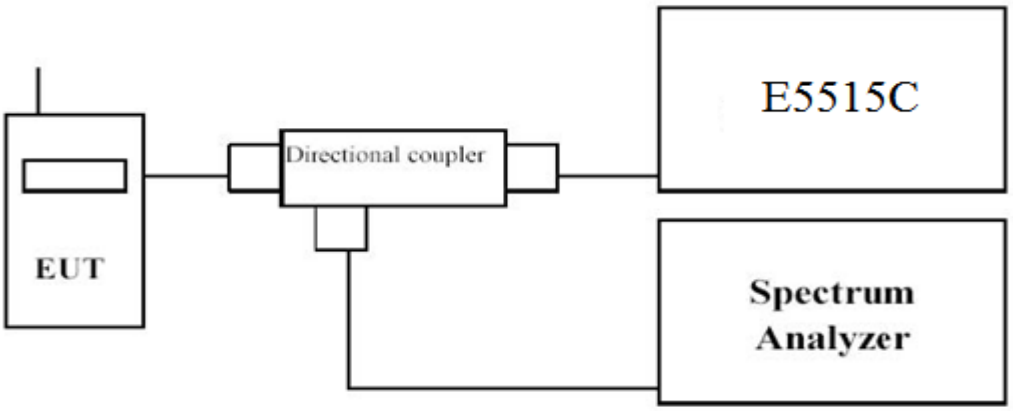
7.Spurious Emission

7.1. Test Equipment

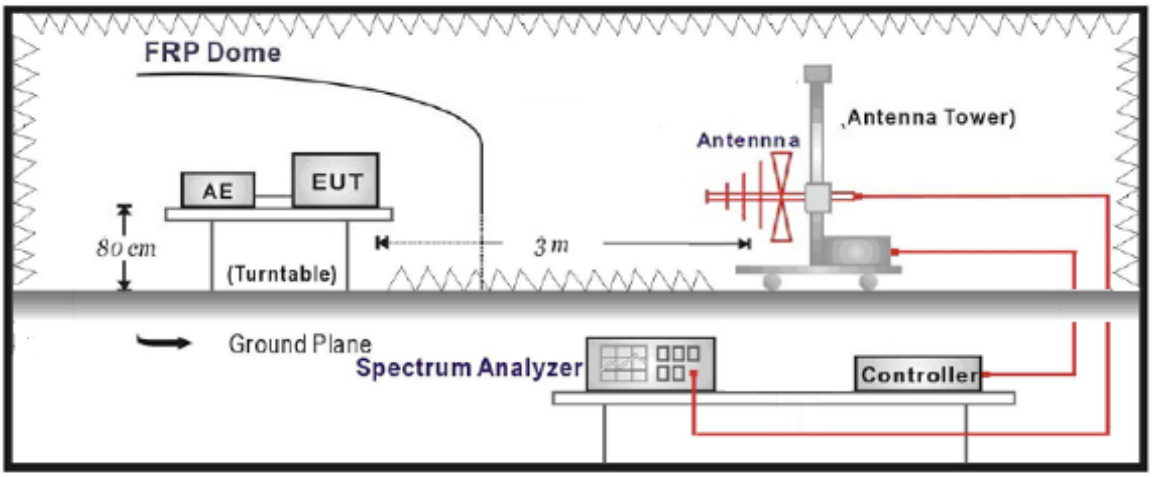
Instrument	Manufacturer	Model	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210142	2013.09.27
Radio Communication Tester	Agilent	E5515C	GB46581718	2013.10.25
Signal Generator	Agilent	N5183A	MY50140938	2013.10.08
Preamplifier	CEM	EM30180	3008A0245	2014.03.01
DC Power Supply	Agilent	6612C	MY43002989	2014.03.04
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2013.09.19
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2013.09.19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2013.09.19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2013.09.19

7.2. Test Setup

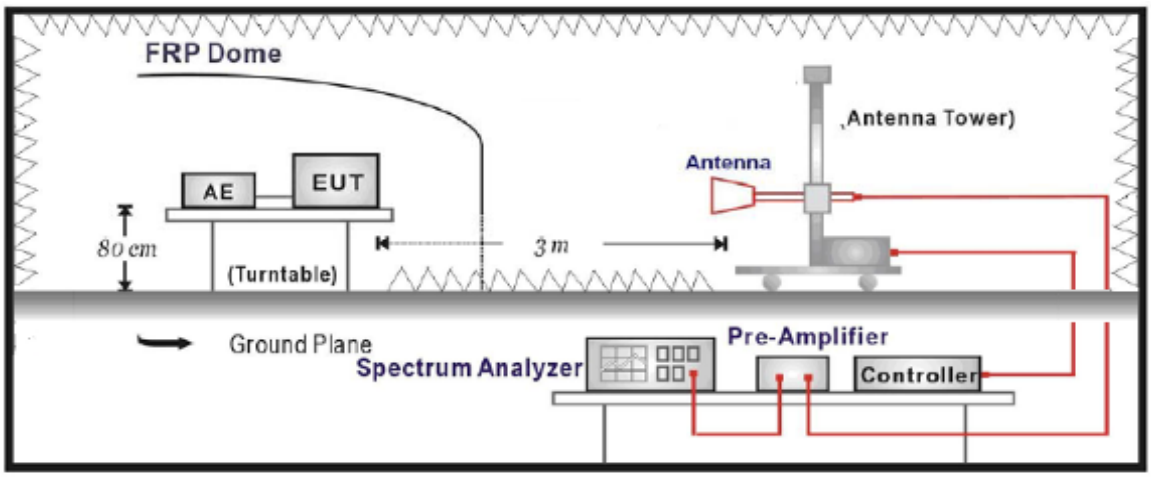
Conducted Spurious Emission Measurement:



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.

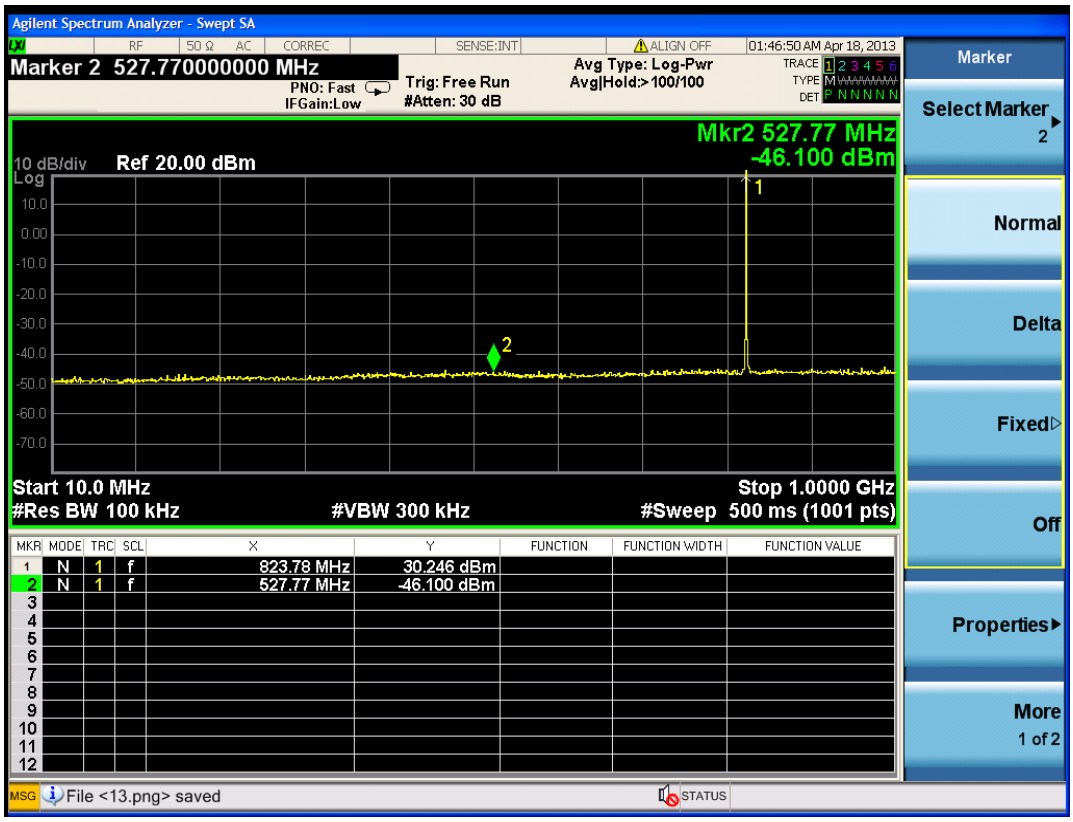
r. Test site anechoic chamber refer to ANSI C63.4: 2009

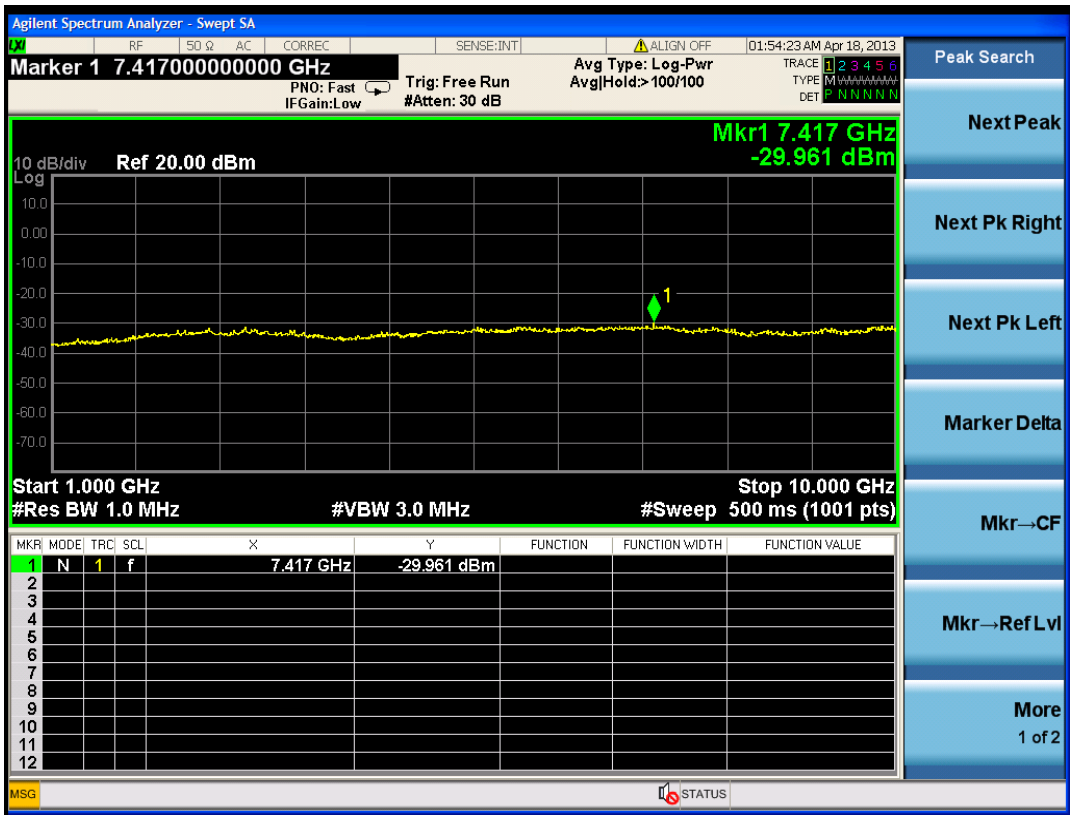
7.5. Uncertainty

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

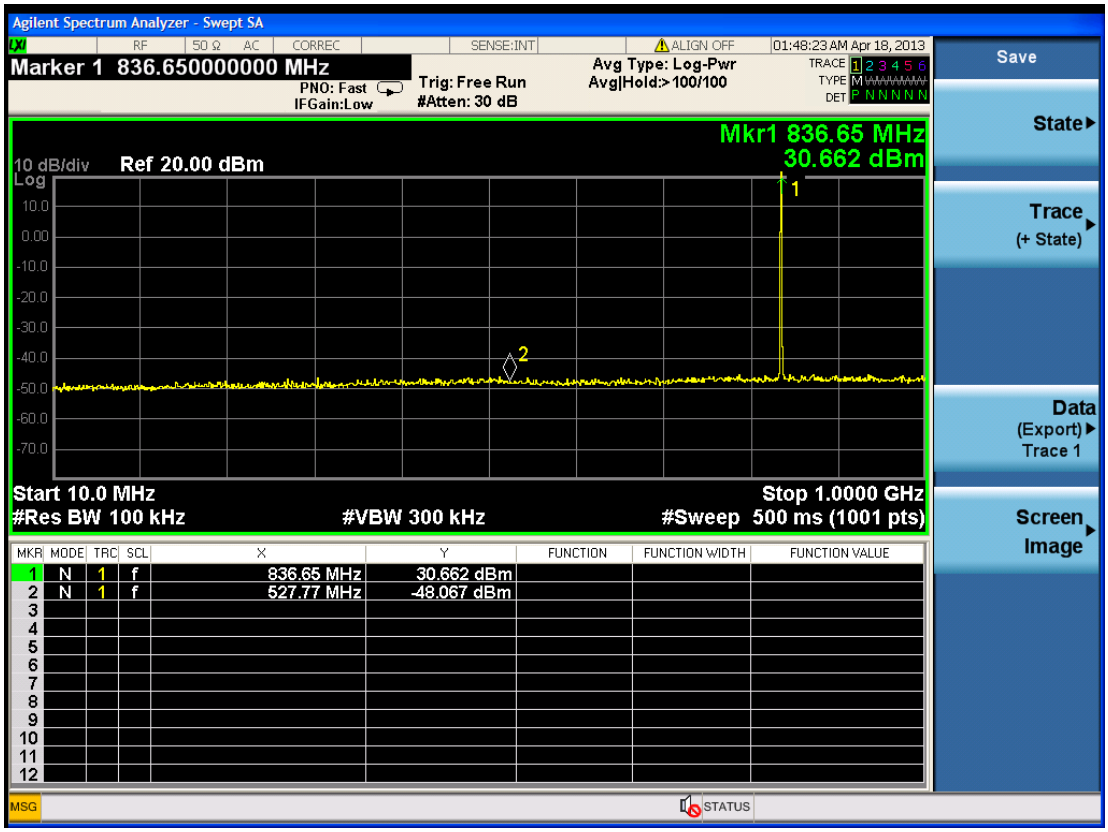
7.6. Test Result

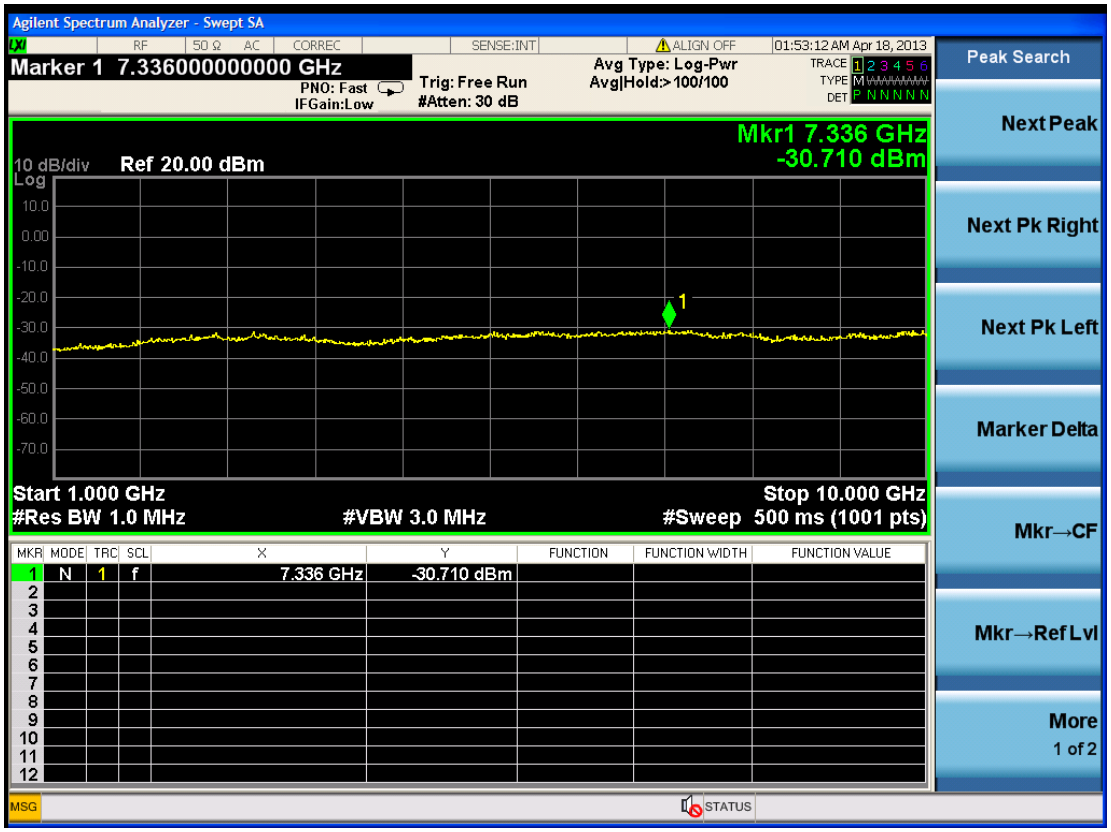
Conducted Spurious Measurement:
GPRS850 Channel 128



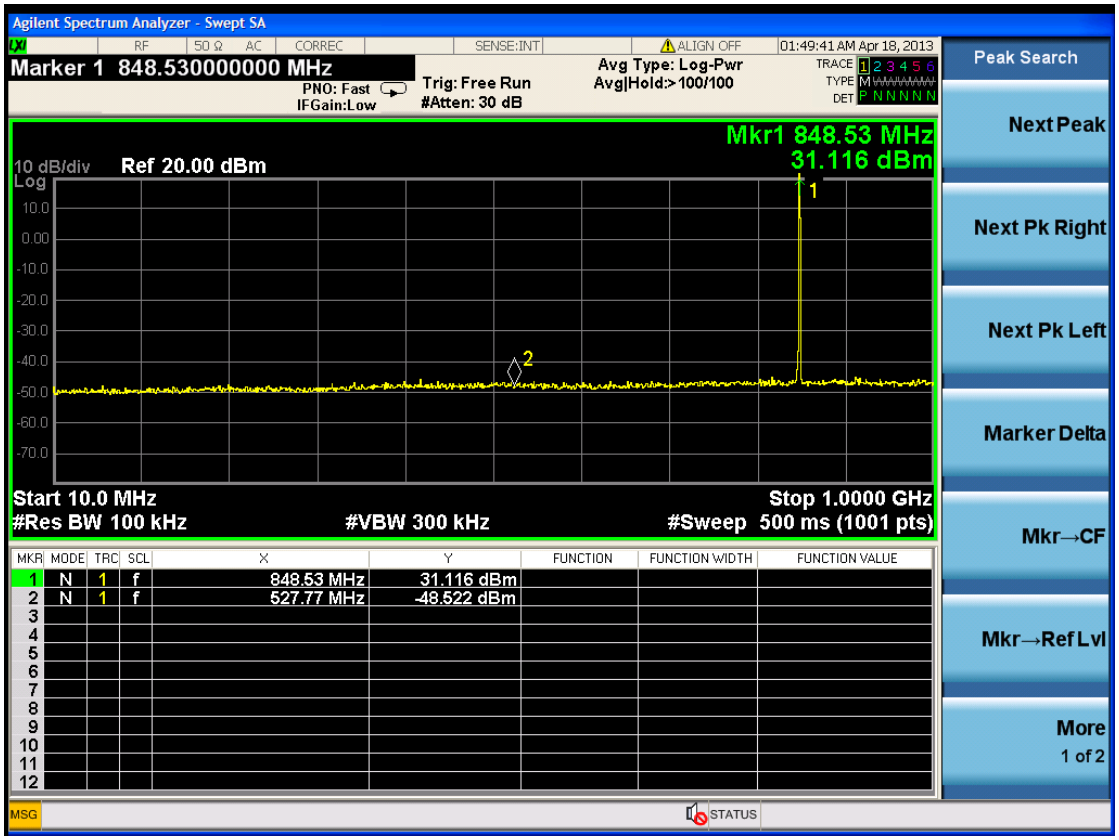


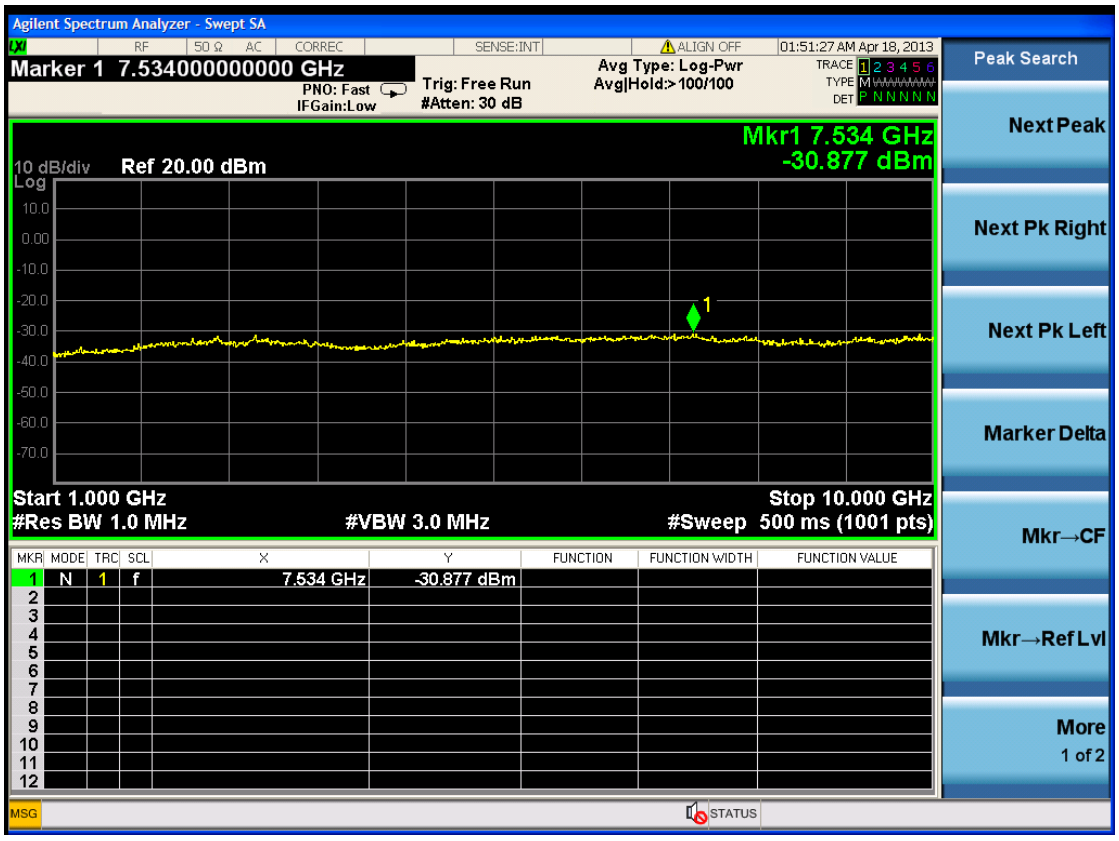
GPRS850 Channel 189



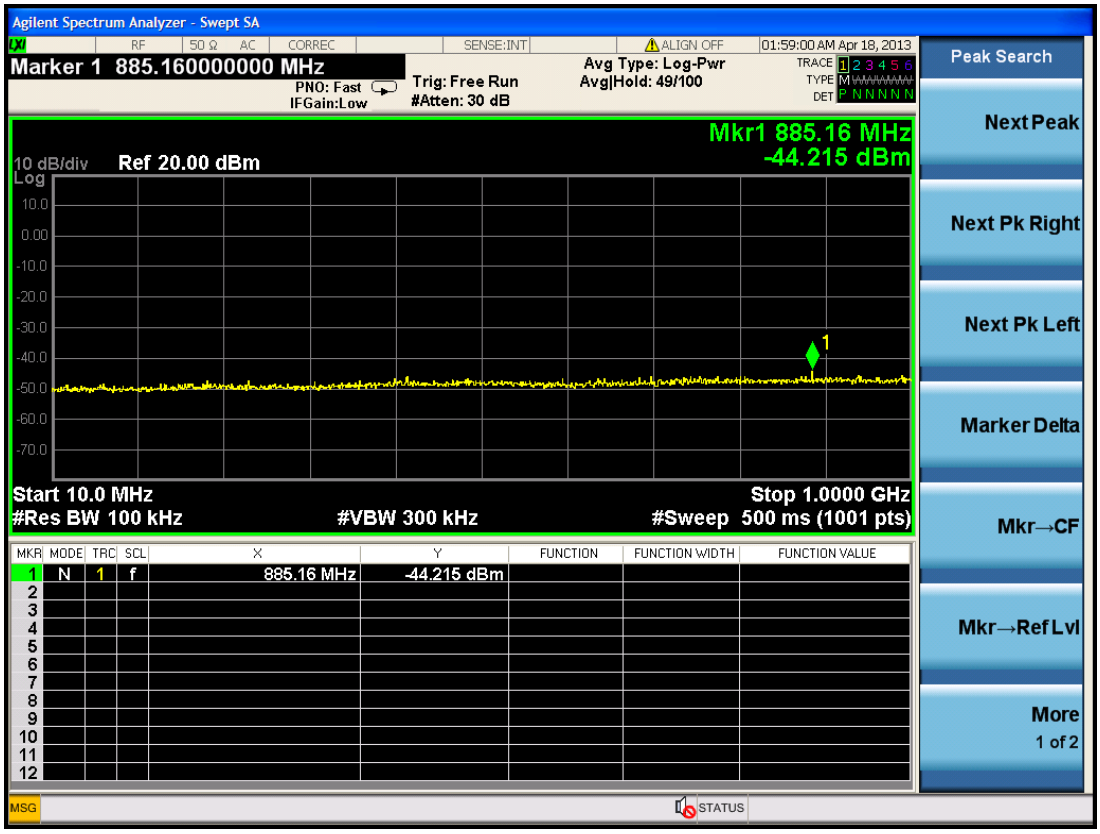


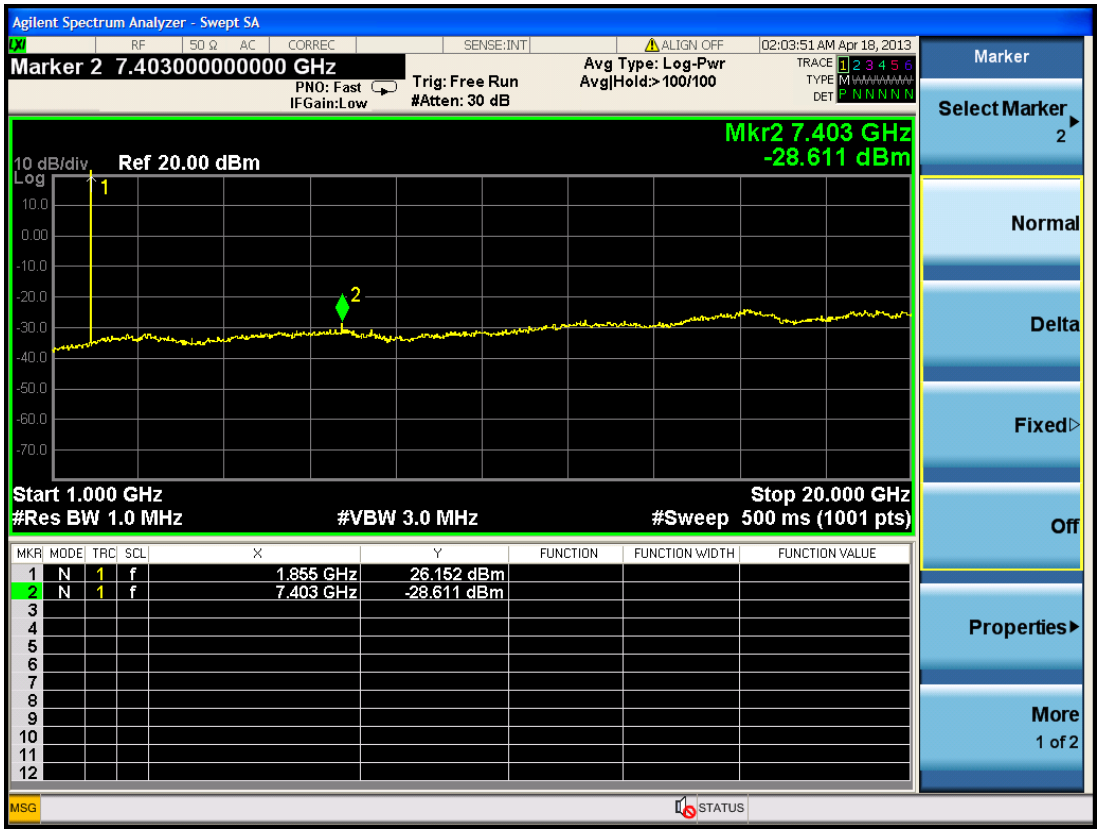
GPRS850 Channel 251



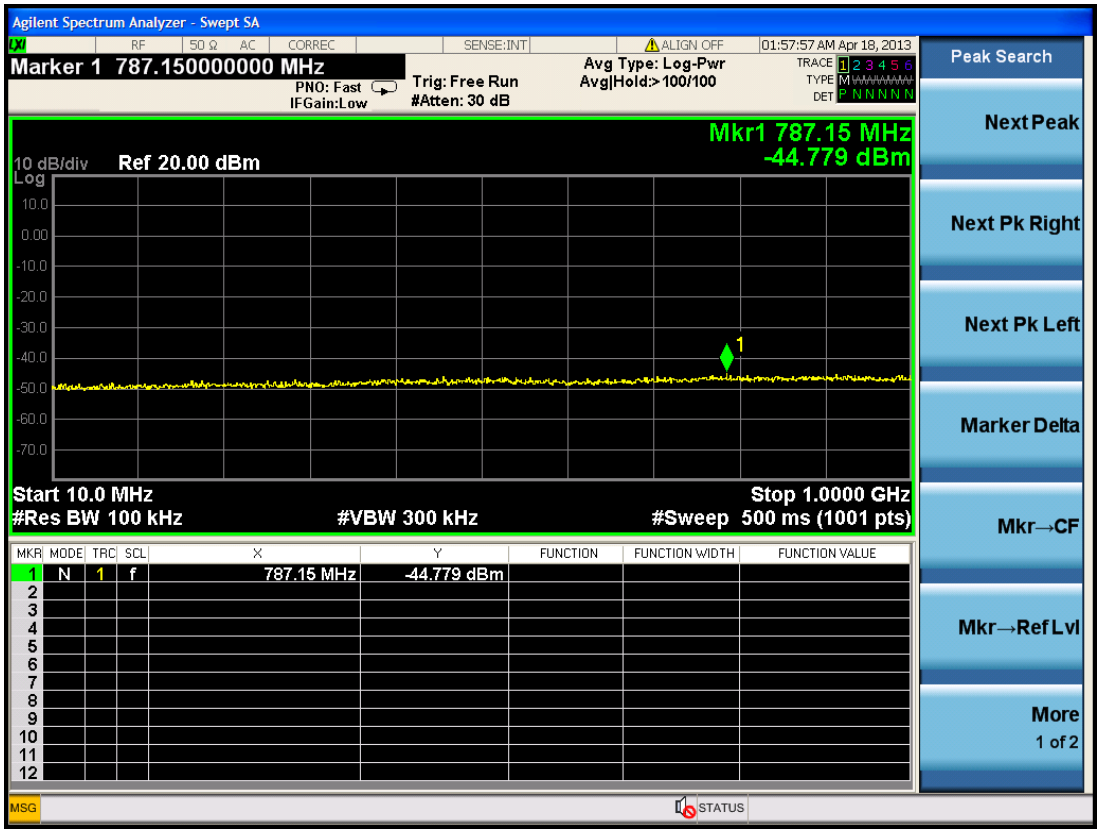


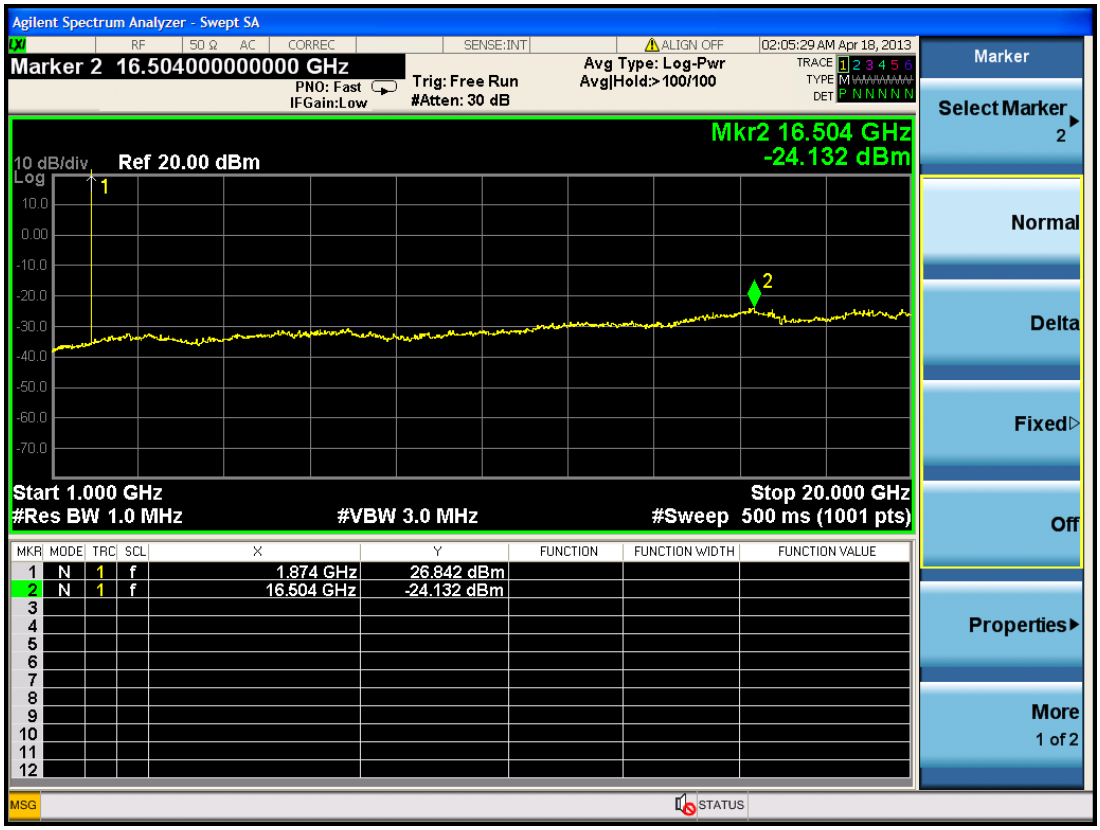
GPRS1900 Channel 512



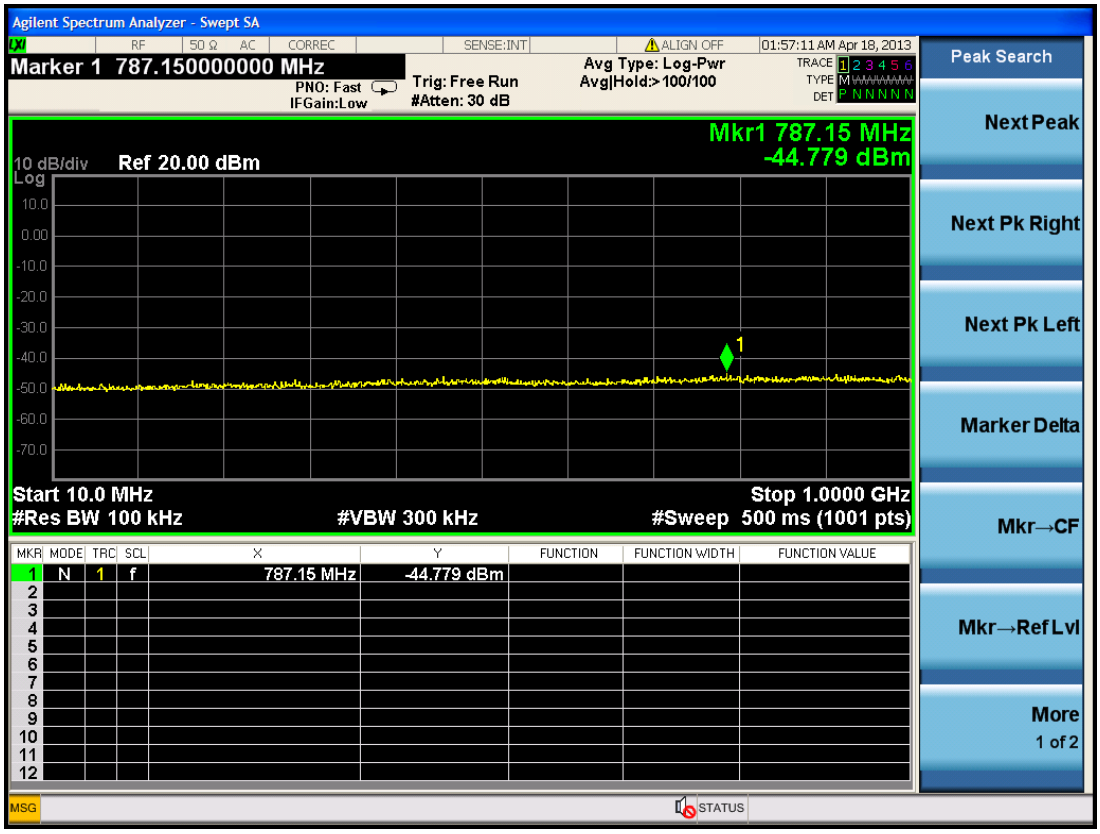


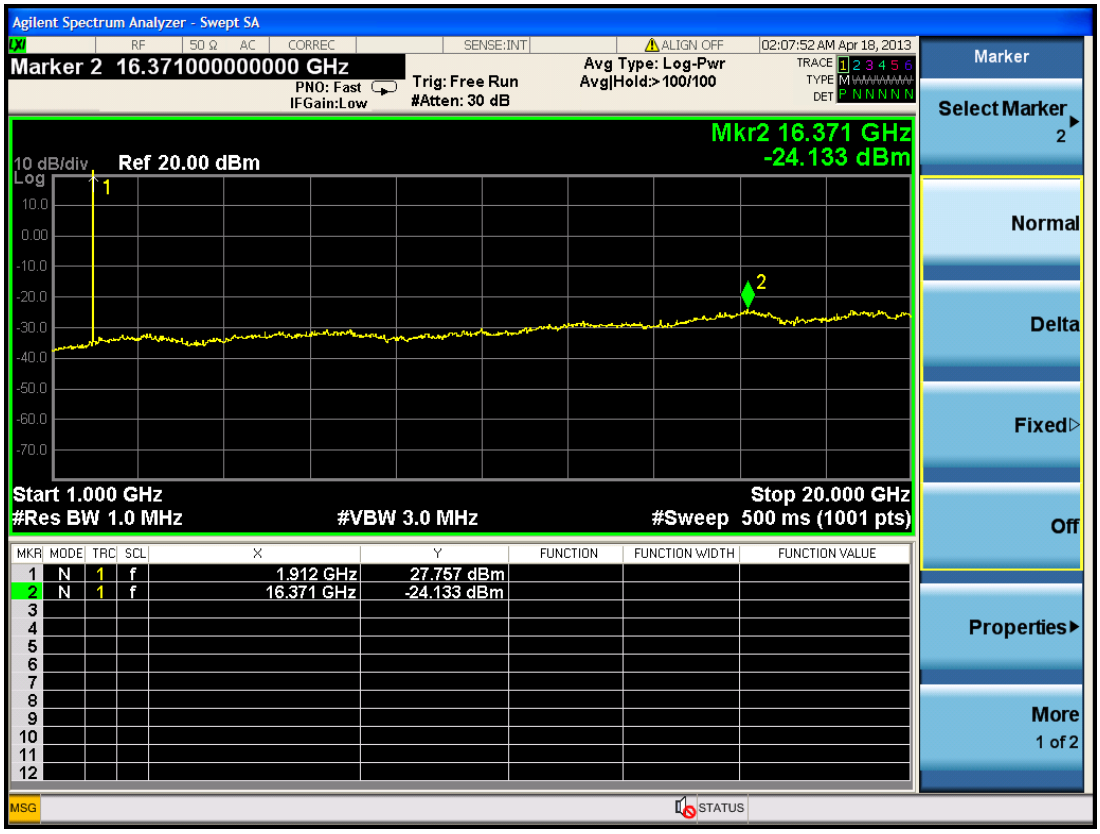
GPRS1900 Channel 661



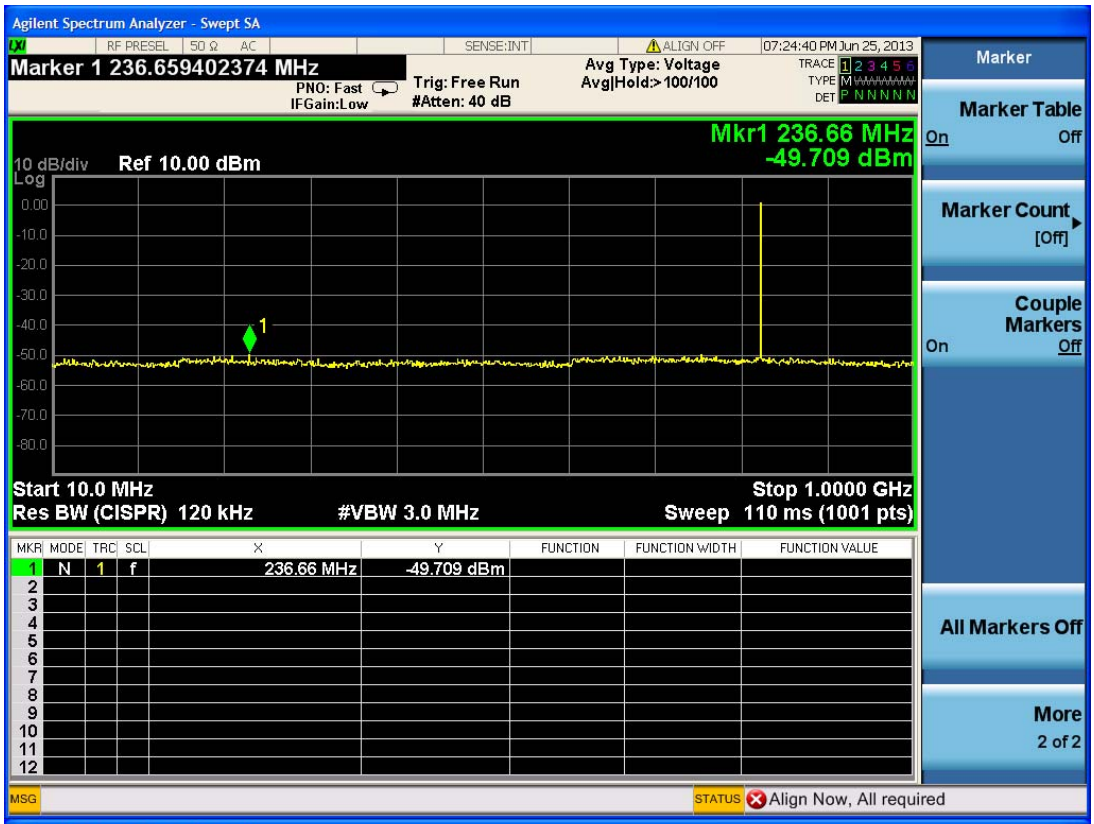


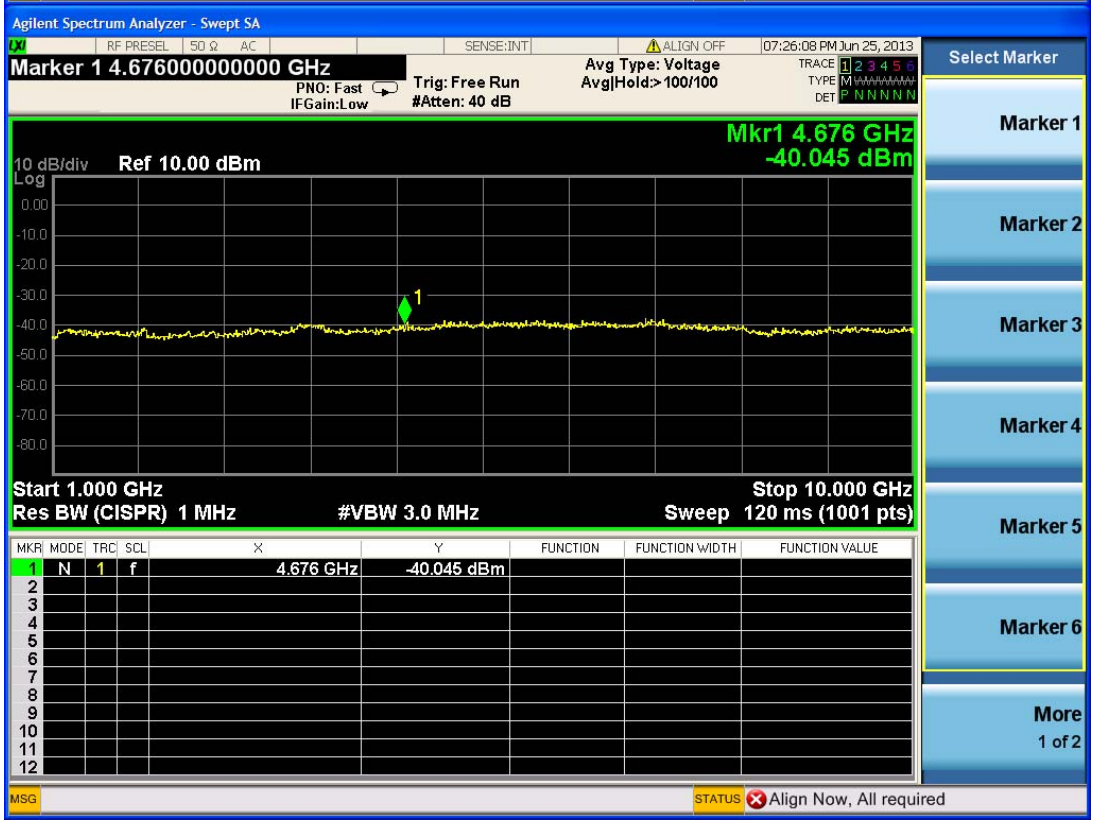
GPRS1900 Channel 810



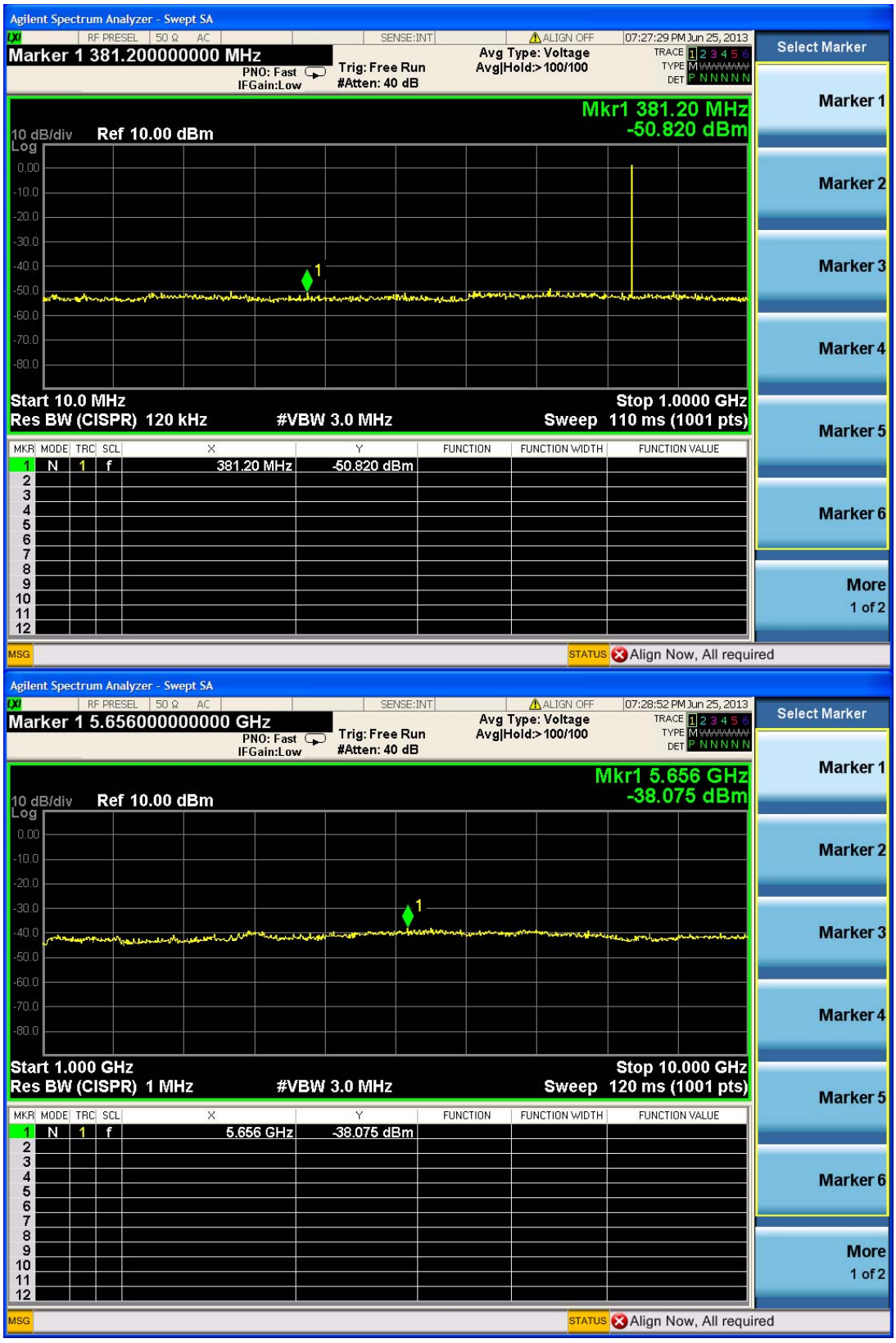


EDGE850 Channel 128

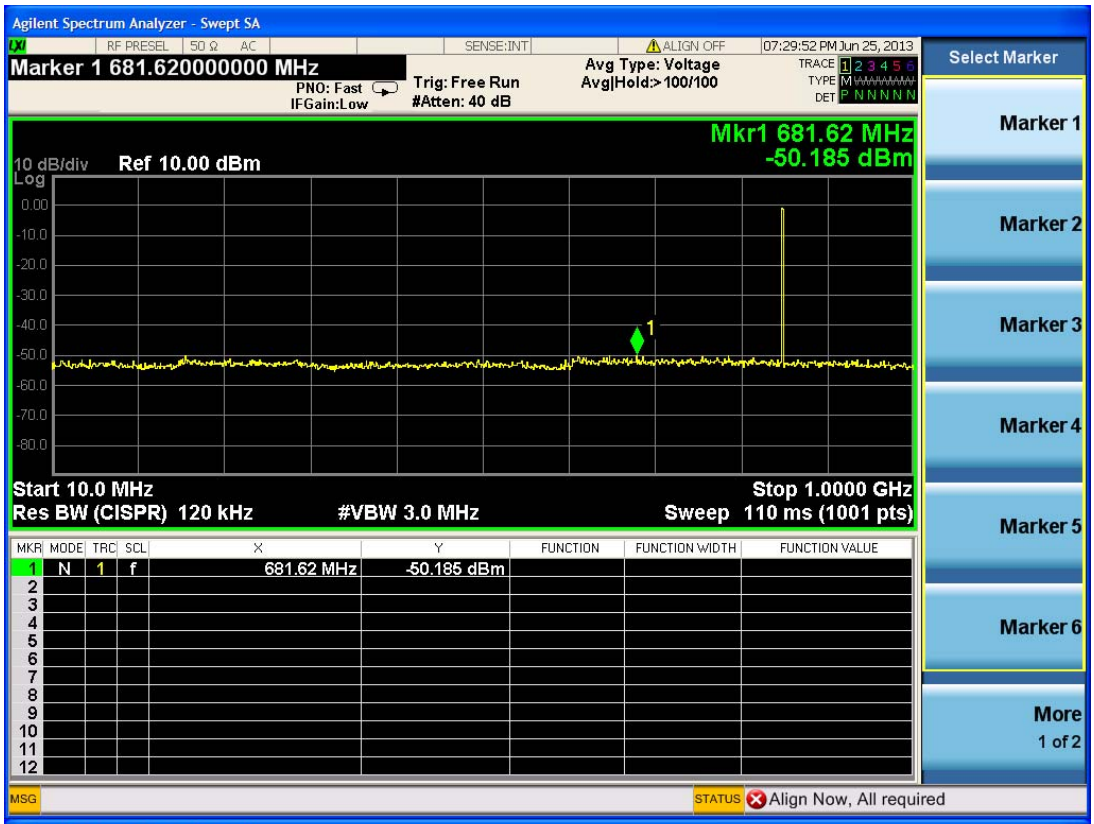


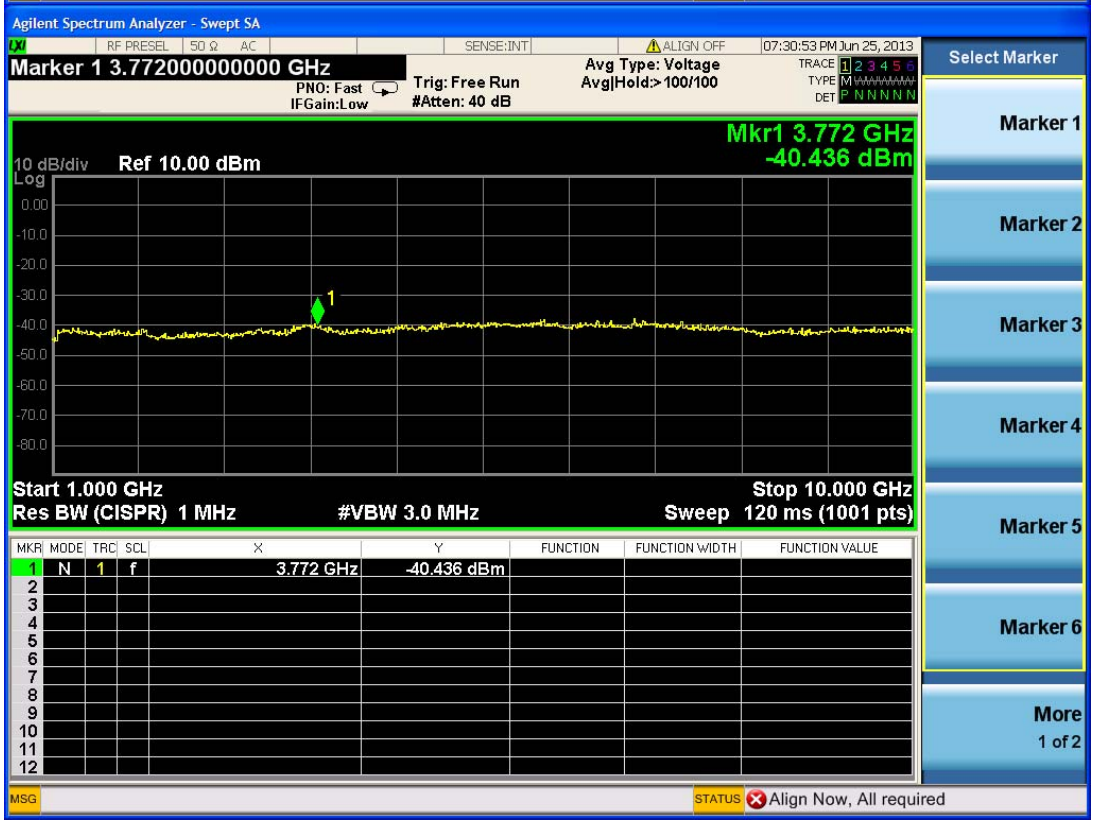


EDGE850 Channel 189

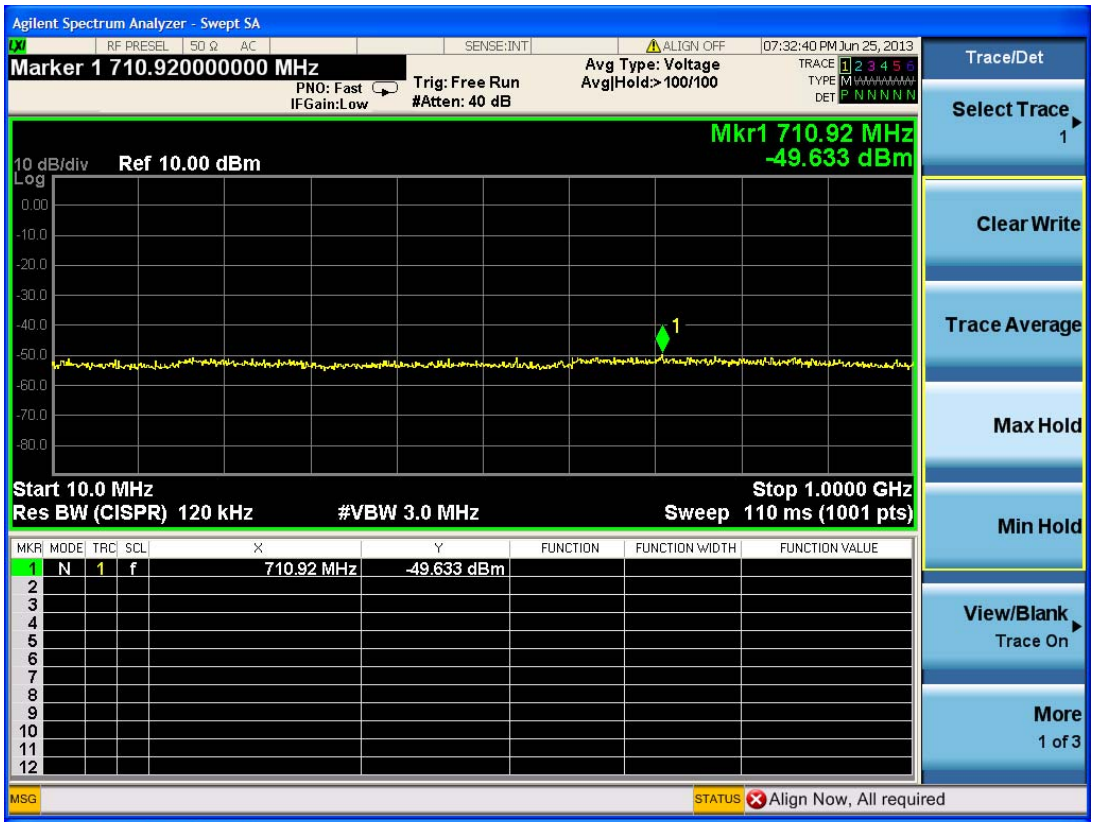


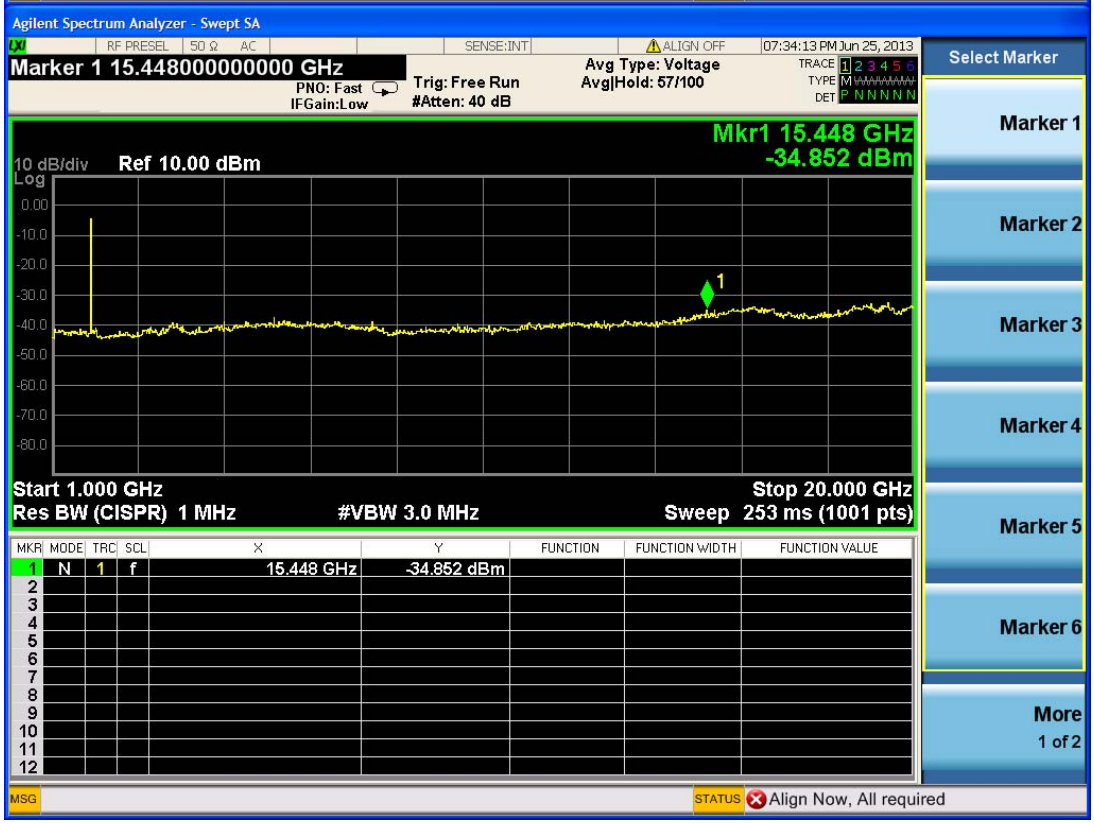
EDGE850 Channel 251



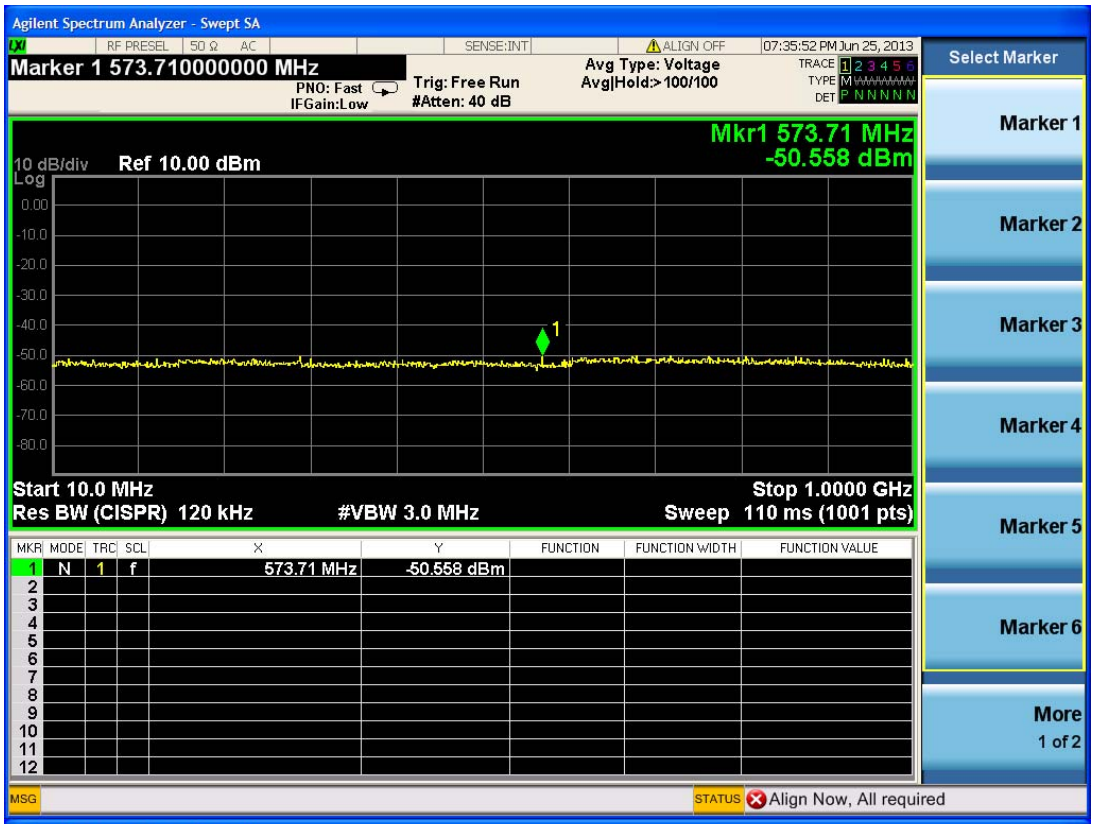


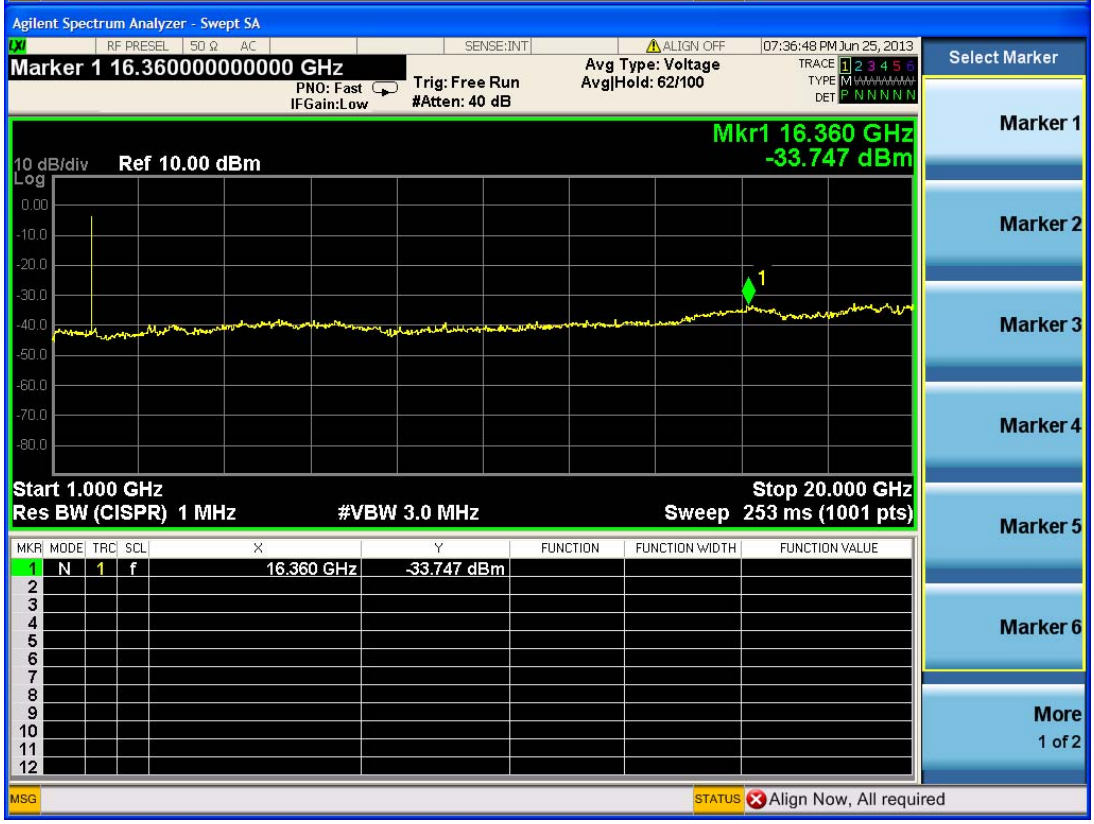
EDGE1900 Channel 512



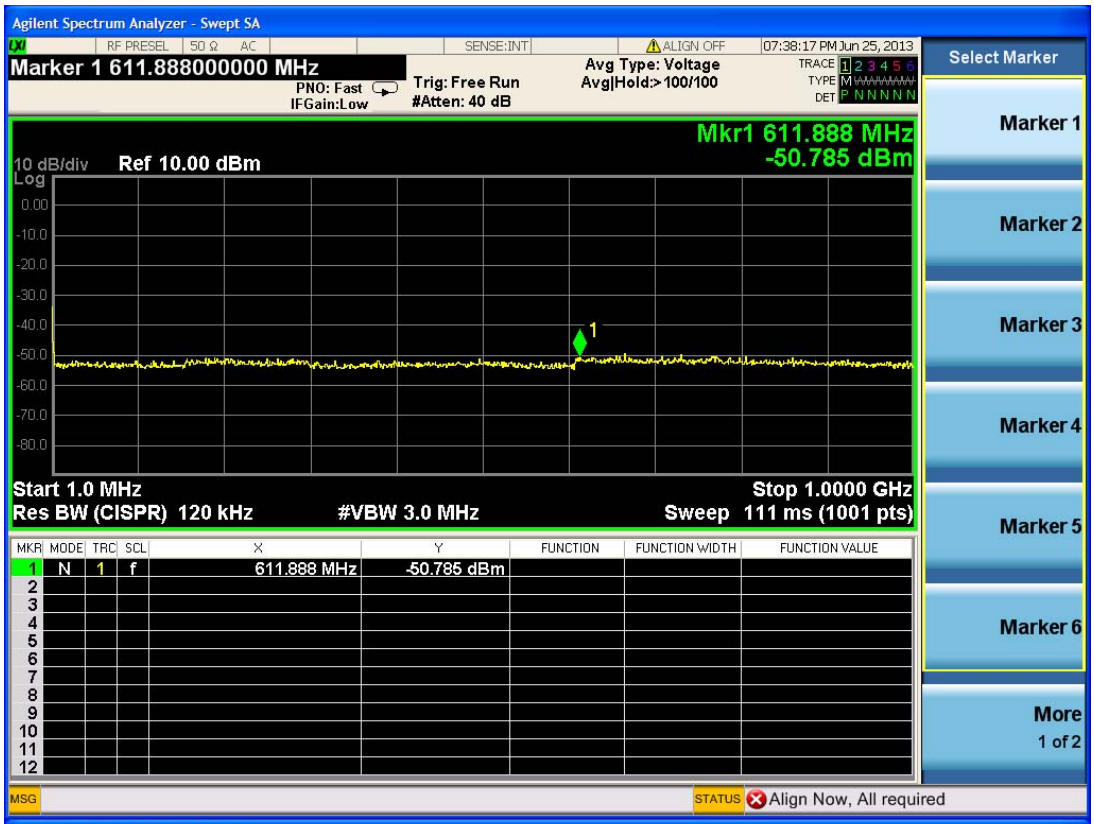


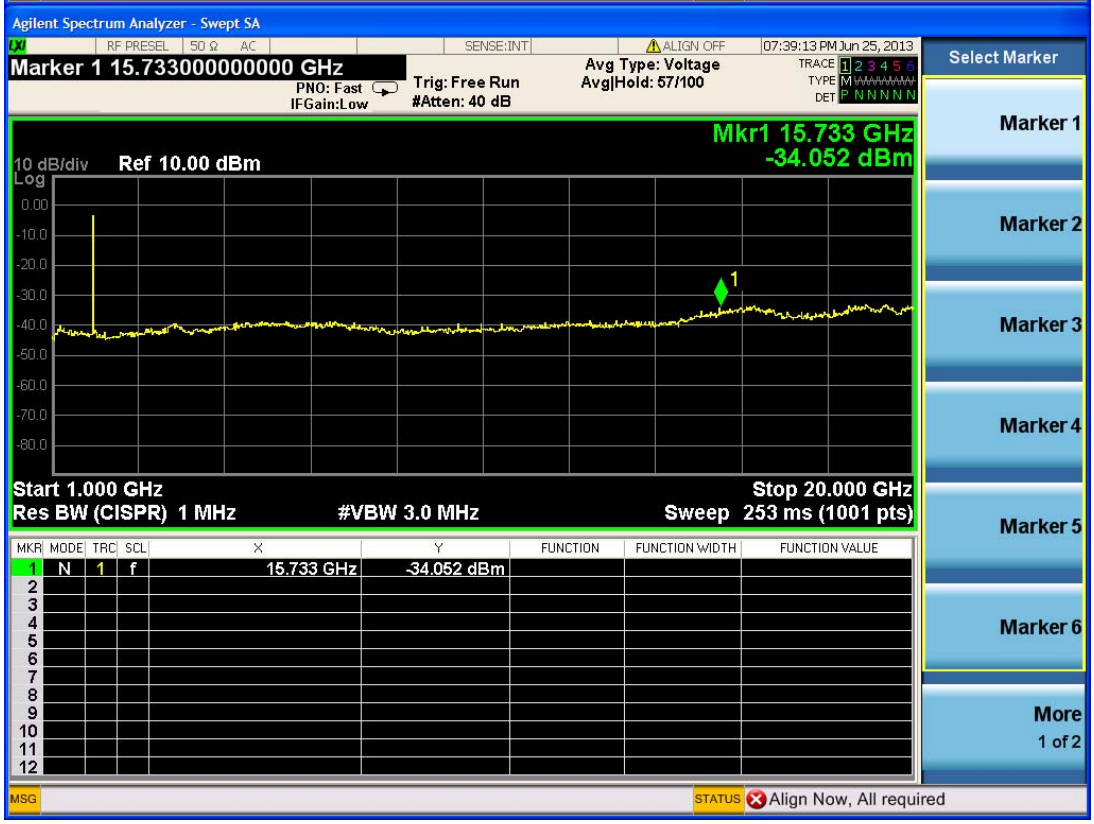
EDGE1900 Channel 661



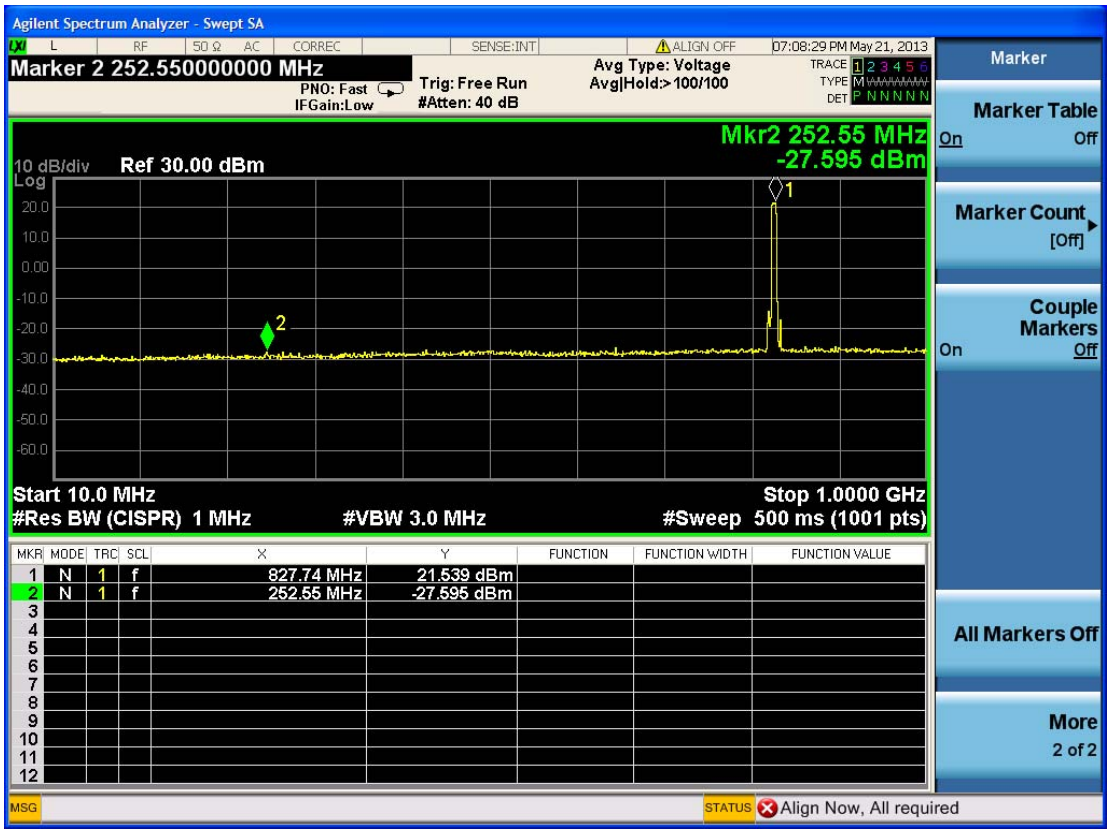


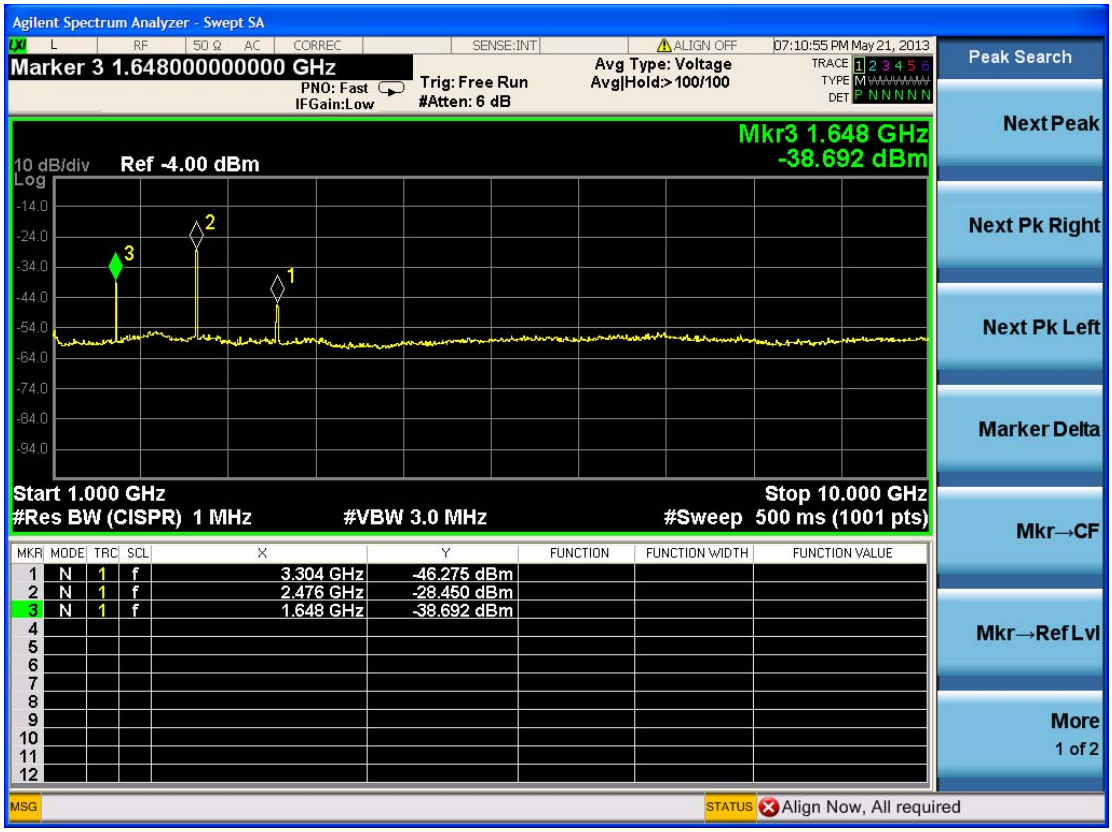
EDGE1900 Channel 810



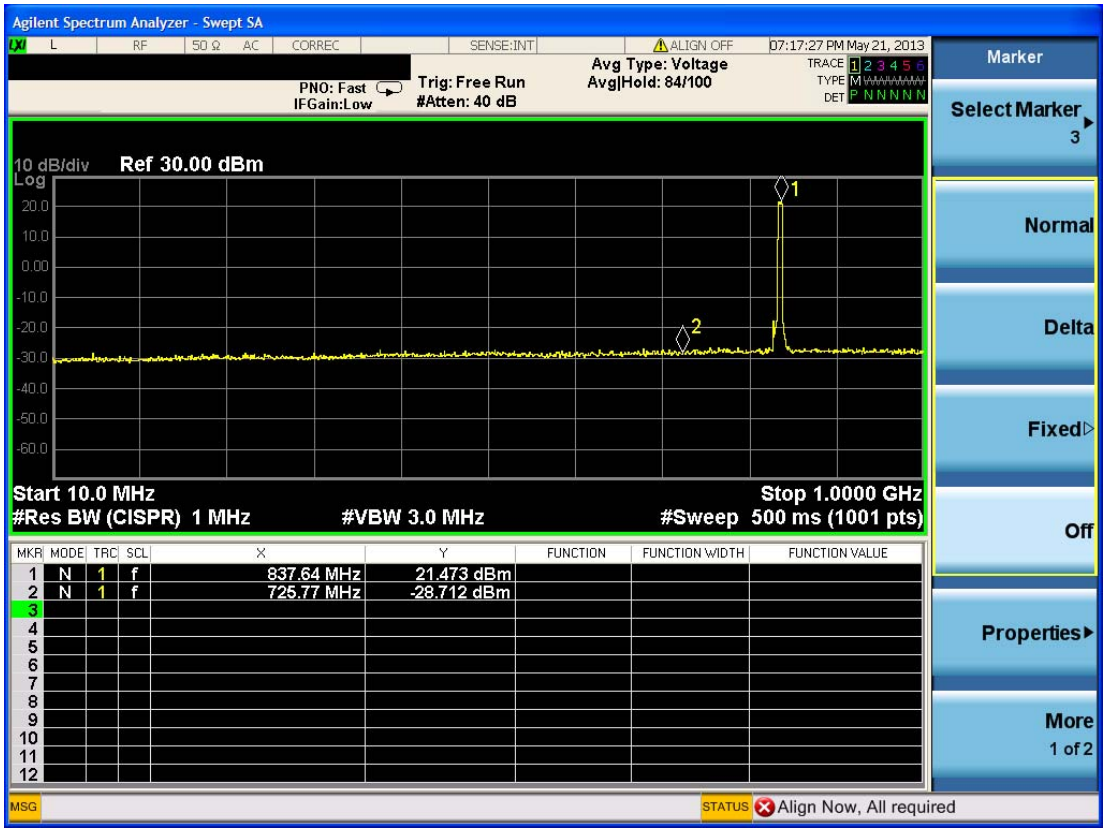


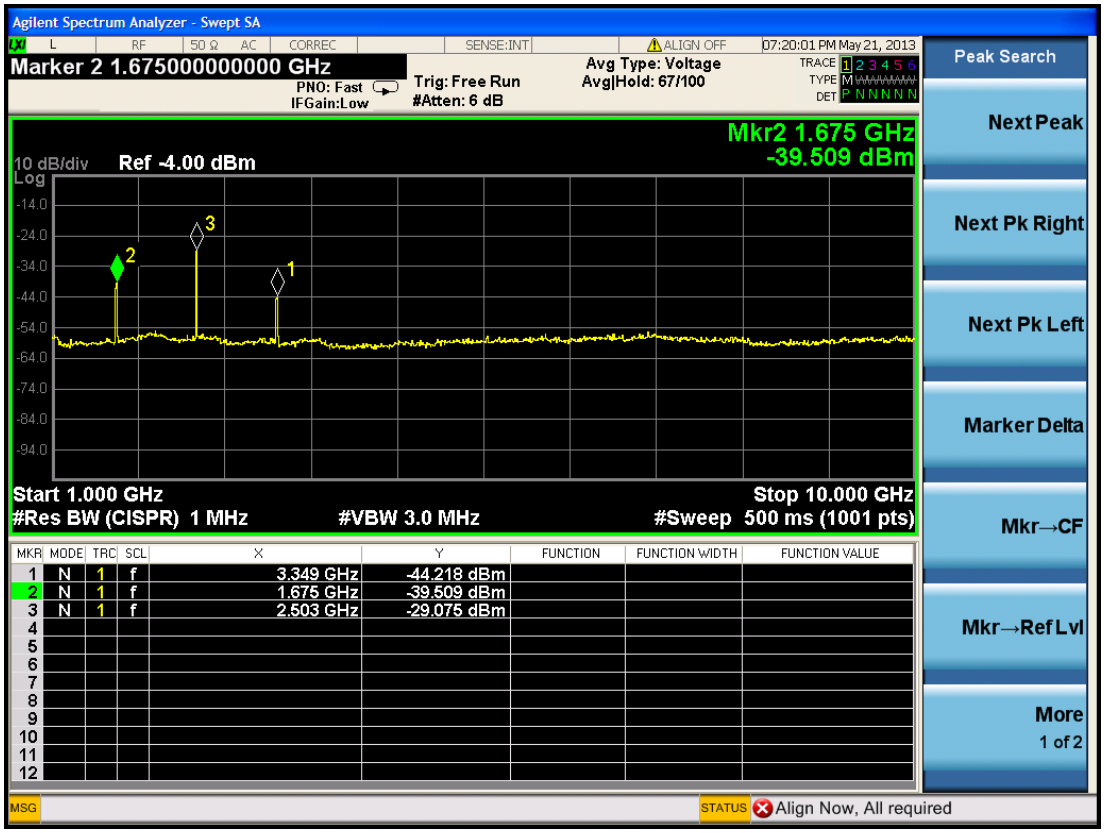
WCDMA Band V Channel 4132



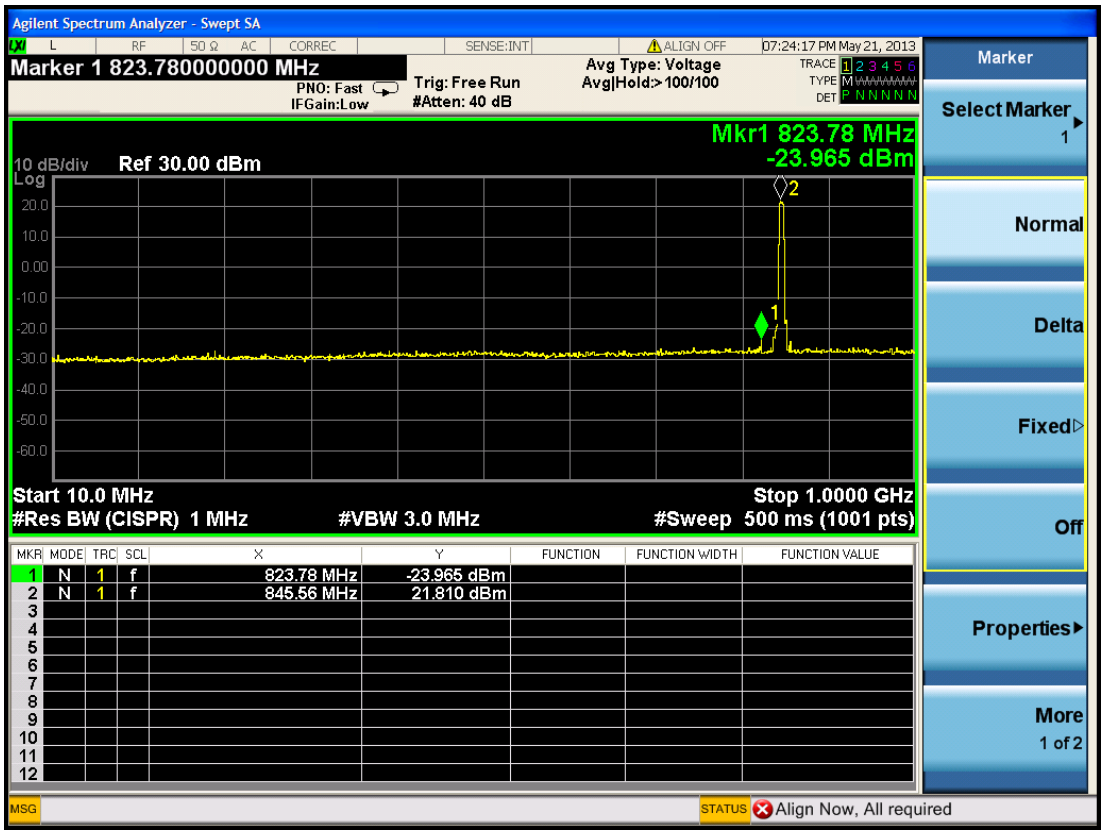


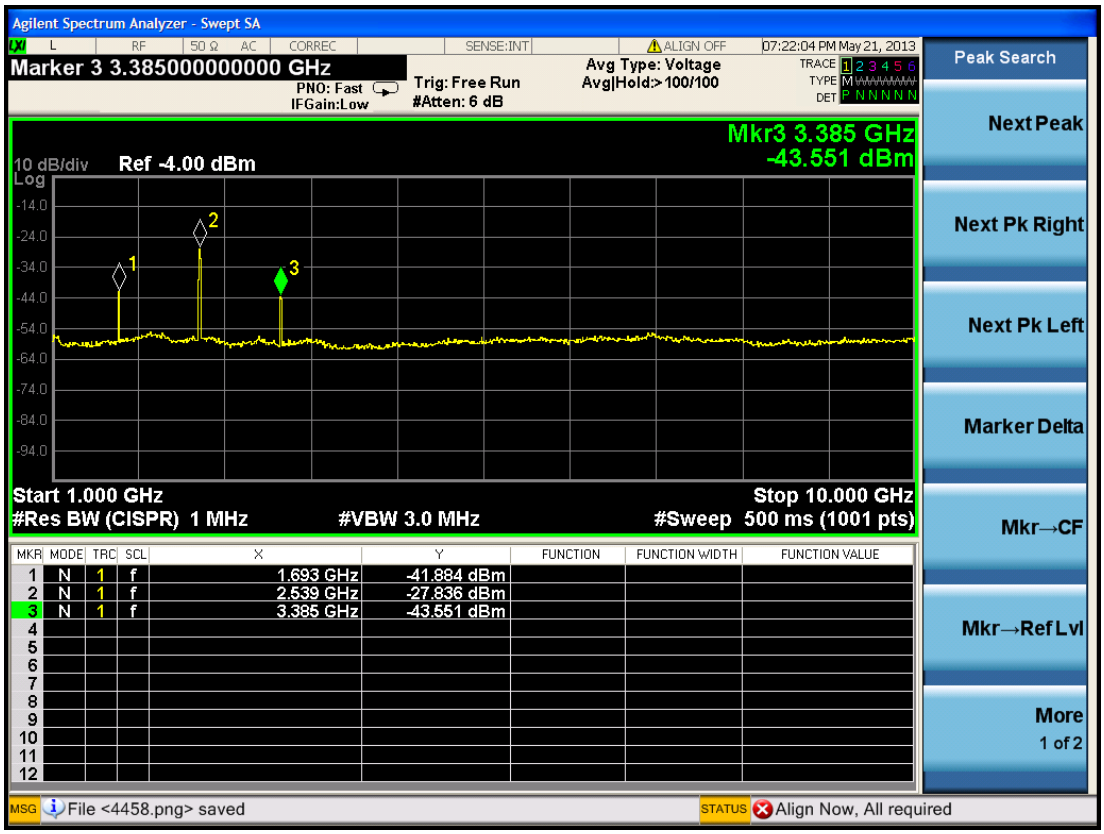
WCDMA Band V Channel 4182





WCDMA Band V Channel 4233





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)							
150.3	H	-66.58	2.09	-0.71	-69.38	-13.00	-56.38
755.6	H	-64.42	3.78	-2.41	-70.61	-13.00	-57.61
150.3	V	-70.98	2.09	-0.71	-73.78	-13.00	-60.78
755.3	V	-69.21	3.78	-2.41	-75.40	-13.00	-62.40

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	-48.59	6.00	7.80	-46.79	-13.00	-33.79
2508.8	H	-41.17	7.36	8.46	-40.07	-13.00	-27.07
1673.4	V	-45.61	6.00	7.80	-43.81	-13.00	-30.81
2508.8	V	-38.39	7.36	8.46	-37.29	-13.00	-24.29

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)							
150.3	H	-67.56	2.09	1.45	-68.20	-13.00	-55.20
755.6	H	-66.34	3.78	-0.26	-70.38	-13.00	-57.38
150.3	V	-74.95	2.09	1.45	-75.59	-13.00	-62.59
755.6	V	-71.05	3.78	-0.26	-75.09	-13.00	-62.09

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)							
3760.0	H	-52.33	8.95	12.73	-48.55	-13.00	-35.55
5462.8	H	-59.56	11.12	13.12	-57.56	-13.00	-44.56
3760.4	V	-53.52	8.95	12.73	-49.74	-13.00	-36.74
5462.8	V	-58.24	11.12	13.12	-56.24	-13.00	-43.24

EDGE850 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)							
150.3	H	-65.47	2.09	-0.71	-68.27	-13.00	-56.38
755.6	H	-63.86	3.78	-2.41	-70.05	-13.00	-57.61
150.3	V	-69.65	2.09	-0.71	-72.45	-13.00	-60.78
755.3	V	-66.2	3.78	-2.41	-72.39	-13.00	-62.40

EDGE850 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	-50.43	6.00	7.80	-48.63	-13.00	-33.79
2508.8	H	-43.19	7.36	8.46	-42.09	-13.00	-27.07
1673.4	V	-46.17	6.00	7.80	-44.37	-13.00	-30.81
2508.8	V	-46.28	7.36	8.46	-45.18	-13.00	-24.29

EDGE1900 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)							
150.3	H	-68.57	2.09	1.45	-69.21	-13.00	-55.20
755.6	H	-65.65	3.78	-0.26	-69.69	-13.00	-57.38
150.3	V	-73.84	2.09	1.45	-74.48	-13.00	-62.59
755.6	V	-71.28	3.78	-0.26	-75.32	-13.00	-62.09

EDGE1900 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)							
3760.0	H	-53.43	8.95	12.73	-49.65	-13.00	-35.55
5462.8	H	-60.73	11.12	13.12	-58.73	-13.00	-44.56
3760.4	V	-54.44	8.95	12.73	-50.66	-13.00	-36.74
5462.8	V	-58.43	11.12	13.12	-55.43	-13.00	-42.24

WCDMA Band V 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)							
150.3	H	-64.31	2.09	-0.71	-67.11	-13.00	-54.11
755.6	H	-61.22	3.78	-2.41	-67.41	-13.00	-54.41
150.3	V	-67.18	2.09	-0.71	-69.98	-13.00	-56.98
755.3	V	-64.37	3.78	-2.41	-70.56	-13.00	-57.56

WCDMA Band V 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)							
1678	H	-40.84	6.00	7.80	-39.04	-13.00	-26.04
2509	H	-31.64	7.36	8.46	-30.54	-13.00	-17.54
1678	V	-38.35	6.00	7.80	-36.55	-13.00	-23.55
2509	V	-30.16	7.36	8.46	-29.06	-13.00	-16.06