TEST REPORT

of

FCC Part 22 Subpart H, Part 24 Subpart E
FCC ID: ZNFD724

Equipment Under Test	:	Cellular/PCS GSM/GPRS/EDGE RX Only/WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN
Model Name	:	LG-D724
Alternative models	:	LGD724, D724, LG-D723, LGD723, D723, LG-D723AR, LGD723AR, D723AR
Applicant	:	LG Electronics MobileComm U.S.A., Inc.
Manufacturer	:	LG Electronics MobileComm U.S.A., Inc.
Date of Test(s)	:	2014.05.23 ~ 2014.06.05
Date of Issue	:	2014.07.04

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Wonjun Sim** **Date:** **2014.07.04**

Approved By: **Hyunchae You** **Date:** **2014.07.04**

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-837

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

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1.2. Details of applicant

Applicant : LG Electronics MobileComm U.S.A., Inc.
Address : 10101 Old Grove Road, San Diego, CA 92131
Contact Person : Lee, Sang-Myung
Phone No. : +82 2 2033 4606

1.3. Description of EUT

Kind of Product	Cellular/PCS GSM/GPRS/EDGE RX Only/WCDMA/HSDPA/HSUPA phone with Bluetooth, WLAN
Model Name	LG-D724 (Alternative models:LGD724,D724,LG-D723,LGD723,D723,LG-D723AR,LGD723AR,D723AR)
Power Supply	DC 3.8 V
Rated Power	GSM850: 33.2 dB m GSM1900: 30.7 dB m WCDMA850: 23.2 dB m WCDMA1900: 23.7 dB m
Frequency Range	GSM850: 824.2 ㎒ ~ 848.8 ㎒ GSM1900: 1 850.2 ㎒ ~ 1 909.8 ㎒ WCDMA850: 826.4 ㎒ ~ 846.6 ㎒ WCDMA1900: 1 852.4 ㎒ ~ 1 907.6 ㎒
Class of GPRS	Class 12, Class B
Emission Designator	GSM850: 246KGXW GSM1900: 246KGXW WCDMA850: 4M17F9W WCDMA1900: 4M17F9W

1.4. Sample calculation for offset

Where relevant, the following sample calculation is provided:

1.4.1. Conducted test

Offset value (dB) = Directional Coupler (dB) + Attenuator (dB) + Cable loss (dB)

1.4.2. Radiation test

E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)

1.5. Information of Alternative model

Model	Information
LG-D724	Basic model name.
LGD724	H/W and S/W are same to basic model. It is only different model name for marketing purpose
D724	H/W and S/W are same to basic model. It is only different model name for marketing purpose
LG-D723	- The SIM socket is replaced with the single socket for supporting the Single SIM option.
LGD723	H/W and S/W are same to LG-D723 model It is only different model name for marketing purpose
D723	H/W and S/W are same to LG-D723 model It is only different model name for marketing purpose
LG-D723AR	H/W and S/W are same to LG-D723 model. It is only different model name for marketing purpose
LGD723AR	H/W and S/W are same to LG-D723 model. It is only different model name for marketing purpose
D723AR	H/W and S/W are same to LG-D723 model. It is only different model name for marketing purpose

1.6. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	R&S	SMBV100A	259067	Jul. 15, 2013	Annual	Jul. 15, 2014
Signal Generator	R&S	SMR40	100272	Aug. 10, 2013	Annual	Aug. 10, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Directional Coupler	KRYTAR	152613	122661	Mar. 18, 2014	Annual	Mar. 18, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
Temperature Chamber	ENEX	TRUST2000	980111	Dec. 26, 2013	Annual	Dec. 26, 2014
Low Pass Filter	Mini circuits	NLP-1200+	V 8979400903-2	Mar. 21, 2014	Annual	Mar. 21, 2015
High Pass Filter	Wainwright	WHK3.0/18G-6SS	4	Jul. 02, 2013	Annual	Jul. 02, 2014
High Pass Filter	Wainwright	WHK7.5/26.5G-6SS	15	Jul. 03, 2013	Annual	Jul. 03, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014
Preamplifier	H.P.	8447F	2944A03909	Jun. 28, 2013	Annual	Jun. 28, 2014
Preamplifier	R&S	SCU 18	1391123	Sep. 30, 2013	Annual	Sep. 30, 2014
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Apr. 28, 2014	Annual	Apr. 28, 2015
Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
Bilog Antenna	TESEQ	CBL6112D	25233	Jul. 19, 2013	Biennial	Jul. 19, 2015
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170223	Aug. 24, 2012	Biennial	Aug. 24, 2014
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	VHA 9103	9103-2817	May 09, 2013	Biennial	May 09, 2015
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	UHA 9105	9105-2514	May 09, 2013	Biennial	May 09, 2015
Antenna Master	INNCO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INNCO	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.4 m)	N/A	N.C.R.	N/A	N.C.R.

1.7. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22, 24 and 27		
Section in FCC part	**Test Item**	**Result**
§22.913(a)(2) §24.232(c)	RF Radiated Output Power	Complied
§2.1053 §22.917(a) §24.238(a)	Spurious Radiated Emission	Complied
§2.1046	Conducted Output Power	See SAR Report
§2.1049	Occupied Bandwidth	Complied
§24.232(d)	Peak-Average Ratio	Complied
§2.1051 §22.917(a) §24.238(a)	Spurious Emission at Antenna Terminal	Complied
§2.1055 §22.355 §24.235	Frequency Stability	Complied
§22.917(a) §24.238(a)	Band Edge	Complied

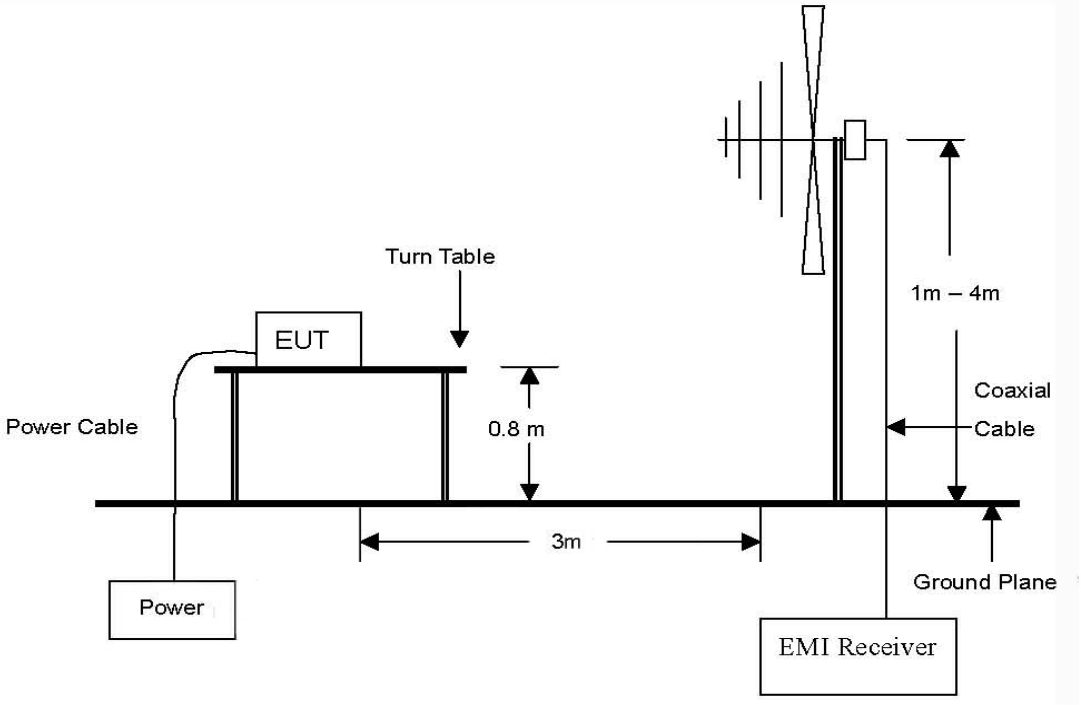
1.8. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL007723	2014.06.10	Initial
1	F690501/RF-RTL007723-1	2014.06.26	Add Alternative models
2	F690501/RF-RTL007723-2	2014.07.04	Add source of each test procedure used

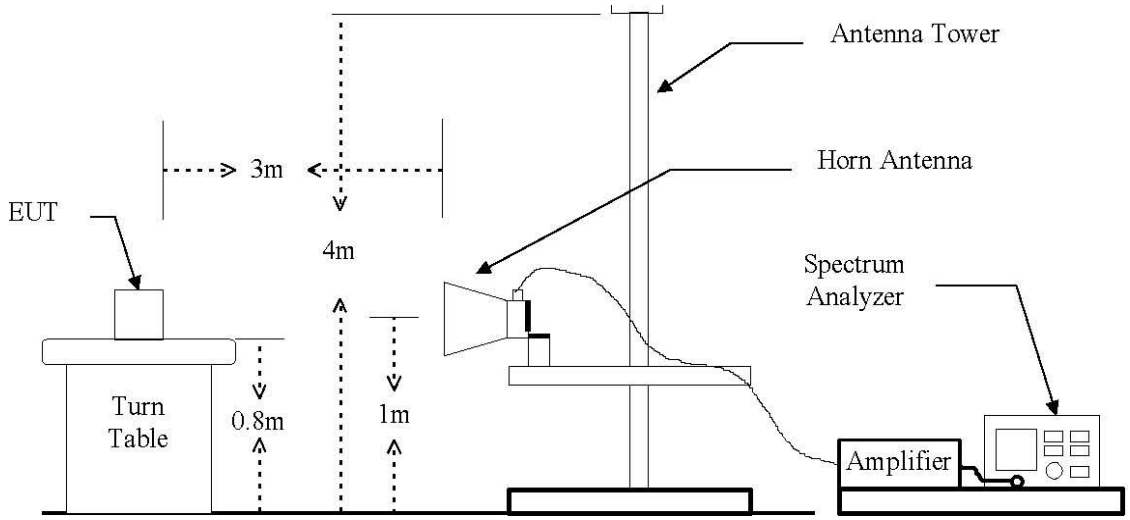
2. RF radiated output power & spurious radiated emission

2.1. Test setup

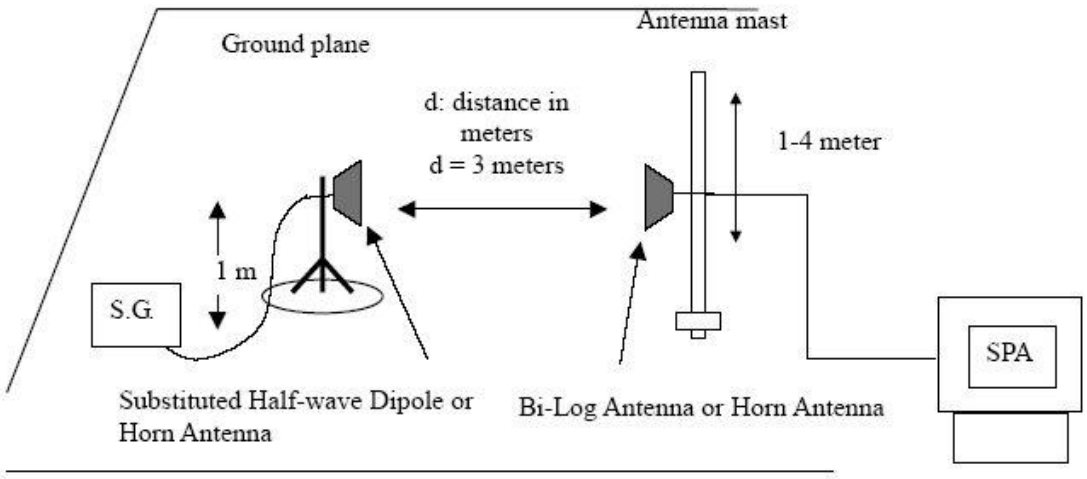
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to 20 ㎓ Emissions.



The diagram below shows the test setup for substituted method.



2.1.1 Actual equipment used for RF radiated output power & spurious radiated emission

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	R&S	SMBV100A	259067	Jul. 15, 2013	Annual	Jul. 15, 2014
Signal Generator	R&S	SMR40	100272	Aug. 10, 2013	Annual	Aug. 10, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
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Preamplifier	R&S	SCU 18	1391123	Sep. 30, 2013	Annual	Sep. 30, 2014
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Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
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Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170223	Aug. 24, 2012	Biennial	Aug. 24, 2014
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	VHA 9103	9103-2817	May 09, 2013	Biennial	May 09, 2015
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	UHA 9105	9105-2514	May 09, 2013	Biennial	May 09, 2015
Antenna Master	INNCO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INNCO	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.4 m)	N/A	N.C.R.	N/A	N.C.R.

2.2. Limit

2.2.1. Limit of radiated output power

FCC §22.913(a)(2), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
FCC §24.232(c), Mobile and portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.2.2. Limit of spurious radiated emission

FCC §22.917(a), 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.
FCC §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

2.3. Test procedure

The test follows section 5.2.1, 5.8 of FCC KDB Publication 971168_v02r01, section 2.2.17, 2.2.12 of ANSI/TIA-603-C-2004

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer " Channel Power" function with the integration band set to the emissions occupied bandwidth, a RMS detector, RBW = 100 ㎑, VBW = 300 ㎑ and 1 second sweep time over a minimum of 10 sweeps, per the guideline of KDB 971168
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which 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.
14. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

2.4. Test result for RF radiated output power

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

GSM850

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(㎽)
824.2	V	34.79	3.28	-0.95	30.56	1 136.64
824.2	H	34.61	3.28	-0.95	30.38	1 092.36
836.6	V	35.91	3.31	-0.95	31.65	1 462.10
836.6	H	35.51	3.31	-0.95	31.25	1 332.71
848.8	V	35.53	3.35	-0.94	31.24	1 328.93
848.8	H	36.46	3.35	-0.94	32.17	1 648.64

GSM1900

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(㎽)
1 850.2	V	27.57	5.90	7.88	29.55	902.36
1 850.2	H	28.19	5.90	7.88	30.17	1 040.80
1 880.0	V	25.59	5.83	7.86	27.62	578.22
1 880.0	H	28.19	5.83	7.86	30.22	1 052.08
1 909.8	V	25.53	5.77	7.84	27.60	575.49
1 909.8	H	28.69	5.77	7.84	30.76	1 191.31

WCDMA850

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(㎽)
826.4	V	25.17	3.28	-0.95	20.94	124.19
826.4	H	24.29	3.28	-0.95	20.06	101.49
836.6	V	25.99	3.31	-0.95	21.73	149.10
836.6	H	26.28	3.31	-0.95	22.02	159.12
846.6	V	26.40	3.35	-0.94	22.11	162.71
846.6	H	27.42	3.35	-0.94	23.13	205.59

WCDMA1900

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(㎽)
1 852.4	V	20.71	5.90	7.87	22.68	185.45
1 852.4	H	21.29	5.90	7.87	23.26	211.90
1 880.0	V	19.23	5.83	7.86	21.26	133.75
1 880.0	H	20.35	5.83	7.86	22.38	173.00
1 907.6	V	18.99	5.77	7.84	21.06	127.64
1 907.6	H	19.81	5.77	7.84	21.88	154.23

Remark:

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)
2. This device was tested under all configurations and highest power is reported in GSM voice mode and WCDMA RMC mode at 12.2kbps.
3. The E.R.P. & E.I.R.P. was measured in three orthogonal EUT position(x-axis, y-axis and z-axis). Worst cases are z-axis for GSM850/WCDMA850 and x-axis for GSM1900/WCDMA1900.
4. The data reported in the table above was measured in worst case.

2.5. Spurious radiated emission

- Measured output Power: 32.17 dB m = 1.65 W
- Modulation Signal: GSM850
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$ (W) = 45.17 dB c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (824.2 ㎒)							
2 471.98	V	-49.16	5.80	8.91	-46.05	78.22	33.05
2 472.13	H	-50.34	5.80	8.91	-47.23	79.40	34.23
Middle Channel (836.4 ㎒)							
2 509.65	V	-47.81	5.86	8.98	-44.69	76.86	31.69
2 509.84	H	-47.04	5.86	8.98	-43.92	76.09	30.92
High Channel (848.8 ㎒)							
2 546.38	V	-46.13	5.93	9.00	-43.06	75.23	30.06
2 546.62	H	-43.99	5.93	9.00	-40.92	73.09	27.92

- Measured output Power: 30.76 dB m = 1.19 W
- Modulation Signal: GSM1900
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$ (W) = 43.76 dB c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 850.2 ㎒)							
5 550.35	V	-39.74	9.10	10.45	-38.39	69.15	25.39
5 550.63	H	-40.22	9.11	10.45	-38.88	69.64	25.88
7 400.39	V	-38.05	14.63	11.66	-41.02	71.78	28.02
7 399.76	H	-42.15	14.64	11.66	-45.13	75.89	32.13
Middle Channel(1 880.0 ㎒)							
5 641.14	V	-39.53	9.15	10.55	-38.13	68.89	25.13
5 640.37	H	-38.21	9.15	10.55	-36.81	67.57	23.81
7 519.64	V	-40.05	12.89	11.73	-41.21	71.97	28.21
7 520.16	H	-39.33	12.88	11.73	-40.48	71.24	27.48
High Channel(1 909.8 ㎒)							
5 729.33	V	-38.49	9.23	10.64	-37.08	67.84	24.08
5 728.87	H	-34.11	9.23	10.64	-32.70	63.46	19.70
7 639.22	V	-36.50	11.77	11.80	-36.47	67.23	23.47
7 639.85	H	-38.30	11.77	11.80	-38.27	69.03	25.27

- Measured output Power: 23.13 dB m = 0.21 W
- Modulation Signal: WCDMA850
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$ (W) = 36.13 dB c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (826.4 ㎒)							
1 653.24	V	-40.28	5.94	7.93	-38.29	61.42	25.29
1 652.89	H	-42.80	5.93	7.93	-40.80	63.93	27.80
Middle Channel (836.6 ㎒)							
1 672.94	V	-37.44	6.00	7.93	-35.51	58.64	22.51
1 674.14	H	-38.23	6.01	7.93	-36.31	59.44	23.31
High Channel (846.6 ㎒)							
1 693.18	V	-42.23	6.08	7.93	-40.38	63.51	27.38
1 693.11	H	-42.43	6.08	7.93	-40.58	63.71	27.58

- Measured output Power: 23.26 dB m = 0.21 W
- Modulation Signal: WCDMA1900
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$ (W) = 36.26 dB c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 852.4 ㎒)							
3 704.64	V	-54.97	8.06	9.08	-53.95	77.21	40.95
3 704.89	H	-54.83	8.06	9.08	-53.81	77.07	40.81
Middle Channel(1 880.0 ㎒)							
3 760.45	V	-57.34	8.32	9.10	-56.56	79.82	43.56
3 759.75	H	-54.68	8.32	9.10	-53.90	77.16	40.90
High Channel(1 907.6 ㎒)							
3 815.19	V	-58.11	8.50	9.12	-57.49	80.75	44.49
3 815.62	H	-53.39	8.50	9.12	-52.77	76.03	39.77

Remark:

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)
2. This device was tested under all configurations and highest power is reported in GSM voice mode and WCDMA RMC mode at 12.2kbps.
3. The E.R.P. & E.I.R.P. was measured in three orthogonal EUT position(x-axis, y-axis and z-axis). Worst cases are z-axis for GSM850/WCDMA850 and x-axis for GSM1900/WCDMA1900.
4. The data reported in the table above was measured in worst case.

3. Occupied Bandwidth 99 %

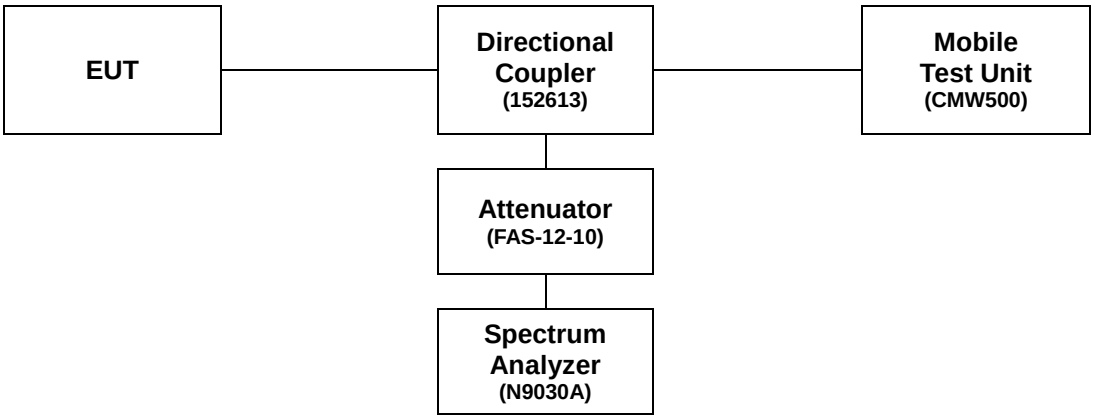
3.1. Limit

Requirements: CFR 47, Section §2.1049.

3.2. Test Procedure

The test follows section 4.2 of FCC KDB Publication 971168_v02r01.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The spectrum analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth.



3.2.1 Actual equipment used for Occupied Bandwidth 99 %

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Directional Coupler	KRYTAR	152613	122661	Mar. 18, 2014	Annual	Mar. 18, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

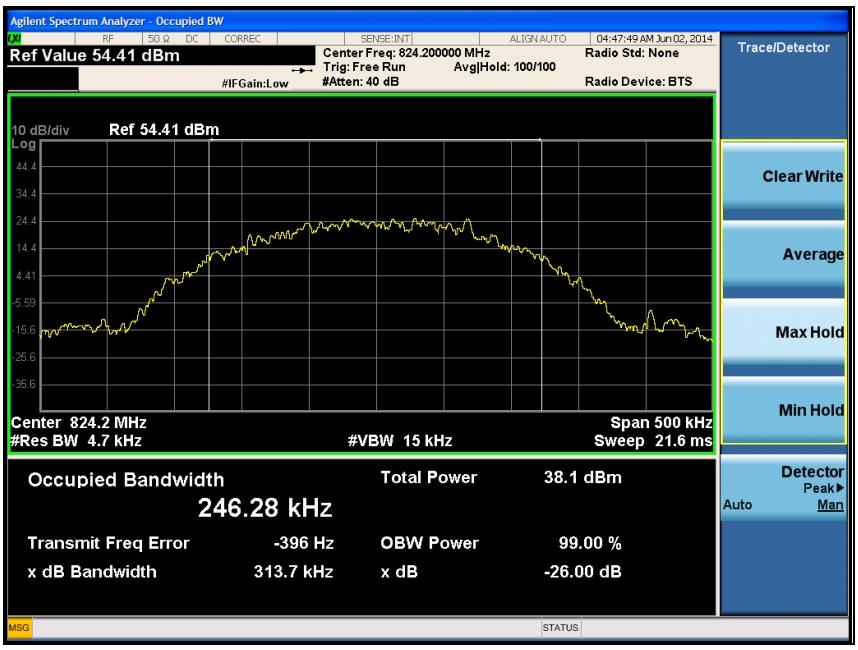
3.3 Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
GSM850	GSM Voice	824.2	0.246
		836.6	0.245
		848.8	0.245
GSM1900	GSM Voice	1 850.2	0.246
		1 880.0	0.244
		1 909.8	0.245
WCDMA850	12.2 kbps (RMC)	826.4	4.171
		836.6	4.169
		846.6	4.170
WCDMA1900	12.2 kbps (RMC)	1 852.4	4.173
		1 880.0	4.162
		1 907.6	4.168

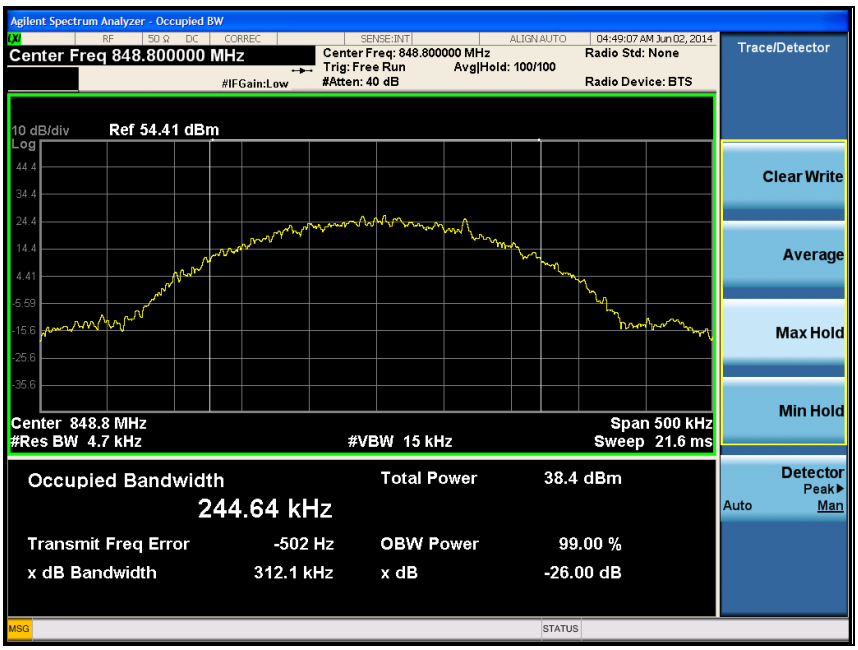
Please refer to the following plots.

GSM850
99 %
Low Channel



Middle Channel

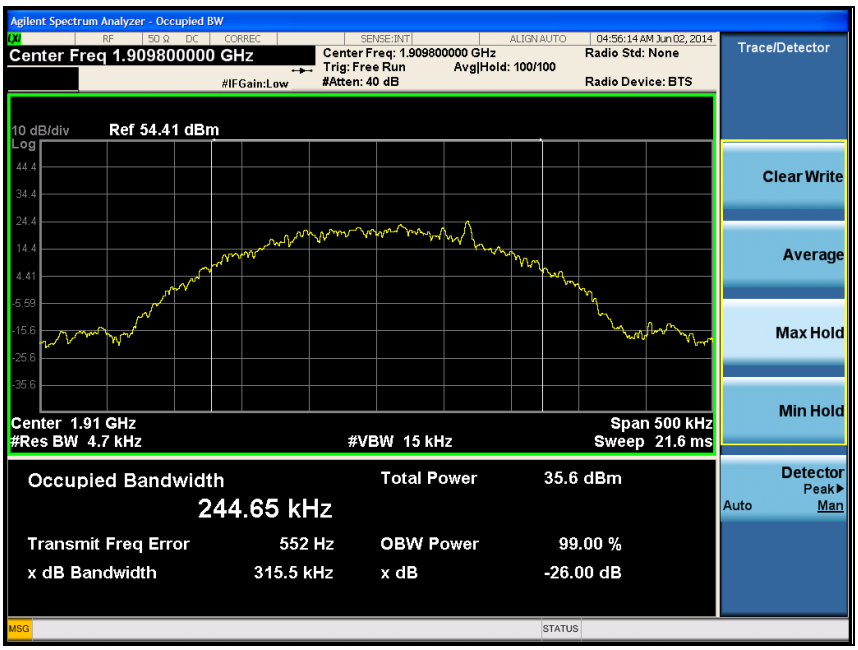
High Channel



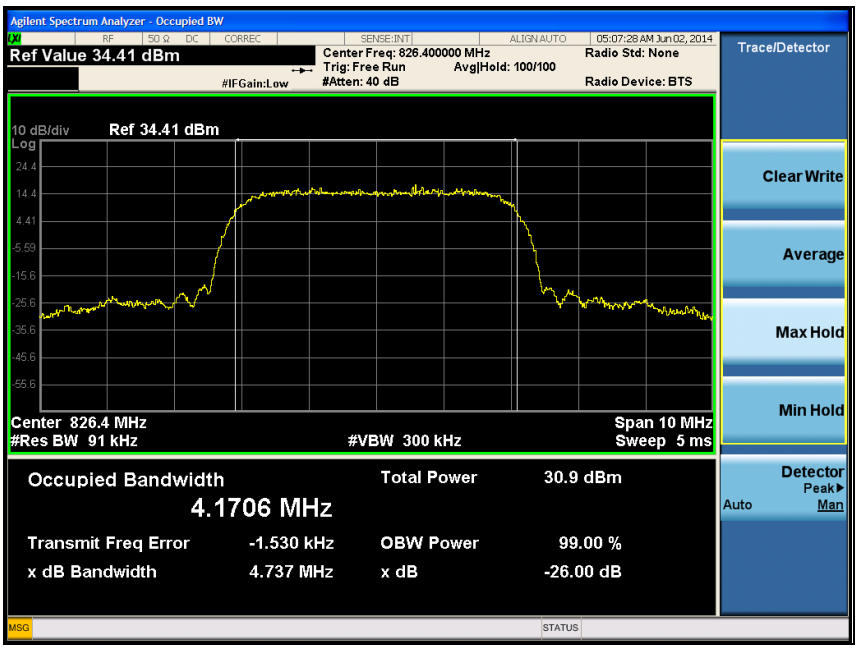
GSM1900
99 %
Low Channel

Middle Channel

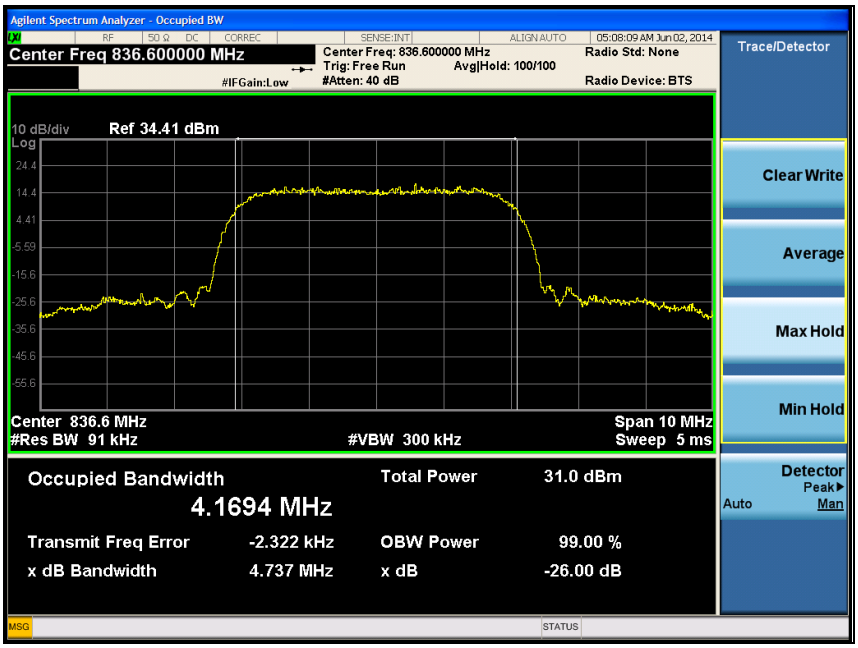
High Channel



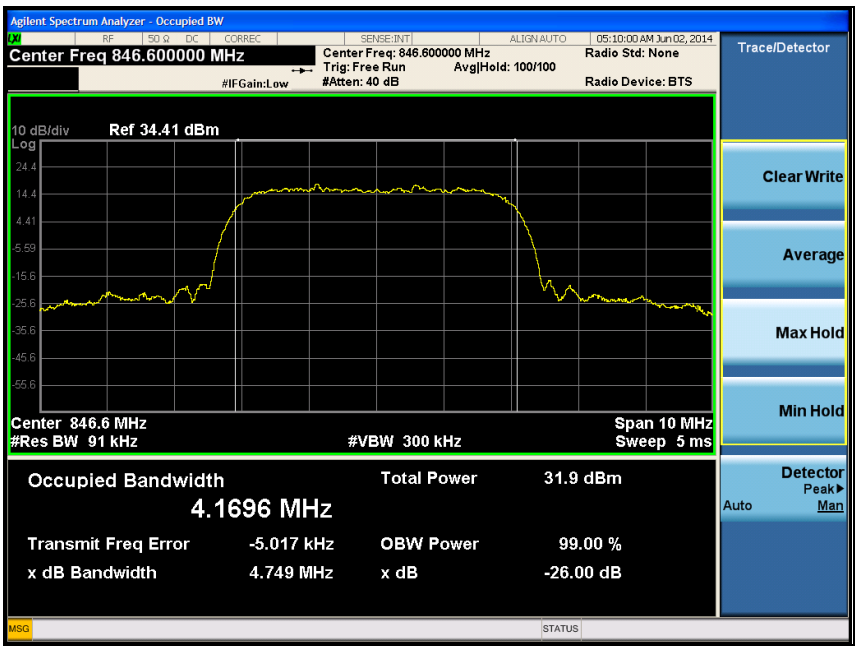
WCDMA850
99 %
Low Channel



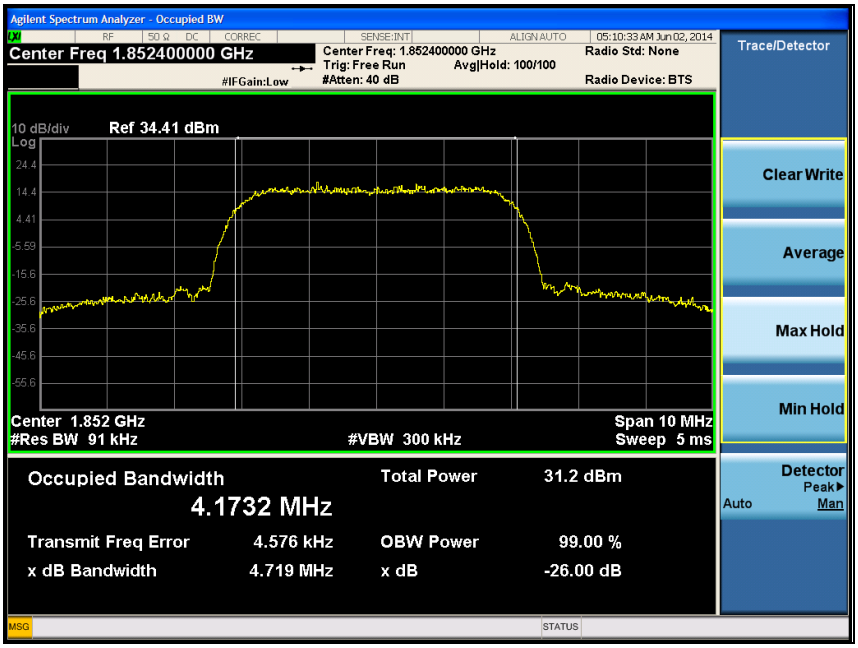
Middle Channel



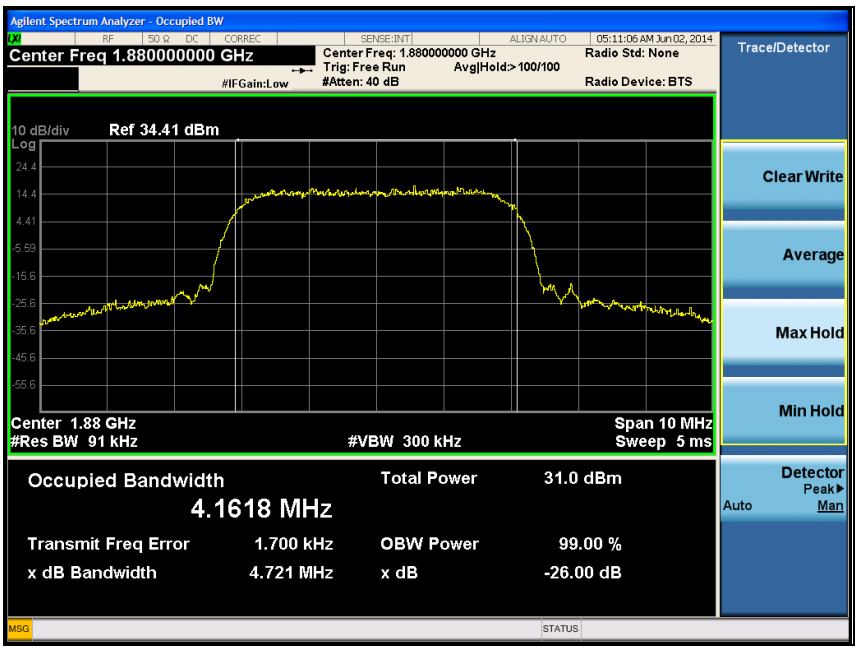
High Channel



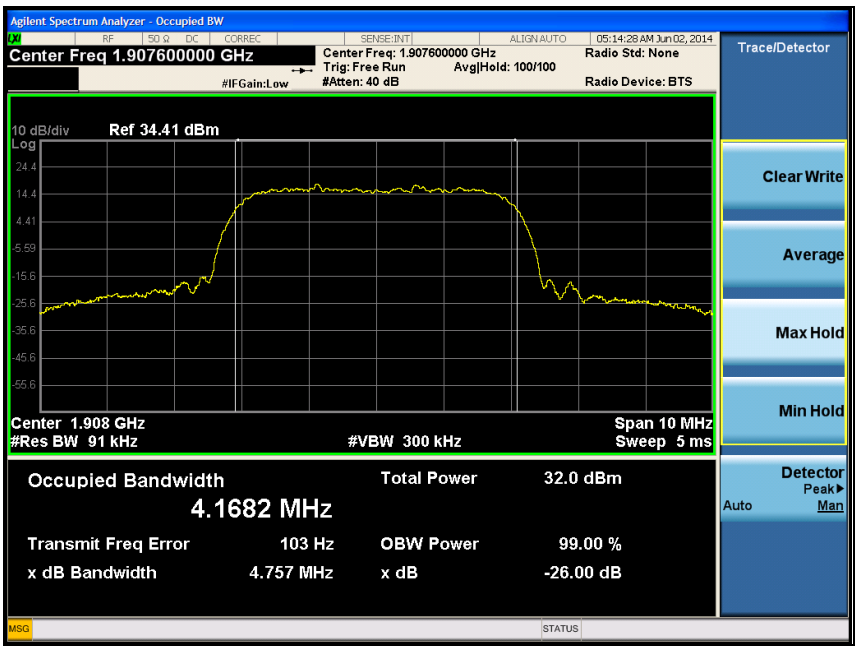
WCDMA1900
99 %
Low Channel



Middle Channel



High Channel



4. Peak-Average Ratio

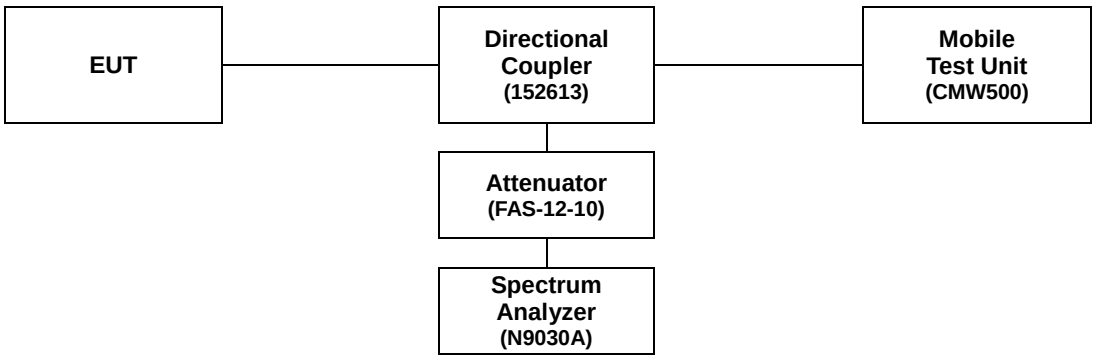
4.1. Limit

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

4.2. Test Procedure

The test follows section 5.7.1 of FCC KDB Publication 971168_v02r01.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The CCDF function of the spectrum analyzer was set.
3. PAR was measured with spectrum analyzer for each channel.



4.2.1 Actual equipment used for Peak-Average Ratio

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Directional Coupler	KRYTAR	152613	122661	Mar. 18, 2014	Annual	Mar. 18, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

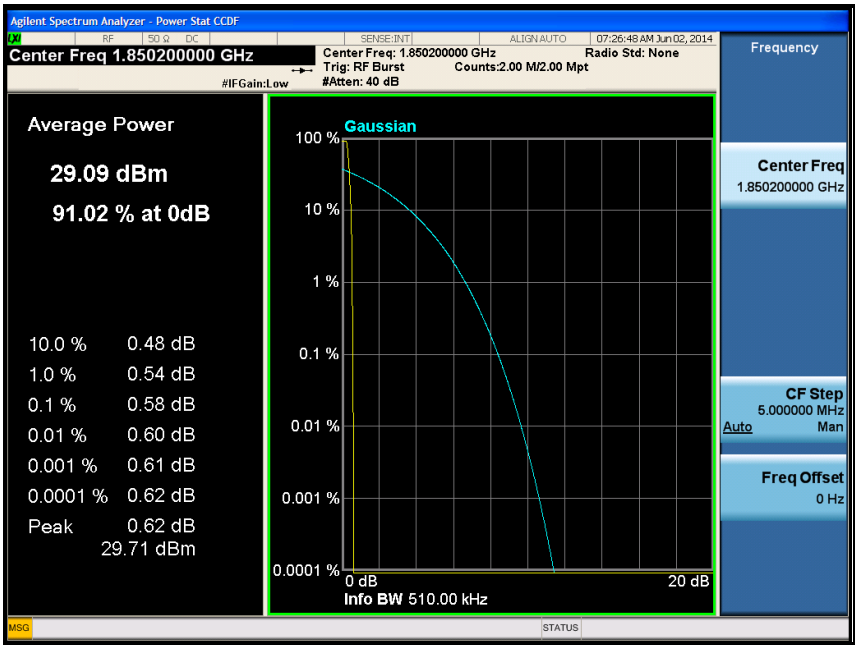
4.3 Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

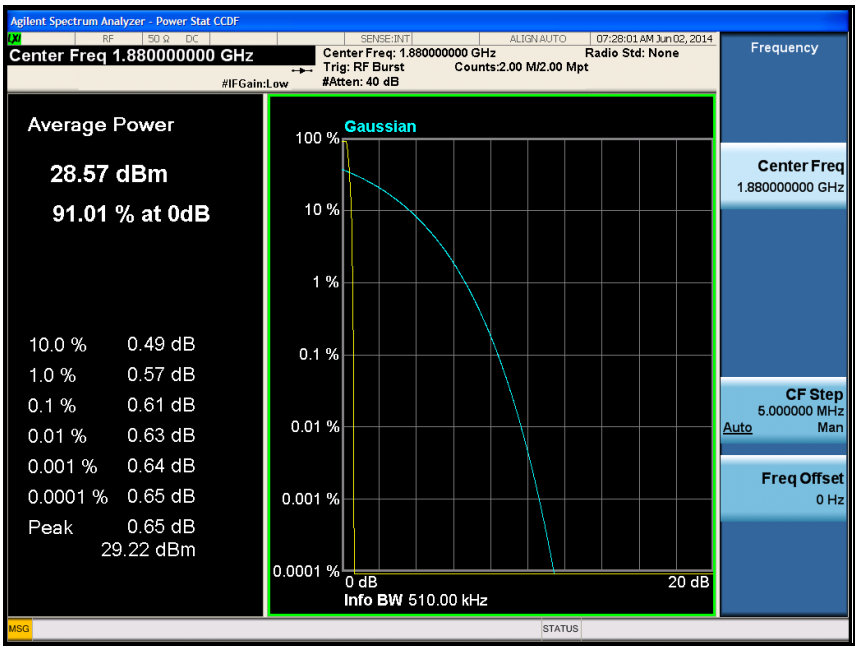
Please refer to the following plots.

Band	Mode	Frequency (㎒)	PAR (dB)
GSM1900	GSM Voice	1 850.2	0.58
		1 880.0	0.61
		1 909.8	0.62
WCDMA1900	12.2 kbps (RMC)	1 852.4	2.74
		1 880.0	2.89
		1 907.6	2.81

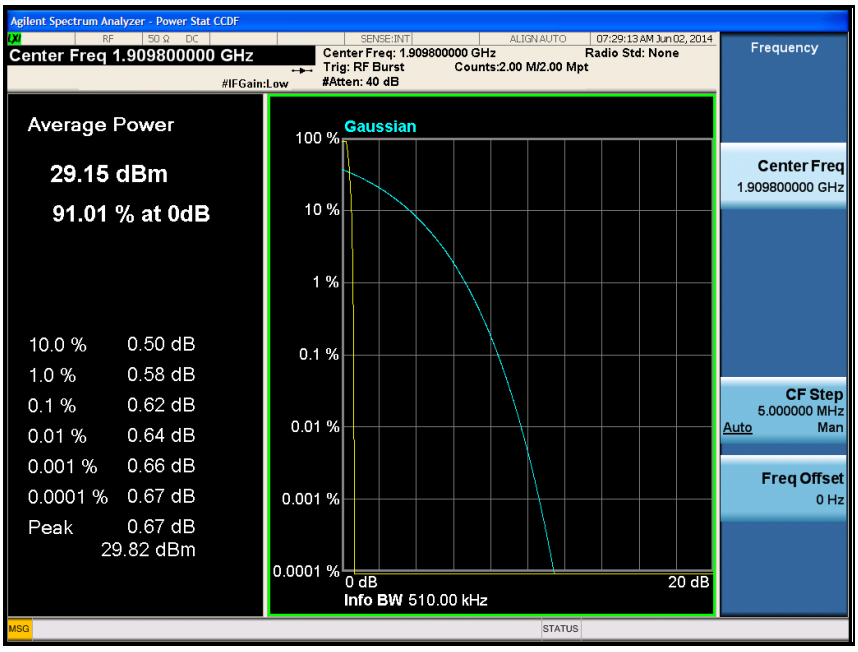
Peak-Average Ratio
GSM1900
Low Channel



Middle Channel

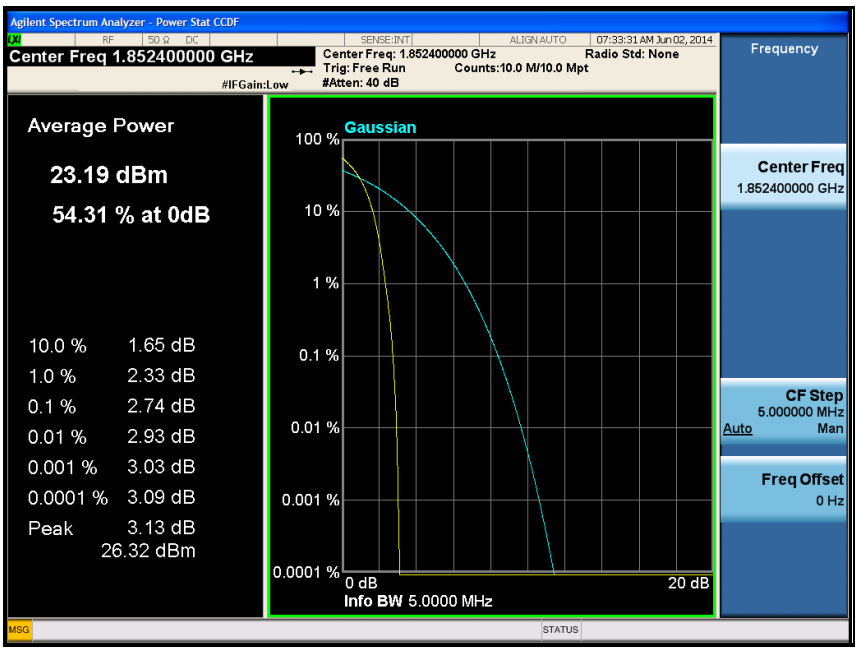


High Channel

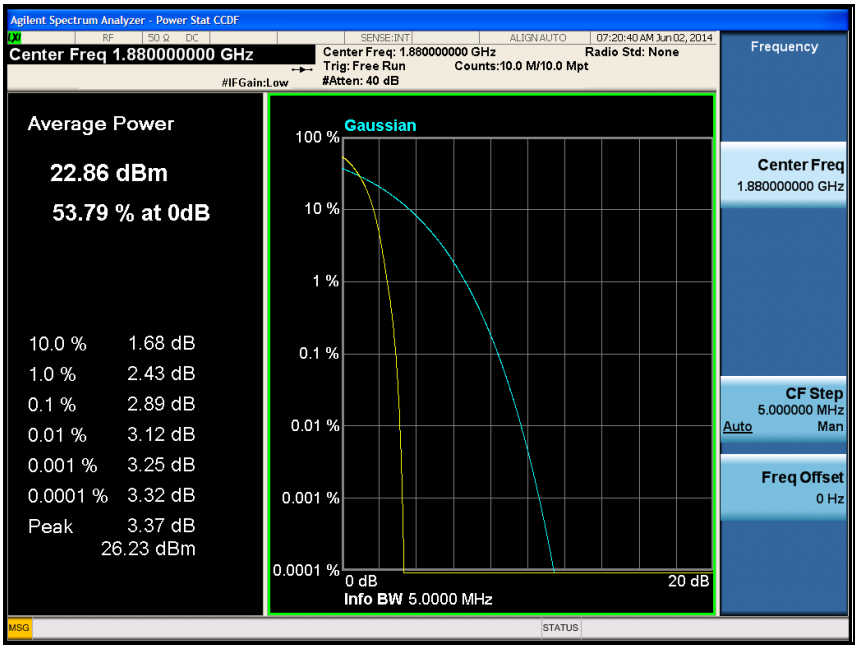


WCDMA1900

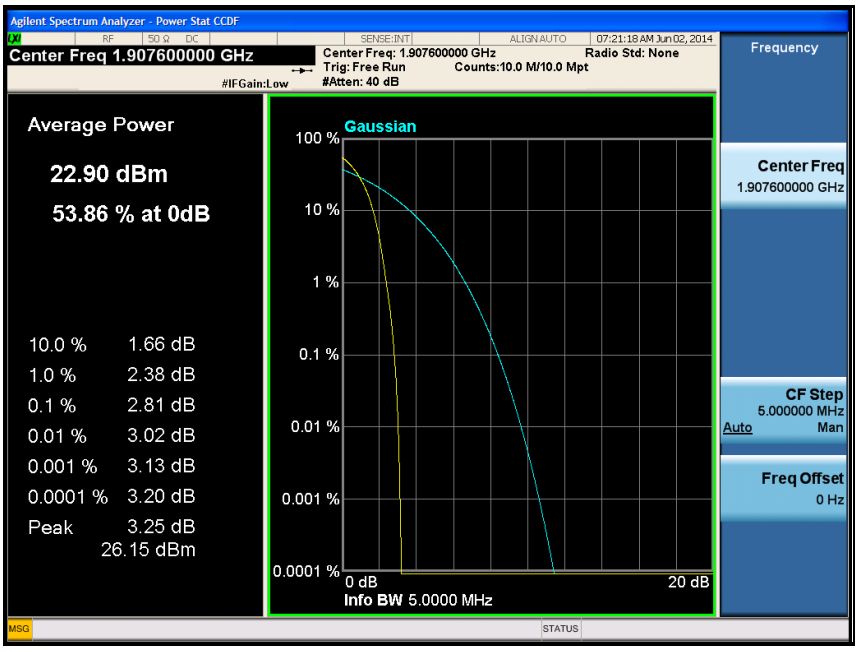
Low Channel



Middle Channel



High Channel



5. Spurious Emissions at Antenna Terminal

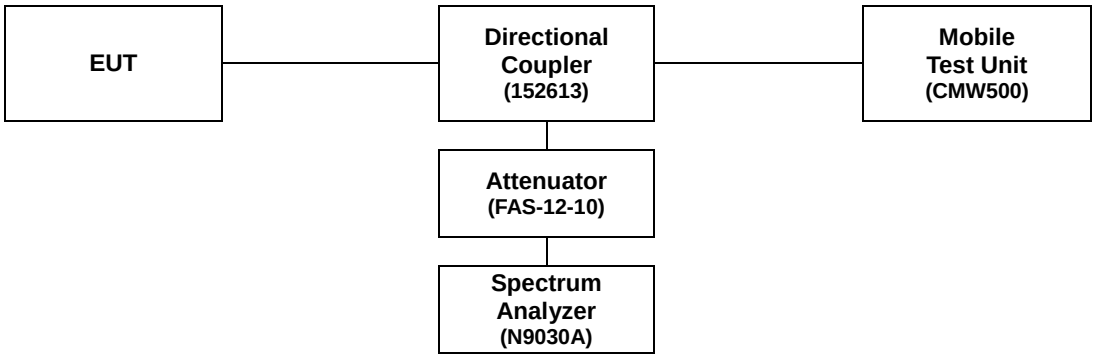
5.1. Limit

FCC §22.917(a), 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) ㏈.
FCC §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) ㏈.

5.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168_v02r01.

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1 ㎒. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



5.2.1 Actual equipment used for Peak-Average Ratio

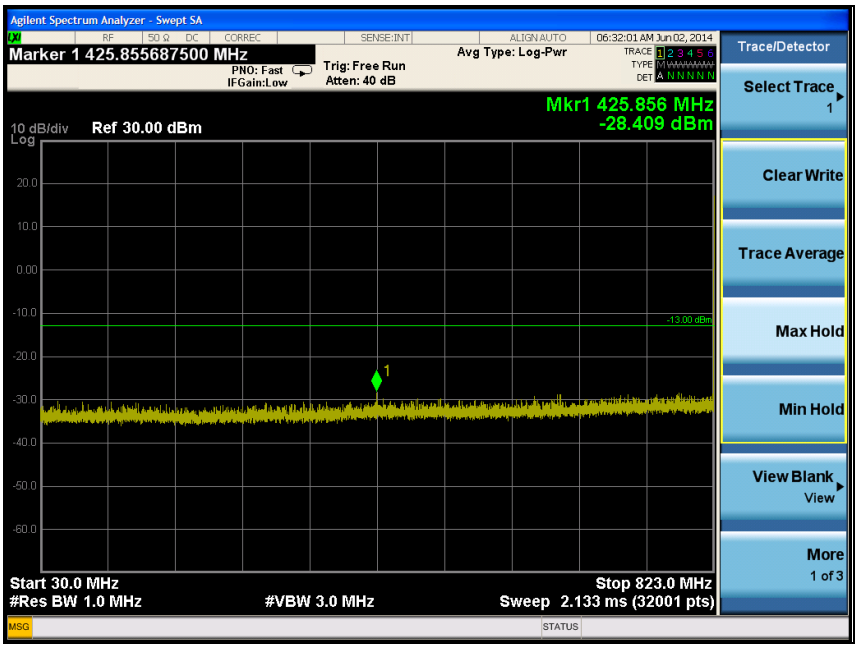
Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	R&S	SMBV100A	259067	Jul. 15, 2013	Annual	Jul. 15, 2014
Signal Generator	R&S	SMR40	100272	Aug. 10, 2013	Annual	Aug. 10, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Directional Coupler	KRYTAR	152613	122661	Mar. 18, 2014	Annual	Mar. 18, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

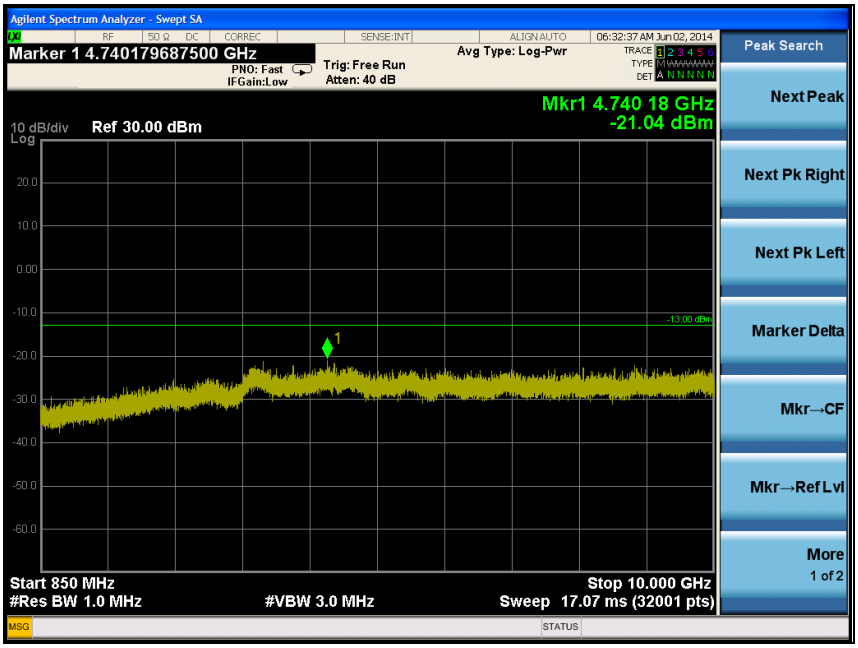
5.3. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

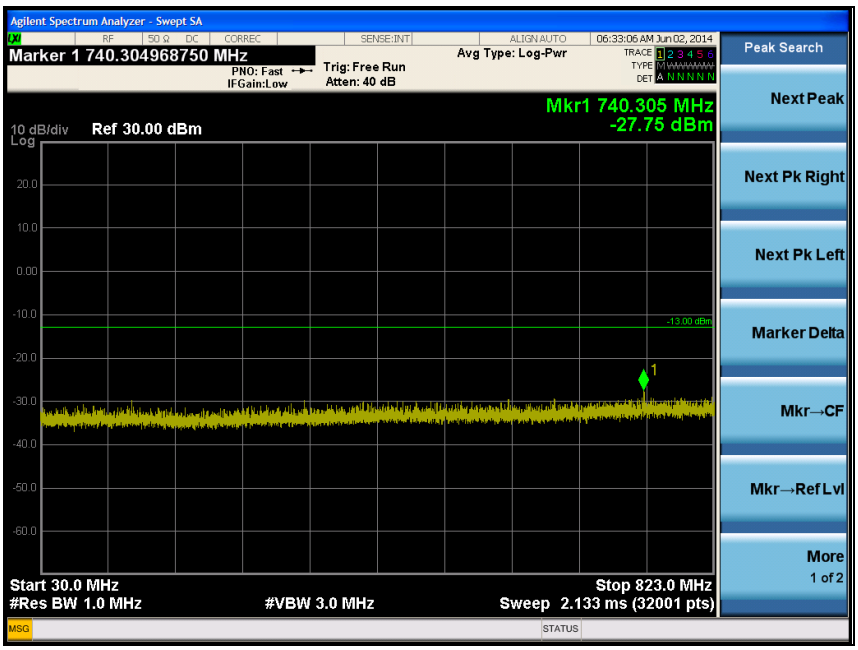
Please refer to the following plots.

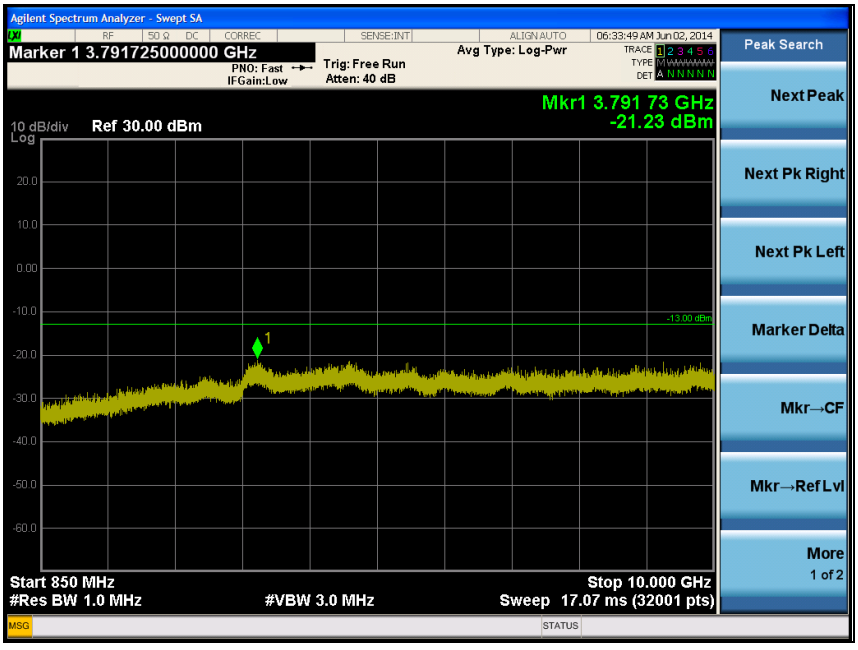
GSM850
Low Channel



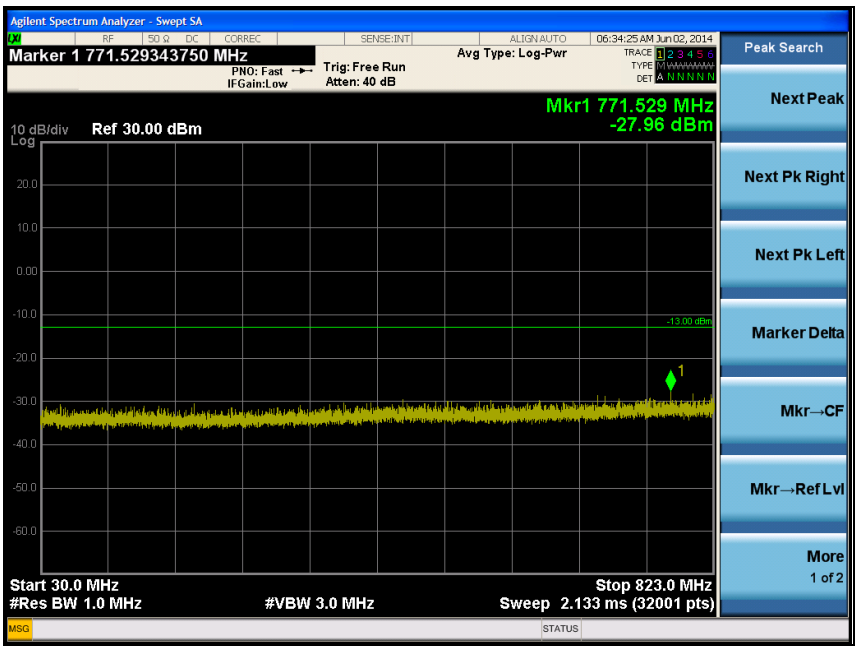


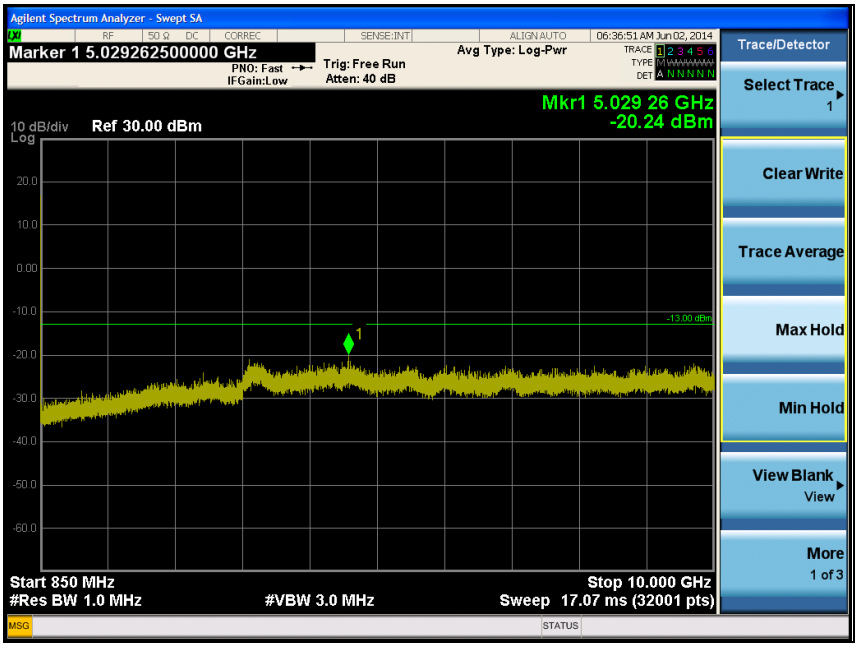
Middle Channel



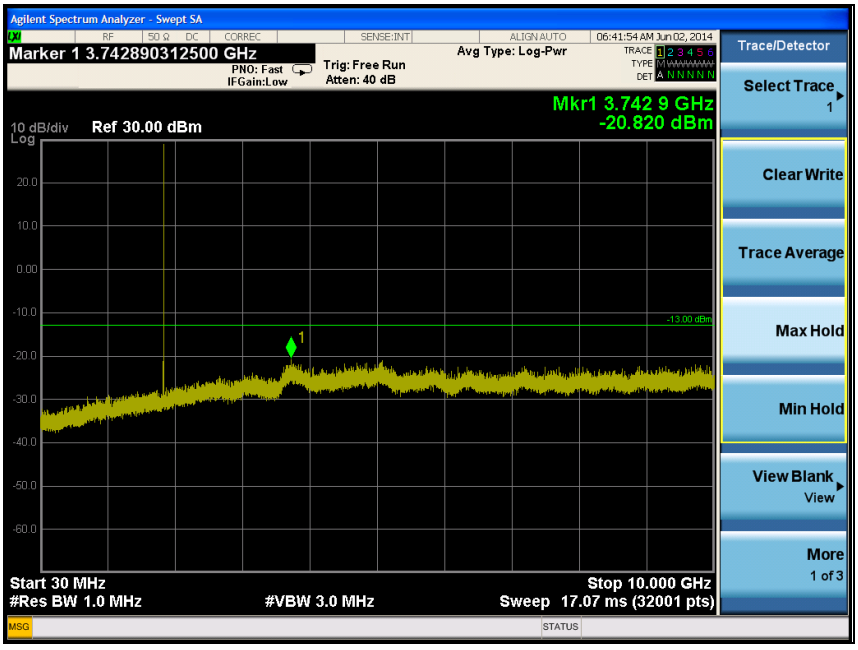


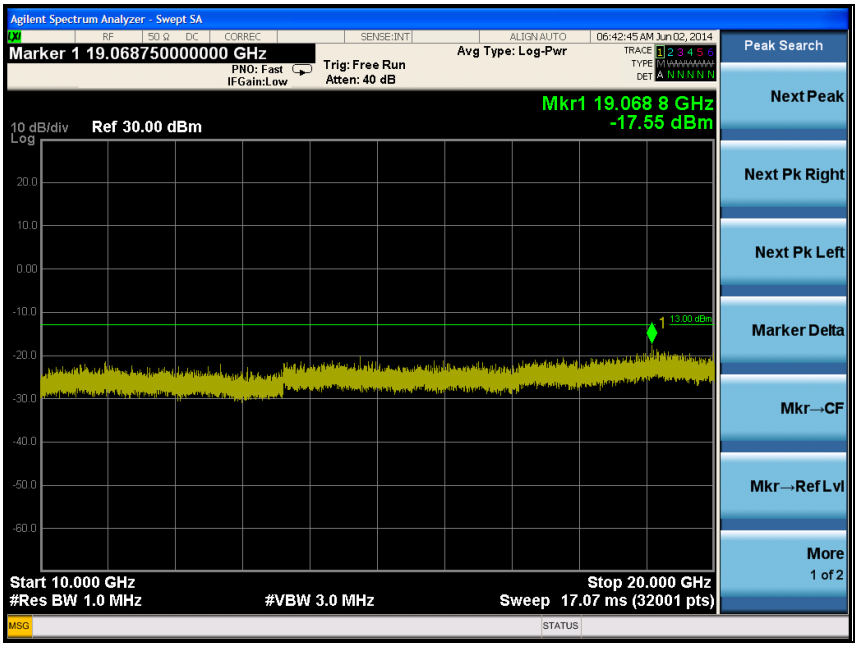
High Channel



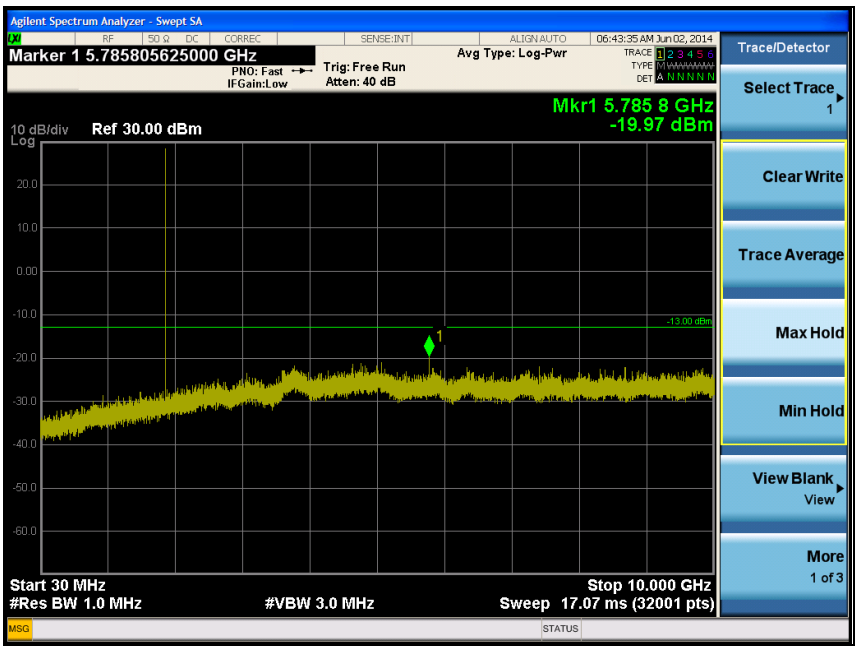


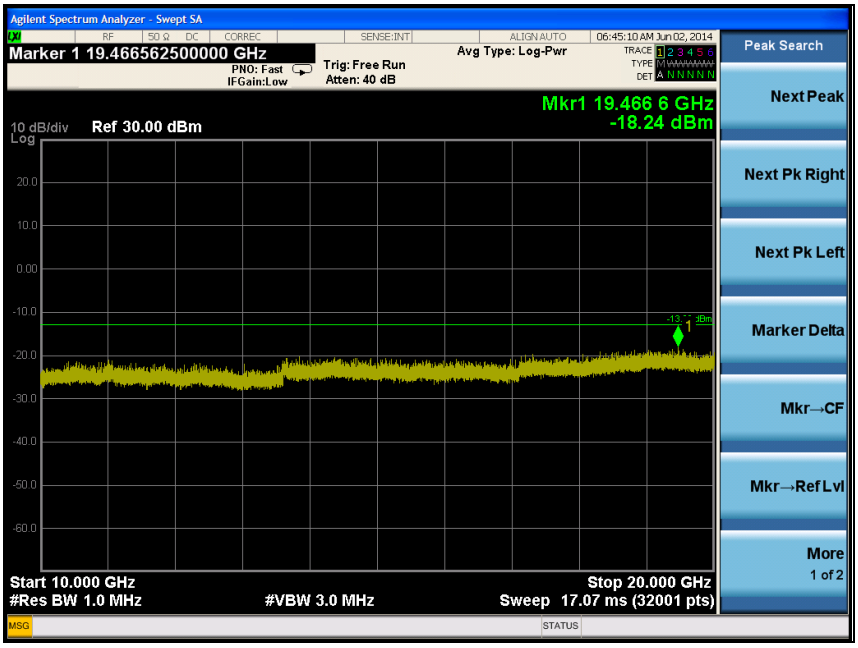
GSM1900
Low Channel



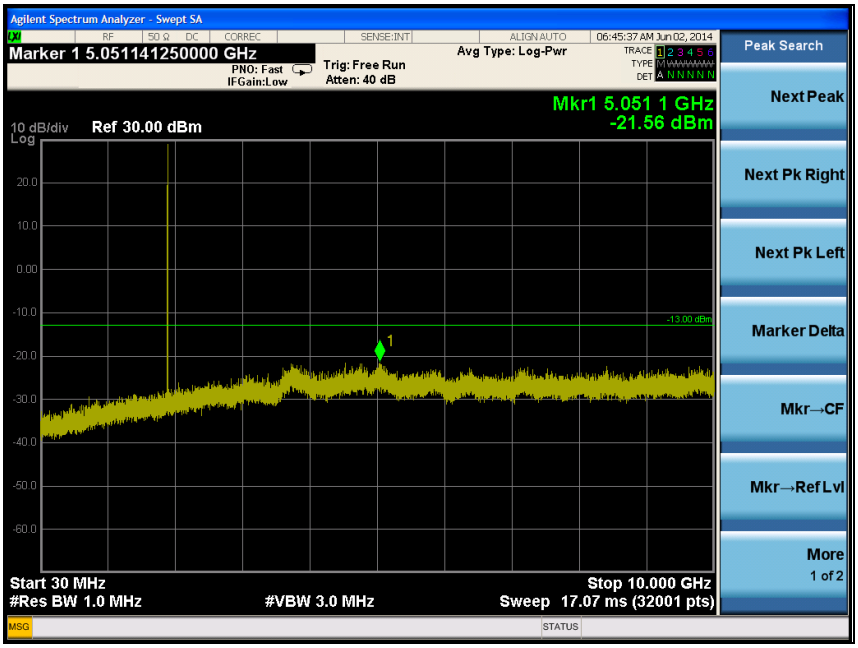


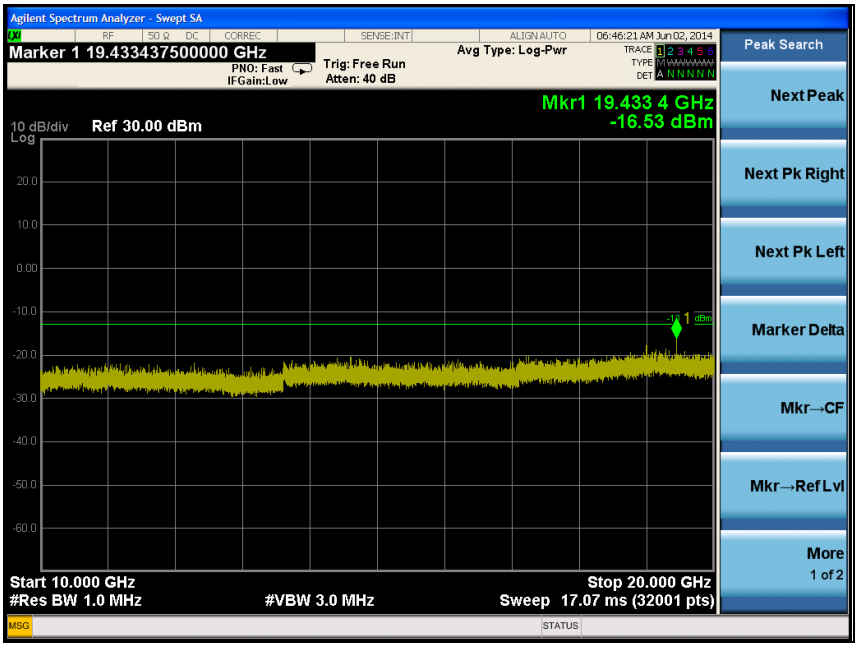
Middle Channel



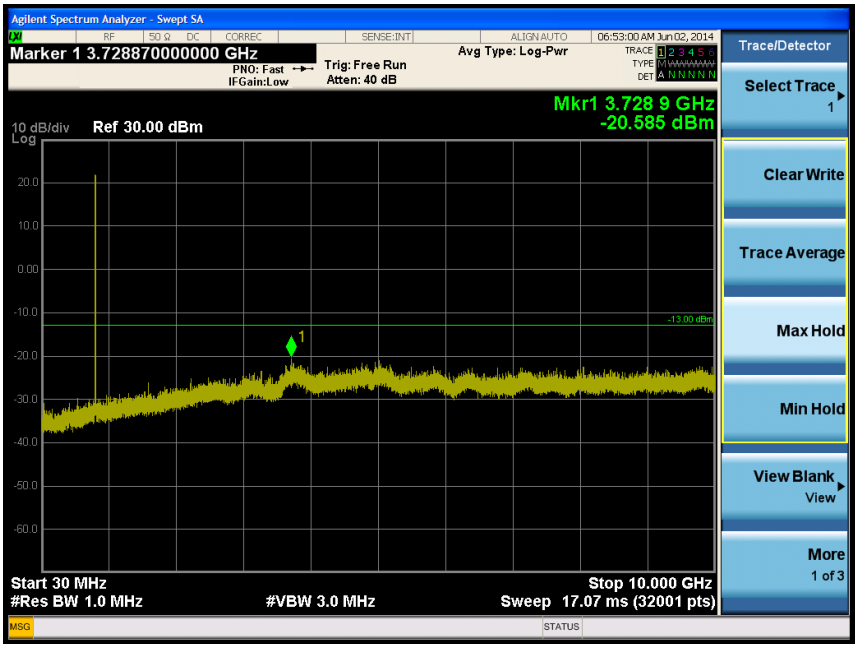


High Channel

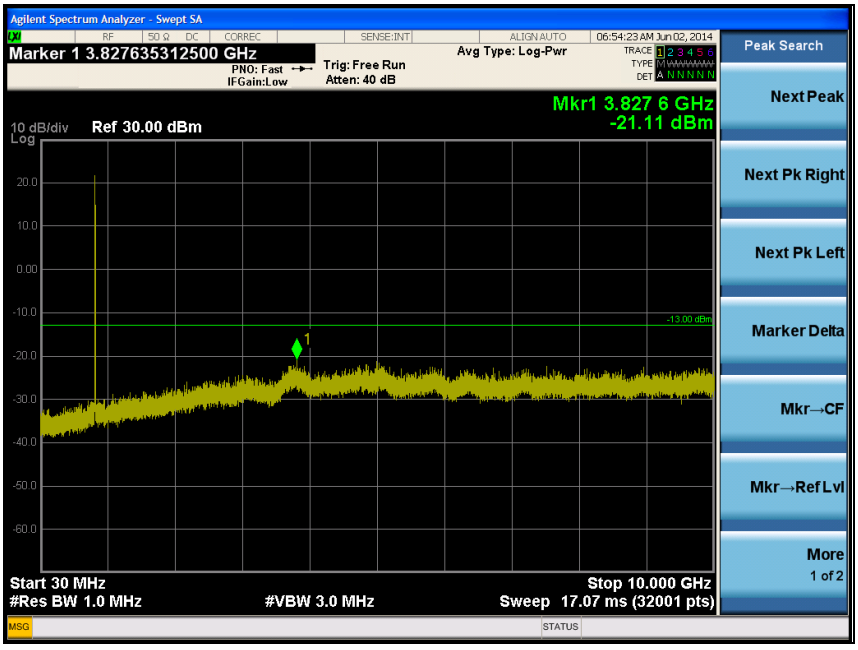




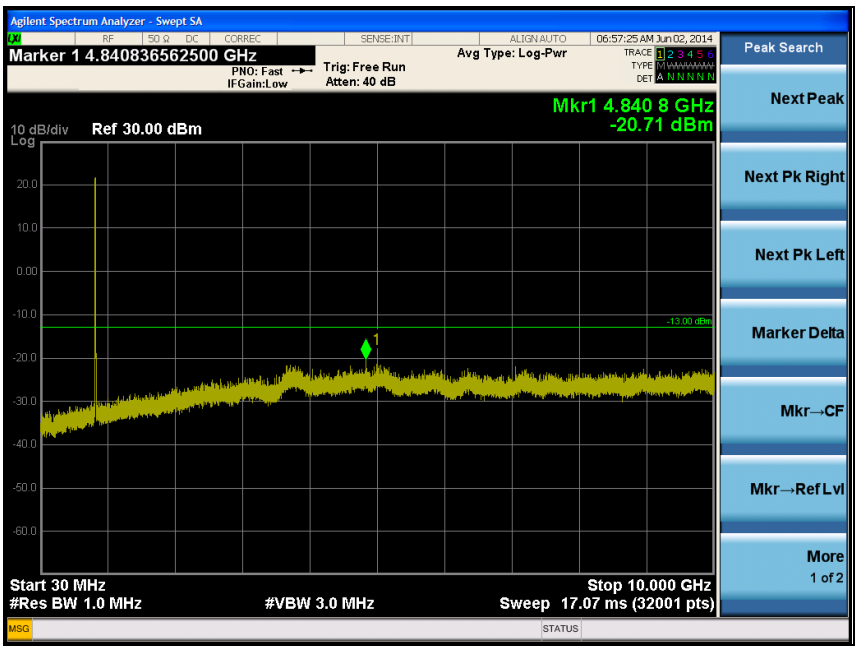
WCDMA850
Low Channel



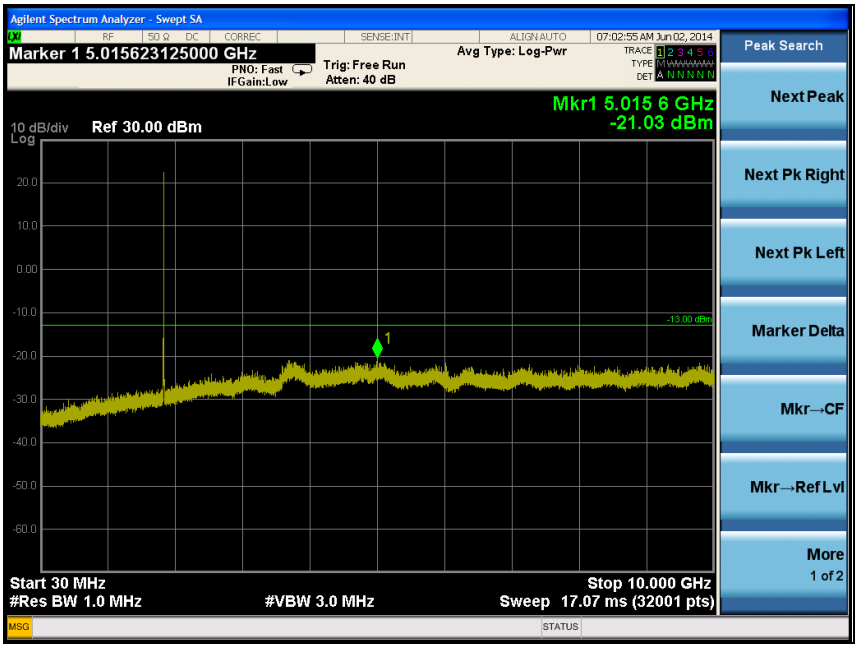
Middle Channel

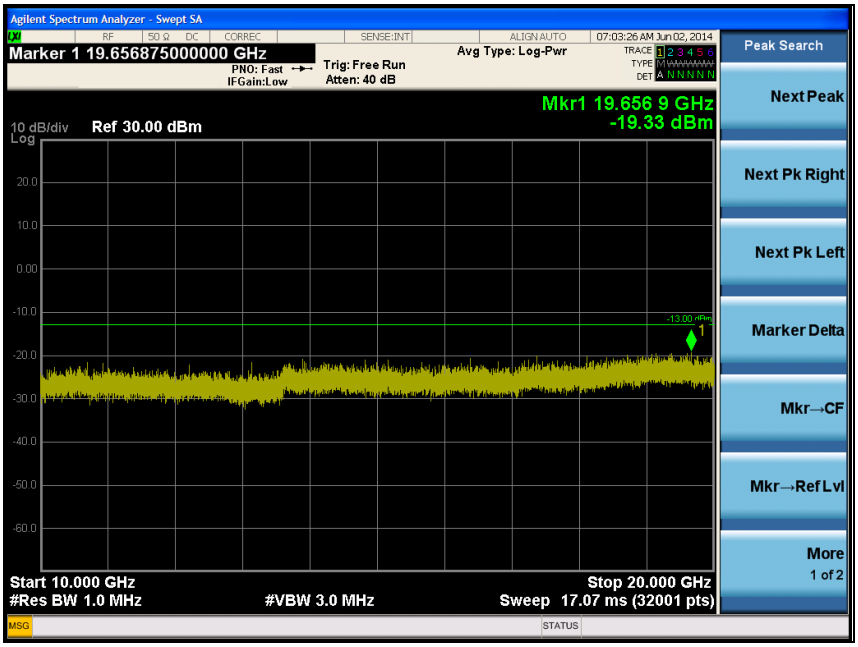


High Channel

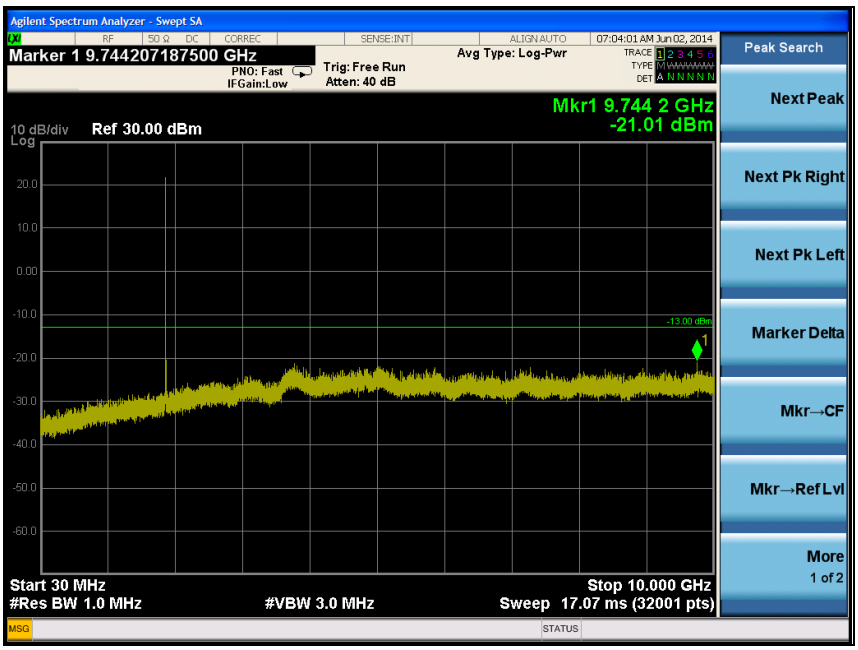


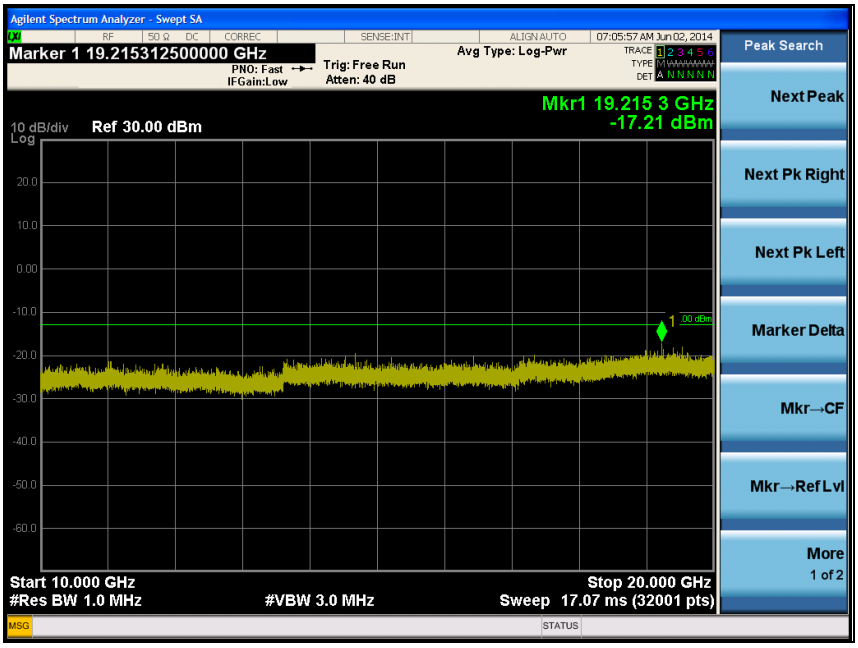
WCDMA1900
Low Channel



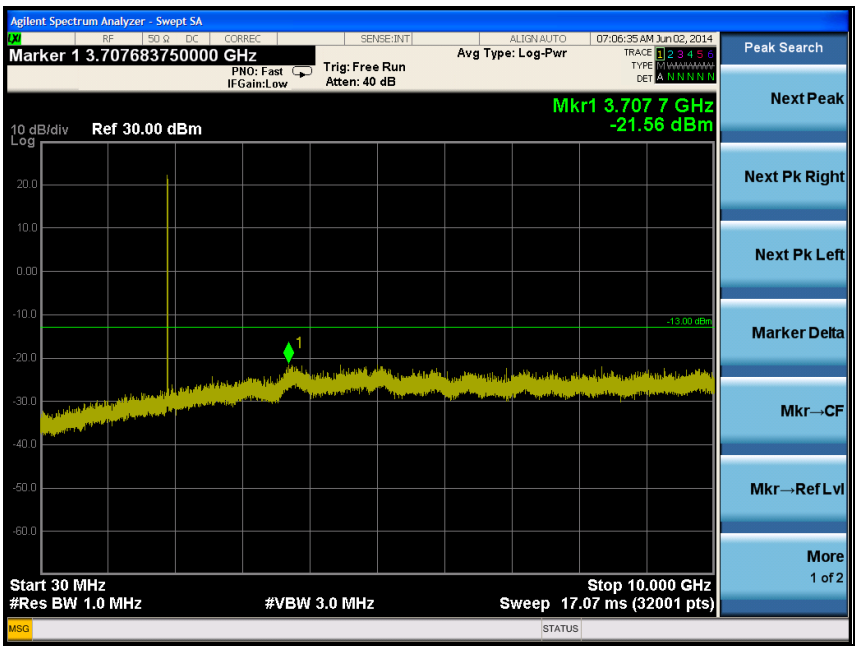


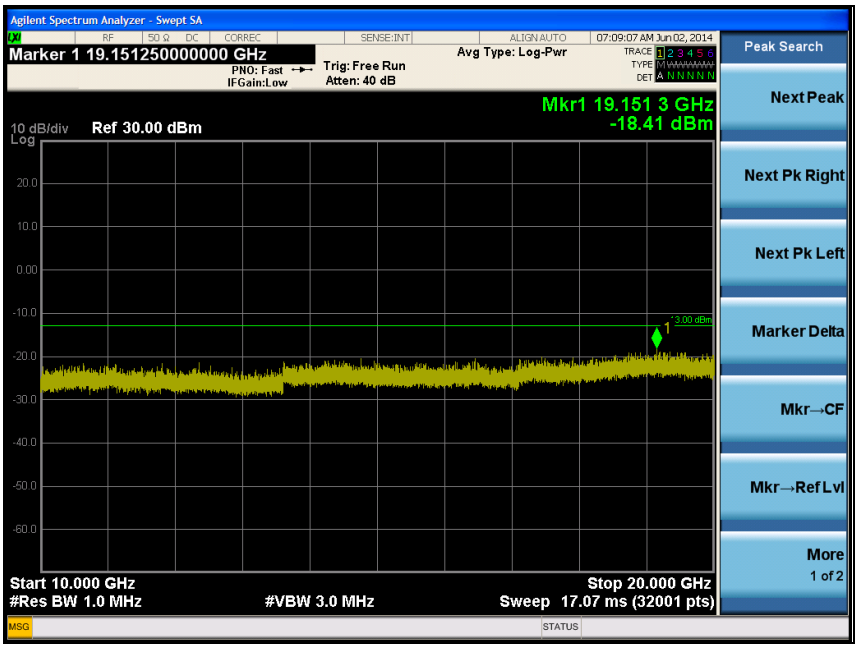
Middle Channel





High Channel





6. Band Edge

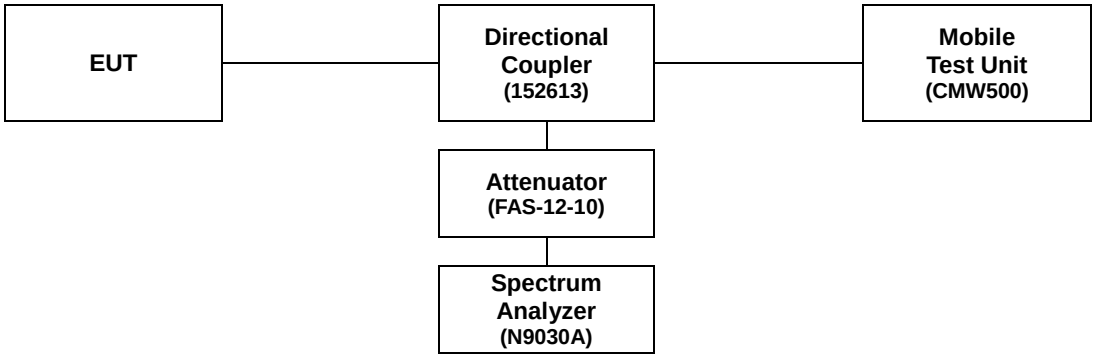
6.1. Limit

FCC §22.917(a), 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.
FCC §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

6.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168_v02r01.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The center of the spectrum analyzer was set to block edge frequency.



6.2.1 Actual equipment used for Band edge

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	R&S	SMBV100A	259067	Jul. 15, 2013	Annual	Jul. 15, 2014
Signal Generator	R&S	SMR40	100272	Aug. 10, 2013	Annual	Aug. 10, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Directional Coupler	KRYTAR	152613	122661	Mar. 18, 2014	Annual	Mar. 18, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

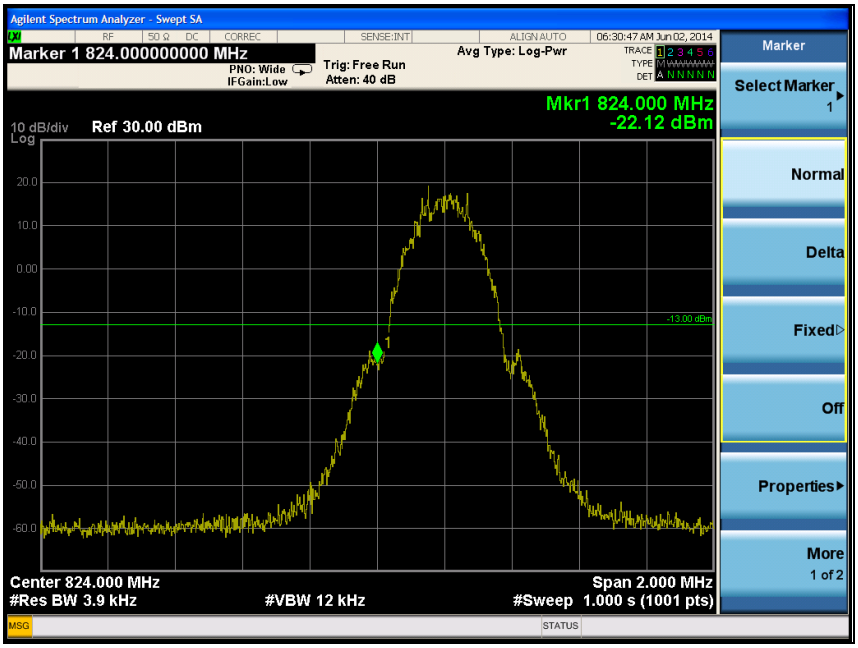
6.3. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

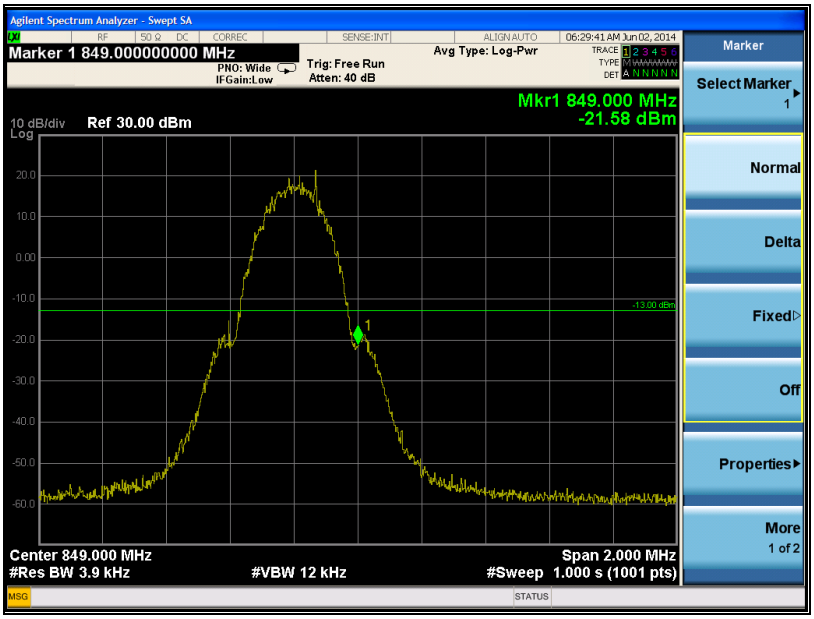
Please refer to the following plots.

Bandedge_GSM850

Low Channel

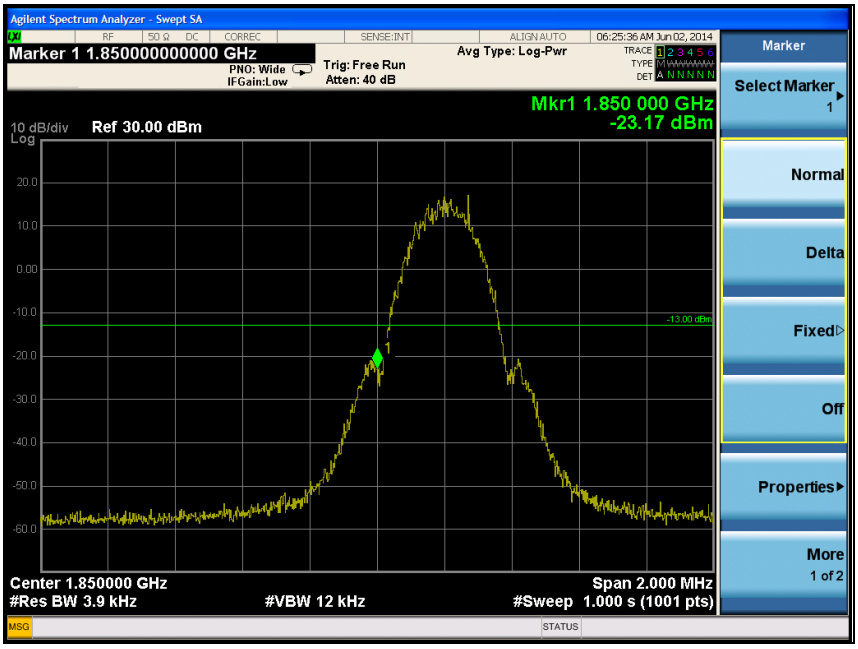


High Channel

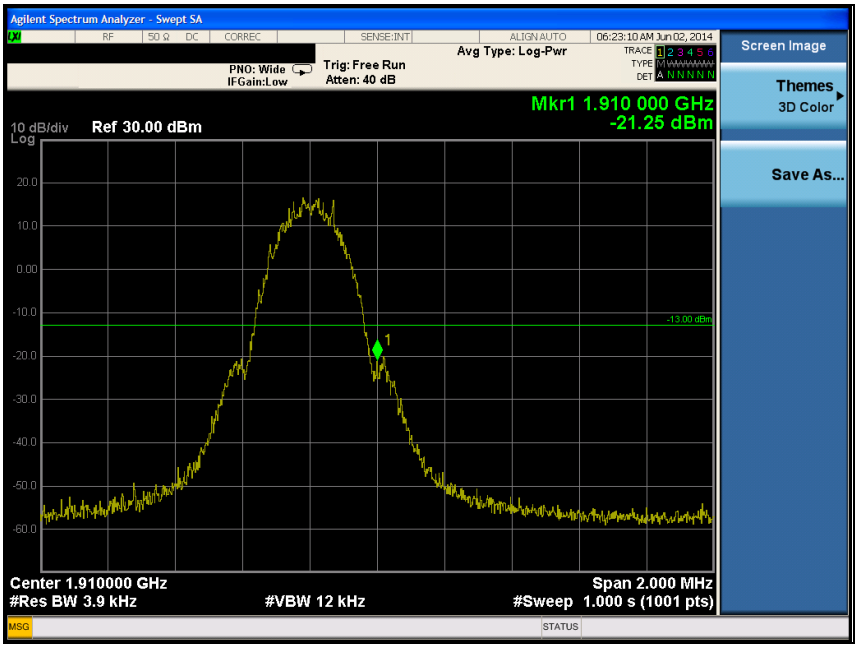


Bandedge_GSM1900

Low Channel

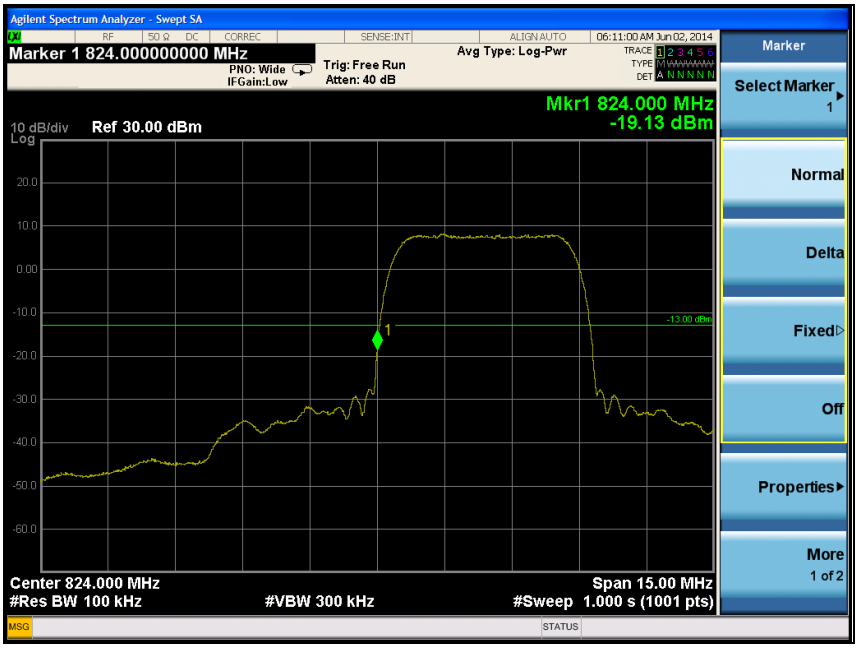


High Channel

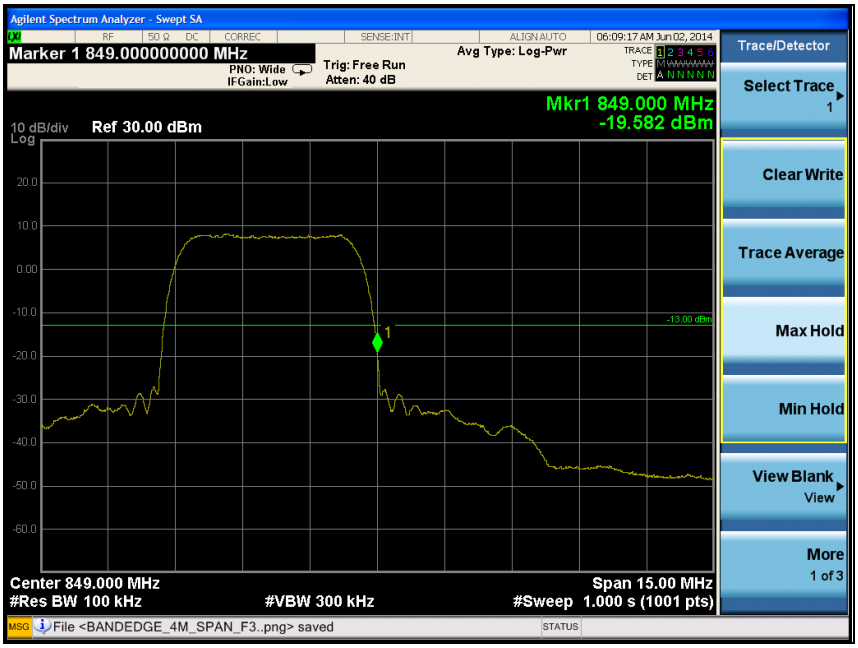


Bandedge_WDCMA850

Low Channel



High Channel



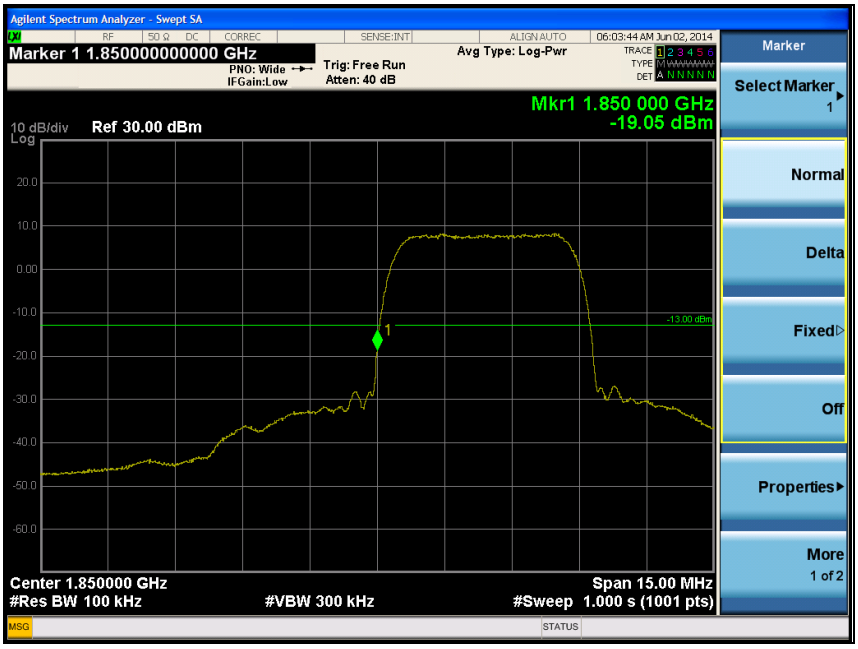
4 ㎒ span plot_WCDMA850

Low Channel

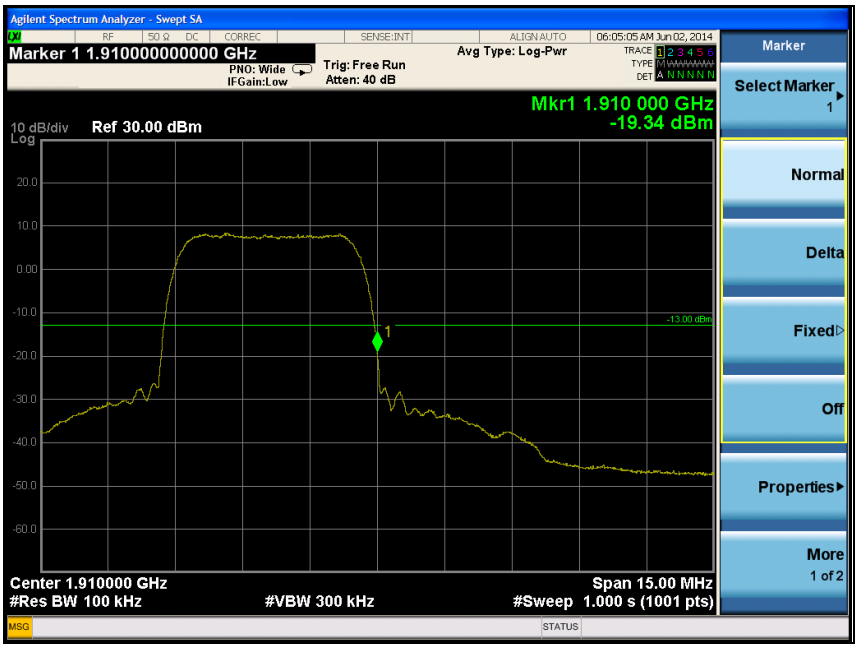
High Channel

Bandedge_WCDMA1900

Low Channel

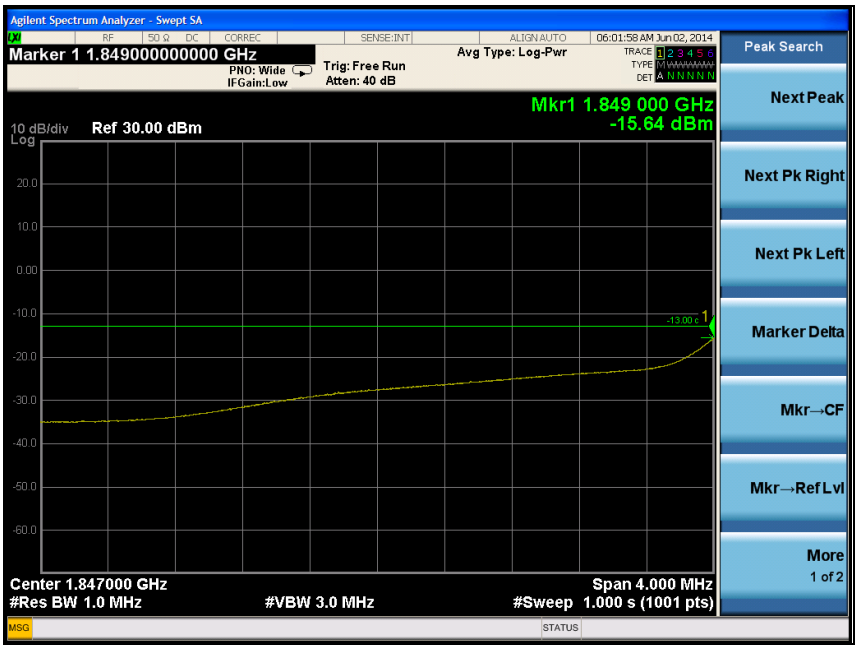


High Channel

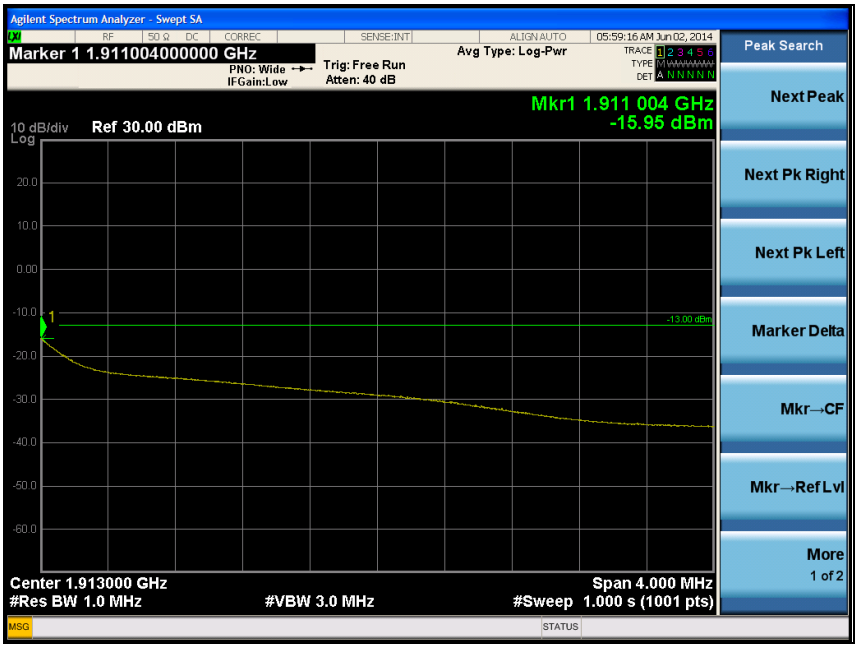


4 ㎒ span plot_WCDMA1900

Low Channel



High Channel



7. Frequency Stability

7.1. Limit

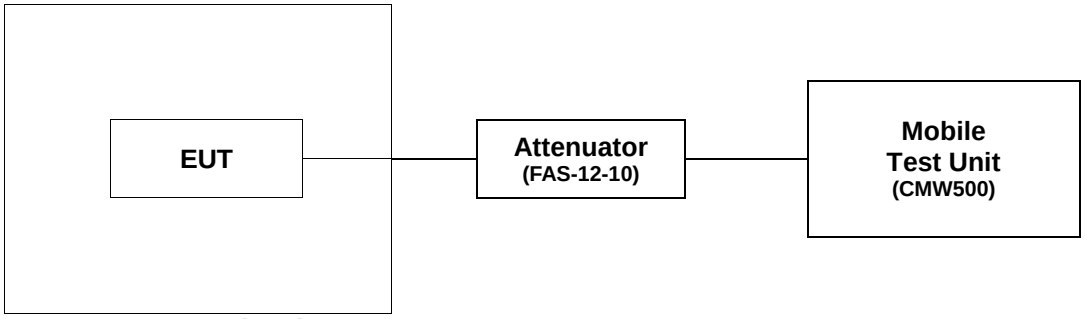
Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:
FCC §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

For Mobile devices operating in the 824 to 849 ㎒ band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.
FCC §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7.2. Test Procedure

The test follows ANSI/TIA-603-C-2004

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



7.2.1 Actual equipment used for Frequency Stability

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2014	Annual	Mar. 03, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 19, 2013	Annual	Jun. 19, 2014
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014
Temperature Chamber	ENEX	TRUST2000	980111	Dec. 26, 2013	Annual	Dec. 26, 2014

7.3. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

GSM850 mode at middle channel

Reference Frequency: 836.6 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.80	16	0.016 734
40		17	0.017 930
30		10	0.009 563
24		2	Ref.
10		9	0.008 367
0		14	0.014 344
-10		9	0.008 367
-20		25	0.027 492
-30		21	0.022 711
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	4.37	14	0.014 344
	3.05(batt. End point)	19	0.020 320

GSM1900 mode at middle channel

Reference Frequency: 1 880.0 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.80	46	0.003 191
40		47	0.003 723
30		52	0.006 383
24		40	Ref.
10		62	0.011 702
0		70	0.015 957
-10		52	0.006 383
-20		70	0.015 957
-30		73	0.017 553
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	4.37	62	0.011 702
	3.05(batt. End point)	49	0.004 787

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured ate very small. As such it is determined that the channels at the band edge would remain in-band When the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested

WCDMA850 mode at middle channel

Reference Frequency: 836.4 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.80	3	0.002 391
40		3	0.002 391
30		2	0.001 196
24		1	Ref.
10		6	0.005 978
0		5	0.004 782
-10		-5	-0.007 174
-20		2	0.001 196
-30		-2	-0.003 587
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**Ppm**
24	4.37	-4	-0.005 978
	3.05(batt. End point)	-2	-0.003 587

WCDMA1900 mode at middle channel

Reference Frequency: 1880.0 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.80	-3	-0.002 660
40		-7	-0.004 787
30		5	0.001 596
24		2	Ref.
10		-5	-0.003 723
0		-10	-0.006 383
-10		4	0.001 064
-20		-7	-0.004 787
-30		5	0.001 596
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	4.37	-3	-0.002 660
	3.05(batt. End point)	-4	-0.003 191

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured ate very small. As such it is determined that the channels at the band edge would remain in-band When the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested