TEST REPORT

of

FCC Part 22 Subpart H and Part 24 Subpart E
FCC ID : SS4BP50

Equipment Under Test	:	Android Business Pad
Model Name	:	BP50
Serial No.	:	N/A
Applicant	:	Bluebird Soft Inc.
Manufacturer	:	Bluebird Soft Inc.
Date of Test(s)	:	2013.04.17 ~ 2013.04.26
Date of Issue	:	2013.04.30

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

Tested By: **Harim Lee** **Date:** **2013.04.30**

Approved By: **Hyunchae You** **Date:** **2013.04.30**

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 3FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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 : Bluebird Soft Inc.
Address : SEI Tower 13~14F, 467-14, Dogok-dong, Kangnam-gu, Seoul, Korea
Contact Person : Lee, Sang-Gon
Phone No. : +82 07 7730 8755

1.3. Description of EUT

Kind of Product	Android Business Pad
Model Name	BP50
Serial Number	N/A
Power Supply	DC 3.7 V
Rated Power	GSM850: 32 ㏈m GSM1900: 29 ㏈m WCDMA850: 23 ㏈m WCDMA1900: 22.5 ㏈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	247K GXW (GSM850), 241K GXW (GSM850 EDGE), 247K GXW (GSM1900), 244K GXW (GSM1900 EDGE), 4M16 F9W (WCDMA850), 4M16 F9W (WCDMA1900)

1.4. Description of test mode

Band	Frequency (MHz)	Voice	GPRS Data			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
GSM850	824.2	32.25	32.24	29.32	27.72	26.26
	836.6	32.01	31.94	29.34	27.64	26.19
	848.8	31.96	31.93	29.04	27.38	26.09
GSM1900	1 850.2	29.11	29.05	25.68	23.93	22.65
	1 880.0	28.99	28.95	25.62	23.87	22.12
	1 909.8	29.03	29.01	25.68	23.95	22.62

Band	Frequency (MHz)	EDGE Data			
		EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	26.36	23.37	21.88	20.88
	836.6	26.21	23.24	21.70	20.65
	848.8	26.04	23.07	21.57	20.51
GSM 1900	1 850.2	24.54	21.48	20.01	18.72
	1 880.0	24.33	21.25	19.81	18.54
	1 909.8	24.36	21.26	19.91	18.56

3GPP Release version	Mode	3GPP 34.121	Cellular Band[dBm]			PCS Band[dBm]		
		Subtest	4132	4183	4233	9262	9400	9538
99	WCDMA	12.2kbps RMC	23.20	23.01	23.13	22.56	21.93	21.74
5	HSDPA	Subtest1	21.55	21.98	21.98	21.57	21.38	21.07
5		Subtest2	21.72	21.85	21.88	21.29	20.78	20.41
5		Subtest3	22.18	21.98	22.01	21.47	21.21	20.98
5		Subtest4	22.20	22.07	22.05	21.53	21.49	21.32
6	HSUPA	Subtest1	22.84	22.61	22.06	21.23	20.57	20.77
6		Subtest2	20.34	20.56	20.30	20.04	19.90	20.36
6		Subtest3	21.46	21.10	20.97	20.56	20.34	20.31
6		Subtest4	20.82	21.23	20.92	20.16	20.13	20.23
6		Subtest5	21.56	21.97	21.79	21.46	21.35	21.45

- GSM (850 / 1900) & WCDMA (850/1900)
We found out the test mode with the highest power level after we analyze all the data rates. So we chose GSM850 / GSM1900 GSM Voice and WCDMA 850 /1900 12.2 kbps RMC(worst case) as a representative.

1.5. Sample calculation for offset

Where relevant, the following sample calculation is provided:

1.5.1. Conducted test

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

1.5.2. Radiation test

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

1.6. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due
Signal Generator	Agilent	E4438C	MY42082477	Mar. 28, 2013	Annual	Mar. 28, 2014
Signal Generator	R&S	SMBV100A	255834	Jul. 02, 2012	Annual	Jul. 02, 2013
Spectrum Analyzer	R&S	FSV30	100768	Mar. 28, 2013	Annual	Mar. 28, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 30, 2012	Annual	Oct. 30, 2013
Mobile Test Unit	Agilent	E5515C	GB43345198	Mar. 29, 2013	Annual	Mar. 29, 2014
Temperature Chamber	Hangil Technics	HGTP-4050	HGTP-4050-04-01	Aug. 17, 2012	Annual	Aug. 17, 2013
Directional Coupler	KRYTAR	152613	122661	Apr. 04, 2013	Annual	Apr. 04, 2014
Attenuator	AEROFLEX/INMET	26A-10dB	3	Apr. 05, 2013	Annual	Apr. 05, 2014
High Pass Filter	Wainwright	WHK3.0/18G-10SS	344	Jul. 12, 2012	Annual	Jul. 12, 2013
Band Rejection Filter	Wainwright	WRCG824/849-814 /859-60/10SS	7	Mar. 30, 2013	Annual	Mar. 30, 2014
DC power Supply	Agilent	U8002A	MY50060028	Mar. 28, 2013	Annual	Mar. 28, 2014
Preamplifier	H.P.	8447F	2944A03909	Jul. 03, 2012	Annual	Jul. 03, 2013
Preamplifier	R&S	SCU 18	10117	Jan. 14, 2013	Annual	Jan. 14, 2014
Preamplifier	MITEQ Inc.	JS44-18004000-35 -8P	1546891	Jul. 12, 2012	Annual	Jul. 12, 2013
Test Receiver	R&S	ESU26	100109	Feb. 28, 2013	Annual	Feb. 28, 2014
Bilog Antenna	SCHWARZBECK	VULB9163	396	May 12, 2011	Biennial	May 12, 2013
Horn Antenna	R&S	HF 906	100326	Nov. 23, 2011	Biennial	Nov. 23, 2013
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170431	May 15, 2012	Biennial	May 15, 2014
Dipole Antenna	SCHWARZBECK	VHA/UHA	9103/9105	May 24, 2011	Biennial	May 24, 2013
Antenna Master	INN-CO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INN-CO	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m×6.4 m×6.6 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		
Section in FCC part	**Test Item**	**Result**
§2.1046 §22.913(a) §24.232(c)	RF Radiated Output Power	Complied
§2.1053 §22.917(e) §24.238(a)	Spurious Radiated Emission	Complied
§2.1046(a)	Conducted Output Power	Complied
§2.1049(h) (i)	Occupied Bandwidth	Complied
§24.232(d)	Peak-Average Ratio	Complied
§2.1051 §22.917(e) §24.238(a)	Spurious Emission at Antenna Terminal	Complied
§2.1055 §22.355 §24.235	Frequency Stability	Complied
§22.917(e) §24.238(a)	Band Edge	Complied

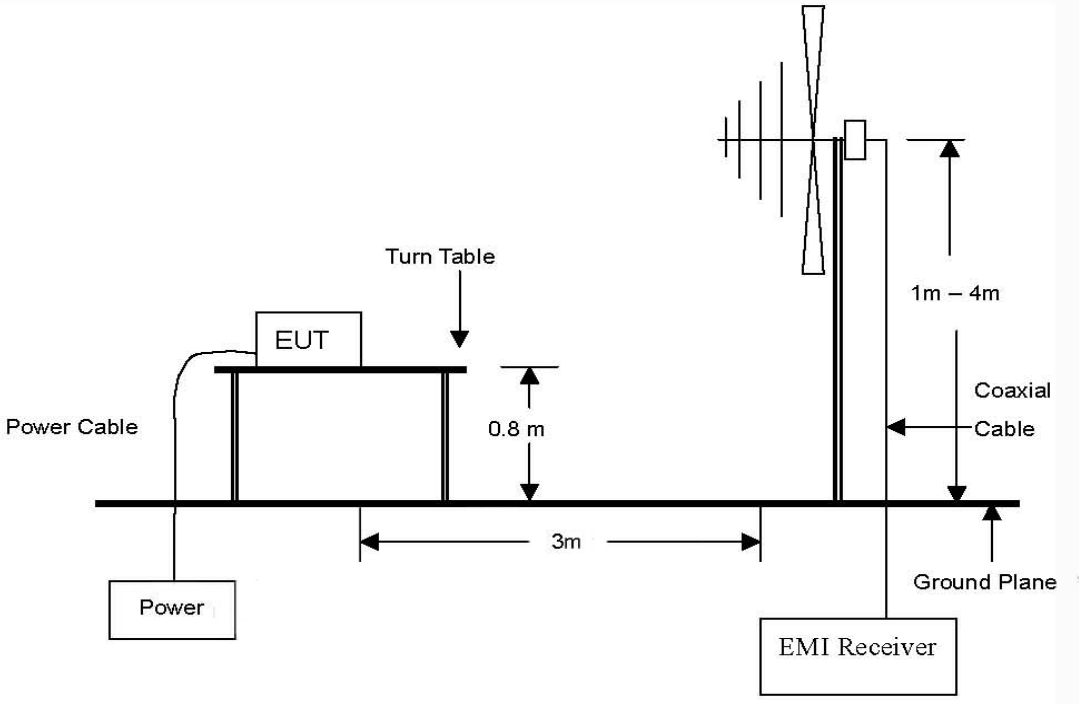
1.8. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL006481	Initial

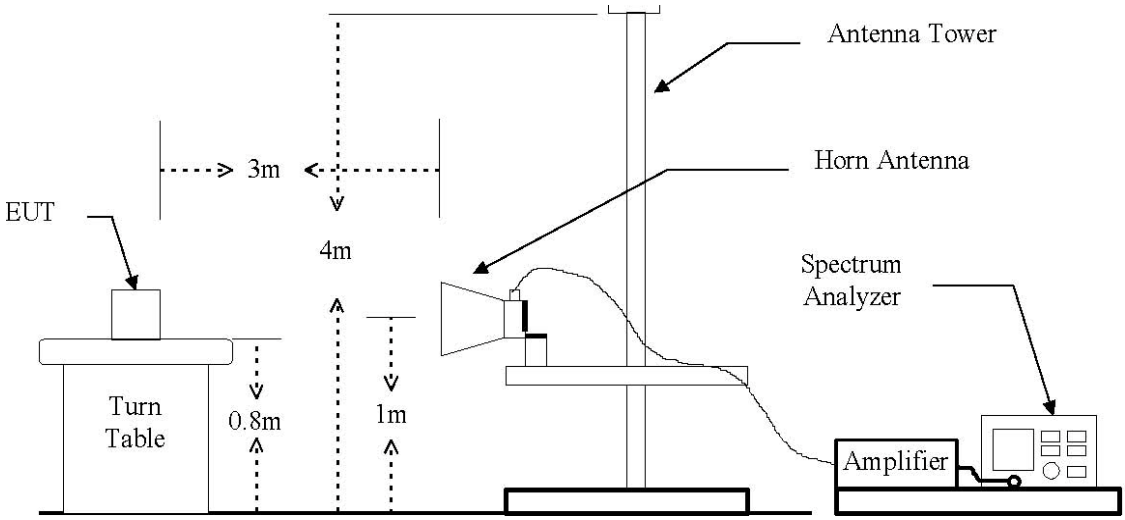
2. RF radiated output power & spurious radiated emission

2.1. Test setup

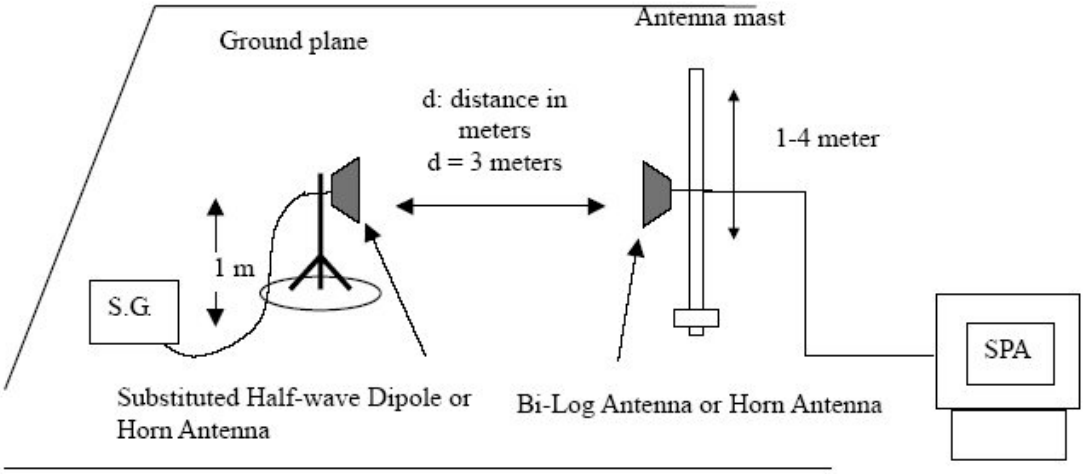
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



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



2.2. Limit

FCC §22.913(a), the E.R.P. of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/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.

2.3. Test procedure : Based on ANSI/TIA 603C: 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. During the measurement of the EUT, the resolution bandwidth was to 1 ㎒ and the average bandwidth was set to 1 ㎒.
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 (824 ~ 849 ㎒) or horn antenna (1 850 ~ 1 910 ㎒) 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	28.51	3.42	-3.44	21.65	146.22
824.2	H	30.86	3.42	-3.44	24.00	251.19
836.4	V	28.46	3.38	-3.45	21.63	145.55
836.4	H	31.39	3.38	-3.45	24.56	285.76
848.8	V	29.32	3.33	-3.41	22.58	181.13
848.8	H	33.60	3.33	-3.41	26.86	485.29

GSM850 (EDGE)

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	22.91	3.42	-3.44	16.05	40.27
824.2	H	25.32	3.42	-3.44	18.46	70.15

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	18.87	4.87	7.55	21.55	142.89
1 850.2	H	17.30	4.87	7.55	19.98	99.54
1 880.0	V	16.92	4.91	7.63	19.64	92.04
1 880.0	H	17.00	4.91	7.63	19.72	93.76
1 909.8	V	18.79	4.94	7.70	21.55	142.89
1 909.8	H	16.90	4.94	7.70	19.66	92.47

GSM1900 (EDGE)

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	14.38	4.87	7.55	17.06	50.82
1 850.2	H	12.85	4.87	7.55	15.53	35.73

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	20.11	3.41	-3.44	13.26	21.18
826.4	H	21.99	3.41	-3.44	15.14	32.66
836.6	V	19.99	3.38	-3.45	13.16	20.70
836.6	H	22.50	3.38	-3.45	15.67	36.90
846.6	V	19.66	3.34	-3.42	12.90	19.50
846.6	H	22.75	3.34	-3.42	15.99	39.72

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	13.73	4.87	7.56	16.42	43.85
1 852.4	H	12.63	4.87	7.56	15.32	34.04
1 880.0	V	11.47	4.91	7.63	14.19	26.24
1 880.0	H	11.16	4.91	7.63	13.88	24.43
1 907.6	V	13.33	4.94	7.69	16.08	40.55
1 907.6	H	10.74	4.94	7.69	13.49	22.34

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. 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 y-axis

2.5. Spurious radiated emission

- Measured output Power: 26.86 ㏈m = 0.485 W
- Modulation Signal: GSM850
- Distance: 3 meters
- Limit: -(43 + 10log$_{10}$(W)) = -39.86 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G. level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈d)	E.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel (824.2 ㎒)							
1 648.31	V	-48.34	4.54	6.44	-46.44	-73.30	33.44
1 648.58	H	-50.55	4.54	6.44	-48.65	-75.51	35.65
Middle Channel (836.4 ㎒)							
1 673.20	V	-40.77	4.58	6.51	-38.84	-65.70	25.84
1 673.20	H	-47.38	4.58	6.51	-45.45	-72.31	32.45
High Channel (848.8 ㎒)							
1 697.56	V	-34.97	4.62	6.57	-33.02	-59.88	20.02
1 697.49	H	-43.93	4.62	6.57	-41.98	-68.84	28.98

- Measured output Power : 21.55 dBm = 0.143 W
- Modulation Signal : GSM1900
- Distance : 3 meters
- Limit : -(43 + 10log$_{10}$(W)) = -34.55 dBc

Frequency (㎒)	Ant. Pol. (H/V)	S.G. level + Amp. (dBm)	Cable loss (dB)	Ant. gain (dBi)	E.I.R.P. (dBm)	dBc	Margin (dB)
Low Channel(1 850.2 ㎒)							
3 700.33	V	-58.33	7.13	11.85	-53.61	-75.16	40.61
3 700.72	H	-56.96	7.13	11.85	-52.24	-73.79	39.24
Middle Channel(1 880.0 ㎒)							
3 759.84	V	-58.01	7.23	11.85	-53.39	-74.94	40.39
3 759.99	H	-57.67	7.23	11.85	-53.05	-74.60	40.05
High Channel(1 909.8 ㎒)							
3 819.30	V	-52.34	7.33	11.84	-47.83	-69.38	34.83
3 819.60	H	-55.83	7.33	11.84	-51.32	-72.87	38.32

- Measured output Power: 15.99 dBm = 0.040 W
- Modulation Signal: WCDMA850
- Distance: 3 meters
- Limit: -(43 + 10log$_{10}$(W)) = -28.99 dBc

Frequency (MHz)	Ant. Pol. (H/V)	S.G. level + Amp. (dBm)	Cable loss (dB)	Ant. gain (dBd)	E.R.P. (dBm)	dBc	Margin (dB)
Low Channel (826.4 MHz)							
1 654.88	V	-57.66	4.55	6.46	-55.75	-71.74	42.75
1 650.75	H	-62.15	4.54	6.45	-60.24	-76.23	47.24
Middle Channel (836.6 MHz)							
1 674.97	V	-54.38	4.58	6.51	-52.45	-68.44	39.45
1 675.17	H	-57.82	4.58	6.51	-55.89	-71.88	42.89
High Channel (846.6 MHz)							
1 691.12	V	-50.43	4.61	6.55	-48.49	-64.48	35.49
1 695.14	H	-58.67	4.61	6.56	-56.72	-72.71	43.72

- Measured output Power : 16.42 dBm = 0.044 W
- Modulation Signal : WCDMA1900
- Distance : 3 meters
- Limit : -(43 + 10log$_{10}$(W)) = -29.42 dBc

Frequency (㎒)	Ant. Pol. (H/V)	S.G. level + Amp. (dBm)	Cable loss (dB)	Ant. gain (dBi)	E.I.R.P. (dBm)	dBc	Margin (dB)
Low Channel(1 852.4 ㎒)							
3 706.65	V	-52.00	7.14	11.85	-47.29	-63.71	34.29
3 706.62	H	-46.65	7.14	11.85	-41.94	-58.36	28.94
Middle Channel(1 880.0 ㎒)							
3 758.06	V	-53.44	7.23	11.85	-48.82	-65.24	35.82
3 758.06	H	-50.35	7.23	11.85	-45.73	-62.15	32.73
High Channel(1 907.6 ㎒)							
3 816.97	V	-50.21	7.33	11.84	-45.70	-62.12	32.70
3 817.08	H	-49.58	7.33	11.84	-45.07	-61.49	32.07

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dBm) - Cable loss (dB) + Ant. gain (dBd/dBi)

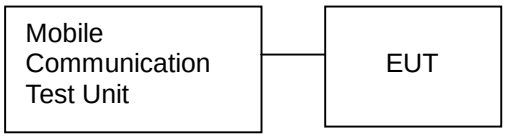
3. Conducted Output Power

3.1. Limit

Requirements: CFR 47, Section §2.1046

3.2. Test Procedure

1. The RF output of the transmitter was connected to the input of the Mobile Communication Test Unit through sufficient attenuation.
2. The mobile was set up for the max. output power with pseudo random data modulation.
3. The power was measured with Mobile Communication Test unit.



3.3. Test Result

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

Band	Frequency (MHz)	Voice	GPRS Data			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
GSM850	824.2	32.25	32.24	29.32	27.72	26.26
	836.6	32.01	31.94	29.34	27.64	26.19
	848.8	31.96	31.93	29.04	27.38	26.09
GSM1900	1 850.2	29.11	29.05	25.68	23.93	22.65
	1 880.0	28.99	28.95	25.62	23.87	22.12
	1 909.8	29.03	29.01	25.68	23.95	22.62

Band	Frequency (MHz)	EDGE Data			
		EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	26.36	23.37	21.88	20.88
	836.6	26.21	23.24	21.70	20.65
	848.8	26.04	23.07	21.57	20.51
GSM 1900	1 850.2	24.54	21.48	20.01	18.72
	1 880.0	24.33	21.25	19.81	18.54
	1 909.8	24.36	21.26	19.91	18.56

3GPP Release version	Mode	3GPP 34.121	Cellular Band[dBm]			PCS Band[dBm]		
		Subtest	4132	4183	4233	9262	9400	9538
99	WCDMA	12.2kbps RMC	23.20	23.01	23.13	22.56	21.93	21.74
5	HSDPA	Subtest1	21.55	21.98	21.98	21.57	21.38	21.07
5		Subtest2	21.72	21.85	21.88	21.29	20.78	20.41
5		Subtest3	22.18	21.98	22.01	21.47	21.21	20.98
5		Subtest4	22.20	22.07	22.05	21.53	21.49	21.32
6	HSUPA	Subtest1	22.84	22.61	22.06	21.23	20.57	20.77
6		Subtest2	20.34	20.56	20.30	20.04	19.90	20.36
6		Subtest3	21.46	21.10	20.97	20.56	20.34	20.31
6		Subtest4	20.82	21.23	20.92	20.16	20.13	20.23
6		Subtest5	21.56	21.97	21.79	21.46	21.35	21.45

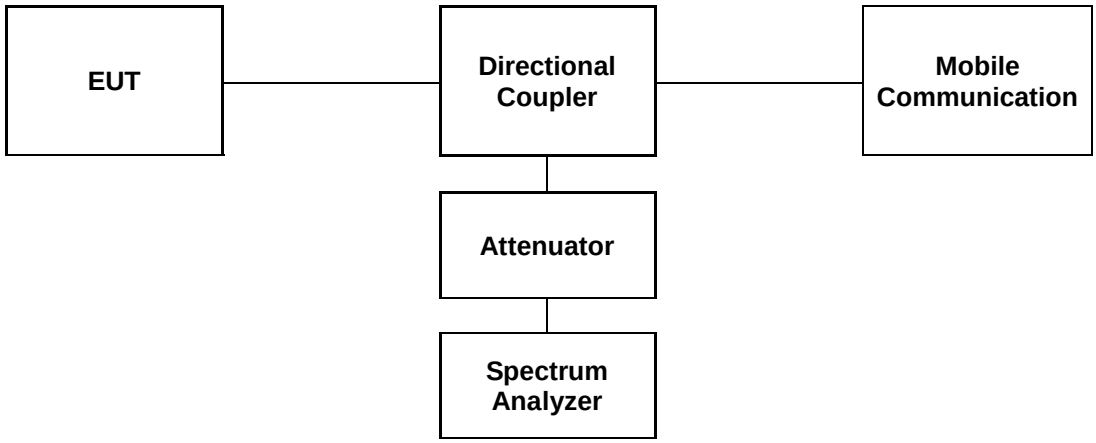
4. Occupied Bandwidth 99 %

4.1. Limit

Requirements: CFR 47, Section §2.1049.

4.2. Test Procedure

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The resolution bandwidth of the spectrum analyzer was set.
   Occupied Bandwidth 99 % was tested under



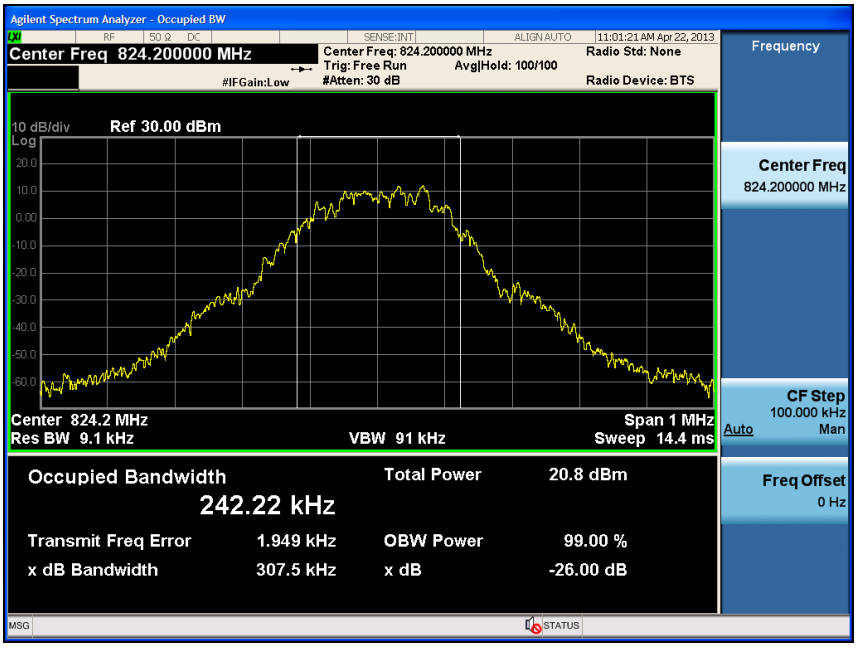
4.3 Test Results

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

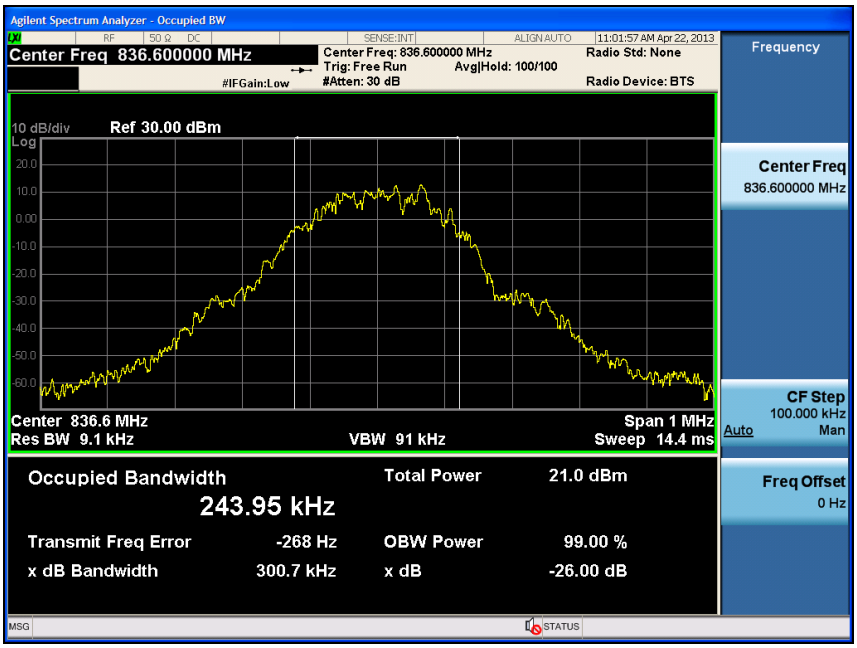
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
GSM850	GSM Voice	824.2	0.242
		836.6	0.244
		848.8	0.247
	EDGE	824.2	0.241
GSM1900	GSM Voice	1 850.2	0.242
		1 880.0	0.240
		1 909.8	0.247
	EDGE	1 850.2	0.244
WCDMA850	12.2 kbps (RMC)	826.4	4.157
		836.6	4.133
		848.6	4.145
WCDMA1900	12.2 kbps (RMC)	1 852.4	4.142
		1 880.0	4.149
		1 907.6	4.163

Please refer to the following plots.

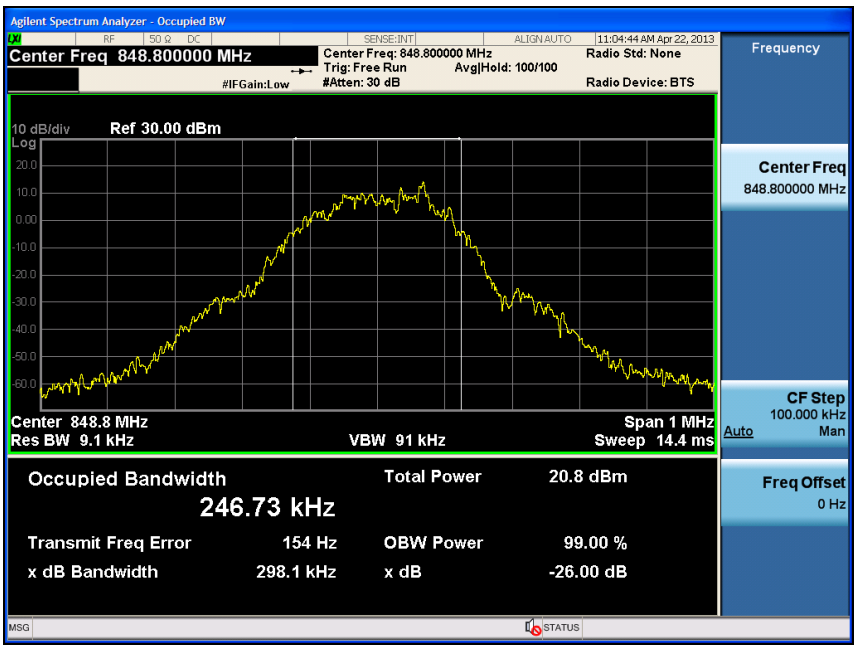
GSM850
99 %
Low Channel



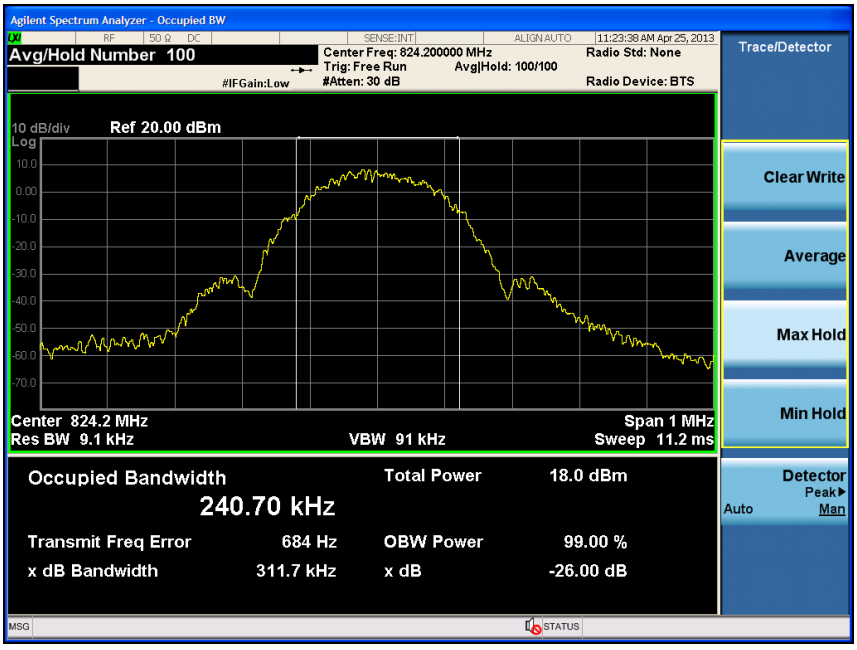
Middle Channel



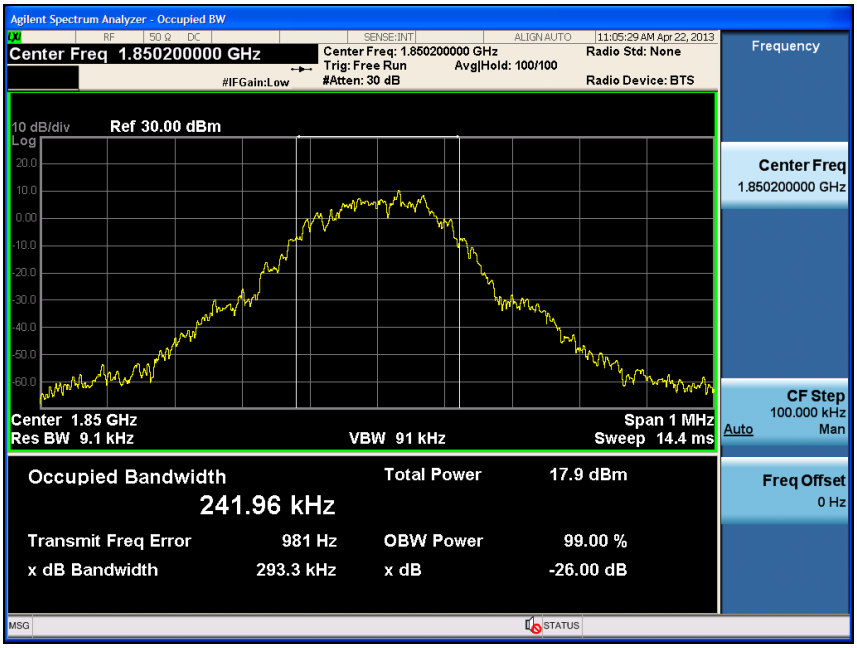
High Channel



GSM850 EDGE
99 %
Low Channel

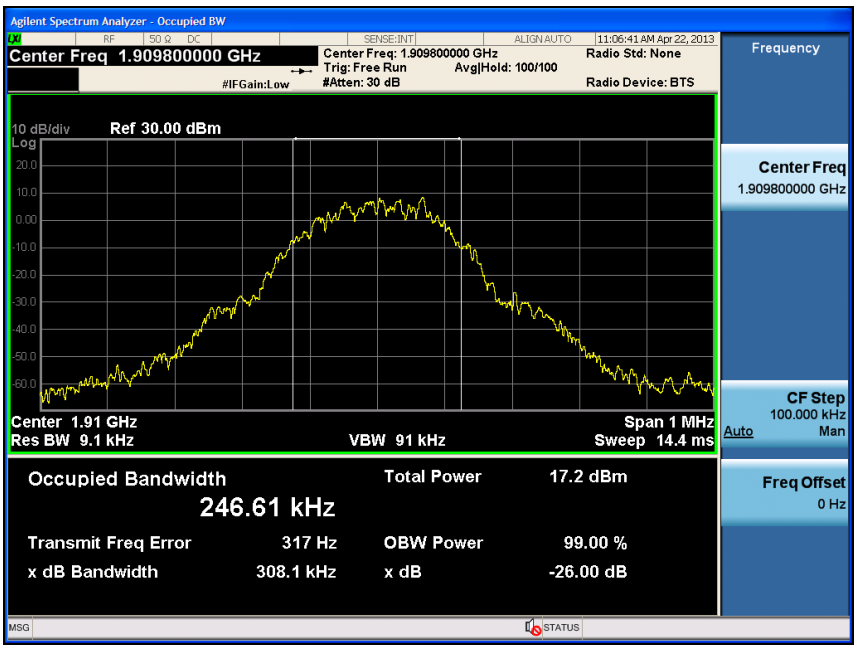


GSM1900
99 %
Low Channel

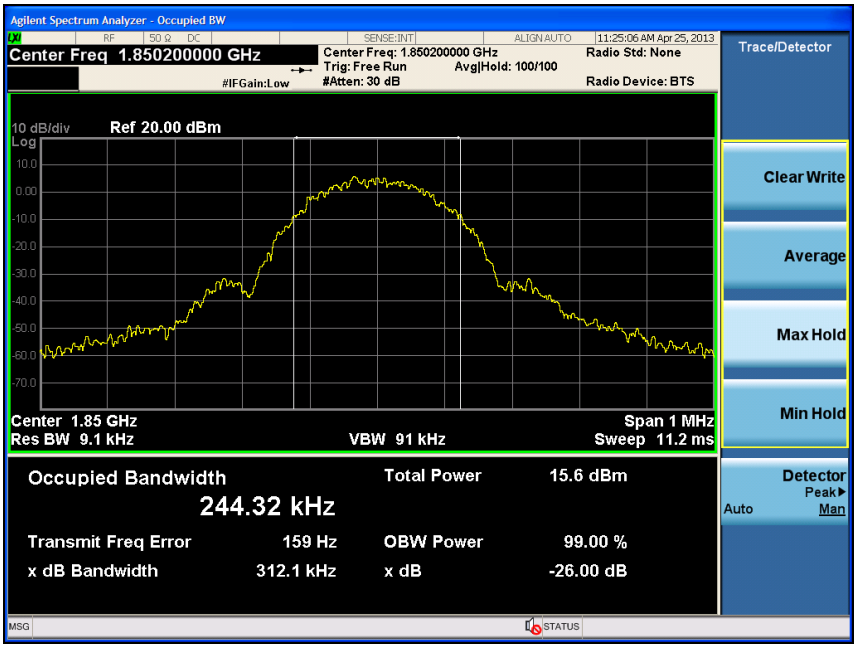


Middle Channel

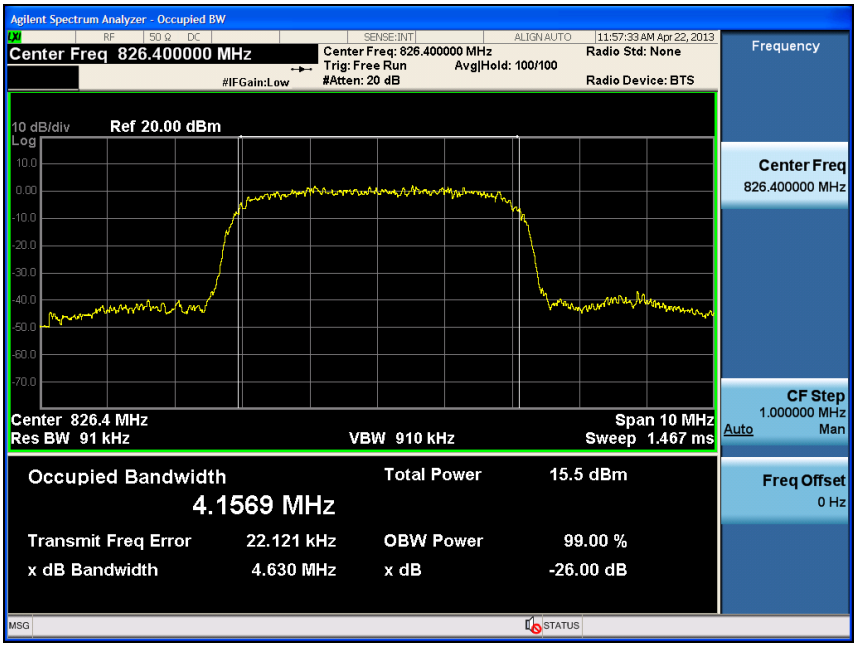
High Channel



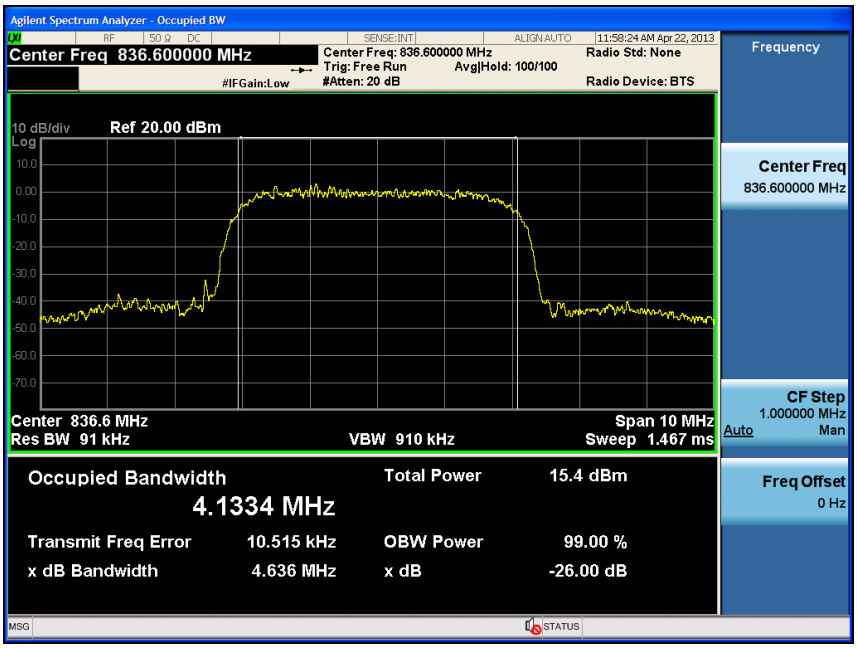
GSM1900 EDGE
99 %
Low Channel



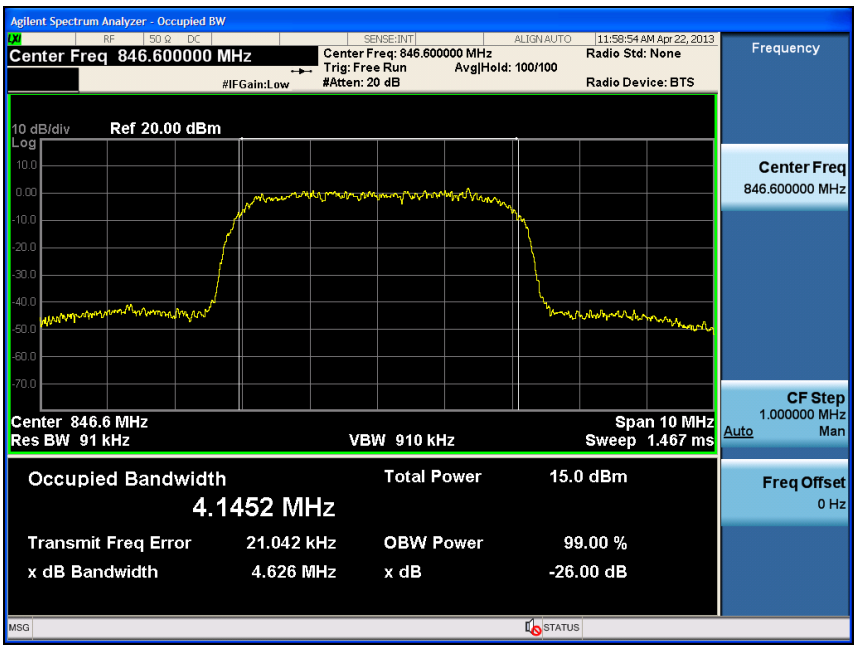
WCDMA850
99 %
Low Channel



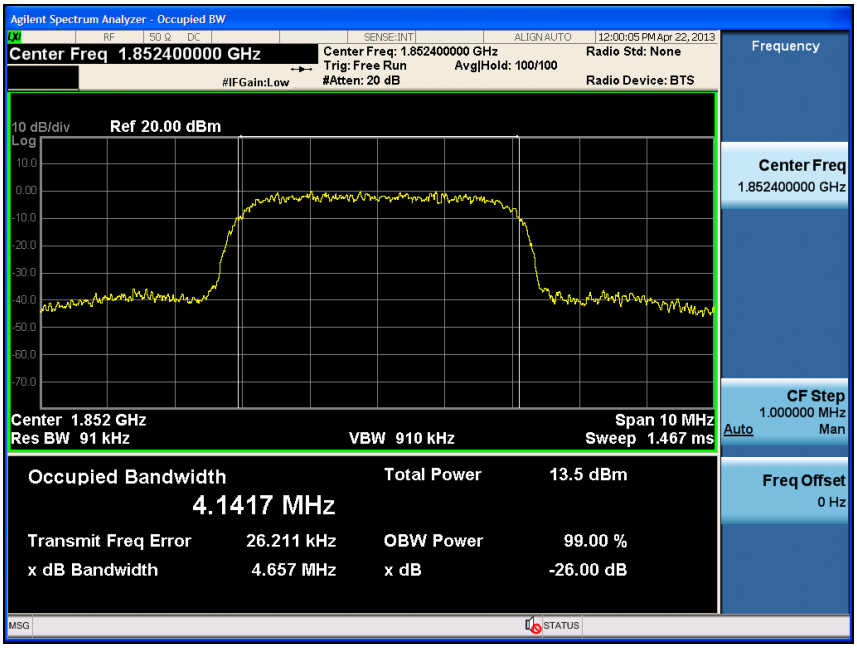
Middle Channel



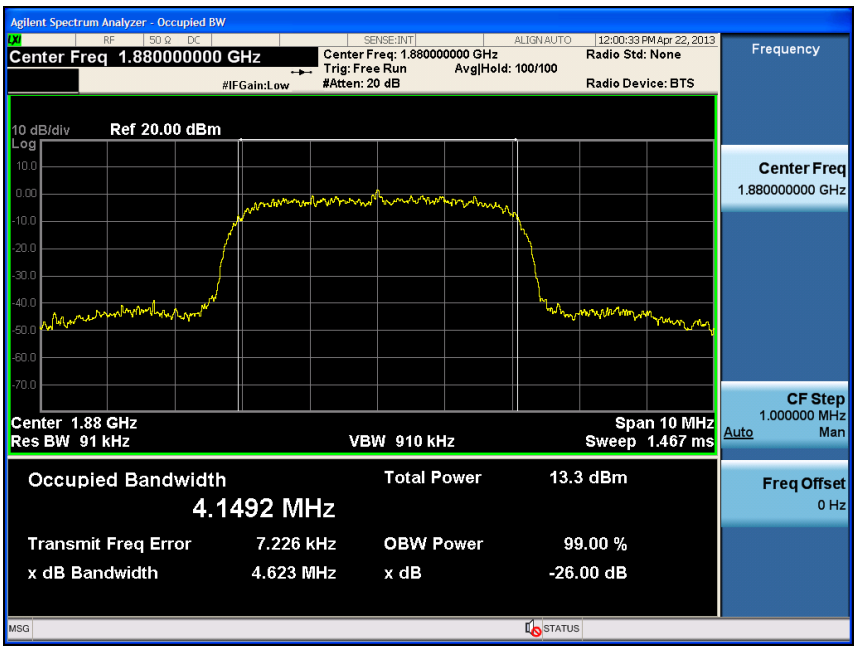
High Channel



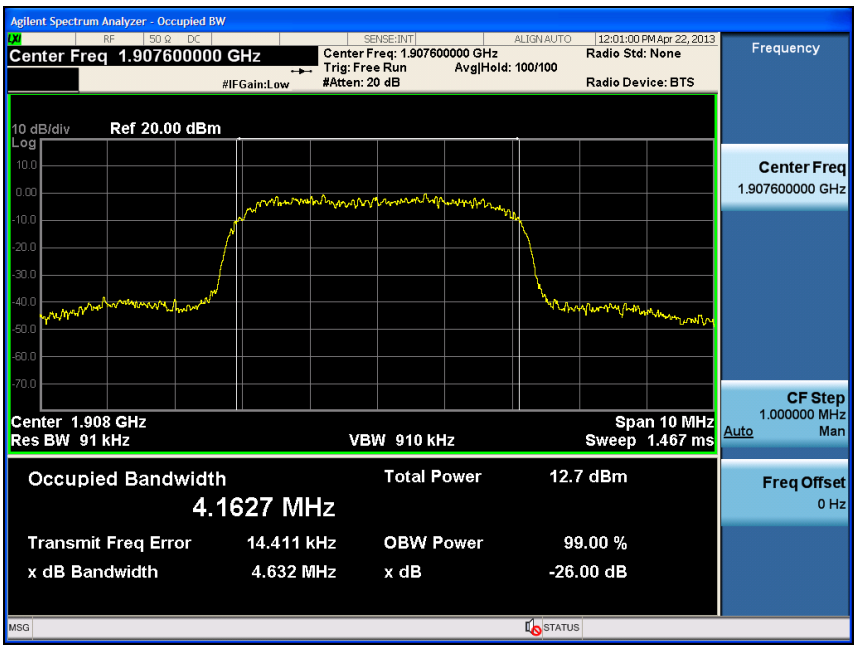
WCDMA1900
99 %
Low Channel



Middle Channel



High Channel



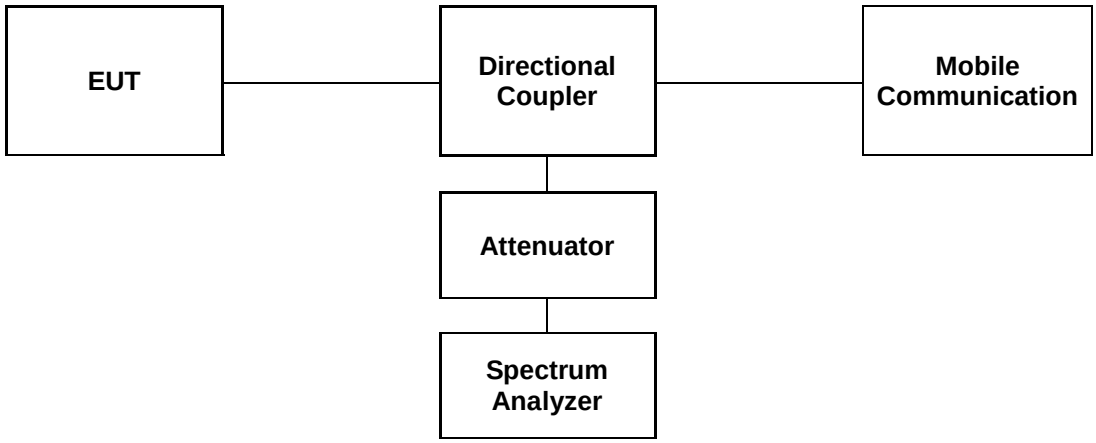
5. Peak-Average Ratio

5.1. 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.

5.2. Test Procedure

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.



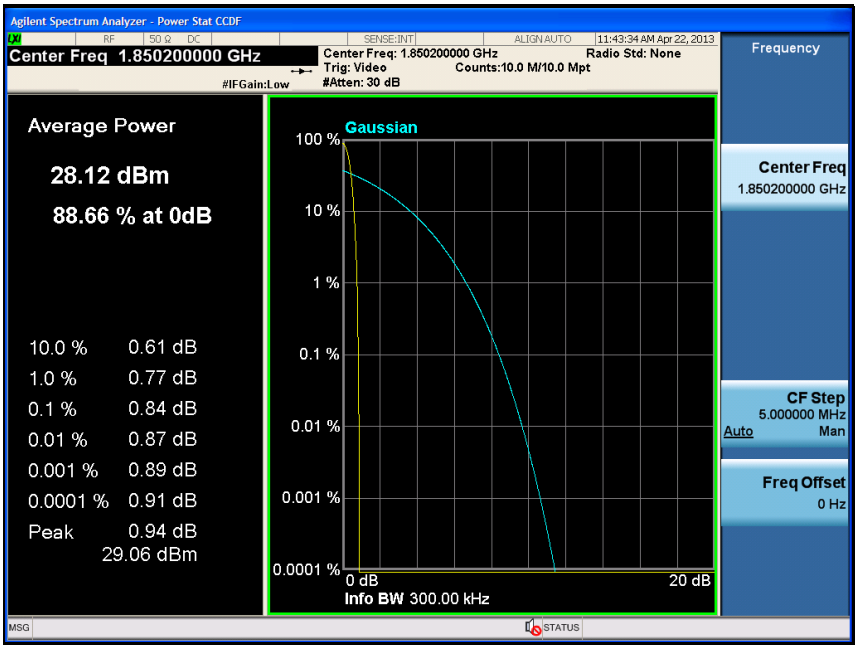
5.3 Test Results

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

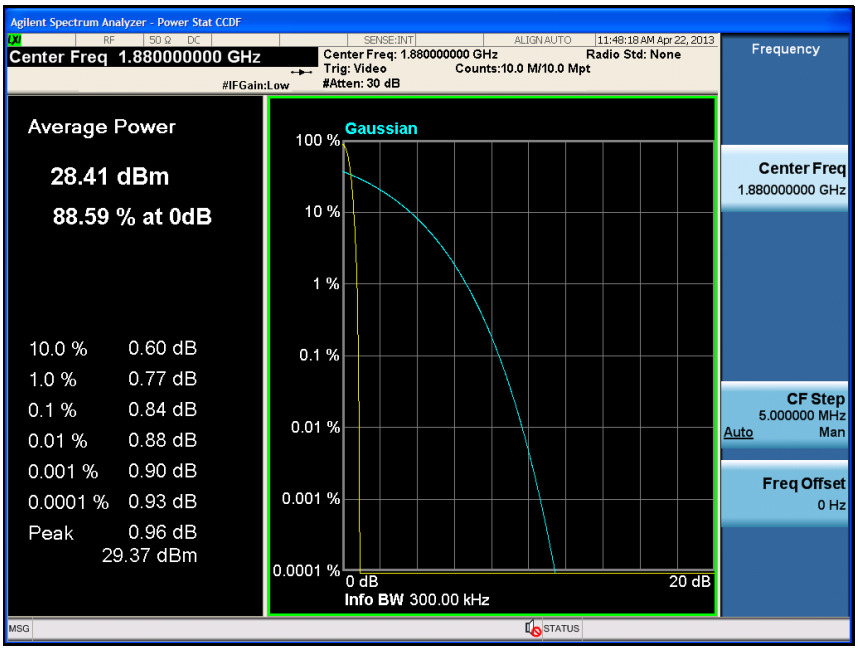
Please refer to the following plots.

Band	Mode	Frequency (㎒)	PAR (㏈)
GSM1900	GSM Voice	1 850.2	0.94
		1 880.0	0.96
		1 909.8	1.35
WCDMA1900	12.2 kbps (RMC)	1 852.4	3.74
		1 880.0	3.75
		1 907.6	3.76

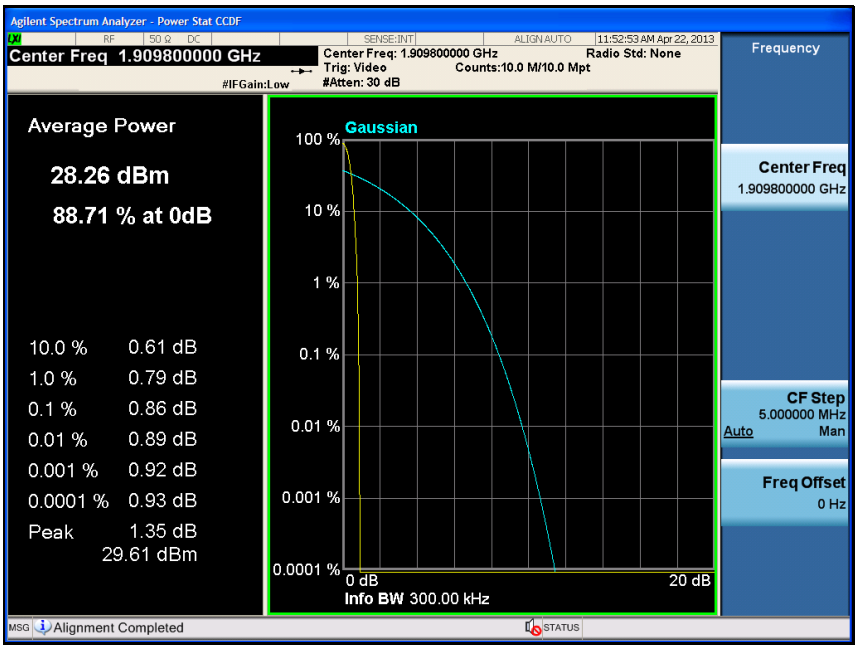
Peak-Average Ratio
GSM1900
Low Channel



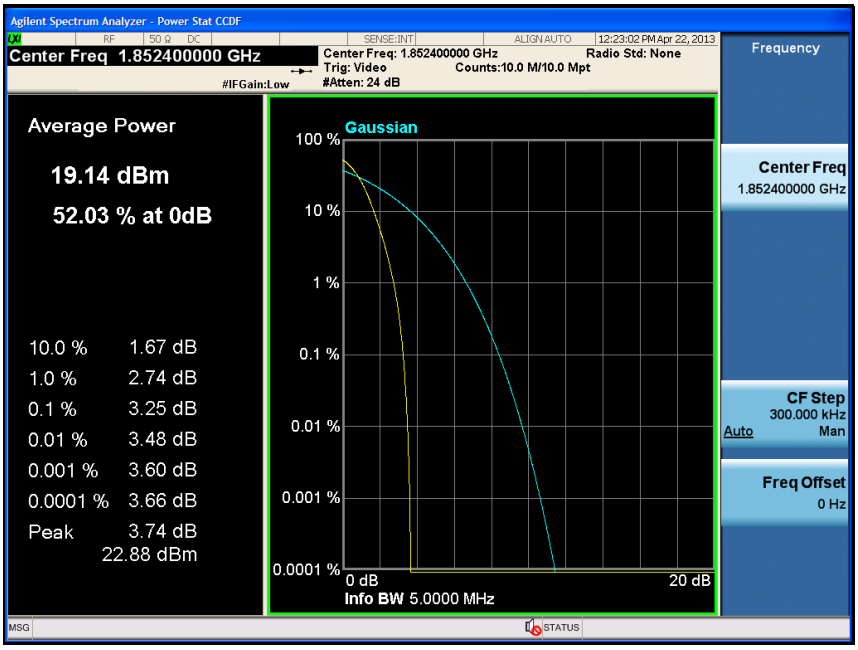
Middle Channel



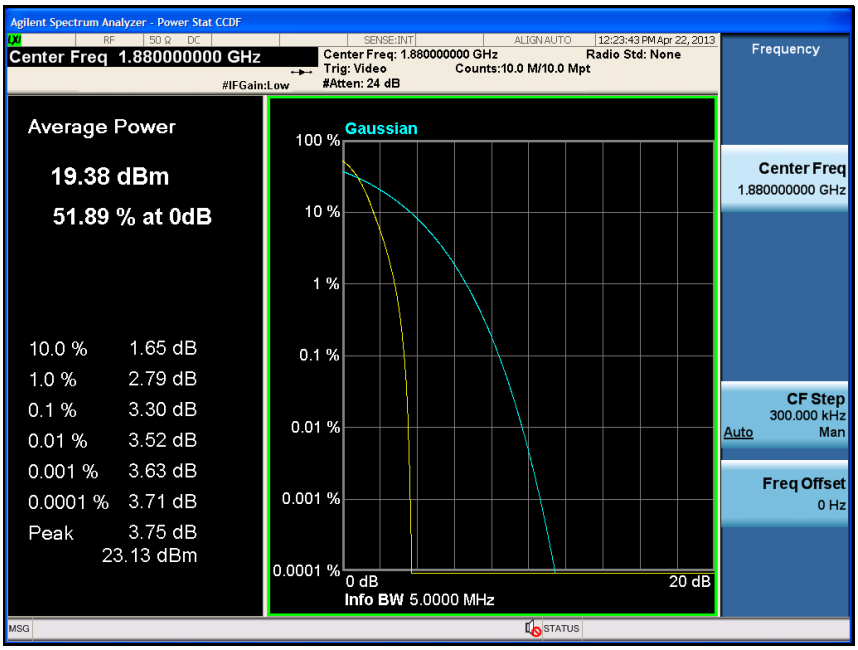
High Channel



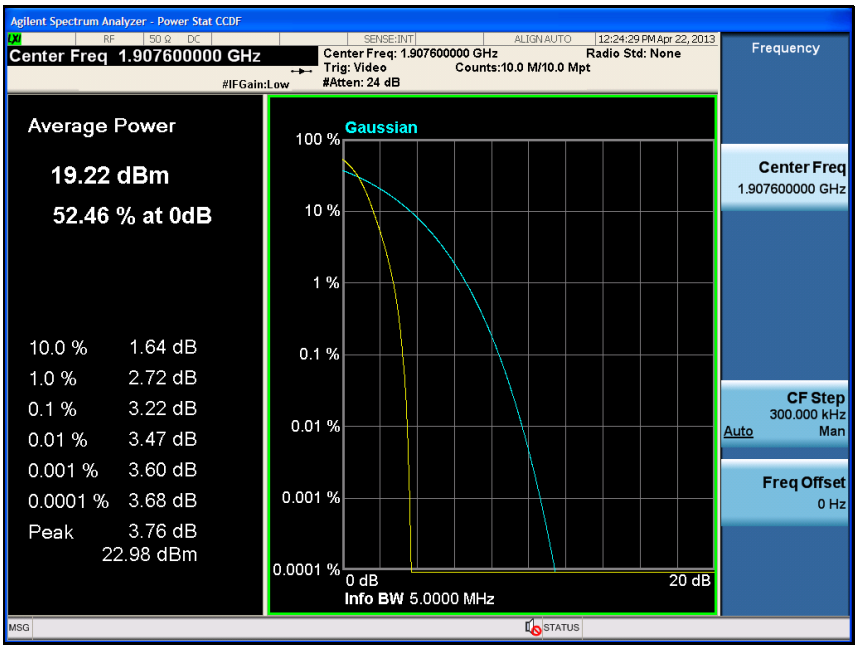
WCDMA1900
Low Channel



Middle Channel



High Channel



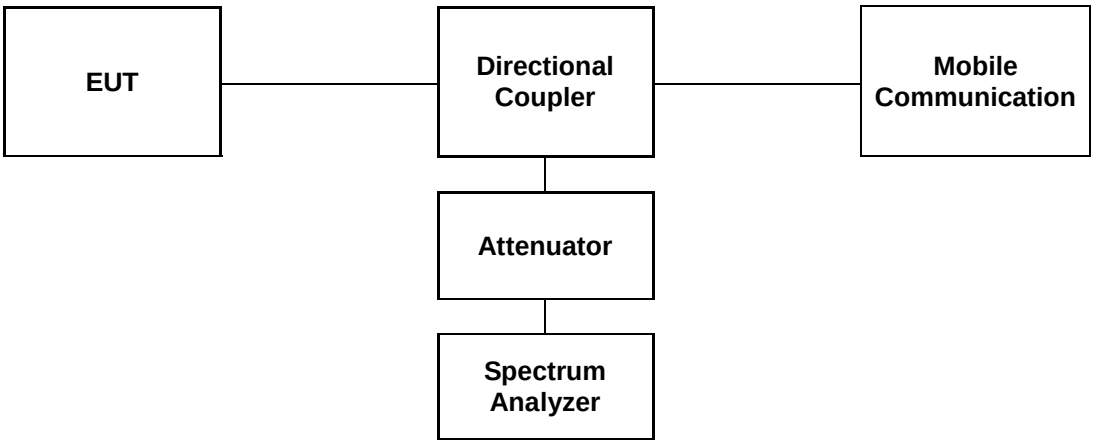
6. Spurious Emissions at Antenna Terminal

6.1. Limit

§ 22.917(e) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43 + 10log(P)㏈.

6.2. Test Procedure

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.

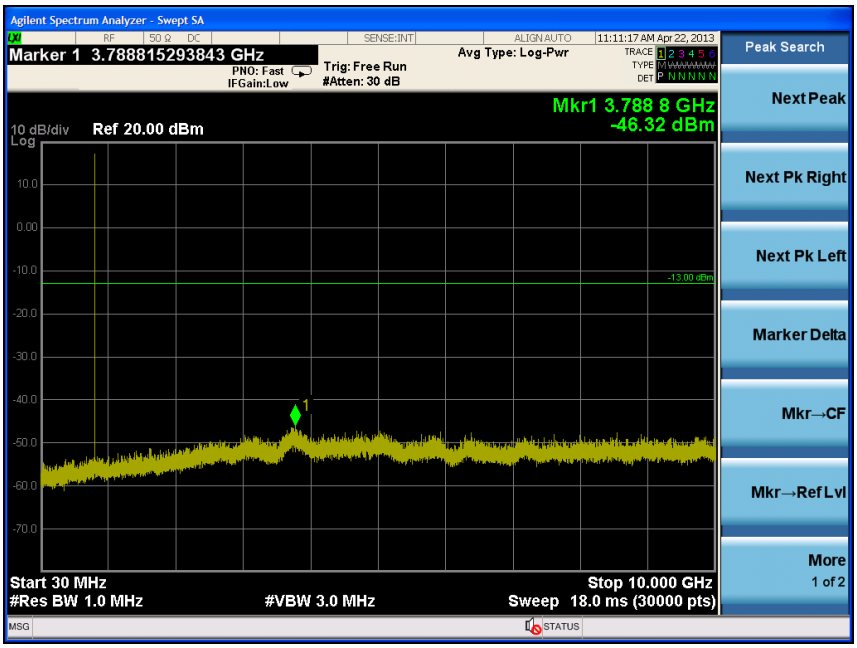


6.3. Test Results

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

Please refer to the following plots.

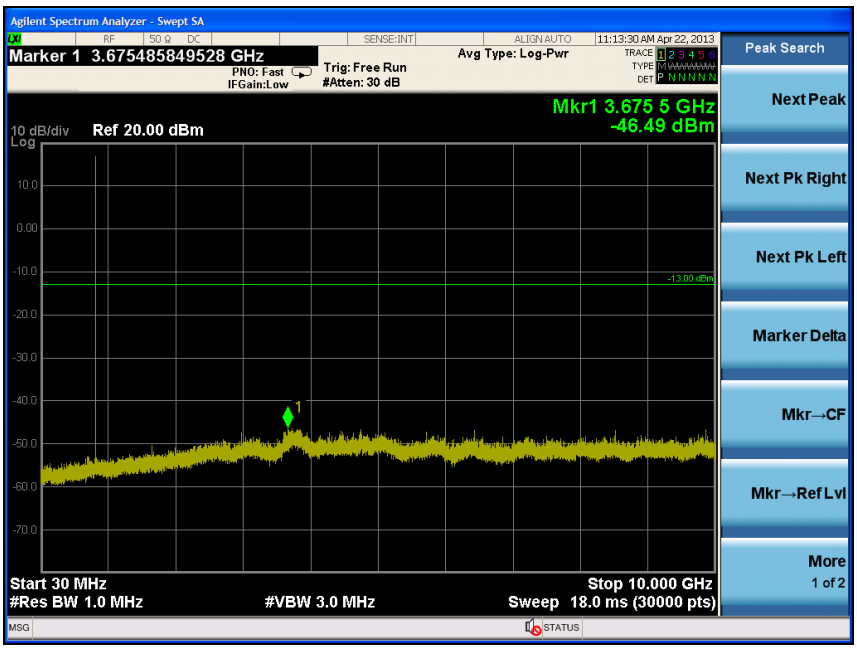
GSM850
Low Channel



Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 788.8	Noise Level	-	-

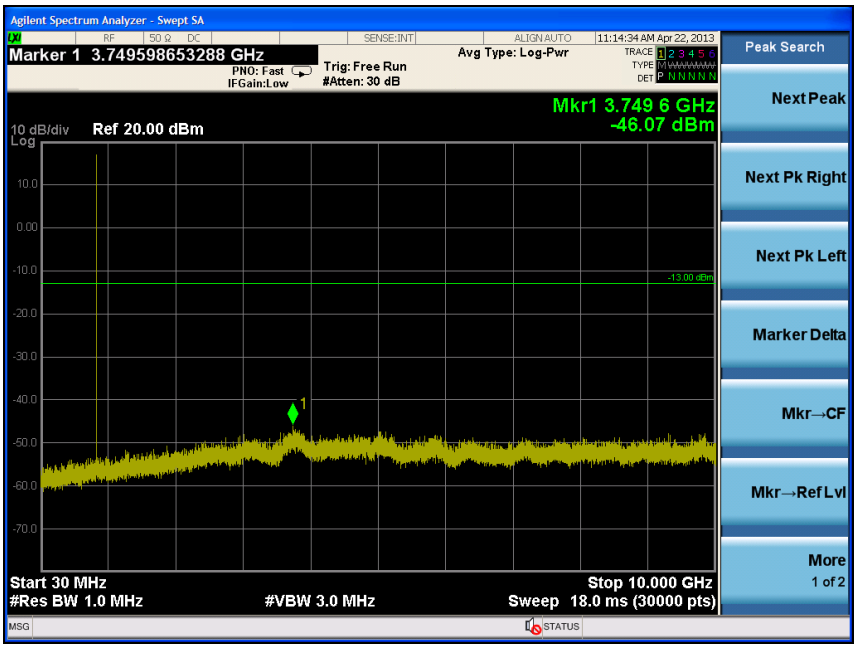
Middle Channel



Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 675.5	Noise Level	-	-

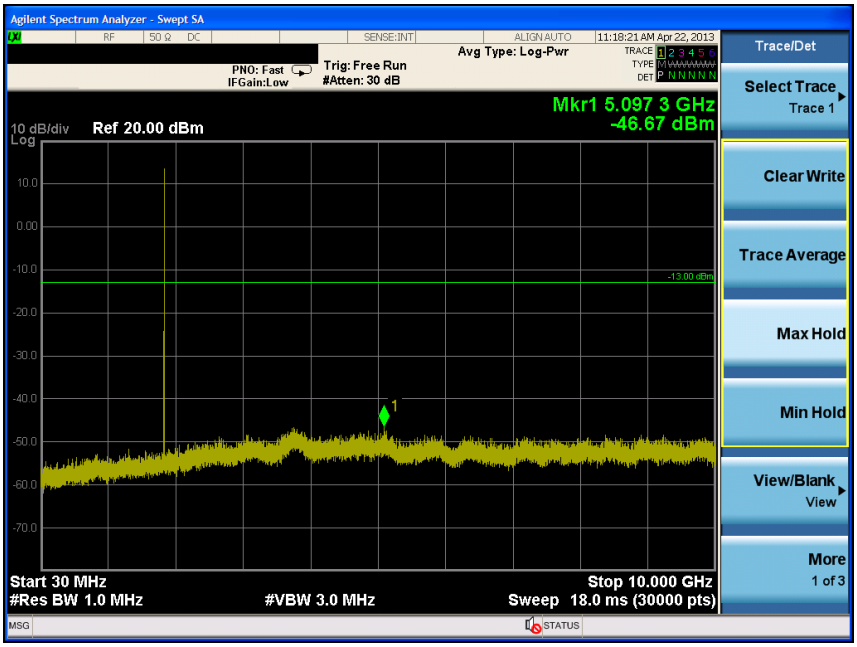
High Channel

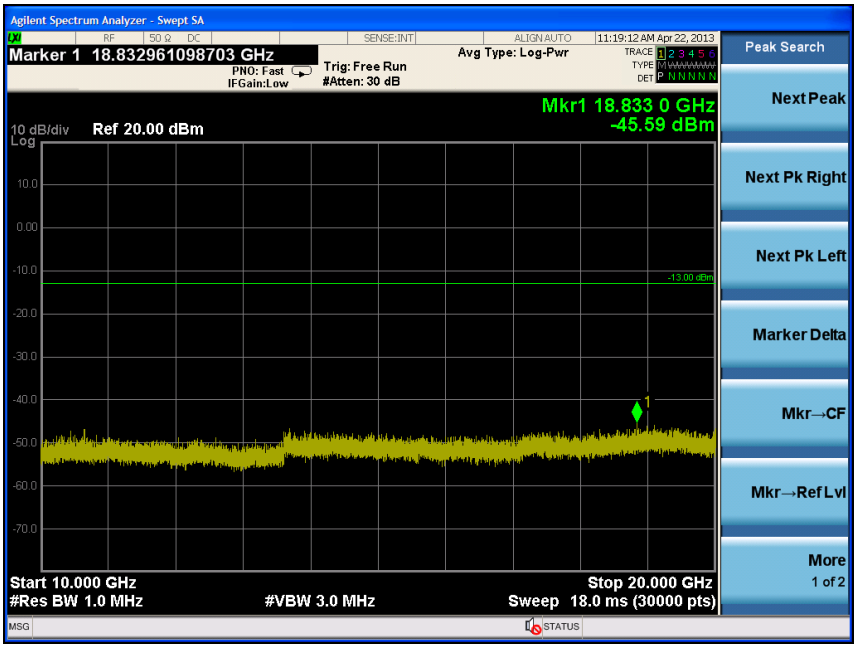


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 749.6	Noise Level	-	-

GSM1900
Low Channel

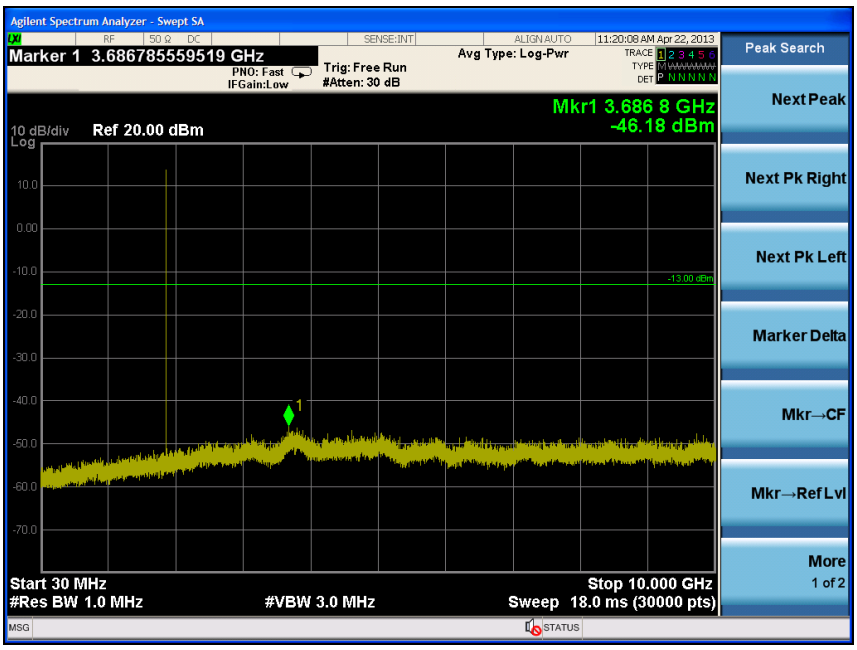


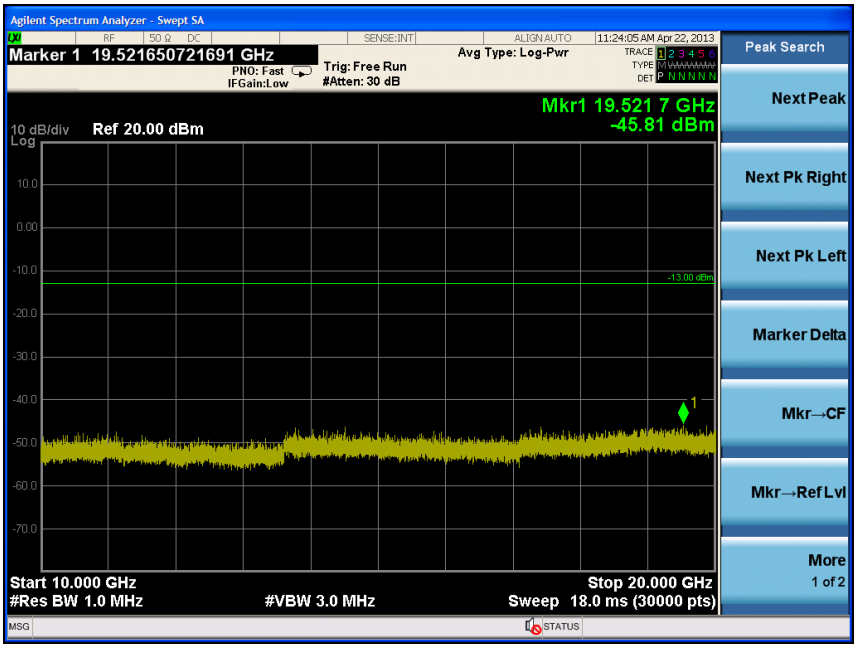


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
5 097.3	Noise Level	-	-
18 833.0	Noise Level	-	-

Middle Channel

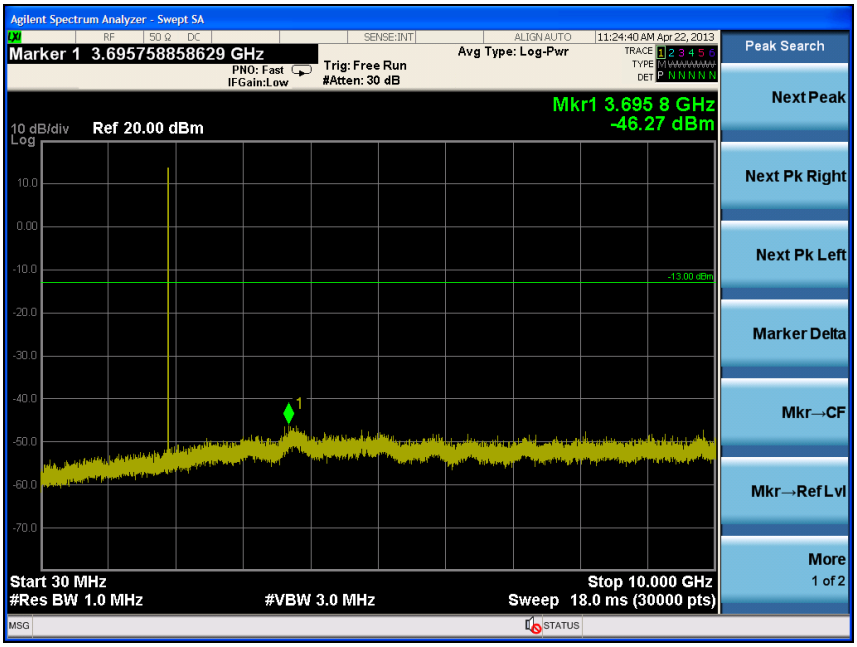


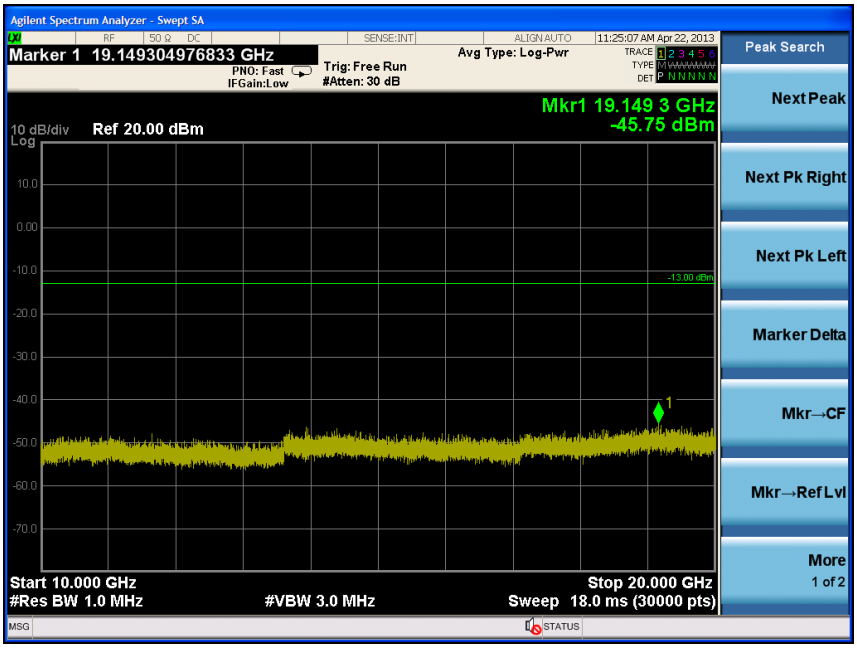


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 686.8	Noise Level	-	-
19 521.7	Noise Level	-	-

High Channel

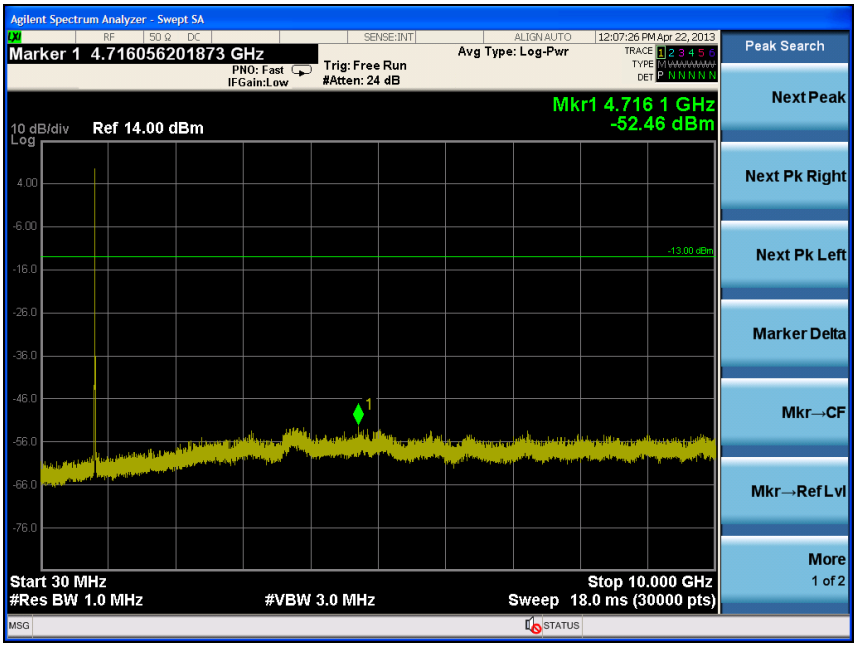




Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 695.8	Noise Level	-	-
19 149.3	Noise Level	-	-

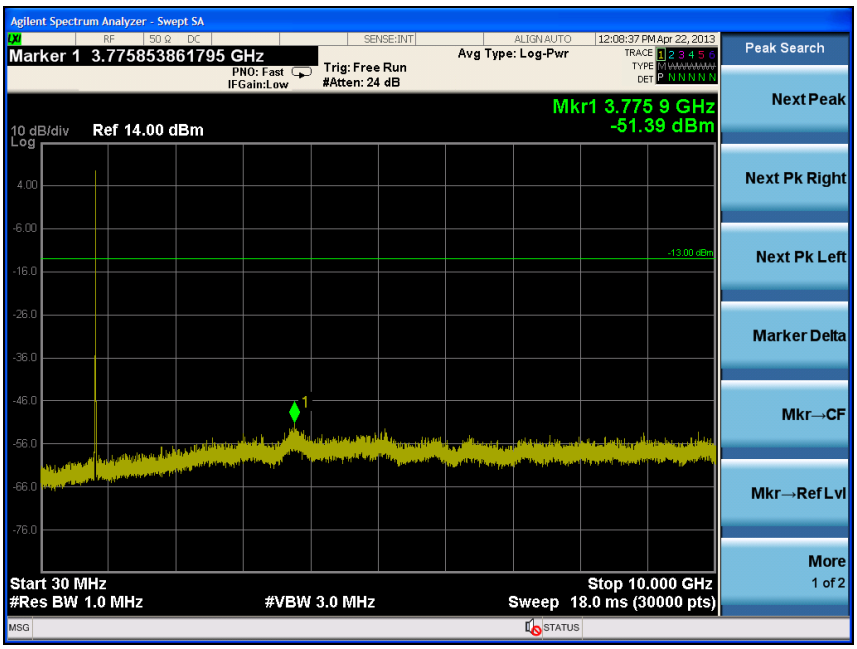
WCDMA850
Low Channel



Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
4 716.1	Noise Level	-	-

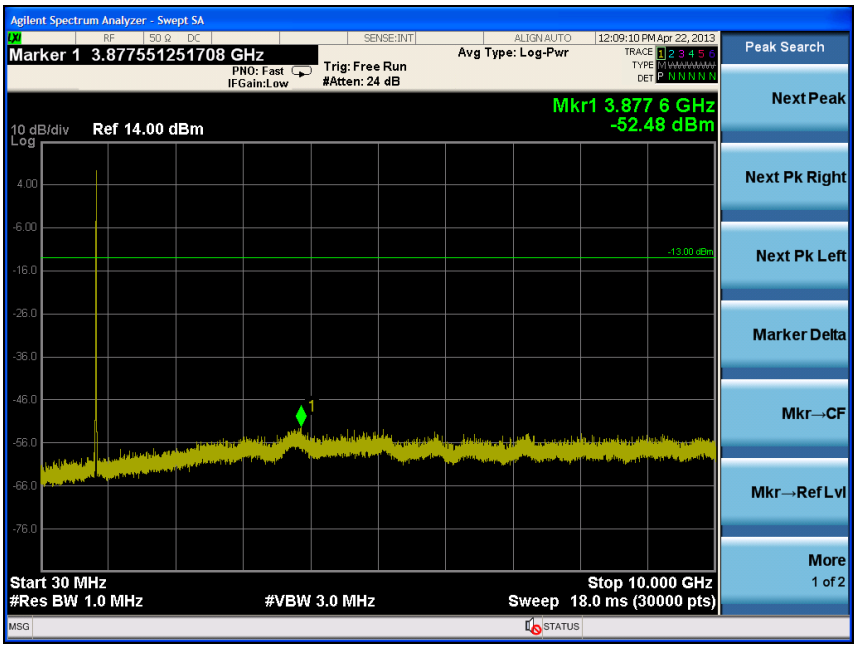
Middle Channel



Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 775.9	Noise Level	-	-

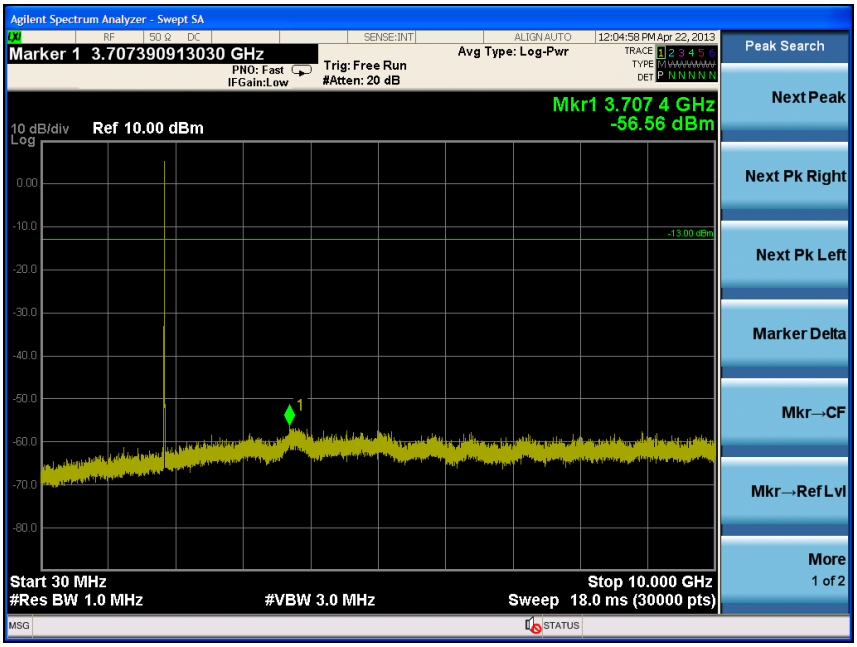
High Channel

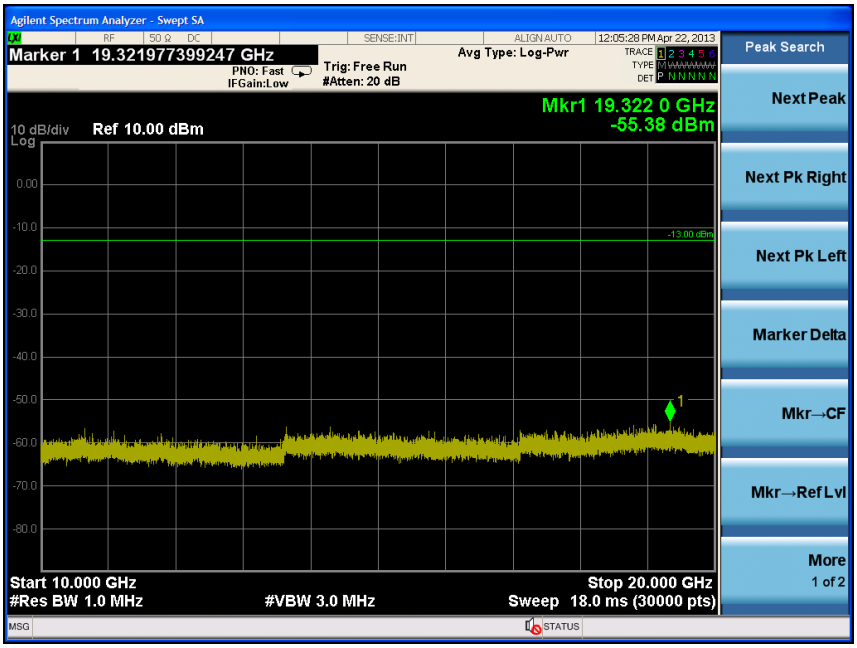


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 877.6	Noise Level	-	-

WCDMA1900
Low Channel

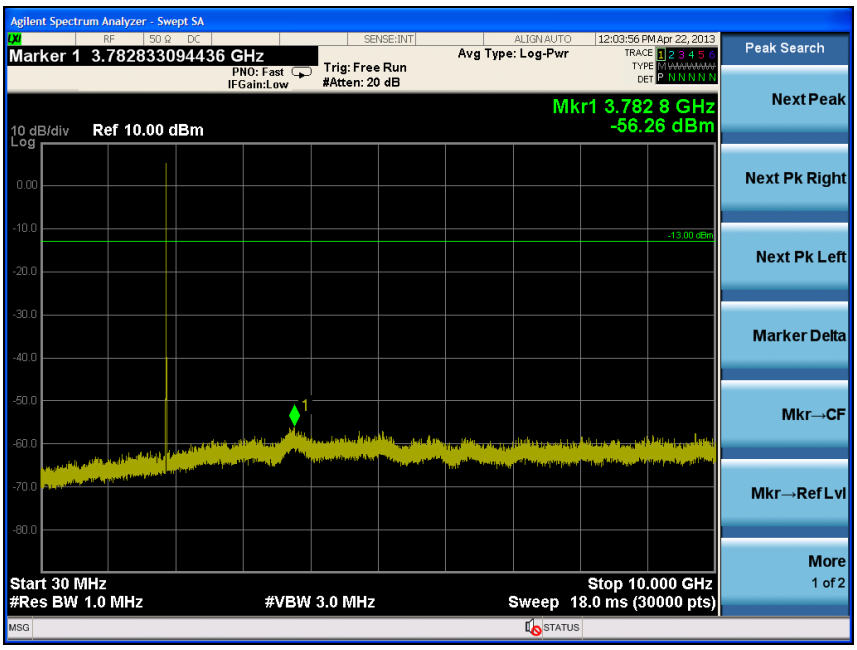


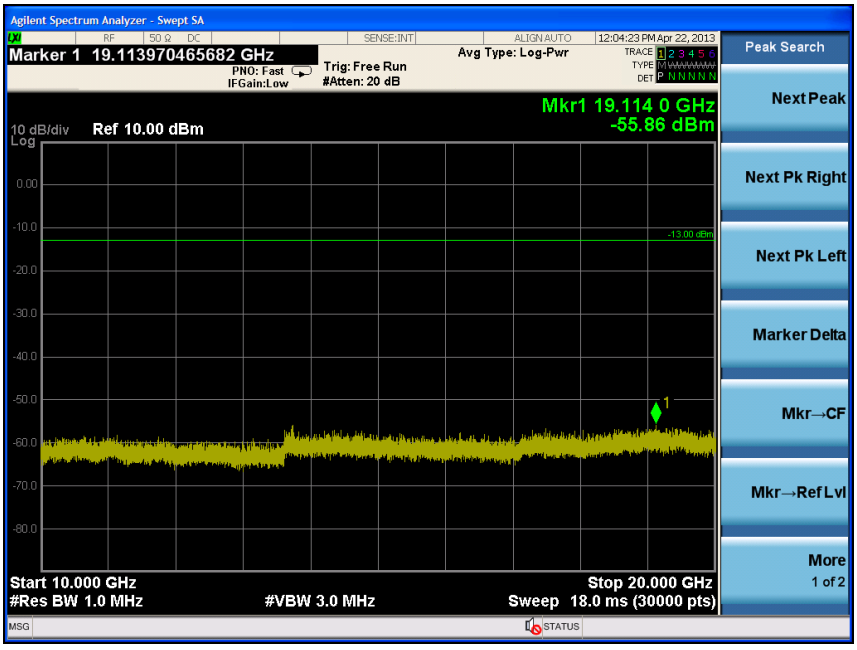


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (㎒)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 707.4	Noise Level	-	-
19 322.0	Noise Level	-	-

Middle Channel

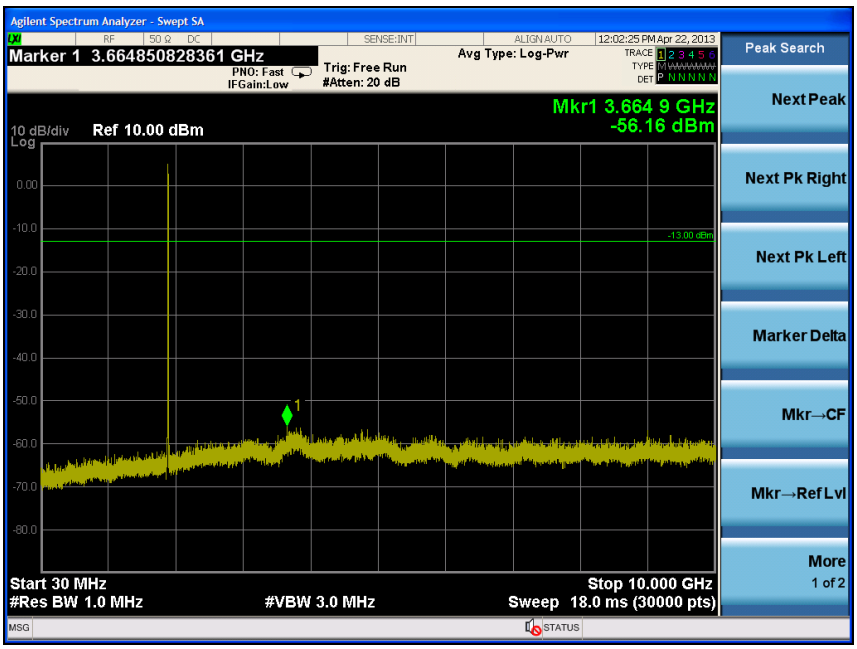


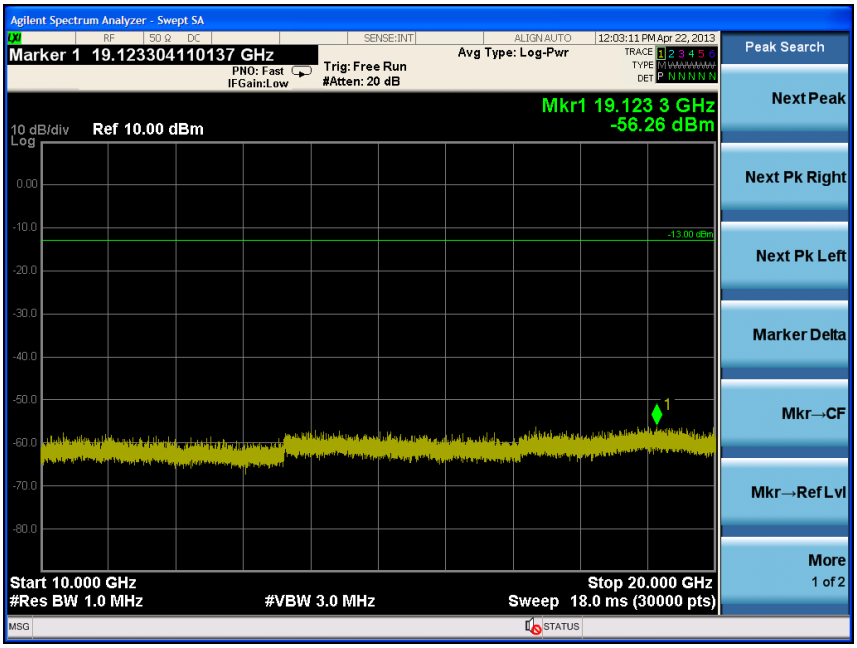


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 782.8	Noise Level	-	-
19 114.0	Noise Level	-	-

High Channel





Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 664.9	Noise Level	-	-
19 123.3	Noise Level	-	-

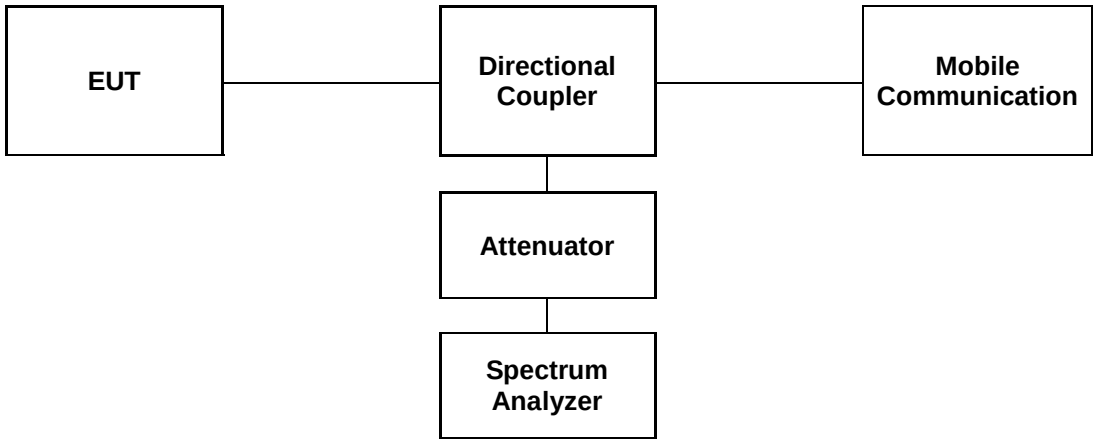
7. Band Edge

7.1. Limit

§ 22.917(e) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)dB.

7.2. Test Procedure

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.

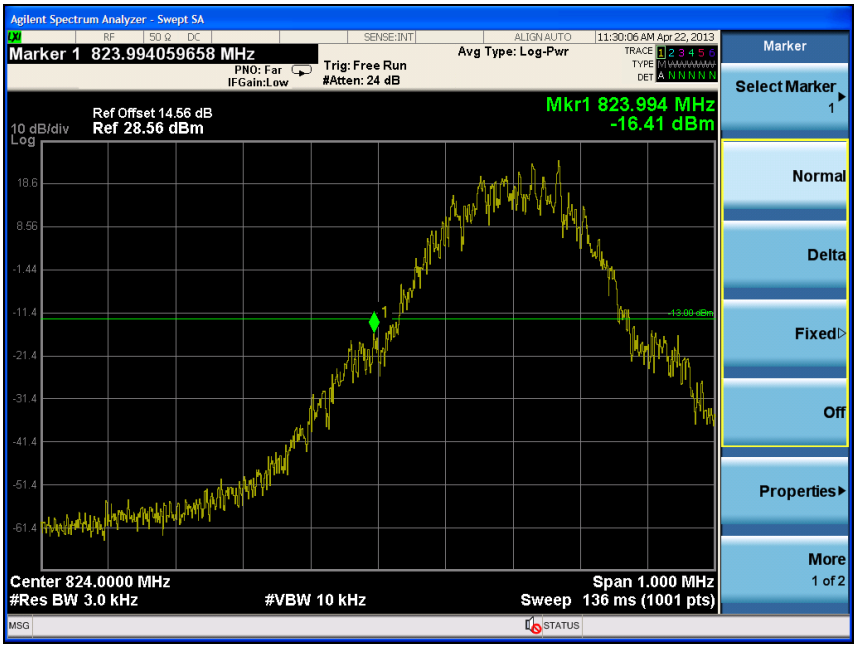


7.3. Test Results

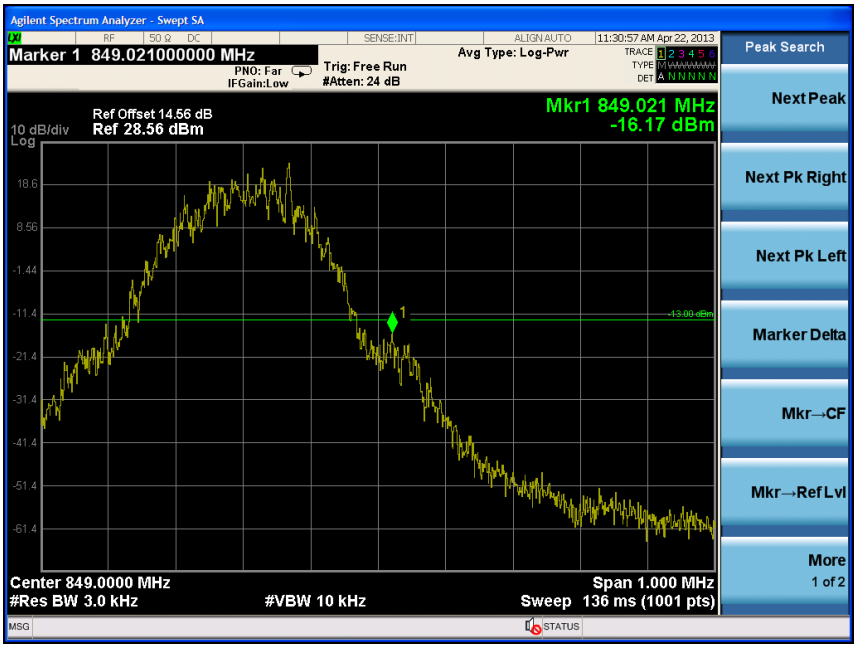
Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

Please refer to the following plots.

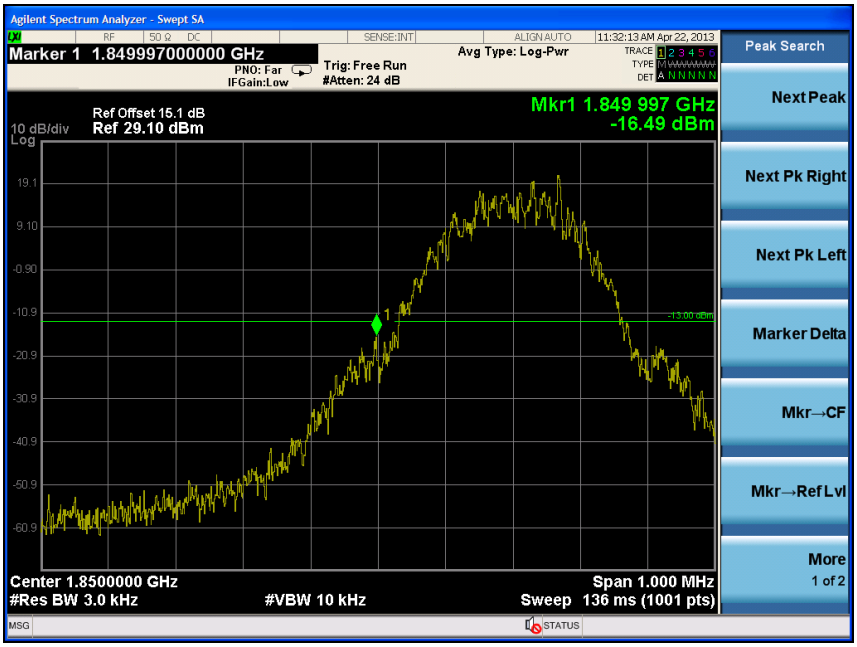
GSM850
Low Channel



High Channel



GSM1900
Low Channel



High Channel

WDCMA850
Low Channel

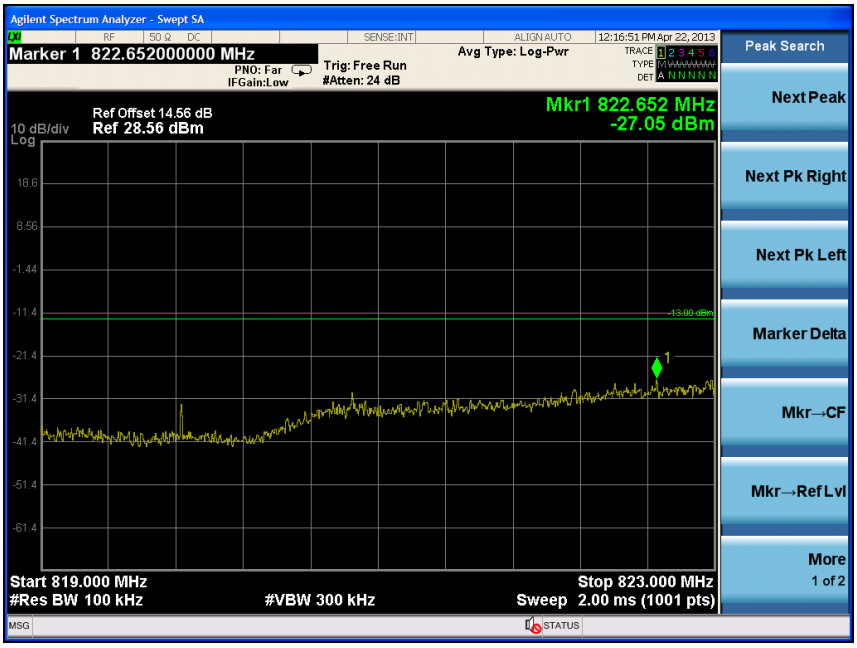
High Channel

WCDMA1900
Low Channel

High Channel

4 ㎒ span plot_WCDMA850

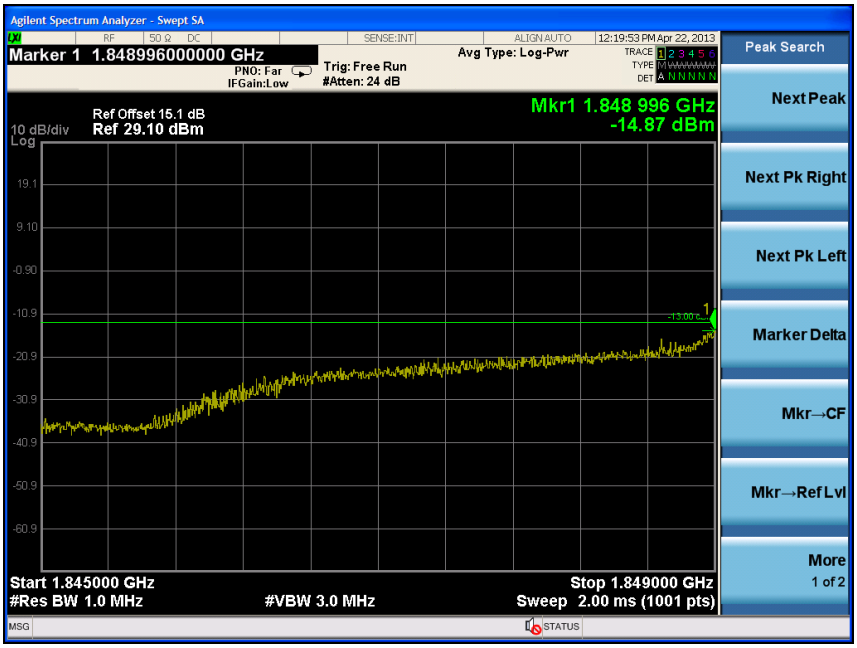
Low Channel



High Channel

4 ㎒ span plot_WCDMA1900

Low Channel



High Channel

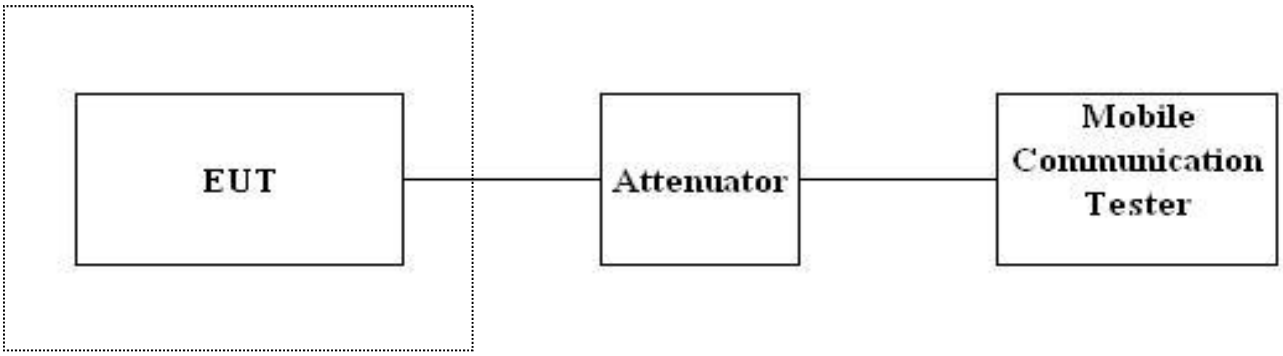
8. Frequency Stability

8.1. Limit

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:
According to §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.
§24.235 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

8.2. Test Procedure

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 frequency counter 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 the counter.



Temperature Chamber

8.3. 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	3.7	-7	-0.008 37
40		-3	-0.003 59
30		-8	-0.009 56
24		-6	-0.007 17
10		-12	-0.014 34
0		-15	-0.017 93
-10		-18	-0.021 52
-20		-19	-0.022 71
-30		-23	-0.027 49
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**ppm**
24	4.255	-8	-0.009 56
	3.12(batt. End point)	-13	-0.015 54

GSM1900 mode at middle channel

Reference Frequency: 1 880.0 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.7	-19	-0.010 11
40		-23	-0.012 23
30		-21	-0.011 17
24		-15	-0.007 98
10		-18	-0.009 57
0		-25	-0.013 30
-10		-31	-0.016 49
-20		-35	-0.018 62
-30		-39	-0.020 74
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**ppm**
24	4.255	-17	-0.009 04
	3.12(batt. End point)	-23	-0.012 23

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	3.7	9	0.010 76
40		5	0.005 98
30		2	0.002 39
24		4	0.004 78
10		1	0.001 20
0		3	0.003 59
-10		-8	-0.009 56
-20		-11	-0.013 15
-30		-16	-0.019 13
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**ppm**
24	4.255	5	0.005 98
	3.12(batt. End point)	-2	-0.002 39

WCDMA1900 mode at middle channel

Reference Frequency: 1880.0 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.7	37	0.019 68
40		24	0.012 77
30		15	0.007 98
24		16	0.008 51
10		-4	-0.002 13
0		-7	-0.003 72
-10		-14	-0.007 45
-20		-20	-0.010 64
-30		-27	-0.014 36
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**ppm**
24	4.255	17	0.009 04
	3.12(batt. End point)	11	0.005 85