TEST REPORT

of

FCC Part 22 Subpart H and Part 24 Subpart E
FCC ID : ZNFC399

Equipment Under Test	:	Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model Name	:	LG-C398 (Additional model : LG-C396, LG-C393 LG-C397,LG-C399, LGC393, LGC396, LGC397, LGC398, LGC399, C396, C397, C398, C399)
Serial No.	:	N/A
Applicant	:	LG Electronics MobileComm U.S.A., Inc.
Manufacturer	:	LG Electronics MobileComm U.S.A., Inc.
Date of Test(s)	:	2012.12.21 ~ 2012.02.13
Date of Issue	:	2013.02.13

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

Tested By: **Harim Lee** **Date:** **2013.02.13**

Approved By: **Denny Ham** **Date:** **2013.02.13**

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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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FAX : +82 31 427 2371

1.2. Details of applicant

Applicant : LG Electronics MobileComm U.S.A., Inc.
Address : 1000 Sylvan Avenue Englewood Cliffs, NJ 07632
Contact Person : Lee, Sang-myeong
Phone No. : +82 2 2033 4606

1.3. Description of EUT

Kind of Product	Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model Name	LG-C398 (Additional model : LG-C396, LG-C393, LG-C397, LG-C399, LGC393, LGC396, LGC397, LGC398, LGC399, C396, C397, C398, C399)
Serial Number	N/A
Power Supply	DC 3.8 V (Li-Ion Battery)
Rated Power	GSM850: 32.7 ㏈m GSM1900: 29.7 ㏈m
Frequency Range	GSM850: 824.2 ㎒ ~ 848.8 ㎒ GSM1900: 1 850.2 ㎒ ~ 1 909.8 ㎒ Bluetooth: 2 402 ~ 2 480 ㎒ WLAN: 2 412 ~ 2 462 ㎒
Number of Channels	GSM850 : 125 GSM1900 : 300 Bluetooth : 79 WLAN: 11
Class of GPRS	Class 12, Class B
Emission Designator	253KGXW (GSM850) 246KGXW (GSM1900)
H/W Version	REV.B
S/W Version	V09a

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	**33.18**	33.15	30.50	28.97	27.50
	836.6	**33.17**	33.17	30.48	28.95	27.49
	848.8	**33.18**	33.16	30.54	29.01	27.54
GSM1900	1 850.2	**30.08**	30.07	27.49	26.00	24.55
	1 880.0	**30.07**	30.06	27.46	25.98	24.55
	1 909.8	**30.10**	30.09	27.50	25.99	24.56

GSM (850 / 1900)
We found out the test mode with the highest power level after we analyze all the data rates. So we chose **Voice** (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. Additional models

Model name	Information
LG-C398	- Basic model and use triple SIM
LG-C396	- Same to basic model but it is different a number of SIM
LG-C393	- Same to basic model but it is different a number of SIM
LG-C397	- Same to basic model but it is different a number of SIM
LG-C399	- Same to basic model but it has different keypad
LGC396, LGC397, LGC398, LGC399, C396, C397, C398, C399	- Same to basic model and only add model names

1.7. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E4438C	MY42082477	Mar, 29. 2012	Annual	Mar, 29. 2013
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 30, 2012	Annual	Oct. 30, 2013
Spectrum Analyzer	Agilent	E4440A	MY43362142	Mar. 29, 2012	Annual	Mar. 29, 2013
Spectrum Analyzer	R&S	FSV30	100768	Mar. 29, 2012	Annual	Mar. 29, 2013
Mobile Test Unit	Agilent	E5515C	GB43345198	Mar. 29, 2012	Annual	Mar. 29, 2013
Attenuator	AEROFLEX / INMET	26A-10dB	1	Apr. 02, 2012	Annual	Apr. 02, 2013
Directional Coupler	KRYTAR	152613	122661	Apr. 04, 2012	Annual	Apr. 04, 2013
Low Pass Filter	Mini-Circuits	NLP-1200+	V8979400903-1	Jul. 12, 2012	Annual	Jul. 12, 2013
High Pass Filter	Wainwright	WHKX1.5/15G6SS	4	Mar. 30, 2012	Annual	Mar. 30, 2013
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. 31, 2013	Annual	Mar. 31, 2013
DC Power Supply	Agilent	U8002A	MY50070064	Mar. 29, 2012	Annual	Mar. 29, 2013
Preamplifier	H.P.	8447F	2944A03909	Jul. 03, 2012	Annual	Jul. 03, 2013
Preamplifier	R&S	SCU18	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. 21, 2012	Annual	Feb. 21, 2013
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	396	May. 12, 2011	Biennial	May. 12, 2013
Horn Antenna	R&S	HF906	100326	Nov. 23, 2011	Biennial	Nov. 23, 2013
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170431	Aug. 24, 2012	Biennial	Aug. 24, 2014
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	VHA/UHA	9103/9105	May 24, 2011	Biennial	May. 24, 2013
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.

1.8. 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

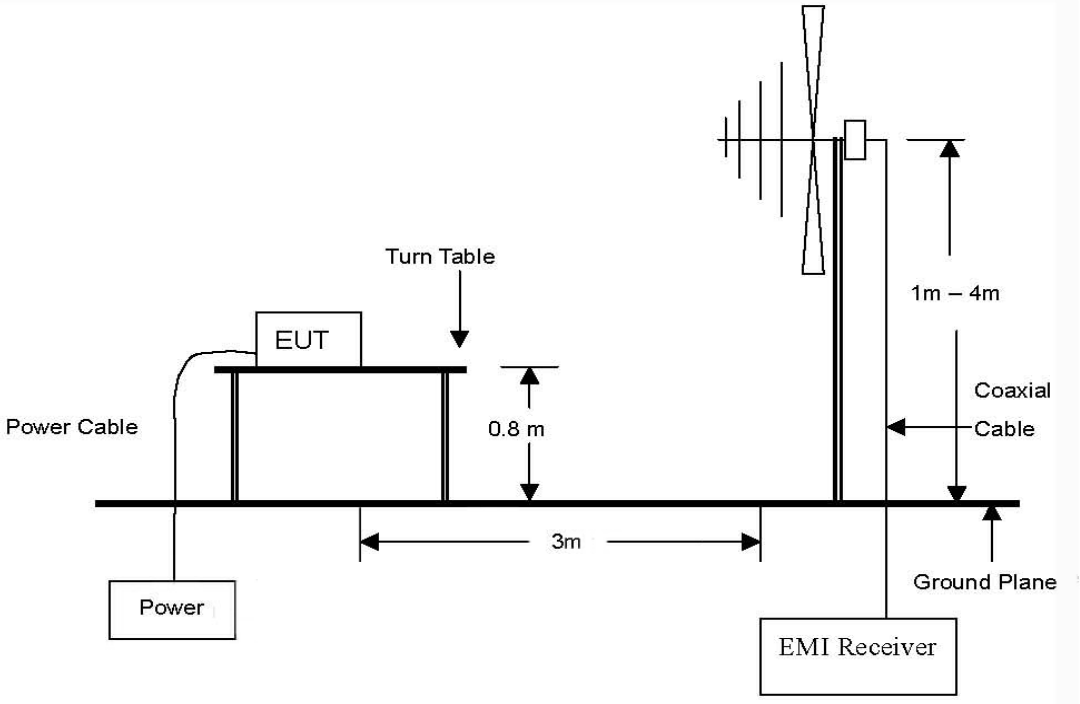
1.9. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL006137	Initial
1	F690501/RF-RTL006137-1	Modified additional model names
2	F690501/RF-RTL006137-2	Retest maximum peak output power and Modify applicant information
3	F690501/RF-RTL006137-3	Retest maximum peak output power and PAR

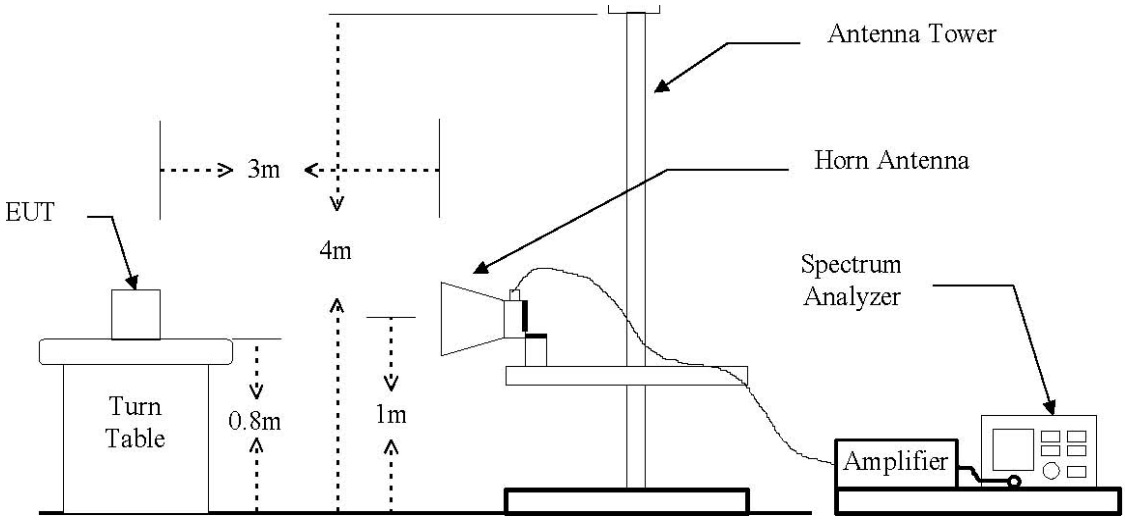
2. RF radiated output power & spurious radiated emission

2.1. Test setup

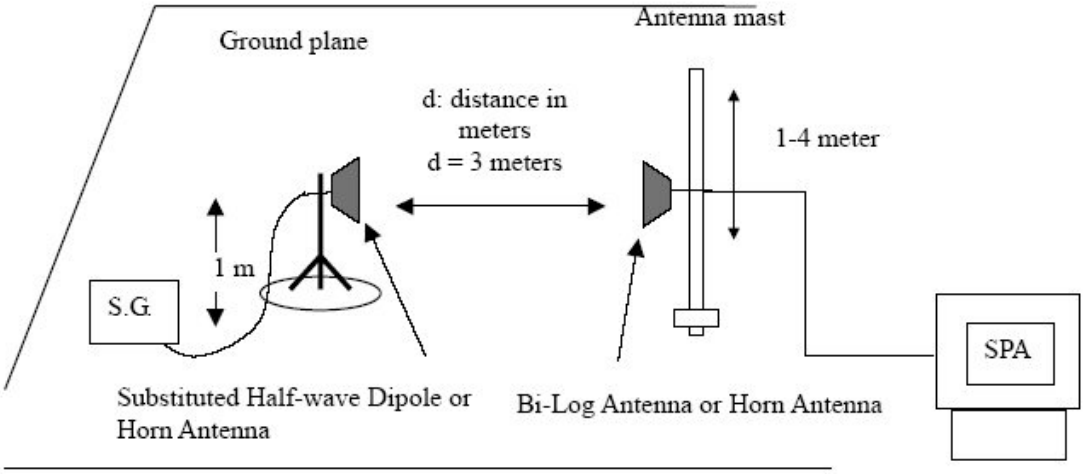
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



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 ERP 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	34.70	3.42	-3.44	27.84	608.14
824.2	H	36.32	3.42	-3.44	29.46	883.08
836.6	V	36.49	3.38	-3.45	29.66	924.70
836.6	H	36.05	3.38	-3.45	29.22	835.60
848.8	V	37.41	3.33	-3.41	30.67	1166.81
848.8	H	38.07	3.33	-3.41	31.33	1358.31

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	26.35	4.87	7.55	29.03	799.83
1 850.2	H	26.29	4.87	7.55	28.97	788.86
1 880.0	V	25.76	4.91	7.63	28.48	704.69
1 880.0	H	26.78	4.91	7.63	29.50	891.25
1 909.8	V	26.58	4.94	7.70	29.34	859.01
1 909.8	H	27.73	4.94	7.70	30.49	1119.44

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 x -axis.

2.5. Spurious radiated emission

- Measured output Power: 31.33 dBm = 1.358 3 W
- Modulation Signal: GSM850
- Distance: 3 meters
- Limit: -(43 + 10log$_{10}$(W)) = -44.33 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 (824.2 MHz)							
1 648.30	V	-37.34	4.54	6.44	-35.44	-66.77	22.44
1 648.30	H	-37.35	4.54	6.44	-35.45	-66.78	22.45
Middle Channel (836.6 MHz)							
1 673.10	V	-37.84	4.58	6.50	-35.92	-67.25	22.92
1 673.10	H	-39.72	4.58	6.50	-37.80	-69.13	24.80
High Channel (848.8 MHz)							
1 697.50	V	-41.05	4.62	6.57	-39.10	-70.43	26.10
1 697.50	H	-48.49	4.62	6.57	-46.54	-77.87	33.54

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 (824.2 MHz)							
2 472.30	V	-48.41	5.67	7.97	-46.11	-77.44	33.11
2 472.30	H	-47.80	5.67	7.97	-45.50	-76.83	32.50
Middle Channel (836.6 MHz)							
2 510.10	V	-49.77	5.72	8.02	-47.47	-78.80	34.47
2 510.10	H	-49.45	5.72	8.02	-47.15	-78.48	34.15
High Channel (848.8 MHz)							
2 546.50	V	-51.32	5.75	8.07	-49.00	-80.33	36.00
2 546.50	H	-52.14	5.75	8.07	-49.82	-81.15	36.82

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 ㎒)							
3 296.50	V	-44.51	6.71	9.29	-41.93	-73.26	28.93
3 296.50	H	-43.14	6.71	9.29	-40.56	-71.89	27.56
Middle Channel (836.6 ㎒)							
3 346.20	V	-41.48	6.75	9.39	-38.84	-70.17	25.84
3 346.20	H	-43.82	6.75	9.39	-41.18	-72.51	28.18
High Channel (848.8 ㎒)							
3 395.30	V	-43.12	6.79	9.50	-40.41	-71.74	27.41
3 395.30	H	-44.18	6.79	9.50	-41.47	-72.80	28.47

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 ㎒)							
4 121.50	V	-46.29	7.68	9.61	-44.36	-75.69	31.36
4 121.00	H	-51.15	7.68	9.61	-49.22	-80.55	36.22
Middle Channel (836.6 ㎒)							
4 183.00	V	-45.45	7.77	9.58	-43.64	-74.97	30.64
4 183.00	H	-48.28	7.77	9.58	-46.47	-77.80	33.47
High Channel (848.8 ㎒)							
4 244.00	V	-42.96	7.81	9.55	-41.22	-72.55	28.22
4 244.00	H	-49.84	7.81	9.55	-48.10	-79.43	35.10

Remark:
1. E.R.P. & E.I.R.P. = S.G level (㏈m) - Cable loss (㏈) + Ant. gain (㏈d/㏈i)
2. No more harmonic above 6rd harmonic for all channel.

- Measured output Power : 30.49 ㏈m = 1.119 4 W
- Modulation Signal : GSM1900
- Distance : 3 meters
- Limit : -(43 + 10log$_{10}$(W)) = -43.49 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈i)	E.I.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel(1 850.2 ㎒)							
3 700.55	V	-47.24	7.13	11.85	-42.52	-73.01	29.52
3 700.58	H	-45.94	7.13	11.85	-41.22	-71.71	28.22
Middle Channel(1 880.0 ㎒)							
3 760.08	V	-43.71	7.23	11.85	-39.09	-69.58	26.09
3 760.04	H	-44.12	7.23	11.85	-39.50	-69.99	26.50
High Channel(1 909.8 ㎒)							
3 819.67	V	-45.48	7.33	11.84	-40.97	-71.46	27.97
3 819.51	H	-47.79	7.33	11.84	-43.28	-73.77	30.28

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈i)	E.I.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel(1 850.2 ㎒)							
5 550.80	V	-44.36	9.24	12.12	-41.48	-71.97	28.48
5 550.56	H	-51.81	9.24	12.12	-48.93	-79.42	35.93
Middle Channel(1 880.0 ㎒)							
5 639.93	V	-49.34	9.36	12.08	-46.62	-77.11	33.62
5 639.93	H	-48.09	9.36	12.08	-45.37	-75.86	32.37
High Channel(1 909.8 ㎒)							
5 729.22	V	-49.77	9.46	12.04	-47.19	-77.68	34.19
5 729.53	H	-44.94	9.46	12.04	-42.36	-72.85	29.36

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 ㎒)							
7 400.99	V	-48.18	10.96	10.17	-48.97	-79.46	35.97
7 400.92	H	-59.27	10.96	10.17	-60.06	-90.55	47.06
Middle Channel(1 880.0 ㎒)							
7 520.08	V	-45.20	11.31	10.22	-46.29	-76.78	33.29
7 520.30	H	-51.84	11.31	10.22	-52.93	-83.42	39.93
High Channel(1 909.8 ㎒)							
7 638.90	V	-43.33	11.44	10.24	-44.53	-75.02	31.53
7 639.31	H	-48.51	11.44	10.24	-49.71	-80.20	36.71

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 ㎒)							
9 251.07	V	-35.15	13.09	10.57	-37.67	-68.16	24.67
9 251.20	H	-35.53	13.09	10.57	-38.05	-68.54	25.05
Middle Channel(1 880.0 ㎒)							
9 399.64	V	-34.39	13.12	10.46	-37.05	-67.54	24.05
9 400.19	H	-33.42	13.12	10.46	-36.08	-66.57	23.08
High Channel(1 909.8 ㎒)							
9 548.70	V	-33.85	13.49	10.42	-36.92	-67.41	23.92
9 549.00	H	-33.52	13.49	10.42	-36.59	-67.08	23.59

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dB m) - Cable loss (dB) + Ant. gain (dB d/dB i)
2. No more harmonic above 6rd harmonic for all channel.

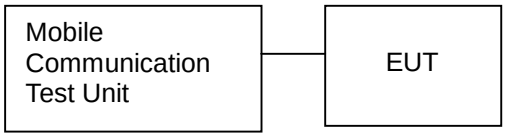
3. Conducted Output Power

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	**33.18**	33.15	30.50	28.97	27.50
	836.6	**33.17**	33.17	30.48	28.95	27.49
	848.8	**33.18**	33.16	30.54	29.01	27.54
GSM1900	1 850.2	**30.08**	30.07	27.49	26.00	24.55
	1 880.0	**30.07**	30.06	27.46	25.98	24.55
	1 909.8	**30.10**	30.09	27.50	25.99	24.56

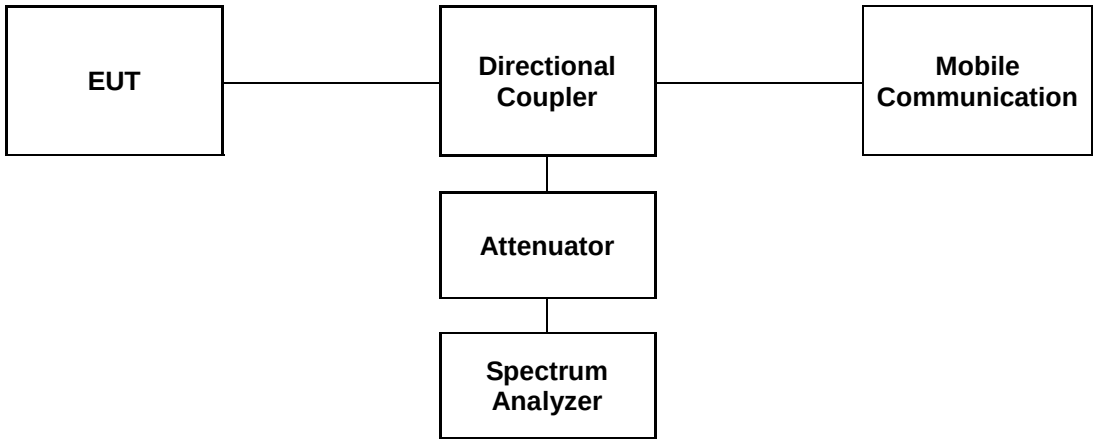
4. Occupied Bandwidth 99 %

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



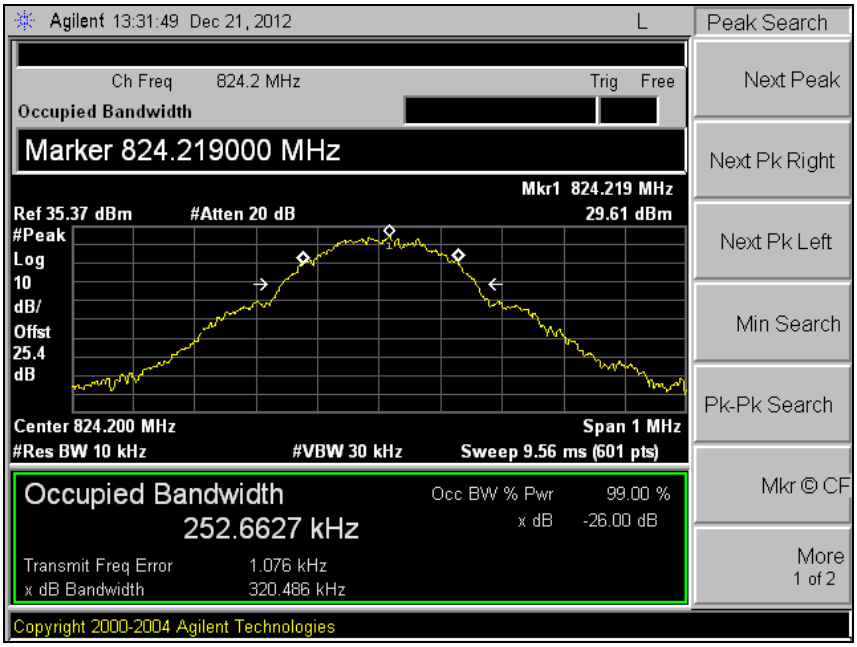
4.3 Test Results

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

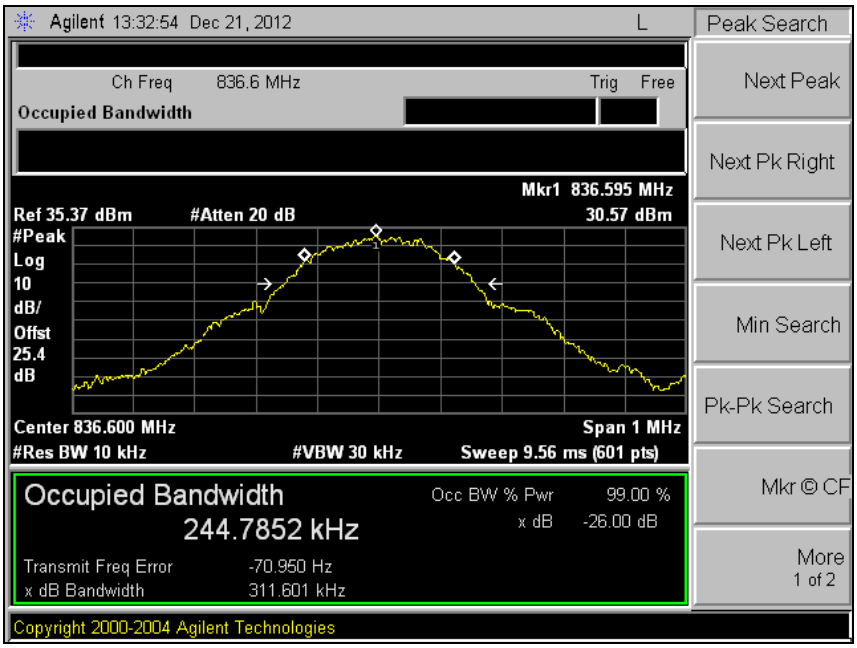
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
GSM850	Voice	824.2	0.253
		836.6	0.245
		848.8	0.240
GSM1900	Voice	1 850.2	0.245
		1 880.0	0.244
		1 909.8	0.246

Please refer to the following plots.

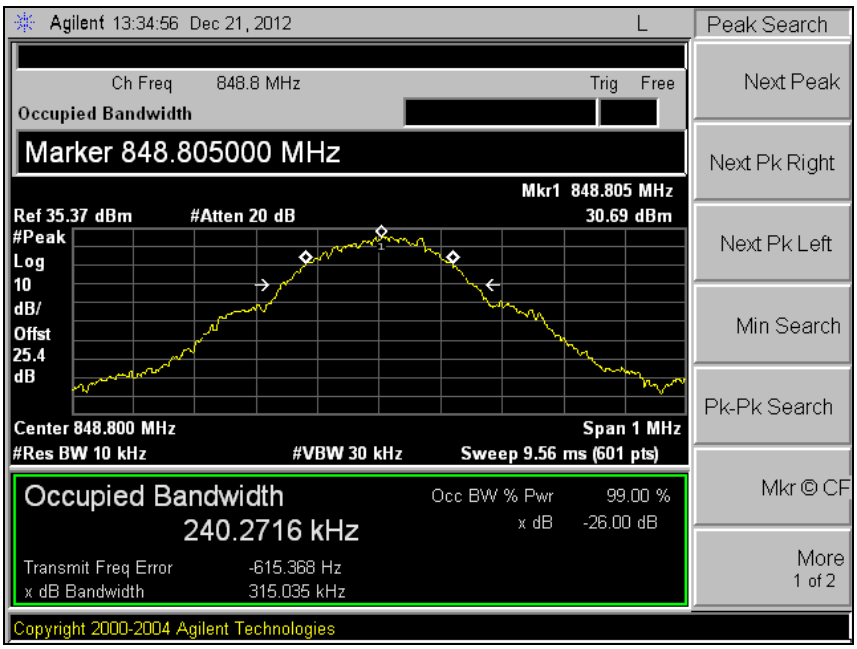
GSM850
99 %
Low Channel



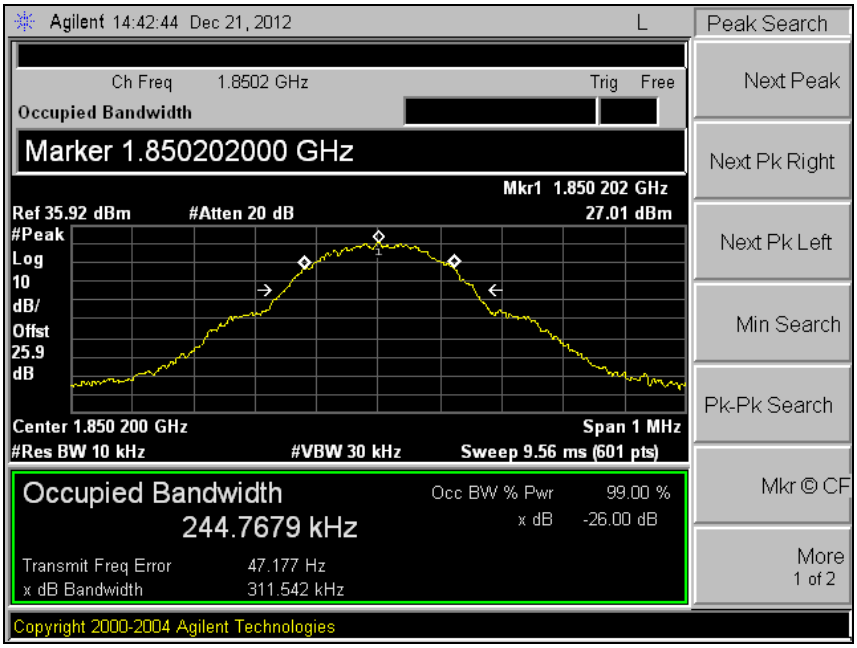
Middle Channel



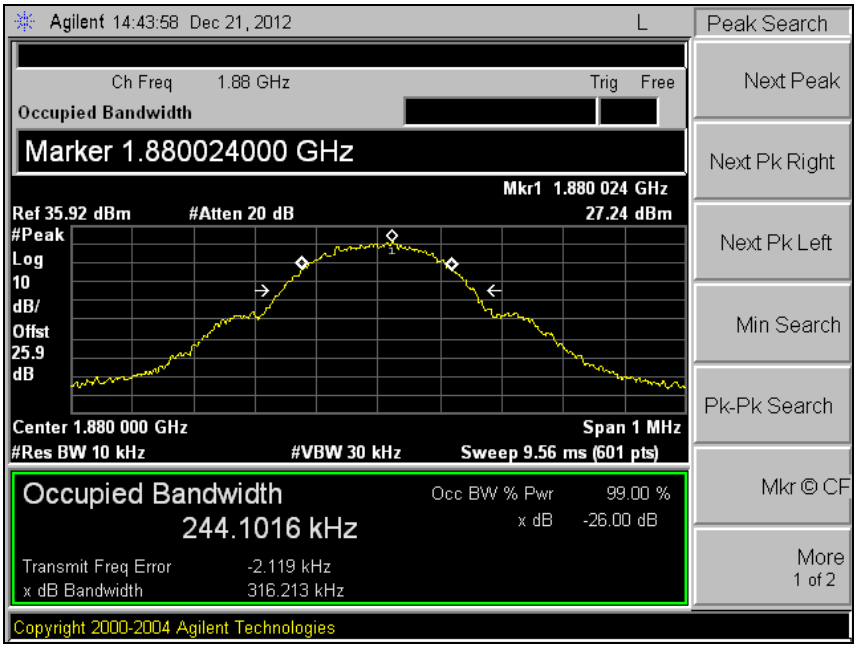
High Channel



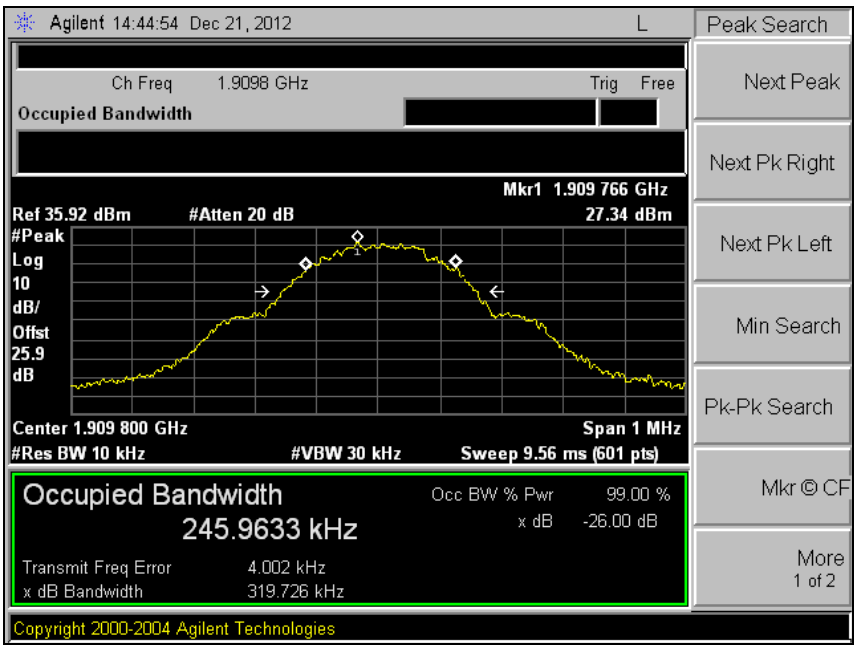
GSM1900
99 %
Low Channel



Middle Channel



High Channel



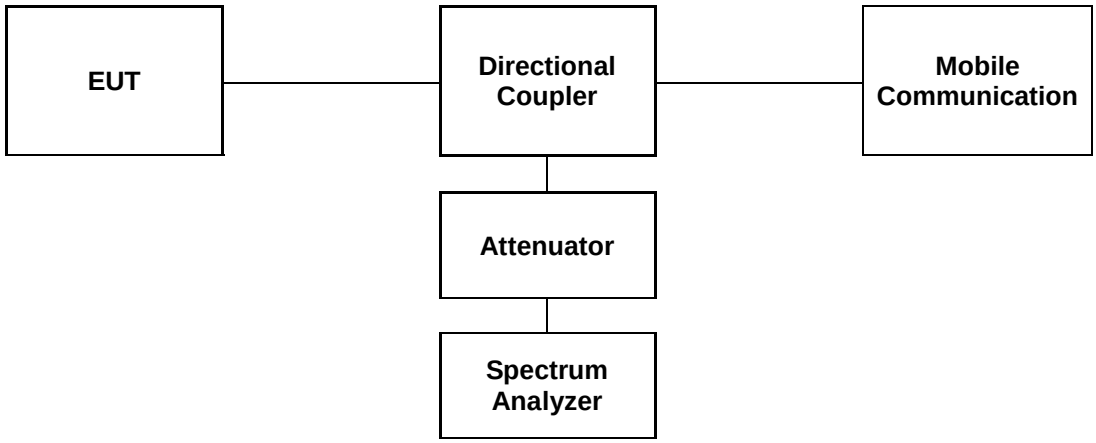
5. Peak-Average Ratio

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.

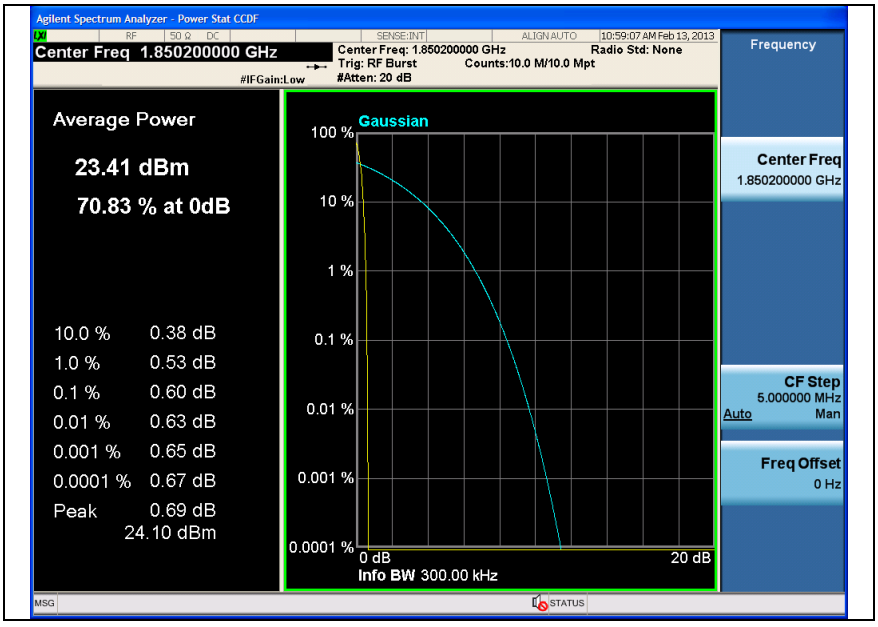


5.3 Test Results

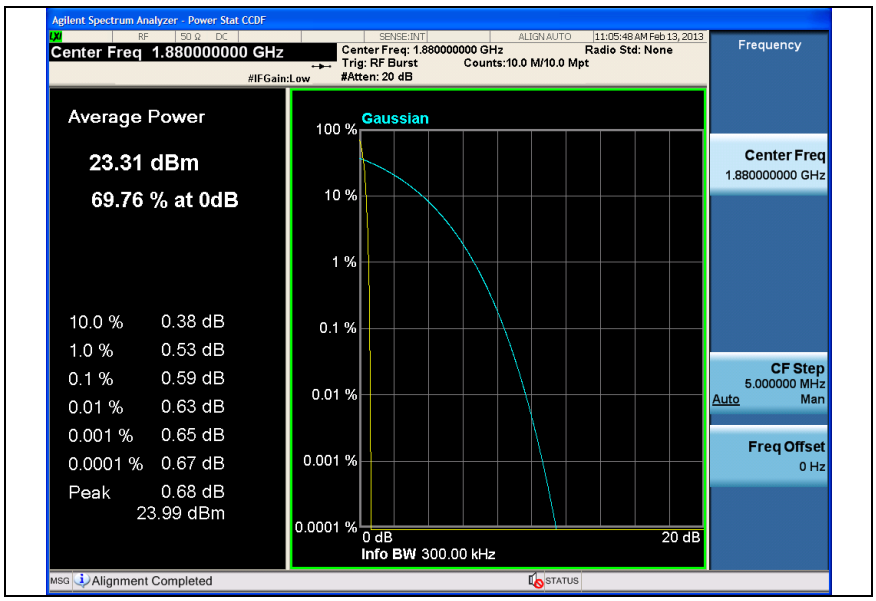
Ambient temperature	:	(24 ± 2) ℃
Relative humidity	:	47 % R.H.

Please refer to the following plots.

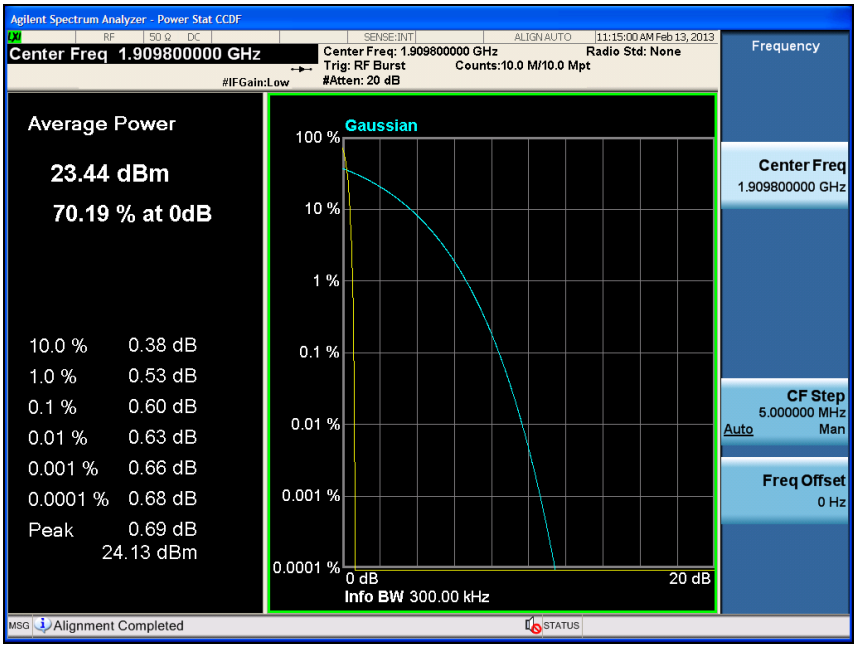
GSM1900
Low Channel



Middle Channel



High Channel



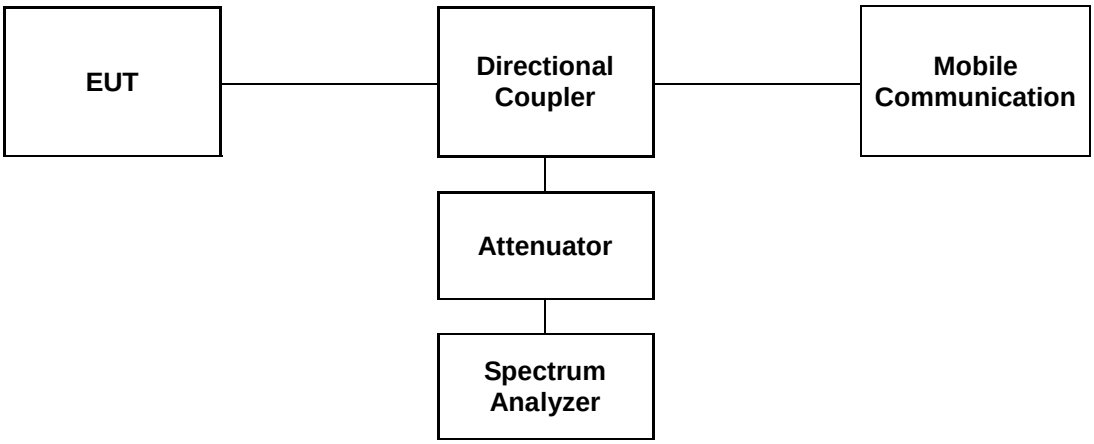
6. Spurious Emissions at Antenna Terminal

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.

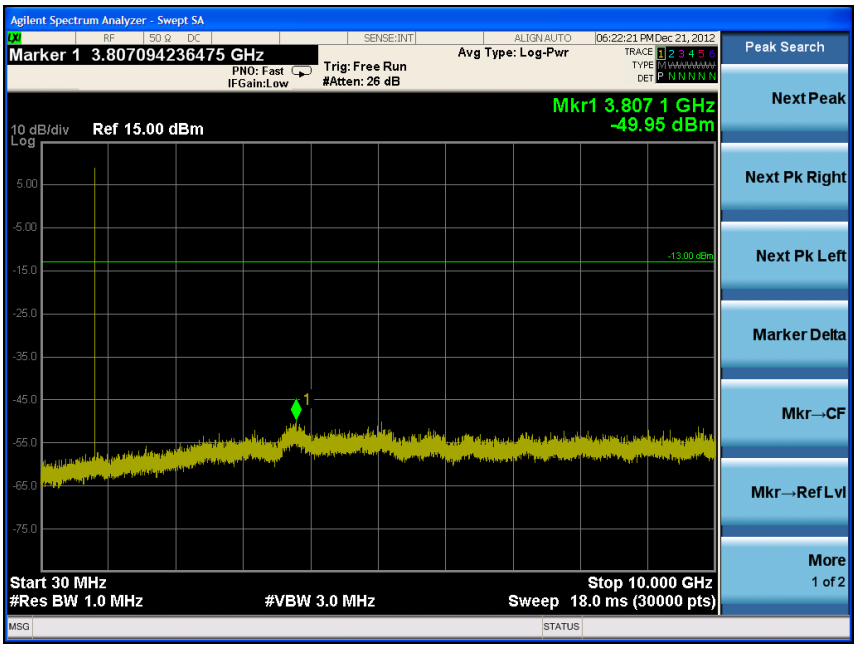


6.3. Test Results

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

Please refer to the following plots.

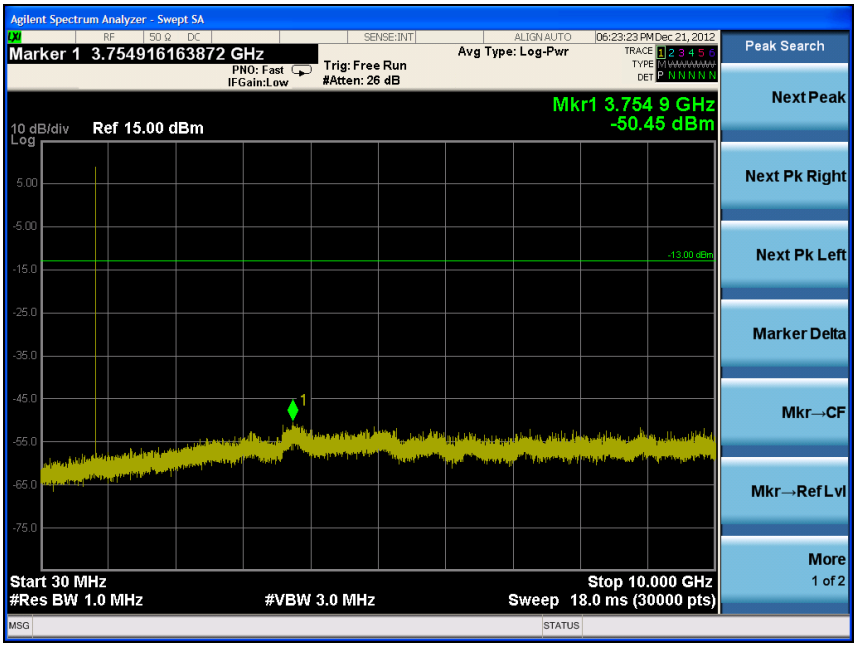
GSM850
Low Channel



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)
3 807.10	Noise Level	-	-

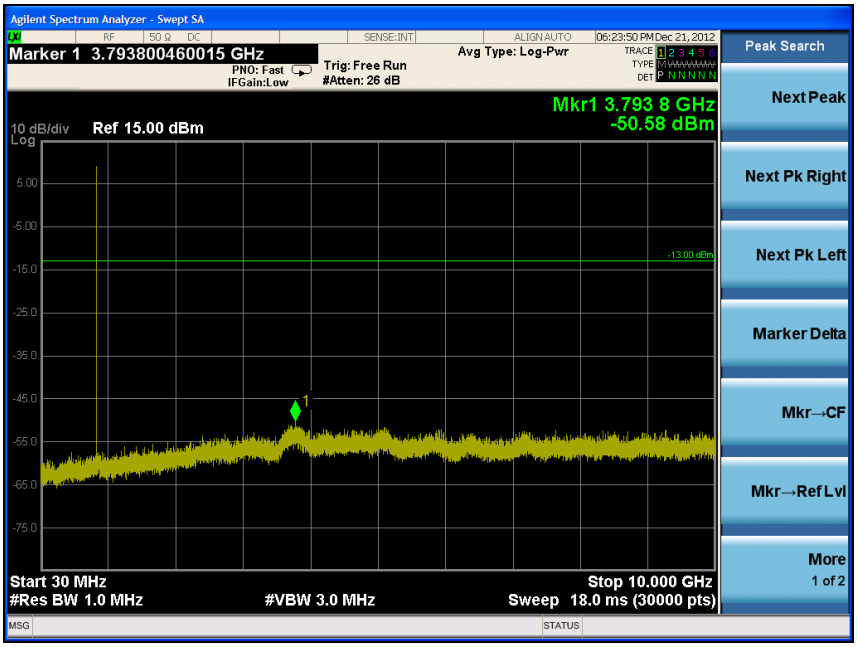
Middle Channel



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)
3 754.90	Noise Level	-	-

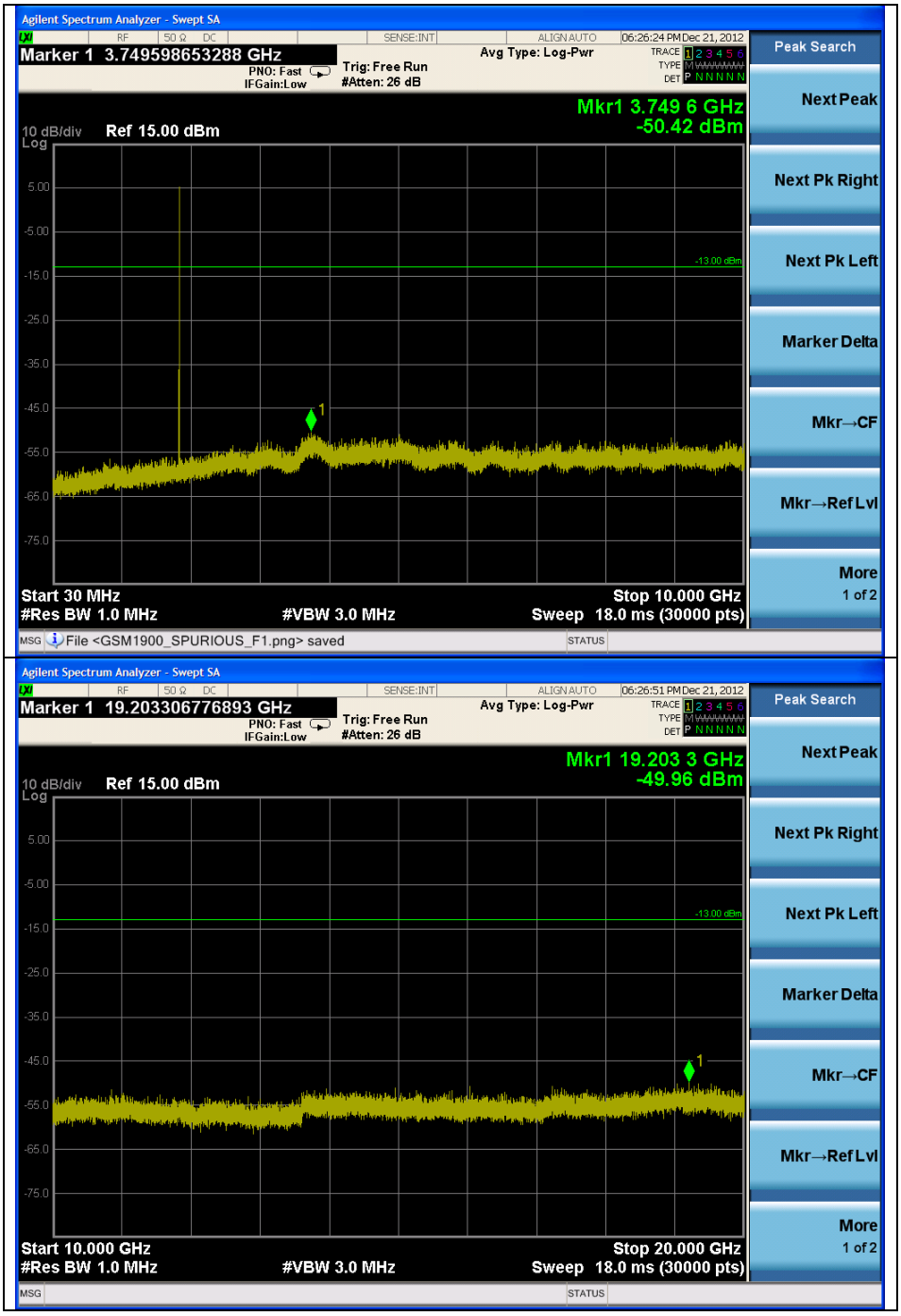
High Channel



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)
3 793.80	Noise Level	-	-

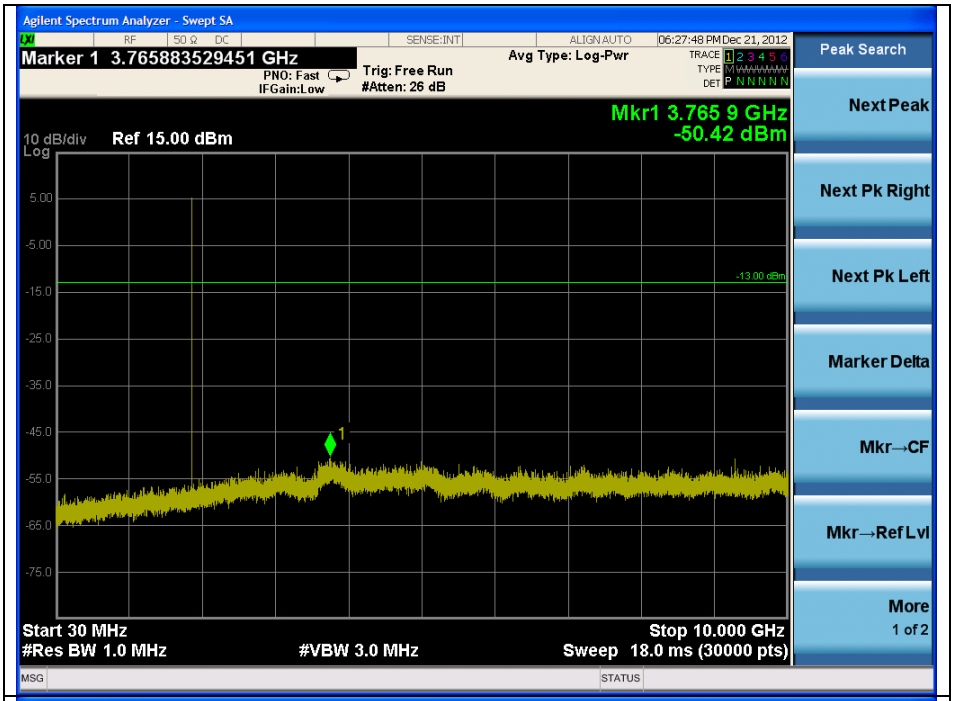
GSM1900
Low Channel

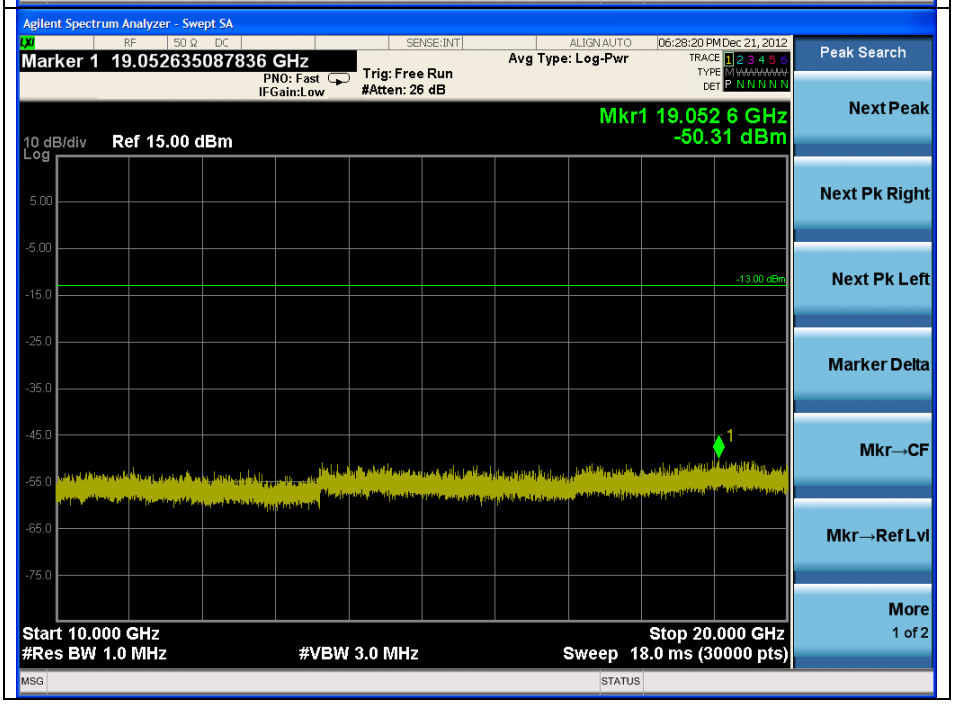


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 749.60	Noise Level	-	-
19 203.30	Noise Level	-	-

Middle Channel

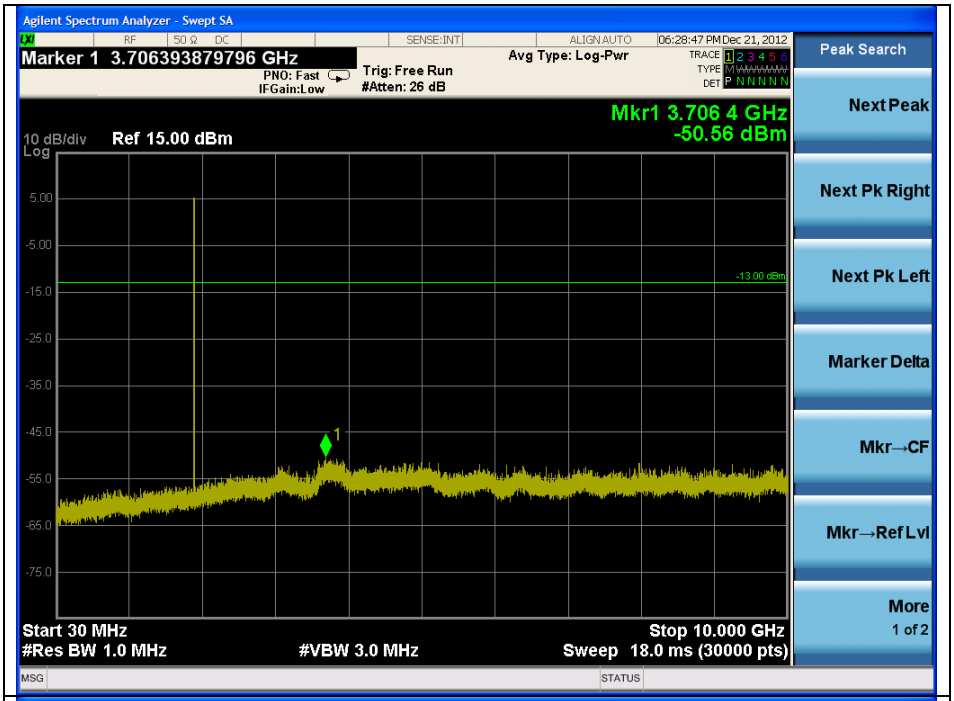


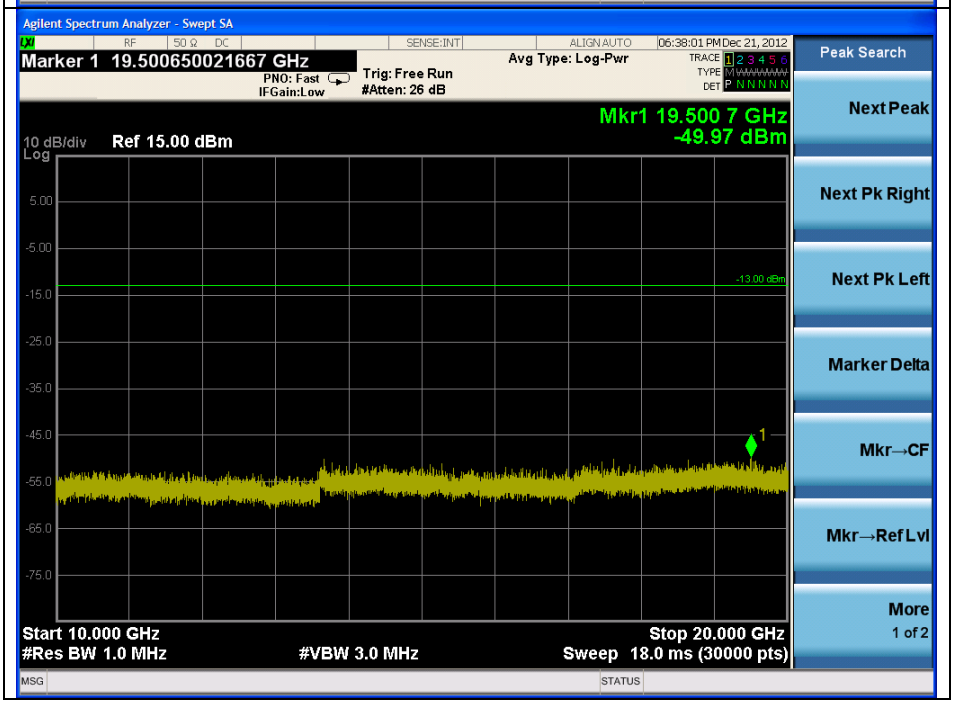


Note:
Offset (dB) = Directional Coupler (dB) + Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
3 765.90	Noise Level	-	-
19 052.60	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)
3 706.40	Noise Level	-	-
19 500.70	Noise Level	-	-

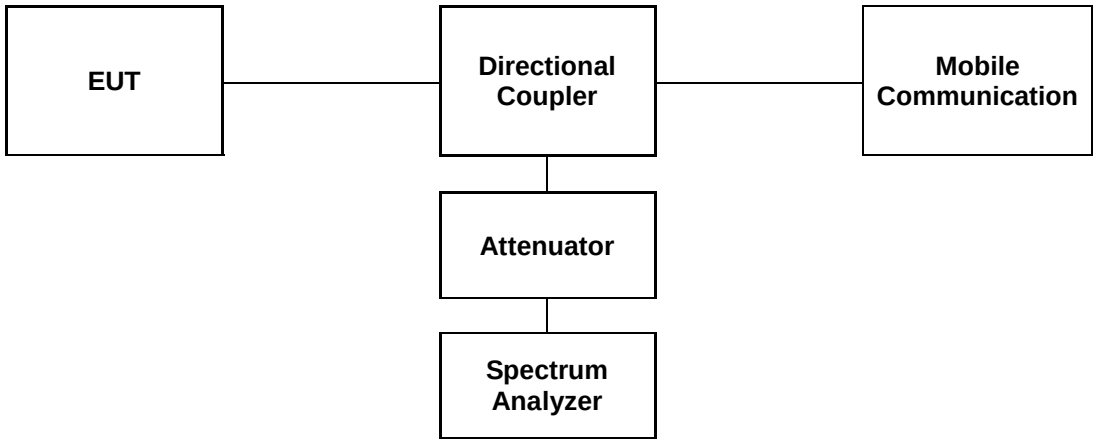
7. Band Edge

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.



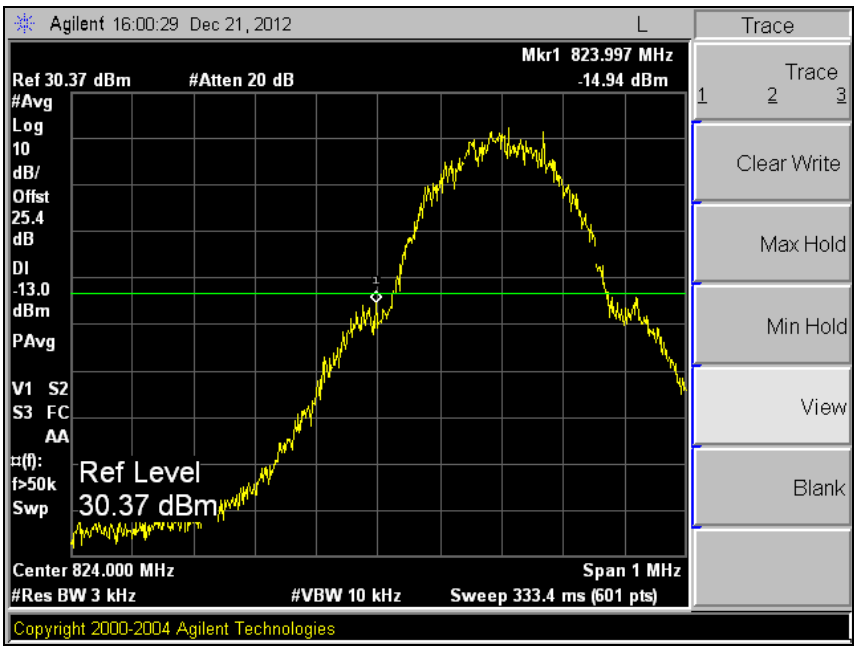
7.3. Test Results

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

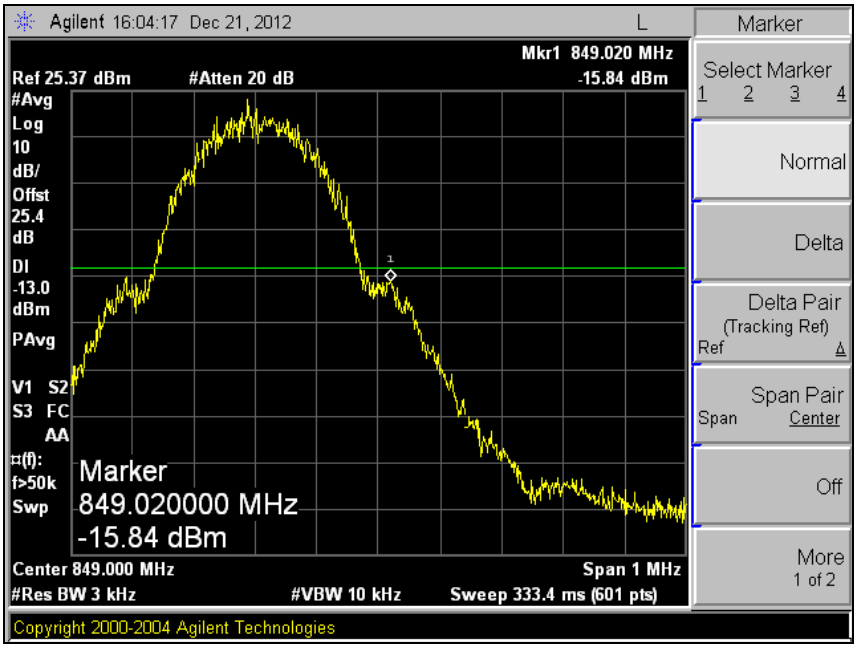
Please refer to the following plots.

GSM850

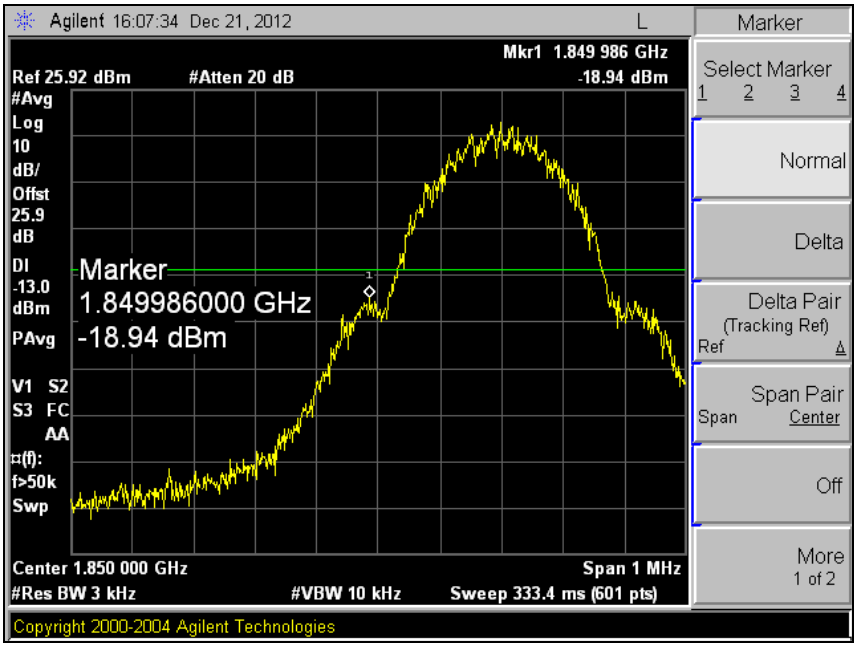
Low Channel



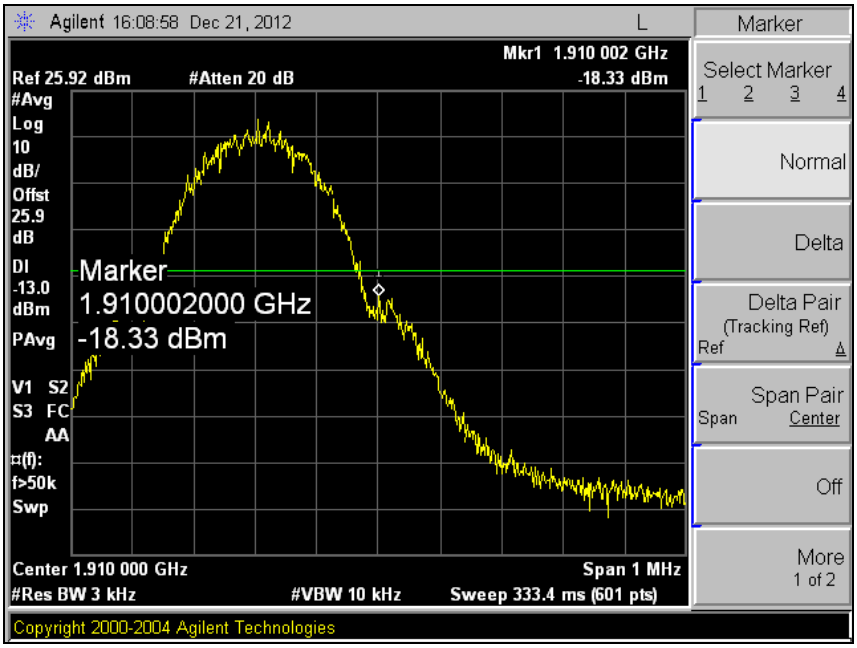
High Channel



GSM1900
Low Channel



High Channel



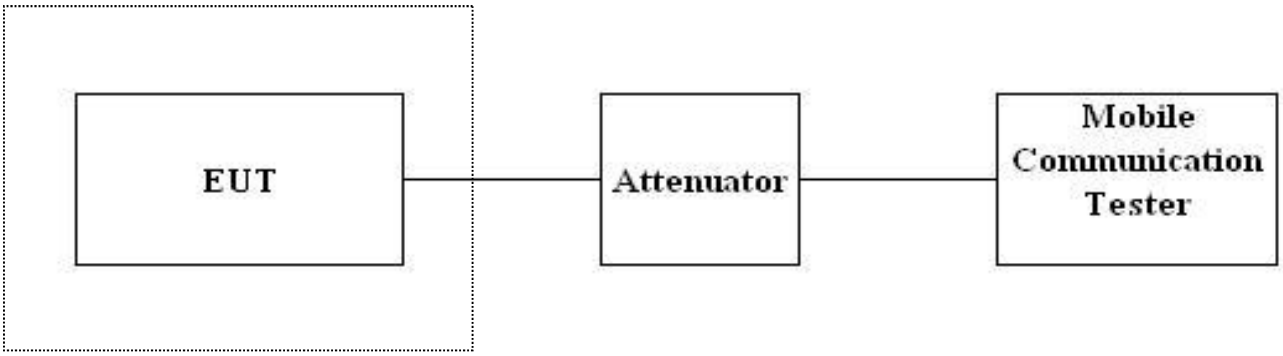
8. Frequency Stability

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 821 to 896 ㎒ 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	3.8	-17	-0.020
40		-20	-0.024
30		-6	-0.007
24		-11	-0.013
10		-9	-0.011
0		7	0.008
-10		3	0.004
-20		-10	-0.012
-30		10	0.012
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**Ppm**
24	4.18(+10%)	-13	-0.016
	3.33(batt. End point)	-18	-0.022

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	3.8	-6	-0.003
40		-10	-0.005
30		-9	-0.005
24		-19	-0.010
10		-12	-0.006
0		3	0.002
-10		-5	-0.003
-20		7	0.004
-30		12	0.006
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (Hz)	**ppm**
24	4.18(+10%)	-24	-0.013
	3.33(batt. End point)	-30	-0.016