Lab Code: 200167-0

FCC PART 22 SUBPART H
MEASUREMENT AND TEST REPORT

For

Linktop Technology Co., Ltd.

Guangye Building, Houju Hi-Tech Zone,
Xiamen, Fujian, China

FCC ID: VH4-WP635MS07

Report Type:	**Equipment Type:**
☒ Original Report	GSM Fixed Wireless Phone

Test Engineer:	Dan Coronia
Report Number:	R0707186-22
Report Date:	2007-07-19
Reviewed By:	Daniel Deng
Prepared By: **(63)**	Bay Area Compliance Laboratories Corp. (BACL) 1274 Anvilwood Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This BACL measurement and test report has been compiled on behalf of *Linktop Technology Co., Ltd.* and their product *FCC ID: VH4-WP635MS07, model: WP635* or the EUT as referred to in the rest of this report. The EUT is a GSM Fixed (desktop) wireless phone that has an operating frequency range of 824.2-848.8 MHz.

1.2 Antenna Information

Item Number	Antenna Information	
Antenna 1	Model number:	TQZ-WZ-3-850/900/1800/18001900V-5
	Manufacturer:	Huahong
	Frequency Range:	824~960 MHz, and 1710~1990 MHz
	Connector Type/ Maximum Gain	RP SMA, 2.5 dBi @ 824~960 MHz, 3.0 dBi @ 1710~1990
	Pattern:	Vertical / omni directional
	Measurement:	Length: 208 mm (L) x 10 mm (D)

1.3 Mechanical Description

The EUT is of plastic construction with approximate measurement of 168 mm (L) x 198 mm (W) x 60 mm (H) and weighs approximately 663 g.

** The test data gathered are from typical production sample, serial number: M635Z7705004 provided by Manufacturer.*

1.4 1.3 EUT Photo:

Please see additional photos in Exhibit C

1.5 Objective

This type approval report is prepared on behalf of *Linktop Technology Co., Ltd.* in accordance with Part 2, Subpart J, Part 22 Subpart H of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

1.6 Related Submittal(s)/Grant(s)

No Related Submittals.

1.7 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services

Applicable Standards: TIA/EIA 603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.8 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603 C.

The final qualification test was performed with the EUT set to normal mode.

2.2 Equipment Modifications

No modifications were made to the EUT.

2.3 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Not Labeled	AC/DC Adaptor	SW-002	2006021607094891
B&K Electronic Co., Ltd.	3.6VDC Backup Battery	JC-08BP	GB/T18287-2000

2.4 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Agilent	Wireless Communications Test Set	8960 Series 10 E5515C	GB44051221
Dell	Laptop	Inspiron 1300	CN-0RJ272-70166-69A-03TC
Mini-Circuits	Splitter	ZFRSC-42	SF874700404

2.5 Interface Ports and Cabling

Cable Description	Length (M)	Cable Type	From	To
RF cable	0.2	Shielded	Communications test set	Splitter
RF cable	0.4	Shielded	Antenna port on EUT	Splitter
Data cable	0.5	Un-shielded	Communications test set	Laptop

3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 2.1047	Modulation Characteristics	Compliant
§ 2.1053	Field Strength of Spurious Radiation	Compliant
§2.1091	RF Exposure	Compliant
§ 2.1046, § 22.912 (d)	RF Output Power	Compliant
§ 2.1049, § 22.917, § 22.905	Out of Band Emissions, Occupied Bandwidth	Compliant
§ 2.1051, § 22.917	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a), § 2.1055 (d), § 22.355	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917	Band Edge	Compliant

4 §2.1047 - MODULATION CHARACTERISTIC

4.1 Applicable Standard

Requirement: FCC § 2.1047.

4.2 Test Procedure

GSM digital mode is used by EUT. Connect EUT to Simulator and spectrum analyzer, check the waveform.

4.2.1 Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

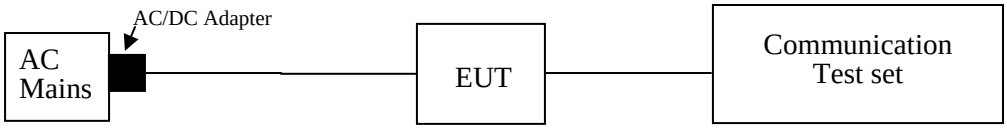
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08

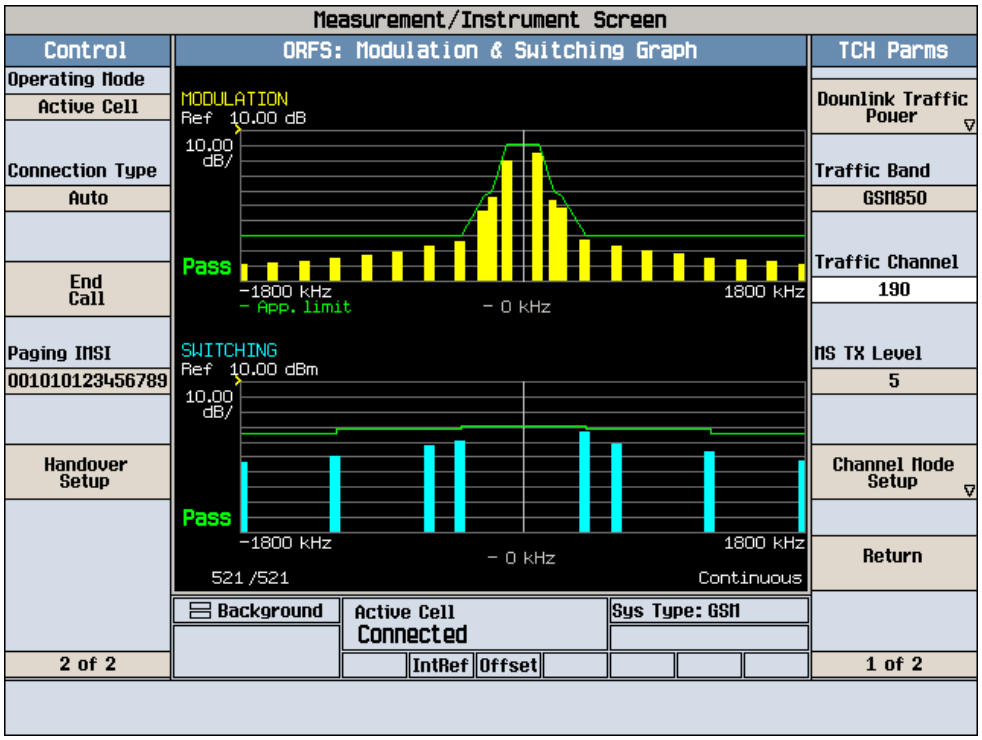
Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

4.4 Test Setup Block Diagram



4.5 Test Results

Please refer to the hereinafter plots.



5 §1.1307(b) (1) & §2.1091 - RF EXPOSURE

5.1 Applicable Standard

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

5.2 MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

GSM Band

Maximum peak output power at antenna input terminal (dBm):	30.86
Maximum peak output power at antenna input terminal (mW):	1219
Prediction distance (cm):	20
Prediction frequency (MHz):	848.8
Antenna Gain, typical (dBi):	2.5
Maximum Antenna Gain (numeric):	1.78
Power density at predication frequency at 20 cm (mW/cm^2):	0.432
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.566

5.3 Test Result

The EUT is a mobile device. The power density level at 20 cm is 0.432 mW/cm^2, which is below the uncontrolled exposure limit of 0.566 mW/cm^2 at 848.8MHz for GSM band.

6 §2.1053 - SPURIOUS RADIATED EMISSIONS

6.1 Applicable Standard

Requirements: CFR 47, § 2.1053, § 22.917.

6.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

6.2.1 Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

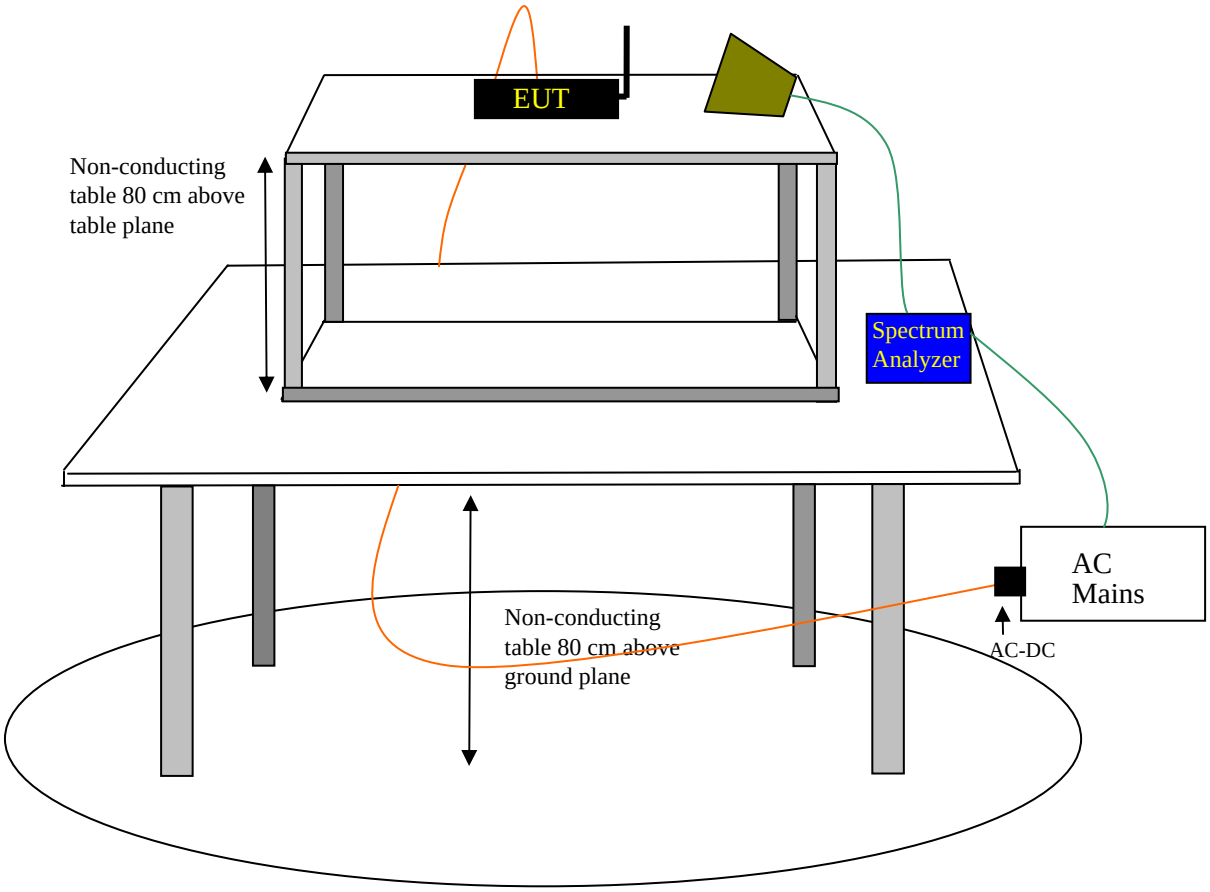
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2008-02-23
Agilent	Amplifier, Pre	8447D	2944A10198	2007-08-17
Agilent	Pre amplifier	8449B	3008A01978	2007-08-10
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	2007-10-18
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2008-06-07
HP	Generator, Signal	8648C	3426A01345	2007-10-10
A.R.A	Antenna Horn	DRG-118/A	1132	2007-08-17
Wainwright	Filter, Band Reject	WRCG823/850-813/860-40/8SS	2	N/A
Wainwright	Filter, Band Reject	WRCG1850/1910-1835/1925-40/8SS	5	N/A

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.4 Test Setup Block Diagram



6.5 Test Result

Worst case reading as follows:

GSM 850

-6.2 dB at 1673.20 MHz

Run # 1: 30MHz -10GHz GSM 850 Band @ Middle Channel

Indicated		Azimuth Degrees	Test Antenna		Substituted		Antenna Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	Amplitude (dBuV)		Height (m)	Polar. H/V	Freq. (MHz)	Level (dBm)					
1673.20	52.67	104	2.0	H	1673.20	-48.10	8.7	1.3	-40.7	-13	-27.7
1673.20	52.50	222	2.3	V	1673.20	-48.80	8.7	1.3	-41.4	-13	-28.4
2509.80	51.67	129	2.4	V	2509.80	-49.73	9.5	1.6	-41.8	-13	-28.8
2509.80	46.17	100	2.1	H	2509.80	-52.35	9.5	1.6	-44.5	-13	-31.5
3346.40	44.17	121	2.2	V	3346.40	-53.47	10.2	2.2	-45.5	-13	-32.5
3346.40	44.83	152	2.0	H	3346.40	-54.00	10.2	2.2	-46.0	-13	-33.0
4183.00	43.33	160	1.4	V	4183.00	-55.20	11.1	2.5	-46.6	-13	-33.6
4183.00	43.20	140	1.8	H	4183.00	-55.15	11.1	2.5	-46.6	-13	-33.6

7 §2.1046 & §22.912(d) – RF OUTPUT POWER

7.1 Applicable Standard

According to FCC §2.1046 and §22.912 (d), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watt.

7.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

7.2.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

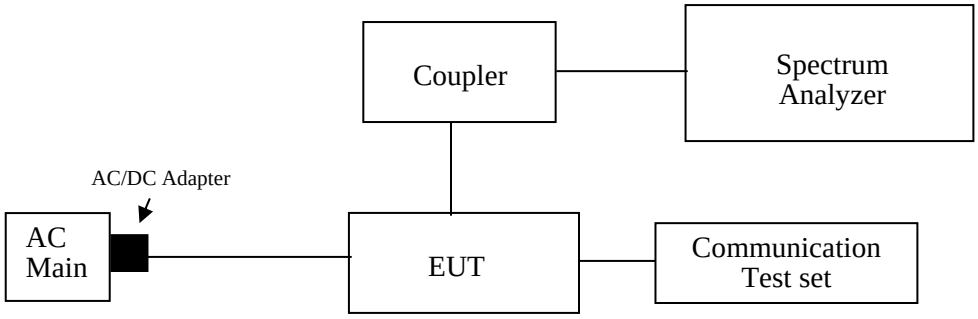
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2008-02-23

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

7.4 Test Setup Block Diagram



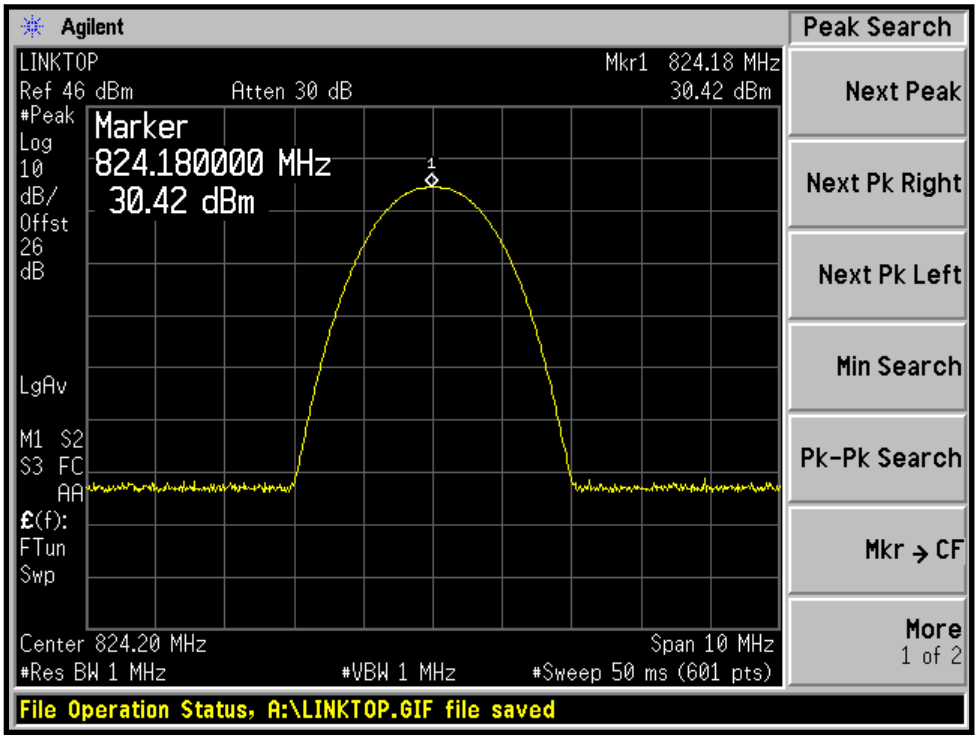
7.5 Test Results

GSM band, Part 22:

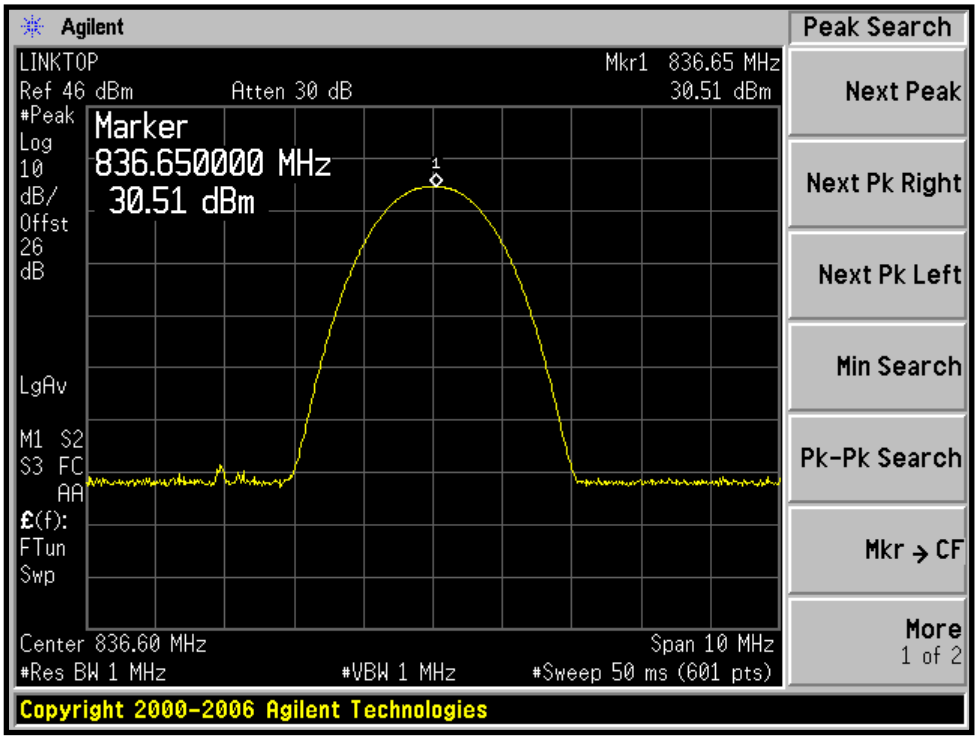
Channel	Frequency (MHz)	Conducted Output Power (dBm)	Output Power (Watt)	Limit (Watt)
LOW	824.2	30.42	1.10	7
MIDDLE	836.6	30.51	1.12	7
HIGH	848.8	30.86	1.22	7

7.6 Plots of Conducted Output Power for Part 22H

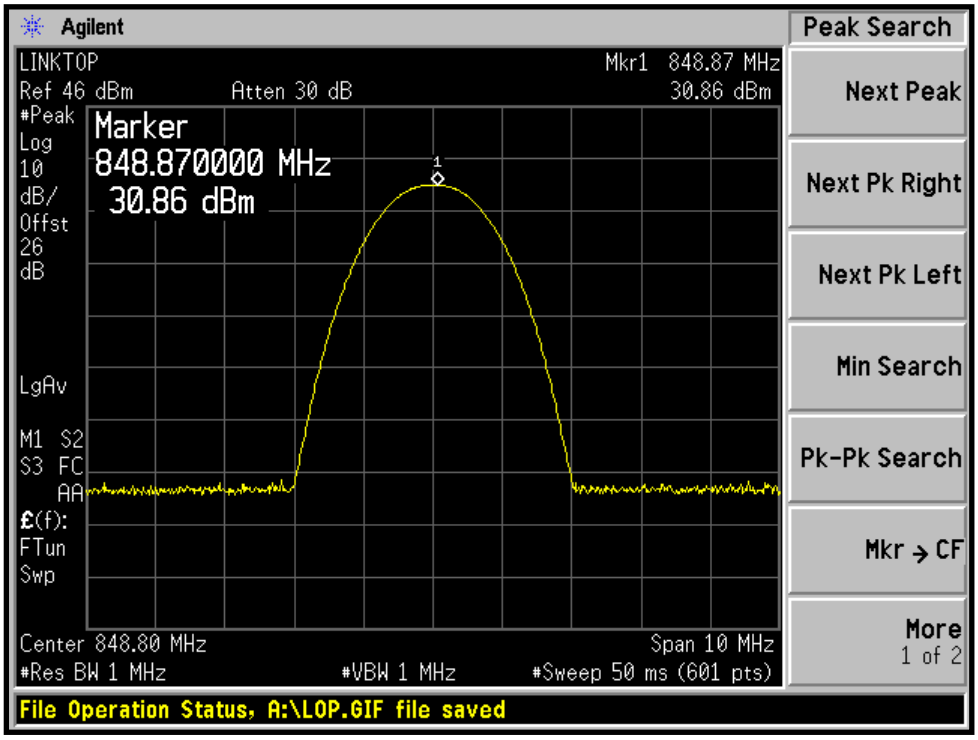
Low Channel



Middle Channel



High Channel



8 §2.1049, §22.917 & §22.905 - OCCUPIED BANDWIDTH

8.1 Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 22.901, Section 22.917.

8.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz (GSM) and the 26 dB & 99% bandwidth was recorded.

8.2.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

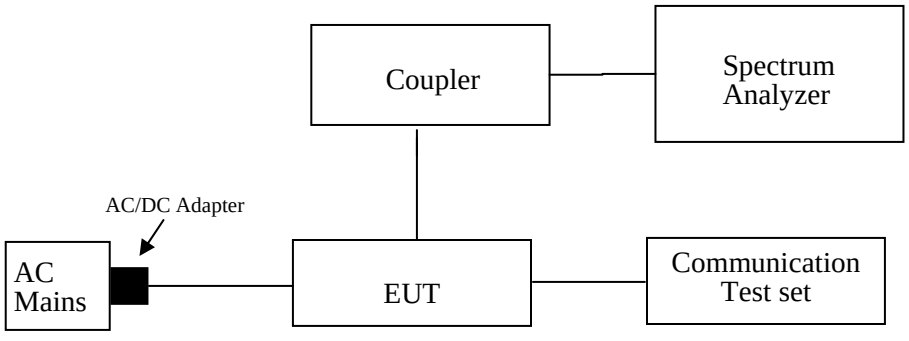
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2008-02-23

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.4 Test Setup Block Diagram



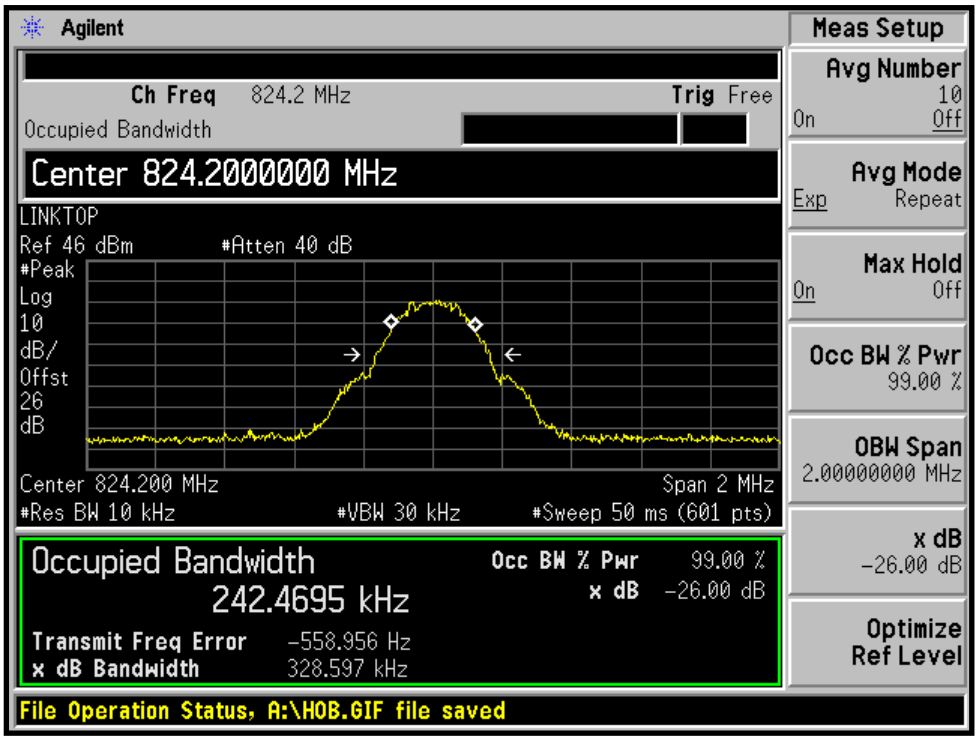
8.5 Test Results

GSM band, Part 22H:

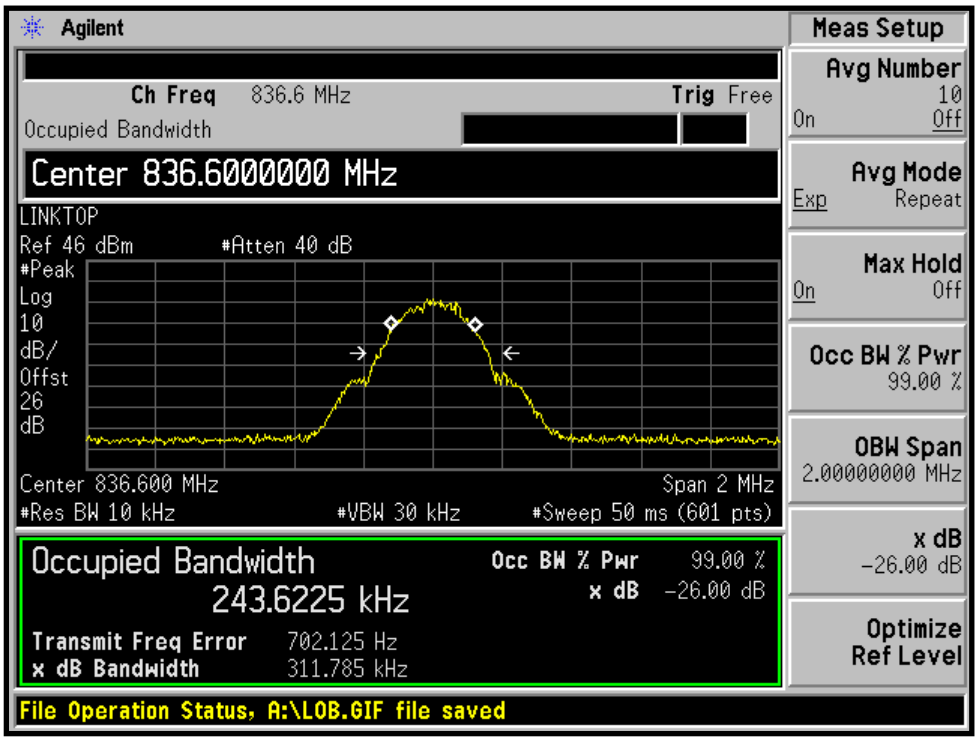
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
LOW	824.2	0.2425
MIDDLE	836.6	0.2436
HIGH	848.8	0.2467

Please refer to the plots attached.

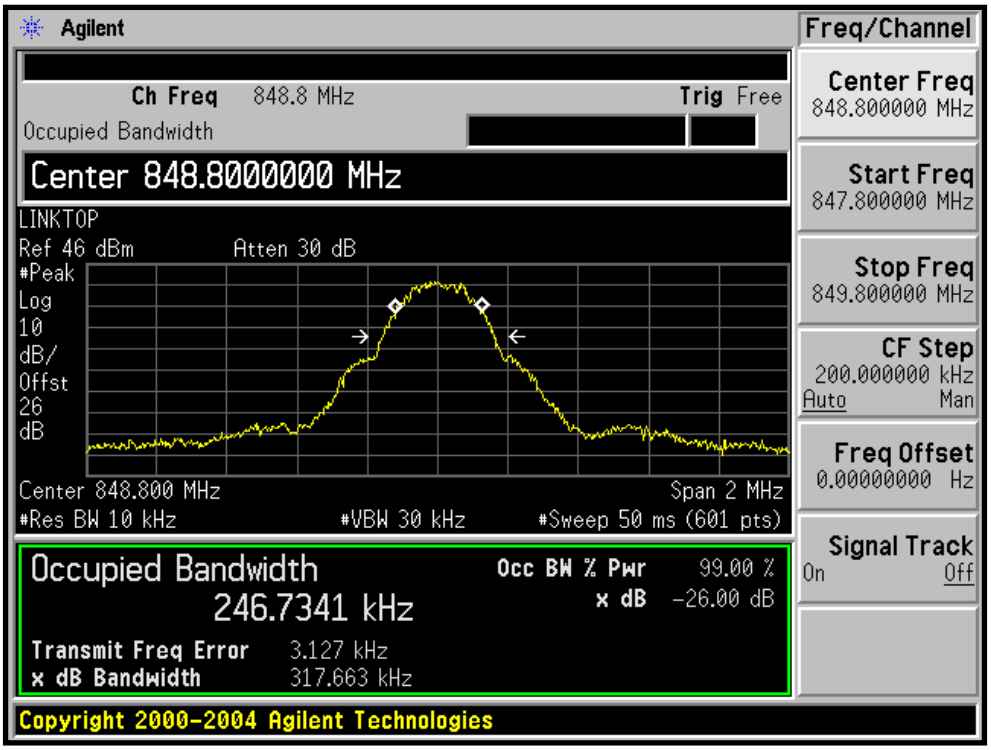
Low Channel



Middle Channel



High Channel



9 §2.1051 & §22.917 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

9.1 Applicable Standard

Requirements: CFR 47, § 2.1051 & § 22.917.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

9.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

9.2.1 Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

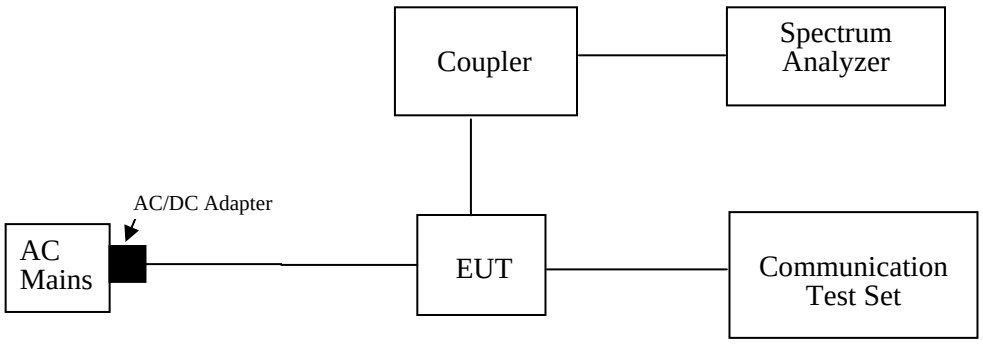
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2008-02-23

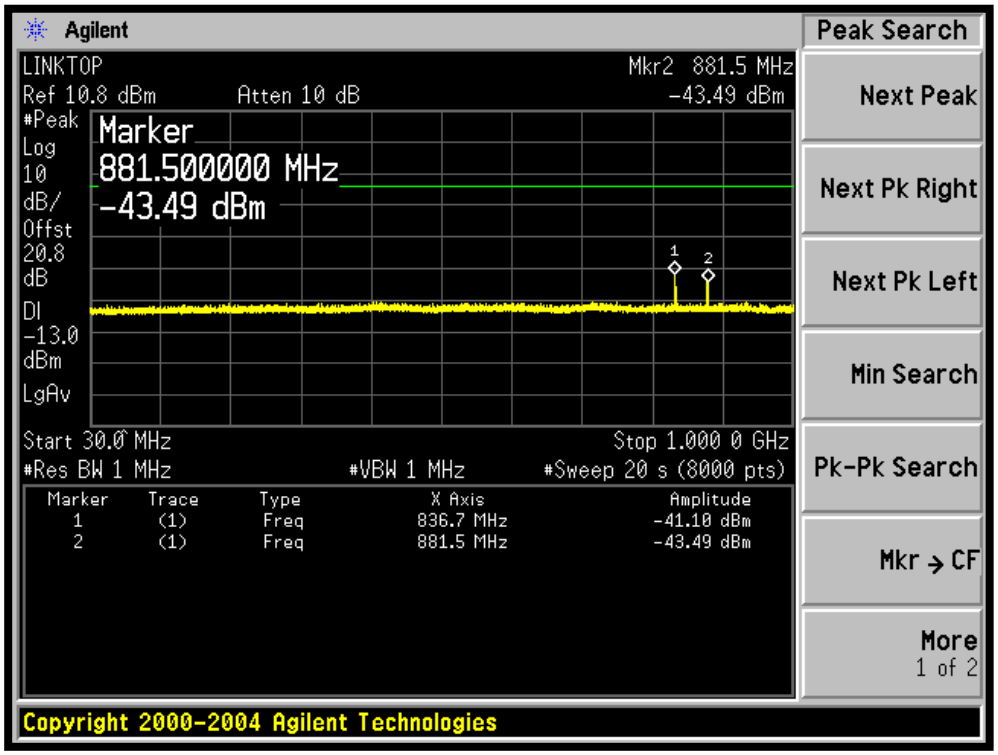
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

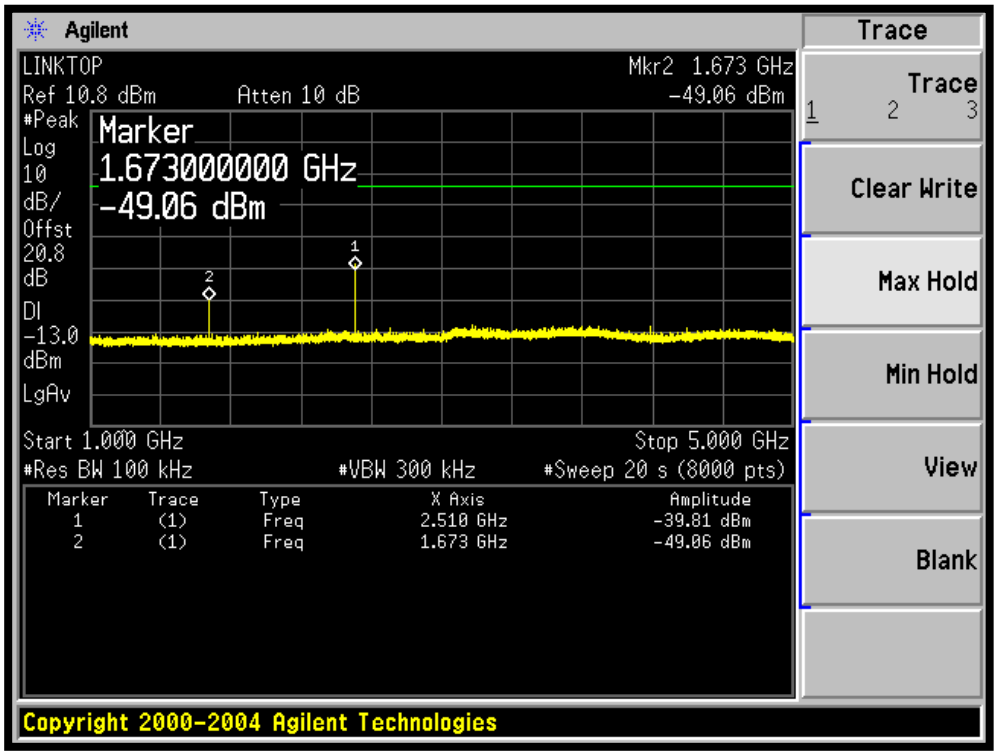
9.4 Test Setup Block Diagram

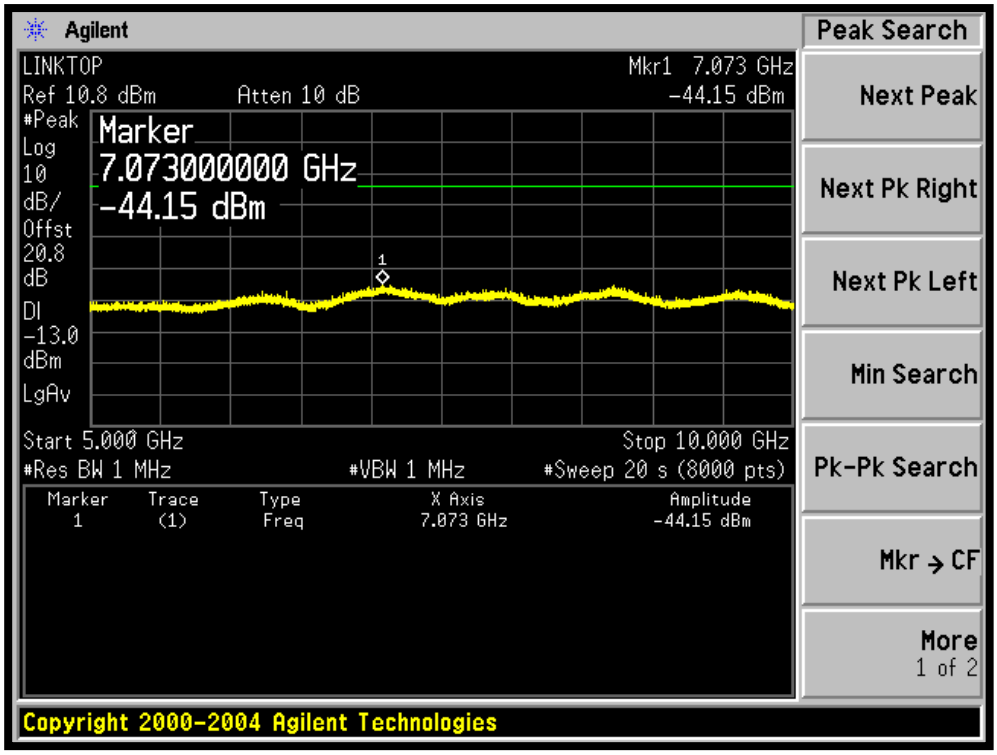


9.5 Test Results

Plots of Spurious Emissions at antenna port @ Middle channel






Agilent
LINKTOP
Ref 10.8 dBm
Atten 10 dB
Mkr1 7.073 GHz
-44.15 dBm
#Peak
Log
10
dB/
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dB
Dl
-13.0
dBm
LgAv
Marker
7.073000000 GHz
-44.15 dBm
Start 5.000 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 10.000 GHz
#Sweep 20 s (8000 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 7.073 GHz -44.15 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
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10 §2.1055 (a), §2.1055 (d) & §22.355 - FREQUENCY STABILITY

10.1 Applicable Standard

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 C-1 of this section.

Table C-1_Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile [le]3 watts (ppm)	Mobile [le]3 watts (ppm)
25 to 50.....	20.0	20.0	50.0
50 to 450.....	5.0	5.0	50.0
450 to 512.....	2.5	5.0	5.0
821 to 896.....	1.5	2.5	2.5
928 to 929.....	5.0	n/a	n/a
929 to 960.....	1.5	n/a	n/a
2110 to 2220.....	10.0	n/a	n/a

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

10.2.1 Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

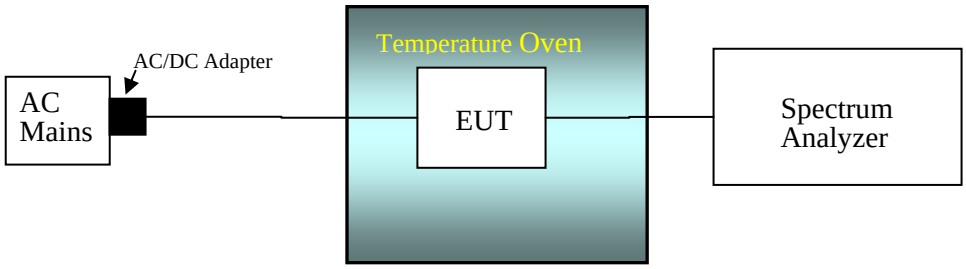
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	200802-23
Tenney	Oven, Temperature	VersaTenn	12.222-193	2007-06-04

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

10.4 Test Setup Block Diagram



10.5 Test Results

With AC adaptor

Frequency Stability versus Temperature

Reference Frequency: 836.600 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Error (ppm)
50	120	836.599969	-0.0371
40	120	836.599968	-0.0383
30	120	836.599976	-0.0287
20	120	836.599982	-0.0215
10	120	836.599971	-0.0347
0	120	836.599967	-0.0394
-10	120	836.599987	-0.0155
-20	120	836.599976	-0.0287
-30	120	836.599963	-0.0442

Frequency Stability versus Voltage

Reference Frequency: 836.6 MHz, Limit: 2.5ppm			
Power Supplied (VAC)	Environment Temperature (°C)	Measured Frequency (MHz)	Error (ppm)
102	20	836.599989	-0.0135
138	20	836.599967	-0.0155

With Rechargeable Battery

Frequency Stability versus Temperature

Reference Frequency: 836.600 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Error (ppm)
50	3.6	836.599982	-0.0215
40	3.6	836.599971	-0.0347
30	3.6	836.599976	-0.0287
20	3.6	836.599969	-0.0371
10	3.6	836.599987	-0.0155
0	3.6	836.599967	-0.0394
-10	3.6	836.599963	-0.0442
-20	3.6	836.599968	-0.0383
-30	3.6	836.599976	-0.0287

Frequency Stability versus Voltage

Reference Frequency: 836.6 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	Environment Temperature (°C)	Measured Frequency (MHz)	Error (ppm)
3.1	20	836.599986	-0.0136
4.1	20	836.599968	-0.0144

11 §22.917 – BAND EDGE

11.1 Applicable Standard

According to § 22.917, the power of any emissions 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.

11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.

11.2.1 Environmental Conditions

Temperature:	23° C
Relative Humidity:	55 %
ATM Pressure:	104.1 kPa

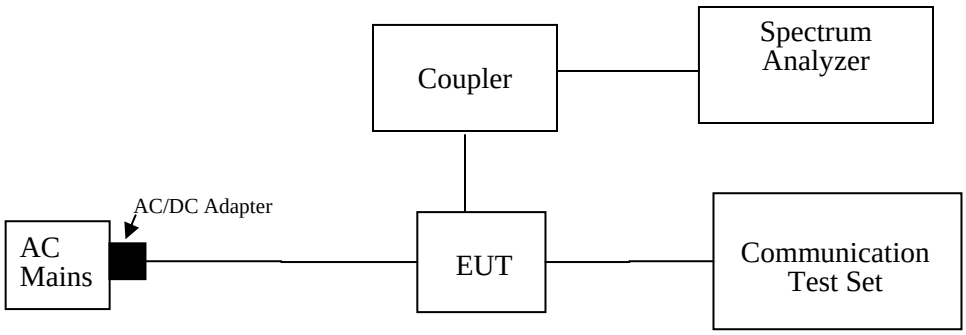
** The testing was performed by Dan Coronia from 2007-07-19 to 21*

11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
Agilent	Analyzer, Communications	E5515C	GB44051221	2007-08-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2008-02-23

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

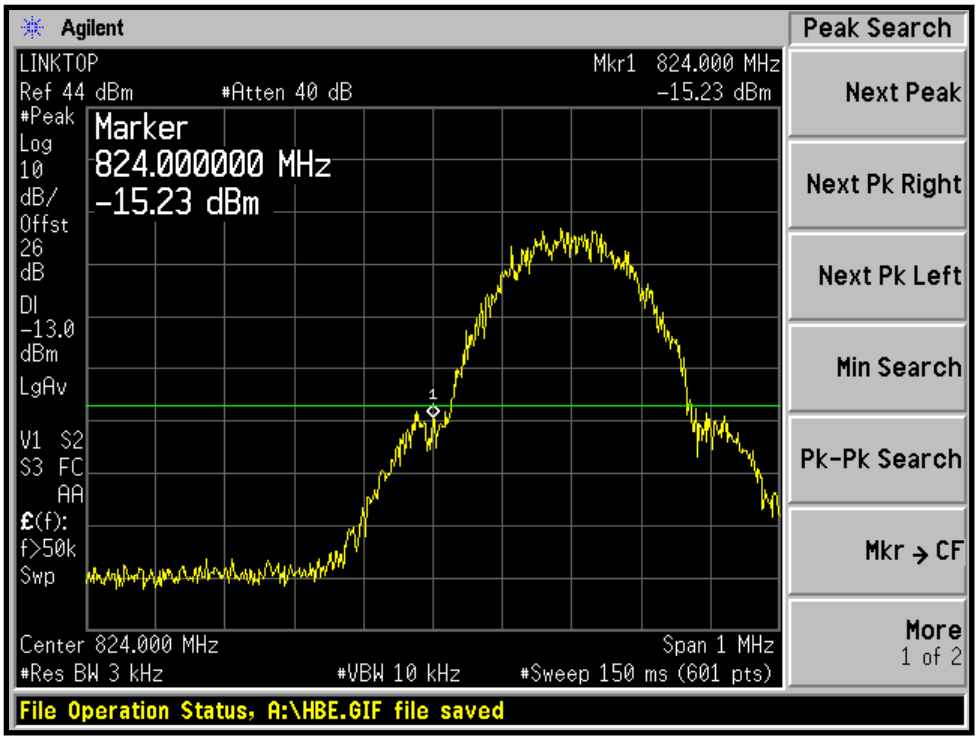
11.4 Test Setup Block Diagram



11.5 Test Results

Please refer to the following plots.

Lowest Channel



Highest Channel