



FCC TEST REPORT

Product Name	GSM Phone with Bluetooth
Model Name	KE970
Applicant	LG Electronics Inc.
FCC ID	BEJKE970

ESTECH CO., LTD

Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204



FCC Test Report

Report Number	ESTR0612-020			
Applicant	Company Name	LG Electronics Inc.		
	Address	459-9, Kasan-dong, Keumchun-ku, Seoul 153-023, Korea		
Product	Product Name	GSM Phone with Bluetooth		
	Model No.	KE970	Manufacturer	LG Electronics Inc.
	Serial No.	NONE	Country of origin	Korea
Other	Issued Date	2006-12-21	Tested Date	2006-11-27 ~ 2006-12-21
Test Result	PASS			
Standard	FCC PART 24 Subpart E			
Tested by	S.R. Kim/ Engineer  (Signature)			
Approved by	Jay Kim/ Engineering Manager  (Signature)			
ESTECH CO., LTD Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204				
o This is certified that the above mentioned products have been tested for the sample provided by client. o No part of this document may not be duplicated or reproduced by any means without the express written permission of Estech Co., Ltd.				



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1. General Information

1.1 EUT Description

FCC ID	BEJKE970
Product Name	GSM Phone with Bluetooth
Model Name	KE970
Frequency	Tx :1850.20 ~ 1909.80MHz
	Rx :1930.20 ~ 1989.80MHz
Channel	(Low: 512/Mid: 661/High: 810)
Modulation Type	GSM(GMSK), EDGE(8PSK)
Power Rating	3.7VDC(3.2 ~ 4.3VDC)



2. Laboratory Information

2.1 Laboratory Name Estech Co., Ltd.

2.2 Location

Head Office Rm. 1015, World Venture Center II, 426-5 Gasan-dong
Geumcheon-gu, Seoul, 153-803. Korea.

EMC Lab(Ichon) 58-1, Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea

EMC Lab(Yanggi) 97-1, Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

2.3 Quality System Accredited by KOLAS(ISO/IEC 17025)

2.4 Major Accredited Mark



Industry Industrie
Canada Canada



3. Summary of Test Results

Test Item	Standard	Result
RF Output Power	Part 24	PASS
Occupied Bandwidth		PASS
Spurious and Harmonic Emission at Antenna Terminal		PASS
Field Strength of Spurious Radiation		PASS
Frequency stability		PASS



4. RF Output Power

4.1 Test Procedure

The EUT was placed on a wooden turn table 3 meters from the receive antenna. The receive antenna height and turn table rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For reading 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

4.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Receiver	Rohde & Schwarz	ESP17	2007-01-06
Signal Generator	HP	83620B	2007-09-07
Power Meter	HP	E4418A	2007-03-03
Wireless Communications Test Set	Agilent	E5515C	2007-02-06
Pre Amplifier	SONOMA INSTRUMENT	310N	2007-09-26
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2007-03-31
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2007-05-01

4.3.1 Test Results (GSM)

Ch No.	Freq (MHz)	Peak Power Meter(dBm)	Peak Power EIRP(dBm)
512	1850.20	29.50	32.70
661	1880.00	29.33	30.03
810	1909.80	29.30	30.44



FREQ (MHz)	Receiver Reading (dBuV)	Correction Factor (dB)		SG Reading (dBm)	EIRP (dBm)	Limit (dBm)	POL (H/V)
		Antenna gain(dBi)	Cable Loss (dB)				
1850.20	102.00	10.40	3.41	25.71	32.70	33	V
1880.00	101.33	10.43	3.33	22.93	30.03	33	V
1909.80	100.83	10.44	3.33	23.33	30.44	33	V

4.3.2 Test Results (EDGE)

Ch No.	Freq (MHz)	Peak Power Meter(dBm)	Peak Power EIRP(dBm)
128	824.70	26.10	29.80
190	835.89	25.82	27.63
251	848.31	25.61	28.04

FREQ (MHz)	Receiver Reading (dBuV)	Correction Factor (dB)		SG Reading (dBm)	EIRP (dBm)	Limit (dBm)	POL (H/V)
		Antenna gain(dBi)	Cable Loss (dB)				
1850.20	99.17	10.40	3.41	22.81	29.80	33	V
1880.00	99.00	10.43	3.33	20.53	27.63	33	V
1909.80	98.33	10.44	3.33	20.93	28.04	33	V



5. Occupied Bandwidth

5.1 Test Procedure

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth.

The VBW is set to 3 times the RBW. The sweep time is coupled.

5.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	2007-03-03
Dual Directional Coupler	HP	778D	2007-03-22
Wireless Communications Test Set	Agilent	E5515C	2007-02-06

5.3 Test Results

(GSM)

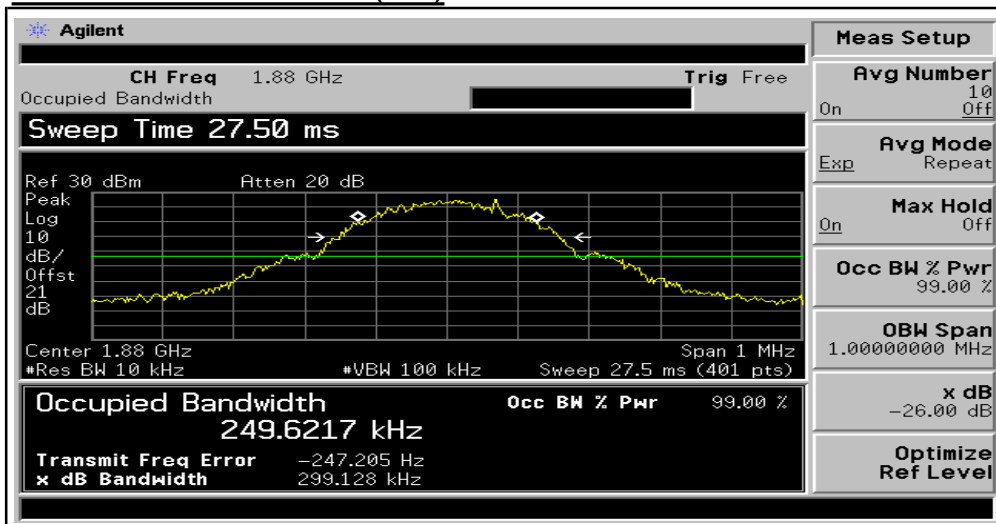
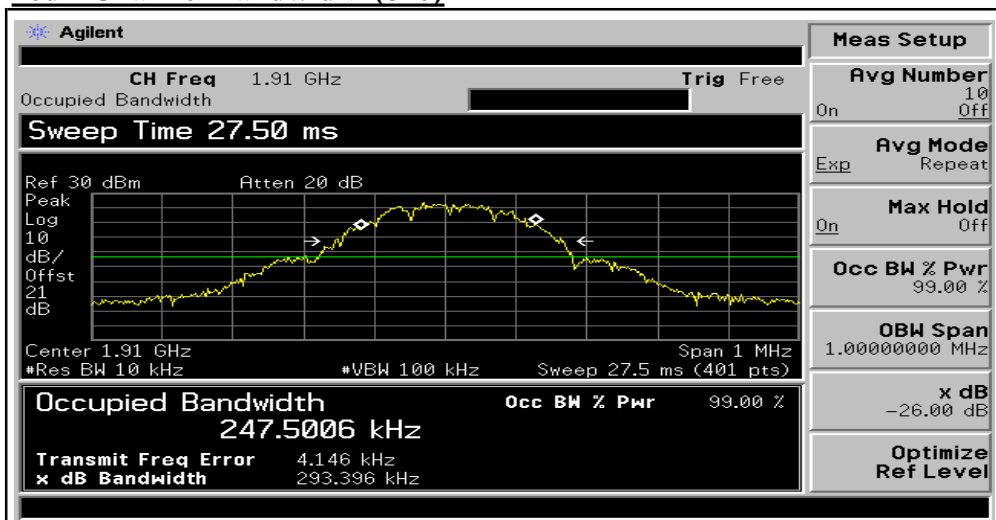
Channel	Frequency(MHz)	26dB Bandwidth(kHz)
512	1850.20	295.94
661	1880.00	299.13
810	1909.80	293.40

(EDGE)

Channel	Frequency(MHz)	26dB Bandwidth(kHz)
512	1850.20	286.93
661	1880.00	290.47
810	1909.80	293.71

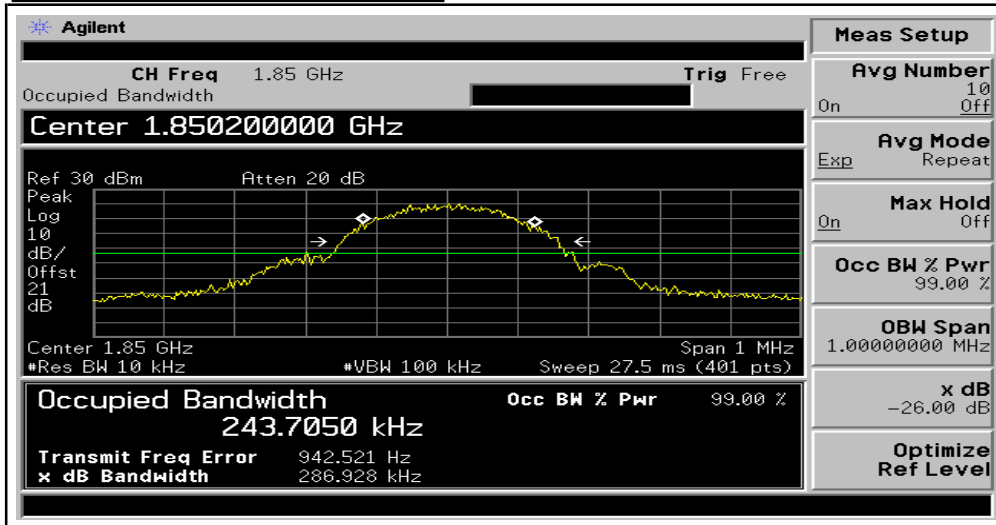
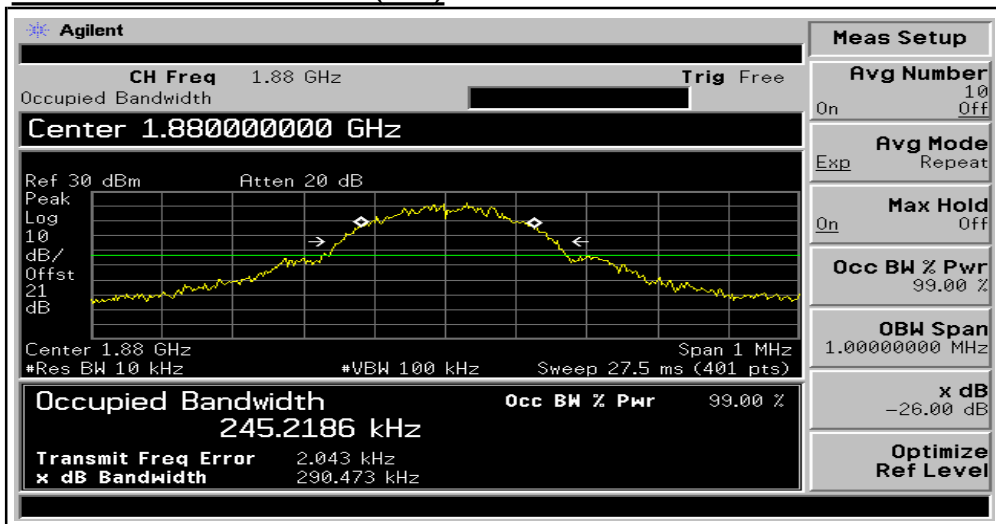
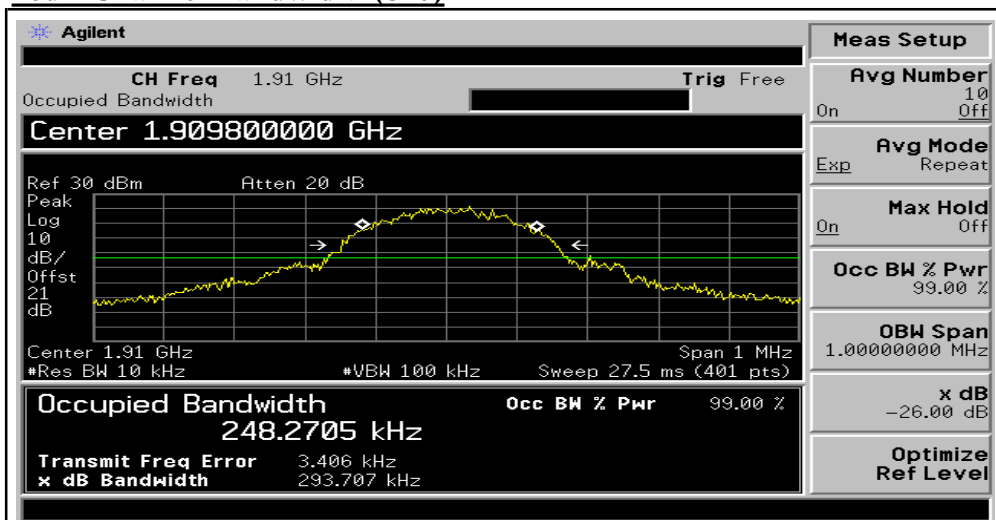


5.4 Test Plot

GSM26dB Channel Bandwidth(512)26dB Channel Bandwidth(661)26dB Channel Bandwidth(810)



EDGE

26dB Channel Bandwidth(512)26dB Channel Bandwidth(661)26dB Channel Bandwidth(810)



6. Spurious and Harmonic Emission at Antenna Terminal

6.1 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the 1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

6.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	2007-03-03
Dual Directional Coupler	HP	778D	2007-03-22
Wireless Communications Test Set	Agilent	E5515C	2007-02-06

6.3 Test Results (GSM)

GSM(Spurious Emission: Band Edge)

Channel	Frequency	Result	Limit	Margin
512	1850.20	-16.62	-13.00	3.62
810	1909.80	-18.57	-13.00	5.57

GSM (Spurious Emission: Out of Band)

Channel	Frequency	Result	Limit	Margin
512	1850.20	-25.23	-13.00	12.23
661	1880.00	-25.85	-13.00	12.85
810	1909.80	-25.11	-13.00	12.11



6.4 Test Results (EDGE)

EDGE(Spurious Emission: Band Edge)

Channel	Frequency	Result	Limit	Margin
512	1850.20	-21.86	-13.00	8.86
810	1909.80	-21.63	-13.00	8.63

EDGE (Spurious Emission: Out of Band)

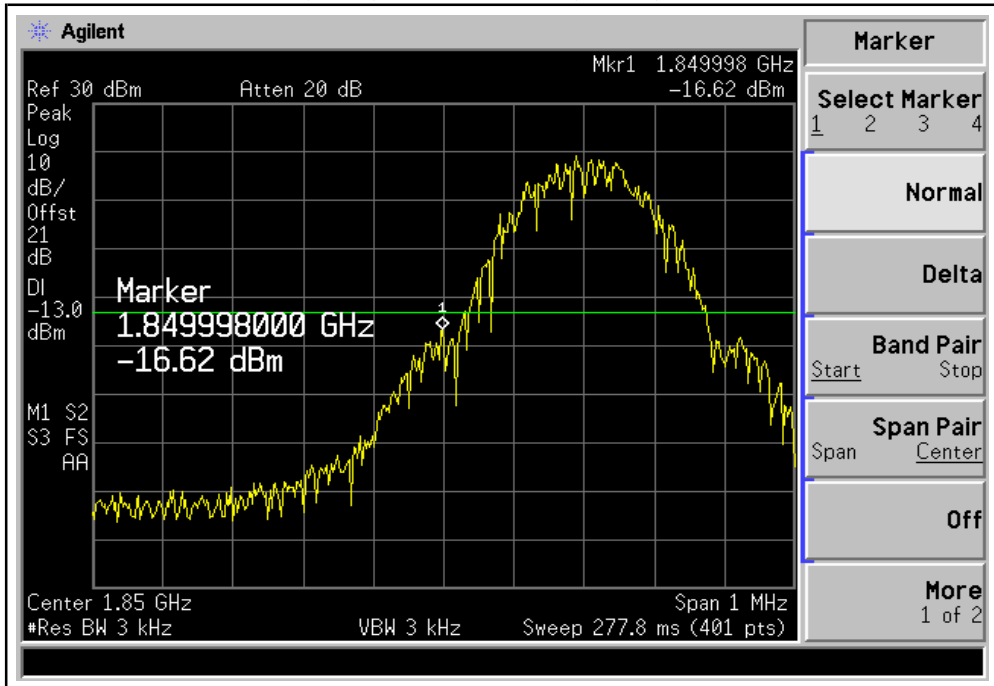
Channel	Frequency	Result	Limit	Margin
512	1850.20	-25.79	-13.00	12.79
661	1880.00	-26.64	-13.00	13.64
810	1909.80	-26.30	-13.00	13.30



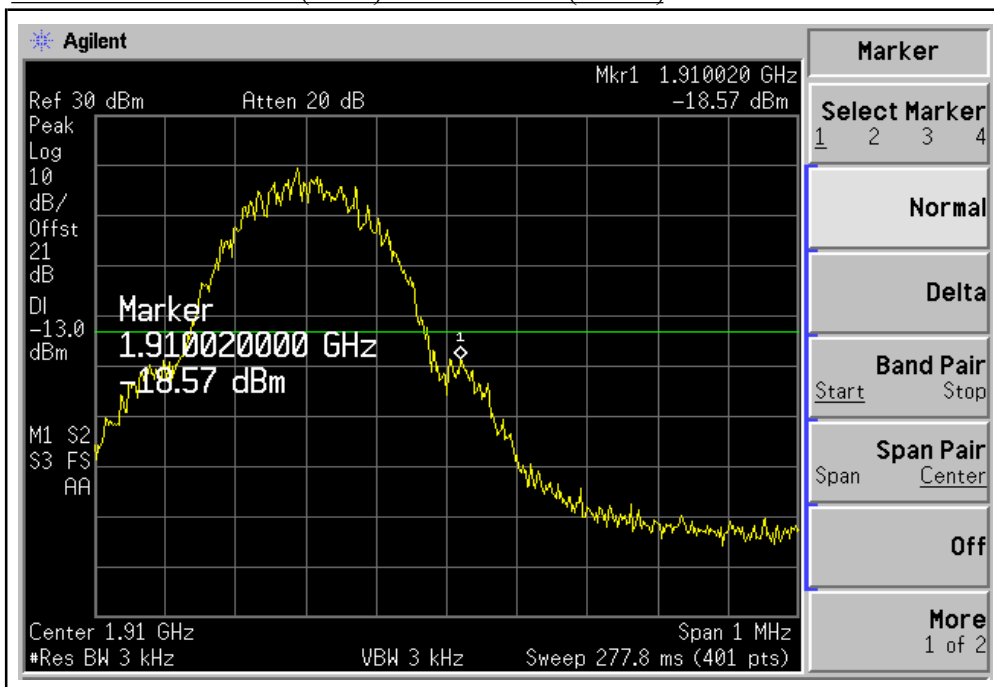
6.5 Test Plot

GSM

PLOTS OF EMISSION (GSM): BAND EDGE(Ch512)



PLOTS OF EMISSION (GSM): BAND EDGE(Ch810)



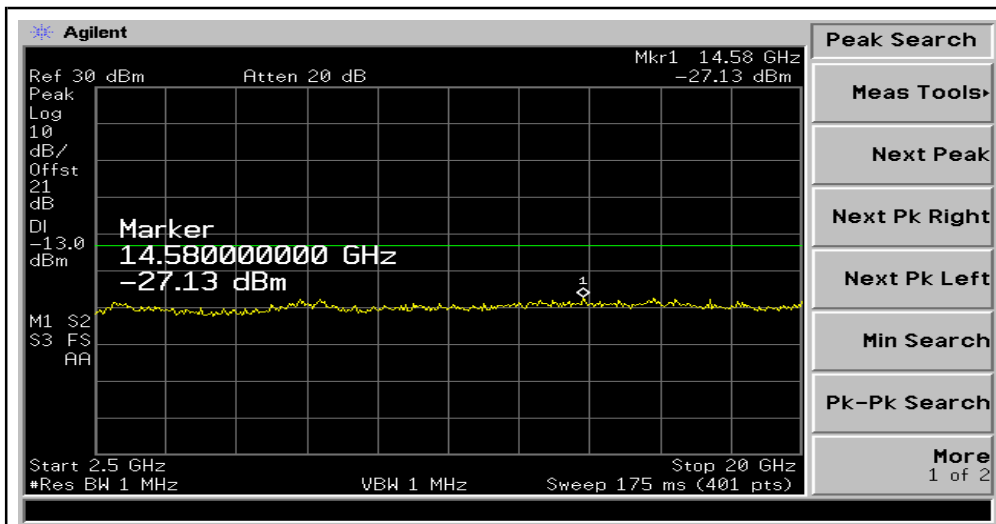
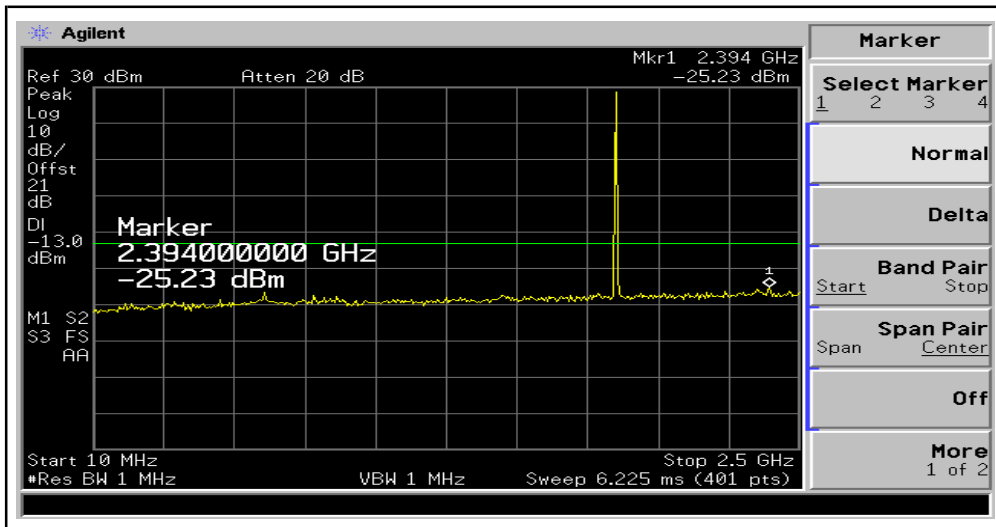
PLOTS OF EMISSION (EDGE): BAND EDGE(Ch512)



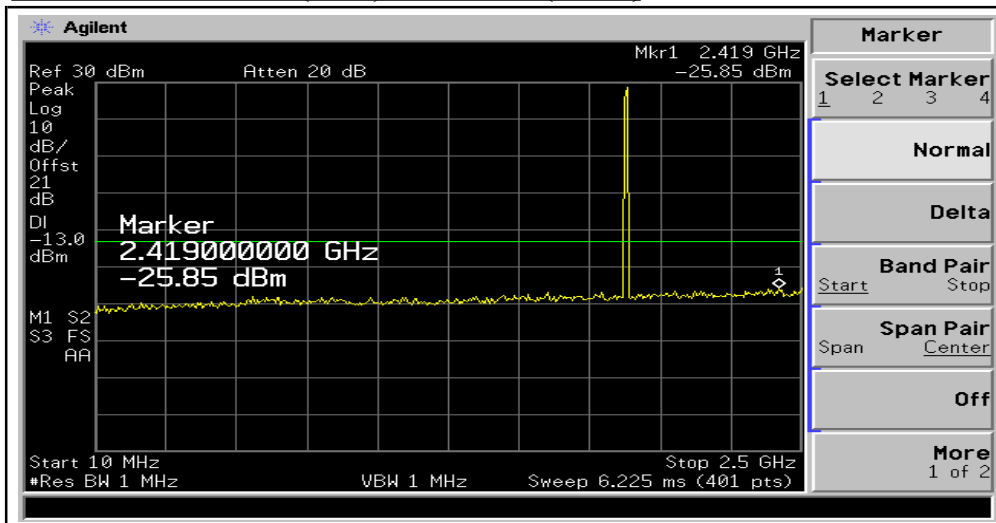


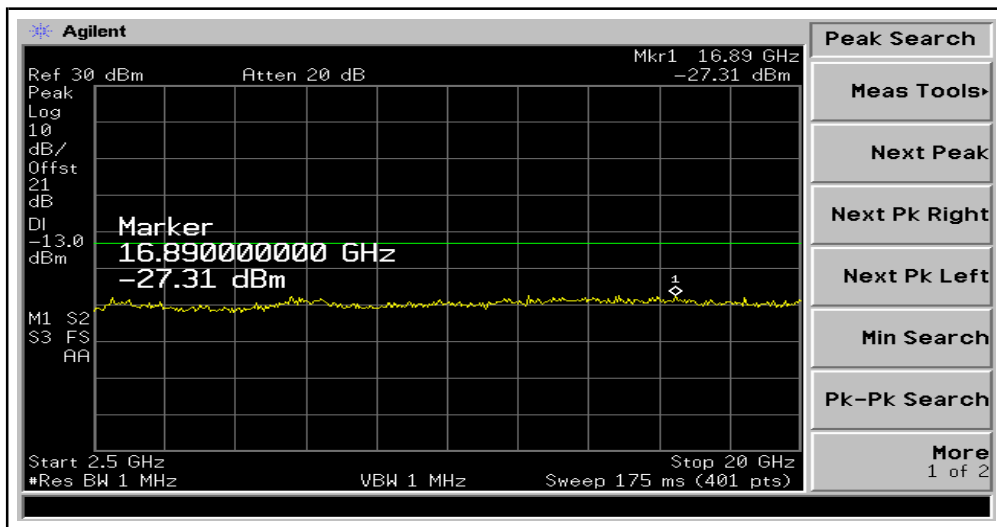
GSM

PLOTS OF EMISSION (GSM): Out of Band(Ch512)

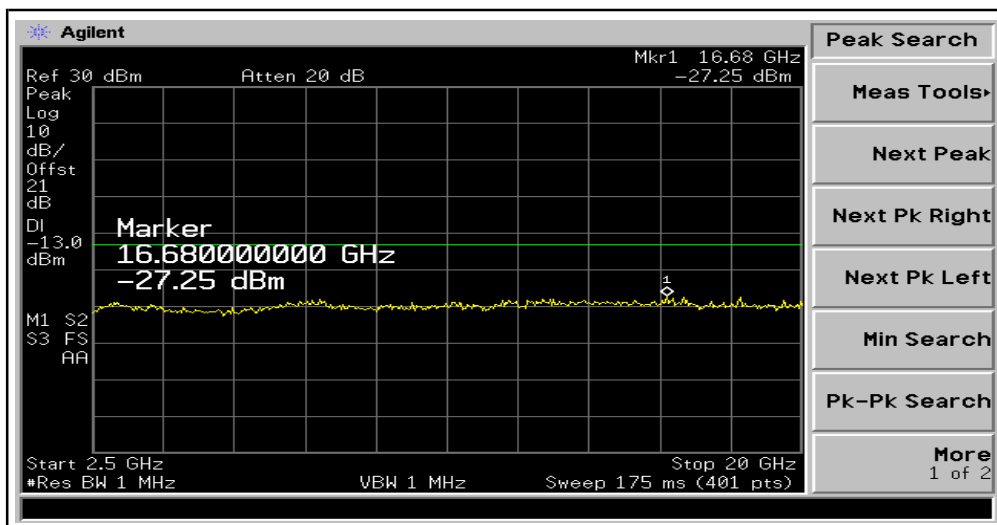
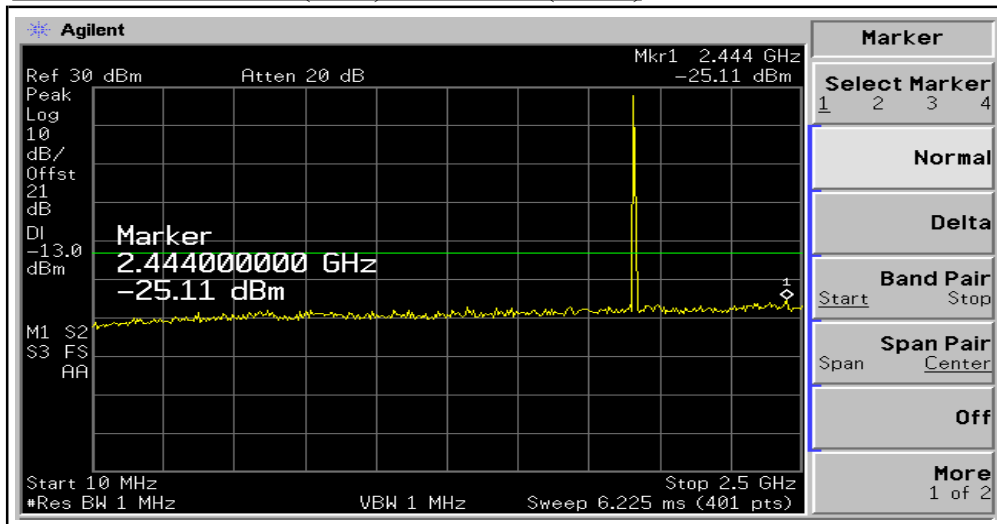


PLOTS OF EMISSION (GSM): Out of Band(Ch661)





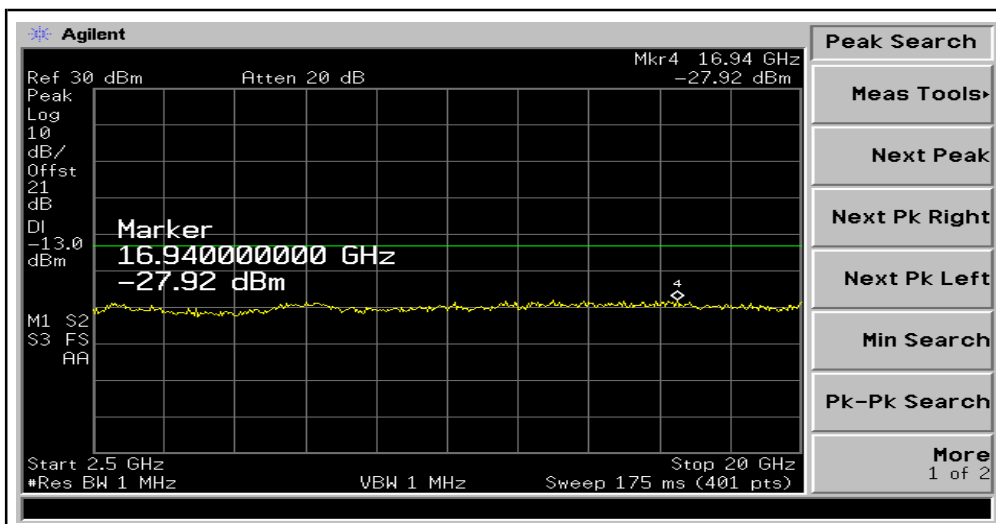
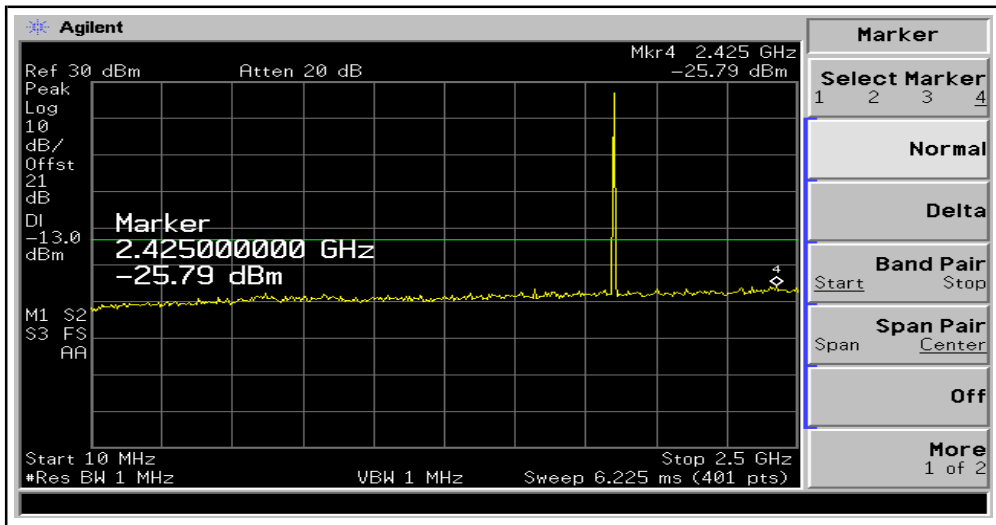
PLOTS OF EMISSION (GSM): Out of Band(Ch810)



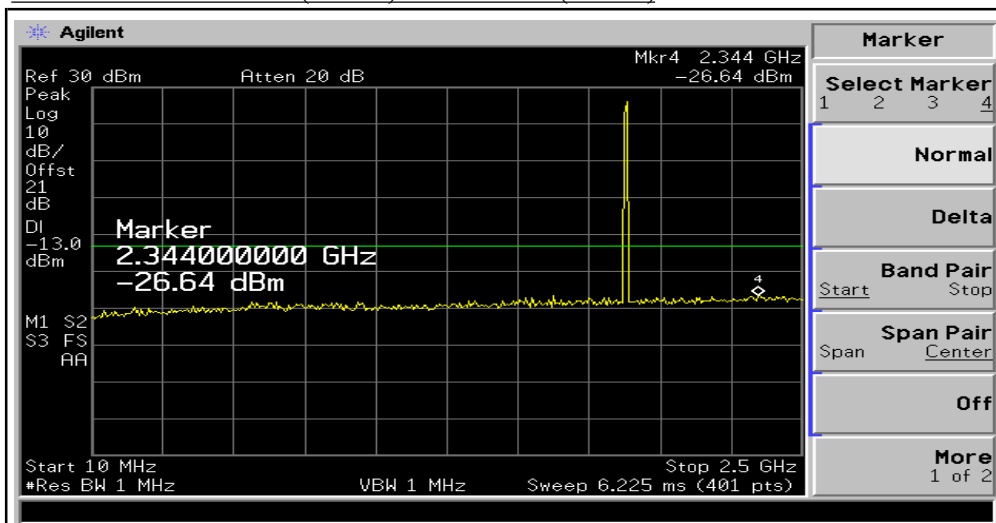


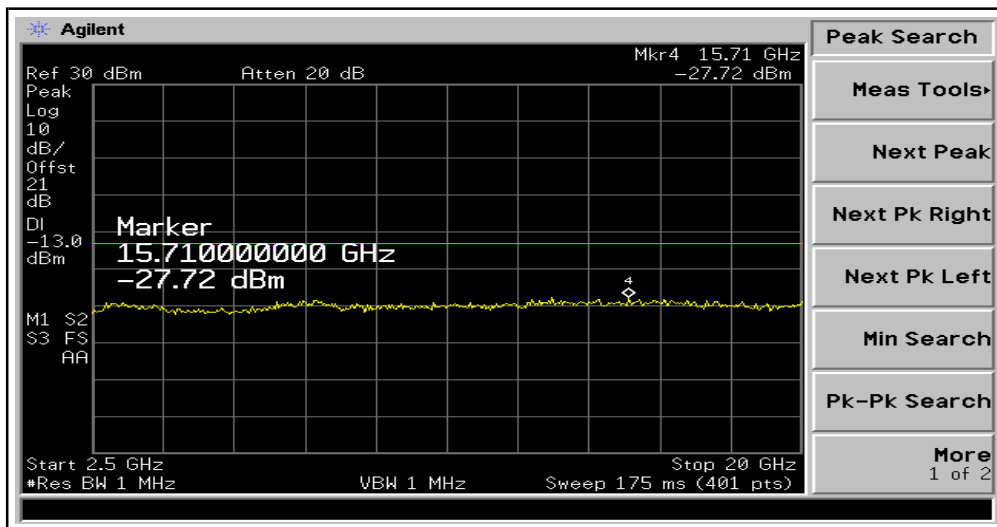
EDGE

PLOTS OF EMISSION (EDGE): Out of Band(Ch512)

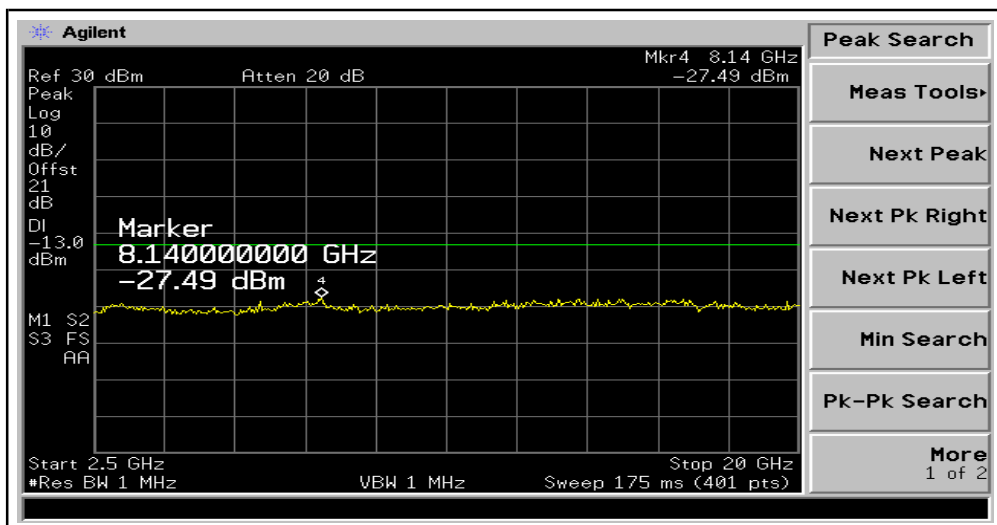
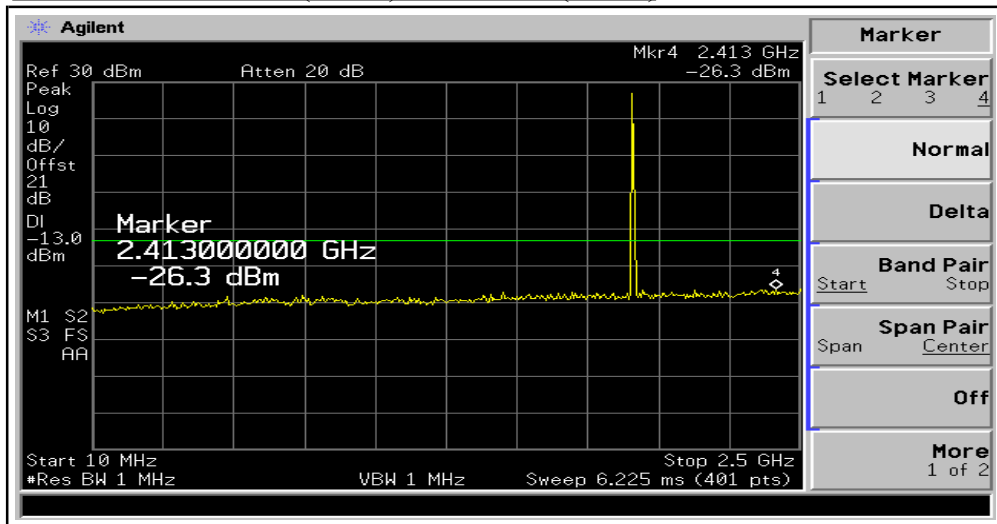


PLOTS OF EMISSION (EDGE): Out of Band(Ch661)





PLOTS OF EMISSION (EDGE): Out of Band(Ch810)





7. Field Strength of Spurious Radiation

7.1 Test Procedure

Radiation and harmonic emission are measured outdoors at our 3 meters test range. The equipment under test is placed on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Receiver	Rohde & Schwarz	ESP17	2007-01-06
Signal Generator	HP	83620B	2007-09-07
Pre Amplifier	SONOMA INSTRUMENT	310N	2007-09-26
Communications Test	Agilent	E5515C	2007-02-06
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2007-03-31
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2007-05-01

* The TX signal isn't detected from 3rd harmonics.



7.3 Test Results

GSM(Ch 512)

Measured output power: 32.70dBm = 1.862W, Limit: 43+10log₁₀(W)= 45.7dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3700.40	51.83	12.69	4.84	-54.13	-46.28	78.98	V
5550.60	51.33	13.15	6.00	-47.53	-40.38	73.08	V

GSM(Ch 661)

Measured output power: 30.03dBm = 1.007W, Limit: 43+10log₁₀(W)= 43.03dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3760.00	50.17	12.75	4.84	-55.59	-47.68	77.71	V
5640.00	51.17	13.15	6.00	-47.43	-40.28	70.31	V

GSM(Ch 810)

Measured output power: 30.44dBm = 1.107W, Limit: 43+10log₁₀(W)= 43.44dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3819.60	51.33	12.75	4.84	-52.59	-44.68	75.12	V
5729.40	50.17	13.09	6.17	-48.76	-41.84	72.28	V



EDGE(Ch 512)

Mesured output power: 29.80dBm = 0.955W, Limit: 43+10log₁₀(W)= 42.80dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3700.40	51.83	12.69	4.84	-54.26	-46.41	76.21	H
5550.60	51.33	13.15	6.00	-48.63	-41.48	71.28	V

EDGE(Ch 661)

Mesured output power: 27.63dBm = 0.579W, Limit: 43+10log₁₀(W)= 40.63dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3760.00	51.00	12.75	4.84	-59.63	-46.88	74.51	H
5640.00	49.83	13.15	6.00	-48.73	-41.58	69.21	V

EDGE(Ch 810)

Mesured output power: 28.04dBm = 0.637W, Limit: 43+10log₁₀(W)= 41.04dBc

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3819.60	51.33	12.75	4.84	-52.59	-44.68	75.12	V
5729.40	50.17	13.09	6.17	-48.76	-41.84	72.28	V



8. Frequency stability

8.1 Test Procedure

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from -30 °C to +60 °C using an environmental chamber.

b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

※ The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 2.5 ppm of the center frequency.

8.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Communications Test	Agilent	E5515C	2007-02-06
DC Power Supply	INTERACT	AK-3010	2007-03-03
Tem/Hum Chamber	Myung Technology	SM-150-2	2007-02-04

**8.3 Test Results**

Operting Frequency :	1,880,000,000
Channel :	661
Reference Voltage :	3.70
Deviatin Limit :	0.00025

Voltage (%)	Power (VDC)	Temperature (°C)	Frequency (Hz)	Deviation
100	3.70	+20 °C (Ref)	1,880,000,003	0.000000
100		-30	1,879,999,974	0.000002
100		-20	1,879,999,976	0.000001
100		-10	1,879,999,980	0.000001
100		0	1,879,999,978	0.000001
100		10	1,879,999,978	0.000001
100		20	1,880,000,003	0.000000
100		25	1,879,999,980	0.000001
100		30	1,879,999,982	0.000001
100		40	1,879,999,978	0.000001
100		50	1,879,999,980	0.000001
100		60	1,879,999,972	0.000002
85	3.15	20	1,879,999,970	0.000002
115	4.26	20	1,879,999,978	0.000001
Batt EndPoint	3.00	20	1,879,999,968	0.000002