



NVLAP LAB CODE 200707-0



## FCC PART 24 E

### MEASUREMENT AND TEST REPORT

For

#### Dyal Trading Limited

Coxmoor Road, Sutton in Ashfield,  
Nottinghamshire, NG17 5LA, UK

**FCC ID: XWN5017271000016C**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Watch Phone
<b>Test Engineer:</b> <u>Vicent Kang</u> <i>Vicent Kang</i>	
<b>Report Number:</b> <u>RSZ09110901</u>	
<b>Report Date:</b> <u>2009-12-08</u>	
<b>Reviewed By:</b> <u>EMC Engineer</u> <i>Merry Zhao</i>	
<b>Prepared By:</b> Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008	

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, NIST, or any agency of the Federal Government.

\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev.2)

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## GENERAL INFORMATION

### Product Description for Equipment Under Test (EUT)

The *Dyal Trading Limited*'s product, model number: *sWaP Classic BX1-S (FCC ID: XWN5017271000016C)* or the "EUT" as referred to in this report is a *Watch Phone*, which measures approximately: 5.0 cm L x 6.2 cm W x 8.5 cm H, rated input voltage: DC 3.7V battery.

Frequency Range:

PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)  
Bluetooth: 2400-2483.5 MHz (TX/Rx)

Modulation Mode: GMSK(PCS) ; GFSK(Bluetooth)

Transmitter Output Power:

PCS Band: 30±2 dBm  
Bluetooth: -6~4 dBm

Adapter Information: POWER SUPPLY

MODEL: CGSW-0500500

INPUT: 100-240V AC 50/60Hz

OUTPUT: 5V 500mA

*\* All measurement and test data in this report was gathered from production sample serial number: 0911013 (Assigned by BACL, Shenzhen). The EUT was received on 2009-11-09.*

### EUT Photo



*Please see additional photos in Exhibit B&C*

## Objective

This type approval report is prepared on behalf of *Dyal Trading Limited* in accordance with Part 2, Subpart J, and Part 24 Subpart E of the Federal Communication Commissions rules.

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

## Related Submittal(s)/Grant(s)

FCC Part 15.247 submission with FCC ID: XWN5017271000016C.

## 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 24 Subpart E - Personal Communication Services

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

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

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. 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 has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Justification

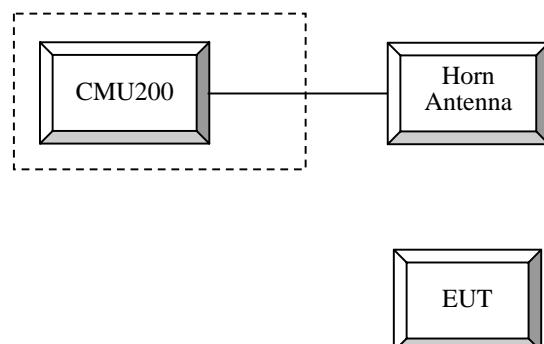
The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

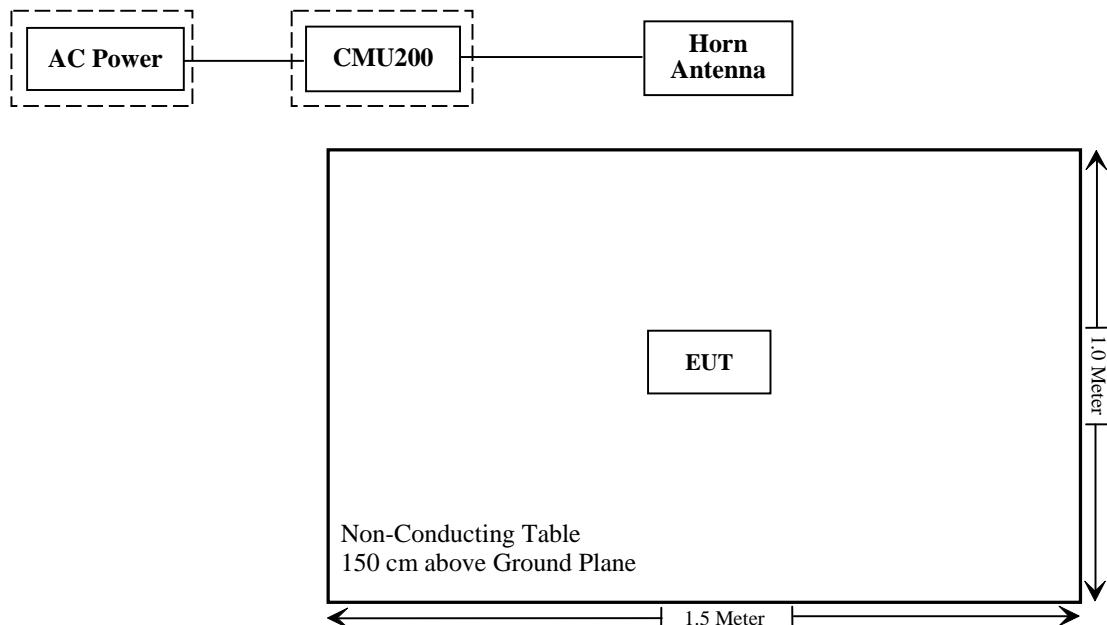
### Equipment Modifications

No modifications were made to the EUT.

### Configuration of Test Setup



**Block Diagram of Test Setup**



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	Compliant *
§2.1046; §24.232(c)	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A
§2.1049 §24.238	99% & -26 dB Occupied Bandwidth	Compliant
§2.1051, §24.238(a)	Spurious Emissions at Antenna Terminal	Compliant
§2.1053 §24.238(a)	Field Strength of Spurious Radiation	Compliant
§24.238(a)	Out of band emission, Band Edge	Compliant
§2.1055 §24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant

Note: \*Please refer to SAR report released by BACL, Report Number: R0911164-SAR

## **FCC §1.1307 & §2.1093 - RF EXPOSURE**

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### **Applicable Standard**

FCC §1.1307 and §2.1093.

### **Test Result**

Compliance

The EUT is a portable device and SAR evaluation is required. Please refer to BACL SAR Report: R0911164-SAR.

## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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According to FCC §2.1047(d), Part 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC §2.1046, & §24.232(c) - RF OUTPUT POWER

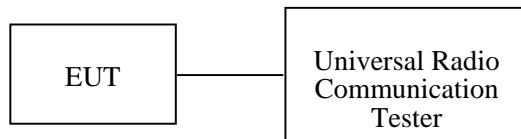
### Applicable Standard

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

### Test Procedure

*Conducted method:*

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



*Radiated method:*

TIA 603-C section 2.2.17

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07
HP	Preamplifier	8449B	3008A00277	2009-09-12	2010-09-11
HP	Signal Generator	HP8657A	2849U00982	2009-10-28	2010-10-27
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2009-11-07	2010-11-06
COM POWER	Dipole Antenna	AD-100	041000	2009-09-25	2010-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2009-05-17	2010-05-16
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

The testing was performed by Vicent Kang on 2009-11-24.

### Conducted Power

Mode	Channel	Frequency (MHz)	Output Power (dBm)
GSM	512	1850.2	30.30
	661	1880.0	30.80
	810	1909.8	29.89
GPRS	512	1850.2	30.32
	661	1880.0	30.80
	810	1909.8	29.88

### Radiated Power (EIRP)

Indicated		Table Angle Degree	Test Antenna		Substituted			Ant Gain Cord. (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 24E
Freq. (MHz)	S.A. Reading (dB $\mu$ V)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Polar (H/V)				
Low Channel											
1850.2	122.21	298	1.5	H	1850.2	21.1	H	6.2	1.02	26.28	33
1850.2	122.34	292	1.5	V	1850.2	23.5	V	6.2	1.02	28.68	33
Middle Channel											
1880	123.51	354	1.3	H	1880	22.1	H	6.2	1.03	27.27	33
1880	124.03	284	1.9	V	1880	24.2	V	6.2	1.03	29.37	33
High Channel											
1909.8	120.19	160	1.4	H	1909.8	20.0	H	6.2	1.03	25.17	33
1909.8	123.36	269	1.2	V	1909.8	23.9	V	6.2	1.03	29.07	33

## FCC §2.1049 & §24.238 - OCCUPIED BANDWIDTH

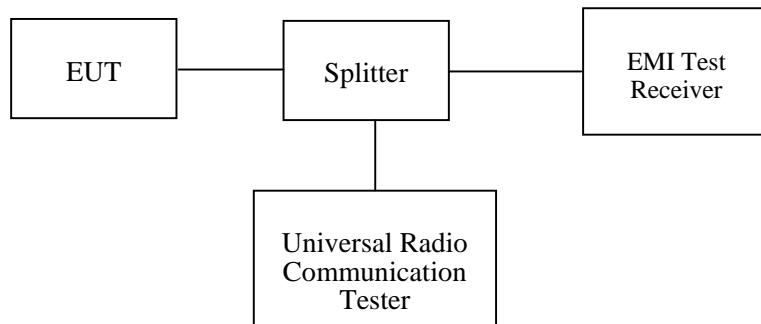
### Applicable Standards

FCC §2.1049 and §24.238.

### 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 (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-07	2010-10-06
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Data

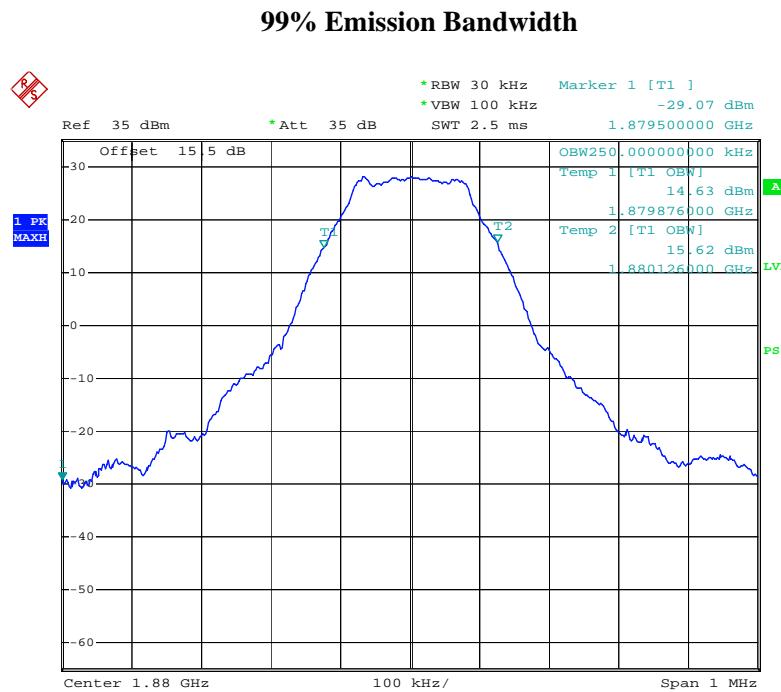
#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

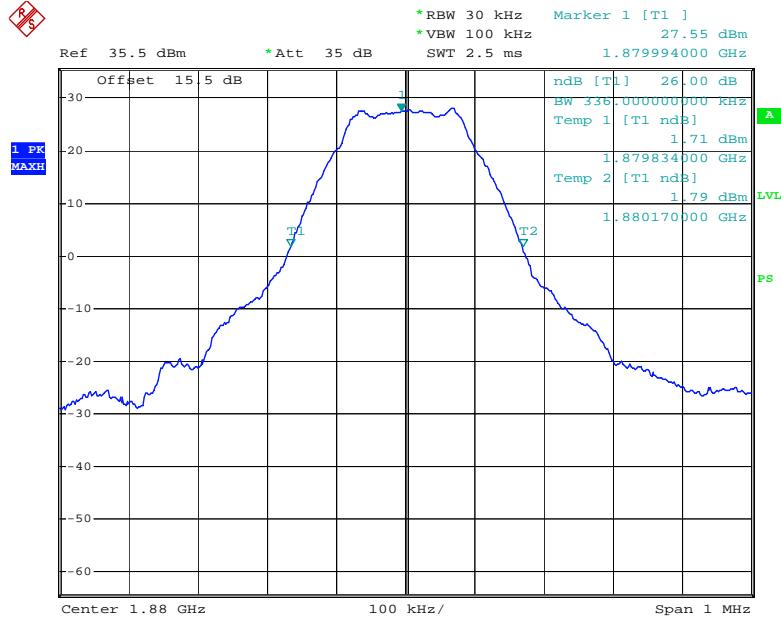
The testing was performed by Vicent Kang on 2009-11-24.

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
661	1880.0	250	336

Please refer to the following plots.



Date: 24.NOV.2009 10:23:24

**26 dB Emission Bandwidth**

Date: 24.NOV.2009 10:14:45

## FCC §2.1051 & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

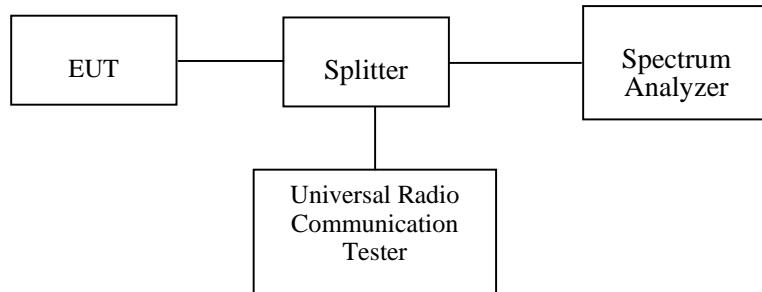
### Applicable Standards

FCC §2.1051 and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

### 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 10<sup>th</sup> harmonic.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10
Rohde & Schwarz	EMI	ESCI	100224	2009-11-07	2010-11-06

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

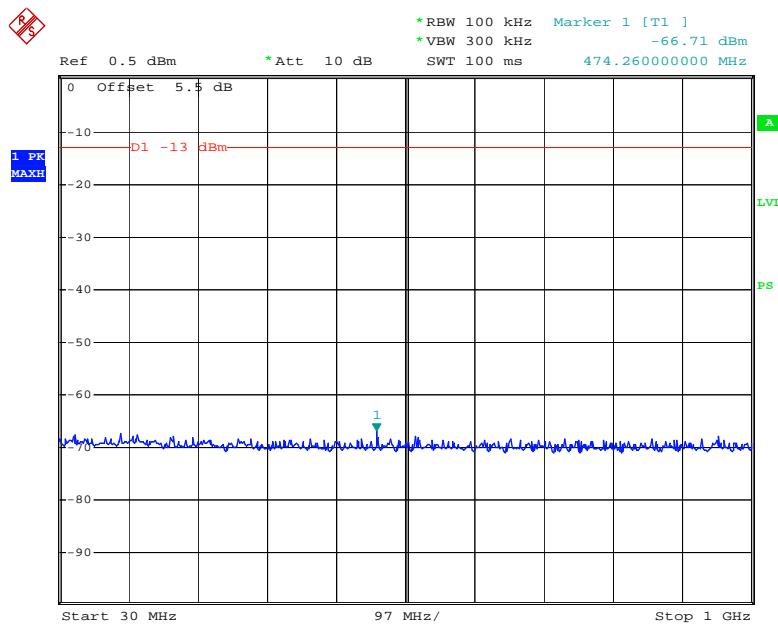
### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Vicent Kang on 2009-11-24.

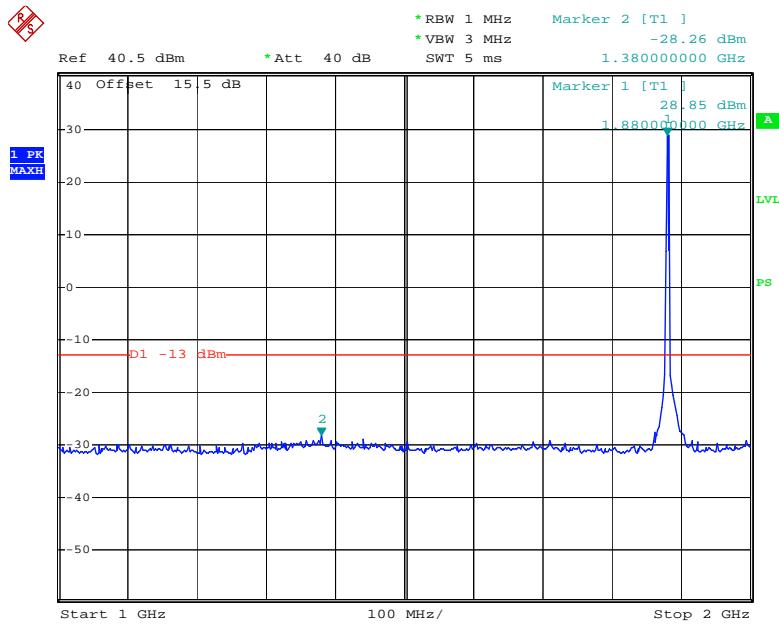
Please refer to the following plots.

### 30–1000 MHz, Middle Channel



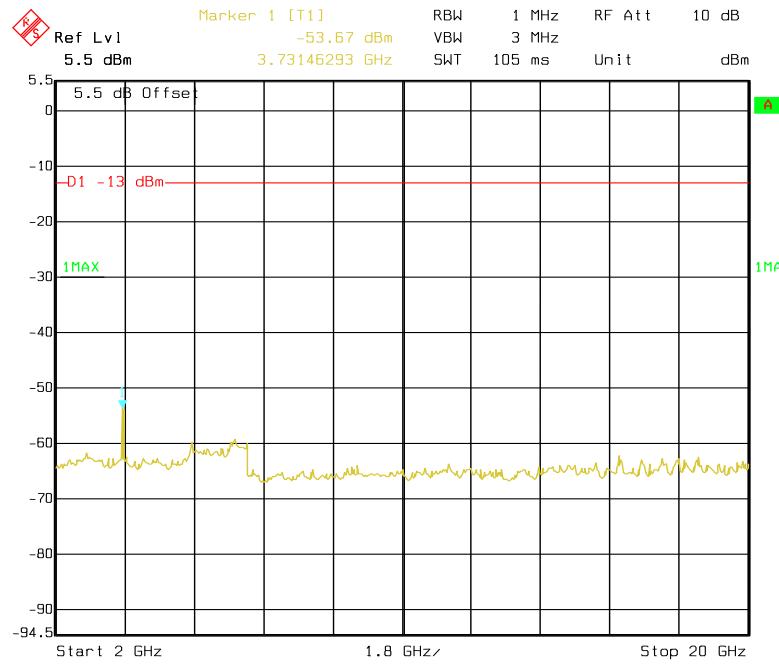
Date: 24.NOV.2009 10:43:52

## 1-2 GHz, Middle Channel



Date: 24.NOV.2009 10:42:32

## 2-20 GHz, Middle Channel



Date: 24.NOV.2009 10:43:13

## FCC §2.1053 & §24.238 - SPURIOUS RADIATED EMISSIONS

### Applicable Standards

FCC §2.1053 and §24.238.

### 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 =  $10 \lg (\text{TXpwr in Watts}/0.001)$  – the absolute level  
Spurious attenuation limit in dB =  $43 + 10 \log_{10} (\text{power out in Watts})$

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07
HP	Preamplifier	8449B	3008A00277	2009-09-12	2010-09-11
HP	Signal Generator	HP8657A	2849U00982	2009-10-28	2010-10-27
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2009-11-07	2010-11-06
COM POWER	Dipole Antenna	AD-100	041000	2009-09-25	2010-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2009-05-17	2010-05-17
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

The testing was performed by Vicent Kang on 2009-11-25.

Test mode: Transmitting

### Below 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dB $\mu$ V)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
332.64	34.57	150	1.5	H	332.64	-61.6	0	0.71	-37.61	-13	24.61
234.75	34.75	70	1.3	H	234.75	-61.5	0	0.67	-41.01	-13	28.01
464.56	39.86	260	1.5	V	464.56	-57.6	0	0.77	-43.65	-13	30.65
598.42	42.15	210	1.0	V	598.42	-54.5	0	0.83	-45.73	-13	32.73

### Above 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dB $\mu$ V)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
3760	56.39	102	1.3	V	3760	-41.3	7.0	3.31	-37.61	-13	24.61
3760	53.15	233	1.4	H	3760	-44.7	7.0	3.31	-41.01	-13	28.01
2947.89	48.83	122	1.0	H	2947.89	-48.5	7.2	1.27	-42.57	-13	29.57
2496.99	48.08	115	1.5	V	2496.99	-49.6	7.2	1.25	-43.65	-13	30.65
2320.64	47.51	198	1.6	H	2320.64	-51.7	7.2	1.23	-45.73	-13	32.73
2563.13	46.63	331	1.3	V	2563.13	-52.5	7.2	1.25	-46.55	-13	33.55

## FCC §24.238(a) - BAND EDGES

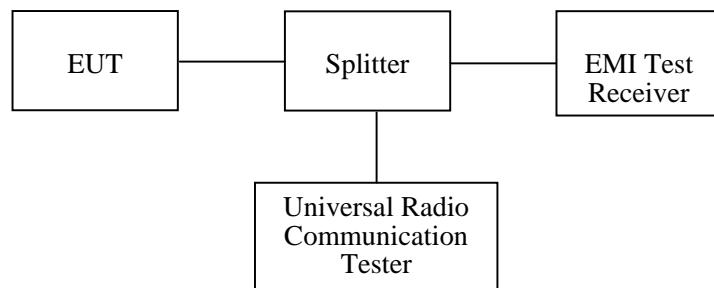
### Applicable Standards

According to FCC §24.238(a), 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.

### 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.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-07	2010-11-06
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Data

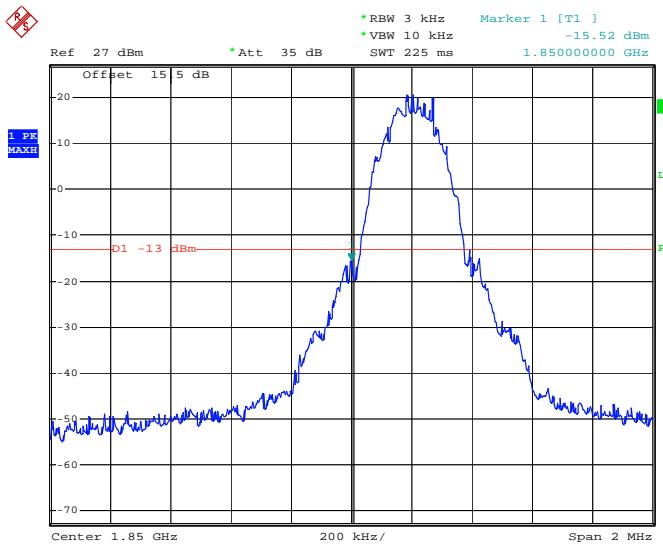
#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Vicent Kang on 2009-11-24.

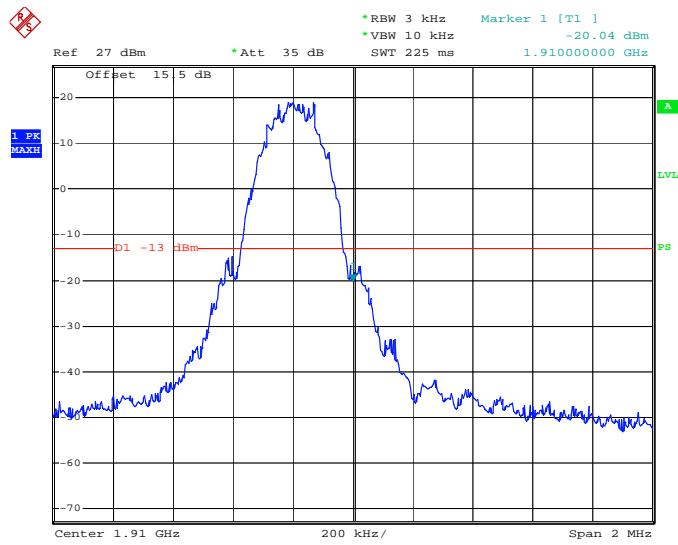
Mode	Frequency (MHz)	Emission Level (dBm)	FCC Limit (dBm)
GSM	1850	-15.52	-13
	1910	-20.04	-13
GPRS	1850	-16.85	-13
	1910	-17.10	-13

## Lowest Channel (GSM)



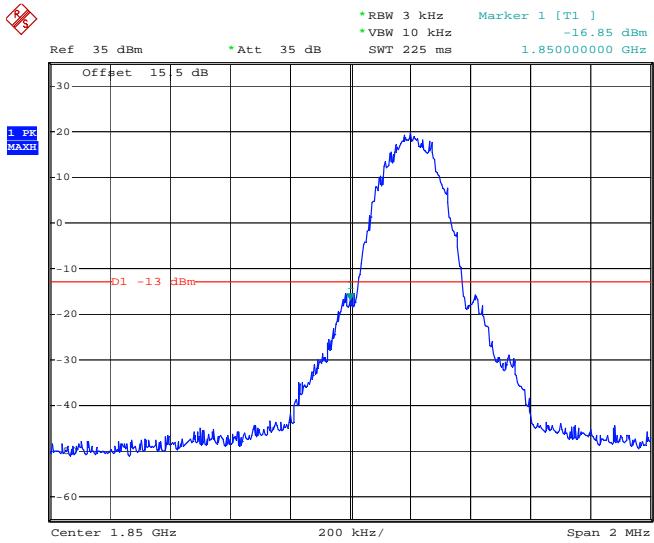
Date: 24.NOV.2009 10:20:39

## Highest Channel (GSM)



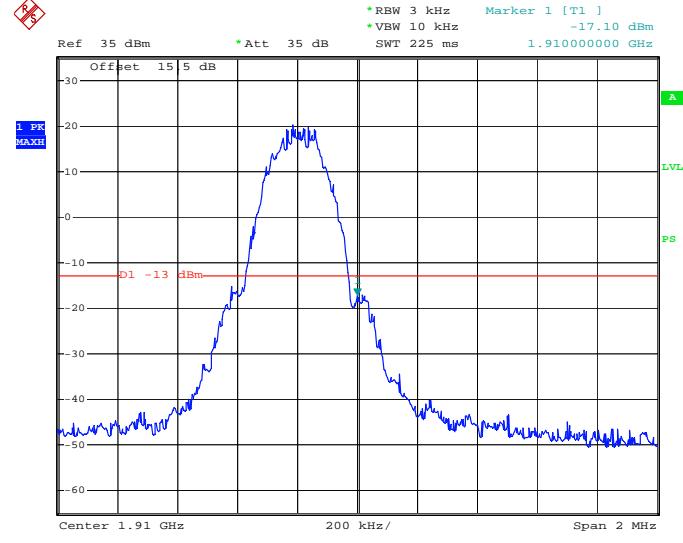
Date: 24.NOV.2009 10:19:51

## Lowest Channel (GPRS)



Date: 24.NOV.2009 10:28:08

## Highest Channel (GPRS)



Date: 24.NOV.2009 10:29:00

## FCC§2.1055 & §24.235 - FREQUENCY STABILITY

### Applicable Standard

FCC §2.1055 (a), §2.1055 (d) and §24.235

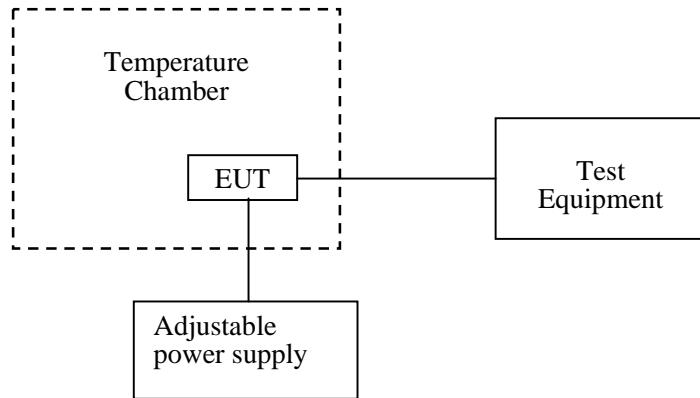
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### 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.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2009-05-09	2010-05-09
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

The testing was performed by Vicent Kang on 2009-11-24.

<b>Middle Channel, <math>f_o = 1880.0</math> MHz</b>			
<b>Temperature (°C)</b>	<b>Power Supplied (Vdc)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>
-30	3.70	-39	-0.02074
-20	3.70	-43	-0.02287
-10	3.70	-37	-0.01968
0	3.70	-35	-0.01862
10	3.70	-31	-0.01649
20	3.70	-34	-0.01809
30	3.70	-47	-0.02500
40	3.70	-35	-0.01862
50	3.70	-39	-0.02074
25	4.20	-43	-0.02287
	3.50	-37	-0.01968

\*\*\*\*\* END OF REPORT \*\*\*\*\*