

FCC PART 22H, PART 24E MEASUREMENT AND TEST REPORT

For

MAXWEST INTERNATIONAL LIMITED

No.1, Longgang Road, Buji, Longgang, Shenzhen City, Guangdong Province, P.R. China

FCC ID: 2AEN3MX110

Report Type: Product Type:
Original Report Mobile Phone

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Report Number: RDG150601005-00B

Report Date: 2015-06-15

Reviewed By: Sula Huang RF Leader

Test Laboratory: Bay Area Compliance Laboratories Corp. (Dongguan)

No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Sola Huay

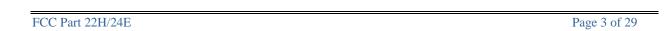
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TABLE OF CONTENTS

GENERAL INFORMATION	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	
OBJECTIVE	
RELATED SUBMITTAL(S)/GRANT(S) TEST METHODOLOGY	
TEST FACILITY	
SYSTEM TEST CONFIGURATION	
JUSTIFICATION	
FOUIPMENT MODIFICATIONS	
SUPPORT EQUIPMENT LIST AND DETAILS	
CONFIGURATION OF TEST SETUP	6
BLOCK DIAGRAM OF TEST SETUP	
SUMMARY OF TEST RESULTS	
FCC §1.1310 & §2.1093- RF EXPOSURE	9
APPLICABLE STANDARD	
TEST RESULT	9
FCC §2.1047 - MODULATION CHARACTERISTIC	10
FCC § 2.1046, § 22.913 (A) & § 24.232 (C) - RF OUTPUT POWER	11
APPLICABLE STANDARD	
TEST PROCEDURE	11
TEST EQUIPMENT LIST AND DETAILS	
TEST DATA	
FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH	
APPLICABLE STANDARD	
TEST PROCEDURE	
TEST EQUIPMENT LIST AND DETAILS	
FCC §2.1051, §22.917(A) & §24.238(A) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS	
APPLICABLE STANDARD	
TEST PROCEDURE	
TEST DATA	
FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS	21
APPLICABLE STANDARD	
TEST PROCEDURE	
TEST EQUIPMENT LIST AND DETAILS	
TEST DATA	
FCC §22.917(A) & §24.238(A) - BAND EDGES	
APPLICABLE STANDARD	
TEST PROCEDURE TEST EQUIPMENT LIST AND DETAILS	
TEST DATA	

FCC §2,1055, §22,355 & §24,235 - FREQUENCY STABILITY	27
APPLICABLE STANDARD	27
Test Procedure	
TEST EQUIPMENT LIST AND DETAILS	28
TEST DATA	28



GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The MAXWEST INTERNATIONAL LIMITED's product, model number: MX-110 (FCC ID: 2AEN3MX110) (the "EUT") in this report was a mobile phone, named as MX-110 by applicant, which was measured approximately: 4.7 cm (L) x 1.43 cm (W) x 11 cm (H), rated input voltage: DC3.7V rechargeable Li-ion battery or DC5.0V charging from adapter.

Report No.: RDG150601005-00B

Adapter information:

Input: AC100-240V, 50/60Hz Output: DC±5%,500mA

All measurement and test data in this report was gathered from production sample serial number: 150601005 (Assigned by BACL, Dongguan). The EUT was received on 2015-06-02.

Objective

This report is prepared on behalf of *MAXWEST INTERNATIONAL LIMITED* in accordance with Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: 2AEN3MX110 FCC Part 15C DSS submissions with FCC ID: 2AEN3MX110

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 Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-D-2010, ANSI C63.4-2009.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

FCC Part 22H/24E Page 4 of 29

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Report No.: RDG150601005-00B

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications 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 February 06, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

FCC Part 22H/24E Page 5 of 29

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D-2010.

The test items were performed with the EUT operating at testing mode.

Equipment Modifications

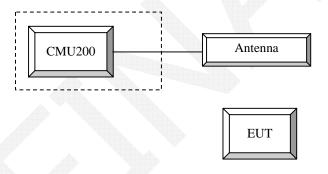
No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	109038
N/A	ANTENNA	N/A	N/A

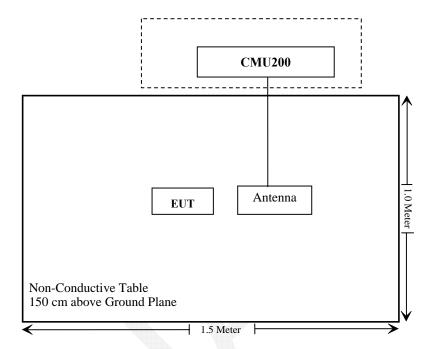
Report No.: RDG150601005-00B

Configuration of Test Setup



FCC Part 22H/24E Page 6 of 29

Block Diagram of Test Setup



Report No.: RDG150601005-00B

FCC Part 22H/24E Page 7 of 29

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
\$2.1046; \$ 22.913 (a); \$ 24.232 (c)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238	Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a)	Out of band emission, Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

Report No.: RDG150601005-00B

FCC Part 22H/24E Page 8 of 29

FCC §1.1310 & §2.1093- RF EXPOSURE

Report No.: RDG150601005-00B

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RDG150601005-20.

FCC Part 22H/24E Page 9 of 29

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC $\S 2.1047(d)$, Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

Report No.: RDG150601005-00B

FCC Part 22H/24E Page 10 of 29

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

Report No.: RDG150601005-00B

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications..

Test Procedure

GSM

Function: Menu select > GSM Mobile Station > GSM 850/1900

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM + only

MS Signal

> 33 dBm for GSM 850 > 30 dBm for GSM 1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stabe)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test

channel) and BCCH channel] Channel Type > Off P0 > 4 dB

TCH > choose desired test channel

Hopping > Off

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input Connection Press Signal on to turn on the signal and change settings

GPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM + GPRS or GSM + EGSM

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850 > 30 dBm for GPRS 1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stabe)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test

channel) and BCCH channel]

FCC Part 22H/24E Page 11 of 29

Channel Type > Off P0 > 4 dB

Slot Config > Unchanged (if already set under MS signal)

TCH > choose desired test channel

Hopping > Off Main Timeslot > 3

Network Coding Scheme > CS4 (GPRS)

Bit Stream > 2E9-1 PSR Bit Stream

Report No.: RDG150601005-00B

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal on to turn on the signal and change settings

Radiated method:

ANSI/TIA 603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-05-09	2016-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
Giga	Signal Generator	1026	320408	2015-05-09	2016-05-09
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2012-09-06	2015-09-06

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.7 °C
Relative Humidity:	56 %
ATM Pressure:	99.9 kPa

The testing was performed by Allen Qiao on 2015-06-04

FCC Part 22H/24E Page 12 of 29

Conducted Power

Cellular Band (Part 22H) & PCS Band (Part 24E)

Report No.: RDG150601005-00B

	Charact	Conducted Output Power (dBm)						
Band	Channel No.	GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot		
	128	31.71	31.66	29.87	28.74	27.69		
Cellular	190	31.99	31.97	29.85	28.73	27.66		
	251	31.90	31.89	29.88	28.76	27.71		
	512	29.18	29.14	26.71	25.68	24.57		
PCS	661	28.80	28.75	26.43	25.54	24.48		
	810	28.90	28.88	26.33	25.47	24.42		

ERP & EIRP

Frequency (MHz)	Polar (H/V)	Daniman	Substituted Method		Absolute			
		Receiver Reading (dBµV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	GSM 850 Middle Channel							
836.600	Н	90.24	15.3	0.0	1	14.3	38.5	24.2
836.600	V	102.77	31.0	0.0	1	30.0	38.5	8.5
			PCS	1900 Low Ch	annel			
1850.200	Н	90.69	18.8	11.4	1.4	28.8	33.0	4.2
1850.200	V	88.35	16.4	11.4	1.4	26.4	33.0	6.6

FCC Part 22H/24E Page 13 of 29

FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

Report No.: RDG150601005-00B

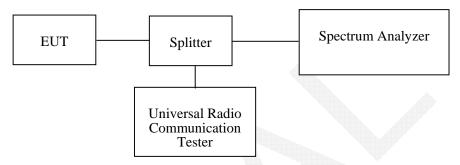
Applicable Standard

FCC §2.1049, §22.917, §22.905 and §24.238.

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.3 °C	
Relative Humidity:	56 %	
ATM Pressure:	99.9 kPa	

The testing was performed by Allen Qiao on 2015-06-09.

Test Mode: Transmitting

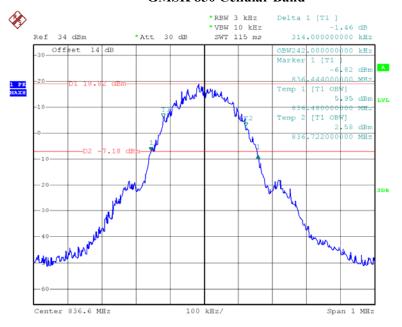
Test Result: Compliant. Please refer to the following table and plots.

FCC Part 22H/24E Page 14 of 29

	Channel No.	Mode	99% Occupied Bandwidth (kHz)	26 dB Occupied Bandwidth (kHz)
Cellular	190	GSM	242	314
PCS	661	PCS	244	316

Report No.: RDG150601005-00B

GMSK 850 Cellular Band

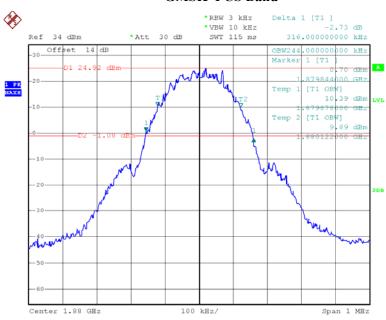


Date: 9.JUN.2015 14:59:52

FCC Part 22H/24E Page 15 of 29

GMSK PCS Band

Report No.: RDG150601005-00B



Date: 9.JUN.2015 16:56:05

FCC Part 22H/24E Page 16 of 29

FCC §2.1051, §22.917(a) & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Report No.: RDG150601005-00B

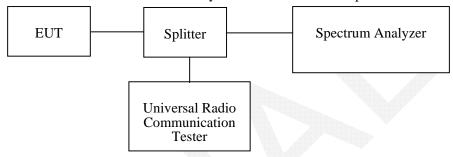
Applicable Standard

FCC §2.1051, §22.917(a) 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. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.7°C
Relative Humidity:	66 %
ATM Pressure:	99.9 kPa

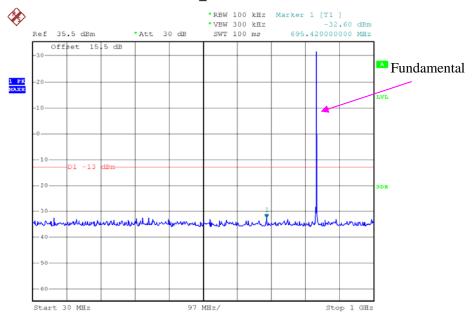
The testing was performed by Allen Qiao on 2015-06-09

Please refer to the following plots.

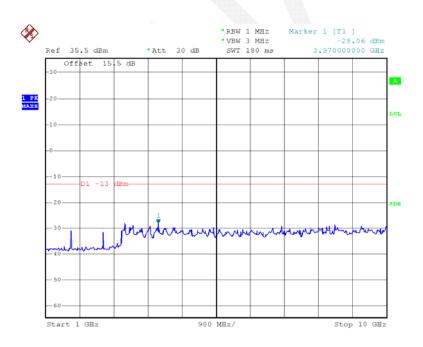
FCC Part 22H/24E Page 17 of 29

Report No.: RDG150601005-00B

GSM850_Middle Channel



Date: 9.JUN.2015 16:17:38

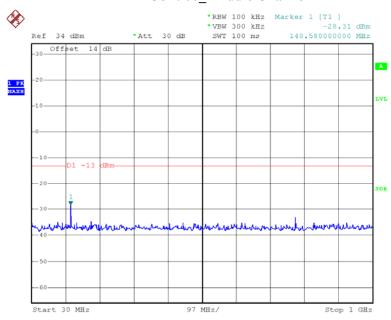


Date: 9.JUN.2015 16:18:22

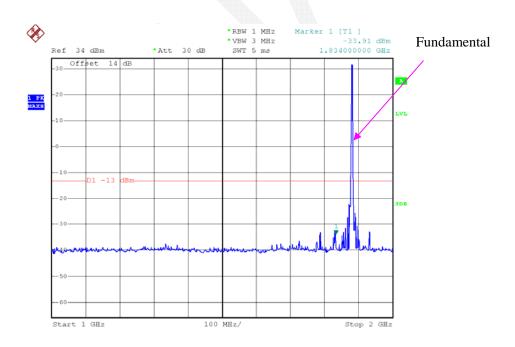
FCC Part 22H/24E Page 18 of 29

PCS 1900_ Middle Channel

Report No.: RDG150601005-00B

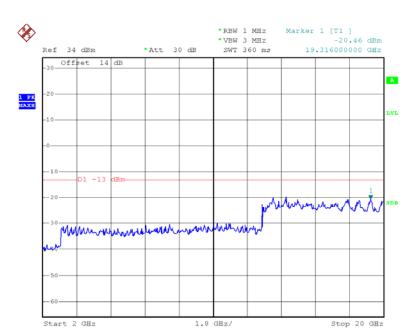


Date: 9.JUN.2015 17:02:28



Date: 9.JUN.2015 17:01:43

FCC Part 22H/24E Page 19 of 29



Report No.: RDG150601005-00B

Date: 9.JUN.2015 17:02:02

FCC Part 22H/24E Page 20 of 29

FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

Report No.: RDG150601005-00B

Applicable Standard

FCC § 2.1053, §22.917 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 $dB = 10 \lg (TXpwr in Watts/0.001)$ – the absolute level

Spurious attenuation limit in $dB = 43 + 10 \text{ Log}_{10}$ (power out in Watts)

Test Equipment List and Details

		Alcielato.	7000		
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-05-09	2016-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
Giga	Signal Generator	1026	320408	2015-05-09	2016-05-09
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2012-09-06	2015-09-06

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

FCC Part 22H/24E Page 21 of 29

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	57 %
ATM Pressure:	100.1 kPa

The testing was performed by Allen Qiao on 2015-06-03.

EUT Operation Mode: Transmitting

Cellular Band

Report No.: RDG150601005-00B

		D	S	ubstituted Me	thod	Alara lasta		
Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Middle Channel							
1673.200	Н	57.69	-43.4	10.6	1.5	-34.3	-13.0	21.3
1673.200	V	59.64	-41.7	10.6	1.5	-32.6	-13.0	19.6
2509.800	Н	51.54	-46.5	13.1	2.8	-36.2	-13.0	23.2
2509.800	V	53.34	-43.8	13.1	2.8	-33.5	-13.0	20.5

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

PCS Band

		Receiver	Sı	ubstituted Me	thod	Absoluto		
Frequency (MHz)	Polar (H/V)	Reading (dBµV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Middle Channel							
3760.000	Н	54.36	-39.9	13.8	2.9	-29.0	-13.0	16.0
3760.000	V	49.24	-43.8	13.8	2.9	-32.9	-13.0	19.9

For below 1GHz, all spurious emissions are 20dB below the limit or are on the system noise floor level.

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = SG Level Cable loss + Antenna Gain

3) Margin = Limit-Absolute Level

FCC Part 22H/24E Page 22 of 29

FCC §22.917(a) & §24.238(a) - BAND EDGES

Applicable Standard

According to § 22.917(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.

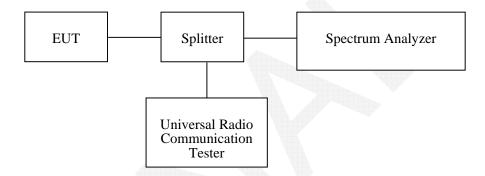
Report No.: RDG150601005-00B

According to \$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.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.7°C
Relative Humidity:	66 %
ATM Pressure:	99.9 kPa

The testing was performed by Allen Qiao on 2015-06-09

FCC Part 22H/24E Page 23 of 29

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

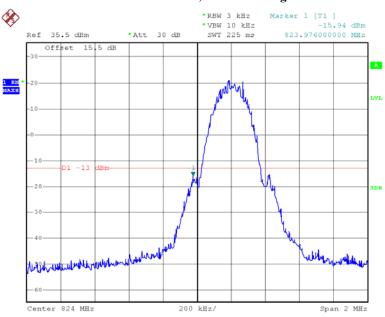
Band	Mode	Dand Edge	Reading	Limit
Danu	Mode	Band Edge	dBm	dBm
C-11-1	GSM	Left	-15.94	≤-13
Cellular	ar GSW	Right	-15.22	≤-13
PCS	DCC	Left	-18.00	≤-13
PCS	PCS	Right	-18.24	≤-13

Report No.: RDG150601005-00B

FCC Part 22H/24E Page 24 of 29

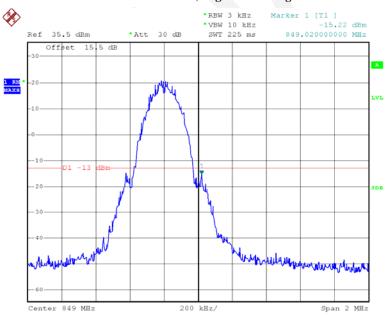
GSM 850, Left Band Edge

Report No.: RDG150601005-00B



Date: 9.JUN.2015 16:10:28

GSM 850, Right Band Edge

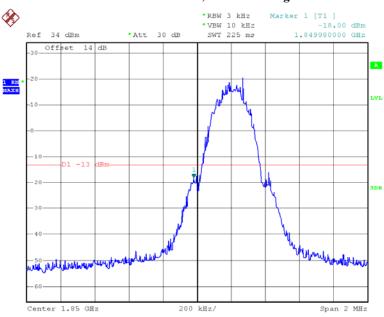


Date: 9.JUN.2015 16:11:44

FCC Part 22H/24E Page 25 of 29

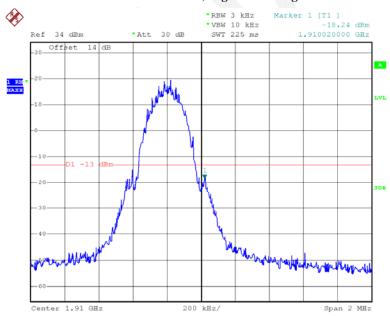
GSM 1900, Left Band Edge

Report No.: RDG150601005-00B



Date: 9.JUN.2015 16:03:06

GSM 1900, Right Band Edge



Date: 9.JUN.2015 16:00:50

FCC Part 22H/24E Page 26 of 29

FCC §2.1055, §22.355 & §24.235 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the I	Public Mobile Services

Report No.: RDG150601005-00B

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 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

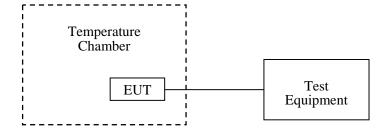
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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 from 85% 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.



FCC Part 22H/24E Page 27 of 29

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-3	2014-08-01	2015-08-01
R&S	Universal Radio Communication Tester	CMU200	109 038	2015-05-09	2016-05-09

Report No.: RDG150601005-00B

Test Data

Environmental Conditions

Temperature:	28.7 °C
Relative Humidity:	66%
ATM Pressure:	99.9kPa

The testing was performed by Allen Qiao on 2015-06-09.

FCC Part 22H/24E Page 28 of 29

^{*} **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Cellular Band (Part 22H)

GMSK, Middle Channel, f _c = 836.6 MHz					
Temperature	Voltage	Frequency Error	Frequency Error	Limit	
ပ	V_{DC}	Hz	ppm	ppm	
-30	3.7	-9	-0.011	2.5	
-20	3.7	-7	-0.008	2.5	
-10	3.7	-11	-0.013	2.5	
0	3.7	-8	-0.010	2.5	
10	3.7	-13	-0.016	2.5	
20	3.7	-14	-0.017	2.5	
30	3.7	-12	-0.014	2.5	
40	3.7	-13	-0.016	2.5	
50	3.7	-15	-0.018	2.5	
20	3.5	-10	-0.012	2.5	
20	4.2	-12	-0.014	2.5	

Report No.: RDG150601005-00B

PCS Band (Part 24E)

GMSK, Middle Channel, f _c = 1880.0 MHz						
Temperature	Voltage	Frequency Error	Frequency Error	Result		
°C	V_{DC}	Hz	ppm			
-30	3.7	-22	-0.012	Pass		
-20	3.7	-23	-0.012	Pass		
-10	3.7	-25	-0.013	Pass		
0	3.7	-26	-0.014	Pass		
10	3.7	-28	-0.015	Pass		
20	3.7	-21	-0.011	Pass		
30	3.7	-27	-0.014	Pass		
40	3.7	-24	-0.013	Pass		
50	3.7	-26	-0.014	Pass		
20	3.5	-25	-0.013	Pass		
20	4.2	-27	-0.014	Pass		

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

FCC Part 22H/24E Page 29 of 29