



FCC PART 15D
MEASUREMENT AND TEST REPORT

For

CETIS, INC.

5025 GALLEY ROAD, COLORADO SPRINGS, CO 80915, USA

FCC ID: ZTUCETIS201

Report Type: Original Report	Product Type: Telephone (Handset Unit)
Test Engineer: Brown Lu	<i>Brown Lu</i>
Report Number: RSZ120522001-00PP	
Report Date: 2012-08-10	
Reviewed By: RF Engineer	<i>Sula Huang</i>
Test Laboratory:	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 www.baclcorp.com.cn

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* This report contains 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 *CETIS, INC.*'s product, model number: *E103 (FCC ID: ZTUCETIS201)* (or the "EUT") in this report was a *handset unit of Telephone*, which was measured approximately: 20.3 cm (L) x 4.2 cm (W) x 3.1 cm (H), input voltage: DC 3.6V Li-ion battery.

Manufacturer information:

Company Name: Rizhao Londai Electronic Technology Co., Ltd.
Address: 515 Shandong Road, Rizhao City, Shandong P.R.C

Note: The product telephone, model E203 is electrically identical with the model E103, which was selected to test, they have the same circuit, PCB motherboard and program, the difference between them is just model number, which was explained in the attached declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 1205042 (Assigned by BAACL, Shenzhen). The EUT was received on 2012-05-22.*

Objective

This test report was based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.17 - 2006 and ANSI C64.3 2009.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart D, section 15.203, 15.315, 15.317, 15.319 and 15.323 rules.

Related Submittal(s)/Grant(s)

No related Submitted.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2006, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). 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 on 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 December 06, 2010. 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.: 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 an ISO/IEC 17025 accredited laboratory, and is accredited by 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

Description of Test Configuration

The system was configured for testing in TBR6 mode which is provided by the manufacturer.

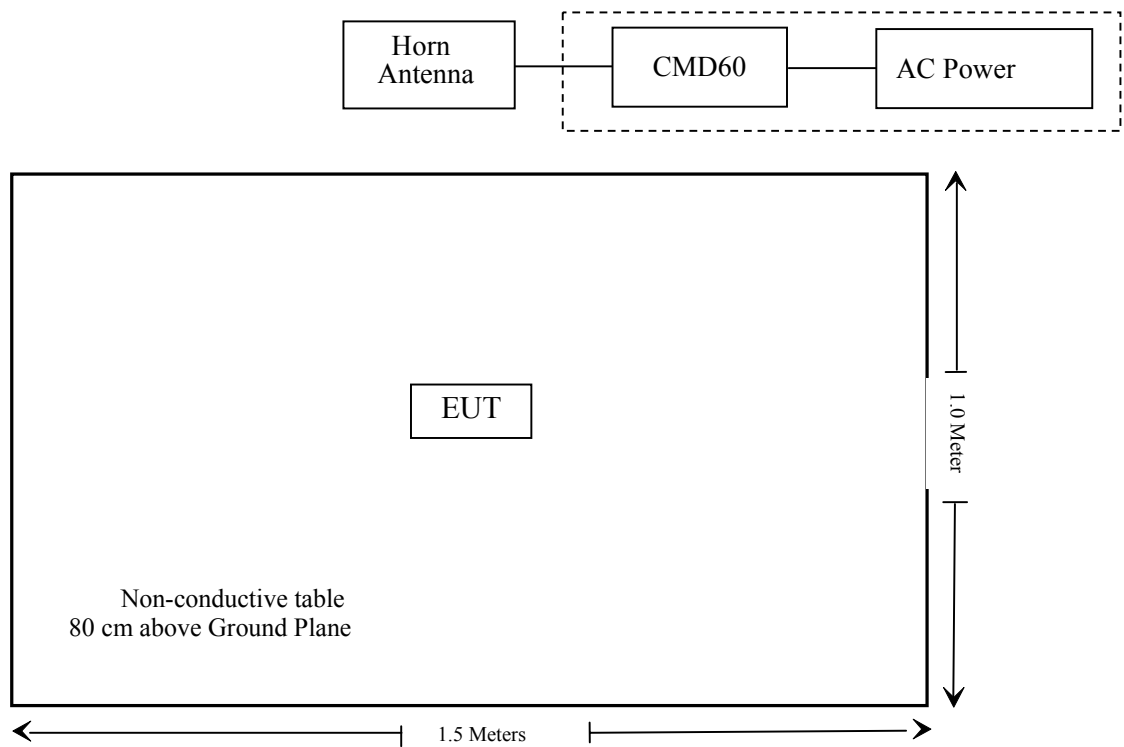
Equipment Modifications

No modification was made to the EUT tested.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R & S	Digital Radio-Communication Tester	CMD60	829902/026

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.319 (i); §2.1093	RF Radiation Exposure	Compliance
§ 15.317 § 15.203	Antenna Requirement	Compliance
§ 15.315 § 15.207	Conducted Emission	Not Applicable
§ 15.323 (a)	Emission Bandwidth	Compliance
§ 15.319 (c)	Peak Transmit Power	Compliance
§ 15.319 (d)	Power Spectral Density	Compliance
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliance
§ 15.319 (g)	Radiated Emission	Compliance
§ 15.323 (f)	Frequency Stability Handset	Compliance
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliance

Note: The EUT is only powered by battery.

FCC §15.319 (i) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §15.319 (i) Unlicensed PCS devices are subject to the radiofrequency radiation exposure requirements specified in §1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a general population/uncontrolled environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request. According to KDB 447498 D01 Mobile Portable RF Exposure v04 1) c): Unless excluded by specific FCC test procedures, portable devices with output power $> 60/f$ (GHz) mW shall include SAR data for equipment approval.

RF Exposure Evaluation

Maximum peak output power at antenna input terminal:

1924.992 MHz: 17.6 dBm = 57.54 mW

The Time-based average power at antenna input terminal = Peak output power *Duty cycle
= 57.54 * 4.03%
= 2.319 mW

$60/f$ (GHz) = $60/1.924992$ (GHz) = 31.17 mW

The time-based average power is less than $60/f$ (GHz)

So the SAR evaluation can be exempted.

Note: The time-base average output power depends on the duty cycle, and this device's duty cycle is 4.03%.

FCC§15.317&§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

This product has an integrated antenna with gain 2.0 dBi arrangement which was soldered on PCB, fulfill the requirement of this section, and please refer to the internal photos.

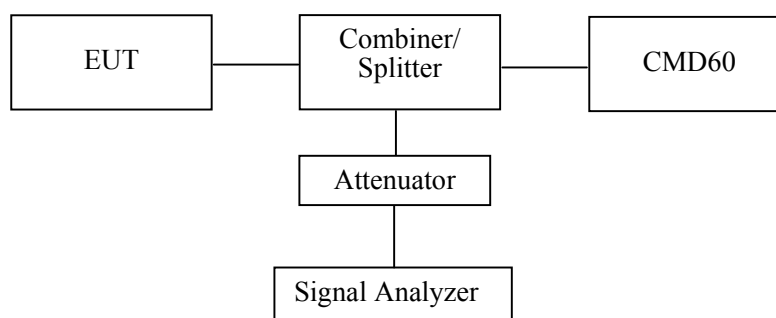
Result: Compliant.

FCC§15.323 (a) - EMISSION BANDWIDTH

Applicable Standard

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below

Test Setup 1:



The width, in Hz, of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that is 26 dB down relative to the maximum level of the modulated carrier. It is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1% of the emission band-width of the device under measurement. [Extraction from 47 CFR 15, subpart D, 15.303 (C)].

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23

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

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

Resolution bandwidth	1.0% of the emission bandwidth (as close as possible)
Video bandwidth	>3 times the resolution bandwidth
Number of sweeps	sufficient to stability the trace
Detection mode	peak detection with maximum hold

Test Data

Environmental Conditions

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

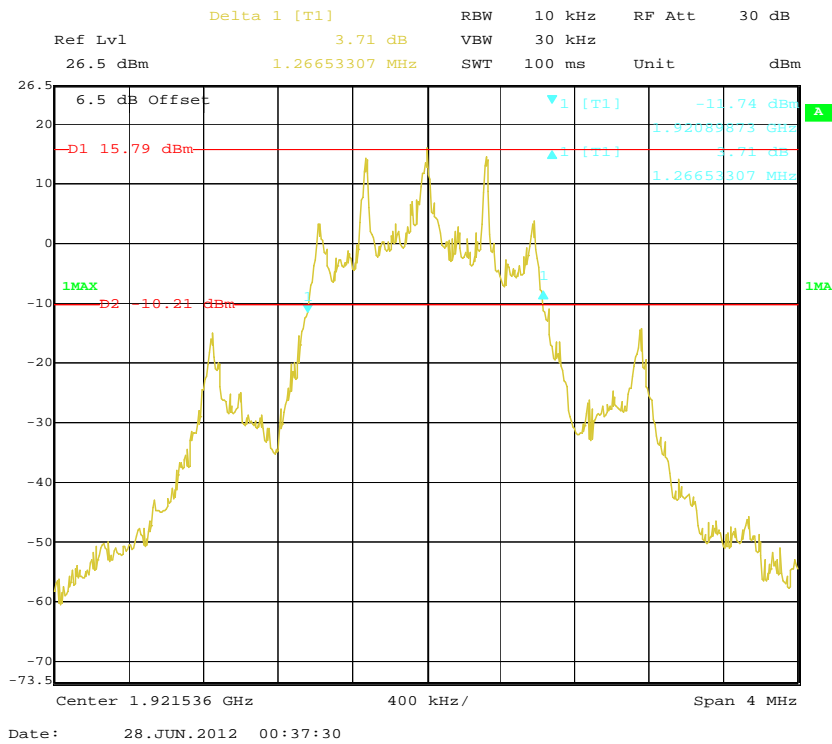
The testing was performed by Brown Lu on 2012-06-28.

Test Mode: Transmitting

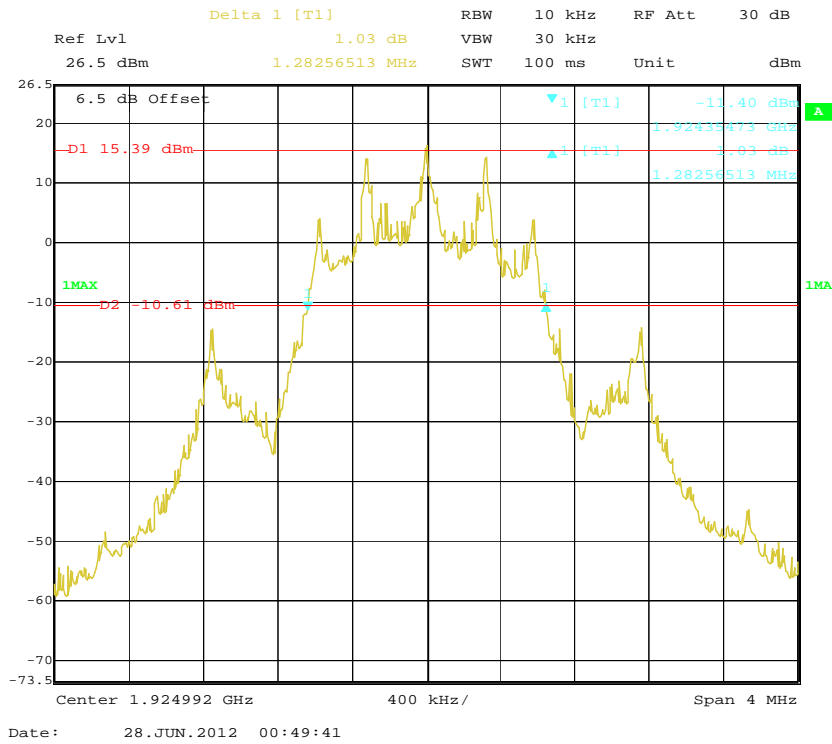
Channel	Center Frequency (MHz)	26 dB Bandwidth (MHz)	Limit
Low	1921.536	1.266	50 kHz < OBW < 2.5 MHz
Middle	1924.992	1.282	50 kHz < OBW < 2.5 MHz
High	1928.448	1.234	50 kHz < OBW < 2.5 MHz

Test Result: Compliance. Please refer to the attached plots.

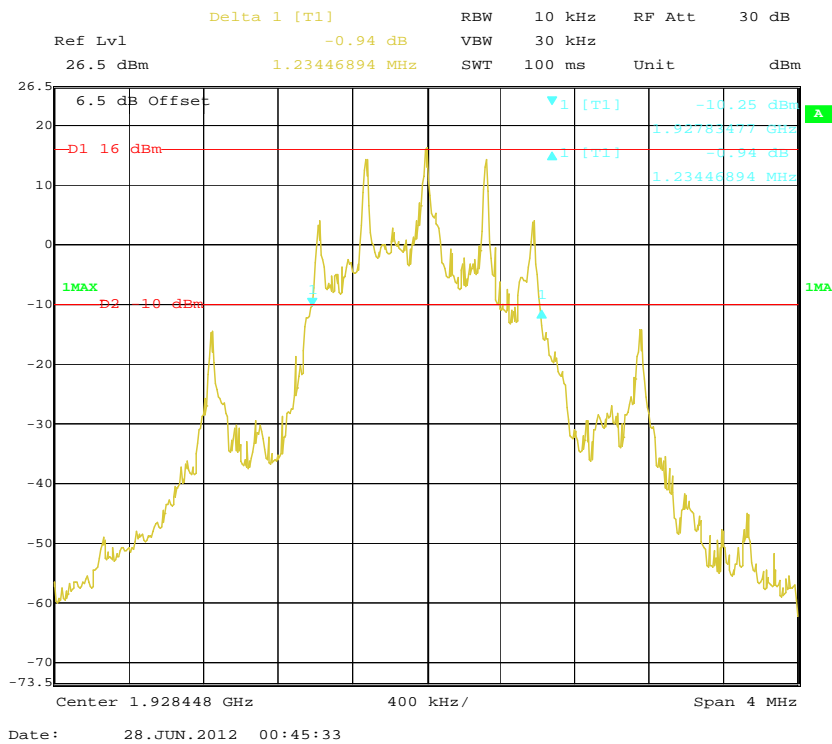
Low Channel



Middle Channel



High Channel



FCC§15.319 (c) - PEAK TRANSMIT POWER

Applicable Standard

The peak power output as measured over an interval of time equal to the transmission-burst duration of the device under all conditions of modulation. [47 CFR 15, subpart D, 15.303 (f)].

Part 15.323(a) & Part 15.319(c) Peak Transmit Power:

The limit for Peak Transmit Power (PTP) is calculated using the following formula:

$$PTP = 100 \mu W \times (EBW)^{1/2}$$

EBW is the transmit emission bandwidth in Hz determined in the other test item:

The peak transmitter power is measured in accordance with ANSI C63.17-2006 Clause 6.1.2.

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	≥ Emission bandwidth
Video bandwidth	≥ RBW
Span	Zero
Center frequency	Nominal center frequency of channels
Amplitude scale	Log (linear may be used if analyzer has sufficient linear dynamic range and accuracy)
Detection	Peak detection
Trigger	Video
Sweep rate	Sufficiently rapid to permit the transmit pulse to be resolved accurately

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23

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

Test Data

Environmental Conditions

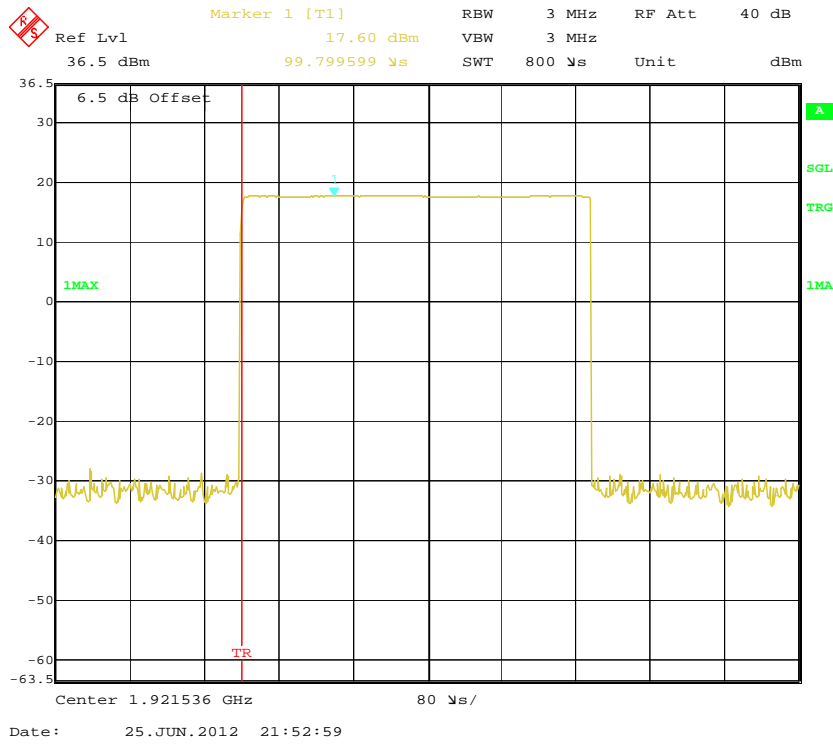
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Brown Lu on 2012-06-25.

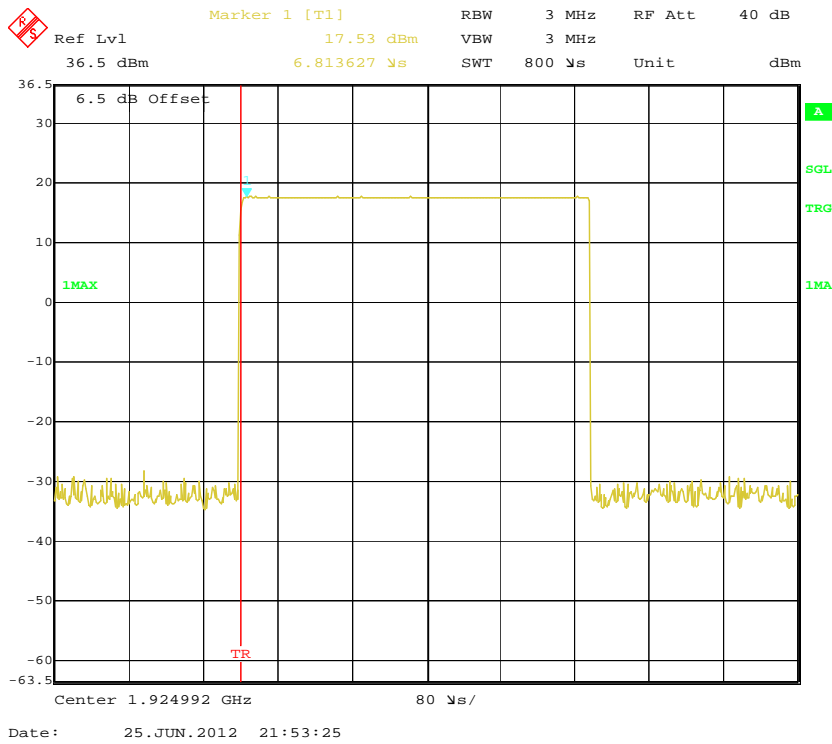
Test Result: Compliance. Please refer to the following plots.

Channel	Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
Low	1921.536	17.60	20.51
Middle	1924.992	17.53	20.54
High	1928.448	17.53	20.46
EBW _{Low channel} = 1266000 Hz, EBW _{Middle channel} = 1282000 Hz, EBW _{High channel} = 1234000 Hz Peak Transmit Power Limit = $100\mu\text{W} \times (\text{EBW})^{1/2}$			

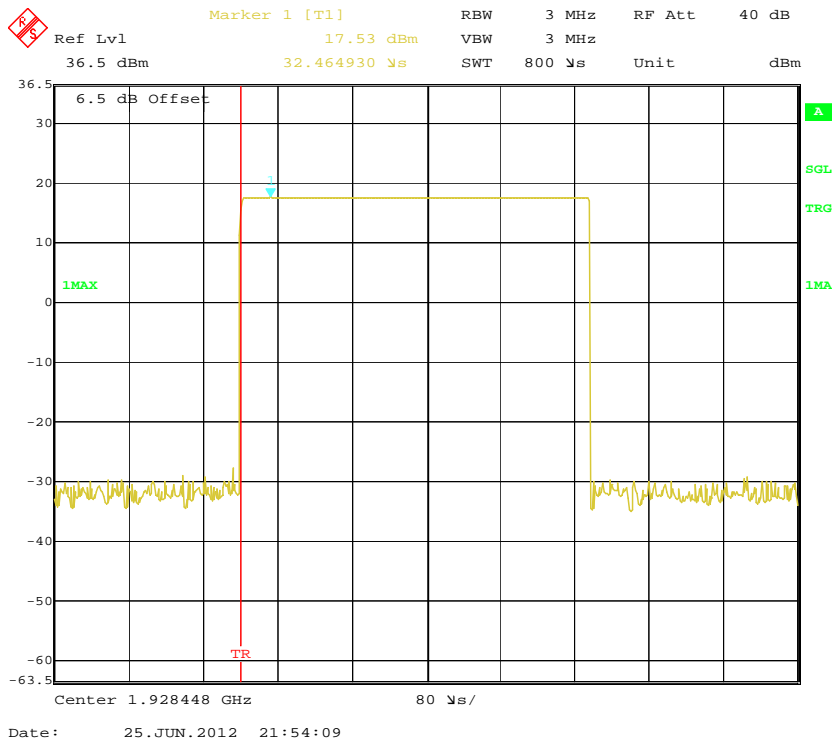
Low Channel



Middle Channel



High Channel



FCC§15.319 (d) - POWER SPECTRAL DENSITY

Applicable Standard

The average pulse energy in a 3 kHz bandwidth is divided by the pulse duration.

The power spectral density shall not exceed 3mW in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

The power spectral density is measured in accordance with ANSI C63.17.2006 Clause 6.1.5.

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	3 kHz
Video bandwidth	$\geq 3 \times \text{RBW}$
Span	Zero span at frequency with the maximum level (frequency determined in 6.1.3 if the same type of signal (continuous versus burst) was used in 6.1.3)
Center frequency	Spectral peak as determined in 6.1.3
Sweep time	For burst signals, sufficient to include essentially all of the maximum length burst at the output of a 3 kHz filter (e.g., maximum input burst duration plus 600 μs). For continuous signals, 20 ms.
Amplitude scale	Log power
Detection	Sample detection and averaged for a minimum of 100 sweeps
Trigger	External or internal

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

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

Test Data

Environmental Conditions

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

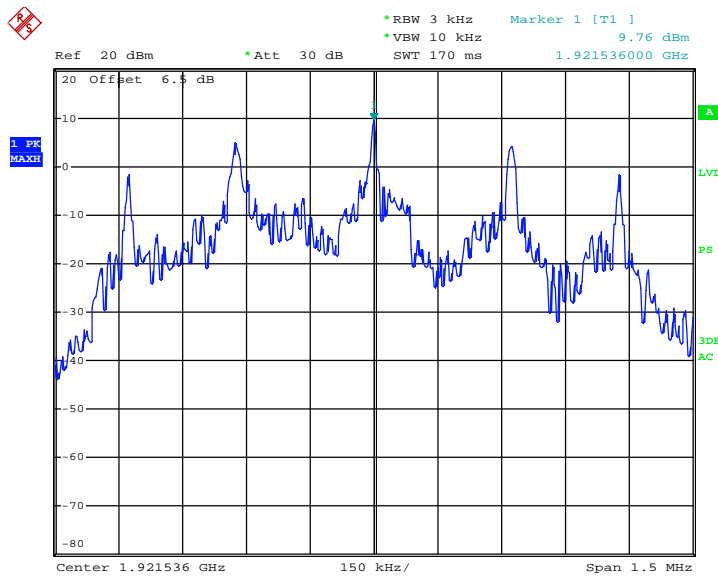
The testing was performed by Brown Lu on 2012-06-25.

Test Mode: Transmitting

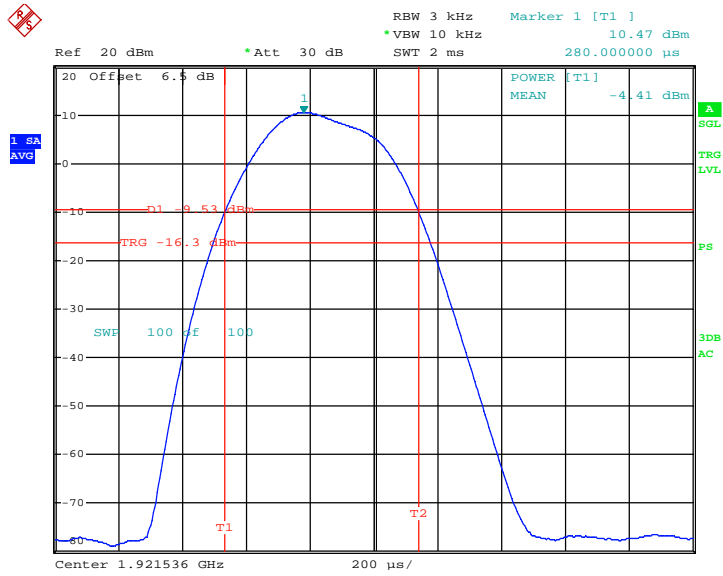
Test Result: Compliance. Please refer to following tables and plots

Frequency (MHz)	Power Spectral Density		Limit (mW/3kHz)	Result
	(dBm/3kHz)	(mW/3kHz)		
1921.536	-4.41	0.362	3	Pass
1924.992	-4.52	0.353	3	Pass
1928.448	-5.89	0.258	3	Pass

Low Channel

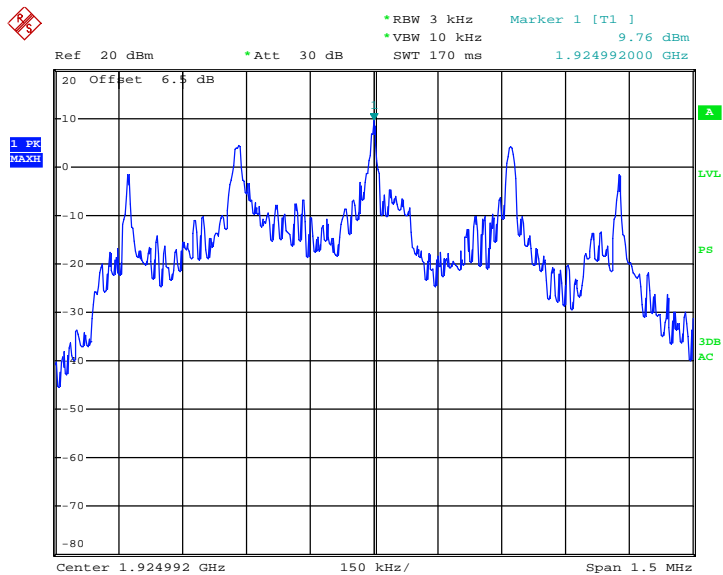


EUT
 Date: 25.JUN.2012 14:17:55

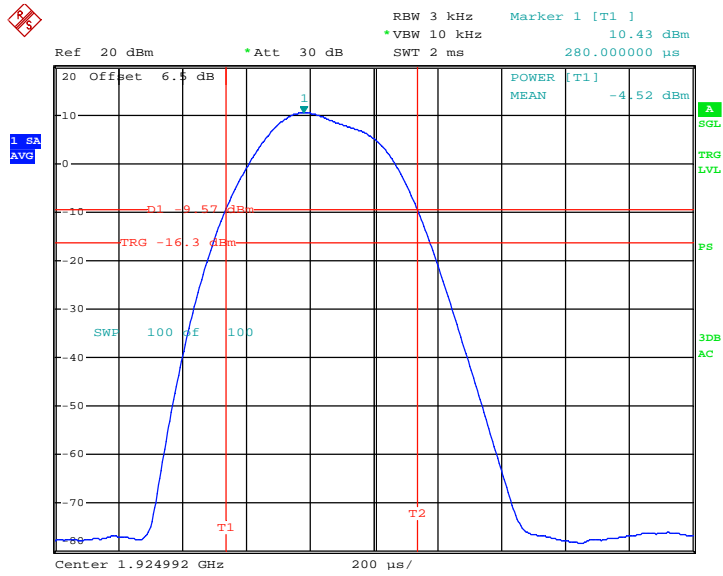


EUT
Date: 25.JUN.2012 14:53:59

Middle Channel



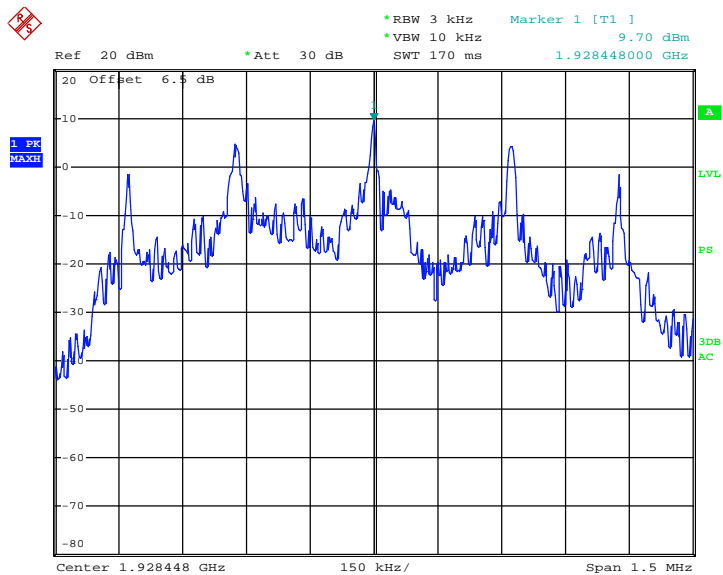
EUT
Date: 25.JUN.2012 14:16:57



EUT

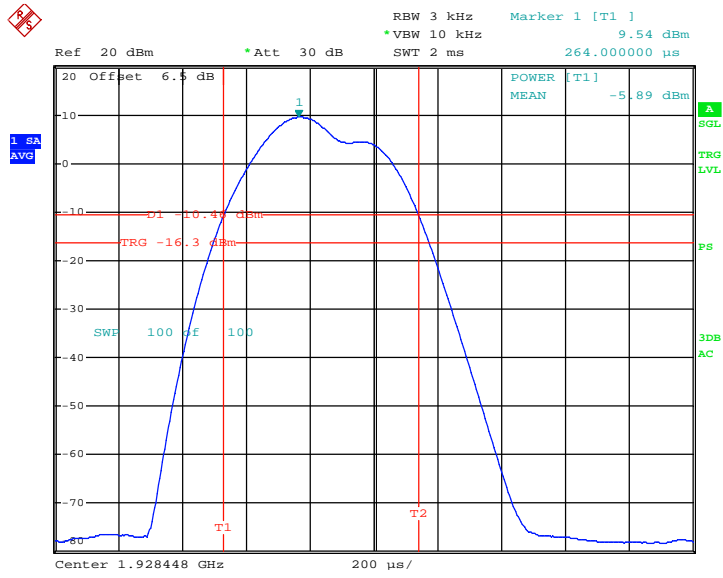
Date: 25.JUN.2012 14:51:47

High Channel



EUT

Date: 25.JUN.2012 14:15:29



EUT

Date: 25.JUN.2012 14:50:36

FCC§15.323 (d) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND

Applicable Standard

Emissions inside the sub-band must comply with the following emission mask:

1. In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device;
2. in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator;
3. in the bands between 3B and the sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator.

Where B = emission bandwidth

Emission Outside the sub-band shall be attenuated below a reference power of 112 mw (20.5 dBm) as follows:

1. 30 dB between the sub-band and 1.25 MHz above or below the sub-band;
2. 50 dB between 1.25 and 2.5 MHz above or below the sub-band;
3. 60 dB at 2.5 MHz or greater above or below the sub-band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23

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

Test Data

Environmental Conditions

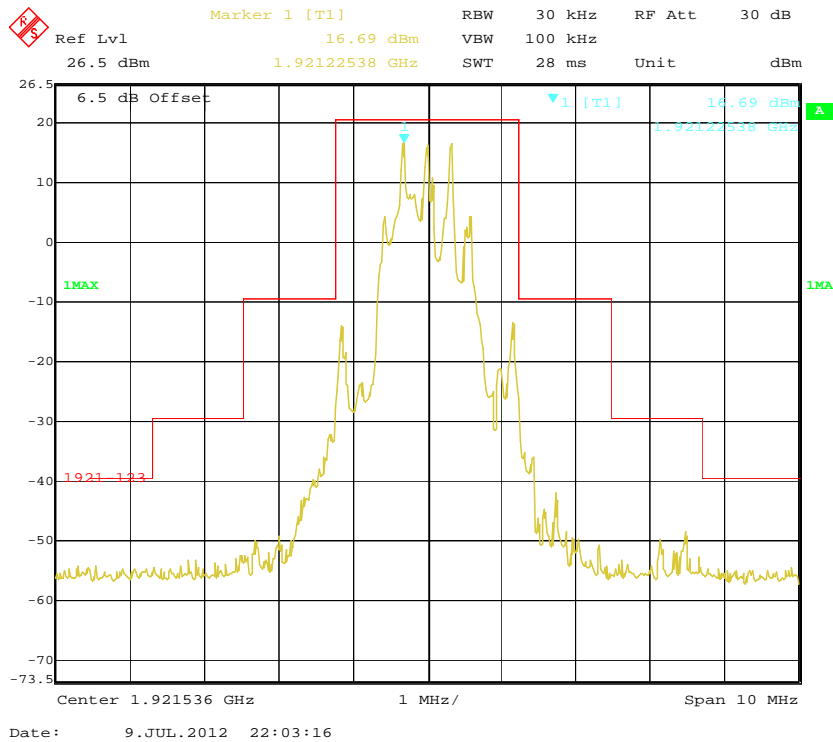
Temperature:	20-25 °C
Relative Humidity:	56-60 %
ATM Pressure:	100.0-100.1 kPa

The testing was performed by Brown Lu from 2012-07-09 and 2012-07-11.

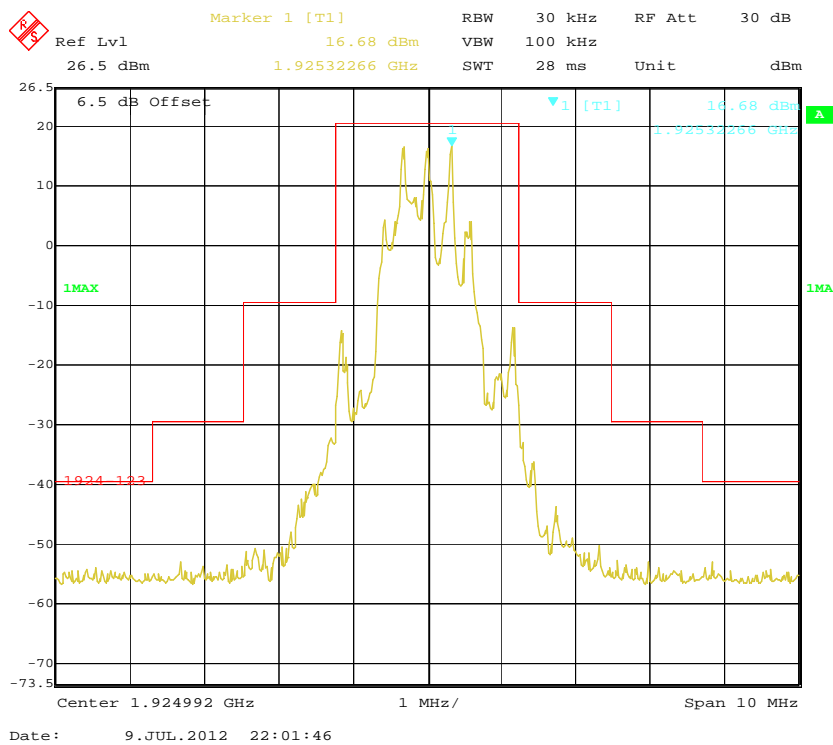
Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

Low Channel (Unwanted Emission inside the Sub-band)



Middle Channel (Unwanted Emission inside the Sub-band)



High Channel (Unwanted Emission inside the Sub-band)

