



FCC PART 90

TEST REPORT

For

SHENZHEN COVALUE COMMUNICATIONS CO., LTD.

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FCC ID: Y4GCU780-2

Report Type:		Product Type:
Original Report		Two Way Radio
Test Engineer:	Brown Lu	Brown Lu
Report Number:	R1DG120419005	5-00
Report Date:	2012-06-06	
Destant Des	Sula Huang	Sonta Huag
Reviewed By: Test Laboratory:	Bay Area Compli 6/F, the 3rd Phase	20018 320008

Note: This test report is prepared for the customer shown above and for the equipment 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*, or any agency of the Federal Government. * This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

Report No.: R1DG120419005-00

Bay Area Compliance Laboratories Corp. (Shenzhen)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SHENZHEN COVALUE COMMUNICATIONS CO., LTD.*'s product, model number: *CU780-2 (FCC ID: Y4GCU780-2)* or the "EUT" in this report is a *Two Way Radio*, which was measured approximately 113.5 mm (L) x 54 mm (W) x 33.5 mm (H), rated input voltage: DC 7.4 V Li-ion battery.

Technical specifications:

Frequency range: 400 MHz-470 MHz Output power: 4.375 W (Conducted power) Modulation: FM Frequency spacing: 12.5 kHz

* All measurement and test data in this report was gathered from production sample serial number: 120419005 (Assigned by BACL, Shenzhen). The EUT was received on 2012-04-19.

Objective

This test report is prepared on behalf of *SHENZHEN COVALUE COMMUNICATIONS CO., LTD.* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

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 individual parts:

Part 90 - Private Land Mobile Radio Service

Applicable Standards: TIA 603-D and ANSI 63.4-2009.

All emissions measurement was performed and 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

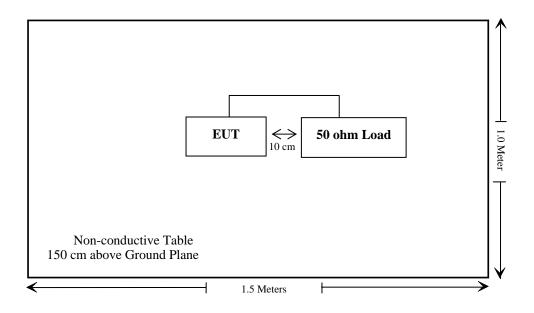
Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

Equipment Modifications

No Equipment Modifications.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1307 (b); §2.1093	RF Exposure	Compliance
§2.1046; §90.205	RF Output Power	Compliance
§2.1047; §90.207	Modulation Characteristic	Compliance
§2.1049; §90.209; §90.210	Authorized Bandwidth & Emission Mask	Compliance
§2.1051; §90.210	Spurious Emission at Antenna Terminal	Compliance
§2.1053; §90.210	Spurious Radiated Emissions	Compliance
§2.1055; §90.213	Frequency Stability	Compliance
§90.214	Transient Frequency Behavior	Compliance

Note: The uncertainty of any RF tests which use conducted method measurement is 0.96 dB. The uncertainty of any radiation emissions measurement is 4.0 dB.

FCC §1.1307(b) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §1.1307(b) and §2.1093, protable device operates Part 90 should be subjected to rountine environmental evaluation for RF exposure prior or equipment authorization or use.

Result: Compliance.

Please refer to SAR Report Number: R1205318-SAR.

FCC §2.1046 & §90.205- RF OUTPUT POWER

Applicable Standard

FCC §2.1046 and §90.205.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

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

Test Procedure

Conducted RF Output Power:

TIA-603-D section 2.2.1

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

Spectrum Analyzer setting:

 RBW
 Video B/W

 100 kHz
 300 kHz

Test Data

Environmental Conditions

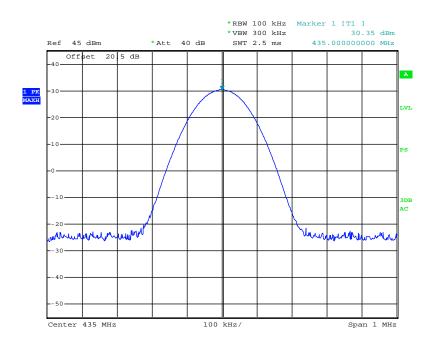
Temperature:	25 °C	
Relative Humidity:	56%	
ATM Pressure:	100.1 kPa	

The testing was performed by Brown Lu on 2012-04-26.

Test Mode: Transmitting

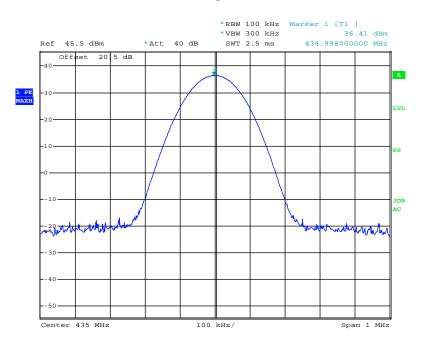
Test Result: Compliance. Please refer to following table and plot.

Frequency Spacing (kHz)	Frequency (MHz)	Output Power (dBm)	Output Power (Watt)	Emission power
12.5	435.000	30.35	1.084	Low
12.5	435.000	36.41	4.375	High



Low Power

High Power



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FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC

Applicable Standard

FCC§2.1047 & §90.207:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
HP	RF Communications Test Set	8920A	3438A05201	2011-06-14	2012-06-13

* 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 Procedure

Test Method: TIA/EIA-603 2.2.3

Test Data

Environmental Conditions

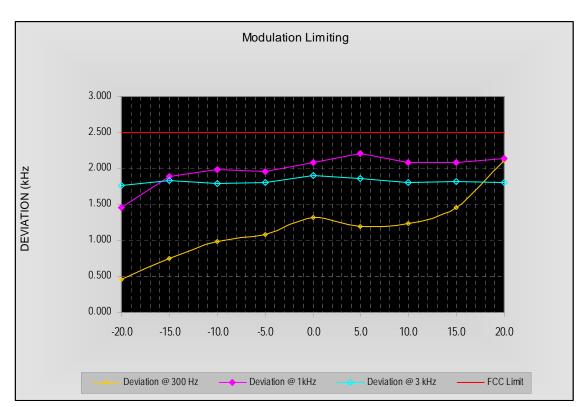
Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.1 kPa

The testing was performed by Brown Lu on 2012-04-26.

Test Mode: Transmitting

Audio Input	Freq	Frequency Deviation (kHz)			
Level [dBm]	@ 300 Hz	@ 1kHz @ 3 kHz		[kHz]	
20.0	2.113	2.134	1.801	2.5	
15.0	1.456	2.089	1.820	2.5	
10.0	1.235	2.088	1.810	2.5	
5.0	1.192	2.213	1.856	2.5	
0.0	1.313	2.082	1.901	2.5	
-5.0	1.083	1.963	1.802	2.5	
-10.0	0.986	1.993	1.785	2.5	
-15.0	0.756	1.883	1.830	2.5	
-20.0	0.454	1.465	1.763	2.5	

MODULATION LIMITING

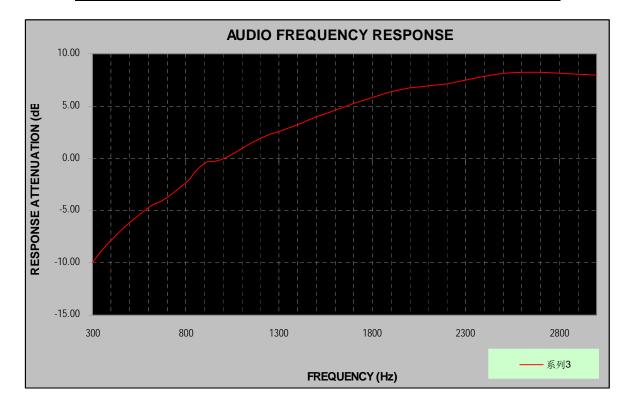


Carrier Frequency: 435.000 MHz, Channel Separation=12.5 kHz

Audio Frequency Response

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.01
400	-7.83
500	-6.20
600	-4.70
700	-3.72
800	-2.34
900	-0.52
1000	0.00
1200	1.90
1400	3.24
1600	4.63
1800	5.86
2000	6.75
2200	7.10
2400	7.90
2600	8.27
2800	8.16
3000	8.00

Carrier Frequency: 435.000 MHz, Channel Separation=12.5 kHz





FCC §2.1049, §90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049, §90.209 and §90.210

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 , 0dB.

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz, at least 7.27 (f_d –2.88 kHz) dB.

3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

 $50+10\log P=50+10\log (4.375) = 56.41 \text{ dB}$

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.

2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.

3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

43+10logP

The resolution bandwidth was 300 Hz or greater for measuring up to 250 kHz from the edge of the authorized frequency segment, and 30 kHz or greater for measuring more than 250 kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
НР	RF Communications Test Set	8920A	3438A05201	2011-06-14	2012-06-13

* **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 Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 300 Hz and the spectrum was recorded in the frequency band \pm 35 kHz from the carrier frequency.

Test Data

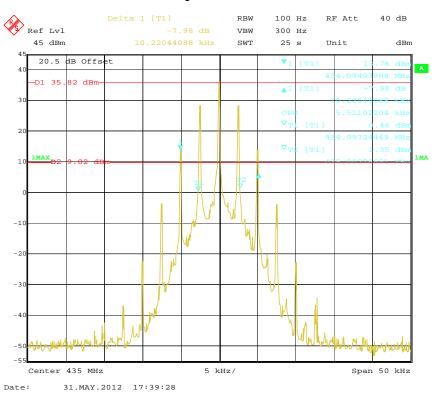
Environmental Conditions

Temperature:	25 °C		
Relative Humidity:	56 %		
ATM Pressure:	100.1 kPa		

The testing was performed by Brown Lu on 2012-05-31.

Result: Compliance. Please refer to the following table and plot.

99% Occupied Bandwidth	26 dB Bandwidth
(kHz)	(kHz)
5.51	10.22



Occupied Bandwidth

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Emission Designator:

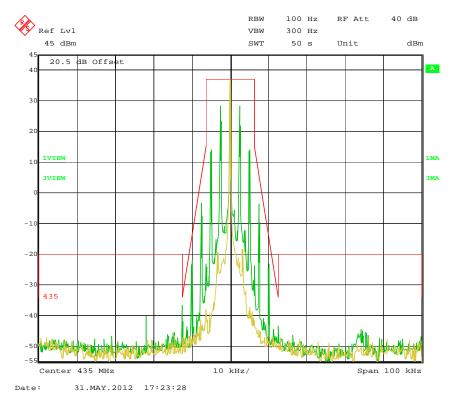
Bn=2M+2DK

Where M = 3 kHz, D = 2.21 kHz, K = 1

Bn =2*3 + 2*2.21 = 10.42 kHz

Type of emission: 10K4F3E

Please refer to the emission mask hereinafter plots.



Emission Mask - 435 MHz

FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 , 0 dB.

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz, at least 7.27 (f_d –2.88 kHz) dB.

3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

50+10logP=50+10log (P) dB

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.

2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.

3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

43+10logP= 43+10log (P) dB

The resolution bandwidth was 300 Hz or greater for measuring up to 250 kHz from the edge of the authorized frequency segment, and 30 kHz or greater for measuring more than 250 kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
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 in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

Test Data

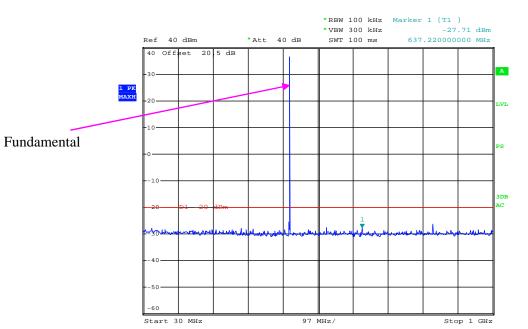
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Brown Lu on 2012-04-26.

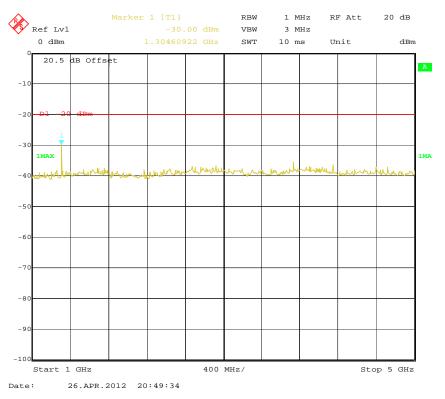
Test Mode: Transmitting

Please refer to the following plots.



30 MHz - 1 GHz (435.000 MHz)

Date: 26.APR.2012 20:28:07



1 GHz - 5 GHz (435.000 MHz)

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FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
Sunol Sciences	Hybrid Antenna	JB1	A040904-2	2011-11-28	2012-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Mini-Circuits	Amplifier	ZVA-213+	N/A	2011-12-24	2012-12-23
HP	Signal Generator	8657A	2849U00982	2011-10-21	2012-10-20
HP	Amplifier	8447E	1937A01046	2011-11-24	2012-11-23
HP	Synthesized Sweeper	8341B	2624A00116	2012-04-11	2013-04-10
COM POWER	Dipole Antenna	AD-100	041000	N/A	N/A
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2013-02-10

* **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 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 teeth 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 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts) Spurious attenuation limit in dB =50+10 Log_{10} (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

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Test Data

Environmental Conditions

Temperature:	25 °C		
Relative Humidity:	56 %		
ATM Pressure:	100.1 kPa		

The testing was performed by Brown Lu on 2012-05-31.

Test Mode: Transmitting

30 MHz - 5 GHz

Indica	nted	Table	Te Ante		Sub	stituted		Antenna Gain	Cable	Absolute	FCC	Part 90
Frequency (MHz)	Reading (dBµV)	Angle Degree	0	Polar (H/V)	Frequency (MHz)	Level (dBm)	Polar (H/V)	Correction	Loss (dB)	Level (dBm)	Limit (dBm)	Margin (dB)
3480	64.31	334	1.4	V	3480	-33.8	V	12.00	2.23	-24.03	-20	4.03
3480	53.41	214	2.1	Н	3480	-43.9	Н	12.00	2.23	-34.13	-20	14.13
2175	49.06	221	1.6	V	2175	-47.3	V	9.90	1.06	-38.46	-20	18.46
1305	52.02	13	1.8	V	1305	-47.6	V	7.00	0.84	-41.44	-20	21.44
1305	46.99	154	1.6	Н	1305	-51.5	Η	7.00	0.84	-45.34	-20	25.34
2175	48.37	86	1.9	Н	2175	-54.2	Н	9.90	1.06	-45.36	-20	25.36
870	41.12	13	1.6	Н	870	-55.9	Н	0.00	0.68	-56.58	-20	36.58
870	40.08	135	1.5	V	870	-56.9	V	0.00	0.68	-57.58	-20	37.58

FCC §2.1055 & §90.213- FREQUENCY STABILITY

Applicable Standard

FCC §2.1055 & §90.213

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Hewlett-Packard	Frequency Counter	5343A	2232A00827	2012-04-15	2013-04-14
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2011-11-24	2012-11-23

* **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:	100.1 kPa		

The testing was performed by Brown Lu on 2012-05-31.

Test Mode: Transmitting

For narrow	Band:
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Reference Frequency: 435.000 MHz						
Test Envi	ironment	Frequency Meas	sure with Time	e Elapsed		
Temperature (℃)	Power Supplied (V _{DC})	Measured Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)		
	Frequency Stability	y versus Input Temper	ature			
50	7.4	40	0.0920	2.5		
40	7.4	39	0.0897	2.5		
30	7.4	37	0.0851	2.5		
20	7.4	36	0.0828	2.5		
10	7.4	34	0.0782	2.5		
0	7.4	38	0.0874	2.5		
-10	7.4	39	0.0897	2.5		
-20	7.4	33	0.0759	2.5		
-30	7.4	41	0.0943	2.5		
	Frequency Stabi	lity versus Input Volta	ıge			
20	6.0	43	0.0989	2.5		

Note: the battery operation end point is 6.0V wihich specified by manufacturer.

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

Regulations: FCC §90.214 Test method: ANSI/TIA-603-D 2010, section 2.2.19.3

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
TEKTRONIX	Digital Phosphor Oscilloscope	TDS 7104	B020518	2012-04-11	2013-04-10
HP	Modulation Analyzer	8901B	3438A05208	2012-04-11	2013-04-11
HP	RF Communications Test Set	8920A	3438A05201	2011-06-14	2012-06-13

* 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

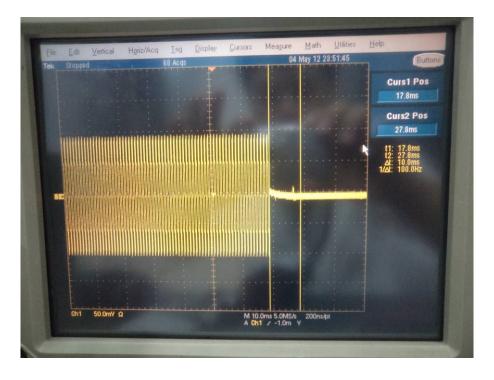
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Brown Lu on 2012-05-04.

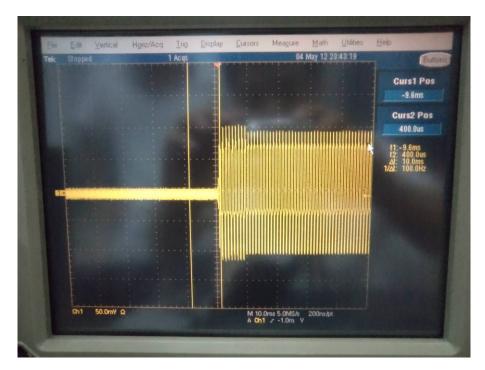
Operation Frequency (MHz)	Channel Separation (kHz)	Time Period (ms)	Maximum frequency difference (kHz)	Result
435.000	12.5	$<10(t_1)$	\pm 12.5 kHz	Pass
		$<25(t_2)$	\pm 6.25 kHz	
		$<10(t_3)$	\pm 12.5 kHz	

Please refer to the following plots.



Turn on (Frequency at 435.000 MHz)

Turn off (Frequency at 435.000 MHz)



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