

FCC PART 15.237

TEST REPORT

For

Congress Network Corporation

7235 NW 19th CT, Hollywood, Florida 33024, United States

FCC ID: 2ABY4T500

Report Type: Original Report	Product Type: T500 FM Transmitter
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Report Number: RSZ141113003-00	
Report Date: 2014-12-04	
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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.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Congress Network Corporation* 's product, model number: *T-500 (FCC ID: 2ABY4T500)* or the "EUT" in this report was a transmitter unit of *T500 FM Transmitter*, which was measured approximately: 14.0 cm (L) × 11.6cm (W) × 4.5 cm (H), rated input voltage: DC 15V from adapter.

Adapter information:

Model: GFP241DA-1516M-2

Input: AC 100-240V, 50/60Hz, 0.55 A

Output: DC 15V, 1.6A

**All measurement and test data in this report was gathered from production sample serial number: 1411106 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2014-11-13.*

Objective

This report is prepared on behalf of *Congress Network Corporation* in accordance with Part 2-Subpart J, and Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine the compliance of EUT with FCC Part 15, Subpart C, section 15.203, 15.205, 15.209, 15.215 and 15.237 rules.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

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.

SYSTEM TEST CONFIGURATION

Justification

The system was configured in a testing mode which provided by manufacturer.

Equipment Modifications

No modifications were made to the unit tested.

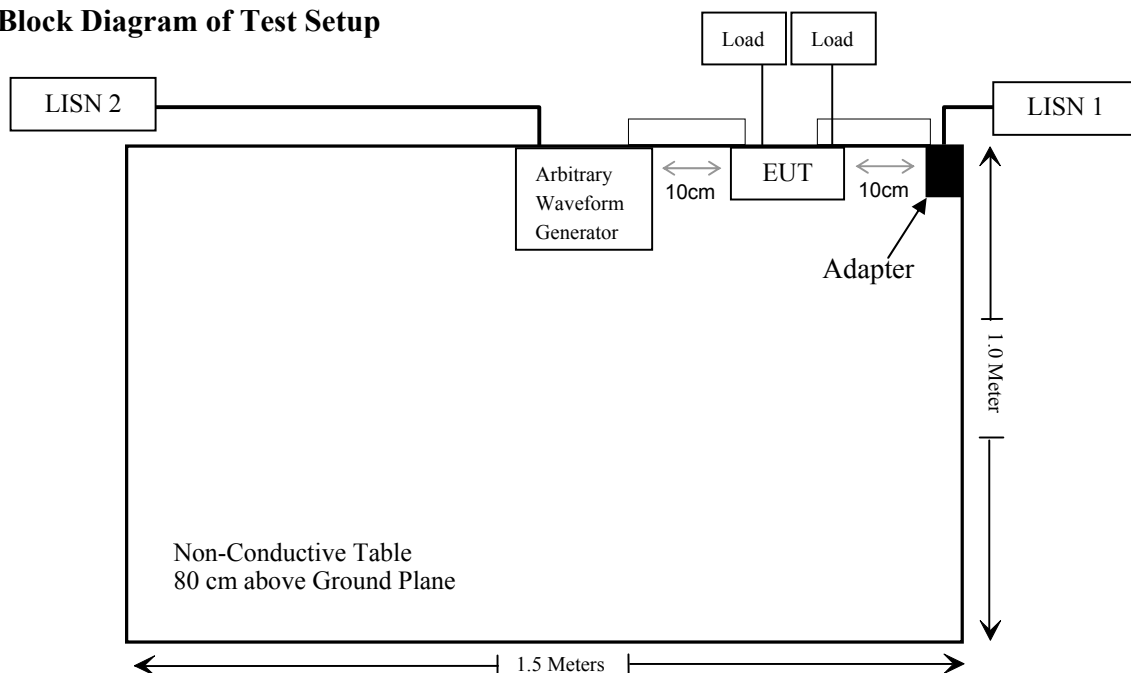
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	Remark
Agilent	20MHz function / Arbitrary Waveform Generator	33220A	MY44018679	

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Detachable AC Power Cable	1.0	Adapter	LISN 1
Un-shielding Un-detachable DC Power Cable	2.0	EUT	Adapter
Un-shielding Detachable Signal Cable	0.25	EUT	Generator
Un-shielding Un-detachable AC Power Cable	2.0	Generator	LISN 2

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Compliance
§15.237(b) (c)	Field strength	Compliance
§15.215(c)	20dB Emission Bandwidth	Compliance

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has TNC type with special thread connector for antenna, only the manufacture's antenna can be matched with this connector and the antenna gain is 0dBi; fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

FCC §15.207 – AC LINE CONDUCTED EMISSION

Applicable Standard

FCC§15.207

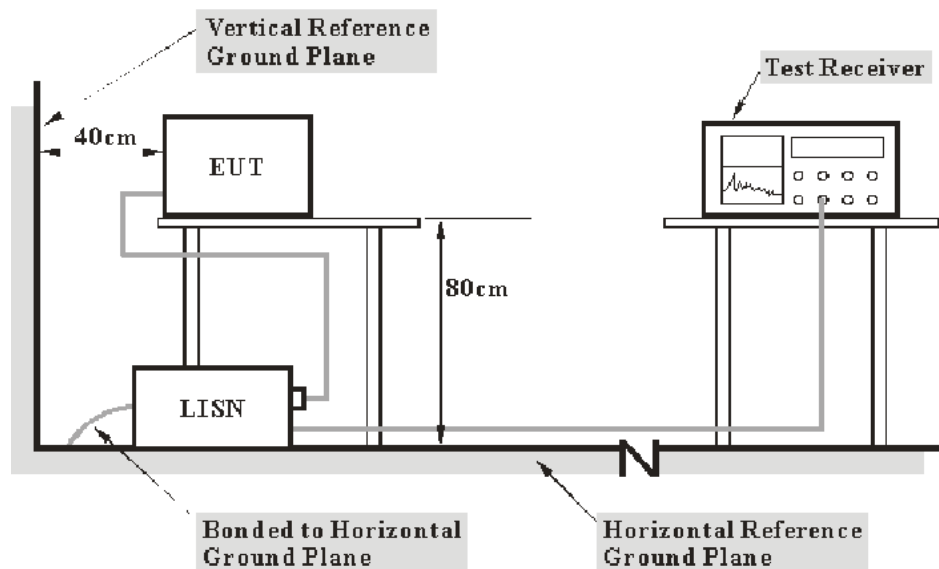
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-03	2015-06-03
Rohde & Schwarz	1st LISN	ENV216	3560.6650.12-101613-Yb	2014-06-09	2015-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-05-14	2015-05-14
Rohde & Schwarz	CE Test software	EMC 32	8.95	-	-

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

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

10.4 dB at 17.692590 MHz in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

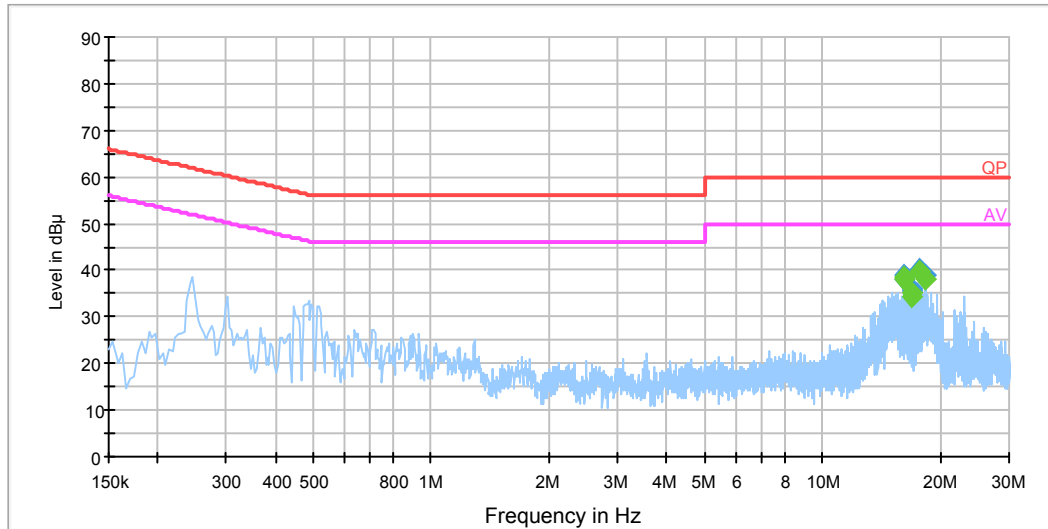
Temperature:	26 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2014-11-21.

Test Mode: Transmitting

AC 120V/60 Hz, Line:

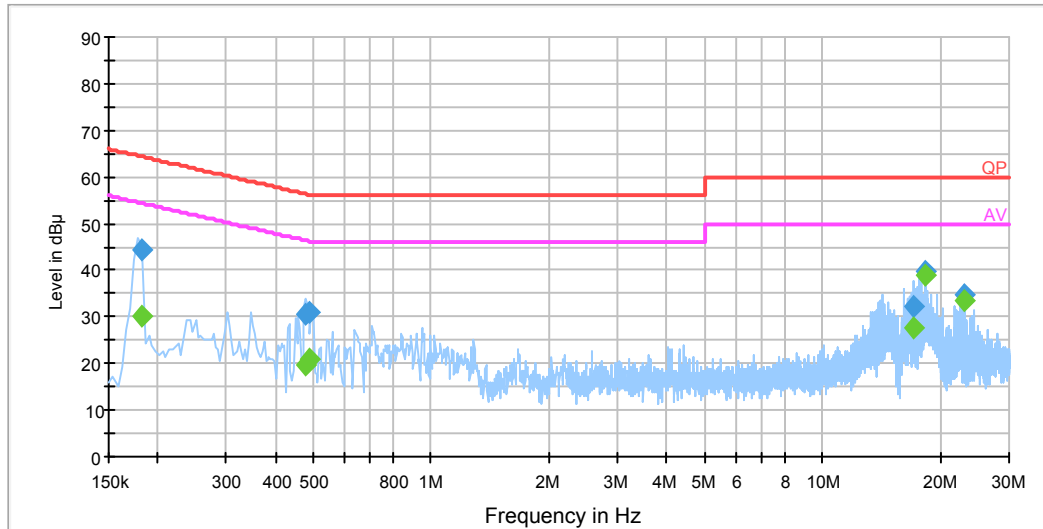
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
16.226610	38.3	19.9	60.0	21.7	QP
16.226610	37.9	19.9	50.0	12.1	Ave.
16.227510	38.8	19.9	60.0	21.2	QP
16.227510	38.5	19.9	50.0	11.5	Ave.
16.900530	36.1	19.9	60.0	23.9	QP
16.900530	35.4	19.9	50.0	14.6	Ave.
16.901770	35.4	19.9	60.0	24.6	QP
16.901770	34.4	19.9	50.0	15.6	Ave.
17.692590	40.0	19.9	60.0	20.0	QP
17.692590	39.6	19.9	50.0	10.4	Ave.
18.244370	38.8	19.9	60.0	21.2	QP
18.244370	38.0	19.9	50.0	12.0	Ave.

AC 120V/60 Hz, Neutral

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.181500	44.5	19.2	64.4	19.9	QP
0.181500	30.2	19.2	54.4	24.2	Ave.
0.478830	30.6	19.2	56.4	25.8	QP
0.478830	19.9	19.2	46.4	26.5	Ave.
0.490710	30.9	19.2	56.2	25.3	QP
0.490710	20.8	19.2	46.2	25.4	Ave.
17.085770	32.3	19.6	60.0	27.7	QP
17.085770	27.5	19.6	50.0	22.5	Ave.
18.244370	39.6	19.6	60.0	20.4	QP
18.244370	39.0	19.6	50.0	11.0	Ave.
23.131050	34.7	19.7	60.0	25.3	QP
23.131050	33.5	19.7	50.0	16.5	Ave.

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

§15.237(b) (c) FIELD STRENGTH

Applicable Standard

According to FCC§15.237

- (a) The intentional radiator shall be restricted to use as an auditory assistance device.
- (b) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the above specified frequency ranges.
- (c) The field strength within the permitted 200 kHz band shall not exceed 80 millivolts/meter at 3 meters. The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emissions limits specified in §15.209. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz, 4.92 dB for above 1GHz, and it will not be taken into consideration for the test data recorded in the report

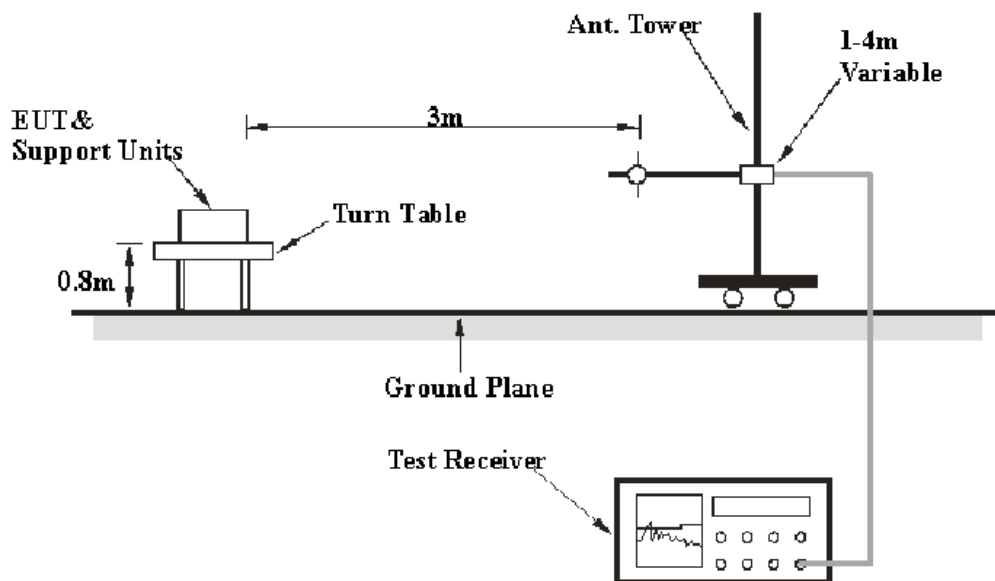
Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209/15.205 and FCC 15.237 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Signal Analyier	FSIQ26	837405/023	2014-05-31	2015-05-31
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
Sunol Sciences	Bi-log Antenna	JB1	A040904-1	NCR	NCR
R&S	EMI Test Receiver	ESCI	101120	2014-11-12	2015-11-12

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

Test Results Summary

According to the data in the following table, the worst margin reading as below:

2.36 dB at 149.4 MHz in the Vertical polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data**Environmental Conditions**

Temperature:	23 °C
Relative Humidity:	48 %
ATM Pressure:	100.1 kPa

The testing was performed by Mike Hu on 2014-11-19.

Test Mode: Transmitting

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.237/205/209		
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)	Comment
Low Channel										
145.0	52.62	QP	136	1.8	V	-13.3	39.32	43.5	4.18	Harmonic
217.5	51.44	QP	135	1.9	V	-15.2	36.24	46.0	9.76	Harmonic
253.7	47.91	QP	267	2.2	V	-14.4	33.51	46.0	12.49	Spurious
72.5	103.08	PK	183	2.6	H	-19.3	83.78	118.06	34.28	Fundamental
72.5	95.60	Ave.	183	2.6	H	-19.3	76.30	98.06	21.76	Fundamental
72.5	111.81	PK	21	2.3	V	-19.3	92.51	118.06	25.55	Fundamental
72.5	102.26	Ave.	21	2.3	V	-19.3	82.96	98.06	15.10	Fundamental
Middle Channel										
149.4	54.94	QP	35	1.8	V	-13.8	41.14	43.5	2.36	Harmonic
224.1	51.94	QP	175	1.7	V	-15.3	36.64	46.0	9.36	Harmonic
334.3	45.47	QP	56	1.5	V	-12.0	33.47	46.0	12.53	Spurious
74.7	108.80	PK	269	2.4	H	-19.3	89.50	118.06	28.56	Fundamental
74.7	98.64	Ave.	269	2.4	H	-19.3	79.34	98.06	18.72	Fundamental
74.7	117.07	PK	193	1.0	V	-19.3	97.77	118.06	20.29	Fundamental
74.7	108.54	Ave.	193	1.0	V	-19.3	89.24	98.06	8.82	Fundamental
High Channel										
151.0	54.44	QP	267	2.4	V	-13.8	40.64	43.5	2.86	Harmonic
226.5	52.75	QP	245	2.1	V	-15.2	37.55	46.0	8.45	Harmonic
348.2	45.02	QP	351	1.8	V	-12.0	33.02	46.0	12.98	Spurious
75.5	109.78	PK	96	2.0	H	-19.3	90.48	118.06	27.58	Fundamental
75.5	100.21	Ave.	96	2.0	H	-19.3	80.91	98.06	17.15	Fundamental
75.5	114.52	PK	30	2.8	V	-19.3	95.22	118.06	22.84	Fundamental
75.5	103.48	Ave.	30	2.8	V	-19.3	84.18	98.06	13.88	Fundamental

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit – Corr. Amplitude

Band-edge:

The amplitude delta between the peak of the fundamental and the peak of the band-edge emission is 60dB, please See the plots of 20dB emission bandwidth.

The limit of the band-edge is 40dBμV/m, so the corrected amplitude of fundamental can not exceed 100dBμV/m.

According the above table, the max corrected amplitude of fundamental is 97.77dBμV/m<100dBμV/m.

So the band-edge test is PASS.

FCC§15.215(c) - 20dB EMISSION BANDWIDTH**Applicable Standard**

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

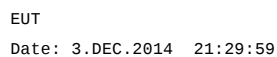
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17

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

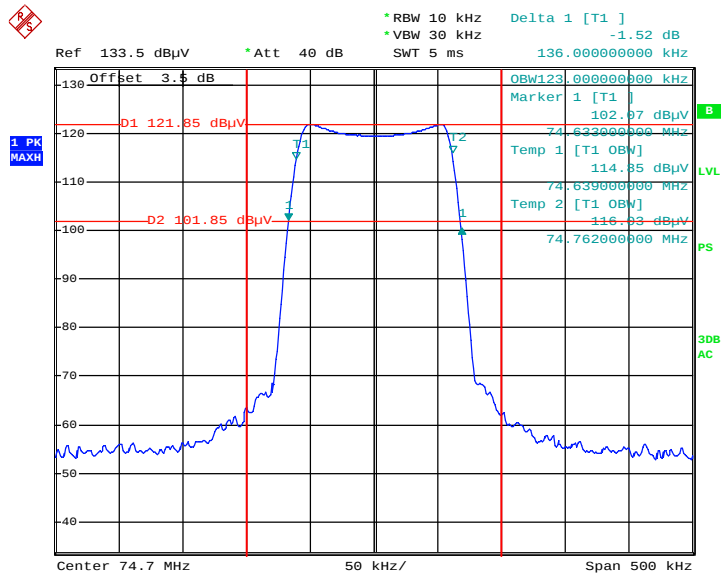
Environmental Conditions

Pleas refer to the following plots.

Low Channel



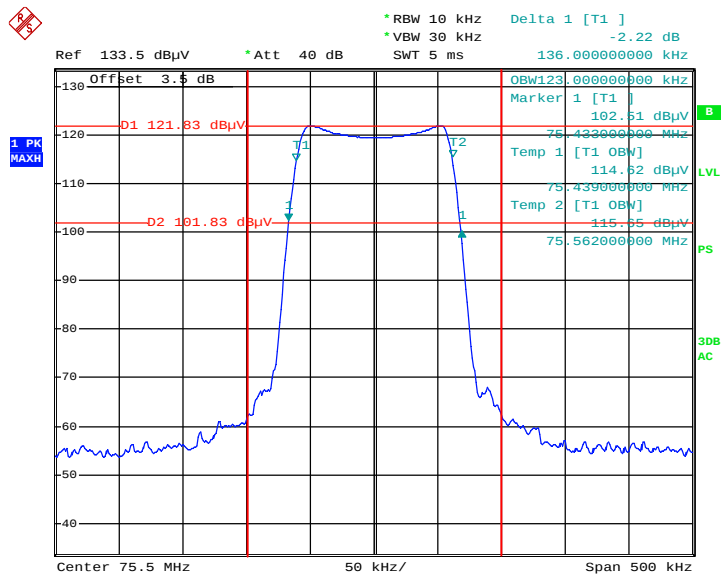
Middle Channel



EUT

Date: 3.DEC.2014 21:28:28

High Channel



EUT

Date: 3.DEC.2014 21:31:13

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