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FCC PART 15 SUBPART C RADIATED EMISSION TEST REPORT

FCC Part 15.249

Report Reference No.....: VITE1009002R

Compiled by

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Name of the organization performing the tests

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(position+printed name+signature)...:

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Date of issue.....: Sep 03, 2010

Testing Laboratory Name: Shenzhen VITE Technology Co., Ltd

Address.....: Suite 2123, Building 4, Hongfa Centre, Central Area Baoan, Baoan District, Shenzhen, Guangdong, 518101, P.R. China

Applicant's name.....: ESP SYSTEMS, LLC.

Address.....: 401 N.Tryon St-10th Floor, Charlotte, North Carolina 28202 United States

Test specification:

Standard: FCC Part 15.249: Operation within the bands 920-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0 - 24.25 GHz.

TRF Originator.....: Shenzhen VITE Technology CO., Ltd

Master TRF.....: Dated 2009-03

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Test item description: ESP Central Unit

Trade Mark: /

Model/Type reference.....: Central Unit Generation 2

Listed Models: /

Serial Number: /

Modulation: FHSS

Work Frequency.....: 902.265 MHz~927.543 MHz

Number of Channels.....: 49

Rate.....: AC 120V/60Hz from Adapter

Antenna Type.....: Unique Reverse-Polarity screw thread connector

Result.....: Positive

T E S T R E P O R T

Test Report No. : VITE1009002R	Sep 03, 2010 Date of issue
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Equipment under Test : **ESP Central Unit**

Model /Type : Central Unit Generation 2

Listed Models : /

Applicant : ESP SYSTEMS, LLC.

Address : 401 N.Tryon St-10th Floor, Charlotte, North Carolina
28202 United States

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.249:](#) Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Aug 26, 2010

Testing commenced on : Aug 28, 2010

Testing concluded on : Sep 02, 2010

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ● 120V / 60 Hz ○ 115V / 60Hz
 ○ 12 V DC ○ 24 V DC
 ○ Other (specified in blank below)

2.3. Short description of the Equipment under Test (EUT)

Wireless Transmitter work at 902-928 MHz ESP Central Unit.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

○ - supplied by the lab

○ Power Cable	Length (m) : /
	Shield : /
	Detachable : /
○ Multimeter	Manufacturer : /
	Model No. : /

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **UGDCENTRALUNITG2** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2008.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.15dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

For Radiated Spurious Emission (30~25GHz) test:

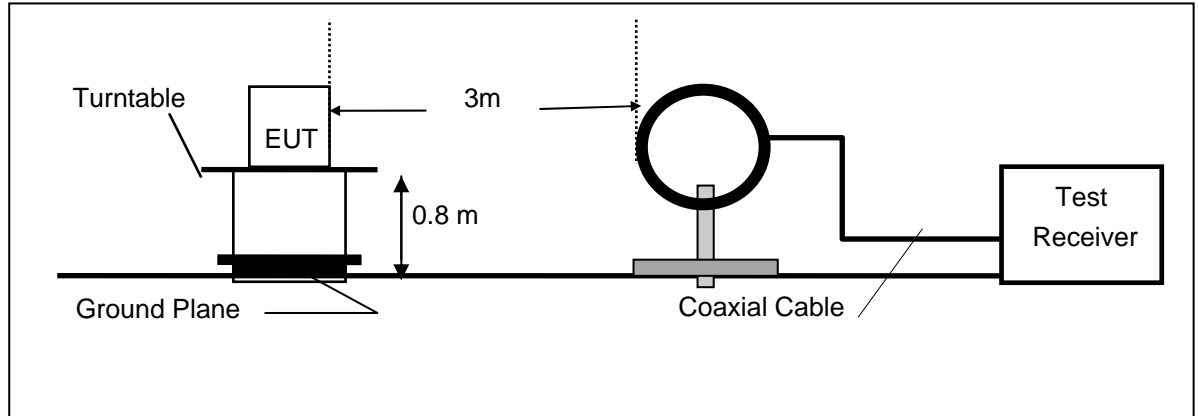
Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100015	2010/04
2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100009	2010/04
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	2010/04
4	TURNTABLE	ETS	2088	2149	2010/04
5	ANTENNA MAST	ETS	2075	2346	2010/04
6	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2010/04

4. TEST CONDITIONS AND RESULTS

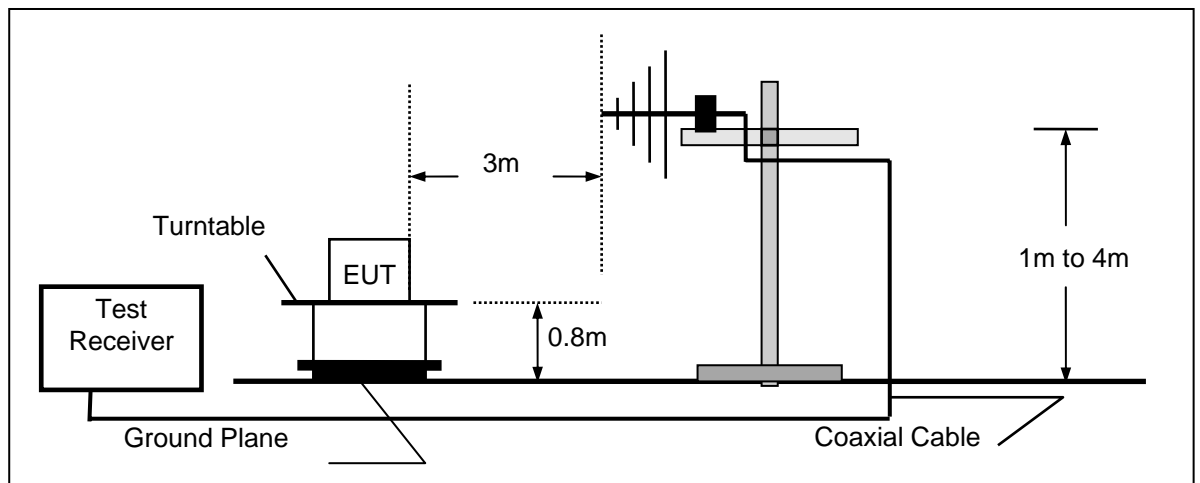
4.1. Radiated Emission Test

TEST CONFIGURATION

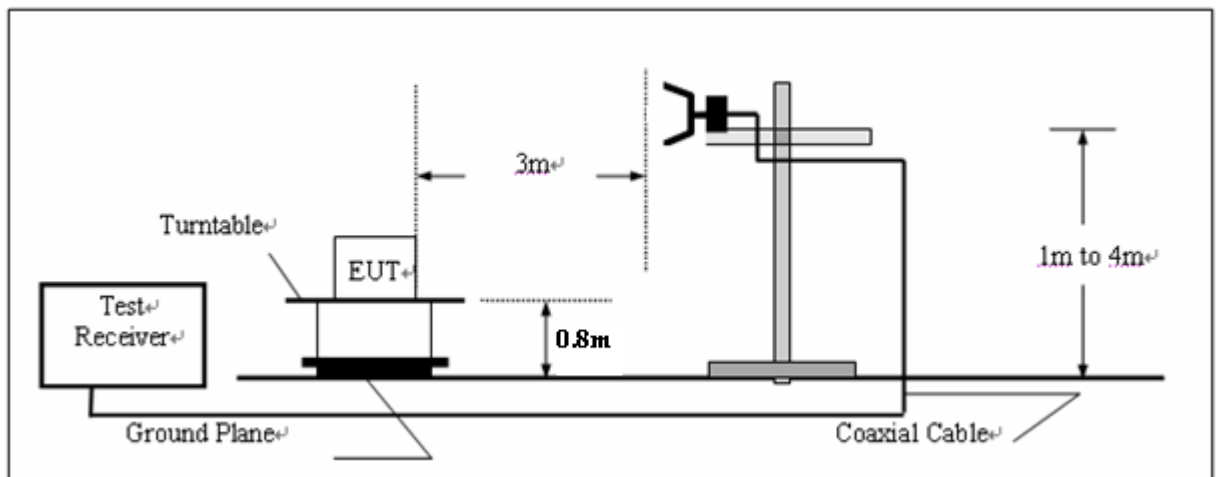
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

Test Procedure

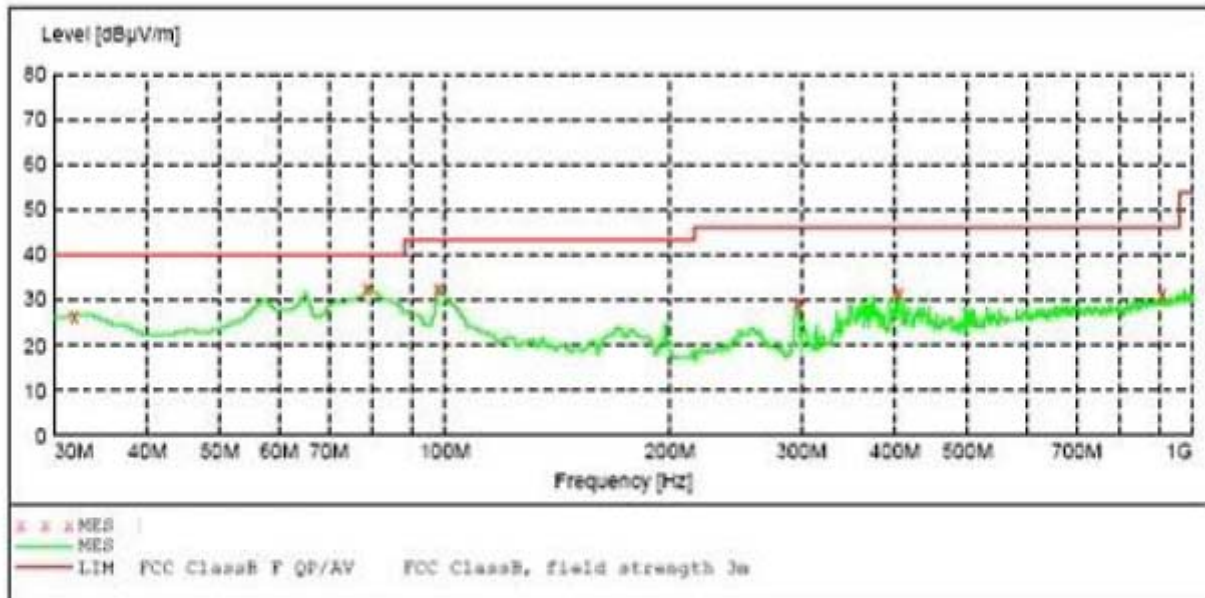
1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

TEST RESULTS

Below 1GHz Test Results:

SCAN TABLE: "test Field(30M-1G)OP"

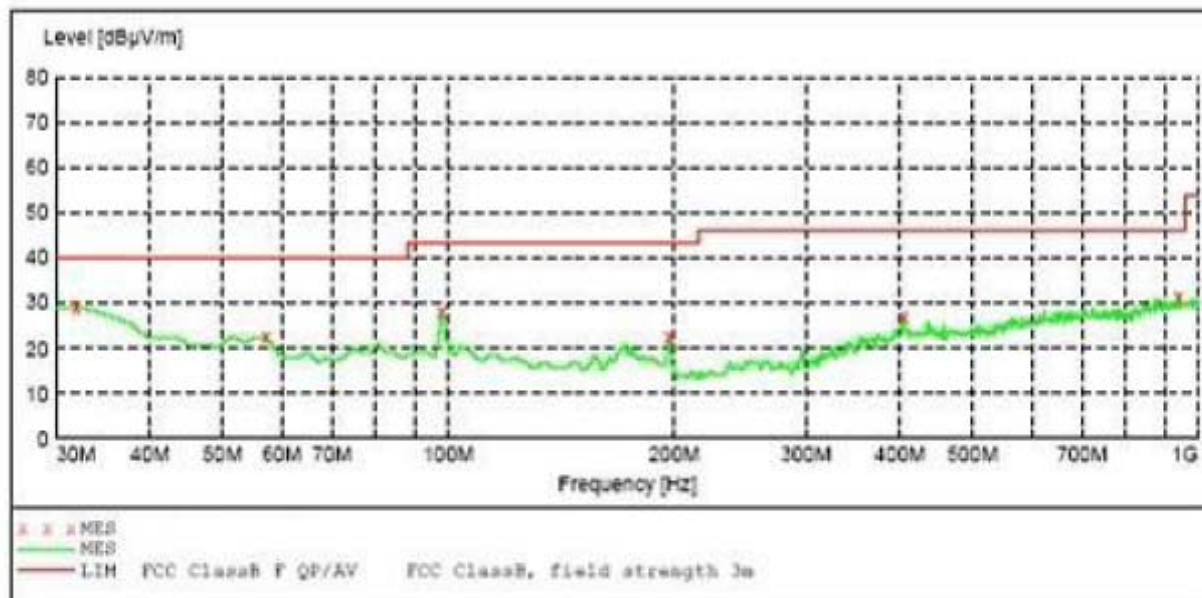
Short Description: Field Strength(30M-1G)
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 30.0 MHz 1.0 GHz 60.0 kHz QuasiPeak 1.0 s 120 kHz HL562

**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
31.943888	26.60	20.1	40.0	13.4	QP	300.0	179.00	HORIZONTAL
78.597194	32.30	11.3	40.0	7.7	QP	300.0	241.00	HORIZONTAL
98.026072	32.70	14.2	43.5	2.8	QP	300.0	41.00	HORIZONTAL
296.312625	29.30	13.7	46.0	14.7	QP	100.0	308.00	HORIZONTAL
405.170341	31.40	20.2	46.0	14.6	QP	100.0	65.00	HORIZONTAL
910.581162	31.20	25.4	46.0	14.8	QP	300.0	41.00	HORIZONTAL

SCAN TABLE: "test Field(30M-1G)OP"

Short Description: Field Strength(30M-1G)
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 30.0 MHz 1.0 GHz 60.0 kHz QuasiPeak 1.0 s 120 kHz HLS62



MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
31.943888	29.30	20.1	40.0	10.7	QP	100.0	90.00	VERTICAL
57.214429	22.60	7.4	40.0	17.4	QP	100.0	280.00	VERTICAL
98.036072	28.20	14.2	43.5	15.3	QP	100.0	66.00	VERTICAL
197.174349	22.60	10.8	43.5	20.9	QP	100.0	255.00	VERTICAL
405.170341	26.90	20.2	46.0	19.1	QP	100.0	280.00	VERTICAL
941.683367	31.40	25.5	46.0	14.6	QP	100.0	309.00	VERTICAL

Above 1 GHz Test Results:

Top Channel:

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
927.543	V	Peak	51.70	29.80	81.50	93.98	-12.48	F
927.543	H	Peak	52.70	29.80	82.50	93.98	-11.48	F
1855.086	V	Peak	51.80	-6.60	45.20	73.98	-28.78	H
1855.086	H	Peak	55.70	-6.60	49.10	73.98	-24.88	H
2782.629	V		---					H
2782.629	H		---					H
Others			---					

Middle Channel:

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
916.484	V	Peak	48.60	29.80	78.40	93.98	-15.58	F
916.484	H	Peak	51.40	29.80	81.20	93.98	-12.78	F
1832.968	V	Peak	37.90	-6.50	31.40	73.98	-42.58	H
1832.968	H	Peak	53.40	-6.50	46.90	73.98	-27.08	H
2749.452	V		---					H
2749.452	H		---					H
Others			---					

Bottom Channel:

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
902.265	V	Peak	83.70	-3.50	80.20	93.98	-13.78	F
902.265	H	Peak	85.80	-3.50	82.30	93.98	-11.68	F
1804.530	V	Peak	30.00	3.80	33.80	73.98	-40.18	H
1804.530	H	Peak	41.00	3.80	44.80	73.98	-29.18	H
2706.795	V		---					H
2706.795	H		---					H
Others			---					

Remark:

- (1) Measuring frequencies from 30 MHz to the 10 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz

.....End of Report.....