

FCC TEST REPORT

REPORT NO.: FCI0906066R

MODEL NO.: AWUN2462D

Trade Mark: AsiaRF

RECEIVED: July 3, 2009

TESTED: July 3, 2009 to July 13, 2009

APPLICANT: AsiaRF Ltd

ADDRESS: 4F., No.2, Lane560, Zhongzheng Rd.,
Xindian City, Taipei Country 231, Taiwan

ISSUED BY: SHENZHEN SETEK TECHNOLOGY CO., LTD.

LAB LOCATION: 2/F, A3 Bldg, East Industry Zone, Overseas
Chinese Town, Shenzhen, China

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SHENZHEN SETEK TECHNOLOGY CO., LTD.

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Prepared for : AsiaRF Ltd

Address : 4F., No.2, Lane560, Zhongzheng Rd., Xindian City, Taipei Country 231, Taiwan

Product : Wireless USB Dongle

Model No. : AWUN2462D

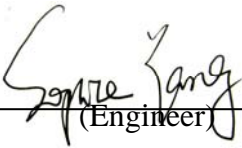
Trademark : AsiaRF


Test Standard : FCC Part 15 Subpart B


Test Lab : Bontek Compliance Testing Laboratory Ltd

FCC registration No. : 338263

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Report Number : FCI0906066R

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Wireless USB Dongle
Model Number	:	AWUN2462D
Power Supply	:	DC 5V
Applicant	:	AsiaRF Ltd
Address	:	4F., No. 2, Lane 560, Zhongzheng Rd., Xindian City, Taipei Country 231, Taiwan
Manufacturer	:	AsiaRF Ltd
Address	:	Room 606, Light Industry Foreign Trade Building, No. 1002, Aiguo Road, Luohu District, 518000, Shenzhen City, China
Received	:	July 3, 2009
Date of Test	:	July 3, 2009 to July 13, 2009

1.2. Description of Support Device

PC : Manufacturer: DELL
M/N: PP26L
S/N: 4XY6L2X
CCC,FCC,VCCI,GS,S,CE

Monitor : Manufacturer: DELL
M/N: E198FP
S/N: MH19H500468F
CCC,SA,UL

Mouse : Manufacturer: DELL
M/N: M056UOA
S/N: F1101WOS
CE, VCCI,FCC,GS,UL

Keyboard : Manufacturer: DELL
M/N: SK-8135
S/N: CN-0DJ340-71616683-01U6
VCCI,CE, FCC

1.3. Measurement Uncertainty

Radiation Uncertainty : $U_r = \pm 4.10\text{dB}$

Conduction Uncertainty : $U_c = \pm 2.91\text{dB}$

1.4. Test Modes

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	Draft 802.11n (20MHz)	1 to 11	1	OFDM	BPSK	7.2
B	Draft 802.11n (20MHz)	1 to 11	1	OFDM	BPSK	7.2

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

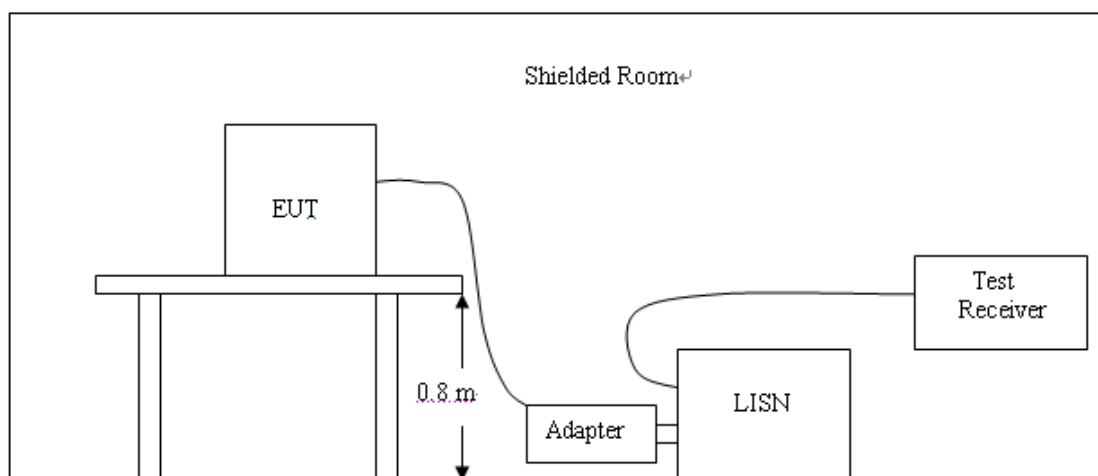
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	Draft 802.11n (20MHz)	1 to 11	1	OFDM	BPSK	7.2
B	Draft 802.11n (20MHz)	1 to 11	1	OFDM	BPSK	7.2

2. POWER LINE CONDUCTED MEASUREMENT

2.1.Measurement Procedure:

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
5. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
6. During the above scans, the emissions were maximized by cable manipulation.

2.2.Test SET-UP (Block Diagram of Configuration)



2.3.Measurement Equipment Used:

Name	Manufacture	M / N	S / N	Calibrated date
Two-Line V-Network	R&S	ENV216	100013	2009/04
Two-Line V-Network	R&S	ENV216	100014	2009/04
EMI Test Receiver	R&S	ESCI	100726	2009/04
ISN	Schaffner	ISN T400	21648	2009/04
PLC ISN	Teseq GmbH	ISN PLC 25-16	24047	2009/04
PLC ISN	Teseq GmbH	ISN PLC 25-30	23387	2009/04
Matching Network	SHX	TZ5	06062902	2009/04
Matching Network	SHX	TZ5	06062903	2009/04
Combining Network	SHX	N-50KKK	N/A	2009/04
Power Analyzer	California	PACS-1	72419	2009/04
AC Power Source	California	5001iX-208	56741	2009/04

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

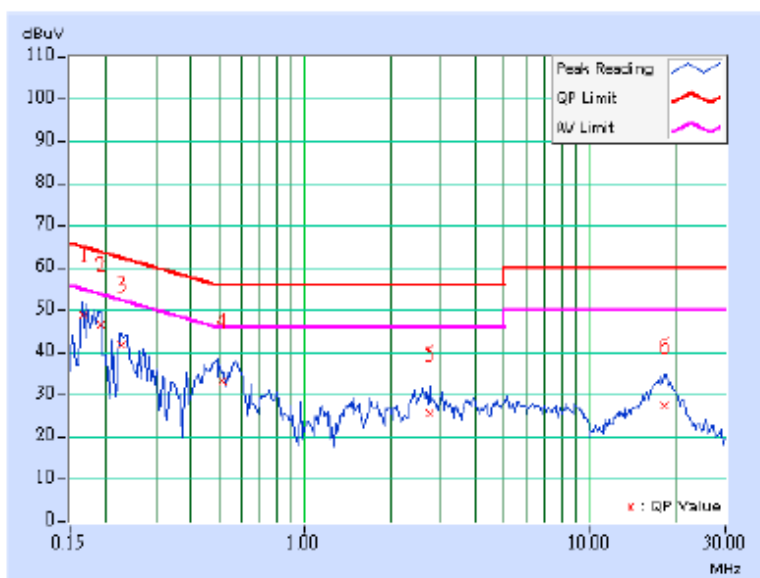
2.4.Measurement Results:

CONDUCTED WORST-CASE DATA: 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 66%RH, 991hPa	TEST MODE	A

No	Freq. [MHz]	Corr. Factor [dB]	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.169	0.20	47.87	-	48.07	-	65.03	55.03	-16.96	-
2	0.193	0.20	45.79	-	45.99	-	63.91	53.91	-17.92	-
3	0.228	0.20	40.97	-	41.17	-	62.52	52.52	-21.35	-
4	0.514	0.20	32.50	-	32.70	-	56.00	46.00	-23.30	-
5	2.762	0.28	24.48	-	24.76	-	56.00	46.00	-31.24	-
6	18.371	0.94	26.63	-	27.57	-	60.00	50.00	-32.43	-

- REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

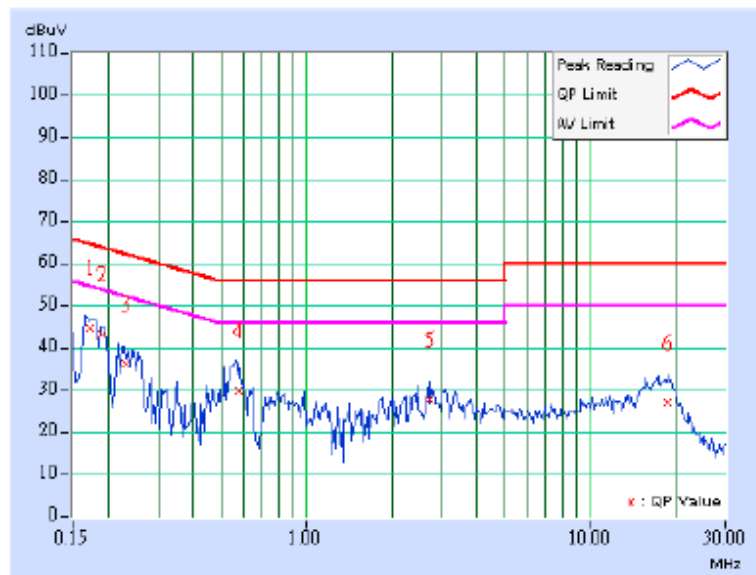


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 66%RH, 991hPa	TEST MODE	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.172	0.20	44.22	-	44.42	-	64.86	54.86	-20.44	-
2	0.190	0.20	42.97	-	43.17	-	64.02	54.02	-20.85	-
3	0.232	0.20	35.87	-	36.07	-	62.38	52.38	-26.31	-
4	0.580	0.20	29.42	-	29.62	-	56.00	46.00	-26.38	-
5	2.730	0.27	27.21	-	27.48	-	56.00	46.00	-28.52	-
6	18.664	0.51	26.66	-	27.17	-	60.00	50.00	-32.83	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

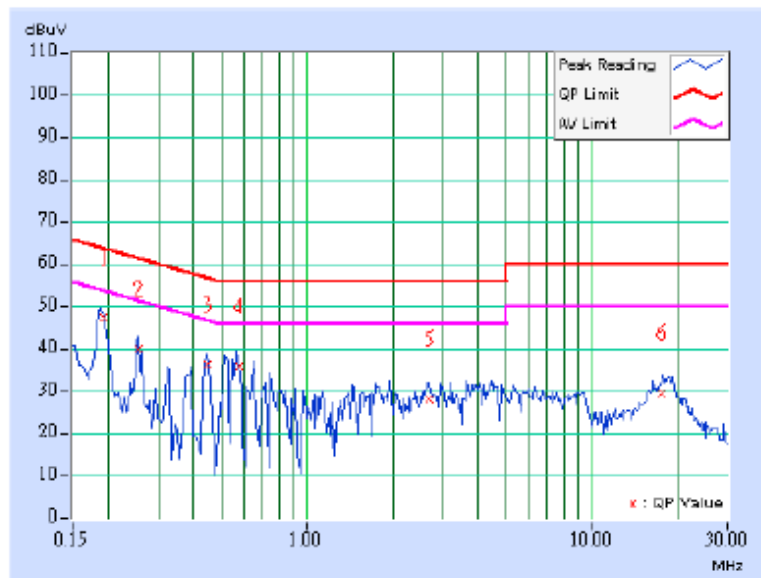


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 66%RH, 991hPa	TEST MODE	B

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.192	0.20	46.35	-	46.55	-	63.93	53.93	-17.38	-
2	0.255	0.20	39.22	-	39.42	-	61.58	51.58	-22.16	-
3	0.448	0.20	35.41	-	35.61	-	56.91	46.91	-21.30	-
4	0.573	0.20	35.11	-	35.31	-	56.00	46.00	-20.69	-
5	2.675	0.27	27.26	-	27.53	-	56.00	46.00	-28.47	-
6	17.703	0.91	28.71	-	29.62	-	60.00	50.00	-30.38	-

- REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

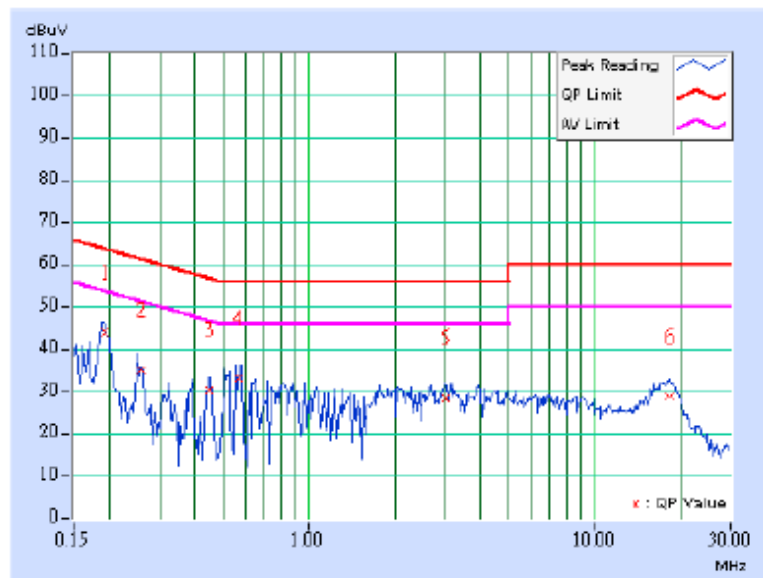


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	7.2Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 66%RH, 991hPa	TEST MODE	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.20	43.74	-	43.94	-	63.91	53.91	-19.97	-
2	0.258	0.20	34.71	-	34.91	-	61.50	51.50	-26.59	-
3	0.449	0.20	29.94	-	30.14	-	56.89	46.89	-26.75	-
4	0.567	0.20	32.83	-	33.03	-	56.00	46.00	-22.97	-
5	3.004	0.30	27.87	-	28.17	-	56.00	46.00	-27.83	-
6	18.230	0.51	28.26	-	28.77	-	60.00	50.00	-31.23	-

- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



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3. RADIATED EMISSION TEST

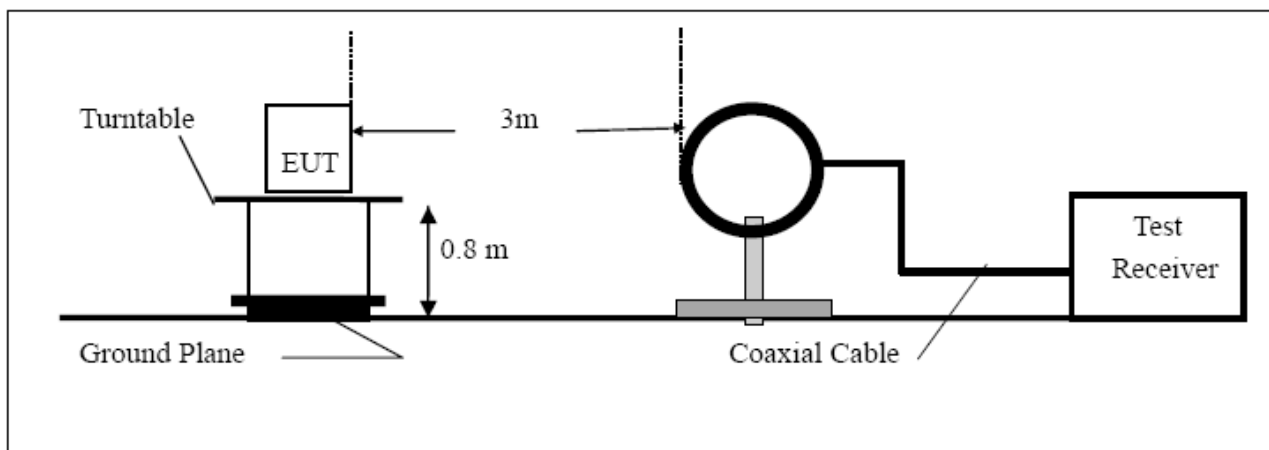
3.1.Measurement Procedure

Radiation Emission Measurement Limits According to FCC Part 15 Section15.109.

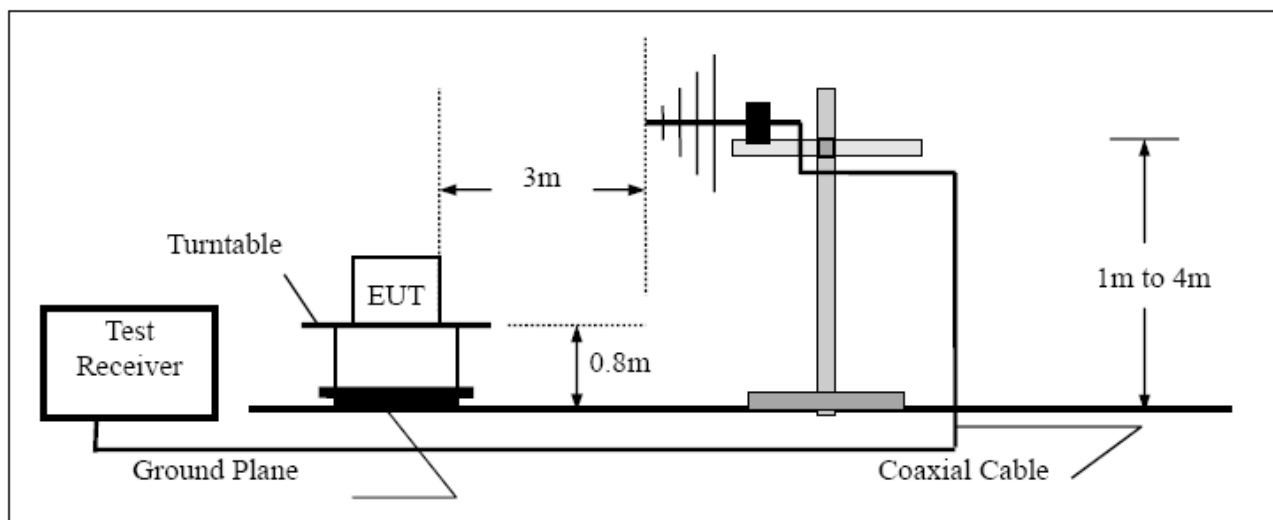
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

3.2.Test SET-UP (Block Diagram of Configuration)

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

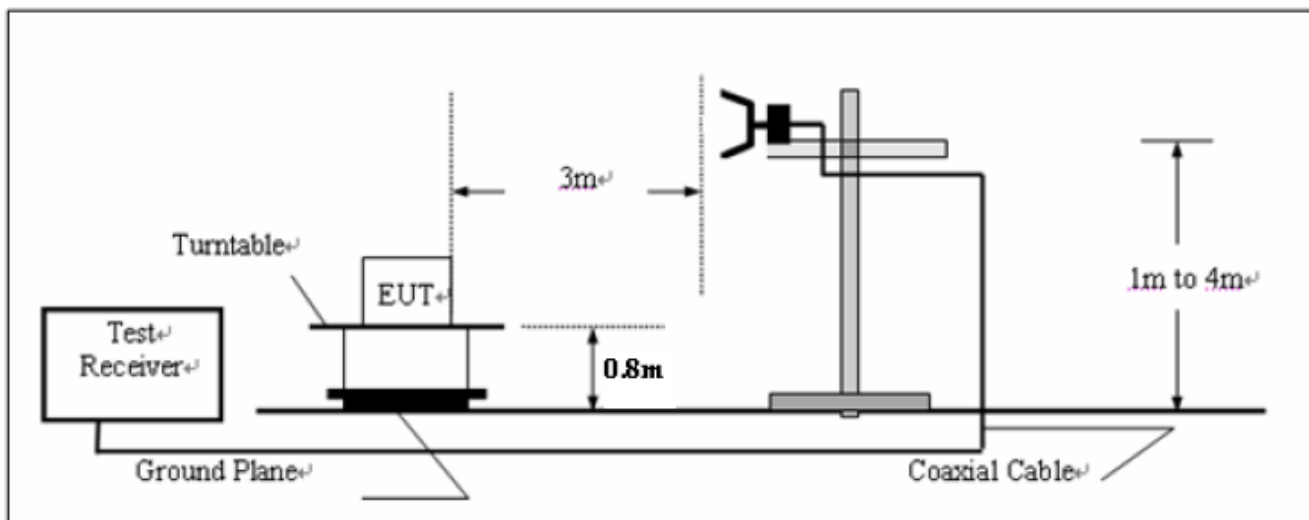


(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



3.4.Measurement Equipment Used:

Name	Manufacture	M / N	S / N	Calibrated date
Spectrum Analyzer	Agilent	E4408B	MY45102679	2009/04
EMI Test Receiver	R&S	ESCI	100573	2009/04
Preamplifier	Quietek	AP-025C	QT-AP003	2009/04
Preamplifier	Quietek	AP-180C	CHM-0602012	2009/04
Bilog Type Antenna	Schaffner	CBL6112B	2932	2009/04
50ohm Coaxial Switch	Anritsu	MP59B	6200447304	2009/04
Coaxial Cable	Huber+Suhner	AC2-C	04	2009/04
Temperature/Humidity Meter	Zhicheng	ZC1-2	QT-TH002	2008.03

3.5.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	

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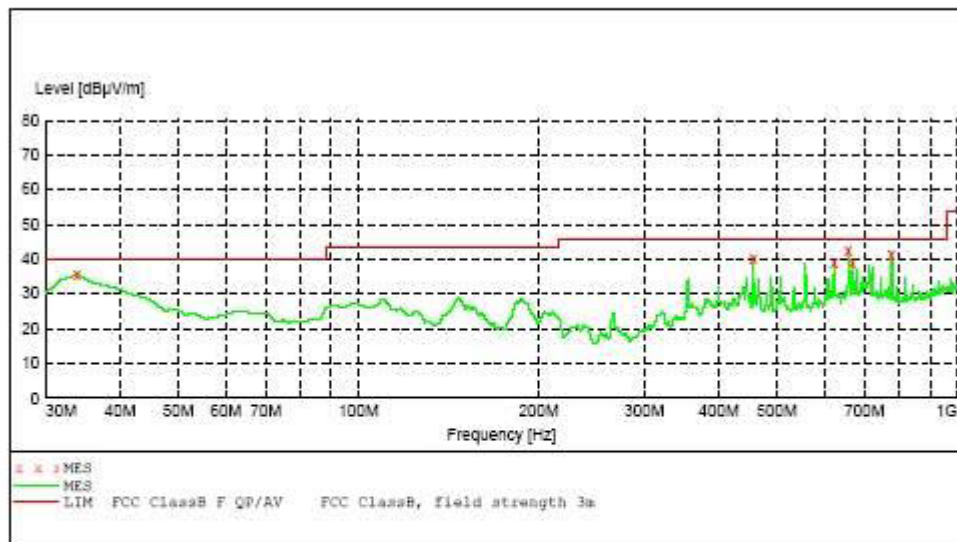
3.6.Measurement Results:

BELOW 1GHz WORST-CASE DATA : DRAFT 802.11n (20MHz) OFDM MODULATION

Mode A:

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	500.0 ms	120 kHz	HL562new



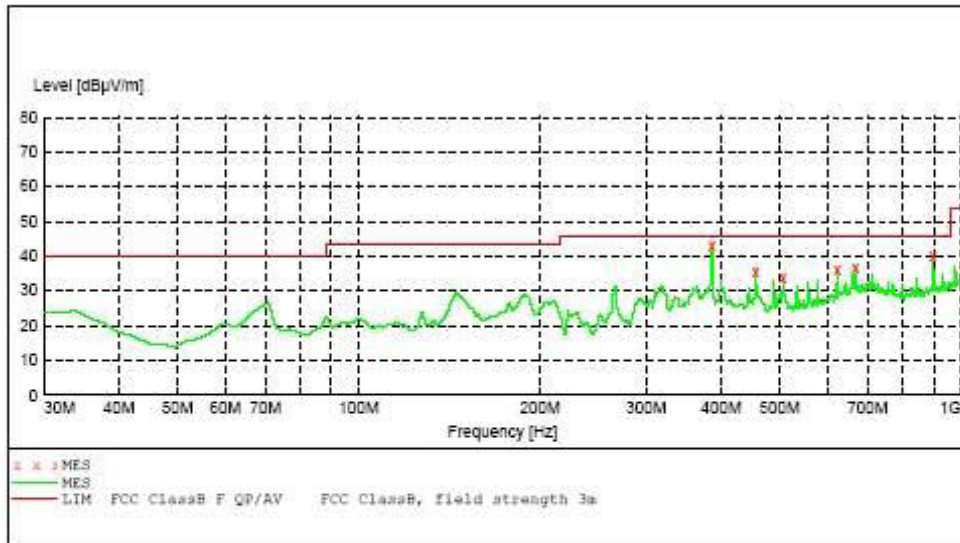
MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
33.887776	35.70	19.0	40.0	4.3	QP	100.0	355.00	VERTICAL
455.711423	40.30	20.2	46.0	5.7	QP	100.0	86.00	VERTICAL
622.883772	39.00	23.7	46.0	7.0	QP	100.0	360.00	VERTICAL
657.875752	42.30	25.5	46.0	3.7	QP	100.0	281.00	VERTICAL
667.595190	39.10	25.7	46.0	6.9	QP	100.0	281.00	VERTICAL
776.452906	41.30	24.3	46.0	4.7	QP	100.0	281.00	VERTICAL

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SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			Transducer
Start	Stop	Detector	Meas. Time	IF Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	500.0 ms	120 kHz	HL562new



MEASUREMENT RESULT:

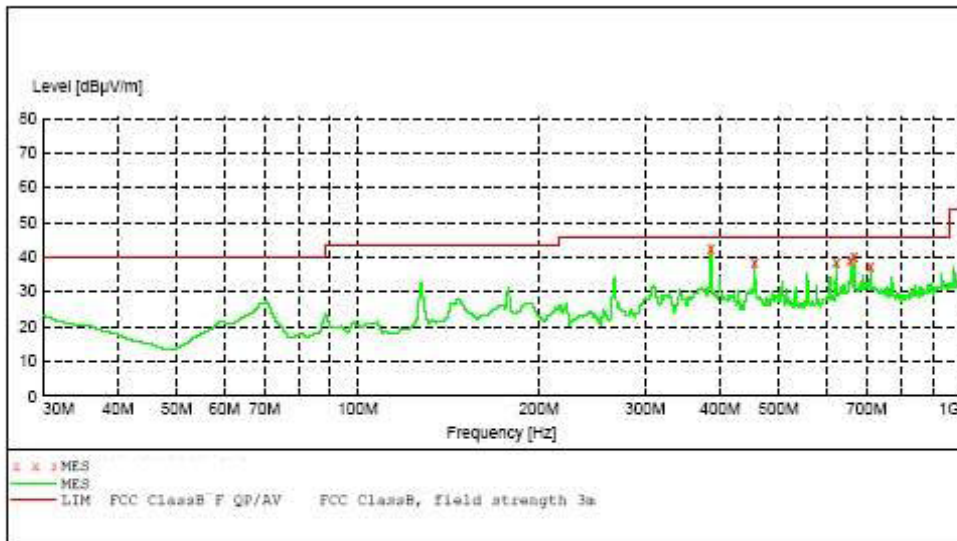
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
385.731463	42.90	19.4	46.0	3.1	QP	100.0	323.00	HORIZONTAL
455.711423	35.70	20.2	46.0	10.3	QP	100.0	208.00	HORIZONTAL
506.252505	33.60	20.3	46.0	12.4	QP	100.0	208.00	HORIZONTAL
622.885772	36.00	23.7	46.0	10.0	QP	100.0	91.00	HORIZONTAL
667.595190	36.40	25.7	46.0	9.6	QP	100.0	52.00	HORIZONTAL
898.917836	39.90	25.4	46.0	6.1	QP	100.0	127.00	HORIZONTAL

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Mode B:

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			Transducer
Start	Stop	Detector	Meas.	IF	
Frequency	Frequency	Time	Bandw.		
30.0 MHz	1.0 GHz	MaxPeak	500.0 ms	120 kHz	HL562new



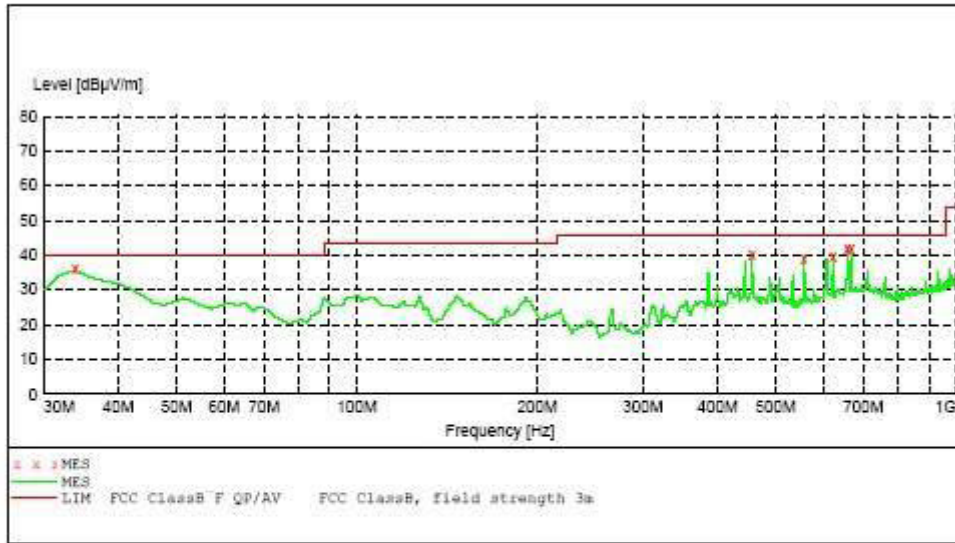
MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
385.731463	42.30	19.4	46.0	3.7	QP	100.0	320.00	HORIZONTAL
455.711423	38.40	20.2	46.0	7.6	QP	100.0	163.00	HORIZONTAL
622.885772	38.40	23.7	46.0	7.6	QP	100.0	202.00	HORIZONTAL
657.875752	39.00	25.5	46.0	7.0	QP	100.0	242.00	HORIZONTAL
667.595190	40.10	25.7	46.0	5.9	QP	100.0	47.00	HORIZONTAL
710.360721	37.30	26.6	46.0	8.7	QP	100.0	202.00	HORIZONTAL

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SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			Transducer
Start	Stop	Detector	Meas. Time	IF	Bandw.
30.0 MHz	1.0 GHz	MaxPeak	500.0 ms	120 kHz	HL562new



MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarisation
33.887776	35.90	19.0	40.0	4.1	QP	100.0	85.00	VERTICAL
455.711423	40.20	20.2	46.0	5.8	QP	100.0	85.00	VERTICAL
556.793587	39.10	21.7	46.0	6.9	QP	100.0	85.00	VERTICAL
622.885772	39.50	23.7	46.0	6.5	QP	100.0	5.00	VERTICAL
657.875752	41.90	25.5	46.0	4.1	QP	100.0	279.00	VERTICAL
667.595190	41.90	25.7	46.0	4.1	QP	100.0	360.00	VERTICAL

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.