

Global United Technology Services Co., Ltd.

Report No.: GTSL202012000272F01

TEST REPORT

Applicant: Shenzhen Renwei Digital Technology Co., Ltd

Address of Applicant: Room 403, building B3, Hongwan maker center, Gushu

Town, Bao'an District, Shenzhen, China

Manufacturer: Shenzhen Renwei Digital Technology Co., Ltd

Address of Room 403, building B3, Hongwan maker center, Gushu

Town, Bao'an District, Shenzhen, China Manufacturer:

Equipment Under Test (EUT)

Product Name: Ntelligent visual ceramic ear spoon

Model No.: V105, V106, V107, V108, V109, V11, V12, V13, V15, V16

Trade Mark: N/A

FCC ID: **2AYIR-V105**

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: Dec. 17, 2020

Date of Test: Dec. 17, 2020 - Dec. 22, 2020

Date of report issued: Dec. 22, 2020

Test Result: PASS *

Authorized Signature:

Robinson Lo Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver. Page 1 of 37

^{*} In the configuration tested, the EUT complied with the standards specified above.



2 Version

Version No.	Date	Description
00	Dec. 22, 2020	Original

Prepared By:	Smelly	Date:	Dec. 22, 2020	
	Project Engineer			
Check By:	Dobinson La	Date:	Dec. 22, 2020	
	Reviewer			



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4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

Pass: The EUT complies with the essential requirements in the standard.

Measurement Uncertainty

•						
Test Item	Frequency Range	Measurement Uncertainty	Notes			
Radiated Emission	30MHz-200MHz	3.8039dB	(1)			
Radiated Emission	200MHz-1GHz	3.9679dB	(1)			
Radiated Emission	1GHz-18GHz	4.29dB	(1)			
Radiated Emission	18GHz-40GHz	3.30dB	(1)			
AC Power Line Conducted 0.15MHz ~ 30MHz 3.44dB						
Note (1): The measurement unce	ertainty is for coverage factor of k	=2 and a level of confidence of 9	95%.			



5 General Information

5.1 General Description of EUT

Product Name:	Ntelligent visual ceramic ear spoon
Model No.:	V105, V106, V107, V108, V109, V11, V12, V13, V15, V16
Serial No.:	/
Hardware Version:	HV01
Software Version:	SV01
Test sample(s) ID:	GTSL202012000272F01
Sample(s) Status:	Engineer sample
Channel numbers:	802.11b/802.11g: 11
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS)
Antenna Type:	Internal antenna
Antenna gain:	1.8dBi
Power supply:	DC 3.7V from battery
	DC 5V from charger



Operation Frequency each of channel								
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz	
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz	
3	2422MHz	6	2437MHz	9	2452MHz			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Toot channel	Frequen	cy (MHz)
Test channel	802.11b/802.11g	
Lowest channel	2412MHz	
Middle channel	2437MHz	
Highest channel	2462MHz	



5.2 Test mode

Transmitting mode Keep the EUT in continuously transmitting mode

Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	
Data rate	1Mbps	6Mbps	

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

• FCC —Registration No.: 381383

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

• IC —Registration No.: 9079A

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

• NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default



6 Test Instruments list

Radi	Radiated Emission:							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025		
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A		
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021		
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021		
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021		
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021		
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021		
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021		
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021		
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021		
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021		
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021		
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021		
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021		
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021		
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021		
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021		
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021		
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021		
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021		
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021		
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021		
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021		



Cond	Conducted Emission							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021		
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021		
4	ENV216 2-L-V- NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021		
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A		
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021		
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021		
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021		

RF C	RF Conducted Test:									
Item	m Test Equipment Manufacturer		Model No. Serial No.		Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)				
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021				
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021				
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021				
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021				
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021				
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021				
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021				
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021				

Gene	General used equipment:								
Item	Test Equipment	Manufacturer	ufacturer Model No.		Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)			
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021			
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021			



7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement: FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

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, 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.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

EUT Antenna:

The antennas are PCB antenna, the best case gain of the antennas are 2dBi, reference to the appendix II for details



7.2 Conducted Emissions

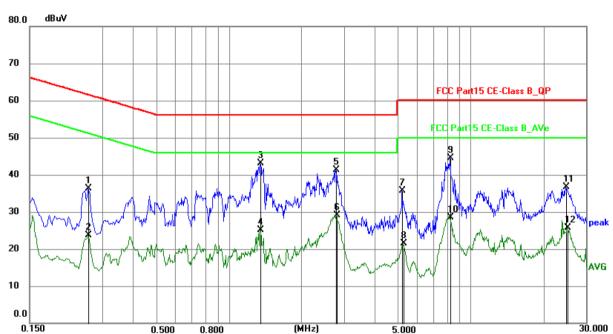
Test Requirement:	FCC Part15 C Section 15.207	,								
Test Method:	ANSI C63.10:2013									
Test Frequency Range:	150KHz to 30MHz									
. , ,	RBW=9KHz, VBW=30KHz, St	ween time-auto								
Receiver setup:	1000-31(12, VBVV-30((12, 3)		(-ID) ()							
Limit:	Frequency range (MHz)	Quasi-peak	(dBuV)	arage						
	0.15-0.5									
	0.5-5	56		46						
	5-30	60	,	50						
	* Decreases with the logarithm	n of the frequency.								
Test setup:	Reference Plane									
	AUX Equipment Test table/Insulation plane Remark E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m	Filter AC p								
Test procedure:	The E.U.T and simulators a line impedance stabilization 500hm/50uH coupling impedance.	n network (L.I.S.N.).	This provide	es a						
	 The peripheral devices are LISN that provides a 50ohr termination. (Please refer to photographs). 	n/50uH coupling imp	edance with	n 50ohm						
	interference. In order to find positions of equipment and	3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.								
Test Instruments:	Refer to section 6.0 for details	;								
Test mode:	Refer to section 5.2 for details	i								
Test environment:	Temp.: 25 °C Hun	nid.: 52%	Press.:	1012mbar						
Test voltage:	AC 120V, 60Hz		1	1						
Test results:	Pass									
10001000000	1 . 230									

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.



Measurement data Line:

Report No.: GTSL202012000272F01

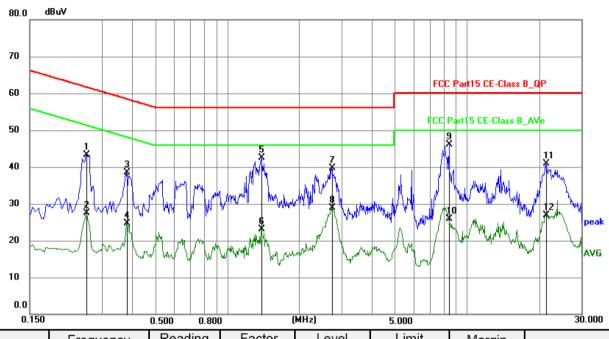


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2625	26.78	9.51	36.29	61.35	25.06	QP
2	0.2625	14.10	9.51	23.61	51.35	27.74	AVG
3	1.3469	33.80	9.24	43.04	56.00	12.96	QP
4	1.3469	15.87	9.24	25.11	46.00	20.89	AVG
5	2.7690	32.12	9.15	41.27	56.00	14.73	QP
6	2.7825	19.96	9.15	29.11	46.00	16.89	AVG
7	5.2170	26.73	8.96	35.69	60.00	24.31	QP
8	5.2980	12.61	8.97	21.58	50.00	28.42	AVG
9	8.2094	35.13	9.30	44.43	60.00	15.57	QP
10	8.2094	19.15	9.30	28.45	50.00	21.55	AVG
11	24.6975	27.18	9.52	36.70	60.00	23.30	QP
12	25.1205	16.19	9.53	25.72	50.00	24.28	AVG

GTS

Neutral:

Report No.: GTSL202012000272F01



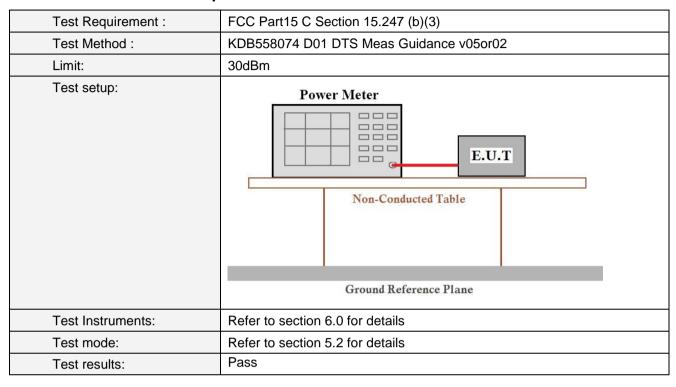
No.	Frequency (MHz)	(dBuV)	Factor (dB)	(dBuV)	(dBuV)	Margin (dB)	Detector
1	0.2580	34.32	9.07	43.39	61.50	18.11	QP
2	0.2580	18.43	9.07	27.50	51.50	24.00	AVG
3	0.3795	29.56	8.92	38.48	58.29	19.81	QP
4	0.3795	15.76	8.92	24.68	48.29	23.61	AVG
5	1.3920	33.61	8.91	42.52	56.00	13.48	QP
6	1.3920	14.16	8.91	23.07	46.00	22.93	AVG
7	2.7330	30.54	9.18	39.72	56.00	16.28	QP
8	2.7330	19.75	9.18	28.93	46.00	17.07	AVG
9	8.4210	36.91	9.29	46.20	60.00	13.80	QP
10	8.4210	16.66	9.29	25.95	50.00	24.05	AVG
11	21.3450	31.32	9.60	40.92	60.00	19.08	QP
12	21.3450	17.28	9.60	26.88	50.00	23.12	AVG

Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.



7.3 Conducted Peak Output Power

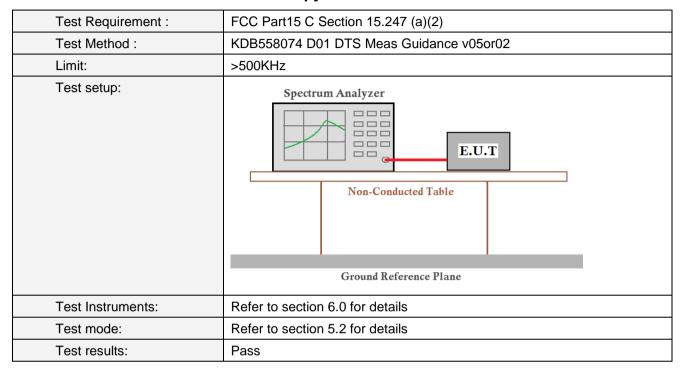


Measurement Data

Test CH	Peak Outpu	Limit(dBm)	Result		
	802.11b				
Lowest	8.331	7.759		Pass	
Middle	8.339	7.776	30.00		
Highest	8.352	7.544			



7.4 Channel Bandwidth & 99% Occupy Bandwidth



Measurement Data

Test CH	Channel Bar	Limit(KHz)	Result		
Test Off	802.11b				
Lowest	9.06	15.70		Pass	
Middle	9.58	15.95	>500		
Highest	9.58	15.70			

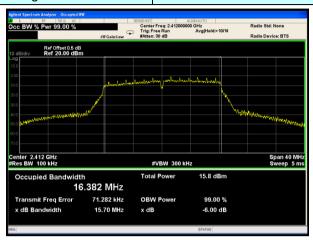


Test plot as follows:

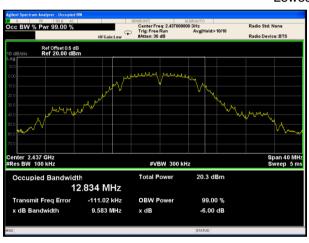
Report No.: GTSL202012000272F01

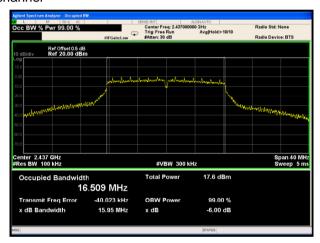






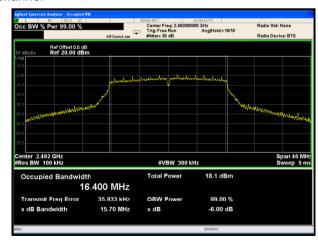
Lowest channel





Middle channel





Highest channel



Power Spectral Density

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one: epochai zeneky					
Test Requirement:	FCC Part15 C Section 15.247 (e)				
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02				
Limit:	8dBm/3kHz				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				

Measurement Data

Test CH	Power Spectral De	ensity (dBm/3kHz)	Limit (dBm/3kHz)	Result	
	802.11b	802.11g			
Lowest	-8.87	-13.95		Pass	
Middle	-8.85	-13.21	8.00		
Highest	-6.38	-13.08			



Test plot as follows:

Report No.: GTSL202012000272F01

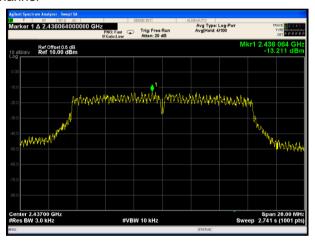
802.11b





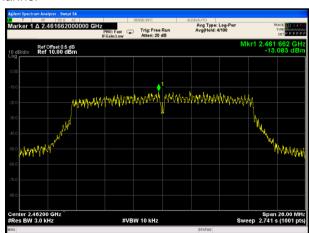
Lowest channel





Middle channel





Highest channel



7.5 Band edges

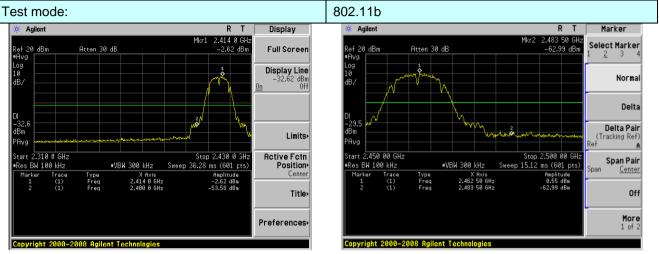
7.5.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)				
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02				
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				



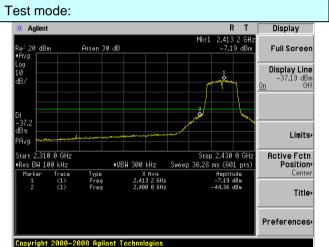
Test plot as follows:

Report No.: GTSL202012000272F01

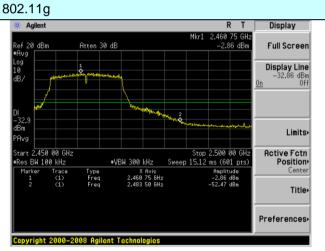


Lowest channel

Highest channel



Lowest channel



Highest channel

Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960 Page 20 of 37



7.5.2 Radiated Emission Method

Test Requirement:	FCC Part15 C S	Section 15.209	and 15.205				
Test Method:	ANSI C63.10: 2013						
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.						
Test site:	Measurement D	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Value		
·		Peak	1MHz	3MHz	Peak		
	Above 1GHz	Average	1MHz	3MHz	Average		
Limit:	Freque		Limit (dBuV		Value		
	Above 1	GHz	54.0		Average		
Test setup:	7 10010	<u></u>	74.0	0	Peak		
·	Tum Table < 150cm > 1	EUT-	Test Antenna	?			
Test Procedure:					.5 meters above		
	the ground a determine the 2. The EUT was antenna, whi tower. 3. The antenna ground to de horizontal an measuremer. 4. For each sus and then the and the rotathe maximum. 5. The test-recesspecified Ba. 6. If the emission the limit specified Ba. 6. If the rotathe limit specified Ba. 7. The radiation And found the the set of the EUT we have 10 the set.	t a 3 meter case position of the set 3 meters che was mount height is varietermine the moderation of the moderation of the set of th	mber. The tall he highest race away from the ed on the toped from one naximum value rizations of the ton, the EUT tuned to heiged from 0 devas set to Peadaximum Hole EUT in peak ting could be ted. Otherwise re-tested on a specified are tested on the tested of the test	ole was rotated diation. The interference of a variable meter to four ere of the field me antenna are was arrange hts from 1 mgrees to 360 ak Detect Full d Mode, mode was 1 stopped and ere the emissione by one used then report med in X, Y, t is worse care	ted 360 degrees to ce-receiving e-height antenna meters above the strength. Both are set to make the ed to its worst case neter to 4 meters degrees to find nction and OdB lower than degrees to degrees ons that did not sing peak, quasi-		
Test Instruments:	Refer to section	6.0 for details	3				
Test mode:	Refer to section	5.2 for details	3				
Test results:	Pass						



Measurement data:

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All antennas have test, only the worst case ANT 1 report.

Test mode: 802.1			1b	Test channel:			_owest	
Peak value:						•		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	51.08	27.59	5.38	30.18	54.44	74.00	-19.56	Horizontal
2390.00	51.58	27.58	5.39	30.18	54.94	74.00	-19.06	Horizontal
2310.00	50.76	27.59	5.38	30.18	54.11	74.00	-19.89	Vertical
2390.00	49.91	27.58	5.39	30.18	53.26	74.00	-20.74	Vertical
Average va	lue:							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	36.95	27.59	5.38	30.18	40.15	54.00	-13.85	Horizontal
2390.00	40.29	27.58	5.39	30.18	43.53	54.00	-10.47	Horizontal
2310.00	36.64	27.59	5.38	30.18	39.84	54.00	-14.16	Vertical
2390.00	35.86	27.58	5.39	30.18	39.05	54.00	-14.95	Vertical
Test mode:		802.1	1b Test channel:		ŀ	Highest		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	50.76	27.53	5.47	29.93	54.39	74.00	-19.61	Horizontal
2500.00	51.97	27.55	5.49	29.93	55.66	74.00	-18.34	Horizontal
2483.50	51.17	27.53	5.47	29.93	54.81	74.00	-19.19	Vertical
2500.00	50.80	27.55	5.49	29.93	54.47	74.00	-19.53	Vertical
Average va	lue:							
Frequency	Read Level	Antenna Factor	Cable	Preamp Factor	Level	Limit Line	Over Limit	Polarization

Factor

(dB)

29.93

29.93

29.93

29.93

(dBuV/m)

41.32

43.96

41.70

40.29

(dBuV/m)

54.00

54.00

54.00

54.00

Level

(dBuV)

37.83

40.40

38.21

36.77

(MHz)

2483.50

2500.00

2483.50

2500.00

Factor

(dB/m)

27.53

27.55

27.53

27.55

Loss

(dB)

5.47

5.49

5.47

5.49

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Polarization

Horizontal

Horizontal

Vertical

Vertical

Limit

(dB)

-12.68

-10.04

-12.30

-13.71



Test mode:		802.1	1g	٦	Test channel:		Lowest	
Peak value:	:							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)		Limit Line (dBuV/m)	I I imit	Polarization
2310.00	50.48	27.59	5.38	30.18	53.27	74.00	-20.73	Horizontal
2390.00	51.90	27.58	5.39	30.18	54.69	74.00	-19.31	Horizontal
2310.00	50.99	27.59	5.38	30.18	53.78	74.00	-20.22	Vertical
2390.00	49.77	27.58	5.39	30.18	52.56	74.00	-21.44	Vertical
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	1 404	Limit Line (dBuV/m)	I I imit	Polarization
2310.00	36.83	27.59	5.38	30.18	39.62	54.00	-14.38	Horizontal
2390.00	39.72	27.58	5.39	30.18	42.51	54.00	-11.49	Horizontal
2310.00	36.84	27.59	5.38	30.18	39.63	54.00	-14.37	Vertical
2390.00	36.37	27.58	5.39	30.18	39.16	54.00	-14.84	Vertical
Test mode:		802.1	1g	٦	Test channel:		Highest	
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	1 404	Limit Line (dBuV/m)	I I imit	Polarization
2483.50	50.70	27.53	5.47	29.93	53.77	74.00	-20.23	Horizontal
2500.00	51.58	27.55	5.49	29.93	54.69	74.00	-19.31	Horizontal
2483.50	50.99	27.53	5.47	29.93	54.06	74.00	-19.94	Vertical
2500.00	51.17	27.55	5.49	29.93	54.28	74.00	-19.72	Vertical
Average va	lue:							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	l Level	Limit Line (dBuV/m)	I Limit	Polarization
2483.50	37.94	27.53	5.47	29.93	41.01	54.00	-12.99	Horizontal
2500.00	40.10	27.55	5.49	29.93	43.21	54.00	-10.79	Horizontal
_					_			

Remarks:

2483.50

2500.00

1. Only the worst case Main Antenna test data.

27.53

27.55

38.05

36.85

2. The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

29.93

29.93

41.12

39.96

54.00

54.00

3. Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor

5.47

5.49

The emission levels of other frequencies are very lower than the limit and not show in test report.

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-12.88

-14.04

Vertical

Vertical



7.6 Spurious Emission

7.6.1 Conducted Emission Method

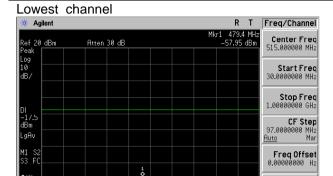
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass we pretest all mode, the worst mode was 802.11b, and the data only show the worst mode data.



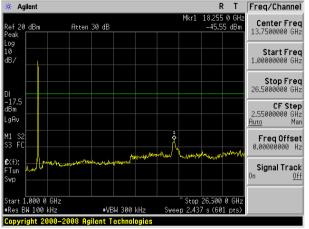
Test plot as follows:

Report No.: GTSL202012000272F01

802.11b



#URW 300 kHz

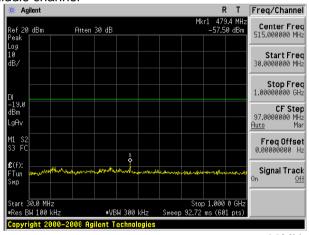


30MHz~25GHz

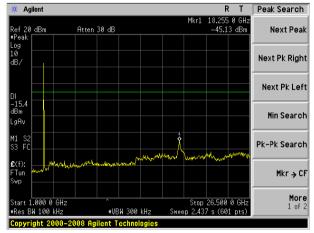
Signal Track

Middle channel

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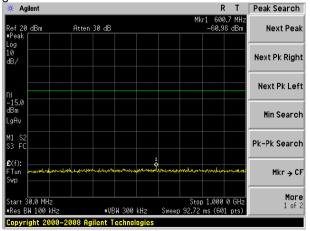


Stop 1.000 0 GH: Sweep 92.72 ms (601 pts)



30MHz~25GHz

Highest channel





30MHz~25GHz

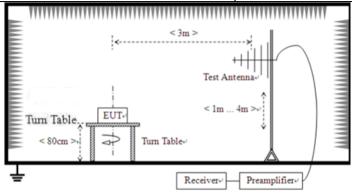


7.6.2 Radiated Emission Method

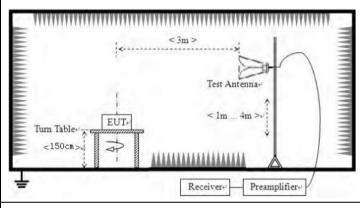
Report No.: GTSL202012000272F01

Test Requirement:	FCC Part15 C Section 15.209										
Test Method:	ANSI C63.10: 2013										
Test Frequency Range:	9kHz to 25GHz										
Test site:	Measurement Distar	Measurement Distance: 3m Frequency Detector RBW VBW Value									
Receiver setup:	Frequency		Detector		Ν	VBW	Value				
	9KHz-150KHz	Qı	Quasi-peak		Ηz	600Hz	z Quasi-peak				
	150KHz-30MHz	Qı	uasi-peak	9KF	łz	30KH	z Quasi-peak				
	30MHz-1GHz	uasi-peak	100K	Hz	300KH	Iz Quasi-peak					
	Above 1GHz		Peak	1MF	łz	3MHz	z Peak				
	Above IGHZ		Peak	1MF	Ηz	10Hz	Average				
Limit:	Frequency		Limit (u\	//m)	٧	alue	Measurement Distance				
	0.009MHz-0.490M	lHz	2400/F(k	(Hz)		QP	300m				
	0.490MHz-1.705M	lHz	24000/F(KHz)		QP	300m				
	1.705MHz-30MH	lz	30			QP	30m				
	30MHz-88MHz										
	88MHz-216MHz	88MHz-216MHz				QP					
	216MHz-960MH	Z	200		QP		3m				
	960MHz-1GHz		500			QP	Sili				
	Above 1GHz		500		Av						
	710070 10112		5000)	F	Peak					
Test setup:	For radiated emiss	sions	from 9kH	z to 30	МН	Z					
	Tum Table 80cm > For radiated emiss	? 1m :									





For radiated emissions above 1GHz



Test Procedure:

- 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test Instruments:

Refer to section 6.0 for details



Report No:	GTSI 20	20120002	72F∩1
	(71,71,71	<i>17</i> (<i>1 7</i> 5 1 1 1

Test mode:	Refer to sec	Refer to section 5.2 for details							
Test voltage:	AC120V 60	AC120V 60Hz							
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar			
Test voltage:	AC 120V, 6	0Hz							
Test results:	Pass								

Remarks:

- 1. Only the worst case Main Antenna test data.
- 2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement data:

■ 9kHz~30MHz

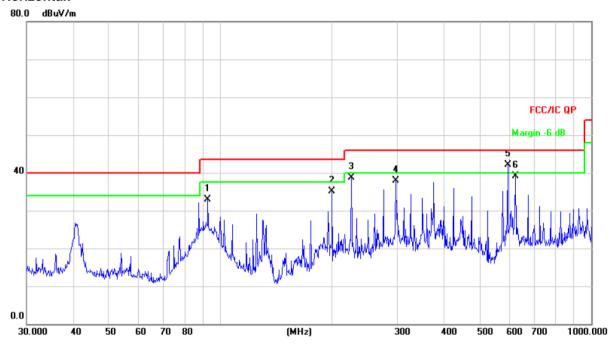
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



■ Below 1GHz

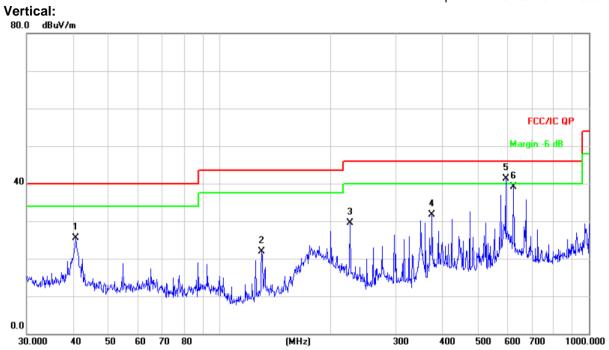
Pre-scan all test modes, found worst case at 802.11b 2462MHz, and so only show the test result of 802.11b 2462MHz

Horizontal:



No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		92.4624	50.16	-17.26	32.90	43.50	-10.60	QP
2		199.9856	51.37	-16.20	35.17	43.50	-8.33	QP
3		225.3080	54.10	-15.32	38.78	46.00	-7.22	QP
4		297.2241	50.59	-12.66	37.93	46.00	-8.07	QP
5	*	595.1329	47.91	-5.83	42.08	46.00	-3.92	QP
6		625.0780	44.67	-5.52	39.15	46.00	-6.85	QP





No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		40.7016	34.43	-8.94	25.49	40.00	-14.51	QP
2		129.9226	35.94	-14.11	21.83	43.50	-21.67	QP
3		225.3080	44.80	-15.32	29.48	46.00	-16.52	QP
4		375.9385	42.44	-10.77	31.67	46.00	-14.33	QP
5	*	595.1329	47.23	-5.83	41.40	46.00	-4.60	QP
6		625.0780	44.65	-5.52	39.13	46.00	-6.87	QP



■ 1-25GHz

Test mode:		802.11b			Test o	channel:		Lowe	est	
Peak value:										
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)		Level (dBuV/m)	Limit (dBu		Over Limit (dB)	polarization
4824	53.64	31.78	8.60	32.	09	61.93	74.00		-12.07	Vertical
7236	46.63	38.14	11.65	32.	00	64.42	74.	00	-9.58	Vertical
9648	45.05	38.45	14.14	31.	62	66.02	74.	00	-7.98	Vertical
12060	*									Vertical
14472	*									Vertical
16884	*									Vertical
4824	54.14	29.65	8.60	32.	09	60.30	74.	00	-13.70	Horizontal
7236	47.10	35.62	11.65	32.	00	62.37	74.	00	-11.63	Horizontal
9648	36.82	42.58	14.14	31.	62	61.92	74.	00	-12.08	Horizontal
12060	*									Horizontal
14472	*									Horizontal
16884	*									Horizontal
Average val										
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Prea Fac (dE	tor	Level (dBuV/m)	Limit (dBu		Over Limit (dB)	polarization
4824	39.30	31.78	8.60	32.0	09	47.59	54.	00	-6.41	Vertical
7236	32.00	36.15	11.65	32.0	00	47.80	54.	00	-6.20	Vertical
9648	29.22	37.95	14.14	31.6	62	49.69	54.	00	-4.31	Vertical
12060	*									Vertical
14472	*									Vertical
16884	*									Vertical
4824	36.43	31.78	8.60	32.0	09	44.72	54.	00	-9.28	Horizontal
7236	31.80	36.15	11.65	32.0	00	47.60	54.	00	-6.40	Horizontal
9648	26.92	37.95	14.14	31.6	62	47.39	54.	00	-6.61	Horizontal
12060	*									Horizontal
14472	*									Horizontal
16884	*									Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



Test mode:		802.11b		Test	channel:	Midd	le	
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	54.53	31.85	8.67	32.12	62.93	74.00	-11.07	Vertical
7311	43.84	36.37	11.72	31.89	60.04	74.00	-13.96	Vertical
9748	46.43	38.35	14.25	31.62	67.41	74.00	-6.59	Vertical
12185	*							Vertical
14622	*							Vertical
17059	*							Vertical
4874	52.91	31.85	8.67	32.12	61.31	74.00	-12.69	Horizontal
7311	46.44	36.37	11.72	31.89	62.64	74.00	-11.36	Horizontal
9748	37.84	38.35	14.25	31.62	58.82	74.00	-15.18	Horizontal
12185	*							Horizontal
14622	*							Horizontal
17059	*							Horizontal
Average val	ue:		•	•				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	38.89	31.85	8.67	32.12	47.29	54.00	-6.71	Vertical
7311	33.03	36.37	11.72	31.89	49.23	54.00	-4.77	Vertical
9748	28.53	38.35	14.25	31.62	49.51	54.00	-4.49	Vertical
12185	*							Vertical
14622	*							Vertical
17059	*							Vertical
4874	35.17	31.85	8.67	32.12	43.57	54.00	-10.43	Horizontal
7311	31.80	36.37	11.72	31.89	48.00	54.00	-6.00	Horizontal
9748	24.09	38.35	14.25	31.62	45.07	54.00	-8.93	Horizontal
12185	*							Horizontal
14622	*							Horizontal
17059	*							Horizontal

Remark

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



Test mode:		802.11b		Test	channel:	Highest		
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	54.14	31.93	8.73	32.16	62.64	74.00	-11.36	Vertical
7386	45.05	36.59	11.79	31.78	61.65	74.00	-12.35	Vertical
9848	42.22	38.81	14.38	31.88	63.53	74.00	-10.47	Vertical
12310	*							Vertical
14772	*							Vertical
17234	*							Vertical
4924	54.34	31.93	8.73	32.16	62.84	74.00	-11.16	Horizontal
7386	46.96	36.59	11.79	31.78	63.56	74.00	-10.44	Horizontal
9848	36.44	38.81	14.38	31.88	57.75	74.00	-16.25	Horizontal
12310	*							Horizontal
14772	*							Horizontal
17234	*							Horizontal
Average val								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	37.15	31.93	8.73	32.16	45.65	54.00	-8.35	Vertical
7386	29.79	36.59	11.79	31.78	46.39	54.00	-7.61	Vertical
9848	24.17	38.81	14.38	31.88	45.48	54.00	-8.52	Vertical
12310	*							Vertical
14772	*							Vertical
17234	*							Vertical
4924	35.24	31.93	8.73	32.16	43.74	54.00	-10.26	Horizontal
7386	29.72	36.59	11.79	31.78	46.32	54.00	-7.68	Horizontal
9848	25.67	38.81	14.38	31.88	46.98	54.00	-7.02	Horizontal
12310	*							Horizontal
14772	*							Horizontal
17234	*							Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



Test mode:		802.11g			Test channel:			lowes	st	
Peak value:										
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)		amp ctor B)	Level (dBuV/m)	Limit (dBu)		Over Limit (dB)	polarization
4824	52.95	31.78	8.60	32.	.09	61.24	74.00		-12.76	Vertical
7236	46.21	38.14	11.65	32.	.00	64.00	74.	00	-10.00	Vertical
9648	43.82	38.45	14.14	31.	.62	64.79	74.	00	-9.21	Vertical
12060	*									Vertical
14472	*									Vertical
16884	*									Vertical
4824	52.99	29.65	8.60	32.	.09	59.15	74.	00	-14.85	Horizontal
7236	45.84	35.62	11.65	32.	.00	61.11	74.	00	-12.89	Horizontal
9648	35.48	42.58	14.14	31.	.62	60.58	74.	00	-13.42	Horizontal
12060	*									Horizontal
14472	*									Horizontal
16884	*									Horizontal
Average val										
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Prea Fac (d		Level (dBuV/m)	Limit (dBu)		Over Limit (dB)	polarization
4824	38.21	31.78	8.60	32.	.09	46.50	54.	00	-7.50	Vertical
7236	30.88	36.15	11.65	32.	.00	46.68	54.	00	-7.32	Vertical
9648	28.23	37.95	14.14	31.	.62	48.70	54.	00	-5.30	Vertical
12060	*									Vertical
14472	*									Vertical
16884	*									Vertica
4824	34.79	31.78	8.60	32.	.09	43.08	54.	00	-10.92	Horizontal
7236	31.02	36.15	11.65	32.	.00	46.82	54.	00	-7.18	Horizontal
9648	26.12	37.95	14.14	31.	.62	46.59	54.	00	-7.41	Horizontal
12060	*									Horizontal
14472	*						-			Horizontal
16884	*						-			Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



Test mode:		802.11g		Test	channel:	Midd	le	
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	54.03	31.85	8.67	32.12	62.43	74.00	-11.57	Vertical
7311	43.98	36.37	11.72	31.89	60.18	74.00	-13.82	Vertical
9748	46.33	38.35	14.25	31.62	67.31	74.00	-6.69	Vertical
12185	*							Vertical
14622	*							Vertical
17059	*							Vertical
4874	52.56	31.85	8.67	32.12	60.96	74.00	-13.04	Horizontal
7311	45.85	36.37	11.72	31.89	62.05	74.00	-11.95	Horizontal
9748	38.13	38.35	14.25	31.62	59.11	74.00	-14.89	Horizontal
12185	*							Horizontal
14622	*							Horizontal
17059	*							Horizontal
Average val	ue:	•						
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	38.93	31.85	8.67	32.12	47.33	54.00	-6.67	Vertical
7311	32.79	36.37	11.72	31.89	48.99	54.00	-5.01	Vertical
9748	27.77	38.35	14.25	31.62	48.75	54.00	-5.25	Vertical
12185	*							Vertical
14622	*							Vertical
17059	*							Vertical
4874	34.97	31.85	8.67	32.12	43.37	54.00	-10.63	Horizontal
7311	31.76	36.37	11.72	31.89	47.96	54.00	-6.04	Horizontal
9748	24.58	38.35	14.25	31.62	45.56	54.00	-8.44	Horizontal
12185	*							Horizontal
14622	*							Horizontal
17059	*							Horizontal

Remark

- 1. Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



Test mode:	802.11g			Test channel:		Highest		
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	54.03	31.93	8.73	32.16	62.53	74.00	-11.47	Vertical
7386	44.72	36.59	11.79	31.78	61.32	74.00	-12.68	Vertical
9848	41.84	38.81	14.38	31.88	63.15	74.00	-10.85	Vertical
12310	*							Vertical
14772	*							Vertical
17234	*							Vertical
4924	53.49	31.93	8.73	32.16	61.99	74.00	-12.01	Horizontal
7386	46.62	36.59	11.79	31.78	63.22	74.00	-10.78	Horizontal
9848	36.44	38.81	14.38	31.88	57.75	74.00	-16.25	Horizontal
12310	*							Horizontal
14772	*							Horizontal
17234	*							Horizontal
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	37.00	31.93	8.73	32.16	45.50	54.00	-8.50	Vertical
7386	30.03	36.59	11.79	31.78	46.63	54.00	-7.37	Vertical
9848	23.82	38.81	14.38	31.88	45.13	54.00	-8.87	Vertical
12310	*							Vertical
14772	*							Vertical
17234	*							Vertical
4924	35.15	31.93	8.73	32.16	43.65	54.00	-10.35	Horizontal
7386	30.04	36.59	11.79	31.78	46.64	54.00	-7.36	Horizontal
9848	24.80	38.81	14.38	31.88	46.11	54.00	-7.89	Horizontal
12310	*							Horizontal
14772	*							Horizontal
17234	*							Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. "*", means this data is the too weak instrument of signal is unable to test.



8 Test Setup Photo

Reference to the appendix I for details.

9 EUT Constructional Details





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