FCC TEST REPORT

FCC ID: 2ADD2TBGL1017A

On Behalf of

Tband srl

Android MiniPC Box

Model No.: TBGL1017A

Prepared for	:	Tband srl
Address	:	Via Battisti, 4, Mogliano Veneto (TV) TREVISO, 31021 Italy

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

Report Number	:	T1871484 06
Date of Receipt	:	June 26, 2017
Date of Test	:	June 26, 2017- July 10, 2017
Date of Report	:	July 10, 2017
Version Number	:	REV0

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TEST REPORT DECLARATION

Applicant	:	Tband srl
Address	:	Via Battisti, 4, Mogliano Veneto (TV) TREVISO, 31021 Italy
Manufacturer	:	Artway Technology International Ltd.
Address	:	621, B3 Block, NO.168, Baoyuan Road, Bao'an D., Shenzhen, Guangdong, China
EUT Description	:	Android MiniPC Box
		(A) Model No. : TBGL1017A
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C 2016,

ANSI C63.4:2014, ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Reak Yang Project Engineer	Reak Yang ……
Approved by (name + signature)…....:	Simple Guan Project Manager	……
Date of issue…… ……..:	July 10, 2017	

Revision History

Revision	Issue Date	Revisions	Revised By
00	July 10, 2017	Initial released Issue	Simple Guan

1. General Information

1.1 Description of Device (EUT)

EUT	:	Android MiniPC Box
Model No.	:	TBGL1017A
DIFF.	:	N/A
Trade mark	:	N/A
Power supply	:	DC 5V From USB Port
Radio Technology	:	2.4G WiFi
Operation frequency	:	IEEE 802.11b/g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz
Channel number	:	IEEE 802.11b/g:11Channels IEEE 802.11n HT20: 11 Channels
Modulation	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Type	:	PCB Antenna, max gain 3.2 dBi.

1.2 Accessories of device (EUT)

Accessories1	:	Remote Control
Mode	:	N/A

1.3 Test Lab information

Shenzhen Alpha Product Testing Co., Ltd.

Building B, East Area of Nanchang Second Industrial Zone,
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

FCC Registered No.: 203110

2. Summary of Measurement

2.1.Summary of test result

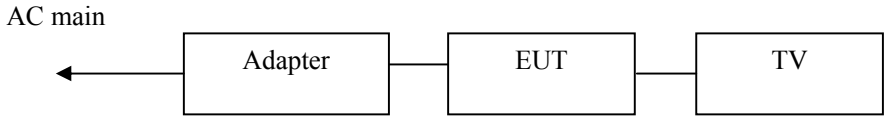
Test Item	Test Requirement	Standards Paragraph	Result
Spurious Emission	FCC PART 15 : 2014 & IC RSS-247	Section 15.247&15.209 & RSS-247 Section 5.5	Compliance
Conduction Emission	FCC PART 15 : 2015 & IC RSS Gen	Section 15.207&7.2.4	Compliance
Bandwidth Test	FCC PART 15 : 2015 & IC RSS-247	Section 15.247& RSS-247 5.1(2)	Compliance
Peak Power	FCC PART 15 : 2015 & IC RSS-247	Section 15.247 & RSS-247 5.4(2)	Compliance
Power Density	FCC PART 15 : 2015 & IC RSS-247	Section 15.247 & Section 5.2(2)	Compliance
Band Edge	FCC PART 15 : 2015 & IC RSS-247	Section 15.247 & Section 5.5	Compliance
Antenna Requirement	FCC PART 15 : 2015 & IC RSS Gen	Section 15.203&7.1.4	Compliance

Note: The EUT has been tested as an independent unit. And Continual Transmitting in maximum power (The adapter be used during Test)

2.2.Assistant equipment used for test

Description 1	:	TV
Manufacturer	:	TCL
Model No.	:	L32F1510BN
Serial No.	:	2400109888
Description 2	:	Adapter
Model No.	:	LS-A01
Input	:	AC 100-240V, 50/60Hz, 0.5A
Output	:	DC 5V, 1000mA

2.3.Block Diagram



2.4.Test mode

Duty cycle :100% Keeping TX			
Mode	data rate (Mbps)(see Note)	Channel	Frequency (MHz)
IEEE 802.11b	1	Low :CH1	2412
	1	Middle: CH6	2437
	1	High: CH11	2462
IEEE 802.11g	6	Low :CH1	2412
	6	Middle: CH6	2437
	6	High: CH11	2462
IEEE 802.11 n/HT20 with 2.4G	6.5	Low :CH1	2412
	6.5	Middle: CH6	2437
	6.5	High: CH11	2462
Note: According exploratory test, EUT will have maximum output power in those data rate. so those data rate were used for all test.			

2.5.Channel list

For IEEE 802.11b/g and IEEE 802.11n/HT20 with 2.4G					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH1	2412	CH5	2432	CH9	2452
CH2	2417	CH6	2437	CH10	2457
CH3	2422	CH7	2442	CH11	2462
CH4	2427	CH8	2447		

2.6.Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

2.7.Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.71dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.90dB	Polarize: V
	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.28dB	Polarize: H
	4.26dB	Polarize: V
Uncertainty for radio frequency	1×10-9	
Uncertainty for conducted RF Power	0.16dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

3. EMC Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	2016.09.29	1Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2016.09.29	1Year
Receiver	R&S	ESCI	1166.5950K03-1011	2016.09.29	1Year
Receiver	R&S	ESCI	101202	2016.09.29	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2016.09.30	2Year
Horn Antenna	EMCO	3115	640201028-06	2016.09.30	2Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2016.09.30	2Year
Cable	Resenberger	N/A	No.1	2016.09.29	1Year
Cable	SCHWARZBECK	N/A	No.2	2016.09.29	1Year
Cable	SCHWARZBECK	N/A	No.3	2016.09.29	1Year
Pre-amplifier	Schwarzbeck	BBV9743	9743-019	2016.09.29	1Year
Pre-amplifier	R&S	AFS33-18002650-30-8P-44	SEL0080	2016.09.29	1Year
Base station	Agilent	E5515C	GB44300243	2016.09.29	1 Year
Temperature controller	Terchy	MHQ	120	2016.09.29	1Year
Power divider	Anritsu	K240C	020346	2016.09.29	1 Year
Signal Generator	HP	83732B	VS3449051	2016.09.29	1 Year
Power Meter	Anritsu	ML2487A	6K00001491	2016.09.29	1Year

Power sensor	Anritsu	ML2491A	32516	2016.09.29	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2016.09.29	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2016.09.29	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2016.09.29	1 Year

4. Spurious Emission

4.1.Radiation Emission

4.2.Radiation Emission Limits(15.209)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

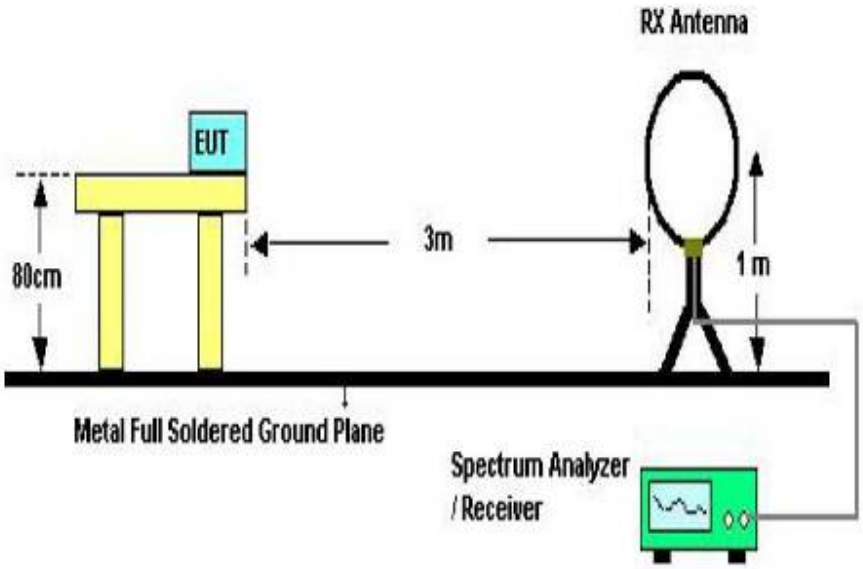
Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

NOTE:

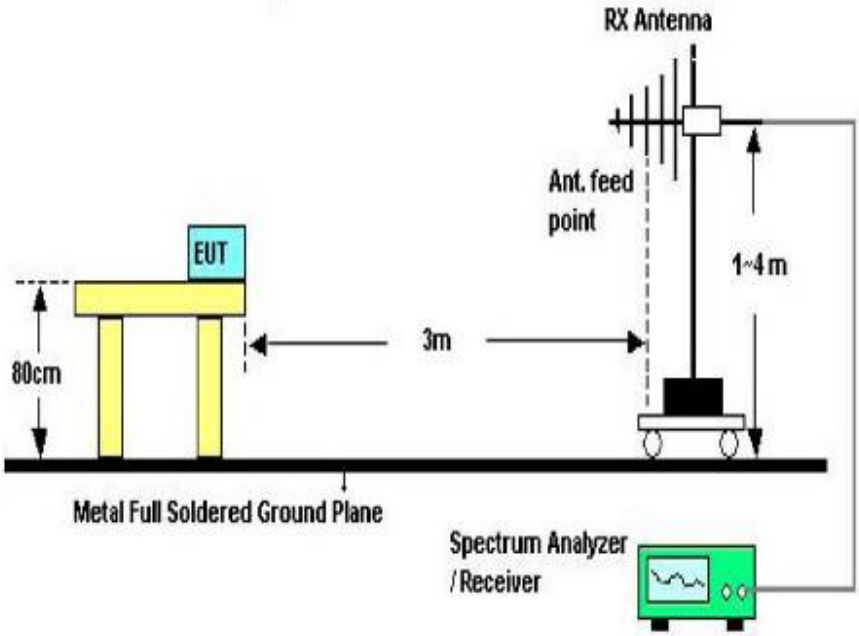
a) The tighter limit applies at the band edges.
b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

4.3.Test Setup

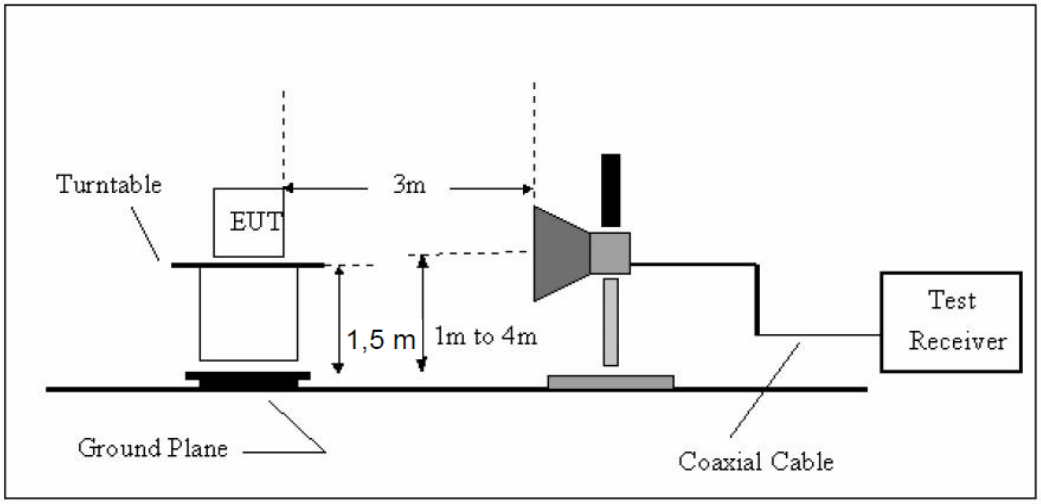
See the next page



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

4.4.Test Procedure

a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground, The table was rotated 360 degrees to determine the position of the highest radiation
b) The Test antenna shall vary between 1m and 4m,Both Horizontal and Vertical antenna are set of make measurement.
c) The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then Qusia Peak Detector mode premeasured
d) If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.
e) For the actual test configuration, please see the test setup photo.

4.5.Test Equipment Setting For emission test Result

9KHz~150KHz	RBW 200Hz	VBW1KHz
150KHz~30MHz	RBW 9KHz	VBW 30KHz
30MHZ~1GHz	RBW 120KHz	VBW 300KHz
Above 1GHz	RBW 1MHz	VBW 3MHz

4.6.Test Condition

Continual Transmitting in maximum power.

4.7.Test Result

We have scanned the 9KHz from 25GHz to the EUT.
Detailed information please see the following page.

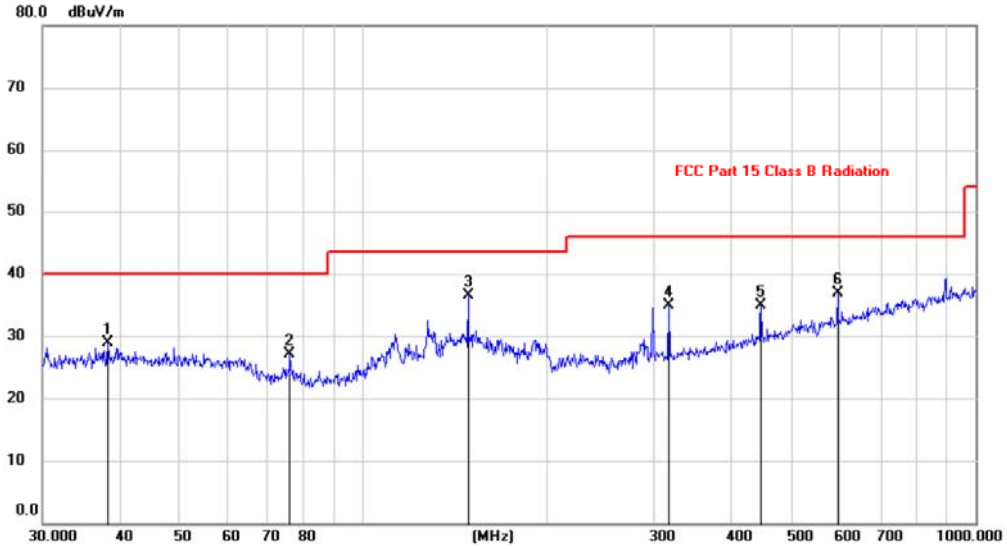
From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Site LAB 966-2 Chamber	Polarization: ***Horizontal***	Temperature: 23.8
Limit: FCC Part 15 Class B Radiation	Power: AC 120V/60Hz	Humidity: 56 %
EUT: Android MiniPC Box	Distance:	
M/N: TBGL1017A		
Mode:WiFi 2.4G		
Note:		
Engineer Signature:		

Radiated Emission Measurement

File :2017 Data :#3 Date: 2017/6/27 Time: 14:05:23



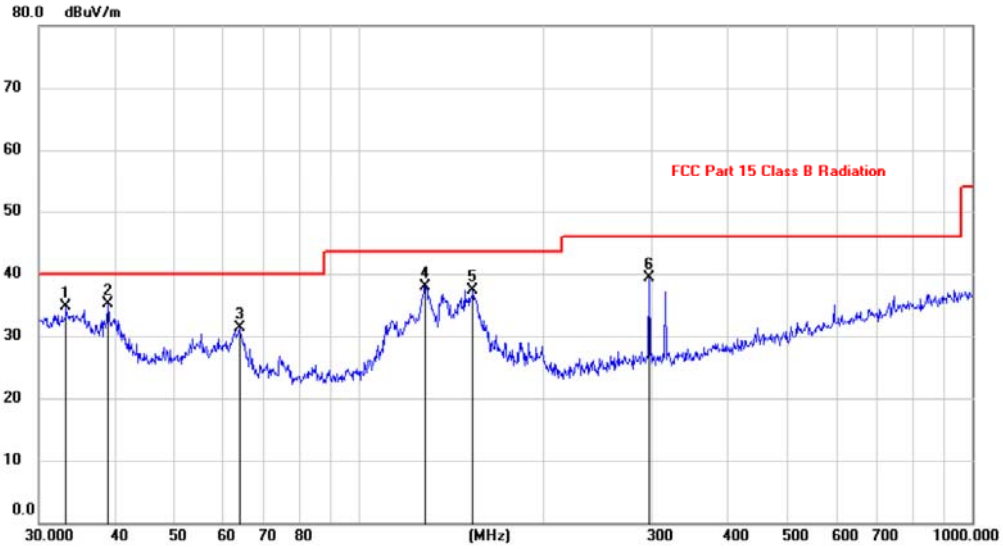
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		38.3462	14.95	13.95	28.90	40.00	-11.10	QP			
2		75.9773	16.89	10.15	27.04	40.00	-12.96	QP			
3	*	148.4410	22.16	14.44	36.60	43.50	-6.90	QP			
4		316.5890	21.11	13.79	34.90	46.00	-11.10	QP			
5		446.4141	17.95	16.86	34.81	46.00	-11.19	QP			
6		595.1329	17.66	19.17	36.83	46.00	-9.17	QP			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Site LAB 966-2 Chamber	Polarization: ***Vertical***	Temperature: 23.8
Limit: FCC Part 15 Class B Radiation	Power: AC 120V/60Hz	Humidity: 56 %
EUT: Android MiniPC Box	Distance:	
M/N: TBGL1017A		
Mode:WiFi 2.4G		
Note:		
Engineer Signature:		

Radiated Emission Measurement

File :2017 Data :#4 Date: 2017/6/27 Time: 14:06:52



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		33.2112	21.20	13.44	34.64	40.00	-5.36	QP			
2	*	39.0245	20.82	14.20	35.02	40.00	-4.98	QP			
3		63.7588	19.07	12.21	31.28	40.00	-8.72	QP			
4		128.5630	24.74	13.14	37.88	43.50	-5.62	QP			
5		153.2004	22.78	14.56	37.34	43.50	-6.16	QP			
6		297.2241	25.96	13.39	39.35	46.00	-6.65	QP			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Remark: All modes and channels have been tested and only worst data of 802.11b, 2412MHz is listed in this report.

From 1G-25GHz

Test Mode: IEEE 802.11b TX Low									
Freq (MHz)	Read Level (dBuV/m)	**Polar (H/V)**	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	43.46	V	33.94	10.17	34.27	53.30	74	20.70	PK
4824	34.01	V	33.94	10.17	34.27	43.85	54	10.15	AV
7236									
9648									
4824	43.31	H	33.94	10.17	34.27	53.15	74	20.85	PK
4824	33.87	H	33.94	10.17	34.27	43.71	54	10.29	AV
7236									
9648									
Test Mode: IEEE 802.11b TX Mid									
4874	41.26	V	33.92	10.2	34.28	51.10	74	22.90	PK
4874	32.34	V	33.92	10.2	34.28	42.18	54	11.82	AV
7311									
9748									
4874	41.69	H	33.92	10.2	34.28	51.53	74	22.47	PK
4874	32.19	H	33.92	10.2	34.28	42.03	54	11.97	AV
7311									
9748									
Test Mode: IEEE 802.11b TX High									
4924	42.01	V	33.99	10.23	34.26	51.97	74	22.03	PK
4924	32.56	V	33.99	10.23	34.26	42.52	54	11.48	AV
7386									
9848									
4924	42.77	H	33.99	10.23	34.26	52.73	74	21.27	PK
4924	31.58	H	33.99	10.23	34.26	41.54	54	12.46	AV
7386									
9848									

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Test Mode: IEEE 802.11g TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	42.50	V	33.94	10.17	34.27	52.34	74	21.66	PK
4824	31.55	V	33.94	10.17	34.27	41.39	54	12.61	AV
7236	/								
9648	/								
4824	43.56	H	33.94	10.17	34.27	53.40	74	20.60	PK
4824	32.13	H	33.94	10.17	34.27	41.97	54	12.03	AV
7236									
9648									
Test Mode: IEEE 802.11g TX Mid									
4874	43.34	V	33.92	10.2	34.28	53.18	74	20.82	PK
4874	31.34	V	33.92	10.2	34.28	41.18	54	12.82	AV
7311	/								
9748	/								
4874	43.21	H	33.92	10.2	34.28	53.05	74	20.95	PK
4874	33.20	H	33.92	10.2	34.28	43.04	54	10.96	AV
7311									
9748									
Test Mode: IEEE 802.11g TX High									
4924	41.76	V	33.99	10.23	34.26	51.72	74	22.28	PK
4924	32.15	V	33.99	10.23	34.26	42.11	54	11.89	AV
7386	/								
9848	/								
4924	42.29	H	33.99	10.23	34.26	52.25	74	21.75	PK
4924	32.08	H	33.99	10.23	34.26	42.04	54	11.96	AV
7386									
9848									

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Test ModeIEEE 802.11n HT20 TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	42.06	V	33.94	10.17	34.27	51.90	74	22.10	PK
4824	31.95	V	33.94	10.17	34.27	41.79	54	12.21	AV
7236	/								
9648	/								
4824	40.62	H	33.94	10.17	34.27	50.46	74	23.54	PK
4824	32.43	H	33.94	10.17	34.27	42.27	54	11.73	AV
7236									
9648									
Test Mode:IEEE 802.11n HT20 TX Mid									
4874	42.10	V	33.92	10.2	34.28	51.94	74	22.06	PK
4874	32.32	V	33.92	10.2	34.28	42.16	54	11.84	AV
7311	/								
9748	/								
4874	42.76	H	33.92	10.2	34.28	52.60	74	21.40	PK
4874	33.21	H	33.92	10.2	34.28	43.05	54	10.95	AV
7311									
9748									
Test Mode:IEEE 802.11n HT20 TX High									
4924	41.61	V	33.99	10.23	34.26	51.57	74	22.43	PK
4924	32.26	V	33.99	10.23	34.26	42.22	54	11.78	AV
7386	/								
9848	/								
4924	41.72	H	33.99	10.23	34.26	51.68	74	22.32	PK
4924	33.40	H	33.99	10.23	34.26	43.36	54	10.64	AV
7386									
9848									

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

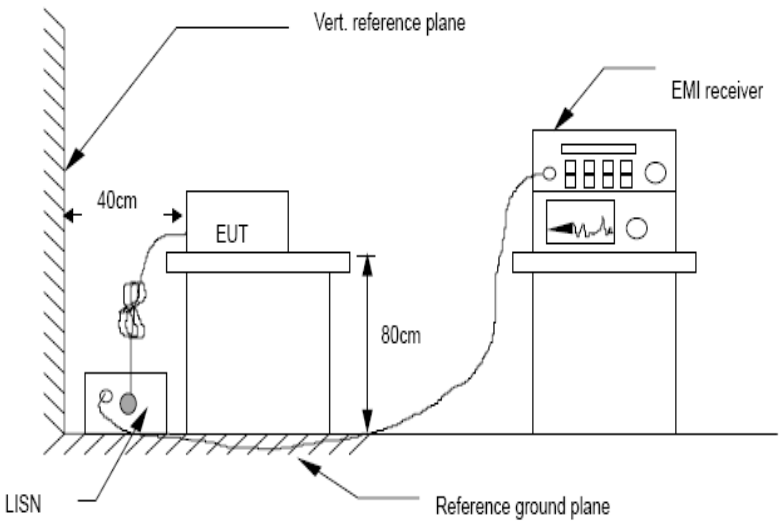
5. POWER LINE CONDUCTED EMISSION

5.1. Conducted Emission Limits(15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.
3.The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

5.2. Test Setup



5.3. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4:2014 on Conducted Emission Measurement.
The bandwidth of test receiver is set at 9 kHz.

5.4. Test Results

Worse case is reported only

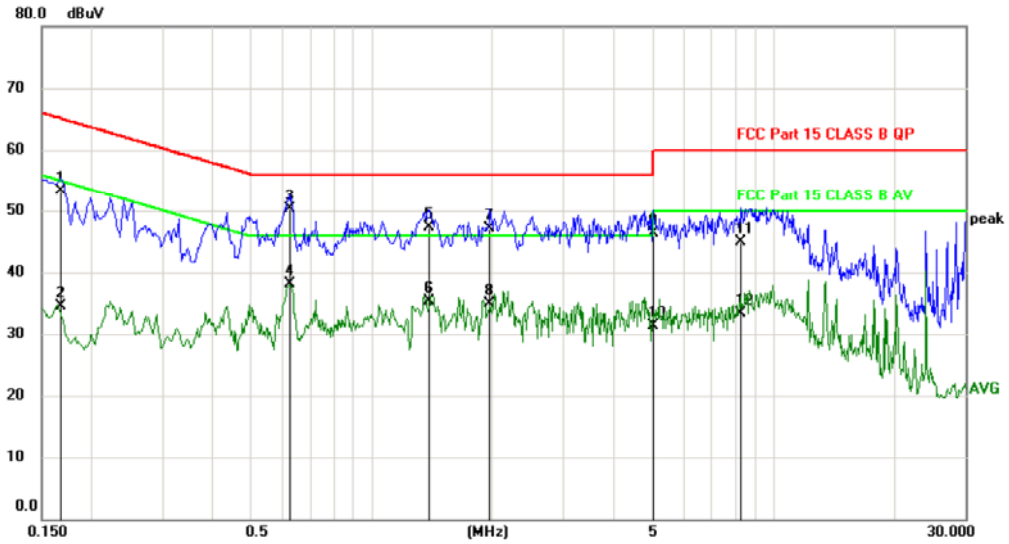
PASS

Detailed information please see the following page.

Site LAB		Phase:	*L1*	Temperature:	24.2
Limit: FCC Part 15 CLASS B QP		Power:	AC 120V/60Hz	Humidity:	53 %
EUT: Android MiniPC Box					
M/N: TBGL1017A					
Mode: WIFI 2.4G					
Note:					
Engineer Signature:					

Conducted Emission Measurement

File :TBGL1017A Data :#8 Date: 2017-6-26 Time: 11:38:22



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1680	53.01	0.20	53.21	65.06	-11.85	QP	
2		0.1680	34.36	0.20	34.56	55.06	-20.50	AVG	
3	*	0.6269	50.09	0.20	50.29	56.00	-5.71	QP	
4		0.6269	37.99	0.20	38.19	46.00	-7.81	AVG	
5		1.3810	47.15	0.20	47.35	56.00	-8.65	QP	
6		1.3810	35.01	0.20	35.21	46.00	-10.79	AVG	
7		1.9600	46.82	0.20	47.02	56.00	-8.98	QP	
8		1.9600	34.79	0.20	34.99	46.00	-11.01	AVG	
9		5.0204	46.13	0.26	46.39	60.00	-13.61	QP	
10		5.0204	30.96	0.26	31.22	50.00	-18.78	AVG	
11		8.2804	44.51	0.34	44.85	60.00	-15.15	QP	
12		8.2804	32.90	0.34	33.24	50.00	-16.76	AVG	

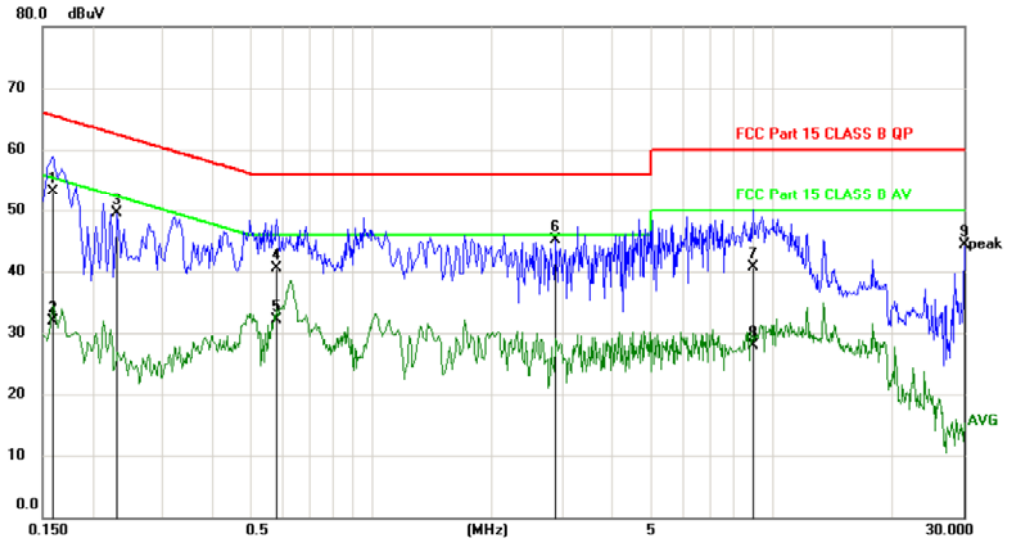
*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Site LAB		Phase:	N	Temperature:	24.2
Limit: FCC Part 15 CLASS B QP		Power:	AC 120V/60Hz	Humidity:	53 %
EUT: Android MiniPC Box					
M/N: TBGL1017A					
Mode: WiFi 2.4G					
Note:					
Engineer Signature:					

Conducted Emission Measurement

File :TBGL1017A Data :#7 Date: 2017-6-26 Time: 11:36:52



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1590	53.00	0.20	53.20	65.52	-12.32	QP	
2		0.1590	31.63	0.20	31.83	55.52	-23.69	AVG	
3		0.2310	49.35	0.20	49.55	62.41	-12.86	peak	
4		0.5775	40.40	0.20	40.60	56.00	-15.40	QP	
5		0.5775	31.94	0.20	32.14	46.00	-13.86	AVG	
6	*	2.8804	44.92	0.24	45.16	56.00	-10.84	peak	
7		8.9604	40.44	0.36	40.80	60.00	-19.20	QP	
8		8.9604	27.52	0.36	27.88	50.00	-22.12	AVG	
9		30.0000	43.01	1.36	44.37	60.00	-15.63	peak	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes and channels have been tested and only worst data of 802.11b, 2412MHz is listed in this report.

6. Conducted Maximum Output Power

6.1.Test limit

Please refer section15.247.

Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1W(30dBm)

6.2.Test Procedure

Details see the KDB558074 Meas Guidance V04

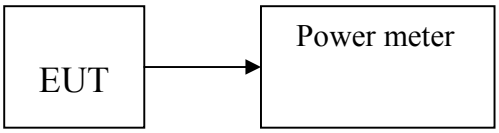
6.2.1 Place the EUT on the table and set it in transmitting mode.

6.2.2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.

6.2.3 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset. Details see the KDB558074 DTS Meas Guidance V04

6.3.Test Setup



6.4.Test Results

PASS

Detailed information please see the following page.

EUT: Android MiniPC Box M/N: TBGL1017A						
Test date: 2017-07-07 Test site: RF site Tested by: Simple Guan						
Mode	Frequency (MHz)	Ant Port	PK Output power(dBm)		Limit (dBm)	Margin (dB)
IEEE 802.11 b	CH1: 2412	0	17.09	17.09	30	12.91
		1	/			
	CH6: 2437	0	17.35	17.35	30	12.65
		1	/			
	CH11: 2462	0	17.11	17.11	30	12.89
		1	/			
IEEE 802.11 g	CH1: 2412	0	16.87	16.87	30	13.13
		1	/			
	CH6: 2437	0	16.91	16.91	30	13.09
		1	/			
	CH11: 2462	0	16.35	16.35	30	13.65
		1	/			
IEEE 802.11 n/HT20 with 2.4G	CH1: 2412	0	15.63	15.63	30	14.37
		1	/			
	CH6: 2437	0	15.70	15.70	30	14.3
		1	/			
	CH11: 2462	0	15.49	15.49	30	14.51
		1	/			
Conclusion: PASS						

7. PEAK POWER SPECTRAL DENSITY

7.1.Test limit

7.1.1 Please refer section15.247.

7.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

7.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

7.2.Method of measurement

Details see the KDB558074 DTS Meas Guidance V04

7.2.1 Place the EUT on the table and set it in transmitting mode.

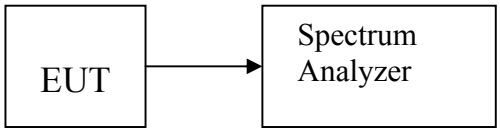
7.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3 Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, span=5-30%EBW, detail see the test plot.

7.2.4 Record the max reading.

7.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

7.3.Test Setup



7.4.Test Results

PASS.

Detailed information please see the below.

EUT: Android MiniPC Box M/N: TBGL1017A						
Test date: 2017-07-07 Test site: RF site Tested by: Simple Guan						
Mode	Frequency (MHz)	Ant Port	PK Output power(dBm)		Limit (dBm)	Result
IEEE 802.11 b	CH1: 2412	0	-7.554	-7.554	8	PASS
		1	/			
	CH6: 2437	0	-8.292	-8.292	8	PASS
		1	/			
	CH11: 2462	0	-8.447	-8.447	8	PASS
		1	/			
IEEE 802.11 g	CH1: 2412	0	-12.861	-12.861	8	PASS
		1	/			
	CH6: 2437	0	-12.207	-12.207	8	PASS
		1	/			
	CH11: 2462	0	-12.288	-12.288	8	PASS
		1	/			
IEEE 802.11 n/HT20 with 2.4G	CH1: 2412	0	-13.829	-13.829	8	PASS
		1	/			
	CH6: 2437	0	-12.858	-12.858	8	PASS
		1	/			
	CH11: 2462	0	-13.428	-13.428	8	PASS
		1	/			
Conclusion: PASS						

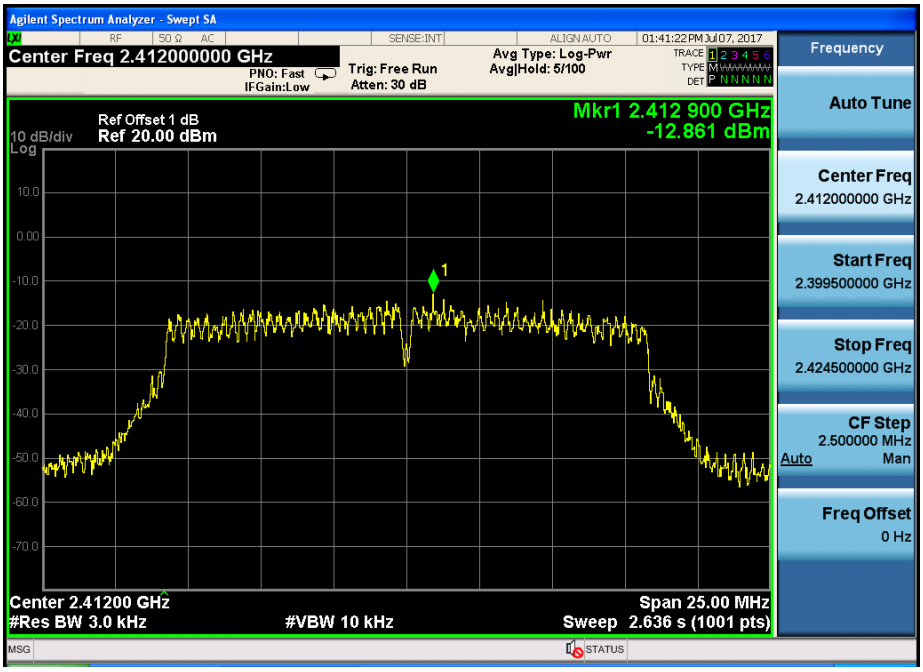
IEEE 802.11b :

CH Low :

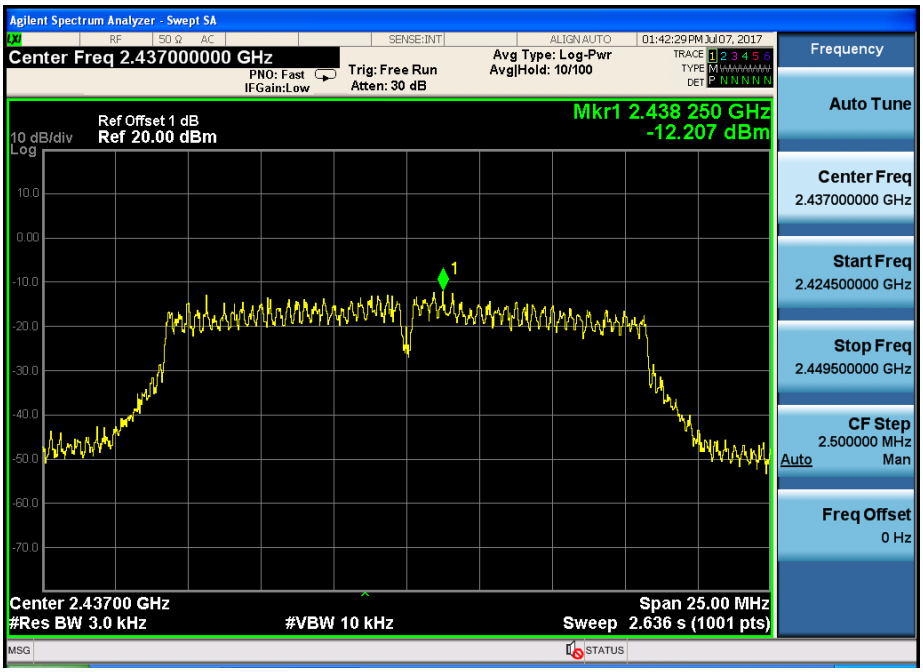
CH Mid:

CH High:

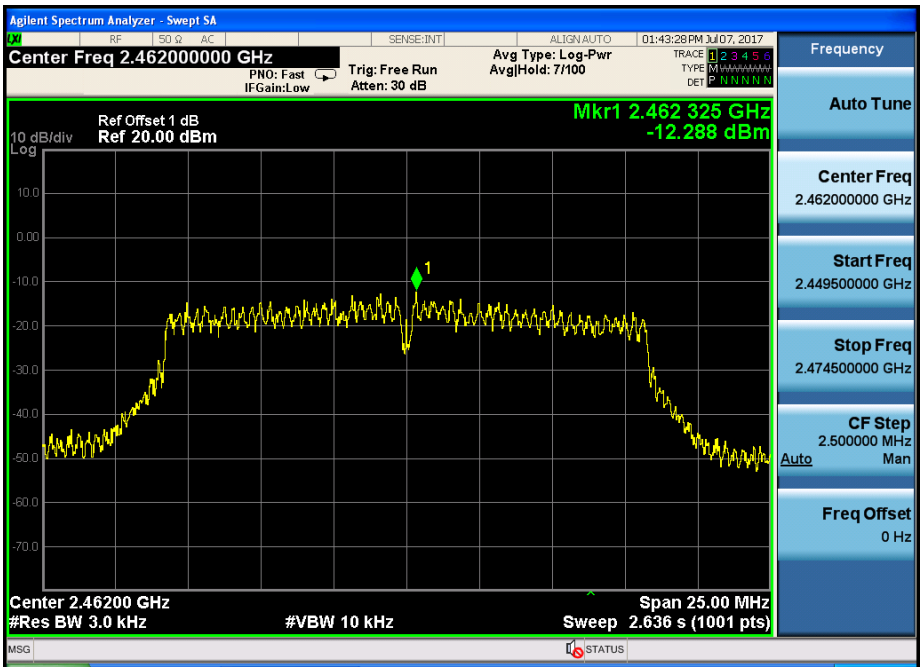
IEEE 802.11g :
CH Low



CH Mid:

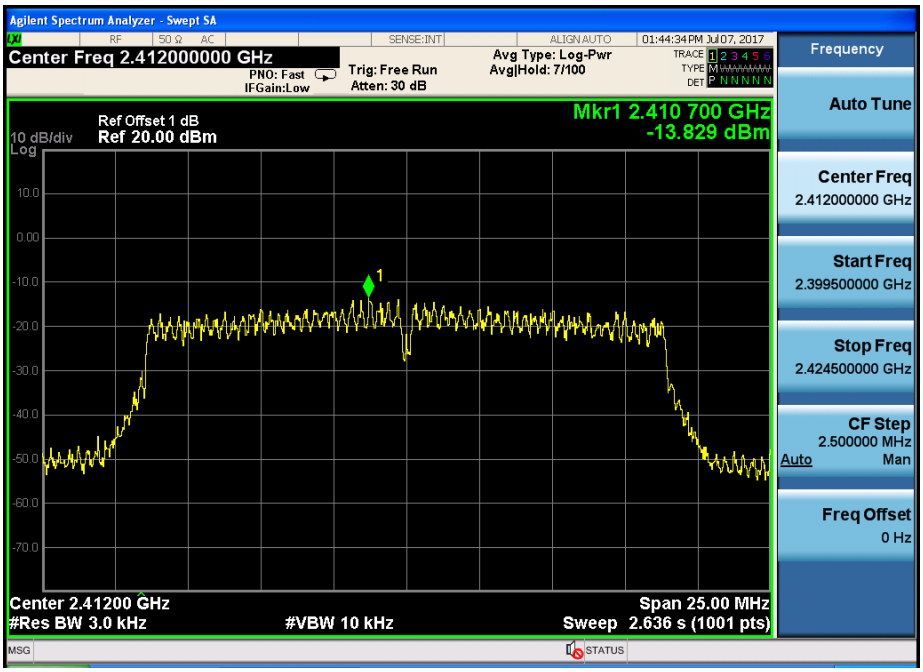


CH High:

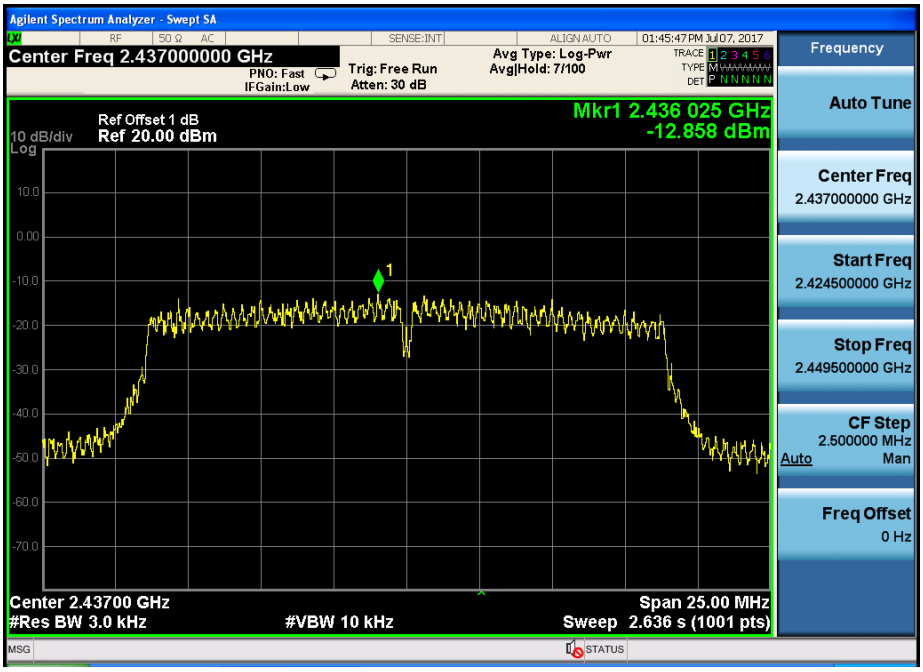


IEEE 802.11n HT20 :

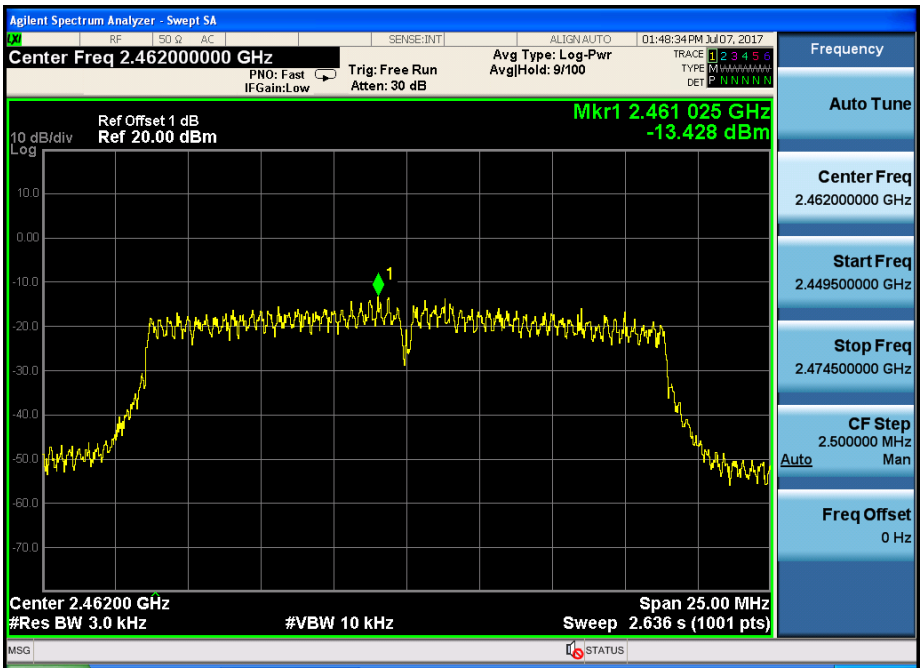
CH Low :



CH Mid:



CH High:


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 9/100
01:48:34 PM Jul 07, 2017
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.461 025 GHz
-13.428 dBm
Center 2.46200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 25.00 MHz
Sweep 2.636 s (1001 pts)
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.449500000 GHz
Stop Freq
2.474500000 GHz
CF Step
2.500000 MHz
Auto
Man
Freq Offset
0 Hz

8. Bandwidth

8.1.Test limit

Please refer section15.247
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

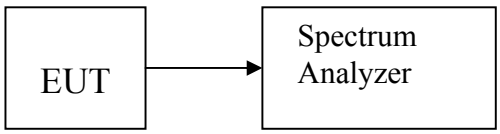
8.2.Method of measurement

Details see the KDB558074 D01 Meas Guidance V04

a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

b) The test receiver set RBW = 1-5 % EBW, VBW≥3RBW, Peak Detector, Sweep time set auto, detail see the test plot.

8.3.Test Setup



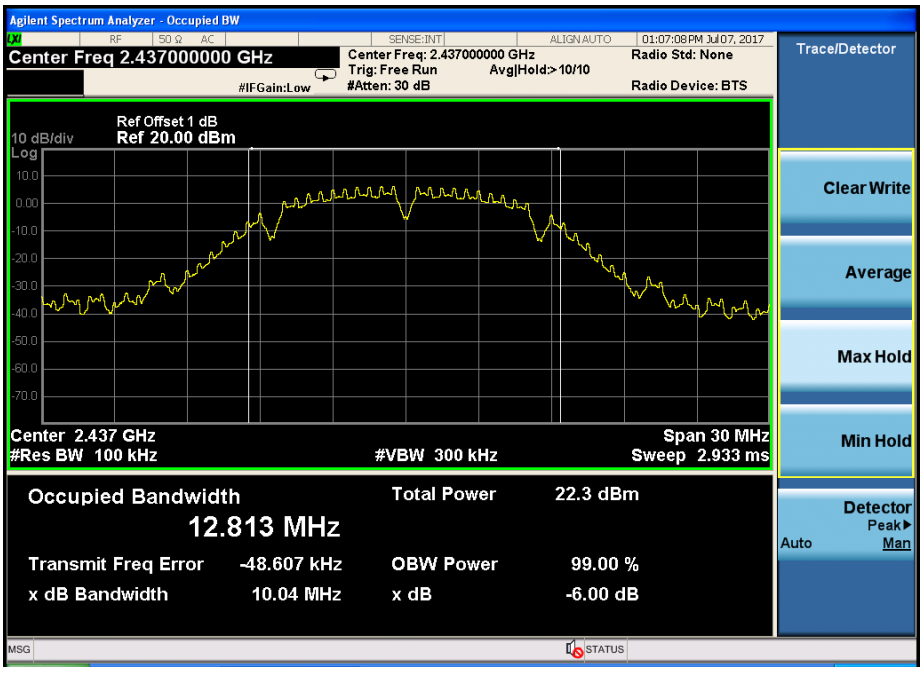
8.4.Test Results

PASS.
Detailed information please see the following page.

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11b:					
Low	2412	10.04	12.874	0.5	PASS
Mid	2437	10.04	12.813	0.5	PASS
High	2462	10.05	12.852	0.5	PASS
IEEE 802.11g					
Low	2412	15.16	16.414	0.5	PASS
Mid	2437	15.33	16.413	0.5	PASS
High	2462	15.49	16.438	0.5	PASS
IEEE 802.11n/HT20:					
Low	2412	16.08	17.573	0.5	PASS
Mid	2437	16.11	17.551	0.5	PASS
High	2462	16.10	17.557	0.5	PASS

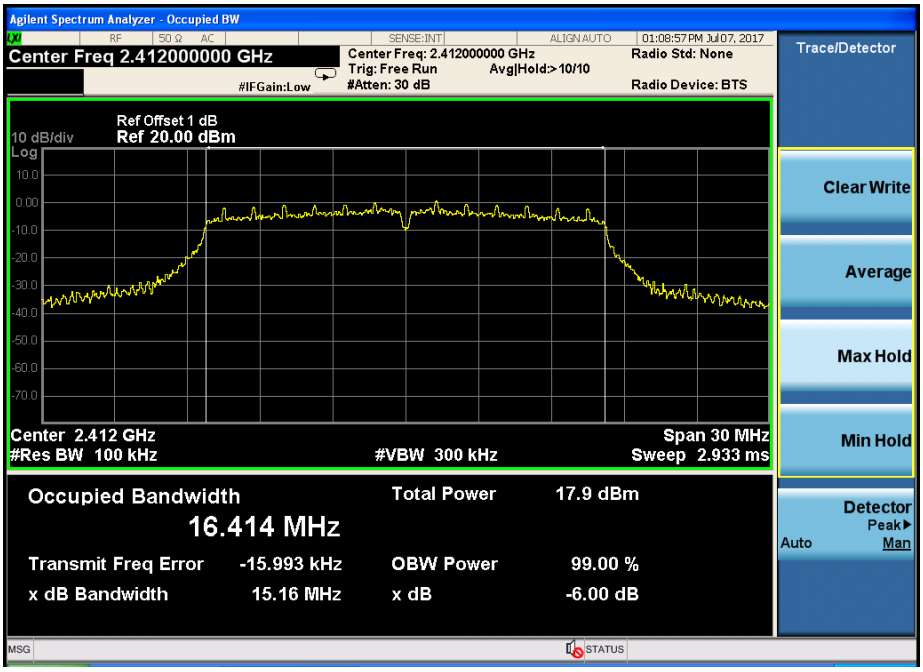
IEEE 802.11b:
CH Low :

CH Mid :

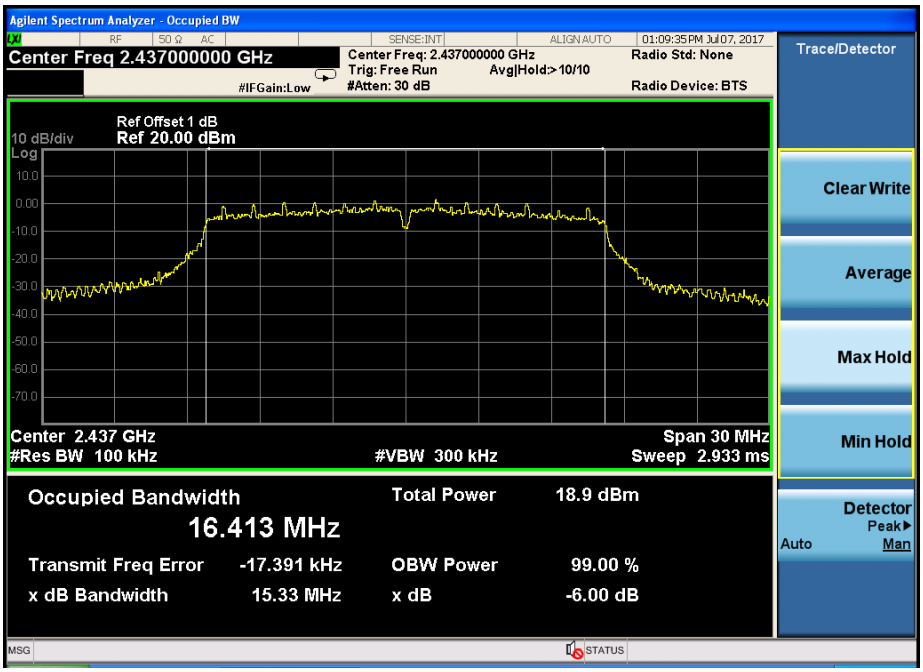


CH High :

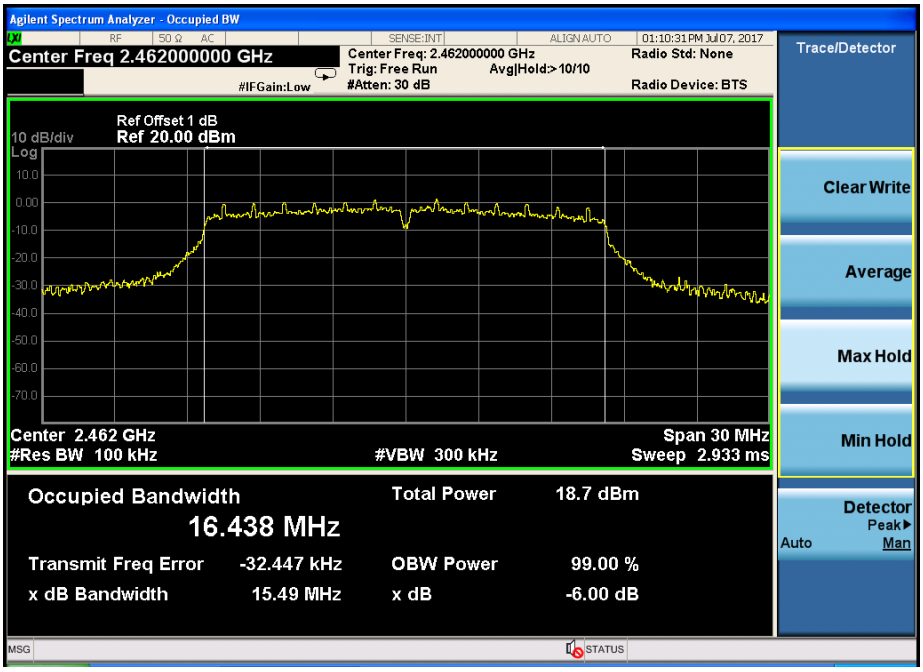
IEEE 802.11g:
CH Low :



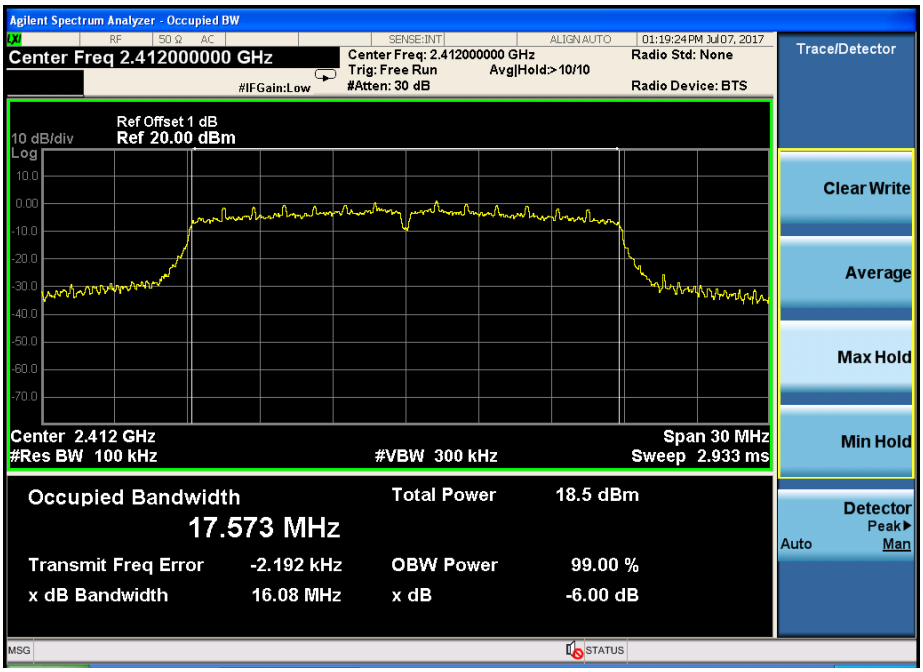
CH Mid:



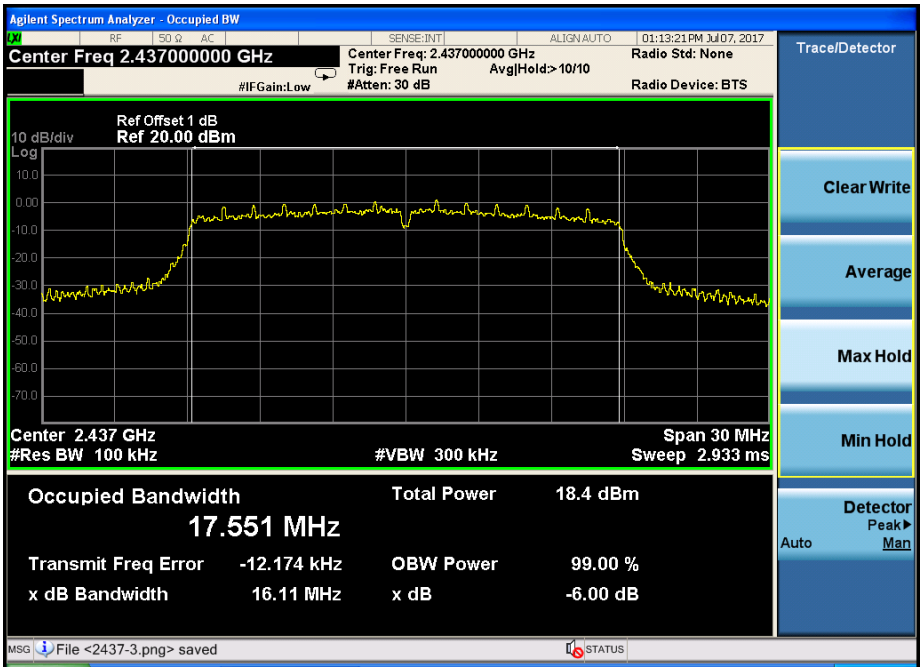
CH High:



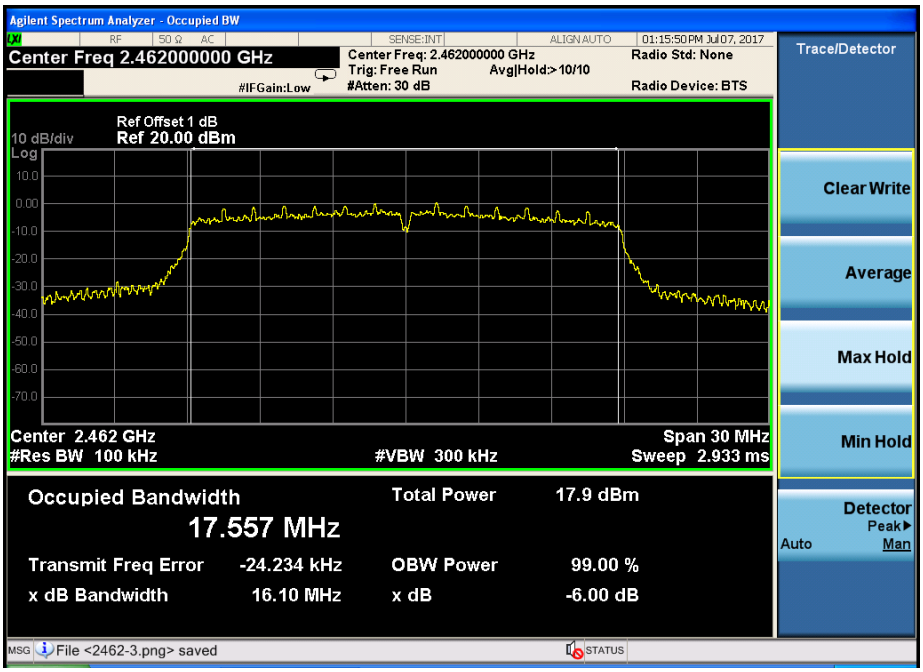
IEEE 802.11n HT20:
CH Low :



CH Mid :



CH High :


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.462000000 GHz
Center Freq: 2.462000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
01:15:50 PM Jul 07, 2017
Trace/Detector
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Clear Write
Average
Max Hold
Min Hold
Center 2.462 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 30 MHz
Sweep 2.933 ms
Occupied Bandwidth
17.557 MHz
Total Power 17.9 dBm
Transmit Freq Error -24.234 kHz
OBW Power 99.00 %
x dB Bandwidth 16.10 MHz
x dB -6.00 dB
Detector
Peak
Auto
Man
File <2462-3.png> saved

9. Band Edge Check

9.1.Test limit

Please refer section15.247
All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz and 5725MHz to 5850MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.2.Test Procedure

9.2.1 Put the EUT on a 0.8m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission
9.2.2 Check the spurious emissions out of band.
9.2.3 RBW 1MHz ,VBW 3MHz ,peak detector for peak value , RBW 1MHz ,VBW 3MHz , RMS detector for AV value.

9.3.Test Setup

Same as 5.2.2.

9.4.Test Result

PASS.
Detailed information please see the following page.

Radiated Method:
IEEE 802.11b CH LOW

Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX Low								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	40.50	27.62	3.92	34.97	37.07	74	36.93	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	41.93	27.62	3.92	34.97	38.50	74	41.93	PK
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

IEEE 802.11b CH High

Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX High								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	41.77	27.89	4	34.97	38.69	74	35.31	PK
2483.5	--	27.89	4	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	46.56	27.89	4	34.97	43.48	74	30.52	**PK**
2483.5	--	27.89	4	34.97	--	54	--	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

IEEE 802.11g CH LOW

Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX Low								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	41.26	27.62	3.92	34.97	37.83	74	41.26	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.15	27.62	3.92	34.97	39.72	74	34.28	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

IEEE 802.11g CH High

Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX High								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	44.13	27.89	4	34.97	41.05	74	32.95	**PK**
2483.5		--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	46.81	27.89	4	34.97	43.73	74	30.27	**PK**
2483.5		--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

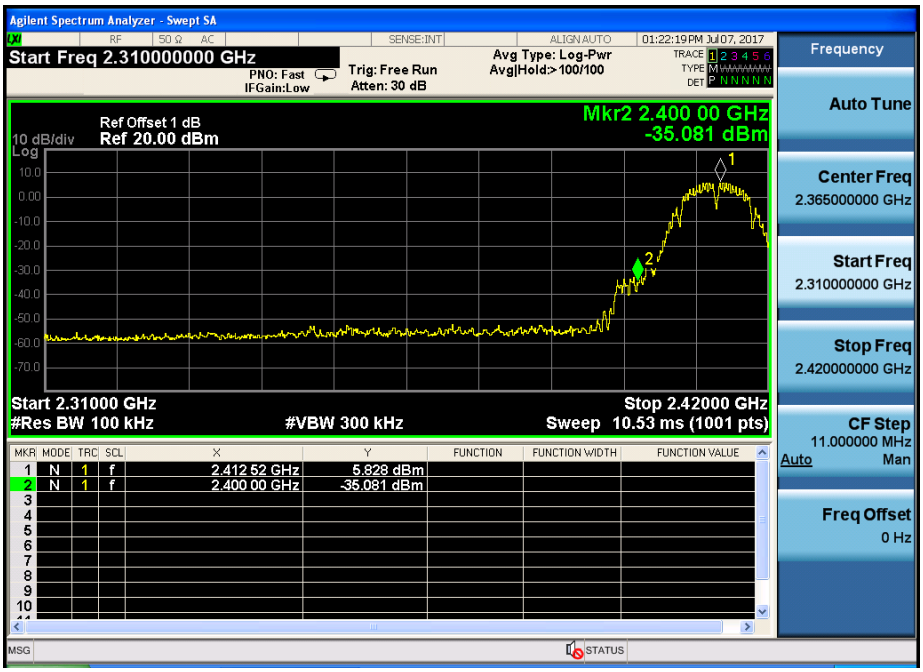
IEEE 802.11n HT20 CH Low

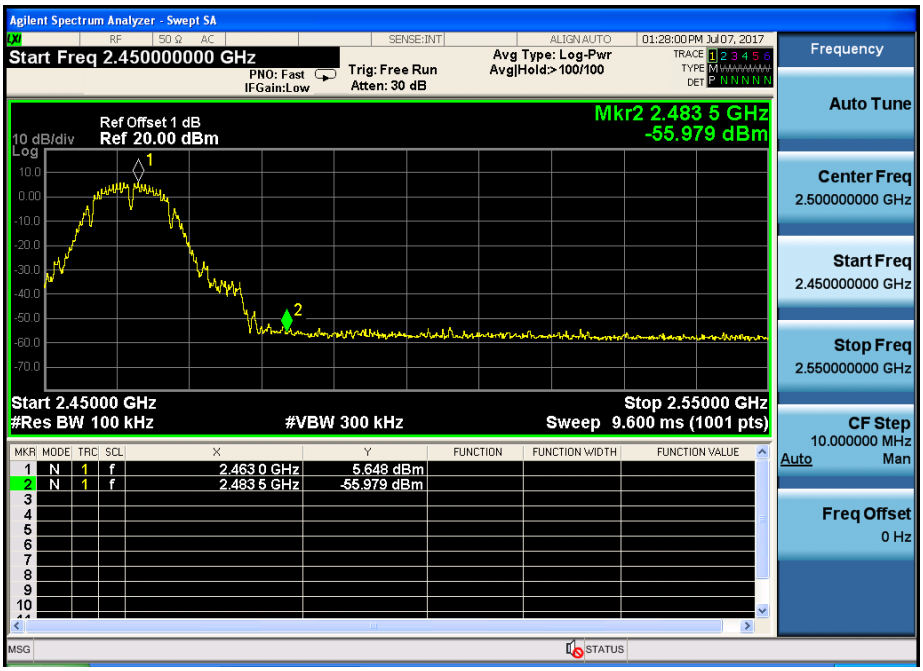
Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX Low								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	40.75	27.62	3.92	34.97	37.32	74	36.68	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	41.82	27.62	3.92	34.97	38.39	74	35.61	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

IEEE 802.11n HT20 CH High

Band Edge Test result								
EUT: Android MiniPC Box M/N: TBGL1017A								
Power: DC 5V From USB port								
Test date: 2017-06-27 Test site: 3m Chamber Tested by: Eric								
Test mode: TX High								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	34.49	27.89	4	34.97	31.41	74	42.59	PK
2483.5		--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	45.79	27.89	4	34.97	42.71	74	31.29	PK
2483.5		--	--	--	--	54	--	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

802.11b


Agilent Spectrum Analyzer - Swept SA
Start Freq 2.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:22:19 PM Jul 07, 2017
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.400 00 GHz
-35.081 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.42000 GHz
Sweep 10.53 ms (1001 pts)
1 N 1 f 2.412 52 GHz 5.828 dBm
2 N 1 f 2.400 00 GHz -35.081 dBm
Frequency
Auto Tune
Center Freq
2.365000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.420000000 GHz
CF Step
11.000000 MHz
Auto Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 2.450000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:28:00 PM Jul 07, 2017
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.483 5 GHz
-55.979 dBm
Start 2.45000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.463 0 GHz 5.648 dBm
2 N 1 f 2.483 5 GHz -55.979 dBm
Frequency
Auto Tune
Center Freq
2.500000000 GHz
Start Freq
2.450000000 GHz
Stop Freq
2.550000000 GHz
CF Step
10.000000 MHz
Auto Man
Freq Offset
0 Hz

802.11g

Agilent Spectrum Analyzer - Swept SA
01:29:48 PM Jul 07, 2017
Start Freq 2.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.400 00 GHz
-32.498 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.42000 GHz
Sweep 10.53 ms (1001 pts)
1 N 1 f 2.413 29 GHz 0.874 dBm
2 N 1 f 2.400 00 GHz -32.498 dBm
Frequency
Auto Tune
Center Freq
2.365000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.420000000 GHz
CF Step
11.000000 MHz
Auto Man
Freq Offset
0 Hz

Agilent Spectrum Analyzer - Swept SA
01:30:44 PM Jul 07, 2017
Start Freq 2.450000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.483 5 GHz
-45.439 dBm
Start 2.45000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.463 3 GHz 1.685 dBm
2 N 1 f 2.483 5 GHz -45.439 dBm
Frequency
Auto Tune
Center Freq
2.500000000 GHz
Start Freq
2.450000000 GHz
Stop Freq
2.550000000 GHz
CF Step
10.000000 MHz
Auto Man
Freq Offset
0 Hz

802.11n HT20

Agilent Spectrum Analyzer - Swept SA
Start Freq 2.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:32:14 PM Jul 07, 2017
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.400 00 GHz
-33.338 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.42000 GHz
Sweep 10.53 ms (1001 pts)
1 N 1 f 2.413 29 GHz 0.533 dBm
2 N 1 f 2.400 00 GHz -33.338 dBm
Frequency
Auto Tune
Center Freq
2.365000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.420000000 GHz
CF Step
11.000000 MHz
Auto Man
Freq Offset
0 Hz

Agilent Spectrum Analyzer - Swept SA
Start Freq 2.450000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:33:22 PM Jul 07, 2017
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Mkr2 2.483 5 GHz
-47.453 dBm
Start 2.45000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.463 2 GHz 0.375 dBm
2 N 1 f 2.483 5 GHz -47.453 dBm
Frequency
Auto Tune
Center Freq
2.500000000 GHz
Start Freq
2.450000000 GHz
Stop Freq
2.550000000 GHz
CF Step
10.000000 MHz
Auto Man
Freq Offset
0 Hz

10. Antenna Requirement

10.1. Standard 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 shall be considered sufficient to comply with the provisions of this Section. 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.

10.2. Antenna Connected Construction

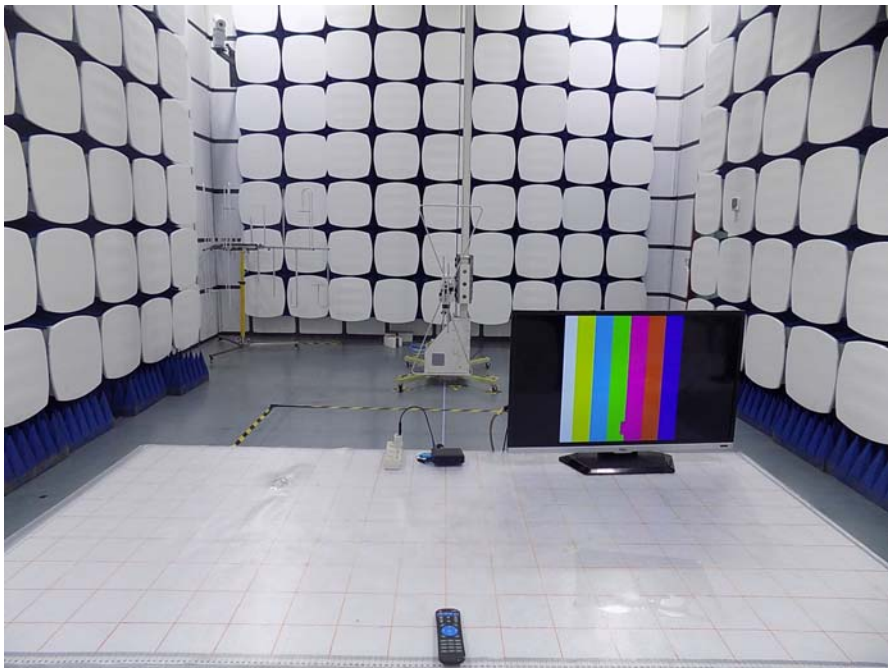
The antenna connector is PCB antenna and no consideration of replacement. Please see EUT photo for details.

10.3. Result

The EUT antenna is PCB Antenna. It comply with the standard requirement.

11. Test setup photo

11.1. Photos of Radiated emission



11.2.Photos of Conducted Emission test

12. Photographs of EUT

Please refer to the report T1871484 05.

---------END OF THE REPORT-------