



FCC TEST REPORT

FCC ID: 2ARVPSGT-UK1

On Behalf of

Shenzhen Guarder Secure Technology Co., Ltd.

Mini Smart Socket US

Model No.: UK-1, UK-2, UK-3, US-1, DE-1, DE-2, DE-3

Prepared for : Shenzhen Guarder Secure Technology Co., Ltd.
Address : Floor 5B, Building D, Ke Li Bang Industrial Area, Fucheng Subdistrict,
Longhua, Shenzhen, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
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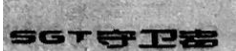
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TABLE OF CONTENTS

Description	Page
1. Summary of Standards And Results-----	6
1.1. Description of Standards and Results -----	6
2. General Information -----	7
2.1. Description of Device (EUT)-----	7
2.2. Accessories of Device (EUT) -----	8
2.3. Tested Supporting System Details -----	8
2.4. Block Diagram of connection between EUT and simulators -----	8
2.5. Test Mode Description -----	9
2.6. Test Conditions -----	10
2.7. Test Facility -----	10
2.8. Measurement Uncertainty -----	11
2.9. Test Equipment List -----	12
3. Spurious Emission -----	13
3.1. Test Limits -----	13
3.2. Test Procedure -----	13
3.3. Test Setup -----	14
3.4. Test Results -----	15
4. Power line Conducted Emission -----	21
4.1. Test Limits -----	21
4.2. Test Procedure -----	21
4.3. Test Setup -----	21
4.4. Test Results -----	22
5. Conducted Maximum Output Power -----	23
5.1. Test limits -----	23
5.2. Test Procedure -----	23
5.3. Test Setup -----	23
5.4. Test Results -----	23
6. Peak Power Spectral Density-----	25
6.1. Test limits -----	25
6.2. Test Procedure -----	25
6.3. Test Setup -----	25
6.4. Test Results -----	26
7. Bandwidth-----	29
7.1. Test limits -----	29
7.2. Test Procedure -----	29
7.3. Test Setup -----	29
7.4. Test Results -----	29
8. Band Edge Check-----	33
8.1. Test limits -----	33
8.2. Test Procedure -----	33
8.3. Test Setup -----	33
8.4. Test Results -----	33

- 9. Antenna Requirement ----- 46**
 - 9.1. Standard Requirement----- 46
 - 9.2. Antenna Connected Construction----- 46
 - 9.3. Results ----- 46
- 10. Test setup photo ----- 47**
 - 10.1. Photos of Radiated emission ----- 47
 - 10.2. Photos of Conducted Emission test----- 48
- 11. EUT photo----- 49**

TEST REPORT DECLARATION

Applicant : Shenzhen Guarder Secure Technology Co., Ltd.
 Address : Floor 5B, Building D, Ke Li Bang Industrial Area, Fucheng Subdistrict, Longhua, Shenzhen, China
 Manufacturer : Shenzhen Guarder Secure Technology Co., Ltd.
 Address : Floor 5B, Building D, Ke Li Bang Industrial Area, Fucheng Subdistrict, Longhua, Shenzhen, China
 EUT Description : Mini Smart Socket US
 (A) Model No. : UK-1, UK-2, UK-3, US-1, DE-1, DE-2, DE-3
 (B) Trademark : 

Measurement Standard Used:


FCC Rules and Regulations Part 15 Subpart C Section 15.247
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).....: Ella Liang
Project Engineer



Approved by (name + signature).....: Simple Guan
Project Manager



Date of issue.....: May 24, 2019

Revision History

Revision	Issue Date	Revisions	Revised By
V0	May 24, 2019	Initial released Issue	Simple Guan

1. SUMMARY OF STANDARDS AND RESULTS

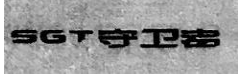
1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Test Requirement	Standards Paragraph	Result
Conducted Emission	FCC PART 15	15.207	P
6dB Bandwidth	FCC PART 15	15.247 (a)(2)	P
Output Power	FCC PART 15	15.247 (b)(3)	P
Radiated Spurious Emission	FCC PART 15	15.247 (c)	P
Conducted Spurious & Band Edge Emission	FCC PART 15	15.247 (d)	P
Power Spectral Density	FCC PART 15	15.247 (e)	P
Radiated Band Edge Emission	FCC PART 15	15.205	P
Antenna Requirement	FCC PART 15	15.203	P
Note:	1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	Mini Smart Socket US
Model Number	:	UK-1, UK-2, UK-3, US-1, DE-1, DE-2, DE-3
Diff	:	There is no difference between all the models, except the model numbers, this report performs the model UK-1.
Trademark	:	
Test Voltage	:	AC 100-240V, 50/60Hz
Operation frequency	:	2412MHz-2462MHz for IEEE 802.11 b, g,n/HT20, 2422MHz~2452MHz for IEEE802.11n/HT40
Channel No.	:	802.11b/802.11g /802.11n(HT20): 11CH 802.11(HT40): 7CH
Modulation type	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Type	:	Internal Antenna, Maximum Gain is 0dBi
Software version	:	V1.0
Hardware version	:	REV1.1

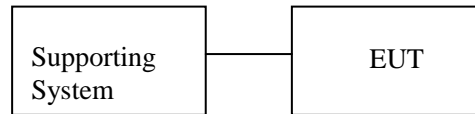
2.2. Accessories of Device (EUT)

Accessories1 : /
Manufacturer : /
Model : /
Power supply : /

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Notebook	ACER	ZQT	N/A	DOC

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

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
IEEE 802.11 n/HT40 with 2.4G	13	Low :CH3	2422
	13	Middle: CH6	2437
	13	High: CH9	2452

Note: According exploratory test, EUT will have maximum output power in those data rate. so those data rate were used for all test.

Channel list:					
For IEEE 802.11b, g, n/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		
For IEEE 802.11 n/HT40 with 2.4G					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH1	2422	CH5	2442		
CH2	2427	CH6	2447		
CH3	2432	CH7	2452		
CH4	2437				

Setting output power (Max)			
802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
12dBm	12dBm	11dBm	11dBm

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	27°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 25, 2017 Certificated by IC
Registration Number: 12135A

2.8.Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10 ⁻⁸
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2018.09.21	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2018.09.21	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2018.09.11	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2018.09.21	1Year
Receiver	R&S	ESCI	101165	2018.09.21	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2018.09.26	2Year
Cable	Resenberger	N/A	No.1	2018.09.21	1Year
Cable	Resenberger	N/A	No.2	2018.09.21	1Year
Cable	Resenberger	N/A	No.3	2018.09.21	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2018.09.21	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2018.09.21	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2018.09.21	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2018.09.21	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2018.09.21	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2018.09.21	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2018.09.21	1 Year
Power Meter	Agilent	E9300A	MY41496625	2018.09.21	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2018.9.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2018.09.11	1 Year

3. SPURIOUS EMISSION

3.1. Test Limits

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)

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency below 1GHz and above 1GHz, The EUT was placed on a rotating 80cm above the ground plane inside a semi-anechoic chamber for below 1GHz and 150cm above the ground plane inside a semi-anechoic chamber for above 1GHz, The table was rotated 360 degrees to determine the position of the highest radiation.

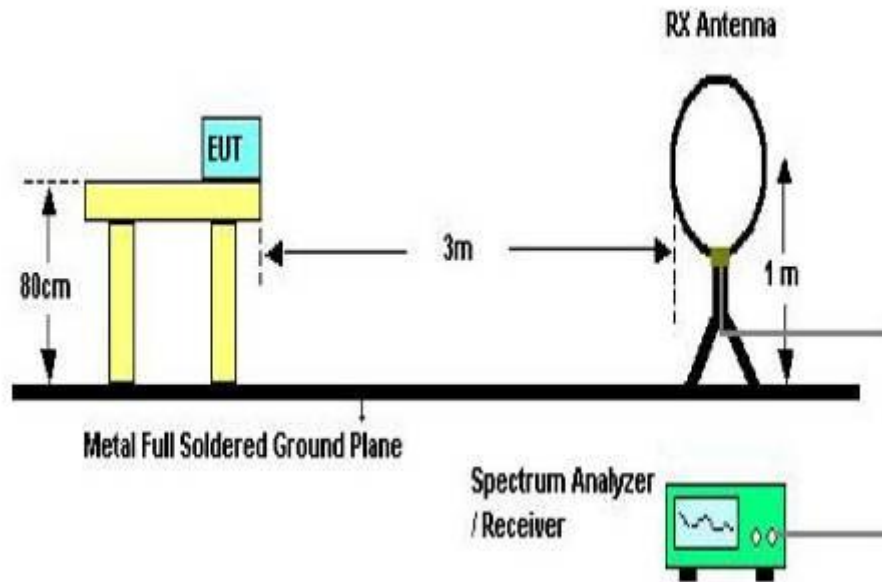
The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.

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.

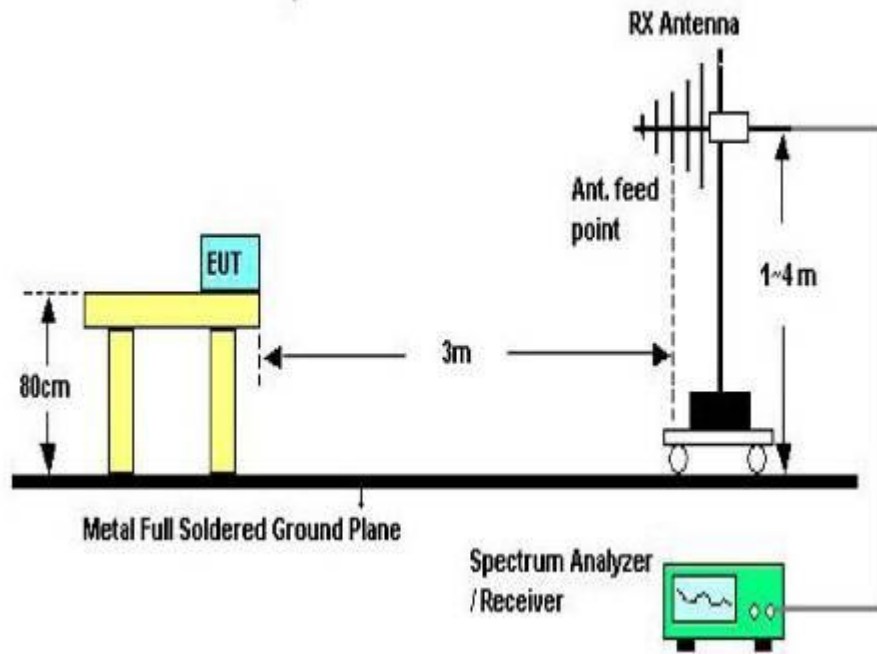
If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

For the actual test configuration, please see the test setup photo.

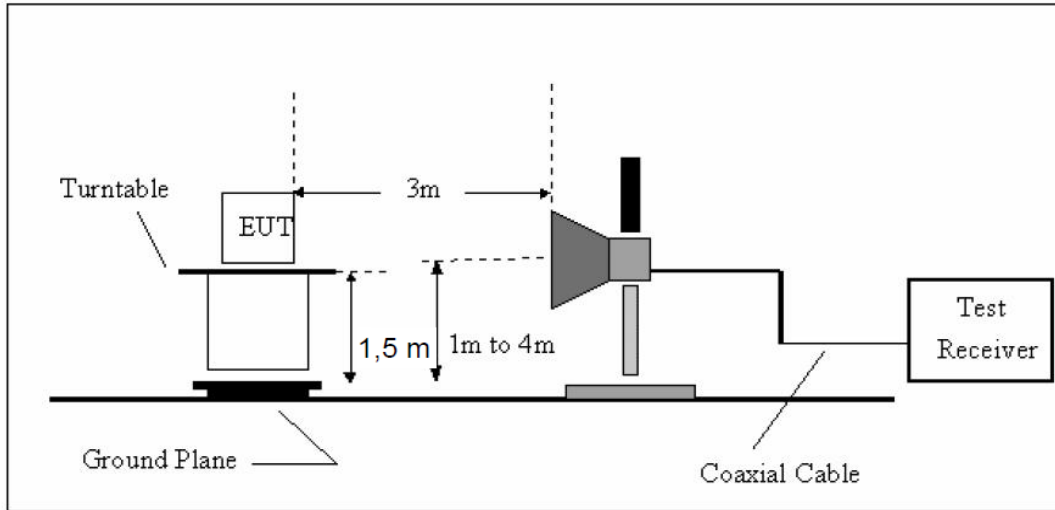
3.3. Test Setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.4. Test Results

Test Condition

Continual Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHz~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned the 10th harmonic from 9 kHz to the EUT.

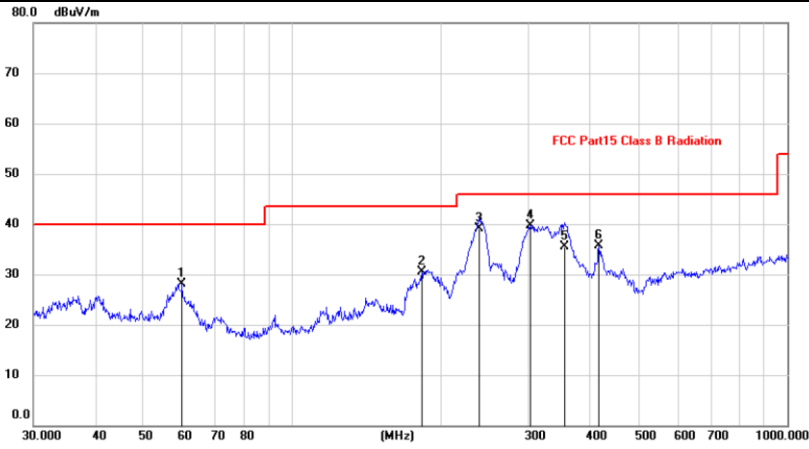
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note:1.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

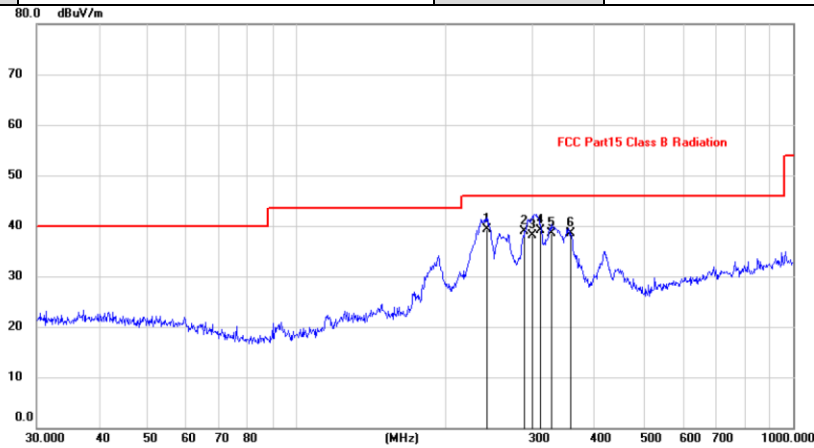
2.Only show the test data of the worst Channel in this report.

EUT Description	Mini Smart Socket US	Model No.	SGT-UK1
Temperature	24°C	Humidity	56%
Pol	Vertical	Test date	2019/5/21
Test Voltage	AC 120V/60Hz	Test mode	802.11b (2437MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		59.8588	15.11	13.00	28.11	40.00	-11.89	peak		
2		182.5592	18.57	11.84	30.41	43.50	-13.09	peak		
3		239.1473	27.06	11.96	39.02	46.00	-6.98	QP		
4	*	302.4812	26.20	13.53	39.73	46.00	-6.27	peak		
5		354.1831	21.05	14.44	35.49	46.00	-10.51	QP		
6		416.1791	19.77	16.00	35.77	46.00	-10.23	peak		

Pol	Horizontal	Test date	2019/5/21
------------	------------	------------------	-----------



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	241.6763	27.26	11.99	39.25	46.00	-6.75	QP		
2		287.9904	25.84	13.09	38.93	46.00	-7.07	peak		
3		298.2681	24.74	13.42	38.16	46.00	-7.84	QP		
4		309.9977	25.50	13.64	39.14	46.00	-6.86	QP		
5		325.5958	24.49	14.10	38.59	46.00	-7.41	QP		
6		356.6758	23.96	14.47	38.43	46.00	-7.57	peak		

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

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	45.73	V	33.95	10.18	34.26	55.60	74	18.40	PK
4824	35.24	V	33.95	10.18	34.26	45.11	54	8.89	AV
7236	/								
9648	/								
4824	42.93	H	33.95	10.18	34.26	52.80	74	21.20	PK
4824	33.29	H	33.95	10.18	34.26	43.16	54	10.84	AV
7236									
9648									
Test Mode: IEEE 802.11b TX Mid									
4874	43.71	V	33.93	10.2	34.29	53.55	74	20.45	PK
4874	35.02	V	33.93	10.2	34.29	44.86	54	9.14	AV
7311	/								
9748	/								
4874	44.38	H	33.93	10.2	34.29	54.22	74	19.78	PK
4874	34.25	H	33.93	10.2	34.29	44.09	54	9.91	AV
7311									
9748									
Test Mode: IEEE 802.11b TX High									
4924	43.28	V	33.98	10.22	34.25	53.23	74	20.77	PK
4924	35.04	V	33.98	10.22	34.25	44.99	54	9.01	AV
7386	/								
9848	/								
4924	44.74	H	33.98	10.22	34.25	54.69	74	19.31	PK
4924	32.61	H	33.98	10.22	34.25	42.56	54	11.44	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	45.43	V	33.95	10.18	34.26	55.30	74	18.70	PK
4824	32.72	V	33.95	10.18	34.26	42.59	54	11.41	AV
7236	/								
9648	/								
4824	44.16	H	33.95	10.18	34.26	54.03	74	19.97	PK
4824	35.93	H	33.95	10.18	34.26	45.80	54	8.20	AV
7236									
9648									
Test Mode: IEEE 802.11g TX Mid									
4874	42.81	V	33.93	10.2	34.29	52.65	74	21.35	PK
4874	35.65	V	33.93	10.2	34.29	45.49	54	8.51	AV
7311	/								
9748	/								
4874	42.38	H	33.93	10.2	34.29	52.22	74	21.78	PK
4874	34.04	H	33.93	10.2	34.29	43.88	54	10.12	AV
7311									
9748									
Test Mode: IEEE 802.11g TX High									
4924	44.48	V	33.98	10.22	34.25	54.43	74	19.57	PK
4924	35.13	V	33.98	10.22	34.25	45.08	54	8.92	AV
7386	/								
9848	/								
4924	44.83	H	33.98	10.22	34.25	54.78	74	19.22	PK
4924	34.31	H	33.98	10.22	34.25	44.26	54	9.74	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 802.11n 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	47.48	V	33.95	10.18	34.26	57.35	74	16.65	PK
4824	33.70	V	33.95	10.18	34.26	43.57	54	10.43	AV
7236	/								
9648	/								
4824	44.42	H	33.95	10.18	34.26	54.29	74	19.71	PK
4824	35.33	H	33.95	10.18	34.26	45.20	54	8.80	AV
7236									
9648									
Test Mode:IEEE 802.11n HT20 TX Mid									
4874	42.98	V	33.93	10.2	34.29	52.82	74	21.18	PK
4874	33.09	V	33.93	10.2	34.29	42.93	54	11.07	AV
7311	/								
9748	/								
4874	42.35	H	33.93	10.2	34.29	52.19	74	21.81	PK
4874	34.41	H	33.93	10.2	34.29	44.25	54	9.75	AV
7311									
9748									
Test Mode:IEEE 802.11n HT20 TX High									
4924	43.59	V	33.98	10.22	34.25	53.54	74	20.46	PK
4924	32.50	V	33.98	10.22	34.25	42.45	54	11.55	AV
7386	/								
9848	/								
4924	43.20	H	33.98	10.22	34.25	53.15	74	20.85	PK
4924	33.67	H	33.98	10.22	34.25	43.62	54	10.38	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 802.11n HT40 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
4844	43.21	V	33.95	10.18	34.26	53.08	74	20.92	PK
4844	34.11	V	33.95	10.18	34.26	43.98	54	10.02	AV
7266	/								
9688	/								
4844	44.90	H	33.95	10.18	34.26	54.77	74	19.23	PK
4844	34.52	H	33.95	10.18	34.26	44.39	54	9.61	AV
7266									
9688									
Test Mode:IEEE 802.11n HT40 TX Mid									
4874	43.05	V	33.93	10.2	34.29	52.89	74	21.11	PK
4874	33.18	V	33.93	10.2	34.29	43.02	54	10.98	AV
7311	/								
9748	/								
4874	43.00	H	33.93	10.2	34.29	52.84	74	21.16	PK
4874	33.69	H	33.93	10.2	34.29	43.53	54	10.47	AV
7311									
9748									
Test Mode:IEEE 802.11n HT40 TX High									
4904	42.08	V	33.98	10.22	34.25	52.03	74	21.97	PK
4904	34.02	V	33.98	10.22	34.25	43.97	54	10.03	AV
7356	/								
9808	/								
4904	42.41	H	33.98	10.22	34.25	52.36	74	21.64	PK
4904	34.59	H	33.98	10.22	34.25	44.54	54	9.46	AV
7356									
9808									
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.									

4. POWER LINE CONDUCTED EMISSION

4.1. Test Limits

Frequency MHz	Limits dB(μ V)	
	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

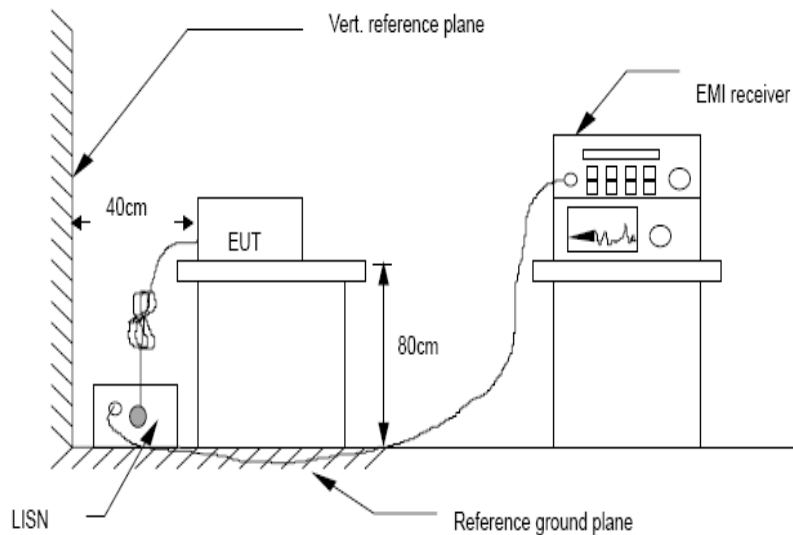
- Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies.
 3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

4.2. 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 C63.10:2013 on Conducted Emission Measurement.

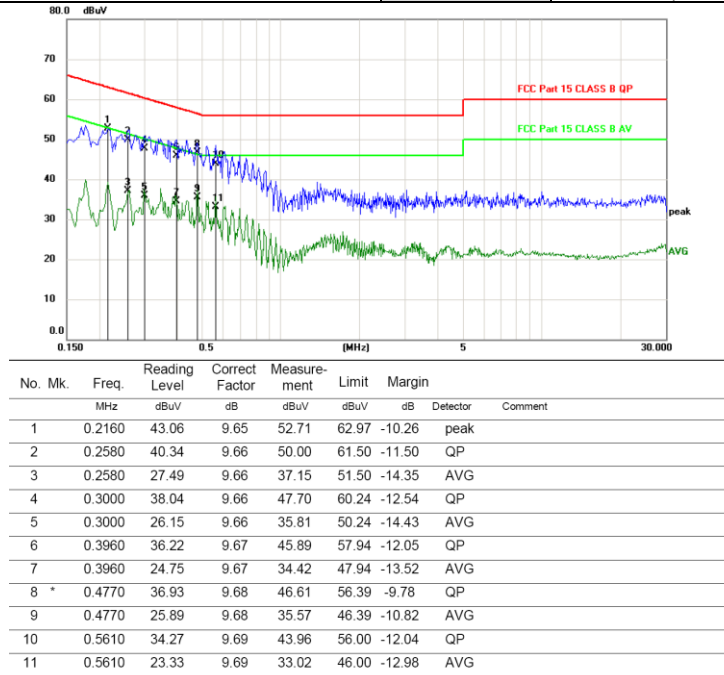
The bandwidth of test receiver is set at 9 kHz.

4.3. Test Setup

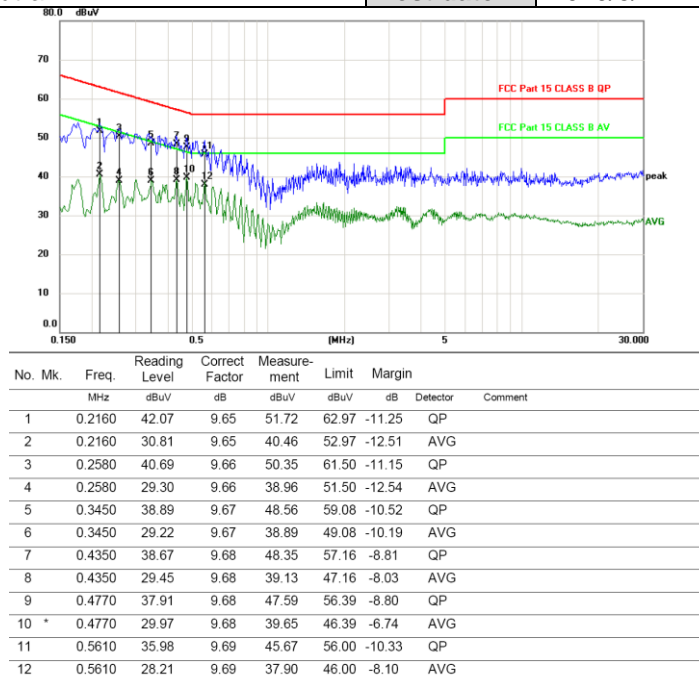


4.4. Test Results

EUT Description	Mini Smart Socket US	Model No.	SGT-UK1
Temperature	24°C	Humidity	56%
Pol	Line	Test date	2019/5/22
Test Voltage	AC 120V/60Hz	Test mode	802.11b (2437MHz)



Pol	Neutral	Test date	2019/5/22
------------	---------	------------------	-----------



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

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1. Test limits

Please refer section 15.247.

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

5.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V05

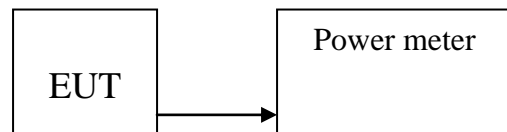
5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Connected the EUT's antenna port to Average power meter by 20dB attenuator.

5.2.3 Measure out each mode and each bands Average output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.3. Test Setup



5.4. Test Results

PASS

Detailed information please see the following page.

Mode	Frequency (MHz)	Average Output power(dBm)	Limit (dBm)	Result
IEEE 802.11 b	CH1: 2412	11.919	30	PASS
	CH6: 2437	11.994	30	PASS
	CH11: 2462	11.817	30	PASS
IEEE 802.11 g	CH1: 2412	10.55	30	PASS
	CH6: 2437	11.428	30	PASS
	CH11: 2462	11.392	30	PASS
IEEE 802.11 n/HT20	CH1: 2412	10.179	30	PASS
	CH6: 2437	10.899	30	PASS
	CH11: 2462	10.839	30	PASS
IEEE 802.11 n/HT40	CH3: 2422	10.826	30	PASS
	CH6: 2437	9.821	30	PASS
	CH9: 2452	10.107	30	PASS

6. POWER SPECTRAL DENSITY

6.1. Test limits

6.1.1 Please refer section 15.247.

6.1.2 For direct sequence systems, the Average 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.

6.1.3 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.

6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V05

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

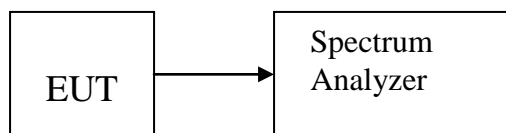
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Detector = RMS. Set the spectrum analyzer as RBW = 3kHz (Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.), VBW = 10kHz (Set the $\text{VBW} \geq 3 \times \text{RBW}$), span = $1.5 \times \text{DTS bandwidth}$., detail see the test plot.

6.2.4 Record the max reading.

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

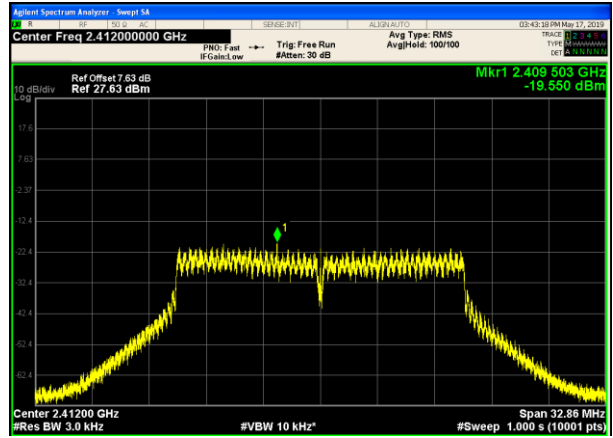
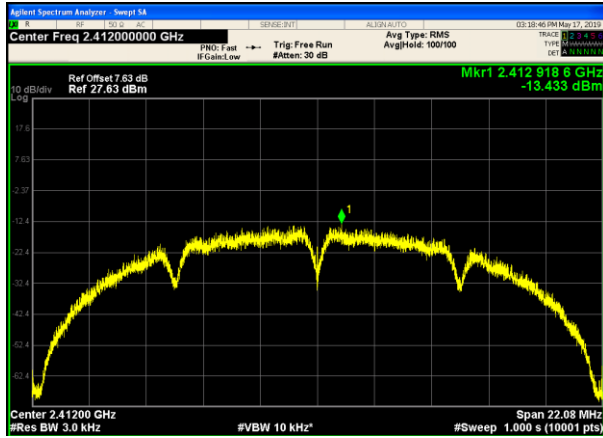
6.3. Test Setup



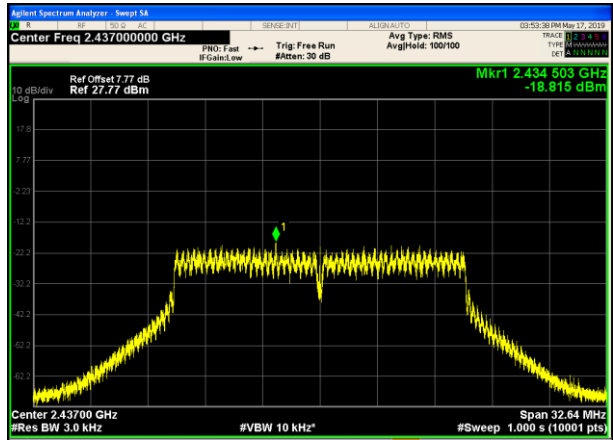
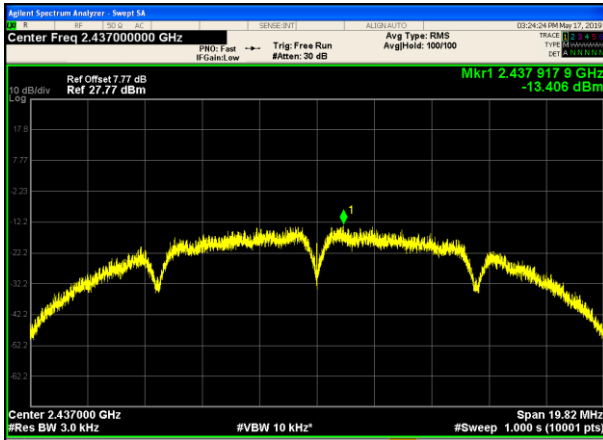
6.4. Test Results

Test CH	Power Spectral Density (dBm)				Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	-13.433	-19.55	-19.209	-23.01	8.00	Pass
Middle	-13.406	-18.815	-19.081	-22.861		
Highest	-13.734	-19.115	-19.328	-23.663		

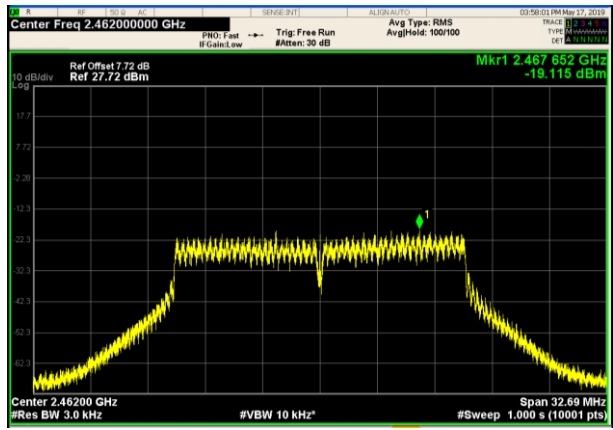
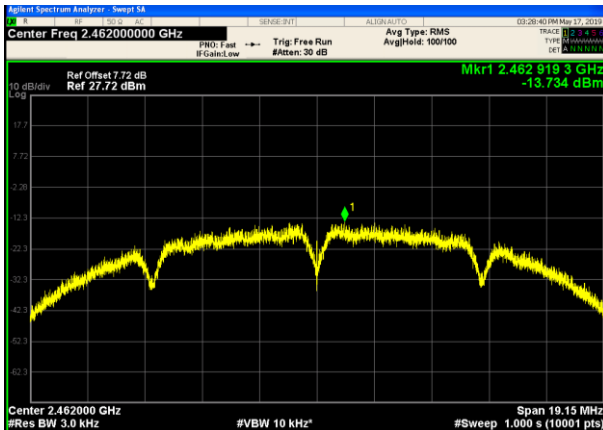
802.11b 802.11g



Lowest channel

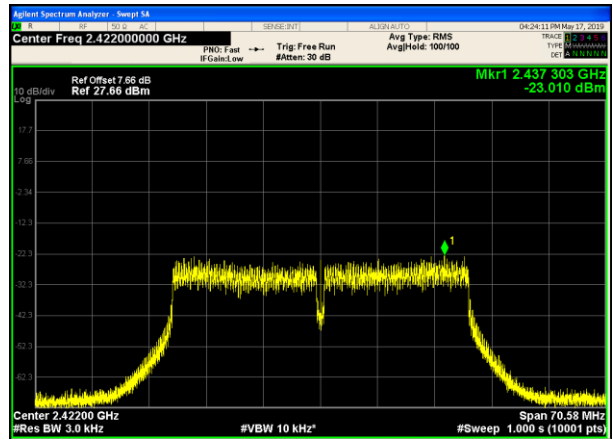
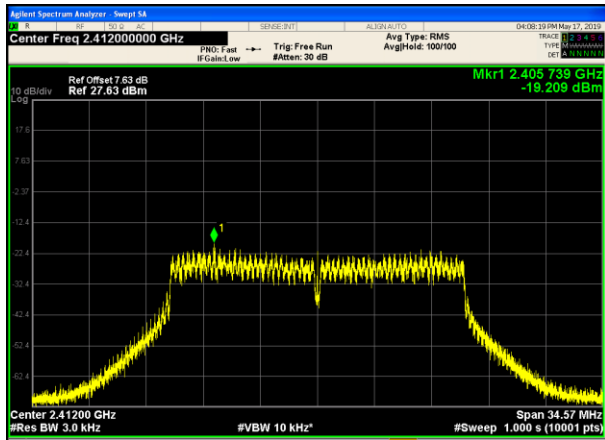


Middle channel

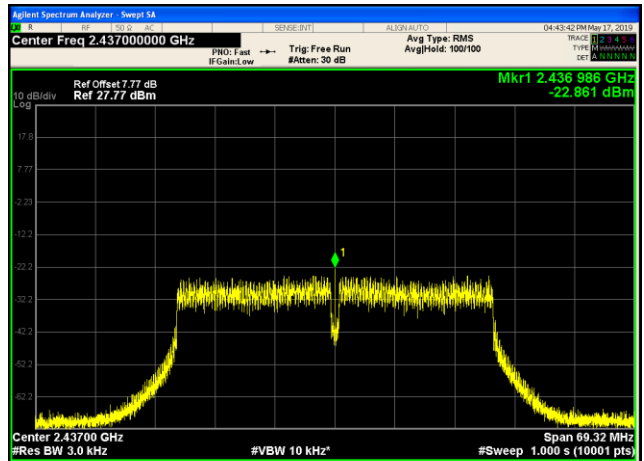
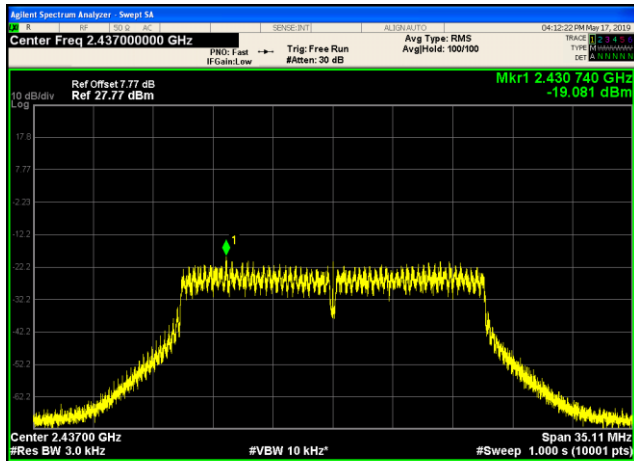


Highest channel

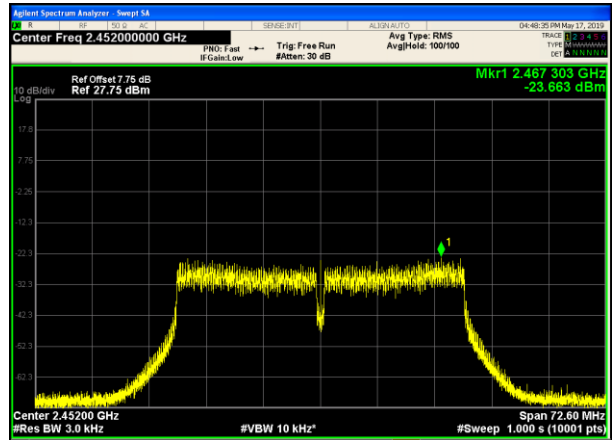
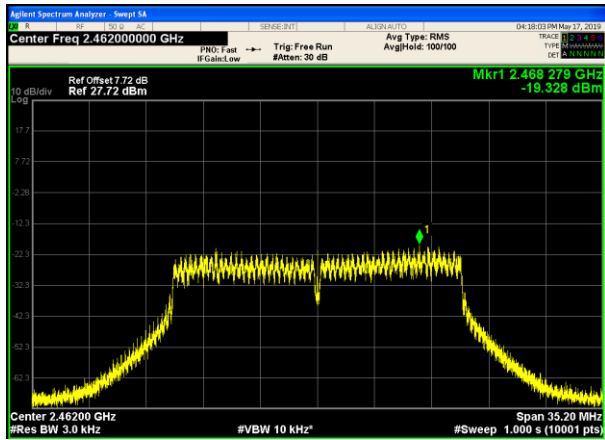
802.11n(HT20) 802.11n(HT40)



Lowest channel



Middle channel



Highest channel

7. BANDWIDTH

7.1. Test limits

Please refer section 15.247

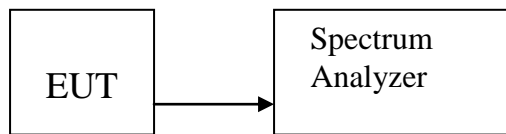
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V05

- 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 $RBW = 100\text{kHz}$, $VBW \geq 3 * RBW = 300\text{kHz}$, Peak Detector, Sweep time set auto, detail see the test plot.

7.3. Test Setup

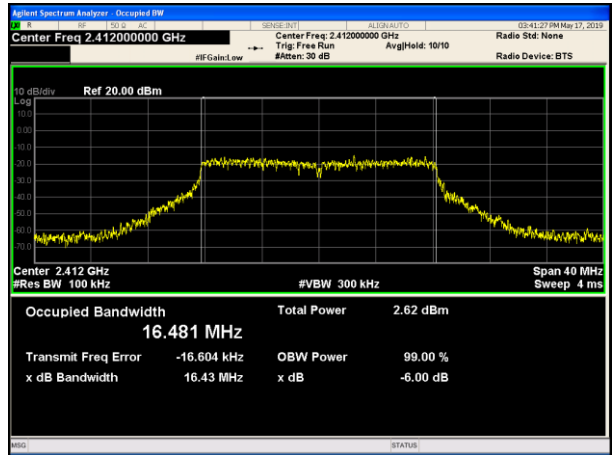
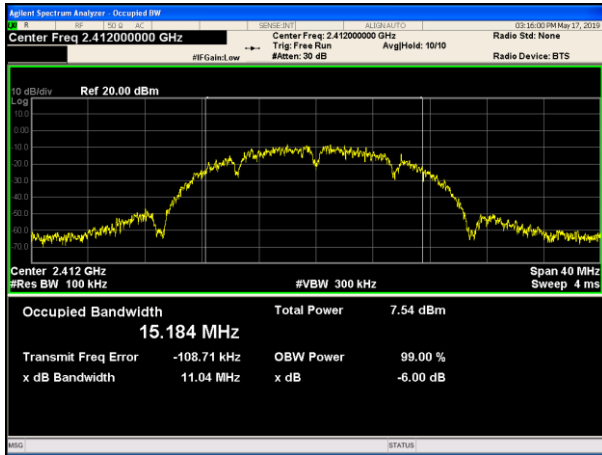


7.4. Test Results

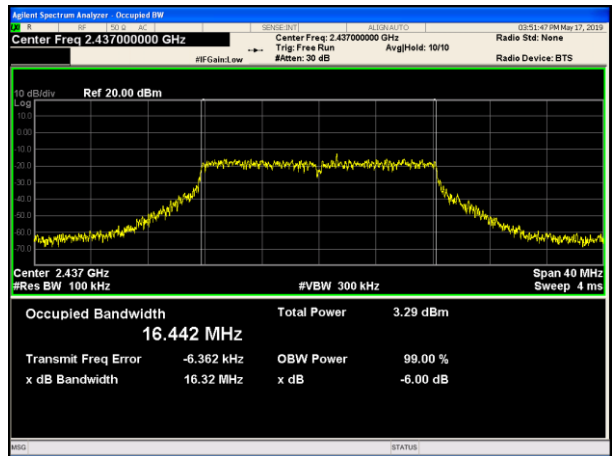
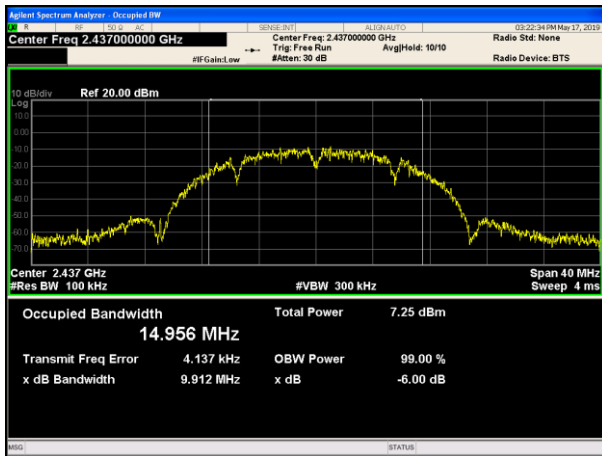
Mode	Frequency (MHz)	99% OBW (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
802.11b	2412	15.1837	11.0405	0.5	Pass
802.11b	2437	14.9556	9.912	0.5	Pass
802.11b	2462	15.2219	9.5757	0.5	Pass
802.11g	2412	16.4808	16.4294	0.5	Pass
802.11g	2437	16.4419	16.321	0.5	Pass
802.11g	2462	16.4516	16.3446	0.5	Pass
802.11n(HT20)	2412	17.6703	17.2871	0.5	Pass
802.11n(HT20)	2437	17.6158	17.5544	0.5	Pass
802.11n(HT20)	2462	17.6631	17.5981	0.5	Pass
802.11n(HT40)	2422	36.2275	35.2919	0.5	Pass
802.11n(HT40)	2437	36.1305	34.6615	0.5	Pass
802.11n(HT40)	2452	36.2659	36.2981	0.5	Pass

IEEE 802.11b:

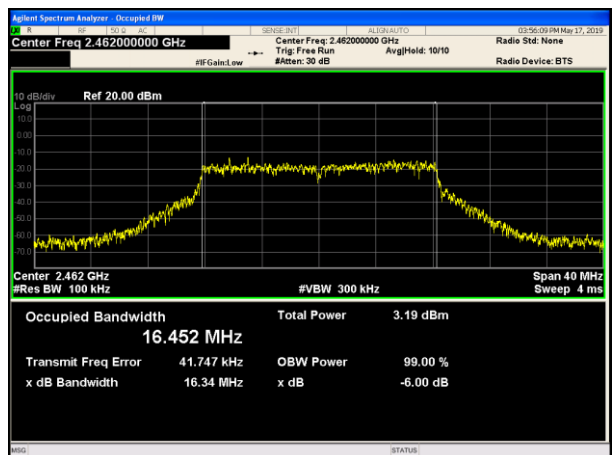
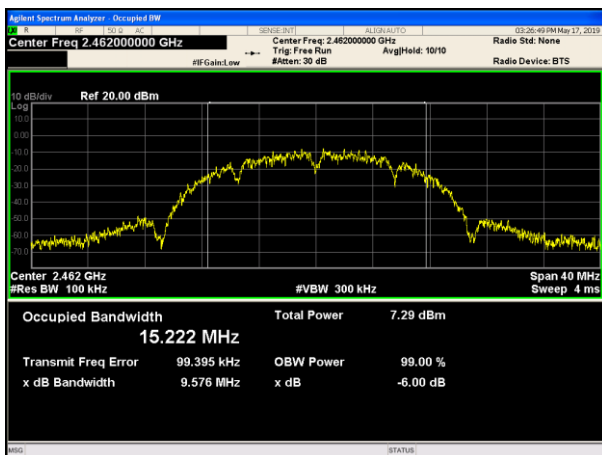
IEEE 802.11g:



Lowest channel



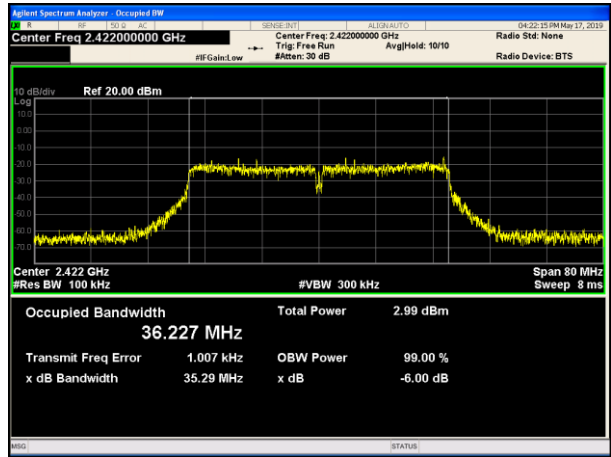
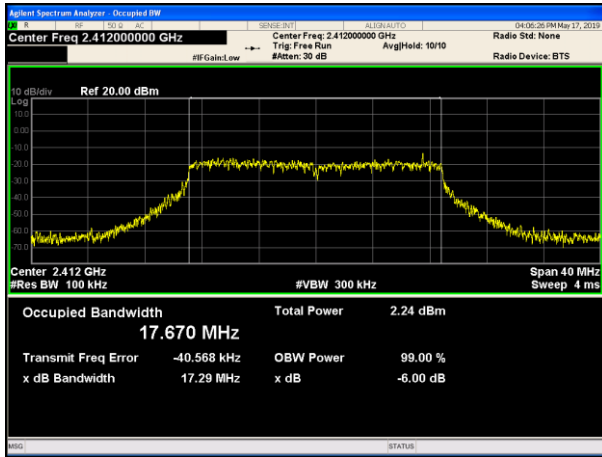
Middle channel



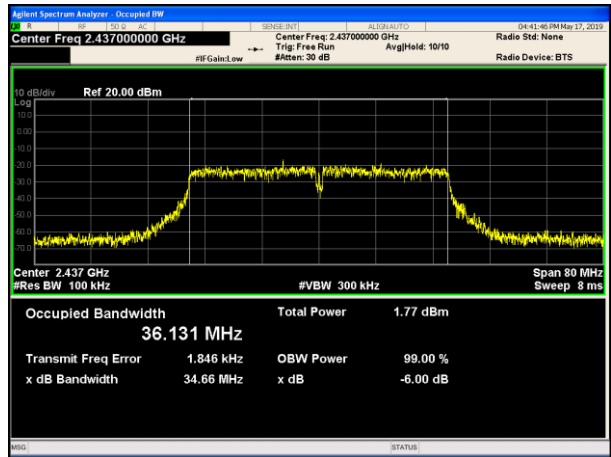
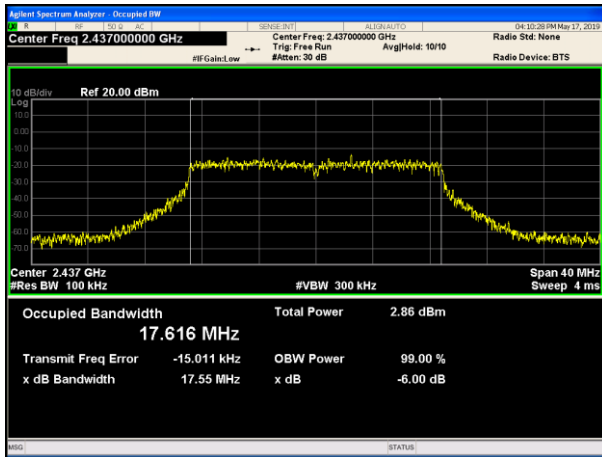
Highest channel

IEEE 802.11n/HT20

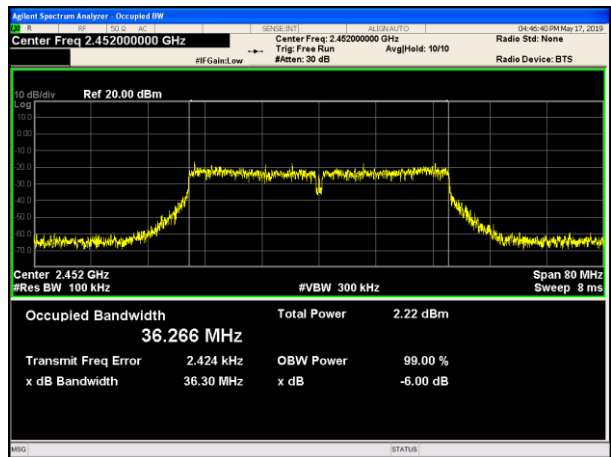
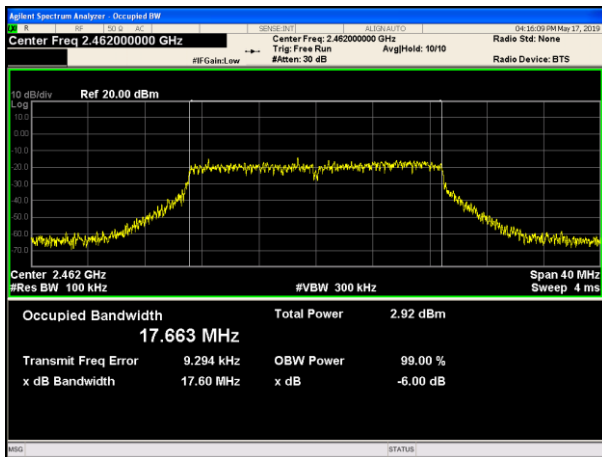
IEEE 802.11n/HT40



Lowest channel



Middle channel



Highest channel

8. BAND EDGE CHECK

8.1. Test limits

Please refer section 15.247

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.

8.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V05

8.2.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

8.2.2 Check the spurious emissions out of band.

8.2.3 RBW 1MHz, VBW 3MHz, peak detector for peak value , RBW 1MHz ,VBW 10Hz , RMS detector for AV value.

8.3. Test Setup

Same as 5.2.2.

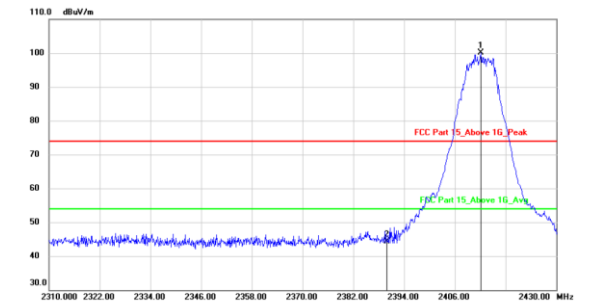
8.4. Test Results

PASS.

Detailed information please see the following page.

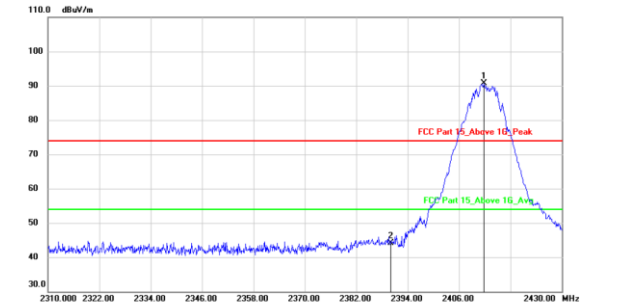
Test Mode: IEEE 802.11b-Low

Polarization: Vertical



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1 *	2412.120	103.50	-3.40	100.10	74.00	26.10			peak
2	2390.000	47.61	-3.40	44.21	74.00	-29.79			peak

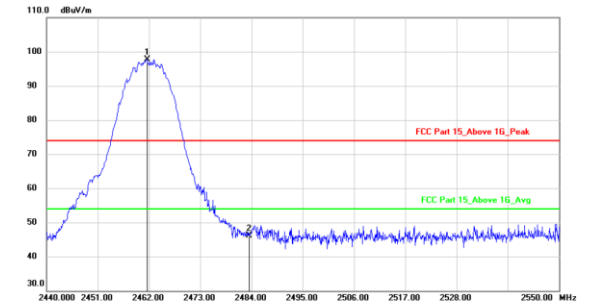
Polarization: Horizontal



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1 *	2411.760	94.05	-3.40	90.65	74.00	16.65			peak
2	2390.000	47.47	-3.40	44.07	74.00	-29.93			peak

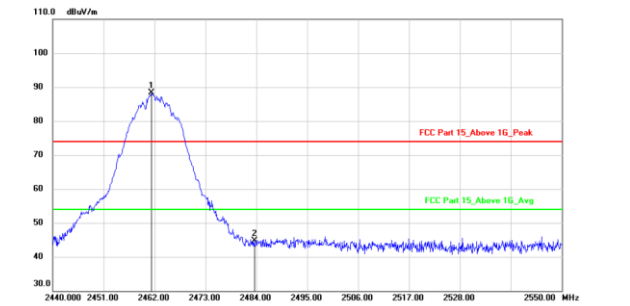
Test Mode: IEEE 802.11b-High

Polarization: Vertical



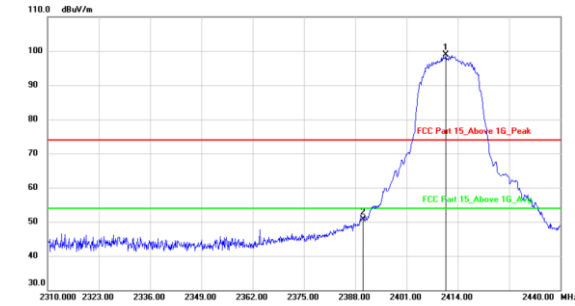
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1 *	2461.560	101.14	-3.39	97.75	74.00	23.75			peak
2	2483.500	49.40	-3.38	46.02	74.00	-27.98			peak

Polarization: Horizontal



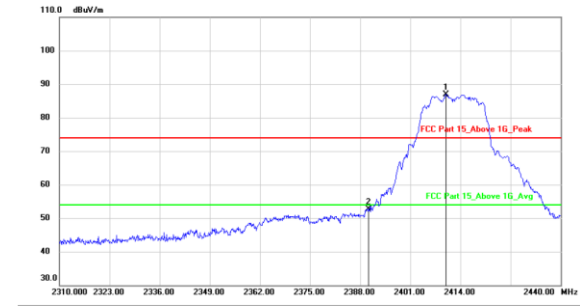
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1 *	2461.340	91.62	-3.39	88.23	74.00	14.23			peak
2	2483.500	48.01	-3.38	44.63	74.00	-29.37			peak

Test Mode: IEEE 802.11g-Low
Polarization: Vertical



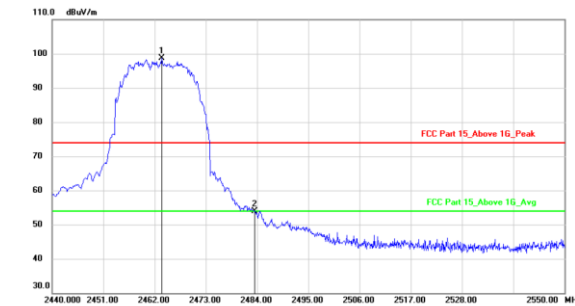
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2410.880	102.37	-3.40	98.97	74.00	24.97	peak			
2		2390.000	54.06	-3.40	50.66	74.00	-23.34	peak			

Polarization: Horizontal



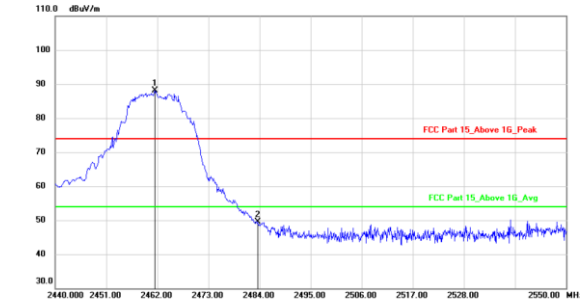
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2410.230	90.36	-3.40	86.96	74.00	12.96	peak			
2		2390.000	56.16	-3.40	52.76	74.00	-21.24	peak			

Test Mode: IEEE 802.11g-High
Polarization: Vertical



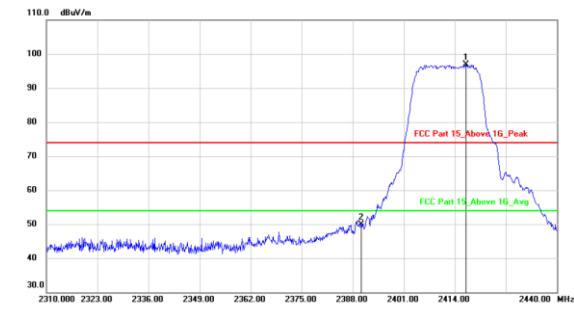
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2463.540	102.08	-3.40	98.68	74.00	24.68	peak			
2		2483.500	57.20	-3.38	53.82	74.00	-20.18	peak			

Polarization: Horizontal



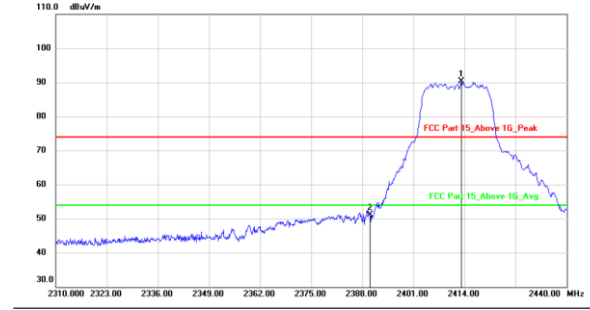
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2461.450	91.52	-3.39	88.13	74.00	14.13	peak			
2		2483.500	52.79	-3.38	49.41	74.00	-24.59	peak			

Test Mode: IEEE 802.11n20-Low
Polarization: Vertical



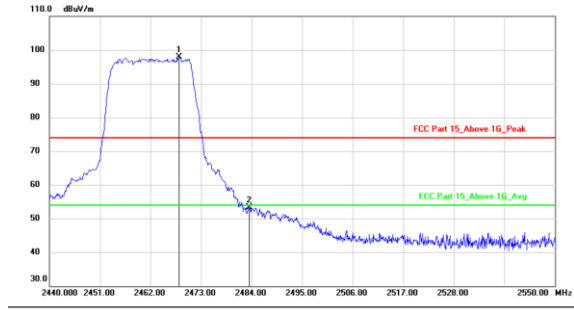
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2416.860	100.22	-3.41	96.81	74.00	22.81	peak		
2		2390.000	53.29	-3.40	49.89	74.00	-24.11	peak		

Polarization: Horizontal



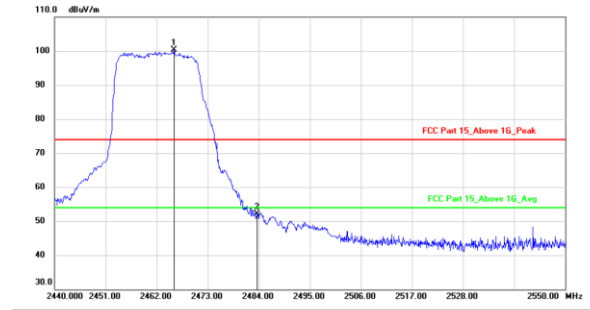
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2413.220	93.66	-3.41	90.25	74.00	16.25	peak		
2		2390.000	54.52	-3.40	51.12	74.00	-22.88	peak		

Test Mode: IEEE 802.11n20-High
Polarization: Vertical



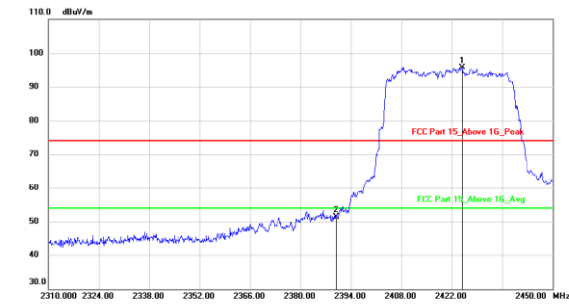
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2468.270	101.21	-3.39	97.82	74.00	23.82	peak		
2		2483.500	56.64	-3.38	53.26	74.00	-20.74	peak		

Polarization: Horizontal



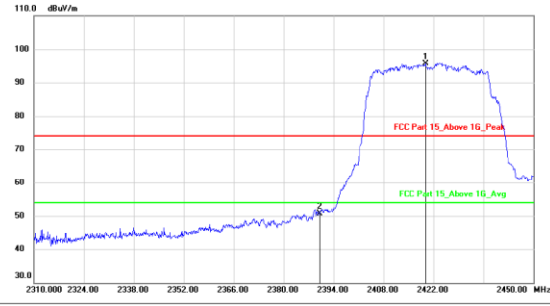
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2465.740	103.62	-3.39	100.23	74.00	26.23	peak		
2		2483.500	55.51	-3.38	52.13	74.00	-21.87	peak		

Test Mode: IEEE 802.11n40-Low
Polarization: Vertical



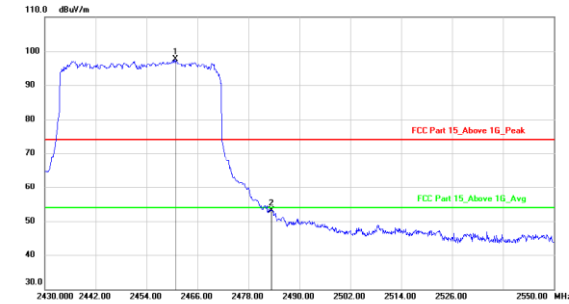
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2424.800	99.19	-3.40	95.79	74.00	21.79	peak		
2		2390.000	54.73	-3.40	51.33	74.00	-22.67	peak		

Polarization: Horizontal



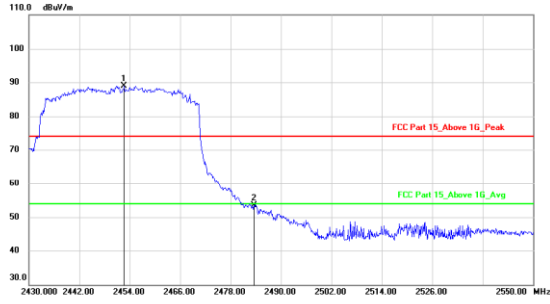
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2419.700	99.21	-3.41	95.80	74.00	21.80	peak		
2		2390.000	54.18	-3.40	50.78	74.00	-23.22	peak		

Test Mode: IEEE 802.11n40-High
Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2460.840	101.00	-3.39	97.61	74.00	23.61	peak		
2		2483.500	56.39	-3.38	53.01	74.00	-20.99	peak		

Polarization: Horizontal

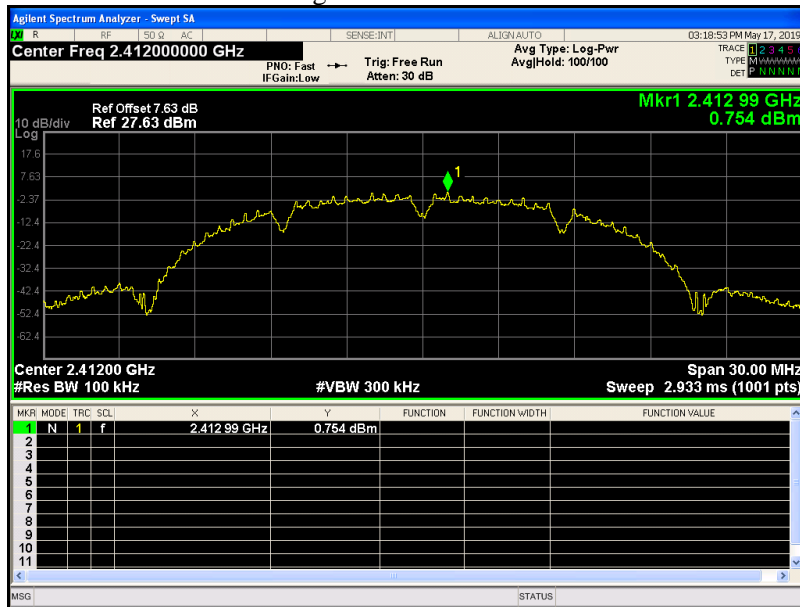


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2452.680	92.34	-3.39	88.95	74.00	14.95	peak		
2		2483.500	56.86	-3.38	53.48	74.00	-20.52	peak		

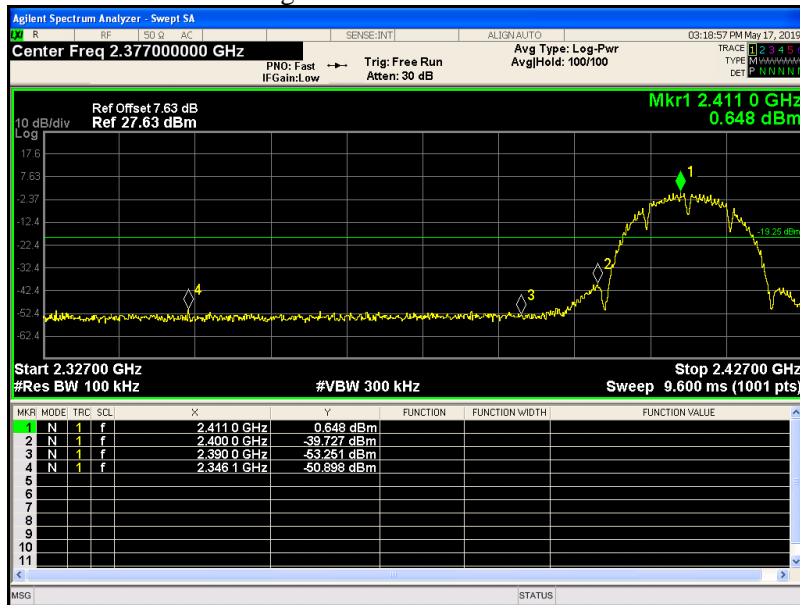
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
802.11b	2412	-51.644	-30	Pass
802.11b	2462	-50.111	-30	Pass
802.11g	2412	-46.673	-30	Pass
802.11g	2462	-46.562	-30	Pass
802.11n(HT20)	2412	-45.230	-30	Pass
802.11n(HT20)	2462	-46.345	-30	Pass
802.11n(HT40)	2422	-43.338	-30	Pass
802.11n(HT40)	2452	-42.843	-30	Pass

Band Edge 802.11b 2412MHz Ref



Band Edge 802.11b 2412MHz Emission



9. ANTENNA REQUIREMENT

9.1. 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.

9.2. Antenna Connected Construction

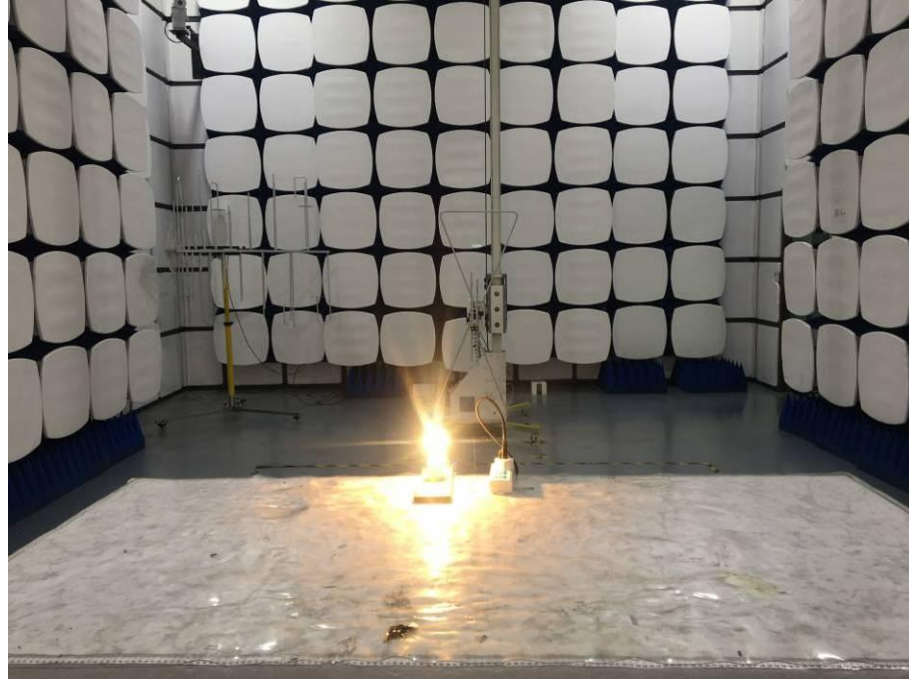
The antenna connector is unique antenna and no consideration of replacement. Please see EUT photo for details.

9.3. Results

The EUT antenna is internal Antenna. It complies with the standard requirement.

10. TEST SETUP PHOTO

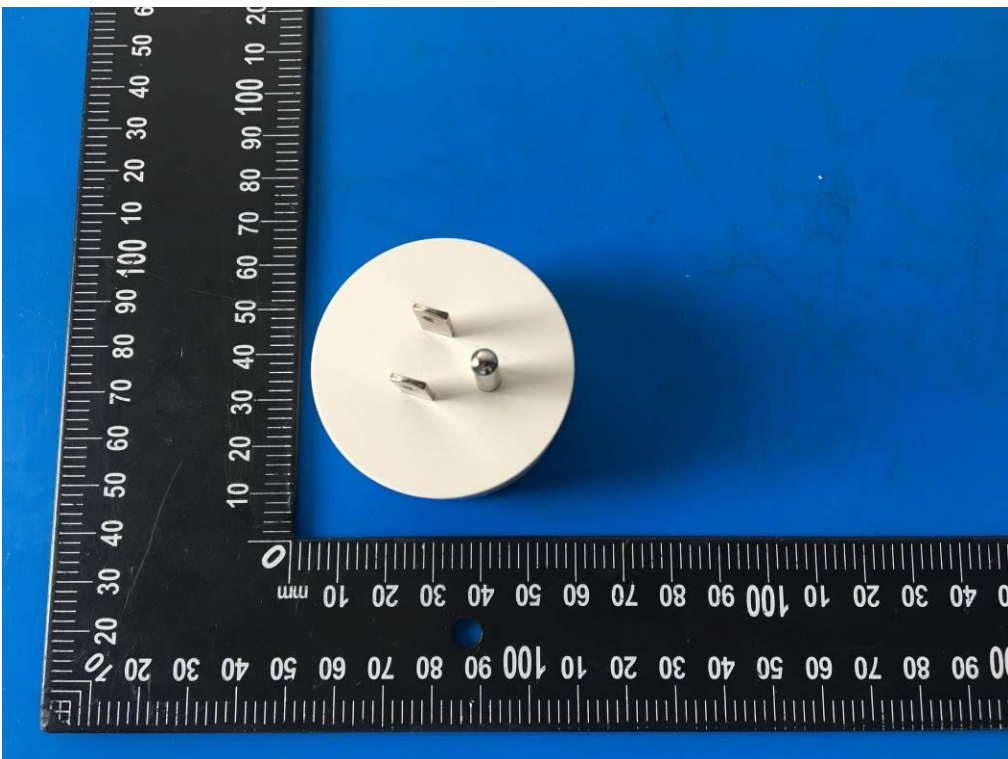
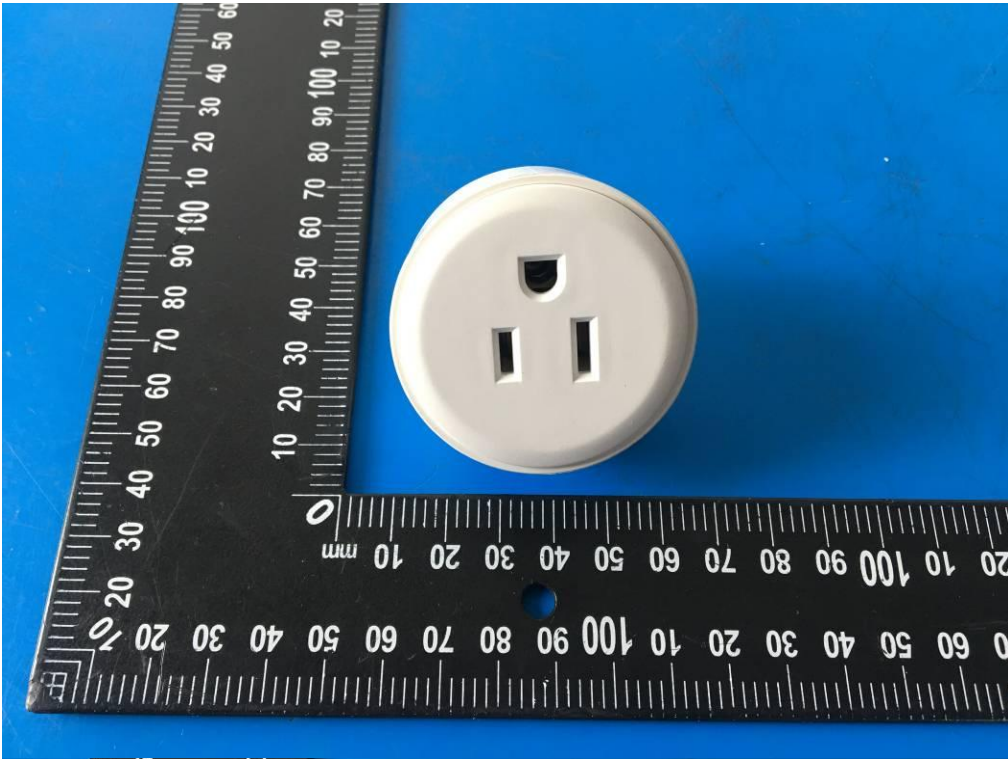
10.1. Photos of Radiated emission

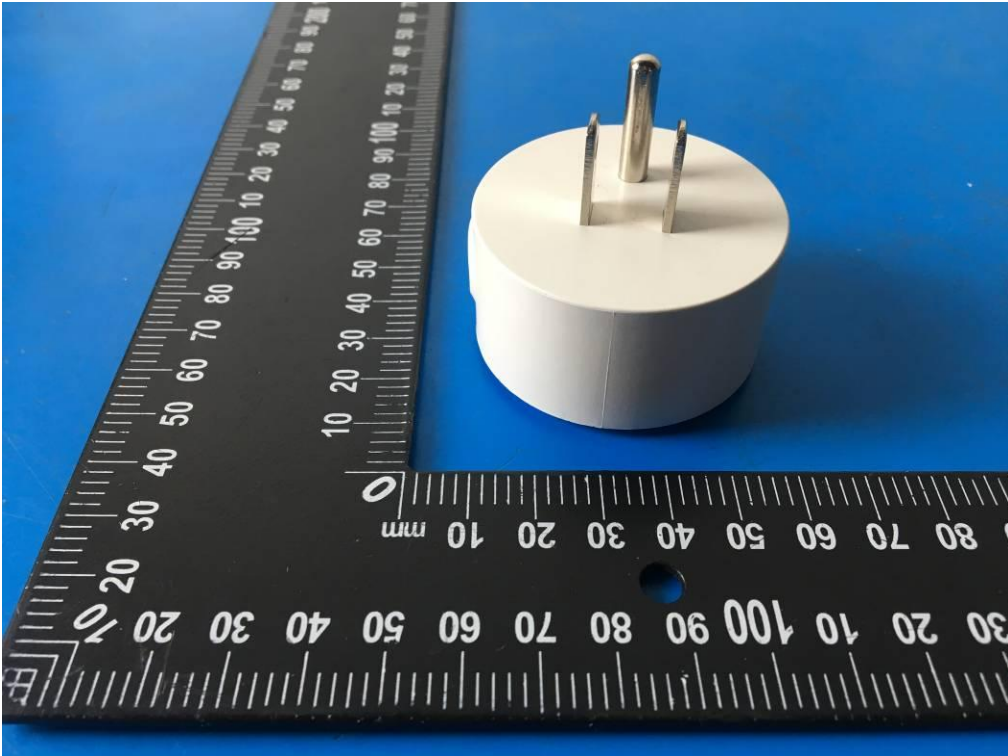
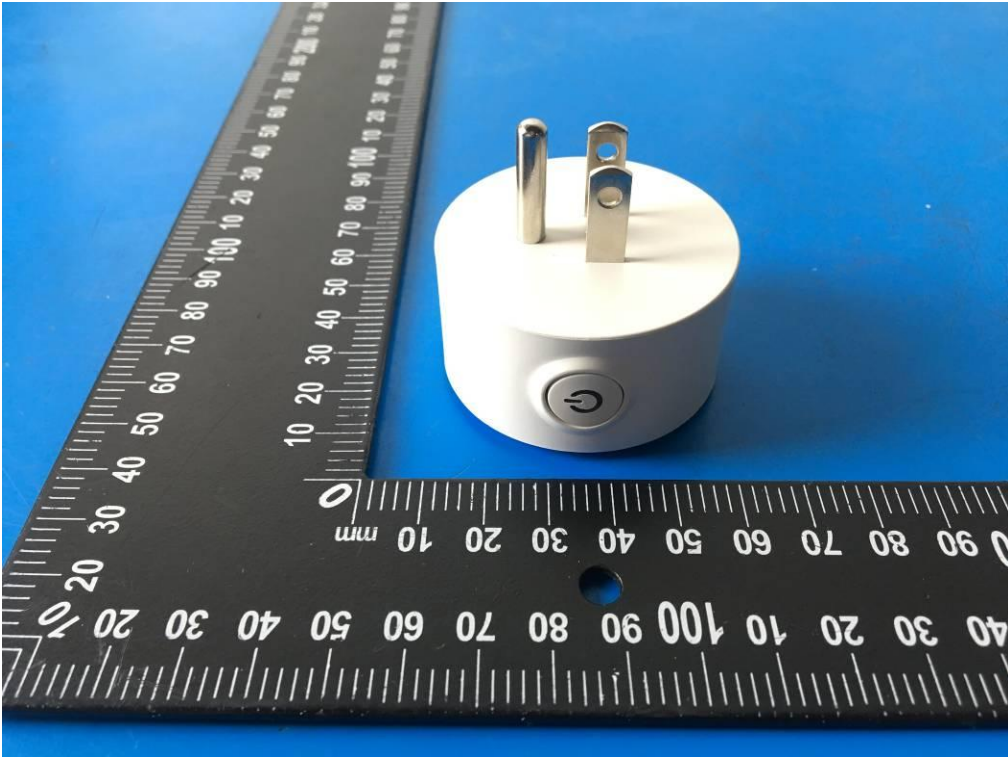


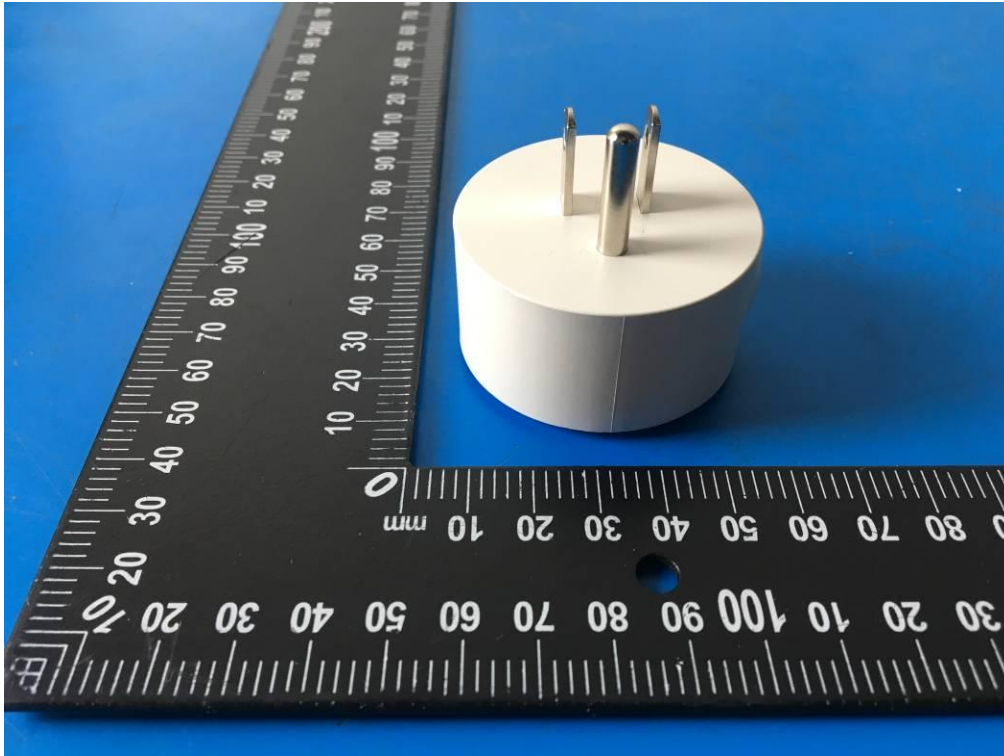
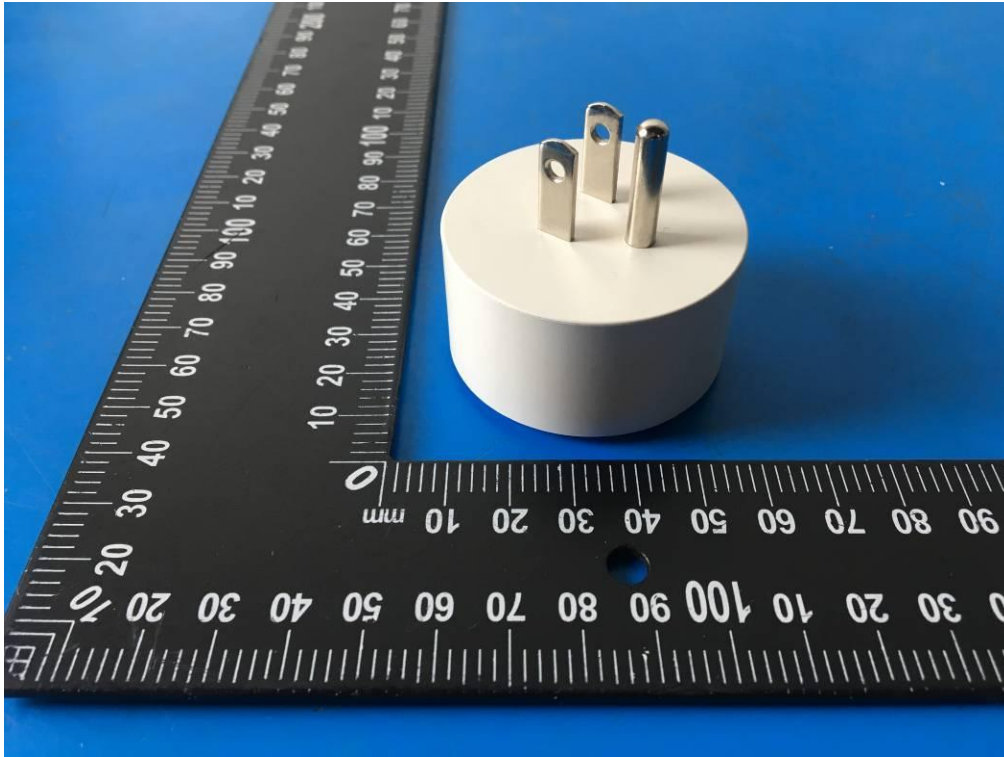
10.2.Photos of Conducted Emission test

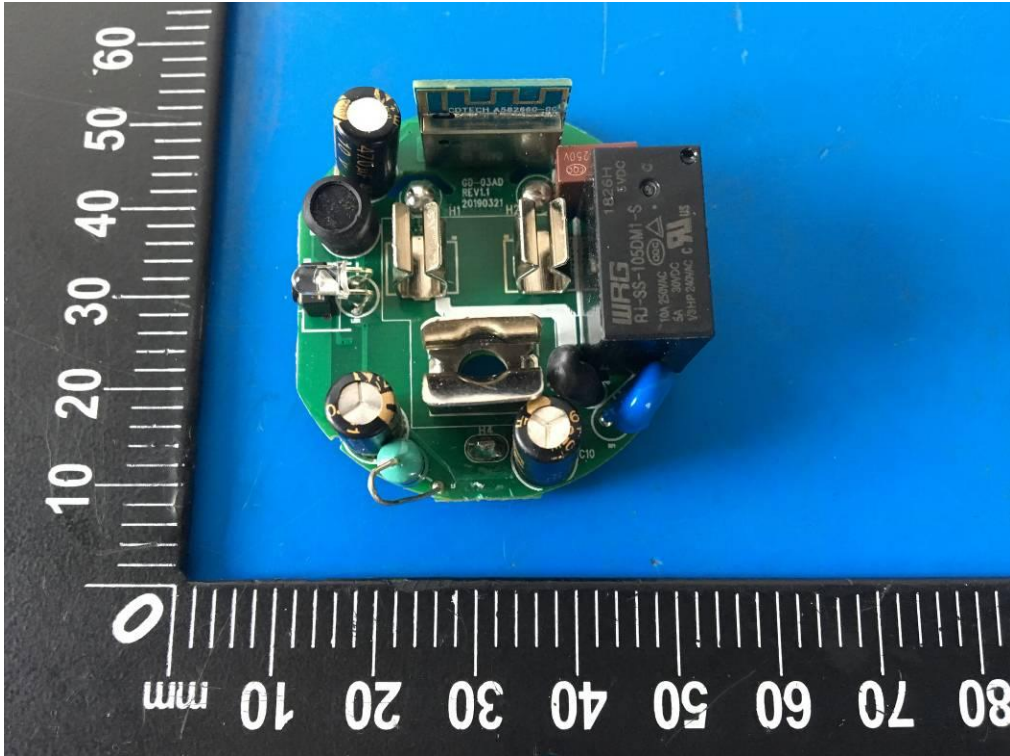
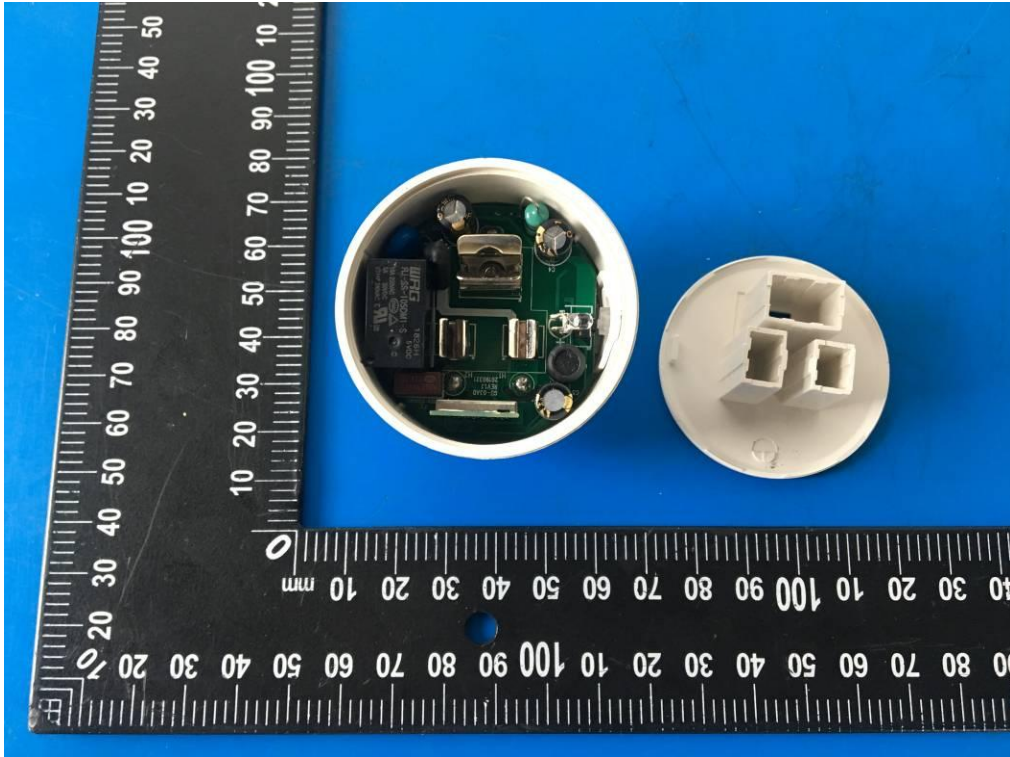


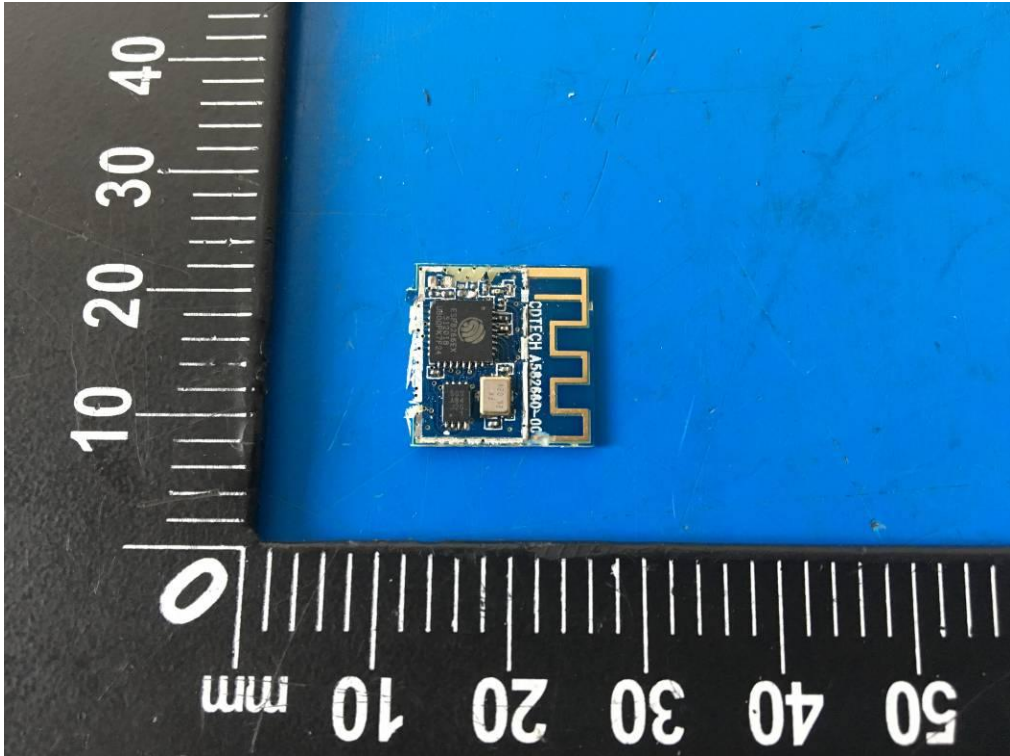
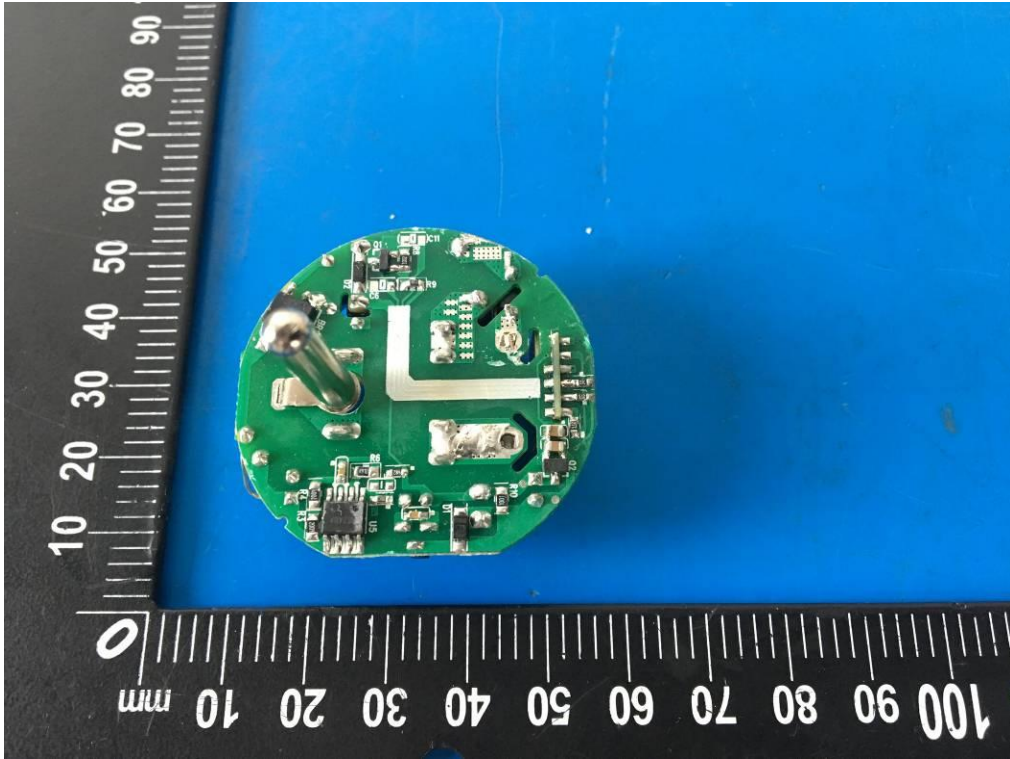
11.EUT PHOTO

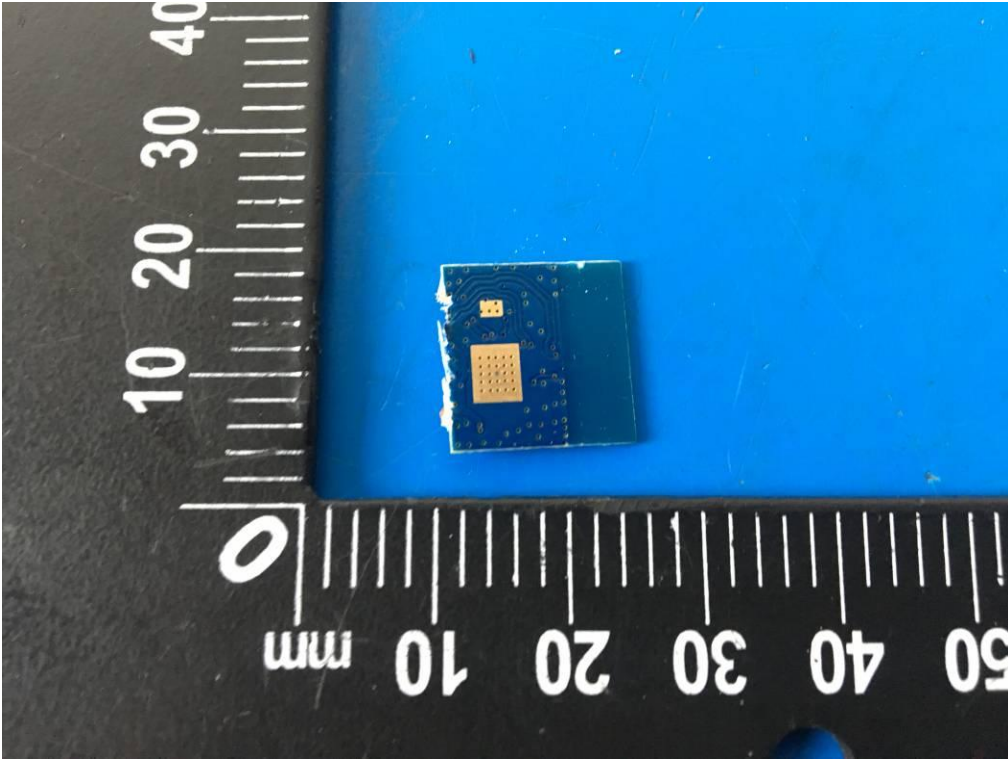












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