

TEST REPORT

FCC ID: 2AU9Z-DMS

Product: Smart Switch

Model No.: DMS303

Additional Model No.: DMS201, DMS202, DMS203, DMS301, DMS302, DMTS10, DMCS10, DMB10, DMS501, DMS502, DMS503, DMS601, DMS602, DMS603, DMS701, DMS702, DMS703, DMS704, DMS606, DMS808, DMS717, DMS747, DMS888, DMS909, DMS777, DMS999, DMS666

Trade Mark: DUOMEI

Report No.: TCT191128E008

Issued Date: Dec. 17, 2019

Issued for:

Shenzhen Duomei Industry Co., Ltd.
Second floor, no7, hengsan lane, yuanhu road, zhangbei district, shenzhen, guangdong, China

Issued By:

Shenzhen Tongce Testing Lab.

1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,
Shenzhen, Guangdong, China

TEL: +86-755-27673339 FAX: +86-755-27673332

Note: This report shall not be reproduced except in full, without the written approval of Shenzhen Tongce Testing Lab.

This document may be altered or revised by Shenzhen Tongce Testing Lab. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



TABLE OF CONTENTS

1.	Test Certification	3
2.	Test Result Summary	4
3.	EUT Description	5
4.	General Information	7
	4.1. Test environment and mode	7
	4.2. Description of Support Units	8
5.	Facilities and Accreditations	9
	5.1. Facilities	9
	5.2. Location	
	5.3. Measurement Uncertainty	9
6.	Test Results and Measurement Data	10
	6.1. Antenna requirement	10
	6.2. Conducted Emission	11
	6.3. Maximum Conducted (Average) Output Power	15
	6.4. Emission Bandwidth	
	6.5. Power Spectral Density	17
	6.6. Conducted Band Edge and Spurious Emission Measurement	
	6.7. Radiated Spurious Emission Measurement	20
A	ppendix A: Test Result of Conducted Test	
Α	ppendix B: Photographs of Test Setup	
Α	ppendix C: Photographs of EUT	



1. Test Certification

Report No.: TCT191128E008

Product:	Smart Switch
Model No.:	DMS303
Additional Model:	DMS201, DMS202, DMS203, DMS301, DMS302, DMTS10, DMCS10, DMB10, DMS501, DMS502, DMS503, DMS601, DMS602, DMS603, DMS701, DMS702, DMS703, DMS704, DMS606, DMS808, DMS717, DMS747, DMS888, DMS909, DMS777, DMS999, DMS666
Trade Mark:	DUOMEI
Applicant:	Shenzhen Duomei Industry Co., Ltd.
Address:	Second floor, no7, hengsan lane, yuanhu road, zhangbei district, shenzhen, guangdong, China
Manufacturer:	Shenzhen Duomei Industry Co., Ltd.
Address:	Second floor, no7, hengsan lane, yuanhu road, zhangbei district, shenzhen, guangdong, China
Date of Test:	Nov. 29, 2019 - Dec. 16, 2019
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10:2013

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: Kevin Huang

Reviewed By: Date: Dec. 16, 2019

Date: Dec. 17, 2019

Beryl Zhao

Approved By: Dec. 17, 2019

Tomsin



2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247 (b)(3)	PASS
6dB Emission Bandwidth	§15.247 (a)(2)	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	§15.247(d)	PASS
Spurious Emission	§15.205/§15.209	PASS

- 1. PASS: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.



3. EUT Description

Product:	Smart Switch		
Model No.:	DMS303		
Additional Model:	DMS201, DMS202, DMS203, DMS301, DMS302, DMTS10, DMCS10, DMB10, DMS501, DMS502, DMS503, DMS601, DMS602, DMS603, DMS701, DMS702, DMS703, DMS704, DMS606, DMS808, DMS717, DMS747, DMS888, DMS909, DMS777, DMS999, DMS666		
Trade Mark:	DUOMEI		
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20)) 2422MHz~2452MHz (802.11n(HT40))		
Channel Separation:	5MHz		
Number of Channel:	11 for 802.11b/802.11g/802.11n(HT20) 7 for 802.11n(HT40)		
Modulation Technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)		
Modulation Technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)		
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps		
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps		
Data speed (IEEE 802.11n):	Up to 150Mbps		
Antenna Type:	PCB Antenna		
Antenna Gain:	2.5dBi		
Power Supply:	AC 120V/60Hz		
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.		



Operation Frequency each of channel For 802.11b/g/n(HT20)

	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		

Operation Frequency each of channel For 802.11n (HT40)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
	1	4	2427MHz	7	2442MHz		
	(3)	5	2432MHz	8	2447MHz	4	
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:

802.11b/802.11g/802.11n (HT20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz

802.11n (HT40)

Channel	Frequency
The lowest channel	2422MHz
The middle channel	2437MHz
The Highest channel	2452MHz



4. General Information

4.1. Test environment and mode

Operating Environment:					
Condition	Conducted Emission	Radiated Emission			
Temperature:	25.0 °C	25.0 °C			
Humidity:	55 % RH	55 % RH			
Atmospheric Pressure:	1010 mbar	1010 mbar			
Test Mode:					
Engineering mode: Keep the EUT in continuous transmitting by select channel and modulations					

The sample was placed 0.8m & 1.5m for the measurement below & above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case(Z axis) are shown in Test Results of the following pages. 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:

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

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps

Final Test Mode:

Operation mode:	Keep the EUT in continuous transmitting		
	with modulation		

- 1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.
- 2.According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup" 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20), 13.5Mbps for 802.11(H40). Duty cycle setting during the transmission is 98.46% with maximum power setting for all modulations.

Report No.: TCT191128E008



4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
		,	/ /	

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



Page 8 of 92

Report No.: TCT191128E008

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



5. Facilities and Accreditations

5.1. Facilities

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

• FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

• IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,

Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

Report No.: TCT191128E008



6. Test Results and Measurement Data

6.1. Antenna requirement

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

15.203 requirement:

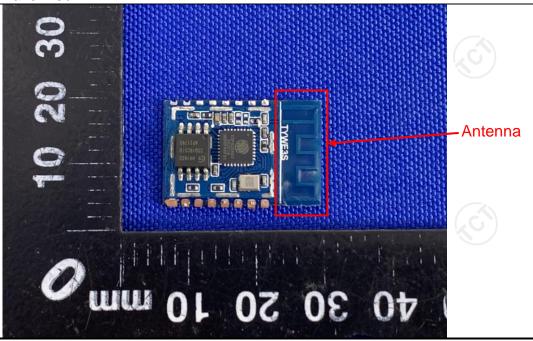
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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.

E.U.T Antenna:

The WIFI antenna is PCB antenna which permanently attached, and the best case gain of the antenna is 2.5dBi.



Page 10 of 92



6.2. Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Frequency Range:	150 kHz to 30 MHz						
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto						
Limits:	Frequency range Limit (dB (MHz) Quasi-peak 0.15-0.5 66 to 56* 0.5-5 56 5-30 60						
Test Setup:	Reference Plane 40cm 80cm Filter AC power EMI Receiver Remark: E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m						
Test Mode:	Charging + transmitting	g with modulation					
Test Procedure:	 The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 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 Result:	PASS						



6.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)								
Equipment	Manufacturer	Model	Serial Number	Calibration Due				
Test Receiver	R&S	ESPI	101402	Jul. 29, 2020				
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 11, 2020				
Coax cable (9KHz-30MHz)	тст	CE-05	N/A	Sep. 08, 2020				
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A				

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



Page 12 of 92

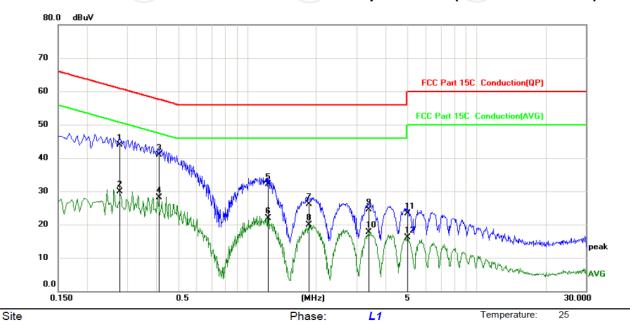
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



AC 120V/60Hz

Humidity:

55 %

Limit: FCC Part 15C Conduction(QP)	Power:

	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
-			MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
-	1		0.2760	33.87	10.13	44.00	60.94	-16.94	QP	
-	2		0.2760	19.75	10.13	29.88	50.94	-21.06	AVG	
	3	*	0.4110	30.84	10.13	40.97	57.63	-16.66	QP	
_	4		0.4110	17.96	10.13	28.09	47.63	-19.54	AVG	
_	5		1.2345	22.07	10.12	32.19	56.00	-23.81	QP	
-	6		1.2345	11.74	10.12	21.86	46.00	-24.14	AVG	
_	7		1.8510	16.01	10.12	26.13	56.00	-29.87	QP	
_	8		1.8510	9.83	10.12	19.95	46.00	-26.05	AVG	
_	9		3.3675	14.47	10.13	24.60	56.00	-31.40	QP	
-	10		3.3675	7.53	10.13	17.66	46.00	-28.34	AVG	
_	11		4.9965	13.12	10.13	23.25	56.00	-32.75	QP	
ς-	12		4.9965	5.91	10.13	16.04	46.00	-29.96	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level $(dB\mu V)$ = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement $(dB\mu V)$ = Reading level $(dB\mu V)$ + Corr. Factor (dB)

 $Limit (dB\mu V) = Limit stated in standard$

 $Margin (dB) = Measurement (dB\mu V) - Limits (dB\mu V)$

Q.P. =Quasi-Peak

AVG =average

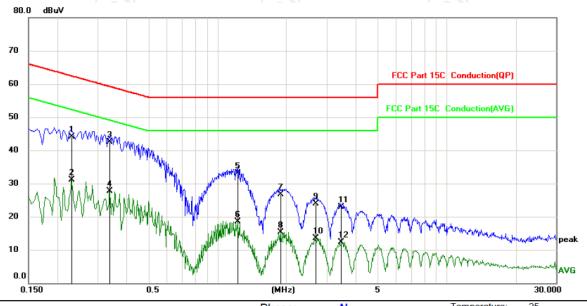
Any value more than 10dB below limit have not been specifically reported.

Report No.: TCT191128E008

^{*} is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.



Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site Phase: N Temperature: 25
Limit: FCC Part 15C Conduction(QP) Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2316	34.02	10.13	44.15	62.39	-18.24	QP	
2		0.2316	20.88	10.13	31.01	52.39	-21.38	AVG	
3	*	0.3390	32.29	10.13	42.42	59.23	-16.81	QP	
4		0.3390	17.53	10.13	27.66	49.23	-21.57	AVG	
5		1.2255	23.03	10.12	33.15	56.00	-22.85	QP	
6		1.2255	8.31	10.12	18.43	46.00	-27.57	AVG	
7		1.8870	16.52	10.12	26.64	56.00	-29.36	QP	
8		1.8870	5.25	10.12	15.37	46.00	-30.63	AVG	
9		2.6835	13.70	10.12	23.82	56.00	-32.18	QP	
10		2.6835	3.30	10.12	13.42	46.00	-32.58	AVG	
11		3.4485	12.73	10.13	22.86	56.00	-33.14	QP	
12		3.4485	2.19	10.13	12.32	46.00	-33.68	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level $(dB\mu V)$ = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement $(dB\mu V)$ = Reading level $(dB\mu V)$ + Corr. Factor (dB)

 $Limit (dB\mu V) = Limit stated in standard$

 $Margin (dB) = Measurement (dB\mu V) - Limits (dB\mu V)$

Q.P. =Quasi-Peak

AVG =average

Any value more than 10dB below limit have not been specifically reported.

^{*} is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.



6.3. Maximum Conducted (Average) Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)							
Test Method:	KDB 558074 D01 v05r02							
Limit:	30dBm							
Test Setup:	Spectrum Analyzer EUT							
Test Mode:	Transmitting mode with modulation							
Test Procedure:	 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Measure the conducted output power and record the results in the test report. 							
Test Result:	PASS							

6.3.2. Test Instruments

RF Test Room								
Equipment	Manufacturer	Model	Serial Number	Calibration Due				
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 12, 2020				
RF Cable (9KHz-26.5GHz)	тст	RE-06	N/A	Sep. 12, 2020				
Antenna Connector	TCT	RFC-01	N/A	Sep. 12, 2020				

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

Page 15 of 92



6.4. Emission Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)				
Test Method:	KDB 558074 D01 v05r02				
Limit:	>500kHz				
Test Setup:	Spectrum Analyzer EUT				
Test Mode:	Transmitting mode with modulation				
Test Procedure:	 Set to the maximum power setting and enable the EUT transmit continuously. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. Measure and record the results in the test report. 				
Test Result:	PASS				

6.4.2. Test Instruments

RF Test Room								
Equipment	Manufacturer	Model	Serial Number	Calibration Due				
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 12, 2020				
RF Cable (9KHz-26.5GHz)	TCT	RE-06	N/A	Sep. 12, 2020				
Antenna Connector	TCT	RFC-01	N/A	Sep. 12, 2020				

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

Page 16 of 92



6.5. Power Spectral Density

6.5.1. Test Specification

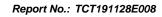
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. Set the span to at least 1.5 times the OBW. Detector = RMS, Sweep time = auto couple. Employ trace averaging (RMS) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. Measure and record the results in the test report.
Test Result:	PASS

6.5.2. Test Instruments

RF Test Room									
Equipment	Manufacturer	Model	Serial Number	Calibration Due					
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 12, 2020					
RF Cable (9KHz-26.5GHz)	TCT	RE-06	N/A	Sep. 12, 2020					
Antenna Connector	TCT	RFC-01	N/A	Sep. 12, 2020					

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

Page 17 of 92





6.6. Conducted Band Edge and Spurious Emission Measurement

6.6.1. Test Specification

NO /	
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). Measure and record the results in the test report. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS



6.6.2. Test Instruments

RF Test Room									
Equipment	Manufacturer	Model	Serial Number	Calibration Due					
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 12, 2020					
RF Cable (9KHz-26.5GHz)	тст	RE-06	N/A	Sep. 12, 2020					
Antenna Connector	TCT	RFC-01	N/A	Sep. 12, 2020					

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



Page 19 of 92

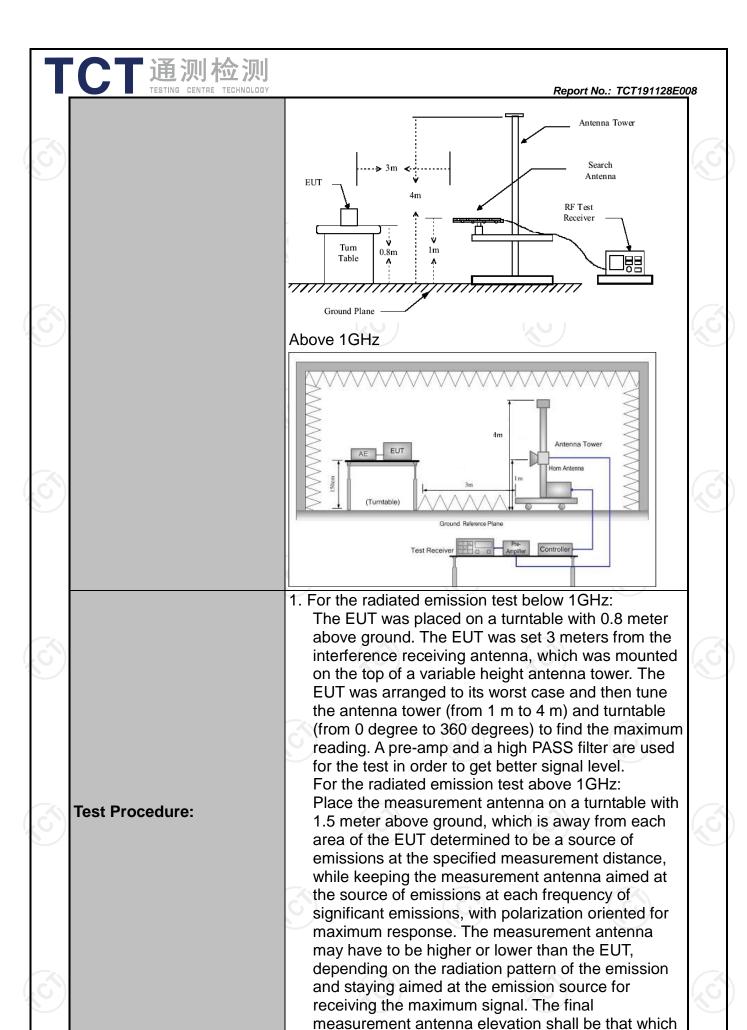
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



6.7. Radiated Spurious Emission Measurement

6.7.1. Test Specification

Test Requirement:	FCC Part15	C Secti	on 1	15.209			
Test Method:	ANSI C63.10): 2013		3			
Frequency Range:	9 kHz to 25 (GHz					(0)
Measurement Distance:	3 m						
Antenna Polarization:	Horizontal &	Vertica	I				
Operation mode:	Transmitting	mode v	vith	modulat	ion		
	Frequency 9kHz- 150kHz 150kHz-	Detect	eak	RBW 200Hz 9kHz	VBW 1kHz 30kHz	Quas	Remark si-peak Value
Receiver Setup:	30MHz 30MHz-1GHz	Quasi-po		120KHz	300KHz		si-peak Value si-peak Value
	Above 1GHz	Peak Peak		1MHz 1MHz	3MHz 10Hz		eak Value erage Value
	Frequen			Field Stre	/meter)		asurement nce (meters)
		0.009-0.490 0.490-1.705		2400/F(F 24000/F(300 30 30	
	30-88 88-216			100 150		3	
Limit:	216-960 Above 960			200 500			3
	Frequency			Strength olts/meter)	Measure Distan (mete	ce	Detector
	Above 1GHz	Z	500 5000		3		Average Peak
	For radiated	emissio	ons	below 30		Compu	ater -
Test setup:	0.8m		ound P	1m	_ [Receiver	
	30MHz to 10	3Hz					



CT通测检测	Panart No : TCT101129500	20
TESTING CENTRE TECHNOLOGY	maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. 3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level 4. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported. 5. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=120 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace =	1)8
	 max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for f >1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. 	
Test results:	PASS	



6.7.2. Test Instruments

	Radiated Em	ission Test Site	e (966)	
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESIB7	100197	Jul. 29, 2020
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ40	200061	Sep. 12, 2020
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 08, 2020
Pre-amplifier	HP	8447D	2727A05017	Sep. 08, 2020
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 12, 2020
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 06, 2020
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 06, 2020
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 06, 2020
Antenna Mast	Keleto	RE-AM	N/A	N/A
Coax cable (9KHz-40GHz)	тст	RE-high-02	N/A	Sep. 08, 2020
Coax cable (9KHz-40GHz)	тст	RE-high-04	N/A	Sep. 08, 2020
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

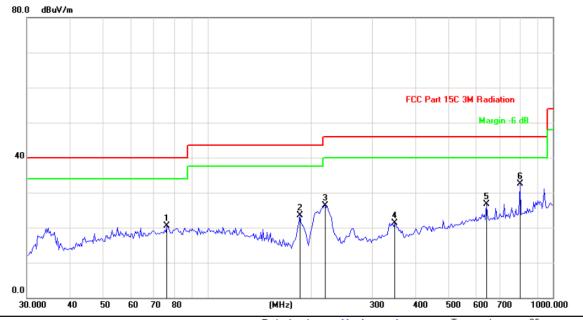
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



6.7.3. Test Data

Please refer to following diagram for individual Below 1GHz

Horizontal:

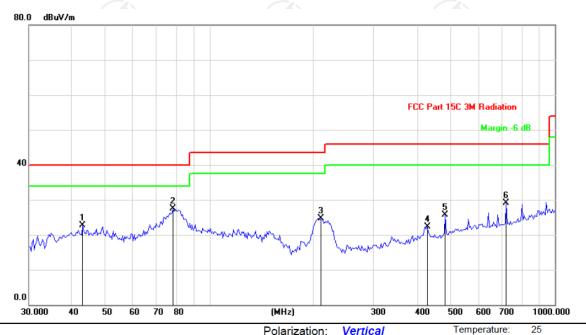


Site Polarization: Horizontal Temperature: 25
Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
<u></u>			MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
_	1		76.3869	36.81	-16.32	20.49	40.00	-19.51	peak
_	2		185.1626	38.12	-14.67	23.45	43.50	-20.05	peak
-	3		219.1785	39.82	-13.45	26.37	46.00	-19.63	peak
-	4		348.5145	31.05	-9.73	21.32	46.00	-24.68	peak
_ }	5		642.2923	32.34	-5.61	26.73	46.00	-19.27	peak
- ر	6	*	804.2523	37.15	-4.60	32.55	46.00	-13.45	peak



Vertical:



Site Polarization: Vertical Temperature: 25
Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
_	1		42.9305	33.47	-10.75	22.72	40.00	-17.28	peak
×	2	*	78.5645	44.11	-16.55	27.56	40.00	-12.44	peak
_	3		210.1294	38.41	-13.72	24.69	43.50	-18.81	peak
_	4		427.2920	30.84	-8.61	22.23	46.00	-23.77	peak
_	5		481.5112	33.44	-7.74	25.70	46.00	-20.30	peak
_	6		723.7930	34.19	-5.00	29.19	46.00	-16.81	peak

Note: 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

- 2. Measurements were conducted in all three channels (high, middle, low) and all modulation(802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40)), and the worst case Mode (Middle channel and 802.11b) was submitted only.
- 3. Freq. = Emission frequency in MHz

 Measurement (dBμV/m) = Reading level (dBμV) + Corr. Factor (dB)

 Correction Factor= Antenna Factor + Cable loss Pre-amplifier

 Limit (dBμV/m) = Limit stated in standard

 Margin (dB) = Maggyrement (dBμV/m) = Limits (dBμV/m)

 $Margin (dB) = Measurement (dB\mu V/m) - Limits (dB\mu V/m)$

Any value more than 10dB below limit have not been specifically reported.

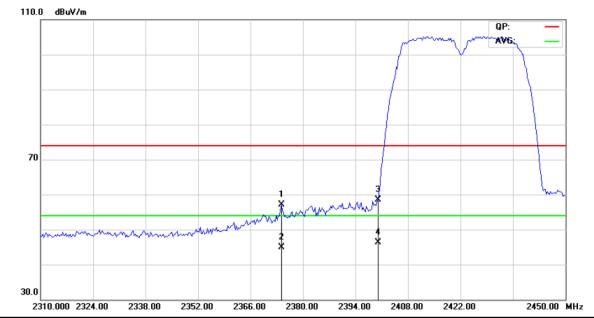
^{*} is meaning the worst frequency has been tested in the test frequency range.



Test Result of Radiated Spurious at Band edges

Lowest channel 2422:

Horizontal:



Limit: FCC part 15 (PK)

Polarization: Horizontal
Power: AC 120V/60Hz

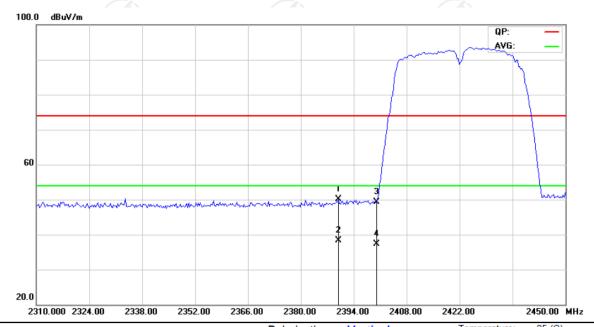
Temperature: 25 (C)

wer: AC 120V/60Hz Humidity: 55 %

	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
,	1		2374.245	54.41	2.66	57.07	74.00	-16.93	peak
	2		2374.245	42.09	2.66	44.75	54.00	-9.25	AVG
_	3		2400.000	55.88	2.66	58.54	74.00	-15.46	peak
_	4	*	2400.000	43.59	2.66	46.25	54.00	-7.75	AVG



Vertical:



Site Polarization: Vertical Temperature: 25 (C)
Limit: FCC part 15 (PK) Power: AC 120V/60Hz Humidity: 55 %

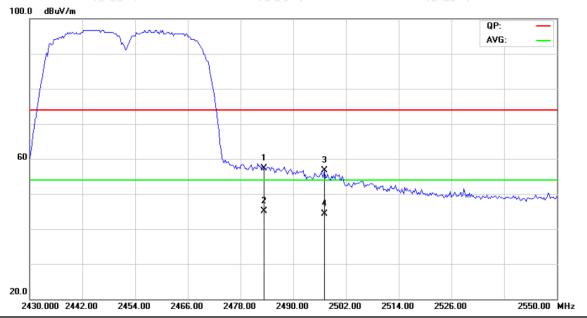
_	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
_	1		2389.958	47.30	2.66	49.96	74.00	-24.04	peak
X	2	*	2389.958	35.51	2.66	38.17	54.00	-15.83	AVG
	3		2400.000	46.53	2.66	49.19	74.00	-24.81	peak
_	4		2400.000	34.62	2.66	37.28	54.00	-16.72	AVG

Note: Measurements were conducted in all two channels (high, low) and all modulation (802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40)), and the worst case Mode 802.11n(HT40)



Highest channel 2452:

Horizontal:



Site Limit: FCC part 15 (PK) Polarization: Horizontal

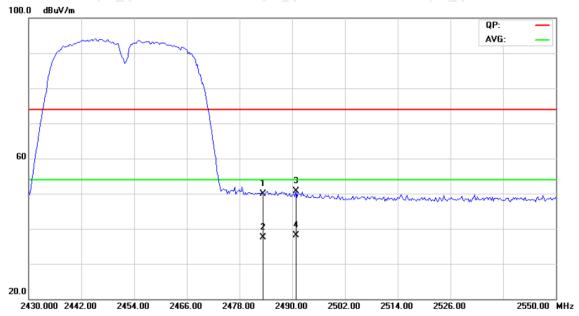
Temperature: 25 (C)

Power: AC 120V/60Hz Humidity: 55 %

_	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	_
` ``	1		2483.500	54.57	2.67	57.24	74.00	-16.76	peak	
ر	2	*	2483.500	42.33	2.67	45.00	54.00	-9.00	AVG	
	3		2497.090	53.87	2.67	56.54	74.00	-17.46	peak	
_	4		2497.090	41.65	2.67	44.32	54.00	-9.68	AVG	_



Vertical:



Site Polarization: Vertical Temperature: 25 (C)
Limit: FCC part 15 (PK) Power: AC 120V/60Hz Humidity: 55 %

_	No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
	1		2483.500	47.24	2.67	49.91	74.00	-24.09	peak
X	2		2483.500	34.70	2.67	37.37	54.00	-16.63	AVG
	3		2490.839	47.93	2.67	50.60	74.00	-23.40	peak
_	4	*	2490.839	35.41	2.67	38.08	54.00	-15.92	AVG

- 1. Peak Final Emission Level=Peak Reading + Correction Factor;
- 2. Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 3. Measurements were conducted in all modulation(802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40)), and the worst case Mode 802.11n(HT40) was submitted only.



Above 1GHz Modulation Type: 802.11b

Report No.: TCT191128E008

	Woddation Type: 002.118								
			L	ow channe	I: 2412 MH:	Z			
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissio Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4824	Н	47.38		0.75	48.13		74	54	-5.87
7236	Н	36.68		9.87	46.55		74	54	-7.45
	Ŧ		K					(A)	
	(C)		('0')			(C)		(,0)	
4824	V	44.82	-77	0.75	45.57		74	54	-8.43
7236	V	35.57		9.87	45.44		74	54	-8.56
	V								

	Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4874	Н	46.90		0.97	47.87	-	74	54	-6.13	
7311	Н	34.03	7	9.83	43.86		74	54	-10.14	
	ЭН		140			2		150		
4874	V	48.71		0.97	49.68		74	54	-4.32	
7311	V	39.16		9.83	48.99		74	54	-5.01	
	V									

			Н	ligh channe	l: 2462 MH	Z			
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4924	Н	45.25		1.18	46.43		74	54	-7.57
7386	Н	37.49		10.07	47.56		74	54	-6.44
	Н								
4924	V	47.63		1.18	48.81		74	54	-5.19
7386	V	39.27		10.07	49.34		74	54	-4.66
9)	V	X 22 /)		X-22 /		

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 25GHz.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- 6. All the restriction bands are compliance with the limit of 15.209.





Report No.: TCT191128E008 Modulation Type: 802.11g

	Low channel: 2412 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4824	Н	45.73		0.75	46.48		74	54	-7.52	
7236	Н	34.18		9.87	44.05		74	54	-9.95	
	Н									
					/					
4824	CV	46.27	 0	0.75	47.02		74	54	-6.98	
7236	V	35.94	-33	9.87	45.81	\ <u></u>	74	54	-8.19	
	V									

Z\	Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4874	I	44.61		0.97	45.58		74	54	-8.42	
7311	Н	35.35		9.83	45.18		74	54	-8.82	
/	Η				/	-1-		+- (\	
1	(0)		NO.		1	(0)		KO		
4874	\ \	47.82		0.97	48.79		74	54	-5.21	
7311	V	38.06		9.83	47.89		74	54	-6.11	
	V									

			Н	ligh channe	l: 2462 MH	Z			
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4924	Н	43.39		1.18	44.57		74	54	-9.43
7386	Н	34.50	<i></i>	10.07	44.57	. ()-1	74	54	-9.43
'4	Н		-4			<i>-</i> /-			
4924	V	42.18		1.18	43.36		74	54	-10.64
7386	V	33.35		10.07	43.42		74	54	-10.58
	V			(

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 25GHz.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- 6. All the restriction bands are compliance with the limit of 15.209.





Modulation Type: 802.11n (HT20)

	Modulation Type: 802.11n (HT20)									
	Low channel: 2412 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4824	Н	44.87		0.75	45.62		74	54	-8.38	
7236	Н	35.04		9.87	44.91		74	54	-9.09	
	Η									
/										
4824	OV	44.48	[- 0]	0.75	45.23	(C+	74	54	-8.77	
7236	\ \ \ \ \	34.76	-77	9.87	44.63	<u></u>	74	54	-9.37	
	\/									

Z.	Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4874	Н	46.53		0.97	47.50		74	54	-6.50	
7311	Н	35.17		9.83	45.00		74	54	-9.00	
/	Н			\	/			- /-		
			KO.			(0)		KO.		
4874	V	44.61		0.97	45.58		74	54	-8.42	
7311	V	34.25		9.83	44.08		74	54	-9.92	
	V									

(((0)	Н	ligh channe	l: 2462 MH	Z	(20)		Z
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4924	Н	43.30		1.18	44.48		74	54	-9.52
7386	Н	33.92	<i></i>	10.07	43.99	. ()-1	74	54	-10.01
	Н					-			
4924	V	42.83		1.18	44.01		74	54	-9.99
7386	V	33.28		10.07	43.35		74	54	-10.65
	V			((

Note:

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 25GHz.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- 6. All the restriction bands are compliance with the limit of 15.209.



Report No.: TCT191128E008



Modulation Type: 802.11n (HT40)

4		Low channel: 2422 MHz									
	Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
Ī	4844	Η	42.82		0.75	43.57		74	54	-10.43	
	7266	Н	33.16		9.87	43.03		74	54	-10.97	
ſ		H		X					(N		
ſ		(C)		(,0)			(C)		(,0)		
ſ	4824	V	42.48	777	0.75	43.23		74	54	-10.77	
	7236	V	32.74		9.87	42.61		74	54	-11.39	
		V									

	Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	n Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)	
4874	Ι	43.90		0.97	44.87	-	74	54	-9.13	
7311	Ξ	33.36		9.83	43.19		74	54	-10.81	
	7		120			2		150		
4874	V	42.53		0.97	43.50		74	54	-10.50	
7311	V	32.29		9.83	42.12		74	54	-11.88	
	V									

			Н	ligh channe	l: 2452 MH	Z			
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Peak (dBµV/m)	AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
4904	Н	43.65	<i>f</i>	1.18	44.83		74	54	-9.17
7356	Н	33.01		10.07	43.08		74	54	-10.92
	Н								
4904	V	42.73		1.18	43.91		74	54	-10.09
7356	V	34.16		10.07	44.23		74	54	-9.77
9)	V	22)		2		

- 1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss Pre-amplifier
- 2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
- 3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 25GHz.
- 5. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- 6. All the restriction bands are compliance with the limit of 15.209.



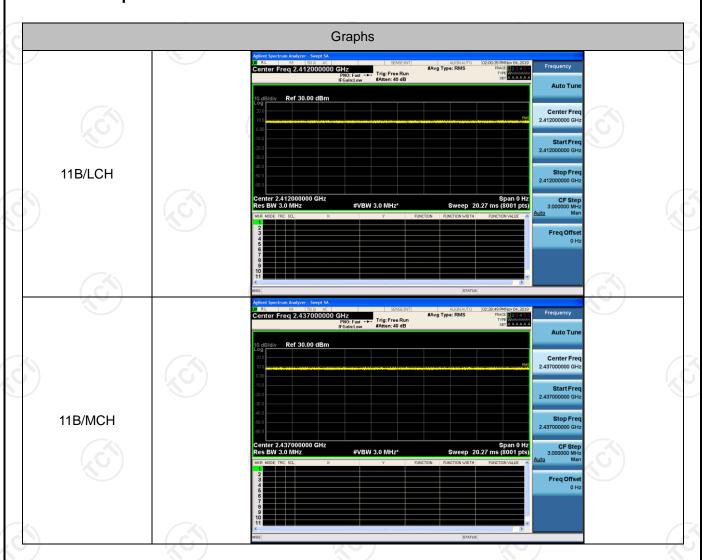


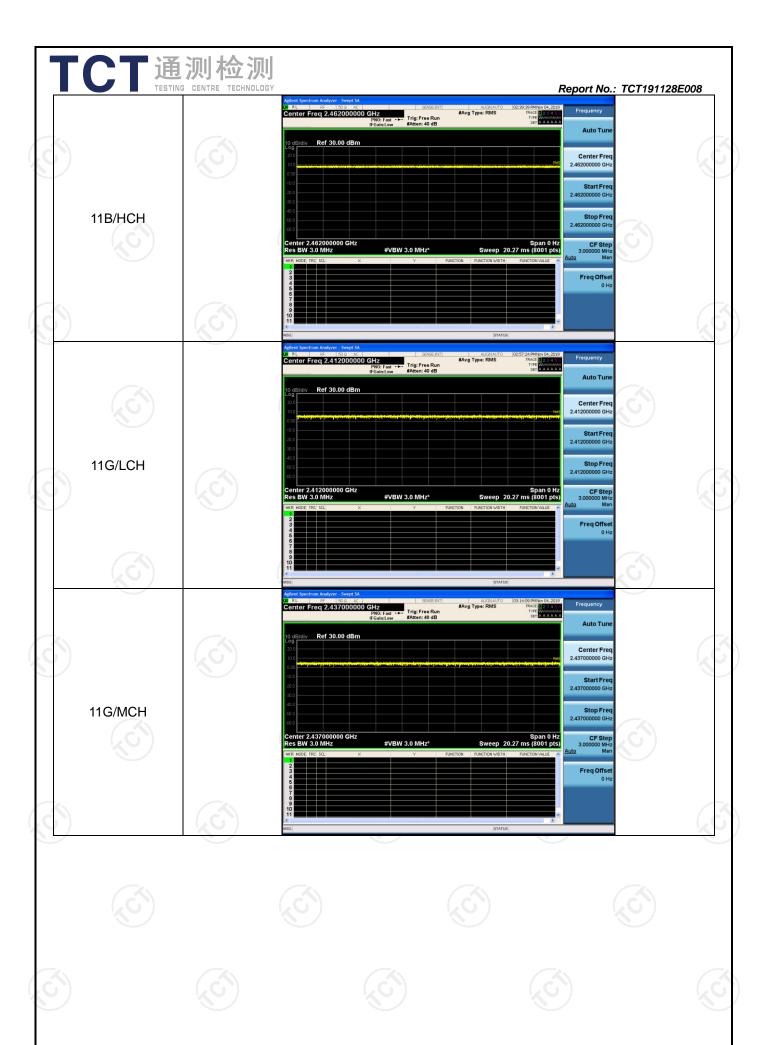
Appendix A: Test Result of Conducted Test Duty Cycle

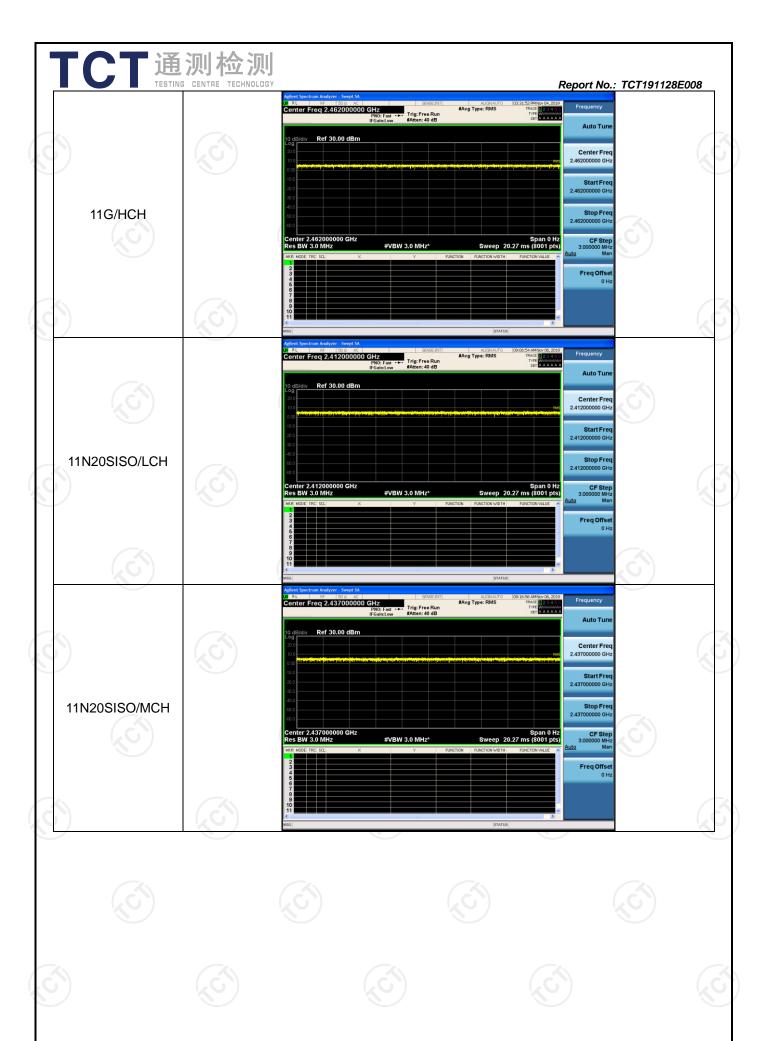
Result Table

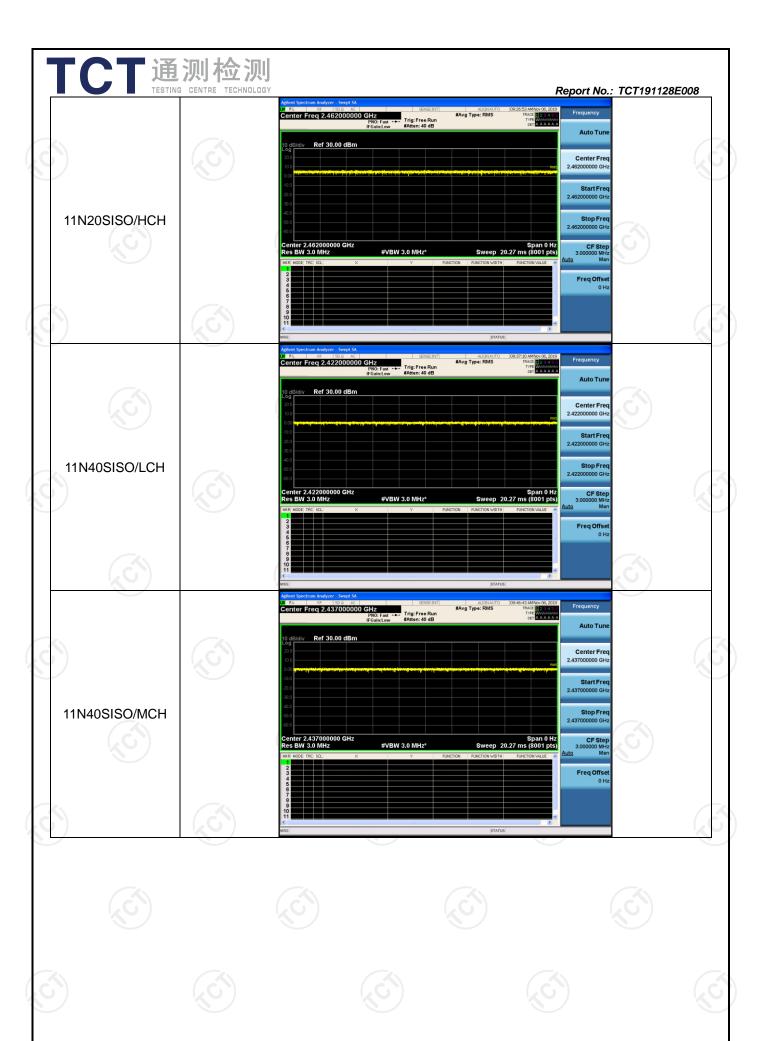
Mode	Channel	Meas.Level [dBm]
11B	LCH	100
11B	MCH	100
11B	HCH	100
11G	LCH	100
11G	MCH	100
11G	HCH	100
11N20SISO	LCH	100
11N20SISO	MCH	100
11N20SISO	HCH	100
11N40SISO	LCH	100
11N40SISO	MCH	100
11N40SISO	HCH	100

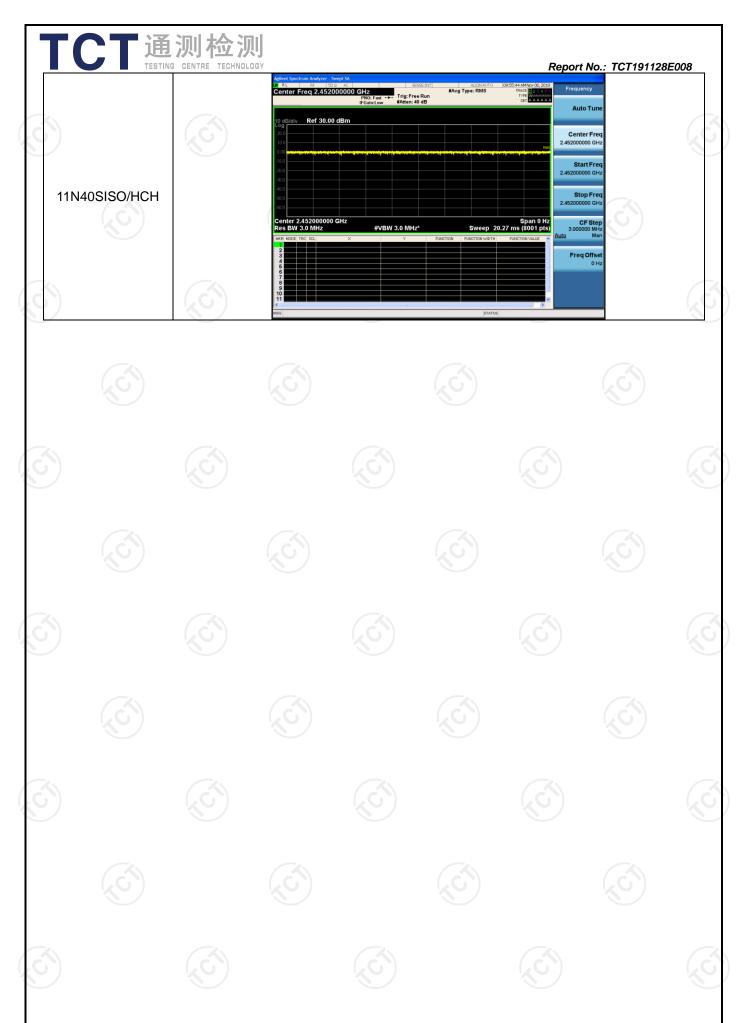
Test Graph













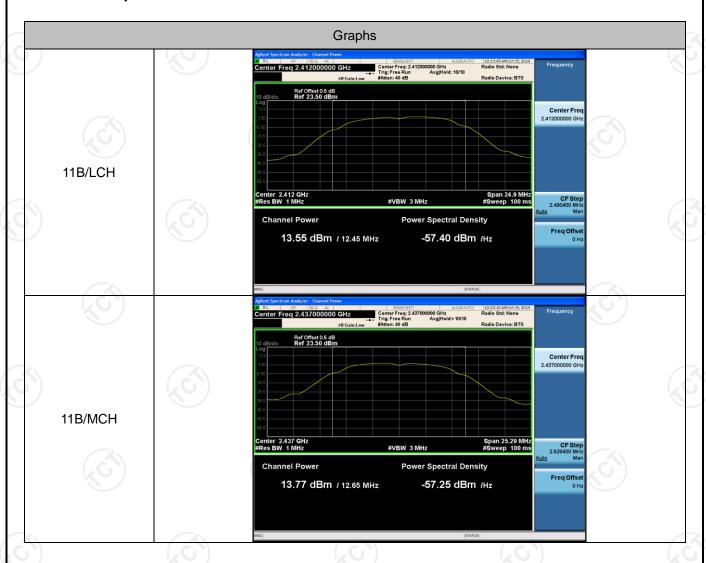
Report No.: TCT191128E008

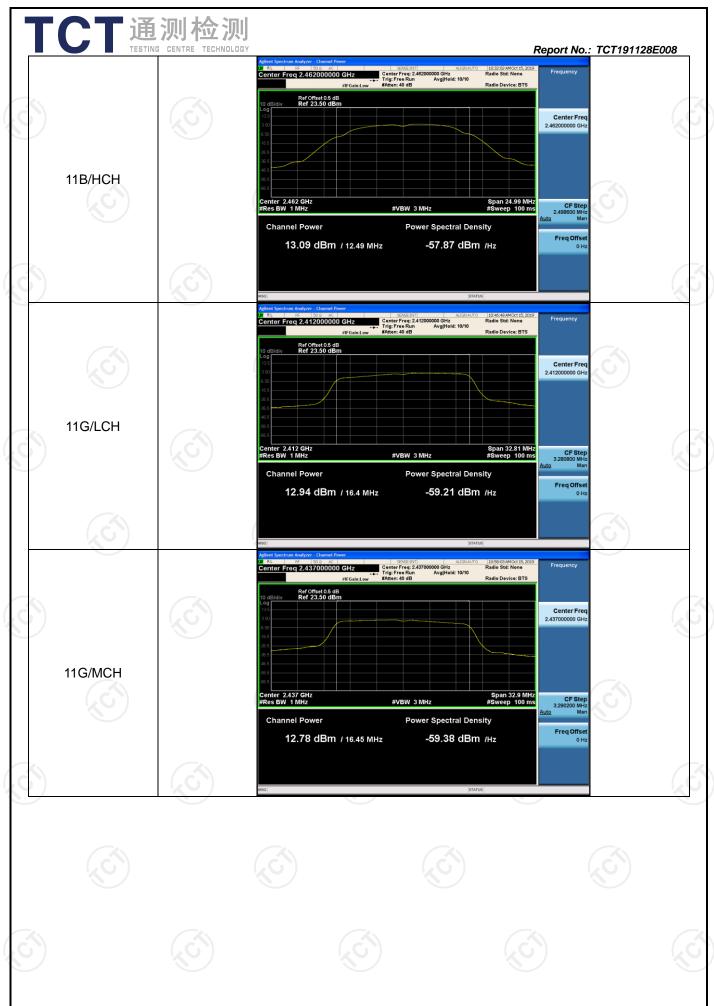
Conducted Average Output Power

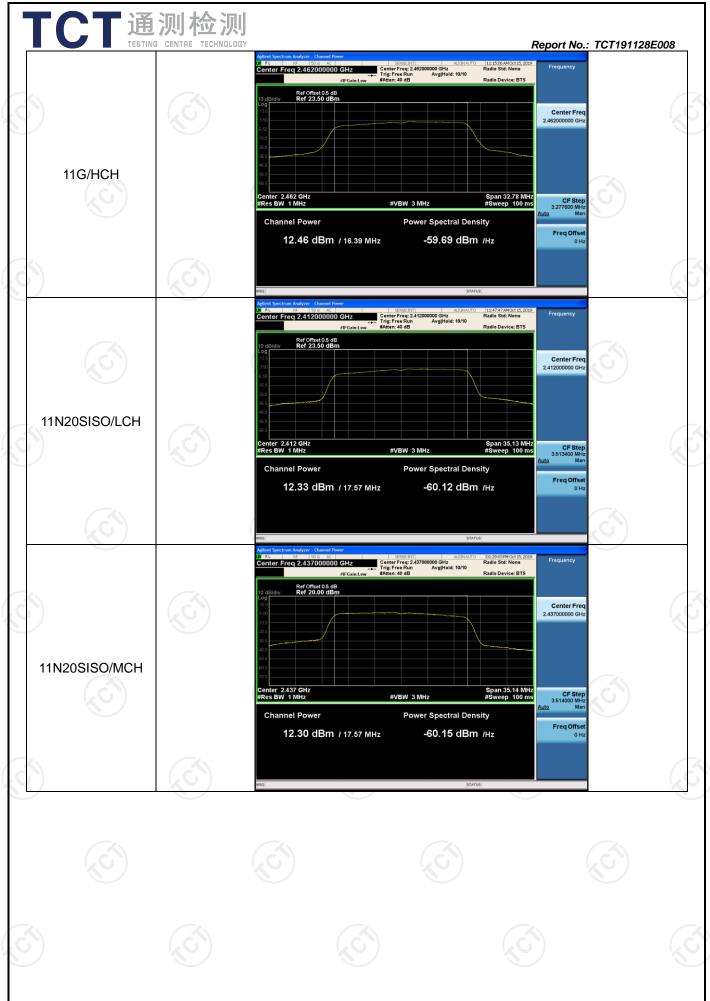
Result Table

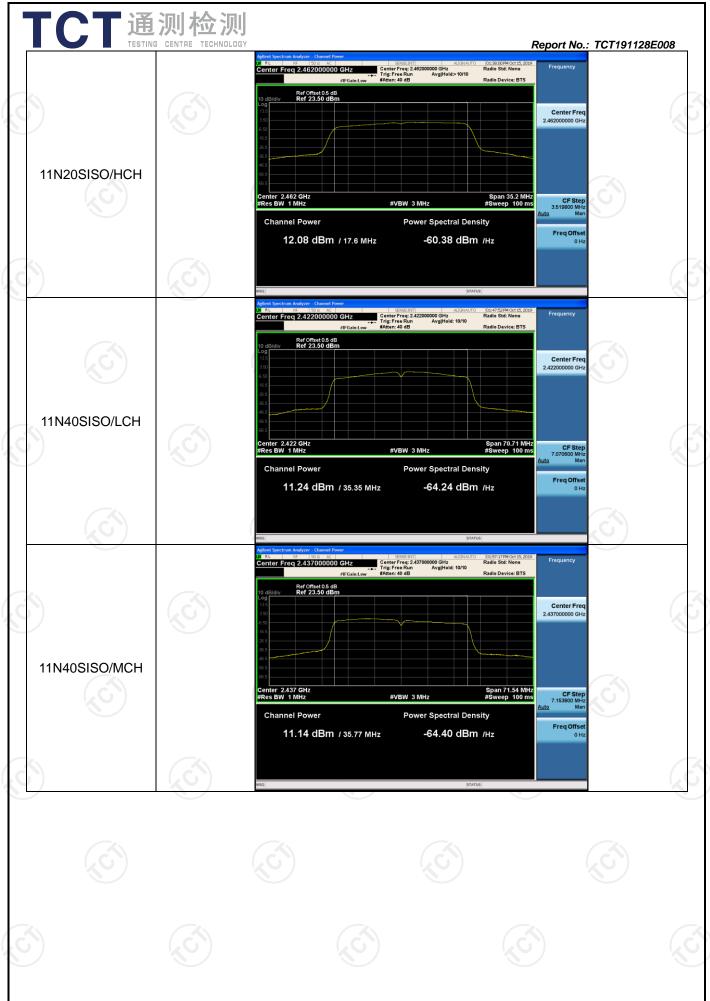
Mode	Channel	Meas.Level [dBm]	Verdict
11B	LCH	13.55	PASS
11B	MCH	13.77	PASS
11B	HCH	13.09	PASS
11G	LCH	12.94	PASS
11G	MCH	12.78	PASS
11G	HCH	12.46	PASS
11N20SISO	LCH	12.33	PASS
11N20SISO	MCH	12.30	PASS
11N20SISO	HCH	12.08	PASS
11N40SISO	LCH	11.24	PASS
11N40SISO	MCH	11.14	PASS
11N40SISO	HCH	10.58	PASS

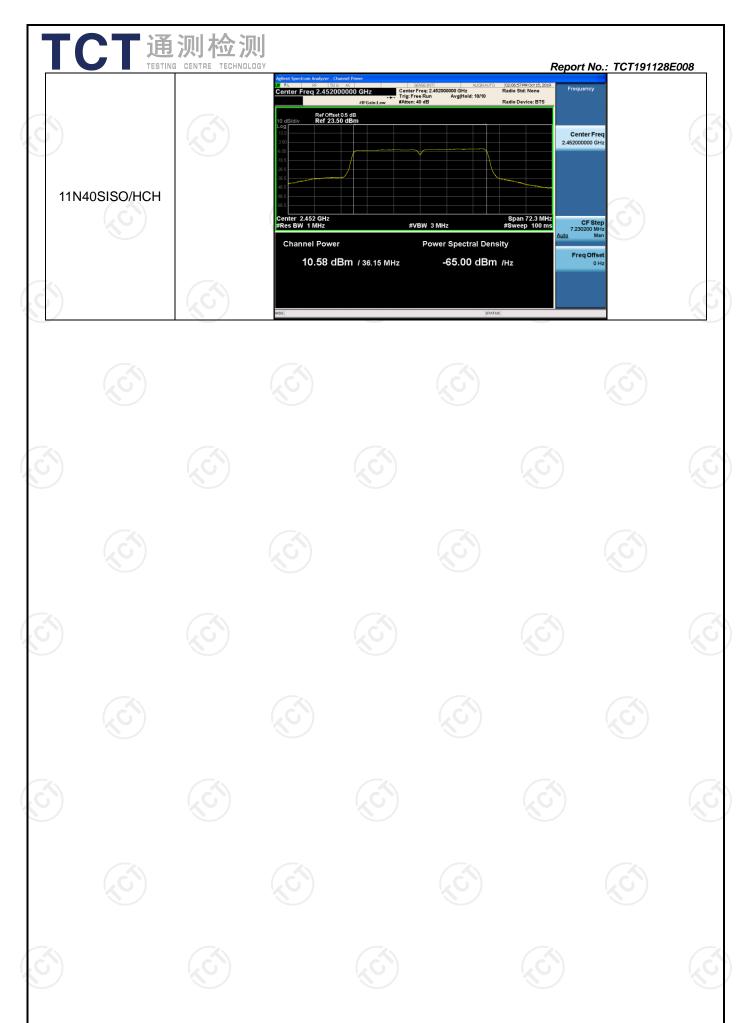
Test Graph













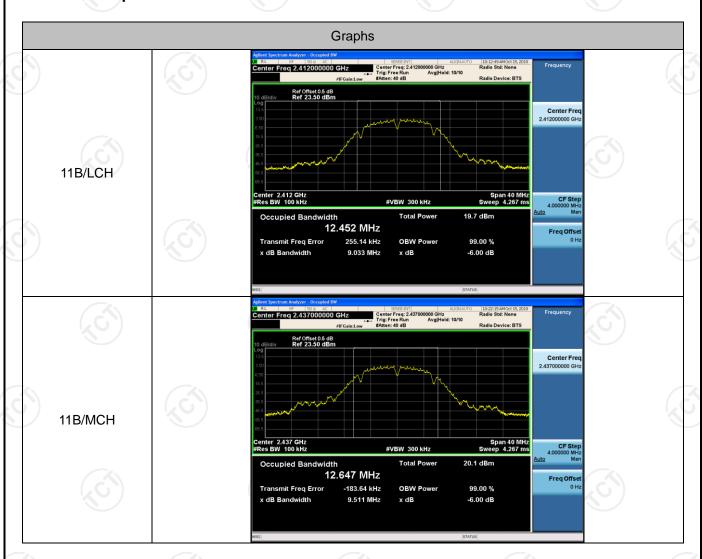
Report No.: TCT191128E008

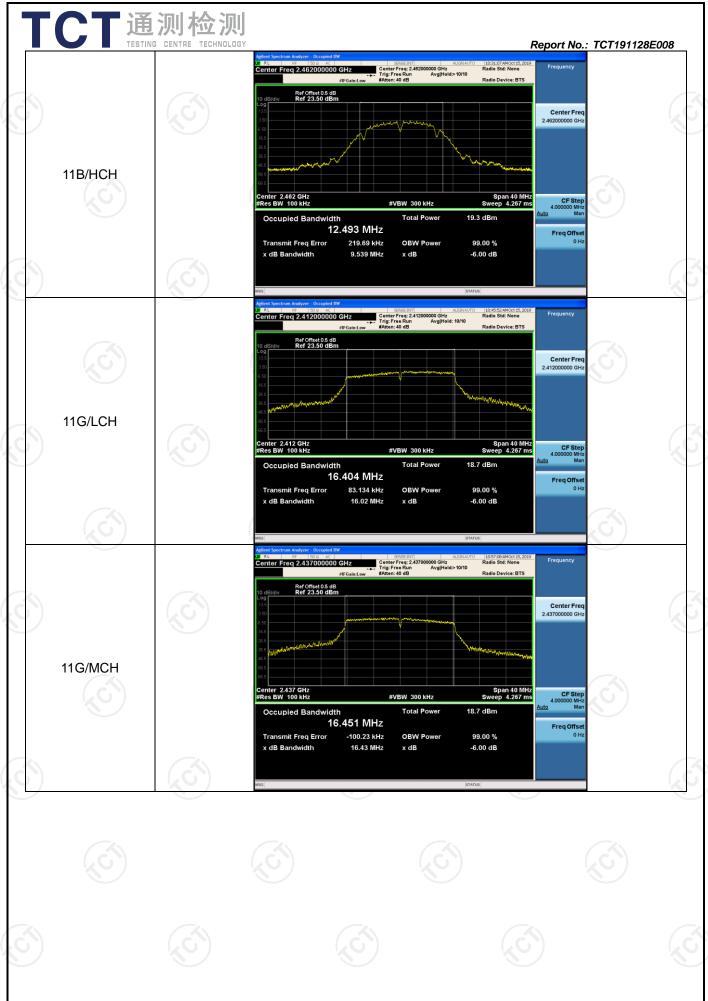
6dB Occupied Bandwidth

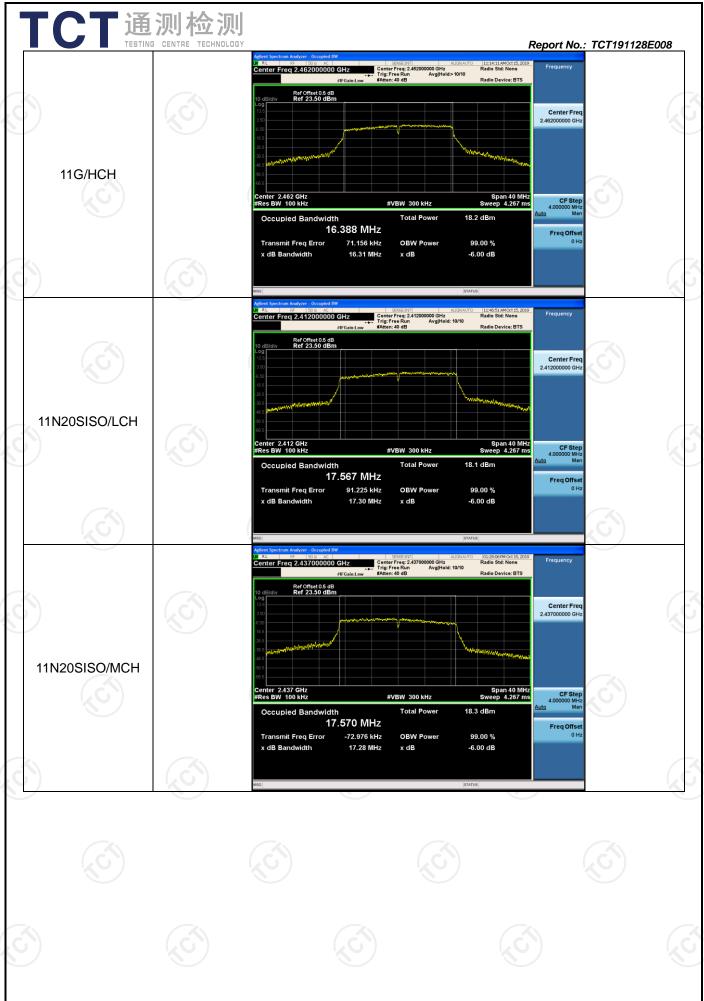
Result Table

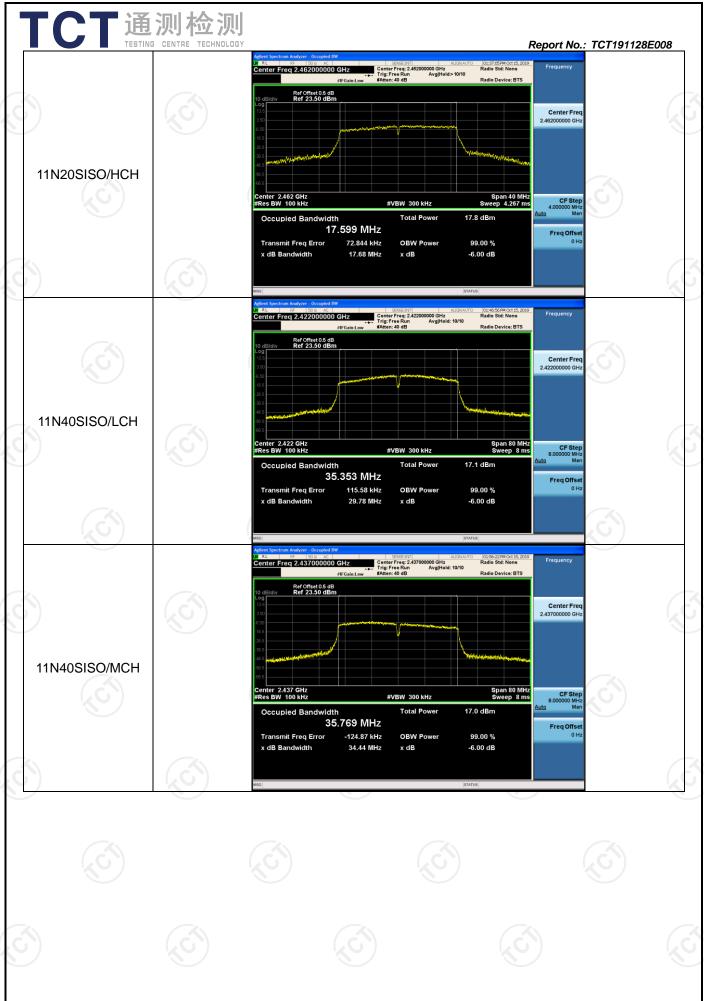
Mode	Channel	6dB Bandwidth [MHz]	Verdict
11B	LCH	9.033	PASS
11B	MCH	9.511	PASS
11B	HCH	9.539	PASS
11G	LCH	16.02	PASS
11G	MCH	16.43	PASS
11G	HCH	16.31	PASS
11N20SISO	LCH	17.30	PASS
11N20SISO	MCH	17.28	PASS
11N20SISO	HCH	17.68	PASS
11N40SISO	LCH	29.78	PASS
11N40SISO	MCH	34.44	PASS
11N40SISO	HCH	36.45	PASS

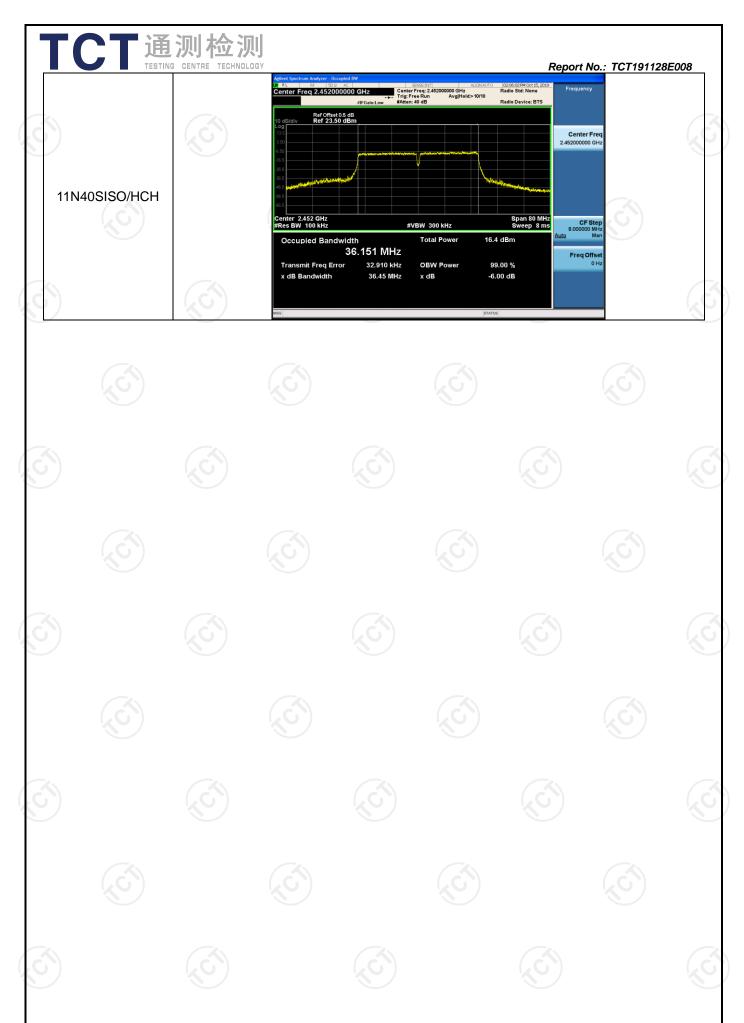
Test Graph













Report No.: TCT191128E008

Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Power [dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	3.663	-48.855	-26.34	PASS
11B	HCH	3.176	-48.247	-26.82	PASS
11G	LCH	-0.410	-48.194	-30.41	PASS
11G	HCH	-1.155	-46.556	-31.16	PASS
11N20SISO	LCH	-1.356	-47.464	-31.36	PASS
11N20SISO	HCH	-1.614	-45.749	-31.61	PASS
11N40SISO	LCH	-4.186	-48.531	-34.19	PASS
11N40SISO	HCH	-6.230	-46.106	-36.23	PASS

Test Graph

