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# **TEST REPORT**

Application No.:	KSCR2201000153AT
FCC ID:	2ADTD-DS2DE3AT5
IC:	20199-DS2DE3AT5
Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd
Address of Applicant:	No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Manufacturer:	Hangzhou Hikvision Digital Technology Co., Ltd
Address of Manufacturer:	No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Factory:	1.Hangzhou Hikvision Technology Co., Ltd.
	2.Hangzhou Hikvision Electronics Co., Ltd.
	3.Chongqing Hikvision technology Co., Ltd.
Address of Factory:	1.No.700,Dongliu Road, Binjiang District, Hangzhou Ctiy,Zhejiang, 310052, China
	2.No.299,Qiushi Road,Tonglu Economic Development Zone,Tonglu County, Hangzhou,Zhejiang,310052,China
	3.No. 118, Haikang Road, Area C, Jianqiao Industrial Park, Dadukou
	District, Chongqing, 401325, China
Equipment Under Test (EUT	):
EUT Name:	MINI PTZ CAMERA
Model No.:	DS-2DE3A400BW-DE/W,DS-2DE3A400BW-DE/WUHK,
	DS-2DE3A400BW-DE/W F1 T5,DS-2DE3A400BW-DE/WUHK F1 T5,
	DS-2DE3A400BW-DE/WCKV,DS-2DE3A400BW-DE/WUVS,
	DS-2DE3A400BW-DE/WKVO,DS-2DE3A400BW-DE/WHUN¤
¤	Please refer to section 2 of this report which indicates which model was
	actually tested and which were electrically identical.
Trade Mark:	HIKVISION
Standard(s) :	47 CFR Part 15, Subpart C 15.247
	RSS-247 Issue 2, February 2017
	RSS-Gen Issue 5 Amendment 2 (February 2021)
Date of Receipt:	2022-01-26
Date of Test:	2022-01-27 to 2022-03-04
Date of Issue:	2022-03-11
Test Result:	Pass*

\* In the configuration tested, the EUT complied with the standards specified above.

Enin fri

Eric Lin EMC Laboratory Manager



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For IC Model No.: DS-2DE3A400BW-DE/W F1 T5, DS-2DE3A400BW-DE/WUHK F1 T5



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Compliance Certification Services (Kunshan) Inc.

	Revision Record								
Version Chapter Date Modifier Remark									
01		2022-03-11		Original					

Authorized for issue by:		
	Tommie Tang	
	Tommie_tang/Project Engineer	-
	Eni fri	
	Eric Lin/Reviewer	-



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# 2 Test Summary

Radio Spectrum Technical Requirement							
ltem	FCC Requirement	IC Requirement	Method	Result			
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration			
N/A: Not applicable							
Radio Spectrum Matt	er Part						
Item	FCC Requirement	IC Requirement	Method	Result			
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.207	RSS-Gen Clause 8.8	ANSI C63.10 (2013) Section 6	2 Pass			
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247a(2)	RSS-247 Clause 5.2(a)	ANSI C63.10 (2013) Section 11.8.1	Pass			
Conducted Average Output Power	47 CFR Part 15, Subpart C 15.247(b)(3)	RSS-247 Clause 5.4(d)	ANSI C63.10 (2013) Section 11.9.2	Pass			
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247(e)	RSS-247 Clause 5.2(b)	ANSI C63.10 (2013) Section 11.10.2	Pass			
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.13.3.2	Pass			
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.11	Pass			
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass			
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass			
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass			

#### **Declaration of EUT Family Grouping:**

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-2DE3A400BW-DE/W was tested since their differences were the model number and appearance.



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#### **General Information** 4

#### Details of E.U.T. 4.1

DC 12V,3.33A by adapter or DC 42.5-57V,0.6A by PoE
802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
802.11b/g/n(HT20):11;802.11n(HT40):7
5MHz
Antenna 1: FPC Antenna,
Antenna 2: FPC Antenna
Antenna 1:2.38dBi, (Provided by the manufacturer)
Antenna 2:4.86dBi, (Provided by the manufacturer)
Directional gain:6.72dBi
DS-2DE3A400BW-DE/W20220108AAWRJ36519724
V5.7.3build 211229

# 4.2 Power level setting using in test:

Ant 1

38

38

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Ant 2

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Channel	802.11b		802.11g		802.11n(HT20)	
Channel	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
1	35	35	42	42	41	41
6	35	35	42	42	41	41
11	35	35	42	42	41	41
Channel	802.11r	n(HT40)				



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# 4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.		
Notebook	LENOVO	K27	EB24537645		
SecureCRT	VanDyke	V 6.2.0	/		
Adapter	CHANNEL WELL TECHNOLOGY	KPL-040F-VI	1		
Serial port adapter plate	/	Test Plate 3	1		
PoE Adapter	PowerDsine	PD-9001GR/AC	/		

# 4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 <sup>-8</sup>
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
0	RF Radiated Power	5.9dB (Above 1GHz)
		4.2dB (Below 30MHz)
9	Radiated Spurious Emission Test	4.5dB (30MHz-1GHz)
9		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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# Compliance Certification Services (Kunshan) Inc.

# 4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

### 4.6 Test Facility

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

### • CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### • A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

#### • FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

### • ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

### • VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

# 4.7 Deviation from Standards

None

#### 4.8 Abnormalities from Standard Conditions None

None



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# 5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
	ducted Emission at Mains Terminals (150					
1	EMI Test Receive	R&S	ESCI	100781	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	101604	10/12/2021	10/11/2022
3	LISN	Schwarzbeck	NNLK 8129	8129-143	10/12/2021	10/11/2022
4	Pulse Limiter	R&S	ESH3-Z2	100609	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	14	10/16/2021	10/15/2022
6	Test Software	Faratronic	EZ-EMC	CCS-03A1	N.C.R	N.C.R
RF	Conducted Test					
1	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/16/2021	04/15/2022
2	Spectrum Analyzer	Keysight	N9020A	MY55370209	10/11/2021	10/10/2022
4	Signal Generator	Agilent	N5182A	MY50142015	08/27/2021	08/26/2022
5	Spectrum Analyzer	Keysight	N9030B	MY61330164	01/22/2022	01/21/2023
6	Vector Signal Generator	R&S	SMW200A	110074	10/12/2021	10/11/2022
7	Radio Communication Test Station	Anritsu	MT8000A	6262012849	09/23/2021	09/22/2022
8	Radio Communication Analyzer	Anritsu	MT8821C	6201692222	09/23/2021	09/22/2022
9	Universal Radio Communication Tester	R&S	CMW500	159275	10/12/2021	10/11/2022
10	Universal Radio Communication Tester	R&S	CMW500	167239	04/16/2021	04/15/2022
11	Power Meter	Anritsu	ML2495A	1445010	04/15/2021	04/14/2022
12	Switcher	CCSRF	FY562	KUS2001M001-3	10/12/2021	10/11/2022
13	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
14	DC Power Supply	Aglient	E3632A	MY50340053	N.C.R	N.C.R
15	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
16	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
17	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
18	Conducted Test Cable	/	RF01-RF04	/	04/15/2021	04/14/2022
19	Software	BST	TST-PASS	N/A	N/A	N/A
20	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/15/2021	04/14/2022
21	Thermometer	Anymetre	TH603	CCS007	10/14/2021	10/13/2022
RF R	adiated Test					
1	Spectrum Analyzer	R&S	FSV40	101493	10/11/2021	10/10/2022
2	Signal Generator	Agilent	E8257C	MY43321570	10/18/2021	10/17/2022
3	Loop Antenna	Com-Power	AL-130R	10160008	04/13/2021	04/12/2023
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2021	02/21/2023
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/20/2022	02/19/2023
9	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2021	04/14/2022
10	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	10/18/2021	10/17/2022
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R



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14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
15	Filter (5150 MHz $\sim$ 5350 MHz $)$	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz $\sim$ 915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz $\sim$ 860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz $\sim$ 1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz $\sim$ 1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz $\sim$ 1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	1	RE01-RE04	/	04/15/2021	04/14/2022
24	Software	Faratronic	EZ_EMC	N/A	N/A	N/A



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# 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

#### 6.1.2 Conclusion

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, 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(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### EUT Antenna:

The antenna 1 and antenna 2 is FPC Antenna, and no consideration of replacement. The best case gain of the antenna 1 is 2.38dBi and antenna 2 is 4.86dBi.

Antenna location: Refer to internal photo.



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# 7 Radio Spectrum Matter Test Results

# 7.1 Conducted Average Output Power

Test Requirement	47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method:	ANSI C63.10 (2013) Section 11.9.2

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

Remark: The EUT 802.11n mode supports 2 \* 2 MIMO transmission. The Gain of each antenna is 2.38dBi and 4.86dBi, and the directional antenna gain is 6.72dBi. Therefore, the power limit should be reduced from the part exceeding 6, 2400-2483.5: 29.28dBm

### 7.1.1 E.U.T. Operation

Operating Enviror	nment:					
Temperature:	18.4 °C	Humidity:	51.9 % RH	Atmospheric Pressure:	1010	mbar

### 7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



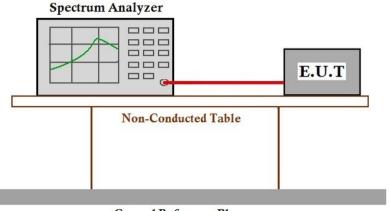
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#### 7.1.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.1.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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# 7.2 Minimum 6dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

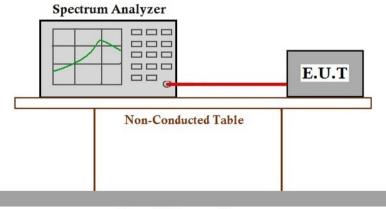
#### 7.2.1 E.U.T. Operation

Operating Environment: Temperature: 18.4 °C Humidity: 51.9 % RH Atmospheric Pressure: 1010 mbar

#### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

### 7.2.3 Test Setup Diagram



**Ground Reference Plane** 

### 7.2.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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# 7.3 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

Remark: The EUT 802.11n mode supports 2 \* 2 MIMO transmission. The Gain of each antenna is 2.38dBi and 4.86dBi, and the directional antenna gain is 6.72dBi. Therefore, the power limit should be reduced from the part exceeding 6, 2400-2483.5: 7.28dBm/3kHz.

#### 7.3.1 E.U.T. Operation

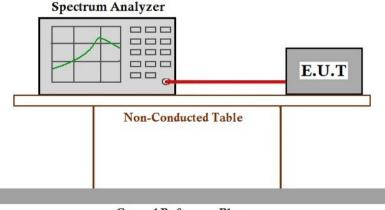
Operating Environment:

· -			
Temperature:	23.1 °C	Humidity: 42.2 % RH	Atmospheric Pressure: 1010 mbar

#### 7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

### 7.3.3 Test Setup Diagram



**Ground Reference Plane** 

### 7.3.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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# 7.4 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2

#### Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

#### 7.4.1 E.U.T. Operation

**Operating Environment:** 

Temperature: 18.4 °C

Humidity: 51.9 % RH

Atmospheric Pressure: 1010 mbar

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

#### 7.4.2 Test Mode Description ----



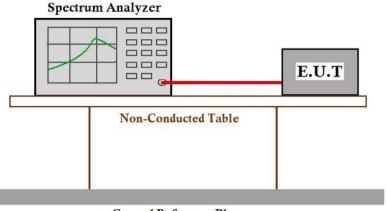
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#### 7.4.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.4.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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### 7.5 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11

#### Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

#### 7.5.1 E.U.T. Operation

**Operating Environment:** 

Temperature: 18.4 °C

Humidity: 51.9 % RH

Atmospheric Pressure: 1010 mbar

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

#### 7.5.2 Test Mode Description



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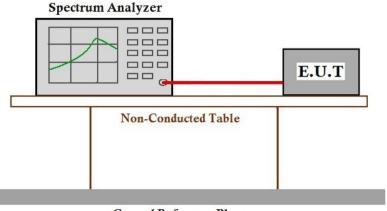
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#### 7.5.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.5.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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# 7.6 Radiated Emissions which fall in the restricted bands

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.10.5

#### Limit:

Frequency(MHz)	Field strength(microvolts/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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

#### 7.6.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	23.1 °C	Humidity:	42.1 % RH	Atmospheric Pressure:	1010	mbar

#### 7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Dra agan	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Pre-scan	01	TX mode_Powered by DC 48V via PoE and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously



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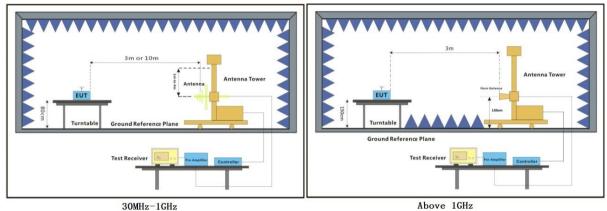
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transmitting mode with all modulation types. All data rates for each modulation type
have been tested and found the data rate @ 1Mbps is the worst case of IEEE
802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @
6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the
worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the
report.

#### 7.6.3 Test Setup Diagram





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#### 7.6.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: This test item was investigated while operating in SISO and MIMO mode, however, it was

determined that SISO antenna 1 operation for b/g modulation and MIMO antenna operation for n modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.



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	2386.580	66.55	-14.02	52.53	74.00	-21.47		peak	
	2390.000	66.15	-14.01	52.14	74.00	-21.86		peak	
	2412.200	120.62	-13.94	106.68	74.00	32.68	peak		

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



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	2390.000 61.78		-14.01	47.77	74.00	-26.23		peak
	2000.000							

Test Mode: 00: Polarity: Vertical: Modulation:802.11b: Bandwidth:20MHz: Channel:Low



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		2483.500		66.69		-13.			2.98		74.00	-21.02	_			pea			
		2484.350		67.29		-13.			3.59	_	74.00	-20.41	_	peak					
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Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



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1		(MHz) (dBuV) 2462.000 117.21		factor(dB/m) -13.78	(dBuV/m) 103.43	(dBuV/m) 74.00	(dB) 29.43	p	eak	
2	2483.500 62.47		-13.71	48.76	74.00	-25.24	p	eak		
3		2486.450	63.36	-13.70	49.66	74.00	-24.34	peak		
4		2500.000	61.15	-13.64	47.51	74.00	-26.49	p	eak	

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



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Report No.: KSCR220100015301

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1	120.0 dBu∀/m		-							
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	0.0	1.00 2338.0	10 2352.00	2356.00 2	380.00 239	1.00 2408.	.00 2122.00	2150.00 MHz		
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)		Remark		
1	2389.660	81.07	-14.01	67.06	74.00	-6.94		peak		
2	2390.000	81.71	-14.01	67.70	74.00	-6.30		peak		
3	2409.400	119.05	-13.95	105.10	74.00	31.10		peak		

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



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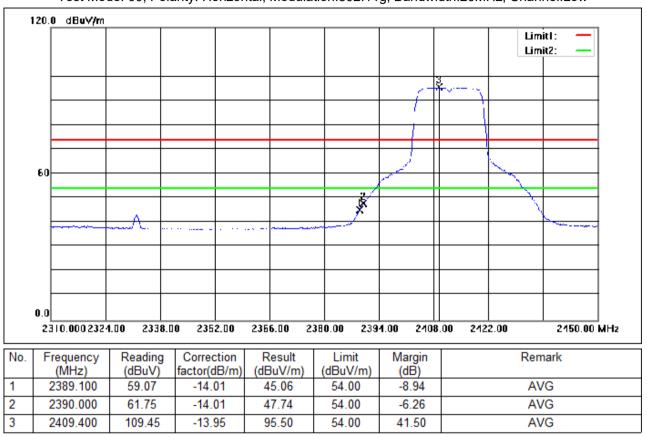
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Test Report Form Version: Rev01



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	0.0	4.00 2338.0	0 2352.00	2356.00 2	380.00 239	1.00 2108.	00 2422.00	2150.00 MHz	
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R	Remark	
	2389.660	71.73	-14.01	57.72	74.00	-16.28	peak		
	2390.000	69.49	-14.01	55.48	74.00	-18.52		peak	
	2413.740	115.01	-13.94	101.07	74.00	27.07	peak		

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



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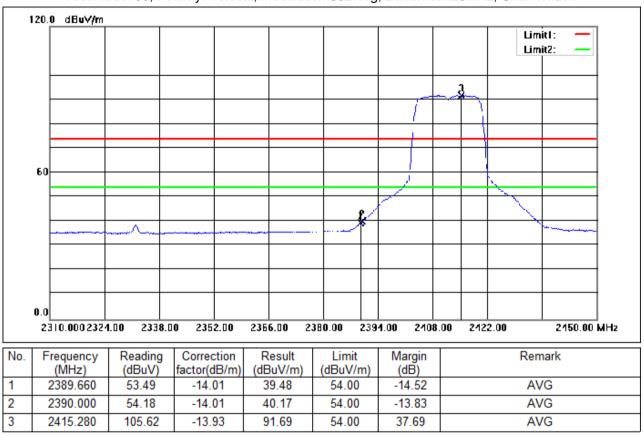
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).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	emark
	2468.300	119.85	-13.75	106.10	74.00	32.10	F	eak
	2483.500 81.22		-13.71	-13.71 67.51		-6.49 peak		
	2483.900	83.20	-13.70	69.50	74.00	-4.50	peak	
	2500.000	62.68	-13.64	49.04	74.00	-24.96	F	eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



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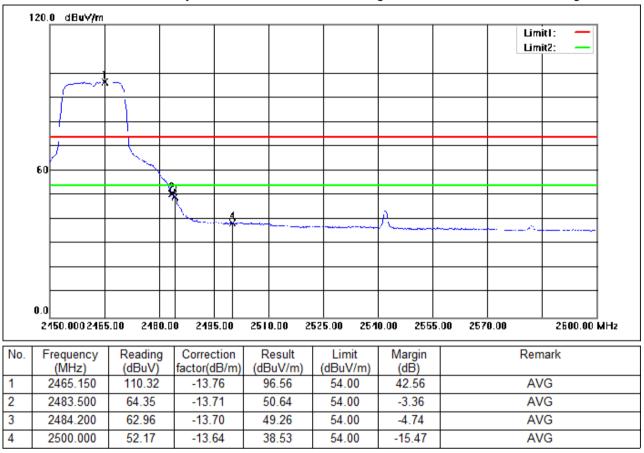
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	2463.500	115.28	-13.77	101.51	74.00	27.51		peak
	2483.500 68.65		-13.71			-19.06 peak		
	2483.900	3.900 71.85 -13.7		58.15 74.00		-15.85	peak	
	2500.000	60.57	-13.64	46.93	74.00	-27.07		peak

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	0.0	5.00 2180.0	10 2495.00	2510.00 2	525.00 251	0.00 2555.	00 2570.00	2500.00 MHz
0.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	2466.350	105.88	-13.76	92.12	54.00	38.12	A	VG
	2483.500	55.33	-13.71	41.62	54.00	-12.38	A	VG
	2484.350	53.92	-13.70	40.22	54.00	-13.78	A	VG
	2500.000	49.35	-13.64	35.71	54.00	-18.29	A	VG

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



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).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)		Remark
	2389.660	79.26	-14.01	65.25	74.00	-8.75	peak	
	2390.000	82.18	-14.01	68.17	74.00	-5.83	peak	
	2409.260	117.11	-13.95	103.16	74.00	29.16	peak	

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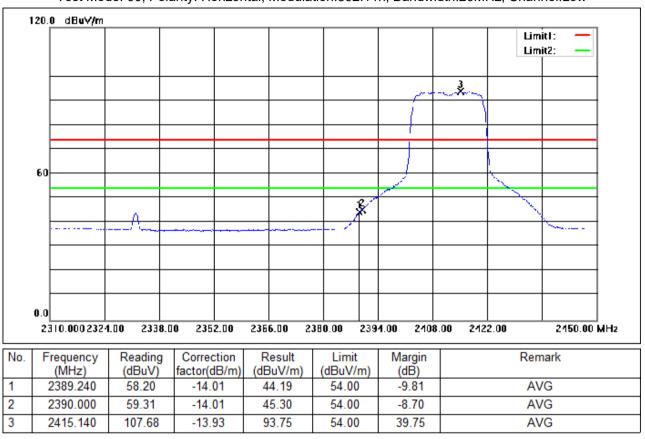
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Test Mode: 00: Polarity: Vertical: Modulation:802.11n: Bandwidth:20MHz: Channel:Low



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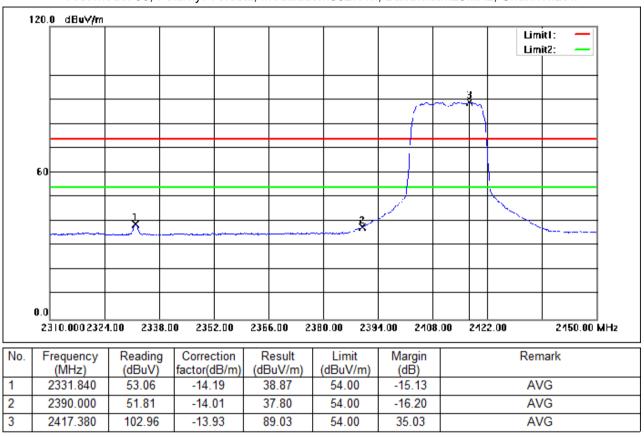
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Test Report Form Version: Rev01



Report No.: KSCR220100015301

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	2466.200	117.98	-13.76	104.22	74.00	30.22		peak
	2483.500	82.99	-13.71	69.28	74.00	-4.72		peak
	2484.050	81.96	-13.70	68.26	74.00	-5.74		peak
	2500.000	62.36	-13.64	48.72	74.00	-25.28	1	peak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



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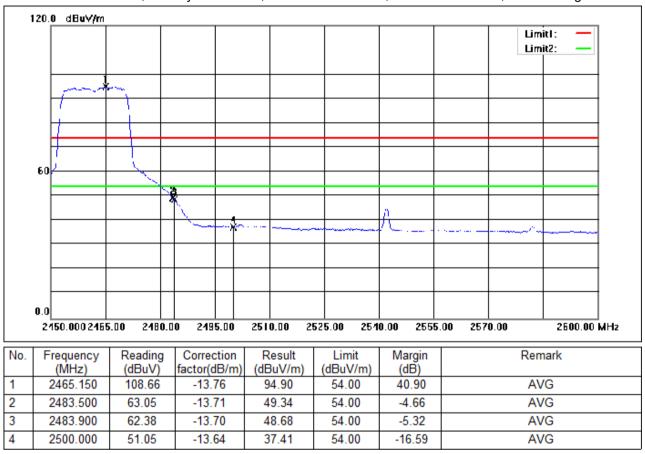
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Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



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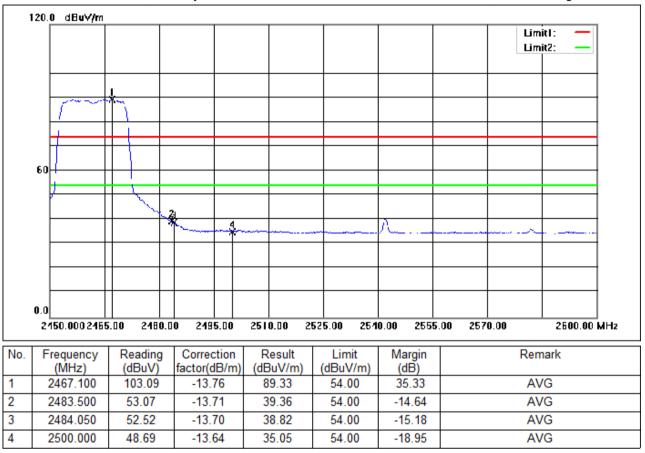
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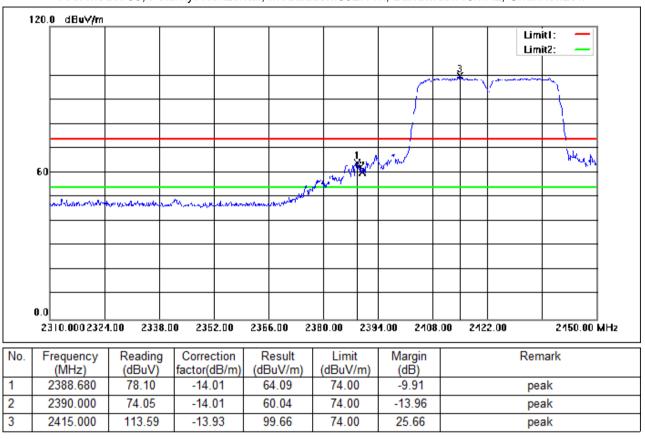
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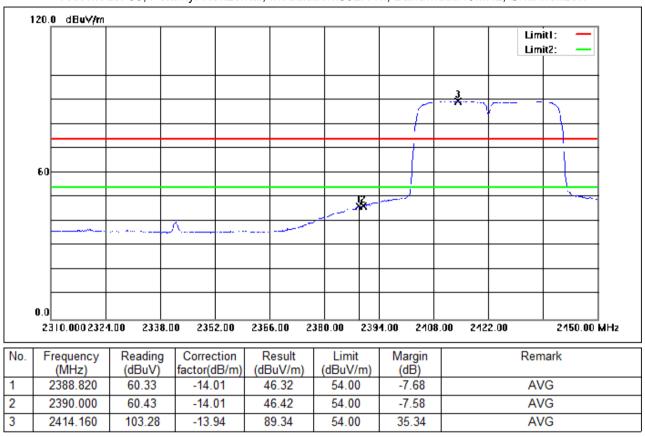
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	23 Fi	requency	Reading	Corre	ction dB/m)	Re (dB	esult	Li (dBu	mit	Ma (d	rgin	8.00	212	2.00	Rema	ark	50.00	MHz
).	23 Fi	requency (MHz)	Reading (dBuV)	Corre	ction dB/m) .02	Re (dB) 56	esult uV/m)	Li (dBu 74	mit IV/m)	Ma (d -17	rgin B)	B.00	212	2.00		ark Ik	50.00	MHz

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



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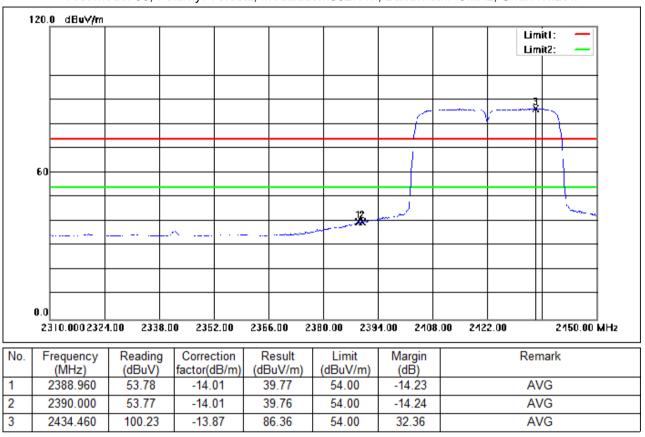
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	2130.000 2117	.00 2 <b>1</b> 64.0	10 2481.00	2498.00 2	515.00 253	2.00 2519.	00 2566.00	2500.00 MHz
0.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R	emark
	2467.910	114.17	-13.75	100.42	74.00	26.42		peak
	2483.500	79.22	-13.71	65.51	74.00	-8.49	I	peak
	2487.800	80.85	-13.69	67.16	74.00	-6.84	I	peak
	2500.000	68.33	-13.64	54.69	74.00	-19.31	1	peak

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1	20.0 d⊟u∀/m							imit1: imit2:
		-v-+						
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	0.0	7.00 2161.0	10 2181.00	2498.00 2	515.00 253	2.00 2549.	00 2566.00	2500.00 MHz
0.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	emark
	2464.510	104.67	-13.77	90.90	54.00	36.90	A	٩VG
	2483.500	64.43	-13.71	50.72	54.00	-3.28	A	4VG
	2484.230	64.28	-13.70	50.58	54.00	-3.42	A	٩VG
	2500.000	54.29	-13.64	40.65	54.00	-13.35	A	AVG

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



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	2130.000 211	7.00 2464.0	10 2481.00	2498.00 2	515.00 253	2.00 2549.	00 2566.00	2600.00 MHz
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	2444.450	108.77	-13.83	94.94	74.00	20.94	р	eak
	2483.500	68.93	-13.71	55.22	74.00	-18.78	р	eak
	2488.480	68.27	-13.68	54.59	74.00	-19.41	р	eak
$\neg$	2500.000	61.99	-13.64	48.35	74.00	-25.65	n	eak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



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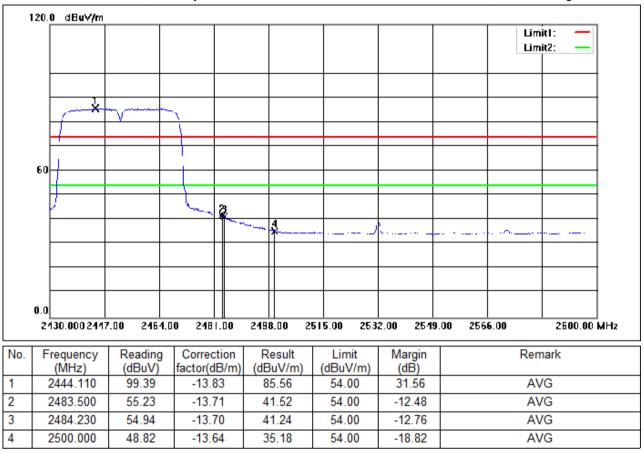
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Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



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# 7.7 Radiated Spurious Emissions Below 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5

## Limit:

Frequency(MHz)	Field strength(microvolts/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
960-1000	500	3

## 7.7.1 E.U.T. Operation

**Operating Environment:** Temperature: 23.1 °C

Humidity: 42.1 % RH

Atmospheric Pressure: 1010 mbar

# 7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan -	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Pre-scan	01	TX mode_Powered by DC 48V via PoE and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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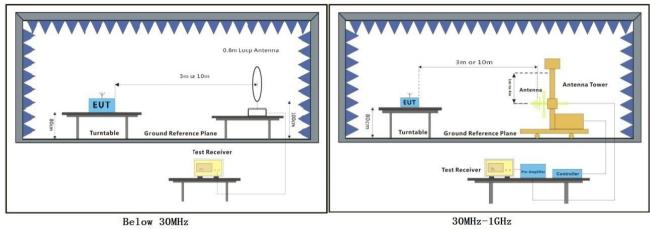
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## 7.7.3 Test Setup Diagram





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## 7.7.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

4. For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.



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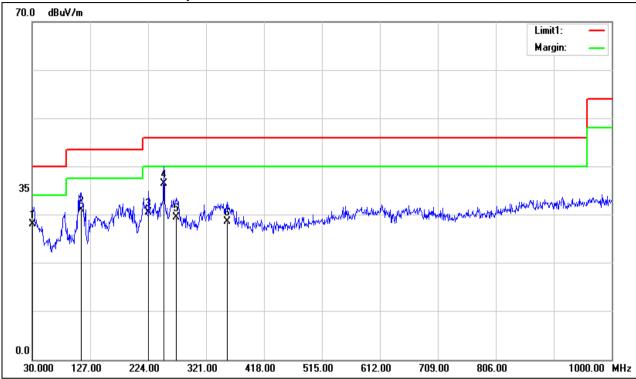


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### 30MHz-1GHz

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	2.78	25.38	28.16	40.00	-11.84	QP
2	111.4800	12.22	18.88	31.10	43.50	-12.40	QP
3	224.9700	12.69	17.78	30.47	46.00	-15.53	QP
4	250.1900	17.22	19.32	36.54	46.00	-9.46	QP
5	271.5300	9.67	19.88	29.55	46.00	-16.45	QP
6	356.8900	6.11	22.55	28.66	46.00	-17.34	QP



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Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

I	).0	127.00	224.00	321.00	418.00	515.00	612.	00 7	)9.00 {	806.00	1000.00	MHz
	No.	Frequer	ncy	Reading	Correc	t	Result		Limit	Margin	Rema	rk
		(MHz	)	(dBuV)	Factor(dB	3/m)	(dBuV/m	I) (4	dBuV/m)	(dB)		
	1	32.910	00	8.34	24.27		32.61		40.00	-7.39	QP	
	2	44.550	00	14.26	17.70		31.96		40.00	-8.04	QP	
	3	83.350	00	14.52	15.92		30.44		40.00	-9.56	QP	

31.25

30.61

18.08

19.32



5

6

176.4700

250.1900

13.17 11.29

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# 7.8 Radiated Spurious Emissions Above 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

## 7.8.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	23.1 °C	Humidity:	42.2 % RH	Atmospheric Pressure: 101	) mbar
•		,		·	

## 7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Dra agan	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Pre-scan	01	TX mode_Powered by DC 48V via PoE and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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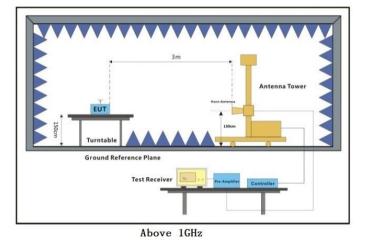
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## 7.8.3 Test Setup Diagram





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## 7.8.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. This test item was investigated while operating in SISO and MIMO mode, however, it was

determined that SISO antenna 1 operation for b/g modulation and MIMO antenna operation for n modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.



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	7236	000	55.40	-{	5.86	4	9.54	74	4.00	-24	.46			pea	ak	
┥	9648	000	51.62		.31	F	0.31	7.	4.00	-23	.69			pea	ak	

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



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	4824.000	59.42	-8.78	50.64	74.00	-23.36	p	eak
	7236.000	55.16	-5.86	49.30	74.00	-24.70	p	eak
	9648.000	52.16	-1.31	50.85	74.00	-23.15	p	eak

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



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	4874.000	59.54	-8.61	50.93	74.00	-23.07	p	eak
	7311.000	54.92	-5.78	49.14	74.00	-24.86	p	eak
$\neg$	9748.000	51.51	-1.43	50.08	74.00	-23.92	D	eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



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	7311.000	54.79	-5.78	49.01	74.00	-24.99		peak
$\neg$	9748.000	52.04	-1.43	50.61	74.00	-23.39		peak

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



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$\neg$								eak
	7386.000	55.53	-5.69	49.84	74.00	-24.16		eak
	9848.000	51.84	-1.27	50.57	74.00	-23.43	p	eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



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	4924.000	58.63	-8.44	50.19	74.00	-23.81		peak
	7386.000	55.14	-5.69	49.45	74.00	-24.55		peak
$\neg$	9848.000	51.57	-1.27	50.30	74.00	-23.70		peak

Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



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									eak
1 2 3		4824.000 7236.000 9648.000	57.59 55.09 52.05	-8.78 -5.86 -1.31	48.81 49.23 50.74	74.00 74.00 74.00	-25.1 -24.7 -23.2	7	77 p

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



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	4824.000	57.13	-8.78	48.35	74.00	-25.65	p	eak
	7236.000	55.32	-5.86	49.46	74.00	-24.54	p	eak
	9648.000	51.82	-1.31	50.51	74.00	-23.49	p	eak

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┥	4874.000	56.97	-8.61	48.36	74.00	-25.64	F	beak
	7311.000	54.94	-5.78	49.16	74.00	-24.84	F	beak
-	9748.000	51.78	-1.43	50.35	74.00	-23.65	r	beak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



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).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	emark		
	4874.000	57.55	-8.61	48.94	74.00	-25.06	p	eak		
	7311.000	54.88	-5.78	49.10	74.00	-24.90	p	eak		
9748.000		51.76			74.00	-23.67	peak			

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



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	0.0	).00 1100.0	0 6100.00	7800.00 9	500.00  12	00.00  290	0.00  1600.00	8000.00MHz
).	Frequency	Reading	Correction	Result	Limit	Margin	Re	emark
+	(MHz) 4924.000	(dBuV)	factor(dB/m)	(dBuV/m) 48.78	(dBuV/m)	(dB) -25.22	-	aak
+				40.70	74.00 74.00	-25.22		eak eak
7386.000 9848.000		54.75 51.95	-5.69 -1.27	49.06 50.68	74.00	-24.94		eak eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



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	1000.000270	0.00 1100.0	10 6100.00	7800.00 9	500.00   2	00.00 1290	0.00  1600.00	18000.00MH;		
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).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)		Remark		
$\neg$	4924.000	56.62	-8.44	48.18	74.00	-25.82		peak		
$\neg$	7386.000	55.10	-5.69	49.41	74.00	-24.59		peak		
$\dashv$	9848.000			50.82	74.00	-23.18	peak			

Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



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0.		luency (Hz)	Reading (dBuV)		Correction ctor(dB/r			esult uV/m)	(	Limit dBuV/m)	Mar (dE	gin 3)			Ren	nark		
		24.000	56.84		-8.78		4	8.06		74.00	-25				pe	ak		
	723	36.000 55.77 -5.86			49.91	9.91		74.00	-24	.09			peak					
	964	18.000	51.77		-1.31		5	50.46		74.00	-23	.54			pe	ak		

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



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	0.0	).00 1100.0	10 6100.00	7800.00 9	 500.00   2	00.00 1290	0.00  1600.00	18000.00MHz
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	emark
	4824.000	57.12	-8.78	48.34	74.00	-25.66	p	eak
┥	7236.000	54.98	-5.86	49.12	74.00	-24.88		eak
┥	9648.000	52.26	-1.31	50.95	74.00	-23.05		eak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



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1	100.0 dBu∀/m							
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	1000.0002700	).00 1100.0	0 6100.00	7800.00 9	500.00  12	00.00 1290	0.00   1600.00	18000.00MHz
).	Frequency	Reading	Correction	Result	Limit	Margin		Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)		
	4874.000	56.98	-8.61	48.37	74.00	-25.63		peak
	7311.000	55.59	-5.78	49.81	74.00	-24.19		peak
T	9748.000	51.67	-1.43	50.24	74.00	-23.76		peak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



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	1000.000270	0.00 1100.0	0 6100.00	7800.00 9	500.00   2	00.00  290	0.00   1600.00	18000.00MHz
0.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	4874.000	57.37	-8.61	48.76	74.00	-25.24	p	eak
	7311.000	55.41	-5.78	49.63	74.00	-24.37	p	eak
$\neg$	9748.000	51.84	-1.43	50.41	74.00	-23.59	D	eak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



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	1000.000 2700	.00 1100.0	0 6100.00	7800.00 9	500.00  12	00.00  290	 0.00  1600.00	8000.00MHz
).	Frequency	Reading	Correction	Result	Limit	Margin	Re	emark
_	(MHz) 4924.000	(dBuV) 56.55	factor(dB/m) -8.44	(dBuV/m) 48.11	(dBuV/m) 74.00	(dB) -25.89		beak
+	7386.000	55.41	-5.69	49.72	74.00	-24.28		peak
+	9848.000	51.80	-1.27	50.53	74.00	-23.47		beak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



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	1000.000 270	0.00 1100.0		7800.00 9	500.00  12	00.00  290	0.00  1600.00	8000.00MHz
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R	emark
	4924.000	56.73	-8.44	48.29	74.00	-25.71		peak
	7386.000	55.59	-5.69	49.90	74.00	-24.10	1	beak
$\neg$	9848.000	51.85	-1.27	50.58	74.00	-23.42		beak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



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	1000.0002700	0.00 1100.0	0 6100.00	7800.00 9	500.00  12	00.00 1290	0.00 14600.00	18000.00MHz
).	Frequency	Reading	Correction	Result	Limit	Margin	R	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)		
	4844.000	57.48	-8.71	48.77	74.00	-25.23		peak
	7266.000	55.64	- <mark>5.83</mark>	49.81	74.00	-24.19		peak
	9688.000	51.39	-1.36	50.03	74.00	-23.97		peak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



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	1000.000270	0.00 1100.0	10 6100.00	7800.00 9	500.00  12	00.00 1290	0.00  1600.00	18000.00MHz
0.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	4844.000	57.33	-8.71	48.62	74.00	-25.38	p	eak
	7266.000	55.72	-5.83	49.89	74.00	-24.11	р	eak
	9688.000	51.71	-1.36	50.35	74.00	-23.65	a	eak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



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								mit1: — mit2: —
	50		1.	2	3			
			Ť	1				
	0.0	 10.00 1100.0	10 6100.00	7800.00 9	500.00  12	00.00 (290)	0.00  1600.00	18000.00MHz
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	4874.000	57.03	-8.61	48.42	74.00	-25.58	p	eak
	7311.000	55.06	-5.78	49.28	74.00	-24.72	p	eak
$\neg$	9748.000	51.92	-1.43	50.49	74.00	-23.51	D	eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



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Test Report Form Version: Rev01



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	00.0 d⊟u∀/m							Limit1: — Limit2: —
	50		1	2	3			
			×	Î				
	0.0							
	1000.0002700	0.00 1100.0	0 6100.00	7800.00 9	500.00 112	00.00 1290	0.00   1600.00	18000.00MHz
	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	R	lemark
	4874.000	57.34	-8.61	48.73	74.00	-25.27		peak
	7311.000	55.22	-5.78	49.44	74.00	-24.56		peak
+	9748.000	51.77	-1.43	50.34	74.00	-23.66		peak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



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	100.0 d⊟u∀/m							mitl: — mit2: —
	50		1	2	3			
			^	Î				
	0.0							
	1000.000270	0.00 1100.0	10 6100.00	7800.00 9	500.00  12	00.00 1290	0.00   1600.00	18000.00MHz
).	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Re	mark
	4904.000	57.48	-8.51	48.97	74.00	-25.03	p	eak
	7356.000	54.86	-5.73	49.13	74.00	-24.87	pe	eak
	9808.000	52.11	-1.47	50.64	74.00	-23.36	p	eak

Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



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1	00.0 dBu∀/m							
								Limit1: — Limit2: —
				3	3			
	50		<u></u>	1	- *			
	0.0							
	1000.0002700	).00 4400.0	10 6100.00	7800.00 9	500.00  12	00.00 1290	0.00  1600.00	18000.00MHz
).	Frequency	Reading	Correction	Result	Limit	Margin		Remark
+	(MHz) 4904.000	(dBuV) 56.68	factor(dB/m) -8.51	(dBuV/m) 48.17	(dBuV/m) 74.00	(dB) -25.83		peak
	7356.000	55.27	-5.73	49.54	74.00	-24.46		peak
1	9808.000	52.02	-1.47	50.55	74.00	-23.45		peak

Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



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Compliance Certification Services (Kunshan) Inc.

## 7.9 99% Bandwidth

Test Requirement	RSS-Gen Section 6.7
Test Method:	ANSI C63.10 Section 6.9.3

## 7.9.1 E.U.T. Operation

**Operating Environment:** Temperature: 23.2 °C

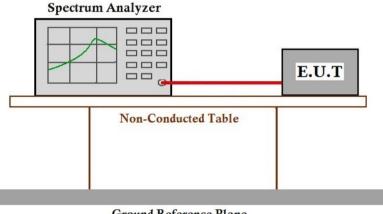
Humidity: 42.2 % RH

Atmospheric Pressure: 1010 mbar

## 7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

#### 7.9.3 Test Setup Diagram



**Ground Reference Plane** 

## 7.9.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220100015301



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# 8 Emission Test Results

## 8.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart C 15.247
	RSS-Gen Issue 5 April 2018 Amendment 2
Test Method:	ANSI C63.10 (2013) Section 6.2

Limit:

	Conducted limit(dBµV)						
Frequency of emission(MHz)	Quasi-peak	Average					
0.15-0.5	66 to 56*	56 to 46*					
0.5-5	56	46					
5-30	60	50					
*Decreases with the logarithm of the frequency.							
Detector: Peak for pre-scan (9kHz r	esolution bandwidth) 0.15M to 3	OMHz					

#### 8.1.1 E.U.T. Operation

Operating Environment:

Temperature:	23.1 °C	Humidity:	42.1 % RH	Atmospheric Pressure:	1010	mbar
romporataro.	20.1 0	riannany.	12.1 /0101		1010	mou

## 8.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
	01	TX mode_Powered by DC 48V via PoE and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.
Final test	00	TX mode_Powered by DC 12V via adapter and keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.



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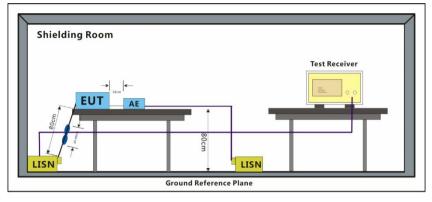
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Compliance Certification Services (Kunshan) Inc.

#### 8.1.3 Test Setup Diagram



#### 8.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50 $\mu$ H + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) 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 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor



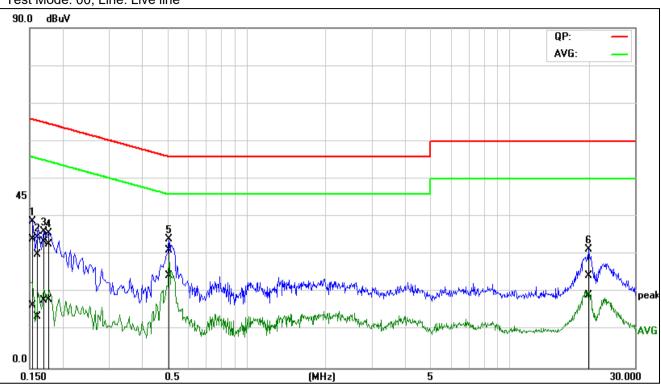
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Test Mode: 00; Lin	e: Live line
--------------------	--------------

No.	Frequency	QuasiPeak	Average	Correction	QuasiPeak	Average	QuasiPeak	Average	QuasiPeak	Average	Remark
		reading	reading	factor	result	result	limit	limit	margin	margin	
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1552	24.19	6.68	9.97	34.16	16.65	65.71	55.72	-31.55	-39.07	Pass
2	0.1577	19.96	3.71	9.97	29.93	13.68	65.58	55.58	-35.65	-41.90	Pass
3	0.1684	23.50	7.82	9.97	33.47	17.79	65.03	55.04	-31.56	-37.25	Pass
4	0.1744	22.86	8.24	9.97	32.83	18.21	64.74	54.75	-31.91	-36.54	Pass
5*	0.5098	21.17	14.28	10.05	31.22	24.33	56.00	46.00	-24.78	-21.67	Pass
6	20.0316	13.70	8.47	10.76	24.46	19.23	60.00	50.00	-35.54	-30.77	Pass



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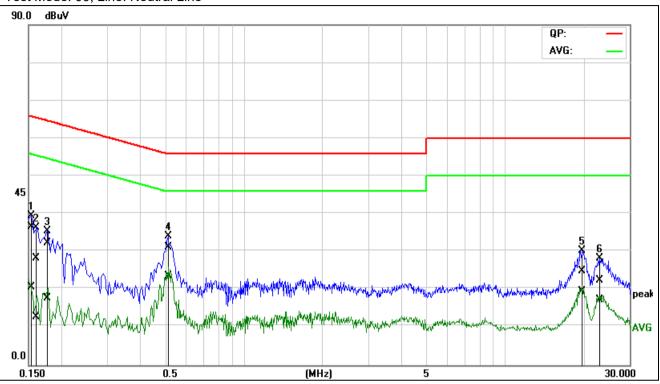
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#### Test Mode: 00; Line: Neutral Line

No.	Frequency	QuasiPeak	Average	Correction	QuasiPeak	Average	QuasiPeak	Average	QuasiPeak	Average	Remark
		reading	reading	factor	result	result	limit	limit	margin	margin	
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1500	26.57	10.62	10.01	36.58	20.63	65.99	56.00	-29.41	-35.37	Pass
2	0.1584	18.12	2.77	10.01	28.13	12.78	65.54	55.55	-37.41	-42.77	Pass
3	0.1747	22.19	7.63	10.01	32.20	17.64	64.73	54.73	-32.53	-37.09	Pass
4*	0.5128	21.08	13.56	10.05	31.13	23.61	56.00	46.00	-24.87	-22.39	Pass
5	19.7762	14.01	8.70	10.78	24.79	19.48	60.00	50.00	-35.21	-30.52	Pass
6	23.1329	11.43	6.20	10.91	22.34	17.11	60.00	50.00	-37.66	-32.89	Pass



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# 9 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

# **10 EUT Constructional Details**

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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