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TEST REPORT

FCC PART 15.407

Report Reference No.: CTL1607252810-WF-02

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Product Name.....: WIFI MODULE

Model/Type reference: ZK-7662

List Model(s).....: See next page

Trade Mark: CT-UNITE

FCC ID: 2ACWK76X2

Applicant's name: CT Unite Communication Technology Ltd

Address of applicant: 6C, Jiajiahao Commercial Building, Yiyuan Road, North of
Shennan Avenue, Nanshan District, Shenzhen, China

Test Firm: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shaheji Road,
Nanshan District, Shenzhen, China 518055

Test specification.....:

Standard.....: FCC Part 15 Subpart E—Unlicensed National Information
Infrastructure Devices

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

Date of Receipt.....: Jul. 25, 2016

Date of Test Date.....: Jul. 26, 2016–Aug. 19, 2016

Data of Issue.....: Aug. 20, 2016

Result.....: Pass

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TEST REPORT

Test Report No. :	CTL1607252810-WF-01	Aug. 20, 2016 Date of issue
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Equipment under Test : WIFI MODULE

Model /Type : ZK-7662

Listed Models : ZK-7632V, ZK-7632U, ZK-7632-TU, ZK-7632-T, ZK-7632-M, ZK-7632-L, ZK-7632-G, ZK-7662, ZK-7662U, ZK-7662-M, ZK-7662-T, ZK-7662-G, ZK-7662-TU, ZK-7662-V, ZK-7662-L, ZK-7612, ZK-7612-T, ZK-7612-U, ZK-7612-V, ZK-7612-G, ZK-7612-M, ZK-7612-TU, ZK-7610, ZK-7610U, ZK-7610V, ZK-7610-T, ZK-7610-M, ZK-7610-G, ZK-7610-TU, ZK-5572

Applicant : **CT Unite Communication Technology Ltd**

Address : 6C, Jiajiahao Commercial Building, Yiyuan Road, North of Shennan Avenue, Nanshan District, Shenzhen, China

Manufacturer : **CT Unite Communication Technology Ltd**

Address : 6C, Jiajiahao Commercial Building, Yiyuan Road, North of Shennan Avenue, Nanshan District, Shenzhen, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**** Modified History ****

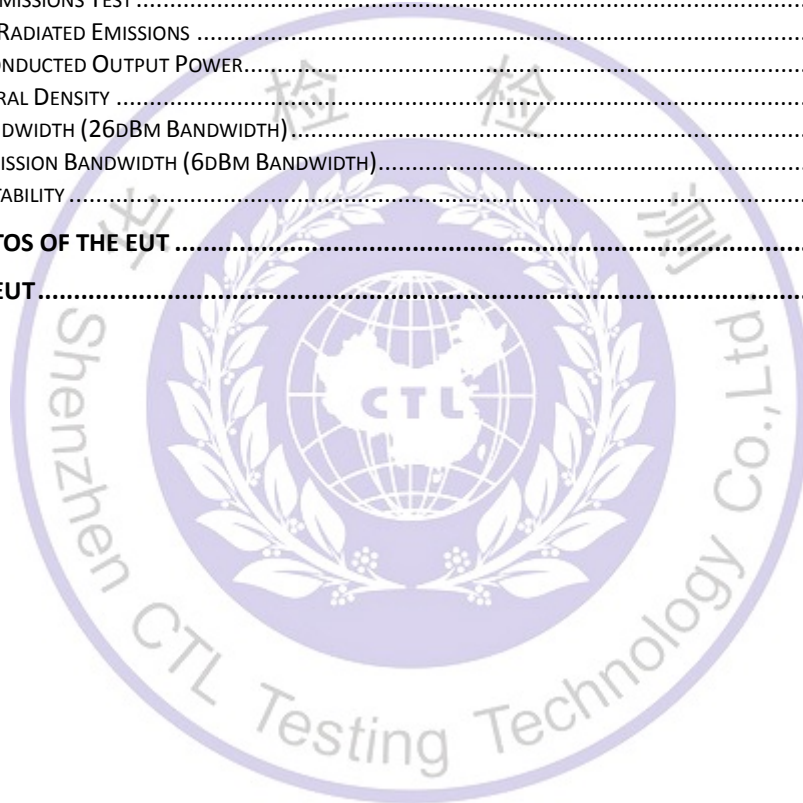
Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2016-08-20	CTL1607252810-WF-02	Tracy Qi



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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15 Subpart E](#)—Unlicensed National Information Infrastructure Devices

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[ANSI C63.4: 2014](#): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

[KDB789033 D02](#): General UNII Test Procedures New Rules v01r02

1.2. Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dBm Bandwidth)	PASS _{Note1}
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dBm Bandwidth)	PASS _{Note2}
FCC Part 15.407(a)	Maximum Conducted Output Power	PASS
FCC Part 15.407(a)	Peak Power Spectral Density	PASS
FCC Part 15.407(g)	Frequency Stability	PASS
FCC Part 15.407(b)	Undesirable emission	PASS
FCC Part 15.407(b)/15.205/15.209	Radiated Emissions	PASS
FCC Part 15.407(h)	Dynamic Frequency Selection	N/A
FCC Part 15.203/15.247(b)	Antenna Requirement	PASS

Note 1: Apply to U-NII 1, U-NII 2A, and U-NII 2C band.

Note 2: Apply to U-NII 3 band only.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	± 0.57 dB	(1)
Transmitter power Radiated	± 2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	± 2.20 dB	(1)
Occupied Bandwidth	± 0.01 ppm	(1)
Radiated Emission 30~1000MHz	± 4.10 dB	(1)
Radiated Emission Above 1GHz	± 4.32 dB	(1)
Conducted Disturbance 0.15~30MHz	± 3.20 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	WIFI MODULE			
Model:	ZK-7662			
Power supply:	DC 3.3V from host device			
WIFI				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a SISO 802.11n MIMO 802.11ac MIMO	802.11n MIMO 802.11ac MIMO	802.11ac MIMO	N/A
Operation frequency:	5180MHz-5240MHz 5745MHz-5825MHz	5190MHz-5230MHz 5755MHz-5795MHz	5210MHz; 5775MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	9	4	2	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type/gain:	PIFA Antenna: 1.2dBi on 5GHz ,Antenna number : 2; Directional gain for MIMO mode = 4.2dBi			

Note: For more details, please refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

All test performed at the low, middle and high of operational frequency range of each mode.

Operation Frequency List WIFI on 5G Band:

Operating band	20MHz		40MHz		80MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
U-NII 1 (5150MHz-5250MHz)	36	5180	38	5190	42	5210
	40	5200				
	44	5220	46	5230		
	48	5240				
U-NII 3 (5725MHz-5850MHz)	149	5745	151	5755	155	5775
	153	5765				
	157	5785	159	5795		
	161	5805				
	165	5825	--	--	--	--

Note:

1. "--"Means no channel(s) available any more.
2. The line display in grey is those Channels/Frequencies select to test is this report for each operation mode.

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate
Maximum Conducted Output Power Power Spectral Density Emission Bandwidth(26dBm Bandwidth) Minimum Emission Bandwidth(6dBm Bandwidth) Undesirable emission Frequency Stability	11a/OFDM	6 Mbps
	11n(20MHz),11ac(20MHz)/OFDM	7.2 Mbps
	11n(40MHz),11ac(40MHz)/OFDM	15.0Mbps
	11ac(80MHz)/OFDM	65.0Mbps

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2016/06/02	2017/06/01
LISN	R&S	ESH2-Z5	860014/010	2016/06/02	2017/06/01
Power Meter	Agilent	U2531A	TW53323507	2016/06/02	2017/06/01
Power Sensor	Agilent	U2021XA	MY5365004	2016/05/21	2017/05/20
EMI Test Receiver	R&S	ESCI	103710	2016/06/02	2017/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2016/05/21	2017/05/20
Spectrum Analyzer	Agilent	N9020	US46220290	2016/01/17	2017/01/16
Controller	EM Electronics	Controller EM 1000	N/A	2016/05/21	2017/05/20
Active Loop Antenna	Daze	ZN30900A	N/A	2016/05/19	2017/05/18
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2017/06/01
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2017/05/18
Horn Antenna	SCHWARZBACK	BBHA 9170	BBHA9170184	2016/05/19	2017/05/18
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2016/05/20	2017/05/19
High-Pass Filter	K&L	9SH10-2700/ X12750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/ U12750-O/O	N/A	2016/05/20	2017/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
RF Cable	Megalon	RF-A303	N/A	2016/06/02	2017/06/01

The calibration interval was one year

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	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.

TEST CONFIGURATION



TEST PROCEDURE

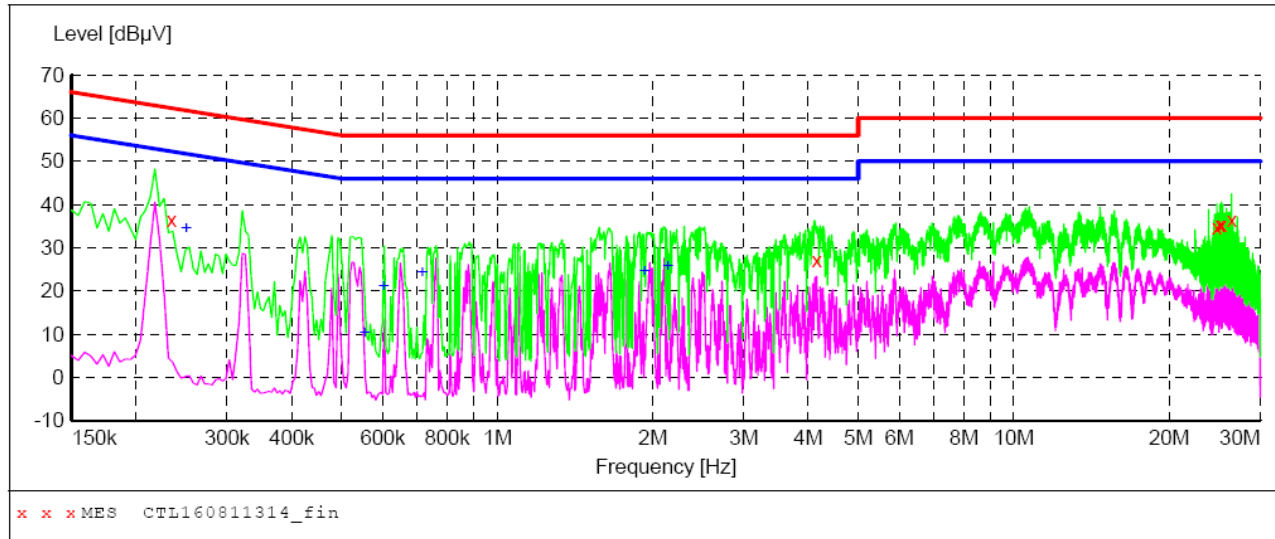
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Remark: 802.11a / 802.11n (HT20) / 802.11ac (HT20) / 802.11n (HT40) / 802.11ac (HT40) /
802.11ac (HT80) all SISO and MIMO mode have been tested, only worse case is reported

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL160811314_fin"**

8/11/2016 5:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.234000	36.30	10.2	62	26.0	QP	L1	GND
4.154000	27.10	10.4	56	28.9	QP	L1	GND
24.728000	34.70	11.1	60	25.3	QP	L1	GND
25.088000	35.30	11.1	60	24.7	QP	L1	GND
25.268000	35.30	11.1	60	24.7	QP	L1	GND
26.414000	36.30	11.2	60	23.7	QP	L1	GND

MEASUREMENT RESULT: "CTL160811314_fin2"

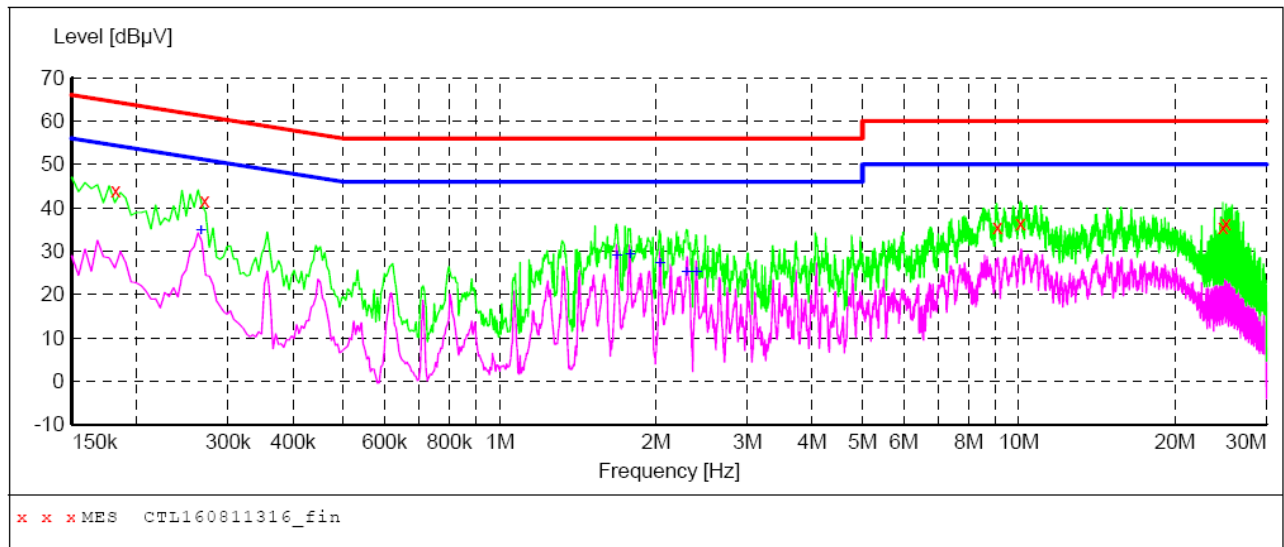
8/11/2016 5:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.250000	34.30	10.2	52	17.5	AV	L1	GND
0.554000	10.10	10.2	46	35.9	AV	L1	GND
0.602000	21.00	10.2	46	25.0	AV	L1	GND
0.716000	24.10	10.2	46	21.9	AV	L1	GND
1.928000	24.60	10.3	46	21.4	AV	L1	GND
2.138000	25.70	10.4	46	20.3	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description:

150K-30M Voltage

**MEASUREMENT RESULT: "CTL160811316_fin"**

8/11/2016 5:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.182000	43.90	10.2	64	20.5	QP	N	GND
0.270000	41.70	10.2	61	19.4	QP	N	GND
9.098000	35.60	10.6	60	24.4	QP	N	GND
10.076000	36.40	10.6	60	23.6	QP	N	GND
24.728000	35.60	11.1	60	24.4	QP	N	GND
25.088000	36.40	11.1	60	23.6	QP	N	GND

MEASUREMENT RESULT: "CTL160811316_fin2"

8/11/2016 5:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.266000	34.70	10.2	51	16.5	AV	N	GND
1.682000	28.90	10.3	46	17.1	AV	N	GND
1.784000	29.10	10.3	46	16.9	AV	N	GND
2.036000	27.00	10.4	46	19.0	AV	N	GND
2.294000	25.10	10.4	46	20.9	AV	N	GND
2.396000	24.90	10.4	46	21.1	AV	N	GND

3.2. Undesirable Radiated Emissions

Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Undesirable emission limits

Requirement	Limit(EIRP)	Limit (Field strength at 3m) ^{Note3}
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27(dBm/MHz) ^{Note1} PK:-17(dBm/MHz) ^{Note2}	PK:68.2(dBμV/m) ^{Note1} PK:78.2(dBμV/m) ^{Note2}

Note1: For frequencies beyond 10MHz of band edge.

Note2: For frequencies within 10MHz of band edge.

Note3: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209

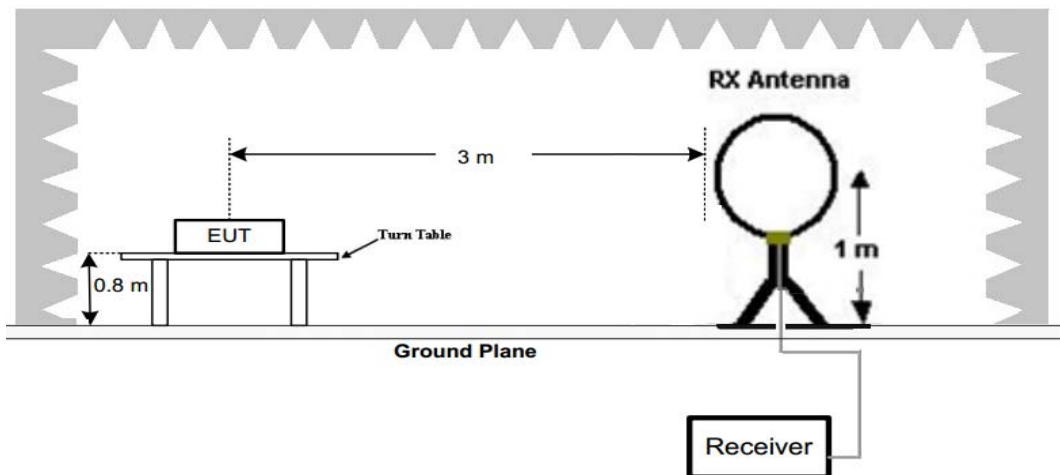
(6) In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

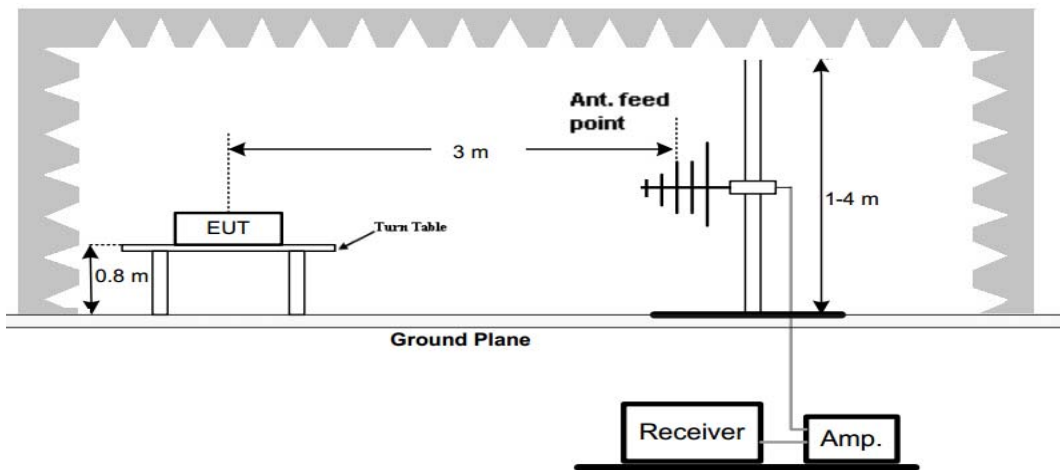
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

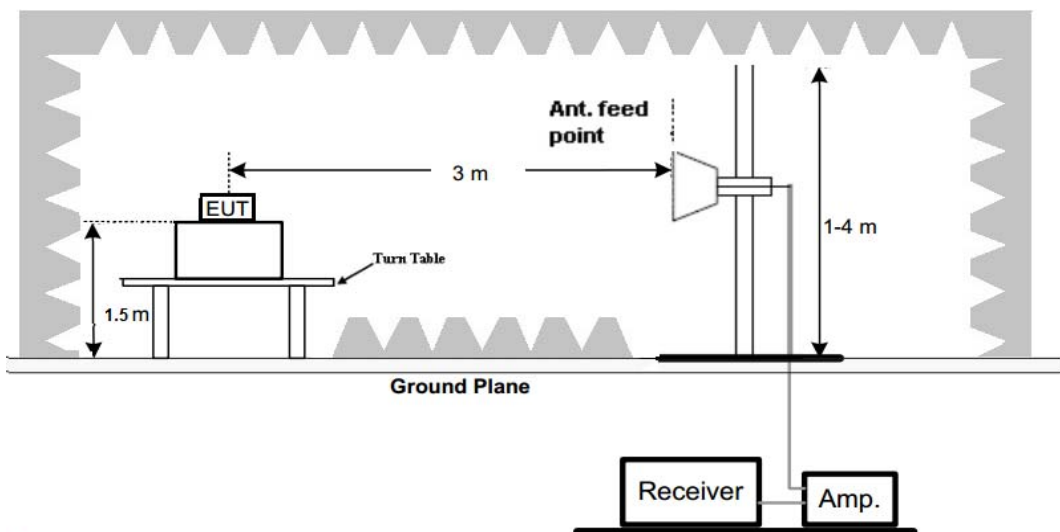
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
4. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.
5. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measurements have been completed.

TEST RESULTS

Remark:

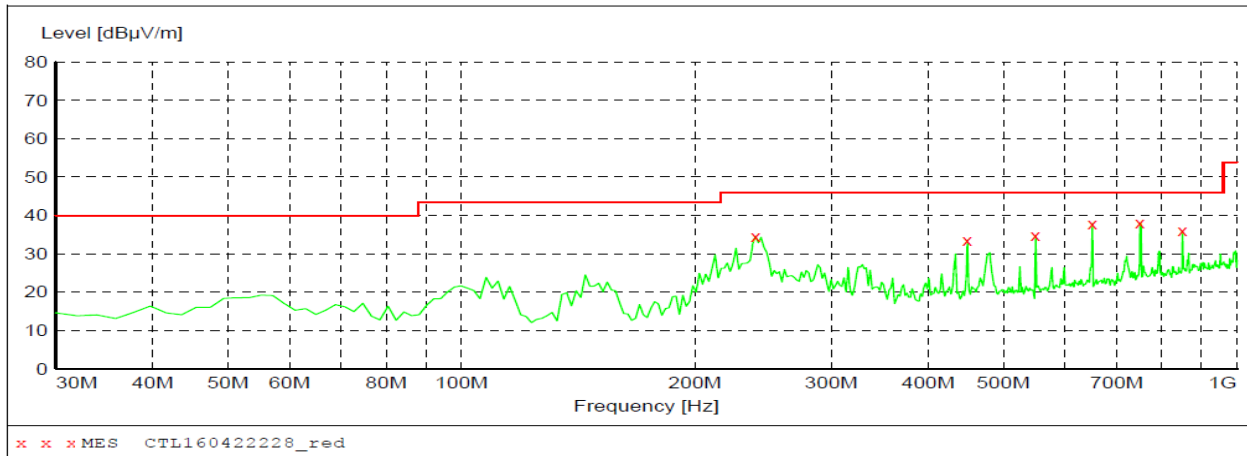
1. All 802.11a SISO/ 802.11n (HT20) MIMO / 802.11ac (HT20) MIMO/ 802.11n (HT40) MIMO/ 802.11ac (HT40) MIMO / 802.11ac (HT80) MIMO modes all have been tested for below 1GHz test, only the worst case 802.11ac (HT20) MIMO mode low channel of U-NII 1 band was recorded.
2. All 802.11a SISO/ 802.11n (HT20) MIMO / 802.11ac (HT20) MIMO/ 802.11n (HT40) MIMO/ 802.11ac (HT40) MIMO / 802.11ac (HT80) MIMO modes all have been tested for above 1GHz test, only the worst case 802.11ac (HT20) MIMO mode was recorded.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			Transducer
Start	Stop	Detector	Meas. Time	IF Bandw.	
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

**MEASUREMENT RESULT: "CTL160422228_red"**

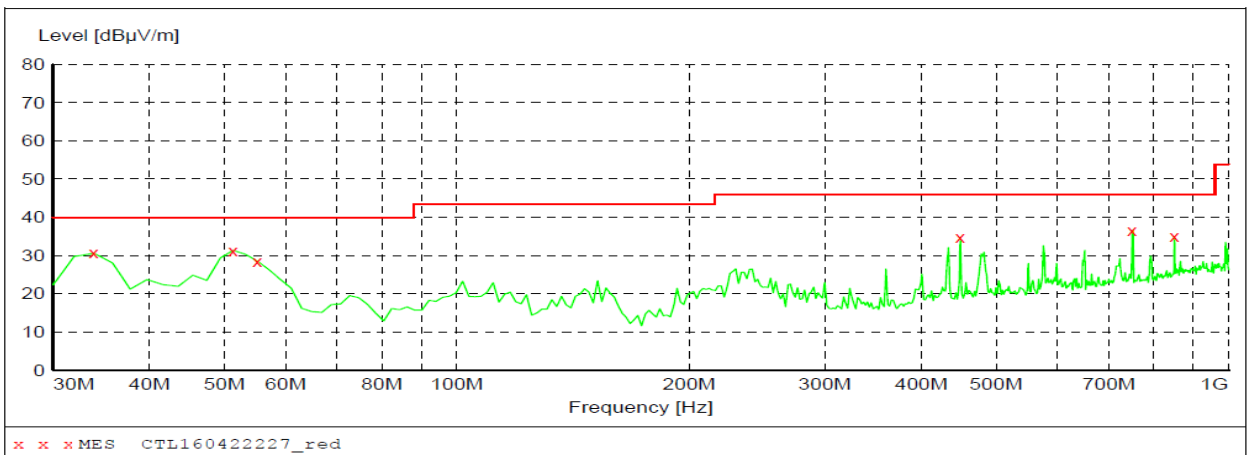
4/22/2016 5:03PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
239.520000	34.60	-15.9	46.0	11.4	---	100.0	111.00	HORIZONTAL
449.040000	33.50	-11.4	46.0	12.5	---	300.0	229.00	HORIZONTAL
549.920000	34.70	-9.5	46.0	11.3	---	100.0	65.00	HORIZONTAL
650.800000	37.90	-7.6	46.0	8.1	---	100.0	45.00	HORIZONTAL
749.740000	38.00	-6.1	46.0	8.0	---	100.0	324.00	HORIZONTAL
850.620000	35.90	-5.1	46.0	10.1	---	100.0	57.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			Transducer
Start	Stop	Detector	Meas. Time	IF Bandw.	
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

**MEASUREMENT RESULT: "CTL160422227_red"**

4/22/2016 5:00PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	30.60	-17.3	40.0	9.4	---	100.0	0.00	VERTICAL
51.340000	31.30	-16.4	40.0	8.7	---	100.0	241.00	VERTICAL
55.220000	28.50	-16.6	40.0	11.5	---	100.0	316.00	VERTICAL
449.040000	34.70	-11.4	46.0	11.3	---	100.0	357.00	VERTICAL
749.740000	36.60	-6.1	46.0	9.4	---	100.0	174.00	VERTICAL
850.620000	34.90	-5.1	46.0	11.1	---	100.0	165.00	VERTICAL

For 1GHz to 25GHz

Note: All 802.11a SISO / 802.11n (HT20) MIMO/ 802.11ac (HT20) MIMO/ 802.11n (HT40) MIMO/ 802.11ac (HT40) MIMO/ 802.11ac (HT80) MIMO modes All have been tested for above 1GHz test, only the worst case 802.11ac (HT20) was recorded.

U-NII 1 & 802.11ac (HT20) Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)		Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
36 (5180MHz)	5150.00	56.85	PK	V	68.20		49.58	34.44	7.12	34.28	7.27
	5150.00	48.11	AV	V	54.0		40.84	34.44	7.12	34.28	7.27
	10360.00	50.36	PK	V	68.20		34.63	39.20	11.45	34.92	15.73
	--	--	--	--	--		--	--	--	--	--
40 (5200MHz)	10400.00	49.87	PK	V	68.20		34.05	39.22	11.48	34.89	15.82
	--	--	--	--	--		--	--	--	--	--
48 (5240MHz)	5350.50	53.65	PK	V	68.20		46.09	34.69	7.23	34.36	7.56
	10480.00	50.39	PK	V	68.20		43.30	34.69	7.23	34.83	7.09
	--	--	--	--	--		--	--	--	--	--

U-NII 3 & 802.11ac (HT20) Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)		Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
149 (5745MHz)	5712.75	52.16	PK	V	68.20		44.43	34.79	7.43	34.49	7.73
	5724.50	48.62	PK	V	68.20		40.89	34.79	7.43	34.49	7.73
	10950.00	51.68	PK	V	68.20		34.63	39.53	11.97	34.45	17.05
	--	--	--	--	--		--	--	--	--	--
157 (5785MHz)	11570.00	51.58	PK	V	68.20		33.14	39.71	13.05	34.31	18.44
	--	--	--	--	--		--	--	--	--	--
165 (5825MHz)	5855.25	51.58	PK	V	68.20		43.80	34.81	7.51	34.54	7.78
	5865.75	49.98	PK	V	68.20		42.20	34.81	7.51	34.54	7.78
	11650.00	52.69	PK	V	68.20		34.07	39.73	13.19	34.30	18.62
	--	--	--	--	--		--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. H and V all have been tested , only worse case Vertical is reported
5. RBW1MHz VBW3MHz Peak detector is for PK value; RMS detector is for AV value.

3.3. Maximum Conducted Output Power

Limit

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration**Test Results**

Type	Bands	Channel	Output power Ant1 (dBm)	Output power Ant2 (dBm)	Output power Total (dBm)	Limit (dBm)	Result
802.11a	U-NII 1	36	16.11	15.19	/	30.00	Pass
		40	15.76	15.25	/		
		48	16.38	15.65	/		
	U-NII 3	149	16.63	16.44	/	30.00	
		157	16.26	16.25	/		
		165	16.69	16.67	/		
802.11n(HT20) MIMO	U-NII 1	36	15.28	15.89	18.61	30.00	Pass
		40	14.93	15.03	17.99		
		48	15.44	14.70	18.10		
	U-NII 3	149	16.34	15.62	19.01	30.00	
		157	16.57	15.40	19.03		
		165	16.47	15.89	19.20		
802.11n(HT40) MIMO	U-NII 1	38	15.83	14.22	18.11	30.00	Pass
		46	15.37	14.34	17.90		
	U-NII 3	151	15.44	14.12	17.84	30.00	
		159	15.25	14.23	17.78		
802.11ac(HT20) MIMO	U-NII 1	36	14.65	14.48	17.58	30.00	Pass
		40	14.93	14.42	17.69		
		48	15.07	14.58	17.84		
	U-NII 3	149	15.93	15.43	18.70	30.00	
		157	15.82	15.42	18.63		
		165	16.66	15.12	18.97		
802.11ac(HT40) MIMO	U-NII 1	38	15.51	15.83	18.68	30.00	Pass
		46	15.75	15.14	18.47		
	U-NII 3	151	15.88	15.81	18.86	30.00	
		159	15.96	15.51	18.75		
802.11ac(HT80) MIMO	U-NII 1	42	14.92	14.77	17.86	30.00	Pass
	U-NII 3	155	15.90	14.98	18.47		

Note: 1.The test results including the cable lose.

3.4. Power Spectral Density

Limit

(1) For the band 5.15 - 5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.^{note1}

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.^{note1}

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band.^{note1}

(2) For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band.^{note1}

(3) For the band 5.725 - 5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.^{note1, note2}

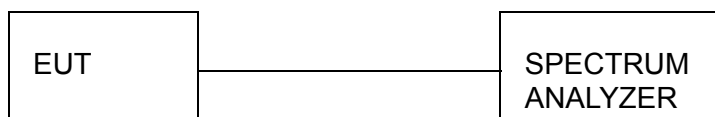
Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 510KHz for U-NII 3 band.
3. Set the VBW $\geq 3 \times$ RBW.
4. Set the span to encompass the entire EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.

Test Configuration



Test Results

Type	Bands	Channel	Power Spectral Density Ant1 (dBm/MHz)	Power Spectral Density Ant2 (dBm/MHz)	Power Spectral Density Total (dBm/ MHz)	Limit (dBm/MHz)	Result
802.11a SISO	U-NII 1	36	10.912	10.415	/	17	Pass
		40	11.249	10.249	/		
		48	11.064	9.941	/		
802.11n (HT20) MIMO	U-NII 1	36	10.155	10.039	13.11		
		40	10.704	10.911	13.82		
		48	9.522	9.457	12.50		
802.11n (HT40) MIMO	U-NII 1	38	7.095	5.687	9.46		
		46	6.459	6.586	9.53		
802.11ac (HT20) MIMO	U-NII 1	36	10.470	8.950	12.79		
		40	10.189	9.997	13.10		
		48	10.835	8.732	12.92		
802.11ac (HT40) MIMO	U-NII 1	38	7.955	5.674	9.97		
		46	7.819	7.743	10.79		
802.11ac (HT80) MIMO	U-NII 1	42	5.199	4.135	7.71		

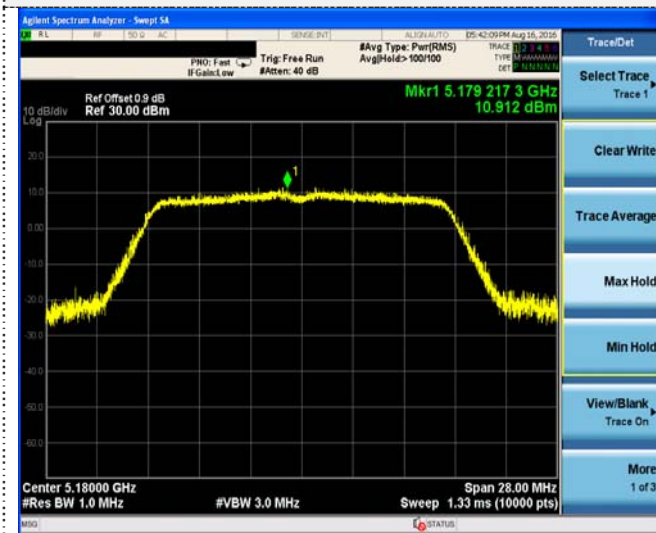
Type	Bands	Channel	Power Spectral Density Ant1 (dBm/500KHz)	Power Spectral Density Ant2 (dBm/500KHz)	Power Spectral Density Total (dBm/ 500KHz)	Limit (dBm/500KHz)	Result
802.11a SISO	U-NII 3	149	6.700	7.634		30	Pass
		157	7.668	8.083			
		165	8.063	7.550			
802.11n (HT20) MIMO	U-NII 3	149	5.775	6.176	8.99		
		157	7.076	6.311	9.72		
		165	7.041	7.245	10.15		
802.11n (HT40) MIMO	U-NII 3	151	4.394	3.426	6.95		
		159	4.252	4.502	7.39		
802.11ac (HT20) MIMO	U-NII 3	149	6.389	6.201	9.31		
		157	6.111	5.984	9.06		
		165	6.273	6.454	9.37		
802.11ac (HT40) MIMO	U-NII 3	151	5.190	3.608	7.48		
		159	4.091	3.679	6.90		
802.11ac (HT80) MIMO	U-NII 3	155	2.108	1.436	4.80		

Test plot as follows:

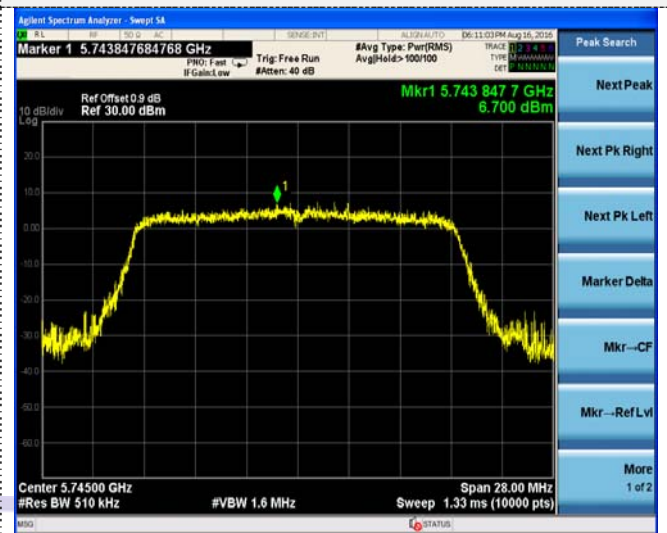
ANT1

802.11a

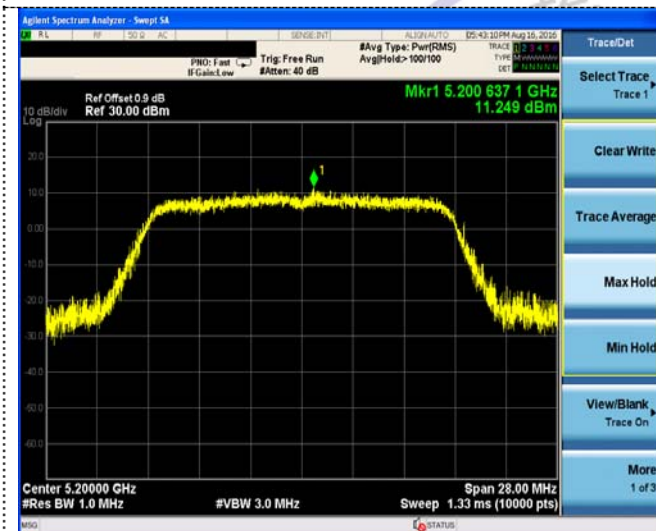
U-NII 1



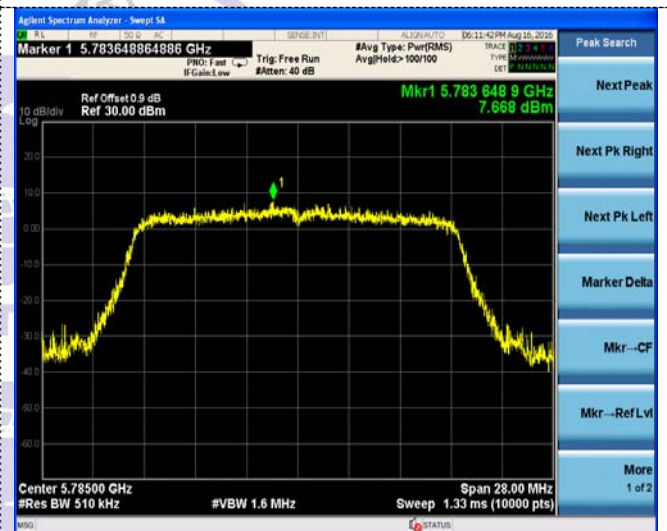
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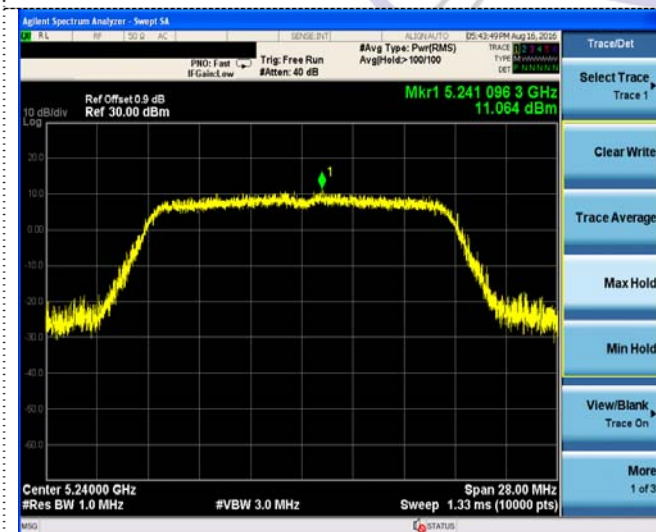
CH36



CH149



CH40



CH157

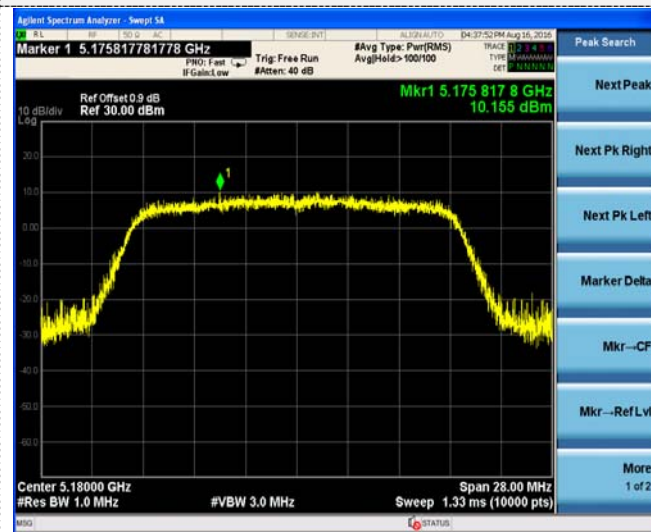


CH48

CH165

802.11n(HT20)

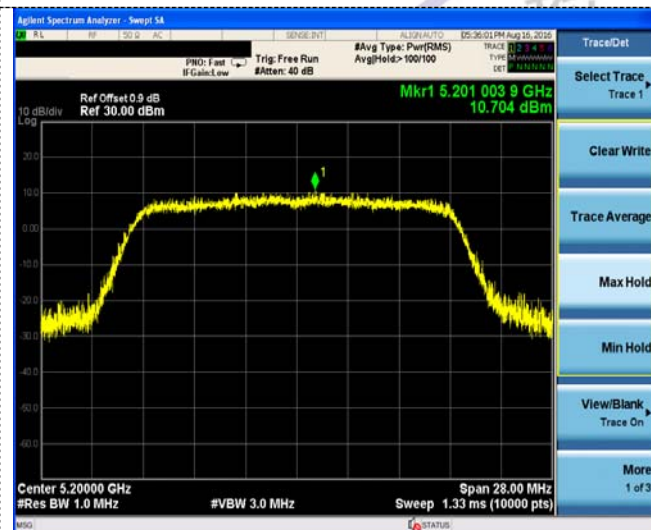
U-NII 1



U-NII 3



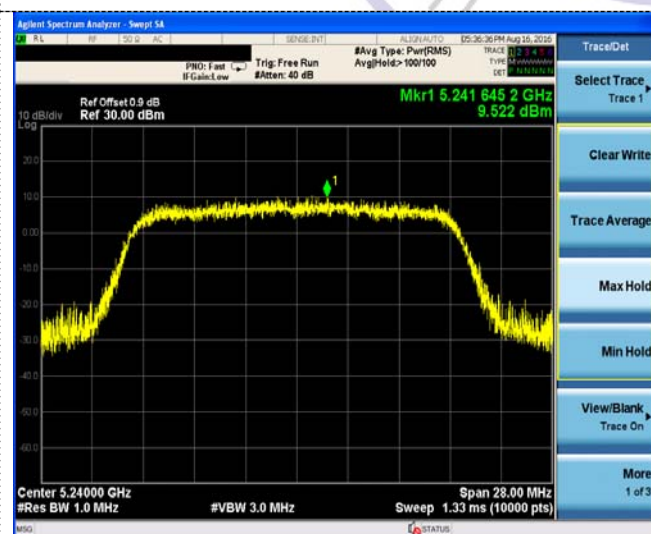
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CH149



CH40



CH157



CH48

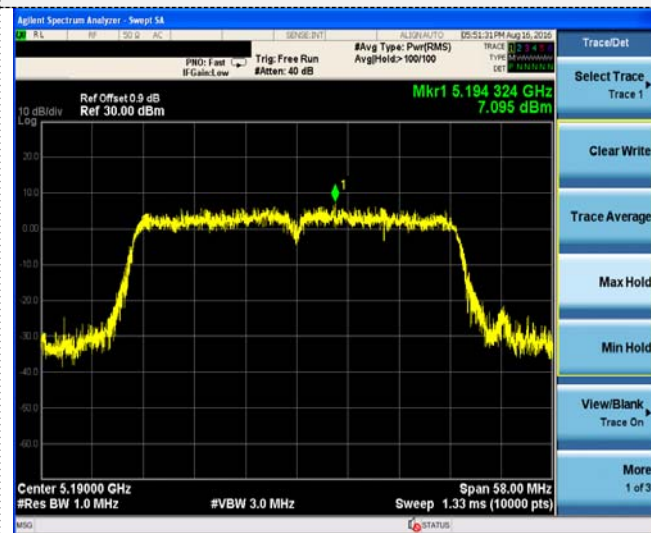


CH165



802.11n(HT40)

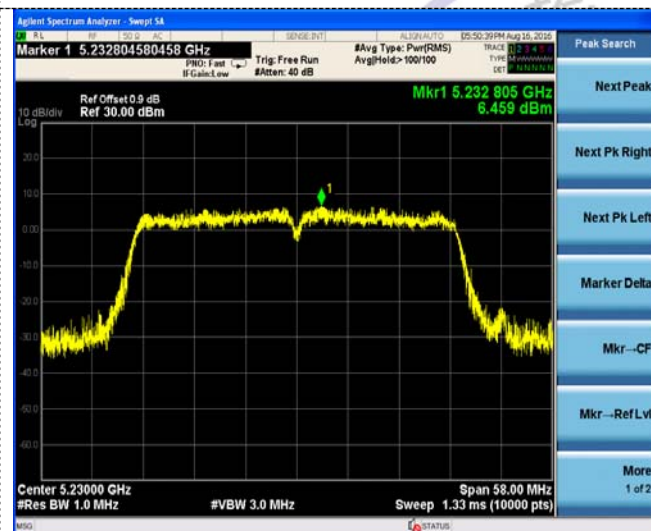
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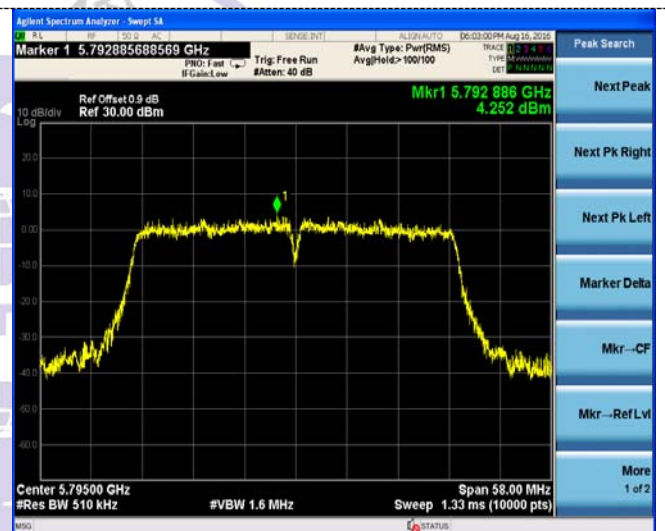
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CH38



CH151

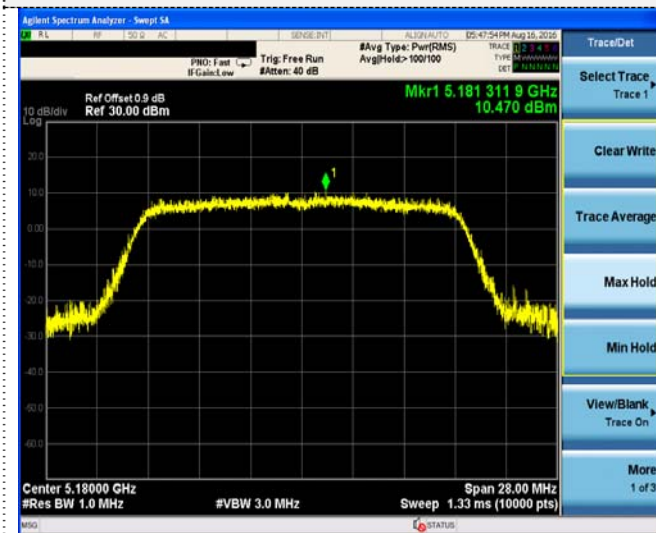


CH46

CH159

802.11ac(HT20)

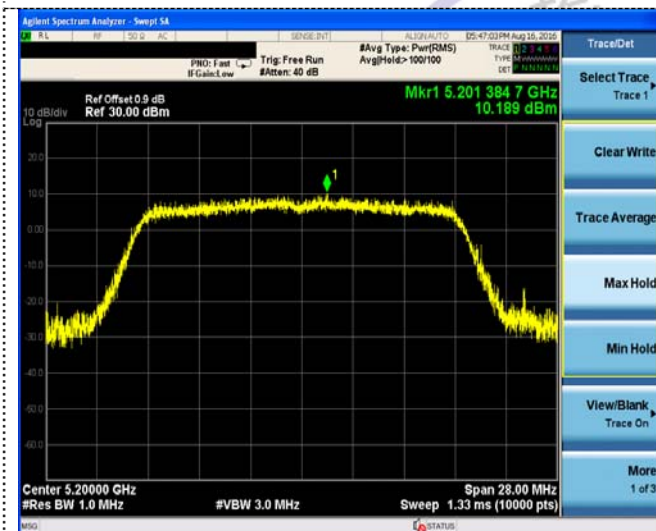
U-NII 1



U-NII 3



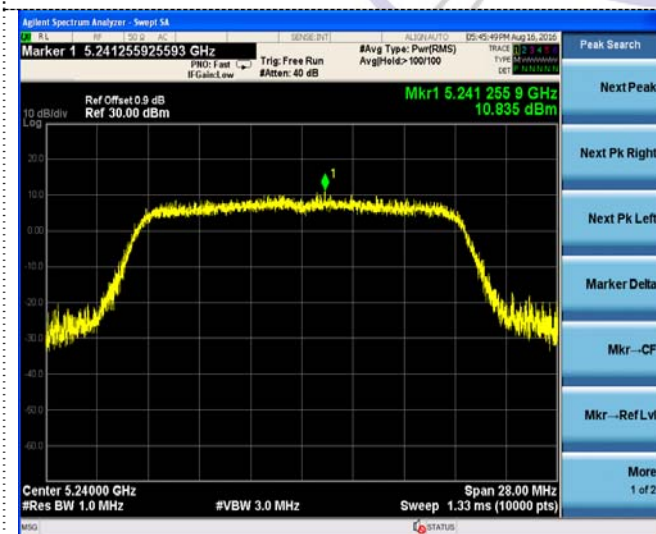
CH36



CH149



CH40



CH157



CH48

CH165