FCC REPORT

Applicant:	Shenzhen siswoo mobile technology co., ltd
Address of Applicant:	room 1701, haisong building, tairang road 9, futian district shenzhen city, China

Equipment Under Test (EUT)

Product Name:	Mobile Phone
Model No.:	C50, C50A, C55A, C5, C45, A4, A4+, A5, A5+, A6, i7, C55, C60, M3, MG12
Trade mark:	APRIX, SISWOO
FCC ID:	2AEW7SISWOOC50A
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	13 May, 2015
Date of Test:	14 May, to 10 Jun., 2015
Date of report issued:	11 Jun., 2015
Test Result:	PASS*

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	*11 Jun., 2015*	*Original*

Prepared by: Luna Gao ***Date:*** *11 Jun., 2015*

Report Clerk

Reviewed by: Gavin Liu ***Date:*** *11 Jun., 2015*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.407 (g)	Pass
AC Power Line Conducted Emission	15.207/15.407(b)(6)	Pass
Conducted Peak Output Power	15.407 (a)(1)(iv)	Pass
26dB Occupied Bandwidth	15.407 (a)	Pass
Power Spectral Density	15.407 (a)(1)(iv)	Pass
Band Edge	15.407(b)(1)	Pass
Spurious Emission	15.205/15.209/15.407(b)(6)(7)	Pass
Frequency Stability	15.407(g)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Shenzhen siswoo mobile technology co., ltd
Address of Applicant:	room 1701, haisong building, tairang road 9, futian district shenzhen city, China
Manufacturer/Factory:	Shenzhen siswoo mobile technology co., ltd
Address of Manufacturer/ Factory:	room 1701, haisong building, tairang road 9, futian district shenzhen city, China

5.2 General Description of E.U.T.

Product Name:	Mobile Phone
Model No.:	C50, C50A, C55A, C5, C45, A4, A4+, A5, A5+, A6, i7, C55, C60, M3, MG12
Operation Frequency:	UNII 1: 5180MHz-5240MHz
Operation mode:	Portable
Channel numbers:	802.11a/802.11n20: 4
Channel separation:	802.11a/802.11n20: 20MHz
Modulation technology: (IEEE 802.11a)	BPSK, QPSK,16-QAM, 64-QAM
Modulation technology: (IEEE 802.11n)	BPSK, QPSK, 16-QAM, 64-QAM
Data speed(IEEE 802.11a)	6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps,36Mbps,48Mbps, 54Mbps
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps, MCS1:13Mbps, MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps
Antenna Type:	Internal
Antenna gain:	0 dBi
AC adapter:	Model:KA25-0501000US Input:100-240V AC,50/60Hz 0.25A Output:5V DC MAX 1A
Power supply:	Rechargeable Li-ion Battery DC3.8V-3000mAh
Remark:	Model No.: C50, C50A, C55A, C5, C45, A4, A4+, A5, A5+, A6, i7, C55, C60, M3, MG12 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name and Color in plastic.

Operation Frequency each of channel

Band 1	
802.11a/802.11n20	
Channel	Frequency
36	5180MHz
40	5200MHz
44	5220MHz
48	5240MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 1	
802.11a/802.11n20	
Channel	Frequency
The lowest channel	5180MHz
The middle channel	5200MHz
The highest channel	5240MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

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

Mode	Data rate
802.11a	6 Mbps
802.11n20	6.5 Mbps

Final Test Mode:

According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup” 6 Mbps for 802.11a, 6.5 Mbps for 802.11n20. All test items for 802.11a and 802.11n were performed in MIMO mode and duty cycle all above 98%, meet the requirements of KDB789033.

5.4 Laboratory Facility

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

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing 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 out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.5 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao’an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

5.6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	CCIS0002	N/A	N/A
3	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2015	03-31-2016
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	03-28-2015	03-28-2016
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	03-28-2015	03-28-2016
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2015	03-31-2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2015	03-31-2016
9	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2015	03-31-2016
10	Pre-amplifier (18-40GHz)	A.H System	PAM-1840	GTS219	04-01-2015	03-31-2016
11	Spectrum analyzer (9k-30GHz)	Rohde & Schwarz	FSP	CCIS0023	03-28-2015	03-28-2016
12	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-28-2015	03-28-2016
13	Spectrum Analyzer	HP	8564E	CCIS0150	03-28-2015	03-28-2016

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	06-09-2015	06-08-2016
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-28-2015	03-28-2016
3	LISN	CHASE	MN2050D	CCIS0074	03-28-2015	03-28-2016
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2015	03-31-2016
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Justification

According to section 5.2 of this report, the EUT have 1 type of antenna, so all radiated method test items was performed with the 0 dBi panel antenna.

6.2 Antenna requirement

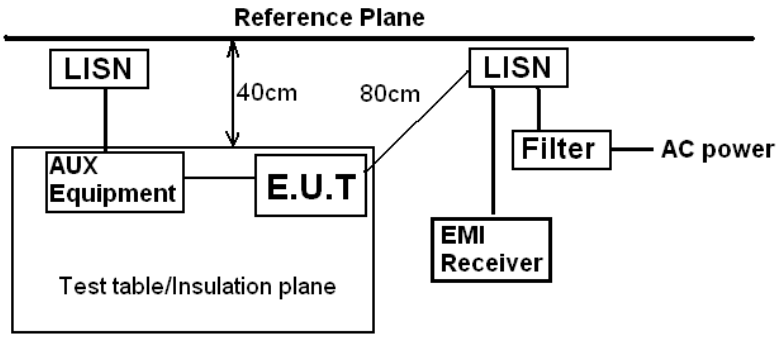
Standard requirement:	FCC Part15 E Section 15.203 /407(a)
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.* *This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.*	
E.U.T Antenna:	
The 5G WiFi antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is 0 dBi.	

6.3 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2014
Test Frequency Range:	150 kHz to 30 MHz
Class / Severity:	Class B
Receiver setup:	RBW=9 kHz, VBW=30 kHz
Limit:	

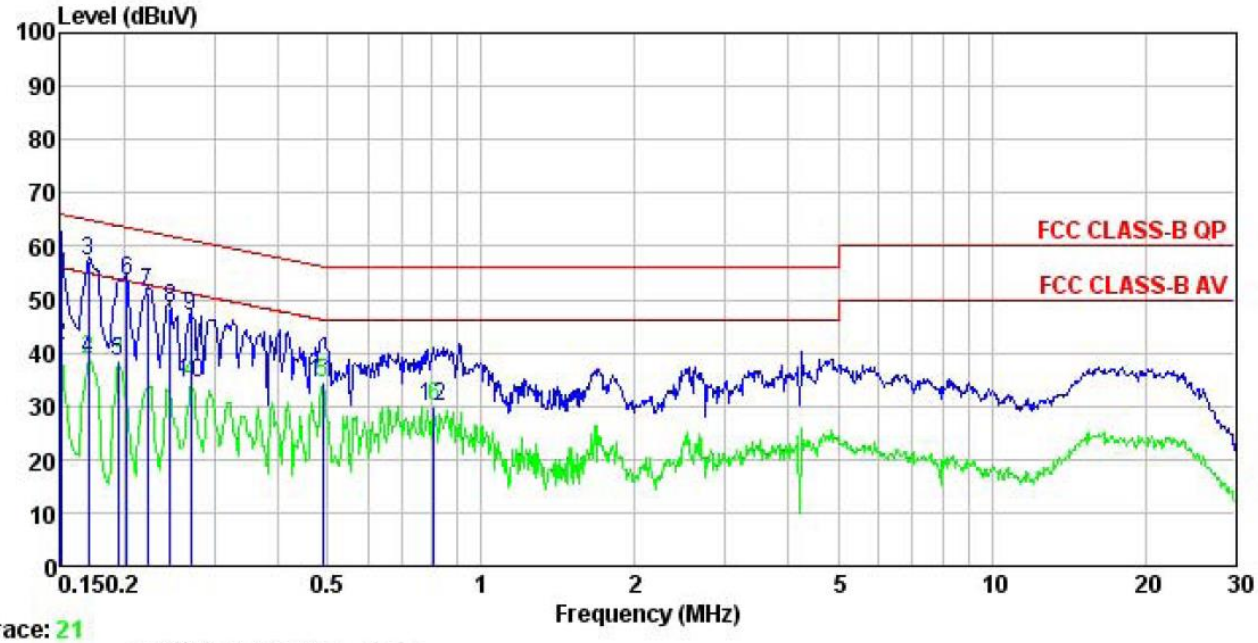
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data

Line:

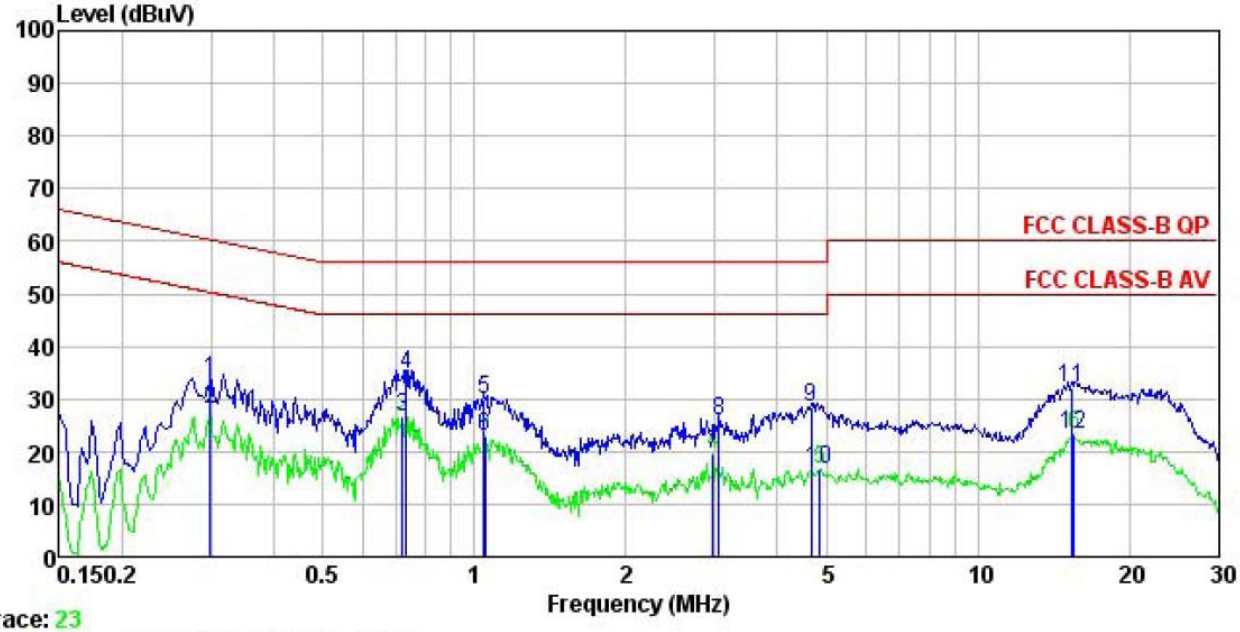


Trace: 21

Site : CCIS Shielding Room
Condition : FCC CLASS-B QP LISN LINE
Pro : 321RF
EUT : Moblie Phone
Model : C50
Test Mode : WIFI TX mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Carey
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	50.70	0.27	10.78	61.75	66.00	-4.25	QP
2	0.150	30.44	0.27	10.78	41.49	56.00	-14.51	Average
3	0.170	46.01	0.27	10.77	57.05	64.94	-7.89	QP
4	0.170	27.66	0.27	10.77	38.70	54.94	-16.24	Average
5	0.194	27.42	0.28	10.76	38.46	53.84	-15.38	Average
6	0.202	42.42	0.28	10.76	53.46	63.54	-10.08	QP
7	0.222	40.21	0.27	10.75	51.23	62.74	-11.51	QP
8	0.246	37.44	0.27	10.75	48.46	61.91	-13.45	QP
9	0.270	35.89	0.27	10.75	46.91	61.12	-14.21	QP
10	0.270	23.33	0.27	10.75	34.35	51.12	-16.77	Average
11	0.489	23.28	0.29	10.76	34.33	46.19	-11.86	Average
12	0.809	18.95	0.23	10.81	29.99	46.00	-16.01	Average

Neutral:



Trace: 23

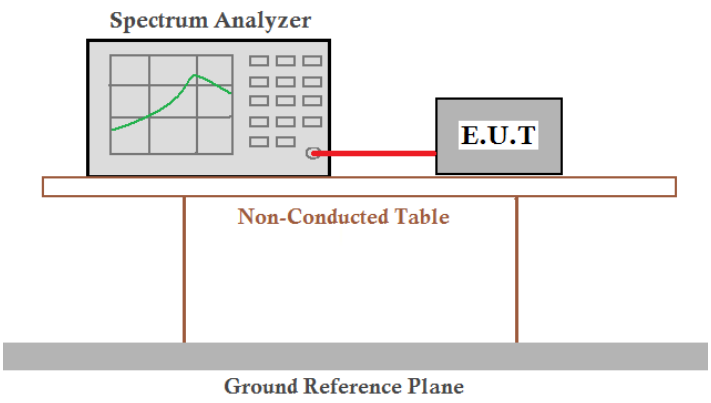
Site : CCIS Shielding Room
Condition : FCC CLASS-B QP LISN NEUTRAL
Pro : 321RF
EUT : Moblie Phone
Model : C50
Test Mode : WIFI TX mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Carey
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.299	22.65	0.26	10.74	33.65	60.28	-26.63	QP
2	0.299	16.92	0.26	10.74	27.92	50.28	-22.36	Average
3	0.720	15.72	0.18	10.78	26.68	46.00	-19.32	Average
4	0.731	23.62	0.18	10.78	34.58	56.00	-21.42	QP
5	1.043	18.81	0.22	10.88	29.91	56.00	-26.09	QP
6	1.049	11.69	0.22	10.88	22.79	46.00	-23.21	Average
7	2.978	8.34	0.29	10.92	19.55	46.00	-26.45	Average
8	3.058	14.72	0.29	10.92	25.93	56.00	-30.07	QP
9	4.672	17.17	0.28	10.86	28.31	56.00	-27.69	QP
10	4.848	5.61	0.28	10.86	16.75	46.00	-29.25	Average
11	15.307	21.09	0.25	10.90	32.24	60.00	-27.76	QP
12	15.552	12.12	0.25	10.90	23.27	50.00	-26.73	Average

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.4 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv)
Test Method:	ANSI C63.10:2013, KDB 789033 D02
Limit:	**Band 1:** 250mW (Maximum antenna gain less than 6 dB, 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.)
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

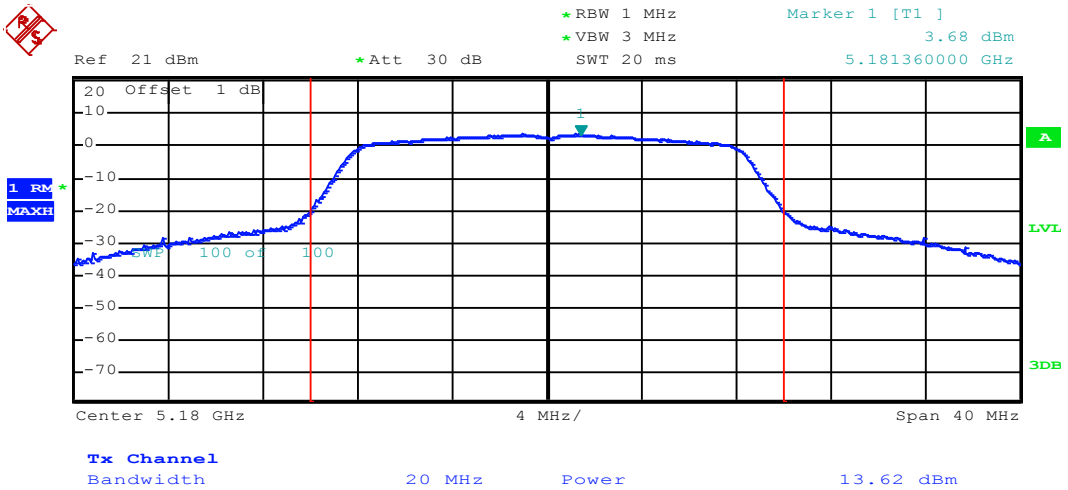
Measurement Data

Band 1:

Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	13.62	24.0	Pass
	Middle	13.31	24.0	Pass
	Highest	12.37	24.0	Pass
802.11n20	Lowest	13.61	24.0	Pass
	Middle	13.24	24.0	Pass
	Highest	12.47	24.0	Pass
Remark: The gain of antenna is less than 6 dBi, so the limit of power is 24 dBm (250mW).				

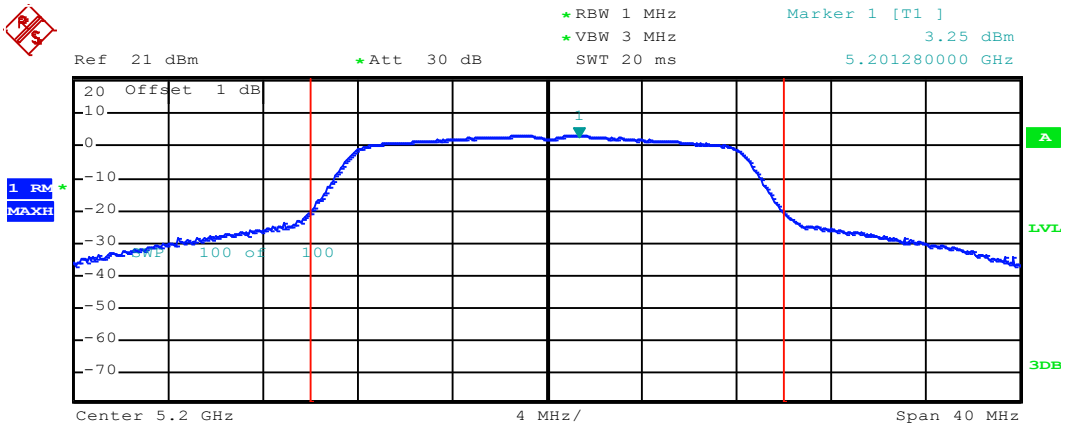
Test plot as follows:

802.11a



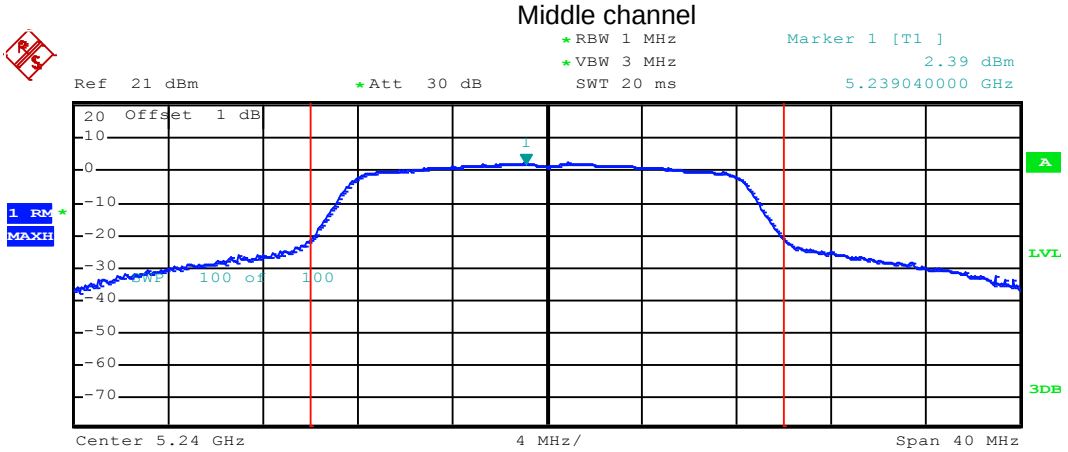
Tx Channel
Bandwidth 20 MHz Power 13.62 dBm

Lowest channel



Tx Channel
Bandwidth 20 MHz Power 13.31 dBm

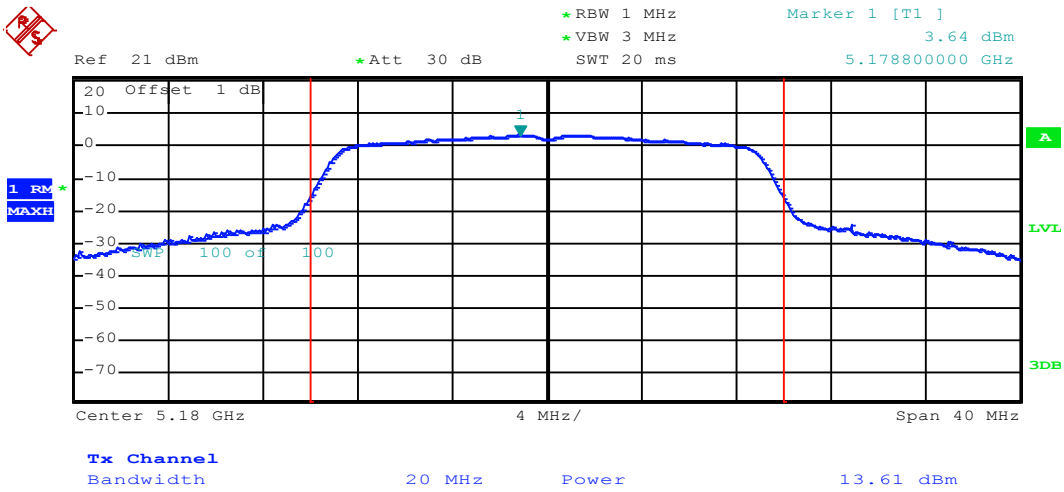
Middle channel



Tx Channel
Bandwidth 20 MHz Power 12.37 dBm

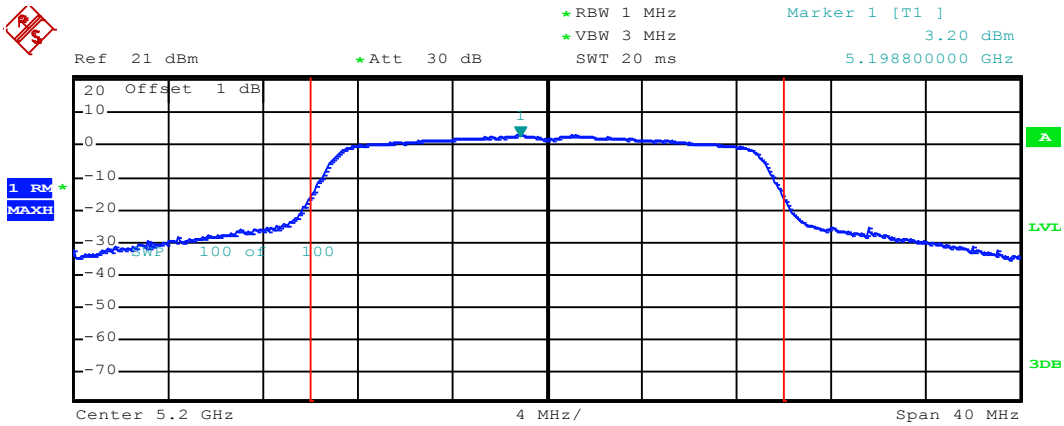
Highest channel

802.11n20



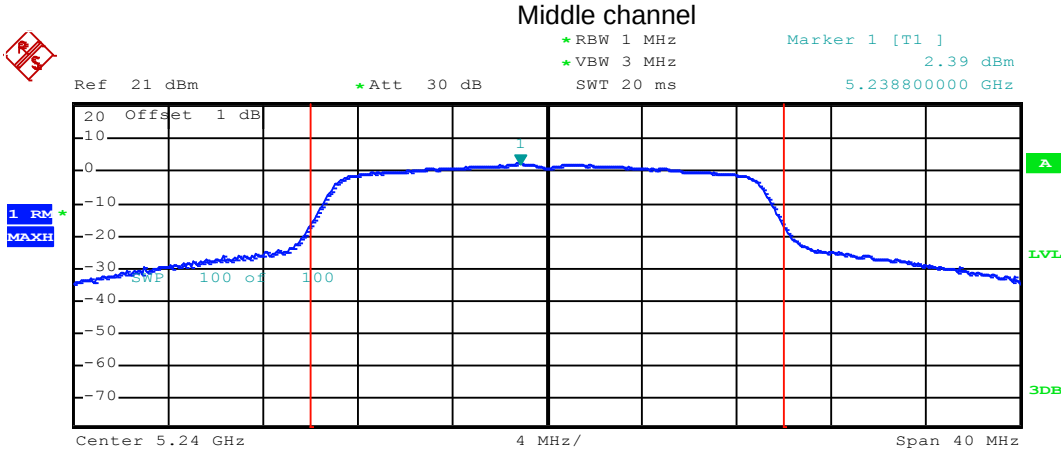
Tx Channel
Bandwidth 20 MHz Power 13.61 dBm

Lowest channel



Tx Channel
Bandwidth 20 MHz Power 13.24 dBm

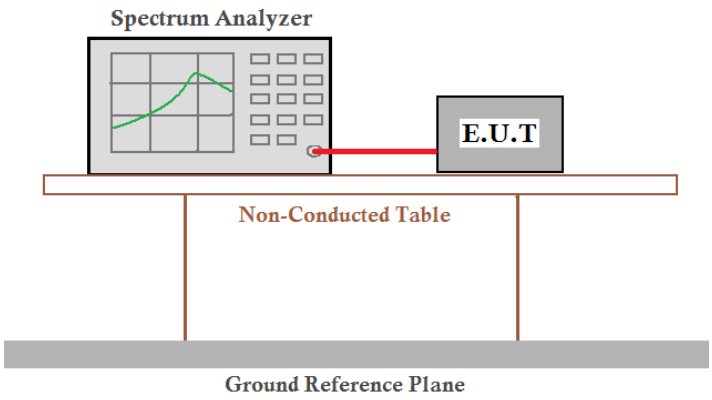
Middle channel



Tx Channel
Bandwidth 20 MHz Power 12.47 dBm

Highest channel

6.5 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02
Limit:	Band 1: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

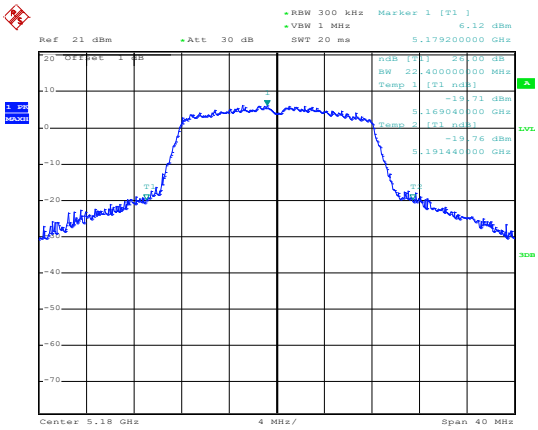
Band 1:

Test Channel	26dB Emission Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	22.40	22.08	N/A	N/A
Middle	22.56	22.88		
Highest	23.12	23.44		

Test Channel	99% Occupy Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	17.12	17.92	N/A	N/A
Middle	17.04	18.00		
Highest	17.20	18.00		

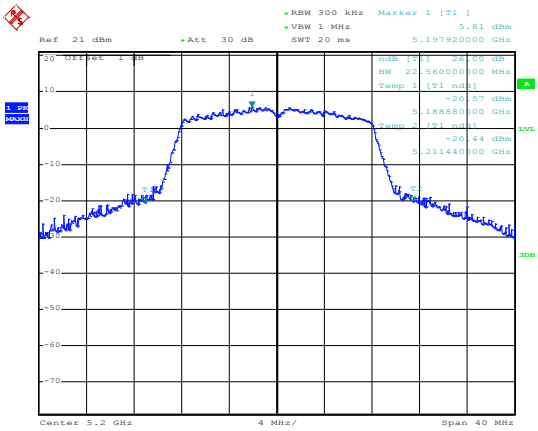
Test plot as follows:

26 dB EBW - 802.11a



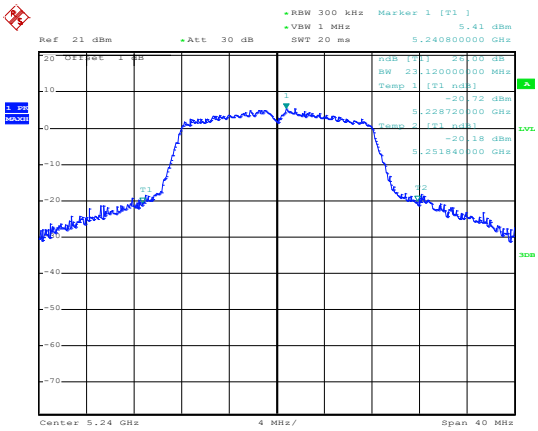
Date: 25.MAY.2015 21:08:58

Lowest channel



Date: 25.MAY.2015 21:10:02

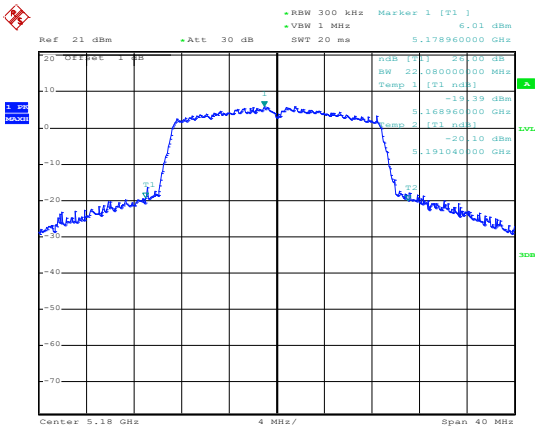
Middle channel



Date: 25.MAY.2015 21:10:24

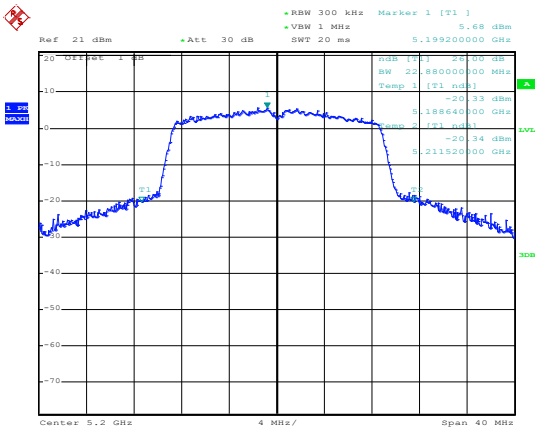
Highest channel

802.11n20



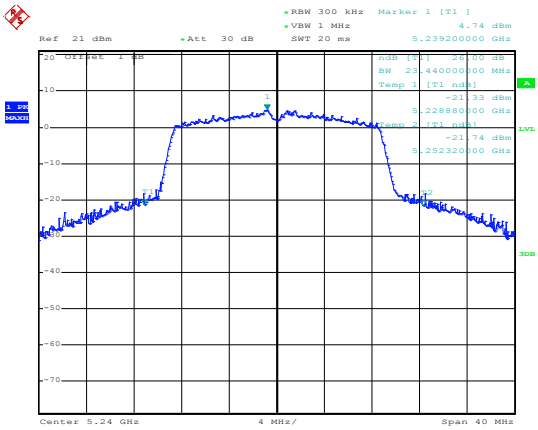
Date: 25.MAY.2015 21:08:31

Lowest channel



Date: 25.MAY.2015 21:07:46

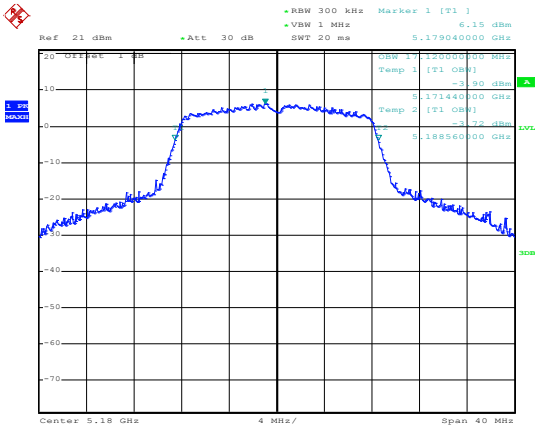
Middle channel



Date: 25.MAY.2015 21:07:28

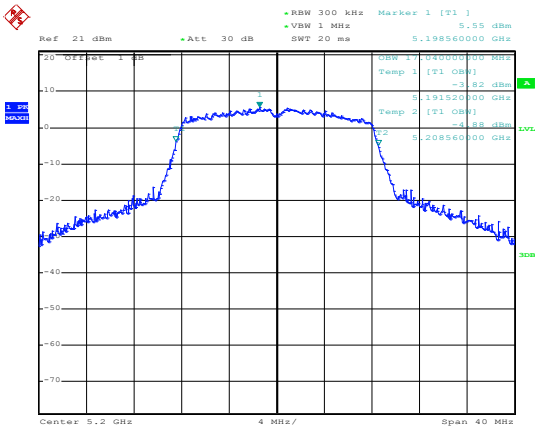
Highest channel

99% OBW - 802.11a



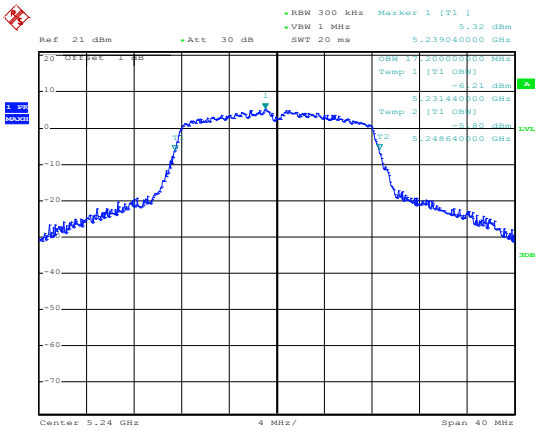
Date: 25.MAY.2015 21:09:23

Lowest channel



Date: 25.MAY.2015 21:09:46

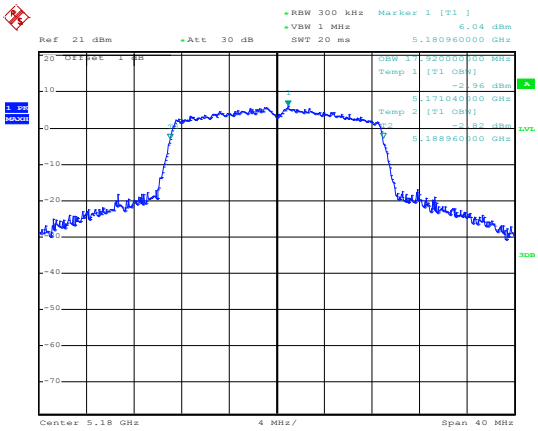
Middle channel



Date: 25.MAY.2015 21:10:36

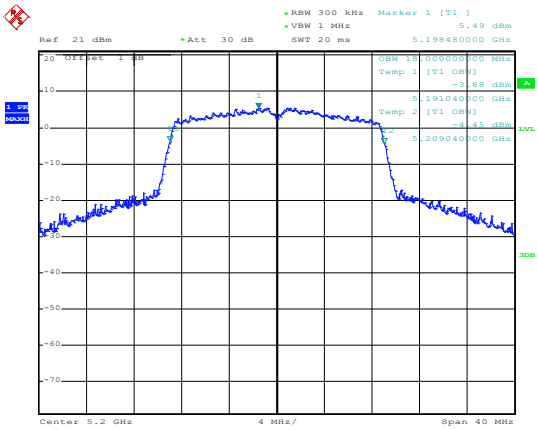
Highest channel

802.11n20



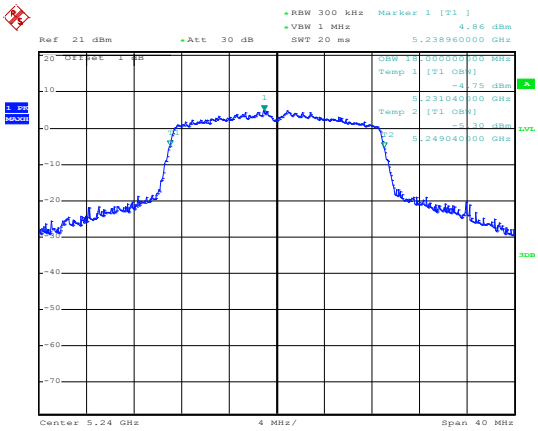
Date: 25.MAY.2015 21:08:17

Lowest channel



Date: 25.MAY.2015 21:08:00

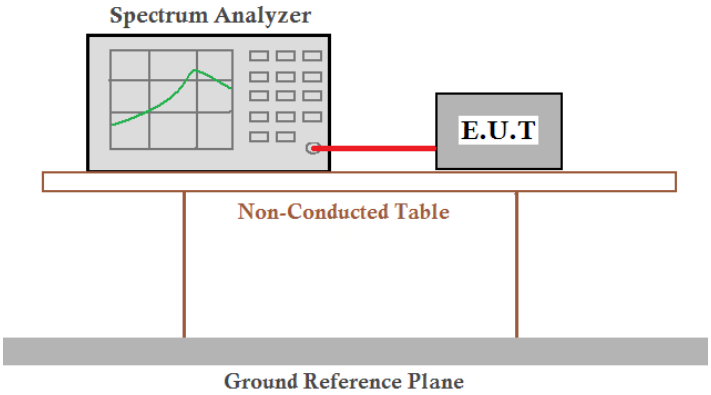
Middle channel



Date: 25.MAY.2015 21:07:19

Highest channel

6.6 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv)
Test Method:	ANSI C63.10:2013, KDB 789033 D02
Limit:	**Band 1:** 11 dBm/MHz (Maximum antenna gain less than 6 dB, 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.)
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

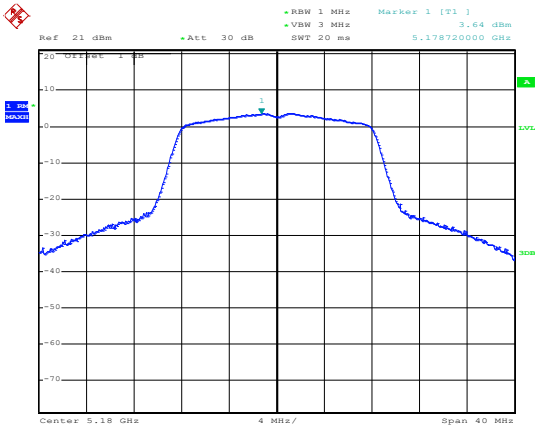
Measurement Data

Band 1:

Mode	Test CH	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Lowest	3.64	11.00	Pass
	Middle	3.47	11.00	Pass
	Highest	2.39	11.00	Pass
802.11n20	Lowest	3.73	11.00	Pass
	Middle	3.20	11.00	Pass
	Highest	2.33	11.00	Pass
Remark: The gain of antenna is less than 6 dBi, so the limit of power spectral density is 11 dBm.				

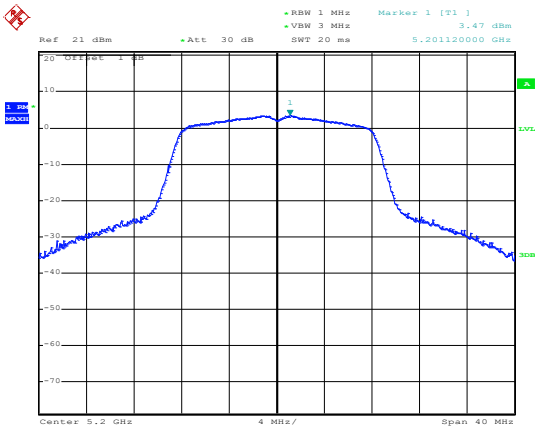
Test plot as follows:

Test mode: 802.11a



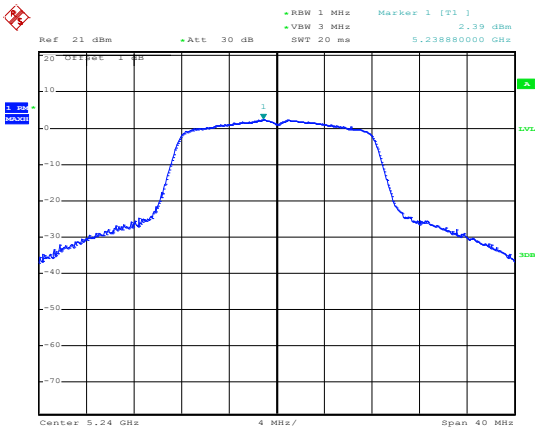
Date: 25.MAY.2015 21:04:57

Lowest channel



Date: 25.MAY.2015 21:05:21

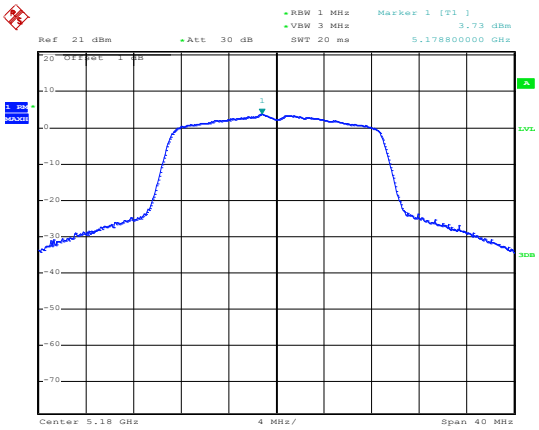
Middle channel



Date: 25.MAY.2015 21:05:40

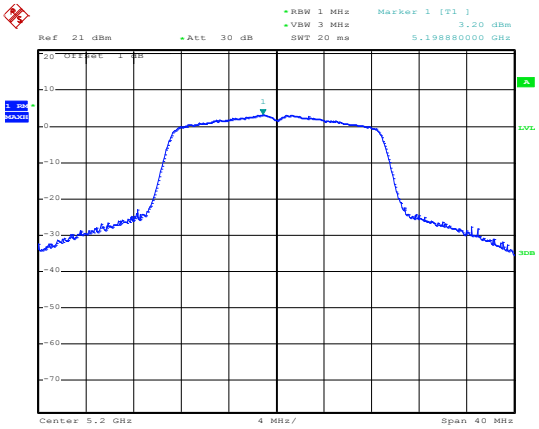
Highest channel

Test mode: 802.11n20



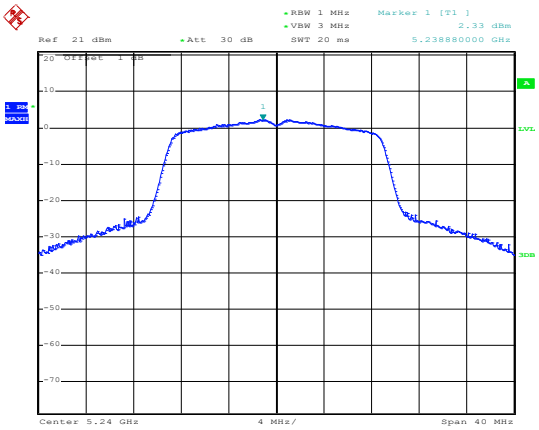
Date: 25.MAY.2015 21:06:09

Lowest channel



Date: 25.MAY.2015 21:06:24

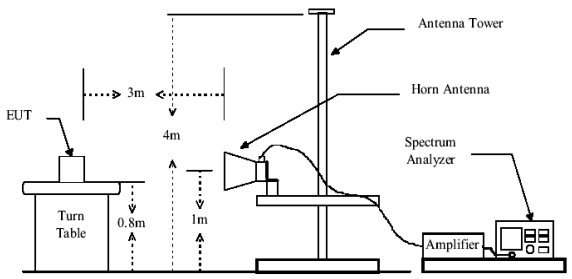
Middle channel



Date: 25.MAY.2015 21:06:38

Highest channel

6.7 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 (b)
Test Method:	ANSI C63.10:2013, KDB 789033 D02
Receiver setup:	Detector / RBW / VBW / Remark Quasi-peak / 100kHz / 300kHz / Quasi-peak Value Peak / 1MHz / 3MHz / Peak Value
Limit:	Band 1: Limit (dBuV/m @3m) / Remark 68.20 / Peak Value 54.00 / Average Value Remark: Band 1 limit: E [dBμV/m] = EIRP [dBm] + 95.2=68.2 dBuV/m, for EIPR [dBm]= -27dBm.
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 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 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. 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	41.77	32.07	10.96	40.06	44.74	68.20	-23.46	Vertical
5150.00	41.41	32.07	10.96	40.06	44.38	68.20	-23.82	Horizontal
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	31.61	32.07	10.96	40.06	34.58	54.00	-19.42	Vertical
5150.00	31.41	32.07	10.96	40.06	34.38	54.00	-19.62	Horizontal
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	44.33	31.78	11.19	40.18	47.12	68.20	-21.08	Vertical
5350.00	43.65	31.78	11.19	40.18	46.44	68.20	-21.76	Horizontal
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.72	31.78	11.19	40.18	37.51	54.00	-16.49	Vertical
5350.00	33.89	31.78	11.19	40.18	36.68	54.00	-17.32	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	41.43	32.07	10.96	40.06	44.4	68.20	-23.80	Vertical
5150.00	41.36	32.07	10.96	40.06	44.33	68.20	-23.87	Horizontal
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	31.09	32.07	10.96	40.06	34.06	54.00	-19.94	Vertical
5150.00	31.99	32.07	10.96	40.06	34.96	54.00	-19.04	Horizontal
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	44.4	31.78	11.19	40.18	47.19	68.20	-21.01	Vertical
5350.00	43.98	31.78	11.19	40.18	46.77	68.20	-21.43	Horizontal
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.49	31.78	11.19	40.18	37.47	54.00	-16.53	Vertical
5350.00	33.97	31.78	11.19	40.18	37.99	54.00	-16.01	Horizontal

Remark:

3. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

4. The emission levels of other frequencies are very lower than the limit and not show in test report.

6.8 Spurious Emission

6.8.1 Restricted Band

Test Requirement:	FCC Part15 C Section 15.205
Test Method:	ANSI C63.10:2013
Test Frequency Range:	4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	RMS	1MHz	3MHz	Average Value

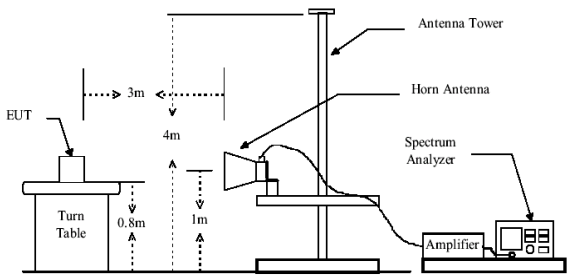
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	74.00	Peak Value
	54.00	Average Value

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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 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.
4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.

Test setup:



Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	43.08	30.72	10.22	40.67	43.35	68.20	-24.85	Vertical
5150.00	41.77	32.07	10.96	40.06	44.74	68.20	-23.46	Vertical
4500.00	43.45	30.72	10.22	40.67	43.72	68.20	-24.48	Horizontal
5150.00	41.41	32.07	10.96	40.06	44.38	68.20	-23.82	Horizontal
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	33.54	30.72	10.22	40.67	33.81	54.00	-20.19	Vertical
5150.00	31.61	32.07	10.96	40.06	34.58	54.00	-19.42	Vertical
4500.00	33.36	30.72	10.22	40.67	33.63	54.00	-20.37	Horizontal
5150.00	31.41	32.07	10.96	40.06	34.38	54.00	-19.62	Horizontal
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	44.33	31.78	11.19	40.18	47.12	68.20	-21.08	Vertical
5460.00	43.29	31.99	11.32	40.23	46.37	68.20	-21.83	Vertical
5350.00	43.65	31.78	11.19	40.18	46.44	68.20	-21.76	Horizontal
5460.00	43.41	31.99	11.32	40.23	46.49	68.20	-21.71	Horizontal
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.72	31.78	11.19	40.18	37.51	54.00	-16.49	Vertical
5460.00	33.66	31.99	11.32	40.23	36.74	54.00	-17.26	Vertical
5350.00	33.89	31.78	11.19	40.18	36.68	54.00	-17.32	Horizontal
5460.00	33.47	31.99	11.32	40.23	36.55	54.00	-17.45	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	42.62	30.72	10.22	40.67	42.89	68.20	-25.31	Vertical
5150.00	41.43	32.07	10.96	40.06	44.40	68.20	-23.80	Vertical
4500.00	42.67	30.72	10.22	40.67	42.94	68.20	-25.26	Horizontal
5150.00	41.36	32.07	10.96	40.06	44.33	68.20	-23.87	Horizontal
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	32.87	30.72	10.22	40.67	33.14	54.00	-20.86	Vertical
5150.00	31.09	32.07	10.96	40.06	34.06	54.00	-19.94	Vertical
4500.00	32.04	30.72	10.22	40.67	32.31	54.00	-21.69	Horizontal
5150.00	31.99	32.07	10.96	40.06	34.96	54.00	-19.04	Horizontal
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	44.40	31.78	11.19	40.18	47.19	68.20	-21.01	Vertical
5460.00	43.38	31.99	11.32	40.23	46.46	68.20	-21.74	Vertical
5350.00	43.98	31.78	11.19	40.18	46.77	68.20	-21.43	Horizontal
5460.00	42.43	31.99	11.32	40.23	45.51	68.20	-22.69	Horizontal
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.49	31.78	11.19	40.18	37.28	54.00	-16.72	Vertical
5460.00	33.56	31.99	11.32	40.23	36.64	54.00	-17.36	Vertical
5350.00	33.97	31.78	11.19	40.18	36.76	54.00	-17.24	Horizontal
5460.00	32.69	31.99	11.32	40.23	35.77	54.00	-18.23	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.8.2 Unwanted Emissions outside the Restricted Bands

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2013
Test Frequency Range:	30MHz to 40GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value

Limit:

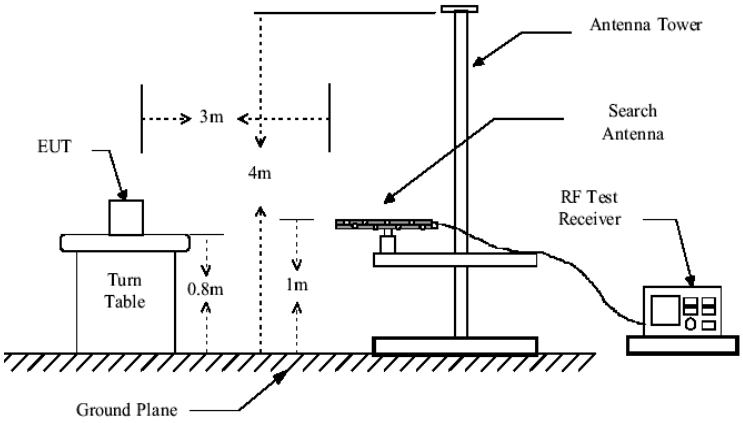
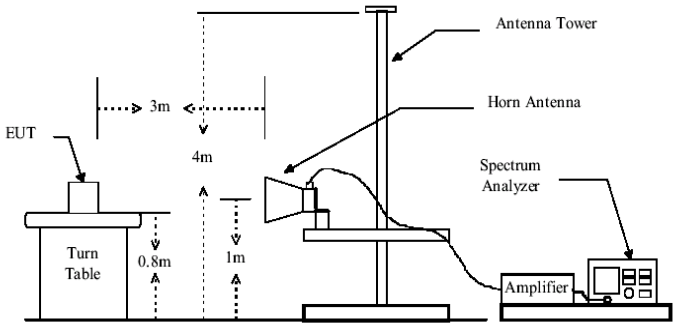
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value

Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	68.20	Peak Value
	54.00	Average Value

Remark:
1. Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

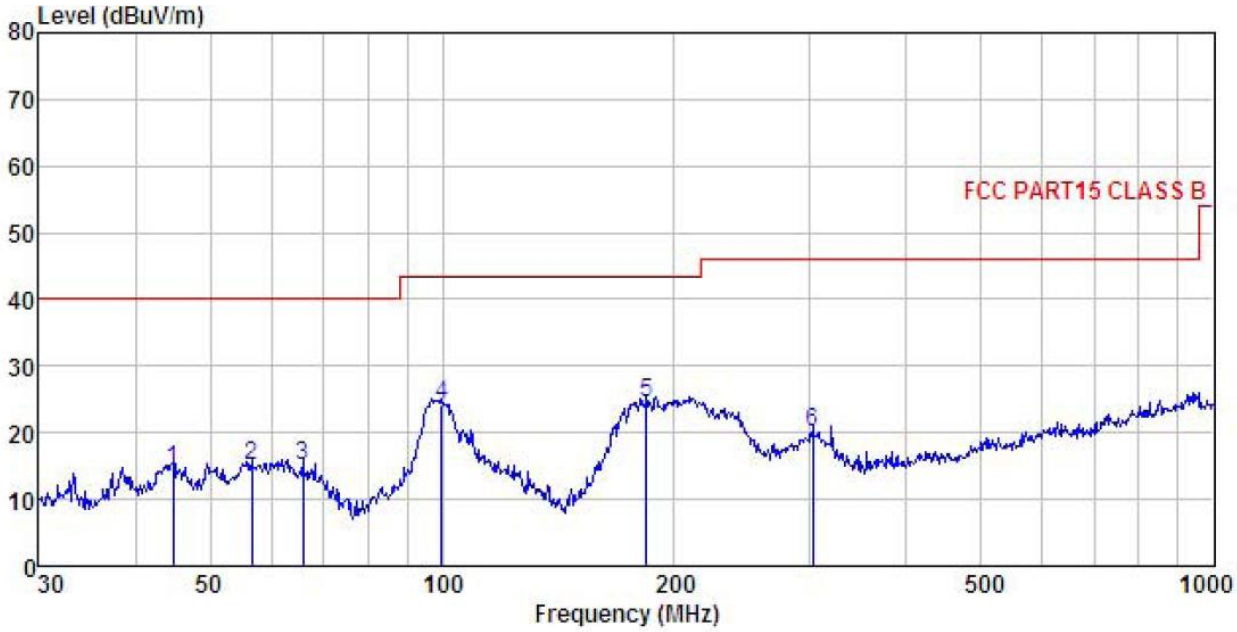
Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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 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.
4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Below 1GHz

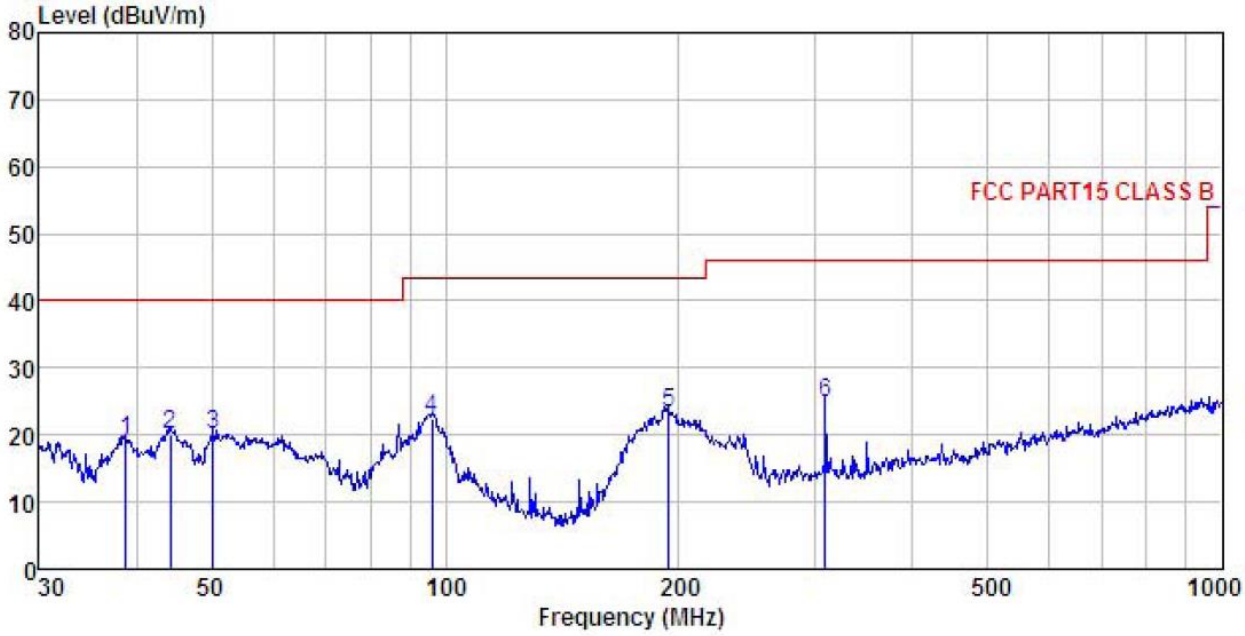
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
EUT : Moblie Phone
Model : C50
Test mode : Wifi -TX Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: Carey
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	44.743	30.26	13.55	0.56	29.86	14.51	40.00	-25.49	QP
2	56.593	31.18	12.93	0.66	29.79	14.98	40.00	-25.02	QP
3	66.034	33.74	10.30	0.76	29.75	15.05	40.00	-24.95	QP
4	99.878	39.57	13.16	0.96	29.53	24.16	43.50	-19.34	QP
5	183.844	42.06	10.00	1.36	28.94	24.48	43.50	-19.02	QP
6	302.481	33.62	13.08	1.78	28.45	20.03	46.00	-25.97	QP

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
EUT : Moblie Phone
Model : C50
Test mode : Wifi -TX Mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: Carey
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	38.752	35.35	13.25	0.51	29.91	19.20	40.00	-20.80	QP
2	44.275	35.82	13.55	0.55	29.87	20.05	40.00	-19.95	QP
3	50.232	36.04	13.25	0.61	29.82	20.08	40.00	-19.92	QP
4	96.099	38.14	12.90	0.94	29.55	22.43	43.50	-21.07	QP
5	193.773	40.13	10.56	1.37	28.87	23.19	43.50	-20.31	QP
6	308.913	38.39	13.17	1.80	28.47	24.89	46.00	-21.11	QP

Above 1GHz:

Band 1:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	43.41	39.23	13.84	41.34	55.14	68.20	-13.06	Vertical
10360.00	42.31	39.23	13.84	41.34	54.04	68.20	-14.16	Horizontal
802.11a mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	31.93	39.23	13.84	41.34	43.66	54.00	-10.34	Vertical
10360.00	29.30	39.23	13.84	41.34	41.03	54.00	-12.97	Horizontal

802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	41.56	39.36	13.85	41.27	53.50	68.20	-14.70	Vertical
10400.00	41.77	39.36	13.85	41.27	53.71	68.20	-14.49	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	29.27	39.36	13.85	41.27	41.21	54.00	-12.79	Vertical
10400.00	28.63	39.36	13.85	41.27	40.57	54.00	-13.43	Horizontal

802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	41.48	39.56	13.90	41.06	53.88	68.20	-14.32	Vertical
10480.00	40.10	39.56	13.90	41.06	52.50	68.20	-15.70	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	29.36	39.56	13.90	41.06	41.76	54.00	-12.24	Vertical
10480.00	28.38	39.56	13.90	41.06	40.78	54.00	-13.22	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	42.95	39.23	13.84	41.34	54.68	68.20	-13.52	Vertical
10360.00	45.03	39.23	13.84	41.34	56.76	68.20	-11.44	Horizontal
802.11n20 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	29.38	39.23	13.84	41.34	41.11	54.00	-12.89	Vertical
10360.00	31.37	39.23	13.84	41.34	43.10	54.00	-10.90	Horizontal

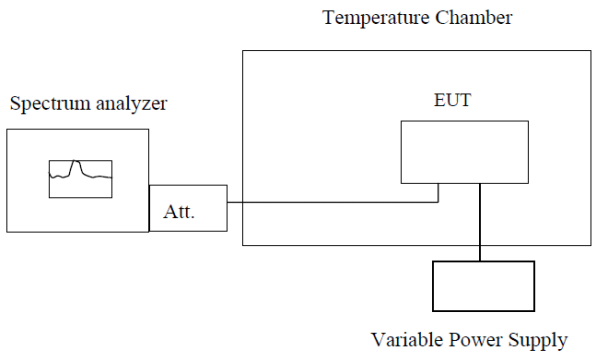
802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	42.76	39.36	13.85	41.27	54.70	68.20	-13.50	Vertical
10400.00	42.69	39.36	13.85	41.27	54.63	68.20	-13.57	Horizontal
802.11n20 mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	30.16	39.36	13.85	41.27	42.10	54.00	-11.90	Vertical
10400.00	30.48	39.36	13.85	41.27	42.42	54.00	-11.58	Horizontal

802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	41.68	39.56	13.90	41.06	54.08	68.20	-14.12	Vertical
10480.00	41.18	39.56	13.90	41.06	53.58	68.20	-14.62	Horizontal
802.11n20 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	29.64	39.56	13.90	41.06	42.04	54.00	-11.96	Vertical
10480.00	30.87	39.56	13.90	41.06	43.27	54.00	-10.73	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.9 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g)
Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

Measurement Data (Worst case):

Band 1:

Voltage vs. Frequency Stability

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(DC)		
20	5180MHz		
	3.7V	5179.986700	-2.568
	3.4V	5179.984600	-2.973
	4.1V	5179.983500	-3.185
	5240MHz		
	3.7V	5239.990300	-1.851
	3.4V	5239.987100	-2.462
	4.1V	5239.980800	-3.664

Temperature vs. Frequency Stability

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(DC)	Temp(℃)		
3.7V	5180MHz		
	-20	5179.982500	-3.378
	-10	5179.981400	-3.591
	0	5179.983200	-3.243
	10	5179.984100	-3.069
	20	5179.985700	-2.761
	30	5179.986400	-2.625
	40	5179.987200	-2.471
	50	5179.988300	-2.259
	5240MHz		
	-20	5239.981100	-3.607
	-10	5239.983400	-3.168
	0	5239.984900	-2.882
	10	5239.986300	-2.615
	20	5239.987500	-2.385
	30	5239.988300	-2.233
	40	5239.988900	-2.118
	50	5239.989700	-1.966