FCC REPORT (WIFI)

Applicant:	Shenzhen Fortuneship Technology CO., LTD
Address of Applicant:	7th floor, Kingson Building, New Energy Innovation Industrial Park, No.1 ChuangSheng Road, Xili, Nanshan District, Shenzhen, P.R.China

Equipment Under Test (EUT)

Product Name:	SMART PHONE
Model No.:	FSM3500G, LS001(A-Z)
FCC ID:	2ABXI-LS001
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	24 Oct., 2014
Date of Test:	24 Oct., to 13 Nov., 2014
Date of report issued:	13 Nov., 2014
Test Result:	PASS *

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*13 Nov., 2014*	*Original*

Prepared by: Luna Gao ***Date:*** *13 Nov., 2014*

Report Clerk

Reviewed by: Winner Zhang ***Date:*** *13 Nov., 2014*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

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

5 General Information

5.1 Client Information

Applicant:	Shenzhen Fortuneship Technology CO., LTD
Address of Applicant:	7th floor, Kingson Building, New Energy Innovation Industrial Park, No.1 ChuangSheng Road, Xili, Nanshan District, Shenzhen, P.R.China
Manufacturer:	Shenzhen Fortuneship Technology CO., LTD
Address of Manufacturer:	7th floor, Kingson Building, New Energy Innovation Industrial Park, No.1 ChuangSheng Road, Xili, Nanshan District, Shenzhen, P.R.China
Factory:	Huizhou Fortuneship Technology CO., LTD
Address of Factory:	He Chang East 4 Road No.1, ZhongKai ZIP, Hui Zhou City, Guang Dong Province, China

5.2 General Description of E.U.T.

Product Name:	SMART PHONE
Model No.:	FSM3500G, LS001(A-Z)
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	11 for 802.11b/802.11g/802.11(H20) 7 for 802.11n(H40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal Antenna
Antenna gain:	0.36 dBi
AC adapter:	Model: A31-501000 Input:100-240V AC, 50/60Hz 0.2A Output:5.0V DC, 1A
Power supply:	Rechargeable Li-ion Battery DC3.8V-2300mAh
Remark:	Model No.: FSM3500G, LS001(A-Z) were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name. The model LS001(A-Z), “A-Z” means Different Customer Icon. The models are same except models name. It not affect the test result. The EUT has two versions, double SIM and single SIM. Both of them can meet different customer’s demand in various markets. The electrical circuit design, layout, components used and internal wiring was identical .We selected double SIM Version for full test.

Operation Frequency each of channel For 802.11b/g/n(H20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel For 802.11n(H40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
		4	2427MHz	7	2442MHz		
		5	2432MHz	8	2447MHz		
3	2422MHz	6	2437MHz	9	2452MHz		

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

802.11b/802.11g/802.11n (H20)

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

802.11n (H40)

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

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Operation mode	Keep the EUT in continuous transmitting with modulation
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps
Final Test Mode:	
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20) and 13.5 Mbps for 802.11n(H40). Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.	

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	Aug 23 2014	Aug 22 2017
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	Apr 19 2014	Apr 19 2015
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	Apr 19 2014	Apr 19 2015
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2014	Mar. 31 2015
6	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2014	June 08 2015
7	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Apr. 01 2014	Mar. 31 2015
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2014	Mar. 29 2015
9	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
10	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
11	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	Apr 19 2014	Apr 19 2015
12	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2014	Mar. 31 2015
13	Loop antenna	Laplace instrument	RF300	EMC0701	Apr 01 2014	Mar. 31 2015
14	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	May. 29 2014	May. 28 2015
15	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	Apr 19 2014	Apr 19 2015

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	Oct 10 2012	Oct 09 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	Apr 10 2014	Apr 09 2015
3	LISN	CHASE	MN2050D	CCIS0074	Apr 10 2014	Apr 10 2015
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2014	Mar. 31 2015
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

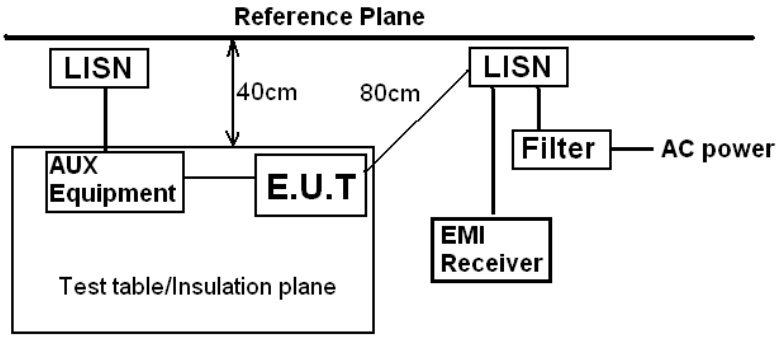
Standard requirement:	FCC Part15 C Section 15.203 /247(c)

15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
15.247(c) (1)(i) requirement:
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:	

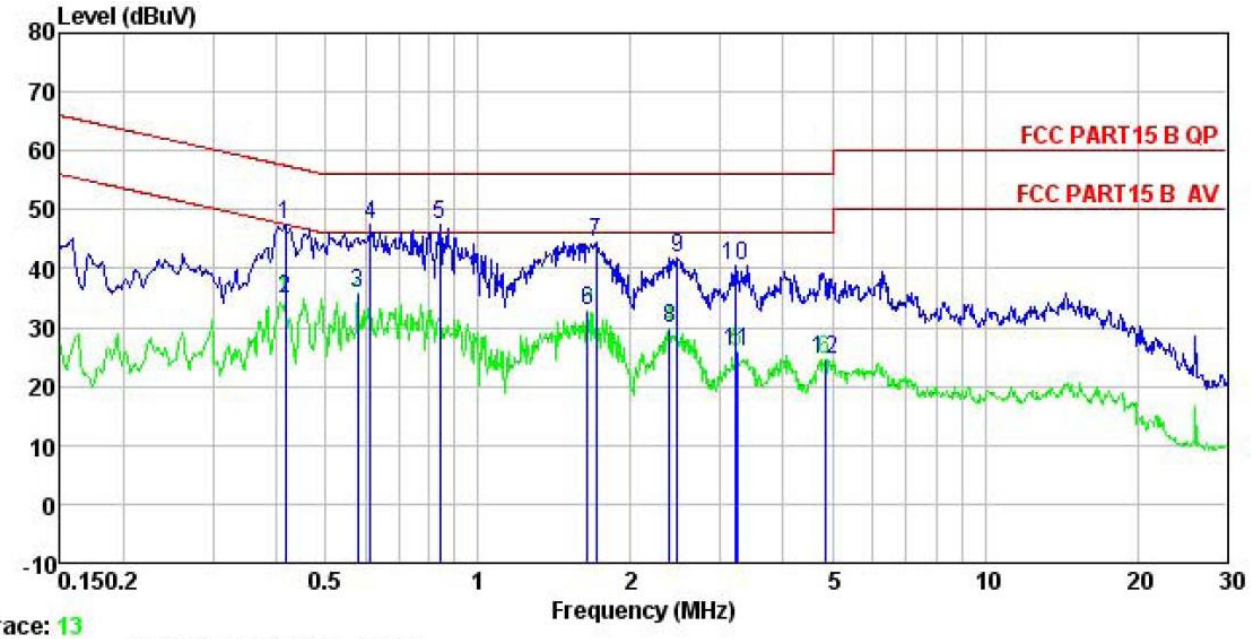
The WIFI antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is0.36dBi.

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2003
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.), which 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

Neutral:

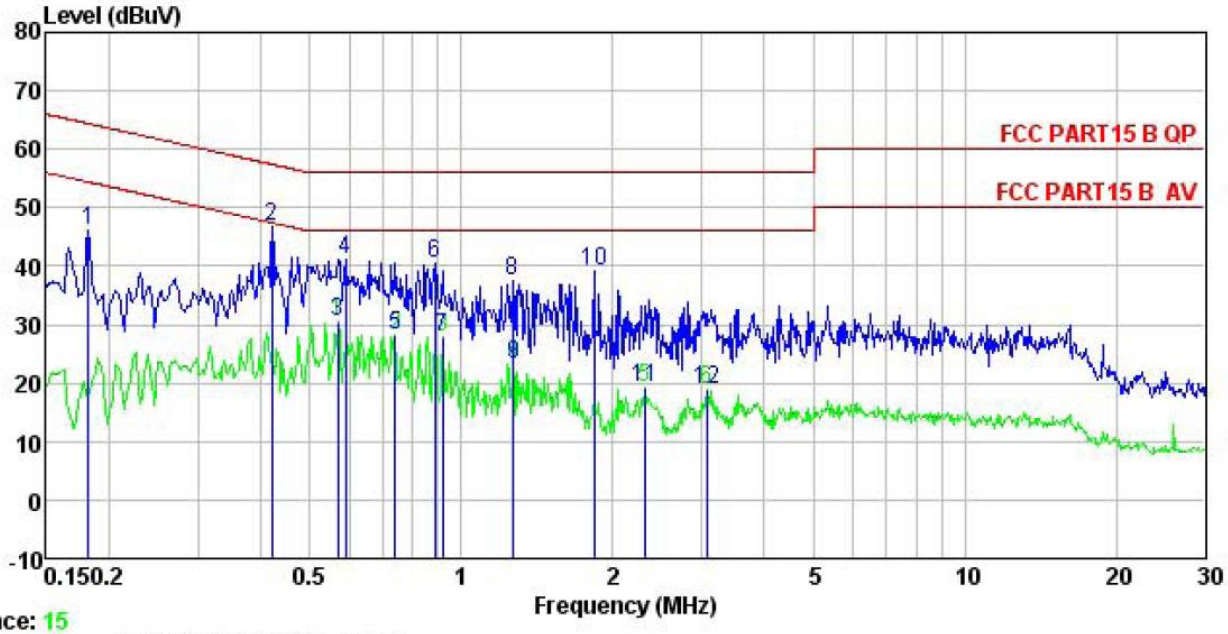


Trace: 13

```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN NEUTRAL
Job. no       : 876RF
EUT           : SMART PHONE
Model         : FSM3500G
Test Mode     : Wifi mode
Power Rating  : AC120V/60Hz
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
Test Engineer: MT
Remark        :
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.417	36.44	0.26	10.73	47.43	57.51	-10.08	QP
2	0.417	23.90	0.26	10.73	34.89	47.51	-12.62	Average
3	0.579	24.73	0.24	10.77	35.74	46.00	-10.26	Average
4	0.614	36.44	0.22	10.77	47.43	56.00	-8.57	QP
5	0.839	36.49	0.20	10.82	47.51	56.00	-8.49	QP
6	1.645	21.65	0.27	10.93	32.85	46.00	-13.15	Average
7	1.707	33.30	0.27	10.94	44.51	56.00	-11.49	QP
8	2.384	18.76	0.29	10.94	29.99	46.00	-16.01	Average
9	2.474	30.47	0.29	10.94	41.70	56.00	-14.30	QP
10	3.224	29.35	0.29	10.91	40.55	56.00	-15.45	QP
11	3.241	14.55	0.29	10.91	25.75	46.00	-20.25	Average
12	4.822	13.42	0.28	10.86	24.56	46.00	-21.44	Average

Line:



Trace: 15

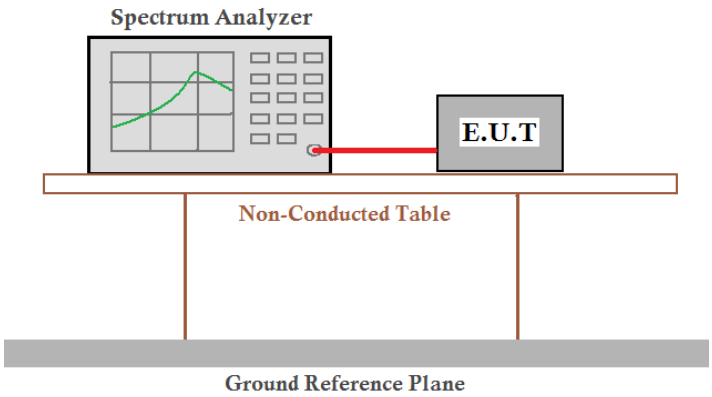
```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN LINE
Job. no       : 876RF
EUT           : SMART PHONE
Model         : FSM3500G
Test Mode     : Wifi mode
Power Rating  : AC120V/60Hz
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
Test Engineer: MT
Remark        :
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.182	35.19	0.28	10.77	46.24	64.42	-18.18	QP
2	0.421	35.70	0.28	10.73	46.71	57.42	-10.71	QP
3	0.570	19.59	0.26	10.77	30.62	46.00	-15.38	Average
4	0.589	30.11	0.26	10.77	41.14	56.00	-14.86	QP
5	0.739	17.25	0.22	10.79	28.26	46.00	-17.74	Average
6	0.885	29.31	0.24	10.84	40.39	56.00	-15.61	QP
7	0.918	16.63	0.24	10.84	27.71	46.00	-18.29	Average
8	1.262	26.36	0.25	10.90	37.51	56.00	-18.49	QP
9	1.269	12.14	0.25	10.90	23.29	46.00	-22.71	Average
10	1.839	27.99	0.26	10.95	39.20	56.00	-16.80	QP
11	2.309	7.87	0.26	10.95	19.08	46.00	-26.92	Average
12	3.074	7.59	0.27	10.92	18.78	46.00	-27.22	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

6.3 Conducted Output Power

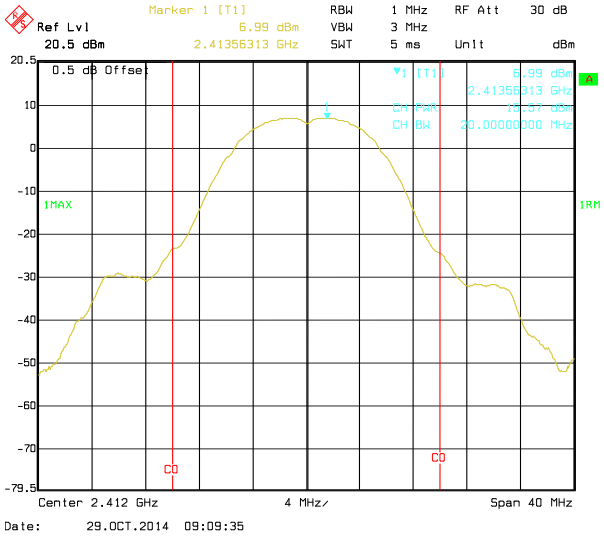
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	Test method refer to KDB558074 (DTS Measure Guidance) section 8.2, option 1.

Measurement Data

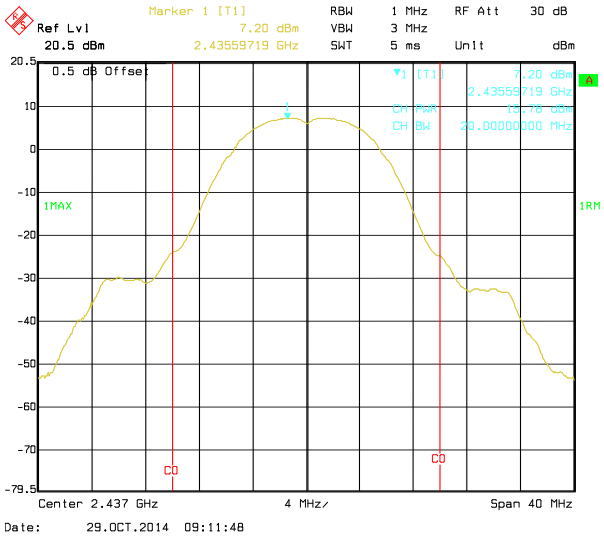
Test CH	Maximum Conducted Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	15.57	13.77	13.80	12.26	30.00	Pass
Middle	15.78	13.95	14.05	12.90		
Highest	16.24	14.13	13.98	13.09		

Test plot as follows:

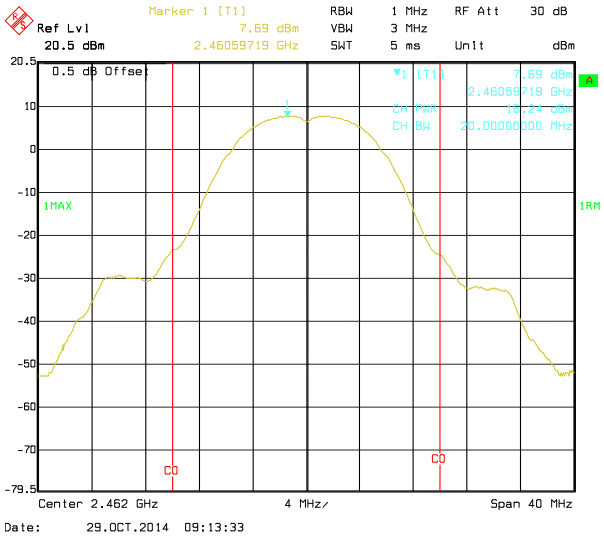
Test mode: 802.11b



Lowest channel

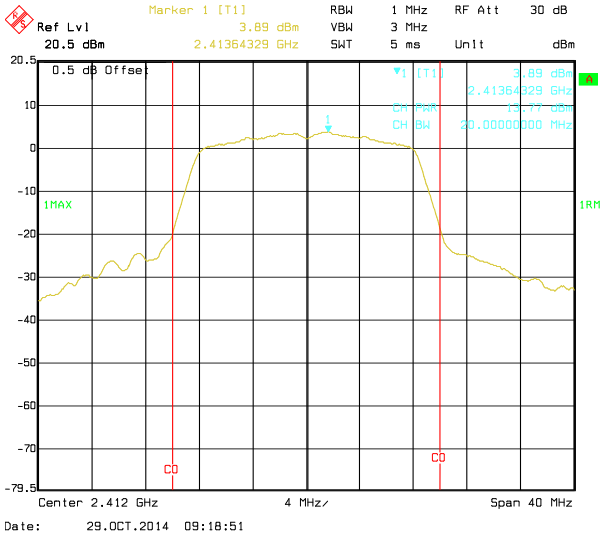


Middle channel

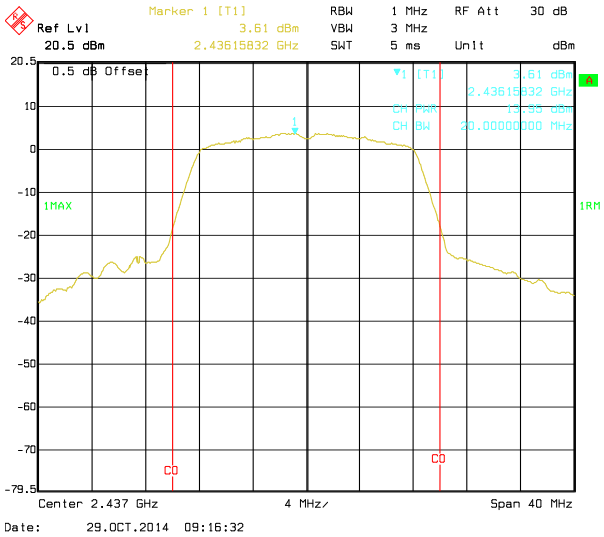


Highest channel

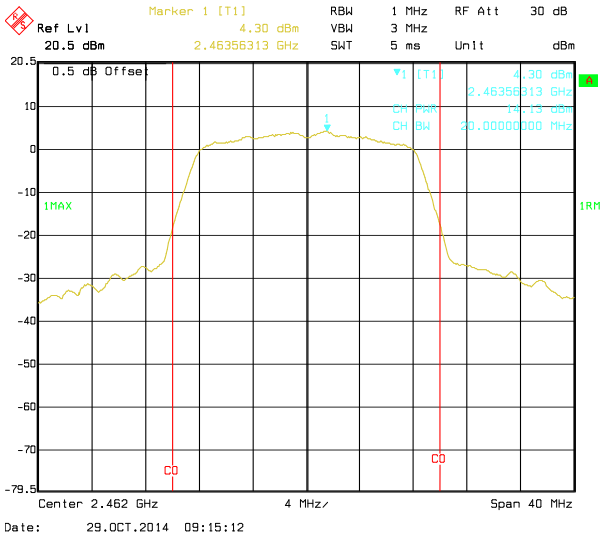
Test mode: 802.11g



Lowest channel

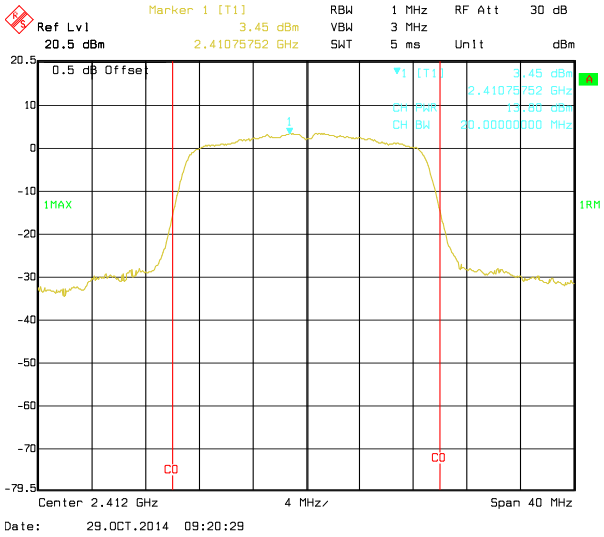


Middle channel

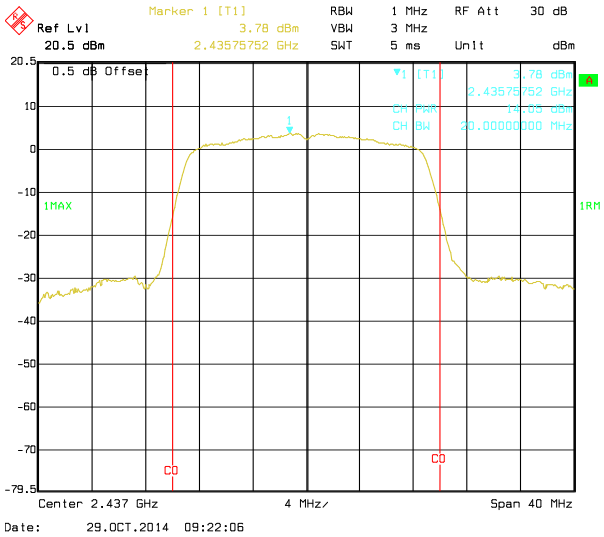


Highest channel

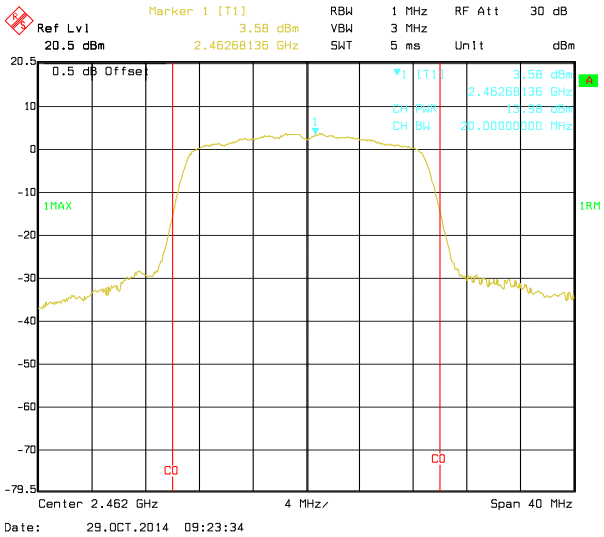
Test mode: 802.11n(H20)



Lowest channel

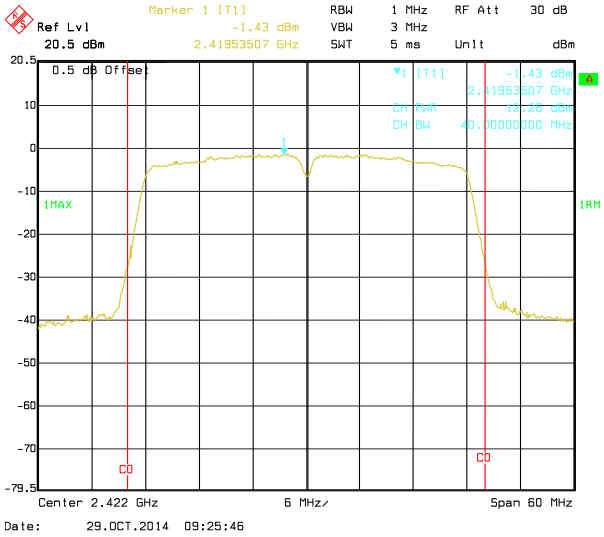


Middle channel

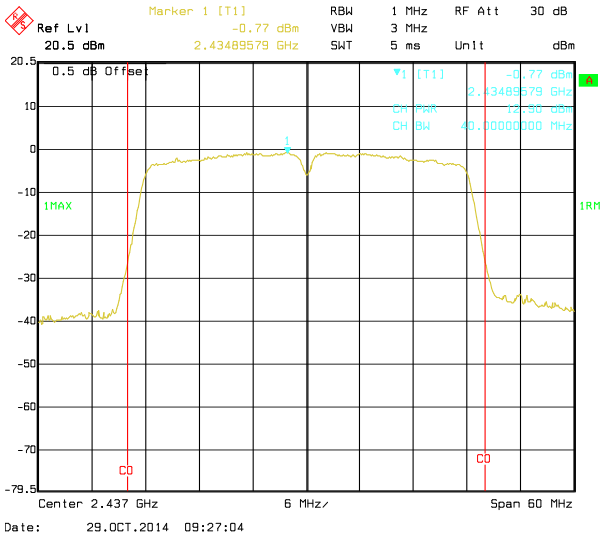


Highest channel

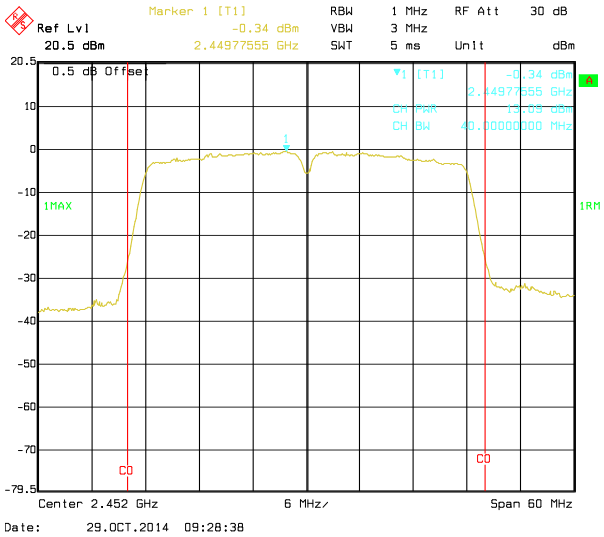
Test mode: 802.11n(H40)



Lowest channel

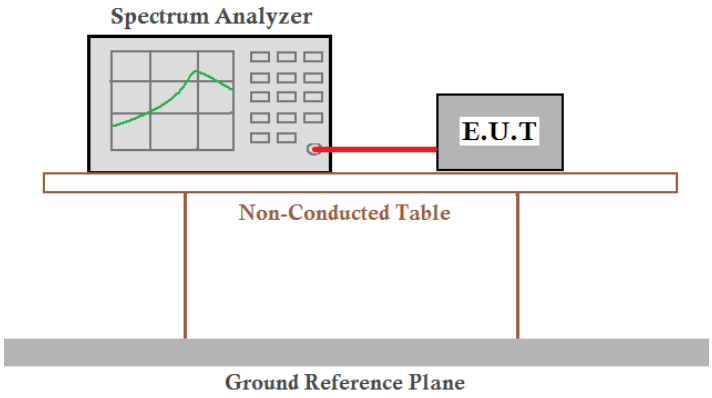


Middle channel



Highest channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	>500kHz
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

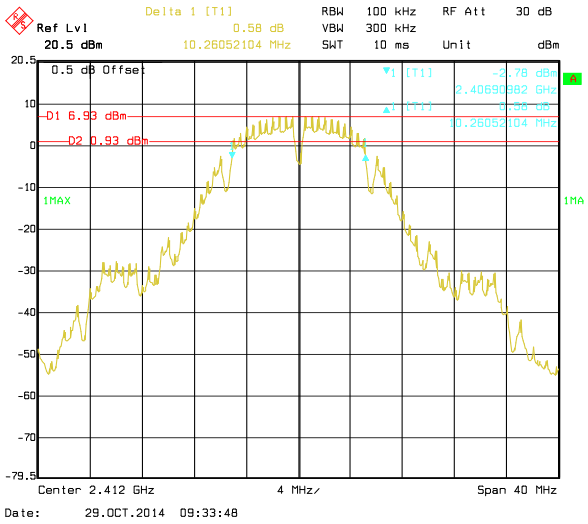
Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	10.26	16.51	17.80	36.55	>500	Pass
Middle	9.38	16.51	17.80	36.55		
Highest	9.30	16.51	17.80	36.55		

Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	12.99	16.51	17.64	35.83	N/A	N/A
Middle	12.99	16.59	17.64	36.07		
Highest	12.99	16.51	17.64	35.95		

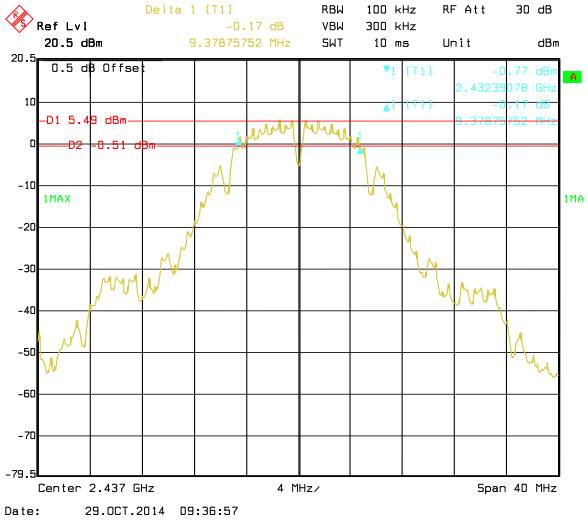
Test plot as follows:

6dB EBW

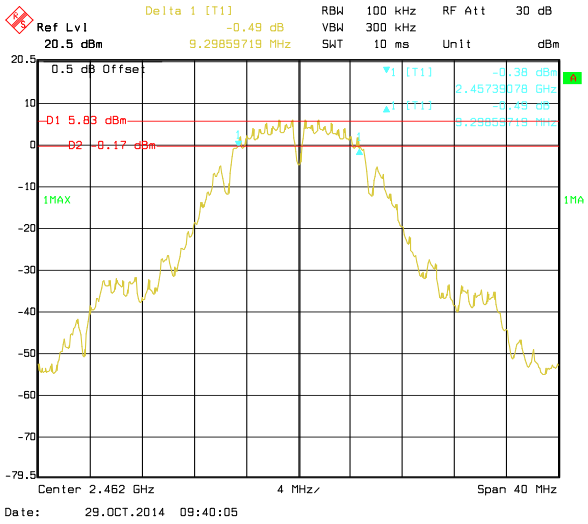
Test mode: 802.11b



Lowest channel

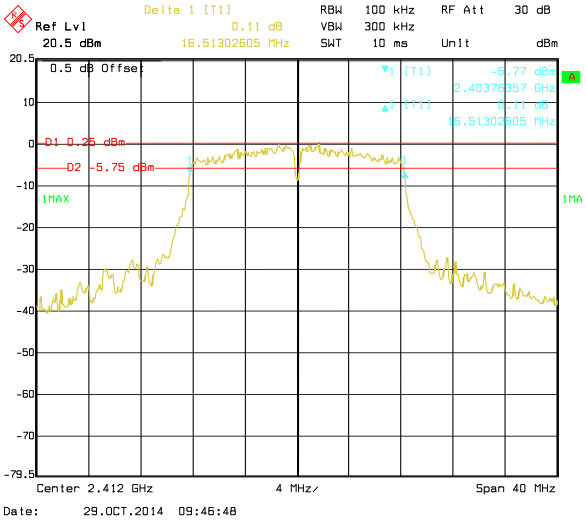


Middle channel

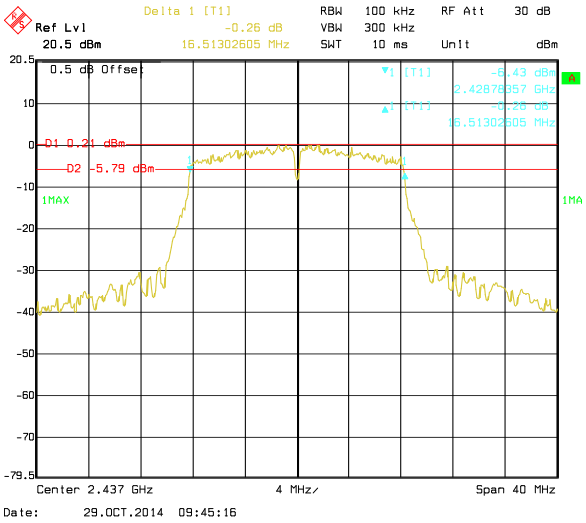


Highest channel

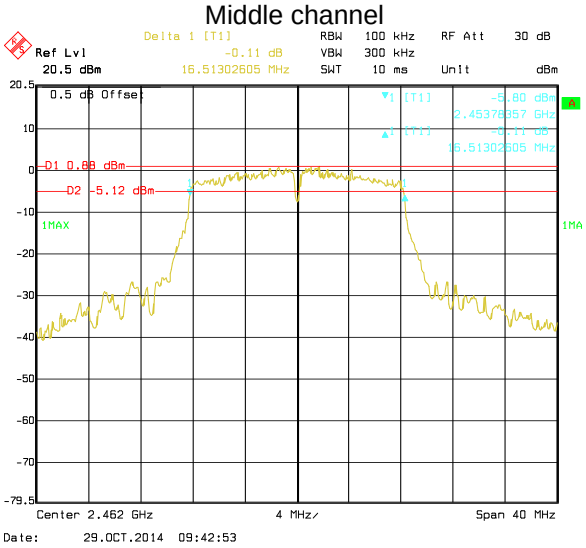
Test mode: 802.11g



Lowest channel

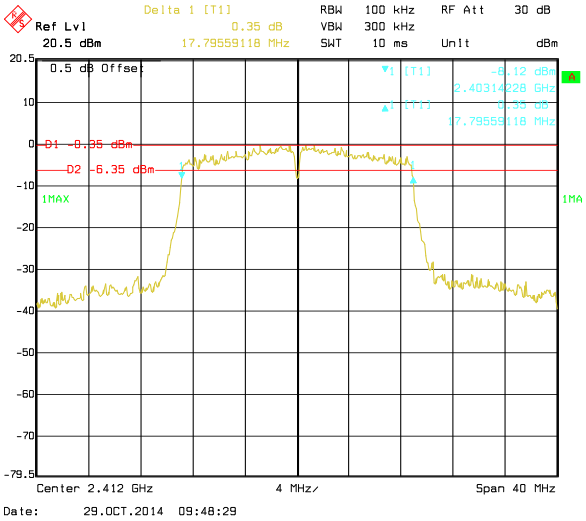


Middle channel

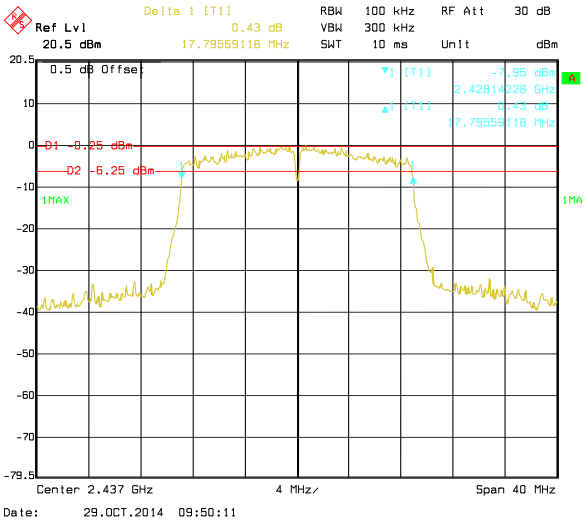


Highest channel

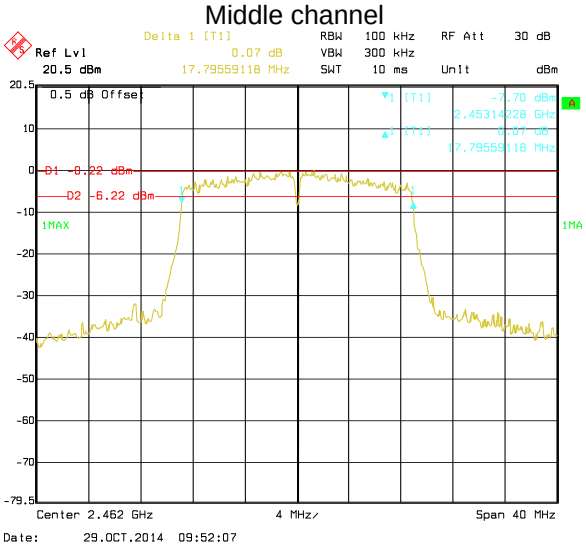
Test mode: 802.11n(H20)



Lowest channel

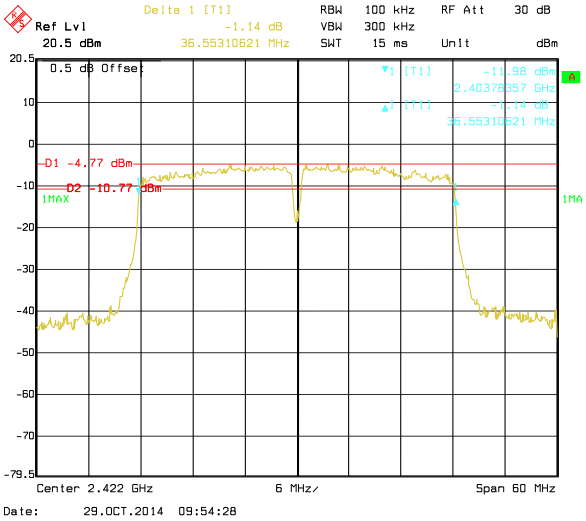


Middle channel

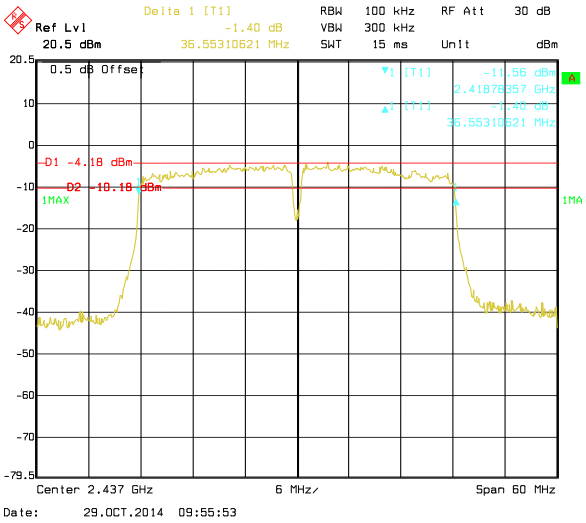


Highest channel

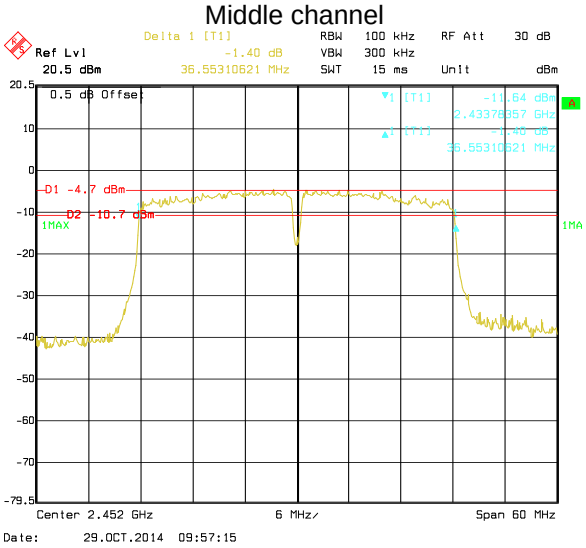
Test mode: 802.11n(H40)



Lowest channel



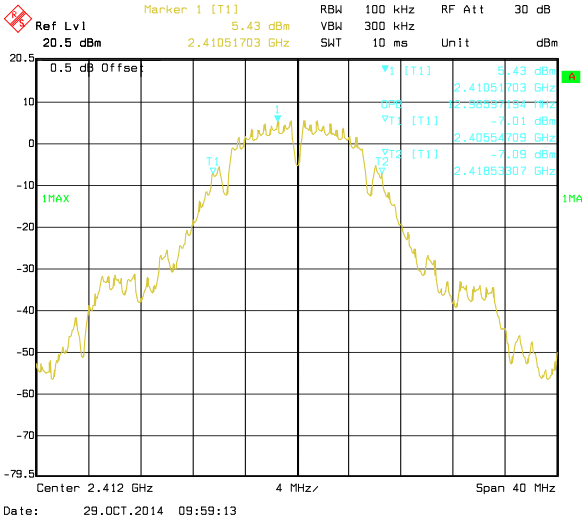
Middle channel



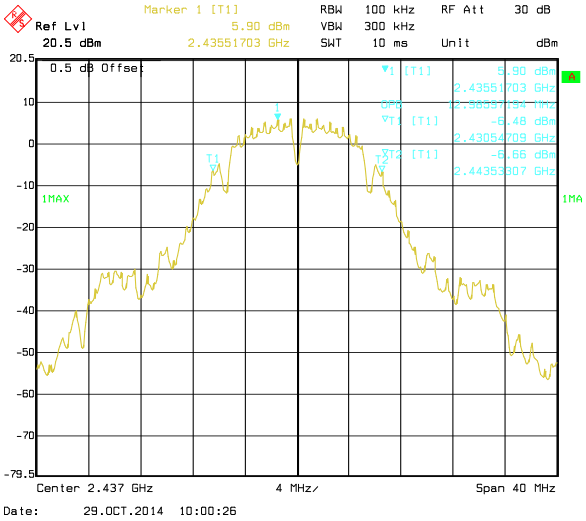
Highest channel

99% OBW

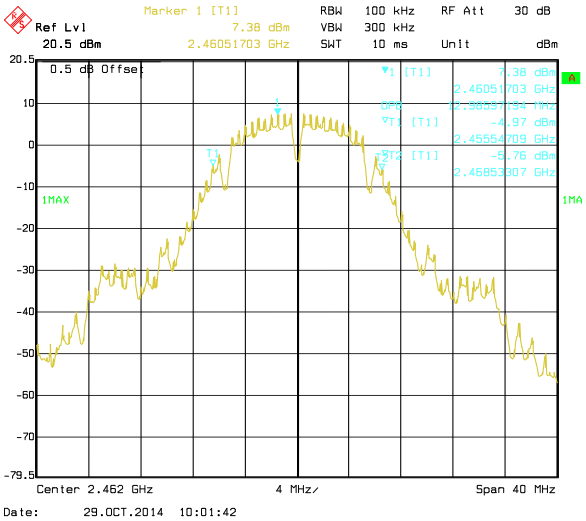
Test mode: 802.11b



Lowest channel

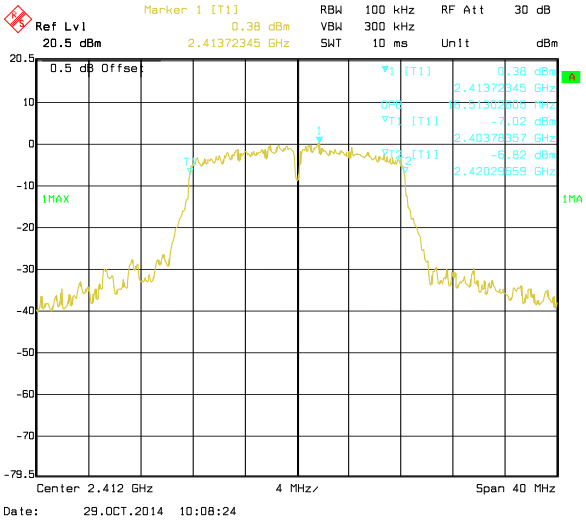


Middle channel

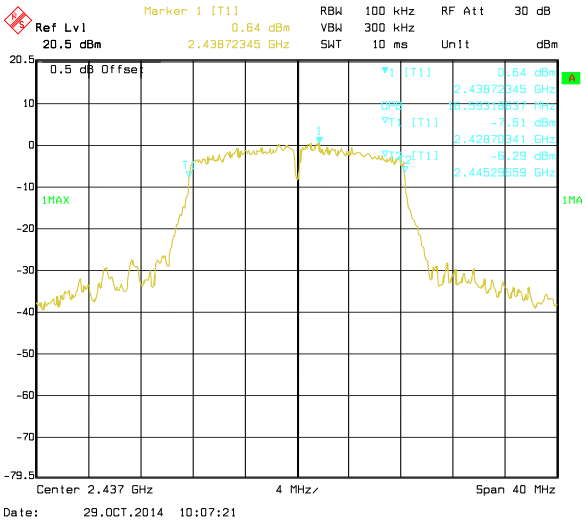


Highest channel

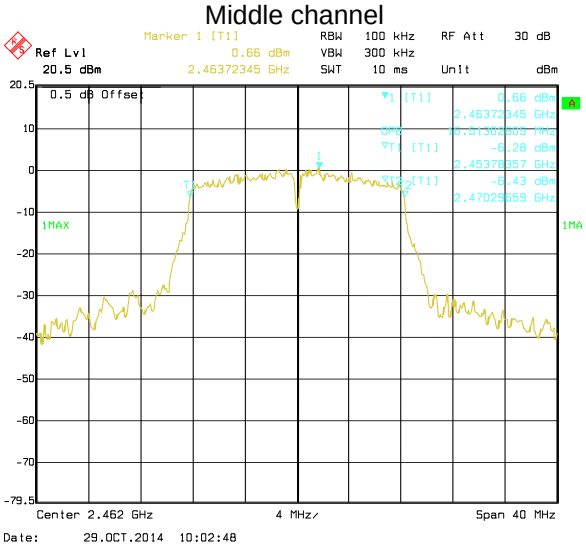
Test mode: 802.11g



Lowest channel

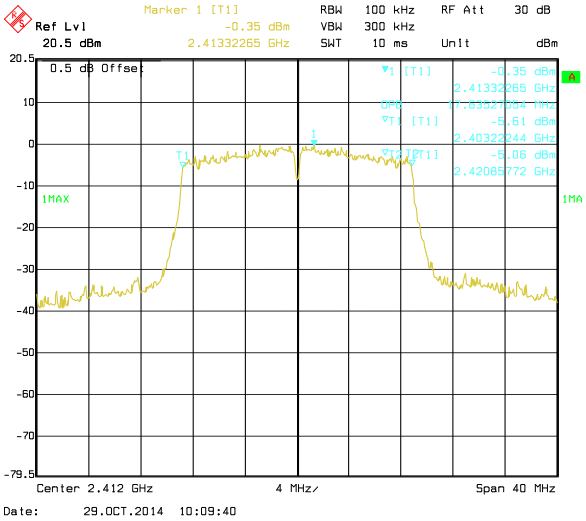


Middle channel

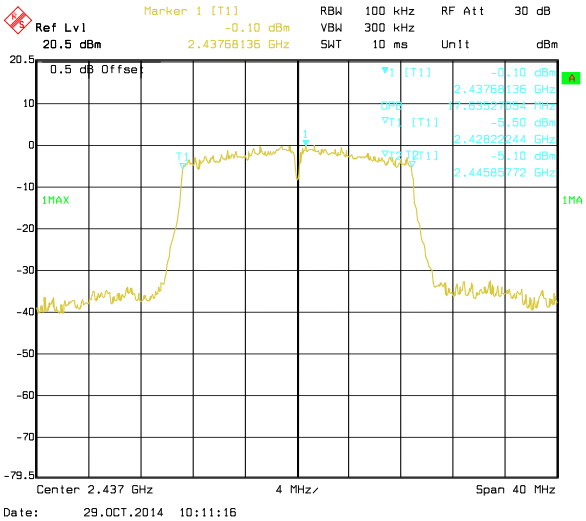


Highest channel

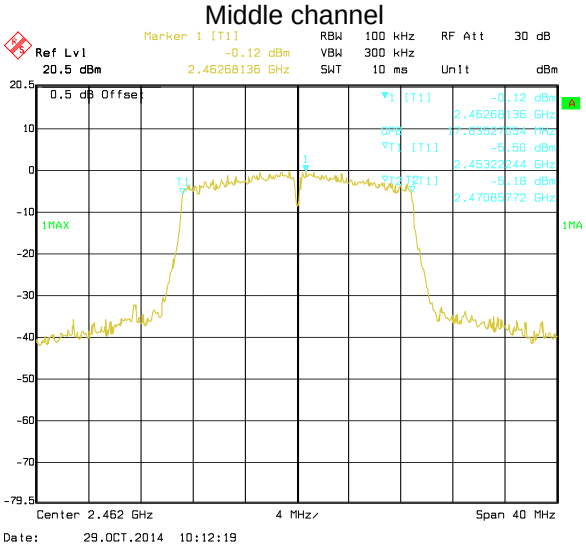
Test mode: 802.11n(H20)



Lowest channel

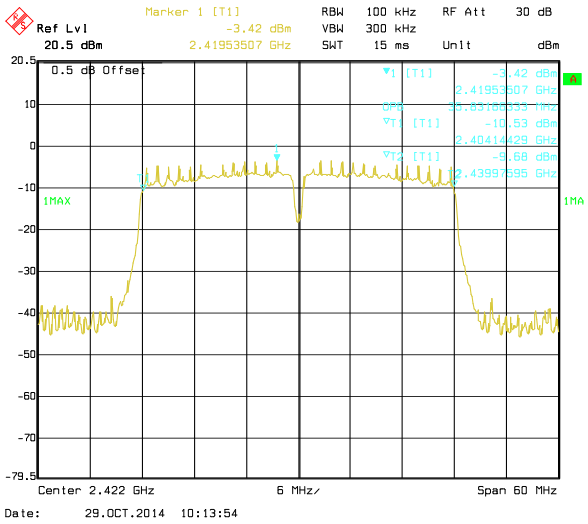


Middle channel

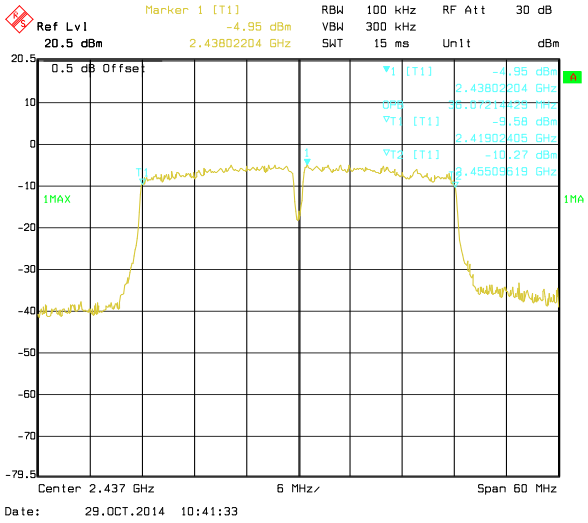


Highest channel

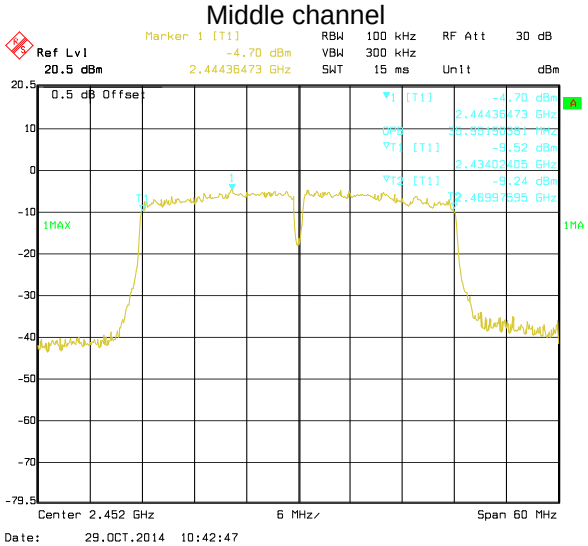
Test mode: 802.11n(H40)



Lowest channel

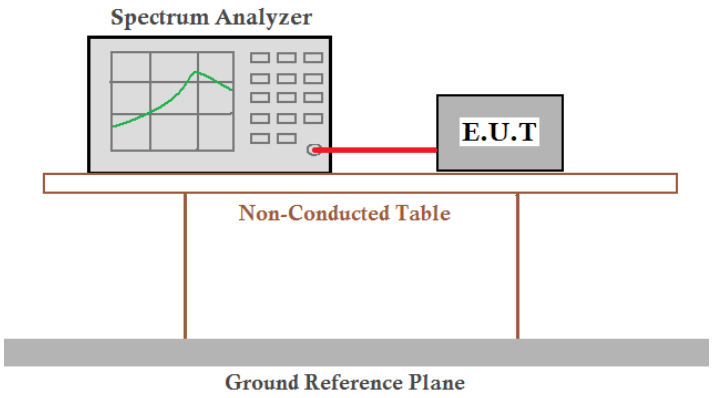


Middle channel



Highest channel

6.5 Power Spectral Density

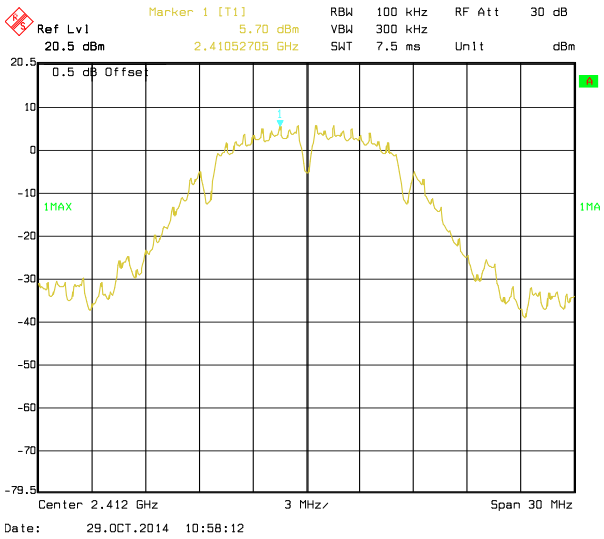
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	8dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

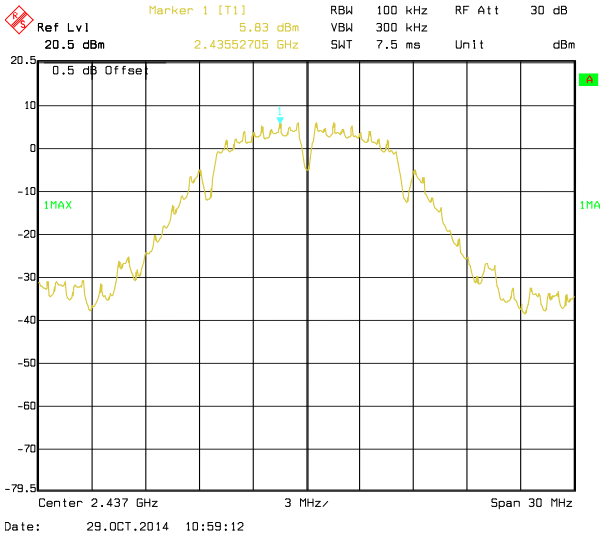
Test CH	Power Spectral Density (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	5.70	0.03	-0.63	-4.84	8.00	Pass
Middle	5.83	0.39	0.10	-4.68		
Highest	6.29	0.30	2.21	-4.67		

Test plot as follows:

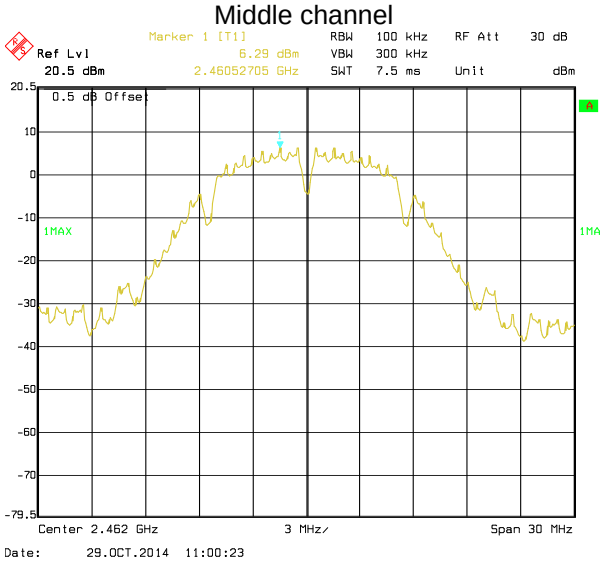
Test mode: 802.11b



Lowest channel

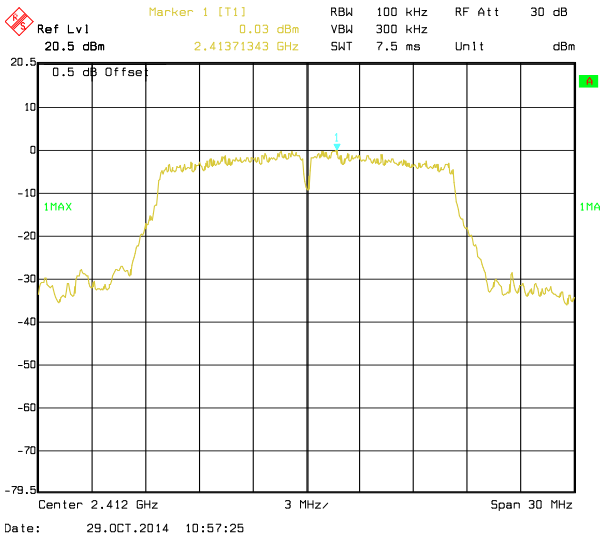


Middle channel

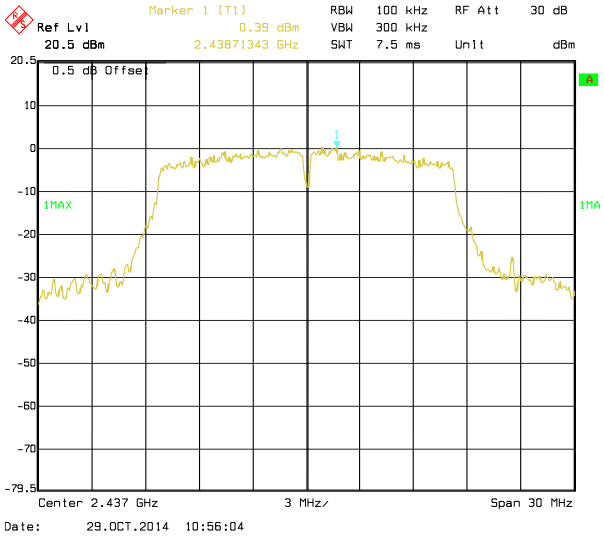


Highest channel

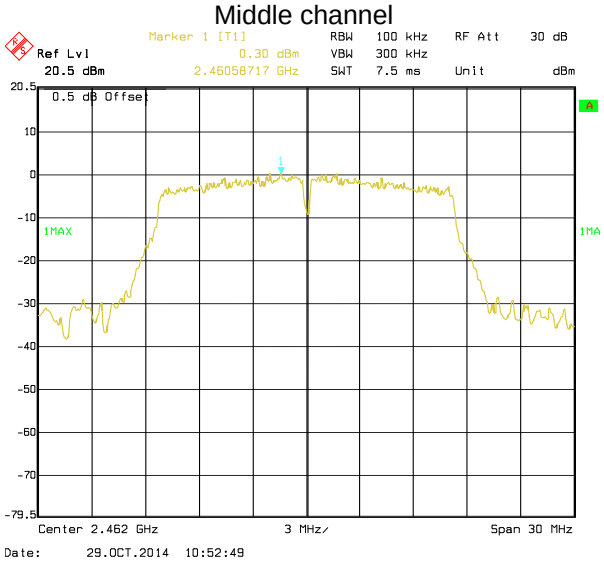
Test mode: 802.11g



Lowest channel

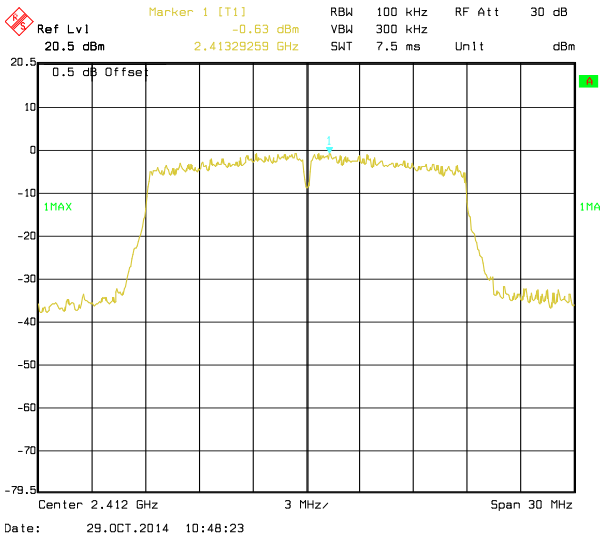


Middle channel

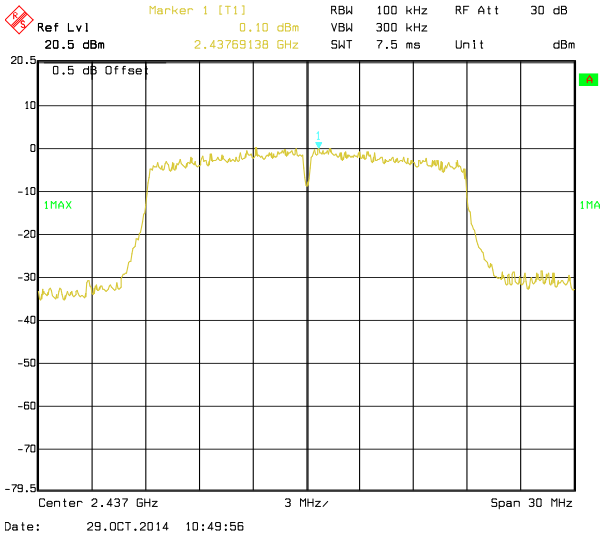


Highest channel

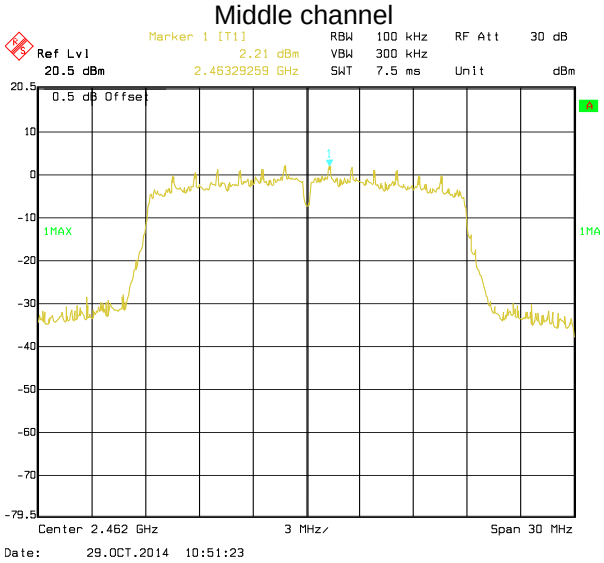
Test mode: 802.11n(H20)



Lowest channel

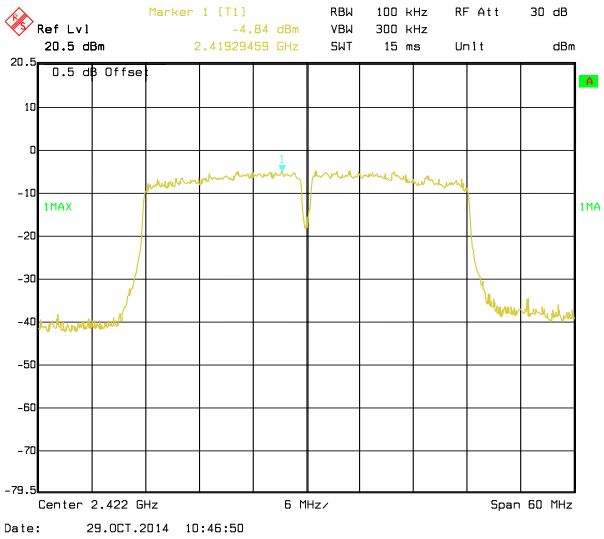


Middle channel

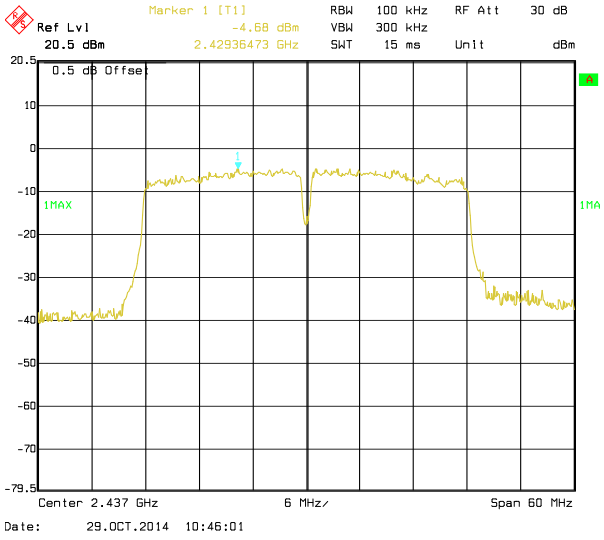


Highest channel

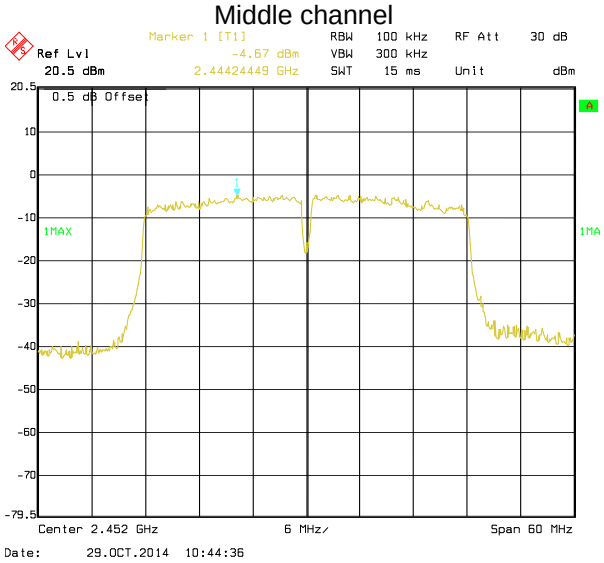
Test mode: 802.11n(H40)



Lowest channel



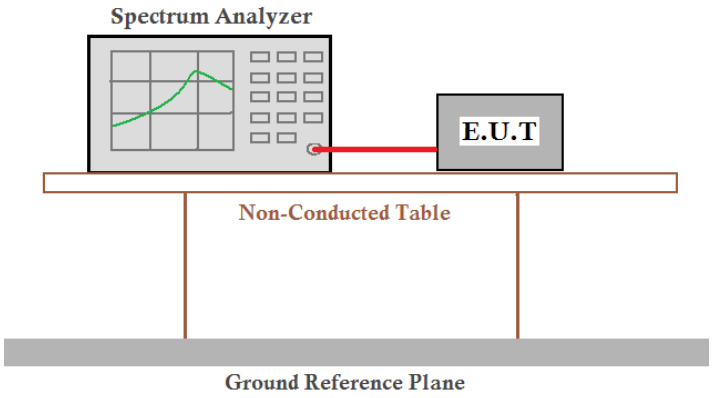
Middle channel



Highest channel

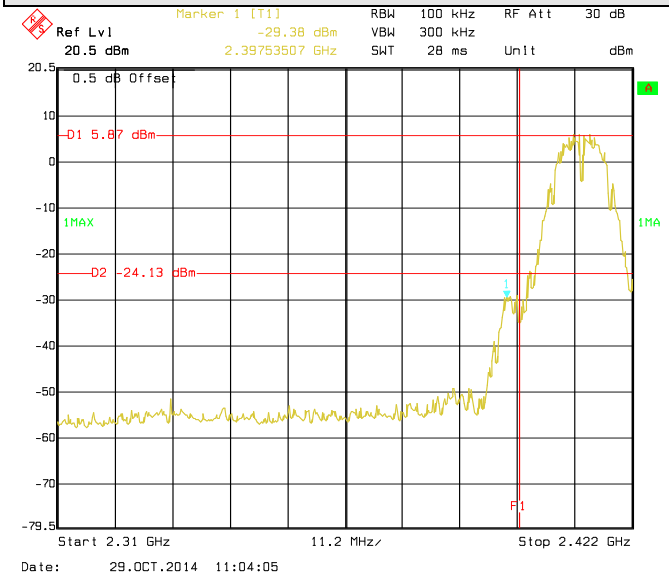
6.6 Band Edge

6.6.1 Conducted Emission Method

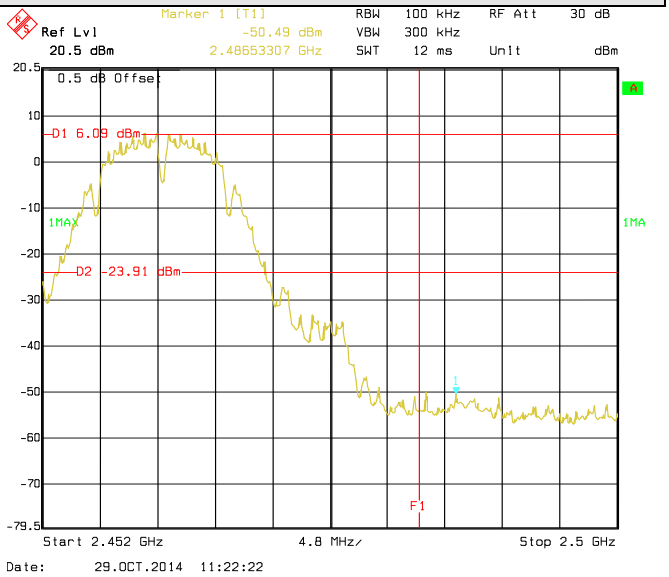
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 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.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

Test mode:	802.11b

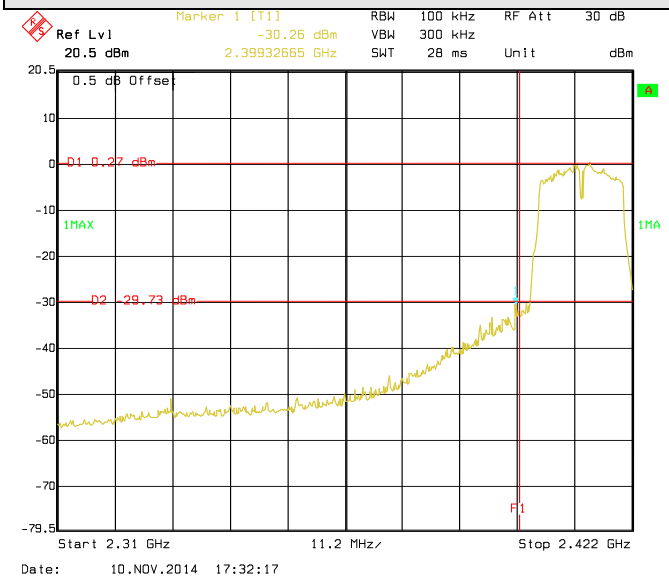


Lowest channel

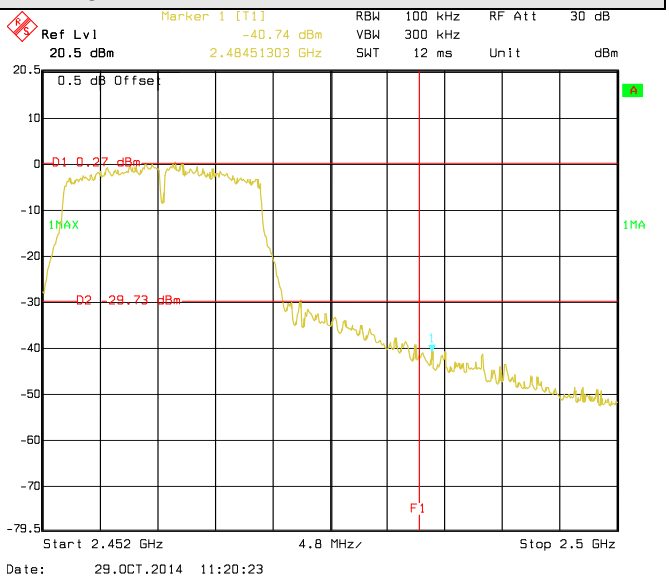


Highest channel

Test mode:	802.11g

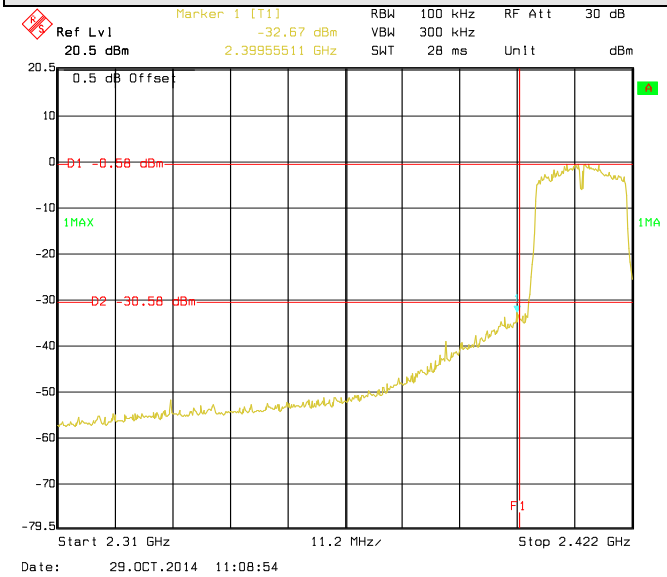


Lowest channel

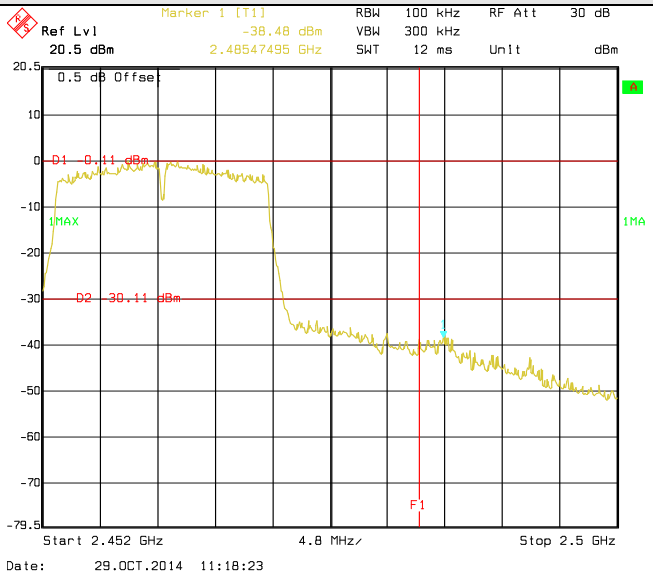


Highest channel

Test mode:	802.11n(H20)

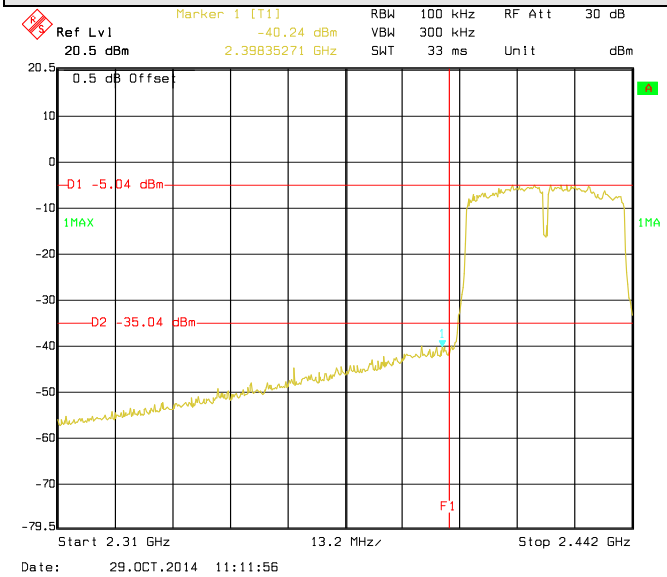


Lowest channel

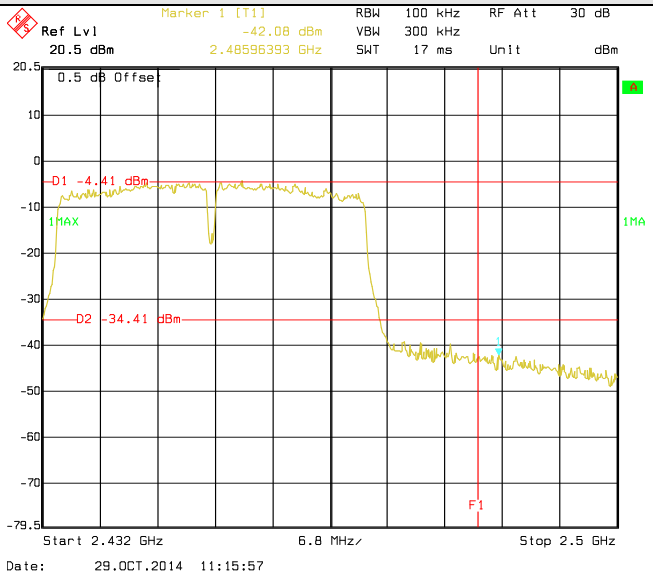


Highest channel

Test mode:	802.11n(H40)



Lowest channel



Highest channel