



Report No.SH16070043W02

FCC RF TEST REPORT

Issued to

Toymail, Inc

For

Toymail Talkie

Model Name : Talkie, Teensie, Weensie
Trade Name : Toymail
Brand Name : Toymail
Standard : 47 CFR Part 15, Subpart C
ANSI C63.10-2013
FCC ID : 2AJENTMAIL01
Test date : Sep.27,2016 to Sep.28,2016
Issue date : Sep.29,2016



Shanghai Skylabs Co., Ltd.

Tested by Wu Hongfei

Approved by Gu Yeping

Review by Xiaodong Wei

The report refers only to the sample tested and does not apply to the bulk. This report is issued in confidence to the client and it will be strictly treated as such by the Shanghai Skylabs Co., Ltd. It may not be reproduced rather in its entirety or in part and it may not be used for advertizing. The client to whom the report is issued may, however, show or send it or a certified copy thereof prepared by the Shanghai Skylabs Co., Ltd to his customer. Supplier or others persons directly concerned. Shanghai Skylabs Co., Ltd will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report. In the event of the improper use of the report, Shanghai Skylabs Co., Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.



DIRECTORY

1.	General Information	4
1.1	Applicant	4
1.2	Manufacturer	4
1.3	Description of EUT	4
2.	Facilities and Accreditations	5
2.1	Test Facility	5
2.2	Environmental Conditions	5
2.3	Measurement Uncertainty	5
2.4	List of Equipments Used	6
3.	Test Standards and Results	7
4.	Test Conditions Setting	8
4.1	Test Mode	8
5.	47 CFR Part 15C	9
5.1	Antenna requirement	9
6.	Test Result	10
6.1	Peak Output Power	10
6.2	Average Power	11
6.3	6dB & 20dB Bandwidth	12
6.4	Conducted Spurious Emissions	22
6.5	Power Spectral Density (PSD)	28
6.6	Band Edge	34
6.7	Conducted Emission	38
6.8	Radiated Emission	39
Annex A	Photos of the EUT	43
Annex B	Photos of Setup	45

**Change History**

Issue	Date	Reason for change
1.0	Sep.29,2016	First edition



1. General Information

1.1 Applicant

Toymail, Inc

86, 2nd Place #2, Brooklyn, NY, 11231, USA

1.2 Manufacturer

Traneat Ele. Co.

1889, HanPu Rd. KunShan City, JianSu Prve. China

1.3 Description of EUT

EUT Name.....: Toymail Talkie
Model Name: Talkie, Teensie, Weensie
Brand Name.....: Toymail
Trade Name: Toymail
Hardware Version: Rev.4.2
Software Version: V2.29
Modulation Type: DSSS (802.11b), OFDM (802.11g/n)
Frequency Range.....: 2.412GHz - 2.462GHz (at interval of 5 MHz)
Channel Number.....: 11
Antenna Type.....: PCB antenna
Antenna Gain.....: 0.5 dBi
Power Supply: 6 V DC

NOTE 1:

*The EUT contains WIFI Module operating at 2.4GHz ISM band; it supports 802.11b, 802.11g, 802.11n(20MHz) and they are all tested in this report. The frequencies allocated is F (MHz) $= 2412 + 5 * (n - 1)$ ($1 \leq n \leq 11$). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).*

NOTE 2:

For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacture.



2. Facilities and Accreditations

2.1 Test Facility

Shanghai Skylabs Co., Ltd. Skylabs Laboratory is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6644. A 9*6*6(m) full/semi-anechoic chamber was used for the radiated emissions test.
FCC registration: 196218

2.2 Environmental Conditions

Ambient temperature: 15~35°C
Relative humidity: 30~60%
Atmosphere pressure: 86-106kPa

2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.
Uncertainty of Conducted Emission: $\pm 1.76\text{dB}$
Uncertainty of Radiated Emission: $\pm 3.16\text{dB}$



2.4 List of Equipments Used

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU26	200880	2016.2.25	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Power Splitter	Mini-Circuits	ZFRSC-183-S+	765001016	(n.a.)	(n.a.)
Attenuator 1	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)
Full/Semi-Anechoic Chamber	CHENGYU	9.2×6.25×6.15m	SAR	2015.9.14	3year
EMI Test Receiver	R&S	ESCI7	100787	2016.2.25	1year
Personal Computer	HP	6300P	CNG24296YW	(n.a.)	(n.a.)
Test Antenna-Horn	Schwarzbeck	BBHA9170	BBHA91970171	2016.9.21	1year
Test Antenna-Horn	Schwarzbeck	BBHA 9120D	9120D-1033	2016.7.24	1year
Test Antenna-Log	Schwarzbeck	VULB 9163	9163-561	2016.9.24	1year
Test Antenna-Loop	Rohde&Schwarz	HFH2-Z2	860004/001	2016.9.21	1year
EPM Series Power Meter	Agilent	E4418B	GB43318055	2016.5.24	1year
Power Sensor	Agilent	8482A	MY41091706	2016.5.24	1year
RF Cable	(n.a.)	0~25GHz	(n.a.)	(n.a.)	(n.a.)
Temporary Antenna Connector	Farpu	SMA-K	(n.a.)	(n.a.)	(n.a.)
Laptop	ACER	Aspire 4376ZG	LXPFY0C004 935291221601	(n.a.)	(n.a.)
Laptop Adapter	LITEON	PA-1650-22	9801016502	(n.a.)	(n.a.)

NOTE:

Equipments listed above have been calibrated and are in the period of validation.



3. Test Standards and Results

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC Part 15 Subpart C §15.247

ANSI C63.10-2013

April 2016 KDB558074

NOTE:

(1)All test items were verified and recorded according to the standards and without any deviation during the test.

(2)This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart C (WIFI, 2.4GHz ISM band radiators), recorded in a separate test report.

Test items and the results are as bellow:

No.	FCC Rules	Description	Result
1	15.203	Antenna Requirement	Pass
2	15.247(b)	Peak Output power	Pass
4	15.247(b)	Average Output power	Pass
5	15.247(a)	6dB & 20dB Bandwidth	Pass
6	15.247(d)	Conducted Spurious Emission	Pass
7	15.247(d)	Band Edge	Pass
8	15.247(e)	Power Spectral Density (PSD)	Pass
9	15.207	Conducted Emission	N/A
10	15.247(d) 15.209	Radiated Emission	Pass



4. Test Conditions Setting

4.1 Test Mode

The EUT configuration is EUT + Laptop

Mode 1: Continuous Transmitting Mode

Wi-Fi module is controlled by computer software. During the measurement, EUT is working in the continuous transmitting mode. (Duty cycle > 98%.)

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

The testing program is configured on laptop, WIFI module keeps working on after software gave a instruction, and the laptop and the TTL cable are removed. The receiver can receive the signals from the EUT and measure the value during the communication.

The power supply is setting with 4XAA NEW alkaline batteries, in order to enough voltage supply, new ones is employed every single test.

Setting table of output power:

Frequency (MHz)	Setting Value		
	802.11b	802.11g	802.11n
2412	-1	-1	-1
2437	-1	-1	-1
2462	-1	-1	-1

NOTE:

‘-1’ means manufactory’s default output power setting value.

Modulation technology	Modulation Type	Transfer Rate (Mbps)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/ 11
OFDM (802.11g)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n-20MHz)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65

NOTE:

Preliminary tests were performed in different data rate in above table 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.



5. 47 CFR Part 15C

5.1 Antenna requirement

5.1.1 Applicable standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by 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 shall be considered sufficient to comply with the provisions of this section.

5.1.2 Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.



6. Test Result

6.1 Peak Output Power

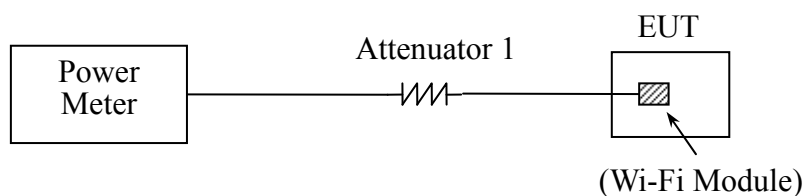
6.1.1 Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

6.1.2 Test Description

The measured output power was calculated by the reading of the spectrum analyzer and calibration.

Test Setup:



The EUT is coupled to the Power Meter with Attenuator; the path loss as the factor is calibrated to correct the reading.

6.1.3 Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module. The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate, the worst value is selected and recorded as below (Duty cycle > 98%)

Test Verdict:

Mode	Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
			dBm	W	dBm	W	
802.11b	1	2412	14.81	0.03027	30	1	Pass
	6	2437	14.85	0.03055			Pass
	11	2462	14.69	0.02944			Pass
802.11g	1	2412	15.00	0.03162			Pass
	6	2437	15.15	0.03273			Pass
	11	2462	14.85	0.03055			Pass
802.11n (20MHz)	1	2412	15.60	0.03631			Pass
	6	2437	15.09	0.03228			Pass
	11	2462	14.92	0.03105			Pass

Conclusion: Pass



6.2 Average Power

6.2.1 Requirement

None; for reporting purposes only.

6.2.2 Test Description

Refer to 6.1.2.

6.2.3 Test Results

Mode	Channel	Frequency (MHz)	Measured Output Average Power	
			dBm	W
802.11b	1	2412	12.35	0.017179
	6	2437	12.44	0.017539
	11	2462	12.31	0.017022
802.11g	1	2412	12.19	0.016558
	6	2437	12.73	0.018750
	11	2462	12.55	0.017989
802.11n (20MHz)	1	2412	10.32	0.010765
	6	2437	10.09	0.010209
	11	2462	10.92	0.012359

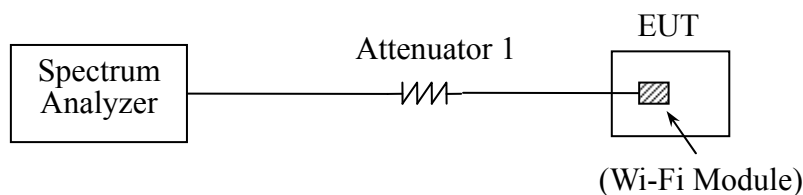


6.3 6dB & 20dB Bandwidth

6.3.1 Requirement

According to FCC section 15.247(a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.3.2 Test Description



6.3.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module. The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate, the worst value is selected and recorded as blow

A. Test Verdict:

802.11b Test mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	9.054	Plot A1	15.064	Plot A2	≥ 500	Pass
6	2437	8.213	Plot B1	15.064	Plot B2	≥ 500	Pass
11	2462	8.854	Plot C1	15.104	Plot C2	≥ 500	Pass

802.11g Test mode

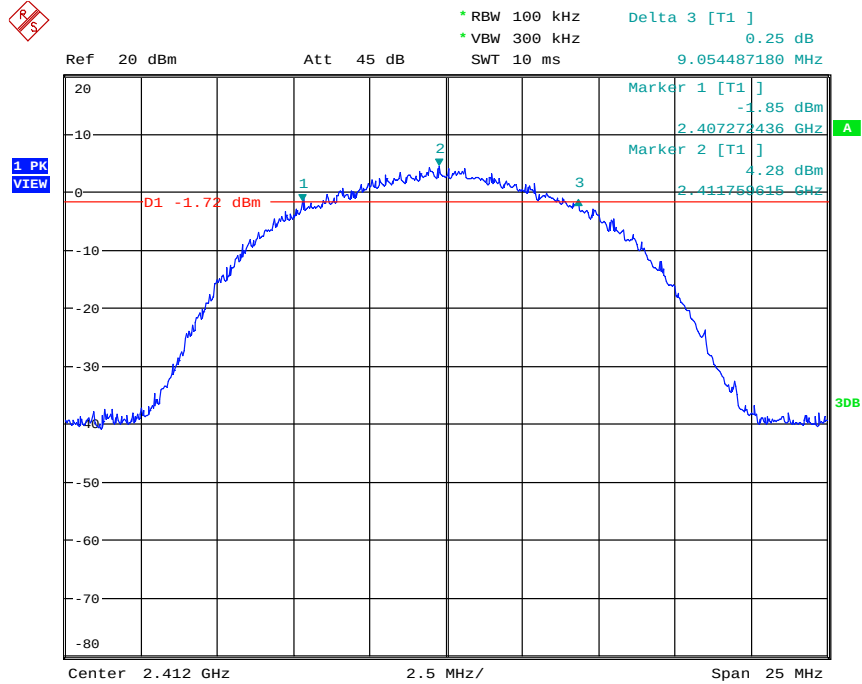
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	15.024	Plot D1	17.628	Plot D2	≥ 500	Pass
6	2437	15.384	Plot E1	17.387	Plot E2	≥ 500	Pass
11	2462	15.424	Plot F1	17.628	Plot F2	≥ 500	Pass

802.11n (20MHz) Test mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	15.144	Plot G1	18.229	Plot G2	≥ 500	Pass
6	2437	16.105	Plot H1	18.349	Plot H2	≥ 500	Pass

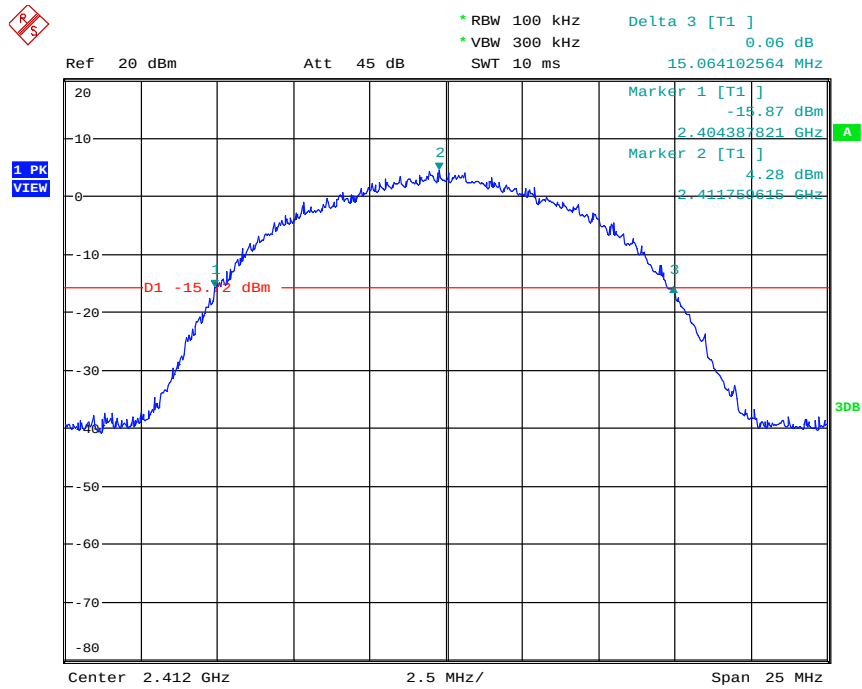


11	2462	15.464	Plot I1	18.349	Plot I2	≥ 500	Pass
----	------	--------	---------	--------	---------	------------	------

B. Test Plots:

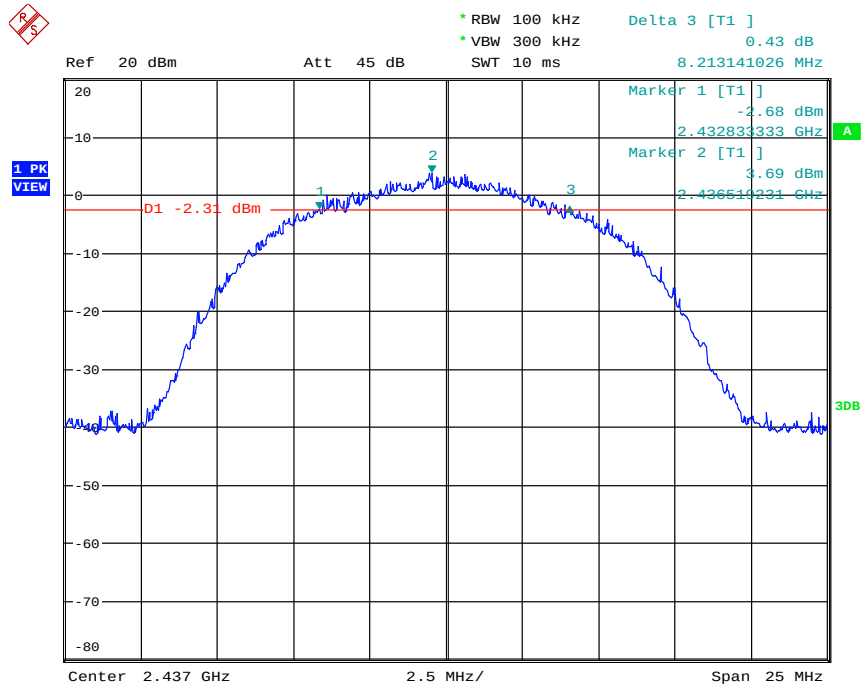
Date: 28.SEP.2016 12:30:51

Plot A1



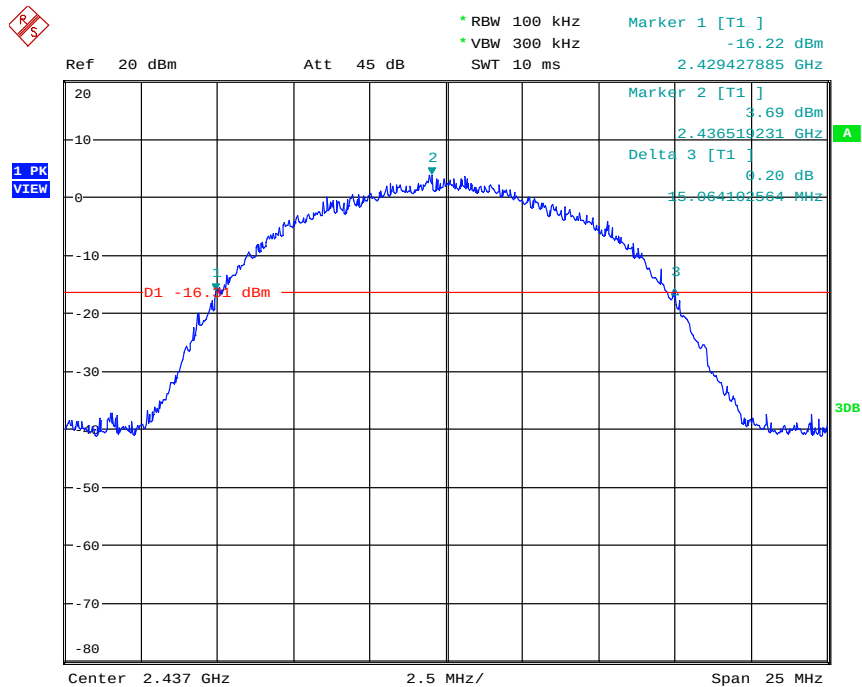
Date: 28.SEP.2016 12:38:23

Plot A2



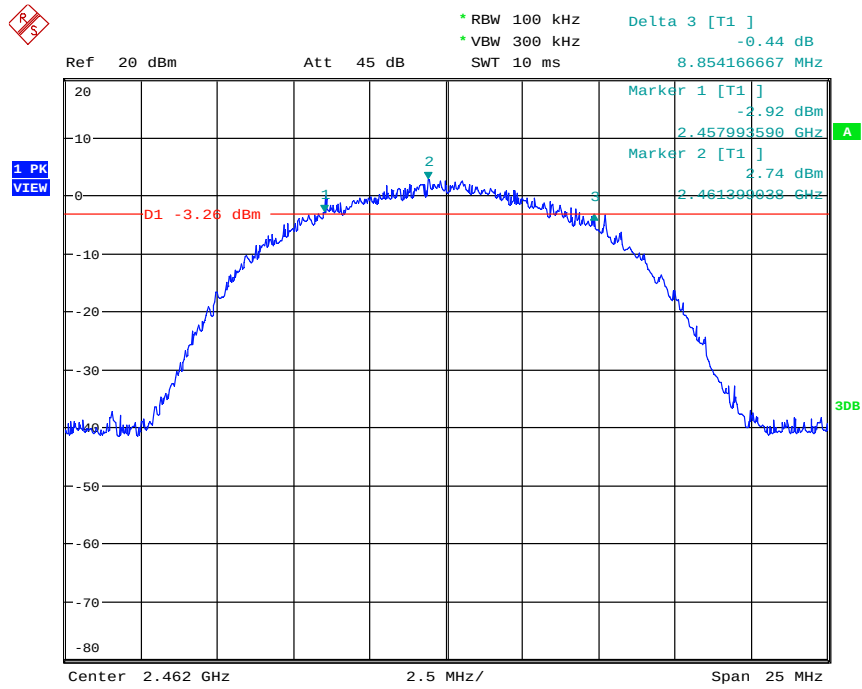
Date: 28.SEP.2016 12:45:06

Plot B1



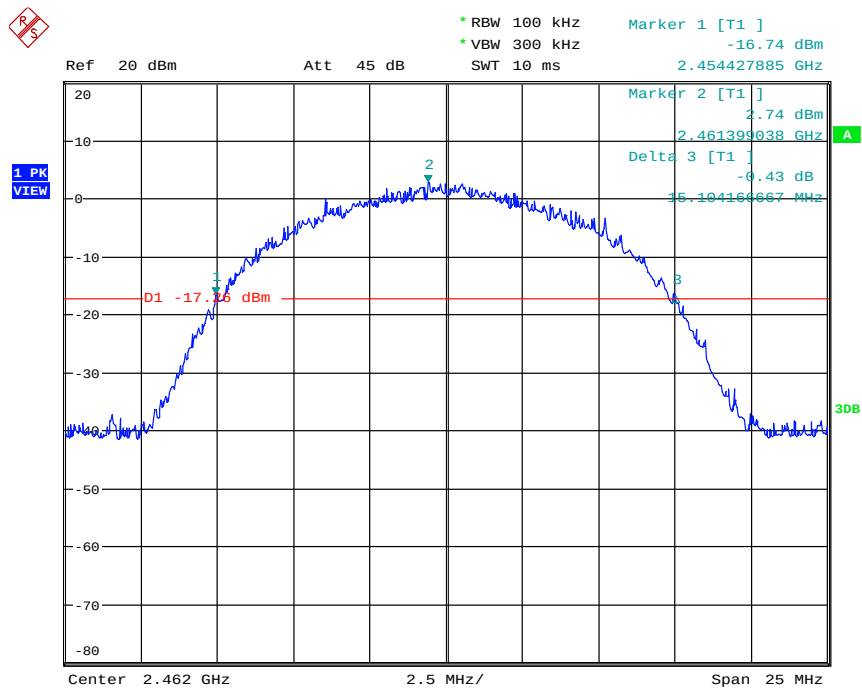
Date: 28.SEP.2016 12:46:01

Plot B2



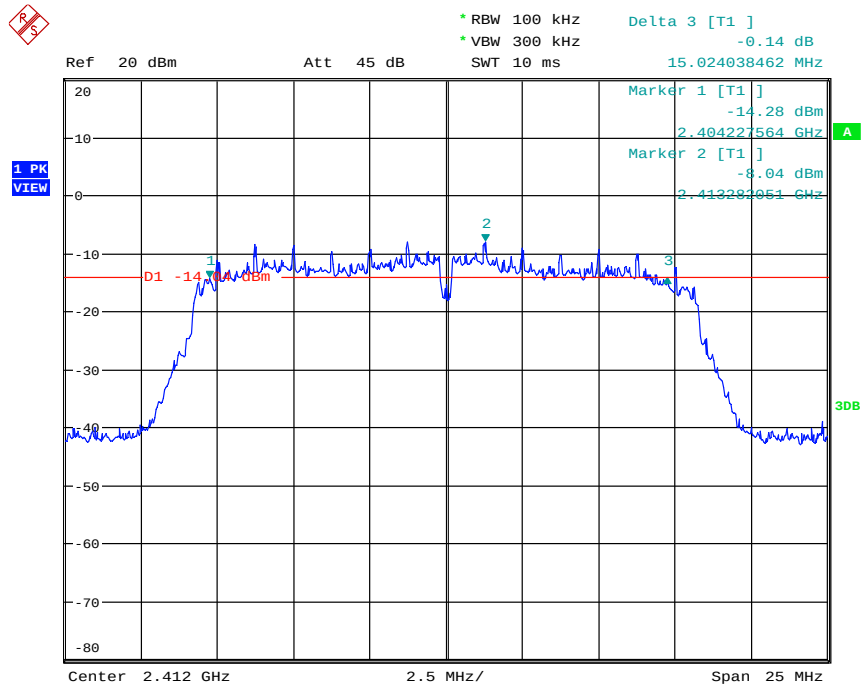
Date: 28.SEP.2016 12:53:59

Plot C1



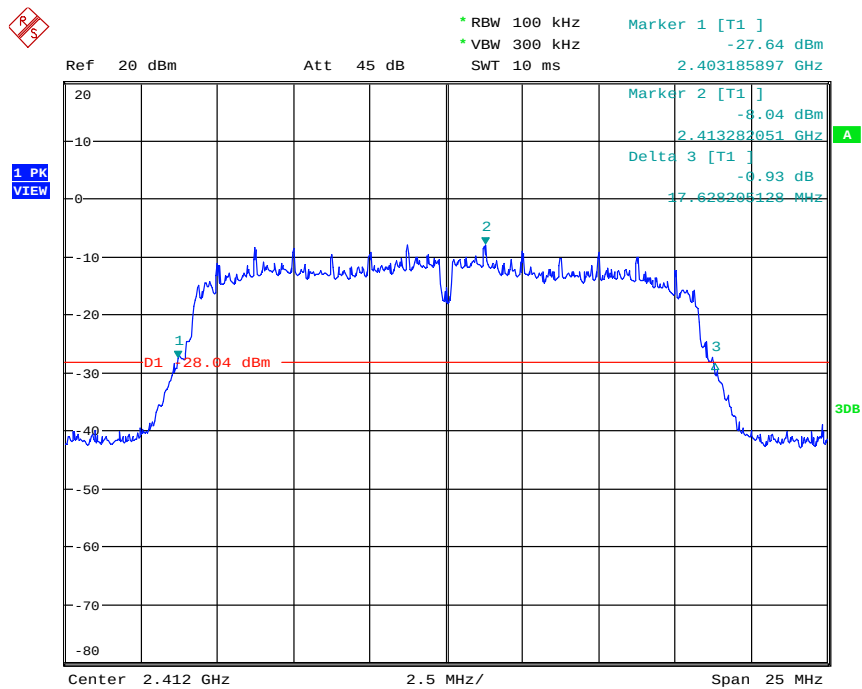
Date: 28.SEP.2016 12:54:49

Plot C2



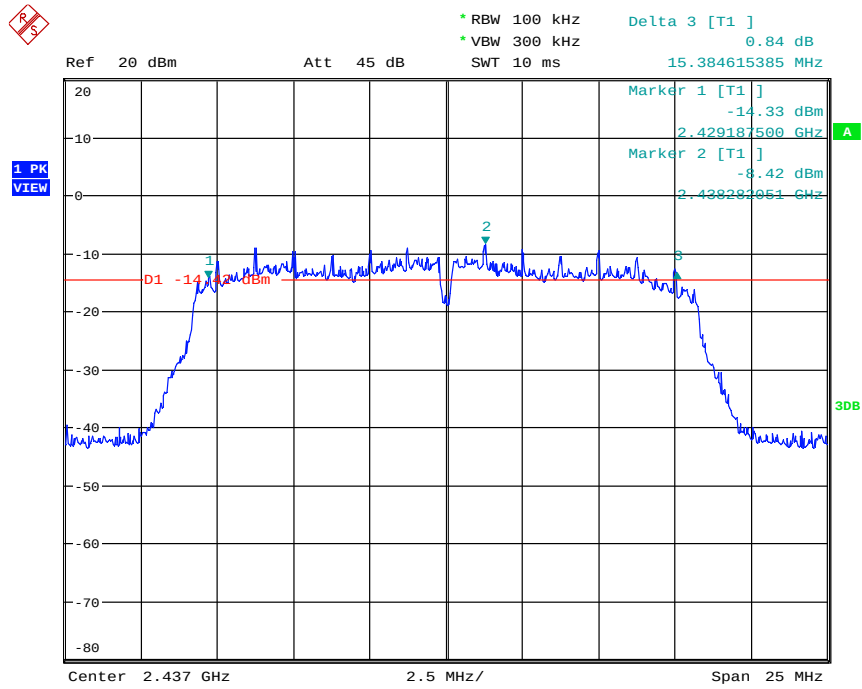
Date: 28.SEP.2016 12:40:38

Plot D1



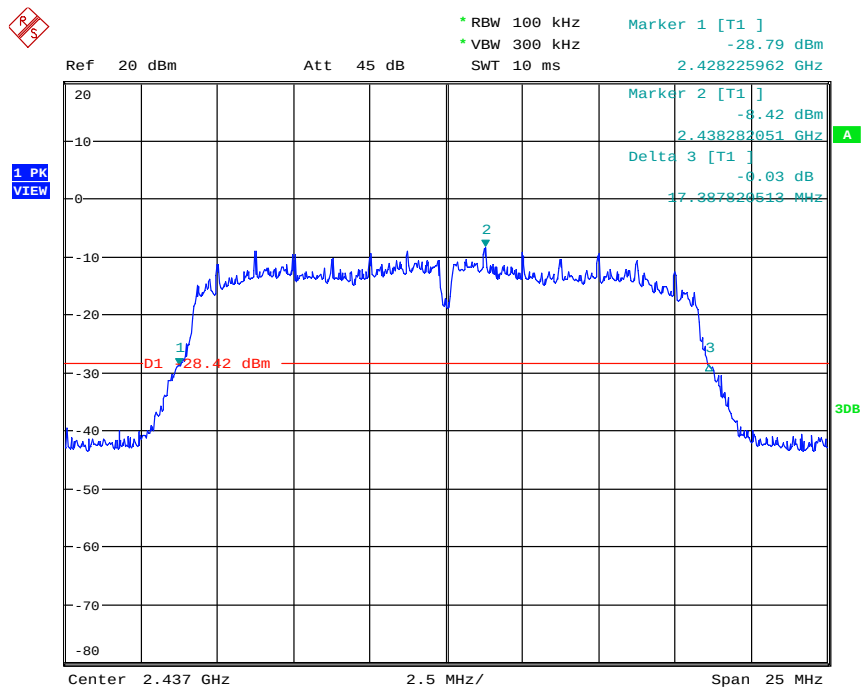
Date: 28.SEP.2016 12:41:25

Plot D2



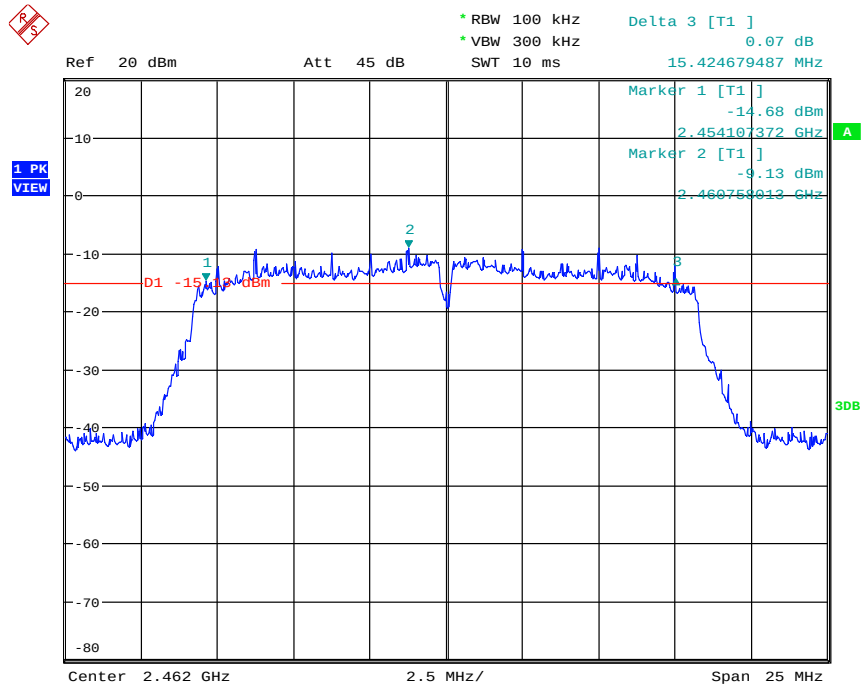
Date: 28.SEP.2016 12:47:21

Plot E1



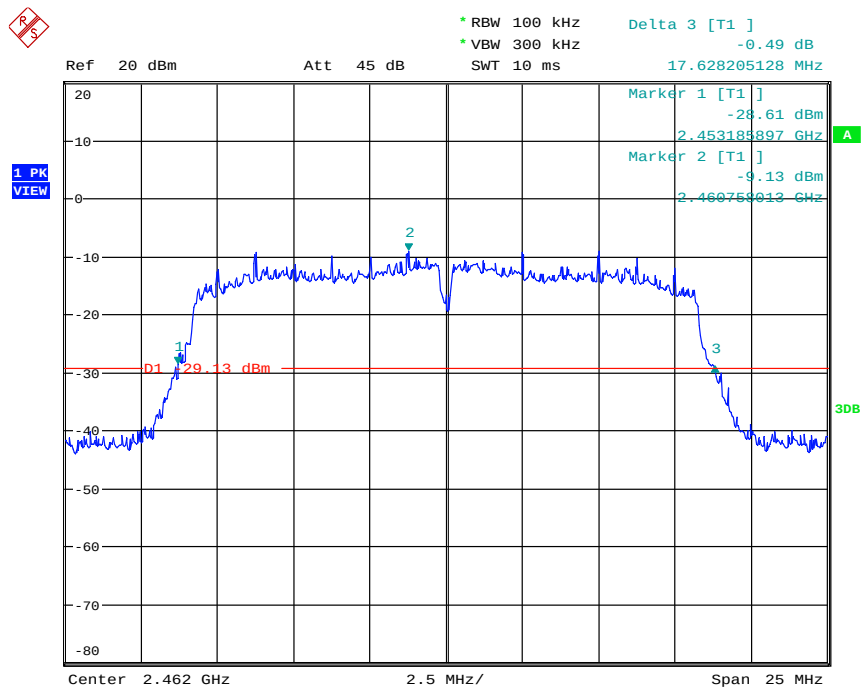
Date: 28.SEP.2016 12:48:02

Plot E2



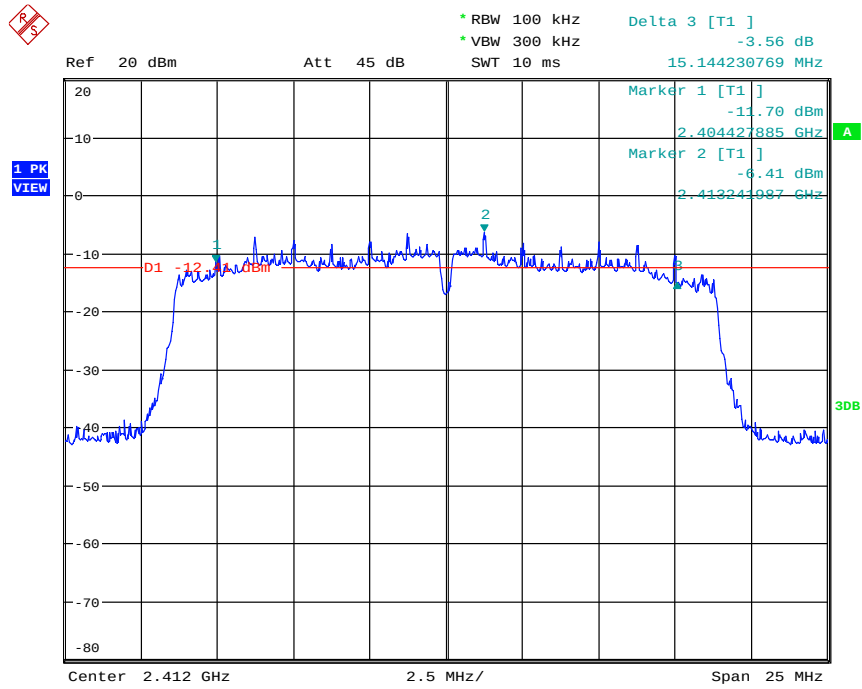
Date: 28.SEP.2016 12:55:52

Plot F1



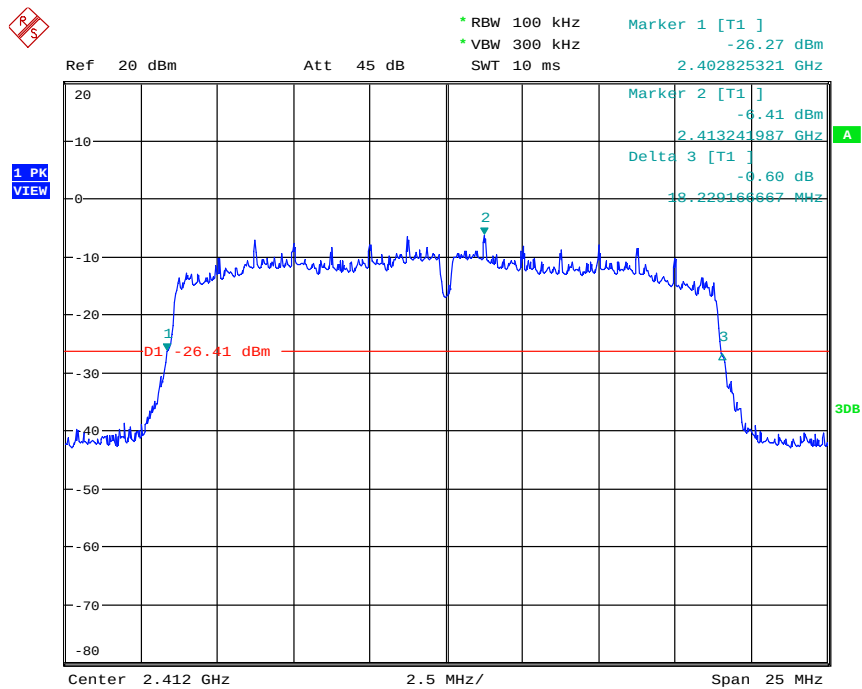
Date: 28.SEP.2016 12:56:29

Plot F2



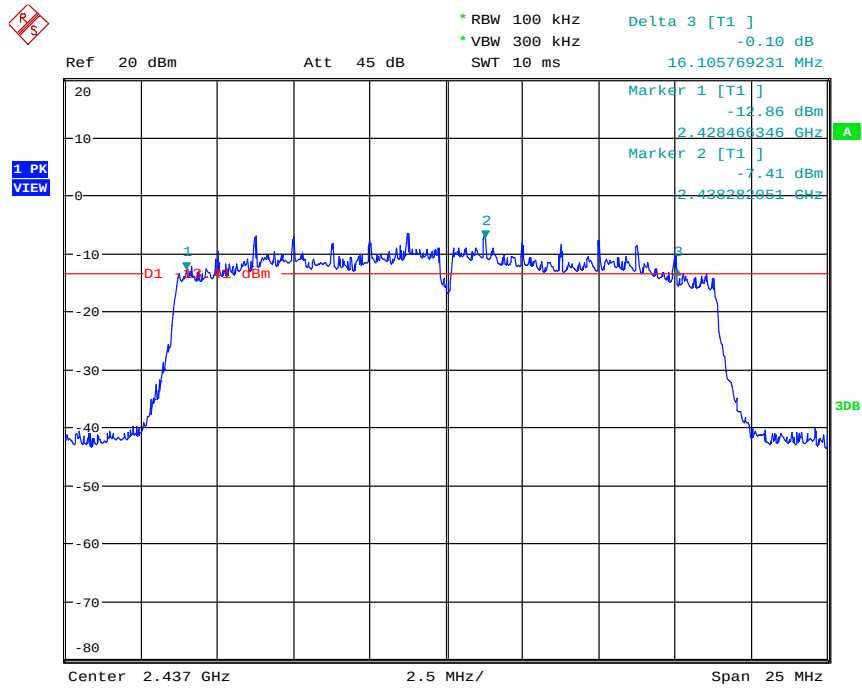
Date: 28.SEP.2016 12:43:24

Plot G1



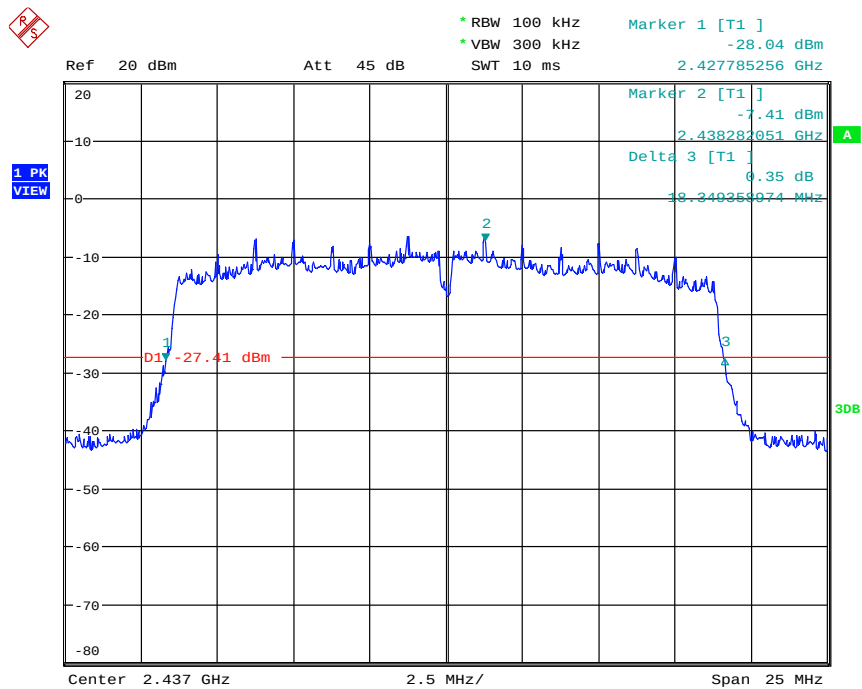
Date: 28.SEP.2016 12:44:03

Plot G2



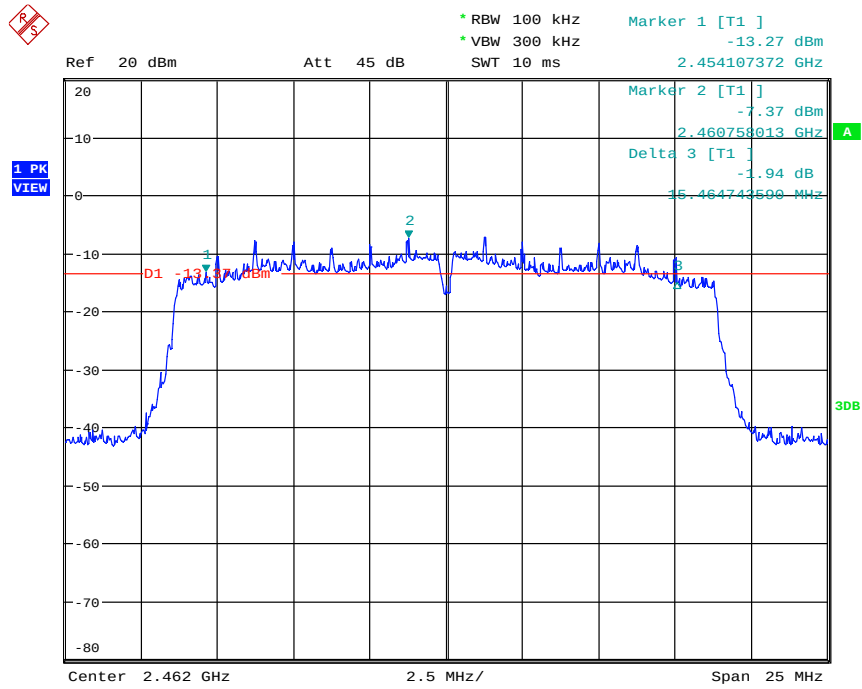
Date: 28.SEP.2016 12:49:36

Plot H1



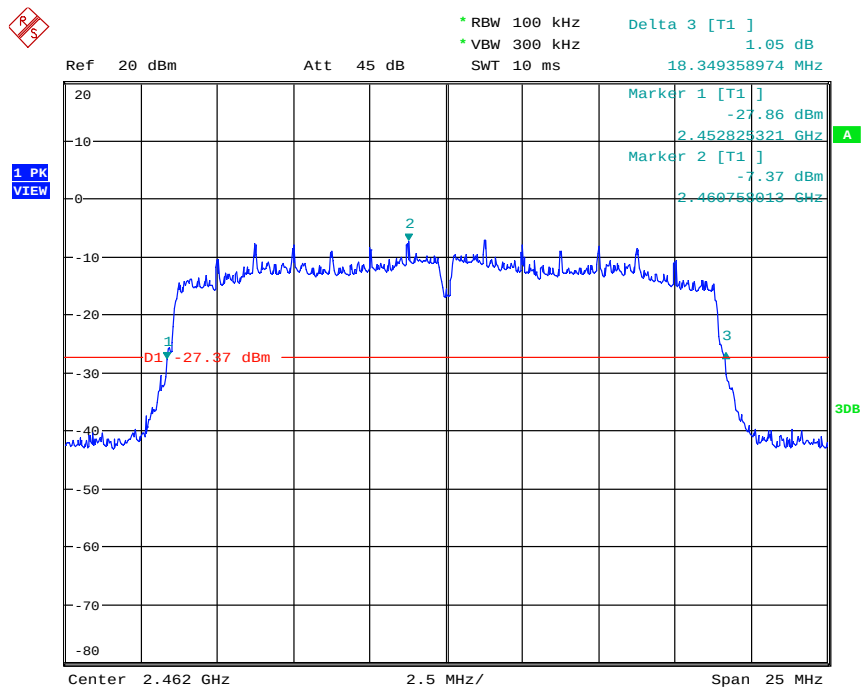
Date: 28.SEP.2016 12:51:01

Plot H2



Date: 28.SEP.2016 12:57:54

Plot I1



Date: 28.SEP.2016 12:58:28

Plot I2

Conclusion: Pass

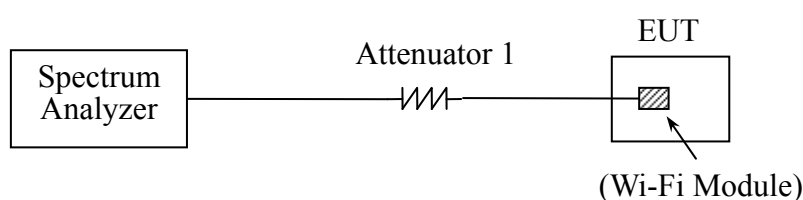


6.4 Conducted Spurious Emissions

6.4.1 Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

6.4.2 Test Description



6.4.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions. The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate, the worst value is selected and recorded as below

A.Test Verdict:

802.11b Test mode

Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-37.42	Plot A	1.63	-18.37	Pass
6	2437	-38.55	Plot B	3.16	-16.84	Pass
11	2462	-36.72	Plot C	1.84	-18.16	Pass

802.11g Test mode

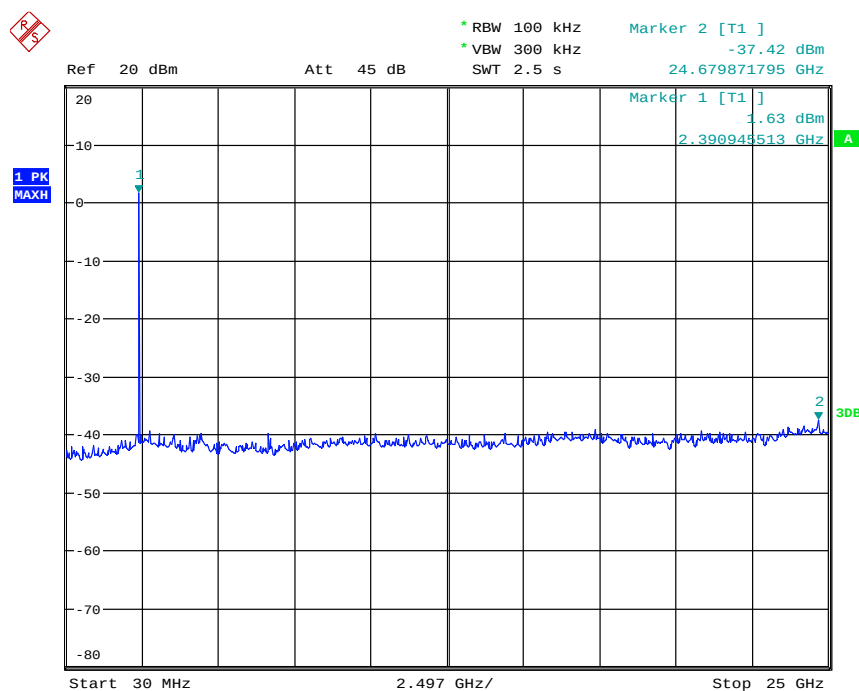
Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-37.63	Plot D	-8.03	-28.03	Pass
6	2437	-37.63	Plot E	-9.76	-29.76	Pass
11	2462	-37.73	Plot F	-10.86	-30.86	Pass



802.11n (20MHz) Test mode

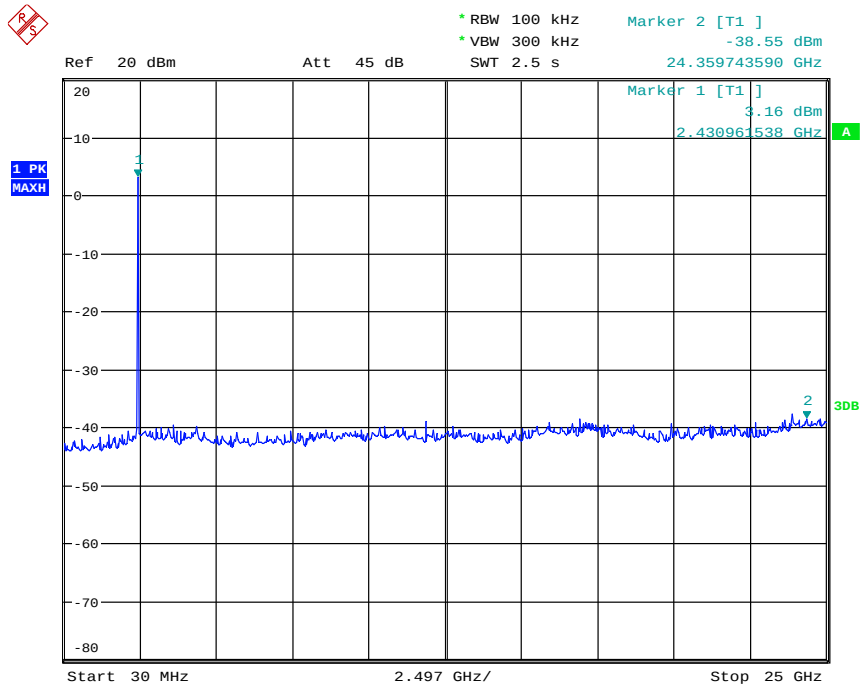
Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-37.47	Plot G	-9.26	-29.26	Pass
6	2437	-38.12	Plot H	-9.77	-29.77	Pass
11	2462	-38.19	Plot I	-9.21	-29.21	Pass

B. Test Plot:



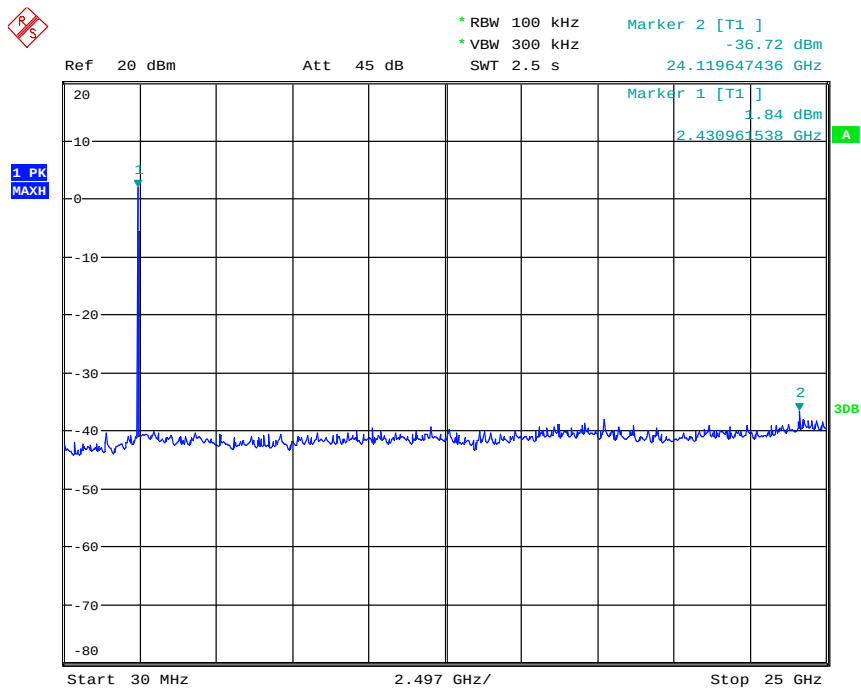
Date: 27.SEP.2016 20:37:25

Plot A



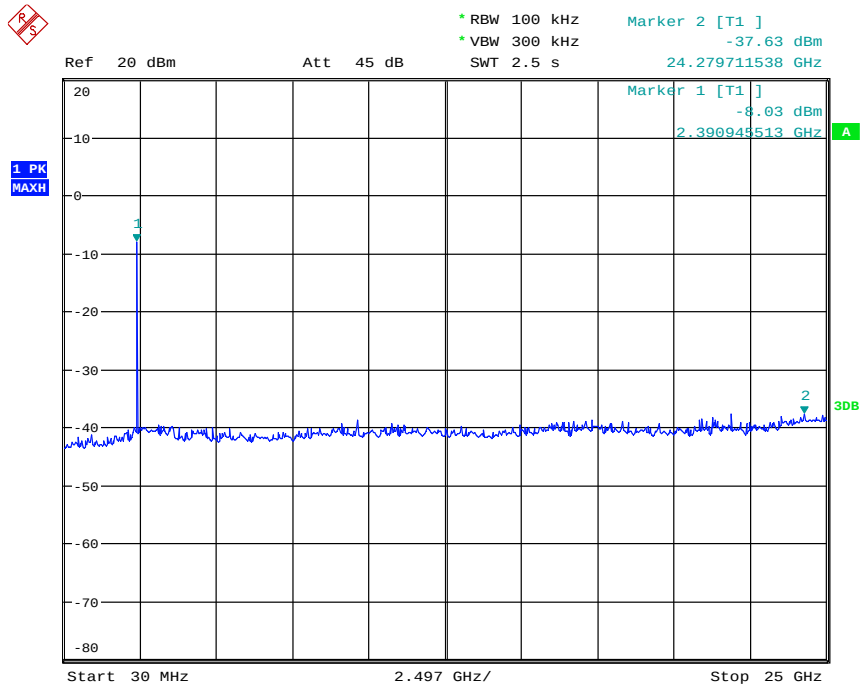
Date: 27.SEP.2016 20:38:02

Plot B



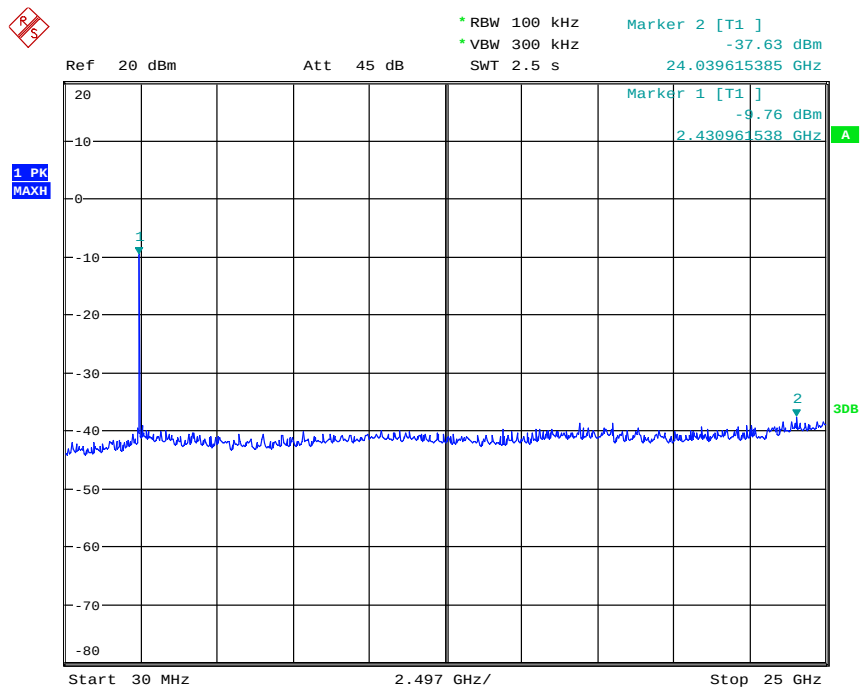
Date: 27.SEP.2016 20:38:40

Plot C



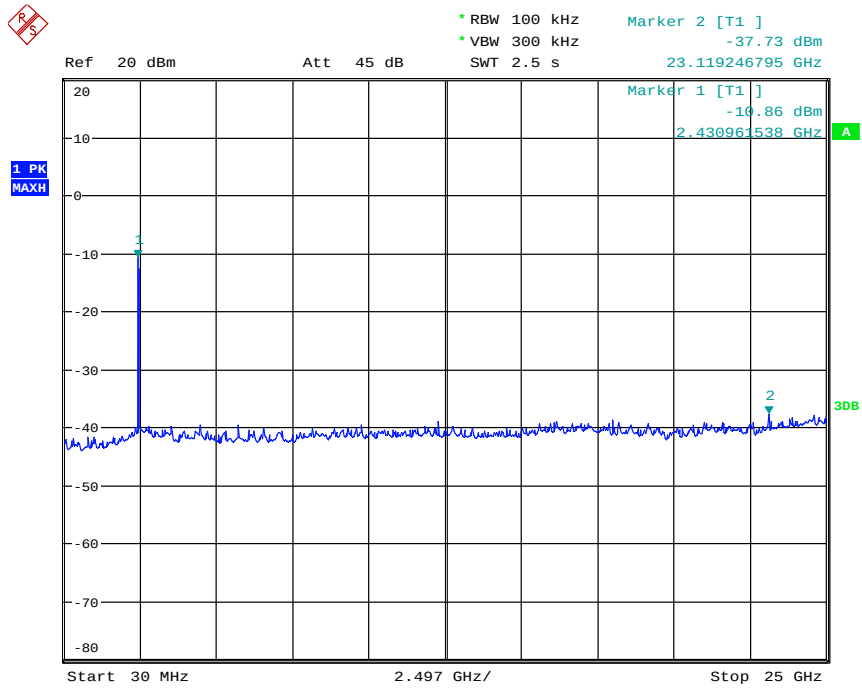
Date: 27.SEP.2016 20:33:35

Plot D



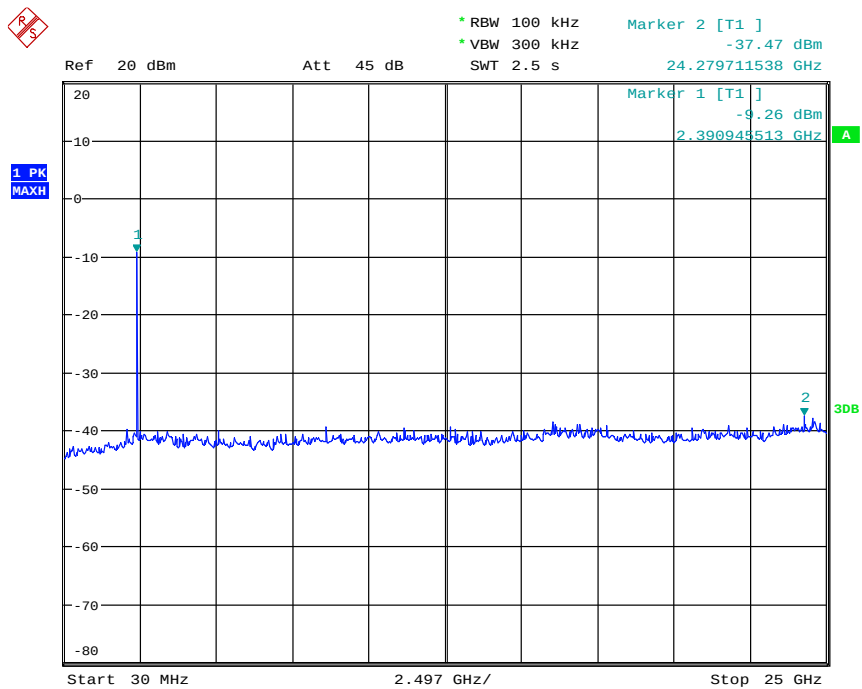
Date: 27.SEP.2016 20:34:11

Plot E



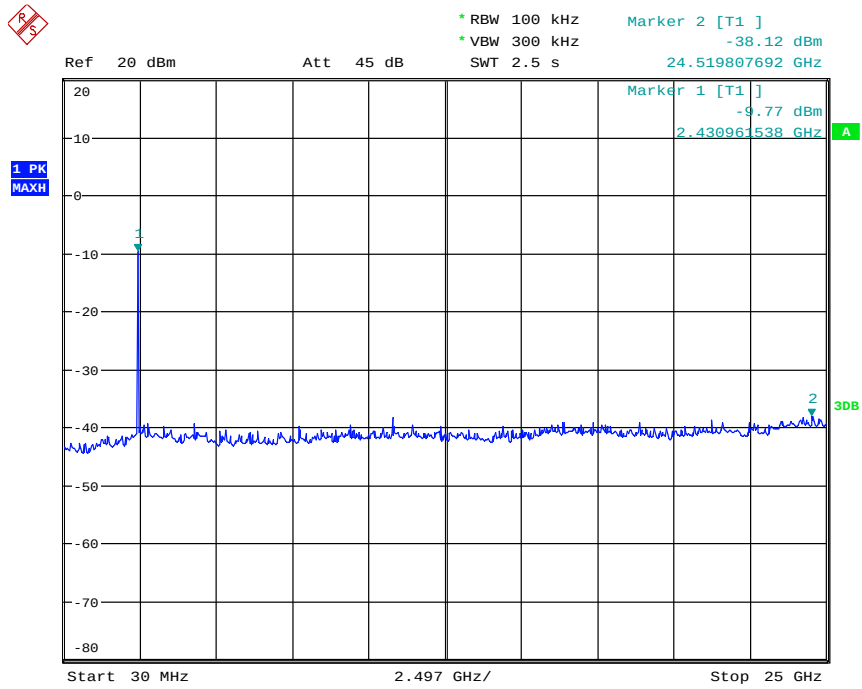
Date: 27.SEP.2016 20:35:14

Plot F



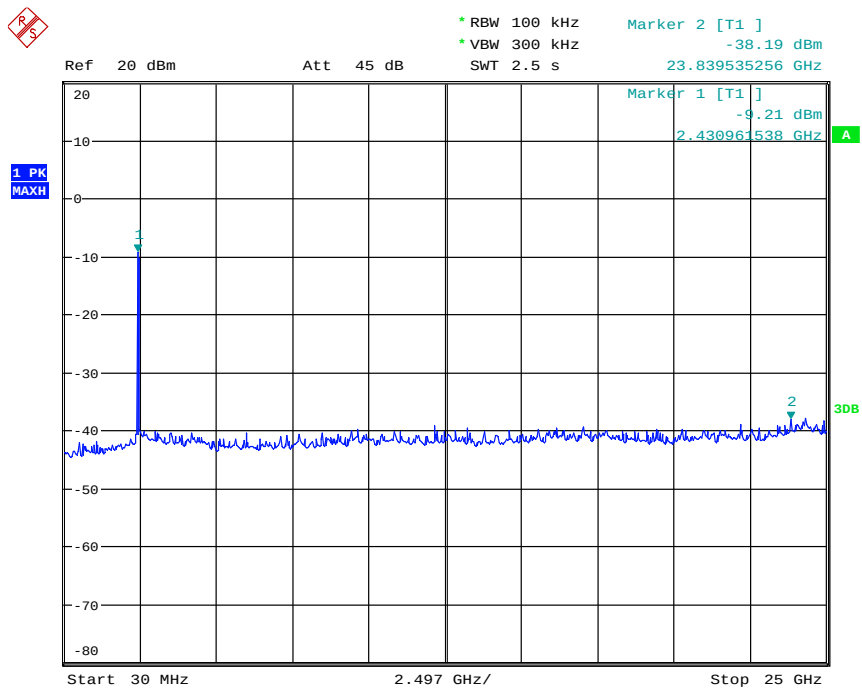
Date: 27.SEP.2016 20:35:45

Plot G



Date: 27.SEP.2016 20:36:22

Plot H



Date: 27.SEP.2016 20:36:51

Plot I

Conclusion: Pass

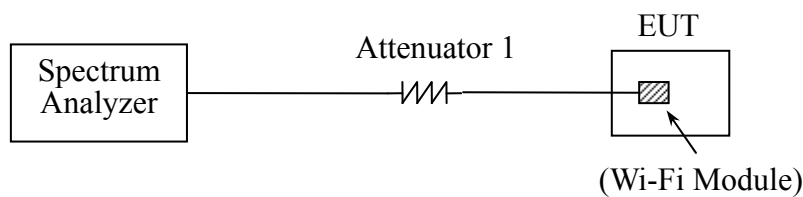


6.5 Power Spectral Density (PSD)

6.5.1 Requirement

According to FCC section 15.247(e), the same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used

6.5.2 Test Description



6.5.3 Test Result

The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate , the worst value is selected and recorded as blow

A.Test Verdict

802.11b Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-10.03	Plot A	8	Pass
6	2437	-11.86	Plot B	8	Pass
11	2462	-11.78	Plot C	8	Pass

802.11g Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-22.00	Plot D	8	Pass
6	2437	-22.50	Plot E	8	Pass
11	2462	-22.26	Plot F	8	Pass

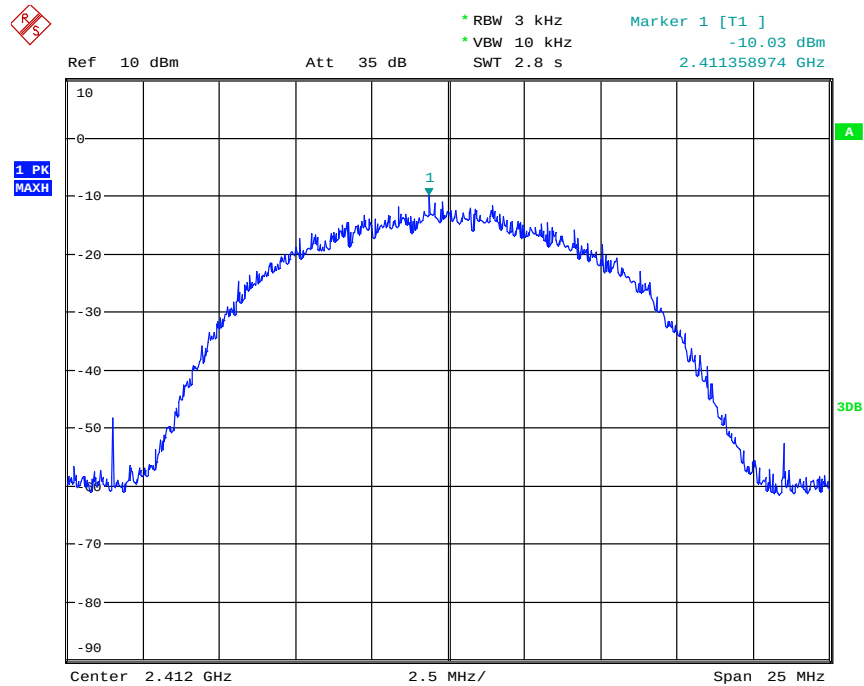
802.11n (20MHz) Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-20.20	Plot G	8	Pass



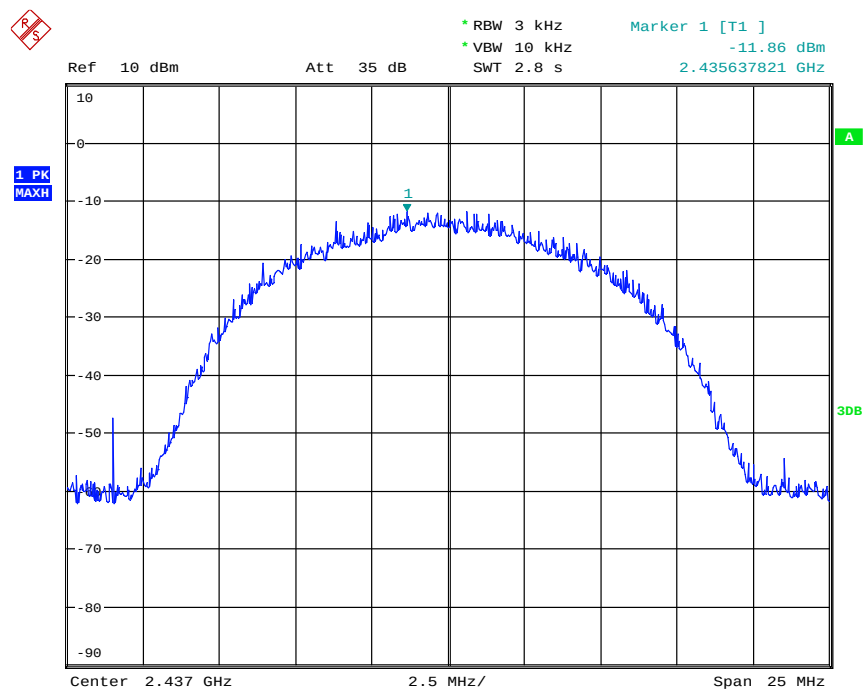
6	2437	-20.38	Plot H	8	Pass
11	2462	-20.53	Plot I	8	Pass

B. Test Plot



Date: 27.SEP.2016 20:23:41

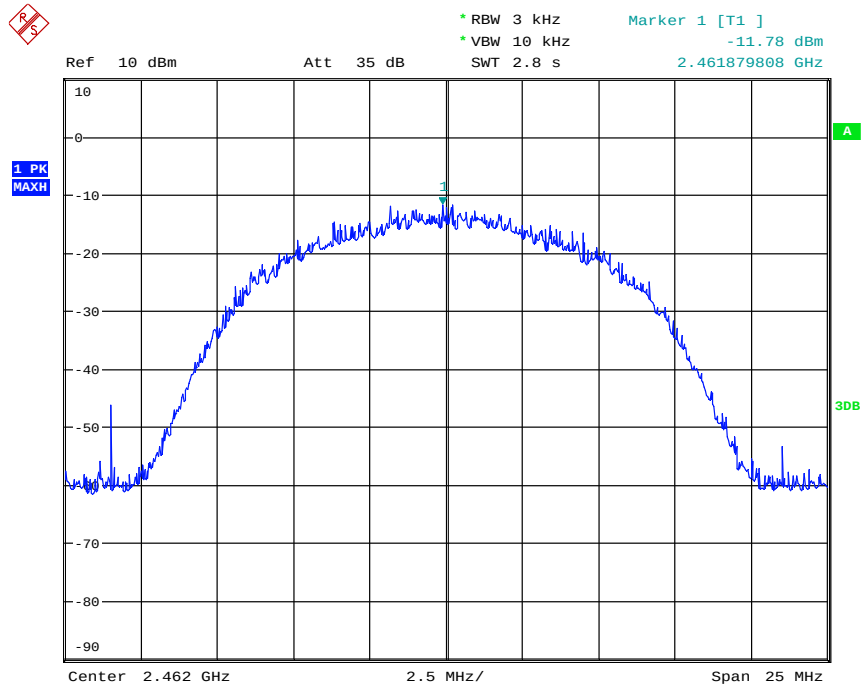
Plot A



Date: 27.SEP.2016 20:25:02

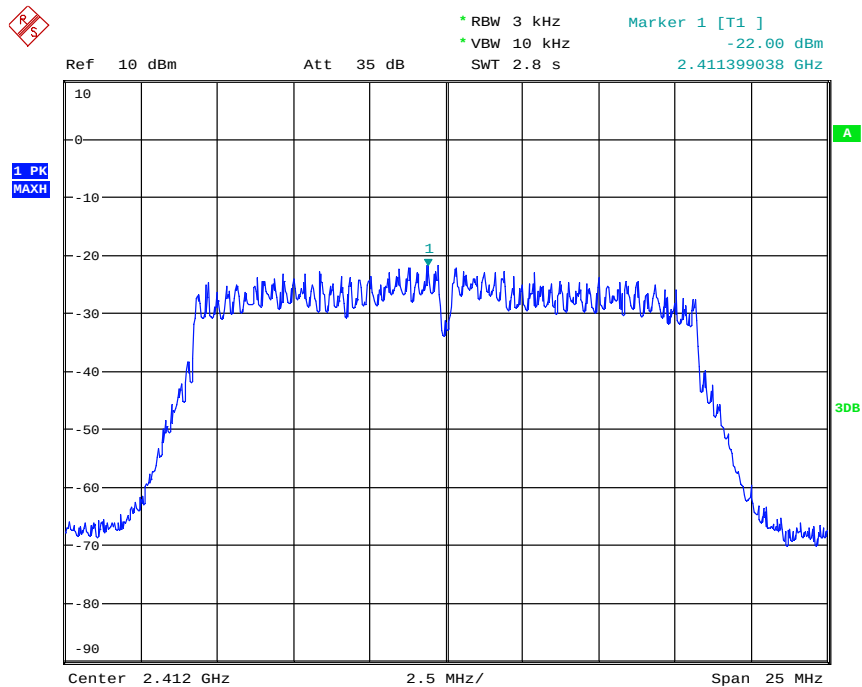


Plot B



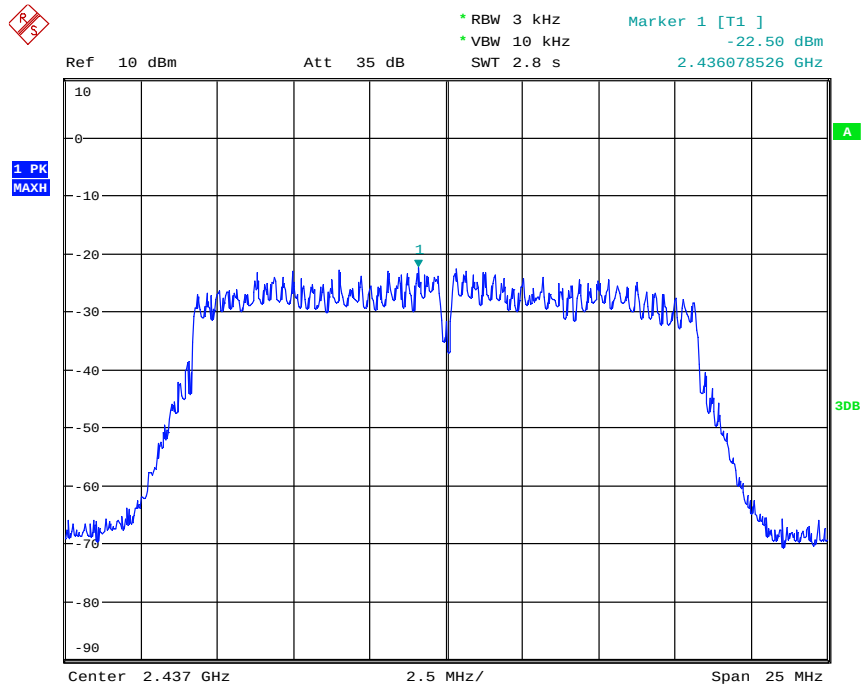
Date: 27.SEP.2016 20:26:21

Plot C



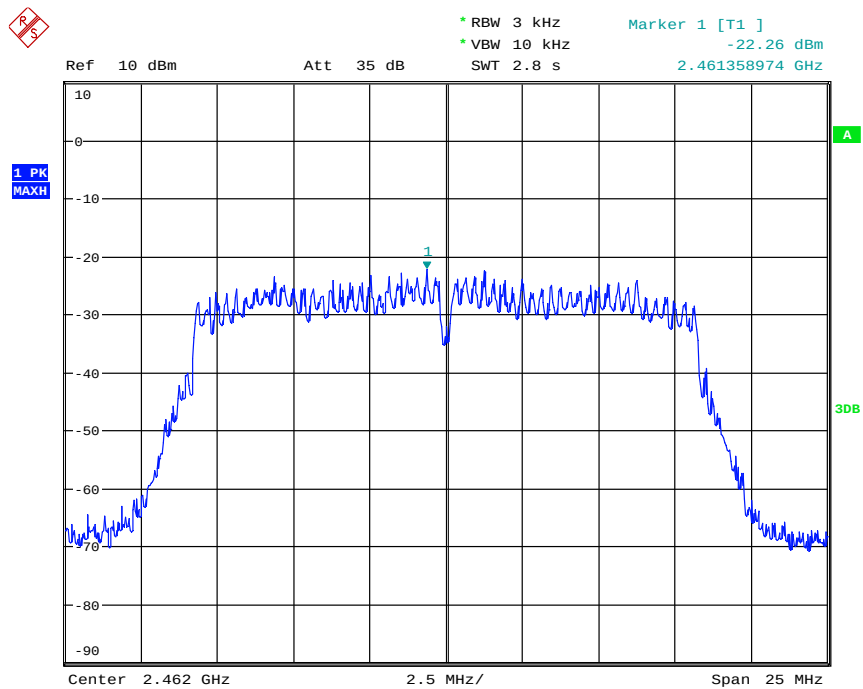
Date: 27.SEP.2016 20:24:09

Plot D



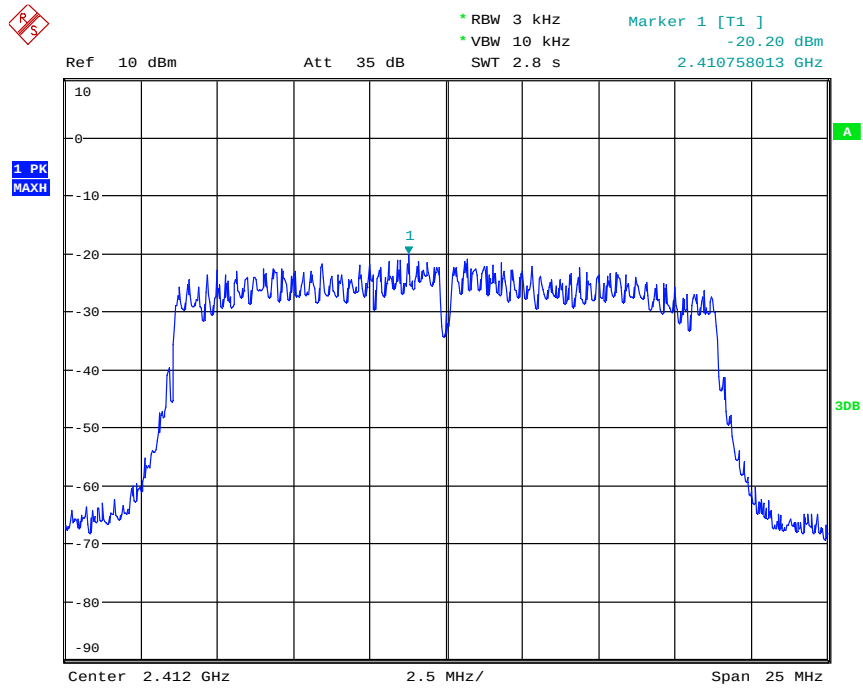
Date: 27.SEP.2016 20:25:23

Plot E



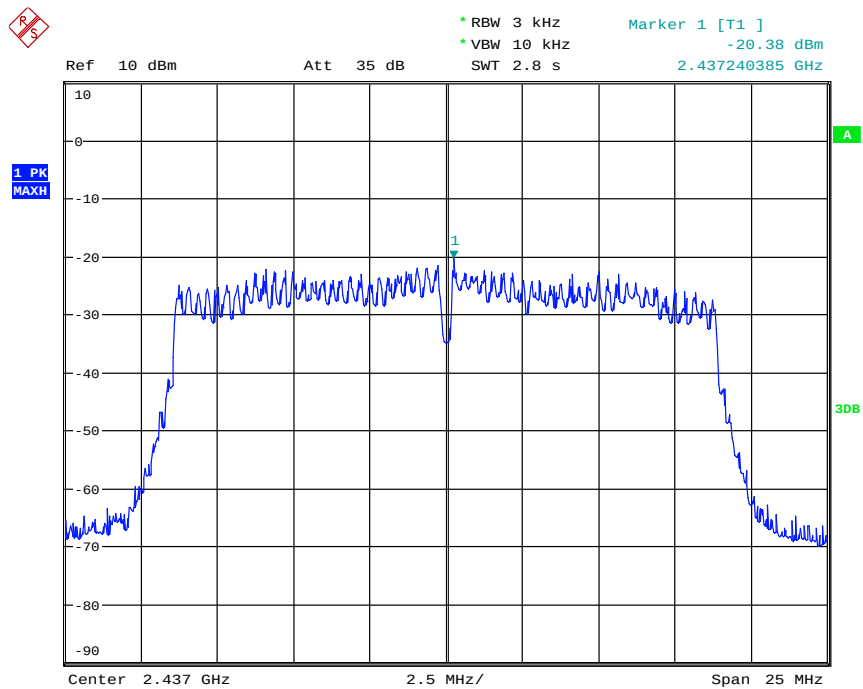
Date: 27.SEP.2016 20:26:46

Plot F



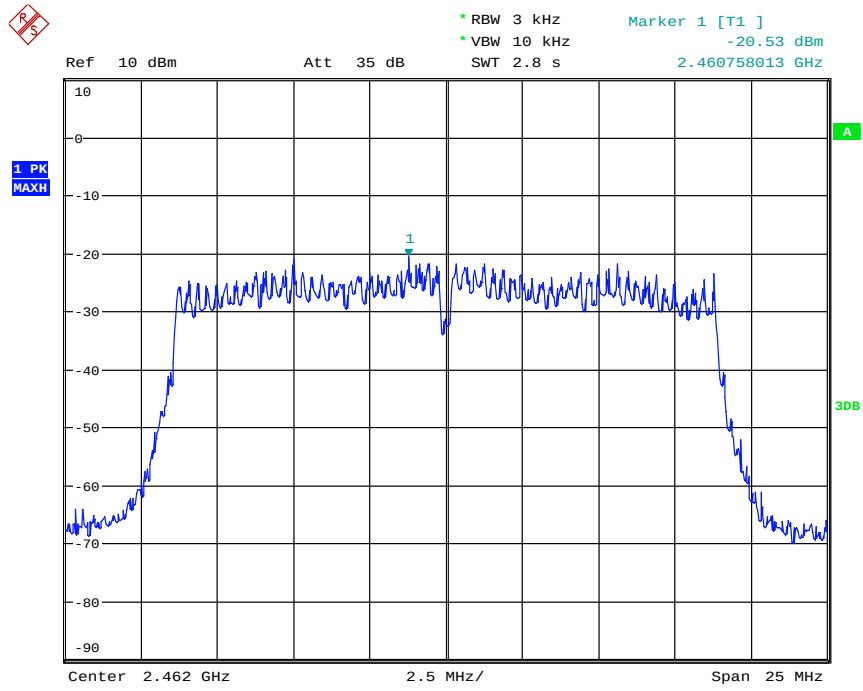
Date: 27.SEP.2016 20:24:32

Plot G



Date: 27.SEP.2016 20:25:43

Plot H



Date: 27.SEP.2016 20:27:18

Plot I

Conclusion: Pass

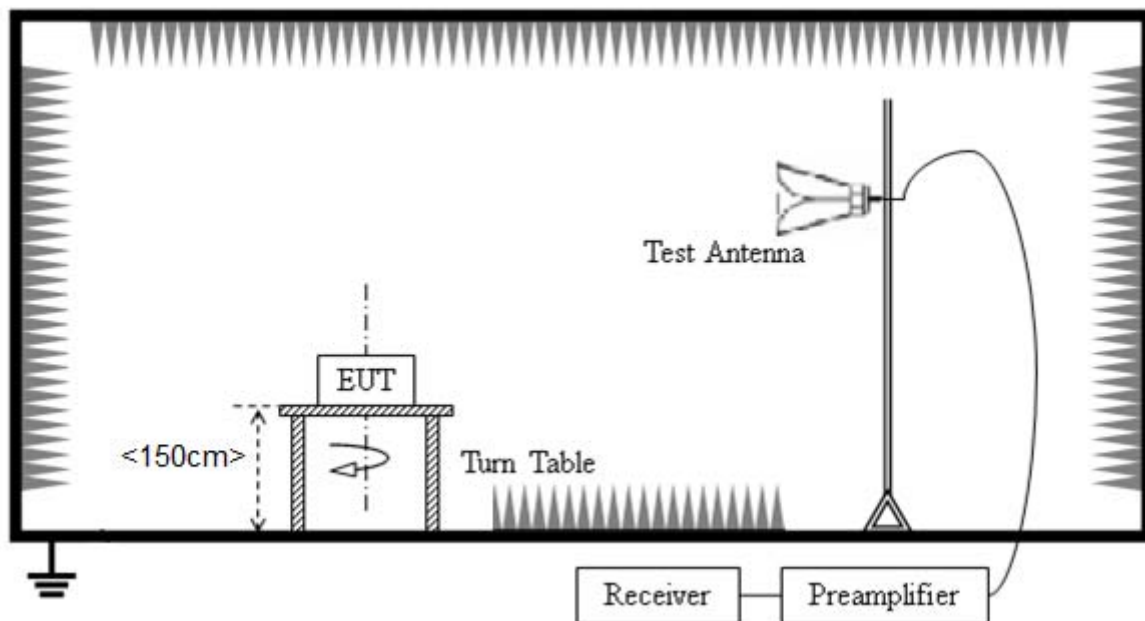


6.6 Band Edge

6.6.1 Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, , 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).

6.6.2 Test Description



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

Receiver Setting: RBW=1MHz, VBW=3MHz, Detector: PK/AV, Max Hold.

6.6.3 Test Result

The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate , the worst value is selected and recorded as blow

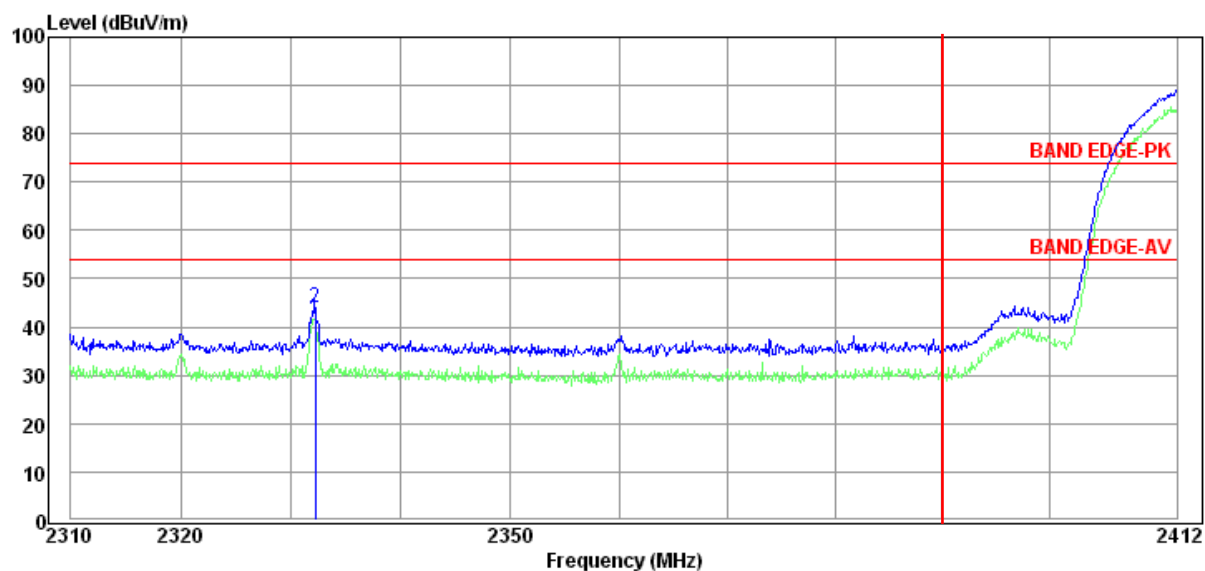
802.11b Test mode

Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2332.16	PK	44.04	74	Plot A	Pass
1	2332.16	AV	41.70	54		Pass

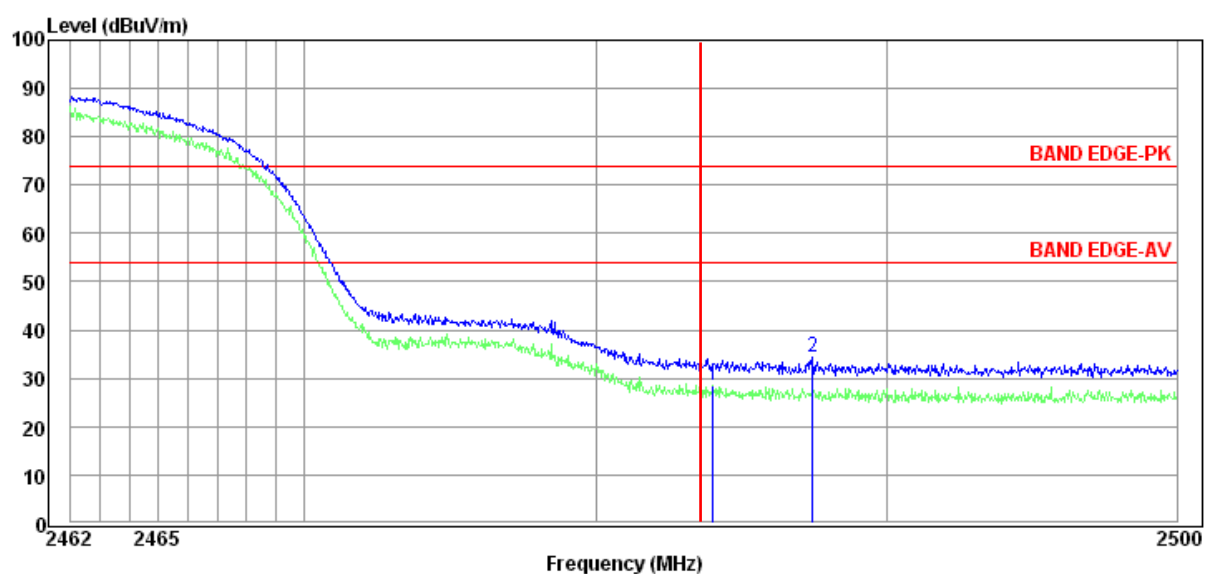


11	2487.43	PK	34.48	74	Plot B	Pass
11	2484.01	AV	28.37	54		Pass

Test Plot:



Plot A



Plot B

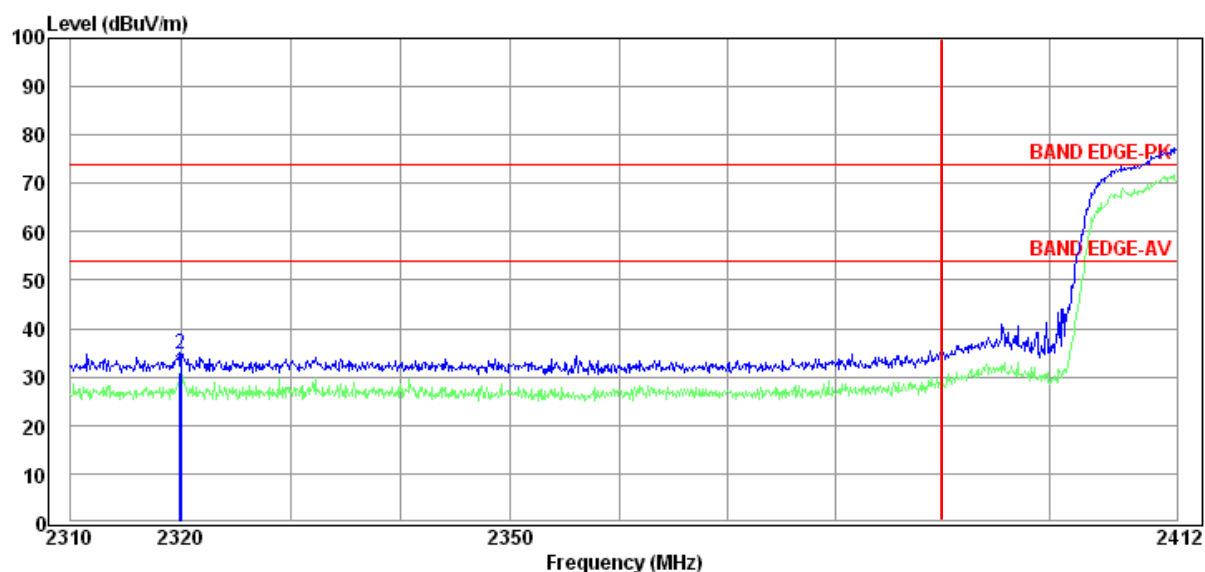
802.11g Test mode

Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2320.00	PK	34.72	74	Plot C	Pass
1	2319.90	AV	30.83	54		Pass
11	2486.44	PK	33.45	74	Plot D	Pass

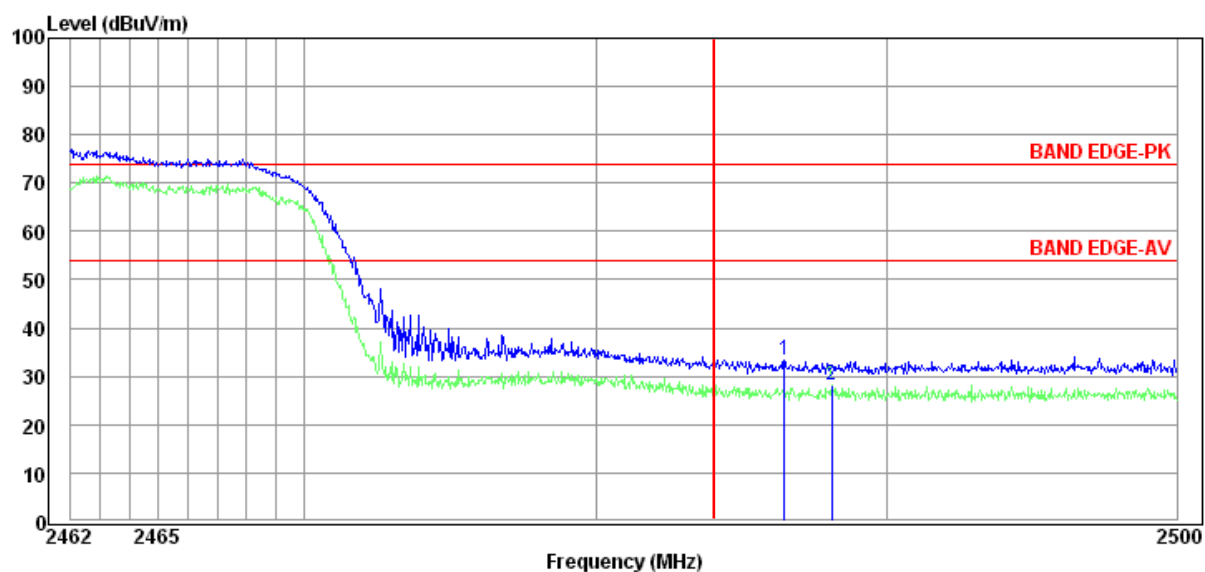


11	2488.08	AV	28.29	54		Pass
----	---------	----	-------	----	--	------

Test Plot:



Plot C



Plot D

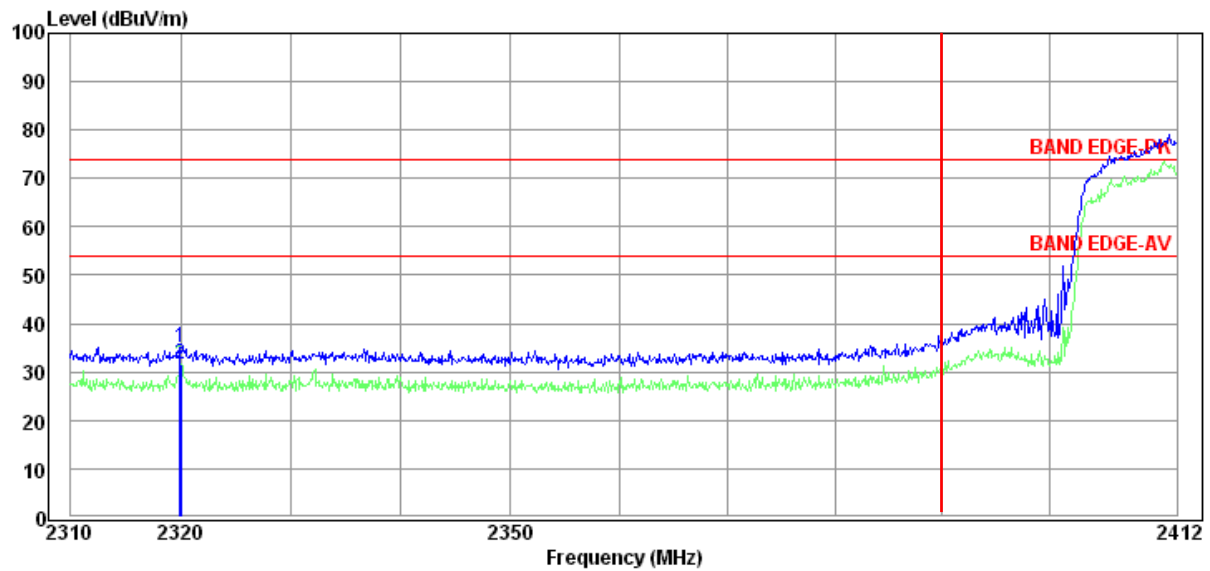
802.11n (20MHz) Test mode

Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2319.90	PK	35.12	74	Plot E	Pass
1	2320.00	AV	31.52	54		Pass
11	2483.89	PK	34.53	74	Plot F	Pass

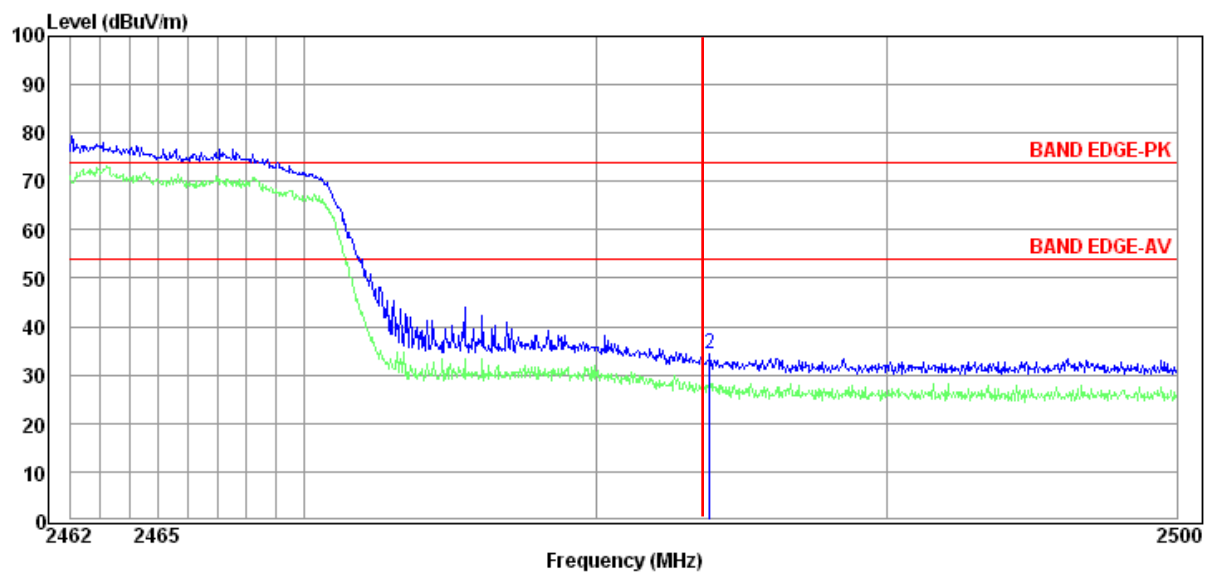


11	2483.89	AV	29.23	54		Pass
----	---------	----	-------	----	--	------

Test Plot:



Plot E



Plot F

Conclusion: Pass



6.7 Conducted Emission

6.7.1 Requirement

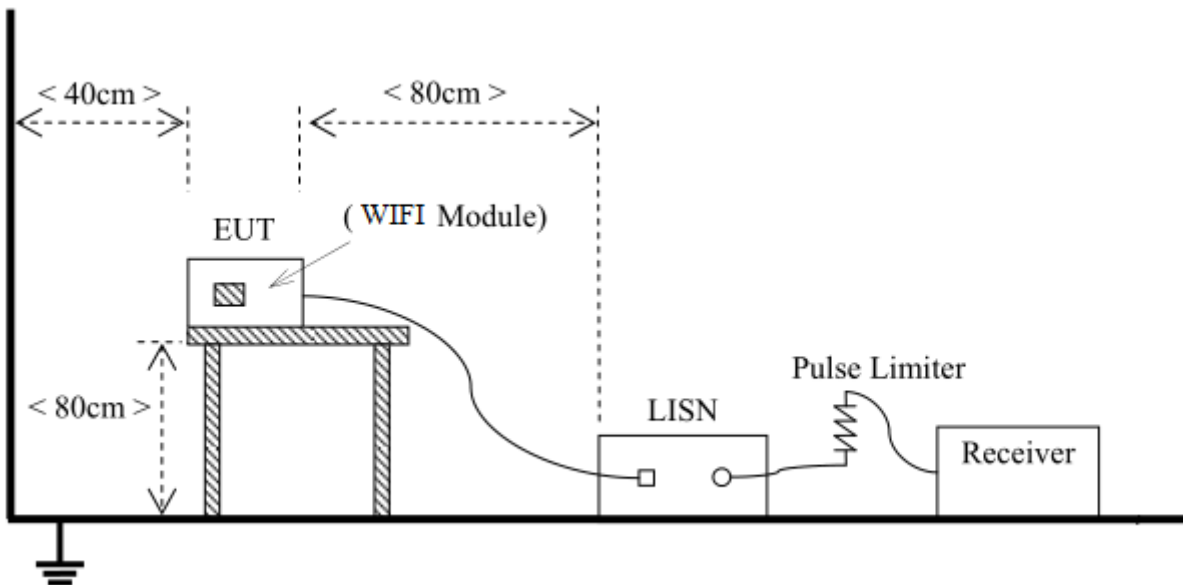
According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network(LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

6.7.2 Test Description



The EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. Power supplier is setting to 120V/60Hz. The set-up and test methods were according to ANSI C63.10:2013

6.7.3 Test result

Not applicable. Because the EUT is powered by battery.



6.8 Radiated Emission

6.8.1 Requirement

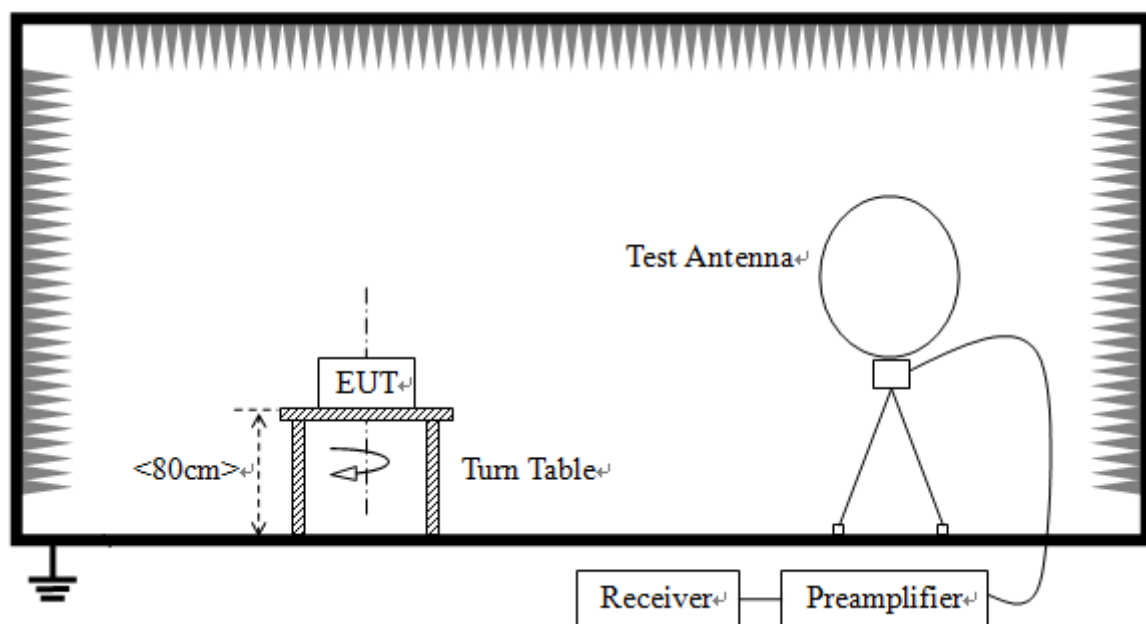
According to FCC section 15.247(c), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

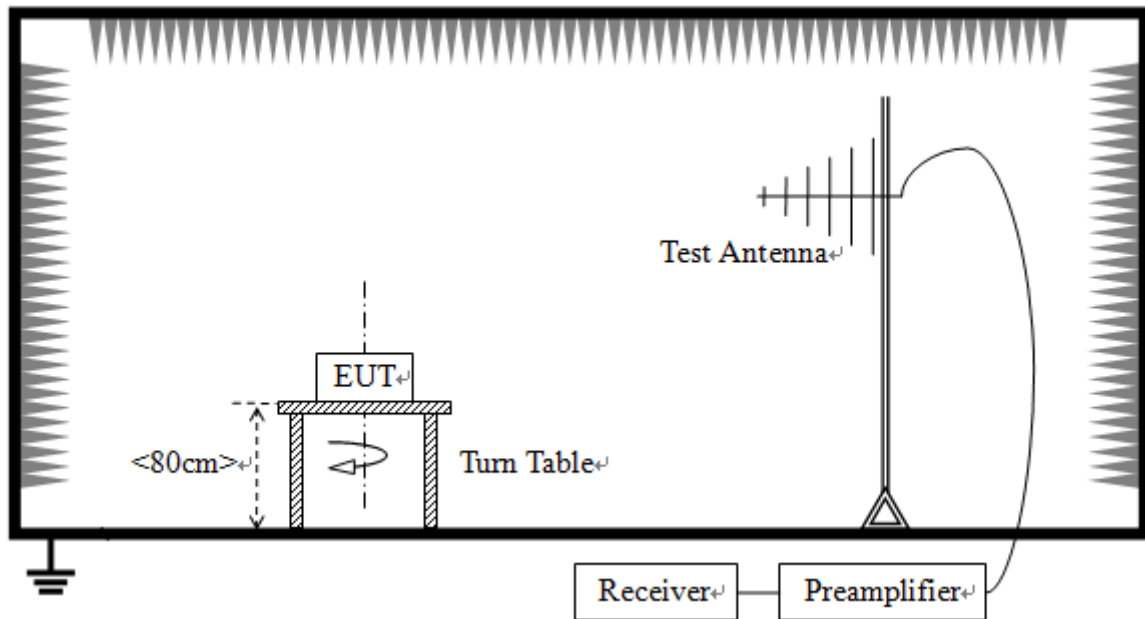
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)	Limit(dB $\mu\text{V/m}$)	Detector
0.009-0.490	2400/F(kHz)	300	/	/
0.490-1.705	24000/F(kHz)	30	/	/
1.705-30	30	30	/	/
30 - 88	100	3	40	QP
88 - 216	150	3	43.5	QP
216 - 960	200	3	46	QP
960 - 1000	500	3	54	QP
Above 1000	500	3	54	AV

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

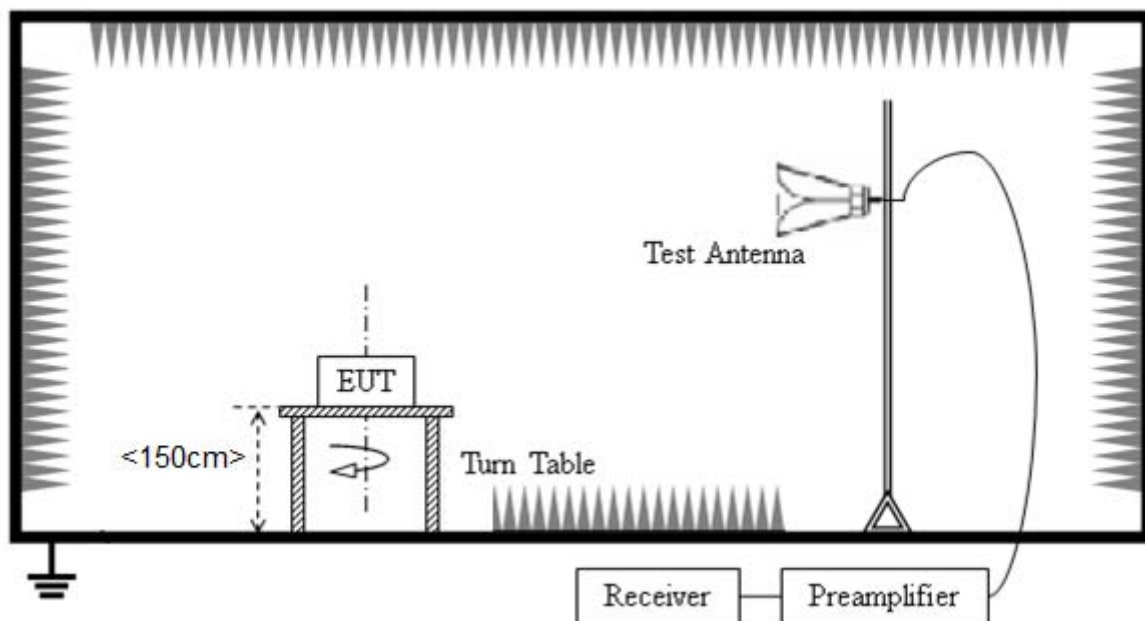
6.8.2 Test setup



Radiated Emissions Below 30MHz



Radiated Emissions 30-1000MHz



Radiated Emissions above 1000MHz

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10-2013. Below 1GHz, the EUT was set-up on insulator 80cm above the Ground Plane. Above 1GHz, the EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Wifi Module is activated and controlled by the computer software, and is set to operate under transmitting at maximum power.



For the Test Antenna: In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength, the azimuth range of turntable was 0o to 360o, the receive antenna has two polarizations horizontal and vertical. When doing measurements above 1GHz, the EUT was placed within the 3dB beam width range of the horn antenna, and the EUT was tested in 3 orthogonal positions as recommended in ANSI C63.10 for Radiated Emissions and the worst-case data was presented.

Receiver Setting: (9-150kHz): RBW=200Hz, VBW=1kHz, Detector: PK, Max Hold. (0.15-30MHz): RBW=9kHz, VBW=30kHz, Detector: PK, Max Hold. (30MHz-1GHz): RBW=120kHz, VBW=300kHz, Detector: QK, Max Hold. (Above 1GHz): RBW=1MHz, VBW=3MHz, Detector: AV, Max Hold.

6.8.3 Test Result

The different data rate is setting and testing, the worst situation occurs when the WIFI works on highest rate, the worst value is selected and recorded as blow

A. Test Result for 9kHz~30MHz

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
--	--	20	--	See Note

Note:

- The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.*
- Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);*
- Limit line = specific limits (dBuV) + distance extrapolation factor.*

B. Test Result for 30MHz ~ 10th Harmonic (25GHz)

Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Detector	Result
40.85	21.27	40.00	18.73	Horizontal	QP	PASS
54.26	20.73	40.00	19.27	Horizontal	QP	PASS
99.18	15.86	43.50	27.64	Horizontal	QP	PASS
195.82	19.28	43.50	24.22	Horizontal	QP	PASS
253.84	17.90	46.00	28.10	Horizontal	QP	PASS
506.48	25.85	46.00	20.15	Horizontal	QP	PASS
4821.88	47.71	54.00	6.29	Horizontal	AV	PASS
7232.82	42.16	54.00	11.84	Horizontal	AV	PASS
41.28	20.15	40.00	19.85	Vertical	QP	PASS
54.64	20.74	40.00	19.26	Vertical	QP	PASS
103.81	15.89	43.50	27.61	Vertical	QP	PASS
193.77	18.77	43.50	24.73	Vertical	QP	PASS
306.75	17.72	46.00	28.28	Vertical	QP	PASS
497.68	25.51	46.00	20.49	Vertical	QP	PASS



Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Detector	Result
4830.53	43.43	54.00	10.57	Vertical	AV	PASS
7242.79	36.74	54.00	17.26	Vertical	AV	PASS

Note:

The worst case (802.11n Channel 1:2412MHz) is recorded in the report.

Conclusion: Pass



Annex A Photos of the EUT



(Teensie)



(Weensie)

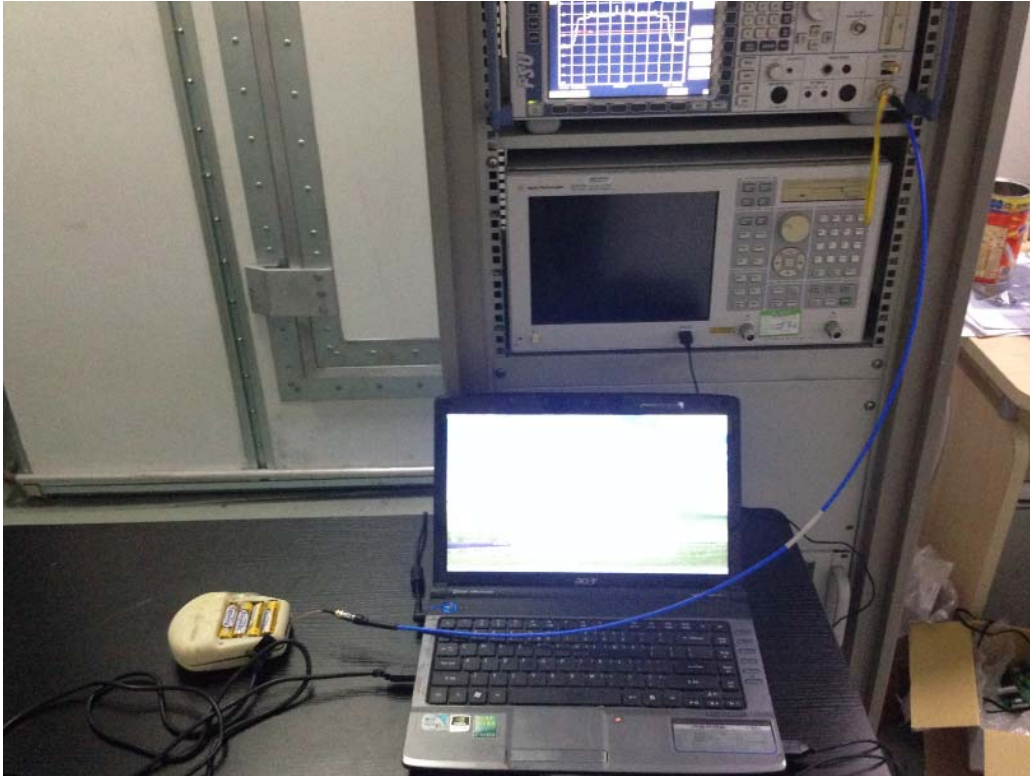






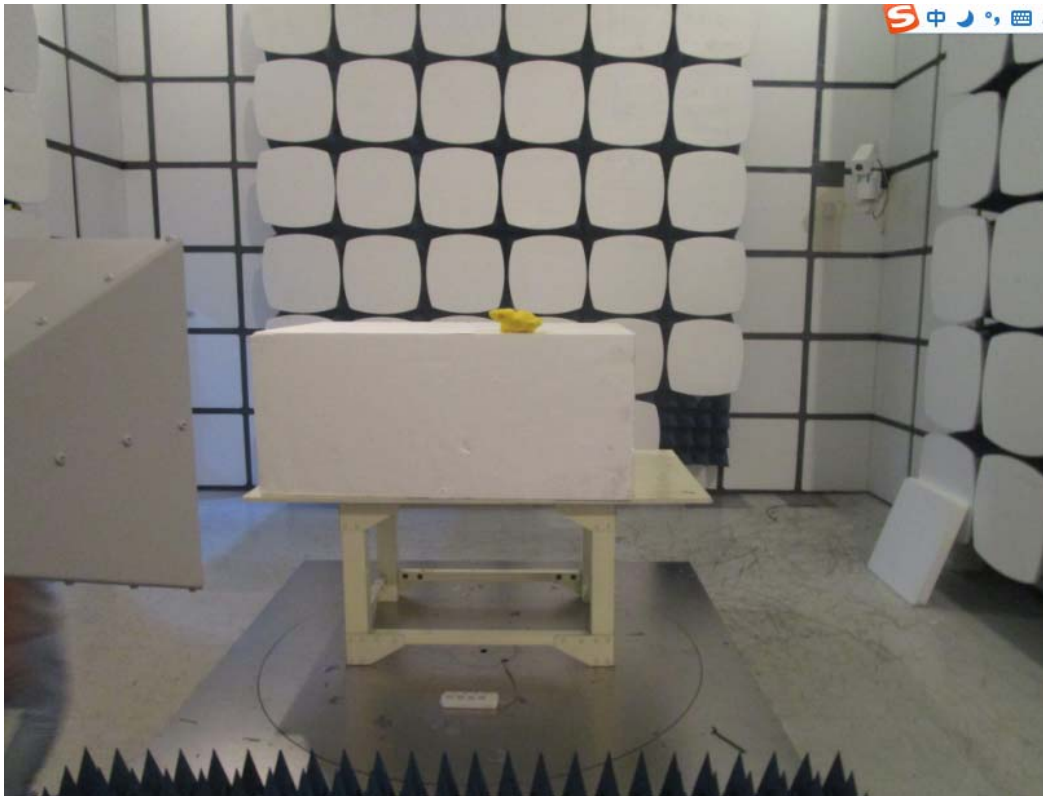
Annex B Photos of Setup

1. RF



2. Radiated Emission





** END OF REPORT **