FCC RF TEST REPORT

Issued to

PQ Labs Inc

For

iStick

Model Name	:	A300
Trade Name	:	PQ Labs
Brand Name	:	PQ Labs
Standard	:	47 CFR Part 15,Subpart C ANSI C63.10-2013
FCC ID	:	2AHL7-PQA300
Test date	:	Mar.18,2016 to Mar.19,2016
Issue date	:	Mar.23,2016

by

Shanghai MORLAB Communication Technology Co., Ltd.

Tested by Wu Hongfei *Approved by* Gu Yejiang *Review by* Fangmin

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DIRECTORY

Change History

Issue	Date	Reason for change
1.0	Mar.23,2016	First edition

1. General Information

1.1 Applicant

PQ Labs Inc
2150 Trade Zone Blvd,Suite 104,San Jose,CA95131,USA

1.2 Manufacturer

Ttrivo (Taicang) Technologies
Building 10A, Taicang Foreign Industry Park, No.105 East Shanghai Road.Taicang, Jiangsu, China

1.3 Description of EUT

EUT Name..... :	iStick
Model Name..... :	A300
Brand Name..... :	PQ Labs
Trade Name ..... :	PQ Labs
Hardware Version..... :	PQ5300_A300
Software Version ..... :	rk3188-eng 4.4.4 KTU 84Q eng.kernel.20150317.135814 test-keys
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..... :	Ceramic Chip Antenna
Antenna Gain..... :	3.1 dBi

NOTE 1:
The EUT contains WIFI Module operating at 2.4GHz ISM band; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report. The frequencies allocated is F (MHz) =2412+5(n-1) (1<=n<=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 Morlab Communications Technology Co., Ltd. Morlab 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.

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: ±1.76dB
Uncertainty of Radiated Emission:±3.16dB

2.4 List of Equipments Used

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Service Simulator	Agilent	N4010A	MY47230669	2015.9.22	1year
Spectrum Analyzer	R&S	FSU26	200880	2016.2.24	1year
EMI Test Receiver	R&S	ESCI7	100787	2016.2.24	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Power Splitter	Mini-Circuits	ZFRSC-183-S+	76500F1016	(n.a.)	(n.a.)
Attenuator 1	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)
Shielding Room	CHENGYU	5m×4m×3m	CR	2015. 9.13	3year
Full/Semi-Anechoie Chamber	CHENGYU	9.2×6.25×6.15m	SAR	2015.9.13	2year
Broadband Log Antenna	Schwarzbeck	VULB 9163	9163-561	2015.7.24	2year
Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1033	2015.7.24	2year
Broadband Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91970171	2015.9.22	2year
Test Antenna-Loop	Rohde&Schwarz	HFH2-Z2	860004/001	2015.9.22	1year
Artificial Mains Network	TESEQ	NNB 51	33285	2016. 2.24	1year
Personal Computer	HP	(n.a.)	(n.a.)	(n.a.)	(n.a.)
EPM Series Power Meter	Agilent	E4418B	GB43318055	2015.5.24	1year
Power Sensor	Agilent	8482A	MY41091706	2015.5.24	1year
Temporary Antenna Connector	Farpu	SMA-K	(n.a.)	(n.a.)	(n.a.)
RF Cable	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(n.a.)
Power Supplier	NF	ES2000S	9087735	2015. 9.25	1year
Keyboard	HP	SK-2885	(n.a.)	(n.a.)	(n.a.)
Mouse	Logitech	M100	(n.a.)	(n.a.)	(n.a.)
Display Screen	AOC	280LM00002	(n.a.)	(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
June 2015 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
3	15.247(a)	20dB Bandwidth	Pass
4	15.247(d)	Conducted Spurious Emission	Pass
5	15.247(d)	Band Edge	Pass
6	15.207	Conducted Emission	Pass
7	15.247(d) 15.209	Radiated Emission	Pass
8	15.247(e)	Power Spectral Density (PSD)	Pass

4. 47 CFR Part 15C

4.1 Antenna requirement

4.1.1 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.

4.1.2 Result: Compliant

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

5. Test Result

5.1 Peak Output Power

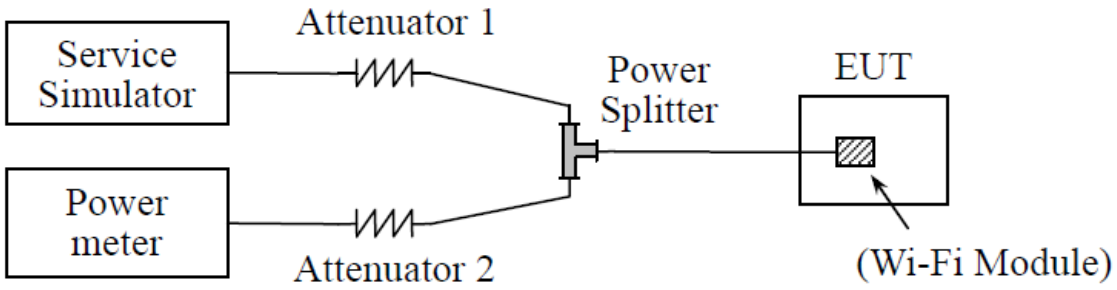
5.1.1 Requirement

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.

5.1.2 Test Description

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

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in power meter.

5.1.3 Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.(Duty cycle > 98%)

A. Test Verdict:

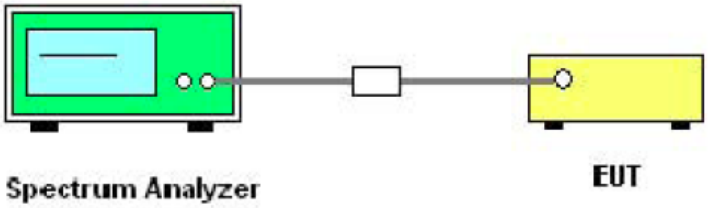
Mode	Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
			dBm	W	dBm	W	
802.11b	1	2412	15.67	0.03690	30	1	Pass
	6	2437	15.42	0.03483			Pass
	11	2462	15.32	0.03404			Pass
802.11g	1	2412	17.44	0.05546			Pass
	6	2437	17.54	0.05675			Pass
	11	2462	17.37	0.05458			Pass
802.11n (20MHz)	1	2412	17.18	0.05224			Pass
	6	2437	17.63	0.05794			Pass
	11	2462	17.67	0.05848			Pass

5.2 6dB & 20dB Bandwidth

5.2.1 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.

5.2.2 Test Description



5.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

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	8.525	Plot A1	13.269	Plot A2	≥500	Pass
6	2437	8.141	Plot B1	14.102	Plot B2	≥500	Pass
11	2462	8.141	Plot C1	14.102	Plot C2	≥500	Pass

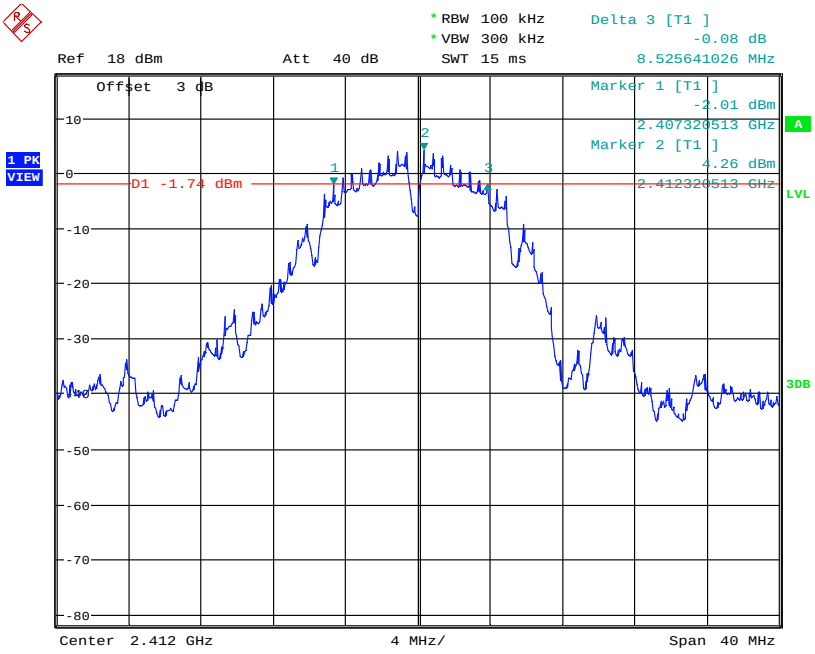
802.11g Test mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	16.346	Plot D1	17.500	Plot D2	≥500	Pass
6	2437	16.474	Plot E1	17.628	Plot E2	≥500	Pass
11	2462	16.282	Plot F1	17.435	Plot F2	≥500	Pass

802.11n (20MHz) Test mode

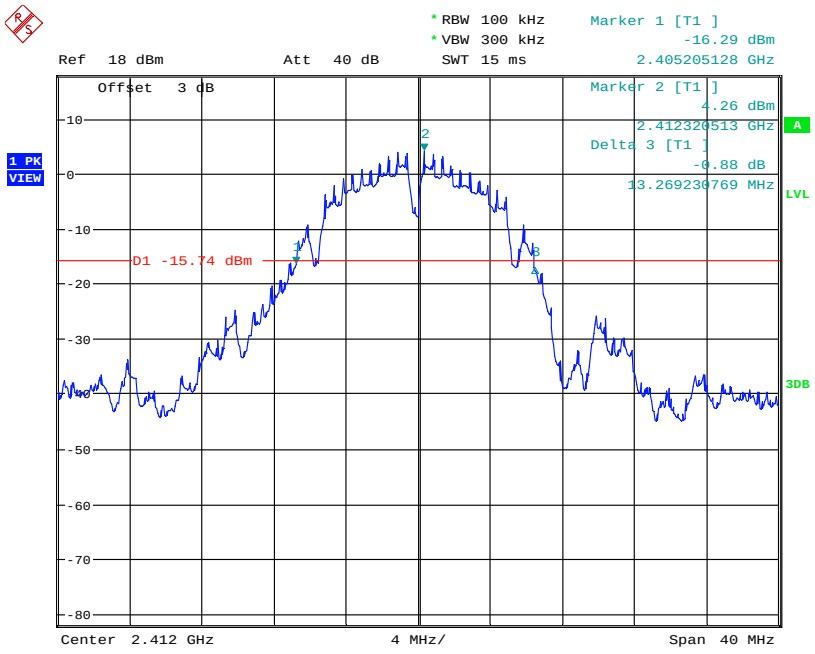
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	17.371	Plot G1	18.269	Plot G2	≥500	Pass
6	2437	17.564	Plot H1	18.333	Plot H2	≥500	Pass
11	2462	17.371	Plot I1	18.269	Plot I2	≥500	Pass

B. Test Plots:



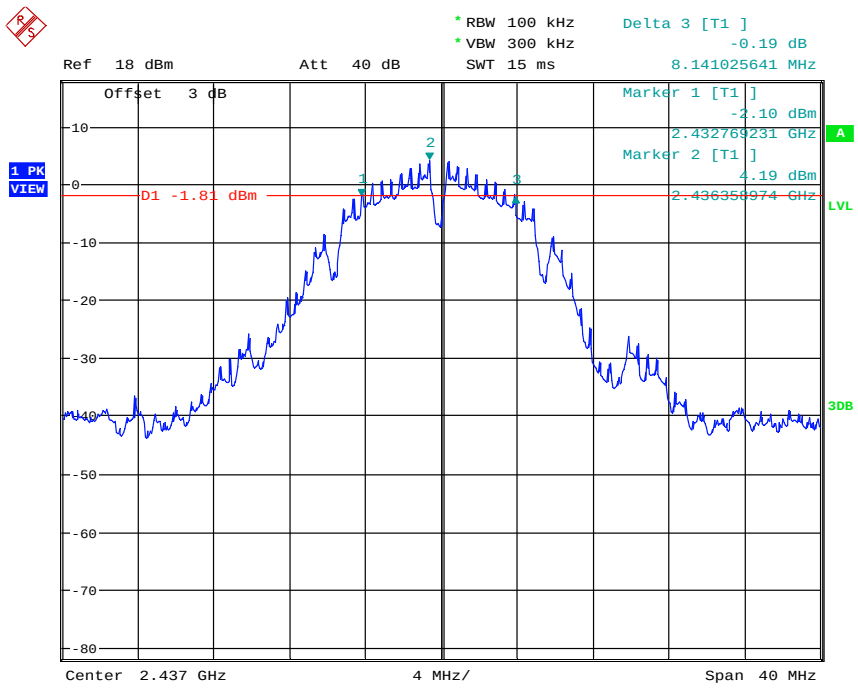
Date: 18.MAR.2016 12:37:38

Plot A1



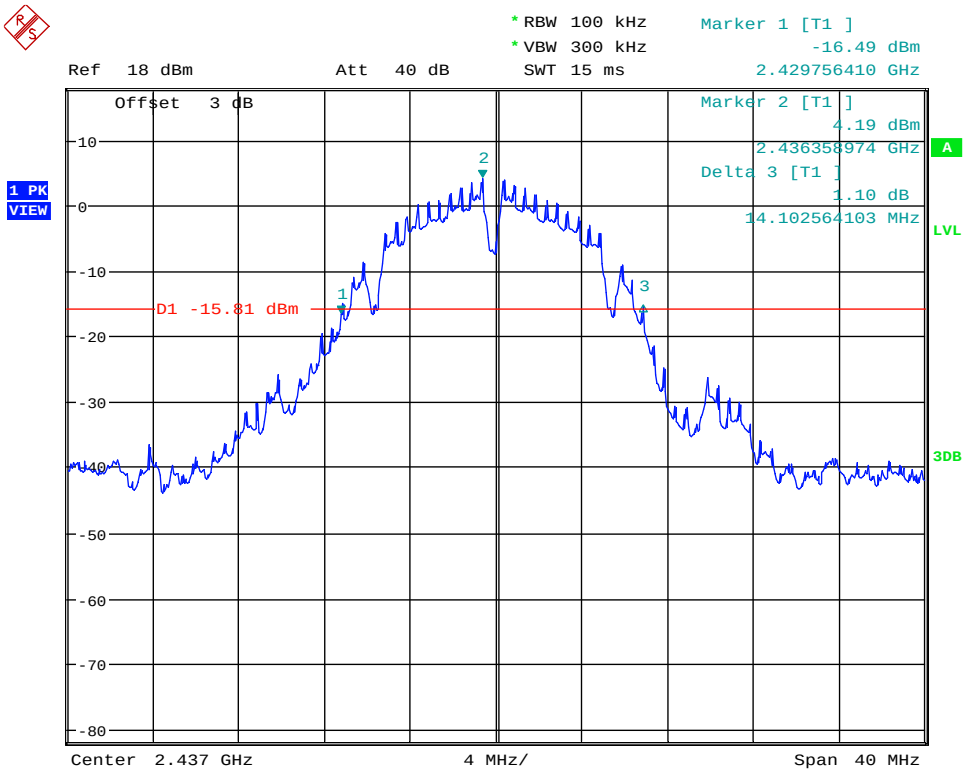
Date: 18.MAR.2016 12:38:41

Plot A2



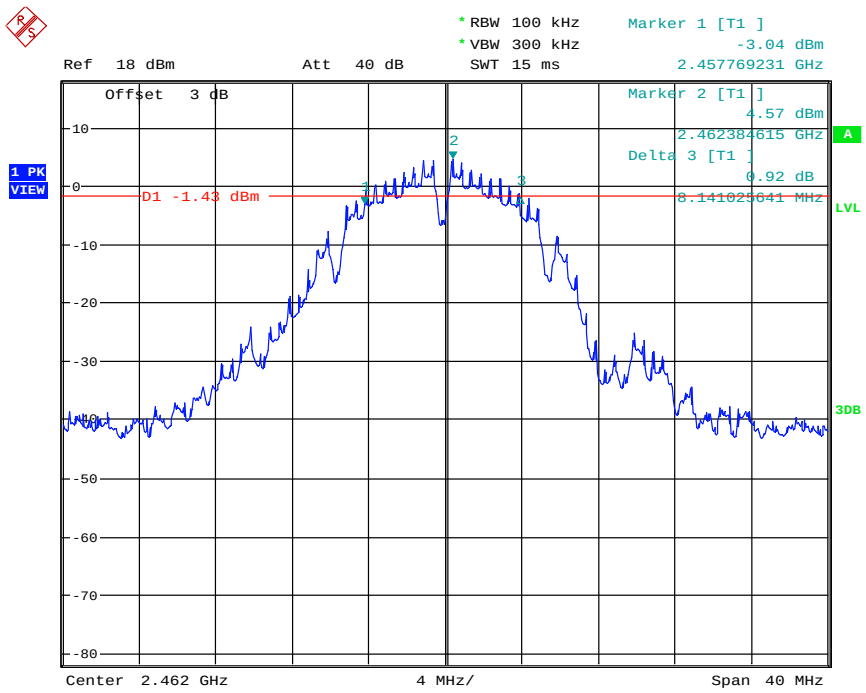
Date: 18.MAR.2016 12:19:42

Plot B1



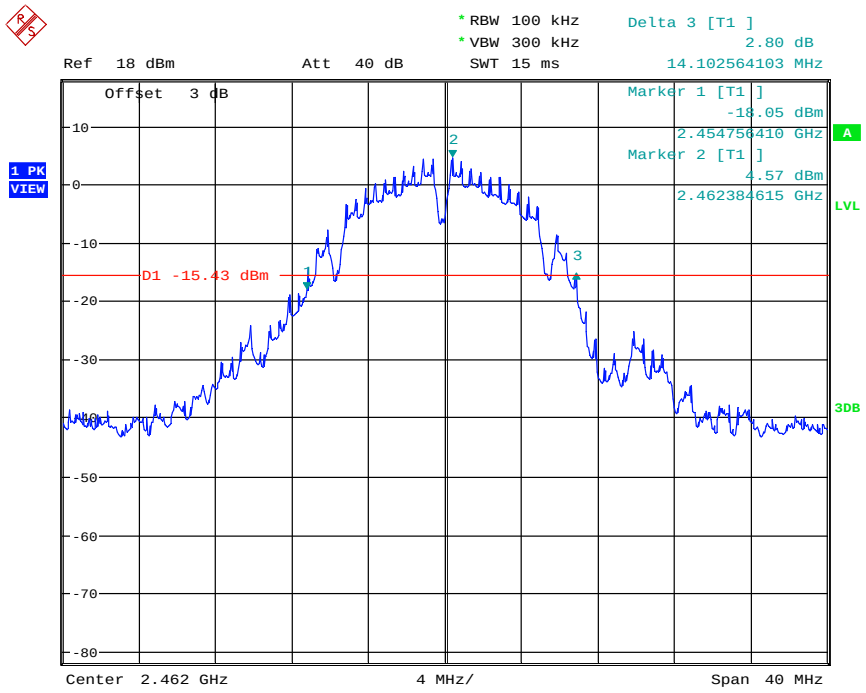
Date: 18.MAR.2016 12:20:34

Plot B2



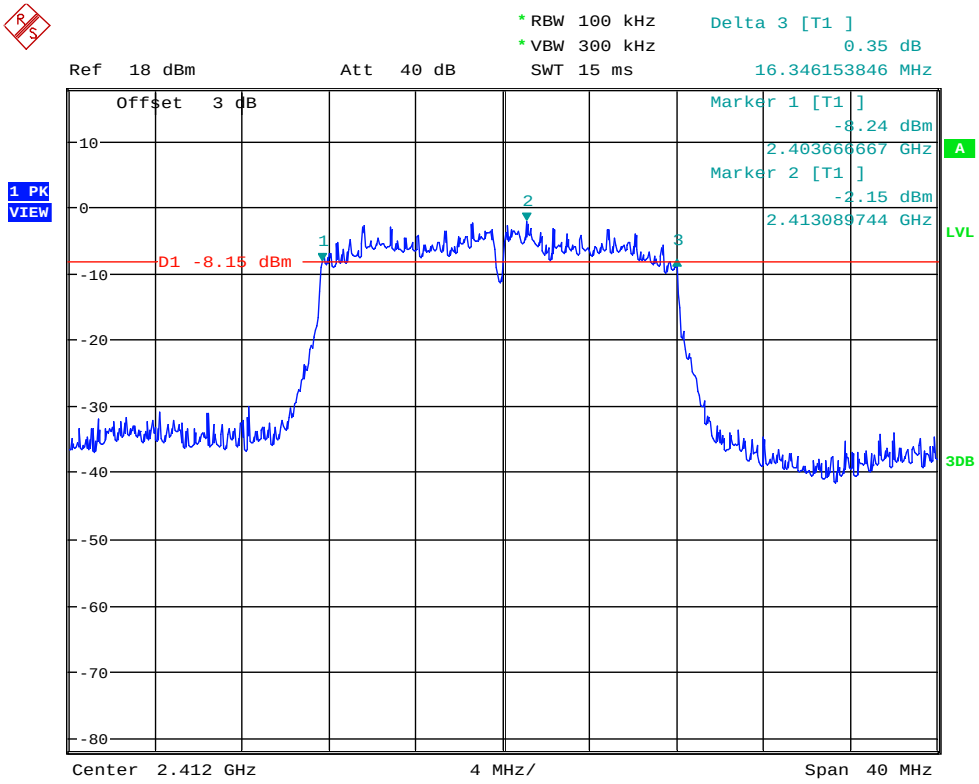
Date: 18.MAR.2016 12:16:07

Plot C1



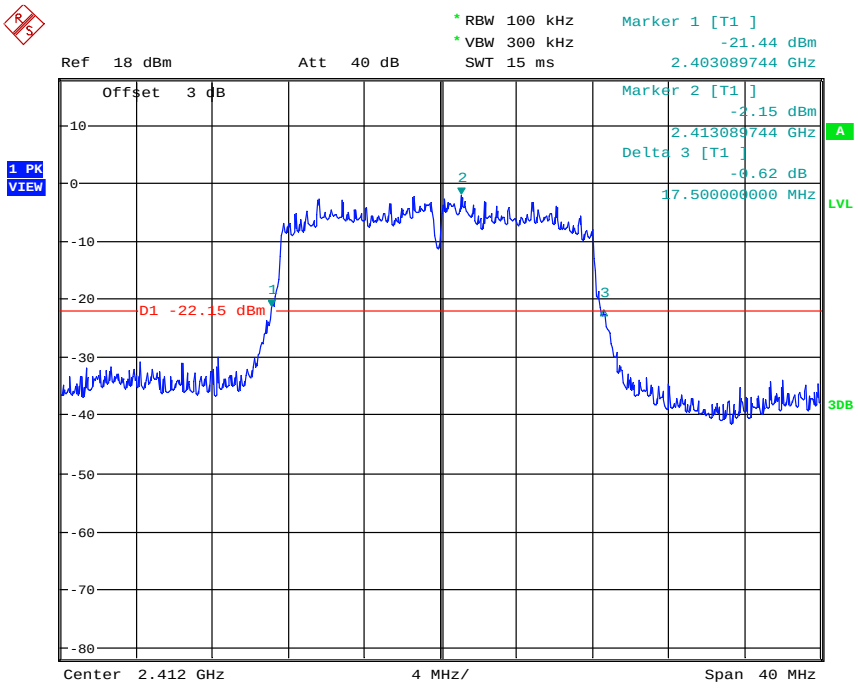
Date: 18.MAR.2016 12:17:39

Plot C2



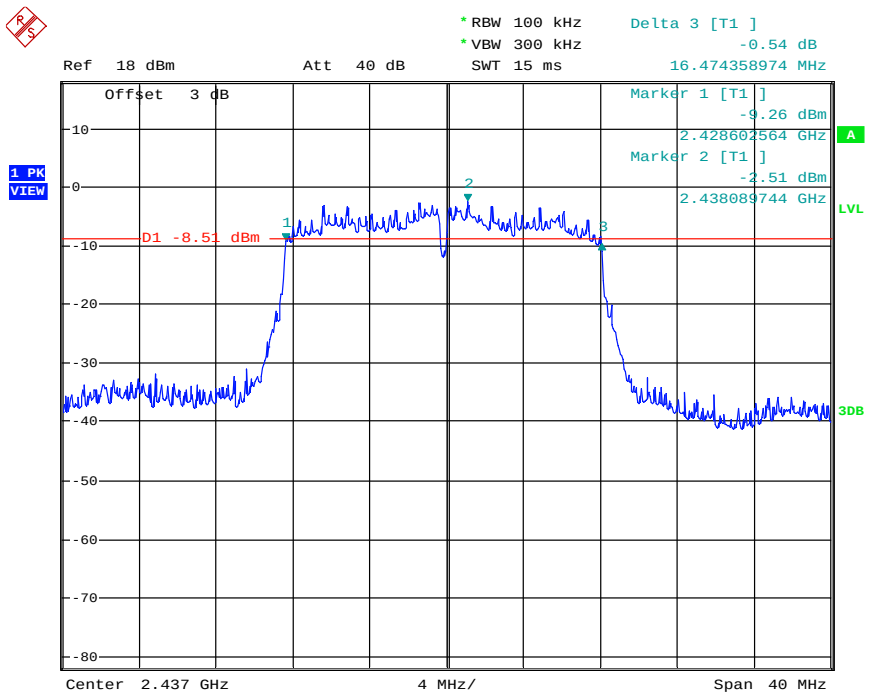
Date: 18.MAR.2016 12:29:22

Plot D1



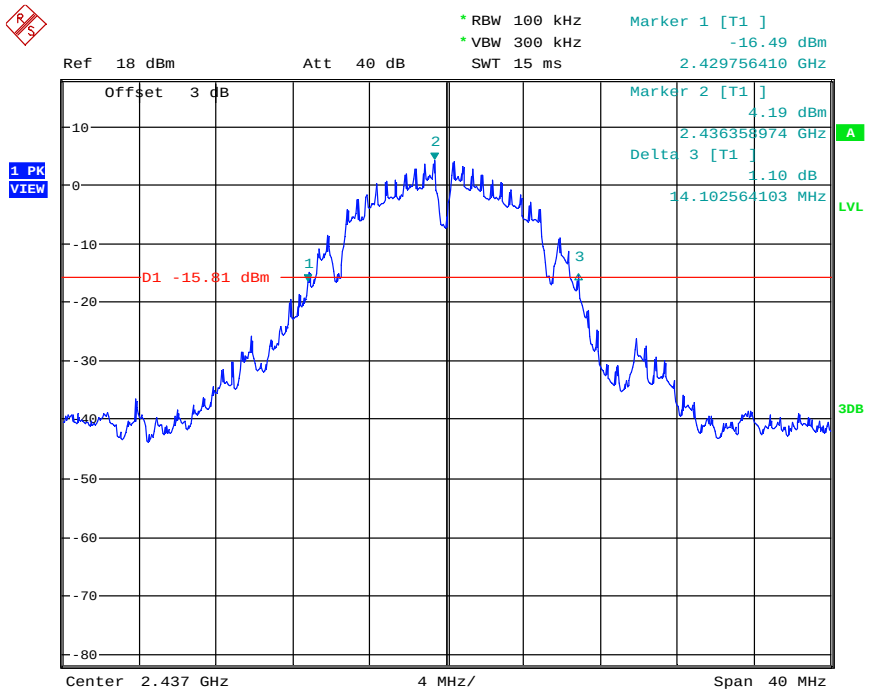
Date: 18.MAR.2016 12:29:53

Plot D2



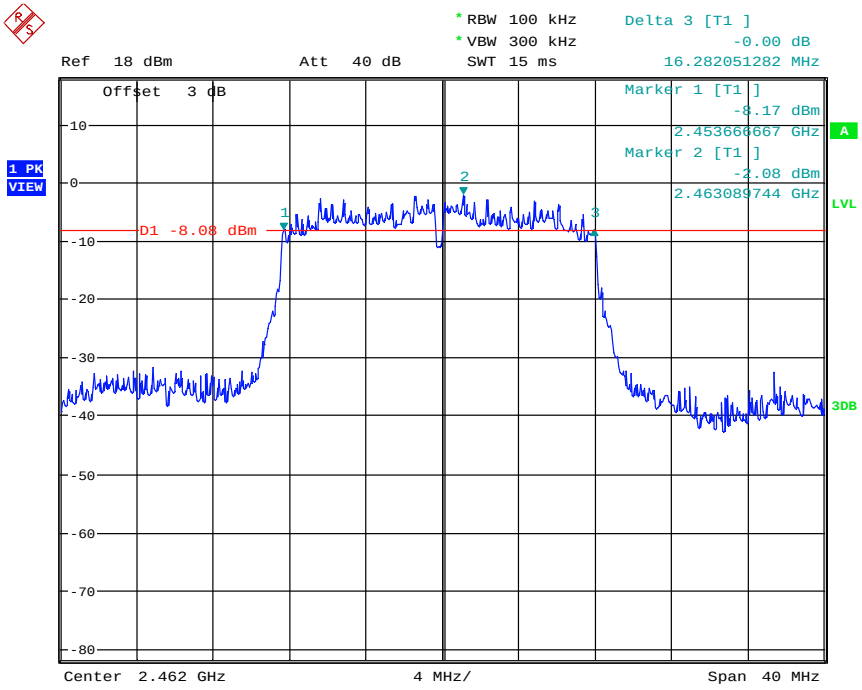
Date: 18.MAR.2016 12:21:53

Plot E1



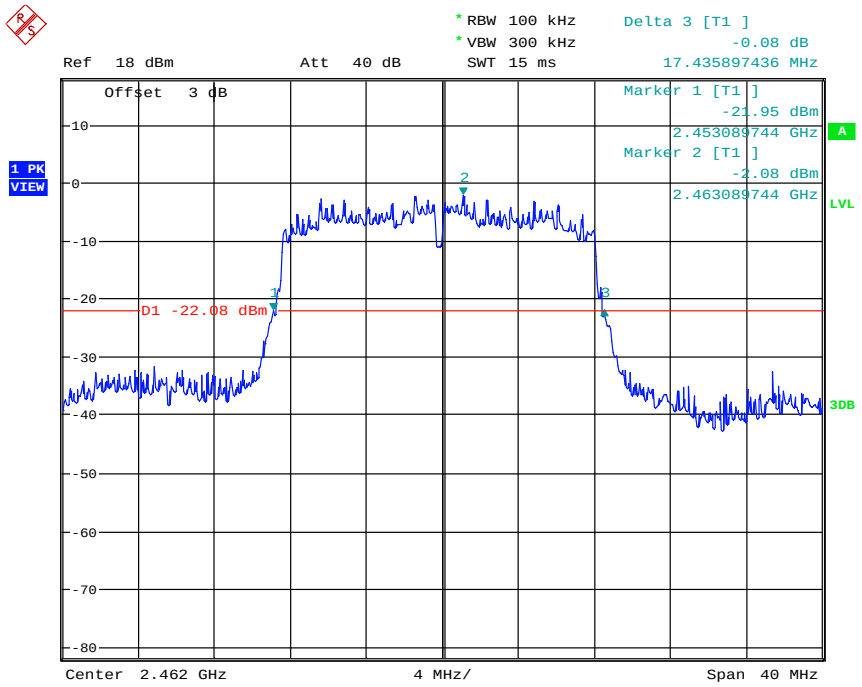
Date: 18.MAR.2016 12:20:34

Plot E2



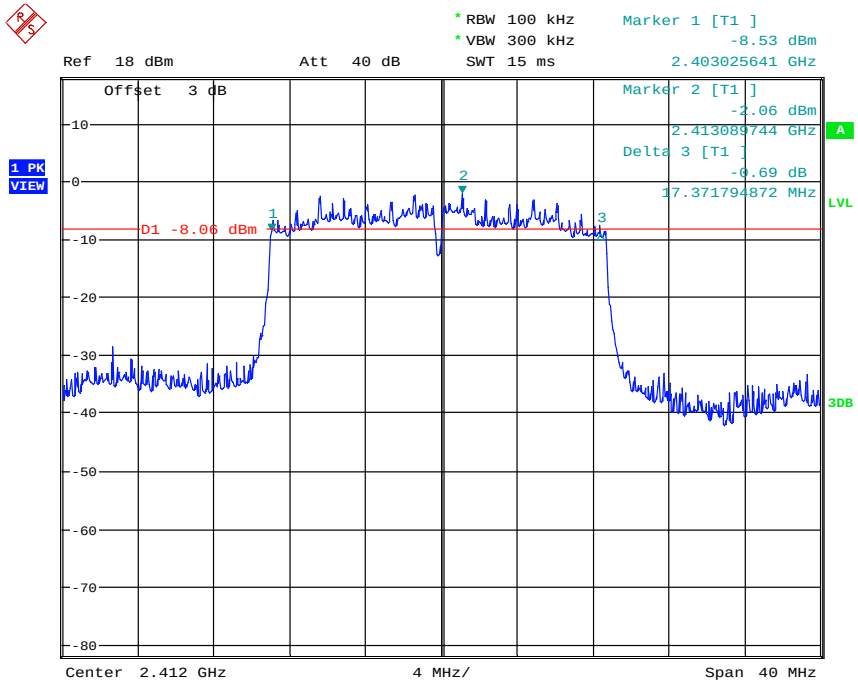
Date: 18.MAR.2016 12:14:11

Plot F1



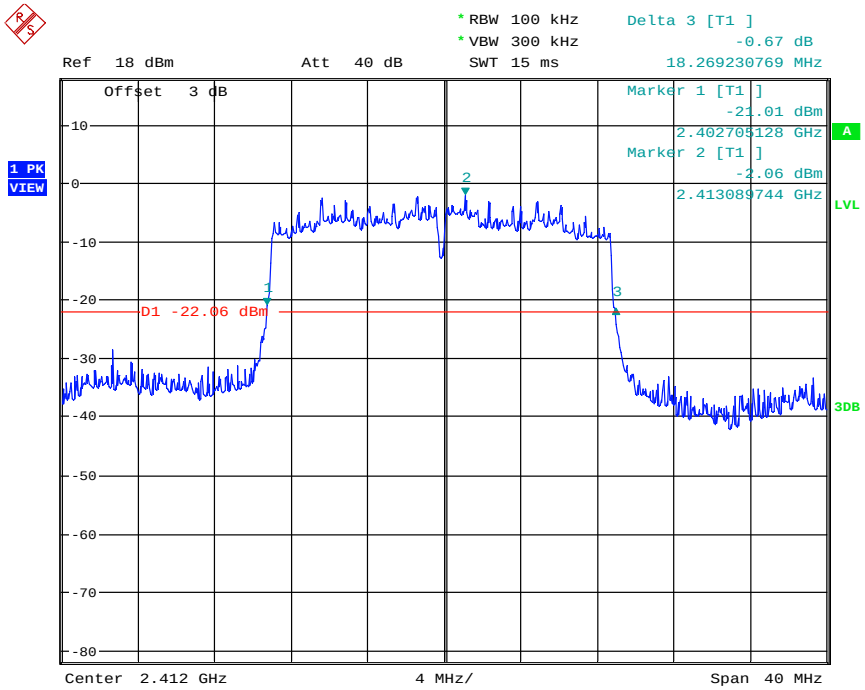
Date: 18.MAR.2016 12:13:24

Plot F2



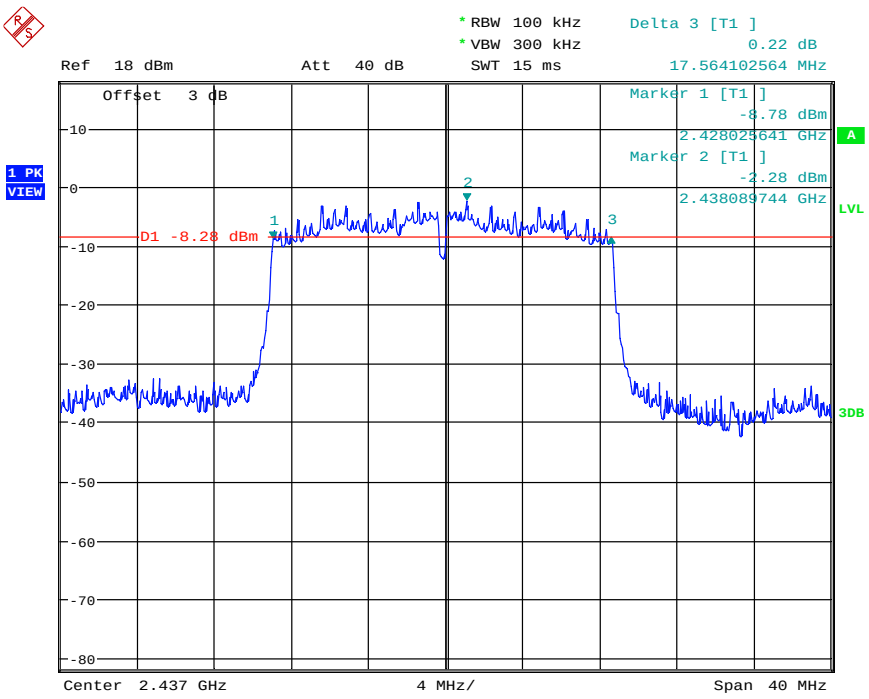
Date: 18.MAR.2016 12:27:57

Plot G1



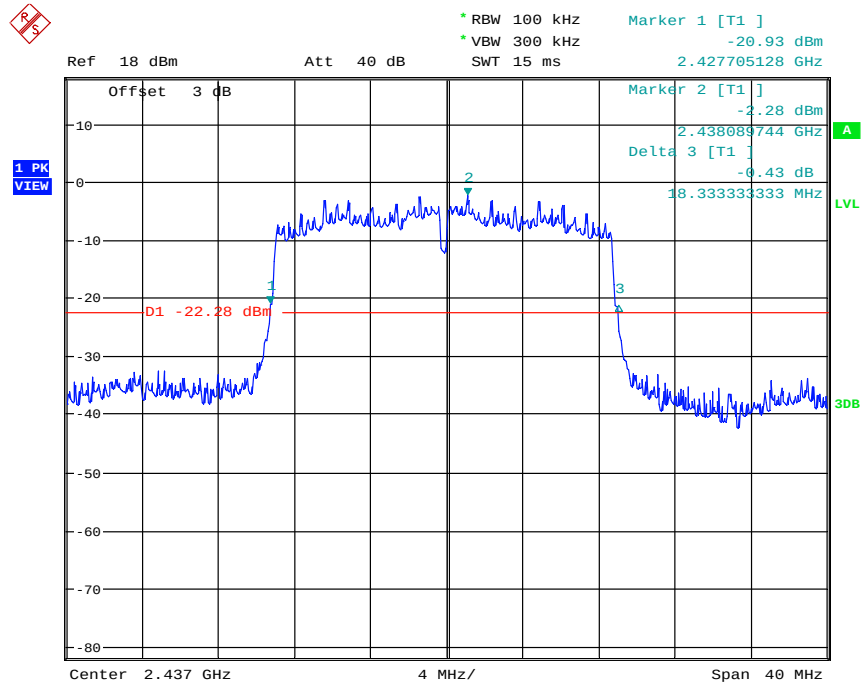
Date: 18.MAR.2016 12:26:37

Plot G2



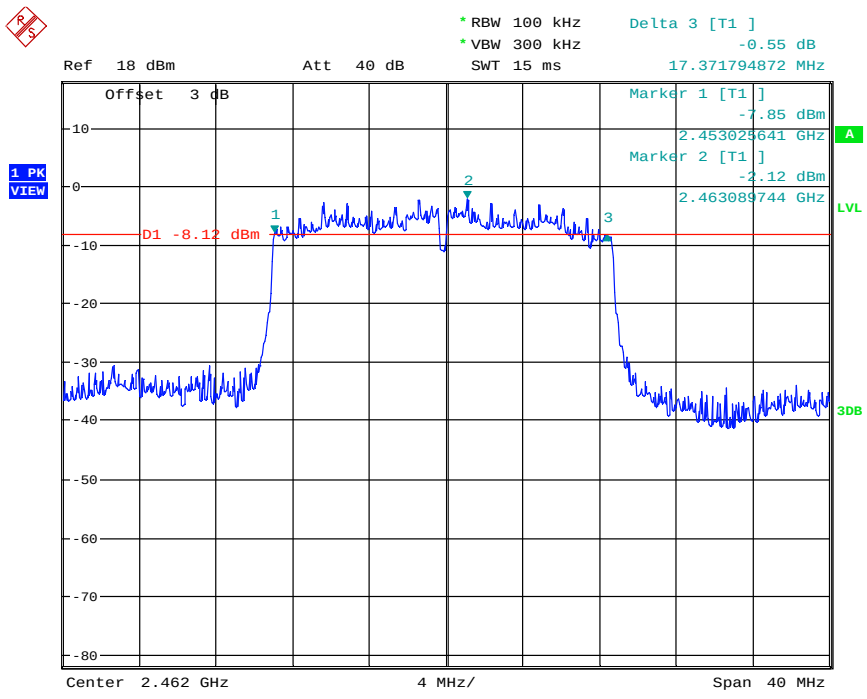
Date: 18.MAR.2016 12:24:01

Plot H1



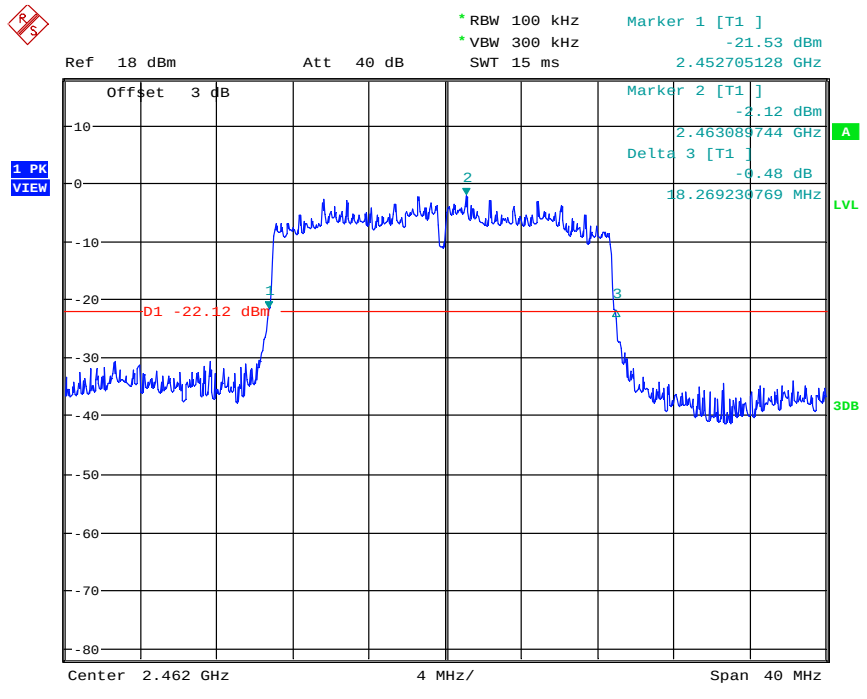
Date: 18.MAR.2016 12:24:56

Plot H2



Date: 18.MAR.2016 12:11:09

Plot I1



Date: 18.MAR.2016 12:12:04

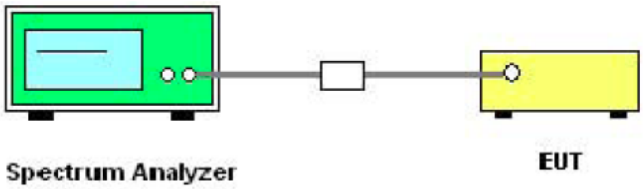
Plot I2

5.3 Conducted Spurious Emissions

5.3.1 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.

5.3.2 Test Description



5.3.3 Test Result

The Wifi Module operates at hopping-off test mode. 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.

A. Test Verict:

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	-38.50	Plot A	2.74	-17.26	Pass
6	2437	-39.55	Plot B	1.08	-18.92	Pass
11	2462	-40.09	Plot C	-2.72	-22.72	Pass

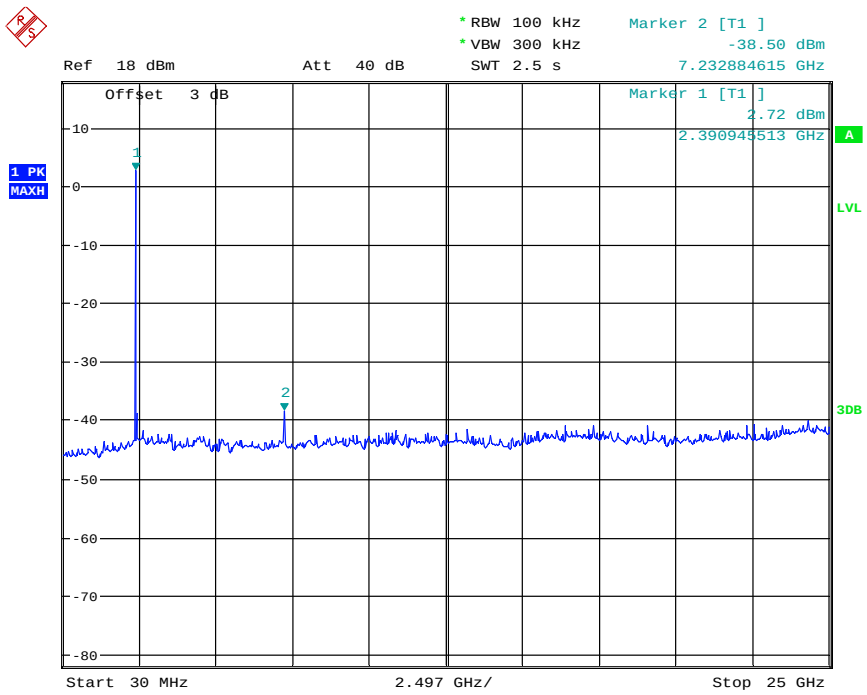
802.11g Test mode

Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-39.88	Plot D	-4.10	-24.10	Pass
6	2437	-39.39	Plot E	-2.88	-22.88	Pass
11	2462	-40.82	Plot F	-3.72	-23.72	Pass

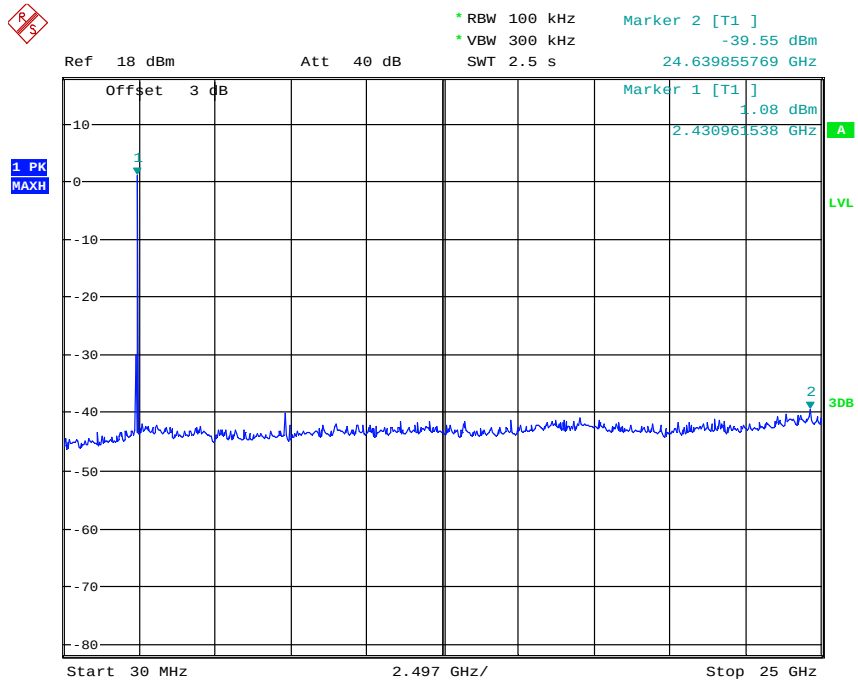
802.11n (20MHz) Test mode

Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-39.62	Plot G	-3.84	-23.84	Pass
6	2437	-40.48	Plot H	-4.91	-24.91	Pass
11	2462	-39.48	Plot I	-4.31	-24.31	Pass

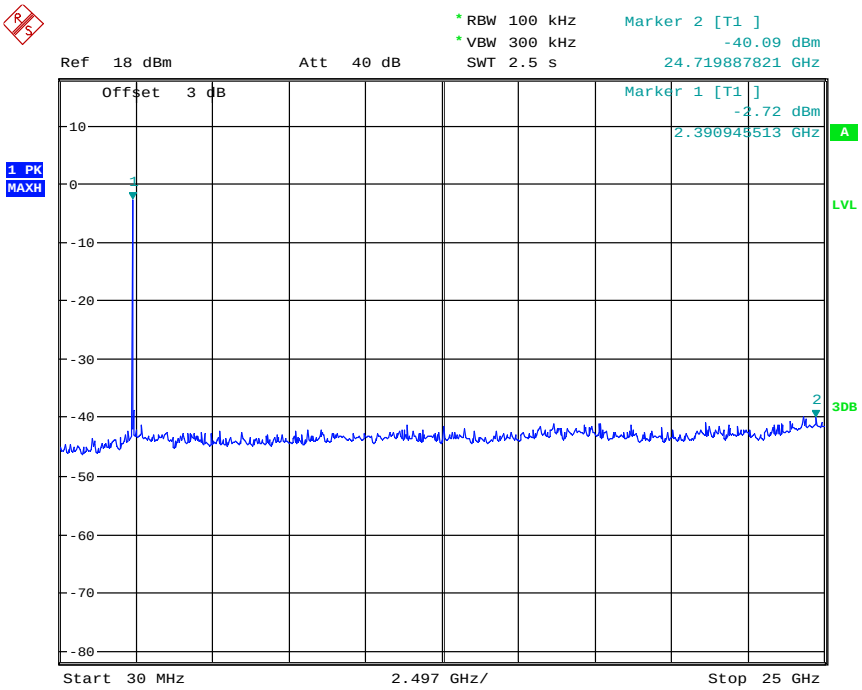
B. Test Plot:



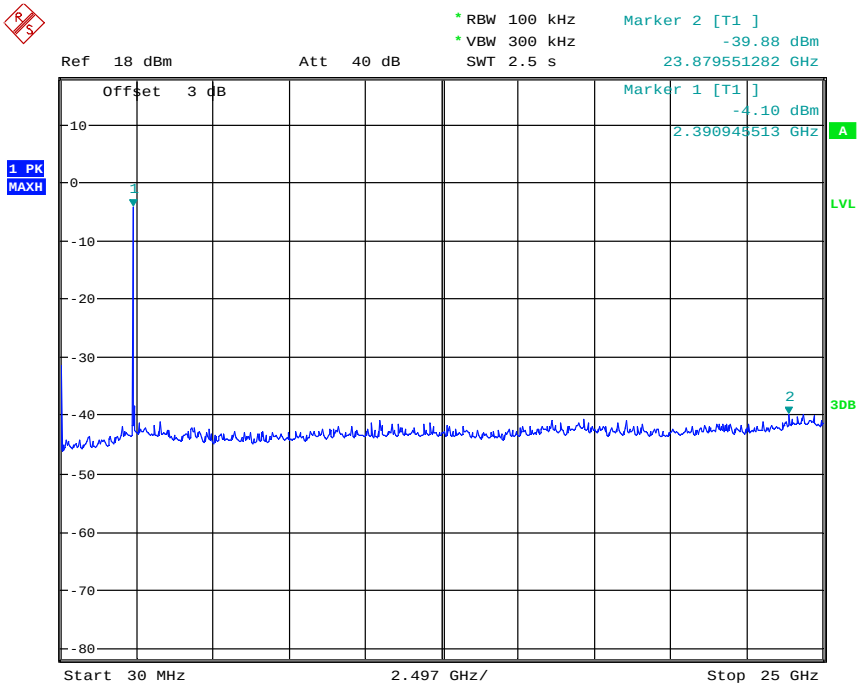
Plot A


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
Marker 2 [T1]
-39.55 dBm
24.639855769 GHz
Ref 18 dBm
Att 40 dB
Offset 3 dB
Marker 1 [T1]
1.08 dBm
2.430961538 GHz
1 PK
MAXH
A
LVL
3DB
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 18.MAR.2016 12:53:03

Plot B

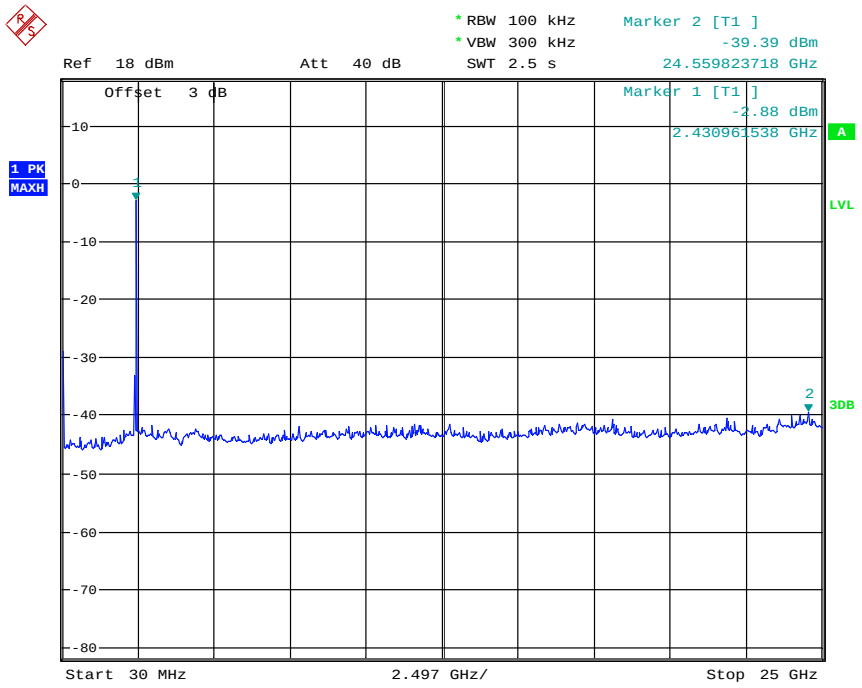

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
Marker 2 [T1]
-40.09 dBm
24.719887821 GHz
Ref 18 dBm
Att 40 dB
Offset 3 dB
Marker 1 [T1]
-2.72 dBm
2.390945513 GHz
1 PK
MAXH
A
LVL
3DB
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 18.MAR.2016 12:54:14

Plot C



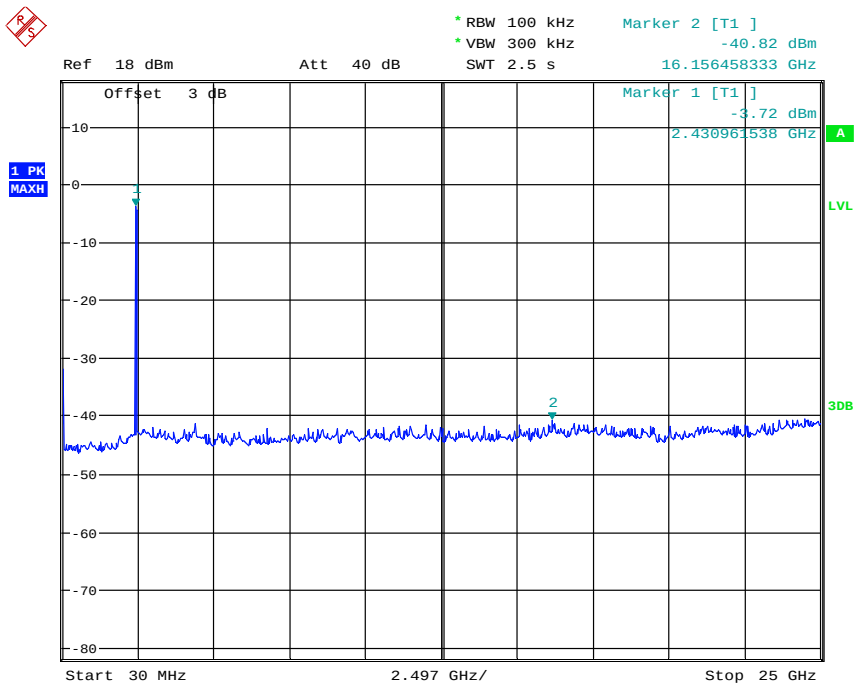
Date: 18.MAR.2016 12:58:07

Plot D



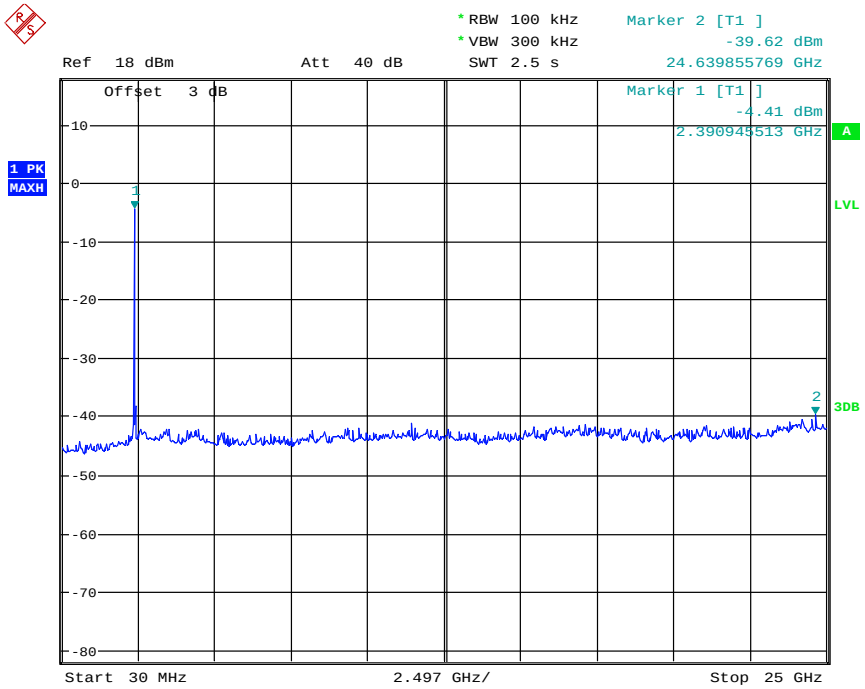
Date: 18.MAR.2016 12:59:20

Plot E



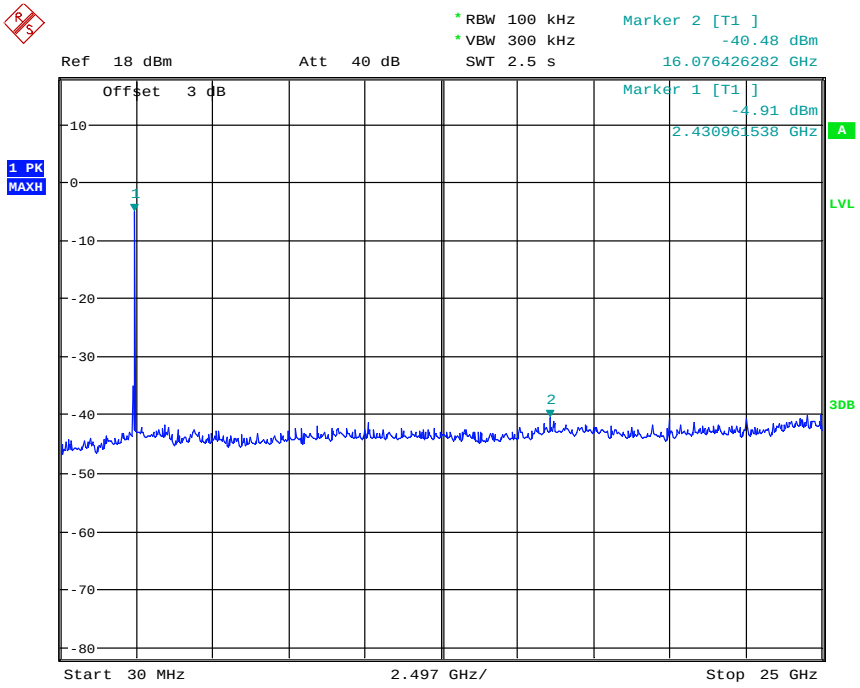
Date: 18.MAR.2016 13:00:18

Plot F



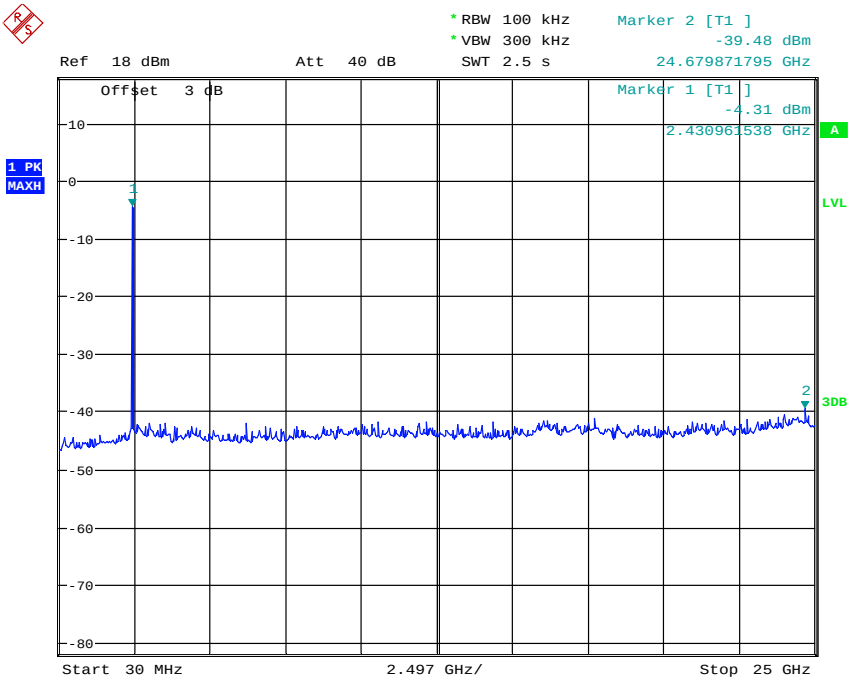
Date: 18.MAR.2016 13:01:18

Plot G



Date: 18.MAR.2016 13:02:16

Plot H



Date: 18.MAR.2016 13:03:03

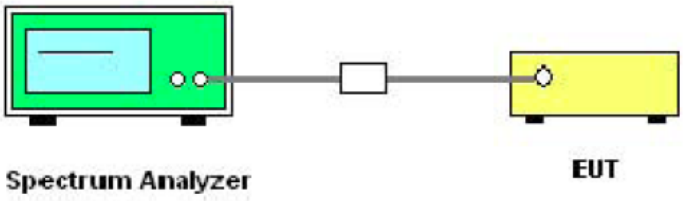
Plot I

5.4 Power Spectral Density (PSD)

5.4.1 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

5.4.2 Test Description



5.4.3 Test Result

A. Test Verdict

802.11b Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-10.74	Plot A	8	Pass
6	2437	-9.78	Plot B	8	Pass
11	2462	-11.88	Plot C	8	Pass

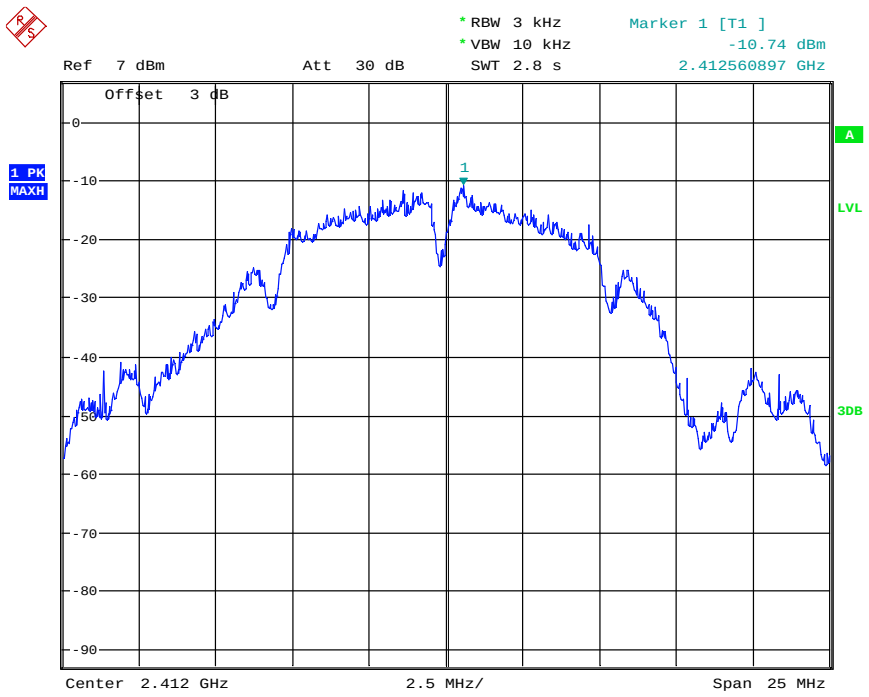
802.11g Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-18.55	Plot D	8	Pass
6	2437	-17.93	Plot E	8	Pass
11	2462	-18.85	Plot F	8	Pass

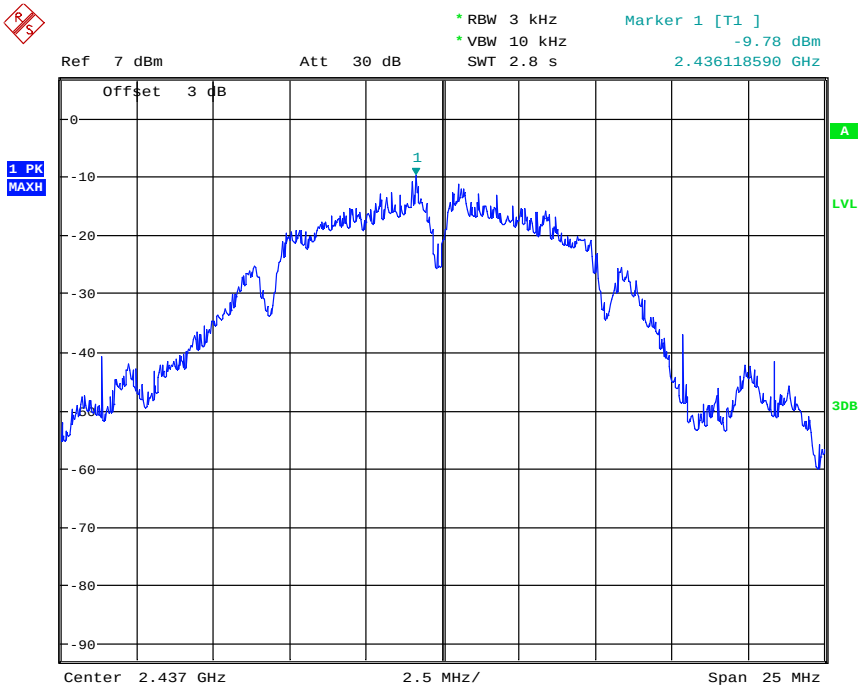
802.11n (20MHz) Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-18.79	Plot G	8	Pass
6	2437	-18.56	Plot H	8	Pass
11	2462	-19.12	Plot I	8	Pass

B. Test Plot

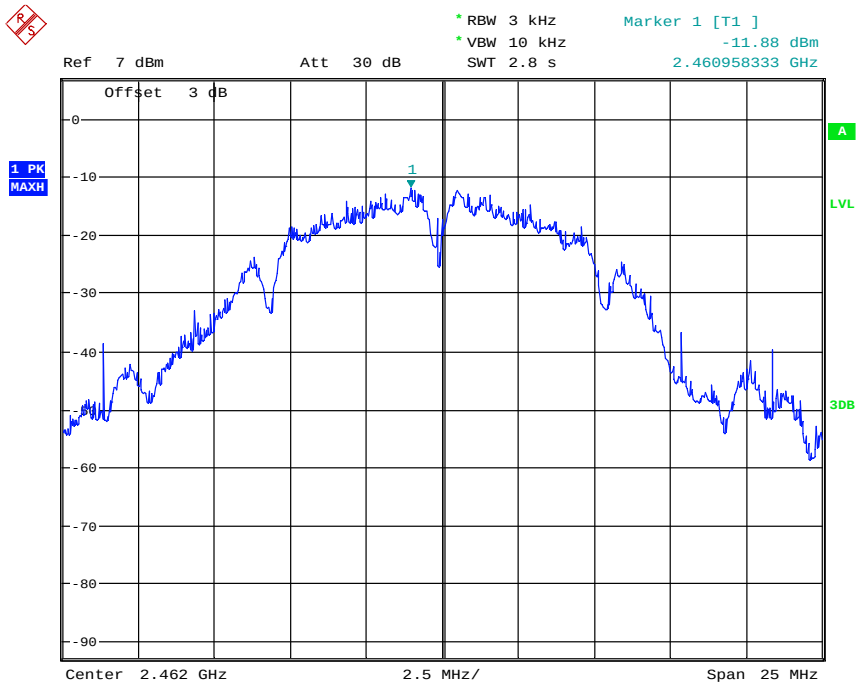


Plot A



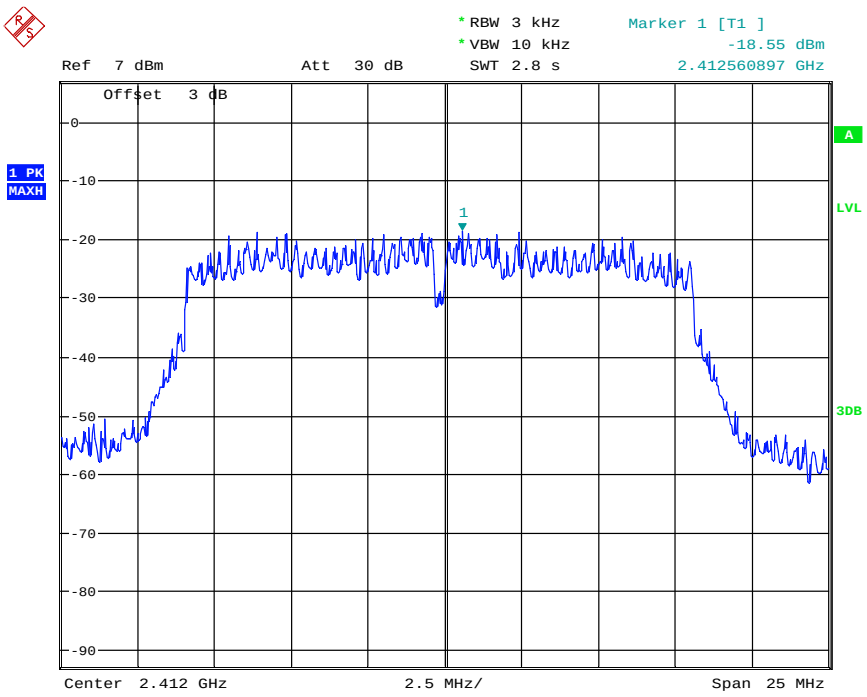
Date: 18.MAR.2016 13:09:27

Plot B

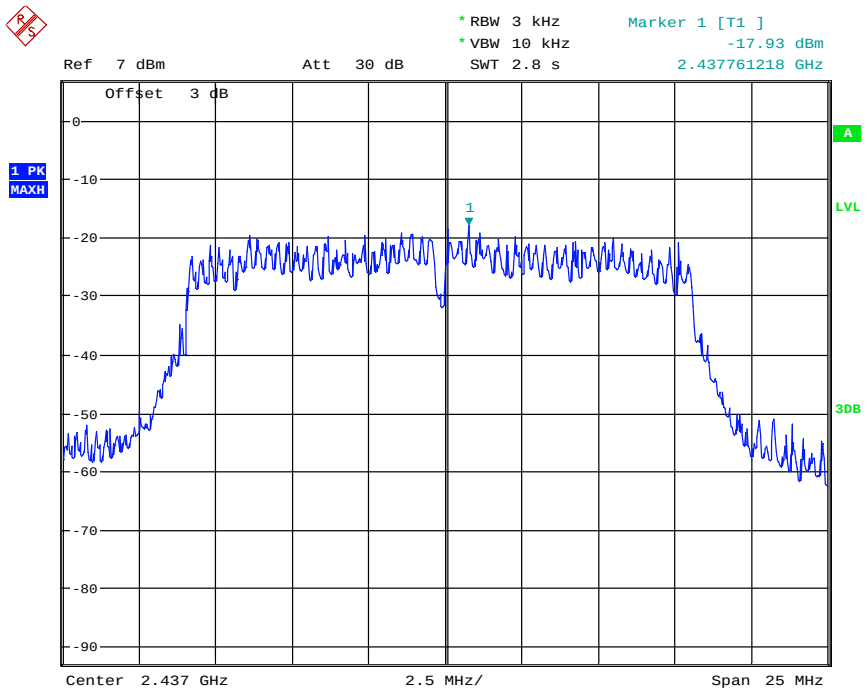


Date: 18.MAR.2016 13:10:07

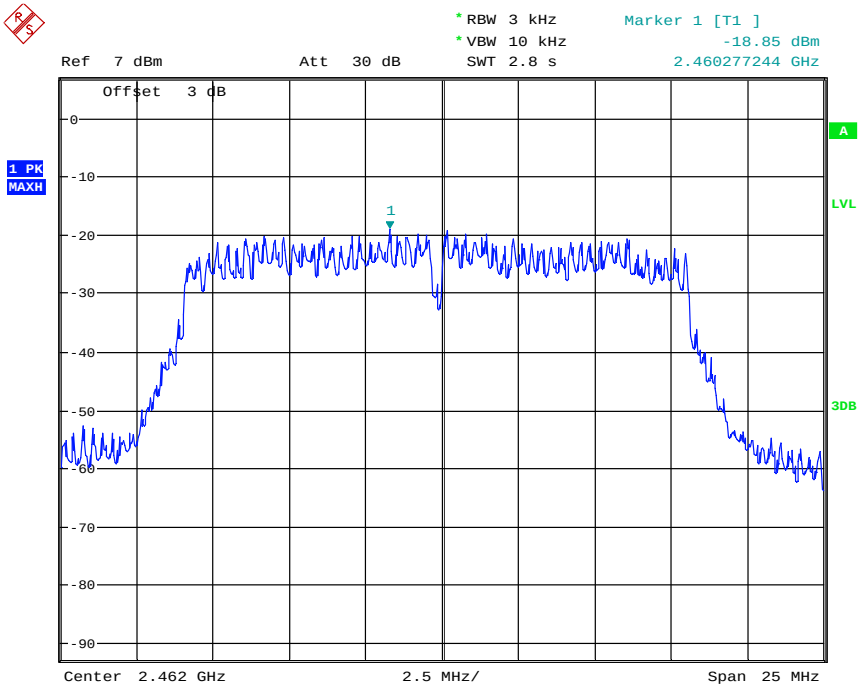
Plot C


RBW 3 kHz
VBW 10 kHz
SWT 2.8 s
Marker 1 [T1]
-18.55 dBm
2.412560897 GHz
Ref 7 dBm
Att 30 dB
Offset 3 dB
1 PK
MAXH
A
LVL
3DB
Center 2.412 GHz
2.5 MHz/
Span 25 MHz
Date: 18.MAR.2016 13:05:38

Plot D

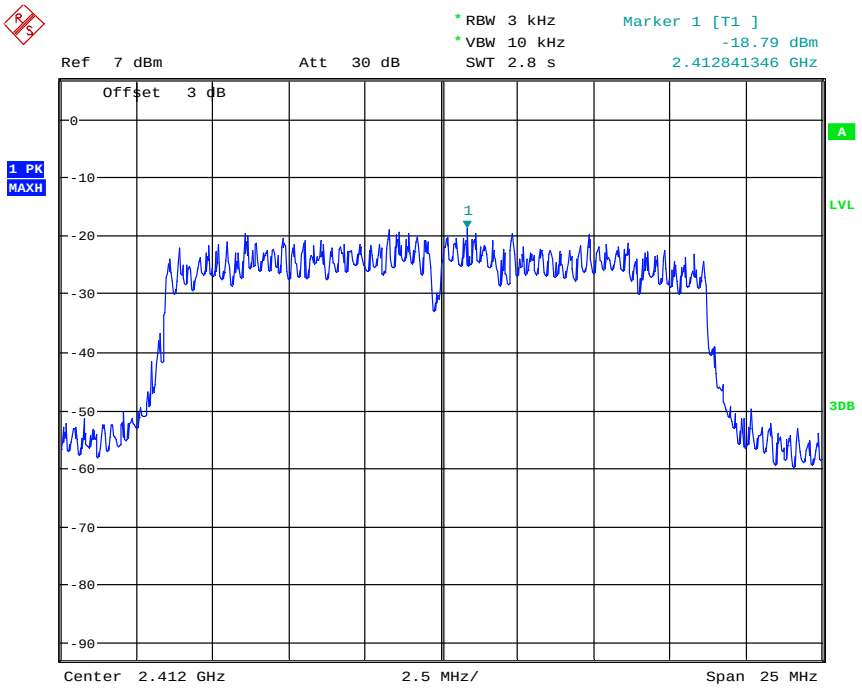

RBW 3 kHz
VBW 10 kHz
SWT 2.8 s
Marker 1 [T1]
-17.93 dBm
2.437761218 GHz
Ref 7 dBm
Att 30 dB
Offset 3 dB
1 PK
MAXH
A
LVL
3DB
Center 2.437 GHz
2.5 MHz/
Span 25 MHz
Date: 18.MAR.2016 13:08:52

Plot E



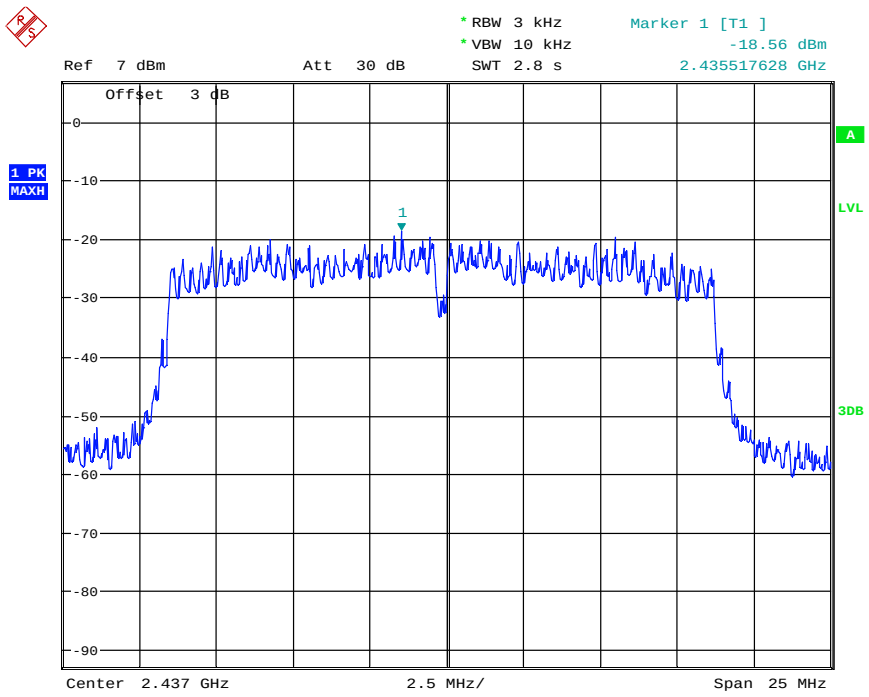
Date: 18.MAR.2016 13:10:57

Plot F

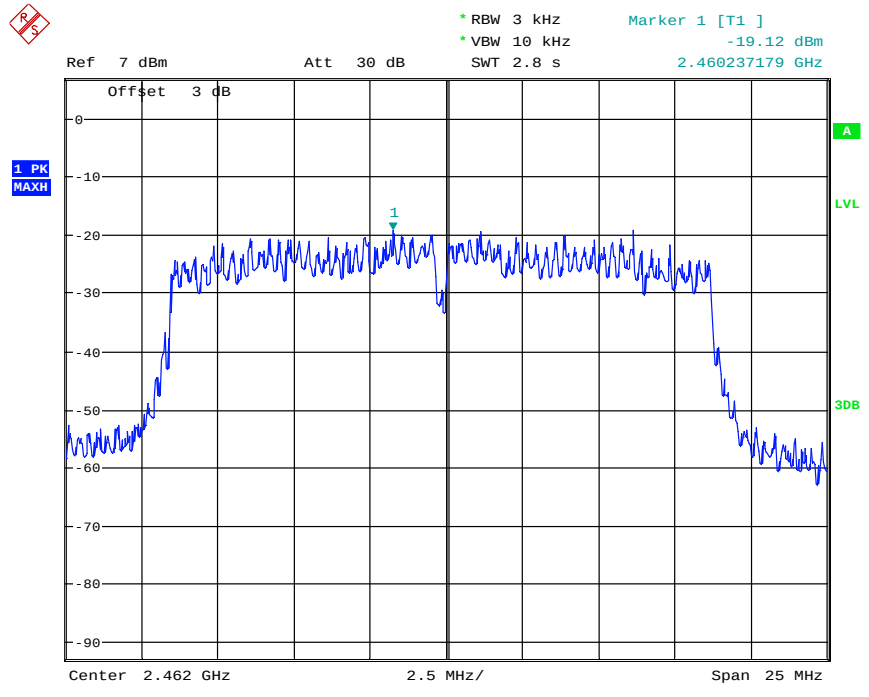


Date: 18.MAR.2016 13:06:18

Plot G


RBW 3 kHz
VBW 10 kHz
SWT 2.8 s
Marker 1 [T1]
-18.56 dBm
2.435517628 GHz
Ref 7 dBm
Att 30 dB
Offset 3 dB
1 PK
MAXH
A
LVL
3DB
Center 2.437 GHz
2.5 MHz/
Span 25 MHz
Date: 18.MAR.2016 13:08:11

Plot H


RBW 3 kHz
VBW 10 kHz
SWT 2.8 s
Marker 1 [T1]
-19.12 dBm
2.460237179 GHz
Ref 7 dBm
Att 30 dB
Offset 3 dB
1 PK
MAXH
A
LVL
3DB
Center 2.462 GHz
2.5 MHz/
Span 25 MHz
Date: 18.MAR.2016 13:11:35

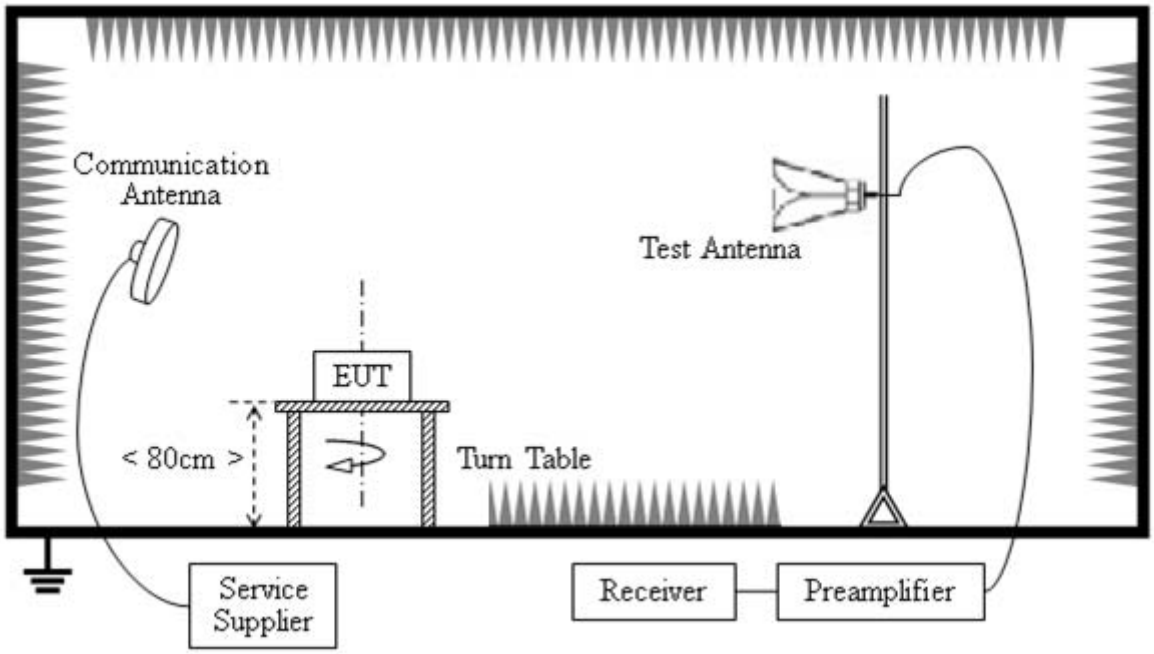
Plot I

5.5 Band Edge

5.5.1 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).

5.5.2 Test Description



The Module 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.

5.5.3 Test Result

The lowest and highest channels are tested to verify the Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBV/m] =UR + AT + AFactor [dB]; AT =LCable loss [dB]-Gpreamp [dB]
AT: Total correction Factor except Antenna
UR: Receiver Reading
Gpreamp: Preamplifier Gain
AFactor: Antenna Factor at 3m
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.
The lowest and highest channels are tested to verify the Restricted Frequency Bands

A. Test Verdict

802.11b Test mode

Ch	Frequency (MHz)	Detector PK/AV	Receiver Reading UR (dBuV/m)	AT (dB)	Afactor (dB@3m)	Max. Emission (dBuV/m)	Limit (dBuV/m)	Result
1	2382.25	PK	53.77	-32.2	32.56	54.13	74	Pass
1	2374.20	AV	47.66	-32.2	32.56	48.02	54	Pass
11	2494.88	PK	52.22	-30.7	32.50	54.02	74	Pass
11	2484.16	AV	48.11	-30.7	32.50	49.91	54	Pass

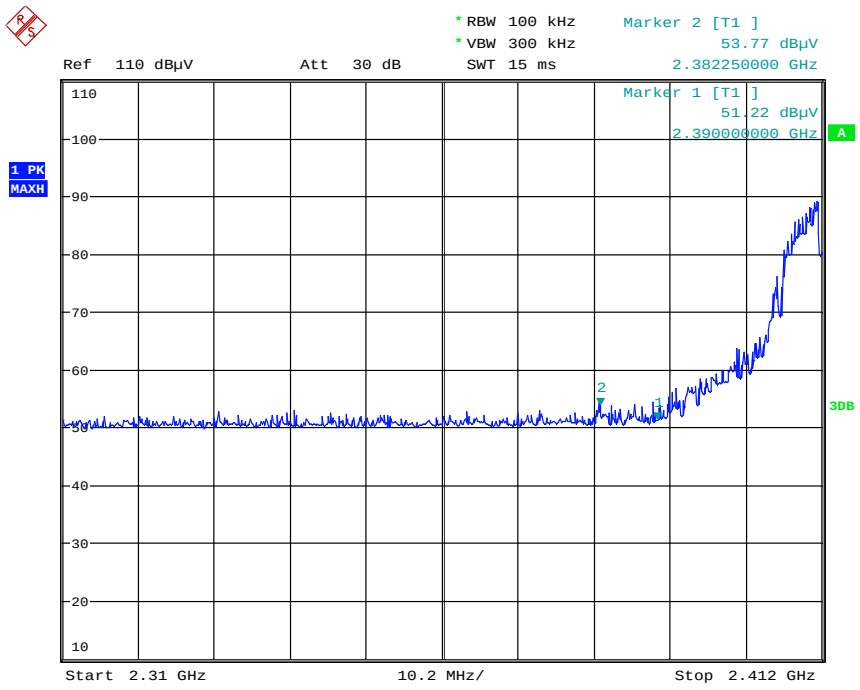
802.11g Test mode

Ch	Frequency (MHz)	Detector PK/AV	Receiver Reading UR (dBuV/m)	AT (dB)	Afactor (dB@3m)	Max. Emission (dBuV/m)	Limit (dBuV/m)	Result
1	2364.26	PK	53.22	-32.2	32.56	53.58	74	Pass
1	2378.98	AV	48.57	-32.2	32.56	48.93	54	Pass
11	2488.73	PK	52.68	-30.7	32.50	54.48	74	Pass
11	2498.80	AV	48.64	-30.7	32.50	50.44	54	Pass

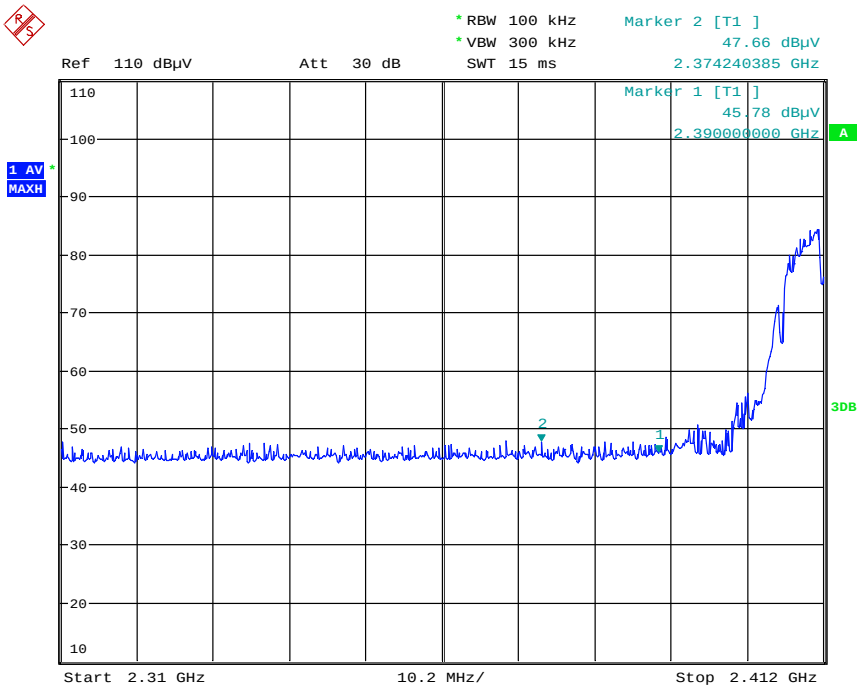
802.11n (20MHz) Test mode

Ch	Frequency (MHz)	Detector PK/AV	Receiver Reading UR (dBuV/m)	AT (dB)	Afactor (dB@3m)	Max. Emission (dBuV/m)	Limit (dBuV/m)	Result
1	3787.97	PK	52.92	-32.2	32.56	53.28	74	Pass
1	2358.87	AV	48.17	-32.2	32.56	48.53	54	Pass
11	2483.92	PK	52.86	-30.7	32.50	54.66	74	Pass
11	2490.92	AV	47.45	-30.7	32.50	49.25	54	Pass

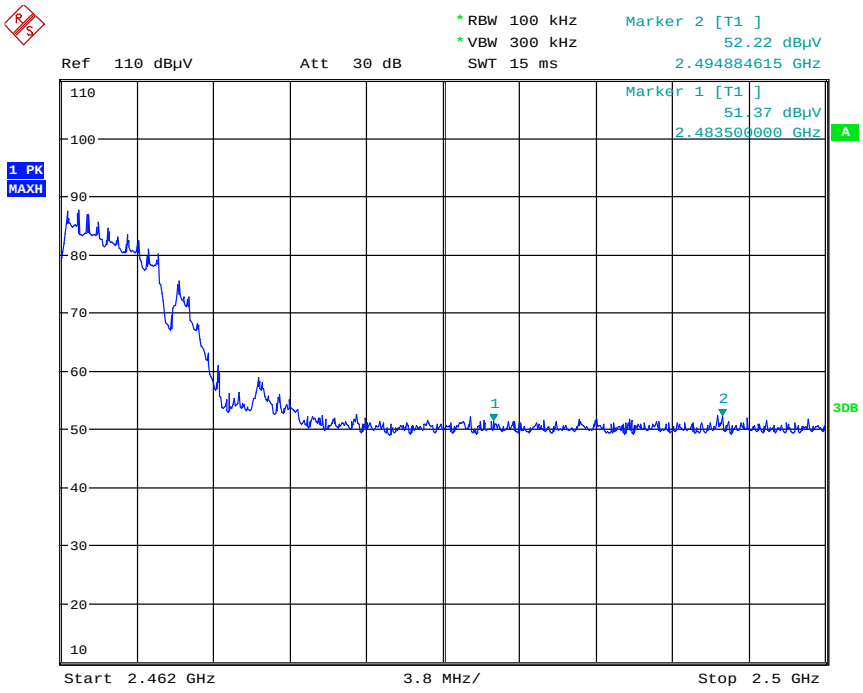
B. Test Plot



(802.11b Channel = 1 PK)

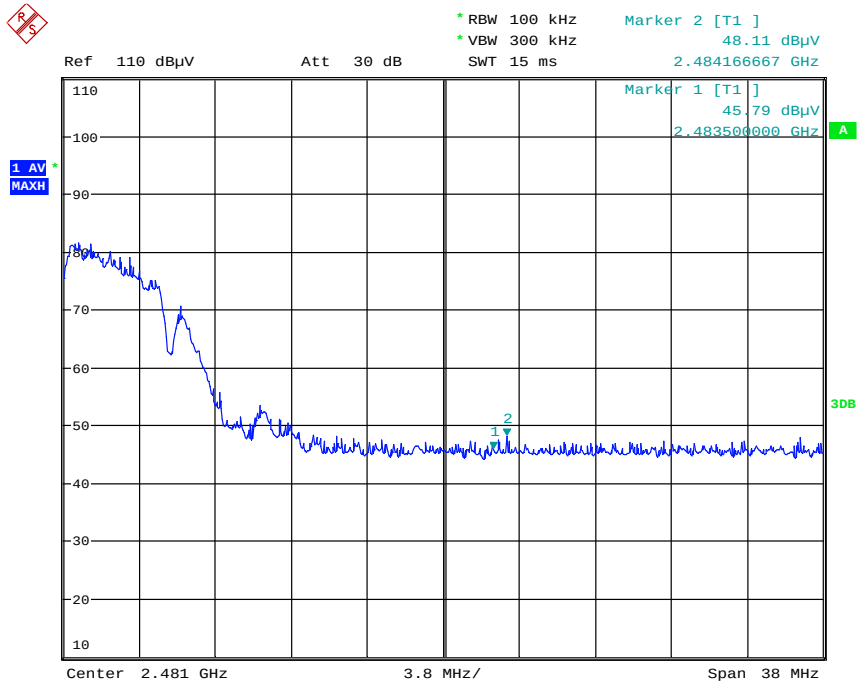


(802.11b Channel = 1 AV)



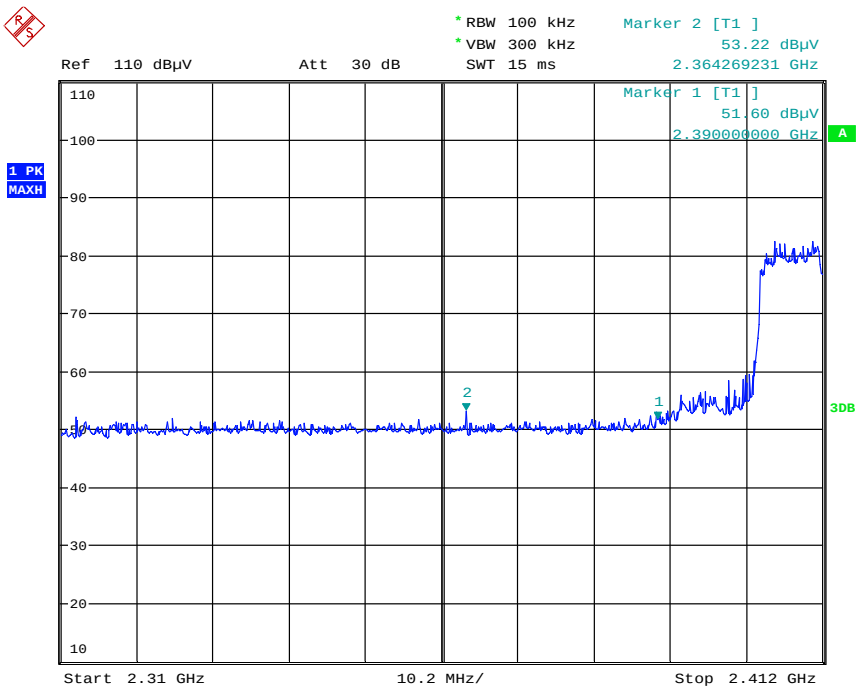
Date: 18.MAR.2016 13:44:47

(802.11b Channel = 11 PK)

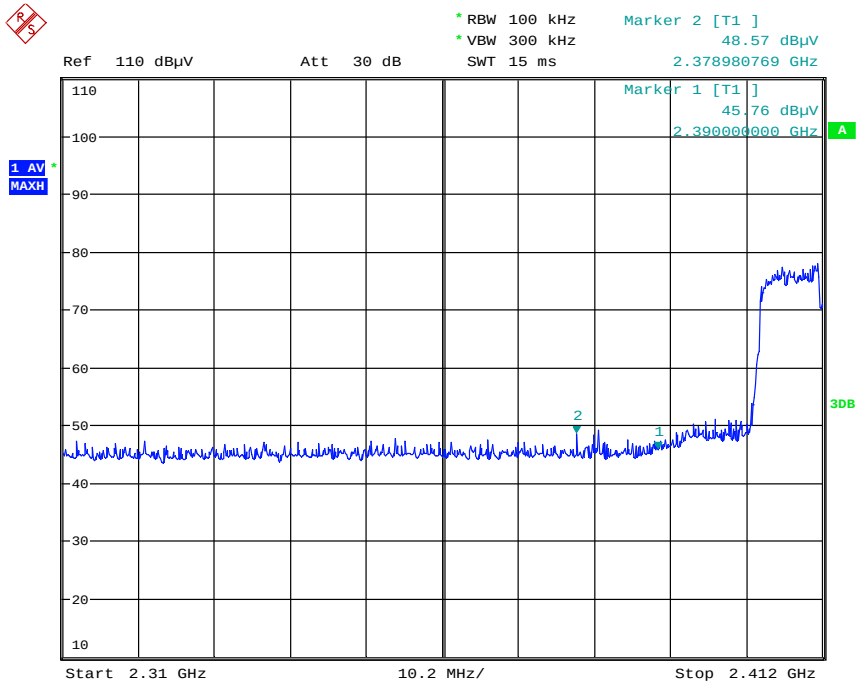


Date: 18.MAR.2016 13:45:37

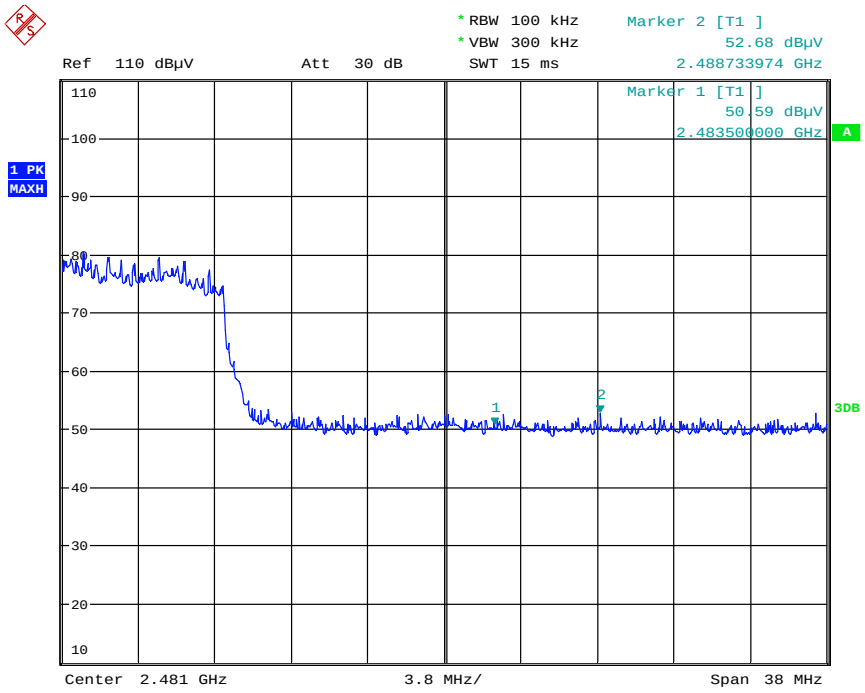
(802.11b Channel = 11 AV)



(802.11g Channel = 1 PK)

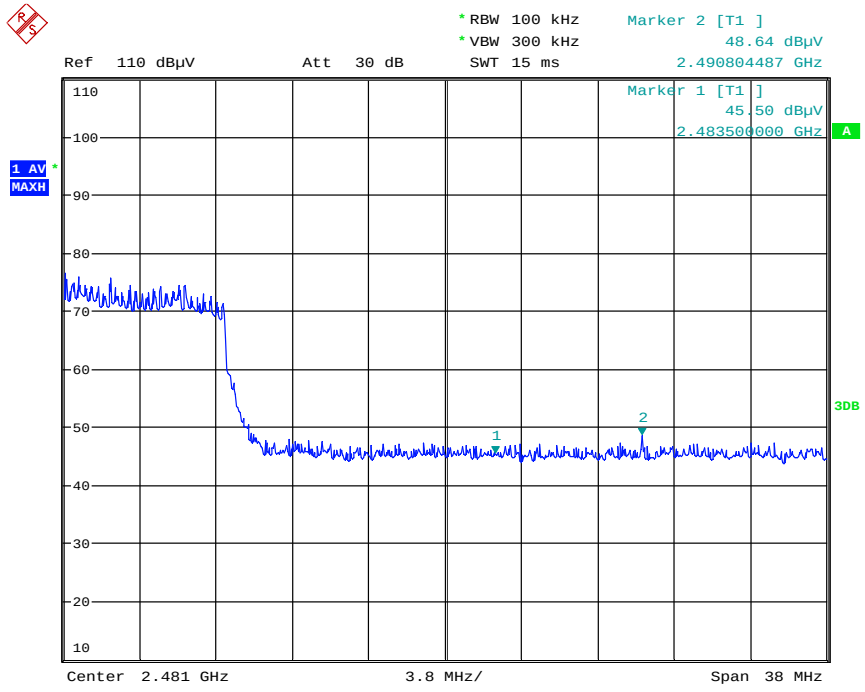


(802.11g Channel = 1 AV)



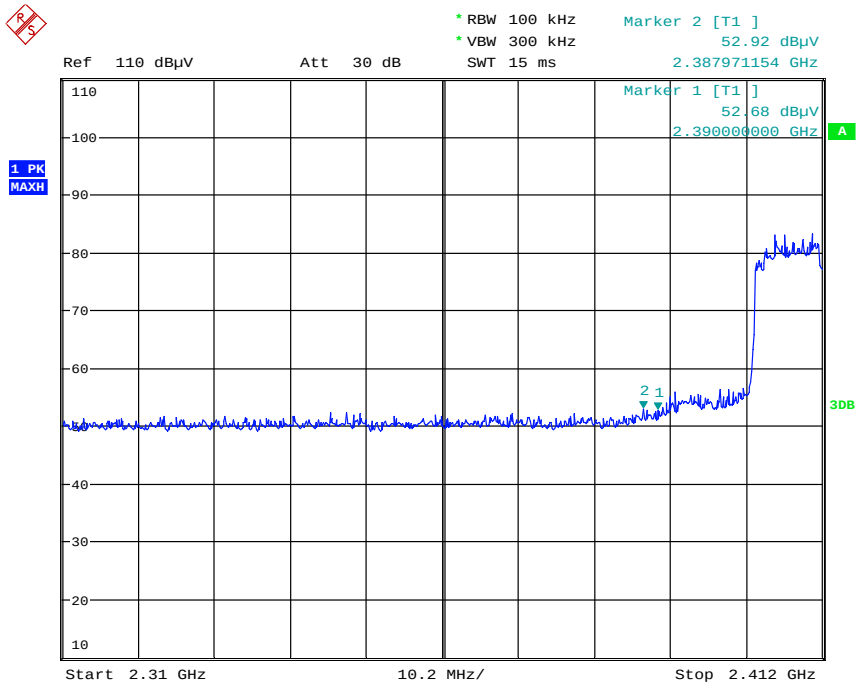
Date: 18.MAR.2016 13:47:01

(802.11g Channel = 11 PK)



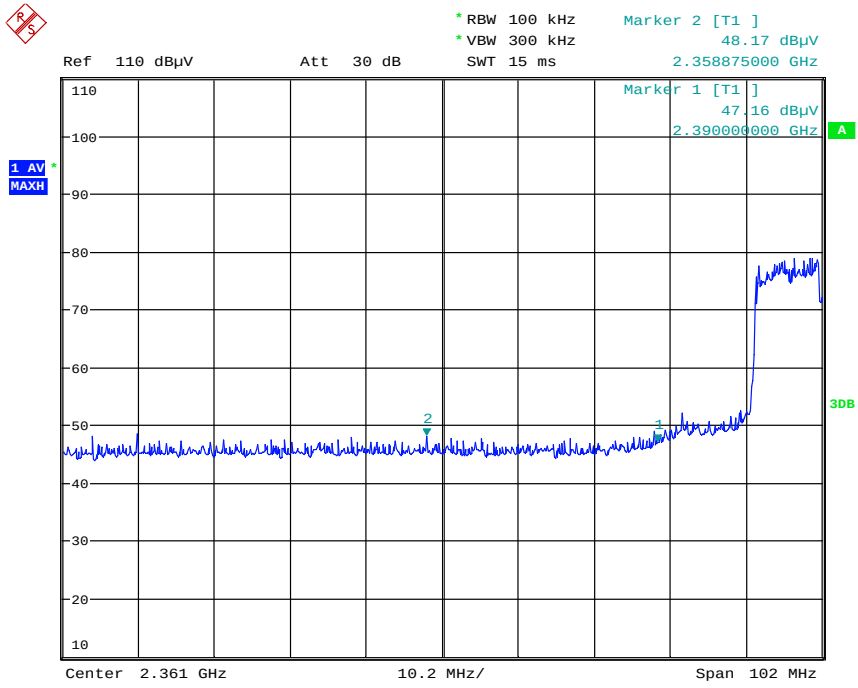
Date: 18.MAR.2016 13:46:31

(802.11g Channel = 11 AV)



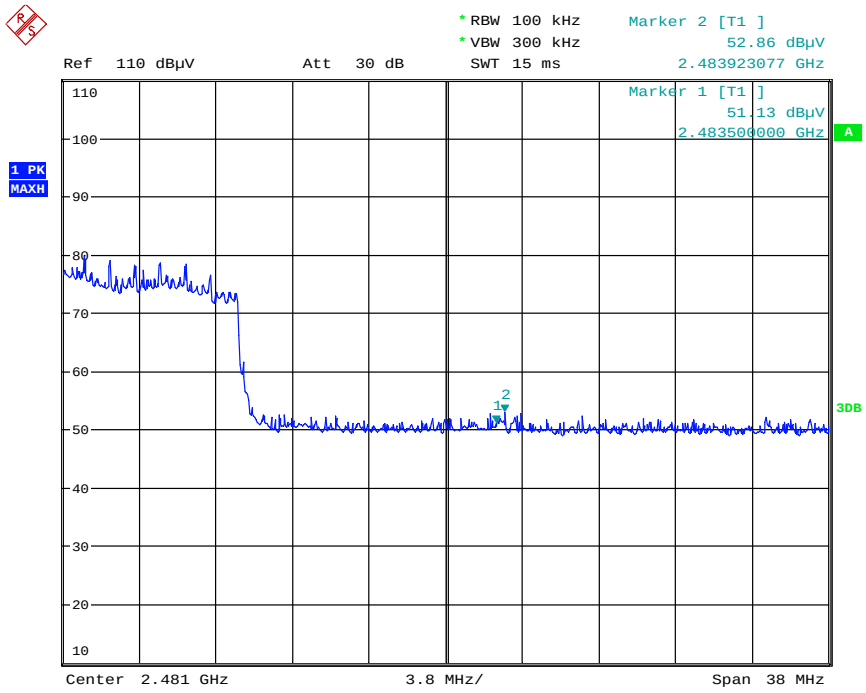
Date: 18.MAR.2016 13:39:52

(802.11n-20MHz Channel = 1 PK)

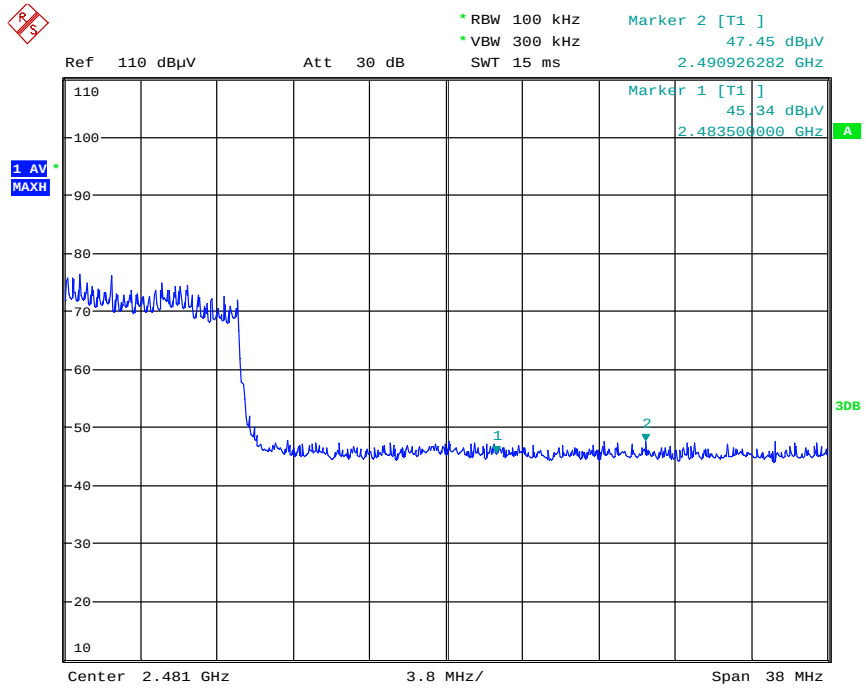


Date: 18.MAR.2016 13:41:00

(802.11n-20MHz Channel = 1 AV)



(802.11n-20MHz Channel = 11 PK)



(802.11n-20MHz Channel = 11 AV)

5.6 Conducted Emission

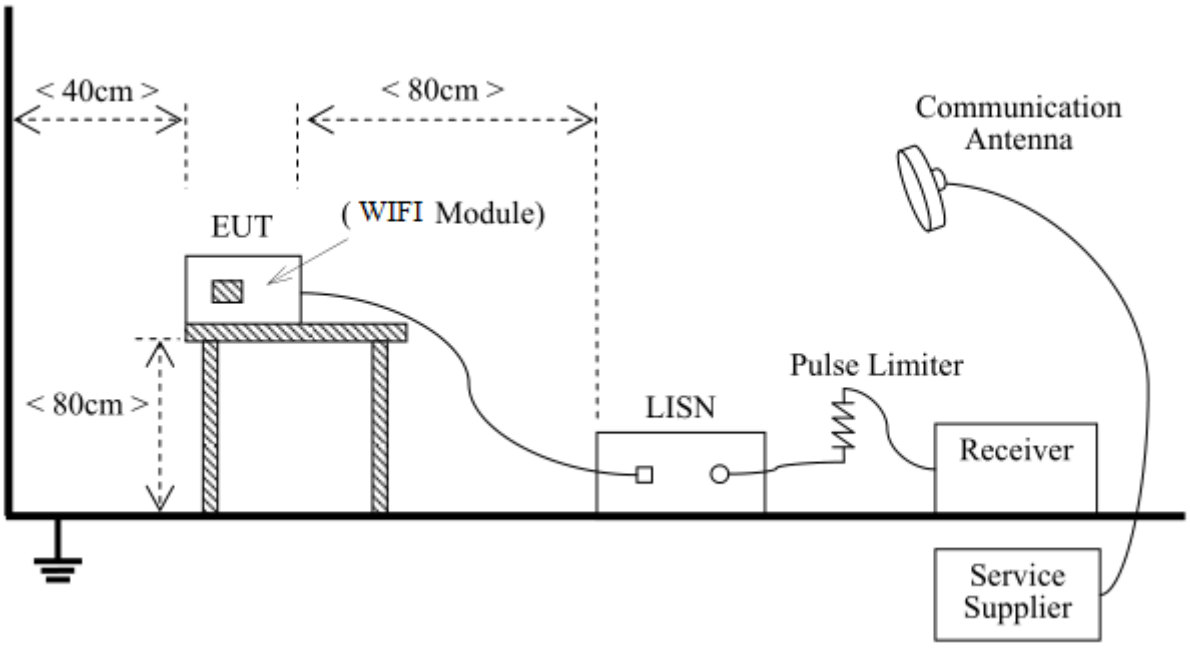
5.6.1 Requirement

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 50μH/50Ω line impedance stabilization network(LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	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.

5.6.2 Test Description



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT connected to Class B Computer/Laptop via USB data cable. The Computer/Laptop installed by US power 120V/60Hz, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10-2013

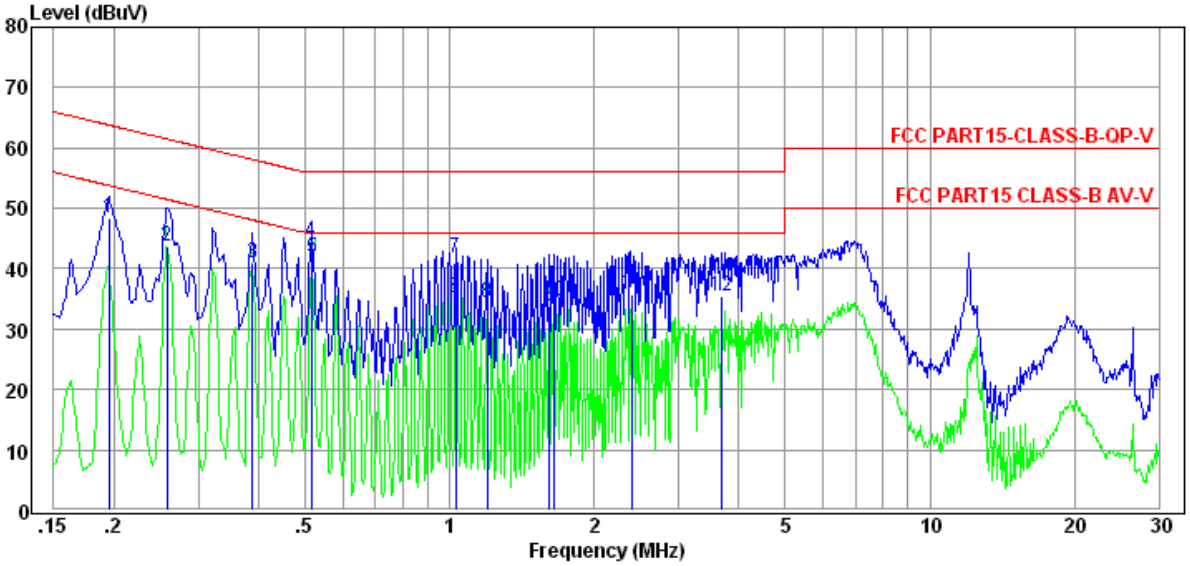
5.6.3 Test result

Test Verdict Recorded for Suspicious Points:

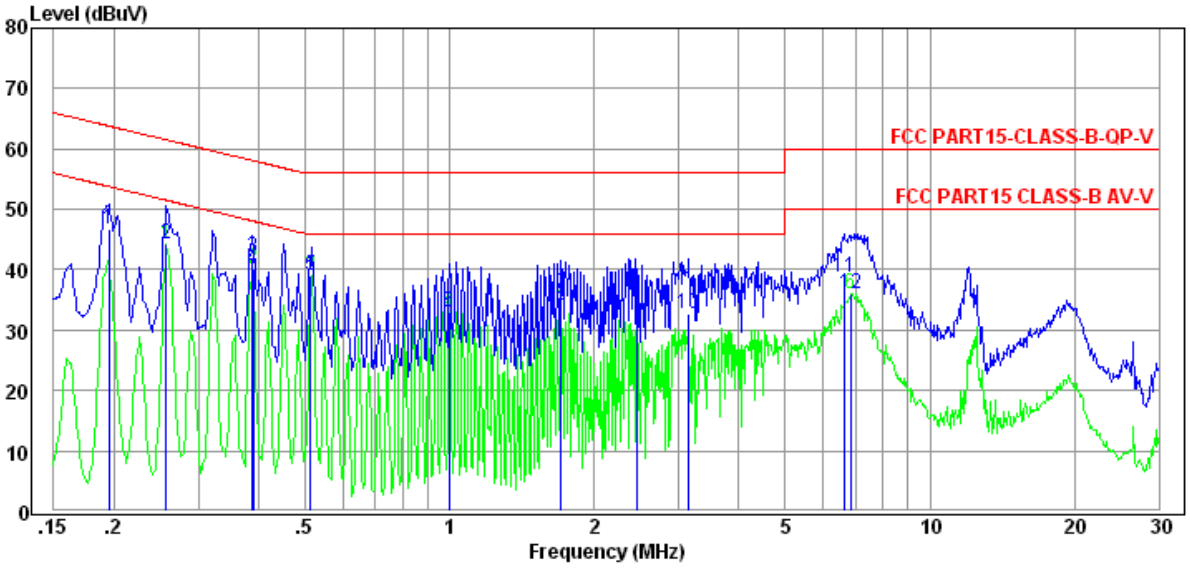
Line	Freq MHz	Result dBuV	Limit dBuV	Margin dB
QP	0.20	48.34	63.80	15.46
Average	0.26	43.78	51.49	7.71
Average	0.39	41.08	48.07	6.99
QP	0.52	44.62	56.00	11.38
Average	0.52	41.77	46.00	4.23
Average	1.03	35.31	46.00	10.69
QP	1.03	41.77	56.00	14.23
Average	1.20	34.47	46.00	11.53
QP	1.61	33.72	56.00	22.28
Average	1.65	34.52	46.00	11.48
QP	2.39	35.86	56.00	20.14
QP	3.68	35.49	56.00	20.51

Neutral	Freq MHz	Result dBuV	Limit dBuV	Margin dB
QP	0.20	46.68	63.78	17.10
Average	0.26	44.15	51.52	7.37
QP	0.39	42.08	58.07	15.99
Average	0.39	40.02	48.06	8.04
Average	0.51	39.01	46.00	6.99
Average	1.00	33.07	46.00	12.93
QP	1.71	36.03	56.00	19.97
Average	1.71	34.07	46.00	11.93
QP	2.45	35.34	56.00	20.66
QP	3.15	32.64	56.00	23.36
QP	6.62	38.81	60.00	21.19
Average	6.84	35.93	50.00	14.07

Test Plot:



(Plot A: L Phase)



(Plot B: N Phase)

5.7 Radiated Emission

5.7.1 Requirement

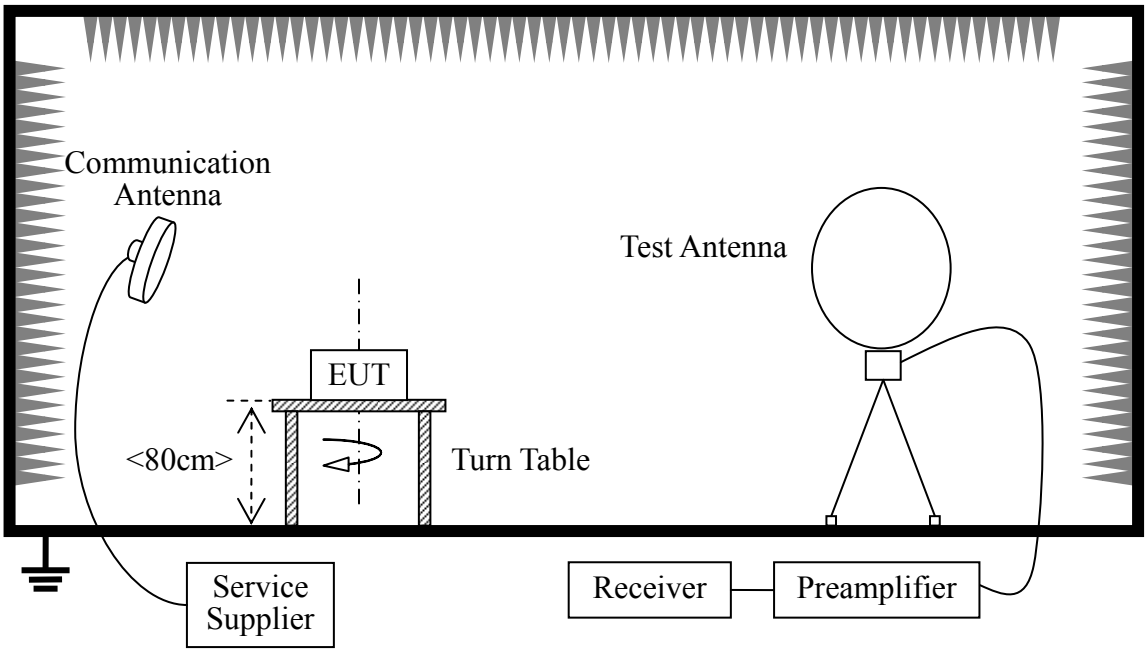
According to FCC section 15.247(c), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the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

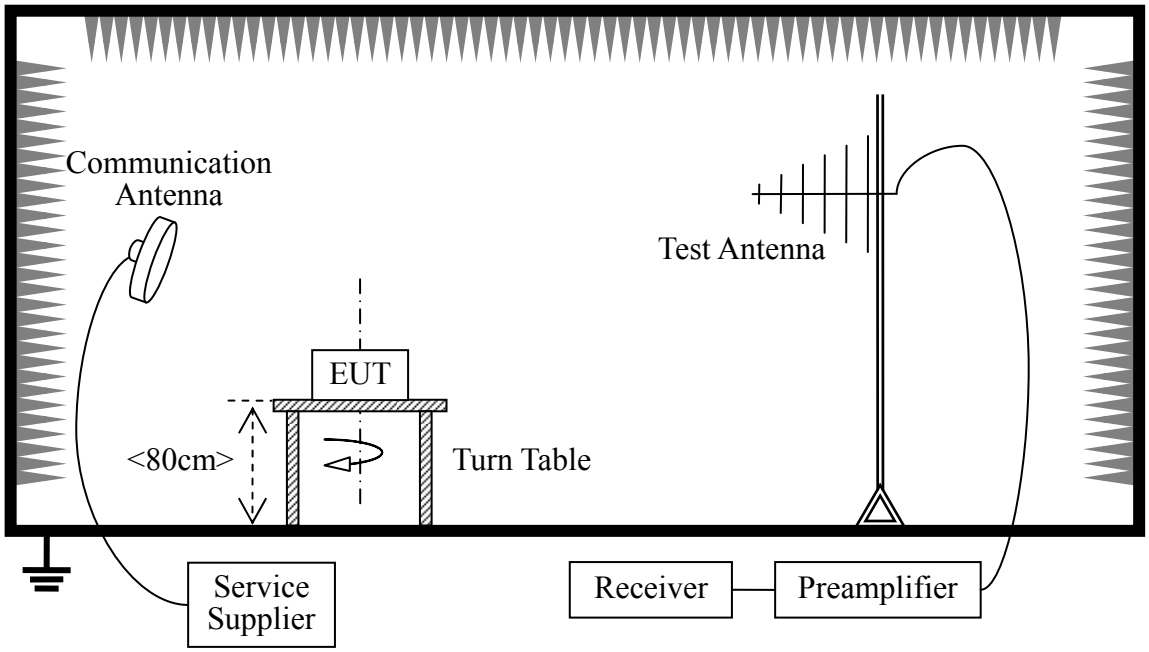
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Limit(dBμV/m)	Detector
0.009-0.490	2400/F(kHz)	300	/	/
0.490-1.705	24000/F(kHz)	30	/	/
1.705-30	30	30	/	/
30 - 88	100	3	40	QP
88 - 216	150	3	43.5	QP
216 - 960	200	3	46	QP
960 - 1000	500	3	54	QP
Above 1000	500	3	54	AV

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)

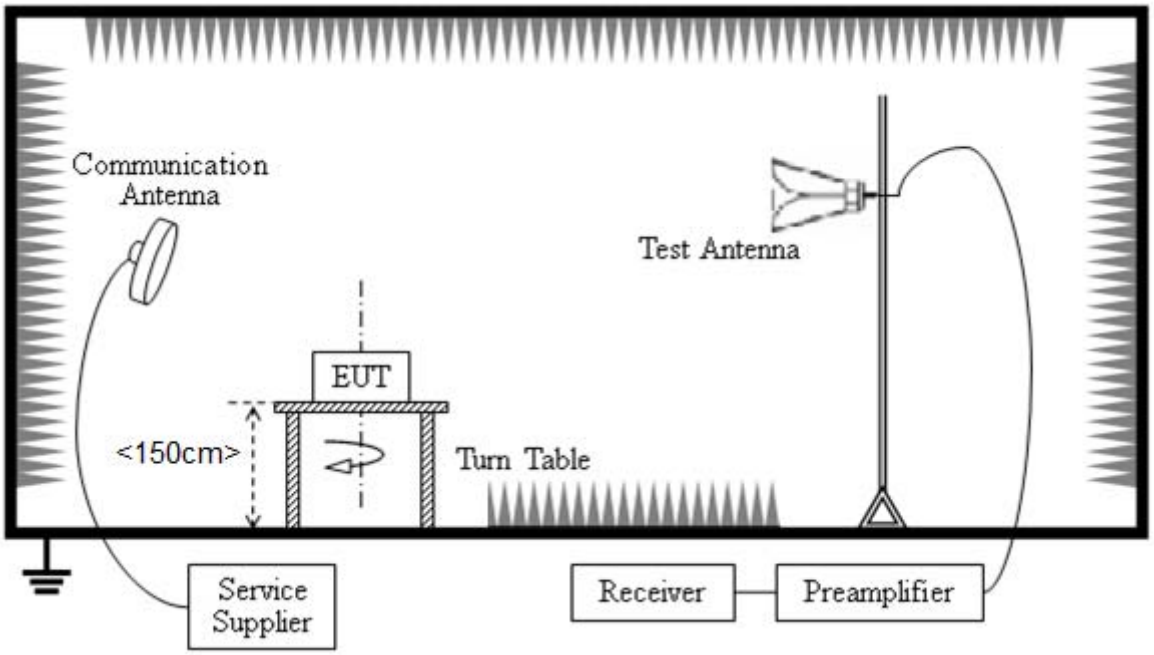
5.7.2 Test setup



Radiated Emissions Below 30MHz



Radiated Emissions 30-1000MHz



Radiated Emissions above 1300MHz

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 Wifi Module 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 Wifi Service Supplier (SS) via a Common Antenna, 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.

5.7.3 Test Result

A. Test Result for 9kHz~30MHz

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

Note:

a) The amplitude of spurious emissions that are attenuated by more than 10dB below the permissible value has no need to be reported.

b) Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

c) Limit line = specific limits (dBuV) + distance extrapolation factor.

B. Test Result for above 30MHz ~ 10th Harmonic

For Modulation: DSSS

Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Result
63.31	26.97	40	13.03	63.31	26.97
104.17	34.88	43.5	8.62	104.17	34.88
162.69	38.47	43.5	5.03	162.69	38.47
288.36	37.94	46	8.06	288.36	37.94
486.72	31.68	46	14.32	486.72	31.68
731.69	39.66	46	6.34	731.69	39.66
1455.33	37.69	54	16.31	1455.33	37.69
1638.79	31.57	54	22.43	1638.79	31.57
2226.24	34.88	54	19.12	2226.24	34.88
4925.36	43.77	54	10.23	4925.36	43.77
31.07	35.14	40	4.86	31.07	35.14
63.31	33.51	40	6.49	63.31	33.51
78.97	32.18	40	7.82	78.97	32.18
162.78	34.55	43.5	8.95	162.78	34.55
633.69	37.98	46	8.02	633.69	37.98
1604.97	37.20	54	16.80	1604.97	37.2
2225.8	37.58	54	16.42	2225.8	37.58
2890.57	34.66	54	19.34	2890.57	34.66
4925.36	44.65	54	9.35	4925.36	44.65

Note:

The worst case (802.11b Channel 1:2462MHz) is recorded in the report.

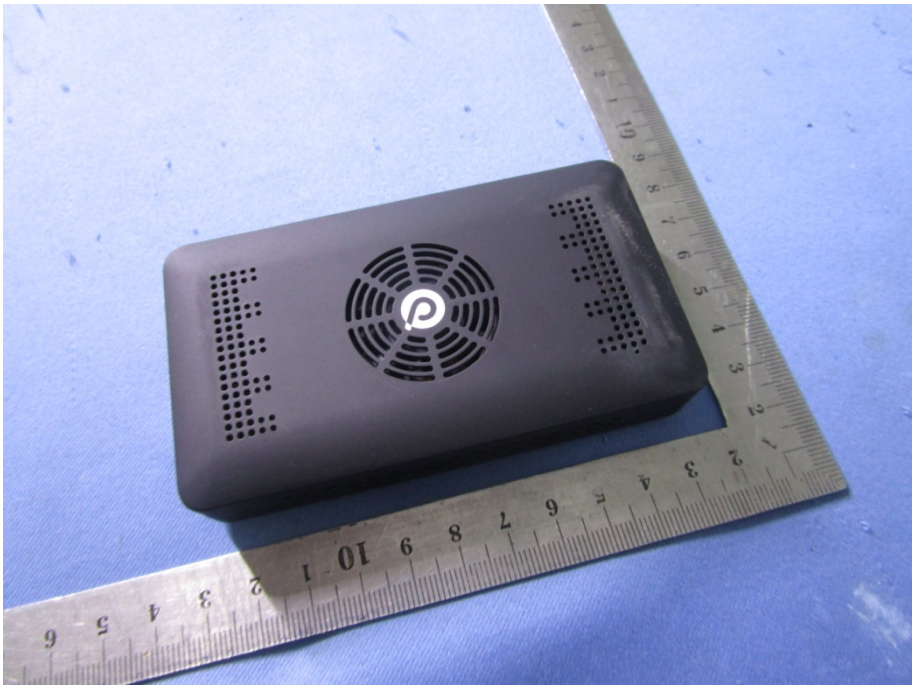
For Modulation: OFDM

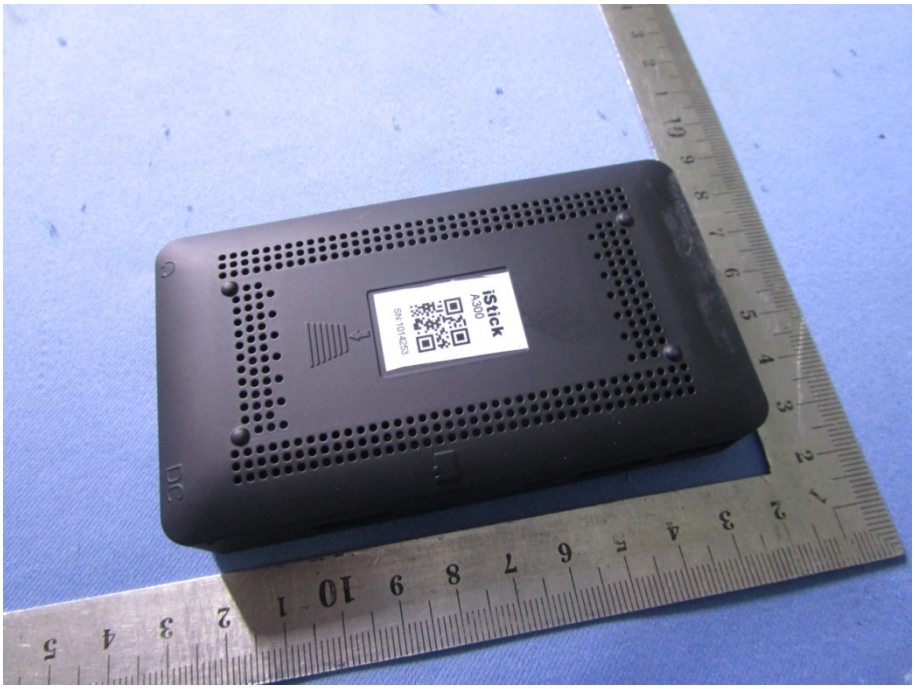
Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Result
63.31	27.10	40.00	12.90	Horizontal	PASS
104.17	35.26	43.50	8.24	Horizontal	PASS
161.47	39.18	43.50	4.32	Horizontal	PASS
297.22	37.85	46.00	8.15	Horizontal	PASS
446.41	33.58	46.00	12.42	Horizontal	PASS
633.91	40.43	46.00	5.57	Horizontal	PASS
1483.18	36.49	54.00	17.51	Horizontal	PASS
1633.86	30.77	54.00	23.23	Horizontal	PASS
2077.24	29.34	54.00	24.66	Horizontal	PASS
2227.58	35.04	54.00	18.96	Horizontal	PASS
2888.46	35.82	54.00	18.18	Horizontal	PASS
4925.36	46.36	54.00	7.64	Vertical	PASS
31.07	36.20	40.00	3.80	Vertical	PASS
47.00	30.17	40.00	9.83	Vertical	PASS
63.31	33.51	40.00	6.49	Vertical	PASS
78.97	32.31	40.00	7.69	Vertical	PASS
162.04	31.82	43.50	11.68	Vertical	PASS
651.94	36.63	46.00	9.37	Vertical	PASS
1482.60	37.65	54.00	16.35	Vertical	PASS
2225.80	38.06	54.00	15.94	Vertical	PASS
2890.57	34.83	54.00	19.17	Vertical	PASS
3862.94	30.20	54.00	23.80	Vertical	PASS
4925.36	47.09	54.00	6.91	Vertical	PASS

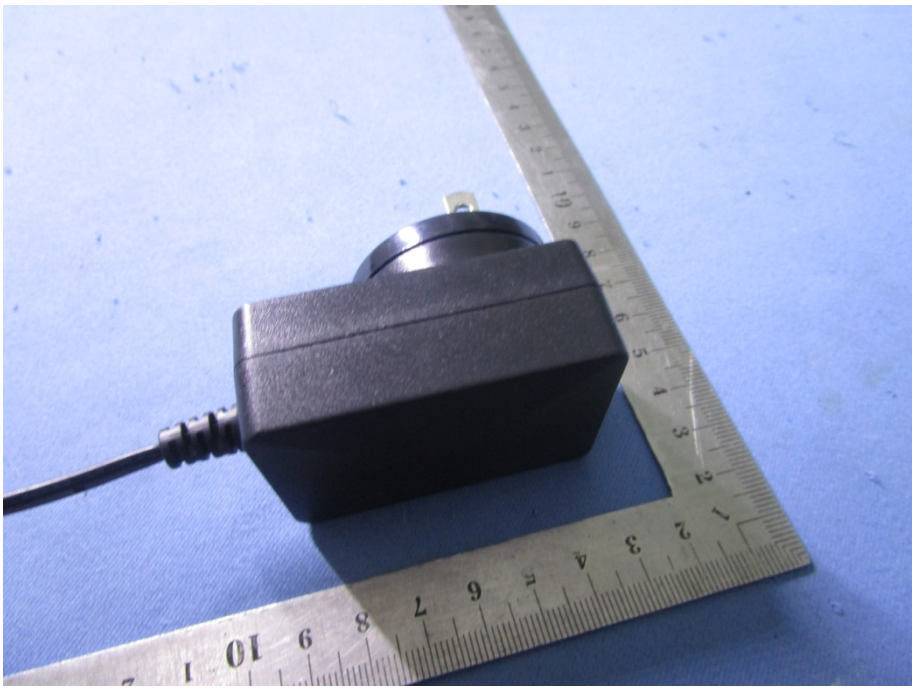
Note:

The worst case (802.11n Channel 1:2462MHz) is recorded in the report.

Annex A Photos of the EUT

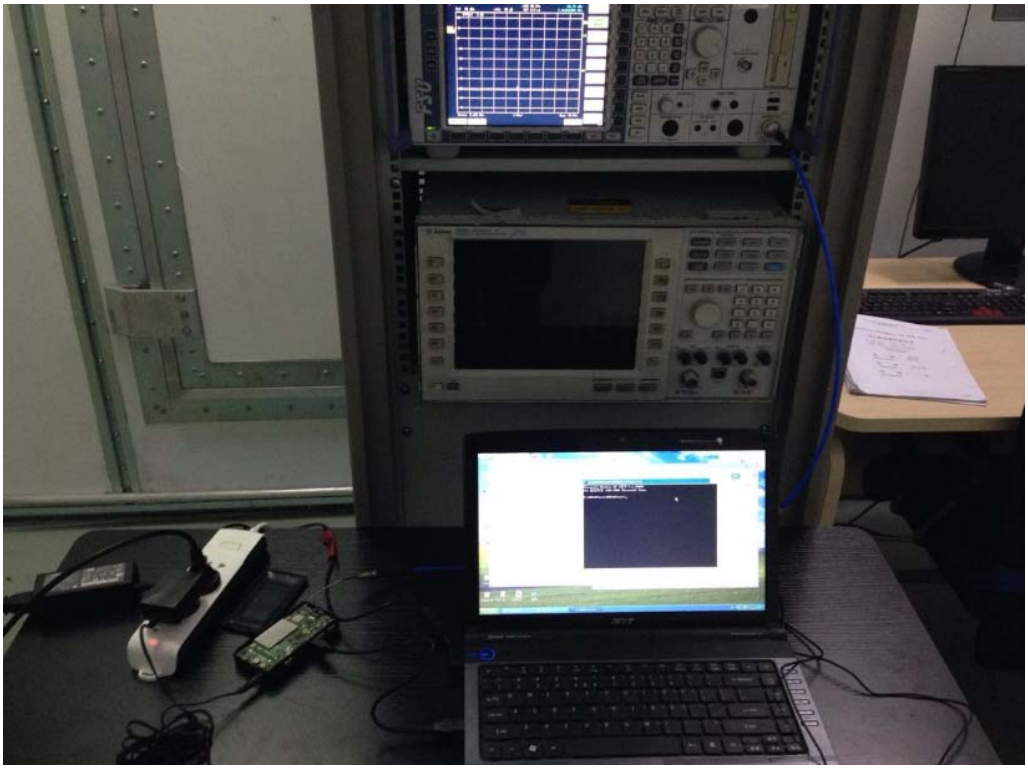






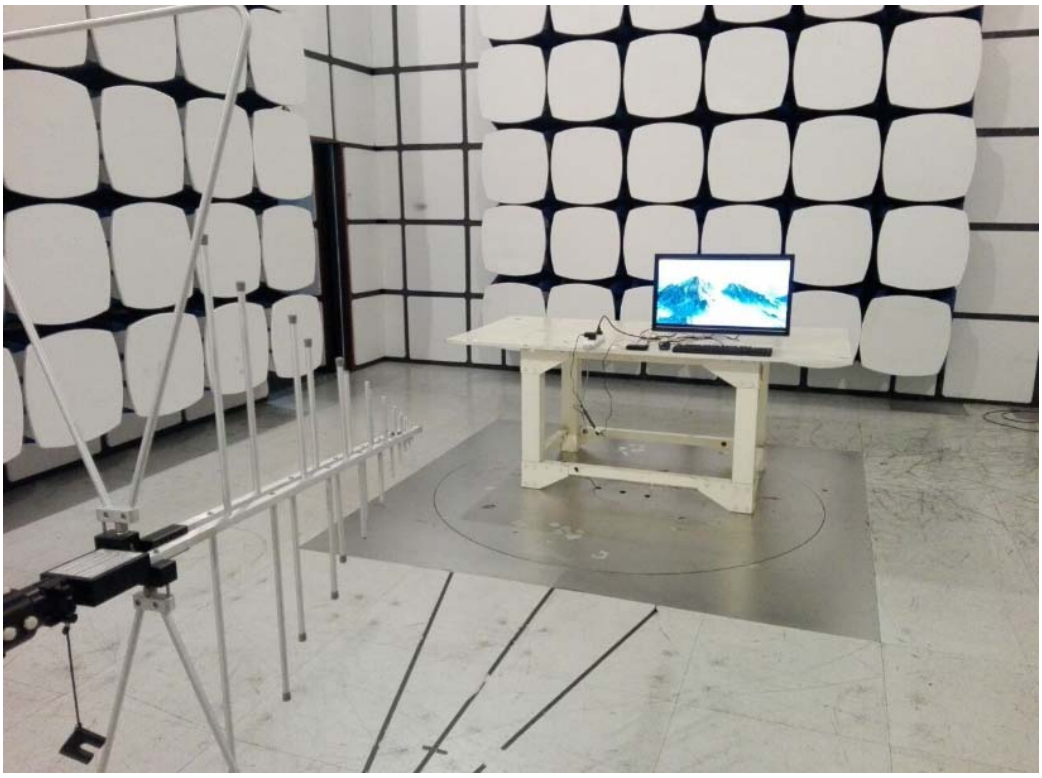
Annex B Photos of Setup

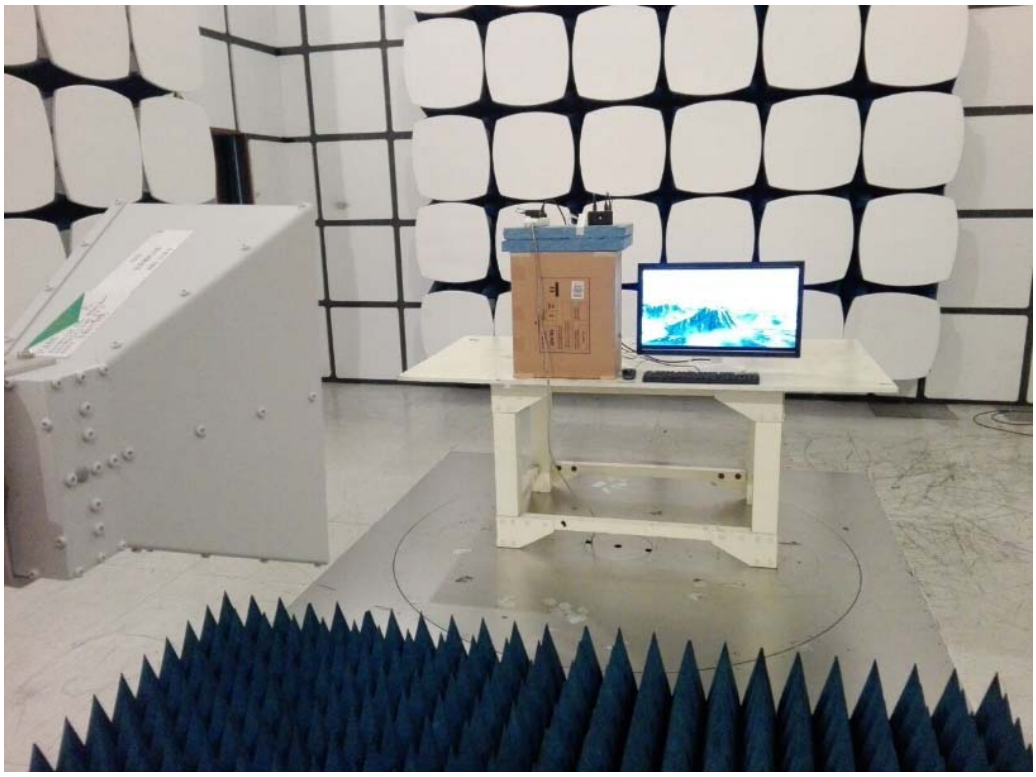
1. RF



2. Conducted Emission

3. Radiated Emission





** END OF REPORT **