



Report No.SH16120037W06

FCC RF TEST REPORT

Issued to

Shanghai MXCHIP Information Technology Co., Ltd

For

Embedded WiFi & Bluetooth module

Model Name : EMW3239-P, EMW3239-E
Trade Name : MXCHIP
Brand Name : MXCHIP
Standard : 47 CFR Part 15, Subpart C
ANSI C63.10-2013
FCC ID : P53-EMW3239
Test date : Jan.3,2017 to Feb.20,2017
Issue date : Feb.21,2017



Tested by An Peng

Approved by Gm Yeping

Review by Menglan Gu

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**Change History**

Issue	Date	Reason for change
1.0	Jan.9,2017	First edition



1. General Information

1.1 Applicant

Shanghai MXCHIP Information Technology Co., Ltd

9th Floor, No. 5, Lane 2145 Jinsha Jiang Road, Putuo District, Shanghai, China (200333)

1.2 Manufacturer

Shanghai MXCHIP Information Technology Co., Ltd

9th Floor, No. 5, Lane 2145 Jinsha Jiang Road, Putuo District, Shanghai, China (200333)

1.3 Description of EUT

EUT Name.....: Embedded WiFi & Bluetooth module
Model Name: EMW3239-P, EMW3239-E
Brand Name.....: MXCHIP
Trade Name: MXCHIP
Hardware Version: EMW3239 V1.0
Software Version: EMW3239_1 v3.0 921600
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 / External antenna
Antenna Gain.....: PCB: 2 dBi / External: 2dBi

NOTE 1:

*The EUT is a WiFi & Bluetooth 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:

EMW3239-P used PCB antenna, EMW3239-E used External antenna.

NOTE 3:

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.

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
Service Simulator	Agilent	N4010A	MY47230669	2016.9.21	1year
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+	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.)
Power supplier	NF	ES2000S	9087735	2016.9.24	1year
Full/Semi-Anechoic Chamber	CHENGYU	9.2×6.25×6.15m	SAR	2015.9.14	3year
EMI Test Receiver	R&S	ESCI7	100787	2016.2.55	1year
LISN	TESEQ	NNB 51	33285	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-Log	Schwarzbeck	VULB 9163	9163-561	2016.9.24	1year
Test Antenna-Loop	Rohde&Schwarz	FMZB 1519	1519-025	2016.9.21	1year
Test Antenna-Horn	Schwarzbeck	BBHA 9120D	9120D-1033	2016.7.24	1year
EPM Series Power Meter	Agilent	E4418B	GB43318055	2016.5.23	1year
Power Sensor	Agilent	8482A	MY41091706	2016.5.23	1year
Temporary Antenna Connector	Farpu	SMA-K	(n.a.)	(n.a.)	(n.a.)
RF Cable	(n.a.)	0-25G	(n.a.)	(n.a.)	(n.a.)

NOTE:

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

Supporting Accessories

Description	Manufacturer	Model	Serial No.
Laptop	ACER	Aspire 4376ZG	LXPFY0C004 935291221601
Laptop Adapter	LITEON	PA-1650-22	9801016502
Test Evaluation board	MX	MiCOKit-3166/3239 V1.0	(n.a.)

Accessory for Conducted Emission:

Equipment	Model	Input	Output	Manufacturer
Power adapter	MDY-08-EH	100-240V AC 50/60Hz 0.5A	5V DC 2.5A	AOHAI GROUP



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(b)	Average power	Pass
4	15.247(a)	6dB & 20dB Bandwidth	Pass
5	15.247(d)	Conducted Spurious Emission and Band Edge	Pass
6	15.247(d)	Restricted Frequency Bands	Pass
7	15.207	Conducted Emission	Pass
8	15.247(d) 15.209	Radiated Emission	Pass
9	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

EMW3239-P: The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal and external photos.

EMW3239-E: The EUT has no standard external antenna jack or electrical connector, only professional users can access to and obtain materials and equipments to install of an external antenna. Please refer to User Manual.



5. Test Result

5.1 Peak Output Power

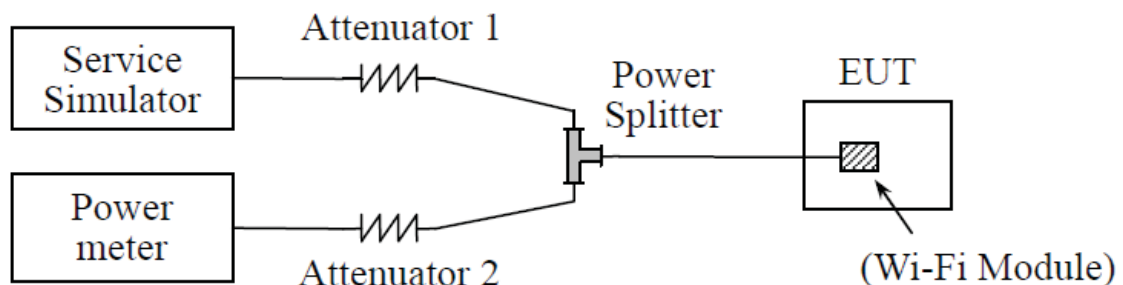
5.1.1 Requirement

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	20.04	0.10093	30	1	Pass
	6	2437	20.14	0.10328			Pass
	11	2462	20.09	0.10209			Pass
802.11g	1	2412	21.24	0.13305			Pass
	6	2437	21.40	0.13804			Pass
	11	2462	21.10	0.12882			Pass
802.11n (20MHz)	1	2412	20.65	0.11614			Pass
	6	2437	20.79	0.11995			Pass
	11	2462	20.62	0.11535			Pass



5.2 Average Power

5.2.1 Requirement

None; for reporting purposes only.

5.2.2 Test Description

Refer to 6.1.2.

5.2.3 Test Results

Mode	Channel	Frequency (MHz)	Measured Output Average Power	
			dBm	W
802.11b	1	2412	17.44	0.05546
	6	2437	17.39	0.05483
	11	2462	17.40	0.05495
802.11g	1	2412	10.30	0.01072
	6	2437	10.69	0.01172
	11	2462	10.32	0.01076
802.11n (20MHz)	1	2412	9.78	0.00951
	6	2437	9.89	0.00975
	11	2462	9.96	0.00991

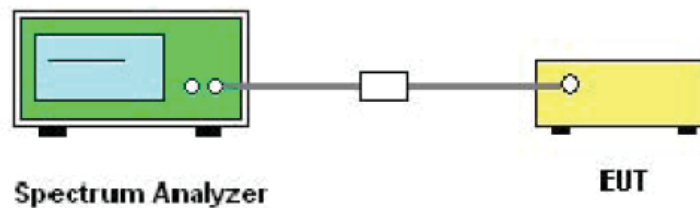


5.3 6dB & 20dB Bandwidth

5.3.1 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.

5.3.2 Test Description



5.3.3 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

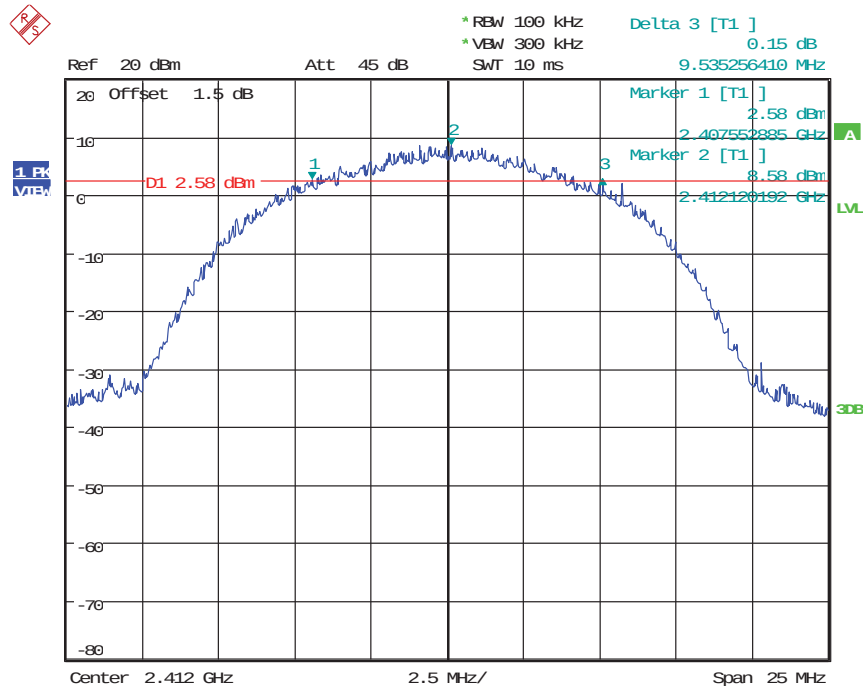
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	9.535	Plot A1	15.464	Plot A2	≥ 500	Pass
6	2437	8.613	Plot B1	15.705	Plot B2	≥ 500	Pass
11	2462	8.854	Plot C1	15.665	Plot C2	≥ 500	Pass

802.11g Test mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	15.785	Plot D1	17.104	Plot D2	≥ 500	Pass
6	2437	16.065	Plot E1	17.347	Plot E2	≥ 500	Pass
11	2462	16.065	Plot F1	17.548	Plot F2	≥ 500	Pass

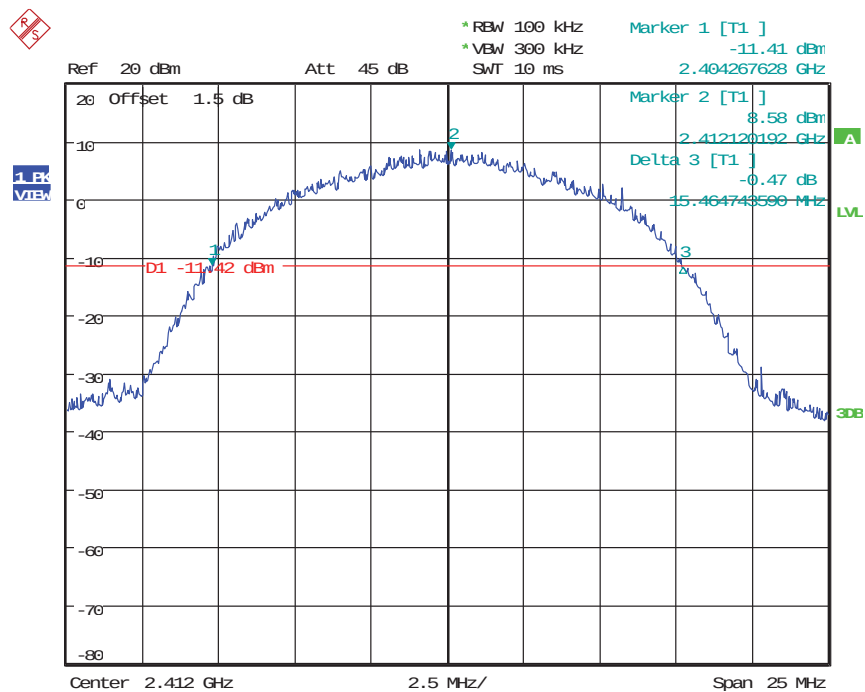
802.11n (20MHz) Test mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Refer to plot	20dB Bandwidth (MHz)	Refer to plot	Limit (KHz)	Result
1	2412	16.225	Plot G1	18.349	Plot G2	≥ 500	Pass
6	2437	16.346	Plot H1	18.429	Plot H2	≥ 500	Pass
11	2462	16.586	Plot I1	18.349	Plot I2	≥ 500	Pass

**B. Test Plots:**

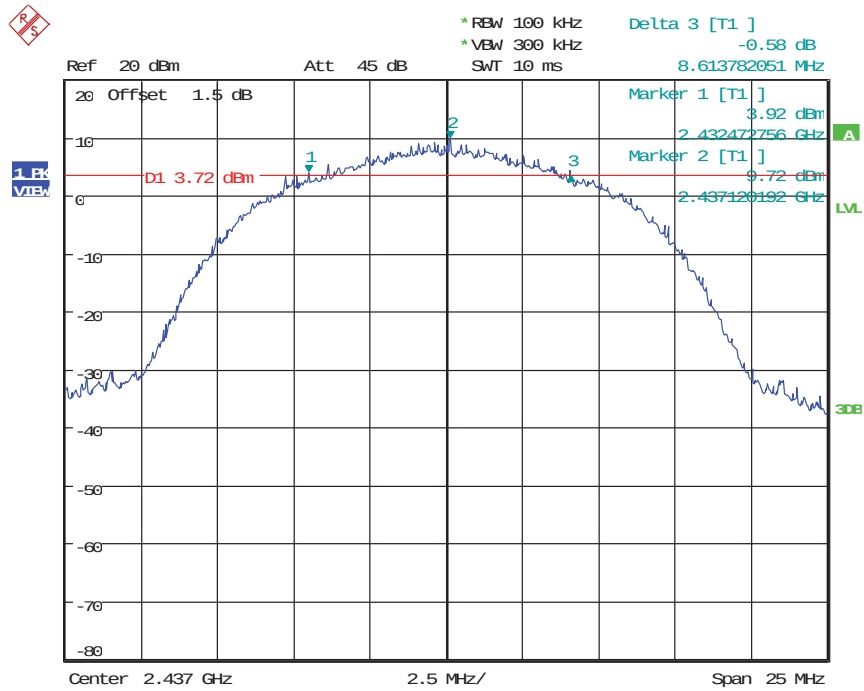
Date: 3.JAN.2017 18:23:08

Plot A1



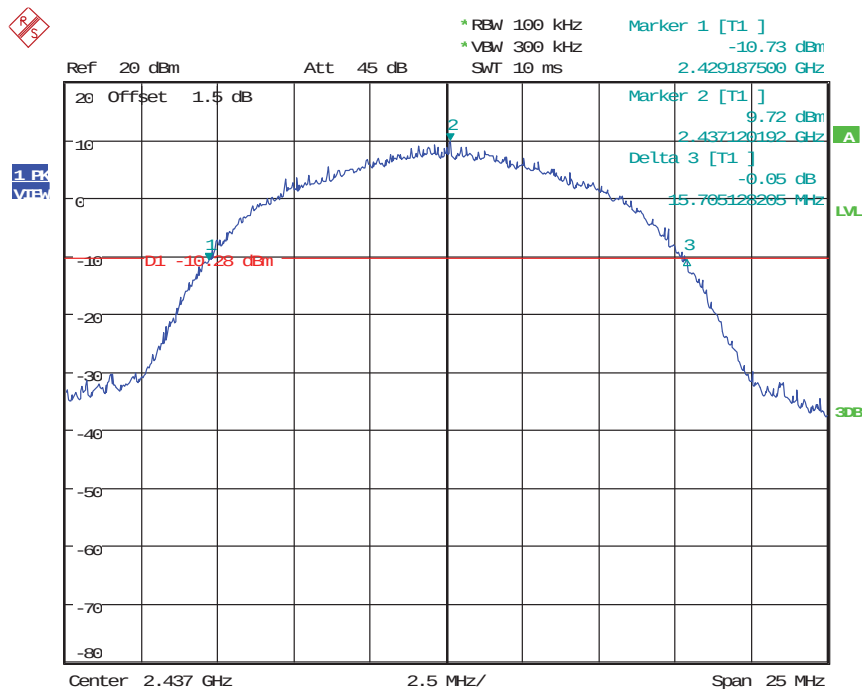
Date: 3.JAN.2017 18:23:50

Plot A2



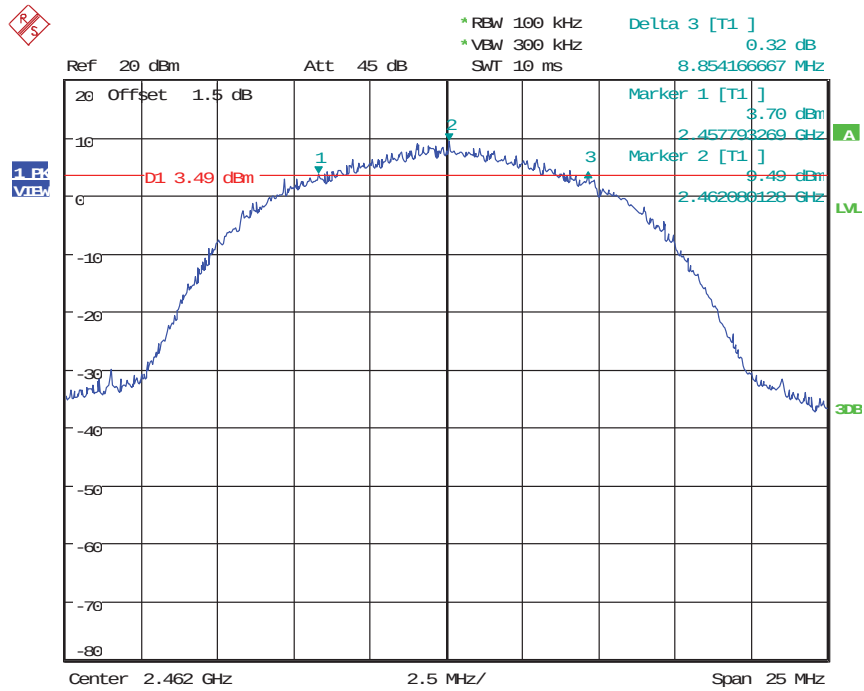
Date: 3.JAN.2017 18:31:12

Plot B1



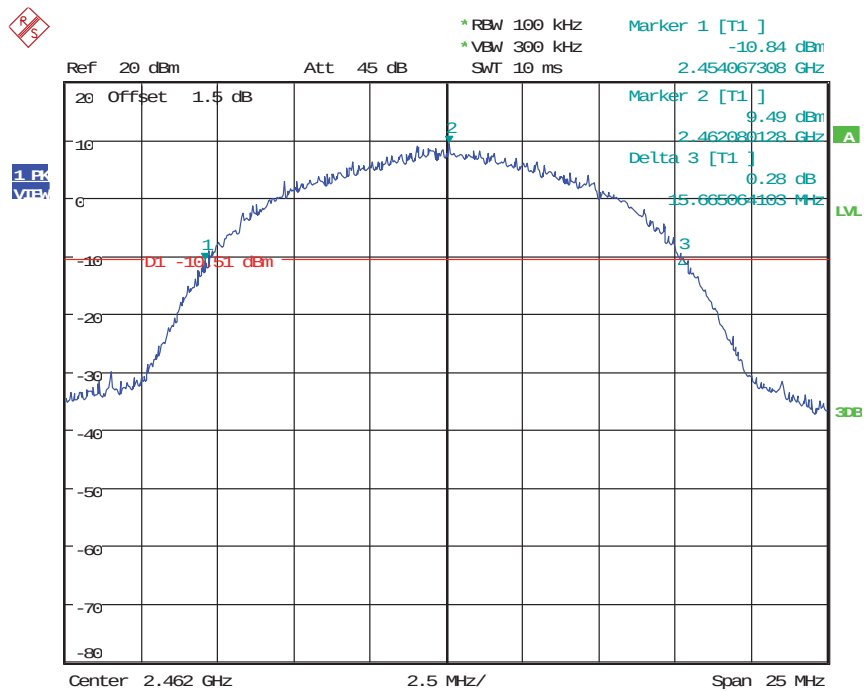
Date: 3.JAN.2017 18:32:07

Plot B2



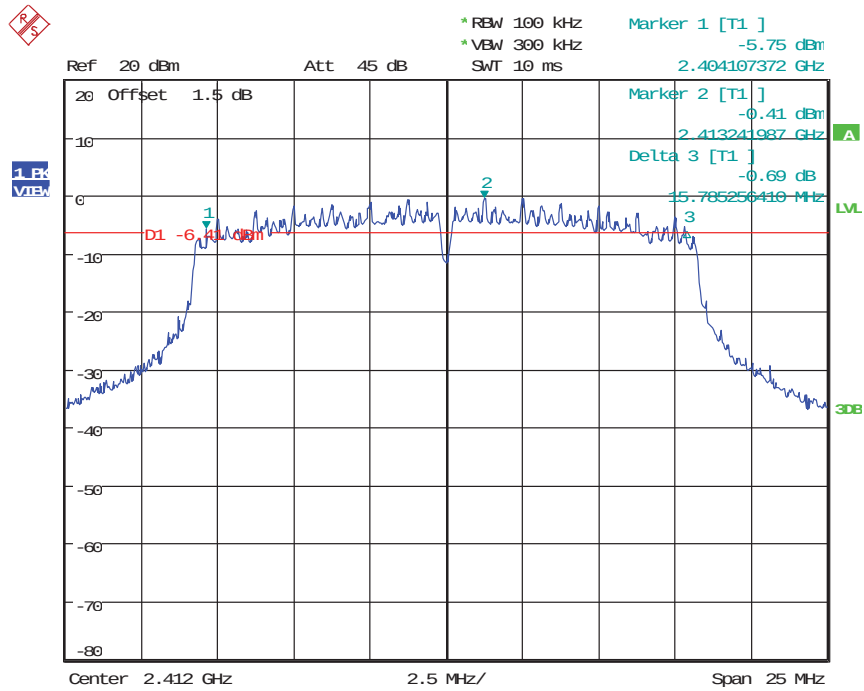
Date: 3.JAN.2017 18:36:54

Plot C1



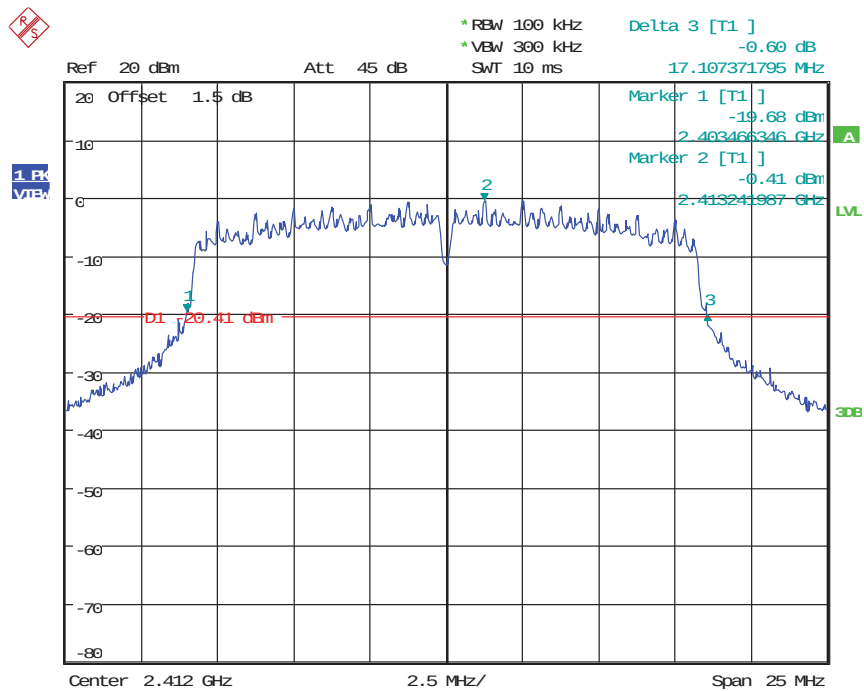
Date: 3.JAN.2017 18:37:43

Plot C2



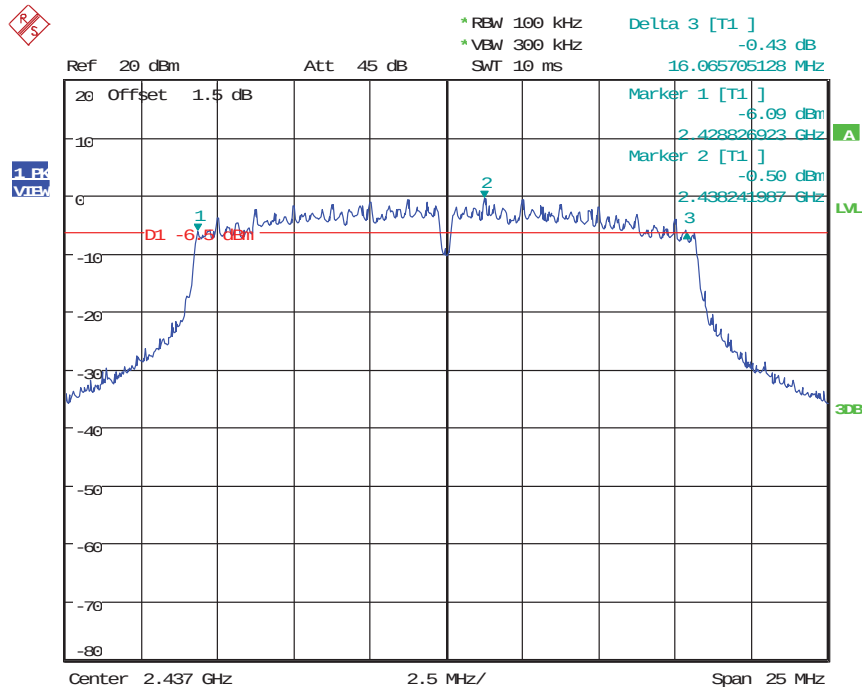
Date: 3.JAN.2017 18:26:00

Plot D1



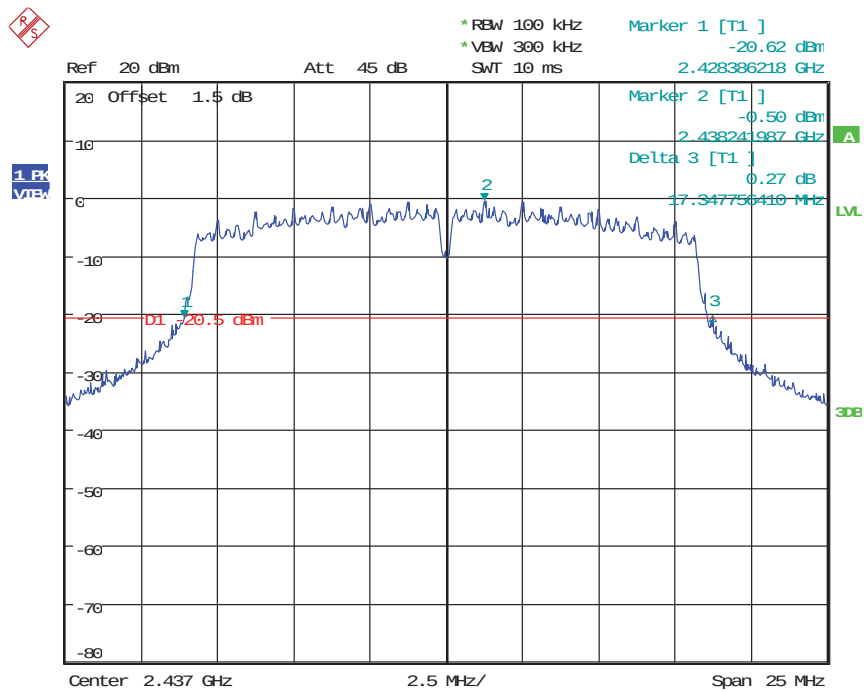
Date: 3.JAN.2017 18:26:27

Plot D2



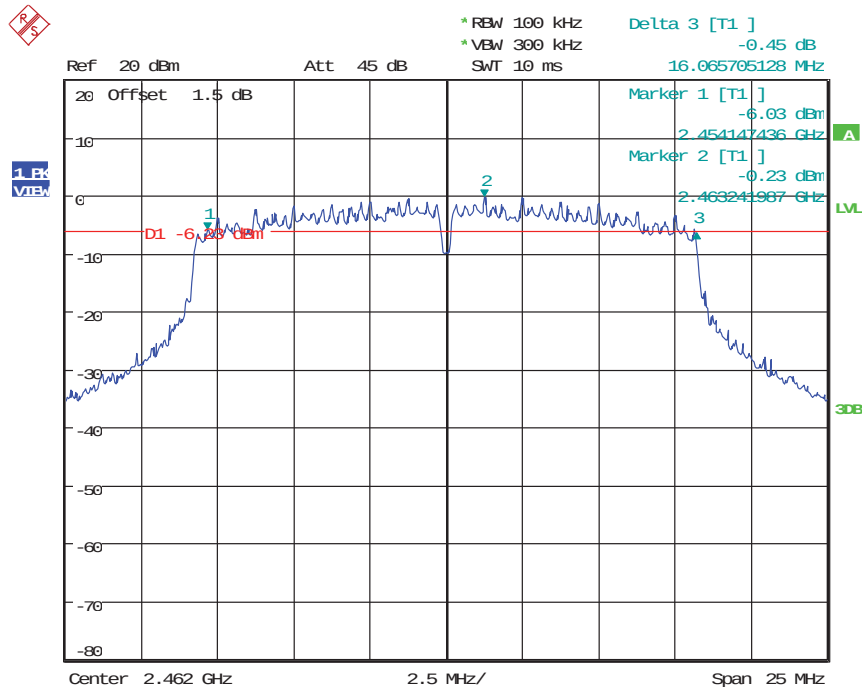
Date: 3.JAN.2017 18:33:31

Plot E1



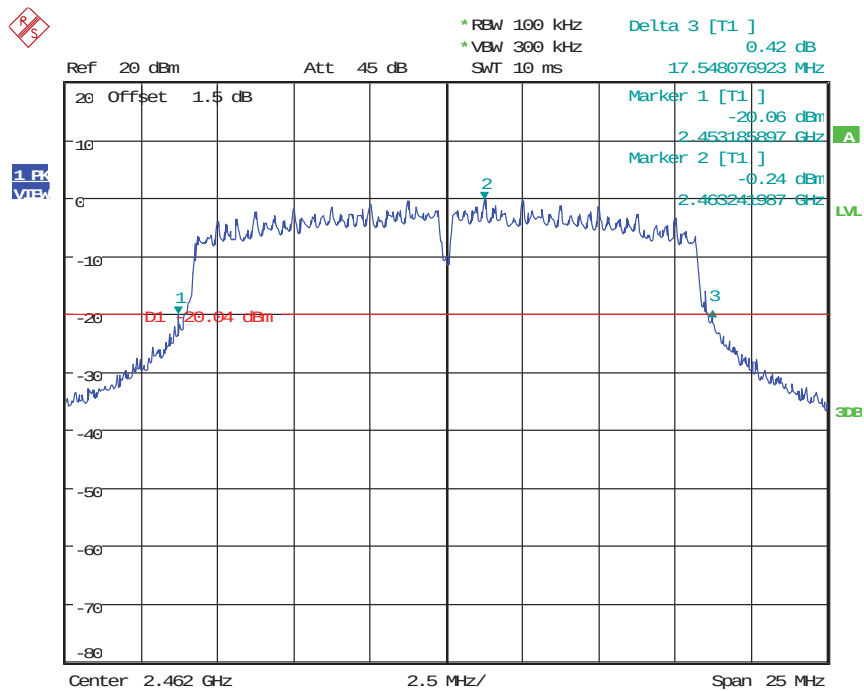
Date: 3.JAN.2017 18:34:18

Plot E2



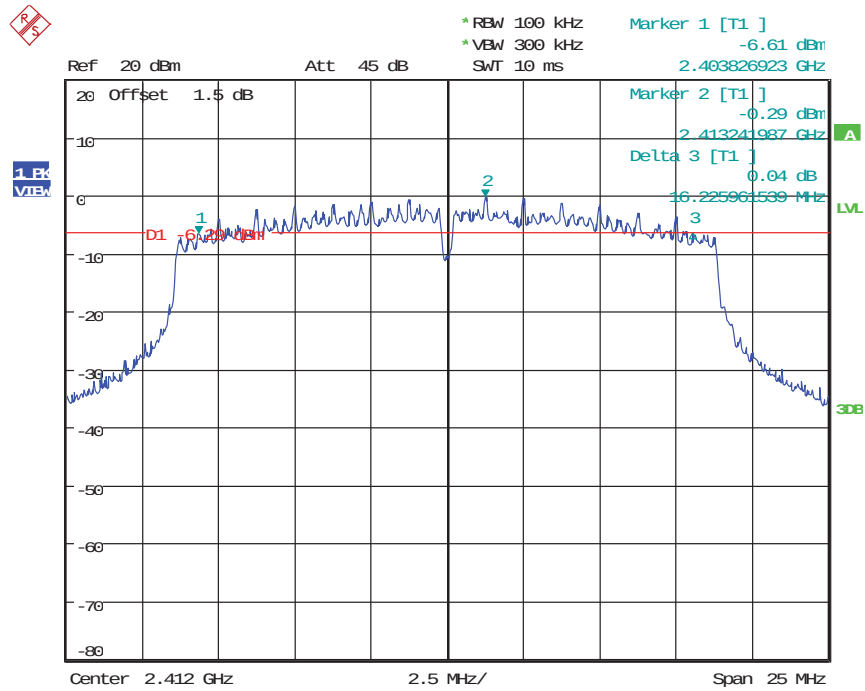
Date: 3.JAN.2017 18:39:19

Plot F1



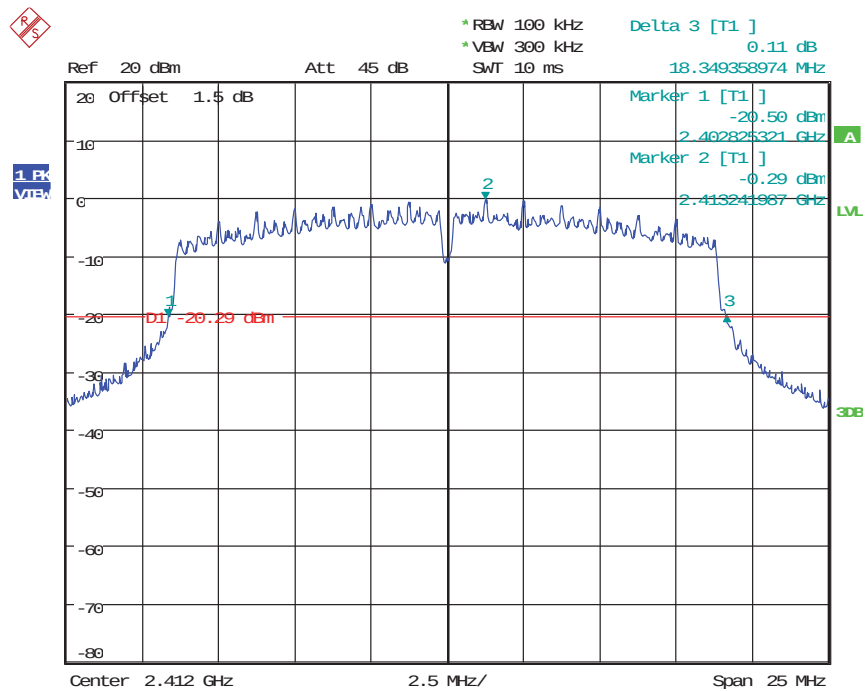
Date: 3.JAN.2017 18:40:07

Plot F2



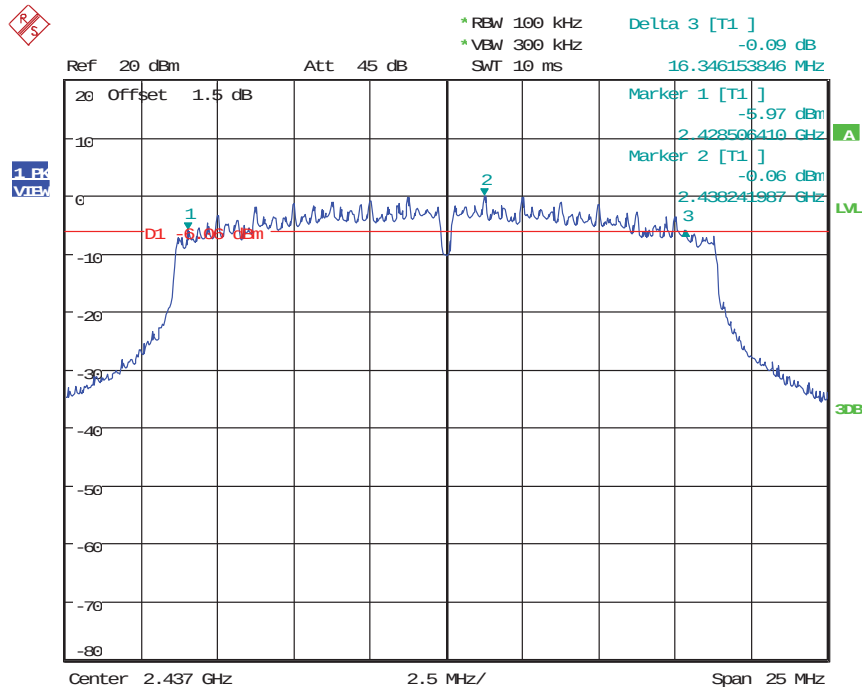
Date: 3.JAN.2017 18:28:32

Plot G1



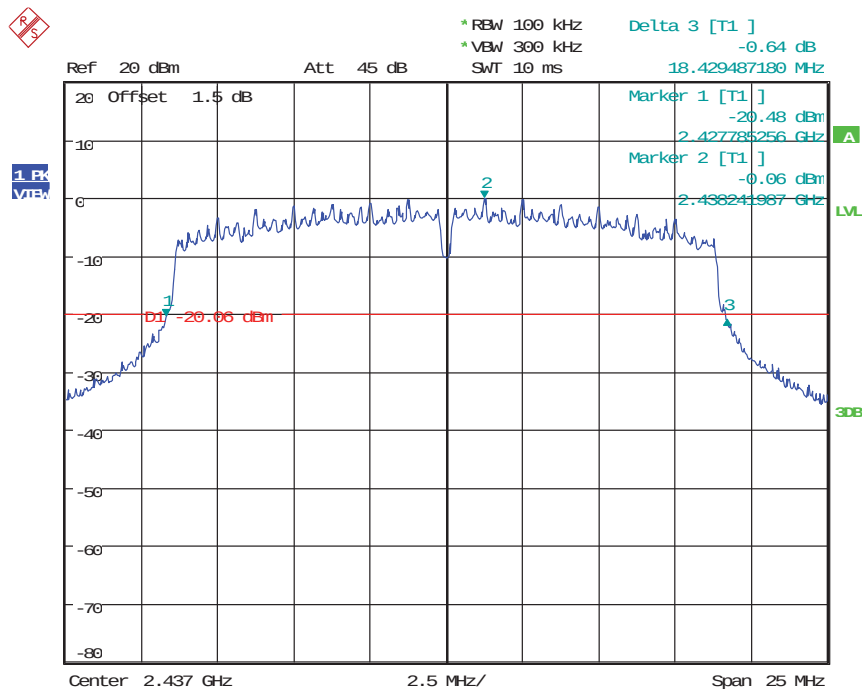
Date: 3.JAN.2017 18:28:57

Plot G2



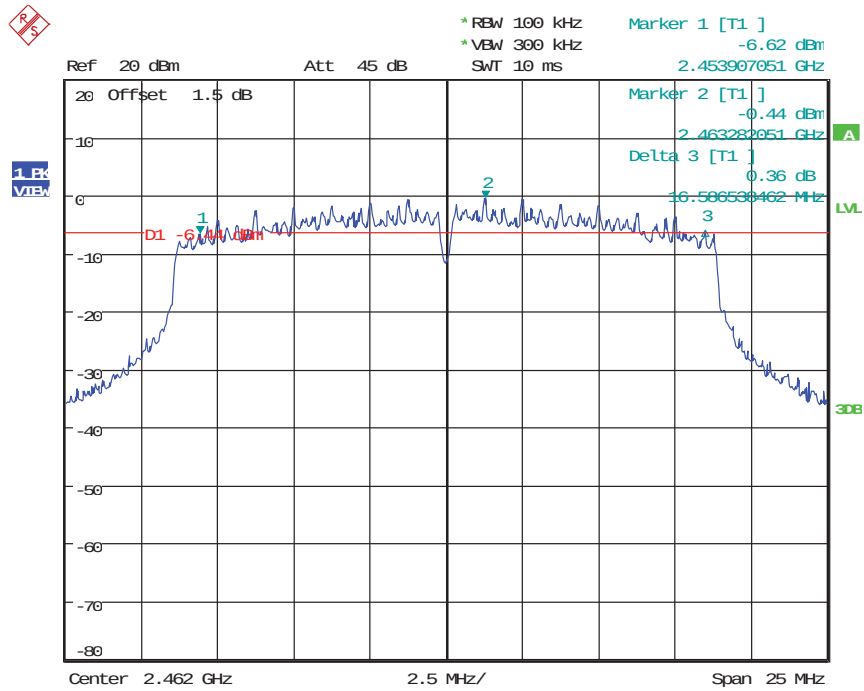
Date: 3.JAN.2017 18:35:24

Plot H1



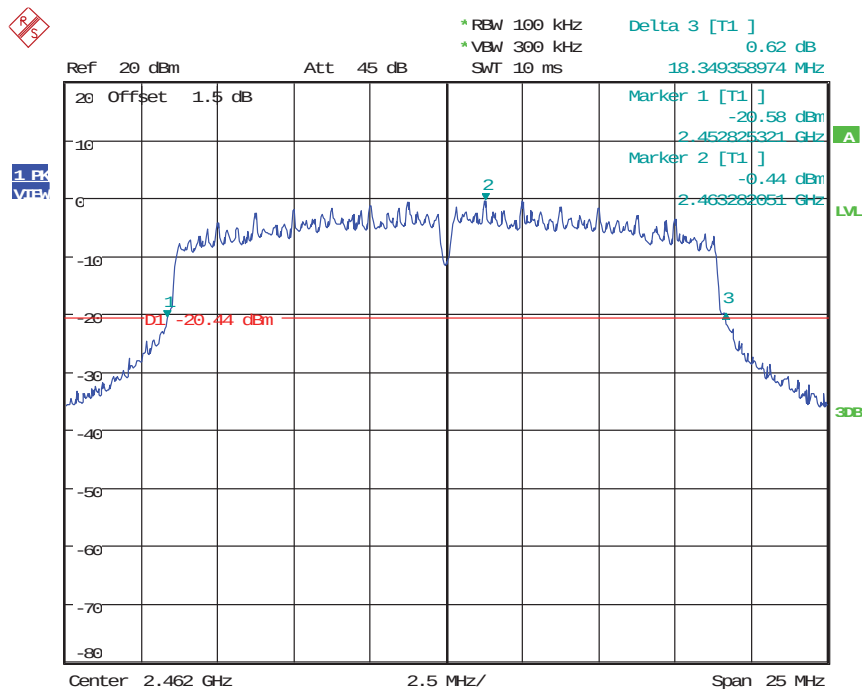
Date: 3.JAN.2017 18:35:51

Plot H2



Date: 3.JAN.2017 18:41:10

Plot I1



Date: 3.JAN.2017 18:41:41

Plot I2

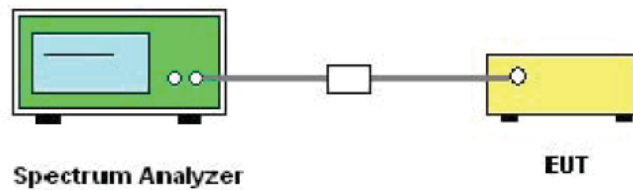


5.4 Conducted Spurious Emissions and Band Edge

5.4.1 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.

5.4.2 Test Description



5.4.3 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 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	-36.55	Plot A1/A2	7.62	-12.38	Pass
6	2437	-36.04	Plot B	7.76	-12.24	Pass
11	2462	-36.62	Plot C1/C2	8.21	-11.79	Pass

802.11g Test mode

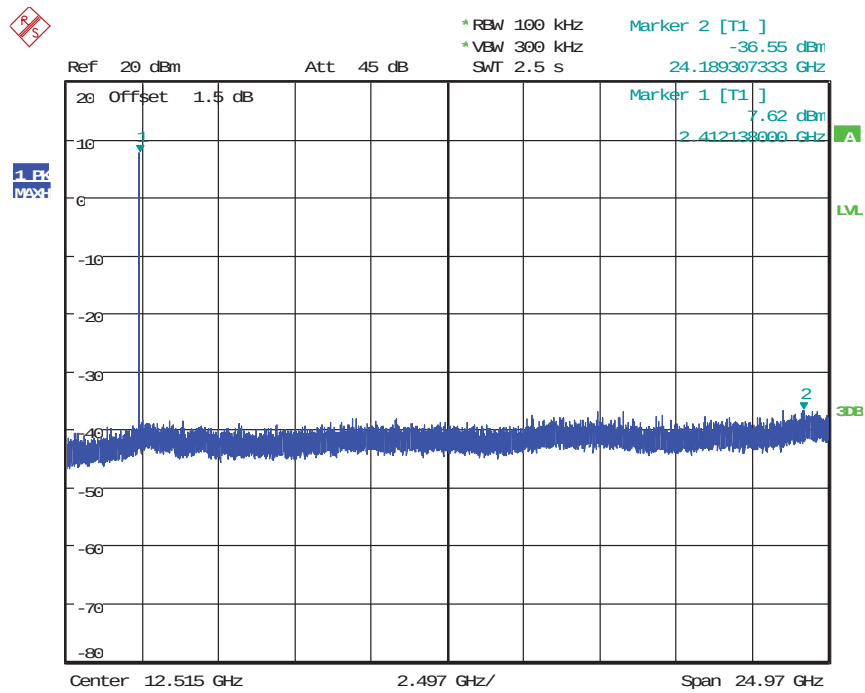
Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-36.98	Plot D1/D2	-1.53	-21.53	Pass
6	2437	-36.01	Plot E	-1.40	-21.40	Pass
11	2462	-36.53	Plot F1/F2	-2.62	-22.62	Pass



802.11n (20MHz) Test mode

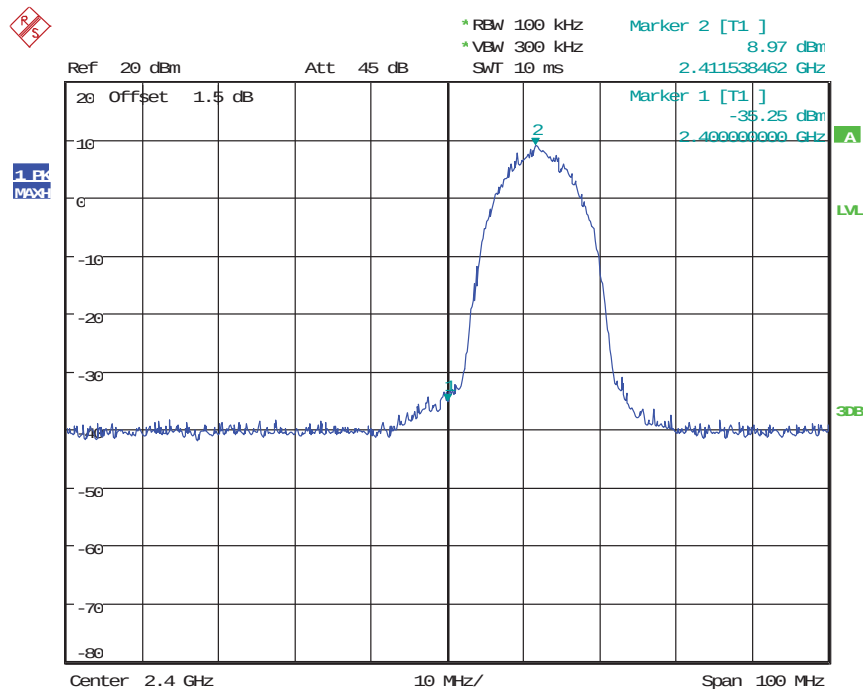
Channel	Frequency (MHz)	Measured max out of band emission(dBm)	Refer to plot	Limit(dBm)		Result
				Carrier level	Calculated 20dBc limit	
1	2412	-36.28	Plot G1/G2	-1.05	-21.05	Pass
6	2437	-36.51	Plot H	-1.41	-21.41	Pass
11	2462	-36.64	Plot I1/I2	-0.52	-20.52	Pass

B. Test Plot:



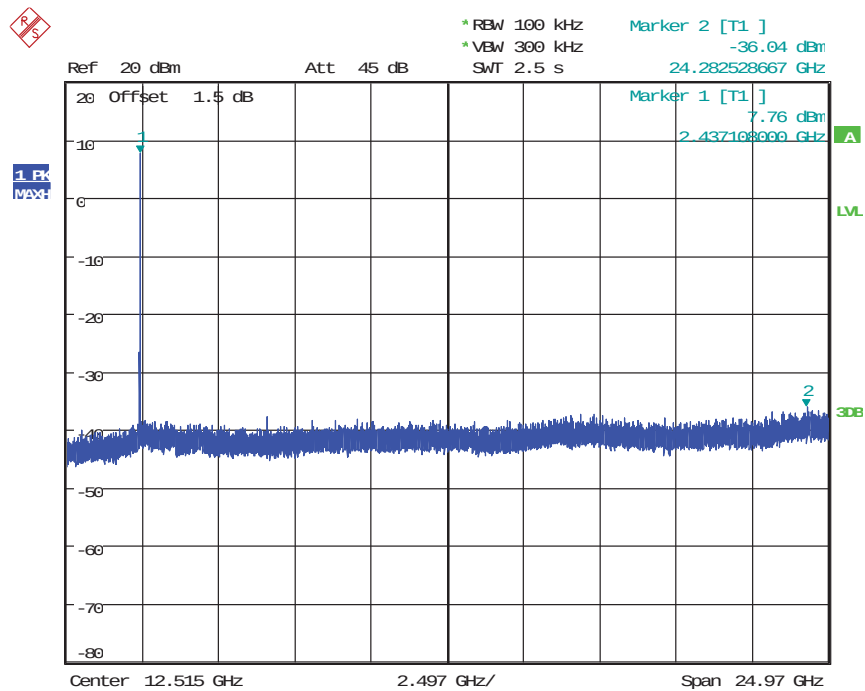
Date: 3.JAN.2017 18:49:12

Plot A1 802.11b Channel 1 30MHz~25GHz



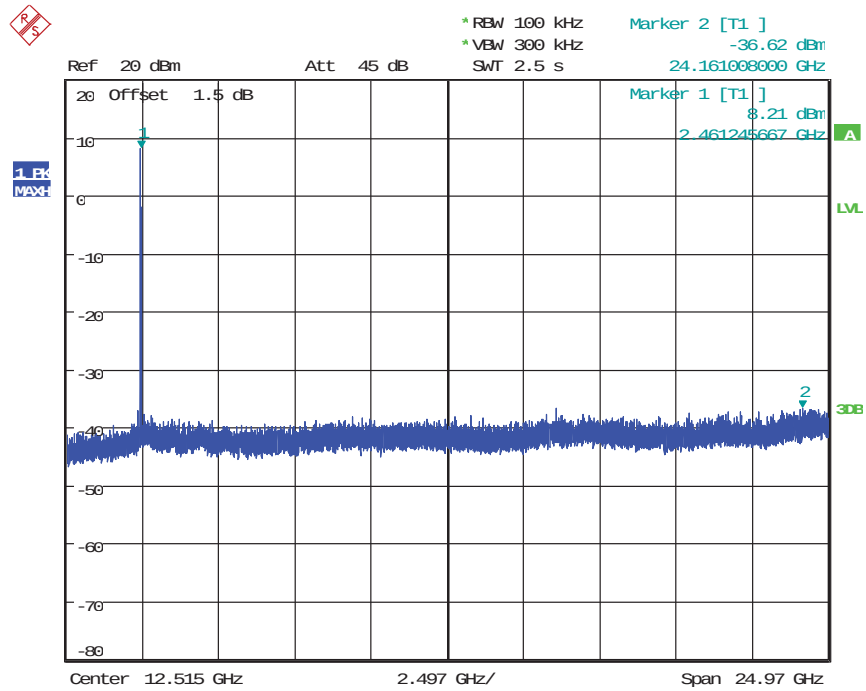
Date: 3.JAN.2017 18:57:33

Plot A2 802.11b Channel 1 Band Edge



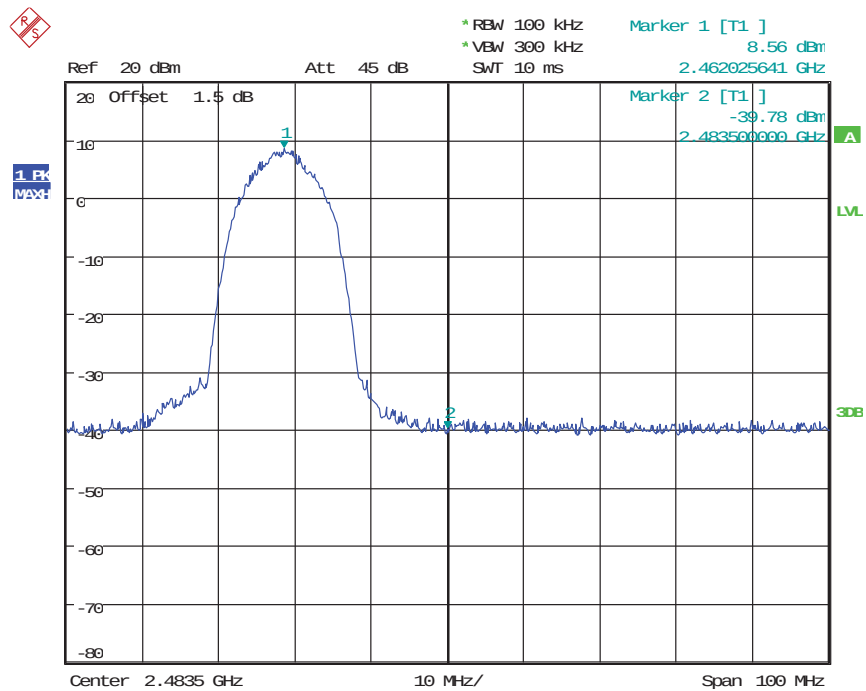
Date: 3.JAN.2017 18:51:32

Plot B 802.11b Channel 6 30MHz~25GHz



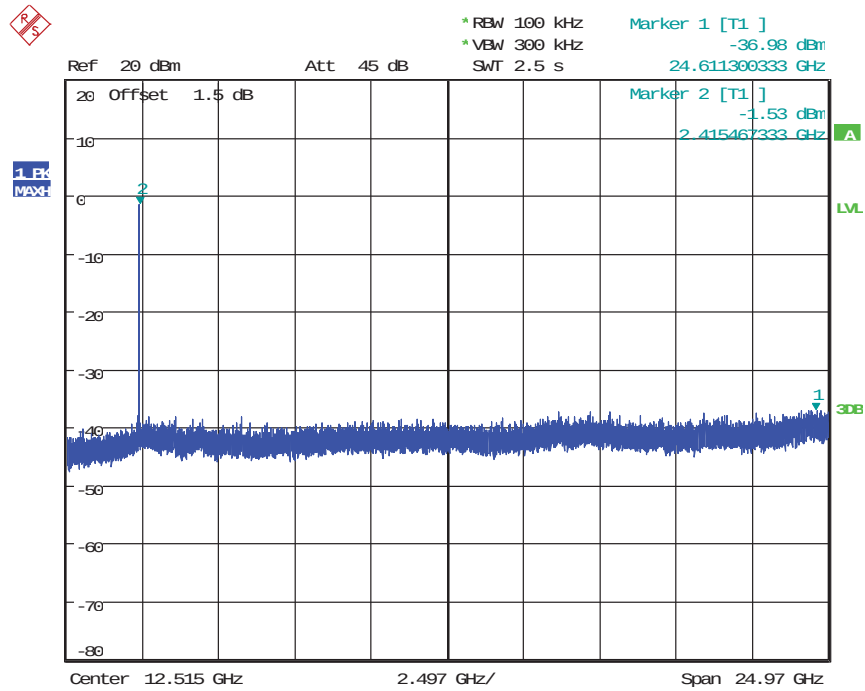
Date: 3.JAN.2017 18:54:08

Plot C1 802.11b Channel 11 30MHz~25GHz



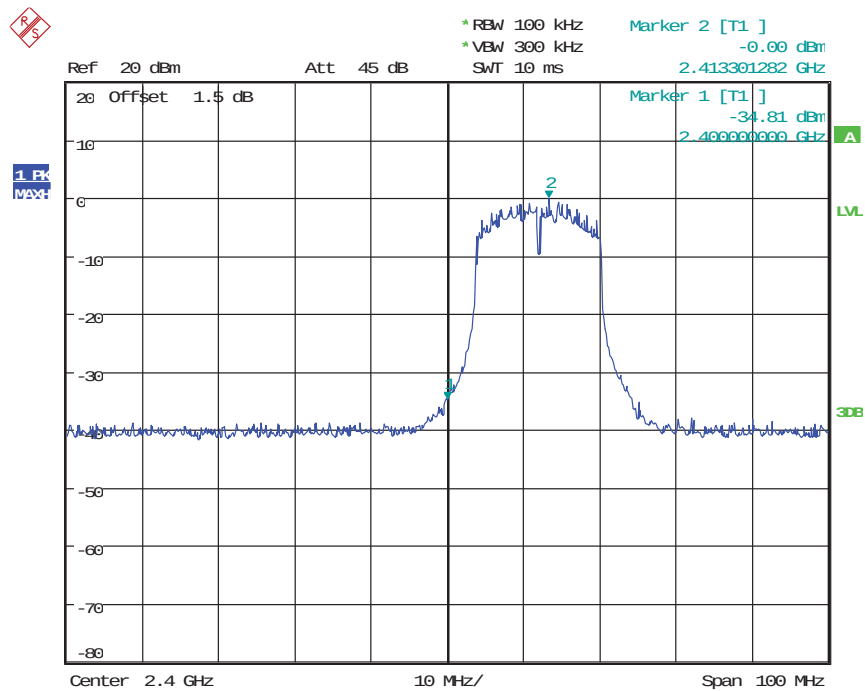
Date: 3.JAN.2017 18:59:46

Plot C2 802.11b Channel 11 Band Edge



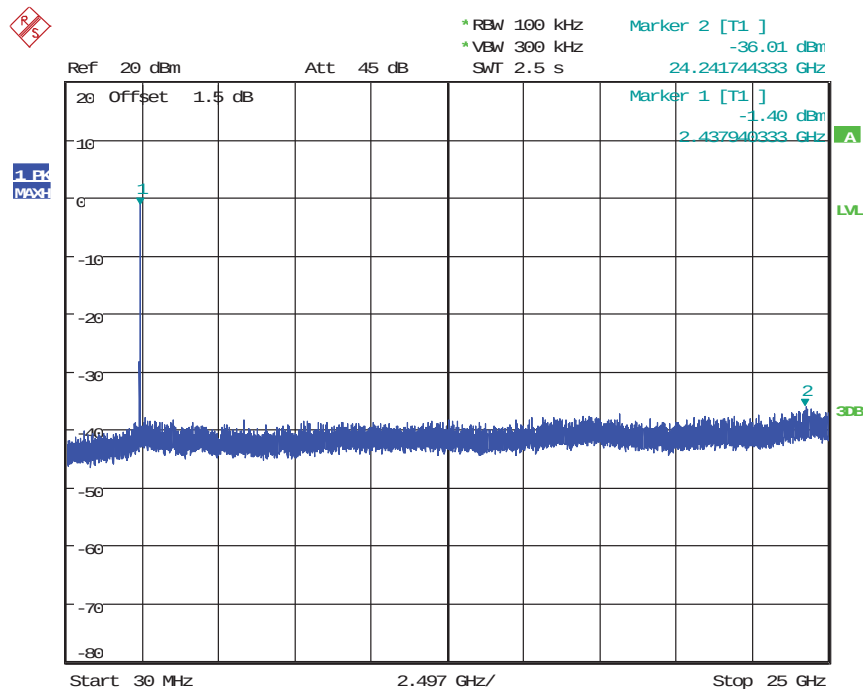
Date: 3.JAN.2017 18:50:05

Plot D1 802.11g Channel 1 30MHz~25GHz



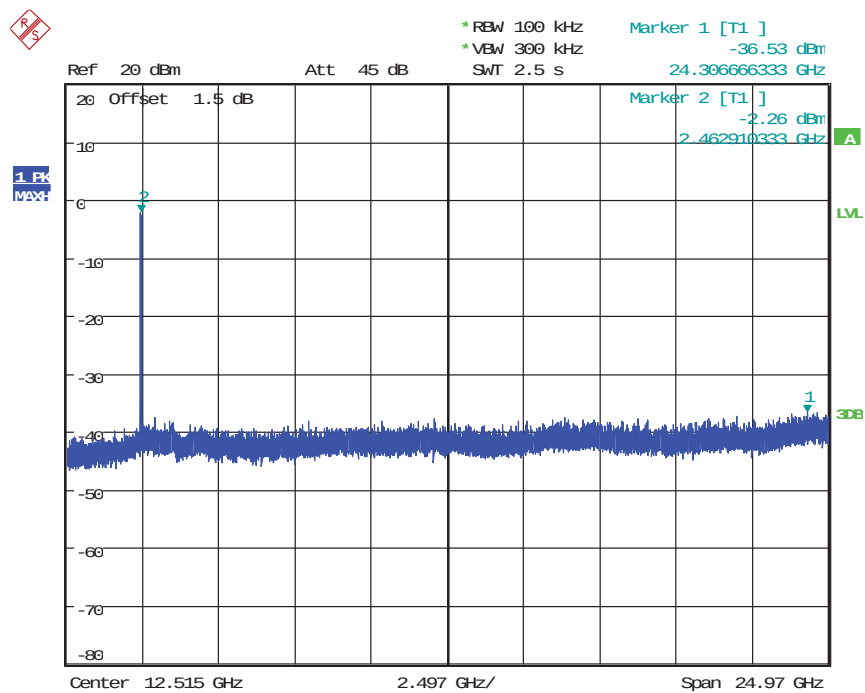
Date: 3.JAN.2017 18:58:37

Plot D2 802.11g Channel 1 Band Edge



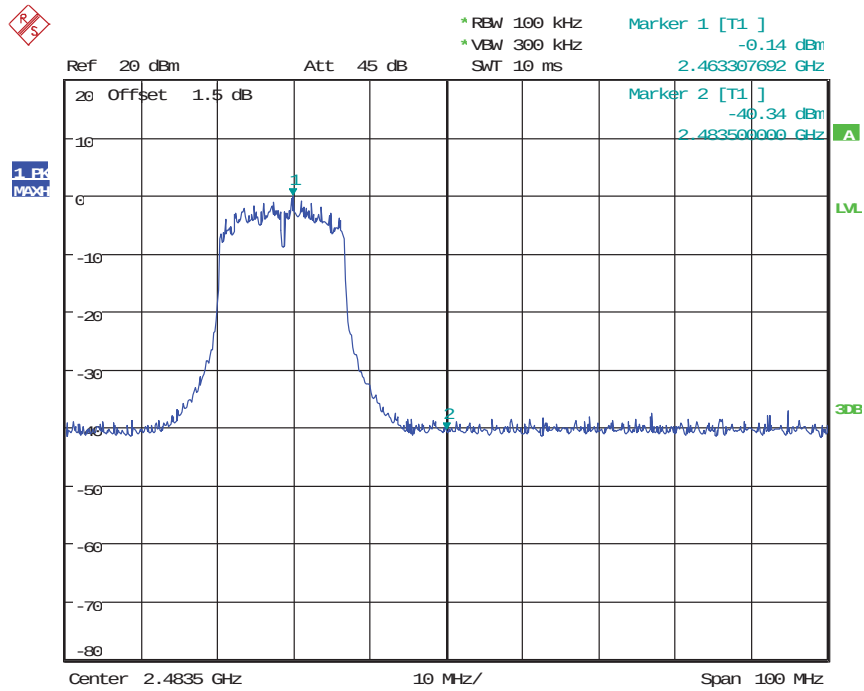
Date: 3.JAN.2017 18:52:18

Plot E 802.11g Channel 6 30MHz~25GHz



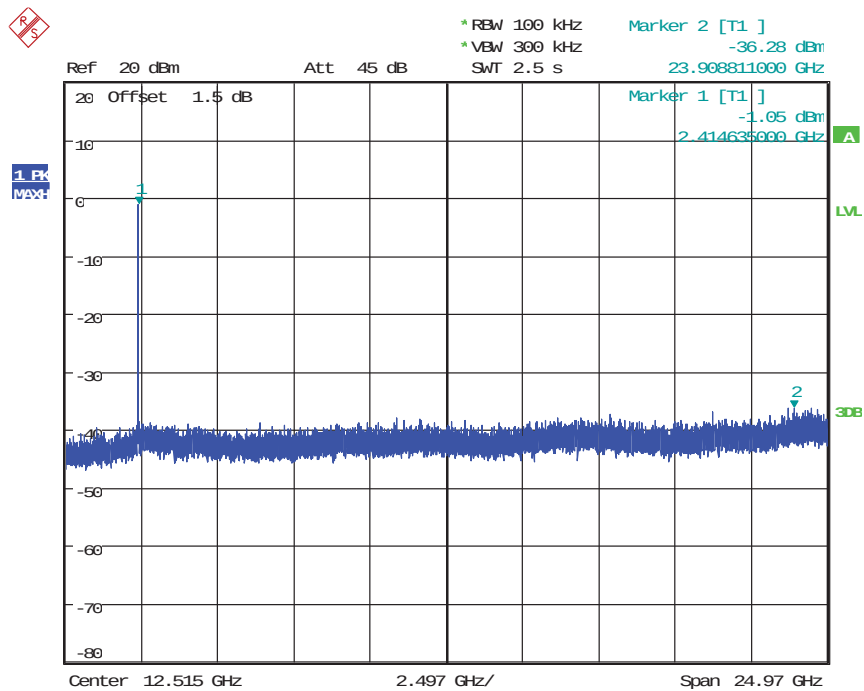
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Plot F1 802.11g Channel 11 30MHz~25GHz



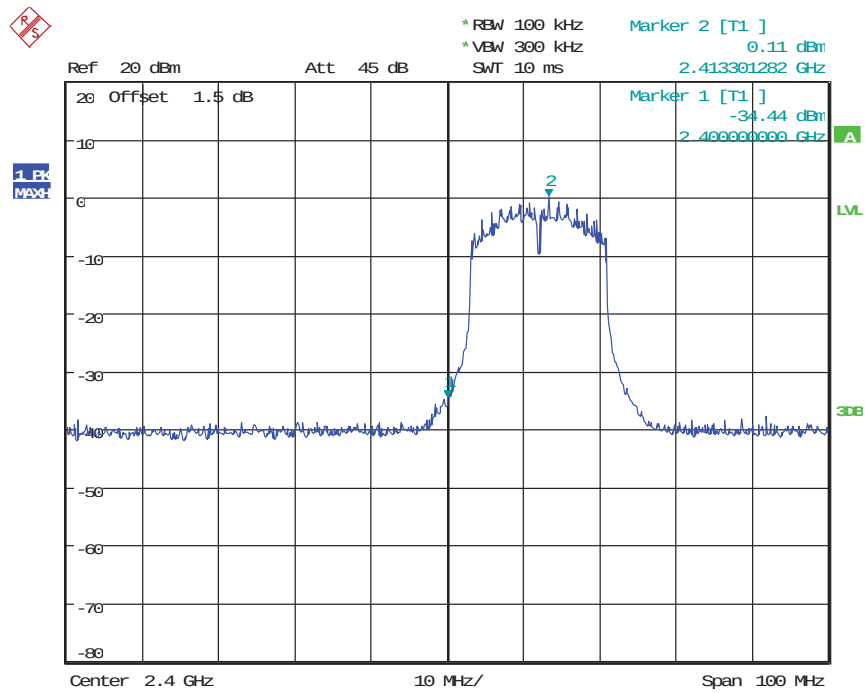
Date: 3.JAN.2017 19:00:12

Plot F2 802.11g Channel 11 Band Edge



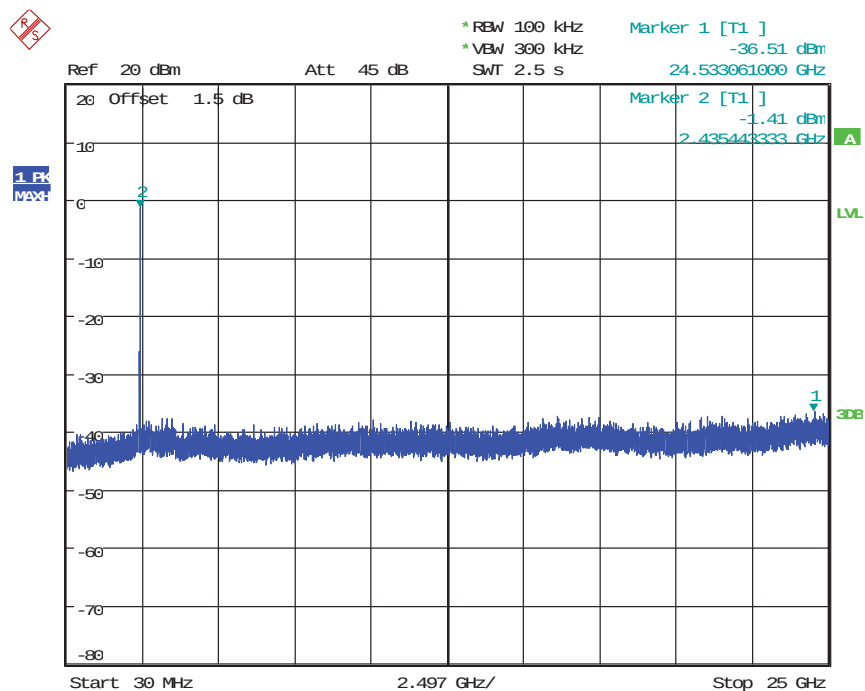
Date: 3.JAN.2017 18:50:43

Plot G1 802.11n-20 Channel 1 30MHz~25GHz



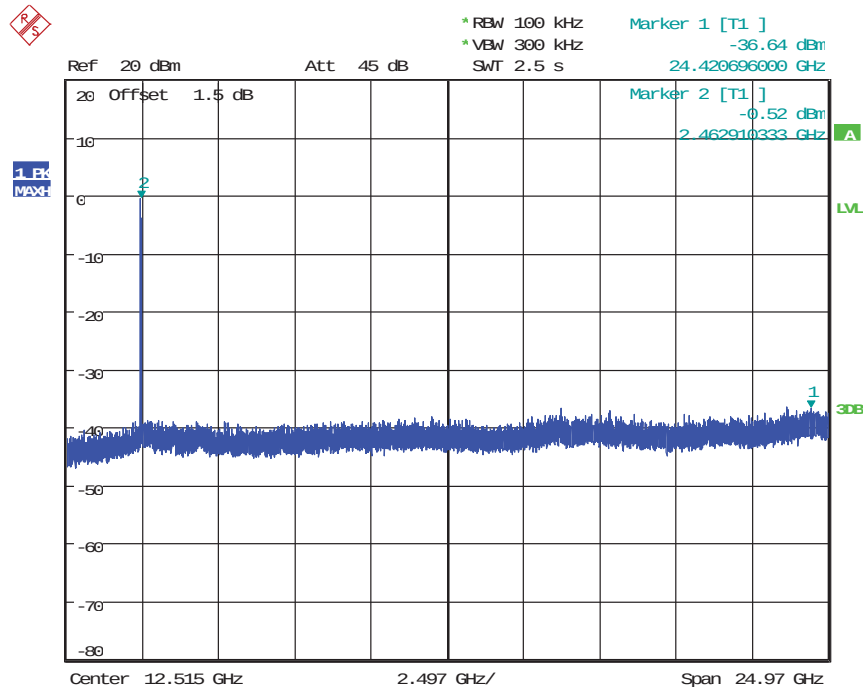
Date: 3.JAN.2017 18:59:11

Plot G2 802.11n-20 Channel 1 Band Edge



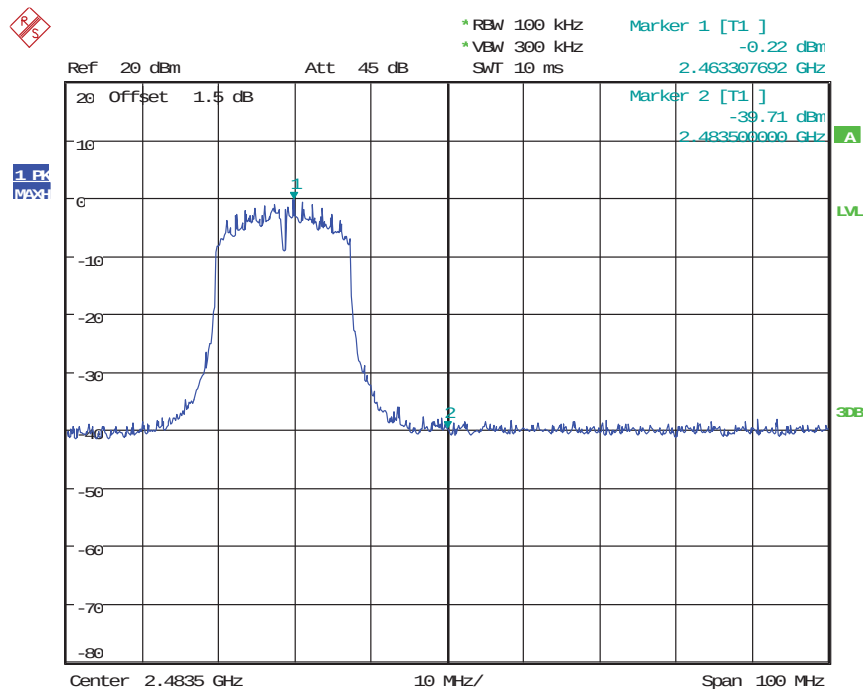
Date: 3.JAN.2017 18:53:13

Plot H 802.11n-20 Channel 6 30MHz~25GHz



Date: 3.JAN.2017 18:56:03

Plot I1 802.11n-20 Channel 11 30MHz~25GHz



Date: 3.JAN.2017 19:00:39

Plot I2 802.11n-20 Channel 11 Band Edge

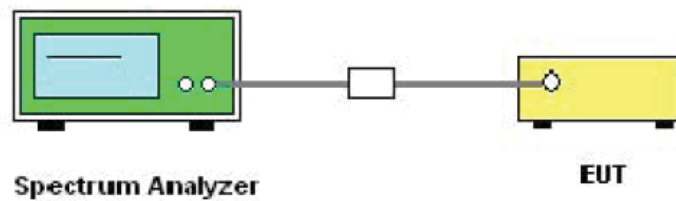


5.5 Power Spectral Density (PSD)

5.5.1 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

5.5.2 Test Description



5.5.3 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	-5.88	Plot A	8	Pass
6	2437	-6.06	Plot B	8	Pass
11	2462	-6.08	Plot C	8	Pass

802.11g Test mode

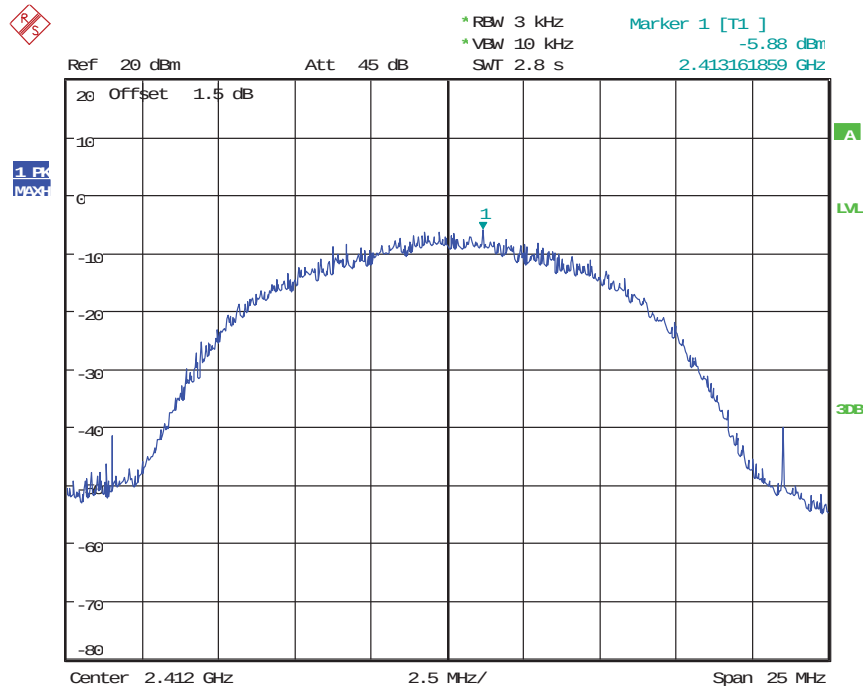
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-14.38	Plot D	8	Pass
6	2437	-14.87	Plot E	8	Pass
11	2462	-13.71	Plot F	8	Pass

802.11n (20MHz) Test mode

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to plot	Limit (dBm/3kHz)	Result
1	2412	-14.84	Plot G	8	Pass
6	2437	-13.63	Plot H	8	Pass
11	2462	-14.53	Plot I	8	Pass

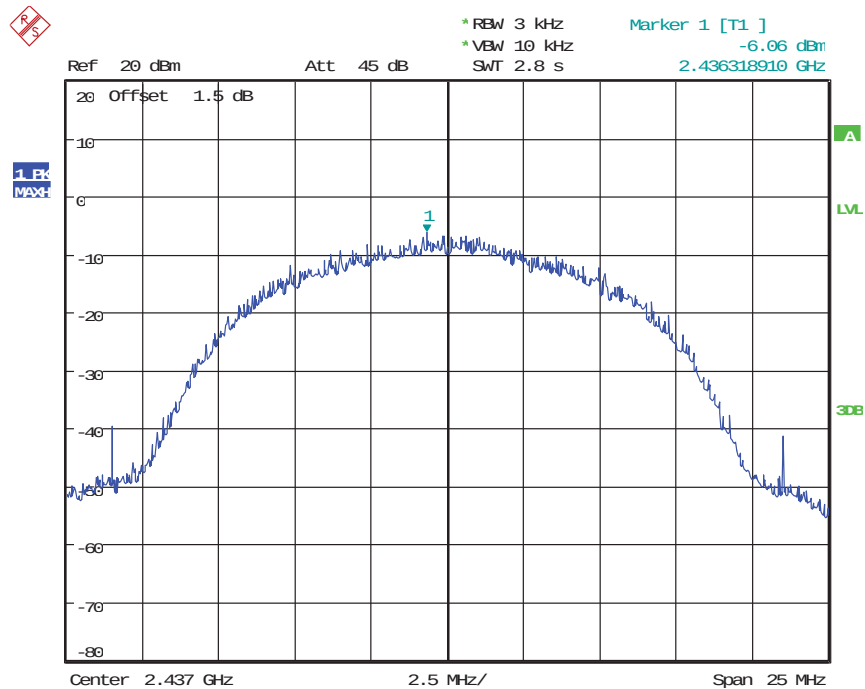


B. Test Plot



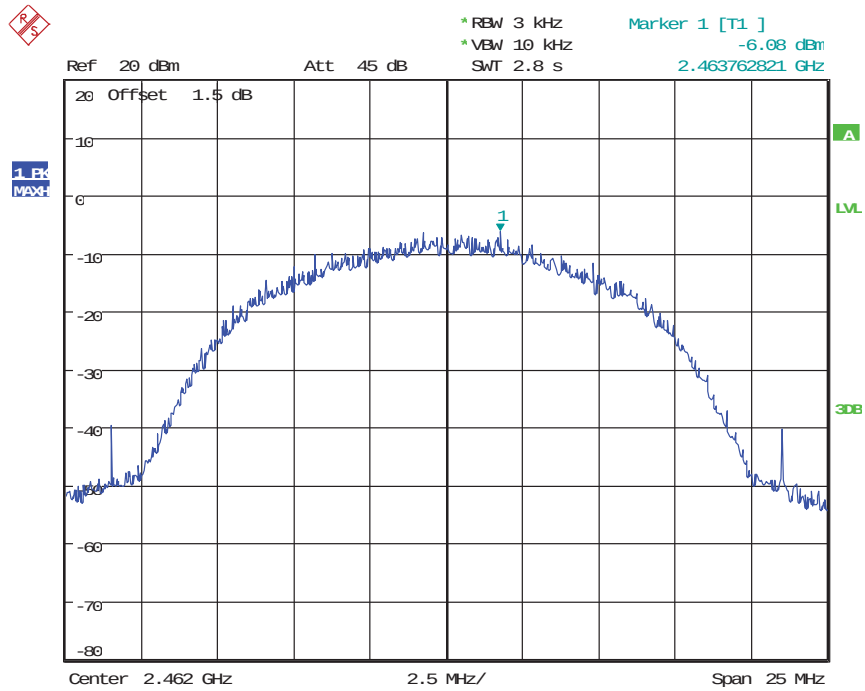
Date: 3.JAN.2017 19:02:12

Plot A



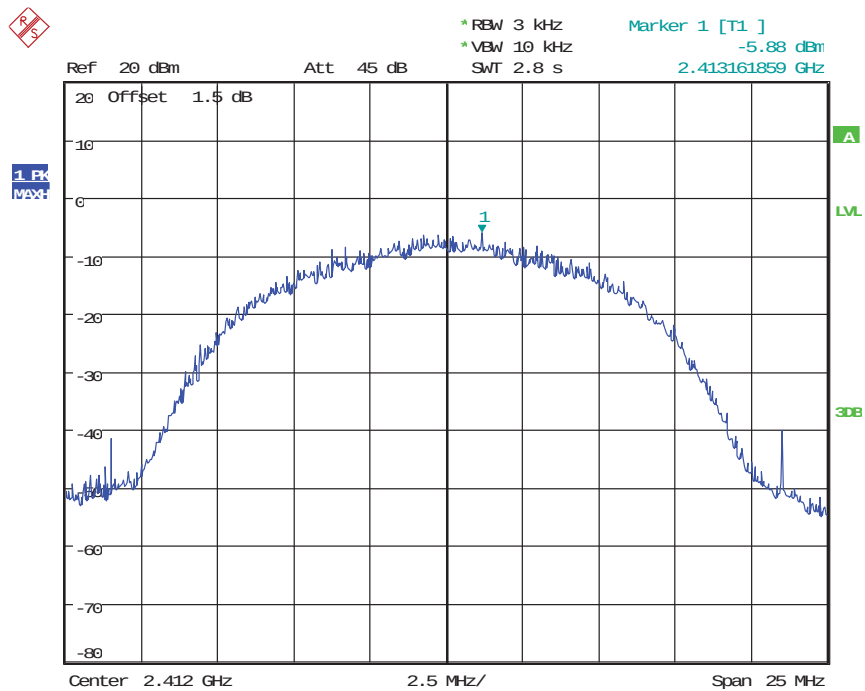
Date: 3.JAN.2017 19:04:02

Plot B



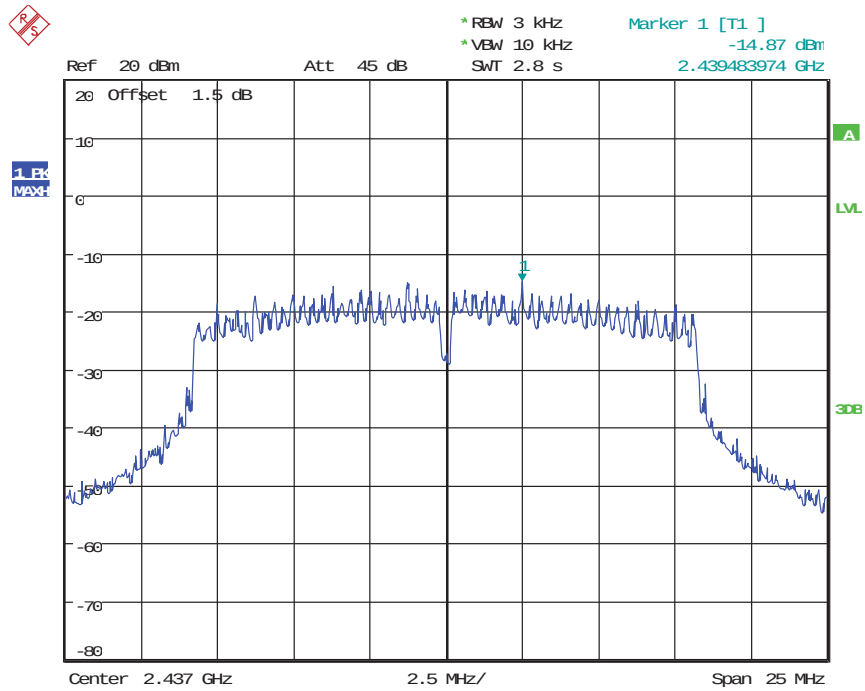
Date: 3.JAN.2017 19:05:37

Plot C



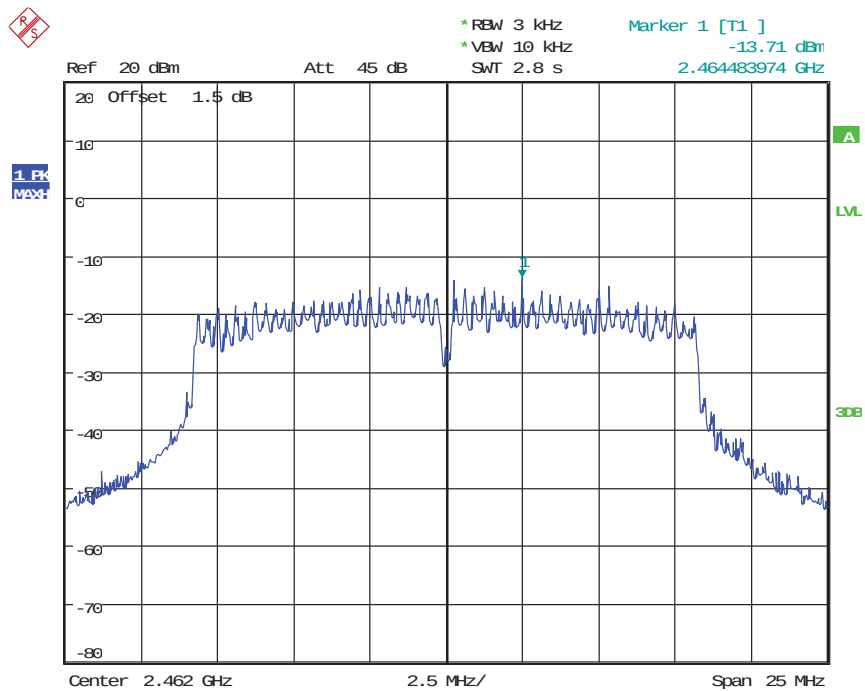
Date: 3.JAN.2017 19:02:12

Plot D



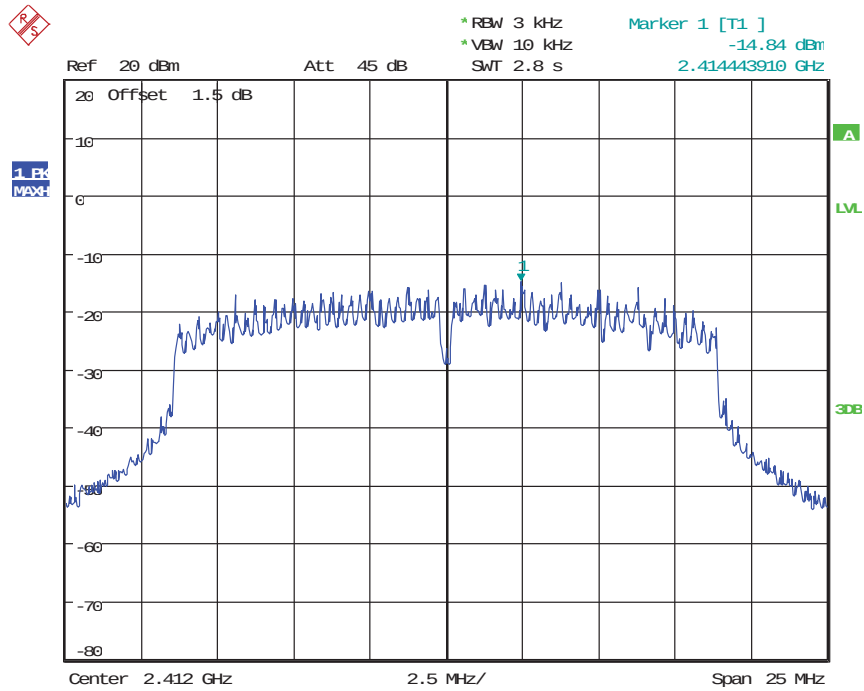
Date: 3.JAN.2017 19:04:31

Plot E



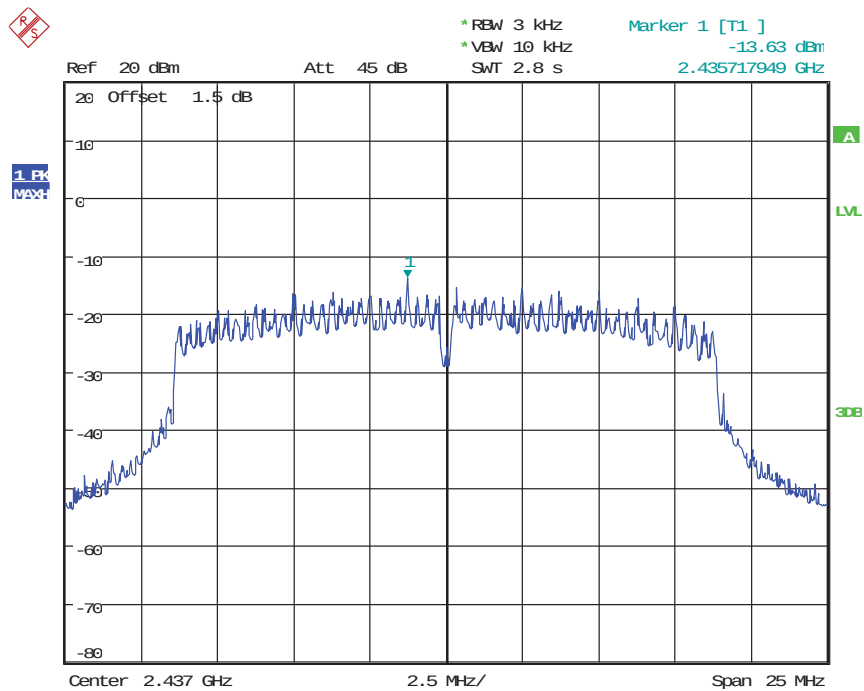
Date: 3.JAN.2017 19:06:04

Plot F



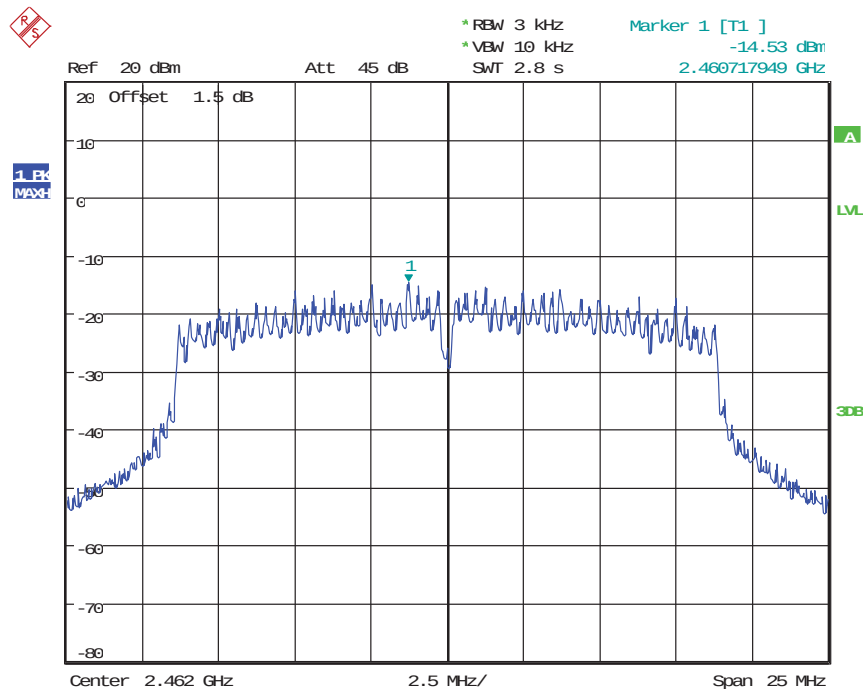
Date: 3.JAN.2017 19:03:24

Plot G



Date: 3.JAN.2017 19:05:00

Plot H



Date: 3.JAN.2017 19:06:34

Plot I

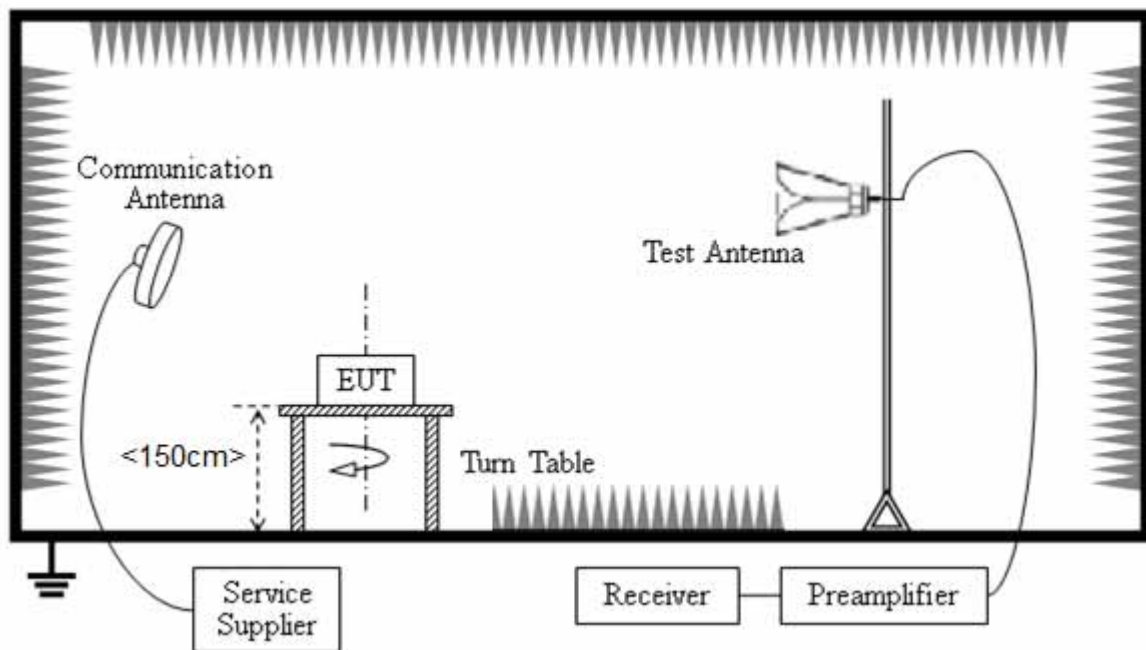


5.6 Restricted Frequency Bands

5.6.1 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).

5.6.2 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.

5.6.3 Test Result

The lowest and highest channels are tested to verify the Restricted Frequency Bands.

The measurement results are obtained as below:

$$E \text{ [dBV/m]} = UR + AT + A\text{Factor [dB]}; AT = LCable \text{ loss [dB]} - G\text{preamp [dB]}$$

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



External Antenna

802.11b Test mode

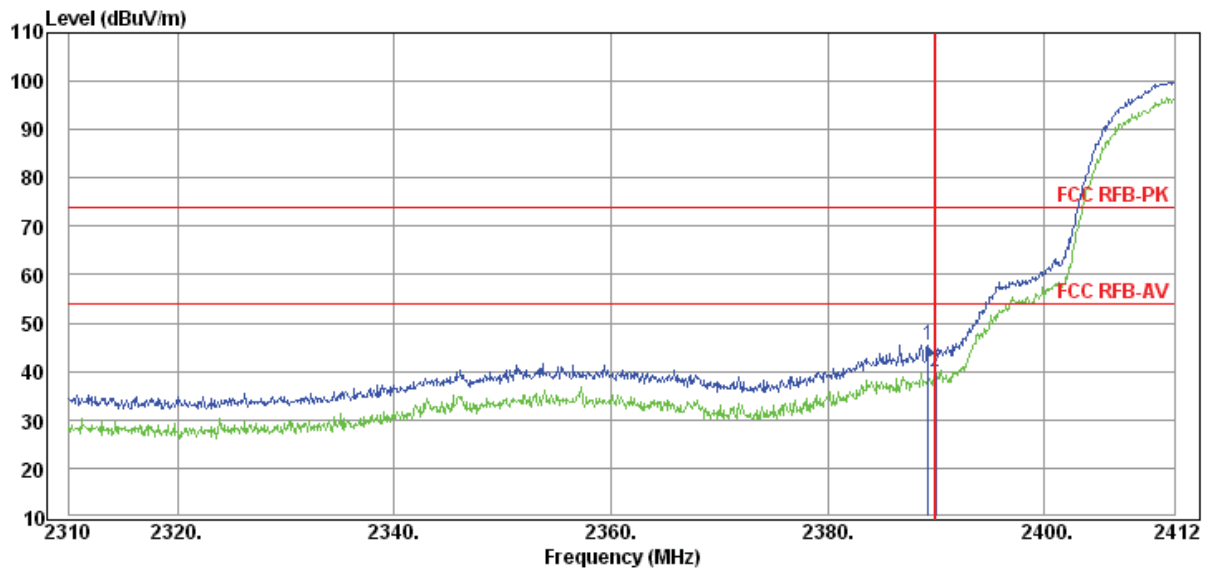
Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.25	PK	45.43	74	Plot A1	Pass
1	2389.97	AV	39.81	54		Pass
11	2483.89	PK	46.67	74	Plot B1	Pass
11	2483.74	AV	40.65	54		Pass

802.11g Test mode

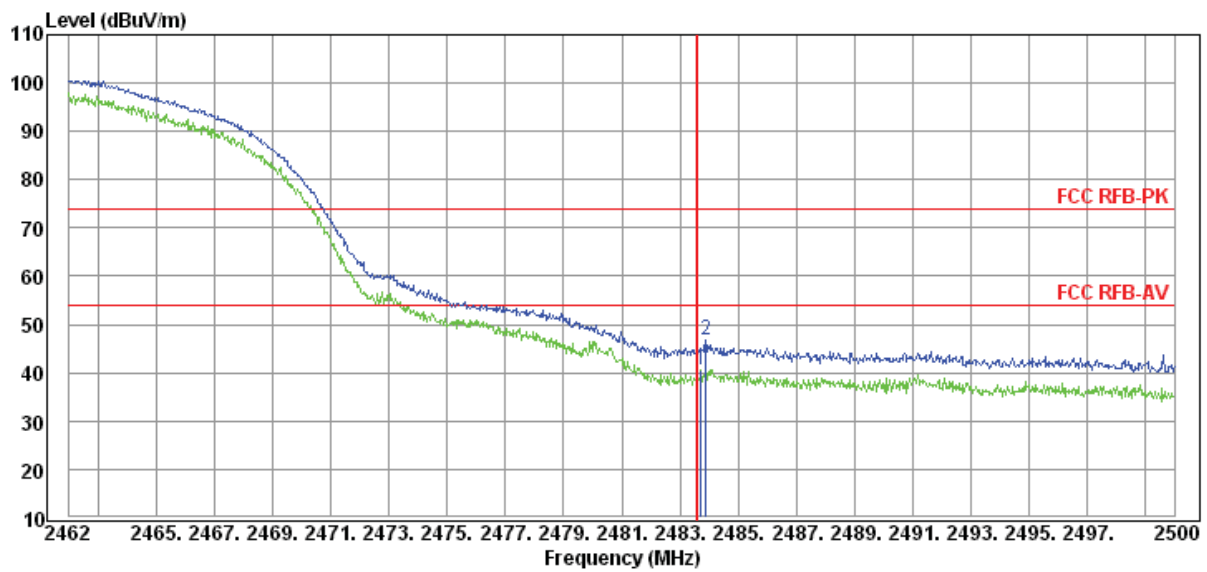
Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.76	PK	43.70	74	Plot C1	Pass
1	2389.97	AV	39.22	54		Pass
11	2483.62	PK	49.17	74	Plot D1	Pass
11	2483.66	AV	41.02	54		Pass

802.11n (20MHz) Test mode

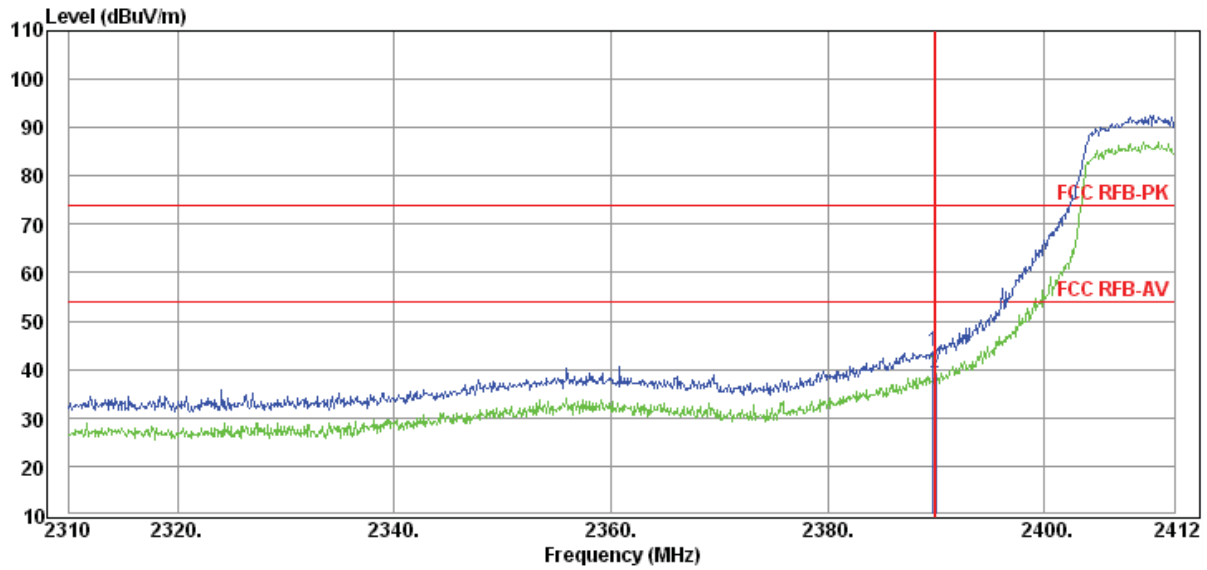
Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.87	PK	45.50	74	Plot E1	Pass
1	2389.46	AV	39.08	54		Pass
11	2483.66	PK	45.39	74	Plot F1	Pass
11	2484.80	AV	40.56	54		Pass



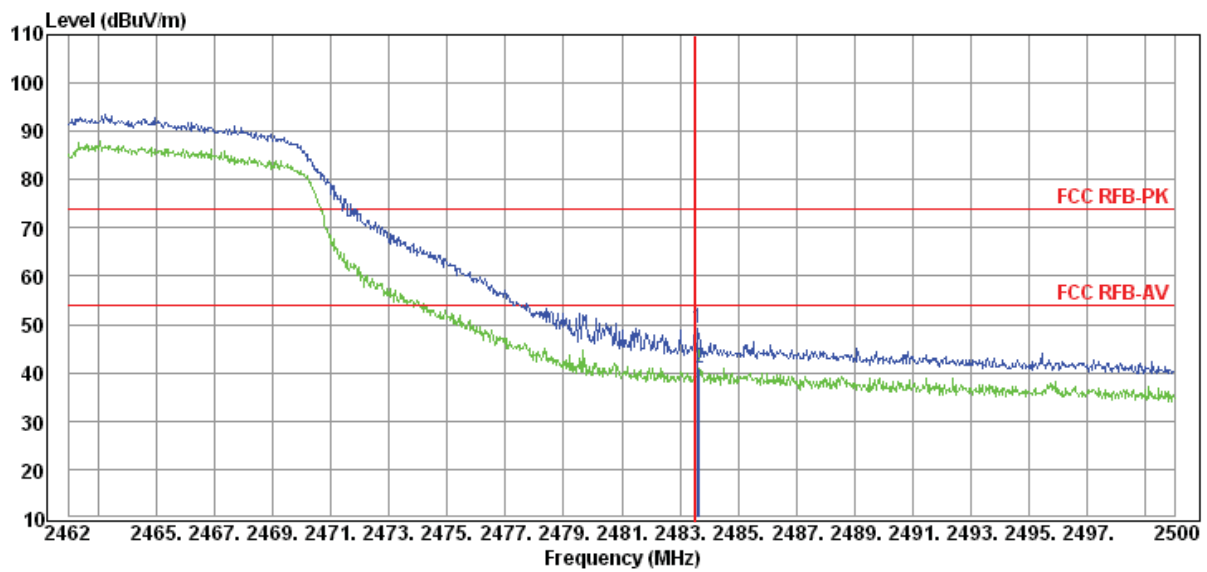
Plot A1



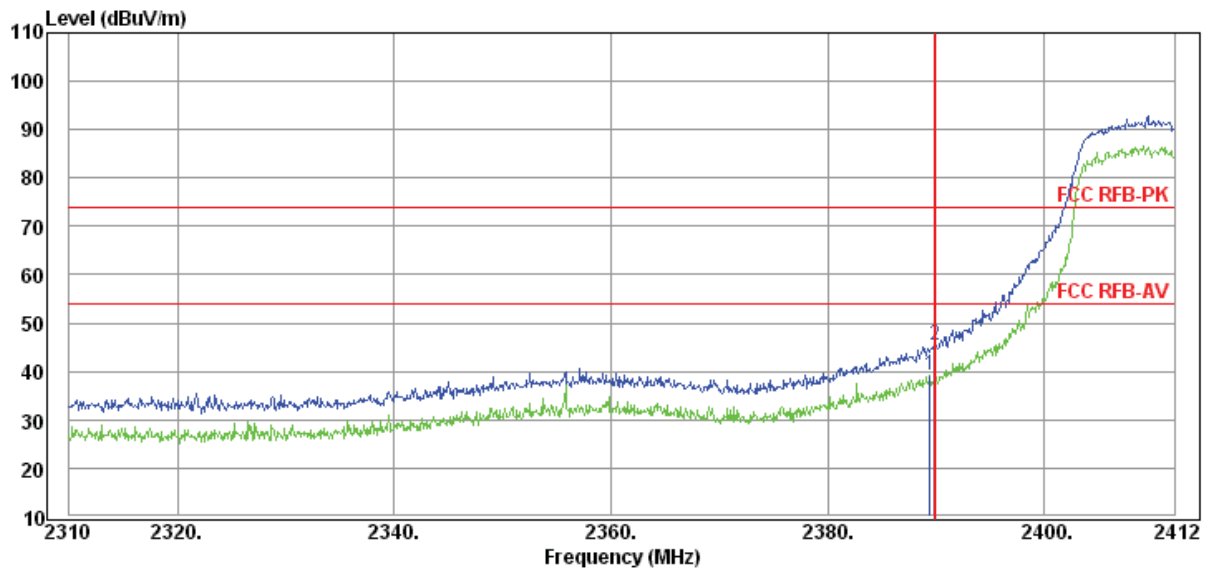
Plot B1



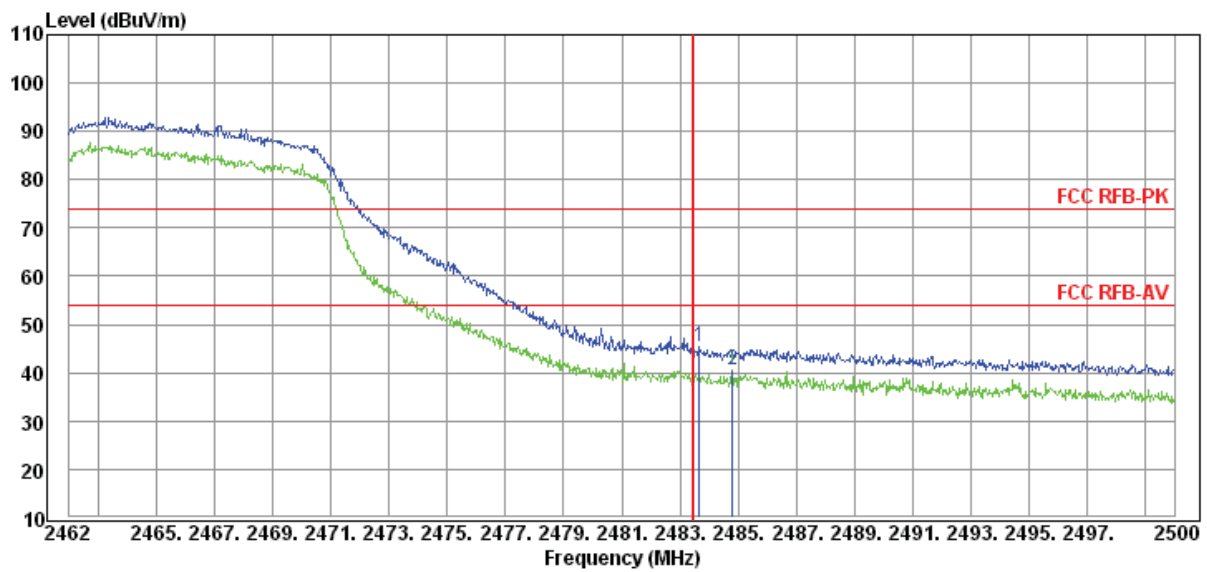
Plot C1



Plot D1



Plot E1



Plot F1



PCB Antenna

802.11b Test mode

Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.66	PK	39.81	74	Plot A2	Pass
1	2388.64	AV	35.76	54		Pass
11	2491.91	PK	43.39	74	Plot B2	Pass
11	2490.69	AV	38.32	54		Pass

802.11g Test mode

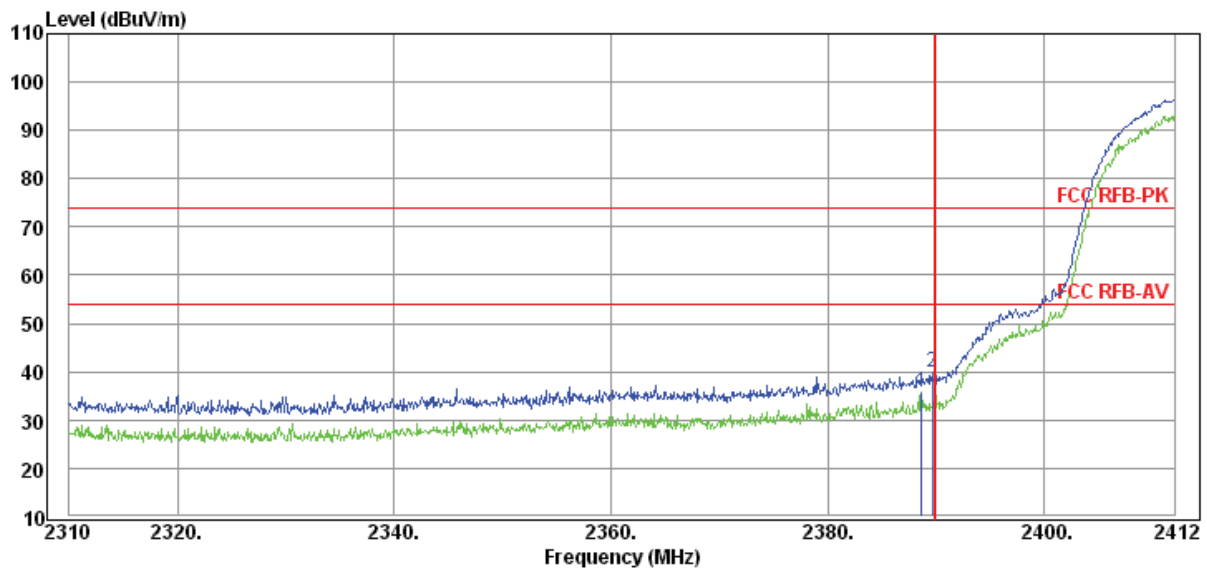
Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.46	PK	38.56	74	Plot C2	Pass
1	2389.46	AV	34.01	54		Pass
11	2484.27	PK	41.76	74	Plot D2	Pass
11	2499.13	AV	36.64	54		Pass

802.11n (20MHz) Test mode

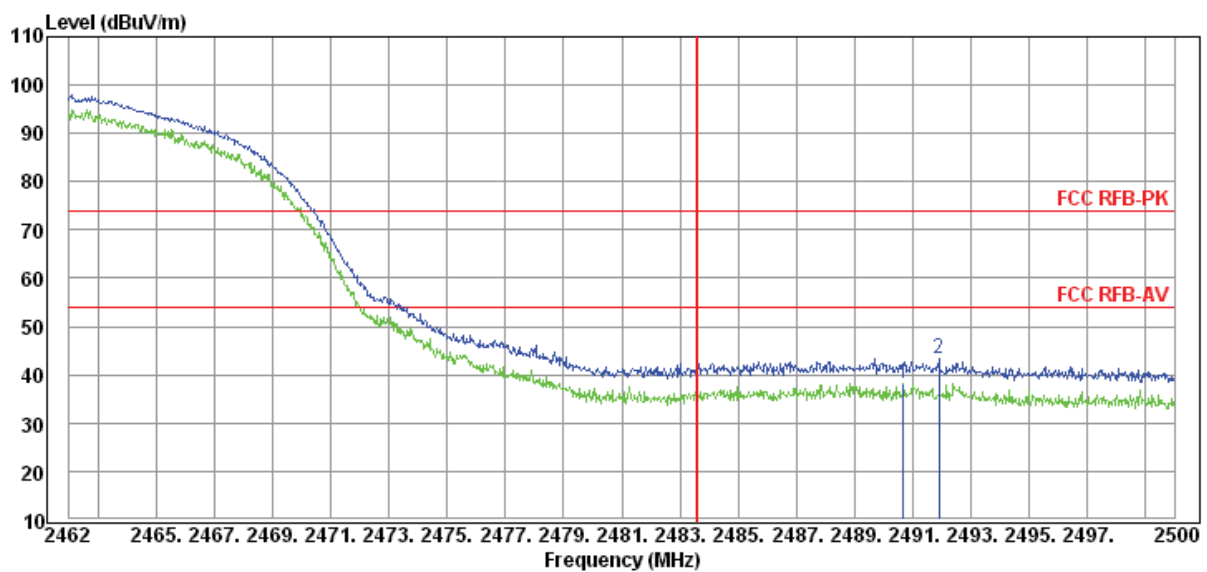
Ch	Frequency (MHz)	Detector PK/AV	Max. Emission (dBuV/m)	Limit (dBuV/m)	Plot	Result
1	2389.87	PK	39.71	74	Plot E2	Pass
1	2389.46	AV	34.85	54		Pass
11	2488.22	PK	42.75	74	Plot F2	Pass
11	2489.44	AV	36.48	54		Pass



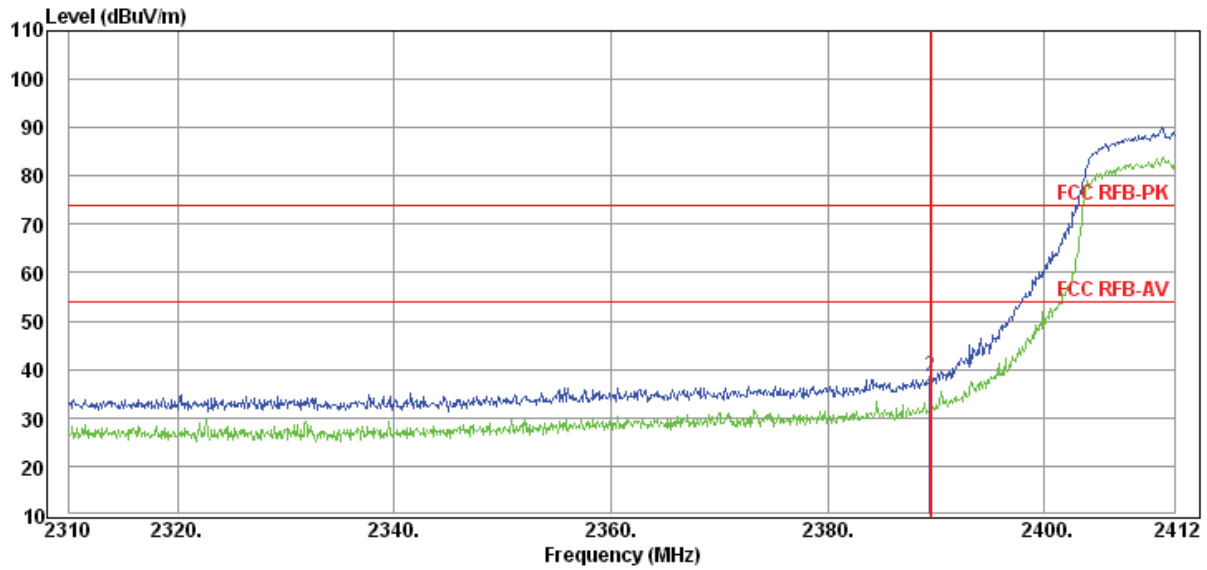
A. Test Plot



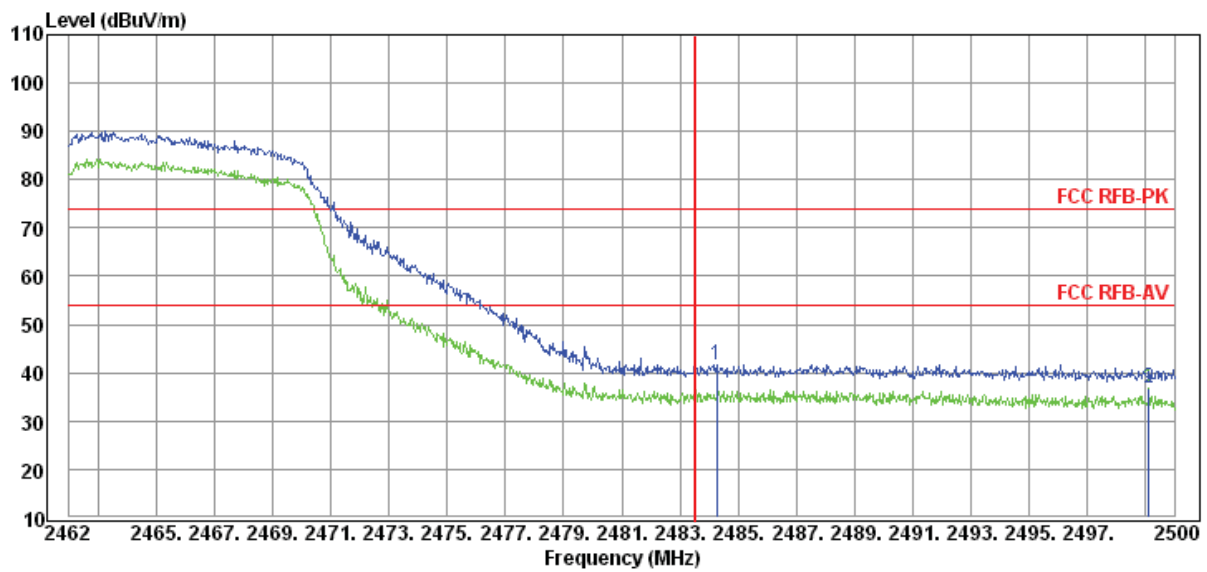
Plot A



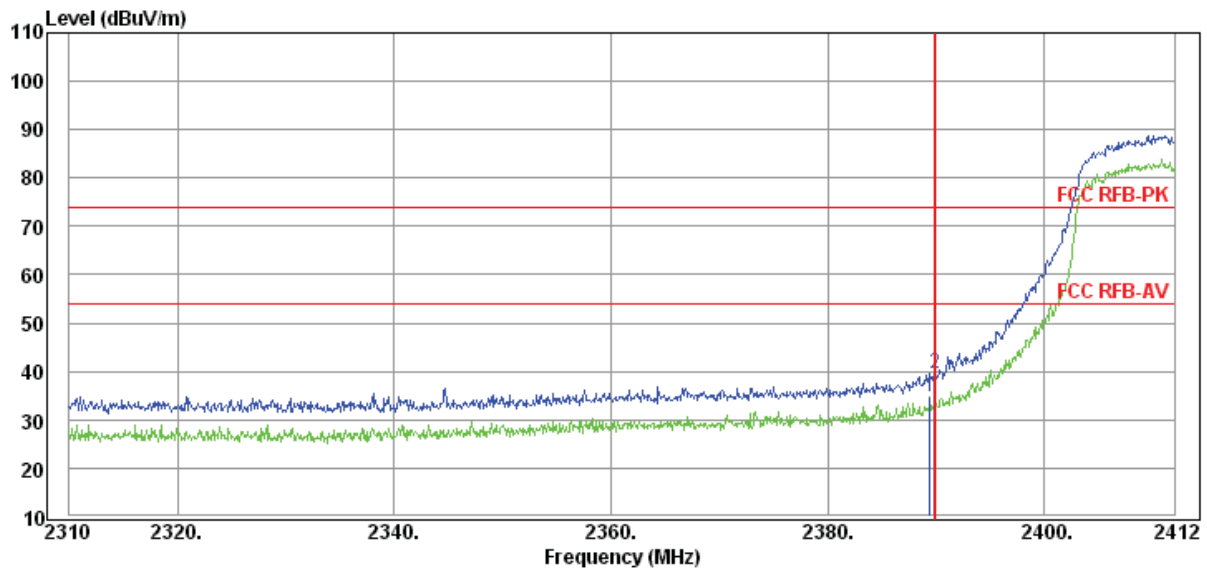
Plot B



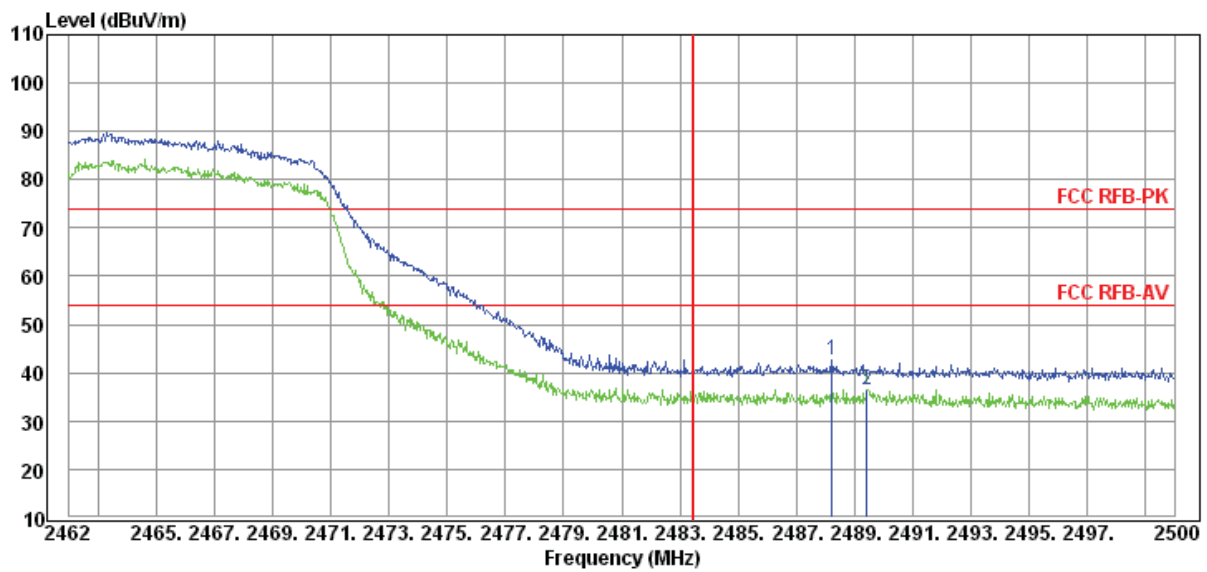
Plot C



Plot D



Plot E



Plot F



5.7 Conducted Emission

5.7.1 Requirement

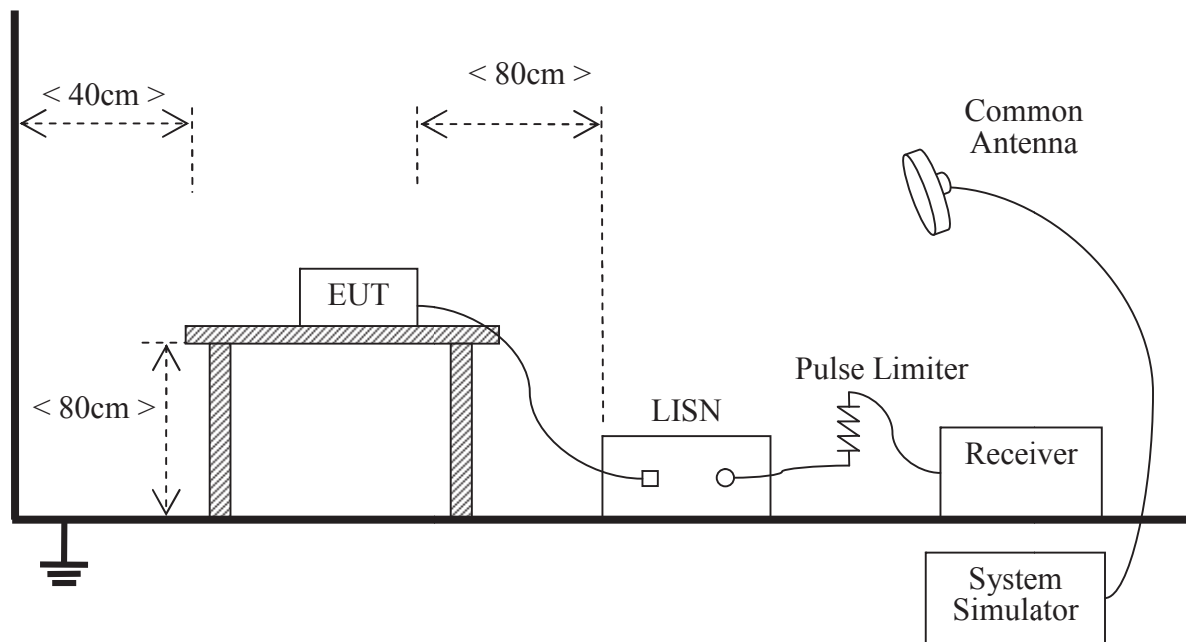
According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following 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.

5.7.2 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 5V. The set-up and test methods were according to ANSI C63.10:2013

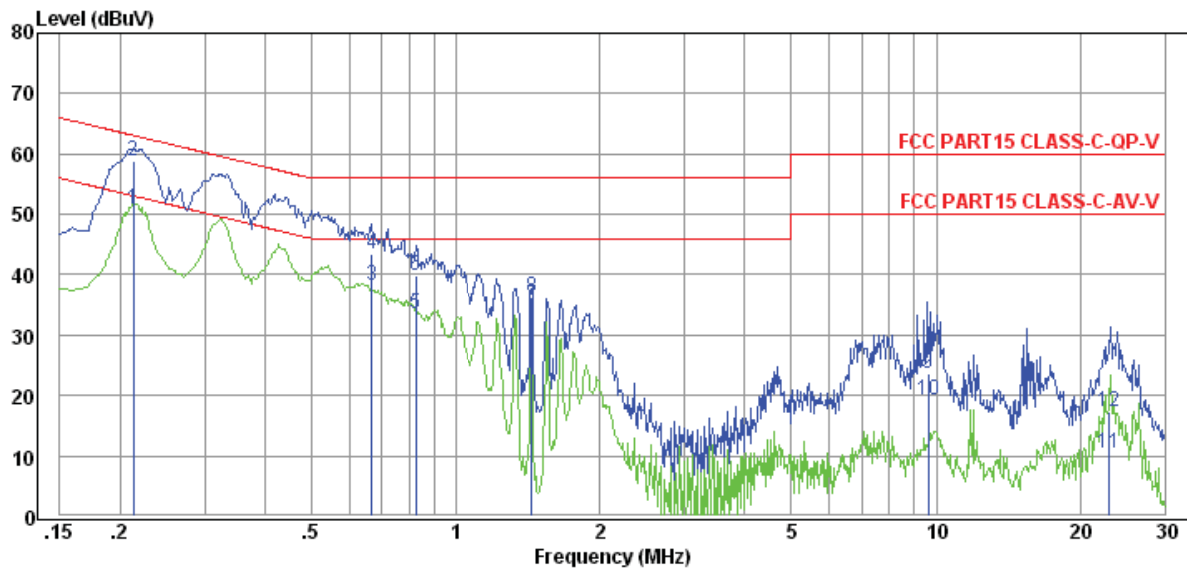


5.7.3 Test result

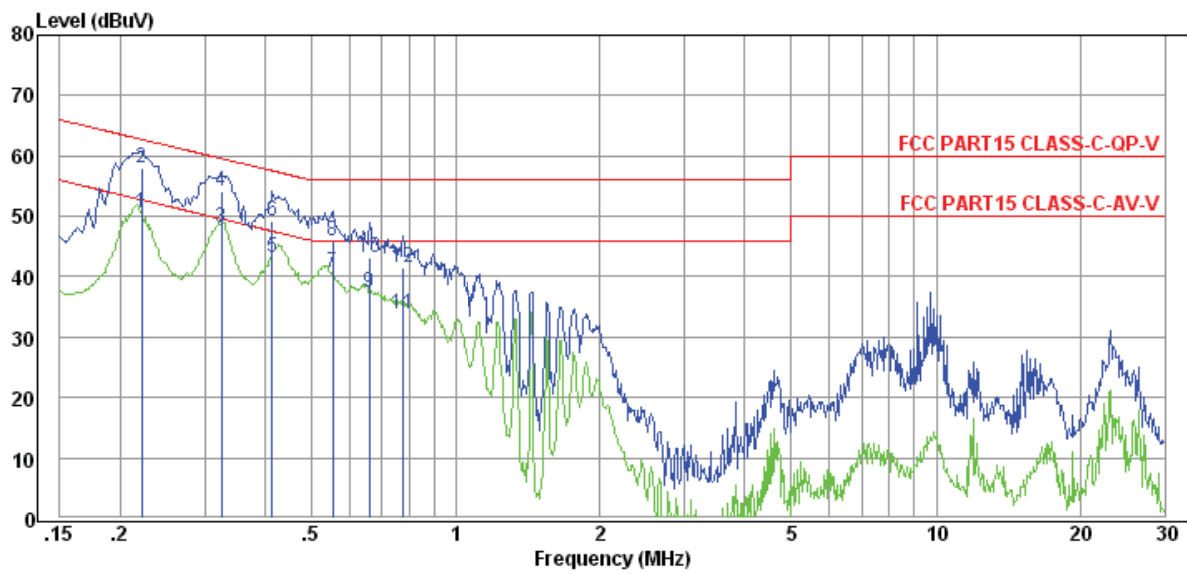
Test Verdict Recorded for Suspicious Points:

EMW3239-E

Frequency (MHz)	Result (dBuV)	Limit Line (dBuV)	Margin (dB)	Phase line	Detector
0.21	50.84	53.06	2.22	L	Average
0.21	58.92	63.06	4.14	L	QP
0.67	38.29	46.00	7.71	L	Average
0.67	43.35	56.00	12.65	L	QP
0.82	33.58	46.00	12.42	L	Average
0.82	39.73	56.00	16.27	L	QP
1.44	34.91	46.00	11.09	L	Average
1.44	36.32	56.00	19.68	L	QP
9.64	23.57	50.00	26.43	L	Average
9.64	19.29	60.00	40.71	L	QP
23.04	10.39	50.00	39.61	L	Average
23.04	17.22	60.00	42.78	L	QP
0.22	50.63	52.74	2.11	N	Average
0.22	57.99	62.74	4.75	N	QP
0.33	48.22	49.57	1.35	N	Average
0.33	54.08	59.57	5.49	N	QP
0.41	43.26	47.55	4.29	N	Average
0.41	49.20	57.55	8.35	N	QP
0.56	40.66	46.00	5.34	N	Average
0.56	45.89	56.00	10.11	N	QP
0.66	37.46	46.00	8.54	N	Average
0.66	43.21	56.00	12.79	N	QP
0.78	33.86	46.00	12.14	N	Average
0.78	41.60	56.00	14.40	N	QP



L Line

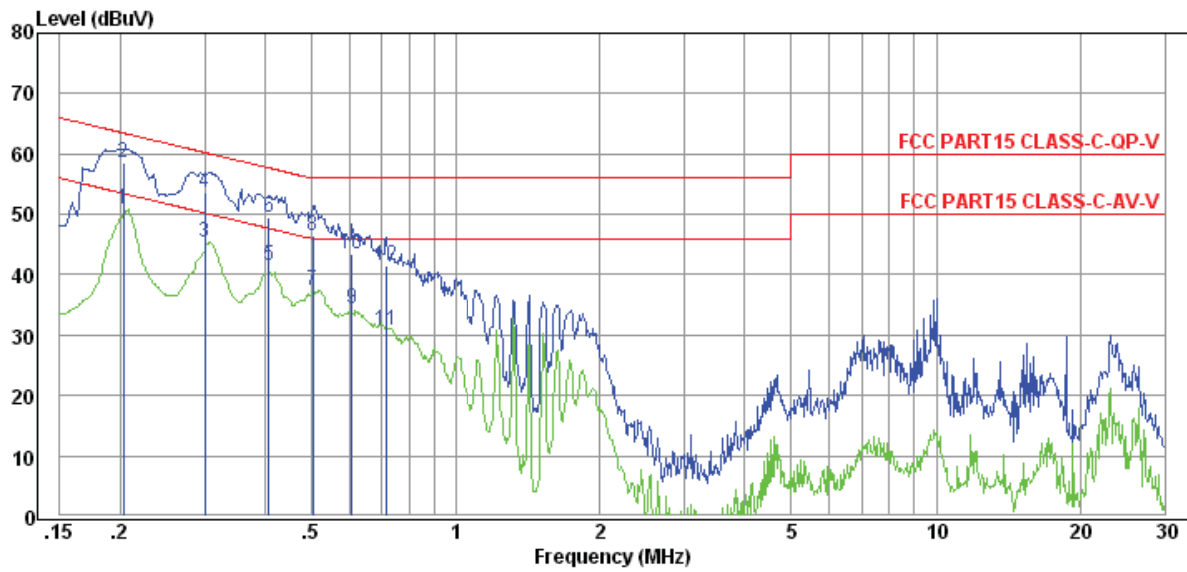


N Line

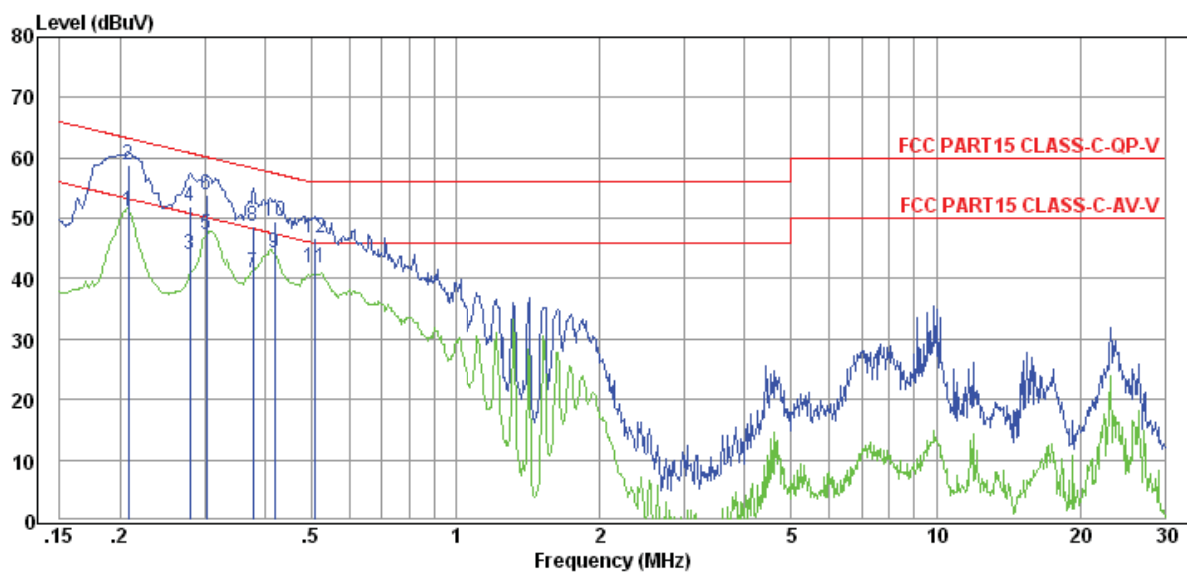


EMW3239-P

Frequency (MHz)	Result (dBuV)	Limit Line (dBuV)	Margin (dB)	Phase line	Detector
0.20	50.74	53.45	2.71	L	Average
0.20	58.56	63.45	4.89	L	QP
0.30	45.23	50.24	5.01	L	Average
0.30	53.65	60.24	6.59	L	QP
0.41	41.40	47.68	6.28	L	Average
0.41	49.56	57.68	8.12	L	QP
0.50	37.31	46.00	8.69	L	Average
0.50	46.39	56.00	9.61	L	QP
0.61	34.35	46.00	11.65	L	Average
0.61	43.43	56.00	12.57	L	QP
0.72	30.86	46.00	15.14	L	Average
0.72	41.58	56.00	14.42	L	QP
0.21	51.12	53.27	2.15	N	Average
0.21	58.90	63.27	4.37	N	QP
0.28	44.06	50.81	6.75	N	Average
0.28	52.01	60.81	8.80	N	QP
0.30	47.35	50.15	2.80	N	Average
0.30	54.00	60.15	6.15	N	QP
0.38	41.09	48.30	7.21	N	Average
0.38	48.72	58.30	9.58	N	QP
0.42	44.37	47.46	3.09	N	Average
0.42	49.61	57.46	7.85	N	QP
0.51	41.71	46.00	4.29	N	Average
0.51	46.60	56.00	9.40	N	QP



L Line



N Line



5.8 Radiated Emission

5.8.1 Requirement

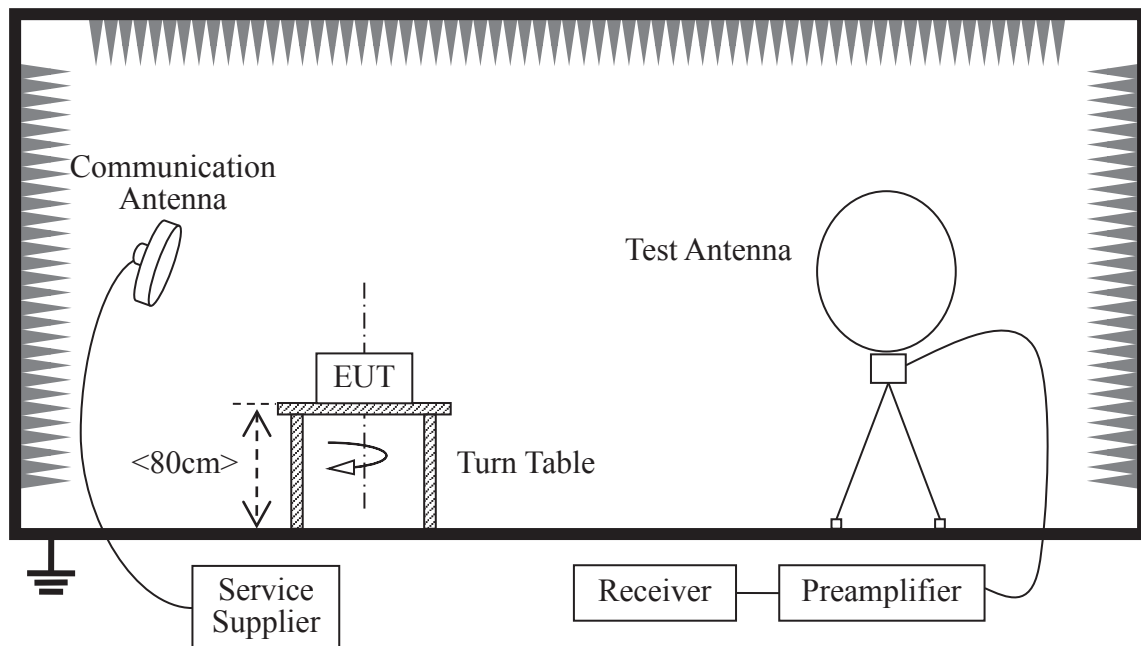
According to FCC section 15.247(c), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the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

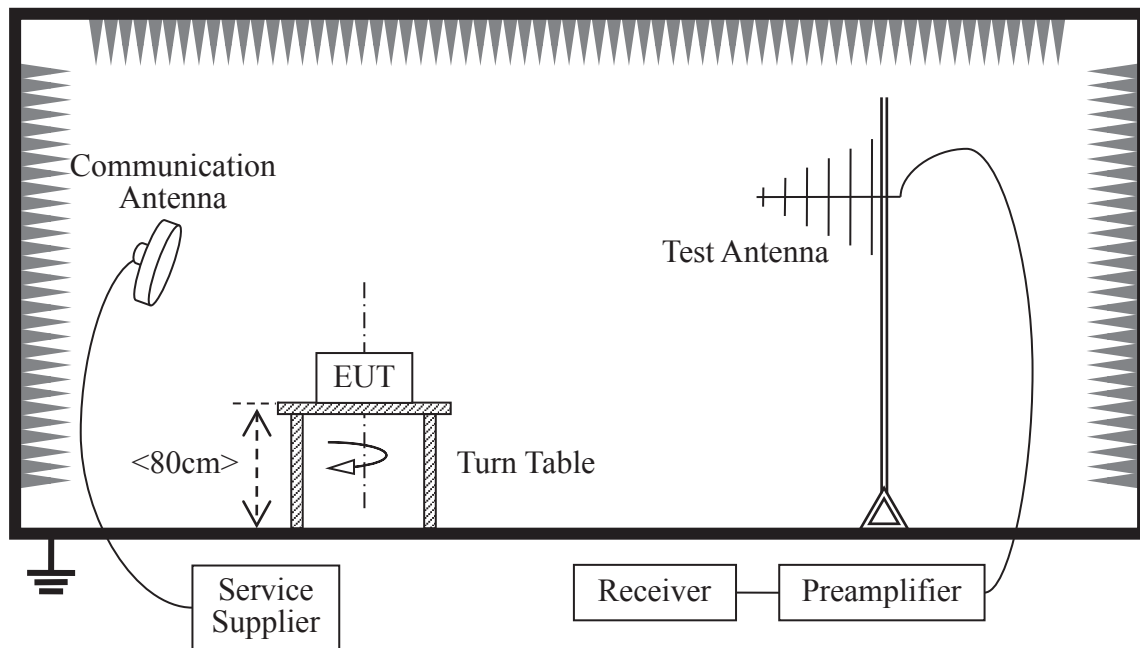
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)	Limit(dB $\mu\text{V/m}$)	Detector
0.009-0.490	2400/F(kHz)	300	/	/
0.490-1.705	24000/F(kHz)	30	/	/
1.705-30	30	30	/	/
30 - 88	100	3	40	QP
88 - 216	150	3	43.5	QP
216 - 960	200	3	46	QP
960 - 1000	500	3	54	QP
Above 1000	500	3	54	AV

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)

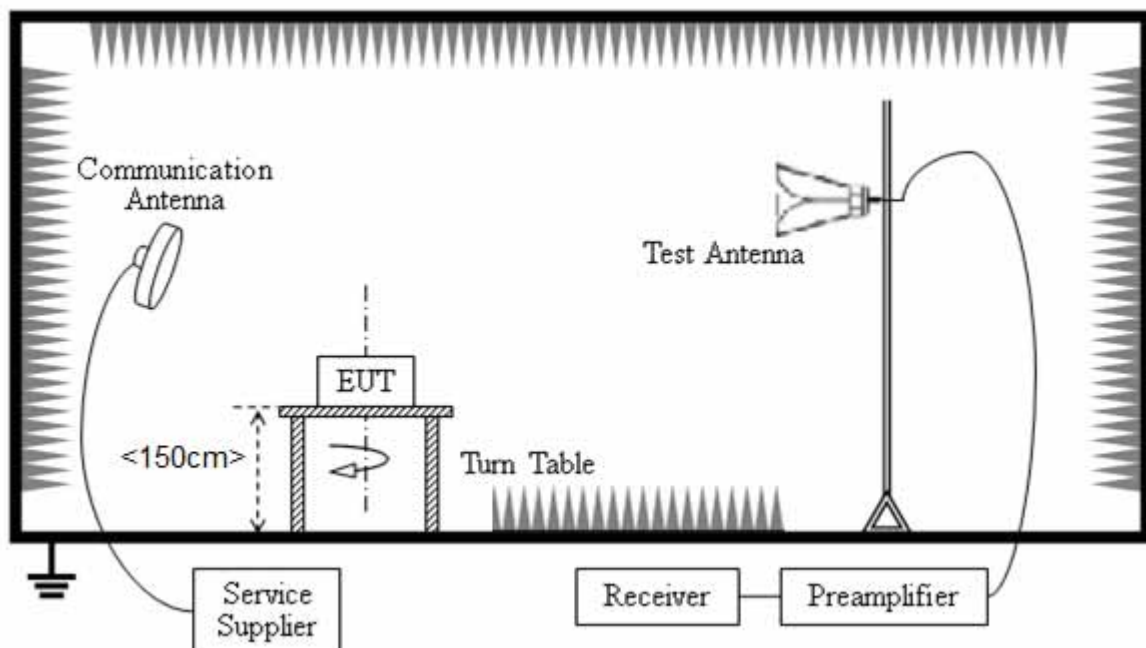
5.8.2 Test setup



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 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.

5.8.3 Test Result

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 above 30MHz ~ 10th Harmonic

EMW3239-E

Frequency (MHz)	Reading (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Detector	Result
56.99	19.66	40.00	20.34	Vertical	QP	QP
103.81	19.51	43.50	23.99	Vertical	QP	QP
247.68	19.57	46.00	26.43	Vertical	QP	QP
400.43	28.33	46.00	17.67	Vertical	QP	QP
601.43	26.78	46.00	19.22	Vertical	QP	QP
848.06	30.69	46.00	15.31	Vertical	QP	QP
1378.13	21.10	54.00	32.90	Vertical	Average	PASS
1496.53	21.38	54.00	32.62	Vertical	Average	PASS
1724.08	19.82	54.00	34.18	Vertical	Average	PASS
2371.75	34.49	54.00	19.51	Vertical	Average	PASS
4997.81	27.44	54.00	26.56	Vertical	Average	PASS
58.00	17.66	40.00	22.34	Horizontal	QP	QP
92.46	17.85	43.50	25.65	Horizontal	QP	QP
234.17	21.26	46.00	24.74	Horizontal	QP	QP
400.43	28.33	46.00	17.67	Horizontal	Average	PASS



Frequency (MHz)	Reading (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Detector	Result
601.43	26.78	46.00	19.22	Horizontal	Average	PASS
827.49	29.82	46.00	16.18	Horizontal	Average	PASS
2350.60	27.90	54.00	26.10	Horizontal	Average	PASS
4821.88	26.41	54.00	27.59	Horizontal	Average	PASS

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Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Detector	Result
47.00	26.92	40.00	13.08	Vertical	QP	PASS
70.09	21.94	40.00	18.06	Vertical	QP	PASS
84.11	22.93	40.00	17.07	Vertical	QP	PASS
183.84	18.76	43.50	24.74	Vertical	QP	PASS
400.43	25.33	46.00	20.67	Vertical	QP	PASS
755.39	28.94	46.00	17.06	Vertical	QP	PASS
1198.38	19.72	54.00	34.28	Vertical	QP	PASS
1596.24	26.70	54.00	27.30	Vertical	Average	PASS
2000.53	23.26	54.00	30.74	Vertical	Average	PASS
2440.73	23.30	54.00	30.70	Vertical	Average	PASS
3620.03	23.38	54.00	30.62	Vertical	Average	PASS
68.87	18.92	40.00	21.08	Horizontal	QP	PASS
102.00	19.48	43.50	24.02	Horizontal	QP	PASS
193.77	26.10	43.50	17.40	Horizontal	QP	PASS
329.04	25.56	46.00	20.44	Horizontal	QP	PASS
420.58	24.89	46.00	21.11	Horizontal	QP	PASS
782.35	29.22	46.00	16.78	Horizontal	QP	PASS
1273.65	17.75	54.00	36.25	Horizontal	Average	PASS
1438.68	17.86	54.00	36.14	Horizontal	Average	PASS
2308.86	20.06	54.00	33.94	Horizontal	Average	PASS
3176.20	22.05	54.00	31.95	Horizontal	Average	PASS
3895.98	23.81	54.00	30.19	Horizontal	Average	PASS

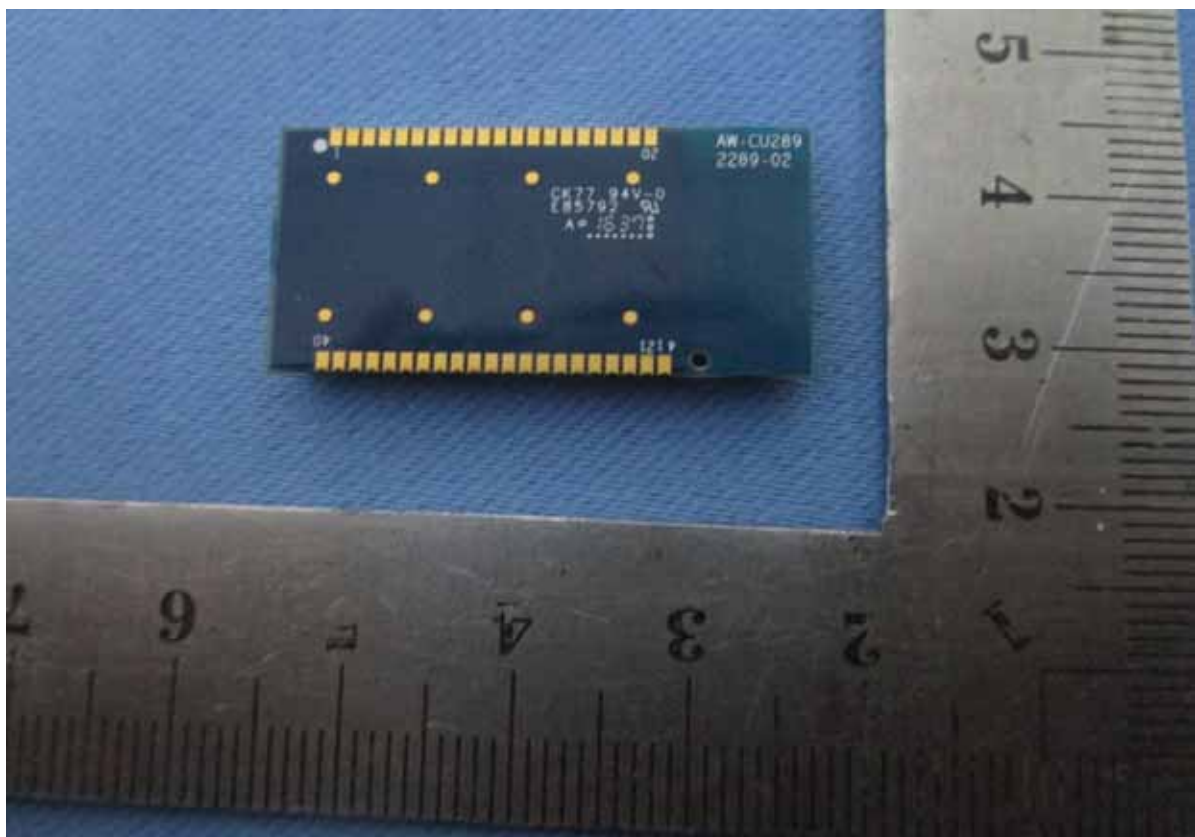
Note:

The worst case(802.11g Channe6:2437MHz)is recorded in the report.



Annex A Photos of the EUT

EMW3239-E





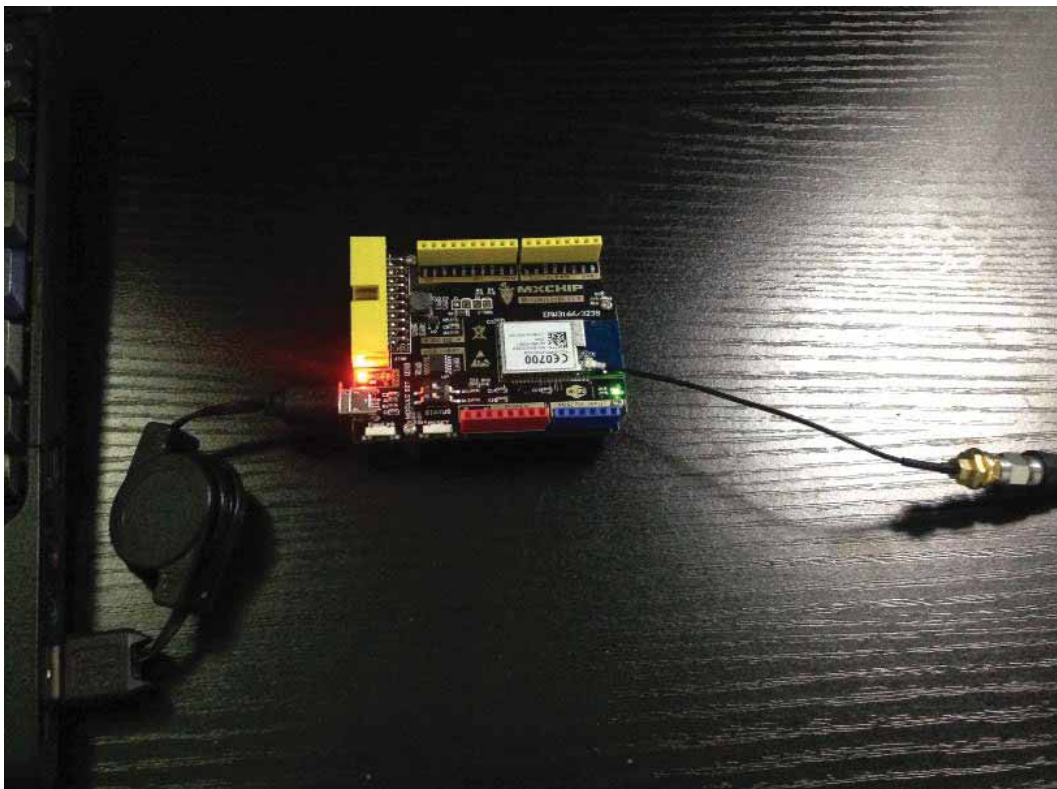
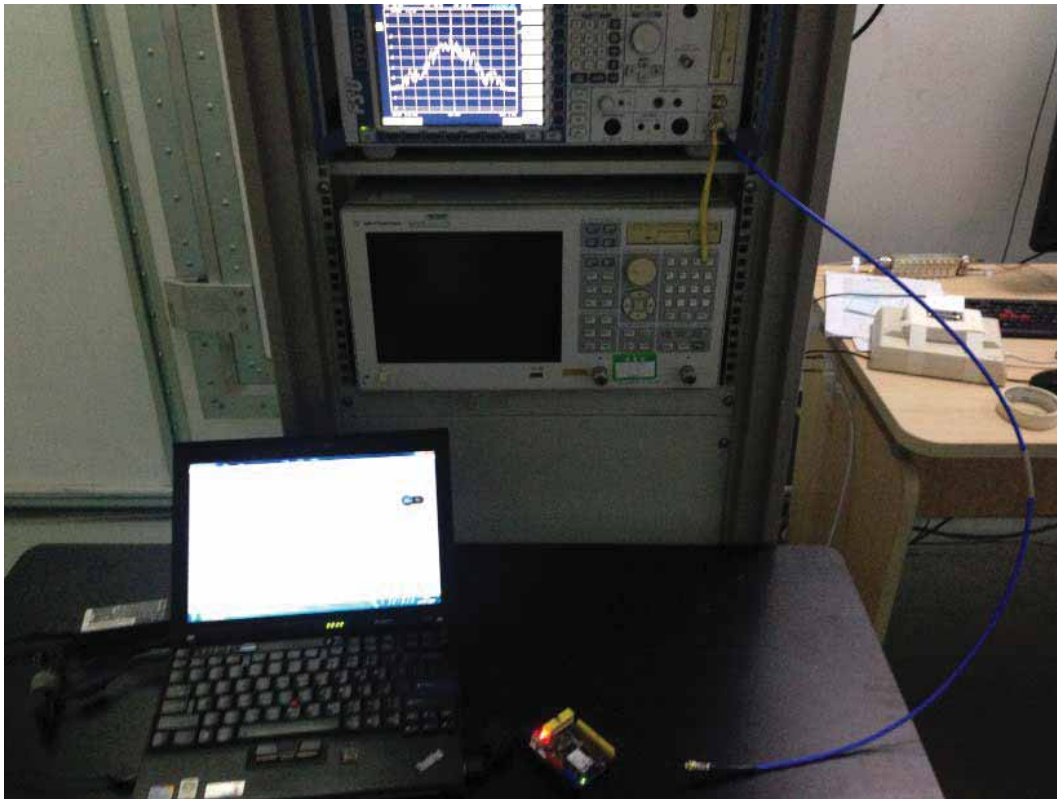
EMW3239-P





Annex B Photos of Setup

1. RF

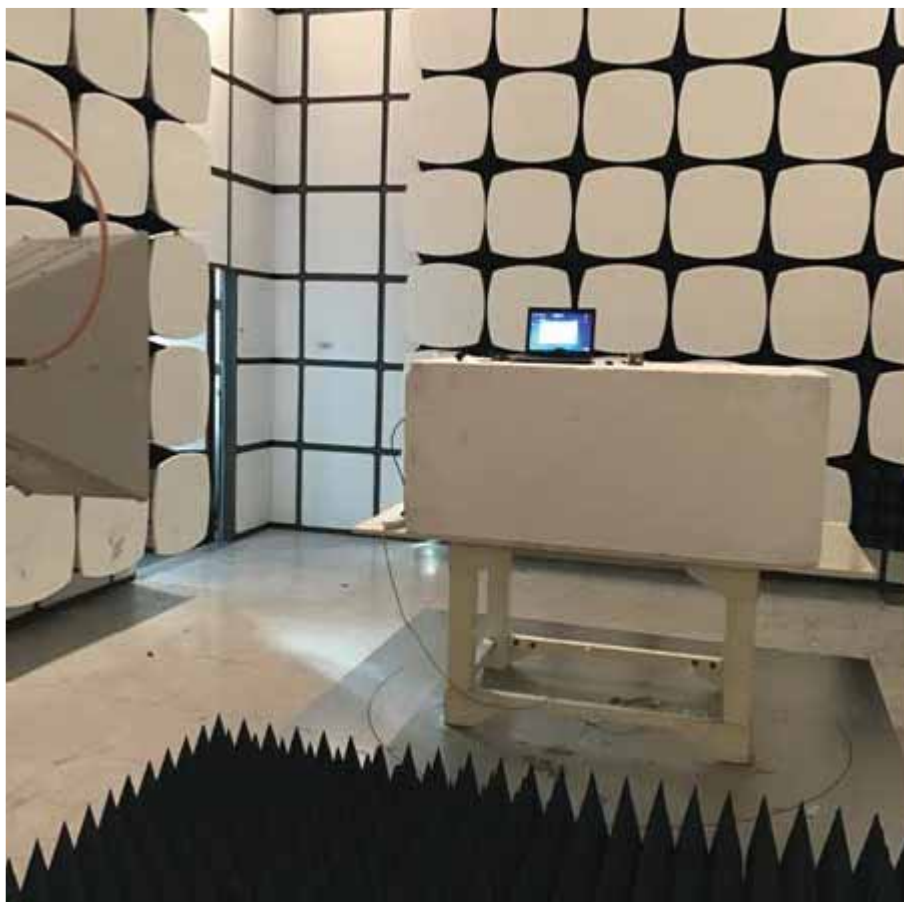




2. Conducted Emission



3. Radiated Emission



**** END OF REPORT ****