FCC Test Report

Report No: FCS20200308007W04

Issued for

Applicant:	CASA DUARTE SRL
Address:	Socrates Nolasco No.2, Santo Domingo, República Dominicana.
Product Name:	netbook
Brand Name:	SAELITE
Model Name:	ES1AU11
Series Model:	YP11G-E
FCC ID:	2AVWN-ES1AU11

Issued By: Flux Compliance Service Laboratory
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com

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Revision History

Rev.	Issue Date	Effect Page	Contents
01	01 March 2020	All	Initial Issue

TEST RESULT CERTIFICATION

Applicant's Name .....: CASA DUARTE SRL

Address .....: Socrates Nolasco No.2, Santo Domingo, República Dominicana.

Manufacture's Name .....: CASA DUARTE SRL

Address .....: Socrates Nolasco No.2, Santo Domingo, República Dominicana.

Product Description

Product Name .....: netbook

Brand Name .....: SAELITE

Model Name .....: ES1AU11

Series Model .....: YP11G-E

Test Standards .....: FCC Rules and Regulations Part 15 Subpart C

Test Procedure .....: ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test.....:

Date (s) of performance of tests .: 09 January 2020 ~ 01 March 2020

Date of Issue .....: 01 March 2020

Test Result .....: Pass

Prepared By : Chris chen

(Chris Chen/Engineer)

Approved By :

(Andy Yue/EMC Manager)

1. Summary of Test Results

Standard Section	Test Item	Judgment	Remark
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS	
FCC Part 15.247(b)(3)	Conducted Output Power	PASS	
FCC Part 15.247(e)	Power Spectral Density	PASS	--
FCC Part 15.247(d)	Band-edge and Spurious Emissions (Conducted)	PASS	
FCC Part 15.247(d) FCC Part 15.209 FCC Part 15.205	Radiated Spurious Emissions	PASS	
FCC Part 15.247(d) FCC Part 15.209 FCC Part 15.205	Radiated Band Edge Compliance	PASS	
FCC Part 15.207	Conducted Emission	PASS	--
FCC Part 15.203	Antenna Requirement	PASS	--

NOTE:
(1)" N/A" denotes test is not applicable in this Test Report

1.1 Test Laboratory

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
A2LA Accreditation No. :	A2LA accreditation number：5545.01

1.2 Measurement Uncertainty

The reported uncertainty of measurement **y ±U**,where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**,providing a level of confidence of approximately **95** %.

No.	Items	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.988 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±5.2 dB
6	All emissions,radiated(>1G) 1000MHz -3000MHz	±4.66 dB
7	All emissions,radiated(<1G) 3000MHz -6000MHz	±5.31 dB

1.3 Test Environment Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature rang:	20-26℃
Humidity range:	40-65%
Pressure range:	86-106Kpa

2. General Information

2.1 General Description of The EUT

Product Name	netbook
Trade Name	SAELITE
Model Name	ES1AU11
Series Model	YP11G-E
Model Difference	Just different in model name
Operation Frequency	IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz IEEE 802.11n HT40: 2422MHz-2452MHz
Modulation	IEEE 802.11b: DSSS (CCK, QPSK, BPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 104, 117, 130 Mbps IEEE 802.11n HT40: 13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 216, 243, 270 Mbps
Antenna Type	FPCB antenna, maximu PK gain: Antenna A :2.4GWIFI 1.12dBi(Main) Antenna B : 2.4GWIFI 1.08dBi(Aux)
Adapter	JK120250-S52US Intput:1100-240VAC,50/60Hz, 0.8A output:12V 2500mA
Battery	DC 7.4V 5500mAh 40.7Wh Li Battery
Hardware version number	N/A
Software versionnumber	N/A
Connecting I/O Port(s)	Please refer to the User's Manual
Note: For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.	

2.2 Channel List

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2412	04	2432	08	2452
01	2417	05	2437	09	2457
02	2422	06	2442	10	2462
03	2427	07	2447		

2.3 Assistant Equipment Used For Test

Assistant equipment	Manufacturer	Model number
/	/	/
/	/	/

2.4 Description of The Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Channel/Frequency	Data Rate
IEEE 802.11b	CH1/2412MHz	1Mbps
	CH6/2437MHz	1Mbps
	CH11/2462MHz	1Mbps
IEEE 802.11g	CH1/2412MHz	6Mbps
	CH6/2437MHz	6Mbps
	CH11/2462MHz	6Mbps
IEEE 802.11n HT20	CH1/2412MHz	8Mbps
	CH6/2437MHz	8Mbps
	CH11/2462MHz	8Mbps
IEEE 802.11n HT40	CH1/2422MHz	8Mbps
	CH6/2437MHz	8Mbps
	CH9/2452MHz	8Mbps
The EUT does not support MIMO mode.		

2.5 Block Digram Showing The Configuration of System Tested

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

2.6 Equipments List

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2019.05.31	2020.05.30
Signal Analyzer	R&S	FSV40-N	FCS-E012	2019.06.05	2020.06.04
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2019.03.11	2020.03.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2019.03.26	2020.03.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2019.05.31	2020.05.30
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2019.05.31	2020.05.30
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2019.05.31	2020.05.30
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2019.03.03	2020.03.02
Temperature & Humidity	HTC-1	victor	FCS-E005	2019.05.31	2020.05.30

Conduction Test equipment

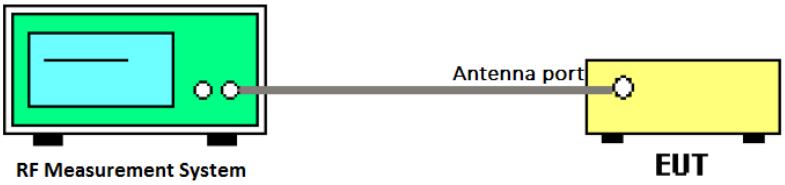
Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2019.05.31	2020.05.30
LISN	R&S	ENV216	FCS-E007	2019.05.15	2020.05.14
LISN	ETS	3810/2NM	FCS-E009	2019.03.15	2020.03.14
Temperature & Humidity	HTC-1	victor	FCS-E008	2019.05.31	2020.05.30

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2019.03.02	2020.03.01

3. 6dB Bandwidth

3.1 Block Diagram of Test Setup



3.2 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

3.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2) Set the spectrum analyzer as follows:

RBW	100KHz
VBW	300KHz
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.4 Test Result

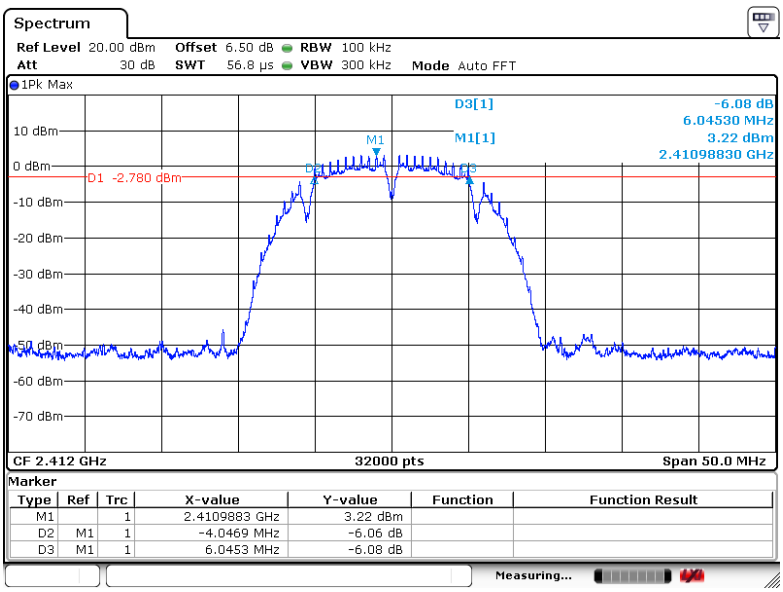
Mode	Frequency(MHz)	6dB bandwidth Result(MHz)	Limit (MHz)	Conclusion
IEEE 802.11b	2412	10.0922	0.5	Pass
	2437	10.0984	0.5	Pass
	2462	10.0938	0.5	Pass
IEEE 802.11g	2412	16.3016	0.5	Pass
	2437	16.3234	0.5	Pass
	2462	16.3141	0.5	Pass
IEEE 802.11n HT20	2412	17.5578	0.5	Pass
	2437	17.5703	0.5	Pass
	2462	17.5672	0.5	Pass
IEEE 802.11n HT40	2422	36.3150	0.5	Pass
	2437	36.3315	0.5	Pass
	2452	36.3175	0.5	Pass

3.5 Original Test data

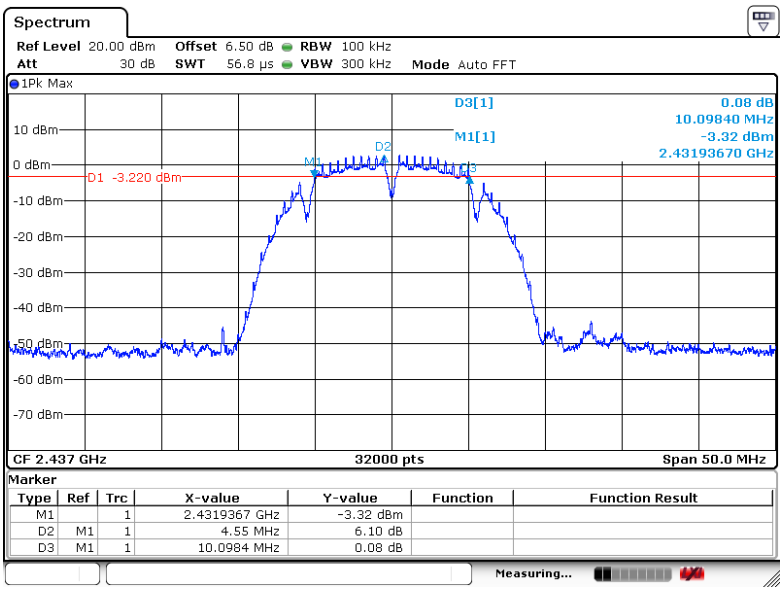
Note: The worst data is Antenna A, only shown Antenna A Plot.

IEEE 802.11b

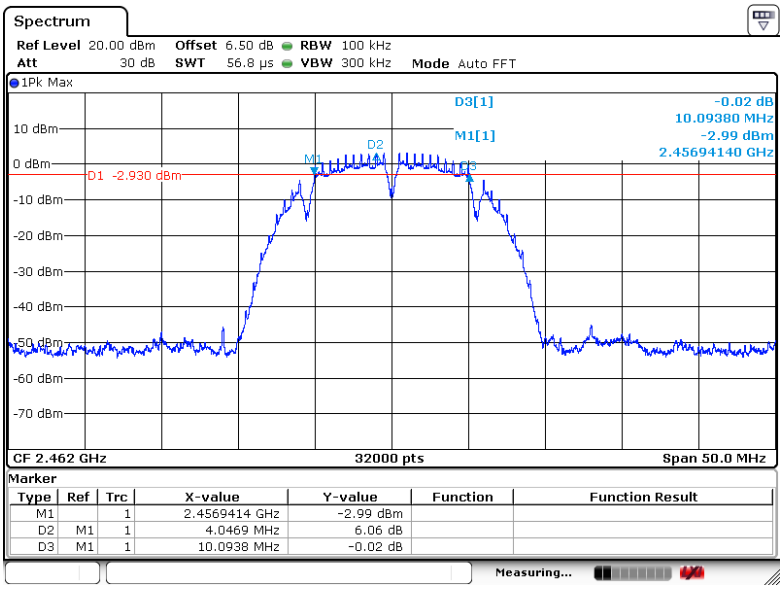
Low CH: 2412MHz



Middle CH: 2437MHz

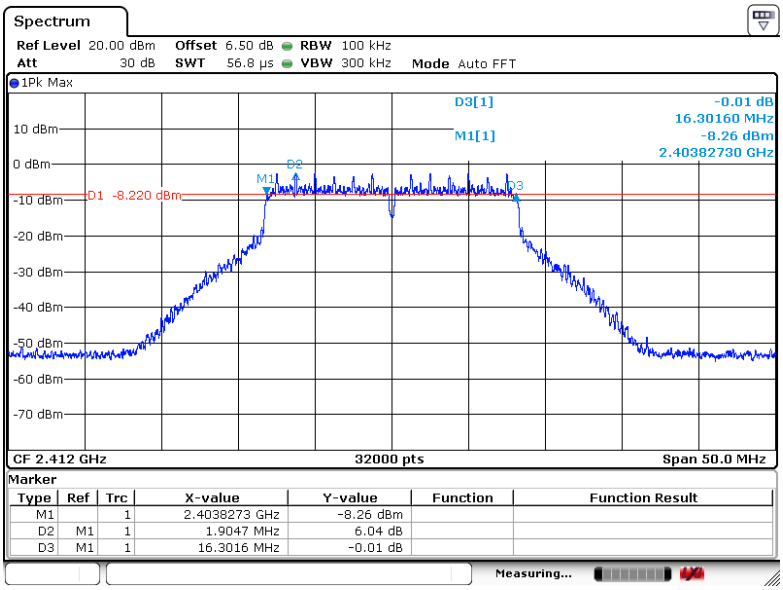


High CH: 2462MHz

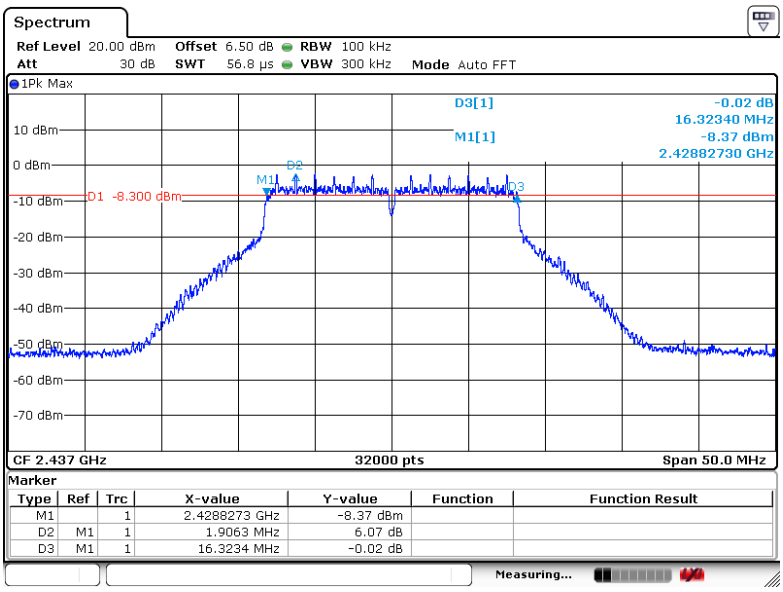


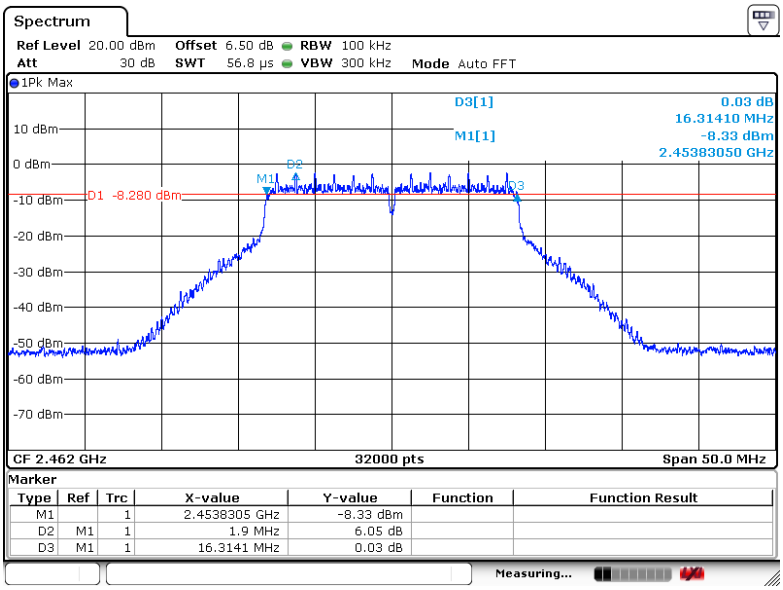
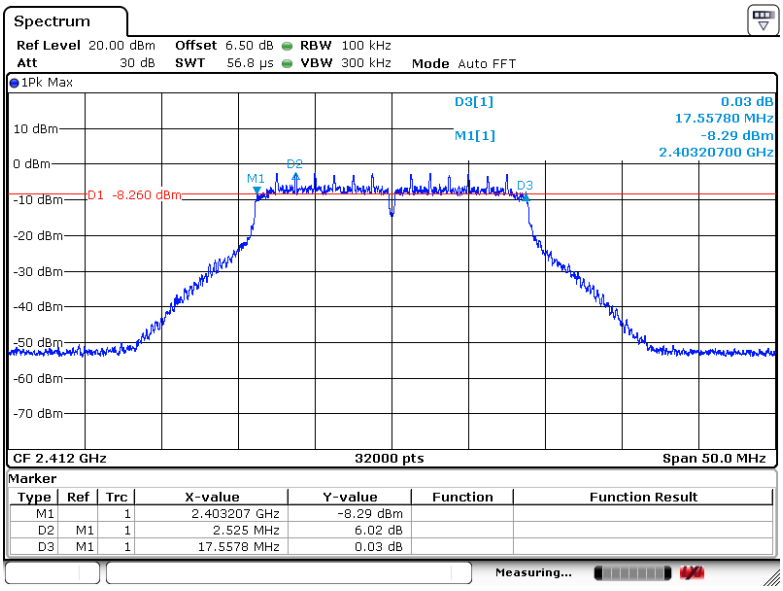
IEEE 802.11g

Low CH: 2412MHz

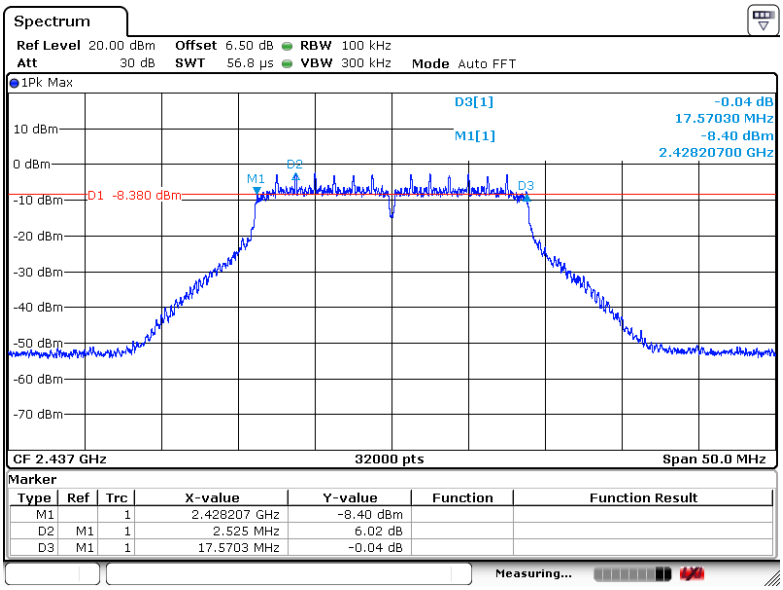


Middle CH: 2437MHz

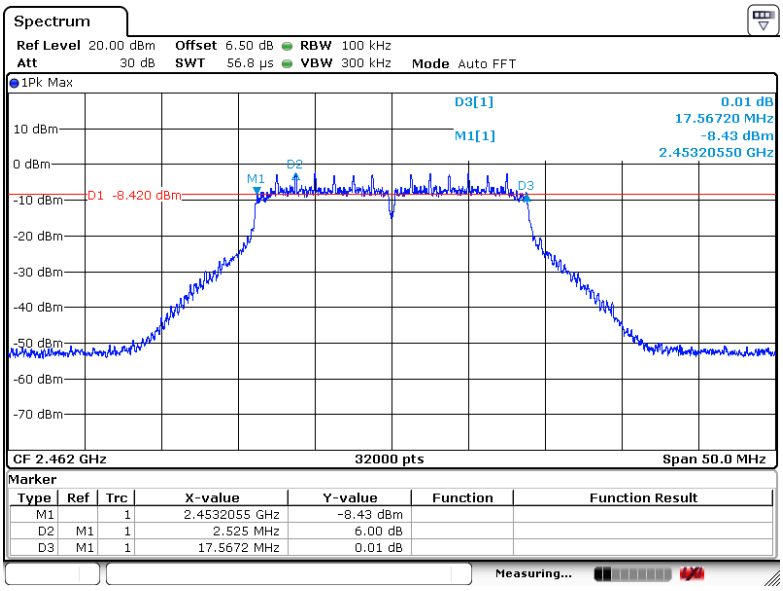


	High CH: 2462MHz 
IEEE 802.11n HT20	Low CH: 2412MHz 

Middle CH: 2437MHz

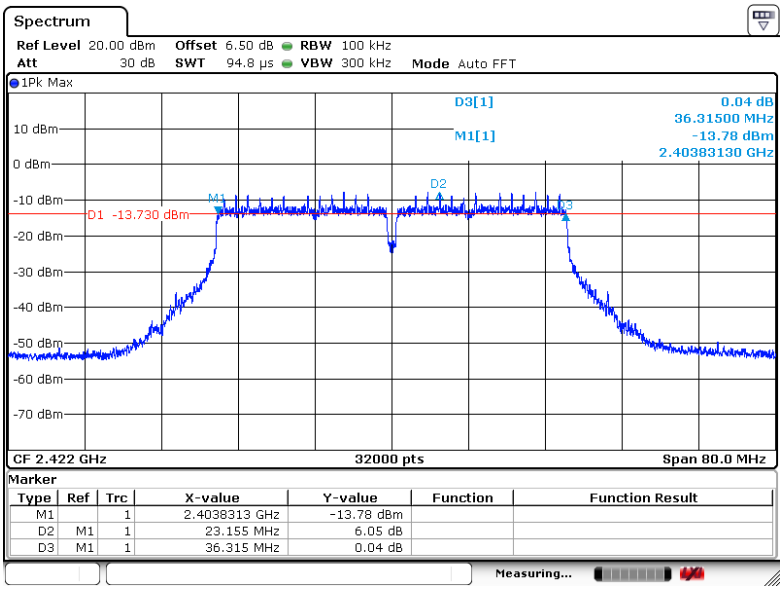


High CH: 2462MHz

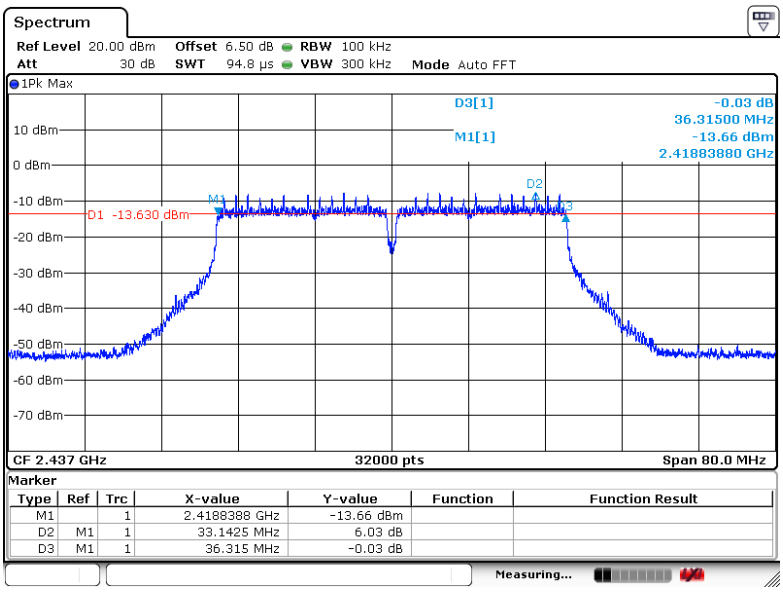


IEEE 802.11n HT40

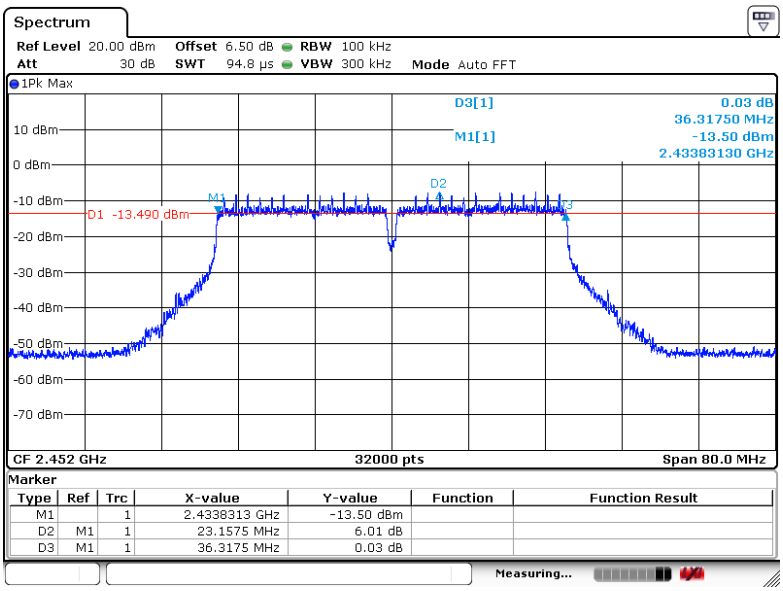
Low CH: 2422MHz



Middle CH: 2437MHz

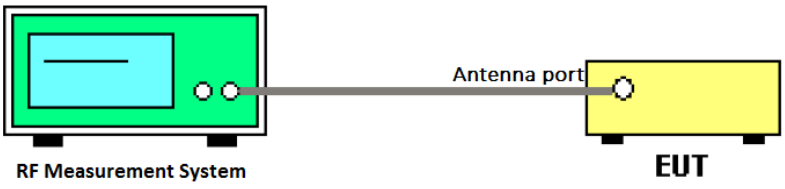


High CH: 2452MHz



4.Conducted Peak Output Power

4.1 Block Diagram of Test Setup



4.2 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi

4.3 Test Procedure

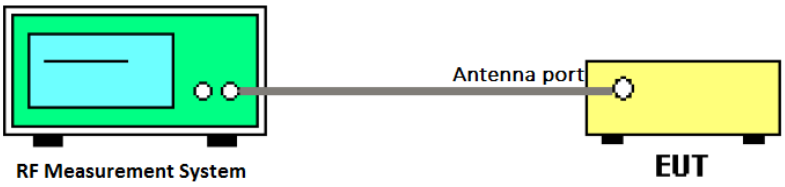
(1)Connect each EUT's antenna output to power sensor by RF cable and attenuator

4.5 Test Result

Mode	Frequency(MHz)	Antenna A Result(dBm)	Antenna B Result(dBm)	Limit(dBm)	Conclusion
IEEE 802.11b	2412	15.80	15.75	30	Pass
	2437	15.76	15.70	30	Pass
	2462	15.69	15.62	30	Pass
IEEE 802.11g	2412	15.00	14.96	30	Pass
	2437	15.00	14.95	30	Pass
	2462	14.97	14.93	30	Pass
IEEE 802.11n HT20	2412	14.87	14.84	30	Pass
	2437	14.94	14.91	30	Pass
	2462	14.84	14.80	30	Pass
IEEE 802.11n HT40	2422	14.11	14.08	30	Pass
	2437	14.04	14.00	30	Pass
	2452	14.05	13.99	30	Pass

5. Power Spectral Density

5.1Block Diagram of Test Setup



5.2Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW	3KHz≤RBW≤100KHz
VBW	≥3RBW
Span	1.5 times the DTS bandwidth
Detector Mode	RMS
Sweep time	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Test Result

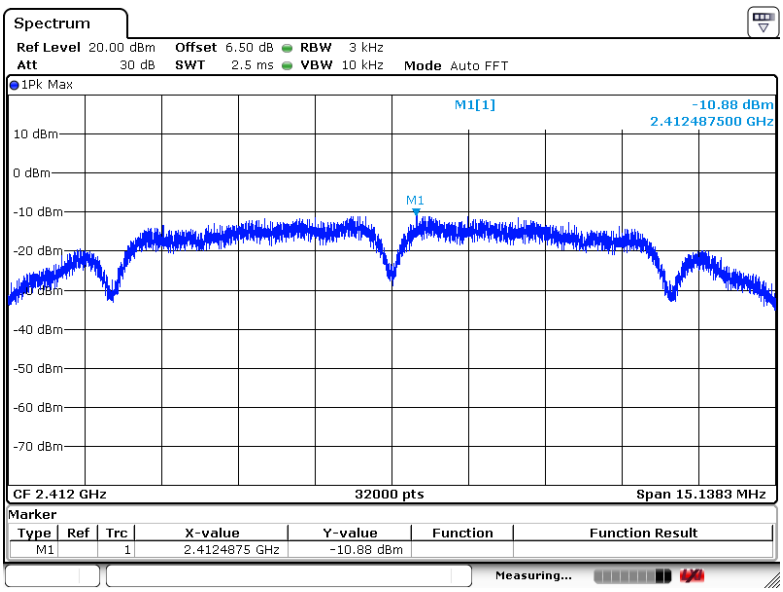
Mode	Frequency(MHz)	Result (dBm/3KHz)	Limit (dBm/3KHz)	Conclusion
IEEE 802.11b	2412	-10.88	8	Pass
	2437	-10.84	8	Pass
	2462	-10.84	8	Pass
IEEE 802.11g	2412	-16.58	8	Pass
	2437	-16.37	8	Pass
	2462	-16.07	8	Pass
IEEE 802.11n HT20	2412	-16.54	8	Pass
	2437	-16.46	8	Pass
	2462	-16.65	8	Pass
IEEE 802.11n HT40	2422	-21.55	8	Pass
	2437	-21.38	8	Pass
	2452	-21.85	8	Pass

Note: The worst data is Antenna A, only shown Antenna A Plot.

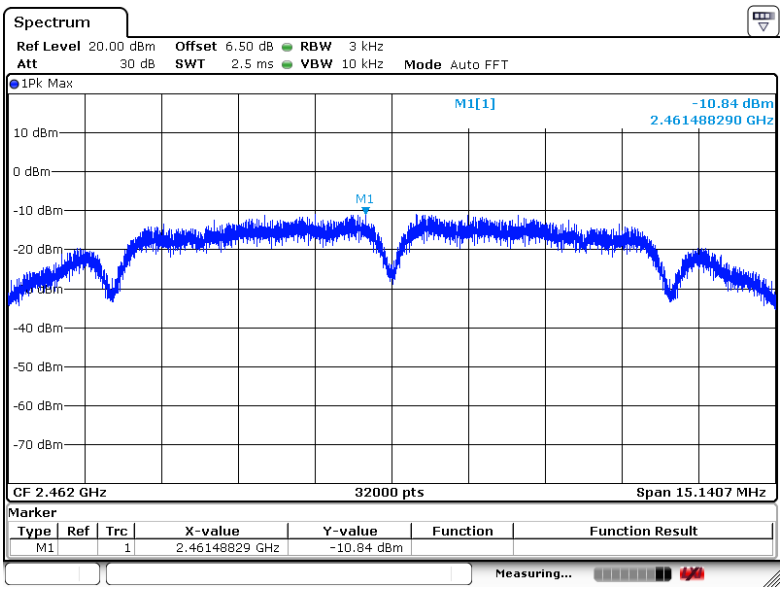
5.5 Original Test data

IEEE 802.11b

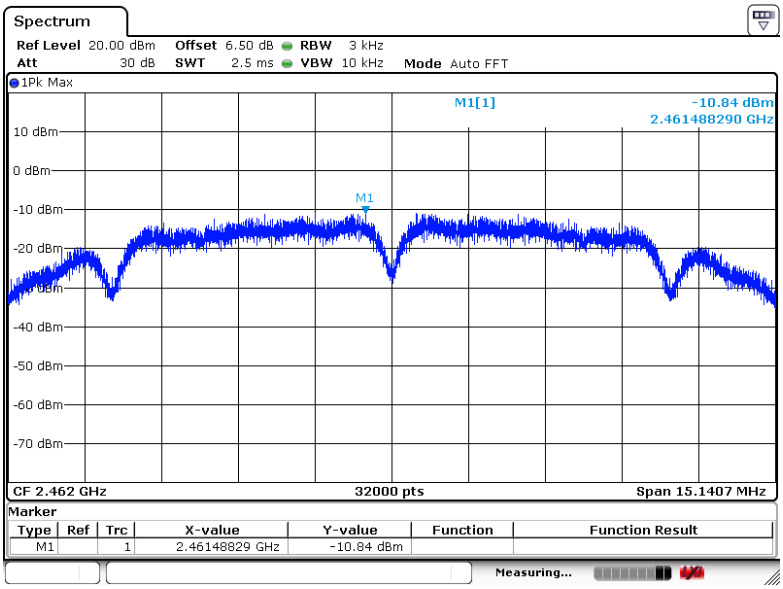
Low CH 2412MHz



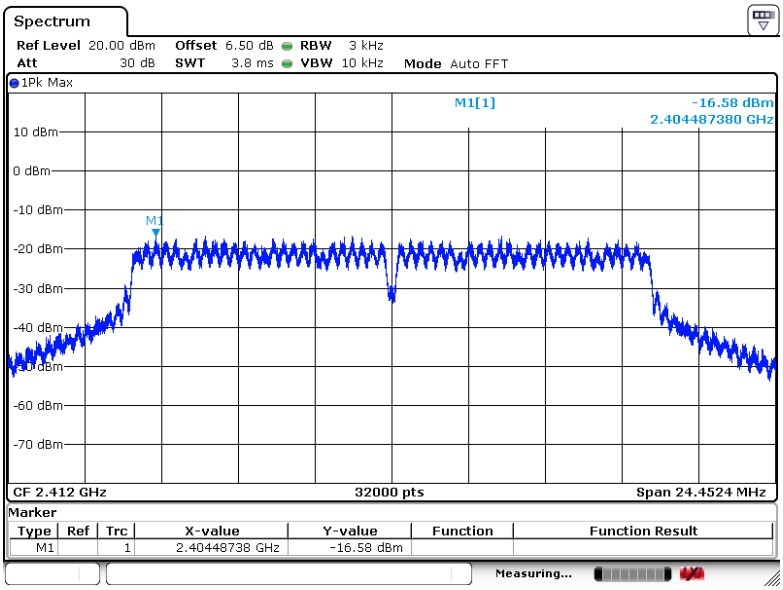
Middle CH 2437MHz



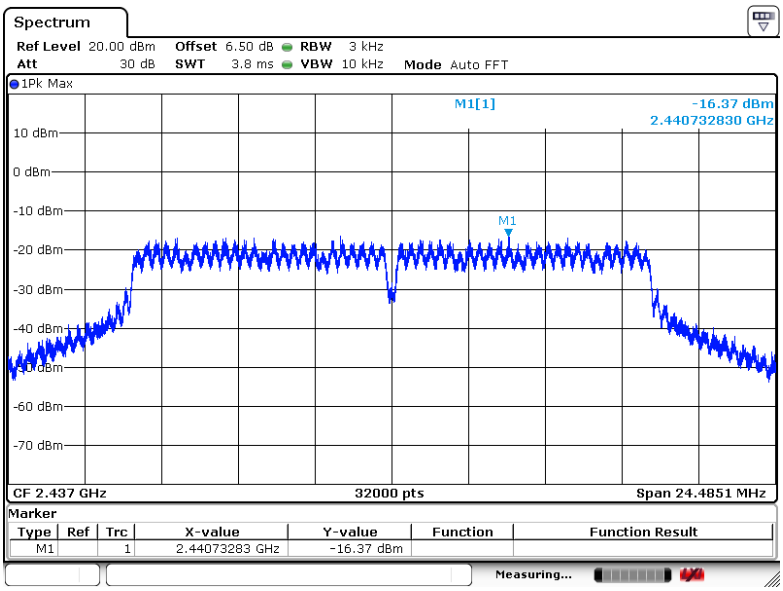
High CH 2462MHz



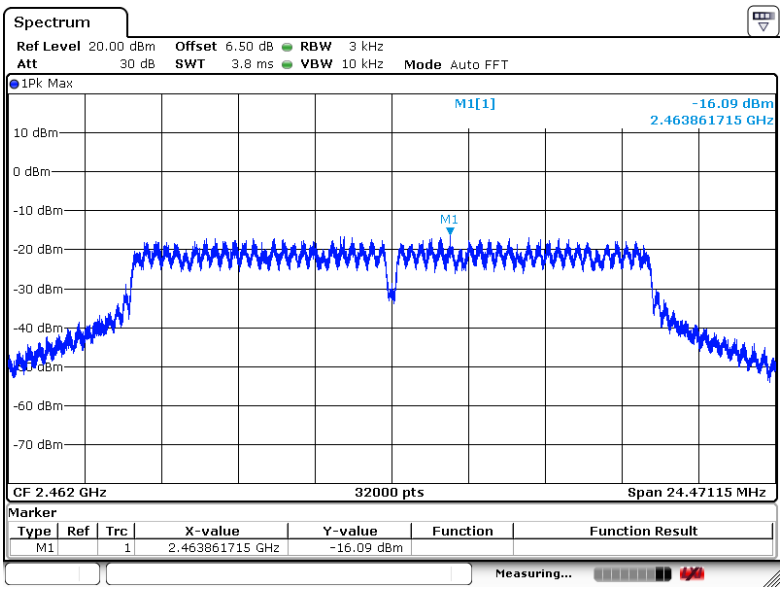
IEEE 802.11g	Low CH 2412MHz



Middle CH 2437MHz

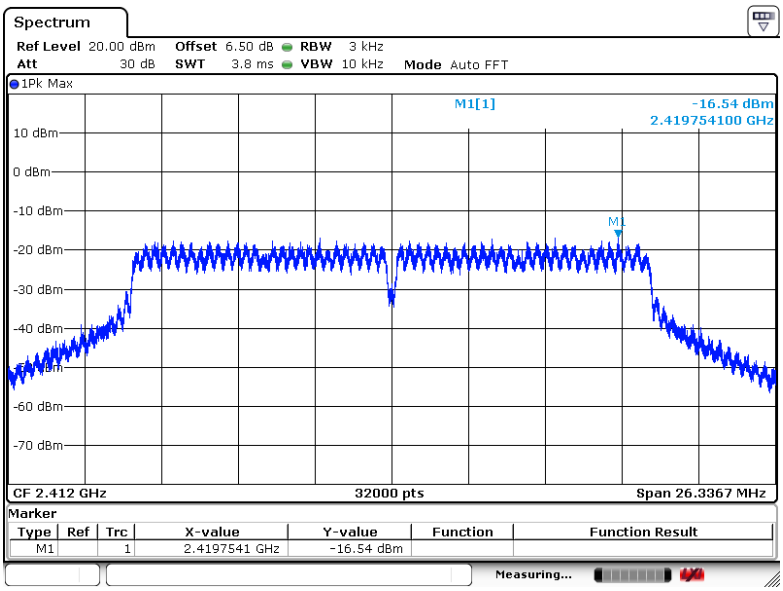


High CH 2462MHz

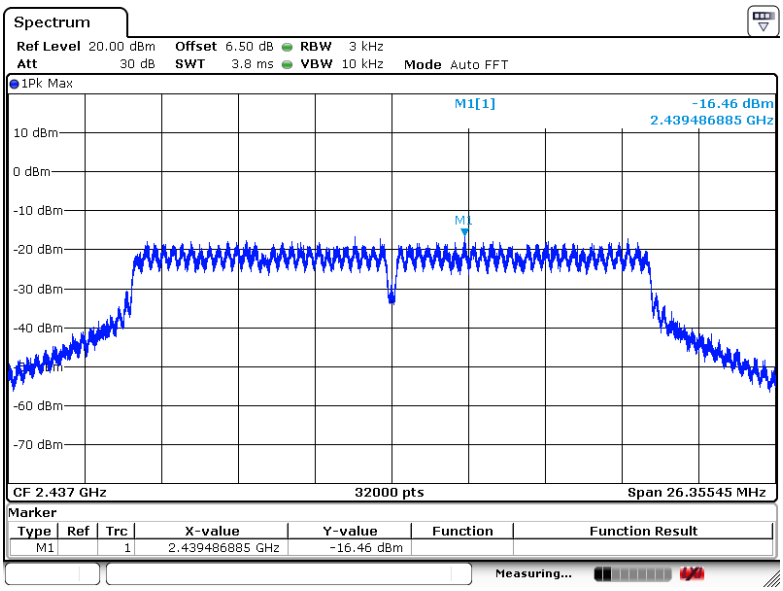


IEEE 802.11n HT20

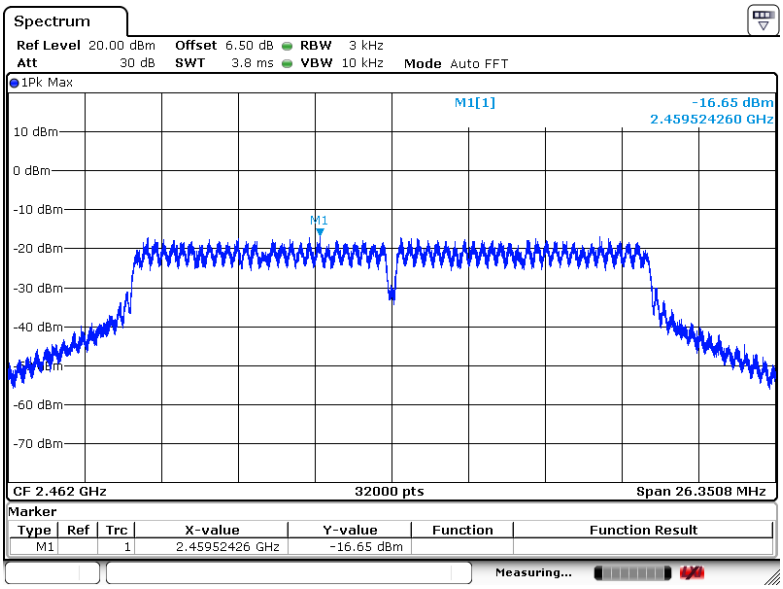
Low CH 2412MHz



Middle CH 2437MHz

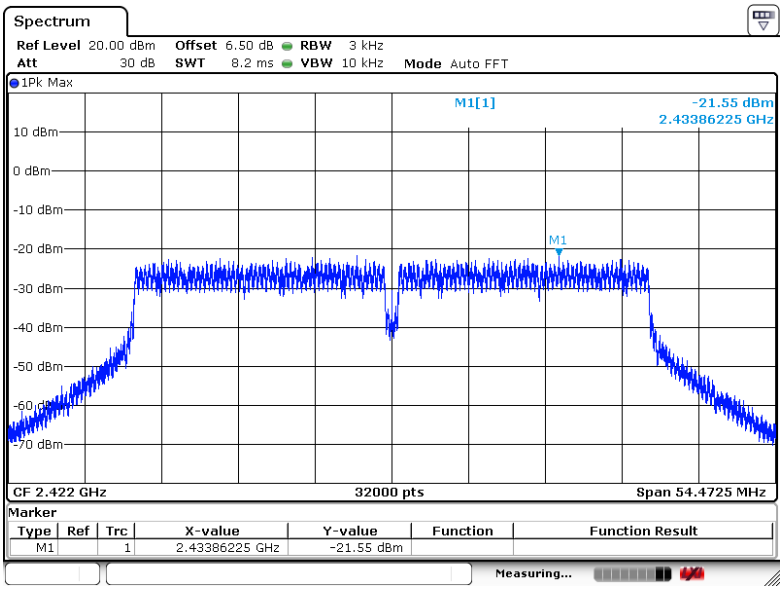


High CH 2462MHz

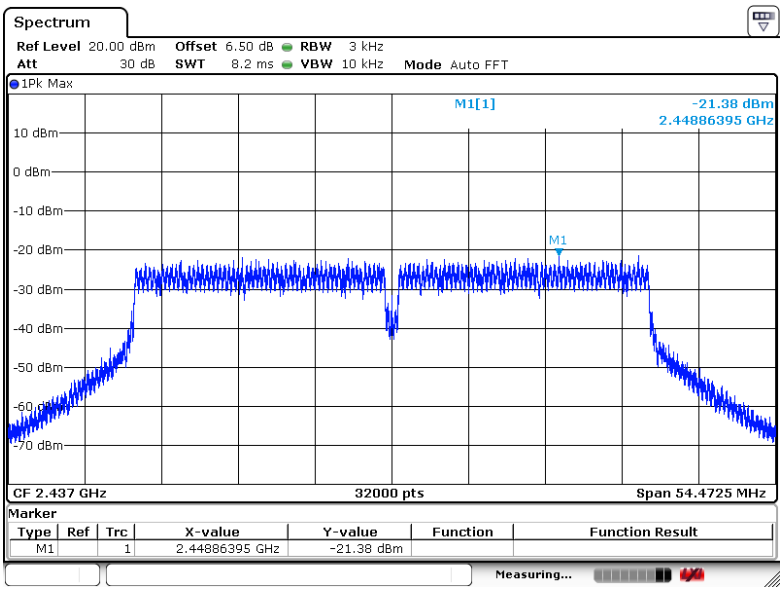


IEEE 802.11n HT40

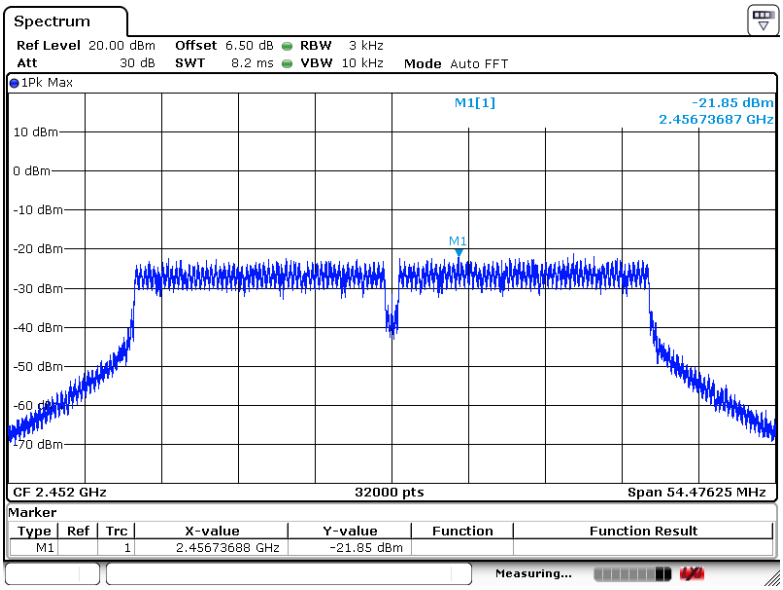
Low CH 2422MHz



Middle CH 2437MHz

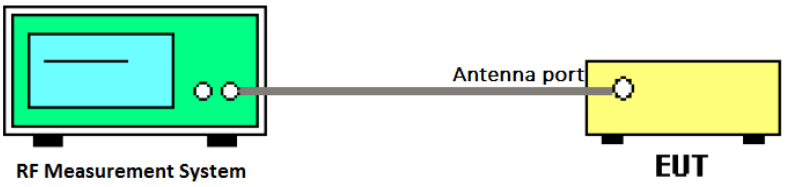


High CH 2452MHz



6. BandEdge and Spurious Emissions (Conducted)

6.1Block Diagram of Test Setup



6.2Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power

6.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2)Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW	100KHz
VBW	300KHz
Span	1.5 times the DTS bandwidth
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW	100KHz
VBW	300KHz
Span	Encompass frequency range to be measured
Number of	≥span/RBW

measurement points	
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

6.4 Test Result

Band Edge

Mode	Frequency(MHz)	Conclusion
IEEE 802.11b	2412	Pass
	2462	Pass
IEEE 802.11g	2412	Pass
	2462	Pass
IEEE 802.11n HT20	2412	Pass
	2462	Pass
IEEE 802.11n HT40	2422	Pass
	2452	Pass

SPURIOUS EMISSIONS

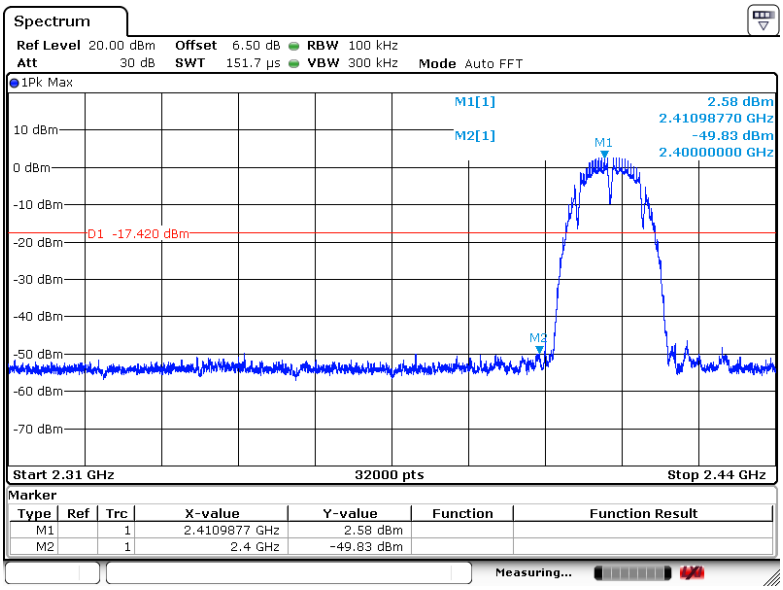
Mode	Frequency(MHz)	Conclusion
IEEE 802.11b	2412	Pass
	2437	Pass
	2462	Pass
IEEE 802.11g	2412	Pass
	2437	Pass
	2462	Pass
IEEE 802.11n HT20	2412	Pass
	2437	Pass
	2462	Pass
IEEE 802.11n HT40	2422	Pass
	2437	Pass
	2452	Pass

6.5 Original Test data

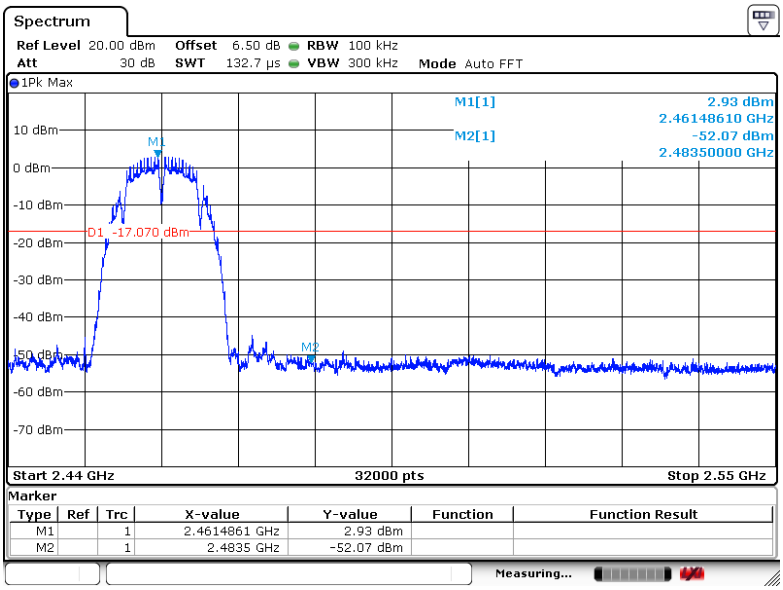
Note: The worst data is Antenna A, only shown Antenna A Plot.

IEEE 802.11b

Low CH

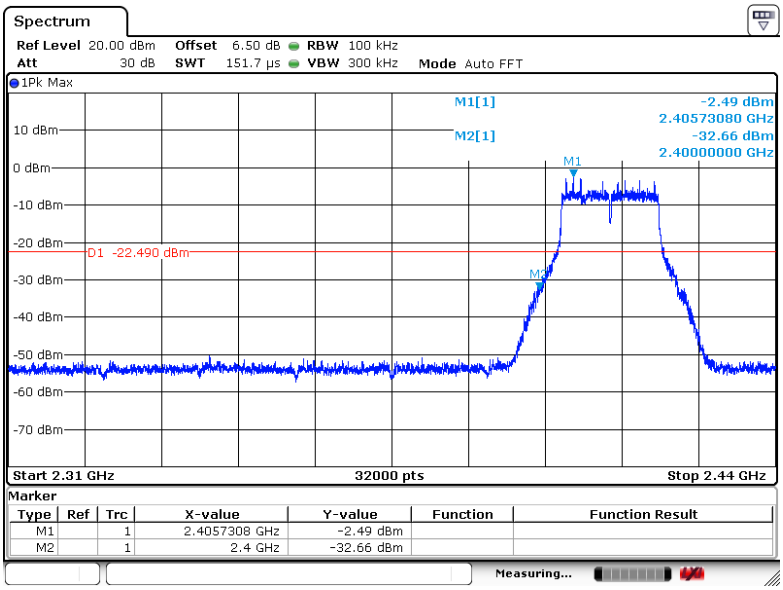


High CH

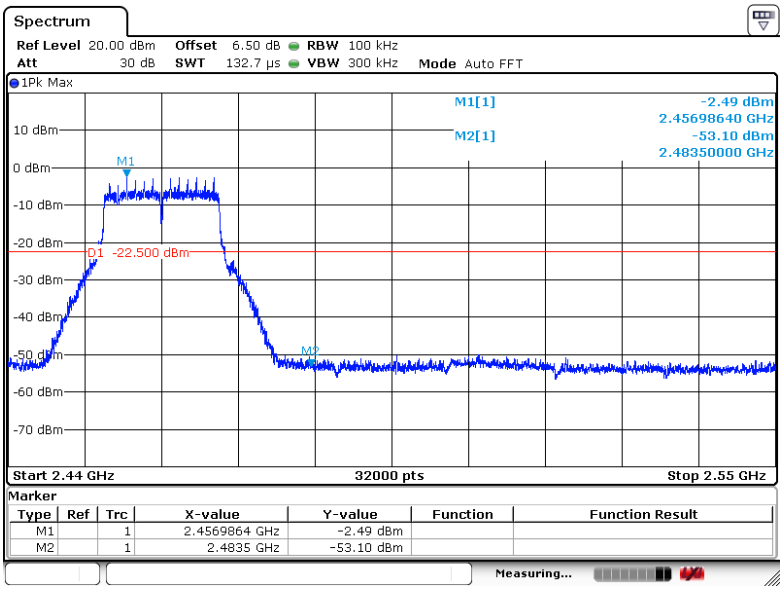


IEEE 802.11g

Low CH



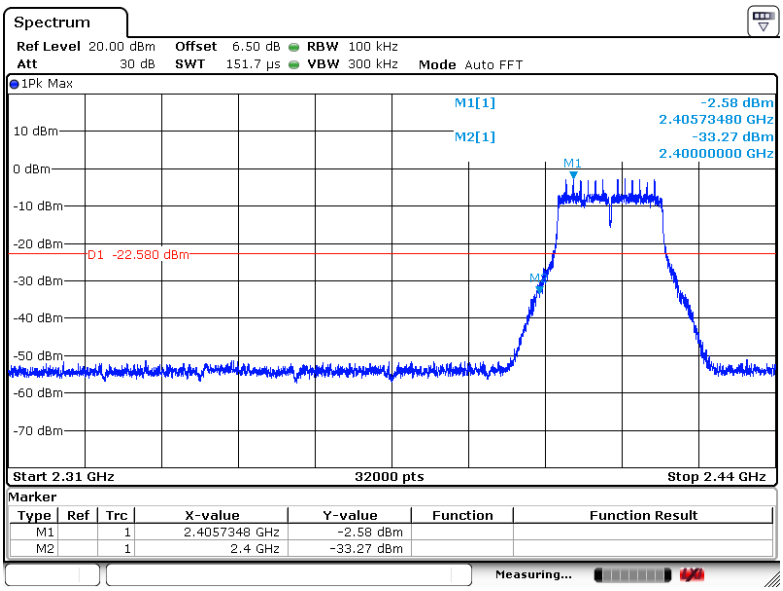
High CH



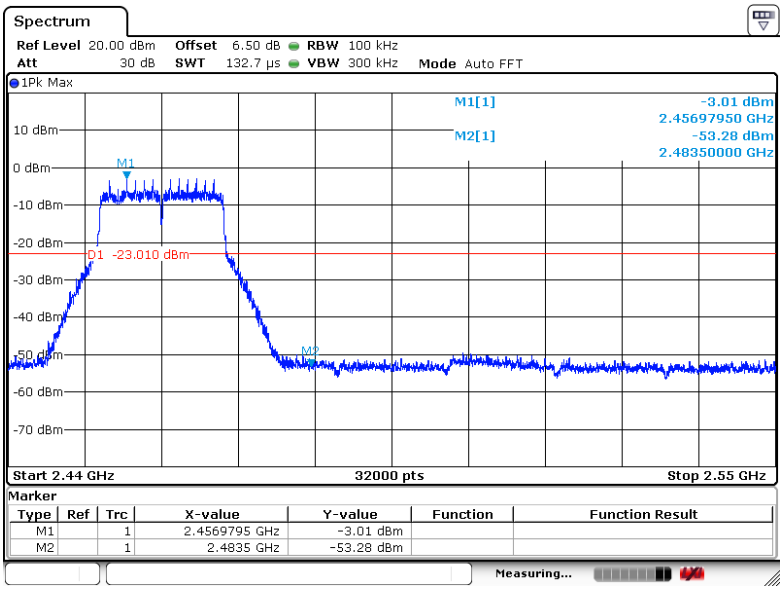
IEEE 802.11n

HT20

Low CH



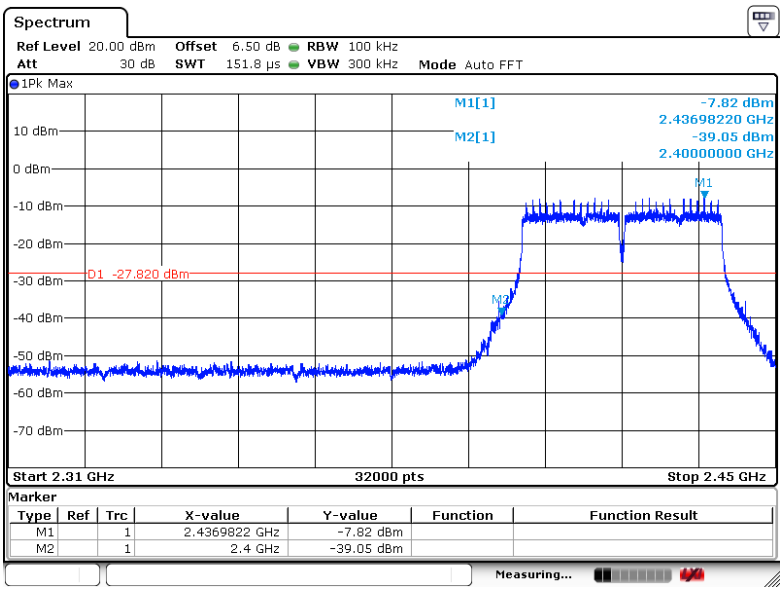
High CH



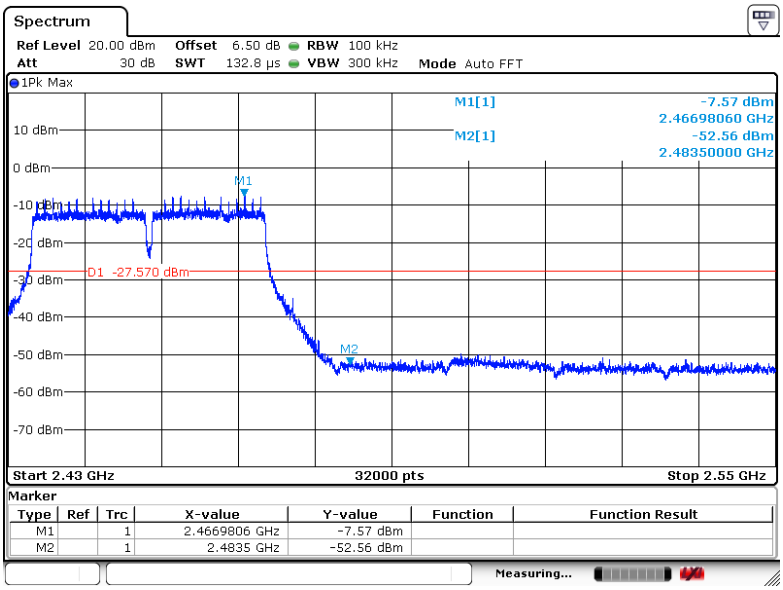
IEEE 802.11n

HT40

Low CH



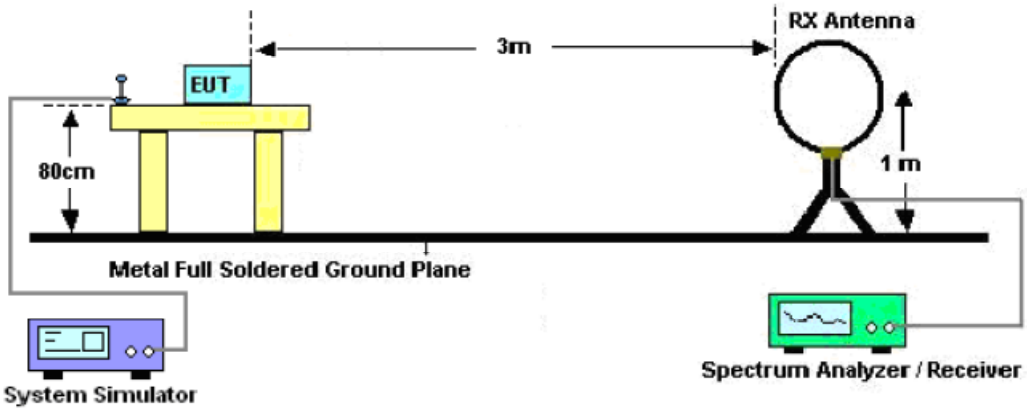
High CH



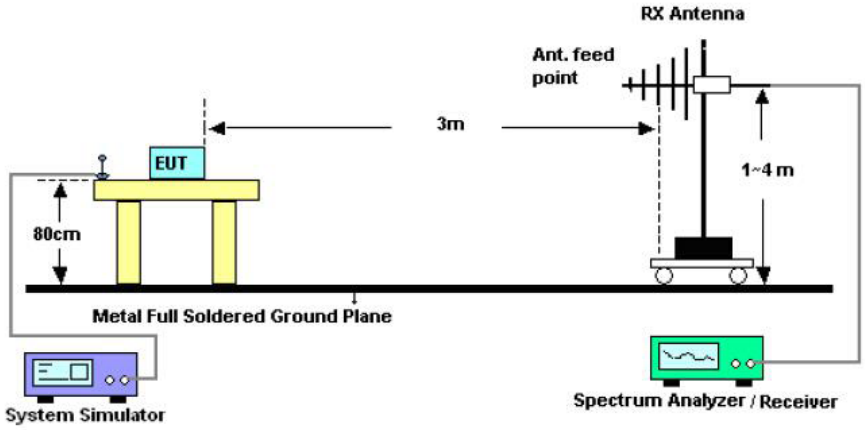
7. Radiated Spurious Emission

7.1Block Diagram of Test Setup

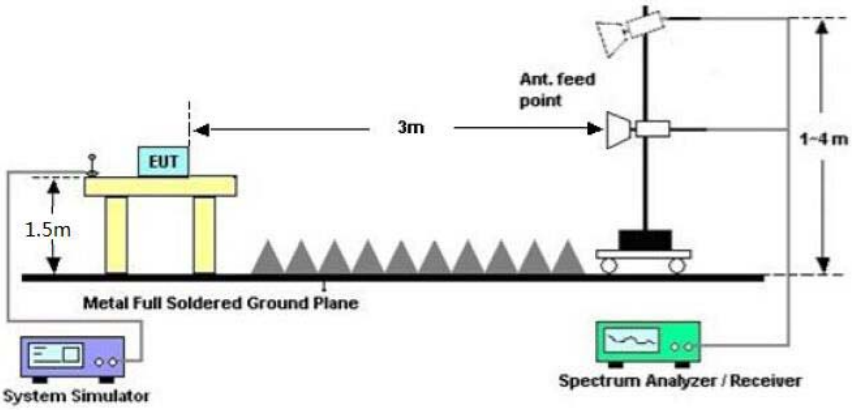
Radiated Emission Test-Setup Frequency Below 30MHz



Radiated Emission Test-Setup Frequency 30MHz-1000MHz



Radiated Emission Test-Setup Frequency Above 1000MHz



7.2 FCC 15.209 Limit

Frequency(MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009~0.490	300	2400/F(KHz)	67.6-20log(F)
0.490~1.705	30	24000/F(KHz)	87.6-20log(F)
1.705~30.0	30	30	29.54
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0dBμV/m—Peak 54.0 dBμV/m--Average	

Remark:
(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

$Limit_{3m}$ (dBuV/m)= $Limit_{30m}$(dBuV/m) + 40Log(30m/3m)

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits

7.3 Test Procedure

(1)EUT was place on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a semi-anechoic chamber for above 1G.
(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used asbelow table.

Test frequency range	Test antenna used	Test antenna distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna(18GHz-40GHz)	3m

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna alsobe positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:
(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)
(b) Change work frequency or channel of device if practicable.
(c) Change modulation type of device if practicable.
(d) Change power supply range from 85% to 115% of the rated supply voltage
(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.
Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.
(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.
(5) The emissions from 9 kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz,110 kHz-490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.
(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9 kHz-150 kHz	200 Hz
150 kHz-30 MHz	9 kHz
30 MHz-1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; RBW 1 MHz VBW 10 Hz for Average measure (according ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported

7.4 Test Result

Pass

Note: The worst data is Antenna A, only shown Antenna A Plot.

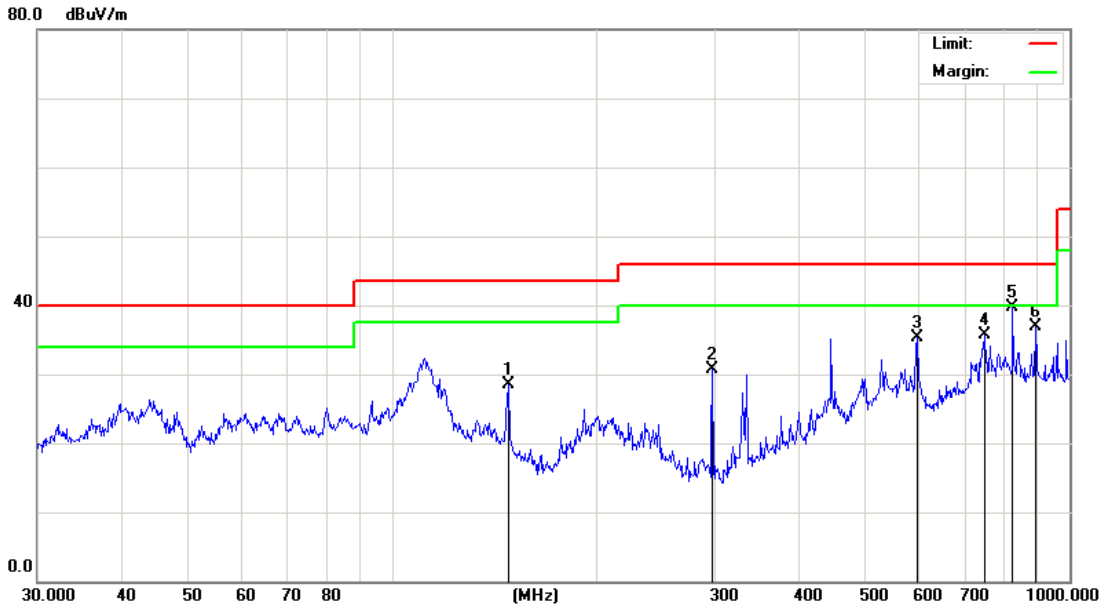
All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits.

Note1: According exploratory test no any obvious emission was detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz.

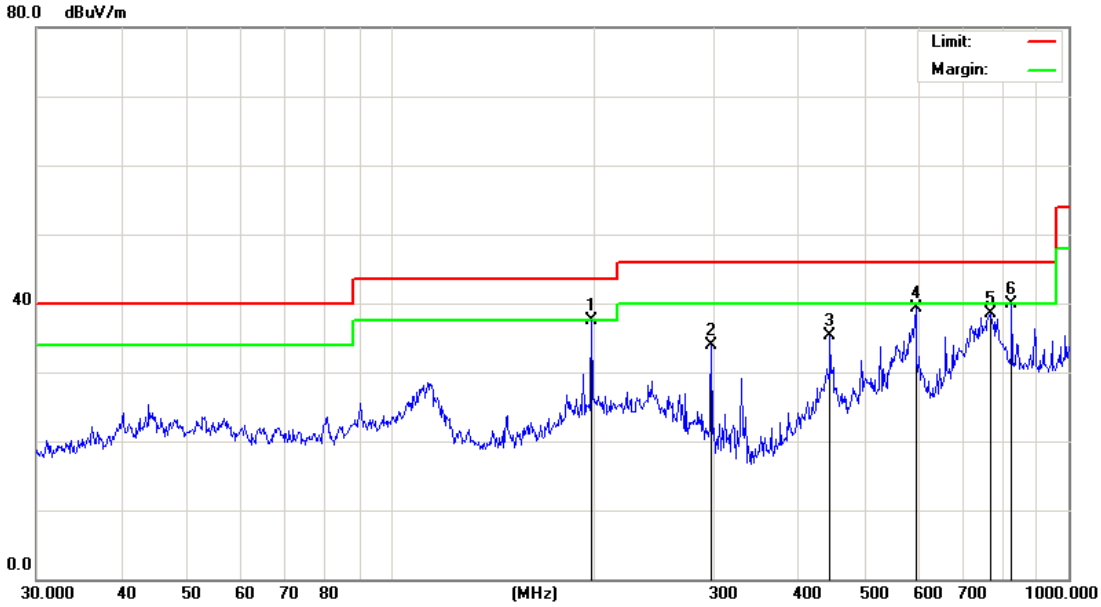
Note2: For emissions below 1GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 8DPSK, Tx 2441 MHz mode.

Note3: For emissions above 1 GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

Vertical



Horizontal


80.0 dBuV/m
Limit:
Margin:
40
0.0
30.000
40
50
60
70
80
(MHz)
300
400
500
600
700
1000.000
1
2
3
4
5
6

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 1Mbps CH1	Temperature :	20 °C
Humidity :	59 %		

802.11b mode

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	44.23	5.08	49.31	74.00	-24.69	PEAK
4824.000	30.70	5.08	35.78	54.00	-18.22	AVE
7326.000	40.98	7.55	48.53	74.00	-25.47	PEAK
7326.000	28.61	7.55	36.16	54.00	-17.84	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	44.72	5.08	49.80	74.00	-24.20	PEAK
4824.000	31.20	5.08	36.28	54.00	-17.72	AVE
7236.000	42.56	7.16	49.72	74.00	-24.28	PEAK
7236.000	29.51	7.16	36.67	54.00	-17.33	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 1Mbps CH6	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	44.75	5.13	49.88	74.00	-24.12	PEAK
4874.000	29.54	5.13	34.67	54.00	-19.33	AVE
7311.000	41.22	7.49	48.71	74.00	-25.29	PEAK
7311.000	27.31	7.49	34.80	54.00	-19.20	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.36	5.13	48.49	74.00	-25.51	PEAK
4874.000	30.38	5.13	35.51	54.00	-18.49	AVE
7311.000	41.01	7.49	48.50	74.00	-25.50	PEAK
7311.000	27.54	7.49	35.03	54.00	-18.97	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 1Mbps CH11	Temperature :	30 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924.000	43.15	5.18	48.33	74.00	-25.67	PEAK
4924.000	31.05	5.18	36.23	54.00	-17.77	AVE
7386.000	40.87	7.82	48.69	74.00	-25.31	PEAK
7386.000	29.12	7.82	36.94	54.00	-17.06	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924.000	44.54	5.18	49.72	74.00	-24.28	PEAK
4924.000	31.25	5.18	36.43	54.00	-17.57	AVE
7386.000	41.24	7.82	49.06	74.00	-24.94	PEAK
7386.000	27.54	7.82	35.36	54.00	-18.64	AVE

Note:
All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 6Mbps CH1	Temperature :	20 °C
Humidity :	59 %		

802.11g mode

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	43.96	5.08	49.04	74.00	-24.96	PEAK
4824.000	30.31	5.08	35.39	54.00	-18.61	AVE
7326.000	41.06	7.55	48.61	74.00	-25.39	PEAK
7326.000	27.34	7.55	34.89	54.00	-19.11	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	43.24	5.08	48.32	74.00	-25.68	PEAK
4824.000	30.11	5.08	35.19	54.00	-18.81	AVE
7236.000	40.99	7.16	48.15	74.00	-25.85	PEAK
7236.000	27.36	7.16	34.52	54.00	-19.48	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 6Mbps CH6	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.25	5.13	48.38	74.00	-25.62	PEAK
4874.000	29.36	5.13	34.49	54.00	-19.51	AVE
7311.000	40.13	7.49	47.62	74.00	-26.38	PEAK
7311.000	27.16	7.49	34.65	54.00	-19.35	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.31	5.13	48.44	74.00	-25.56	PEAK
4874.000	29.06	5.13	34.19	54.00	-19.81	AVE
7311.000	40.12	7.49	47.61	74.00	-26.39	PEAK
7311.000	27.07	7.49	34.56	54.00	-19.44	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 6Mbps CH11	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (Db)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (Db)	Detector Type
4924.000	43.15	5.18	48.33	74.00	-25.67	PEAK
4924.000	30.19	5.18	35.37	54.00	-18.63	AVE
7386.000	39.98	7.82	47.80	74.00	-26.20	PEAK
7386.000	27.05	7.82	34.87	54.00	-19.13	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924.000	43.22	5.18	48.40	74.00	-25.60	PEAK
4924.000	30.36	5.18	35.54	54.00	-18.46	AVE
7386.000	40.19	7.82	48.01	74.00	-25.99	PEAK
7386.000	27.23	7.82	35.05	54.00	-18.95	AVE

Note:
All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 7.2Mbps CH1	Temperature :	20 °C
Humidity :	59 %		

802.11n(HT20) mode with 7.2Mbps data rate

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	43.39	5.08	48.47	74.00	-25.53	PEAK
4824.000	30.18	5.08	35.26	54.00	-18.74	AVE
7326.000	40.19	7.55	47.74	74.00	-26.26	PEAK
7326.000	27.31	7.55	34.86	54.00	-19.14	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824.000	43.54	5.08	48.62	74.00	-25.38	PEAK
4824.000	30.02	5.08	35.10	54.00	-18.90	AVE
7236.000	41.02	7.16	48.18	74.00	-25.82	PEAK
7236.000	27.34	7.16	34.50	54.00	-19.50	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 7.2Mbps CH6	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	42.91	5.13	48.04	74.00	-25.96	PEAK
4874.000	29.39	5.13	34.52	54.00	-19.48	AVE
7311.000	40.05	7.49	47.54	74.00	-26.46	PEAK
7311.000	26.99	7.49	34.48	54.00	-19.52	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.31	5.13	48.44	74.00	-25.56	PEAK
4874.000	29.55	5.13	34.68	54.00	-19.32	AVE
7311.000	40.09	7.49	47.58	74.00	-26.42	PEAK
7311.000	27.31	7.49	34.80	54.00	-19.20	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 7.2Mbps CH11	Temperature :	20 °C
Humidity :	59 %		

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924.000	43.16	5.18	48.34	74.00	-25.66	PEAK
4924.000	30.64	5.18	35.82	54.00	-18.18	AVE
7386.000	40.15	7.82	47.97	74.00	-26.03	PEAK
7386.000	27.33	7.82	35.15	54.00	-18.85	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924.000	43.28	5.18	48.46	74.00	-25.54	PEAK
4924.000	30.35	5.18	35.53	54.00	-18.47	AVE
7386.000	40.56	7.82	48.38	74.00	-25.62	PEAK
7386.000	27.11	7.82	34.93	54.00	-19.07	AVE

Note:
All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 15Mbps CH3	Temperature :	20 °C
Humidity :	59 %		

802.11n(HT40) mode

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844.000	43.35	5.11	48.46	74.00	-25.54	PEAK
4844.000	29.48	5.11	34.59	54.00	-19.41	AVE
7266.000	40.34	7.29	47.63	74.00	-26.37	PEAK
7266.000	27.16	7.29	34.45	54.00	-19.55	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844.000	43.58	5.11	48.69	74.00	-25.31	PEAK
4844.000	29.08	5.11	34.19	54.00	-19.81	AVE
7266.000	40.17	7.29	47.46	74.00	-26.54	PEAK
7266.000	27.16	7.29	34.45	54.00	-19.55	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 15Mbps CH6	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.67	5.13	48.80	74.00	-25.20	PEAK
4874.000	30.15	5.13	35.28	54.00	-18.72	AVE
7311.000	40.55	7.49	48.04	74.00	-25.96	PEAK
7311.000	27.02	7.49	34.51	54.00	-19.49	AVE

V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874.000	43.15	5.13	48.28	74.00	-25.72	PEAK
4874.000	29.97	5.13	35.10	54.00	-18.90	AVE
7311.000	40.54	7.49	48.03	74.00	-25.97	PEAK
7311.000	27.64	7.49	35.13	54.00	-18.87	AVE

Power :	DC 7.4V from battery	Pol/Phase :	HORIZONTAL/ VERTICAL
Test Mode 1 :	TX 15Mbps CH9	Temperature :	20 °C
Humidity :	59 %		

Harmonics & Spurious Emissions. Peak & Average Measurement

H

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904.000	43.89	5.16	49.05	74.00	-24.95	peak
4904.000	30.68	5.16	35.84	54.00	-18.16	AVE
7356.000	40.64	7.69	48.33	74.00	-25.67	peak
7356.000	27.66	7.69	35.35	54.00	-18.65	AVE

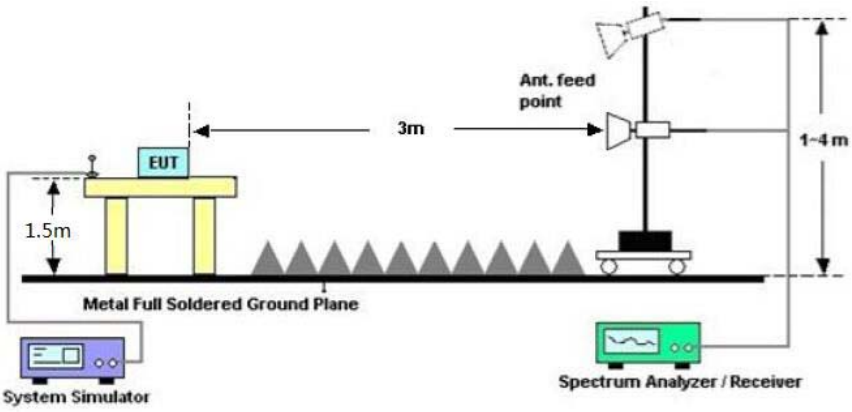
V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904.000	43.07	5.16	48.23	74.00	-25.77	peak
4904.000	30.38	5.16	35.54	54.00	-18.46	AVE
7356.000	40.06	7.69	47.75	74.00	-26.25	peak
7356.000	27.34	7.69	35.03	54.00	-18.97	AVE

Note:
All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

8. Band Edge Compliance(radiated method)

8.1Block Diagram of Test Setup



8.2Limit

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

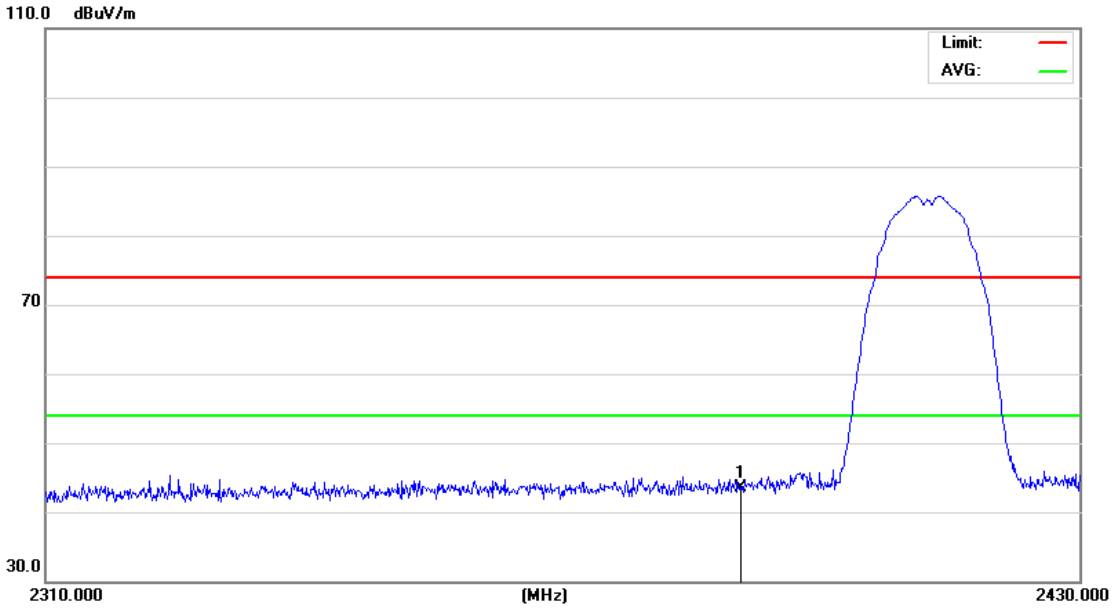
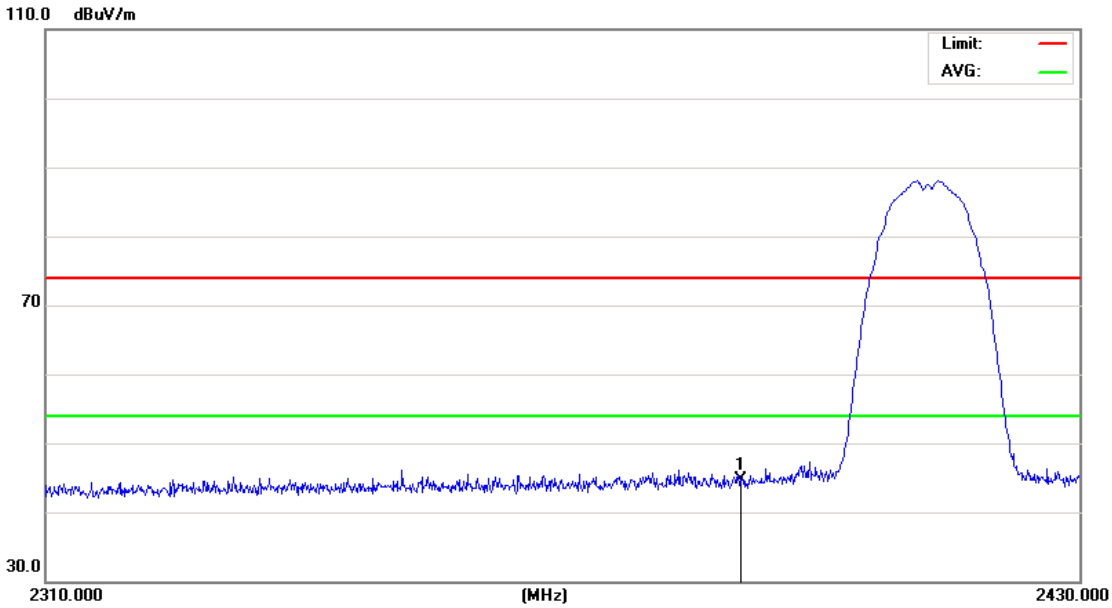
8.3 Test Procedure

Same with clause 7.3 except change investigated frequency range from 2310 MHz to 2410 MHz and 2475 MHz to 2500 MHz.

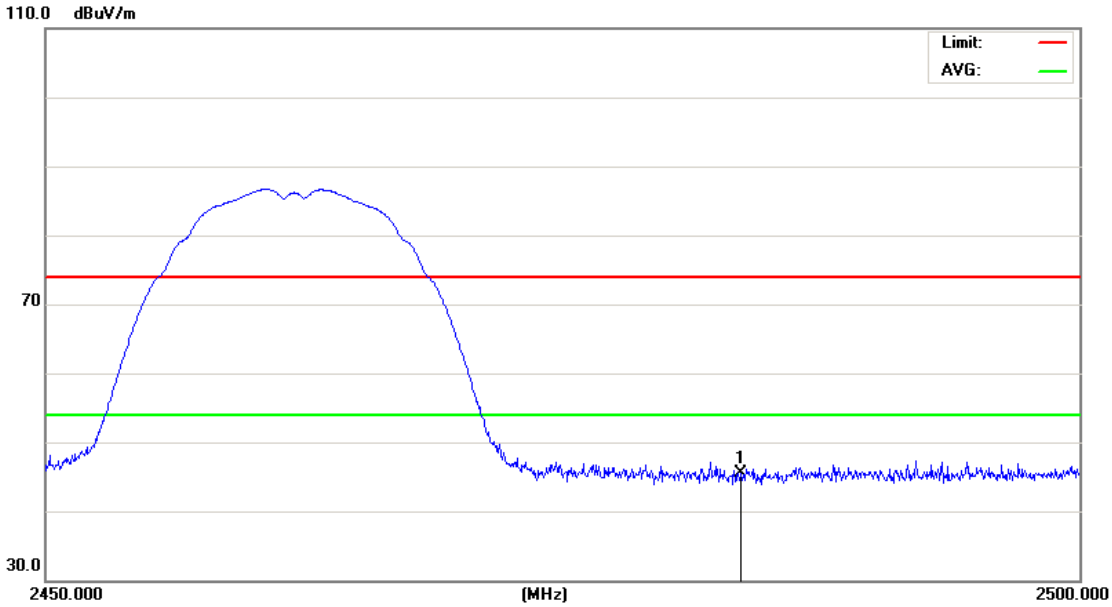
8.4 Test Result

PASS. (See below detailed test result)
Remark: hopping on and hopping off mode all have been test, hopping off mode is worse and reported only.
Note: The worst data is Antenna A, only shown Antenna A Plot.

8.5 Original Test data

11b	V  H 

V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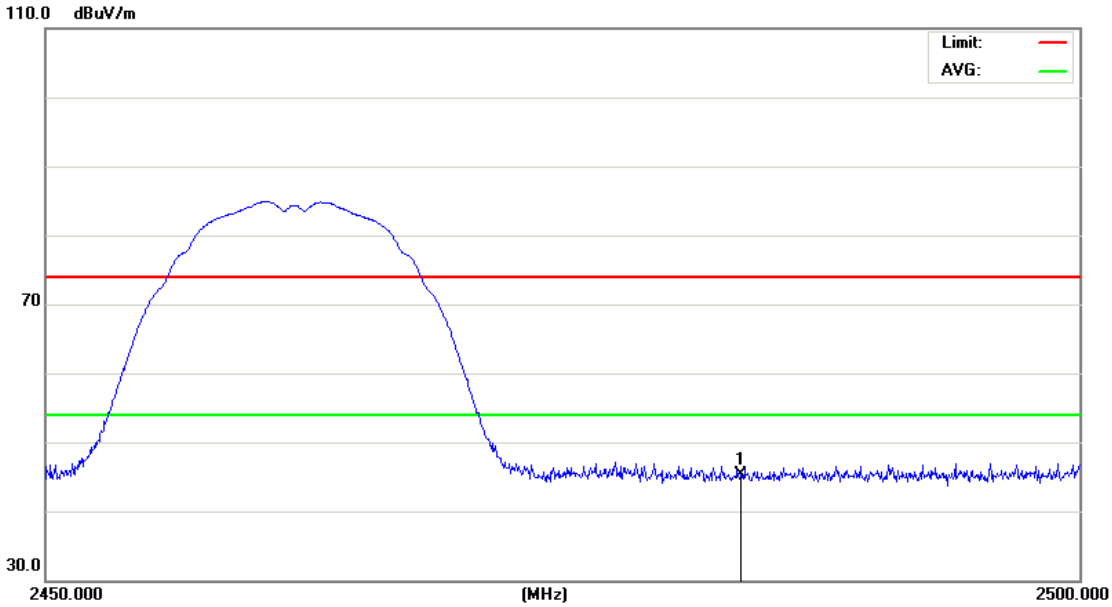
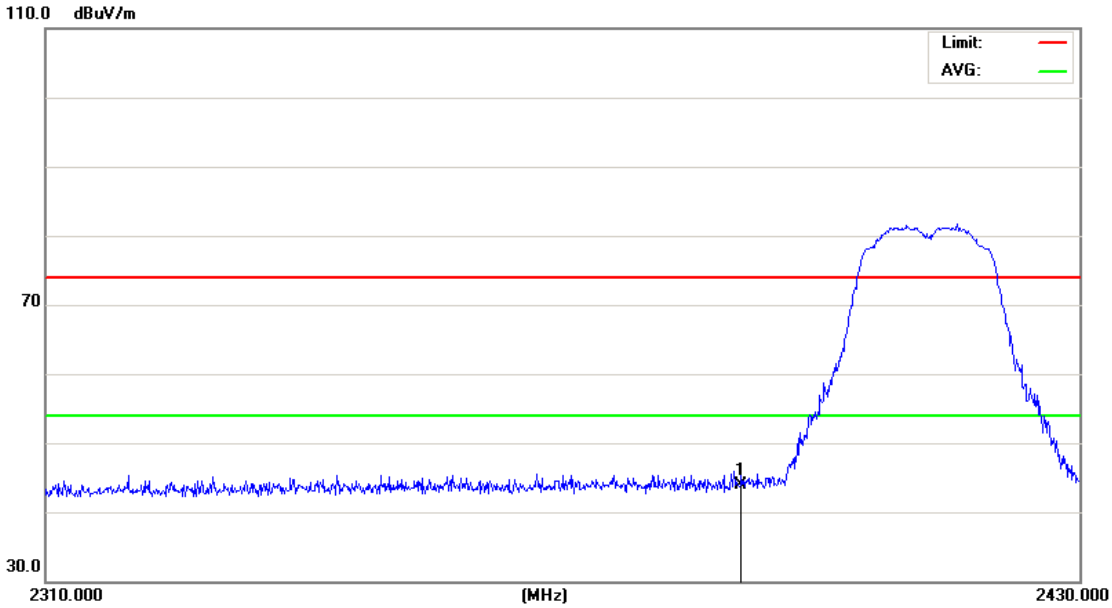
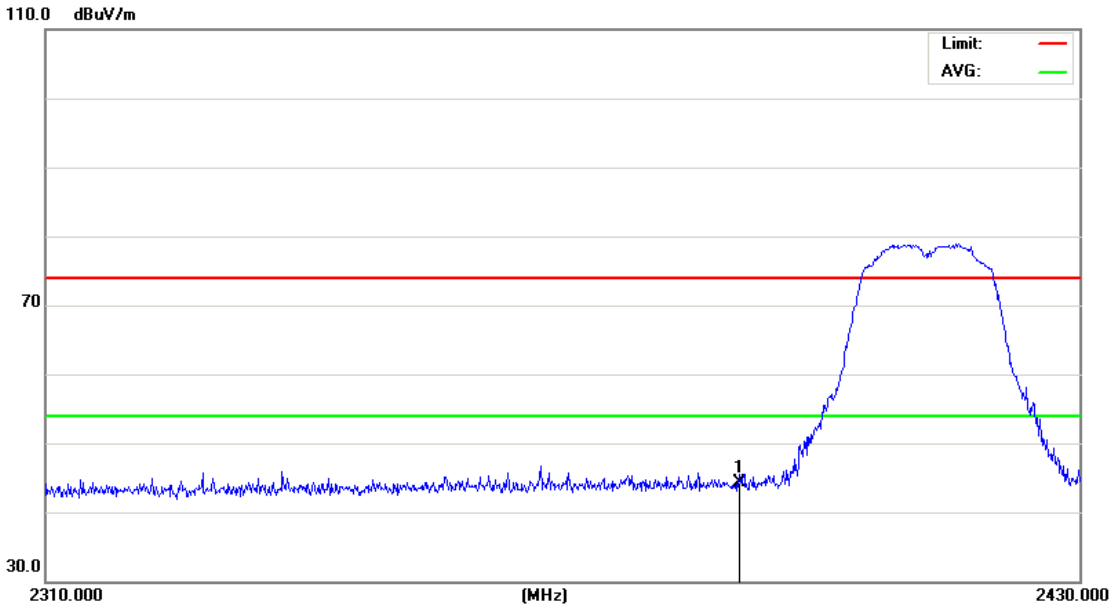
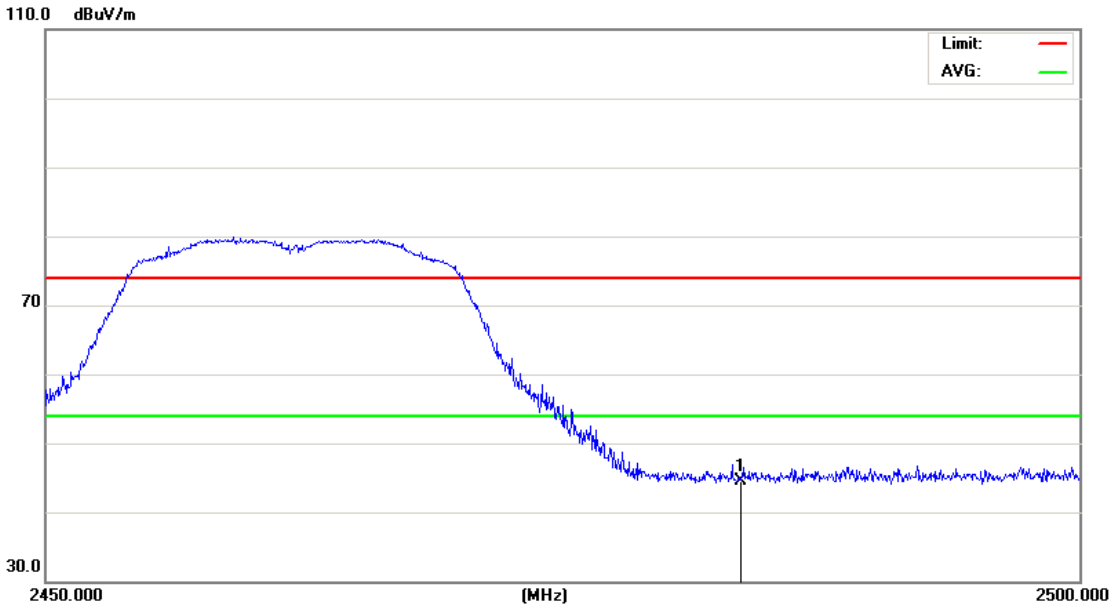
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

H

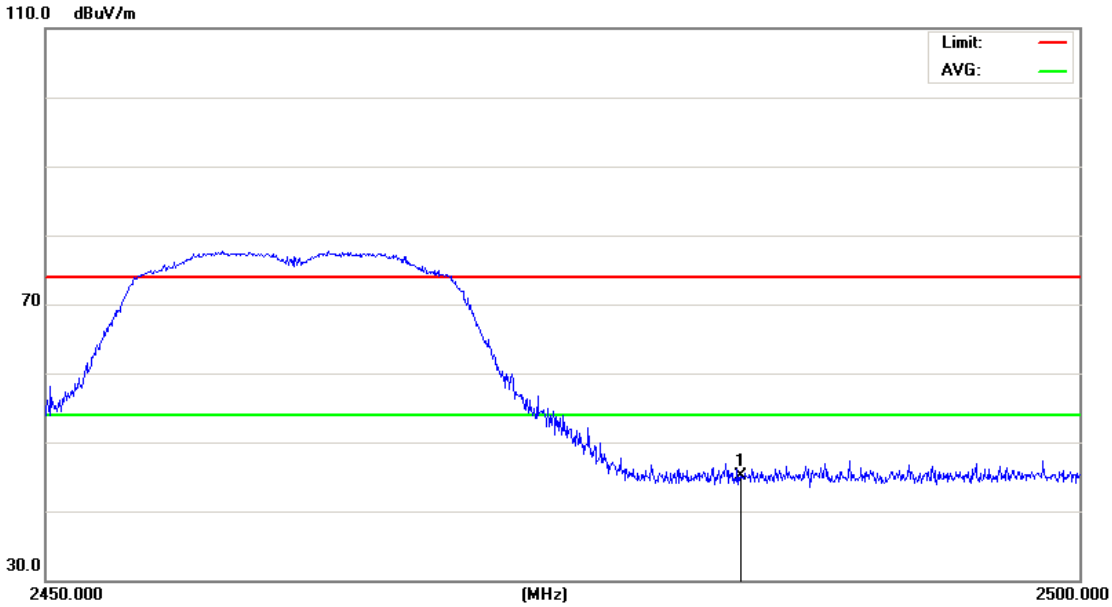

110.0 dBuV/m
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

11g	V  H 

V


110.0 dBuV/m
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

H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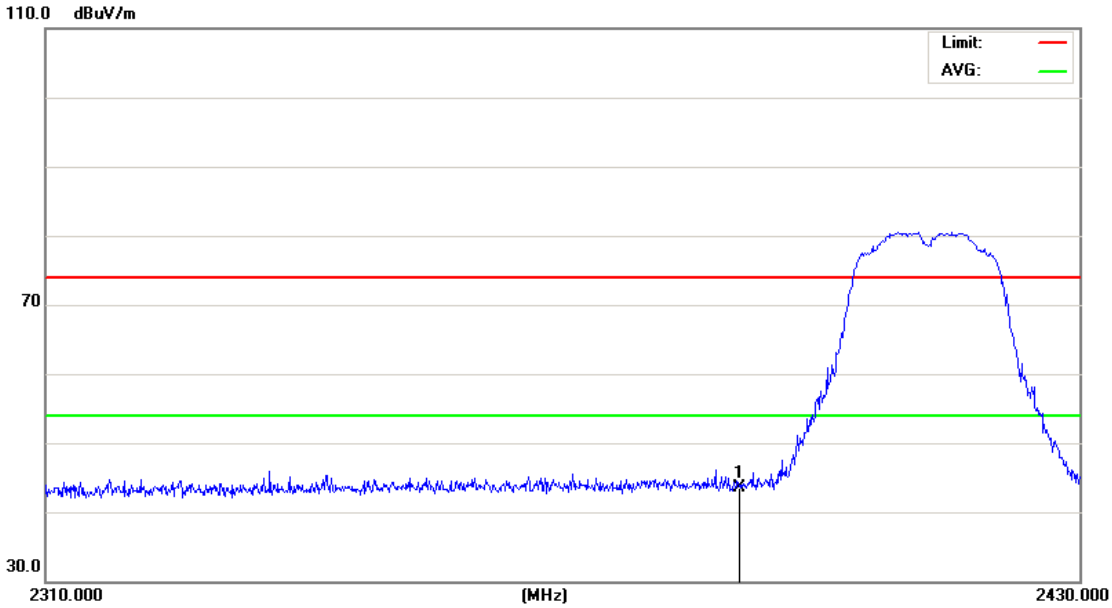
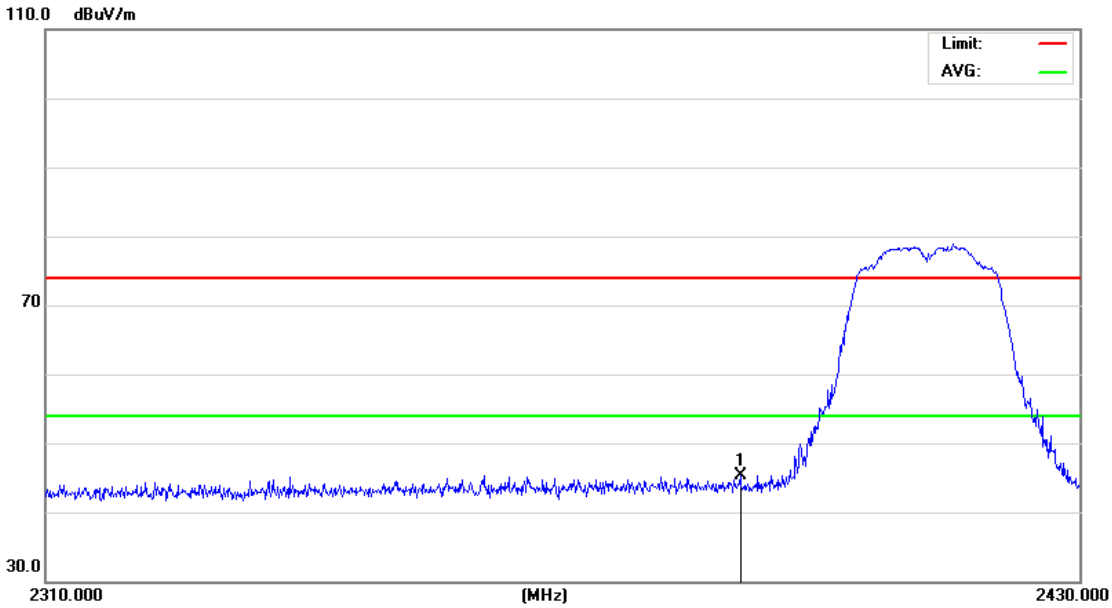
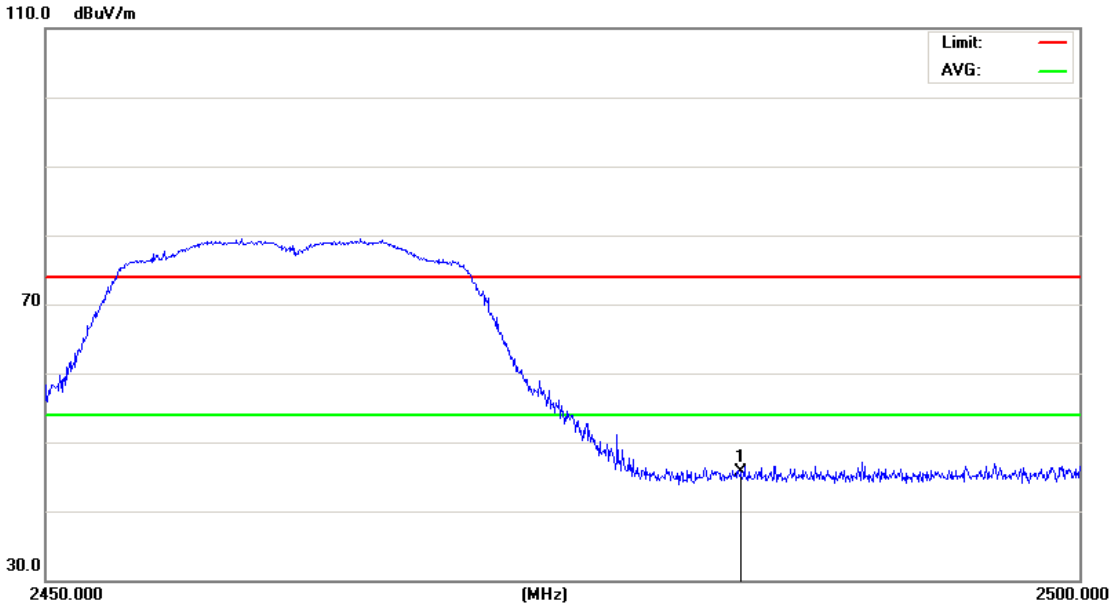
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

11n H20	V  H 

V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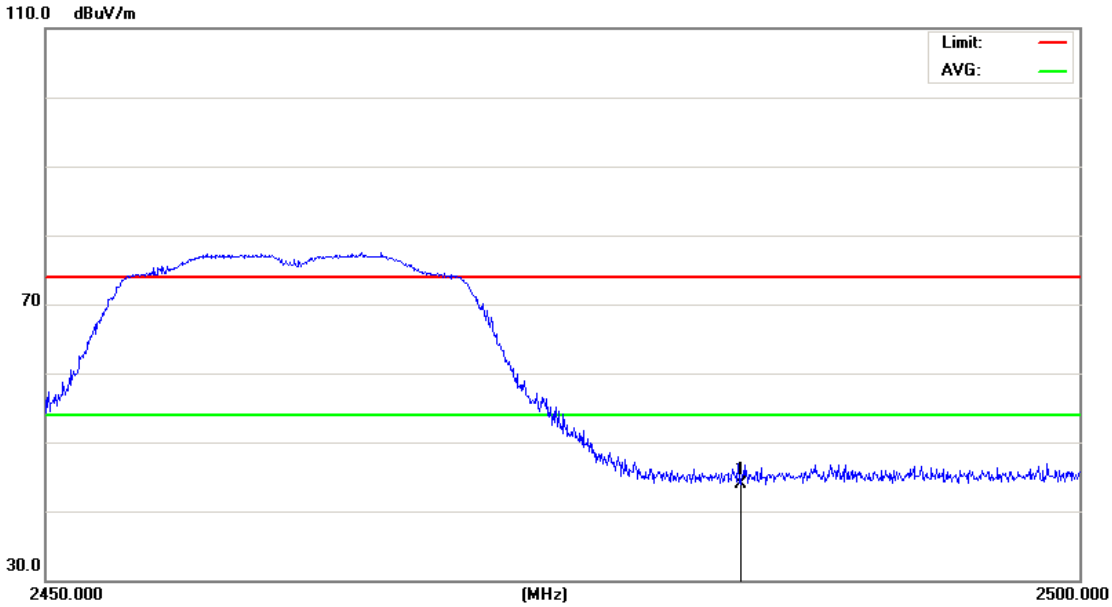
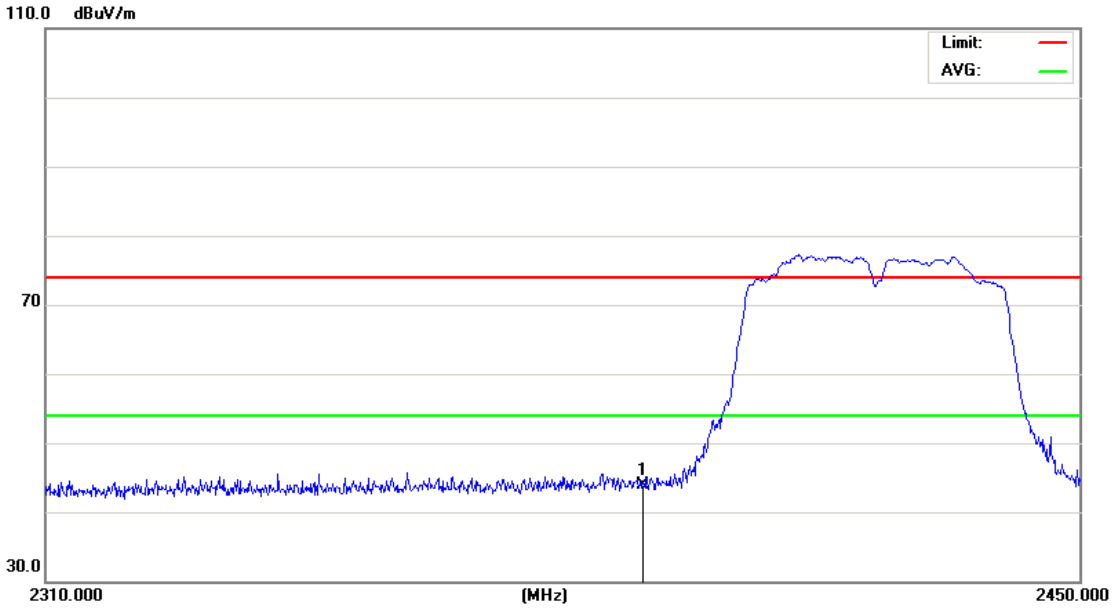
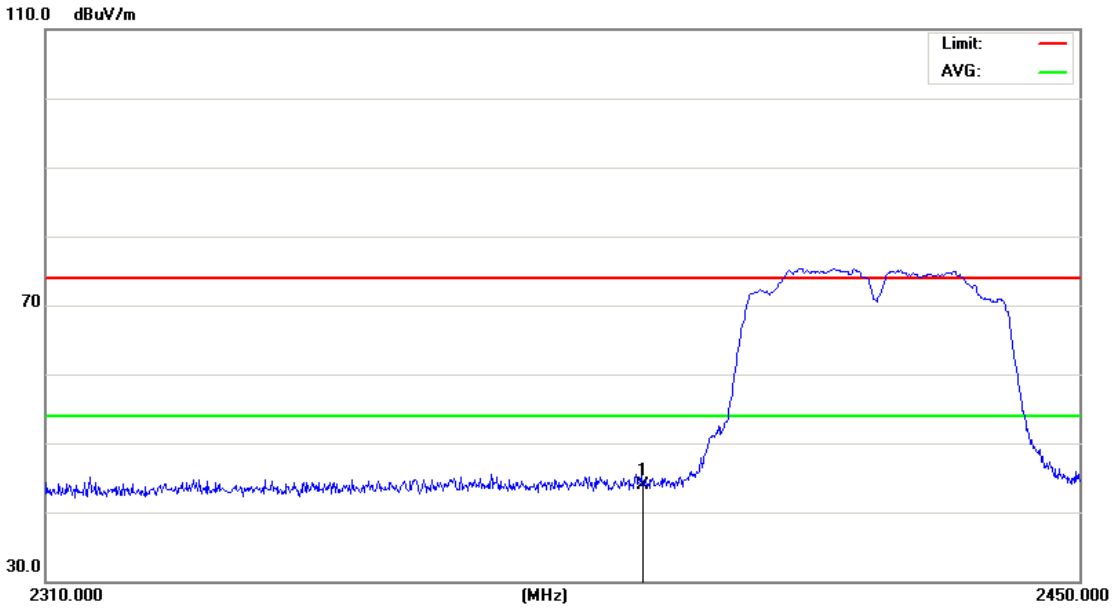
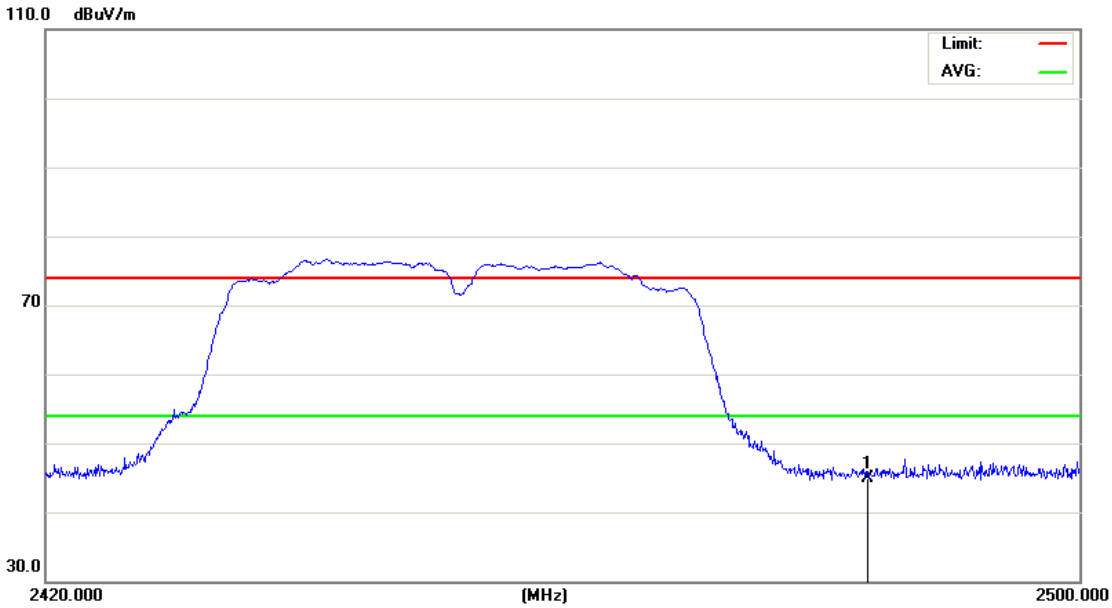
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

H

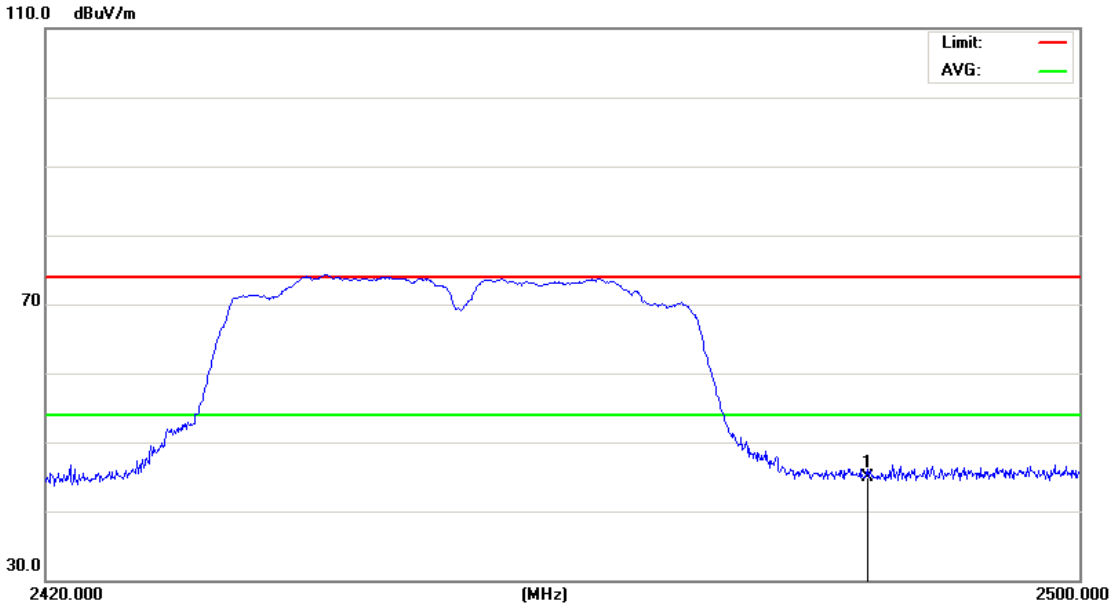

110.0 dBuV/m
Limit:
AVG:
70
30.0
1
2450.000
(MHz)
2500.000

11n H40	V  H 

V

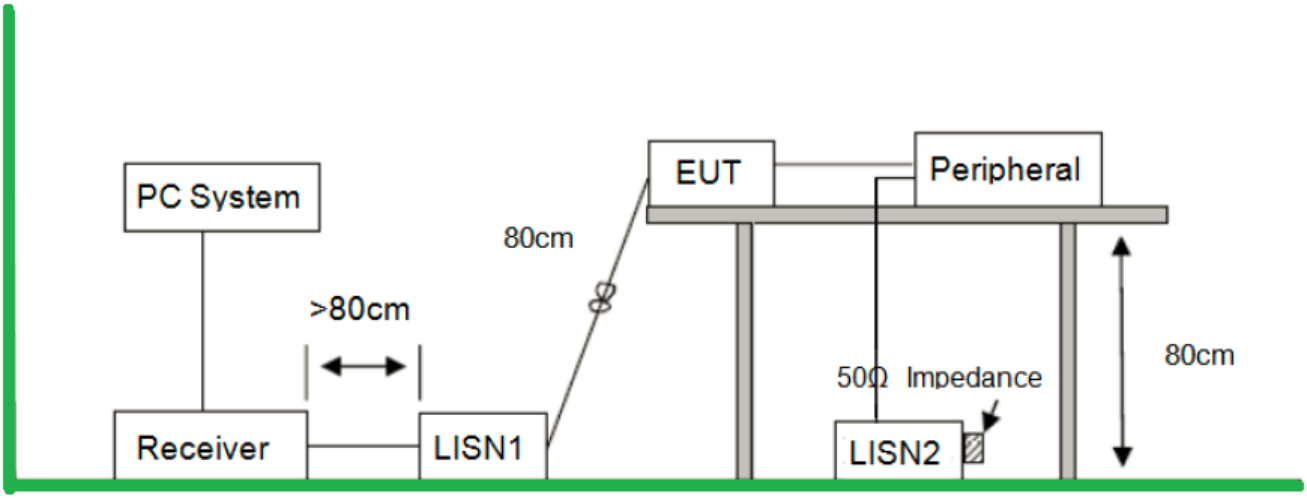

110.0 dBuV/m
Limit:
AVG:
70
30.0
1
2420.000
(MHz)
2500.000

H


110.0 dBuV/m
Limit:
AVG:
70
30.0
1
2420.000
(MHz)
2500.000

9. Power Line Conducted Emission

9.1Block Diagram of Test Setup



9.2Limit

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150KHz-500KHz	66 ~ 56*	56 ~ 46*
500KHz-5MHz	56	46
5MHz-30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.
Note 2: The lower limit shall apply at the transition frequencies

9.3 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

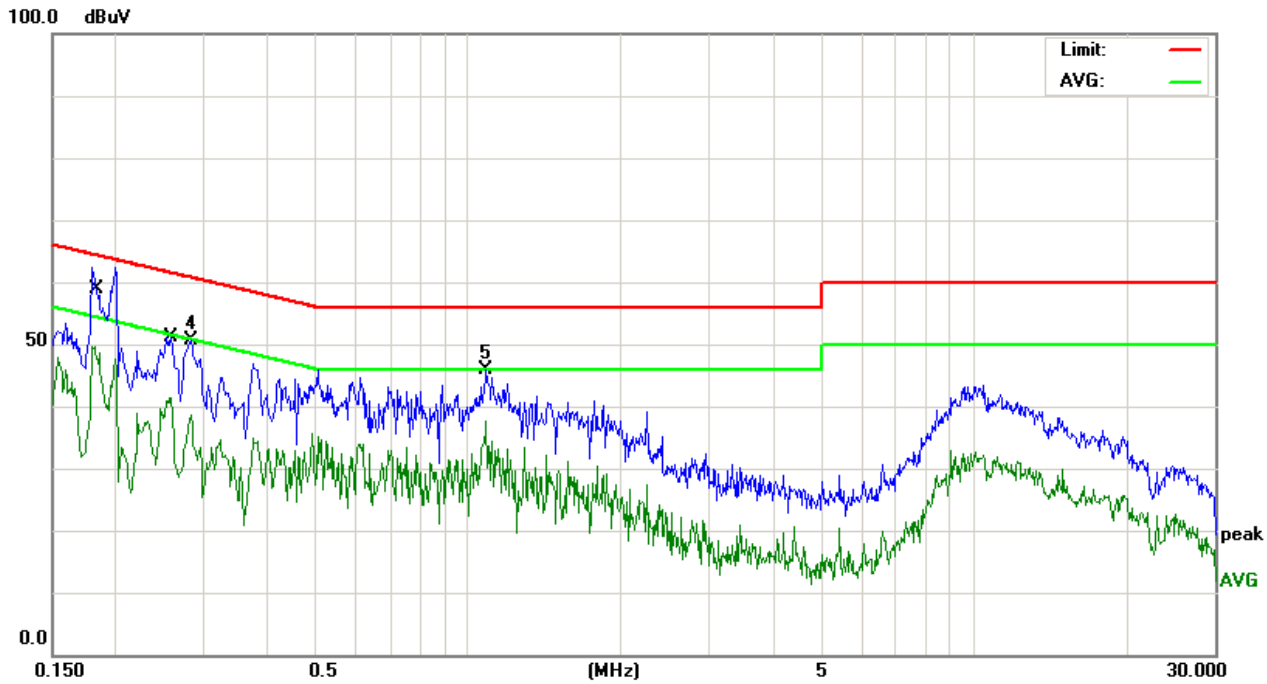
The bandwidth of test receiver is set at 9 kHz.

9.4 Test Result

PASS. (See below detailed test result)

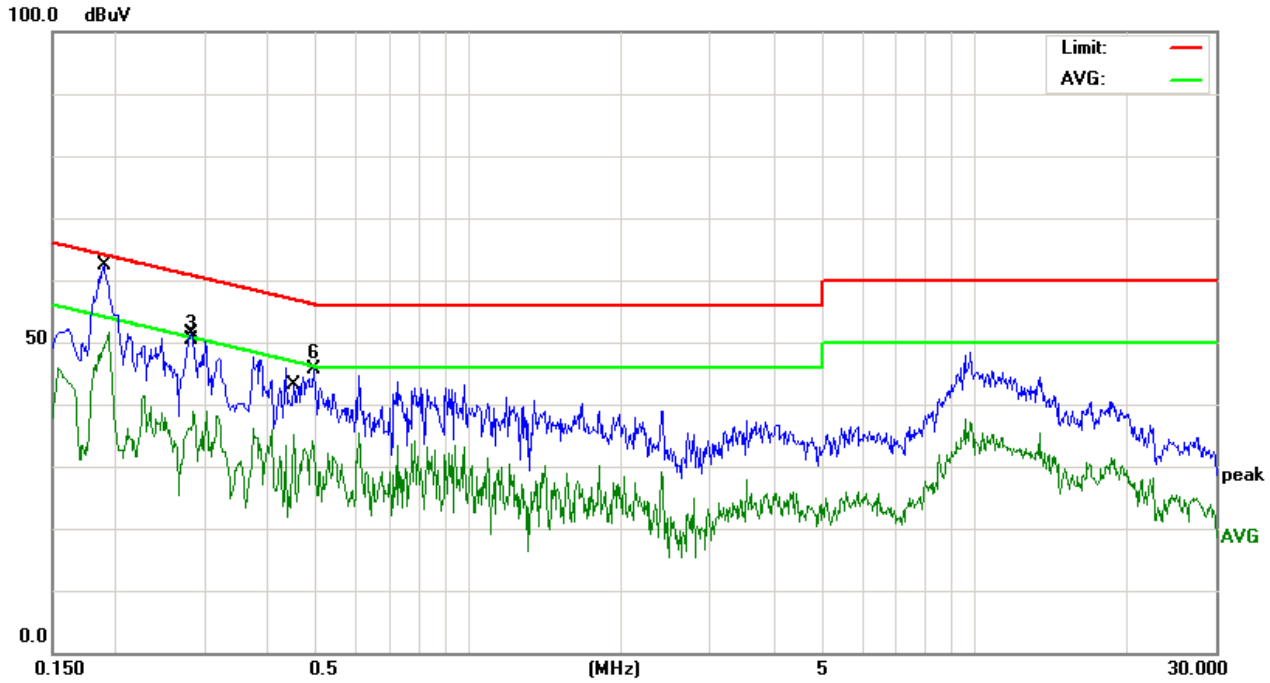
9.5 Original Test data

L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1860	57.44	2.27	59.71	64.21	-4.50	QP
2		0.1860	47.24	2.27	49.51	54.21	-4.70	AVG
3		0.2580	39.55	1.84	41.39	51.49	-10.10	AVG
4		0.2819	48.87	1.71	50.58	60.76	-10.18	peak
5		1.0859	44.96	0.84	45.80	56.00	-10.20	peak
6		1.0859	36.72	0.84	37.56	46.00	-8.44	AVG

N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1900	57.24	2.22	59.46	64.03	-4.57	QP
2	*	0.1900	48.43	2.22	50.65	54.03	-3.38	AVG
3		0.2819	48.76	1.71	50.47	60.76	-10.29	peak
4		0.2819	37.44	1.71	39.15	50.76	-11.61	AVG
5		0.4500	34.23	0.99	35.22	46.87	-11.65	AVG
6		0.4939	44.80	0.93	45.73	56.10	-10.37	peak

10. Antenna Requirements

10.1 Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2 Result

The antennas used for this product are integrated antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 1.12 dBi.

※※※※※**END OF REPORT**※※※※※