FCC Test Report

Report No: FCS202007005W01

Issued for

Sinocan International Technologies Co., Ltd

4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China

Product Name:	Interactive Touch Panel
Brand Name:	Bestboard
Model Name:	R5E65
Series Model:	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
FCC ID:	2AT6L-R5E65

Issued By: Flux Compliance Service Laboratory
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TEST RESULT CERTIFICATION

Applicant's Name ..... :	Sinocan International Technologies Co., Ltd
Address ..... :	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China
Manufacture's Name ..... :	Sinocan International Technologies Co., Ltd
Address ..... :	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China

Product Description

Product Name ..... :	Interactive Touch Panel
Brand Name ..... :	Bestboard
Model Name ..... :	R5E65
Series Model ..... :	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
Test Standards ..... :	FCC Part15.247
Test Procedure ..... :	ANSI C63.10-2013

This device described above has been tested by Flux Compliance Service Laboratory, 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 .:	10 July 2020 to 22 July 2020
Date of Issue .....:	22 July 2020
Test Result .....:	Pass

Tested by : Chris chen

(Chris Chen)

Reviewed by : Jack chen

(Jack Chen)

Approved by : Andy yue

(Andy yue)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	22 July 2020	FCS202007005W01	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02

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

NOTE:

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

(2) All tests are according to ANSI C63.10-2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 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.	Item	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 1GHz -18GHz	±4.66 dB
7	All emissions,radiated 18GHz -40GHz	±4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Interactive Touch Panel
Trade Name	Bestboard
Model Name	R5E65
Series Model	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
Model Difference	The difference between the test sample and other models are that the color is different, and all circurts are the same.
Channel List	Please refer to the Note 2.2.
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: up to 150 Mbps, HT40: up to 300Mbps
Power supply	AC 120V/60HZ
Battery	NA
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452
02	2417	06	2437	10	2457
03	2422	07	2442	11	2462
04	2427	08	2447		

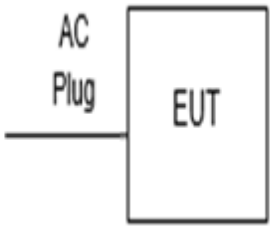
3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	CC2	PIFA antenna	N/A	2.0B dBi	Antenna

2.2 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.

Block diagram of EUT configuration for test



Test software: the QA tool-D

The test softeware was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

Tested mode, channel, and data rate information

Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11b	8	1	LCH: CH1	2412
	8	1	MCH: CH6	2437
	8	1	HCH: CH11	2462
IEEE 802.11g	20	6	LCH: CH1	2412
	20	6	MCH: CH6	2437
	20	6	HCH: CH11	2462
IEEE 802.11n HT20	20	MCS 8	LCH: CH1	2412
	20	MCS 8	MCH: CH6	2437
	20	MCS 8	HCH: CH11	2462
IEEE 802.11n HT40	20	MCS 8	LCH: CH3	2422
	20	MCS 8	MCH: CH6	2437
	20	MCS 8	HCH: CH9	2452

Note:

(1) According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test,

(2) During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 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	2019.10.09	2020.10.10
Signal Analyzer	R&S	FSV40-N	FCS-E012	2019.10.09	2020.10.10
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2019.10.09	2020.10.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2019.10.26	2020.10.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2019.10.03	2020.10.02
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2019.10.09	2020.10.10
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	2019.10.03	2020.10.02
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2019.10.08	2020.10.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2019.10.03	2020.10.02

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2019.10.03	2020.10.02
LISN	R&S	ENV216	FCS-E007	2019.10.03	2020.10.02
LISN	ETS	3810/2NM	FCS-E009	2019.10.15	2020.10.14
Temperature & Humidity	HTC-1	victor	FCS-E008	2019.10.03	2020.10.02

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2019.10.02	2020.10.01
Spectrum Analyzer	Agilent	E4447A	MY50180039	2019.11.08	2020.11.07
Spectrum Analyzer	R&S	FSV-40	101499	2019.10.10	2020.10.09

3. 6DB BANDWIDTH

3.1 Limit

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

3.2 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

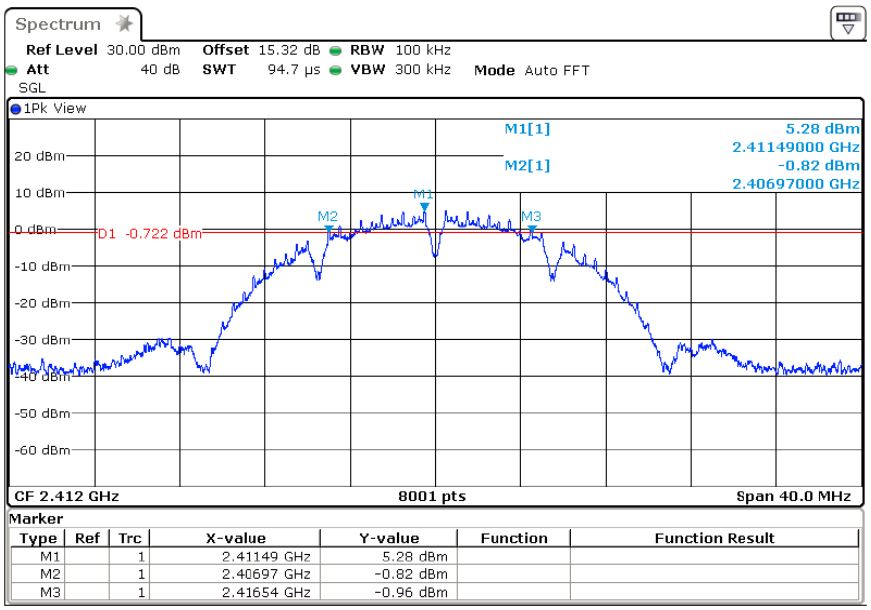
3.3 Test setup

3.4 Test results

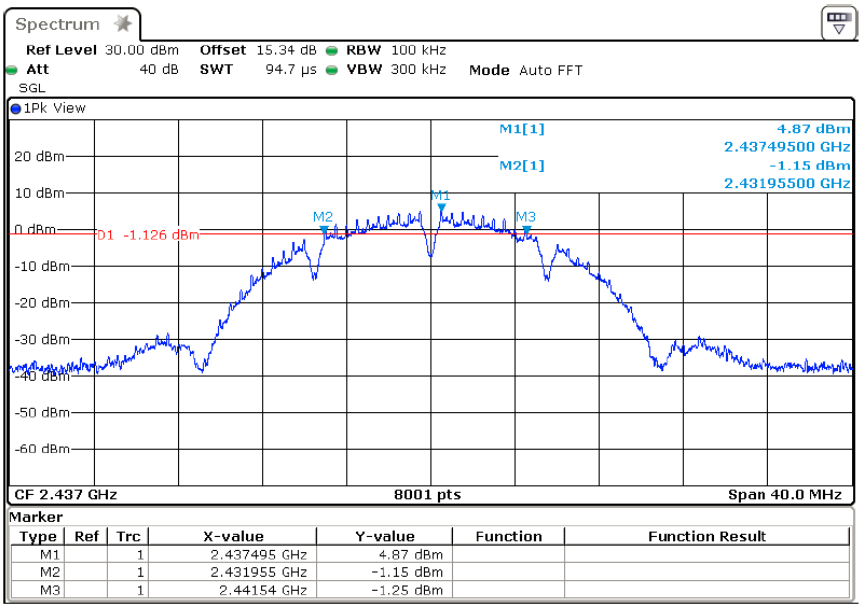
TestMode	Channel (MHz)	6dB Bandwidth (MHz)	Limit [MHz]	Verdict
802.11b	2412MHz	9.570	0.5	Pass
802.11b	2437MHz	9.585	0.5	Pass
802.11b	2462MHz	9.095	0.5	Pass
802.11g	2412MHz	16.335	0.5	Pass
802.11g	2437MHz	16.340	0.5	Pass
802.11g	2462MHz	16.340	0.5	Pass
802.11n 20	2412MHz	17.585	0.5	Pass
802.11n 20	2437MHz	17.580	0.5	Pass
802.11n 20	2462MHz	17.590	0.5	Pass
802.11n 40	2422MHz	35.690	0.5	Pass
802.11n 40	2437MHz	35.720	0.5	Pass
802.11n 40	2452MHz	35.720	0.5	Pass

3.5 Original Test Data

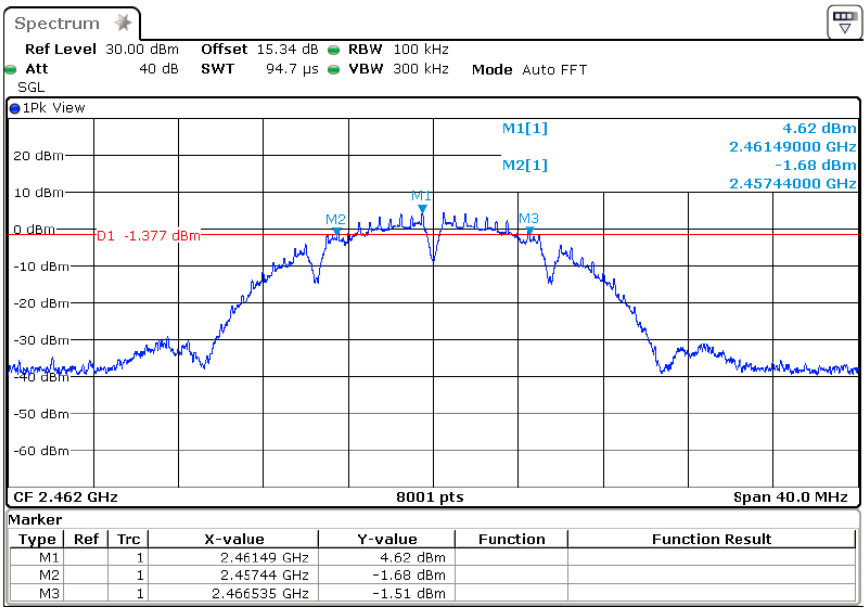
802.11b-CH2412MHZ



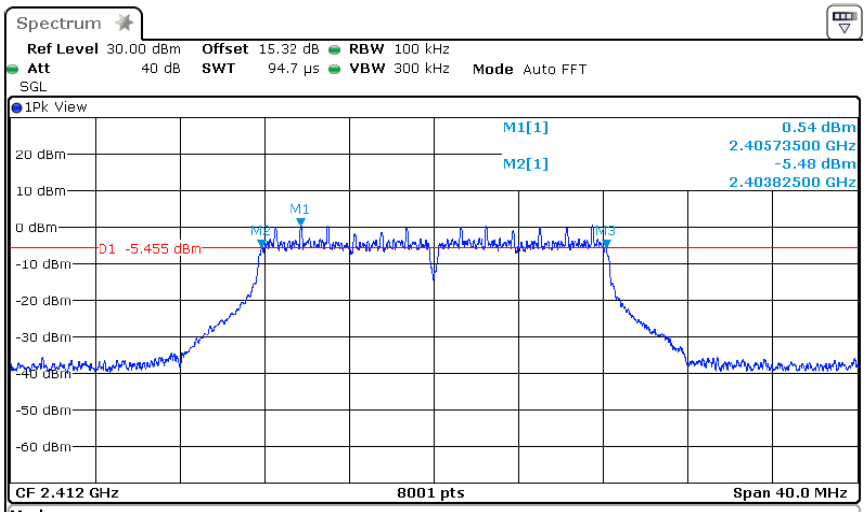
802.11b-CH237MHZ



802.11b-CH2462MHZ



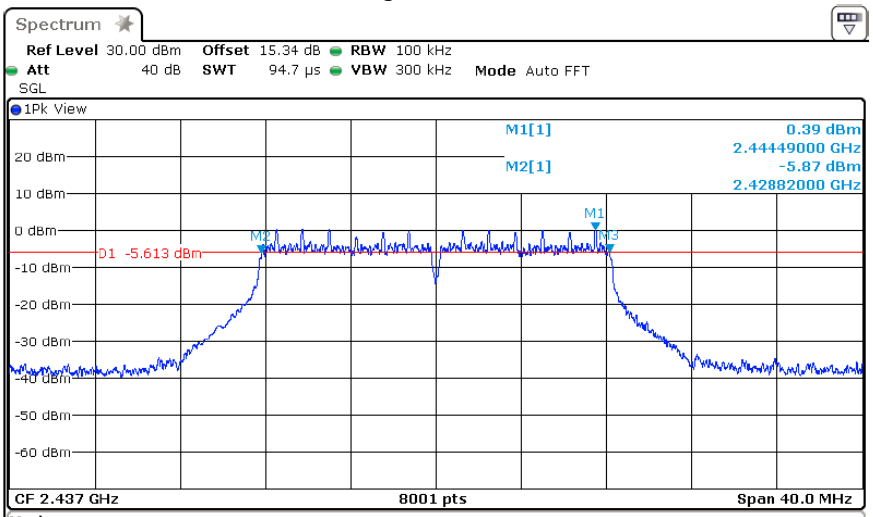
802.11g H2412MHZ



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.405735 GHz	0.54 dBm		
M2		1	2.403825 GHz	-5.48 dBm		
M3		1	2.42016 GHz	-5.55 dBm		

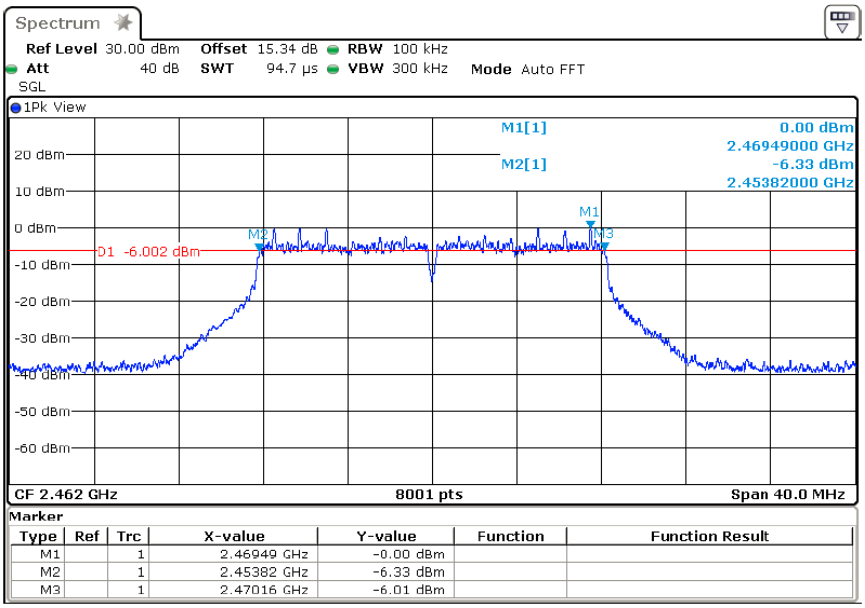
802.11g CH2437MHZ



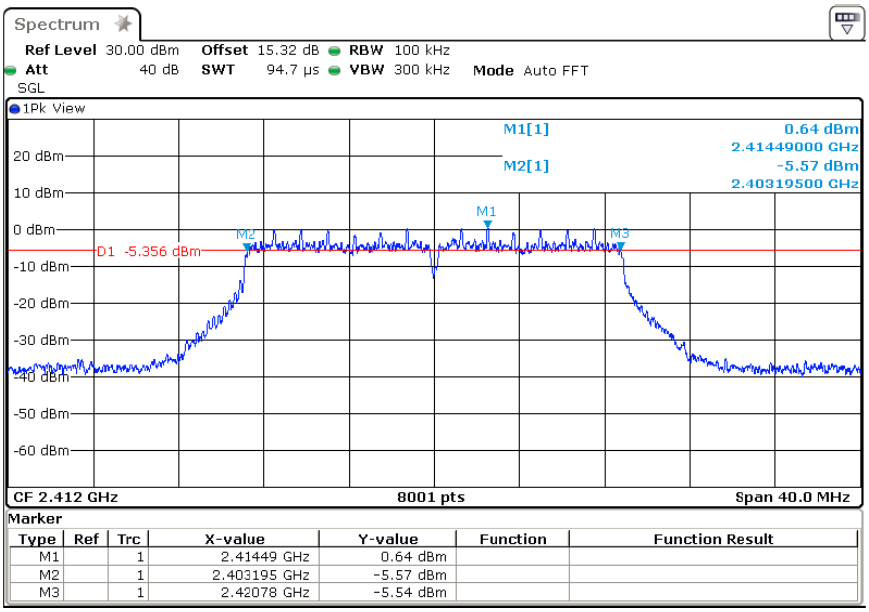
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44449 GHz	0.39 dBm		
M2		1	2.42882 GHz	-5.87 dBm		
M3		1	2.41516 GHz	-5.68 dBm		

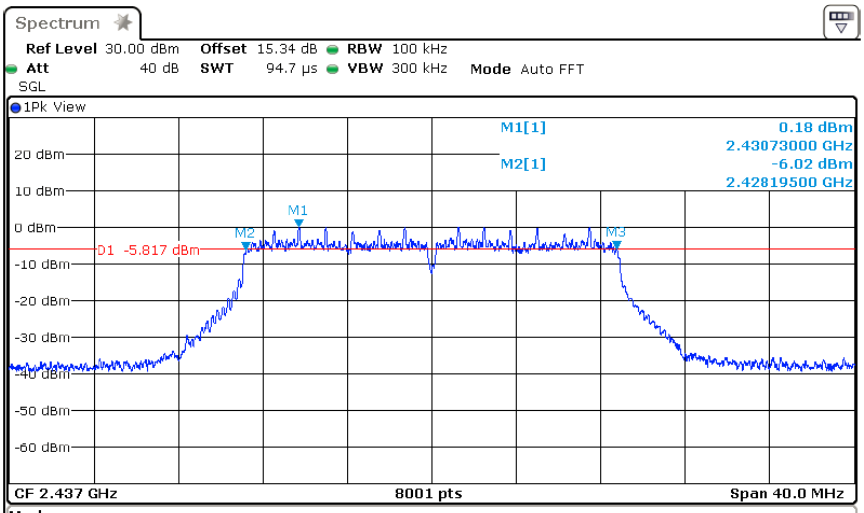
802.11g CH2462MHZ



802.11n 20-2412MHz



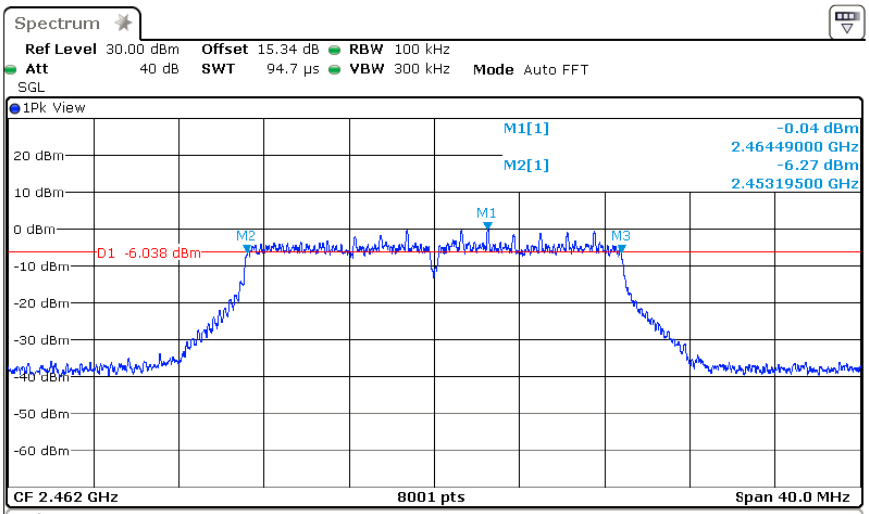
802.11n 20-2437MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43073 GHz	0.18 dBm		
M2		1	2.428195 GHz	-6.02 dBm		
M3		1	2.445775 GHz	-5.83 dBm		

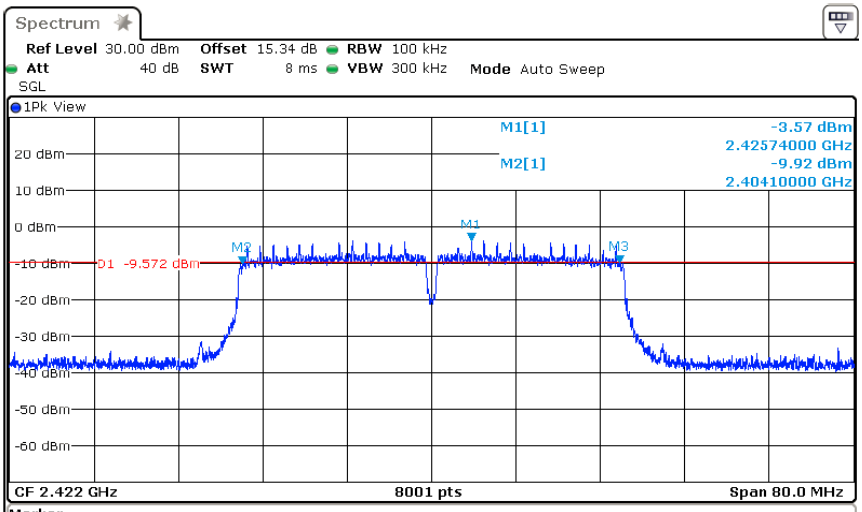
802.11n 20-2462MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46449 GHz	-0.04 dBm		
M2		1	2.453195 GHz	-6.27 dBm		
M3		1	2.470785 GHz	-6.25 dBm		

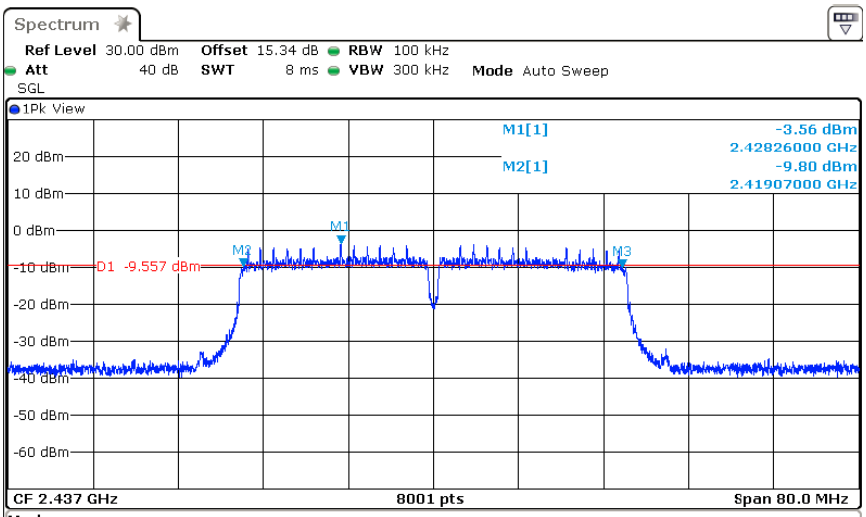
802.11n 40-2422MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42574 GHz	-3.57 dBm		
M2		1	2.4041 GHz	-9.92 dBm		
M3		1	2.43979 GHz	-9.78 dBm		

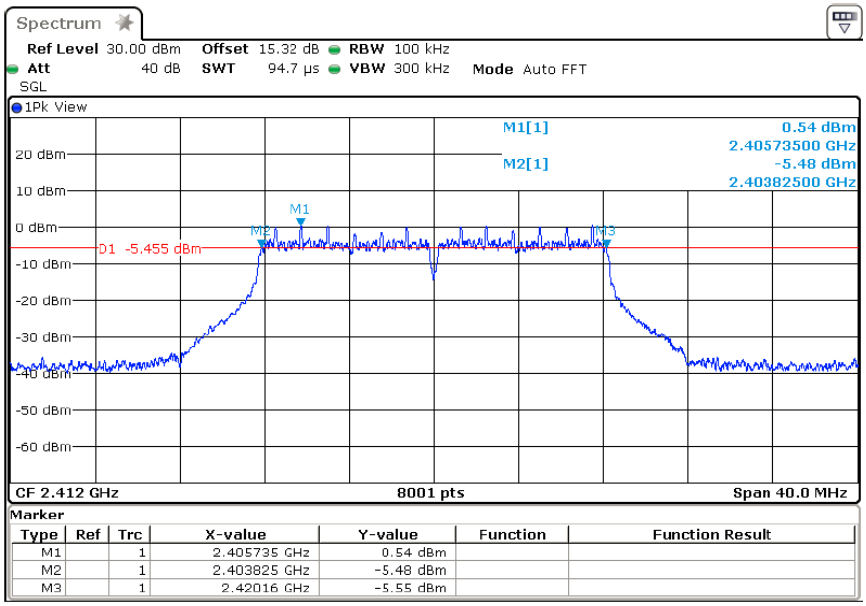
802.11n 40-2437MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42826 GHz	-3.56 dBm		
M2		1	2.41907 GHz	-9.80 dBm		
M3		1	2.45479 GHz	-10.05 dBm		

802.11n 40-2452MHz



4 CONDUCTED OUTPUT POWER

4.1 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.

4.2 test procedure

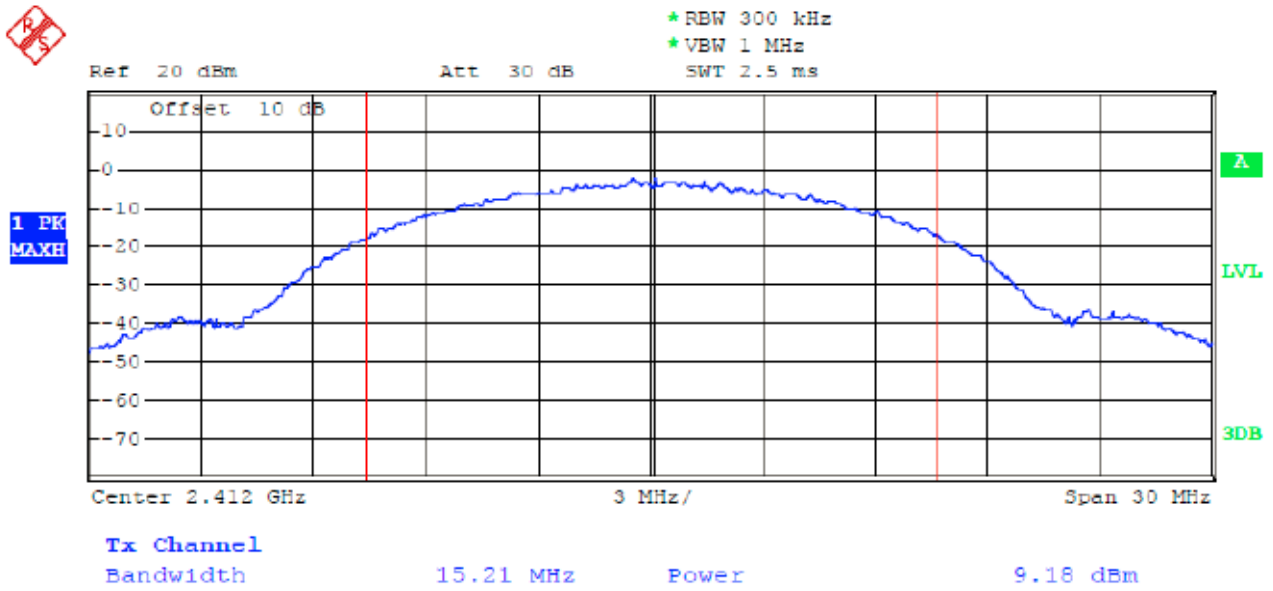
a. Connect each EUT's antenna output to power sensor by RF cable and attenuator

4.3 TEST SETUP

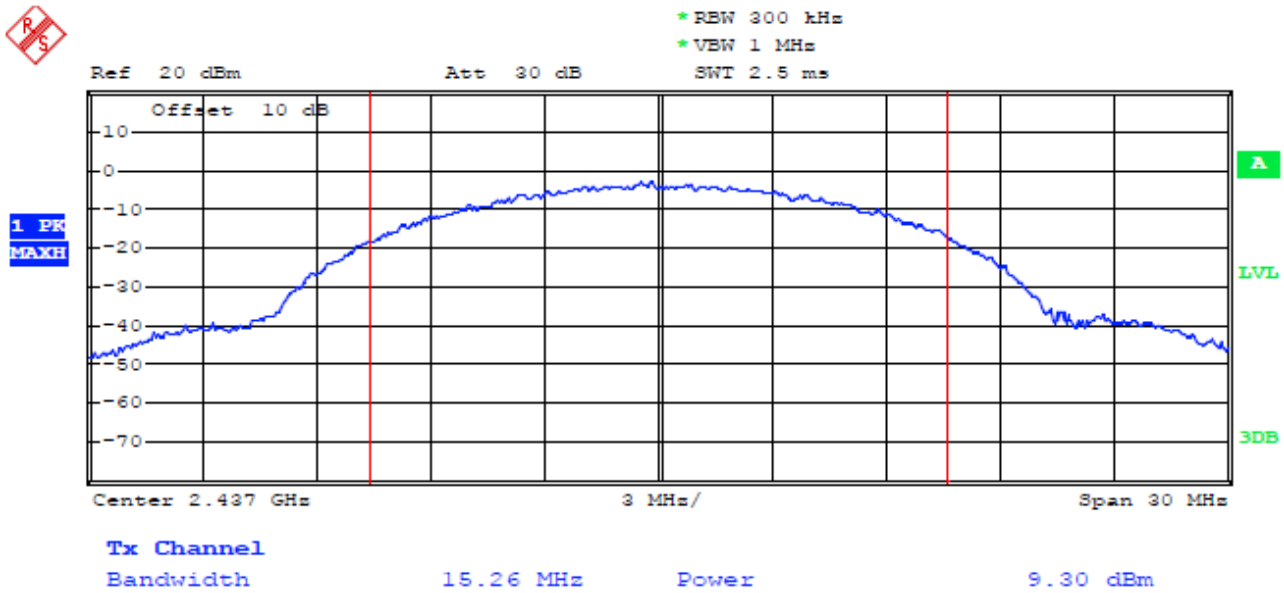
4.5 test results

TestMode	Channel (MHz)	Result（dBm）	Limit（dBm）	Verdict
802.11b	2412MHz	9.18	30	Pass
802.11b	2437MHz	9.30	30	Pass
802.11b	2462MHz	9.24	30	Pass
802.11g	2412MHz	8.39	30	Pass
802.11g	2437MHz	8.74	30	Pass
802.11g	2462MHz	8.85	30	Pass
802.11n 20	2412MHz	8.86	30	Pass
802.11n 20	2437MHz	8.73	30	Pass
802.11n 20	2462MHz	8.42	30	Pass
802.11n 40	2422MHz	7.20	30	Pass
802.11n 40	2437MHz	7.03	30	Pass
802.11n 40	2452MHz	7.11	30	Pass

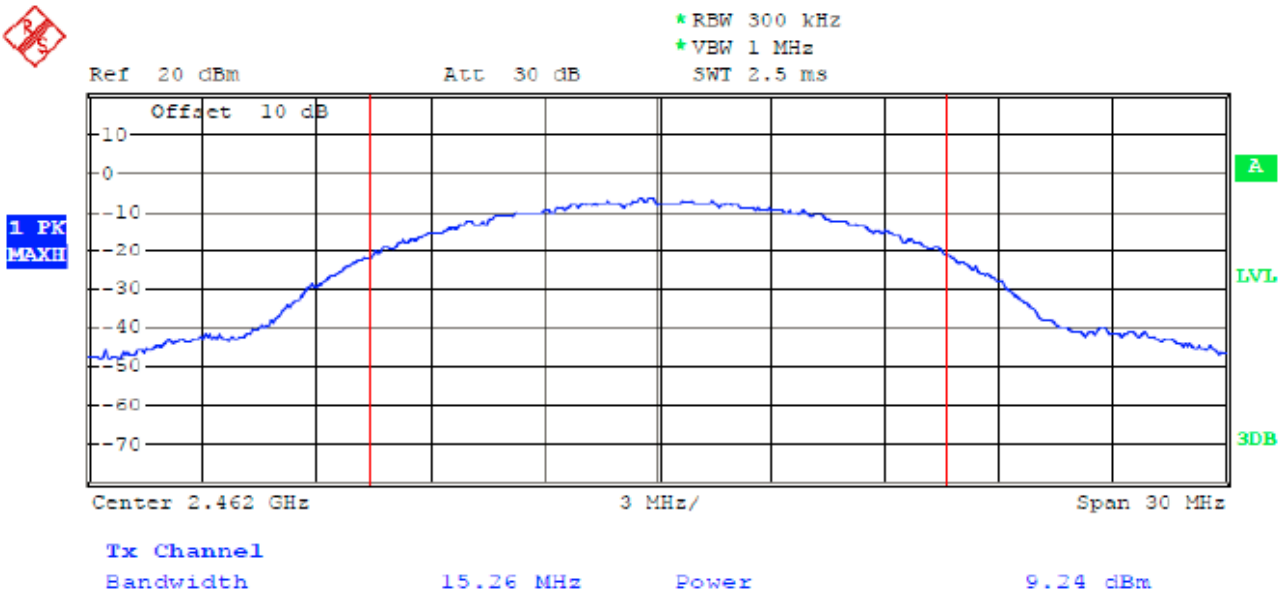
802.11B- 2412MHZ



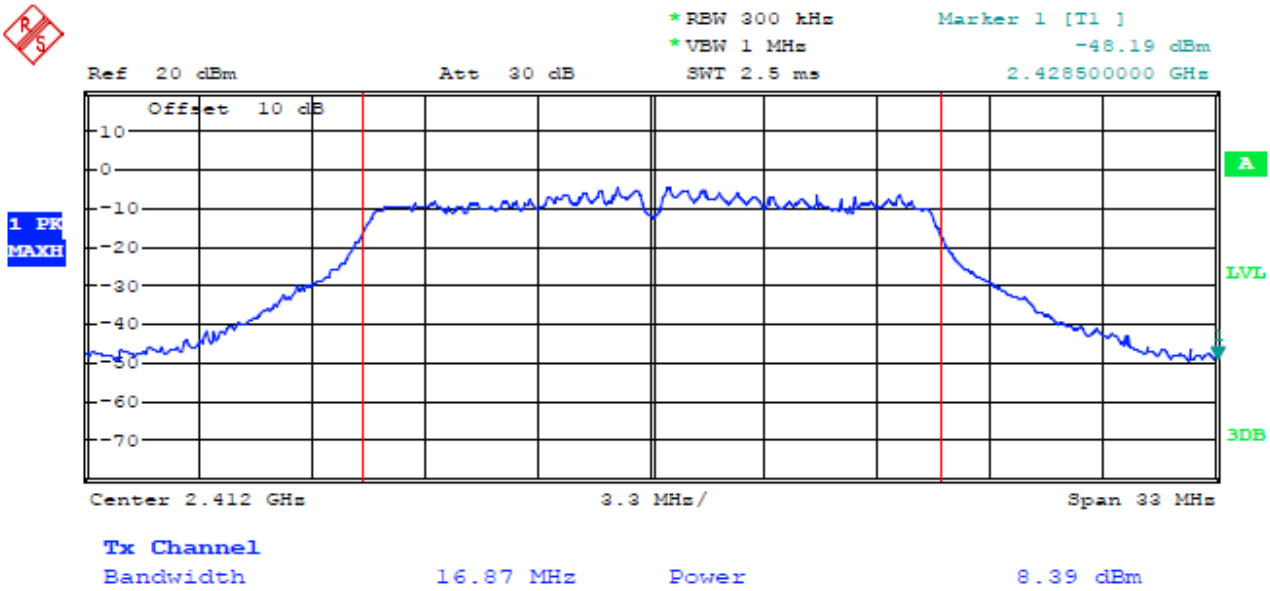
802.11B- 2437MHZ



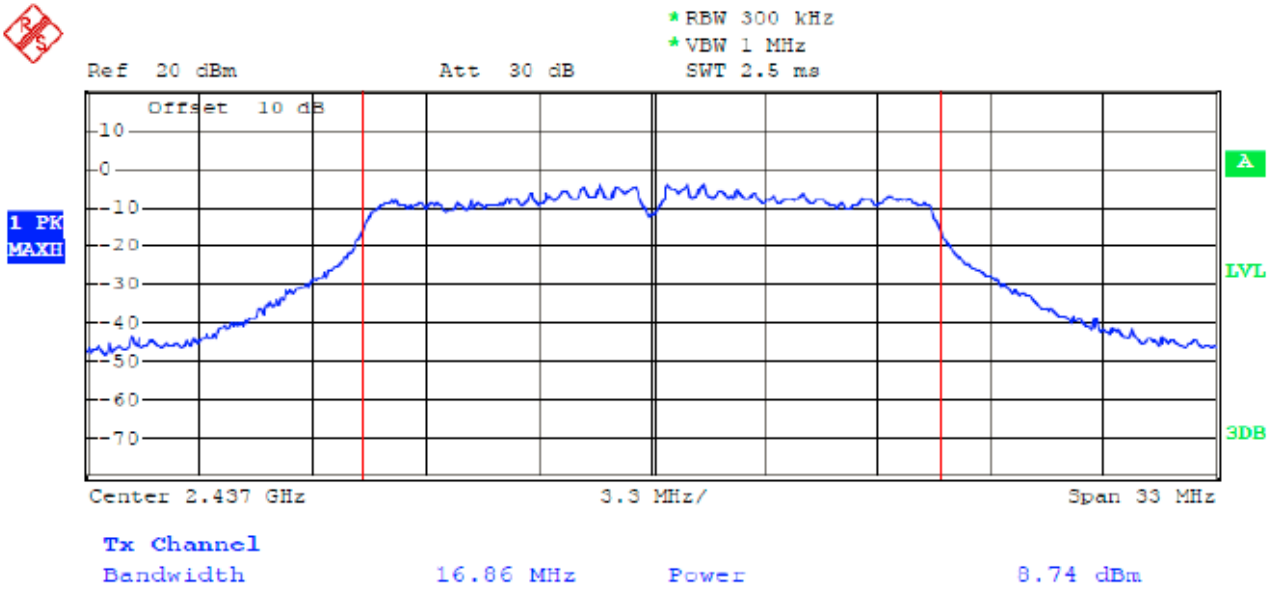
802.11B- 2462MHZ



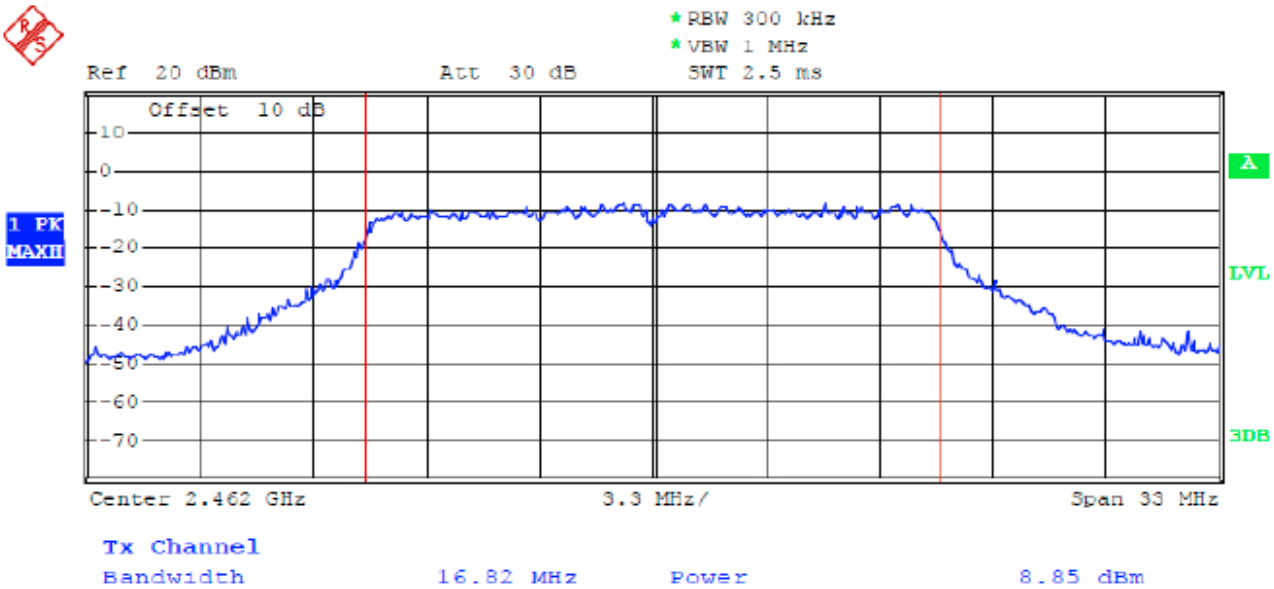
802.11G-2412MHZ



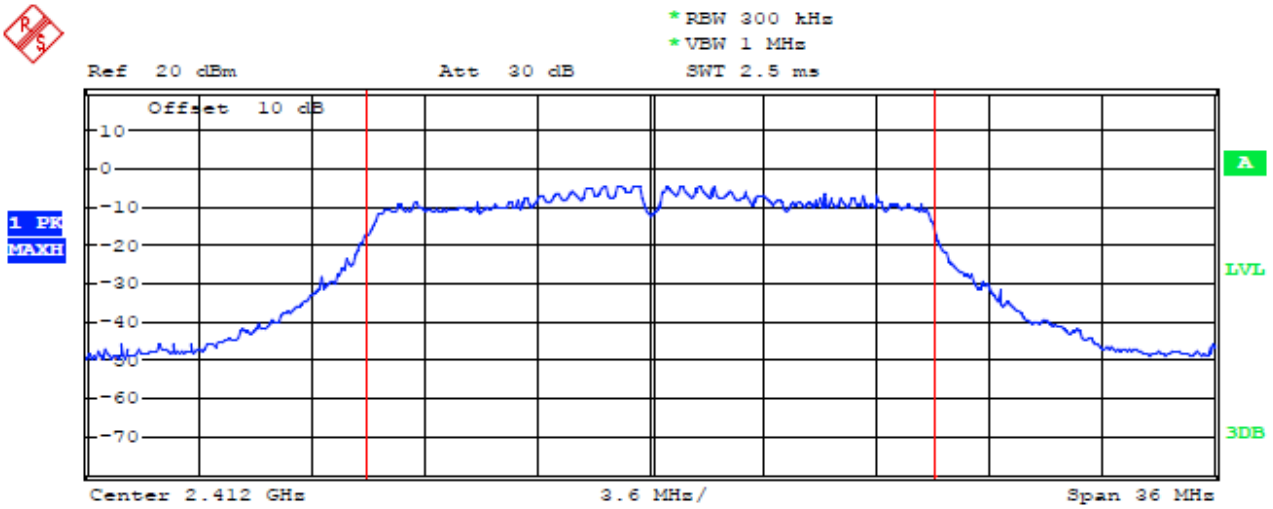
802.11G-2437MHZ



802.11G-2462MHZ



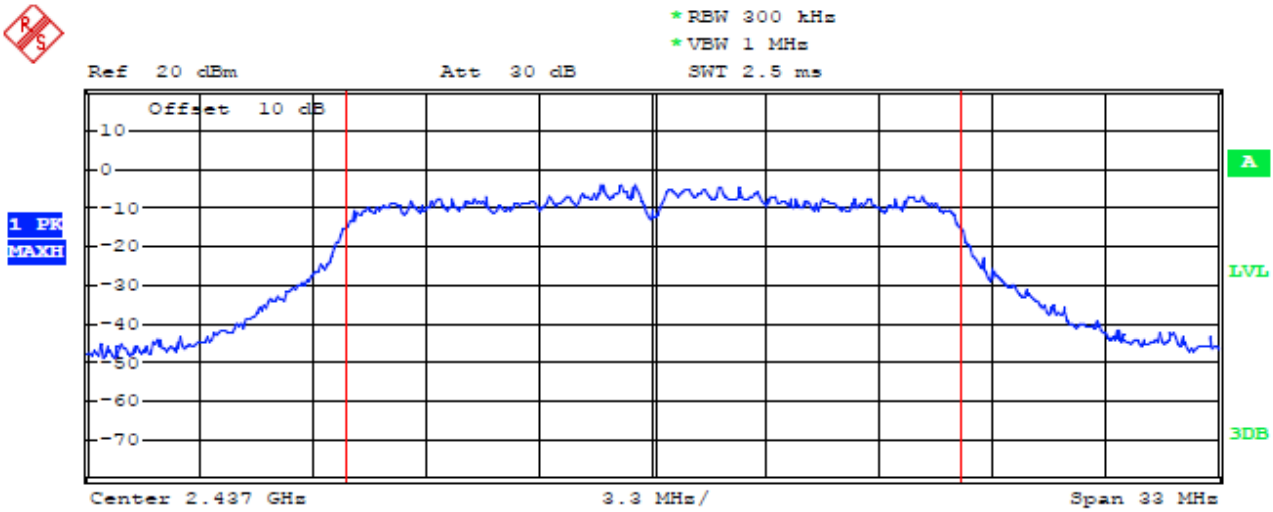
802.11N 20-2412MHZ



Tx Channel

Bandwidth 18.14 MHz Power 8.86 dBm

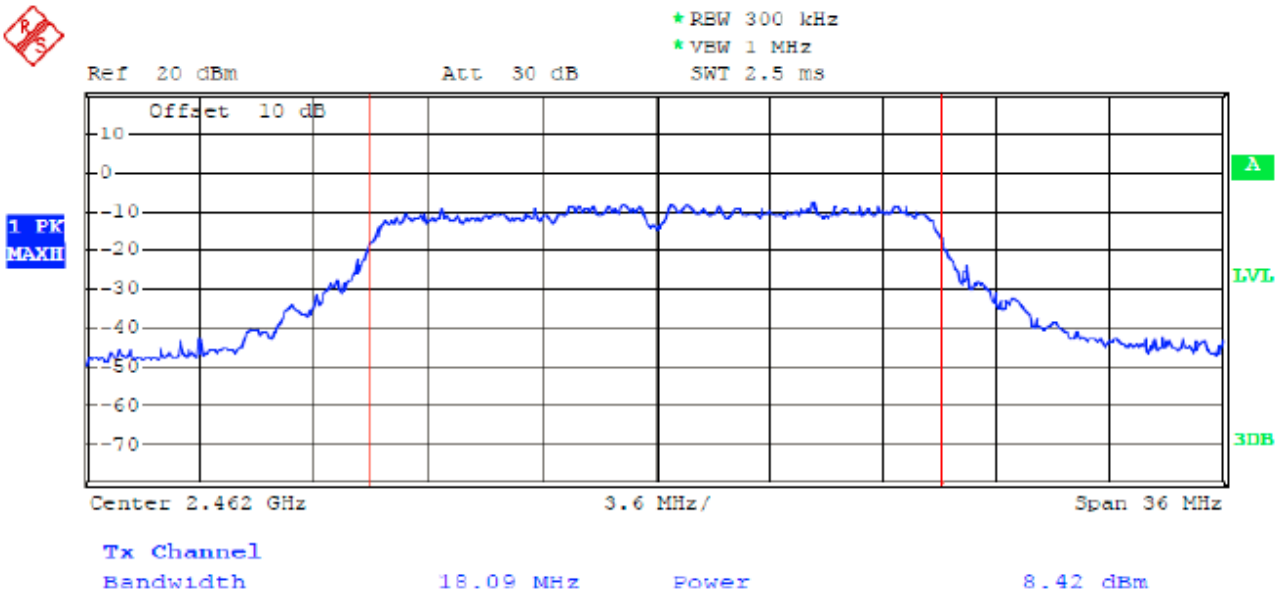
802.11N 20-2437MHZ



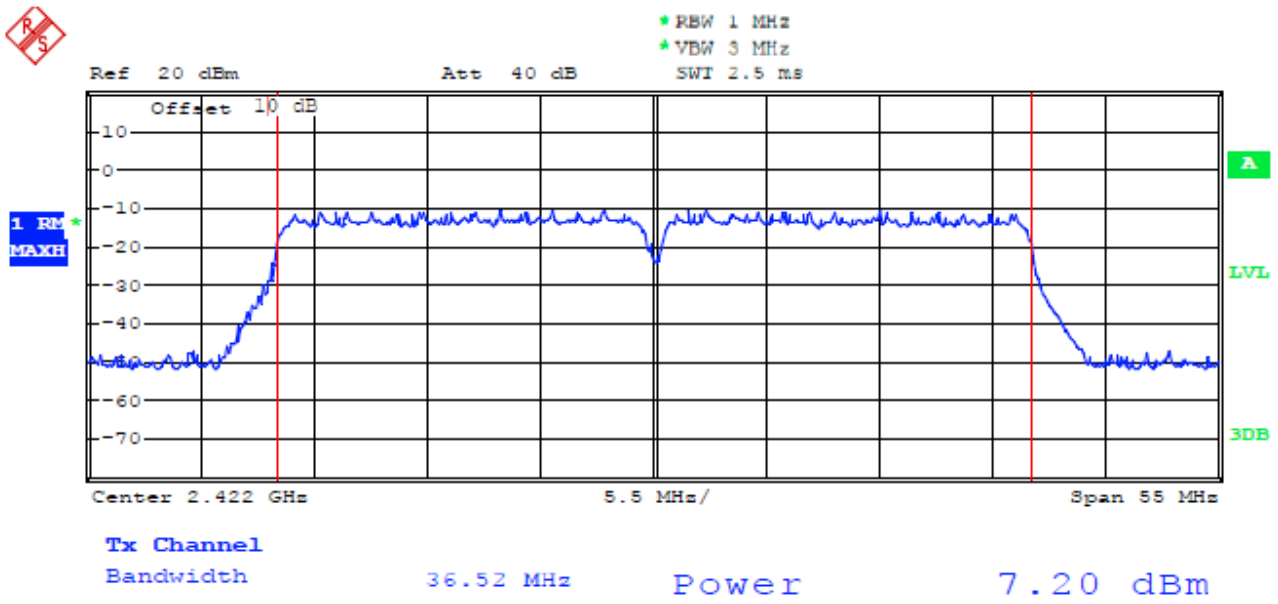
Tx Channel

Bandwidth 17.97 MHz Power 8.73 dBm

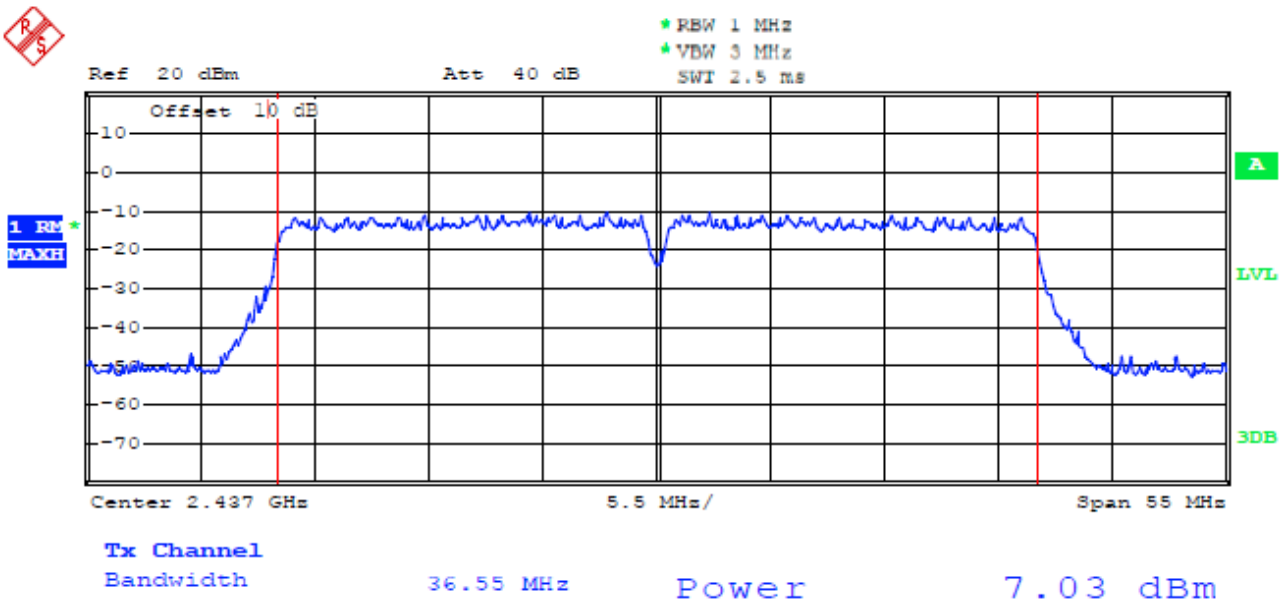
802.11N 20-2462MHZ



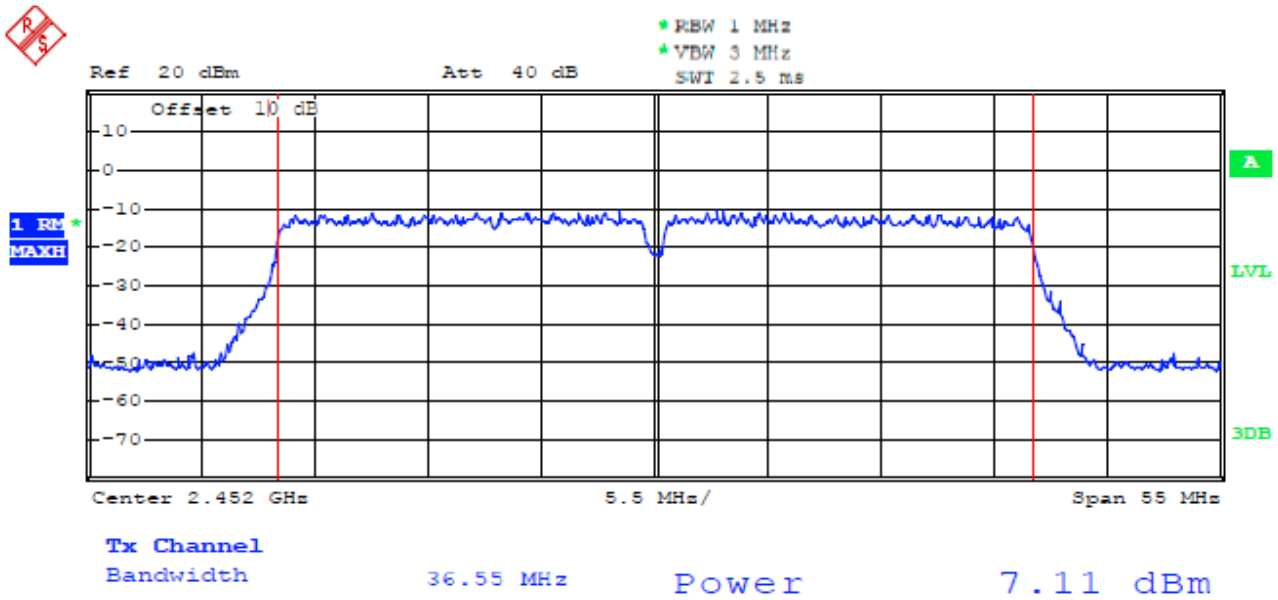
802.11N 40-2422MHZ



802.11N 40-2437MHZ



802.11N 40-2452MHZ



5. POWER SPECTRAL DENSITY

5.1 LIMIT

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.

5.2 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:	3 kHz ≤ RBW ≤ 100 kHz
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.

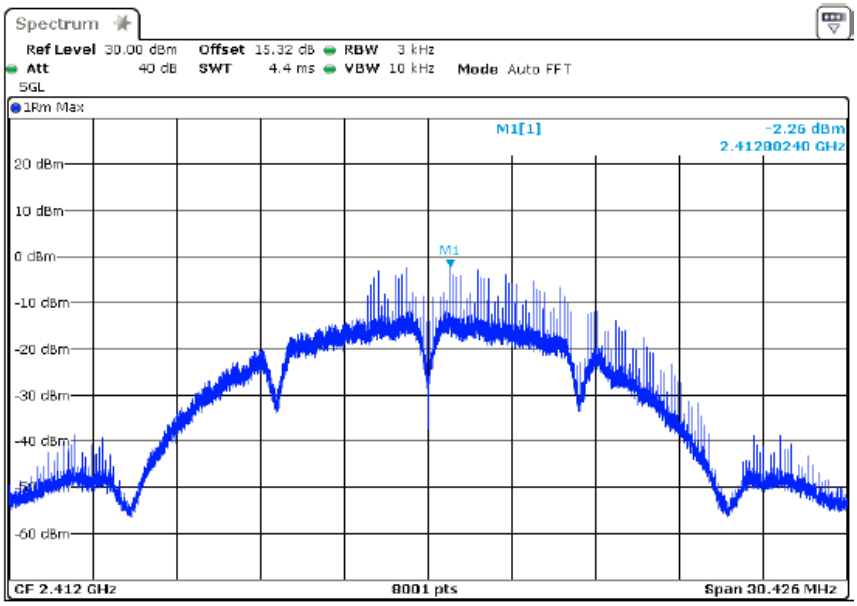
5.3 TEST SETUP

5.5 TEST RESULTS

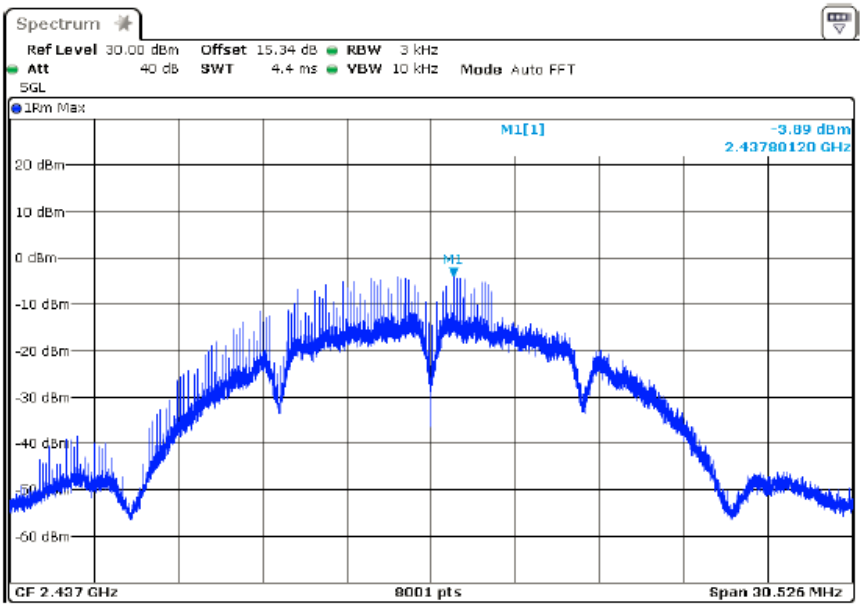
TestMode	Channel (MHz)	Result （dBm/3KHz）	Limit （dBm/3KHz）	Verdict
802.11b	2412MHz	-2.26	8	Pass
802.11b	2437MHz	-3.89	8	Pass
802.11b	2462MHz	-4.03	8	Pass
802.11g	2412MHz	-16.01	8	Pass
802.11g	2437MHz	-17.33	8	Pass
802.11g	2462MHz	-16.86	8	Pass
802.11n 20	2412MHz	-16.43	8	Pass
802.11n 20	2437MHz	-16.29	8	Pass
802.11n 20	2462MHz	-16.86	8	Pass
802.11n 40	2422MHz	-21.11	8	Pass
802.11n 40	2437MHz	-21.21	8	Pass
802.11n 40	2452MHz	-21.25	8	Pass

5.6 original test data

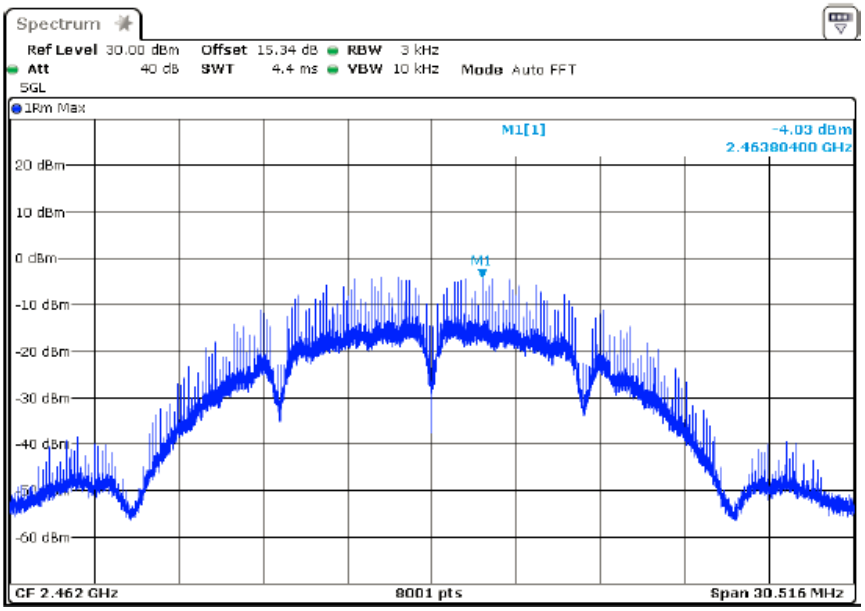
802.11b-2412MHz



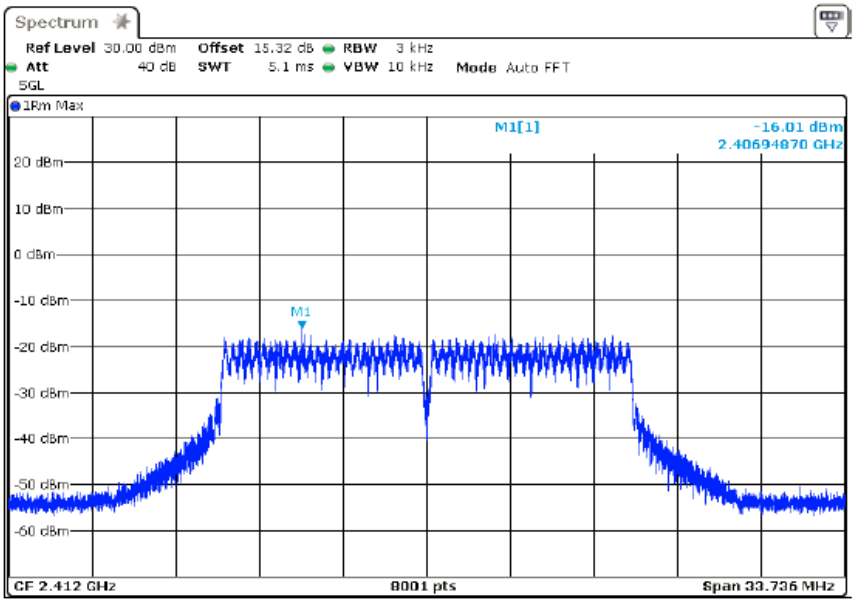
802.11b-2437MHz



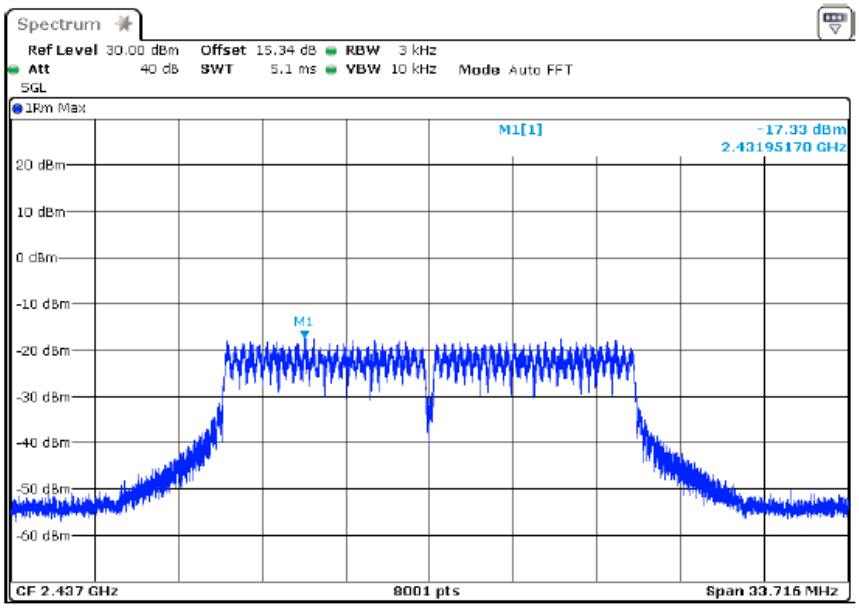
802.11b-2462MHz



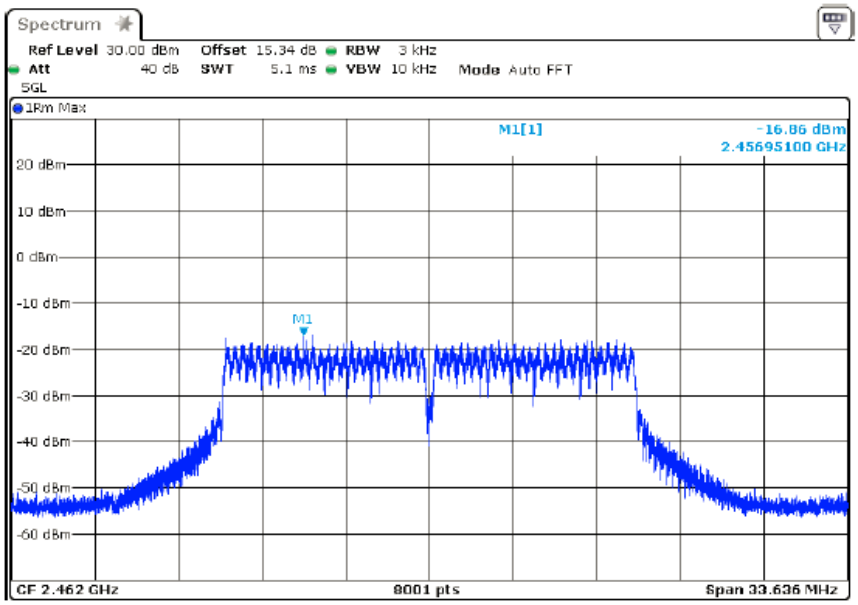
802.11g-2412MHz



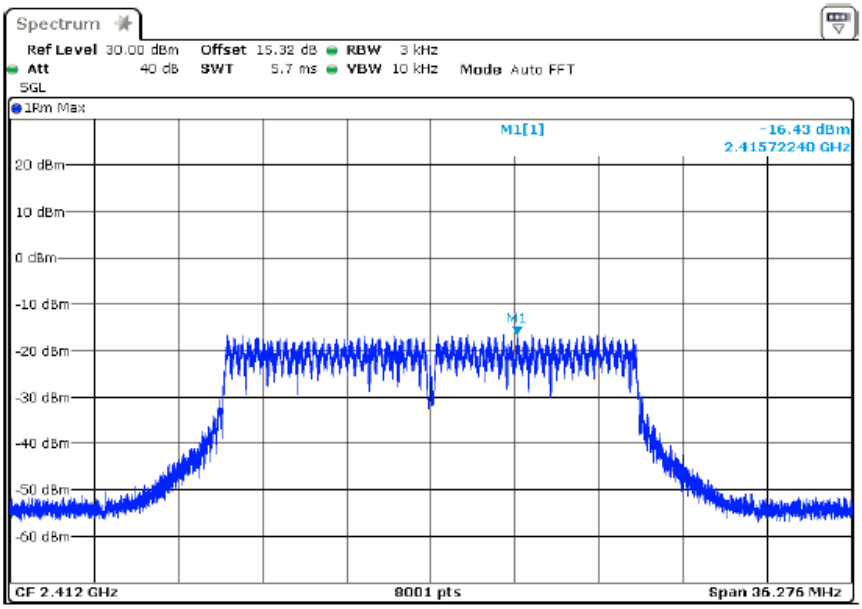
802.11g-2437MHz



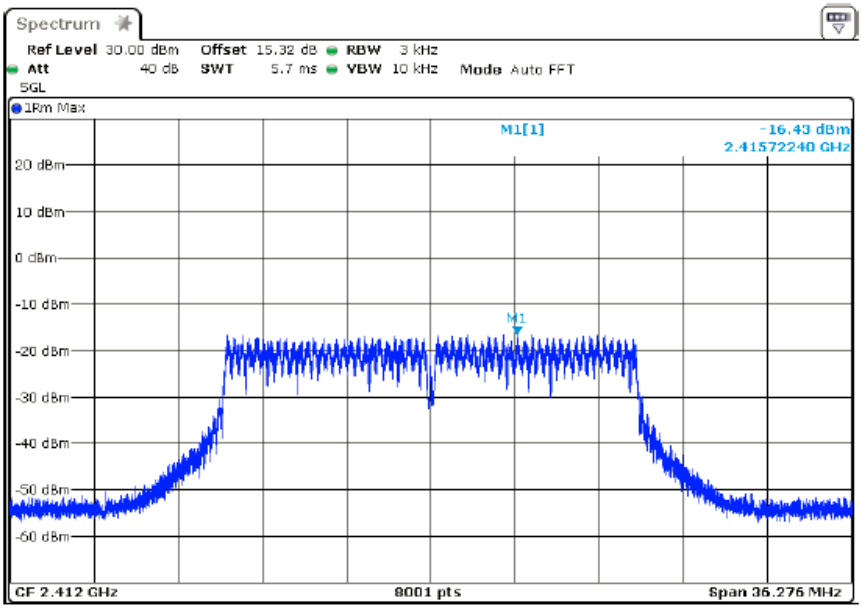
802.11g-2462MHz



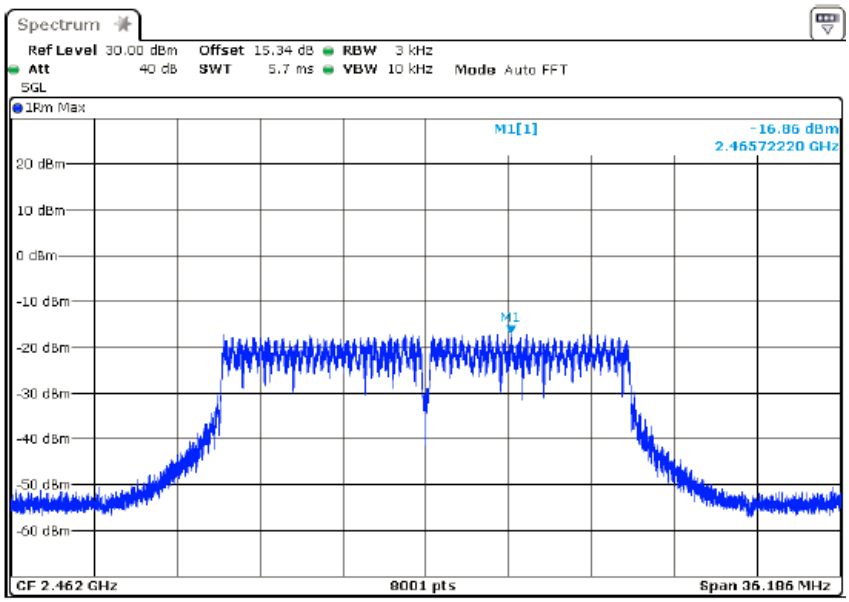
802.11n 20-2412MHz



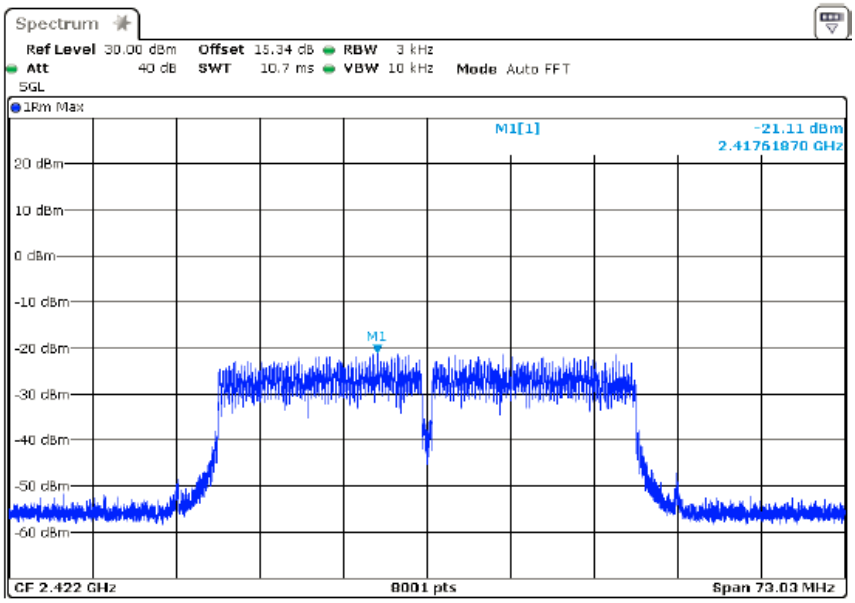
802.11n 20-2437MHz



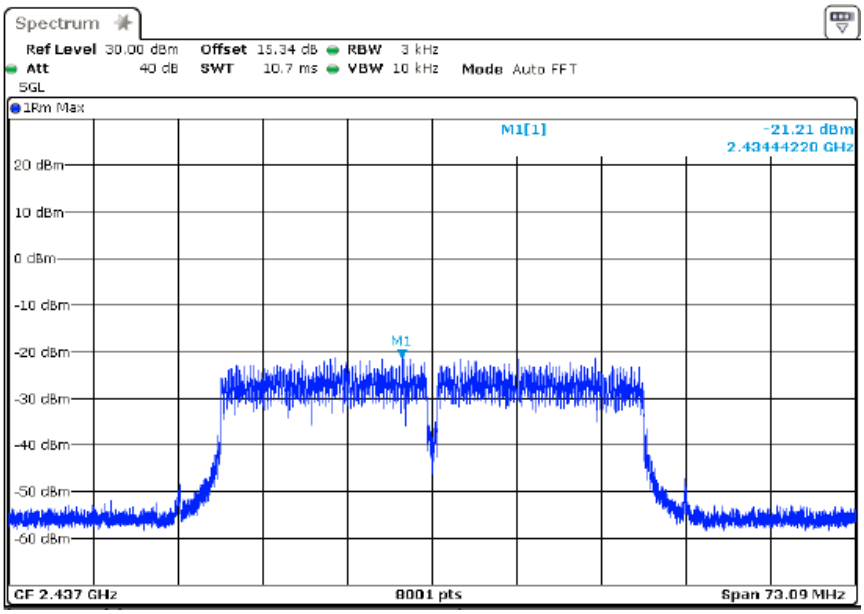
802.11n 20-2462MHz



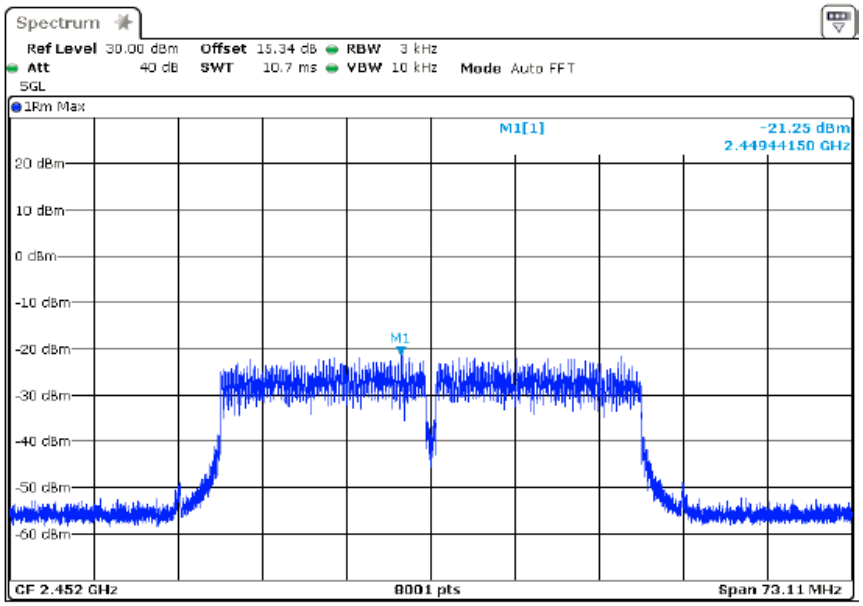
802.11n 40-2422MHz



802.11n 40-2437MHz



802.11n 40-2452MHz



6. Band edge and spurious

6.1 LIMIT

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.

6.2 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	1.5times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

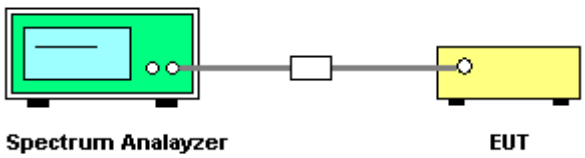
(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW:	100kHz
VBW:	300kHz
Span	Encompass frequency range to be measured
Number of measurement points	≥span/RBW
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

6.3 TEST SETUP

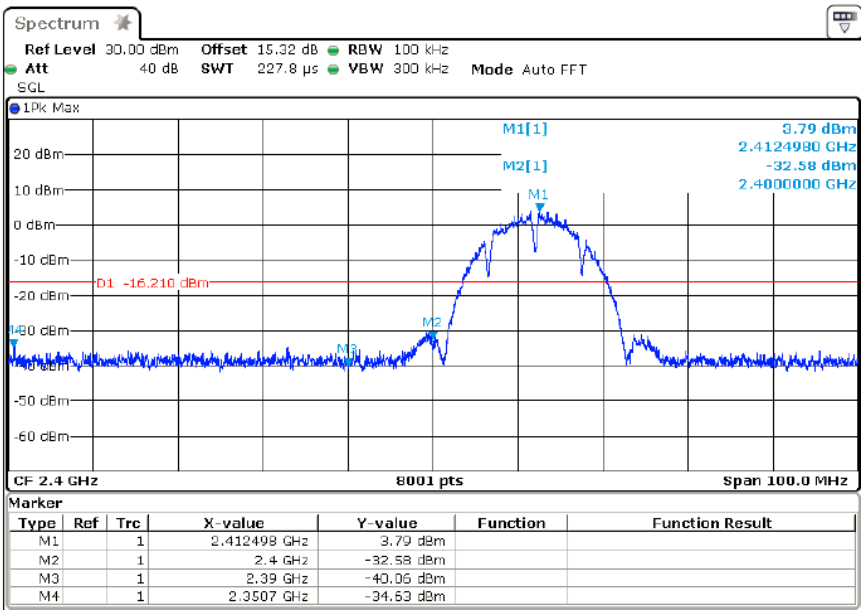


6.5 TEST RESULTS

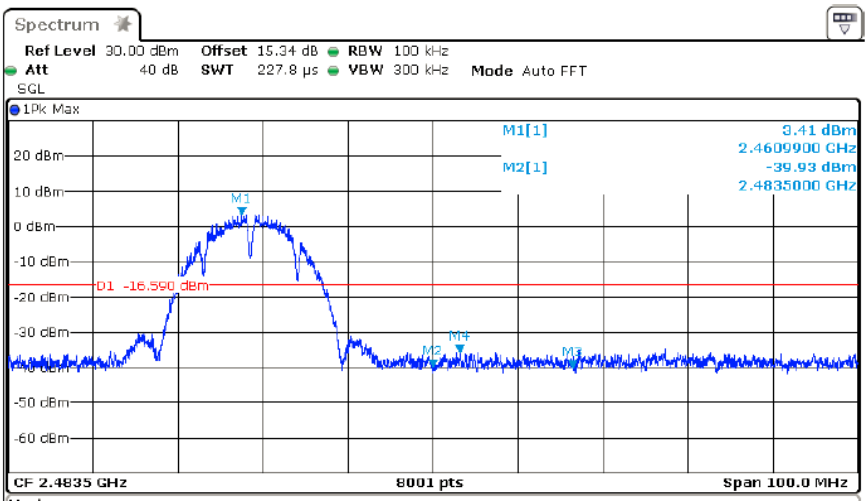
Eut set mode	CH or Frequency	Result
802.11b	CH1	Pass
	CH11	Pass
802.11g	CH1	Pass
	CH11	Pass
802.11n 20	CH1	Pass
	CH11	Pass
802.11n 40	CH3	Pass
	CH9	Pass

6.5 Original test data

802.11b Low CH



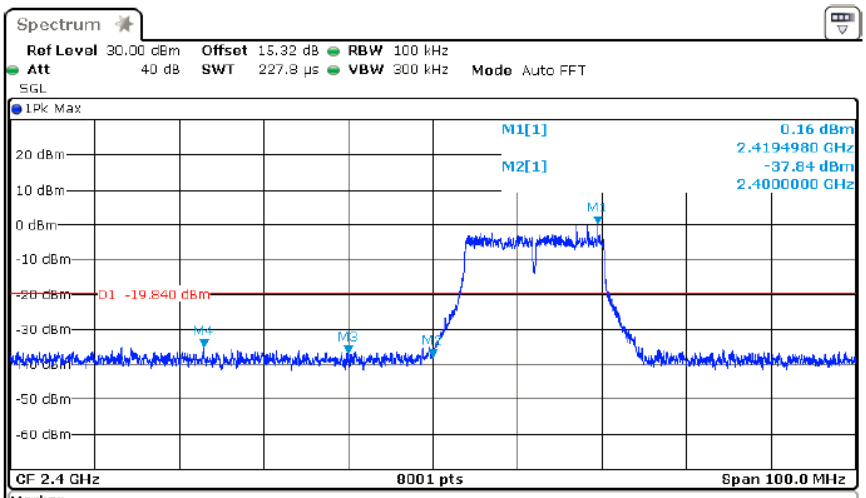
802.11b High CH



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46099 GHz	3.41 dBm		
M2		1	2.4835 GHz	-39.93 dBm		
M3		1	2.5 GHz	-40.41 dBm		
M4		1	2.4066625 GHz	-35.56 dBm		

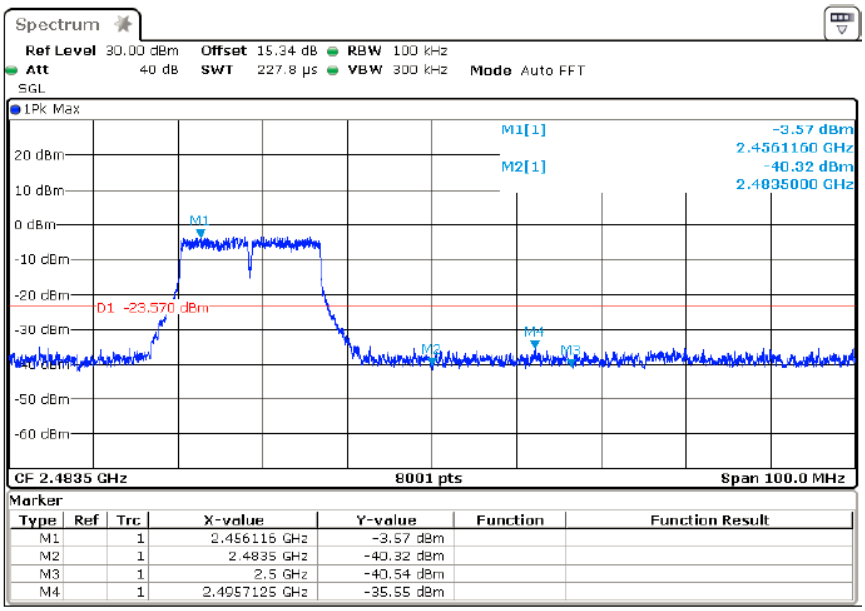
802.11g low CH



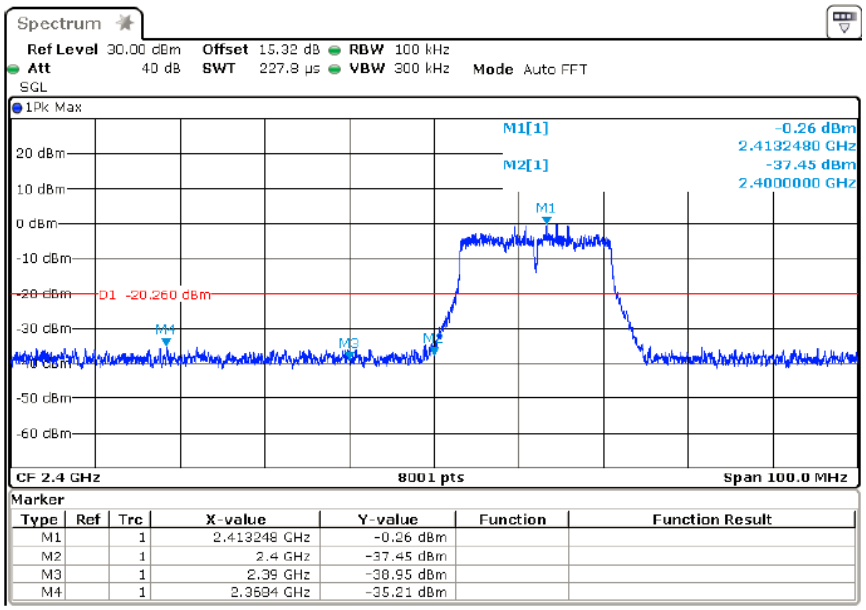
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.419498 GHz	0.16 dBm		
M2		1	2.4 GHz	-37.84 dBm		
M3		1	2.39 GHz	-36.82 dBm		
M4		1	2.3720875 GHz	-35.03 dBm		

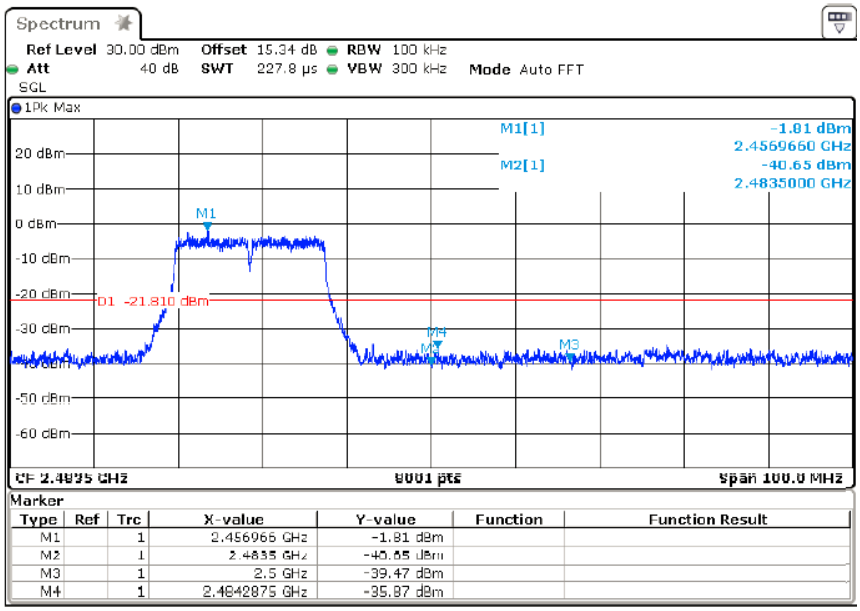
802.11g high CH



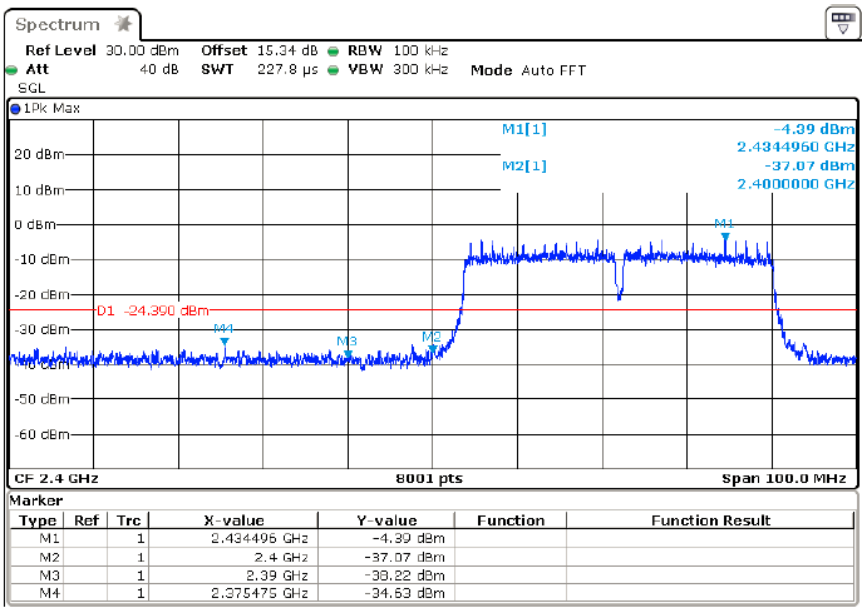
802.11n20 Low CH



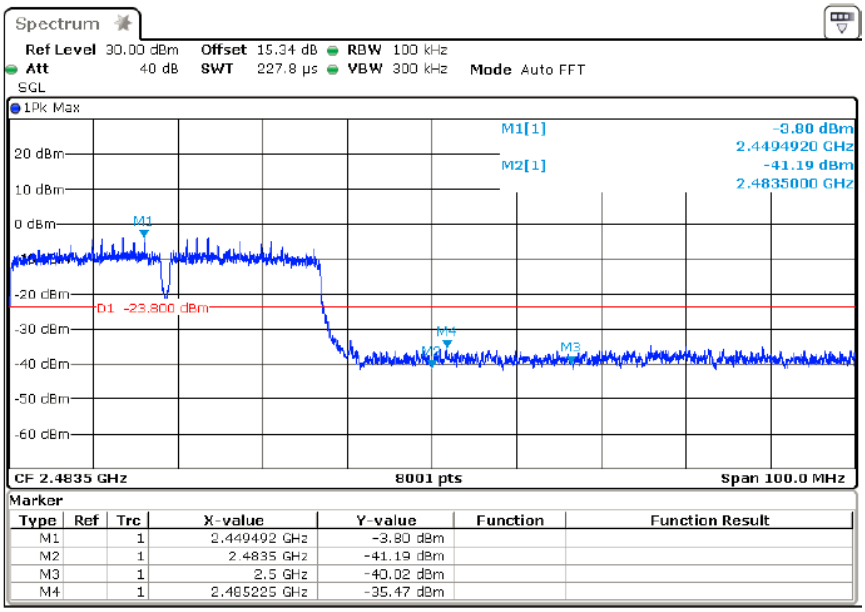
802.11n20 High CH



802.11n40 Low CH

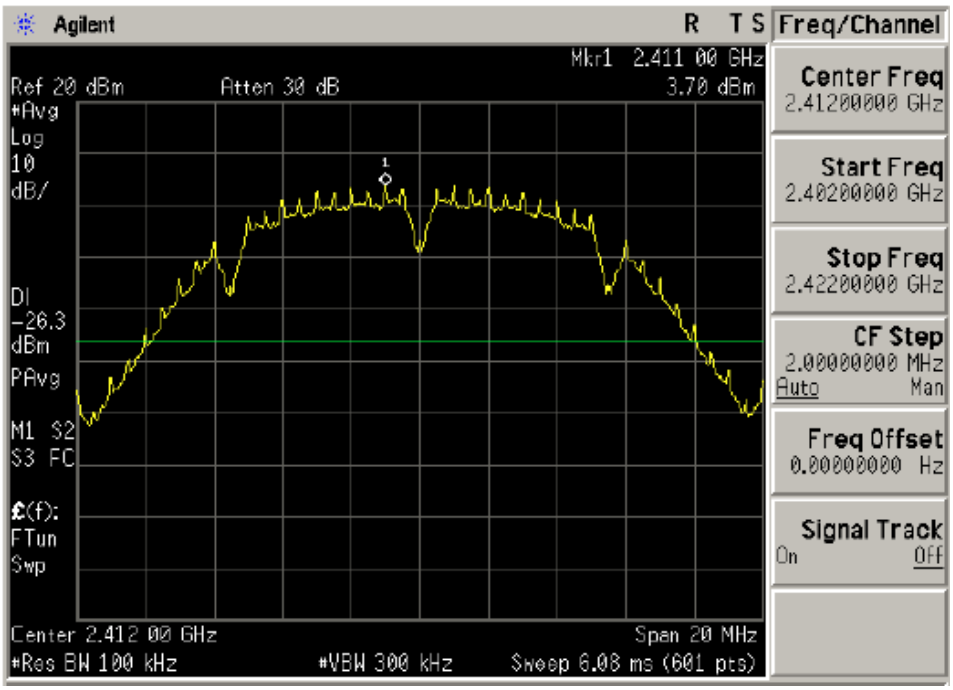


802.11n40 High CH

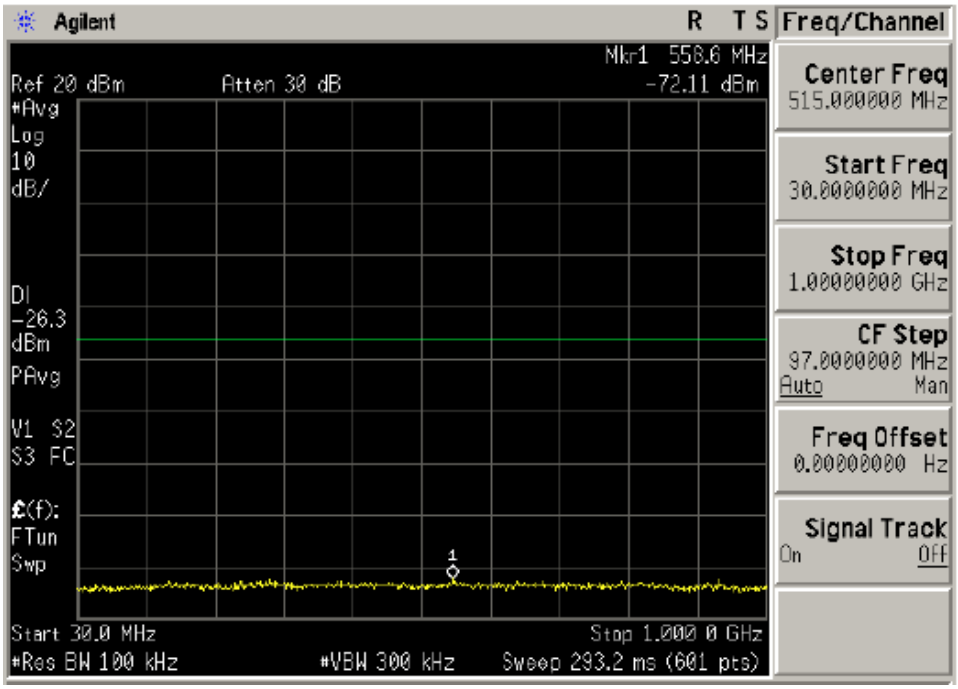


Spurious emissions
(802.11b)

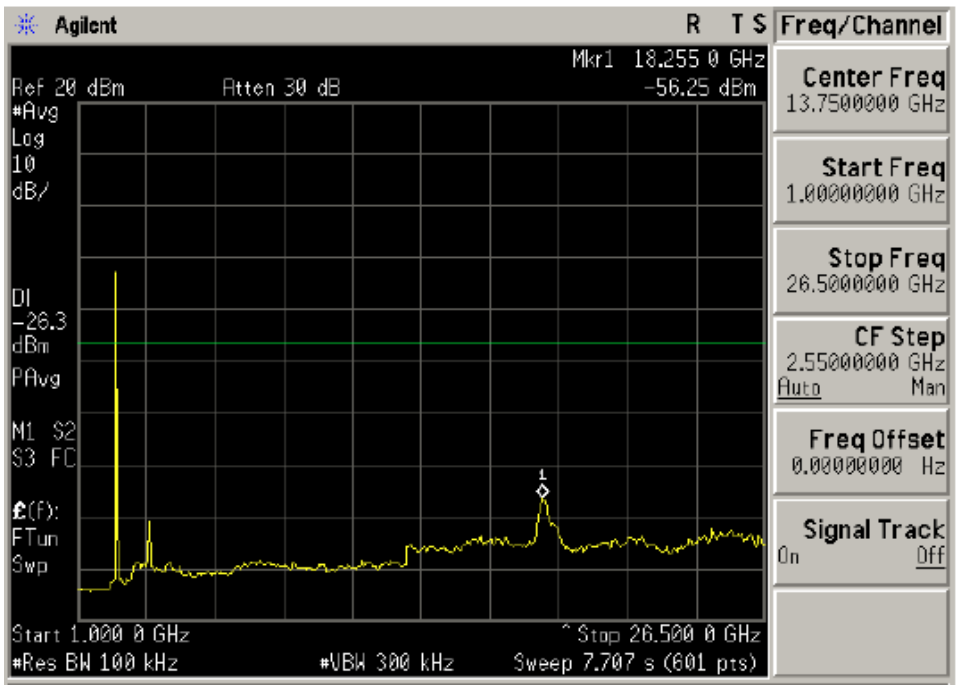
802.11b low CH, 2412MHZ



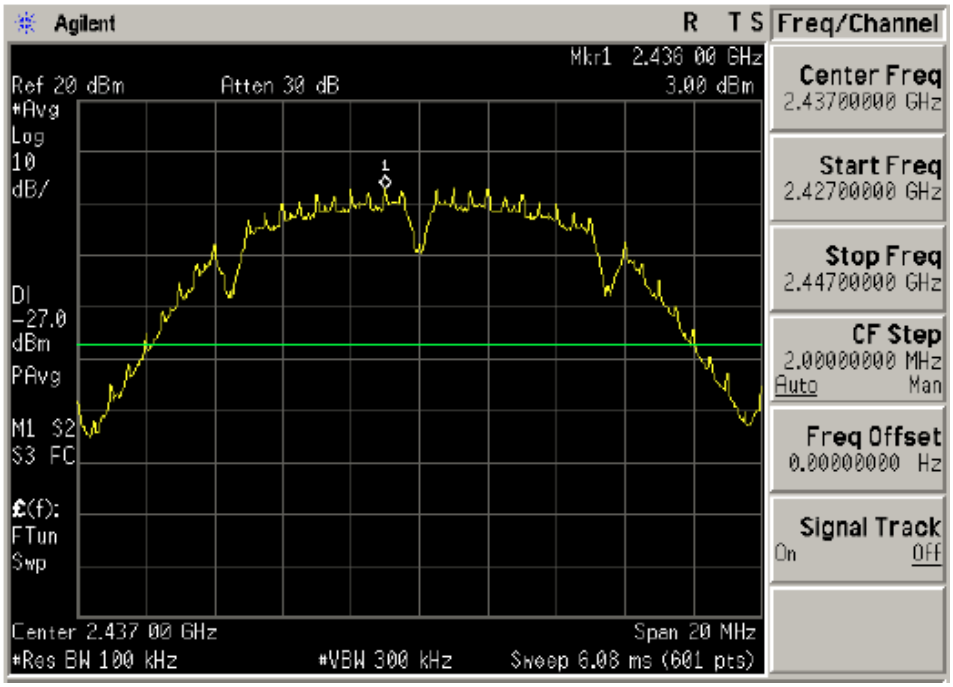
30MHz-1000MHz



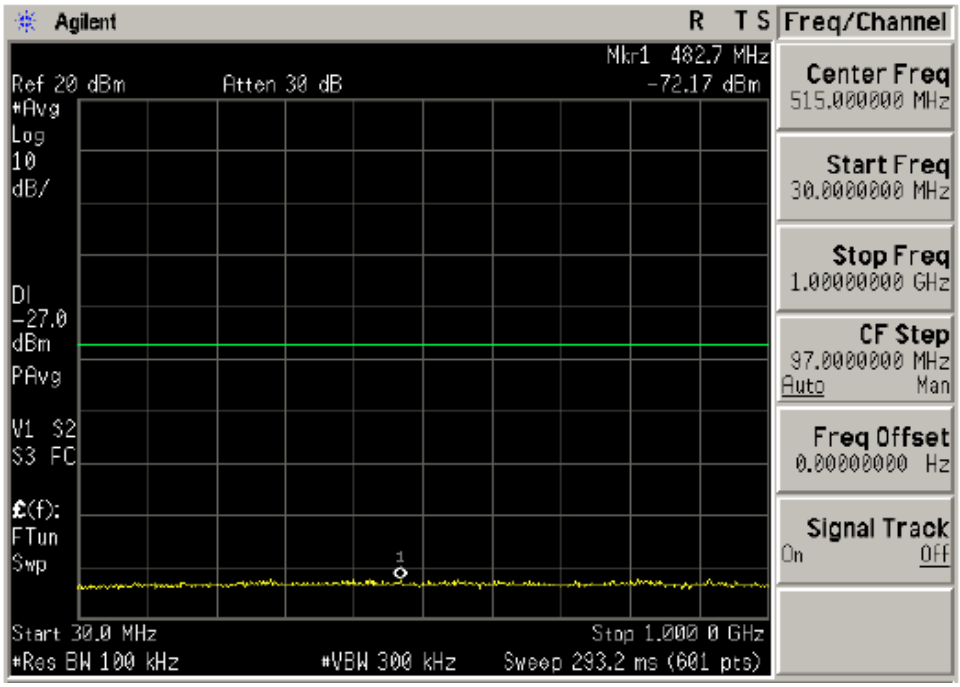
1000MHz-26500MHz



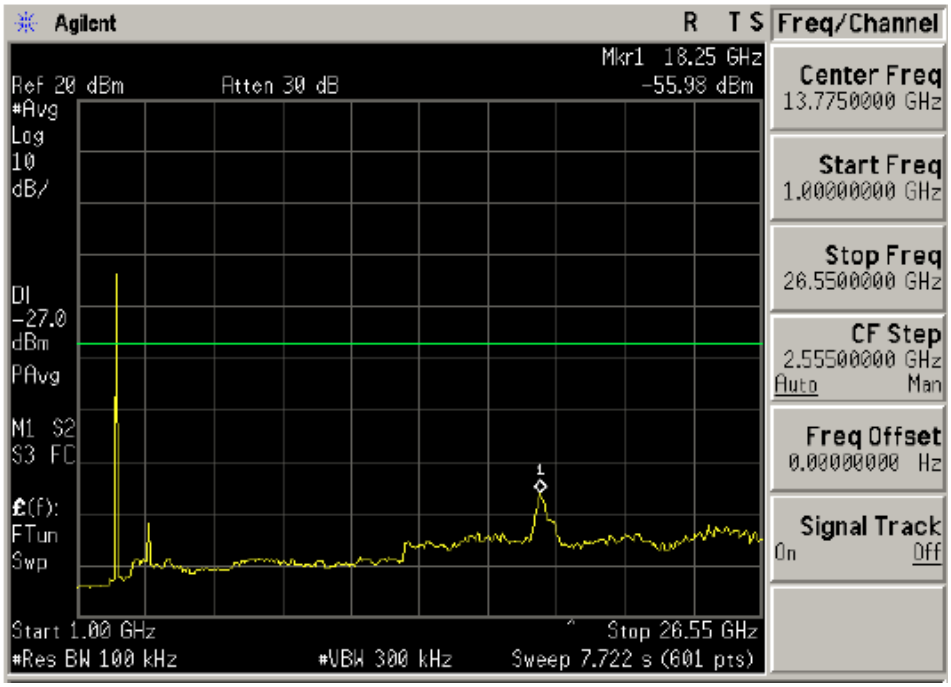
802.11b Middle CH, 2437MHz



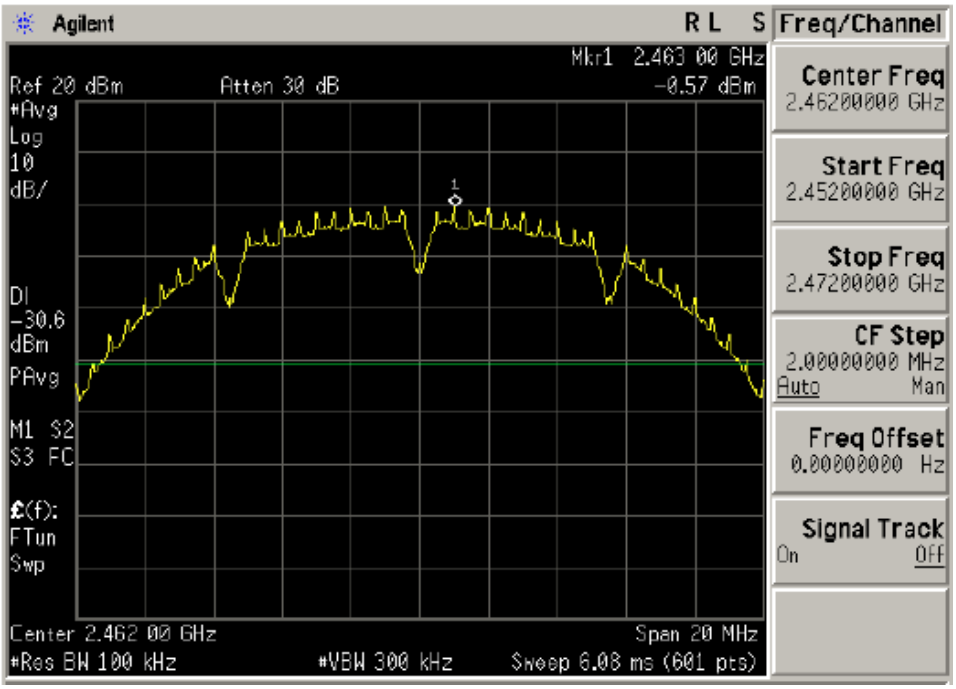
30MHz-1000MHz



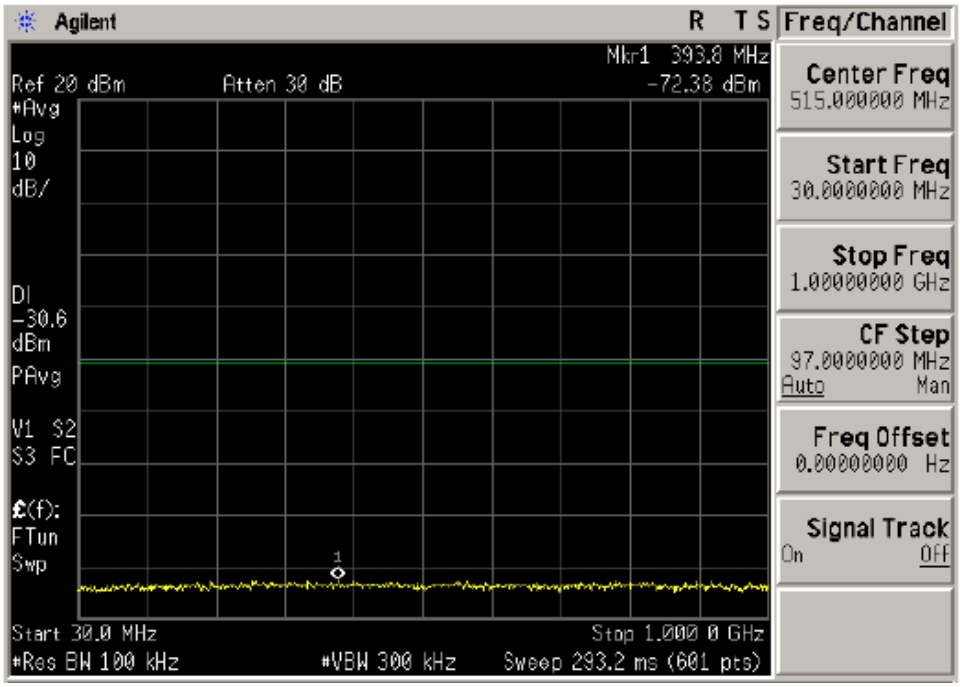
1000MHz-26500MHz



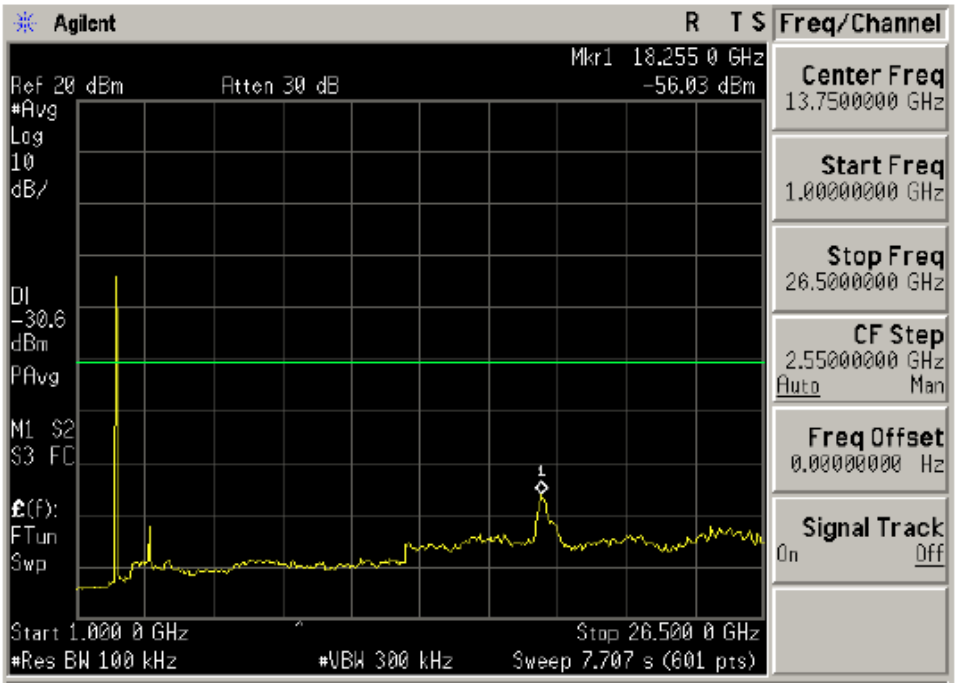
802.11b High CH, 2462MHz



30MHZ-1000MHZ



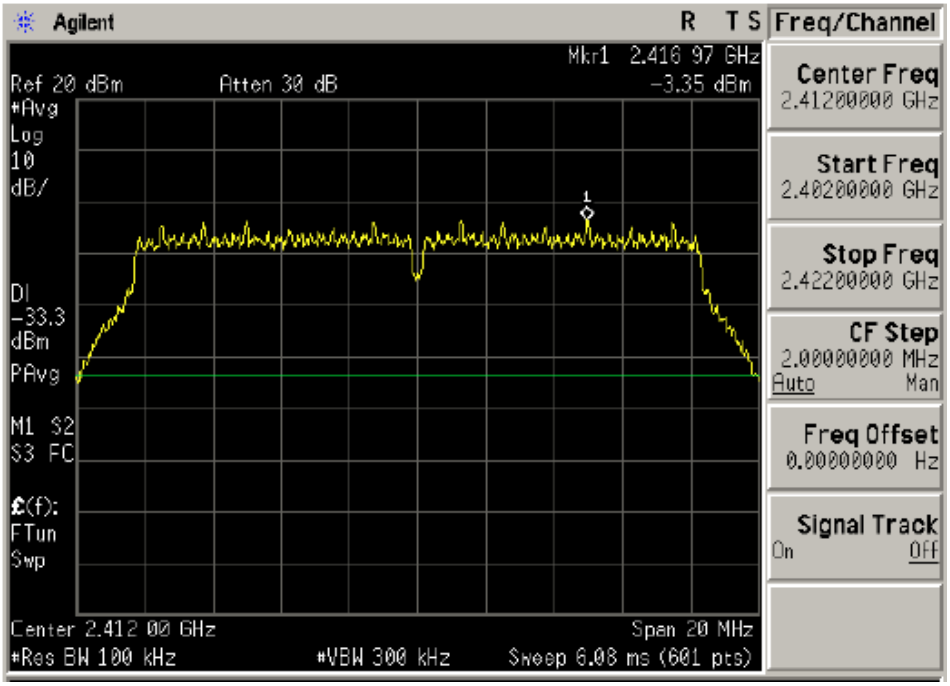
1000MHZ-26500MHZ



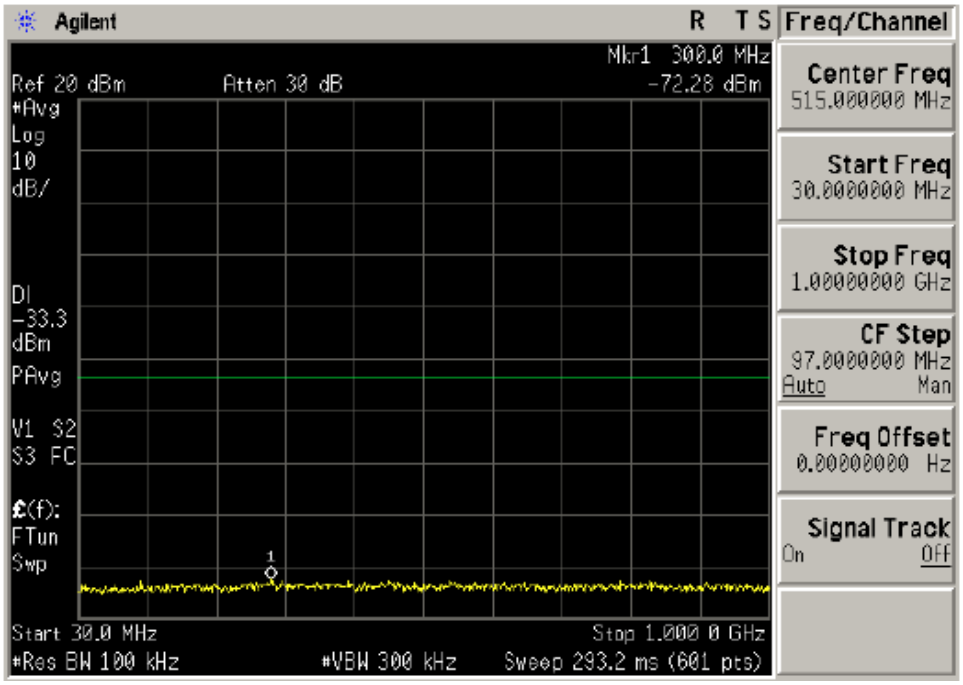
(802.11g)

802.11g Low CH, 2412MHz

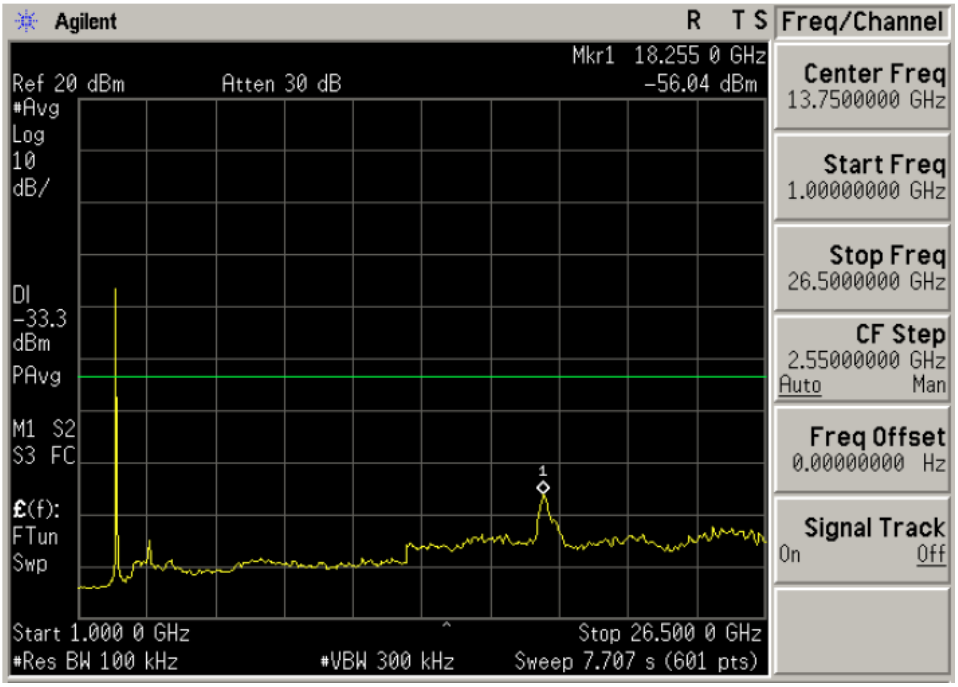
Ref.



30MHz-1000MHz

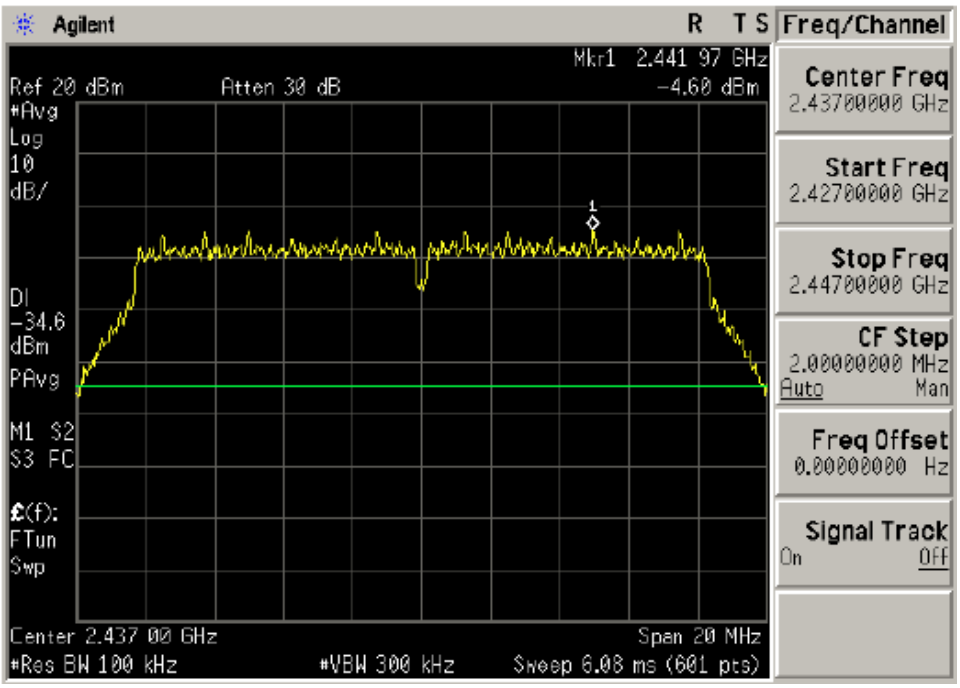


1GHZ-26.5GHZ

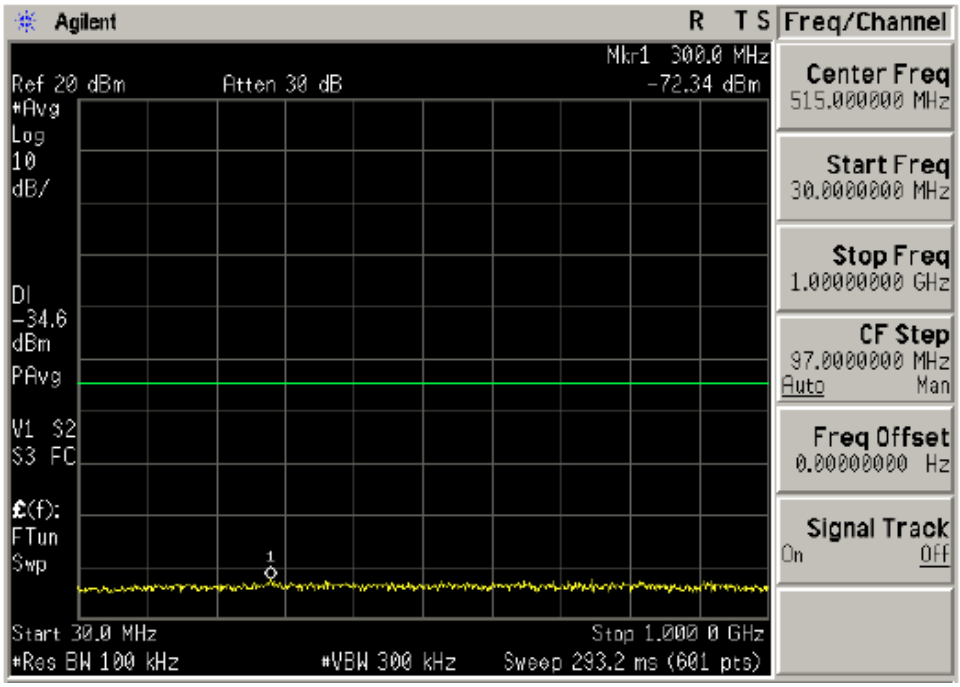


802.11g Middle CH, 2437MHz

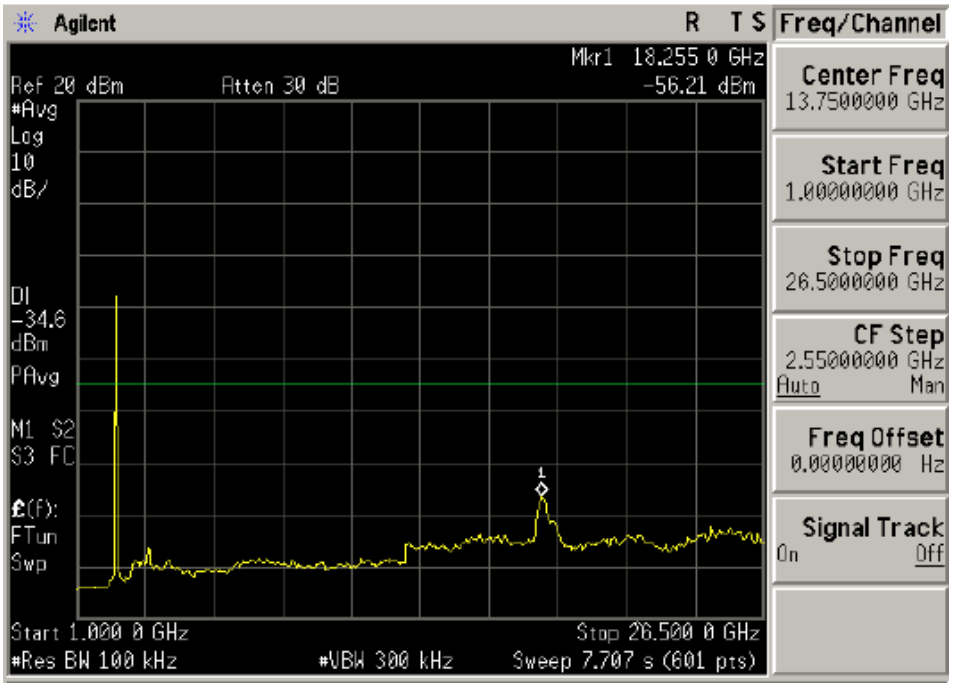
Ref.



30MHz-1000MHz

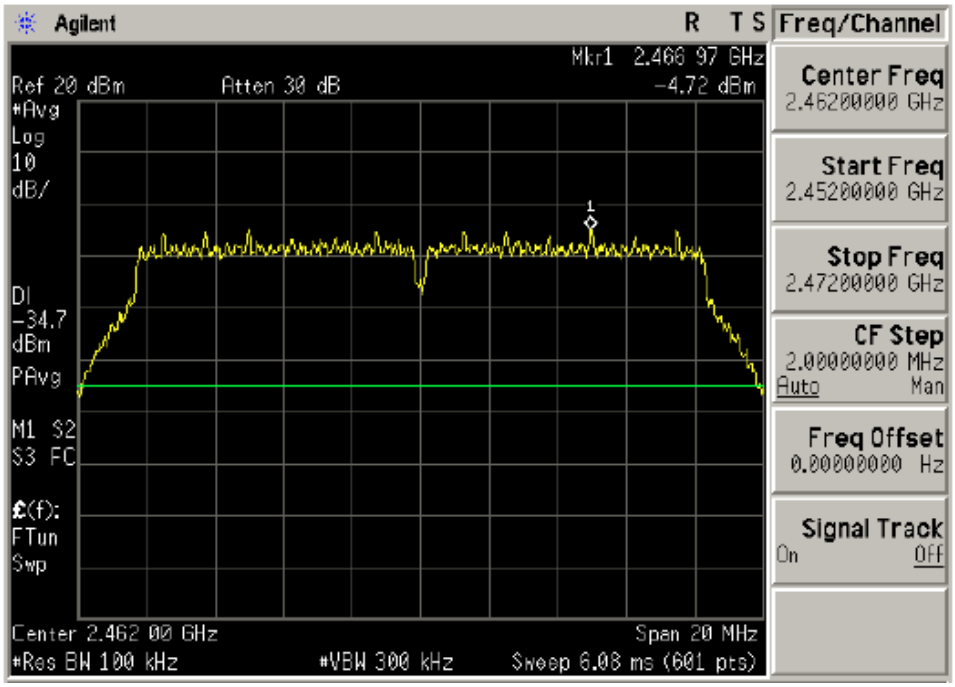


1GHZ-26.5GHZ

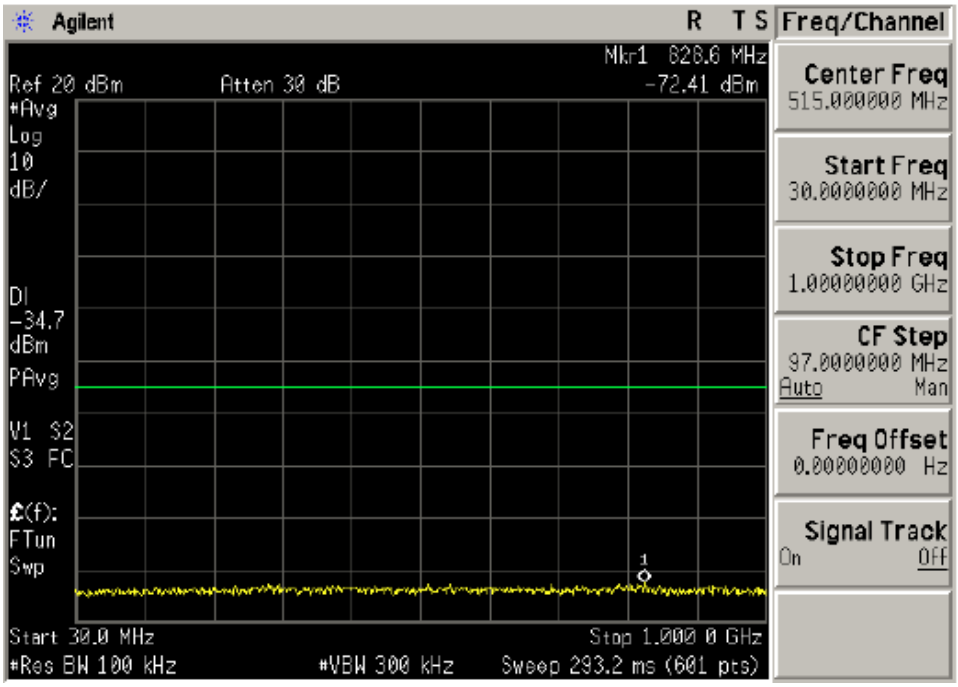


802.11g High CH, 2462MHz

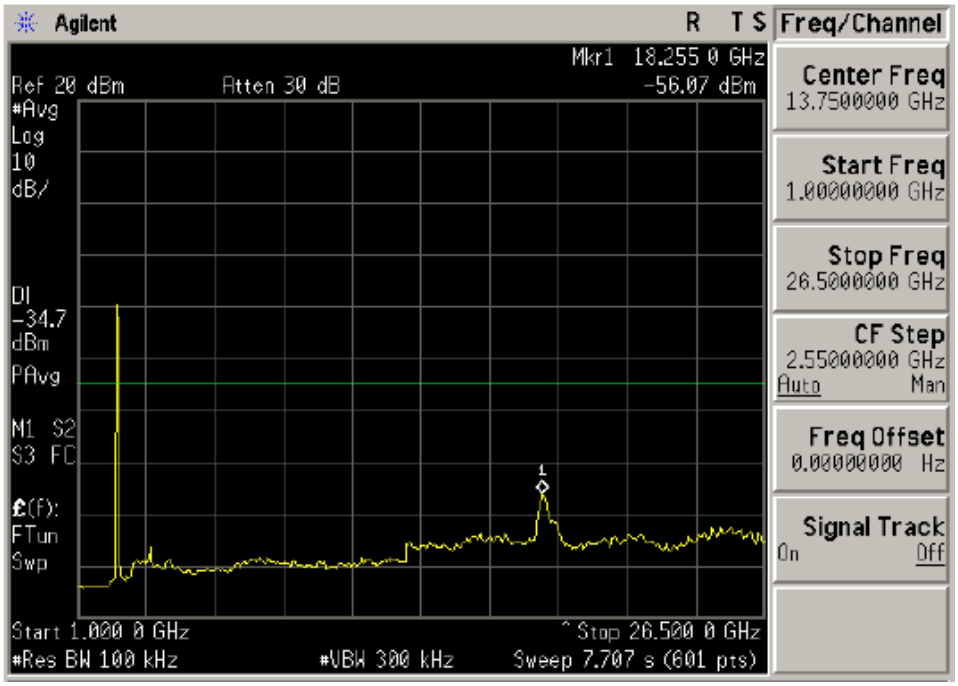
Ref.



30MHZ-1000MHZ

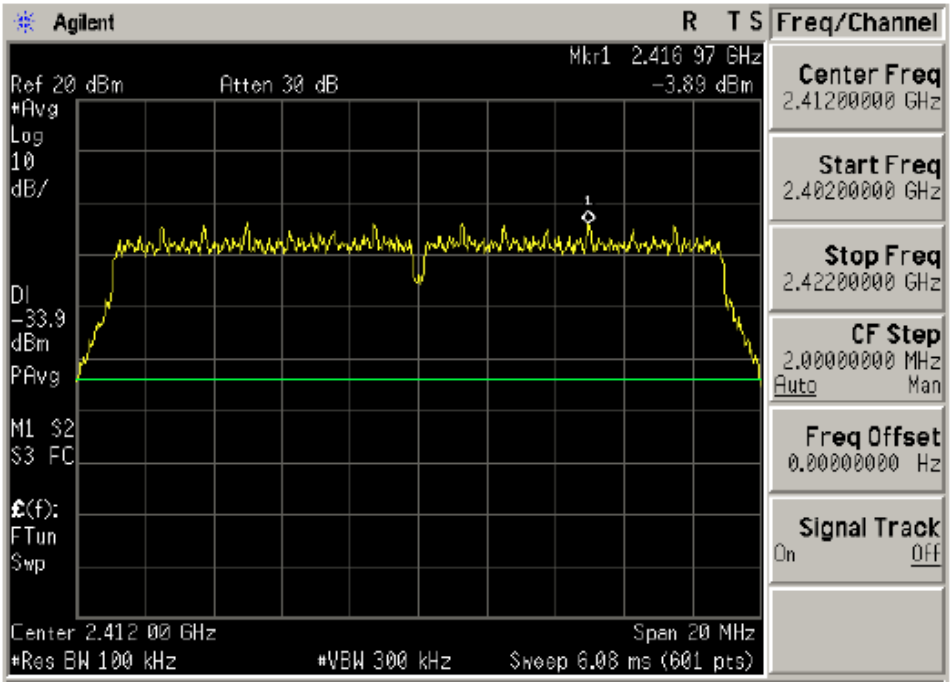


1GHZ-26.5GHZ

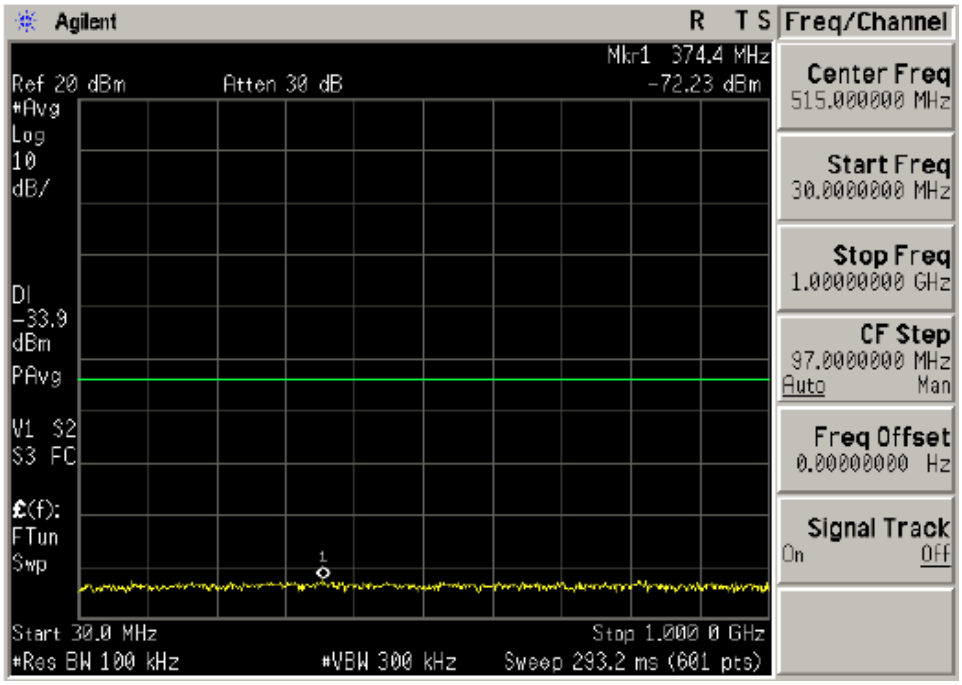


802.11n 20 Low CH, 2412MHz

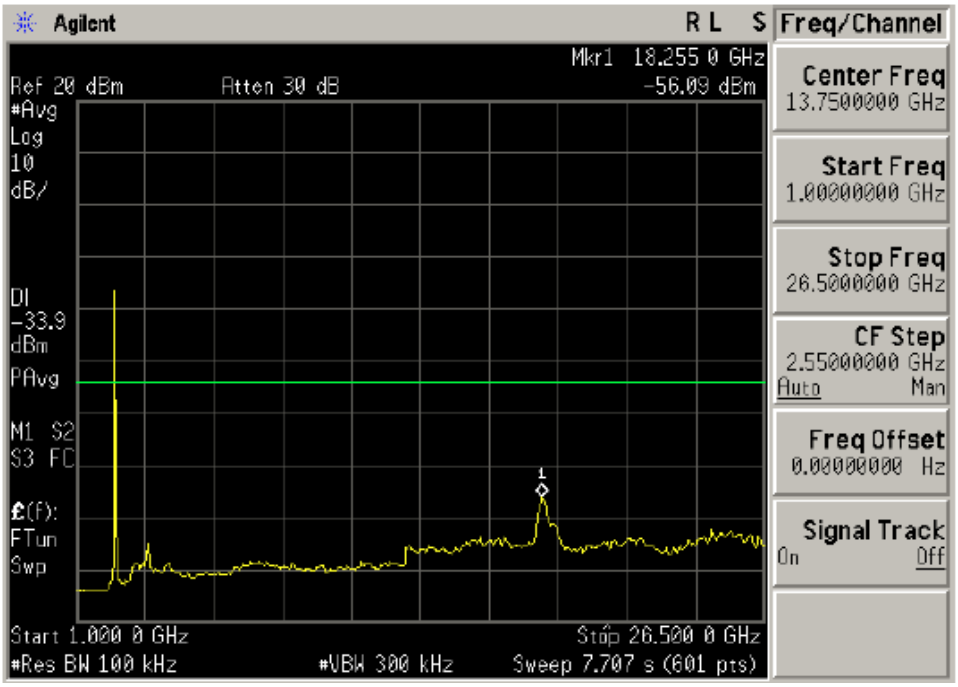
Ref.



30MHZ-1000MHZ

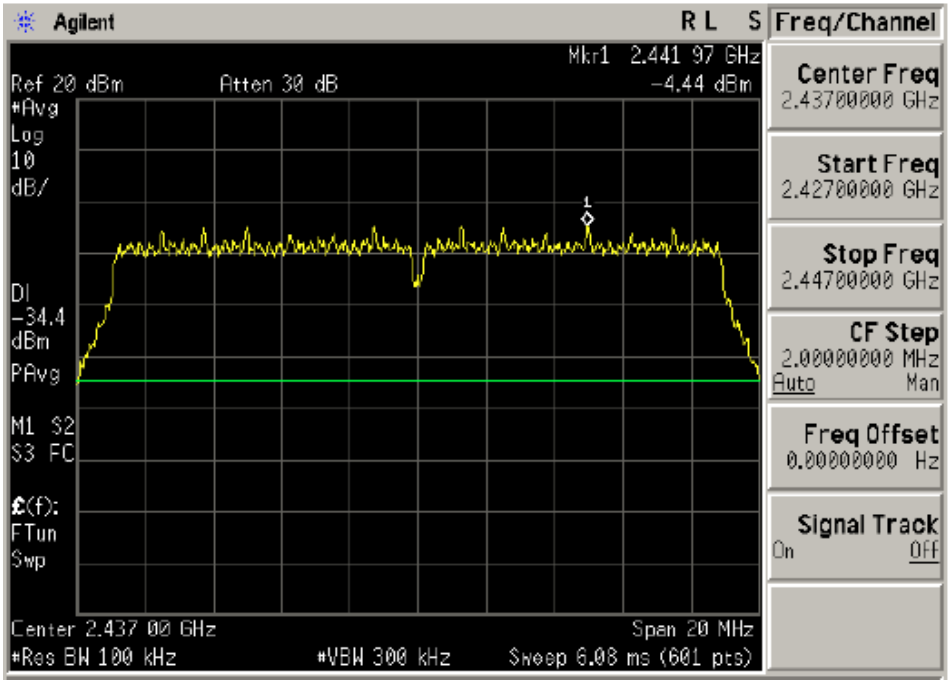


1GHZ-26.5GHZ

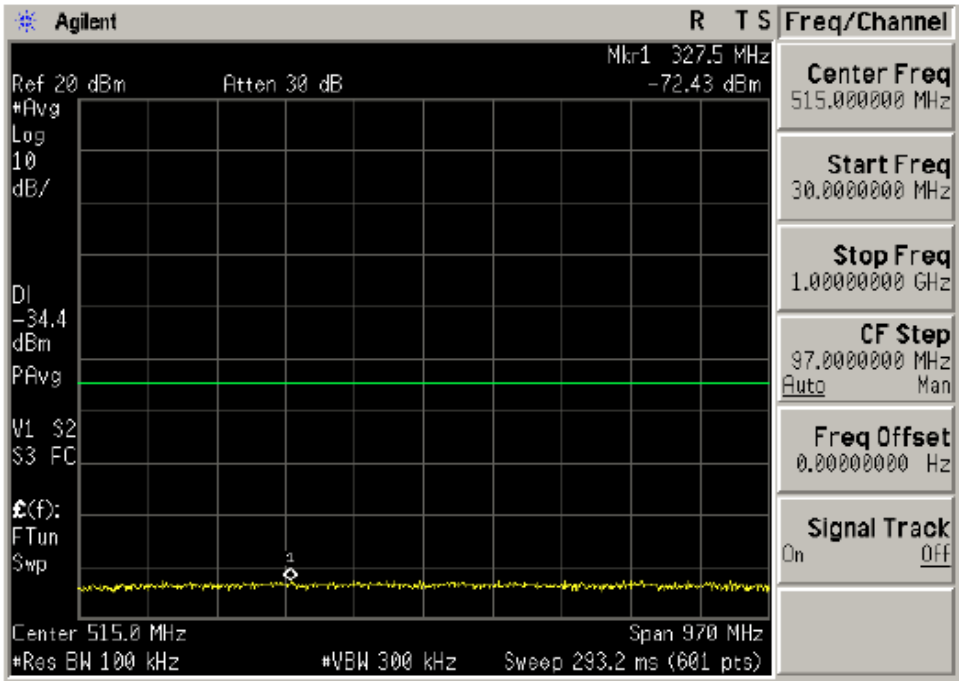


802.11n 20 Middle CH, 2437MHz

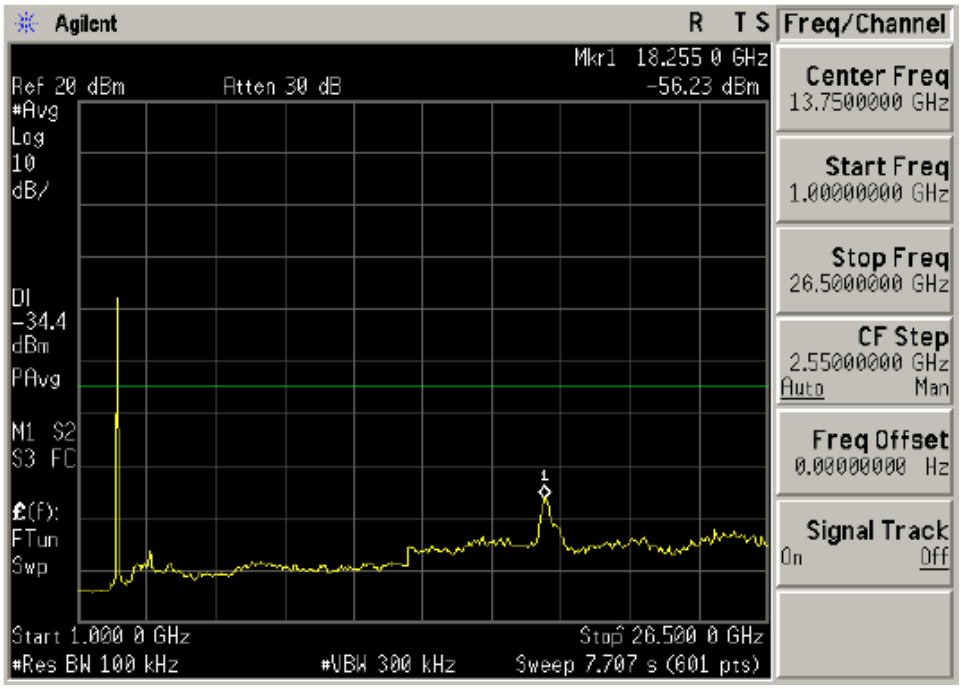
Ref.



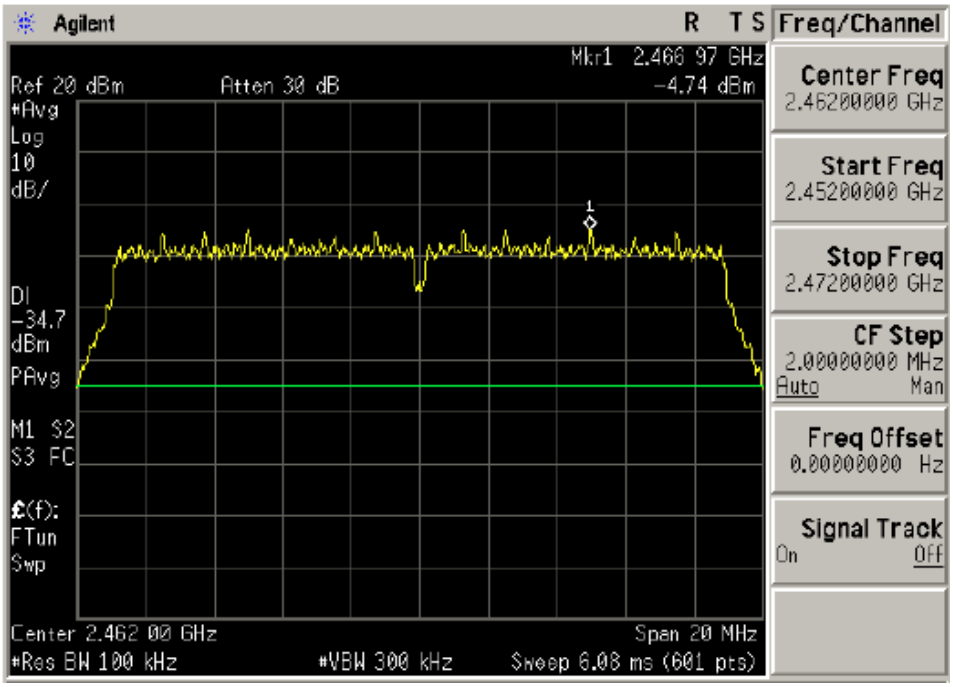
30MHZ-1000MHZ



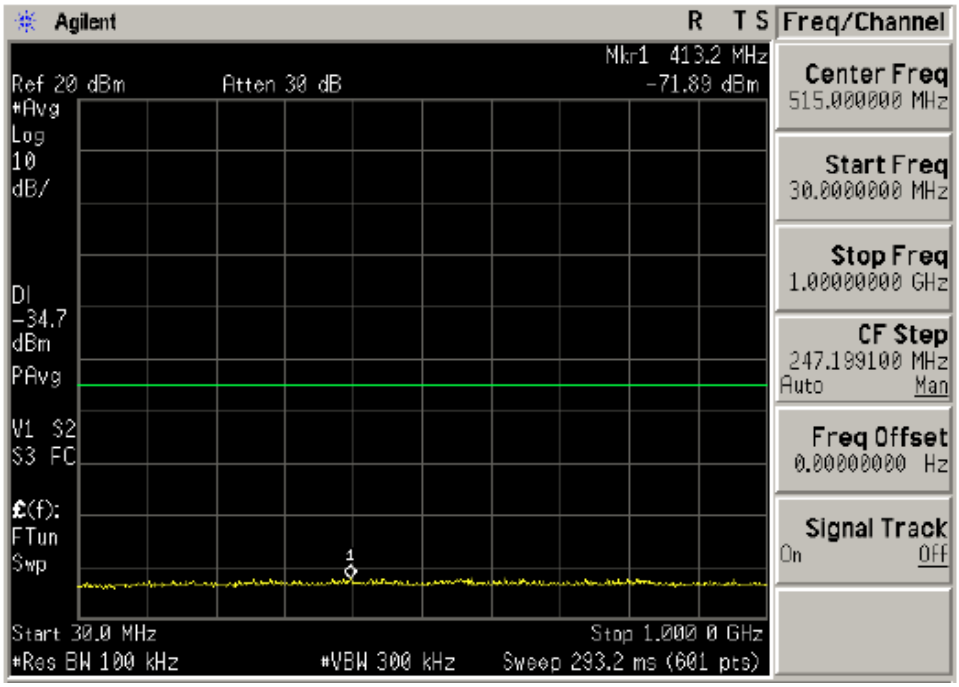
1GHZ-26.5GHZ



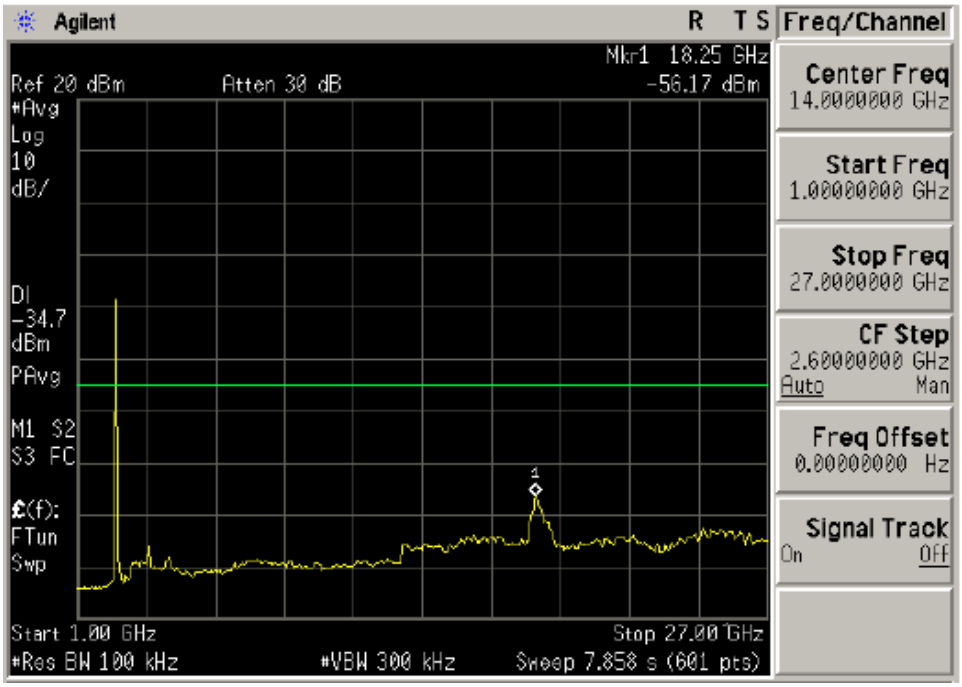
802.11n 20 High CH, 2462MHz
Ref.



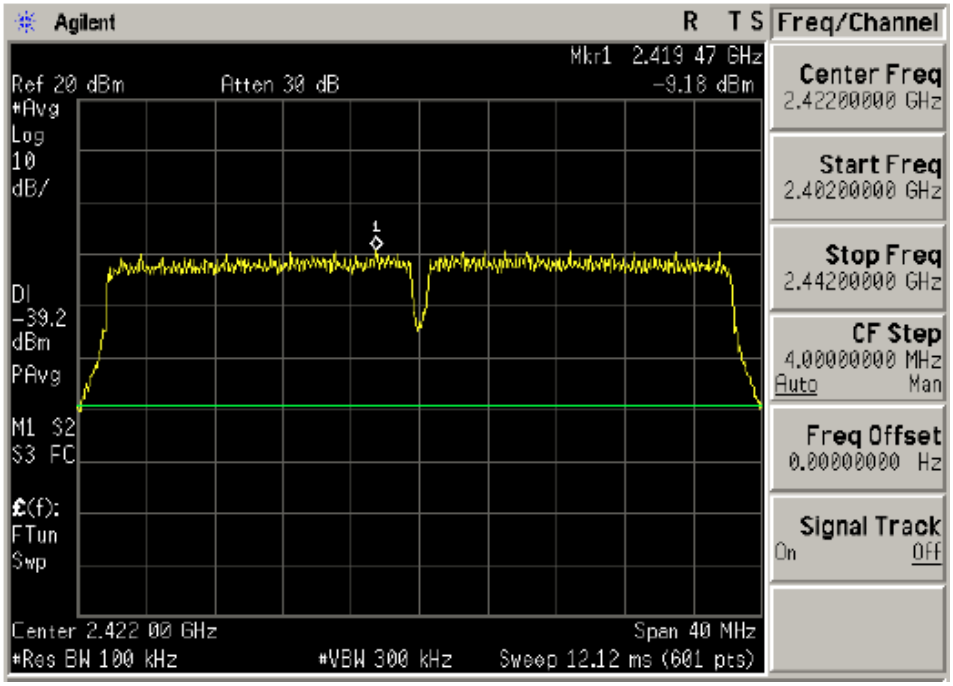
30MHZ-1000MHZ



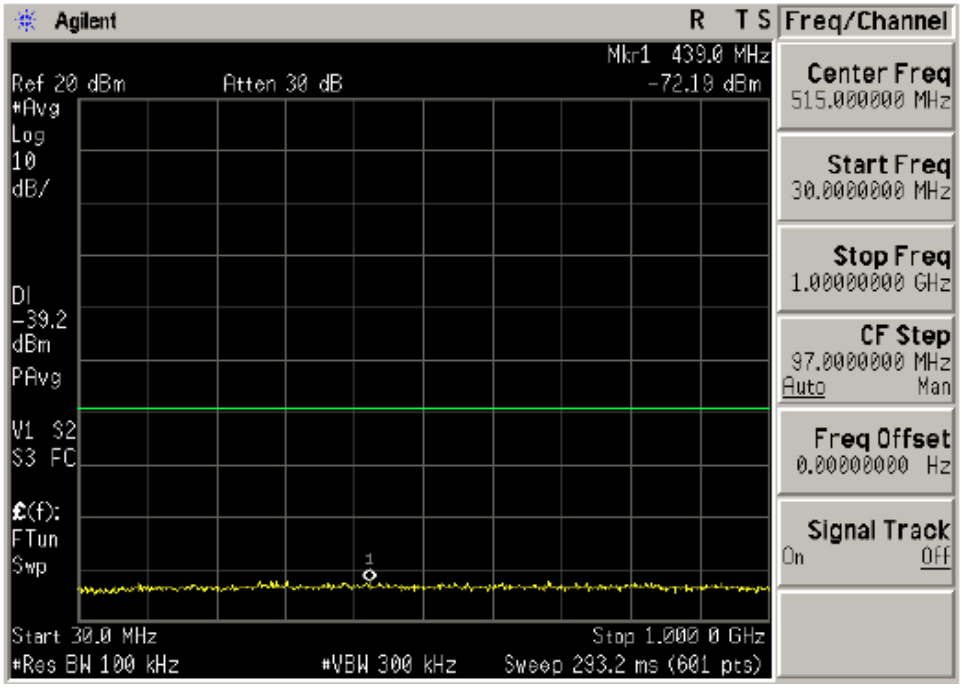
1GHZ-26.5GHZ



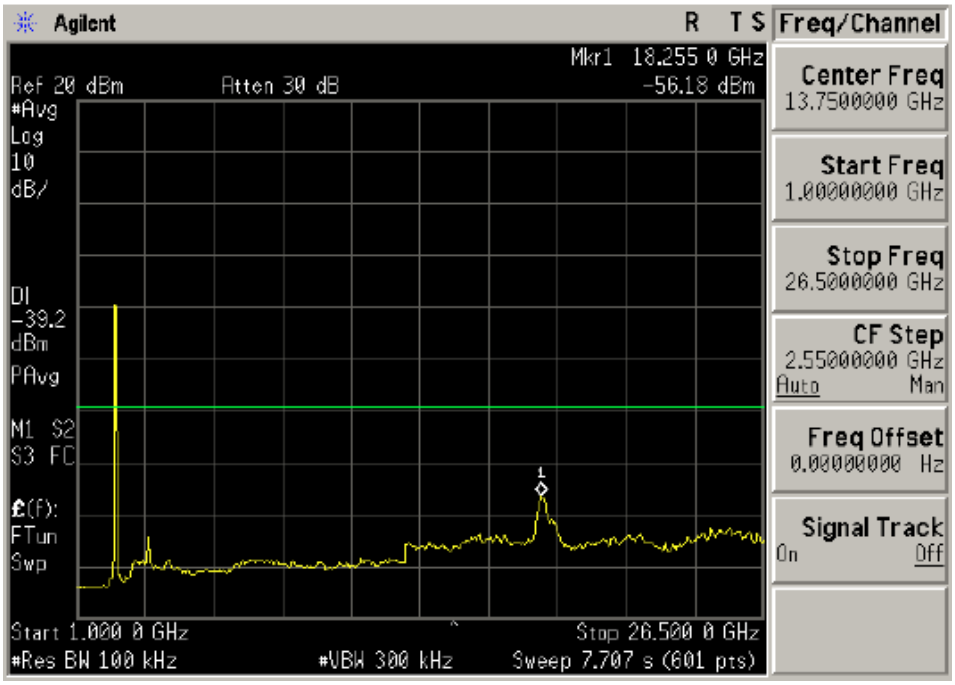
802.11n 40 Low CH, 2422MHz
Ref.



30MHZ-1000MHZ

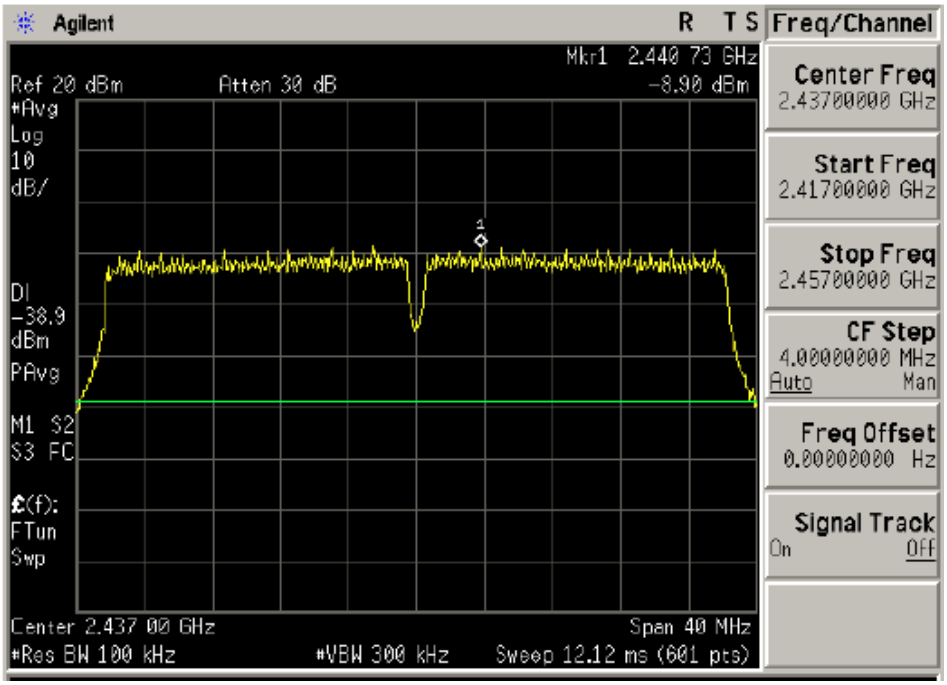


1GHz-26.5GHz

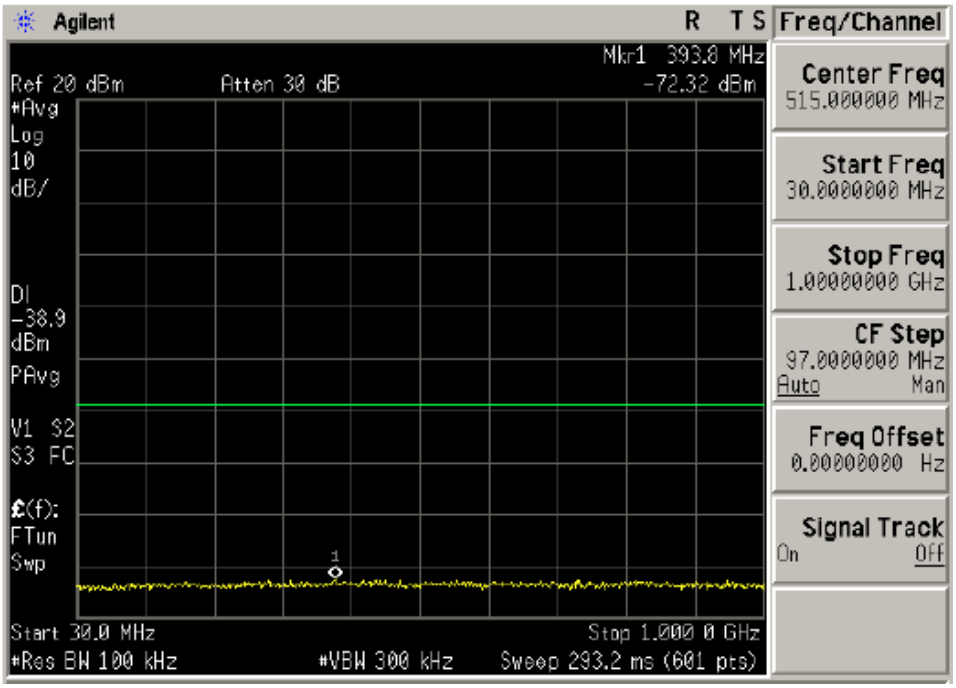


802.11n 40 Middle CH, 2437MHz

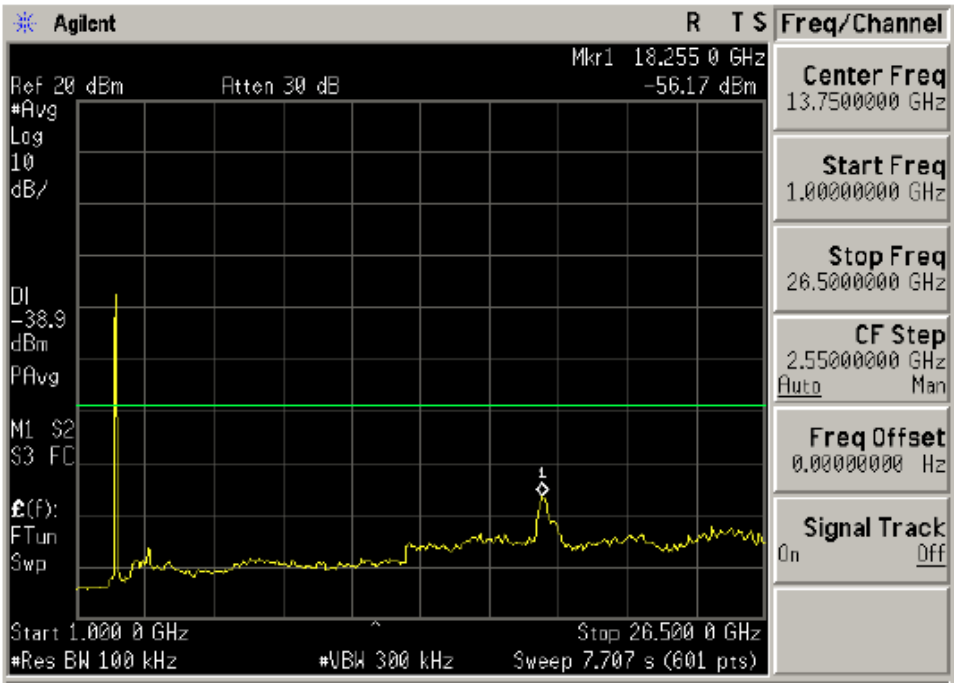
Ref.



30MHZ-1000MHZ

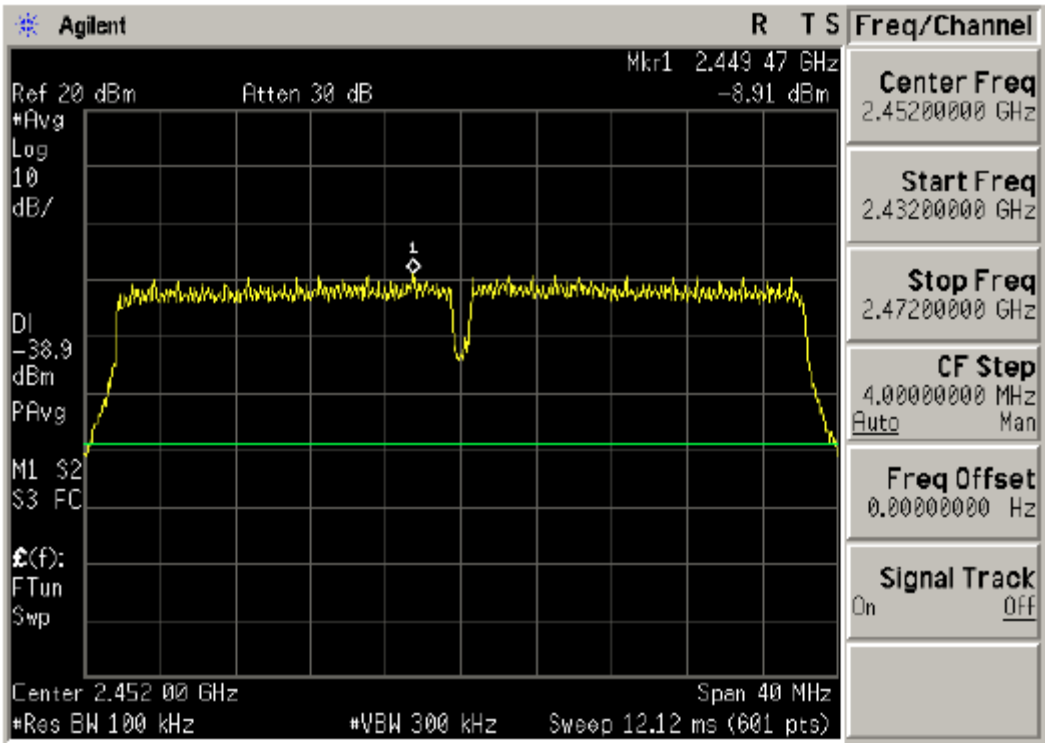


1GHZ-26.5GHZ

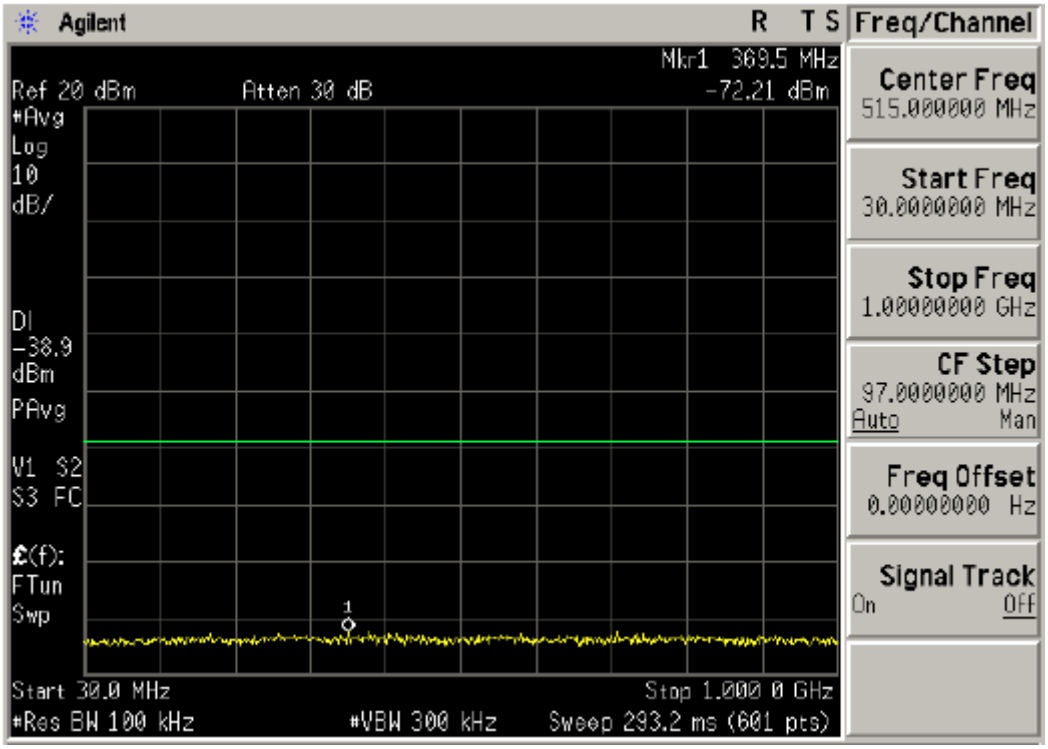


802.11n 40 High CH, 2452MHz

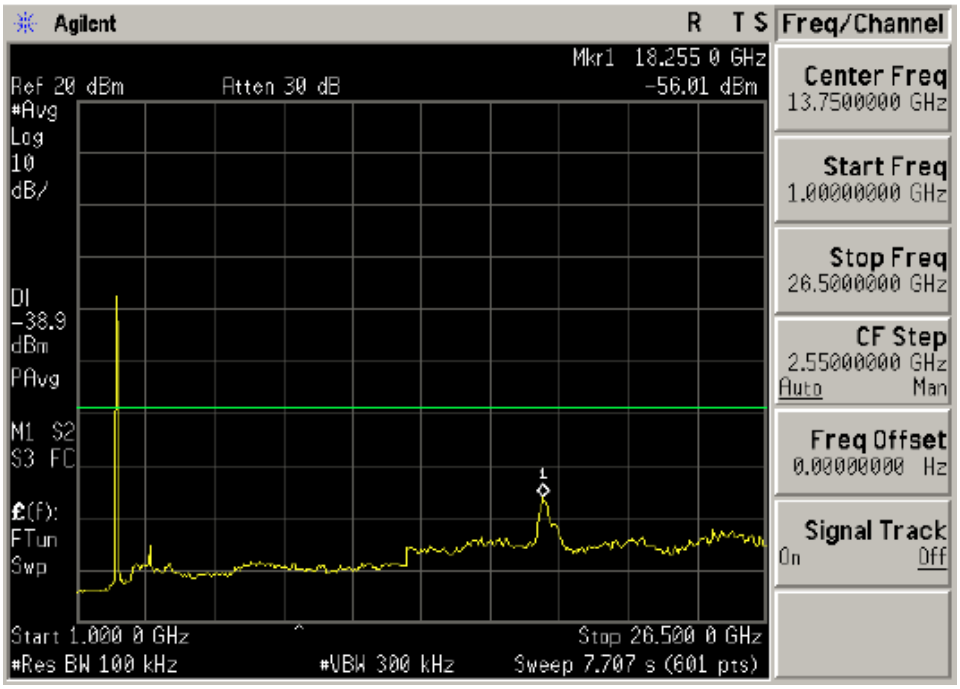
Ref.



30MHZ-1000MHZ



1GHZ-26.5GHZ


Agilent
R T S
Freq/Channel
Mkr1 18.255 0 GHz
Ref 20 dBm
Atten 30 dB
-56.01 dBm
#Avg
Log
10
dB/
Dl
-38.9
dBm
PAvg
M1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
13.7500000 GHz
Start Freq
1.00000000 GHz
Stop Freq
26.5000000 GHz
CF Step
2.55000000 GHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 1.000 0 GHz
Stop 26.500 0 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 7.707 s (601 pts)

7 RADIATED EMISSION MEASUREMENT

7.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz

For Band edge

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2300 to 2403 MHz Upper Band Edge: 2479 to 2500 MHz
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7.2 TEST PROCEDURE

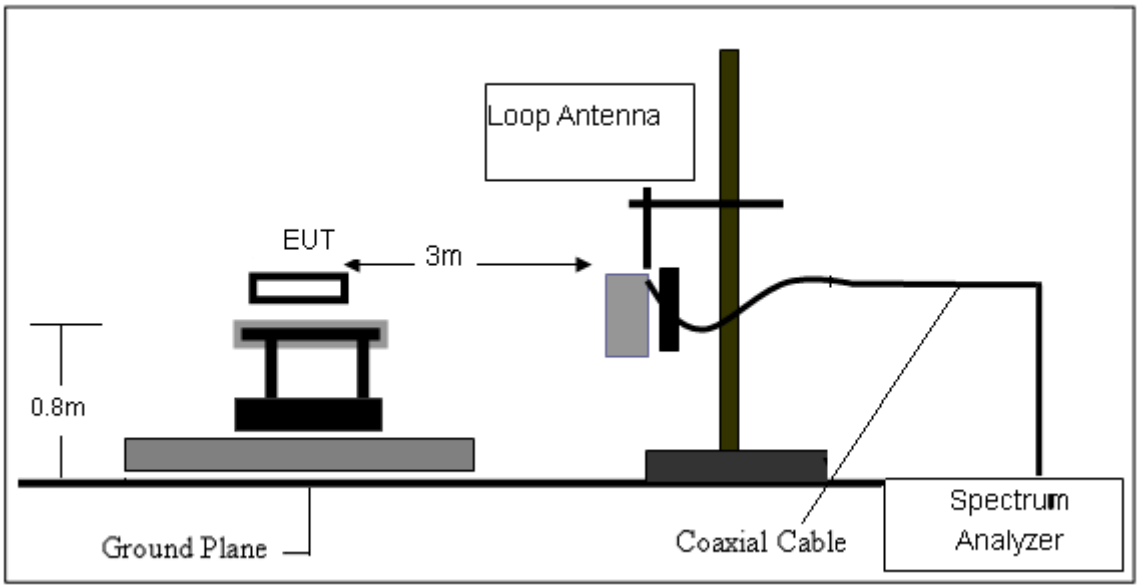
a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

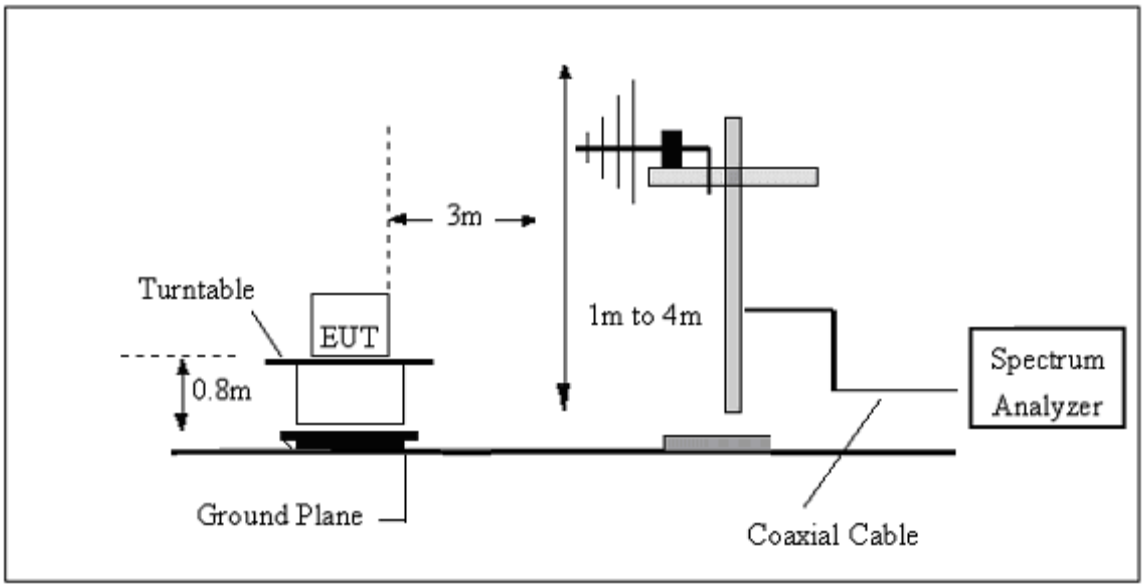
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

7.3 TESTSETUP

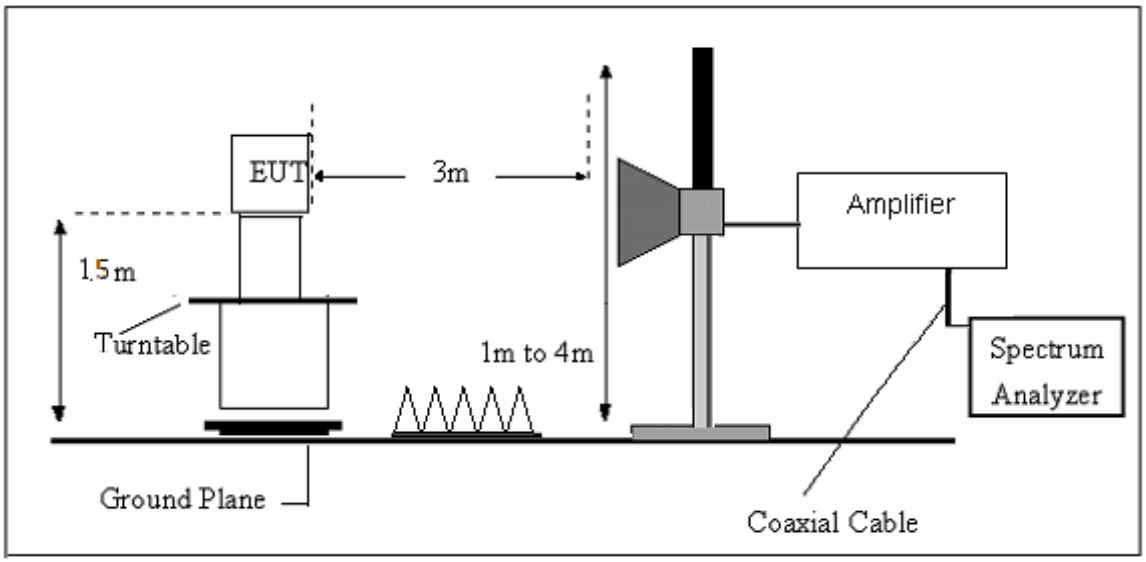
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



7.4. TEST RESULTS

(9KHz-30MHz)

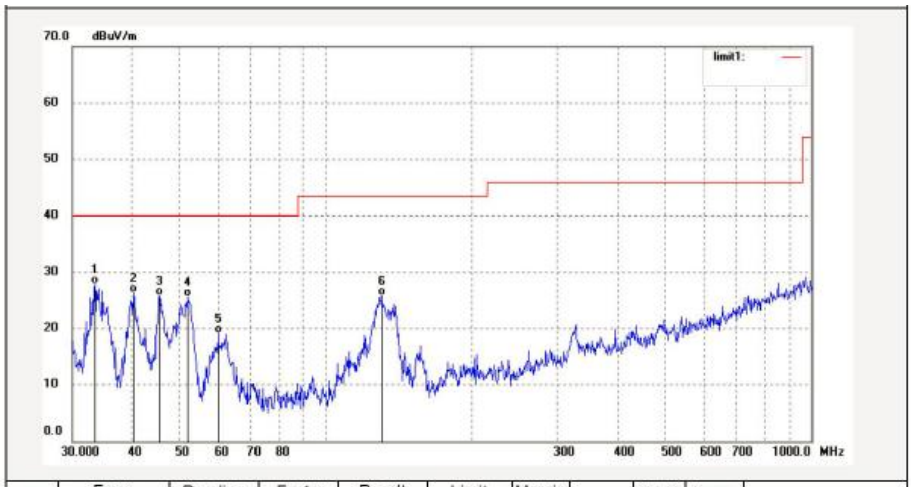
Temperature:	22.7℃	Relative Humidity:	61%
Test Voltage:	AC 120V/60HZ	Test Mode:	802.11 b(worst)

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuv) + distance extrapolation factor.

(30MHz-1000MHz)

Temperature:	24.7℃	Relative Humidity:	61%
Test Voltage:	AC 120V/60HZ	Phase:	Horizontal
Test Mode:	802.11 b(worst)		

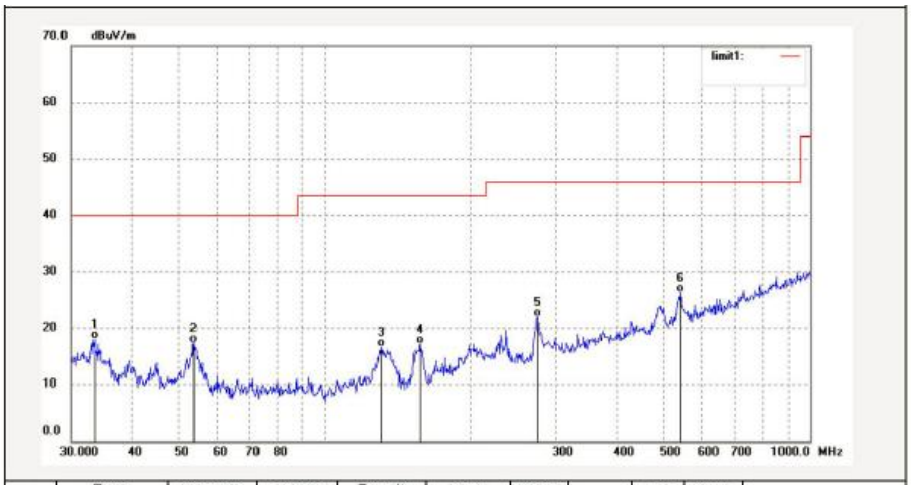


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.4522	43.50	-15.56	27.94	40.00	-12.06	QP			
2	40.1581	44.41	-18.13	26.28	40.00	-13.72	QP			
3	45.4130	44.81	-19.07	25.74	40.00	-14.26	QP			
4	51.8998	46.68	-21.11	25.57	40.00	-14.43	QP			
5	59.9418	40.92	-21.80	19.12	40.00	-20.88	QP			
6	130.3048	47.94	-22.14	25.80	43.50	-17.70	QP			

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit

Temperature:	22.7℃	Relative Humidity:	61%
Test Voltage:	AC 120V/60HZ	Phase:	Vertical
Test Mode:	802.11 b(worst)		

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.5700	33.75	-15.59	18.16	40.00	-21.84	QP			
2	53.7559	38.80	-21.41	17.39	40.00	-22.61	QP			
3	131.2235	38.87	-22.16	16.71	43.50	-26.79	QP			
4	157.5290	38.93	-21.64	17.29	43.50	-26.21	QP			
5	274.4464	38.83	-16.92	21.91	46.00	-24.09	QP			
6	540.7072	36.35	-9.93	26.42	46.00	-19.58	QP			

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit

(1GHz~25GHz) Restricted band and Spurious emission Requirements

Frequency	Read Level	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Remark	Comment
(MHz)	(dBμV)	(dB)	dB/m	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
Low Channel (2412 MHz)(802.11b)									
4823.832	63.6	5.21	35.59	44.30	60.10	74.00	-13.9	Pk	Vertical
4823.832	41.81	5.21	35.59	44.30	38.31	54.00	-15.69	AV	Vertical
7236.307	62.85	6.48	36.27	44.60	61.00	74.00	-13	Pk	Vertical
7236.307	45.64	6.48	36.27	44.60	43.79	54.00	-10.21	AV	Vertical
4823.737	63.51	5.21	35.55	44.30	59.97	74.00	-14.03	Pk	Horizontal
4823.737	43.03	5.21	35.55	44.30	39.49	54.00	-14.51	AV	Horizontal
7235.828	64.84	6.48	36.27	44.52	63.07	74.00	-10.93	Pk	Horizontal
7235.828	44.96	6.48	36.27	44.52	43.19	54.00	-10.81	AV	Horizontal
Middle Channel (2437 MHz)(802.11b)									
4873.363	59.95	5.21	35.66	44.20	56.62	74.00	-17.38	Pk	Vertical
4873.363	38.81	5.21	35.66	44.20	35.48	54.00	-18.52	AV	Vertical
7320.33	57.03	7.10	36.50	44.43	56.20	74.00	-17.80	Pk	Vertical
7320.33	39.6	7.10	36.50	44.43	38.77	54.00	-15.23	AV	Vertical
4873.346	57.67	5.21	35.66	44.20	54.34	74.00	-19.66	Pk	Horizontal
4873.346	40.47	5.21	35.66	44.20	37.14	54.00	-16.86	AV	Horizontal
7310.596	57.89	7.10	36.50	44.43	57.06	74.00	-16.94	Pk	Horizontal
7310.596	40.57	7.10	36.50	44.43	39.74	54.00	-14.26	AV	Horizontal
High Channel (2462 MHz)(802.11b)--Above 1G									
4925.916	62.22	5.21	35.52	44.21	58.74	74.00	-15.26	Pk	Vertical
4925.916	43.65	5.21	35.52	44.21	40.17	54.00	-13.83	AV	Vertical
7387.974	65.66	7.10	36.53	44.60	64.69	74.00	-9.31	Pk	Vertical
7387.974	43.47	7.10	36.53	44.60	42.50	54.00	-11.50	AV	Vertical
4925.444	66.33	5.21	35.52	44.21	62.85	74.00	-11.15	Pk	Horizontal
4925.444	45.26	5.21	35.52	44.21	41.78	54.00	-12.22	AV	Horizontal
7329.443	63.36	7.10	36.53	44.60	62.39	74.00	-11.61	Pk	Horizontal
7329.443	44.47	7.10	36.53	44.60	43.50	54.00	-10.5	AV	Horizontal

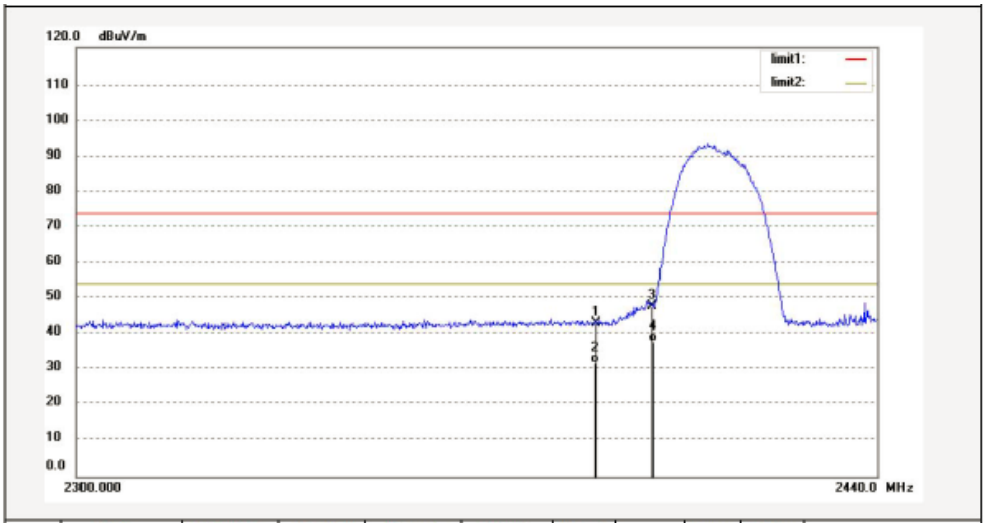
Note:
(1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4)"802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average don't record.

Radiated Band Edge data

Remark: All restriction band have been tested, and only the worst case is shown in report

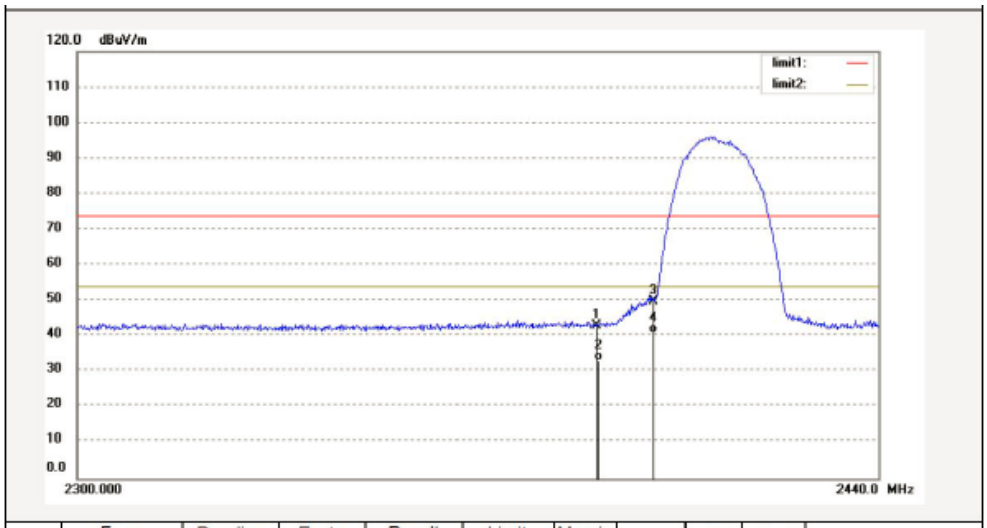
802.11 b low CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	6.26	36.73	42.99	74.00	-31.01	peak			
2	2390.000	-4.68	36.73	32.05	54.00	-21.95	AVG			
3	2400.000	10.99	36.78	47.77	74.00	-26.23	peak			
4	2400.000	1.27	36.78	38.05	54.00	-15.95	AVG			

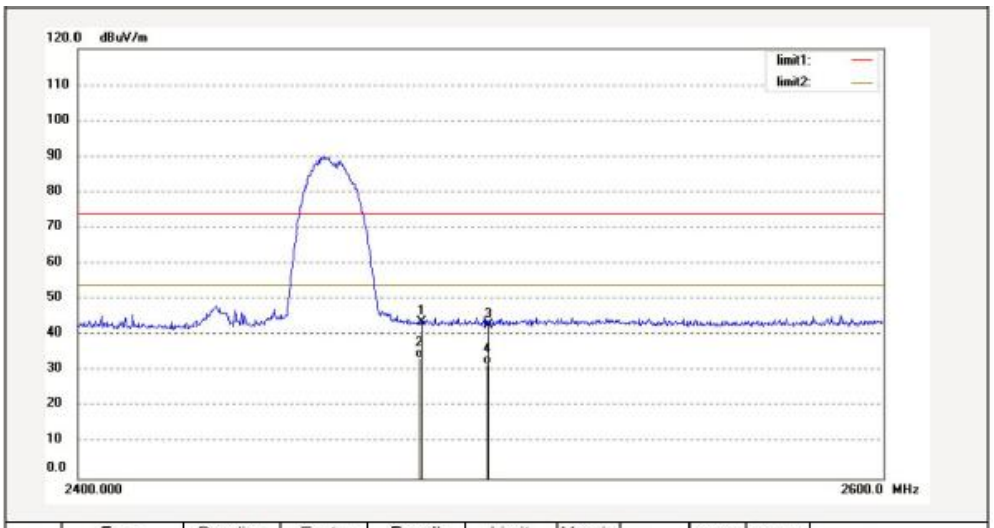
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	6.33	36.73	43.06	74.00	-30.94	peak			
2	2390.000	-3.49	36.73	33.24	54.00	-20.76	AVG			
3	2400.000	13.24	36.78	50.02	74.00	-23.98	peak			
4	2400.000	4.27	36.78	41.05	54.00	-12.95	AVG			

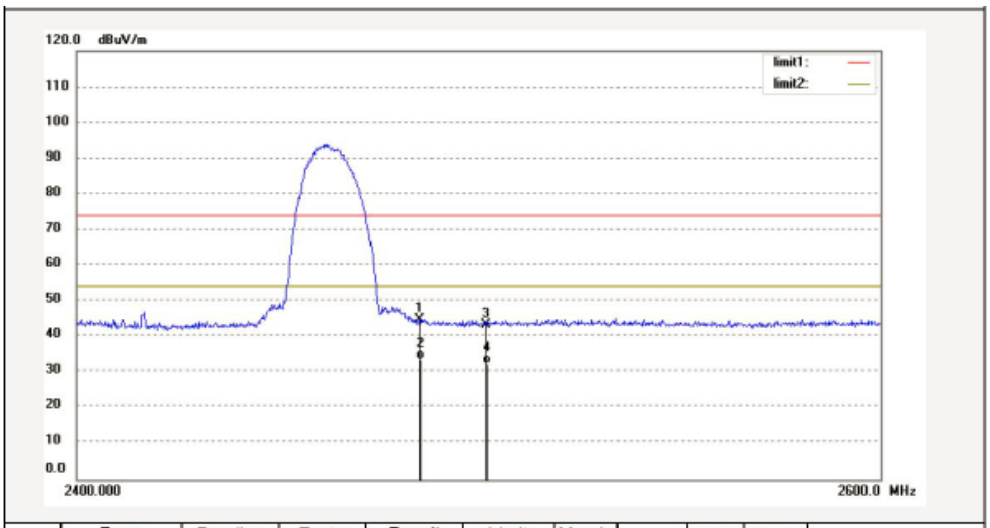
802.11 b High CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	6.66	37.13	43.79	74.00	-30.21	peak			
2	2483.500	-3.27	37.13	33.86	54.00	-20.14	AVG			
3	2500.000	5.68	37.20	42.88	74.00	-31.12	peak			
4	2500.000	-5.28	37.20	31.92	54.00	-22.08	AVG			

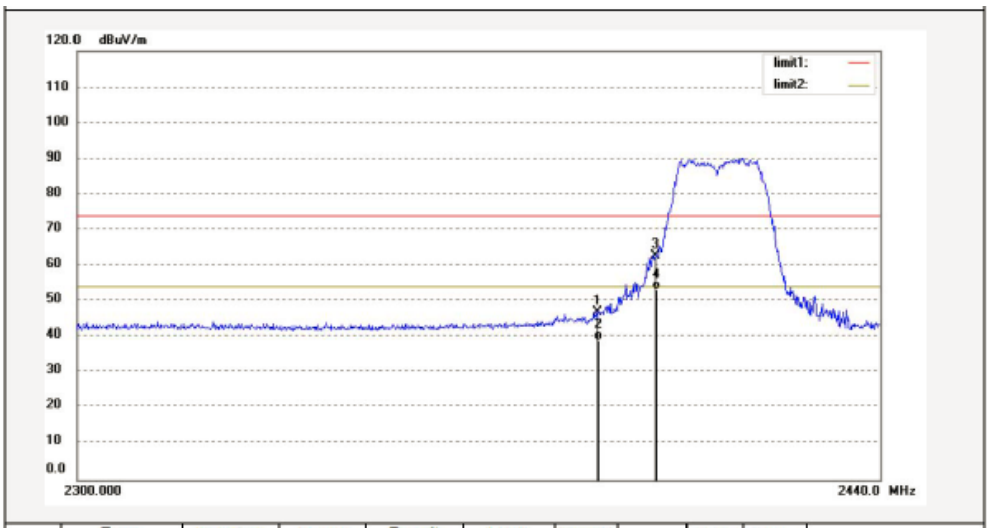
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	7.65	37.13	44.78	74.00	-29.22	peak			
2	2483.500	-3.40	37.13	33.73	54.00	-20.27	AVG			
3	2500.000	6.04	37.20	43.24	74.00	-30.76	peak			
4	2500.000	-4.59	37.20	32.61	54.00	-21.39	AVG			

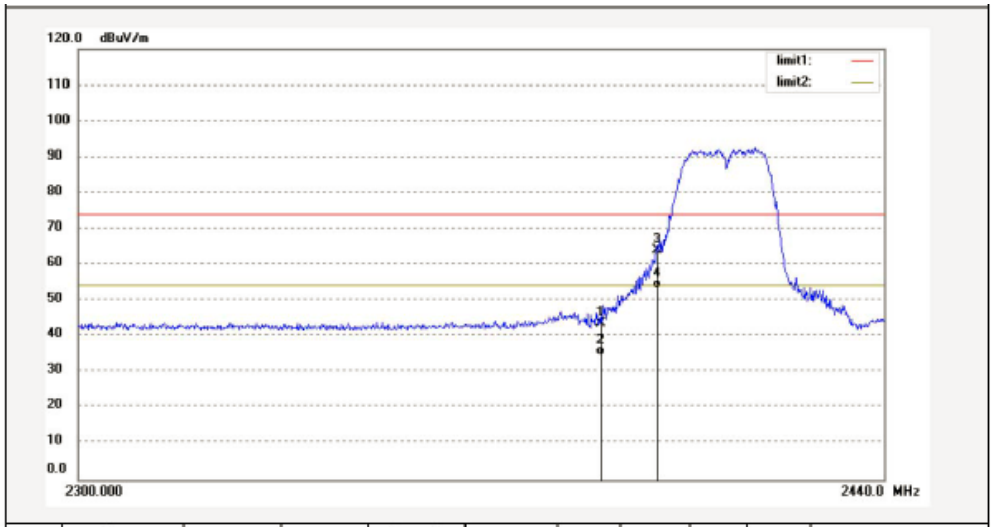
802.11 g Low CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	10.32	36.73	47.05	74.00	-26.95	peak			
2	2390.000	2.39	36.73	39.12	54.00	-14.88	AVG			
3	2400.000	26.06	36.78	62.84	74.00	-11.16	peak			
4	2400.000	16.34	36.78	53.12	54.00	-0.88	AVG			

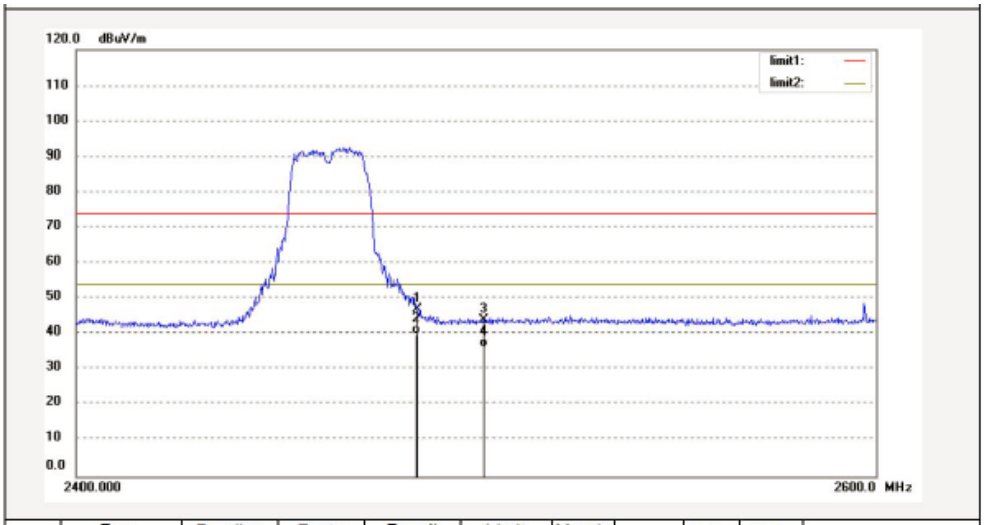
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	6.88	36.73	43.61	74.00	-30.39	peak			
2	2390.000	-2.00	36.73	34.73	54.00	-19.27	AVG			
3	2400.000	27.35	36.78	64.13	74.00	-9.87	peak			
4	2400.000	16.47	36.78	53.25	54.00	-0.75	AVG			

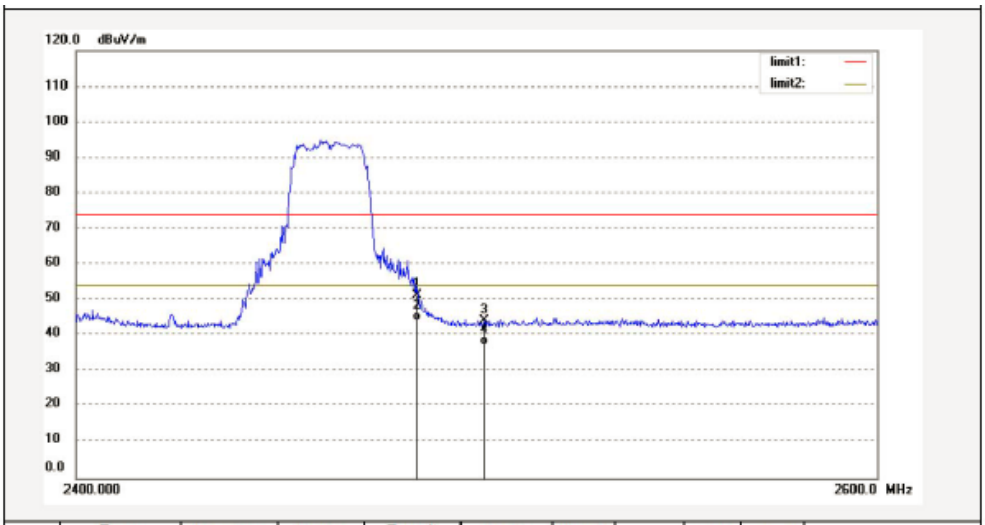
802.11 g High CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	9.88	37.13	47.01	74.00	-26.99	peak			
2	2483.500	2.81	37.13	39.94	54.00	-14.06	AVG			
3	2500.000	6.78	37.20	43.98	74.00	-30.02	peak			
4	2500.000	-0.83	37.20	36.37	54.00	-17.63	AVG			

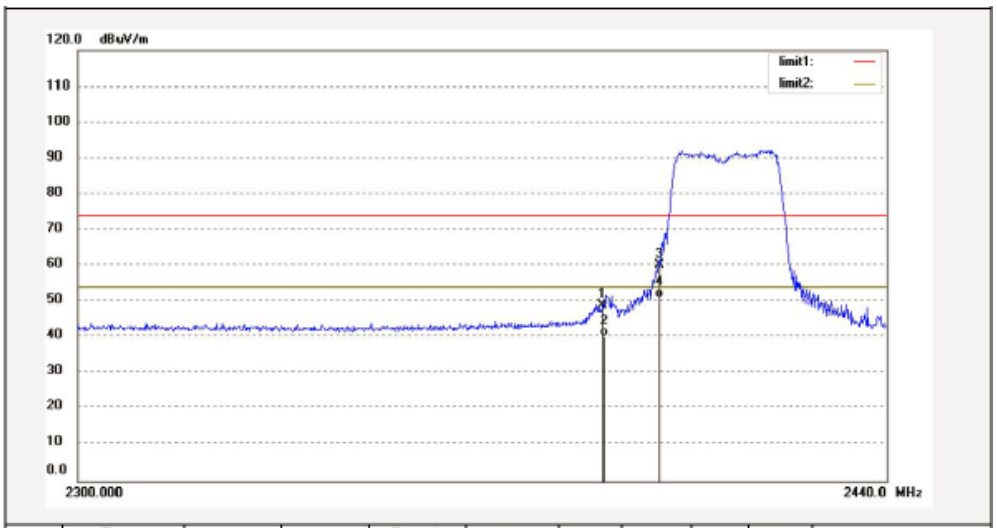
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	14.31	37.13	51.44	74.00	-22.56	peak			
2	2483.500	7.14	37.13	44.27	54.00	-9.73	AVG			
3	2500.000	7.20	37.20	44.40	74.00	-29.60	peak			
4	2500.000	0.00	37.20	37.20	54.00	-16.80	AVG			

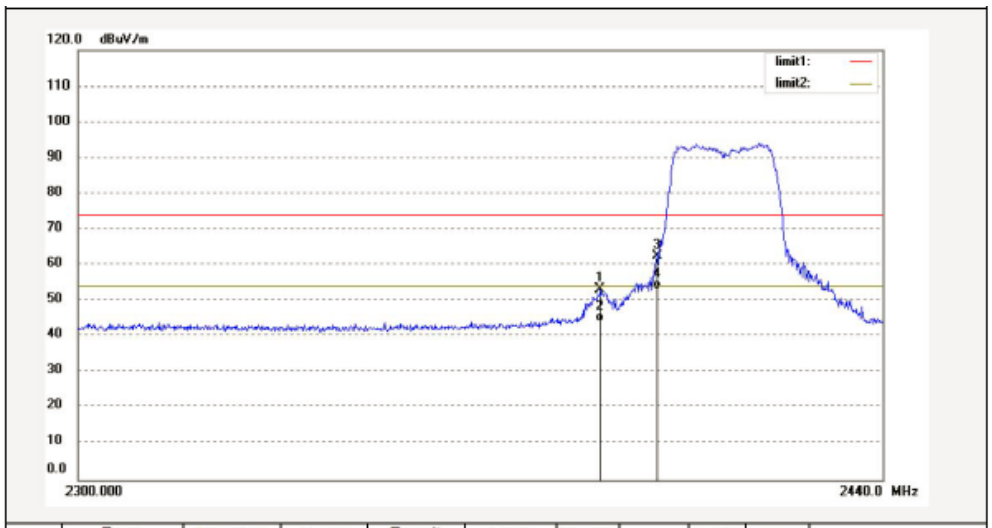
802.11 N 20 Low CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	12.31	36.73	49.04	74.00	-24.96	peak			
2	2390.000	3.59	36.73	40.32	54.00	-13.68	AVG			
3	2400.000	23.29	36.78	60.07	74.00	-13.93	peak			
4	2400.000	14.27	36.78	51.05	54.00	-2.95	AVG			

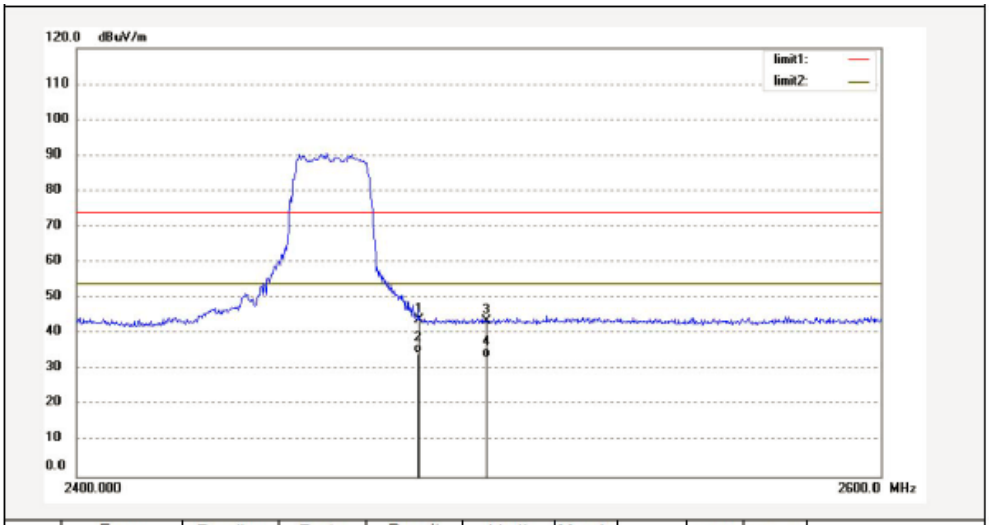
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	16.67	36.73	53.40	74.00	-20.60	peak			
2	2390.000	7.41	36.73	44.14	54.00	-9.86	AVG			
3	2400.000	25.64	36.78	62.42	74.00	-11.58	peak			
4	2400.000	16.47	36.78	53.25	54.00	-0.75	AVG			

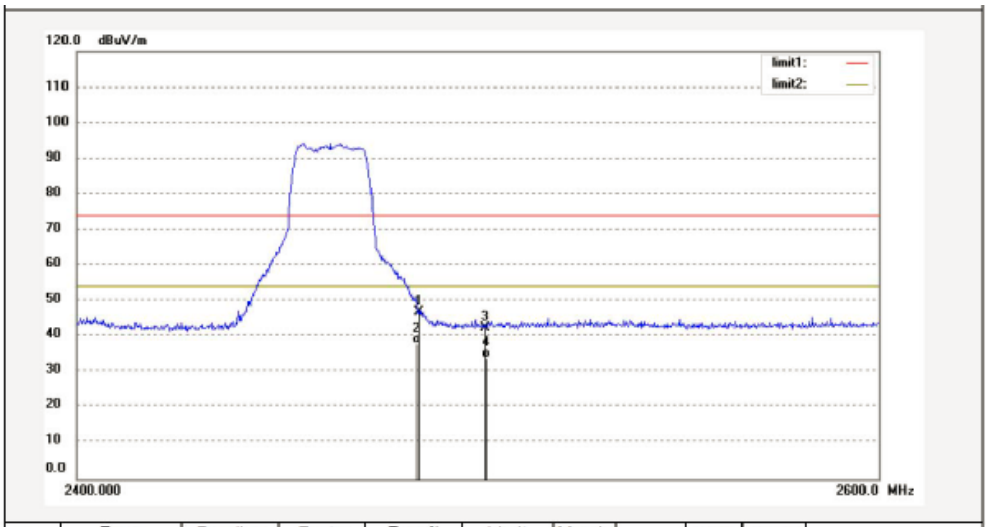
802.11 N 20 High CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	6.68	37.13	43.81	74.00	-30.19	peak			
2	2483.500	-2.47	37.13	34.66	54.00	-19.34	AVG			
3	2500.000	6.53	37.20	43.73	74.00	-30.27	peak			
4	2500.000	-3.71	37.20	33.49	54.00	-20.51	AVG			

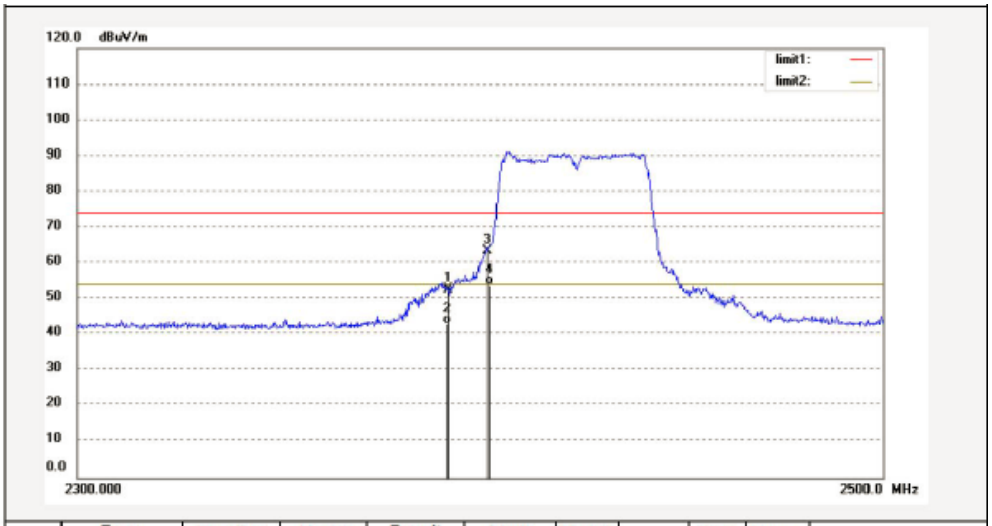
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	9.81	37.13	46.94	74.00	-27.06	peak			
2	2483.500	0.71	37.13	37.84	54.00	-16.16	AVG			
3	2500.000	5.33	37.20	42.53	74.00	-31.47	peak			
4	2500.000	-3.03	37.20	34.17	54.00	-19.83	AVG			

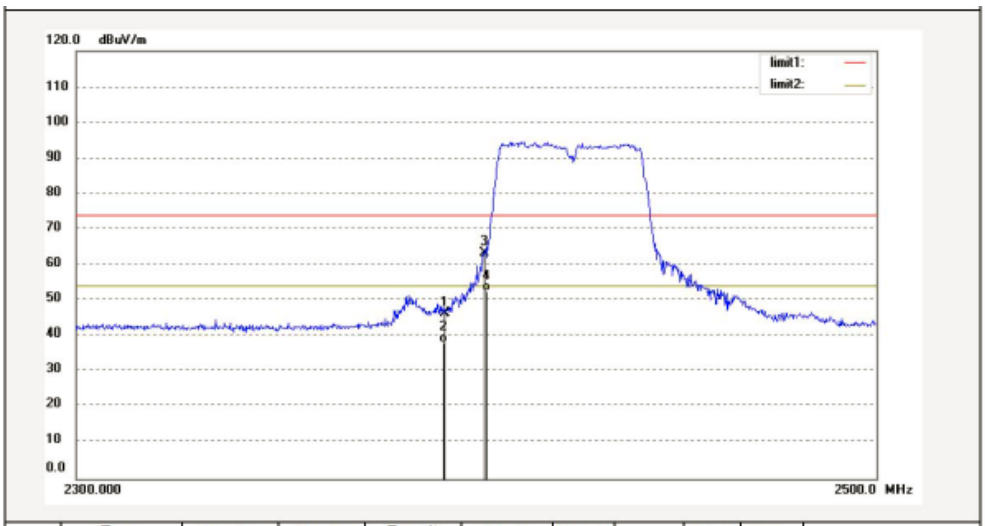
802.11 N 40 Low CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	15.91	36.73	52.64	74.00	-21.36	peak			
2	2390.000	6.29	36.73	43.02	54.00	-10.98	AVG			
3	2400.000	26.81	36.78	63.59	74.00	-10.41	peak			
4	2400.000	17.14	36.78	53.92	54.00	-0.08	AVG			

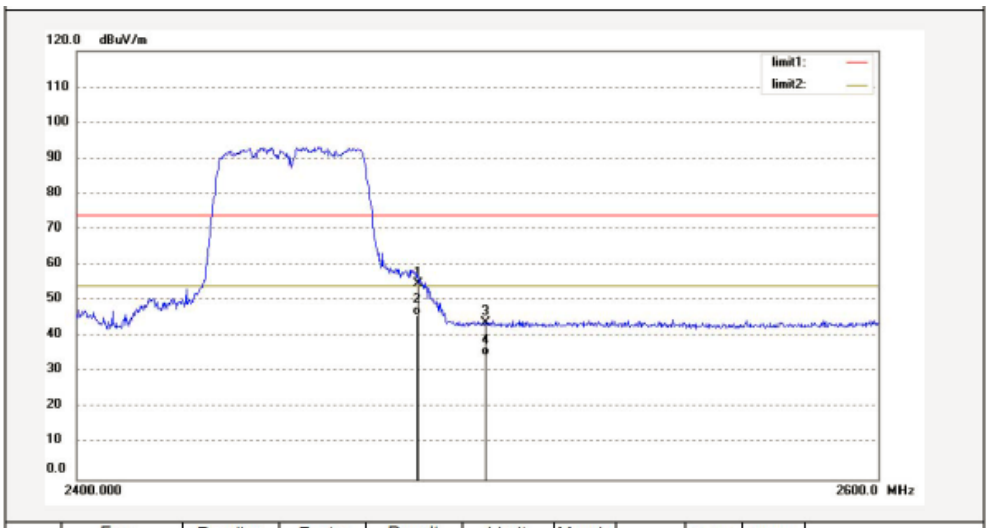
Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	9.58	36.73	46.31	74.00	-27.69	peak			
2	2390.000	1.55	36.73	38.28	54.00	-15.72	AVG			
3	2400.000	26.58	36.78	63.36	74.00	-10.64	peak			
4	2400.000	16.00	36.78	52.78	54.00	-1.22	AVG			

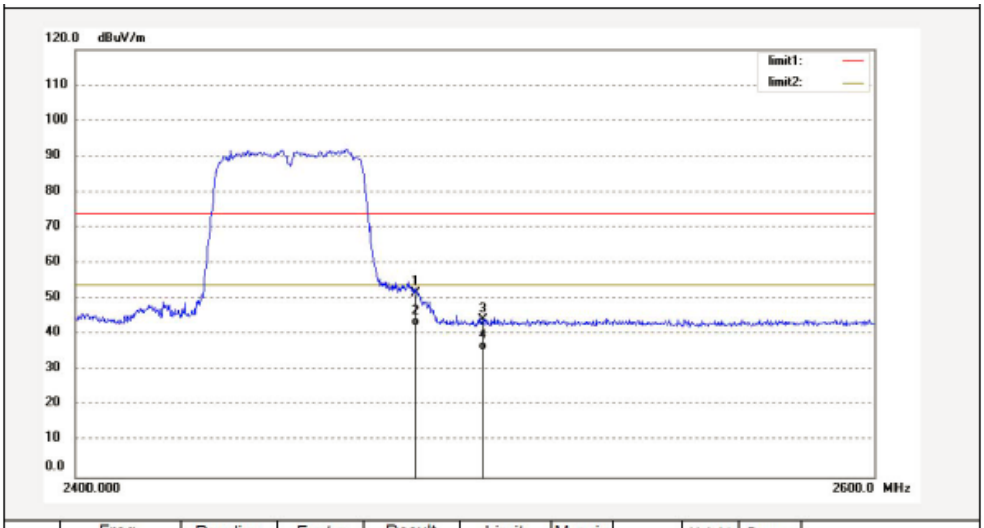
802.11 N 40 High CH

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	17.54	37.13	54.67	74.00	-19.33	peak			
2	2483.500	8.91	37.13	46.04	54.00	-7.96	AVG			
3	2500.000	6.84	37.20	44.04	74.00	-29.96	peak			
4	2500.000	-2.54	37.20	34.66	54.00	-19.34	AVG			

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	14.58	37.13	51.71	74.00	-22.29	peak			
2	2483.500	5.28	37.13	42.41	54.00	-11.59	AVG			
3	2500.000	7.01	37.20	44.21	74.00	-29.79	peak			
4	2500.000	-1.61	37.20	35.59	54.00	-18.41	AVG			

8 CONDUCTED EMISSION TEST

8.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

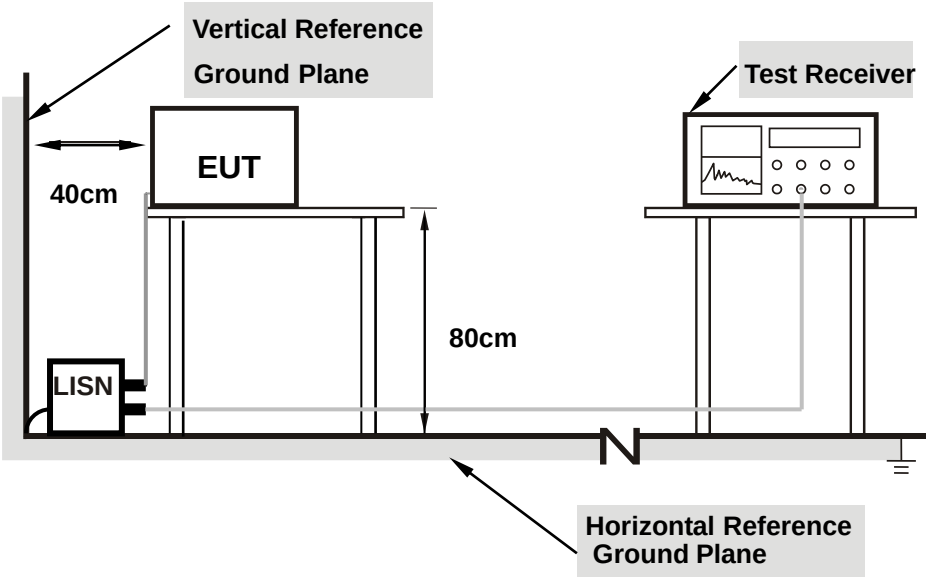
The following table is the setting of the receiver

Receiver Parameters	**Setting**
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

8.1.2 TEST PROCEDURE

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

8.1.3 TEST SETUP



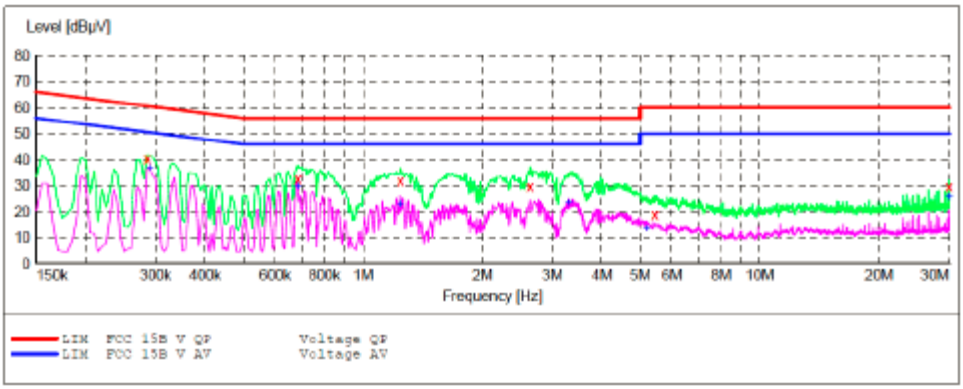
Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

8.1.4 TEST RESULT

Temperature:	22.1 ℃	Relative Humidity:	56%
Test Voltage:	120V/60HZ	Phase:	L/N
Test Mode:	ON		

L-line



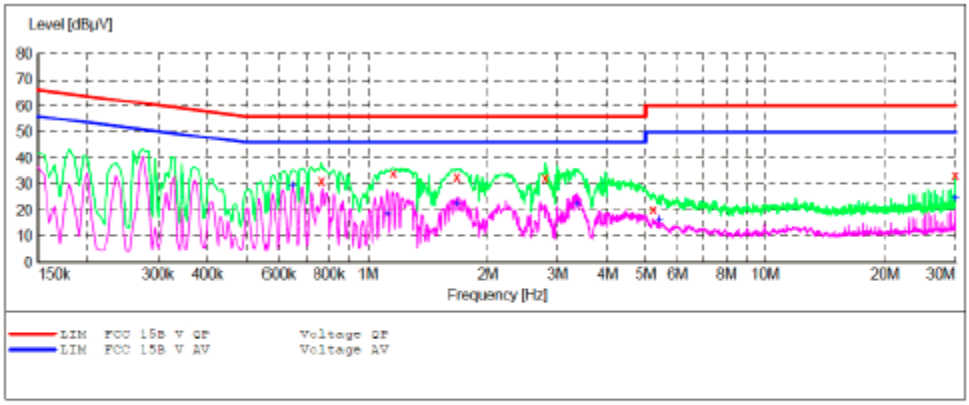
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.285000	40.10	10.6	60.7	20.6	QP	L1	GND
0.685000	32.50	10.8	56	23.5	QP	L1	GND
1.245000	31.70	10.9	56	24.3	QP	L1	GND
2.640000	29.80	11.0	56	26.2	QP	L1	GND
5.450000	18.90	11.2	60	41.1	QP	L1	GND
30.000000	29.80	11.5	60	30.2	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	37.10	10.6	50.5	13.4	AV	L1	GND
0.685000	30.00	10.8	46	16.0	AV	L1	GND
1.240000	23.00	10.9	46	23.0	AV	L1	GND
3.300000	23.60	11.1	46	22.4	AV	L1	GND
5.180000	13.70	11.2	50	36.3	AV	L1	GND
30.000000	25.60	11.5	50	24.4	AV	L1	GND

N-line



MEASUREMENT RESULT :

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.765000	31.00	10.8	56	25.0	QP	N	GND
1.160000	34.00	10.9	56	22.0	QP	N	GND
1.675000	32.70	10.9	56	23.3	QP	N	GND
2.800000	32.20	11.0	56	23.8	QP	N	GND
5.210000	20.20	11.2	60	39.8	QP	N	GND
30.000000	33.30	11.5	60	26.7	QP	N	GND

MEASUREMENT RESULT :

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.645000	29.80	10.8	46	16.2	AV	N	GND
1.120000	18.80	10.9	46	27.2	AV	N	GND
1.675000	22.80	10.9	46	23.2	AV	N	GND
3.360000	22.50	11.1	46	23.5	AV	N	GND
5.410000	16.50	11.2	50	33.5	AV	N	GND
30.000000	24.60	11.5	50	25.4	AV	N	GND

9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

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.

9.2 RESULT

The antennas used for this product are PIFA antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 2.0dBi.

※※※※※END OF THE REPORT※※※※※