
TEST REPORT FOR WLAN TESTING

Report No.: SRTC2021-9004(F)-21012102(F)

Product Name: Mobile phone

Product Model: HLTE233E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: FCC Part 15 Subpart C (2019)

FCC ID: 2ADOBHLTE233E

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District,

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1. GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
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1.3 Applicant's details

Company:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China
City:	Qingdao
Country or Region:	China
Contacted person:	Geng Ruifeng
Tel:	+86-532-80877742
Fax:	---
Email:	gengruifeng@hisense.com

1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao, China
City:	Qingdao
Country or Region:	China
Contacted person:	Deng Tingting
Tel:	+86-532-55753708
Fax:	---
Email:	dengtingting@hisense.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2021-01-21
Testing Start Date:	2021-01-21
Testing End Date:	2021-02-22

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	50	---
Minimum Extreme	-30	---

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.35
Minimum Extreme Supply Voltage (V d.c.):	3.50

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Band	2.412GHz~2.462GHz
Number of Channel For 20MHz	11
Number of Channel For 40MHz	7
Modulation Type	DBPSK/DQPSK/CCK/BPSK/QPSK/16QAM/64QAM
Duplex Mode	TDD
Channel Spacing	5MHz
Data Rate	802.11b: 1Mbps-11Mbps 802.11g: 6Mbps-54Mbps 802.11n (HT20/HT40): MCS0-MCS7
Power Supply	Battery/Charger
Hardware Version	FS185-MB-V0.2
Software Version	Hisense_HLTE233E_10_S01_01_02_MX05_debug_KS2 33C _0003853_20210115_1121
IMEI	860598050000357
Antenna type	Refer to Note1
Antenna connector	Refer to Note1

Antenna requirement (FCC part 15.203)

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The antenna(s) of the EUT are permanently attached.
- There are no provisions for connection to an external antenna.

Note1: The antenna provide to the EUT, please refer to the following table:

Brand	Model	Antenna gain	Frequency range(GHz)	Antenna type	Connector Type
N/A	N/A	-0.26dBi	2.412GHz~2.462GHz	Fixed Internal Antenna	N/A

Manufacturers ensure that their designs will not be modified by the user or third parties arbitrary antenna parameters and performance. The EUT complies with the requirement of §15.203.

Note2: The difference between main supply and secondary supply is that the LCD, Camera and Memory, so the secondary supply evaluates the worst case of radiation.

Main Supply

Part Name	Model	Supplier(Brand)	Description
LCD touch panel	FT8006S-AA	WANCHANGLONG ELECTRONICS TECHNOLOGY (SHENZHEN) CO., LTD	6.55
Camera	imx586	GXW	imx586 COB
Memory	KMDH6001DM-B422	SAMSUNG(AA)	64+4

Secondary Supply

Part Name	Model Name	supplier	Remark
LCD touch panel	ILI9882N	WANCHANGLONG ELECTRONICS TECHNOLOGY (SHENZHEN) CO., LTD	6.55
Camera	OV48B2Q	DD	OV48B2Q COB
Memory	KMDH6001DA-B422	SAMSUNG(AA)	64+4

2.2 Description of Test Modes

11 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	---	---

2.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE ≥ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where

RE ≥ 1G: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1 to 11	1/6/11 For HT20 3/6/9 For HT40	DBPSK/BPSK	1,6, 6.5,13.5

Radiated Emission Test (Below 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1 to 11	1/6/11 For HT20 3/6/9 For HT40	DBPSK/BPSK	1,6, 6.5,13.5

Power Line Conducted Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1 to 11	6	DBPSK	1

Antenna Port Conducted Measurement:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1 to 11	1/6/11 For HT20 3/6/9 For HT40	DBPSK/BPSK	1,6, 6.5,13.5

2.3 Duty Cycle of Test Signal

Modulation Type	Data Rate	Duty Cycle	Correction factor
11b	1Mbps	97.35%	0.12
11g	6Mbps	82.82%	0.82
11n(HT20)	6.5Mbps	79.62%	0.99
11n(HT40)	13.5Mbps	63.14%	2.00

Duty cycle of test signal is > 98 %, duty factor shall not be considered.
Correction factor = 10* log (1/duty cycle)

2.4 EUT Operating conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

2.5 Support Equipment

The following support equipment was used to exercise the DUT during testing:

Equipment	Battery
Manufacturer	ShenzhenAerospaceElectronic Co.,Ltd.
Model Number	PLG496590
Equipment	Charger
Manufacturer	SHENZHENTIANYIN ELECTRONICS CO., LTD.
Model Number	TPA-46050200UU
Equipment	Headset
Manufacturer	kelinDongguan Keling Electronic Technology Co., Ltd
Model Number	KS232D
Equipment	USB Cable
Manufacturer	kelinDongguan Keling Electronic Technology Co., Ltd
Model Number	KS232D

3 REFERENCE SPECIFICATION


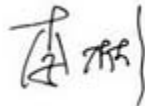

Specification	Version	Title
FCC part15 Subpart C	2019	Intentional radiators
ANSI C63.10	2013	Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074D01 V05R02r02	April 2, 2019	Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules

4 KEY TO NOTES AND RESULT CODES

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
N/T	Test case is not tested.

5 RESULT SUMMARY

No.	Test case	Reference	Verdict
1	Transmitter Output Power	15.247(b)(3)	Pass
2	6dB Bandwidth	15.247(a)(2)	Pass
3	Transmitter Power Spectral Density	15.247(e)	Pass
4	Conducted Out of band emission measurement	15.247(d)	Pass
5	Band Edge	15.247(d)	Pass
6	Spurious Radiated Emissions	15.205/15.209	Pass
7	AC Power line Conducted Emission	15.207	Pass
8	Antenna requirement	15.203	Pass(refer to section 2.1)

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. Tong Daocheng 	Issued date: 20210225

6 TEST RESULT

6.1 Peak Power Output

6.1.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.2.2 Test limit

Part15.247 (b) (3)

The maximum permissible conducted output power is 1 Watt.

6.2.3 Test Procedure Used

ANSI C63.10-2013 – Section 11.9.1.3

ANSI C63.10-2013 – Section 11.9.2.3.2

KDB 558074 D01 v05r02 – Section 8.3.1.3

6.2.4 Test Settings

Peak Power Measurement

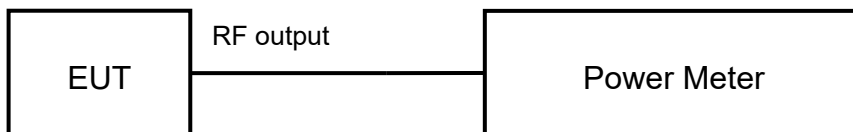
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

6.2.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.2.6 Test result

The test results are shown in Appendix A.

6.2 6dB Bandwidth

6.2.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.1.2 Test limit

Part15.247 (a) (2)

The minimum permissible 6dB bandwidth is 500 kHz

6.1.3 Test Procedure Used

ANSI C63.10-2013 – Section 11.8.2 Option 2

KDB 558074 D01 v05r02 – Section 8.2

6.1.4 Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

2. RBW = 100 kHz

3. VBW ≥ 3 x RBW

4. Detector = Peak

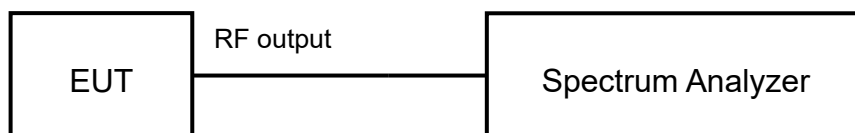
5. Trace mode = max hold

6. Sweep = auto couple

7. The trace was allowed to stabilize

6.1.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.1.6 Test result

The test results are shown in Appendix A.

6.3 Transmitter Power Spectral Density

6.3.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.3.2 Test limit

Part15.247 (e)

The maximum permissible power spectral density is 8.0dBm in any 3 kHz band.

6.3.3 Test Procedure Used

ANSI C63.10-2013 – Section 11.10.2 Method PKPSD

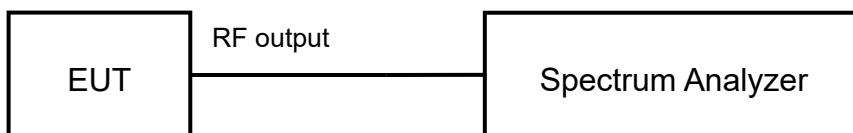
KDB 558074 D01 v05r02 – Section 8.4

6.3.4 Test Settings

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3 kHz
4. VBW = 10 kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

6.3.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.3.7 Test result

The test results are shown in Appendix A.

6.4 Conducted Out of band emission measurement

6.4.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.4.2 Test limit

Part 15.247(d): The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth.

6.4.3 Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3

KDB 558074 D01 v05r02 – Section 8.5

6.4.4 Reference level measurement Settings

Establish a reference level by using the following procedure:

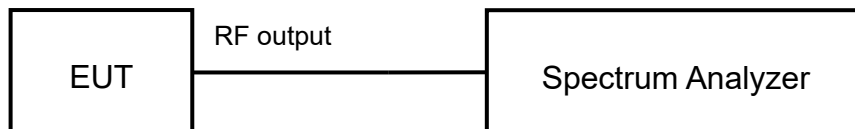
- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 MHz
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

6.4.5 Test Settings

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Set span to encompass the spectrum to be examined
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

6.4.6 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.4.7 Test result

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement. The test results are shown in Appendix A.

6.5 Band-edge measurement

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.5.2 Test limit

Part 15.247(d): The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth.

6.5.3 Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3

KDB 558074 D01 v05r02 – Section 8.7.2

6.5.4 Reference level measurement Settings

Establish a reference level by using the following procedure:

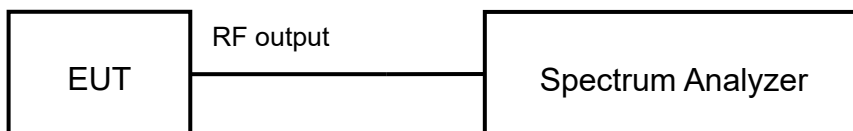
- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 MHz
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

6.5.5 Test Settings

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Set span to encompass the spectrum to be examined
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

6.5.6 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.5.7 Test result

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement. The test results are shown in Appendix A.

6.6 Spurious Radiated Emissions

6.6.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.6.2 Test Description

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

6.6.3 Test limit

Part15.205, 15.209, 15.247(d)

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in below Table per Section 15.209. The spectrum shall be investigated from the lowest radio frequency signal generated in the device

Frequency [MHz]	Field strength [μV/m]	Measured 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

Radiated Limits

Part15.35(b):

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit

Used conversion factor: Limit (dBμV/m) = 20 log (Limit (μV/m)/1μV/m)

Frequency [MHz]	Detector	Unit (dBμV/m)
30~88	Quasi-peak	40.0
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46.0
960~1000	Quasi-peak	54.0
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54.0
	Peak	74.0

Conversion Radiated limits

6.6.4 Test Procedure Used

KDB 558074 D01 DTS Meas Guidance v05r02r02 – Section 12.2.7

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and recorded the reading with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer complied the following setting:

Frequency	RBW
9-150kHz	200-300Hz
0.15-30MHz	9-10kHz

For Radiated emission above 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground in chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and recorded the reading with Maximum Hold Mode when the test frequency is below 1 GHz.
- The test-receiver system was set to peak and average detector and recorded the reading with Maximum Hold Mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Average detection (AV) at frequency above 1GHz. If duty cycle of test signal is < 98%, the duty factor need added to measured value.
4. All modes of operation were investigated and the worst-case emissions are reported.

6.6.5 Test Settings

Average Field Strength Measurements per Section 12.2.7 of KDB 558074 (Part 15.35)

Frequency	Detector
<1000MHz	Quasi-peak
>1000MHz	Peak and average

Peak Field Strength Measurements per Section 12.2.7 of KDB 558074 (Part 15.35)

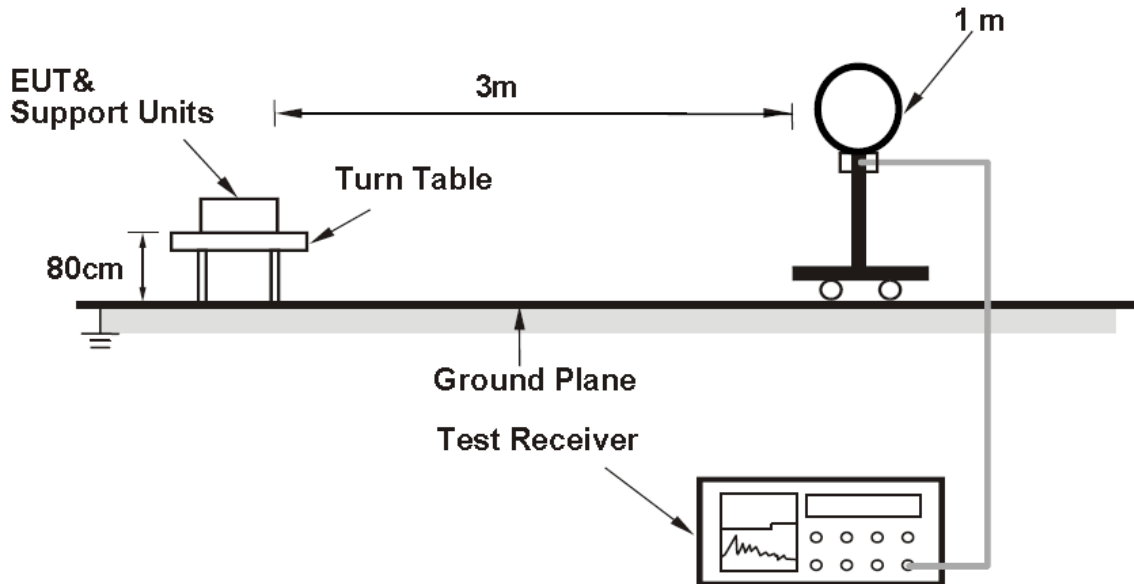
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in following table

Frequency	RBW
9-150kHz	200-300Hz
0.15-30MHz	9-10kHz
30-1000MHz	100-120kHz
>1000MHz	1MHz

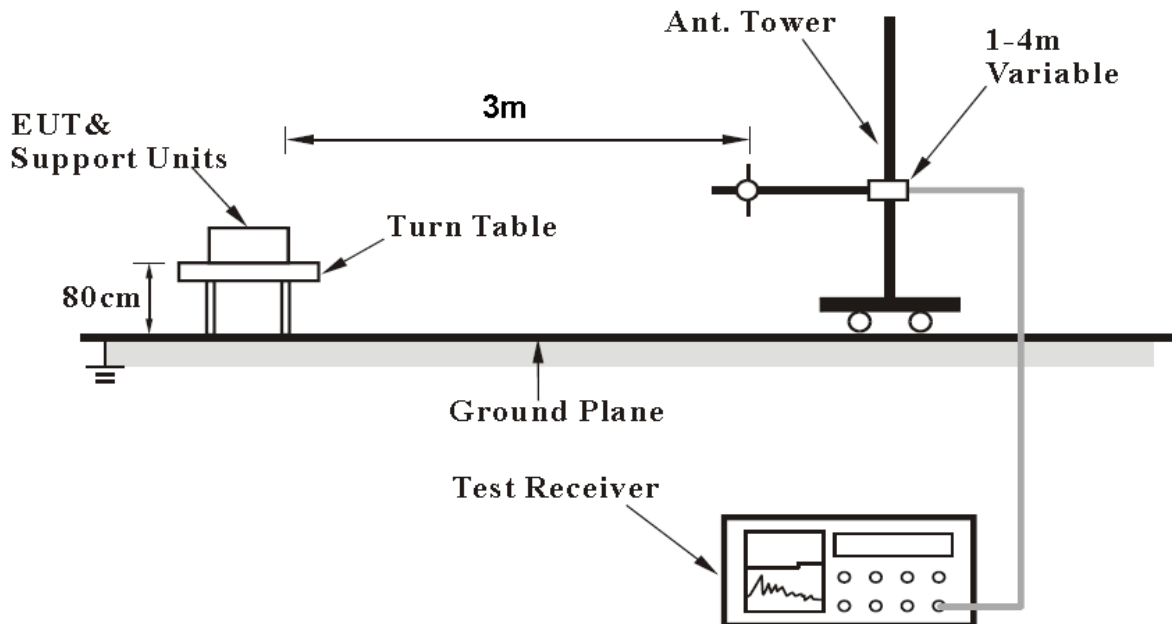
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.6 Test Setup

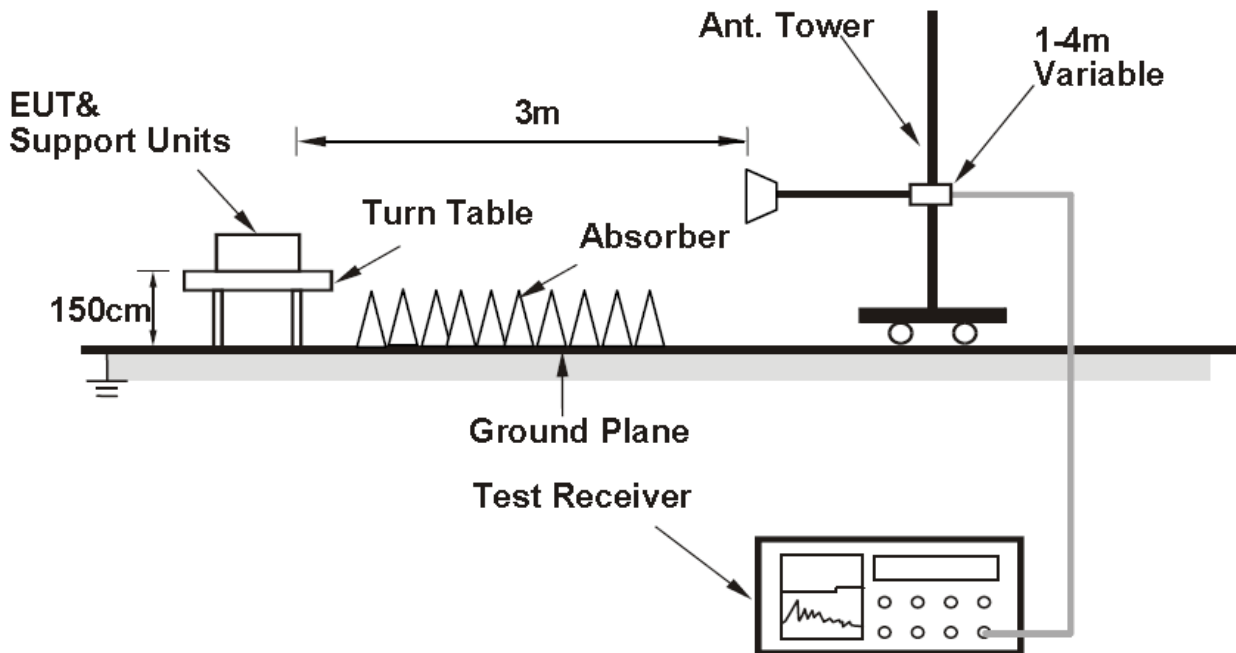
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



6.6.7 Test result

The test results are shown in Appendix B.

6.7 AC Power line Conducted Emission

6.7.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	40%	101.5kPa

6.7.2 Test limit

FCC Part15.207

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

The measurement is made according to ANSI C63.10-2013

6.7.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

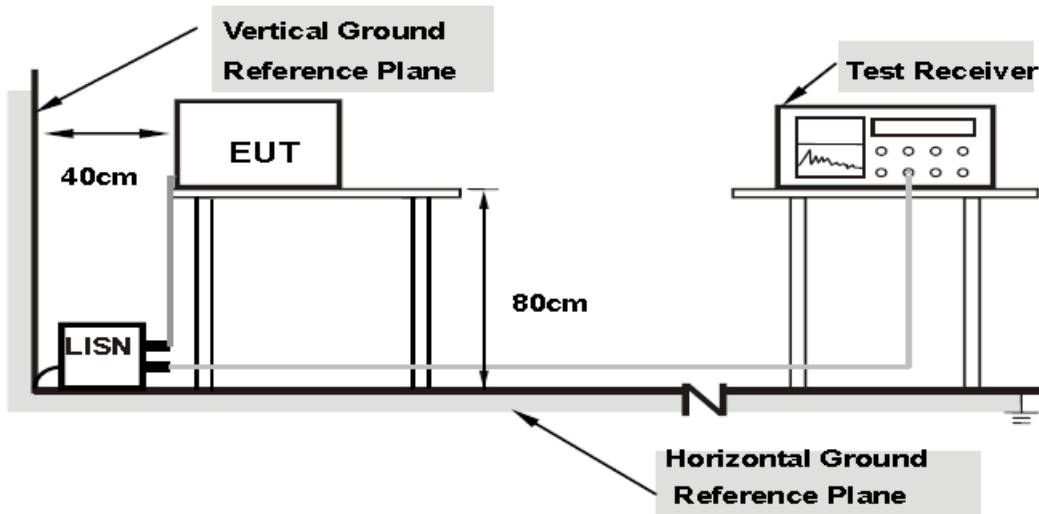
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

The EUT shall test under the power AC120V/60Hz.

6.7.4 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.7.5 Test result

The test results are shown in Appendix B.

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
Occupied Bandwidth	3kHz	
Peak power output	0.67dB	
Band edge compliance	1.20dB	
Spurious emissions	30MHz~1GHz	2.83dB
	1GHz~12.75GHz	2.50dB
	12.75GHz~25GHz	2.75dB

8 TEST EQUIPMENTS

No.	Name/ Model	Manufacturer	S/N	Cal date	Cal Due date
1.	Spectrum Analyzer FSV	ROHDE&SCHWARZ	101065	2020.08.20	2021.08.19
2.	Power Meter E4416A	Agilent	MY52370013	2020.04.13	2021.04.12
3.	Power Sensor E9327A	Agilent	MY52420006	2020.04.13	2021.04.12
4.	Attenuator 6810.17.B	HUBER+SUHNER	768710	2020.08.20	2021.08.19
5.	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	----	----
6.	Turn table Diameter:5m	FRANKONIA	----	----	----
7.	Antenna master SAC(MA4.0)	MATURO	----	----	----
8.	9.080m×5.255m×3.525m Shielding room	FRANKONIA	----	----	----
9.	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2020.08.20	2021.08.19
10.	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2020.08.20	2021.08.19
11.	ESI 40 EMI test receiver	R&S	100015	2020.08.20	2021.08.19
12.	ESCS30 EMI test receiver	R&S	100029	2020.08.20	2021.08.19
13.	HL562 Receive antenna	R&S	100167	2020.08.20	2021.08.19
14.	ENV216 AMN	R&S	3560.6550.12	2020.08.20	2021.08.19

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Test Mode	Data Rate
802.11b	1Mbps
802.11g	6Mbps
802.11n HT20	MCS0(6.5 Mbps)
802.11n HT40	MCS0(13.5Mbps)

Conducted power

Modulation type	Peak power output (dBm)		
	2412MHz	2437MHz	2462MHz
802.11b	18.30	18.80	18.00
802.11g	23.30	23.20	22.60
11n HT20	23.90	23.90	23.40
11n HT40	23.60	23.90	25.20

Modulation type	Average power output (dBm)		
	2412MHz	2437MHz	2462MHz
802.11b	15.30	15.80	15.00
802.11g	14.80	14.60	14.00
11n HT20	14.70	14.70	14.20
11n HT40	13.90	14.10	15.50

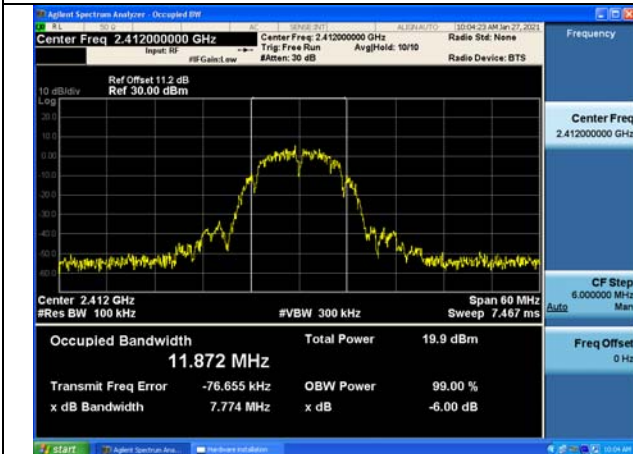
6dB Bandwidth

Offset 11.2dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.0dB

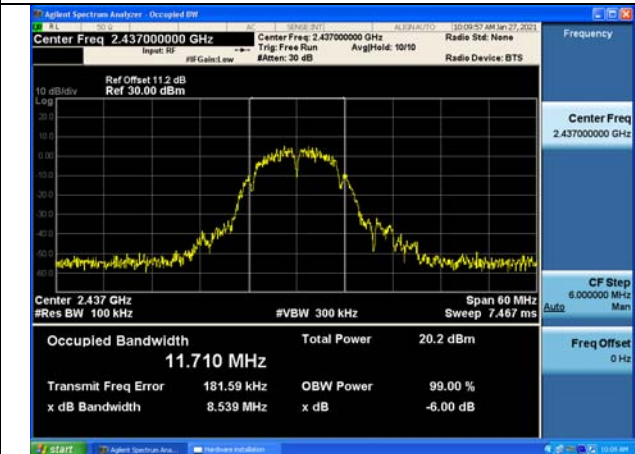
Test Mode: 802.11b

Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	7.77
2437	6	8.54
2462	11	8.09

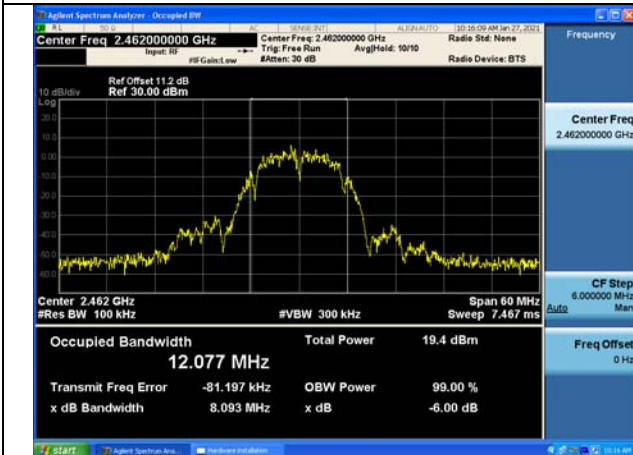
CH1



CH6



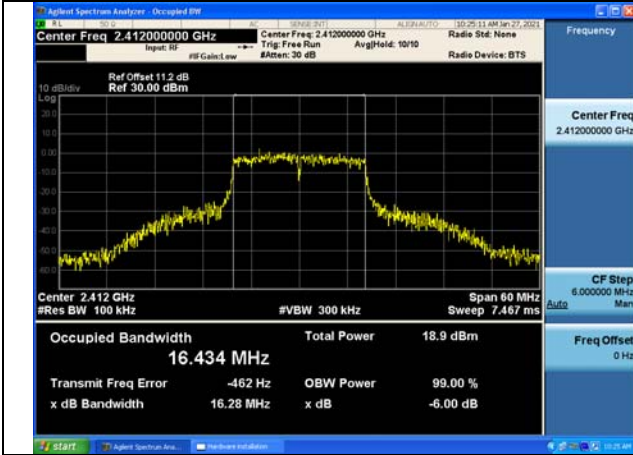
CH11



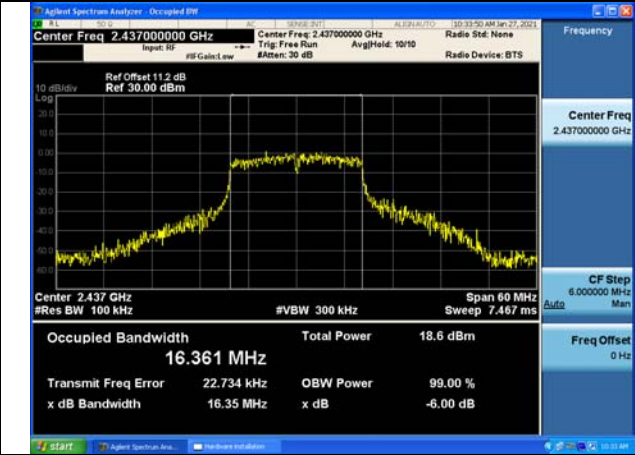
Test Mode: 802.11g

Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	16.28
2437	6	16.35
2462	11	16.52

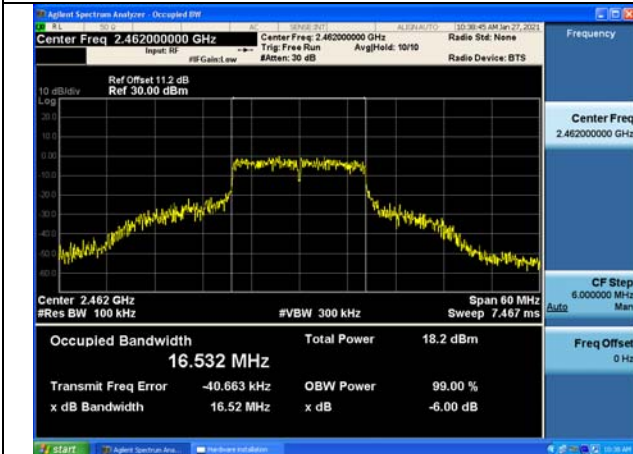
CH1



CH6



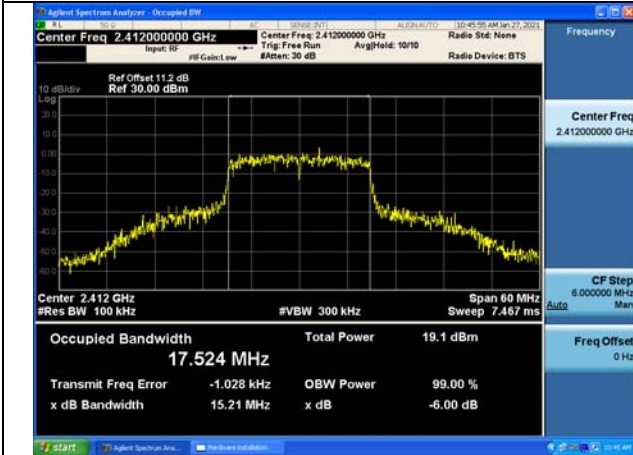
CH11



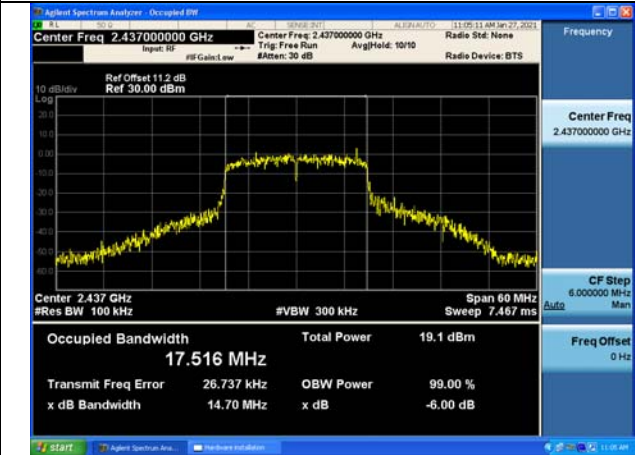
Test Mode: 802.11n (HT20)

Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2412	1	15.21
2437	6	14.70
2462	11	17.58

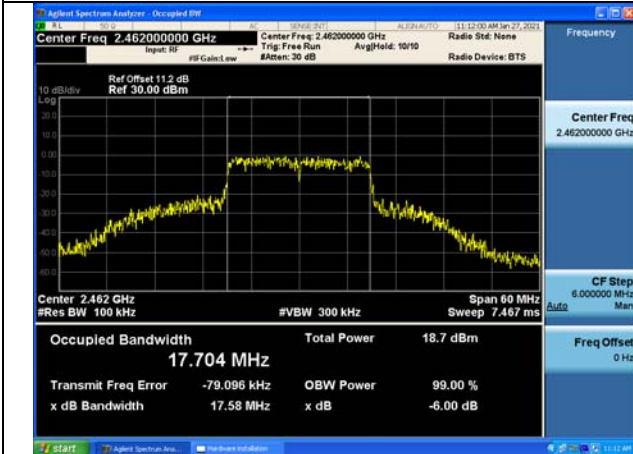
CH1



CH6



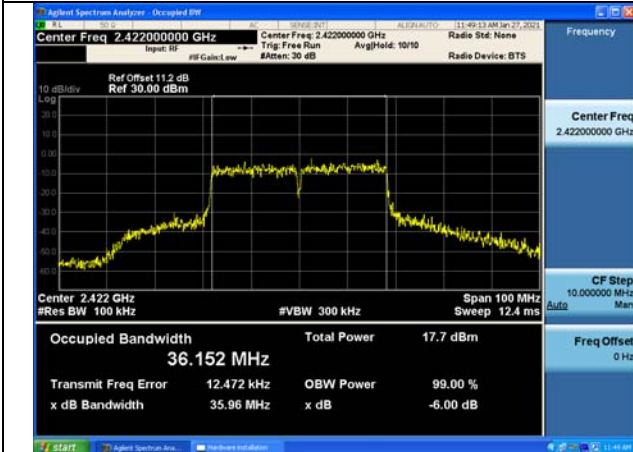
CH11



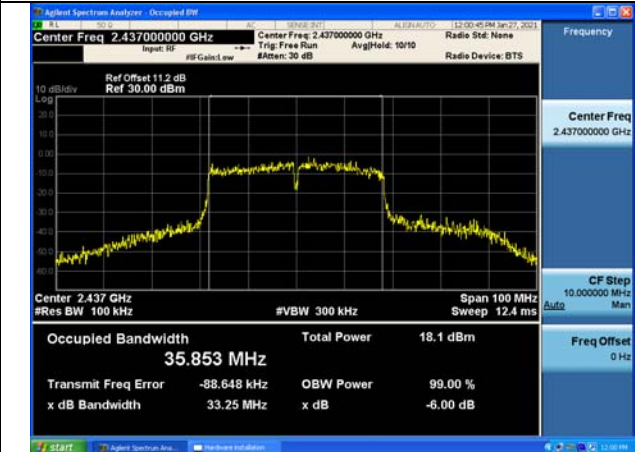
Test Mode: 802.11n (HT40)

Carrier frequency (MHz)	Channel No.	6 dB bandwidth(MHz)
2422	3	35.96
2437	6	33.25
2452	9	26.46

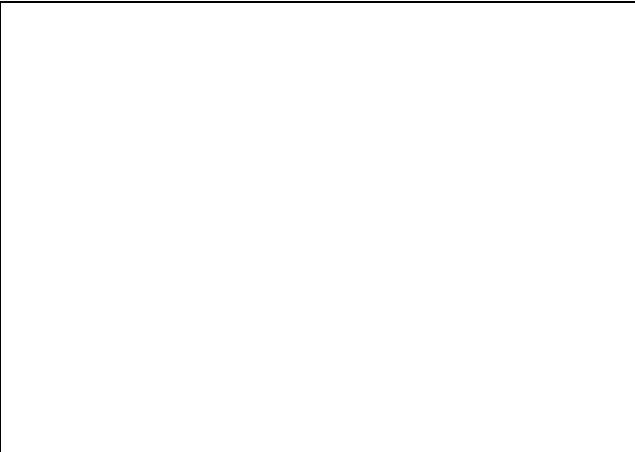
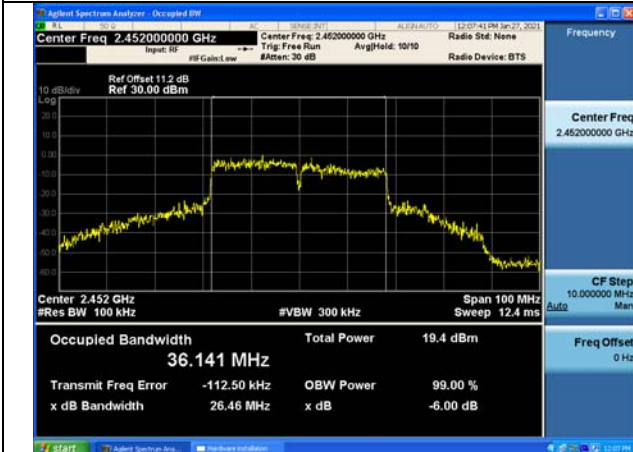
CH3



CH6



CH9



Transmitter Power Spectral Density

Offset 11.2dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.0dB

Test Mode: 802.11b

Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-4.254
2437	6	-4.552
2462	11	-5.981

CH1



CH6



CH11



Test Mode: 802.11g

Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-8.534
2437	6	-8.345
2462	11	-9.126

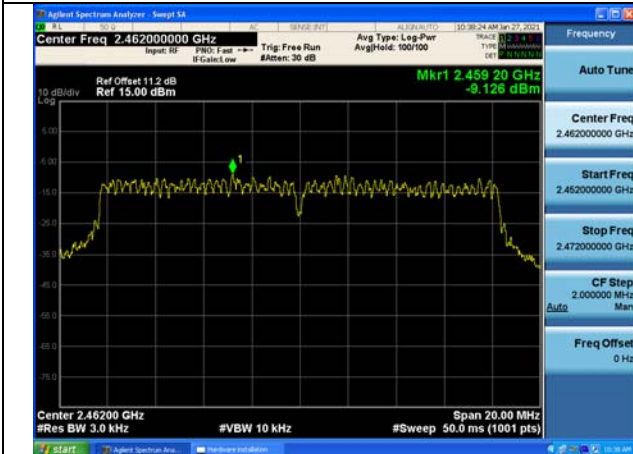
CH1



CH6



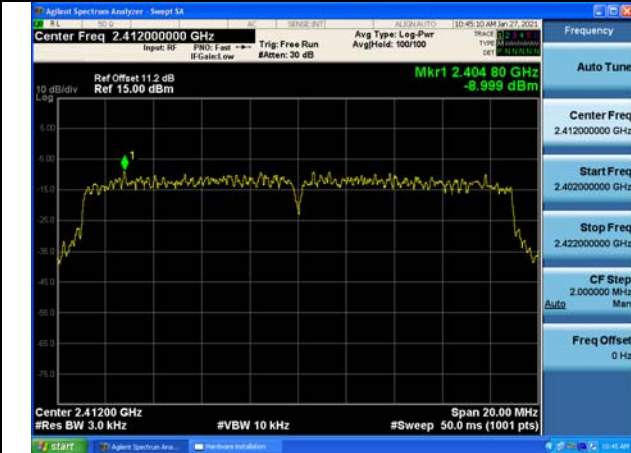
CH11



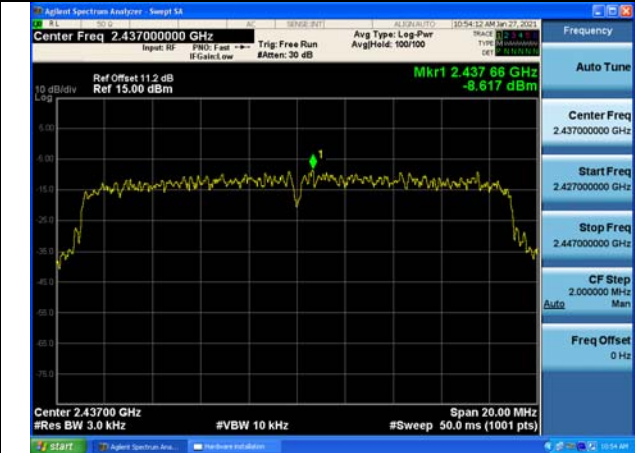
Test Mode: 802.11n (HT20)

Carrier frequency (MHz)	Channel No	Power Density (dBm)
2412	1	-8.999
2437	6	-8.617
2462	11	-9.614

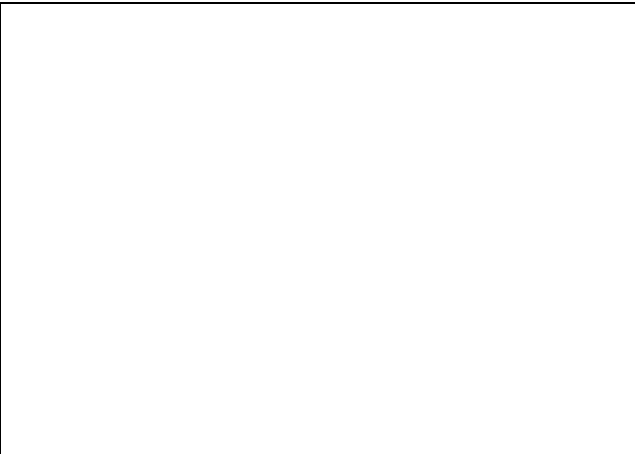
CH1



CH6



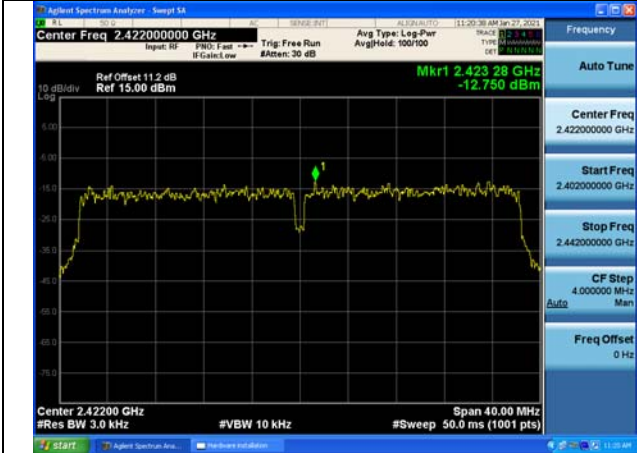
CH11



Test Mode: 802.11n (HT40)

Carrier frequency (MHz)	Channel No	Power Density (dBm)
2422	3	-12.750
2437	6	-11.396
2452	9	-10.240

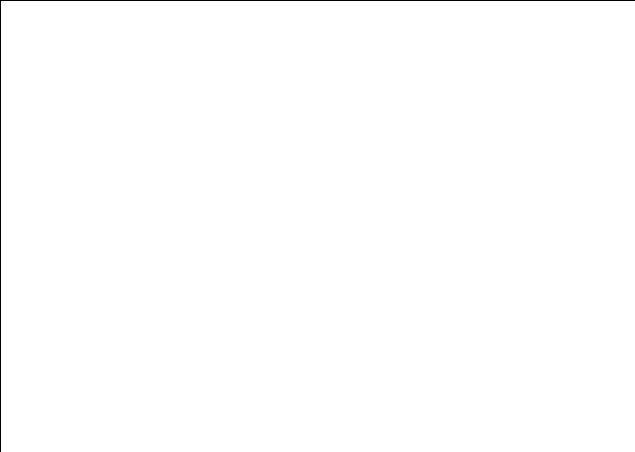
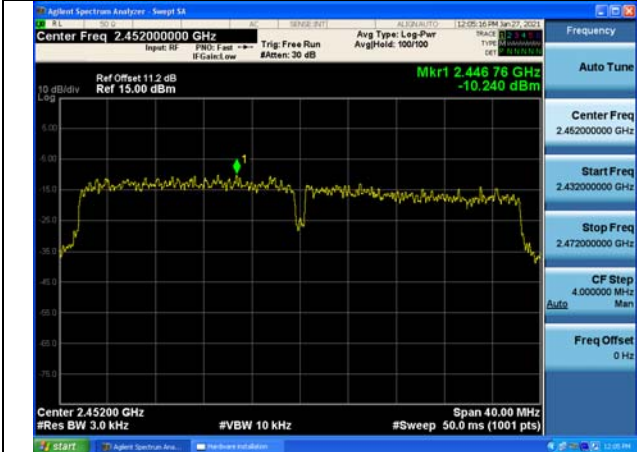
CH3



CH6



CH9

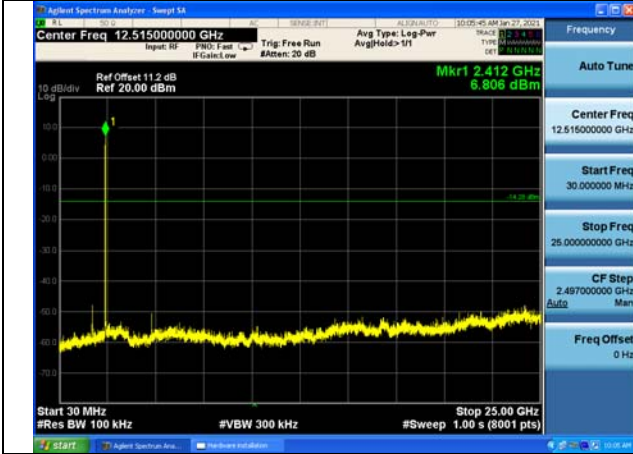


Conducted Out of band emission measurement

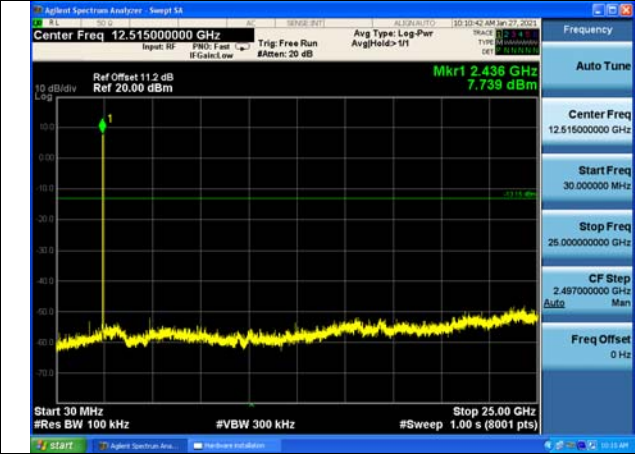
Offset 11.2dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.0dB

Test Mode: 802.11b

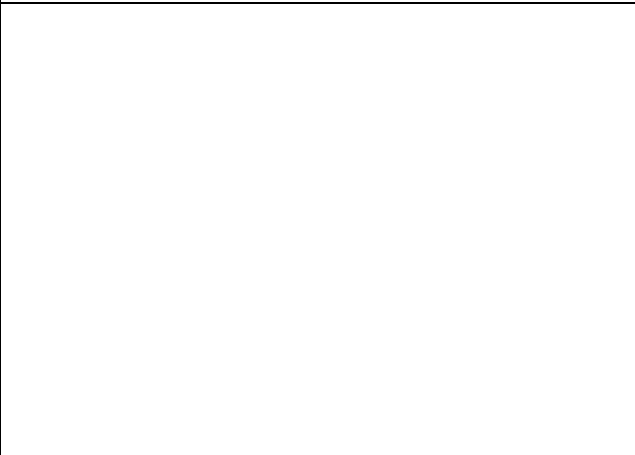
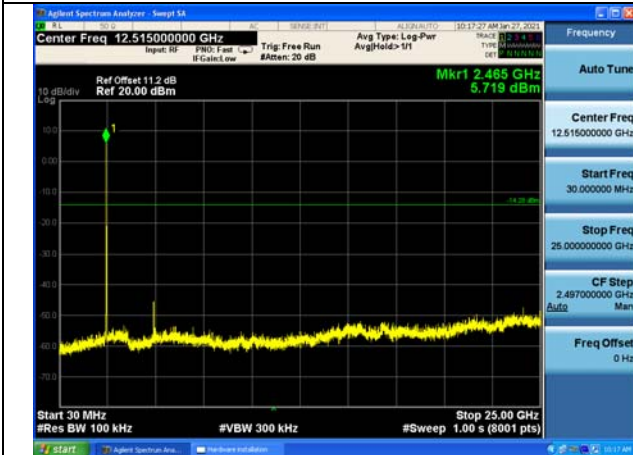
CH1



CH6

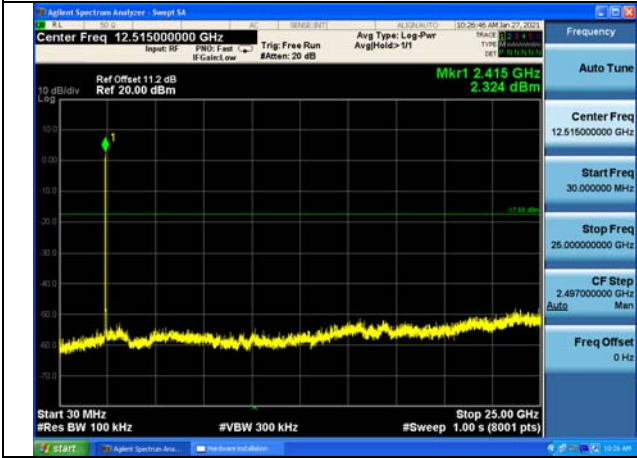


CH11

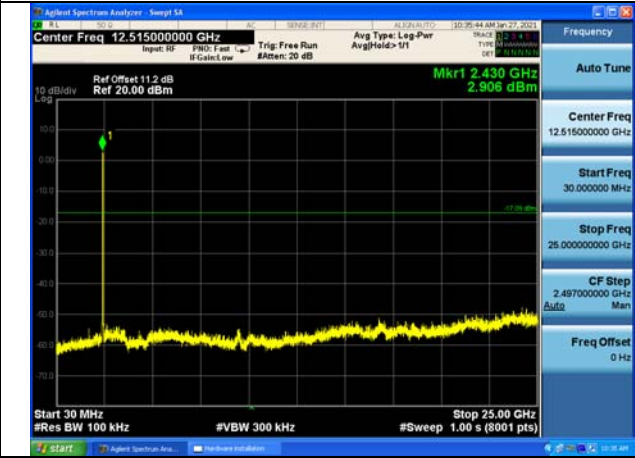


Test Mode: 802.11g

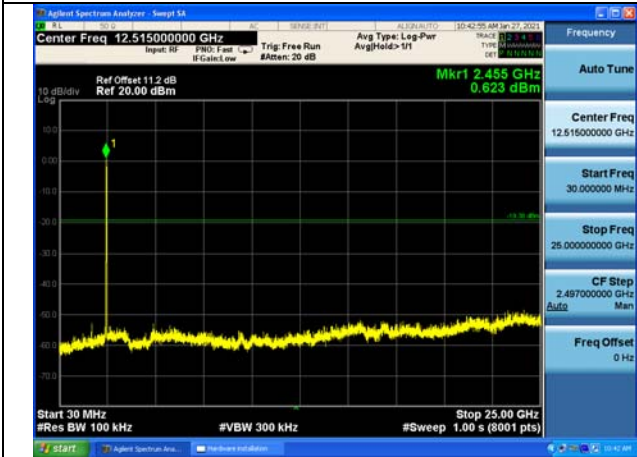
CH1



CH6

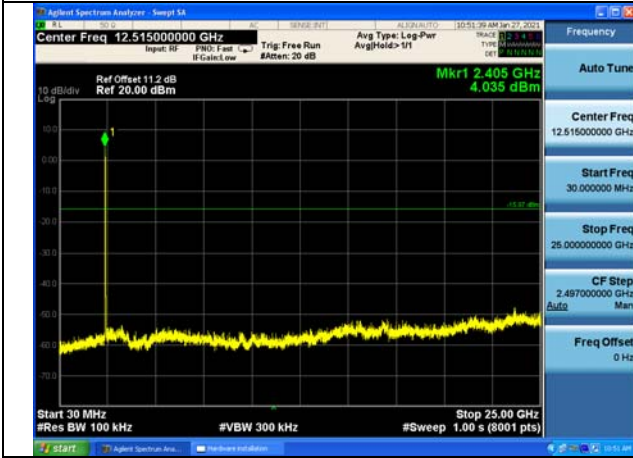


CH11

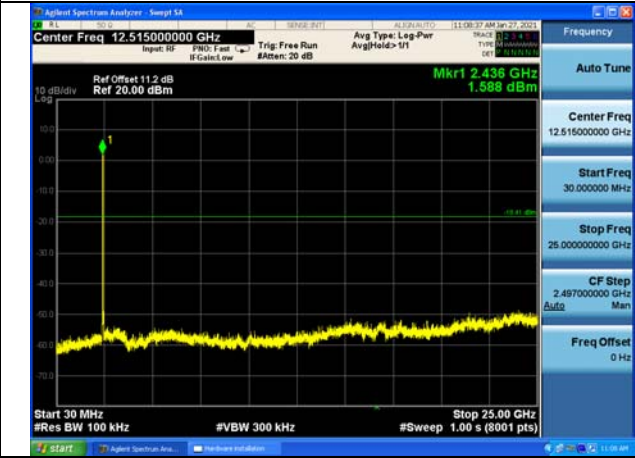


Test Mode: 802.11n (HT20)

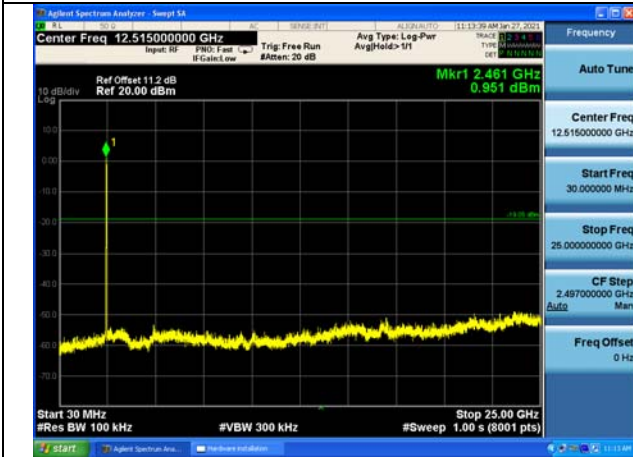
CH1



CH6

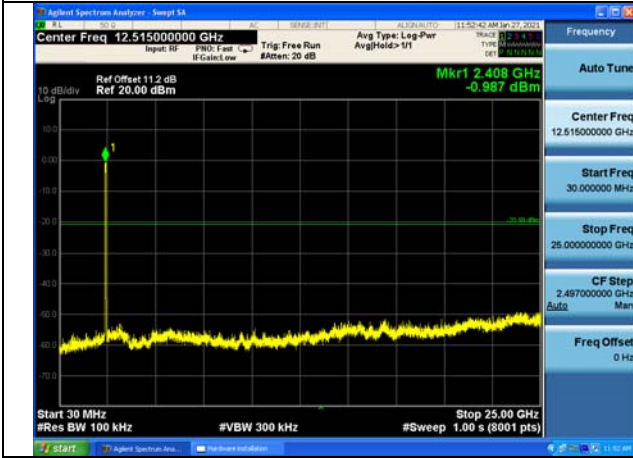


CH11

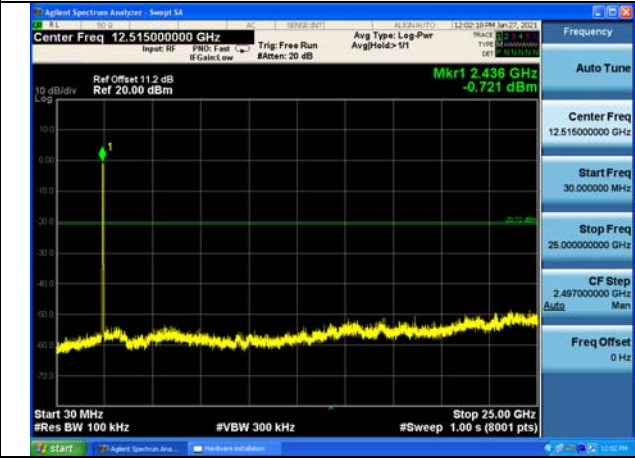


Test Mode: 802.11n (HT40)

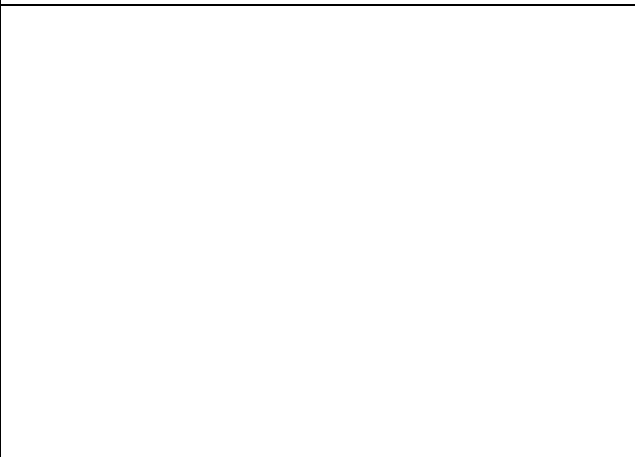
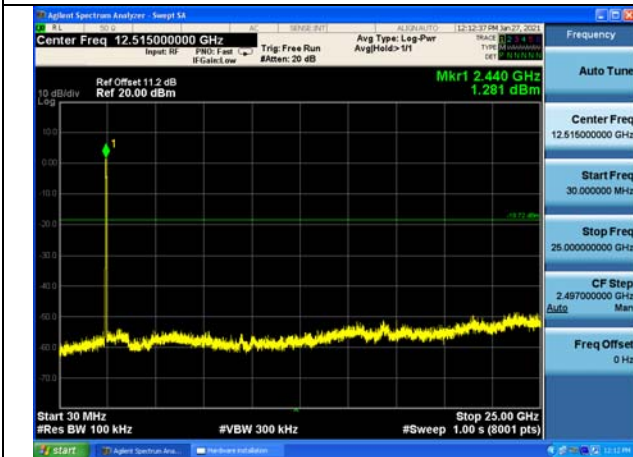
CH3



CH6



CH9



Band edge measurement (RF Conducted measurement)

Offset 11.2 dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.0dB

Test Mode: 802.11b

CH1

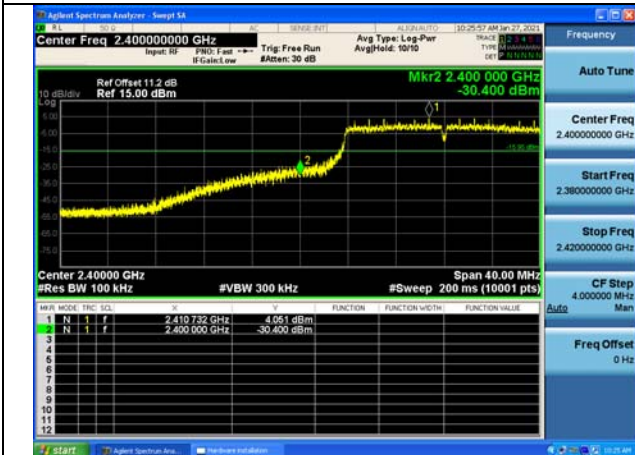


CH11



Test Mode: 802.11g

CH1

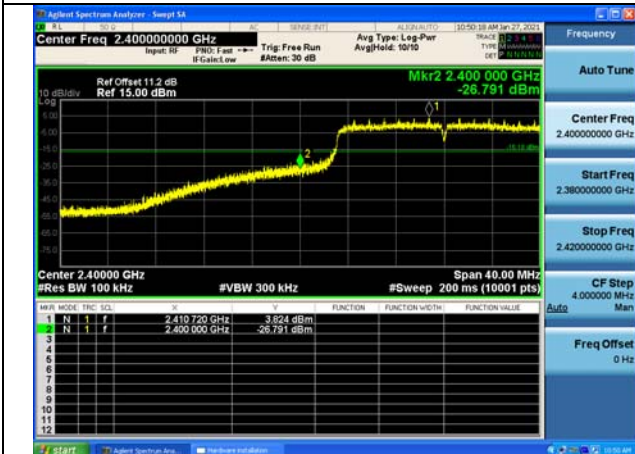


CH11



Test Mode: 802.11n (HT20)

CH1

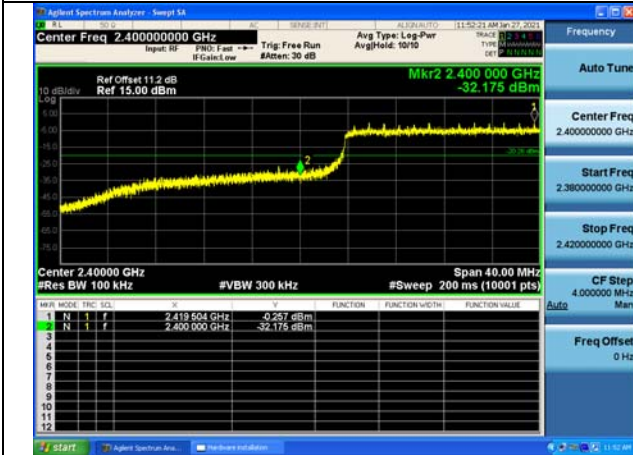


CH11



Test Mode: 802.11n (HT40)

CH1



CH11



APPENDIX B – TEST DATA OF RADIATED EMISSION

Radiated Emission Band Edge

The measurement results are obtained as described below:

Measure Level = Reading Level + cable loss + antenna factor

Sample calculation: (88.43 dBuV/m) = (54.43 dBuV) + (8.90 dB) + (25.10 dB), the corresponding frequency is 2412MHz.

The measurement results contain the correction factor of the duty cycle.

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Vertical

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	88.43	54.43	N/A	N/A	8.90	25.10
2	2390	27.13	-6.87	-46.87	74.00	8.90	25.10

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Horizontal

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	85.78	51.78	N/A	N/A	8.90	25.10
2	2390	27.21	-6.79	-46.79	74.00	8.90	25.10

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Vertical

Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	82.99	48.99	N/A	N/A	8.90	25.10
2	2390	22.12	-11.88	-31.88	54.00	8.90	25.10

Carrier frequency (MHz): 2412

Channel No.:1

Test Mode: 802.11b

Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	80.56	46.56	N/A	N/A	8.90	25.10
2	2390	22.57	-11.43	-31.43	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	89.59	55.59	N/A	N/A	8.90	25.10
2	2483.5	28.65	-5.35	-45.35	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	87.30	53.30	N/A	N/A	8.90	25.10
2	2483.5	28.97	-5.03	-45.03	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	83.24	49.24	N/A	N/A	8.90	25.10
2	2483.5	22.76	-11.24	-31.24	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11b
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	80.89	46.89	N/A	N/A	8.90	25.10
2	2483.5	23.36	-10.64	-30.64	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	89.69	55.69	N/A	N/A	8.90	25.10
2	2390	27.47	-6.53	-46.53	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	86.87	52.87	N/A	N/A	8.90	25.10
2	2390	27.54	-6.46	-46.46	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	84.22	50.22	N/A	N/A	8.90	25.10
2	2390	22.47	-11.53	-31.53	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11g
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	84.22	50.22	N/A	N/A	8.90	25.10
2	2390	22.47	-11.53	-31.53	54.00	8.90	25.10

1	2412	81.46	47.46	N/A	N/A	8.90	25.10
2	2390	21.55	-12.45	-32.45	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	88.70	54.70	N/A	N/A	8.90	25.10
2	2483.5	27.97	-6.03	-46.03	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	85.87	51.87	N/A	N/A	8.90	25.10
2	2483.5	27.24	-6.76	-46.76	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	82.99	48.99	N/A	N/A	8.90	25.10
2	2483.5	23.74	-10.26	-30.26	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11g
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	80.80	46.80	N/A	N/A	8.90	25.10
2	2483.5	24.30	-9.70	-29.70	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	89.15	55.15	N/A	N/A	8.90	25.10
2	2390	28.42	-5.58	-45.58	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	86.87	52.87	N/A	N/A	8.90	25.10
2	2390	27.91	-6.09	-46.09	74.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	83.77	49.77	N/A	N/A	8.90	25.10
2	2390	22.54	-11.46	-31.46	54.00	8.90	25.10

Carrier frequency (MHz): 2412
Channel No.:1
Test Mode: 802.11n(HT20)

Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	81.43	47.43	N/A	N/A	8.90	25.10
2	2390	22.85	-11.15	-31.15	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	89.01	55.01	N/A	N/A	8.90	25.10
2	2483.5	27.06	-6.94	-46.94	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	86.45	52.45	N/A	N/A	8.90	25.10
2	2483.5	26.25	-7.75	-47.75	74.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	83.83	49.83	N/A	N/A	8.90	25.10
2	2483.5	22.87	-11.13	-31.13	54.00	8.90	25.10

Carrier frequency (MHz): 2462
Channel No.:11
Test Mode: 802.11n(HT20)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	80.88	46.88	N/A	N/A	8.90	25.10
2	2483.5	22.15	-11.85	-31.85	54.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	88.25	54.25	N/A	N/A	8.90	25.10
2	2390	28.44	-5.56	-45.56	74.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	85.52	51.52	N/A	N/A	8.90	25.10
2	2390	29.03	-4.97	-44.97	74.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	84.35	50.35	N/A	N/A	8.90	25.10
2	2390	22.51	-11.49	-31.49	54.00	8.90	25.10

Carrier frequency (MHz): 2422
Channel No.:3
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2412	84.35	50.35	N/A	N/A	8.90	25.10
2	2390	22.51	-11.49	-31.49	54.00	8.90	25.10

1	2412	81.45	47.45	N/A	N/A	8.90	25.10
2	2390	23.02	-10.98	-30.98	54.00	8.90	25.10

Carrier frequency (MHz): 2452
Channel No.:9
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	88.52	54.52	N/A	N/A	8.90	25.10
2	2483.5	27.11	-6.89	-46.89	74.00	8.90	25.10

Carrier frequency (MHz): 2452
Channel No.:9
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	85.90	51.90	N/A	N/A	8.90	25.10
2	2483.5	26.22	-7.78	-47.78	74.00	8.90	25.10

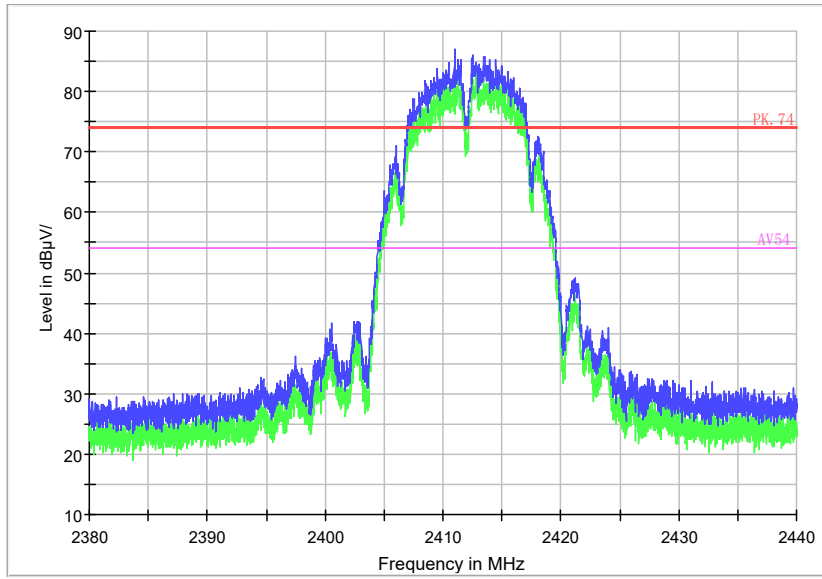
Carrier frequency (MHz): 2452
Channel No.:9
Test Mode: 802.11n(HT40)
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	84.13	50.13	N/A	N/A	8.90	25.10
2	2483.5	23.75	-10.25	-30.25	54.00	8.90	25.10

Carrier frequency (MHz): 2452
Channel No.:9
Test Mode: 802.11n(HT40)
Polarity:Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2462	81.91	47.91	N/A	N/A	8.90	25.10
2	2483.5	24.01	-9.99	-29.99	54.00	8.90	25.10

Copy of 002C_FCC



Radiated Emission Band Edge for 2412MHz

Sample Calculations

Determining Spurious Emissions Levels

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

Sample calculation: (21.27 dB μ V/m) = (38.77 dB μ V) + (-17.5 dB/m), the corresponding frequency is 52.6755MHz.

The worst case attitude: The mobile lay down.

For 802.11b Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6755	21.27	-17.5	38.77	Vertical	40
65.3655	22.85	-20.2	43.05	Vertical	40
98.6075	21.63	-18.9	40.53	Vertical	43.5
212.0465	13.01	-18	31.01	Vertical	43.5
483.6865	14.07	-9.7	23.77	Vertical	46
927.2615	20.66	-1.1	21.76	Vertical	46

For 802.11g Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.672	21.28	-17.5	38.78	Vertical	40
65.22	22.78	-20.1	42.88	Vertical	40
98.588	21.62	-18.9	40.52	Vertical	43.5
211.399	12.75	-18	30.75	Vertical	43.5
532.9055	14.56	-8.4	22.96	Vertical	46
952.49	20.94	-0.8	21.74	Vertical	46

For 802.11n(HT20) Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6805	21.25	-17.5	38.75	Vertical	40
64.832	22.5	-20	42.5	Vertical	40
98.605	21.64	-18.9	40.54	Vertical	43.5
212.0635	13.03	-18	31.03	Vertical	43.5
482.93	14.04	-9.7	23.74	Vertical	46
939.7345	20.81	-1	21.81	Vertical	46

For 802.11b Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl	Pmea	Polarity	Limit
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		(dB)	(dBuV/m)		(dBuV/m)
52.6525	21.25	-17.5	38.75	Vertical	40
65.881	22.77	-20.3	43.07	Vertical	40
98.77	21.65	-18.8	40.45	Vertical	43.5
212.0065	13.01	-18	31.01	Vertical	43.5
552.6075	14.6	-7.9	22.5	Vertical	46
956.5895	20.85	-0.8	21.65	Vertical	46

For 802.11g Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6465	21.24	-17.5	38.74	Vertical	40
66.075	22.7	-20.4	43.1	Vertical	40
98.6935	21.64	-18.8	40.44	Vertical	43.5
212.0865	13.01	-18	31.01	Vertical	43.5
484.0915	14.13	-9.7	23.83	Vertical	46
941.232	20.77	-1	21.77	Vertical	46

For 802.11n(HT20) Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6635	21.23	-17.5	38.73	Vertical	40
65.22	22.77	-20.1	42.87	Vertical	40
98.6935	21.66	-18.8	40.46	Vertical	43.5
212.3425	12.91	-18	30.91	Vertical	43.5
531.8725	14.56	-8.4	22.96	Vertical	46
955.5345	20.87	-0.8	21.67	Vertical	46

For 802.11b Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.7375	21.21	-17.5	38.71	Vertical	40
65.5415	22.83	-20.2	43.03	Vertical	40
98.8125	21.67	-18.8	40.47	Vertical	43.5
212.0345	13.03	-18	31.03	Vertical	43.5
545.2815	14.72	-8.1	22.82	Vertical	46
935.418	20.8	-1	21.8	Vertical	46

For 802.11g Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6465	21.23	-17.5	38.73	Vertical	40
65.414	22.82	-20.2	43.02	Vertical	40
98.81	21.66	-18.8	40.46	Vertical	43.5

211.707	12.98	-18	30.98	Vertical	43.5
486.5215	14.03	-9.6	23.63	Vertical	46
932.7215	20.72	-1	21.72	Vertical	46

For 802.11n(HT20) Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.61	21.2	-17.5	38.7	Vertical	40
65.67	22.8	-20.3	43.1	Vertical	40
98.1515	21.49	-18.9	40.39	Vertical	43.5
212.0115	13.04	-18	31.04	Vertical	43.5
502.068	13.61	-9.3	22.91	Vertical	46
923.2215	20.39	-1.2	21.59	Vertical	46

For 802.11n(HT40) Channel No.:3

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.684	21.25	-17.5	38.75	Vertical	40
65.476	22.79	-20.2	42.99	Vertical	40
98.782	21.66	-18.8	40.46	Vertical	43.5
212.1	13.02	-18	31.02	Vertical	43.5
487.1035	14	-9.6	23.6	Vertical	46
944.45	20.75	-0.9	21.65	Vertical	46

For 802.11n(HT40) Channel No.:6

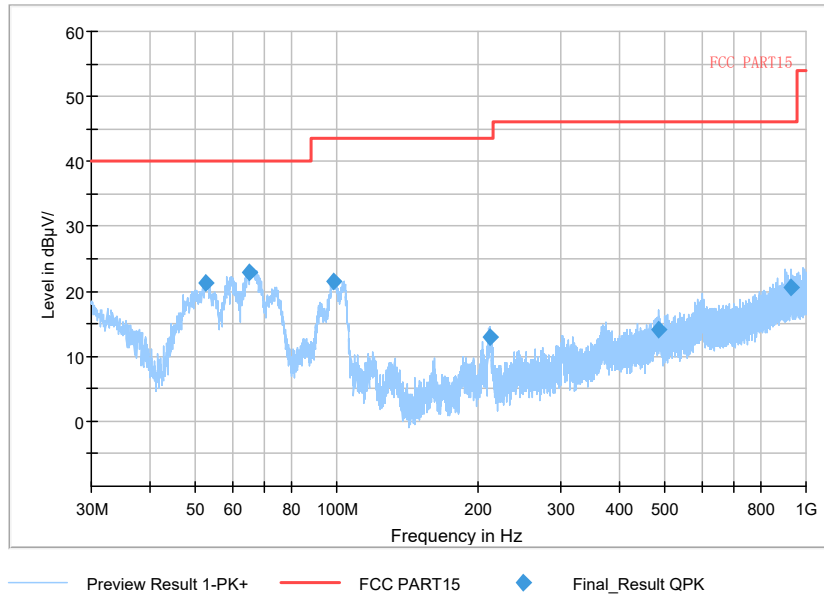
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.9315	21.09	-17.5	38.59	Vertical	40
66.5115	22.5	-20.5	43	Vertical	40
98.759	21.68	-18.8	40.48	Vertical	43.5
211.6015	13.02	-18	31.02	Vertical	43.5
486.2705	14.12	-9.6	23.72	Vertical	46
936.405	20.82	-1	21.82	Vertical	46

For 802.11n(HT40) Channel No.:9

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
52.6925	21.29	-17.5	38.79	Vertical	40
65.277	22.76	-20.1	42.86	Vertical	40
98.719	21.69	-18.8	40.49	Vertical	43.5
211.6015	13.02	-18	31.02	Vertical	43.5
479.079	14.05	-9.8	23.85	Vertical	46
939.549	20.88	-1	21.88	Vertical	46

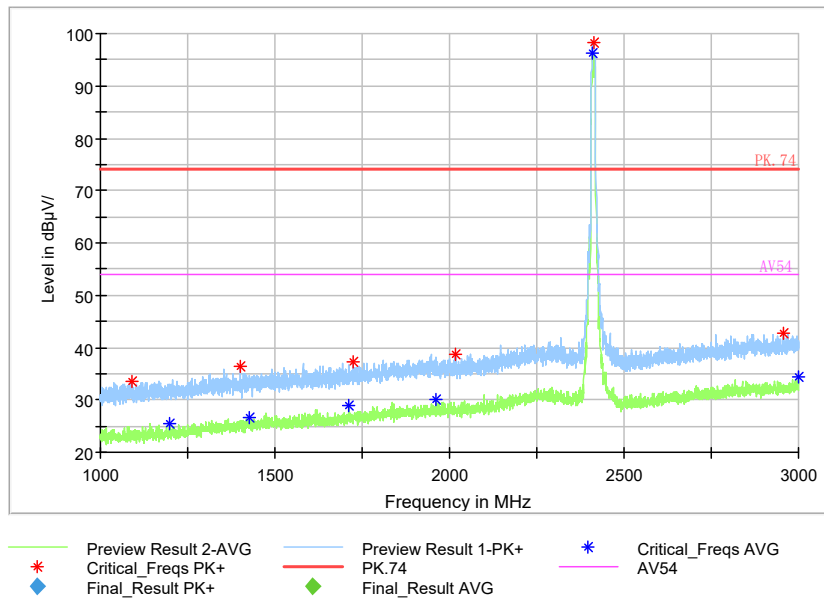
Carrier frequency (MHz): 2412
Channel No.:1

Full Spectrum



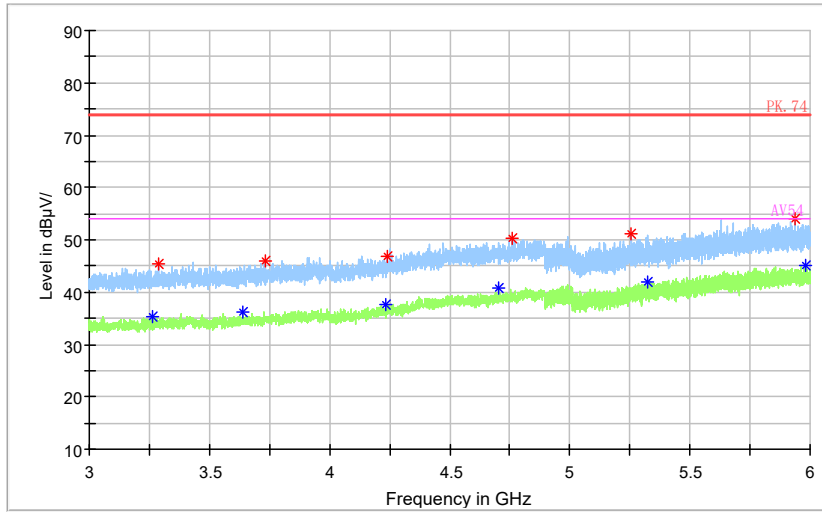
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

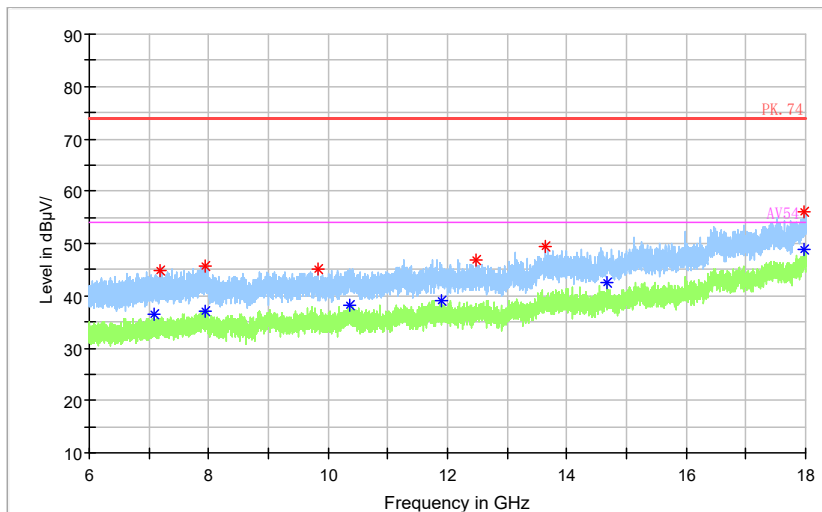
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG AV54
* Critical_Freqs PK+ — PK.74 ◆ Final_Result PK+
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

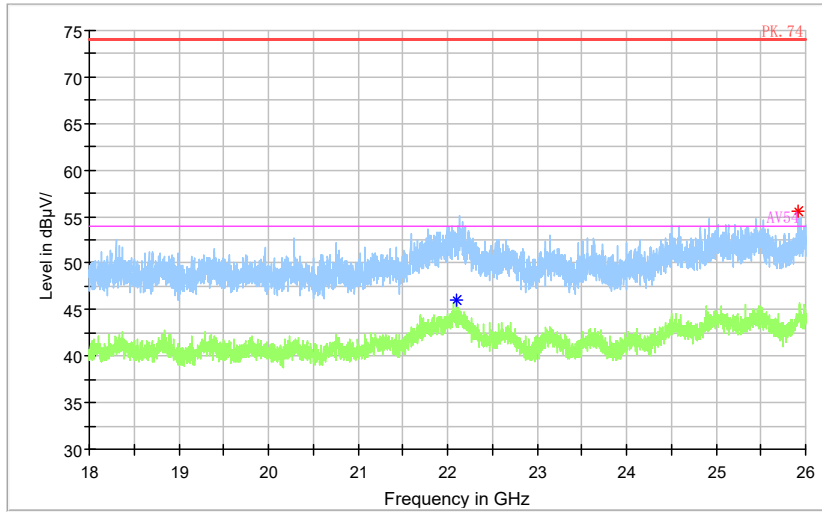
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG AV54
* Critical_Freqs PK+ — PK.74 ◆ Final_Result PK+
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

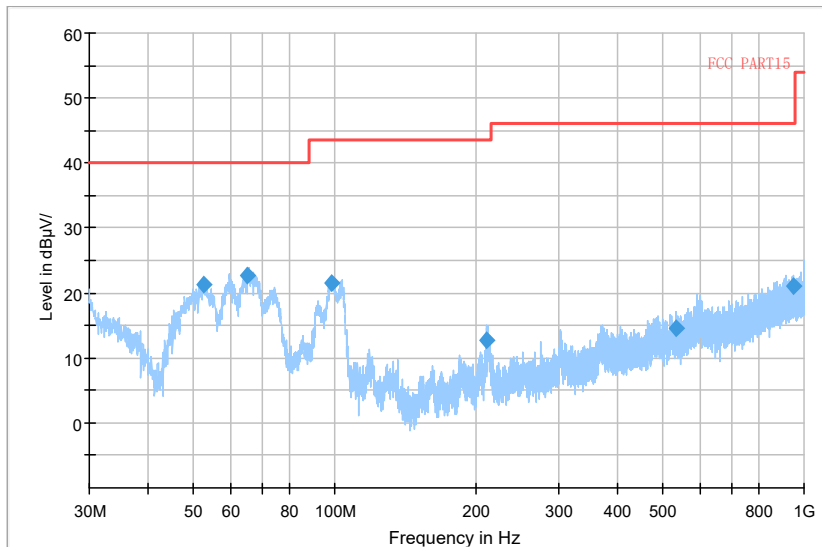
Full Spectrum



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG AV54
- * Critical_Freqs PK+
- PK.74
- ◆ Final_Result AVG
- ◆ Final_Result PK+

Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

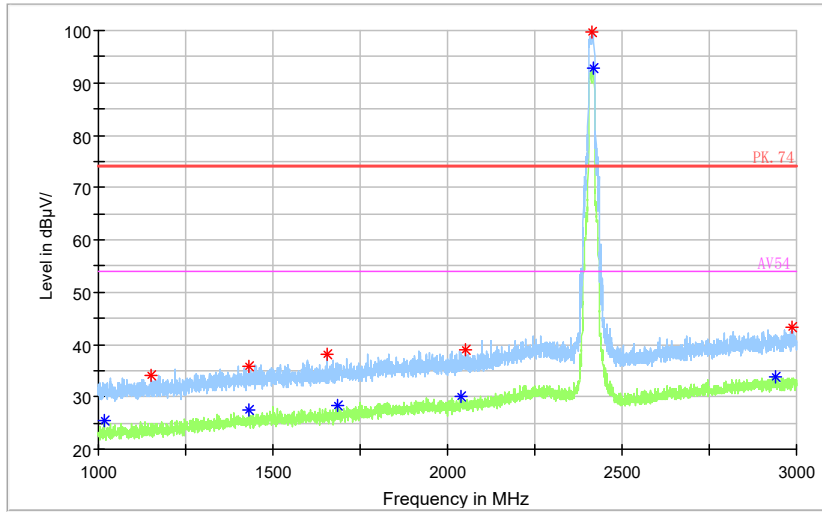
Full Spectrum



- Preview Result 1-PK+
- FCC PART15
- ◆ Final_Result QPK

Frequency Range: 30MHz -1GHz
Detector: QP mode
Modulation type: 802.11g

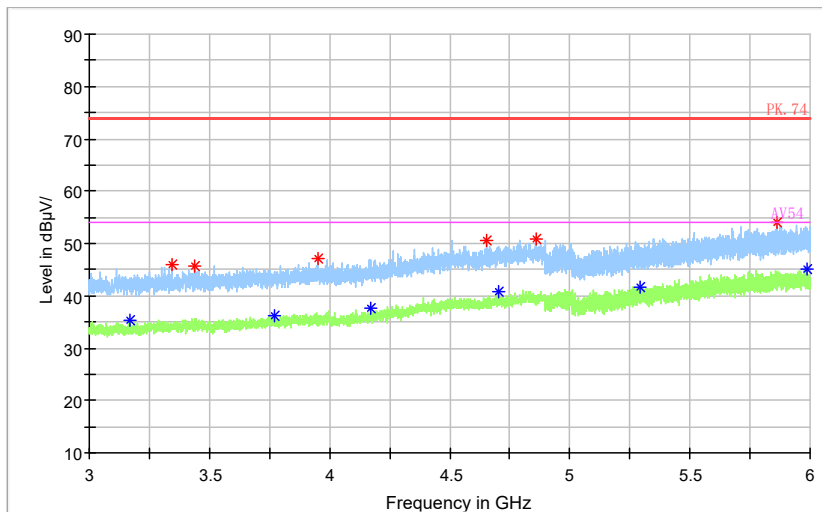
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 * AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

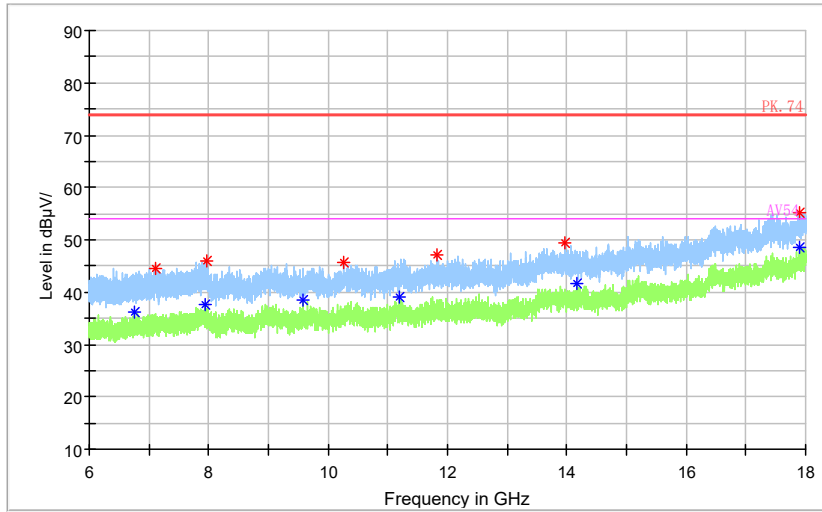
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 * AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

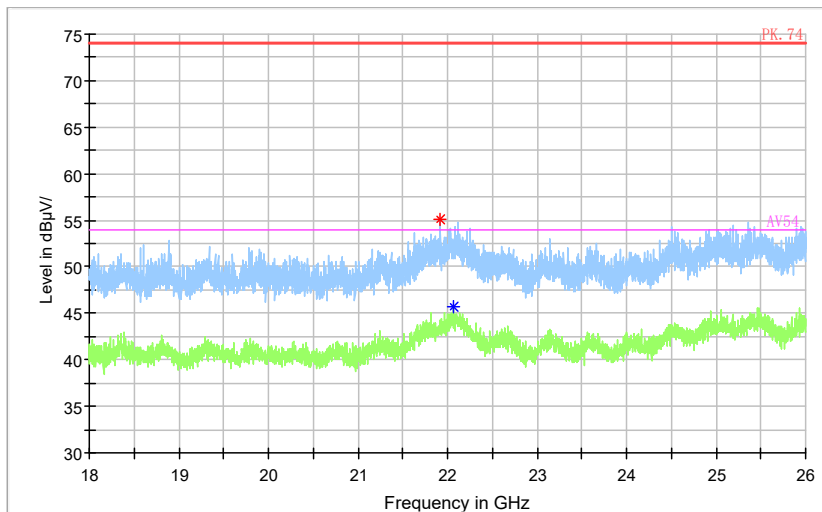
Full Spectrum



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- PK.74
- AV54
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

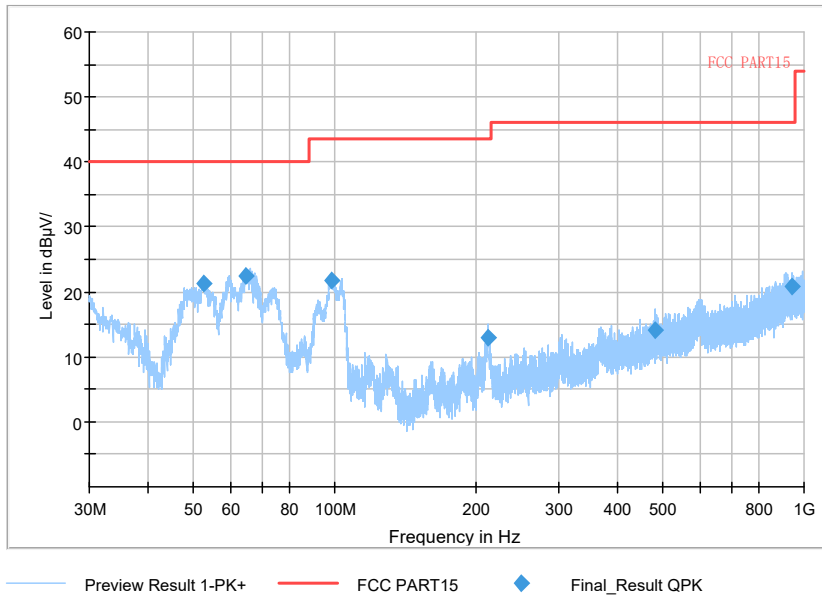
Full Spectrum



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- PK.74
- AV54
- ◆ Final_Result PK+
- ◆ Final_Result AVG

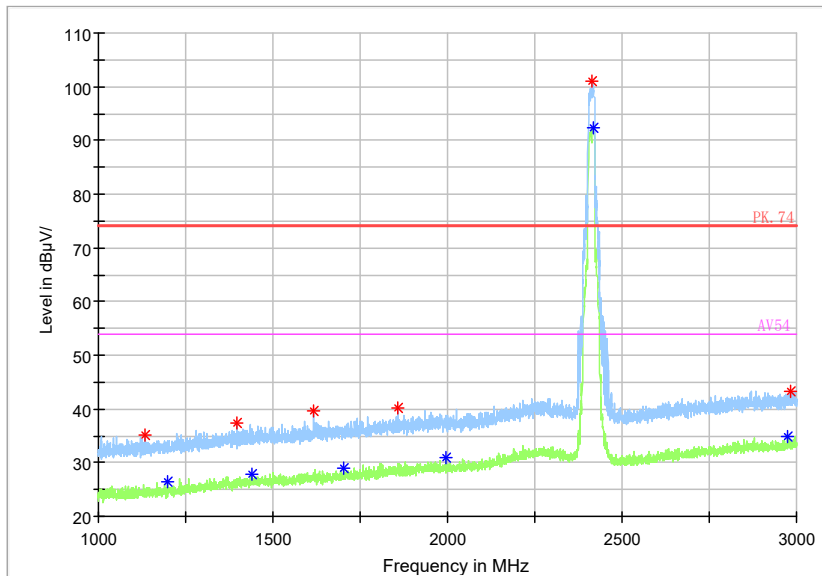
Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

Full Spectrum



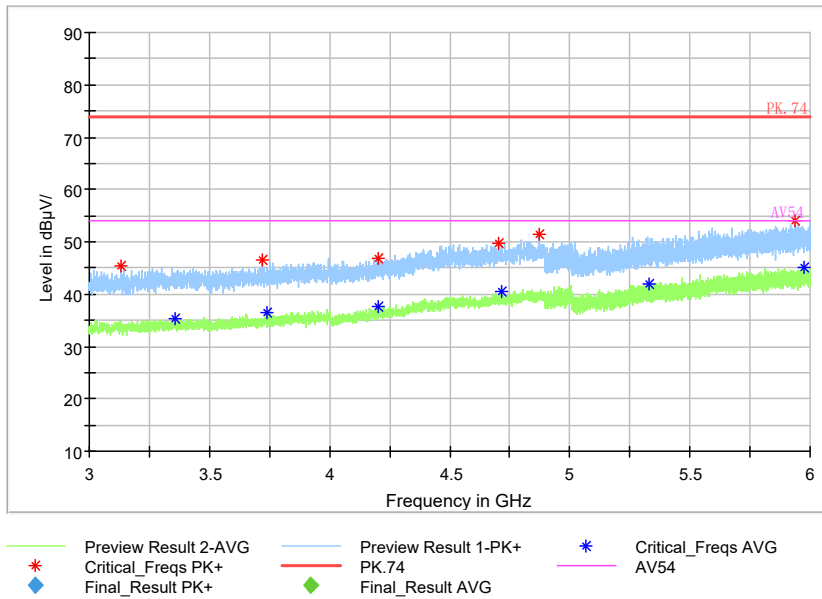
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT20)

Full Spectrum



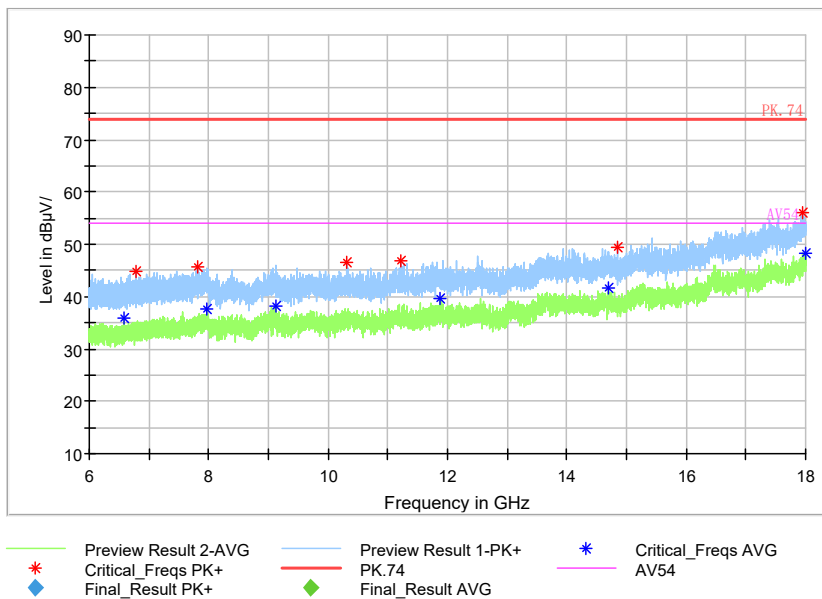
Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

Full Spectrum



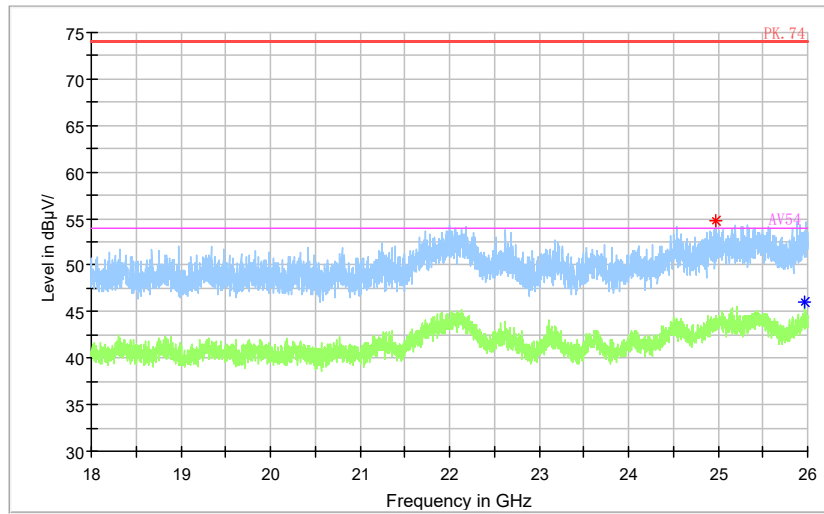
Frequency Range: 3GHz -6GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 6GHz -18GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT20)

Full Spectrum

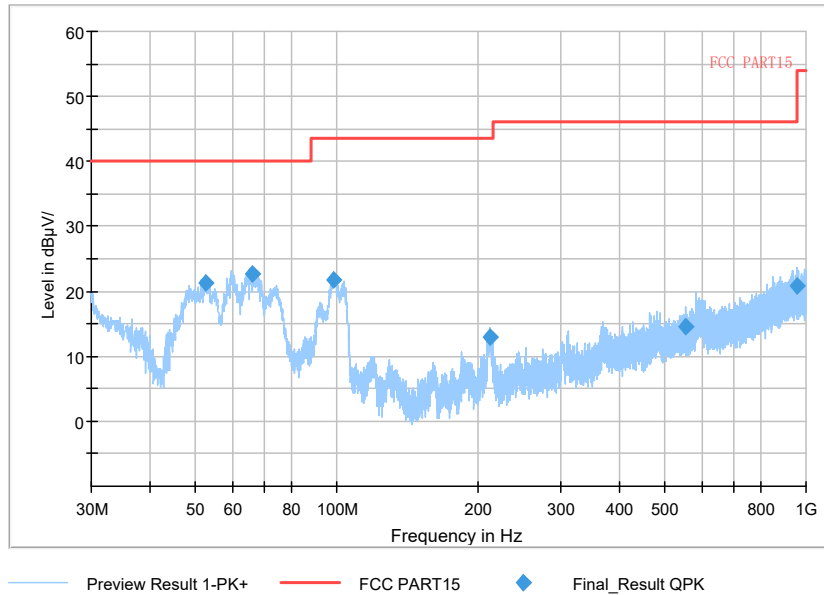


- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs PK+
- PK.74
- Critical_Freqs AVG AV54
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT20)

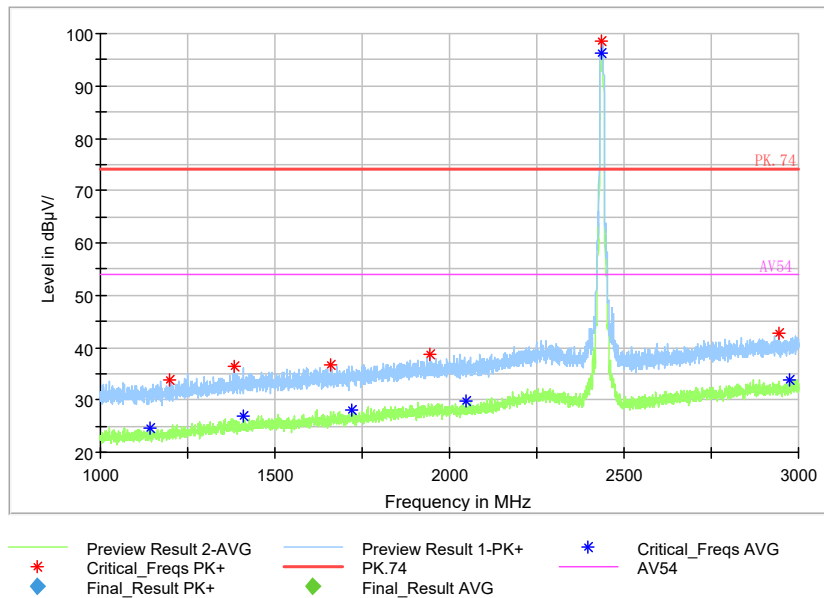
Carrier frequency (MHz): 2437
Channel No.:6

Full Spectrum



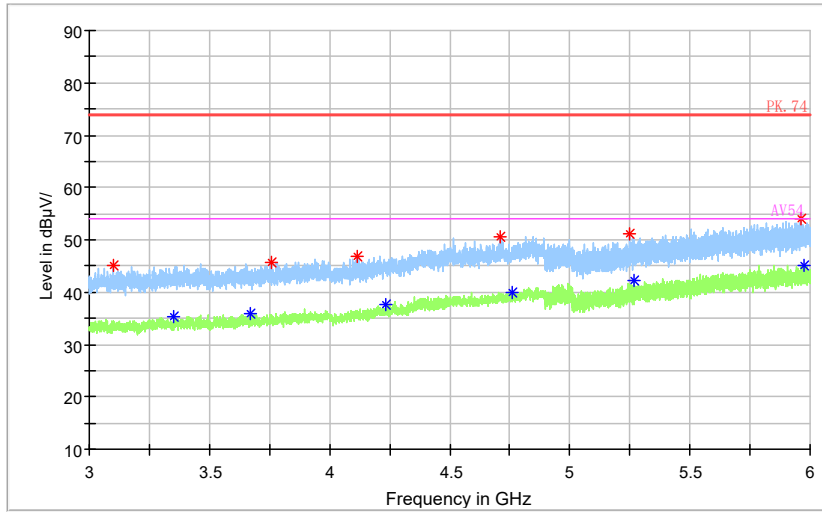
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

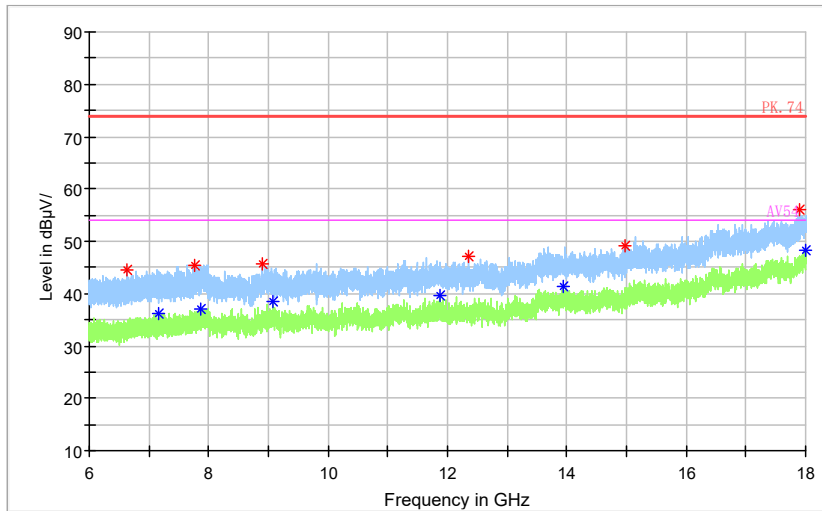
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

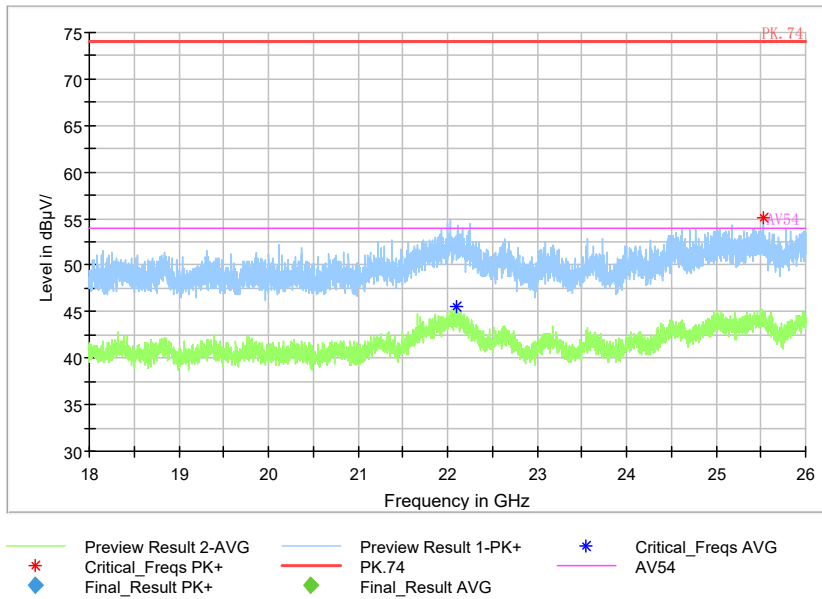
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

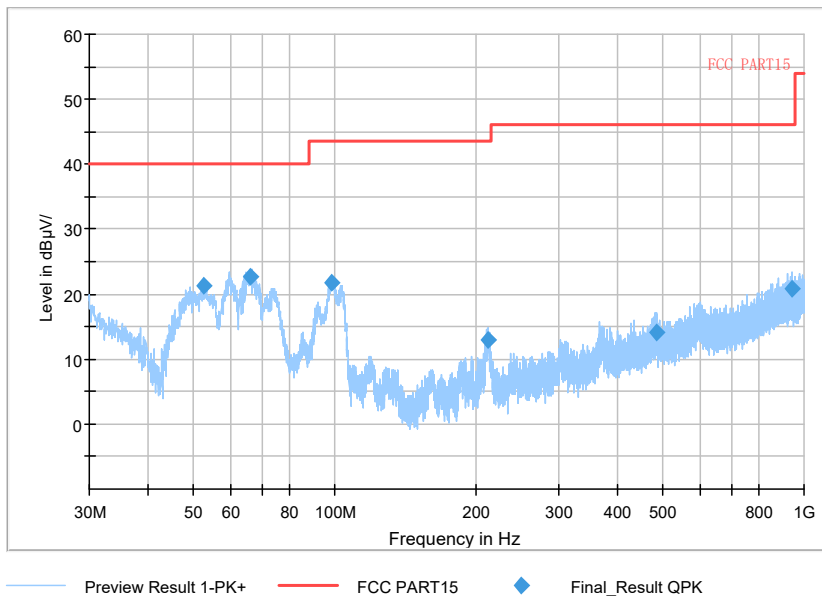
Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

Full Spectrum



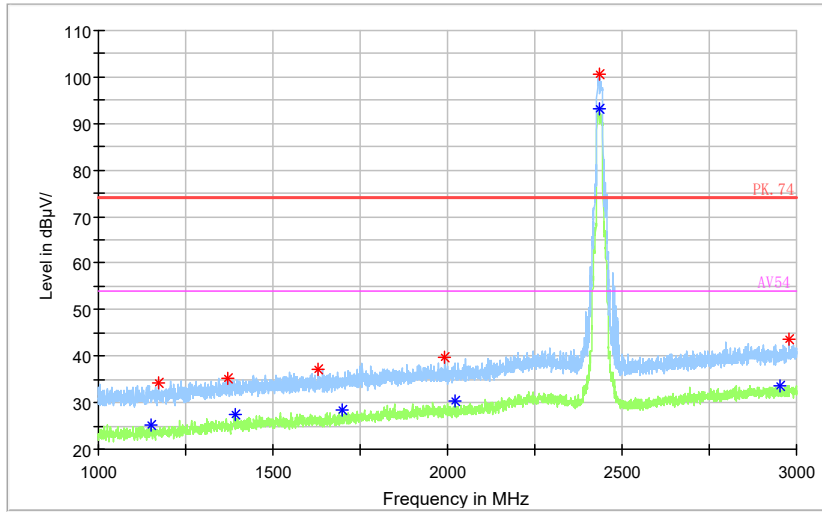
Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

Full Spectrum



Frequency Range: 30MHz -1GHz
Detector: QP mode
Modulation type: 802.11g

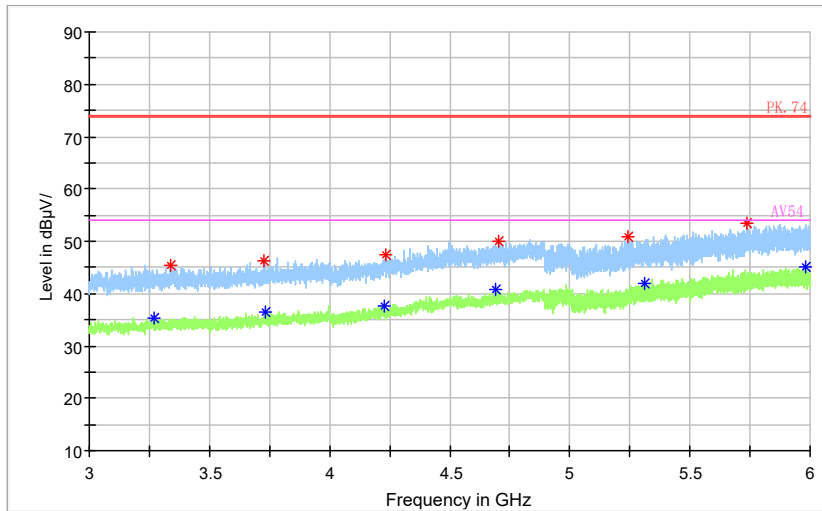
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

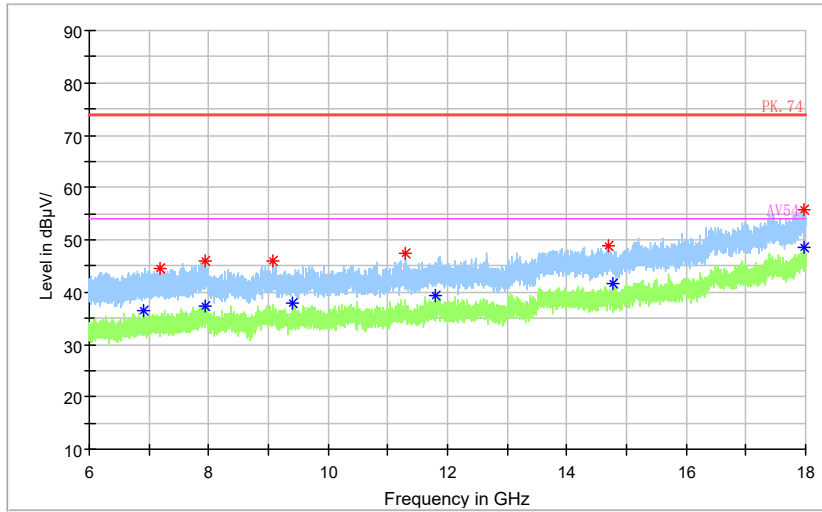
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

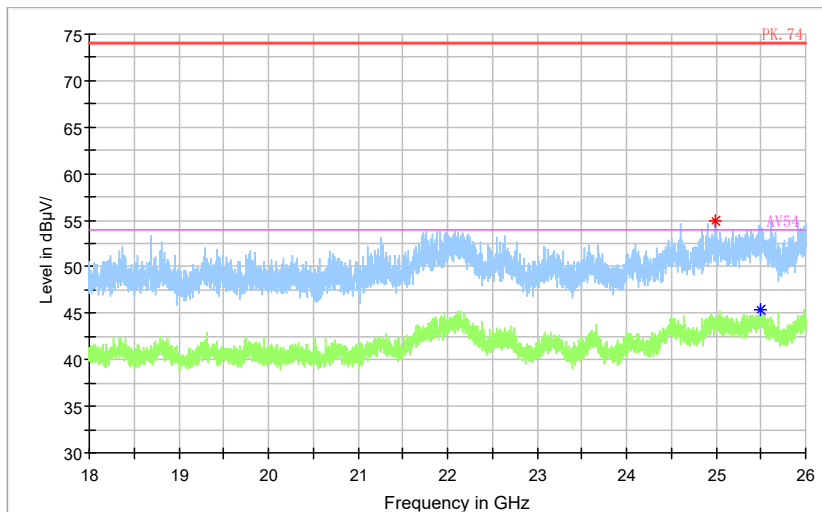
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

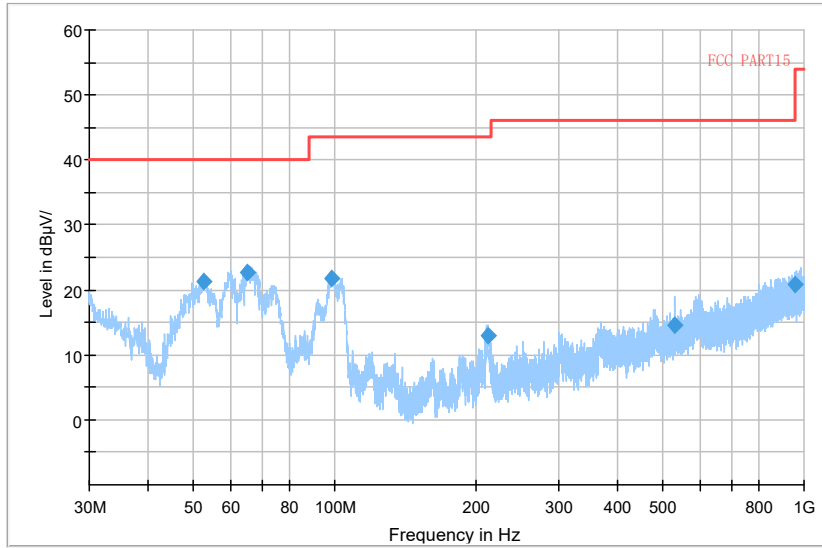
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

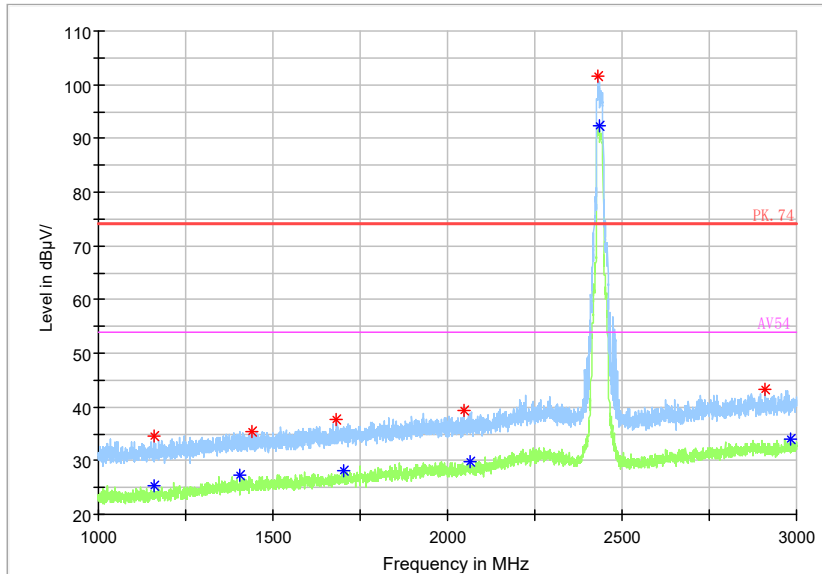
Full Spectrum



— Preview Result 1-PK+ — FCC PART15 ◆ Final_Result QPK

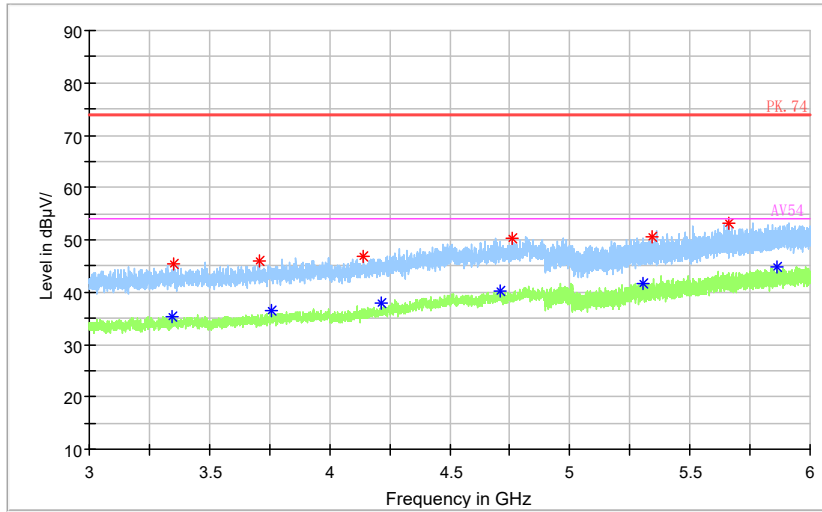
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT20)

Full Spectrum



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

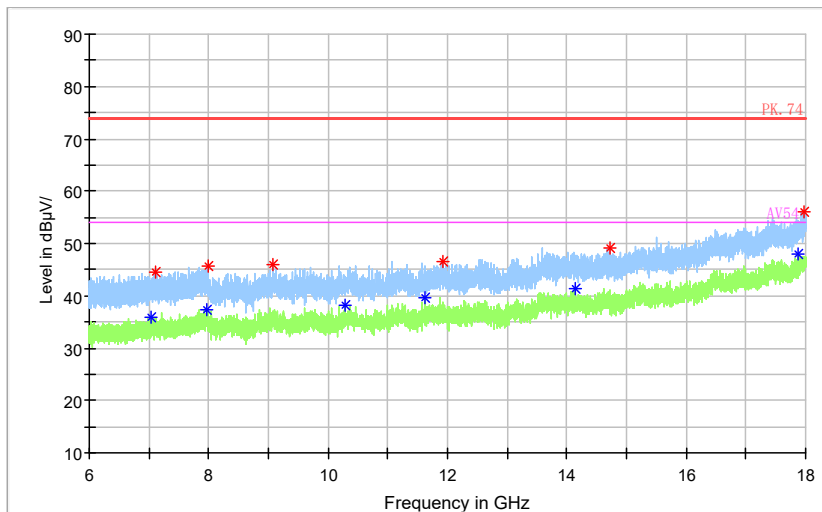
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

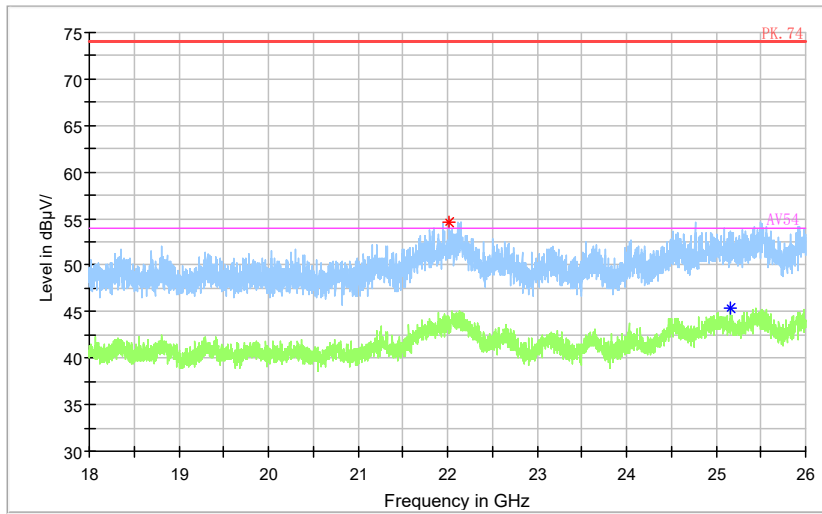
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

Full Spectrum

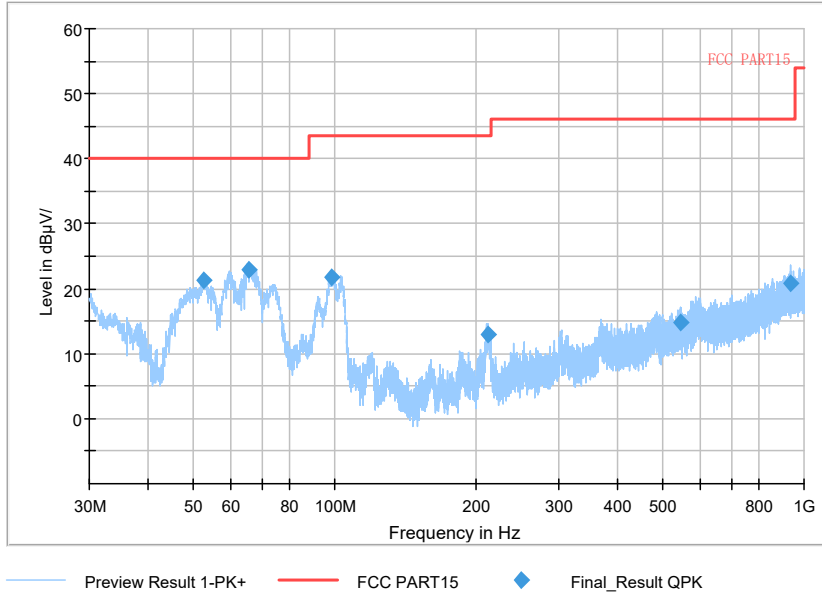


- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs PK+
- PK.74
- * Critical_Freqs AVG
- * Final_Result PK+
- ◆ Final_Result AVG
- AV54

Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT20)

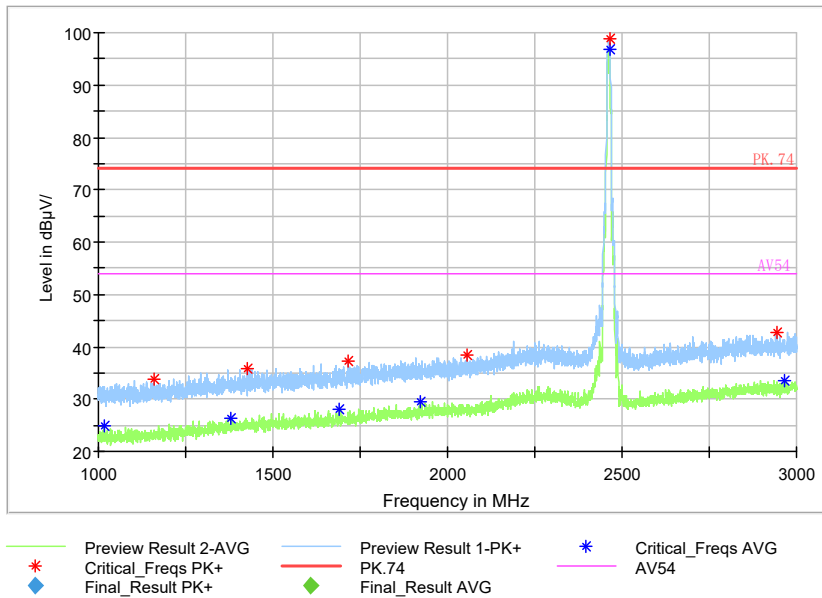
Carrier frequency (MHz): 2462
Channel No.:11

Full Spectrum



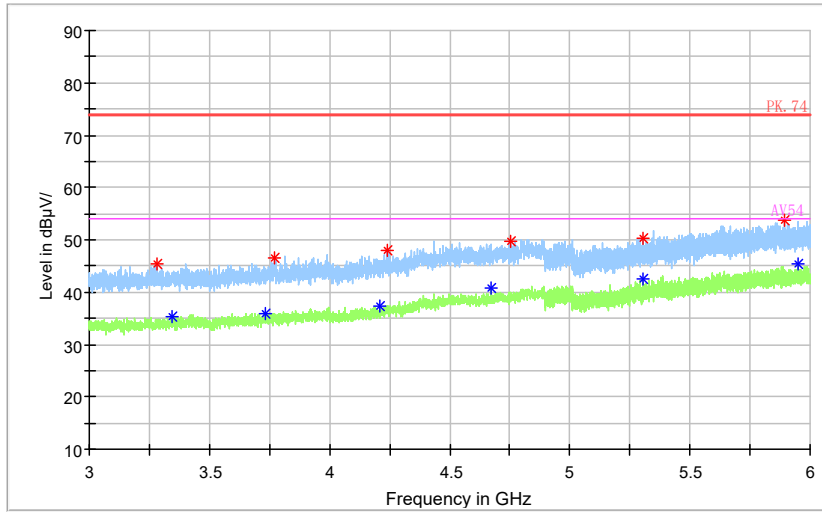
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

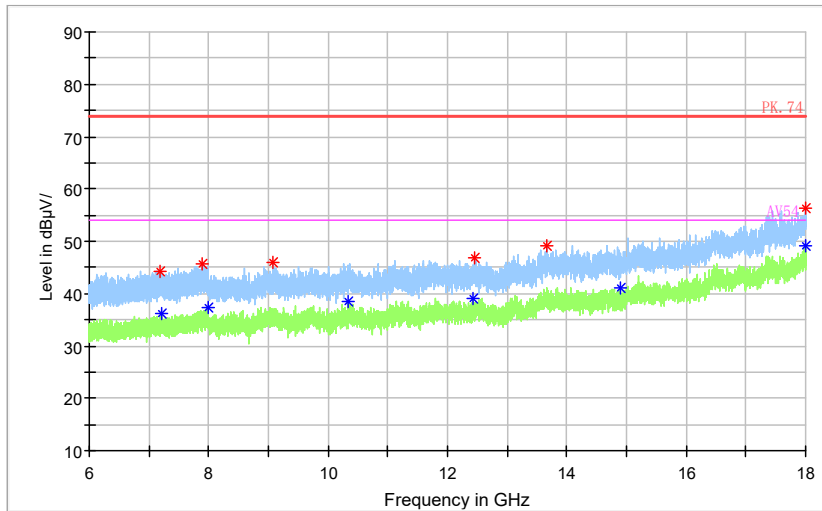
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

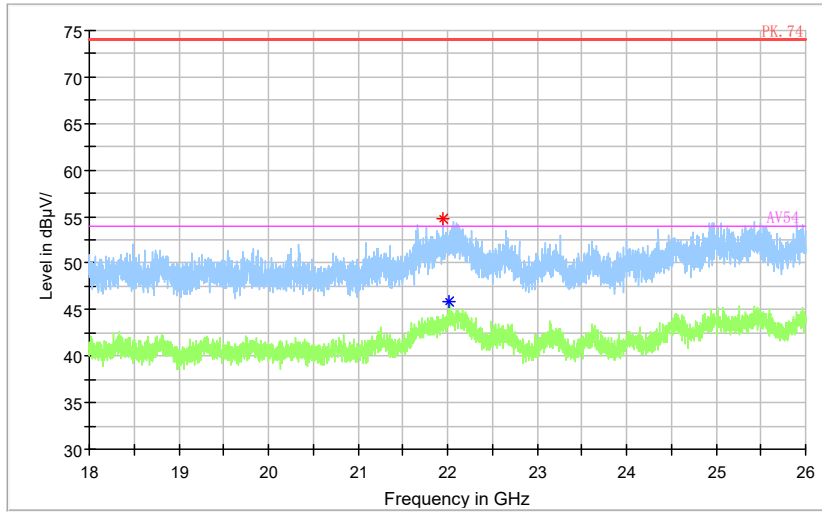
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

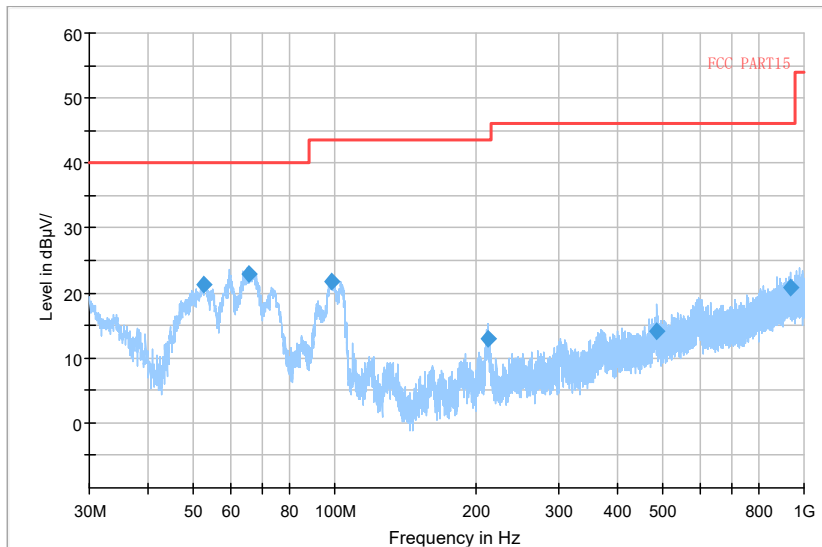
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG AV54
* Critical_Freqs PK+ — PK.74 — Final_Result AVG
◆ Final_Result PK+ ◆

Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11b

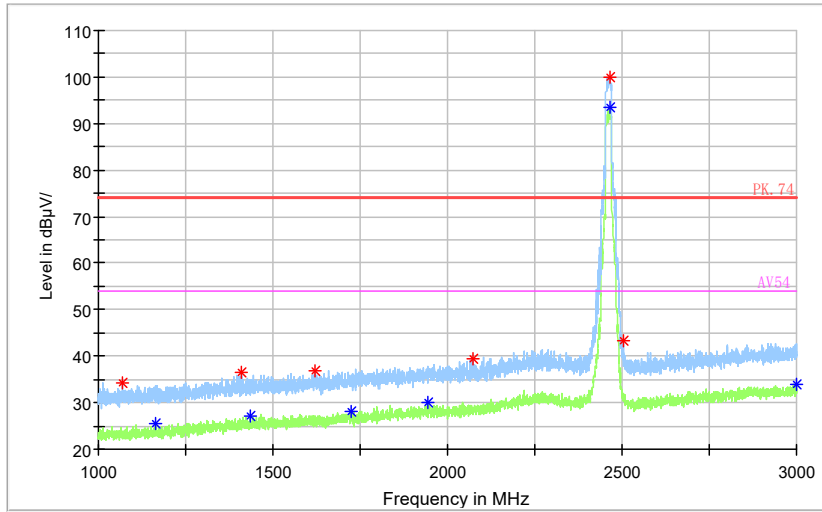
Full Spectrum



— Preview Result 1-PK+ — FCC PART15 ◆ Final_Result QPK

Frequency Range: 30MHz -1GHz
Detector: QP mode
Modulation type: 802.11g

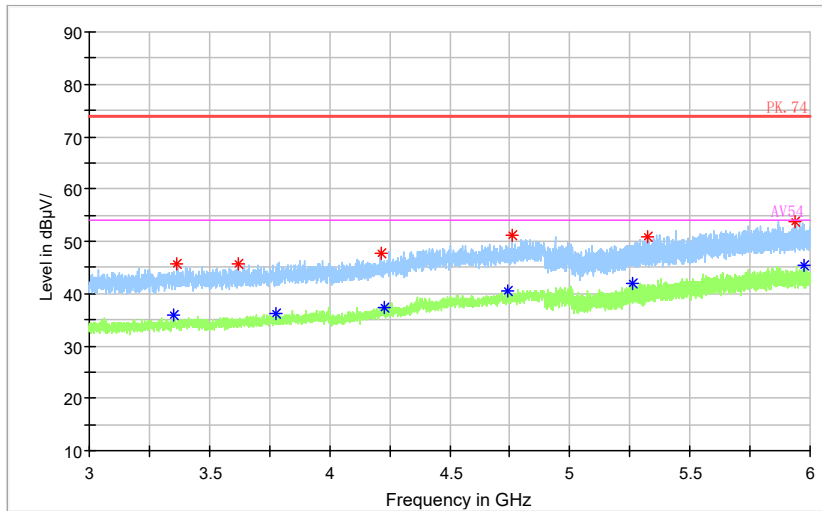
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 1GHz -3GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11g

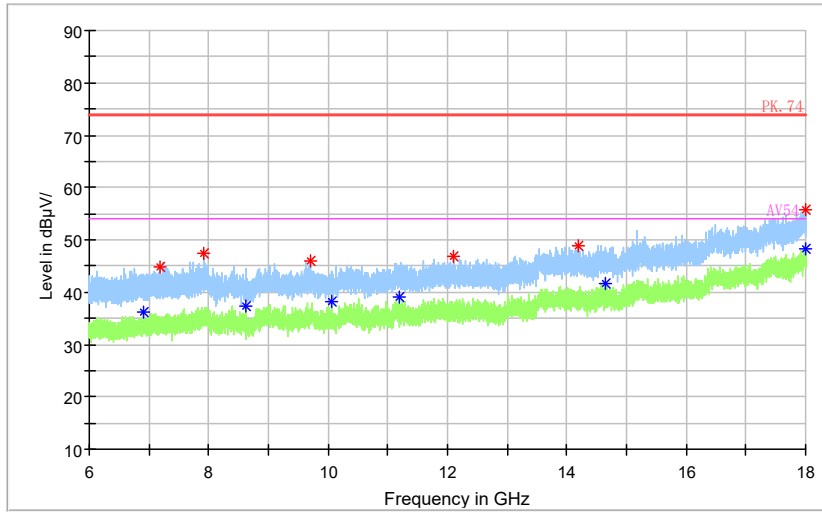
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11g

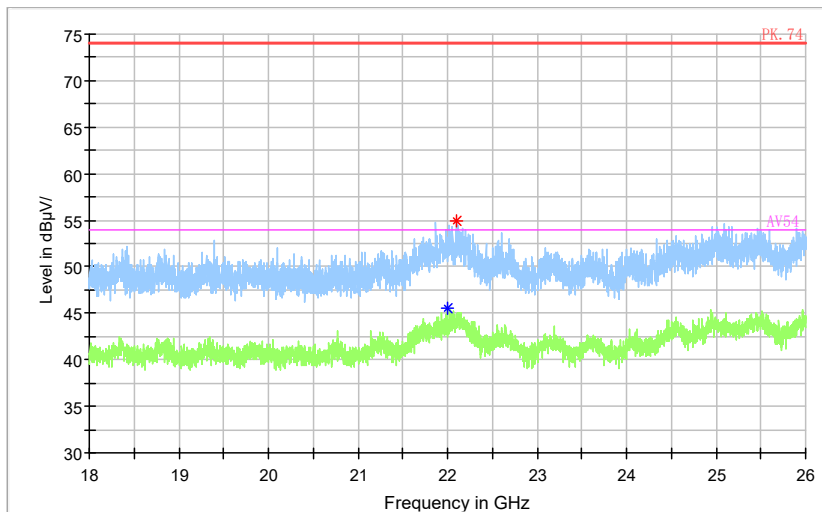
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

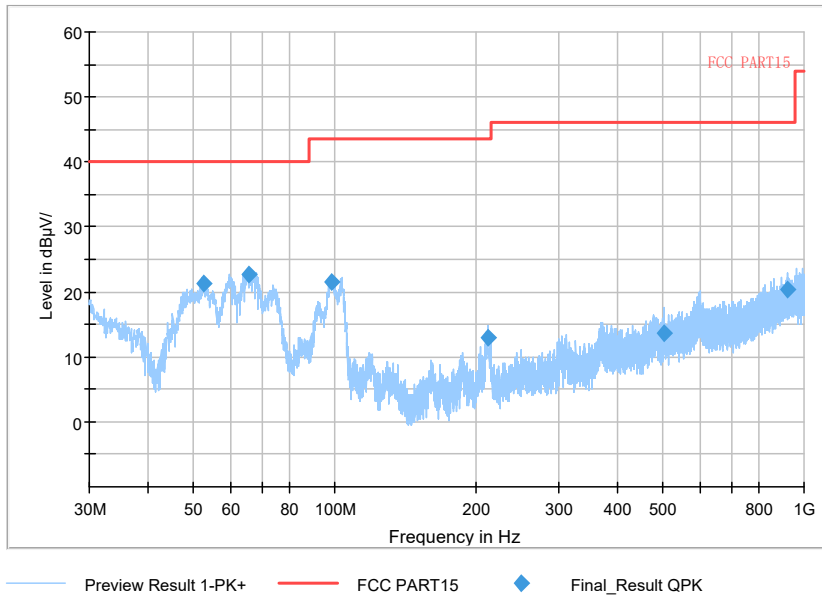
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

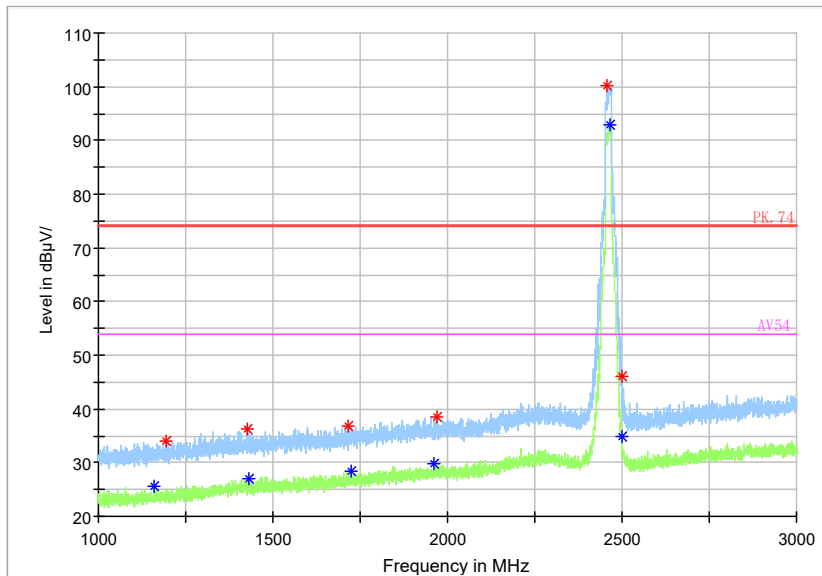
Frequency Range: 18GHz-26GHz
Detector: Av mode and PK mode
Modulation type: 802.11g

Full Spectrum



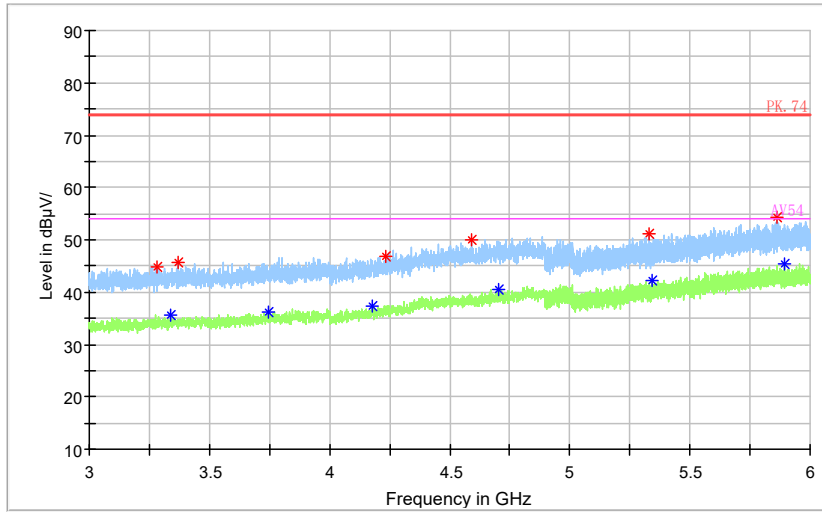
Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT20)

Full Spectrum



Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

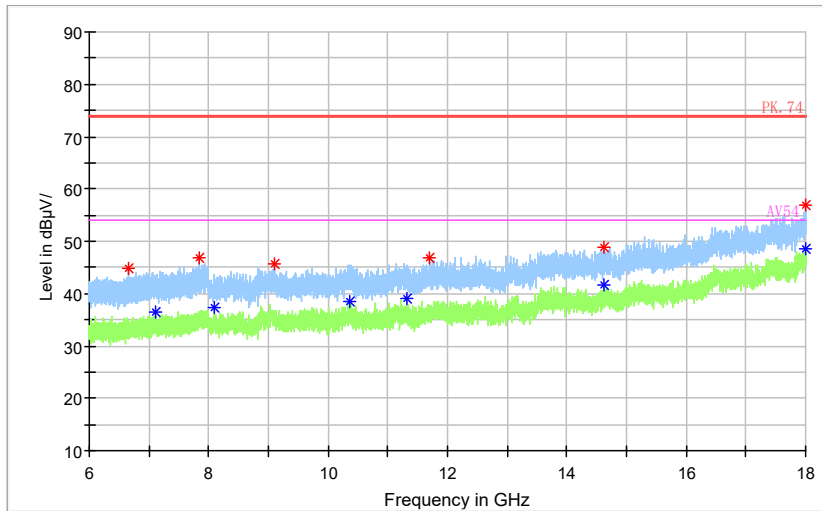
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

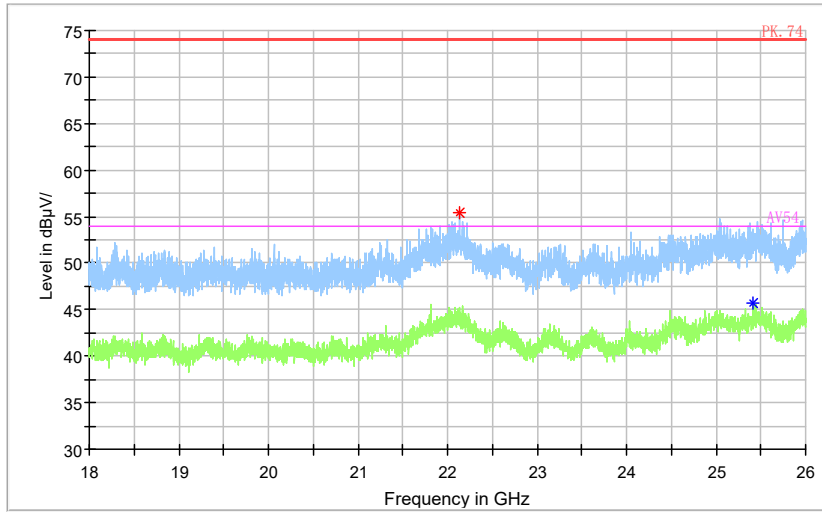
Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ * Critical_Freqs AVG
* Critical_Freqs PK+ — PK.74 — AV54
◆ Final_Result PK+ ◆ Final_Result AVG

Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT20)

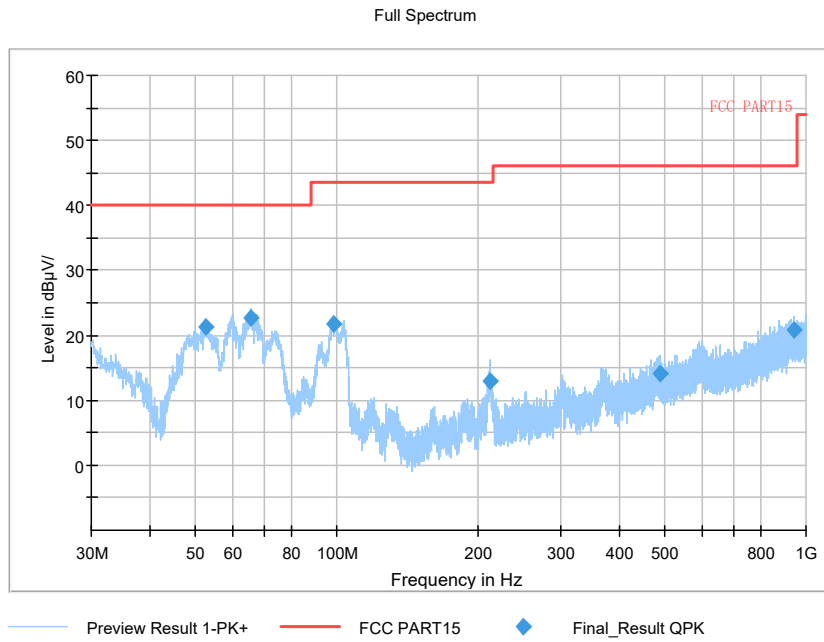
Full Spectrum



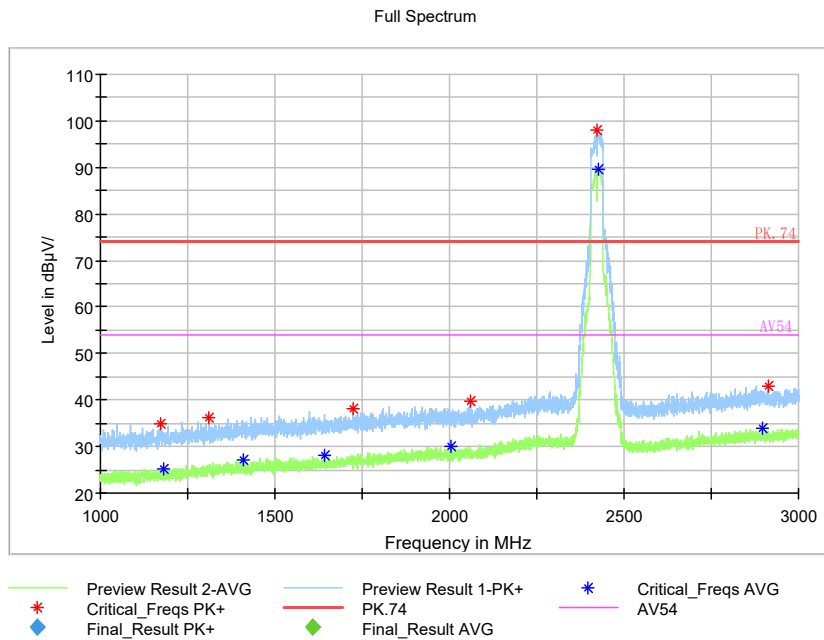
- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- PK.74
- AV54
- ♦ Final_Result PK+
- ♦ Final_Result AVG

Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT20)

Carrier frequency (MHz): 2422
Channel No.:3

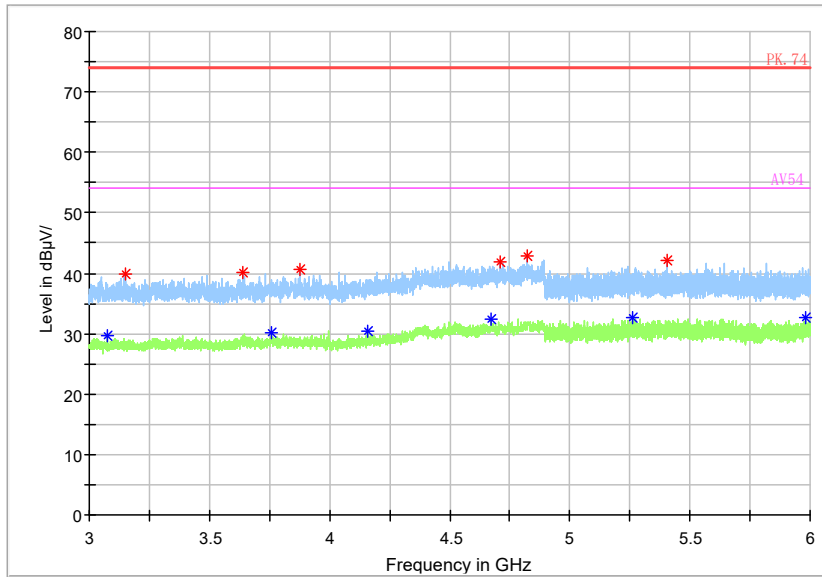


Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT40)



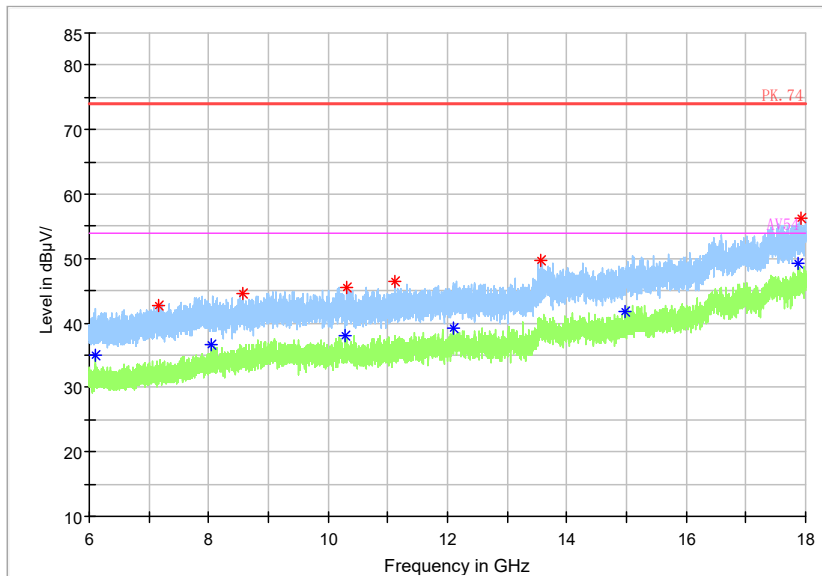
Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum



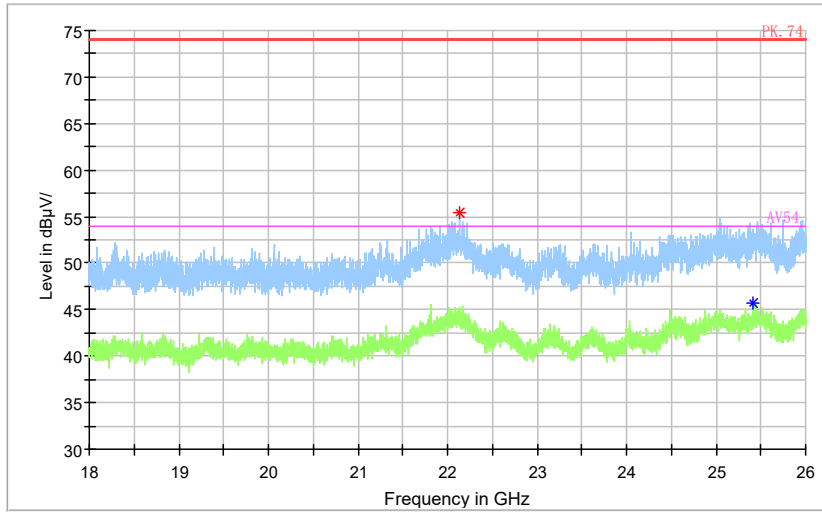
Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum



Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

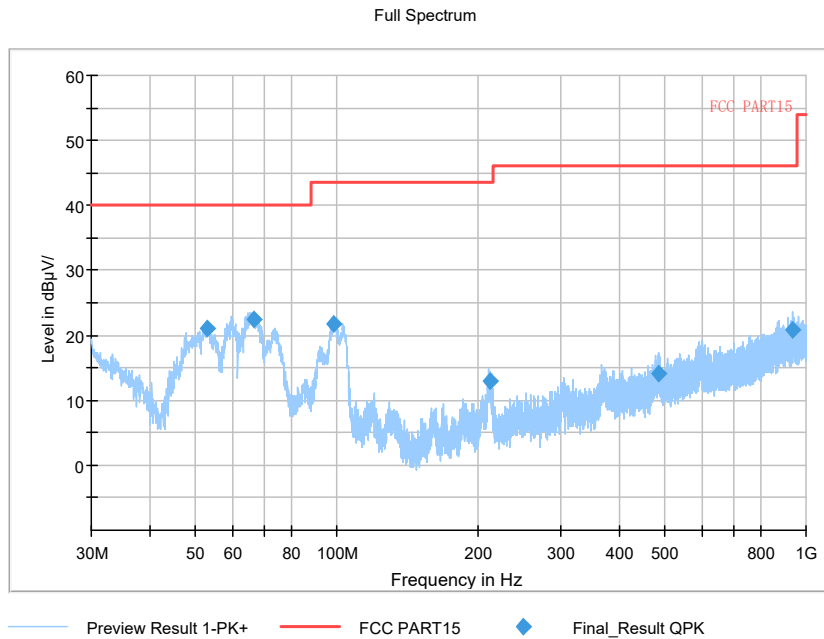
Full Spectrum



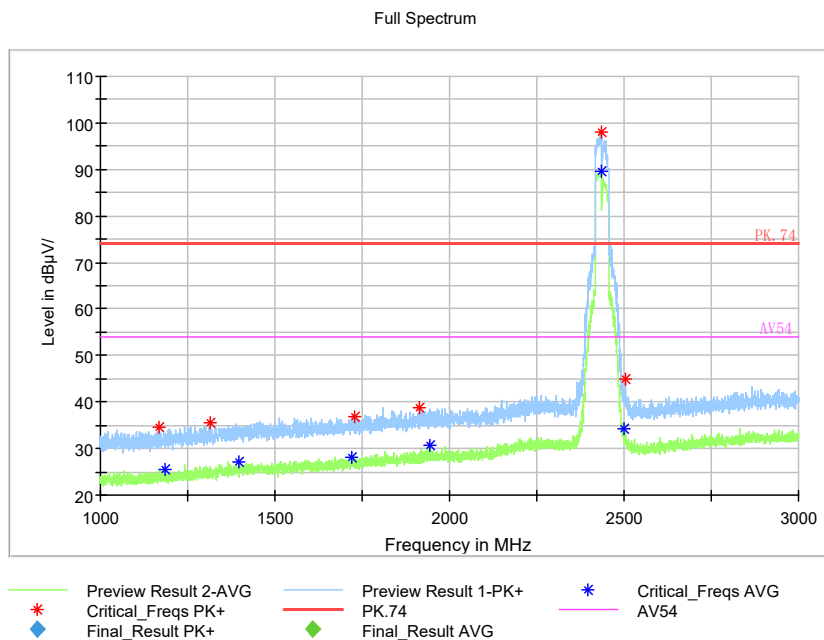
- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- PK.74
- AV54
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT40)

Carrier frequency (MHz): 2437
Channel No.:6

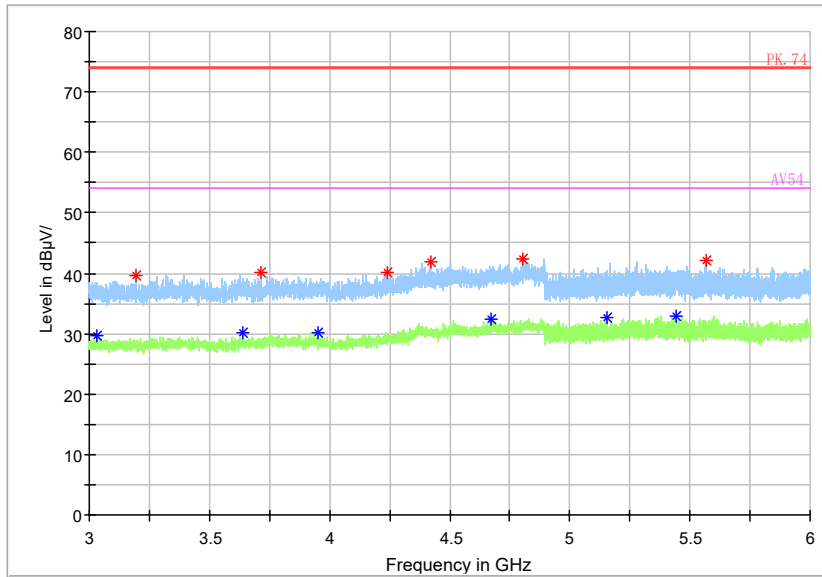


Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT40)



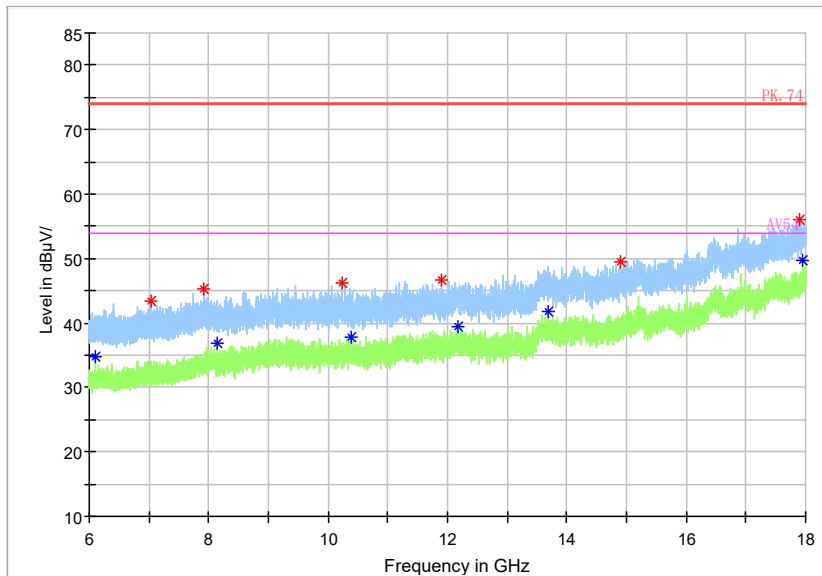
Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum



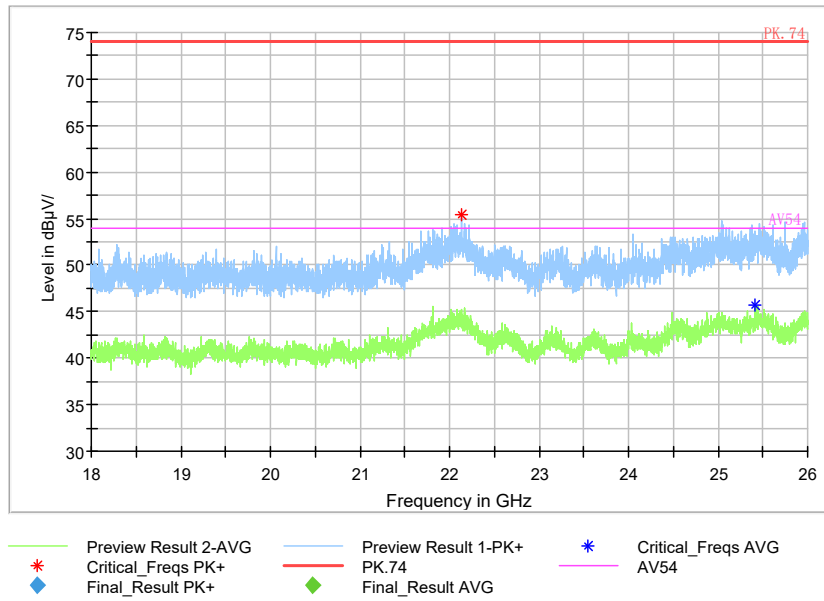
Frequency Range: 3GHz -6GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum



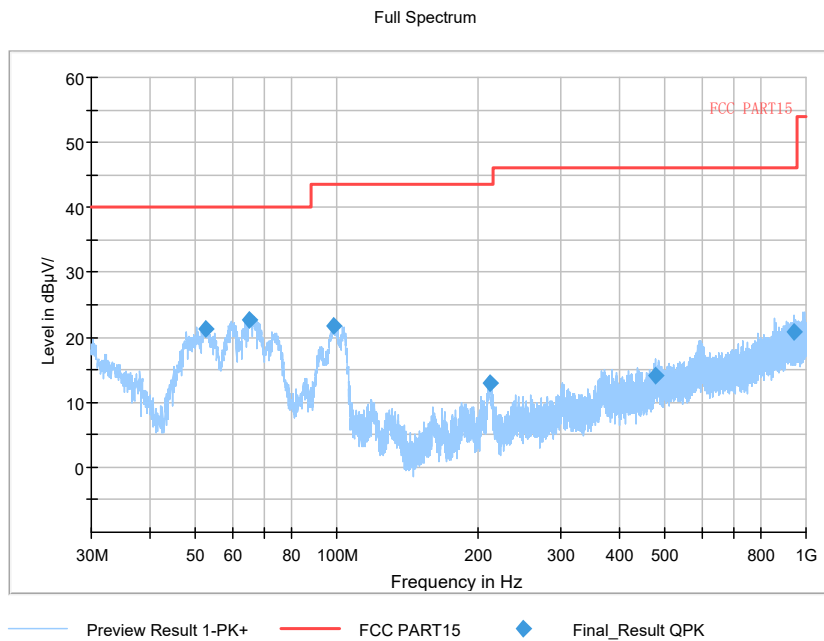
Frequency Range: 6GHz -18GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum

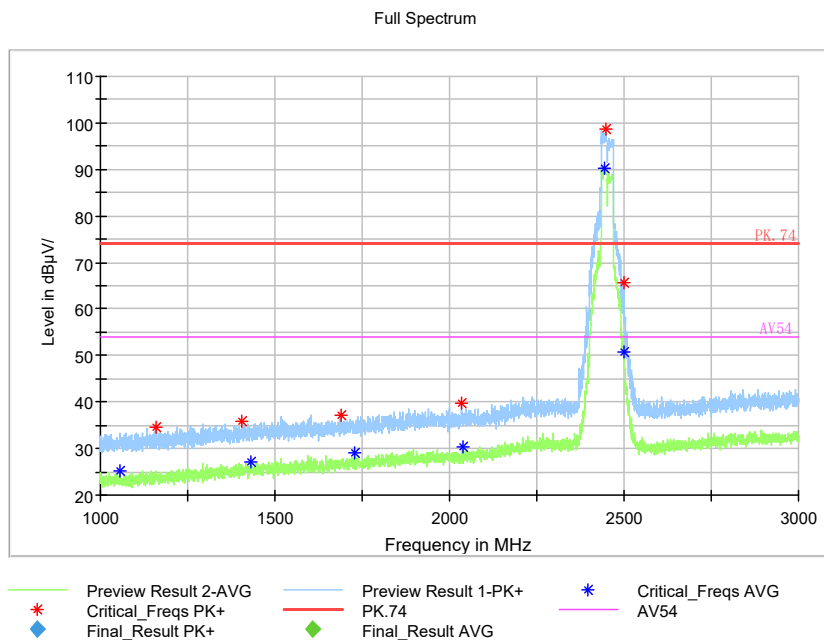


Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT40)

Carrier frequency (MHz): 2452
Channel No.:9

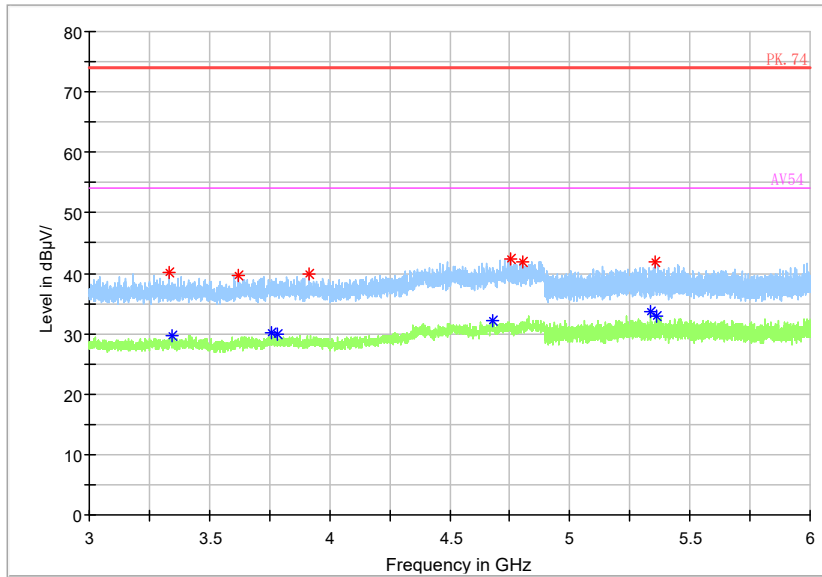


Frequency Range: 30MHz -1GHz
Detector: QP mode
Test Mode: 802.11n(HT40)



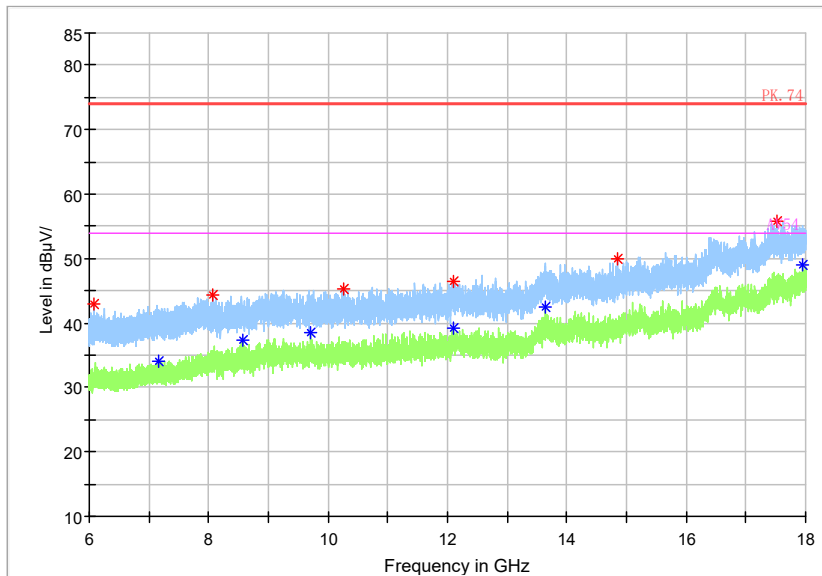
Frequency Range: 1GHz -3GHz
Detector: Av mode and PK mode
Modulation type: 802.11n(HT40)

Full Spectrum



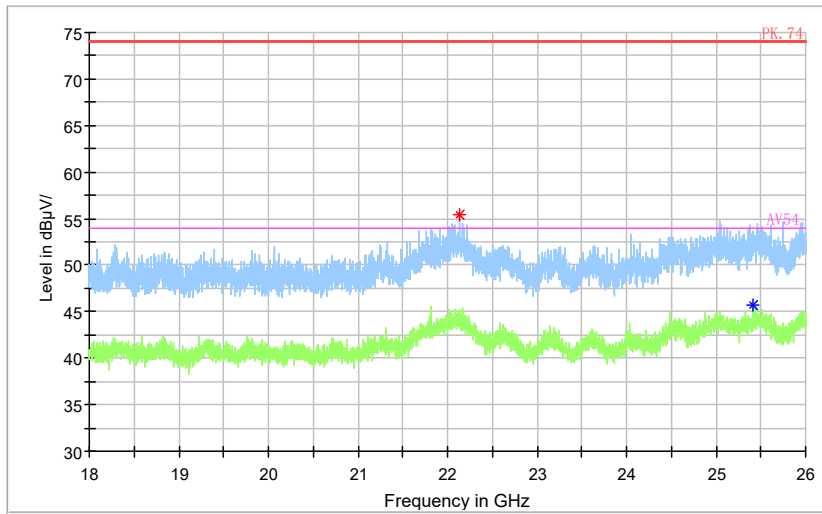
Frequency Range: 3GHz -6GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT40)

Full Spectrum



Frequency Range: 6GHz -18GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT40)

Full Spectrum



- Preview Result 2-AVG
- Preview Result 1-PK+
- * Critical_Freqs AVG
- * Critical_Freqs PK+
- PK.74
- AV54
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Frequency Range: 18GHz-26GHz
 Detector: Av mode and PK mode
 Modulation type: 802.11n(HT40)

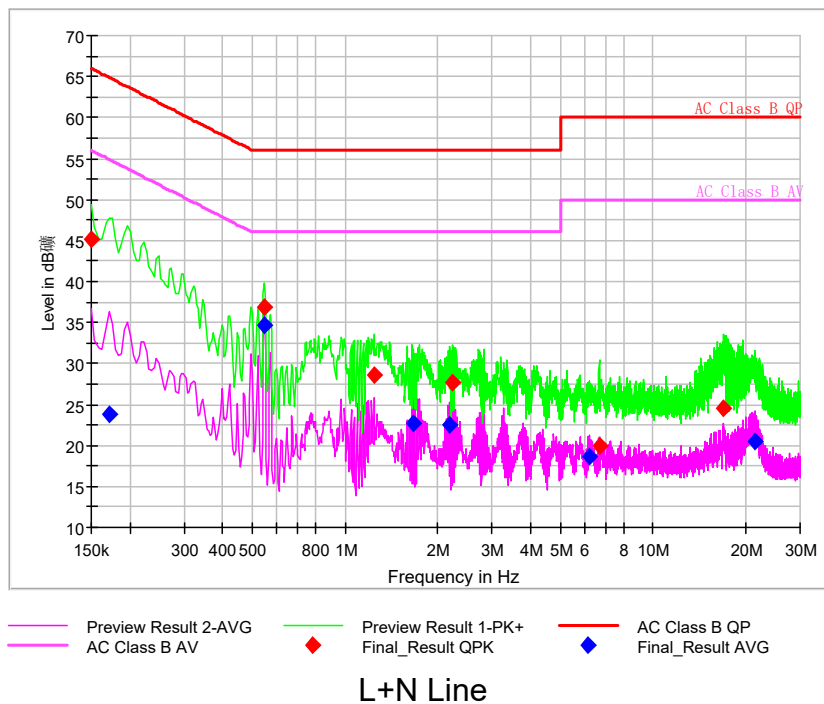
AC Power line Conducted Emission

A “reference path loss” Corr.(dB) is established and the $L_{cable}+ATT+VDF$ is the attenuation of “reference path loss”, and including the cable loss, the attenuation of the attenuator, the voltage division factor of AMN.

The measurement results are obtained as described below:

$$P_{result}=P_{mea}+ Corr.(dB)$$

Sample calculation: $(45.19 \text{ dB}\mu\text{V}) = (15.49 \text{ dB}\mu\text{V}) + (29.7 \text{ dB})$, the corresponding frequency is 0.150000MHz.



MEASUREMENT RESULT:

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Pmea Quasi Peak (dBμV)	Pmea Average (dBμV)
0.150000	45.19	---	66.00	20.81	L1	29.7	15.49	---
0.171321	---	23.86	54.90	31.04	L1	29.7	---	-5.84
0.546579	---	34.61	46.00	11.39	N	29.7	---	4.91
0.546579	36.80	---	56.00	19.20	L1	29.7	7.1	---
1.245921	28.52	---	56.00	27.48	L1	29.8	-1.28	---
1.668086	---	22.68	46.00	23.32	L1	29.8	---	-7.12
2.192593	---	22.43	46.00	23.57	N	29.8	---	-7.37
2.243764	27.75	---	56.00	28.25	L1	29.8	-2.05	---
6.205286	---	18.71	50.00	31.29	N	29.8	---	-11.09
6.682886	19.88	---	60.00	40.12	L1	29.8	-9.92	---
16.998193	24.50	---	60.00	35.50	L1	30.1	-5.6	---
21.454371	---	20.56	50.00	29.44	L1	30.3	---	-9.74

---The end of the test report---