

MEASUREMENT REPORT

FCC PART 15C WLAN 802.11b/g/n

FCC ID: 2ASR8SC3832

APPLICANT: Qingdao Haier Biomedical Co Ltd

Application Type: Certification

Product: Touch screen main control board

Model No.: SC3832V

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15 Subpart C (Section 15.247)

Test Procedure(s): ANSI C63.10-2013, KDB 558074 D01v05r02

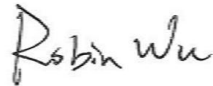
Test Date: February 25 ~ March 22, 2019

Reviewed By:



(Kevin Guo)

Approved By:



(Robin Wu)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1902RSU012-U1	Rev. 01	Initial report	04-26-2019	Valid

CONTENTS

Description	Page
§2.1033 General Information.....	5
1. INTRODUCTION	6
1.1. Scope	6
1.2. MRT Test Location	6
2. PRODUCT INFORMATION	7
2.1. Equipment Description	7
2.2. Product Specification Subjective to this Report	7
2.3. Working Frequencies for this report.....	8
2.4. Test Mode	8
2.5. Description of Test Software.....	8
2.6. Device Capabilities.....	9
2.7. Test Configuration	10
2.8. EMI Suppression Device(s)/Modifications.....	10
2.9. Labeling Requirements.....	10
3. DESCRIPTION of TEST.....	11
3.1. Evaluation Procedure	11
3.2. AC Line Conducted Emissions	11
3.3. Radiated Emissions.....	12
4. ANTENNA REQUIREMENTS.....	13
5. TEST EQUIPMENT CALIBRATION DATE.....	14
6. MEASUREMENT UNCERTAINTY	16
7. TEST RESULT	17
7.1. Summary.....	17
7.2. 6dB Bandwidth Measurement.....	18
7.2.1. Test Limit	18
7.2.2. Test Procedure used.....	18
7.2.3. Test Setting.....	18
7.2.4. Test Setup	18
7.2.5. Test Result.....	19
7.3. Output Power Measurement.....	23
7.3.1. Test Limit	23
7.3.2. Test Procedure Used	23
7.3.3. Test Setting.....	23

7.3.4.	Test Setup	23
7.3.5.	Test Result.....	24
7.4.	Power Spectral Density Measurement.....	26
7.4.1.	Test Limit	26
7.4.2.	Test Procedure Used	26
7.4.3.	Test Setting.....	26
7.4.4.	Test Setup	26
7.4.5.	Test Result.....	27
7.5.	Conducted Band Edge and Out-of-Band Emissions	31
7.5.1.	Test Limit	31
7.5.2.	Test Procedure Used	31
7.5.3.	Test Setting.....	31
7.5.4.	Test Setup	32
7.5.5.	Test Result.....	33
7.6.	Radiated Spurious Emission Measurement	40
7.6.1.	Test Limit	40
7.6.2.	Test Procedure Used	40
7.6.3.	Test Setting.....	40
7.6.4.	Test Setup	42
7.6.5.	Test Result.....	43
7.7.	Radiated Restricted Band Edge Measurement.....	54
7.7.1.	Test Limit	54
7.7.2.	Test Procedure Used	55
7.7.3.	Test Setting.....	55
7.7.4.	Test Setup	56
7.7.5.	Test Result.....	57
7.8.	AC Conducted Emissions Measurement	81
7.8.1.	Test Limit	81
7.8.2.	Test Setup	81
7.8.3.	Test Result.....	82
8.	CONCLUSION	84
	Appendix A – Test Setup Photograph	85
	Appendix B – EUT Photograph.....	86

§2.1033 General Information

Applicant:	Qingdao Haier Biomedical Co Ltd
Applicant Address:	HAIER INDUSTRIAL PARK ECONOMIC TECHNOLOGY DEVELOPMENT ZONE QINGDAO SHANDONG 266510 CHINA
Manufacturer:	Qingdao Haier Biomedical Co Ltd
Manufacturer Address:	HAIER INDUSTRIAL PARK ECONOMIC TECHNOLOGY DEVELOPMENT ZONE QINGDAO SHANDONG 266510 CHINA
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	Touch screen main control board
Model No.:	SC3832V
Wi-Fi Specification:	802.11b/g/n
Bluetooth Version:	V4.2 dual mode
Working Voltage:	12VDC

2.2. Product Specification Subjective to this Report

Frequency Range:	802.11b/g/n-HT20: 2412 ~ 2462MHz
Channel Number:	802.11b/g/n-HT20: 11
Type of Modulation:	802.11b: DSSS 802.11g/n: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 72.2Mbps
Maximum Peak Output Power:	802.11b: 19.15dBm 802.11g: 24.36dBm 802.11n-HT20: 23.36dBm
Antenna Type:	PCB Antenna
Antenna Gain:	3.9dBi

Note: For other features of this EUT, test report will be issued separately.

2.3. Working Frequencies for this report

802.11b/g/n-HT20

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

2.4. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)

2.5. Description of Test Software

The test utility software used during testing was “Ampak RFTTestTool”, and the version was VER 5.6.

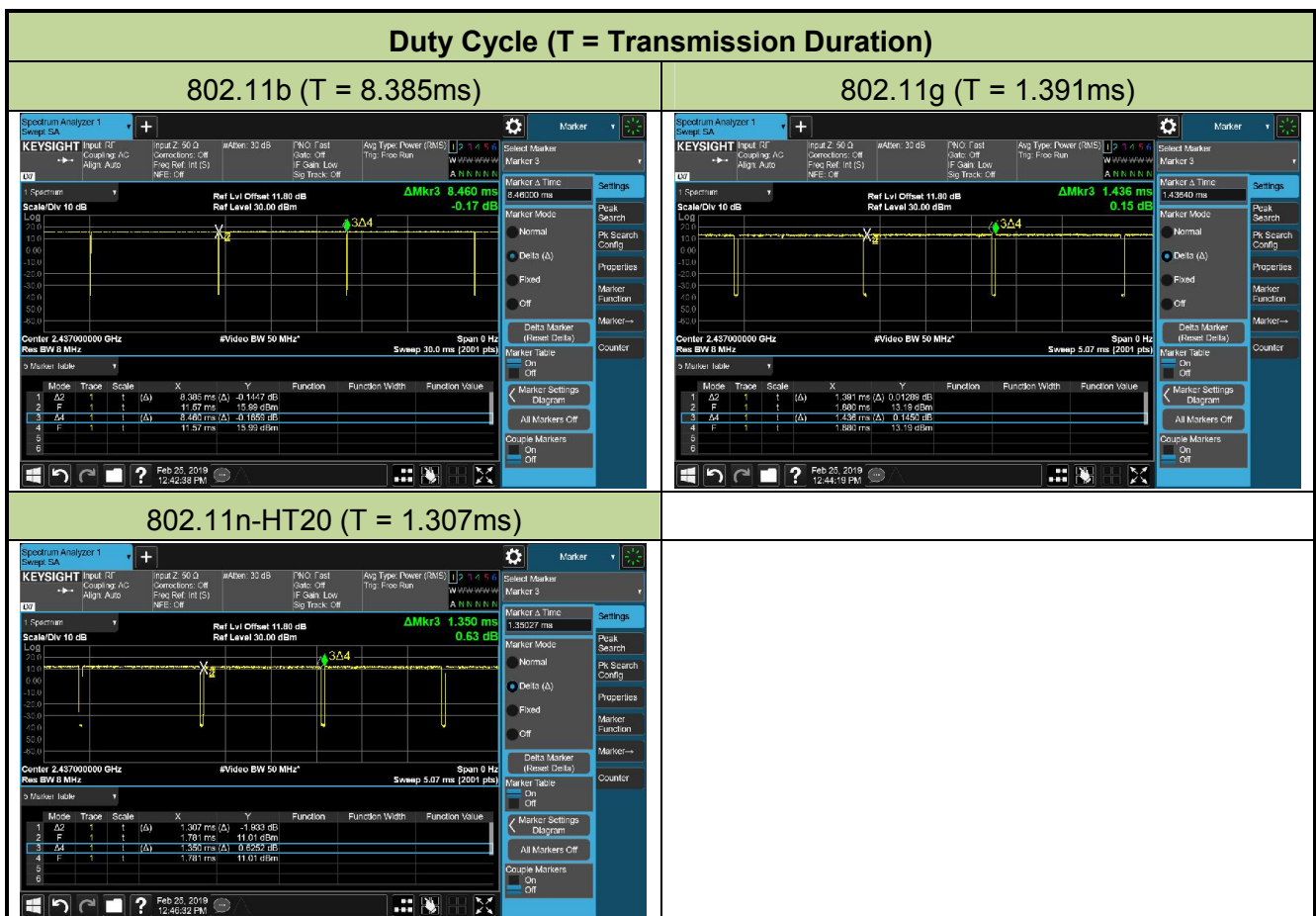
2.6. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS), Bluetooth v4.2 dual mode (DTS/DSS)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11b	99.11%
802.11g	96.87%
802.11n-HT20	96.81%



2.7. Test Configuration

The **Touch screen main control board** was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.8. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.9. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in ANSI C63.10-2013 were used in the measurement of the **Touch screen main control board**.

Deviation from measurement procedure.....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50 Ω /50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment which determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, which produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“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 of the **Touch screen main control board** is uses a unique connector (I-PEX connector).

Conclusion:

The **Touch screen main control board** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2020/04/15
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2019/06/14
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2019/06/14
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2019/08/14
Shielding Anechoic Chamber	MIX-BEP	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/13
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2019/09/25
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/09
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2020/03/31
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2019/10/19
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2019/12/17
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/16
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/12
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2019/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06213	1 year	2019/05/01

Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2019/08/13
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/09
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2019/10/19
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2019/11/09
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2019/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2019/11/16
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/12
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2019/12/13
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2019/05/01

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2020/04/15
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06452	1 year	2019/07/19
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2019/11/16
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2019/07/19
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2019/07/05
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2019/11/16
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2019/08/14

Software	Version	Function
EMI Software	V3	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
Radiated Emission Measurement - AC2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz ~ 1GHz: 3.86dB 1GHz ~ 25GHz: 4.33dB
Spurious Emissions, Conducted - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.78dB
Output Power - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.13dB
Power Spectrum Density - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.15dB
Occupied Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.28%

7. TEST RESULT

7.1. Summary

Product Name: Touch screen main control board

FCC ID: 2ASR8SC3832

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 7.2
15.247(b)(3)	Output Power	$\leq 1\text{Watt}$		Pass	Section 7.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm} / 3\text{kHz}$		Pass	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\geq 20\text{dBc(Peak)}$		Pass	Section 7.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6&7.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.

7.2. 6dB Bandwidth Measurement

7.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

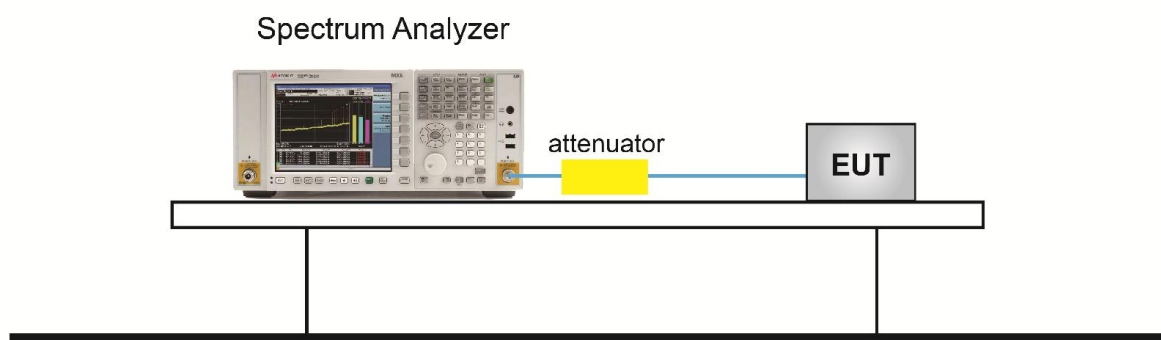
7.2.2. Test Procedure used

ANSI C63.10-2013 - Section 11.8.2 Option 2

7.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability 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. Set RBW = 100 kHz
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize

7.2.4. Test Setup



7.2.5. Test Result

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2019/02/25

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1Mbps	01	2412	9.07	≥ 0.5	Pass
802.11b	1Mbps	06	2437	8.09	≥ 0.5	Pass
802.11b	1Mbps	11	2462	9.56	≥ 0.5	Pass
802.11g	6Mbps	01	2412	15.82	≥ 0.5	Pass
802.11g	6Mbps	06	2437	16.03	≥ 0.5	Pass
802.11g	6Mbps	11	2462	16.29	≥ 0.5	Pass
802.11n-HT20	MCS0	01	2412	17.54	≥ 0.5	Pass
802.11n-HT20	MCS0	06	2437	17.56	≥ 0.5	Pass
802.11n-HT20	MCS0	11	2462	17.57	≥ 0.5	Pass

802.11b 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



--

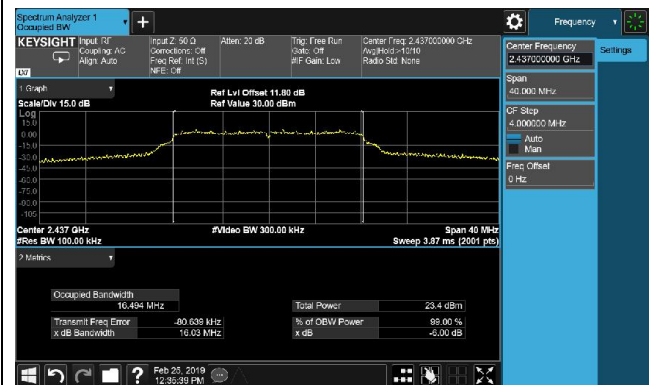
--

802.11g 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

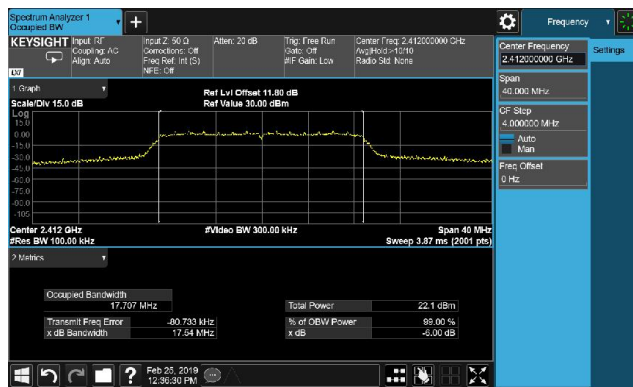


--

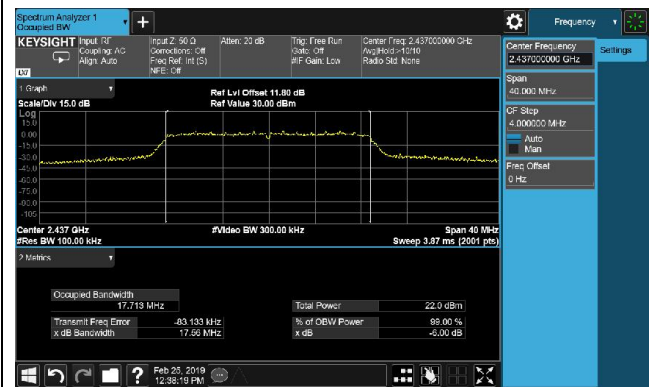
--

802.11n-HT20 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



--

--

7.3. Output Power Measurement

7.3.1. Test Limit

The maximum conducted output power shall be exceed 1 Watt (30dBm).

7.3.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.9.1.3 PKPM1 Peak-reading power meter method

ANSI C63.10-2013 - Section 11.9.2.3.2 Method AVGPM-G

7.3.3. Test Setting

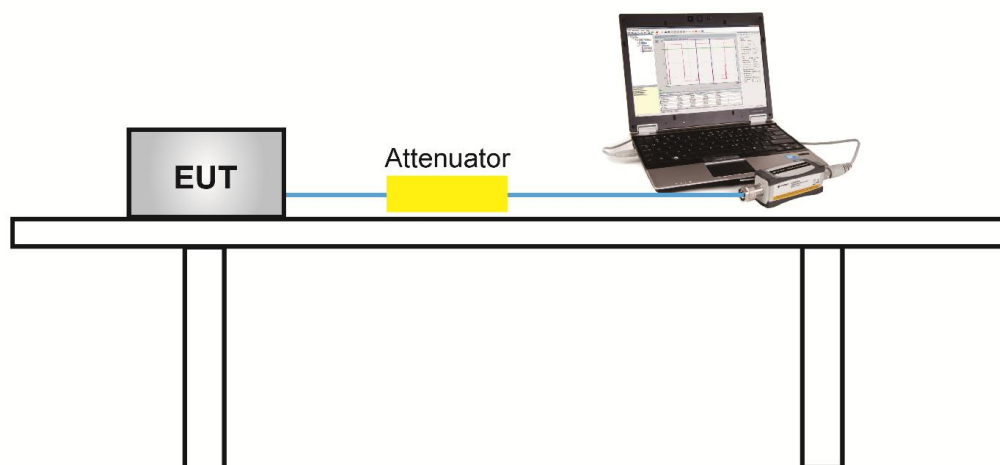
Method PKPM1 (Peak Power Measurement)

Peak 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 pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

7.3.4. Test Setup



7.3.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (gray marker) for final test of each channel.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate / MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	16.60
				5.5Mbps	16.37
				11Mbps	16.05
802.11g	20	6	2437	6Mbps	16.22
				24Mbps	15.91
				54Mbps	15.52
802.11n	20	6	2437	MCS0	14.21
				MCS3	13.98
				MCS7	13.63

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2019/02/25

Test Result of Peak Output Power

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	1Mbps	01	2412	19.15	≤ 30.00	Pass
11b	1Mbps	06	2437	19.08	≤ 30.00	Pass
11b	1Mbps	11	2462	18.95	≤ 30.00	Pass
11g	6Mbps	01	2412	24.06	≤ 30.00	Pass
11g	6Mbps	06	2437	24.36	≤ 30.00	Pass
11g	6Mbps	11	2462	23.98	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	23.36	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	23.24	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	23.06	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	1Mbps	01	2412	16.71	≤ 30.00	Pass
11b	1Mbps	06	2437	16.60	≤ 30.00	Pass
11b	1Mbps	11	2462	16.51	≤ 30.00	Pass
11g	6Mbps	01	2412	16.14	≤ 30.00	Pass
11g	6Mbps	06	2437	16.22	≤ 30.00	Pass
11g	6Mbps	11	2462	15.94	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	14.81	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	14.61	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	14.53	≤ 30.00	Pass

7.4. Power Spectral Density Measurement

7.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

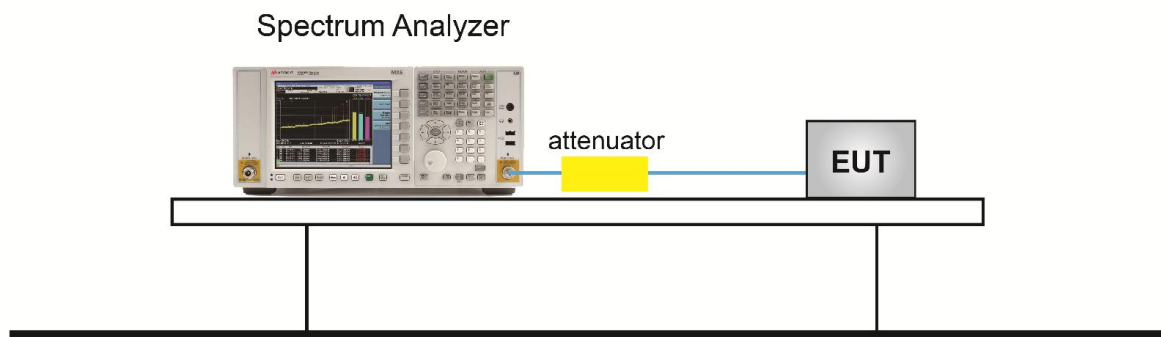
7.4.2. Test Procedure Used

ANSI C63.10 Section 11.10.2

7.4.3. Test Setting

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 = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

7.4.4. Test Setup



7.4.5. Test Result

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2019/02/25

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	PK PSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	1Mbps	01	2412	-2.94	≤ 8.00	Pass
11b	1Mbps	06	2437	-2.90	≤ 8.00	Pass
11b	1Mbps	11	2462	-3.35	≤ 8.00	Pass
11g	6Mbps	01	2412	-7.50	≤ 8.00	Pass
11g	6Mbps	06	2437	-7.28	≤ 8.00	Pass
11g	6Mbps	11	2462	-7.23	≤ 8.00	Pass
11n-HT20	MCS0	01	2412	-7.49	≤ 8.00	Pass
11n-HT20	MCS0	06	2437	-7.45	≤ 8.00	Pass
11n-HT20	MCS0	11	2462	-7.99	≤ 8.00	Pass

802.11b PK PSD

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



--

--

802.11g - PK PSD

Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



--

--

Channel 06 (2437MHz)



—



7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1. Test Limit

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 per the PSD procedure.

7.5.2. Test Procedure Used

ANSI C63.10 Section 11.11

7.5.3. Test Setting

Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

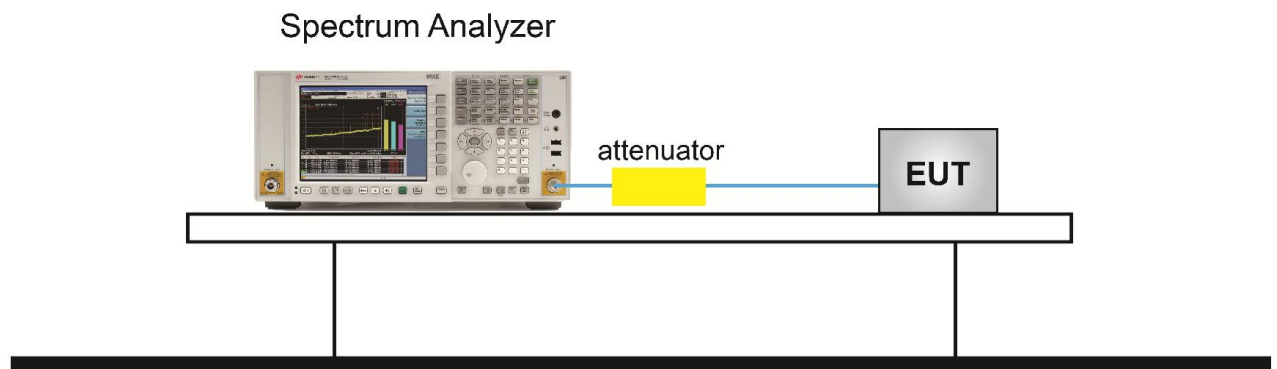
Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 1.3MHz
3. VBW = 4MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Notes

1. RBW was set to 1.3MHz rather than 100 kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100 kHz bandwidth. However, since the traces in the following plots are measured with a 1.3MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1.3MHz bandwidth.
3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

7.5.4.Test Setup



7.5.5. Test Result

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2019/02/25

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit	Result
802.11b	1Mbps	01	2412	20dBc	Pass
802.11b	1Mbps	06	2437	20dBc	Pass
802.11b	1Mbps	11	2462	20dBc	Pass
802.11g	6Mbps	01	2412	20dBc	Pass
802.11g	6Mbps	06	2437	20dBc	Pass
802.11g	6Mbps	11	2462	20dBc	Pass
802.11n-HT20	MCS0	01	2412	20dBc	Pass
802.11n-HT20	MCS0	06	2437	20dBc	Pass
802.11n-HT20	MCS0	11	2462	20dBc	Pass

802.11b Out-of-Band Emissions

Channel 01 (2412MHz)

100kHz PSD Reference Level



Low Band Edge



Spurious Emission



--

--

Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission



802.11b Out-of-Band Emissions

Channel 11 (2462MHz)

100kHz PSD Reference Level



High Band Edge



Spurious Emission



--

--

802.11g Out-of-Band Emissions

Channel 01 (2412MHz)

100kHz PSD Reference Level



Low Band Edge



Spurious Emission



--

--

Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission



802.11g Out-of-Band Emissions

Channel 11 (2462MHz)

100kHz PSD Reference Level



High Band Edge



Spurious Emission



--

--

802.11n-HT20 Out-of-Band Emissions

Channel 01 (2412MHz)

100kHz PSD Reference Level



Low Band Edge



Spurious Emission



--

--

Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission



802.11n-HT20 Out-of-Band Emissions

Channel 11 (2462MHz)

100kHz PSD Reference Level



High Band Edge



Spurious Emission



--

--

7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

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 Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

7.6.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak or average
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

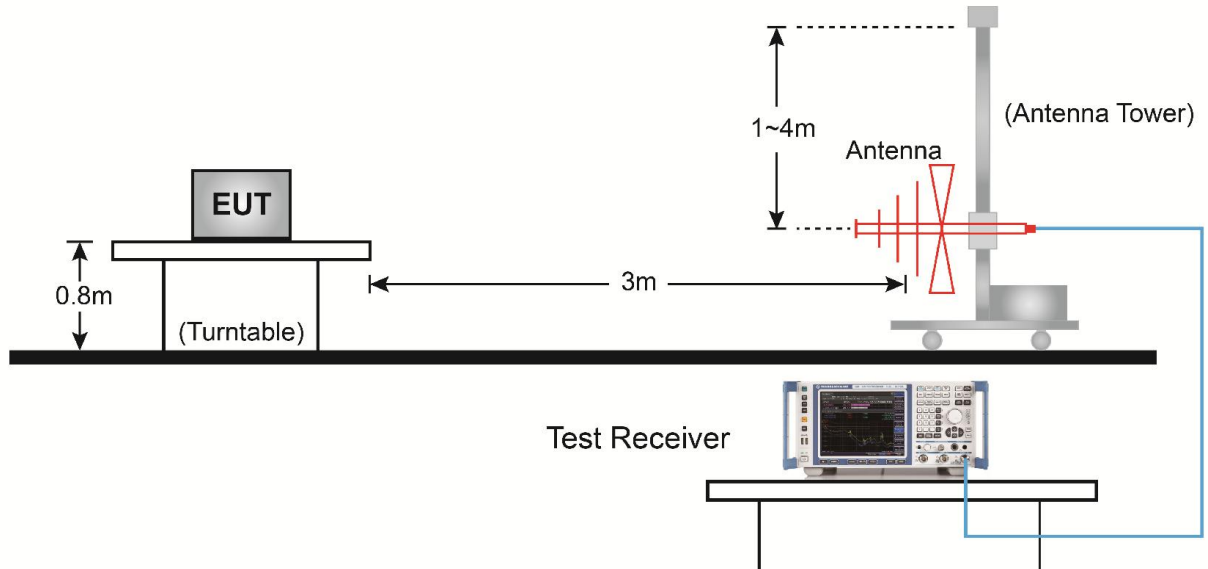
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

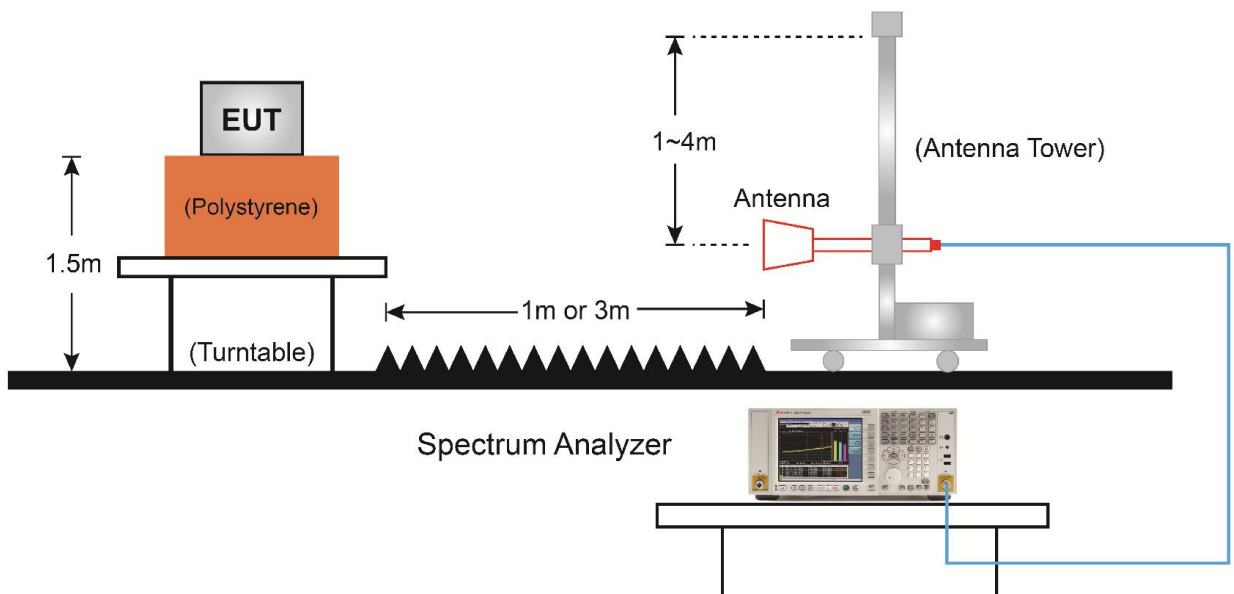
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$. T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

7.6.4.Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



7.6.5. Test Result

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11b	Test Channel:	01
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4009.0	37.1	3.4	40.5	74.0	-33.5	Peak	Horizontal
	4918.5	37.6	6.1	43.7	74.0	-30.3	Peak	Horizontal
*	5836.5	35.1	7.7	42.8	81.9	-39.1	Peak	Horizontal
*	6593.0	36.2	10.2	46.4	81.9	-35.5	Peak	Horizontal
	4689.0	38.1	5.4	43.5	74.0	-30.5	Peak	Vertical
	4944.0	36.9	6.1	43.0	74.0	-31.0	Peak	Vertical
*	5216.0	36.3	6.4	42.7	81.9	-39.2	Peak	Vertical
*	5853.5	35.9	7.8	43.7	81.9	-38.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.9dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11b	Test Channel:	06
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3754.0	40.6	2.4	43.0	74.0	-31.0	Peak	Horizontal
	4986.5	40.0	6.2	46.2	74.0	-27.8	Peak	Horizontal
*	5998.0	36.9	8.0	44.9	83.5	-38.6	Peak	Horizontal
*	7893.5	35.8	13.4	49.2	83.5	-34.3	Peak	Horizontal
	4060.0	39.0	3.5	42.5	74.0	-31.5	Peak	Vertical
	4859.0	36.9	5.9	42.8	74.0	-31.2	Peak	Vertical
*	5216.0	35.2	6.4	41.6	83.5	-41.9	Peak	Vertical
*	6083.0	35.1	8.0	43.1	83.5	-40.4	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.5dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11b	Test Channel:	11
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3754.0	42.5	2.4	44.9	74.0	-29.1	Peak	Horizontal
	4213.0	37.5	4.0	41.5	74.0	-32.5	Peak	Horizontal
*	5207.5	36.7	6.4	43.1	85.4	-42.3	Peak	Horizontal
*	6380.5	35.0	9.2	44.2	85.4	-41.2	Peak	Horizontal
	4927.0	38.1	6.1	44.2	74.0	-29.8	Peak	Vertical
	5454.0	35.0	6.8	41.8	74.0	-32.2	Peak	Vertical
*	6040.5	34.4	7.9	42.3	85.4	-43.1	Peak	Vertical
*	7910.5	35.2	13.4	48.6	85.4	-36.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.4dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11g	Test Channel:	01
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3754.0	40.2	2.4	42.6	74.0	-31.4	Peak	Horizontal
	4000.5	39.4	3.3	42.7	74.0	-31.3	Peak	Horizontal
*	5998.0	37.1	8.0	45.1	85.7	-40.6	Peak	Horizontal
*	7120.0	36.4	12.2	48.6	85.7	-37.1	Peak	Horizontal
	4961.0	37.2	6.1	43.3	74.0	-30.7	Peak	Vertical
	7630.0	36.3	12.6	48.9	74.0	-25.1	Peak	Vertical
*	7970.0	36.3	13.6	49.9	85.7	-35.8	Peak	Vertical
*	8769.0	36.0	13.2	49.2	85.7	-36.5	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.7dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11g	Test Channel:	06
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4995.0	38.1	6.3	44.4	74.0	-29.6	Peak	Horizontal
	5420.0	36.7	6.6	43.3	74.0	-30.7	Peak	Horizontal
*	6652.5	37.8	10.1	47.9	85.9	-38.0	Peak	Horizontal
*	7995.5	37.1	13.7	50.8	85.9	-35.1	Peak	Horizontal
	4128.0	38.4	3.8	42.2	74.0	-31.8	Peak	Vertical
	4833.5	37.2	5.9	43.1	74.0	-30.9	Peak	Vertical
*	5998.0	36.7	8.0	44.7	85.9	-41.2	Peak	Vertical
*	7910.5	35.0	13.4	48.4	85.9	-37.5	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.9dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11g	Test Channel:	11
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	7358.0	36.6	12.7	49.3	74.0	-24.7	Peak	Horizontal
	7655.5	36.3	12.7	49.0	74.0	-25.0	Peak	Horizontal
*	7961.5	35.8	13.5	49.3	84.8	-35.5	Peak	Horizontal
*	8837.0	36.4	13.2	49.6	84.8	-35.2	Peak	Horizontal
	4969.5	36.6	6.1	42.7	74.0	-31.3	Peak	Vertical
	7536.5	34.4	12.9	47.3	74.0	-26.7	Peak	Vertical
*	7987.0	35.6	13.7	49.3	84.8	-35.5	Peak	Vertical
*	8820.0	35.3	13.3	48.6	84.8	-36.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (104.8dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11n-HT20	Test Channel:	01
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4621.0	36.8	5.2	42.0	74.0	-32.0	Peak	Horizontal
	4978.0	38.4	6.2	44.6	74.0	-29.4	Peak	Horizontal
*	5250.0	38.3	6.4	44.7	83.2	-38.5	Peak	Horizontal
*	6185.0	34.6	8.3	42.9	83.2	-40.3	Peak	Horizontal
	4876.0	35.2	6.0	41.2	74.0	-32.8	Peak	Vertical
	5386.0	34.9	6.6	41.5	74.0	-32.5	Peak	Vertical
*	5904.5	34.3	7.8	42.1	83.2	-41.1	Peak	Vertical
*	7885.0	34.7	13.4	48.1	83.2	-35.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.2dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11n-HT20	Test Channel:	06
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4995.0	38.9	6.3	45.2	74.0	-28.8	Peak	Horizontal
	7485.5	35.7	12.8	48.5	74.0	-25.5	Peak	Horizontal
*	7919.0	36.5	13.4	49.9	83.2	-33.3	Peak	Horizontal
*	8658.5	36.4	13.0	49.4	83.2	-33.8	Peak	Horizontal
	4570.0	37.4	5.0	42.4	74.0	-31.6	Peak	Vertical
	5063.0	36.5	6.5	43.0	74.0	-31.0	Peak	Vertical
*	5258.5	35.4	6.4	41.8	83.2	-41.4	Peak	Vertical
*	5811.0	34.7	7.6	42.3	83.2	-40.9	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.2dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	Touch screen main control board	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	AC1	Test Date	2019/03/04
Test Mode:	802.11n-HT20	Test Channel:	11
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4842.0	36.8	5.9	42.7	74.0	-31.3	Peak	Horizontal
	4995.0	36.9	6.3	43.2	74.0	-30.8	Peak	Horizontal
*	5998.0	37.5	8.0	45.5	83.2	-37.7	Peak	Horizontal
*	7978.5	36.2	13.6	49.8	83.2	-33.4	Peak	Horizontal
	4833.5	37.7	5.9	43.6	74.0	-30.4	Peak	Vertical
	5394.5	36.2	6.6	42.8	74.0	-31.2	Peak	Vertical
*	6346.5	36.3	9.0	45.3	83.2	-37.9	Peak	Vertical
*	7808.5	35.3	13.2	48.5	83.2	-34.7	Peak	Vertical

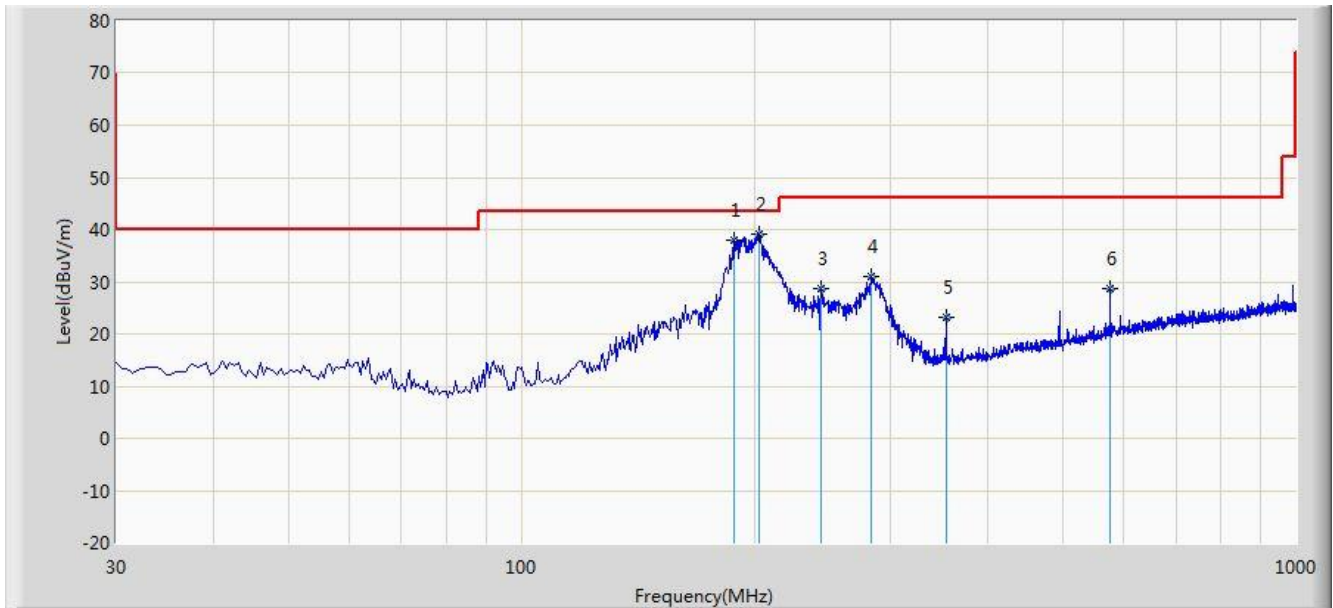
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.2dBμV/m) or FCC 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Worst Case of Radiated Emission below 1GHz:

Site: AC1	Time: 2019/03/22 - 17:03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bacon Dong
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Worst case	



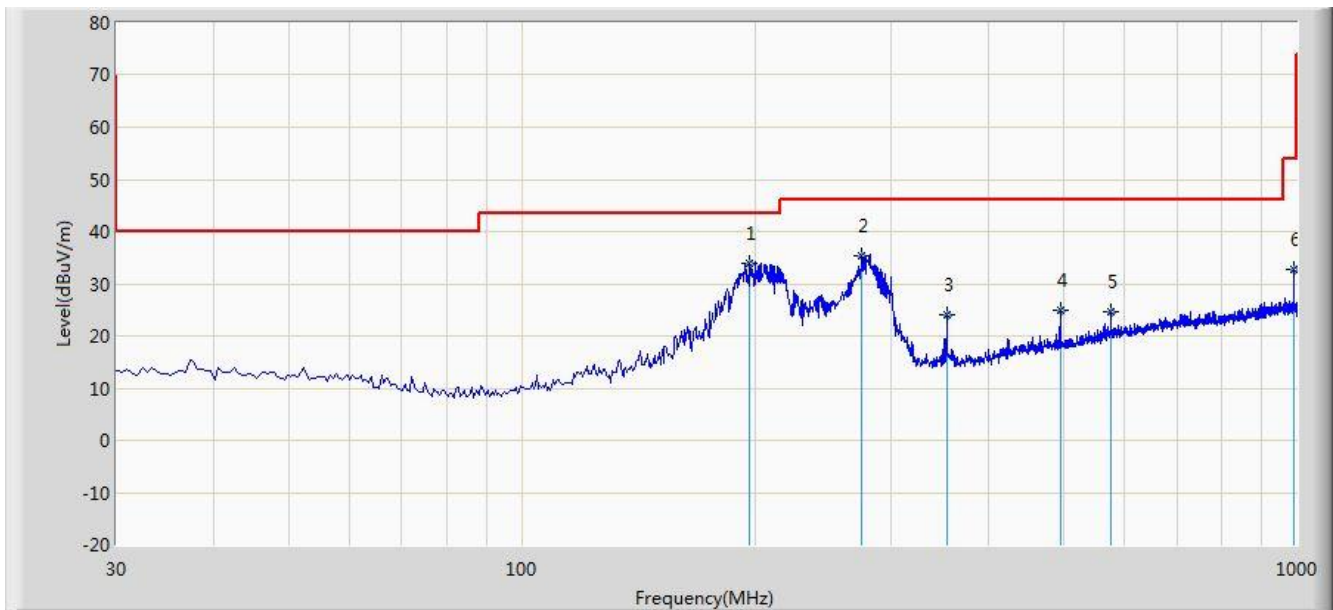
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			188.110	37.953	25.879	-5.547	43.500	12.074	QP
2		*	203.145	39.105	27.719	-4.395	43.500	11.385	QP
3			243.885	28.721	15.655	-17.279	46.000	13.067	QP
4			283.170	31.033	16.925	-14.967	46.000	14.107	QP
5			353.495	23.269	7.480	-22.731	46.000	15.789	QP
6			576.110	28.716	8.340	-17.284	46.000	20.376	QP

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Site: AC1	Time: 2019/03/22 - 17:06
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bacon Dong
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Worst case	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	196.840	33.894	22.403	-9.606	43.500	11.491	QP
2			274.925	35.461	21.589	-10.539	46.000	13.872	QP
3			353.495	24.138	8.349	-21.862	46.000	15.789	QP
4			495.115	25.055	6.409	-20.945	46.000	18.646	QP
5			576.110	24.694	4.318	-21.306	46.000	20.376	QP
6			990.300	32.710	7.219	-21.290	54.000	25.491	QP

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

7.7. Radiated Restricted Band Edge Measurement

7.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.7.2.Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

7.7.3.Test Setting

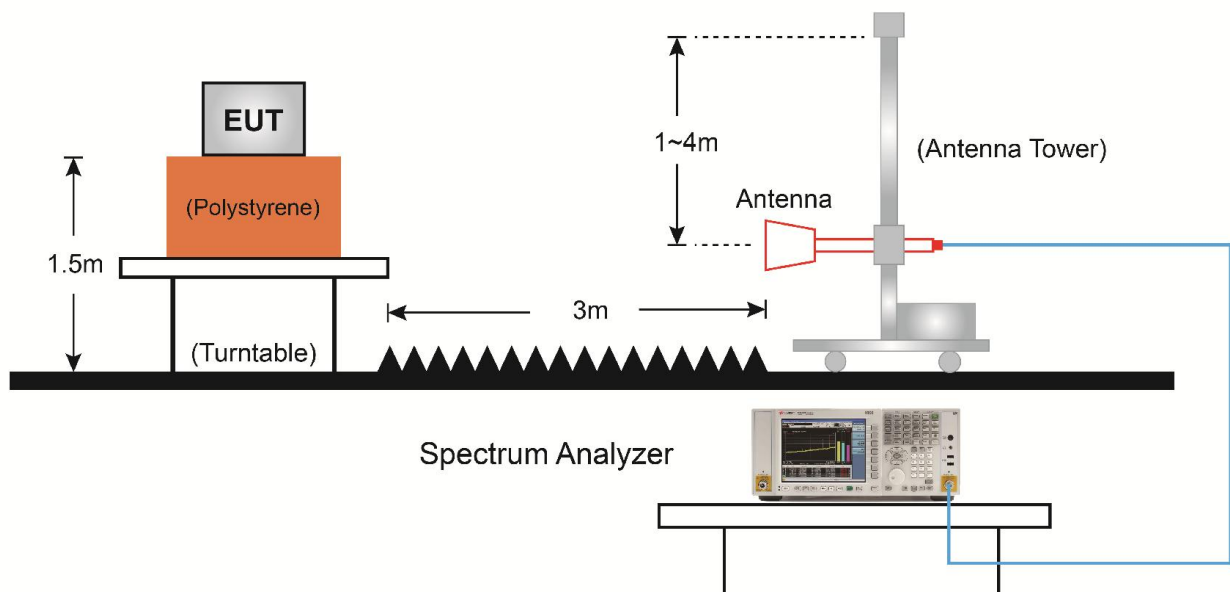
Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

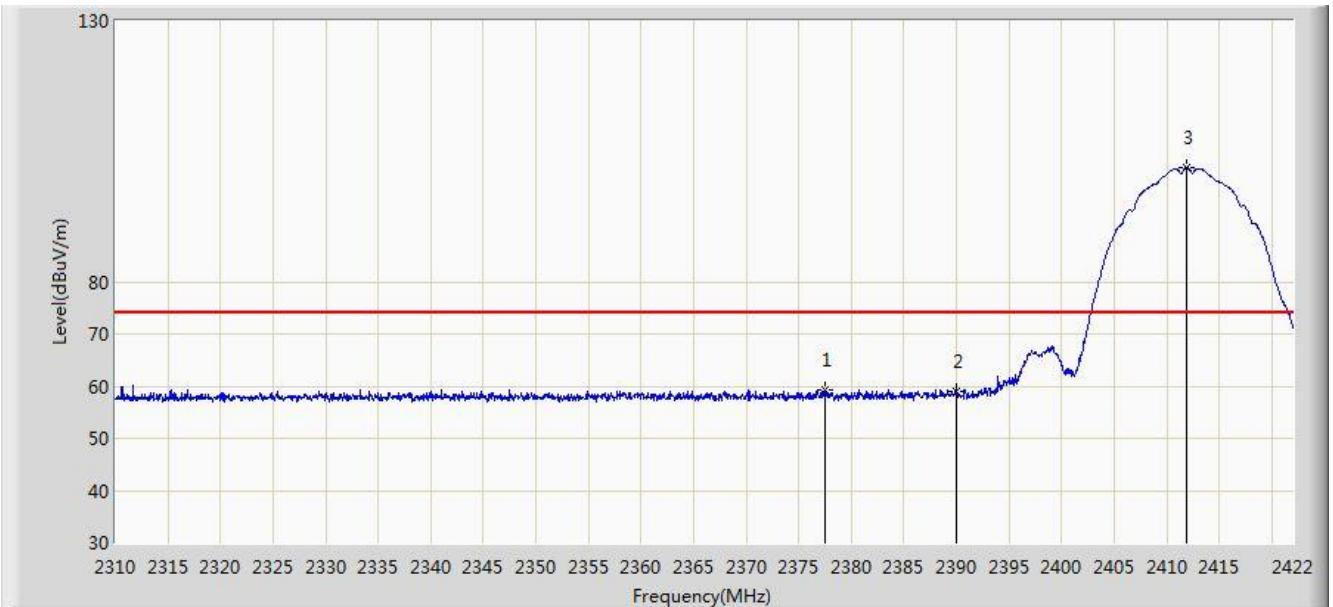
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

7.7.4.Test Setup



7.7.5.Test Result

Site: AC1	Time: 2019/03/04 - 19:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2412MHz	

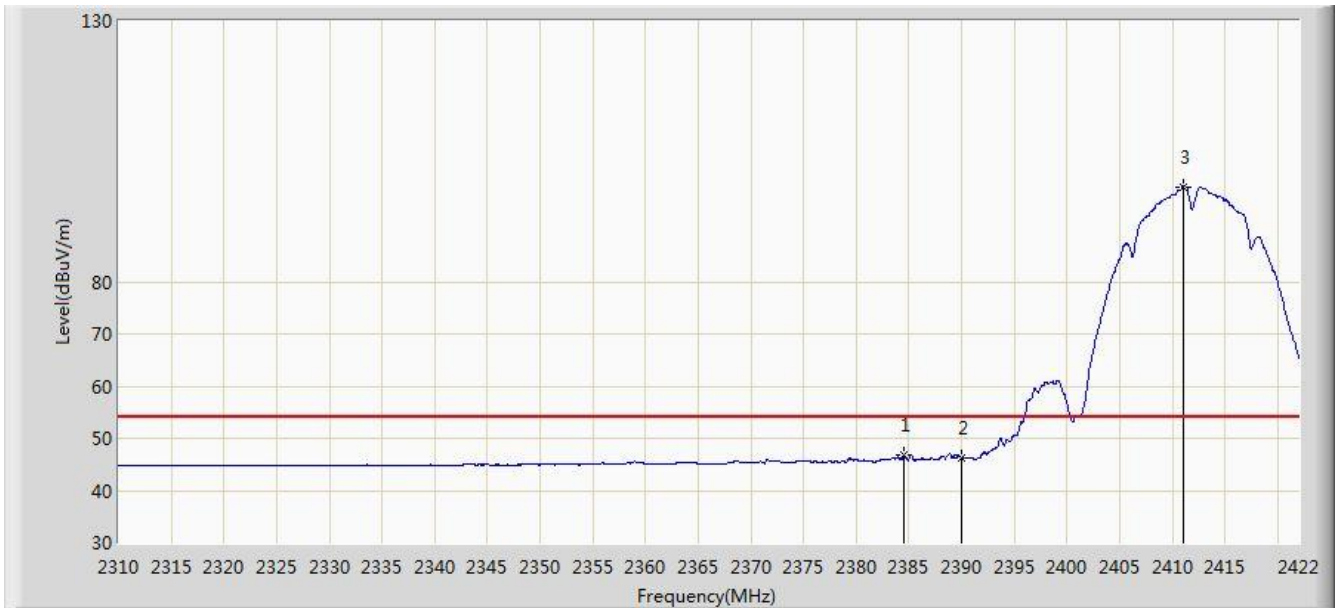


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2377.536	59.414	27.070	-14.586	74.000	32.344	PK
2			2390.000	59.029	26.702	-14.971	74.000	32.327	PK
3		*	2411.920	101.905	69.620	N/A	N/A	32.285	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:48
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2412MHz	

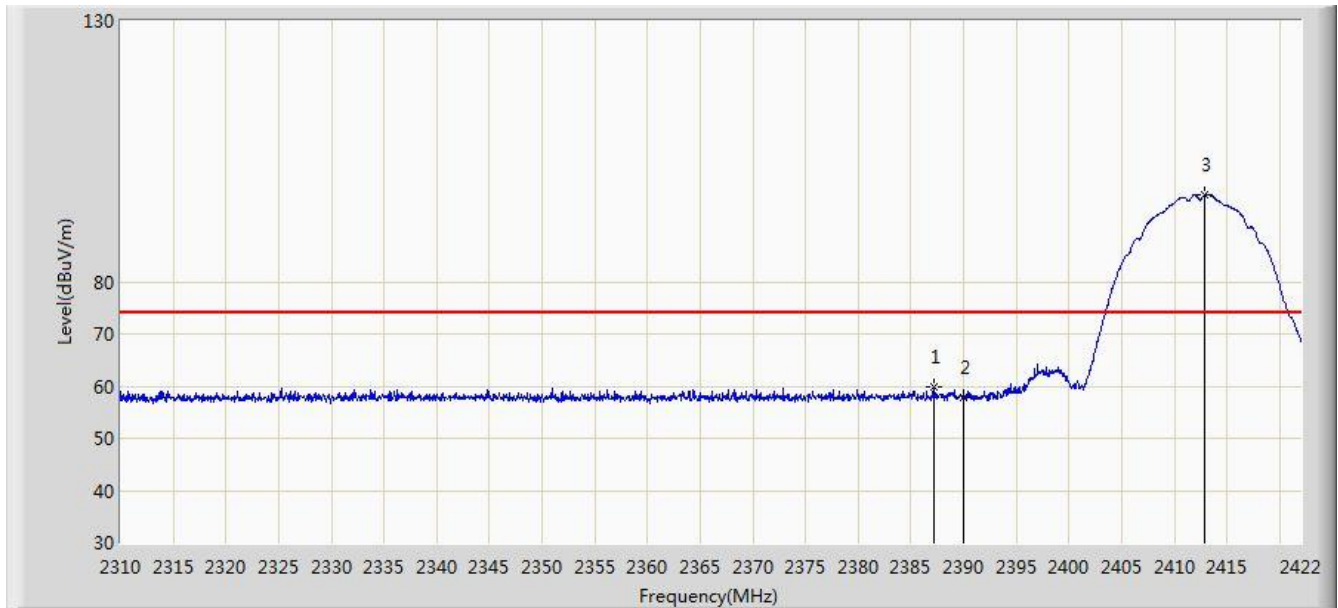


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2384.536	46.786	14.452	-7.214	54.000	32.334	AV
2			2390.000	46.298	13.971	-7.702	54.000	32.327	AV
3		*	2411.024	98.193	65.908	N/A	N/A	32.285	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:48
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2412MHz	

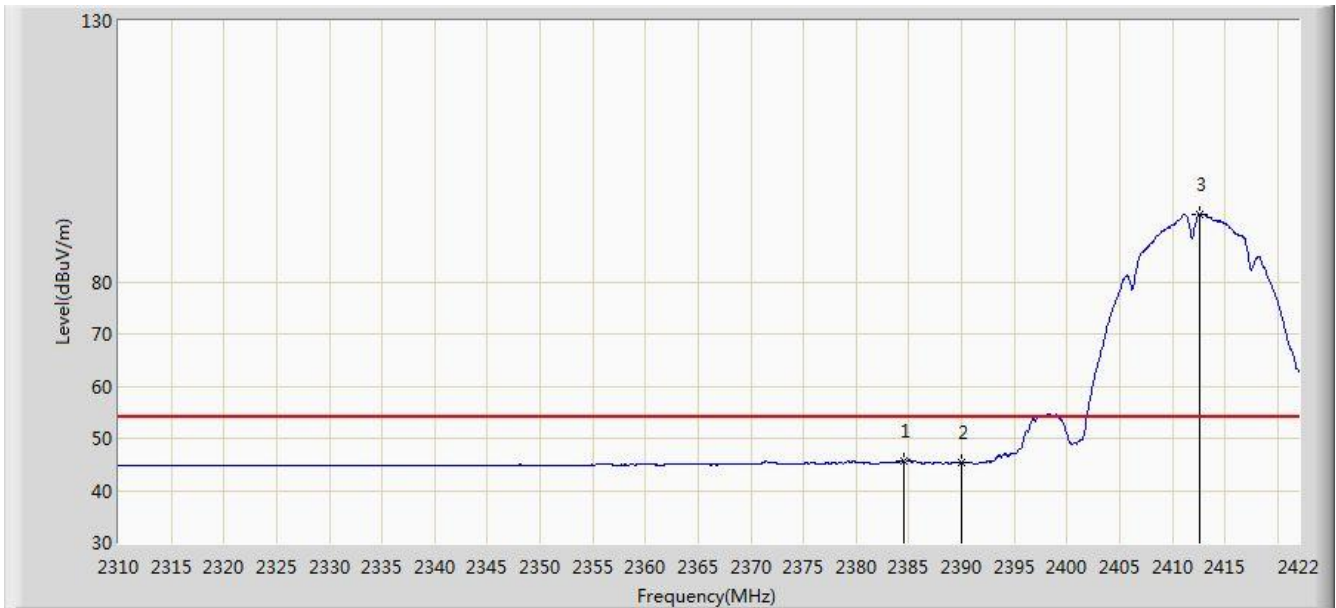


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2387.168	59.764	27.433	-14.236	74.000	32.331	PK
2			2390.000	57.939	25.612	-16.061	74.000	32.327	PK
3		*	2412.872	96.616	64.332	N/A	N/A	32.285	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2412MHz	

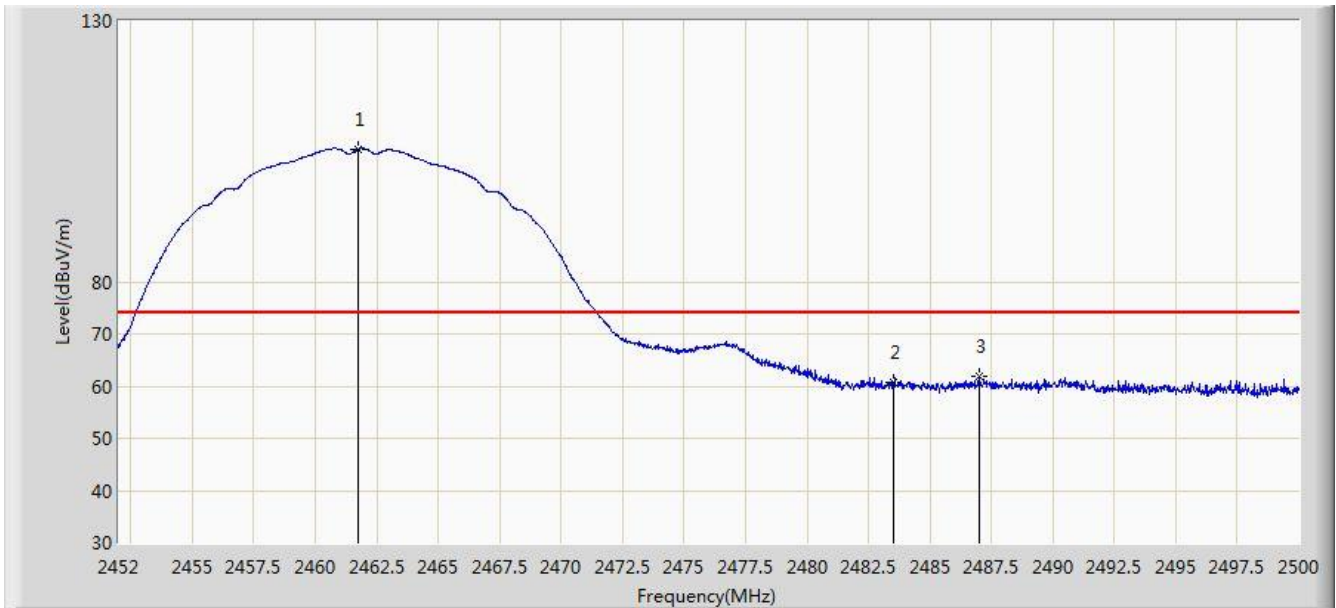


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2384.480	45.736	13.402	-8.264	54.000	32.334	AV
2			2390.000	45.300	12.973	-8.700	54.000	32.327	AV
3		*	2412.536	92.890	60.605	N/A	N/A	32.285	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.744	105.420	73.140	N/A	N/A	32.280	PK
2			2483.500	60.776	28.437	-13.224	74.000	32.340	PK
3			2486.992	61.944	29.591	-12.056	74.000	32.353	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:52
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2462MHz	

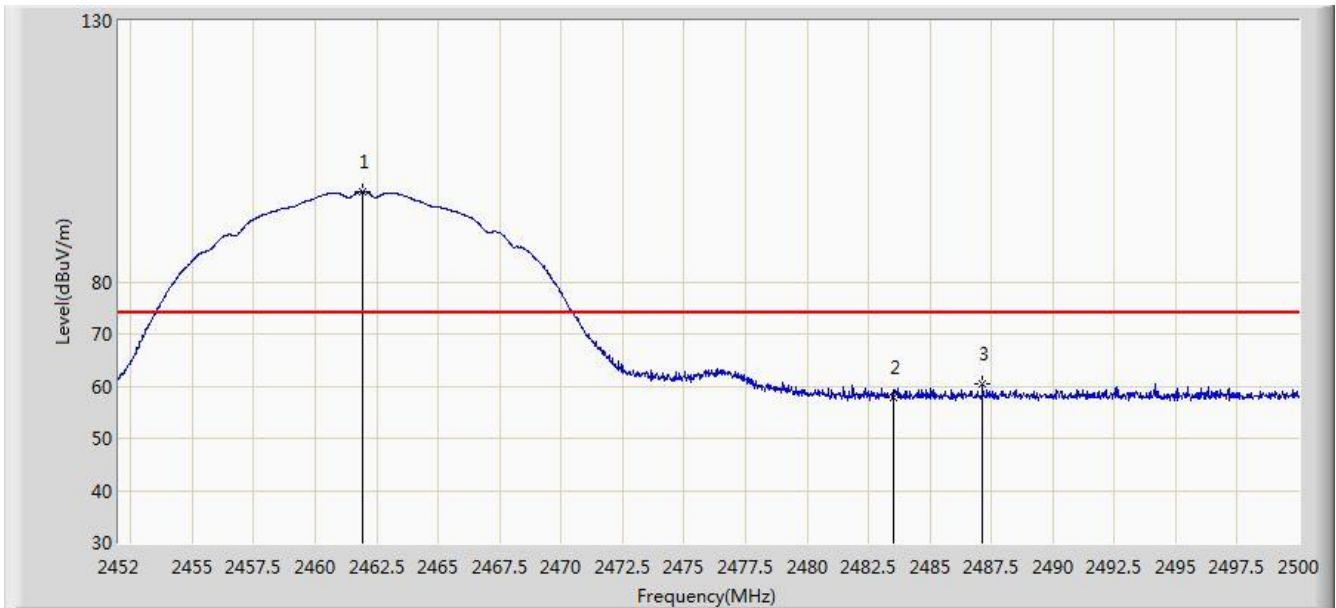


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.240	102.061	69.782	N/A	N/A	32.279	AV
2			2483.500	48.645	16.306	-5.355	54.000	32.340	AV
3			2484.064	49.582	17.241	-4.418	54.000	32.342	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:53
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.912	97.239	64.959	N/A	N/A	32.280	PK
2			2483.500	57.863	25.524	-16.137	74.000	32.340	PK
3			2487.136	60.410	28.057	-13.590	74.000	32.353	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:54
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11b at channel 2462MHz	

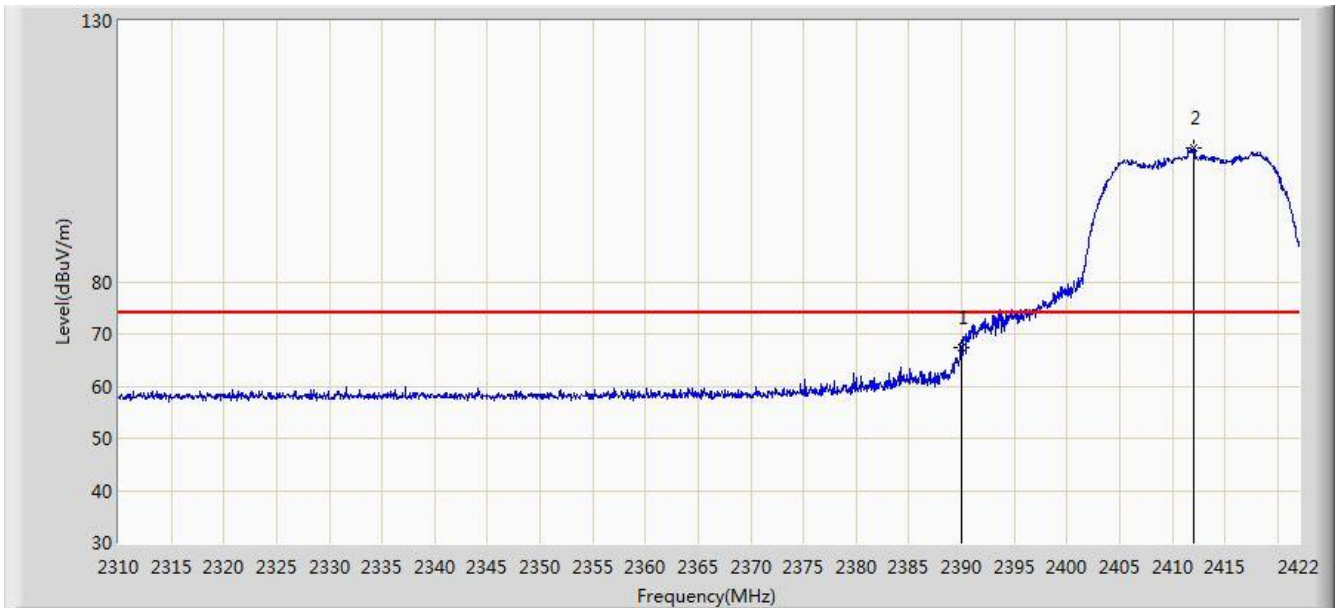


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2462.656	93.617	61.336	N/A	N/A	32.281	AV
2			2483.500	45.298	12.959	-8.702	54.000	32.340	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:55
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2412MHz	

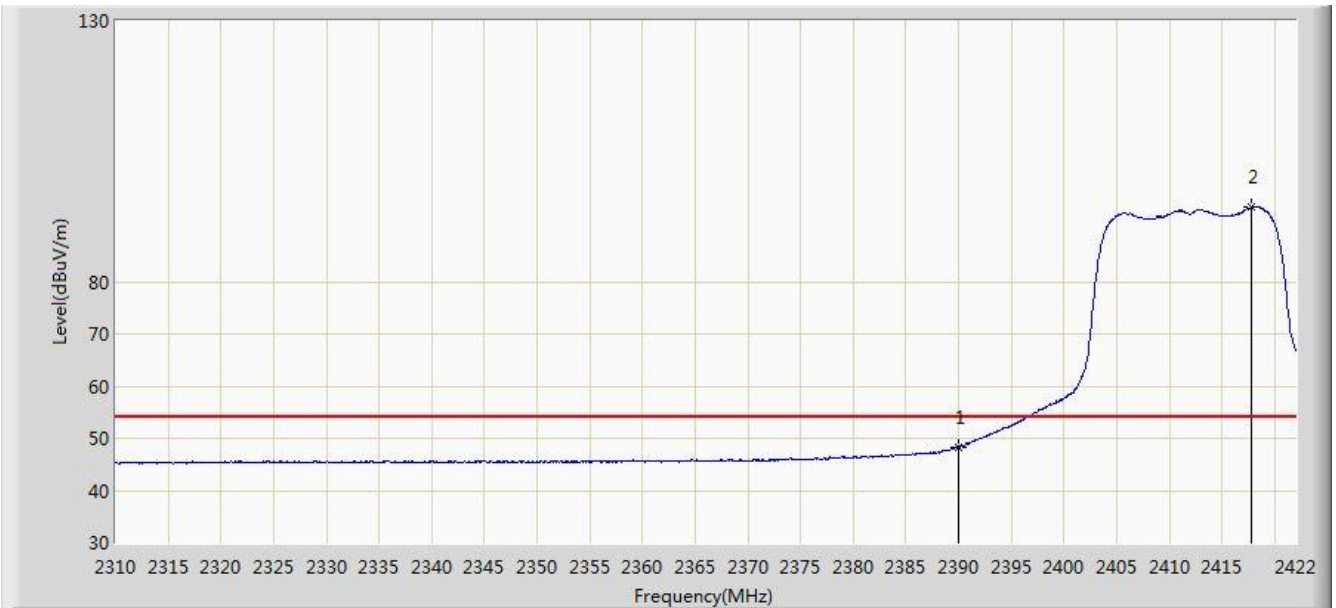


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	67.413	35.086	-6.587	74.000	32.327	PK
2		*	2411.976	105.656	73.371	N/A	N/A	32.285	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 19:59
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2412MHz	

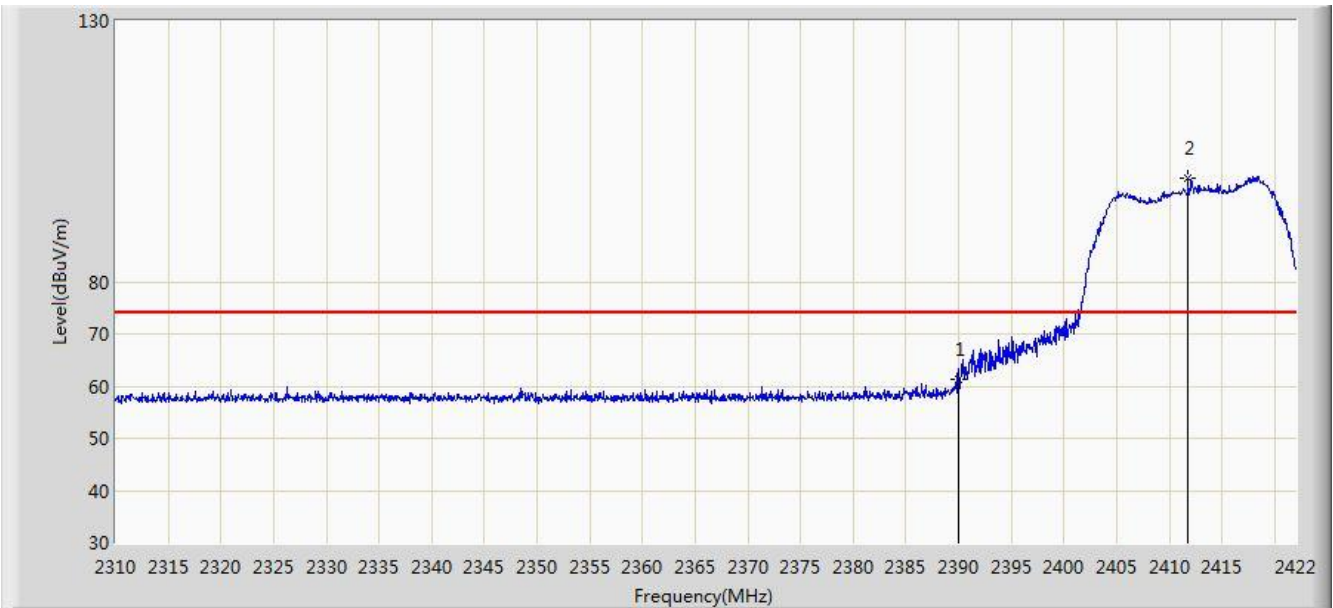


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	48.351	16.024	-5.649	54.000	32.327	AV
2		*	2417.744	94.233	61.951	N/A	N/A	32.282	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2412MHz	

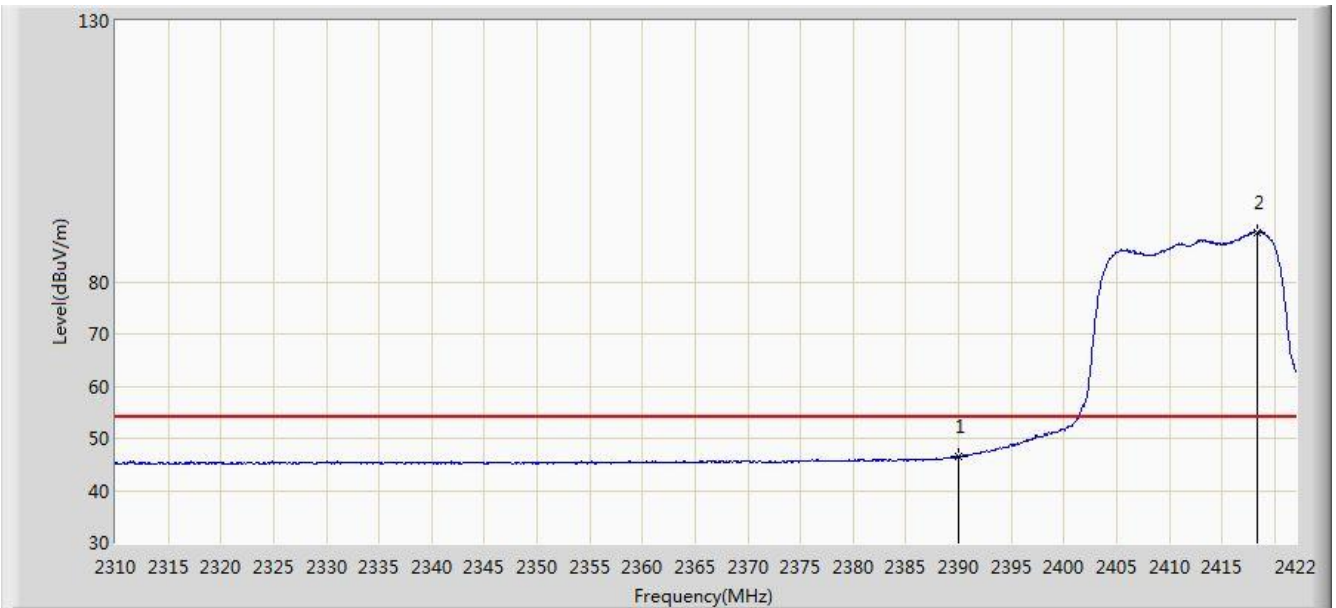


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	61.411	29.084	-12.589	74.000	32.327	PK
2		*	2411.752	99.840	67.555	N/A	N/A	32.285	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:03
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2412MHz	

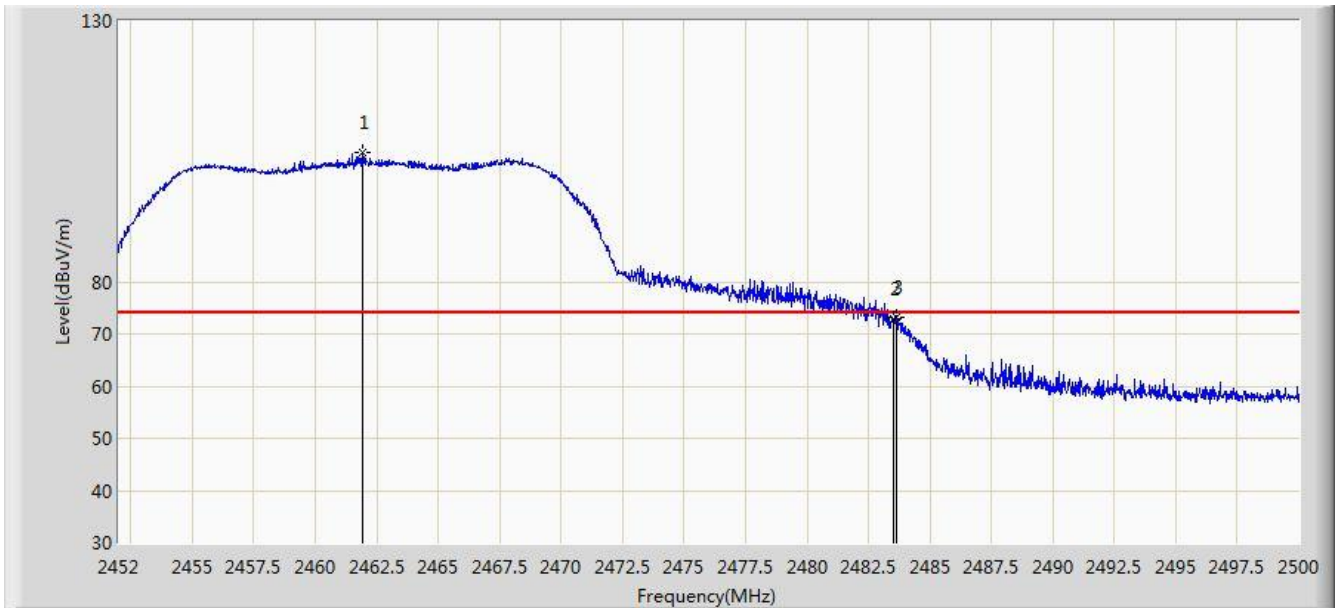


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	46.480	14.153	-7.520	54.000	32.327	AV
2		*	2418.304	89.562	57.280	N/A	N/A	32.282	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:25
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2462MHz	

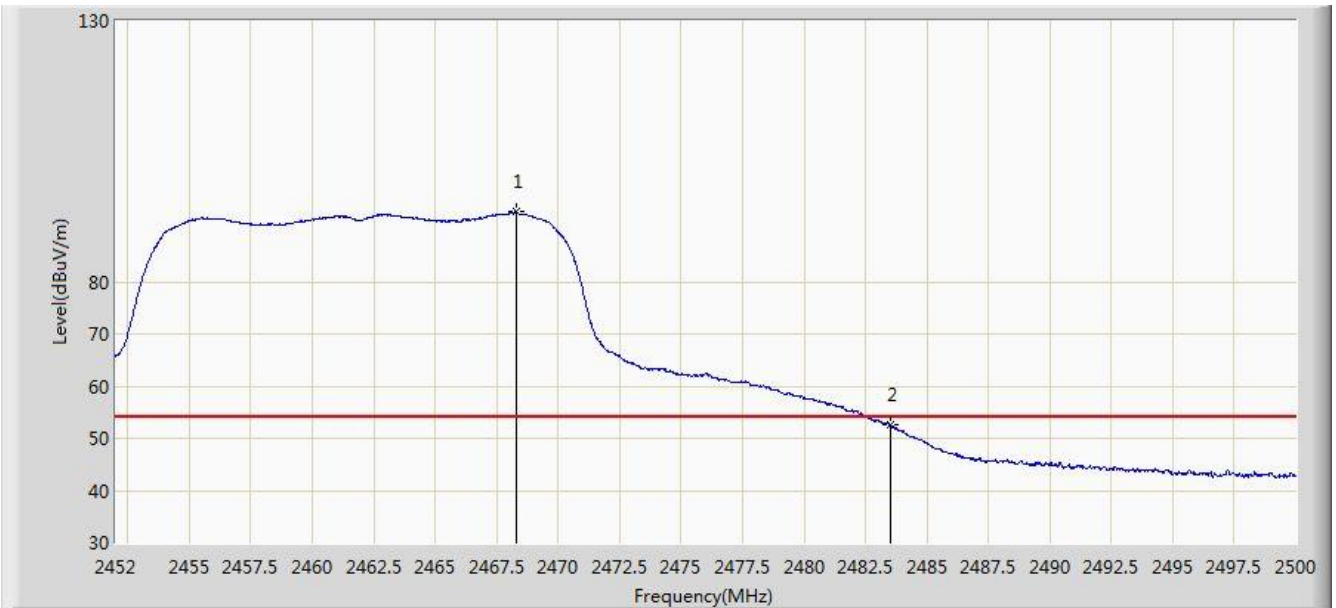


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.936	104.786	72.506	N/A	N/A	32.280	PK
2			2483.500	72.866	40.527	-1.134	74.000	32.340	PK
3			2483.656	73.167	40.827	-0.833	74.000	32.340	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2462MHz	

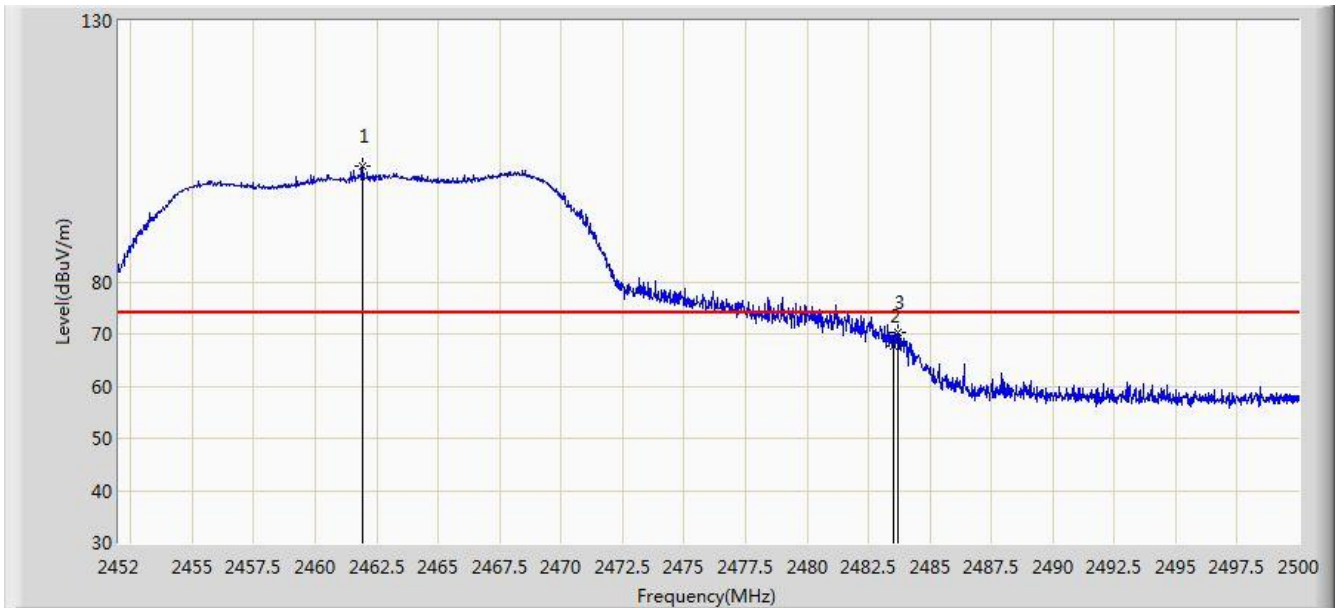


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2468.320	93.374	61.079	N/A	N/A	32.294	AV
2			2483.500	52.581	20.242	-1.419	54.000	32.340	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2462MHz	

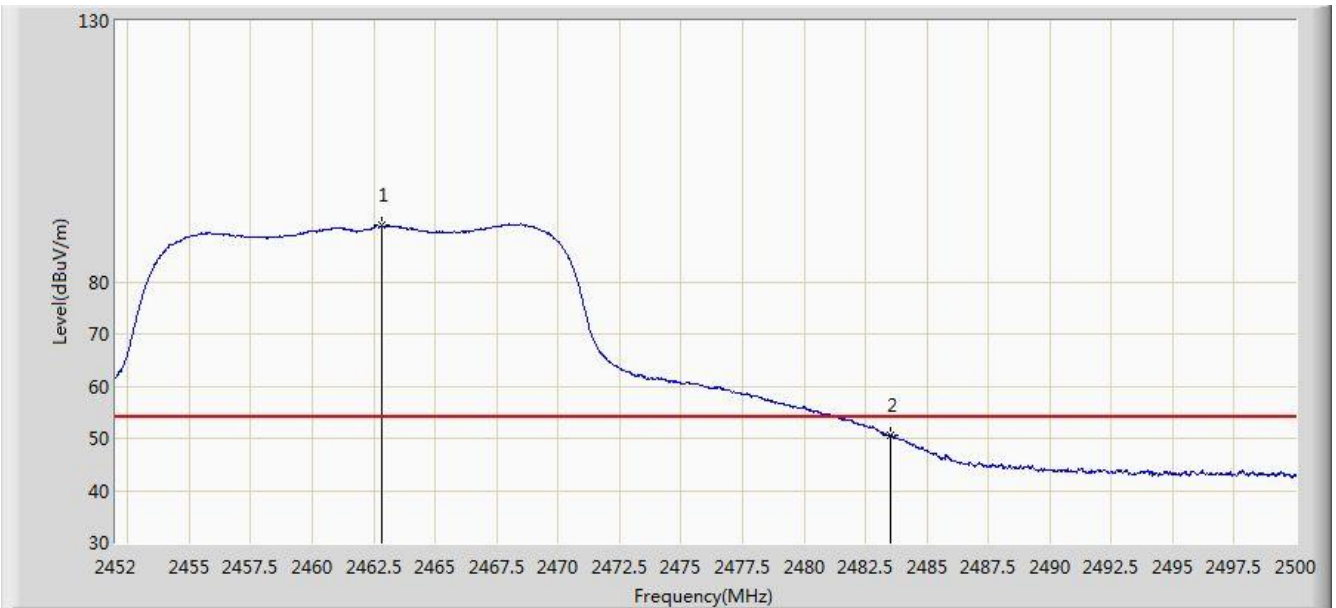


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.912	102.267	69.987	N/A	N/A	32.280	PK
2			2483.500	67.608	35.269	-6.392	74.000	32.340	PK
3			2483.680	70.344	38.004	-3.656	74.000	32.340	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11g at channel 2462MHz	

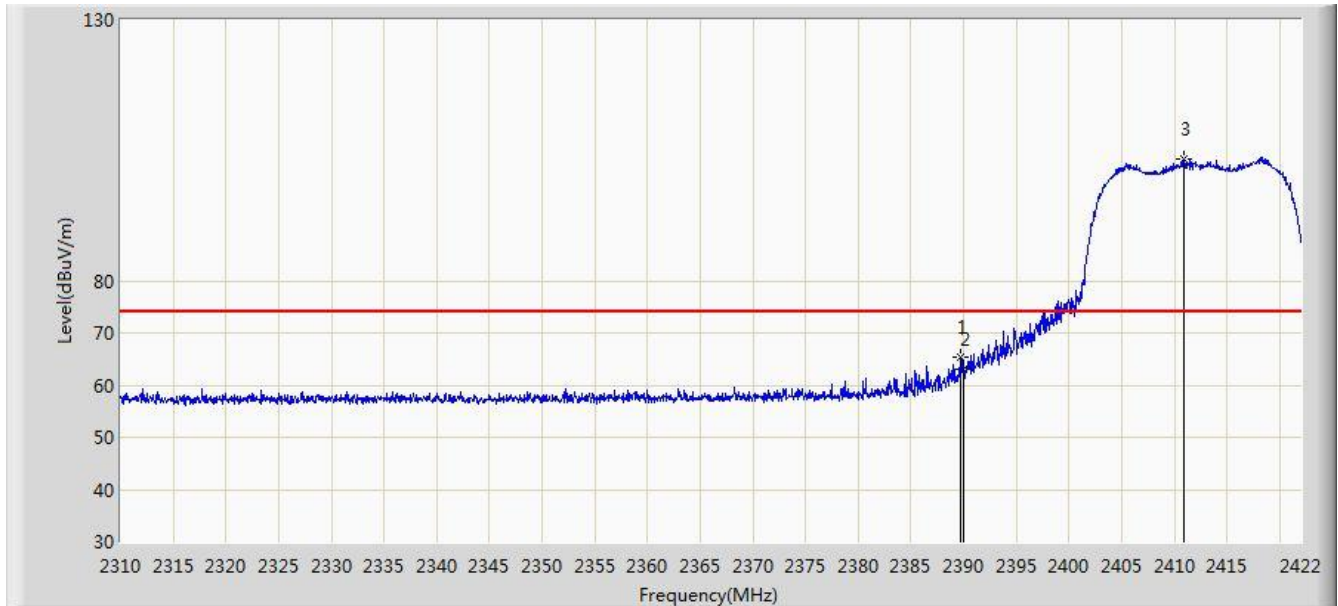


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2462.824	90.770	58.488	N/A	N/A	32.282	AV
2			2483.500	50.651	18.312	-3.349	54.000	32.340	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:16
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2412MHz	

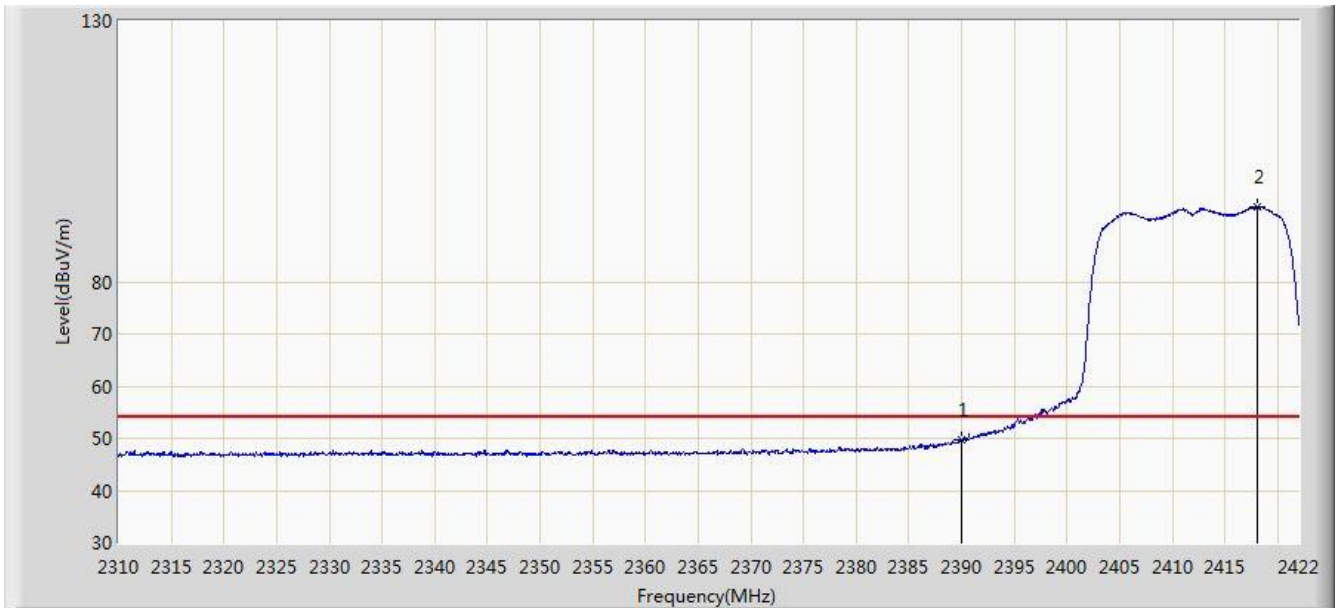


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.688	65.262	32.935	-8.738	74.000	32.328	PK
2			2390.000	63.084	30.757	-10.916	74.000	32.327	PK
3		*	2410.856	103.229	70.943	N/A	N/A	32.286	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2412MHz	

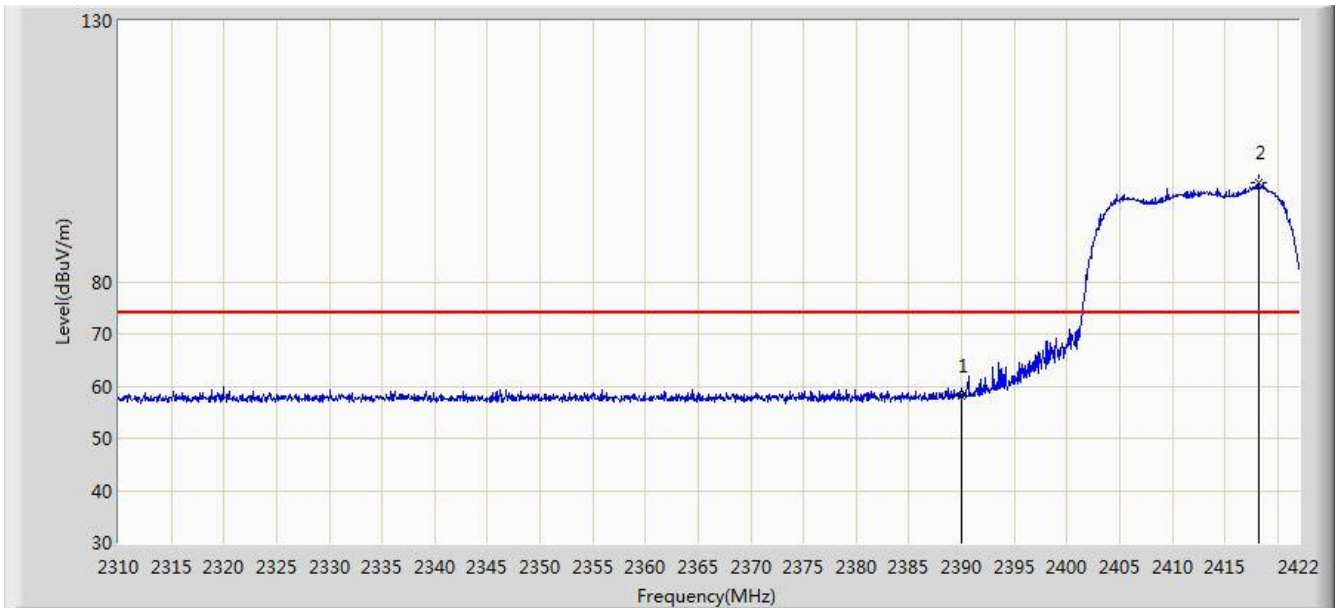


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	49.625	17.298	-4.375	54.000	32.327	AV
2		*	2418.136	94.451	62.169	N/A	N/A	32.282	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2412MHz	

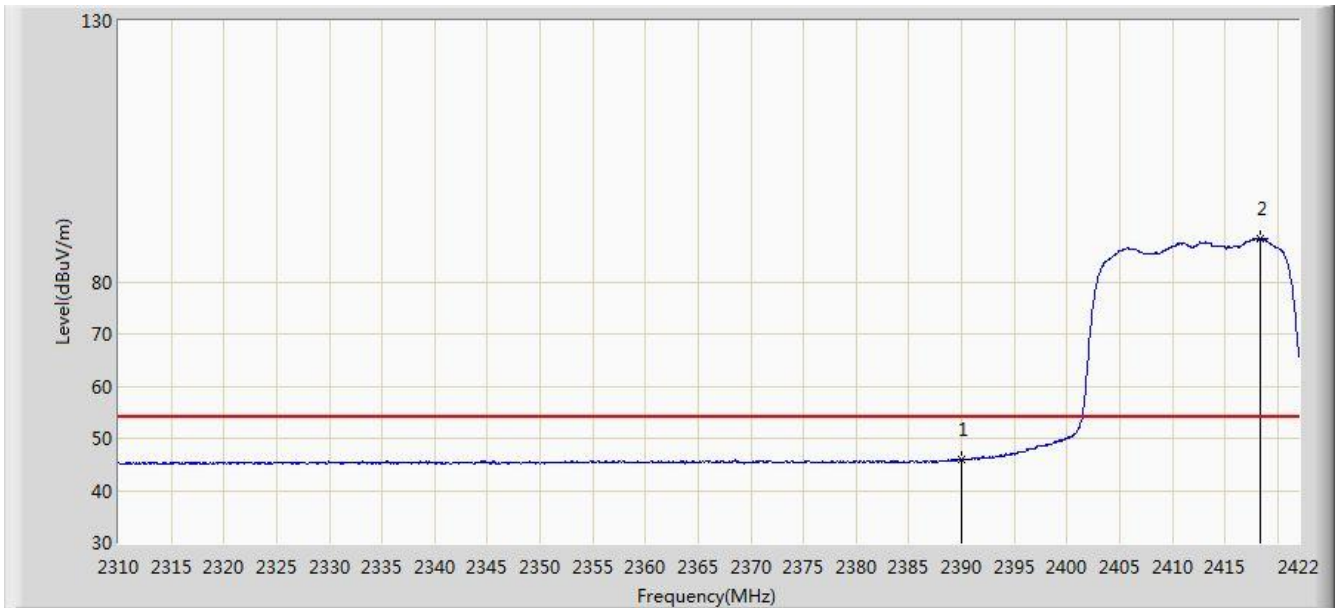


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	58.127	25.800	-15.873	74.000	32.327	PK
2		*	2418.248	98.935	66.653	N/A	N/A	32.282	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/04 - 20:20
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2412MHz	

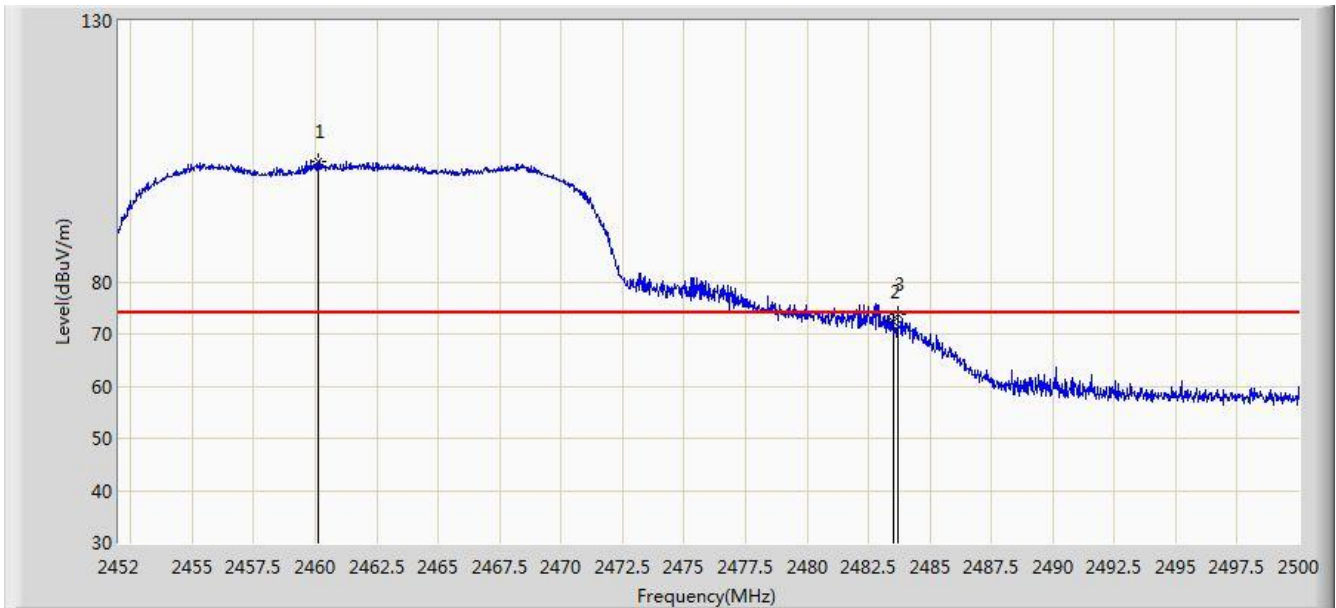


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	45.915	13.588	-8.085	54.000	32.327	AV
2		*	2418.304	88.312	56.030	N/A	N/A	32.282	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:34
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2462MHz	

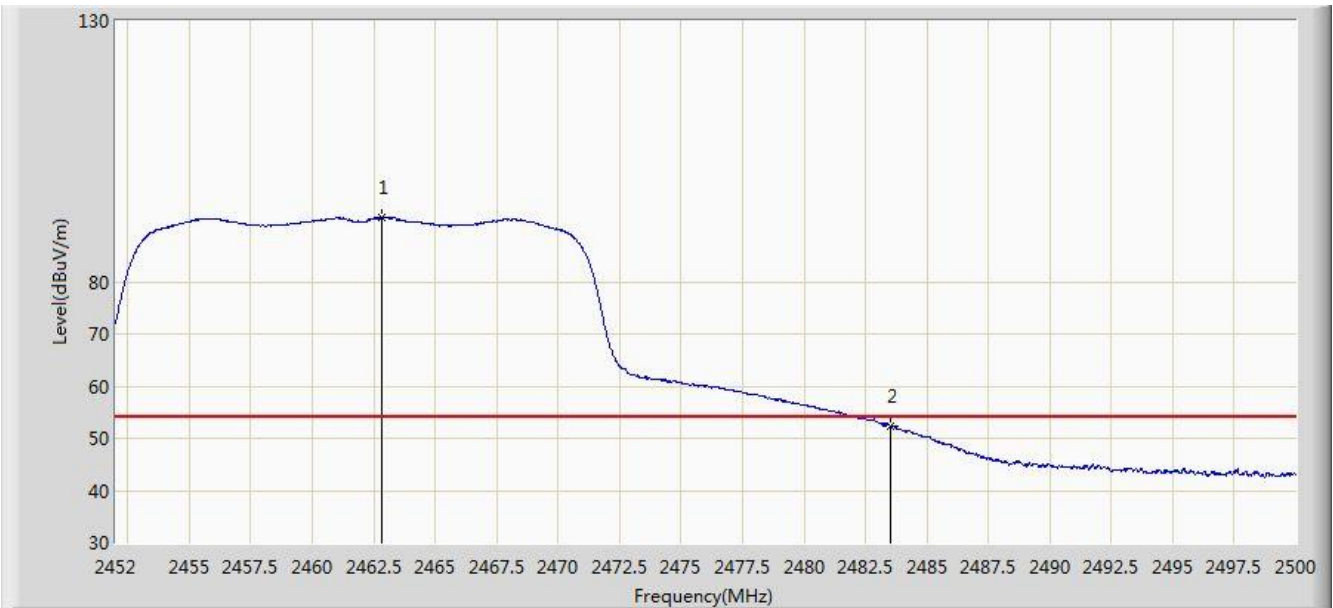


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2460.112	103.178	70.901	N/A	N/A	32.277	PK
2			2483.500	72.226	39.887	-1.774	74.000	32.340	PK
3			2483.704	73.646	41.306	-0.354	74.000	32.340	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2462MHz	

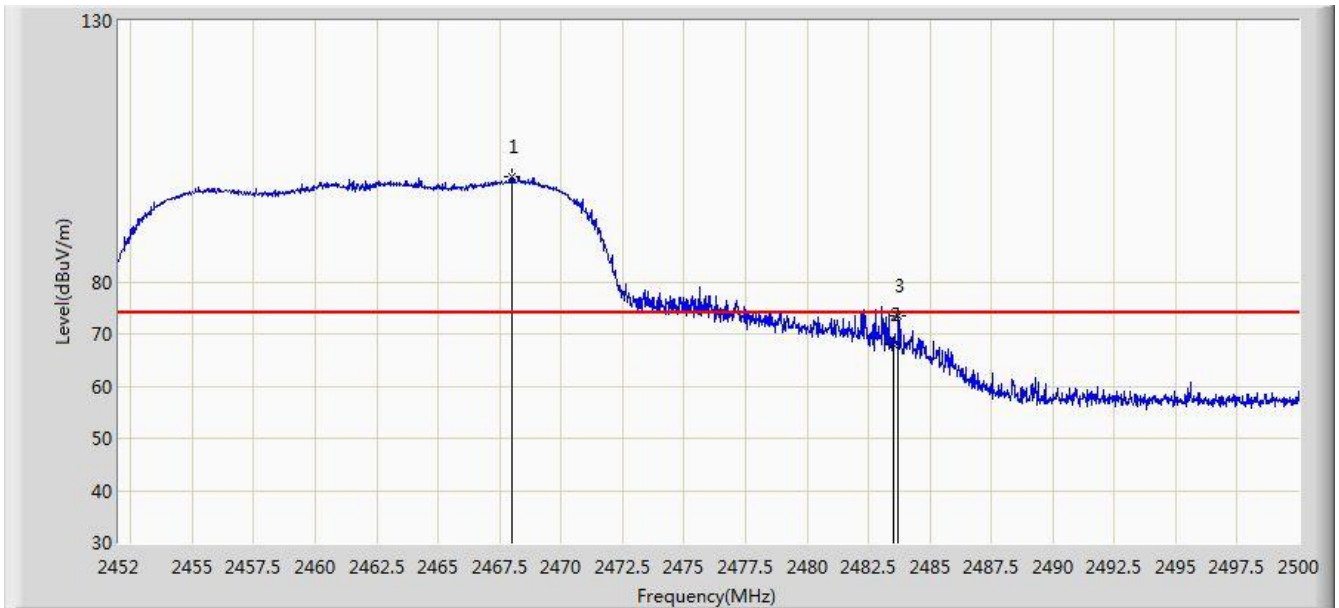


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2462.848	92.293	60.011	N/A	N/A	32.282	AV
2			2483.500	52.443	20.104	-1.557	54.000	32.340	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2462MHz	

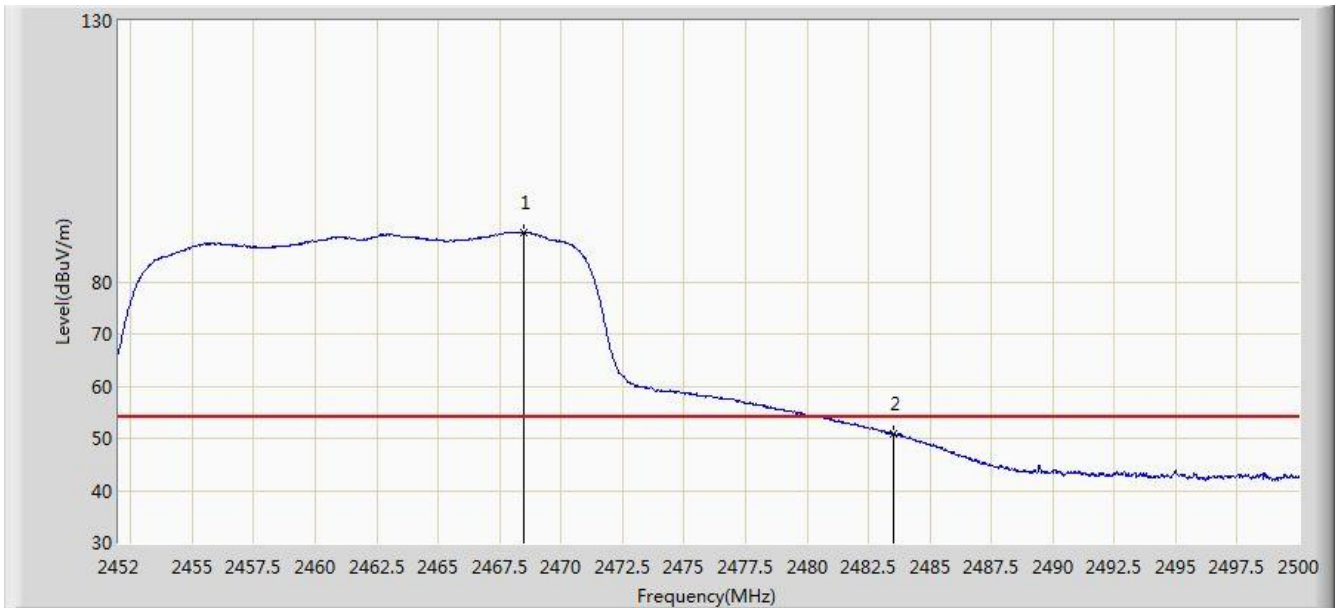


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2468.008	100.034	67.740	N/A	N/A	32.294	PK
2			2483.500	68.066	35.727	-5.934	74.000	32.340	PK
3			2483.728	73.356	41.016	-0.644	74.000	32.340	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2019/03/13 - 22:38
Limit: FCC_Part15.209_RE(3m)	Engineer: Dandy Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Transmit by 802.11n-HT20 at channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2468.464	89.505	57.210	N/A	N/A	32.295	AV
2			2483.500	50.807	18.468	-3.193	54.000	32.340	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.8. AC Conducted Emissions Measurement

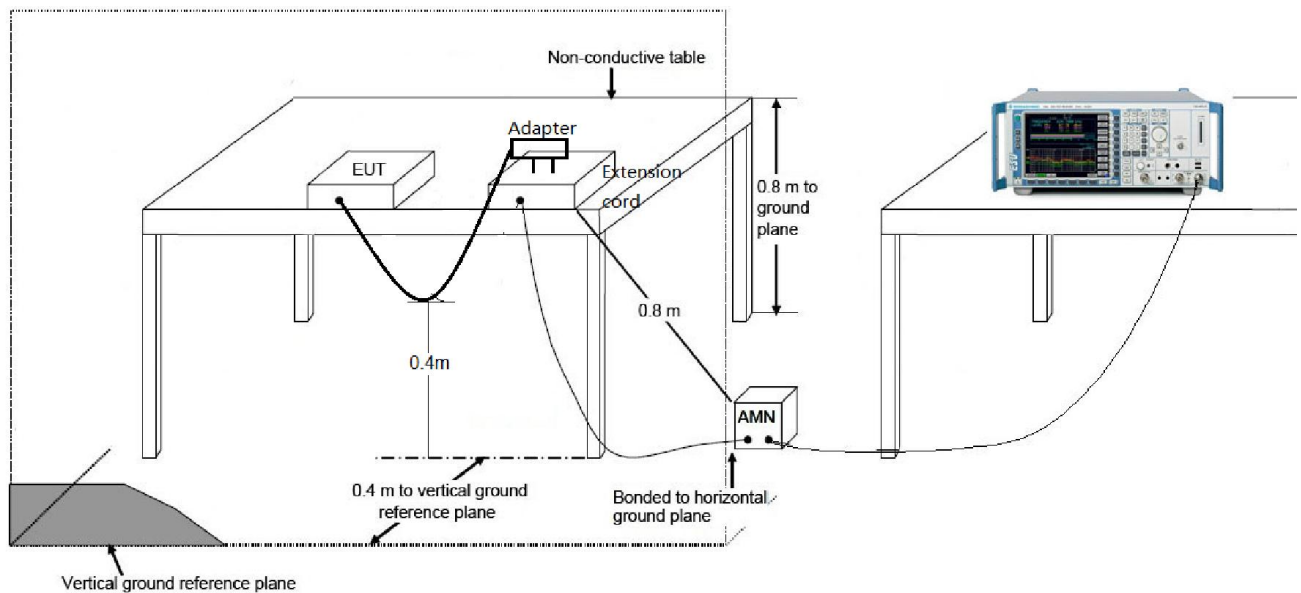
7.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

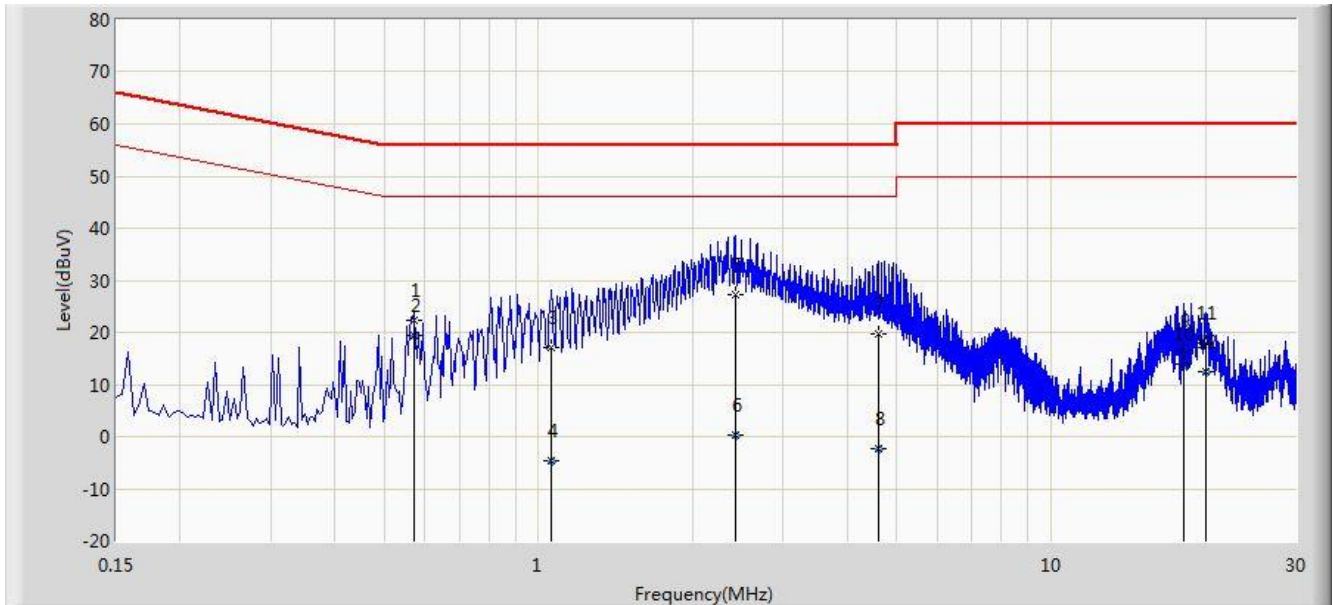
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3.Test Result

Site: SR2	Time: 2019/03/22 - 13:11
Limit: FCC_Part15.207_CE_AC Power	Engineer: Liz Yuan
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Worst case	

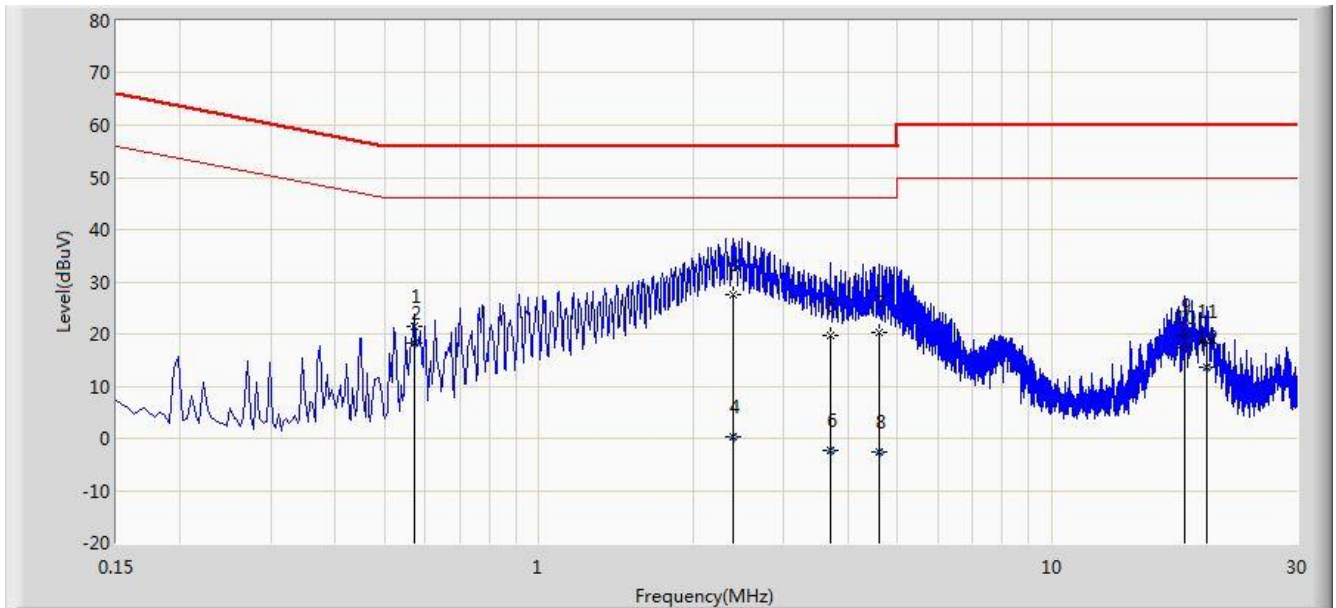


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.570	22.456	12.326	-33.544	56.000	10.130	QP
2		*	0.570	19.395	9.265	-26.605	46.000	10.130	AV
3			1.058	17.025	7.119	-38.975	56.000	9.906	QP
4			1.058	-4.617	-14.523	-50.617	46.000	9.906	AV
5			2.414	27.262	17.402	-28.738	56.000	9.860	QP
6			2.414	0.363	-9.497	-45.637	46.000	9.860	AV
7			4.590	19.840	9.844	-36.160	56.000	9.996	QP
8			4.590	-2.427	-12.424	-48.427	46.000	9.996	AV
9			18.174	16.645	6.544	-43.355	60.000	10.101	QP
10			18.174	13.851	3.750	-36.149	50.000	10.101	AV
11			20.086	17.881	7.742	-42.119	60.000	10.139	QP
12			20.086	12.424	2.285	-37.576	50.000	10.139	AV

Note: Measure Level (dBuV) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2019/03/22 - 13:33
Limit: FCC_Part15.207_CE_AC Power	Engineer: Liz Yuan
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Touch screen main control board	Power: DC 12V
Test Mode: Worst case	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.570	21.587	11.439	-34.413	56.000	10.148	QP
2		*	0.570	18.189	8.042	-27.811	46.000	10.148	AV
3			2.382	27.487	17.622	-28.513	56.000	9.865	QP
4			2.382	0.343	-9.522	-45.657	46.000	9.865	AV
5			3.702	19.659	9.709	-36.341	56.000	9.950	QP
6			3.702	-2.339	-12.289	-48.339	46.000	9.950	AV
7			4.598	20.293	10.287	-35.707	56.000	10.006	QP
8			4.598	-2.549	-12.555	-48.549	46.000	10.006	AV
9			18.194	19.825	9.686	-40.175	60.000	10.139	QP
10			18.194	17.413	7.274	-32.587	50.000	10.139	AV
11			20.062	18.634	8.464	-41.366	60.000	10.170	QP
12			20.062	13.554	3.384	-36.446	50.000	10.170	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Touch screen main control board** is in compliance with Part 15C of the FCC rules.

The End

Appendix A – Test Setup Photograph

Refer to “1902RSU012-UT” file.

Appendix B – EUT Photograph

Refer to “ 1902RSU012-UE” file.