MEASUREMENT REPORT

FCC PART 15.407 WLAN 802.11a/n

FCC ID:	2AQYK-WWTMXS
Applicant:	Shenzhen WOWOTO Technology Co., Ltd.
Application Type:	Certification
Product:	Smart Projector
Model No.:	WWT-M5S
Brand Name:	WOWOTO
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part15 Subpart E (Section 15.407)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v02r01, KDB 662911 D01v02r01
Test Date:	October 14 ~ 28, 2019

Reviewed By: Sunny Sun
(Sunny Sun)

Approved By: Robin Wu
(Robin Wu)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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 KDB 789033 D02v02r01. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1910RSU009-U4	Rev. 01	Initial Report	10-30-2019	Valid

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Description Page

§2.1033 General Information

Applicant:	Shenzhen WOWOTO Technology Co., Ltd.
Applicant Address:	G05, 2nd Floor, Gaoxinqi Industry Park, District 67, Xingdong Community, Xin'an Street, Baoan Area, Shenzhen, China
Manufacturer:	Shenzhen WOWOTO Technology Co., Ltd.
Manufacturer Address:	G05, 2nd Floor, Gaoxinqi Industry Park, District 67, Xingdong Community, Xin'an Street, Baoan Area, Shenzhen, 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 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.**

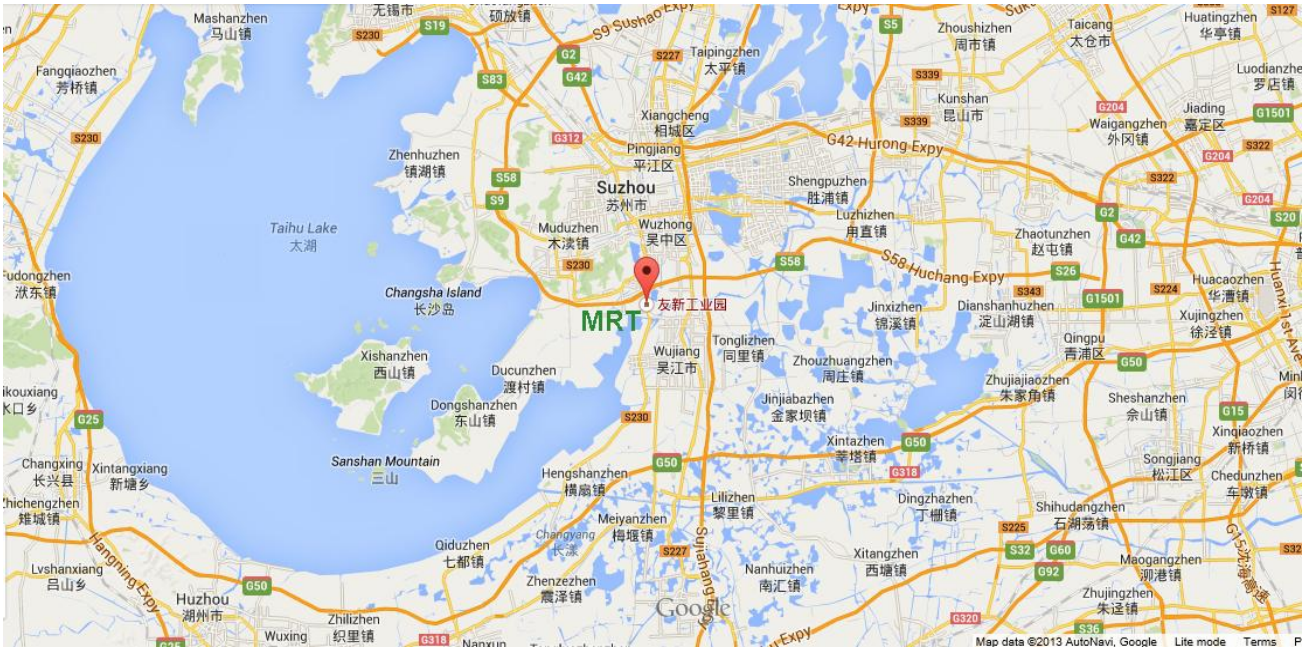
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices includingintentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and 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:	Smart Projector
Model No.:	WWT-M5S
Serial Model No.:	WWT-M1S, WWT-M2S, WWT-M3S, WWT-M4S, WWT-M5S, WWT-M6S, WWT-M7S, WWT-M8S, WWT-M9S, WWT-S1S, WWT-S2S, WWT-S3S, WWT-S4S, WWT-S5S, WWT-S6S, WWT-S7S, WWT-S8S, WWT-S9S
Brand Name:	WOWOTO
Wi-Fi Specification:	802.11a/b/g/n
Bluetooth Specification:	v4.0 (BLE only)
Accessory	
Adapter #1:	Model No.: GQ36-120300-AX Input: 100-240V ~ 50/60Hz 1.0A Max Output: 12V ⎓ 3.0A
Adapter #2:	Model No.: KZ1203000 Input: 100-240V ~ 50/60Hz 1.0A Max Output: 12V ⎓ 3000mA
Adapter #3:	Model No.: GW48W-120300D Input: 100-240V ~ 50/60Hz 1.2A Output: 12V ⎓ 3.0A

Note: The different models are only for marketing different clients, others are the same.

2.2. Product Specification Subjective to this Report

Frequency Range:	For 802.11a/n-HT20: 5180 ~ 5240MHz, 5745 ~ 5825MHz For 802.11n-HT40: 5190 ~ 5230MHz, 5755 ~ 5795MHz
Type of Modulation:	802.11a/n: OFDM
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps

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

2.3. Working Frequencies for this report

802.11a/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	149	5745 MHz	153	5765 MHz
157	5785 MHz	161	5805 MHz	165	5825 MHz

802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz
159	5795 MHz	--	--	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)		CDD Directional Gain (dBi)	
			Ant A	Ant B	For Power	For PSD
Wi-Fi Antenna						
FPC Antenna	2412 ~ 2462	2	3.44	2.92	3.44	6.45
	5150 ~ 5250 5725 ~ 5850	2	3.35	2.18	3.35	6.36
Bluetooth Antenna						
FPC Antenna	2402 ~ 2480	1	3.04		--	--

Note:

The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

Directional gain = $G_{ANT\ MAX}$ + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;

- For power measurements on IEEE 802.11 devices,

  Array Gain = 0 dB for $N_{ANT} \leq 4$;

2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11a (6Mbps)
	Mode 2: Transmit by 802.11n-HT20 (MCS0)
	Mode 3: Transmit by 802.11n-HT40 (MCS0)

2.6. Description of Test Software

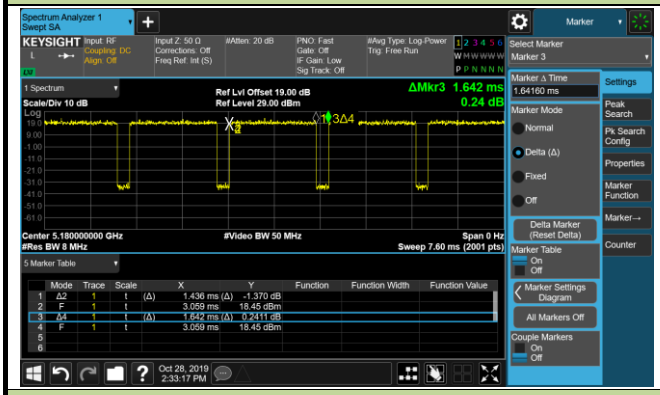
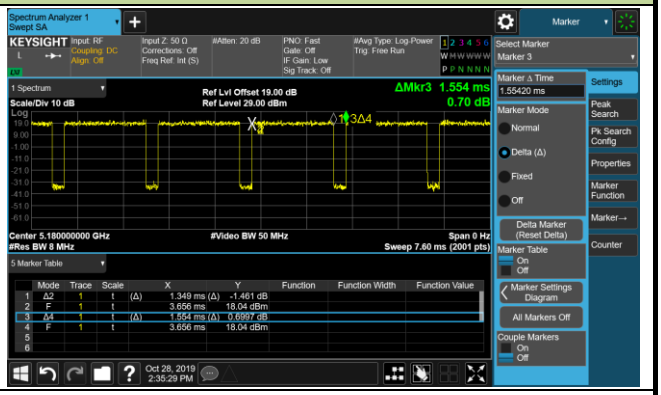
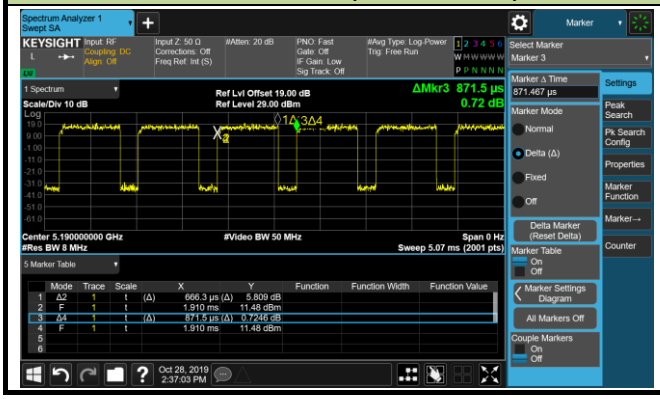
The test utility software used during testing was “MT7662UQA”, and the version was 1.0.3.19.

2.7. Device Capabilities

2.4GHz WLAN, 5GHz WLAN, Bluetooth (v4.0).

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
802.11a	87.45%
802.11n-HT20	86.81%
802.11n-HT40	76.45%

Duty Cycle (T = Transmission Duration)	
802.11a (T = 1.436ms)	802.11n-HT20 (T = 1.349ms)
	
802.11n-HT40 (T = 666.3us)	
	

2.8. Test Configuration

The device was tested per the guidance of KDB 789033 D02v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testingand AC line conducted testing.

2.9. EMI Suppression Device(s)/Modifications

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

2.10. 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 pamphletsupplied to the user and be readily visible to the purchaser at the time of purchase. However, when the deviceis 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 andlabel location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed WirelessDevices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v02r01 were used in themeasurement of the device**.**

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an8'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, 50Ω/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 whichever 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, remotecontrolled, 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. An80cm 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 tomaximize 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, whichever 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 theresponsible party can be used with the device. The use of a permanently attached antenna or of an antennathat uses a unique coupling to the intentional radiator shall be considered sufficient to comply with theprovisions of this section.”

- The antenna of this device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The 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	2020/06/13
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2020/06/13
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2020/08/08
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	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	2020/08/01
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2020/09/03
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	2020/10/13
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	2020/06/11
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2020/08/08
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2020/04/30

Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2020/08/01
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/09
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2020/10/13
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	2020/06/11
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2019/12/13
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2020/04/30

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	2020/07/11
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2020/04/15
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2019/11/16
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2020/06/30
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2020/06/30
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2020/06/13
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2020/06/13
Modulation Analyzer	HP	8901A	MRTSUE06098	1 year	2020/10/10
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2019/11/16
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	2020/08/08

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.

Conducted Emission Measurement - SR2
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.84dB 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
The maximum measurement uncertainty is evaluated as: Horizontal: 30MHz~300MHz: 4.07dB 300MHz~1GHz: 3.63dB 1GHz~18GHz: 4.16dB Vertical: 30MHz~300MHz: 4.18dB 300MHz~1GHz: 3.60dB 1GHz~18GHz: 4.76dB
Radiated Emission Measurement - AC2
The maximum measurement uncertainty is evaluated as: Horizontal: 30MHz~300MHz: 3.75dB 300MHz~1GHz: 3.53dB 1GHz~18GHz: 4.28dB Vertical: 30MHz~300MHz: 3.86dB 300MHz~1GHz: 3.53dB 1GHz~18GHz: 4.33dB

7. TEST RESULT

7.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	Pass	Section 7.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(iv), (3)	Maximum Conducted Output Power	Refer to section 7.4		Pass	Section 7.4
15.407(h)(1)	Transmit Power Control	≤ 24 dBm		N/A	Section 7.5
15.407(a)(1)(iv), (3), (5)	Peak Power Spectral Density	Refer to section 7.6		Pass	Section 7.6
15.407(g)	Frequency Stability	N/A		Pass	Section 7.7
15.407(b)(1), (4)(i)	Undesirable Emissions	Refer to Section 7.8	Radiated	Pass	Section 7.8 & 7.9
15.205, 15.209 15.407(b)(5), (6), (7)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.10

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 ofthe 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.
3) Test Items “26dB Bandwidth” & “6dB Bandwidth” have been assessed MIMO transmission, and showed the worst test data in this report.
4) “N/A” means that this item is not applicable, and the detail information refers to relevant section.

7.2. 26dB Bandwidth Measurement

7.2.1.Test Limit

N/A

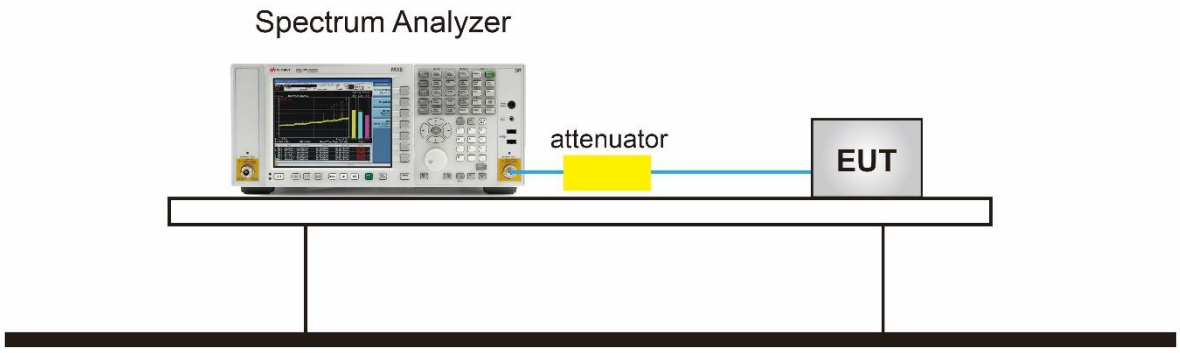
7.2.2.Test Procedure Used

KDB 789033 D02v02r01 - Section C.1

7.2.3.Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW ≥ 3×RBW.
4. Detector = Peak.
5. Trace mode = max hold.

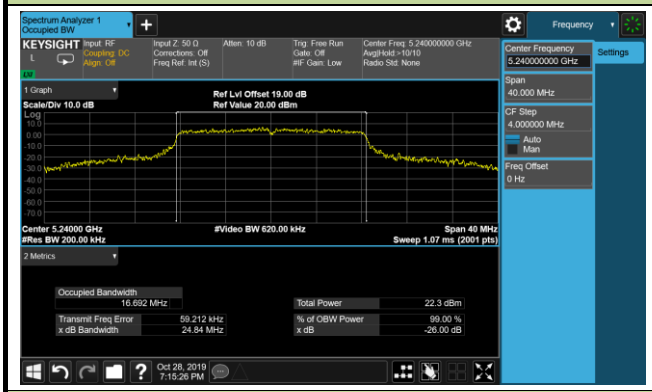
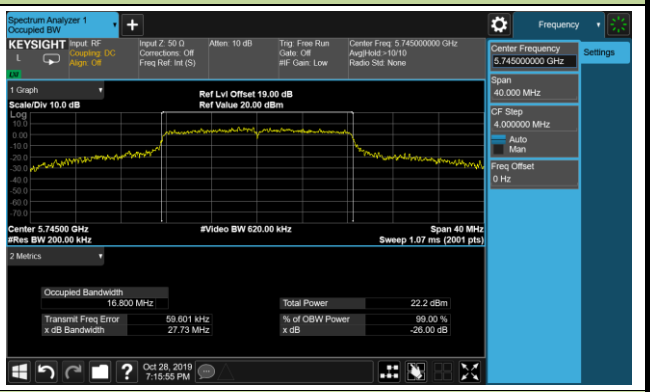
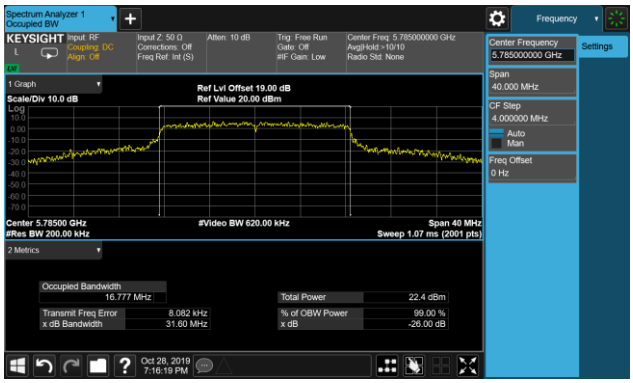
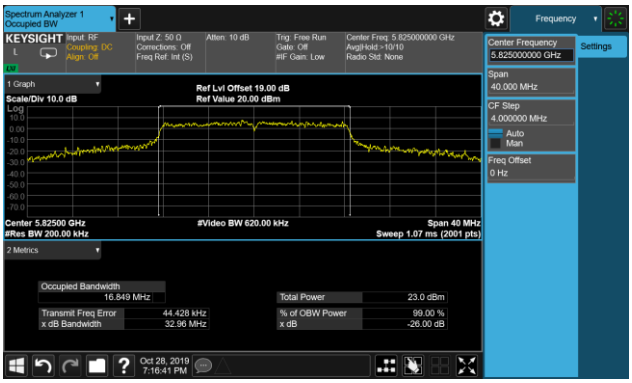
7.2.4.Test Setup

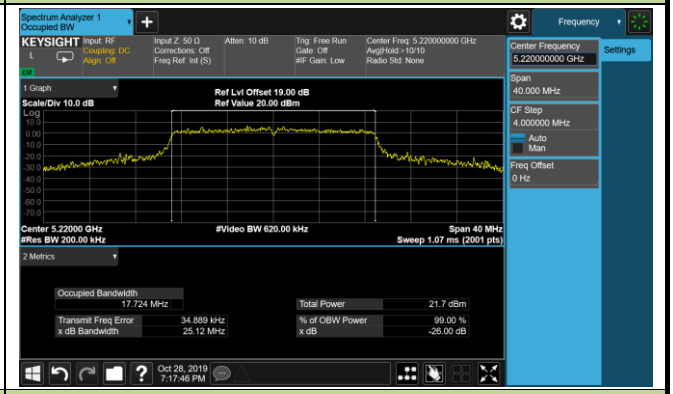
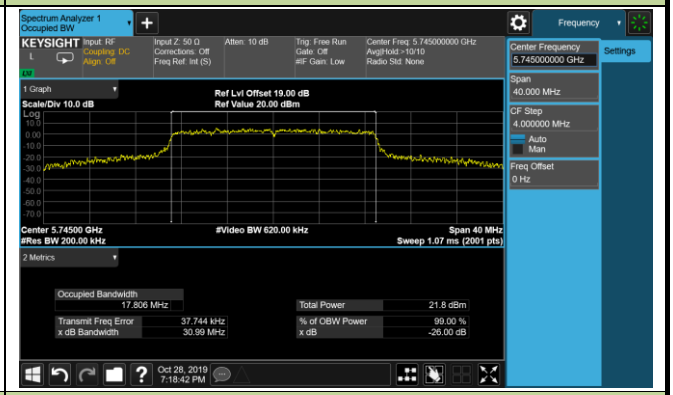
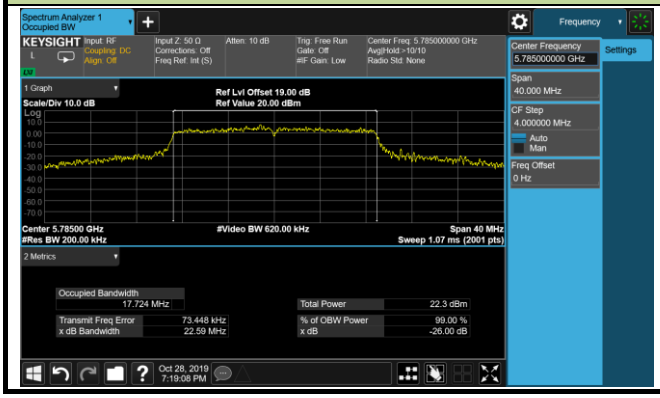
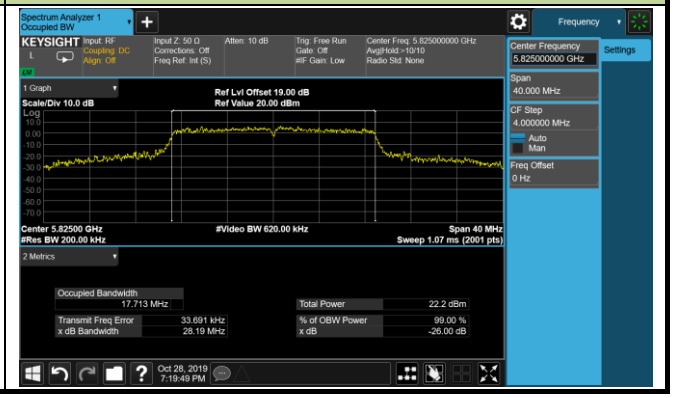


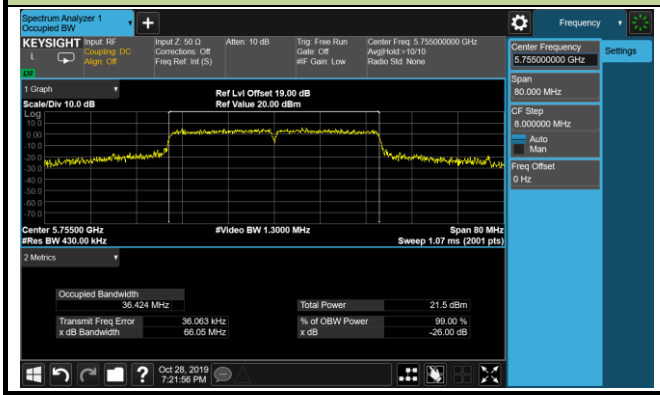
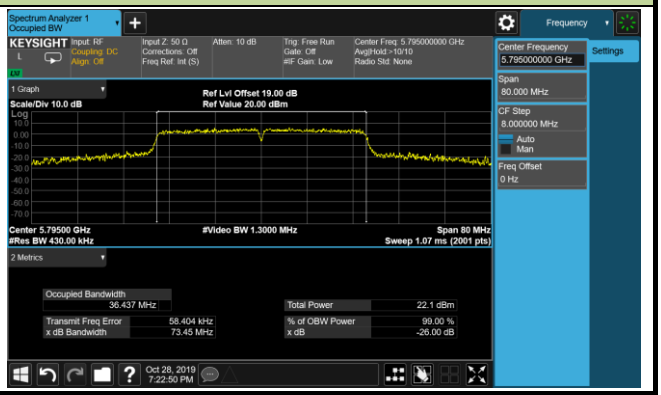
7.2.5.Test Result

Product	Smart Projector	Temperature	24°C
Test Engineer	Flay Yang	Relative Humidity	56%
Test Site	TR3	Test Date	2019/10/28

Test Mode	Data Rate/ Mbps	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant A / Ant A + B					
802.11a	6Mbps	36	5180	22.24	16.63
802.11a	6Mbps	44	5220	27.52	16.72
802.11a	6Mbps	48	5240	24.84	16.69
802.11a	6Mbps	149	5745	27.73	16.80
802.11a	6Mbps	157	5785	31.60	16.78
802.11a	6Mbps	165	5825	32.96	16.85
802.11n-HT20	MCS0	36	5180	21.54	17.68
802.11n-HT20	MCS0	44	5220	25.12	17.72
802.11n-HT20	MCS0	48	5240	21.95	17.69
802.11n-HT20	MCS0	149	5745	30.99	17.81
802.11n-HT20	MCS0	157	5785	22.59	17.72
802.11n-HT20	MCS0	165	5825	28.19	17.71
802.11n-HT40	MCS0	38	5190	52.77	36.27
802.11n-HT40	MCS0	46	5230	58.80	36.22
802.11n-HT40	MCS0	151	5755	66.05	36.42
802.11n-HT40	MCS0	159	5795	73.45	36.44

802.11a 26dB Bandwidth & 99% Bandwidth - Ant A / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT20 26dB Bandwidth & 99% Bandwidth - Ant A / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT40 26dB Bandwidth & 99% Bandwidth - Ant A / Ant A + B	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

7.3. 6dB Bandwidth Measurement

7.3.1.Test Limit

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

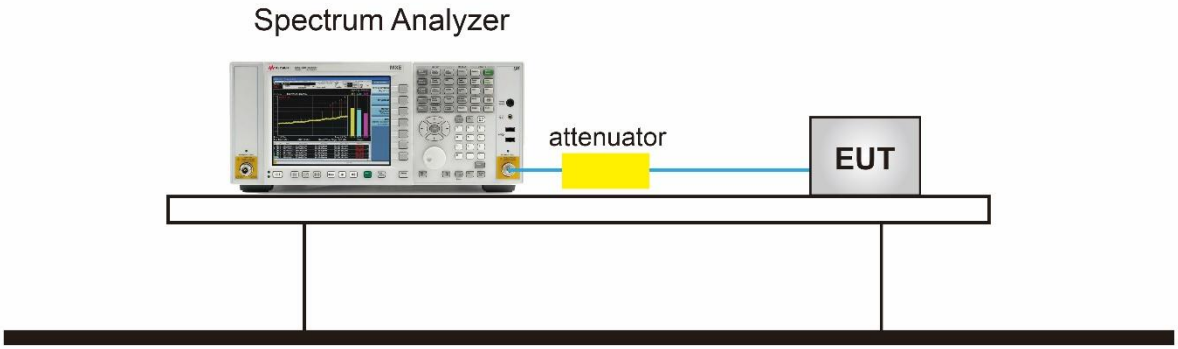
7.3.2.Test Procedure Used

KDB 789033 D02v02r01 - Section C.2

7.3.3.Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≤ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.3.4.Test Setup

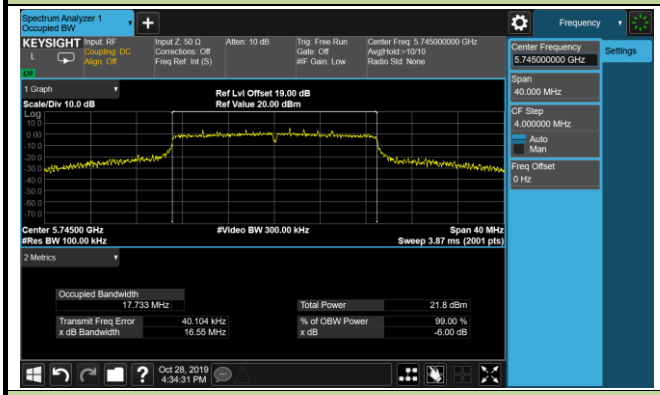
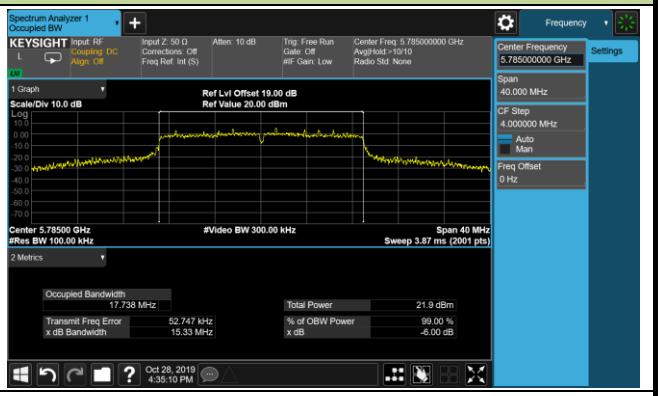
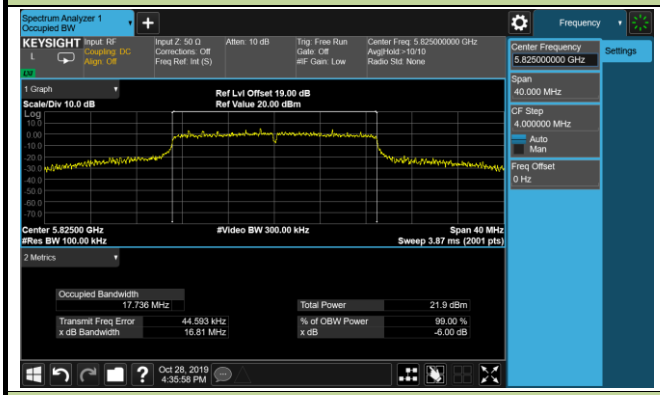


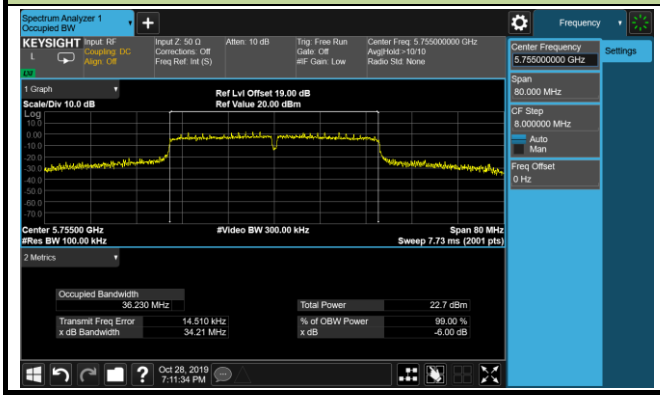
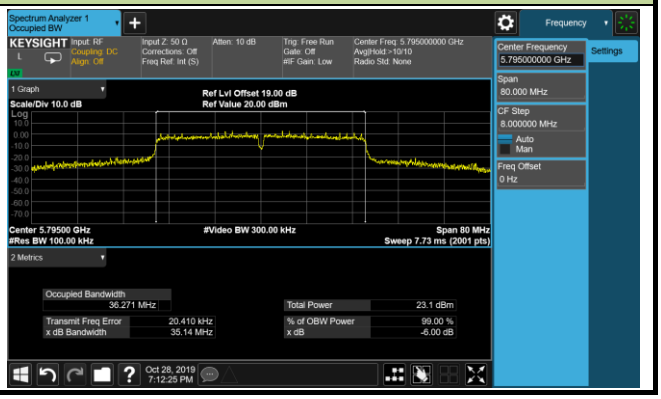
7.3.5.Test Result

Product	Smart Projector	Temperature	24°C
Test Engineer	Flay Yang	Relative Humidity	56%
Test Site	SR1	Test Date	2019/10/28

Test Mode	Data Rate/ Mbps	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant A / Ant A + B						
802.11a	6Mbps	149	5745	15.68	≥ 0.5	Pass
802.11a	6Mbps	157	5785	16.29	≥ 0.5	Pass
802.11a	6Mbps	165	5825	15.45	≥ 0.5	Pass
802.11n-HT20	MCS0	149	5745	16.55	≥ 0.5	Pass
802.11n-HT20	MCS0	157	5785	15.33	≥ 0.5	Pass
802.11n-HT20	MCS0	165	5825	16.81	≥ 0.5	Pass
802.11n-HT40	MCS0	151	5755	34.21	≥ 0.5	Pass
802.11n-HT40	MCS0	159	5795	35.14	≥ 0.5	Pass

802.11a 6dB Bandwidth- Ant A / Ant A + B	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	

802.11n-HT20 6dB Bandwidth- Ant A / Ant A + B	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	

802.11n-HT40 6dB Bandwidth - Ant A / Ant A + B	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

7.4. Output Power Measurement

7.4.1.Test Limit

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of theantenna exceeds 6dBi.

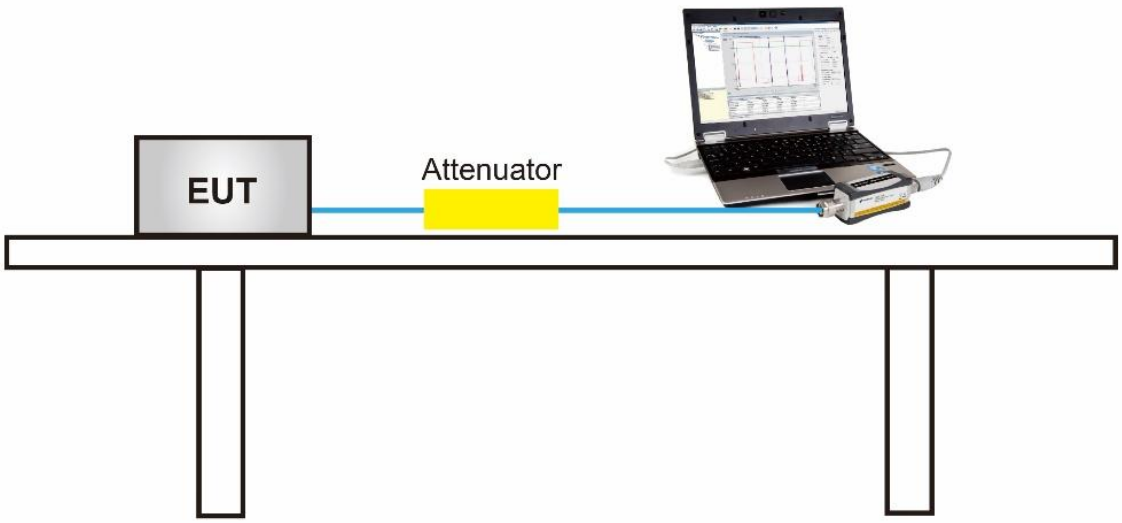
7.4.2.Test Procedure Used

KDB 789033 D02v02r01 - Section E) 3) b) Method PM-G

7.4.3.Test Setting

Average power measurements were perform 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.

7.4.4.Test Setup



7.4.5.Test Result

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

For Ant A / Ant A + B port:

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate/ Mbps	Average Power (dBm)
802.11a	20	36	5180	6Mbps	16.69
				24Mbps	16.12
				54Mbps	15.73
802.11n	20	36	5180	MCS0	16.65
				MCS3	16.08
				MCS7	15.69
802.11n	40	38	5190	MCS0	16.65
				MCS3	16.14
				MCS7	15.76

Product	Smart Projector	Temperature	25°C
Test Engineer	Flay Yang	Relative Humidity	56%
Test Site	TR3	Test Date	2019/10/28

Test Mode	Data Rate/ Mbps	Channel No.	Freq. (MHz)	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11a	6Mbps	36	5180	16.69	16.23	19.48	≤ 23.98	Pass
11a	6Mbps	44	5220	16.88	17.11	20.01	≤ 23.98	Pass
11a	6Mbps	48	5240	16.61	16.91	19.77	≤ 23.98	Pass
11a	6Mbps	149	5745	17.59	17.84	20.73	≤ 30.00	Pass
11a	6Mbps	157	5785	17.52	17.83	20.69	≤ 30.00	Pass
11a	6Mbps	165	5825	17.26	17.72	20.51	≤ 30.00	Pass
11n-HT20	MCS0	36	5180	16.65	16.46	19.57	≤ 23.98	Pass
11n-HT20	MCS0	40	5220	16.45	16.31	19.39	≤ 23.98	Pass
11n-HT20	MCS0	48	5240	16.34	16.60	19.48	≤ 23.98	Pass
11n-HT20	MCS0	149	5745	16.49	17.14	19.84	≤ 30.00	Pass
11n-HT20	MCS0	157	5785	16.52	17.03	19.79	≤ 30.00	Pass
11n-HT20	MCS0	165	5825	16.66	17.23	19.96	≤ 30.00	Pass
11n-HT40	MCS0	38	5190	16.65	16.84	19.76	≤ 23.98	Pass
11n-HT40	MCS0	46	5230	16.56	17.10	19.85	≤ 23.98	Pass
11n-HT40	MCS0	151	5755	17.08	17.95	20.55	≤ 30.00	Pass
11n-HT40	MCS0	159	5795	17.38	17.96	20.69	≤ 30.00	Pass

Note: The Total Average Power (dBm) = $10*\log\{10^{(\text{Ant A Average Power }/10)} + 10^{(\text{Ant B Average Power }/10)}\}$.

7.5. Transmit Power Control

7.5.1.Test Limit

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

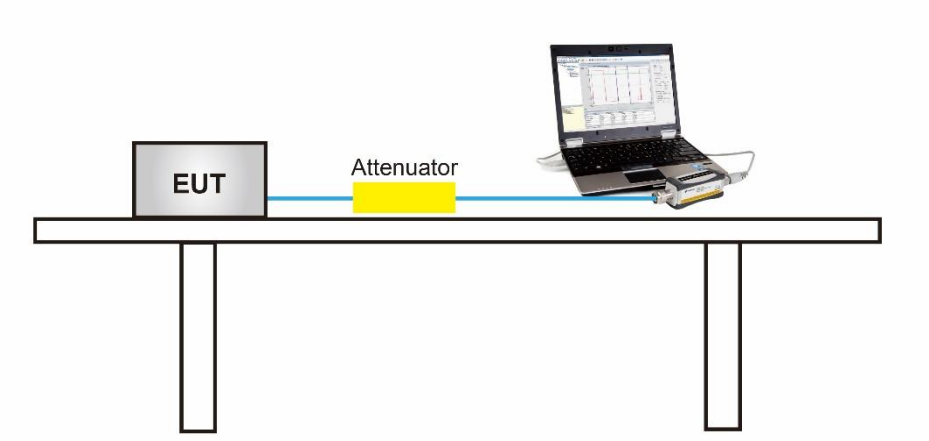
7.5.2.Test Procedure Used

KDB 789033 D02v01- Section E)3)b) Method PM-G

7.5.3.Test Setting

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.

7.5.4.Test Setup



7.5.5.Test Result

A TPC mechanism is not required for systems operating in frequency band 5150 ~ 5250 MHz & 5725 ~ 5850 MHz.

7.6. Power Spectral Density Measurement

7.6.1.Test Limit

For the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 11 dBm in any 1MHz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

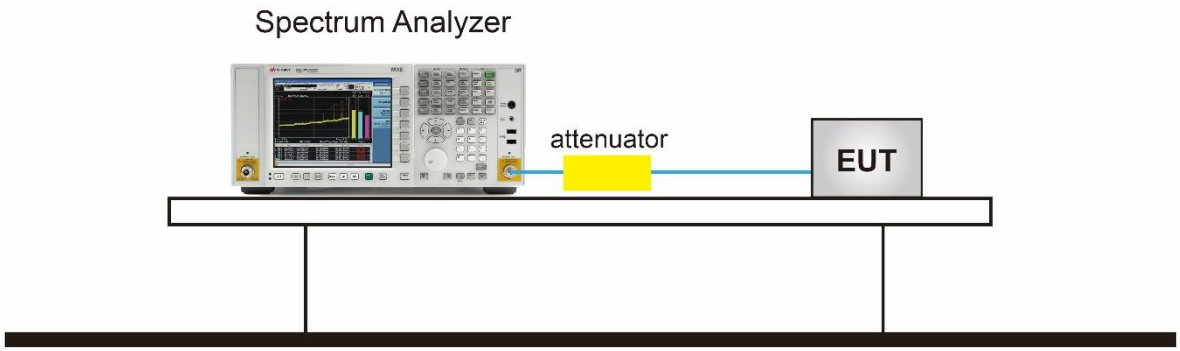
7.6.2.Test Procedure Used

KDB 789033 D02v02r01 – Section F

7.6.3.Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 100 kHz
4. VBW = 3MHz
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
10. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.
11. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor 10*log(500kHz/100kHz) = 6.99 dB to the measured result.

7.6.4.Test Setup



7.6.5.Test Result

Product	Smart Projector	Temperature	24°C
Test Engineer	Flay Yang	Relative Humidity	56%
Test Site	TR3	Test Date	2019/10/28
Remark	**For U-NII 1**		

Test Mode	Data Rate /Mbps	Channel No.	Freq. (MHz)	Ant A PSD (dBm/MHz)	Ant B PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	6.12	6.00	87.45	9.65	≤ 10.64	Pass
11a	6Mbps	44	5220	5.62	6.12	87.45	9.47	≤ 10.64	Pass
11a	6Mbps	48	5240	5.44	5.98	87.45	9.31	≤ 10.64	Pass
11n-HT20	MCS0	36	5180	4.76	5.31	86.81	8.05	≤ 10.64	Pass
11n-HT20	MCS0	44	5220	5.17	5.46	86.81	8.33	≤ 10.64	Pass
11n-HT20	MCS0	48	5240	5.22	5.20	86.81	8.22	≤ 10.64	Pass
11n-HT40	MCS0	38	5190	2.22	1.96	76.45	6.27	≤ 10.64	Pass
11n-HT40	MCS0	46	5230	2.55	1.97	76.45	6.45	≤ 10.64	Pass

Note 1: When EUT duty cycle < 98%, the total PSD (dBm/MHz) = 10*log {$10^{(\text{Ant A PSD}/10)}$ + $10^{(\text{Ant B PSD}/10)}$} (dBm/MHz) + 10*log (1/Duty Cycle).

Note 2: For the 5GHz band, the Directional Gain = 6.36 dBi, so the PSD Limit was calculated as below:

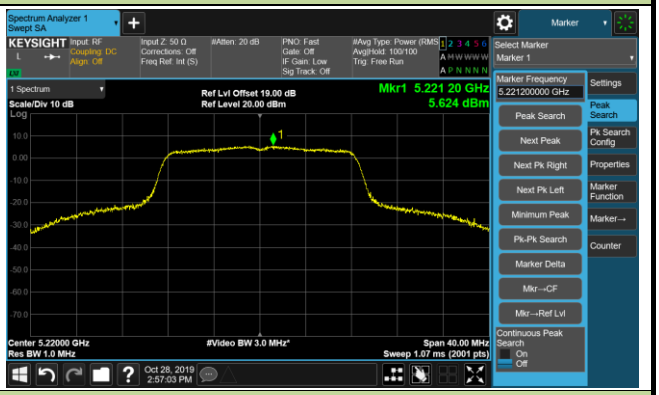
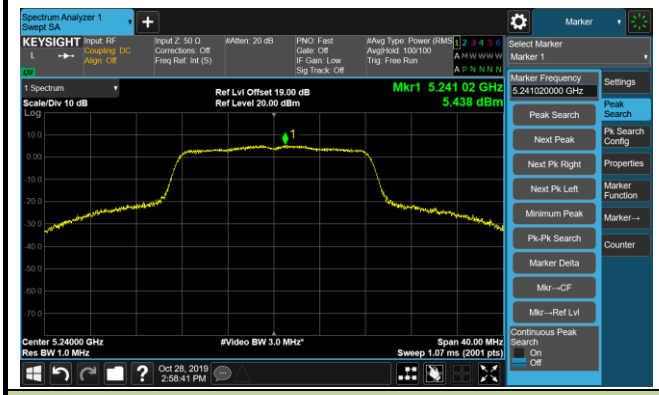
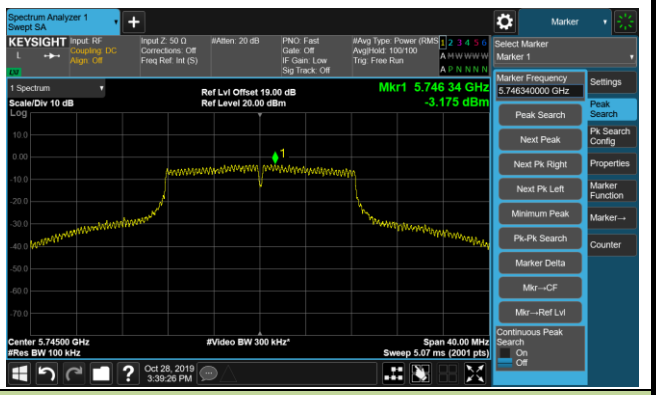
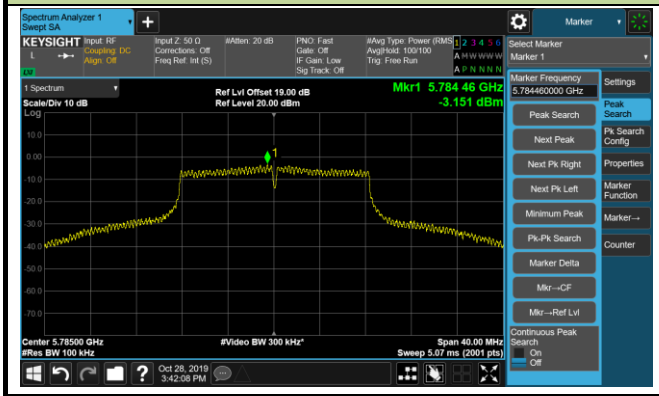
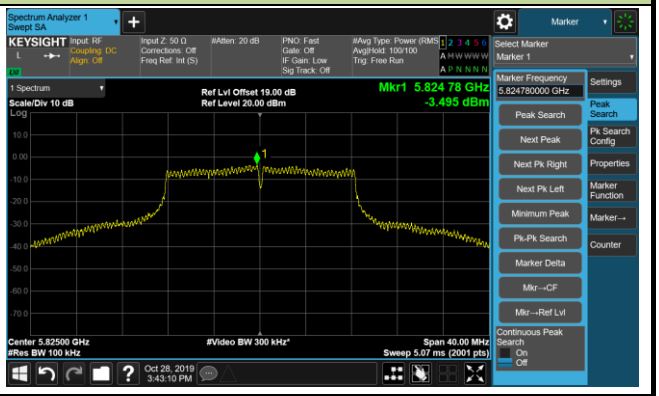
The PSD Limit (dBm/MHz) = [11 - (6.36 - 6)] (dBm/MHz) = 10.64 (dBm/MHz).

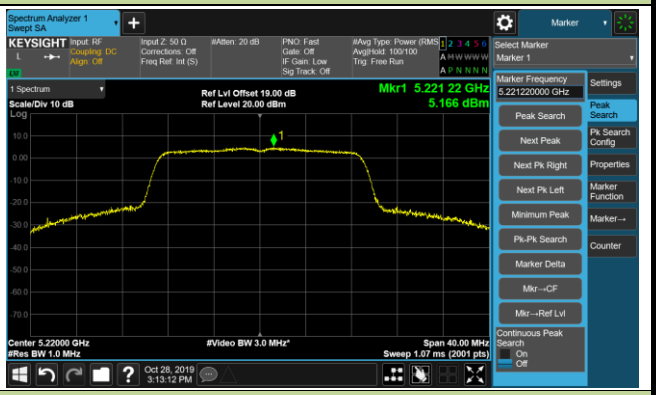
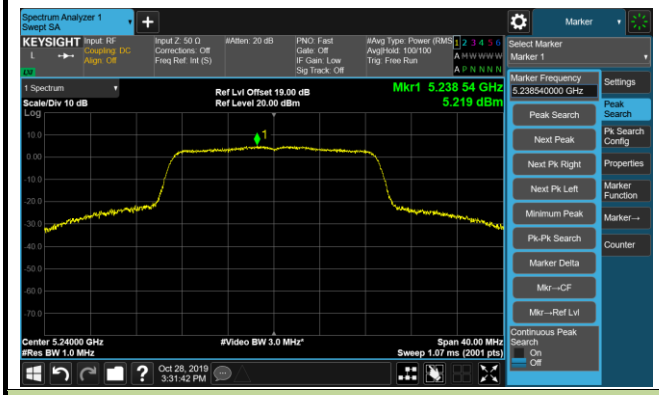
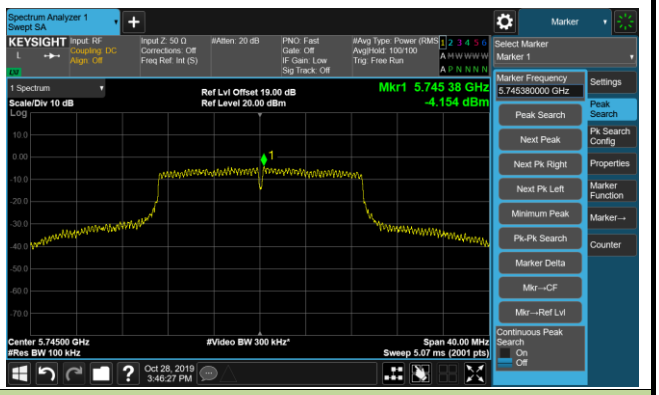
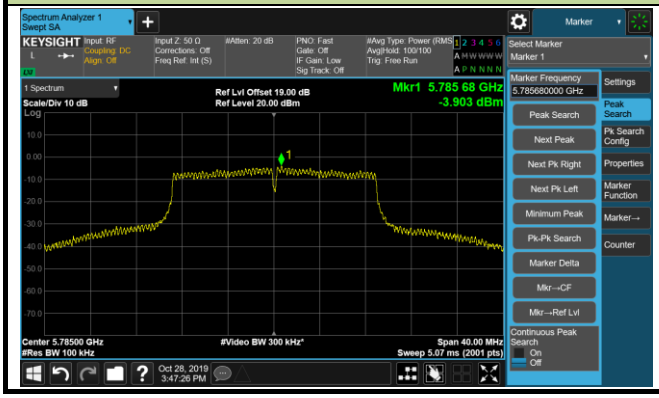
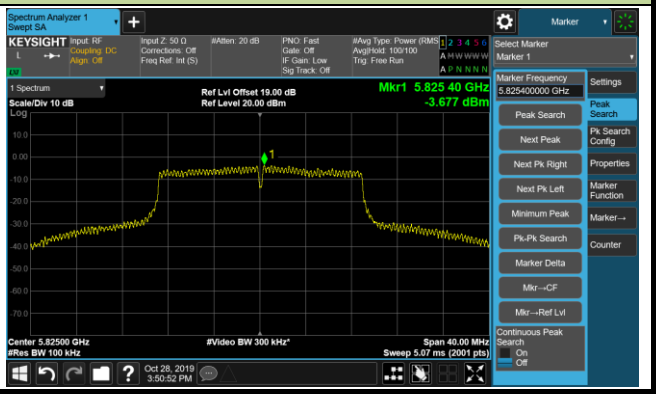
Product	Smart Projector	Temperature	24°C
Test Engineer	Flay Yang	Relative Humidity	56%
Test Site	TR3	Test Date	2019/10/28
Remark	**For U-NII 3**		

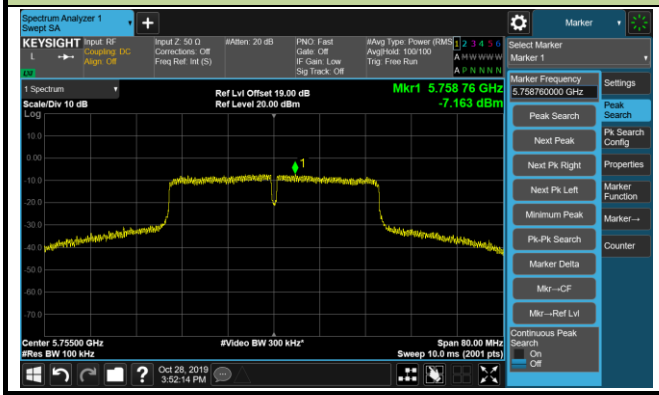
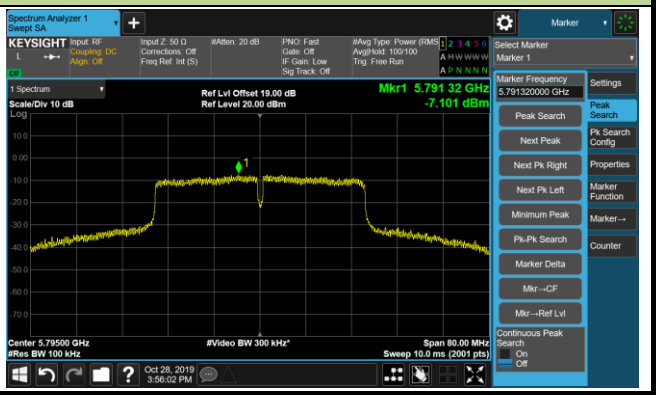
Test Mode	Data Rate/ Mbps	Channel No.	Freq. (MHz)	Ant A PSD (dBm/ 100kHz)	Ant B PSD (dBm/ 100kHz)	Duty Cycle (%)	Total PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
11a	6Mbps	149	5745	-3.18	-2.71	87.45	7.64	≤ 29.64	Pass
11a	6Mbps	157	5785	-3.15	-2.72	87.45	7.65	≤ 29.64	Pass
11a	6Mbps	165	5825	-3.50	-2.19	87.45	7.79	≤ 29.64	Pass
11n-HT20	MCS0	149	5745	-4.15	-3.62	86.81	6.12	≤ 29.64	Pass
11n-HT20	MCS0	157	5785	-3.90	-3.41	86.81	6.35	≤ 29.64	Pass
11n-HT20	MCS0	165	5825	-3.68	-3.72	86.81	6.30	≤ 29.64	Pass
11n-HT40	MCS0	151	5755	-7.16	-6.92	76.45	4.13	≤ 29.64	Pass
11n-HT40	MCS0	159	5795	-7.10	-6.30	76.45	4.48	≤ 29.64	Pass

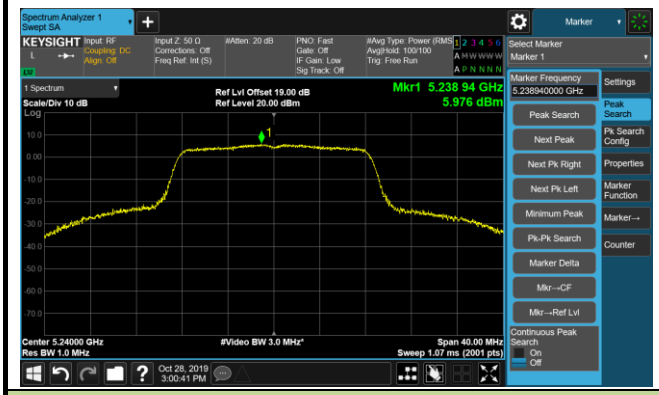
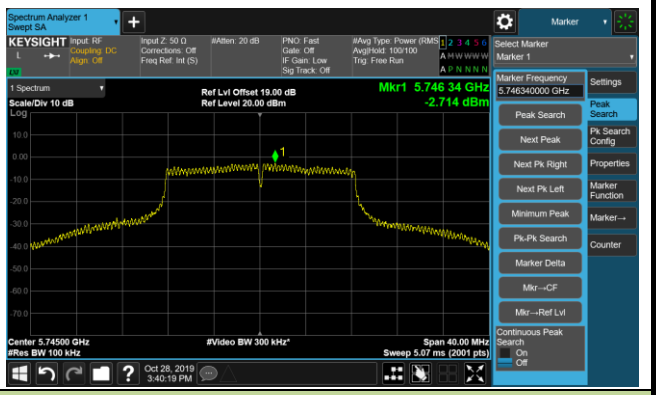
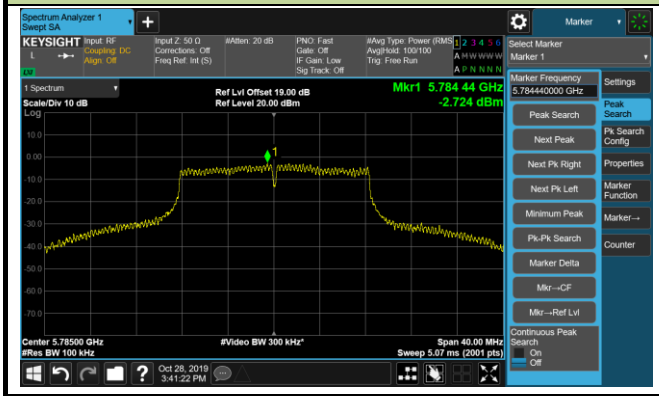
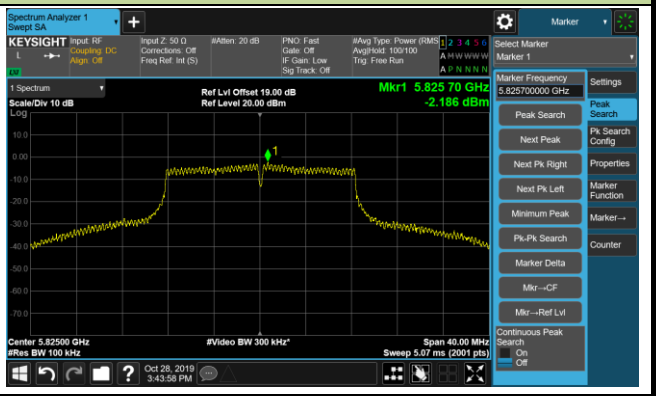
Note 1: When EUT duty cycle < 98%, the total PSD (dBm/500kHz) = 10*log {$10^{(\text{Ant A PSD}/10)}$ + $10^{(\text{Ant B PSD}/10)}$} (dBm/100kHz) + Constant Factor (dB) + 10*log (1/Duty Cycle), Constant Factor (dB) = 6.99dB.

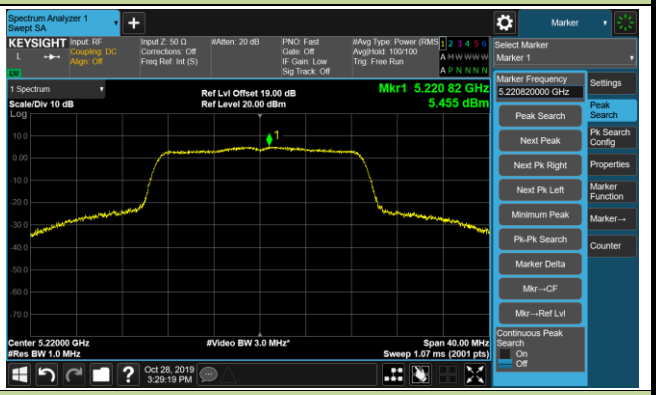
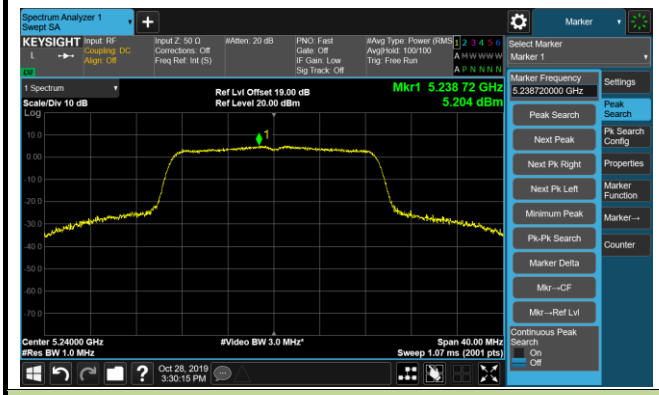
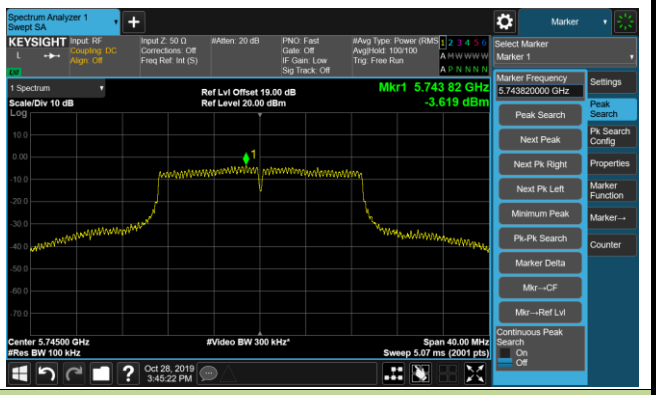
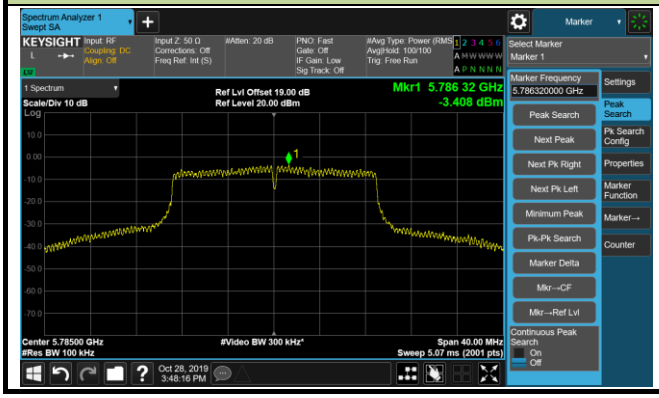
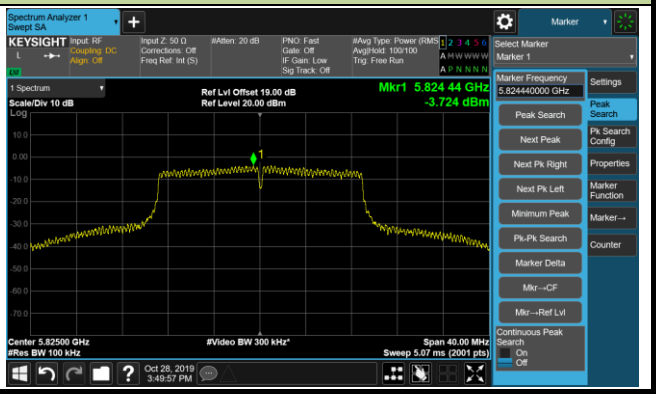
Note 2: PSD Limit (dBm/500kHz) = [30 - (6.36 - 6)] (dBm/500kHz) = 29.64 (dBm/500kHz).

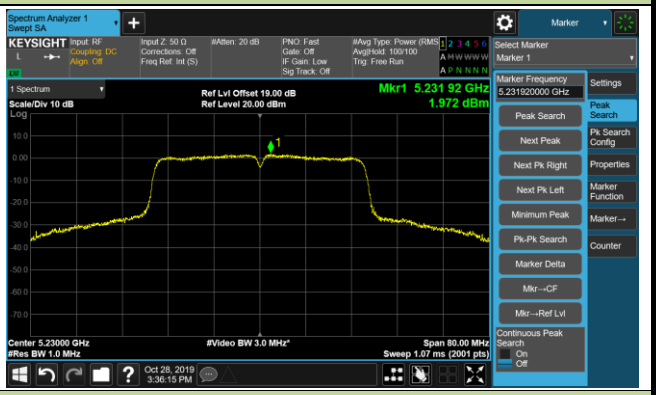
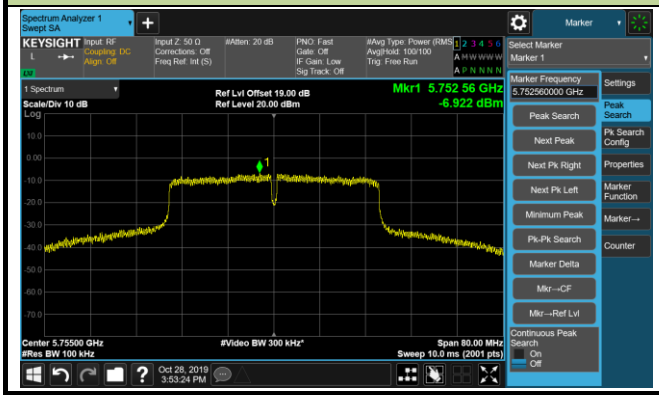
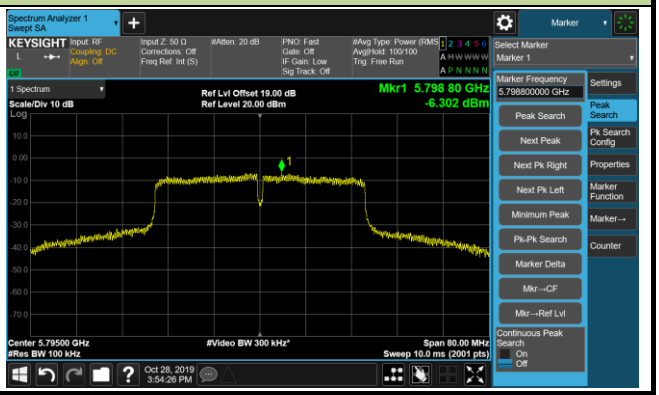
802.11a Power Spectral Density - Ant A / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT20 Power Spectral Density - Ant A / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT40 Power Spectral Density - Ant A / Ant A + B	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11a Power Spectral Density - Ant B / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT20 Power Spectral Density - Ant B / Ant A + B	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 149 (5745MHz)
	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT40 Power Spectral Density - Ant B / Ant A + B	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

7.7. Frequency Stability Measurement

7.7.1.Test Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

7.7.2.Test Procedure Used

Frequency Stability Under Temperature Variations:

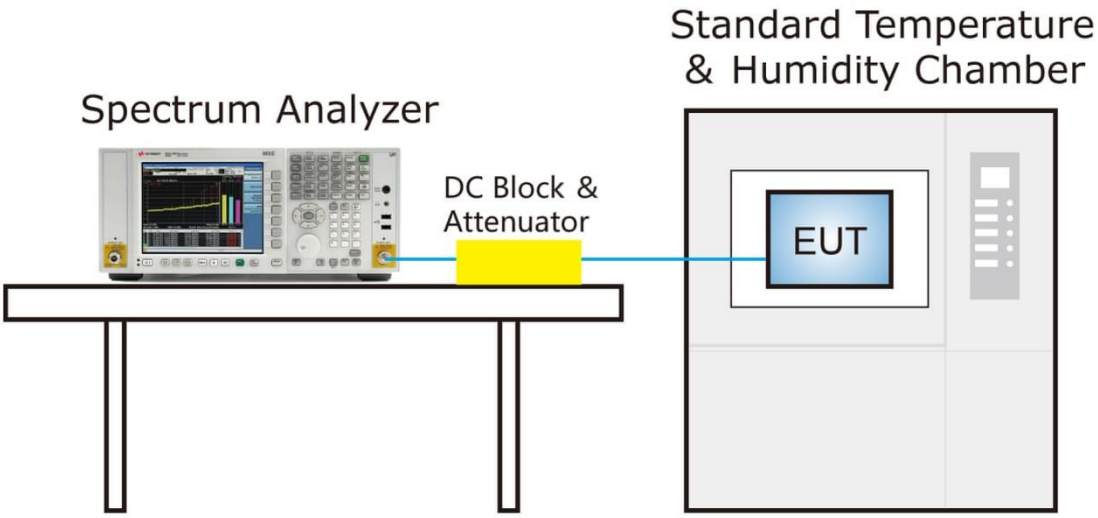
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

7.7.3.Test Setup



7.7.4.Test Result

Product	Smart Projector	Temperature	-30 ~ 50°C
Test Engineer	Flay Yang	Relative Humidity	46 ~ 55%RH
Test Site	TR3	Test Time	2019/10/28
Test Mode	5180MHz (Carrier Mode)		

Voltage (%)	Power (V_{DC})	Temp (℃)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	120	- 30	11.24	11.20	11.03	10.89
		- 20	13.04	13.13	13.05	12.86
		- 10	14.28	14.16	13.98	13.71
		0	12.48	12.52	11.47	11.13
		+ 10	12.79	12.73	12.51	12.27
		+ 20 (Ref)	13.54	13.50	13.33	13.06
		+ 30	13.42	13.34	13.18	12.89
		+ 40	13.34	13.21	13.36	13.03
		+ 50	13.33	13.22	13.18	12.83
115%	138	+ 20	13.36	13.27	13.03	12.76
85%	102	+ 20	13.43	13.52	13.41	13.19

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) - Declared Frequency (Hz)] / Declared Frequency (Hz)} *10^6.

7.8. Radiated Spurious Emission Measurement

7.8.1.Test Limit

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

7.8.2.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)

7.8.3.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
> 1000 MHz	1 MHz

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

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 ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

4. Detector = Peak

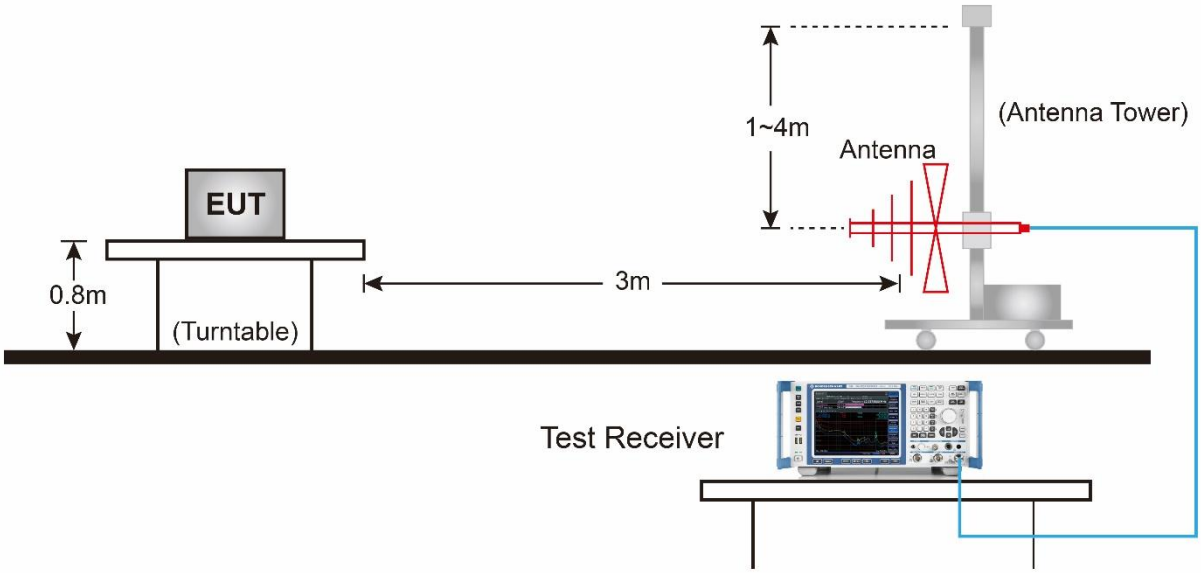
5. Sweep time = auto

6. Trace mode = max hold

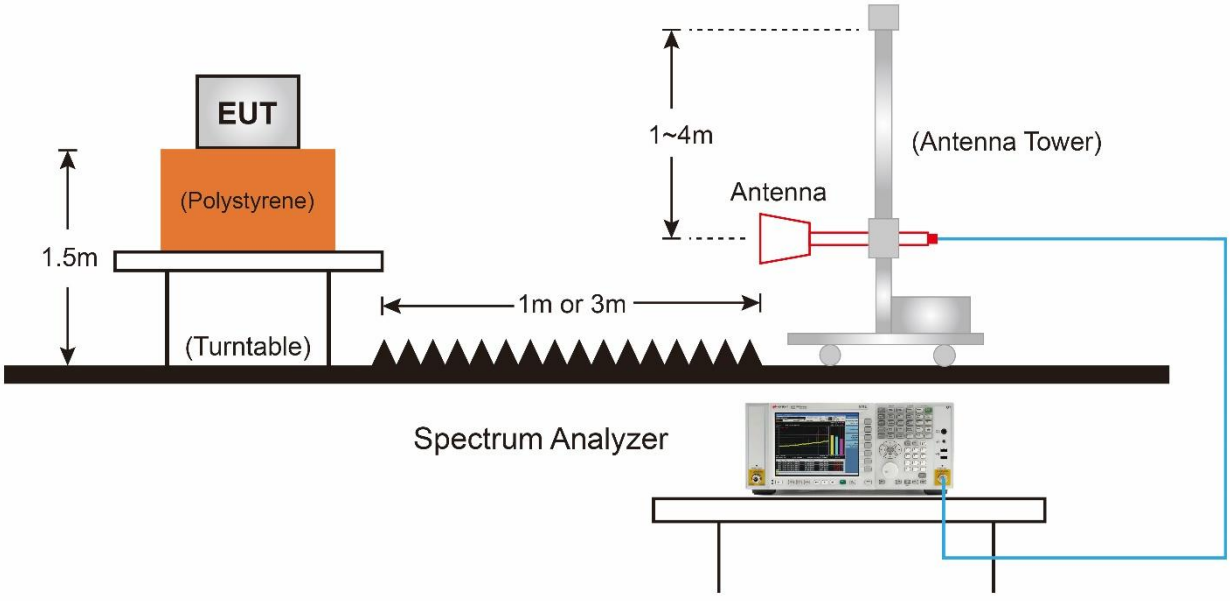
7. Trace was allowed to stabilize

7.8.4.Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



7.8.5.Test Result

Product	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11a - Ant A + B	Test Channel	36
Note	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
*	6797.0	32.4	9.7	42.1	68.2	-26.1	Peak	Horizontal
*	10358.5	38.5	16.8	55.3	68.2	-12.9	Peak	Horizontal
	11633.5	33.5	17.2	50.7	74.0	-23.3	Peak	Horizontal
	15538.7	40.8	17.5	58.3	74.0	-15.7	Peak	Horizontal
	15538.7	28.6	17.5	46.1	54.0	-7.9	Average	Horizontal
*	6814.0	34.5	9.7	44.2	68.2	-24.0	Peak	Vertical
*	10358.5	43.2	16.8	60.0	68.2	-8.2	Peak	Vertical
	12101.0	33.1	17.1	50.2	74.0	-23.8	Peak	Vertical
	15539.7	45.5	17.5	63.0	74.0	-11.0	Peak	Vertical
	15539.7	36.0	17.5	53.5	54.0	-0.5	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11a - Ant A + B	Test Channel	44
Note	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
*	7188.0	32.9	11.6	44.5	68.2	-23.7	Peak	Horizontal
*	10443.5	35.4	16.8	52.2	68.2	-16.0	Peak	Horizontal
	11684.5	33.1	17.2	50.3	74.0	-23.7	Peak	Horizontal
	15662.6	43.0	17.2	60.2	74.0	-13.8	Peak	Horizontal
	15662.6	32.8	17.2	50.0	54.0	-4.0	Average	Horizontal
*	7026.5	32.6	10.9	43.5	68.2	-24.7	Peak	Vertical
*	10435.0	37.5	16.8	54.3	68.2	-13.9	Peak	Vertical
	11676.0	33.0	17.3	50.3	74.0	-23.7	Peak	Vertical
	15662.3	47.1	17.2	64.3	74.0	-9.7	Peak	Vertical
	15662.3	36.1	17.2	53.3	54.0	-0.7	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11a - Ant A + B	Test Channel	48
Note	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
*	7171.0	33.5	11.7	45.2	68.2	-23.0	Peak	Horizontal
*	10477.5	34.2	16.9	51.1	68.2	-17.1	Peak	Horizontal
	11123.5	33.4	17.5	50.9	74.0	-23.1	Peak	Horizontal
	15720.9	40.4	17.1	57.5	74.0	-16.5	Peak	Horizontal
	15720.9	28.1	17.1	45.2	54.0	-8.8	Average	Horizontal
*	9967.5	32.5	16.0	48.5	68.2	-19.7	Peak	Vertical
*	10477.5	40.4	16.9	57.3	68.2	-10.9	Peak	Vertical
	11506.0	32.4	17.6	50.0	74.0	-24.0	Peak	Vertical
	15722.0	48.0	17.0	65.0	74.0	-9.0	Peak	Vertical
	15722.0	36.6	17.0	53.6	54.0	-0.4	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11a - Ant A + B	Test Channel	149
Note	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
	8063.5	34.6	12.8	47.4	74.0	-26.6	Peak	Horizontal
	11429.5	34.2	17.7	51.9	74.0	-22.1	Peak	Horizontal
*	13010.5	31.1	17.9	49.0	68.2	-19.2	Peak	Horizontal
*	15093.0	31.2	19.3	50.5	68.2	-17.7	Peak	Horizontal
	8072.0	35.6	12.7	48.3	74.0	-25.7	Peak	Vertical
	11489.0	33.3	17.7	51.0	74.0	-23.0	Peak	Vertical
*	12951.0	31.0	17.7	48.7	68.2	-19.5	Peak	Vertical
*	17226.5	35.5	21.4	56.9	68.2	-11.3	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11a - Ant A + B	Test Channel	157
Note	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
	8046.5	36.4	12.7	49.1	74.0	-24.9	Peak	Horizontal
	11582.5	33.4	17.6	51.0	74.0	-23.0	Peak	Horizontal
*	12968.0	33.1	17.8	50.9	68.2	-17.3	Peak	Horizontal
*	16793.0	34.0	20.7	54.7	68.2	-13.5	Peak	Horizontal
	8454.5	34.4	12.3	46.7	74.0	-27.3	Peak	Vertical
	11574.0	35.4	17.5	52.9	74.0	-21.1	Peak	Vertical
*	13869.0	33.3	19.7	53.0	68.2	-15.2	Peak	Vertical
*	17354.0	35.6	22.4	58.0	68.2	-10.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11a - Ant A + B	Test Channel	165
Note	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
	8174.0	35.4	12.4	47.8	74.0	-26.2	Peak	Horizontal
	11506.0	35.0	17.6	52.6	74.0	-21.4	Peak	Horizontal
*	12806.5	33.8	17.6	51.4	68.2	-16.8	Peak	Horizontal
*	16368.0	31.7	18.3	50.0	68.2	-18.2	Peak	Horizontal
	8369.5	34.4	12.3	46.7	74.0	-27.3	Peak	Vertical
	11659.0	36.9	17.5	54.4	74.0	-19.6	Peak	Vertical
	11648.0	24.8	17.3	42.1	54.0	-11.9	Average	Vertical
*	12874.5	32.1	17.7	49.8	68.2	-18.4	Peak	Vertical
*	17464.5	35.5	23.1	58.6	68.2	-9.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	36
Note	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
*	6754.5	33.2	9.5	42.7	68.2	-25.5	Peak	Horizontal
*	9967.5	32.9	16.0	48.9	68.2	-19.3	Peak	Horizontal
	10809.0	33.0	17.6	50.6	74.0	-23.4	Peak	Horizontal
	11701.5	32.7	17.1	49.8	74.0	-24.2	Peak	Horizontal
*	7009.5	32.6	10.7	43.3	68.2	-24.9	Peak	Vertical
*	10367.0	37.7	16.9	54.6	68.2	-13.6	Peak	Vertical
	11633.5	33.0	17.2	50.2	74.0	-23.8	Peak	Vertical
	15539.3	37.1	17.5	54.6	74.0	-19.4	Peak	Vertical
	15539.3	22.3	17.5	39.8	54.0	-14.2	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	44
Note	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
*	7111.5	32.8	11.4	44.2	68.2	-24.0	Peak	Horizontal
*	9967.5	32.5	16.0	48.5	68.2	-19.7	Peak	Horizontal
	11565.5	32.7	17.5	50.2	74.0	-23.8	Peak	Horizontal
	15656.5	40.3	17.2	57.5	74.0	-16.5	Peak	Horizontal
	15656.5	25.5	17.2	42.7	54.0	-11.3	Average	Horizontal
*	7120.0	32.4	11.4	43.8	68.2	-24.4	Peak	Vertical
*	10435.0	39.1	16.8	55.9	68.2	-12.3	Peak	Vertical
	11599.5	32.8	17.6	50.4	74.0	-23.6	Peak	Vertical
	15664.1	45.5	17.2	62.7	74.0	-11.3	Peak	Vertical
	15664.1	30.1	17.2	47.3	54.0	-6.7	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	48
Note	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
*	7179.5	33.3	11.7	45.0	68.2	-23.2	Peak	Horizontal
*	9967.5	34.2	16.0	50.2	68.2	-18.0	Peak	Horizontal
	11140.5	33.1	17.6	50.7	74.0	-23.3	Peak	Horizontal
	15722.5	37.0	17.0	54.0	74.0	-20.0	Peak	Horizontal
	15722.5	26.6	17.0	43.6	54.0	-10.4	Average	Horizontal
*	6856.5	31.6	10.0	41.6	68.2	-26.6	Peak	Vertical
*	10486.0	38.3	17.1	55.4	68.2	-12.8	Peak	Vertical
	11735.5	32.2	17.0	49.2	74.0	-24.8	Peak	Vertical
	15723.9	45.8	17.0	62.8	74.0	-11.2	Peak	Vertical
	15723.9	30.3	17.0	47.3	54.0	-6.7	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	149
Note	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
	8386.5	34.0	12.3	46.3	74.0	-27.7	Peak	Horizontal
	11659.0	34.1	17.5	51.6	74.0	-22.4	Peak	Horizontal
*	13129.5	31.2	18.1	49.3	68.2	-18.9	Peak	Horizontal
*	16529.5	31.7	19.2	50.9	68.2	-17.3	Peak	Horizontal
	8174.0	34.9	12.4	47.3	74.0	-26.7	Peak	Vertical
	11480.5	35.2	17.7	52.9	74.0	-21.1	Peak	Vertical
	11487.2	25.0	17.7	42.7	54.0	-11.3	Average	Vertical
*	13869.0	32.6	19.7	52.3	68.2	-15.9	Peak	Vertical
*	17235.0	35.9	21.5	57.4	68.2	-10.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	157
Note	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
	7468.5	34.8	11.8	46.6	74.0	-27.4	Peak	Horizontal
	8310.0	33.8	12.4	46.2	74.0	-27.8	Peak	Horizontal
*	10001.5	32.1	16.1	48.2	68.2	-20.0	Peak	Horizontal
*	10350.0	32.8	16.8	49.6	68.2	-18.6	Peak	Horizontal
	7536.5	35.5	11.9	47.4	74.0	-26.6	Peak	Vertical
	11574.0	35.4	17.5	52.9	74.0	-21.1	Peak	Vertical
	11577.3	24.6	17.6	42.2	54.0	-11.8	Average	Vertical
*	12951.0	31.9	17.7	49.6	68.2	-18.6	Peak	Vertical
*	16427.5	33.3	18.6	51.9	68.2	-16.3	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11n-HT20 - Ant A + B	Test Channel	165
Note	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
	8344.0	34.0	12.0	46.0	74.0	-28.0	Peak	Horizontal
	11395.5	35.0	17.6	52.6	74.0	-21.4	Peak	Horizontal
*	13010.5	31.5	17.9	49.4	68.2	-18.8	Peak	Horizontal
*	16436.0	32.4	18.5	50.9	68.2	-17.3	Peak	Horizontal
	8250.5	34.2	12.3	46.5	74.0	-27.5	Peak	Vertical
	11659.0	35.8	17.5	53.3	74.0	-20.7	Peak	Vertical
*	13095.5	33.1	18.1	51.2	68.2	-17.0	Peak	Vertical
*	16725.0	32.4	20.2	52.6	68.2	-15.6	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11n-HT40 - Ant A + B	Test Channel	38
Note	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
*	6882.0	33.7	10.0	43.7	68.2	-24.5	Peak	Horizontal
*	9967.5	33.4	16.0	49.4	68.2	-18.8	Peak	Horizontal
	11132.0	33.3	17.6	50.9	74.0	-23.1	Peak	Horizontal
	11608.0	32.9	17.5	50.4	74.0	-23.6	Peak	Horizontal
*	7001.0	32.9	10.6	43.5	68.2	-24.7	Peak	Vertical
*	10384.0	37.3	16.9	54.2	68.2	-14.0	Peak	Vertical
	11642.0	33.0	17.2	50.2	74.0	-23.8	Peak	Vertical
	15560.5	36.1	17.5	53.6	74.0	-20.4	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/18
Test Mode	802.11n-HT40 - Ant A + B	Test Channel	46
Note	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
*	7009.5	31.1	10.7	41.8	68.2	-26.4	Peak	Horizontal
*	10035.5	29.7	16.1	45.8	68.2	-22.4	Peak	Horizontal
	11276.5	31.1	17.5	48.6	74.0	-25.4	Peak	Horizontal
	15671.0	40.2	17.2	57.4	74.0	-16.6	Peak	Horizontal
	15671.0	31.5	17.2	48.7	54.0	-5.3	Average	Horizontal
*	7009.5	30.9	10.7	41.6	68.2	-26.6	Peak	Vertical
*	10460.5	38.5	16.7	55.2	68.2	-13.0	Peak	Vertical
	11897.0	29.8	16.9	46.7	74.0	-27.3	Peak	Vertical
	15679.5	47.3	17.2	64.5	74.0	-9.5	Peak	Vertical
	15679.5	36.0	17.2	53.2	54.0	-0.8	Average	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11n-HT40 - Ant A + B	Test Channel	151
Note	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
	7545.0	33.6	11.9	45.5	74.0	-28.5	Peak	Horizontal
	10817.5	34.9	17.6	52.5	74.0	-21.5	Peak	Horizontal
*	13010.5	32.4	17.9	50.3	68.2	-17.9	Peak	Horizontal
*	16538.0	31.8	19.2	51.0	68.2	-17.2	Peak	Horizontal
	8386.5	34.2	12.3	46.5	74.0	-27.5	Peak	Vertical
	11914.0	31.9	16.8	48.7	74.0	-25.3	Peak	Vertical
*	13138.0	31.7	18.1	49.8	68.2	-18.4	Peak	Vertical
*	16487.0	31.7	18.9	50.6	68.2	-17.6	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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	Smart Projector	Temperature	26°C
Test Engineer	Flay Yang	Relative Humidity	57 %
Test Site	AC1	Test Date	2019/10/27
Test Mode	802.11n-HT40 - Ant A + B	Test Channel	159
Note	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
	8276.0	34.1	12.0	46.1	74.0	-27.9	Peak	Horizontal
	10902.5	32.7	17.9	50.6	74.0	-23.4	Peak	Horizontal
*	12772.5	35.9	17.4	53.3	68.2	-14.9	Peak	Horizontal
*	16504.0	31.9	19.1	51.0	68.2	-17.2	Peak	Horizontal
	8327.0	34.4	12.2	46.6	74.0	-27.4	Peak	Vertical
	11259.5	32.6	17.5	50.1	74.0	-23.9	Peak	Vertical
*	13070.0	31.7	17.9	49.6	68.2	-18.6	Peak	Vertical
*	16759.0	31.8	20.1	51.9	68.2	-16.3	Peak	Vertical

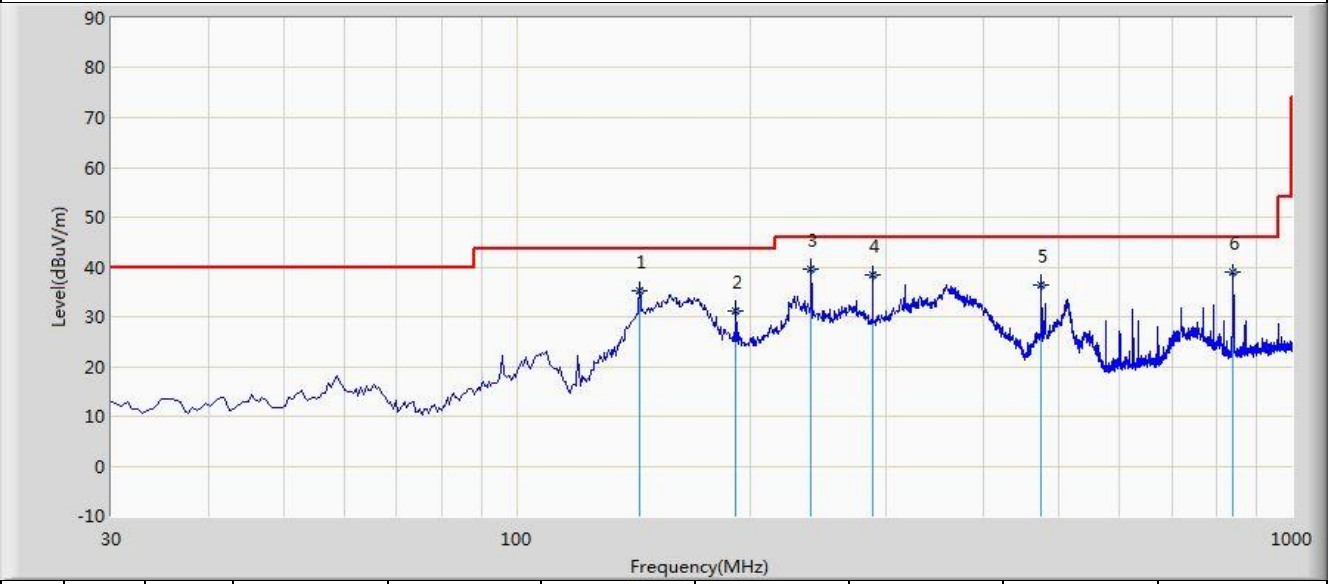
Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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: 2019/10/14 - 13:37
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: Smart Projector	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11a at channel 5180MHz	



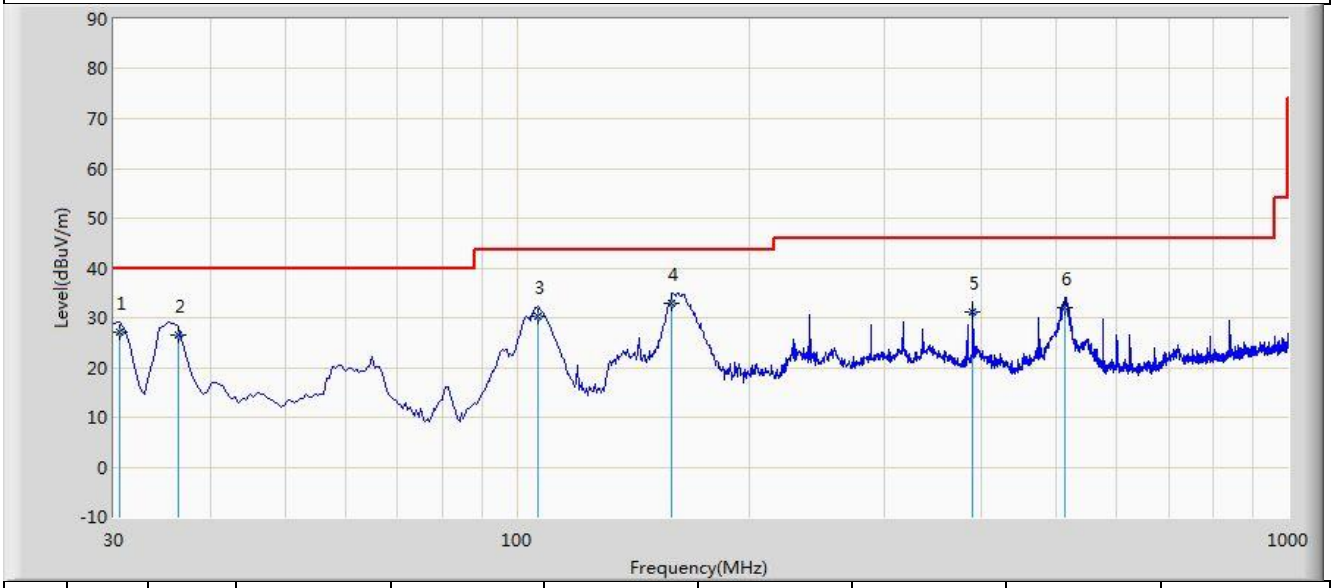
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			143.975	35.091	20.114	-8.409	43.500	14.977	QP
2			191.990	31.132	19.382	-12.368	43.500	11.749	QP
3		*	240.005	39.630	26.627	-6.370	46.000	13.003	QP
4			288.020	38.281	24.050	-7.719	46.000	14.231	QP
5			474.745	36.461	18.089	-9.539	46.000	18.371	QP
6			840.435	38.889	14.888	-7.111	46.000	24.001	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 ~ 40GHz), therefore no data appear in the report.

Site: AC1	Time: 2019/10/14 - 13:49
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: Smart Projector	Engineer: Flay Yang
Test Mode: Transmit by 802.11a at channel 5180MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			30.485	27.083	13.294	-12.917	40.000	13.789	QP
2			36.305	26.398	12.219	-13.602	40.000	14.178	QP
3			106.630	30.383	18.539	-13.117	43.500	11.844	QP
4		*	159.010	33.013	17.617	-10.487	43.500	15.397	QP
5			390.335	31.099	14.552	-14.901	46.000	16.547	QP
6			512.575	32.035	12.898	-13.965	46.000	19.137	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 ~ 40GHz), therefore no data appear in the report.

7.9. Radiated Restricted Band Edge Measurement

7.9.1.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 - 156.52525	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	--	--	--

For 15.407(b) requirement:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Refer to KDB 789033 D02v02r01 G)2)c), as specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

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

7.9.2.Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

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

7.9.3.Test Setting

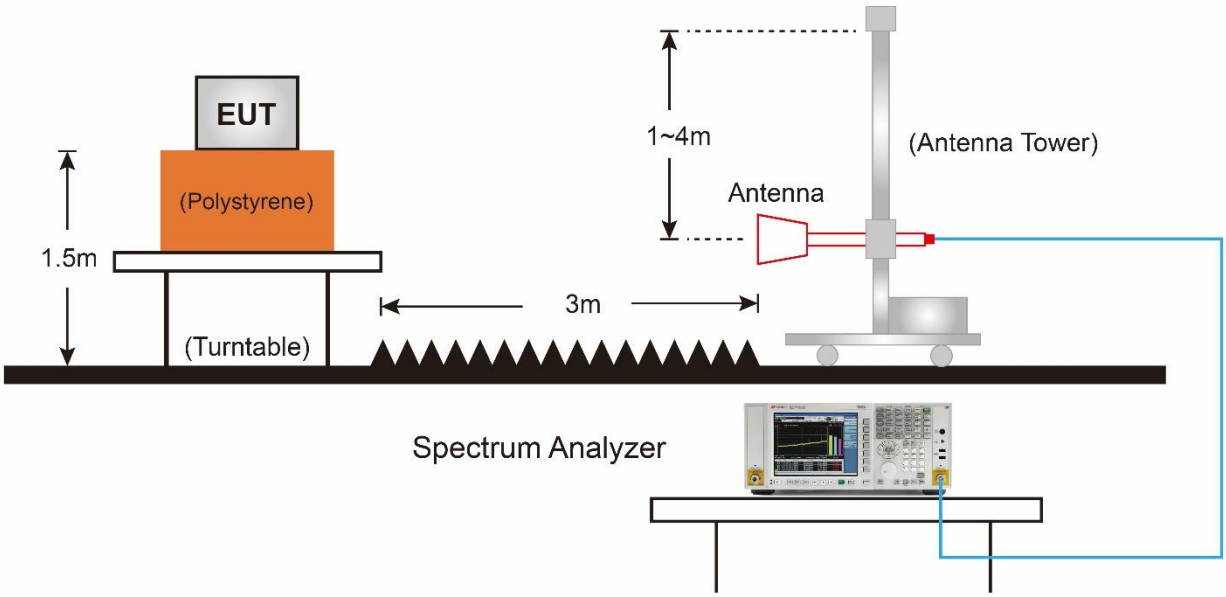
Peak Measurements above 1GHz

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)

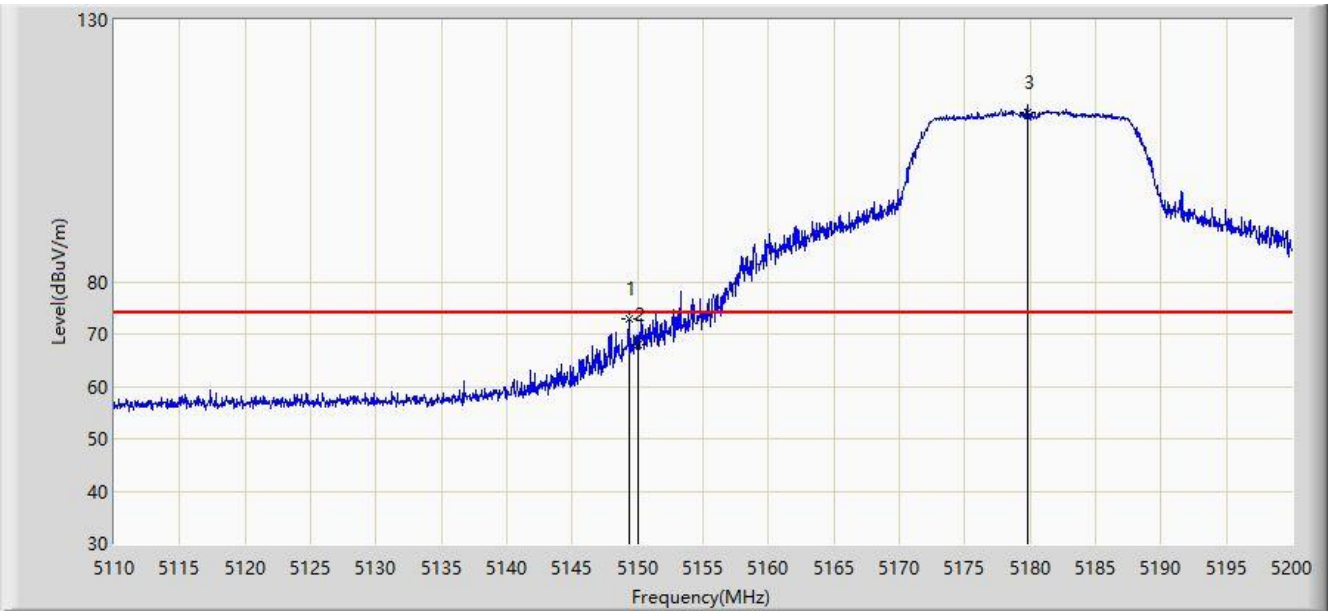
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW ≤ RBW/100 (i.e., 10 kHz) but not less than 10 Hz. If the EUT duty cycle is < 98%, set VBW ≥ 1/T.
4. Detector = Peak
5. Sweep time = auto
6. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle.

7.9.4.Test Setup



7.9.5.Test Result

Site: AC1	Time: 2019/10/18 - 11:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Smart Projector	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11a at channel 5180MHz Ant A + B	

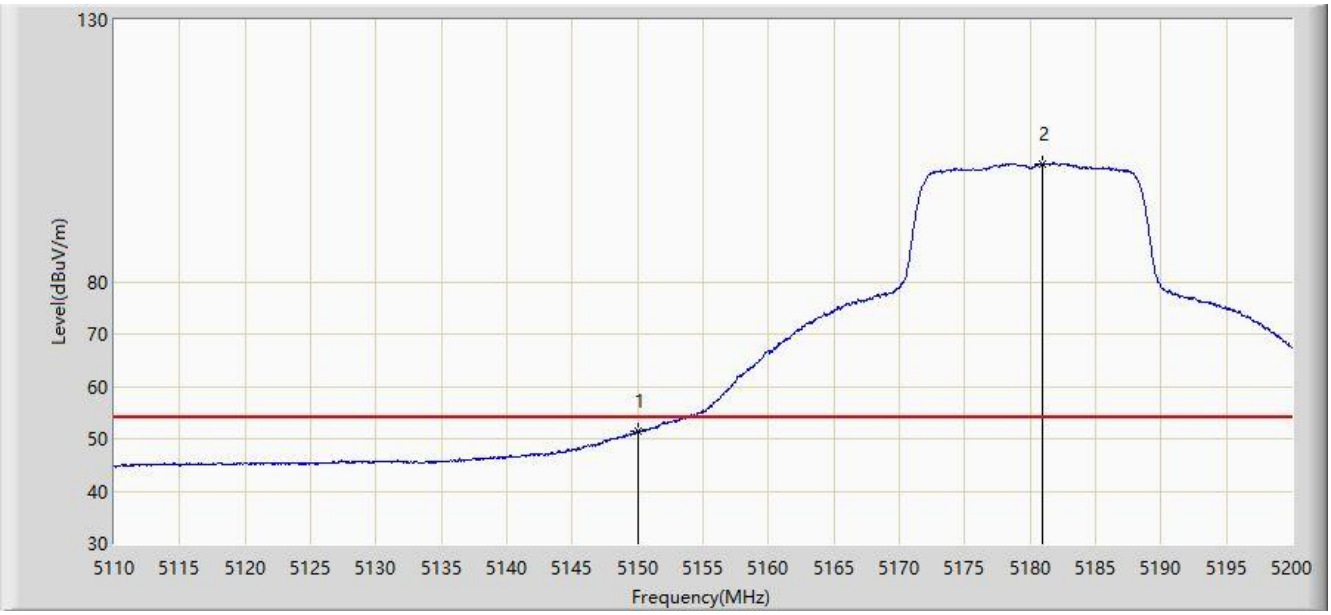


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5149.330	73.038	66.643	-0.962	74.000	6.396	PK
2			5150.000	68.029	61.632	-5.971	74.000	6.398	PK
3		*	5179.840	112.230	105.662	N/A	N/A	6.569	PK

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

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

Site: AC1	Time: 2019/10/18 - 11:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Smart Projector	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11a at channel 5180MHz Ant A + B	

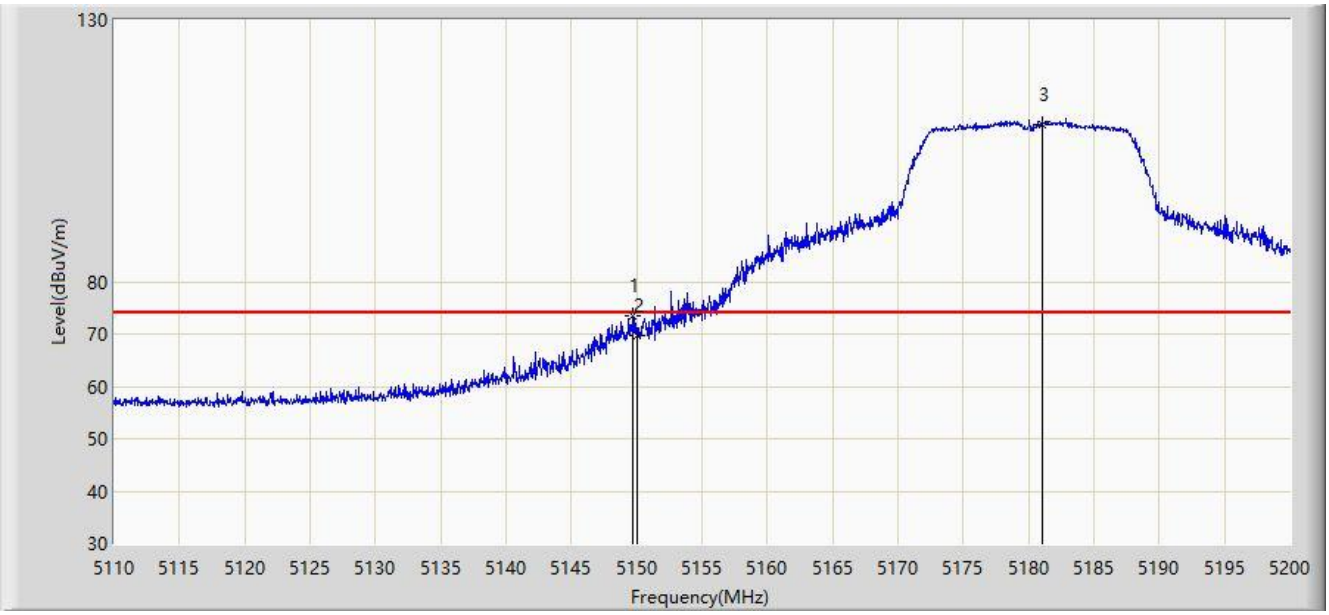


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	51.381	44.984	-2.619	54.000	6.398	AV
2		*	5180.965	102.451	95.872	N/A	N/A	6.579	AV

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

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

Site: AC1	Time: 2019/10/18 - 11:14
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Smart Projector	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11a at channel 5180MHz Ant A + B	

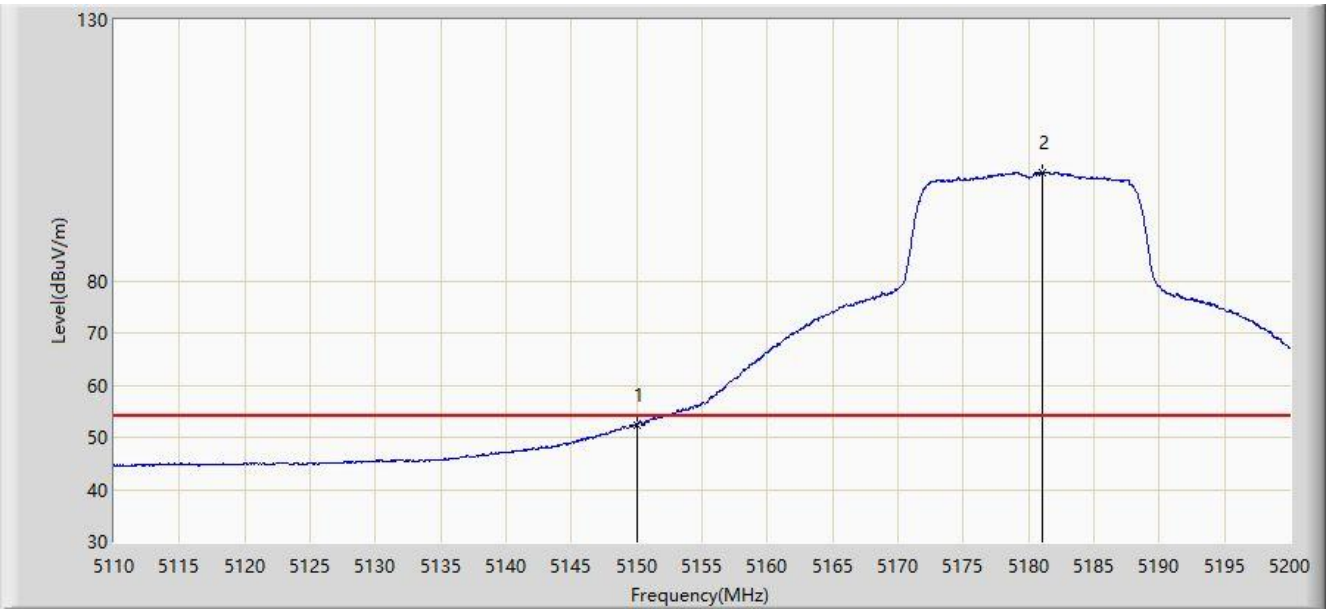


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5149.735	73.370	66.974	-0.630	74.000	6.396	PK
2			5150.000	69.647	63.250	-4.353	74.000	6.398	PK
3		*	5181.055	109.969	103.389	N/A	N/A	6.580	PK

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

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

Site: AC1	Time: 2019/10/18 - 11:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Flay Yang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Smart Projector	Power: AC 120V/60Hz
Test Mode: Transmit by 802.11a at channel 5180MHz Ant A + B	

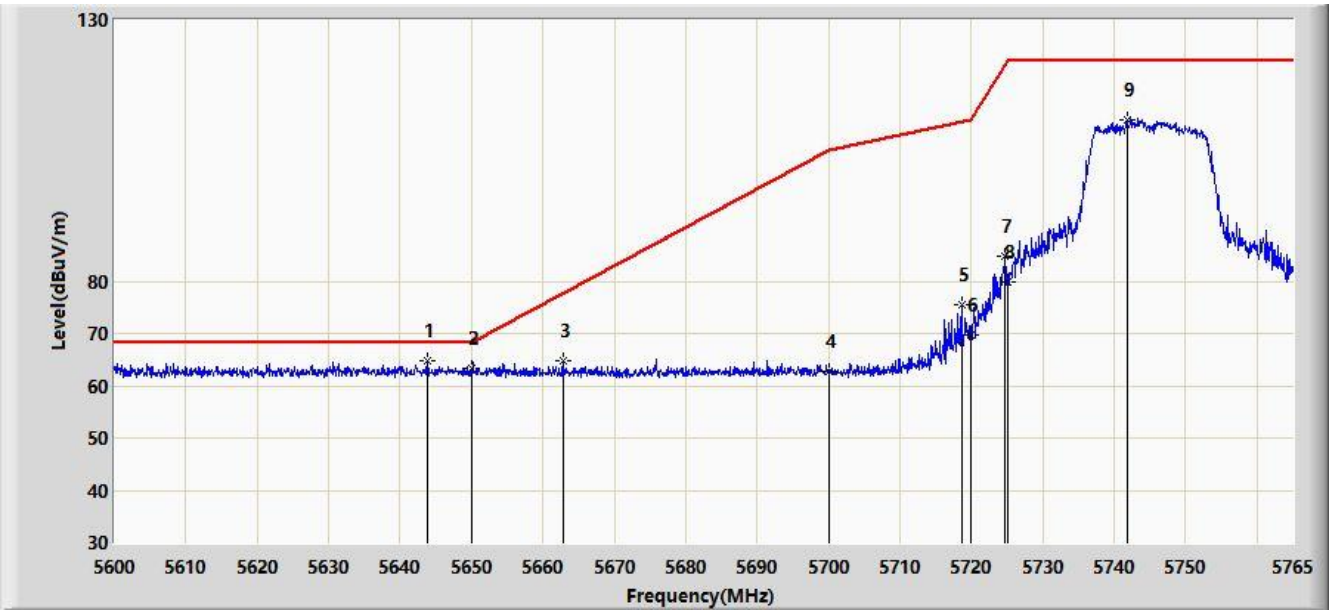


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	52.406	46.009	-1.594	54.000	6.398	AV
2		*	5181.055	100.603	94.023	N/A	N/A	6.580	AV

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

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

Site: AC1	Time: 2019/10/27 - 17:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Snake Ni
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Smart Projector	Power: AC 120V/60Hz
Test mode: Transmit by 802.11a at Channel 5745MHz Ant A + B	

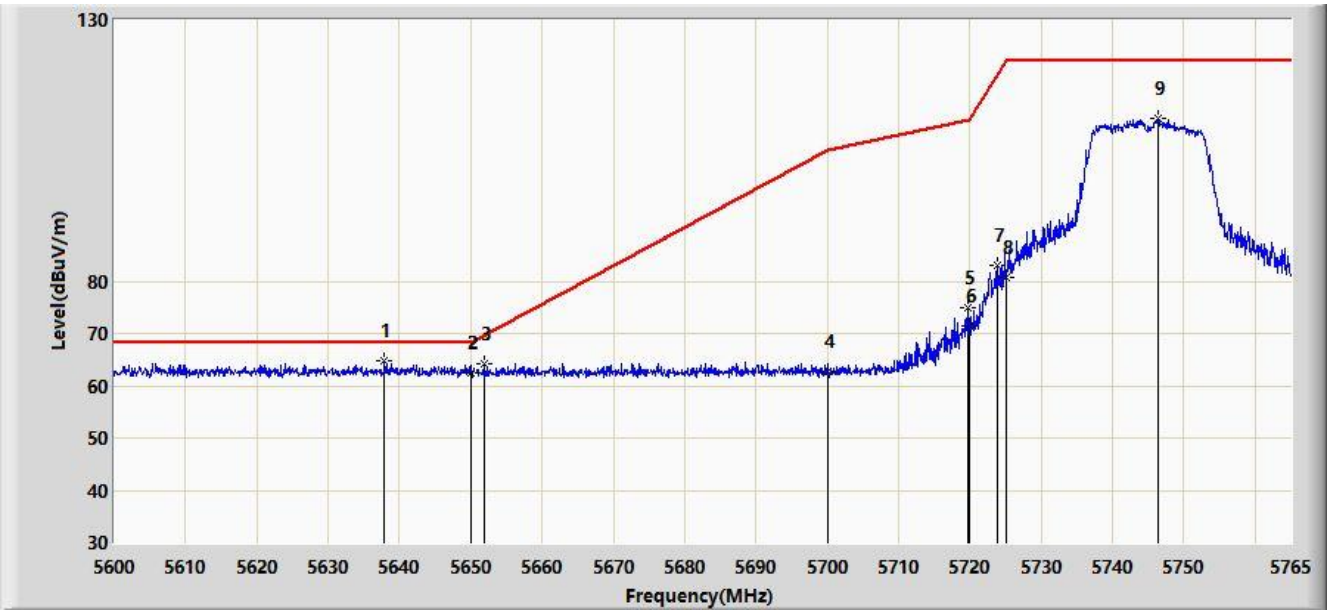


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5643.890	64.791	57.971	-3.409	68.200	6.820	PK
2			5650.000	63.284	56.491	-4.916	68.200	6.793	PK
3			5662.783	64.876	58.127	-12.815	77.690	6.749	PK
4			5700.000	62.870	55.961	-42.330	105.200	6.909	PK
5			5718.635	75.652	68.737	-34.767	110.418	6.915	PK
6			5720.000	69.638	62.734	-41.162	110.800	6.904	PK
7			5724.740	84.728	77.859	-36.879	121.607	6.870	PK
8			5725.000	79.784	72.917	-42.416	122.200	6.867	PK
9			5741.817	110.978	104.010	N/A	N/A	6.967	PK

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

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

Site: AC1	Time: 2019/10/27 - 17:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Snake Ni
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Smart Projector	Power: AC 120V/60Hz
Test mode: Transmit by 802.11a at Channel 5745MHz Ant A + B	

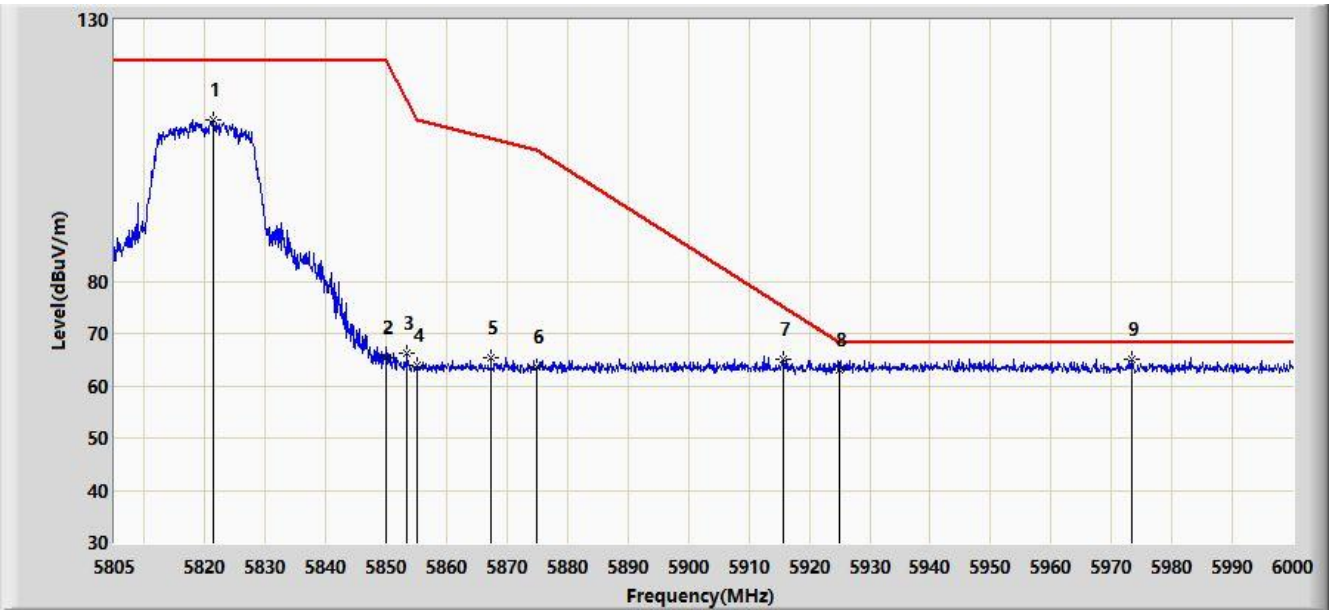


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5637.868	64.816	58.004	-3.384	68.200	6.812	PK
2			5650.000	62.553	55.760	-5.647	68.200	6.793	PK
3			5651.975	64.134	57.348	-5.534	69.668	6.785	PK
4			5700.000	62.644	55.735	-42.556	105.200	6.909	PK
5			5719.708	74.985	68.078	-35.734	110.718	6.907	PK
6			5720.000	71.409	64.505	-39.391	110.800	6.904	PK
7			5723.750	83.067	76.190	-36.284	119.351	6.876	PK
8			5725.000	80.640	73.773	-41.560	122.200	6.867	PK
9			5746.355	111.291	104.275	N/A	N/A	7.017	PK

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

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

Site: AC1	Time: 2019/10/27 - 17:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Snake Ni
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Smart Projector	Power: AC 120V/60Hz
Test mode: Transmit by 802.11a at Channel 5825MHz Ant A + B	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5821.283	110.850	103.566	N/A	N/A	7.284	PK
2			5850.000	65.390	58.060	-56.810	122.200	7.331	PK
3			5853.360	66.275	58.946	-48.263	114.538	7.329	PK
4			5855.000	63.836	56.508	-46.964	110.800	7.327	PK
5			5867.303	65.387	58.026	-41.966	107.353	7.361	PK
6			5875.000	63.628	56.214	-41.572	105.200	7.414	PK
7			5915.663	65.181	57.887	-9.905	75.086	7.295	PK
8			5925.000	63.009	55.709	-5.191	68.200	7.299	PK
9		*	5973.285	64.975	57.611	-3.225	68.200	7.364	PK

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

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