MEASUREMENT REPORT

FCC PART 15.407 / RSS-247 WLAN 802.11a/n

FCC ID	:	2ACS5-ST10C
IC	:	11554B-ST10C
APPLICANT	:	Yuneec Technology Co., Limited
Application Type	:	Certification
Product	:	Personal Ground Station
Model No.	:	ST10C
Brand Name	:	YUNEEC
FCC Classification	:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s)	:	Part 15.407
IC Rule(s)	:	RSS-247 Issue 2, RSS-GEN Issue 4
Test Procedure(s)	:	ANSI C63.10-2013, KDB 789033 D02v01r04
Test Date	:	October 10 ~ December 07, 2017

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

Testing Laboratory
3261

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 D02v01r04. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1711TW0140-U2	Rev. 01	Initial report	12-12-2017	Valid

CONTENTS

Description Page

§2.1033 General Information

Applicant:	Yuneec Technology Co., Limited
Applicant Address:	Unit 2301, 23/F, 9 Chong Yip Street, Kwun Tong, Kowloon, Hong Kong
Manufacturer:	Yuneec International (China) Co., Ltd.
Manufacturer Address:	No.388 East Zhengwei Road, Jinxi Town, Kunshan, Jiangsu 215324, China
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
FCC Registration No.:	153292
IC Registration No.:	21723
FCC Rule Part(s):	Part 15.407
IC Rule(s):	RSS-247 Issue 2, RSS-GEN Issue 4
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Unlicensed National Information Infrastructure (UNII)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (Reg. No. 153292) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.**
- **MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.**

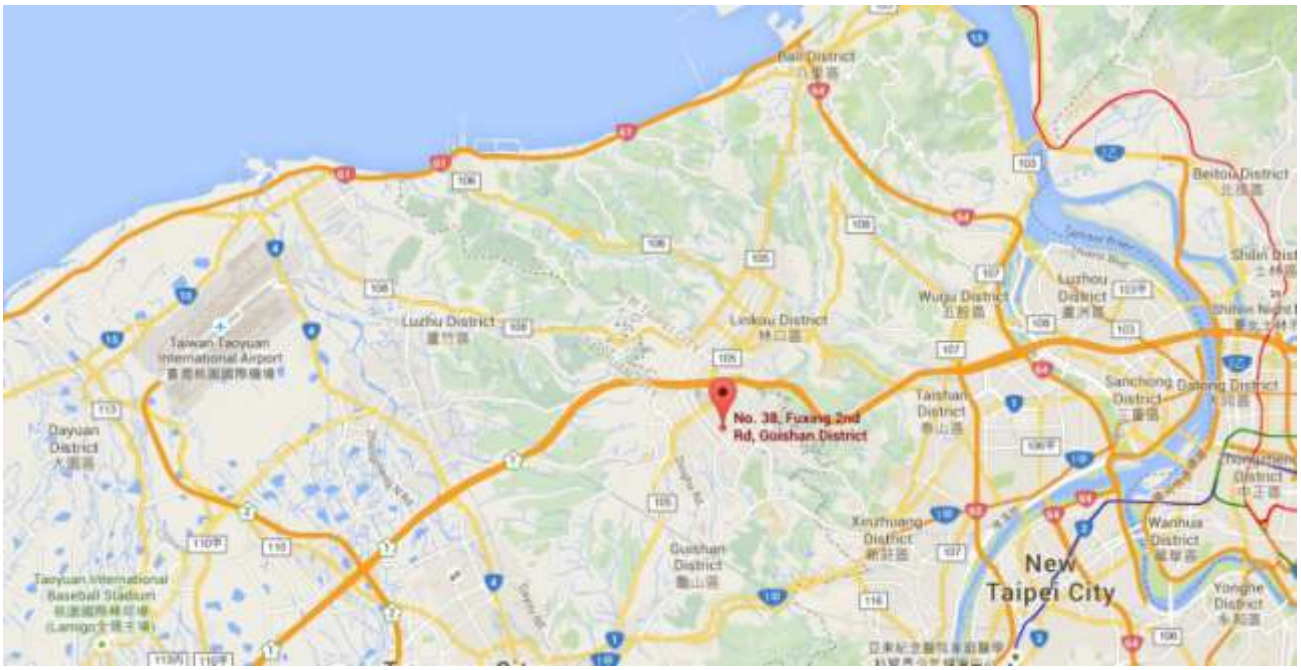
1. INTRODUCTION

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 Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Personal Ground Station
Model No.	ST10C
Brand Name	YUNEEC
Wi-Fi Specification	802.11a/n-HT20
ZigBee Specification	802.15.4

2.2. Product Specification Subjective to this Report

Frequency Range	802.11a/n-HT20: 5180~5240MHz, 5745~5825MHz
Type of Modulation	802.11a/n-HT20: OFDM
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n-HT20: up to 72.2Mbps
Maximum Average Output Power	802.11a: 17.88dBm 802.11n-HT20: 17.90dBm

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

2.4. Description of Available Antennas

Antenna Type	Manufacturer	Frequency Band (MHz)	Max Peak Gain (dBi)
Dipole Antenna	Cortec Technology Inc.	2400 ~ 2483.5	1.22
Omni-directional Antenna	Yuneec Technology Co., Limited	5180 ~ 5240	4.08
		5745 ~ 5825	1.08

2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20

2.6. Description of Test Software

The test utility software used during testing was engineering directive ordered by applicant.

Mode	Channel No.	Frequency (MHz)	Power Parameter Value
802.11a	36	5180	45
	44	5220	46
	48	5240	45
	149	5745	42
	157	5785	42
	165	5825	40
802.11n-HT20	36	5180	45
	44	5220	45
	48	5240	45
	149	5745	46
	157	5785	45
	165	5825	44

2.7. Device Capabilities

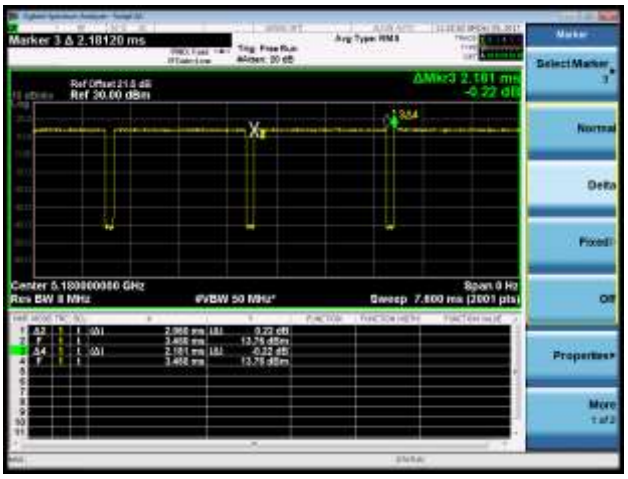
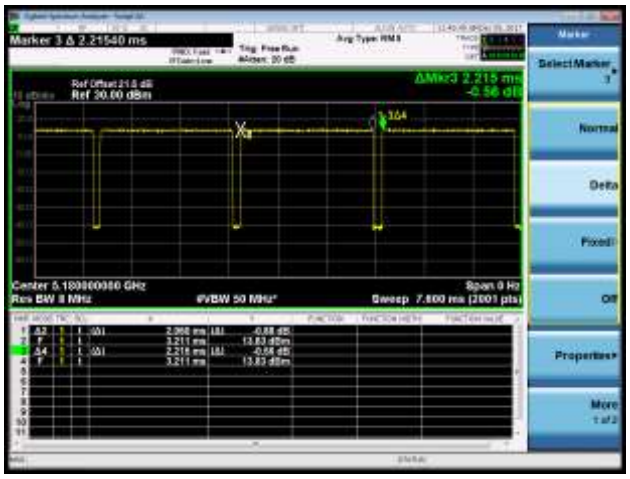
This device contains the following capabilities:

2.4GHz ZigBee (DTS), 5.8GHz WLAN (UNII)

Note: 5GHz (UNII) 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 duty cycles are as follows:

Test Mode	Duty Cycle
802.11a	94.45 %
802.11n-HT20	93.00 %

802.11a - T = 2.060 ms	802.11n-HT20 - T = 2.060 ms
	

2.8. Test Configuration

The **Personal Ground Station FCC ID: 2ACS5-ST10C** was tested per the guidance of KDB 789033 D02v01r04. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and 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 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 KDB 789033 D02v01r04 were used in the measurement of the **Personal Ground Station FCC ID: 2ACS5-ST10C.**
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, 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, 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, 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 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 **Personal Ground Station** is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Personal Ground Station FCC ID: 2ACS5-ST10C** 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	MRTTWA00045	1 year	2018/03/17
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2018/03/23
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2018/03/23
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2018/06/08

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2018/03/02
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2018/03/16
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2018/04/06
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2018/04/06
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2018/04/06
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2018/04/06
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2018/04/06
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2018/04/06
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2018/06/08

Conducted Test Equipment - SR1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2018/07/10
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2018/03/18
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2018/03/18
Programmable Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTTWA00036	1 year	2018/05/11
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2018/06/08

Software	**Version**	**Function**
e3	V 8.3.5	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 ~ 40GHz: 4.76dB
Spurious Emissions, Conducted - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Company Name: **Yuneec Technology Co., Limited**
FCC ID: **2ACS5-ST10C**
IC: **11554B-ST10C**

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)(3)	Maximum Conducted Output Power	≤ 23.98 dBm U-NII-1 ≤ 30 dBm U-NII-3		Pass	Section 7.4
15.407(a)(3), (5)	Peak Power Spectral Density	≤ 11 dBm/MHz U-NII-1 ≤ 30 dBm/500kHz U-NII-3		Pass	Section 7.5
15.407(g)	Frequency Stability	N/A		Pass	Section 7.6
15.407(b)(4)(i)	Undesirable Emissions	≤ -27dBm/MHz EIRP Detail see section 7.8	Radiated	Pass	Section 7.7 & 7.8
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 in 15.209		Pass	
15.207	RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Section 7.9

RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
RSS-247 §6.2	99% Bandwidth	N/A	Conducted	Pass	Section 7.2
RSS-247 §6.2.4	6dB Bandwidth	>500kHz		Pass	Section 7.3
RSS-247 §6.2.4	Max Conducted Output Power	Refer to section 7.4		Pass	Section 7.4
RSS-247 §6.2.4	Peak Power Spectral Density	Refer to section 7.5		Pass	Section 7.5
RSS-Gen [8.11]	Frequency Stability	N/A		Pass	Section 7.6
RSS-247 §6.2.4	Out-of-Band Emissions	≤ -27dBm/MHz EIRP ≤ -17dBm/MHz EIRP	Radiated	Pass	Section 7.7 & 7.8
RSS-247 §6.2.4	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in RSS-Gen [8.9]		Pass	
RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	≤ RSS-Gen [8.8] Limit	Line Conducted	Pass	Section 7.9

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. 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.
2) 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.

7.2. 26dB Bandwidth Measurement

7.2.1.Test Limit

N/A

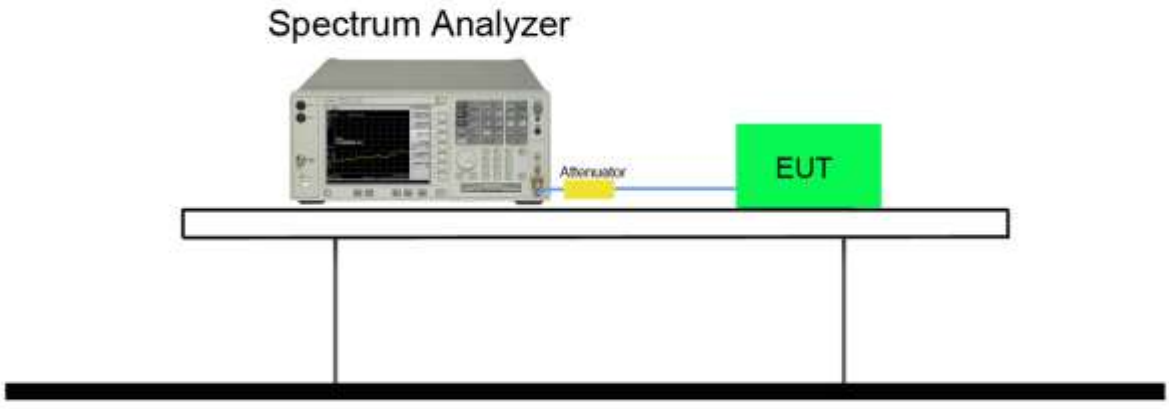
7.2.2.Test Procedure used

KDB 789033 D02v01r04 – 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.

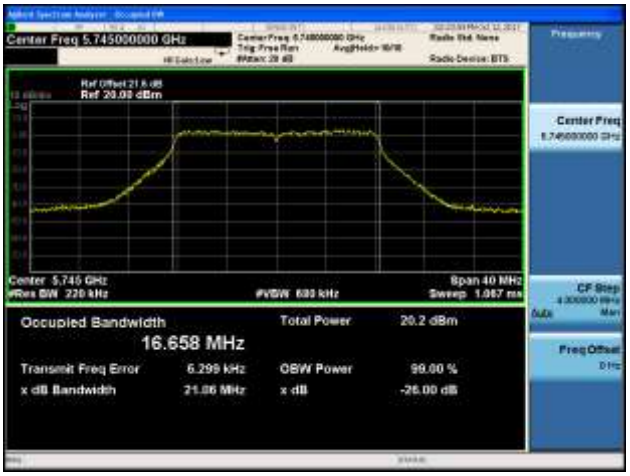
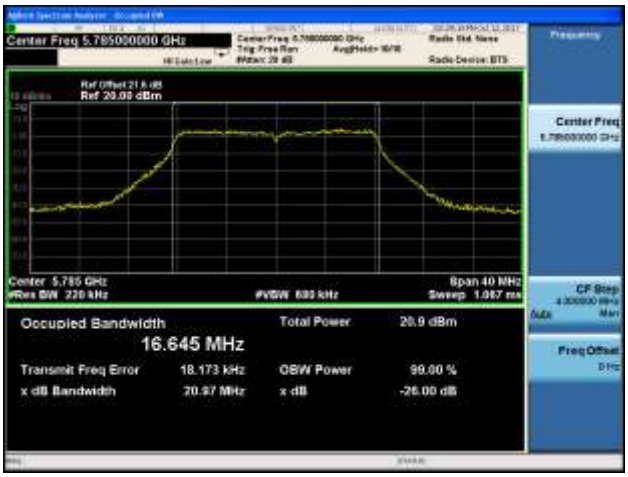
7.2.4.Test Setup



7.2.5.Test Result

Product	Personal Ground Station	Temperature	24°C
Test Engineer	Kevin Ker	Relative Humidity	59%
Test Site	SR1	Test Date	2017/10/12

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6	36	5180	21.54	17.76
802.11a	6	44	5220	21.58	17.76
802.11a	6	48	5240	21.40	17.74
802.11a	6	149	5745	21.06	16.66
802.11a	6	157	5785	20.97	16.65
802.11a	6	165	5825	20.98	16.65
802.11n-HT20	6.5	36	5180	21.74	17.76
802.11n-HT20	6.5	44	5220	21.62	17.77
802.11n-HT20	6.5	48	5240	21.93	17.78
802.11n-HT20	6.5	149	5745	21.23	17.71
802.11n-HT20	6.5	157	5785	21.33	17.69
802.11n-HT20	6.5	165	5825	21.44	17.68

802.11a 26dB Bandwidth & 99% Bandwidth	
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	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

7.3. 6dB Bandwidth Measurement

7.3.1.Test Limit

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

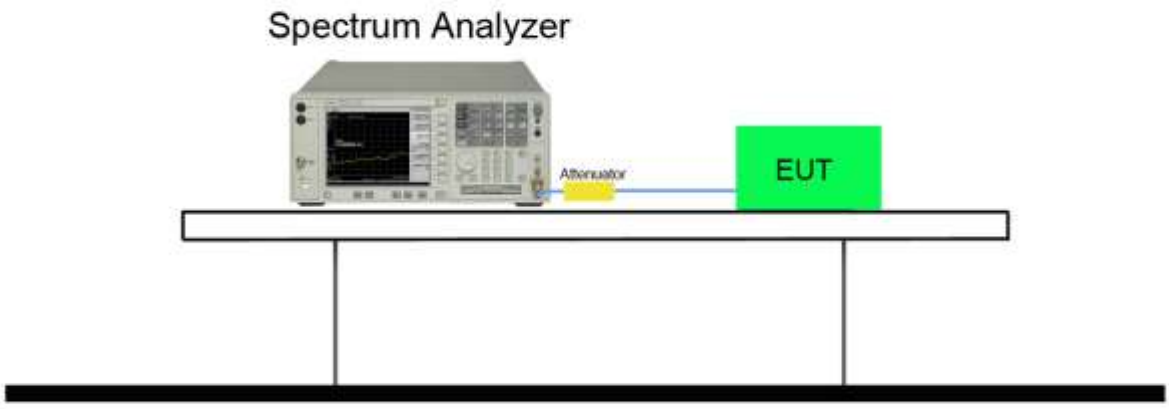
7.3.2.Test Procedure used

KDB 789033 D02v01r04 – 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



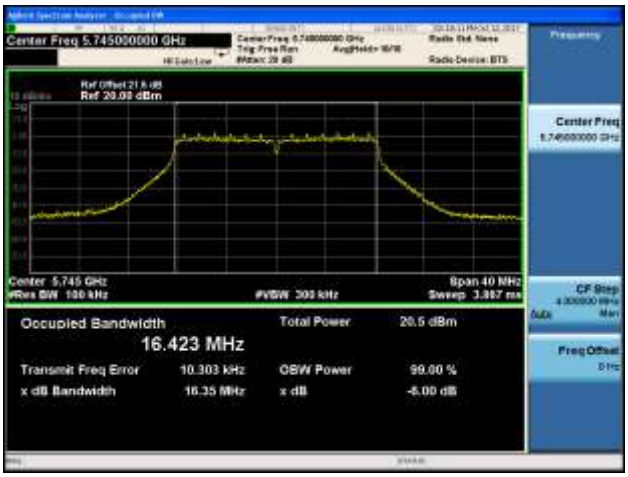
7.3.5.Test Result

Product	Personal Ground Station	Temperature	24°C
Test Engineer	Kevin Ker	Relative Humidity	59%
Test Site	SR1	Test Date	2017/10/12

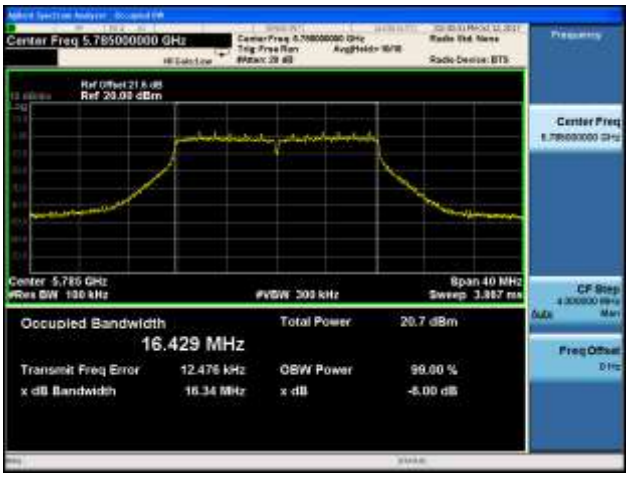
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6	149	5745	16.35	≥ 0.5	Pass
802.11a	6	157	5785	16.34	≥ 0.5	Pass
802.11a	6	165	5825	16.34	≥ 0.5	Pass
802.11n-HT20	6.5	149	5745	17.30	≥ 0.5	Pass
802.11n-HT20	6.5	157	5785	17.30	≥ 0.5	Pass
802.11n-HT20	6.5	165	5825	17.53	≥ 0.5	Pass

802.11a 6dB Bandwidth

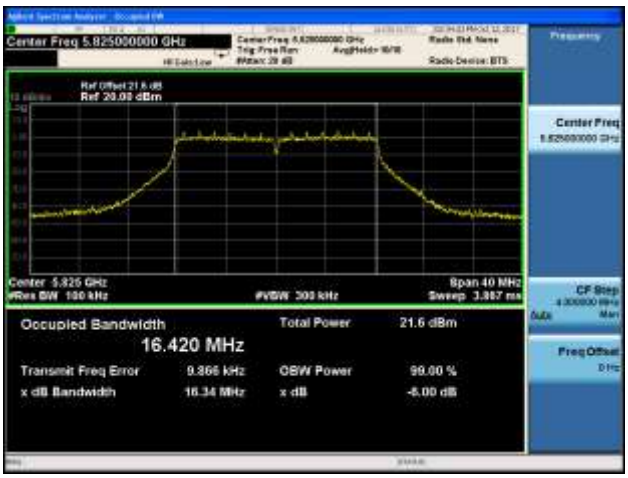
Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



802.11n-HT20 6dB Bandwidth	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

7.4. Output Power Measurement

7.4.1.Test Limit

For FCC

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

For IC

For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW (23.01dBm) or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

For the 5.725-5.85 GHz band, the maximum conducted output power shall not exceed 1 W.

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 the antenna exceeds 6dBi.

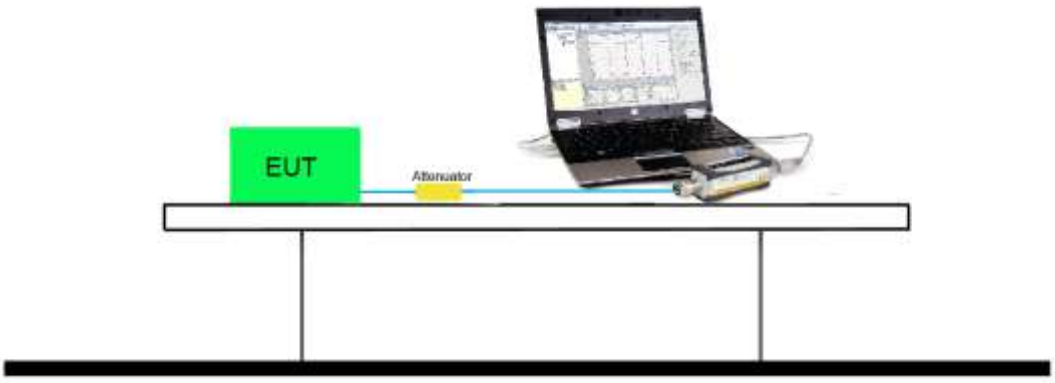
7.4.2.Test Procedure Used

KDB 789033 D02v01r04 - 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. The trace was averaged over 100 traces to obtain the final measured average power.

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 (Gray Marker) for final test of each channel.

Test Mode	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)
802.11a	5785	6	17.55
		24	17.32
		54	17.03
802.11n-HT20	5785	6.5	17.76
		39.0	17.39
		65.0	17.13

Product	Personal Ground Station	Temperature	22°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	SR1	Test Date	2017/11/10
Test Item	Output Power (FCC & IC)		

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Average Power Limit (dBm)	Max EIRP (dBm)	EIRP Limit (dBm)	Result
802.11a	6	36	5180	17.41	≤ 24.00	21.49	22.49	Pass
802.11a	6	44	5220	17.88	≤ 24.00	21.96	22.49	Pass
802.11a	6	48	5240	17.24	≤ 24.00	21.32	22.49	Pass
802.11a	6	149	5745	17.43	≤ 30.00	--	--	Pass
802.11a	6	157	5785	17.55	≤ 30.00	--	--	Pass
802.11a	6	165	5825	17.81	≤ 30.00	--	--	Pass
802.11n-HT20	6.5	149	5180	17.59	≤ 24.00	21.67	22.49	Pass
802.11n-HT20	6.5	157	5220	17.47	≤ 24.00	21.55	22.49	Pass
802.11n-HT20	6.5	165	5240	17.35	≤ 24.00	21.43	22.49	Pass
802.11n-HT20	6.5	149	5745	17.70	≤ 30.00	--	--	Pass
802.11n-HT20	6.5	157	5785	17.76	≤ 30.00	--	--	Pass
802.11n-HT20	6.5	165	5825	17.90	≤ 30.00	--	--	Pass

Note 1: The Max EIRP (dBm) = Average Power (dBm) + Antenna Gain (dBi).

Note 2: EIRP Limit Calculation as below:

For 5150 ~ 5250MHz

802.11a: 10 + 10 log10 (17.74MHz) = 22.49dBm < 23.01dBm;

802.11n-HT20: 10 + 10 log10 (17.76MHz) = 22.49dBm < 23.01dBm;

7.5. Power Spectral Density Measurement

7.5.1.Test Limit

For FCC

For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For IC

For the 5.15-5.25 GHz band, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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

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

7.5.2.Test Procedure Used

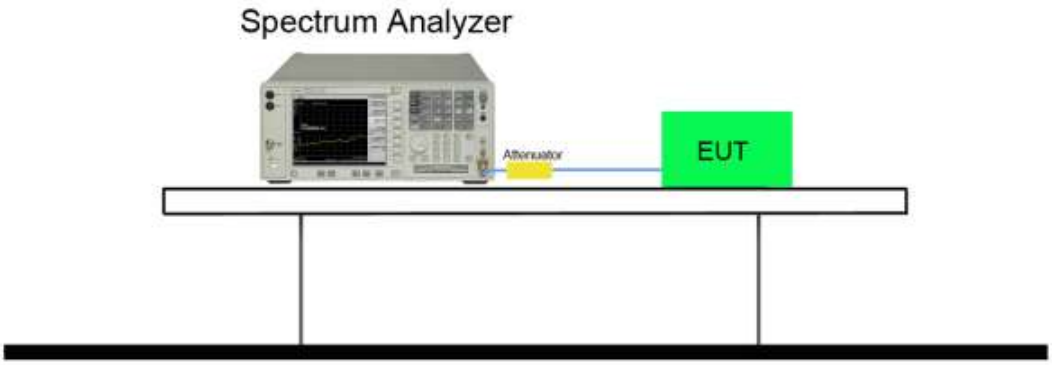
KDB 789033 D02v01r04 - Section F

7.5.3.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 OBW 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 (RMS)
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.

7.5.4.Test Setup



7.5.5.Test Result

Product	Personal Ground Station	Temperature	24°C
Test Engineer	Kevin Ker	Relative Humidity	59%
Test Site	SR1	Test Date	2017/12/05
Test Item	Power Spectral Density (FCC & IC U-NII-1)		

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Final PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	EIRP PSD (dBm/ MHz)	EIRP PSD Limit (dBm /MHz)	Result
802.11a	6	36	5180	5.25	94.45	5.50	≤ 11	9.58	≤ 10	Pass
802.11a	6	44	5220	5.39	94.45	5.64	≤ 11	9.72	≤ 10	Pass
802.11a	6	48	5240	5.05	94.45	5.30	≤ 11	9.38	≤ 10	Pass
802.11n-HT20	6	36	5180	5.04	93.00	5.36	≤ 11	9.44	≤ 10	Pass
802.11n-HT20	6	44	5220	4.97	93.00	5.29	≤ 11	9.37	≤ 10	Pass
802.11n-HT20	6	48	5240	5.30	93.00	5.62	≤ 11	9.70	≤ 10	Pass

Note 1: When EUT duty cycle ≥ 98%, the Final PSD (dBm/MHz) = PSD (dBm/MHz).

Note 2: When EUT duty cycle < 98%, the Final PSD (dBm/MHz) = PSD (dBm/MHz) + 10*log (1/Duty Cycle).

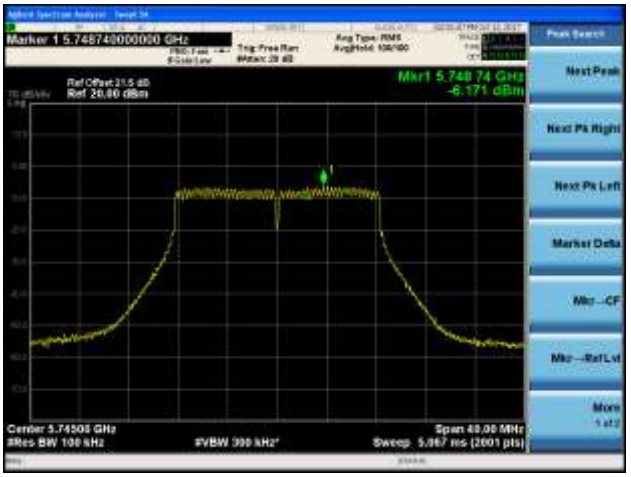
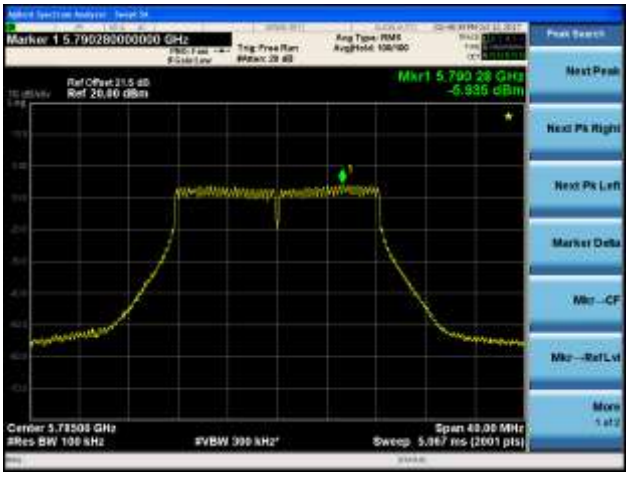
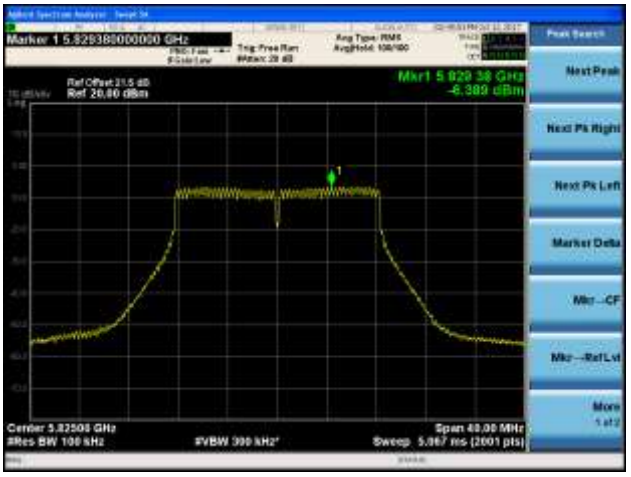
Note 3: EIRP PSD (dBm/MHz) = Final PSD (dBm/MHz) + Antenna Gain (dBi).

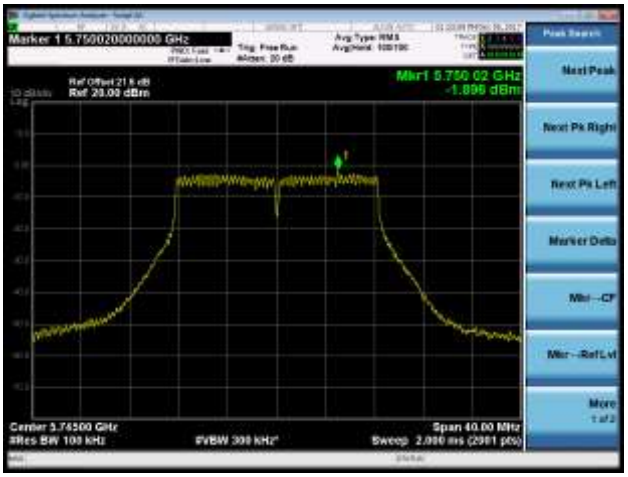
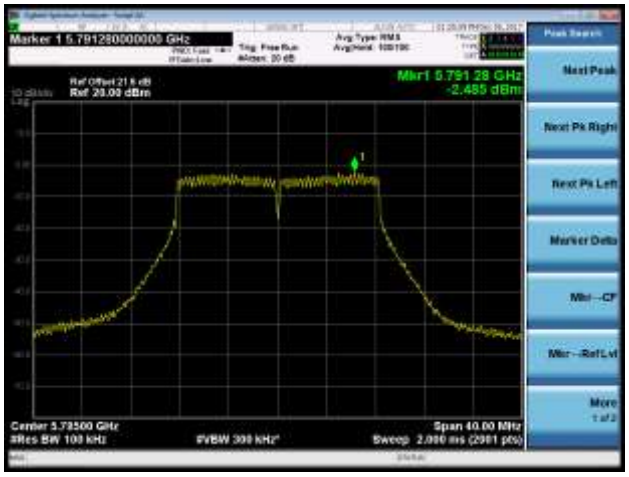
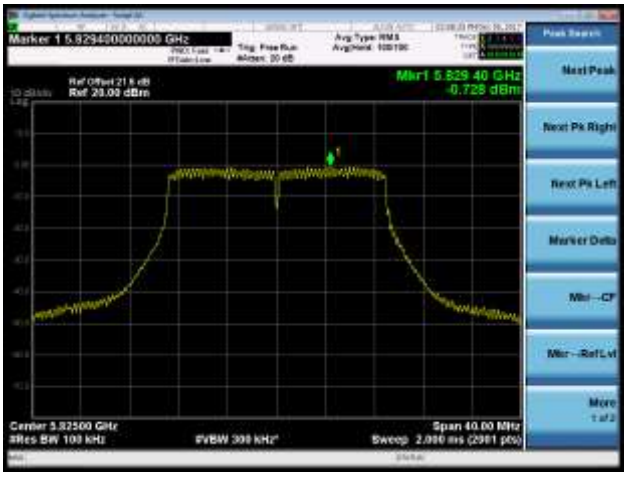
Product	Personal Ground Station	Temperature	24°C
Test Engineer	Kevin Ker	Relative Humidity	59%
Test Site	SR1	Test Date	2017/10/12
Test Item	Power Spectral Density (FCC & IC U-NII-3)		

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ 100KHz)	Duty Cycle (%)	Constant Factor	Final PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
802.11a	6	149	5745	-6.17	94.45	6.99	1.07	≤ 30.00	Pass
802.11a	6	157	5785	-5.94	94.45	6.99	1.30	≤ 30.00	Pass
802.11a	6	165	5825	-6.39	94.45	6.99	0.85	≤ 30.00	Pass
802.11n-HT20	6.5	149	5745	-1.90	93.00	6.99	5.41	≤ 30.00	Pass
802.11n-HT20	6.5	157	5785	-2.49	93.00	6.99	4.82	≤ 30.00	Pass
802.11n-HT20	6.5	165	5825	-0.73	93.00	6.99	6.58	≤ 30.00	Pass

Note 1: When EUT duty cycle ≥ 98%, the Final PSD (dBm/500kHz) = PSD (dBm/100kHz) + Constant Factor.

Note 2: When EUT duty cycle < 98%, the Final PSD (dBm/500kHz) = PSD (dBm/100kHz) + Constant Factor + 10*log (1/Duty Cycle).

802.11a Power Spectral Density	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT20 Power Spectral Density	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

7.6. Frequency Stability Measurement

7.6.1.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.

The transmitter center frequency tolerance shall be ±20 ppm maximum for the 5GHz band (IEEE 802.11 specification).

7.6.2.Test Procedure Used

Frequency Stability Under Temperature Variations:

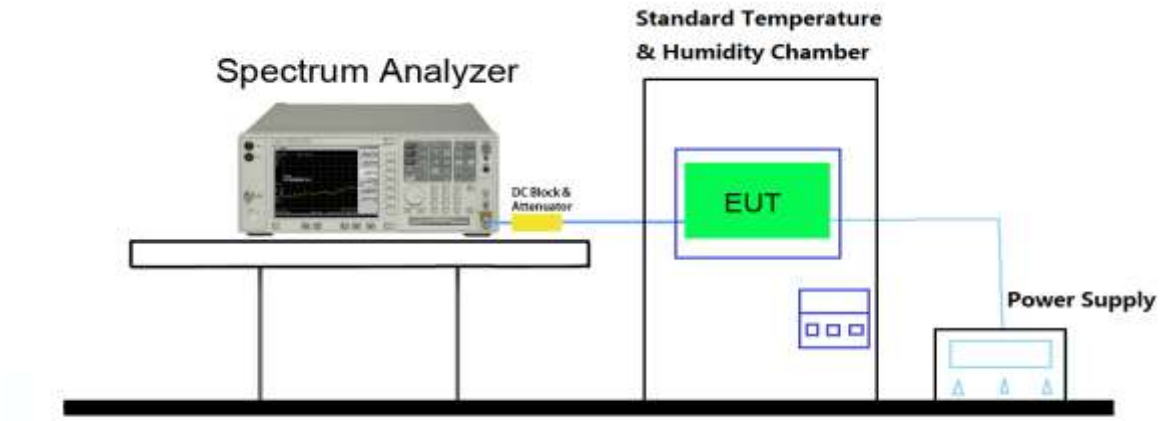
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain 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, record the maximum frequency change.

7.6.3.Test Setup



7.6.4.Test Result

Test Engineer	Kevin Ker	Temperature	-30 ~ 50°C
Test Time	2017/11/10	Relative Humidity	52%RH
Test Mode	5180MHz (Carrier Mode)	Test Site	SR1

Voltage (%)	Power (VAC)	Temp (°C)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	3.6	- 30	-3.72	-3.61	-3.51	-3.10
		- 20	-3.86	-3.62	-3.61	-3.23
		- 10	-3.66	-3.63	-3.58	-3.33
		0	-3.71	-3.73	-3.22	-3.48
		+ 10	-3.63	-3.73	-3.51	-3.81
		+ 20 (Ref)	-3.24	-3.52	-3.60	-3.88
		+ 30	-3.22	-3.11	-3.09	-3.03
		+ 40	-3.44	-3.55	-3.77	-3.52
		+ 50	-4.52	-4.50	-4.45	-4.22
115%	4.14	+ 20	-3.48	-3.44	-3.36	-3.50
85%	3.06	+ 20	-3.33	-3.24	-3.26	-2.43

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

7.7. Radiated Spurious Emission Measurement

7.7.1.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.

All out of band emissions appearing in a restricted band as specified in Section 8.10 of the RSS-Gen Issue 4 must not exceed the limits shown in Table per Section 8.9.

FCC Part 15 Subpart C Paragraph 15.209 & RSS-Gen Issue4 Section 8.9		
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

KDB 789033 D02v01r04 – Section G

7.7.3.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

Quasi-Peak Measurements below 1GHz

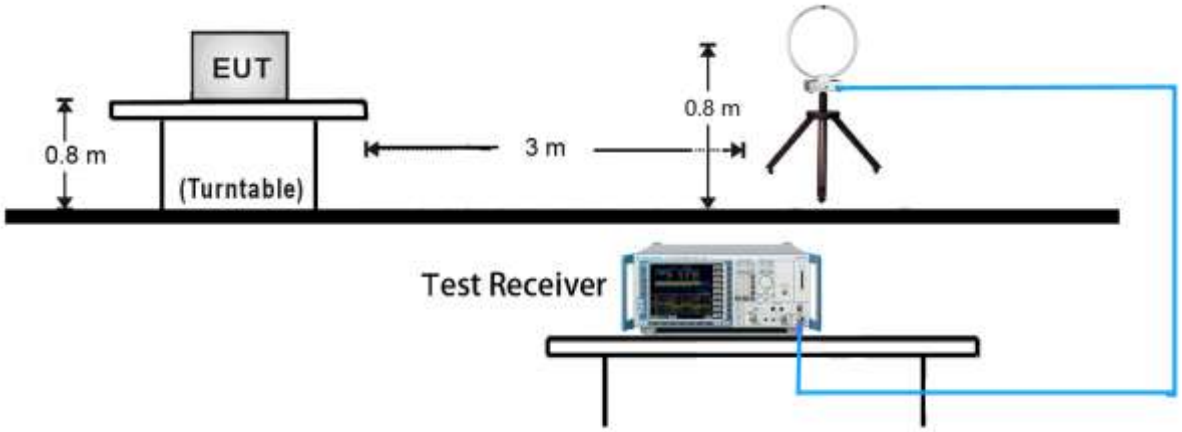
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 120 kHz
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Average Measurements above 1GHz (Method AD)

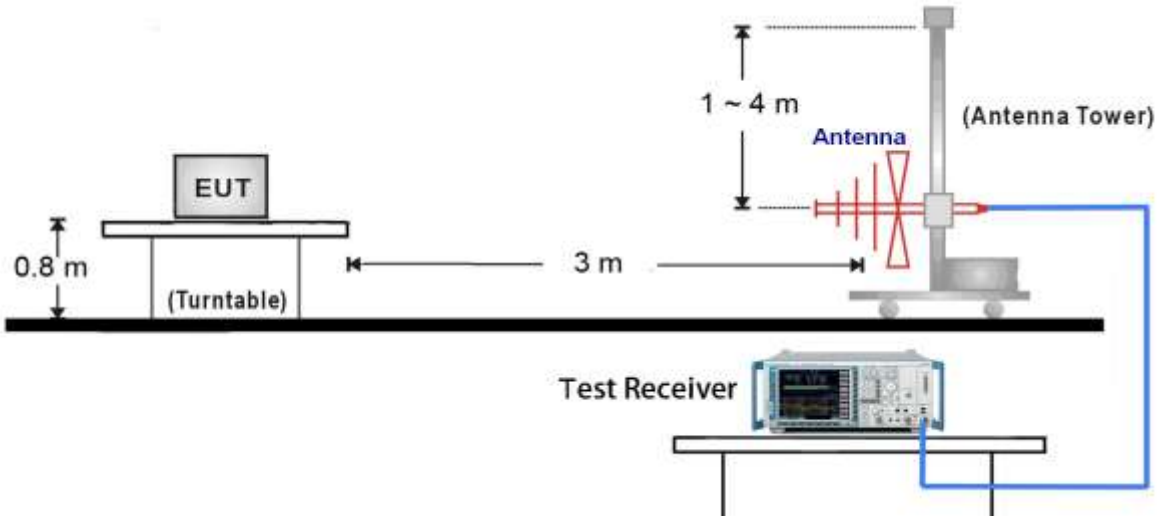
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be > 2 x span/RBW)
6. Sweep time = auto
7. Trace was averaged over at 100 sweeps

7.7.4.Test Setup

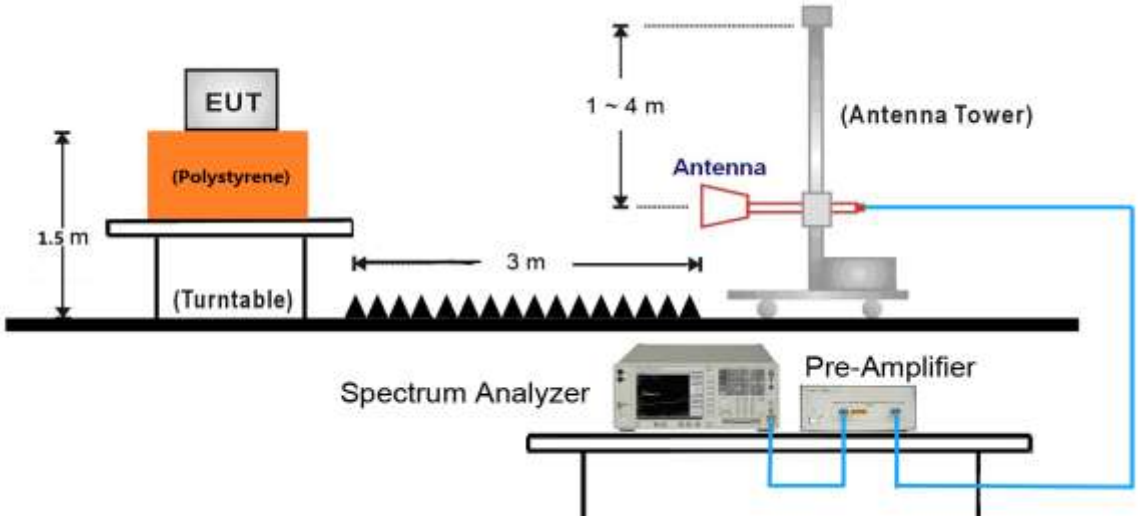
9kHz ~ 30MHz Test Setup:



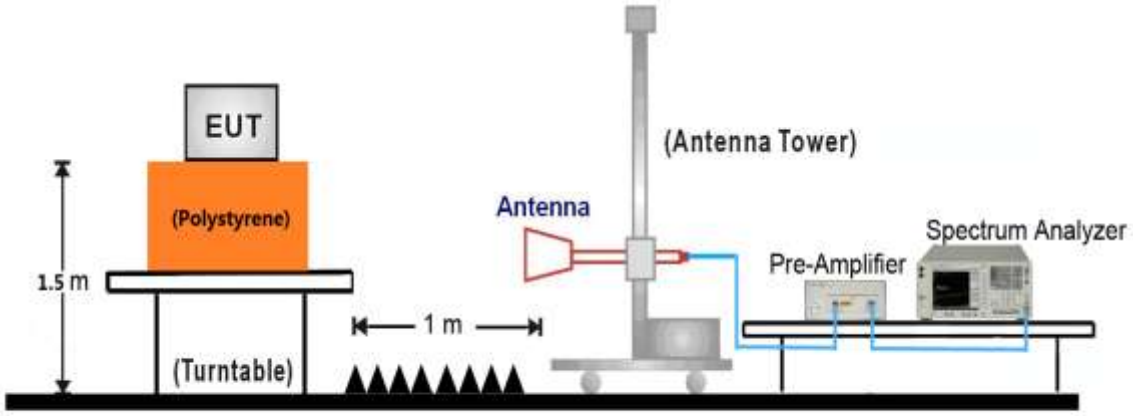
30MHz ~ 1GHz Test Setup:



1GHz ~18GHz Test Setup:



18GHz ~40GHz Test Setup:



7.7.5.Test Result

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	36	Test Engineer:	Kevin Ker
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
	7375.0	28.0	12.5	40.5	74.0	-33.5	Peak	Horizontal
	8352.5	31.3	12.0	43.3	74.0	-30.7	Peak	Horizontal
*	8998.5	29.0	14.1	43.1	68.2	-25.1	Peak	Horizontal
*	10078.0	28.9	15.6	44.5	68.2	-23.7	Peak	Horizontal
	7332.5	29.3	12.4	41.7	74.0	-32.3	Peak	Vertical
	8318.5	30.5	11.9	42.4	74.0	-31.6	Peak	Vertical
*	8905.0	29.4	14.0	43.4	68.2	-24.8	Peak	Vertical
*	10001.5	28.9	15.4	44.3	68.2	-23.9	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)

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	44	Test Engineer:	Kevin Ker
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
	7451.5	29.6	12.8	42.4	74.0	-31.6	Peak	Horizontal
	8429.0	31.1	12.4	43.5	74.0	-30.5	Peak	Horizontal
*	8888.0	28.9	14.0	42.9	68.2	-25.3	Peak	Horizontal
*	10095.0	29.2	15.7	44.9	68.2	-23.3	Peak	Horizontal
	7434.5	29.0	12.7	41.7	74.0	-32.3	Peak	Vertical
	8361.0	29.5	12.0	41.5	74.0	-32.5	Peak	Vertical
*	8845.5	29.7	14.0	43.7	68.2	-24.5	Peak	Vertical
*	9899.5	29.9	15.4	45.3	68.2	-22.9	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)

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	48	Test Engineer:	Kevin Ker
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
	7315.5	29.2	12.3	41.5	74.0	-32.5	Peak	Horizontal
	8361.0	29.6	12.0	41.6	74.0	-32.4	Peak	Horizontal
*	8888.0	28.2	14.0	42.2	68.2	-26.0	Peak	Horizontal
*	9891.0	29.1	15.5	44.6	68.2	-23.6	Peak	Horizontal
	7468.5	33.4	8.1	41.5	74.0	-32.5	Peak	Vertical
	8437.5	34.4	8.2	42.6	74.0	-31.4	Peak	Vertical
*	8828.5	33.9	9.1	43.0	68.2	-25.2	Peak	Vertical
*	10171.5	32.8	11.7	44.5	68.2	-23.7	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)

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	149	Test Engineer:	Kevin Ker
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
	7324.0	36.9	12.4	49.3	74.0	-24.7	Peak	Horizontal
	11480.5	35.9	19.3	55.2	74.0	-18.8	Peak	Horizontal
	11480.5	25.7	19.3	45.0	54.0	-9.0	Average	Horizontal
*	13002.0	26.6	19.9	46.5	68.2	-21.7	Peak	Horizontal
*	14243.0	25.6	23.1	48.7	68.2	-19.5	Peak	Horizontal
	7315.5	34.9	12.3	47.2	74.0	-26.8	Peak	Vertical
	11489.0	41.8	19.3	61.1	74.0	-12.9	Peak	Vertical
	11489.0	31.6	19.3	50.9	54.0	-3.1	Average	Vertical
*	13002.0	26.2	19.9	46.1	68.2	-22.1	Peak	Vertical
*	14260.0	26.1	23.1	49.2	68.2	-19.0	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)

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	157	Test Engineer:	Kevin Ker
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
	7324.0	31.9	12.4	44.3	74.0	-29.7	Peak	Horizontal
	8318.5	31.0	11.9	42.9	74.0	-31.1	Peak	Horizontal
*	8769.0	29.4	13.9	43.3	68.2	-24.9	Peak	Horizontal
*	10214.0	27.9	16.3	44.2	68.2	-24.0	Peak	Horizontal
	7613.0	30.0	12.6	42.6	74.0	-31.4	Peak	Vertical
	8412.0	30.1	12.3	42.4	74.0	-31.6	Peak	Vertical
*	9763.5	34.7	14.9	49.6	68.2	-18.6	Peak	Vertical
*	13741.5	26.5	22.0	48.5	68.2	-19.7	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)

Test Mode:	802.11a	Test Site:	AC1
Test Channel:	165	Test Engineer:	Kevin Ker
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
	7587.5	30.2	12.7	42.9	74.0	-31.1	Peak	Horizontal
	11650.5	37.6	19.3	56.9	74.0	-17.1	Peak	Horizontal
	11650.5	25.5	19.3	44.8	54.0	-9.2	Average	Horizontal
*	12908.5	27.0	19.5	46.5	68.2	-21.7	Peak	Horizontal
*	14251.5	25.0	23.1	48.1	68.2	-20.1	Peak	Horizontal
	7315.5	33.6	12.3	45.9	74.0	-28.1	Peak	Vertical
	11650.5	46.0	19.3	65.3	74.0	-8.7	Peak	Vertical
	11650.5	32.5	19.3	51.8	54.0	-2.2	Average	Vertical
*	12789.5	26.6	19.0	45.6	68.2	-22.6	Peak	Vertical
*	14209.0	26.1	23.1	49.2	68.2	-19.0	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	36	Test Engineer:	Kevin Ker
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
	7264.5	29.7	12.3	42.0	74.0	-32.0	Peak	Horizontal
	8310.0	30.7	11.9	42.6	74.0	-31.4	Peak	Horizontal
*	8820.0	30.6	14.0	44.6	68.2	-23.6	Peak	Horizontal
*	9976.0	29.5	15.3	44.8	68.2	-23.4	Peak	Horizontal
	7366.5	29.3	12.5	41.8	74.0	-32.2	Peak	Vertical
	8242.0	29.9	11.9	41.8	74.0	-32.2	Peak	Vertical
*	8888.0	30.6	14.0	44.6	68.2	-23.6	Peak	Vertical
*	10027.0	30.2	15.4	45.6	68.2	-22.6	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	44	Test Engineer:	Kevin Ker
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
	7324.0	28.7	12.4	41.1	74.0	-32.9	Peak	Horizontal
	8335.5	29.1	11.9	41.0	74.0	-33.0	Peak	Horizontal
*	8820.0	29.7	14.0	43.7	68.2	-24.5	Peak	Horizontal
*	10222.5	27.8	16.3	44.1	68.2	-24.1	Peak	Horizontal
	7400.5	28.3	12.6	40.9	74.0	-33.1	Peak	Vertical
	8454.5	29.0	12.5	41.5	74.0	-32.5	Peak	Vertical
*	8879.5	27.7	14.0	41.7	68.2	-26.5	Peak	Vertical
*	10188.5	27.3	16.2	43.5	68.2	-24.7	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	48	Test Engineer:	Kevin Ker
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
	7434.5	27.8	12.7	40.5	74.0	-33.5	Peak	Horizontal
	8276.0	30.1	11.9	42.0	74.0	-32.0	Peak	Horizontal
*	8820.0	28.1	14.0	42.1	68.2	-26.1	Peak	Horizontal
*	9967.5	30.0	15.3	45.3	68.2	-22.9	Peak	Horizontal
	7307.0	29.1	12.3	41.4	74.0	-32.6	Peak	Vertical
	8352.5	29.9	12.0	41.9	74.0	-32.1	Peak	Vertical
*	8896.5	28.9	14.0	42.9	68.2	-25.3	Peak	Vertical
*	10205.5	29.6	16.2	45.8	68.2	-22.4	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	149	Test Engineer:	Kevin Ker
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
	7366.5	29.6	12.5	42.1	74.0	-31.9	Peak	Horizontal
	8318.5	31.4	11.9	43.3	74.0	-30.7	Peak	Horizontal
*	8811.5	29.5	14.0	43.5	68.2	-24.7	Peak	Horizontal
*	10086.5	29.4	15.7	45.1	68.2	-23.1	Peak	Horizontal
	7451.5	28.9	12.8	41.7	74.0	-32.3	Peak	Vertical
	11497.5	33.6	19.3	52.9	74.0	-21.1	Peak	Vertical
*	12917.0	25.5	19.6	45.1	68.2	-23.1	Peak	Vertical
*	13801.0	25.2	22.1	47.3	68.2	-20.9	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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	157	Test Engineer:	Kevin Ker
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
	7332.5	29.9	12.4	42.3	74.0	-31.7	Peak	Horizontal
	8293.0	30.2	11.9	42.1	74.0	-31.9	Peak	Horizontal
*	8743.5	29.9	13.9	43.8	68.2	-24.4	Peak	Horizontal
*	10222.5	29.3	16.3	45.6	68.2	-22.6	Peak	Horizontal
	7485.5	28.1	12.8	40.9	74.0	-33.1	Peak	Vertical
	11574.0	33.5	19.5	53.0	74.0	-21.0	Peak	Vertical
*	12951.0	24.9	19.7	44.6	68.2	-23.6	Peak	Vertical
*	14039.0	25.1	22.7	47.8	68.2	-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)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	165	Test Engineer:	Kevin Ker
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
	7528.0	29.9	12.8	42.7	74.0	-31.3	Peak	Horizontal
	11650.5	30.1	19.3	49.4	74.0	-24.6	Peak	Horizontal
*	12883.0	26.9	19.4	46.3	68.2	-21.9	Peak	Horizontal
*	14294.0	25.8	23.1	48.9	68.2	-19.3	Peak	Horizontal
	7332.5	29.1	12.4	41.5	74.0	-32.5	Peak	Vertical
	11659.0	35.8	19.3	55.1	74.0	-18.9	Peak	Vertical
	11659.0	25.5	19.3	44.8	54.0	-9.2	Average	Vertical
*	13665.0	27.2	21.9	49.1	68.2	-19.1	Peak	Vertical
*	14149.5	26.8	23.0	49.8	68.2	-18.4	Peak	Vertical

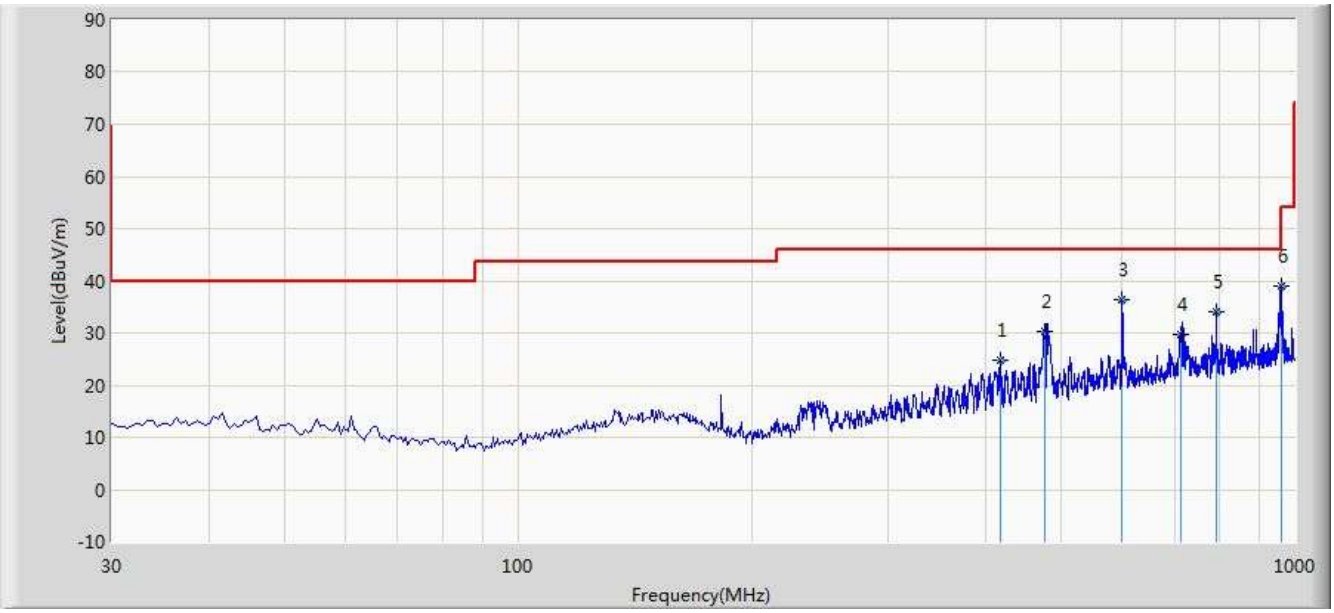
Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

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

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

The worst case of Radiated Emission below 1GHz:

Site: AC1	Time: 2017/10/17 - 18:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Worse Case Mode: Transmit by 802.11a at Channel 5745MHz	



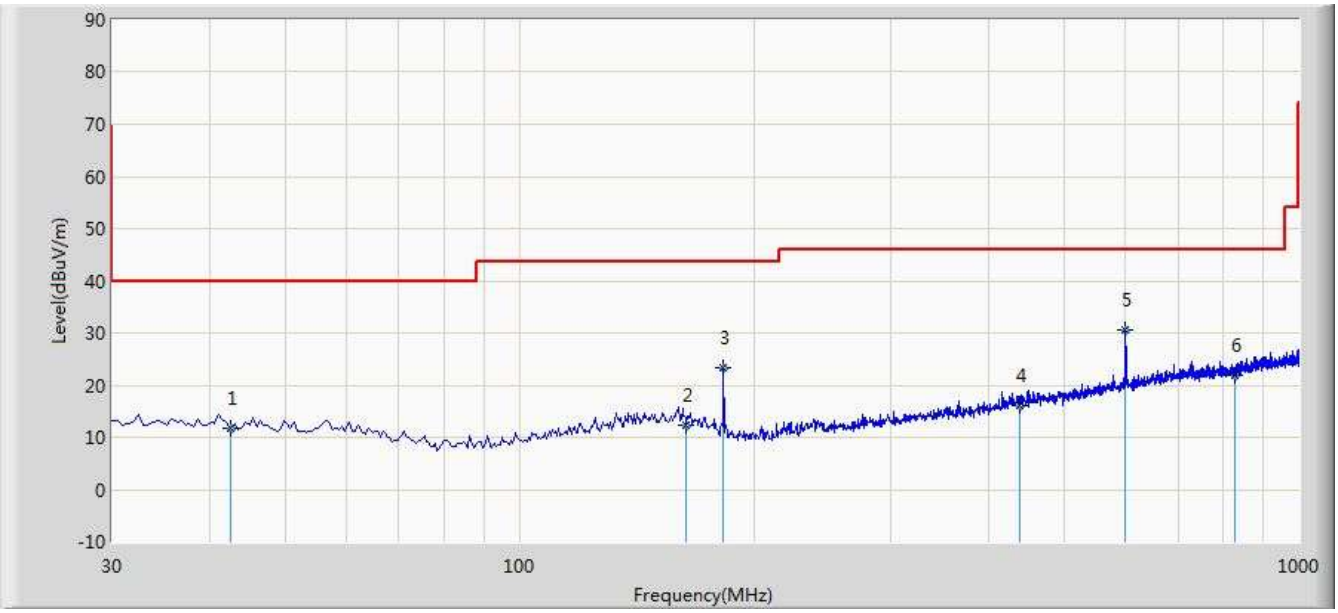
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			417.515	24.739	7.534	-21.261	46.000	17.204	QP
2			476.200	30.413	12.253	-15.587	46.000	18.160	QP
3		*	599.875	36.513	16.193	-9.487	46.000	20.320	QP
4			712.395	29.731	7.681	-16.269	46.000	22.049	QP
5			791.935	33.944	10.909	-12.056	46.000	23.035	QP
6			960.230	38.848	13.938	-15.152	54.000	24.910	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.

Site: AC1	Time: 2017/10/17 - 18:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Worse Case Mode: Transmit by 802.11a at Channel 5745MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			42.610	11.645	-2.729	-28.355	40.000	14.374	QP
2			163.860	12.456	2.345	-31.044	43.500	10.112	QP
3			182.775	23.395	12.116	-20.105	43.500	11.280	QP
4			438.370	16.122	-1.347	-29.878	46.000	17.469	QP
5		*	599.875	30.681	10.361	-15.319	46.000	20.320	QP
6			828.310	21.756	-1.837	-24.244	46.000	23.593	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.

7.8. Radiated Restricted Band Edge Measurement

7.8.1.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	8.25 - 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	--	--	--

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.

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 [V/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

For RSS-Gen Section 8.10 Requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 8.10 of RSS-Gen, must also comply with the radiated emission limits specified in Section 8.9.

Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.009 - 0.110	240 - 285	9.0 - 9.2
2.1735 - 2.1905	322 - 335.4	9.3 - 9.5
3.020 - 3.026	399.9 - 410	10.6 - 12.7
4.125 - 4.128	608 - 614	13.25 - 13.4
4.17725 - 4.17775	960 - 1427	14.47 - 14.5
4.20725 - 4.20775	1435 - 1626.5	15.35 - 16.2
5.677 - 5.683	1645.5 - 1646.5	17.7 - 21.4
6.215 - 6.218	1660 - 1710	22.01 - 23.12
6.26775 - 6.26825	1718.8 -1722.2	23.6 - 24.0
6.31175 - 6.31225	2200 - 2300	31.2 - 31.8
8.291 - 8.294	2310 -2390	36.43 - 36.5
8.362 - 8.366	2655 - 2900	Above 38.6
8.37625 - 8.38675	3260 - 3267	--
8.41425 - 8.41475	3332 -3339	
12.29 - 12.293	334.5 - 3358	
12.51975 - 12.52025	3500 - 4400	
12.57675 - 12.57725	4500 - 5150	
13.36 -13.41	5350 - 5460	
16.42 - 16.423	7250 - 7750	
16.69475 - 16.69525	8025 - 8500	
16.80425 - 16.80475	--	
25.5 - 25.67		
37.5 - 38.25		
73 - 74.6		
74.8 - 75.2		
108 - 138		
156.52475 - 156.525225		
156.7 - 156.9		

Note: *Certain frequency bands listed in Table 6 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to the devices

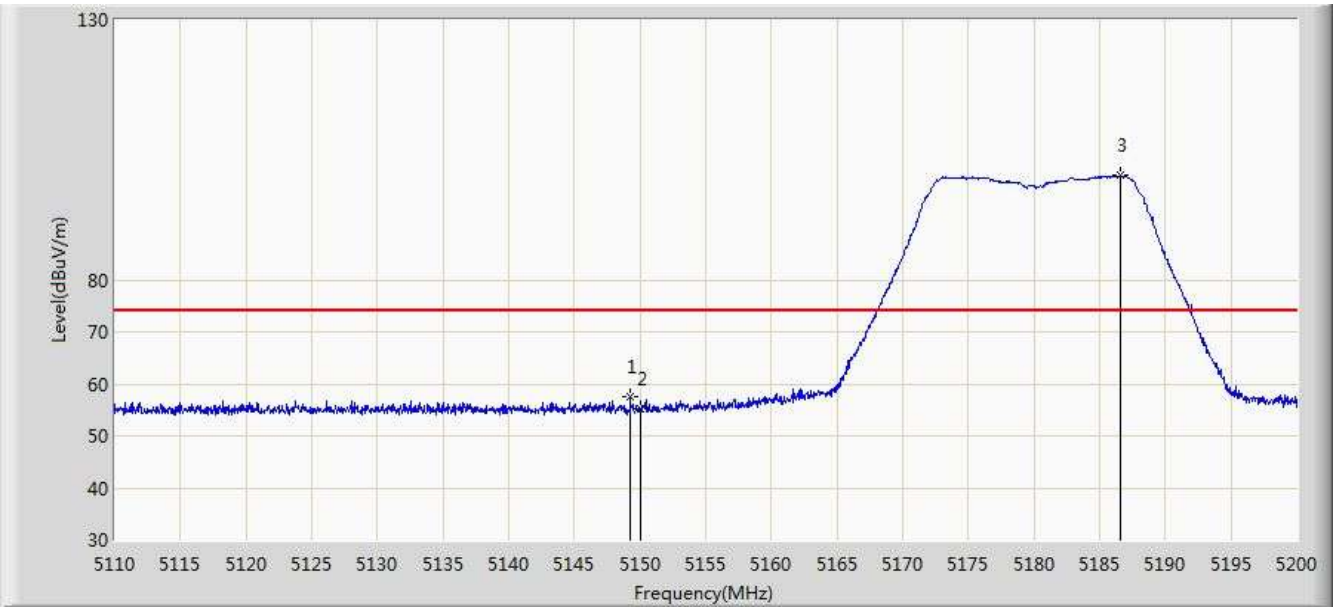
are set out in the 200- and 300-series of RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.

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 band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:
a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5MHz above or below the band edges;
b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.
All out of band emissions appearing in a restricted band as specified in Section 8.10 of the RSS-Gen must not exceed the limits shown in Table per Section 8.9.

RSS-Gen Section 8.9		
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 Result of Radiated Restricted Band Edge

Site: AC1	Time: 2017/12/07 - 00:17
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at channel 5180MHz	

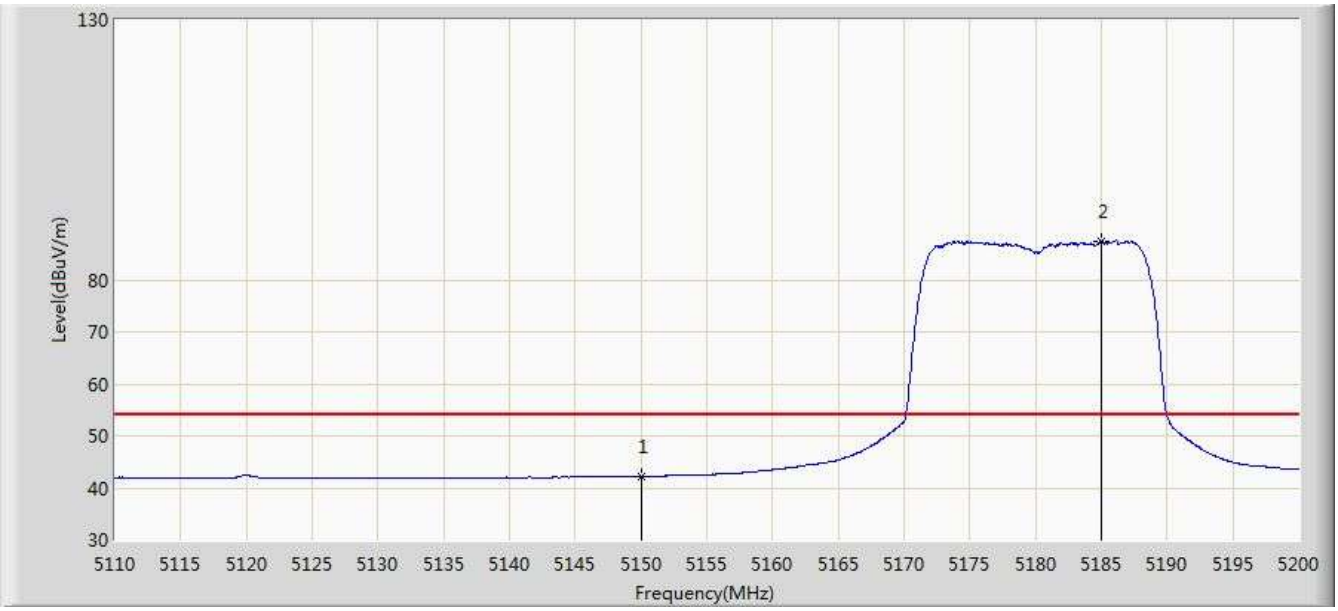


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5149.240	57.603	53.431	-16.397	74.000	4.172	PK
2			5150.000	55.221	51.052	-18.779	74.000	4.170	PK
3		*	5186.590	100.014	95.968	N/A	N/A	4.045	PK

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

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

Site: AC1	Time: 2017/12/07 - 00:28
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at channel 5180MHz	

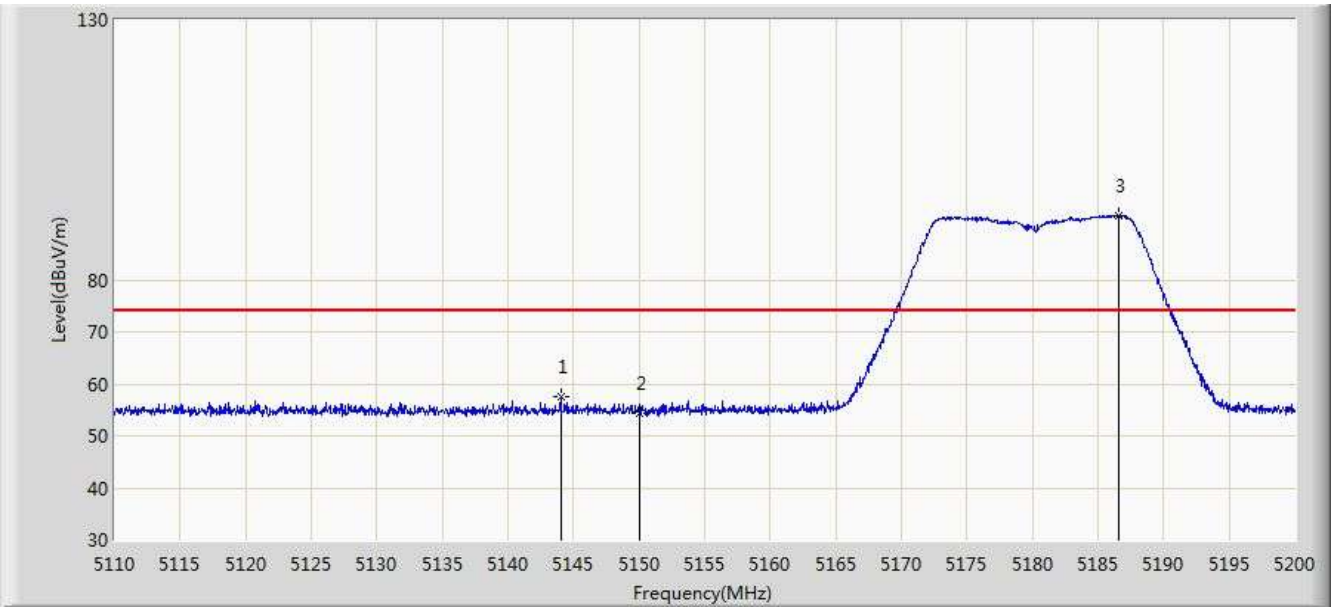


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	42.176	38.007	-11.824	54.000	4.170	AV
2		*	5184.970	87.509	83.458	N/A	N/A	4.052	AV

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

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

Site: AC1	Time: 2017/12/07 - 00:29
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at channel 5180MHz	

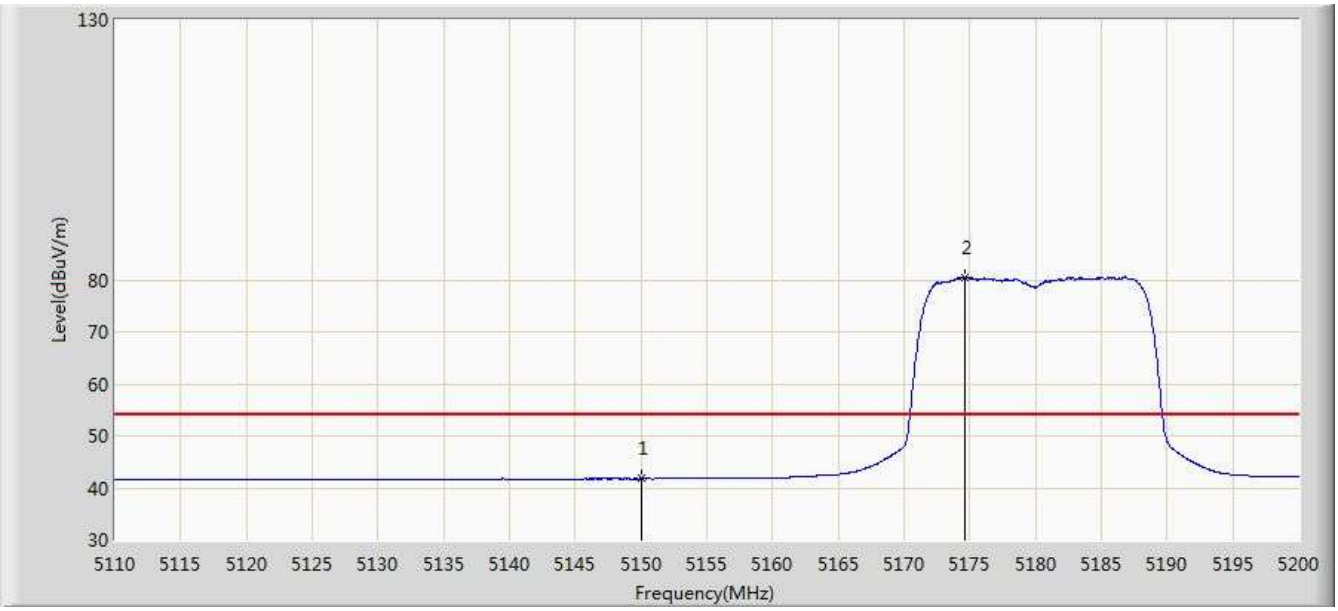


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5144.020	57.428	53.252	-16.572	74.000	4.176	PK
2			5150.000	54.313	50.144	-19.687	74.000	4.170	PK
3		*	5186.635	92.451	88.406	N/A	N/A	4.045	PK

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

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

Site: AC1	Time: 2017/12/07 - 00:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at channel 5180MHz	

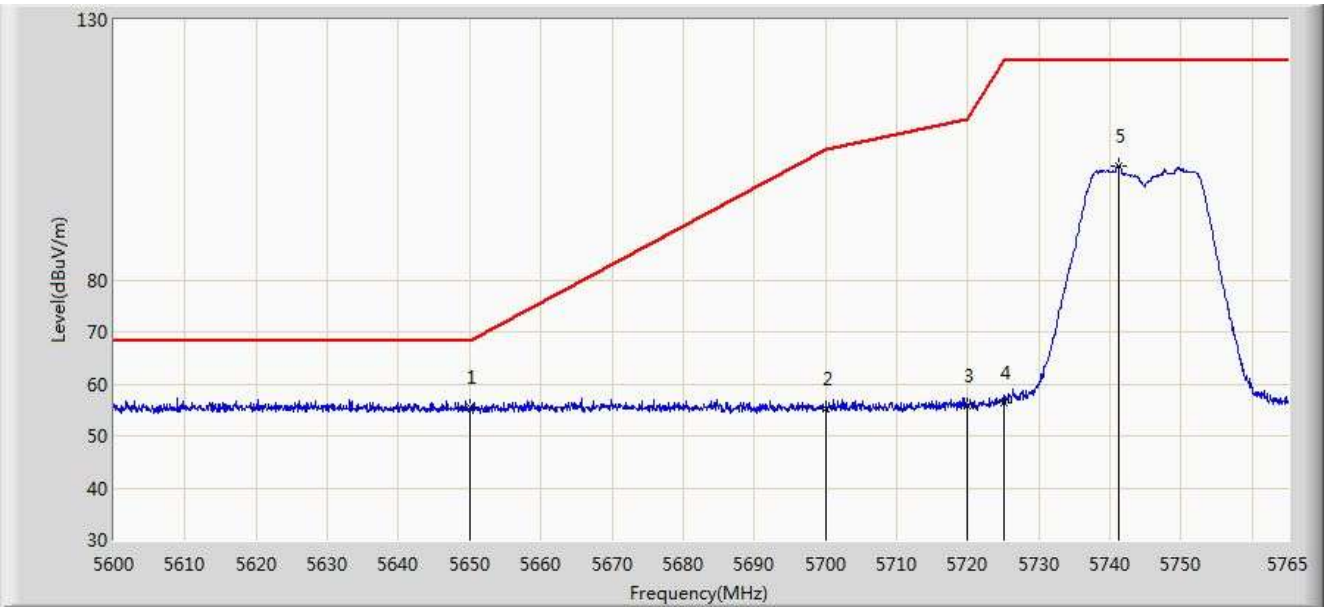


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	41.741	37.572	-12.259	54.000	4.170	AV
2		*	5174.665	80.506	76.418	N/A	N/A	4.088	AV

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

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

Site: AC1	Time: 2017/10/12 - 21:38
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at Channel 5745MHz	

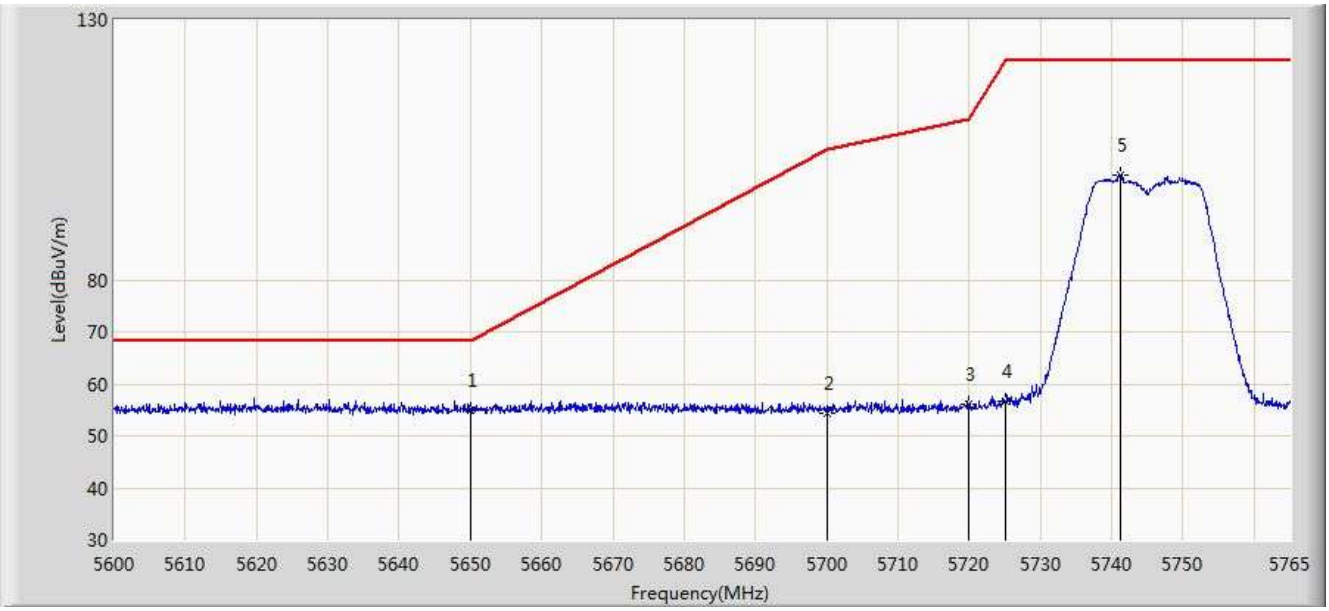


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5650.000	55.447	50.776	-12.753	68.200	4.671	PK
2			5700.000	55.195	50.317	-50.005	105.200	4.878	PK
3			5720.000	55.917	50.920	-54.883	110.800	4.997	PK
4			5725.000	56.306	51.277	-65.894	122.200	5.029	PK
5			5741.240	102.026	96.893	N/A	N/A	5.132	PK

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

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

Site: AC1	Time: 2017/10/12 - 21:41
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at Channel 5745MHz	

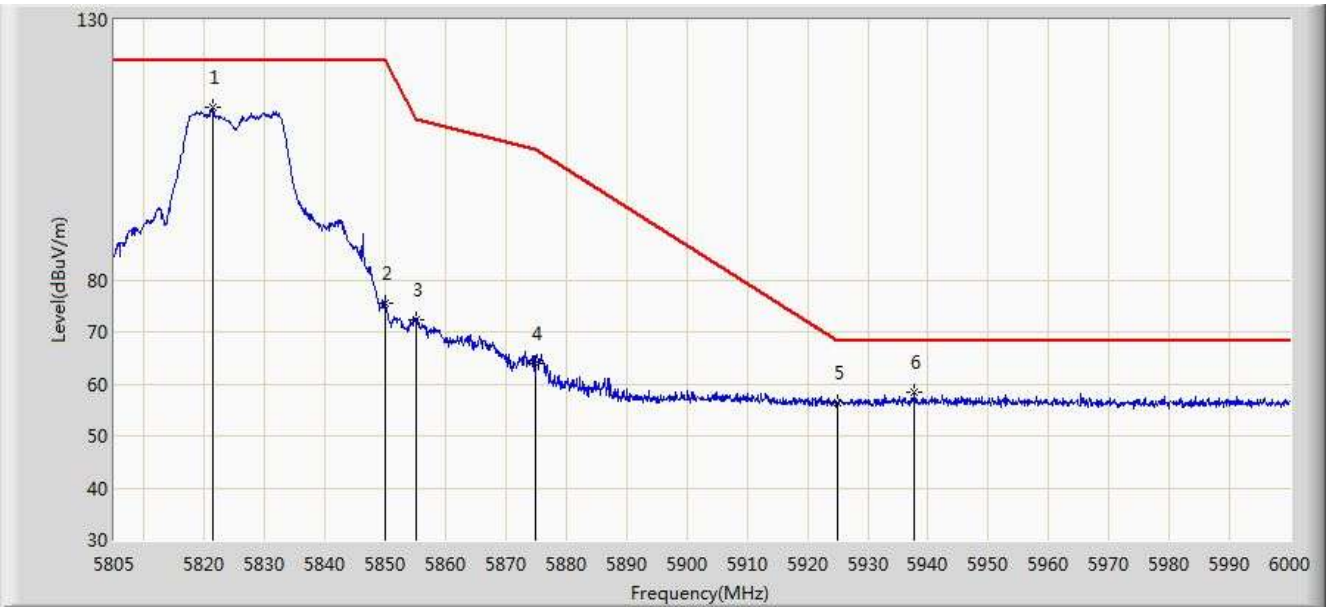


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5650.000	54.938	50.267	-13.262	68.200	4.671	PK
2			5700.000	54.404	49.526	-50.796	105.200	4.878	PK
3			5720.000	56.060	51.063	-54.740	110.800	4.997	PK
4			5725.000	56.618	51.589	-65.582	122.200	5.029	PK
5			5741.322	100.219	95.086	N/A	N/A	5.133	PK

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

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

Site: AC1	Time: 2017/10/12 - 21:43
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at Channel 5825MHz	

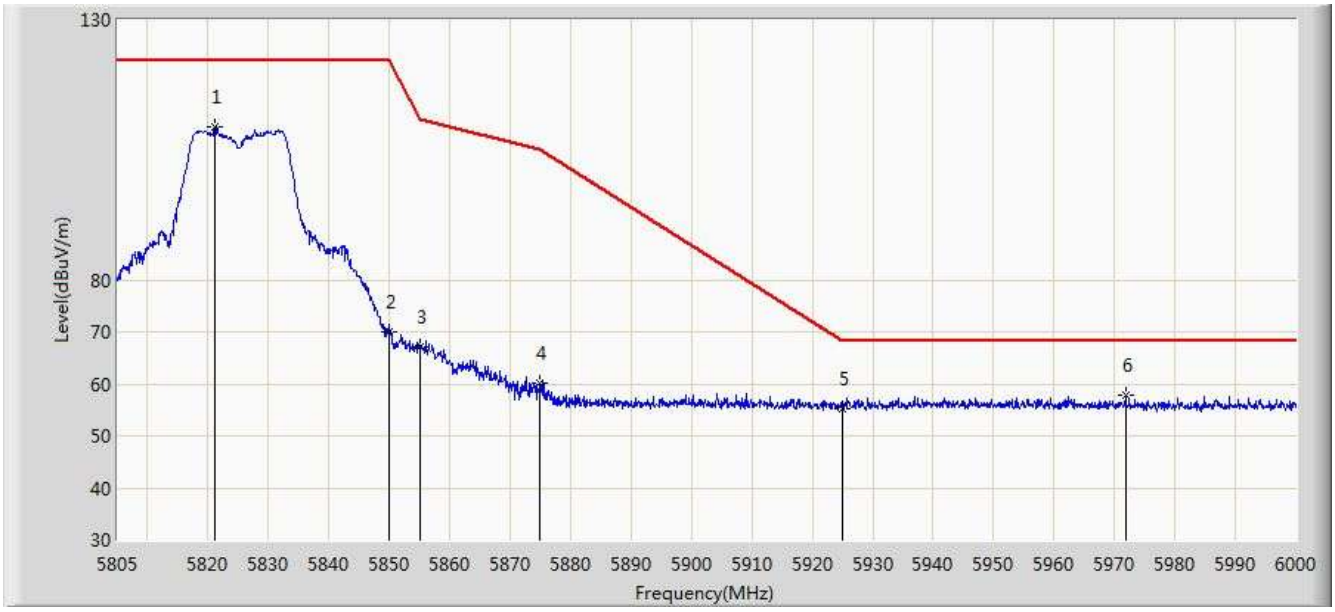


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5821.283	113.081	107.515	N/A	N/A	5.566	PK
2			5850.000	75.411	69.685	-46.789	122.200	5.726	PK
3			5855.000	72.196	66.450	-38.604	110.800	5.746	PK
4			5875.000	64.009	58.189	-41.191	105.200	5.820	PK
5			5925.000	56.351	50.385	-11.849	68.200	5.967	PK
6			5937.795	58.459	52.461	-9.741	68.200	5.998	PK

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

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

Site: AC1	Time: 2017/10/12 - 21:49
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11a at Channel 5825MHz	

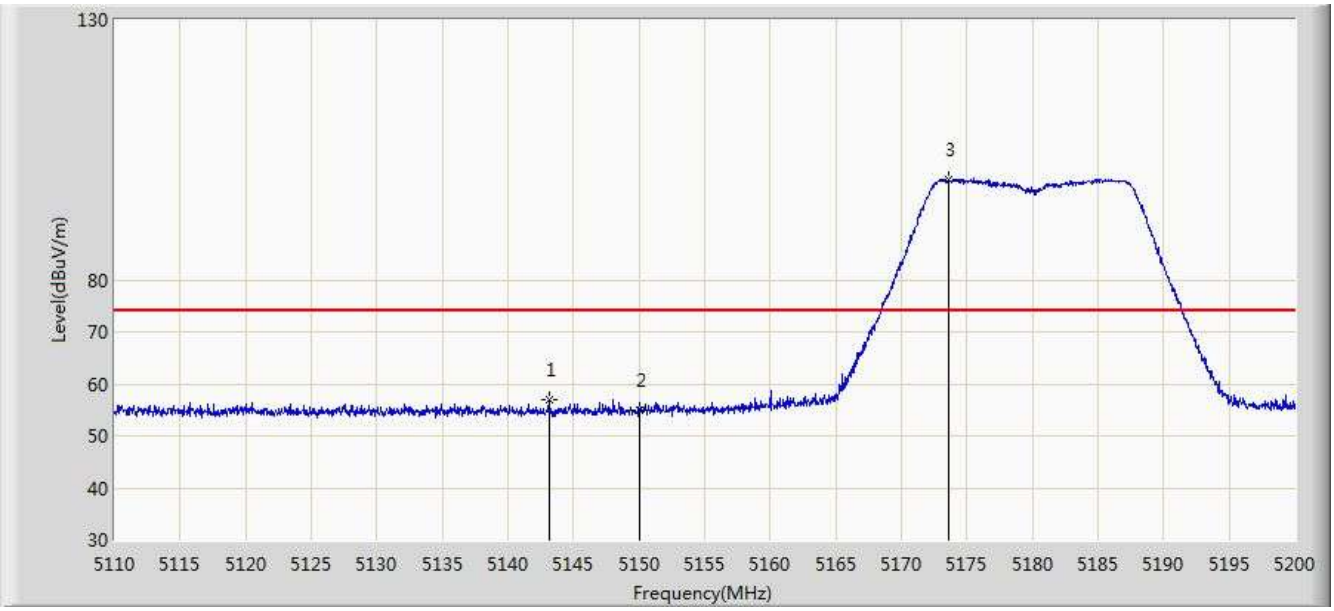


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5821.185	109.360	103.794	N/A	N/A	5.566	PK
2			5850.000	70.031	64.305	-52.169	122.200	5.726	PK
3			5855.000	67.222	61.476	-43.578	110.800	5.746	PK
4			5875.000	60.160	54.340	-45.040	105.200	5.820	PK
5			5925.000	55.339	49.373	-12.861	68.200	5.967	PK
6		*	5971.822	57.824	51.760	-10.376	68.200	6.064	PK

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

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

Site: AC1	Time: 2017/12/07 - 00:34
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5180MHz	

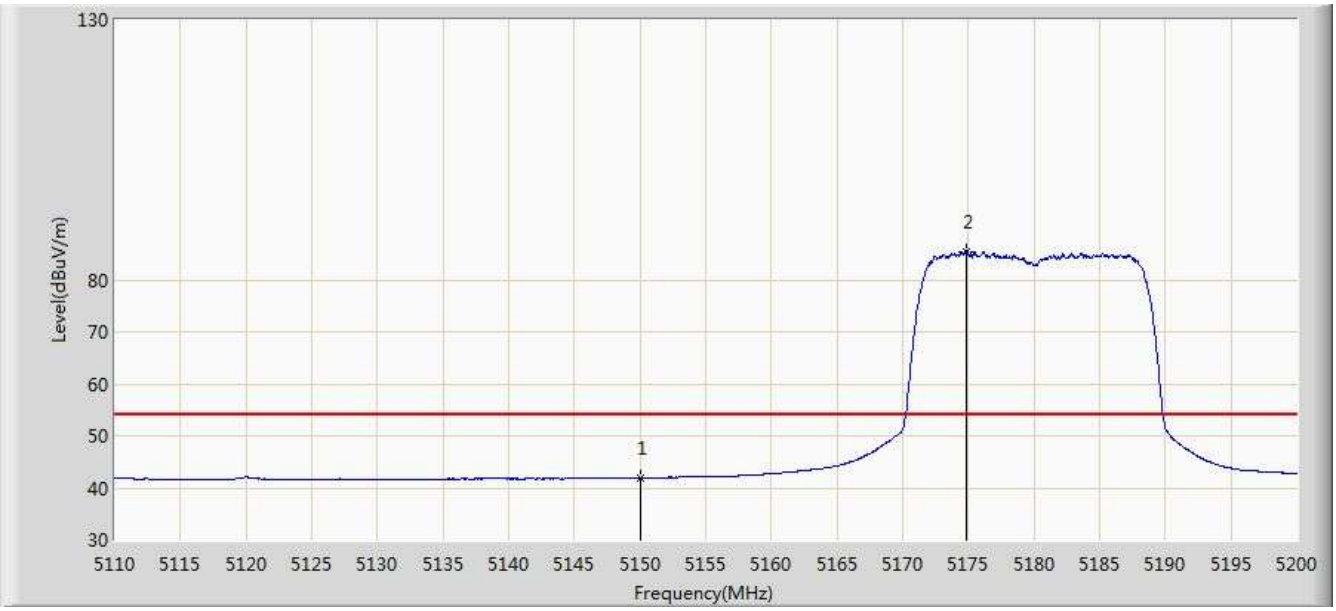


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5143.120	56.870	52.694	-17.130	74.000	4.176	PK
2			5150.000	54.881	50.712	-19.119	74.000	4.170	PK
3		*	5173.630	99.416	95.325	N/A	N/A	4.092	PK

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

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

Site: AC1	Time: 2017/12/07 - 00:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5180MHz	

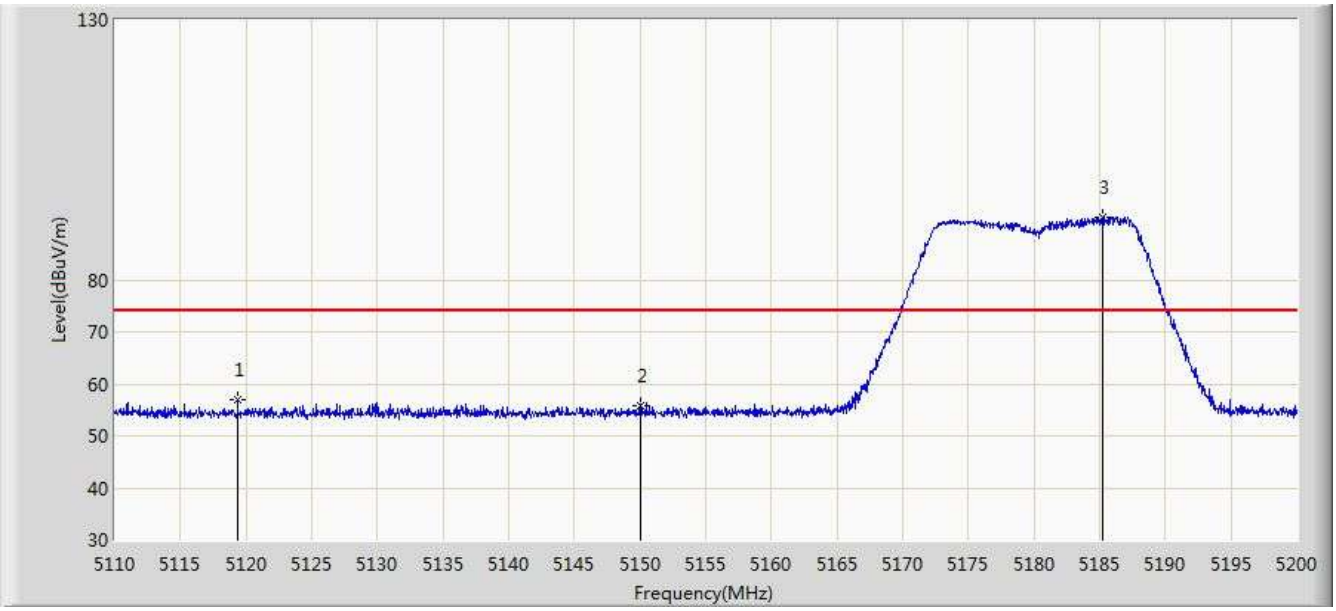


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	41.906	37.737	-12.094	54.000	4.170	AV
2		*	5174.800	85.438	81.351	N/A	N/A	4.088	AV

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

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

Site: AC1	Time: 2017/12/07 - 00:39
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5180MHz	

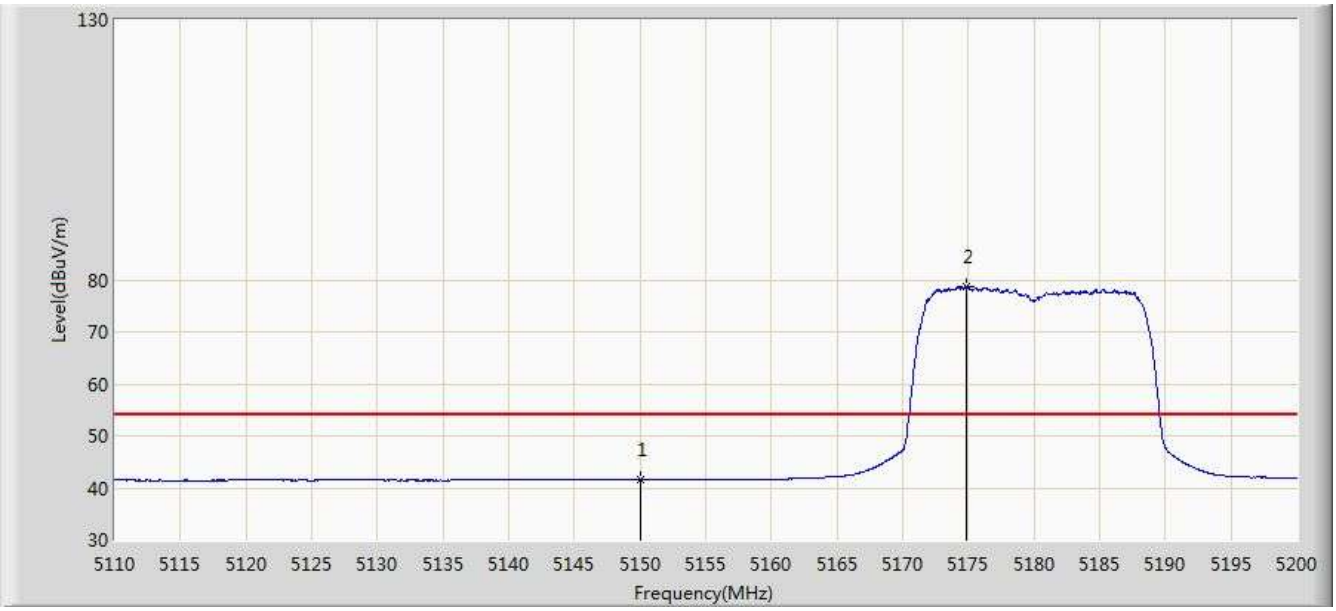


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5119.360	56.910	52.735	-17.090	74.000	4.175	PK
2			5150.000	55.866	51.697	-18.134	74.000	4.170	PK
3		*	5185.195	92.141	88.091	N/A	N/A	4.050	PK

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

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

Site: AC1	Time: 2017/12/07 - 00:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5180MHz	

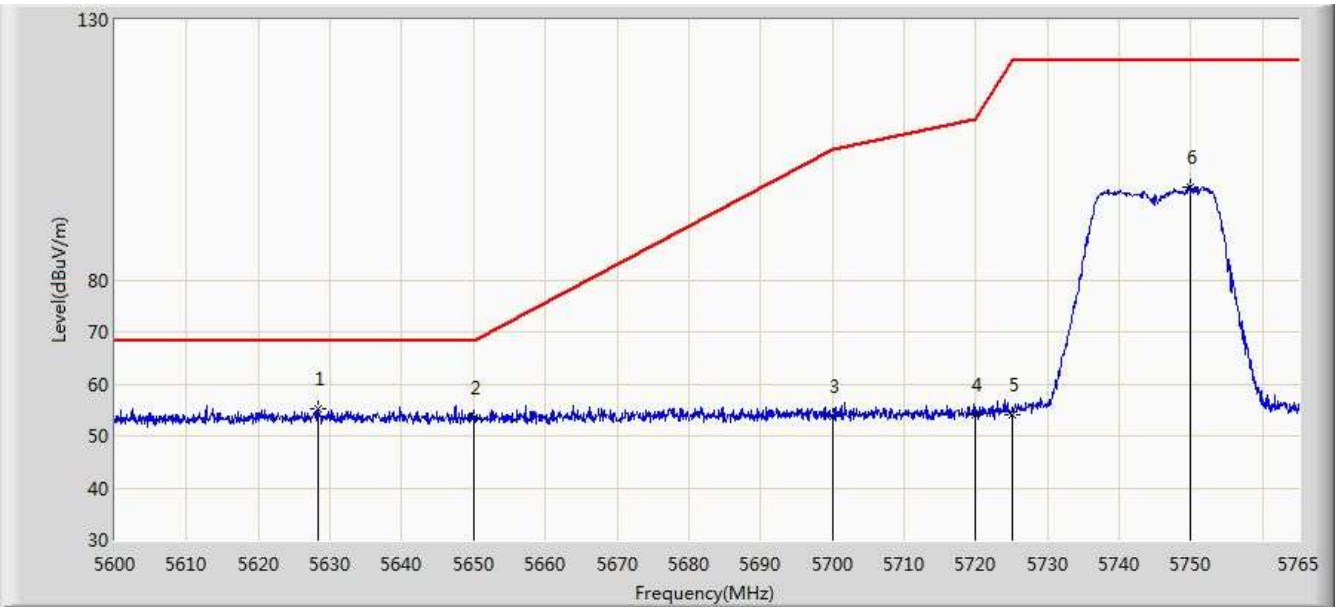


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5150.000	41.554	37.385	-12.446	54.000	4.170	AV
2		*	5174.845	78.765	74.678	N/A	N/A	4.087	AV

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

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

Site: AC1	Time: 2017/12/07 - 00:42
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5745MHz	

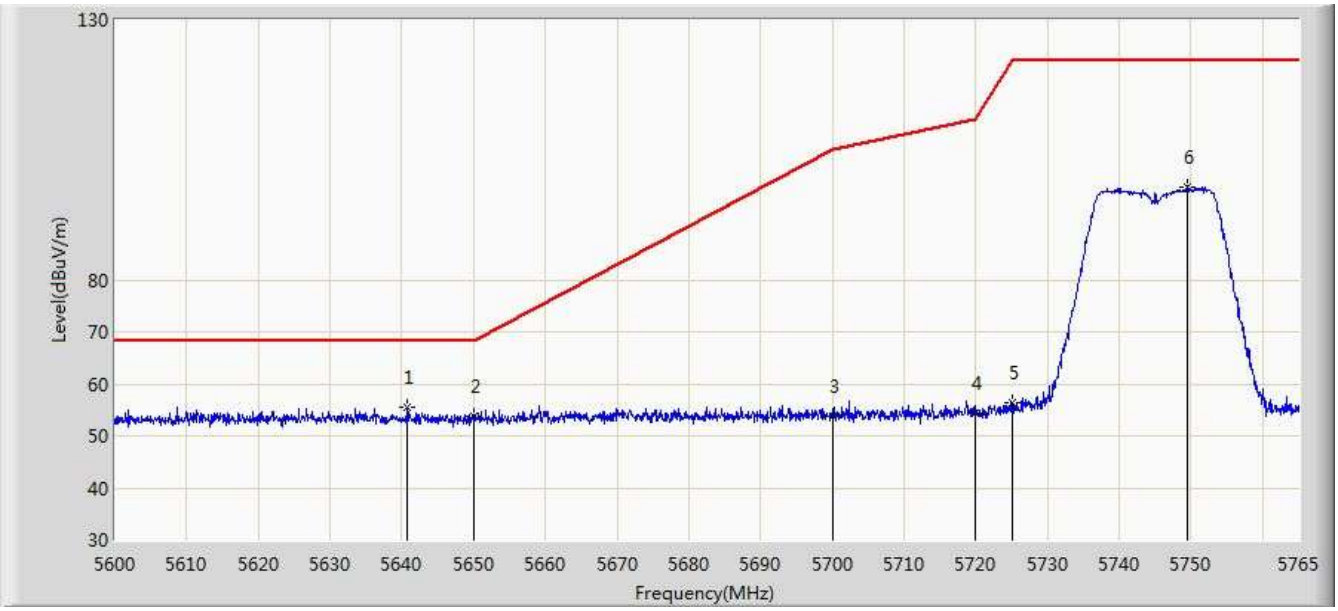


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5628.297	55.351	50.747	-12.849	68.200	4.604	PK
2			5650.000	53.464	48.793	-14.736	68.200	4.671	PK
3			5700.000	53.884	49.006	-51.316	105.200	4.878	PK
4			5720.000	54.169	49.172	-56.631	110.800	4.997	PK
5			5725.000	54.056	49.027	-68.144	122.200	5.029	PK
6			5749.820	97.931	92.749	N/A	N/A	5.183	PK

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

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

Site: AC1	Time: 2017/12/07 - 01:39
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5745MHz	

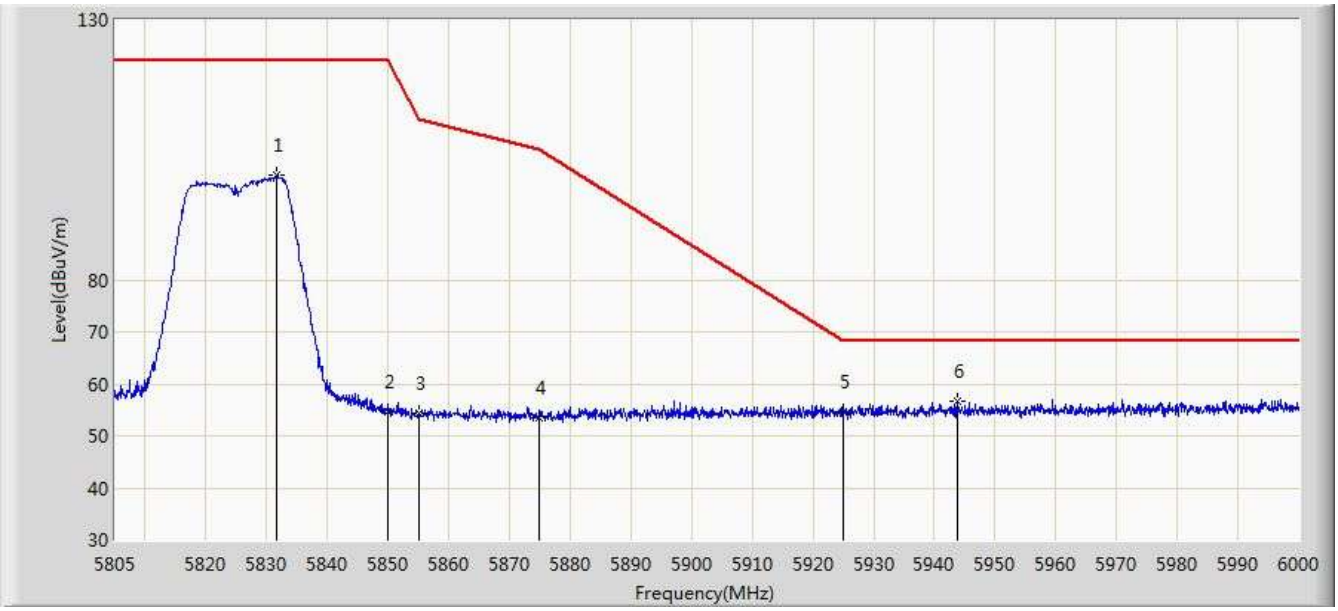


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5640.755	55.389	50.749	-12.811	68.200	4.641	PK
2			5650.000	53.857	49.186	-14.343	68.200	4.671	PK
3			5700.000	53.716	48.838	-51.484	105.200	4.878	PK
4			5720.000	54.276	49.279	-56.524	110.800	4.997	PK
5			5725.000	56.301	51.272	-65.899	122.200	5.029	PK
6			5749.490	97.909	92.729	N/A	N/A	5.180	PK

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

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

Site: AC1	Time: 2017/12/07 - 01:39
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5825MHz	

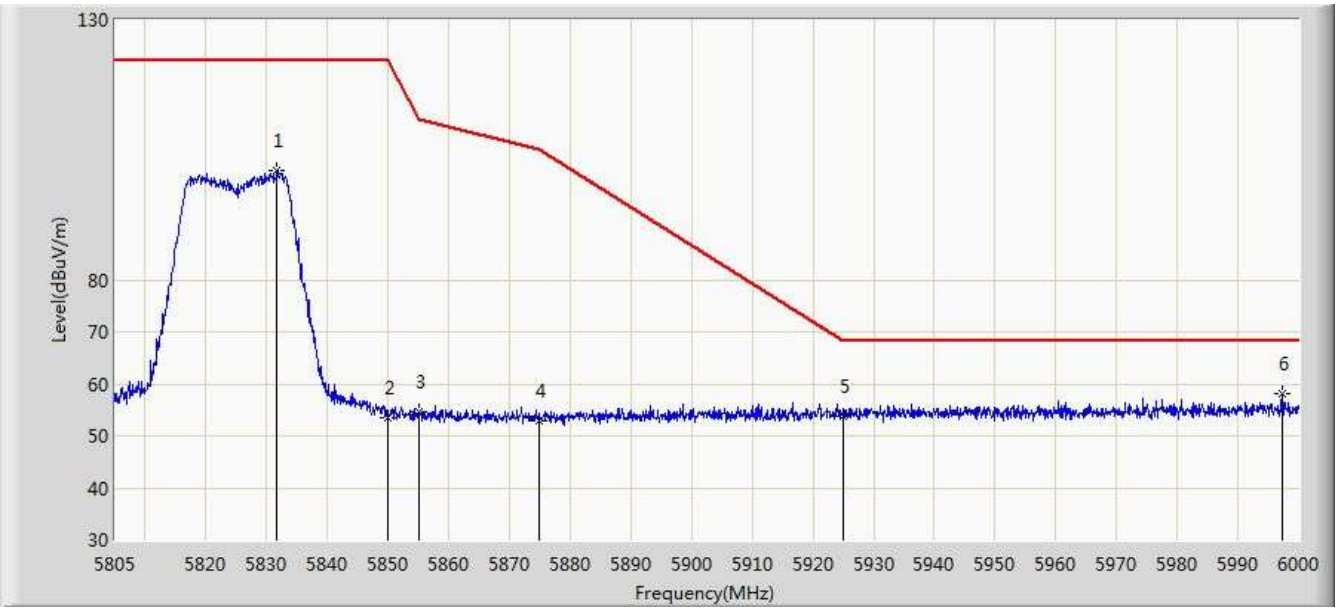


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5831.715	100.064	94.437	N/A	N/A	5.628	PK
2			5850.000	54.741	49.015	-67.459	122.200	5.726	PK
3			5855.000	54.268	48.522	-56.532	110.800	5.746	PK
4			5875.000	53.361	47.541	-51.839	105.200	5.820	PK
5			5925.000	54.509	48.543	-13.691	68.200	5.967	PK
6		*	5943.743	56.714	50.701	-11.486	68.200	6.012	PK

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

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

Site: AC1	Time: 2017/12/07 - 01:42
Limit: FCC_Part15.407_RE(3m)	Engineer: Kevin Ker
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Personal Ground Station	Power: By Battery
Test Mode: Transmit by 802.11n-HT20 at channel 5825MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5831.715	100.891	95.264	N/A	N/A	5.628	PK
2			5850.000	53.592	47.866	-68.608	122.200	5.726	PK
3			5855.000	54.508	48.762	-56.292	110.800	5.746	PK
4			5875.000	52.907	47.087	-52.293	105.200	5.820	PK
5			5925.000	53.709	47.743	-14.491	68.200	5.967	PK
6		*	5997.270	58.208	52.102	-9.992	68.200	6.106	PK

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

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

7.9. AC Conducted Emissions Measurement

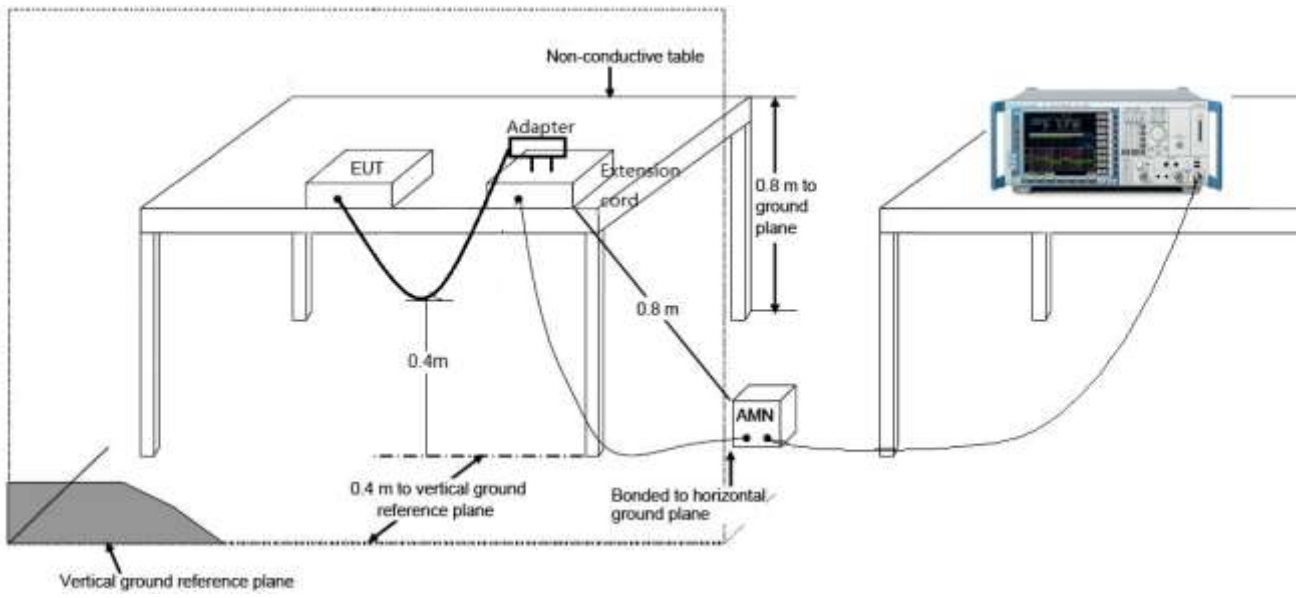
7.9.1.Test Limit

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.

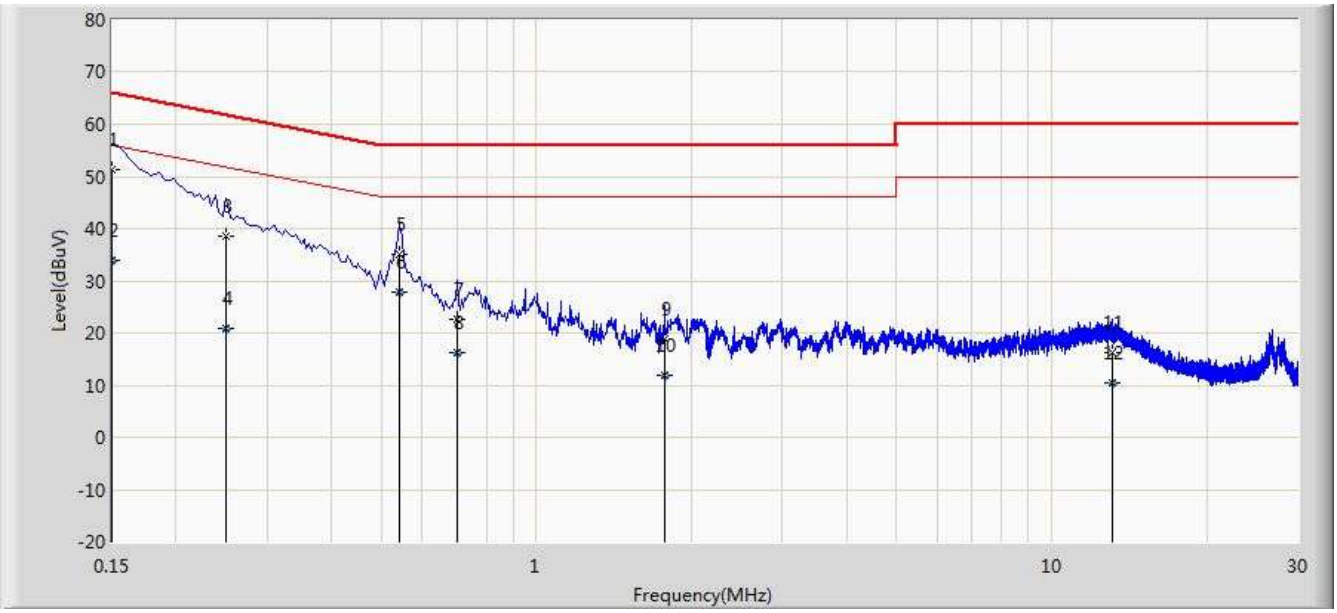
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.9.2.Test Setup



7.9.3.Test Result

Site: SR2	Time: 2017/11/24 - 15:34
Limit: FCC_Part15.207_CE_AC Power	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Personal Ground Station	Power: AC 120V/60Hz
Worst Case Mode: Transmit by 802.11a at Channel 5785MHz	

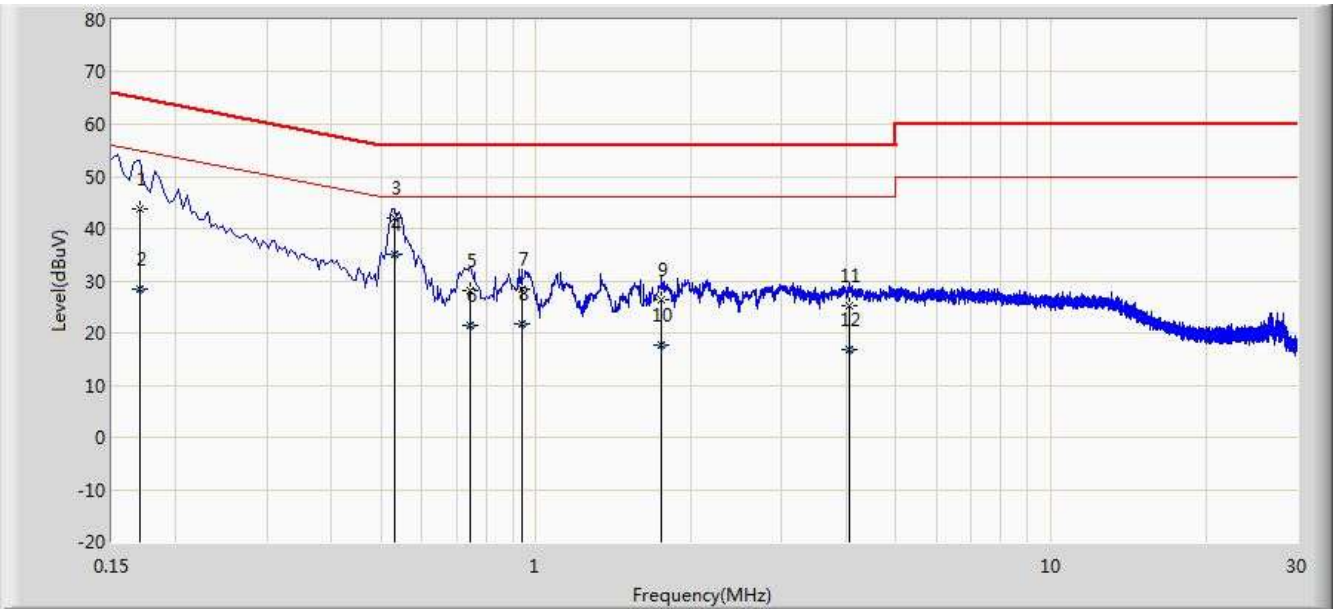


No	Flag	Mark	Frequency (MHz)	Measure Level (DBUV)	Reading Level (DBUV)	Over Limit (dB)	Limit (DBUV)	Factor (dB)	Type
1		*	0.150	51.217	40.049	-14.783	66.000	11.168	QP
2			0.150	33.954	22.785	-22.046	56.000	11.168	AV
3			0.250	38.448	28.484	-23.309	61.757	9.964	QP
4			0.250	20.958	10.994	-30.799	51.757	9.964	AV
5			0.542	35.101	24.956	-20.899	56.000	10.145	QP
6			0.542	27.780	17.635	-18.220	46.000	10.145	AV
7			0.702	22.743	12.681	-33.257	56.000	10.062	QP
8			0.702	16.121	6.059	-29.879	46.000	10.062	AV
9			1.770	18.806	8.927	-37.194	56.000	9.879	QP
10			1.770	11.837	1.958	-34.163	46.000	9.879	AV
11			13.142	16.308	6.244	-43.692	60.000	10.064	QP
12			13.142	10.541	0.478	-39.459	50.000	10.064	AV

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

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

Site: SR2	Time: 2017/11/24 - 15:39
Limit: FCC_Part15.207_CE_AC Power	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Personal Ground Station	Power: AC 120V/60Hz
Worst Case Mode: Transmit by 802.11a at Channel 5785MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (DBUV)	Reading Level (DBUV)	Over Limit (dB)	Limit (DBUV)	Factor (dB)	Type
1			0.170	43.903	33.839	-21.057	64.960	10.064	QP
2			0.170	28.286	18.222	-26.674	54.960	10.064	AV
3			0.530	42.035	31.866	-13.965	56.000	10.169	QP
4		*	0.530	35.173	25.003	-10.827	46.000	10.169	AV
5			0.746	28.186	18.136	-27.814	56.000	10.049	QP
6			0.746	21.589	11.539	-24.411	46.000	10.049	AV
7			0.938	28.449	18.506	-27.551	56.000	9.943	QP
8			0.938	21.699	11.756	-24.301	46.000	9.943	AV
9			1.750	26.382	16.500	-29.618	56.000	9.882	QP
10			1.750	17.716	7.834	-28.284	46.000	9.882	AV
11			4.062	25.247	15.270	-30.753	56.000	9.976	QP
12			4.062	16.860	6.884	-29.140	46.000	9.976	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 **Personal Ground Station FCC ID: 2ACS5-ST10C** is in compliance with Part 15E of the FCC Rules and RSS-247 Section 6 of the IC Rules.

The End