



FCC PART 15.407  
TEST REPORT

For

**Epik One America Corporation**

170 Ocean Lane Dr. #705, Key Biscayne, FL 33149, United States

**FCC ID: 2AO6ZRS550**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Smart phone
<b>Report Number:</b>	RSZ180724002-00E
<b>Report Date:</b>	2018-08-22
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## TABLE OF CONTENTS

<b>GENERAL INFORMATION.....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE .....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY .....	4
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EUT EXERCISE SOFTWARE .....	6
EQUIPMENT MODIFICATIONS .....	8
SUPPORT EQUIPMENT LIST AND DETAILS .....	8
EXTERNAL I/O CABLE.....	8
BLOCK DIAGRAM OF TEST SETUP .....	9
<b>SUMMARY OF TEST RESULTS.....</b>	<b>10</b>
<b>TEST EQUIPMENT LIST .....</b>	<b>11</b>
<b>FCC §1.1310 &amp; §2.1093- RF EXPOSURE.....</b>	<b>13</b>
APPLICABLE STANDARD .....	13
<b>FCC §15.203 – ANTENNA REQUIREMENT.....</b>	<b>14</b>
APPLICABLE STANDARD .....	14
ANTENNA CONNECTOR CONSTRUCTION .....	14
<b>FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS .....</b>	<b>15</b>
APPLICABLE STANDARD .....	15
EUT SETUP .....	15
EMI TEST RECEIVER SETUP.....	15
TEST PROCEDURE .....	15
TEST RESULTS SUMMARY .....	16
TEST DATA .....	16
<b>§15.205 &amp; §15.209 &amp; §15.407(B) (1) (7) – UNDESIRABLE EMISSION.....</b>	<b>19</b>
APPLICABLE STANDARD .....	19
EUT SETUP .....	19
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP .....	20
TEST PROCEDURE .....	21
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	22
TEST RESULTS SUMMARY .....	22
TEST DATA .....	22
<b>§15.407(B) (1) –OUT OF BAND EMISSION.....</b>	<b>31</b>
APPLICABLE STANDARD .....	31
TEST PROCEDURE .....	31
TEST DATA .....	31
<b>FCC §15.407(a) (1) – 26 dB EMISSION BANDWIDTH.....</b>	<b>35</b>
APPLICABLE STANDARD .....	35
TEST PROCEDURE .....	35

TEST DATA .....35

**FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER.....41**

    APPLICABLE STANDARD .....41

    TEST PROCEDURE .....41

    TEST DATA .....42

**FCC §15.407(a) (1) - POWER SPECTRAL DENSITY.....43**

    APPLICABLE STANDARD .....43

    TEST PROCEDURE .....43

    TEST DATA .....44

## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Epik One America Corporation's* product, model number: *RS550 (FCC ID: 2AO6ZRS550)* or the "EUT" in this report was a *Smart phone*, which was measured approximately: 155.2 mm (L) × 74.6 mm (W) × 11.9 mm (H), rated with input voltage: DC 3.8V from battery or DC 5.0V from adapter.

#### Adapter Information:

Model: TPA-46B050100UU

Input: AC 100-240V, 50/60Hz, 0.2A

Output: DC 5.0V, 1000 mA

*\*All measurement and test data in this report was gathered from production sample serial number: 180724002 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-07-24.*

### Objective

This type approval report is prepared on behalf of *Epik One America Corporation* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

### Related Submittal(s)/Grant(s)

Part 15.247 DSS & DTS, Part15.225 DXX and FCC Part 22H&24E&27 PCE submissions with FCC ID: 2AO6ZRS550.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Measurement Uncertainty**

Parameter		uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.5dB
RF conducted test with spectrum		±1.5dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		-30~60 °C
Humidity		±6%
Supply voltages		±0.4%

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The device support 802.11a/n20/n40 modes.

For 5150-5250MHz Band, 6 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240

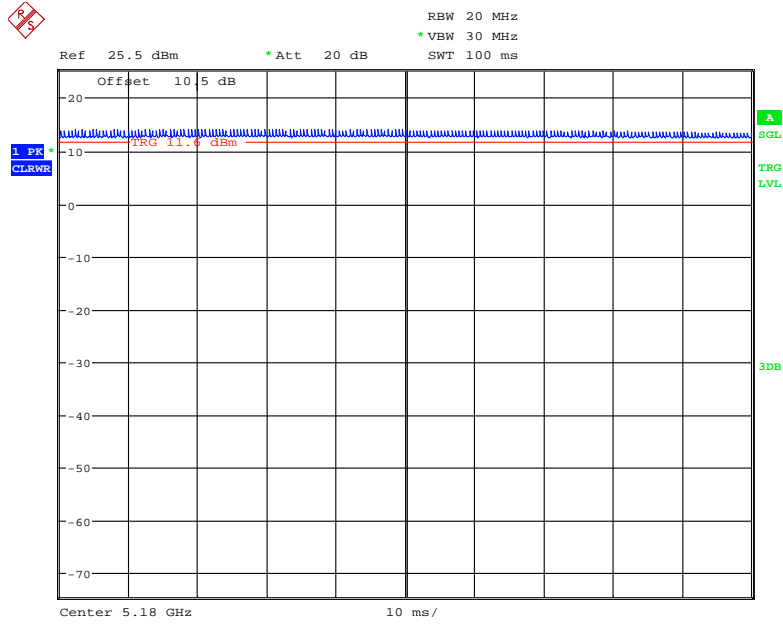
### EUT Exercise Software

No software was used for testing. Test frequencies and power level were configured as below:

U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5150 – 5250MHz	802.11 a	CH36	5180	6	15
		CH40	5200	6	15
		CH48	5240	6	15
	802.11 n20	CH36	5180	MCS0	15
		CH40	5200	MCS0	14
		CH48	5240	MCS0	15
	802.11 n40	CH38	5190	MCS0	14
		CH46	5230	MCS0	14

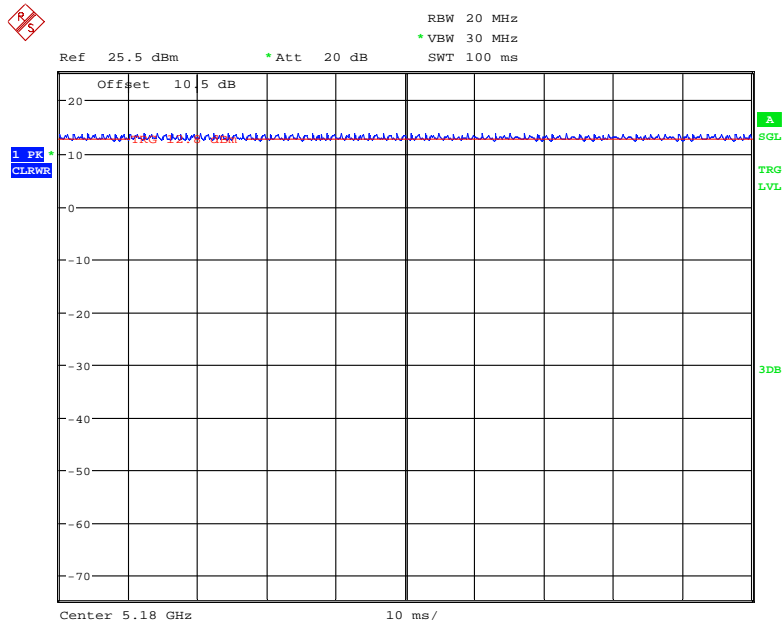
### Duty cycle

#### 802.11a mode



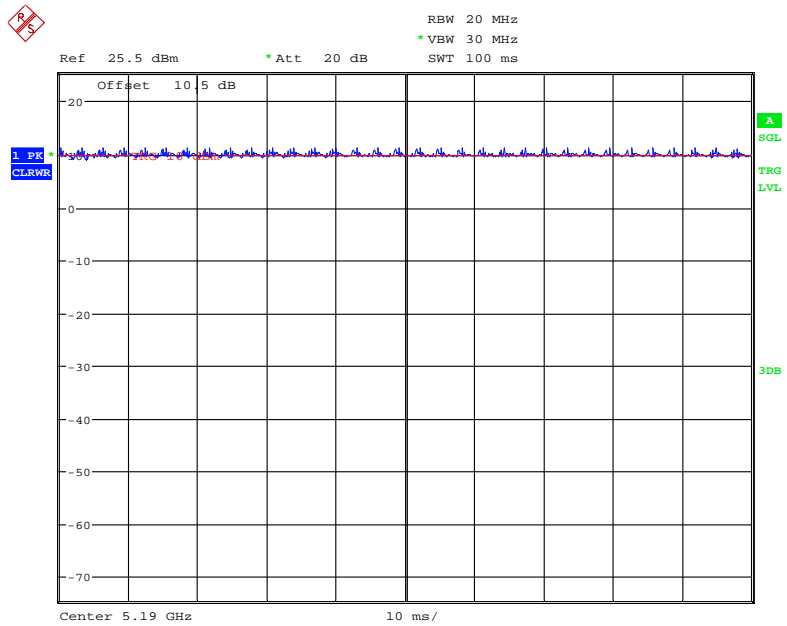
Date: 5.AUG.2018 17:04:59

#### 802.11n20 mode



Date: 5.AUG.2018 17:06:09

**802.11n40 Mode**



Date: 5.AUG.2018 17:08:01

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	100	-	-	10Hz	-
802.11n20	100	-	-	10Hz	-
802.11n40	100	-	-	10Hz	-

**Equipment Modifications**

No modification was made to the EUT tested.

**Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
/	/	/	/

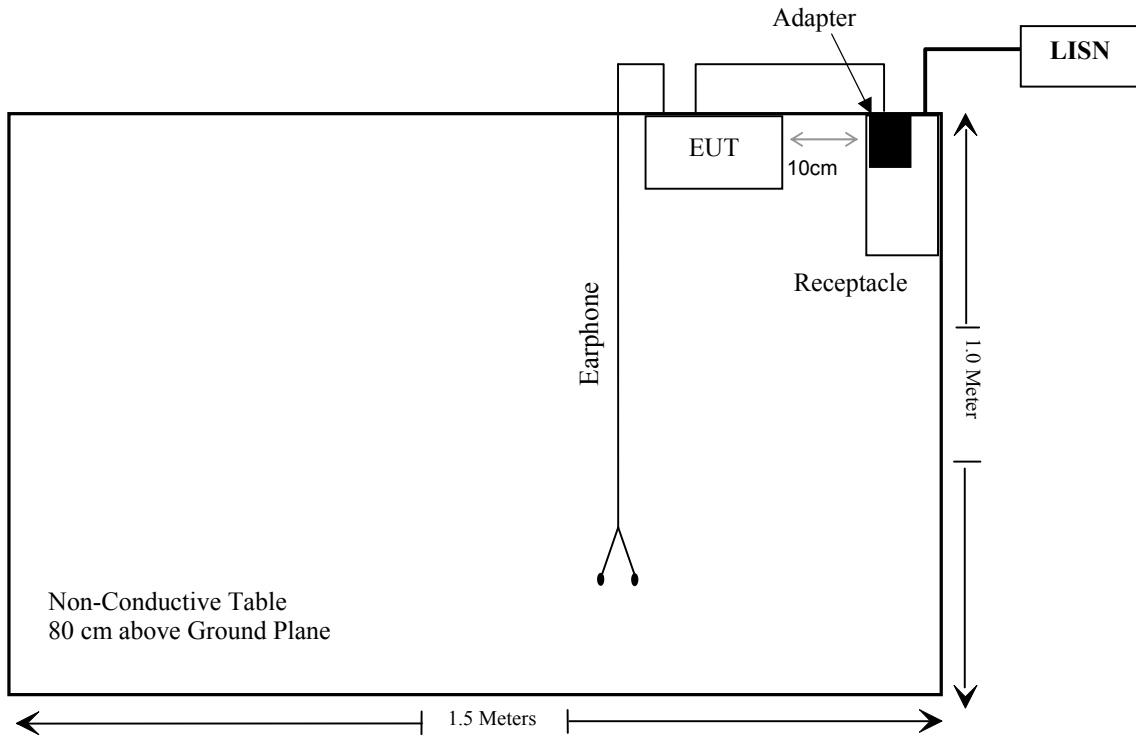
**External I/O Cable**

Cable Description	Length (m)	From/Port	To
Un-shielding detachable DC Cable	1.0	EUT	Adapter



### Block Diagram of Test Setup

For conducted emission:



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§1.1307 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1), (7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1)	Out Of Band Emission	Compliance
§15.407(a) (1)	26 dB Emission Bandwidth	Compliance
§15.407(a)(1)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1)	Power Spectral Density	Compliance

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>AC Line Conducted test</b>					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2018-07-11	2019-07-11
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-21	2018-12-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2018-05-21	2018-11-19
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2018-05-12	2018-11-12
<b>Radiated Emission Test</b>					
A.H.System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-06-23	2019-06-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2018-01-04	2019-01-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-05-21	2019-05-21
HP	Amplifier	HP8447E	1937A01046	2018-05-21	2018-11-19
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-04-01	2018-10-01
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	1	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-05-22	2018-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2016-11-18	2019-11-18
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-04	2016-11-18	2019-11-18
Ducommun Technologies	Pre-amplifier	ALN-22093530-01	991373-01	2018-08-03	2019-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2017-12-24	2018-12-24
Agilent	USB Wideband Power Meter	U2021XA	MY54250003	2018-06-23	2019-06-23
Ducommun technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	10dB Attenuator	N/A	N/A	Each Time	

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## FCC §1.1310 & §2.1093- RF EXPOSURE

### Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

1.  $f(\text{GHz})$  is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test Exclusion.

### Measurement Result

For worst case:

Mode	Frequency (MHz)	Max Tune-up Conducted Power (dBm)	Max Tune-up Conducted Power (mW)	Calculated Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
Wi-Fi	5150	8.0	6.31	5	2.86	3.0	Yes

**Result: No SAR test is required**

## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is 1.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

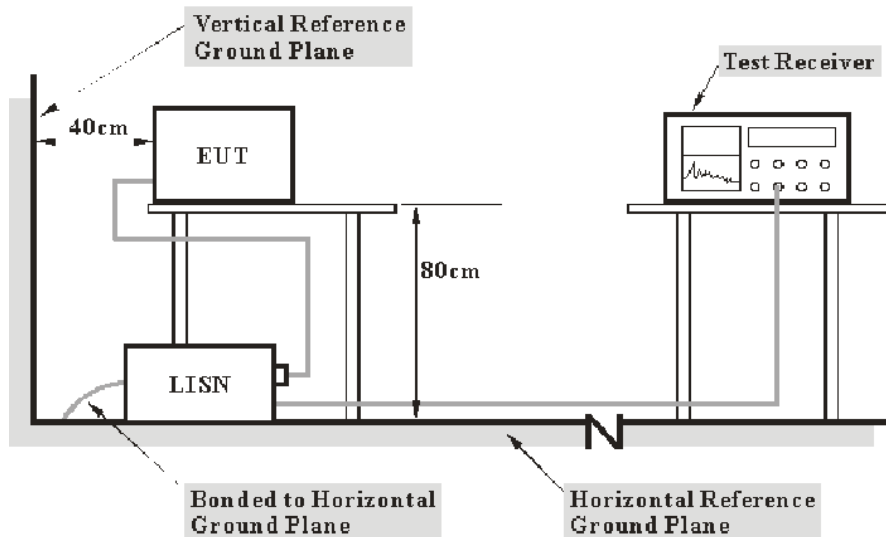
**Result:** Compliance.

**FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS**

**Applicable Standard**

FCC §15.207, §15.407(b) (6)

**EUT Setup**



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

**EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

**Test Procedure**

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

In BAACL,  $U_{(L_m)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

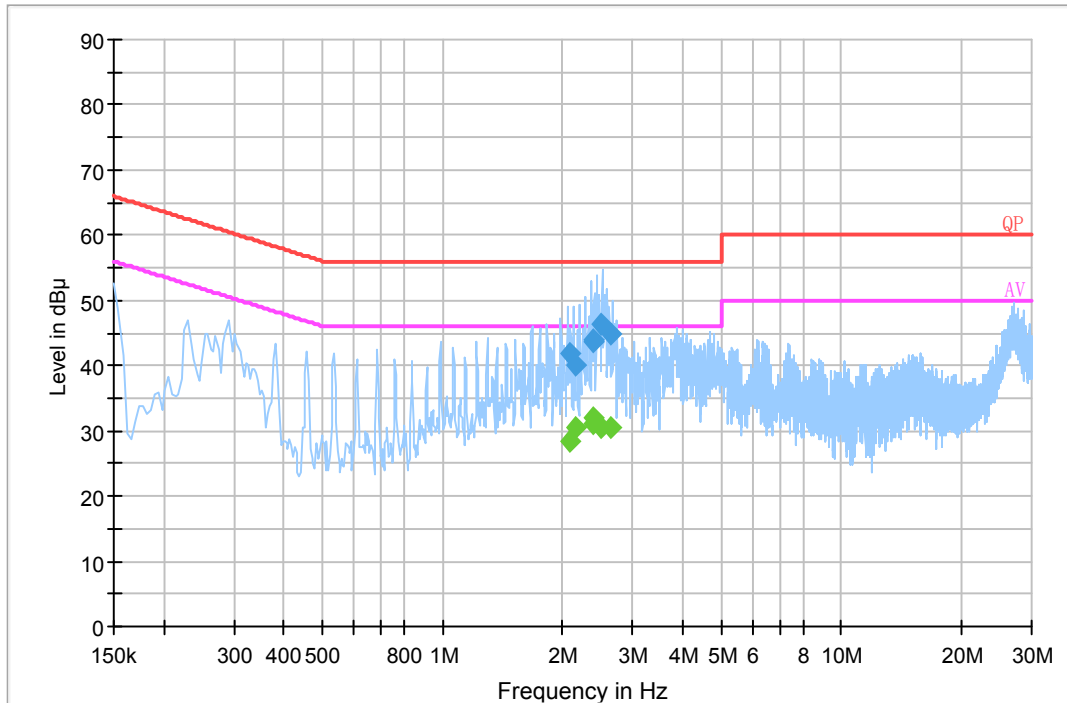
Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

*The testing was performed by Hill He on 2018-08-13.*

*EUT operation mode: Transmitting (worst case is 802.11a mode 5180 MHz)*

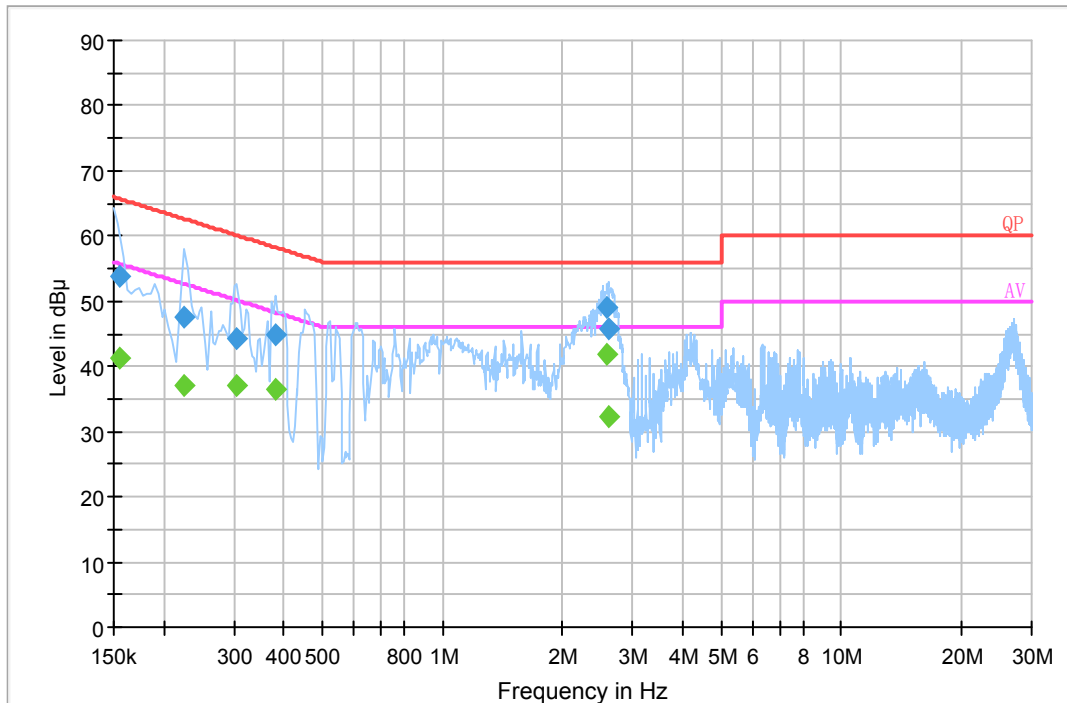


**AC 120V/60 Hz, Line:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
2.088870	41.8	19.9	56.0	14.2	QP
2.153990	40.2	19.9	56.0	15.8	QP
2.386630	43.7	19.9	56.0	12.3	QP
2.390570	44.1	19.9	56.0	11.9	QP
2.508290	46.2	19.9	56.0	9.8	QP
2.630010	45.0	19.9	56.0	11.0	QP
2.088870	28.4	19.9	46.0	17.6	Ave.
2.153990	30.5	19.9	46.0	15.5	Ave.
2.386630	31.9	19.9	46.0	14.1	Ave.
2.390570	31.2	19.9	46.0	14.8	Ave.
2.508290	30.6	19.9	46.0	15.4	Ave.
2.630010	30.5	19.9	46.0	15.5	Ave.

**AC120V, 60 Hz, Neutral:**



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.154500	53.7	19.8	65.8	12.1	QP
0.225500	47.7	19.7	62.6	14.9	QP
0.305410	44.3	19.8	60.1	15.8	QP
0.380270	45.0	19.7	58.3	13.3	QP
2.582970	49.1	19.9	56.0	6.9	QP
2.614190	45.7	19.9	56.0	10.3	QP
0.154500	41.2	19.8	55.8	14.6	Ave.
0.225500	36.9	19.7	52.6	15.7	Ave.
0.305410	37.1	19.8	50.1	13	Ave.
0.380270	36.3	19.7	48.3	12	Ave.
2.582970	41.9	19.9	46.0	4.1	Ave.
2.614190	32.2	19.9	46.0	13.8	Ave.

**Note:**

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit - Corrected Amplitude

**§15.205 & §15.209 & §15.407(B) (1) (7) – UNDESIRABLE EMISSION**

**Applicable Standard**

FCC §15.407 (b) (1), (7); §15.209; §15.205;

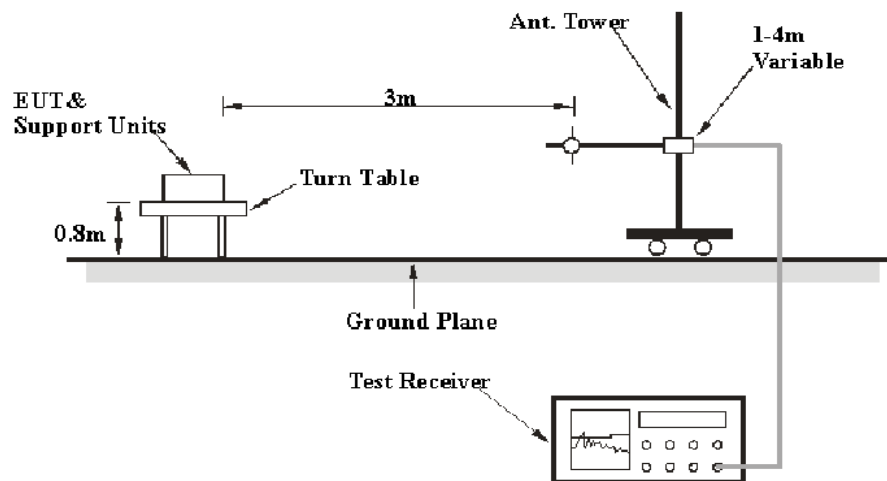
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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.

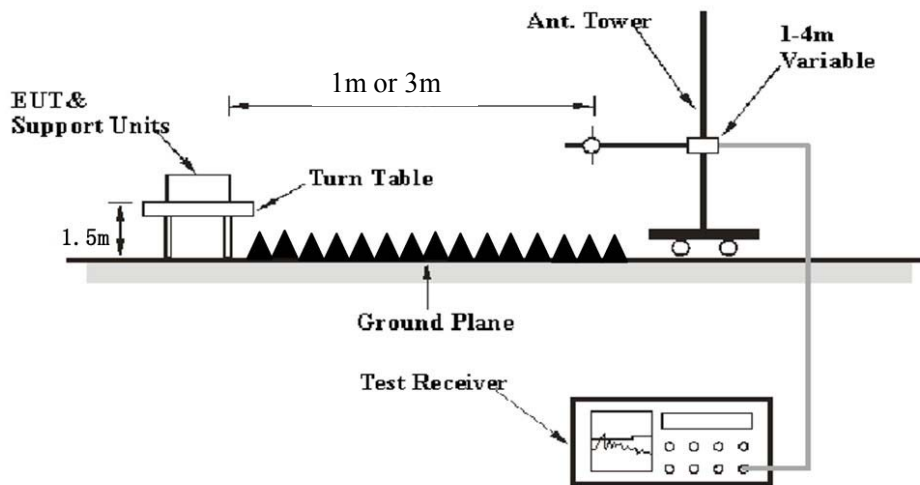
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

**EUT Setup**

**Below 1 GHz:**



**Above 1 GHz:**



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz <sup>Note 1</sup>	/	Average
	1MHz	> 1/T <sup>Note 2</sup>	/	Average

Note 1: when duty cycle is no less than 98%

Note 2: when duty cycle is less than 98%

## Test Procedure

### Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

The testing distance of 1GHz-18GHz is 3m, and the testing distance of 18GHz-40GHz is 1m, According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\text{SpecLimit}} = E_{\text{Meas}} + 20 \log \left( \frac{d_{\text{Meas}}}{d_{\text{SpecLimit}}} \right)$$

where

$E_{\text{SpecLimit}}$	is the field strength of the emission at the distance specified by the limit, in dB $\mu$ V/m
$E_{\text{Meas}}$	is the field strength of the emission at the measurement distance, in dB $\mu$ V/m
$d_{\text{Meas}}$	is the measurement distance, in m
$d_{\text{SpecLimit}}$	is the distance specified by the limit, in m

So the limit of 1m = limit of 3m+20\*log(3/1), the peak limit=84dB $\mu$ V/m, the average limit=64dB $\mu$ V/m

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL,  $U_{(Lm)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

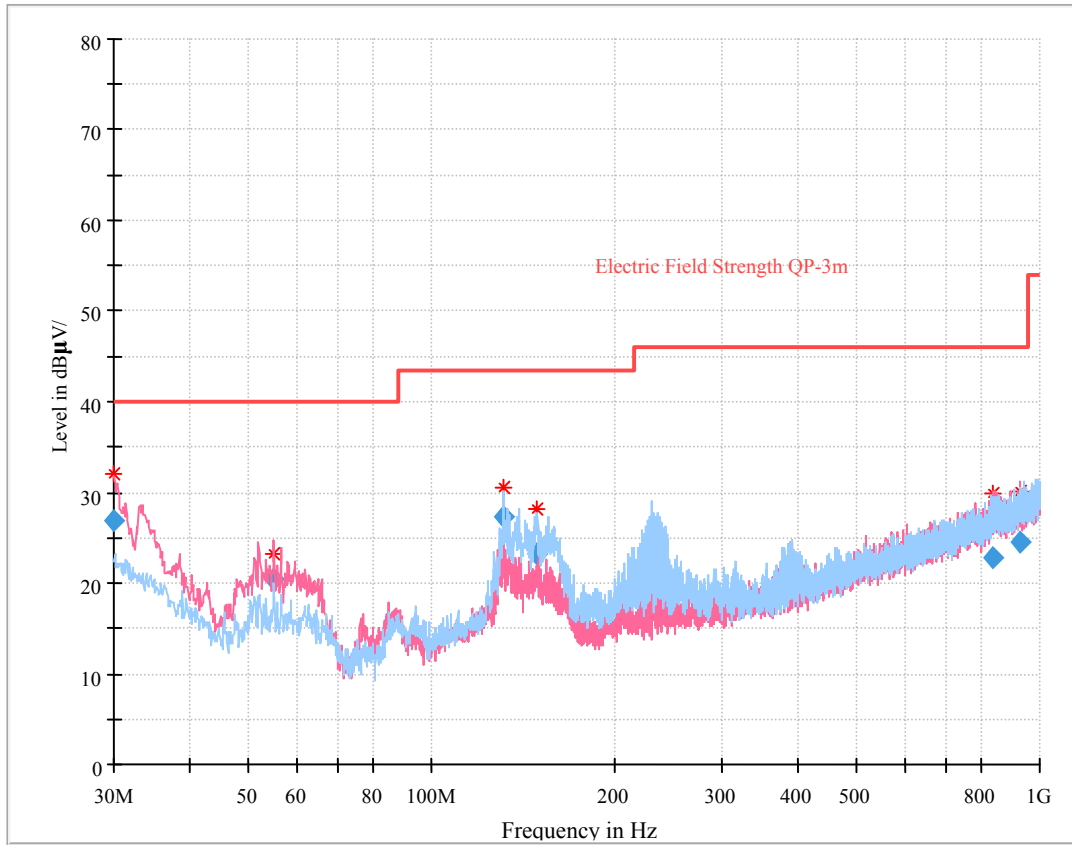
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Hill He on 2018-08-17.*

*EUT operation mode: Transmitting*

**30 MHz – 1 GHz:** (worst case is 802.11a mode 5180 MHz)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.008375	26.85	155.0	V	189.0	-4.7	40.00	13.15
55.074375	20.39	170.0	V	151.0	-16.7	40.00	19.61
131.573000	27.28	312.0	H	92.0	-10.5	43.50	16.22
149.129375	23.22	209.0	H	95.0	-11.1	43.50	20.28
835.347375	22.90	109.0	V	356.0	0.1	46.00	23.10
931.668500	24.47	112.0	V	30.0	1.5	46.00	21.53

**30 MHz ~ 40 GHz:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @3m	FCC Part 15.407/205/209	
	Reading (dBµV) @3m	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m) @3m	Margin (dB)
802.11a									
5180 MHz									
5180.00	51.35	PK	341	2.0	H	41.80	93.15	/	/
5180.00	38.58	Ave.	341	2.0	H	41.80	80.38	/	/
5180.00	56.84	PK	117	2.2	V	41.80	98.64	/	/
5180.00	44.85	Ave.	117	2.2	V	41.80	86.65	/	/
5129.16	43.45	PK	333	1.9	V	6.90	50.35	74	23.65
5129.16	28.87	Ave.	333	1.9	V	6.90	35.77	54	18.23
5386.59	42.90	PK	118	1.6	V	6.93	49.83	74	24.17
5386.59	28.33	Ave.	118	1.6	V	6.93	35.26	54	18.74
10360.00	40.60	PK	93	1.8	V	15.66	56.26	74	17.74
10360.00	26.02	Ave.	93	1.8	V	15.66	41.68	54	12.32
5200 MHz									
5200.00	52.77	PK	205	1.3	H	41.80	94.57	/	/
5200.00	41.03	Ave.	205	1.3	H	41.80	82.83	/	/
5200.00	56.01	PK	23	2.3	V	41.80	97.81	/	/
5200.00	42.97	Ave.	23	2.3	V	41.80	84.77	/	/
10400.00	40.94	PK	33	2.1	V	15.66	56.60	74	17.40
10400.00	25.64	Ave.	33	2.1	V	15.66	41.30	54	12.70
5240 MHz									
5240.00	51.68	PK	323	1.8	H	41.80	93.48	/	/
5240.00	40.80	Ave.	323	1.8	H	41.80	82.60	/	/
5240.00	55.64	PK	156	2.2	V	41.80	97.44	/	/
5240.00	43.51	Ave.	156	2.2	V	41.80	85.31	/	/
4664.13	43.13	PK	315	2.0	V	4.79	47.92	74	26.08
4664.13	28.14	Ave.	315	2.0	V	4.79	32.93	54	21.07
5373.37	42.68	PK	235	1.9	V	6.93	49.61	74	24.39
5373.37	28.26	Ave.	235	1.9	V	6.93	35.19	54	18.81
10480.00	39.54	PK	75	1.1	V	16.56	56.10	74	17.90
10480.00	25.63	Ave.	75	1.1	V	16.56	42.19	54	11.81



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @3m	FCC Part 15.407/205/209	
	Reading (dBµV) @3m	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m) @3m	Margin (dB)
802.11n20									
5180 MHz									
5180.00	53.33	PK	319	1.8	H	41.80	95.13	/	/
5180.00	41.97	Ave.	319	1.8	H	41.80	83.77	/	/
5180.00	55.91	PK	121	2.1	V	41.80	97.71	/	/
5180.00	43.79	Ave.	121	2.1	V	41.80	85.59	/	/
5008.01	42.84	PK	63	2.0	V	6.90	49.74	74	24.26
5008.01	28.36	Ave.	63	2.0	V	6.90	35.26	54	18.74
5423.19	41.47	PK	241	2.4	V	6.93	48.40	74	25.60
5423.19	28.17	Ave.	241	2.4	V	6.93	35.10	54	18.90
10360.00	40.05	PK	8	2.0	V	15.66	55.71	74	18.29
10360.00	25.79	Ave.	8	2.0	V	15.66	41.45	54	12.55
5200 MHz									
5200.00	52.29	PK	255	1.6	H	41.80	94.09	/	/
5200.00	41.37	Ave.	255	1.6	H	41.80	83.17	/	/
5200.00	54.68	PK	86	1.6	V	41.80	96.48	/	/
5200.00	43.22	Ave.	86	1.6	V	41.80	85.02	/	/
10400.00	40.27	PK	28	1.4	V	15.66	55.93	74	18.07
10400.00	24.47	Ave.	28	1.4	V	15.66	40.13	54	13.87
5240 MHz									
5240.00	53.49	PK	5	2.3	H	41.80	95.29	/	/
5240.00	42.35	Ave.	5	2.3	H	41.80	84.15	/	/
5240.00	56.82	PK	242	2.3	V	41.80	98.62	/	/
5240.00	44.69	Ave.	242	2.3	V	41.80	86.49	/	/
4571.34	42.51	PK	177	2.4	V	5.31	47.82	74	26.18
4571.34	28.27	Ave.	177	2.4	V	5.31	33.58	54	20.42
5382.18	42.69	PK	123	2.3	V	6.93	49.62	74	24.38
5382.18	28.23	Ave.	123	2.3	V	6.93	35.16	54	18.84
10480.00	40.52	PK	328	1.0	V	16.56	57.08	74	16.92
10480.00	25.77	Ave.	27	1.3	V	16.56	42.33	54	11.67

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @3m	FCC Part 15.407/205/209	
	Reading (dBµV) @3m	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m) @3m	Margin (dB)
802.11n40									
5190 MHz									
5190.00	50.77	PK	218	2.4	H	41.80	92.57	/	/
5190.00	38.23	Ave.	218	2.4	H	41.80	80.03	/	/
5190.00	53.75	PK	278	1.3	V	41.80	95.55	/	/
5190.00	41.52	Ave.	278	1.3	V	41.80	83.32	/	/
5150.00	44.69	PK	27	1.8	V	6.60	51.29	74	22.71
5150.00	29.90	Ave.	27	1.8	V	6.60	36.50	54	17.50
5432.44	42.35	PK	230	2.3	V	6.93	49.28	74	24.72
5432.44	28.65	Ave.	230	2.3	V	6.93	35.58	54	18.42
10380.00	39.23	PK	239	1.3	V	15.66	54.89	74	19.11
10380.00	25.30	Ave.	239	1.3	V	15.66	40.96	54	13.04
5230 MHz									
5230.00	50.49	PK	185	2.4	H	41.80	92.29	/	/
5230.00	36.34	Ave.	185	2.4	H	41.80	78.14	/	/
5230.00	53.55	PK	140	1.1	V	41.80	95.35	/	/
5230.00	42.33	Ave.	140	1.1	V	41.80	84.13	/	/
4657.62	42.23	PK	156	1.7	V	4.79	47.02	74	26.98
4657.62	28.43	Ave.	156	1.7	V	4.79	33.22	54	20.78
5374.24	42.73	PK	333	1.8	V	6.93	49.66	74	24.34
5374.24	28.31	Ave.	333	1.8	V	6.93	35.24	54	18.76
10460.00	40.34	PK	351	1.2	V	16.56	56.90	74	17.10
10460.00	25.41	Ave.	351	1.2	V	16.56	41.97	54	12.03

**Note:** For the band edge of 5150-5250MHz band testing, the amplifier had been use.

**Note:**

Corrected Amplitude = Corrected Factor + Reading

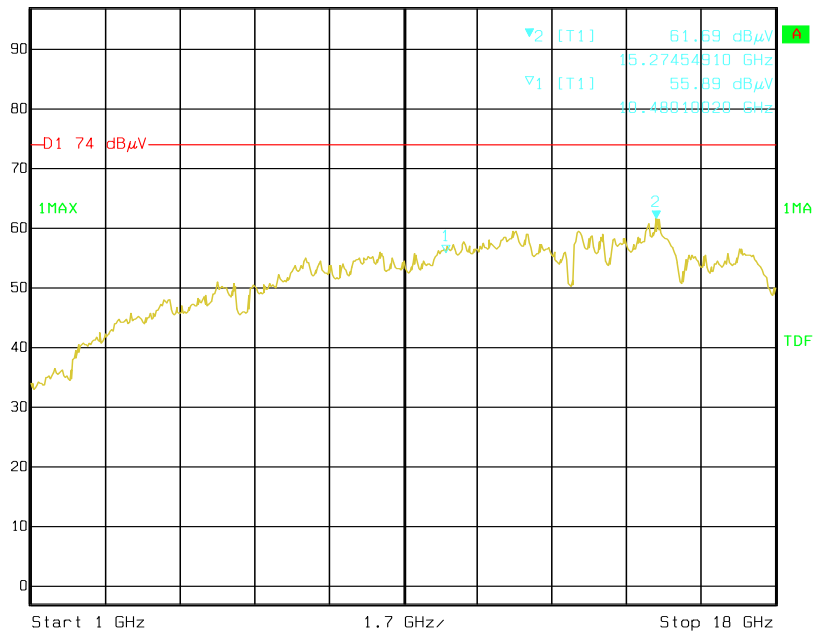
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit- Corr. Amplitude

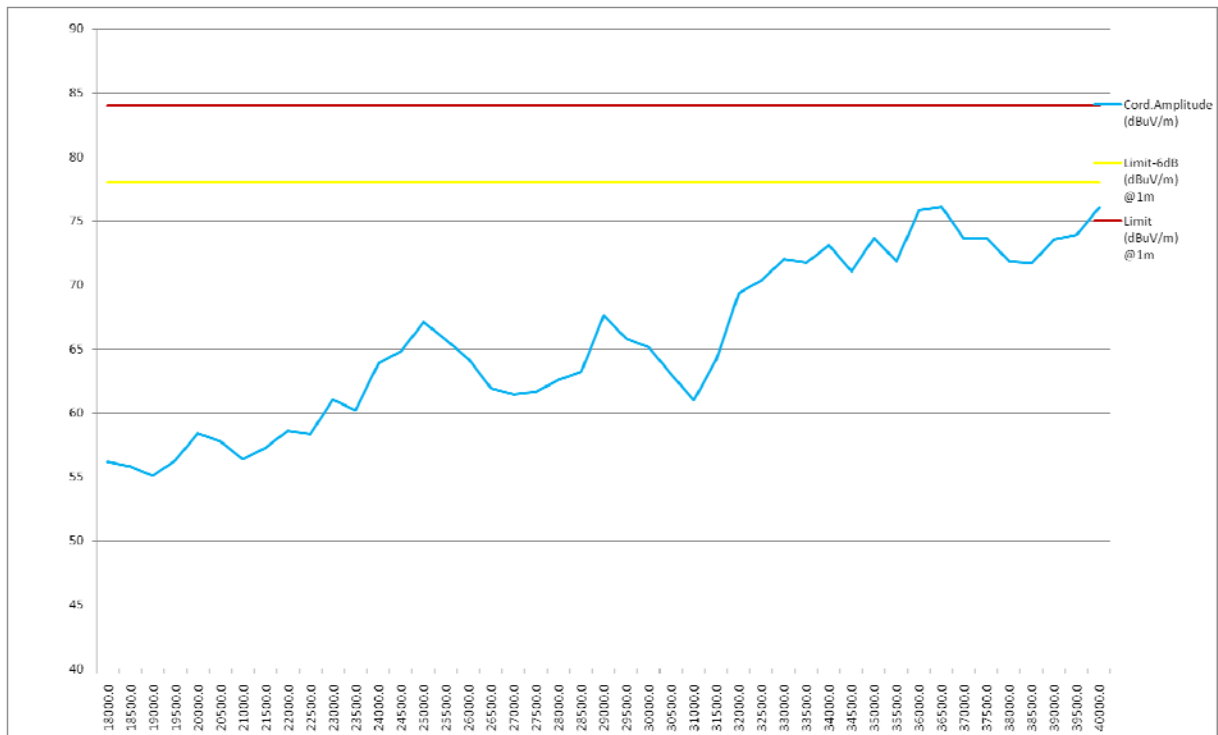
All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

**Peak**  
**Pre-scan with 802.11n20 5240MHz**  
**Horizontal**

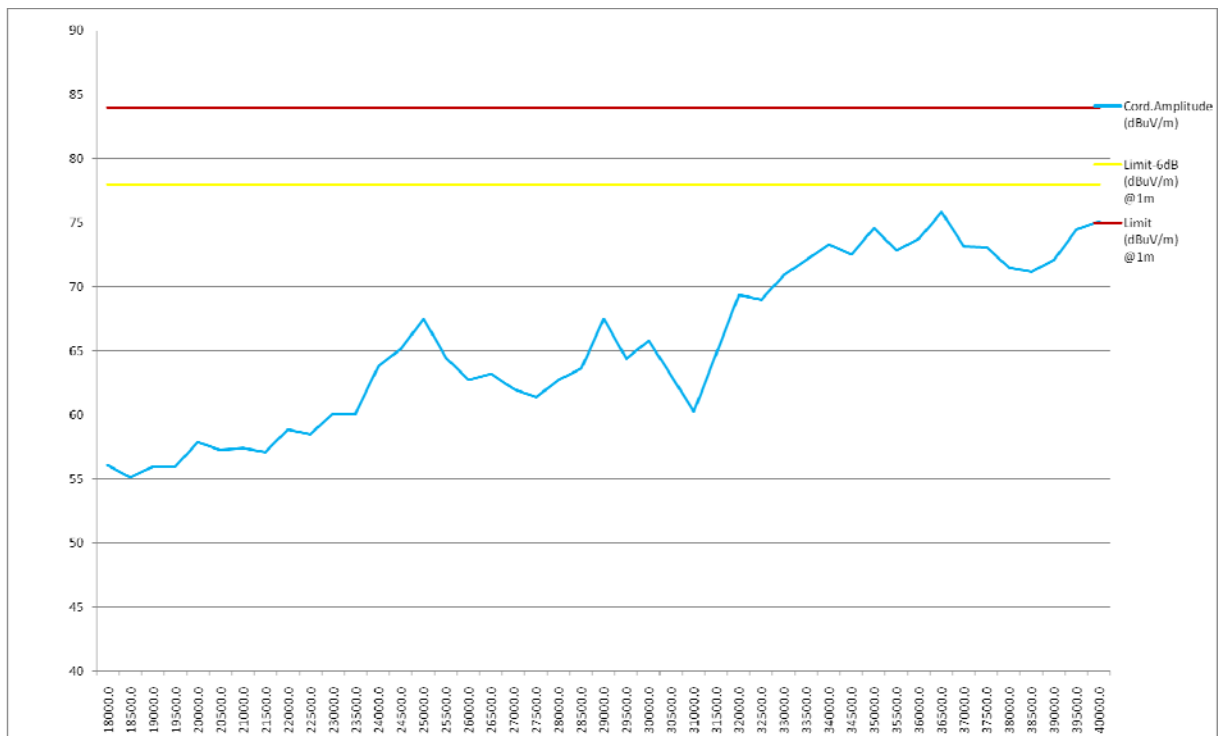
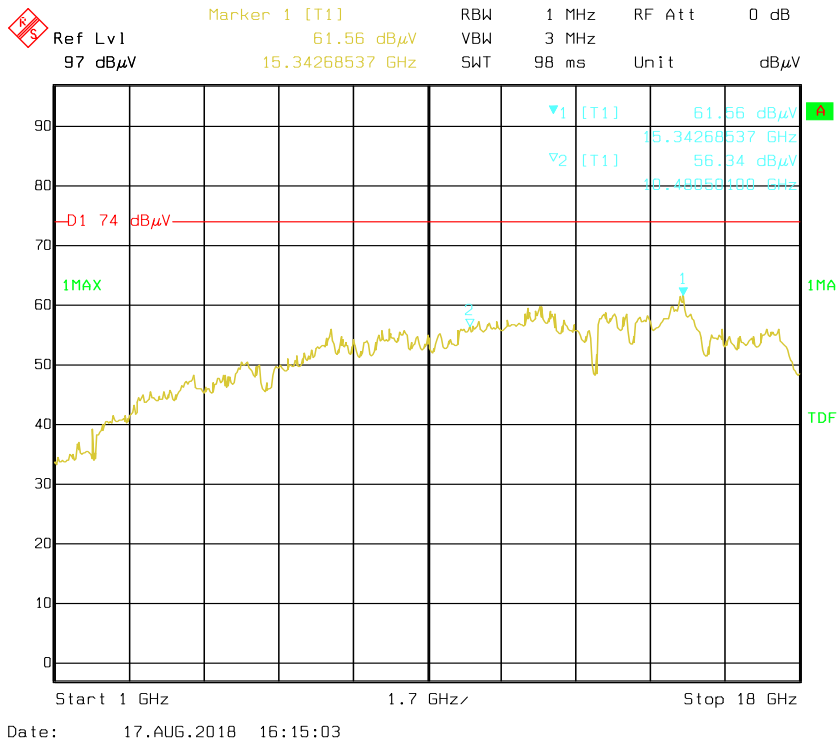
	Ref Lvl	Marker 2 [T1]	RBW	1 MHz	RF Att	0 dB
	97 dB $\mu$ V	61.69 dB $\mu$ V	VBW	3 MHz		
		15.27454910 GHz	SWT	98 ms	Unit	dB $\mu$ V



Date: 17.AUG.2018 16:10:23

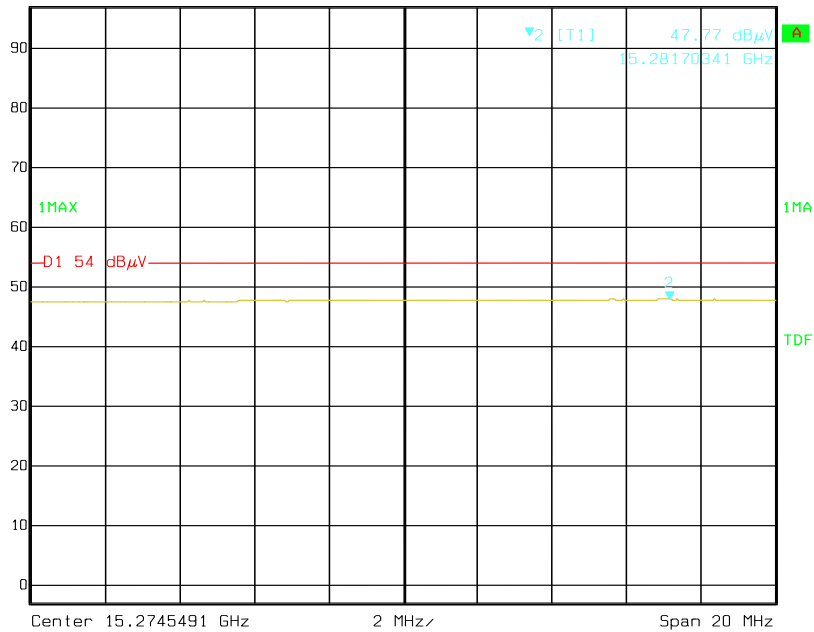


Vertical

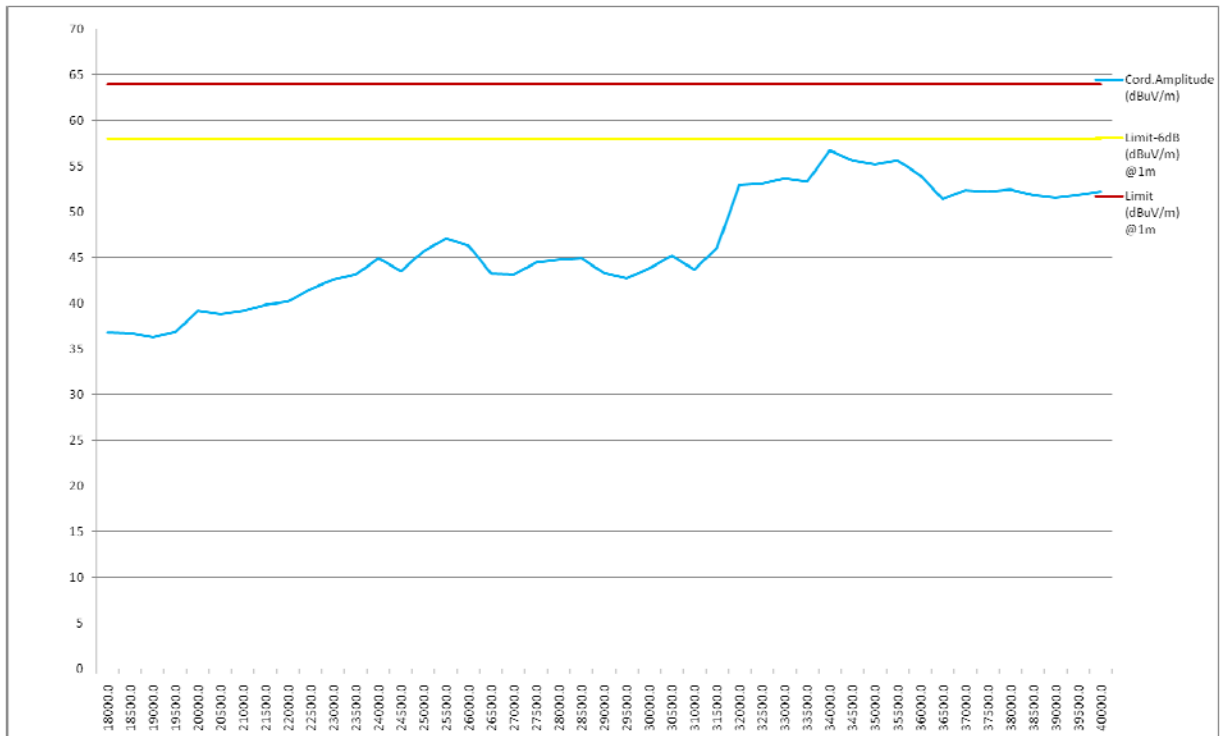


### Average Horizontal

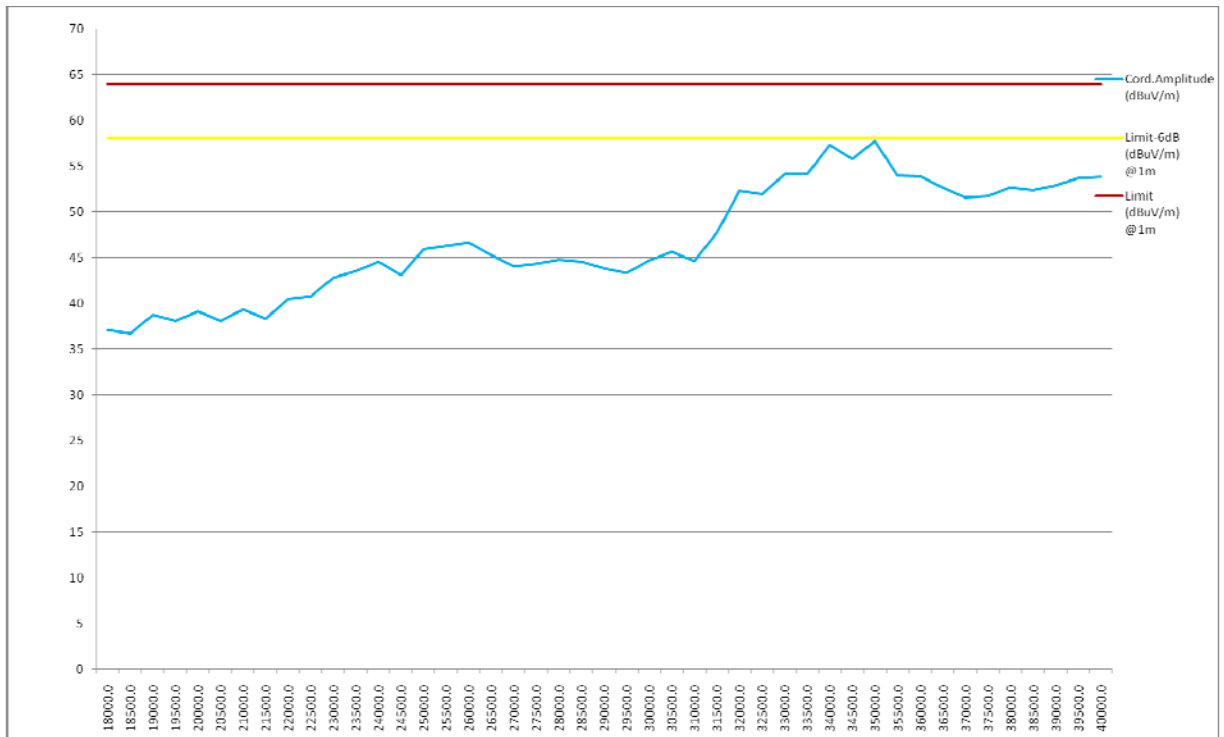
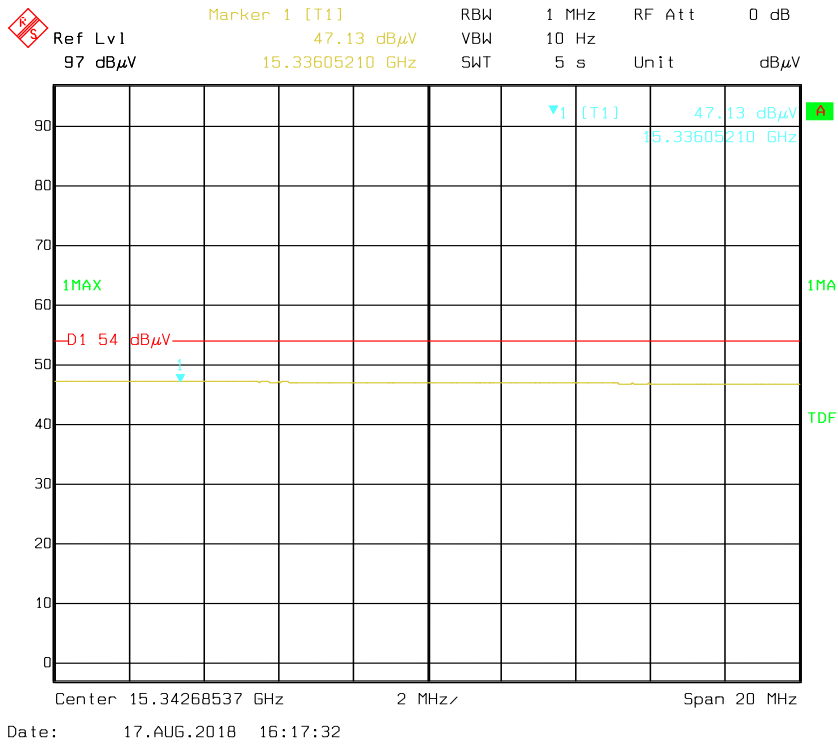

Marker 2 [T1]
RBW 1 MHz
RF Att 0 dB  
Ref Lvl 97 dB $\mu$ V
47.77 dB $\mu$ V
VBW 10 Hz  
15.28170341 GHz
SWT 5 s
Unit dB $\mu$ V



Date: 17.AUG.2018 16:13:09



Vertical



## §15.407(B) (1) –OUT OF BAND EMISSION

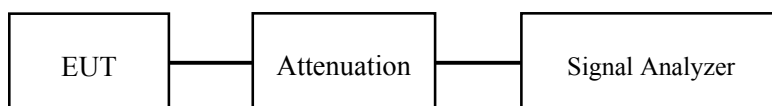
### Applicable Standard

FCC §15.407 (b) (1);

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 EIRP of –27dBm/MHz.

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to  $\geq 1$ MHz, report the peak value out of the operating band.
3. Repeat above procedures until all frequencies measured were complete.
4. when necessary, provided the measured energy is integrated to show the total power over 1 MHz.



### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

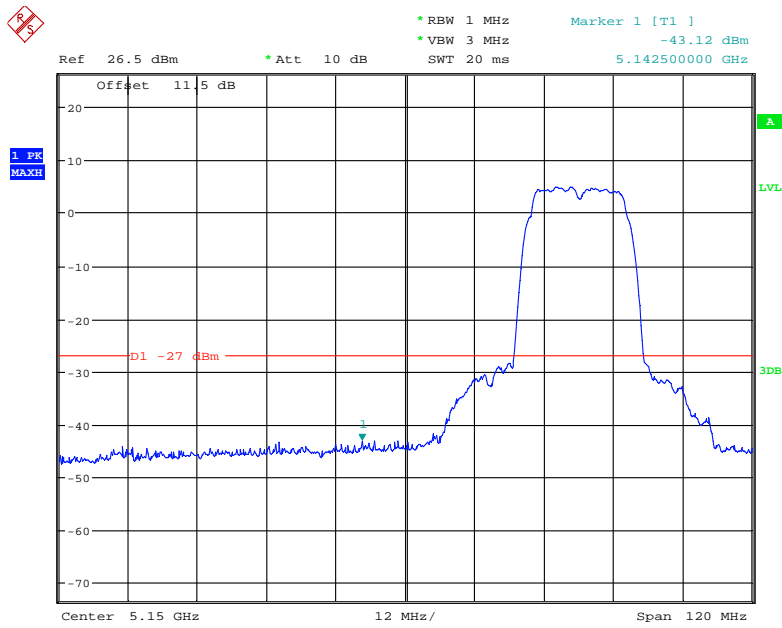
*The testing was performed by Hill He on 2018-08-05.*

*EUT operation mode: Transmitting*

#### 5150 – 5250 MHz:

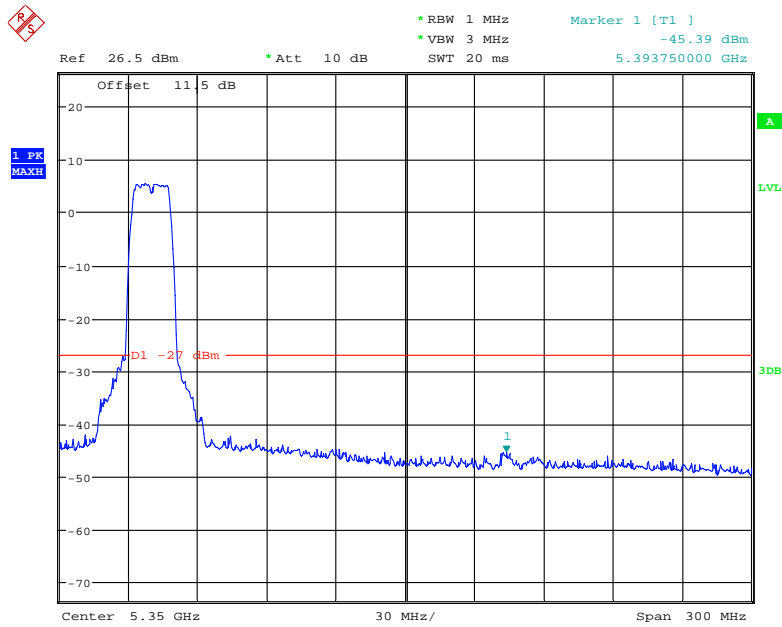
Note: For 5150-5250MHz band, the limit is EIRP, so the antenna gain had been adding to the plots.

### 802.11a mode, Band Edge, Left Side



Date: 5.AUG.2018 16:48:51

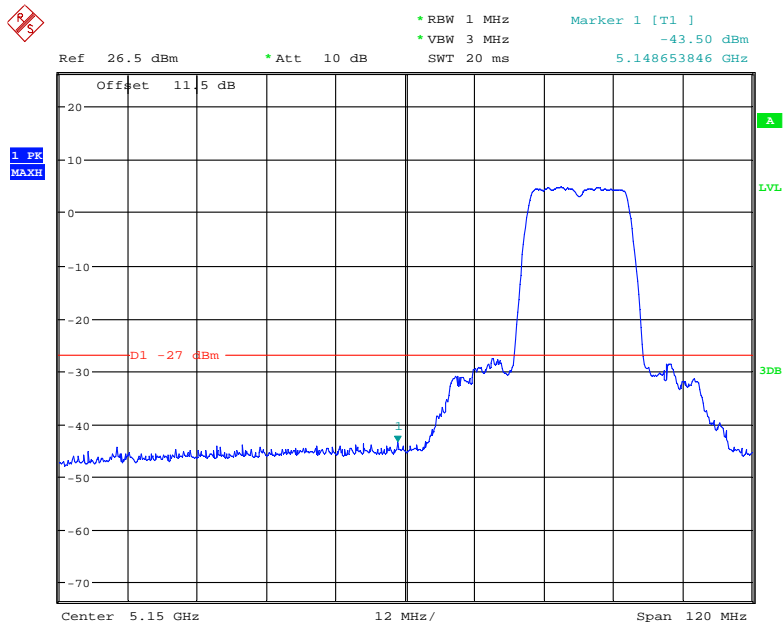
### 802.11a mode, Band Edge, Right Side



Date: 5.AUG.2018 16:50:05

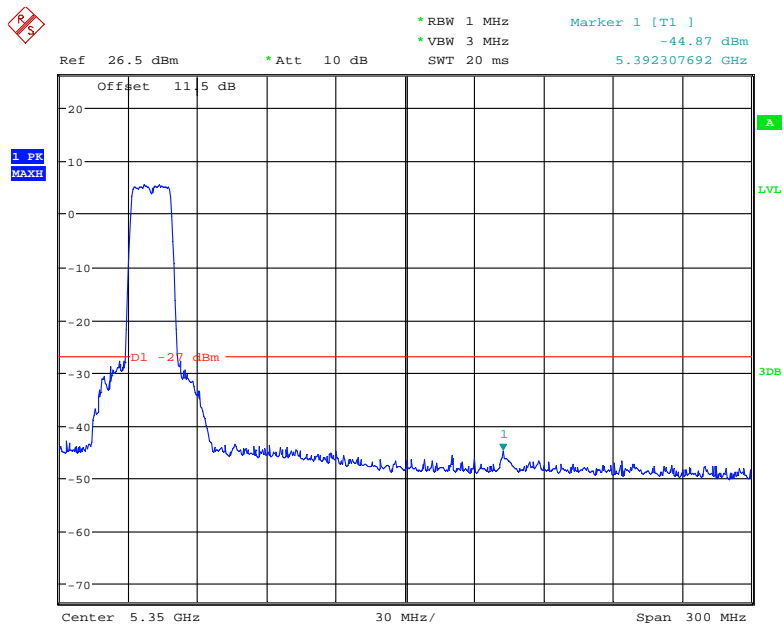


### 802.11n20 mode, Band Edge, Left Side



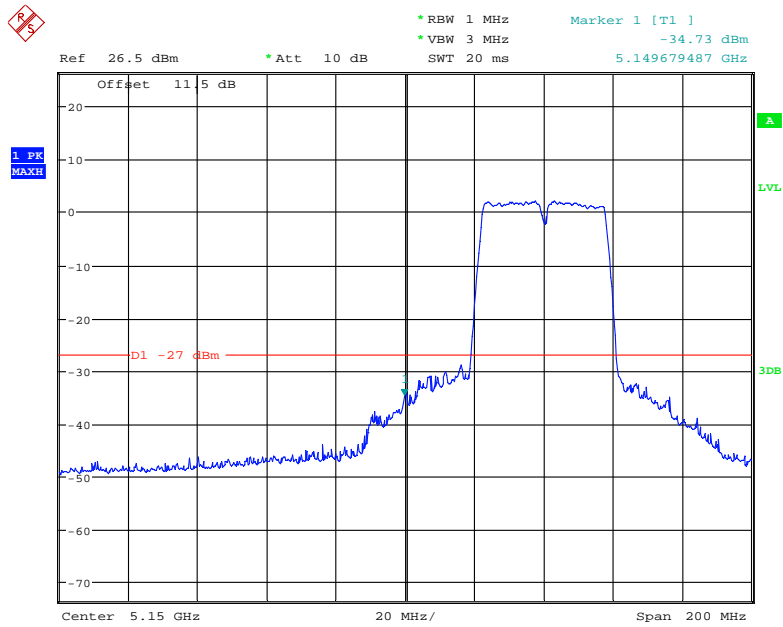
Date: 5.AUG.2018 16:52:00

### 802.11n20 mode, Band Edge, Right Side



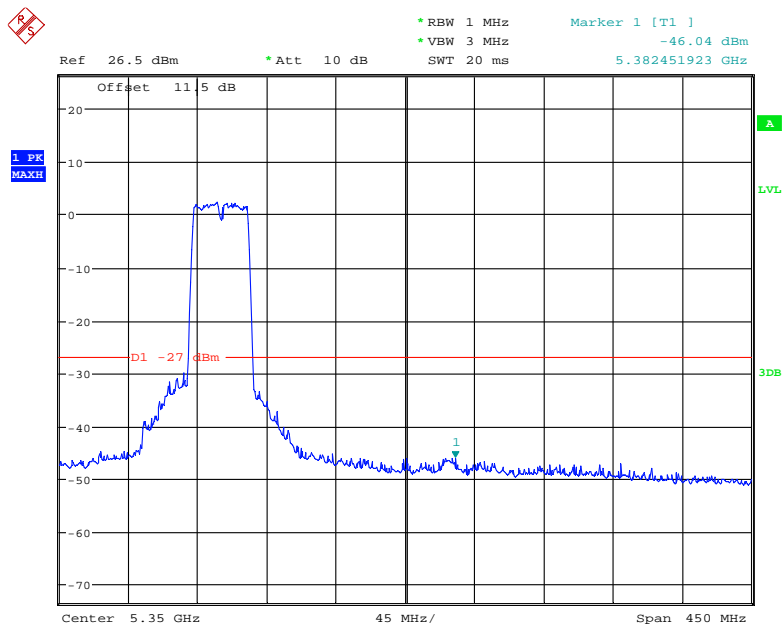
Date: 5.AUG.2018 16:51:14

### 802.11n40 mode, Band Edge, Left Side



Date: 5.AUG.2018 16:57:51

### 802.11n40 mode, Band Edge, Right Side



Date: 5.AUG.2018 16:58:40

## FCC §15.407(a) (1) – 26 dB EMISSION BANDWIDTH

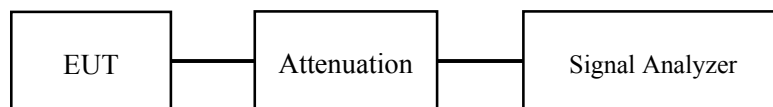
### Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

### Test Procedure

#### 1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.



### Test Data

#### Environmental Conditions

Temperature:	25°C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

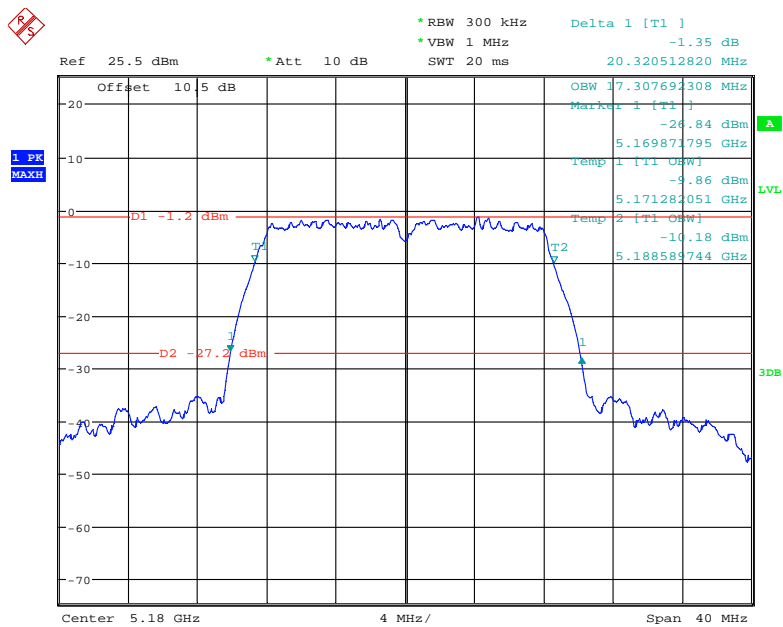
*The testing was performed by Hill He on 2018-08-05.*

EUT operation mode: Transmitting

Test Result: Pass; please refer to the following tables and plots.

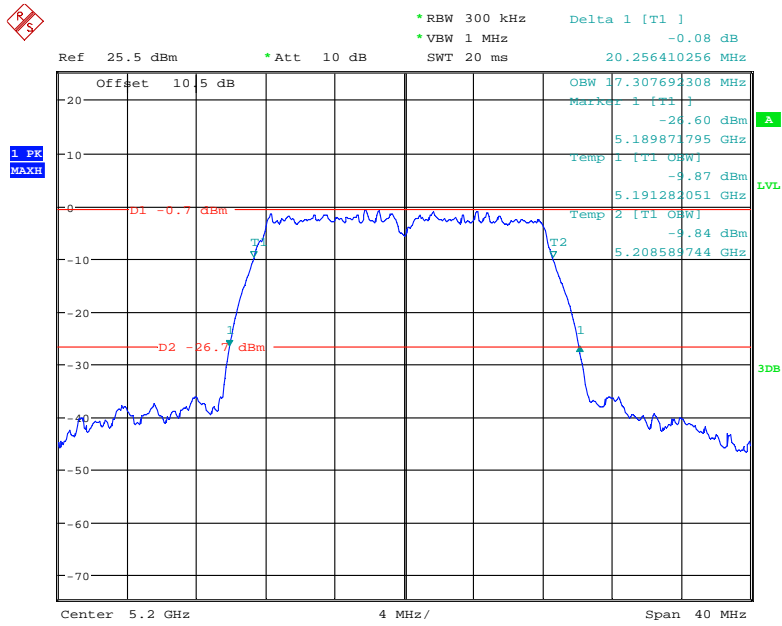
Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
<b>802.11a</b>			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	20.321	17.308	
5200	20.256	17.308	
5240	20.128	17.115	
<b>802.11n20</b>			
5180	20.192	17.885	
5200	20.192	17.885	
5240	20.192	17.885	
<b>802.11n40</b>			
5190	40.769	36.538	
5230	40.641	36.282	

**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz**



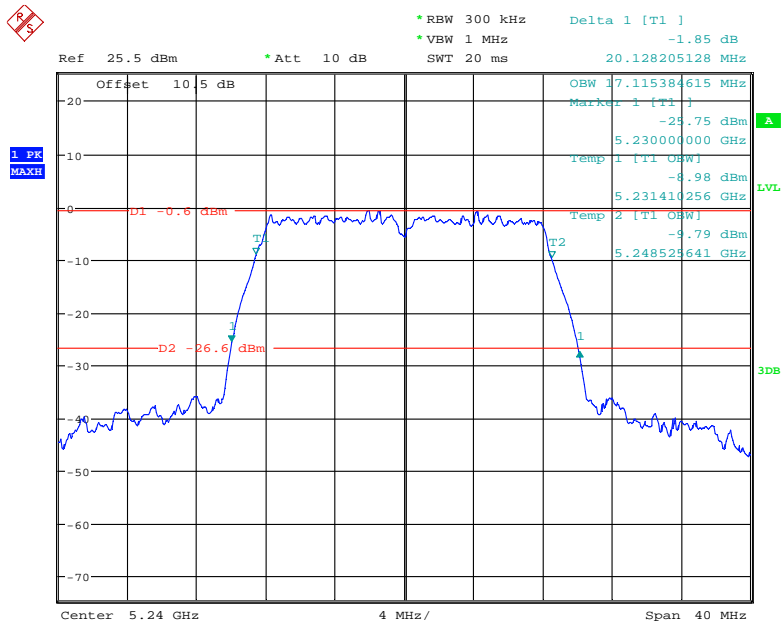
Date: 5.AUG.2018 16:11:57

**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz**



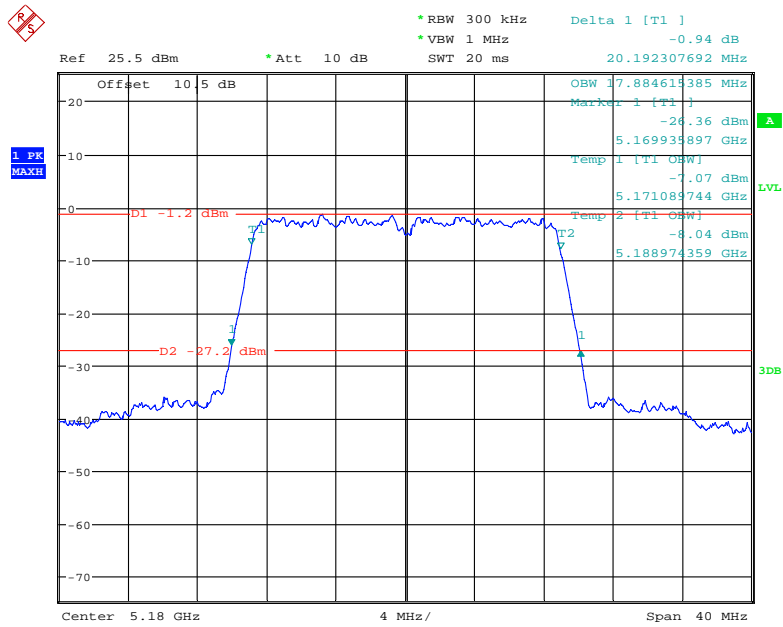
Date: 5.AUG.2018 16:13:48

**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz**



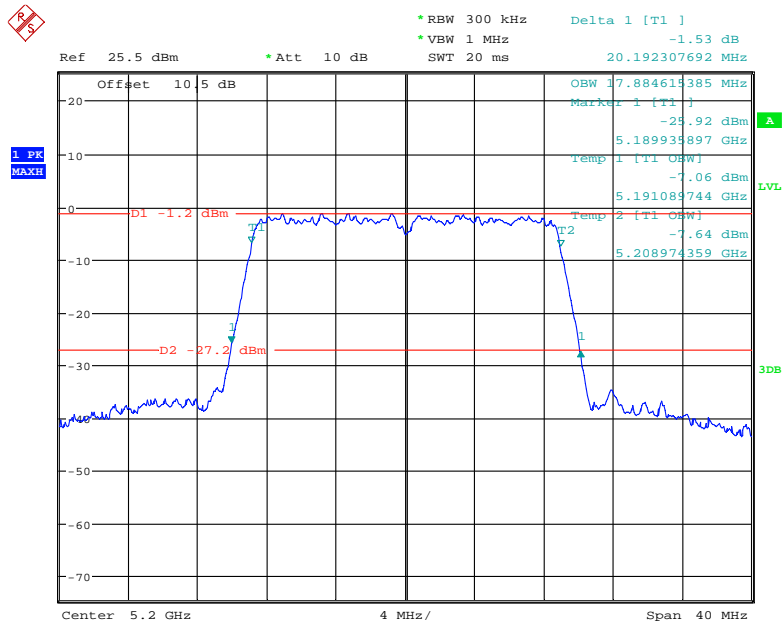
Date: 5.AUG.2018 16:14:42

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



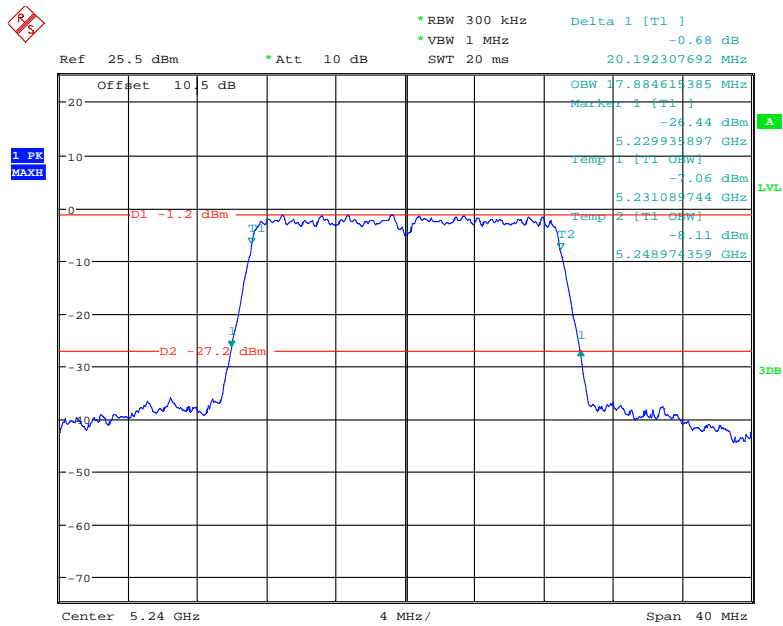
Date: 5.AUG.2018 16:22:59

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



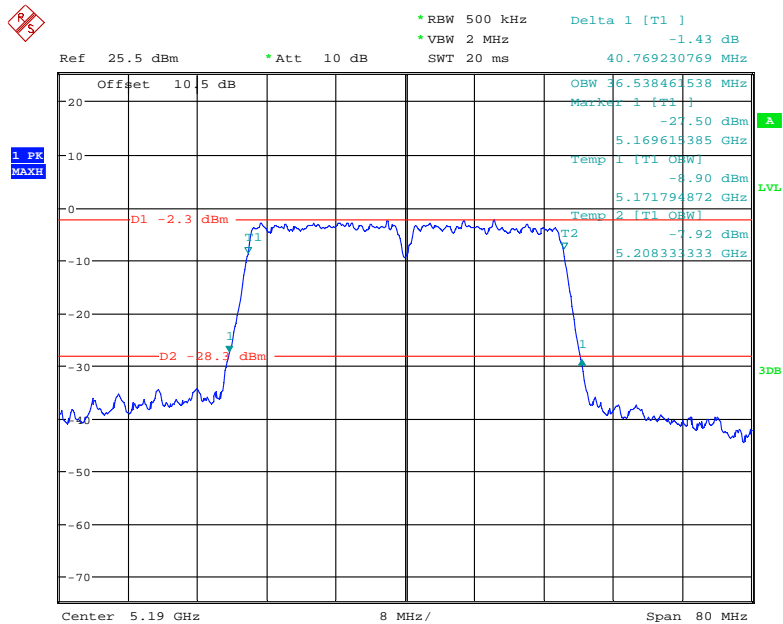
Date: 5.AUG.2018 16:23:44

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz**



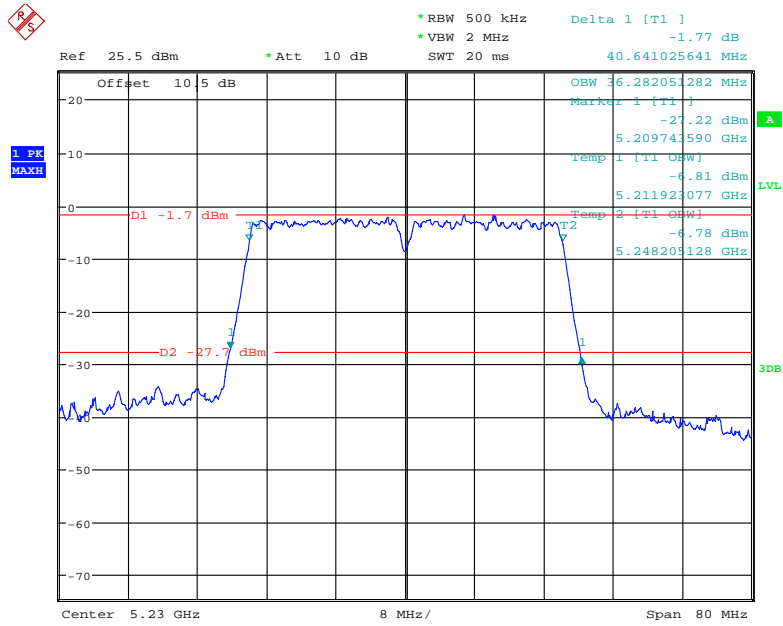
Date: 5.AUG.2018 16:25:36

**802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz**



Date: 5.AUG.2018 16:33:16

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz



Date: 5.AUG.2018 16:31:13



## **FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER**

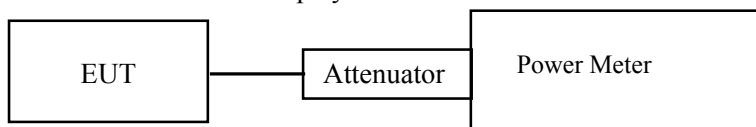
### **Applicable Standard**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Test Procedure**

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Hill He on 2018-08-05.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

Please refer to the following tables.

**5150 MHz – 5250 MHz (client used):**

Frequency (MHz)	Output Power (dBm)	Limit (dBm)
802.11a		
5180	7.39	24
5200	7.66	
5240	7.42	
802.11n20		
5180	7.39	24
5200	7.66	
5240	7.42	
802.11n40		
5190	7.36	24
5230	7.53	

## **FCC §15.407(a) (1) - POWER SPECTRAL DENSITY**

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### **Applicable Standard**

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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Test Procedure**

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set  $RBW \geq 1/T$ , where T is defined in section II.B.1.a).
- b) Set  $VBW \geq 3 RBW$ .
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz}/RBW)$  to the measured result, whereas  $RBW (< 500 \text{ kHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1\text{MHz}/RBW)$  to the measured result, whereas  $RBW (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101 kPa

*The testing was performed by Hill He on 2018-08-05.*

*EUT operation mode: Transmitting*

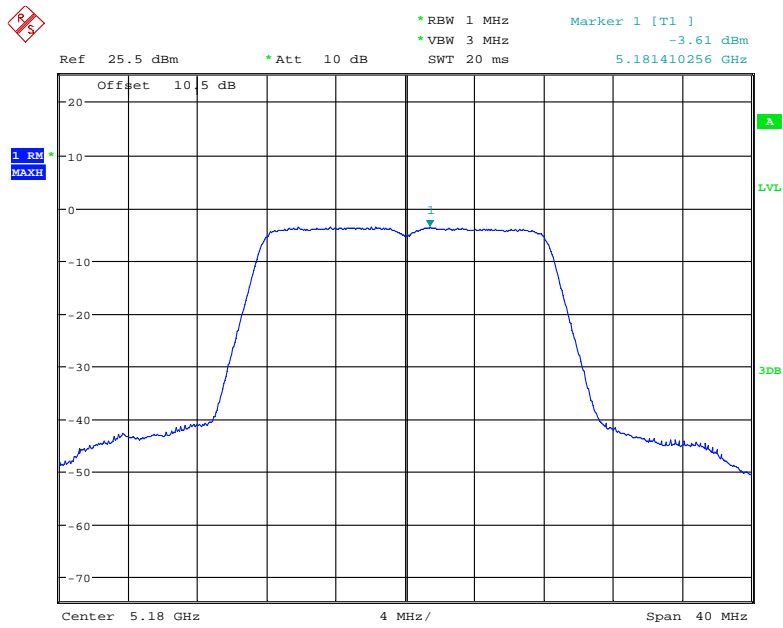
**Test Result: Pass**

Please refer to the following tables and plots.

**5150 MHz – 5250 MHz (client used):**

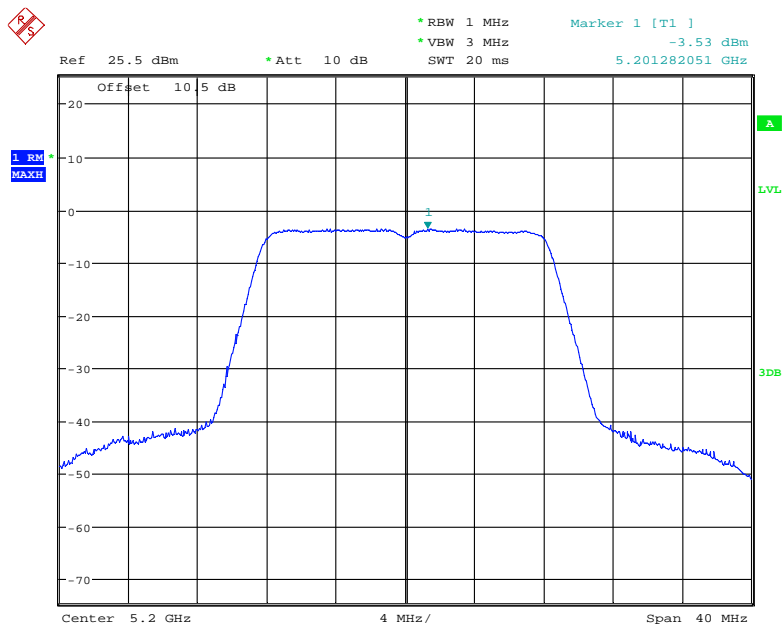
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
<b>802.11a</b>		
5180	-3.61	11
5200	-3.53	
5240	-3.04	
<b>802.11n20</b>		
5180	-3.54	11
5200	-3.83	
5240	-3.20	
<b>802.11n40</b>		
5190	-6.39	11
5230	-6.74	

### 802.11a mode, Power Spectral Density, 5180 MHz



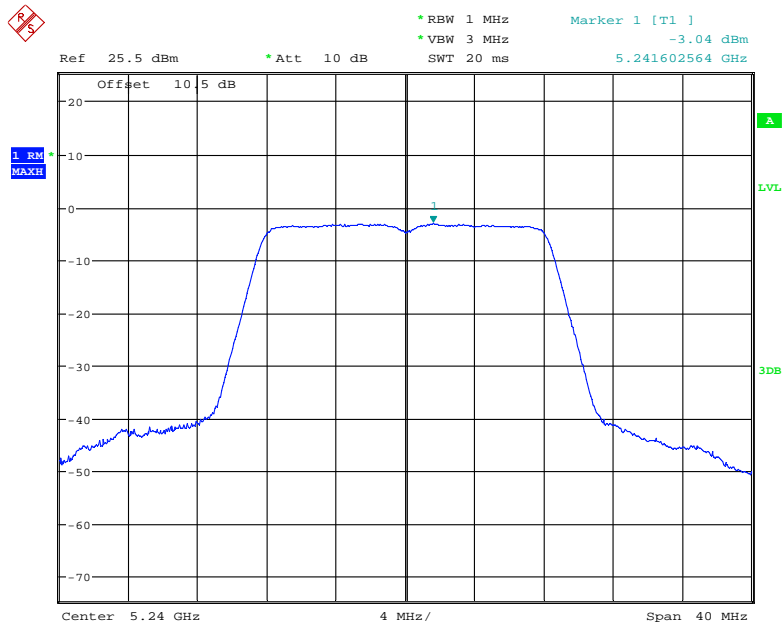
Date: 5.AUG.2018 17:15:16

### 802.11a mode, Power Spectral Density, 5200 MHz



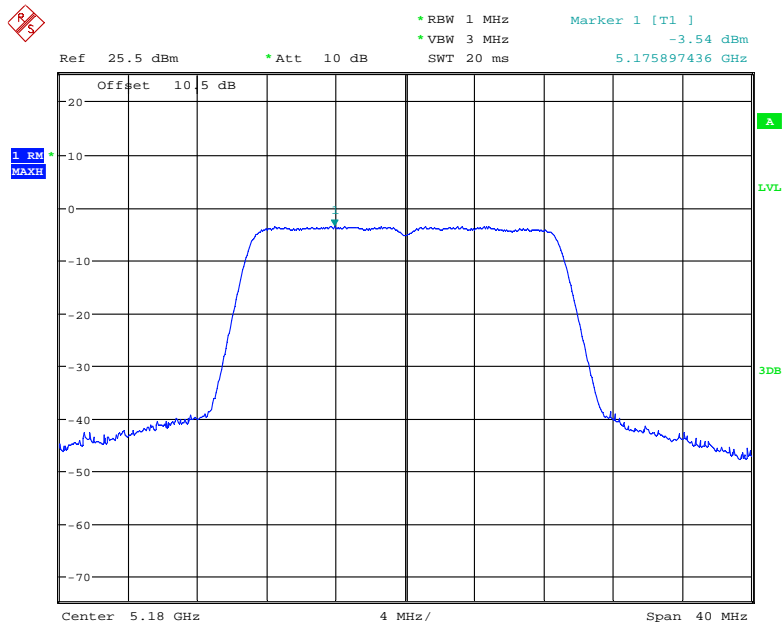
Date: 5.AUG.2018 17:15:57

### 802.11a mode, Power Spectral Density, 5240 MHz



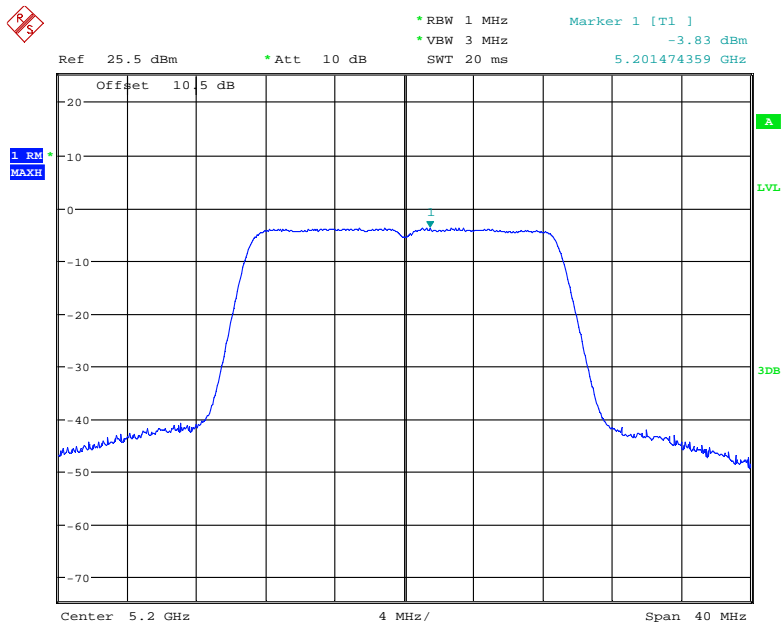
Date: 5.AUG.2018 17:16:30

### 802.11n20 mode, Power Spectral Density, 5180 MHz



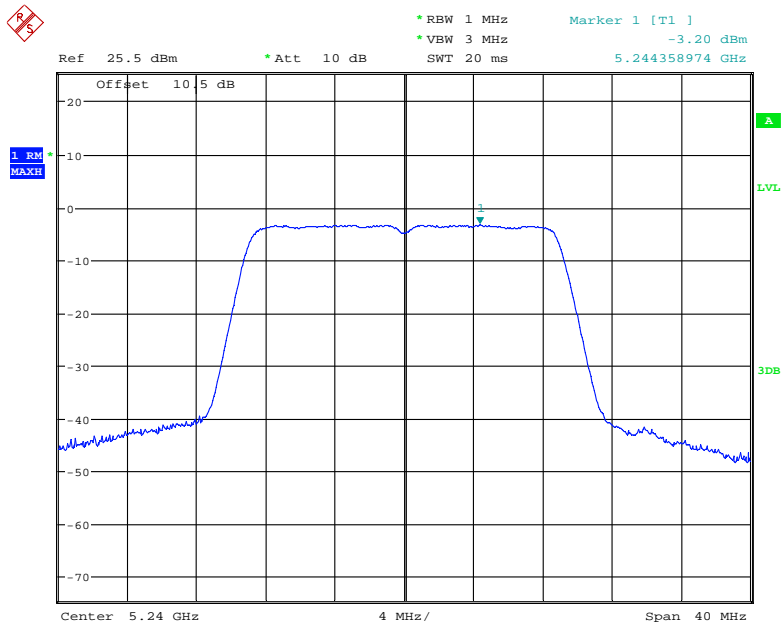
Date: 5.AUG.2018 17:18:25

### 802.11n20 mode, Power Spectral Density, 5200 MHz



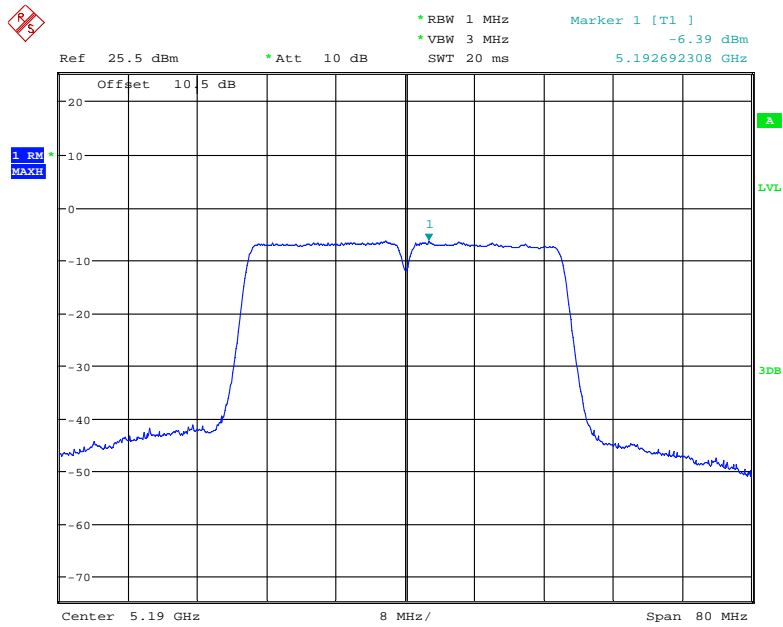
Date: 5.AUG.2018 17:17:54

### 802.11n20 mode, Power Spectral Density, 5240 MHz



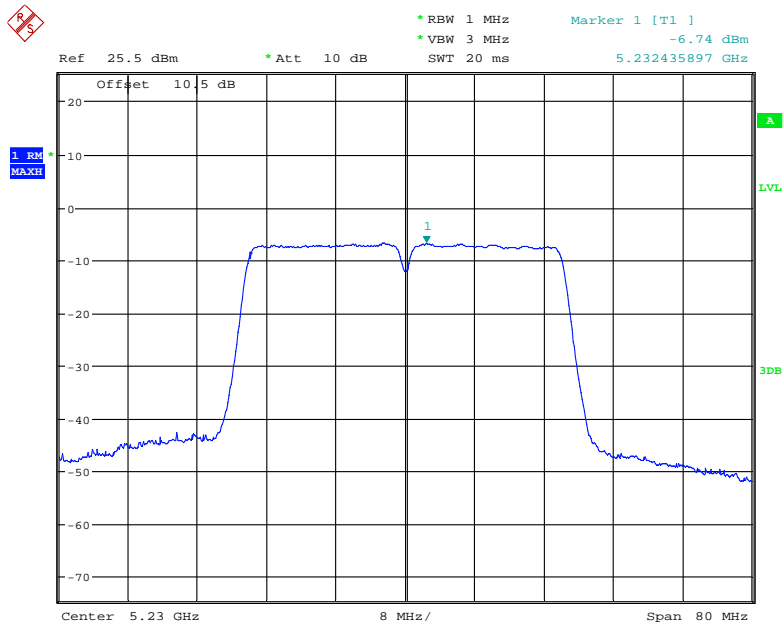
Date: 5.AUG.2018 17:17:17

### 802.11n40 mode, Power Spectral Density, 5190 MHz



Date: 5.AUG.2018 17:21:53

### 802.11n40 mode, Power Spectral Density, 5230 MHz



Date: 5.AUG.2018 17:22:49

\*\*\*\*\* END OF REPORT \*\*\*\*\*