

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

	OF
Applicant:	Sharp Corporation, Mobile Communication B.U. 2-13-1, Hachihonmatsu-Iida, Higashi-hiroshima-shi, Hiroshima 739-0192, Japan
Manufacturer:	Sharp Corporation 1 Takumi-cho, Sakai-ku, Sakai-Shi, Osaka 590-8522, Japan
Product Name:	Smart Phone
Report Number:	ER/2018/30017
FCC ID:	APYHRO00259
FCC Rule Part:	§15.407, Cat: NII
Issue Date:	Mar. 28, 2018
Date of Test:	Mar. 05, 2018 ~ Mar. 23, 2018
Date of EUT Received:	Mar. 05, 2018

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Marcus

Tested By:

Approved By:

Marcus Tseng / Sr. Engineer

Jim Chang / Manager



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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/30017	Rev.00	Initial creation of document	All	Mar. 28, 2018	Violetta Tang

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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Smart Phone		
Hardware Version:	DVT		
Software Version:	N/A		
	3.85V from Rechargeable Li-ion Battery		
Power Supply:	Battery:	Model No.: UBATIA286AFN2, Supplier: SCUD (FUJIAN) Electronics Co., Ltd.	

WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
	5180~5240	4	14.84	
11a_20	5260~5320	4	14.90	OFDM
	5500~5700	11	14.73	
11n HT/	5180~5240	4	HT: 17.66 (Worst Case)	
ac_VHT	5260~5320	4	HT: 17.54 (Worst Case)	OFDM
20M	5500~5700	11	HT: 17.69 (Worst Case)	
11n HT/	5190~5230	2	HT: 17.53 (Worst Case)	
ac_VHT	5270~5310	2	HT: 17.54 (Worst Case)	OFDM
40M	5510~5670	5 HT: 17.73 (Worst Case)		
11	5210	1	14.72	
VHT80M	11ac 5290		14.52	OFDM
VIIIOOM	5530~5610	2 17.71		
Modulation Type64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		Μ		
Transition Rate: 802.11 802.11 802.11 802.11 802.11 802.11 802.11		802.11 n_2 802.11 n_4 802.11 ac_ 802.11 ac_	6/9/12/18/24/36/48/54 Mbps 20MHz: 6.5 – 144.4Mbps 40MHz: 13.5 – 300.0Mbps 20MHz: 6.5 –173.3Mbps 40MHz: 13.5 –400.0Mbps 80MHz: 29.3 – 866.7Mbps	
Antenna Designation: Antenna Designation: IFA Antenna, 5150~5250MHz Gain: -3.6dBi (Main 5250~5350MHz Gain: -3.6dBi (Main 5470~5725MHz Gain: -1.7dBi (Main			0MHz Gain: -3.6dBi (Main) / -3 0MHz Gain: -3.6dBi (Main) / -3	3.9dBi(Aux)

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

KDB 789033 D02 v01r04 General UNII Test Procedures New Rules

FCC KDB 662911 D01 Multiple Transmitter Output

KDB 644545 D03 v01 Guidance for IEEE 802.11ac

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

(TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 **Conducted Emissions**

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 **Radiated Emissions**

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level. Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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2.5 Configuration of Tested System

Fig. 2-1 Radiated & AC Power Line Conducted Emission



Fig. 2-2 Conducted (Antenna Port) Emission

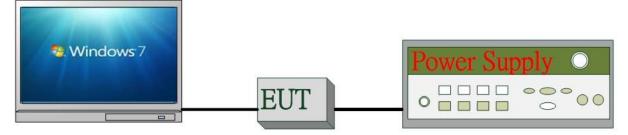


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	DC Power Supply	Anritsu	E3640A	MY52410006	N/A	Unshielded
3.	Notebook	Lenovo	T440	P0000564	Shielded	Unshielded

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3. SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	26 dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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4. DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode		
Channel	Frequency	
36	5180	
40	5200	
44	5220	
48	5240	

802.11 n HT40 Mode, 802.11ac VHT40 Mode		
channel Frequency		
38 5190		
46	5230	

802.11ac VHT80 Mode		
channel	Frequency	
42	5210	

Operated band in 5250 MHz ~5350 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode		
channel	Frequency	
52	5260	
56 5280		
60	5300	
64	5320	

802.11 n HT40 Mode, 802.11ac VHT40 Mode		
channel Frequency		
54 5270		
62 5310		

802.11ac \	/HT80 Mode
Channel	Frequency
58	5290

Operated band in 5470 MHz ~5725 MHz:

802.11a / n HT20 Mode,						
802.11ac VHT20 Mode						
Channel	Frequency					
100	5500					
104	5520					
108	5540					
112	5560					
116	5580					
120	5600					
124	5620					
128	5640					
132	5660					
136	5680					
140	5700					

802.11 n HT40 Mode, 802.11ac VHT40 Mode						
channel	Frequency					
102	5510					
110	5550					
118	5590					
126	5630					
134	5670					

802.11ac VHT80 Mode						
channel	Frequency					
106	5530					
122	5610					

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4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- Test program used to control the EUT for staying in continuous transmitting mode is prorammed.
- 3. Investigation has been done on all the possible configurations for searching the worst case.
- 4. The given UE is pre-scanned among 802.11n and ac modes, and 802.11n yields the highest reading that generates the highest emission.

RADIATED EMISSION TEST (BELOW 1 GHz)								
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT		
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN		
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO		
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN		
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO		
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	MAIN		
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS8	MIMO		
	RADI	ATED EMISS	ION TEST (AE	BOVE 1 GHz)				
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT		
802.11a	E100 E240	36 to 48	36,44,48	OFDM	6	MAIN		
802.11n_HT20	5180~5240			OFDM	MCS8	MIMO		
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO		
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO		
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN		
802.11n_HT20	5200~5520	52 10 04	52,00,04	OFDM	MCS8	MIMO		
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO		
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO		
802.11a	5500~5720	100 to 144	100,116,140	OFDM	6	MAIN		
802.11n_HT20	5500~5720	100 10 144	100,110,140	OFDM	MCS8	MIMO		
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS8	MIMO		
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO		

RADIATED EMISSION TEST:

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case E1 position was reported.

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ANTENNA PORT CONDUCTED MEASUREMENT:

		CON	NDUCTED TEST			
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
MODE	BAND (MHz)	CHANNEL	CHANNEL	MODULATION	(Mbps)	PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN
802.11n_HT20	5160~5240	50 10 40	30,44,40	OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	EQ to GA	ED 60 64	OFDM	6	MAIN
802.11n_HT20	5200~5520	52 to 64	52,60,64	OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	0~5310 54 to 62 54,62		OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5720	100 to 144	100,116,140,144	OFDM	6	MAIN
802.11n_HT20	5500~5720	100 10 144	100,110,140,144	OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102,110,134,142	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO

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MEASUREMENT UNCERTAINTY 5.

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission:

	9kHz-30MHz: +/-2.87dB			
	30MHz - 180MHz: +/- 3.37dB			
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB			
(Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB			
	1GHz - 18GHz: +/- 4.04dB			
	18GHz - 40GHz: +/- 4.04dB			

	9kHz-30MHz: +/-2.87dB		
	30MHz - 167MHz: +/- 4.22dB		
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB		
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB		
-	1GHz - 18GHz: +/- 4.08dB		
	18GHz - 40GHz: +/- 4.08dB		

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6. CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range		mits (uV)				
MHz	Quasi-peak Average					
0.15 to 0.50	66 to 56	56 to 46				
0.50 to 5	56	46				
5 to 30	60 50					
Note						

1. The lower limit shall apply at the transition frequencies

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	2017/06/06	2018/06/05
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A
LISN	SCHWARZBECK	NSLK 8127	8127-649	2017/05/22	2018/05/21

6.3 EUT Setup

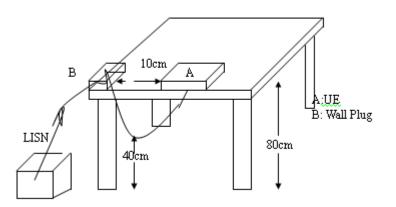
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP



6.5 Measurement Procedure

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all phases of power being supplied by given UE are completed.

6.6 Measurement Result

Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit.

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Site Conduction Room

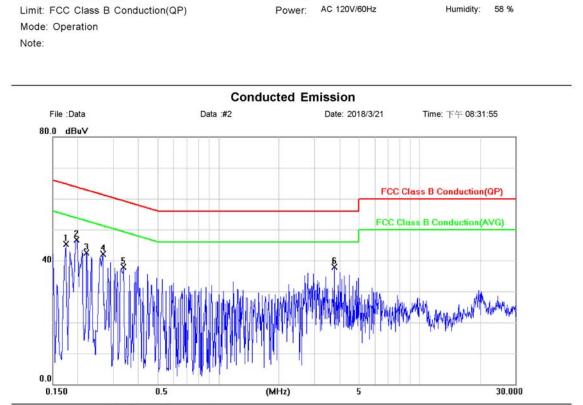
Temperature:

20 °C

AC POWER LINE CONDUCTED EMISSION TEST DATA

Phase:

L1



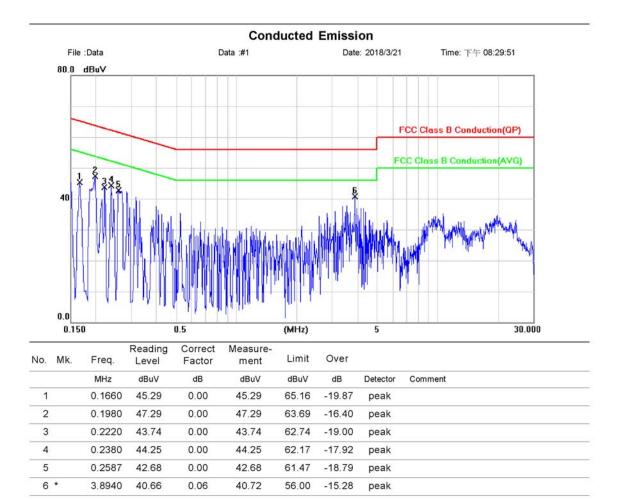
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.1740	45.27	0.00	45.27	64.77	-19.50	peak		
2	*	0.1965	46.79	0.00	46.79	63.76	-16.97	peak		
3		0.2220	42.44	0.00	42.44	62.74	-20.30	peak		
4		0.2660	42.20	0.00	42.20	61.24	-19.04	peak		
5		0.3380	37.84	0.00	37.84	59.25	-21.41	peak		
6		3.7660	37.94	0.06	38.00	56.00	-18.00	peak		
- 332.4		0.00124-0200244	01243300000	0.0000000	51 CH 97 CO	0.000	2007 CAR 197	A64.05795566		

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Site Conduction Room Temperature: 20 °C Phase: N AC 120V/60Hz Limit: FCC Class B Conduction(QP) Power: Humidity: 58 % Mode: Operation Note:



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7. DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

- 1. Set span = Zero
- 2. RBW = 8MHz
- 3. VBW = 8MHz,
- 4. Detector = Peak

Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	98.23	0.08	0.88	1.00
802.11n_20	98.10	0.08	0.74	1.00
802.11n_40	96.19	0.17	4.66	5.00
802.11ac_80	92.54	0.34	2.78	3.00

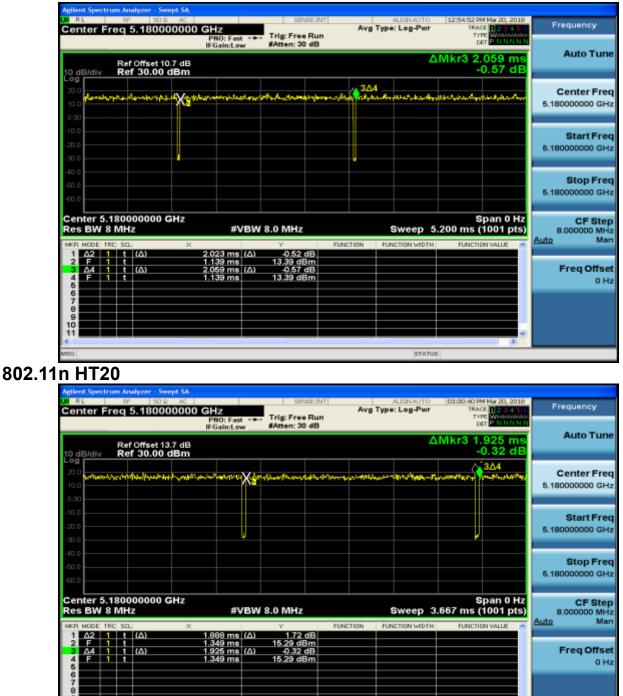
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DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



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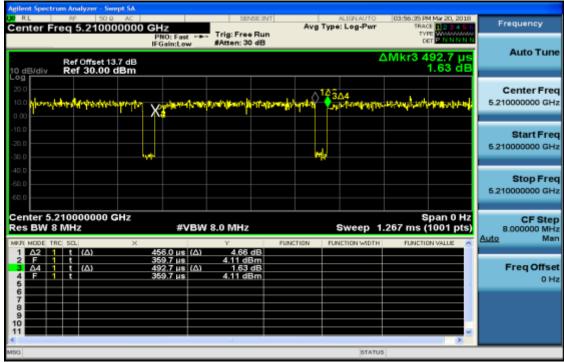
STATUS



802.11n HT 40

gilent Spectrum Analyzer - Swept SA				
RL MF 50.9 AC		Avg Type: Log-Pwr	03:21:24 PM Mar 20, 2018 TRACE 2 3 4 5 6 TYPE Watanata	Frequency
Ref Offset 13.7 dB 0 dB/div Ref 30.00 dBm	PNO: Fast Trig: Free Kun IFGain:Low #Atten: 30 dB	1	ΔMkr3 964.7 μs 0.52 dB	Auto Tune
	generation and the second s	1A7 304 • arresti ¹ An base for fulling	hyphyranad rinnamaelydd	Center Free 5.190000000 GH
10.0 20.0 30.0		4		Start Fre 5.19000000 GH
40.0				Stop Fre 5.19000000 GH
Center 5.190000000 GHz Res BW 8 MHz	#VBW 8.0 MHz	Sweep 1	Span 0 Hz .933 ms (1001 pts)	CF Ste 8.000000 MH Auto Ma
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	928.0 µs (Δ) 5.43 dB 214.6 µs 7.21 dBm 954.7 µs (Δ) 0.52 dB 214.6 µs 7.21 dBm			Freq Offse 0 H
7 8 9 10				
90		STATUS	>	

802.11 ac VHT 80



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8. 26DB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

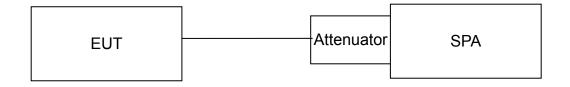
8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
 - b. Mark the peak frequency and -26dB (upper and lower) frequency.
- 4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
- 5. Repeat above procedures until all test default channel measured were complete.

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY54200716	2017/10/16	2018/10/15
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Notebook	Lenovo	T440	P0000564	N/A	N/A

8.3 Measurement Equipment Used

8.4 Test Set-up



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はサナガオ 死が、 いれてきる 不達 ガガ (ヘン(水の) 見)、 「 切すい(水の) 足が (回すい)、 うれて オポネス なり き 回すり、 ハーサ (加す ス) かん (れて ス) jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law



8.5 Measurement Result

26dB Bandwidth

802.11a_Main						
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)				
5180	21.46	13.315				
5220	21.75	13.375				
5240	22.26	13.476				
5260	21.47	13.319				
5300	21.39	13.303				
5320	21.94	13.412				
5500	21.37	13.299				
5580	21.79	13.383				
5700	21.67	13.358				

802.11n_HT20_Main

802.11n_HT20_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.39	13.500	5180	23.09	13.634
5220	22.58	13.538	5220	22.32	13.487
5240	22.73	13.565	5240	23.44	13.700
5260	22.20	13.463	5260	22.39	13.501
5300	22.84	13.587	5300	22.87	13.593
5320	22.68	13.556	5320	22.61	13.542
5500	22.69	13.558	5500	22.55	13.532
5580	22.53	13.527	5580	22.69	13.559
5700	22.77	13.574	5700	22.67	13.554

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802.11n	HT40	Main

802.11n _HT40_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.58	16.189
5230	42.50	16.284
5270	42.08	16.240
5310	41.75	16.206
5510	43.00	16.335
5550	42.61	16.295
5670	43.26	16.361

26dB Frequency 10 Log (B) BW (MHz) (dB) (MHz) 41.91 16.223 5190 5230 42.21 16.254 5270 42.25 16.258 5310 42.21 16.254 5510 42.19 16.252 5550 43.05 16.340 42.59 5670 16.293

802.11ac _VHT80_Main

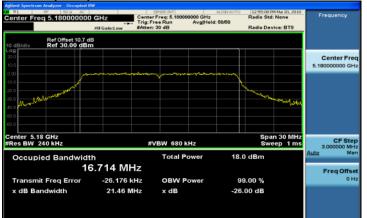
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	85.34	19.312
5290	82.04	19.140
5530	85.14	19.301
5610	84.81	19.284

802.11ac _VHT80_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	85.66	19.328
5290	85.32	19.311
5530	85.39	19.314
5610	85.24	19.306



802.11a (Main) 5180MHz



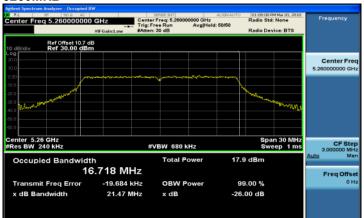
5220MHz



5240MHz

enter Freq 5.2400000	Trig:	er Freq: 5.240000000 GHz Free Run Avg Hold n: 30 dB	ALIONAUTO 01:04:37 PM Ma Radio Std: No : 50/50 Radio Device:	ne Frequency
Ref Offset 10. dB/div Ref 30.00 d	7 dB IBm			
•g 0.0 0.0				Center Free 5.240000000 GH:
0.0				
enter 5.24 GHz Res BW 240 kHz	;	≇VBW 680 kHz	Span 3 Sweep	0 MHz CF Step 1 ms 3.000000 MHz
Occupied Bandwidth 16.810 MHz		Total Power	18.7 dBm	Auto Mar Freq Offse
Transmit Freq Error x dB Bandwidth	2.352 kHz 22.26 MHz	OBW Power x dB	99.00 % -26.00 dB	0 H

5260MHz



5300MHz



5320MHz

Center Fre	⊯ 50.9 AC eq 5.320000000	GHz Cente Trig:F	SENSE:INT r Freq: 5.320000000 GHz ree Run Avg Hold : 30 dB	Radio SI 1: 50/50	PM Mar 20, 2018 d: None wice: BTS	Frequency
10 dB/div	Ref Offset 10.7 d Ref 30.00 dBn					
- 99 20.0 0.00 0.00 20.0 20.0 30.0 40.0 50.0 60.0	and the second sec				Warrant	Center Free 5.32000000 GHz
Center 5.3 #Res BW 3		#	VBW 680 kHz		an 30 MHz /eep 1 ms	CF Step 3.000000 MH
Occup	ied Bandwidt 16	^h 6.733 MHz	Total Power	19.0 dBm		Auto Mar Freg Offse
	it Freq Error Indwidth	-16.062 kHz 21.94 MHz	OBW Power x dB	99.00 % -26.00 dB		0 H:

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enter Freq	5.5000000		SEMSE INT Center Freq: 5,500 Trig: Free Run #Atten: 30 dB		50/50	Radio Std		Freque	
0 dB/div	Ref Offset 10.7 Ref 30.00 di								
og x0.0 10.0		Analoga and an article	and a construction of the second second					Cent 5.500000	er Freq 000 GHz
						Ladow Art			
enter 5.5 GH Res BW 220			#VBW 680	kHz		Spa Sw	un 30 MHz eep 1 ms		F Step
Occupied	Bandwi	dth	Total	Power	20.9	dBm		Auto	Man
		16.650 MI	lz					Free	Offset
Transmit F	req Error	-33.264	Hz OBW	Power	99.	00 %			0 Hz
x dB Band	width	21.37 N	lHz xdB		-26.0	0 dB			

5580MHz



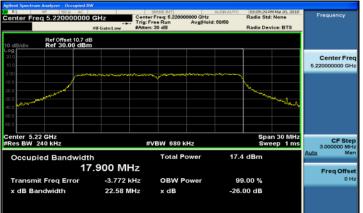
5700MHz

enter Freq 5.70000000	0 GHz Cente	SENSE:INT r Freq: 5.700000000 GHz Free Run Avg Hold a: 30 dB	ALIONAUTO 02:48:08 PM Mar 20, Radio Std: None 8:50/50 Radio Device: BT	Frequency
Ref Offset 10.7 Ref 30.00 dE				
		a alamaa amaa a		Center Free 5.700000000 GHz
Ronal Maharman			Marine Sale of Sales	m ala
0.0				
enter 5.7 GHz Res BW 240 kHz	#	VBW 680 kHz	Span 30 M Sweep 1	MHZ CF Step ms 3.000000 MHz
Occupied Bandwic	^{ith} 6.685 MHz	Total Power	22.2 dBm	Auto Mar
Transmit Freq Error	-29.544 kHz	OBW Power	99.00 %	он
x dB Bandwidth	21.67 MHz	x dB	-26.00 dB	

802.11n HT20 (Main) 5180 MHz



5220 MHz



5240 MHz

	5.240000000	-t- Tri	sense:int nter Freq: 5,240000000 Gi g: Free Run Avg]i tten: 30 dB	ALIGNAUTO Hz Hold: 50/50	Radio Std: M Radio Devic	lone	Frequency
0 dB/div	Ref Offset 10.7 dE Ref 30.00 dBm						
.09 20.0 10.0							Center Free 5.240000000 GH
20.0					Ven mar		
40.0 50.0 50.0						an way ligh	
enter 5.24 Res BW 24			#VBW 750 kHz			30 MHz p 1 ms	CF Step 3.000000 MH
Occupie	d Bandwidt	^h ′.917 MHz	Total Power	17.7	dBm		Auto Mar Freg Offse
Transmit	Freq Error	12.346 kHz	OBW Power	99	.00 %		0 H
x dB Ban	dwidth	22.73 MHz	x dB	-26.1	00 dB		

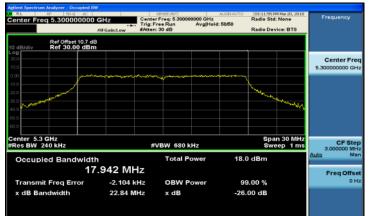
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nter Freq 5.26000000	Trig	sense:int] ter Freq: 5.260000000 GHz : Free Run Avg Hold en: 30 dB	Radio Std:	
dB/div Ref 0ffset 10.7 d				
		40		Center Fre 5.260000000 GH
			and the second s	7****/J.D=1.0x
enter 5.26 GHz tes BW 240 kHz		#VBW 750 kHz		a 30 MHz ep 1 ms 3.000000 MH
Occupied Bandwid	th	Total Power	18.0 dBm	Auto Ma
1	7.813 MHz			Freq Offse
Transmit Freq Error	-11.994 kHz	OBW Power	99.00 %	0 H
x dB Bandwidth	22.20 MHz	x dB	-26.00 dB	

5300 MHz



5320 MHz

enter Freq 5.3		Trig	sense:int ter Freq: 5.320000000 GHz Free Run Avg Hole en: 30 dB	d: 50/50	03:13:42 PM Mar 20, 2018 Radio Std: None Radio Device: BTS	Frequency
0 dB/div Re	Offset 10.7 dB 30.00 dBm					
•g 0.0 0.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	un jup man marine			Center Free 5.320000000 GH
0.0 0.0 0.0	and the second s				Manual and	
0.0						
enter 5.32 GH Res BW 240 ki			#VBW 680 kHz		Span 30 MHz Sweep 1 ms	CF Step 3.000000 MH
Occupied E		.842 MHz	Total Power	18.9	dBm	Auto Mar Freg Offse
Transmit Fre	q Error	-11.195 kHz	OBW Power	99.	00 %	0 H
x dB Bandwi	dth	22.68 MHz	x dB	-26.0	0 dB	

5500 MHz



5580 MHz



5700 MHz

enter Fre	eq 5.700000000		Center Freq Trig: Free Ri #Atten: 30 dt	5.700000		ALIGNAUTO	Radio Ste	PM Mar 20, 2018 d: None vice: BTS	Frequency
0 dB/div	Ref Offset 10.7 d Ref 30.00 dBn								
0 10.0 1.00 10.0		n,n.n.h.saylan.ga	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	part al Para	- 19 (marth fr	•••••			Center Free 5.700000000 GH
0.0 0.0 0.0							~~~Walu	- and a start of the	
enter 5.7 Res BW 3			#VBW	750 kH	łz		Sp: Sw	an 30 MHz eep 1 ms	CF Ste 3.000000 MH
Occup	ied Bandwidt 17	^ь 7.928 МН		otal Po	wer	21.7	dBm		Auto Mar Freq Offse
Transm	it Freq Error	-12.227 kH	lz O	BW Po	wer	99	0.00 %		он
x dB Ba	ndwidth	22.77 MH	lz x	dB		-26.	00 dB		

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802.11n HT20 (Aux1) 5180 MHz



5220 MHz



5240 MHz

RL 8F 50.9 AC enter Freq 5.240000000	GHz Cente	SENSE:INT r Freq: 5.240000000 GHz Free Run Avg Hold h: 30 dB	Radio S 50/50	r PM Mar 20, 2018 td: None evice: BTS	Frequency
Ref Offset 10.7 d 0 dB/div Ref 30.00 dB					
	- where a strate of the second				Center Freq 5.24000000 GHz
			- have	a manager	
0.0					
enter 5.24 GHz Res BW 240 kHz	#	VBW 750 kHz	Sp Sv	an 30 MHz veep 1 ms	CF Step 3.000000 MHz
Occupied Bandwid	ւհ 7.910 MHz	Total Power	17.6 dBm	4	Freq Offset
Transmit Freq Error	-218 Hz	OBW Power	99.00 %		0 Ha
x dB Bandwidth	23.44 MHz	x dB	-26.00 dB		

5260 MHz



5300 MHz



5320 MHz

	q 5.320000000	GHz Cen	sense:htt ter Freq: 5.320000000 GHz Free Run Avg Hole en: 30 dB	ALIGN AUTO	Radio Std: N Radio Device	one	Frequency
l0 dB/div _og	Ref Offset 10.7 dE Ref 30.00 dBm						
10.0 10.0 10.0 10.0			****		Mr.		Center Free 5.320000000 GHz
40.0 50.0 60.0							
Center 5.32 Res BW 2			#VBW 680 kHz			30 MHz p 1 ms	CF Step 3.000000 MH;
Occupi	ed Bandwidti 17	n 7.825 MHz	Total Power	18.9	dBm		Auto Mar Freq Offset
Transmit x dB Bar	t Freq Error ndwidth	-9.541 kHz 22.61 MHz	OBW Power x dB		00 % 00 dB		0 Ha

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enter Fre	g 5.500000000	-t Trig: f	SENSE:INT r Freq: 5.500000000 GHz ree Run Avg[Hold: h: 30 dB	ALIONAUTO 03:16:03 PM Ma Radio Std: No 50/50 Radio Device:	ne Frequency
d <u>B/div</u>	Ref Offset 10.7 d Ref 30.00 dBr	B n			
		- and an and a star of the start of the star	the providence and the second second	~~~~	Center Fre 5.500000000 GH
.0 .0 .0 .0 .0	Auronalural				
onter 5.5 Res BW 2		#	VBW 750 kHz	Span 3 Sweep	
Occupi	ed Bandwidt		Total Power	20.2 dBm	Auto Ma
		7.913 MHz			Freq Offse
	t Freq Error ndwidth	-26.456 kHz 22.55 MHz	OBW Power x dB	99.00 % -26.00 dB	U U

5580 MHz



5700 MHz

enter Freq 5.70000000	GHz Cente	sense:int r Freq: 5.700000000 GHz Free Run Avg Hold n: 30 dB	Radio Std		Frequency
Ref Offset 10.7 o 0 dB/div Ref 30.00 dB					
•g 0.0 0.0				5.	Center Freq 700000000 GHz
			- And	and	
0.0					
enter 5.7 GHz Res BW 240 kHz	#	VBW 750 kHz		n 30 MHz ep 1 ms	CF Step 3.000000 MH
Occupied Bandwid	th 7.932 MHz	Total Power	21.6 dBm	Auto	p Mar Freq Offse
Transmit Freq Error x dB Bandwidth	-24.930 kHz 22.67 MHz	OBW Power x dB	99.00 % -26.00 dB		0 Н:

802.11n HT40 (Main) 5190 MHz



5230 MHz



5270 MHz

Center Fre	eq 5.270000000	GHz Cente Trig:F	SENSE:INT r Freq: 5.270000000 GHz ree Run Avg Hold : 30 dB	ALIONAUTO [03:30:37 PM Mar 20, 2 Radio Std: None : 50/50 Radio Device: BTS	Frequency
10 dB/div	Ref Offset 10.7 dE Ref 30.00 dBm				
.09 20.0 10.0 0.00	and the second second				Center Free 5.270000000 GH:
10.0 20.0 50.0 40.0					w
center 5.2 Res BW		#	VBW 1.3 MHz	Span 50 M Sweep 1	
Occup	ied Bandwidtl 36	n .450 MHz	Total Power	18.0 dBm	Auto Mar Freq Offse
Transm	it Freq Error	22.493 kHz	OBW Power	99.00 %	0 Hi
x dB Ba	indwidth	42.08 MHz	x dB	-26.00 dB	

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enter Fre	eq 5.31000000	Trig: F	SENSE:INT r Freq: 5.310000000 GHz ree Run Avg Hole : 30 dB	d: 50/50	03:34:38 PM Mar 20, 2018 Radio Std: None Radio Device: BTS	Frequency
dB/div	Ref Offset 10.7 d Ref 30.00 dBi					
•g 1.0						Center Free 5.31000000 GH
00			A normalization		\sim	
3.0	AN CONTRACT					
Nineter.					A ALL ALL ALL ALL ALL ALL ALL ALL ALL A	
1.0						
.0						
enter 5.3 Res BW 4		#	VBW 1.3 MHz		Span 50 MHz Sweep 1 ms	CF Step 5.000000 MH
Occupi	ied Bandwid	th	Total Power	18.8	dBm	Auto Ma
	3	6.441 MHz				Freq Offse
Transmi	it Freq Error	61.326 kHz	OBW Power	99.	00 %	он
x dB Ba	ndwidth	41.75 MHz	x dB	-26.0	0 dB	

5510 MHz



5550 MHz

	⊯ sog ac eq 5.550000000	GHz Cent Trig:	sense:int er Freq: 5,550000000 GHz Free Run Avg Holo n: 30 dB	Radio S 1: 50/50	evice: BTS	Frequency
0 dB/div	Ref Offset 10.7 d Ref 30.00 dBn					
20.00 10.00 20.00 20.00 20.00 10.00 20.00 10.00 20					A CANANA	Center Free 5.55000000 GHz
Center 5.5 Res BW			∉VBW 1.3 MHz	Sp Sv	an 50 MHz veep 1 ms	CF Step 5.000000 MH
Occup	ied Bandwidt 36	^h 6.544 MHz	Total Power	21.6 dBm		Auto Mar Freg Offset
Transm	it Freq Error	-28.287 kHz	OBW Power	99.00 %		0 Ha
x dB Ba	indwidth	42.61 MHz	x dB	-26.00 dB		

5670 MHz



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802.11n HT40 (Aux1) 5190 MHz



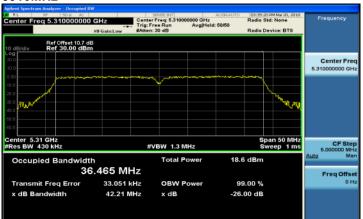
5230 MHz



5270 MHz

enter Freq 5.2700		Center Freq: 5.270000000 F Trig: Free Run Avg #Atten: 30 dB	3Hz R: Hold: 50/50	8:31:17 PM Mar 20, 2018 adio Std: None adio Device: BTS	Frequency
0 dB/div Ref 30.	et 10.7 dB 00 dBm				
•g 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.				~	Center Free 5.270000000 GH
center 5.27 GHz					
Res BW 430 kHz		#VBW 1.3 MHz		Span 50 MHz Sweep 1 ms	CF Step 5.000000 MH
Occupied Ban	dwidth 36.409 M	Total Power Hz	r 18.2 d	Bm	Auto Mar Freq Offse
Transmit Freq Ei x dB Bandwidth	rror 16.894 42.25 I		r 99.04 -26.00	- /0	OH

5310MHz



5510 MHz



5550 MHz

enter Fro	eq 5.550000000	GHz Center	SEMSE:INT r Freq: 5.550000000 GHz ree Run Avg Hold : 30 dB	ALIONAUTO 03:47:19 PM Radio Std: 1 1: 50/50 Radio Devi	None Frequency
0 dB/div og	Ref Offset 10.7 d Ref 30.00 dBn				
					Center Free 5.55000000 GH
enter 5.5 Res BW		#	VBW 1.3 MHz	Span Swee	p 50 MHz cF Ster 5 00000 MH
Occup	ied Bandwidt 36	^h 6.478 MHz	Total Power	21.5 dBm	Auto Mar Freq Offse
Transm	it Freq Error	-11.612 kHz	OBW Power	99.00 %	он
x dB Ba	andwidth	43.05 MHz	x dB	-26.00 dB	

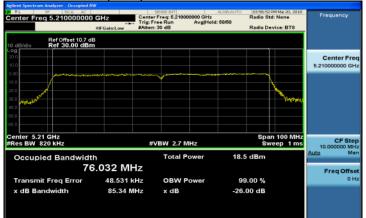
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enter Freq 5	509 AC	Trig:	er Freg: 5.67000000 GHz	ALIGN AUTO	03:52:58 PM Mar 20, 2018 Radio Std: None Radio Device: BTS	Frequency
	ef Offset 10.7 dB ef 30.00 dBm					
0.00			~~~~		~	Center Freq 5.670000000 GH2
					- Aller Contraction	
enter 5.67 G Res BW 510			∉VB₩ 1.5 MHz		Span 50 MHz Sweep 1 ms	CF Step 5.000000 MHz
Occupied	Bandwidth 36	649 MHz	Total Power	22.1	dBm	Auto Mar Freg Offse
Transmit F	req Error	43.025 kHz	OBW Power	99.	00 %	0 Hz
x dB Bandy	width	42.59 MHz	x dB	-26.0	0 dB	

802.11ac VHT80 (Main) 5210 MHz



5290 MHz



5530 MHz

enter Freq	5.530000000	GHz Cente Trig: F	SENSE:INT r Freq: 5.530000000 GHz free Run Avg Hold h: 30 dB	ALIGNAUTO D4:06:40 PM Mar 2 Radio Std: Non : 50/50 Radio Device: E	Frequency
) dB/div	Ref Offset 10.7 dl Ref 30.00 dBn				
og 0.0 0.0	· · · · · · · · · · · · · · · · · · ·		a and the second se		Center Fre 5.530000000 GH
0.0					10.04 C
0.0					
enter 5.53 (Res BW 82)			VBW 2.7 MHz	Span 100 Sweep	1 mc CF Ste
	d Bandwidt		Total Power	22.6 dBm	Auto Ma
Transmit I	Freq Error	2.519 kHz	OBW Power	99.00 %	0 H
x dB Band	dwidth	85.14 MHz	x dB	-26.00 dB	

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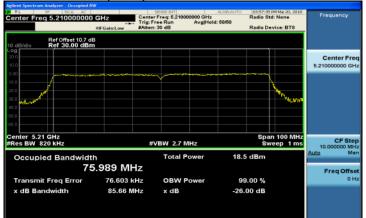
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f (886-2) 2298-0488



Center Freq 5.5300000	00 GHz Cer	SEASE:INT Iter Freq: 5.530000000 GHz I: Free Run Avg Hold I:en: 30 dB	Radi 50/50	16:40 PM Mar 20, 2018 io Std: None io Device: BTS	Frequency
0 dB/div Ref 30.00 dl					
					Center Free 5.53000000 GH
0.0					
enter 5.53 GHz Res BW 820 kHz		#VBW 2.7 MHz	Ę	Span 100 MHz Sweep 1 ms	CF Ster 10.000000 MH
Occupied Bandwi	dth 76.092 MHz	Total Power	22.6 dBr	m	Auto Mar Freg Offse
Transmit Freq Error	2.519 kHz	OBW Power	99.00	%	0 H
x dB Bandwidth	85.14 MHz	x dB	-26.00 d	в	

802.11ac VHT80 (Aux1) 5210 MHz



5290 MHz



5530 MHz

RL MF 500 AC enter Freq 5.530000000	GHz Cente Trig: F	SENSE:INT r Freq: 5.530000000 GHz ree Run Avg Hold : 30 dB	ALIONAUTO [04:07:31 PM Mar 20, 2018 Radio Std: None : 50/50 Radio Device: BTS	Frequency
Ref Offset 10.7 d dB/div Ref 30.00 dBr				
		~		Center Free 5.530000000 GH:
enter 5.53 GHz Res BW 820 kHz	#	VBW 2.7 MHz	Span 100 MHz Sweep 1 ms	
Occupied Bandwidt	.h 5.909 MHz	Total Power	22.2 dBm	Auto Ma Freg Offse
Transmit Freq Error	27.667 kHz	OBW Power	99.00 %	0 H
x dB Bandwidth	85.39 MHz	x dB	-26.00 dB	

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enter Freq 5.610000000 GHz		ALIGNAUTO 04:11:34 PM Mar 20, GHz Radio Std: None gHold: 50/50 Radio Device: B1	Frequency
0 dB/div Ref Offset 10.7 dB			
			Center Freq 5.610000000 GHz
enter 5.61 GHz Res BW 820 kHz	#VBW 2.7 MHz	Span 100 Sweep 1	MHz CF Step
Occupied Bandwidth 75.960	Total Powe MHZ	r 22.6 dBm	Auto Man Freq Offset
Transmit Freq Error -23.	015 kHz OBW Powe	r 99.00 %	0 Hz
x dB Bandwidth 85	.24 MHz x dB	-26.00 dB	

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9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

OPERZTION Band		EUT CATEGORY	LIMIT
U-NII-1		Access Point (Mater device)	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
	\checkmark	Mobile and portable clinet device	250mW(23.98dBm)
U-NII-2A	\checkmark		250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C	\checkmark		250mW(23.98dBm) or 11dBm+10 log B
U-NII-3			1 Watt(30dBm)

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

Note:

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

	Effective Legacy Gain (dBi)	Limit
UNII-1	-3.6+3.01=-0.59dBi	23.98dBm
UNII-2A	-3.6+3.01=-0.59dBi	23.98dBm
U-NII-2C	-1.7+3.01=1.31dBi	23.98dBm

Therefore the limit no needs to reduce for the UNII-1, U-NII-2A and U-NII-2C band.

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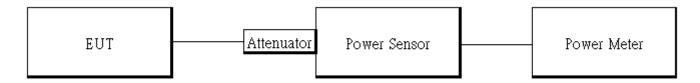
9.2 Measurement Procedure

- 1 Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
- 4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
- Record the max. reading and add 10 log(1/duty cycle). 5.
- Repeat above procedures until all frequency (low, middle, and high channel) measured 6. were complete.

9.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1242004	2017/10/16	2018/10/15
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Notebook	Lenovo	T440	P0000564	N/A	N/A

9.4 Test Set-up



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9.5 Measurement Result

Conducted output power

802.11a_Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	6	11.70	14.781		30		PASS
44	5220	6	14.84	30.459		30		PASS
48	5240	6	14.83	30.389		30		PASS
52	5260	6	14.90	30.882	23.98	or 11+10log(B) =	24.32	PASS
60	5300	6	14.86	30.599	23.98	or 11+10log(B) =	24.30	PASS
64	5320	6	11.94	15.621	23.98	or 11+10log(B) =	24.41	PASS
100	5500	6	11.90	15.478	23.98	or 11+10log(B) =	24.30	PASS
116	5580	6	14.73	29.697	23.98	or 11+10log(B) =	24.38	PASS
140	5700	6	11.79	15.091	23.98	or 11+10log(B) =	24.36	PASS

802.11n_HT20_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER	TOTAL POWER	REQUIRED LIMIT			RESULT
СН			CH 0	CH 1	(dBm)	(mW)	(dBm)			RESULT
36	5180	MCS8	12.75	10.58	14.89	30.804		30		PASS
44	5220	MCS8	14.57	14.31	17.53	56.610		30		PASS
48	5240	MCS8	14.68	14.46	17.66	58.323		30		PASS
52	5260	MCS8	14.57	14.34	17.54	56.800	23.98	or 11+10log(B) =	24.46	PASS
60	5300	MCS8	14.56	14.31	17.52	56.543	23.98	or 11+10log(B) =	24.59	PASS
64	5320	MCS8	11.66	11.24	14.54	28.458	23.98	or 11+10log(B) =	24.54	PASS
100	5500	MCS8	11.77	11.6	14.77	30.011	23.98	or 11+10log(B) =	24.53	PASS
116	5580	MCS8	14.67	14.53	17.69	58.716	23.98	or 11+10log(B) =	24.53	PASS
140	5700	MCS8	11.67	11.32	14.59	28.744	23.98	or 11+10log(B) =	24.55	PASS

802.11n HT40 MIMO

СН	Frequency	Data	Avg. POWER (dBm)		TOTAL POWER	TOTAL POWER	REQUIRED LIMIT			RESULT
СП	(MHz)	Rate	СН 0	CH 1	(dBm)	(mW)		(dBm)		RESULT
38	5190	MCS8	12.52	10.6	14.84	30.483		30		PASS
46	5230	MCS8	14.38	14.32	17.53	56.565		30		PASS
54	5270	MCS8	14.41	14.32	17.54	56.763	23.98	or 11+10log(B) =	27.24	PASS
62	5310	MCS8	11.72	10.98	14.54	28.452	23.98	or 11+10log(B) =	27.21	PASS
102	5510	MCS8	11.72	11.53	14.80	30.209	23.98	or 11+10log(B) =	27.25	PASS
110	5550	MCS8	14.58	14.53	17.73	59.299	23.98	or 11+10log(B) =	27.30	PASS
134	5670	MCS8	11.57	11.12	14.53	28.354	23.98	or 11+10log(B) =	27.29	PASS

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802.11ac_VHT80_MIMO

	СН	Frequency	Data Rate	Avg. POWER (dBm)		TOTAL POWER			REQUIRED LIMIT		
	Un	(MHz)		CH 0	CH 1	(dBm)	(mW)				RESULT
Γ	42	5210	MCS8	12.09	10.52	14.72	29.621		30		PASS
	58	5290	MCS8	11.52	10.81	14.52	28.313	23.98	or 11+10log(B) =	30.14	PASS
	106	5530	MCS8	11.47	11.26	14.71	29.558	23.98	or 11+10log(B) =	30.30	PASS
	122	5610	MCS8	14.65	14.07	17.71	59.022	23.98	or 11+10log(B) =	30.28	PASS

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10. POWER SPECTRAL DENSITY

10.1 Standard Applicable

OPERZTION Band	EUT CATEGORY	LIMIT
U-NII-1	Access Point (Mater device)	17dBm/ MHz
	Fixed point-to-point Acess Ponit	
	 Mobile and portable clinet device	11dBm/ MHz
U-NII-2A		11dBm/ MHz
U-NII-2C		11dBm/ MHz
U-NII-3		30dBm/ 500kHz

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

Note:

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

	Effective Legacy Gain (dBi)	Limit
UNII-1	-3.6+3.01=-0.59dBi	11dBm
UNII-2A	-3.6+3.01=-0.59dBi	11dBm
U-NII-2C	-1.7+3.01=1.31dBi	11dBm

Therefore the limit needs to reduce for the UNII-1, U-NII-2A and U-NII-2C band.

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10.2Measurement Procedure

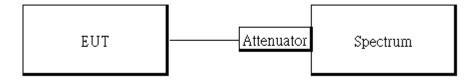
- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- 4. For U-NII1, U-NII-2A, U-NII-2C Band: Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging.
- (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
- 5. User the cursor on spectrum to peak search the highest level of trace
- 6. Record the max. reading and add 10 log(1/duty cycle).
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome.

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY54200716	2017/10/16	2018/10/15
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Notebook	Lenovo	T440	P0000564	N/A	N/A

10.3 Measurement Equipment Used

10.4Test Set-up



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10.5Measurement Result

POWER DENSITY 802.11a MODE								
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5180	-1.75	0.08	-1.67	11	-12.67			
5220	-2.06	0.08	-1.98	11	-12.98			
5240	-2.14	0.08	-2.06	11	-13.06			
5260	-1.81	0.08	-1.73	11	-12.73			
5300	-1.11	0.08	-1.03	11	-12.03			
5320	-0.67	0.08	-0.59	11	-11.59			
5500	1.09	0.08	1.17	11	-9.83			
5580	1.48	0.08	1.56	11	-9.44			
5700	2.16	0.08	2.24	11	-8.76			
	POWER DEN	SITY 802	.11n HT20 MC	DDE				
F	PPSD W/O		PPSD With		Manut			
Frequency (MHz)	Duty Factor (dBm)	Duty Factor	Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5180	0.07	0.08	0.15	11	-10.85			
5220	0.52	0.08	0.60	11	-10.40			
5240	0.16	0.08	0.24	11	-10.76			
5260	0.76	0.08	0.84	11	-10.16			
5300	1.36	0.08	1.44	11	-9.56			
5320	1.91	0.08	1.99	11	-9.01			
5500	3.18	0.08	3.26	11	-7.74			
5580	4.23	0.08	4.31	11	-6.69			
5700	4.51	0.08	4.59	11	-6.41			
	POWER DEN	SITY 802	.11n HT40 MC	DDE				
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5190	-3.23	0.17	-3.06	11	-14.06			
5230	-3.46	0.17	-3.29	11	-14.29			
5270	-3.03	0.17	-2.86	11	-13.86			
5310	-1.85	0.17	-1.68	11	-12.68			
5510	0.75	0.17	0.92	11	-10.08			
5550	1.83	0.17	2.00	11	-9.00			
5670	1.68	0.17	1.85	11	-9.15			
	POWER DENS	ITY 802.1		IODE				
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5210	-6.31	0.34	-5.97	11	-16.97			
	-5.86	0.34	-5.52	11	-16.52			
5290			0.02					
5290 5530	-3.28	0.34	-2.94	11	-13.94			

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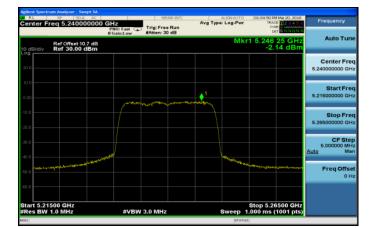
802.11a 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)





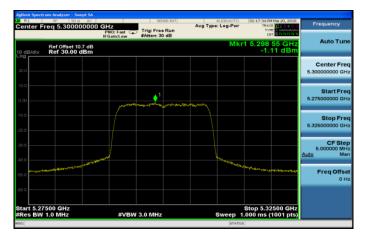
Peak Power Spectral Density Data Plot (CH High 5240 MHz)

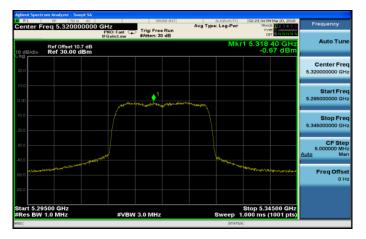
802.11a 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH Low 5260 MHz)









Peak Power Spectral Density Data Plot (CH High 5320 MHz)

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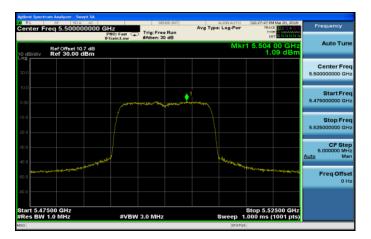
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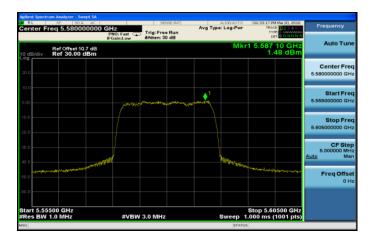


802.11a 5470~5725 MHz

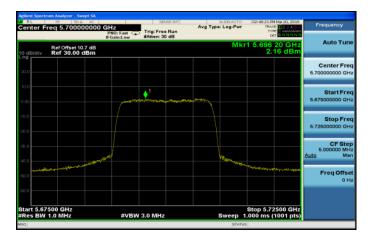
Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5580 MHz)



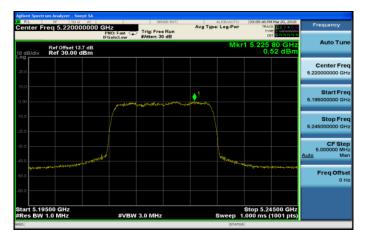
Peak Power Spectral Density Data Plot (CH High 5700 MHz)



802.11n HT20, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)





Peak Power Spectral Density Data Plot (CH High 5240 MHz)

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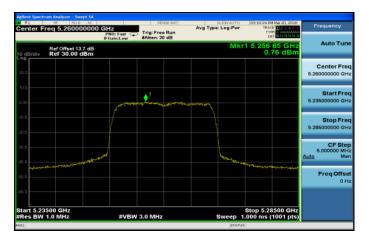
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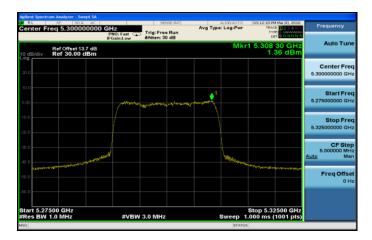


802.11n HT20, 5250~5350 MHz

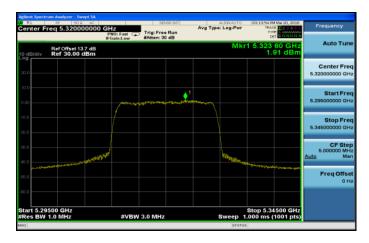
Peak Power Spectral Density Data Plot (CH Low 5260MHz)



Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



Peak Power Spectral Density Data Plot (CH High 5320 MHz)

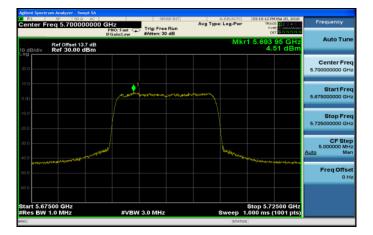


802.11n HT20, 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5580MHz)





Peak Power Spectral Density Data Plot (CH High 5700 MHz)

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802.11n HT40, 5150~5250 MHz

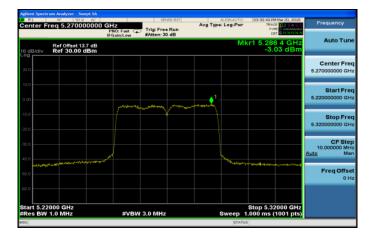
Peak Power Spectral Density Data Plot (CH Low 5190 MHz)



Peak Power Spectral Density Data Plot (CH High 5230 MHz)

Center Fre	eq 5.230000000	GHz PNO: Fast G		Run dB	Avg Typ	e: Log-Pwr	TRAC	4 Mar 20, 2018 6 1 2 3 4 5 6 7 5 N N N N N	Frequency
0 dB/div	Ref Offset 13.7 dB Ref 30.00 dBm					M	kr1 5.23 -3.	5 2 GHz 46 dBm	Auto Tuni
20.0									Center Fre 5.230000000 GH
10.0			har a grander	11	march				Start Fre 5.180000000 GH
20.0			and a street	,					Stop Fre 5.280000000 GH
10.0									CF Ste 10.000000 MH Auto Ma
50.0	and the second					and a second sec		egenegag andre	Freq Offse 0 H
50.0 Start 5.180	00 GHz						Stop 5.2	3000 GHz	

802.11n HT40, 5250~5350 MHz Peak Power Spectral Density Data Plot (CH Low 5270 MHz)



Peak Power Spectral Density Data Plot (CH High 5310 MHz)



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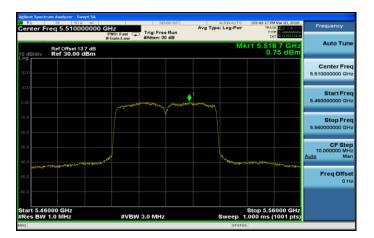
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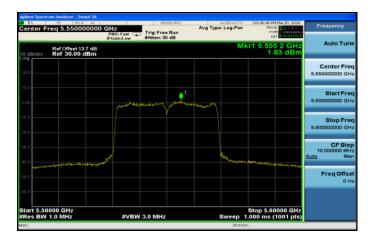


802.11n HT40, 5470~5725 MHz

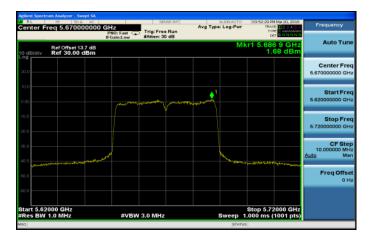
Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5550 MHz)



Peak Power Spectral Density Data Plot (CH High 5670 MHz)



802.11ac VHT80, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Mid 5210 MHz)



802.11ac VHT80, 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH Mid 5290 MHz)



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802.11ac VHT80, 5470~5725 MHz

Peak Power Spectral Density Data Plot (CH Low 5530 MHz)



802.11ac VHT80, 5470~5725 MHz

Peak Power Spectral Density Data Plot (CH High 5610 MHz)



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11. UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 Standard Applicable

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.
- 2. 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.

APPLICABLE TO	LI	MIT			
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRENGTH AT 3m				
	ΡΚ: 74 (dBμV/m)	AV 54 (dBµV/m)			
APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m			
15.407(b)(1)					
15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)			
15.407(b)(3)					
	PK:-27 (dBm/MHz) *1	PK: 68.2(dBµV/m) *1			
15.407(b)(4)(i)	PK:10 (dBm/MHz) *2	PK:105.2 (dBµV/m) *2			
15.407(b)(4)(1)	PK:15.6 (dBm/MHz) *3	PK: 110.8(dBµV/m) *3			
	PK:27 (dBm/MHz) *4	PK:122.2 (dBµV/m) *4			

¹ beyond 75 MHz or more above of the bandedge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

EIRP = $((E^*d)^2)/30$, where E is the field in V/m, d is the measurement distance (3m), EIRP is the equivalent isotropically radiated power in Watts.

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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

Frequency (MHz)	Field strength (microvolts/meter)	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

Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level ($dB\mu V/m$) = 20 log Emission level ($dB\mu V/m$)

11.2Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWAZBECK	VULB9168	378	2017/12/29	2018/12/28
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/08/03
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/09/25
Spectrum Analyzer	Agilent	E4446A	MY51100003	2017/05/10	2018/05/09
EMI Test Receiver	R&S	ESCI7	100760	2017/06/06	2018/06/05
Pre-Amplifier	HP	8449B	3008A00578	2018/01/02	2019/01/01
Pre-Amplifier	HP	8447D	2944A07676	2018/01/02	2019/01/01
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	2018/01/02	2019/01/01
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	2018/01/02	2019/01/01
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01
Notebook	Lenovo	T440	P0000564	N/A	N/A

Note: N.C.R refers to Not Calibrated Required.

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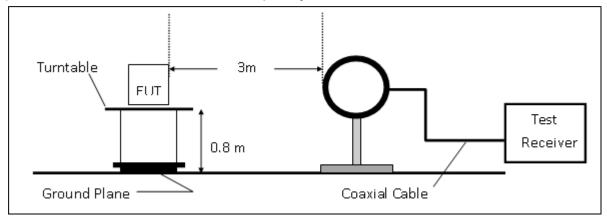
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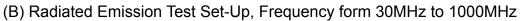
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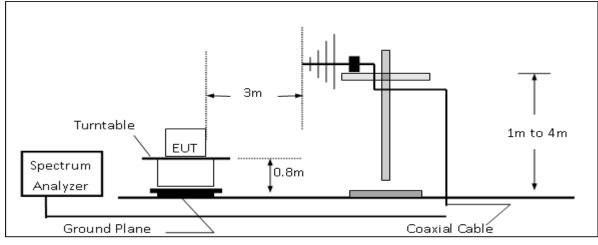


11.3Test SET-UP

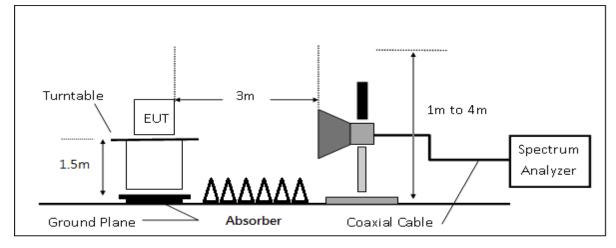
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.







(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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11.4Measurement Procedure

- The EUT was placed on a turn table which is 0.8m above ground plane. 1.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequen-3. cy> 1GHz above ground plane.
- 4. The turn table shall rotate 360 degrees to determine the position of maximum emission level
- 5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 11. Repeat above procedures until all frequency measured were complete.

11.5Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

Note :

"F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency.; "S" : denotes Spurious Frequency.

11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.7Measurement Result

Refer to next page for tabular data sheets.

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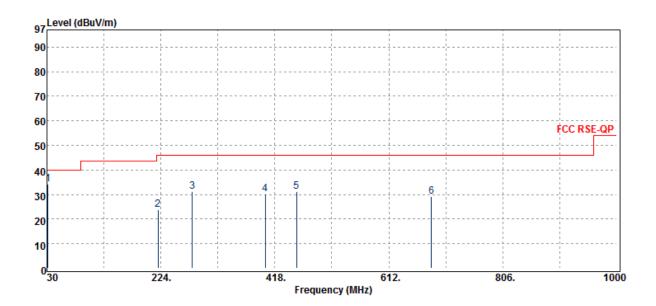


Radiated Spurious Emission Measurement Result

Below 1GHz Worst-Case Data:

802.11a 5150~5250 MHz

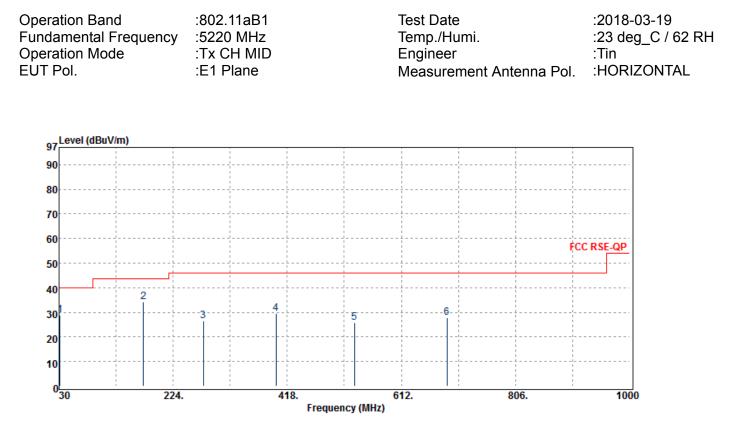
Operation Band	:802.11aB1	Test Date	:2018-03-19
Fundamental Frequency	:5220 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	43.00	-8.88	34.12	40.00	-5.88
219.15	S	Peak	32.95	-9.08	23.87	46.00	-22.13
277.35	S	Peak	37.54	-6.27	31.27	46.00	-14.73
401.51	S	Peak	33.36	-3.27	30.09	46.00	-15.91
454.86	S	Peak	33.44	-2.33	31.11	46.00	-14.89
684.75	S	Peak	27.46	1.58	29.04	46.00	-16.96

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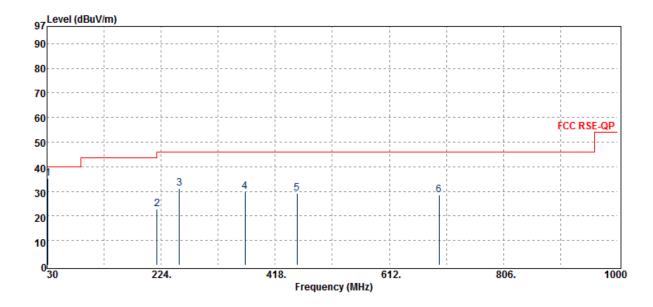
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	37.74	-8.88	28.86	40.00	-11.14
173.56	S	Peak	41.77	-7.70	34.07	43.50	-9.43
275.41	S	Peak	32.99	-6.38	26.61	46.00	-19.39
398.60	S	Peak	32.94	-3.41	29.53	46.00	-16.47
532.46	S	Peak	27.40	-1.60	25.80	46.00	-20.20
689.60	S	Peak	25.83	1.88	27.71	46.00	-18.29
689.60	S	Peak	25.83	1.88	27.71	46.00	-18.29



802.11a 5250~5350 MHz

Operation Band	:802.11aB2
Fundamental Frequency	:5300 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E1 Plane

Test Date	:2018-03-19
Temp./Humi.	:23 deg_C / 62 RH
Engineer	:Tin
Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	44.04	-8.88	35.16	40.00	-4.84
217.21	S	Peak	32.06	-9.12	22.94	46.00	-23.06
255.04	S	Peak	38.50	-7.15	31.35	46.00	-14.65
366.59	S	Peak	33.99	-4.02	29.97	46.00	-16.03
454.86	S	Peak	31.51	-2.33	29.18	46.00	-16.82
696.39	S	Peak	27.45	1.13	28.58	46.00	-17.42



Operation Band Fundamental Frequency Operation Mode EUT Pol.	:802.11aB2 :5300 MHz :Tx CH MID :E1 Plane		Test Date Temp./Humi. Engineer Measurement	: Antenna Pol.	:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL
97					
90					
80					
70					
60		· · · · · · · · · · · · · · · · · · ·		FC	C RSE-QP
50					
40 2					
30	3	4 5	6		
20					
10				· · · · · · · · · · · · · · · · · · ·	
0					
0 <mark></mark> 30 224	I. 4	18. Frequency (MHz	612. :)	806.	1000

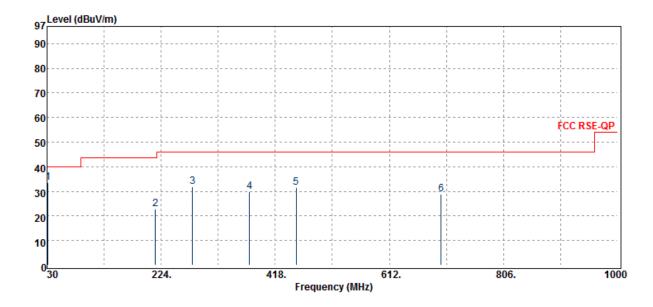
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.00	S	Peak	36.64	-8.96	27.68	40.00	-12.32
178.41	S	Peak	43.54	-8.06	35.48	43.50	-8.02
280.26	S	Peak	33.92	-6.12	27.80	46.00	-18.20
419.94	S	Peak	32.37	-2.77	29.60	46.00	-16.40
483.96	S	Peak	28.91	-2.70	26.21	46.00	-19.79
687.66	S	Peak	27.35	1.76	29.11	46.00	-16.89



802.11a, 5470~5725 MHz

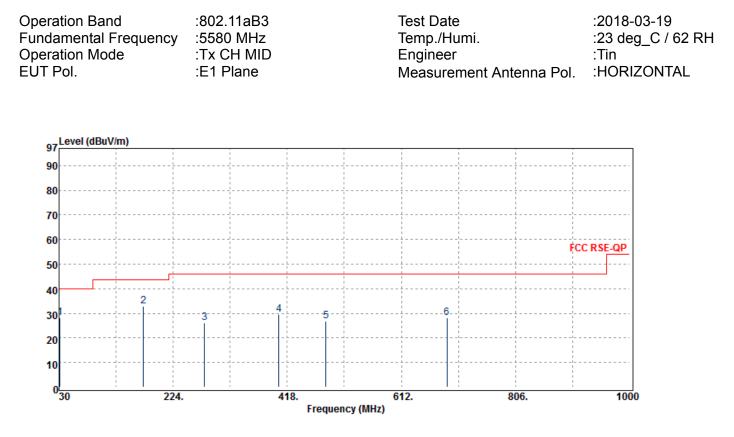
Operation Band	:802.11aB3
Fundamental Frequency	:5580 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	42.45	-8.88	33.57	40.00	-6.43
214.30	S	Peak	32.04	-9.17	22.87	43.50	-20.63
277.35	S	Peak	38.01	-6.27	31.74	46.00	-14.26
374.35	S	Peak	33.81	-3.96	29.85	46.00	-16.15
453.89	S	Peak	33.92	-2.41	31.51	46.00	-14.49
700.27	S	Peak	26.93	1.82	28.75	46.00	-17.25





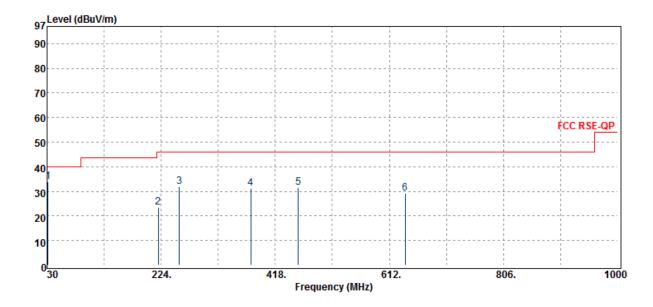
Factor	Actual FS	Limit @3m	Margin
dB	dBµV/m	dBµV/m	dB
-8.88	28.20	40.00	-11.80
-7.70	32.83	43.50	-10.67
-6.27	26.23	46.00	-19.77
-3.07	29.61	46.00	-16.39
-2.70	26.96	46.00	-19.04
1.88	28.34	46.00	-17.66
	dB -8.88 -7.70 -6.27 -3.07 -2.70	FS dB dBµV/m -8.88 28.20 -7.70 32.83 -6.27 26.23 -3.07 29.61 -2.70 26.96	FS @3m dB dBμV/m dBμV/m -8.88 28.20 40.00 -7.70 32.83 43.50 -6.27 26.23 46.00 -3.07 29.61 46.00 -2.70 26.96 46.00



802.11ac VHT80 5150~5250 MHz

802.11ac80B1
5210 MHz
Tx CH LOW
E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	42.61	-8.88	33.73	40.00	-6.27
219.15	S	Peak	32.63	-9.08	23.55	46.00	-22.45
255.04	S	Peak	38.93	-7.15	31.78	46.00	-14.22
376.29	S	Peak	35.22	-3.92	31.30	46.00	-14.70
456.80	S	Peak	33.83	-2.37	31.46	46.00	-14.54
639.16	S	Peak	28.48	0.84	29.32	46.00	-16.68

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Operation Band Fundamental Frequency Operation Mode EUT Pol.			:802.11ac80B1 :5210 MHz :Tx CH LOW :E1 Plane			Test Date Temp./Humi. Engineer Measurement Antenna Pol.				8-03-19 deg_C / 62 RH RIZONTAL	
97	Level (dBuV/m)										
90								 	1	 	
80				 		, , , , , ,	, , , ,		1 1 1 1 1		
70				, , , ,				: : : 	: : : 	: : : 	
60				, , , ,		; ; ; /	; ; ; ;	; ; ;			
						1				FCC RSE-Q	<u>P</u>
50				1		 	1	1 1 1 1	1		
40	L	2				/ ! !	6	! ! ! !	1	. <u></u>	
30			3 I	4-	5	, , , ,	Ì		- - - - -		
20						 		1 1 	1 1 1	 	
10						, , , , ,		, , ,	1 1 4	, , ,,, , ,	
0	30	224.		41		e (MHz)	12.	8	06.	1	000
						,					

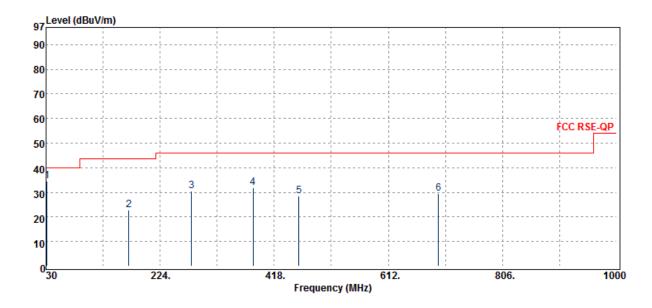
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	37.07	-8.88	28.19	40.00	-11.81
170.65	S	Peak	41.28	-7.38	33.90	43.50	-9.60
298.69	S	Peak	32.43	-5.55	26.88	46.00	-19.12
398.60	S	Peak	30.64	-3.41	27.23	46.00	-18.77
483.96	S	Peak	30.15	-2.70	27.45	46.00	-18.55
691.54	S	Peak	28.19	1.57	29.76	46.00	-16.24



802.11ac VHT80 5250~5350 MHz

Operation Band	:802.11ac80B2
Fundamental Frequency	:5290 MHz
Operation Mode	:Tx CH HIGH
EUT Pol.	:E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	43.59	-8.88	34.71	40.00	-5.29
170.65	S	Peak	30.31	-7.38	22.93	43.50	-20.57
277.35	S	Peak	36.68	-6.27	30.41	46.00	-15.59
382.11	S	Peak	35.51	-3.78	31.73	46.00	-14.27
459.71	S	Peak	31.12	-2.46	28.66	46.00	-17.34
697.36	S	Peak	28.37	1.33	29.70	46.00	-16.30

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Operation Band Fundamental Frequency Operation Mode EUT Pol.	:802.11ac80B2 :5290 MHz :Tx CH HIGH :E1 Plane		Test Date Temp./Humi. Engineer Measuremer	nt Antenna Pol.	:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL
97 Level (dBuV/m)					
90					
80					
70					
60			-	· · · · · · · · · · · · · · · · · · ·	
				FCC	RSE-QP
50					
40 2					
30		5	6		
20					
10					
0 <mark>/</mark> 30 224.	418	3. Frequency (MHz)	612.	806.	1000

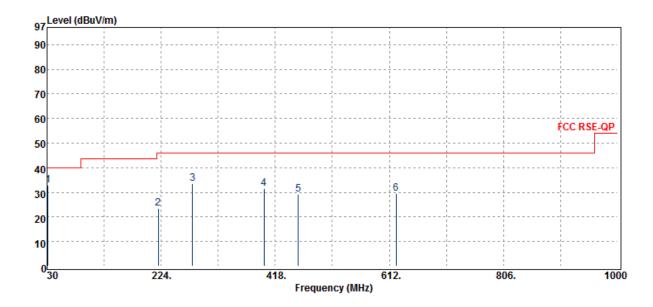
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	37.20	-8.88	28.32	40.00	-11.68
177.44	S	Peak	42.66	-7.99	34.67	43.50	-8.83
275.41	S	Peak	34.04	-6.38	27.66	46.00	-18.34
398.60	S	Peak	31.98	-3.41	28.57	46.00	-17.43
483.96	S	Peak	28.53	-2.70	25.83	46.00	-20.17
624.61	S	Peak	28.95	0.71	29.66	46.00	-16.34



802.11ac VHT80 5470~5725 MHz

:802.11ac80B3
:5530 MHz
:Tx CH LOW
:E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	41.93	-8.88	33.05	40.00	-6.95
219.15	S	Peak	32.62	-9.08	23.54	46.00	-22.46
277.35	S	Peak	39.97	-6.27	33.70	46.00	-12.30
398.60	S	Peak	34.86	-3.41	31.45	46.00	-14.55
456.80	S	Peak	31.57	-2.37	29.20	46.00	-16.80
623.64	S	Peak	28.88	0.64	29.52	46.00	-16.48

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Operation Band Fundamental Fr Operation Mode EUT Pol.	equency	:802.11ac8 :5530 MHz :Tx CH LO :E1 Plane		Test Da Temp./F Enginee Measur	łumi.	:Tin)3-19 _C / 62 RH CONTAL
97 Level (dBuV/m	1)						
90				· · · · · · · · · · · · · · · · · · ·			
80				· · · · · · · · · · · · · · · · · · ·			
70							
60						FCC RSE-QP	
50							
40	2						
30		3	- 4	5			
20							
10							
0 <mark></mark>	224.		418. Frequency	612. (MHz)	806.	1000	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin

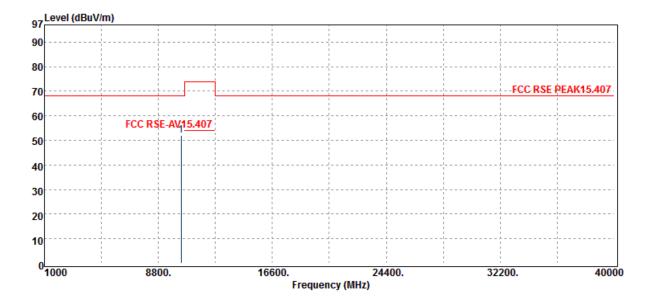
	Fleq.	note	Mode	Reading Level	Factor	FS	@3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
	31.94	S	Peak	38.11	-8.88	29.23	40.00	-10.77	
	173.56	S	Peak	42.41	-7.70	34.71	43.50	-8.79	
	277.35	S	Peak	35.37	-6.27	29.10	46.00	-16.90	
	398.60	S	Peak	31.21	-3.41	27.80	46.00	-18.20	
	541.19	S	Peak	27.46	-1.40	26.06	46.00	-19.94	
	686.69	S	Peak	27.60	1.70	29.30	46.00	-16.70	



Above 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

Operation Band Fundamental Frequency	:802.11aB1 :5180 MHz	Test Date Temp./Humi.	:2018-03-20 :23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10360.00	Н	Peak	31.77	20.41	52.18	68.30	-16.12



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11aB1 :5180 MHz :Tx CH LO\ :E1 Plane	N	Test Date Temp./Humi. Engineer Measurement A	Antenna Pol.	:2018-03-20 :23 deg_C / (:Tin :HORIZONT/	
97	BuV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	
60	FCC DC	N/45 407					
50	FUC KS	-AV <u>15.407</u>					
40							
30						 	
20							
10						 	
0			40000				
0 <mark></mark> 1000	880	0.	16600. Frequenc	24400. y (MHz)	32200.	400	00
Freq.	Note	Detector Mode	Spectrum Reading Low	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	Reading Lev dBµV	dB	dBµV/m	dBµV/m	Margin dB
			-		-		
10360.00	Н	Peak	32.42	20.41	52.83	68.30	-15.47



Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB1 :5220 MHz :Tx CH MID :E1 Plane)	Test Date Temp./Hum Engineer Measureme	ni. ent Antenna F	:23 :Tin	18-03-20 deg_C / 6 RTICAL	2 RH
97	uV/m)							
90								
80								
70						FCC RSE	PEAK15.407	
60	FCC PSI	E-AV15.407					- - - -	
50							- - - -	
40	· J							
30						- - - -	 	
20							- - - - -	
10								
0 <mark></mark> 1000	880	0.	16600. Frequenc	24400. y (MHz)	32	2200.	4000	0
Freq.	Note	Detector Mode	Spectrum Reading Lev	Facto	or Actua FS		Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB			BµV/m	dB
10440.00	н	Peak	31.66	20.7	5 52.42	1 6	8.30	-15.89



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB1 :5220 MHz :Tx CH MID :E1 Plane)	Test Date Temp./Humi. Engineer Measurement A	ntenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONT/	
97	BuV/m)						-
90 90							
80							
70					FC	C RSE PEAK15.407	
<mark>60</mark>		E-AV15.407					
50		E-AV 13.401					
40						,	
30		· · · · · · · · · · · · · · · · · · ·					
20							
10							
0	000		40000	24400	22200	100	
1000	880	JU.	16600. Frequenc	24400. y (MHz)	32200.	4000	0
Freq.	Note	Detector Mode	Spectrum Reading Lev	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	Margin dB
40440.00				00.75	50.40		45.07
10440.00	Н	Peak	31.68	20.75	52.43	68.30	-15.87



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11aB1 :5240 MHz :Tx CH HIG :E1 Plane	Η	Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :VERTICAL	62 RH
97	BuV/m)						
90 90							
80							
70					FC	C RSE PEAK15.407	
60		-AV15.407					
50		-AV <u>15.407</u>					
40							
30							
20							
10							
0 <mark></mark>	880	0	16600.	24400.	32200.	4000	
1000	880	υ.	Frequence		32200.	4000	0
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10480.00	Н	Peak	31.33	20.79	52.12	68.30	-16.18



...

0040 00 00

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB1 :5240 MHz :Tx CH HIG :E1 Plane	- iH I	Test Date Temp./Humi. Engineer Measurement A	ntenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONT/	
97 Level (d	BuV/m)						1
90							
80						 	
70	· · · · · · · · · · · · · · · · · · ·				FC	C RSE PEAK15.407	
60	FCC RS	E-AV15.407		 		 	
50	J			1 1 1 1 1		 	
40		·		1 1 1 1		 	
30							
20							
10							
0 <mark></mark>	880) 0.	16600. Frequency	24400. (MHz)	32200.	4000	00
Freq.	Note	Detector Mode	Spectrum Reading Leve		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10480.00	Н	Peak	31.17	20.79	51.96	68.30	-16.34

. . .



10520.00

Н

Peak

Operation Band :802.11aB2 Test Date :2018-03-20 Fundamental Frequency :5260 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol. 97 Level (dBuV/m) 90 80 FCC RSE PEAK15 70 60 FCC RSE-AV15.407 50 40 30 20 10 0<mark>_____</mark> 8800. 16600. 24400. 32200. 40000 Frequency (MHz) Freq. Note Detector Spectrum Factor Actual Limit Safe Mode Reading Level @3m Margin FS MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB

31.70

20.78

52.48

Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

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68.30

-15.82



Operation B Fundamenta Operation M EUT Pol.	al Frequency	:802.11aB :5260 MHz :Tx CH LO :E1 Plane	<u>-</u> W B	Test Date Temp./Humi. Engineer Measurement /	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONTA	
97	dBuV/m)						_
90	· · · · · · · · · · · · · · · · · · ·	·					
80		 					
70					FC	C RSE PEAK15.407	
60	FCC RS	E-AV15.407					
50				 		 	
40	·			 		 	
30	 					 	
20	 						
10				 		 	
0 <mark>0</mark>	880	0	16600.	24400.	32200.	4000	
1000	000		Frequency		52200.	4000	10
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode PK/QP/AV	Reading Leve dBµV	ei dB	FS dBµV/m	@3m dBµV/m	Margin dB
			•		•	•	
10520.00	Н	Peak	32.04	20.78	52.82	68.30	-15.48



Н

Peak

10600.00

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB2 :5300 MHz :Tx CH MII :E1 Plane		Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :VERTICAL	62 RH
97 Level (dE	BuV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	_
60	FCC RSI	-AV25.407					
50				 			
40			 			 	
30			L J	 		 	
20							
10							
0 <mark>0</mark>	880	0.	16600.	24400.	32200.	400	00
1000	000			cy (MHz)	ULLUUT	100	
Freq.	Note	Detector Mode	Spectrum Reading Le	vel	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10600.00	Н	Average	22.34	21.18	43.52	54.00	-10.48

32.53

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21.18

53.71

74.00

-20.29



Н

Peak

10600.00

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11aB2 :5300 MHz :Tx CH MII :E1 Plane	<u>.</u>	Test Date Temp./Humi. Engineer Measurement	t Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :HORIZONT	
97 Level (de	BuV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	_
60	FCC RSF	-AV\$5.407					
50				 			
40				 		 	
30				1 1 1 1 1			
20							
10							
0 <mark>1000</mark>	880	0.	16600.	24400.	32200.	400	00
1000				cy (MHz)	022001	100	
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV		dB	dBµV/m	dBµV/m	dB
10600.00	Н	Average	21.74	21.18	42.92	54.00	-11.08

31.02

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21.18

52.20

74.00

-21.80



10640.00

10640.00

Н

Н

Average

Peak

eration Band ndamental Frequ eration Mode IT Pol.	tal Frequency :5320 MHz Temp./Humi.		:23 :Tin	8-03-20 deg_C / 6 RTICAL	62 RH				
97 Level (dBuV/m)									7
90									
80									
70							FCC RSE I	EAK15.407	
60		-AV25.407							
50									
40									
30									
20									
10									
0	880	0.	16600.	244	00.	32200).	400	 DO
			Frequen	cy (MHz)					
Freq. No	ote	Detector Mode	Spectrum Reading Le		actor	Actual FS		.imit @3m	Safe Margin
MHz F/H	/E/S	PK/QP/AV	dBµV		dB	dBµV/m		μV/m	dB

22.20

32.49

21.24

21.24

43.44

53.73

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54.00

74.00

-10.56

-20.27



10640.00

Н

Н

Average

Peak

peration Band ndamental Frequenc peration Mode JT Pol.	:802.11aB2 y :5320 MHz :Tx CH HIC :E1 Plane	GH E	Test Date Temp./Humi. Engineer Measurement A	Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :HORIZONT	62 RH
97 Level (dBuV/m)						_
90						
80						
70				FC	C RSE PEAK15.407	<u>.</u>
60	R\$E-AV <u>\$</u> 5.407					
50						
40						
30						
20						
10						
0	3800.	16600.	24400.	32200.	400	000
		Frequency	(MHz)			
Freq. Note	Detector Mode	Spectrum Reading Leve	Factor	Actual FS	Limit @3m	Safe Margin
MHz F/H/E/S		dBµV	dB	dBµV/m	dBµV/m	dB

22.20

31.76

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21.24

21.24

43.44

53.00

54.00

74.00

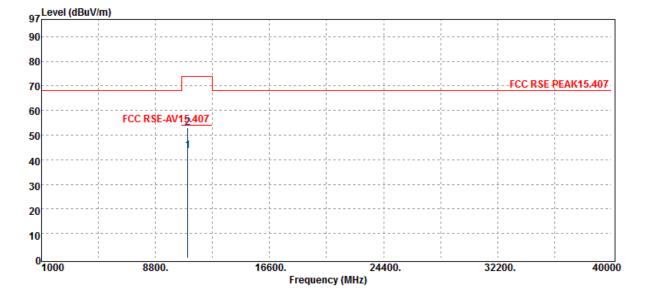
-10.56

-21.00



Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz Operation Band ·802 11aB3 Test Date ·2018-03-20

Operation Danu	.002.11aDJ	Test Date	.2010-03-20
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Н	Average	21.52	22.17	43.69	54.00	-10.31
11000.00	Н	Peak	31.02	22.17	53.19	74.00	-20.81



Н

Peak

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB3 :5500 MHz :Tx CH LOV :E1 Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2018-03-20 :23 deg_C / :Tin :HORIZONT	
97	BuV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	:
60	FCC RSF	-AV12.407					
50							
40							
30							
20						 	
10						 	
0 1000	880	0.	16600.	24400.	32200.	400	00
1000	000		Frequenc		022001	100	
Freq.	Note	Detector Mode	Spectrum Reading Lev	/el	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	н	Average	21.84	22.17	44.01	54.00	-9.99

31.59

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22.17

53.76

74.00



Н

Peak

11160.00

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11aB3 :5580 MHz :Tx CH MII :E1 Plane	<u>.</u>	Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / (:Tin :VERTICAL	62 RH
97	BuV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	
60	FCC RSE	E-AV152407		 		 	
50							
40							
30							
20						 	
10				 		 	
0 <mark></mark>	880	0.	16600.	24400.	32200.	400	 00
			Frequenc	:y (MHz)			
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV		dB	dBµV/m	dBµV/m	dB
11160.00	Н	Average	20.78	22.31	43.09	54.00	-10.91

31.14

22.31

53.45

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74.00



Н

Peak

11160.00

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11aB3 :5580 MHz :Tx CH MII :E1 Plane	D	Test Date Temp./Humi. Engineer Measurement <i>A</i>	Antenna Pol.	:2018-03-20 :23 deg_C / (:Tin :HORIZONT/	
97 Level (dl	BuV/m)						7
90			· · · · · · · · · · · · · · · · · · ·	 			
80				 		 	
70					FC	C RSE PEAK15.407	
60	FCC RSI	E-AV15-407		 		 	
50							
40							
30			· · · · · · · · · · · · · · · · · · ·	 			
20				 		 	
10				 		 	
0 <mark>1000</mark>	880	I : I O.	16600. Frequenc	24400. y (MHz)	32200.	400	_ DO
Freq.	Note	Detector Mode	Spectrum Reading Lev	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00	Н	Average	20.59	22.31	42.90	54.00	-11.10

30.74

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22.31

53.05

74.00



11400.00

Н

Н

Average

Peak

Operation Band Fundamental Fre Operation Mode EUT Pol.		:802.11aB3 :5700 MHz :Tx CH HIG :E1 Plane		Test Da Temp./H Enginee Measure	lumi. er	ntenna Pol	:23 de :Tin	-03-20 èg_C / 62 FICAL	2 RH
97	m)								
90									
80						, , , , ,			
70						· · · · · · · · · · · · · · · · · · ·	FCC RSE PE	AK15.407	
60	FCC RSI	E-AV15.407			L				
50						· · · · · · · · · · · · · · · · · · ·			
40					 	· · · · · · · · · · · · · · · · · · ·			
30					 				
20					 		 		
10					 		 		
0 <mark></mark>	880	0.	16600.	244	400.	32200).	40000)
			Frequen	cy (MHz)					
Freq.	Note	Detector Mode	Spectrum Reading Le		actor	Actual FS	Lir @3	-	Safe Margin
MHz F	/H/E/S	PK/QP/AV	dBµV		dB	dBµV/m	dBµ		dB

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21.21

34.00

22.42

22.42

43.63

56.42

54.00

74.00

-10.37

-17.58



11400.00

Н

Н

Average

Peak

Operation Band Fundamental F Operation Mode EUT Pol.	requency	:802.11aB3 :5700 MHz :Tx CH HIG :E1 Plane	Н	Test Date Temp./Hu Engineer Measuren	mi.	enna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONTA	
97	//m)							
90								
80								
70						FCC	RSE PEAK15.407	
60	FCC DS	-AV15#07	· · · · · · · · · · · · · · · · · · ·					
50	FUC KSE	-AV1 <u>32407</u>	· · · · · · · · · · · · · · · · · · ·					
40								
30								
20			· · · · · · · · · · · · · · · · · · ·					
10			· · · · · · · · · · · · · · · · · · ·					
0	880	0	16600.	24400		32200.	4000	n
1000	600	υ.	Frequence			32200.	4000	5
Freq.	Note	Detector Mode	Spectrum Reading Lev	vel		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dl	3 (dBµV/m	dBµV/m	dB

21.09

31.09

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22.42

22.42

43.51

53.51

54.00

74.00

-10.49



Operation Band :802.11n20B1 Test Date :2018-03-20 Fundamental Frequency :5180 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin :VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol. 97 Level (dBuV/m) 90 80 FCC RSE PEAK15 70 60 FCC RSE-AV15.407 50 40 30 20 10 0<mark>_____</mark> 8800. 16600. 24400. 32200. 40000 Frequency (MHz) Freq. Note Detector Spectrum Factor Actual Limit Safe Mode Reading Level @3m Margin FS MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB 31.01 68.30 -16.88 10360.00 Н Peak 20.41 51.42

Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

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Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :5180 MHz :Tx CH LO\ :E1 Plane		Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :HORIZONT	
97	BuV/m)						_
90							
80		· · · · · · · · · · · · · · · · · · ·					
70					F(CC RSE PEAK15.407	
<mark>60</mark>		-AV15.407					
50							
40							
30							
20				 			
10							
0	880	n	16600.	24400.	32200.	400	00
1000	000		Frequenc		52200.	400	
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10360.00	Н	Peak	30.88	20.41	51.29	68.30	-17.01



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :5220 MHz :Tx CH MID :E1 Plane)	Test Date Temp./Humi. Engineer Measurement A	ntenna Pol.	:2018-03-20 :23 deg_C / :Tin :VERTICAL	62 RH
97	BuV/m)						_
90				·			
80							
70					FC	C RSE PEAK15.407	
<mark>60</mark>		-AV15.407					
50							
40							
30							
20							
10						 	
0 <mark>0</mark>	880	0.	16600.	24400.	32200.	400	00
			Frequency				
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10440.00	Н	Peak	31.40	20.75	52.15	68.30	-16.15



Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :5220 MHz :Tx CH MID :E1 Plane)	Test Date Temp./H Enginee Measure	umi. r	ntenna Pol	:23 :Tin	18-03-20 deg_C / 6 RIZONT/	
97	uV/m)								_
90									
80								 	
70							FCC RSE	PEAK15.407	
60		-AV15.407							
50									
40								 	
30								 	
20								 	
10									
0 1000	880	0	16600.	244(00	3220	0	400	
1000	880	υ.	Frequenc		UU.	3220	υ.	4000	0
Freq.	Note	Detector	Spectrum	-	actor	Actual		_imit	Safe
MHz	F/H/E/S	Mode PK/QP/AV	Reading Lev dBµV		dB	FS dBµV/m		⊉3m 8µV/m	Margin dB
			I					•	
10440.00	Н	Peak	30.80	20).75	51.55	6	8.30	-16.75



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :5240 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement /	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :VERTICAL	32 RH
97	BuV/m)						
90							
80							
70					FC	C RSE PEAK15.407	
60	FCC RSI	-AV15.407					
50							
40		J					
30		J					
20							
10							
0 <mark></mark>	880	0.	16600.	24400.	32200.	4000	0
			Frequenc	sy (MHz)			
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10480.00	н	Peak	31.20	20.79	51.99	68.30	-16.31



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :5240 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONTA	
97	BuV/m)						
90							
80				 			
70					FC	C RSE PEAK15.407	
60	FCC RSI	-AV15.407					
50				 			
40		J		 			
30		J					
20							
10							
0 <mark></mark>	880	0.	16600.	24400.	32200.	4000	0
			Frequenc	sy (MHz)			
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10480.00	н	Peak	30.07	20.79	50.86	68.30	-17.44



Operation Bal Fundamental Operation Mo EUT Pol.	nd Frequency	:802.11n20l	B2	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2018-03-20 :23 deg_C / :Tin :VERTICAL	
97	BuV/m)				: :		-
90							
80						·	
70					FC	C RSE PEAK15.407	<u>r.</u>
60	FCC RSI	-AV15.407				·	
50				· · · · · · · · · · · · · · · · · · ·			
40				· · · · · · · · · · · · · · · · · · ·		 	
30				1 1 1 1		 	
20							
10							
0	880	0.	16600. Frequenc	24400. cy (MHz)	32200.	400	000
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10520.00	н	Peak	30 54	20.78	51 32	68 30	-16 98
MHz 10520.00	F/H/E/S H		-		-	-	

Radiated Spurious Emission Measurement Result 802.11n HT20. 5250~5350 MHz



...

-

000 44 0000

0040 00 00

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Frequency Spectrum Reading Lev dBµV	Factor	Actual FS dBµV/m	Limit @3m dBµV/m	Safe Margin dB
0 ^L 1000	880	0.	16600.	24400.	32200.	4000	00
10							
20							
30							
40							
50							
60	FCC RSI	E-AV1 <u>5.407</u>					
70					F6	C NOE PEAN 13.401	
80		i				C RSE PEAK15.407	
90							
97 Level (d	BuV/m)						1
Operation Ba Fundamental Operation Mo EUT Pol.	Frequency ode	:802.11n20 :5260 MHz :Tx CH LO\ :E1 Plane	- N I	Test Date Temp./Humi. Engineer Measurement A	antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONT/	

. . .



10600.00

Н

Н

Average

Peak

Operation Band Fundamental Free Operation Mode EUT Pol.	quency	:802.11n20l :5300 MHz :Tx CH MID :E1 Plane		Test Da Temp./H Enginee Measure	lumi. er	ntenna Pol	:23 :Tin	18-03-20 deg_C / 6 RTICAL	32 RH
97)								-
90					 				
80					 				
70							FCC RSE	PEAK15.407	
60	FCC RSF.	AV\$5.407	· · · · · · · · · · · · · · · · · · ·		 				
50					 			 	
40	·				 			 	
30					: : : :			: : 	
20					 			 	
10	·				 			 	
01000	8800).	16600.	244	400.	3220	0.	4000	00
			Frequen						
Freq.	Note	Detector Mode	Spectrum Reading Le		actor	Actual FS		₋imit ⊉3m	Safe Margin
MHz F/	H/E/S	PK/QP/AV	dBµV		dB	dBµV/m	-	βµV/m	dB

20.24

32.21

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21.18

21.18

41.42

53.39

54.00

74.00

-12.58



10600.00

Н

Н

Average

Peak

Operation Band Fundamental Fre Operation Mode EUT Pol.	quency	:802.11n20l :5300 MHz :Tx CH MID :E1 Plane		Test Da Temp./H Enginee Measure	lumi. er	ntenna Pol	:23 :Tin	18-03-20 deg_C / (RIZONT/	
97	1)								_
90									
80									
70							FCC RSE	PEAK15.407	
60		AV25.407							
50	TCC NJL-								
40									
30									
20						I I I I I I I		: : :	
10								 	
0	8800	<u> </u>	16600.	244	400.	3220	0.	400	 DO
			Frequen	cy (MHz)					
Freq.	Note	Detector Mode	Spectrum Reading Le		actor	Actual FS		_imit ⊉3m	Safe Margin
MHz F/	'H/E/S	PK/QP/AV	dBµV		dB	dBµV/m		βµV/m	dB
			•			•			

21.19

32.36

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21.18

21.18

42.37

53.54

54.00

74.00

-11.63



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :5320 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measuremen	t Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :VERTICAL	
97 Level (dE	BuV/m)	,					-
90							
80							
70					F	CC RSE PEAK15.407	
60	FCC RSI	-AV\$5.407					
50							
40					· · · · · · · · · · · · · · · · · · ·		
30							
20						 	
10						 	
0 <mark></mark> 1000	880	0.	16600. Frequen	24400. cy (MHz)	32200.	400	000
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

	1/1// 2/0		uDμv	uВ	uDμv/m	uDμv/m	uD
10640.00	Н	Average	20.43	21.24	41.67	54.00	-12.33
10640.00	Н	Peak	31.69	21.24	52.93	74.00	-21.07



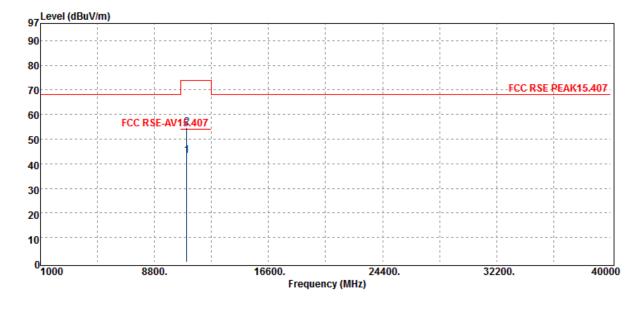
Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :5320 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi Engineer Measureme	nt Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :HORIZONT	62 RH
97 Level (dE	BuV/m)						_
90							
80							
70					F	CC RSE PEAK15.407	<u>r.</u>
60	FCC RSI	E-AV <u>\$5.407</u>					
50							
40							
30							
20						 	
10		i					
0 <mark></mark> 1000	880)0 .	16600. Frequen	24400. cy (MHz)	32200.	. 400	000
Freq.	Note	Detector Mode	Spectrum Reading Le		r Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

	F/11/E/3		υσμν	uВ	υσμν/π	υσμν/π	uБ
10640.00 10640.00	H H	Average Peak	20.87 32.05	21.24 21.24	42.11 53.29	54.00 74.00	-11.89 -20.71



Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

Operation Band	:802.11n20B3	Test Date	:2018-03-20
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Н	Average	21.03	22.17	43.20	54.00	-10.80
11000.00	Н	Peak	32.47	22.17	54.64	74.00	-19.36



11000.00

Н

Н

Average

Peak

Operation Band Fundamental Fre Operation Mode EUT Pol.	equency	:802.11n20E :5500 MHz :Tx CH LOV :E1 Plane		Test Dat Temp./H Enginee Measure	lumi. er	ntenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONT/	
97	n)							-
90				 				
80								
70						FC	C RSE PEAK15.407	
60		AV12.407						
50	FCC NJE-	AV 12.407						
40			· · · · · · · · · · · · · · · · · · ·	 				
30								
20			· · · · · · · · · · · · · · · · · · ·	 	 		 	
10			· · · · · · · · · · · · · · · · · · ·				 	
0	8800		16600.	244	00.	32200.	400	
1000	0000		Frequen			022001	100	
'	Note	Detector Mode	Spectrum Reading Le		actor	Actual FS	Limit @3m	Safe Margin
MHz F	/H/E/S	PK/QP/AV	dBµV		dB	dBµV/m	dBµV/m	dB
			•			•	•	

21.39

31.57

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22.17

22.17

43.56

53.74

54.00

74.00

-10.44



Н

11160.00

Peak

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20l :5580 MHz :Tx CH MID :E1 Plane)	Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :VERTICAL	
97 	uV/m)						_
90							
80							
70					FC	C RSE PEAK15.407	<u>.</u>
60	FCC BS	-AV152407			· · · · · · · · · · · · · · · · · · ·		
50							
40							
30					· · · · · · · · · · · · · · · · · · ·		
20				 			
10				 			
0	880		16600.	24400.	32200.	400	
1000	000	0.	Frequenc		52200.	400	100
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode PK/QP/AV	Reading Lev dBµV	dB	FS dBµV/m	@3m dBµV/m	Margin dB
			•		•	•	
11160.00	Н	Average	21.16	22.31	43.47	54.00	-10.53

31.85

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22.31

54.16

74.00

-19.84



Н

11160.00

Peak

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20[:5580 MHz :Tx CH MID :E1 Plane		Test Date Temp./Humi. Engineer Measuremer	nt Antenna Pol	:2018-03-20 :23 deg_C / :Tin :HORIZON	62 RH
97	uV/m)						
90							
80							
70						FCC RSE PEAK15.40	7.
60		-AV15 ₂ 407					- ·
50		-AV 1 <u>37401</u>	· · · · · · · · · · · · · · · · · · ·				- •
40							
30							
20			· · · · · · · · · · · · · · · · · · ·				- ·
10						 	- ·
0	880		16600.	24400.	3220		000
1000	000	0.	Frequenc		5220	J. 40	000
Freq.	Note	Detector	Spectrum			Limit	Safe
MHz	F/H/E/S	Mode PK/QP/AV	Reading Lev dBµV	/ei dB	FS dBµV/m	@3m dBµV/m	Margin dB
			-			-	
11160.00	Н	Average	21.26	22.31	43.57	54.00	-10.43

30.34

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22.31

52.65

74.00

-21.35



11400.00

Н

Н

Average

Peak

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :5700 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2018-03-20 :23 deg_C / :Tin :VERTICAL	
97	uV/m)						_
90							
80							
70			L		FC	C RSE PEAK15.407	
60	FCC RSE	E-AV15,407					
50		•••••	¹				
40							
30							
20							
10	· · · · · · · · · · · · · · · · · · ·						
0	880	0.	16600.	24400.	32200.	400	000
			Frequence				
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
0 <mark>1000</mark> Freq.		Detector Mode	Spectrum Reading Lev	Factor	FS	@3m	Safe Margin

20.88

30.87

I place otherwise stated the results shown in this test report refer only to th	a complete) tested and such complete) are retained for 00 days only	d such comple(a) are retained for 00 days only

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22.42

22.42

43.30

53.29

54.00

74.00

-10.70



11400.00

Н

Н

Average

Peak

Operation Band Fundamental Freq Operation Mode EUT Pol.	uency	:802.11n :5700 M :Tx CH I :E1 Plan	−lz HIGH		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:23 :Tin	18-03-20 deg_C / / RIZONT/		
97 Level (dBuV/m)										_
90										
80										
70							· · · · · · · · · · · · · · · · · · ·	FCC RSE	PEAK15.407	:
60		-AV152407							, , , , , ,	
50				 			1 1 1 1 1 1 1 1 1		 	
40				 		 	 		 	
30						 			 - 	
20				 		 			 	
10									 	
0	880	D.	166	00. Frequen		400.	3220	0.	400	00
Freq. N	ote	Detecto Mode		Spectrum ading Le		actor	Actual FS		_imit ⊉3m	Safe Margin
MHz F/H	I/E/S	PK/QP/		dBµV		dB	dBµV/m		βμV/m	dB
				•			•		-	

21.66

31.36

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22.42

22.42

44.08

53.78

54.00

74.00

-9.92



Operation Band :802.11n40B1 Test Date :2018-03-20 Fundamental Frequency :5190 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin :VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol. 97 Level (dBuV/m) 90 80 FCC RSE PEAK15 70 60 FCC RSE-AV15.407 50 40 30 20 10 0<mark>_____</mark> 8800. 16600. 24400. 32200. 40000 Frequency (MHz) Freq. Note Detector Spectrum Factor Actual Limit Safe Mode Reading Level @3m Margin FS MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB 32.51 68.30 -15.31 10380.00 Н Peak 20.48 52.99

Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

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...

-

000 44 4004

0040 00 00

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Frequency (Spectrum Reading Leve dBµV	Factor	Actual FS dBµV/m	Limit @3m dBµV/m	Safe Margin dB
0 ^L 1000	880	00.	16600.	24400.	32200.	400	000
10							
20							
30							
40							
50	FCC RS	E-AV <u>15.407</u>					
60							_
70					FC	C RSE PEAK15.407	
80							
97 Level (dl	Buvillij]
Operation Ba Fundamental Operation Mo EUT Pol.	Frequency ode	:802.11n40 :5190 MHz :Tx CH LOV :E1 Plane	Te N E	est Date emp./Humi. ngineer leasurement <i>A</i>	antenna Pol.	:2018-03-20 :23 deg_C / :Tin :HORIZONT	62 RH

. . .



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n40 :5230 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement /	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :VERTICAL	62 RH
97 Level (de	BuV/m)						-
90					·		
80							
70			 		FC	C RSE PEAK15.407	
60	FCC RSI	-AV15.407					
50							
40			 			 	
30						 	
20							
10							
0 <mark></mark> 1000	880	0.	16600. Frequen	24400. cy (MHz)	32200.	4000])0
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10460.00	Н	Peak	30.90	20.77	51.67	68.30	-16.63

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Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n40 :5230 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :HORIZONT/	
97 Level (de	BuV/m)						
90							
80							
70					FC	C RSE PEAK15.407	
60	FCC RSE	-AV15.407	 			 	
50				 		 	
40							
30							
20							
10							
0 <mark>0</mark> 0	880	0.	16600.	24400.	32200.	4000	00
			Frequen	cy (whz)			
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10460.00	н	Peak	30.97	20.77	51.74	68.30	-16.56



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n40l :5270 MHz :Tx CH LOV :E1 Plane		Test Date Temp./Humi. Engineer Measuremen	t Antenna Pol.	:2018-03-20 :23 deg_C / 6 :Tin :VERTICAL	62 RH
97	BuV/m)					,	-
90				· · · · · · · · · · · · · · · · · · ·			
80							
70					F(C RSE PEAK15.407	
60	FCC RSF	-AV15.407	· · · · · · · · · · · · · · · · · · ·				
50						·	
40							
30						 	
20				· · · · · · · · · · · · · · · · · · ·		 	
10						 	
0 <mark></mark>	880	0.	16600.	24400.	32200.	400	
			Frequen				-
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10540.00	Н	Peak	32.55	20.82	53.37	68.30	-14.93



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n40l :5270 MHz :Tx CH LOV :E1 Plane		Test Date Temp./Hum Engineer Measureme	i. ent Antenna Pc	:23 :Tin	18-03-20 deg_C / 6 RIZONTA	
97	BuV/m)							
90							 	
80								
70			L			FCC RSE	PEAK15.407	
60	FCC PSE	-AV15.407						
50								
40		· · · · · · · · · · · · · · · · · · ·						
30								
20								
10					· · · · · · · · · · · · · · · · · · ·			
0 <mark></mark>	880		16600.	24400.	322	00	4000	0
1000	880	υ.	Frequen		322	00.	4000	U
Freq.	Note	Detector Mode	Spectrum Reading Le		or Actual FS		₋imit ⊉3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/n		∂µV/m	dB
10540.00	Н	Peak	31.51	20.82	2 52.33	6	8.30	-15.97



:802.11n40B2

Operation Band

10620.00

10620.00

Н

Н

Average

Peak

:2018-03-20

Fundamental I Dperation Mod EUT Pol.	- requency	:5310 MHz :Tx CH HIG :E1 Plane	iΗ	Temp./Humi. Engineer Measurement Antenna Pol.		:23 deg_C / 62 RH :Tin :VERTICAL		
97	JV/m)						-	
90						 		
80						·		
70					FC	C RSE PEAK15.407	:	
60	FCC RS	E-AV25.407						
50						,		
40								
30						 		
20						 		
10						 		
0	880	0.	16600.	24400.	32200.	400	00	
			Frequenc	y (MHz)				
Freq.	Note	Detector Mode	Spectrum Reading Lev	Factor	Actual FS	Limit @3m	Safe Margi	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	

20.20

32.67

Test Date

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21.21

21.21

41.41

53.88

54.00

74.00

-12.59



10620.00

Н

Н

Average

Peak

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n40 :5310 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measuremer	nt Antenna Pol.	:2018-03-2 :23 deg_C :Tin :HORIZON	/ 62 RH
97	BuV/m)						
90							
80							
70						CC RSE PEAK15.4	<u>07.</u>
60	FCC RSI	E-AV <u>\$5.407</u>					
50							
40							
30							
20							
10							
0 <mark></mark> 1000	880)0.	16600. Frequen	24400. cy (MHz)	32200	. 4	0000
Freq.	Note	Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

20.23

31.59

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21.21

21.21

41.44

52.80

54.00

74.00

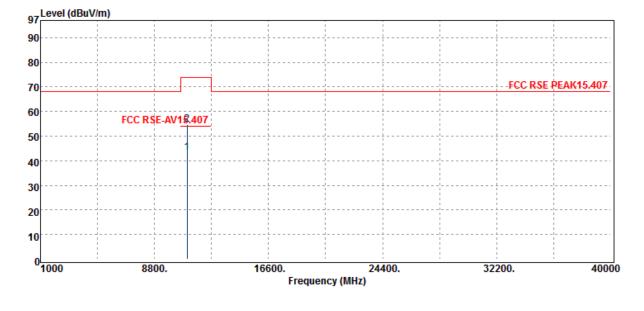
-12.56

-21.20



Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

Operation Band	:802.11n40B3	Test Date	:2018-03-20
Fundamental Frequency	:5510 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11020.00	Н	Average	21.10	22.28	43.38	54.00	-10.62
11020.00	Н	Peak	32.55	22.28	54.83	74.00	-19.17



11020.00

Н

Н

Average

Peak

Operation Band Fundamental Freque Operation Mode EUT Pol.	:802.11n40 ency :5510 MHz :Tx CH LO :E1 Plane	MHz Temp./Humi. H LOW Engineer		Antenna Pol.	62 RH AL	
97 Level (dBuV/m)						7
90						
80						
70				FC(C RSE PEAK15.407	
60	CC RSE-AV12.407		 			
50						
40						
30						
20						
10						
0 <mark></mark> 1000	8800.	16600. Frequenc	24400. cy (MHz)	32200.	4000])0
Freq. Not	e Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz F/H/E		-	dB	dBµV/m	dBµV/m	dB
		I				

21.16

31.31

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22.28

22.28

43.44

53.59

54.00

74.00

-10.56



11100.00

Н

Н

Average

Peak

Operation Band Fundamental Fr Operation Mode EUT Pol.	requency :5550 MHz		Test Date Temp./Humi. Engineer Measurement Antenna Pol.			:23 :Tin	:2018-03-20 :23 deg_C / 62 RH :Tin :VERTICAL			
97 Level (dBuV	//m)									
90				-						
80										
70	J						· · · · · · · · · · · · · · · · · · ·	FCC RSE	PEAK15.407	
60	FCC RSI	E-AV1 5 407							 	
50							i 			
40										
30							 		 	
20				 					 	
10				 					 	
0 <mark>1000</mark>	880	0	1(5600.	244	100	322	00	4000	n
1000	1000 8800. 16600. 24400. 32200. 40000 Frequency (MHz)									
Freq.	Note	Detect Mode		Spectrun eading Le		actor	Actual FS		_imit ⊋3m	Safe Margin
MHz I	F/H/E/S	PK/QP		dBµV		dB	dBµV/m		3μV/m	dB

20.44

32.99

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22.38

22.38

42.82

55.37

54.00

74.00

-11.18

-18.63



11100.00

Н

Н

Average

Peak

Operation Band Fundamental Frequ Operation Mode EUT Pol.	iency :5550	H MID	Engineer	Temp./Humi.		2 RH L
97 Level (dBuV/m)						
90						
80		· · · · · · · · · · · · · · · · · · ·				
70					FCC RSE PEAK15.407	
60	FCC RSE-AV1540	<u> </u>				
50						
40						
30						
20						
10						
0L 1000	8800.	16600.	24400.	3220	00. 40000	0
		Fre	equency (MHz)			
Freq. No	ote Dete Mo			tor Actual FS	Limit @3m	Safe Margin
MHz F/H/	/E/S PK/Q				-	dB

20.78

30.94

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22.38

22.38

43.16

53.32

54.00

74.00

-10.84

-20.68



11340.00

Н

Н

Average

Peak

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n40 :5670 MHz :Tx CH HIG :E1 Plane	-	Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / :Tin :VERTICAL	
97	uV/m)						_
90							
80							
70					FC	C RSE PEAK15.40	<u>r.</u>
60	FCC RSI	E-AV152407					
50						 	
40				 		 	
30							
20							
10							
0	880	0	16600.	24400.	32200.	40	000
1000			Frequenc		022001		
Freq.	Note	Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
			•		•	•	

21.08

31.93

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22.34

22.34

43.42

54.27

54.00

74.00

-10.58

-19.73



11340.00

Н

Н

Average

Peak

Operation Band Fundamental Freque Operation Mode EUT Pol.	:802.11n40 ncy :5670 MHz :Tx CH HI0 :E1 Plane	<u>.</u>	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2018-03-20 :23 deg_C / :Tin :HORIZONT	62 RH
97 Level (dBuV/m)						_
90						
80						
70				FC	C RSE PEAK15.407	
60	CC RSE-AV152407					
50	LC RSE-AV 15407					
40						
30						
20						
10						
0	0000	40000	24402	22200	100	
⁰ 1000	8800.	16600. Frequen	24400. cy (MHz)	32200.	400	00
	Detector	Creation	Footor	Astuc	Lingit	Cofe
Freq. Note	e Detector Mode	Spectrum Reading Le		Actual FS	Limit @3m	Safe Margin
MHz F/H/E			dB	dBµV/m	dBµV/m	dB

21.42

32.30

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22.34

22.34

43.76

54.64

54.00

74.00

-10.24

-19.36



Н

Peak

10420.00

Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz **Operation Band** :802.11ac80B1 Test Date :2018-03-20 Fundamental Frequency :5210 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol. Level (dBuV/m) 97 90 80 70 FCC RSE PEAK15.407 60 FCC RSE-AV15.407 50 40 30 20 10 0 1000 8800. 16600. 24400. 32200. 40000 Frequency (MHz) Detector Spectrum Safe Freq. Note Factor Actual Limit Mode Reading Level FS @3m Margin dBµV MHz F/H/E/S PK/QP/AV dB dBµV/m dBµV/m dB

31.36

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52.05

68.30

-16.25

20.69



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11ac8(:5210 MHz :Tx CH LOV :E1 Plane		Test Date Temp./Hu Engineer Measure	umi.	tenna Pol.	:2018-03 :23 deg_ :Tin :HORIZ0	<u>C / 62 RH</u>
97	BuV/m)							
90								
80								
70						FC	C RSE PEAK1	5.407
60	FCC RSF	-AV15.407	·····					
50								
40								
30								
20								
10								
0 <mark></mark>	880	0.	16600.	2440)0.	32200.	1	40000
			Frequen	cy (MHz)				
Freq.	Note	Detector Mode	Spectrum Reading Le		ctor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV		βB	dBµV/m	dBµV/r	
10420.00	Н	Peak	31.51	20).69	52.20	68.30	-16.10

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Н

Peak

Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5250~5350 MHz **Operation Band** :2018-03-20 :802.11ac80B2 Test Date Fundamental Frequency :5290 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer :Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol. 97 Level (dBuV/m) 90 80 FCC RSE PEAK15 70 60 FCC RSE-AV15.407 50 40 30 20 10 0<mark>_____</mark> 8800. 16600. 24400. 32200. 40000 Frequency (MHz) Freq. Note Detector Spectrum Factor Actual Limit Safe Mode Reading Level @3m Margin FS MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB

32.46

21.03

53.49

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68.30

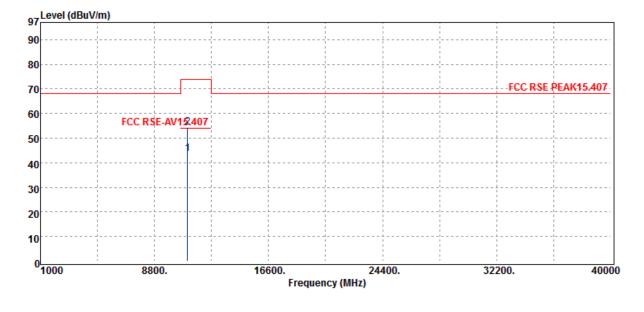
-14.81



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11ac8 :5290 MHz :Tx CH HIG :E1 Plane		Test Date Temp./Humi. Engineer Measurement	Antenna Pol.	:2018-03-20 :23 deg_C / 62 RH :Tin :HORIZONTAL	
97 Level (dE	BuV/m)						-
90							
80				·			
70					FC	C RSE PEAK15.407	
60	ree ner	N/45 407					
50	FUC KSI	-AV1 <u>5.407</u>					
40							
30							
20							
10					· · · · · · · · · · · · · · · · · · ·		
0							
0 ^L 1000	880	0.	16600. Frequend	24400. cy (MHz)	32200.	400	00
Freq.	Note	Detector	Spectrum		Actual	Limit	Safe
MHz	F/H/E/S	Mode PK/QP/AV	Reading Lev dBµV	vel dB	FS dBµV/m	@3m dBµV/m	Margin dB
			4001				
10580.00	Н	Peak	31.29	21.03	52.32	68.30	-15.98



Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5470~5725 MHz



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11060.00	Н	Average	21.13	22.41	43.54	54.00	-10.46
11060.00	Н	Peak	31.91	22.41	54.32	74.00	-19.68



11060.00

Н

Н

Average

Peak

Operation Band Fundamental Frequ Operation Mode EUT Pol.	:802.11ad iency :5530 MH :Tx CH L :E1 Plane	lz OW	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2018-03-20 :23 deg_C / 62 RH :Tin :HORIZONTAL	
97 Level (dBuV/m)				· · · · · ·		-
90						
80						
70			 	FC	C RSE PEAK15.407	
60	FCC RSE-AV12407					
50						
40						
30						
20						
10						
0	8800.	16600.	24400.	32200.	4000	
1000	6600.	Frequenc		J2200.	4000	0
Freq. No	ote Detector Mode	Spectrum Reading Lev		Actual FS	Limit @3m	Safe Margin
MHz F/H	/E/S PK/QP/A		dB	dBµV/m	dBµV/m	dB

21.28

31.59

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22.41

22.41

43.69

54.00

54.00

74.00

-10.31

-20.00



Operation Band

11220.00

11220.00

Н

Н

Average

Peak

:2018-03-20

54.00

74.00

-10.37

-20.13

Fundamental Operation Mod EUT Pol.	Frequency	:5610 MHz :Tx CH HIG :E1 Plane	- iH l	Temp./Humi. Engineer Measurement Antenna Pol.		:23 deg_C / 62 RH :Tin :VERTICAL		
97	uV/m)						7	
90					·			
80					·	 		
70					FC	C RSE PEAK15.407		
60	FCC RS	E-AV152407			·			
50			· · · · · · · · · · · · · · · · · · ·		·			
40					·	·		
30					·			
20					· · · · · · · · · · · · · · · · · · ·	 		
10					· · · · · · · · · · · · · · · · · · ·	 		
0			40000	24400	22200	1000		
°1000	880	<i>.</i>	16600. Frequency	24400. / (MHz)	32200.	4000	0	
Freq.	Note	Detector Mode	Spectrum Reading Lev	Factor	Actual FS	Limit @3m	Safe Margi	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	

21.27

31.51

Test Date

:802.11ac80B3

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22.36

22.36

43.63

53.87



Operation Band

11220.00

11220.00

Н

Н

Average

Peak

:2018-03-20

peration Ba peration Mo JT Pol.	Frequency	:5610 MHz :Tx CH HIG :E1 Plane	т іН Е	Temp./Humi. Engineer Aeasurement A	Antenna Pol.	:2010-00-20 :23 deg_C / 6 :Tin :HORIZONTA	
97	BuV/m)						
90							
80						 	
70					FC	C RSE PEAK15.407	
60	FCC RS	E-AV152407				 	
50		1				 	
40							
30							
20							
10							
0 <mark></mark> 1000	880	00.	16600. Frequency	24400. (MHz)	32200.	4000	0
Freq.	Note	Detector Mode	Spectrum Reading Leve	Factor	Actual FS	Limit @3m	Safe Margi
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

21.62

30.85

Test Date

:802.11ac80B3

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22.36

22.36

43.98

53.21

54.00

74.00

-10.02

-20.79



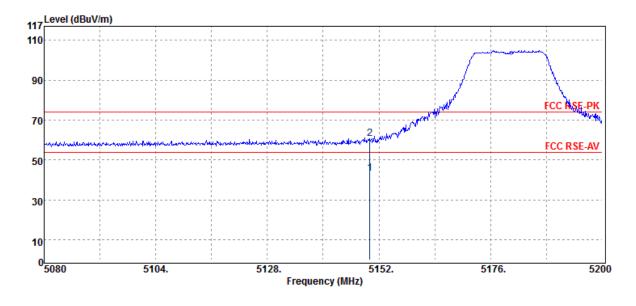
Band Edge falling to restricted band

802.11a mode

Operation Band	:802.11aB1
Fundamental Frequency	:5180 MHz
Operation Mode	:Bandedge CH LOW
EUT Pol.	:E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-16 :23 deg_C / 62 RH :Tin :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	35.16	8.32	43.48	54.00	-10.52
5150.00	Е	Peak	52.58	8.32	60.90	74.00	-13.10

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Operation Band :802.11aB1 Test Date :2018-03-16 Fundamental Frequency :5180 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW Engineer :Tin EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol. .evel (dBuV/m) 117 110 90 SE-PK 70 FCC RSE-AV 50 30 10 0 5080 5104. 5128 5152. 5176. 5200 Frequency (MHz)

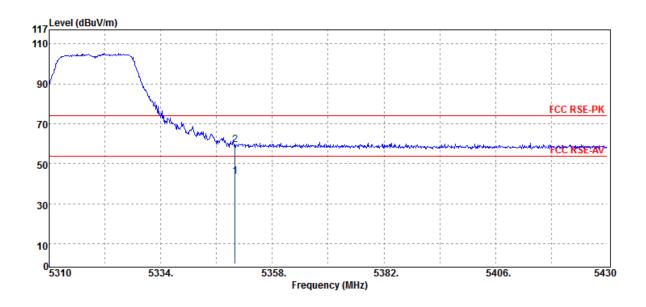
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5150.0	0 E	Average	34.24	8.32	42.56	54.00	-11.44
5150.0	0 E	Peak	49.62	8.32	57.94	74.00	-16.06

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Operation Band :802.11aB2 Fundamental Frequency :5320 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2018-03-16 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	35.20	8.63	43.83	54.00	-10.17
5350.00	E	Peak	50.72	8.63	59.35	74.00	-14.65

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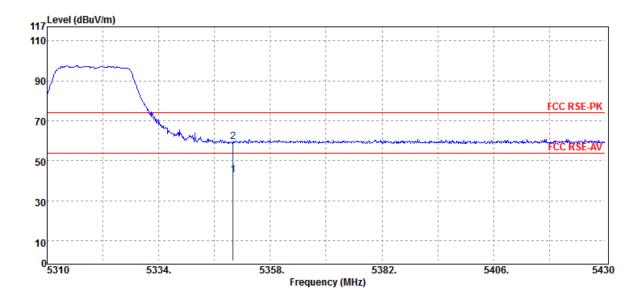
Report No.: ER/2018/30017 Page: 123 of 177



Operation Band :802.11aB2 Fundamental Frequency :5320 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-16 :23 deg_C / 62 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	34.24	8.63	42.87	54.00	-11.13
5350.00	Е	Peak	51.01	8.63	59.64	74.00	-14.36

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Dperation Band Fundamental Frequency Dperation Mode EUT Pol.		:802.11aB :5500 MH :Bandedg :E1 Plane	z e CH LOW		Ter Eng	et Date np./Humi gineer asureme		nna Pol.	:2018-03-16 :23 deg_C / 62 RH :Tin :VERTICAL	
117	Level (dBuV/r	m)								_
110										
90										
90									FCC RSE-PK	
70	****		we all hand of a fact of the	en et a constant on a constant of	www.moture.	manman	mand	n 	FCC RSE-AV	
50									TCC NJL-AV	-
30								, , , , , ,		
10								, , , , , ,		
0	5390	5444		E420		460		000		10
	2280	5414.		5438. Freque	ncy (MHz)	462.	54	186.	55	10
Fre	eq.	Note	Detector	Spect		Factor		tual	Limit	Margin

	rieq.	NOLE	Mode	Reading Level	T actor	FS	@3m	Margin
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
-	5460.00	E	Average	35.22	8.75	43.97	54.00	-10.03
	5460.00	E	Peak	50.44	8.75	59.19	74.00	-14.81

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Operation Band :802.11aB3 Test Date :2018-03-16 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW Engineer :Tin EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol. .evel (dBuV/m) 117 110 90 CC RSE-P 70 FCC RSE-AV 50 30 10 0 5390 5414. 5438 5462. 5486. 5510 Frequency (MHz)

Fre	q.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
MF	z	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5460	.00	E	Average	34.28	8.75	43.03	54.00	-10.97
5460	.00	E	Peak	49.46	8.75	58.21	74.00	-15.79

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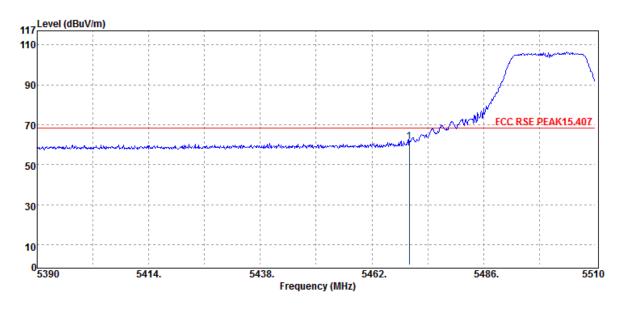


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-16 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5470.00	Ē	Peak	52.95	8.74	61.69	68.30	-6.61

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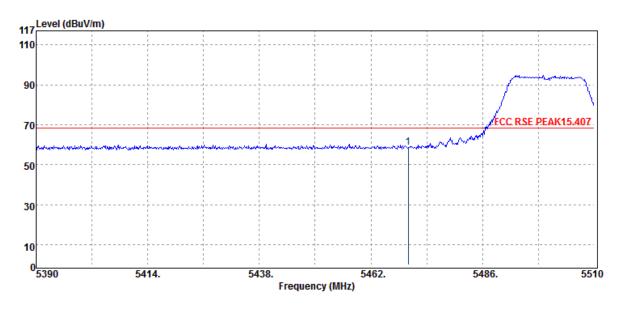


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-16 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
 MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
 5470.00	Е	Peak	49.98	8.74	58.72	68.30	-9.58

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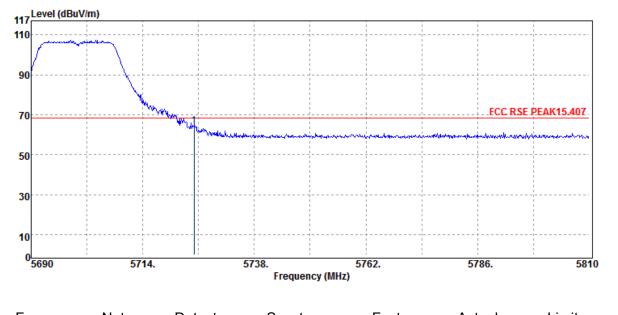


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz :Bandedge CH HIGH RSE :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :VERTICAL



F	req.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
N	ИНz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
57	25.00	Е	Peak	54.87	9.44	64.31	68.30	-3.99

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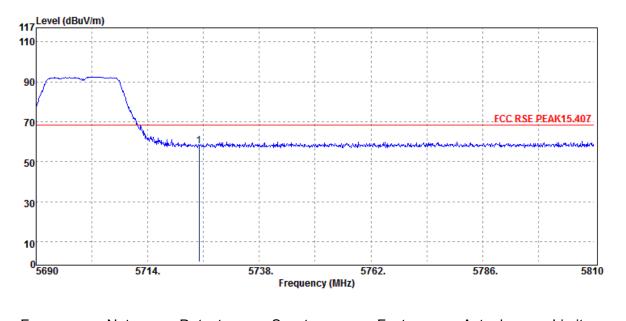


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz :Bandedge CH HIGH RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@3m		
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
	5725.00	Е	Peak	48.59	9.44	58.03	68.30	-10.27	_



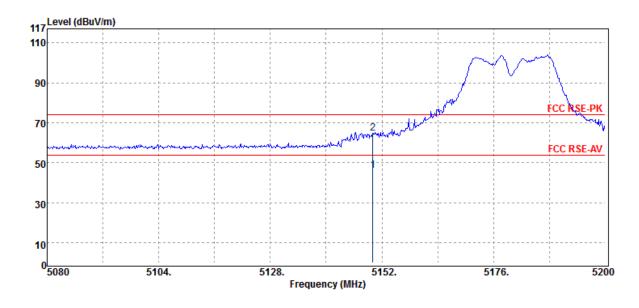
802.11n20 HT mode

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B1 :5180 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :VERTICAL



Note	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
E	Average	37.74	8.32	46.06	54.00	-7.94
E	Peak	56.33	8.32	64.65	74.00	-9.35
	F/H/E/S	ModeF/H/E/SPK/QP/AVEAverage	ModeReading LevelF/H/E/SPK/QP/AVdBµVEAverage37.74	ModeReading LevelF/H/E/SPK/QP/AVdBµVdBEAverage37.748.32	ModeReading LevelFSF/H/E/SPK/QP/AVdBµVdBdBµV/mEAverage37.748.3246.06	ModeReading LevelFS@3mF/H/E/SPK/QP/AVdBµVdBdBµV/mdBµV/mEAverage37.748.3246.0654.00

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Operation Band :802.11n20B1 Test Date :2018-03-19 Fundamental Frequency :5180 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW Engineer :Tin EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol. evel (dBuV/m) 117 110 90 70 FCC RSE-AV 50 30 10 0 5080 5104. 5128 5152. 5176. 5200 Frequency (MHz)

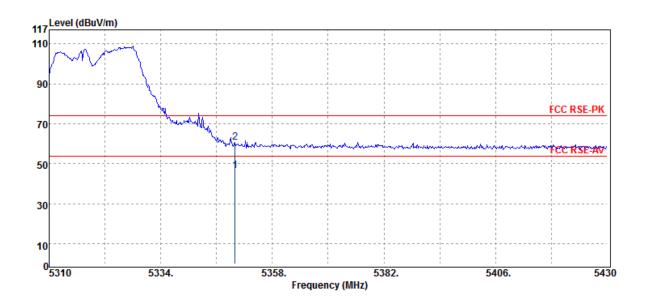
	Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin	
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
-	5150.00	E	Average	37.66	8.32	45.98	54.00	-8.02	-
	5150.00	Е	Peak	56.46	8.32	64.78	74.00	-9.22	
		E	U						

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Operation Band :802.11n20B2 Fundamental Frequency :5320 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		dB	dBµV/m	dBµV/m	dB
5350.00	Е	Average	37.87	8.63	46.50	54.00	-7.50
5350.00	Е	Peak	52.30	8.63	60.93	74.00	-13.07

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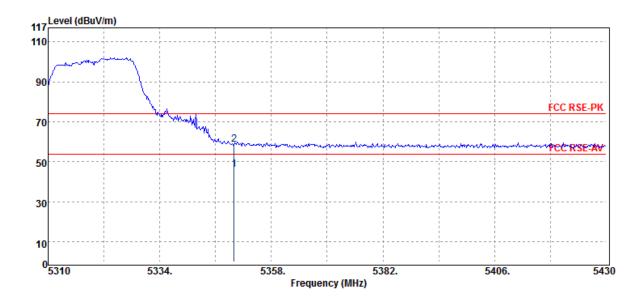


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz :Bandedge CH HIGH :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	37.40	8.63	46.03	54.00	-7.97
5350.00	Е	Peak	50.21	8.63	58.84	74.00	-15.16

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unda	tion Mo	Frequency	:802.11n20 :5500 MHz :Bandedge :E1 Plane			Ter Eng	st Date np./Humi gineer asureme		nna Pol.	:2018-03-19 :23 deg_C / 62 RH :Tin :VERTICAL
117	Level (dBuV	//m)								_
110										
90								$\sum_{i=1}^{n}$	mar 1	
								J	FCC RSE-PK	
70		· · · · · · · · · · · · · · · · · · ·				- - -	JWWwwlfer		FUL KSE-PN	
	and the state of the		ununununu	A	2	Mr.Um	un an		FCC RSE-AV	
50								1 1 1		
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10										
, in the second s	5390	5414.		5438. Freque	5 ncy (MHz)	462.	54	486.	55	10
Fre	eq.	Note	Detector	Spect		Factor		tual	Limit @3m	Margin

	ricq.	NOIC	Mode	Reading Level	T actor	FS	@3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
_	5460.00	E	Average	37.35	8.75	46.10	54.00	-7.90	-
	5460.00	E	Peak	49.93	8.75	58.68	74.00	-15.32	

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Operation Band :802.11n20B3 Test Date :2018-03-19 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW Engineer :Tin EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol. .evel (dBuV/m) 117 110 90 CC RSF-PK 70 FCC RSE-AV 50 30 10 0 5390 5414. 5438 5462. 5486. 5510 Frequency (MHz)

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5460.00	E	Average	37.14	8.75	45.89	54.00	-8.11
5460.00	Е	Peak	49.50	8.75	58.25	74.00	-15.75

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Operation Band :802.11n20B3 Test Date :2018-03-19 **Fundamental Frequency** :5500 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW RSE Engineer :Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol. .evel (dBuV/m) 117 110 90 FCC RSE PEAK15.407 70 1/Mb FCC RSE-AV 50 30 10 0 5390 5414. 5510 5438 5462. 5486. Frequency (MHz) Spectrum Margin Freq. Note Detector Factor Actual Limit Mode **Reading Level** FS @3m MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB 5470.00 E Peak 56.98 8.74 65.72 68.30 -2.58

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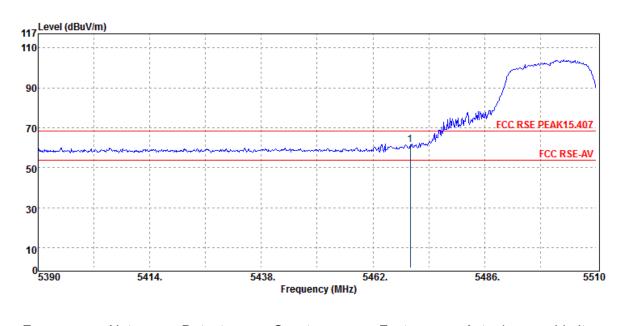


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5470.00	Е	Peak	52.81	8.74	61.55	68.30	-6.75

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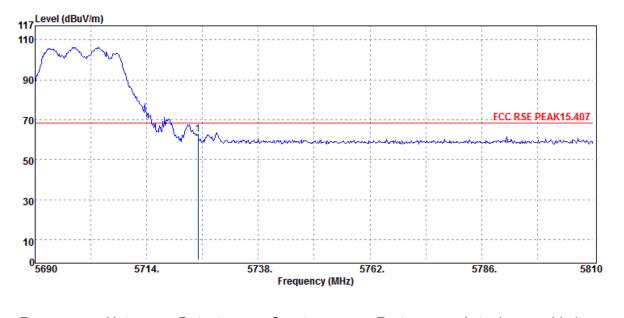


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz :Bandedge CH HIGH RSE :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
 MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
 5725.00	Е	Peak	53.27	9.44	62.71	68.30	-5.59

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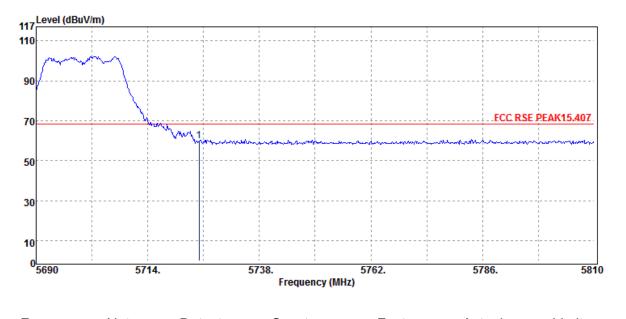


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz :Bandedge CH HIGH RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5725.00	E	Peak	50.40	9.44	59.84	68.30	-8.46

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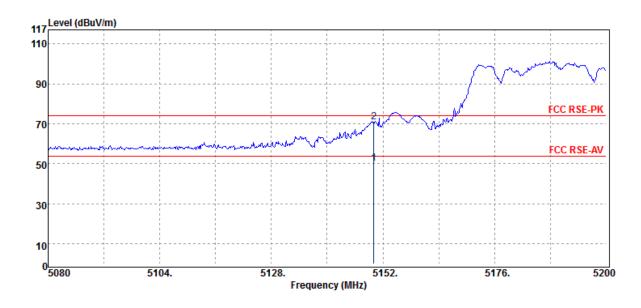
802.11n40 HT mode

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B1 :5190 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	41.99	8.32	50.31	54.00	-3.69
5150.00	E	Peak	62.61	8.32	70.93	74.00	-3.07

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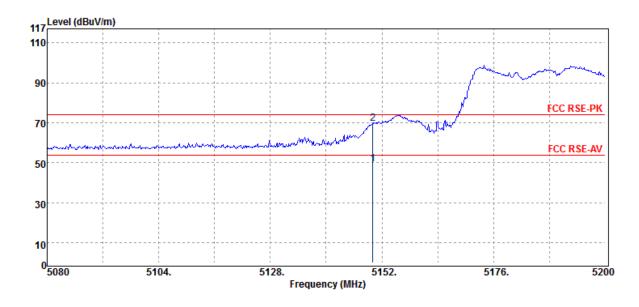
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Operation Band :802.11n40B1 Fundamental Frequency :5190 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



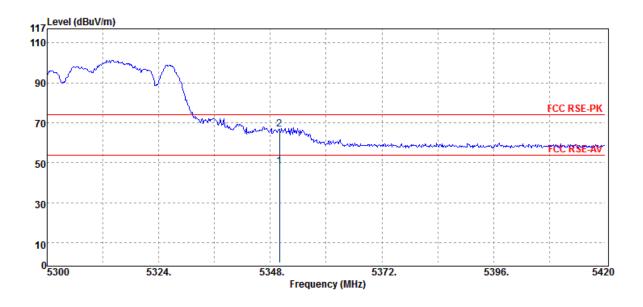
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	40.99	8.32	49.31	54.00	-4.69
5150.00	Е	Peak	61.21	8.32	69.53	74.00	-4.47

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Operation Band :802.11n40B2 Fundamental Frequency :5310 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2018-03-19 Temp./Humi. :23 deg_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Lovel	Factor	Actual FS	Limit	Margin
MHz	F/H/E/S	PK/QP/AV	Reading Level dBuV	dB	го dBµV/m	@3m dBµV/m	dB
5350.00	E	Average	<u>39.72</u>	8.63	48.35	<u>54.00</u>	-5.65
5350.00	E	Peak	58.13	8.63	66.76	74.00	-7.24
	_			0.00			

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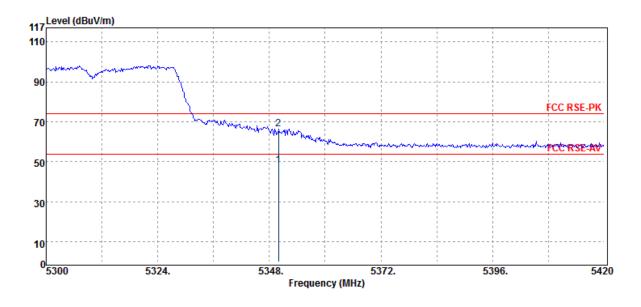
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Operation Band :802.11n40B2 Fundamental Frequency :5310 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBuV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	39.42	8.63	48.05	54.00	-5.95
5350.00	Е	Peak	57.88	8.63	66.51	74.00	-7.49

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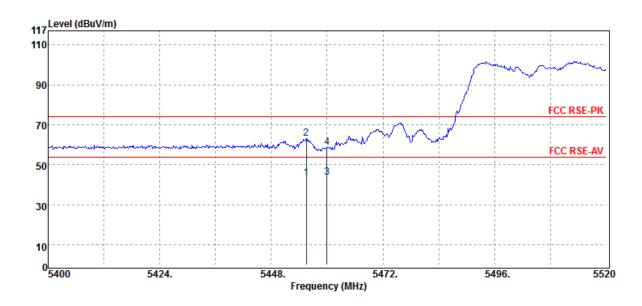


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5455.56	E	Average	34.76	8.75	43.51	54.00	-10.49
5455.56	E	Peak	54.39	8.75	63.14	74.00	-10.86
5460.00	E	Average	34.80	8.75	43.55	54.00	-10.45
5460.00	E	Peak	49.84	8.75	58.59	74.00	-15.41

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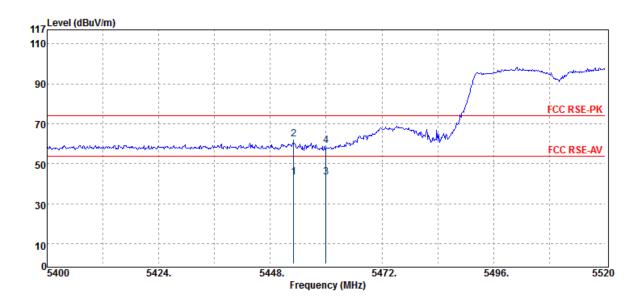


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5453.04	E	Average	34.51	8.76	43.27	54.00	-10.73
5453.04	E	Peak	53.45	8.76	62.21	74.00	-11.79
5460.00	E	Average	34.72	8.75	43.47	54.00	-10.53
5460.00	E	Peak	50.18	8.75	58.93	74.00	-15.07

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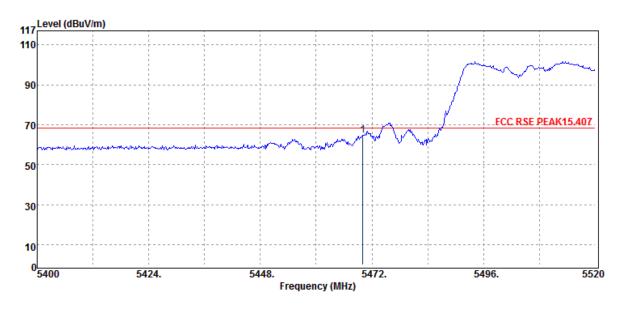


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



Fre	q. N	ote Detect	tor Spectrum	Factor	Actual	Limit	Margin
		Mode	e Reading Lev	/el	FS	@3m	
MH	z F/H	/E/S PK/QP	/AV dBµV	dB	dBµV/m	dBµV/m	dB
5470	.00	E Peal	x 56.01	8.74	64.75	68.30	-3.55

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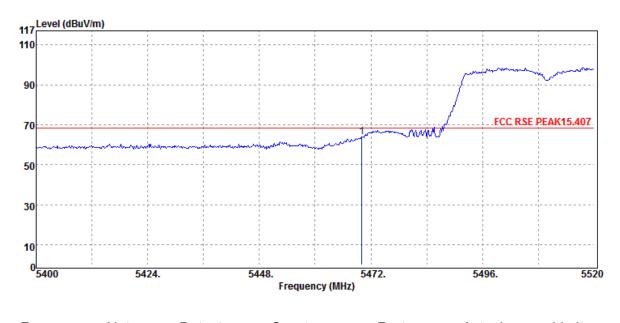


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :Tin :HORIZONTAL



Fre	eq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
MF	lz F/	/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5470	0.00	E	Peak	55.08	8.74	63.82	68.30	-4.48

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Operation Band :802.11n40B3 Test Date :2018-03-19 **Fundamental Frequency** :5670 MHz Temp./Humi. :23 deg_C / 62 RH **Operation Mode** :Bandedge CH HIGH RSE Engineer :Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol. .evel (dBuV/m) 117 110 90 4.40 ECC RSE PEAK15.407 70 50 30 10 0 5660 5684. 5780 5708 5732. 5756. Frequency (MHz) Spectrum Margin Freq. Note Detector Factor Actual Limit Mode **Reading Level** FS @3m MHz F/H/E/S PK/QP/AV dBµV dB dBµV/m dBµV/m dB 5725.00 E Peak 54.16 9.44 63.60 68.30 -4.70

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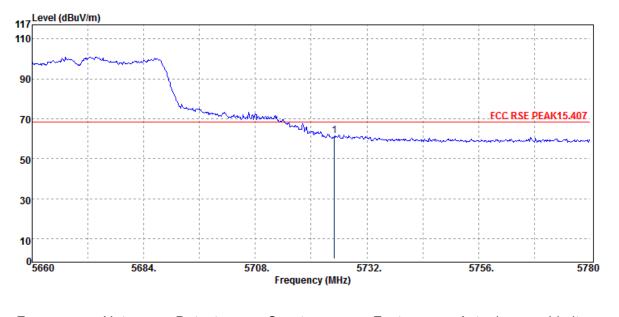


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz :Bandedge CH HIGH RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin	
 MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
5725.00	Е	Peak	52.01	9.44	61.45	68.30	-6.85	_

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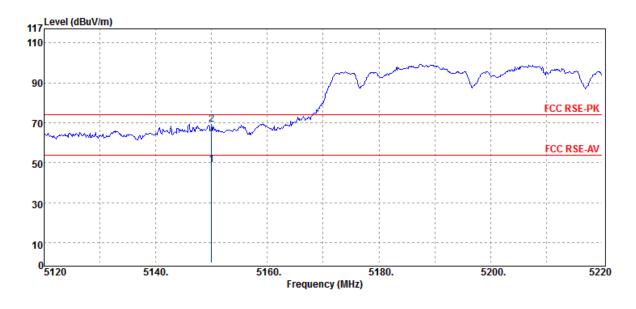
802.11ac VHT80 mode

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B1 :5210 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	40.51	8.32	48.83	54.00	-5.17
5150.00	Е	Peak	60.93	8.32	69.25	74.00	-4.75

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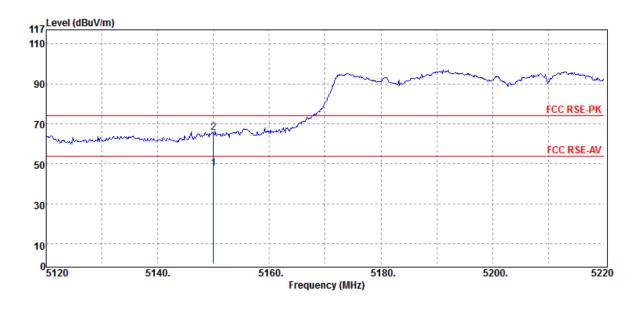


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B1 :5210 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



argin
dB
6.09
8.39
6

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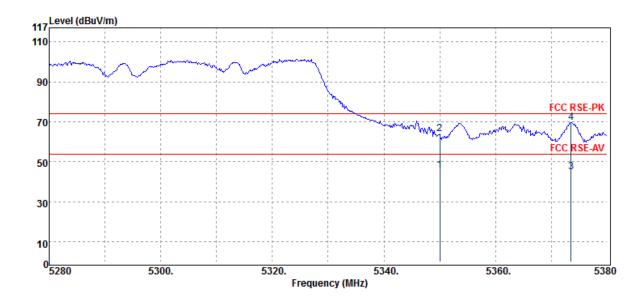


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz :Bandedge CH HIGH :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	37.20	8.63	45.83	54.00	-8.17
5350.00	E	Peak	55.42	8.63	64.05	74.00	-9.95
5373.50	E	Average	36.34	8.63	44.97	54.00	-9.03
5373.50	E	Peak	61.02	8.63	69.65	74.00	-4.35

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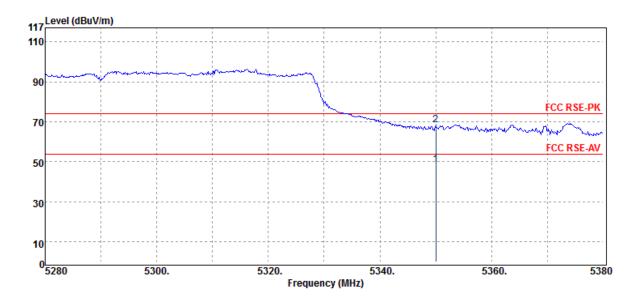


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz :Bandedge CH HIGH :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-19 :23 deg_C / 62 RH :Tin :HORIZONTAL



Margin
dB
-5.57
-5.76

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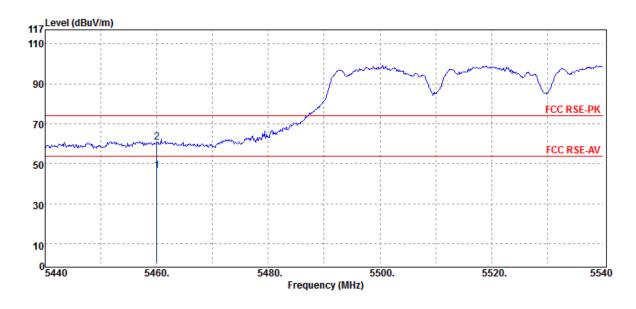


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5460.00	E	Average	37.80	8.75	46.55	54.00	-7.45
5460.00	Е	Peak	52.16	8.75	60.91	74.00	-13.09

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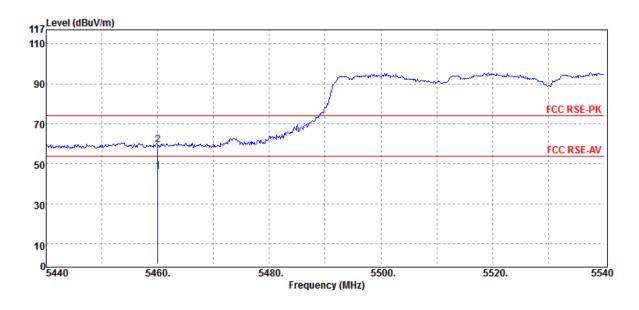


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz :Bandedge CH LOW :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :Tin :HORIZONTAL



Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
S PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Average	37.58	8.75	46.33	54.00	-7.67
Peak	50.91	8.75	59.66	74.00	-14.34
	Mode S PK/QP/AV Average	Mode Reading Level <u>S PK/QP/AV dBµV</u> Average 37.58	ModeReading LevelSPK/QP/AVdBμVdBAverage37.588.75	ModeReading LevelFSSPK/QP/AVdBµVdBAverage37.588.7546.33	ModeReading LevelFS@3mSPK/QP/AVdBµVdBdBµV/mdBµV/mAverage37.588.7546.3354.00

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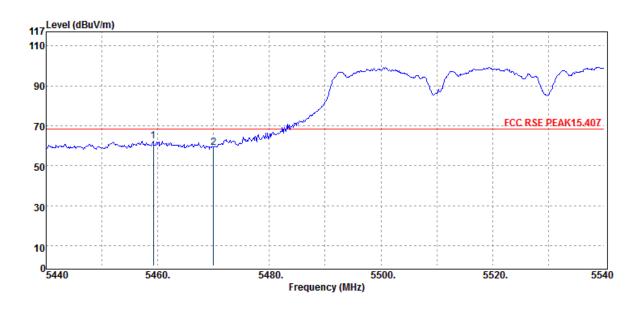


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :VERTICAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
_	5459.20	E	Peak	53.69	8.75	62.44	68.30	-5.86
	5470.00	E	Peak	50.17	8.74	58.91	68.30	-9.39

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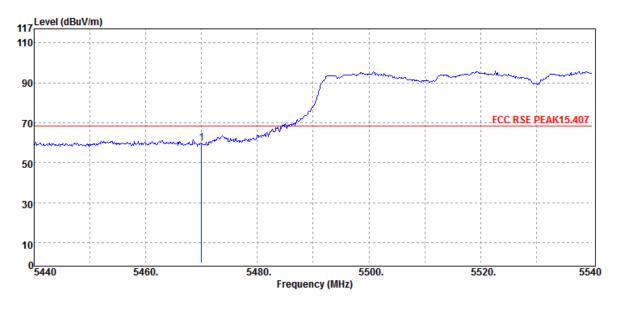


Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz :Bandedge CH LOW RSE :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-03-23 :23 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5470.00	E	Peak	51.21	8.74	59.95	68.30	-8.35

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12. TRANSMISSION IN THE ABSENCE OF DATA

12.1 Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

12.2Result

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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13. FREQUENCY STABILITY

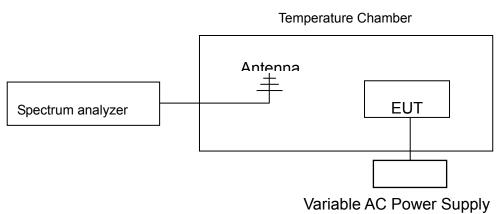
13.1 Standard Applicable

Manufacturers 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.

13.2Measurement Procedure

- 1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
- 2. Set EUT as normal operation.
- 3. Turn the EUT on and couple its output to spectrum.
- 4. Turn the EUT off and set the chamber to the highest temperature specified.
- 5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
- 6. Repeat step with the temperature chamber set to the lowest temperature.

13.3Test SET-UP



13.4Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY54200716	2017/10/16	2018/10/15
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Notebook	Lenovo	T440	P0000564	N/A	N/A

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13.5Measurement Result

Startup:

Operation Mode	802.11 a	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,179.98486	0.00000292
		44	5220	5,219.98486	0.00000290
		48	5240	5,239.98486	0.00000289
		52	5260	5,259.98486	0.00000288
		60	5300	5,299.98486	0.00000286
	4.43V	64	5320	5,319.98486	0.00000285
		100	5500	5,499.98486	0.00000275
		116	5580	5,579.98486	0.00000271
		140	5700	5,699.98486	0.00000266
-10 °C		36	5180	5,179.98486	0.00000292
		44	5220	5,219.98486	0.00000290
		48	5240	5,239.98486	0.00000289
		52	5260	5,259.98486	0.00000288
		60	5300	5,299.98486	0.00000286
	3.27V	64	5320	5,319.98486	0.00000285
		100	5500	5,499.98486	0.00000275
		116	5580	5,579.98486	0.00000271
		140	5700	5,699.96997	0.00000527



		36	5180	5,179.98486	0.00000292
		44	5220	5,219.98486	0.00000290
		48	5240	5,239.98486	0.00000289
		52	5260	5,259.98486	0.00000288
		60	5300	5,299.98486	0.00000286
25 °C	3.85V	64	5320	5,319.98486	0.00000285
		100	5500	5,499.98486	0.00000275
		116	5580	5,579.98486	0.00000271
		140	5700	5,699.98486	0.00000266
		36	5180	5,179.98486	0.00000292
		44	5220	5,219.98486	0.00000290
		48	5240	5,239.98486	0.00000289
		52	5260	5,259.98486	0.00000288
		60	5300	5,299.98486	0.00000286
		64	5320	5,319.98486	0.00000285
	4.43V	100	5500	5,499.98486	0.00000275
		116	5580	5,579.98486	0.00000271
		140	5700	5,699.98486	0.00000266
55 °C		36	5180	5,179.98486	0.00000292
		44	5220	5,219.98486	0.00000290
		48	5240	5,239.98486	0.00000289
		52	5260	5,259.98486	0.00000288
		60	5300	5,299.98486	0.00000286
	3.27V	64	5320	5,319.98486	0.00000285
		100	5500	5,499.98486	0.00000275
		116	5580	5,579.98486	0.00000271
		140	5700	5,699.98486	0.00000266



Operation Mode	802.11 n_HT40	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,189.97510	0.00000480
		46	5230	5,229.97510	0.00000476
		54	5270	5,269.97510	0.00000473
		62	5310	5,309.97510	0.00000469
	4.43V	102	5510	5,509.97510	0.00000452
		110	5550	5,549.97510	0.00000449
		134	5670	5,669.97510	0.00000439
-10 °C		38	5190	5,189.97510	0.00000480
		46	5230	5,229.97510	0.00000476
		54	5270	5,269.97510	0.00000473
		62	5310	5,309.97510	0.00000469
	3.27V	102	5510	5,509.97510	0.00000452
		110	5550	5,549.97510	0.00000449
		134	5670	5,669.97510	0.00000439

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		38	5190	5,189.97510	0.00000480
		46	5230	5,229.97510	0.00000476
		54	5270	5,269.97510	0.00000473
		62	5310	5,309.97510	0.00000469
25 °C	3.85V	102	5510	5,509.97510	0.00000452
		110	5550	5,549.97510	0.00000449
		134	5670	5,669.97510	0.00000439
		38	5190	5,189.97510	0.00000480
		46	5230	5,229.97510	0.00000476
		54	5270	5,269.97510	0.00000473
		62	5310	5,309.97510	0.00000469
	4.43V	102	5510	5,509.97510	0.00000452
		110	5550	5,549.97510	0.00000449
		134	5670	5,670.00000	0.00000000
55 °C		38	5190	5,189.97510	0.00000480
		46	5230	5,229.97510	0.00000476
		54	5270	5,269.97510	0.00000473
		62	5310	5,309.97510	0.00000469
	3.27V	102	5510	5,509.97510	0.00000452
		110	5550	5,549.97510	0.00000449
		134	5670	5,669.97510	0.00000439



Operation Mode	802.11 ac_VHT80	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		42	5210	5,209.95020	0.00000956
		58	5290	5,290.04981	-0.00000941
	4.43V	106	5530	5,529.95020	0.00000901
		122	5610	5,609.95020	0.00000888
-10 °C		42	5210	5,210.00000	0.00000000
		58	5290	5,290.04981	-0.00000941
	3.27V	106	5530	5,529.95020	0.00000901
		122	5610	5,610.00000	0.00000000
		42	5210	5,210.00000	0.00000000
		58	5290	5,290.04981	-0.00000941
25 °C	3.85V	106	5530	5,529.95020	0.00000901
		122	5610	5,609.95020	0.00000888
		42	5210	5,209.95020	0.00000956
		58	5290	5,290.04981	-0.00000941
	4.43V	106	5530	5,530.00000	0.00000000
		122	5610	5,609.95020	0.00000888
55 °C		42	5210	5,210.00000	0.00000000
		58	5290	5,290.04981	-0.00000941
	3.27V	106	5530	5,529.95020	0.00000901
		122	5610	5,610.00000	0.00000000



2 Minutes:

Operation Mode	802.11 a	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,179.98850	0.00000222
		44	5220	5,219.98061	0.00000371
		48	5240	5,239.99298	0.00000134
		52	5260	5,259.98118	0.00000358
		60	5300	5,299.98164	0.00000346
	4.43V	64	5320	5,319.98467	0.0000288
		100	5500	5,499.97700	0.00000418
		116	5580	5,579.99201	0.00000143
		140	5700	5,699.99058	0.00000165
-10 °C		36	5180	5,179.99164	0.00000161
		44	5220	5,219.98552	0.00000277
		48	5240	5,239.98283	0.00000328
		52	5260	5,259.99325	0.00000128
		60	5300	5,299.97762	0.00000422
	3.27V	64	5320	5,319.99464	0.00000101
		100	5500	5,499.98800	0.00000218
		116	5580	5,579.98994	0.00000180
		140	5700	5,699.96089	0.00000686
		36	5180	5,179.97611	0.00000461
		44	5220	5,219.98952	0.00000201
		48	5240	5,239.97750	0.00000429
		52	5260	5,259.98302	0.00000323
		60	5300	5,299.98648	0.00000255
25 ℃	3.85V	64	5320	5,319.99363	0.00000120
		100	5500	5,499.97592	0.00000438
		116	5580	5,579.98332	0.00000299
		140	5700	5,699.98891	0.00000195

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		36	5180	5,179.99441	0.00000108
		44	5220	5,219.98515	0.00000285
				,	
		48	5240	5,239.98681	0.00000252
		52	5260	5,259.99158	0.00000160
		60	5300	5,299.98234	0.00000333
		64	5320	5,319.98748	0.00000235
	4.43V	100	5500	5,499.98052	0.00000354
		116	5580	5,579.99130	0.00000156
		140	5700	5,699.99076	0.00000162
55 ° C		36	5180	5,179.99400	0.00000116
		44	5220	5,219.97519	0.00000475
		48	5240	5,239.97707	0.00000438
		52	5260	5,259.99225	0.00000147
		60	5300	5,299.98307	0.00000319
	3.27V	64	5320	5,319.98943	0.00000199
		100	5500	5,499.98675	0.00000241
		116	5580	5,579.97541	0.00000441
		140	5700	5,699.98649	0.00000237



Operation Mode	802.11 n_HT40	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,189.96850	0.00000607
		46	5230	5,229.97711	0.00000438
		54	5270	5,269.97792	0.00000419
		62	5310	5,309.96558	0.00000648
	4.43V	102	5510	5,509.97928	0.00000376
		110	5550	5,549.98294	0.00000307
		134	5670	5,669.97570	0.00000429
-10 °C		38	5190	5,189.96939	0.00000590
		46	5230	5,229.98260	0.00000333
		54	5270	5,269.97721	0.00000432
		62	5310	5,309.96599	0.00000641
	3.27V	102	5510	5,509.97069	0.00000532
		110	5550	5,549.97935	0.00000372
		134	5670	5,669.97820	0.00000385
		38	5190	5,189.97581	0.00000466
		46	5230	5,229.97363	0.00000504
		54	5270	5,269.96550	0.00000655
		62	5310	5,309.98350	0.00000311
25 ° C	3.85V	102	5510	5,509.98025	0.00000358
		110	5550	5,549.96913	0.00000556
		134	5670	5,669.97377	0.00000463
		38	5190	5,189.98196	0.00000348
		46	5230	5,229.98073	0.00000369
		54	5270	5,269.97624	0.00000451
		62	5310	5,309.97665	0.00000440
	4.43V	102	5510	5,509.98439	0.00000283
		110	5550	5,549.97512	0.00000448
		134	5670	5,669.99850	0.00000026
55 °C		38	5190	5,189.96674	0.00000641
		46	5230	5,229.98463	0.00000294
		54	5270	5,269.97884	0.00000402
		62	5310	5,309.97232	0.00000521
	3.27V	102	5510	5,509.97513	0.00000451
		110	5550	5,549.97224	0.00000500
		134	5670	5,669.97600	0.00000423



Operation Mode	802.11 ac_VHT80	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		42	5210	5,209.94484	0.00001059
		58	5290	5,290.04804	-0.00000908
	4.43V	106	5530	5,529.95028	0.00000899
		122	5610	5,609.94847	0.00000919
-10 °C		42	5210	5,210.00770	-0.00000148
		58	5290	5,290.05251	-0.00000993
	3.27V	106	5530	5,529.95302	0.00000850
		122	5610	5,609.99090	0.00000162
		42	5210	5,209.99499	0.0000096
		58	5290	5,290.04269	-0.00000807
25 °C	3.85V	106	5530	5,529.95523	0.00000810
		122	5610	5,609.95739	0.00000760
		42	5210	5,209.95896	0.00000788
		58	5290	5,290.05315	-0.00001005
	4.43V	106	5530	5,530.00527	-0.00000095
		122	5610	5,609.94736	0.00000938
55 °C		42	5210	5,210.00600	-0.00000115
		58	5290	5,290.04835	-0.00000914
	3.27V	106	5530	5,529.95070	0.00000891
		122	5610	5,609.99566	0.0000077



5 Minutes:

Operation Mode	802.11 a	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,179.98318	0.00000325
		44	5220	5,219.97913	0.00000400
		48	5240	5,239.97773	0.00000425
		52	5260	5,259.98970	0.00000196
		60	5300	5,299.98247	0.00000331
	4.43V	64	5320	5,319.98548	0.00000273
		100	5500	5,499.98022	0.00000360
		116	5580	5,579.99269	0.00000131
		140	5700	5,699.97900	0.00000368
-10 °C		36	5180	5,179.97808	0.00000423
		44	5220	5,219.99022	0.00000187
		48	5240	5,239.98562	0.00000274
		52	5260	5,259.97945	0.00000391
		60	5300	5,299.98111	0.00000356
	3.27V	64	5320	5,319.98193	0.00000340
		100	5500	5,499.98548	0.00000264
		116	5580	5,579.99300	0.00000125
		140	5700	5,699.97661	0.00000410
		36	5180	5,179.97756	0.00000433
		44	5220	5,219.98253	0.00000335
		48	5240	5,239.99052	0.00000181
		52	5260	5,259.97697	0.00000438
		60	5300	5,299.98609	0.00000262
25 °C	3.85V	64	5320	5,319.98974	0.00000193
		100	5500	5,499.98782	0.00000221
		116	5580	5,579.99005	0.00000178
		140	5700	5,699.98957	0.00000183



		36	5180	5,179.99035	0.00000186
		44	5220	5,219.98738	0.00000242
		48	5240	5,239.98745	0.00000239
		52	5260	5,259.99452	0.00000104
		60	5300	5,299.99383	0.00000116
		64	5320	5,319.97721	0.00000428
	4.43V	100	5500	5,499.97567	0.00000442
		116	5580	5,579.97496	0.00000449
		140	5700	5,699.98391	0.00000282
55 °C		36	5180	5,179.97616	0.00000460
		44	5220	5,219.97764	0.00000428
		48	5240	5,239.98575	0.00000272
		52	5260	5,259.99430	0.00000108
		60	5300	5,299.99356	0.00000122
	3.27V	64	5320	5,319.99251	0.00000141
		100	5500	5,499.97741	0.00000411
		116	5580	5,579.99092	0.00000163
		140	5700	5,699.98001	0.00000351



Operation Mode	802.11 n_HT40	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %	-	_

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,189.97066	0.00000565
		46	5230	5,229.97367	0.00000503
		54	5270	5,269.98053	0.00000369
		62	5310	5,309.98371	0.00000307
	4.43V	102	5510	5,509.97070	0.00000532
		110	5550	5,549.97317	0.00000484
		134	5670	5,669.96514	0.00000615
-10 °C		38	5190	5,189.97174	0.00000545
		46	5230	5,229.96949	0.00000583
		54	5270	5,269.96519	0.00000660
		62	5310	5,309.97091	0.00000548
	3.27V	102	5510	5,509.97890	0.00000383
		110	5550	5,549.96844	0.00000569
		134	5670	5,669.96868	0.00000552
		38	5190	5,189.97026	0.00000573
		46	5230	5,229.97184	0.00000539
		54	5270	5,269.97074	0.00000555
		62	5310	5,309.97027	0.00000560
25 °C	3.85V	102	5510	5,509.96522	0.00000631
		110	5550	5,549.97322	0.00000482
		134	5670	5,669.97137	0.00000505
		38	5190	5,189.98018	0.00000382
		46	5230	5,229.98209	0.00000343
		54	5270	5,269.97465	0.00000481
		62	5310	5,309.98178	0.00000343
	4.43V	102	5510	5,509.96725	0.00000594
		110	5550	5,549.96783	0.00000580
		134	5670	5,670.00582	-0.00000103
55 ° C		38	5190	5,189.96770	0.00000622
		46	5230	5,229.98162	0.00000352
		54	5270	5,269.97170	0.00000537
		62	5310	5,309.98449	0.00000292
	3.27V	102	5510	5,509.97809	0.00000398
		110	5550	5,549.96870	0.00000564
		134	5670	5,669.97783	0.00000391



Operation Mode	802.11 ac_VHT80	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		42	5210	5,209.95766	0.00000813
		58	5290	5,290.05519	-0.00001043
	4.43V	106	5530	5,529.94679	0.00000962
		122	5610	5,609.95203	0.00000855
-10 °C		42	5210	5,209.99187	0.00000156
		58	5290	5,290.04841	-0.00000915
	3.27V	106	5530	5,529.94872	0.00000927
		122	5610	5,610.00264	-0.00000047
		42	5210	5,210.00777	-0.00000149
		58	5290	5,290.05293	-0.00001001
25 °C	3.85V	106	5530	5,529.94379	0.00001016
		122	5610	5,609.95737	0.00000760
		42	5210	5,209.94792	0.00001000
		58	5290	5,290.05717	-0.00001081
	4.43V	106	5530	5,529.99951	0.00000009
		122	5610	5,609.94850	0.00000918
55 °C		42	5210	5,210.00118	-0.00000023
		58	5290	5,290.05841	-0.00001104
	3.27V	106	5530	5,529.95589	0.00000798
		122	5610	5,609.99211	0.00000141



10 Minutes:

Operation Mode	802.11 a	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,179.97501	0.00000482
		44	5220	5,219.98453	0.00000296
		48	5240	5,239.99204	0.00000152
		52	5260	5,259.97680	0.00000441
		60	5300	5,299.97617	0.00000450
	4.43V	64	5320	5,319.99263	0.00000139
		100	5500	5,499.97527	0.00000450
		116	5580	5,579.98989	0.00000181
		140	5700	5,699.98749	0.00000219
-10 °C		36	5180	5,179.97861	0.00000413
		44	5220	5,219.99480	0.00000100
		48	5240	5,239.97716	0.00000436
		52	5260	5,259.98360	0.00000312
		60	5300	5,299.97871	0.00000402
	3.27V	64	5320	5,319.97872	0.00000400
		100	5500	5,499.97807	0.00000399
		116	5580	5,579.98220	0.00000319
		140	5700	5,699.96720	0.00000576
		-			
		36	5180	5,179.97700	0.00000444
		44	5220	5,219.99473	0.00000101
		48	5240	5,239.98191	0.00000345
		52	5260	5,259.97867	0.00000406
		60	5300	5,299.98384	0.00000305
25 °C	3.85V	64	5320	5,319.97779	0.00000417
		100	5500	5,499.99177	0.00000150
		116	5580	5,579.98446	0.00000278
		140	5700	5,699.99101	0.00000158

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		36	5180	5,179.99379	0.00000120
		44	5220	5,219.97819	0.00000418
		48	5240	5,239.98707	0.00000247
		52	5260	5,259.97839	0.00000411
		60	5300	5,299.97695	0.00000435
		64	5320	5,319.97495	0.00000471
	4.43V	100	5500	5,499.97710	0.00000416
		116	5580	5,579.99318	0.00000122
55 ° ℃		140	5700	5,699.98971	0.00000181
		36	5180	5,179.99197	0.00000155
		44	5220	5,219.98015	0.00000380
		48	5240	5,239.99160	0.00000160
		52	5260	5,259.98839	0.00000221
		60	5300	5,299.97546	0.00000463
	3.27V	64	5320	5,319.99442	0.00000105
		100	5500	5,499.98902	0.00000200
		116	5580	5,579.97789	0.00000396
		140	5700	5,699.99196	0.00000141

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Operation Mode	802.11 n_HT40	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,189.96537	0.00000667
		46	5230	5,229.98080	0.00000367
		54	5270	5,269.97031	0.00000563
		62	5310	5,309.97798	0.00000415
	4.43V	102	5510	5,509.98283	0.00000312
		110	5550	5,549.97085	0.00000525
		134	5670	5,669.96674	0.00000587
-10 °C		38	5190	5,189.98176	0.00000352
		46	5230	5,229.96791	0.00000614
		54	5270	5,269.97452	0.00000484
		62	5310	5,309.97703	0.00000433
	3.27V	102	5510	5,509.96519	0.00000632
		110	5550	5,549.97808	0.00000395
		134	5670	5,669.97888	0.00000373
		38	5190	5,189.97977	0.00000390
		46	5230	5,229.97741	0.00000432
		54	5270	5,269.97862	0.00000406
		62	5310	5,309.97000	0.00000565
25 °C	3.85V	102	5510	5,509.98167	0.00000333
		110	5550	5,549.98038	0.00000354
		134	5670	5,669.97098	0.00000512
		38	5190	5,189.98476	0.00000294
		46	5230	5,229.98367	0.00000312
		54	5270	5,269.97182	0.00000535
		62	5310	5,309.96686	0.00000624
	4.43V	102	5510	5,509.97832	0.00000393
		110	5550	5,549.97140	0.00000515
		134	5670	5,670.00907	-0.00000160
55 °C		38	5190	5,189.98388	0.00000311
		46	5230	5,229.97240	0.00000528
		54	5270	5,269.97070	0.00000556
		62	5310	5,309.97261	0.00000516
	3.27V	102	5510	5,509.96594	0.00000618
		110	5550	5,549.98424	0.0000284
		134	5670	5,669.96577	0.00000604



Operation Mode	802.11 ac_VHT80	Test Date	2018.03.20
Temperature	:23 °C	Test By	Mike
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		42	5210	5,209.94897	0.00000979
		58	5290	5,290.04831	-0.00000913
	4.43V	106	5530	5,529.95683	0.00000781
		122	5610	5,609.94185	0.00001037
-10 °C		42	5210	5,210.00042	-0.00000008
		58	5290	5,290.04575	-0.00000865
	3.27V	106	5530	5,529.94067	0.00001073
		122	5610	5,609.99264	0.00000131
		42	5210	5,210.00809	-0.00000155
		58	5290	5,290.04845	-0.00000916
25 °C	3.85V	106	5530	5,529.95850	0.00000750
		122	5610	5,609.94945	0.00000901
		42	5210	5,209.95088	0.00000943
		58	5290	5,290.04826	-0.00000912
	4.43V	106	5530	5,529.99859	0.0000025
		122	5610	5,609.94807	0.00000926
55 °C		42	5210	5,210.00270	-0.00000052
		58	5290	5,290.05590	-0.00001057
	3.27V	106	5530	5,529.94757	0.00000948
		122	5610	5,609.99108	0.00000159



14. ANTENNA REQUIREMENT

14.1 Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

According to §15.407, 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.

14.2Antenna Connected Construction

An embedded-in antenna design is used.

The antenna is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

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