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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant: CastleNet Technology Inc.

No. 14, Ln. 141, Sec. 3, Beishen Rd., Shenkeng Dist.,

New Taipei City 22244, Taiwan (R.O.C.)

Product Name: Wireless Cable Gateway

Brand Name: Castlenet Model No.: CBV384Z4

Model Difference: N/A

Report Number: E2/2020/B0037-01 FCC ID RK9-CBV384Z4 **FCC Rule Part:** §15.407, Cat: U-NII

Issue Date: Feb. 23, 2021

Date of Test: Nov. 23, 2020 - Feb. 22, 2021

Date of EUT Received: Nov. 23, 2020

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab 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.

Approved By:

Jay Lin / Asst. Supervisor





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Revision History				
Report Number	Revision	Description	Issue Date	Remark
E2/2020/B0037	Rev.00	Original.	Feb. 22, 2021	Revised By: Yuri Tsai
E2/2020/B0037-01	Rev.01	B2 & B3 disabled via software	Feb. 23, 2021	Revised By: Yuri Tsai

Note:

1 · Addendum to the original test report

This test report is an addendum to the original test report E2/2020/B0037, EUTs represent the original test report and this test report are assessed as identical in hardware and software, measurement results in the original report are fully leveraged in this test report without further verification test.

2 · Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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GENERAL INFORMATION

1.1 Product Description

Product Name: Wireles		Wireless Cable Gateway		
Brand Name:		Castlenet		
Model No.:		CBV384Z4	DBV384Z4	
Model Differ	ence:	N/A		
Hardware Version: N/A				
Software Version: N/A		N/A		
EUT Series No.: PJ20B158002		PJ20B158002		
Power Supply: 12		12Vdc from AC/DC Adapter		
I Modifiation type.		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Transition Rate: 802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 - 288.9Mbps 802.11 n_40MHz: 13.5 - 600.0Mbps		20MHz: 6.5 – 288.9Mbps	802.11 ac_20MHz: 6.5 –346.8Mbps 802.11 ac_40MHz: 13.5 –800.0Mbps 802.11 ac_80MHz: 29.3 – 1733.2Mbps	

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1.2 Antenna Designation

Ant. Type	Ch0/Ch1/Ch2/Ch3	Supplier	Part No.	Freq.(MHz)	Peak Gain (dBi)	Worst Antenna Gain
PCB	Ol- O	A 1! -	CDV20474 AC2000	5150~5250	2.90	
РСВ	Ch0	AnJie	CBV384Z4-AC2800	5725~5850	2.97	V
PCB	Ch1	AnJie CBV384Z4-AC2800	CDV20474 AC2000	5150~5250	2.69	
PCB			Albie	CBV384Z4-AC2800	OD V 304Z4-AC2000	5725~5850
PCB	Ch2	AnJie	CBV384Z4-AC2800	5150~5250	2.93	V
PCB	CHZ	Alble	CDV304Z4-ACZ000	5725~5850	2.93	
PCB	Ch2	AnJie	CDV20474 AC2000	5150~5250	2.67	
PCB	Ch3	Alble	CBV384Z4-AC2800	5725~5850	2.83	

Note: Investigation has been done to determine the worst case scenario for the above antennas demonstrated with measurements in this report.

1.3 Worst power

Wi-Fi 802.11	Frequency Range	Channels		wer (Avg.) /orst case)	Modulation Technology
	5150~5250		21.99		<u> </u>
а	5725-5850	5	21	.92	OFDM
n_HT	5150~5250	4	HT:	26.63	OFDM
ac_VHT 20M	5725-5850	5	HT:	26.69	OFDM
n_HT	5150~5250	2	HT:	26.57	05014
ac_VHT 40M	5725-5850	2	HT:	25.63	OFDM
ac_VHT	5150~5250	1	21	.06	OFDM
80M	5725-5850	1	20	.68	OFDIVI

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1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

1.5 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702)

No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333

FCC Designation number: TW0028

1.6 Special Accessories

There are no special accessories used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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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 a 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. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

Conducted Test (RF) 2.3.2

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 **Radiated Emissions**

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. 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.

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2.4 Measurement Results Explanation Example

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

For all conducted test items: 2.4.2

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.

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

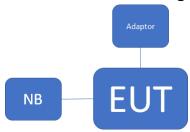


Fig. 2-2 Conducted (Antenna Port) Emission Configuration

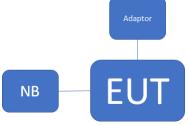


Fig. 2-3 Conducted (AC powerline) Emission Configuration



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.	Notebook	Lenovo	L420	S0011721	N/A	N/A

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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 & 6dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1802.11a/n/ac operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

20 M		
СН	Freq (MHz)	
36	5180	
40	5200	
44	5220	
48	5240	

١	<u>u III 3 130 IVII</u>		
	40 M		
	СН	Freq (MHz)	
	38	5190	
	46	5230	

JZJU IVII IZ.		
80 M		
CH	Freq (MHz)	
42	5210	

Operated band in 5745 MHz ~5850 MHz:

20 M		
СН	Freq (MHz)	
149	5745	
153	5765	
157	5785	
161	5805	
165	5825	

40 M			
СН	Freq (MHz)		
151	5755		
159	5795		

8	0 M
СН	Freq (MHz)
155	5775

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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 programmed.
- 3. Investigation has been done on all the possible configurations for searching the worst case. The gevin UE is pre-scanned among below modes.

Modulation	Transmission Chain	Single Transmission Spatial	Multiple Transmission Spatial
⊠ 802.11 a	□ Ch0 □ Ch1 □ Ch2 □ Ch3	☐ 1TX	⊠ 3TX
⊠ 802.11 n	⊠ Ch0 ⊠ Ch1 ⊠ Ch2 ⊠ Ch3	□ SISO	
⊠ 802.11 ac	⊠ Ch0 ⊠ Ch1 ⊠ Ch2 ⊠ Ch3	□ SISO	

4. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

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4.2.1RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)								
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA		
IVIODE	BAND (MHz)	CHANNEL	CHANNEL	IVIODULATION	(Mbps)	PORT		
802.11a	5180~5240	36 to 48	44	OFDM	6	ch1		
002.114	5745~5825	149 to 165	157	OI DIVI	U	CIII		
902 11ac V/UT90	5190~5230	42	42	OFDM	MCS0	MIMO		
802.11ac_VHT80	5775	155	155		IVIC30	IVIIIVIU		

RADIATED EMISSION TEST (ABOVE 1 GHz)								
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA		
IVIODE	BAND (MHz)	CHANNEL	CHANNEL	WODULATION	(Mbps)	PORT		
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ch1		
002.11a	5745~5825	149 to 165	149,157,165	OI DIVI	6	CITI		
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS0	MIMO		
002.1111_11120	5745~5825	149 to 165	149,157,165	OI DIVI	MCSU	IVIIIVIO		
802.11n HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MIMO		
002.1111_11140	5755~5795 151 to 159	151,159	OI DIVI	MCSU	IVIIIVIO			
002 11aa VIIT00	5210	42	42	OFDM	MCS0	MIMO		
802.11ac_VHT80	5775	155	155	OI DIVI	MCSU	IVIIIVIO		

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 H position was reported.

4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST							
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA		
IVIODE	BAND (MHz)	CHANNEL	CHANNEL	IVIODULATION	(Mbps)	PORT		
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ch1		
002.114	5745~5825	149 to 165	149,157,165	OI DIVI	6	CIII		
802.11n_HT20	5180~5240	36 to 48	36,44,48	.48 OFDM	MCS0	MIMO		
002.1111_11120	5745~5825	149 to 165	149,157,165	OI DIVI	MCSU	IVIIIVIO		
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MIMO		
002.1111_11140	5755~5795 15		151,159	OI DIVI	IVICSU	IVIIIVIO		
802.11ac VHT80	5210	42	42	MNSS	MCS0	MIMO		
002.11ac_V11100	5775	155	155	IVIIVOO	IVICOU	IVIIIVIO		

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MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 dB
26dB & 6dB Emission Bandwidth	+/- 1.54 Hz
The Maximum Output Power Meas- urement	+/- 1 dB
Peak Power Spectral Density Meas- urement	+/- 1.54 dB
Frequency Stability	+/- 1.54 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 1%

Radiated Spurious Emission Measurement Uncertainty							
Polarization: Vertical	+/-	2.64	dB	9kHz~30MHz: +-2.3dB			
	+/-	4.93	dB	30MHz - 1000MHz: +/- 3.37dB			
	+/-	4.81	dB	1GHz - 18GHz: +/- 4.04dB			
	+/-	4.52	dB	18GHz - 40GHz: +/- 4.04dB			
Polarization: Horizontal	+/-	2.64	dB	9kHz~30MHz: +-2.3dB			
	+/-	4.45	dB	30MHz - 1000MHz: +/- 4.22dB			
	+/-	4.81	dB	1GHz - 18GHz: +/- 4.08dB			
	+/-	4.52	dB	18GHz - 40GHz: +/- 4.08dB			

Note:

- 1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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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	Lin dB(nits 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

6.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	974	03/25/2020	03/24/2021			
EMI Test Receiver	R&S	ESCI	101342	04/28/2020	04/27/2021			

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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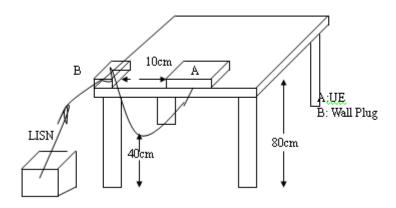
^{1.} The lower limit shall apply at the transition frequencies

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



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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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AC POWER LINE CONDUCTED EMISSION TEST DATA

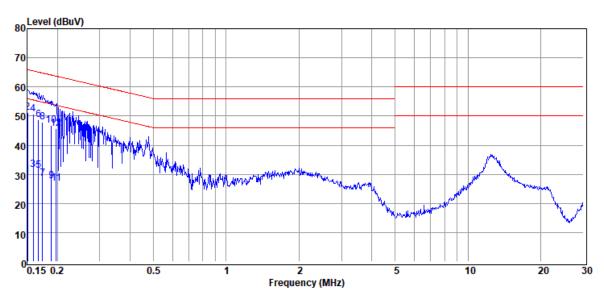
Report Number :E2-2020-B0037 Test Site :Conduction Room C

Test Mode :WLAN 5G Test Date :2020-12-23

Power :120V/60Hz Temp./Humi. :25.4/62

Probe :L1 Engineer :Ashton Chiu

Note: : MS-V300R120-036H0-US



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dΒμV	dB	dΒμV	dΒμV	dB
0.15	Average	19.75	10.22	29.97	55.95	-25.98
0.15	QP	40.88	10.22	51.10	65.95	-14.85
0.16	Average	21.25	10.22	31.47	55.52	-24.05
0.16	QP	40.41	10.22	50.63	65.52	-14.89
0.17	Average	21.17	10.22	31.39	55.08	-23.69
0.17	QP	38.61	10.22	48.83	65.08	-16.25
0.17	Average	18.27	10.22	28.49	54.77	-26.28
0.17	QP	37.80	10.22	48.02	64.77	-16.75
0.19	Average	17.41	10.22	27.63	54.07	-26.44
0.19	QP	36.58	10.22	46.80	64.07	-17.27
0.20	Average	16.52	10.22	26.74	53.69	-26.95
0.20	QP	35.46	10.22	45.68	63.69	-18.01

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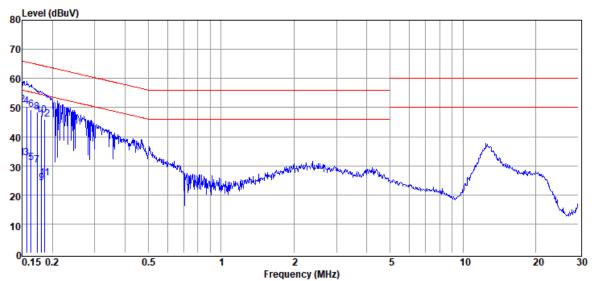
Report Number **Test Site** :Conduction Room C :E2-2020-B0037

Test Mode :WLAN 5G **Test Date** :2020-12-23

Power :120V/60Hz Temp./Humi. :25.4/62

Probe Engineer :N :Ashton Chiu

Note: : MS-V300R120-036H0-US



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dΒμV	dΒμV	dB
0.15	Average	22.54	10.21	32.75	56.00	-23.25
0.15	QP	40.70	10.21	50.91	66.00	-15.09
0.16	Average	22.38	10.21	32.59	55.65	-23.06
0.16	QP	40.18	10.21	50.39	65.65	-15.26
0.16	Average	20.67	10.21	30.88	55.30	-24.42
0.16	QP	39.14	10.21	49.35	65.30	-15.95
0.17	Average	20.03	10.21	30.24	54.81	-24.57
0.17	QP	38.31	10.21	48.52	64.81	-16.29
0.18	Average	13.96	10.21	24.17	54.45	-30.28
0.18	QP	37.13	10.21	47.34	64.45	-17.11
0.19	Average	15.46	10.21	25.67	54.19	-28.52
0.19	QP	35.87	10.21	46.08	64.19	-18.11

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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.

7.1 Measurement Procedure:

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

Duty Cycle:

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	95.00	0.22	0.48	1.00
802.11n_20	95.00	0.22	0.52	1.00
802.11ac_20	98.00	0.09	0.52	0.01
802.11n_40	91.00	0.41	1.06	2.00
802.11ac_40	97.00	0.13	1.05	2.00
802.11ac_80	94.00	0.27	2.17	3.00

Duty Cycle Factor: 10 * log(1/0.95) = 0.22 Duty Cycle Factor: 10 * log(1/0.95) = 0.22 Duty Cycle Factor: 10 * log(1/0.98) = 0.09 Duty Cycle Factor: 10 * log(1/0.91) = 0.41 Duty Cycle Factor: 10 * log(1/0.97) = 0.13 Duty Cycle Factor: 10 * log(1/0.94) = 0.27

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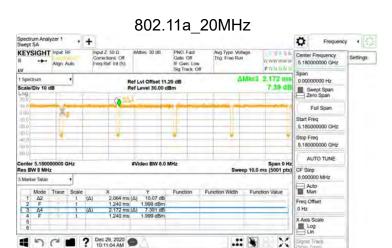
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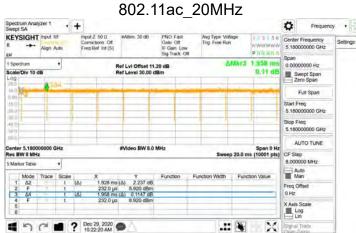
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7.2 DUTY CYCLE TEST SIGNAL MEASURE-MENT RESULT





802.11n 40MHz + ٥ KEYSIGHT input RF Ref Lvi Offset 11.20 dB Ref Level 30.00 dBm Swept Span Zero Span Full Span 5.190000000 GHz 5.190000000 GHz #Video BW 8.0 MHz Center 5.19000 Res BW 8 MHz Auto Man X Y 944.0 ps (Δ) -3.172 dB 914.0 μs 3.105 dBm 1.042 ms (Δ) -1.705 dB 914.0 μs 3.105 dBm (A) Freq Offset 0 Hz X Axis Sca Log Lin ■ 1 C ■ ? Dec 29, 2020 ●

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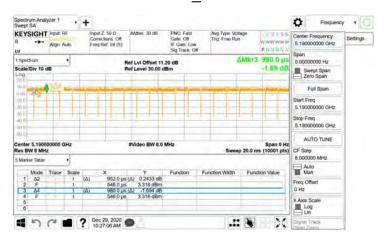
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802.11ac 40MHz



802.11ac 80MHz



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26DB &6DB 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.
- Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - 3.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.

- 3.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. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
 - a. Set the spectrum analyzer as

RBW = 100 kHz

VBW = 3*RBW,

Span = 30M/50MHz,

Detector=Peak,

Sweep=auto

- b. Mark the peak frequency and -6dB (upper and lower) frequency.
- 6. Repeat above procedures until all frequency of interest measured was complete.

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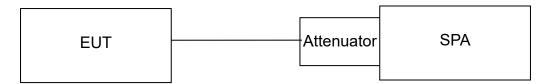


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8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equip- ment	Manufacturer Model Serial Calibration Calibration Due				
Spectrum Analyzer	KEYSIGHT	N9010B	MY59071574	06/24/2020	06/23/2021
Attenuator	Marvelous	MVE2213-10	RF09	11/19/2020	11/18/2021
DC Block	PASTERNACK	PE8210	RF151	11/19/2020	11/18/2021

8.4 Test Set-up



8.5 Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11a_Ch1

_		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.26	13.280
5220	21.10	13.240
5240	21.55	13.330

802.11n_HT20_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.20	13.260
5220	21.46	13.320
5240	21.40	13.300

802.11n_HT20_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.24	13.270
5220	21.37	13.300
5240	21.28	13.280

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802.11n HT20 Ch2

802.11n_HT20_Ch3

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.33	13.290
5220	21.41	13.310
5240	21.25	13.270

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.42	13.310
5220	21.18	13.260
5240	20.93	13.210

802.11n _HT40_Ch0

802.11n _HT40_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	43.92	16.430
5230	42.90	16.320

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.50	16.280
5230	39.80	16.000

802.11n _HT40_Ch2

802.11n _HT40_Ch3

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.92	16.330
5230	39.70	15.990

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.63	16.300
5230	39.66	15.980

802.11ac _VHT80_Ch0

802.11ac _VHT80_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	80.14	19.040

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	80.08	19.040

802.11ac _VHT80_Ch2

802.11ac _VHT80_Ch3

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	81.34	19.100

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	80.79	19.070

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8.5.2 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802	.11a	Ch1
-----	------	-----

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.38	12.140
5785	16.34	12.130
5825	16.37	12.140

802.11n_HT20_Ch0

802.11n_HT20_Ch1

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.60	12.460
5785	17.60	12.460
5825	17.33	12.390

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.60	12.460
5785	17.65	12.470
5825	17.62	12.460

802.11n_HT20_Ch2

802.11n_HT20_Ch3

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.59	12.450
5785	17.62	12.460
5825	17.57	12.450

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.63	12.460
5785	17.62	12.460
5825	17.61	12.460

802.11n_HT40_Ch0

802.11n_HT40_Ch1

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.36	15.610
5795	36.39	15.610

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.39	15.610
5795	36.39	15.610

802.11n_HT40_Ch2

802.11n_HT40_Ch3

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.38	15.610
5795	36.01	15.560

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.31	15.600
5795	36.34	15.600

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802.11ac _VHT80_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.86	18.800

802.11ac _VHT80_Ch1 _ _ _ 6dB

BW

(MHz)

76.05

10 Log (B) (dB)

18.810

802.11ac _VHT80_Ch2

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.92	18.800

802.11ac _VHT80_Ch3

Freq.

(MHz)

5775

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	76.12	18.810

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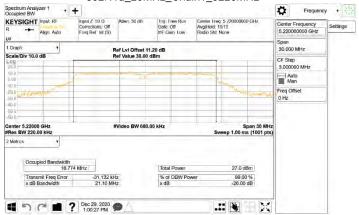


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802.11a_20MHz_Chain1_5180MHz



802.11a_20MHz_Chain1_5220MHz



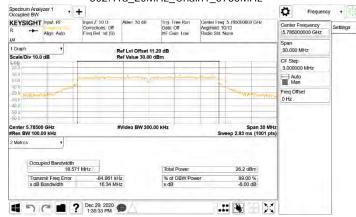
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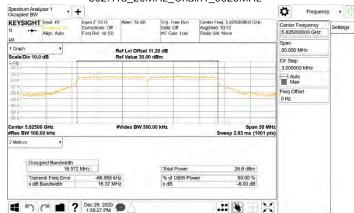
802.11a_20MHz_Chain1_5745MHz



802.11a_20MHz_Chain1_5785MHz



802.11a_20MHz_Chain1_5825MHz



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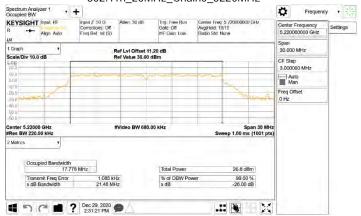


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802.11n_20MHz_Chain0_5180MHz



802.11n_20MHz_Chain0_5220MHz



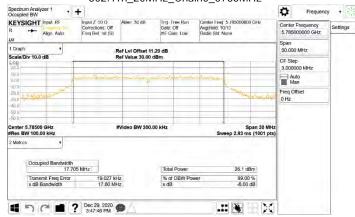
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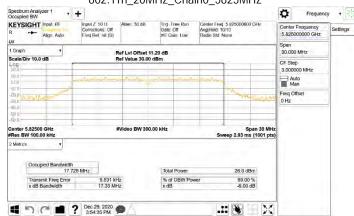
802.11n 20MHz Chain0 5745MHz



802.11n_20MHz_Chain0_5785MHz



802.11n_20MHz_Chain0_5825MHz



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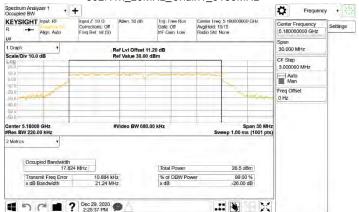
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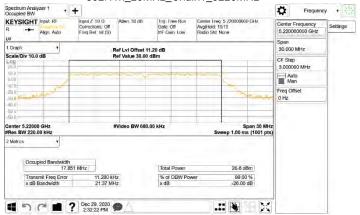


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802.11n_20MHz_Chain1_5180MHz



802.11n_20MHz_Chain1_5220MHz



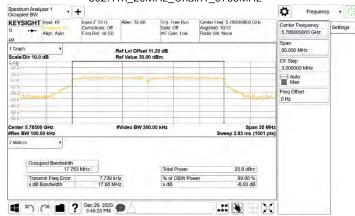
802.11n_20MHz_Chain1_5240MHz



802.11n 20MHz Chain1 5745MHz



802.11n_20MHz_Chain1_5785MHz



802.11n_20MHz_Chain1_5825MHz



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802.11n_20MHz_Chain2_5180MHz



802.11n_20MHz_Chain2_5220MHz



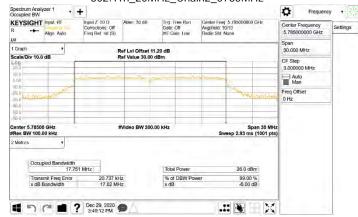
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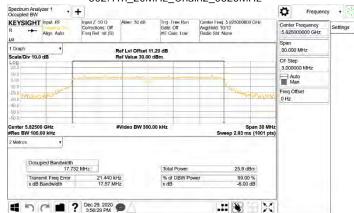
802.11n 20MHz Chain2 5745MHz



802.11n_20MHz_Chain2_5785MHz



802.11n_20MHz_Chain2_5825MHz



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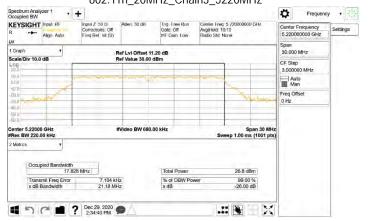


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802.11n_20MHz_Chain3_5180MHz



802.11n_20MHz_Chain3_5220MHz



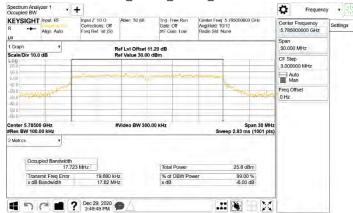
802.11n_20MHz_Chain3_5240MHz



802.11n 20MHz Chain3 5745MHz



802.11n_20MHz_Chain3_5785MHz



802.11n_20MHz_Chain3_5825MHz



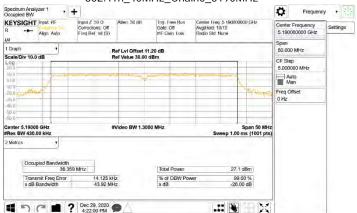
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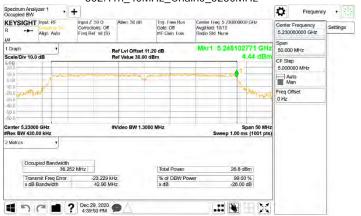


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802.11n_40MHz_Chain0_5190MHz



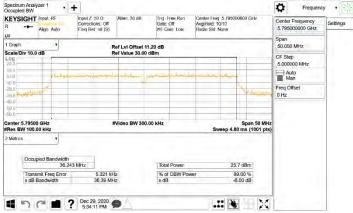
802.11n_40MHz_Chain0_5230MHz



802.11n_40MHz_Chain0_5755MHz



802.11n 40MHz Chain0 5795MHz



802.11n_40MHz_Chain1_5190MHz



802.11n_40MHz_Chain1_5230MHz



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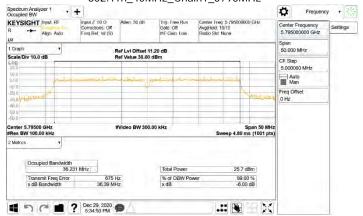


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802.11n_40MHz_Chain1_5755MHz



802.11n_40MHz_Chain1_5795MHz



802.11n_40MHz_Chain2_5190MHz



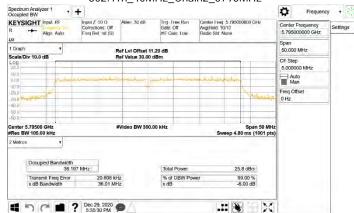
802.11n 40MHz Chain2 5230MHz



802.11n_40MHz_Chain2_5755MHz



802.11n_40MHz_Chain2_5795MHz



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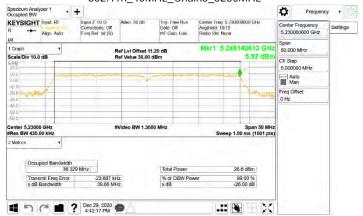


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802.11n_40MHz_Chain3_5190MHz



802.11n_40MHz_Chain3_5230MHz



802.11n_40MHz_Chain3_5755MHz



802.11n 40MHz Chain3 5795MHz



802.11ac_80MHz_Chain0_5210MHz



802.11ac_80MHz_Chain0_5775MHz



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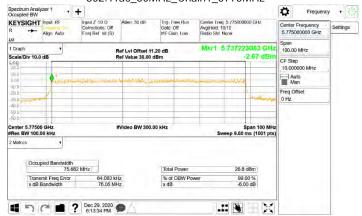


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802.11ac_80MHz_Chain1_5210MHz



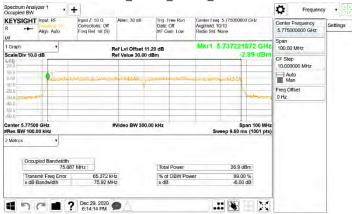
802.11ac_80MHz_Chain1_5775MHz



802.11ac_80MHz_Chain2_5210MHz



802.11ac 80MHz Chain2 5775MHz



802.11ac_80MHz_Chain3_5210MHz



802.11ac_80MHz_Chain3_5775MHz



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BW Verification for DFS Function 8.5.3

802.11a Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.31	< 5250
5745	5736.65	> 5725

802.11n HT20 Ch0

802.11n_HT20_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.94	< 5250
5745	5736.15	> 5725

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.93	< 5250
5745	5736.14	> 5725

802.11n_HT20_Ch2

802.11n_HT20_Ch3

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.95	< 5250
5745	5736.12	> 5725

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.89	< 5250
5745	5736.15	> 5725

802.11n _HT40_Ch0

802.11n _HT40_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.10	< 5250
5755	5736.88	> 5725

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.18	< 5250
5755	5736.87	> 5725

802.11n _HT40_Ch2

802.11n _HT40_Ch3

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.19	< 5250
5755	5736.87	> 5725

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.14	< 5250
5755	5736.87	> 5725

802.11ac _VHT80_Ch0

802.11ac _VHT80_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.54	< 5250
5775	5737.24	> 5725

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.66	< 5250
5775	5737.22	> 5725

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802.11ac VHT80 Ch2

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.80	< 5250
5775	5737.22	> 5725

802.11ac _VHT80_Ch3

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.78	< 5250
5775	5737.23	> 5725

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9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

FCC

OPERZTION Band		EUT CATEGORY	LIMIT
V		Access Point (Master device)	1 Watt(30dBm)
U-NII-1		Fixed point-to-point Access Ponit	1 Watt(30dBm)
		Mobile and portable client device	250mW(23.98dBm)
U-NII-2A			250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C			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, the Maximum transmit power shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

Note:

As per section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

• Directional Gain =
$$10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^{2}}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

 $g_{j,k} = /20$ 10Gk if the kth antenna is being fed by spatial stream j, or zero if it is not;

Gk is the gain in dBi of the kth antenna.

The antenna gain is grater than 6 dBi, therefore the power limit autenuation has been applied in the test results.

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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.
- 5. Record the max. reading and add 10 log(1/duty cycle).
- 6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

9.3 Measurement Equipment Used

	SGS Conducted Room											
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due							
Power Meter	Anritsu	ML2496A	1512003	07/23/2020	07/22/2021							
Power Sensor	Anritsu	MA2411B	1339378	07/23/2020	07/22/2021							
Power Sensor	Anritsu	MA2411B	1339379	07/23/2020	07/22/2021							
Attenuator	Marvelous	MVE2213-10	RF09	11/19/2020	11/18/2021							

9.4 Test Set-up



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9.5 Measurement Result

9.5.1Conducted output power (FCC)

802.11a Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	21.99	158.225	30	PASS
44	5220	6	21.97	157.498	30	PASS
48	5240	6	21.93	156.055	30	PASS
149	5745	6	21.92	155.696	30	PASS
157	5785	6	21.92	155.696	30	PASS
165	5825	6	21.89	154.624	30	PASS

802.11n_HT20_MIMO

СН	Frequency	equency Data	Avg. POWER (dBm)				TOTAL	TOTAL POWER	REQUIRED	RESULT
"	(MHz) Rate	Rate	CH 0	CH 1	CH 2	CH3	POWER (dBm)	(mW)	LIMIT (dBm)	RESULT
36	5180	MCS0	19.89	20.98	20.39	20.1	26.60	457.408	27.18	PASS
44	5220	MCS0	19.97	20.91	20.51	20.02	26.61	458.468	27.18	PASS
48	5240	MCS0	19.77	20.86	20.44	20.39	26.63	459.788	27.18	PASS
149	5745	MCS0	20.28	20.49	20.4	20.41	26.64	461.212	27.05	PASS
157	5785	MCS0	20.25	20.46	20.33	20.49	26.63	459.934	27.05	PASS
165	5825	MCS0	20.38	20.55	20.32	20.53	26.69	466.601	27.05	PASS

802.11n HT40 MIMO

СН	CH 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Data	Avg. POWER (dBm)			TOTAL POWER	TOTAL POWER	REQUIRED LIMIT	RESULT	
On On		Rate	CH 0	CH 1	CH 2	СНЗ	(dBm)	(mW)	(dBm)	KESSEI
38	5190	MCS0	16.51	17.12	17.05	16.84	23.32	214.614	27.18	PASS
46	5230	MCS0	19.81	20.47	20.08	20.18	26.57	454.110	27.18	PASS
151	5755	MCS0	15.51	15.78	15.01	15.13	21.80	151.304	27.05	PASS
159	5795	MCS0	19.29	19.38	18.88	19.22	25.63	365.322	27.05	PASS

802.11ac VHT80 MIMO

сн	Frequency	Data	Data		Avg. POWER (dBm)			TOTAL POWER	REQUIRED LIMIT	RESULT		
	(MHz)	Rate	CH 0	CH 1	CH 2	СНЗ	POWER (dBm)	(mW)	(dBm)	RESULT		
42	5210	MCS0	14.21	15.08	14.93	14.82	21.06	127.692	27.18	PASS		
155	5775	MCS0	14.13	14.56	14.34	14.51	20.68	116.884	27.05	PASS		

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10 MAXIMUM POWER SPECTRAL DENSITY

Standard Applicable 10.1

FCC

OPERZTION Band		EUT CATEGORY	LIMIT			
		Access Point (Master device)	17dBm/ MHz			
U-NII-1	Fixed point-to-point Access P		TAGDITI/ IVII IZ			
	√ Acc II-1 Fixed Mobil -2A -2C	Mobile and portable client 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, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note:

As per section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

• Directional Gain =
$$10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^{2}}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

 $g_{i,k} = /20$ 10Gk if the kth antenna is being fed by spatial stream j, or zero if it is not;

 \hat{G}_k is the gain in dBi of the kth antenna.

The antenna gain is grater than 6 dBi in MIMO mode, therefore the the power density limit autenuation has been applied in the test results.

10.2 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 .

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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)

For U-NII-3 Band:

Set RBW=300kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto, detector = RMS or sample, traces 100 sweeps of video averaging.

Set RBW=500kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto, detector = RMS or sample, traces 100 sweeps of video averaging.

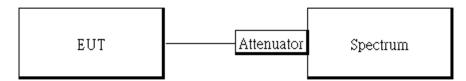
- 5. User the cursor on spectrum to peak search the highest level of trace
- **6.** Record the max. reading and add 10 log(1/duty cycle).
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.
- 8. MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna.

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

10.3 **Measurement Equipment Used**

	SGS Conducted Room										
Name of Equip- ment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due						
Spectrum Ana- lyzer	KEYSIGHT	N9010B	MY59071574	06/24/2020	06/23/2021						
Attenuator	Marvelous	MVE2213-10	RF09	11/19/2020	11/18/2021						
DC Block	PASTERNACK	PE8210	RF151	11/19/2020	11/18/2021						

10.4 **Test Set-up**



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10.5 **Measurement Result**

10.5.1 Power spectral density

		POWER DI	ENSITY 802.11a	MODE		
Frequency (MHz)	ch1 meas PSD (dBm/MHz)	Duty Factor (dB)		m Corr'd 3m/MHz)	Limit	Margin (dB)
5180.00	9.287	0.220	9.	51	17.00 dBm/MHz	-7.49
5220.00	8.022	0.220	8.	24	17.00 dBm/MHz	-8.76
5240.00	7.910	0.220	8.	13	17.00 dBm/MHz	-8.87
Frequency (MHz)	ch1 meas PSD (dBm/300kH z)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500 kHz)	Limit	Margin (dB)
5745.00	3.010	0.220	2.22	5.45	30.00 dBm/500kHz	-24.55
5785.00	2.262	0.220	2.22	4.70	30.00 dBm/500kHz	-25.30
5825.00	3.744	0.220	2.22	6.18	30.00 dBm/500kHz	-23.82

	POWER DENSITY 802.11n HT20 MODE											
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	ch1 meas PSD (dBm/MHz)	ch2 meas PSD (dBm/MHz)	ch3 meas PSD (dBm/MHz)	Duty Factor (dB)	Maxmum Corr'd PSD(dBm/MHz)		Limit	Margin (dB)			
5180.00	1.423	0.529	1.329	1.138	0.220	7.36		14.18 dBm/MHz	-6.82			
5220.00	-1.251	2.481	-0.268	3.030	0.220	7.60		14.18 dBm/MHz	-6.58			
5240.00	0.163	3.283	1.403	-0.025	0.220	7.	66	14.18 dBm/MHz	-6.52			
Frequency (MHz)	ch0 meas PSD (dBm/300kH z)	ch1 meas PSD (dBm/300kH z)	ch2 meas PSD (dBm/300kH z)	ch3 meas PSD (dBm/300k Hz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500 kHz)	Limit	Margin (dB)			
5745.00	0.646	0.341	1.518	-1.362	0.220	2.22	8.87	27.05 dBm/500kHz	-18.18			
5785.00	-3.095	-3.467	-2.950	-2.642	0.220	2.22	5.43	27.05 dBm/500kHz	-21.62			
5825.00	-3.546	1.007	-1.692	-1.723	0.220	2.22	7.29	27.05 dBm/500kHz	-19.76			

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	POWER DENSITY 802.11n HT40 MODE									
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	ch1 meas PSD (dBm/MHz)	ch2 meas PSD (dBm/MHz)	ch3 meas PSD (dBm/MHz)	Duty Factor (dB)		m Corr'd 3m/MHz)	Limit	Margin (dB)	
5190.00	-5.133	-3.374	-5.425	-5.874	0.410	1.	59	14.18 dBm/MHz	-12.59	
5230.00	-3.859	-6.609	-6.331	-4.114	0.410	1.	38	14.18 dBm/MHz	-12.80	
Frequency (MHz)	ch0 meas PSD (dBm/300kH z)	ch1 meas PSD (dBm/300kH z)	ch2 meas PSD (dBm/300kH z)	ch3 meas PSD (dBm/300k Hz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500 kHz)	Limit	Margin (dB)	
5755.00	-9.096	-10.036	-11.171	-10.280	0.410	2.22	-1.43	27.05 dBm/500kHz	-28.48	
5795.00	-5.977	-11.589	-9.067	-11.677	0.410	2.22	-0.26	27.05 dBm/500kHz	-27.31	

	POWER DENSITY 802.11ac VHT80 MODE									
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	ch1 meas PSD (dBm/MHz)	ch2 meas PSD (dBm/MHz)	ch3 meas PSD (dBm/MHz)	Duty Factor (dB)		m Corr'd 3m/MHz)	Limit	Margin (dB)	
5210.00	0.549	-2.295	-1.183	-1.356	0.270	5.	35	14.18 dBm/MHz	-8.83	
Frequency (MHz)	ch0 meas PSD (dBm/300kH z)	ch1 meas PSD (dBm/300kH z)	ch2 meas PSD (dBm/300kH z)	ch3 meas PSD (dBm/300k Hz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500 kHz)	Limit	Margin (dB)	
5775.00	-5.880	-6.193	-4.445	-6.671	0.270	2.22	2.80	27.05 dBm/500kHz	-24.25	

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802.11a_20MHz_Chain1_5180MHz



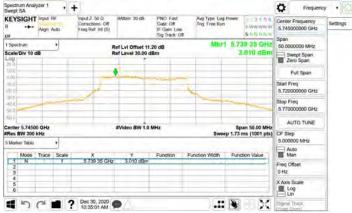
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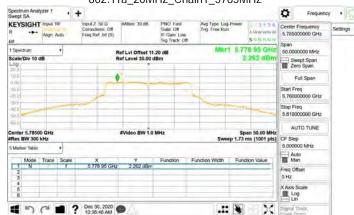
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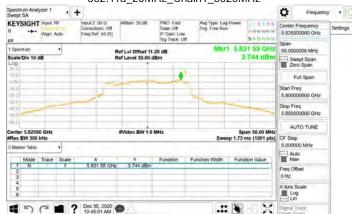
802.11a_20MHz_Chain1_5745MHz



802.11a_20MHz_Chain1_5785MHz



802.11a_20MHz_Chain1_5825MHz



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802.11n_20MHz_Chain0_5180MHz



802.11n_20MHz_Chain0_5220MHz



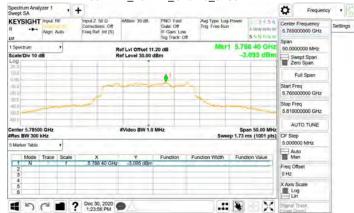
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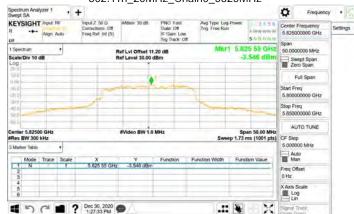
802.11n 20MHz Chain0 5745MHz



802.11n_20MHz_Chain0_5785MHz



802.11n_20MHz_Chain0_5825MHz



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802.11n_20MHz_Chain1_5180MHz



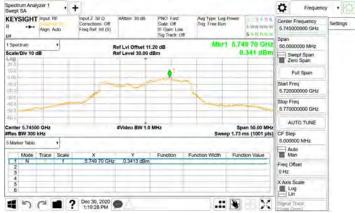
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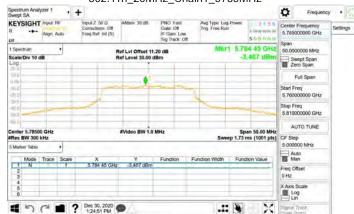
802.11n_20MHz_Chain1_5240MHz



802.11n_20MHz_Chain1_5745MHz



802.11n_20MHz_Chain1_5785MHz



802.11n_20MHz_Chain1_5825MHz



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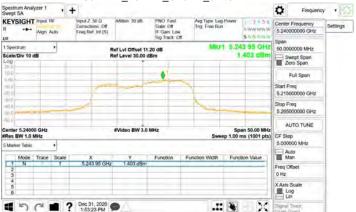
802.11n_20MHz_Chain2_5180MHz



802.11n_20MHz_Chain2_5220MHz



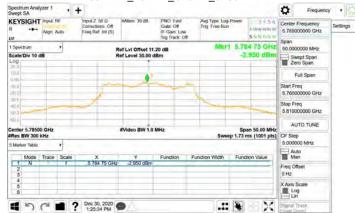
802.11n_20MHz_Chain2_5240MHz



802.11n 20MHz Chain2 5745MHz



802.11n_20MHz_Chain2_5785MHz



802.11n_20MHz_Chain2_5825MHz



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802.11n_20MHz_Chain3_5180MHz



802.11n_20MHz_Chain3_5220MHz



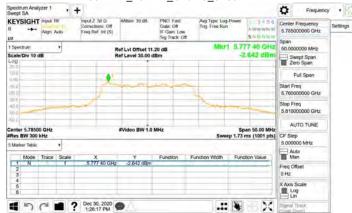
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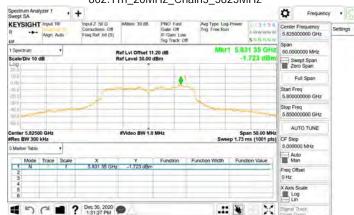
802.11n_20MHz_Chain3_5745MHz



802.11n_20MHz_Chain3_5785MHz



802.11n_20MHz_Chain3_5825MHz



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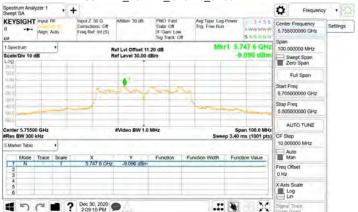
802.11n_40MHz_Chain0_5190MHz



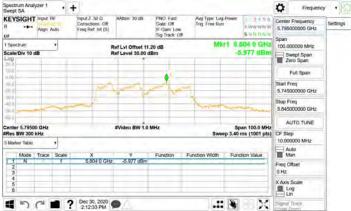
802.11n_40MHz_Chain0_5230MHz



802.11n_40MHz_Chain0_5755MHz



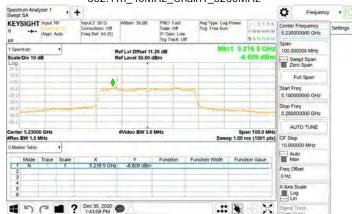
802.11n_40MHz_Chain0_5795MHz



802.11n_40MHz_Chain1_5190MHz



802.11n_40MHz_Chain1_5230MHz



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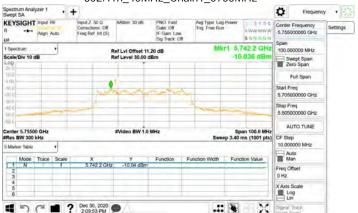
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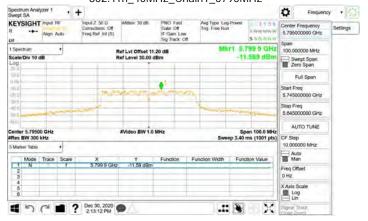


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802.11n_40MHz_Chain1_5755MHz



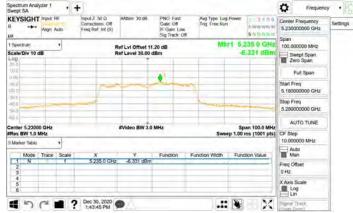
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802.11n_40MHz_Chain2_5190MHz



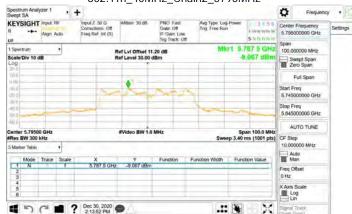
802.11n_40MHz_Chain2_5230MHz



802.11n_40MHz_Chain2_5755MHz



802.11n_40MHz_Chain2_5795MHz



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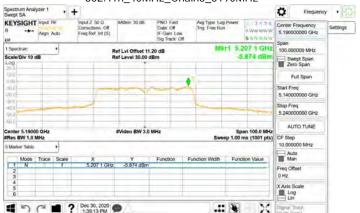
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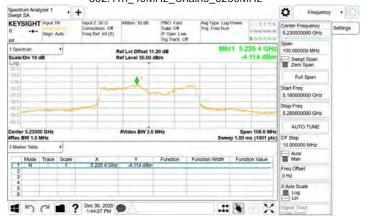


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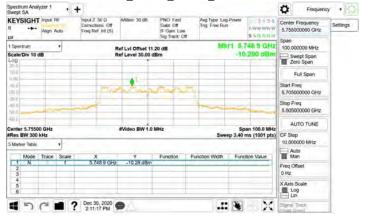
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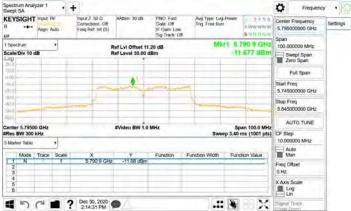
802.11n_40MHz_Chain3_5230MHz



802.11n_40MHz_Chain3_5755MHz



802.11n_40MHz_Chain3_5795MHz



802.11ac_80MHz_Chain0_5210MHz



802.11ac_80MHz_Chain0_5775MHz



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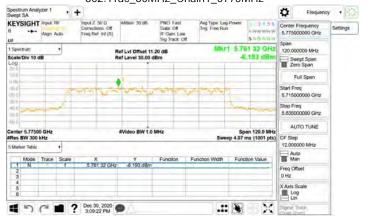


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802.11ac_80MHz_Chain1_5210MHz



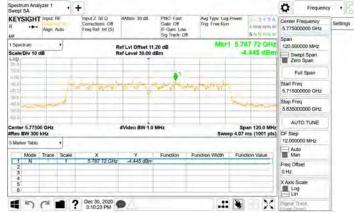
802.11ac_80MHz_Chain1_5775MHz



802.11ac_80MHz_Chain2_5210MHz



802.11ac 80MHz Chain2 5775MHz



802.11ac_80MHz_Chain3_5210MHz



802.11ac_80MHz_Chain3_5775MHz



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11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

Standard Applicable

11.1.1 Band Edge

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	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1) RSS-247 §6.2.1.2		
15.407(b)(2) RSS-247 §6.2.2.2	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)
15.407(b)(3) RSS-247 §6.2.3.2		
	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
RSS-247 §6.2.4.2	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.

 $EIRP = ((E^*d)^2) / 30$, 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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^{*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.



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11.1.2Spurious Emission

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

d citiesion intite specified de below table.						
Field strength (microvolts/meter)	Distance (meters)					
2400/F(KHz)	300					
24000/F(KHz)	30					
30	30					
100	3					
150	3					
200	3					
500	3					
	Field strength (microvolts/meter) 2400/F(KHz) 24000/F(KHz) 30 100 150 200					

Note:

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



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11.2 Measurement Equipment Used

and a second manufacture of the second manuf								
		SGS SAC-III						
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due			
Broadband An- tenna	TESEQ	CBL 6112D	35240	09/08/2020	09/07/2021			
Horn Antenna	Schwarzbeck	BBHA9120D	1341	06/22/2020	06/21/2021			
Horn Antenna	Schwarzbeck	BBHA9170	185	07/30/2020	07/29/2021			
Loop Antenna	ETS.LINDGREN	6502	143303	04/28/2020	04/27/2021			
3m Site NSA	SGS	966 chamber D	N/A	07/12/2020	07/11/2021			
Spectrum Ana- lyzer	KEYSIGHT	N9010A	MY54510568	07/08/2020	07/07/2021			
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/27/2020	10/26/2021			
Pre-Amplifier	EMC Instruments	EMC9135	980234	11/19/2020	11/18/2021			
Pre-Amplifier	EMC Instruments	EMC12630SE	980271	11/19/2020	11/18/2021			
Attenuator	Marvelous	WATT-218FS-10	RF25	11/19/2020	11/18/2021			
High Pass Filter	R&S	F13 HPF 3GHz	RF175	11/19/2020	11/18/2021			
Lowpass Filter	Woken	EWT-56-0019	RF173	11/19/2020	11/18/2021			
Notch Filter	Woken	EWT-54-0038	RF178	11/19/2020	11/18/2021			
Coaxial Cable	Huber Suhner	EMC106-SM-SM-7200	150703	11/19/2020	11/18/2021			
Coaxial Cable	Huber+Suhner	RG 214/U	W21.01	11/19/2020	11/18/2021			
Coaxial Cable	Huber Suhner	SUCOFLEX 104	MY17413/4	11/19/2020	11/18/2021			

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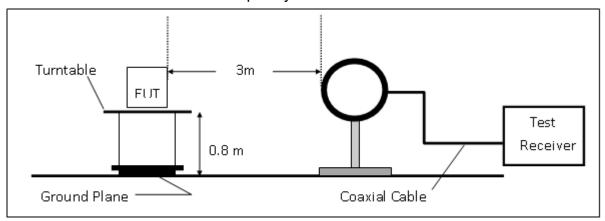
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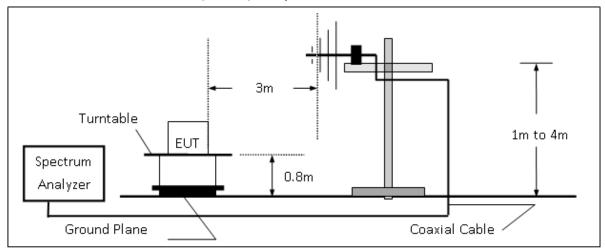
Page: 57 of 131

Test SET-UP

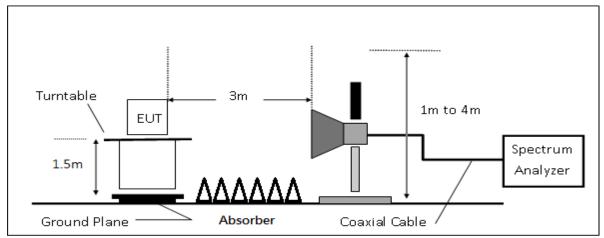
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



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



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11.4 **Measurement Procedure**

- The EUT was placed on a turn table which is 0.8m above ground plane.
- 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 frequency> 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.
- 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.
- At frequency above 1 GHz, Set the spectrum analyzer:
 - A. RBW=1 MHz, VBW=3 MHz for Peak Detector.
 - **B.** Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for **Average** Detector.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance. 8.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- **10.** Repeat above procedures until all frequency measured were complete.

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11.5 Field 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

The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

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

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.

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Radiated Spurious Emission Measurement Result

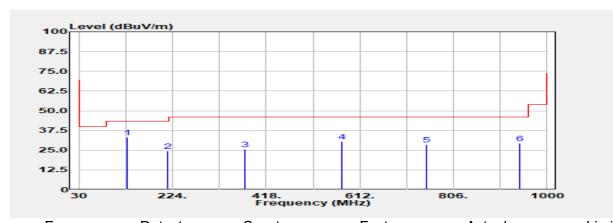
11.7.1 Below 1GHz Worst-Case Data:

Test Site Report Number :966 Chamber D :E2/2020/B0037

:802.11a / Band 1 Test Date :2020-12-25 Operation Mode

Test Frequency Temp./Humi. :20.3/66 :5220 MHz Test Mode :TX CH MID Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
129.487	Peak	51.60	-18.33	33.27	43.50	-10.23
214.984	Peak	44.27	-19.92	24.35	43.50	-19.15
375.096	Peak	40.24	-14.52	25.72	46.00	-20.28
575.625	Peak	41.70	-11.00	30.70	46.00	-15.30
749.728	Peak	36.48	-7.66	28.82	46.00	-17.18
944.039	Peak	34.19	-4.79	29.40	46.00	-16.60

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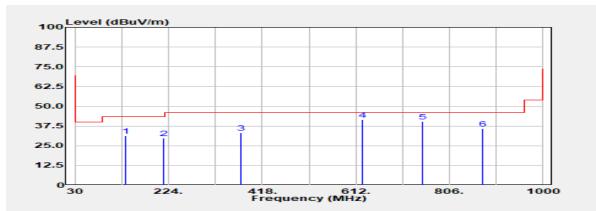
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2020-12-25

Test Frequency :5220 MHz Temp./Humi. :20.3/66

:TX CH MID Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBμV/m	dBμV/m	dB
134.151	Peak	49.45	-17.96	31.48	43.50	-12.02
214.984	Peak	49.73	-19.92	29.81	43.50	-13.69
375.096	Peak	47.69	-14.52	33.17	46.00	-12.83
625.369	Peak	50.54	-9.21	41.33	46.00	-4.67
749.728	Peak	47.93	-7.66	40.27	46.00	-5.73
875.641	Peak	42.12	-6.25	35.87	46.00	-10.13

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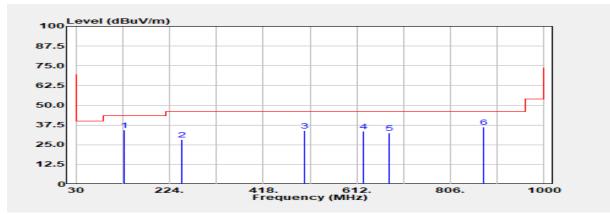
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2020-12-25

Test Frequency :5785 MHz Temp./Humi. :20.3/66

:TX CH MID Antenna Pol. Test Mode :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
129.487	Peak	52.86	-18.33	34.53	43.50	-8.97
249.183	Peak	46.50	-18.14	28.35	46.00	-17.65
504.119	Peak	45.48	-11.66	33.82	46.00	-12.18
625.369	Peak	42.72	-9.21	33.50	46.00	-12.50
679.776	Peak	40.55	-8.23	32.32	46.00	-13.68
875.641	Peak	42.34	-6.25	36.09	46.00	-9.91

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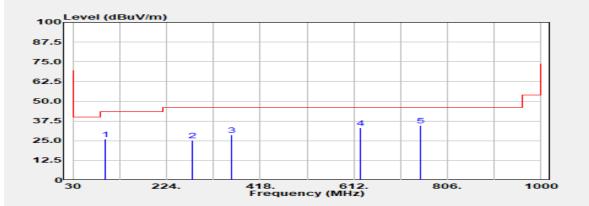
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2020-12-25

Test Frequency :5785 MHz Temp./Humi. :20.3/66

:TX CH MID Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμV	dB	dΒμV/m	dBµV/m	dB
	96.843	Peak	48.43	-22.52	25.91	43.50	-17.59
	277.164	Peak	42.10	-16.73	25.38	46.00	-20.62
	359.551	Peak	43.51	-14.99	28.52	46.00	-17.48
	625.369	Peak	42.43	-9.21	33.22	46.00	-12.78
	749.728	Peak	42.28	-7.66	34.62	46.00	-11.38

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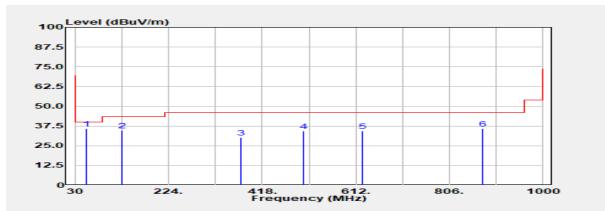
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2020-12-25

Test Frequency :5210 MHz Temp./Humi. :20.3/66 :TX CH LOW Antenna Pol. Test Mode :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBμV/m	dB
53.317	Peak	53.33	-17.65	35.68	40.00	-4.32
126.378	Peak	53.27	-18.67	34.60	43.50	-8.90
375.096	Peak	44.64	-14.52	30.12	46.00	-15.88
504.119	Peak	45.89	-11.66	34.23	46.00	-11.77
625.369	Peak	43.58	-9.21	34.37	46.00	-11.63
875.641	Peak	41.97	-6.25	35.72	46.00	-10.28

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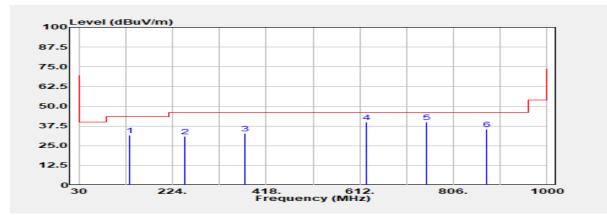
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2020-12-25

Test Frequency :5210 MHz Temp./Humi. :20.3/66

:TX CH LOW Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBμV/m	dBμV/m	dB
135.705	Peak	49.33	-17.77	31.55	43.50	-11.95
249.183	Peak	49.10	-18.14	30.96	46.00	-15.04
375.096	Peak	47.39	-14.52	32.87	46.00	-13.13
625.369	Peak	49.31	-9.21	40.09	46.00	-5.91
749.728	Peak	47.70	-7.66	40.04	46.00	-5.96
875.641	Peak	41.89	-6.25	35.64	46.00	-10.36

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Test Mode

Report No.: E2/2020/B0037-01

:Vertical

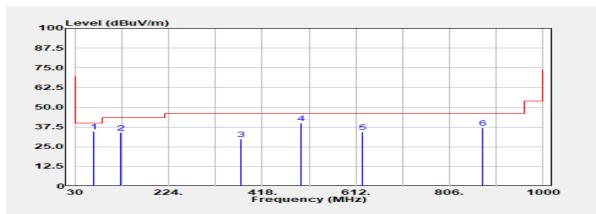
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2020-12-25

Test Frequency :5775 MHz Temp./Humi. :20.3/66 :TX CH MID Antenna Pol.

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dΒμV/m	dB
68.862	Peak	53.51	-18.83	34.69	40.00	-5.31
124.824	Peak	52.90	-18.84	34.05	43.50	-9.45
375.096	Peak	44.16	-14.52	29.64	46.00	-16.36
499.455	Peak	52.20	-12.08	40.12	46.00	-5.88
625.369	Peak	43.70	-9.21	34.49	46.00	-11.51
875.641	Peak	43.41	-6.25	37.17	46.00	-8.83

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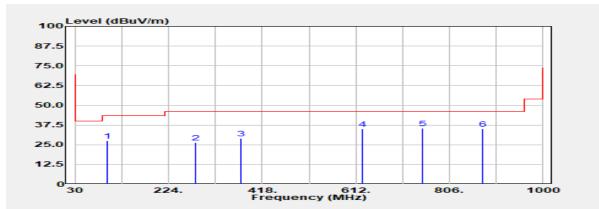
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2020-12-25

Test Frequency :5775 MHz Temp./Humi. :20.3/66

Test Mode :TX CH MID Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
96.843	Peak	50.13	-22.52	27.61	43.50	-15.89
280.272	Peak	42.90	-16.46	26.45	46.00	-19.55
375.096	Peak	43.69	-14.52	29.17	46.00	-16.83
625.369	Peak	44.46	-9.21	35.25	46.00	-10.75
749.728	Peak	43.13	-7.66	35.47	46.00	-10.53
875.641	Peak	41.46	-6.25	35.21	46.00	-10.79

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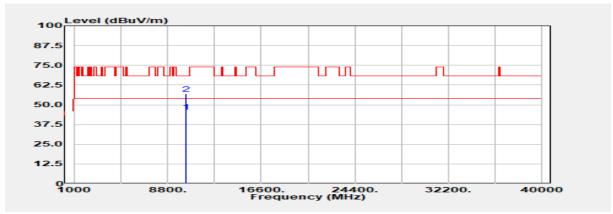
11.7.2 Above 1GHz Worst-Case Data:

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5180 MHz Temp./Humi. :21.3/61
Test Mode :TX CH LOW Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10360.000	Average	37.69	7.86	45.54	54.00	-8.46
10360.000	Peak	48.94	7.86	56.80	68.20	-11.40

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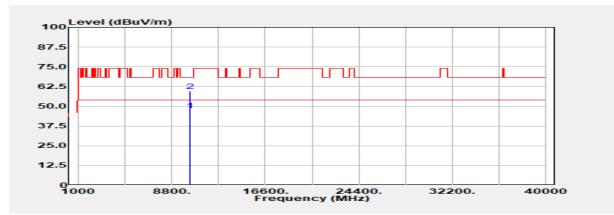
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5180 MHz Temp./Humi. :21.3/61

:TX CH LOW Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10360.000	Average	39.81	7.86	47.67	54.00	-6.33
10360.000	Peak	51.80	7.86	59.66	68.20	-8.54

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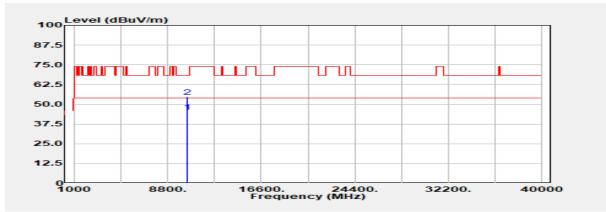
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5220 MHz Temp./Humi. :21.3/61

Test Mode :TX CH MID Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
10440.000	Average	37.38	7.95	45.33	54.00	-8.67
10440.000	Peak	46.87	7.95	54.82	68.20	-13.38

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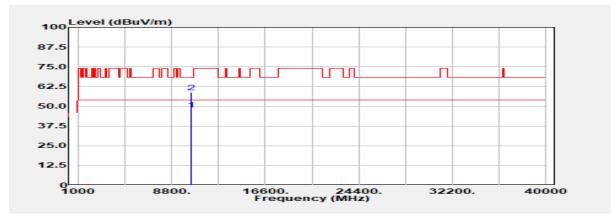
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5220 MHz Temp./Humi. :21.3/61

:TX CH MID Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10440.000	Average	40.00	7.95	47.94	54.00	-6.06
10440.000	Peak	50.80	7.95	58.75	68.20	-9.45

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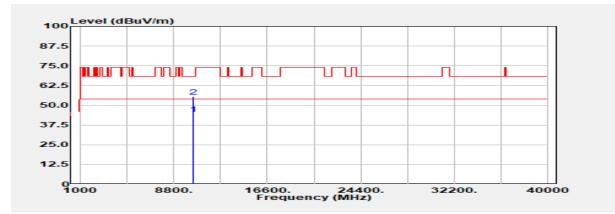
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5240 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10480.000	Average	37.43	7.28	44.71	54.00	-9.29
10480.000	Peak	48.18	7.28	55.46	68.20	-12.74

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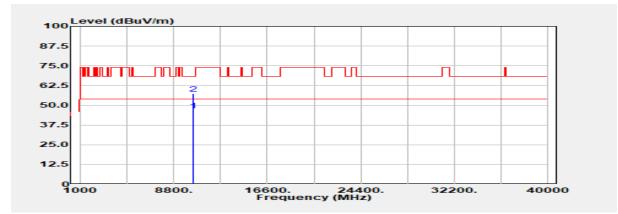
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2021-01-06

Test Frequency :5240 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBμV/m	dB
10480.000	Average	39.66	7.28	46.94	54.00	-7.06
10480.000	Peak	50.23	7.28	57.51	68.20	-10.69

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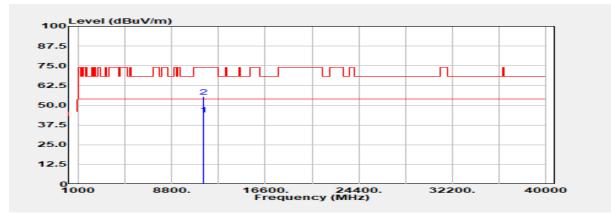
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5745 MHz Temp./Humi. :21.3/61

Test Mode :TX CH LOW Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
11490.000	Average	35.23	8.99	44.22	54.00	-9.78
11490.000	Peak	46.31	8.99	55.30	74.00	-18.70

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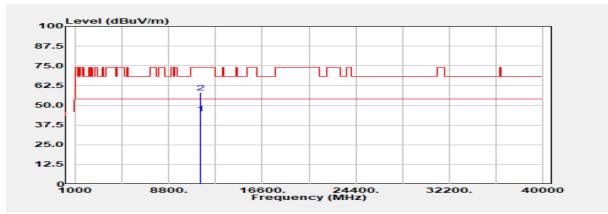
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5745 MHz Temp./Humi. :21.3/61

:TX CH LOW Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
11490.000	Average	35.95	8.99	44.94	54.00	-9.06
11490.000	Peak	49.09	8.99	58.07	74.00	-15.93

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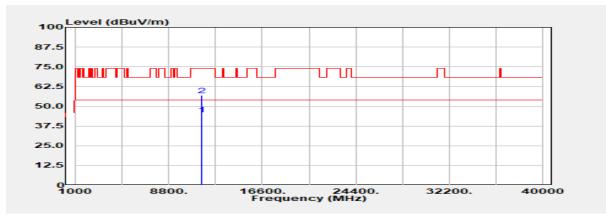
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5785 MHz Temp./Humi. :21.3/61

Test Mode :TX CH MID Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBμV/m	dΒμV/m	dB
11570.00	0 Average	36.25	8.65	44.90	54.00	-9.10
11570.00	0 Peak	48.22	8.65	56.87	74.00	-17.13

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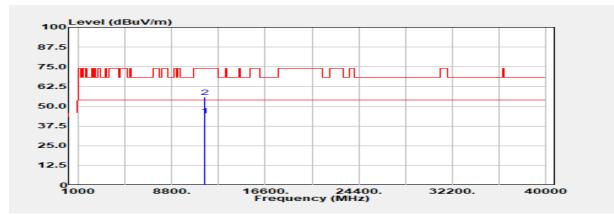
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5785 MHz Temp./Humi. :21.3/61

:TX CH MID Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBµV/m	dB
11570.000) Average	35.39	8.65	44.04	54.00	-9.96
11570.000) Peak	47.19	8.65	55.84	74.00	-18.16

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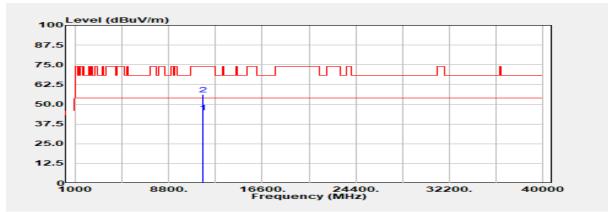
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5825 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
11650.000	Average	36.98	8.07	45.05	54.00	-8.95
11650.000	Peak	48.21	8.07	56.28	74.00	-17.72

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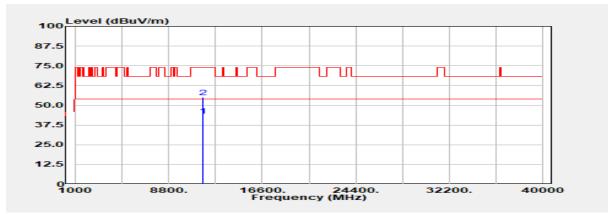
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-06

Test Frequency :5825 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBμV/m	dB
11650.000	Average	35.22	8.07	43.29	54.00	-10.71
11650.000	Peak	46.84	8.07	54.91	74.00	-19.09

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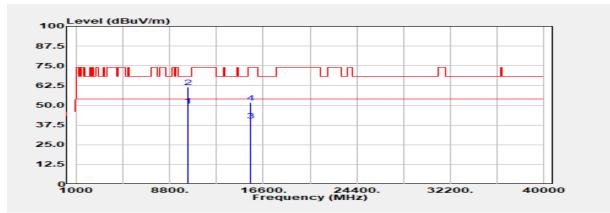
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5180 MHz Temp./Humi. :22.5/70

Test Mode :TX CH LOW Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
10360.000	Average	41.79	7.86	49.65	54.00	-4.35
10360.000	Peak	53.80	7.86	61.66	68.20	-6.54
15540.000	Average	33.78	6.42	40.20	54.00	-13.80
15540.000	Peak	45.43	6.42	51.85	74.00	-22.15

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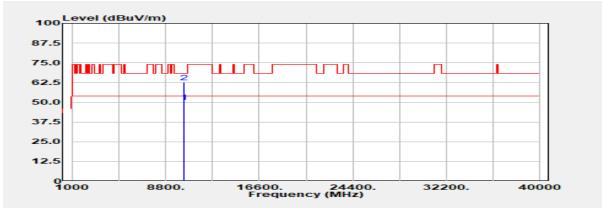
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5180 MHz Temp./Humi. :22.5/70

Test Mode :TX CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10360.000	Average	42.46	7.86	50.32	54.00	-3.68
10360.000	Peak	54.63	7.86	62.49	68.20	-5.71

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Test Mode

Report No.: E2/2020/B0037-01

:Vertical

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Antenna Pol.

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5220 MHz Temp./Humi. :22.5/70

:TX CH MID

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dΒμV/m	dB
10440.000	Average	40.95	7.95	48.89	54.00	-5.11
10440.000	Peak	51.03	7.95	58.98	68.20	-9.22
15660.000	Average	37.45	6.36	43.81	54.00	-10.19
15660.000	Peak	48.68	6.36	55.04	74.00	-18.96

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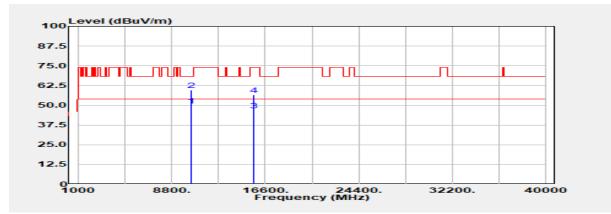
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5220 MHz Temp./Humi. :22.5/70

:TX CH MID Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
10440.000	Average	41.76	7.95	49.71	54.00	-4.29
10440.000	Peak	51.84	7.95	59.79	68.20	-8.41
15660.000	Average	40.61	6.36	46.97	54.00	-7.03
15660.000	Peak	50.43	6.36	56.79	74.00	-17.21

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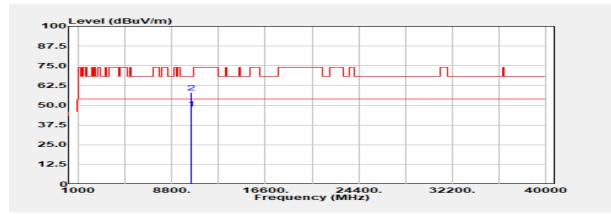
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5240 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBμV/m	dB
10480.000	Average	40.53	7.28	47.80	54.00	-6.20
10480.000	Peak	50.78	7.28	58.06	68.20	-10.14

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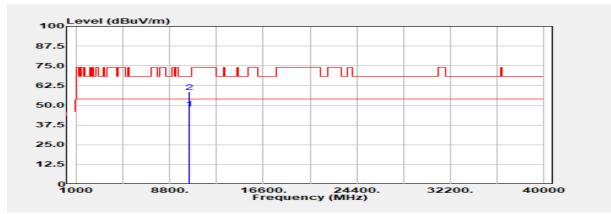
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2021-01-06

Test Frequency :5240 MHz Temp./Humi. :21.3/61

:TX CH HIGH Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBμV/m	dB
10480.000	Average	40.72	7.28	48.00	54.00	-6.00
10480.000	Peak	51.04	7.28	58.32	68.20	-9.88

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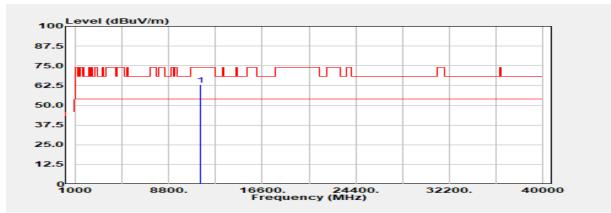
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5745 MHz Temp./Humi. :21.3/61

:TX CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
	11490.000	Peak	54.13	8.99	63.12	74.00	-10.88

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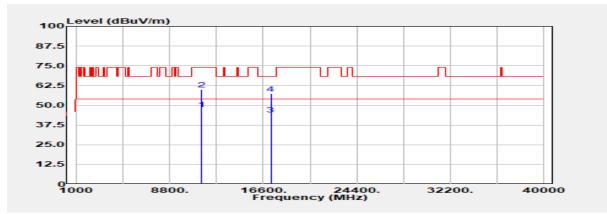
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5745 MHz Temp./Humi. :21.3/61

Test Mode :TX CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dΒμV/m	dB
11490.000	Average	38.63	8.99	47.62	54.00	-6.38
11490.000	Peak	51.05	8.99	60.04	74.00	-13.96
17235.000	Average	34.25	9.83	44.08	54.00	-9.92
17235.000	Peak	47.43	9.83	57.25	68.20	-10.95

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Test Mode

Report No.: E2/2020/B0037-01

:Vertical

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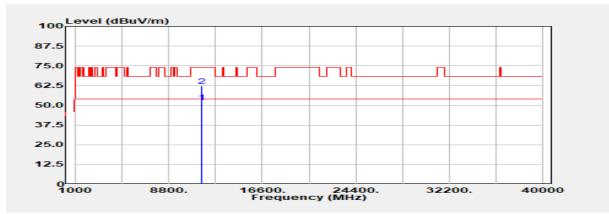
Antenna Pol.

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5785 MHz Temp./Humi. :21.3/61 :TX CH MID

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dBμV/m	dB
11570.000	Average	43.28	8.65	51.92	54.00	-2.08
11570.000	Peak	53.68	8.65	62.32	74.00	-11.68

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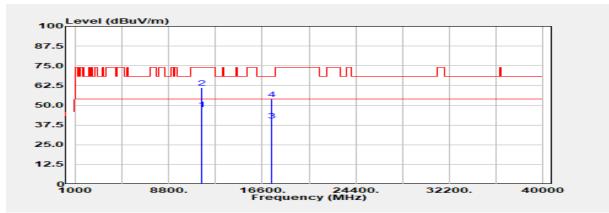
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5785 MHz Temp./Humi. :21.3/61

:TX CH MID Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
11570.000	Average	38.87	8.65	47.51	54.00	-6.49
11570.000	Peak	52.38	8.65	61.03	74.00	-12.97
17355.000	Average	29.73	10.62	40.35	54.00	-13.65
17355.000	Peak	43.33	10.62	53.95	68.20	-14.25

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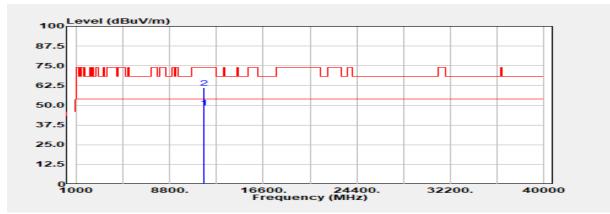
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5825 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
11650.000	Average	40.72	8.07	48.79	54.00	-5.21
11650.000	Peak	52.97	8.07	61.04	74.00	-12.96

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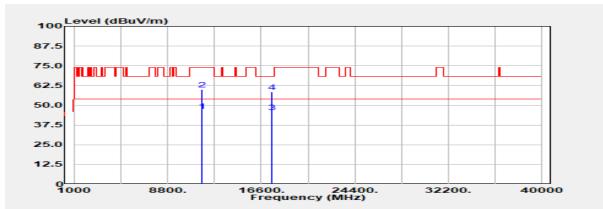
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-07

Test Frequency :5825 MHz Temp./Humi. :21.3/61

Test Mode :TX CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
11650.000	Average	38.47	8.07	46.54	54.00	-7.46
11650.000	Peak	51.94	8.07	60.01	74.00	-13.99
17480.000	Average	33.85	11.75	45.60	54.00	-8.40
17480.000	Peak	46.56	11.75	58.31	68.20	-9.89

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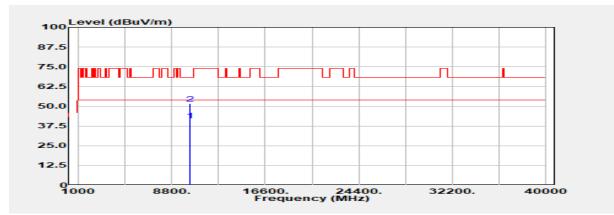
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 1 Test Date :2021-01-07

Test Frequency :5190 MHz Temp./Humi. :20.8/62 :TX CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
	10380.000	Average	33.23	7.88	41.11	54.00	-12.89
	10380.000	Peak	43.89	7.88	51.76	68.20	-16.44

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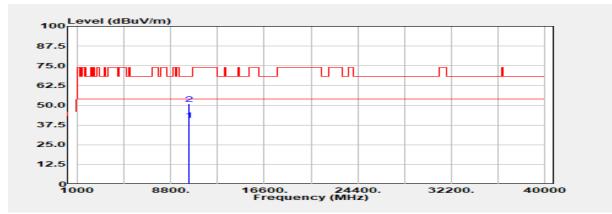
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 1 Test Date :2021-01-07

Test Frequency :5190 MHz Temp./Humi. :20.8/62

Test Mode :TX CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10380.000	Average	32.83	7.88	40.71	54.00	-13.29
10380.000	Peak	43.20	7.88	51.08	68.20	-17.12

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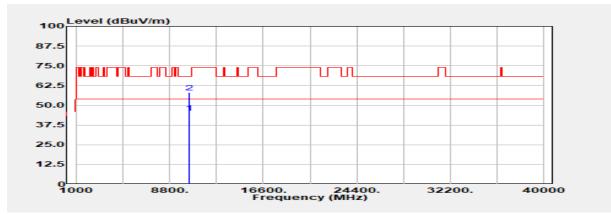
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 1 Test Date :2021-01-07

Test Frequency :5230 MHz Temp./Humi. :20.8/62

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10460.000	Average	37.63	7.73	45.36	54.00	-8.64
10460.000	Peak	50.32	7.73	58.06	68.20	-10.14

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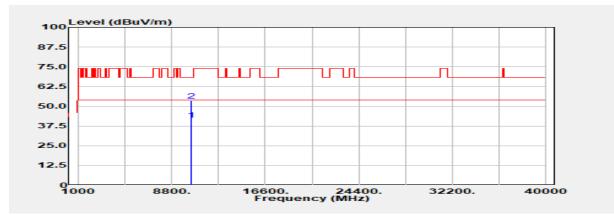
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Operation Mode :802.11n40 / Band 1 Test Date :2021-01-07

Test Frequency :5230 MHz Temp./Humi. :20.8/62

Test Mode :TX CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
 MHz	PK/QP/AV	dΒμ̈V	dB	dBµV/m	dΒμV/m	dB
10460.000	Average	33.84	7.73	41.57	54.00	-12.43
10460.000	Peak	45.77	7.73	53.51	68.20	-14.69

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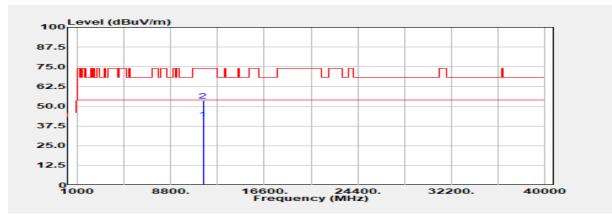
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-07

Test Frequency :5755 MHz Temp./Humi. :20.8/62
Test Mode :TX CH MID Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



I	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
	MHz	PK/QP/AV	dΒμ̈V	dB	dBμV/m	dBμV/m	dB
115	510.000	Average	32.90	9.05	41.95	54.00	-12.05
115	510.000	Peak	44.68	9.05	53.73	74.00	-20.27

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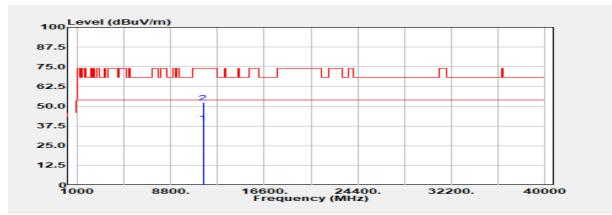
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-07

Test Frequency :5755 MHz Temp./Humi. :20.8/62

Test Mode :TX CH MID Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμ̈V	dB	dΒμV/m	dΒμV/m	dB
	11510.000	Average	30.62	9.05	39.66	54.00	-14.34
	11510.000	Peak	43.44	9.05	52.49	74.00	-21.51

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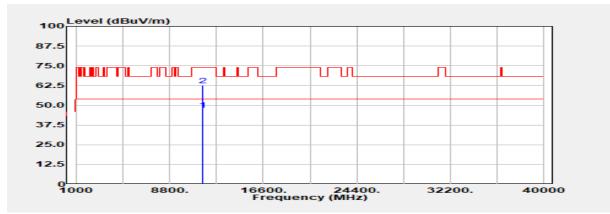
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-07

Test Frequency :5795 MHz Temp./Humi. :20.8/62

Test Mode :TX CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
11590.000	Average	38.91	8.44	47.35	54.00	-6.65
11590.000	Peak	54.33	8.44	62.77	74.00	-11.23

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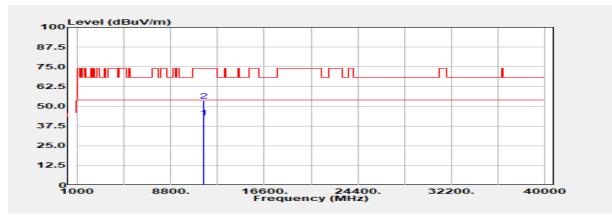
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-07

Test Frequency :5795 MHz Temp./Humi. :20.8/62

:TX CH HIGH Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμ̈V	dB	dΒμV/m	dΒμV/m	dB
_							
	11590.000	Average	34.46	8.44	42.90	54.00	-11.10
	11590.000	Peak	45.11	8.44	53.54	74.00	-20.46

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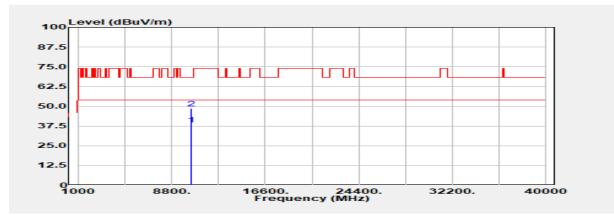
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2021-01-07

Test Frequency :5210 MHz Temp./Humi. :20.8/62 :TX CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμ̈V	dB	dΒμV/m	dΒμV/m	dB
_							
	10420.000	Average	30.59	7.92	38.51	54.00	-15.49
	10420.000	Peak	40.86	7.92	48.78	68.20	-19.42

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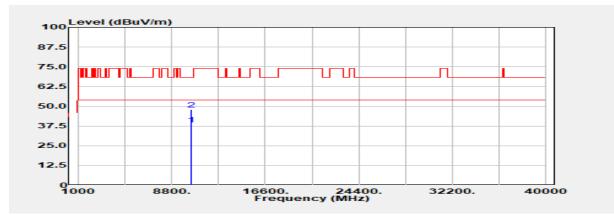
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2021-01-07

Test Frequency :5210 MHz Temp./Humi. :20.8/62

:TX CH LOW Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
10420.000	Average	30.63	7.92	38.55	54.00	-15.45
10420.000	Peak	40.09	7.92	48.01	68.20	-20.19

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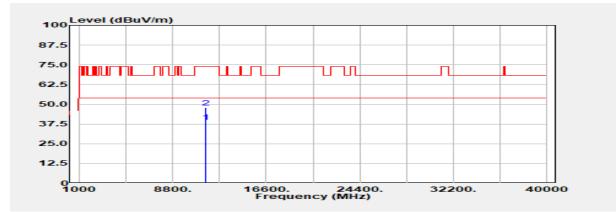
Report Number :E2/2020/B0037 Test Site :966 Chamber D

:802.11ac80 / Band 4 Operation Mode Test Date :2021-01-08

Test Frequency :5775 MHz Temp./Humi. : 22.5/67

: TX CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
11550.000	Average	29.95	8.86	38.81	54.00	-15.19
11550.000	Peak	38.90	8.86	47.76	74.00	-26.24

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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2021-01-08

Test Frequency :5775 MHz Temp./Humi. : 22.5/67

Test Mode : TX CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBμV/m	dBμV/m	dB
11550.000	Average	29.95	8.86	38.81	54.00	-15.19
11550.000	Peak	40.09	8.86	48.94	74.00	-25.06

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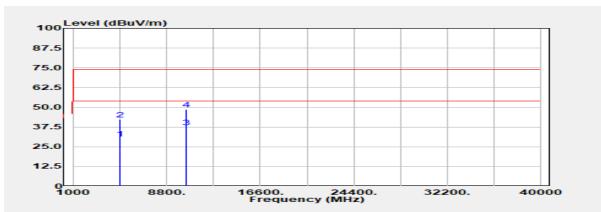
Simultaneous

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Test Date :2021-02-22 Operation Mode :802.11b&802.11a/Band 1

Test Frequency :2437 MHZ/5220 MHz Temp./Humi. :21.1/49 Test Mode :TX CH MID Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Jack Tseng



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.000	Average	33.37	-3.00	30.37	54.00	-23.63
4874.000	Peak	45.12	-3.00	42.12	74.00	-31.88
10440.000	Average	29.38	7.95	37.33	54.00	-16.67
10440.000	Peak	40.65	7.95	48.60	74.00	-25.40

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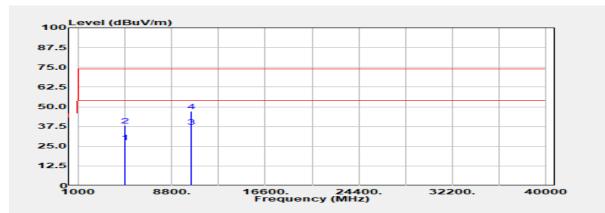
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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11b&802.11a/Band 1 Test Date :2021-02-22

Test Frequency :2437 MHZ/5220 MHz Temp./Humi. :21.1/49

Test Mode :TX CH MID Antenna Pol. :Horizontal EUT Pol :H Plan Engineer :Jack Tseng



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.000	Average	30.41	-3.00	27.41	54.00	-26.59
4874.000	Peak	41.07	-3.00	38.07	74.00	-35.93
10440.000	Average	29.46	7.95	37.40	54.00	-16.60
10440.000	Peak	39.26	7.95	47.21	74.00	-26.79

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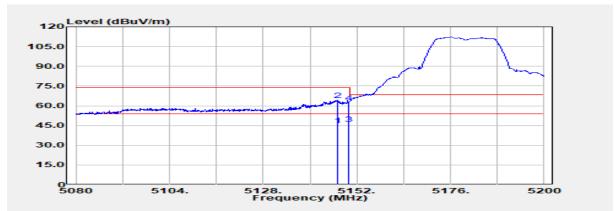
11.7.3 Band edge falling to restricted band

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2020-12-26

Test Frequency :5180 MHz Temp./Humi. :22.5/63
Test Mode :BE CH LOW Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBμV/m	dB
5147.200	Average	47.84	-2.39	45.45	54.00	-8.55
5147.200	Peak	66.57	-2.39	64.18	74.00	-9.82
5150.000	Average	48.51	-2.43	46.08	54.00	-7.92
5150.000	Peak	65.06	-2.43	62.63	74.00	-11.37

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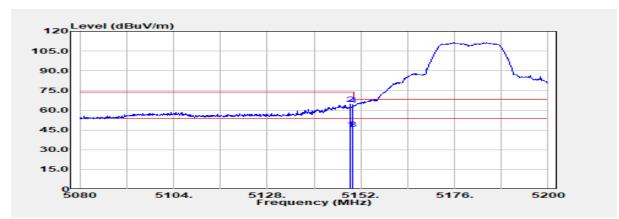
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 1 Test Date :2020-12-26

Test Frequency :5180 MHz Temp./Humi. :22.5/63

:BE CH LOW Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dΒμV/m	dB
						_
5149.240	Average	47.97	-2.42	45.55	54.00	-8.45
5149.240	Peak	67.00	-2.42	64.58	74.00	-9.42
5150.000	Average	48.17	-2.43	45.74	54.00	-8.26
5150.000	Peak	66.56	-2.43	64.13	74.00	-9.87

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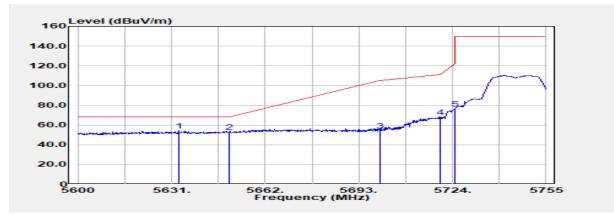
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-08

Test Frequency :5745 MHz Temp./Humi. :22.9/66

:BE CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5633.480	Peak	56.08	-2.04	54.04	68.20	-14.16
5650.000	Peak	55.00	-2.00	53.00	68.20	-15.20
5700.000	Peak	56.69	-2.17	54.53	105.20	-50.67
5720.000	Peak	70.11	-1.70	68.42	110.80	-42.38
5725.000	Peak	78.80	-1.98	76.82	122.20	-45.38

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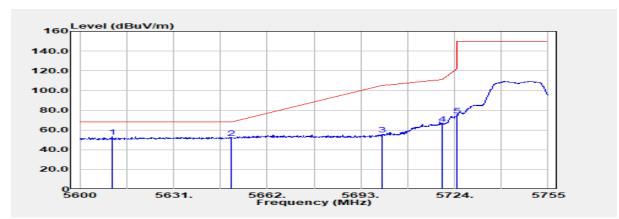
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-08

Test Frequency :5745 MHz Temp./Humi. : 22.9/66

Test Mode :BE CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
5610.540	Peak	55.60	-2.37	53.23	68.20	-14.97
5650.000	Peak	53.81	-2.00	51.81	68.20	-16.39
5700.000	Peak	57.53	-2.17	55.37	105.20	-49.83
5720.000	Peak	67.97	-1.70	66.27	110.80	-44.53
5725.000	Peak	77.08	-1.98	75.10	122.20	-47.10

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Test Mode

Report No.: E2/2020/B0037-01

:Vertical

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Antenna Pol.

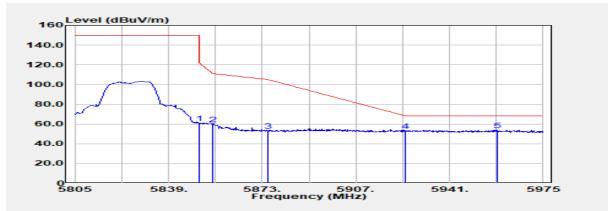
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-08

Test Frequency :5825 MHz Temp./Humi. : 22.9/66

:BE CH HIGH

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dΒμV/m	dΒμV/m	dB
5850.000	Peak	62.64	-1.57	61.07	122.20	-61.13
5855.000	Peak	61.37	-1.42	59.95	110.80	-50.85
5875.000	Peak	54.28	-1.42	52.86	105.20	-52.34
5925.000	Peak	54.34	-0.99	53.35	68.20	-14.85
5958.340	Peak	54.61	-0.79	53.82	68.20	-14.38

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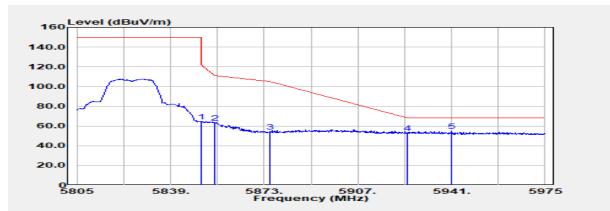
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11a / Band 4 Test Date :2021-01-08

Test Frequency :5825 MHz Temp./Humi. :22.9/66

Test Mode :BE CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5850.000	Peak	65.91	-1.57	64.34	122.20	-57.86
5855.000	Peak	64.93	-1.42	63.51	110.80	-47.29
5875.000	Peak	55.58	-1.42	54.16	105.20	-51.04
5925.000	Peak	54.08	-0.99	53.09	68.20	-15.11
5941.000	Peak	55.87	-1.23	54.65	68.20	-13.55

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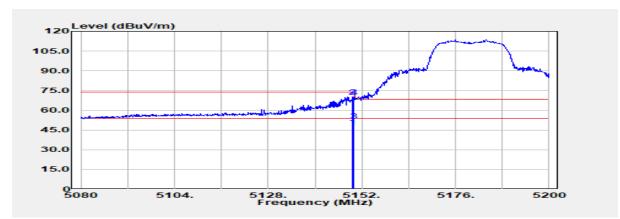
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2020-12-26

Test Frequency :5180 MHz Temp./Humi. :22.5/63

Test Mode :BE CH LOW Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dΒμV/m	dB
5149.720	Average	49.76	-2.42	47.33	54.00	-6.67
5149.720	Peak	72.74	-2.42	70.32	74.00	-3.68
5150.000	Average	54.57	-2.43	52.14	54.00	-1.86
5150.000	Peak	72.40	-2.43	69.97	74.00	-4.03

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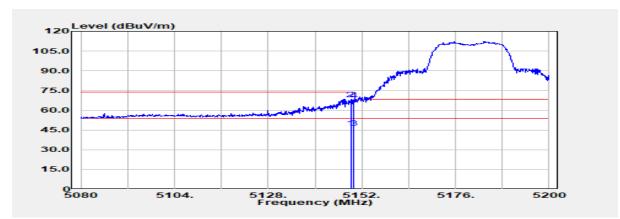
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 1 Test Date :2020-12-26

Test Frequency :5180 MHz Temp./Humi. :22.5/63

:BE CH LOW Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dΒμV/m	dB
						_
5149.120	Average	49.02	-2.42	46.60	54.00	-7.40
5149.120	Peak	70.93	-2.42	68.51	74.00	-5.49
5150.000	Average	49.19	-2.43	46.76	54.00	-7.24
5150.000	Peak	70.41	-2.43	67.98	74.00	-6.02

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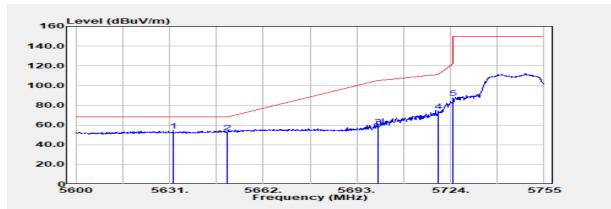
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-08

Test Frequency :5745 MHz Temp./Humi. :20.2/60

:BE CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dΒμV/m	dBµV/m	dB
5632.240	Peak	56.31	-2.02	54.30	68.20	-13.90
5650.000	Peak	54.83	-2.00	52.83	68.20	-15.37
5700.000	Peak	60.57	-2.17	58.40	105.20	-46.80
5720.000	Peak	75.75	-1.70	74.05	110.80	-36.75
5725.000	Peak	89.44	-1.98	87.47	122.20	-34.73

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:H Plan

EUT Pol

Report No.: E2/2020/B0037-01

:Kailin Lee

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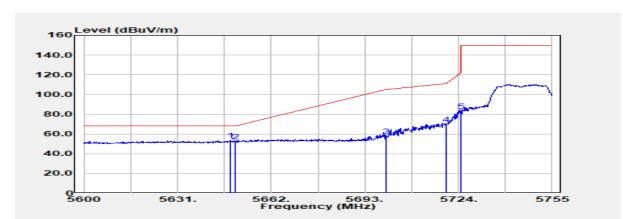
Engineer

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 **Test Date** :2021-01-08

Test Frequency :5745 MHz Temp./Humi. :20.2/60

:BE CH LOW Test Mode Antenna Pol. :Horizontal



Fre	∋q.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MH	Hz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
							_
5648	3.670	Peak	55.72	-2.02	53.70	68.20	-14.50
5650	0.000	Peak	54.82	-2.00	52.82	68.20	-15.38
5700	0.000	Peak	60.24	-2.17	58.07	105.20	-47.13
5720	0.000	Peak	71.57	-1.70	69.87	110.80	-40.93
5725	5.000	Peak	85.26	-1.98	83.28	122.20	-38.92

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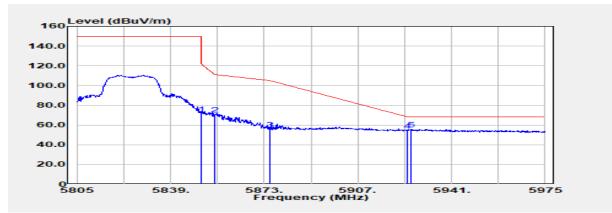
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-08

Test Frequency :5825 MHz Temp./Humi. : 20.2/60

Antenna Pol. Test Mode :BE CH HIGH :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5850.000	Peak	72.63	-1.57	71.06	122.20	-51.14
5855.000	Peak	71.88	-1.42	70.46	110.80	-40.34
5875.000	Peak	57.04	-1.42	55.62	105.20	-49.58
5925.000	Peak	55.57	-0.99	54.58	68.20	-13.62
5926.380	Peak	56.70	-0.96	55.74	68.20	-12.46

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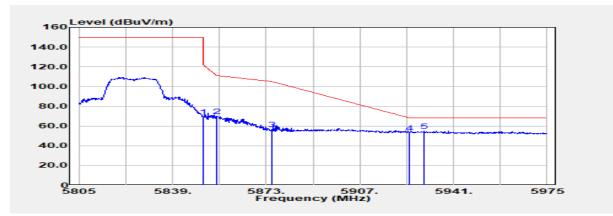
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n20 / Band 4 Test Date :2021-01-08

Test Frequency :5825 MHz Temp./Humi. : 20.2/60

Test Mode :BE CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	_
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBμV/m	dB
5850.000	Peak	71.01	-1.57	69.43	122.20	-52.77
5855.000	Peak	71.34	-1.42	69.92	110.80	-40.88
5875.000	Peak	58.46	-1.42	57.04	105.20	-48.16
5925.000	Peak	54.14	-0.99	53.15	68.20	-15.05
5930.290	Peak	55.71	-0.90	54.82	68.20	-13.38

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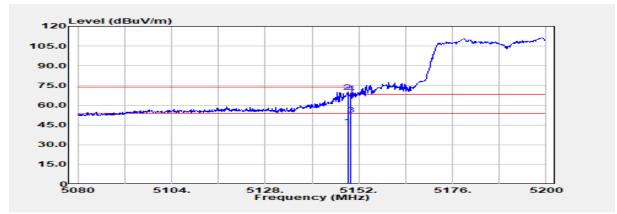
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 1 Test Date :2020-12-28

Test Frequency :5190 MHz Temp./Humi. : 21.7/63

:BE CH LOW Antenna Pol. Test Mode :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5149.120	Average	46.80	-2.42	44.38	54.00	-9.62
5149.120	Peak	72.40	-2.42	69.98	74.00	-4.02
5150.000	Average	55.30	-2.43	52.87	54.00	-1.13
5150.000	Peak	71.88	-2.43	69.45	74.00	-4.55

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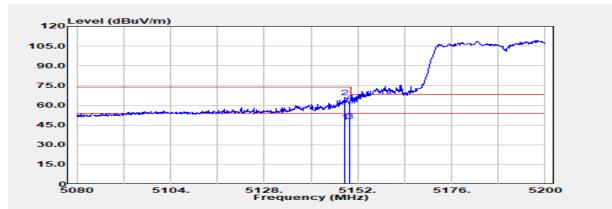
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 1 Test Date :2020-12-28

Test Frequency :5190 MHz Temp./Humi. : 21.7/63

:BE CH LOW Antenna Pol. Test Mode :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5148.520	Average	49.85	-2.41	47.44	54.00	-6.56
5148.520	Peak	68.41	-2.41	66.00	74.00	-8.00
5150.000	Average	50.27	-2.43	47.84	54.00	-6.16
5150.000	Peak	65.08	-2.43	62.65	74.00	-11.35

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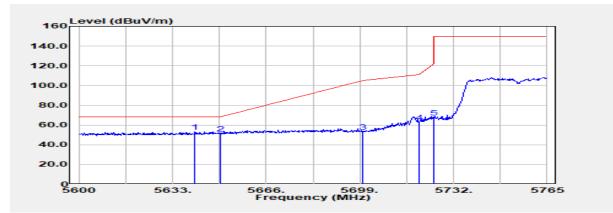
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-08

Test Frequency :5755 MHz Temp./Humi. : 20.2/60

:BE CH LOW Test Mode Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5640.920	Peak	55.16	-2.14	53.02	68.20	-15.18
5650.000	Peak	53.59	-2.00	51.59	68.20	-16.61
5700.000	Peak	55.25	-2.17	53.08	105.20	-52.12
5720.000	Peak	64.38	-1.70	62.69	110.80	-48.11
5725.070	Peak	69.44	-1.98	67.46	150.00	-82.54

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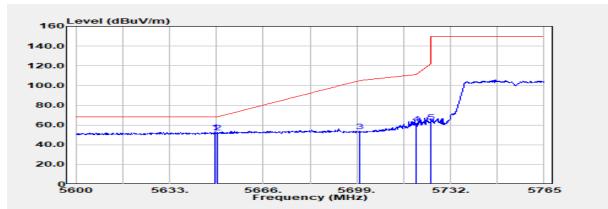
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-08

Test Frequency :5755 MHz Temp./Humi. : 20.2/60

Test Mode :BE CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
	5648.840	Peak	54.94	-2.02	52.93	68.20	-15.27	
	5650.000	Peak	54.26	-2.00	52.27	68.20	-15.93	
	5700.000	Peak	56.09	-2.17	53.93	105.20	-51.27	
	5720.000	Peak	63.05	-1.70	61.35	110.80	-49.45	
	5725.000	Peak	65.07	-1.98	63.10	122.20	-59.10	

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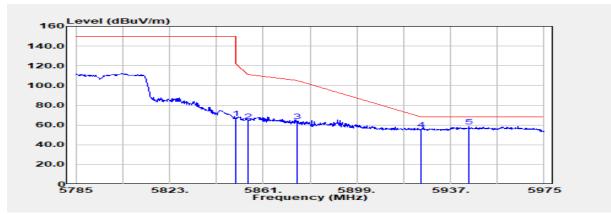
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-08

Test Frequency :5795 MHz Temp./Humi. : 20.2/60

Test Mode :BE CH HIGH Antenna Pol. :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5850.000	Peak	68.33	-1.57	66.75	122.20	-55.45
5855.000	Peak	65.69	-1.42	64.28	110.80	-46.52
5875.000	Peak	65.70	-1.42	64.28	105.20	-40.92
5925.000	Peak	56.41	-0.99	55.42	68.20	-12.78
5944.410	Peak	59.70	-1.20	58.50	68.20	-9.70

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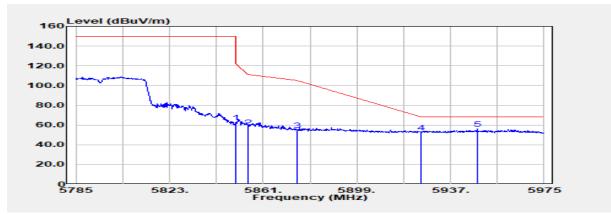
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11n40 / Band 4 Test Date :2021-01-08

Test Frequency :5795 MHz Temp./Humi. : 20.2/60

Test Mode :BE CH HIGH Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5850.000	Peak	64.39	-1.57	62.82	122.20	-59.38
5855.000	Peak	59.60	-1.42	58.18	110.80	-52.62
5875.000	Peak	56.48	-1.42	55.06	105.20	-50.14
5925.000	Peak	53.81	-0.99	52.82	68.20	-15.38
5947.830	Peak	57.21	-1.18	56.03	68.20	-12.17

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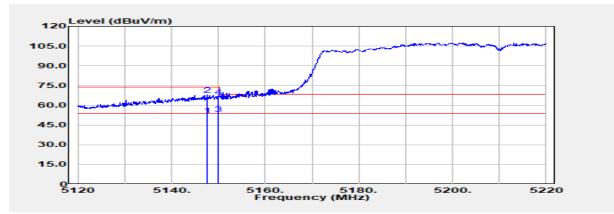
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2020-12-28

Test Frequency :5210 MHz Temp./Humi. :20.7/63

:BE CH LOW Antenna Pol. Test Mode :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
						_
5147.600	Average	55.13	-2.39	52.74	54.00	-1.26
5147.600	Peak	70.50	-2.39	68.10	74.00	-5.90
5150.000	Average	55.64	-2.43	53.21	54.00	-0.79
5150.000	Peak	69.02	-2.43	66.59	74.00	-7.41

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Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 1 Test Date :2020-12-28

Test Frequency :5210 MHz Temp./Humi. : 20.7/63

Test Mode :BE CH LOW Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5149.300	Average	55.59	-2.42	53.17	54.00	-0.83
5149.300	Peak	71.40	-2.42	68.98	74.00	-5.02
5150.000	Average	55.70	-2.43	53.27	54.00	-0.73
5150.000	Peak	68.84	-2.43	66.41	74.00	-7.59

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:H Plan

EUT Pol

Report No.: E2/2020/B0037-01

:Kailin Lee

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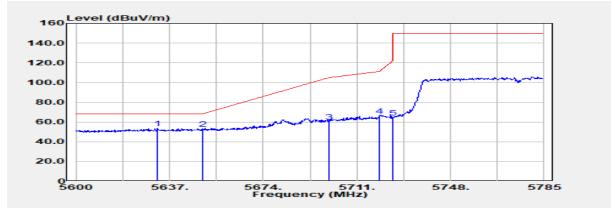
Engineer

Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2021-12-28

Test Frequency :5775 MHz Temp./Humi. : 20.7/63

:BE CH LOW Test Mode Antenna Pol. :Vertical



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dΒμV/m	dB
5632.375	Peak	55.59	-2.02	53.57	68.20	-14.63
5650.000	Peak	55.06	-2.00	53.06	68.20	-15.14
5700.000	Peak	62.77	-2.17	60.60	105.20	-44.60
5720.000	Peak	68.09	-1.70	66.39	110.80	-44.41
5725.000	Peak	66.45	-1.98	64.48	122.20	-57.72

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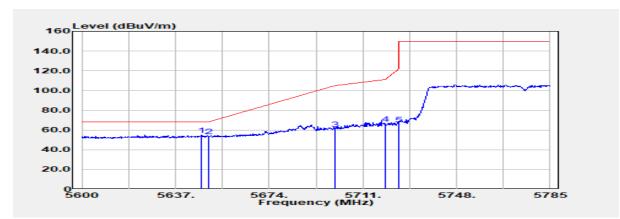
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2021-12-28

Test Frequency :5775 MHz Temp./Humi. : 20.7/63

:BE CH LOW Test Mode Antenna Pol. :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
5647.175	Peak	56.94	-2.04	54.89	68.20	-13.31
5650.000	Peak	55.93	-2.00	53.93	68.20	-14.27
5700.000	Peak	62.93	-2.17	60.76	105.20	-44.44
5720.000	Peak	68.35	-1.70	66.65	110.80	-44.15
5725.060	Peak	67.90	-1.98	65.92	150.00	-84.08

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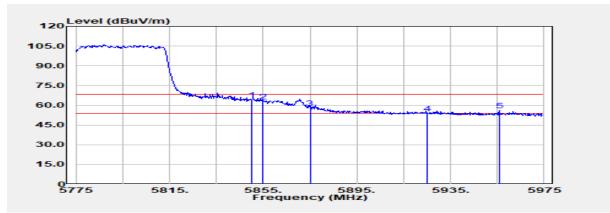
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2021-12-28

Test Frequency :5775 MHz Temp./Humi. : 20.7/63

:BE CH HIGH Antenna Pol. Test Mode :Vertical

EUT Pol :H Plan Engineer :Kailin Lee



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5850.000	Peak	65.91	-1.57	64.34	68.20	-3.86
5855.000	Peak	64.28	-1.42	62.86	68.20	-5.34
5875.000	Peak	59.45	-1.42	58.02	68.20	-10.18
5925.000	Peak	54.67	-0.99	53.67	68.20	-14.53
5955.800	Peak	56.93	-0.90	56.03	68.20	-12.17

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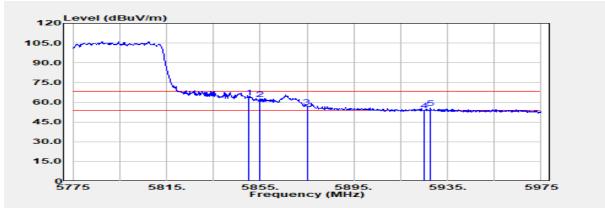
Report Number :E2/2020/B0037 Test Site :966 Chamber D

Operation Mode :802.11ac80 / Band 4 Test Date :2021-01-08

Test Frequency :5775 MHz Temp./Humi. : 20.2/60

Antenna Pol. Test Mode :BE CH HIGH :Horizontal

EUT Pol :H Plan Engineer :Kailin Lee



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
	5850.000	Peak	65.57	-1.57	64.00	68.20	-4.20
	5855.000	Peak	63.79	-1.42	62.37	68.20	-5.83
	5875.000	Peak	58.24	-1.42	56.82	68.20	-11.38
	5925.000	Peak	54.74	-0.99	53.75	68.20	-14.45
	5927.600	Peak	56.45	-0.94	55.51	68.20	-12.69

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12 TRANSMISSION IN THE ABSENCE OF DATA

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.

12.2 Result

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 ANTENNA REQUIREMENT

13.1 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.

13.2 Antenna Connected Construction

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

~ End of Report ~

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