

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant: Manufacturer:	Cisco Systems 125 West Tasman Drive San Jose California United States 95134-1706 Cisco Systems
Product Name:	125 West Tasman Drive San Jose California United States 95134-1706 FM1200V-HW
Brand Name:	Fluidmesh FM1200V VOLO
Model No.:	FM1200V-HW
Model Difference:	N/A
Report Number:	ER/2020/30136
FCC ID:	R5S1200V
FCC Rule Part:	§15.407, Cat: NII
Issue Date:	Dec. 28, 2020
Date of Test:	Mar. 24, 2020 ~ Apr. 20, 2020
Date of EUT Re- ceived:	Mar. 24, 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:

Blue Yang / Asst. Manager



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Revision History				
Report Number Revision Description Issue Date Remark				
ER/2020/30136	Rev.00	Original.	Dec. 28, 2020	Revised By: Elle Chang

Note:

1 · 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

1.1 Product Description

-			
Product Name:	FM1200V-HW		
Brand Name:	Fluidmesh FM1200V VOLO		
Model No.:	FM1200V-HW		
Model Difference:	N/A		
Hardware Version:	N/A		
Software Version:	N/A		
	24V from AC/DC Adapter		
Power Supply:	Adapter: Model No.: GFP241DA-240100HB Supplier: GME		
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Transition Rate:	802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps		

1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Ma/n / Aux	Peak Antenna Gain (dBi)
			5150~5250	Main / Aux	12
Integrated	N/A	N/A	5470~5725	Main / Aux	12
			5725~5850	Main / Aux	12

1.3 FCC worst power

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm) (Worst case)	Modulation Technology
n HT	5150~5250	4	HT: 14.99	
ac_VHT	5470~5725	12	HT: 9.96	OFDM
20M	5725-5850	5	HT: 15.59	
n HT	5150~5250	2	HT: 15.92	
ac_VHT	5470~5725	5	HT: 9.54	OFDM
40M	5725-5850	2	HT: 15.86	
Noto:				

NOTE:

5470~5725MHz is disabled by software when the device marketed in the USA.

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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.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

FCC Designation number: TW0027

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

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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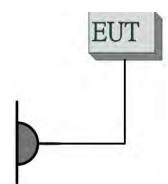
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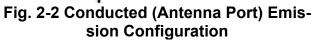
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2.5 Configuration of Tested System

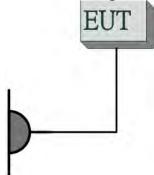
Fig. 2-1 Radiated Emission Configuration











ltem	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	L480	PF-1S9Q32	N/A	N/A

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SUMMARY OF TEST RESULT 3

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
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES Δ

4.1 802.11n operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

20 M		4	0 M
СН	Freq (MHz)	СН	Freq (MHz
00		00	
36	5180	38	5190
40	5200	46	5230
44	5220		
48	5240		

Operated band in 5470 MHz ~5725 MHz:

2	0 M	
СН	Freq	
	(MHz)	
100	5500	
104	5520	
108	5540	
112	5560	
116	5580	
120	5600	
124	5620	
128	5640	
132	5660	
136	5680	
140	5700	
144	5720	

•				
	40 M			
	СН	Freq (MHz)		
	102	5510		
	110	5550		
	118	5590		
	126	5630		
	134	5670		
	142	5710		

Operated band in 5745 MHz ~5850 MHz:

Freq

(MHz) 5755 5795

20 M		4	0 M
СН	Freq (MHz)	СН	Fr (MI
149	5745	151	57
153	5765	159	57
157	5785		
161	5805		
165	5825		

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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 pro-2. grammed.
- 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	Transmissi	on Chain	Multiple Transmission Spatial
🛛 802.11 n	🛛 Ch0 🖂 Ch1	🗆 Ch2 🗆 Ch3	⊠ MIMO

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	FREQUEN- CY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTEN- NA PORT
	5180~5240	36 to 48	44			
802.11n_HT20	5500~5700	100 to 140	116	OFDM	MCS8	MIMO
	5745~5825	149 to 165	157			

	RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUEN- CY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTEN- NA PORT	
	5180~5240	36 to 48	36,44,48		MCS8		
802.11n_HT20	5500~5720	100 to 144	100,116,140, 144			MIMO	
	5745~5825	149 to 165	149,157,165	OFDM			
	5190~5230	38 to 46	38,46				
802.11n_HT40	5510~5710	102 to 142	102,110,134,14 2		MCS8	MIMO	
	5755~5795	151 to 159	151,159				

Note:

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

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ANTENNA PORT CONDUCTED MEASUREMENT: 4.2.1

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTEN- NA PORT
	5180~5240	36 to 48	36,44,48			
	5260~5320	52 to 64	52,60,64		MCS8	MIMO
802.11n_HT20	5500~5720	100 to 144	100,116,140, 144			
	5745~5825	149 to 165	149,157,165	OFDM		
	5190~5230	38 to 46	38,46			
	5270~5310	54 to 62	54,62			
802.11n_HT40	5510~5710	102 to 142	102,110,134, 142	MCS8		MIMO
	5755~5795	151 to 159	151,159]		

Maximum EIRP at any elevation angle above 30 degrees						
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
MODE	BAND (MHz)	CHANNEL	CHANNEL		(Mbps)	PORT
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46		MCS8	MIMO

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MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Meas- urement	+/- 0.96 dB
Peak Power Spectral Density Meas- urement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission Measurement Uncertainty			
	9kHz~30MHz: +-2.3dB		
Polarization: Vertical	30MHz - 180MHz: +/- 3.37dB		
	180MHz -417MHz: +/- 3.19dB		
	0.417GHz-1GHz: +/- 3.19dB		
	1GHz - 18GHz: +/- 4.04dB		
	18GHz - 40GHz: +/- 4.04dB		
	9kHz~30MHz: +-2.3dB		
	30MHz - 167MHz: +/- 4.22dB		
Polarization: Horizontal	167MHz -500MHz: +/- 3.44dB		
Polarization. Horizontai	0.5GHz-1GHz: +/- 3.39dB		
	1GHz - 18GHz: +/- 4.08dB		
	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.

	Limits				
Frequency range	dB(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			
NI-4-					

Note

1. The lower limit shall apply at the transition frequencies

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

6.2 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
EMI Test Receiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020	
LISN	SCHWARZ- BECK	NSLK 8127	8127-649	06/02/2019	06/01/2020	
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R	N.C.R	
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2020	01/01/2021	

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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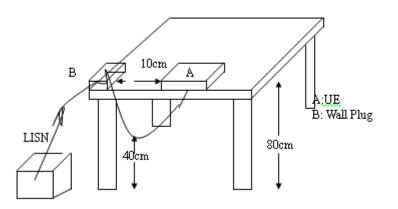
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6.4 Test SET-UP



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.

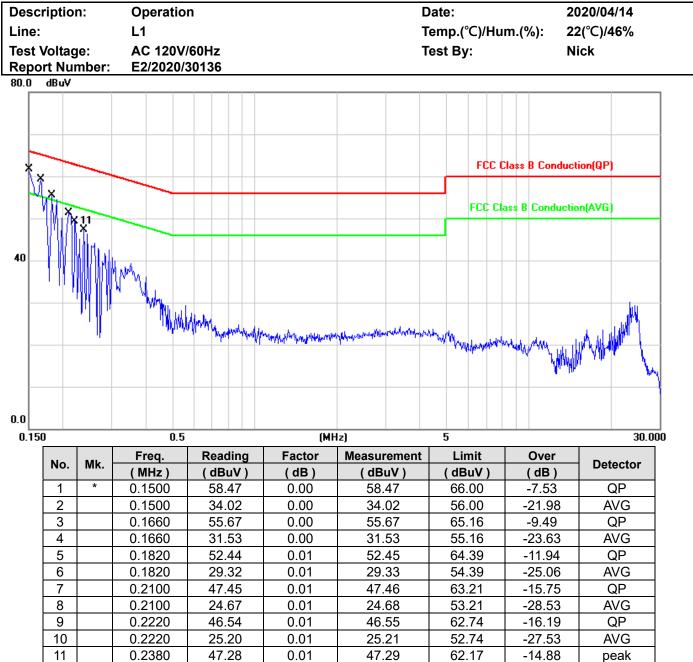
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AC POWER LINE CONDUCTED EMISSION TEST DATA



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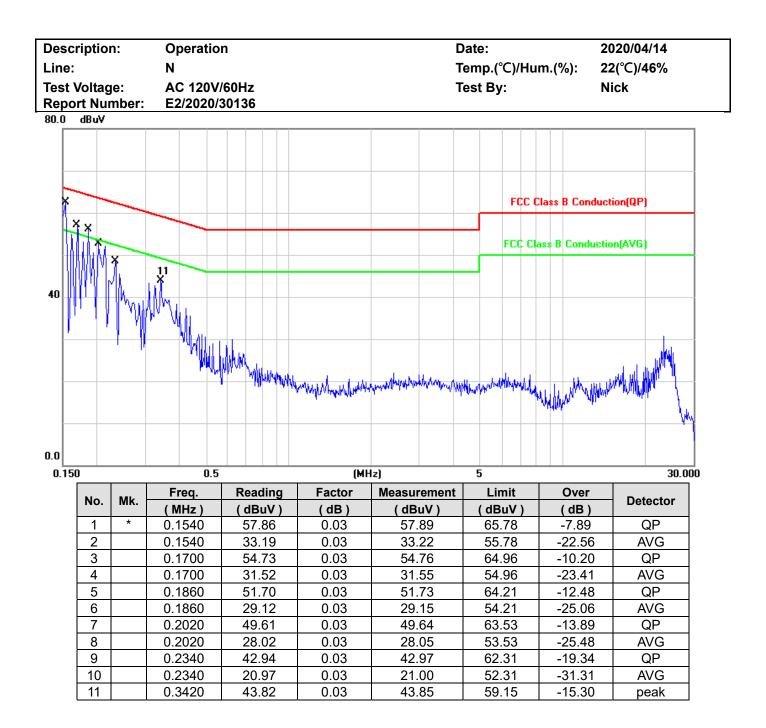
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DUTY CYCLE TEST SIGNAL 7

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)
802.11n_20	96.33	0.16	0.63	1.00
802.11n_40	96.13	0.17	0.62	1.00

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7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

802.11n 20MHz 5180MHz-5180



802.11n 40MHz 5190 MHz-5190



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26DB, 6DB EMISSION BANDWIDTH MEASUREMENT 8

8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C. The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - 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.

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8.3 Measurement Equipment Used

SGS Conducted Room						
Name of Equip- ment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due	
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2019	05/16/2020	
EXA Spectrum An- alyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021	
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021	
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021	

8.4 Test Set-up



8.5 Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11n_HT2	0_Ch0		802.11n_HT20_Ch1					
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)			
5180	22.58	13.537	5180	22.32	13.487			
5220	22.42	13.506	5220	22.47	13.516			
5240	22.3	13.483	5240	22.78	13.576			
5500	22.11	13.446	5500	22.57	13.535			
5580	23.28	13.670	5580	23.08	13.632			
5700	22.61	13.543	5700	22.66	13.553			
5720(U-NII 2C)	16.085	12.064	5720(U-NII 2C)	15.995	12.040			
5720 (U-NII 3)	6.085	7.843	5720 (U-NII 3)	5.995	7.778			

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802.11n _HT4	40_Ch0	802.11n _HT40_Ch1						
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB) (MHz)		26dB BW (MHz)	10 Log (B) (dB)			
5190	45.99	16.627	5190	45.99	16.627			
5230	45.72	16.601	5230	45.94	16.622			
5510	46.61	16.685	5510	46.27	16.653			
5550	47.58	16.774	5550	46.76	16.699			
5670	47.91	16.804	5670	47.7	16.785			
5710 (U-NII 2C)	38.085	15.808	5710 (U-NII 2C)	37.085	15.692			
5710 (U-NII 3)	8.085	9.077	5710 (U-NII 3)	7.085	8.503			

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

802.11n	_HT20_C	h0	802.11n_HT20_Ch1				
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)		
5745	17.15	12.343	5745	16.46	12.164		
5785	16.91	12.281	5785	16.94	12.289		
5825	16.96	12.294	5825	17.19	12.353		

802.11n_HT40_Ch0

802.11n_HT40_Ch1

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	
5755	35.76	15.534	5755	35.75	15.533	
5795	35.39	15.489	5795	35.83	15.542	

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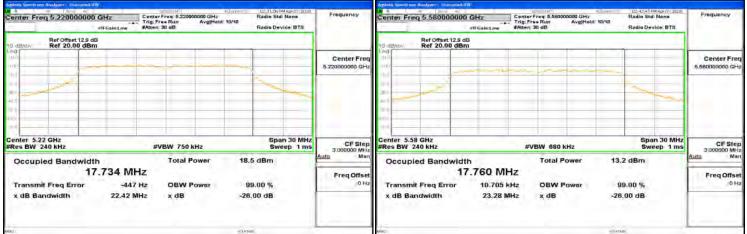
FCC_802.11n_20MHz_Chain0_5180MHz

FCC_802.11n_20MHz_Chain0_5500MHz

FCC_802.11n_20MHz_Chain0_5580MHz



FCC_802.11n_20MHz_Chain0_5220MHz



FCC_802.11n_20MHz_Chain0_5240MHz

FCC_802.11n_20MHz_Chain0_5700MHz

Antient Spectrum Analyzer - Discound SW					Aglienii Spectrum Analyzer - Darapied 6W			
Center Freq 5.240000000 G	Hz Center Trig:Fri #Atten		E 10/10 Radio Std: None Radio Device: BTS	Frequency	Center Freq 5.700000000 GHz	Center Freq 5.70000000 GHz Trig: Free Run Avg[Hold: 10	Radio Device: BTS	Frequency
10 dB/div Ref 20.00 dBm			MKr1 5,24887 GHz -6,2073 dBm		10 dB/day Ref 20.00 dBm			
100 100				Center Freq 5.240000000 GHz				Center Fred 5,700000000 GH;
-200			1				1	
-50.0 (0.0) (0.0)					10 0 (0.0) (0.0)			
Genter 5.24 GHz #Res BW 240 kHz	#V	BW 750 kHz	Span 30 MHz Sweep 1 ms	CF Step 3.000000 MHz	Center 5.7 GHz #Res BW 240 kHz	#VBW 680 kHz	Span 30 MHz Sweep 1 ms	CF Step 3.000000 MHz
Occupied Bandwidth	G	Total Power	18.3 dBm	Auto Man	Occupied Bandwidth	Total Power	13.6 dBm	Auto Mar
17.	737 MHz			Freq Offset	17.739 1	MHz		Freq Offset
Transmit Freq Error	7.866 kHz	OBW Power	99.00 %	0 Hz	Transmit Freq Error -14.82	28 kHz OBW Power	99.00 %	0 Hz
x dB Bandwidth	22.30 MHz	x dB	-26,00 dB	1	x dB Bandwidth 22.6	1MHz xdB	-26,00 dB	
(inc)			-Tates		ARR I		TATAS	

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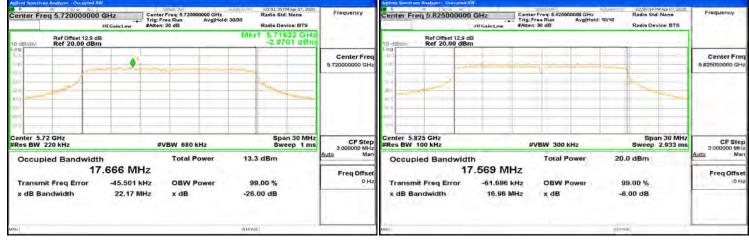
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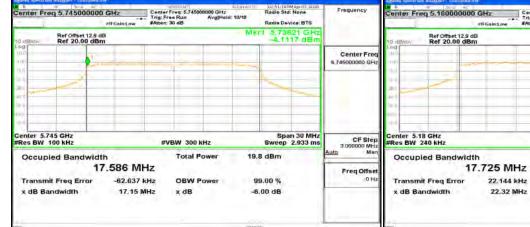


FCC_802.11n_20MHz_Chain0_5720MHz

FCC_802.11n_20MHz_Chain0_5825MHz



FCC_802.11n_20MHz_Chain0_5745MHz



FCC_802.11n_20MHz_Chain0_5785MHz

FCC_802.11n_20MHz_Chain1_5180MHz



FCC_802.11n_20MHz_Chain1_5220MHz

Aglerik Spectrum Analyzer - Danapord BW-				Agilenii Spectrum Analyzer - Lissupped-SW			
Trig	nter Freq 5,785000000 GHz ; Free Run Avg Hold 1 ten 30 dB	Characteric (20154-45144 Apr (1) (2015) Radio Std: None 10/10 Radio Device: BTS	Frequency	Center Freq 5.220000000 GHz	Center Freq 5.220000000 GHz Trig: Free Run Avg[Hold: 10/18 #Atten 30 dB	Radio Device: BTS	Frequency
10 dB/div Ref 20.00 dBm				Bef Offset 12.9 dB 10 dB/div Ref 20.00 dBm			
100 100 100		~	Center Freq 5,795000000 GHz	1900 1970 1970		-	Center Freq 5.220000000 GHz
30 0 -20 0 -40 0				10 0 40 0 40 0			
500 (00) 				30.0 (00) (0.0			
Center 5.785 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 30 MHz Sweep 2.933 ms	CF Step 3.000000 MHz	Center 5.22 GHz #Res BW 240 kHz	#VBW 680 kHz	Span 30 MHz Sweep 1 ms	CF Step 3.000000 MHz
Occupied Bandwidth	Total Power	19,5 dBm	Auto Man	Occupied Bandwidth		18.3 dBm	Auto Man
17.582 MHz Transmit Freq Error -43.040 kHz	OBW Power	99.00 %	Freq Offset	Transmit Freq Error 725	Hz OBW Power	99.00 %	Freq Offset 0 Hz
x dB Bandwidth 16.91 MHz	x dB	-6,00 dB		x dB Bandwidth 22,47 I	AHz xdB ·	-26,00 dB	
All C	-	Trive		AVIIG () and	

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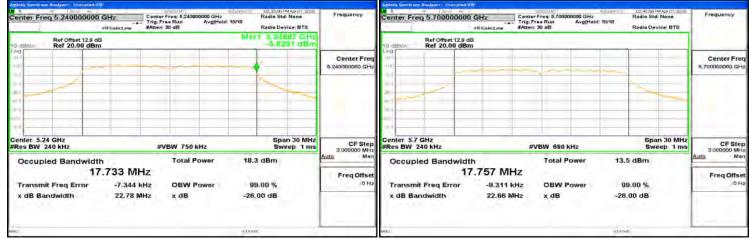
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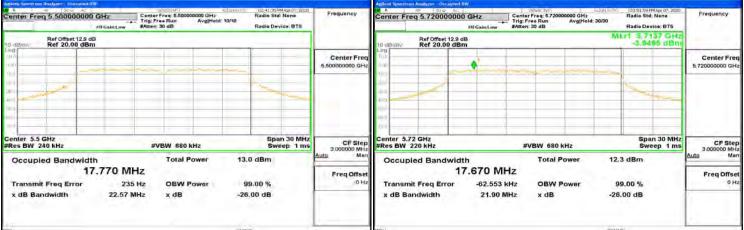


FCC_802.11n_20MHz_Chain1_5240MHz

FCC_802.11n_20MHz_Chain1_5700MHz



FCC_802.11n_20MHz_Chain1_5500MHz



FCC_802.11n_20MHz_Chain1_5580MHz

FCC_802.11n_20MHz_Chain1_5720MHz

FCC_802.11n_20MHz_Chain1_5745MHz Radio Std: Nor Radio Std: None Frequency Frequency Center Freq 5.745000000 GHz 5.58000000 GH Center Freq 5.745000 Trig: Free Run CO GH 100 GHz Radio Device: BTS Radio Device: BTS 73621 GH Ref Offset 12.9 dB Ref 20.00 dBm Ref Offset 12.9 dB Ref 20.00 dBm Center Fre Center Fre enter 5.58 GHz Res BW 240 kHz Span 30 MHz Sweep 1 ms enter 5.745 GHz Res BW 100 kHz Span 30 MHz Sweep 2.933 ms CF Step 3.000000 MHz CF Ster #VBW 300 kHz #VBW 680 kHz 3.000000 MH Total Po 13.3 dBm Total Powe 19.6 dBm Occupied Bandwidth Occupied Bandwidth 17.586 MHz 17.766 MHz Freq Offse Freq Offs Transmit Freq Error 5.368 kHz OBW Power 99.00 % Transmit Freq Error -65.207 kHz OBW Powe 99.00 % x dB Bandwidth 23.08 MHz x dB -26.00 dB x dB Bandwidth 16.46 MHz x dB -6.00 dB

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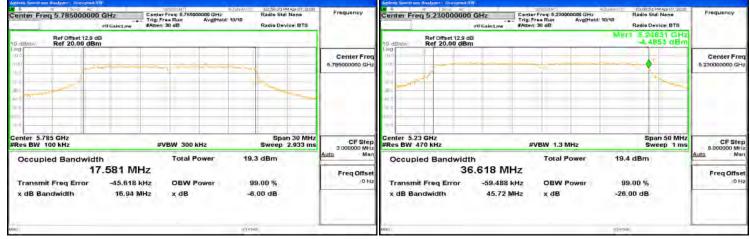
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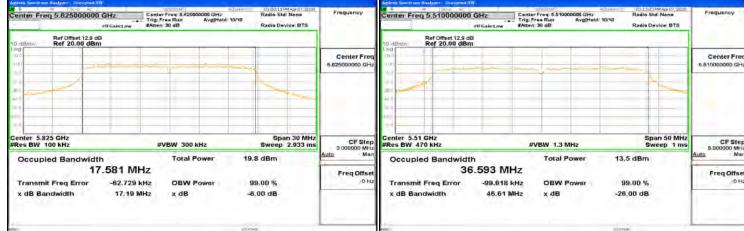


FCC_802.11n_20MHz_Chain1_5785MHz

FCC_802.11n_40MHz_Chain0_5230MHz



FCC_802.11n_20MHz_Chain1_5825MHz



FCC 802.11n 40MHz Chain0 5190MHz

FCC 802.11n 40MHz Chain0 5550MHz

O.H

FCC_802.11n_40MHz_Chain0_5510MHz

lgilerii Spectrum Analyzer - Duragood SW					Agilerii Spectrum Analyzer - Document SW	n5			
Center Freq 5.190000000 C	SHz Center Trig: F	rFreq: 5.190000000 GHz TreeRdn Avg Hold 30 oB	Radio Std: None Radio Std: None 10/10 Radio Device: B	Frequency	Center Freq 5.550000000	- Trig:	er Freg: 5,550000000 GHz	Radio Std: Nene Radio Std: Nene : 10/18 Radio Device: BTS	Frequency
10 dB/div Ref 20.00 dBm				1	10 dBrew Ref Offset 12.9 dB				
		No		Center Freq 5 190000000 GHz					Center Fri 5.550000000 G
2.9 January 1				<	0.0				1
an 0 10 0					100				
Center 5.19 GHz			Span 50	WHZ	Center 5.55 GHz			Span 50 MHz	
Res BW 470 kHz	#	VBW 1.3 MHz	Sweep	ms 5.000000 MHz			VBW 1.5 MHz	Sweep 1 ms	5.000000 MP
Occupied Bandwidth		Total Power	19.0 dBm	Auto Man	Occupied Bandwidth	1	Total Power	13.0 dBm	Auto Ma
36. Transmit Freq Error	-26.325 kHz	OBW Power	99.00 %	Freq Offset	A CONTRACT OF	.826 MHz -158.71 kHz	OBW Power	99.00 %	Freq Offse
x dB Bandwidth	45.99 MHz	x dB	-26,00 dB		x dB Bandwidth	47,58 MHz	x dB	-26,00 dB	
10 i			-Teros		wind i			-7.4748	-

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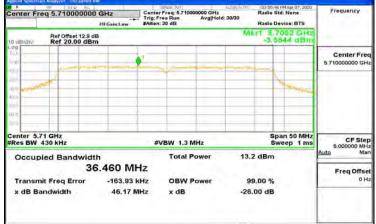


FCC_802.11n_40MHz_Chain0_5670MHz

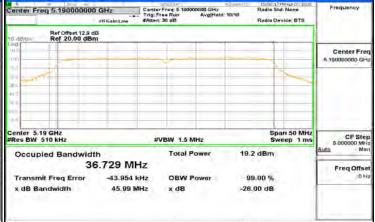
FCC_802.11n_40MHz_Chain0_5795MHz

Agiland Spectrum Analyzer - Document SW	n.				Agtines Spectrum Analyzer - Decopied 5	SW1			
Center Freq 5.670000000 (GHz Cente Trig: F	rFreq: 5,670000000 GHz resRup Avg[Hold 30 dB	Radio Std: None Radio Std: None 10/18 Radio Device: BTS	Frequency	Center Freq 5.79500000	Trig:	Freg 5,79500000 GHz	Daved to:33;414MApril),2021 Radio Std: None 0/10 Radio Device: BTS	Frequency
10 dB/dev Ref 20.00 dBm					10 dB/div Ref 20.00 dBr	B VI			
100 (00) (00)		J		Center Freq 5,670000000 GHz	100 100 100		منصفيهما	and the second	Center Fre 5.79500000 GH
00) 200 400					-30 0 -30 0 -40 0			14	
Center 5.67 GHz #Res BW 470 kHz		VBW 1.3 MHz	Span 50 MHa Sweep 1 ms	CF Step	Center 5.795 GHz #Res BW 100 kHz		VBW 300 kHz	Span 50 MHz Sweep 4.8 ms	CF Ste
Occupied Bandwidth	0	Total Power	12.4 dBm	5.000000 MHz Auto Man	Occupied Bandwidt	th	Total Power	19.8 dBm	5.000000 MH Auto Ma
36 Transmit Freq Error x dB Bandwidth	.695 MHz -154.46 kHz 47.91 MHz	OBW Power x dB	99.00 % -26,00 dB	Freq Offset 0 Hz	A CONTRACT OF A	6.043 MHz -86.649 kHz 35,39 MHz	OBW Power x dB	99.00 % -6.00 dB	Freq Offse 0H
ARINO (-7.4765		CORP.		-	-Trans	

FCC_802.11n_40MHz_Chain0_5710MHz



FCC_802.11n_40MHz_Chain1_5190MHz



FCC_802.11n_40MHz_Chain0_5755MHz

FCC_802.11n_40MHz_Chain1_5230MHz

gliers Spectrum Analyzer - Disconied-SW					Agtime Spectrum Analyzer - Document-SW			
Center Freq 5.755000000 G	Hz Cente Trig:F	rFreq 5.755000000 GHz Free Run Avg Hold 1 30 dB	Adirowite Distant Mapelli, 2021 Radio Std: None 10/10 Radio Device: BTS	Frequency	Center Freq 5.230000000 GH	Center Freq 5.230000000 GHz Trig: Free Run Avg Pold	Radio Std: None 10/10 Radio Device: BTS	Frequency
o dB/div Ref 20.00 dBm			Mkr1 5,73697 GHz -7.8711 dBm		10 dB/div Ref 20,00 dBm		Mkr1 5 2483 GHz -5.6664 dBm	
10.0 0.00 10.6	aures	Laure	all and a second	Center Freq 5.755000000 GHz	100 100			Center Free 5.230000000 GH
10 0 20 0 40 0			×~		30 0			
90 0. NUO 10 0					-50 0 			
Center 5.755 GHz #Res BW 100 kHz	#	VBW 300 kHz	Span 50 MHz Sweep 4.8 ms	CF Step 5.000000 MHz	Genter 5.23 GHz #Res BW 470 kHz	#VBW 1.3 MHz	Span 50 MHz Sweep 1 ms	CF Step
Occupied Bandwidth	Sec. 10	Total Power	19.6 dBm	Auto Man	Occupied Bandwidth	Total Power	19.4 dBm	Auto Mar
	065 MHz		5.5.Qe-1	Freq Offset		98 MHz	5 0 Geo. 1	Freq Offset
Transmit Freq Error	-134.97 kHz	OBW Power	99.00 %	OHz		01.231 kHz OBW Power	99.00 %	0 Ha
x dB Bandwidth	35.76 MHz	x dB	-6,00 dB		x dB Bandwidth	45.94 MHz x dB	-26,00 dB	
eq.		-	-7-THE		ANNO 1		-Tatus	-

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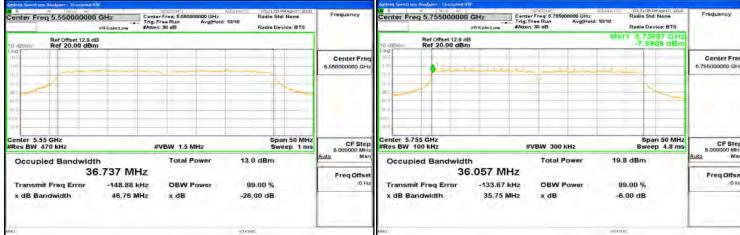
FCC_802.11n_40MHz_Chain1_5510MHz

FCC 802.11n 40MHz Chain1 5710MHz

FCC_802.11n_40MHz_Chain1_5755MHz

Agland Spectrum Analyzer - Liczupied SW				Agilent Spectrum Analyzer - Occupted BW			
Eenter Freq 5.510000000 GHz #FGalitin	CenterFreq 5.510000000 GHz Trig:Freq 5.510000000 GHz Trig:Freq Run Avg Hold: 10/1 #Atten 30 dB	Radio Std: None	Frequency	Center Freq 5.710000000 GHz	Center Freq 5.710000000 GHz Trig: Free Run Avg Hold: 30/3 #Atten: 30 dB	Radio Std: None	Frequency
10 dB/div Ref 20.00 dBm				10 dB/div Ref Offset 12.9 dB Ref 20.00 dBm		Mkr1 5.6969 GHz -2.6365 dBm	
90 100 100			Center Freq 5,510000000 GHz	Log fut	and the second sec	-	Center Fr 5.710000000 G
00				200 200 200			
) () ()) () ()				2001			
enter 5.51 GHz Res BW 470 kHz	#VBW 1.3 MHz	Span 50 MHz Sweep 1 ms	CF Step 5.000000 MHz	Center 5.71 GHz #Res BW 430 kHz	#VBW 1.3 MHz	Span 50 MHz Sweep 1 ms	CF S
Occupied Bandwidth 36.625 I	Total Power MHz	13.8 dBm	Auto Man	Occupied Bandwidth 36.249 M	Total Power	12.8 dBm	
Transmit Freq Error -87.03	33 kHz OBW Power 7 MHz x dB	99.00 % -26.00 dB	Freq Offset 0 Hz	Transmit Freq Error -97.05		99.00 % -26.00 dB	Freq Off
01		-174748	·	Artist		TRANE	

FCC_802.11n_40MHz_Chain1_5550MHz



FCC_802.11n_40MHz_Chain1_5670MHz

FCC_802.11n_40MHz_Chain1_5795MHz

Antienii Spectrum Analyzer - Documed-SW-						Antient Spectrum Analyzer - Dampied S				
Center Freq 5.670000000 GH			Radi	n Std: None n Device: BTS	Frequency	Center Freq 5.795000000	GHz Cen	ter Freq 5.795000000 GH2 Free Run Avg Hold en 30 dB	Radio Std: None Radio Device: BTS	Frequency
dB/dB/						10 dB/day Ref 20.00 dBn	B 1			
100 100 100					Center Freq 5.670000000 GHz				معتقد	Center Fre 5.795000000 GH
0.0 0.0				-		-20 0 -20 0 -40 0			1	
0.0						50 0 000				
Center 5.67 GHz #Res BW 470 kHz	#VE	BW 1.3 MHz		Span 50 MHz Sweep 1 ms	CF Step 5.000000 MHz	Center 5.795 GHz #Res BW 100 kHz	_	#VBW 300 kHz	Span 50 MHz Sweep 4.8 ms	CF Ste
Occupied Bandwidth	S	Total Power	12.3 dBr	n	Auto Man	Occupied Bandwidt	h	Total Power	20.0 dBm	Auto Ma
	-169.69 kHz	OBW Power	99.00	%	Freq Offset	36 Transmit Freq Error	-83.676 KHz	OBW Power	99.00 %	Freq Offse
x dB Bandwidth	47,70 MHz	x dB	-26,00 d	В	1	x dB Bandwidth	35,83 MHz	x dB	-6,00 dB	
eio i			-7+105		·	Alina I			-7/9705	

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8.5.3 99% BW Verification for DFS Function

802.11r	_HT20_Ch0		802.11n_HT20_Ch1				
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)		
5240	5248.87	< 5250	5240	5248.87	< 5250		
5745	5736.21	> 5725	5745	5736.21	> 5725		

802.11n _HT40_Ch0

802.11n _HT40_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.31	< 5250	5230	5248.30	< 5250
5755	5736.97	> 5725	5755	5736.97	> 5725

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9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

FCC

OPERZTION Band		EUT CATEGORY	LIMIT			
		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	If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit					

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 FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi. (i) If transmit signals are correlated, then Directional gain

= $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}] dBi$

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

The maximum e.i.r.p at any elevation angle above 30defrees as measured from the horizon must not exceed 125 mw (21dBm). For fixed point-to-point access points operating in the band 5.15-5.25Ghz.

The antenna gain is grater than 6 dBi in MIMO mode, therefore the limit needs to be reduced as below:

	Antenna Gain (dBi)	Conducted Power Limit (dBm)
UNII-1	15.01	20.99
U-NII-2C	15.01	14.97
U-NII-3	15.01	20.99

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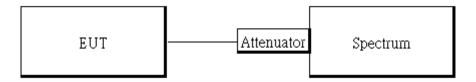
9.2 Measurement Procedure

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

SGS Conducted Room									
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due				
Power Meter	Anritsu	ML2496A	1804001	02/20/2020	02/19/2021				
Power Sensor	Anritsu	MA2411B	1726104	02/20/2020	02/19/2021				
Power Sensor	Anritsu	MA2411B	1726107	02/20/2020	02/19/2021				
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021				

9.3 Measurement Equipment Used

9.4 Test Set-up



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9.5 Measurement Result

9.5.1Conducted output power (FCC)

802.11n_HT20_MIMO

011	Frequency	Data	Avg. POV	VER (dBm)	TOTAL	TOTAL		REQUIRED		DEOLUT
СН	(MHz)	Rate	CH 0	CH 1	POWER (dBm)	POWER (mW)		LIMIT (dBm)		RESULT
36	5180	MCS8	5.92	5.11	8.71	7.424		20.99		PASS
44	5220	MCS8	11.98	11.46	14.90	30.906		20.99		PASS
48	5240	MCS8	12.41	11.12	14.99	31.517		20.99		PASS
100	5500	MCS8	6.92	6.65	9.96	9.908	14.97	or 11+10log(B) =	24.45	PASS
116	5580	MCS8	6.8	6.69	9.92	9.813	14.97	or 11+10log(B) =	24.63	PASS
140	5700	MCS8	7.07	5.89	9.69	9.317	14.97	or 11+10log(B) =	24.54	PASS
144	5720(U-NII 2C)	MCS8	3.95	3.44	6.87	4.861	14.97	or 11+10log(B) =	23.04	PASS
144	5720 (U-NII 3)	MCS8	-0.28	-0.82	2.65	1.839		20.99		PASS
149	5745	MCS8	12.97	12.51	15.92	39.073		20.99		PASS
157	5785	MCS8	12.92	12.13	15.72	37.287		20.99		PASS
165	5825	MCS8	13	11.65	15.55	35.892		20.99		PASS

802.11n_HT40_MIMO

СН	Frequency	Data	Avg. POWER (dBm)		TOTAL TOTAL POWER POWER		REQUIRED LIMIT			RESULT
Сп	(MHz)		CH 0	CH 1	(dBm)	(mW)		(dBm)		RESULI
38	5190	MCS8	6.81	6.22	9.71	9.347		20.99		PASS
46	5230	MCS8	12.91	12.56	15.92	39.086		20.99		PASS
102	5510	MCS8	5.53	4.97	8.44	6.983	14.97	or 11+10log(B) =	27.65	PASS
110	5550	MCS8	6.61	6.1	9.54	9.004	14.97	or 11+10log(B) =	27.70	PASS
134	5670	MCS8	6.38	5.95	9.35	8.614	14.97	or 11+10log(B) =	27.79	PASS
142	5710(U-NII 2C)	MCS8	6.17	5.38	8.94	7.839	14.97	or 11+10log(B) =	26.69	PASS
142	5720 (U-NII 3)	MCS8	-0.56	-1.81	2.21	1.664		20.99		PASS
151	5755	MCS8	12.92	12.42	15.86	38.538		20.99		PASS
159	5795	MCS8	12.85	11.95	15.60	36.349		20.99		PASS

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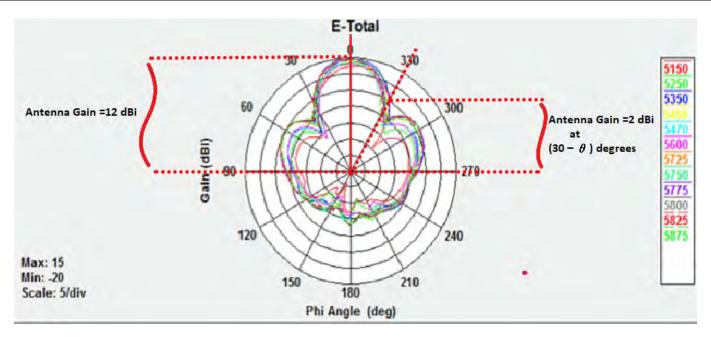
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9.5.2 Maximum EIRP at any elevation angle above 30 degrees

MODE	BANDWIDTH (MHz)	FREQUENCY (MHz)	MAXIMUM CONDUCTED OUTPUT POWER (dBm)	ELEVATION ABOVE 30° Directional GAIN (dBi)	ELEVATION ABOVE 30° MAX EIRP (dBm)	EIRP LIMIT (dBm)	RESULT
Orafianation	20	5180	8.71	5.01	13.72	21	PASS
Configuration IEEE 802.11n HT20		5220	14.90	5.01	19.91	21	PASS
		5240	14.99	5.01	20.00	21	PASS
Configuration IEEE 802.11_HT40	40	5190	9.71	5.01	14.72	21	PASS
		5230	15.92	5.01	20.93	21	PASS



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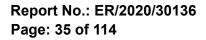
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10 MAXIMUM POWER SPECTRAL DENSITY

10.1 Standard Applicable

FCC

OPERZTION Band		EUT CATEGORY	LIMIT				
		Access Point (Master device)	17dBm/ MHz				
U-NII-1		Fixed point-to-point Access Ponit					
		Mobile and portable client device	11dBm/ MHz				
U-NII-2A			11dBm/ MHz				
U-NII-2C			11dBm/ MHz				
U-NII-3	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 FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi. (i) If transmit signals are correlated, then Directional gain

= $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}] dBi$

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

The antenna gain is grater than 6 dBi in MIMO mode, therefore the limit needs to be reduced as below:

	Antenna Gain (dBi)	PSD Limit	
UNII-1	15.01	7.99	dBm/MHz
U-NII-2C	15.01	1.99 dBm/MHz	
U-NII-3	15.01	20.99	dBm/500 kHz

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 .
- 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=500 kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601

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解決分行成例 「URTERSTEED JRBAC (kendleg) 「回時URKendlegi 「回時URKendlegi FloreFull Ward Texter ACD 目音 面計 「「「「可助力 探殺" This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com.tw/Terms-and-Conditions and for electronic format documents is subject to the full without prior written approal of the socument does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



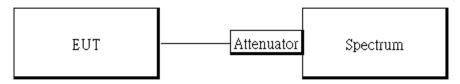
pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

- 5. User the cursor on spectrum to peak search the highest level of trace
- 6. Record the max. reading and add 10 log(1/duty cycle).
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.
- 802.11n 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. N=3 for this given application.
- 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

SGS Conducted Room								
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due			
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2019	05/16/2020			
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021			

10.3 Measurement Equipment Used

10.4 Test Set-up



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10.5 **Measurement Result**

10.5.1 Power spectral density

POWER DENSITY 802.11n HT20 MODE								
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5180	-7.52	0.16	-7.36	7.99	-15.35			
5220	2.33	0.16	2.49	7.99	-5.50			
5240	2.20	0.16	2.36	7.99	-5.63			
5500	-5.91	0.16	-5.75	1.99	-7.74			
5580	-5.38	0.16	-5.22	1.99	-7.21			
5700	-5.41	0.16	-5.25	1.99	-7.24			
5720 (U-NII 2C)	-4.14	0.16	-3.97	1.99	-5.96			
5720 (U-NII 3)	-7.14	0.16	-6.98	20.99	-27.97			
5745	0.99	0.16	1.15	20.99	-19.84			
5785	0.65	0.16	0.81	20.99	-20.18			
5825	1.68	0.16	1.84	20.99	-19.15			

POWER DENSITY 802.11n HT40 MODE									
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)				
5190	-9.23	0.17	-9.06	7.99	-17.05				
5230	0.65	0.17	0.82	7.99	-7.17				
5510	-10.06	0.17	-9.89	1.99	-11.88				
5550	-5.54	0.17	-5.37	1.99	-7.36				
5670	-5.98	0.17	-5.81	1.99	-7.80				
5710 (U-NII 2C)	-4.79	0.17	-4.61	1.99	-6.60				
5710 (U-NII 3)	-9.43	0.17	-9.25	20.99	-30.24				
5755	-2.03	0.17	-1.86	20.99	-22.85				
5795	-2.08	0.17	-1.91	20.99	-22.90				

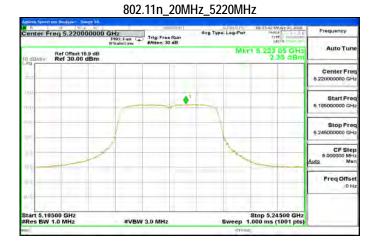
t (886-2) 2299-3279

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802.11n_20MHz_5180MHz





802.11n_20MHz_5240MHz



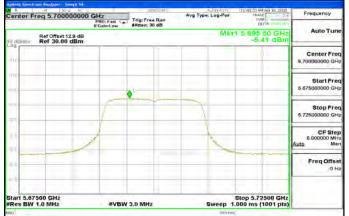




802.11n_20MHz_5580MHz



802.11n_20MHz_5700MHz



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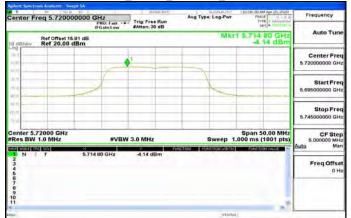
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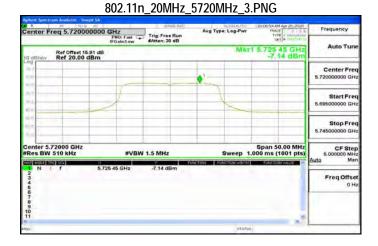
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802.11n_20MHz_5720MHz_2C.PNG









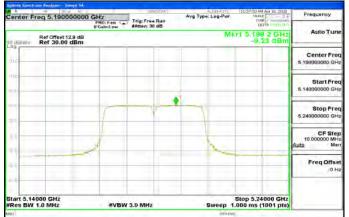
802.11n 20MHz 5785MHz



802.11n_20MHz_5825MHz



802.11n_40MHz_5190MHz



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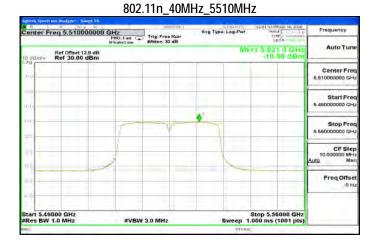
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802.11n_40MHz_5230MHz





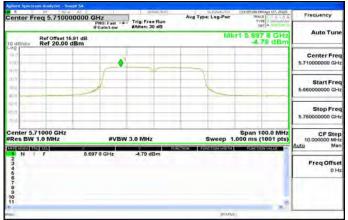
802.11n_40MHz_5550MHz



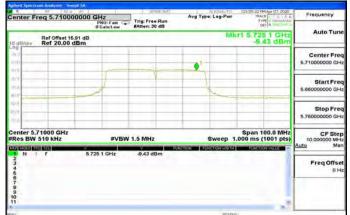
802.11n 40MHz 5670MHz



802.11n_40MHz_5710MHz_2C.PNG



802.11n_40MHz_5710MHz_3.PNG



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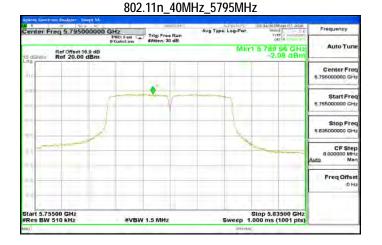
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802.11n_40MHz_5755MHz





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11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

Standard Applicable 11.1

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.

EIRP LIMIT	FIELD STRENGTH AT 3m
– PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)
-	
PK:-27 (dBm/MHz) *1	PK: 68.2(dBµV/m) *1
PK:10 (dBm/MHz) *2	PK:105.2 (dBµV/m) *2
PK:15.6 (dBm/MHz) *3	PK: 110.8(dBµV/m) *3
PK:27 (dBm/MHz) *4	PK:122.2 (dBµV/m) *4
	PK: -27 (dBm/MHz) PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3

1 beyond 75 MHz or more above of the bandedge.

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

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

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

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

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11.1.2Spurious Emission

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

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

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

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11.2 **Measurement Equipment Used**

SGS SAC-III							
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due		
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/03/2020	01/02/2021		
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/20/2019	08/19/2020		
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2019	12/24/2020		
3m Site NSA	SGS	966 chamber	N/A	01/02/2019	01/01/2021		
Loop Antenna	ETS.LINDGREN	6502	148045	10/15/2019	10/14/2020		
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/22/2019	04/21/2020		
EMI Test Re- ceiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020		
Pre-Amplifier	HP	8449B	3008A00578	01/02/2020	01/01/2021		
Pre-Amplifier	HP	8447D	2944A07676	01/02/2020	01/01/2021		
Pre-Amplifier	EMC Instruments	EMC184045B	980135	01/02/2020	01/01/2021		
Filter 5150-5350 MHz	Micro-Tronics	BRM50703	1	01/02/2020	01/01/2021		
Filter 5470-5725 MHz	Micro-Tronics	BRM50704	1	01/02/2020	01/01/2021		
Filter 5725-5875 MHz	Micro-Tronics	BRM50705	1	01/02/2020	01/01/2021		
High Pass Fil- ter	WI	WHKX7.0/18G-8SS	45	01/02/2020	01/01/2021		
Low Loss Ca- ble	Huber Suhner	966_RX	9	01/02/2020	01/01/2021		

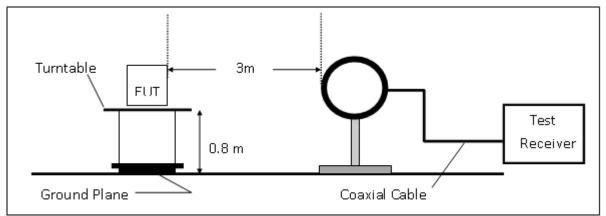
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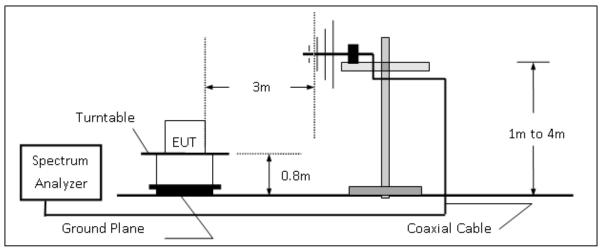


Test SET-UP 11.3

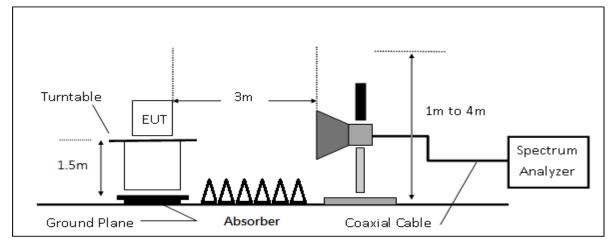
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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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Measurement Procedure 11.4

- 1. 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 .
- 3. 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 6. Quasi-peak (QP) at frequency below 1 GHz.
- At frequency above 1 GHz, Set the spectrum analyzer: 7.

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 \geq 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 an-9. tenna 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* RA = Reading Amplitude AF = Antenna Factor

CL = Cable Attenuation Factor (Cable Loss) AG = Amplifier Gain

The limit of the emission level is expressed in dBuV/m, which converts $20^{\circ}\log(uV/m)$

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

Pre-scanned was done at frequency 5.47 GHz and 5.85 GHz for bandedge measurement of straddle channels 138, 142 and 144 which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

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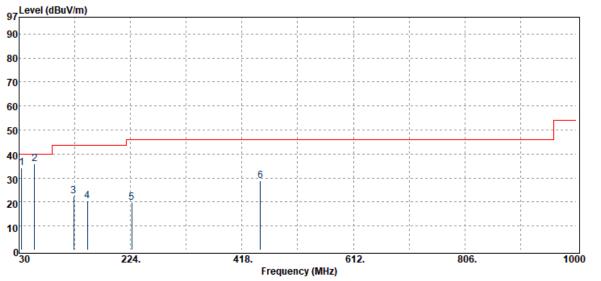
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11.7 **Radiated Spurious Emission Measurement Result**

11.7.1 Below 1GHz Worst-Case Data:

Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5220 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
34.85	Peak	43.33	-9.00	34.33	40.00	-5.67
57.16	Peak	44.38	-8.53	35.85	40.00	-4.15
125.06	Peak	31.76	-9.19	22.57	43.50	-20.93
149.31	Peak	28.00	-7.37	20.63	43.50	-22.87
225.94	Peak	29.01	-9.30	19.71	46.00	-26.29
450.01	Peak	31.44	-2.57	28.87	46.00	-17.13

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5220 MHz :Tx CH Mid :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONTA :Nick	AL.
97 Level (dBuV/m)						
90						
80				·		
70				·		
60						
50						
40		5	6			
30	4	Ĩ				
20						
10						
030	224.	418. Frequency (MH	612. iz)	806.	1000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	UD	ασμν/π	ασμν/m	<u>ub</u>
57.16	Peak	32.93	-8.53	24.40	40.00	-15.60
128.94	Peak	29.67	-8.76	20.91	43.50	-22.59
143.49	Peak	29.79	-7.50	22.29	43.50	-21.21
225.94	Peak	31.74	-9.30	22.44	46.00	-23.56
450.01	Peak	31.14	-2.57	28.57	46.00	-17.43
675.05	Peak	35.01	0.86	35.87	46.00	-10.13

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2(:5580 MHz :Tx CH Mic :H Plane) z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90			· · · · · · · · · · · · · · · · · · ·			
80			· · · · · · · · · · · · · · · · · · ·			
70		JJJJJ				
60						
50						
40 2		5	6			
30	4					
20						
10						
0	224.	418. Frequency (Mi	612. Hz)	806.	1000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level	dB	FS dBu\//m	@3m	dB
	PN/QP/AV	dBµV	uр	dBµV/m	dBµV/m	uБ
37.76	Peak	41.15	-8.71	32.44	40.00	-7.56
57.16	Peak	44.61	-8.53	36.08	40.00	-3.92
125.06	Peak	31.81	-9.19	22.62	43.50	-20.88
225.94	Peak	29.04	-9.30	19.74	46.00	-26.26
450.01	Peak	31.47	-2.57	28.90	46.00	-17.10
618.79	Peak	29.46	-0.55	28.91	46.00	-17.09

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f (886-2) 2298-0488

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5580 MHz :Tx CH Mic :H Plane	2		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT :Nick	AL
97 Level (dBuV/m)						
90 80						
70						
60 50						
40			6			
30 1 20	4					
10						
0 <mark></mark> 30	224.	418. Frequency (M	612. Hz)	806.	1000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
57.16	Peak	32.67	-8.53	24.14	40.00	-15.86
127.00	Peak	30.20	-8.87	21.33	43.50	-22.17
163.86	Peak	27.98	-7.36	20.62 21.76	43.50 46.00	-22.88
225.94 450.01	Peak Peak	31.06 29.93	-9.30 -2.57	27.36	46.00 46.00	-24.24 -18.64
675.05	Peak	30.53	0.86	31.39	46.00	-14.61

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Test Date



:ER-2020-30136

Report Number

•		:802.11n20 :5785 MHz :Tx CH Mid :H Plane	2		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 <mark>-</mark> 90	evel (dBuV/m)						
90 80							
70							
60							
50							
40 1 30	2		6				
20	3	4	5				
10							
0	0 0	224.	418. Frequency (M	612. Hz)	806.	1000	
F	req.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
N	ЛНz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
3.	7.76	Peak	41.25	-8.71	32.54	40.00	-7.46
5	7.16	Peak	44.45	-8.53	35.92	40.00	-4.08
12	25.06	Peak	31.66	-9.19	22.47	43.50	-21.03
	2.50	Peak	28.62	-6.91	21.71	46.00	-24.29
35	54.95	Peak	28.14	-4.93	23.21	46.00	-22.79
45	50.01	Peak	32.02	-2.57	29.45	46.00	-16.55

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SGS Taiwan Ltd.

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2(:5785 MHz :Tx CH Mic :H Plane	Z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT :Nick	AL
97 Level (dBuV/m)						
90						
80						
70						
60						
50						
40			_ 6			
30 1 2	3	4				
20						
10						
0 <mark></mark> 30	224.	418. Frequency (N	612. /Hz)	806.	1000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
·	Mode	Reading Level		FS	@3m	-
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
57.40	Deale	00 54	0.50	05.04	40.00	44.00
57.16 138.64	Peak Peak	33.54 28.56	-8.53 -7.71	25.01 20.85	40.00 43.50	-14.99 -22.65
225.94	Peak	32.14	-9.30	20.85	46.00	-22.05
450.01	Peak	31.09	-2.57	28.52	46.00	-17.48
576.11	Peak	28.66	-0.42	28.24	46.00	-17.76
675.05	Peak	30.31	0.86	31.17	46.00	-14.83

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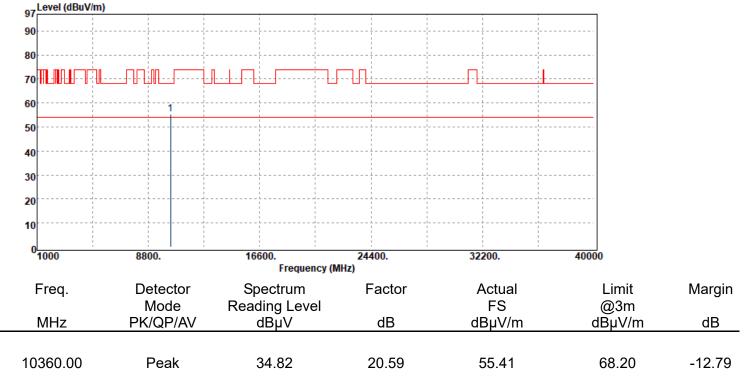
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11.7.2 Above 1GHz Worst-Case Data:

Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5180 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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Test Date



:ER-2020-30136

Report Number

Operation Test Freq Test Mod EUT Pol	luency	:802.11 :5180 M :Tx CH :H Plar	//Hz Low					Temp./Hu Antenna Engineer setting	Pol.	21.2/72 HORIZO Nick 6	NTAL
o7	(dBuV/m)										
90											
							1				
80	╷╻┌──┐┌┼┐╖						1 1 1		1		
70	[] <u>H</u> - <u>+</u>]+	╶┥╴┟╴╁╘╢╫┼╌╌┥╶╶╴ ┆	<u>-</u>								
60		1					!				
50	·						 	·			
40	·	· · · · · · · · · · · · · · · · · · ·		 			 	· 1			
30								·			
20							 				
							1 1 1				
10	1						 				
0 <u>1000</u>		8800.	160	500. Frequen		400.		32200.	4	0000	
Freq	.	Detecto		ectrum		actor		Actual		Limit	Margin
		Mode		ling Leve	1			FS		@3m	
MHz	2	PK/QP/A	V o	dBμV		dB		dBµV/m		dBµV/m	dB
10360	.00	Peak		34.62	2	20.59		55.21		68.20	-12.99

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SGS Taiwan Ltd.

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2 :5220 MH :Tx CH M :H Plane	lz		A	emp./Humi. Intenna Pol. Ingineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)							
80							
70 	J-U-t:WtJ1	<u>-] </u>	· {-} { { { { { { { {-				
50 40							
30							
20							
0 1000	8800.	16600. Frequei	24400 ncy (MHz)). 32	2200.	40000	
Freq.	Detector Mode	Spectrum Reading Leve		ctor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV		B d	BµV/m	dBµV/m	dB
10440.00	Peak	35.04	21	.08	56.12	68.20	-12.08

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5220 MHz :Tx CH Mic :H Plane	<u>r</u>			A	emp./Hu ntenna f ngineer	Pol. :H	21.2/72 IORIZON [⊤] Jick	ΓAL
97 Level (dBuV/m)									
90							1 1 1		
70	- - <u> </u> - - - - - - - - - -						· · · · · · · · · · · · · · · · · · ·	<u>··</u>	
60	1		, , , , , , , , , , , , , , , , , , ,					_	
50							 		
40	L J		, , , , , , , , , , , , , , , , , , ,						
30									
20					- 		 		
10					 	 	 		
0	8800.	16600.	244	00	22	200.	400	200	
1000	0000.		icy (MHz)	00.	32	200.	400	00	
Freq.	Detector	Spectrum		actor	/	Actual		Limit	Margin
MHz	Mode PK/QP/AV	Reading Leve dBµV		dB	d	FS BµV/m		@3m dBµV/m	dB
10440.00	Peak	34.26	2	1.08	:	55.34		68.20	-12.86

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SGS Taiwan Ltd.

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2 :5240 MH :Tx CH Hi :H Plane	z		A	emp./Humi. ntenna Pol. ngineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)	i i	i	i i	i	i i		
90							
80		·····			· · · · · · · · · · · · · · · · · · ·		
70	<u>∃-U-ti₩t</u> jt-	 	·				
60	1						
50							
40							
30							
20							
10							
01000	8800.	16600. Freque	24400. ncy (MHz)	32	200.	40000	
Freq.	Detector	Spectrum	Fac	tor A	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Lev dBµV	el dE	3 dl	FS BµV/m	@3m dBµV/m	dB
10480.00	Peak	34.50	21.2	21	55.71	68.20	-12.49

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SGS Taiwan Ltd. 台灣檢驗科技股份有限公司

f (886-2) 2298-0488

www.tw.sgs.com

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5240 MHz :Tx CH Hig :H Plane	Z		Temp./Hu Antenna I Engineer		.2/72 DRIZONT/ ck	AL.
97 <mark>Level (dBuV/m)</mark>				iii	;]		
90							
80							
70	-]- +	┠╴╺┟╴╻╴╸					
60	···· 1						
50							
40							
30					 		
20							
10							
0 <mark>1000</mark>	8800.	16600. Frequen	24400. cy (MHz)	32200.	4000	0	
Freq.	Detector	Spectrum	Factor	Actual		Limit	Margin
MHz	Mode PK/QP/AV	Reading Leve dBµV	l dB	FS dBµV/m		@3m BµV/m	dB
10480.00	Peak	34.64	21.21	55.85		68.20	-12.35

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5500 MHz :Tx CH Low :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70	$\frac{1}{1}$			F		
60	22					
50						
40						
30						
20						
10						
0L 1000	8800.	16600. Frequency	24400. (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz F	Mode F PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
	Average Peak	22.86 34.63	23.37 23.37	46.23 58.00	54.00 74.00	-7.77 -16.00
11000.00	Peak	34.63	23.37	58.00	74.00	-16.00

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Test Date



:ER-2020-30136

Report Number

Operation Me Test Frequer Test Mode EUT Pol		Hz .ow		Temp./Humi Antenna Pol Engineer		AL
97 Level (dBu\	//m)					
90						
80 70			·····			
60	2222222					
50	· · · · · · · · · · · · · · · · · · ·					
40						
30						
20						
10						
0 ^L 1000	8800.	16600. Frequen	24400. cy (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Leve	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV		dB	dBµV/m	dBµV/m	dB
11000.00 11000.00	Average Peak	23.25 33.53	23.37 23.37	46.62 56.90	54.00 74.00	-7.38 -17.10

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5580 MHz :Tx CH Mic :H Plane	2		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90	· · · · · · · · · · · · · · · · · · ·					
80	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
70						
60	2					
50						
40	· · · · · · · · · · · · · · · · · · ·					
30			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
20		·		·		
10						
0L 1000	8800 .	16600. Frequency	24400. y (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00 11160.00	Average Peak	23.22 33.83	22.20 22.20	45.42 56.03	54.00 74.00	-8.58 -17.97

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2 :5580 MH :Tx CH Mi :H Plane	Z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT :Nick	AL
97 Level (dBuV/m)						
90						
80						
70		<u></u>		F		
60	2					
50		· · · · · · · · · · · · · · · · · · ·				
40		·				
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequence	24400. cy (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Love	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	Reading Leve dBµV	dB	dBµV/m	@3m dBµV/m	dB
11160.00 11160.00	Average Peak	23.27 33.63	22.20 22.20	45.47 55.83	54.00 74.00	-8.53 -18.17
11100.00	i our	00.00		00.00	14.00	10.17

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5700 MHz :Tx CH High :H Plane	ı		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70						
60	2					
50						
40						
30						
20						
10						
0	8800.	16600. Frequency	24400. (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11400.00	Average	22.90	22.22	45.12	54.00	-8.88
11400.00	Peak	33.14	22.22	55.36	74.00	-18.64

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5700 MHz :Tx CH Hig :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT/ :Nick	AL
97 Level (dBuV/m)						
90						
80						
70			-111			
60	2					
50	····					
40						
30						
20	· · · · · · · · · · · · · · · · · · ·					
10	· · · · · · · · · · · · · · · · · · ·					
0 <mark></mark>	8800.	16600.	24400.	32200.	40000	
1000	8800.	Frequenc		52200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		•		•	•	
11400.00	Average	22.97	22.22	45.19	54.00	-8.81
11400.00	Peak	35.01	22.22	57.23	74.00	-16.77

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Test Date



:ER-2020-30136

Report Number

	2/72 RTICAL k
97 Level (dBuV/m)	
90	
80	
┲╍╫╢╢╢╎╫╌╢┊╢╌╌╌┚╌╟╵┊╢╎╌┚╌╌╌┥╢╌╌┟╌╹╌╞┊╌┚╴╌╌╌╴┊╌╲┎╴╴╲┛╏┊╌╌╌╴╴╴┊╴╴╴╸╸╸╸╸╸╸╸╸╸╸╸╸╸	
60	
50	
40	
30	
20	
10	
0 1000 8800. 16600. 24400. 32200. 40000 Frequency (MHz)	
	imit Margin
	⊉3m 8µV/m dB
	4.00
0	4.00 -9.03 4.00 -17.74

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SGS Taiwan Ltd. 台灣檢驗科技股份有限公司

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5720 MHz :Tx CH High :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT/ :Nick	AL
97 Level (dBuV/m)						
90						
80						
70		L.I	-1_F1_F1	F		
60	2					
50						
40						
30						
20						
10						
0	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz F	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11440.00	Average	00.07	22.66	45.03	54.00	-8.97
11440.00	Average Peak	22.37 33.53	22.66 22.66	45.03 56.19	54.00 74.00	-8.97 -17.81

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SGS Taiwan Ltd. 台灣檢驗科技股份有限公司

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5745 MHz :Tx CH Low :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90	· · · · · · · · · · · · · · · · · · ·					
80						
70	₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	L		F	· ·	
60	·····2·····					
50						
40						
30	· · · · · · · · · · · · · · · · · · ·					
20						
10						
0 <mark></mark>	8800.	16600. Frequency	24400. (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
44400.00			00.04		54.00	
11490.00 11490.00	Average Peak	22.89 33.97	23.24 23.24	46.13 57.21	54.00 74.00	-7.87 -16.79

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5745 MHz :Tx CH Lov :H Plane	2		Temp./Humi. Antenna Pol. Engineer		AL
97 Level (dBuV/m)						
90						
80						
70	<u>_</u>	L	-1_F1_F1			
60	2			· · · · · · · · · · · · · · · · · · ·		
50				· · · · · · · · · · · · · · · · · · ·		
40						
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	Reading Level dBµV	dB	dBµV/m	@3m dBµV/m	dB
	_					
11490.00 11490.00	Average Peak	23.22 34.19	23.24 23.24	46.46 57.43	54.00 74.00	-7.54 -16.57
11100.00	i oun	01110	20.21	07.10	1 1.00	10.01

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5785 MHz :Tx CH Mid :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80	· · · · · · · · · · · · · · · · · · ·					
70			-1_F1_Ft			
60	2					
50		·				
40						
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequenc	24400. sy (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11570.00 11570.00	Average Peak	23.21 35.13	22.01 22.01	45.22 57.14	54.00 74.00	-8.78 -16.86
11070.00	i can	55.15	22.01	57.14	74.00	-10.00

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n2 :5785 MH: :Tx CH Mi :H Plane	z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT :Nick	AL
97 Level (dBuV/m)						
90						
80	· · · · · · · · · · · · · · · · · · ·					
70			-1-F1-F	F		
60	2					
50						
40	·					
30						
20						
10						
0	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
	<u>.</u>					
11570.00 11570.00	Average Peak	23.63 35.01	22.01 22.01	45.64 57.02	54.00 74.00	-8.36 -16.98
11370.00	rean	33.01	22.01	01.02	74.00	-10.90

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5825 MHz :Tx CH High :H Plane	1		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70			l-Fl-Fl		· ·	
60	2					
50						
40						
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequency	24400. (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11650.00	Average Peak	23.71	22.45	46.16	54.00	-7.84
11650.00	reak	33.21	22.45	55.66	74.00	-18.34

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n20 :5825 MHz :Tx CH High :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONTAL :Nick
97 					
90					
80					
70	┟╴ᡶ┊╢┨╌╌┨╌╌╌╌┤╌╢╴╌╴┟╌	·			
60	2				
50		· · · · · · · · · · · · · · · · · · ·			
40					
30					
20					
10					
0	8800.	16600. Frequency	24400. (MHz)	32200.	40000
Freq.	Detector Mode R	Spectrum eading Level	Factor	Actual FS	Limit Margin @3m
MHz F	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m dB
11650.00	Average	24.17	22.45	46.62	54.00 -7.38
11650.00	Peak	34.18	22.45	56.63	74.00 -17.37

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n4 :5190 MH :Tx CH L :H Plane	Hz ow					Temp./Hu Antenna Engineer	Pol. :	21.2/72 VERTICAL Nick	
97 Level (dBuV/m)										
80										
70 11 - 11 - 1 - 1		Ĵ_ <u>N</u> ŀ_ <u></u>								
60	1									
50		 	 	 	 	 				
40				1 1 1 1 1 1	1 1 1 	 				
30				, , , , , ,	, , , , , , , , , , , , , , , , , , ,	- - - - -				
20			 	 	 	 		 - 		
10		 	 	 	 	 				
0 <mark></mark>	8800.	160	500. Frequer	244 1cy (MHz)	400.		32200.	4	0000	
Freq.	Detector		ectrum		actor		Actual		Limit	Margin
MHz	Mode PK/QP/AV		ling Leve dBµV	el	dB		FS dBµV/m		@3m dBµV/m	dB
10380.00	Peak	:	34.48		20.61		55.09		68.20	-13.11

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency	:802.11n40 :5190 MHz			Temp./Humi. Antenna Pol.	:21.2/72 :HORIZONT	AI
Test Mode	:Tx CH Lov			Engineer	:Nick	
EUT Pol	:H Plane			Liigiireer	in them	
EUTFU	.n Fiane					
97 Level (dBuV/m)						
90						
80						
70		A- - - - --				
60	1					
50						
40						
30						
20		·····		i i i i i i		
10						
0L 1000	8800.	16600. Frequend	24400. cy (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
4.	Mode	Reading Leve		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10280.00	Dook	22 50	20.61	E4 10	69.20	14.04
10380.00	Peak	33.58	20.61	54.19	68.20	-14.01

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SGS Taiwan Ltd.

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n4 :5230 MH :Tx CH Hi :H Plane	z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)	ii	i	i i	i i i		
90						
80		·····				
70	<u></u> ┫╴┠╴┠┊╫┠╌╌┨╴╴╴╴╶┨╴	<u> </u> <u></u>	······			
60	1					
50			J I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I			
40			J , , , , , , , , , , , , , , , , , , ,			
30			· · · · · · · · · · · · · · · · · · · ·			
20			· · · · · · · · · · · · · · · · · · ·			
10			· · · · · · · · · · · · · · · · · · ·			
0 <mark>. 1000</mark>	8800.	16600. Freque	24400. ncy (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	Reading Leve dBµV	dB	dBµV/m	@3m dBµV/m	dB
10460.00	Peak	34.05	21.20	55.25	68.20	-12.95

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5230 MHz :Tx CH High :H Plane	ı			Aı	emp./Hu ntenna F ngineer	Pol.	21.2/72 HORIZON Nick	TAL
97 <mark>Level (dBuV/m)</mark>			i				1		
90	· · · · · · · · · · · · · · · · · · ·					 	 		
80							 		
70									
60	1						, , , , ,		
50						 	 		
40							 		
30	·····						 		
20	·····						!		
10									
0							-		
0 ¹ 1000	8800.	16600. Frequen	244 cy (MHz)	00.	32	200.	4	0000	
Freq.	Detector	Spectrum		actor	A	octual		Limit	Margin
MHz	Mode PK/QP/AV	Reading Leve dBµV		dB	d	FS 3µV/m		@3m dBµV/m	dB
10460.00	Peak	33.77	2	1.20	Ę	54.97		68.20	-13.23

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5510 MHz :Tx CH Lov :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70			-1_F1_F1++			
60	2					
50						
40						
30		i	iiiiiiii			
20						
10						
0	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11020.00 11020.00	Average Peak	22.99 33.28	22.85 22.85	45.84 56.13	54.00 74.00	-8.16 -17.87

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5510 MHz :Tx CH Low :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONTAL :Nick	
97 Level (dBuV/m)						
90						
80						
70	┟╴ᡶ┊╢┨╶╌╶╴╌╶┥╴╢╴╌┟╶╶┤			F1		
60	2					
50						
40						
30						
20			 			
10						
0	8800. 16	600. 244 Frequency (MHz)	400.	32200.	40000	
Freq.		bectrum F ding Level	actor	Actual FS	Limit I @3m	<i>l</i> argin
MHz F		dBµV	dB	dBµV/m	dBµV/m	dB
11020.00	Average	22.85 2	22.85	45.70	54.00	-8.30
11020.00	0		22.85 22.85	45.70 57.86		-6.30 16.14

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5550 MHz :Tx CH Mid :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)				······		
90						
80						
70			-1	·····		
60	2					
50						
40	· · · · · · · · · · · · · · · · · · ·					
30	· · · · · · · · · · · · · · · · · · ·					
20						
10						
0 <mark></mark>	8800.	16600. Frequence	24400. cy (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Leve		Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11100.00 11100.00	Average Peak	23.03 33.32	21.82 21.82	44.85 55.14	54.00 74.00	-9.15 -18.86

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5550 MHz :Tx CH Mid :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONTAL :Nick	
97 Level (dBuV/m)						
90						
80						
70		J				
60	2					
50						
40						
30						
20						
10						
0 ^L 1000	8800.	16600. Frequency (M	24400. Hz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit Mar	rgin
		eading Level		FS	@3m dDuV//m	п
MHz F	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m dl	D
11100.00	Average	23.05	21.82	44.87	54.00 -9.	13
11100.00	Peak	33.11	21.82	54.93	74.00 -19	

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5670 MHz :Tx CH Hig :H Plane	2		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70			·			
60	2					
50		·				
40						
30						
20						
10						
0 ^L 1000	8800.	16600. Frequency	24400. / (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11340.00	Average	23.05	22.34	45.39	54.00	-8.61
11340.00	Peak	33.63	22.34	55.97	74.00	-18.03

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Test Date



:ER-2020-30136

Report Number

Operation M Test Freque Test Mode EUT Pol		:802.11n :5670 Mł :Tx CH F :H Plane	⊣z ligh					Temp./Hu Antenna Engineer	Pol.	:21.2/72 :HORIZON :Nick	ITAL
97 Level (dBu	IV/m)										
90											
80		<mark> </mark>						1 1 1 1 1 1 1 1			
70	╷ ╷╢╶┊┥ <mark>╟╶╴╴╴╴</mark> ╶╿										
60		2									
50				· · · · · · · · · · · · · · · · · · ·				 			
40											
30											
20	 						 				
10											
0 <mark></mark>	1	8800.	46	600.	24	100.		32200.		40000	
1000		0000.	100	Frequenc		ω.		52200.		40000	
Freq.		Detector		ectrum		actor		Actual		Limit	Margin
MHz	F	Mode PK/QP/AV		ding Level dBµV		dB		FS dBµV/m		@3m dBµV/m	dB
				·						•	
11340.00		Average		22.94		2.34		45.28		54.00	-8.72
11340.00		Peak		33.12	2	2.34		55.46		74.00	-18.54

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5710 MHz :Tx CH Higl :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 						
90						
80						
70			<u> </u>	·····		
60	2					
50						
40						
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequency	24400. (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11420.00	Average	22.81	22.44	45.25	54.00	-8.75
11420.00	Peak	33.13	22.44	55.57	74.00	-18.43

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n4 :5710 MH :Tx CH Hi :H Plane	Z		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT/ :Nick	ΑL
97 Level (dBuV/m)						
90						
80						
70			-1-F1-FL			
60	2					
50						
40						
30						
20						
10						
0 <mark></mark> 1000	8800.	16600. Frequence	24400. :y (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11420.00	Average	22.79	22.44	45.23	54.00	-8.77
11420.00	Peak	34.09	22.44	56.53	74.00	-17.47

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5755 MHz :Tx CH Low :H Plane	,		Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70	-]-!:					
60	2					
50						
40						
30						
20						
10						
0 1000	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11510.00	Average	22.68	23.13	45.81	54.00	-8.19
11510.00	Peak	33.61	23.13	56.74	74.00	-17.26

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Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5755 MHz :Tx CH Lov :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :HORIZONT :Nick	AL
97 Level (dBuV/m)						
90			·			
80						
70						
60	2					
50	L					
40						
30						
20						
10						
0 <mark></mark>	8800.	16600. Frequenc	24400. cy (MHz)	32200.	40000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11510.00	Average	22.72	23.13	45.85	54.00	-8.15
11510.00	Peak	33.15	23.13	56.28	74.00	-17.72

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SGS Taiwan Ltd.

Test Date



:ER-2020-30136

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:802.11n40 :5795 MHz :Tx CH Higl :H Plane			Temp./Humi. Antenna Pol. Engineer	:21.2/72 :VERTICAL :Nick	
97 Level (dBuV/m)						
90						
80						
70	-]-l,ML	<u></u>		·····		
60	2					
50						
40						
30						
20						
10						
0 <mark></mark> 1000	8800.	16600. Frequenc	24400. y (MHz)	32200.	40000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
11590.00 11590.00	Average Peak	23.21 34.32	21.84 21.84	45.05 56.16	54.00 74.00	-8.95 -17.84
11000.00	i car	JH.JZ	21.04	50.10	74.00	-17.04

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SGS Taiwan Ltd. 台灣檢驗科技股份有限公司

Test Date



:ER-2020-30136

Report Number

Operation Test Freq Test Mode EUT Pol	uency	:802.11n4 :5795 MH :Tx CH H :H Plane	łz		Temp./l Antenn Engine	a Pol. :H	1.2/72 ORIZONT ick	AL
97 Level (dBuV/m)						_	
90								
80								
70								
60		2						
50			, , , , , , , , , , , , , , , , , , ,					
40								
30								
20								
10								
0 <mark></mark>	1	8800.	16600. Free	24400. quency (MHz)	32200.	4000	00	
Freq		Detector	Spectrur		r Actual		Limit	Margin
MHz	, r	Mode	Reading Lo	evel dB	FS dBu\//m		@3m	dD
	. r	PK/QP/AV	dBµV	UD	dBµV/n	<u> (</u>	dBµV/m	dB
11590.	00	Average	23.30	21.84	45.14		54.00	-8.86
11590.		Peak	33.50	21.84	55.34		74.00	-18.66

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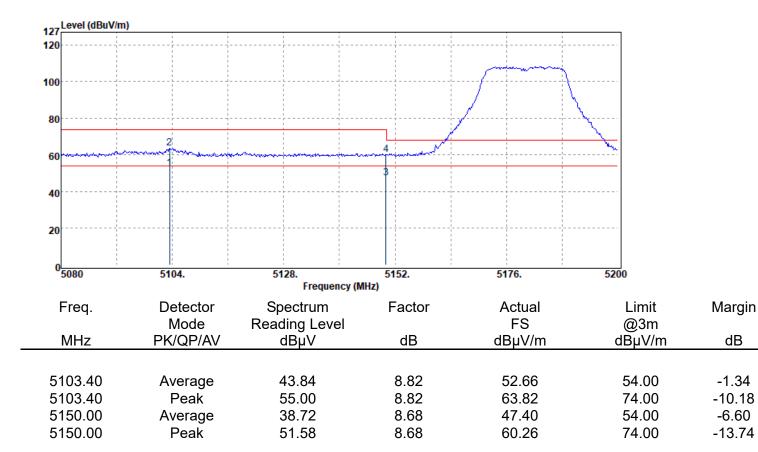
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11.7.3 Band edge falling to restricted band

Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5180 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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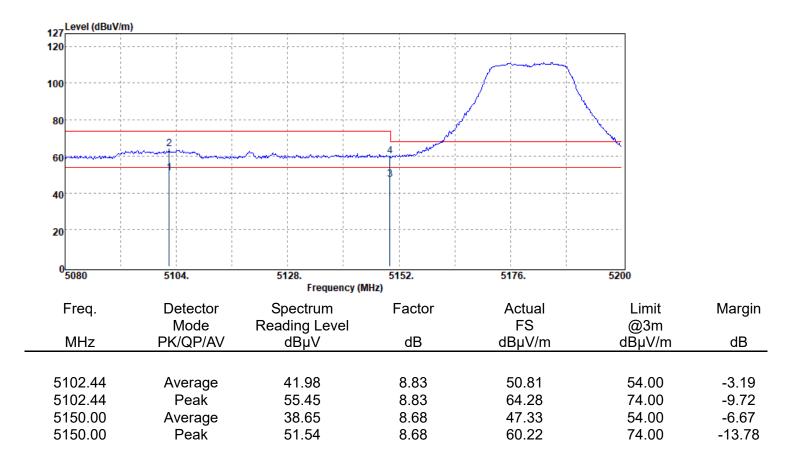
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5180 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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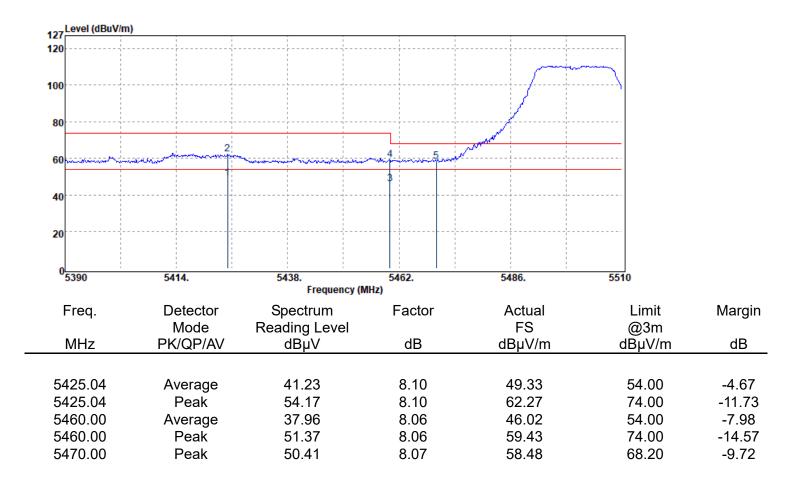
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5500 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only

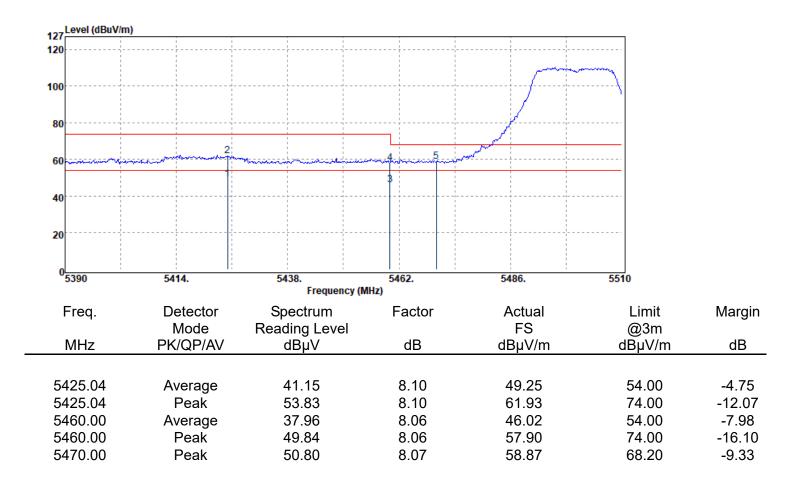
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5500 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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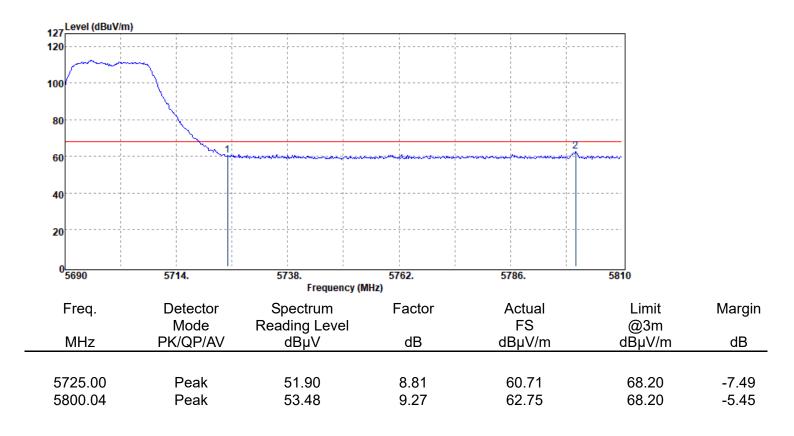
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5700 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



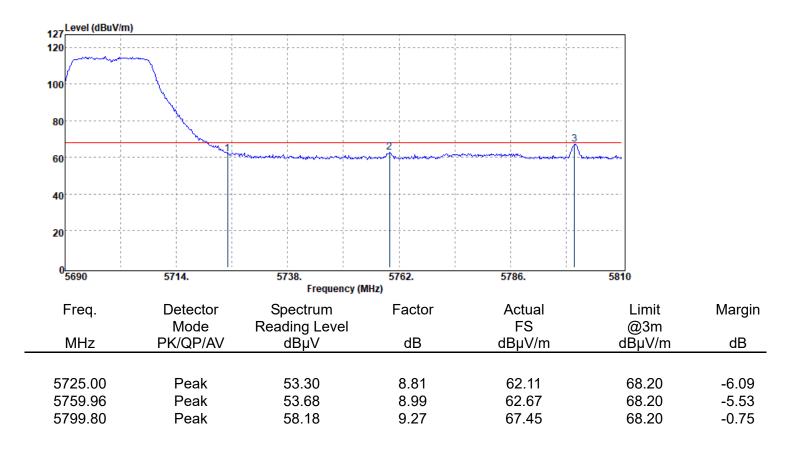
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5700 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



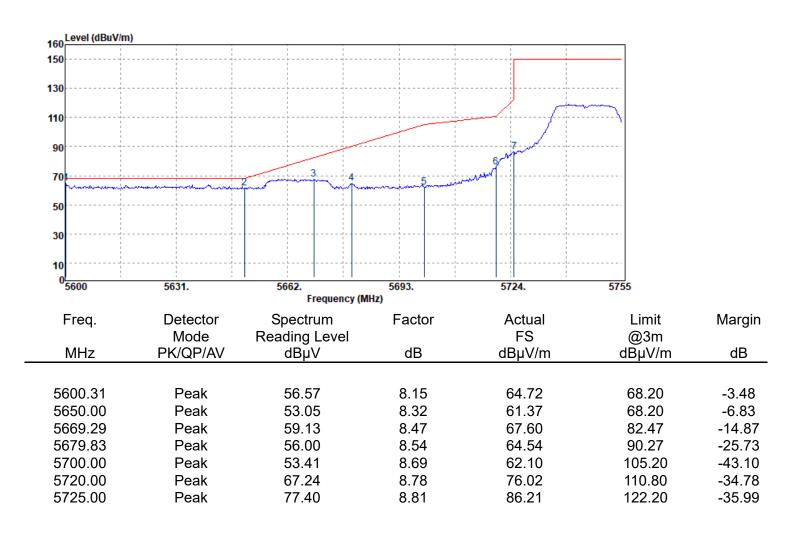
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5745 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



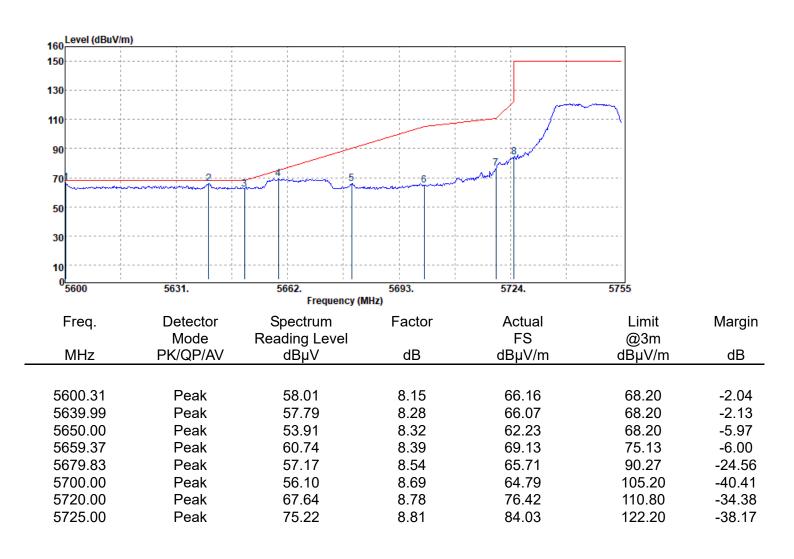
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5745 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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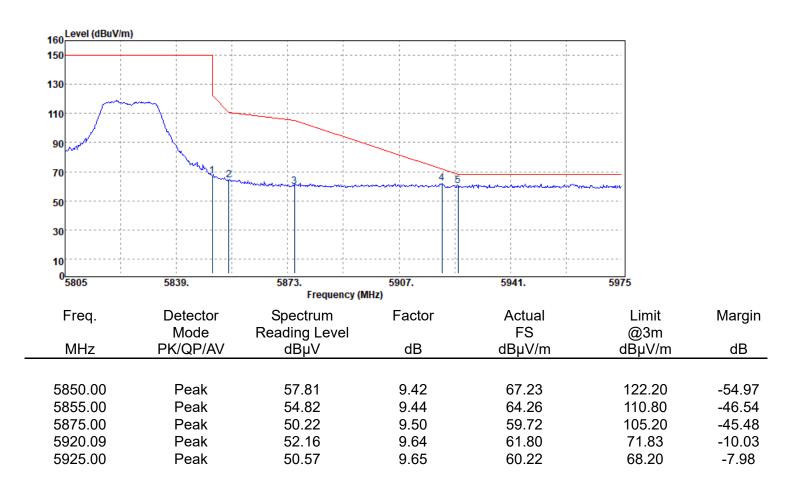
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5825 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



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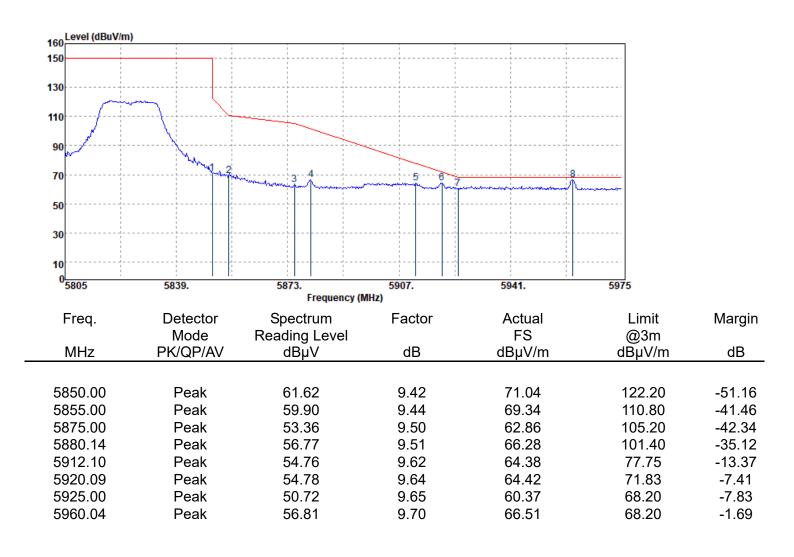
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n20	Temp./Humi.	:21.2/72
Test Frequency	:5825 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



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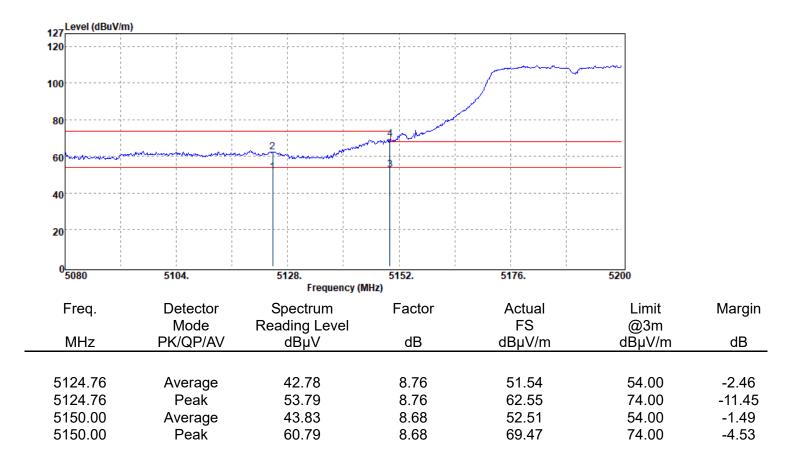
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5190 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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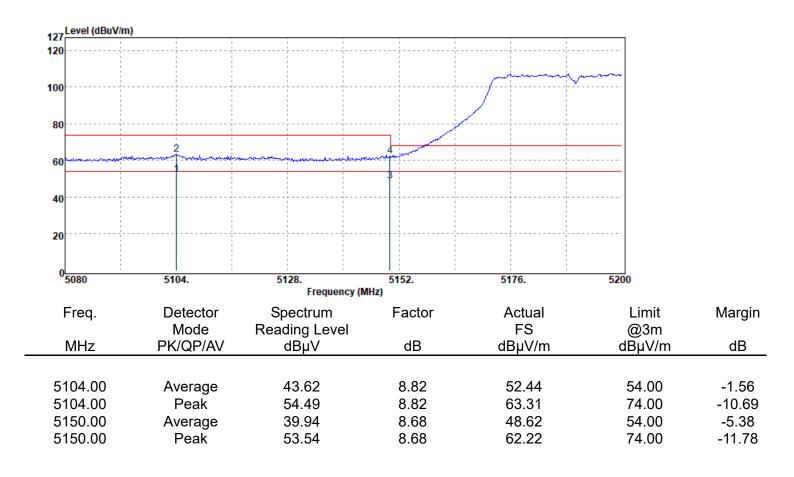
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5190 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



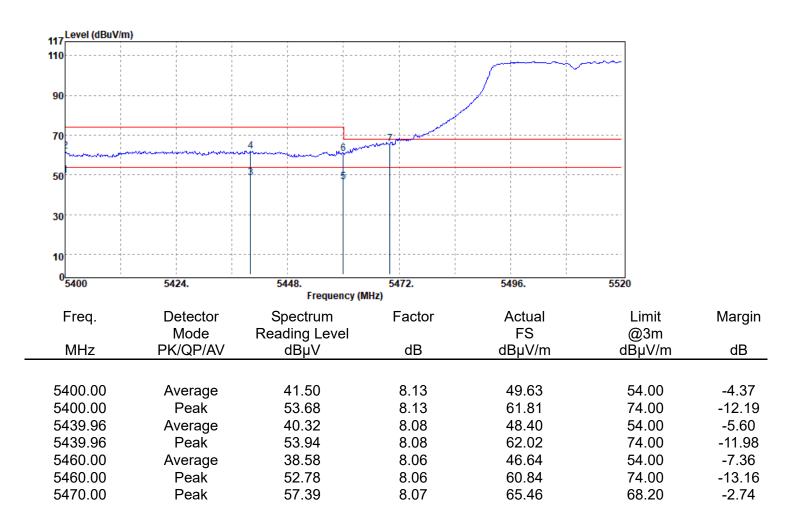
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5510 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



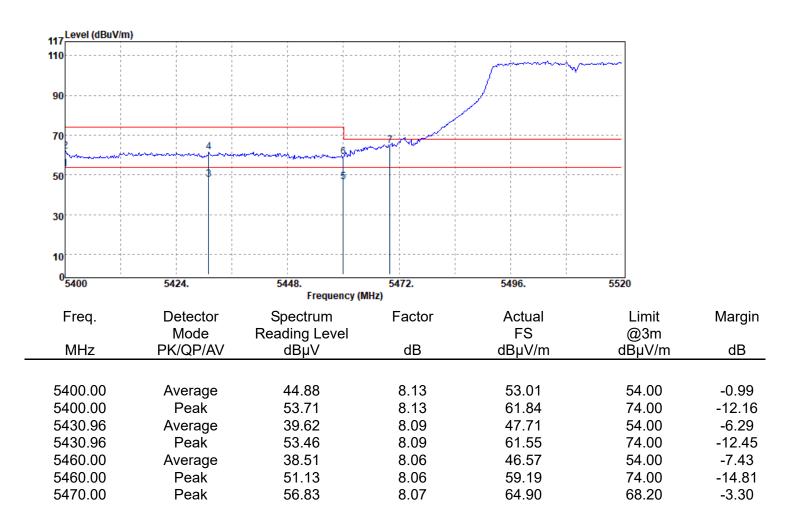
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5510 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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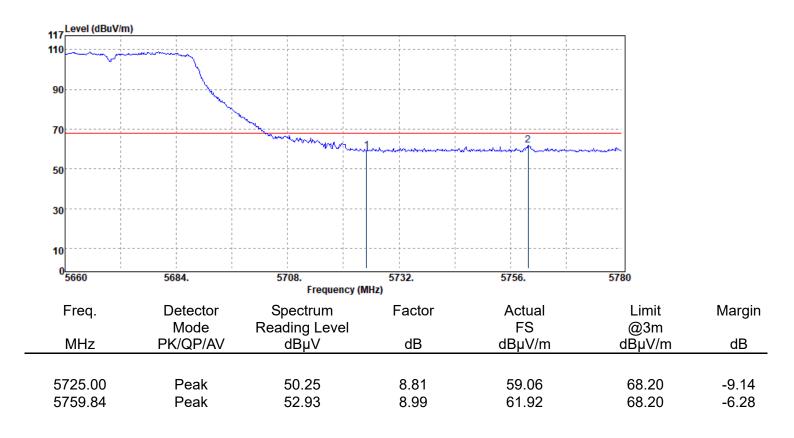
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5670 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		

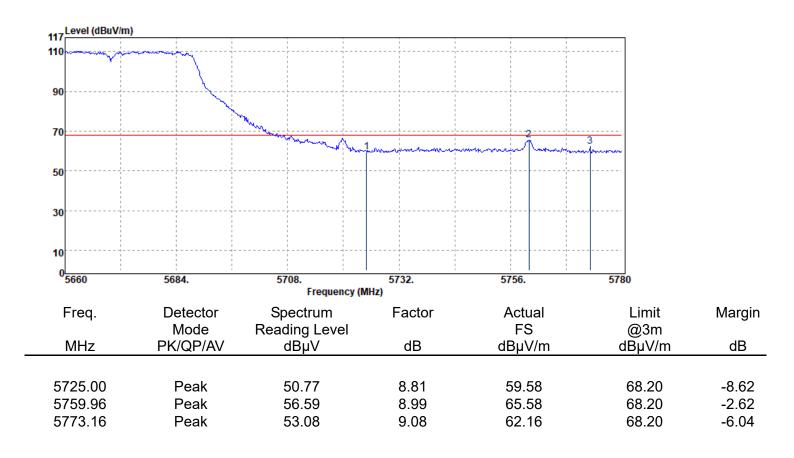


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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5670 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		

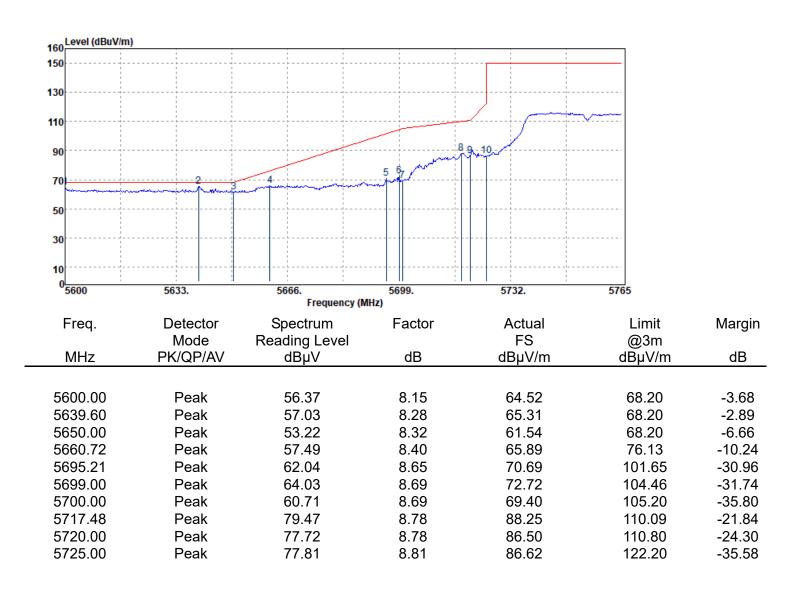


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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5755 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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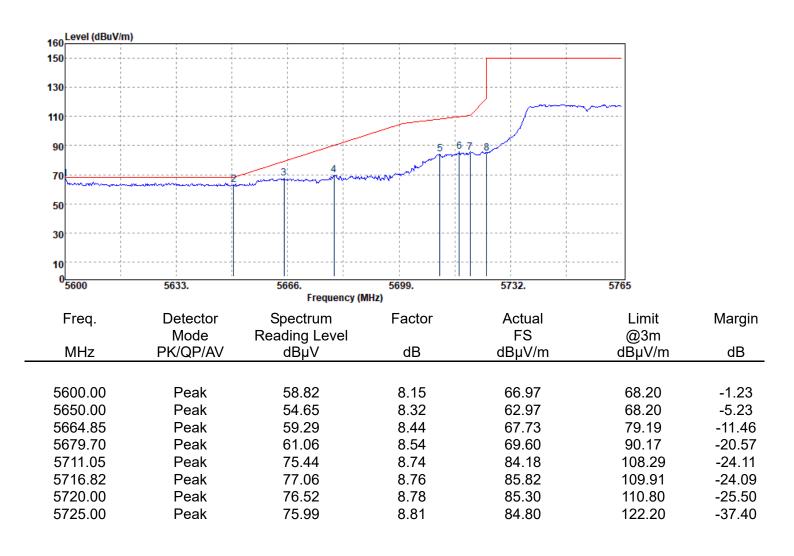
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SGS Taiwan Ltd



Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5755 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



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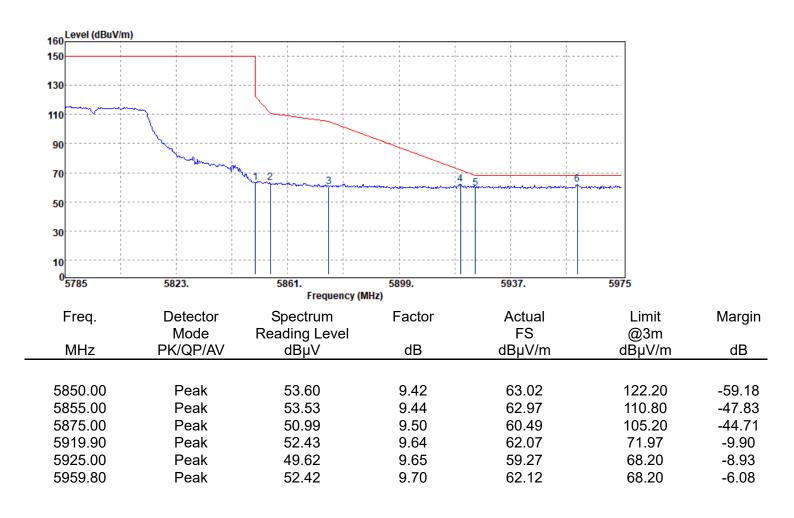
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台灣檢驗科技股份有限公司

SGS Taiwan Ltd



Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5795 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



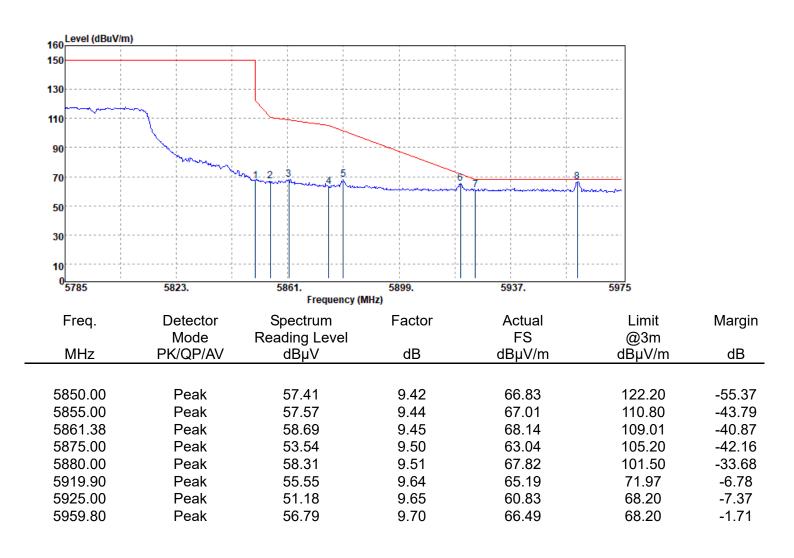
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Report Number	:ER-2020-30136	Test Date	:2020-04-09
Operation Mode	:802.11n40	Temp./Humi.	:21.2/72
Test Frequency	:5795 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



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12 TRANSMISSION IN THE ABSENCE OF DATA

12.1 **Standard Applicable**

According to §15.407(c)

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

12.2 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 FREQUENCY STABILITY

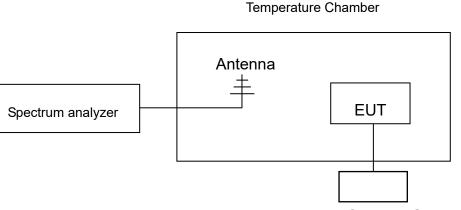
Standard Applicable 13.1

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

13.2 **Measurement Procedure**

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

Test SET-UP 13.3



Variable AC Power Supply

13.4 **Measurement Equipment Used:**

SGS Conducted Room						
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due	
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2019	05/16/2020	
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021	
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021	
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021	

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13.5 **Measurement Result**

Start up

Operation Mode	802.11 n	Test Date	2020.04.20
Temperature	: 25°C	Test By	Tom
Humidity	: 51%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
0	24	36	5180	5,179.91600	0.00001622
0	24	36	5180	5,180.05300	-0.00001023
25	24	36	5180	5,180.06200	-0.00001197
FO	24	36	5180	5,179.94600	0.00001042
50	24	36	5180	5,179.98700	0.00000251

2 minutes

Operation Mode	802.11 n	Test Date	2020.04.20
Temperature	: 25°C	Test By	Tom
Humidity	: 51%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
0	24	36	5180	5,179.96400	0.00000695
0	24	36	5180	5,180.07400	-0.00001429
25	24	36	5180	5,179.96200	0.00000734
50	24	36	5180	5,180.08000	-0.00001544
50	24	36	5180	5,180.01600	-0.00000309

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5 minutes

Operation Mode	802.11 n	Test Date	2020.04.20
Temperature	: 25°C	Test By	Tom
Humidity	: 51%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
0	24	36	5180	5,179.90000	0.00001931
0	24	36	5180	5,180.05600	-0.00001081
25	24	36	5180	5,179.97300	0.00000521
50	24	36	5180	5,180.02100	-0.00000405
50	24	36	5180	5,180.09500	-0.00001834

10 minutes

Operation Mode	802.11 n	Test Date	2020.04.20
Temperature	: 25°C	Test By	Tom
Humidity	: 51%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
0	24	36	5180	5,179.98000	0.0000386
0	24	36	5180	5,180.07900	-0.00001525
25	24	36	5180	5,180.03100	-0.00000598
50	24	36	5180	5,179.93500	0.00001255
	24	36	5180	5,179.97800	0.00000425

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14 ANTENNA REQUIREMENT

14.1 **Standard Applicable**

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

According to §15.407, If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

14.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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