

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

	OF
Applicant:	Harman International Industries Incorporated
	636, Ellis St, Mountain View, CA 94043, USA
Product Name:	Sprint Drive
Brand Name:	Sprint Drive
Model No.:	HSA-15US-AA
Model Difference:	N/A
FCC ID:	2AHPN-HSA-15US-AA
Report Number:	E2/2018/70104
FCC Rule Part:	§15.247, Cat: DTS
Issue Date:	Aug. 31, 2018
Date of Test:	Aug. 10, 2018 ~ Aug. 22, 2018
Date of EUT Received:	Aug. 10, 2018

We hereby certify that:

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

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

Tested By:

Aken Huana

Aken Huang / Engineer

Approved By:

Jim Chang / Manager



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Revision History

Report Numb	er Revisior	Description	Effected Page	Issue Date	Revised By
E2/2018/701	04 Rev.00	Initial creation of docu- ment	All	Aug. 31, 2018	Elle Chang

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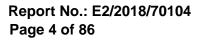


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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Sprint Drive
Brand Name:	Sprint Drive
Model No.:	HSA-15US-AA
Model Difference:	N/A
Hardware Version:	VS.0
Software Version:	HSA-15US_81_LA301_R03B
Power Supply:	3.7Vdc from Rechargeable Li-polymer Battery or 12Vdc from vehicle battery

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	
11b/g	2412-2462	11	b: 17.36dBm g: 19.37dBm	DSSS, OFDM	
11n	HT20 2412-2462	11	HT20:19.83dBm	OFDM	
Antenna Designation: FPC Antenna, Gain: 2.5 dBi					
Modulati	on type:	n type: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transitio	n Rate:	802.11 g:	1/2/5.5/11 Mbps 6/9/12/18/24/36/48/54 Mbps _20MHz: 6.5 – 72.2Mbps		

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance v05

ANSI C63.10:2013

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

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Number and Designation are: 735305 / TW0002

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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

2.3.2 Radiated Emissions

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

Fig. 2-1 Conducted Emission Configuration



Fig. 2-2 Radiated Emission Configuration



Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	DELL	E5400	3704625136	Shielded	Unshielded
2.	WIFI Test Software	N/A	N/A	N/A	N/A	N/A
3.	Test tool kit	N/A	N/A	N/A	N/A	N/A

SUMMARY OF TEST RESULTS 3

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	N/A
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES 4

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3. Investigation has been done on all the possible configurations for searching the worst case.

	RADIATED EMISSION TEST: RADIATED EMISSION TEST (BELOW 1 GHz)							
MODEAVAILABLE CHANNELTESTED CHANNELMODULATIONDATA RATE (Mbps)								
802.11g 1 to 11 1,6,11 OFDM 6								

RADIATED	EMISSION	TEST:

RADIATED EMISSION TEST (ABOVE 1 GHz)								
MODE AVAILABLE TESTED MODULATION DATA RATE (Mbps)								
802.11b	1 to 11	1, 6, 11	DSSS	1				
802.11g	1 to 11	1, 6, 11	OFDM	6				
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0				

Note:

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

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ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST								
MODEAVAILABLE CHANNELTESTED CHANNELMODULATIONDATA RATE (Mbps)								
802.11b	1 to 11	1, 6, 11	DSSS	1				
802.11g	1 to 11	1, 6, 11	OFDM	6				
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0				

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty			
AC Power Line Conducted Emission	+/- 2.586 dB			
Peak Output Power	+/- 0.84 dB			
6dB Bandwidth	+/- 51.33 Hz			
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB			
Peak Power Density	+/- 1.3 dB			
Temperature	+/- 0.65 °C			
Humidity	+/- 4.6 %			
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%			

Radiated Spurious Emission:

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

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

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

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CONDUCTED EMISSION TEST 6

6.1 Standard Applicable

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

Frequency range	Limits 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						
Note								
1.The lower limit shall apply at the transition frequencies								
2. The limit decreases linearly wit	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

N/A

6.3 EUT Setup

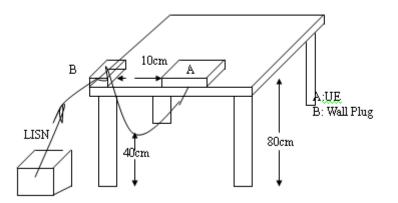
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



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

N/A, the EUT powered by DC car battery.

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DUTY CYCLE OF 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.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)	1/T (kHz)	VBW setting (kHz)
802.11b	97.50	0.11	0.12	1.00
802.11g	87.41	0.58	0.73	1.00
802.11n_20	86.48	0.63	0.78	1.00

b = 97.5%, *g* = 87.41%,*n*_*ht*_20 = 86.48% Duty Cycle Factor: 10 * log(1/0.975) = 0.11 Duty Cycle Factor: $10 * \log(1/0.8741) = 0.58$ Duty Cycle Factor: $10 * \log(1/0.8648) = 0.63$

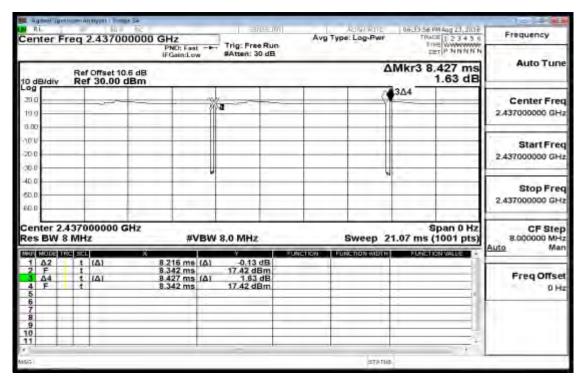
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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g

	Analysis I Tomas Sa	-	_						and the second second	10.4.6
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6 7 8 .9 10 11										

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802.11 n_20 MHz

	Annyat I Sa	_					10.4.83
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PEAK OUTPUT POWER MEASUREMENT 8

8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

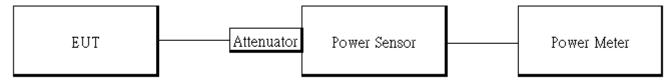
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

8.2 Measurement Equipment Used

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Power Meter	Anritsu	ML2496A	1326001	2018/08/09	2019/8/2					
Power Sensor	Anritsu	MA2411B	1315048	2018/08/09	2019/8/2					
Power Sensor	Anritsu	MA2411B	1315049	2018/08/09	2019/8/2					
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25					
Notebook	Lenovo	L420	S0011721	N/A	N/A					

8.3 Test Set-up

Power Meter:



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8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.

8.5 Measurement Result

802. 1	302.11b Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit			RESULT			
1	2412	1	16.93	1 Watt =	30.00	dBm	PASS			
6	2437	1	17.15	1 Watt =	30.00	dBm	PASS			
11	2462	1	17.36	1 Watt =	30.00	dBm	PASS			
802.1	1b Main									
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit			RESULT			
1	2412	1	14.98	1 Watt =	30.00	dBm	PASS			
6	2437	1	14.79	1 Watt =	30.00	dBm	PASS			
11	2462	1	14.88	1 Watt =	30.00	dBm	PASS			

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802.1	802.11g Main								
сн	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit			RESULT		
1	2412	6	18.44	1 Watt =	30.00	dBm	PASS		
6	2437	6	19.37	1 Watt =	30.00	dBm	PASS		
11	2462	6	19.05	1 Watt =	30.00	dBm	PASS		
802.1	l1g Main	Ì							
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit		RESULT			
1	2412	6	9.69	1 Watt =	30.00	dBm	PASS		
6	2437	6	9.96	1 Watt =	30.00	dBm	PASS		
11	2462	6	9.80	1 Watt =	30.00	dBm	PASS		

802.1	802.11n_HT20M Main								
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit			RESULT		
1	2412	MCS0	18.79	1 Watt =	30.00	dBm	PASS		
6	2437	MCS0	19.83	1 Watt =	30.00	dBm	PASS		
11	2462	MCS0	19.46	1 Watt =	30.00	dBm	PASS		
802.1	1n_HT2	OM Mair	า						
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit			RESULT		
1	2412	MCS0	9.83	1 Watt =	30.00	dBm	PASS		
6	2437	MCS0	9.98	1 Watt =	30.00	dBm	PASS		
11	2462	MCS0	9.84	1 Watt =	30.00	dBm	PASS		

* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.

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6DB BANDWIDTH MEASUREMENT 9

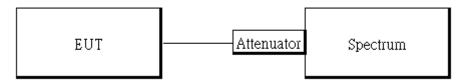
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/6/19					
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25					
DC Block	PASTERNACK	PE8210	RF29	2017/12/26	2018/12/25					
Notebook	Lenovo	L420	S0011721	N/A	N/A					

9.3 Test Set-up



9.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. For 6dB Bandwidth:

Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.

- 5. Mark the peak frequency and –6dB (upper and lower) frequency.
- 6. For 99% Bandwidth:

Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.

- 7. Turn on the 99% bandwidth function, max reading.
- 8. Repeat above procedures until all frequency of interest measured was complete.

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9.5 Measurement Result

6dB Bandwidth

802.11b Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8574.00	> 500	PASS
2437	8552.60	> 500	PASS
2462	8555.40	> 500	PASS

802.11q Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16328.00	> 500	PASS
2437	16377.00	> 500	PASS
2462	16098.00	> 500	PASS

802.11_n_HT20 Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16321.00	> 500	PASS
2437	17350.00	> 500	PASS
2462	17306.00	> 500	PASS

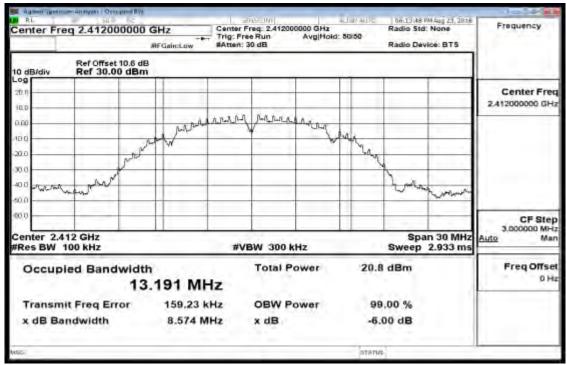
*Refer to next page for plots

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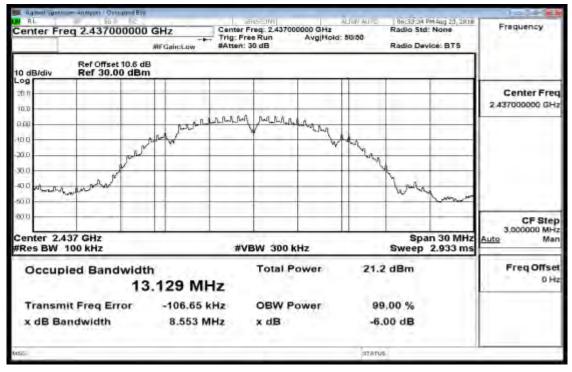
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802.11b 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

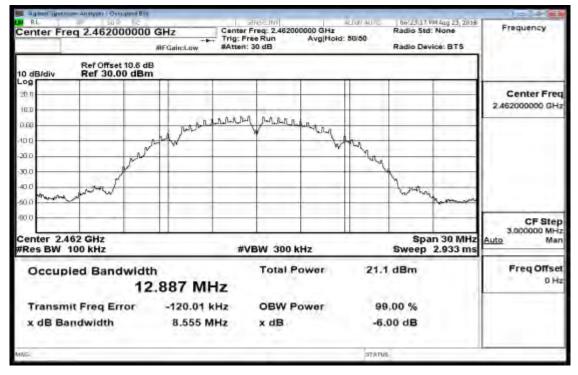


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6dB Band Width Test Data CH-High



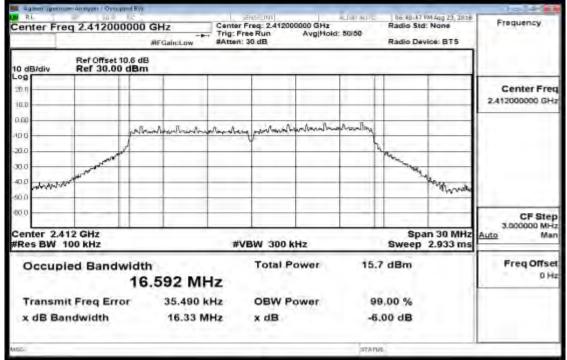
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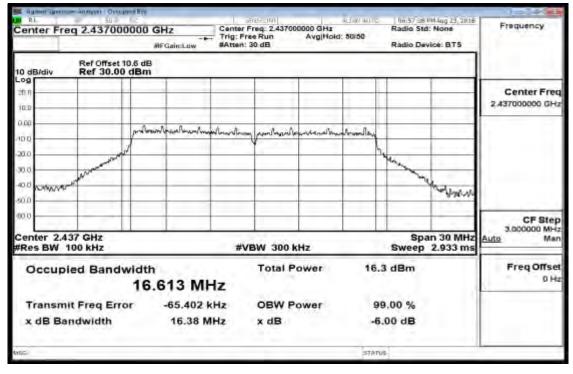
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802.11g 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

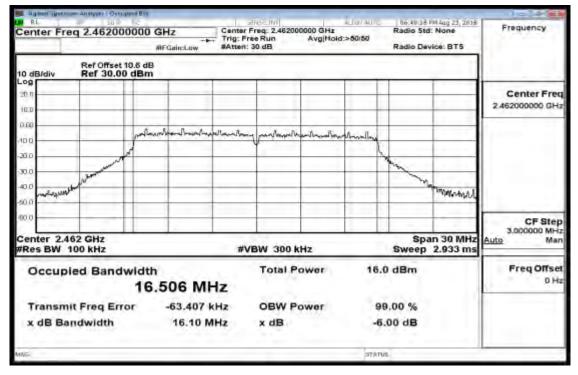


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6dB Band Width Test Data CH-High



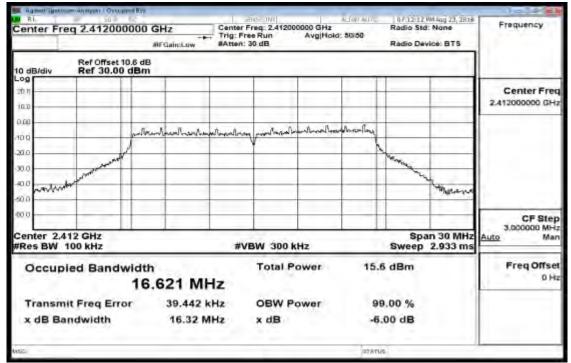
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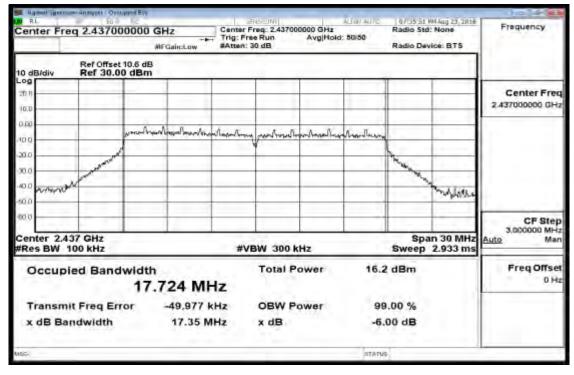
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802.11n HT20M 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

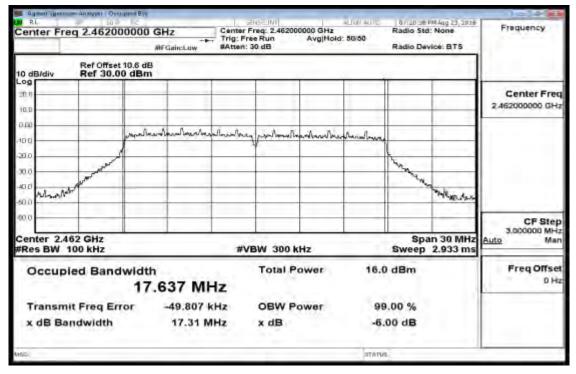


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6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

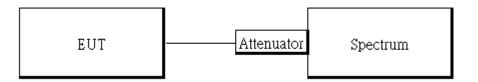
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

10.2 Measurement Equipment Used

Conducted Emission Test Site											
EQUIPMENT	MFR	SERIAL	LAST	CAL DUE.							
ТҮРЕ		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/6/19						
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25						
DC Block	PASTERNACK	PE8210	RF29	2017/12/26	2018/12/25						
Notebook	Lenovo	L420	S0011721	N/A	N/A						

10.3 Test SET-UP



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10.4 Measurement Procedure

Reference Level of Emission Limit:

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 100kHz & VBW = 300 kHz.
- 5. Detector = peak.
- Sweep time = auto couple.
- 7. Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

Conducted Band Edge:

- To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- Repeat above procedures until all default test channel (low, middle, and high) was complete.

Conducted Spurious Emission:

- 1. To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

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10.5 Measurement Result

Reference Level of Limit 802.11b mode								
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)						
2412	5.42	-14.58						
2437	5.71	-14.29						
2462	5.92	-14.08						

Reference	Reference Level of Limit 802.11g mode										
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)									
2412	-1.24	-21.24									
2437	-1.16	-21.16									
2462	-1.90	-21.90									

Reference Level of Limit 802.11n20 mode									
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)							
2412	-1.41	-21.41							
2437	-1.53	-21.53							
2462	-1.71	-21.71							

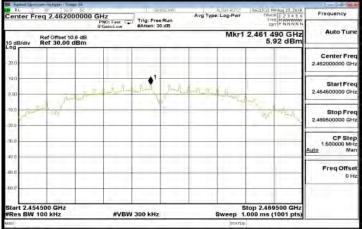
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802.11b Reference Level of Emission Limit (CH-Low)



802.11b Reference Level of Emission Limit(CH-High)



802.11g Reference Level of Emission Limit(CH-Low)

10.4	MANG 23, 2038	I he change			INSIE INT			13	- Annyat (T	BL RL
Frequency	123496 HWWWWWW	TRAD		Avg Type	e Run	Trig: Free	NO: Fast La	P	q 2.41200	Center Fre
Auto Tun	53 GHz 24 dBm	1 2.419	Mkr		30 dB	#Atten: 3	Gain:Low	6 dB	Ref Offset 10 Ref 30.00 d	
Center Free 2.412000000 GH		_								200
Start Free 2.397000000 GH		-	•1							10 0. 0 00
Stop Free 2.427000000 GH			and a second	aport months	panlourd	Marchen	k-laria	1 des		10.0
CF Ste 3.000000 MH Auto Ma	-	N.	- 1						and and	30.0
Freq Offse	Martin .								·	ann
	2700 GHz 1001 pts)	Stop 2.42				300 kHz				Start 2.3970
	toor pts)		sweep 1.			SUD KHZ	#VBW		UU KHZ	#Res BW 10

802.11g Reference Level of Emission Limit(CH-High)



802.11n HT20 Reference Level of Emission Limit(CH-Low)



802.11n_HT20 Reference Level of Emission Limit(CH-High)

Frequency	MAug 23, 2038 = 1 2 3 4 5 6 = MWWWWWW P NNNNN	07(28:52) TRA	ALDIV AUTO pe: Log-Pwr	Avg Ty	Free Run		0000 GH	2.46200		en R		
Auto Tune	Ref Offset 10.6 dB Mkr1 2.457 02 GHz 0 dB/div Ref 30.00 dBm -1.71 dBm											
Center Free 2.462000000 GHa										200		
Start Free 2.447000000 GH						•				100 0 00		
Stop Free 2.477000000 GH:			er realize	Impalment	and parties		pontical			-10.0		
CF Step 3.000000 MH; Auto Mar		X						100-W		30.0		
Freq Offse 0 Ha	With the								nonv	en a		
	7700 GHz	Stop 2.4	Sweep			#VBW 30		0 GHz 0 kHz	1 2.44			

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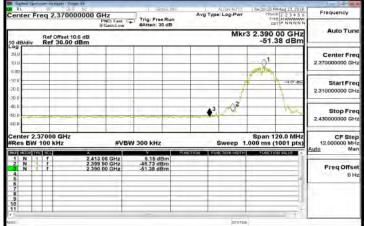
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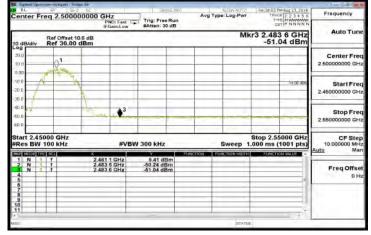
f (886-2) 2298-0488



802.11b **Band Edges Test Data CH-Low**



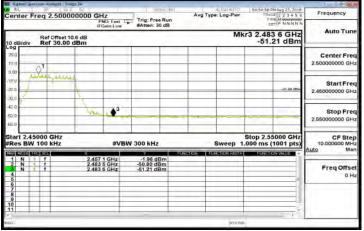
Band Edges Test Data CH-High



802.11q Band Edges Test Data CH-Low

Center Freq 2.3700	PNO: Fast Le	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	06:46:30 PM Aug 23, 2038 TRACE 1 2 3 4 5 6 TITE P NNNNN	Frequency
10 dB/div Ref 30.00	10.6 dB		Mkr3	2.390 00 GHz -51.07 dBm	Auto Tune
20,0 10.0 0.00				01	Center Free 2.37000000 GH
10.0 20.0 			.2	ALL LUMPA	Start Free 2.310000000 GH
40.0 50.0 60.0			1 ³		Stop Fre 2.430000000 GH
Start 2.31000 GHz Res BW 100 KHz	#VBW	300 kHz	Sweep 1.	Stop 2.43000 GHz 000 ms (1001 pts)	CF Stej 12.000000 MH Auto Ma
1 N 1 f 2 N 1 f 4 N 1 f 5 6 7 8 9	2.419.68 GHz 2.399.90 GHz 2.390.00 GHz	-1.18 dBm -39.31 dBm -61.07 dBm			Freq Offse 0 H
9 10 11					

Band Edges Test Data CH-High



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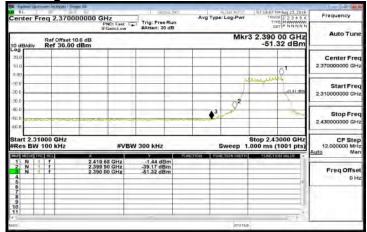
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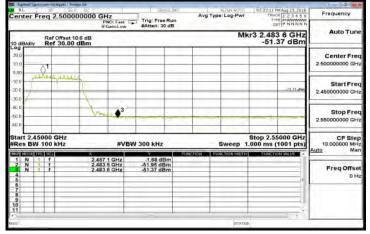
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802.11n_HT20 **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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802.11b

Spurious Emission Test Data CH-Low

Agener (gen)	- Annyan (134	SERVE IN	ALIGH WITC	0e(20:49 PM Aug 23, 2018	10.4.03
	eq 1.51500	0000 GHz PNO: Fast C	A State of the second	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
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10.00 -10'0 -20 0					-1657-059	Start Fre 30.000000 MH
30.0 40.0 60.0	ور و و و و و و و و و و و و و و و و و و					Stop Fre 3.00000000 GH
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1 N 1 2 3 4 5 6	1	2,414 9 GHz	5.20 dBm			Freq Offse
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* 895				STATU	e	

	An opposit 1 To	mar 54		_	-			10 4 43
Center Fr	eq 14.750	000000 GHz PNO: Fast	Trig: Free Rus	Ave	Type: Log-Pwr	TRA	M44g 23, 2038	Frequency
10 dB/div	Ref Offset 1 Ref 30.00	iFGain:Low	#Atten: 30 dB	8	M	r1 4.83	3 0 GHz 43 dBm	Auto Tuni
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-100	•1						-1657 (Br)	Start Fre 3.000000000 GH
40.0	Incie		unger the second	indone and				Stop Fre 26.50000000 GH
Center 14. #Res BW	100 KHz	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	W 300 kHz	PARTICA	Sweep 7	6.40 ms (23.50 GHz (1001 pts)	CF Ste 2.35000000 GH Auto Mi
1 N 1 2 3 4 5 6	1	4.833.0 GHz	-33.43 dBm	PONETIAN				Freq Offs 0
7 8 9 10 11								-
85G					STATU		-	

Spurious Emission Test Data CH-Mid

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	Freq	1.5150	00000 GH	NO: East	Trig: Free Ru	Av	Type: Log-Pw	IF TR	ACE 123456	Frequency
10 dB/div		f Offset 1 f 30.00	0.6 dB	Gain:Low	#Atten: 30 di	1	N	1kr1 2.4	35 7 GHz .31 dBm	Auto Tun
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0.00 -10.0 -20.0				-			_		-11 29 494	Start Fre 30.000000 MH
40 0 60 0	_	-	-					-1		Stop Fre 3.000000000 GH
Center 1 #Res BV				#VB	N 300 kHz	1	Sweep		2.970 GHz (1001 pts)	CF Ste 297.000000 MH Auto Ma
1 N 2 3 4			2,435	7 GHz	5.31 dBm	Peticitari	FUNCTION WAD	IH DAW	TICIN WALKE	Freq Offse
5 6 7 8 9 10										1
NIS)	-	1					STA	тыз-	- ×.	

10.4.6						tongs (sa	-Annyal (1	in Mercel	
Frequency	06130:51 PM 4ug 23, 2038 TRACE 1 2 3 4 5 6 THE MWWWWW	Aug Type: Log-Pwr		Trig: Pree F	GHz PNO: Fant	0000000	q 14.75	er Fre	RI.
Auto Tun	1 25.583 5 GHz	Mkr		#Atten: 30 d	IFGain:Low	10.6 dB	RefOffset	-	-
	-40.83 dBm						Ref 30.0		dBA
Center Fre 14.750000000 GH			_		-	-	_	-	10 -
Start Fre	10.29 (00)								0
-	•1							_	0
Stop Fre 26.50000000 GH				- mean - mean			store	Print	0
CF Ste 2.35000000 GH	Span 23.50 GHz 6.40 ms (1001 pts)	Sweep 70		V 300 kHz	#VBV	-	5 GHz 00 kHz		
Auto Ma	FUNCTION VALUE	NI FUNCTION WOTH	PUN	-40.83 dBn	33 5 GHz	X 25.51	1990 mar		
Freq Offse 0 H			m	-40,63 0150	55 9 GHK	20,01			
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Spurious Emission Test Data CH-High

RL	(Broom	An myyer 1		_	sense	NI	ALIM WITC	00:32:42	VM 4ug 23, 2018	10.04 60
Cente	r Freq	1.5150	000000 GH	O: East La	Trig: Free Ru		g Type: Log-Pwr	TR	TE NNNNN	Frequency
Ref Offset 10.5 dB Mkr1 2.462 4 GHz 10 dB/div Ref 30.00 dBm 5.56 dBm										Auto Tune
20,0				-		-		♦ ¹		Center Fre 1.515000000 GH
-10.0				-		-			.in 16 days	Start Fre 30.000000 MH
40.0								1-		Stop Fre 3.00000000 GH
#Res I	r 1.515 BW 10	0 KHz	×	#VBV	/ 300 kHz	PONCTION	Sweep	9.667 ms	2.970 GHz (1001 pts)	CF Ste 297.000000 Mi Auto Ma
1 N 2 3 4 5	1		2,462.4	GHZ	5,56 dBm					Freq Offse
6 7 8 9 10										
, NEGO							STAT	08-	- E.	

Option (procession Arrayses Trease 52						10 4 41
Center Freq 14.75000000	0 GHz	Trig: Free Run	Avg	ALIGH WITC Type: Log-Pwr	06(30)A1 PM Aug 23, 20 TRACE 1 2 3 4 5	Frequency
Ref Offset 10.6 dB	PNO: Fast Let IFGain:Low	#Atten: 30 dB		Mkr	1 26.241 5 GH -41.24 dBn	Z Auto Tuni
100 0.00						Center Fre 14.750000000 GH
0.00 10/0 20 0 30.0					A 6 10 40	Start Fre
						Stop Fre 26.50000000 GH
Center 14.75 GHz Res BW 100 kHz	#VBW 3	00 kHz		Sweep 7	Span 23.50 GH 6.40 ms (1001 pts	2.35000000 G
N 1 7 26.	241 5 GHz	-41.24 dBm	PONCTION	FUNCTION MDTH	FUNCTION VALUE	Auto M
2 3 4 5						FreqOffs
5 6 7 8 9 10			_			
11				STATU) F	ti.

802.11g **Spurious Emission Test Data CH-Low**

10.4.6	The local division of	1.000000000	ALIGH WITC					1 5a	and the second second			
Frequency	06:47:13 PM 44g 25, 2038 TRACE 1 2 3 4 5 6 THE MUNICIPAL OF NN NN N		pe: Log-Pwr	Avg		E.v. v.	Hz	00000 G	1.5150	Freq		
			-		0 dB	#Atten: 3	PNO: Fast La		-			_
Auto Tuni	7 9 GHz .52 dBm	r1 2.41 -1	Mk					dBm	Offset 1 f 30.00	Re	B/div	10 d
Center Fre			-	-	-	_		-				30,0
1.515000000 GH	-	1	-	-	-		-	-			-	10.6
		1		-				-		-		10,00
Start Freq 30.000000 MHz	-21.24 (\$10)			-	-		1.1		-	-		-10.0
	0120100						1.1					-30.0
Stop Fred 3.000000000 GH2				-			1.1	-	_	_		40.0
				-			-	-		_		50.0
	-		-		-	_		-		-	F	-60.0
CF Ste	2.970 GHz (1001 pts)		Cuman 0	-		300 kHz		-	GHz	1.515 N 100	ter	Cer
Auto Ma	(1007 pts)		sweep 9.	0001000		300 KH2	#VBV	×			-	-
						-1,52 d	9 GHz			1 1	N	1
Freq Offse					-				-	-	_	2 3 4
0 H					-		-				_	5
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				-	-						-	9
		-			-	-			-			11
			STATUS									453

Agener (process Annyar) hours 54	-				10 4 4
Center Freq 14.75000000	PNO: East Lal Trig:	Avg Type: Log-Pwr TRACE 11 Trig: Free Run Tree My		06:47:35 PM Aug 23, 2038 TRACE 1 2 3 4 5 6 TTRE MWWWWW DET P NNNNN	Frequency
Ref Offset 10.6 dB 10 dB/div Ref 30.00 dBm	IFGain:Low #Atte	n: 30 dB	Mkr	1 26.006 5 GHz -40.07 dBm	Auto Tun
-og 30,0 10.0		_			Center Fre 14.750000000 GH
0.00 10/0 20 0				31 24 rEm	Start Fre 3.000000000 GH
	- All and a start of the start			-	Stop Fre 26.50000000 GH
Center 14.75 GHz Res BW 100 kHz	#VBW 300 k	Hz	Sweep 7	Span 23.50 GHz 6.40 ms (1001 pts)	CF Ste 2.35000000 GH
	006 5 GHz -40.0	7 dBm	ILINCTION WOTH	PUNCTION VALUE	Auto Ma
2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		/ stern			Freq Offse
7 8 9					
11			STATU	+	

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台灣檢驗科技股份有限公司

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Spurious Emission Test Data CH-Mid

10 4 6			-	_			_	- 1 ja	- Annym (1	an Mura	
Frequency	HM 440 23, 2028	0/10.38 TRA	ALIGH MITO Type: Log-Pwr	Av	ig: Free Run		GHZ PNO: Fast	000000	q 1.515	er Fre	Cent
Auto Tun	9 8 GHz 94 dBm	r1 2.42	Mk		Atten: 30 dB	w	iFGain:Low		Ref Offset		10 dE
Center Fre 1.515000000 GH		1		_	_		-	-	-		20,0 10.0
Start Fre 30.000000 MH	-21.16 (Etc	4									0.00 -10 U -20 D
Stop Fre 3.00000000 GH		1				-1-2426					40.0
CF Ste 297.000000 MH Auto Ma	2.970 GHz (1001 pts)	.667 ms			0 kHz	VBW	#VI		15 GHz 00 kHz	BW 1	Ceni #Re:
Freq Offse 0 H		D.Sticl		PUNCTION	0.94 dBm		.429 8 GHz	2,4	1	N 1	123456
											7 8 9 10
-			STATUS		<u> </u>						। सन्दर्भ

Agener Special Ageneration (Second Second						10 4 10
Center Freq 14.75000000	0 GHz	Trig: Free Rus	Avg	ALIGN WITC Type: Log-Pwr	07:11:54 PM 44g 23, 20 TRACE 1 2 3 4 5	Frequency
Ref Offset 10.5 dB 10 dB/div Ref 30.00 dBm	PNO: Fast L IFGain:Low	#Atten: 30 dB		Mkr	1 26.453 0 GH -40.69 dBn	Z Auto Tun
20,0 10.0	_					Center Fre 14.750000000 GH
100 100 200					-21.16 (8	Start Fre
40.0 60.0 60.0		- Albertown - The state of	-			Stop Fre 26.50000000 GH
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N T 26	453 0 GHz	-40.69 dBm	FORCTION:	FUNCTION WOTH	PLINCTION VALUE	
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5 6 7 8 9 10	-					1
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Spurious Emission Test Data CH-High

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Center Freq 1.5	PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr	06:55:33 FW Aug 25, 2038 TRACE 1 2 3 4 5 6 THE A WWWWW DET P NNNNN	Frequency				
If Galactory #Atten: 30 dB Ext (F MANA N 10 dBidliv Ref Offset 10.6 dB									
20,0 10.0				.1	Center Free 1.515000000 GH				
-1070				-21.90.0bs	Start Free 30.000000 MH				
-40.0 -60.0 -60.0		4			Stop Free 3.000000000 GH				
Center 1.515 GH #Res BW 100 kH		W 300 kHz	Sweep 9	Span 2.970 GHz 0.667 ms (1001 pts)	CF Step 297.000000 MH Auto Mai				
100 12012 100 501 1 N 1 7 2 3 4 5 6 7 7 8 9 9 10	x 2,459.5 GHz	-2.35 dBm	NICTION FUNCTION		Freq Offse 0 H				
11			STATE	* *					

Against Spronger Anapper (Tomas)	9			NAME AND ADDRESS	10 4 63			
Center Freq 14.75000	PNO: Fast	Trig: Free Run	Aug Type: Log-Pwr	06:55 59 PM 4ug 23, 2038 TRACE 1 2 3 4 5 6 THE HWWWWW	Frequency			
Ref Offset 10.6 dB Mkr1 26.147 5 GHz 10 dB/div Ref 30.00 dBm -40.63 dBm								
-og 30,0 10.0					Center Fre 14.750000000 GH			
0.00 100 200				-21.90 mbm	Start Fre 3.000000000 GH			
	internet.	منجد با اسرزمی		and the second second	Stop Fre 26.50000000 GH			
Center 14.75 GHz Res BW 100 kHz	#VBW	300 kHz	Sweep	Span 23.50 GHz 76.40 ms (1001 pts)	CF Ste 2.35000000 GH Auto Ma			
	26,147 5 GHz	-40.63 dBm	PONCTION TO LEGISCHICK WIDTH	PUNCTION VALUE	AULO Mia			
2 3 4 5					Freq Offse			
5 6 7 8 9								
11			STAIL	+				

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802.11n_HT20 **Spurious Emission Test Data CH-Low**

10.4 63		10000		_			_	1.54	An expert (The	Minum	RL
Frequency	2 PM 4ug 23, 2028 RACE 1 2 3 4 5 6 TITE M WWWWWW DET P N N N N N	07:18:5	ADIM WITO	A	e Run	Trig: Fre	NO: East	00000 G	1.5150	r Free	
Auto Tune	20 9 GHz 1.33 dBm	r1 2.4	Mk	~	0 dB	#Atten: 3	Gain:Low	0.6 dB	ef Offset 1 lef 30.00		0 dB/c
Center Freq 1.51500000 GHz		1			-						30,0
Start Free 30.000000 MHz	-21.4) tEm										20.0
Stop Free 3.00000000 GHz		h				مر المراجع ا				~ ,	40 0 50 0
CF Step 297.000000 MH Auto Mar	2.970 GHz s (1001 pts)	.667 ms		_		300 kHz	#VBN		0 kHz	1.51 3W 10	Res
Freq Offse 0 Ha	A DAIN VÄLKE	PLAK		UNCTION .		-1,33 d	9 GHz	2.420	ſ		1 N 2 3 4 5 6 7 8 9 10
			STATUS							1.1	94) 101

10.4.63	the operation of the second se					Trenue Sa	An organi			
Frequency	19:23 PM Aug 23, 2038 TRACE 1 2 3 4 5 6 THE AUXILIARY OF NUMBER	ALIGN MITC	Avg	Trig: Free Run	GHz	50000000	req 14.7		Cen	
Auge Trees	Ref Offset 10.5 dB Mkr1 26.312 0 GHz 10 dB/div Ref 30.00 dBm -41.44 dBm									
Center Freq 14.75000000 GHz			-						20,0 10.0	
Start Freq 3.000000000 GHz	-31.41 tEm								-10.0	
Stop Freq 26.50000000 GHz				-				Jen	-40,0 60,0	
CF Step 2.350000000 GHz Auto Man	oan 23.50 GHz ms (1001 pts)	Sweep 76	PUNCTION	V 300 kHz	#VB		100 kHz	ter 14. s BW	#Re:	
Freq Offset 0 Hz				-41,44 dBm	12 0 GHz	26.31	1	N 1	123456	
		_							7 8 9 10 11	
		STATUS							NESS	

Spurious Emission Test Data CH-Mid

10.4	41 47 PM 4ug 23, 2018			SERVICE IN			134	1111	- Ann	in Murr	
Frequency	TRACE 1 2 3 4 5 6 TREE MWWWWW		Avg Type: Log-Pwr		Tria	Center Freq 1.515000000 GHz					
Auto Tur			_	#Atten: 30 dB		Gain:Low	ú	_	-	_	_
	Ref Officet 10.5 dB Mkr1 2.429 8 GHz 10 dB/div Ref 30.00 dBm -1.20 dBm -1.20 dBm										
Center Fre 1.515000000 GH	_	_	-	-	_	-	-		-	1	30,0
		-			-	-			-	-	0.0
1.1.1.2		1									0.00
Start Fre 30.000000 Mil	21 (3.050			_	-	-		_	-	_	0.0
	-	1	-	-					-	-	0.0
Stop Fre 3.000000000 GI		1		-							0.0
		_	-						-		6.0
CF Ste 297.000000 MH Auto Mi	ter 1.515 GHz Span 2.970 GHz s BW 100 kHz #VBW 300 kHz Sweep 9.667 ms (1001 pts)										
	UNCTION VALUE	NUNMETH	CTION:	0 dBm	Y	B GHz	2 4 2 9				
Freq Offs 0				o dom		o ona	6.464			-	2345
			_	-				_		+	6 7 8 9
										-	0
	- F .	STATUS							-		a)
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10 4 6		-				134	ingen (Tee	iper a		
Frequency	07:42:33 PM Aug 23, 2038 TRACE 1 2 3 4 5 6 THE MINING	Type: Log-Pwr	Avg	Trig: Free Run	SHz	000000	14.750	Freq		Cer
Auto Tun	Ref Offset 10.6 dB Mkr1 25.818 5 GHz							B/div	10 d	
Center Free 14.750000000 GH							_		-	20,0 10.0
Start Free 3.000000000 GH									-	10.00 10.00 20.0
Stop Free 26.50000000 GH				-	-			nit o	-	40.0
CF Step 2.350000000 GH Auto Mai	Span 23.50 GHz 6.40 ms (1001 pts)	Sweep 76	1	300 kHz	#VBW	-		14.75 W 100		
Freq Offse 0 H	PLANETICR WALKE	FUNCTION MOTO	PONCTION:	-41.20 dBm	E 6 GHZ	25.818		1 T	N	12345678910
	+									7 8 9 10 11
		STATUS								1943

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Spurious Emission Test Data CH-High

10 4 63							_	134	100001	0	and the	
Frequency	1 PM 44g 23, 2018 RACE 1 2 3 4 5 6 THE M WWWWWW	07:3314	ALIGN WATE pe: Log-Pwr	Avg	ree Run	Trig: Fre	NO: Fast C.	00000 G	1.5150	req 1	er F	Cent
Auto Tuni	56 5 GHz 1.57 dBm	r1 2.4	Mk	~	30 dB	#Atten:	Gain:Low	6 dB	Offset 10		Vdiv	10 de
Center Free 1.515000000 GH		1								_		30,0 10.0
Start Free 30.000000 MH	21,71,050								_			10 U 10 U 20 D
Stop Free 3.000000000 GH		11		ماريه				-				40.0 60,0 60,0
CF Step 297.000000 MH Auto Ma	2.970 GHz (1001 pts)		Sweep 9	1	z	/ 300 kH	#VB	-		515 C		
Freq Offse	TION VALUE	7.6%6	UNCTION WOTH	PUNCTION	dBm	-1,57 d	5 GHz	2,456		ſ	N	1 2 3
OH												4 5 6 7 8 9 10
	- X		STATUS							-		5

10 4 63		-				1 ja	any and the	Theorem	
Frequency	07:34:13 PM Aug 23, 2018 TRACE 1 2 3 4 5 6 THE M WWWW	Type: Log-Pwr		Trig: Free Run	GHz PNO: Fant	000000	14.750	r Freq	ente
Auto Tune	25.654 0 GHz -41.00 dBm	Mkr1	1	#Atten: 30 dB	FGain:Low	0.6 dB	Offset 10		dBJ
Center Freq 14.75000000 GHz									99 10,0 10.0
Start Free 3.000000000 GH:	21.11.690			_					00
Stop Free 26.50000000 GH:			-					runa	
CF Step 2.350000000 GH Auto Mar	Span 23.50 GHz 3.40 ms (1001 pts)	Sweep 76	PROFILE	300 kHz	#VBW	1	kHz	r 14.75 BW 100	ente Res
Freq Offse 0 Hi			2011110	-41.00 dBm	4 0 GHz	25,654			1 N 2 3 4 5
									6 7 8 9 0
	- (F)	STATUS		· · ·					a)

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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

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

Note:

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

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11.2 Measurement Equipment Used:

	-	966 Chamber			
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Broadband An- tenna	SCHWAZBECK	VULB 9168	9168-617	2017/10/27	2018/10/26
Horn Antenna	Schwarzbeck	BBHA9120D	1341	2018/06/07	2019/6/6
Horn Antenna	SCHWAZBECK	BBHA9170	184	2017/12/12	2018/12/11
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/9/25
3m Site NSA	SGS	966 chamber D	N/A	2018/07/06	2019/7/5
EMI Test Receiver	R&S	ESU 40	100363	2018/04/11	2019/4/10
Pre-Amplifier	EMC Instru- ments	EMC184045B	980135	2017/10/27	2018/10/26
Pre-Amplifier	EMC Instru- ments	EMC9135	980234	2017/12/26	2018/12/25
Pre-Amplifier	EMC Instru- ments	EMC12630SE	980271	2017/12/26	2018/12/25
Attenuator	Marvelous	WATT-218FS-10	RF246	2017/12/26	2018/12/25
Highpass Filter	Micro Tronics	BRM50701-01	G008	2017/12/26	2018/12/25
Coaxial Cable	Huber Suhner	EMC106-SM-SM-72 00	150703	2017/12/26	2018/12/25

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

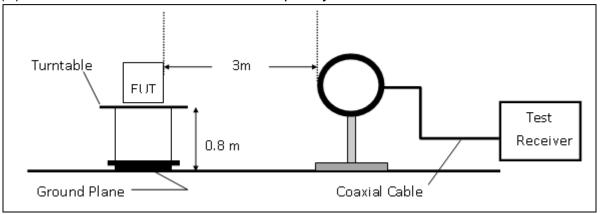
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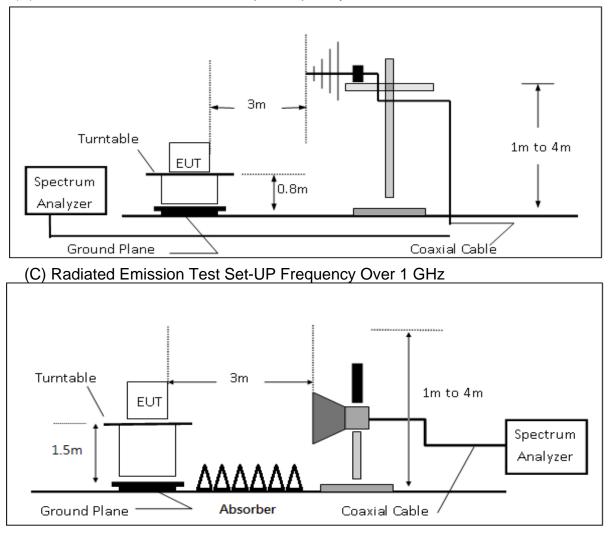


11.3 Test SET-UP

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



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



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11.4 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When 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.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 12. Repeat above procedures until all default test channel measured were complete.

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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11.5 Field Strength Calculation

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

FS = RA + AF + CL - AG

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

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

11.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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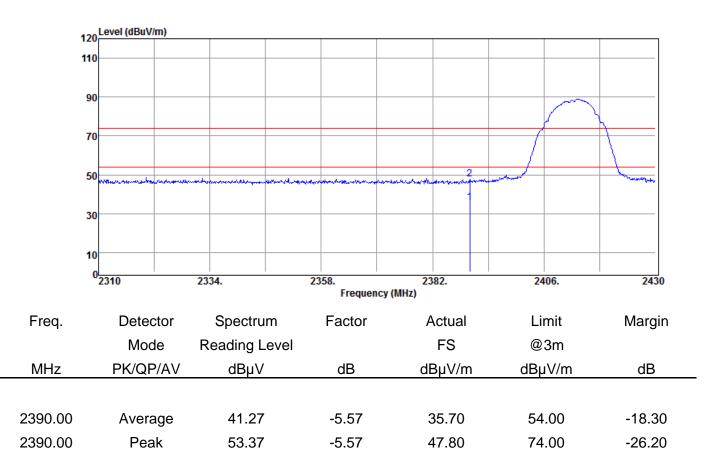
Radiated Band Edge Measurement Result (802.11b)

Operation Mode Test Mode EUT Pol Test Channel

:802.11b :BE CH Low :H Plan :2412 MHz

Test Date Temp./Humi. Antenna Pol. Engineer

:2018-07-27 :25/60 :VERTICAL :Jerry



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Operation Mo Test Mode EUT Pol Test Channel		:802.11b :BE CH Low :H Plan :2412 MHz		Test D Temp. Anten Engine		:2018-07-27 :25/60 :HORIZONTAL :Jerry	_	
	20 Level (dBuV/m)							
	10							
!	90							
	70				/			
					m		hand	
:	50	and a state of the second s	in a second and the second	galan and the subscription of the subscription	Low markers			
	30							
	10							
	0 <mark></mark> 2310	2334.	2358. Freque	2382. ency (MHz)	1	2406.	2430	
Freq.	Detector	Spectru		Actu	l leu	.imit	Margin	
ricq.	Mode	Reading L		F		23m	Margin	
MHz	PK/QP/A	-		dBµ ^v		μV/m	dB	
					42	Pr /		
2390.00	Average	43.39	-5.57	37.	82 5	4.00	-16.18	
2390.00	Peak	54.98	-5.57	49.	41 7	4.00	-24.59	



Operation Mo Test Mode EUT Pol Test Channel		:802.111 :BE CH :H Plan :2462 N	High			Te Ar	st Date mp./Hum ntenna Po ngineer			:2018-07-27 :25/60 :VERTICAL :Jerry
	120 Level (dBuV/m	1)								
	110									
	90	\sim								
	70									
				,			_			
	50		and the second states and second s		rquadric of the analysis of the	and the second secon	e-elon-phone-control	n bluzzan Anskazan fer		and a state of the second s
	30									
	10									
	2450	2470.		24		cy (MHz)	2510.	2	530.	2550
Freq.	Detect	or S	pectrum		Factor		Actual	Li	mit	Margin
	Mode	e Rea	ading Leve	el			FS	@	3m	
MHz	PK/QP/	AV	dBµV		dB	(dBµV/m	dBļ	uV/m	dB
2483.50	Averag	je	41.32		-4.90		36.42	54	.00	-17.58
2483.50	Peak		53.47		-4.90		48.57	74	.00	-25.43



Operation Mo Test Mode EUT Pol Test Channel	de	:802.11b :BE CH High :H Plan :2462 MHz			Test Date Temp./Hum Antenna Po Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	20 Level (dBuV/m)					
	90	\sim					
	70						
	50		an the 2	Nervetyler, Alexanous	unternational produced for the state of the	angtransing after a support of the second	(P ⁻ 1-dependence), deskeletere
	30						
	10						
	0 <mark></mark> 2450	2470.	249	0. Frequency	2510. (MHz)	2530.	2550
Freq.	Detecto	or Spectru	im l	Factor	Actual	Limit	Margin
	Mode	e Reading L	evel		FS	@3m	
MHz	PK/QP//	AV dBµV		dB	dBµV/m	dBµV/m	dB
2483.50	Averag	je 43.75		-4.90	38.85	54.00	-15.15
2483.50	Peak	54.84		-4.90	49.94	74.00	-24.06

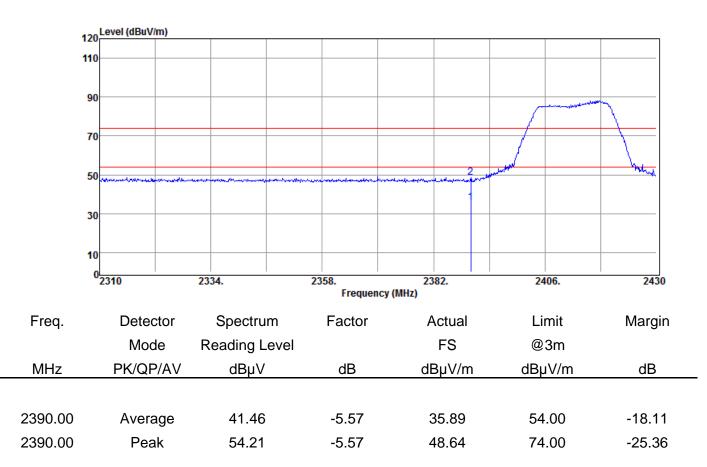
Radiated Band Edge Measurement Result (802.11g)

Operation Mode Test Mode EUT Pol Test Channel

:802.11g :BE CH Low :H Plan :2412 MHz

Test Date Temp./Humi. Antenna Pol. Engineer

:2018-07-27 :25/60 :VERTICAL :Jerry



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Operation Mo Test Mode EUT Pol Test Channel	:B :H	02.11g E CH Low Plan 412 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	20 Level (dBuV/m)					
	10					
					- marine	
1	90				-/	+
	70					+
	70			, n	n M	Mar
	50	warden van waaren aan waarden de sek	multer barded mar mar where	aparent and the dark of the		
:	30					
	10					
	0 2310	2334.	2358.	2382.	2406.	2430
	2310	2334.	Frequency		2400.	2430
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	46.08	-5.57	40.51	54.00	-13.49
2390.00	Peak	57.69	-5.57	52.12	74.00	-21.88



Operation Mo Test Mode EUT Pol Test Channel	de	:802.1 [:] :BE CH :H Plai :2462	⊣ High n			Te Ar	st Date mp./Hum atenna Po agineer			:2018-07-27 :25/60 :VERTICAL :Jerry
4.	20 Level (dBuV/n	n)								
1										
9	90									
			\							
4	70									
	50		Manu	2		****			handerstand	-
:	30									
	10									
	02450									
	2450	247	0.	24	190. Frequei	ncy (MHz)	2510.	2:	530.	2550
Freq.	Detect	tor	Spectrur	n	Factor		Actual	Li	mit	Margin
	Mode	e Re	eading Le	evel			FS	@	3m	
MHz	PK/QP/	/AV	dBµV		dB	(dBµV/m	dBµ	ıV/m	dB
2483.50	Avera	ge	41.37		-4.90		36.47	54	.00	-17.53
2483.50	Peak	x	54.39		-4.90		49.49	74	.00	-24.51



Operation Mode Test Mode EUT Pol Test Channel	:802.11g :BE CH High :H Plan :2462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
120 Level (dBuV/m	n)				
120					
J. Marine	about the state of				
90					
70	Marke .				
50		un far an	warman producer and the second second second second	-	Maran Maran and Provider
30					
10					
0 <mark></mark> 2450	2470.	2490. Frequency	2510. (MHz)	2530.	2550
Freq. Detect	or Spectrum	Factor	Actual	Limit	Margin
Mode	e Reading Level		FS	@3m	
MHz PK/QP/	/AV dBμV	dB	dBµV/m	dBµV/m	dB
2483.50 Averag	ge 42.96	-4.90	38.06	54.00	-15.94
2483.50 Peak	s 55.99	-4.90	51.09	74.00	-22.91



120 Level (dBuV/m)

110

90

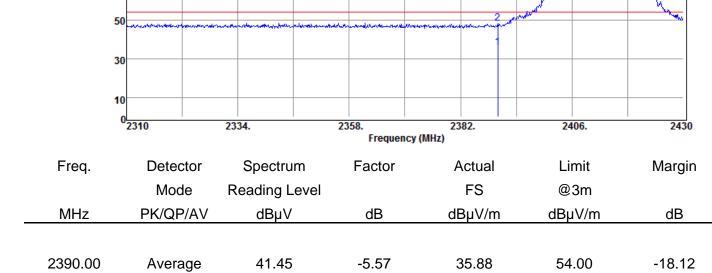
70

2390.00

Peak

Radiated Band Edge Measurement Result (802.11_HT20)

Operation Mode	:802.11n20	Test Date	:2018-07-27
Test Mode	:BE CH Low	Temp./Humi.	:25/60
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Jerry



-5.57

48.01

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53.58

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74.00

-25.99



Operation Mo Test Mode EUT Pol Test Channel		:802.11n20 :BE CH Low :H Plan :2412 MHz		Test Date Temp./Hum Antenna Po Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
	20 Level (dBuV/m)					
	10					
	90					+
	70					- m
	10			2.1	And Mark	Ť
	50 minutes and the second		an a	warman warman and a second		
	30					
	10					
	0 2310	2334.	2358.	2382.	2406.	2430
			Frequer	ncy (MHz)		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Lev	el	FS	@3m	
MHz	PK/QP/A\	/ dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	46.16	-5.57	40.59	54.00	-13.41
2390.00	Peak	60.94	-5.57	55.37	74.00	-18.63



Operation Mod Test Mode EUT Pol Test Channel	:B :⊦	02.11n20 E CH High I Plan 462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
12	Devel (dBuV/m)					
11						
g	10 James and the second					
ī	ro /					
		- M - 2				
5	50	When you want	-production of the section of	Wenness a see produce - topo the	dentional dente dense de la constant	er, after setter at market to an
3	0					
1	0 0 2450	0.470				
	2450	2470.	2490. Frequen	2510. cy (MHz)	2530.	2550
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Leve	I	FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	41.85	-4.90	36.95	54.00	-17.05
2483.50	Peak	52.90	-4.90	48.00	74.00	-26.00



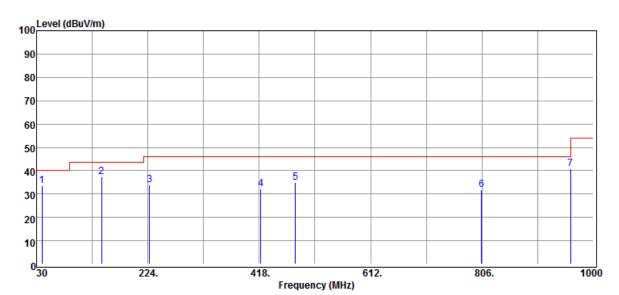
Operation Moc Test Mode EUT Pol Test Channel	:	802.11n20 BE CH High H Plan 2462 MHz			Ter An	st Date mp./Hum tenna Po gineer			:2018-07 :25/60 :HORIZC :Jerry	
12	Level (dBuV/m)									
12										
9	0									
7	0	- Wong								
			w1,2							
5			1 Marianda	and an and a second	alana kana kana kana kana kana kana kana	an a	anda - 16794 (nor 477) (normal		and the second second	
3	0									
1		0.170								
	0 2450	2470.	24	190. Frequei	2 ncy (MHz)	510.	2	530.	2550	
Freq.	Detector	Spectru	m	Factor		Actual	Li	mit	Margii	า
	Mode	Reading L	evel			FS	@	3m		
MHz	PK/QP/AV	∕ dBµV		dB	d	BµV/m	dBļ	uV/m	dB	
2483.50	Average	44.73		-4.90		39.83	54	1.00	-14.17	7
2483.50	Peak	58.72		-4.90		53.82	74	.00	-20.18	3



Below 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result (802.11 g)

802.11g Tx CH Low H Plan 2412 MHz	Test Date Temp./Humi. Antenna Pol. Engineer	:2018-07-27 :25/60 :VERTICAL :Jerry
	Engineer	Jerry
	Tx CH Low H Plan	Tx CH Low Temp./Humi. H Plan Antenna Pol.



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	Peak	51.09	-17.52	33.57	40.00	-6.43
143.49	Peak	53.80	-16.38	37.42	43.50	-6.08
226.91	Peak	52.26	-18.20	34.06	46.00	-11.94
420.91	Peak	44.23	-12.22	32.01	46.00	-13.99
481.05	Peak	46.00	-11.04	34.96	46.00	-11.04
805.03	Peak	37.88	-6.20	31.68	46.00	-14.32
960.23	Peak	44.85	-4.07	40.78	54.00	-13.22

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Operation Mode Test Mode EUT Pol Test Channel	:T: :H	02.11g x CH Low Plan 412 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
90 80 70 60 50 40 30 20		224.		4 5 4 5 612.	806.	6
		224	Frequency		000.	1000
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
63.95	Peak	56.00	-22.21	33.79	40.00	-6.21
186.17	Peak	58.96	-22.03	36.93	43.50	-6.57
478.14	Peak	48.45	-11.09	37.36	46.00	-8.64
633.34	Peak	44.22	-8.12	36.10	46.00	-9.90
663.41	Peak	43.91	-8.80	35.11	46.00	-10.89
960.23	Peak	42.94	-4.07	38.87	54.00	-15.13



Operation Mod Test Mode EUT Pol Test Channel	:T: :H	02.11g x CH Mid Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
100	Level (dBuV/m)					
90						
80						
70						
50						
40			4			6
30					5	
20						
10						
(30	224.	418. Frequency (612. (MHz)	806.	1000
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
•	Mode	Reading Level		FS	@3m	0
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
54.25	Peak	49.85	-17.19	32.66	40.00	-7.34
146.40	Peak	52.86	-16.28	36.58	43.50	-6.92
226.91	Peak	52.06	-18.20	33.86	46.00	-12.14
479.11	Peak	46.04	-11.07	34.97	46.00	-11.03
838.98	Peak	37.52	-6.29	31.23	46.00	-14.77
960.23	Peak	45.12	-4.07	41.05	54.00	-12.95



Operation Mode Test Mode EUT Pol Test Channel	:T: :H	02.11g x CH Mid Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
100 90	Level (dBuV/m)					
80						
60						
50 40		2	3	4		5 6
30 20						
10 0						
-	30	224.	418. Frequency (612. (MHz)	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
63.95	Peak	55.52	-22.21	33.31	40.00	-6.69
193.93	Peak	57.99	-20.69	37.30	43.50	-6.20
478.14	Peak	48.28	-11.09	37.19	46.00	-8.81
664.38	Peak	42.81	-8.78	34.03	46.00	-11.97
960.23	Peak	42.78	-4.07	38.71	54.00	-15.29
996.12	Peak	43.87	-3.80	40.07	54.00	-13.93



Operation Mod Test Mode EUT Pol Test Channel	:T: :H	02.11g x CH High Plan 462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
100	DLevel (dBuV/m)					
90	D					
80	0					
70	D					
60						
50						6
40	1 1	3	4	5		
20						
10						
	0 <mark></mark> 30	224.	418.	612.	806.	1000
			Frequency			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
68.80	Peak	52.12	-19.26	32.86	40.00	-7.14
146.40	Peak	52.82	-16.28	36.54	43.50	-6.96
226.91	Peak	52.81	-18.20	34.61	46.00	-11.39
480.08	Peak	45.91	-11.04	34.87	46.00	-11.13
666.32	Peak	38.69	-8.72	29.97	46.00	-16.03
960.23	Peak	42.94	-4.07	38.87	54.00	-15.13



Operation Mod Test Mode EUT Pol Test Channel	:T: :H	02.11g x CH High Plan 462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
100	Level (dBuV/m)					
90						
80						
70						
60						
50			4			6
30		3				
20						
10						
() 30	224.	418.	612.	806.	1000
			Frequency ((MHz)		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
109.54	Peak	56.52	-20.01	36.51	43.50	-6.99
185.20	Peak	58.21	-21.30	36.91	43.50	-6.59
240.49	Peak	53.85	-17.35	36.50	46.00	-9.50
478.14	Peak	48.34	-11.09	37.25	46.00	-8.75
666.32	Peak	45.59	-8.72	36.87	46.00	-9.13
960.23	Peak	42.57	-4.07	38.50	54.00	-15.50

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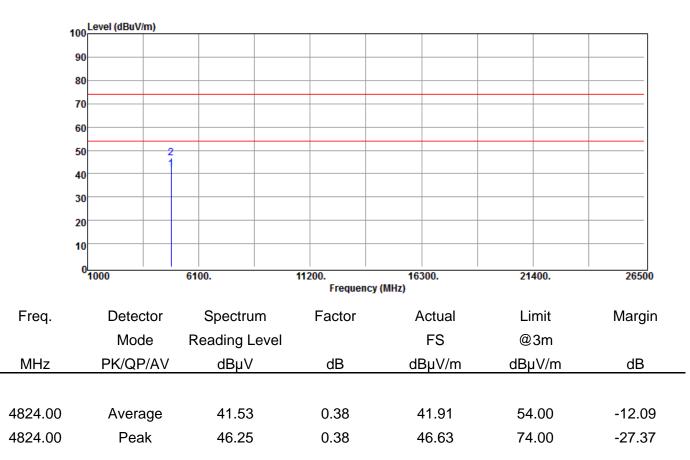
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Above 1GHz Data:

Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode	:802.11b	Test Date	:2018-07-27
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Jerry
		-	



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Operation Mo Test Mode EUT Pol Test Channel	:: :F	802.11b Fx CH Low H Plan 2412 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	Do Level (dBuV/m)					
	90					
	80					
	70					
(50	2				
:	50					
	40					
:	30					
:	20					
•	10					
	01000	6100.	11200. Frequency	16300. / (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	52.38	0.38	52.76	54.00	-1.24
4824.00	Peak	56.70	0.38	57.08	74.00	-16.92



Operation Mode Test Mode EUT Pol Test Channel	T: ⊦	02.11b x CH Mid I Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry	
10	0 Level (dBuV/m)						
g							
	0						
	70						
	0						
	0 2						
4	0						
3	0						
2	0						
1	0						
	0	6100.	11200.	16300.	21400.	26500	
Frequency (MHz)							
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin	
	Mode	Reading Level		FS	@3m		
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Average	42.05	0.66	42.71	54.00	-11.29	
4874.00	Peak	47.53	0.66	48.19	74.00	-25.81	



Operation Moo Test Mode EUT Pol Test Channel	ר: א:	802.11b Fx CH Mid H Plan 2437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer			
10	0 Level (dBuV/m)						
	0						
	0						
	70						
6	0	2					
5	i0						
4	0						
3	0						
2	0						
1	0						
	0	6100.	11200. Frequency	16300. (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin	
	Mode	Reading Level		FS	@3m		
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Average	52.23	0.66	52.89	54.00	-1.11	
4874.00	Peak	55.38	0.66	56.04	74.00	-17.96	



Operation Moo Test Mode EUT Pol Test Channel	ר: ו:	02.11b Tx CH High H Plan 1462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
10	0 Level (dBuV/m)					
g						
	0					
	0					
6	0					
5	0	2				
4	0					
3	0					
2	0					
1	0					
	0 <mark></mark> 1000	6100.	11200. Frequency	16300. (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	41.36	0.97	42.33	54.00	-11.67
4924.00	Peak	45.34	0.97	46.31	74.00	-27.69

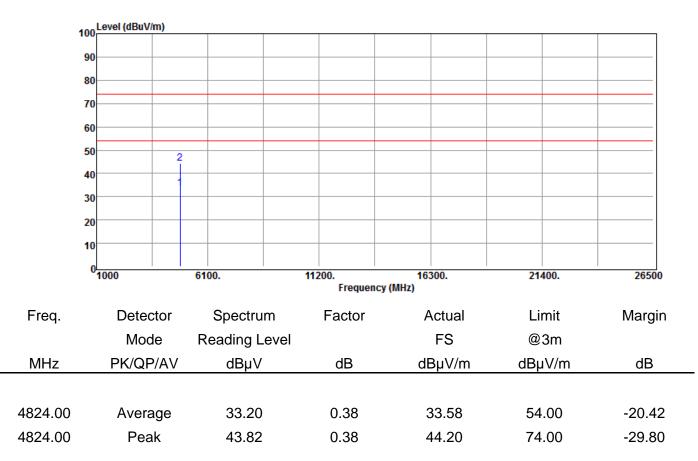


Operation Mo Test Mode EUT Pol Test Channel	: :	802.11b Tx CH High H Plan 2462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	DO					
	90					
	80					
	70					
	60	2				
:	50					
	40					
:	30					
:	20					
	10					
	0 1000	6100.	11200. Frequence	16300. :y (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Leve	el	FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	51.88	0.97	52.85	54.00	-1.15
4924.00	Peak	54.22	0.97	55.19	74.00	-18.81



Radiated Spurious Emission Measurement Result (802.11 g)

:802.11g	Test Date	:2018-07-27
:Tx CH Low	Temp./Humi.	:25/60
:H Plan	Antenna Pol.	:VERTICAL
:2412 MHz	Engineer	:Jerry
	:Tx CH Low :H Plan	:Tx CH Low Temp./Humi. :H Plan Antenna Pol.



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Operation Mode Test Mode EUT Pol Test Channel	:	802.11g Tx CH Low H Plan 2412 MHz		Test Date Temp./Hum Antenna Po Engineer	:2018-07-27 :25/60 :HORIZONTAL :Jerry	
10	0 Level (dBuV/m)					
	0					
	0					
	0					
6	0					
5	60					
4	0	1				
3	0					
2	0					
1	0					
0 <mark>1000 6100. 11200. 16300. Frequency (MHz)</mark>					21400.	26500
Freq.	Detector	Spectrum	n Factor	Actual	Limit	Margin
	Mode	Reading Le	vel	FS	@3m	
MHz	PK/QP/A\	/ dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	40.55	0.38	40.93	54.00	-13.07
4824.00	Peak	52.29	0.38	52.67	74.00	-21.33



Operation Mode Test Mode EUT Pol Test Channel	:T +:	02.11g x CH Mid I Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
10	0 Level (dBuV/m)					
	0					
	0					
	70					
	0					
	.0					
	0 2					
3	0					
2	0					
1	0					
	0	6100.	11200.	16300.	21400.	26500
	1000	01001	Frequency		211001	20000
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4871.00	Average	32.67	0.64	33.31	54.00	-20.69
4871.00	Peak	42.53	0.64	43.17	74.00	-30.83



Operation Mode Test Mode EUT Pol Test Channel	: :	802.11g Tx CH Mid H Plan 2437 MHz		Test Date Temp./Humi Antenna Po Engineer	:2018-07-27 :25/60 :HORIZONTAL :Jerry	
10	0 Level (dBuV/m)					
9						
8						
7						
6	0					
5	0	2				
4	0					
3	0					
2	0					
1	0					
	0 <mark></mark> 1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Lev	vel	FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	39.08	0.66	39.74	54.00	-14.26
4874.00	Peak	51.09	0.66	51.75	74.00	-22.25



Operation Mode Test Mode EUT Pol Test Channel	:	802.11g Tx CH High H Plan 2462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
10	00 Level (dBuV/m)					
	0					
£	30					
ī	70					
	60					
	50					
4	lo	2				
3	60					
2	20					
1	0					
	01000	6100.	11200. Frequency	16300. (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/A\	/ dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	31.10	0.97	32.07	54.00	-21.93
4924.00	Peak	41.36	0.97	42.33	74.00	-31.67

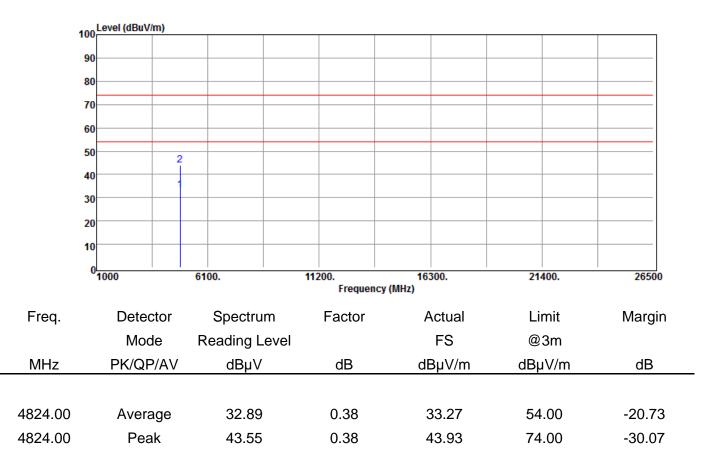


Operation Mo Test Mode EUT Pol Test Channel	:	802.11g Tx CH High H Plan 2462 MHz		Test Date Temp./Hum Antenna Po Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	00 Level (dBuV/m)					
	90					
	80					
	70					
	60					
:	50	2				
	40	1				
:	30					
:	20					
	10					
	0 <mark></mark> 1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Lev	el	FS	@3m	
MHz	PK/QP/A\	/ dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	38.73	0.97	39.70	54.00	-14.30
4924.00	Peak	50.54	0.97	51.51	74.00	-22.49



Radiated Spurious Emission Measurement Result (802.11_n20)

Operation Mode	:802.11n20	Test Date	:2018-07-27
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Jerry



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Operation Mo Test Mode EUT Pol Test Channel	de	:802.11n20 :Tx CH Low :H Plan :2412 MHz		Test Date Temp./Hum Antenna Po Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	00 Level (dBuV/m)					
	90					
	80					
	70					
	60					
	50	2				
	40	1				
	30					
	20					
	10					
	0 <mark></mark> 1000	6100.	11200. Freque	16300. ncy (MHz)	21400.	26500
Freq.	Detecto	r Spectru	m Factor	Actual	Limit	Margin
	Mode	Reading L	evel	FS	@3m	
MHz	PK/QP/A	.V dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	e 41.02	0.38	41.40	54.00	-12.60
4824.00	Peak	51.03	0.38	51.41	74.00	-22.59



Operation Mode Test Mode EUT Pol Test Channel	:T :H	02.11n20 x CH Mid I Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :VERTICAL :Jerry
10	0 Level (dBuV/m)					
	0					
	0					
	70					
6	60					
5	i0 2					
4	10					
3	0					
2	20					
1	0					
	01000	6100.	11200.	16300.	21400.	26500
			Frequency	(MHz)		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	33.52	0.66	34.18	54.00	-19.82
4874.00	Peak	43.89	0.66	44.55	74.00	-29.45



Operation Mo Test Mode EUT Pol Test Channel	T: +:	02.11n20 x CH Mid I Plan 437 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
1	DO Level (dBuV/m)					
	90					
	80					
	70					
	60					
	50					
	40					
:	30					
:	20					
	10					
	0	6100.	11200.	16300.	21400.	26500
			Frequency	(MHz)		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.68	0.66	42.34	54.00	-11.66
4874.00	Peak	51.68	0.66	52.34	74.00	-21.66



Operation Mode Test Mode EUT Pol Test Channel	T: +:	02.11n20 x CH High I Plan 462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-30 :25/60 :VERTICAL :Jerry
1()0 Level (dBuV/m)					
	90					
	30					
	70					
	50					
ŧ	50					
4	10					
3	30					
2	20					
1	10					
	01000	6 100 .	11200. Frequency	16300. (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	32.04	0.97	33.01	54.00	-20.99
4924.00	Peak	42.24	0.97	43.21	74.00	-30.79



Operation Mo Test Mode EUT Pol Test Channel	ר: א:	802.11n20 Гx CH High H Plan 2462 MHz		Test Date Temp./Humi. Antenna Pol. Engineer		:2018-07-27 :25/60 :HORIZONTAL :Jerry
	00 Level (dBuV/m)					
	90					
	80					
	70					
	60					
	50	2				
	40					
	30					
	20					
	10					
	0 <mark></mark> 1000	6100.	11200. Frequenc	16300. y (MHz)	21400.	26500
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	39.62	0.97	40.59	54.00	-13.41
4924.00	Peak	49.83	0.97	50.80	74.00	-23.20



12 PEAK POWER SPECTRAL DENSITY

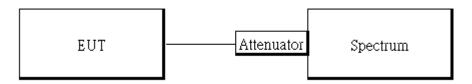
12.1 Standard Applicable

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

12.2 Measurement Equipment Used

Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/6/19		
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25		
DC Block	PASTERNACK	PE8210	RF29	2017/12/26	2018/12/25		
Notebook	Lenovo	L420	S0011721	N/A	N/A		

12.3 Test Set-up



12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz & VBW = 10 kHz.
- 5. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.

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12.5 Measurement Result

	POWER DENSITY 802.11b					
Freq. (MHz)	PPSD (dBm)	Limit (dBm)	Result			
2412	-7.81	8.00	PASS			
2437	-6.42	8.00	PASS			
2462	-7.66	8.00	PASS			

POWER DENSITY 802.11g					
Freq.	PPSD	Limit	Result		
(MHz)	(dBm)	(dBm)	Result		
2412	-14.83	8.00	PASS		
2437	-13.98	8.00	PASS		
2462	-15.52	8.00	PASS		

F	POWER DENSITY 802.11n HT20					
Freq.	PPSD	Limit	Result			
(MHz)	(dBm)	(dBm)	Result			
2412	-13.15	8.00	PASS			
2437	-15.32	8.00	PASS			
2462	-15.50	8.00	PASS			

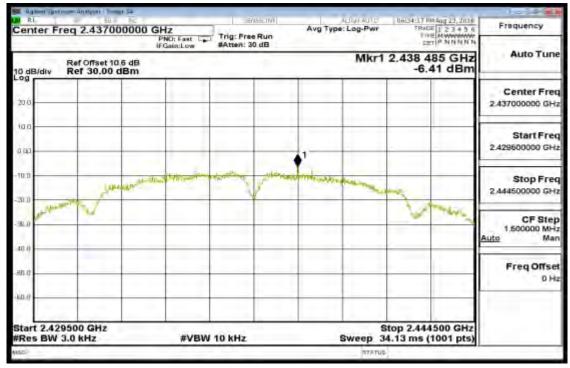
*Refer to next page for plots



802.11b **Power Spectral Density Test Plot (CH-Low)**



Power Spectral Density Test Plot (CH-Mid)



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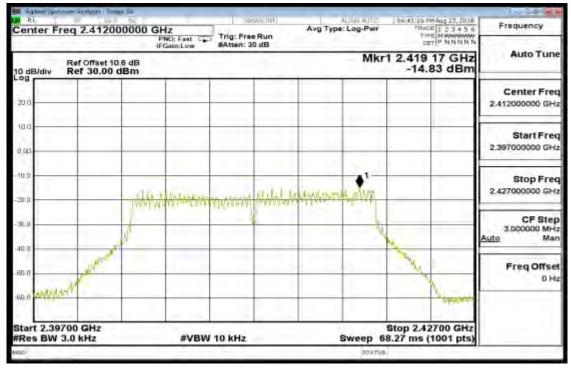


Power Spectral Density Test Plot (CH-High)



802.11g

Power Spectral Density Test Plot (CH-Low)

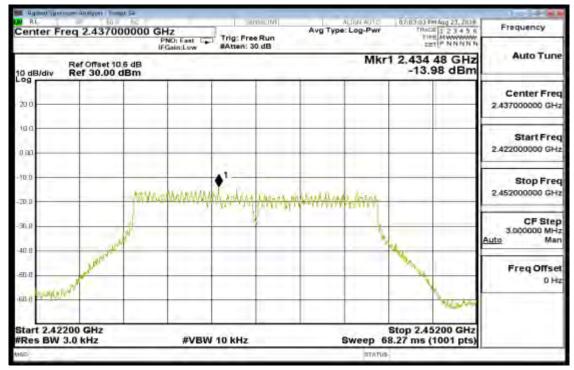


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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



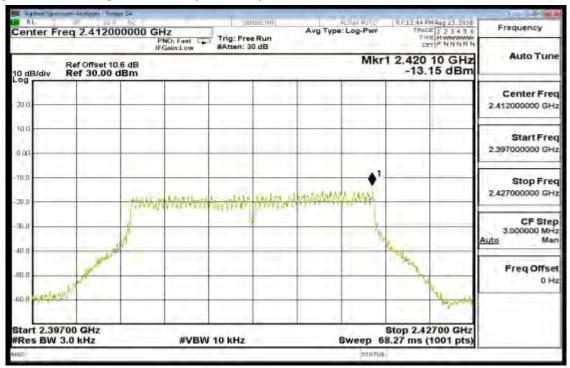
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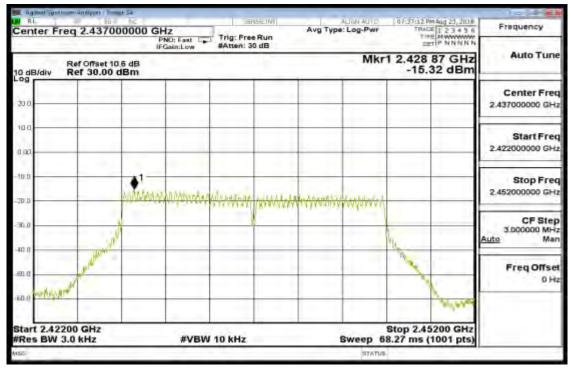
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802.11n HT20 **Power Spectral Density Test Plot (CH-Low)**



Power Spectral Density Test Plot (CH-Mid)

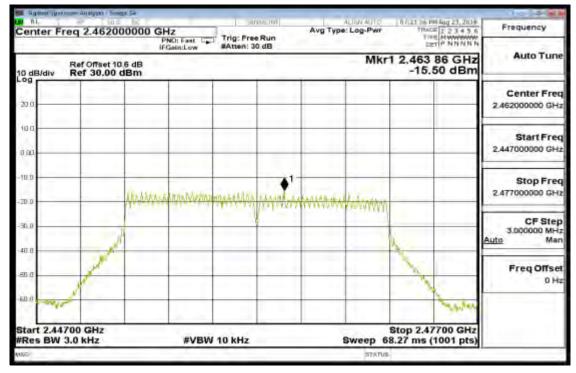


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Power Spectral Density Test Plot (CH-High)



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

For intentional device, 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. If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

13.2 Antenna Connected Construction

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

~ End of Report ~

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