

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	GOOGLE LLC 1600 Amphitheatre Parkway Mountain View, CA 94043
Product Name:	Wireless Streaming Device
Brand Name:	Google
Model No.:	G3AL9
Model Difference:	N/A
Report Number:	ER/2020/80014
FCC ID:	A4RG3AL9
IC:	10395A-G3AL9
FCC Rule Part:	§15.247, Cat: DTS
IC RSS:	RSS-247 issue 2 Feb 2017
Issue Date:	Dec. 16, 2020
Date of Test:	Aug. 06, 2020 ~ Dec. 16, 2020
Date of EUT Received:	Aug. 06, 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.

Men Lay

Approved By:

Blue Yang / Asst. Manager



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Revision History						
Report Number Revision Description Issue Date Remark						
ER/2020/80014Rev.00Original.Dec. 08, 2020Revised By Tiffany Kad						

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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Table of Contents

1	GENERAL INFORMATION	4
2	SYSTEM TEST CONFIGURATION	6
3	SUMMARY OF TEST RESULTS	9
4	DESCRIPTION OF TEST MODES	10
5	MEASUREMENT UNCERTAINTY	12
6	CONDUCTED EMISSION TEST	13
7	DUTY CYCLE OF TEST SIGNAL	17
8	PEAK OUTPUT POWER MEASUREMENT	19
9	6dB & 99% BANDWIDTH MEASUREMENT	27
10	CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT	32
11	RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT	40
12	POWER SPECTRAL DENSITY	112
13	ANTENNA REQUIREMENT	116

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GENERAL INFORMATION

1.1 Product description

Product Name:	Wireless Streaming Device
Brand Name:	Google
Model No.:	G3AL9
Model Difference:	N/A
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	3.65Vdc from Rechargeable Li-polymer Battery or 5V from AC/DC Adapter

WLAN 2.4GHz

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology		
b			20.72	DSSS,		
g	2412-2462	11	25.24			
n_HT20			25.23	– OFDM,		
Modulation	type:		PSK, DBPSK for DSSS 16QAM, QPSK, BPSK for OFDM	·		
Antenna De	esignation	PIFA Antenna, Gain: 2.4dBi				
Transistion	Rate	802.11 g	: 1/2/5.5/11 Mbps : 6/9/12/18/24/36/48/54 Mbps _20MHz: 6.5 – 144.4Mbps			

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Report No.: ER/2020/80014 Page 5 of 116



1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 FCC KDB 662911 D01 Multiple Transmitter Output v02r01 RSS-247 issue 2 Feb. 2017 RSS-Gen. issue 5, Amendment 1, March 2019 ANSI C63.10:2013

1.3 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

ISED CAB identifier: TW3702

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on 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.

2.3.2 Conducted Test (RF)

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.

2.4.2 For all conducted test items:

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

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission configuration



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



Fig 2-3 Conduction (AC Power Line) Radiated Emission

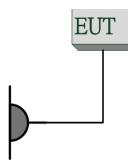


Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Bluetooth LE Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	T440P	PC-014TAK	N/A	N/A

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SUMMARY OF TEST RESULTS 3

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	RSS-Gen §8.8 AC Power Line Conducted Emission	
§15.247(b) (3)	RSS-247 §5.4 d	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.2 a RSS-Gen §6.7	6dB & 99% Emission Bandwidth	Compliant
§15.205 §15.209 §15.247(d)	RSS-247 §5.5 RSS-Gen §8.10	Conducted Band Edge and Spurious Emission	Compliant
§15.205 §15.209 §15.247(d)	RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10 RSS-Gen §6.13	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	RSS-247 §5.2 b	Power Spectral Density	Compliant
§15.203 §15.247(b)	RSS- Gen §6.8	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b/g/n 20M.

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

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.

The gevin UE is	pre-scanned	among b	elow modes.
-----------------	-------------	---------	-------------

Modulation	Transmission Chain	Single Transmission Spatial	Multiple Transmission Spatial
🛛 802.11 b	🖾 Ch0 🖾 Ch1 🗆 Ch2 🗆 Ch3	⊠ 1TX	🗆 2TX
🛛 802.11 g	🖾 Ch0 🖾 Ch1 🗆 Ch2 🗆 Ch3	🛛 1TX	□ 2TX
🛛 802.11 n	🖾 Ch0 🖾 Ch1 🗆 Ch2 🗆 Ch3	⊠ SISO	

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

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4.3 Radiated Emission Test:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
RADIATED EMISSION TEST (BELOW 1 GHz)								
802.11g	802.11g 1 to 11 6 OFDM 6 Ch0							
	RADIATED EMISSION TEST (ABOVE 1 GHz)							
802.11b	1 to 11	1, 6, 11	DSSS	1	Ch0			
802.11g	802.11g 1 to 11 1, 6, 11 OFDM 6 Ch0							
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 8	Ch0			
Note:								
0	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 E2 position was reported.

4.4 Antenna Port Conducted Mesurement:

CONDUCTED TEST							
MODE AVAILABLE TESTED MODULATION RATE OPRT							
802.11b	1 to 11	1, 6, 11	DSSS	1	Ch0		
802.11g	1 to 11	1, 6, 11	OFDM	6	Ch0		
802.11n 20M	1 to 11	1, 6, 11	OFDM	MCS 8	Ch0		

Note: EUT serial number is 07251J3D5013W5.

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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 Measurement Uncertainty					
	9kHz~30MHz: +-2.3dB				
	30MHz - 180MHz: +/- 3.37dB				
	180MHz -417MHz: +/- 3.19dB				
Polarization: Vertical	0.417GHz-1GHz: +/- 3.19dB				
	1GHz - 18GHz: +/- 4.04dB				
	18GHz - 40GHz: +/- 4.04dB				
	9kHz~30MHz: +-2.3dB				
	30MHz - 167MHz: +/- 4.22dB				
Delevizeti e uz Henizentel	167MHz -500MHz: +/- 3.44dB				
Polarization: Horizontal	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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6 CONDUCTED EMISSION TEST

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 th	1. The lower limit shall apply at the transition frequencies					
2. The limit decreases linearly wit	h 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	100759	07/13/2020	07/12/2021			
LISN	SCHWARZBECK	NSLK 8127	8127-465	04/09/2020	04/08/2021			
Coaxial Cables	N/A	Coaxial Cable	161207	12/07/2019	12/06/2020			
Test Software	audix	e3	Ver. 6.11- 20180413	N.C.R	N.C.R			

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

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.
- 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.

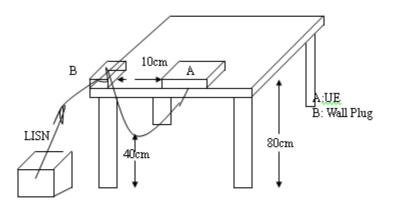
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6.4 Test SET-UP (Block Diagram of Configuration)



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

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

Test Mode Power Probe	:V	ER-2020-800 VLAN 2.4G AC 120V/60H			Test Site Test Date Temp./Humi. Engineer	:Conduction 6 :2020-08-10 :26.2/53 :Nick	F
Note:	80 Level (dBuV) 70 60 50 40 1 2 3 4 5 30 1 2 3 4 5 10	6					
		1 1 1	1 222 State				
	0.15 0.2	0.5	1	2	5 10	20 30	
	0.15 0.2	0.5	-	2 equency (MHz)	5 10	20 30	
Freq.		0.5 etector	-		5 10 Actual	20 30 Limit	Margin
Freq.	De	etector	Fr	equency (MHz)			Margin
Freq. MHz	De	etector	Fr	equency (MHz)	Actual		Margin dB
	De	etector Vode	Fr Spectrum Reading Level	equency (MHz) Factor	Actual FS	Limit	-
	De I PK	etector Vode	Fr Spectrum Reading Level	equency (MHz) Factor	Actual FS	Limit	-
MHz	De I PK	etector Mode /QP/AV	Fr Spectrum Reading Level dBµV	equency (MHz) Factor dB	Actual FS dBµV	Limit dBµV	dB
<u>MHz</u> 0.17	De r PK	etector Mode /QP/AV Peak	Fr Spectrum Reading Level dBµV 29.58	equency (MHz) Factor dB 2.14	Actual FS dBµV 31.72	Limit dBµV 65.16	dB -33.44
<u>MHz</u> 0.17 0.19	Do r PK	etector Mode /QP/AV Peak Peak	Fr Spectrum Reading Level dBµV 29.58 29.37	Factor dB 2.14 2.14	Actual FS dBµV 31.72 31.51	Limit dBµV 65.16 64.06	dB -33.44 -32.55
MHz 0.17 0.19 0.21	Da r PK	etector Mode /QP/AV Peak Peak Peak	Fr Spectrum Reading Level dBµV 29.58 29.37 29.03	equency (MHz) Factor dB 2.14 2.14 2.14 2.14	Actual FS dBµV 31.72 31.51 31.17	Limit dBµV 65.16 64.06 63.23	dB -33.44 -32.55 -32.06

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.

:Conduction 6F

-32.60

-32.35

-32.26

-31.85

-31.44

64.94

63.98

63.32

63.01

62.39

Test Site



:ER-2020-80014

Report Number

0.17

0.19

0.21

0.22

0.23

Test Mode Power Probe	:N	2.4G 0V/60Hz		Test Dat Temp./H Enginee	łumi. :26.2/53	10
Note:	80 Level (dBuV) 70 60 50 40					
	12 3 6 6 30 20 10 0 0.15 0.2	0.5 1	2 Frequency (MHz)	V ////////////////////////////////////	10 20	30
Freq.		-		Actual	Limit	Margin
MHz	Mode PK/QP/A	Reading Le ∖V dBµV	evel dB	FS dBμV	dBµV	dB
0.16	Peak	30.39	2.14	32.53	65.56	-33.03

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.

30.20

29.49

28.92

29.02

28.81

Peak

Peak

Peak

Peak

Peak

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2.14

2.14

2.14

2.14

2.14

32.34

31.63

31.06

31.16

30.95



7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1 Measurement Procedure:

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

7.2 Duty Cycle:

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	98.90	0.05	0.12	0.01
802.11g	93.09	0.31	0.70	1.00
802.11n_20	92.65	0.33	0.75	1.00

Duty Cycle Factor: $10 * \log(1/0.989) = 0.05$ Duty Cycle Factor: $10 * \log(1/0.9309) = 0.31$ Duty Cycle Factor: $10 * \log(1/0.9265) = 0.33$

b = 98.9%, *g* = 93.09%,*n*_*ht*_20 = 92.65%

7.3 Duty Cycle test plots

Please refer to next page.

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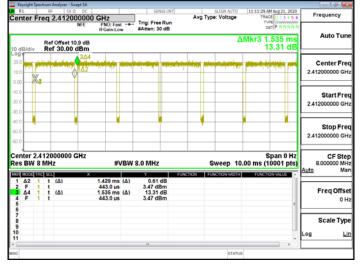
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Duty Cycle_802.11b_20MHz_Chain0_2412MHz

	ectrum Analyzer -									
Center F	req 2.412				SENSE:INT	Avg	ALIGN AUTO Type: Voltage	09:02:56 AM Aug 21, 2 TRACE 1 2 3 4	5 6	Frequency
		NFE	PNO: Fast IFGain:Lov		Trig: Free Run #Atten: 30 dB			DET PNNN	NN	Auto Tun
10 dB/div	Ref Offset Ref 30.0							ΔMkr3 8.704 n -19.34 d	B	Auto Tun
20.0		×.		-			1Δ2			Center Fre
10.0				-		+	3∆4		2	412000000 GH
0.00										Otort Fro
20.0	_	_		-					2	Start Fre 412000000 GH
40.0										
50.0				-					2	Stop Fre 412000000 GH
60.0										
center 2. Tes BW 8	412000000 MHz	GHZ	#V	BW	8.0 MHz		Sweep	Span 0 I 20.00 ms (5001 pi	(s)	CF Ste 8.000000 MH
1 Δ2 1		х	8.608 ms	(A)	-0.59 dB	UNCTION	FUNCTION WIDT	H FUNCTION VALUE	Auto	2 Ma
2 F 3 Δ4 4 F 5	t t (Δ) t		4.384 ms 8.704 ms 4.384 ms		22.94 dBm -19.34 dB 22.94 dBm					Freq Offse 0 H
6 7 8 9										Scale Typ
10									Log	Lit
e 📖							STAT	, us		

Duty Cycle_802.11g_20MHz_Chain0_2412MHz



Registration of the second sec Aug 21, 20 Freque Aug Type: Voltage icy Auto Tur ΔMkr3 1.442 ms 0.16 dB Ref Offset 10.9 dB Ref 30.00 dBm Center Fre 2.412000000 GH Start Fre 2.412000000 GH Н ų Stop Fre Center 2.412000000 GHz Res BW 8 MHz Span 0 Hz Sweep 10.00 ms (10001 pts) CF Step #VBW 8.0 MHz 8.000000 M -6.74 dB 16.75 dBm 0.16 dB 16.75 dBm 1.336 ms (Δ) 401.0 μs 1.442 ms (Δ) Freq Offse ł (Δ) 4 0 н Scale Type Lir

Duty Cycle_802.11n_20MHz_Chain0_2412MHz

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8 PEAK OUTPUT POWER MEASUREMENT

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.

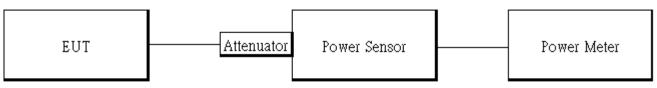
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

8.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
Power Meter	Anritsu	ML2496A	1242004		11/04/2020			
Power Sensor	Anritsu	MA2411B	1207365	11/05/2019	11/04/2020			
Power Sensor	Anritsu	MA2411B	1207368	11/05/2019	11/04/2020			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021			

8.3 Test Set-up

Power Meter:



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 .
- 3. 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.

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

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8.5 Measurement Result

802.1	1b Ch0				
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	20.72	30.00	PASS
6	2437	1	20.70	30.00	PASS
10	2457	1	20.53	30.00	PASS
11	2462	1	20.28	30.00	PASS
802.1	1b Ch0				
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT
1	2412	1	17.93	30.00	PASS
6	2437	1	17.78	30.00	PASS
10	2457	1	17.68	30.00	PASS
11	2462	1	17.42	30.00	PASS
802.1 CH	1b Ch1 Freq. (MHz)	Data Rate	Peak Output Power	Limit (dBm)	RESULT
1	2412	1	(dBm) 20.64	30.00	PASS
6	2412	1	20.65	30.00	PASS
10	2457	1	20.05	30.00	PASS
11	2457	1	20.06	30.00	PASS
	1b Ch1	I	20.00	50.00	17,00
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT
1	2412	1	17.86	30.00	PASS
6	2437	1	17.76	30.00	PASS
10	2457	1	17.59	30.00	PASS

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.



002.11	lg Ch0				
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	21.88	30.00	PASS
2	2417	6	23.52	30.00	PASS
3	2422	6	24.42	30.00	PASS
4	2427	6	24.66	30.00	PASS
5	2432	6	24.91	30.00	PASS
6	2437	6	25.24	30.00	PASS
8	2447	6	24.99	30.00	PASS
9	2452	6	24.52	30.00	PASS
10	2457	6	24.37	30.00	PASS
11	2462	6	21.59	30.00	PASS
802.11	lg Ch0				
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT
		Rute	()	(ubiii)	
1	2412	6	14.60	30.00	PASS
1 2	2412 2417				PASS
		6	14.60	30.00	
2	2417	6 6	14.60 16.55	30.00 30.00	PASS
2 3	2417 2422	6 6 6	14.60 16.55 17.52	30.00 30.00 30.00	PASS PASS
2 3 4	2417 2422 2427	6 6 6 6	14.60 16.55 17.52 18.30	30.00 30.00 30.00 30.00	PASS PASS PASS
2 3 4 5	2417 2422 2427 2432	6 6 6 6 6	14.60 16.55 17.52 18.30 18.45	30.00 30.00 30.00 30.00 30.00 30.00	PASS PASS PASS PASS
2 3 4 5 6	2417 2422 2427 2432 2432 2437	6 6 6 6 6 6	14.60 16.55 17.52 18.30 18.45 19.25	30.00 30.00 30.00 30.00 30.00 30.00	PASS PASS PASS PASS PASS
2 3 4 5 6 8	2417 2422 2427 2432 2432 2437 2447	6 6 6 6 6 6 6	14.60 16.55 17.52 18.30 18.45 19.25 19.00	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	PASS PASS PASS PASS PASS PASS



002.1	1g Ch1				
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	21.63	30.00	PASS
2	2417	6	23.41	30.00	PASS
3	2422	6	24.07	30.00	PASS
4	2427	6	24.55	30.00	PASS
5	2432	6	24.74	30.00	PASS
6	2437	6	25.21	30.00	PASS
8	2447	6	24.78	30.00	PASS
9	2452	6	24.36	30.00	PASS
10	2457	6	24.29	30.00	PASS
11	2462	6	21.57	30.00	PASS
802.1	1g Ch1				
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT
1	2412	6	14.47	30.00	PASS
2	2417	6	16.29	30.00	PASS
3	2422	<u>^</u>	47.05		
5	2422	6	17.05	30.00	PASS
3 4	2422	6 6	17.05	30.00 30.00	PASS PASS
4	2427	6	17.94	30.00	PASS
4 5	2427 2432	6 6	17.94 18.22	30.00 30.00	PASS PASS
4 5 6	2427 2432 2437	6 6 6	17.94 18.22 19.16	30.00 30.00 30.00	PASS PASS PASS
4 5 6 8	2427 2432 2437 2447	6 6 6	17.94 18.22 19.16 18.72	30.00 30.00 30.00 30.00	PASS PASS PASS PASS



802.1	802.11n_HT20M Ch0							
СН	CH Freq. (MHz)		Peak Output Power (dBm)	Limit (dBm)	RESULT			
1	2412	MCS0	22.42	30.00	PASS			
2	2417	MCS0	23.79	30.00	PASS			
3	2422	MCS0	23.86	30.00	PASS			
4	2427	MCS0	24.56	30.00	PASS			
5	2432	MCS0	24.72	30.00	PASS			
6	2437	MCS0	25.23	30.00	PASS			
9	2452	MCS0	24.87	30.00	PASS			
10	2457	MCS0	24.61	30.00	PASS			
11	2462	MCS0	20.21	30.00	PASS			
802.1	1n_HT20	M Ch0						
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT			
1	2412	MCS0	14.99	30.00	PASS			
2	2417	MCS0	16.71	30.00	PASS			
3	2422	MCS0	16.84	30.00	PASS			
4	2427	MCS0	17.69	30.00	PASS			
5	2432	MCS0	18.09	30.00	PASS			
6	2437	MCS0	18.34	30.00	PASS			
9	2452	MCS0	18.19	30.00	PASS			
10	2457	MCS0	17.16	30.00	PASS			
11	2462	MCS0	12.60	30.00	PASS			



802.11n_HT20M Ch1							
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT		
1	2412	MCS0	22.24	30.00	PASS		
2	2417	MCS0	23.54	30.00	PASS		
3	2422	MCS0	23.76	30.00	PASS		
4	2427	MCS0	24.41	30.00	PASS		
5	2432	MCS0	24.51	30.00	PASS		
6	2437	MCS0	25.02	30.00	PASS		
9	2452	MCS0	24.52	30.00	PASS		
10	2457	MCS0	24.35	30.00	PASS		
11	2462	MCS0	19.91	30.00	PASS		
802.1	1n_HT20	M Ch1					
СН	Freq. (MHz)	Data Rate	Avg. Power (dBm)	Limit (dBm)	RESULT		
1	2412	MCS0	14.89	30.00	PASS		
2	2417	MCS0	16.55	30.00	PASS		
3	2422	MCS0	16.49	30.00	PASS		
4	2427	MCS0	17.61	30.00	PASS		
5	2432	MCS0	17.75	30.00	PASS		
6	2437	MCS0	18.22	30.00	PASS		
9	2452	MCS0	17.86	30.00	PASS		
10	2457	MCS0	16.96	30.00	PASS		
11	2462	MCS0	12.30	30.00	PASS		

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

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EIRP

802.11	802.11b Ch0									
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT			
1	2412	1	17.93	2.40	20.33	36	PASS			
6	2437	1	17.78	2.40	20.18	36	PASS			
10	2457	1	17.68	2.40	20.08	36	PASS			
11	2462	1	17.42	2.40	19.82	36	PASS			
802.11	b Ch1									
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT			
1	2412	1	17.86	2.40	20.26	36	PASS			
6	2437	1	17.76	2.40	20.16	36	PASS			
10	2457	1	17.59	2.40	19.99	36	PASS			
11	2462	1	17.18	2.40	19.58	36	PASS			

802.11	802.11g Ch0									
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT			
1	2412	6	14.60	2.40	17.00	36	PASS			
2	2417	6	16.55	2.40	18.95	36	PASS			
3	2422	6	17.52	2.40	19.92	36	PASS			
4	2427	6	18.30	2.40	20.70	36	PASS			
5	2432	6	18.45	2.40	20.85	36	PASS			
6	2437	6	19.25	2.40	21.65	36	PASS			
8	2447	6	19.00	2.40	21.40	36	PASS			
9	2452	6	17.85	2.40	20.25	36	PASS			
10	2457	6	17.59	2.40	19.99	36	PASS			
11	2462	6	14.49	2.40	16.89	36	PASS			

802.11	802.11g Ch1										
сн	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT				
1	2412	6	14.47	2.40	16.87	36	PASS				
2	2417	6	16.29	2.40	18.69	36	PASS				
3	2422	6	17.05	2.40	19.45	36	PASS				
4	2427	6	17.94	2.40	20.34	36	PASS				
5	2432	6	18.22	2.40	20.62	36	PASS				
6	2437	6	19.16	2.40	21.56	36	PASS				
8	2447	6	18.72	2.40	21.12	36	PASS				
9	2452	6	17.76	2.40	20.16	36	PASS				
10	2457	6	17.34	2.40	19.74	36	PASS				
11	2462	6	14.46	2.40	16.86	36	PASS				

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802.11	802.11n_HT20M Ch0								
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT		
1	2412	MCS0	14.99	2.40	17.39	36	PASS		
2	2417	MCS0	16.71	2.40	19.11	36	PASS		
3	2422	MCS0	16.84	2.40	19.24	36	PASS		
4	2427	MCS0	17.69	2.40	20.09	36	PASS		
5	2432	MCS0	18.09	2.40	20.49	36	PASS		
6	2437	MCS0	18.34	2.40	20.74	36	PASS		
9	2452	MCS0	18.19	2.40	20.59	36	PASS		
10	2457	MCS0	17.16	2.40	19.56	36	PASS		
11	2462	MCS0	12.60	2.40	15.00	36	PASS		
802.11	n_HT20M	1 Ch1							
сн	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT		
1	2412	MCS0	14.89	2.40	17.29	36	PASS		
2	2417	MCS0	16.55	2.40	18.95	36	PASS		
3	2422	MCS0	16.49	2.40	18.89	36	PASS		
4	2427	MCS0	17.61	2.40	20.01	36	PASS		
5	2432	MCS0	17.75	2.40	20.15	36	PASS		
6	2437	MCS0	18.22	2.40	20.62	36	PASS		
9	2452	MCS0	17.86	2.40	20.26	36	PASS		
10	2457	MCS0	16.96	2.40	19.36	36	PASS		
11	2462	MCS0	12.30	2.40	14.70	36	PASS		



9 6DB & 99% BANDWIDTH MEASUREMENT

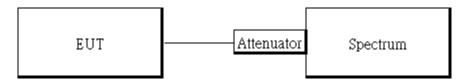
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	EQUIPMENT MFR MODEL SERIAL LAST CAL DUE								
TYPE		NUMBER	NUMBER	CAL.					
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/21/2020	04/20/2021				
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				

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. Set the spectrum analyzer as RBW= 1 % to 5% of OBW , VBW = 3 X RBW, Span= 2 to 5 times of the OBW, Sweep=auto, Detector = Peak, and Max hold for 20dB Bandwidth test.

5. Mark the peak frequency and –20dB (upper and lower) frequency

6. Set the spectrum analyzer as

RBW= 1 % to 5% of 99% Bandwidth ,

VBW \geq 3 X RBW,

Span= large enough to capture all products of the modulation process,

Sweep=auto,

Detector = Peak, and Max hold for 99% Bandwidth test.

- 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 6dB Bandwidth

802.11b Ch0				802.11g Ch0			
Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result	Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	9073.00	> 500	PASS	2412	15150.00	> 500	PASS
2437	9034.00	> 500	PASS	2437	15140.00	> 500	PASS
2462	9055.00	> 500	PASS	2462	15160.00	> 500	PASS

802.11_n_HT20 Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15430.00	> 500	PASS
2437	15150.00	> 500	PASS
2462	15130.00	> 500	PASS

9.6 99% Bandwidth

802.11b Ch0		802.11g Ch0			
Freq. 99% BW		Freq.	99% BW		
(MHz)	(MHz)	(MHz)	(MHz)		
2412	12.252	2412	16.688		
2437	11.892	2437	16.685		
2462	11.881	2462	16.668		

802.11n_HT20M Ch0					
Freq.	99% BW				
(MHz)	(MHz)				
2412	17.747				
2437	17.736				
2462	17.755				

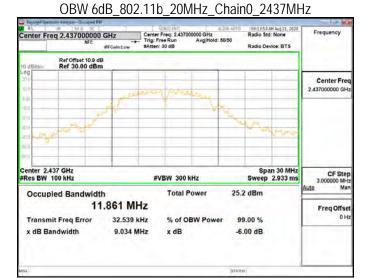
Refer to next page for plots

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OBW 6dB_802.11b_20MHz_Chain0_2412MHz





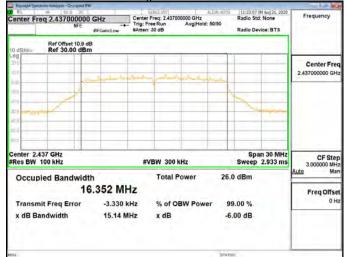
OBW 6dB_802.11b_20MHz_Chain0_2462MHz



OBW 6dB_802.11q_20MHz_Chain0_2412MHz



OBW 6dB_802.11g_20MHz_Chain0_2437MHz



OBW 6dB_802.11g_20MHz_Chain0_2462MHz

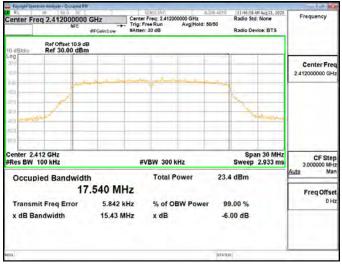


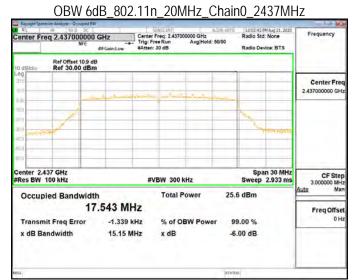
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OBW 6dB_802.11n_20MHz_Chain0_2412MHz





OBW 6dB_802.11n_20MHz_Chain0_2462MHz



IC OBW 99%_802.11b_20MHz_Chain0_2412MHz



IC OBW 99%_802.11b_20MHz_Chain0_2437MHz



IC OBW 99%_802.11b_20MHz_Chain0_2462MHz



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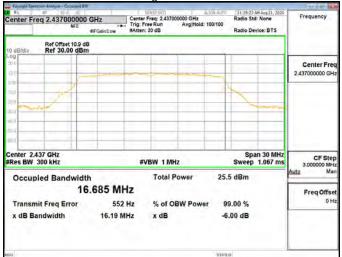
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IC OBW 99%_802.11g_20MHz_Chain0_2412MHz







IC OBW 99%_802.11g_20MHz_Chain0_2462MHz



IC OBW 99%_802.11n_20MHz_Chain0_2412MHz



IC OBW 99%_802.11n_20MHz_Chain0_2437MHz



IC OBW 99%_802.11n_20MHz_Chain0_2462MHz



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

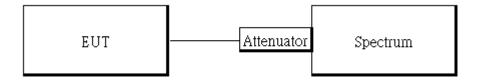
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9.

10.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	EQUIPMENT MFR MODEL SERIAL LAST C								
TYPE		NUMBER	NUMBER	CAL.					
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/21/2020	04/20/2021				
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 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.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.

Conducted Band Edge:

- 1. 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. Mark the highest readings of the emissions outside of 2400MHz~2483.5MHz.
- 9. 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 .
- 3. 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.	PSD	Reference Level of Limit	
(MHz)	(dBm)	(dBm)	
2412	8.80	-11.20	
2437	8.98	-11.02	
2457	9.21	-10.79	
2462	8.70	-11.30	

Reference Level of Limit 802.11g mode			
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)	
2412	3.99	-16.01	
2417	6.06	-13.94	
2437	8.13	-11.87	
2457	7.37	-12.63	
2462	3.21	-16.79	

Reference Level of Limit 802.11n20 mode			
Freq.	PSD	Reference Level of Limit	
(MHz)	(dBm)	(dBm)	
2412	4.54	-15.46	
2417	6.27	-13.73	
2437	7.59	-12.41	
2457	7.01	-12.99	
2462	1.94	-18.06	

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Reference Level_802.11b_20MHz_Chain0_2412MHz

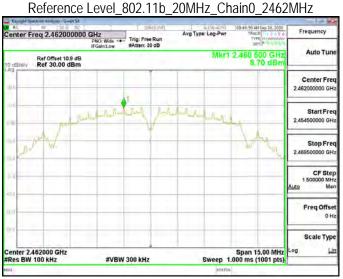


Reference Level 802.11b 20MHz Chain0 2437MHz



Reference Level_802.11b_20MHz_Chain0_2457MHz





Reference Level_802.11g_20MHz_Chain0_2412MHz



Reference Level_802.11g_20MHz_Chain0_2417MHz



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Reference Level_802.11g_20MHz_Chain0_2437MHz



Reference Level 802.11g 20MHz Chain0 2457MHz



Reference Level_802.11g_20MHz_Chain0_2462MHz



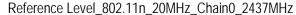
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Reference Level_802.11n_20MHz_Chain0_2417MHz







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Reference Level 802.11n 20MHz Chain0 2457MHz

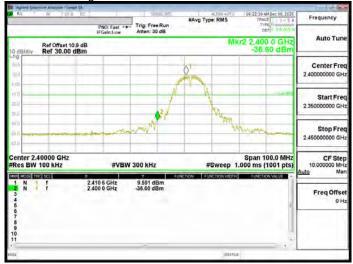


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Center Freq 2.462000000 GHz	Trig: Free Run	Avg Type: Log-Pwr	11:17(07 AM Sep 24, 2020 TRACE TYPE TYPE DET P	Frequency
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Center 2.46200 GHz #Res BW 100 kHz #VBW 3	00 kHz	Sweep	Span 30.00 MHz 1.000 ms (1001 pts)	Log <u>Lin</u>
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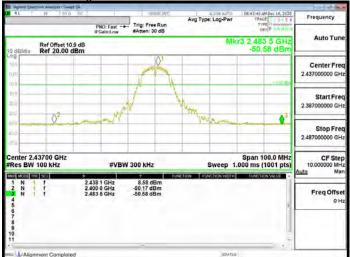
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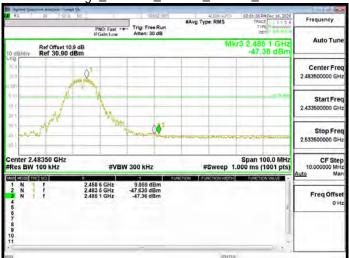
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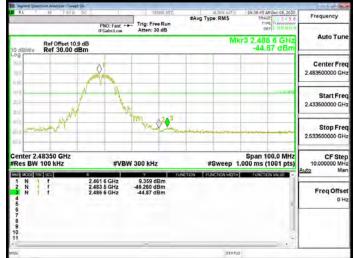
Band Edge_802.11b_20MHz_Chain0_2437MHz



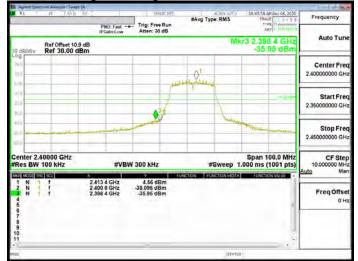
Band Edge_802.11b_20MHz_Chain0_2457MHz



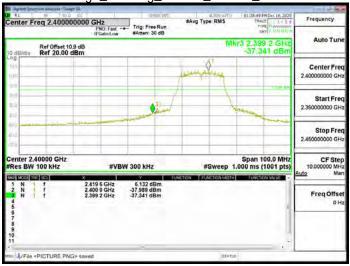
Band Edge_802.11b_20MHz_Chain0_2462MHz



Band Edge_802.11g_20MHz_Chain0_2412MHz



Band Edge_802.11g_20MHz_Chain0_2417MHz



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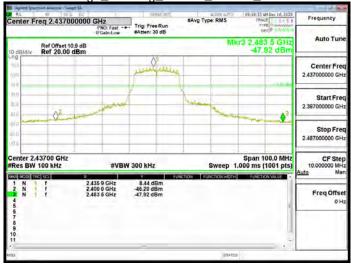
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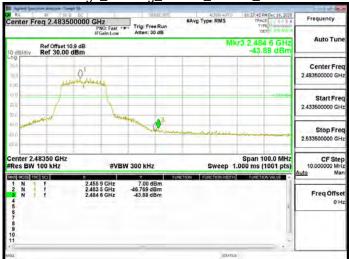
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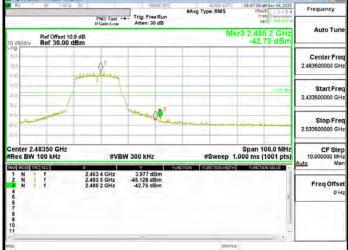
Band Edge_802.11g_20MHz_Chain0_2437MHz



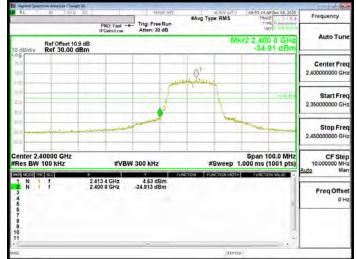
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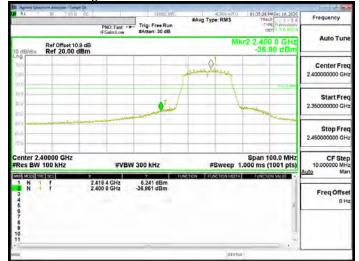
Band Edge_802.11g_20MHz_Chain0_2462MHz



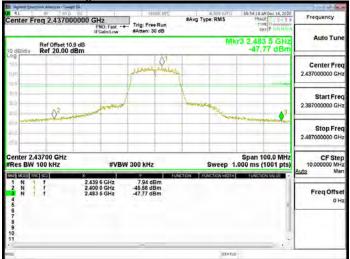
Band Edge_802.11n_20MHz_Chain0_2412MHz



Band Edge_802.11n_20MHz_Chain0_2417MHz



Band Edge_802.11n_20MHz_Chain0_2437MHz



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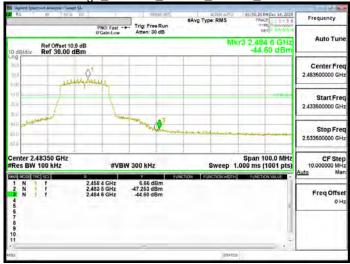
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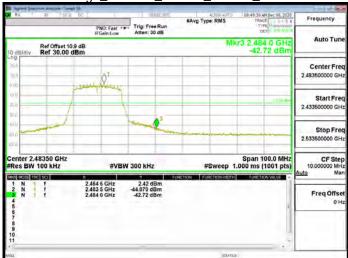
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Band Edge_802.11n_20MHz_Chain0_2457MHz



Band Edge_802.11n_20MHz_Chain0_2462MHz

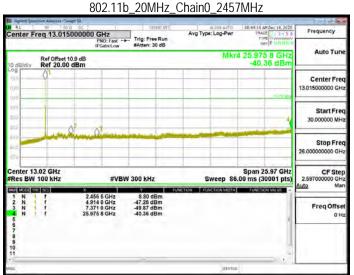


802.11b_20MHz_Chain0_2412MHz

33 AM 54p 26, 202 Aug Tupe: L Auto Tu Mkr4 25.816 5 GH: -39.00 dBm Ref Offset 10.9 dB Ref 30.00 dBm Center Fre 13.015000000 GH Start Free 30.000000 N Stop Freq 26.00000000 GH Span 25.97 GHz Sweep 86.00 ms (30001 pts enter 13.02 GHz Res BW 100 kHz CF Ster 2.59700000 GH #VBW 300 kHz M 2 2 2 2 7.05 dBm -47.34 dBm -49.43 dBm -39.00 dBm 4.824 0 GHz 7.236 0 GHz Freq Offse 0H Scale Typ L3

802.11b_20MHz_Chain0_2437MHz





802.11b_20MHz_Chain0_2462MHz



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802.11g_20MHz_Chain0_2412MHz

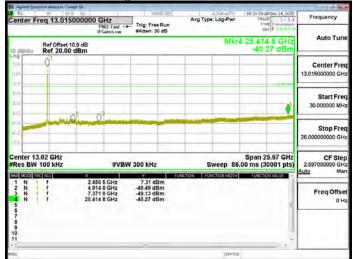
Freed do by				Swaper Sci	emum Annique - D	
Frequency	09107:40 AM S4p 26, 2020 TRACE 5 6 TYPE N WWWWW	Aug Type: Log-Pwr	Trig: Free Run #Atten: 30 dB	5000000 GHz PNC: Fast	req 13.015	Center F
Auto Tun	r4 2.399 3 GHz -36.39 dBm	Mk		10.9 dB	Ref Offset 1 Ref 30.00	10 dB/div
Center Fre 13.015000000 GH					01	188
Start Fre 30.000000 MH	0100					10 g 20 d 30 d
Stop Fre 26.00000000 GH				0 ²	Juni	40 Q 60 7 60 7
CF Ste 2.597000000 GH Auto Ma	Span 25.97 GHz .00 ms (30001 pts)		300 kHz	#VBV	0.02 GHz 100 kHz	Res BW
Freq Offs 0 H	FUNCTION VALUE	CTICH FUNCTION WOTH	3.49 dBm -48.60 dBm -46.52 dBm -36.39 dBm	2.409 7 GHz 4.824 0 GHz 7.236 0 GHz 2.399 3 GHz		1 N 2 N 3 N 4 N 6
Scale Typ						6 7 8 9 10 11
	0.1	status				+ \

802.11g_20MHz_Chain0_2417MHz er Freq 13.015000000 GH2 PND: Fast ---- Trig: Free Run #Atten: 30 dB Frequency Auto Tu Akr4 2.397 6 GH -40,33 dBi Ref Offset 10.9 dB Ref 20.00 dBm Center Fre 13.015000000 G Start Fre 30.000000 MH Stop Fred 0000000 GH Center 13.02 GHz #Res BW 100 kHz Span 25.97 GHz Sweep 86.00 ms (30001 pts CF Step #VBW 300 kH 2.597 2.75 dBm -47.12 dBm -49.03 dBm -40.33 dBm NNN 4.834 0 GHz 7.251 0 GHz 2.397 5 CHz ł Freq Offse 0 H

802.11g_20MHz_Chain0_2437MHz

light de la	1	ALC: NO. OF			ectrum Analigue - Sa	
Frequency	09:16:55 AMSep 26, 2020 TRACE	Avg Type: Log-Pwr	Trig: Free Run #Atten: 30 dB	0000000 GHz PNC: Fast		Center F
Auto Tur	4 25.512 6 GHz -39.29 dBm	Mkr	watten: 30 dB		Ref Offset 10 Ref 30.00	10 dB/div
Center Fre 13.015000000 GH					01	18/0 18/0 0 m
Start Fre 30.000000 Mi						1010 2010 3010
Stop Fre 26.00000000 Gi		-		0 ²	June	40 X 50 0 60 0
CF Ste 2.597000000 GI	Span 25.97 GHz .00 ms (30001 pts)	Sweep 86,	V 300 KHz	#VBI	3.02 GHz 100 kHz	Center 13 Res BW
Auto Mi Freq Offs 0 F	FUNCTION VALUE	стон тикстокилотн	5.04 dBm -47.90 dBm -49.07 dBm -39.29 dBm	2.434 0 GHz 4.874 0 GHz 7.311 0 GHz 25.512 6 GHz	10 503 	1 N 2 N 3 N 4 N
Scale Typ						5 7 9 10
		STATUS				+1

802.11g_20MHz_Chain0_2457MHz



802.11g 20MHz Chain0 _2462MHz



802.11n 20MHz Chain0 2412MHz



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Report No.: ER/2020/80014 Page 42 of 116

802.11n_20MHz_Chain0_2417MHz

Against Insertion Analyse Cough SA					
RL 25 SOU DC	0.001-	SERISE: INT	Avg Type: Log-Pwr	09:35:28 AM Dec 16, 2020	Frequency
enter Freg 13.01500000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type, Log-Pwr	DET P N N H	
Ref Offset 10.9 dB Ref 20.00 dBm			Mk	r4 2.399 3 GHz -40,19 dBm	Auto Tun
•00 •1.4 •					Center Fre 13.015000000 GH
200 100 110 100 100					Start Fre 30.000000 MH
10 10 10	Ω-				Stop Fre 26.00000000 G
enter 13.02 GHz Res BW 100 kHz	#VBW	300 kHz		Span 25.97 GHz 00 ms (30001 pts)	CF Ste 2.597000000 GH
2 N I A. 3 N I I 7.	420 1 GHz 834 0 GHz 251 0 GHz 399 3 GHz	54 dBm -47.09 dBm -49.69 dBm -40.19 dBm	ансткон [РОМСТКОН МАРТН]		Freq Offs
		-	SYATUS		

802.11n_20MHz_Chain0_2437MHz



802.11n 20MHz Chain0 2457MHz

Segure Inserver Analyse Comp					
Center Freq 13.0150	PNO: Fast +1	SERISE INT	Avg Type: Log-Pwr	10:04:07 AM Dec 16, 2020 TRACE 3 5 0 TYPE 10:00000000000000000000000000000000000	Frequency
Ref Offset 10		#Atten: 30 dB	Mkr	23.832 4 GHz -41.09 dBm	Auto Tune
10 dB/div Ref 20.00 d	BM				Center Free
10.0					
200 200	2 13			4	Start Free 30.000000 MH
800	Mar Vietes				Stop Fre 26.00000000 GH
Center 13.02 GHz #Res BW 100 kHz	#VB	N 300 kHz	Sweep 86.	Span 25.97 GHz 00 ms (30001 pts)	CF Ste 2.597000000 GH Auto Ma
1 N 1 1 2 N 1 3 N 1 5 6 6 7 8 9	2454 7 GHz 4914 0 GHz 7.371 0 GHz 23.832 4 GHz	6.32 dBm -47,13 dBm -49,13 dBm -49,09 dBm	NCTION SUNCTION WOTH	Tenetion Walder	Freq Offse 0 H
10 11			difatus		

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802.11n_20MHz_Chain0_2462MHz

Keypight Spectrum Annique - So					Free a line
Center Freq 13.015	PNO: Fast	SENSE INT	Aug Type: Log-Pwr	11:22:49 AM Sep 26, 2020 TRACE 12:4 & 5 6 TIPE INVOICEMENT DET P 7 11:14 A 5	Frequency
Ref Offset 10		WATTER: SO OB	Mkn	4 25.791 4 GHz -39.20 dBm	Auto Tune
2010 10.0					Center Fre 13.015000000 GH
100 200 300				4-2-2-	Start Fre 30.000000 MH
	2 ²				Stop Fre 26.00000000 GH
Center 13.02 GHz #Res BW 100 kHz	#VBW	300 KHz	Sweep 86	Span 25.97 GHz .00 ms (30001 pts)	CF Ste 2.597000000 GH
1 N 1	2.466.9 GHz	0.75 dBm	HCTICH FUNCTION WOTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 1 3 N 1 1 4 N 1	4.924 0 GHz 7.386 0 GHz 25,791 4 GHz	-46.85 dBm -48.04 dBm -39.20 dBm			Freq Offse 0 H
6 7 8 9					Scale Type
10 11					Log Li
eo			status		

SGS Taiwan Ltd. No.1134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號 台灣檢驗科技股份有限公司 t (886-2) 2299-3279 f (886-2) 2298-0488 www.sgs.com.tw



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 and RSS-Gen §8.9 Table 5 and 6 limit as below. And according to §15.33(a) (1) & RSS-Gen §6.13.2.a, 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 μ V/m) = 20 log Emission level (μ V/m)

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11.2 Measurement Equipment Used:

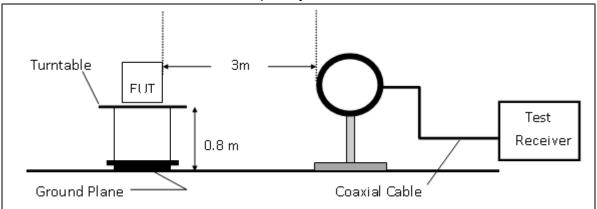
966 Chamber						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.	
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2019	12/24/2020	
Horn Antenna	Schwarzbeck	BBHA9120D	603	04/29/2020	04/28/2021	
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/03/2020	01/02/2021	
Loop Antenna	ETS.LINDGREN	6502	148045	10/15/2019	10/14/2020	
3m Site NSA	SGS	966 chamber	N/A	01/02/2020	01/01/2021	
Spectrum Analyzer	R&S	FSV-30	101398	11/13/2019	11/12/2020	
PXA Spectrum An- alyzer	Agilent	N9030A	MY53120760	04/21/2020	04/20/2021	
EMI Test Receiver	R&S	ESCI 7	100759	07/13/2020	07/12/2021	
Pre-Amplifier	EMC Instruments	EMC184045B	980135	01/02/2020	01/01/2021	
Pre-Amplifier	HP	8447D	2944A09469	01/02/2020	01/01/2021	
Attenuator	Mini-Circuit	BW-S10W2+	4	01/02/2020	01/01/2021	
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	01/02/2020	01/01/2021	
High Pass Filter	WI	WHKX4.0/18G- 10SS	22	01/02/2020	01/01/2021	
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	01/02/2020	01/01/2021	
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	01/02/2020	01/01/2021	
Coaxial Cable	Huber Suhner	EMC 104-SM- SM-2000	160123	01/02/2020	01/01/2021	
Test Software	audix	e3	Ver. 6.11- 20180413	N.C.R	N.C.R	

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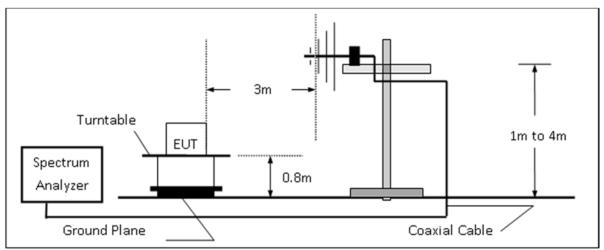


11.3 Test SET-UP

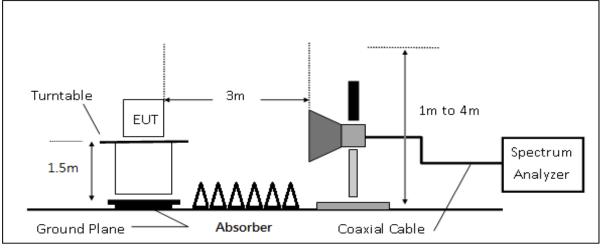
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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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 Quasipeak (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.

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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) AG = Amplifier Gain

AF = Antenna Factor

RA = *Reading Amplitude*

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

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB) Factor(dB) = Antenna Factor($dB\mu V/m$) + 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) & RSS-GEN §6.13.2 was not reported.

11.7 Measurement Result

Note:

- 1. Refer to next page spectrum analyzer data chart and tabular data sheets.
- 2. Measurements are completed at peak and average level, the mark of average is the highest emission in restricted bands

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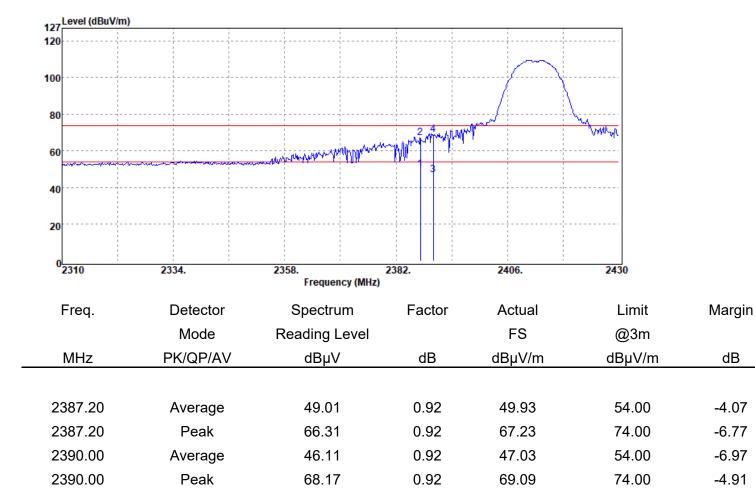
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11.7.1 Radiated Band Edge Measurement Result

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Margin

dB

-6.12

-10.84

-8.46

-7.69

74.00

54.00

74.00

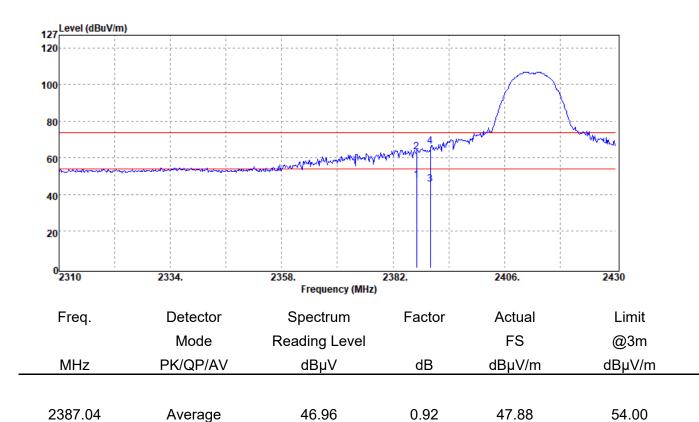


2387.04

2390.00

2390.00

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



62.24

44.62

65.39

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Peak

Average

Peak

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0.92

0.92

0.92

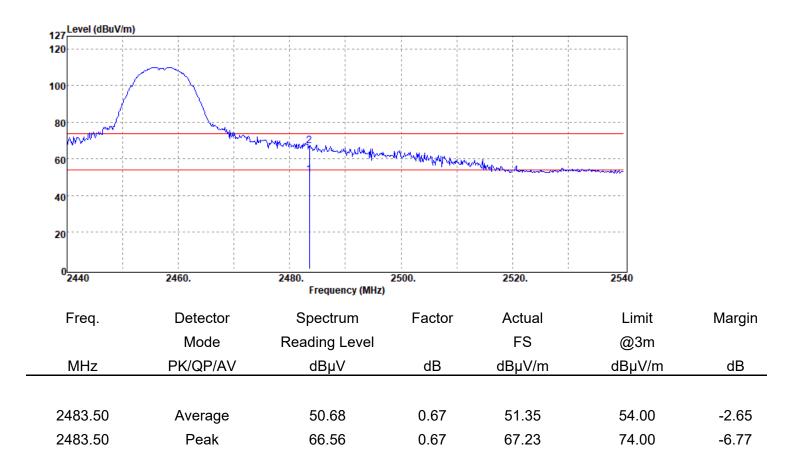
63.16

45.54

66.31

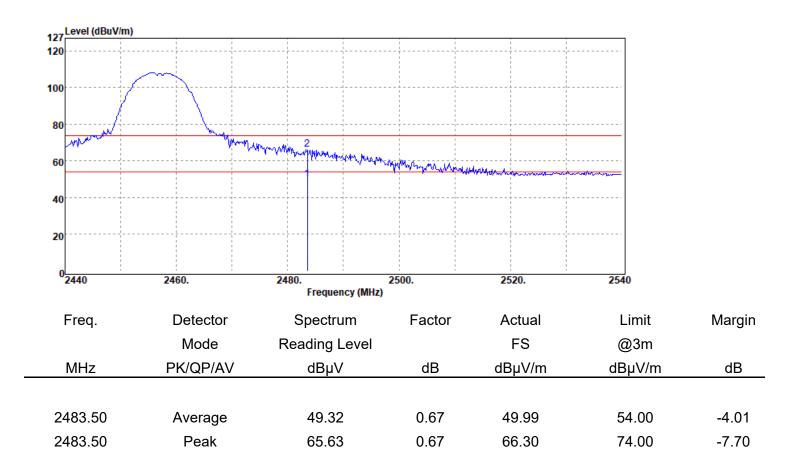


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





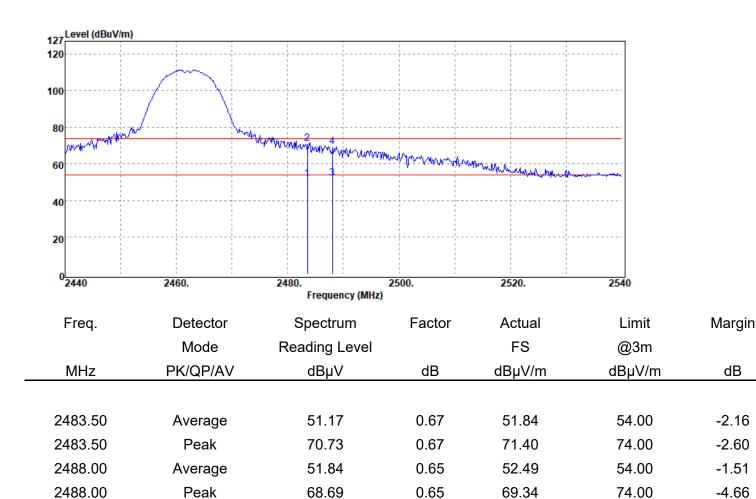
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick

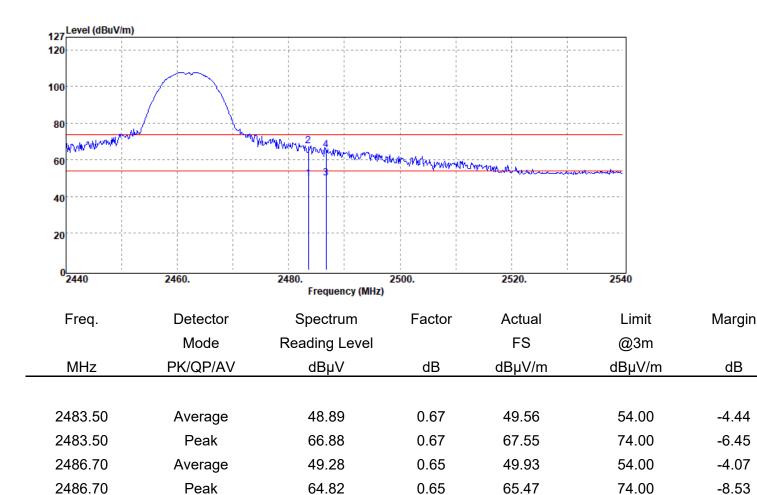


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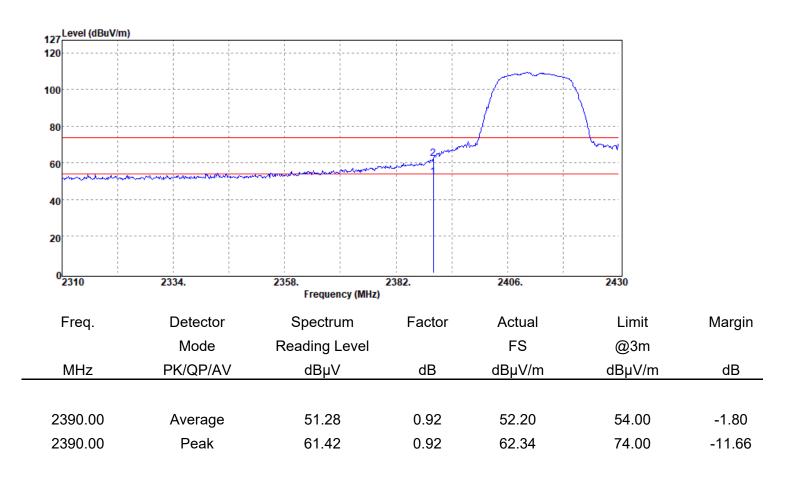
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-07
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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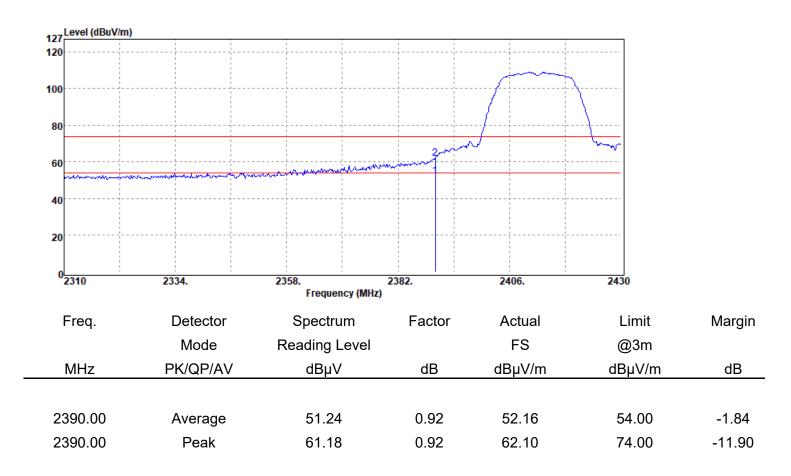


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





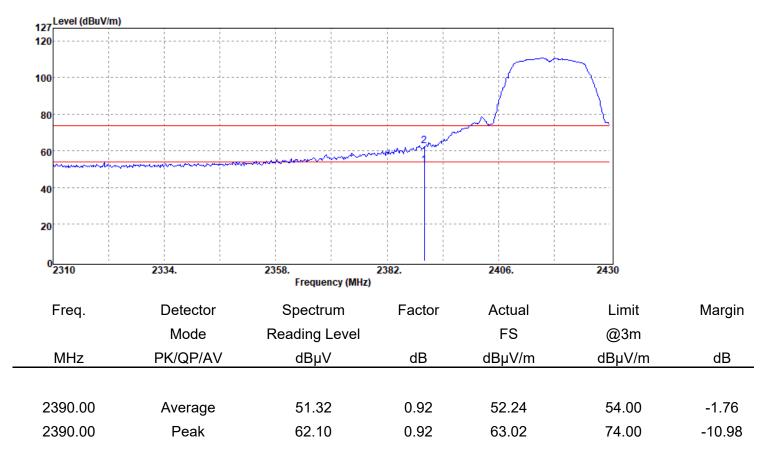
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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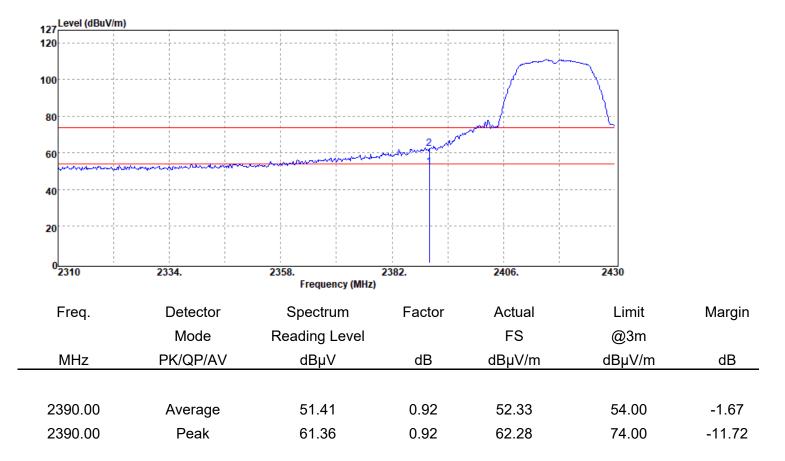


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2417 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



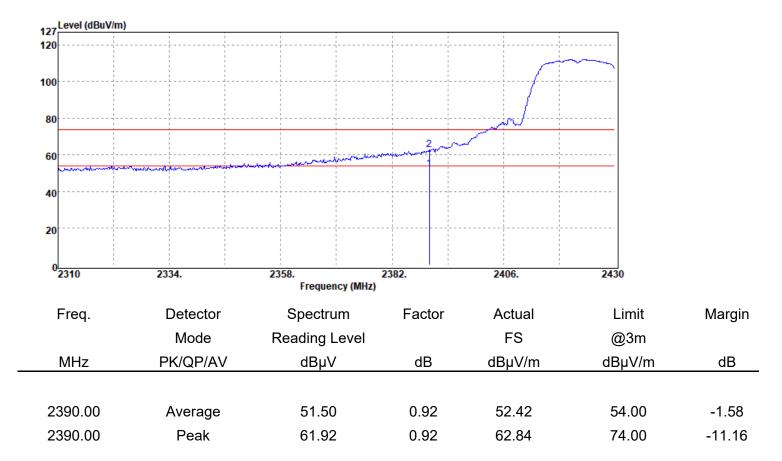


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2417 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



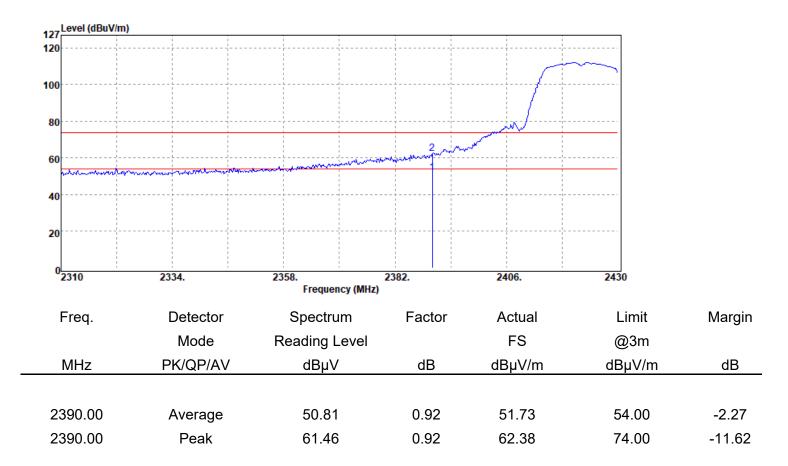


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2422 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2422 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



dB

-1.58

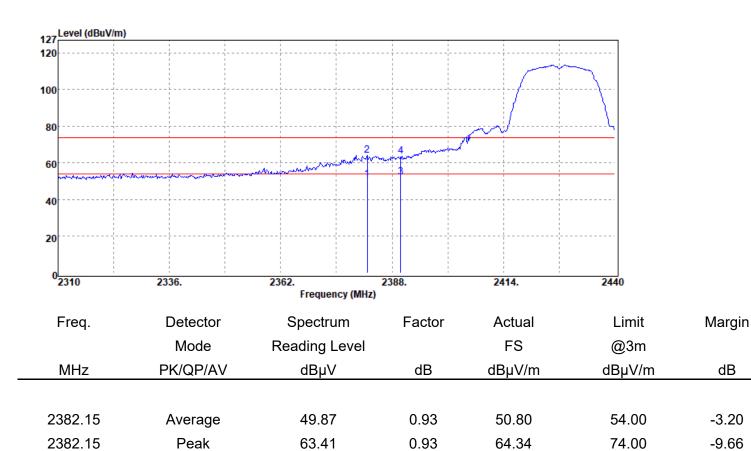
-10.12



2390.00

2390.00

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2427 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



51.50

62.96

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Average

Peak

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52.42

63.88

0.92

0.92

54.00

74.00

Margin

dB

-4.40

-10.70

-2.05

-12.40

74.00

54.00

74.00

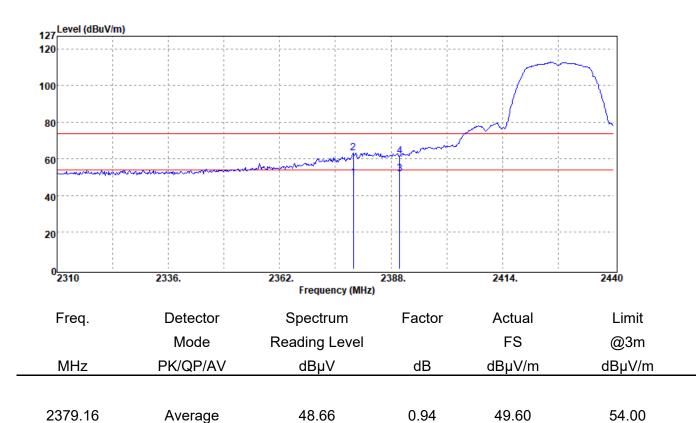


2379.16

2390.00

2390.00

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2427 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



62.36

51.03

60.68

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Peak

Average

Peak

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0.94

0.92

0.92

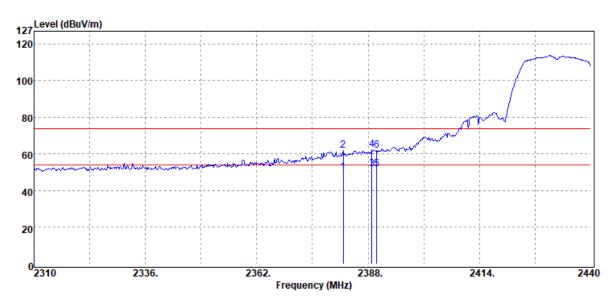
63.30

51.95

61.60



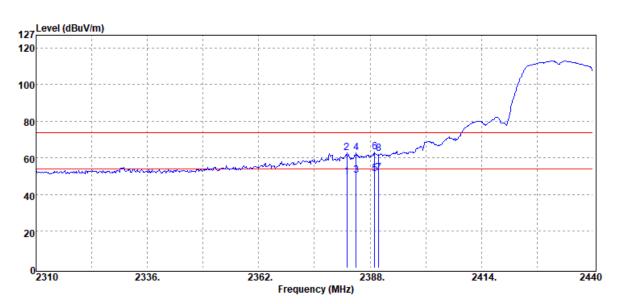
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2432 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2382.15	Average	49.01	0.93	49.94	54.00	-4.06
2382.15	Peak	60.91	0.93	61.84	74.00	-12.16
2388.91	Average	50.77	0.91	51.68	54.00	-2.32
2388.91	Peak	61.50	0.91	62.41	74.00	-11.59
2390.00	Average	51.05	0.92	51.97	54.00	-2.03
2390.00	Peak	61.03	0.92	61.95	74.00	-12.05



Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2432 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2382.54	Average	48.88	0.93	49.81	54.00	-4.19
2382.54	Peak	61.73	0.93	62.66	74.00	-11.34
2384.75	Average	49.47	0.93	50.40	54.00	-3.60
2384.75	Peak	61.81	0.93	62.74	74.00	-11.26
2389.04	Average	50.58	0.91	51.49	54.00	-2.51
2389.04	Peak	62.22	0.91	63.13	74.00	-10.87
2390.00	Average	50.76	0.92	51.68	54.00	-2.32
2390.00	Peak	61.31	0.92	62.23	74.00	-11.77

2450

2422.



40

20

0 2310

2338.

Report Number Operation Mode Test Frequency	:ER-2020-80014 :802.11g :2437 MHz	Test Site Test Date Temp./Humi.	:966 SEMI_Chamber :2020-08-07 :25.8/63
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick
127 Level (dBuV/m) 120			
100			
80 60	2 mar and a mar	m	

Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2387.28	Average	48.71	0.92	49.63	54.00	-4.37
2387.28	Peak	61.32	0.92	62.24	74.00	-11.76
2390.00	Average	49.82	0.92	50.74	54.00	-3.26
2390.00	Peak	59.41	0.92	60.33	74.00	-13.67

2394.

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2366.

Frequency (MHz)



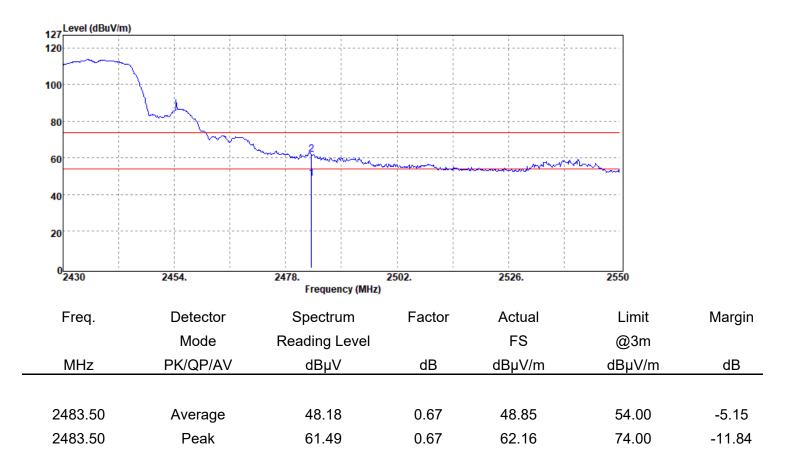
127 Level (dBuV/m) 120 100	80				 		b
	100				 		
127Level (dBuV/m)							~
	127	iBuV/m)					
				-			
st Mode :Bandedge CH Low Antenna Pol. :HORIZONTAL JT Pol :E2 Plane Engineer :Nick	-	ency				Temp./Humi.	:25.8/63
st Mode :Bandedge CH Low Antenna Pol. :HORIZONTAL	eport Nui peration	Mode	:802.11g			Test Date	:2020-08-07

Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2387.42	Average	48.26	0.92	49.18	54.00	-4.82
2387.42	Peak	60.13	0.92	61.05	74.00	-12.95
2390.00	Average	48.91	0.92	49.83	54.00	-4.17
2390.00	Peak	58.40	0.92	59.32	74.00	-14.68

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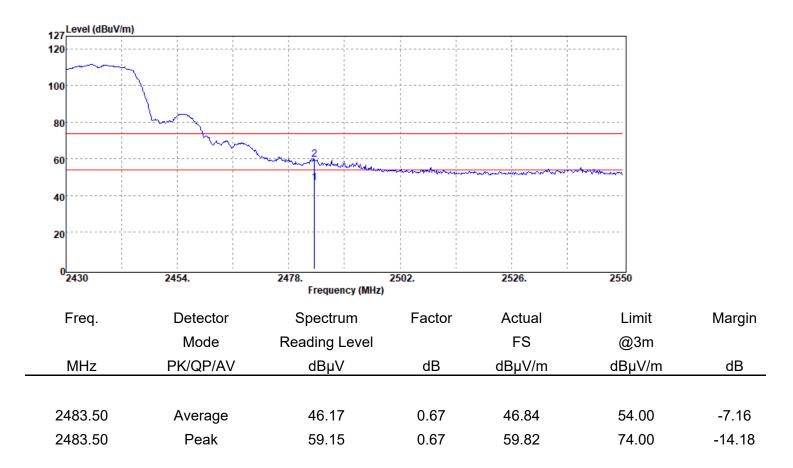


:ER-2020-80014	Test Site	:966 SEMI_Chamber
:802.11g	Test Date	:2020-08-07
:2437 MHz	Temp./Humi.	:25.8/63
:Bandedge CH High	Antenna Pol.	:VERTICAL
:E2 Plane	Engineer	:Nick
	:802.11g :2437 MHz :Bandedge CH High	:EN-2020-000 T4:802.11gTest Date:2437 MHzTemp./Humi.:Bandedge CH HighAntenna Pol.





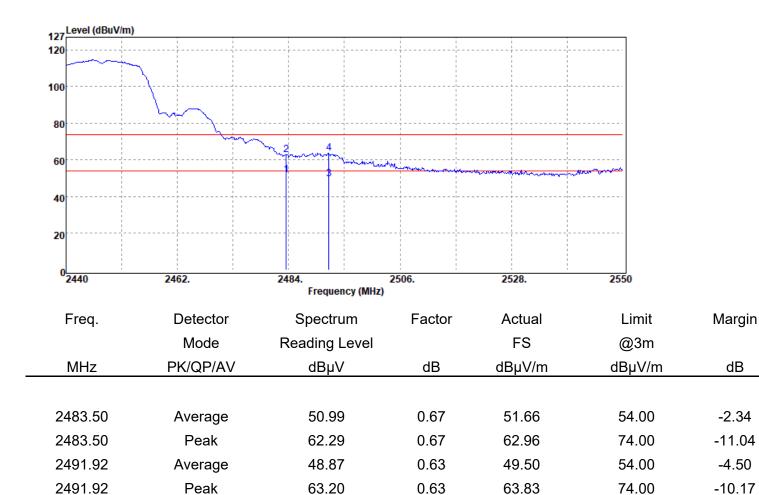
Report Number	:ER-2020-80014	Test Site	:966 SEMI_Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2437 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2447 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick

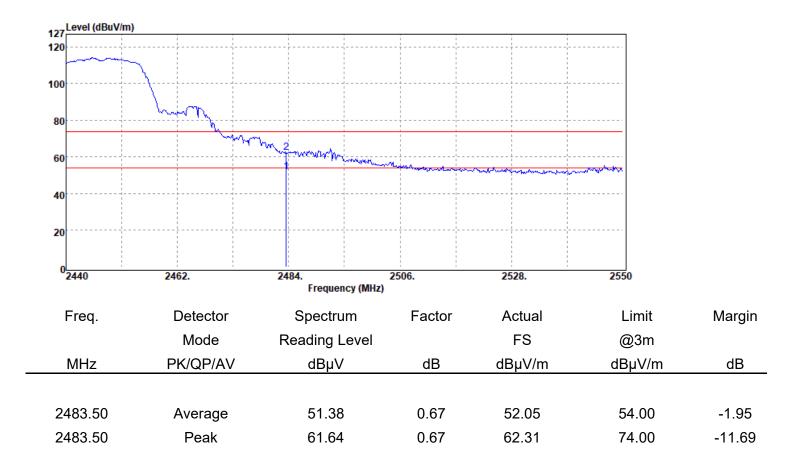


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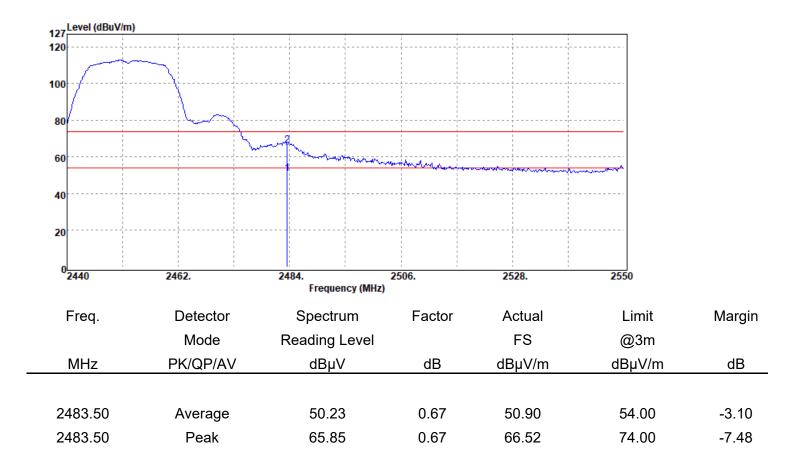
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2447 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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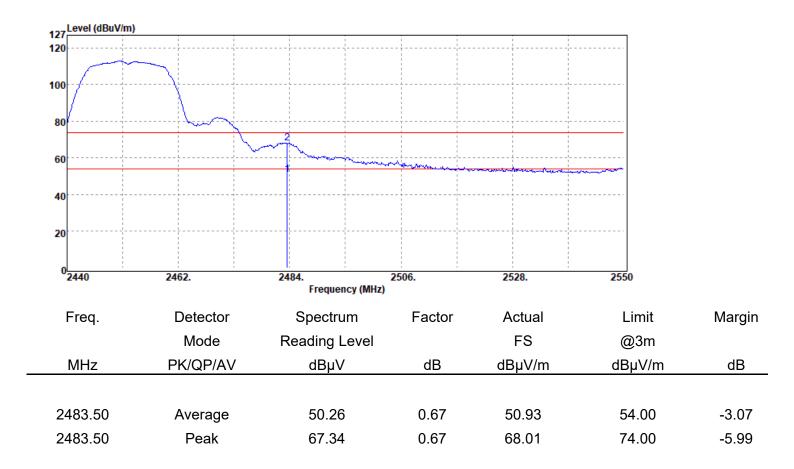


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2452 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



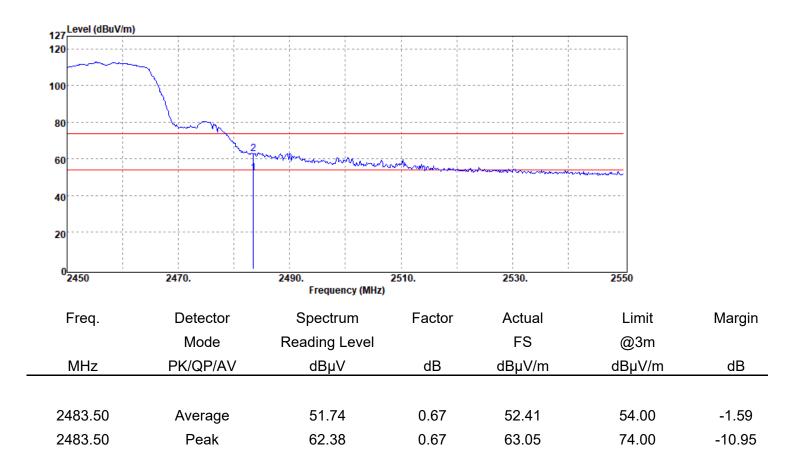


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2452 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



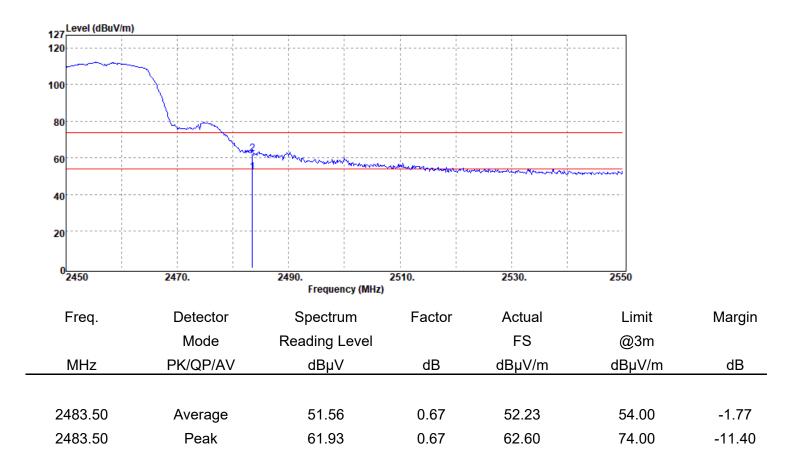


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





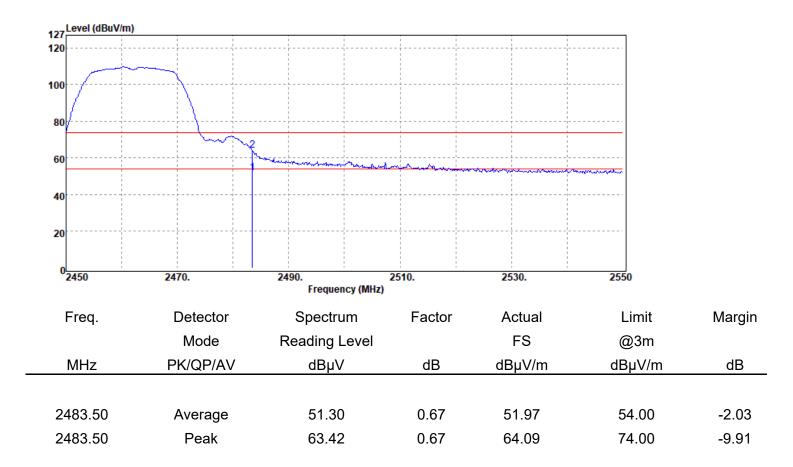
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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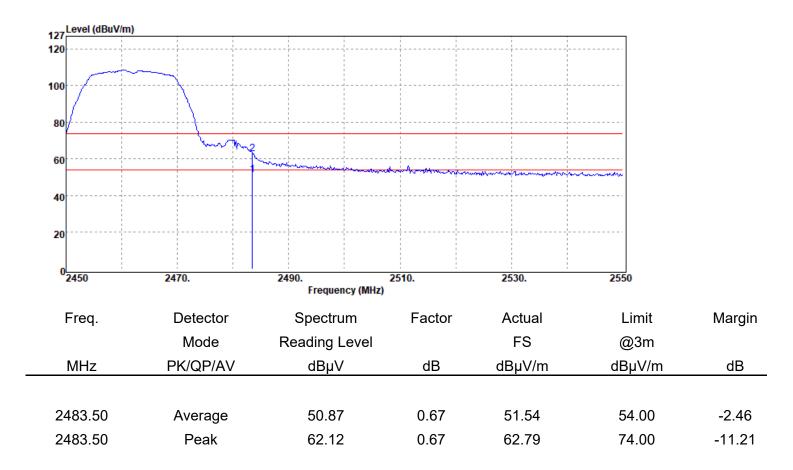


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





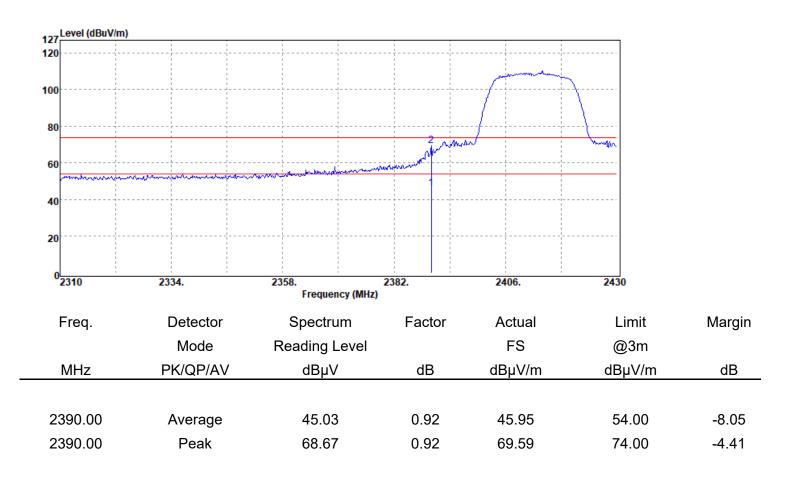
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-07
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/63
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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.



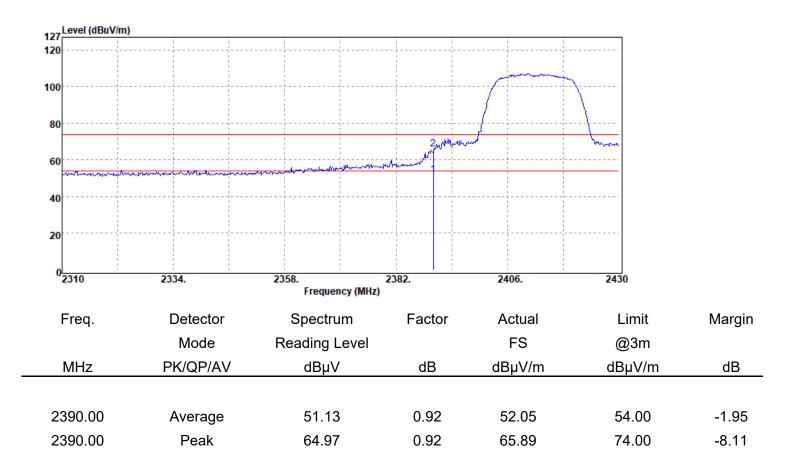
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



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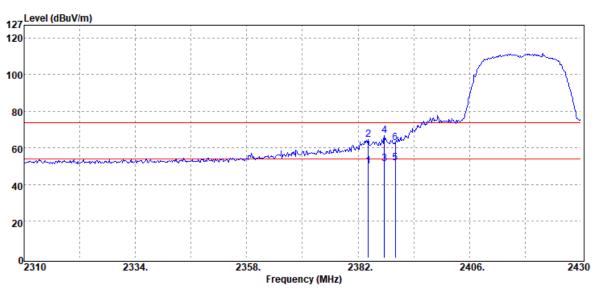


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick





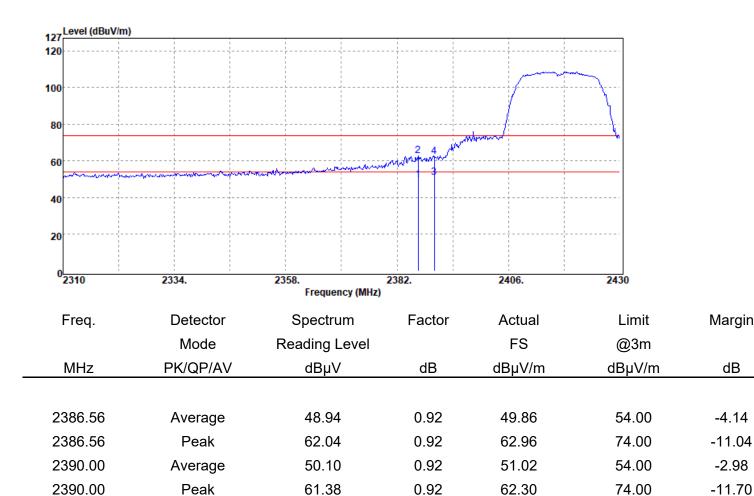
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2417 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2384.16	Average	49.32	0.92	50.24	54.00	-3.76
2384.16	Peak	63.78	0.92	64.70	74.00	-9.30
2387.64	Average	50.65	0.92	51.57	54.00	-2.43
2387.64	Peak	65.99	0.92	66.91	74.00	-7.09
2390.00	Average	50.90	0.92	51.82	54.00	-2.18
2390.00	Peak	61.85	0.92	62.77	74.00	-11.23



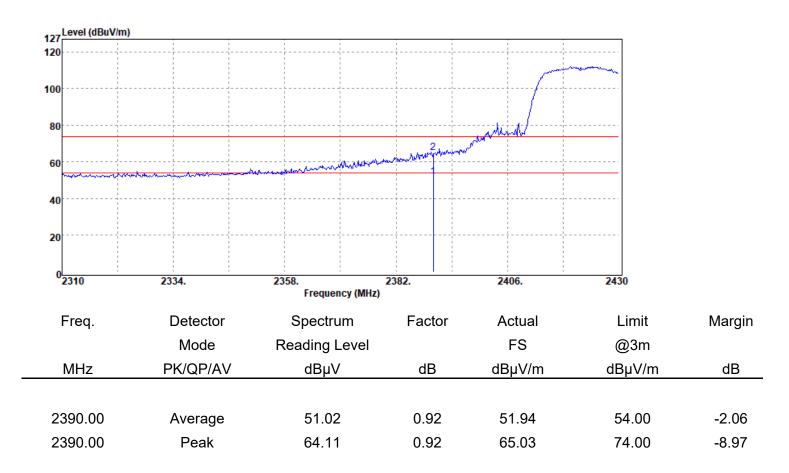
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2417 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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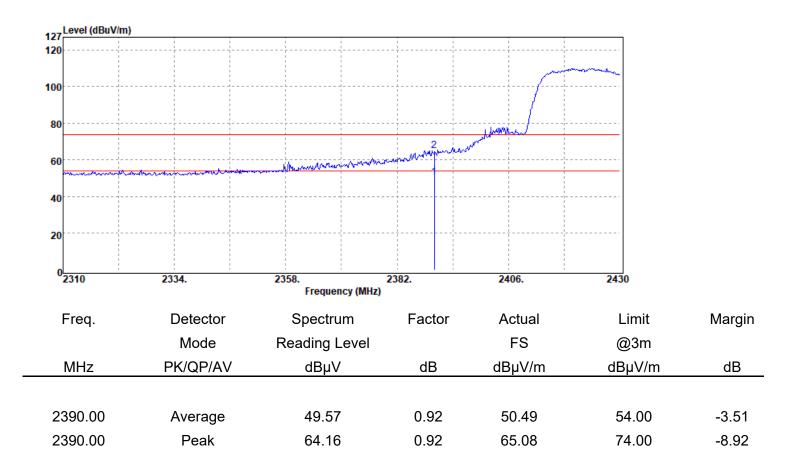


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2422 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





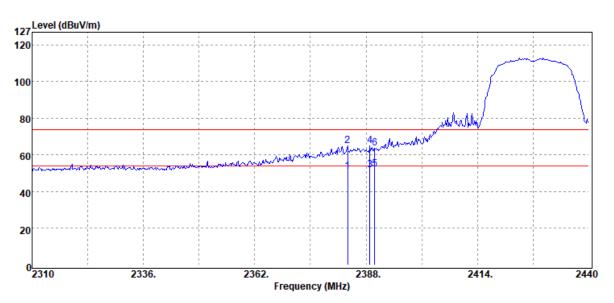
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2422 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2427 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick

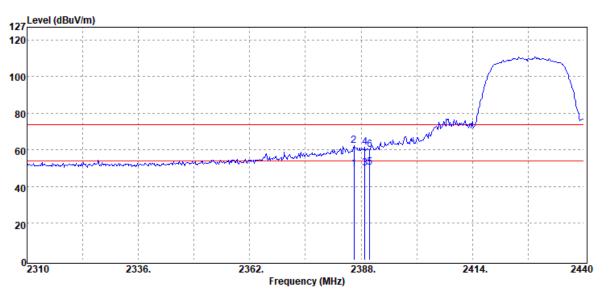


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2383.71	Average	49.97	0.92	50.89	54.00	-3.11
2383.71	Peak	63.98	0.92	64.90	74.00	-9.10
2388.91	Average	51.09	0.91	52.00	54.00	-2.00
2388.91	Peak	63.99	0.91	64.90	74.00	-9.10
2390.00	Average	51.31	0.92	52.23	54.00	-1.77
2390.00	Peak	62.60	0.92	63.52	74.00	-10.48

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.



Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2427 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick

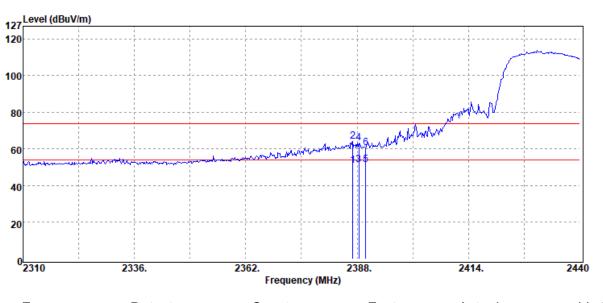


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2386.31	Average	48.64	0.92	49.56	54.00	-4.44
2386.31	Peak	61.51	0.92	62.43	74.00	-11.57
2388.91	Average	49.21	0.91	50.12	54.00	-3.88
2388.91	Peak	60.59	0.91	61.50	74.00	-12.50
2390.00	Average	49.56	0.92	50.48	54.00	-3.52
2390.00	Peak	59.20	0.92	60.12	74.00	-13.88

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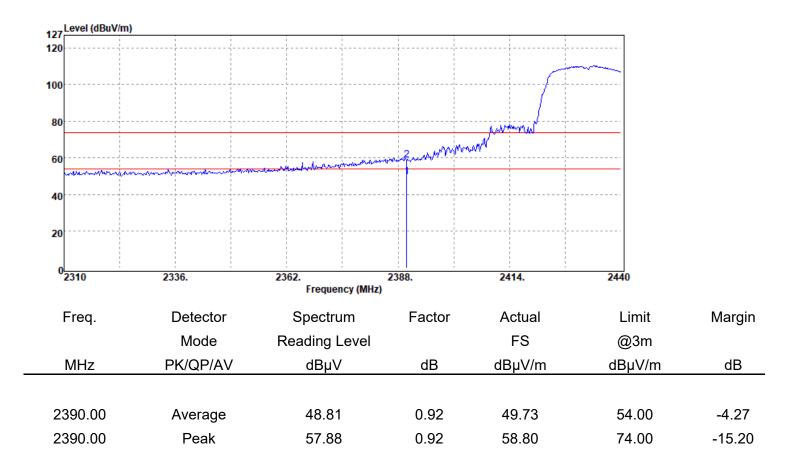
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2432 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2386.96	Average	50.01	0.92	50.93	54.00	-3.07
2386.96	Peak	63.21	0.92	64.13	74.00	-9.87
2388.39	Average	50.42	0.92	51.34	54.00	-2.66
2388.39	Peak	62.25	0.92	63.17	74.00	-10.83
2390.00	Average	50.58	0.92	51.50	54.00	-2.50
2390.00	Peak	59.93	0.92	60.85	74.00	-13.15



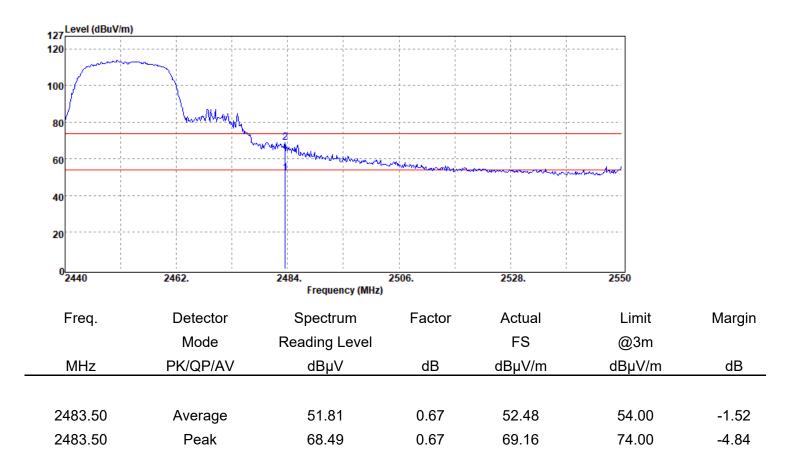
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2432 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH Low	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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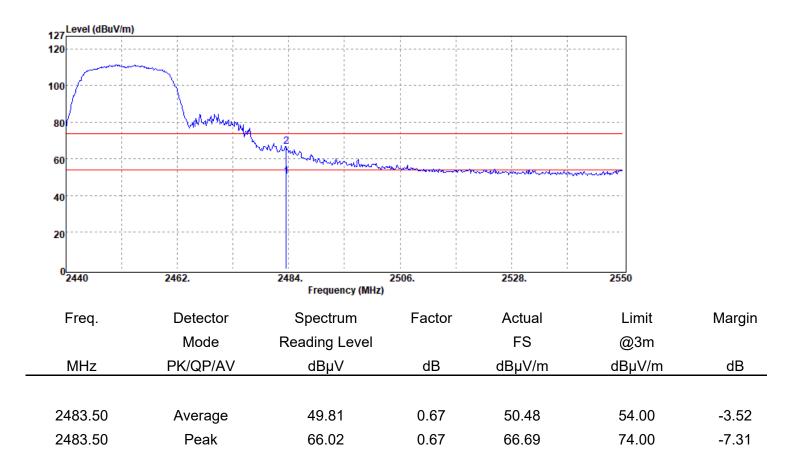


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2452 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





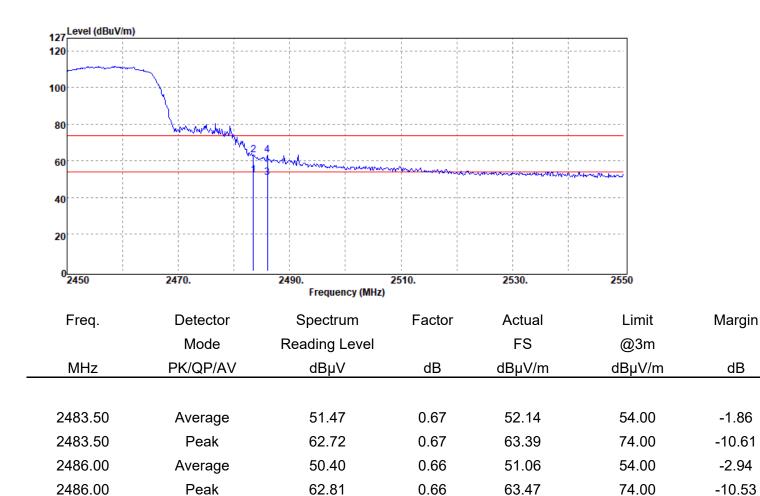
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2452 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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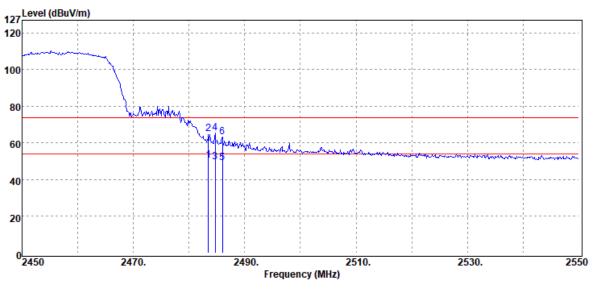
Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2457 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick

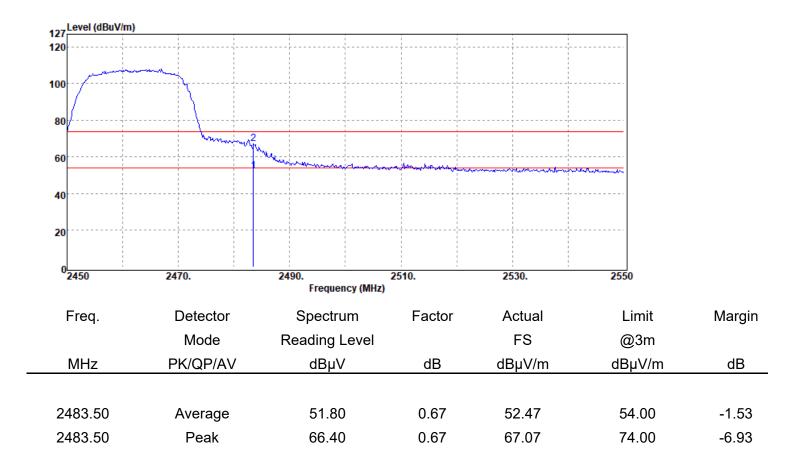


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	49.65	0.67	50.32	54.00	-3.68
2483.50	Peak	64.36	0.67	65.03	74.00	-8.97
2484.70	Average	48.92	0.66	49.58	54.00	-4.42
2484.70	Peak	64.60	0.66	65.26	74.00	-8.74
2486.00	Average	48.49	0.66	49.15	54.00	-4.85
2486.00	Peak	62.52	0.66	63.18	74.00	-10.82

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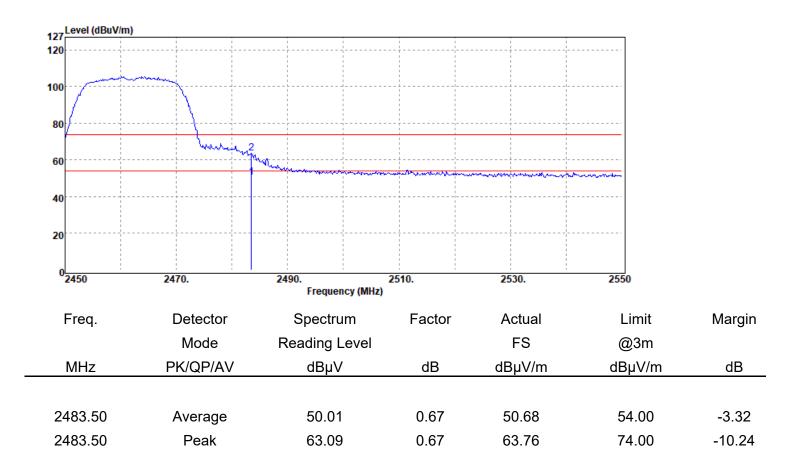


Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick





Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11n20	Test Date	:2020-08-10
Test Frequency	:2462 MHz	Temp./Humi.	:25.8/60
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plane	Engineer	:Nick



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Margin

dB

-8.23

-16.64

-19.25

-18.83

-23.50

-19.43

43.50

46.00

46.00



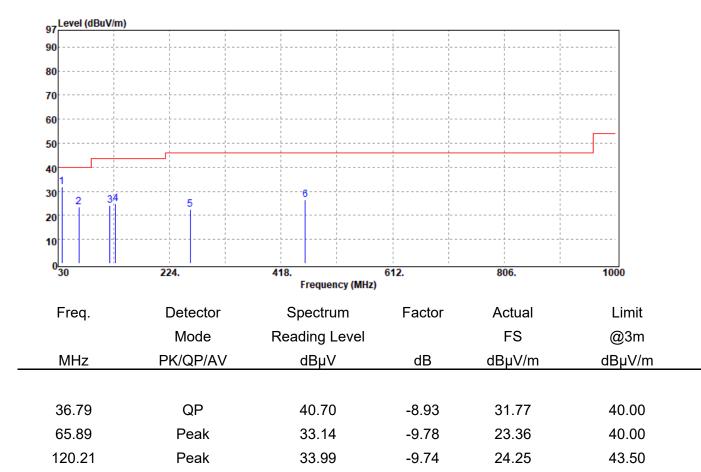
129.91

259.89

459.71

11.7.2 Below 1GHz Worst-Case Emission:

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11g	Test Date	:2020-08-10
Test Frequency	:2437 MHz	Temp./Humi.	:25.8/60
Test Mode	:Tx CH Mid	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



33.22

30.03

28.96

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Peak

Peak

Peak

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-8.55

-7.53

-2.39

24.67

22.50

26.57

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Test Site

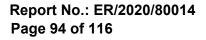


·ED 2020 80014

Report Number

Report Number	:ER-2020-80	0014		Test Sile	.SAC III Chan	inei
Operation Mode	:802.11g			Test Date	:2020-08-10	
Test Frequency	:2437 MHz			Temp./Humi.	:25.8/60	
Test Mode	:Tx CH Mid			Antenna Pol.	:HORIZONTA	L
EUT Pol	:E2 Plane			Engineer	:Nick	
97						
90						
80						
70						
60						
50						
40]					
30	5 4 6					
20						
10						
0 <mark>30</mark>	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
36.79	Peak	40.14	-8.93	31.21	40.00	-8.79
120.21	Peak	32.99	-9.74	23.25	43.50	-20.25
185.20	Peak	32.95	-9.24	23.71	43.50	-19.79
204.60	Peak	35.24	-9.76	25.48	43.50	-18.02
233.70	Peak	39.57	-8.62	30.95	46.00	-15.05
274.44	Peak	31.02	-6.86	24.16	46.00	-21.84

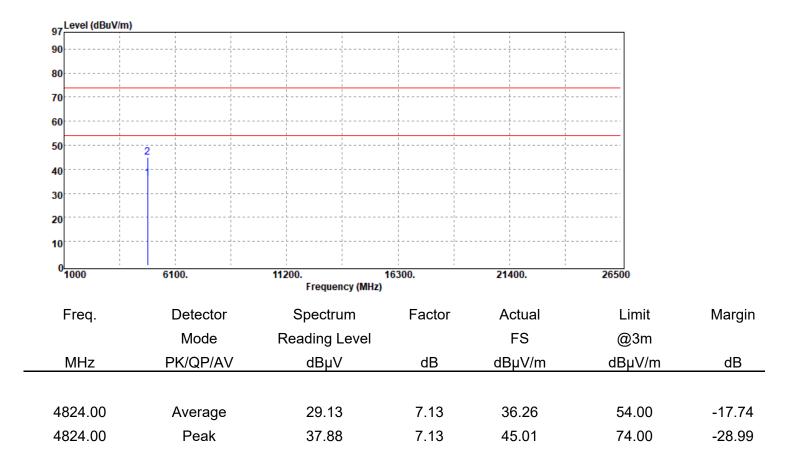
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11.7.3 Above 1GHz Emission:

Report Number	:ER-2020-80014	Test Site	:SAC III Chamber
Operation Mode	:802.11b	Test Date	:2020-08-10
Test Frequency	:2412 MHz	Temp./Humi.	:25.8/60
Test Mode	:Tx CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick



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.

Test Site



:ER-2020-80014

Report Number

4824.00

Operation Mode	:802.11b			Test Date	:2020-08-10	
Test Frequency	:2412 MHz			Temp./Humi.	:25.8/60	
				-		
Test Mode	:Tx CH Low	1		Antenna Pol.	:HORIZONTAL	-
EUT Pol	:E2 Plane			Engineer	:Nick	
97 Level (dBuV/m)						
90				· · · · · · · · · · · · · · · · · · ·		
80						
70			i i i i i i i i i i i i i i i i i i i i	· · · · · · · · · · · · · · · · · · ·		
60						
50	2					
40		·		· · · · · · · · · · · · · · · · · · ·		
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
1000	01001	Frequency (MHz)		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
		·		·	·	
4824.00	Average	29.72	7.13	36.85	54.00	-17.15

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Peak

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7.13

43.34

74.00

-30.66

Test Site



:ER-2020-80014

Report Number

4874.00

		.ER-2020-0	0014				
Operat	ion Mode	:802.11b			Test Date	:2020-08-10	
Test Fr	requency	:2437 MHz			Temp./Humi.	:25.8/60	
Test M	ode	:Tx CH Mid			Antenna Pol.	:VERTICAL	
EUT P	ol	:E2 Plane			Engineer	:Nick	
07L	evel (dBuV/m)						
90							
80							
70	 		· · · · · · · · · · · · · · · · · · ·				
60							
50							
40	2		· · · · · · · · · · · · · · · · · · ·				
30							
20							
10							
1	000	6100.	11200. Frequency (MHz)	16300.	21400.	26500	
F	req.	Detector	Spectrum	Factor	Actual	Limit	Margin
	ioq.	Mode	Reading Level	1 00101	FS	@3m	Margin
			-	dB		-	dB
ľ	MHz	PK/QP/AV	dBµV	UD	dBµV/m	dBµV/m	UD
40	74.00	A		7 54	27.00	F4.00	10.04
48	74.00	Average	29.55	7.51	37.06	54.00	-16.94

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36.71

Peak

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44.22

74.00

-29.78

-30.09

74.00

Test Site



:ER-2020-80014

Report Number

4874.00

Ropol		ER-2020-8	0014				
Opera	ation Mode	:802.11b			Test Date	:2020-08-10	
Test F	requency	:2437 MHz			Temp./Humi.	:25.8/60	
Test N	/lode	:Tx CH Mid			Antenna Pol.	:HORIZONTA	L
EUT P	Pol	:E2 Plane			Engineer	:Nick	
					•		
	Level (dBuV/m)						
90							
80							
70				·	·		
60	·			·	·		
50		1 1 1 	1 1 1 	· 1	·		
40	2						
30							
20							
10				·ii	·		
0	1000	<u>6100.</u>	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
				/		- /	44.05
4	874.00	Average	31.81	7.51	39.32	54.00	-14.68

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Peak

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7.51

43.91

Test Site



·FR-2020-80014

Report Number

4924.00

Report Ramber		:ER-2020-8	0014		1001 0110			
Operat	tion Mode	:802.11b			Test Date	:2020-08-10	:2020-08-10	
Test Fr	requency	:2462 MHz			Temp./Humi.	:25.8/60		
Test M	ode	:Tx CH Higl	า		Antenna Pol.	:VERTICAL		
EUT P	ol	:E2 Plane			Engineer :Nick			
L	evel (dBuV/m)							
90								
80				· · · · · · · · · · · · · · · · · · ·				
70								
60								
_								
50		2						
40								
30								
20					· · · · · · · · · · · · · · · · · · ·			
10								
0 1	000	6100.	11200. Frequency (MHz)	16300.	21400.	26500		
F	req.	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
N	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
49	24.00	Average	30.54	7.84	38.38	54.00	-15.62	

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7.84

36.93

44.77

74.00

-29.23

74.00

-29.32

Test Site



:ER-2020-80014

Report Number

4924.00

report rambol		.ER-2020-0	.ER-2020-00014				
Oper	ation Mode	:802.11b			Test Date	:2020-08-10	
Test	Frequency	:2462 MHz			Temp./Humi.	:25.8/60	
Test	Mode	:Tx CH High	:Tx CH High			:HORIZONTA	L
EUT Pol		:E2 Plane			Engineer	:Nick	
					-		
	7 Level (dBuV/m)						
9							
8	1						
7	0	· · · · · · · · · · · · · · · · · · ·					
6	0						
5	0	2					
4	0						
3	0						
2	0				· · · · · · · · · · · · · · · · · · ·		
1	0						
	0 ^L 1000	6100.	11200. Frequency (MHz)	16300.	21400.	26500	
	Fra a	Detector		Fastar	Actual	Lingit	Margin
	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Z	4924.00	Average	33.54	7.84	41.38	54.00	-12.62

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Peak

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7.84

44.68

Test Site



:ER-2020-80014

Report Number

-			0014				
Operat	ion Mode	:802.11g			Test Date	:2020-08-10	
Test Fr	equency	:2412 MHz			Temp./Humi.	:25.8/60	
Test Mo	ode	:Tx CH Low	,		Antenna Pol.	:VERTICAL	
EUT Po	ol	:E2 Plane			Engineer	:Nick	
Le	evel (dBuV/m)						
97							
80					·		
70							
60							
50	2						
40					·		
30				· 4			
20				·			
10	·						
0	000	6100.	11200. Frequency (MHz)	16300.	21400.	26500	
F	req.	Detector	Spectrum	Factor	Actual	Limit	Margin
	·	Mode	Reading Level		FS	@3m	-
N	ЛНz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
482	24.00	Average	27.90	7.13	35.03	54.00	-18.97
482	24.00	Peak	36.88	7.13	44.01	74.00	-29.99

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Test Site



:ER-2020-80014

Report Number

rioport riambol	.ER-2020-0	:ER-2020-80014 :802.11g :2412 MHz :Tx CH Low					
Operation Mode	:802.11g				:2020-08-10	:2020-08-10 :25.8/60 :HORIZONTAL	
Test Frequency	:2412 MHz				:25.8/60		
Test Mode	:Tx CH Low				:HORIZONTA		
EUT Pol	:E2 Plane			Engineer	:Nick		
97 							
90							
80							
70			· +				
60			· +				
50			· · · · · · · · · · · · · · · · · · ·				
40	2						
30							
20							
10							
0 <mark>1000</mark>	6100.	11200. Frequency (MHz)	16300.	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	27.63	7.13	34.76	54.00	-19.24	
4824.00	Peak	36.84	7.13	43.97	74.00	-30.03	

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Test Site



:ER-2020-80014

Report Number

•							
Oper	ration Mode	:802.11g			Test Date	:2020-08-10	
Test	Frequency	:2437 MHz			Temp./Humi.	:25.8/60	
Test	Mode	:Tx CH Mid			Antenna Pol.	:VERTICAL	
EUT Pol		:E2 Plane			Engineer	:Nick	
	7 Level (dBuV/m)						
	0						
	30						
	/0						
	50						
	50						
	4	2					
	10						
	80						
2	20						
1	10						
	0 <mark></mark>	6100.	11200. Frequency (MHz)	16300.	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
4	4874.00	Average	28.24	7.51	35.75	54.00	-18.25
2	4874.00	Peak	37.25	7.51	44.76	74.00	-29.24

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Repo	rt Number	:ER-2020-8	0014		Test Site	:SAC III Charr	ıber	
Opera	ation Mode	:802.11g			Test Date	:2020-08-10		
Test F	requency	:2437 MHz			Temp./Humi.	:25.8/60	:25.8/60	
Test N	/lode	:Tx CH Mid	:Tx CH Mid			:HORIZONTA	:HORIZONTAL	
EUT F	Pol	:E2 Plane			Engineer	:Nick		
97	Level (dBuV/m)							
90								
80								
70								
60								
50		2			·			
40	i i							
30								
20					·			
10								
C	1000	6100.		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	
4	874.00	Average	28.29	7.51	35.80	54.00	-18.20	
4	874.00	Peak	36.14	7.51	43.65	74.00	-30.35	

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74.00

-29.91

Test Site



:ER-2020-80014

Report Number

4924.00

Oper	ation Mod	le :802.	11g			Test Date	:2020-08-10	
Test	Frequenc	y :2462	2 MHz			Temp./Humi.	:25.8/60	
Test	Mode	:Tx C	H High			Antenna Pol.	:VERTICAL	
EUT	Pol	:E2 P	lane			Engineer	:Nick	
9	7 Level (dBuV/	m)						
9						· · · · · · · · · · · · · · · · · · ·		
8	0							
7	0							
6	0							
5	0						· · · · · · · · · · · · · · · · · · ·	
4	0	2						
3	0							
2	0						1 1 1 1	
1	0						1 1 1 1	
	0							
	1000	6100.	11200. F	requency (MHz)	16300.	21400.	26500	
	Freq.	Detect	or Sp	ectrum	Factor	Actual	Limit	Margin
		Mode	e Read	ling Level		FS	@3m	
	MHz	PK/QP/	AV d	lΒμV	dB	dBµV/m	dBµV/m	dB
4	1924.00	Averag	ge 2	27.39	7.84	35.23	54.00	-18.77

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36.25

Peak

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7.84

Test Site



:ER-2020-80014

Report Number

(opent Hambel	ER-2020-8	0014		1001 0110		
Operation Mode	:802.11g			Test Date	:2020-08-10	
Test Frequency	:2462 MHz			Temp./Humi.	:25.8/60	
Fest Mode	:Tx CH Higl	h		Antenna Pol.	:HORIZONTA	L
EUT Pol	:E2 Plane			Engineer	:Nick	
97 Level (dBuV/m)						
97				·		
80						
70						
60						
50		· · · · · · · · · · · · · · · · · · ·				
40	2					
30						
20						
10						
0 <mark></mark>	6100.		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
4924.00	Average	27.45	7.84	35.29	54.00	-18.71
4924.00	Peak	36.55	7.84	44.39	74.00	-29.61
						=0.01

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Test Site



:ER-2020-80014

Report Number

		.ER-2020-0	0014				
Oper	ation Mode	:802.11n20			Test Date	:2020-08-10	
Test I	Frequency	:2412 MHz			Temp./Humi.	:25.8/60	
Test I	Mode	:Tx CH Low	,		Antenna Pol.	:VERTICAL	
EUT	Pol	:E2 Plane			Engineer	:Nick	
97	7 Level (dBuV/m)						
90							
8	0			<u>1</u>			
7	0						
6	0						
5	0	2					
4	0	2					
3(0						
2	0						
10	0				· · · · · · · · · · · · · · · · · · ·		
	0 1000		44000		21.022	20500	
	1000	6100.	11200. Frequency (MHz)	16300.	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
4	824.00	Average	27.27	7.13	34.40	54.00	-19.60
4	824.00	Peak	36.81	7.13	43.94	74.00	-30.06

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Repor	t Number	:ER-2020-8	0014		Test Site	:SAC III Charr	nber
Opera	tion Mode	:802.11n20			Test Date	:2020-08-10	
Test F	requency	:2412 MHz			Temp./Humi.	:25.8/60	
Test M	lode	:Tx CH Low	,		Antenna Pol.	:HORIZONTA	L
EUT F	Pol	:E2 Plane			Engineer	:Nick	
97	Level (dBuV/m)			i i			
90	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·					
80							
70			 				
60	· · · · · · · · · · · · · · · · · · ·						
50		2					
40							
30	· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·		
20	·				· · · · · · · · · · · · · · · · · · ·		
10							
0	1000	6100.	11200. Frequency (MHz)	6300.	21400.	26500	
I	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
48	324.00	Average	27.64	7.13	34.77	54.00	-19.23
48	324.00	Peak	37.08	7.13	44.21	74.00	-29.79

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Test Site



:ER-2020-80014

Report Number

4874.00

4874.00

Operation Mode	:802.11n20		Test Date	:2020-08-10
Test Frequency	:2437 MHz		Temp./Humi.	:25.8/60
Test Mode	:Tx CH Mid		Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane		Engineer	:Nick
97 Level (dBuV/m)				
90				
80				
70				
60				
50 2				
40			· · · · · · · · · · · · · · · · · · ·	
30	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	
20			·	
10			·	
0 <mark></mark> 61	00. 11200. F	16300. Frequency (MHz)	21400.	26500
Freq.	Detector Sp	ectrum Factor	Actual	Limit Margin
	Mode Read	ling Level	FS	@3m
MHz P	K/QP/AV d	dBµV dB	dBµV/m	dBµV/m dB

7.51

7.51

35.41

44.28

54.00

74.00

-18.59

-29.72

27.90

36.77

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Average

Peak



4874.00

4874.00

eport Number peration Mode	:ER-2020-8001 :802.11n20	4		Test Site Test Date	:SAC III Cham :2020-08-10	ıber
est Frequency	:2437 MHz			Temp./Humi.	:25.8/60	
est Mode	:Tx CH Mid			Antenna Pol.	:HORIZONTAI	L
UT Pol	:E2 Plane			Engineer	:Nick	
97Level (dBuV/m)						
90						
80						
70						
60			- <u>-</u>			
50 2						
40						
30						
20						
10						
0 <mark>6</mark>	100. 1 [,]	1200. 10 Frequency (MHz)	5300.	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz F	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

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.

Average

Peak

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7.51

7.51

28.35

37.47

35.86

44.98

54.00

74.00

-18.14

-29.02

Test Site



:ER-2020-80014

Report Number

4924.00

4924.00

Operation Mode	:802.11n20			Test Date	:2020-08-10	
Test Frequency	:2462 MHz			Temp./Humi.	:25.8/60	
Test Mode	:Tx CH Higl	h		Antenna Pol.	:VERTICAL	
EUT Pol	:E2 Plane			Engineer	:Nick	
97 Level (dBuV/m)						
90						
80			· 1			
70						
60			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
50	2		· ¹			
40		·	· +	· · · · · · · · · · · · · · · · · · ·		
30						
			· · · · · · · · · · · · · · · · · · ·			
20						
10						
0 <mark></mark> 1000	6100.	11200. Frequency (MHz	16300.)	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
	_					

27.32

37.42

7.84

7.84

35.16

45.26

54.00

74.00

-18.84

-28.74

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.

Average

Peak

Test Site



:ER-2020-80014

Report Number

4924.00

4924.00

peration Mode	:802.11n20			Test Date	:2020-08-10	
est Frequency	:2462 MHz			Temp./Humi.	:25.8/60	
est Mode	:Tx CH Hig	h		Antenna Pol.	:HORIZONTA	L
UT Pol	:E2 Plane			Engineer	:Nick	
97 Level (dBuV/m)						
90						
80						
70			·			
60						
50	2					
40						
30						
20						
10						
0 1000	<mark>610</mark> 0.	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

7.84

7.84

35.17

44.87

54.00

74.00

-18.83

-29.13

27.33

37.03

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Average

Peak



12 POWER SPECTRAL DENSITY

12.1 Standard Applicable

Per Part 15.247 (e)

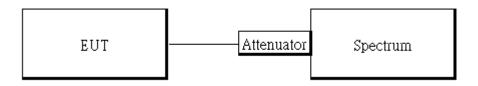
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

12.2 Measurement Equipment Used

Conducted Emission Test Site							
EQUIPMENT	EQUIPMENT MFR MODEL SERIAL LAST CAL DUE						
ТҮРЕ		NUMBER	NUMBER	CAL.			
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/21/2020	04/20/2021		
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		

12.3 Test Set-up



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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. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.

12.5 Power spectral density

	POWER DENSITY 802.11b_Ch0							
Freq.	PSD	Limit	Result					
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Nesuit					
2412	-3.71	8.00	PASS					
2437	-3.39	8.00	PASS					
2462	-4.79	8.00	PASS					

	POWER DENSITY 802.11g_Ch0							
Freq.	PSD	Limit	Result					
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Result					
2412	-9.95	8.00	PASS					
2437	-5.86	8.00	PASS					
2462	-10.29	8.00	PASS					

	POWER DENSITY 802.11n HT20_Ch0							
Freq.	PSD	Limit	Result					
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Nesuit					
2412	-9.62	8.00	PASS					
2437	-6.22	8.00	PASS					
2462	-12.11	8.00	PASS					

Note

Cable Loss 10.90 dB

*Refer to next page for plots

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Power Density_802.11b_20MHz_Chain0_2412MHz

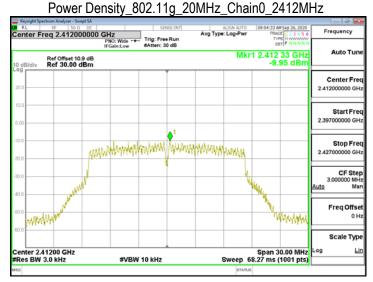


Power Density_802.11b_20MHz_Chain0_2437MHz



Power Density_802.11b_20MHz_Chain0_2462MHz





Power Density_802.11g_20MHz_Chain0_2437MHz



Power Density_802.11g_20MHz_Chain0_2462MHz



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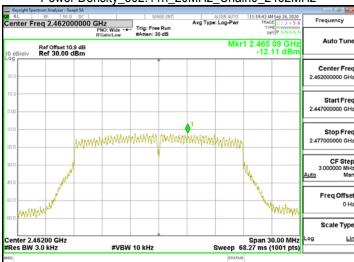
Power Density_802.11n_20MHz_Chain0_2412MHz



Power Density_802.11n_20MHz_Chain0_2437MHz



Power Density_802.11n_20MHz_Chain0_2462MHz



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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 as permanently attached and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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