

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant: Digi International Inc

9350 Excelsior Blvd., Suite 700 Hopkins, MN 55343

Product Name: ConnectCore 8X

Brand Name: Diai Model No.: CC8X **Model Difference:** N/A

Report Number: ER/2019/B0064 FCC ID: MCQ-CCIMX8 IC: 1846A-CCIMX8

FCC Rule Part: §15.247, Cat: DTS

RSS-247 issue 2 Feb 2017 IC RSS:

Jul. 10, 2020 Issue Date:

Date of Test: Dec. 04, 2019 ~ Feb 07, 2020

Date of EUT Dec. 04, 2019

Received:

We hereby certify that:

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

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

Approved By: _____CHUN; CHIEN, CHIEN CHUN-CHIEH, CHEN / Supervisor





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Revision History							
Report Number	Report Number Revision Description Issue Date Remark						
ER/2019/B0064	Rev.00	Original.	Jul. 10, 2020	Revised By: Susan Lin			

Note:

- 1 Disclaimer Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
- 2 The test data in this test report is fully leveraged from the TAF code 0513. Since the laboratory's TAF code has been updated to 3702, this test report is being issued by the laboratory of TAF code 3702.

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GENERAL INFORMATION

1.1 Product description

Product Name:	ConnectCore 8X		
Brand Name:	Digi		
Model No.:	CC8X		
Model Difference:	N/A		
Hardware Version:	55001984-02 rev 4P		
Software Version:	82004286 rev 4P		
EUT Serial Number:	F191001000424		
	5Vdc from AC/DC Adapter		
Power Supply:	Adapter: Model No.: GT-46180-1605, Supplier:. GlobTek, Inc.		

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology
b			20.83	DSSS
g	2412-2462	11	26.50	
n_HT20			26.88	OFDM
n_HT40	2422-2452	7	23.02	
I Modifiation Mas.		1	PSK, DBPSK for DSSS 16QAM, QPSK, BPSK for OFDM	
Transistion Rate: 802.11 g 802.11 n		802.11 g: 802.11 n __	1/2/5.5/11 Mbps 6/9/12/18/24/36/48/54 Mbps _20MHz: 6.5 – 144.4Mbps _40MHz: 13.5 – 300.0Mbps	

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1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Directional Gain (dBi)	Worst Antenna Gain
PCB	YAGEO	ANTX100P001B24553	2.4GHz	4.6	7.61	V
PCB	TAOGLAS	FXP830.07.0100C	2.4GHz	3.32	6.33	
Dipole	TAOGLAS	GW.48.A151	2.4GHz	3.42	6.43	V
РСВ	TAOGLAS	FXP522.A.07.A.001	2.4GHz	3.78 (Port 1) 3.15 (Port 2)	6.79	
Dipole	Linx	ANT-DB1-RAF-RPS	2.4GHz	2.5	5.51	
PCB	ethertronic	1001932	2.4GHz	2.5	5.51	
PCB	TAOGLAS	FXP831.07.0100C	2.4GHz	3.0	6.01	

Note: Pre-scanned was done on the above 7 antennas, the PCB (ANTX100P001B24553) and Dipole (GW.48.A151) results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on the antenna to be presented on this test report.

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1.3 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

1.4 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

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

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

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 & Conducted (AC powerline) Emission

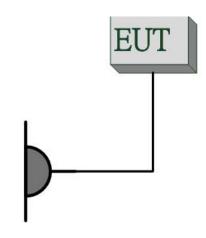


Fig. 2-2 Conducted (Antenna Port) Emission



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	L430	R9-X11BG	Unshielded	Shielded

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SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	RSS-247 §5.4 d	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.1 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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DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

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

9 channels are provided for 802.11n 40M

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

CHANNEL	FREQUENCY (MHz)
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452

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 given UE is pre-scanned among below modes.

Modulation	Transmission Chain	Multiple Transmission Spatial
⊠ 802.11 b	⊠ Ch0 ⊠ Ch1 □ Ch2 □ Ch3	⊠ 2TX
⊠ 802.11 g	⊠ Ch0 ⊠ Ch1 □ Ch2 □ Ch3	⊠ 2TX
⊠ 802.11 n	⊠ Ch0 ⊠ Ch1 □ Ch2 □ Ch3	⊠ MIMO

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

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4.3 Radiated Emission Test:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
	RADIATED EMISSION TEST (BELOW 1 GHz)							
802.11g	1 to 11	6	OFDM	6	2TX			
802.11n40M	3 to 9	6	OFDM	MCS 8	MIMO			
	RADIAT	ED EMISSIC	N TEST (ABOVE	1 GHz)				
802.11b	1 to 11	1, 6, 11	DSSS	1	2TX			
802.11g	1 to 11	1, 6, 11	OFDM	6	2TX			
802.11n20M	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO			
802.11n40M	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO			

Note:

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

4.4 Antenna Port Conducted Mesurement:

	CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
802.11b	1 to 11	1, 6, 11	DSSS	1	2TX			
802.11g	1 to 11	1, 6, 11	OFDM	6	2TX			
802.11n 20M	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO			
802.11n 40M	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO			

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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						
Baladadaa Wadaal	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						
Baladada Hadaada	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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CONDUCTED EMISSION TEST

6.1 Standard Applicable

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

Frequency range	Lin dB(nits ′uV)
MHz	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1. The lower limit shall apply at the transition frequencies
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2 Measurement Equipment Used

	Conducted Emission Test Site										
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.						
EMI Test Receiver	R&S	ESCI 3	100335	02/12/2019	02/11/2020						
LISN	SCHWARZBECK	NSLK 8127	8127-649	04/02/2019	04/01/2020						
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2020	01/01/2021						
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R	N.C.R						

6.3 EUT Setup

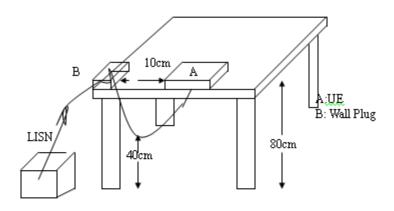
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure

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

6.6 Measurement Result

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

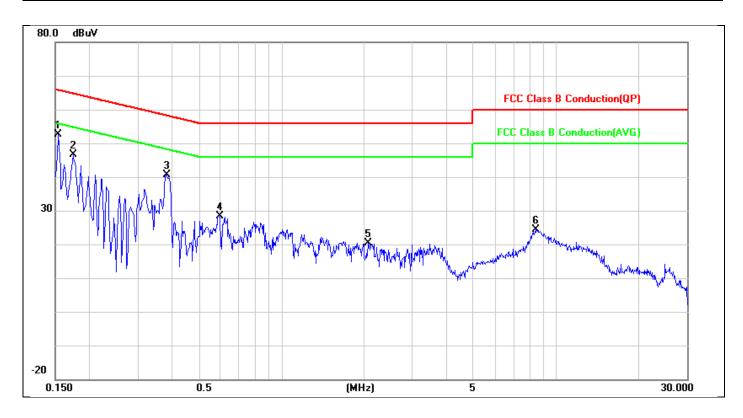
Dipole Antenna (Part No.: GW.48.A151)

Description: Operation Date: 2020/02/06

Temp.(°C)/Hum.(%): 20.5(°C)/67% Line:

Test Voltage: AC 120V/60Hz Test By: **Thomas**

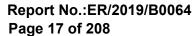
Report Number: ER-2019-B0064



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIK.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Detector	Comment
1	*	0.1540	52.73	0.00	52.73	65.78	-13.05	peak	
2		0.1740	46.56	0.00	46.56	64.77	-18.21	peak	
3		0.3820	40.70	0.01	40.71	58.24	-17.53	peak	
4		0.5980	28.43	0.01	28.44	56.00	-27.56	peak	
5		2.0660	20.23	0.04	20.27	56.00	-35.73	peak	
6		8.4460	24.15	0.25	24.40	60.00	-35.60	peak	

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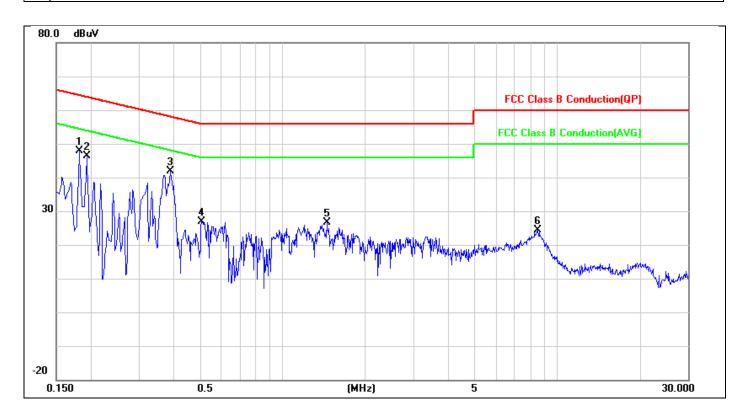


Description: Operation Date: 2020/02/06

Temp.(°C)/Hum.(%): 20.5(°C)/67% Line:

Test Voltage: AC 120V/60Hz Test By: **Thomas**

Report Number: ER-2019-B0064



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIK.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Detector	Comment
1		0.1820	47.84	0.01	47.85	64.39	-16.54	peak	
2		0.1940	46.29	0.01	46.30	63.86	-17.56	peak	
3	*	0.3900	41.88	0.01	41.89	58.06	-16.17	peak	
4		0.5100	26.83	0.01	26.84	56.00	-29.16	peak	
5		1.4500	26.58	0.03	26.61	56.00	-29.39	peak	
6		8.5180	24.03	0.25	24.28	60.00	-35.72	peak	

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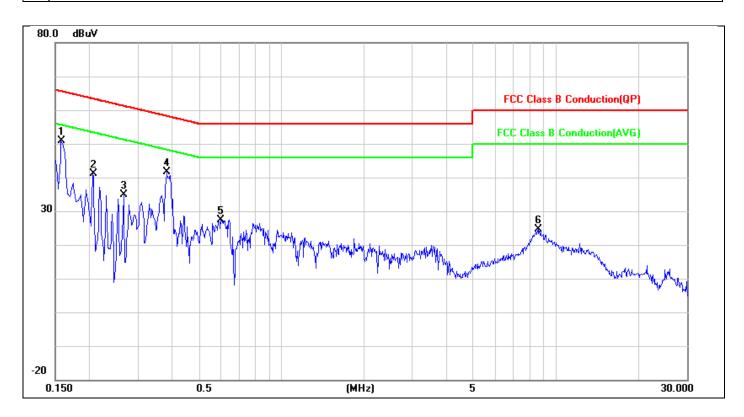
PCB Antenna (Part No.: ANTX100P001B24553)

Description: Operation Date: 2020/02/06

Temp.(°C)/Hum.(%): 20.5(°C)/67% Line: L1

Test Voltage: AC 120V/60Hz Test By: **Thomas**

Report Number: ER-2019-B0064



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIK.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Detector	Comment
1	*	0.1580	50.79	0.00	50.79	65.57	-14.78	peak	
2		0.2060	41.21	0.01	41.22	63.37	-22.15	peak	
3		0.2660	34.75	0.01	34.76	61.24	-26.48	peak	
4		0.3820	41.50	0.01	41.51	58.24	-16.73	peak	
5		0.6020	27.31	0.01	27.32	56.00	-28.68	peak	
6		8.6220	24.35	0.25	24.60	60.00	-35.40	peak	

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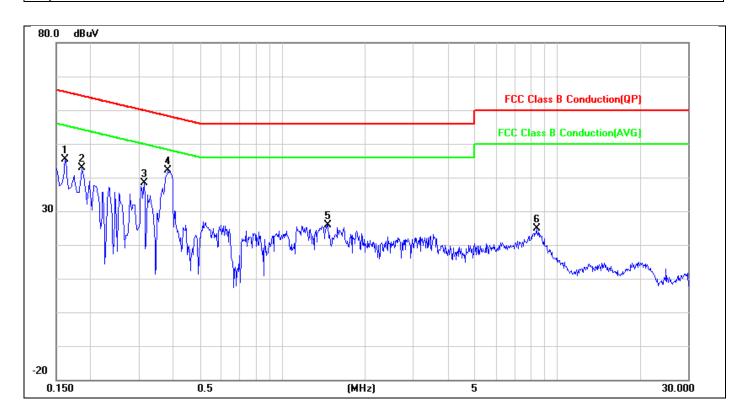


Description: Operation Date: 2020/02/06

Temp.(°C)/Hum.(%): 20.5(°C)/67% Line:

Test Voltage: AC 120V/60Hz Test By: **Thomas**

Report Number: ER-2019-B0064



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIK.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Detector	Comment
1		0.1620	45.40	0.00	45.40	65.36	-19.96	peak	
2		0.1860	42.89	0.01	42.90	64.21	-21.31	peak	
3		0.3140	38.42	0.01	38.43	59.86	-21.43	peak	
4	*	0.3820	42.22	0.01	42.23	58.24	-16.01	peak	
5		1.4660	25.88	0.03	25.91	56.00	-30.09	peak	
6		8.4380	24.62	0.25	24.87	60.00	-35.13	peak	

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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	98.74	0.06	0.08	0.01
802.11g	92.27	0.35	0.49	1.00
802.11n_20	88.97	0.51	1.08	2.00
802.11n_40	89.76	0.47	1.08	2.00

b = 98.74%, q = 92.27%, n ht 20 = 88.97% n ht 40 = 89.76%

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7.3 Duty Cycle test plots

802.11b

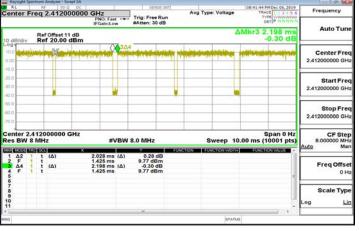
802.11n 20





802.11g

802.11n 40





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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.

Note:

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

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

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

where

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

NSS = the number of independent spatial streams of data:

NANT = the total number of antennas

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

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

Frequency (MHz)	Effective Legacy Gain (dBi)	Conducted Power Limit (dBm)
2412~2462	7.61	28.39

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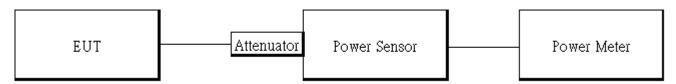


8.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/02/2019	05/01/2020				
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2019	01/04/2020				
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2019	01/04/2020				
Power Meter	Anritsu	ML2496A	1804001	02/13/2019	02/12/2020				
Power Sensor	Anritsu	MA2411B	1726104	02/13/2019	02/12/2020				
Power Sensor	Anritsu	MA2411B	1726107	02/13/2019	02/12/2020				

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	802.11b Ch0									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT					
1	2412	1	18.22	30.00	PASS					
6	2437	1	16.86	30.00	PASS					
11	2462	1	17.61	30.00	PASS					
802.1	1b Ch0									
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT					
1	2412	1	15.70	30.00	PASS					
6	2437	1	14.40	30.00	PASS					
11	2462	1	15.09	30.00	PASS					

802.1	802.11b Ch1								
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT				
1	2412	1	17.05	30.00	PASS				
6	2437	1	15.96	30.00	PASS				
11	2462	1	16.83	30.00	PASS				
802.1°	1b Ch1								
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT				
1	2412	1	14.47	30.00	PASS				
6	2437	1	13.51	30.00	PASS				
11	2462	1	14.47	30.00	PASS				

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802.1	802.11b_2TX									
СН	Freq.	Data Rate	Peak Output Total Peak Power Output Power	Limit (dBm)	RESULT					
	(MHz)	Kale	CH 0	CH1	(dBm)	(ubiii)				
1	2412	1	18.32	17.26	20.83	28.39	PASS			
6	2437	1	16.87	16.13	19.53	28.39	PASS			
11	2462	1	17.64	17.09	20.38	28.39	PASS			
802.1	1b_2TX									
			Avg. C	utput	Max. Avg. Output					
СН	Freq.	Data	Pov	wer	include tune up	Limit	RESULT			
CII	(MHz)	Rate	(dE	Bm)	tolerance Power	(dBm)	KLJULI			
			CH 0	CH1	(dBm)					
1	2412	1	15.38	14.44	18.00	28.39	PASS			
6	2437	1	14.17	13.62	16.97	28.39	PASS			
11	2462	1	14.96	14.42	17.76	28.39	PASS			

802.1	802.11g Ch0								
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT				
1	2412	6	22.28	30.00	PASS				
2	2417	6	23.54	30.00	PASS				
3	2422	6	23.72	30.00	PASS				
6	2437	6	23.83	30.00	PASS				
9	2452	6	23.42	30.00	PASS				
10	2457	6	22.76	30.00	PASS				
11	2462	6	19.79	30.00	PASS				
802.1	1g Ch0								
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT				
1	2412	6	16.13	30.00	PASS				
2	2417	6	18.07	30.00	PASS				
3	2422	6	18.28	30.00	PASS				
6	2437	6	18.25	30.00	PASS				
9	2452	6	18.17	30.00	PASS				
10	2457	6	17.09	30.00	PASS				
11	2462	6	13.38	30.00	PASS				



802.1	1g Ch1				
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	21.37	30.00	PASS
2	2417	6	22.85	30.00	PASS
3	2422	6	23.09	30.00	PASS
6	2437	6	23.61	30.00	PASS
9	2452	6	22.86	30.00	PASS
10	2457	6	22.04	30.00	PASS
11	2462	6	19.01	30.00	PASS
802.1	1g Ch1				
			Max. Avg. Output		
СН	Freq.	Data	include tune up	Limit	RESULT
CII	(MHz)	Rate	tolerance Power	(dBm)	KLSOLI
			(dBm)		
1	2412	6	15.33	30.00	PASS
2	2417	6	17.09	30.00	PASS
3	2422	6	17.38	30.00	PASS
6	2437	6	17.84	30.00	PASS
9	2452	6	17.29	30.00	PASS
10	2457	6	16.49	30.00	PASS
11	2462	6	12.81	30.00	PASS



802.1	1g_2TX						
СН	Freq. (MHz)	Data Rate	Po	Output wer	Total Peak Output Power	Limit (dBm)	RESULT
	0.410	,	CH 0	CH 1	(dBm)	20.20	DACC
1	2412	6	22.23	21.45	24.87	28.39	PASS
2	2417	6	23.51	22.61	26.09	28.39	PASS
3	2422	6	23.62	22.99	26.33	28.39	PASS
6	2437	6	23.51	23.47	26.50	28.39	PASS
9	2452	6	23.34	22.74	26.06	28.39	PASS
10	2457	6	22.64	22.07	25.37	28.39	PASS
11	2462	6	19.82	19.18	22.52	28.39	PASS
802.1	1g_2TX		•	•			•
			Avg. C	Output	Max. Avg. Output		
C II	Freq.	Data	Po	wer	include tune up	Limit	DECLUT
СН	(MHz)	Rate	(dE	Bm)	tolerance Power	(dBm)	RESULT
			CH 0	CH1	(dBm)		
1	2412	6	15.74	15.03	18.76	28.39	PASS
2	2417	6	17.54	16.74	20.52	28.39	PASS
3	2422	6	17.86	17.19	20.90	28.39	PASS
6	2437	6	17.86	17.58	21.08	28.39	PASS
9	2452	6	17.70	17.16	20.80	28.39	PASS
10	2457	6	16.72	16.29	19.87	28.39	PASS
				12.67	16.19	28.39	PASS



802.1	1n_HT20	M Ch0			
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	22.25	30.00	PASS
2	2417	MCS0	23.73	30.00	PASS
3	2422	MCS0	24.26	30.00	PASS
6	2437	MCS0	24.30	30.00	PASS
8	2447	MCS0	23.99	30.00	PASS
9	2452	MCS0	23.18	30.00	PASS
10	2457	MCS0	22.42	30.00	PASS
11	2462	MCS0	19.11	30.00	PASS
802.1	1n_HT20	M Ch0			
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	16.24	30.00	PASS
2	2417	MCS0	18.25	30.00	PASS
3	2422	MCS0	19.08	30.00	PASS
6	2437	MCS0	19.13	30.00	PASS
8	2447	MCS0	18.98	30.00	PASS
9	2452	MCS0	17.72	30.00	PASS
10	2457	MCS0	16.63	30.00	PASS
		MCS0	12.94	30.00	PASS



802.1	1n_HT20	M Ch1			
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	21.46	30.00	PASS
2	2417	MCS0	22.92	30.00	PASS
3	2422	MCS0	23.72	30.00	PASS
6	2437	MCS0	22.88	30.00	PASS
8	2447	MCS0	23.42	30.00	PASS
9	2452	MCS0	22.46	30.00	PASS
10	2457	MCS0	21.62	30.00	PASS
11	2462	MCS0	18.41	30.00	PASS
802.1	1n_HT20	M Ch1			
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15.38	30.00	PASS
2	2417	MCS0	17.23	30.00	PASS
3	2422	MCS0	18.29	30.00	PASS
6	2437	MCS0	16.85	30.00	PASS
8	2447	MCS0	18.38	30.00	PASS
9	2452	MCS0	17.05	30.00	PASS
10	2457	MCS0	16.16	30.00	PASS
11	2462	MCS0	12.23	30.00	PASS



802.1	802.11n_HT20M MIMO									
СН	Freq. (MHz)	• 1		Output wer	Total Peak Output Power	Limit (dBm)	RESULT			
	(101112)	Kate	CH 0	CH1	(dBm)	(ubiii)				
1	2412	MCS8	22.25	21.56	24.93	28.39	PASS			
2	2417	MCS8	23.41	23.03	26.23	28.39	PASS			
3	2422	MCS8	23.89	23.43	26.68	28.39	PASS			
6	2437	MCS8	23.92	23.82	26.88	28.39	PASS			
8	2447	MCS8	23.91	23.35	26.65	28.39	PASS			
9	2452	MCS8	22.98	22.48	25.75	28.39	PASS			
10	2457	MCS8	22.33	21.87	25.12	28.39	PASS			
11	2462	MCS8	19.27	18.51	21.92	28.39	PASS			
802.1	1n_HT20	M MIMO								
			Avg. C	Output	Max. Avg. Output					
СН	Freq.	Data	Po	wer	include tune up	Limit	RESULT			
011	(MHz)	Rate	(dE	3m)	tolerance Power	(dBm)	KESOLI			
			CH 0	CH1	(dBm)					
1	2412	MCS8	15.39	14.68	18.57	28.39	PASS			
		WC30	10.07	1 1.00	10.37	20.37	1705			
2	2417	MCS8	17.59	16.76	20.71	28.39	PASS			
3	2417 2422									
		MCS8	17.59	16.76	20.71	28.39	PASS			
3	2422	MCS8 MCS8	17.59 18.19	16.76 17.72	20.71 21.48	28.39 28.39	PASS PASS			
3	2422 2437	MCS8 MCS8 MCS8	17.59 18.19 18.62	16.76 17.72 18.33	20.71 21.48 22.00	28.39 28.39 28.39	PASS PASS PASS			
3 6 8	2422 2437 2447	MCS8 MCS8 MCS8 MCS8	17.59 18.19 18.62 18.20	16.76 17.72 18.33 17.77	20.71 21.48 22.00 21.51	28.39 28.39 28.39 28.39	PASS PASS PASS PASS			



802.1	802.11n_HT40M Ch0								
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT				
3	2422	MCS0	18.27	30.00	PASS				
4	2427	MCS0	18.17	30.00	PASS				
5	2432	MCS0	19.93	30.00	PASS				
6	2437	MCS0	20.60	30.00	PASS				
7	2442	MCS0	19.68	30.00	PASS				
8	2447	MCS0	18.69	30.00	PASS				
9	2452	MCS0	17.86	30.00	PASS				
802.1	1n_HT40	M Ch0							
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power	Limit (dBm)	RESULT				
3	2422	MCS0	(dBm) 11.15	30.00	PASS				
4	2427	MCS0	11.32	30.00	PASS				
	2432	MCS0	13.04	30.00	PASS				
1 b				00.00					
5 6				30.00	PASS				
6	2437 2442	MCS0	13.91	30.00 30.00	PASS PASS				
6	2437								



802.1	1n_HT40	M Ch1			
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	17.02	30.00	PASS
4	2427	MCS0	16.74	30.00	PASS
5	2432	MCS0	18.56	30.00	PASS
6	2437	MCS0	19.18	30.00	PASS
7	2442	MCS0	18.38	30.00	PASS
8	2447	MCS0	17.45	30.00	PASS
9	2452	MCS0	16.66	30.00	PASS
802.1	1n_HT40	M Ch1			
			Max. Avg. Output		
СН	Freq.	Data	include tune up	Limit	RESULT
CII	(MHz)	Rate	tolerance Power	(dBm)	KLJULI
			(dBm)		
3	2422	MCS0	10.36	30.00	PASS
3	2422 2427	MCS0 MCS0	10.36 10.15	30.00 30.00	PASS PASS
4	2427	MCS0	10.15	30.00	PASS
4 5	2427 2432	MCS0 MCS0	10.15 12.00	30.00 30.00	PASS PASS
4 5 6	2427 2432 2437	MCS0 MCS0 MCS0	10.15 12.00 13.00	30.00 30.00 30.00	PASS PASS PASS



802.1	1n_HT40l	M MIMO					
СН	Freq. (MHz)	Data Rate	Po	Output wer	Total Peak Output Power	Limit (dBm)	RESULT
	, ,		CH 0	CH1	(dBm)		
3	2422	MCS8	18.59	17.22	20.97	28.39	PASS
4	2427	MCS8	18.36	17.05	20.76	28.39	PASS
5	2432	MCS8	19.82	19.36	22.61	28.39	PASS
6	2437	MCS8	20.75	19.12	23.02	28.39	PASS
7	2442	MCS8	19.79	18.24	22.09	28.39	PASS
8	2447	MCS8	18.67	17.36	21.07	28.39	PASS
9	2452	MCS8	17.63	16.62	20.16	28.39	PASS
802.1	1n_HT40l	M MIMO					
			Avg. C	Output	Max. Avg. Output		
СН	Freq.	Data	Po	wer	include tune up	Limit	RESULT
CII	(MHz)	Rate	(dE	3m)	tolerance Power	(dBm)	KLJULI
			CH 0	CH 1	(dBm)		
3	2422	MCS8	10.19	9.28	13.24	28.39	PASS
4	2427	MCS8	10.28	9.37	13.33	28.39	PASS
5	2432	MCS8	12.08	11.26	15.17	28.39	PASS
6	2437	MCS8	13.05	12.17	16.11	28.39	PASS
7	2442	MCS8	12.11	11.21	15.16	28.39	PASS
8	2447	MCS8	11.27	10.25	14.27	28.39	PASS
U							

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



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	15.70	4.60	20.30	36	PASS				
6	2437	1	14.40	4.60	19.00	36	PASS				
11	2462	1	15.09	4.60	19.69	36	PASS				

802.11	802.11b Ch1										
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT				
1	2412	1	14.47	4.60	19.07	36	PASS				
6	2437	1	13.51	4.60	18.11	36	PASS				
11	2462	1	14.47	4.60	19.07	36	PASS				

802.11	802.11b_2TX											
СН	Freq. Data (MHz) Rate		Avg. C	•	Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT			
	(111112)	Nate	CH 0	CH 1	(dBm)	(dBi)	(ubiii)	(ubiii)				
1	2412	1	15.38	14.44	18.00	7.61	25.61	36	PASS			
6	2437	1	14.17	13.62	16.97	7.61	24.58	36	PASS			
11	2462	1	14.96	14.42	17.76	7.61	25.37	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	16.13	4.60	20.73	36	PASS				
2	2417	6	18.07	4.60	22.67	36	PASS				
3	2422	6	18.28	4.60	22.88	36	PASS				
6	2437	6	18.25	4.60	22.85	36	PASS				
9	2452	6	18.17	4.60	22.77	36	PASS				
10	2457	6	17.09	4.60	21.69	36	PASS				
11	2462	6	13.38	4.60	17.98	36	PASS				

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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	15.33	4.60	19.93	36	PASS				
2	2417	6	17.09	4.60	21.69	36	PASS				
3	2422	6	17.38	4.60	21.98	36	PASS				
6	2437	6	17.84	4.60	22.44	36	PASS				
9	2452	6	17.29	4.60	21.89	36	PASS				
10	2457	6	16.49	4.60	21.09	36	PASS				
11	2462	6	12.81	4.60	17.41	36	PASS				

802.11	802.11g_2TX										
СН	Freq. (MHz)	Data Rate		Output wer	Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT		
	(141112)	Nate	CH 0	CH 1	(dBm)	(dBi)	(ubiii)	(ubiii)			
1	2412	6	15.74	15.03	18.76	7.61	26.37	36	PASS		
2	2417	6	17.54	16.74	20.52	7.61	28.13	36	PASS		
3	2422	6	17.86	17.19	20.90	7.61	28.51	36	PASS		
6	2437	6	17.86	17.58	21.08	7.61	28.69	36	PASS		
9	2452	6	17.70	17.16	20.80	7.61	28.41	36	PASS		
10	2457	6	16.72	16.29	19.87	7.61	27.48	36	PASS		
11	2462	6	12.98	12.67	16.19	7.61	23.80	36	PASS		

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	16.24	4.60	20.84	36	PASS				
2	2417	MCS0	18.25	4.60	22.85	36	PASS				
3	2422	MCS0	19.08	4.60	23.68	36	PASS				
6	2437	MCS0	19.13	4.60	23.73	36	PASS				
8	2447	MCS0	18.98	4.60	23.58	36	PASS				
9	2452	MCS0	17.72	4.60	22.32	36	PASS				
10	2457	MCS0	16.63	4.60	21.23	36	PASS				
11	2462	MCS0	12.94	4.60	17.54	36	PASS				



802.11	802.11n_HT20M Ch1										
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT				
1	2412	MCS0	15.38	4.60	19.98	36	PASS				
2	2417	MCS0	17.23	4.60	21.83	36	PASS				
3	2422	MCS0	18.29	4.60	22.89	36	PASS				
6	2437	MCS0	16.85	4.60	21.45	36	PASS				
8	2447	MCS0	18.38	4.60	22.98	36	PASS				
9	2452	MCS0	17.05	4.60	21.65	36	PASS				
10	2457	MCS0	16.16	4.60	20.76	36	PASS				
11	2462	MCS0	12.23	4.60	16.83	36	PASS				

802.11	802.11n_HT20M MIMO										
СН	Freq. (MHz)	Data Rate	Avg. C	Output wer	Total Avg. Antenna Output Power Gain		EIRP (dBm)	Limit (dBm)	RESULT		
	(141112)	Rate	CH 0	CH 1	(dBm)	(dBi)	(abiii)	(uDiii)			
1	2412	MCS8	15.39	14.68	18.57	7.61	26.18	36	PASS		
2	2417	MCS8	17.59	16.76	20.71	7.61	28.32	36	PASS		
3	2422	MCS8	18.19	17.72	21.48	7.61	29.09	36	PASS		
6	2437	MCS8	18.62	18.33	22.00	7.61	29.61	36	PASS		
8	2447	MCS8	18.20	17.77	21.51	7.61	29.12	36	PASS		
9	2452	MCS8	16.88	16.40	20.16	7.61	27.77	36	PASS		
10	2457	MCS8	15.85	15.37	19.13	7.61	26.74	36	PASS		
11	2462	MCS8	12.06	11.69	15.40	7.61	23.01	36	PASS		

802.11	802.11n_HT40M Ch0										
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT				
3	2422	MCS0	11.15	4.60	15.75	36	PASS				
4	2427	MCS0	11.32	4.60	15.92	36	PASS				
5	2432	MCS0	13.04	4.60	17.64	36	PASS				
6	2437	MCS0	13.91	4.60	18.51	36	PASS				
7	2442	MCS0	13.08	4.60	17.68	36	PASS				
8	2447	MCS0	11.94	4.60	16.54	36	PASS				
9	2452	MCS0	11.06	4.60	15.66	36	PASS				



802.11	802.11n_HT40M Ch1						
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	10.36	4.60	14.96	36	PASS
4	2427	MCS0	10.15	4.60	14.75	36	PASS
5	2432	MCS0	12.00	4.60	16.60	36	PASS
6	2437	MCS0	13.00	4.60	17.60	36	PASS
7	2442	MCS0	12.09	4.60	16.69	36	PASS
8	2447	MCS0	11.20	4.60	15.80	36	PASS
9	2452	MCS0	10.23	4.60	14.83	36	PASS

802.11	302.11n_HT40M MIMO								
СН	Freq. (MHz)	Data Rate		Output wer	Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT
	(111112)	Ruto	CH 0	CH 1	(dBm)	(dBi)	(aBiii)	(abiii)	
3	2422	MCS8	10.19	9.28	13.24	7.61	20.85	36	PASS
4	2427	MCS8	10.28	9.37	13.33	7.61	20.94	36	PASS
5	2432	MCS8	12.08	11.26	15.17	7.61	22.78	36	PASS
6	2437	MCS8	13.05	12.17	16.11	7.61	23.72	36	PASS
7	2442	MCS8	12.11	11.21	15.16	7.61	22.77	36	PASS
8	2447	MCS8	11.27	10.25	14.27	7.61	21.88	36	PASS
9	2452	MCS8	10.84	10.32	14.07	7.61	21.68	36	PASS

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6DB & 99% BANDWIDTH MEASUREMENT

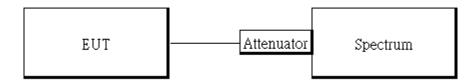
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE MFR MODEL SERIAL NUMBER LAST CAL. CAL D								
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/02/2019	05/01/2020			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2019	01/05/2020			
DC Block	Mini-Circuits	BLK-18-S+	1	01/04/2019	01/04/2020			

9.3 Test Set-up



9.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. For 6dB Bandwidth:
 - Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = large enough to capture all products of the modulation process, Detector=peak, Sweep=auto.
- 5. Mark the peak frequency and –6dB (upper and lower) frequency.
- 6. For 99% Bandwidth:
 - Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = large enough to capture all products of the modulation process, Detector=Sample, Sweep=auto.
- 7. Turn on the 99% bandwidth function, max reading.
- 8. Repeat above procedures until all frequency of interest measured was complete.

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9.5 6dB Bandwidth

802.11a Ch1 802.11a Ch0

					•		
Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Result	(MHz)	(kHz)	(kHz)	Result
2412	16320.00	> 500	PASS	2412	16050.00	> 500	PASS
2437	16360.00	> 500	PASS	2437	16340.00	> 500	PASS
2462	16300.00	> 500	PASS	2462	16320.00	> 500	PASS

802.11_n_HT20 Ch0 802.11_n_HT20 Ch1

Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Resuit	(MHz)	(kHz)	(kHz)	Resuit
2412	16800.00	> 500	PASS	2412	16930.00	> 500	PASS
2437	17550.00	> 500	PASS	2437	16930.00	> 500	PASS
2462	16830.00	> 500	PASS	2462	16590.00	> 500	PASS

802.11_n_HT40 Ch0 802.11_n_HT40 Ch1

Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Resuit	(MHz)	(kHz)	(kHz)	Resuit
2422	35180.00	> 500	PASS	2422	35350.00	> 500	PASS
2437	35800.00	> 500	PASS	2437	36350.00	> 500	PASS
2452	35380.00	> 500	PASS	2452	35730.00	> 500	PASS

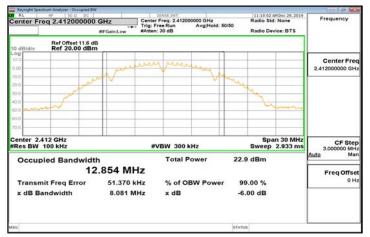
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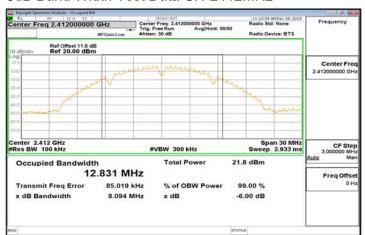




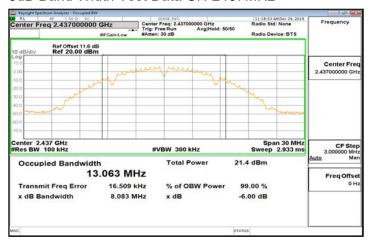
802.11b (CH0) 6dB Band Width Test Data CH-2412MHz



802.11b (CH1) 6dB Band Width Test Data CH-2412MHz



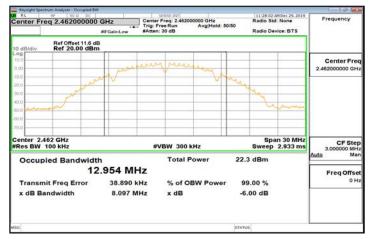
6dB Band Width Test Data CH-2437MHz



6dB Band Width Test Data CH-2437MHz



6dB Band Width Test Data CH-2462MHz



6dB Band Width Test Data CH-2462MHz



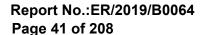
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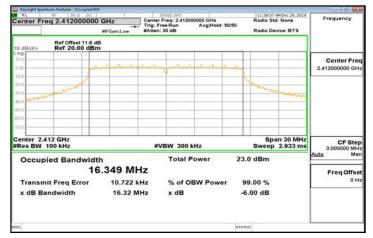
SGS Taiwan Ltd.





802.11g (CH0)

6dB Band Width Test Data CH-2412MHz

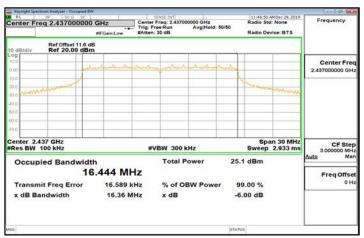


802.11g (CH1)

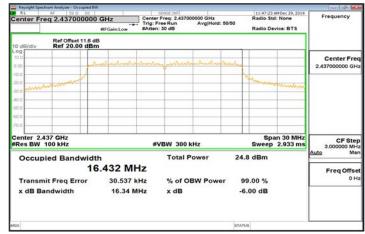
6dB Band Width Test Data CH-2412MHz



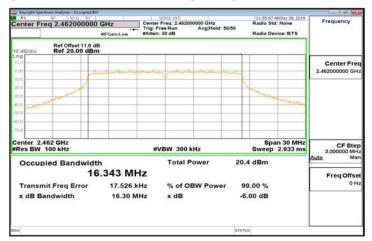
6dB Band Width Test Data CH-2437MHz



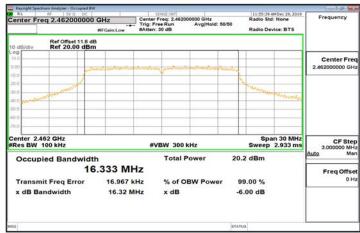
6dB Band Width Test Data CH-2437MHz



6dB Band Width Test Data CH-2462MHz



6dB Band Width Test Data CH-2462MHz



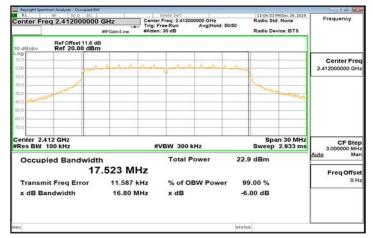
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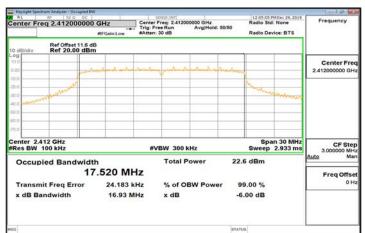




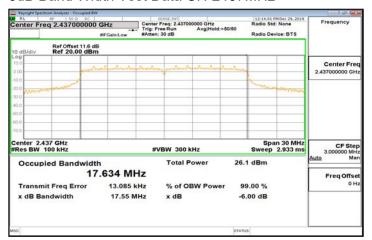
802.11n 20M (CH0) 6dB Band Width Test Data CH-2412MHz



802.11n 20M (CH1) 6dB Band Width Test Data CH-2412MHz



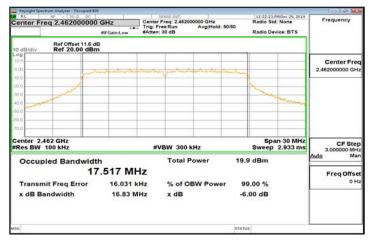
6dB Band Width Test Data CH-2437MHz



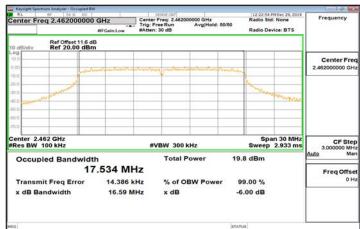
6dB Band Width Test Data CH-2437MHz



6dB Band Width Test Data CH-2462MHz



6dB Band Width Test Data CH-2462MHz



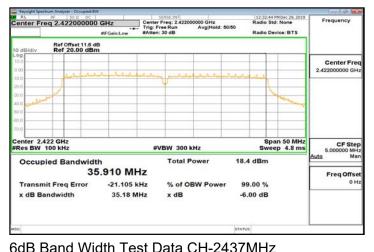
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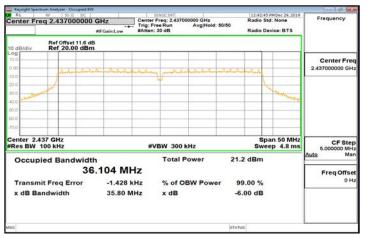
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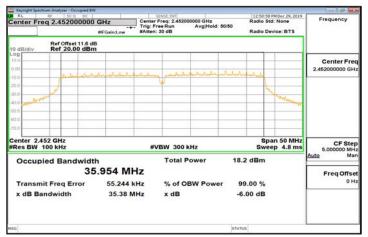


802.11n_40M (CH0) 6dB Band Width Test Data CH-2422MHz

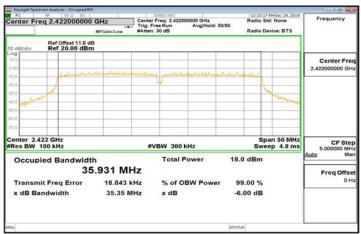




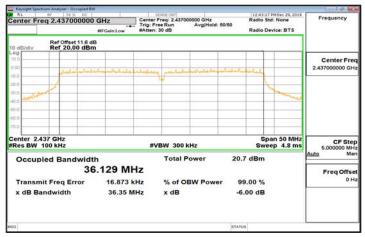
6dB Band Width Test Data CH-2452MHz



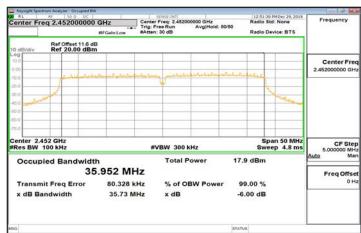
802.11n_40M (CH1) 6dB Band Width Test Data CH-2422MHz



6dB Band Width Test Data CH-2437MHz



6dB Band Width Test Data CH-2452MHz



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9.6 99% Bandwidth

802.11b Ch0		802.11b Ch1			
Freq. (MHz)	99% BW (MHz)	Freq. (MHz)	99% BW (MHz)		
2412	12.897	2412	12.893		
2437	13.123	2437	13.094		
2462	12.961	2462	13.012		

802.11g Ch0		802.11g Ch1			
Freq.	99% BW	Freq.	99% BW		
(MHz)	(MHz)	(MHz)	(MHz)		
2412	16.477	2412	16.422		
2437	16.656	2437	16.61		
2462	16.462	2462	16.421		

802.11n_HT2	20M Ch0	802.11n_HT20M Ch1			
Freq.	99% BW	Freq.	99% BW		
(MHz)	(MHz)	(MHz)	(MHz)		
2412	17.58	2412	17.566		
2437	17.836	2437	17.763		
2462	17.576	2462	17.55		

802.11n_HT4	IOM Ch0	802.11n_HT40M Ch1			
Freq.	99% BW	Freq.	99% BW		
(MHz)	(MHz)	(MHz)	(MHz)		
2422	36.157	2422	36.059		
2437	36.358	2437	36.265		
2452	36.204	2452	36.089		

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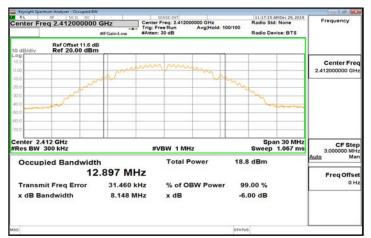
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802.11b (CH0)

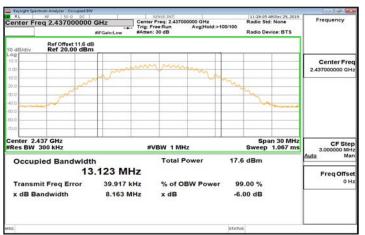
99% Band Width Test Data CH-2412MHz



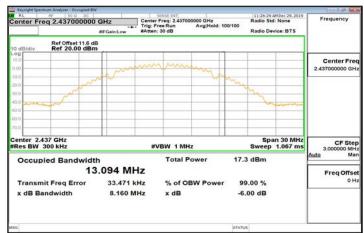
802.11b (CH1) 99% Band Width Test Data CH-2412MHz



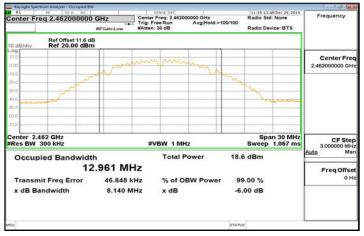
99% Band Width Test Data CH-2437MHz



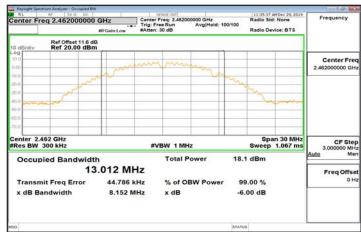
99% Band Width Test Data CH-2437MHz



99% Band Width Test Data CH-2462MHz



99% Band Width Test Data CH-2462MHz



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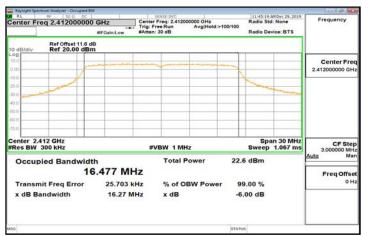
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802.11g (CH0)

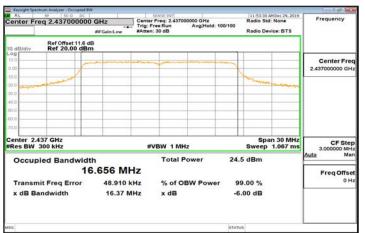
99% Band Width Test Data CH-2412MHz



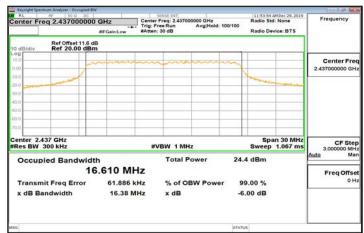
802.11g (CH1) 99% Band Width Test Data CH-2412MHz



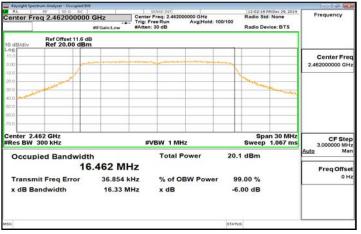
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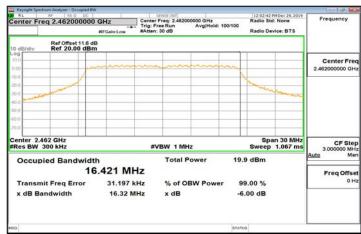
99% Band Width Test Data CH-2437MHz



99% Band Width Test Data CH-2462MHz



99% Band Width Test Data CH-2462MHz



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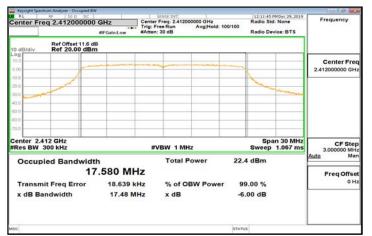
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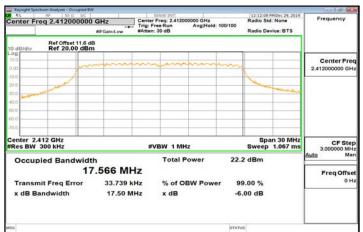




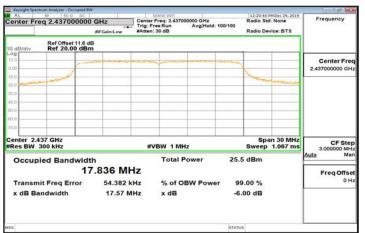
802.11n_20M (CH0) 99% Band Width Test Data CH-2412MHz



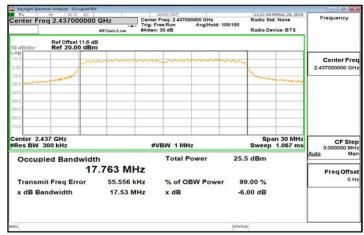
802.11n_20M (CH1) 99% Band Width Test Data CH-2412MHz



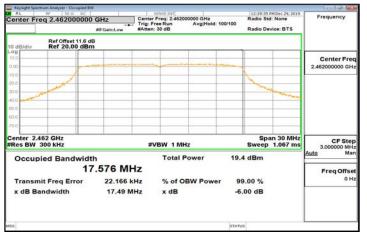
99% Band Width Test Data CH-2437MHz



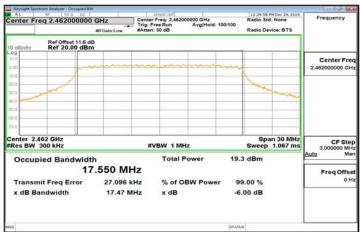
99% Band Width Test Data CH-2437MHz



99% Band Width Test Data CH-2462MHz



99% Band Width Test Data CH-2462MHz



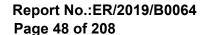
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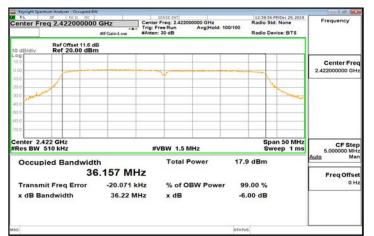
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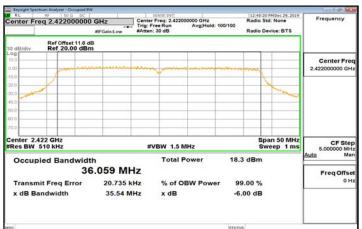




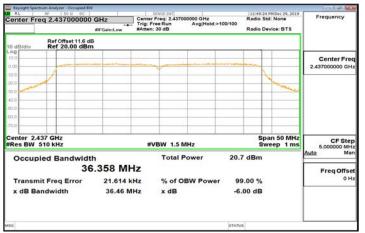
802.11n_40M (CH0) 99% Band Width Test Data CH-2422MHz



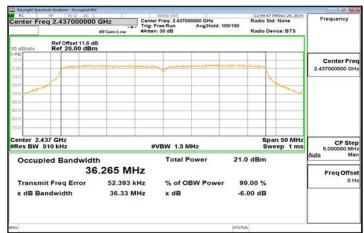
802.11n_40M (CH1) 99% Band Width Test Data CH-2422MHz



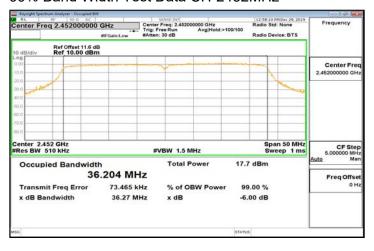
99% Band Width Test Data CH-2437MHz



99% Band Width Test Data CH-2437MHz



99% Band Width Test Data CH-2452MHz



99% Band Width Test Data CH-2452MHz



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

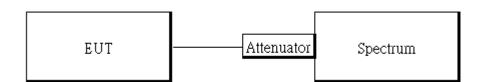
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

10.2 Measurement Equipment Used

Conducted Emission Test Site							
EQUIPMENT TYPE MFR MODEL SERIAL NUMBER LAST CAL. CAL D							
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/02/2019	05/01/2020		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2019	01/04/2020		
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2019	01/04/2020		

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. Use the peak marker function to determine the maximum amplitude level.
- 9. 802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

Conducted Band Edge:

- To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- 9. Repeat above procedures until all default test channel (low, middle, and high) was complete.
- 10.802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

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Conducted Spurious Emission:

- To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.
- 7. 802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

Note:

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

10.5 Measurement Result

Refere	Reference Level of Limit 802.11b mode			Reference Level of Limit 802.11g mode		
Freq.	PSD	Reference Level of Limit	Freq.	PSD	Reference Level of Limit	
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)	
2412	10.26	-9.74	2412	7.88	-12.12	
2437	9.15	-10.85	2437	9.90	-10.10	
2462	10.02	-9.98	2462	5.04	-14.96	

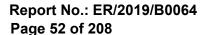
Referen	ce Level	of Limit 802.11n20 mode	Reference Level of Limit 802.11n40 MODE			
Freq.	PSD	Reference Level of Limit	Freq.	PSD	Reference Level of Limit	
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)	
2412	7.61	-12.39	2422	0.86	-19.14	
2437	10.91	-9.09	2437	3.20	-16.80	
2462	4.87	-15.13	2452	0.86	-19.14	

Note

Cable Loss 11.60 dB

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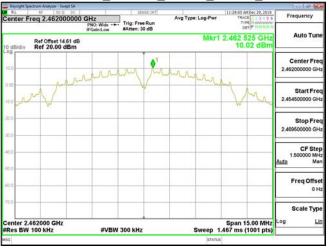
Reference Level_802.11b_20MHz_Chain0_2412MHz



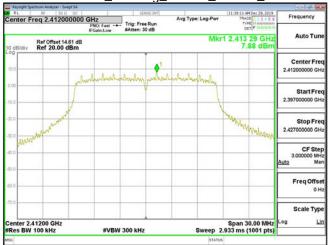
Reference Level 802.11b 20MHz Chain0 2437MH



Reference Level 802.11b 20MHz Chain0 2462MHz



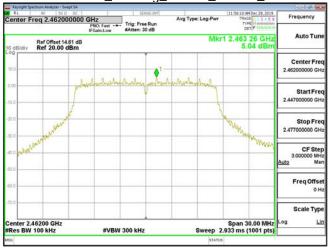
Reference Level_802.11g_20MHz_Chain0_2412MHz



Reference Level 802.11g 20MHz Chain 2437MH

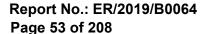


Reference Level 802.11g 20MHz Chain0 2462MHz



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Reference Level_802.11n_20MHz_Chain0_2412MHz



Reference Level_802.11n 20MHz Chain0 2437MH



Reference Level 802.11n 20MHz Chain0 2462MHz



Reference Level_802.11n_40MHz_Chain0_2422MHz



Reference Level 802.11n 40MHz Chain0 2437MH

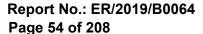


Reference Level 802.11n 40MHz Chain0 2452MHz



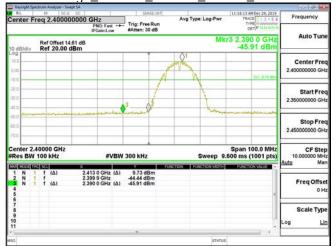
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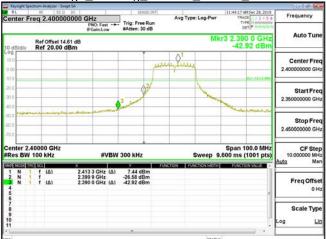
Band Edge_802.11b_20MHz _Chain0_2412MHz



Band Edge_802.11b_20MHz _Chain0_2462MHz



Band Edge_802.11q_20MHz _Chain0_2412MHz

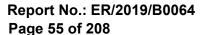


Band Edge_802.11g_20MHz _Chain0_2462MHz



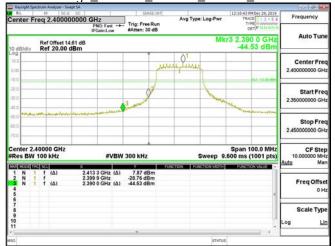
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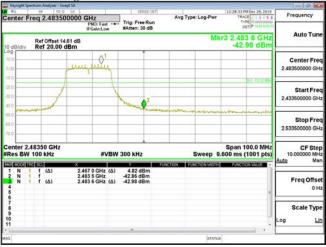




Band Edge_802.11n_20MHz _Chain0_2412MHz



Band Edge_802.11n_20MHz_Chain0_2462MHz



Band Edge_802.11n_40MHz _Chain0_2422MHz



Band Edge_802.11n_40MHz_Chain0_2452MHz

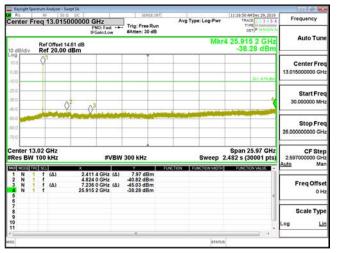


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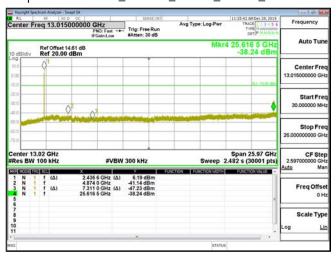
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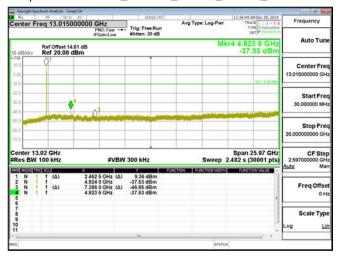
Spurious Emission_802.11b_20MHz_Chain0_2412MHz



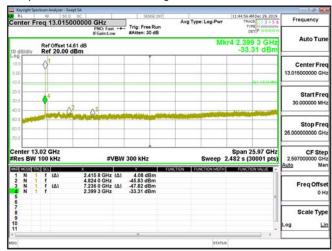
Spurious Emission_802.11b_20MHz_Chain0_2437MHz



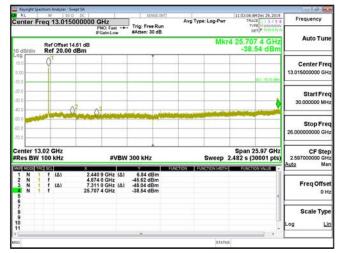
Spurious Emission_802.11b_20MHz_Chain0_2462MHz



Spurious Emission_802.11q_20MHz_Chain0_2412MHz



Spurious Emission_802.11g_20MHz_Chain0_2437MHz



Spurious Emission_802.11q_20MHz_Chain0_2462MHz

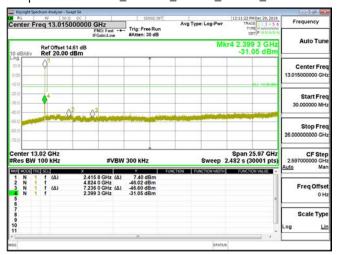


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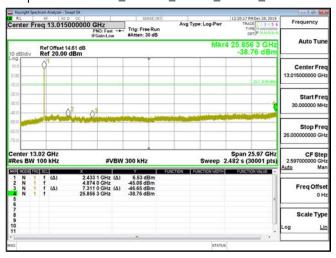
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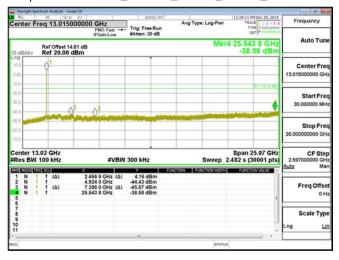
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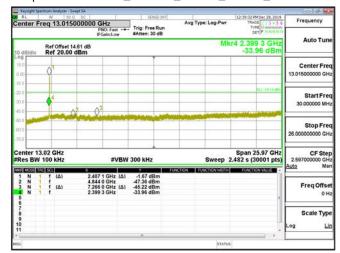
Spurious Emission_802.11n_20MHz_Chain0_2437MHz



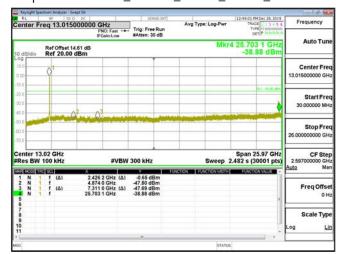
Spurious Emission_802.11n_20MHz_Chain0_2462MHz



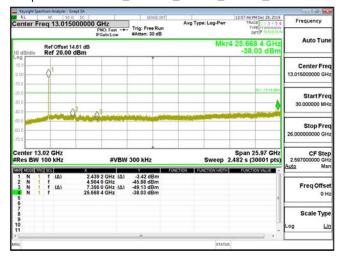
Spurious Emission_802.11n_40MHz_Chain0_2422MHz



Spurious Emission_802.11n_40MHz_Chain0_2437MHz



Spurious Emission_802.11n_40MHz_Chain0_2452MHz



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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

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

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

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

Note:

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

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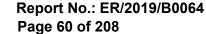
11.2 Measurement Equipment Used:

966 Chamber							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/04/2019	01/03/2020		
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/20/2019	08/19/2020		
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2018	12/24/2019		
Attenuator	Mini-Circuit	BW-S10W2+	4	01/05/2019	01/04/2020		
3m Site NSA	SGS	966 chamber	N/A	01/05/2019	01/04/2020		
Loop Antenna	ETS.LINDGREN	6502	148045	10/15/2019	10/14/2020		
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/22/2019	04/21/2020		
EMI Test Receiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020		
Pre-Amplifier	HP	8449B	3008A00578	01/05/2019	01/04/2020		
Pre-Amplifier	HP	8447D	2944A07676	01/05/2019	01/04/2020		
Pre-Amplifier	EMC Instruments	EMC184045B	980135	01/05/2019	01/04/2020		
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	01/05/2019	01/04/2020		
High Pass Filter	WI	WHKX4.0/18G-10SS	22	01/05/2019	01/04/2020		
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2019	01/04/2020		

Note: The measurement was taken place with the long duration of the time, and additional equipment list as shown above indicate those equipment of which has been subject to undertake the calibration in intermediate period of time of the measurement.

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	966 Chamber							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/03/2020	01/02/2021			
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2019	12/24/2020			
Attenuator	Mini-Circuit	BW-S10W2+	4	01/05/2020	01/04/2021			
3m Site NSA	SGS	966 chamber	N/A	01/05/2020	01/04/2021			
Pre-Amplifier	HP	8449B	3008A00578	01/05/2020	01/04/2021			
Pre-Amplifier	HP	8447D	2944A07676	01/05/2020	01/04/2021			
Pre-Amplifier	EMC Instruments	EMC184045B	980135	01/05/2020	01/04/2021			
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	01/05/2020	01/04/2021			
High Pass Filter	WI	WHKX4.0/18G-10SS	22	01/05/2020	01/04/2021			
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2020	01/04/2021			

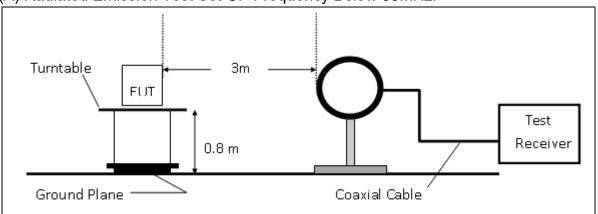
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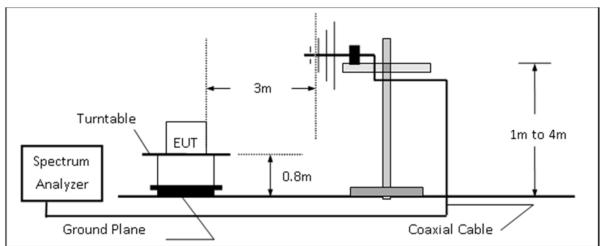


11.3 Test SET-UP

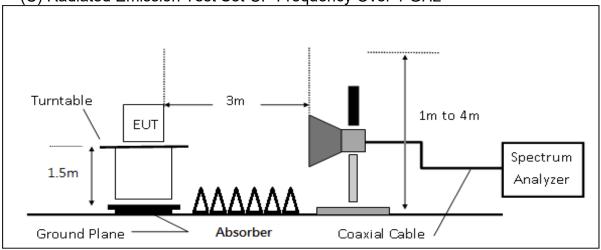
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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. Guid-
- 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.
- When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 12. Repeat above procedures until all default test channel measured were complete.

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11.5 Field Strength Calculation

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

FS = RA + AF + CL - AG

Where FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

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

Actual $FS(dB\mu V/m) = SPA$. Reading level(dB μV) + 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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11.7.1 Radiated Band Edge Measurement Result

Dipole Antenna (Part No.: GW.48.A151)

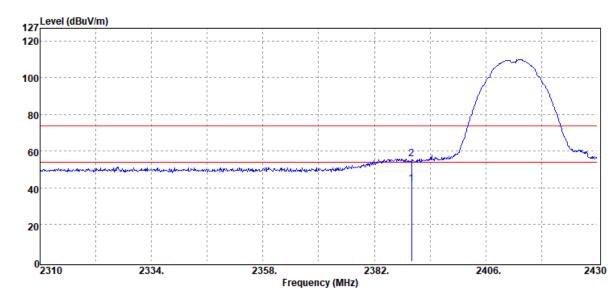
Report Number **Test Date** :2019-12-17 :ER/2019/B0064

Operation Mode :802.11b Temp./Humi. :22.3/59

Test Channel :2412 MHz Antenna Pol. :VERTICAL

Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2390.00	Average	41.93	0.24	42.17	54.00	-11.83
2390.00	Peak	55.64	0.24	55.88	74.00	-18.12

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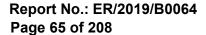
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Operation Mode :802.11b

Test Channel :2412 MHz

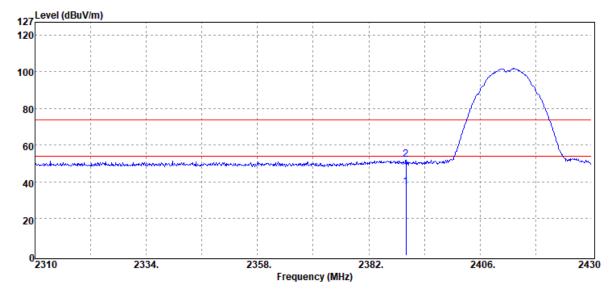
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

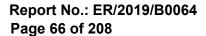
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	37.33	0.24	37.57	54.00	-16.43
2390.00	Peak	52.11	0.24	52.35	74.00	-21.65

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Operation Mode :802.11b

Test Channel :2462 MHz

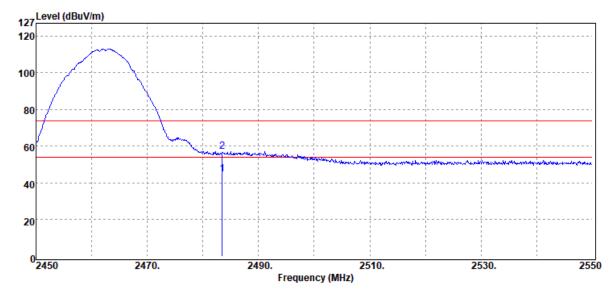
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:VERTICAL Antenna Pol.

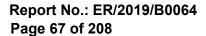
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	44.86	-0.17	44.69	54.00	-9.31
2483.50	Peak	57.50	-0.17	57.33	74.00	-16.67

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Operation Mode :802.11b

Test Channel :2462 MHz

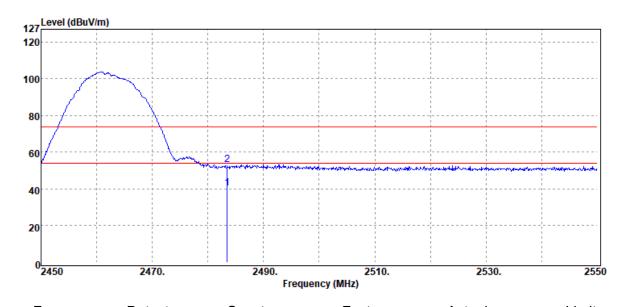
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

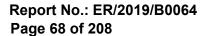
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	2483.50	Average	40.67	-0.17	40.50	54.00	-13.50
	2483.50	Peak	53.52	-0.17	53.35	74.00	-20.65

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Operation Mode :802.11g

Test Channel :2412 MHz

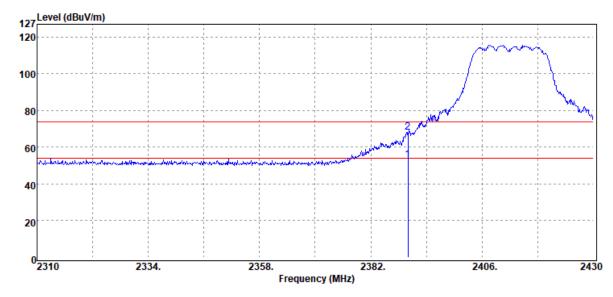
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

Antenna Pol. :VERTICAL

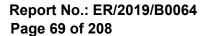
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	52.75	0.24	52.99	54.00	-1.01
2390.00	Peak	67.87	0.24	68.11	74.00	-5.89

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Operation Mode :802.11g

Test Channel :2412 MHz

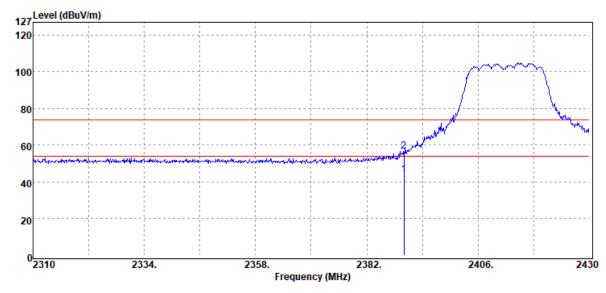
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

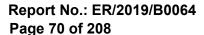
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2390.00	Average	43.52	0.24	43.76	54.00	-10.24
2390.00	Peak	56.65	0.24	56.89	74.00	-17.11

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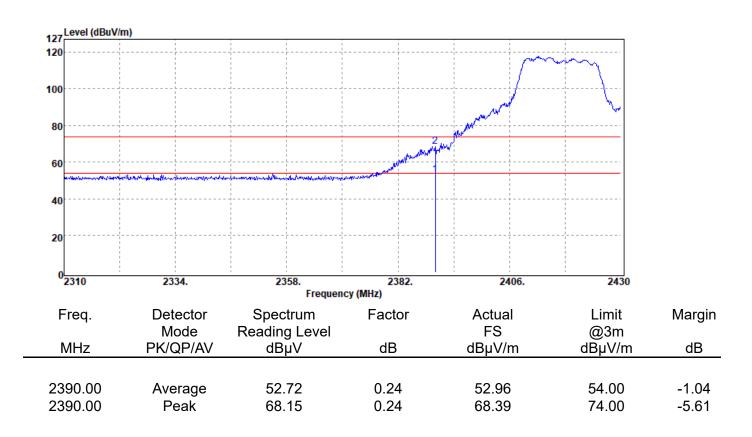
Report Number :ER/2019/B0064 Test Date :2019-12-17

Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2417 MHz Antenna Pol. :VERTICAL

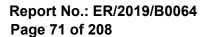
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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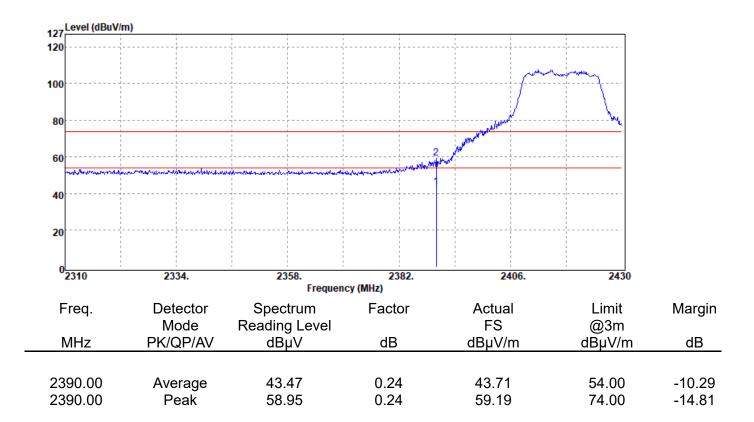
Report Number :ER/2019/B0064 **Test Date** :2019-12-17

Operation Mode Temp./Humi. :802.11g :22.3/59

:HORIZONTAL **Test Channel** :2417 MHz Antenna Pol.

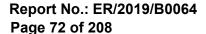
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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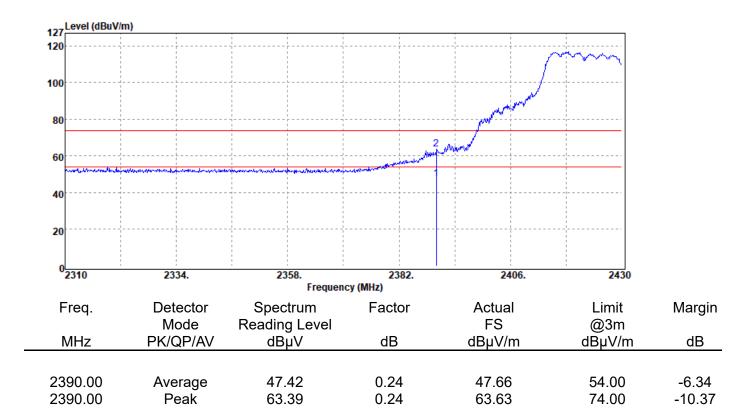
Report Number :ER/2019/B0064 Test Date :2019-12-17

Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2422 MHz Antenna Pol. :VERTICAL

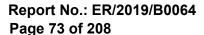
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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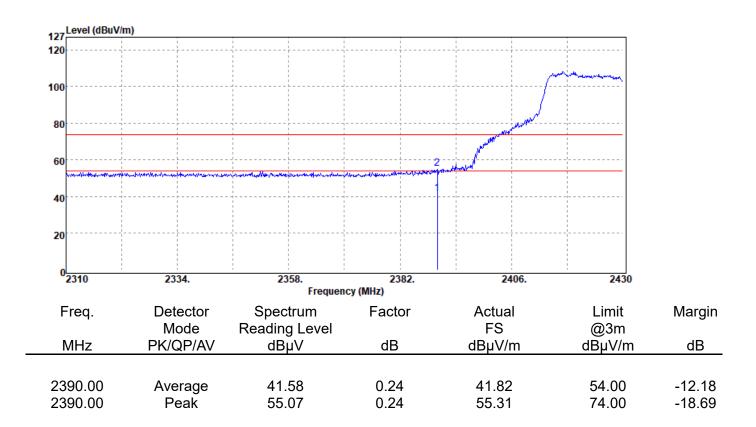


Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2422 MHz Antenna Pol. :HORIZONTAL

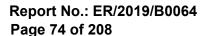
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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Report Number :ER/2019/B0064 T

Operation Mode :802.11g

Test Channel :2452 MHz

Test Mode :Bandedge CH High

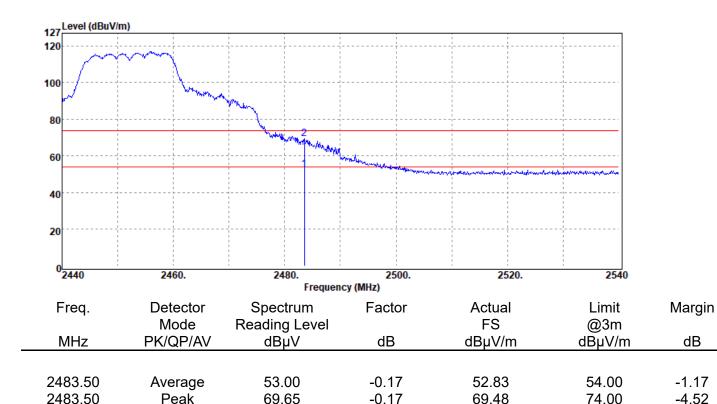
EUT Pol :E2 Plane

Test Date :2019-12-17

Temp./Humi. :22.3/59

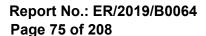
Antenna Pol. :VERTICAL

Engineer :Thomas



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:2019-12-17



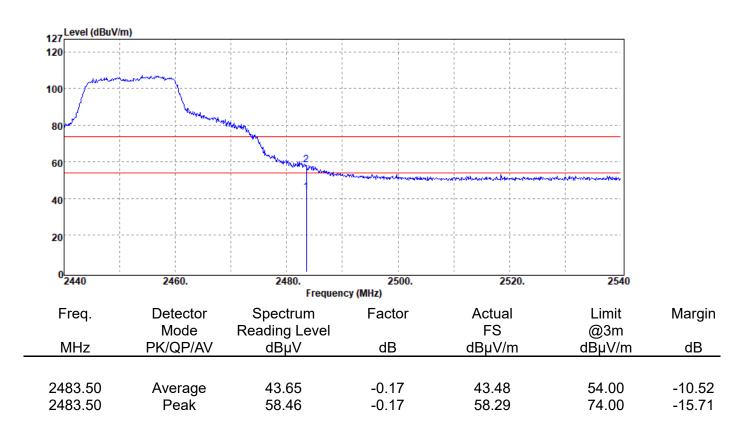
Report Number :ER/2019/B0064 Test Date

Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2452 MHz Antenna Pol. :HORIZONTAL

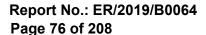
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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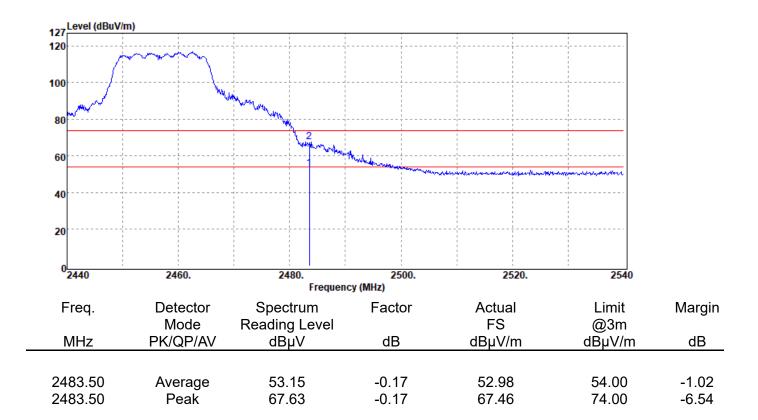


Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2457 MHz Antenna Pol. :VERTICAL

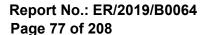
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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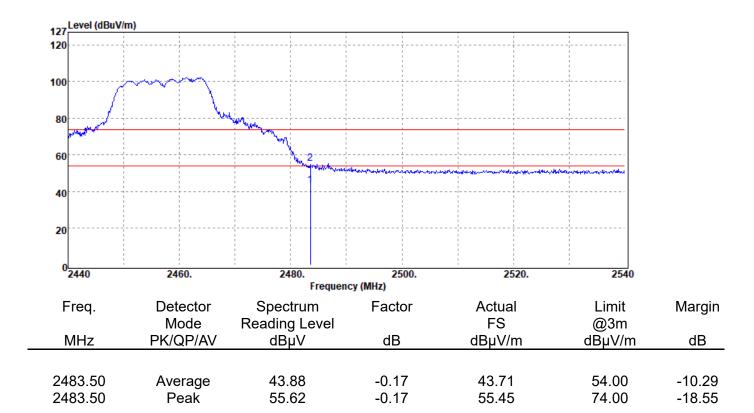


Operation Mode :802.11g Temp./Humi. :22.3/59

Test Channel :2457 MHz Antenna Pol. :HORIZONTAL

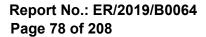
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11g

Test Channel :2462 MHz

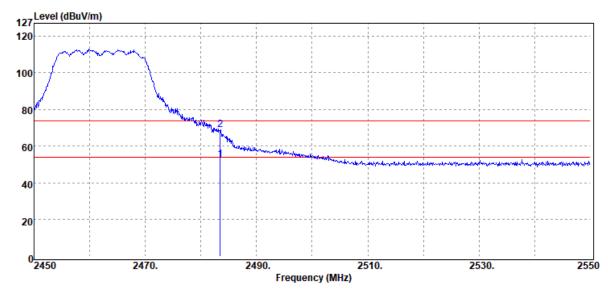
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:VERTICAL Antenna Pol.

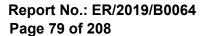
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	53.00	-0.17	52.83	54.00	-1.17
2483.50	Peak	69.24	-0.17	69.07	74.00	-4.93

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Operation Mode :802.11g

Test Channel :2462 MHz

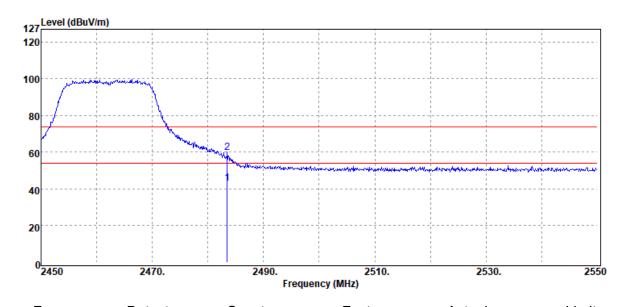
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

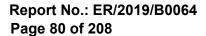
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	2483.50	Average	43.24	-0.17	43.07	54.00	-10.93
	2483.50	Peak	60.00	-0.17	59.83	74.00	-14.17

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Operation Mode :802.11n20

Test Channel :2412 MHz

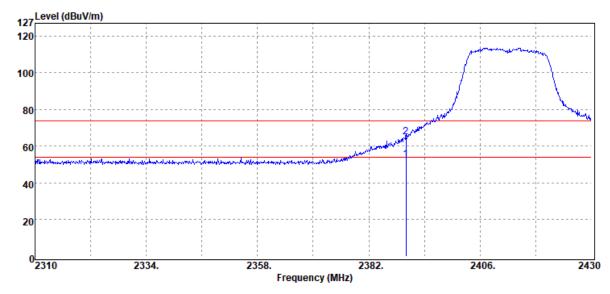
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:VERTICAL Antenna Pol.

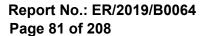
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	52.40	0.24	52.64	54.00	-1.36
2390.00	Peak	64.70	0.24	64.94	74.00	-9.06

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Operation Mode :802.11n20

Test Channel :2412 MHz

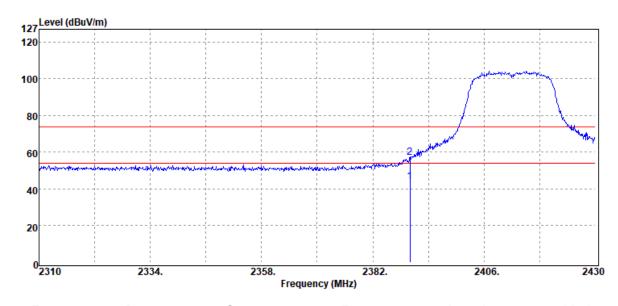
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

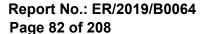
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	43.85	0.24	44.09	54.00	-9.91
2390.00	Peak	57.00	0.24	57.24	74.00	-16.76

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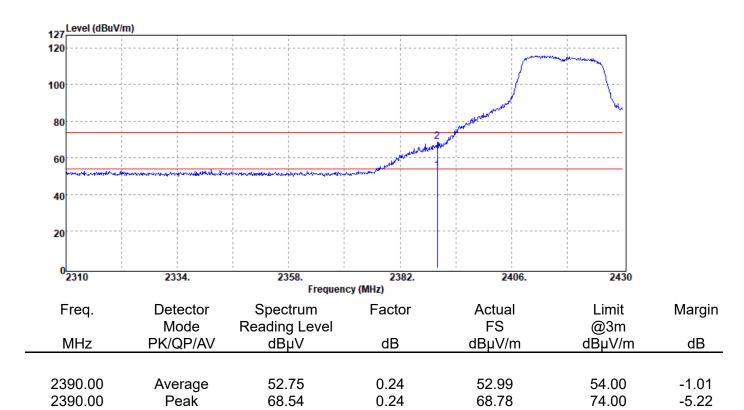


Operation Mode :802.11n20 Temp./Humi. :22.3/59

Test Channel :2417 MHz Antenna Pol. :VERTICAL

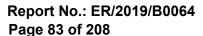
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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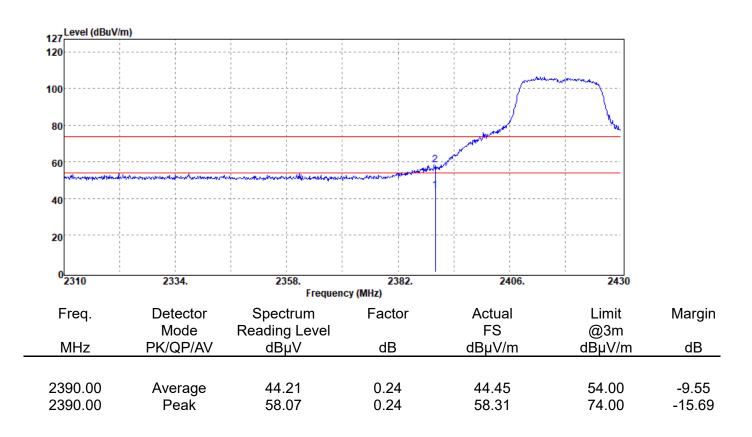


Operation Mode :802.11n20 Temp./Humi. :22.3/59

Test Channel :2417 MHz Antenna Pol. :HORIZONTAL

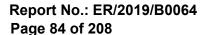
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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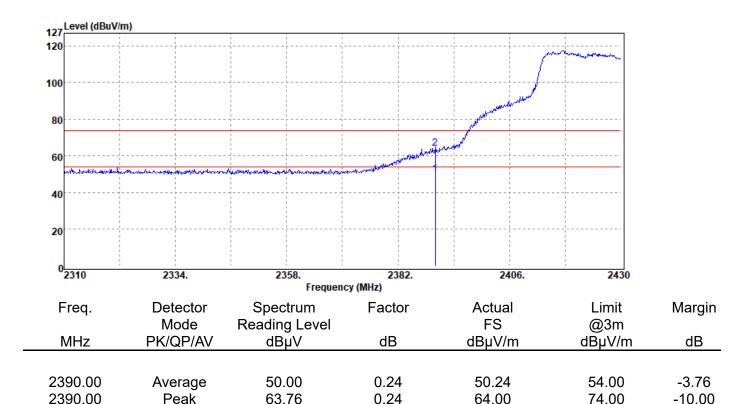


Operation Mode :802.11n20 Temp./Humi. :22.3/59

Test Channel :2422 MHz Antenna Pol. :VERTICAL

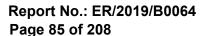
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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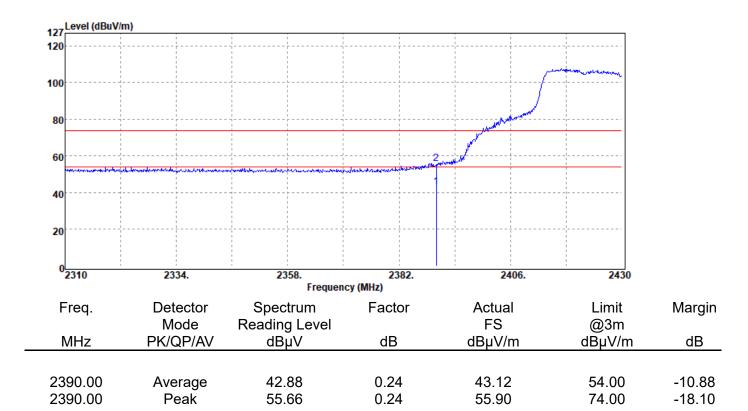


Operation Mode Temp./Humi. :802.11n20 :22.3/59

:HORIZONTAL **Test Channel** :2422 MHz Antenna Pol.

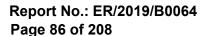
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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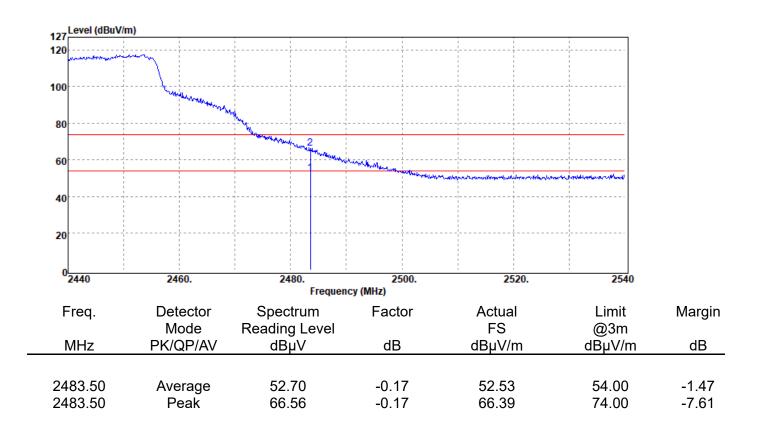


Operation Mode :802.11n20 Temp./Humi. :22.3/59

Test Channel :2447 MHz Antenna Pol. :VERTICAL

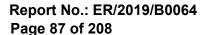
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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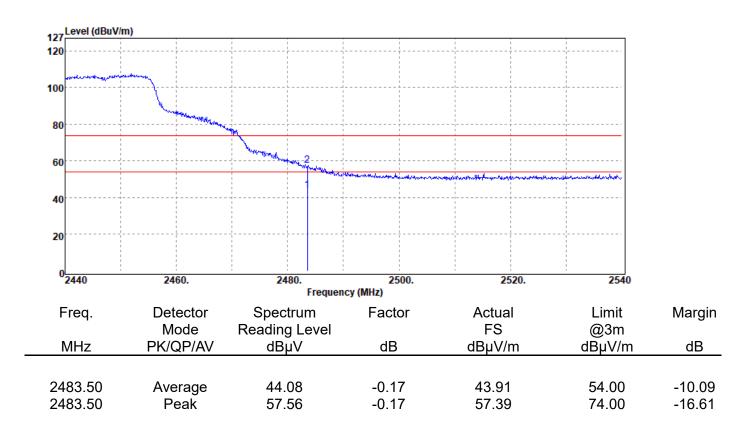


Operation Mode Temp./Humi. :802.11n20 :22.3/59

:HORIZONTAL **Test Channel** :2447 MHz Antenna Pol.

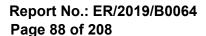
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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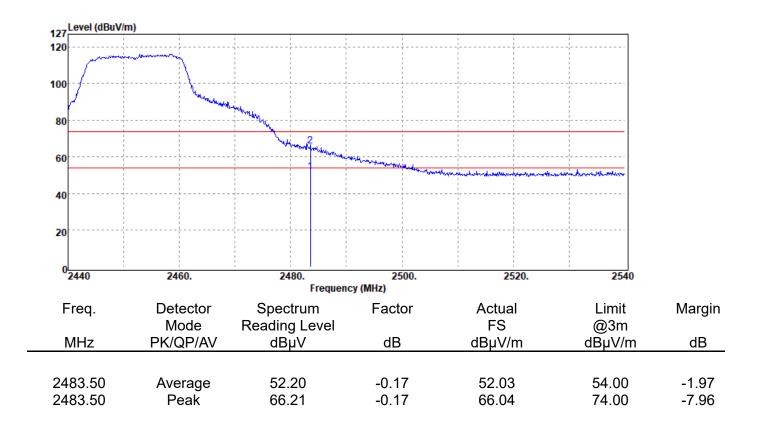


Operation Mode :802.11n20 Temp./Humi. :22.3/59

:VERTICAL **Test Channel** :2452 MHz Antenna Pol.

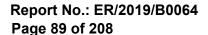
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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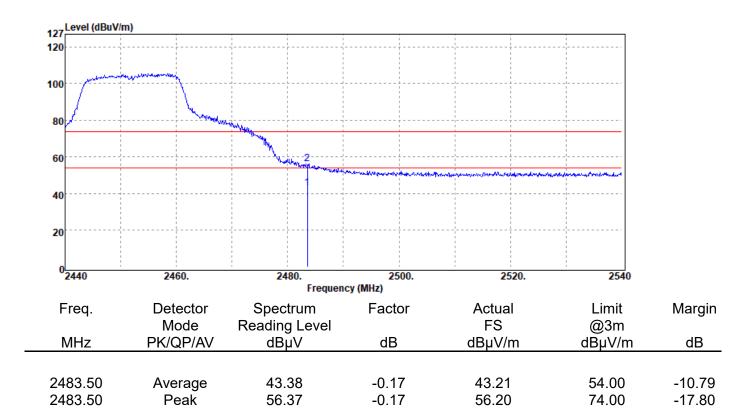


Operation Mode Temp./Humi. :802.11n20 :22.3/59

:HORIZONTAL **Test Channel** :2452 MHz Antenna Pol.

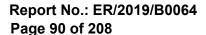
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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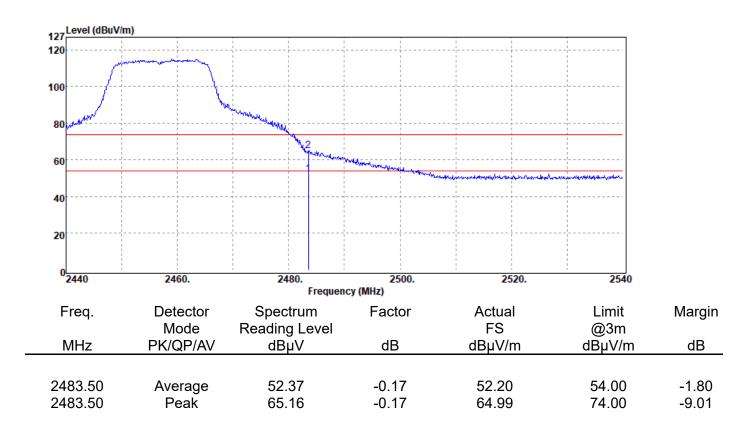


Operation Mode :802.11n20 Temp./Humi. :22.3/59

:VERTICAL **Test Channel** :2457 MHz Antenna Pol.

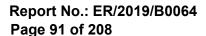
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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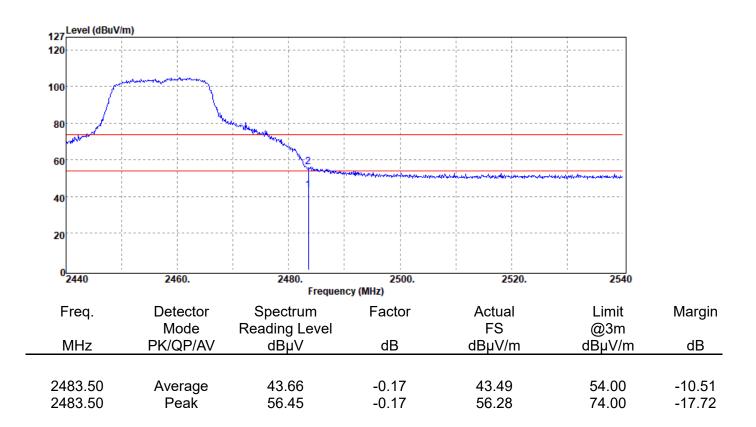


Operation Mode :802.11n20 Temp./Humi. :22.3/59

Test Channel :2457 MHz Antenna Pol. :HORIZONTAL

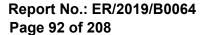
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11n20

Test Channel :2462 MHz

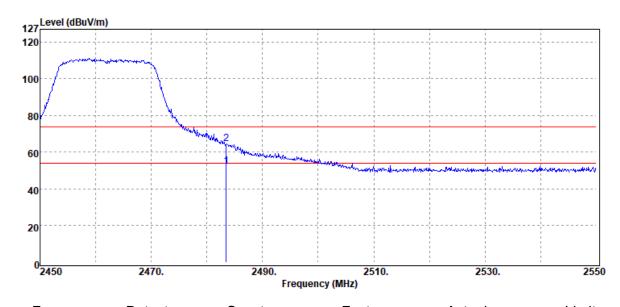
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

Antenna Pol. :VERTICAL

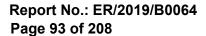
Engineer :Thomas



	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	52.60	-0.17	52.43	54.00	-1.57
	2483.50	Peak	64.90	-0.17	64.73	74.00	-9.27

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Operation Mode :802.11n20

Test Channel :2462 MHz

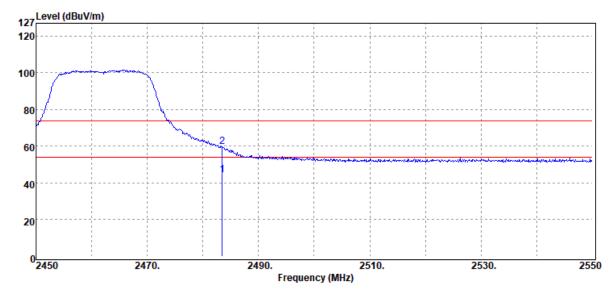
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

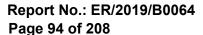
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2483.50	Average	44.42	-0.17	44.25	54.00	-9.75
2483.50	Peak	59.86	-0.17	59.69	74.00	-14.31

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Operation Mode :802.11n40

Test Channel :2422 MHz

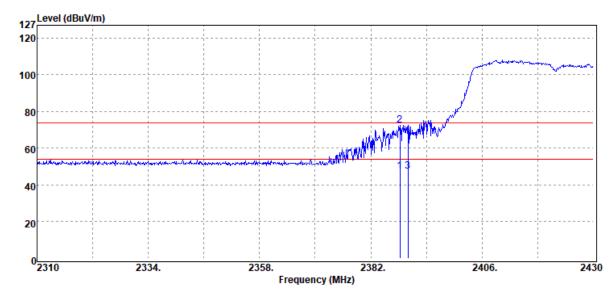
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

:22.3/59 Temp./Humi.

:VERTICAL Antenna Pol.

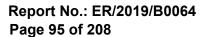
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2388.24	Average	47.29	0.25	47.54	54.00	-6.46
2388.24	Peak	72.45	0.25	72.70	74.00	-1.30
2390.00	Average	47.03	0.24	47.27	54.00	-6.73
2390.00	Peak	66.99	0.24	67.23	74.00	-6.77

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Operation Mode :802.11n40

Test Channel :2422 MHz

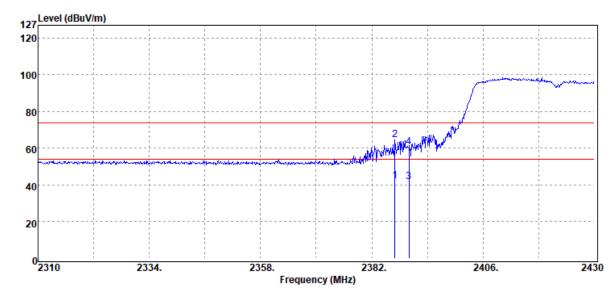
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

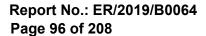
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2386.98	Average	41.79	0.25	42.04	54.00	-11.96
2386.98	Peak	64.21	0.25	64.46	74.00	-9.54
2390.00	Average	41.61	0.24	41.85	54.00	-12.15
2390.00	Peak	60.50	0.24	60.74	74.00	-13.26

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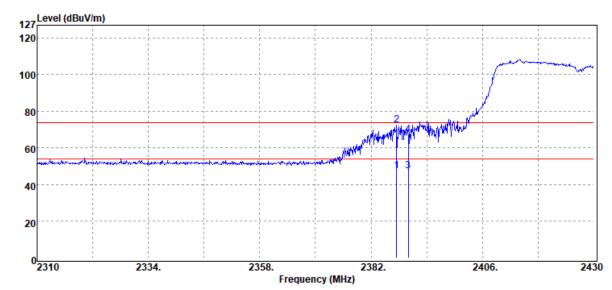


Operation Mode :802.11n40 Temp./Humi. :22.3/59

Test Channel :VERTICAL :2427 MHz Antenna Pol.

Test Mode :Bandedge CH Low Engineer :Thomas

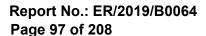
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2387.52	Average	47.30	0.25	47.55	54.00	-6.45
2387.52	Peak	72.13	0.25	72.38	74.00	-1.62
2390.00	Average	47.21	0.24	47.45	54.00	-6.55
2390.00	Peak	67.09	0.24	67.33	74.00	-6.67

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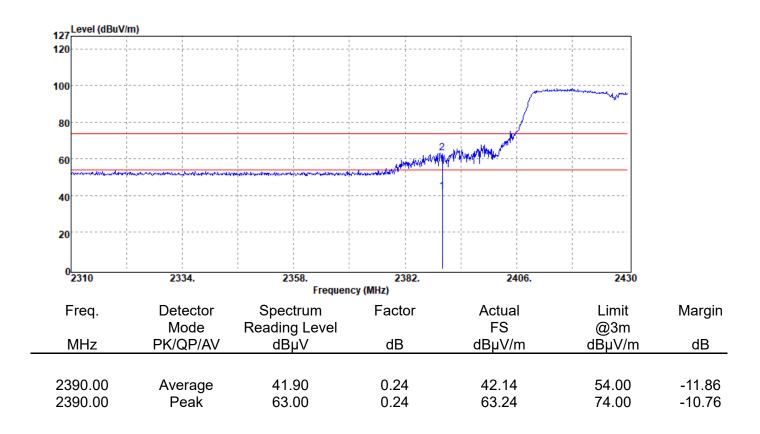


Operation Mode :802.11n40 Temp./Humi. :22.3/59

Test Channel :2427 MHz Antenna Pol. :HORIZONTAL

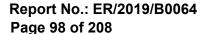
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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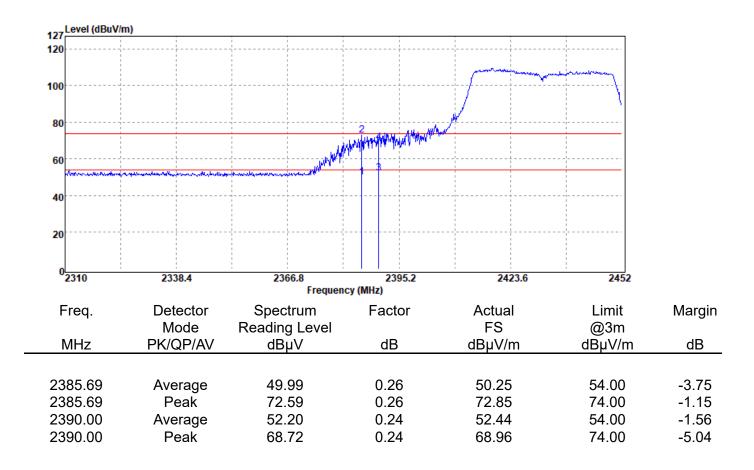


Operation Mode :802.11n40 Temp./Humi. :22.3/59

Test Channel :2432 MHz Antenna Pol. :VERTICAL

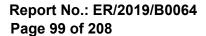
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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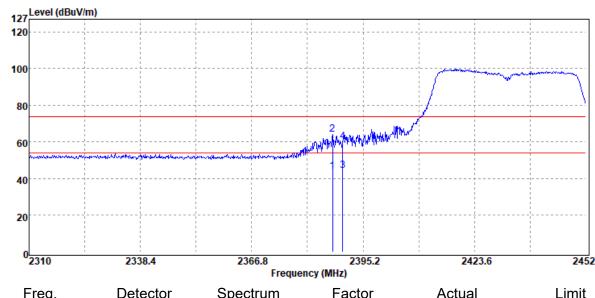


Operation Mode Temp./Humi. :802.11n40 :22.3/59

Test Channel :HORIZONTAL :2432 MHz Antenna Pol.

Test Mode :Bandedge CH Low Engineer :Thomas

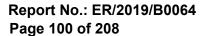
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2387.39	Average	43.50	0.25	43.75	54.00	-10.25
2387.39	Peak	63.75	0.25	64.00	74.00	-10.00
2390.00	Average	44.01	0.24	44.25	54.00	-9.75
2390.00	Peak	60.18	0.24	60.42	74.00	-13.58

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Operation Mode :802.11n40

Test Channel :2437 MHz

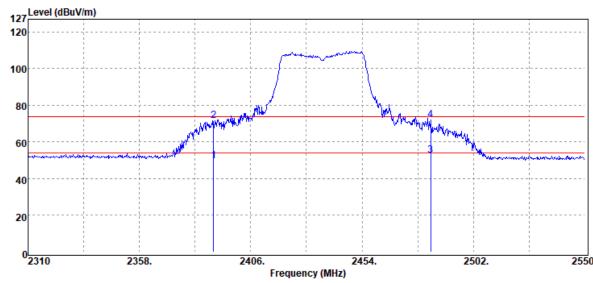
Test Mode :Bandedge CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-17

> Temp./Humi. :22.3/59

:VERTICAL Antenna Pol.

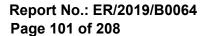
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	49.50	0.24	49.74	54.00	-4.26
2390.00	Peak	71.47	0.24	71.71	74.00	-2.29
2483.50	Average	52.90	-0.17	52.73	54.00	-1.27
2483.50	Peak	72.21	-0.17	72.04	74.00	-1.96

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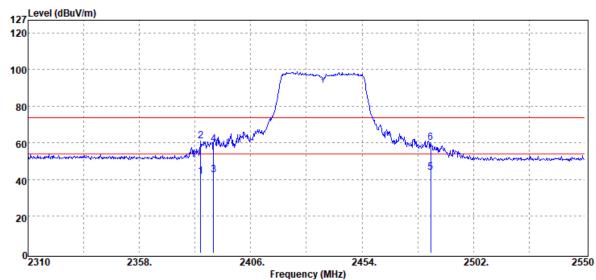


Operation Mode Temp./Humi. :802.11n40 :22.3/59

Test Channel :HORIZONTAL :2437 MHz Antenna Pol.

Test Mode :Bandedge CH Mid Engineer :Thomas

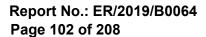
EUT Pol :E2 Plane



	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
_							
	2384.40	Average	41.48	0.26	41.74	54.00	-12.26
	2384.40	Peak	60.91	0.26	61.17	74.00	-12.83
	2389.92	Average	42.35	0.24	42.59	54.00	-11.41
	2389.92	Peak	58.88	0.24	59.12	74.00	-14.88
	2483.50	Average	44.20	-0.17	44.03	54.00	-9.97
	2483.50	Peak	60.51	-0.17	60.34	74.00	-13.66

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Operation Mode :802.11n40 **Test Channel** :2442 MHz

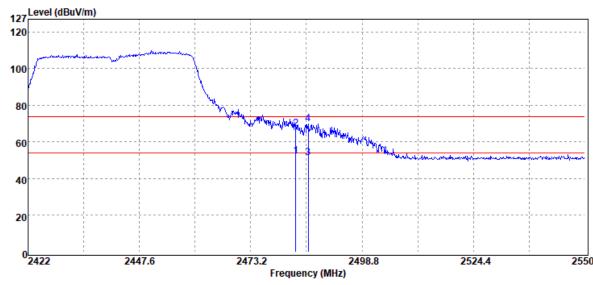
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

:22.3/59 Temp./Humi.

:VERTICAL Antenna Pol.

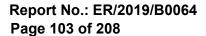
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBμV/m	dB
2483.50	Average	52.25	-0.17	52.08	54.00	-1.92
2483.50	Peak	67.39	-0.17	67.22	74.00	-6.78
2486.38	Average	51.65	-0.19	51.46	54.00	-2.54
2486.38	Peak	70.09	-0.19	69.90	74.00	-4.10

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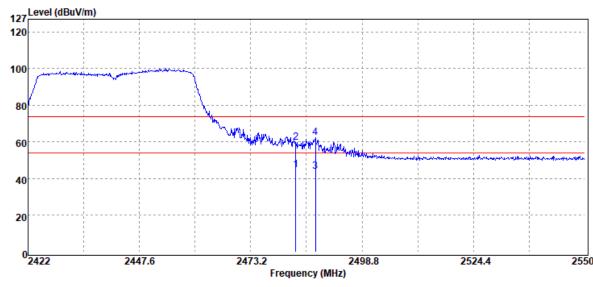


Operation Mode Temp./Humi. :802.11n40 :22.3/59

Test Channel :HORIZONTAL :2442 MHz Antenna Pol.

Test Mode :Bandedge CH High Engineer :Thomas

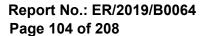
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	45.15	-0.17	44.98	54.00	-9.02
2483.50	Peak	60.09	-0.17	59.92	74.00	-14.08
2488.05	Average	44.21	-0.20	44.01	54.00	-9.99
2488.05	Peak	62.45	-0.20	62.25	74.00	-11.75

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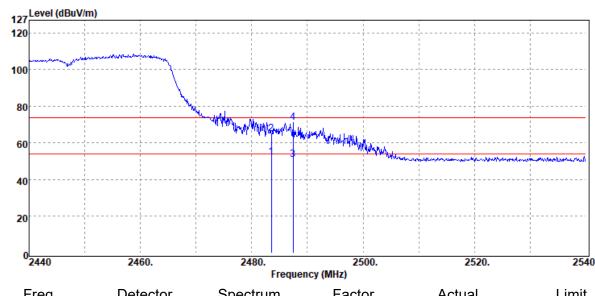


Operation Mode :22.3/59 :802.11n40 Temp./Humi.

:VERTICAL **Test Channel** :2447 MHz Antenna Pol.

Test Mode :Bandedge CH High Engineer :Thomas

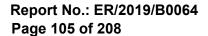
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.55	-0.17	52.38	54.00	-1.62
2483.50	Peak	65.24	-0.17	65.07	74.00	-8.93
2487.40	Average	51.30	-0.19	51.11	54.00	-2.89
2487.40	Peak	71.24	-0.19	71.05	74.00	-2.95

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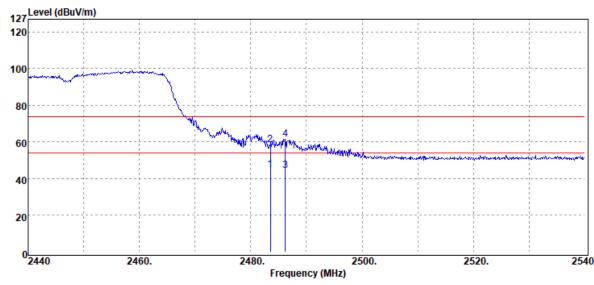


Operation Mode Temp./Humi. :802.11n40 :22.3/59

Test Channel :HORIZONTAL :2447 MHz Antenna Pol.

Test Mode :Bandedge CH High Engineer :Thomas

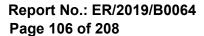
EUT Pol :E2 Plane



Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
Average	45.00	-0.17	44.83	54.00	-9.17
Peak	58.70	-0.17	58.53	74.00	-15.47
Average	44.64	-0.19	44.45	54.00	-9.55
Peak	61.76	-0.19	61.57	74.00	-12.43
	Mode PK/QP/AV Average Peak Average	Mode Reading Level PK/QP/AV dBµV Average 45.00 Peak 58.70 Average 44.64	Mode PK/QP/AV Reading Level dBμV dB Average Peak Peak S8.70 Peak Average 44.64 Peak S8.70 Peak Peak S8.70 Peak Peak S8.70 Peak Peak Peak S8.70 Peak Peak Peak Peak Peak Peak Peak Peak	Mode PK/QP/AV Reading Level dBμV FS dBμV/m Average 45.00 -0.17 44.83 Peak 58.70 -0.17 58.53 Average 44.64 -0.19 44.45	Mode PK/QP/AV Reading Level dB μV FS dB μV/m @3m dB μV/m Average Peak 58.70 Peak Average 44.64 -0.17 -0.17 -0.17 -0.17 -0.17 -0.17 -0.19

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Operation Mode :802.11n40

Test Channel :2452 MHz

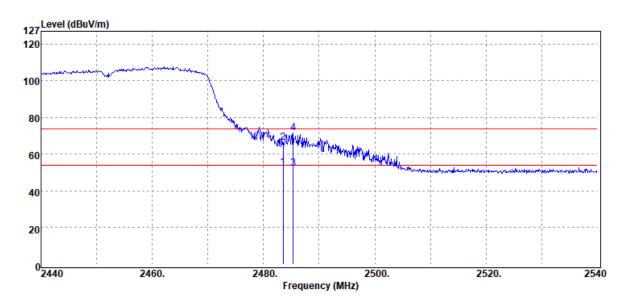
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

:22.3/59 Temp./Humi.

Antenna Pol. :VERTICAL

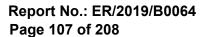
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.85	-0.17	52.68	54.00	-1.32
2483.50	Peak	66.66	-0.17	66.49	74.00	-7.51
2485.30	Average	52.30	-0.18	52.12	54.00	-1.88
2485.30	Peak	71.62	-0.18	71.44	74.00	-2.56

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Operation Mode :802.11n40

Test Channel :2452 MHz

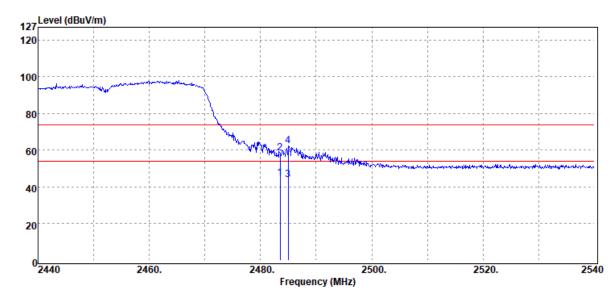
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-17

Temp./Humi. :22.3/59

:HORIZONTAL Antenna Pol.

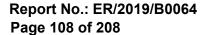
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	45.00	-0.17	44.83	54.00	-9.17
2483.50	Peak	58.48	-0.17	58.31	74.00	-15.69
2485.00	Average	44.18	-0.18	44.00	54.00	-10.00
2485.00	Peak	62.63	-0.18	62.45	74.00	-11.55

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PCB Antenna (Part No.: ANTX100P001B24553)

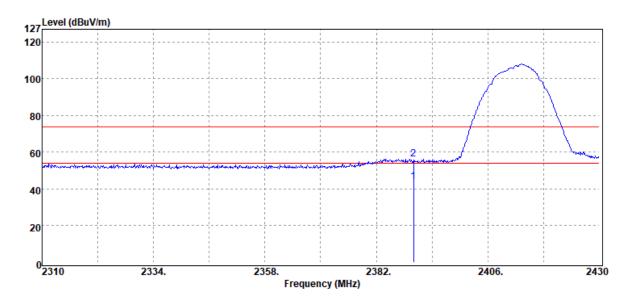
Report Number **Test Date** :2019-12-23 :ER/2019/B0064

Operation Mode :802.11b Temp./Humi. :22.6/62

Test Channel :2412 MHz Antenna Pol. :VERTICAL

Test Mode :Bandedge CH Low Engineer :Thomas

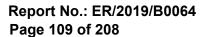
EUT Pol :E2 Plane



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	2390.00	Average	43.50	0.24	43.74	54.00	-10.26
	2390.00	Peak	56.14	0.24	56.38	74.00	-17.62

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Operation Mode :802.11b

Test Channel :2412 MHz

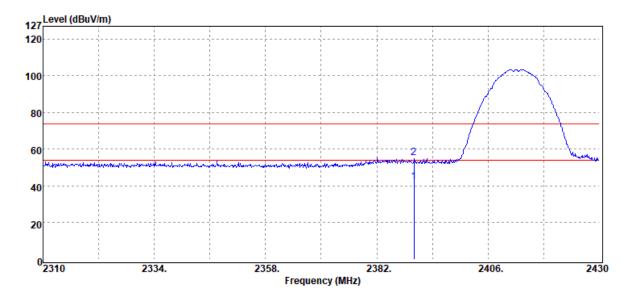
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:HORIZONTAL Antenna Pol.

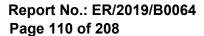
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	41.81	0.24	42.05	54.00	-11.95
2390.00	Peak	54.95	0.24	55.19	74.00	-18.81

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Operation Mode :802.11b

Test Channel :2462 MHz

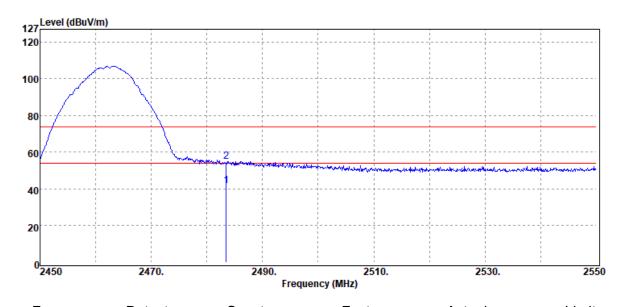
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:VERTICAL Antenna Pol.

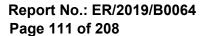
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
 MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	42.00	-0.17	41.83	54.00	-12.17
2483.50	Peak	55.31	-0.17	55.14	74.00	-18.86

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Operation Mode :802.11b

Test Channel :2462 MHz

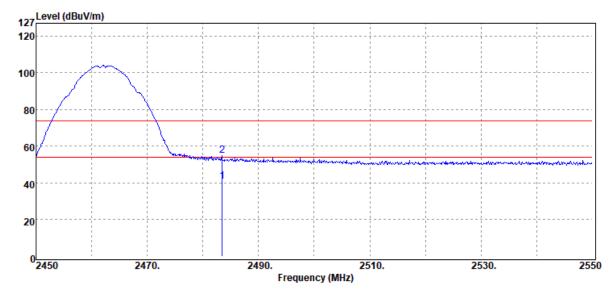
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:HORIZONTAL Antenna Pol.

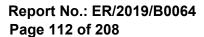
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	41.10	-0.17	40.93	54.00	-13.07
2483.50	Peak	55.10	-0.17	54.93	74.00	-19.07

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Operation Mode :802.11g

Test Channel :2412 MHz

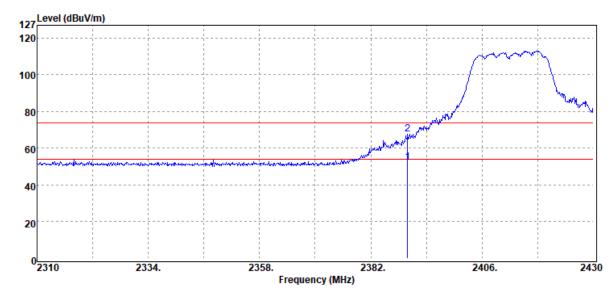
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:VERTICAL Antenna Pol.

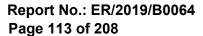
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	2389.92	Average	52.00	0.24	52.24	54.00	-1.76
	2389.92	Peak	67.30	0.24	67.54	74.00	-6.46

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Operation Mode :802.11g

Test Channel :2412 MHz

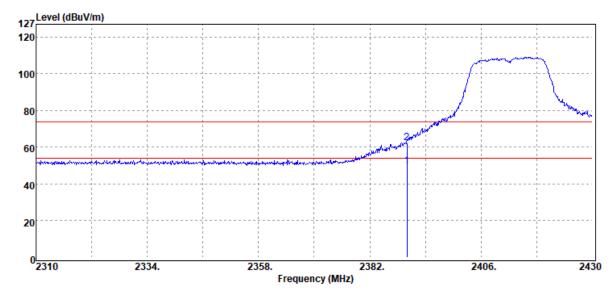
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:HORIZONTAL Antenna Pol.

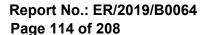
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2390.00	Average	49.51	0.24	49.75	54.00	-4.25
2390.00	Peak	62.28	0.24	62.52	74.00	-11.48

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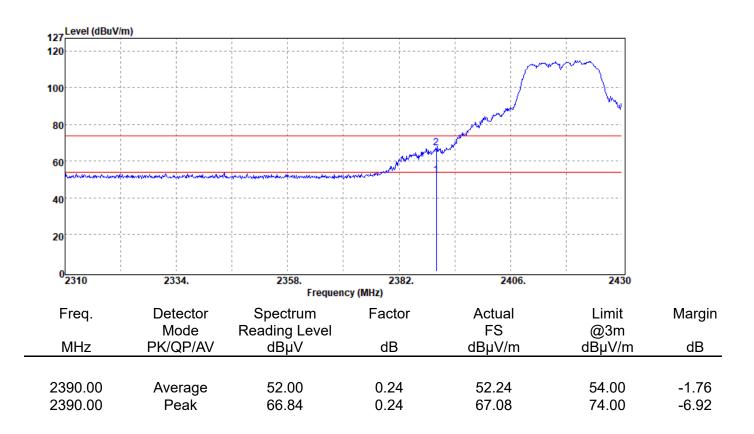


Operation Mode :802.11g Temp./Humi. :22.6/62

Test Channel :2417 MHz Antenna Pol. :VERTICAL

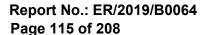
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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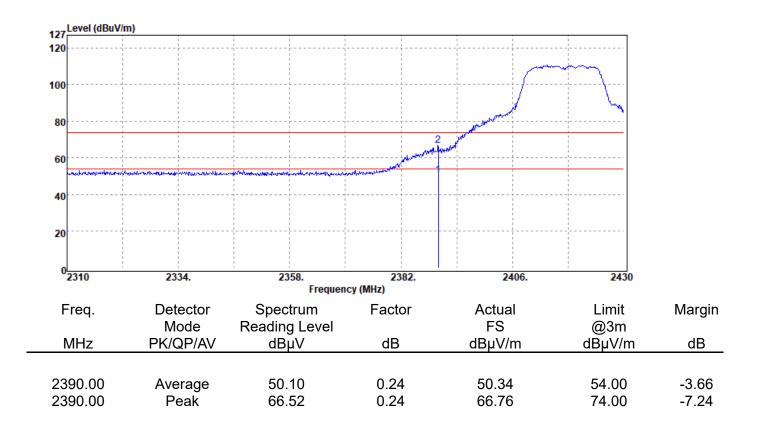


Operation Mode :802.11g Temp./Humi. :22.6/62

Test Channel :2417 MHz Antenna Pol. :HORIZONTAL

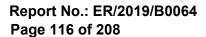
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11g

Test Channel :2457 MHz

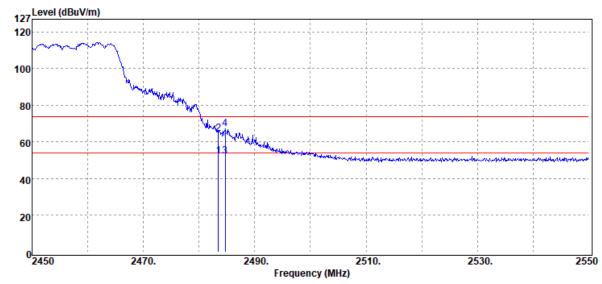
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:VERTICAL Antenna Pol.

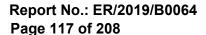
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2483.50	Average	52.30	-0.17	52.13	54.00	-1.87
2483.50	Peak	64.74	-0.17	64.57	74.00	-9.43
2484.70	Average	52.50	-0.18	52.32	54.00	-1.68
2484.70	Peak	67.44	-0.18	67.26	74.00	-6.74

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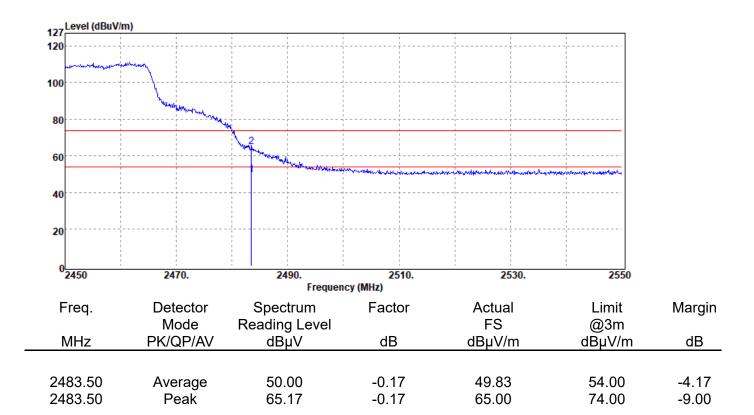


Operation Mode :802.11g Temp./Humi. :22.6/62

Test Channel :2457 MHz Antenna Pol. :HORIZONTAL

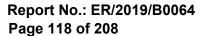
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11g

Test Channel :2462 MHz

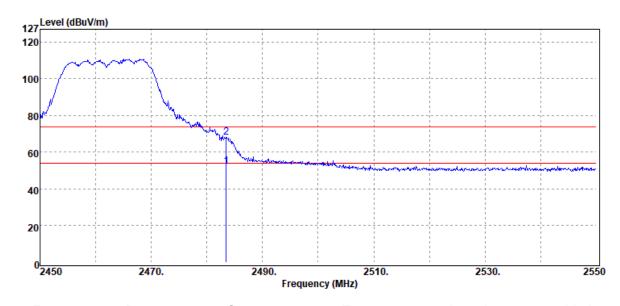
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:VERTICAL Antenna Pol.

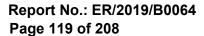
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
 MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
						_
2483.50	Average	52.31	-0.17	52.14	54.00	-1.86
2483.50	Peak	68.49	-0.17	68.32	74.00	-5.68

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Operation Mode :802.11g

Test Channel :2462 MHz

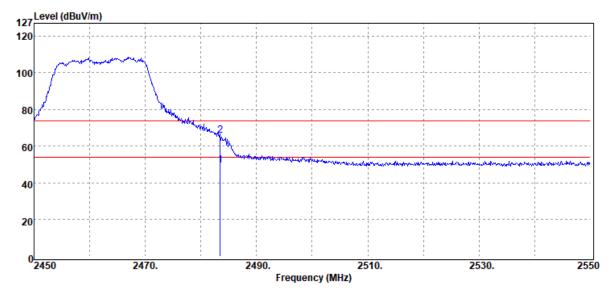
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:HORIZONTAL Antenna Pol.

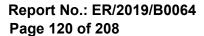
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	50.00	-0.17	49.83	54.00	-4.17
2483.50	Peak	65.96	-0.17	65.79	74.00	-8.21

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Operation Mode :802.11n20

Test Channel :2412 MHz

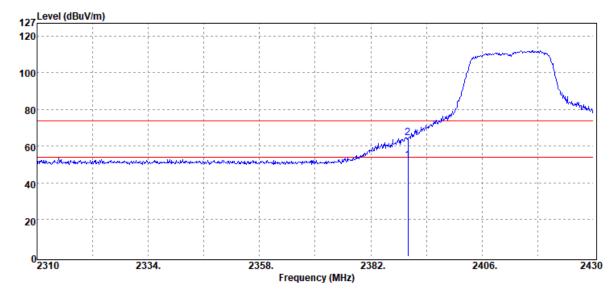
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:VERTICAL Antenna Pol.

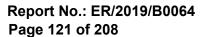
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	51.88	0.24	52.12	54.00	-1.88
2390.00	Peak	64.52	0.24	64.76	74.00	-9.24

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Operation Mode :802.11n20

Test Channel :2412 MHz

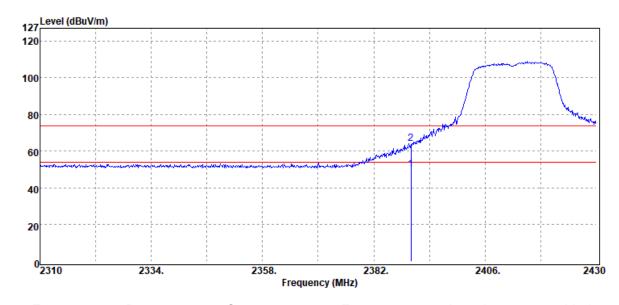
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-23

Temp./Humi. :22.6/62

:HORIZONTAL Antenna Pol.

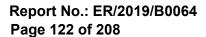
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	50.07	0.24	50.31	54.00	-3.69
2390.00	Peak	63.85	0.24	64.09	74.00	-9.91

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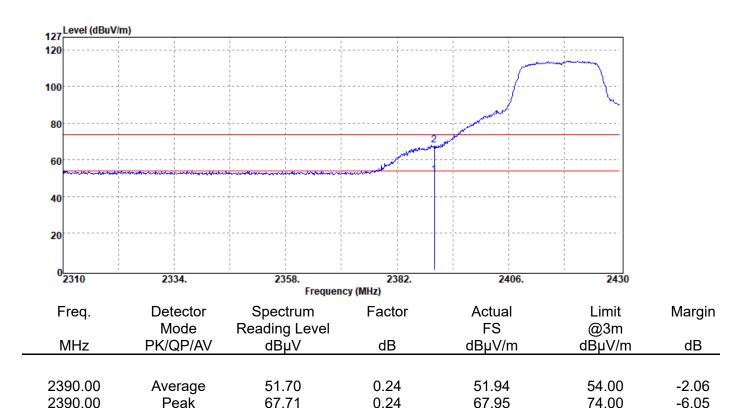


Operation Mode :802.11n20 Temp./Humi. :22.6/62

Test Channel :2417 MHz Antenna Pol. :VERTICAL

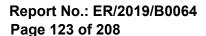
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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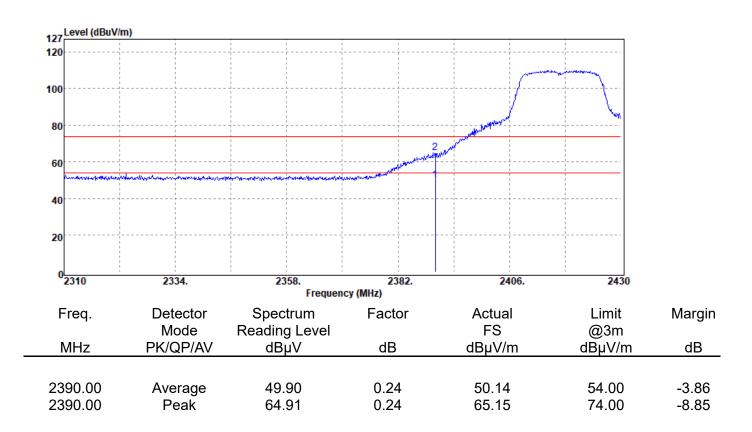


Operation Mode :802.11n20 Temp./Humi. :22.6/62

Test Channel :2417 MHz Antenna Pol. :HORIZONTAL

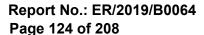
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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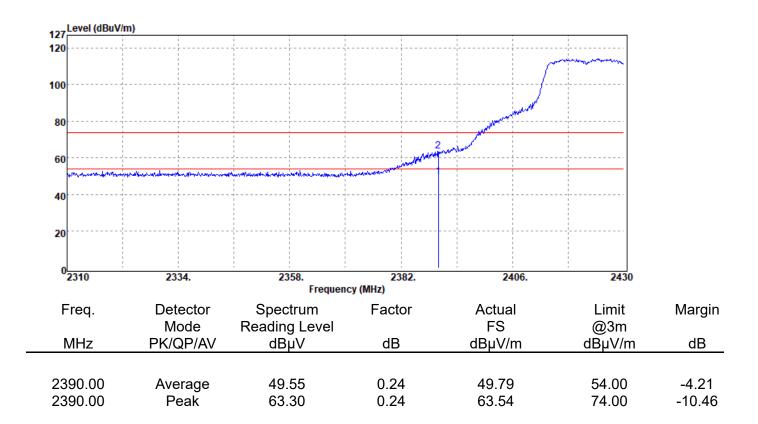


Operation Mode :802.11n20 Temp./Humi. :22.6/62

Test Channel :2422 MHz Antenna Pol. :VERTICAL

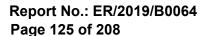
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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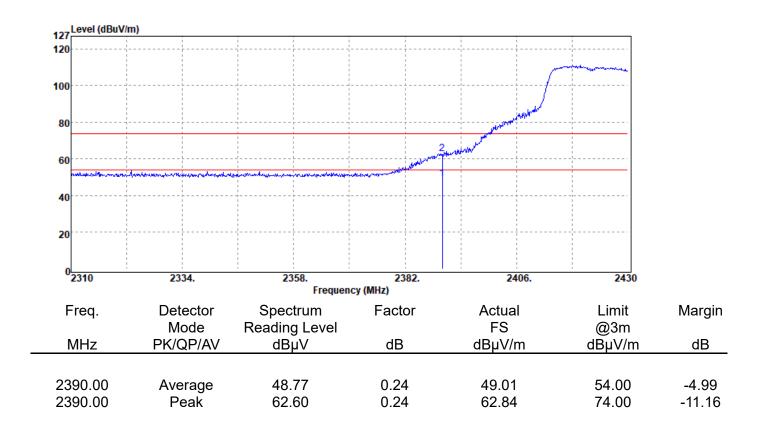


Operation Mode :802.11n20 Temp./Humi. :22.6/62

Test Channel :2422 MHz Antenna Pol. :HORIZONTAL

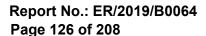
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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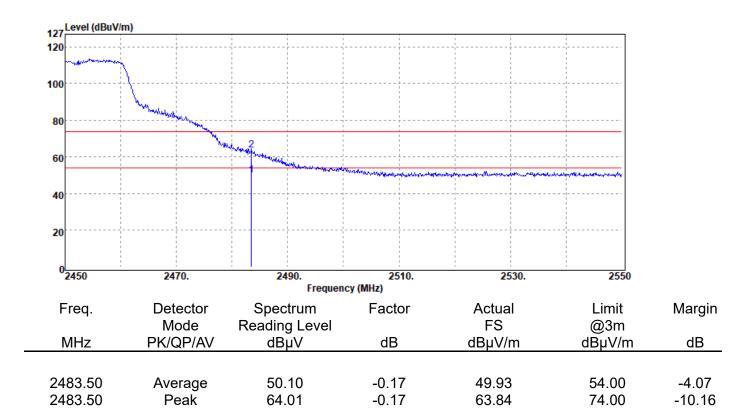


Operation Mode Temp./Humi. :802.11n20 :23/67

Test Channel :2452 MHz Antenna Pol. :VERTICAL

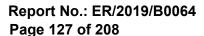
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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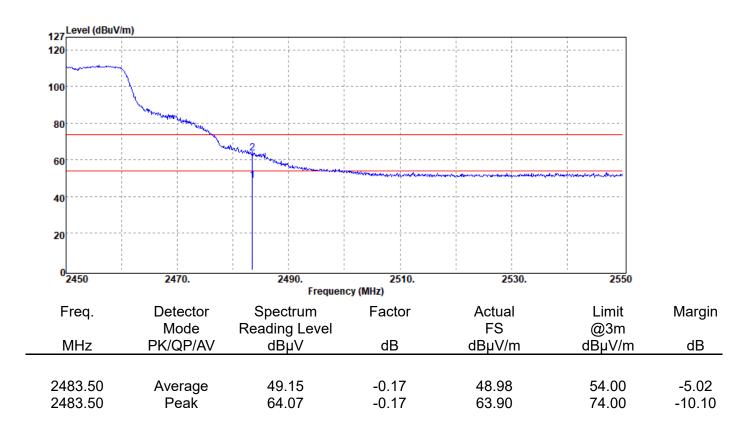


Operation Mode :802.11n20 Temp./Humi. :23/67

Test Channel :2452 MHz Antenna Pol. :HORIZONTAL

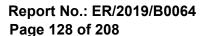
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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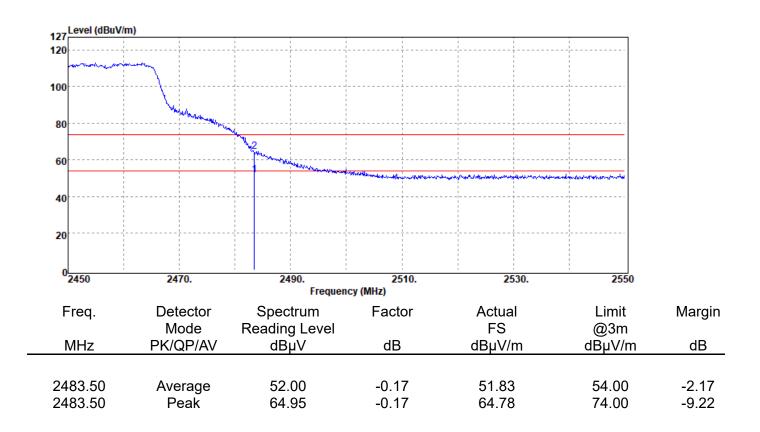


Operation Mode Temp./Humi. :802.11n20 :23/67

Test Channel :2457 MHz Antenna Pol. :VERTICAL

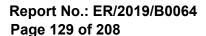
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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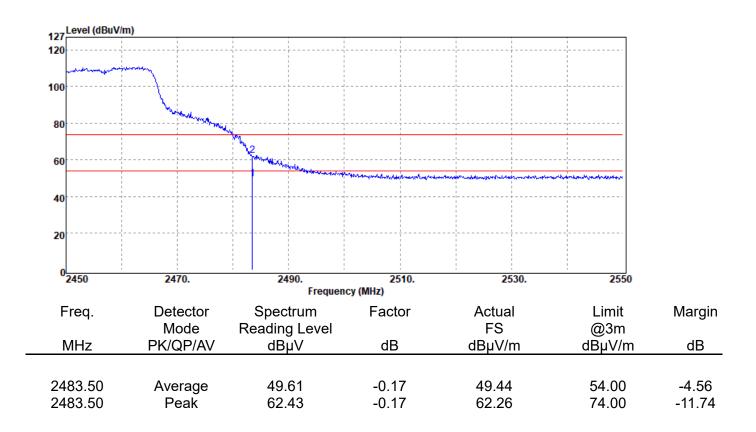


Operation Mode :802.11n20 Temp./Humi. :23/67

Test Channel :2457 MHz Antenna Pol. :HORIZONTAL

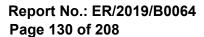
Test Mode :Bandedge CH High Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11n20

Test Channel :2462 MHz

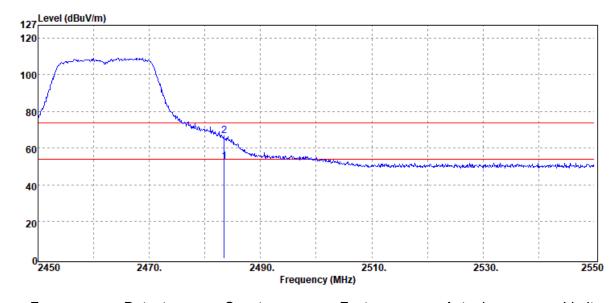
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :VERTICAL

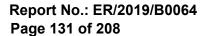
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	53.00	-0.17	52.83	54.00	-1.17
2483.50	Peak	67.14	-0.17	66.97	74.00	-7.03

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Operation Mode :802.11n20

Test Channel :2462 MHz

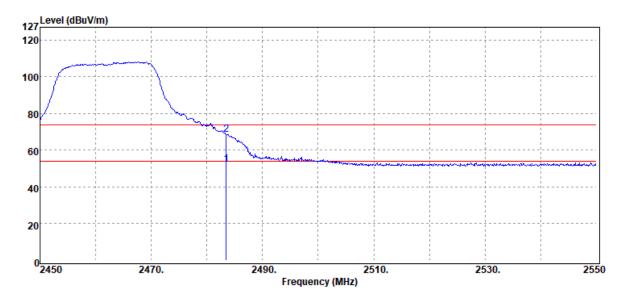
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :HORIZONTAL

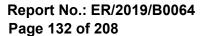
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.40	-0.17	52.23	54.00	-1.77
2483.50	Peak	68.88	-0.17	68.71	74.00	-5.29

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Operation Mode :802.11n40

Test Channel :2422 MHz

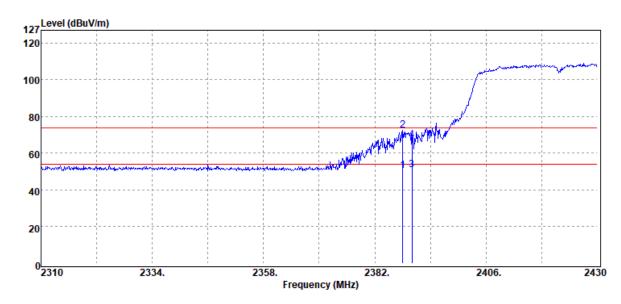
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

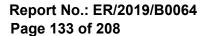
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2388.00	Average	50.43	0.25	50.68	54.00	-3.32
2388.00	Peak	72.29	0.25	72.54	74.00	-1.46
2390.00	Average	50.56	0.24	50.80	54.00	-3.20
2390.00	Peak	67.12	0.24	67.36	74.00	-6.64

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Operation Mode :802.11n40

Test Channel :2422 MHz

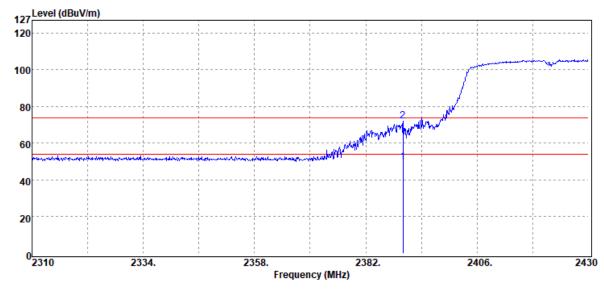
Test Mode :Bandedge CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :HORIZONTAL

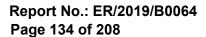
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2390.00	Average	49.35	0.24	49.59	54.00	-4.41
2390.00	Peak	71.62	0.24	71.86	74.00	-2.14

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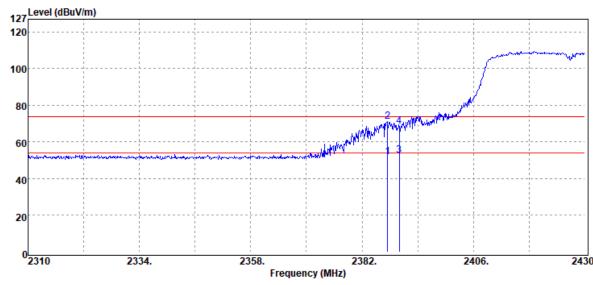


Operation Mode :802.11n40 Temp./Humi. :23/67

Test Channel :2427 MHz Antenna Pol. :VERTICAL

Test Mode :Bandedge CH Low Engineer :Thomas

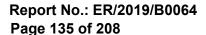
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2387.52	Average	51.70	0.25	51.95	54.00	-2.05
2387.52	Peak	71.05	0.25	71.30	74.00	-2.70
2390.04	Average	52.70	0.24	52.94	54.00	-1.06
2390.04	Peak	68.47	0.24	68.71	74.00	-5.29

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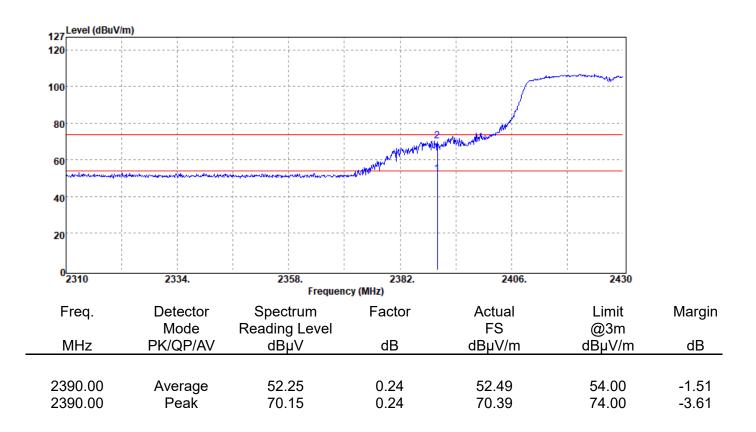


Operation Mode Temp./Humi. :23/67 :802.11n40

:HORIZONTAL **Test Channel** :2427 MHz Antenna Pol.

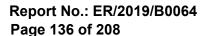
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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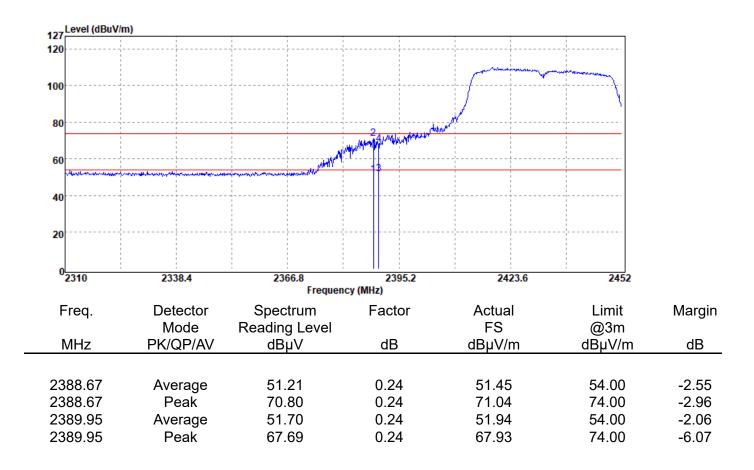


Operation Mode :802.11n40 Temp./Humi. :23/67

Test Channel :2432 MHz Antenna Pol. :VERTICAL

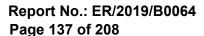
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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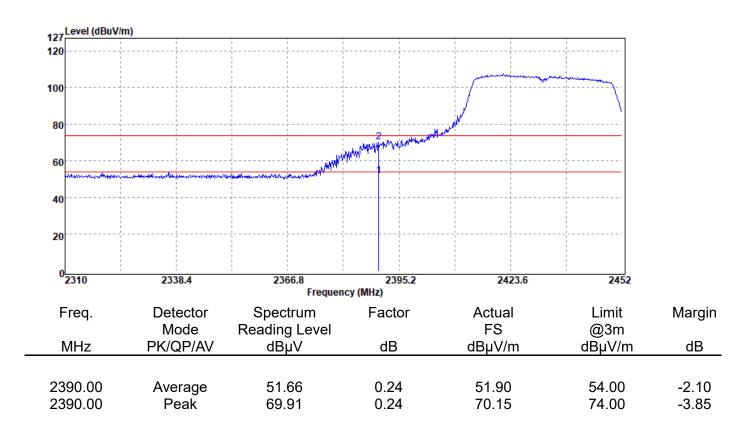


Operation Mode :802.11n40 Temp./Humi. :23/67

Test Channel :2432 MHz Antenna Pol. :HORIZONTAL

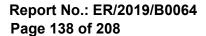
Test Mode :Bandedge CH Low Engineer :Thomas

EUT Pol :E2 Plane



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Operation Mode :802.11n40

Test Channel :2437 MHz

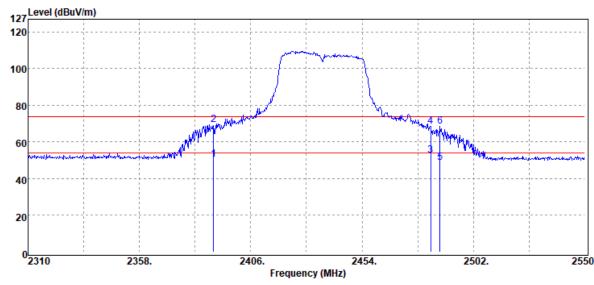
Test Mode :Bandedge CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :VERTICAL

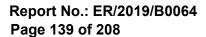
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	50.25	0.24	50.49	54.00	-3.51
2390.00	Peak	69.13	0.24	69.37	74.00	-4.63
2483.50	Average	53.10	-0.17	52.93	54.00	-1.07
2483.50	Peak	68.52	-0.17	68.35	74.00	-5.65
2487.60	Average	48.81	-0.20	48.61	54.00	-5.39
2487.60	Peak	68.83	-0.20	68.63	74.00	-5.37

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Operation Mode :802.11n40

Test Channel :2437 MHz

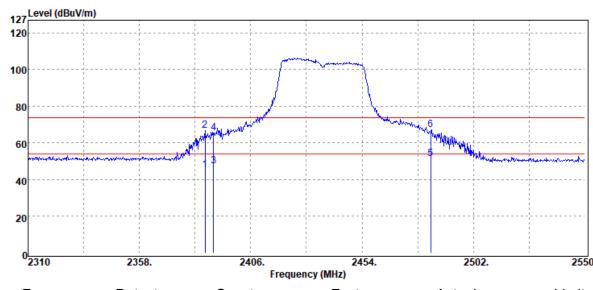
Test Mode :Bandedge CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

:HORIZONTAL Antenna Pol.

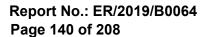
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2386.32	Average	45.13	0.25	45.38	54.00	-8.62
2386.32	Peak	66.63	0.25	66.88	74.00	-7.12
2390.00	Average	47.41	0.24	47.65	54.00	-6.35
2390.00	Peak	65.38	0.24	65.62	74.00	-8.38
2483.50	Average	51.75	-0.17	51.58	54.00	-2.42
2483.50	Peak	67.56	-0.17	67.39	74.00	-6.61

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Operation Mode :802.11n40

Test Channel :2442 MHz

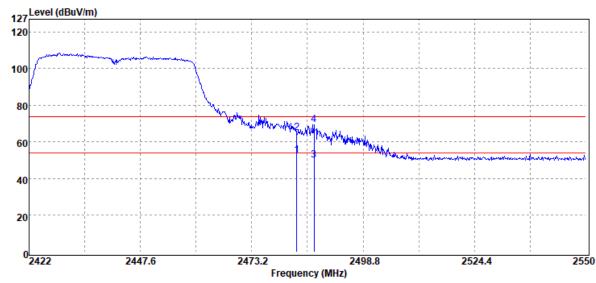
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :VERTICAL

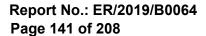
Engineer :Thomas



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.90	-0.17	52.73	54.00	-1.27
2483.50	Peak	65.11	-0.17	64.94	74.00	-9.06
2487.54 2487.54	Average Peak	50.33 69.75	-0.20 -0.20	50.13 69.55	54.00 74.00	-3.87 -4.45

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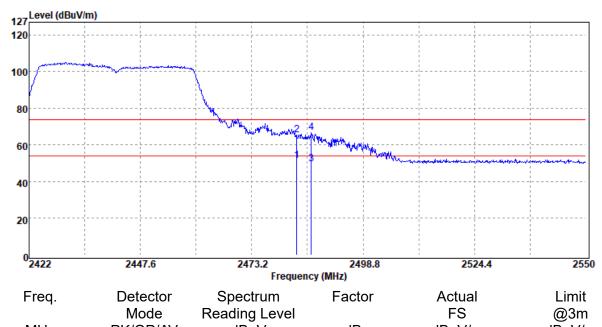


Operation Mode Temp./Humi. :23/67 :802.11n40

Test Channel :HORIZONTAL :2442 MHz Antenna Pol.

Test Mode :Bandedge CH High Engineer :Thomas

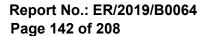
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2483.50	Average	51.66	-0.17	51.49	54.00	-2.51
2483.50	Peak	65.58	-0.17	65.41	74.00	-8.59
2486.90	Average	49.71	-0.19	49.52	54.00	-4.48
2486.90	Peak	67.01	-0.19	66.82	74.00	-7.18

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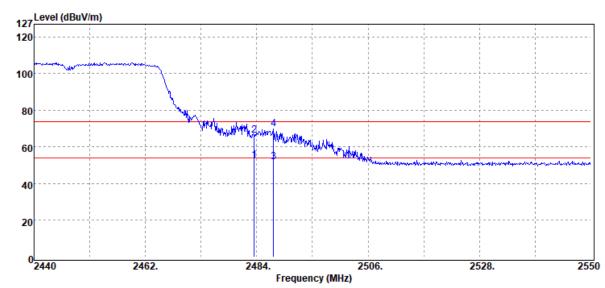


Operation Mode :23/67 :802.11n40 Temp./Humi.

Test Channel :2447 MHz Antenna Pol. :VERTICAL

Test Mode :Bandedge CH High Engineer :Thomas

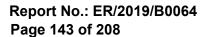
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	53.07	-0.17	52.90	54.00	-1.10
2483.50	Peak	66.40	-0.17	66.23	74.00	-7.77
2487.30	Average	52.14	-0.19	51.95	54.00	-2.05
2487.30	Peak	69.92	-0.19	69.73	74.00	-4.27

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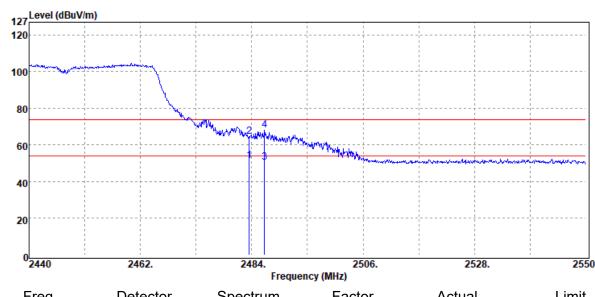


Operation Mode Temp./Humi. :23/67 :802.11n40

Test Channel :HORIZONTAL :2447 MHz Antenna Pol.

Test Mode :Bandedge CH High Engineer :Thomas

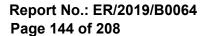
EUT Pol :E2 Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2483.50	Average	51.63	-0.17	51.46	54.00	-2.54
2483.50	Peak	64.82	-0.17	64.65	74.00	-9.35
2486.53	Average	50.70	-0.19	50.51	54.00	-3.49
2486.53	Peak	68.41	-0.19	68.22	74.00	-5.78

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Operation Mode :802.11n40

Test Channel :2452 MHz

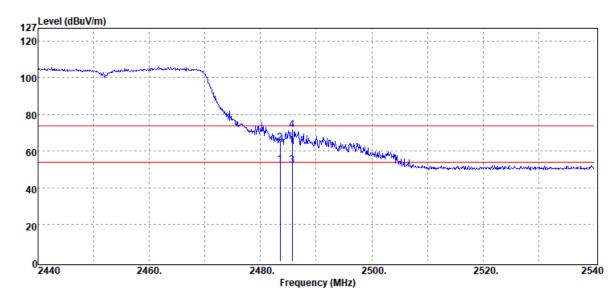
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

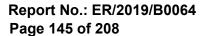
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2483.50	Average	52.90	-0.17	52.73	54.00	-1.27
2483.50	Peak	64.73	-0.17	64.56	74.00	-9.44
2485.70	Average	52.42	-0.18	52.24	54.00	-1.76
2485.70	Peak	71.68	-0.18	71.50	74.00	-2.50

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Operation Mode :802.11n40

Test Channel :2452 MHz

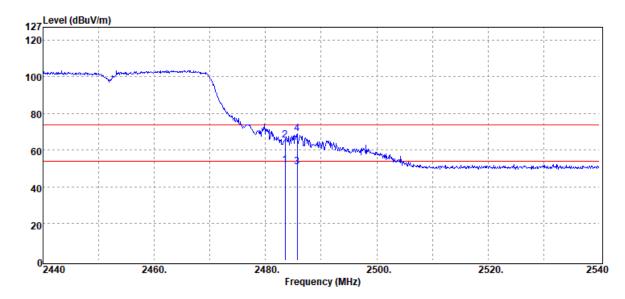
Test Mode :Bandedge CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

Temp./Humi. :23/67

Antenna Pol. :HORIZONTAL

Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.10	-0.17	51.93	54.00	-2.07
2483.50	Peak	65.65	-0.17	65.48	74.00	-8.52
2485.70	Average	51.18	-0.18	51.00	54.00	-3.00
2485.70	Peak	68.97	-0.18	68.79	74.00	-5.21

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11.7.2 Below 1GHz Worst-Case Emission:

Dipole Antenna (Part No.: GW.48.A151)

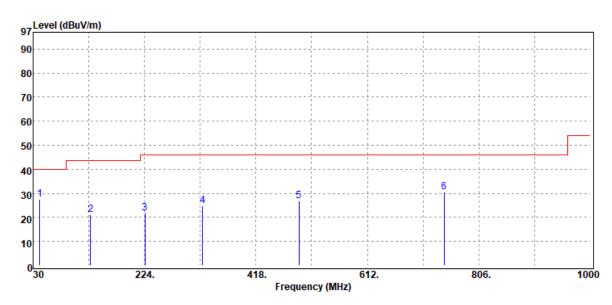
Report Number **Test Date** :2020-02-04 :ER/2019/B0064

Operation Mode :802.11g Temp./Humi. :20.2/65

Test Channel :2437 MHz Antenna Pol. :VERTICAL

Test Mode :Tx CH Mid Engineer :Thomas

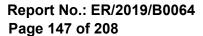
EUT Pol :E2 Plane



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
41.64	Peak	35.67	-8.07	27.60	40.00	-12.40
129.91	Peak	30.09	-9.00	21.09	43.50	-22.41
224.97	Peak	30.83	-8.90	21.93	46.00	-24.07
324.88	Peak	30.20	-5.29	24.91	46.00	-21.09
492.69	Peak	29.24	-2.45	26.79	46.00	-19.21
745.86	Peak	28.14	2.46	30.60	46.00	-15.40

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Operation Mode :802.11g

Test Channel :2437 MHz

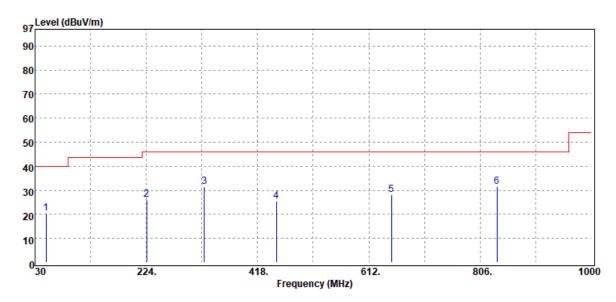
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2020-02-04

Temp./Humi. :20.2/65

:HORIZONTAL Antenna Pol.

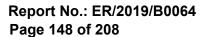
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
49.40	Peak	28.26	-7.66	20.60	40.00	-19.40
224.97	Peak	35.24	-8.90	26.34	46.00	-19.66
324.88	Peak	36.96	-5.29	31.67	46.00	-14.33
450.98	Peak	28.66	-3.27	25.39	46.00	-20.61
651.77	Peak	27.94	0.20	28.14	46.00	-17.86
835.10	Peak	27.33	4.17	31.50	46.00	-14.50

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Operation Mode :802.11n40

Test Channel :2437 MHz

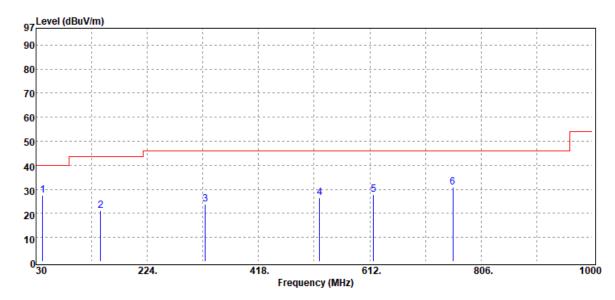
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2020-02-04

:20.2/65 Temp./Humi.

:VERTICAL Antenna Pol.

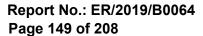
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
41.64	Peak	35.74	-8.07	27.67	40.00	-12.33
142.52	Peak	28.62	-7.42	21.20	43.50	-22.30
324.88	Peak	29.13	-5.29	23.84	46.00	-22.16
524.70	Peak	28.44	-2.08	26.36	46.00	-19.64
618.79	Peak	28.47	-0.61	27.86	46.00	-18.14
756.53	Peak	27.89	2.90	30.79	46.00	-15.21

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Operation Mode :802.11n40

Test Channel :2437 MHz

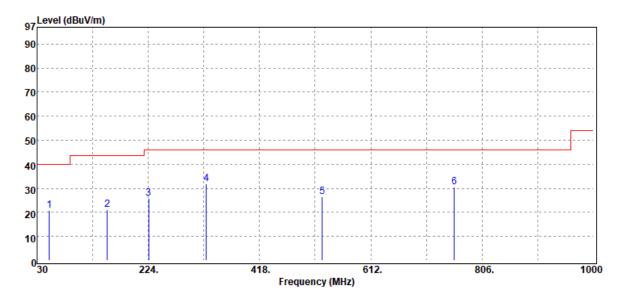
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2020-02-04

:20.2/65 Temp./Humi.

:HORIZONTAL Antenna Pol.

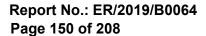
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
51.34	Peak	28.38	-7.63	20.75	40.00	-19.25
152.22	Peak	28.08	-7.00	21.08	43.50	-22.42
224.97	Peak	34.89	-8.90	25.99	46.00	-20.01
324.88	Peak	37.16	-5.29	31.87	46.00	-14.13
527.61	Peak	28.48	-2.09	26.39	46.00	-19.61
757.50	Peak	27.66	2.93	30.59	46.00	-15.41

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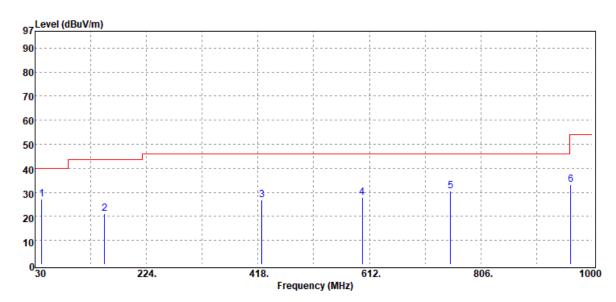


PCB Antenna (Part No.: ANTX100P001B24553)

Report Number **Test Date** :2020-02-04 :ER/2019/B0064

Operation Mode :802.11g Temp./Humi. :20.2/65 **Test Channel** :2437 MHz Antenna Pol. :VERTICAL **Test Mode** :Tx CH Mid Engineer :Thomas

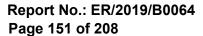
EUT Pol :E2 Plane



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
 MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
41.64	Peak	35.33	-8.07	27.26	40.00	-12.74
151.25	Peak	28.12	-6.99	21.13	43.50	-22.37
424.79	Peak	30.70	-3.82	26.88	46.00	-19.12
599.39	Peak	28.03	-0.15	27.88	46.00	-18.12
753.62	Peak	27.73	2.82	30.55	46.00	-15.45
962.17	Peak	28.12	5.17	33.29	54.00	-20.71

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Operation Mode :802.11g

Test Channel :2437 MHz

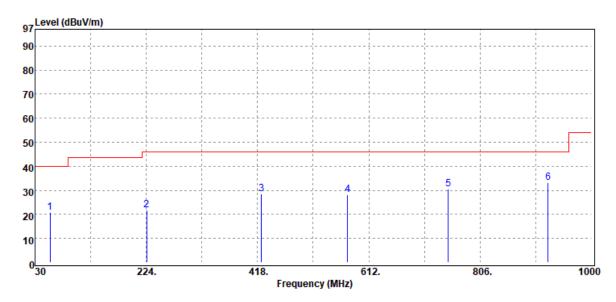
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2020-02-04

Temp./Humi. :20.2/65

:HORIZONTAL Antenna Pol.

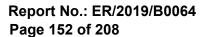
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
56.19	Peak	28.64	-7.97	20.67	40.00	-19.33
224.97	Peak	30.79	-8.90	21.89	46.00	-24.11
424.79	Peak	32.39	-3.82	28.57	46.00	-17.43
575.14	Peak	29.39	-1.19	28.20	46.00	-17.80
750.71	Peak	27.65	2.78	30.43	46.00	-15.57
924.34	Peak	28.20	5.10	33.30	46.00	-12.70

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Operation Mode :802.11n40

Test Channel :2437 MHz

Test Mode :Tx CH Mid

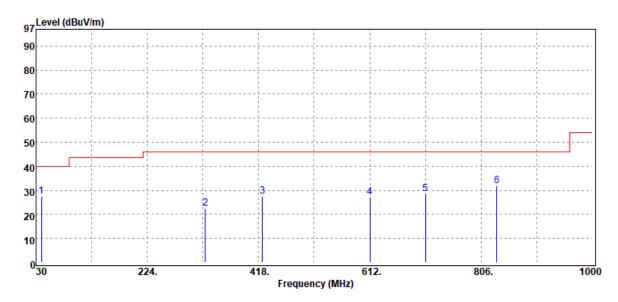
EUT Pol :E2 Plane



:20.2/65 Temp./Humi.

:VERTICAL Antenna Pol.

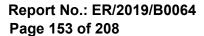
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
39.70	Peak	35.81	-8.31	27.50	40.00	-12.50
324.88	Peak	27.80	-5.29	22.51	46.00	-23.49
424.79	Peak	31.19	-3.82	27.37	46.00	-18.63
612.00	Peak	27.64	-0.34	27.30	46.00	-18.70
709.00	Peak	27.90	0.62	28.52	46.00	-17.48
833.16	Peak	27.82	4.10	31.92	46.00	-14.08

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Operation Mode :802.11n40

Test Channel :2437 MHz

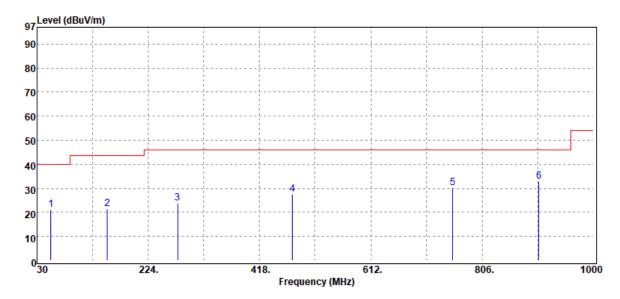
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2020-02-04

Temp./Humi. :20.2/65

:HORIZONTAL Antenna Pol.

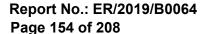
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dΒμV/m	dB
54.25	Peak	28.91	-7.83	21.08	40.00	-18.92
152.22	Peak	28.60	-7.00	21.60	43.50	-21.90
275.41	Peak	30.51	-6.58	23.93	46.00	-22.07
475.23	Peak	30.30	-2.72	27.58	46.00	-18.42
754.59	Peak	27.43	2.84	30.27	46.00	-15.73
904.94	Peak	27.36	5.38	32.74	46.00	-13.26

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11.7.3 Above 1GHz Emission:

Dipole Antenna (Part No.: GW.48.A151)

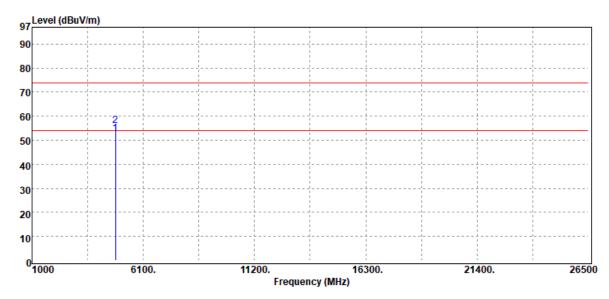
Report Number **Test Date** :2019-12-18 :ER/2019/B0064

Operation Mode :802.11b Temp./Humi. :21.1/62

Test Channel :2412 MHz Antenna Pol. :VERTICAL

Test Mode :Tx CH Low Engineer :Thomas

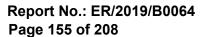
EUT Pol :E2 Plane



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	46.19	6.53	52.72	54.00	-1.28
4824.00	Peak	49.39	6.53	55.92	74.00	-18.08

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Operation Mode :802.11b

Test Channel :2412 MHz

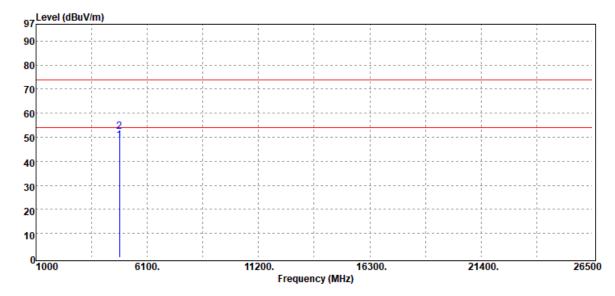
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

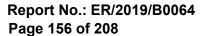
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	41.99	6.53	48.52	54.00	-5.48
4824.00	Peak	45.99	6.53	52.52	74.00	-21.48

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Operation Mode :802.11b

Test Channel :2437 MHz

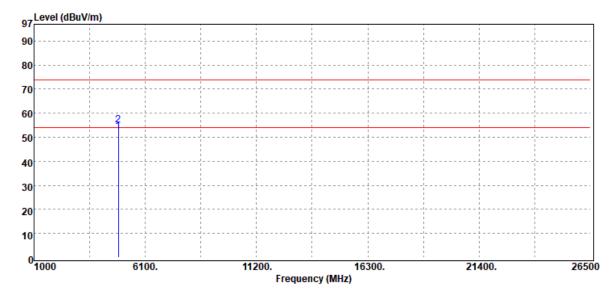
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

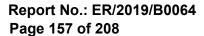
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4	874.00	Average	45.74	6.69	52.43	54.00	-1.57
4	874.00	Peak	48.44	6.69	55.13	74.00	-18.87

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Operation Mode :802.11b

Test Channel :2437 MHz

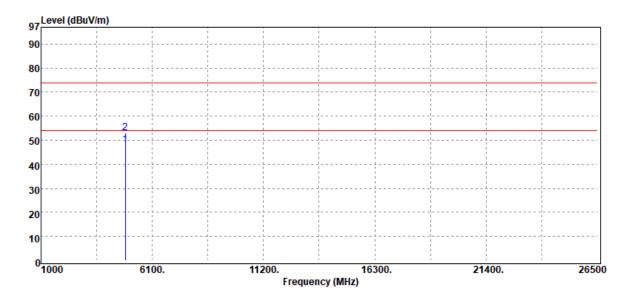
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

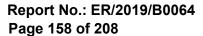
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	4874.00	Average	41.27	6.69	47.96	54.00	-6.04
	4874.00	Peak	46.17	6.69	52.86	74.00	-21.14

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Operation Mode :802.11b

Test Channel :2462 MHz

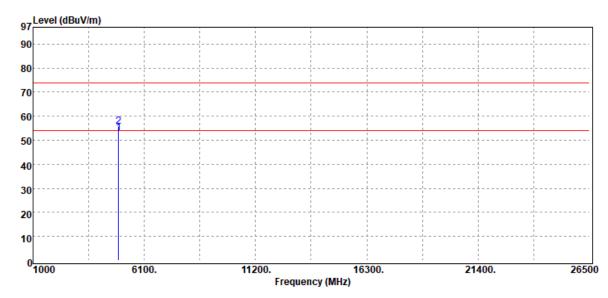
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

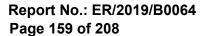
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	46.13	6.85	52.98	54.00	-1.02
4924.00	Peak	48.81	6.85	55.66	74.00	-18.34

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Operation Mode :802.11b

Test Channel :2462 MHz

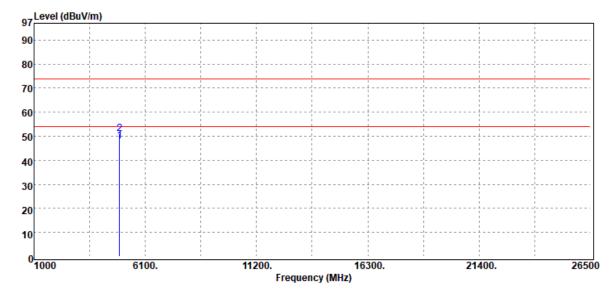
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

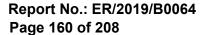
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	41.01	6.85	47.86	54.00	-6.14
4924.00	Peak	44.32	6.85	51.17	74.00	-22.83

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Operation Mode :802.11g

Test Channel :2412 MHz

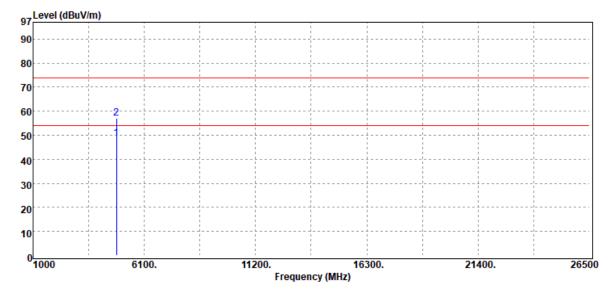
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

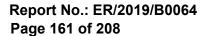
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	41.99	6.53	48.52	54.00	-5.48
4824.00	Peak	50.43	6.53	56.96	74.00	-17.04

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Operation Mode :802.11g

Test Channel :2412 MHz

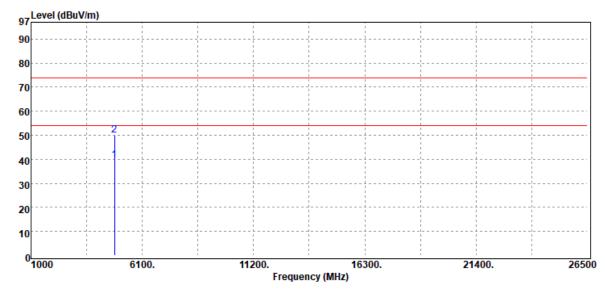
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

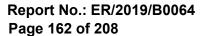
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	32.99	6.53	39.52	54.00	-14.48
4824.00	Peak	43.37	6.53	49.90	74.00	-24.10

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Operation Mode :802.11g

Test Channel :2437 MHz

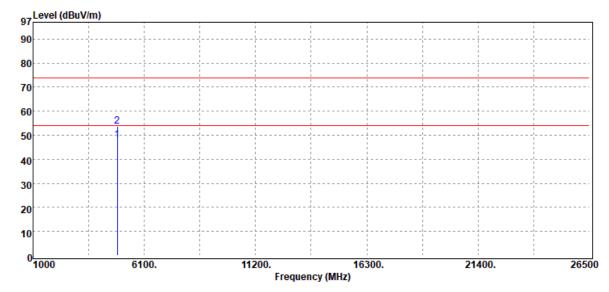
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

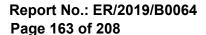
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.21	6.69	47.90	54.00	-6.10
4874.00	Peak	46.95	6.69	53.64	74.00	-20.36

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Operation Mode :802.11g

Test Channel :2437 MHz

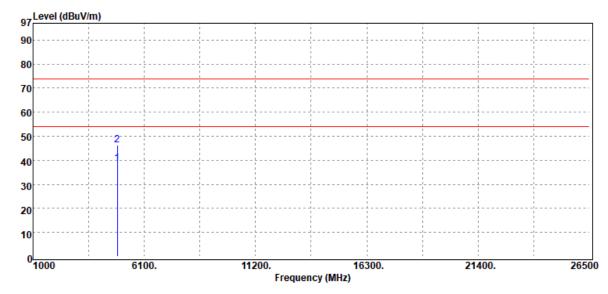
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

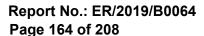
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	31.99	6.69	38.68	54.00	-15.32
4874.00	Peak	39.74	6.69	46.43	74.00	-27.57

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Operation Mode :802.11g

Test Channel :2462 MHz

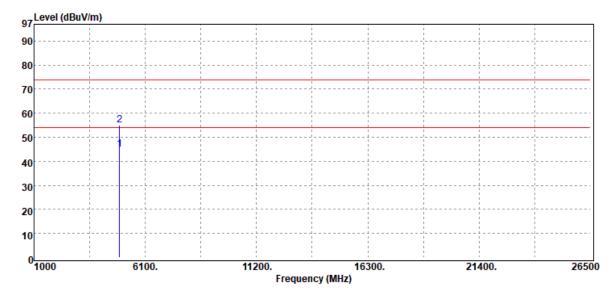
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

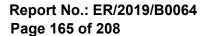
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	38.02	6.85	44.87	54.00	-9.13
4924.00	Peak	48.13	6.85	54.98	74.00	-19.02

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Operation Mode :802.11g

Test Channel :2462 MHz

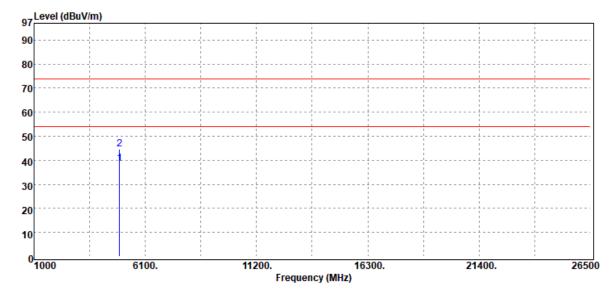
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

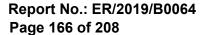
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
4924.00	Average	31.77	6.85	38.62	54.00	-15.38
4924.00	Peak	37.87	6.85	44.72	74.00	-29.28

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Operation Mode :802.11n20

Test Channel :2412 MHz

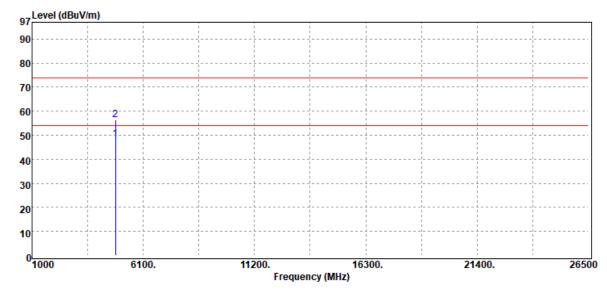
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

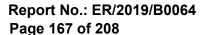
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	41.76	6.53	48.29	54.00	-5.71
4824.00	Peak	49.99	6.53	56.52	74.00	-17.48

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Operation Mode :802.11n20

Test Channel :2412 MHz

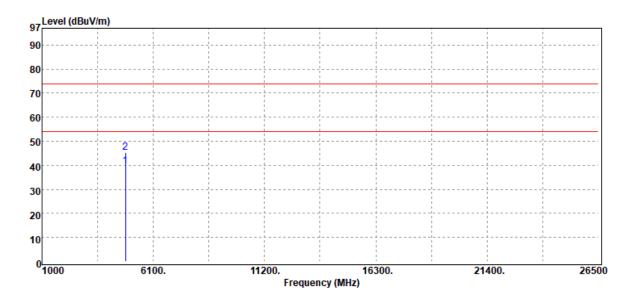
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

Antenna Pol. :HORIZONTAL

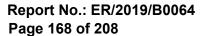
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	33.08	6.53	39.61	54.00	-14.39
4824.00	Peak	38.65	6.53	45.18	74.00	-28.82

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Operation Mode :802.11n20

Test Channel :2437 MHz

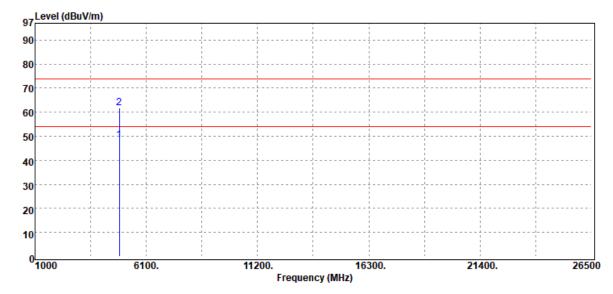
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

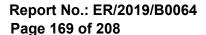
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.76	6.69	48.45	54.00	-5.55
4874.00	Peak	55.01	6.69	61.70	74.00	-12.30

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Operation Mode :802.11n20

Test Channel :2437 MHz

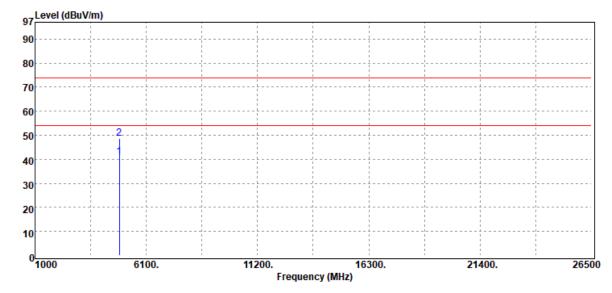
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

Antenna Pol. :HORIZONTAL

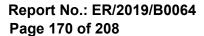
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	34.26	6.69	40.95	54.00	-13.05
4874.00	Peak	42.12	6.69	48.81	74.00	-25.19

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Operation Mode :802.11n20

Test Channel :2462 MHz

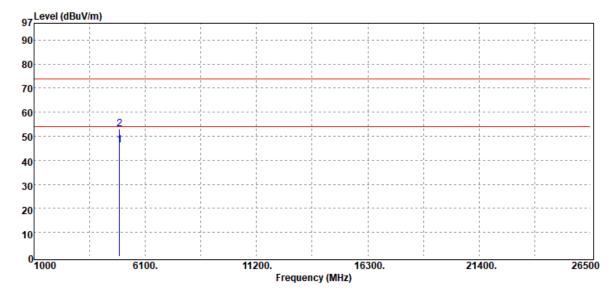
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

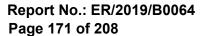
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	39.57	6.85	46.42	54.00	-7.58
4924.00	Peak	46.19	6.85	53.04	74.00	-20.96

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Operation Mode :802.11n20

Test Channel :2462 MHz

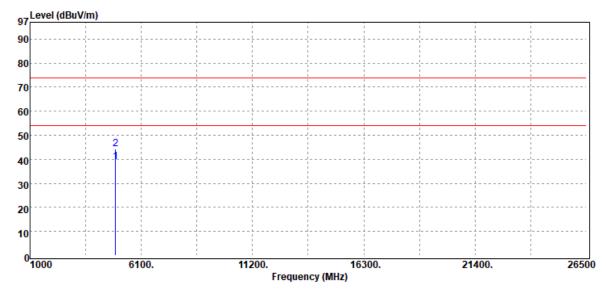
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

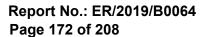
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	32.19	6.85	39.04	54.00	-14.96
4924.00	Peak	37.33	6.85	44.18	74.00	-29.82

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Operation Mode :802.11n40

Test Channel :2422 MHz

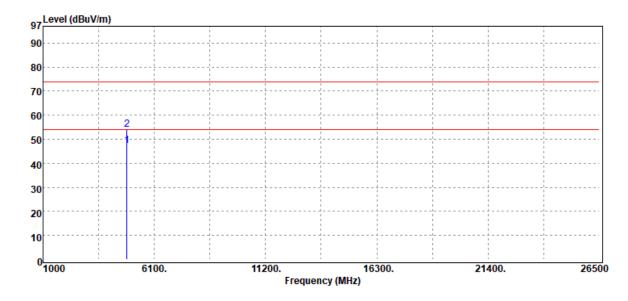
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

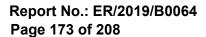
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	4844.00	Average	40.82	6.60	47.42	54.00	-6.58
	4844.00	Peak	47.28	6.60	53.88	74.00	-20.12

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Operation Mode :802.11n40

Test Channel :2422 MHz

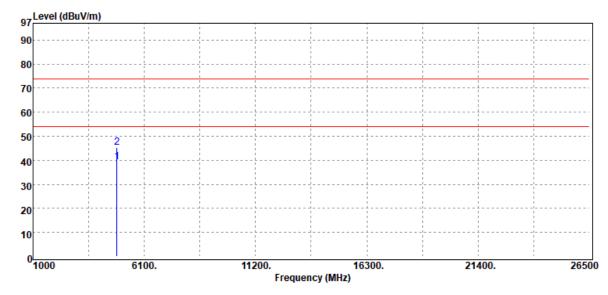
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

Antenna Pol. :HORIZONTAL

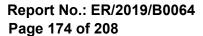
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4844.00	Average	32.51	6.60	39.11	54.00	-14.89
4844.00	Peak	38.59	6.60	45.19	74.00	-28.81

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Operation Mode :802.11n40

Test Channel :2437 MHz

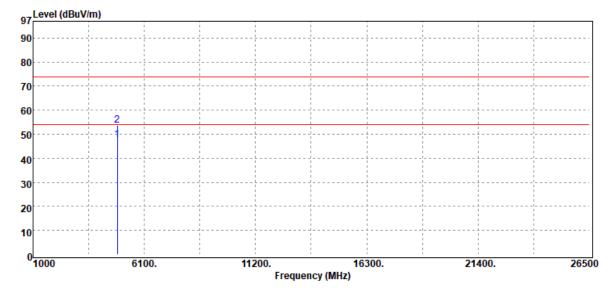
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

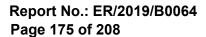
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.08	6.69	47.77	54.00	-6.23
4874.00	Peak	46.93	6.69	53.62	74.00	-20.38

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Operation Mode :802.11n40

Test Channel :2437 MHz

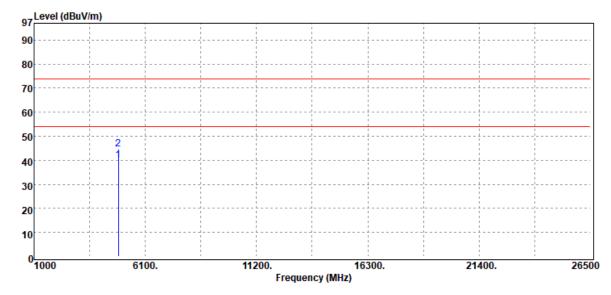
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

Antenna Pol. :HORIZONTAL

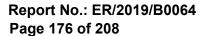
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	33.18	6.69	39.87	54.00	-14.13
4874.00	Peak	38.09	6.69	44.78	74.00	-29.22

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Operation Mode :802.11n40

Test Channel :2452 MHz

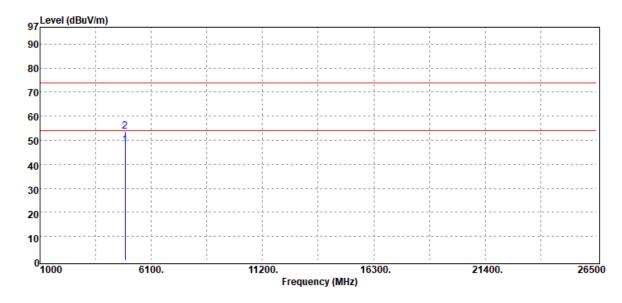
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:VERTICAL Antenna Pol.

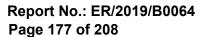
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	4904.00	Average	41.28	6.78	48.06	54.00	-5.94
	4904.00	Peak	46.77	6.78	53.55	74.00	-20.45

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Operation Mode :802.11n40

Test Channel :2452 MHz

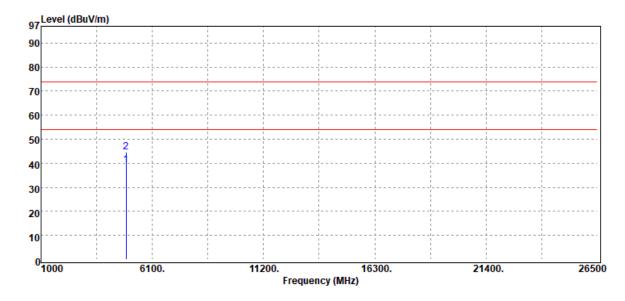
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-18

:21.1/62 Temp./Humi.

:HORIZONTAL Antenna Pol.

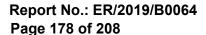
Engineer :Thomas



Freq	. Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Leve	I	FS	@3m	
MHz	PK/QP/AV	⁄ dBμV	dB	dBµV/m	dBµV/m	dB
4904.	00 Average	32.43	6.78	39.21	54.00	-14.79
4904.	00 Peak	37.86	6.78	44.64	74.00	-29.36

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PCB Antenna (Part No.: ANTX100P001B24553)

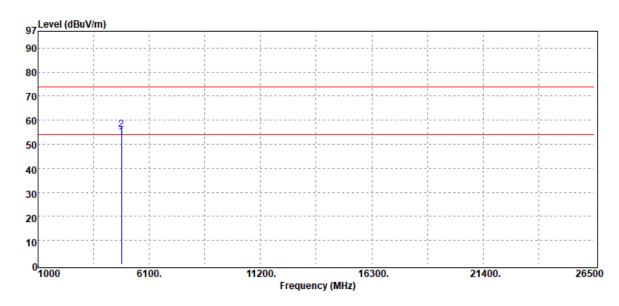
Report Number **Test Date** :2019-12-24 :ER/2019/B0064

Operation Mode :802.11b Temp./Humi. :23/67

Test Channel :2412 MHz Antenna Pol. :VERTICAL

Test Mode :Tx CH Low Engineer :Thomas

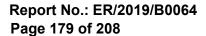
EUT Pol :E2 Plane



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	46.41	6.53	52.94	54.00	-1.06
4824.00	Peak	49.42	6.53	55.95	74.00	-18.05

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Operation Mode :802.11b

Test Channel :2412 MHz

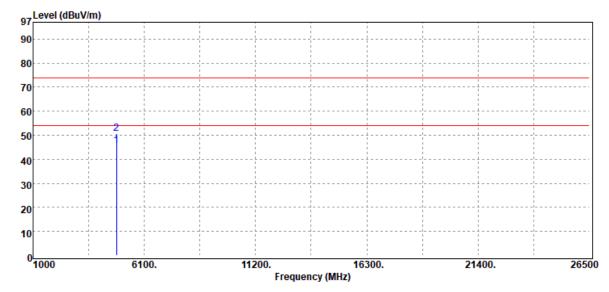
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

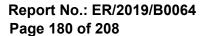
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	39.24	6.53	45.77	54.00	-8.23
4824.00	Peak	43.99	6.53	50.52	74.00	-23.48

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Operation Mode :802.11b

Test Channel :2437 MHz

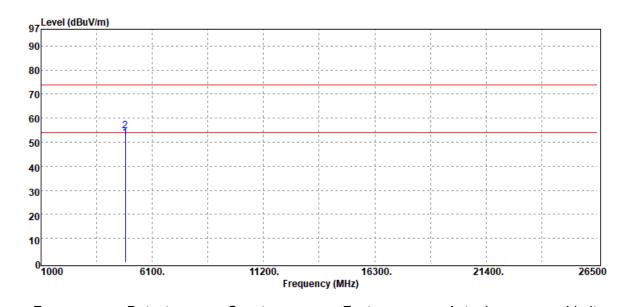
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

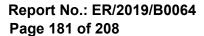
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margın
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	45.09	6.69	51.78	54.00	-2.22
4874.00	Peak	48.09	6.69	54.78	74.00	-19.22

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Operation Mode :802.11b

Test Channel :2437 MHz

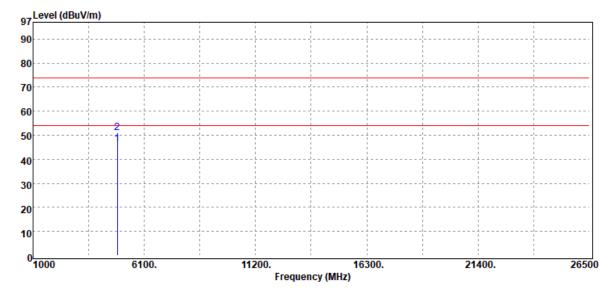
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

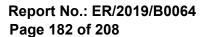
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	39.49	6.69	46.18	54.00	-7.82
4874.00	Peak	44.19	6.69	50.88	74.00	-23.12

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Operation Mode :802.11b

Test Channel :2462 MHz

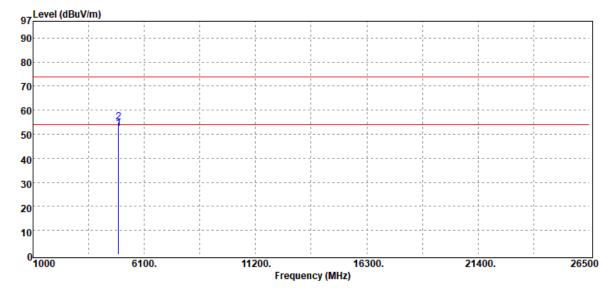
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

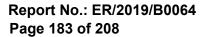
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	45.61	6.85	52.46	54.00	-1.54
4924.00	Peak	48.21	6.85	55.06	74.00	-18.94

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Operation Mode :802.11b

Test Channel :2462 MHz

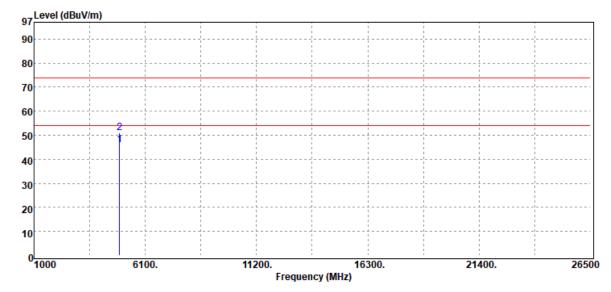
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

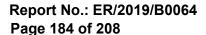
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	39.11	6.85	45.96	54.00	-8.04
4924.00	Peak	44.18	6.85	51.03	74.00	-22.97

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Operation Mode :802.11g

Test Channel :2412 MHz

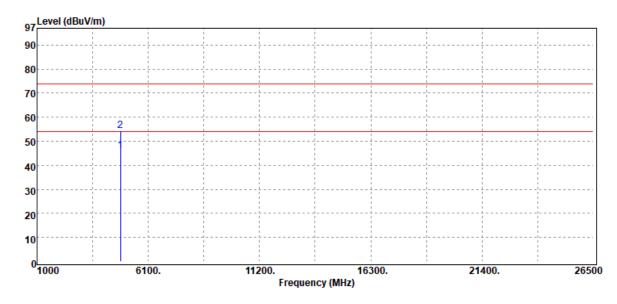
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

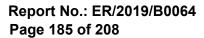
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	39.32	6.53	45.85	54.00	-8.15
4824.00	Peak	47.83	6.53	54.36	74.00	-19.64

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Operation Mode :802.11g

Test Channel :2412 MHz

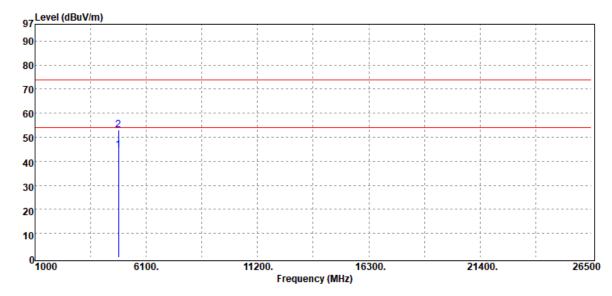
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

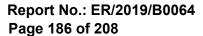
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	37.99	6.53	44.52	54.00	-9.48
4824.00	Peak	46.36	6.53	52.89	74.00	-21.11

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Operation Mode :802.11g

Test Channel :2437 MHz

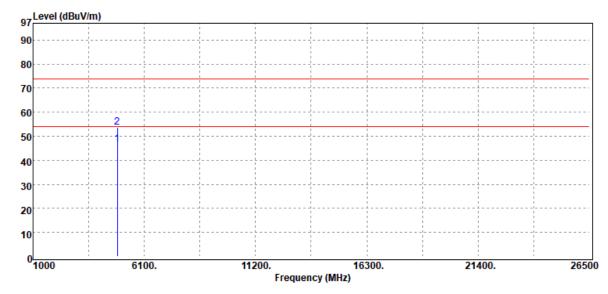
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

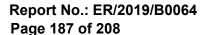
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	40.09	6.69	46.78	54.00	-7.22
4874.00	Peak	47.02	6.69	53.71	74.00	-20.29

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Operation Mode :802.11g

Test Channel :2437 MHz

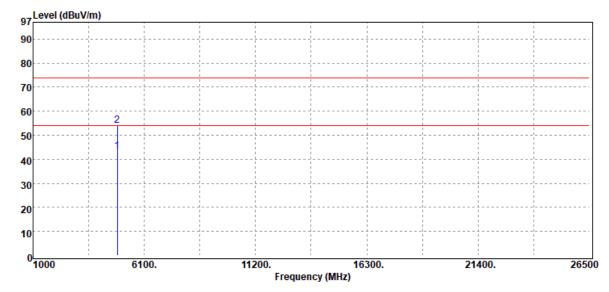
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

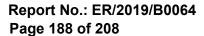
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
4874.00	Average	36.47	6.69	43.16	54.00	-10.84
4874.00	Peak	47.24	6.69	53.93	74.00	-20.07

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Operation Mode :802.11g

Test Channel :2462 MHz

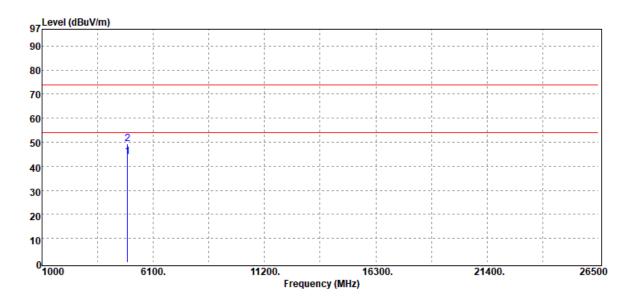
Test Mode :Tx CH high

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	37.04	6.85	43.89	54.00	-10.11
4924.00	Peak	42.63	6.85	49.48	74.00	-24.52

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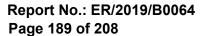
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No.134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號

台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488





Operation Mode :802.11g

Test Channel :2462 MHz

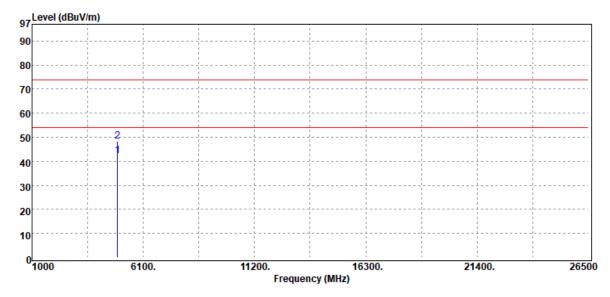
Test Mode :Tx CH high

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

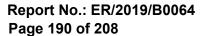
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	35.42	6.85	42.27	54.00	-11.73
4924.00	Peak	41.63	6.85	48.48	74.00	-25.52

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Operation Mode :802.11n20

Test Channel :2412 MHz

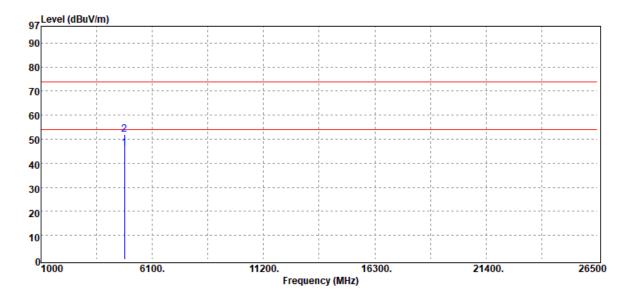
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

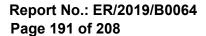
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
	MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4	4824.00	Average	39.66	6.53	46.19	54.00	-7.81
4	4824.00	Peak	45.64	6.53	52.17	74.00	-21.83

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Operation Mode :802.11n20

Test Channel :2412 MHz

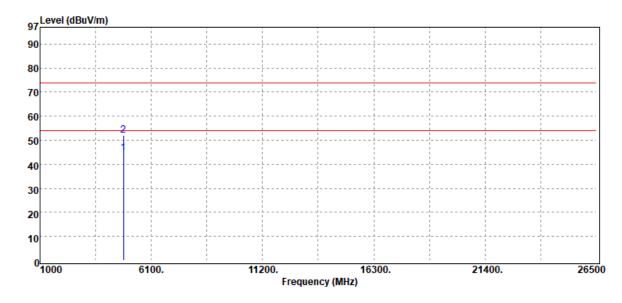
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

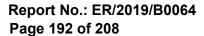
Engineer :Thomas



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	38.21	6.53	44.74	54.00	-9.26
4824.00	Peak	45.63	6.53	52.16	74.00	-21.84

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Operation Mode :802.11n20

Test Channel :2437 MHz

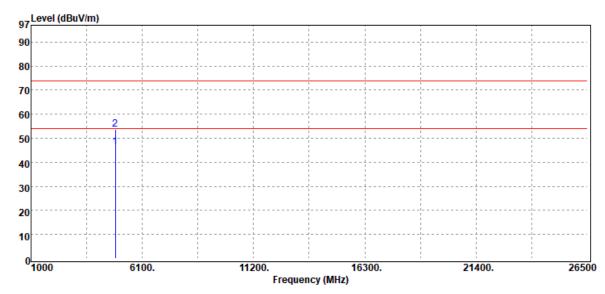
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

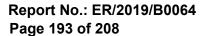
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	39.54	6.69	46.23	54.00	-7.77
4874.00	Peak	47.07	6.69	53.76	74.00	-20.24

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Operation Mode :802.11n20

Test Channel :2437 MHz

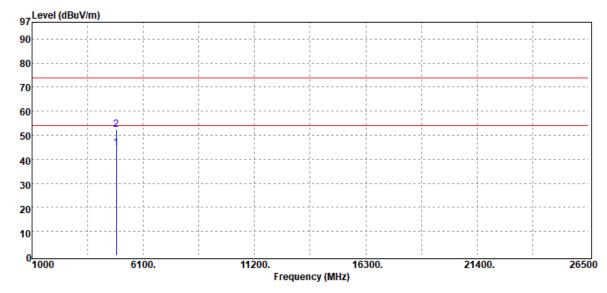
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

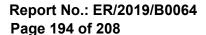
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	37.88	6.69	44.57	54.00	-9.43
4874.00	Peak	45.50	6.69	52.19	74.00	-21.81

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Operation Mode :802.11n20

Test Channel :2462 MHz

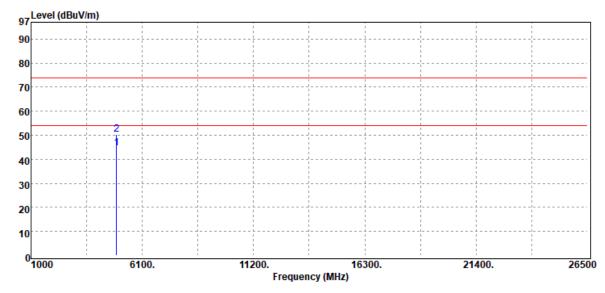
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

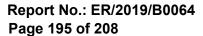
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	37.63	6.85	44.48	54.00	-9.52
4924.00	Peak	43.54	6.85	50.39	74.00	-23.61

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Operation Mode :802.11n20

Test Channel :2462 MHz

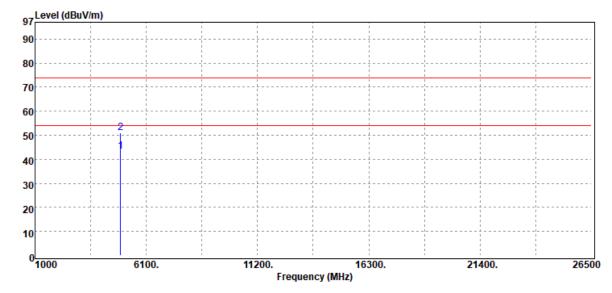
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

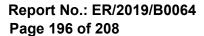
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	36.29	6.85	43.14	54.00	-10.86
4924.00	Peak	44.33	6.85	51.18	74.00	-22.82

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Operation Mode :802.11n40

Test Channel :2422 MHz

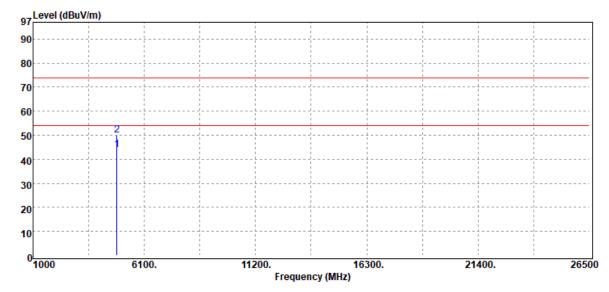
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

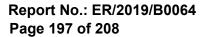
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4844.00	Average	37.45	6.60	44.05	54.00	-9.95
4844.00	Peak	43.36	6.60	49.96	74.00	-24.04

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Operation Mode :802.11n40

Test Channel :2422 MHz

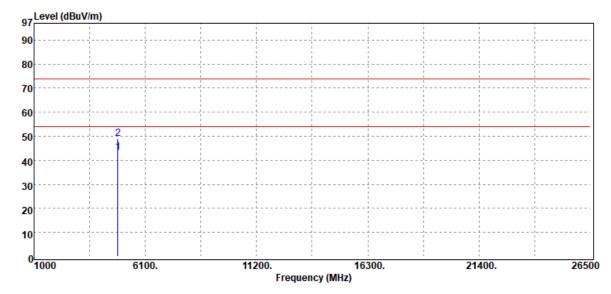
Test Mode :Tx CH Low

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

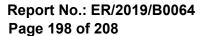
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4844.00	Average	36.71	6.60	43.31	54.00	-10.69
4844.00	Peak	42.32	6.60	48.92	74.00	-25.08

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Operation Mode :802.11n40

Test Channel :2437 MHz

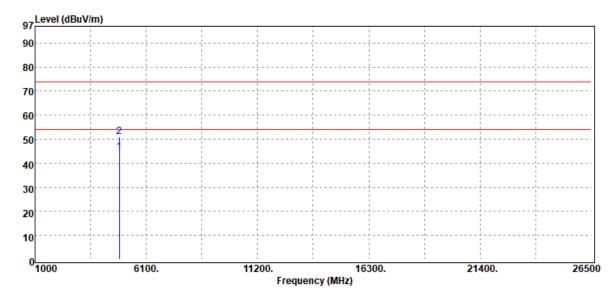
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

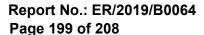
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	38.05	6.69	44.74	54.00	-9.26
4874.00	Peak	44.45	6.69	51.14	74.00	-22.86

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Operation Mode :802.11n40

Test Channel :2437 MHz

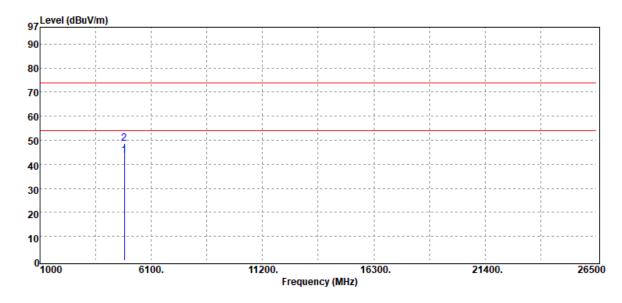
Test Mode :Tx CH Mid

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

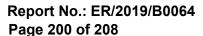
Engineer :Thomas



	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
	MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
4	874.00	Average	36.94	6.69	43.63	54.00	-10.37
4	874.00	Peak	42.11	6.69	48.80	74.00	-25.20

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Operation Mode :802.11n40

Test Channel :2452 MHz

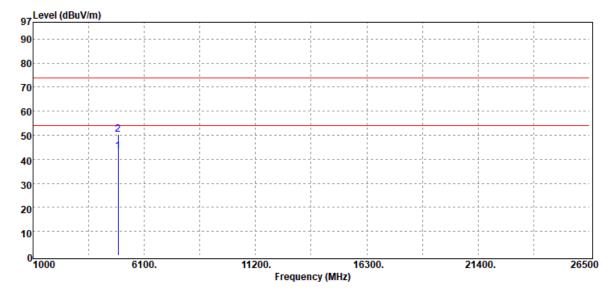
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :VERTICAL

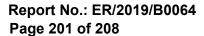
Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4904.00	Average	36.37	6.78	43.15	54.00	-10.85
4904.00	Peak	43.50	6.78	50.28	74.00	-23.72

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Operation Mode :802.11n40

Test Channel :2452 MHz

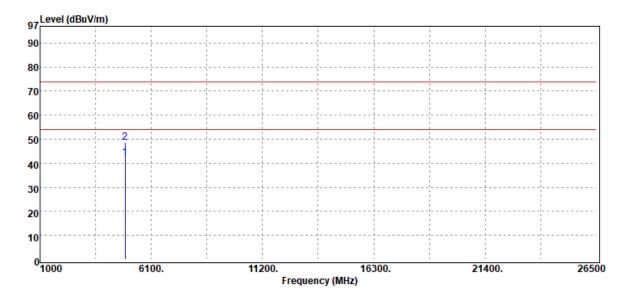
Test Mode :Tx CH High

EUT Pol :E2 Plane **Test Date** :2019-12-24

:23/67 Temp./Humi.

Antenna Pol. :HORIZONTAL

Engineer :Thomas



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4904.00	Average	35.49	6.78	42.27	54.00	-11.73
4904.00	Peak	41.92	6.78	48.70	74.00	-25.30

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12 POWER SPECTRAL DENSITY

12.1 Standard Applicable

Per Part 15.247 (e)

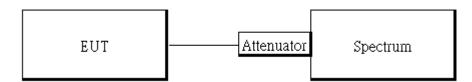
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

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 TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/02/2019	05/01/2020		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2019	01/04/2020		
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2019	01/04/2020		

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. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.
- 11.802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

Note:

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

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12.5 As per FCC KDB 662911 D01

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

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

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

where

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

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

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

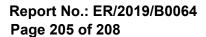
 G_k is the gain in dBi of the kth antenna.

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

Frequency (MHz)	Effective Legacy Gain (dBi)	Peak spectral density (dBm/3kHz)
2412~2462	7.61	6.39

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12.6 Power spectral density

POWER DENSITY 802.11b_2TX					
Freq.	PSD	Limit	Result		
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Result		
2412	-4.25	6.39	PASS		
2437	-5.88	6.39	PASS		
2462	-3.84	6.39	PASS		

POWER DENSITY 802.11g_MIMO					
Freq.	PSD	Limit	Result		
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Result		
2412	-6.80	6.39	PASS		
2437	-5.45	6.39	PASS		
2462	-7.98	6.39	PASS		

POWER DENSITY 802.11n HT20_MIMO				
Freq.	PSD	Limit	Result	
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Result	
2412	-7.94	6.39	PASS	
2437	-3.61	6.39	PASS	
2462	-9.90	6.39	PASS	

POWER DENSITY 802.11n HT40_MIMO				
Freq.	PSD	Limit	Result	
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Result	
2422	-14.48	6.39	PASS	
2437	-11.62	6.39	PASS	
2452	-13.78	6.39	PASS	

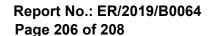
Note

Cable Loss 11.60 dВ

*Refer to next page for plots

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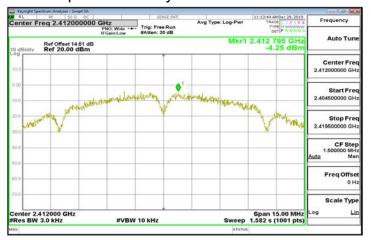
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802.11b

Power Spectral Density Test Plot-2412MHz



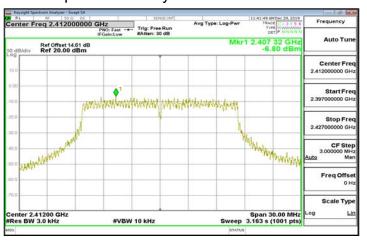
Power Spectral Density Test Plot-2437MHz



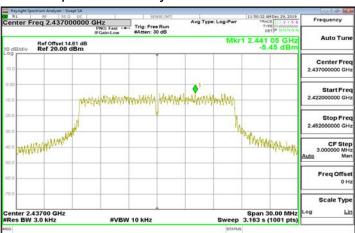
Power Spectral Density Test Plot-2462MHz



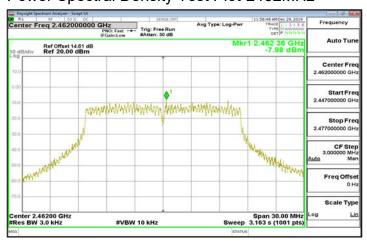
802.11g Power Spectral Density Test Plot-2412MHz



Power Spectral Density Test Plot-2437MHz



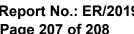
Power Spectral Density Test Plot-2462MHz



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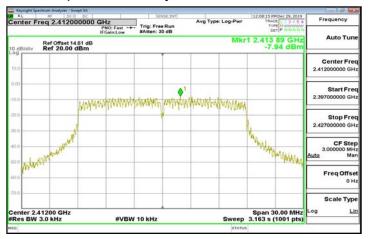
SGS Taiwan Ltd.



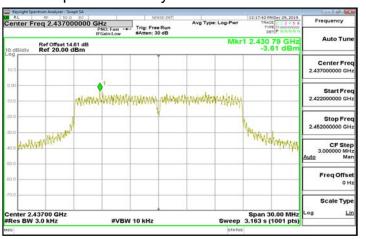
Report No.: ER/2019/B0064 Page 207 of 208



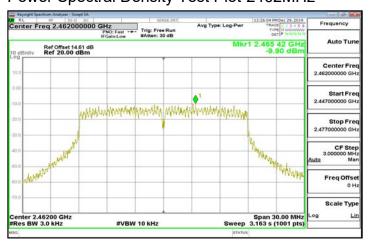
Power Spectral Density Test Plot-2412MHz



Power Spectral Density Test Plot-2437MHz

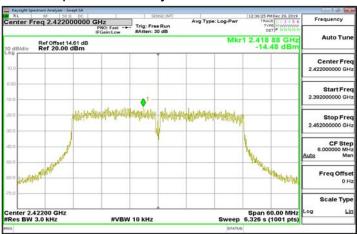


Power Spectral Density Test Plot-2462MHz

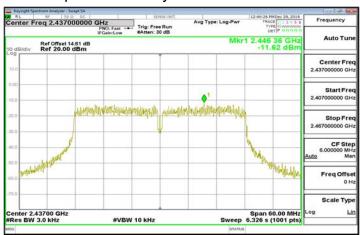


802.11n HT40

Power Spectral Density Test Plot-2422MHz



Power Spectral Density Test Plot-2437MHz



Power Spectral Density Test Plot-2452MHz



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

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

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

13.2 Antenna Connected Construction

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

~ End of Report ~

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