

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	Digi International Inc 9350 Excelsior Blvd., Suite 700	Hopkins, MN 55343
Product Name:	ConnectCore 8X	
Brand Name:	Digi	
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	
IC RSS:	RSS-247 issue 2 Feb 2017	
Issue Date:	Jul. 10, 2020	
Date of Test:	Dec. 04, 2019 ~ Feb 07, 2020	
Date of EUT Received:	Dec. 04, 2019	

#### 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; CHIZEH, 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

#### **1.1 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	
Modulation	type:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM		
Transistion Rate: 802.11 802.11		802.11 g: 802.11 n_	2 1/2/5.5/11 Mbps 2 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
PCB	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

#### 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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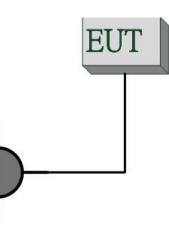
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#### 2.5 Configuration of Tested System

#### Fig. 2-1 Radiated Emission & Conducted (AC powerline) Emission



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



Table 2-1 Equipment Used in Tested System

lte	em	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 3

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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### 4 DESCRIPTION OF TEST MODES

#### 4.1 Operated in 2400 ~ 2483.5MHz Band

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

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

9 channels are provided for 802.11n 40M

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	E 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				

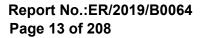
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#### MEASUREMENT UNCERTAINTY 5

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

Radiated Spurious Emission Measurement Uncertainty						
	9kHz~30MHz: +-2.3dB					
	30MHz - 180MHz: +/- 3.37dB					
	180MHz -417MHz: +/- 3.19dB					
Polarization: Vertical	0.417GHz-1GHz: +/- 3.19dB					
	1GHz - 18GHz: +/- 4.04dB					
	18GHz - 40GHz: +/- 4.04dB					
	9kHz~30MHz: +-2.3dB					
	30MHz - 167MHz: +/- 4.22dB					
	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

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

#### 6.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT 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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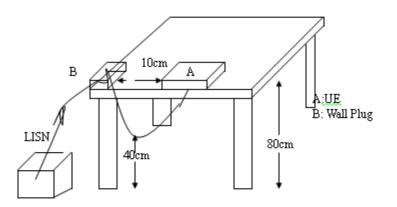
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#### 6.4 Test SET-UP (Block Diagram of Configuration)



#### **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.
- 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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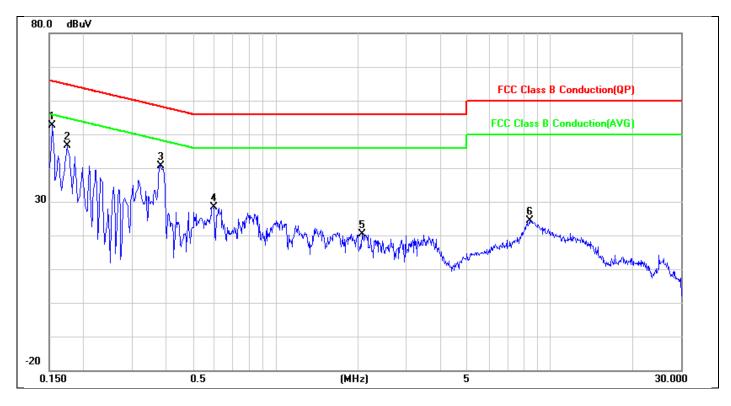
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### AC POWER LINE CONDUCTED EMISSION TEST DATA

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

Description:	Operation	Date:	2020/02/06
Line:	L1	Temp.(°C)/Hum.(%):	20.5(°C)/67%
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)	Delector	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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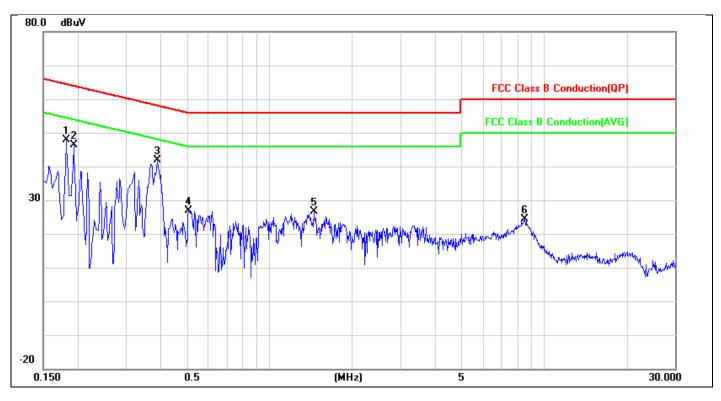
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Description: Line:	Operation N	Date: Temp.(°C)/Hum.(%):	2020/02/06 20.5(°C)/67%
Test Voltage:	AC 120V/60Hz	Test By:	Thomas
Report Number:	ER-2019-B0064		



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIK.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Delector	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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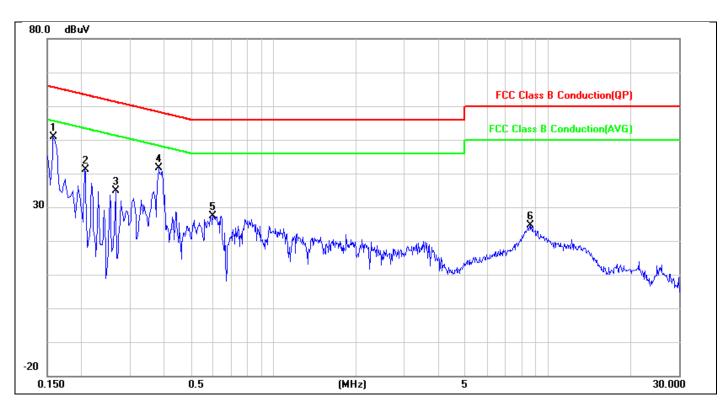
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#### PCB Antenna (Part No.: ANTX100P001B24553)

Description:	Operation	Date:	2020/02/06
Line:	L1	Temp.(°C)/Hum.(%):	20.5(°C)/67%
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)	Delector	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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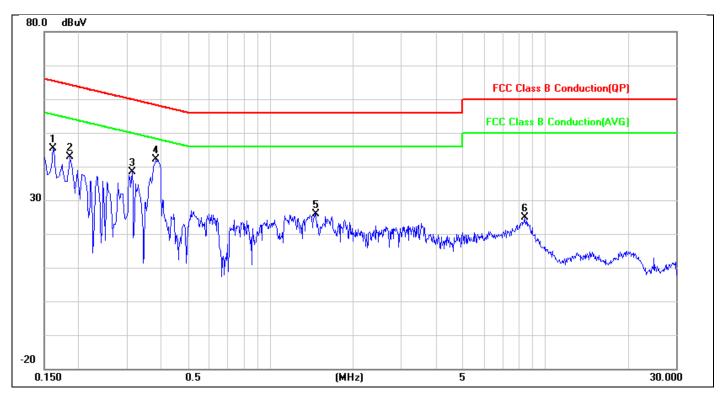
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Description: Line:	Operation N	Date: Temp.(°C)/Hum.(%):	2020/02/06 20.5(°C)/67%
Test Voltage:	N AC 120V/60Hz	Test By:	Thomas
Report Number:	ER-2019-B0064		



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
NO.	IVIR.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Delector	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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### 7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

#### 7.1 Measurement Procedure:

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

#### 7.2 Duty Cycle:

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
802.11b	98.74	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%, g = 92.27%,  $n_ht_20 = 88.97\%$   $n_ht_40 = 89.76\%$ 

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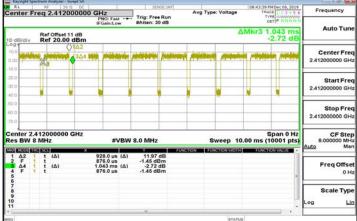


### 7.3 Duty Cycle test plots

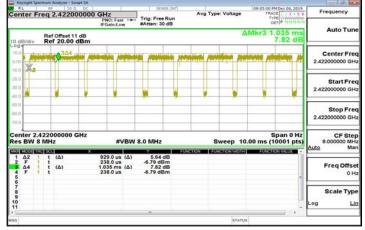
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#### PEAK OUTPUT POWER MEASUREMENT 8

#### 8.1 Standard Applicable

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

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

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

#### 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.

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

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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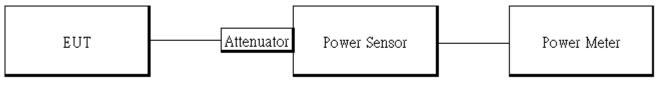


#### 8.2 Measurement Equipment Used

	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	1b 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 <sup>°</sup>	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	1b 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 <sup>-</sup>	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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802.2	11b_2 <sup>-</sup>	ТΧ											
СН	Fr∈ (M⊦	•	Dat Rat		Pea		Dutput wer	Total P Output P		Lim (dBn		RESU	ILT
		12)	και	e	CH 0 C		CH 1	(dBm	1)	(UDI			
1	24	12	1		18.3	32	17.26	20.83	}	28.3	9	PAS	S
6	243	37	1		16.8	37	16.13	19.53	}	28.3	9	PAS	S
11	240	52	1	1 17		64	17.09	20.38	}	28.3	9	PAS	S
802.	11b_2 <sup>-</sup>	ГΧ											
					Av	g. C	Dutput	Max. Avg. (	Output				
СН	Fre	eq.	Dat	a		Po	wer	include tu	ine up	Lim	it	RESU	ΠТ
	(MHz)		Rat	Rate		(dB	3m)	tolerance	Power	(dBn	n)	NL30	
				CH		0	CH 1	(dBm	1)				
1	24	2412 1			15.3	38	14.44	18.00	)	28.3	9	PAS	
6		2437 1			14.1	17	13.62	16.97		28.3		PAS	
11	240	52	1		14.9	96	14.42	17.76	ó	28.3	9	PAS	S
	000.4												
	802.1 <sup>-</sup>	lg C	h0								1		
		Fr	eq.	D				COutput		imit DE			
	СН		·		ate		Pov		(d	Bm)	RES	ULT	
		-					(dE	÷		•			
	1		12		6 22.					0.00		ISS	
	2		17		6		23.			0.00		ISS	
	3		22		6		23.			0.00		ASS	
	6		37		6		23.			0.00		ISS	
	9		52		6		23.	-		0.00		ISS	
	10		57		6		22.76		30.00		PASS PASS		
	11		-62		6		19.	.79	3	0.00	PF	122	
	802.1 <sup>-</sup>	ig C	nu				Mox Ave	. Output					
		Г.,		П	ata		-	J. Output					
	СН		eq.		ata		include	•		imit Duu)	RES	ULT	
		(IVI	Hz)	R	ate			e Power	(a	Bm)			
			10		,		(dE	•		0.00			
	1		12		6		16.			0.00		ASS	
	2		17		6		18.			0.00		ISS ISS	
	3		22		6		18.			0.00		455 455	
	6 9		37		6		18.			0.00		455 455	
	9 10		52 57		6		18. 17.			0.00		lss ISS	
					6							lss ISS	
	11	Z4	62		6		13.	.30	3	0.00	Γ <i>Γ</i>	ພວ	

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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				
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
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

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802.1	1g_2TX						
СН	Freq. (MHz)	Data Rate	Peak ( Po	Dutput wer	Total Peak Output Power	Limit (dBm)	RESULT
	(	Huto	CH 0	CH 1	(dBm)	(ubiii)	
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		
СН	Freq.	Data	Po	wer	include tune up	Limit	RESULT
СП	(MHz)	Rate	(dE	3m)	tolerance Power	(dBm)	REJULI
			CH 0	CH 1	(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
11	2462	6	12.98	12.67	16.19	28.39	PASS

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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
11	2462	MCS0	12.94	30.00	PASS

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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			
			Max. Avg. Output		
СН	Freq.	Data	include tune up	Limit	RESULT
	(MHz)	Rate	tolerance Power	(dBm)	KLJUL I
			(dBm)		
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

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002.1	1n_HT20	м мімо					
СН	Freq. (MHz)	Data Rate		Dutput wer	Total Peak Output Power	Limit (dBm)	RESULT
	(101112)	Nate	CH 0	CH 1	(dBm)	(ubili)	
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
802.11	1n_HT201	M MIMO					
				Dutput	Max. Avg. Output		
	Freq.	Data	Avg. C	Dutput wer	Max. Avg. Output include tune up	Limit	
CH			Avg. C Po		• .	Limit (dBm)	RESULT
	Freq.	Data	Avg. C Po	wer	include tune up		RESULT
	Freq.	Data	Avg. C Po (dE	wer 3m)	include tune up tolerance Power		<b>RESULT</b> PASS
СН	Freq. (MHz)	Data Rate	Avg. C Pov (dE CH 0	wer 3m) CH 1	include tune up tolerance Power (dBm)	(dBm)	
CH 1	Freq. (MHz) 2412	Data Rate MCS8	Avg. C Pov (dE CH 0 15.39	wer 3m) CH 1 14.68	include tune up tolerance Power (dBm) 18.57	(dBm) 28.39	PASS
CH 1 2	Freq. (MHz) 2412 2417	Data Rate MCS8 MCS8	Avg. C Por (dE CH 0 15.39 17.59	wer 3m) CH 1 14.68 16.76	include tune up tolerance Power (dBm) 18.57 20.71	(dBm) 28.39 28.39	PASS PASS
CH 1 2 3	Freq. (MHz) 2412 2417 2422	Data Rate MCS8 MCS8 MCS8	Avg. C Pov (dE CH 0 15.39 17.59 18.19	wer 3m) CH 1 14.68 16.76 17.72	include tune up tolerance Power (dBm) 18.57 20.71 21.48	(dBm) 28.39 28.39 28.39	PASS PASS PASS
CH 1 2 3 6	Freq. (MHz) 2412 2417 2422 2437	Data Rate MCS8 MCS8 MCS8 MCS8	Avg. C Pov (dE CH 0 15.39 17.59 18.19 18.62	wer 3m) CH 1 14.68 16.76 17.72 18.33	include tune up tolerance Power (dBm) 18.57 20.71 21.48 22.00	(dBm) 28.39 28.39 28.39 28.39 28.39	PASS PASS PASS PASS PASS PASS
CH 1 2 3 6 8	Freq. (MHz) 2412 2417 2422 2437 2447	Data Rate MCS8 MCS8 MCS8 MCS8 MCS8	Avg. C Pov (dE CH 0 15.39 17.59 18.19 18.62 18.20	wer 3m) CH 1 14.68 16.76 17.72 18.33 17.77	include tune up tolerance Power (dBm) 18.57 20.71 21.48 22.00 21.51	(dBm) 28.39 28.39 28.39 28.39 28.39 28.39	PASS PASS PASS PASS PASS

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802.1	1n_HT40	M 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 (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	11.15	30.00	PASS
4	2427	MCS0	11.32	30.00	PASS
5	2432	MCS0	13.04	30.00	PASS
6	2437	MCS0	13.91	30.00	PASS
7	2442	MCS0	13.08	30.00	PASS
8	2447	MCS0	11.94	30.00	PASS
9	2452	MCS0	11.06	30.00	PASS

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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			
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	10.36	30.00	PASS
4	2427	MCS0	10.15	30.00	PASS
5	2432	MCS0	12.00	30.00	PASS
6	2437	MCS0	13.00	30.00	PASS
7	2442	MCS0	12.09	30.00	PASS
8	2447	MCS0	11.20	30.00	PASS
9	2452	MCS0	10.23	30.00	PASS

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802.1	1n_HT401	M MIMO					
СН	Freq. (MHz)	Data Rate		Dutput wer	Total Peak Output Power	Limit (dBm)	RESULT
	(101112)	Nate	CH 0	CH 1	(dBm)	(ubiii)	
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_HT40	M MIMO					
			Avg. C	Dutput	Max. Avg. Output		
СН	Freq.	Data	Po	wer	include tune up	Limit	RESULT
	(MHz)	Rate	(dE	Bm)	tolerance Power	(dBm)	REJUET
			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
9	2452	MCS8	10.84	10.32	14.07	28.39	PASS

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

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#### EIRP

802.11	b 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 11h Ch1

0UZ.1							
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

### 002 11h 2TV

802.1	10_21X								
СН	Freq. (MHz)	Data Rate	Avg. C Pov	•	Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT
	(101112)	Nate	CH 0	CH 1	(dBm)	(dBi)	(ubii)	(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

#### 802.11g Ch0 Antenna Avg. Output EIRP Freq. Data Limit СН RESULT Gain (MHz) Rate Power (dBm) (dBm) (dBm) (dBi) PASS 1 2412 6 16.13 4.60 20.73 36 PASS 2 2417 18.07 4.60 22.67 36 6 18.28 PASS 3 2422 6 4.60 22.88 36 PASS 18.25 22.85 6 2437 6 4.60 36 9 2452 22.77 36 PASS 6 18.17 4.60 PASS 10 2457 6 17.09 4.60 21.69 36 PASS 11 2462 6 13.38 4.60 17.98 36

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802.11	lg 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

#### 802.11g\_2TX

СН	Freq. (MHz)	Data Rate	Pov		Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT
			CH 0	CH 1	(dBm)	(dBi)			
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

#### 802.11n HT20M Ch0

002.1	III_III 2010						
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

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СН	Freq. (MHz)	Data Rate	Avg. Ou Power (d	' I Gain	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

СН	Freq. (MHz)	Data Rate	Avg. Output Power		Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT
	()		CH 0	CH 1	(dBm)	(dBi)	(	(	
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

#### 802.11n 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			

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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

### 802.11n\_HT40M MIMO

СН	Freq. (MHz)	Data Rate	Avg. C Pov	)utput wer	Total Avg. Output Power	Antenna Gain	EIRP (dBm)	Limit (dBm)	RESULT
	(	Huto	CH 0	CH 1	(dBm)	(dBi)	(uDiii)	(uDiii)	
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

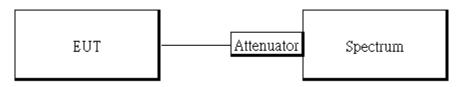
# 9.1 Standard Applicable

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

## 9.2 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL 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	01/05/2020	
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

802.11g	802.11g Ch0 802.11g Ch1						
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_r	_HT20 Ch0			802.11_r	_HT20 Ch1		
Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Result	(MHz)	(kHz)	(kHz)	Result
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_r	n_HT40 Ch0			802.11_r	_HT40 Ch1		
Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Result	(MHz)	(kHz)	(kHz)	Result
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

\*Refer to next page for plots

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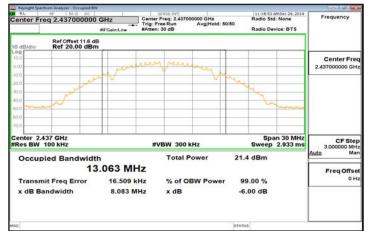
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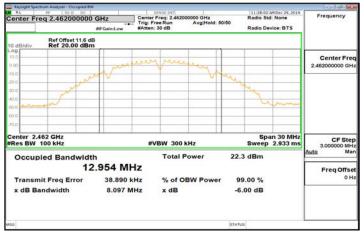
## 802.11b (CH0) 6dB Band Width Test Data CH-2412MHz



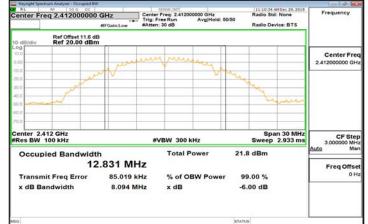
## 6dB Band Width Test Data CH-2437MHz



# 6dB Band Width Test Data CH-2462MHz



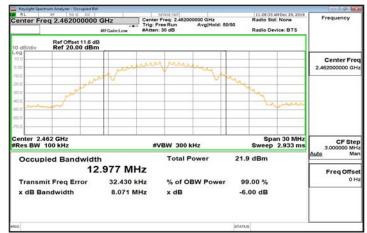
## 802.11b (CH1) 6dB Band Width Test Data CH-2412MHz



### 6dB Band Width Test Data CH-2437MHz



## 6dB Band Width Test Data CH-2462MHz



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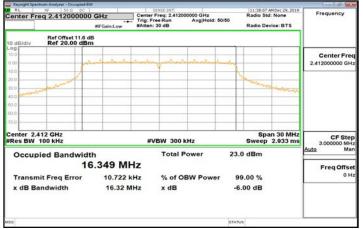
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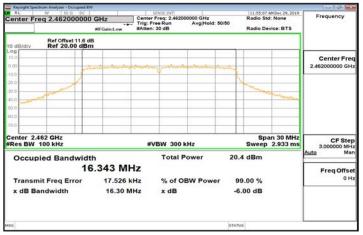
## 802.11g (CH0) 6dB Band Width Test Data CH-2412MHz



# 6dB Band Width Test Data CH-2437MHz



# 6dB Band Width Test Data CH-2462MHz

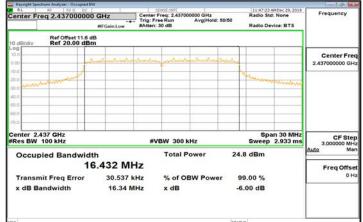


# 802.11g (CH1)

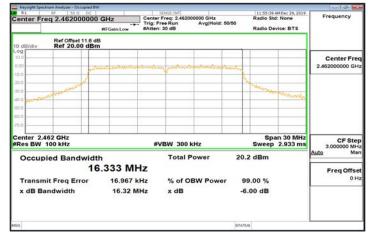
### 6dB Band Width Test Data CH-2412MHz

Center Fr	eq 2.412000000	GHz #IFGain:Low	Center Fr		0000 GHz AvgiHold	: 50/50	Radio St	AMDec 29, 2019 cd: None evice: BTS	Frequency
10 dB/div	Ref Offset 11.6 d Ref 20.00 dBr								
10.00	-	anna	Andry	mana	- Ampro	America			Center Free 2.412000000 GH
-10.0	menned						Marine M	With Married	
40.0		_							
-60.0									
Center 2.4 #Res BW			#VE	W 300 k	Hz		Sp Sweep	an 30 MHz 2.933 ms	CF Step 3.000000 MH
Occup	bied Bandwidt	h 6.345 MH	łz	Total P	ower	22	2.5 dBm		Auto Mar Freq Offse
	nit Freq Error andwidth	18.681 k 16.05 M	1933	% of OI x dB	BW Pow		99.00 % 6.0 <mark>0 d</mark> B		0 H
and a set						STA	TUS		

### 6dB Band Width Test Data CH-2437MHz



# 6dB Band Width Test Data CH-2462MHz



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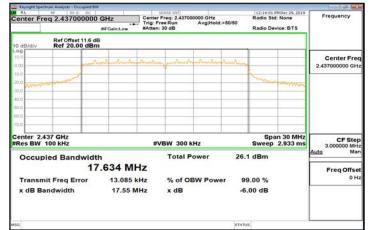
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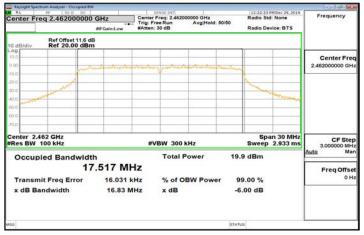
## 802.11n\_20M (CH0) 6dB Band Width Test Data CH-2412MHz

Center Fre	aq 2.41200000	IFGain:Low	Center F		0000 GHz Avg Hold	50/50	Radio De		Frequency
10 dB/div	Ref Offset 11.6 d Ref 20.00 dBr								
10.0 0.00	- Jun	-Andrea	and marken	-	Ante	andres			Center Freq 2.412000000 GHz
10.0 20.0 30.0 40.0 0000000	www						mon	Summer and	
40.0									
70.0 Center 2.4	12 0112							an 30 MHz	
#Res BW 1			#VI	BW 300 k	Hz			2.933 ms	CF Step 3.000000 MHz
Occupi	ied Bandwid	th		Total P	ower	22.	9 dBm		<u>Auto</u> Man
	13	7.523 MH	IZ						Freq Offset
Transm	it Freq Error	11.587 k	Hz	% of OF	W Powe	er 91	9.00 %		0 Hz
x dB Ba	ndwidth	16.80 M	Hz	x dB		-6	.00 dB		
150						STATU	-0		

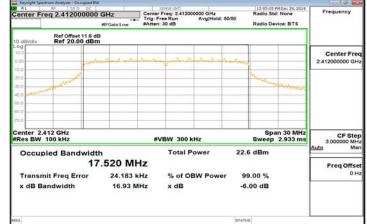
### 6dB Band Width Test Data CH-2437MHz



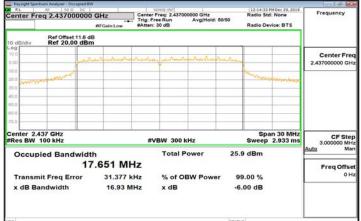
# 6dB Band Width Test Data CH-2462MHz



## 802.11n\_20M (CH1) 6dB Band Width Test Data CH-2412MHz



### 6dB Band Width Test Data CH-2437MHz



## 6dB Band Width Test Data CH-2462MHz

Center Freq 2.462000	000 GHz	enter Freq: 2.452000000 GHz rig: Free Run Avg Hold: 50/1 Atten: 30 dB	T2:22:54 PMDec 29, 2019 Radio Std: None S0 Radio Device: BTS	Frequency
10 dB/div Ref Offset 11				
100 0.00 -10.0	where the start warden	antray and seal to be the sector of the	Men	Center Free 2.462000000 GH
20.0 30.0 40.0			A Montemporter	
60.0 60.0 70.0				
Center 2.462 GHz #Res BW 100 kHz		#VBW 300 kHz	Span 30 MHz Sweep 2.933 ms	CF Step 3.000000 MH
Occupied Bandw	<sub>idth</sub> 17.534 MHz	Total Power	19.8 dBm	Auto Mar Freq Offse
Transmit Freq Error x dB Bandwidth	14.386 kHz 16.59 MHz		99.00 % -6.00 dB	он
150			STATUS	

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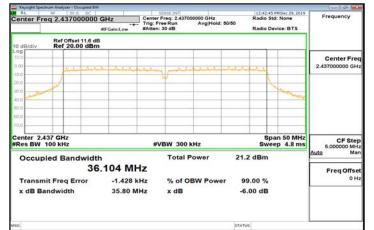
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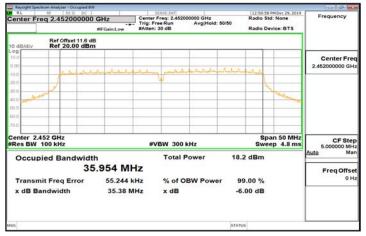
## 802.11n\_40M (CH0) 6dB Band Width Test Data CH-2422MHz



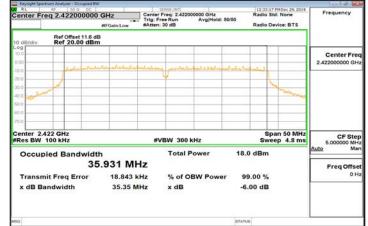
## 6dB Band Width Test Data CH-2437MHz



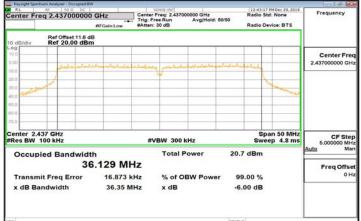
# 6dB Band Width Test Data CH-2452MHz



## 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

Center Fr	req 2.452000000	Trig: I	SENSE INT r Freq: 2.452000000 GHz Free Run Avg Hold: 500 h: 30 dB	12:51:30 PMDec 29, 2019 Radio Std: None 80 Radio Device: BTS	Frequency
10 dB/div	Ref Offset 11.6 dE Ref 20.00 dBm				
10.0 0.00		A. J. J. B. Bulleton	manadadadadaman	- Andalashi I	Center Free 2.452000000 GH
-10.0	A		V		
30.0	and a start of the				
40.0					
60.0					
70.0					
Center 2. #Res BW		#	VBW 300 kHz	Span 50 MHz Sweep 4.8 ms	5.000000 MH
Occur	oied Bandwidt	h	Total Power	17.9 dBm	Auto Mai
	35	.952 MHz			Freq Offse
Transn	nit Freq Error	80.328 kHz	% of OBW Power	99.00 %	он
x dB B	andwidth	35.73 MHz	x dB	-6.00 dB	

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## 9.6 99% Bandwidth

802.11b Ch0		802.11b Ch1			
Freq.	99% BW	Freq.	99% BW		
(MHz)	(MHz)	(MHz)	(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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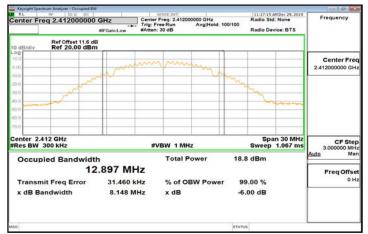
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## 802.11b (CH0) 99% Band Width Test Data CH-2412MHz



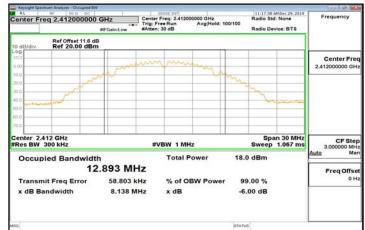
# 99% Band Width Test Data CH-2437MHz



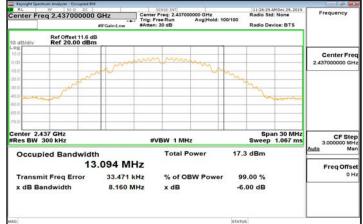
# 99% Band Width Test Data CH-2462MHz



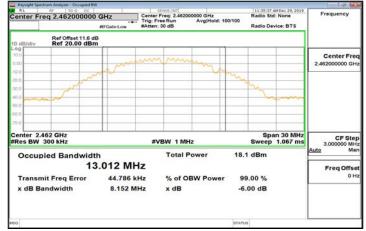
## 802.11b (CH1) 99% Band Width Test Data CH-2412MHz



## 99% Band Width Test Data CH-2437MHz



## 99% Band Width Test Data CH-2462MHz



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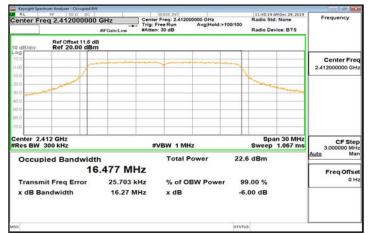
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## 802.11g (CH0) 99% Band Width Test Data CH-2412MHz



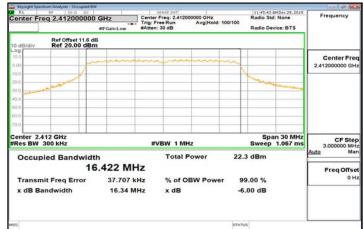
# 99% Band Width Test Data CH-2437MHz



# 99% Band Width Test Data CH-2462MHz



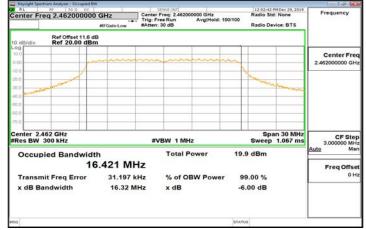
## 802.11g (CH1) 99% Band Width Test Data CH-2412MHz



## 99% Band Width Test Data CH-2437MHz



## 99% Band Width Test Data CH-2462MHz



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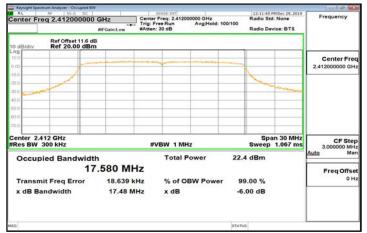
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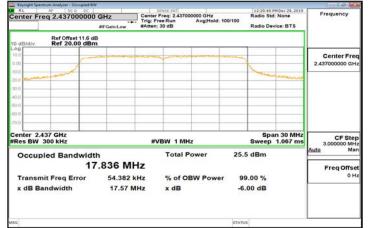
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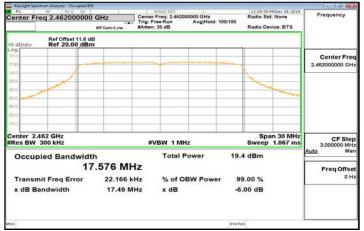
## 802.11n\_20M (CH0) 99% Band Width Test Data CH-2412MHz



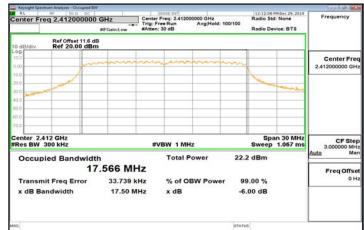
# 99% Band Width Test Data CH-2437MHz



# 99% Band Width Test Data CH-2462MHz



## 802.11n\_20M (CH1) 99% Band Width Test Data CH-2412MHz



# 99% Band Width Test Data CH-2437MHz



# 99% Band Width Test Data CH-2462MHz



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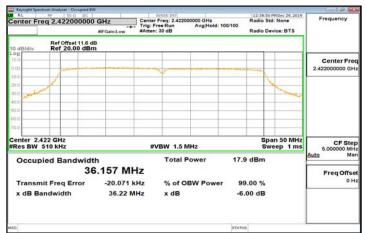
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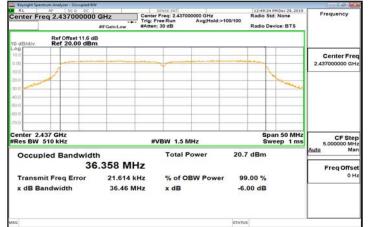
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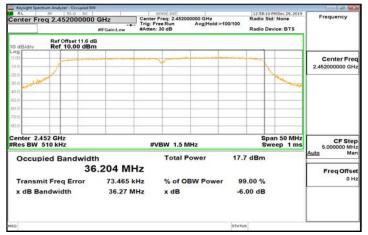
## 802.11n\_40M (CH0) 99% Band Width Test Data CH-2422MHz



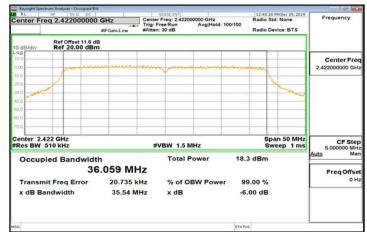
# 99% Band Width Test Data CH-2437MHz



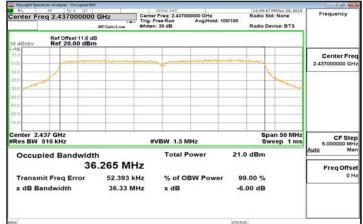
# 99% Band Width Test Data CH-2452MHz



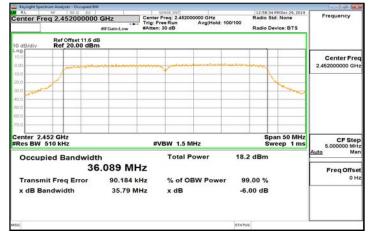
## 802.11n\_40M (CH1) 99% Band Width Test Data CH-2422MHz



# 99% Band Width Test Data CH-2437MHz



## 99% Band Width Test Data CH-2452MHz



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# 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

## **10.1 Standard Applicable**

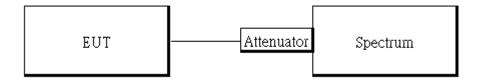
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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 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		

## 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

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

Reference Level of Limit 802.11n20 mode			Referen	ce Level o	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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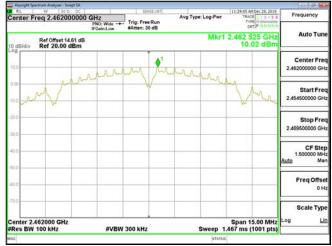
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#### Reference Level\_802.11b\_20MHz\_Chain0\_2437MH



### Reference Level\_802.11b\_20MHz\_Chain0\_2462MHz



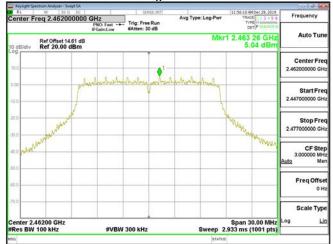
## Reference Level\_802.11g\_20MHz\_Chain0\_2412MHz



#### Reference Level\_802.11g\_20MHz\_Chain0\_2437MH



#### Reference Level\_802.11g\_20MHz\_Chain0\_2462MHz



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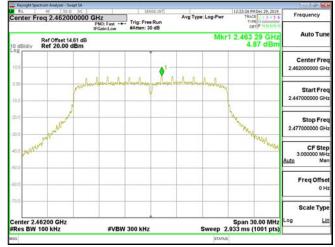
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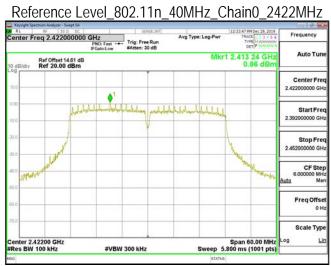


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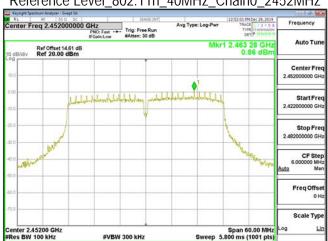
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Reference Level\_802.11n\_40MHz\_Chain0\_2437MH





Reference Level 802.11n 40MHz Chain0 2452MHz

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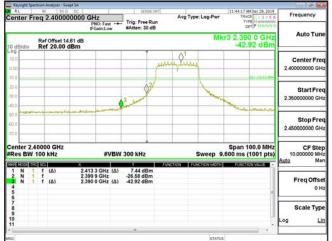
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## Band Edge\_802.11b\_20MHz \_Chain0\_2462MHz



### Band Edge\_802.11g\_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 Next Freq 2.400000000 GHz FN0: Fast →→ Trig: Free Run FN0: Fast →→ Trig: Free Run Avg Type: Log-Pw Auto Tu 44.85 dB Ref Offset 14.61 dB Ref 20.00 dBm Center Free 2' 1111ml Start Free Stop Free 00 GI CF Step enter 2.40000 GH Res BW 100 kHz Span 100.0 MHz Sweep 9.600 ms (1001 pts) #VBW 300 kH 2.413 3 GHz (Δ) 0.80 dBm 2.399 9 GHz -33.78 dBm 2.390 0 GHz (Δ) -44.85 dBm NN Freq Offse OF Scale Typ

## Band Edge\_802.11n\_40MHz\_Chain0\_2452MHz



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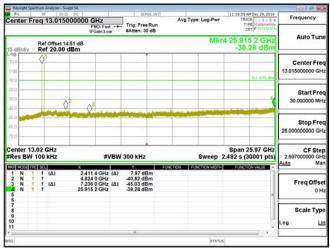
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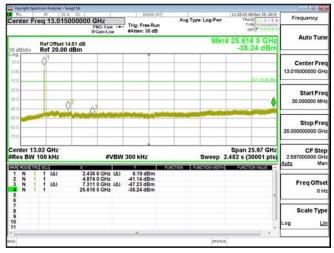
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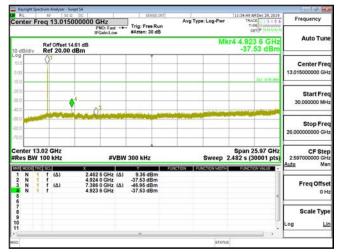
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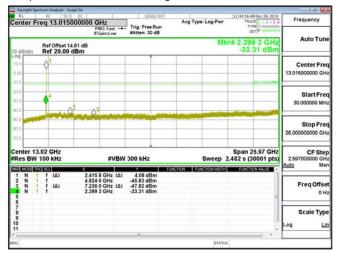
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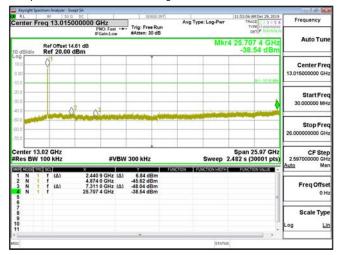
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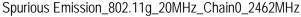


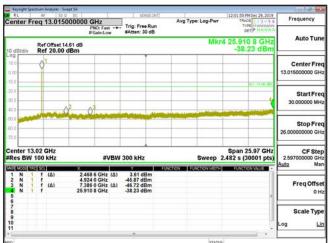
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Spurious Emission\_802.11g\_20MHz\_Chain0\_2437MHz







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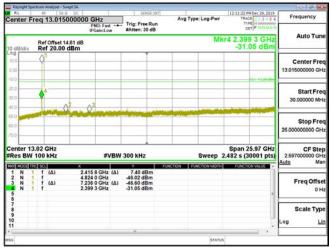
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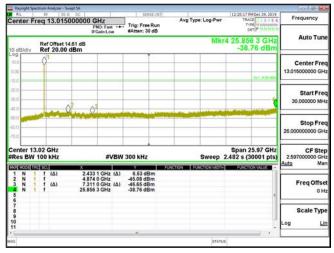
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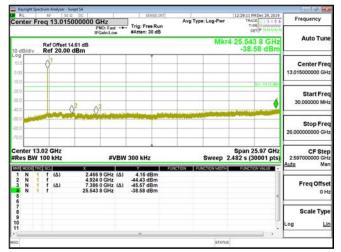
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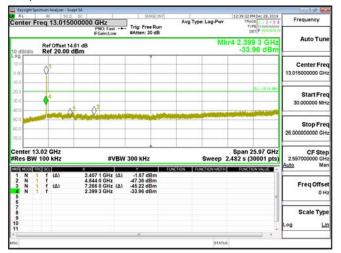
Spurious Emission\_802.11n\_20MHz\_Chain0\_2437MHz



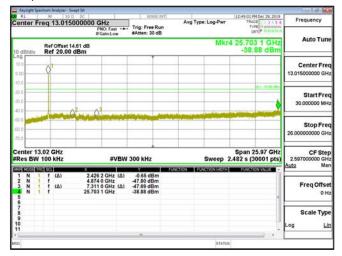
#### Spurious Emission\_802.11n\_20MHz\_Chain0\_2462MHz

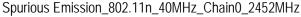


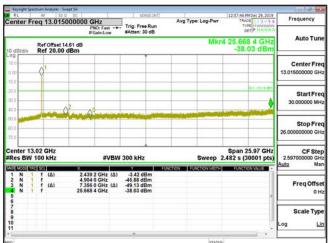
#### Spurious Emission\_802.11n\_40MHz\_Chain0\_2422MHz



Spurious Emission\_802.11n\_40MHz\_Chain0\_2437MHz







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# 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

## 11.1 Standard Applicable

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

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

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

### Note:

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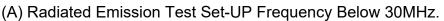
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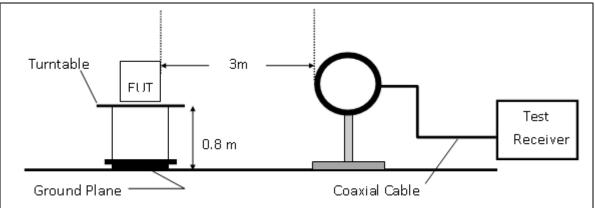
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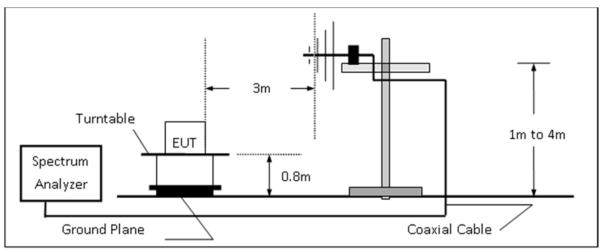


# 11.3 Test SET-UP

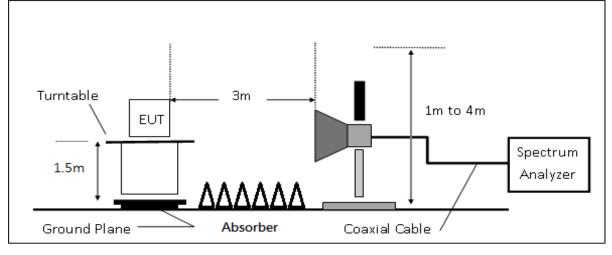




# (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



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



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## **11.4 Measurement Procedure**

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and 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* 

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

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

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB) Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

## 11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

## **11.7 Measurement Result**

## Note:

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

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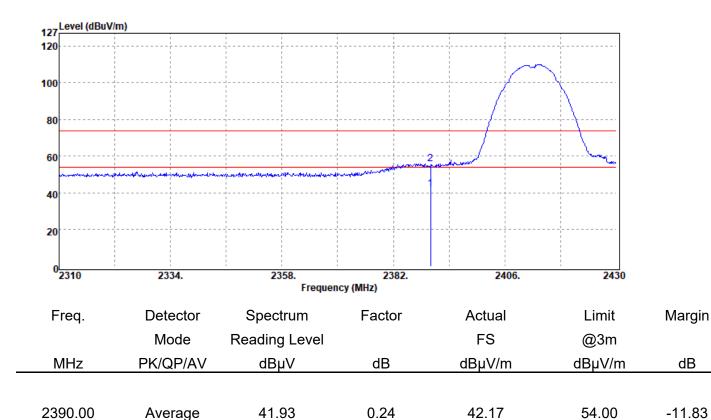
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# 11.7.1 Radiated Band Edge Measurement Result

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

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



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55.64

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0.24

55.88

74.00

-18.12

2390.00

t (886-2) 2299-3279

Peak

f (886-2) 2298-0488

:2019-12-17

Test Date



:ER/2019/B0064

**Report Number** 

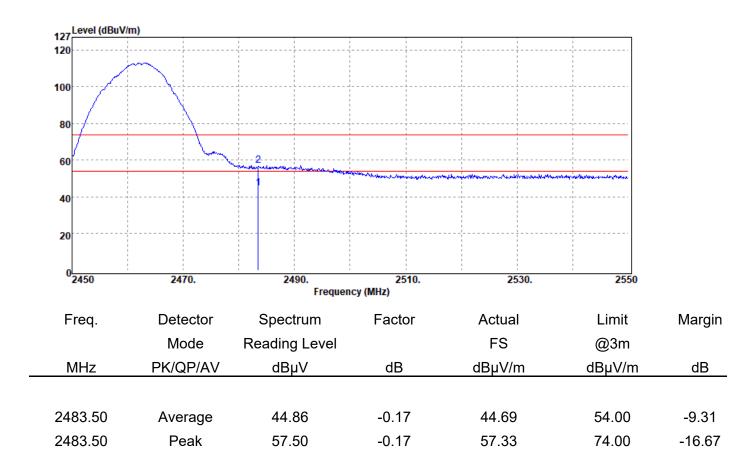
Operation Mode	:802.11b			Temp./Humi.	:22.3/59
Test Channel	:2412 MHz			Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH	Low		Engineer	:Thomas
EUT Pol	:E2 Plane				
127 Level (dBuV/m)	iii		i	i i	1
120			· · · · · · · · · · · · · · · · · · ·		
100				$\sim$	<u>\</u>
80				/	- <u>}</u>
60					
unknown month provided	wander and the second second second	man and the second s	and a second and a s	and the second	homen
40					
20					
0					
°2310	2334.	2358. Frequency	2382. ( (MHz)	2406.	2430
		Troquene	,		

Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	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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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11b	Temp./Humi.	:22.3/59
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

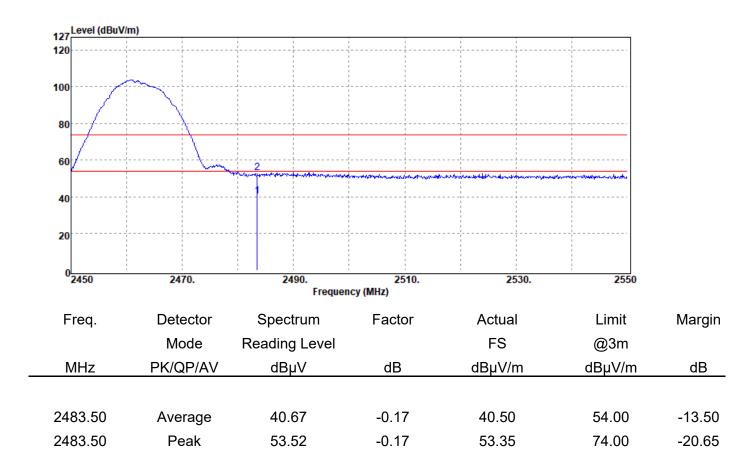


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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11b	Temp./Humi.	:22.3/59
Test Channel	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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:2019-12-17

Margin

Test Date



:ER/2019/B0064

**Report Number** 

peration Mode	:802.11g			Temp./Humi.	:22.3/59
est Channel	:2412 MHz			Antenna Pol.	:VERTICA
est Mode	:Bandedge	CH Low		Engineer	:Thomas
UT Pol	:E2 Plane				
127 Level (dBuV/m)		i i i			i
120			1 1 1	m	~~~~
100					
80					Mu an
			3	~ ~ ~	
60			where the state of		
40					
20					
0 <mark></mark> 2310	2334.	2358.	2382.	2406.	2430
		Frequen	cy (WHZ)		
Freq.	Detector	Spectrum	Factor	Actual	Limit
	Mode	Reading Level		FS	<i>@</i> 3m

	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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
	2390.00	2390.00 Average	MHz         PK/QP/AV         dBμV           2390.00         Average         52.75	MHz         PK/QP/AV         dBμV         dB           2390.00         Average         52.75         0.24	MHz         PK/QP/AV         dBμV         dB         dBμV/m           2390.00         Average         52.75         0.24         52.99	MHz         PK/QP/AV         dBμV         dB         dBμV/m           2390.00         Average         52.75         0.24         52.99         54.00

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:2019-12-17

74.00

-17.11

Test Date



:ER/2019/B0064

**Report Number** 

2390.00

Peak

Operation Mode	:802.11g				Temp./	Humi.	:22.3/59	
Test Channel	:2412 MHz	<u>.</u>			Antenr	na Pol.	:HORIZONT	ÄL
Test Mode	:Bandedge	CH Low			Engine	er	:Thomas	
EUT Pol	:E2 Plane							
127 Level (dBuV/m)			•				·	
120			1 1 1 7			         		
100						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~	
100				1		     		
80						     T	<b>k</b>	
					and what a faith of the second	1 1 1	www.hu	
60	Wardel Angelander Augustan	- J	and the state of t	2 de		+		
40				1				
20			1 1 1 1 1 1 1 1 1					
<sup>0</sup> 2310	2334.	2358. Frequer	2382. ncy (MHz)		24	406.	2430	
Freq.	Detector	Spectrum	Factor		Actua	ı	Limit	Margin
Fieq.		-	Factor		FS	1		warym
	Mode	Reading Level	JD				@3m	
MHz	PK/QP/AV	dBµV	dB		dBµV/ı	m	dBµV/m	dB
2390.00	Average	43.52	0.24		43.76	5	54.00	-10.24

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56.65

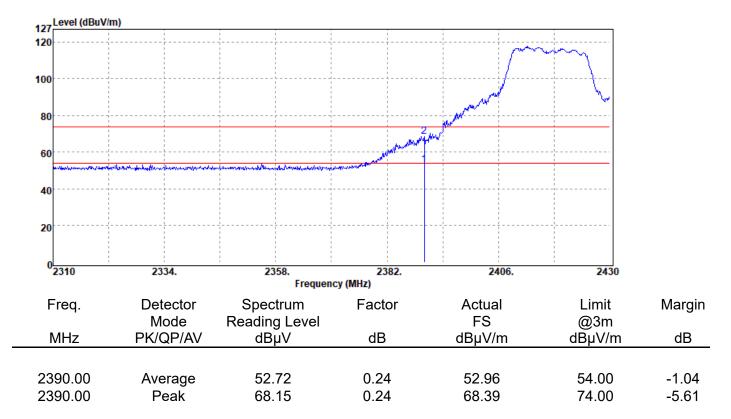
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0.24

56.89



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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f (886-2) 2298-0488

2430

Margin

dB

-10.29

-14.81

Limit

@3m

dBµV/m

54.00

74.00



40

20

0<sup>L</sup> 2310

Freq.

MHz

2390.00

2390.00

2334.

Detector

Mode

PK/QP/AV

Average

Peak

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.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
127 120 120			<u>.</u>
100		, mar	
80		matheestand	h
60	2	×	· · ·

2382.

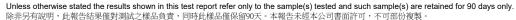
Factor

dB

0.24

0.24

Frequency (MHz)



2358.

Spectrum

Reading Level

dBµV

43.47

58.95

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2406.

Actual

FS

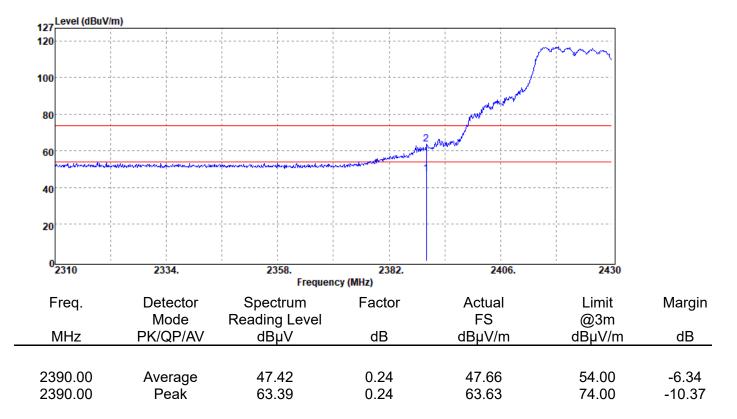
dBµV/m

43.71

59.19



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		

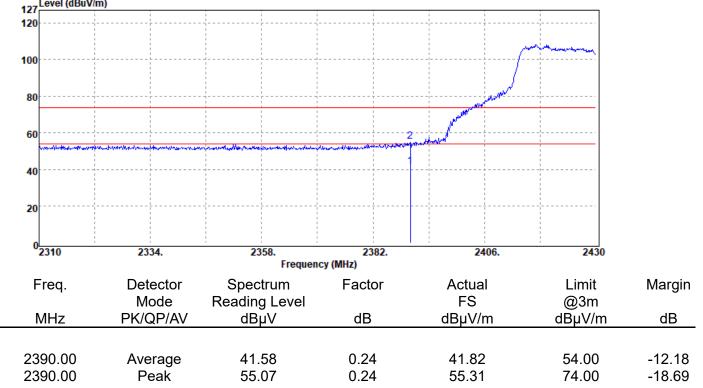


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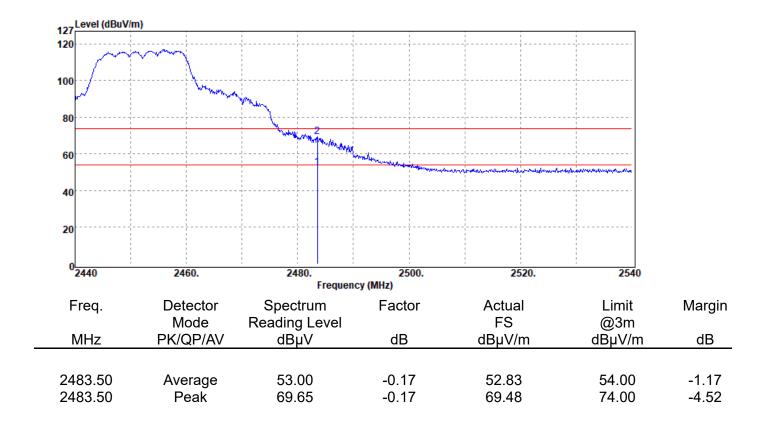
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11g	Temp./Humi.	:22.3/59
Test Channel	:2422 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
Louol (dDuV/m)			



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:ER/2019/B0064	Test Date	:2019-12-17
:802.11g	Temp./Humi.	:22.3/59
:2452 MHz	Antenna Pol.	:VERTICAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11g :2452 MHz :Bandedge CH High	:802.11gTemp./Humi.:2452 MHzAntenna Pol.:Bandedge CH HighEngineer



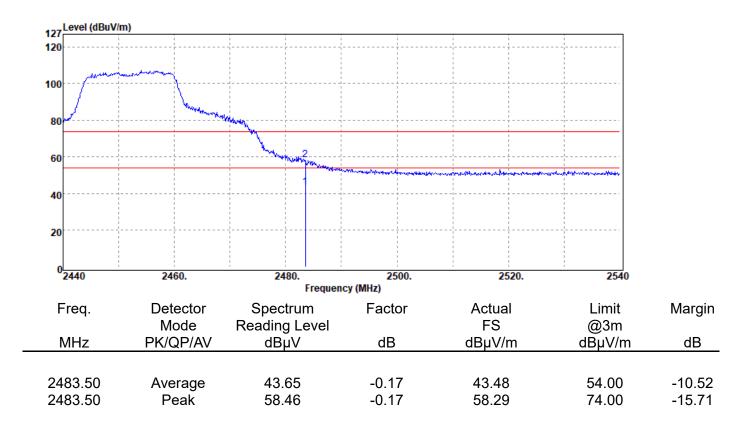
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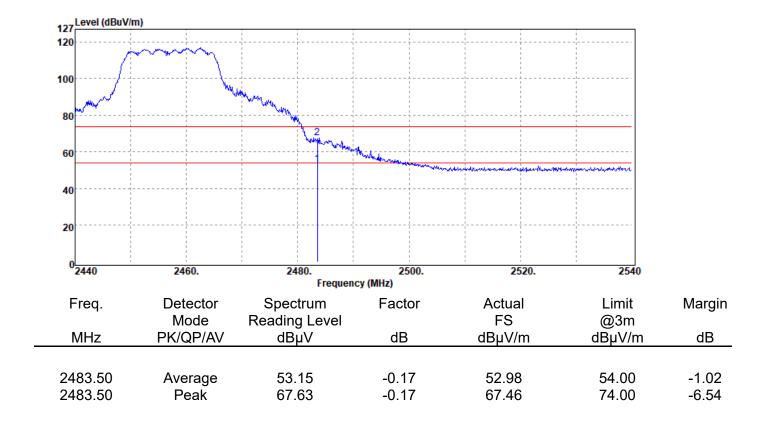
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11g	Temp./Humi.	:22.3/59
Test Channel	:2452 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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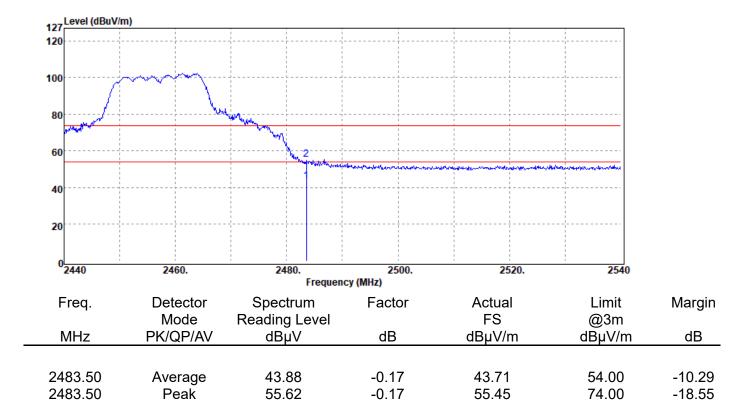
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11g	Temp./Humi.	:22.3/59
Test Channel	:2457 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		
Test Channel Test Mode	:2457 MHz :Bandedge CH High	Antenna Pol.	:VERTICAL



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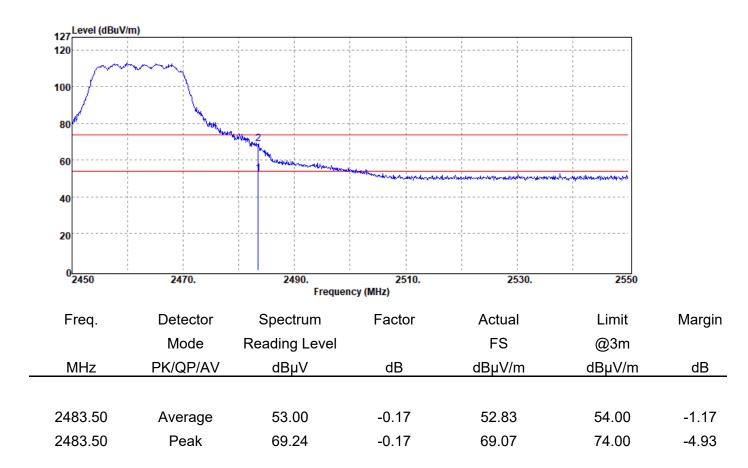
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11g	Temp./Humi.	:22.3/59
Test Channel	:2457 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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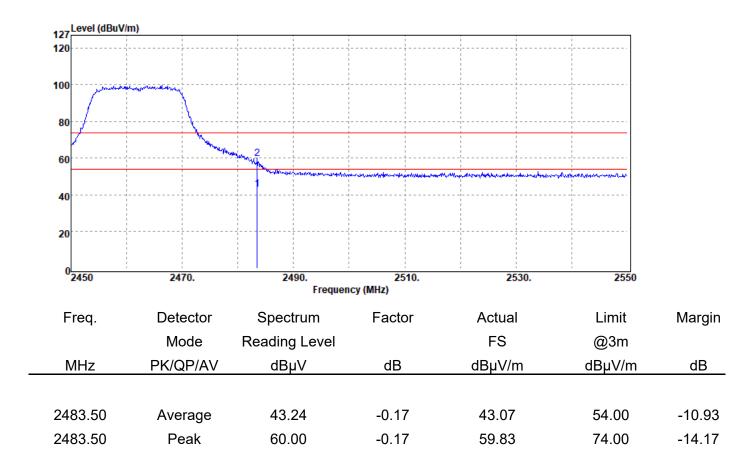
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11g	Temp./Humi.	:22.3/59
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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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	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

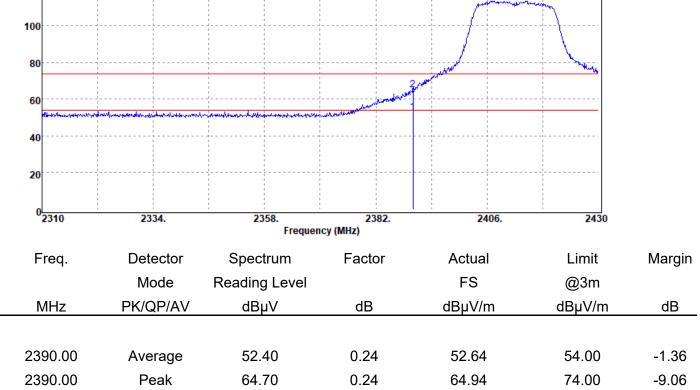


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Report Number	:ER/2019/B0064		Test Da	ate	:2019-12-17
Operation Mode	:802.11n20		Temp./	Humi.	:22.3/59
Test Channel	:2412 MHz		Antenn	a Pol.	:VERTICAL
Test Mode	:Bandedge CH Low		Engine	er	:Thomas
EUT Pol	:E2 Plane				
127 Level (dBuV/m)					
120			 		
				-	



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:2019-12-17

-9.91

-16.76

54.00

74.00

Test Date



:ER/2019/B0064

**Report Number** 

2390.00

2390.00

Average

Peak

Operation Mode	:802.11n20			Temp./Humi.	:22.3/59	
Test Channel	:2412 MHz			Antenna Pol.	:HORIZONT	AL
Test Mode	:Bandedge	CH Low		Engineer	:Thomas	
EUT Pol	:E2 Plane					
127 Level (dBuV/m)						
120			, , , , , , , , , , , , , , , , , , ,			
100				Annan	Mar and a state of the state of	
100				/		
80		 	 	/		
60	       			2 martine and	****Y	
1	er when the property in the second	energian periodian managementer	enter and the second second and			
40						
20						
20						
0 <mark></mark>	2334.	2358.	2382.	2406.	2430	
		Frequer	ncy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz I	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

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43.85

57.00

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0.24

0.24

44.09

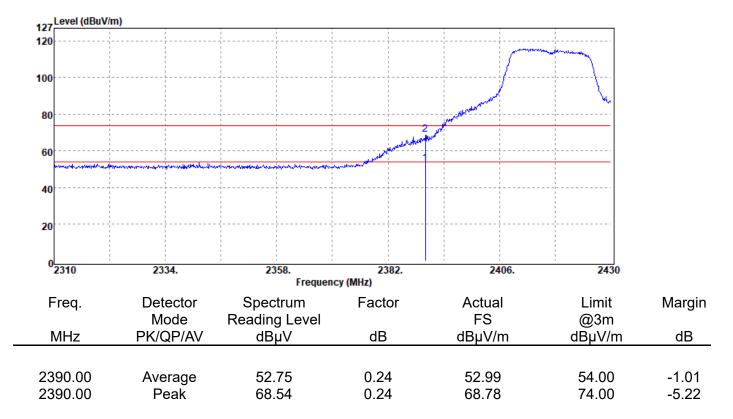
57.24

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



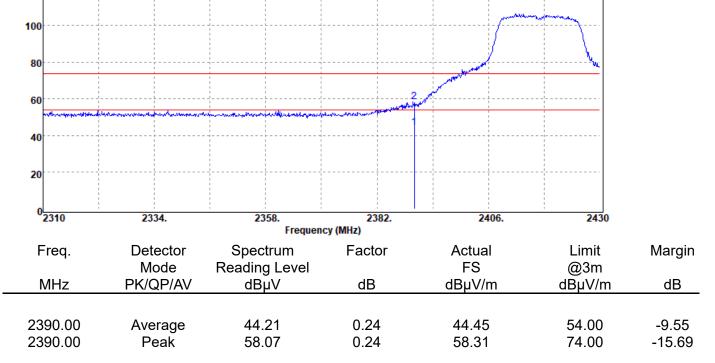
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Report Number	:ER/2019/B0064		Test Date	:2019-12-17
Operation Mode	:802.11n20		Temp./Humi.	:22.3/59
Test Channel	:2417 MHz		Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low		Engineer	:Thomas
EUT Pol	:E2 Plane			
127 Level (dBuV/m)				
120		 	 	



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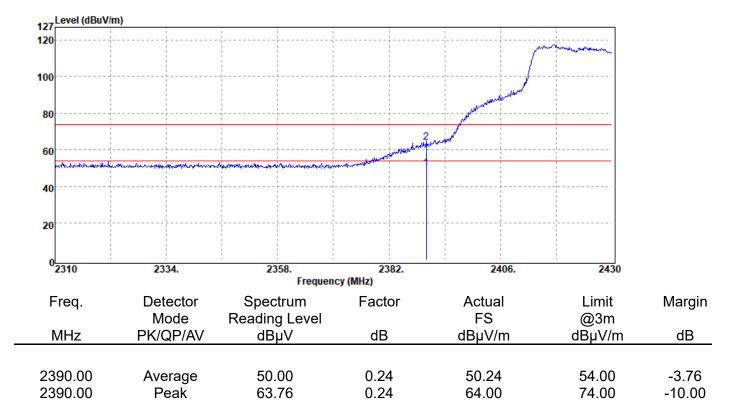
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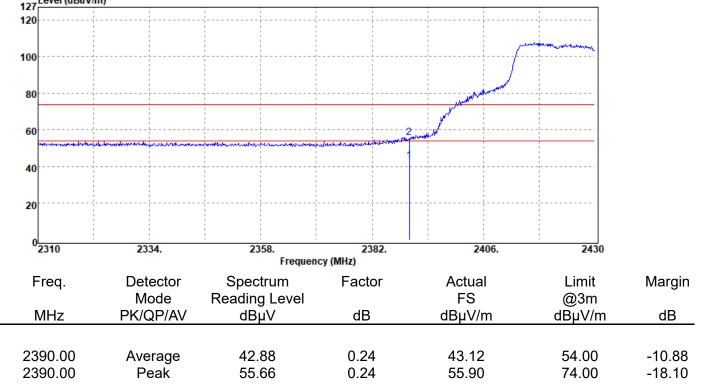
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2422 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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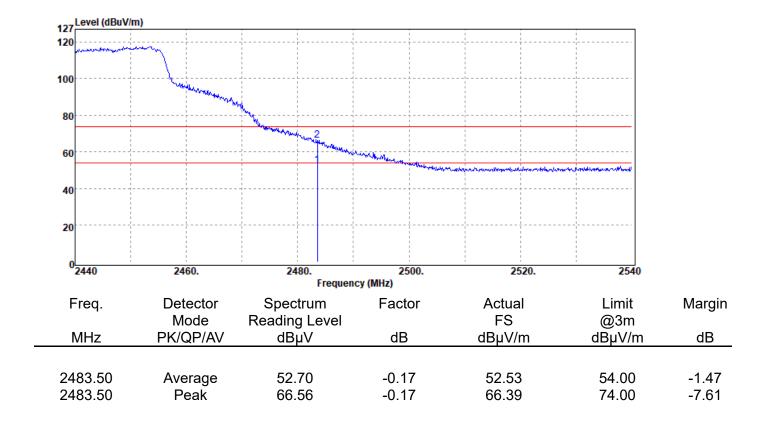
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2422 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
Level (dBuV/m)			



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

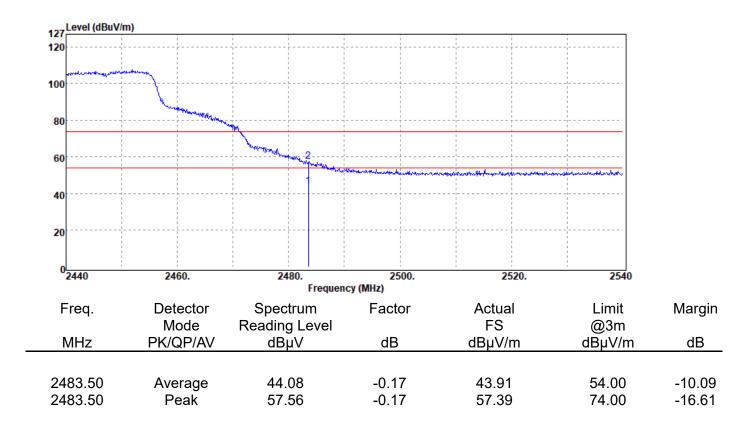


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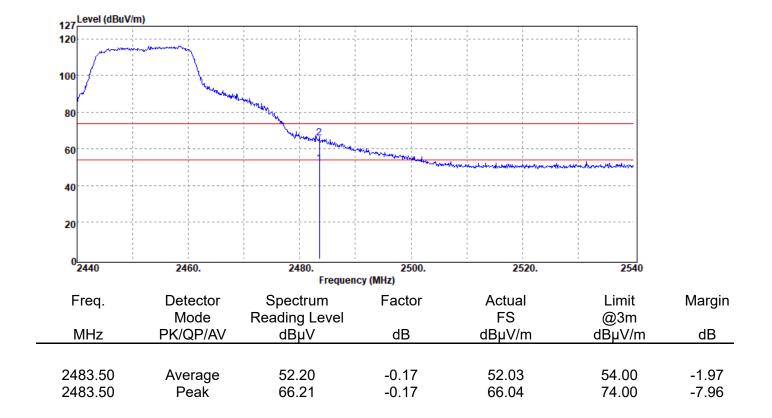
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2447 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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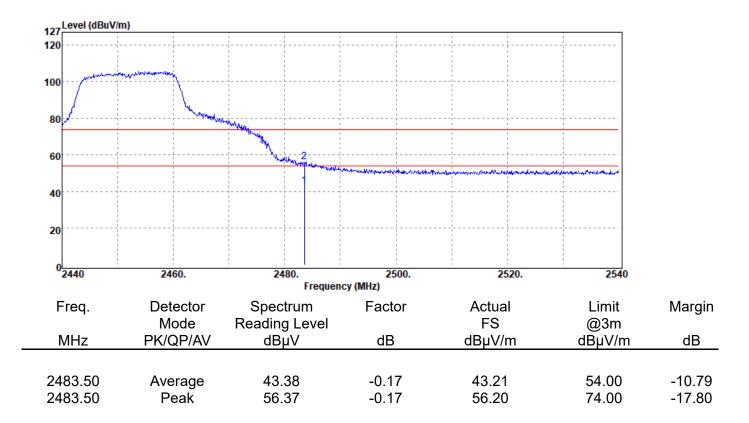
:ER/2019/B0064	Test Date	:2019-12-17
:802.11n20	Temp./Humi.	:22.3/59
:2452 MHz	Antenna Pol.	:VERTICAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11n20 :2452 MHz :Bandedge CH High	:802.11n20Temp./Humi.:2452 MHzAntenna Pol.:Bandedge CH HighEngineer



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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	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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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2457 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

127	evel (dBuV	(m)						
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0 <mark>_2</mark> 4	440	2460.	24	80. Frequei	2500. ncy (MHz)	2520.	2540	
Fr	req.	Detector Mode	Spec Reading	trum	Factor	Actual FS	Limit @3m	Març
Μ	1Hz	PK/QP/AV	dBj		dB	dBµV/m	dBµV/m	dB
2/18	33.50	Average	52.	37	-0.17	52.20	54.00	-1.8
	33.50	Peak	65.		-0.17	64.99	74.00	-9.0

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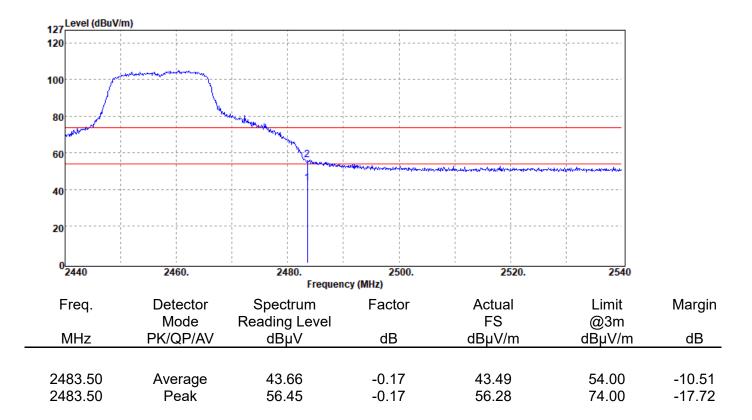
t (886-2) 2299-3279

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 f (886-2) 2298-0488

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



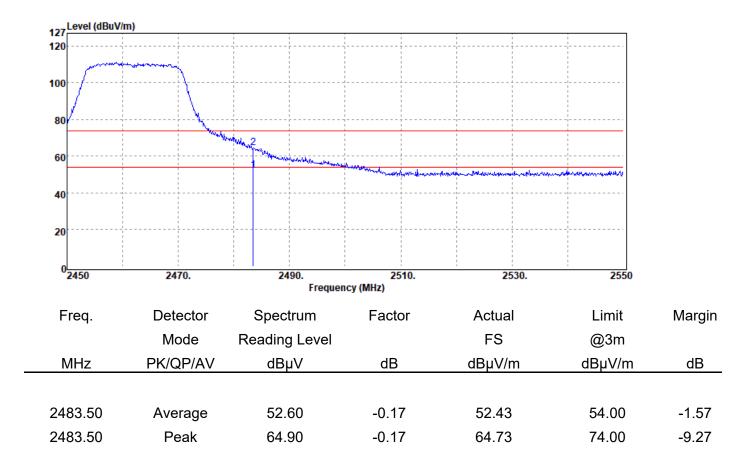
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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



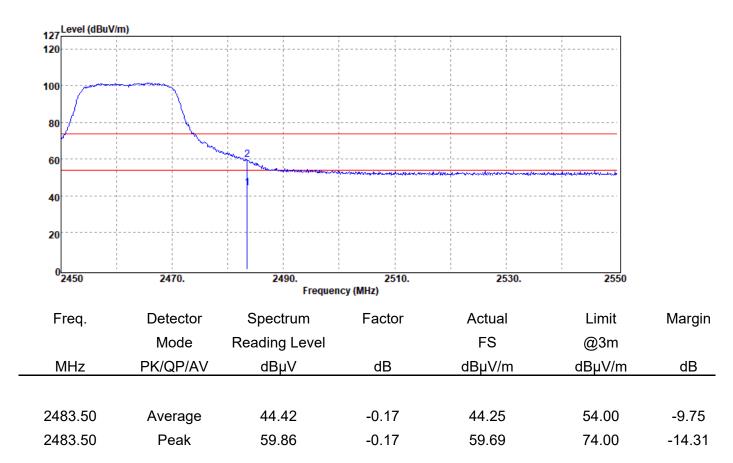
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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n20	Temp./Humi.	:22.3/59
Test Channel	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Margin

dB

-6.46

-1.30

-6.73

-6.77

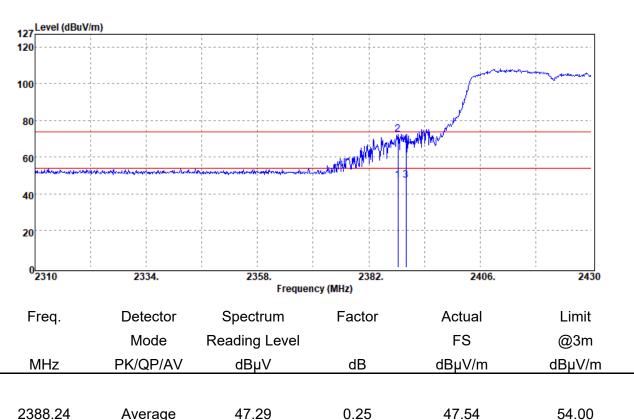
74.00

54.00

74.00



Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	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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72.45

47.03

66.99

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0.25

0.24

0.24

72.70

47.27

67.23

2388.24

2390.00

2390.00

Peak

Average

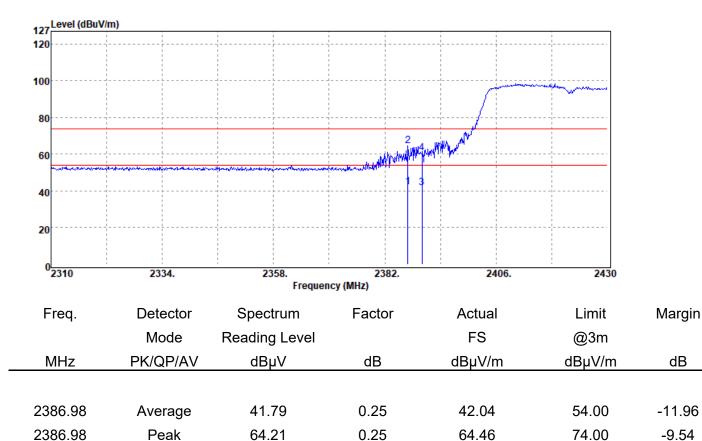
Peak

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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2422 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



41.61

60.50

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0.24

0.24

41.85

60.74

54.00

74.00

-12.15

-13.26

Average

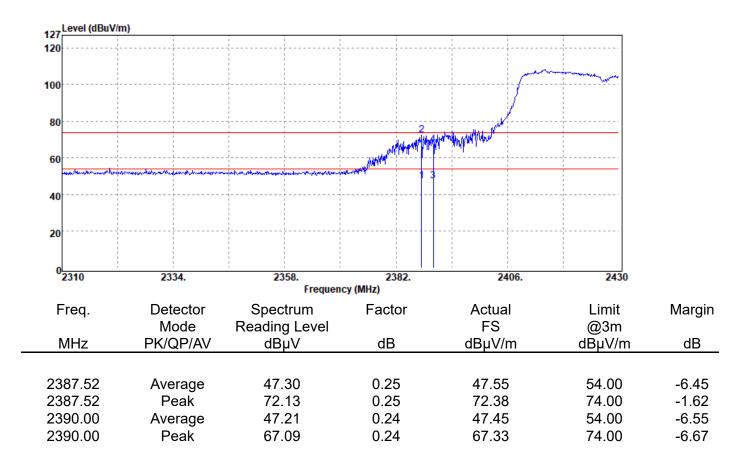
Peak

2390.00

2390.00



Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2427 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



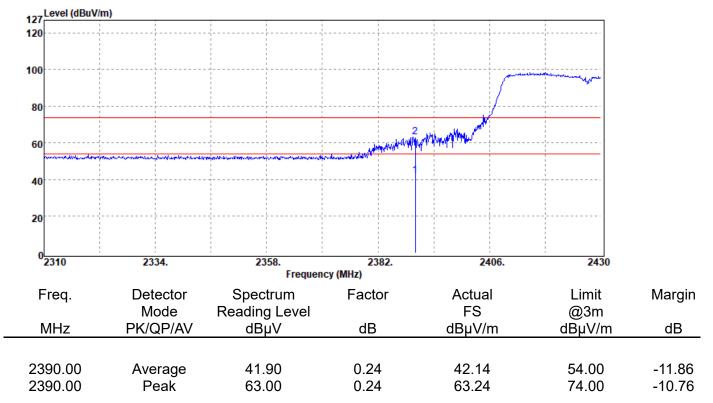
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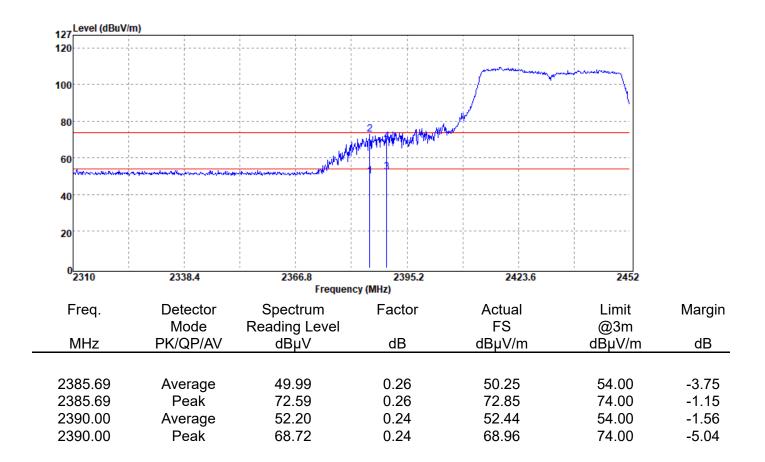
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2427 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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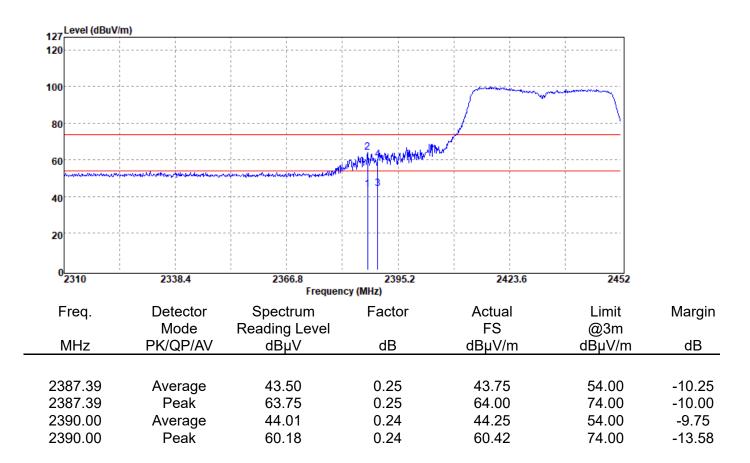
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2432 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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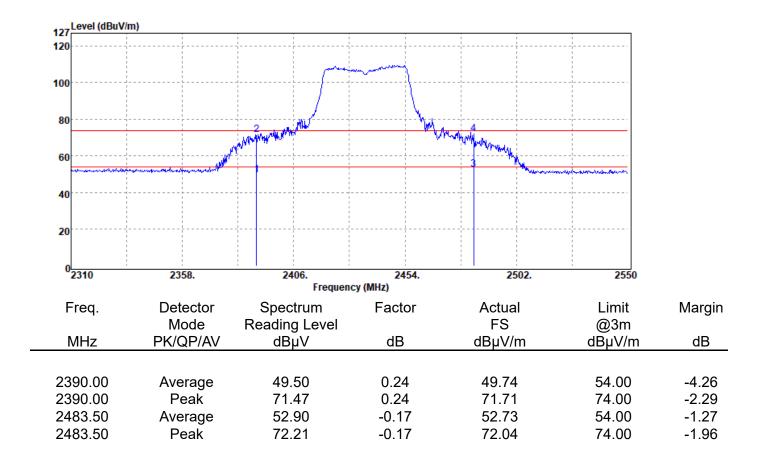
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2432 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2437 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		

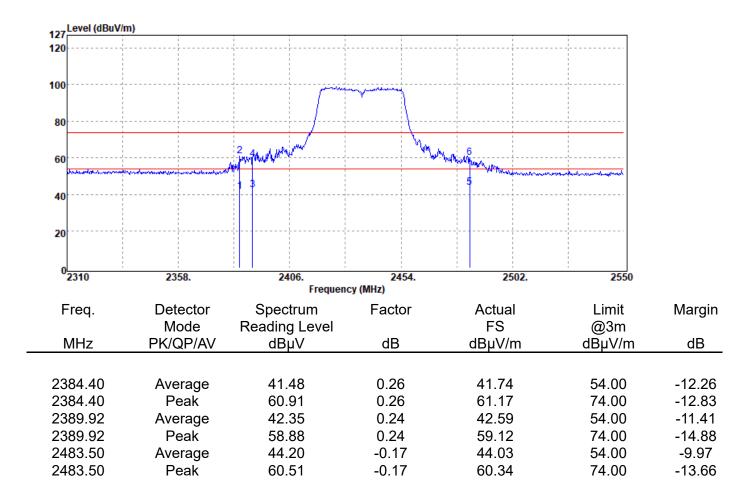


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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		

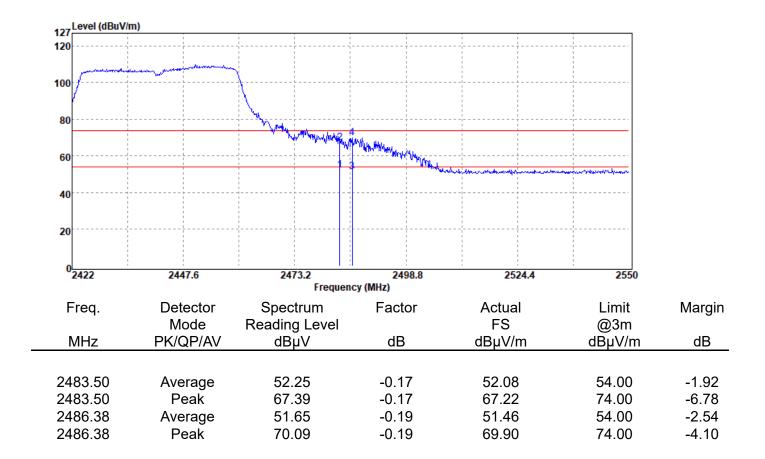


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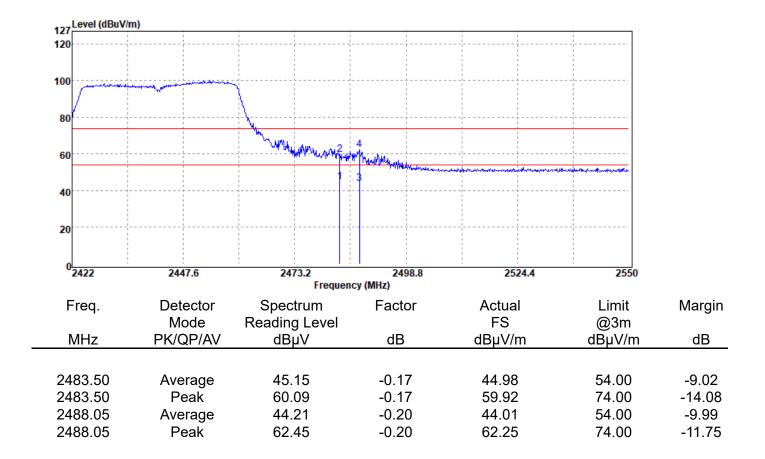
:ER/2019/B0064	Test Date	:2019-12-17
:802.11n40	Temp./Humi.	:22.3/59
:2442 MHz	Antenna Pol.	:VERTICAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11n40 :2442 MHz :Bandedge CH High	:802.11n40Temp./Humi.:2442 MHzAntenna Pol.:Bandedge CH HighEngineer



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:ER/2019/B0064	Test Date	:2019-12-17
:802.11n40	Temp./Humi.	:22.3/59
:2442 MHz	Antenna Pol.	:HORIZONTAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11n40 :2442 MHz :Bandedge CH High	:802.11n40Temp./Humi.:2442 MHzAntenna Pol.:Bandedge CH HighEngineer



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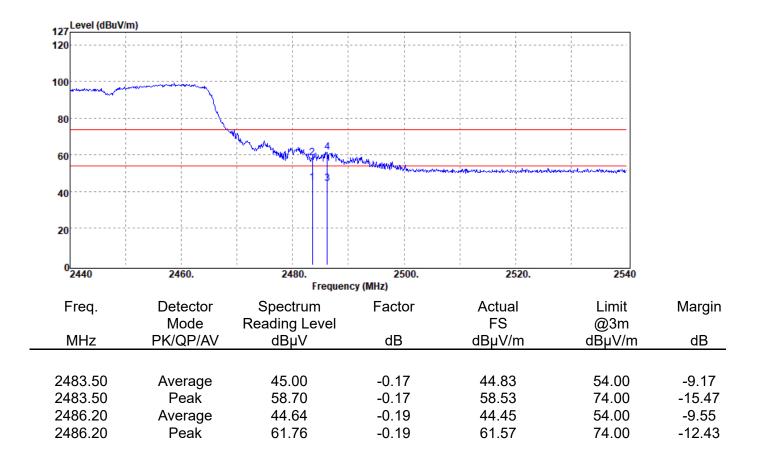
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2447 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

Level (dBuV/n	m)					
127 Level (ubu vii 120						
100	mound the second se					
80	X	A A				
60		nn	and Martine tradition			
00		1 3	WWWWWW	n nga selangan nan nan dipangan dipanga	down on an and a second	
40						
20						
0	2460.	2480.	2500.	2520.	2540	
2440	2400.		2500. cy (MHz)	2520.	2540	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Marg
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	52.55	-0.17	52.38	54.00	-1.6
2483.50	Peak	65.24	-0.17	65.07	74.00	-8.9
2487.40	Average	51.30	-0.19	51.11	54.00	-2.8
2487.40	Peak	71.24	-0.19	71.05	74.00	-2.9

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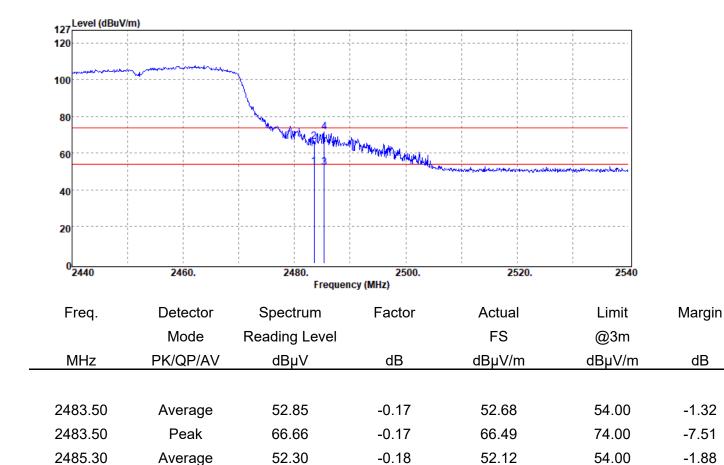
Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2447 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	Temp./Humi.	:22.3/59
Test Channel	:2452 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



71.62

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-0.18

71.44

74.00

-2.56

2485.30

Peak

dB

-15.69

-10.00

-11.55

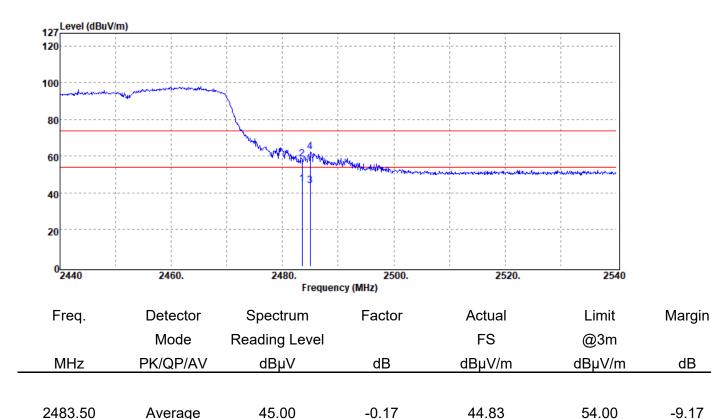
74.00

54.00

74.00



Report Number	:ER/2019/B0064	Test Date	:2019-12-17
Operation Mode	:802.11n40	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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58.48

44.18

62.63

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-0.17

-0.18

-0.18

2483.50

2485.00

2485.00

Peak

Average

Peak

www.sgs.com.tw

58.31

44.00

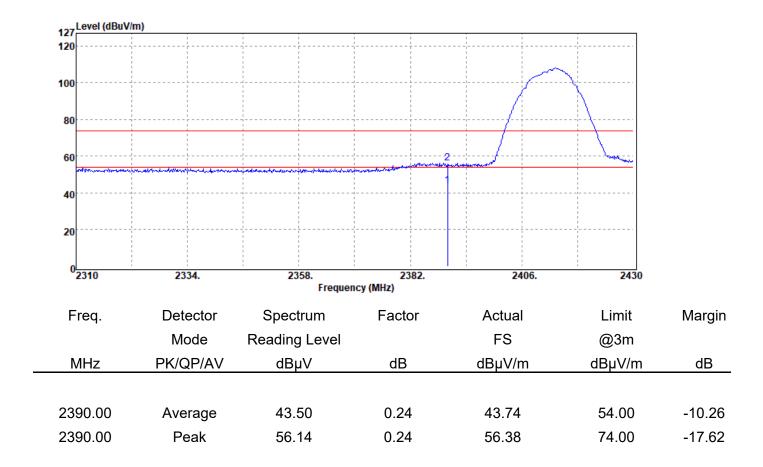
62.45

f (886-2) 2298-0488



## PCB Antenna (Part No.: ANTX100P001B24553)

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



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:2019-12-23

54.00

74.00

-11.95

-18.81

Test Date



:ER/2019/B0064

**Report Number** 

2390.00

2390.00

Average

Peak

Operation Mode Test Channel Test Mode EUT Pol	:802.11b :2412 MHz :Bandedge :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:22.6/62 :HORIZONT/ :Thomas	λL
127 127 120		·				
100						
80						
60	المراجع		4 - Augusta		human	
40						
20						
0						
<sup>0</sup> 2310	2334.	2358. Frequen	2382. cy (MHz)	2406.	2430	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

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41.81 54.95

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0.24

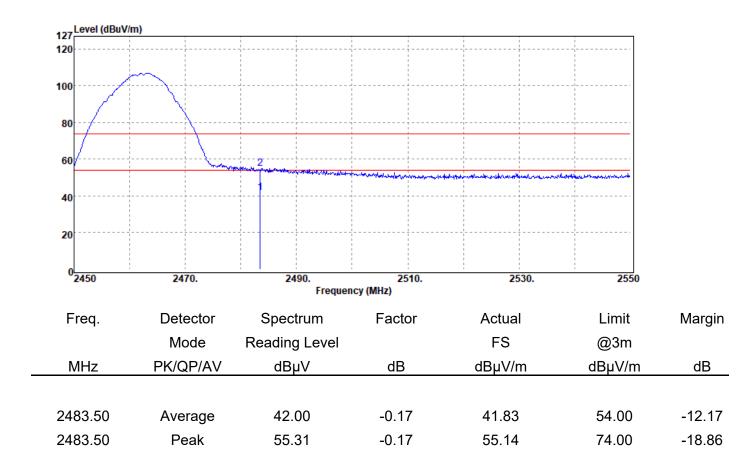
0.24

42.05

55.19



Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11b	Temp./Humi.	:22.6/62
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

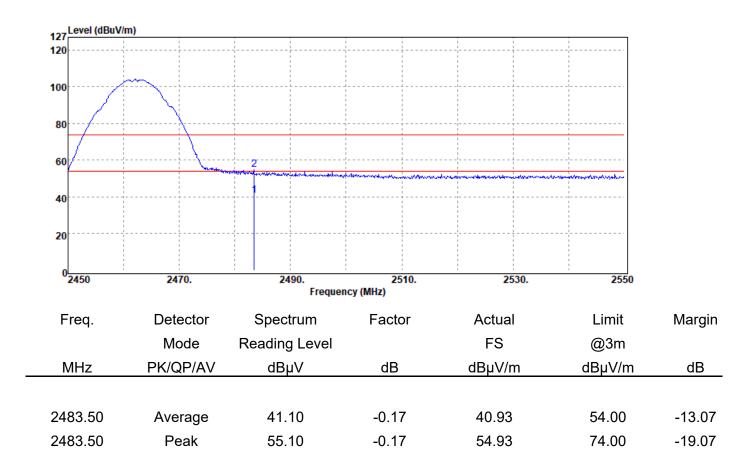


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Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11b	Temp./Humi.	:22.6/62
Test Channel	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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:2019-12-23

Test Date



:ER/2019/B0064

**Report Number** 

peration Mode	:802.11g			Temp./Humi.	:22.6/62
est Channel	:2412 MHz			Antenna Pol.	:VERTICAL
est Mode	:Bandedge CH	Low		Engineer	:Thomas
UT Pol	:E2 Plane				
127 Level (dBuV/m)					
120					
				m	$\sim$
100				1	
80		     			"Link the
			2 Martin Martin	new mark	
60			and the second	<sup>1</sup>	
40					
20					
<sup>0</sup> 2310	2334.	2358. Frequen	2382.	2406.	2430

Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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:2019-12-23

Test Date

62.52

74.00

-11.48



:ER/2019/B0064

**Report Number** 

2390.00

Peak

Operation Mode	:802.11g			Temp./Humi.	:22.6/62	
Test Channel	:2412 MHz	<u>.</u>		Antenna Pol.	:HORIZONT/	۹L
Test Mode	:Bandedge	CH Low		Engineer	:Thomas	
EUT Pol	:E2 Plane					
127 Level (dBuV/m)						
120						
100	     					
100				1	$ \lambda $	
80						
			24	and the contract		
60	warmer and some south and the		and all an an an and a start a start a start a start			
40	·					
20	· • • • • • • • • • • • • • • • • • • •			<mark>-</mark>		
0						
<sup>0 </sup> 2310	2334.	2358. Frequen	2382. cy (MHz)	2406.	2430	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	49.51	0.24	49.75	54.00	-4.25

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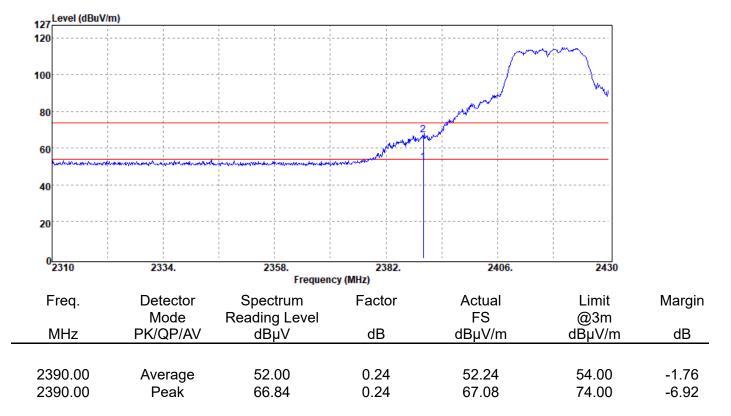
0.24

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f (886-2) 2298-0488



Report Number	:ER/2019/B0064	Test Date	:2019-12-23
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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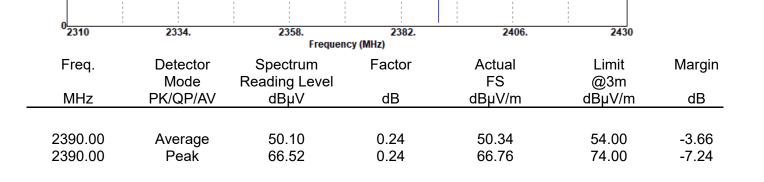
80

60

40

20

Report Number Operation Mode Test Channel Test Mode EUT Pol	:ER/2019/B0064 :802.11g :2417 MHz :Bandedge CH Low :E2 Plane	Test Date Temp./Humi. Antenna Pol. Engineer	:2019-12-23 :22.6/62 :HORIZONTAL :Thomas
127 Level (dBuV/m) 120 100			

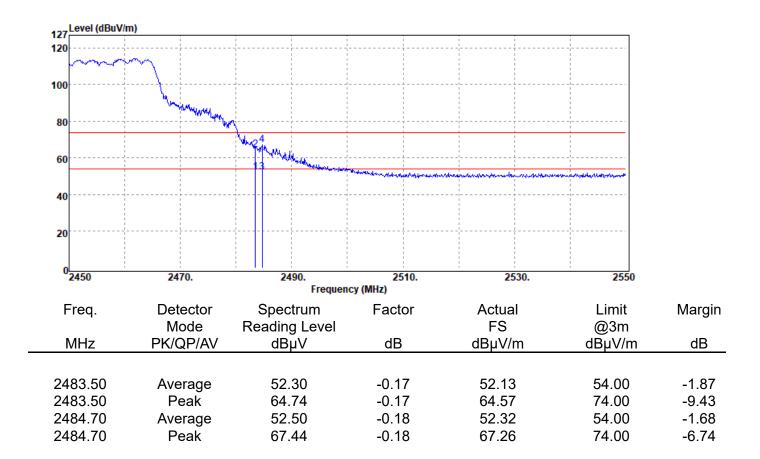


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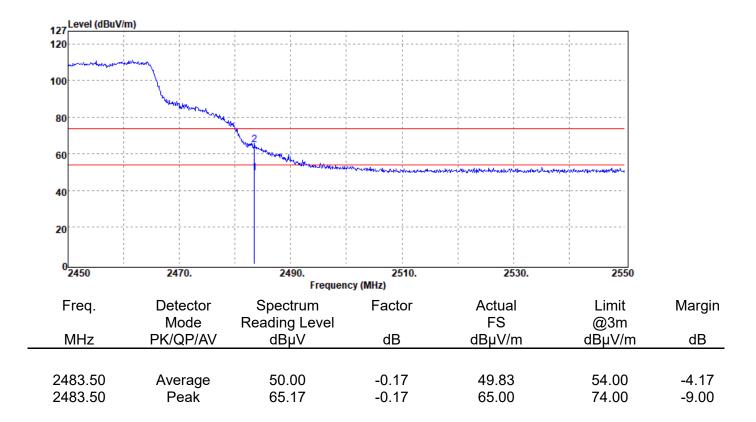
Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11g	Temp./Humi.	:22.6/62
Test Channel	:2457 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-23
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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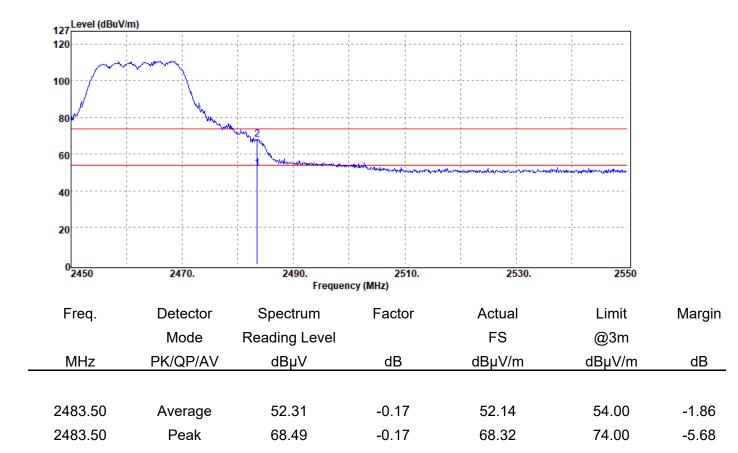
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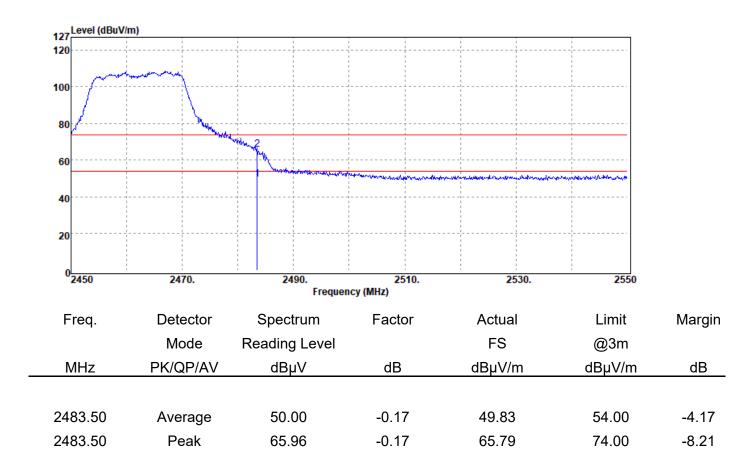
Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11g	Temp./Humi.	:22.6/62
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11g	Temp./Humi.	:22.6/62
Test Channel	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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2430

Margin

Limit

2406.

Actual



80

60

40

20

0<mark>\_\_\_\_\_2310</mark>

Freq.

2334.

Detector

Report Number Operation Mode Test Channel Test Mode EUT Pol	:ER/2019/B0064 :802.11n20 :2412 MHz :Bandedge CH Low :E2 Plane				Test Da Temp./ Antenr Engine	Humi. na Pol.	:2019-1 :22.6/62 :VERTI :Thoma	2 CAL
127 Level (dBuV/m)								-
120								
				1	ſ			
100		       			1	4		

2358.

Spectrum

			1				0
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dBµV	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

Frequency (MHz)

2382.

Factor

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:2019-12-23

Test Date



:ER/2019/B0064

**Report Number** 

peration Mode	:802.11n20			Temp./Humi.	:22.6/62
est Channel	:2412 MHz			Antenna Pol.	:HORIZONT
st Mode	:Bandedge	CH Low		Engineer	:Thomas
JT Pol	:E2 Plane				
127 Level (dBuV/m)					
120					
100					
				/	
80					And and a start of the start of
60			2 under a second of the desired by the	and the second se	
		and and the second s	man and a second and		
40	         				 
20					
0 2310	2334.	2358.	2382.	2406.	2430

Frequency (MHz)

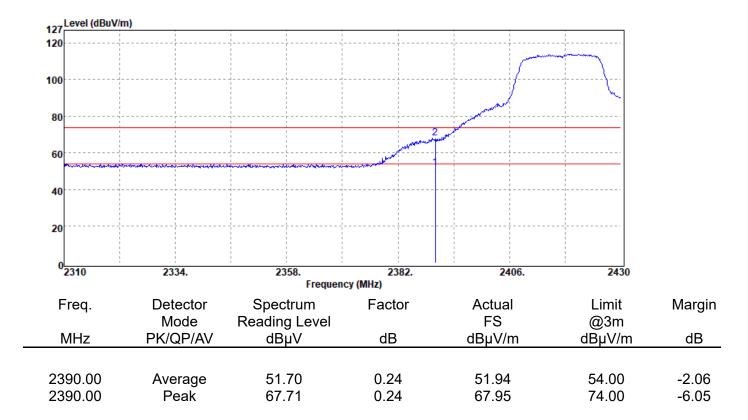
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	50.07	0.24	50.31	54.00	-3.69
2390.00	Peak	63.85	0.24	64.09	74.00	-9.91

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Report Number	:ER/2019/B0064	Test Date	:2019-12-23
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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80

60

40

20

0

Report Number	:ER/2019/B0064	Test Date	:2019-12-23
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		
127	· · · · · · · · · · · · · · · · · · ·		
120			
100			
100		: : :/	A A A

	2310	2334.	Z 336. Frequenc	2362. ;y (MHz)	2400.	2430	
	Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	2390.00 2390.00	Average Peak	49.90 64.91	0.24 0.24	50.14 65.15	54.00 74.00	-3.86 -8.85
	2000.00	i our	01.01	0.21	00.10	11.00	0.00

2

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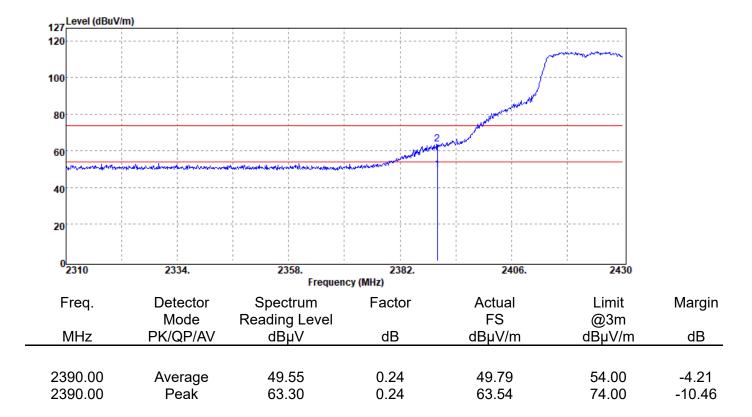
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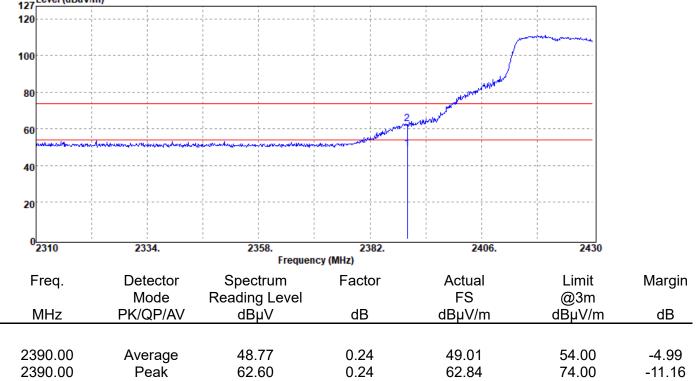
Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11n20	Temp./Humi.	:22.6/62
Test Channel	:2422 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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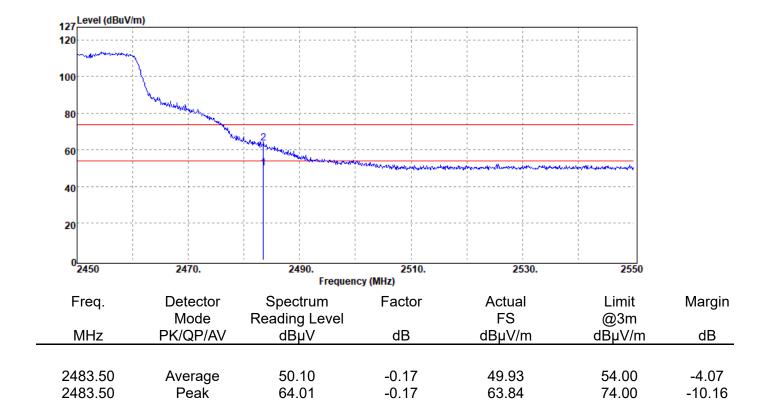
Report Number	:ER/2019/B0064	Test Date	:2019-12-23
Operation Mode	:802.11n20	Temp./Humi.	:22.6/62
Test Channel	:2422 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
Level (dBuV/m)			



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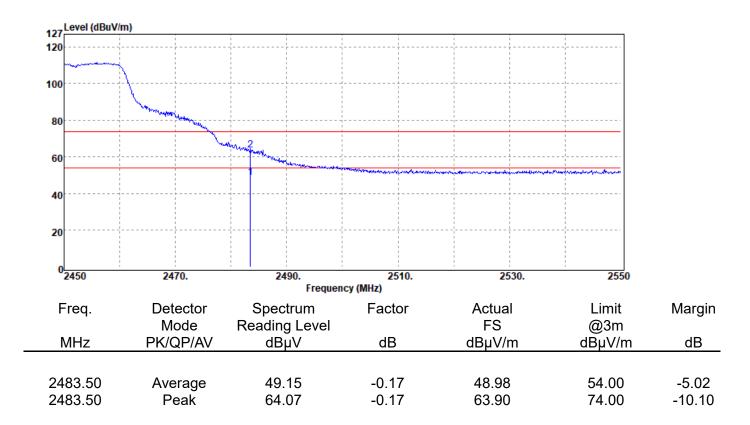
Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2452 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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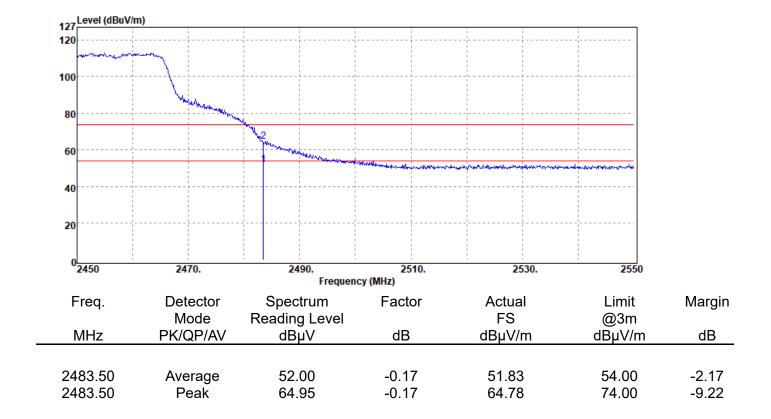
Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2452 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2457 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



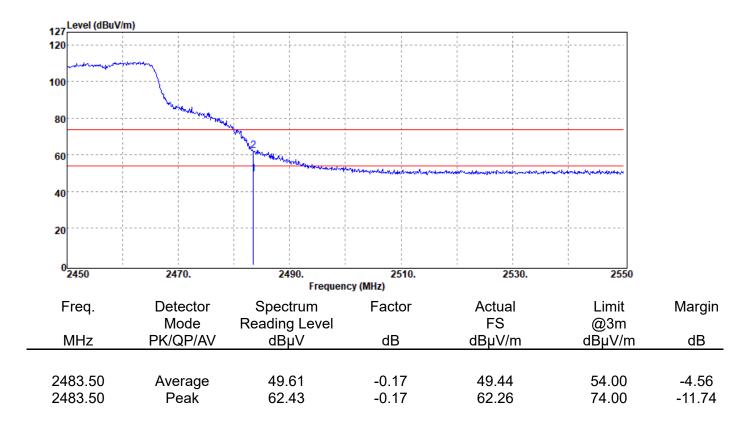
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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2457 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

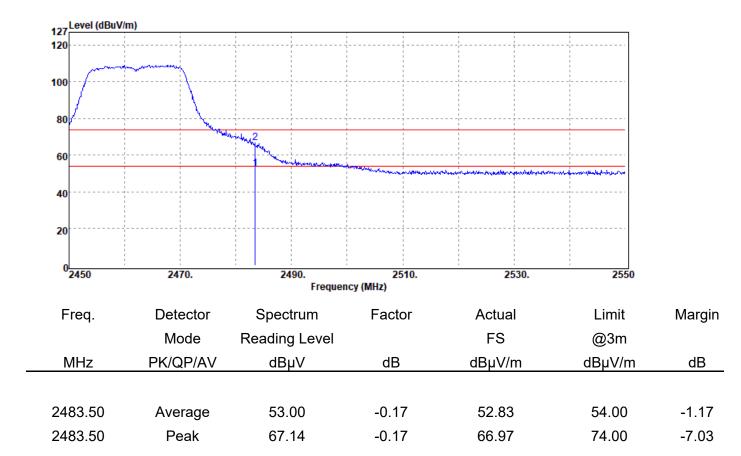


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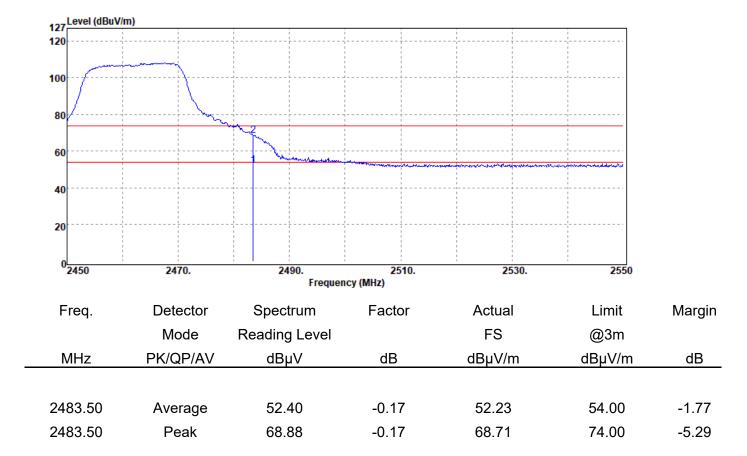
Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2462 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n20	Temp./Humi.	:23/67
Test Channel	:2462 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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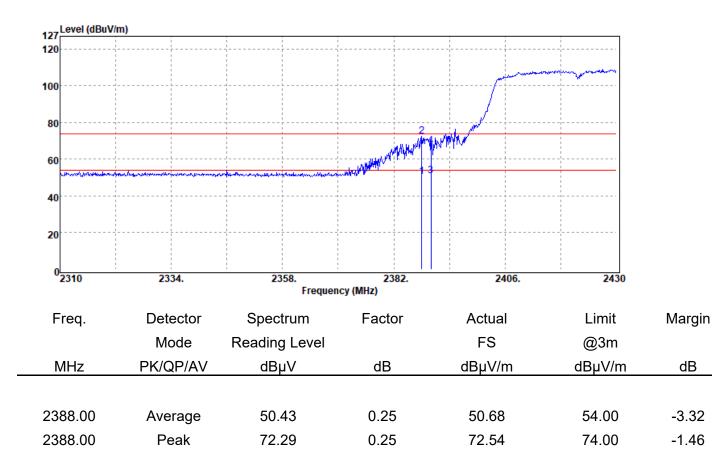
-6.64

54.00

74.00



Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2422 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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0.24

0.24

50.80

67.36

2390.00

2390.00

Average

Peak

f (886-2) 2298-0488



60

40

20

Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2422 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
127 Level (dBuV/m)			
120			
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0 <mark></mark> 2310	2334.	2358.	2382.	2406.	2430	
		Frequence	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	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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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
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		

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0 <mark>2</mark>	:310	2334.	2358. Frequer	2382. 1cy (MHz)	2406.	2430	
F	req.	Detector	Spectrum	Factor	Actual	Limit	Margir
Ν	1Hz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
238	87.52	Average	51.70	0.25	51.95	54.00	-2.05
238	37.52	Peak	71.05	0.25	71.30	74.00	-2.70
				0.04	50.04	F4 00	1 06
239	90.04	Average	52.70	0.24	52.94	54.00	-1.06

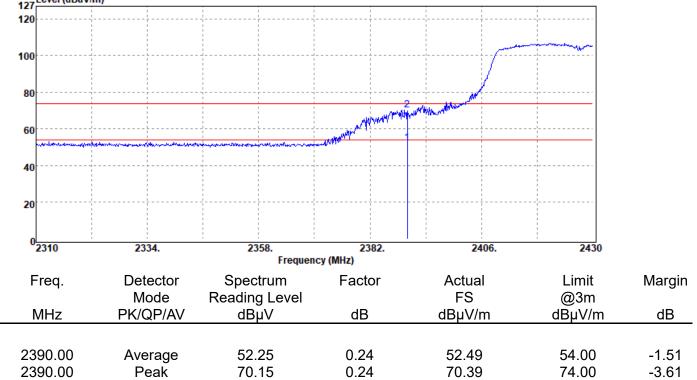
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f (886-2) 2298-0488



Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2427 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		
Level (dBuV/m)			

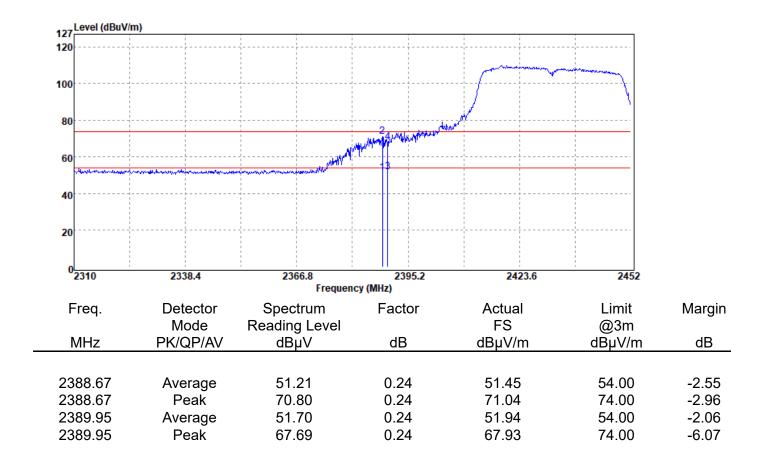


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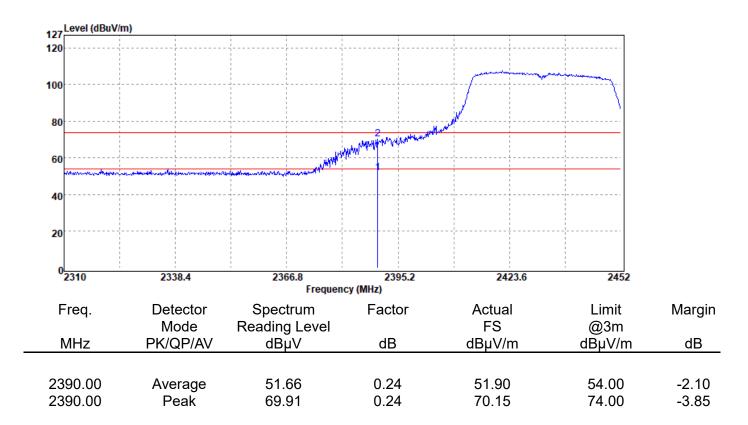
Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2432 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Thomas
EUT Pol	:E2 Plane		



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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
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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Loval (dDu//m)

ER/2019/B0064	Test Date	:2019-12-24
302.11n40	Temp./Humi.	:23/67
2437 MHz	Antenna Pol.	:VERTICAL
Bandedge CH Mid	Engineer	:Thomas
E2 Plane		
	802.11n40 2437 MHz Bandedge CH Mid	302.11n40Temp./Humi.2437 MHzAntenna Pol.Bandedge CH MidEngineer

127 Level (dBuV	//m)					
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Freq.	Detector	Frequent Spectrum	Factor	Actual	Limit	Margin
rieq.	Mode	Reading Level	1 actor	FS	@3m	Margin
MHz	PK/QP/AV	dBµV	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

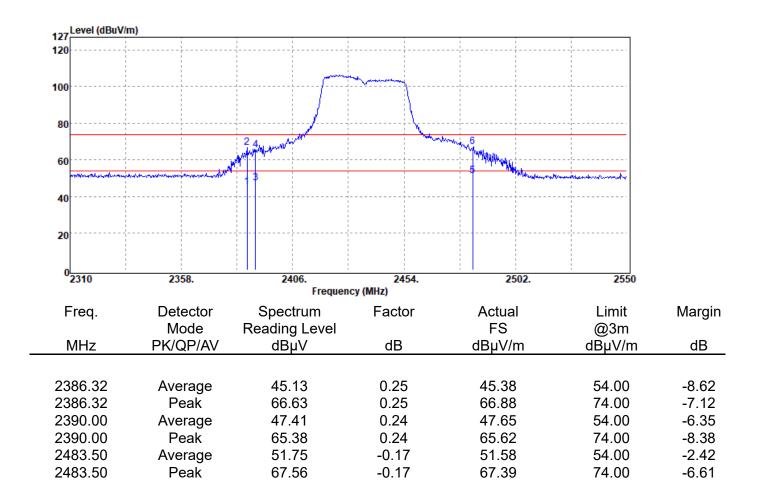
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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		



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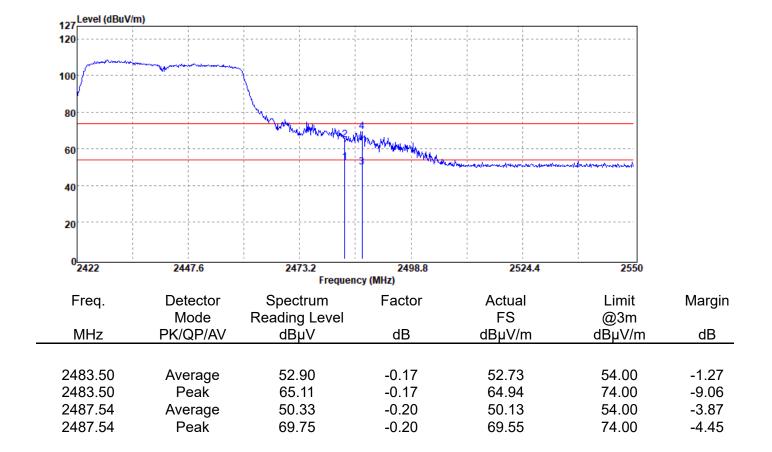
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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2442 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



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:ER/2019/B0064	Test Date	:2019-12-24
:802.11n40	Temp./Humi.	:23/67
:2442 MHz	Antenna Pol.	:HORIZONTAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11n40 :2442 MHz :Bandedge CH High	:802.11n40Temp./Humi.:2442 MHzAntenna Pol.:Bandedge CH HighEngineer

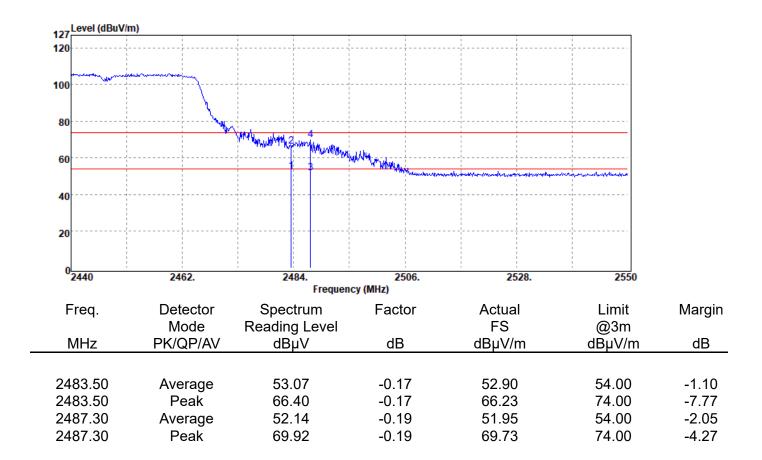
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°2	422	2447.6	2473.2 Freque	2498.8 ency (MHz)	2524.4	2550	
Fr	req.	Detector	Spectrum	Factor	Actual	Limit	Margi
	•	Mode	Reading Level		FS	@3m	Ũ
Ν	1Hz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	33.50	Average	51.66	-0.17	51.49	54.00	-2.51
	33.50	Peak	65.58	-0.17	65.41	74.00	-8.59
	36.90	Average	49.71	-0.19	49.52	54.00	-4.48
248	36.90	Peak	67.01	-0.19	66.82	74.00	-7.18

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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2447 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		

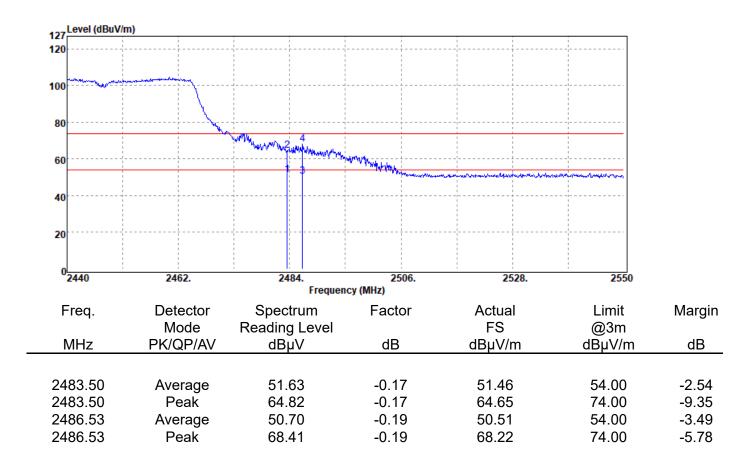


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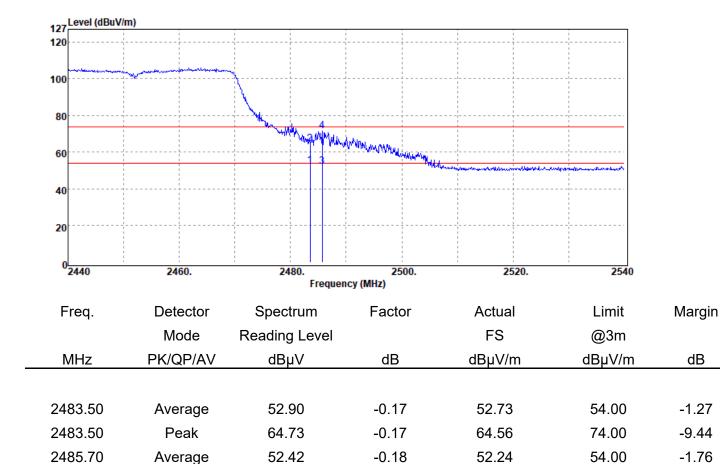
:ER/2019/B0064	Test Date	:2019-12-24
:802.11n40	Temp./Humi.	:23/67
:2447 MHz	Antenna Pol.	:HORIZONTAL
:Bandedge CH High	Engineer	:Thomas
:E2 Plane		
	:802.11n40 :2447 MHz :Bandedge CH High	:802.11n40Temp./Humi.:2447 MHzAntenna Pol.:Bandedge CH HighEngineer



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Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	Temp./Humi.	:23/67
Test Channel	:2452 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Thomas
EUT Pol	:E2 Plane		



71.68

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-0.18

71.50

74.00

-2.50

2485.70

Peak

dB

-8.52

-3.00

-5.21

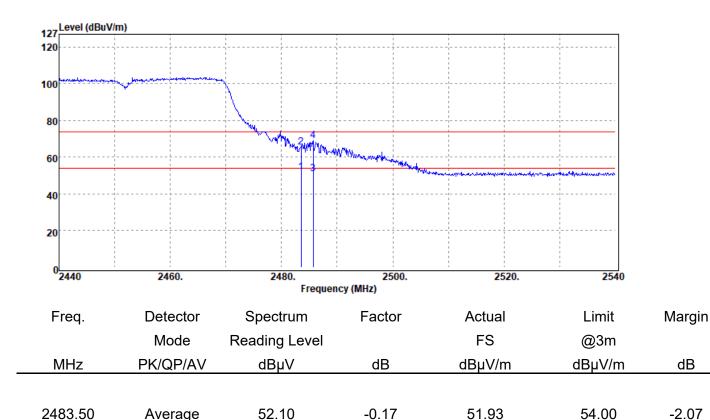
74.00

54.00

74.00



Report Number	:ER/2019/B0064	Test Date	:2019-12-24
Operation Mode	:802.11n40	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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65.65

51.18

68.97

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-0.17

-0.18

-0.18

65.48

51.00

68.79

2483.50

2485.70

2485.70

Peak

Average

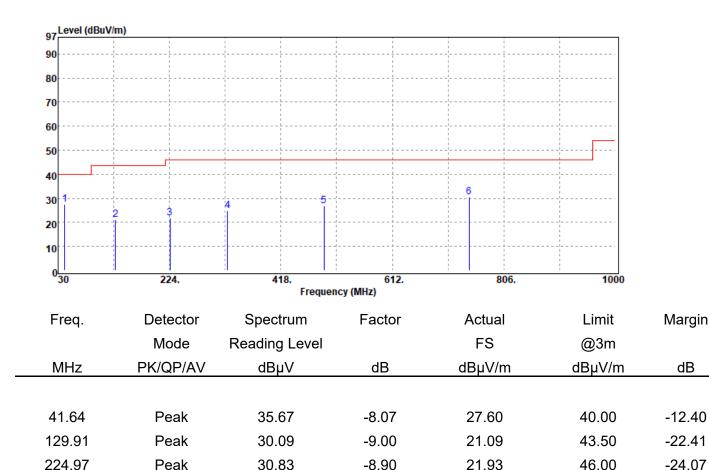
Peak



## 11.7.2 Below 1GHz Worst-Case Emission:

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

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



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30.20

29.24

28.14

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-5.29

-2.45

2.46

台灣檢驗科技股份有限公司

324.88

492.69

745.86

t (886-2) 2299-3279

Peak

Peak

Peak

f (886-2) 2298-0488 www.sgs.com.tw

24.91

26.79

30.60

-21.09

-19.21

-15.40

46.00

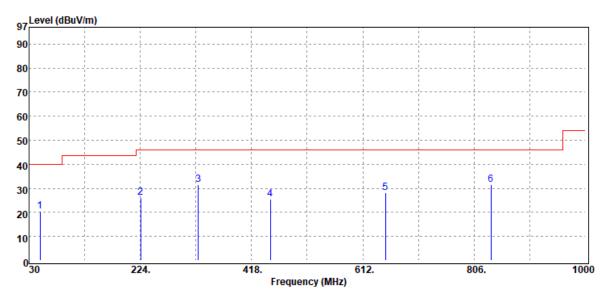
46.00

46.00

Member of SGS Group



Report Number	:ER/2019/B0064	Test Date	:2020-02-04
Operation Mode	:802.11g	Temp./Humi.	:20.2/65
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		

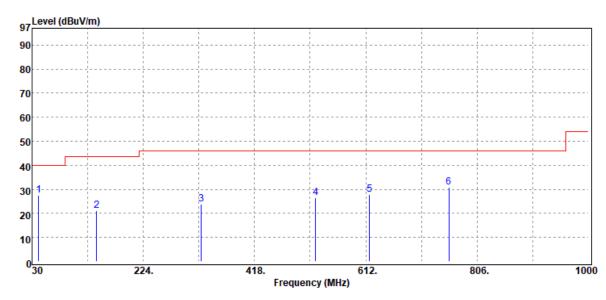


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
49.40	Peak	28.26	-7.66	20.60	40.00	-19.40
224.97	Peak	35.24	-8.90	26.34	46.00	-19.66
324.88	Peak	36.96	-5.29	31.67	46.00	-14.33
450.98	Peak	28.66	-3.27	25.39	46.00	-20.61
651.77	Peak	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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Report Number	:ER/2019/B0064	Test Date	:2020-02-04
Operation Mode	:802.11n40	Temp./Humi.	:20.2/65
Test Channel	:2437 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		

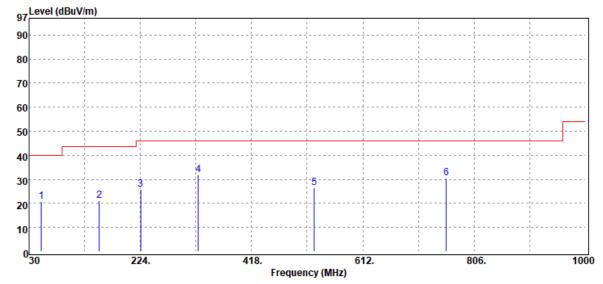


	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	41.64	Peak	35.74	-8.07	27.67	40.00	-12.33
	142.52	Peak	28.62	-7.42	21.20	43.50	-22.30
	324.88	Peak	29.13	-5.29	23.84	46.00	-22.16
	524.70	Peak	28.44	-2.08	26.36	46.00	-19.64
	618.79	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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Report Number	:ER/2019/B0064	Test Date	:2020-02-04
Operation Mode	:802.11n40	Temp./Humi.	:20.2/65
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
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	dBµV	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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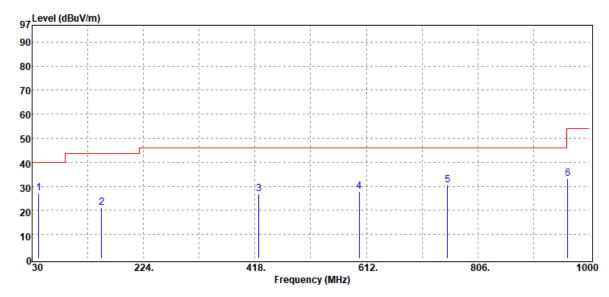
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# PCB Antenna (Part No.: ANTX100P001B24553)

Report Number	:ER/2019/B0064
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
Antenna Pol.	:VERTICAL
Engineer	:Thomas



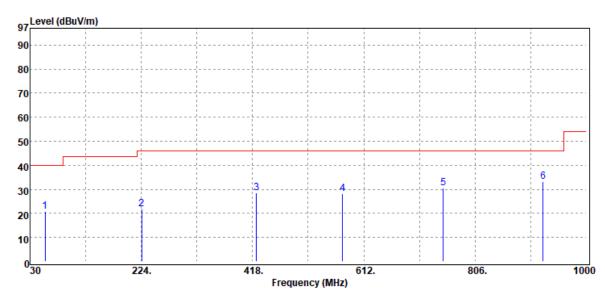
	Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
_	MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	41.64	Peak	35.33	-8.07	27.26	40.00	-12.74
	151.25	Peak	28.12	-6.99	21.13	43.50	-22.37
	424.79	Peak	30.70	-3.82	26.88	46.00	-19.12
	599.39	Peak	28.03	-0.15	27.88	46.00	-18.12
	753.62	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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Report Number	:ER/2019/B0064	Test Date	:2020-02-04
Operation Mode	:802.11g	Temp./Humi.	:20.2/65
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Thomas
EUT Pol	:E2 Plane		

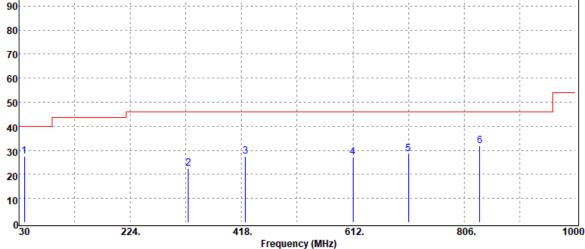


Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Peak	28.64	-7.97	20.67	40.00	-19.33
Peak	30.79	-8.90	21.89	46.00	-24.11
Peak	32.39	-3.82	28.57	46.00	-17.43
Peak	29.39	-1.19	28.20	46.00	-17.80
Peak	27.65	2.78	30.43	46.00	-15.57
Peak	28.20	5.10	33.30	46.00	-12.70
	Mode PK/QP/AV Peak Peak Peak Peak Peak Peak	ModeReading LevelPK/QP/AVdBµVPeak28.64Peak30.79Peak32.39Peak29.39Peak27.65	Mode         Reading Level           PK/QP/AV         dBµV         dB           Peak         28.64         -7.97           Peak         30.79         -8.90           Peak         32.39         -3.82           Peak         29.39         -1.19           Peak         27.65         2.78	Mode         Reading Level         FS           PK/QP/AV         dBμV         dB         dBμV/m           Peak         28.64         -7.97         20.67           Peak         30.79         -8.90         21.89           Peak         32.39         -3.82         28.57           Peak         29.39         -1.19         28.20           Peak         27.65         2.78         30.43	Mode PK/QP/AVReading Level dBμVFS dB dBμV/m@3m dBμV/mPK/QP/AVdBμVdBdBμV/mdBμV/mPeak28.64-7.9720.6740.00Peak30.79-8.9021.8946.00Peak32.39-3.8228.5746.00Peak29.39-1.1928.2046.00Peak27.652.7830.4346.00

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Report Number	:ER/2019/B0064				Test Date	:2020-02-04
Operation Mode	:802.11n40	:802.11n40				:20.2/65
Test Channel	:2437 MHz				Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid		Engineer	:Thomas		
EUT Pol	:E2 Plane					
97						
90						

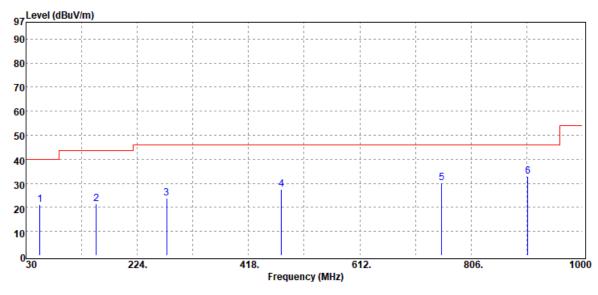


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	Peak	35.81	-8.31	27.50	40.00	-12.50
324.88	Peak	27.80	-5.29	22.51	46.00	-23.49
424.79	Peak	31.19	-3.82	27.37	46.00	-18.63
612.00	Peak	27.64	-0.34	27.30	46.00	-18.70
709.00	Peak	27.90	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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Report Number	:ER/2019/B0064	Test Date	:2020-02-04
Operation Mode	:802.11n40	Temp./Humi.	:20.2/65
Test Channel	:2437 MHz	Antenna Pol.	:HORIZONTAL
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	dBµV	dB	dBµV/m	dBµV/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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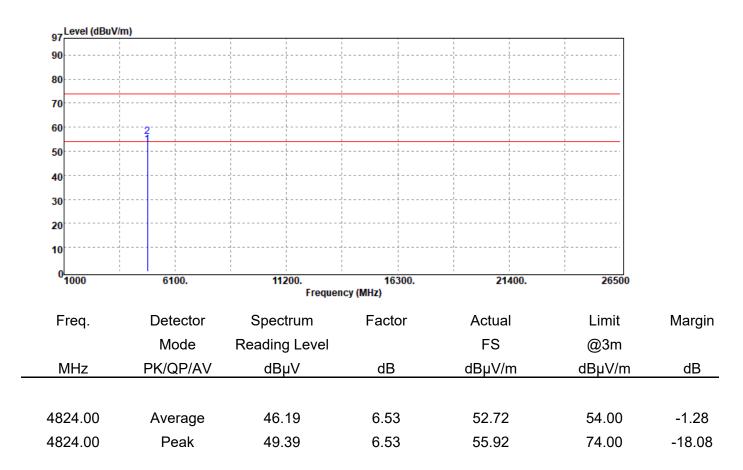
t (886-2) 2299-3279



#### 11.7.3 Above 1GHz Emission:

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

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



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陳邦芳有說明<sup>1</sup> 几報告結果僅對測試之後結員員,「同時近後品種採留列気、<sup>6</sup> 本報告未送年公司音間計可,<sup>1</sup>、<sup>4</sup> 中部位復殺。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>http://www.sgs.com.tw/Terms-and-Conditions</u> and for electronic format documents, subject to Terms and Conditions for Electronic Documents at <u>http://www.sgs.com.tw/Terms-and-Conditions</u>. Attention is drawn to the limitation of liability, indemnifica-tion and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Taiwan Ltd 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

f (886-2) 2298-0488

Test Date



:ER/2019/B0064

**Report Number** 

Deration Mode Test Channel Test Mode EUT Pol	:EX/2019/E :802.11b :2412 MHz :Tx CH Lov :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:21.1/62 :HORIZONT/ :Thomas	ΑL
97 Level (dBuV/m)						
90						
80						
70						
60	0					
50	1		     			
40						
30						
20						
10						
0 <mark></mark>	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margir
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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t (886-2) 2299-3279



Report Number	:ER/2019/I	30064		Test Date	:2019-12-18	
Operation Mode	:802.11b			Temp./Humi.	:21.1/62	
Test Channel	:2437 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mid	b		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70						
60	2					
50						
40						
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Frequen	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	45.74	6.69	52.43	54.00	-1.57
4874.00	Peak	48.44	6.69	55.13	74.00	-18.87

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Test Date



·ER/2019/B0064

**Report Number** 

	:ER/2019/E	30064		Tool Date	.2010 12 10	
peration Mode	:802.11b			Temp./Humi.	:21.1/62	
est Channel	:2437 MHz			Antenna Pol.	:HORIZONT	AL
est Mode	:Tx CH Mid	:Tx CH Mid			:Thomas	
UT Pol	:E2 Plane					
97 97	)	: :		: :	1	
90						
80						
70			· · · · · · · · · · · · · · · · · · ·			
60						
50	2					
40						
30						
20						
10						
0 <mark>1000</mark>	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margir
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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
			0.00	02.00	1	

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Test Date



:ER/2019/B0064

**Report Number** 

	Mada	Decisional aval		F0	@?m	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Marg
<sup>01</sup> 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
10						
20		· · · · · · · · · · · · · · · · · · ·				
30						
40						
50						
60	7					
70						
80						
90						
97						
T Pol	:E2 Plane			5		
st Mode	:Tx CH Higl	h		Engineer	:Thomas	
t Channel	:2462 MHz			Antenna Pol.	:VERTICAL	
eration Mode	:802.11b			Temp./Humi.	:21.1/62	

	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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-22.83

74.00

Test Date

51.17



:ER/2019/B0064

**Report Number** 

4924.00

Peak

Operation Mode Test Channel Test Mode EUT Pol	:802.11b :2462 MHz :Tx CH Hig :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:21.1/62 :HORIZONT/ :Thomas	AL
97 Level (dBuV/m	)					
90						
80						
70	 					
60			       			
50					<sup>1</sup>	
40						
30						
20						
10			, , , , , , , , , , , , , , , , , , ,		<sup>1</sup>	
0 <mark></mark>	6100 <b>.</b>	11200. Frequen	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	41.01	6.85	47.86	54.00	-6.14

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6.85

74.00

-17.04

Test Date



:ER/2019/B0064

**Report Number** 

4824.00

Peak

97 90 80 70 60 50 40	30 20			 		
90 80 70 60 2	30	 		 		
90 80	50	22		 		
		//m)		 		
	Operation Moo Test Channel	de :802.11g :2412 MHz	:	Temp./Humi. Antenna Pol.	:21.1/62 :VERTICAL	

50.43

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6.53

56.96

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Test Date



:ER/2019/B0064

**Report Number** 

oportruinioor	:ER/2019/1	30064		loot Bate	.2010 12 10	
peration Mode	:802.11g			Temp./Humi.	:21.1/62	
est Channel	:2412 MHz	2		Antenna Pol.	:HORIZONT	AL
est Mode	:Tx CH Lo	w		Engineer	:Thomas	
UT Pol	:E2 Plane					
97	n					
97	,					
80						
70		- J	J I I I I I I I I I I I I I I I I I			
60						
50	2					
40	1	- J	, ,, ,			
30			· · · · · · · · · · · · · · · · · · ·			
20						
10			i i i i i i i i i i i i i i i i i i i			
0 <mark></mark>	6100.	11200. Frequer	16300. 1cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi
	Mode	Reading Level		FS	@3m	-
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	32.99	6.53	39.52	54.00	-14.4
4824.00	Peak	43.37	6.53	49.90	74.00	-24.1

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Report Number	:ER/2019/8	30064		Test Date	:2019-12-18	
Operation Mode	e :802.11g			Temp./Humi.	:21.1/62	
Test Channel	:2437 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mid	k		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 	1)					
90				· · · · · · · · · · · · · · · · · · ·		
80						
70			· · · · · · · · · · · · · · · · · · ·			
60	2		, , , ,			
50						
40	L					
30				· · · · · · · · · · · · · · · · · · ·		
20	L		1 1 1 1 1 1 1 1 1			
10	  1					
0	6100.	11200.	16300.	21400.	26500	
			ncy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.21	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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Report Number	:ER/2019/8	30064		Test Date	:2019-12-18	
Operation Mode	ration Mode :802.11g			Temp./Humi.	:21.1/62	
Test Channel	:2437 MHz	<u>.</u>			:HORIZONTAL	
Test Mode	:Tx CH Mid	Ł		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70						
60						
50						
40			· · · · · · · · · · · · · · · · · · ·			
30						
20						
10						
0 <mark>1000</mark>	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Morgin
Fieq.	Mode	•	Factor	FS		Margin
		Reading Level	15		@3m	10
MHz	PK/QP/AV	dBµV	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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t (886-2) 2299-3279

Test Date



:ER/2019/B0064

**Report Number** 

peration Mode est Channel est Mode UT Pol	:802.11g :2462 MHz :Tx CH Hig :E2 Plane			Temp./Humi. Antenna Pol. Engineer		
97						
97						
80			·			
70						
60						
50	2					
40						
30						
20						
10						
0 <mark></mark> 1000	6100.	11200. Frequence	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi
	Mode	Reading Level		FS	@3m	
N 41 I						

MHz	PK/QP/AV	dBµV	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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Test Date

44.72

74.00

-29.28



:ER/2019/B0064

**Report Number** 

4924.00

Peak

Operation Mode Test Channel Test Mode EUT Pol	:802.11g :2462 MHz :Tx CH Hig :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:21.1/62 :HORIZONT/ :Thomas	AL
97						
90	       					
80	       					
70	 					
60	       					
50	2		     		<sup>1</sup>	
40						
30	  1			<sup>1</sup>		
20						
10						
0	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	31.77	6.85	38.62	54.00	-15.38

37.87

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6.85

t (886-2) 2299-3279

Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode	:802.11n20			Temp./Humi.	:21.1/62	
Test Channel	:2412 MHz	_		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Lov	N		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70						
60	2					
50						
40						
30						
20						
10						
0		44000	40000	24400	20500	
1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	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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Test Date



:ER/2019/B0064

**Report Number** 

oportrainbor	ER/2019/0	50064		loot Bato	.2010 12 10	
Operation Mode :802.11n20 Test Channel :2412 MHz		Temp./Humi.	:21.1/62			
		<u>.</u>		Antenna Pol.		AL
est Mode	:Tx CH Lov	N		Engineer	:Thomas	
UT Pol	:E2 Plane					
97 Level (dBuV/m)	)	i i		i i		
90						
80						
70						
60						
50	2					
40						
30						
20						
10				· · · · · · · · · · · · · · · · · · ·		
0						
1000	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	33.08	6.53	39.61	54.00	-14.3
4824.00	Peak	38.65	6.53	45.18	74.00	-28.8
4024.00	reak	30.03	0.00	40.10	14.00	-20.0

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Test Date



·FR/2019/B0064

**Report Number** 

Deration Mode	:ER/2019/B :802.11n20			Temp./Humi.	:21.1/62	
est Channel	:2437 MHz			Antenna Pol.	:VERTICAL	
est Mode	:Tx CH Mid			Engineer	:Thomas	
UT Pol	:E2 Plane			0		
97	)					
90						
80						
70						
60	2	· · · · · · · · · · · · · · · · · · ·				
50		· · · · · · · · · · · · · · · · · · ·		 		
40		· · · · · · · · · · · · · · · · · · ·				
30						
20						
10						
0 <mark>1000</mark>	6100.	11200. Frequen	16300. icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margii
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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Test Date



:ER/2019/B0064

**Report Number** 

	.ER/2019/D			loot Bato	.2010 12 10		
Operation Mode :802.11n20				Temp./Humi. :21.1/62			
est Channel	:2437 MHz	:2437 MHz :Tx CH Mid			:HORIZONTAL		
est Mode	:Tx CH Mid				:Thomas		
UT Pol	:E2 Plane						
97 Level (dBuV/m)	)		1				
90							
80				·			
70							
60							
50		· · · · · · · · · · · · · · · · · · ·					
40	1			· · · · · · · · · · · · · · · · · · ·			
30				, , , , , , , , , , , , , , , , , , ,			
20							
10							
0 <sup>1</sup> 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi	
	Mode	Reading Level		FS	@3m		
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Average	34.26	6.69	40.95	54.00	-13.0	
	•						
4874.00	Peak	42.12	6.69	48.81	74.00	-25.19	

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Test Date



:ER/2019/B0064

**Report Number** 

4924.00

Peak

Operation Mode	:802.11n20	)		Temp./Humi.	:21.1/62	
Test Channel	:2462 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70						
60						
50			· · · · · · · · · · · · · · · · · · ·			
40						
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
			icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	39.57	6.85	46.42	54.00	-7.58

46.19

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6.85

53.04

74.00

-20.96

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Report Number	:ER/2019/I	30064		Test Date	:2019-12-18	
Operation Mode	:802.11n20	)		Temp./Humi.	:21.1/62	
Test Channel	:2462 MHz	2		Antenna Pol.	:HORIZONT	۹L
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97						
90						
80						
70			i i Ji i i	· · · · · · · · · · · · · · · · · · ·		
60						
50	2					
40			· · · · · · · · · · · · · · · · · · ·			
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
		Freque	ncy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	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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Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode Test Channel Test Mode EUT Pol	:802.11n40 :2422 MHz :Tx CH Low :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:21.1/62 :VERTICAL :Thomas	
97 Level (dBuV/m)						
90						
80						
70		· · · · · · · · · · · · · · · · · · ·				
60	2	           				
50						
40		· · · · · · · · · · · · · · · · · · ·				
30						
20						
10						
0 <mark></mark> 1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
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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Report Number	:ER/2019/B	0064		Test Date	:2019-12-18	
Operation Mode	:802.11n40			Temp./Humi.	:21.1/62	
Test Channel	:2422 MHz			Antenna Pol.	:HORIZONT/	4L
Test Mode	:Tx CH Low			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m	)					
90						
80						
70			       			
60						
50	2			·		
40						
30						
20				·		
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Frequen				
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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Report Number	:ER/2019/8	30064		Test Date	:2019-12-18	
Operation Mode	:802.11n40	)		Temp./Humi.	:21.1/62	
Test Channel	:2437 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mic	ł		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70			         	· · · · · · · · · · · · · · · · · · ·		
60	2		     			
50			 			
40		- J				
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Frequer	icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	41.08	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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Report Number	:ER/2019/E	30064		Test Date	:2019-12-18	
Operation Mode	:802.11n40			Temp./Humi.	:21.1/62	
Test Channel	:2437 MHz			Antenna Pol.	:HORIZONT	۹L
Test Mode	:Tx CH Mid			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70						
60						
50	2					
40						
30						
20					   	
10					1 1 	
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
1000	01001	Frequen		211001	20000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
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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74.00

-20.45

Test Date



:ER/2019/B0064

**Report Number** 

4904.00

Peak

Operation Mode	:802.11n4(			Temp./Humi.	:21.1/62	
Test Channel	:2452 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70						
60		- J				
50	2					
40						
30						
20						
10						
0 <sup>L</sup> 1000	6100.	11200. Frequen	16300. icy (MHz)	21400.	26500	
_						
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4904.00	Average	41.28	6.78	48.06	54.00	-5.94

46.77

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6.78

53.55

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Report Number	:ER/2019/I	30064		Test Date	:2019-12-18	
Operation Mode	:802.11n4(	)		Temp./Humi.	:21.1/62	
Test Channel	:2452 MHz	2		Antenna Pol.	:HORIZONT/	4L
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97						
90						
80			, , , , , , , , , , , , , , , , , , ,			
70			       			
60			1 1 1 1 7			
50	2		 		       	
40			1 1 1 J 1 J 1 J 1 J 1 J 1 J 1 J 1 J 1 J			
30			1 1 1 1 1 1 1 1 1 1 1 1 1 1			
20			     			
10						
0	6100.	11200.	16300.	21400.	26500	
		Freque	ncy (MHz)			
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	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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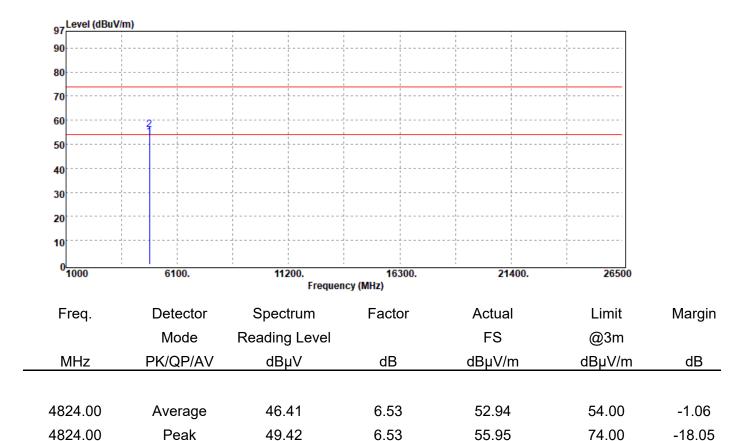
t (886-2) 2299-3279



## PCB Antenna (Part No.: ANTX100P001B24553)

Report Number	:ER/2019/B0064
Operation Mode	:802.11b
Test Channel	:2412 MHz
Test Mode	:Tx CH Low
EUT Pol	:E2 Plane

Test Date	:2019-12-24
Temp./Humi.	:23/67
Antenna Pol.	:VERTICAL
Engineer	:Thomas



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f (886-2) 2298-0488

Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode Test Channel Test Mode EUT Pol	:802.11b :2412 MHz :Tx CH Lov :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:23/67 :HORIZONT/ :Thomas	AL
97 Level (dBuV/m)			1			
90						
80			· · · · · · · · · · · · · · · · · · ·			
70			· · · · · · · · · · · · · · · · · · ·			
60			, ,			
50	2		J			
40			· · · · · · · · · · · · · · · · · · ·			
30						
20			· · · · · · · · · · · · · · · · · · ·			
10						
01000	6100.	11200. Frequei	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	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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Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode	:802.11b	0004		Temp./Humi.	:23/67	
est Channel	:2437 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mid			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70						
60	2					
50	<b>T</b>					
40						
30						
20						
10						
0 <mark></mark>	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margir
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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t (886-2) 2299-3279



Report Number	:ER/2019/I	30064		Test Date	:2019-12-24	
Operation Mode	:802.11b			Temp./Humi.	:23/67	
Test Channel	:2437 MHz	2		Antenna Pol.	:HORIZONT/	۹L
Test Mode	:Tx CH Mie	b		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70						
60			, , , , , , , , , , , , , , , , , , ,		<sup>1</sup>	
50	2		           			
40			i i J i i			
30						
20						
10			     			
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
			icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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54.00

74.00

-1.54

-18.94

Test Date



:ER/2019/B0064

**Report Number** 

4924.00

4924.00

Average

Peak

Operation Mode Test Channel	:802.11b :2462 MHz	:		Temp./Humi. Antenna Pol.	:23/67 :VERTICAL	
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70				· · · · · · · · · · · · · · · · · · ·		
60	2		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
50	<u> </u>			· · · · · · · · · · · · · · · · · · ·		
40			· · · · · · · · · · · · · · · · · · ·			
30			· · · · · · · · · · · · · · · · · · ·			
20						
10						
01000	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
-	Mode	Reading Level		FS	@3m	-
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

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45.61

48.21

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6.85

6.85

52.46

55.06

t (886-2) 2299-3279

f (886-2) 2298-0488

74.00

-22.97

Test Date



:ER/2019/B0064

**Report Number** 

4924.00

Peak

Operation Mode	:802.11b			Temp./Humi.	:23/67	
Test Channel	:2462 MHz	2		Antenna Pol.	:HORIZONT/	4L
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
1000	0100.		cy (MHz)	21400.	20300	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	39.11	6.85	45.96	54.00	-8.04

44.18

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6.85

51.03

t (886-2) 2299-3279

74.00

-19.64

Test Date



:ER/2019/B0064

**Report Number** 

4824.00

Peak

Operation Mode	:802.11g			Temp./Humi.	:23/67	
Test Channel	:2412 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Lov	N		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 						
90						
80			· · · · · · · · · · · · · · · · · · ·			
70						
60	2					
50						
40						
30						
20						
10			· · · · · · · · · · · · · · · · · · ·			
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
1000	0100.		ncy (MHz)	21400.	20000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	39.32	6.53	45.85	54.00	-8.15

47.83

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6.53

54.36

t (886-2) 2299-3279



Report Number	:ER/2019/I	30064		Test Date	:2019-12-24	
Operation Mode	:802.11g			Temp./Humi.	:23/67	
Test Channel	:2412 MHz	2		Antenna Pol.	:HORIZONT	۹L
Test Mode	:Tx CH Lov	N		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90			· · · · · · · · · · · · · · · · · · ·			
80			     			
70						
60	·····		 	·		
50						
40			     			
30						
20			· · · · · · · · · · · · · · · · · · ·			
10			· · · · · · · · · · · · · · · · · · ·			
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Frequer	ncy (MHz)			
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	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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Report Number	:ER/2019/E	30064		Test Date	:2019-12-24	
Operation Mode	:802.11g			Temp./Humi.	:23/67	
Test Channel	:2437 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mid	t		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)	)					
90				· · · · · · · · · · · · · · · · · · ·		
80			· · · · · · · · · · · · · · · · · · ·			
70				· · · · · · · · · · · · · · · · · · ·		
60	2					
50						
40			 			
30						
20						
10						
0 <mark></mark> 1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500	
_	<b>-</b> / /					
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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Report Number	:ER/2019/B	0064		Test Date	:2019-12-24	
Operation Mode	:802.11g			Temp./Humi.	:23/67	
Test Channel	:2437 MHz			Antenna Pol.	:HORIZONT	۹L
Test Mode	:Tx CH Mid			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m	)					
90						
80			         			
70						
60	2	J				
50		J				
40						
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Frequen	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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t (886-2) 2299-3279

54.00

74.00

-10.11

-24.52

Test Date



:ER/2019/B0064

**Report Number** 

4924.00

4924.00

Average

Peak

Operation Mode	:802.11g			Temp./Humi.	:23/67	
Test Channel	:2462 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH hig	h		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 						
90						
80			· · · · · · · · · · · · · · · · · · ·			
70			· · · · · · · · · · · · · · · · · · ·			
60			1 1 1 1 7			
50	2					
40						
30						
20			· · · · · · · · · · · · · · · · · · ·			
10			, , , , , , , , , , , , , , , , , , ,			
0 <mark></mark>	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
_						
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

6.85

6.85

43.89

49.48

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37.04

42.63

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Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode Test Channel Test Mode EUT Pol	:802.11g :2462 MHz :Tx CH hig :E2 Plane			Temp./Humi. Antenna Pol. Engineer	:23/67 :HORIZONT/ :Thomas	AL
97 Level (dBuV/m)	)				;	
90						
80						
70						
60						
50	2					
40		- J	· · · · · · · · · · · · · · · · · · ·			
30			·			
20						
10		             				
0 <mark></mark>	6100.	11200. Freque	<b>16300.</b> ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	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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Test Date



:ER/2019/B0064

**Report Number** 

Operation Mode	:802.11n20			Temp./Humi.	:23/67	
Test Channel	:2412 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Lov	v		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90			, , , , , , , , , , , , , , , , , , ,	·		
80			· · · · · · · · · · · · · · · · · · ·			
70			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
60			· · · · · · · · · · · · · · · · · · ·			
50	2					
40						
30			· · · · · · · · · · · · · · · · · · ·			
20				· · · · · · · · · · · · · · · · · · ·		
10					1 1 1 1	
0 <sup>1</sup> 1000	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	39.66	6.53	46.19	54.00	-7.81
4824.00	Peak	45.64	6.53	52.17	74.00	-21.83

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Test Date



·ER/2019/B0064

**Report Number** 

Dperation Mode Test Channel Test Mode	:ER/2019/E :802.11n20 :2412 MHz :Tx CH Lov :E2 Plane	)		Temp./Humi. Antenna Pol. Engineer	:23/67 :HORIZONT/ :Thomas	4L
97	·				·	
90			       			
80			       			
70	 	- J J J	       			
60			     			
50	-2		       			
40			     			
30			     			
20			     			
10			       			
0 <mark></mark>	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	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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Report Number	:ER/2019/8	30064		Test Date	:2019-12-24	
Operation Mode	:802.11n20	)		Temp./Humi.	:23/67	
Test Channel	:2437 MHz	1		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mid	k		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90				· · · · · · · · · · · · · · · · · · ·		
80	1 1 1 1					
70						
60			           			
50	2					
40			· · · · · · · · · · · · · · · · · · ·		<sup>1</sup>	
30						
20						
10			       			
0	6400	44200	40200	24.400	26500	
1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	20000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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Report Number	:ER/2019/B	0064		Test Date	:2019-12-24	
Operation Mode	:802.11n20			Temp./Humi.	:23/67	
Test Channel	:2437 MHz			Antenna Pol.	:HORIZONT/	۹L
Test Mode	:Tx CH Mid			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m	)					
90						
80				·		
70						
60						
50				·		
40		       				
30						
20						
10						
		44000	40000	24400	20500	
0 <mark>1000</mark>	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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Test Date

50.39

74.00

-23.61



:ER/2019/B0064

**Report Number** 

4924.00

Peak

Operation Mode	:802.11n20	)		Temp./Humi.	:23/67	
Test Channel	:2462 MHz	<u>.</u>		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Hig	jh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)					-:	
90						
80						
70	         					
60						
50	2					
40						
30						
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
			cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	37.63	6.85	44.48	54.00	-9.52

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43.54

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Test Date



·ER/2019/B0064

**Report Number** 

oportriambol	ER/2019/1	80064		loot Bate	.2010 12 21	
peration Mode	:802.11n20	)		Temp./Humi.	:23/67	
est Channel	:2462 MHz	2		Antenna Pol.	:HORIZONT	AL
est Mode	:Tx CH Hig	gh		Engineer	:Thomas	
UT Pol	:E2 Plane					
97 Level (dBuV/m)	)					
90						
80				·		
70						
60				· · · · · · · · · · · · · · · · · · ·		
50	2					
40						
30						
20						
10						
0	C400	44200	40200	24.400	20500	
1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	36.29	6.85	43.14	54.00	-10.8
4924.00	Peak	44.33	6.85	51.18	74.00	-22.82
			0.00	00		

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t (886-2) 2299-3279

74.00

-24.04

Test Date



:ER/2019/B0064

**Report Number** 

4844.00

Peak

Operation Mode	:802.11n40	)		Temp./Humi.	:23/67	
Test Channel	:2422 MHz			Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Lov	N		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 						
97						
80						
70						
60	2					
50	1					
40						
30						
20						
10						
0 <mark></mark>	<mark>6100.</mark>	11200. Frequen	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	C
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	Average	37.45	6.60	44.05	54.00	-9.95
					_ /	

43.36

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6.60

49.96



Report Number	:ER/2019/B	0064		Test Date	:2019-12-24	
Operation Mode	:802.11n40			Temp./Humi.	:23/67	
Test Channel	:2422 MHz			Antenna Pol.	:HORIZONT/	۹L
Test Mode	:Tx CH Low	,		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)	)					
90				·		
80						
70			       			
60						
50						
40						
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
1000	0100.	Frequent		21400.	20300	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	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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Report Number	:ER/2019/I	B0064		Test Date	:2019-12-24	
Operation Mode	:802.11n40	)		Temp./Humi.	:23/67	
Test Channel	:2437 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Mie	b		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97	)					
90						
80			· · · · · · · · · · · · · · · · · · ·			
70						
60						
50	2		1 1 2 1 1 1 1 1			
40			· · · · · · · · · · · · · · · · · · ·			
30			1 1 J 1 J 1 J			
20						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
		Freque	ncy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	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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Report Number	:ER/2019/B	30064		Test Date	:2019-12-24	
Operation Mode	:802.11n40			Temp./Humi.	:23/67	
Test Channel	:2437 MHz			Antenna Pol.	:HORIZONT	AL
Test Mode	:Tx CH Mid			Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)	)					
90						
80	           					
70	         	J				
60	         					
50	21	J				
40		, , , , , , , , , , , , , , , , , , ,	       			
30		JJ	       			
20			       			
10						
0 1000	6100.	11200.	16300.	21400.	26500	
		Frequen	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	36.94	6.69	43.63	54.00	-10.37
4874.00	Peak	42.11	6.69	48.80	74.00	-25.20

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74.00

-23.72

Test Date



:ER/2019/B0064

**Report Number** 

4904.00

Peak

Operation Mode	:802.11n40	)		Temp./Humi.	:23/67	
Test Channel	:2452 MHz	2		Antenna Pol.	:VERTICAL	
Test Mode	:Tx CH Hig	gh		Engineer	:Thomas	
EUT Pol	:E2 Plane					
97 Level (dBuV/m)						
90						
80						
70						
60	·					
50	2					
40						
30						
20						
10						
0	6400	44.200	40200	24.400	20500	
1000	6100.	11200. Frequen	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4904.00	Average	36.37	6.78	43.15	54.00	-10.85

43.50

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50.28

t (886-2) 2299-3279

Test Date



:ER/2019/B0064

**Report Number** 

	.ER/2019/1	60004		Foot Bato		
peration Mode	:802.11n40	)		Temp./Humi.	:23/67	
est Channel	:2452 MHz	2		Antenna Pol.	:HORIZONT	۹L
est Mode	:Tx CH Hig	gh		Engineer	:Thomas	
UT Pol	:E2 Plane					
97 Level (dBuV/m	)					
90				·		
80				·		
70		- J				
60	       			·		
50				·		
40						
30						
20				· · · · · · · · · · · · · · · · · · ·		
10						
0						
0 <mark></mark>	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margi
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4004.00	<b>A</b>	25.40	0.70	40.07	54.00	4 A - 7
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)

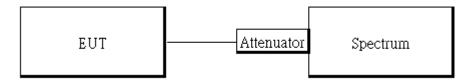
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

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.
- 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.

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

where

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

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

 $g_{j,k}$  = / 20 10Gk if the kth antenna is being fed by spatial stream j, or zero if it is not;  $G_k$  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)	Nesuit	
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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#### 802.11b

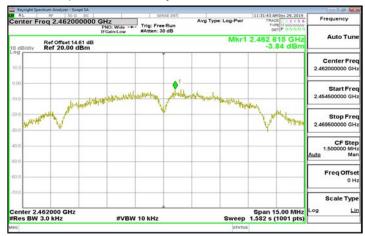
Power Spectral Density Test Plot-2412MHz



#### Power Spectral Density Test Plot-2437MHz

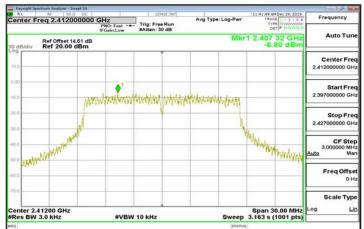


#### Power Spectral Density Test Plot-2462MHz

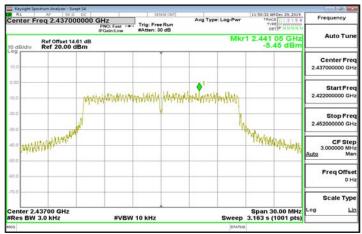


## 802.11g

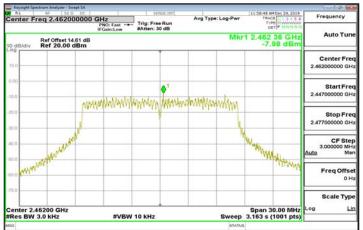
Power Spectral Density Test Plot-2412MHz



#### Power Spectral Density Test Plot-2437MHz



## Power Spectral Density Test Plot-2462MHz



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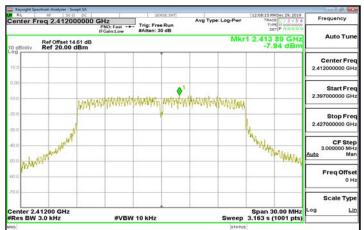
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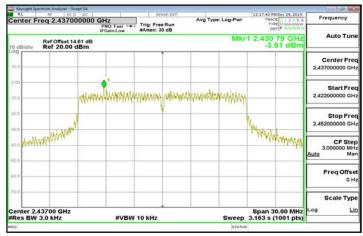
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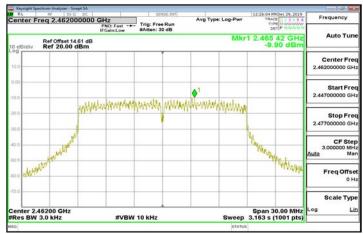
## 802.11n\_HT20 Power Spectral Density Test Plot-2412MHz



## Power Spectral Density Test Plot-2437MHz

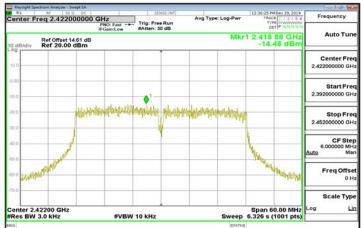


## Power Spectral Density Test Plot-2462MHz

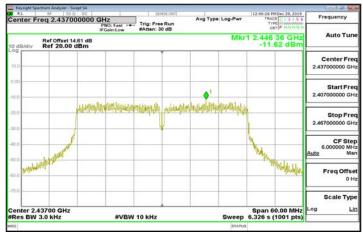


## 802.11n\_HT40

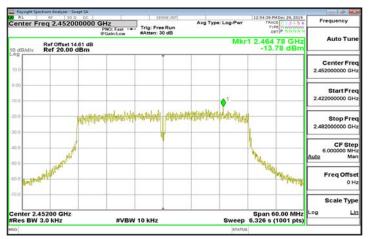
## Power Spectral Density Test Plot-2422MHz



## 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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