

FCC Radio Test Report

FCC ID: KA2WL8630APA1

Report No. Equipment Model Name Brand Name Applicant Address	 BTL-FCCP-1-1909H044 Unified AX Dual-Band PoE Access Point DWL-8630AP, DWL-8630APE, DWL-X8630AP, DWL-X8630APE D-Link Corporation D-Link Corporation 17595 Mt. Herrmann, Fountain Valley, California United State 92708
Radio Function	: WLAN 2.4 GHz
FCC Rule Part(s) Measurement Procedure(s)	: FCC Part15, Subpart C (15.247) : ANSI C63.10-2013
Date of Receipt Date of Test Issued Date	: 2019/9/30 : 2019/9/30 ~ 2020/3/16 : 2020/4/21

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by Peter Chen, Engineer **ac-MRA Testing Laborator** Approved by Scott Hsu , Manager BTL Inc. No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the ISO/IEC 17025 requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.



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REPORT ISSUED HISTORY

	REPORT ISSUED HISTORY						
	Report Version	Description	Issued Date				
	R00	Original Issue.	2020/4/21				
L							

SUMMARY OF TEST RESULTS 1

Test procedures according to the technical standards.

FCC Part 15, Subpart C (15.247)							
Standard(s) Section	Judgement	Remark					
15.207	AC power line conducted emissions	APPENDIX A	Pass				
15.205 15.209 15.247(d)	Radiated emissions	APPENDIX B APPENDIX C	Pass				
15.247(a)	Bandwidth	APPENDIX D	Pass				
15.247(b)	Output power	APPENDIX E	Pass				
15.247(e)	Power spectral density	APPENDIX F	Pass				
15.247(d)	Antenna conducted spurious emission	APPENDIX G	Pass				
15.203	Antenna requirement		Pass				

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report.(2) The report format version is TP.1.1.1.



1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 355421 and DN: TW1099.

○ C05
○ CB08

○ CB11
○ CB15
○ CB16
○ SR06

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, TaiwanThe test sites and facilities are covered under FCC RN: 325517 and DN: TW1115.□C03⊠CB18□CB19

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k = 2, providing a level of confidence of approximately 95 %. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test :

Test Site	Measurement Frequency Range	U,(dB)
	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
CB18	1 GHz ~ 6 GHz	5.21
CB10	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test :

Test Item	U,(dB)
Bandwidth	1.13
Output power	1.06
Power Spectral Density	1.20
Conducted Spurious emissions	1.14
Conducted Band edges	1.13

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Tested by	
AC Power Line Conducted Emissions	20 °C, 58 %	Eric Lee	
Radiated emissions below 1 GHz	23 °C, 61 %	Hunter Chiang	
Radiated emissions above 1 GHz	23 °C, 59~65 %	Hunter Chiang	
Bandwidth	25.4 °C, 54 %	Tim Lee	
Output Power	25.4 °C, 54 %	Tim Lee	
Power Spectral Density	25.4 °C, 54 %	Tim Lee	
Antenna conducted Spurious Emission	25.4 °C, 54 %	Tim Lee	

1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

Non-Beamforming mode							
Test Software	QRCT v4.0.00123						
Mode	2412 MHz	2437 MHz	2462 MHz	Data Rate			
IEEE 802.11b	22.5	22.5	22	1 Mbps			
IEEE 802.11g	17	18	17	6 Mbps			
IEEE 802.11n (HT20)	17.5	18	15	MCS 0			
IEEE 802.11ac (VHT20)	17.5	18	15	MCS 0			
IEEE 802.11ax (HEW20)	17 17 16 MC						
Mode	2422 MHz	2437 MHz	2452 MHz	Data Rate			
IEEE 802.11n (HT40)	15	18	14	MCS 0			
IEEE 802.11ac (VHT40)	15	17.5	14	MCS 0			
IEEE 802.11ax (HEW40)	14	17	14	MCS 0			
	Bea	amforming mode					
Test Software		QRCT v4	1.0.00123				
Mode	2412 MHz 2437 MHz 2462 MHz Data Rate						
IEEE 802.11b	16.5	16.5	16	1 Mbps			

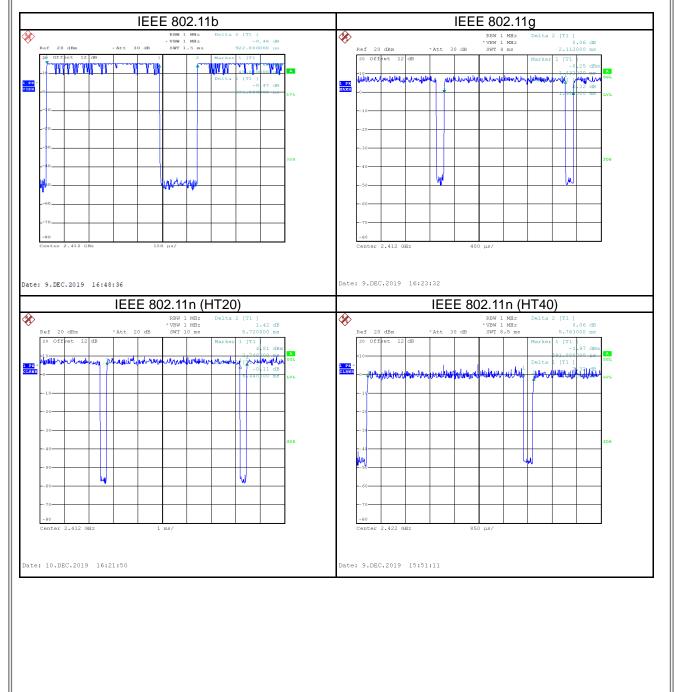
Mode	2412 MHz	2437 MHz	2462 MHz	Data Rate
IEEE 802.11b	16.5	16.5	16	1 Mbps
IEEE 802.11g	11	12	11	6 Mbps
IEEE 802.11n (HT20)	11.5	12	9	MCS 0
IEEE 802.11ac (VHT20)	11.5	12	9	MCS 0
IEEE 802.11ax (HEW20)	11	11	10	MCS 0
Mode	2422 MHz	2437 MHz	2452 MHz	Data Rate
IEEE 802.11n (HT40)	9	12	8	MCS 0
IEEE 802.11ac (VHT40)	9	11.5	8	MCS 0
IEEE 802.11ax (HEW40)	8	11	8	MCS 0



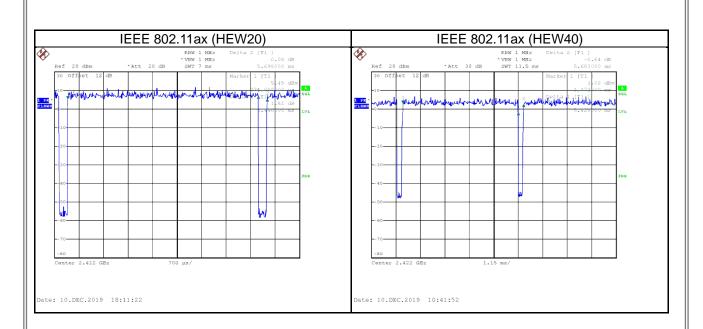
1.5 DUTY CYCLE

If duty cycle is \geq 98 %, duty factor is not required. If duty cycle is < 98 %, duty factor shall be considered.

Remark	Delta 1			Delta 2	On Time/Period	10 log(1/Duty Cycle)	1/On Time (B)
Mode	ON (ms)	Numbers (ON)	On Time (B) (ms)	Period (ON+OFF) (ms)	Duty Cycle (%)	Duty Factor (dB)	1/B Minimum VBW (kHz)
IEEE 802.11b	0.686	1	0.686	0.922	74.40%	1.28	1.458
IEEE 802.11g	1.984	1	1.984	2.112	93.94%	0.27	0.504
IEEE 802.11n (HT20)	5.440	1	5.440	5.720	95.10%	0.22	0.184
IEEE 802.11n (HT40)	5.406	1	5.406	5.763	93.81%	0.28	0.185
IEEE 802.11ax (HEW20)	5.446	1	5.446	5.698	95.58%	0.20	0.184
IEEE 802.11ax (HEW40)	5.428	1	5.428	5.681	95.55%	0.20	0.184







2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Unified AX Dual-Band PoE Access Point							
Model Name	DWL-8630AP, DWL-8630APE, DWL-X8630AP, DWL-X8630APE							
Brand Name	D-Link Corporation							
	Model Name	Antenna type						
Model Difference	DWL-8630AP, DWL-X8630AP	Built-in antenna						
	DWL-8630APE, DWL-X8630APE	External antenna						
Power Source		DC voltage supplied from AC/DC Adapter or PoE (support unit).						
Power Rating	Adapter: 12V 2.5A PoE: 42.5-57V 0.6A							
Products Covered	2 * Aadapter: (1) CWT / 2ABL030F (2) APD / WA-30J12R							
Frequency Range	2400 MHz ~ 2483.5 MHz							
Operation Frequency	2412 MHz ~ 2462 MHz							
Modulation Technology	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n/ac: OFDM IEEE 802.11ax: OFDMA	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n/ac: OFDM						
Transfer Rate	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 600 Mbps IEEE 802.11ac: up to 800 Mbps IEEE 802.11ax: up to 1147.1 Mbps							
Output Power Max.	IEEE 802.11b: 29.72 dBm (0.9369 W) IEEE 802.11g: 29.85 dBm (0.9655 W) IEEE 802.11n (HT20): 29.91 dBm (0.9796 W) IEEE 802.11n (HT40): 29.89 dBm (0.9751 W) IEEE 802.11ac (VHT20): 29.77 dBm (0.9477 W) IEEE 802.11ac (VHT40): 29.52 dBm (0.8960 W) IEEE 802.11ax (HEW20): 29.88 dBm (0.9721 W) IEEE 802.11ax (HEW40): 29.45 dBm (0.8811 W)							
Output Power Max. With Beamforming	IEEE 802.11b: 23.70 dBm (0.2343 W) IEEE 802.11g: 23.83 dBm (0.2414 W) IEEE 802.11n (HT20): 23.89 dBm (0.2449 W) IEEE 802.11n (HT40): 23.87 dBm (0.2438 W) IEEE 802.11ac (VHT20): 23.75 dBm (0.2370 W) IEEE 802.11ac (VHT40): 23.50 dBm (0.2240 W) IEEE 802.11ax (HEW20): 23.86 dBm (0.2431 W) IEEE 802.11ax (HEW40): 23.43 dBm (0.2203 W)							
Test Model	DWL-8630AP (Built-in antenna), DWL							
Sample Status	Engineering Sample	· · · · · · · · · · · · · · · · · · ·						
EUT Modification(s)	N/A							

NOTE:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

(2) Cha									
	CH01 – CH11 for IEEE 802.11b/g/n (HT20)/ac (VHT20)/ax (HEW20) CH03 – CH09 for IEEE 802.11n (HT40)/ac (VHT40)/ax (HEW40)								
Ch	Channel Frequence			Channel	Frequency	Channel	Frequency		
	01	(MHz) 2412		05	(MHz) 2432	09	(MHz) 2452		
	02	2412		06	2437	10	2457		
	03	2422		07	2442	11	2462		
	04	2427		08	2447				
	(3) Table for Filed Antenna: Group I: Built-in antenna								
Ant.	Br	and	М	odel Name	Antenna Type	Connector	Gain (dBi)		
1	N •8	DWL-		VL-8630AP	PIFA	I-PEX	3.24		
2	M •§	Seal DV		VL-8630AP	PIFA	I-PEX	3.52		
3	M •8				PIFA	I-PEX	3.58		
4	M •§	Sear www.whayu.com	DWL-8630AP		PIFA	I-PEX	3.50		
Group I	Group II: External antenna								
Ant.	Br	and	Model Name		Antenna Type	Connector	Gain (dBi)		
1	M •§	Sear www.whayu.com	DWL-8630APE		Dipole	RP-SMA	3.10		
2	M-8	Sear www.whayu.com	DWL-8630APE		Dipole	RP-SMA	3.10		
3	M-8	Sear www.whayu.com	DWL-8630APE		Dipole	RP-SMA	3.10		
4	M.5	Sear www.whayu.com	DW	/L-8630APE	Dipole	RP-SMA	3.10		

NOTE:

(a) The EUT incorporates a MIMO function. Physically, the EUT provides four completed transmitters and receivers (4T4R). 2.4 GHz and 5GHz can transmit simultaneously.

(b) For Power Spectral Density Directional Gain = 10log [(10^{G1/20} + 10^{G2/20} + ... + 10^{Gn/20})²/N_{ANT}] = 9.48 dBi > 6dBi. The reduced power spectral density limits (dBm/3 kHz) = 8 - (9.48 - 6) = 4.52.
(c) For Output Power For N_{ANT} = 2 < 5, Direction gain = G_{ANT} + 0 = 3.58 + 0 = 3.58 dBi. The Direction gain is less than 6 dBi, so output power limits will not be reduced.
(d) For Beamforming mode

Directional Gain = $10\log [(10^{G1/20} + 10^{G2/20} + ... + 10^{Gn/20})^2/N_{ANT}] = 9.48 dBi > 6dBi.$ The reduced power spectral density limits (dBm/3 kHz) = 8 - (9.48 - 6) = 4.52. The reduced output power limits (dBm) = 30 - (9.48 - 6) = 26.52. Beamforming gain is 5.10 dBi.



(4) Operating Mode and Antenna Configuration

Operating Mode	4TX
IEEE 802.11b	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11g	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11n (HT20)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11n (HT40)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11ac (VHT20)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11ac (VHT40)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11ax (HEW20)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)
IEEE 802.11ax (HEW40)	V (Ant. 1+Ant. 2+Ant. 3+Ant. 4)



2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal	-	-
Transmitter Radiated Emissions	IEEE 802.11b	11	-
(below 1 GHz)	IEEE 802.11g	11	-
	IEEE 802.11b		
	IEEE 802.11g	0.1/14	
	IEEE 802.11n (HT20)	01/11	
	IEEE 802.11ax (HEW20)		Bandedge
	IEEE 802.11n (HT40)	00/00	
Transmitter Radiated Emissions	IEEE 802.11ax (HEW40)	03/09	
(above 1 GHz)	IEEE 802.11b		
	IEEE 802.11g		
	IEEE 802.11n (HT20)	01/06/11	
	IEEE 802.11ax (HEW20)		Harmonic
	IEEE 802.11n (HT40)		
	IEEE 802.11ax (HEW40)	03/06/09	
Bandwidth	IEEE 802.11b		_
	IEEE 802.11g		
	IEEE 802.11n (HT20)	01/06/11	
	IEEE 802.11ax (HEW20)		
	IEEE 802.11n (HT40)	02/06/00	
	IEEE 802.11ax (HEW40)	03/06/09	
	IEEE 802.11b		
	IEEE 802.11g		
	IEEE 802.11n (HT20)	01/06/11	
Output Power	IEEE 802.11ac (VHT20)		-
	IEEE 802.11ax (HEW20)		
	IEEE 802.11n (HT40)		
	IEEE 802.11ac (VHT40) IEEE 802.11ax (HEW40)	03/06/09	
	IEEE 802.11b		
	IEEE 802.11g		
Power Spectral Density	IEEE 802.11n (HT20)	01/06/11	
	IEEE 802.11ax (HEW20)		-
	IEEE 802.11n (HT40)	0.0 /0.0 /0.0	
	IEEE 802.11ax (HEŴ40)	03/06/09	
	IEEE 802.11b		
	IEEE 802.11g	01/06/11	
Antenna conducted Spurious Emission	IEEE 802.11n (HT20)	01/00/11	-
	IEEE 802.11ax (HEW20)		
	IEEE 802.11n (HT40)	03/06/09	
	IEEE 802.11ax (HEW40)		





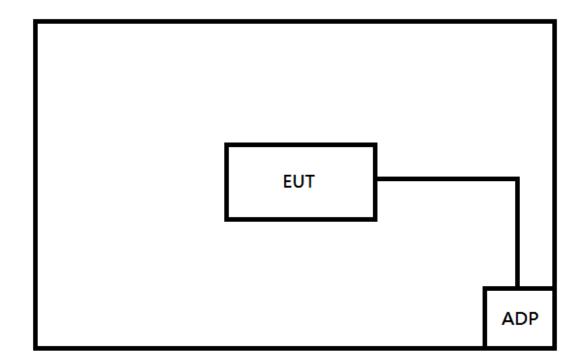
NOTE:

- (1) The EUT includes two adapters and both are evaluated. Only the worst case is used for final test.
- (2) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
- (3) The EUT includes two groups of antenna assemblies and beamforming mode, all are evaluated. For Transmitter Radiated Emissions, only the worst cases are recorded.
- (4) All X, Y and Z axes are evaluated, but only the worst cases (Y axis (Built-in antenna), X axis (External antenna)) are recorded.
- (5) There were no emissions found below 30 MHz within 20 dB of the limit.



2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
-	-	-	-	-	-
Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
-	-	-	-	-	-



3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency	Limit (dBµV)		
(MHz)	Quasi-peak	Average	
0.15 - 0.5	66 - 56 *	56 - 46 *	
0.50 - 5.0	56	46	
5.0 - 30.0	60	50	

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
 - Measurement Value = Reading Level + Correct Factor
 - Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	Π	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
 All other support equipment were powered from an additional LISN(s).

The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.

- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable will be terminated, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- e. For the actual test configuration, please refer to the related Item EUT TEST PHOTO.

NOTE:

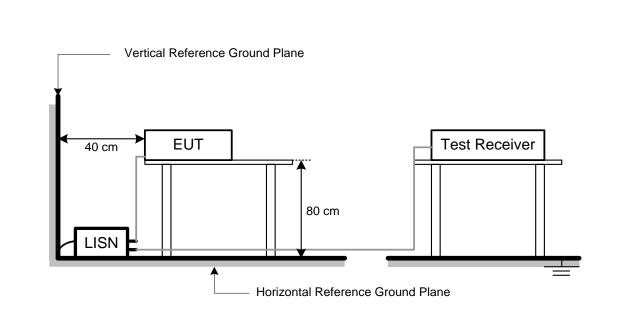
- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used. BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.



3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.



4 RADIATED EMISSIONS TEST

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated E (dBu)	Measurement Distance	
	Peak	Average	(meters)
Above 1000	74	54	3

NOTE:

(1) The limit for radiated test was performed according to FCC Part 15, Subpart C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

(4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

19.11 + 2.11 = 21.22	Reading Level		Correct Factor		Measurement Value
	19.11	+	2.11	Ш	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	54	Ι	-32.78

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW	1MHz / 3MHz for Peak,
(Emission in restricted band)	1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency 490KHz~30MHz for QP detector	
Start ~ Stop Frequency	30MHz~1000MHz for QP detector



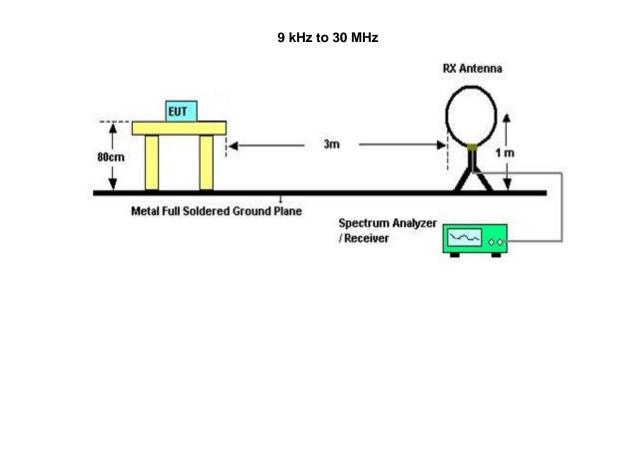
4.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item EUT TEST PHOTO.

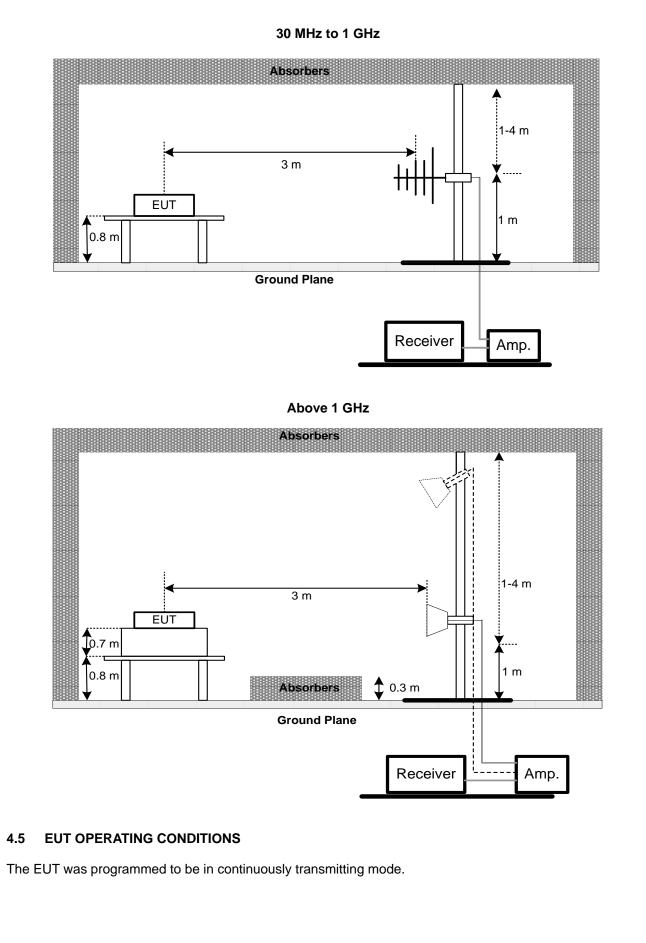
4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP









4.6 TEST RESULT – 9 KHZ TO 30 MHZ

There were no emissions found below 30 MHz within 20 dB of the limit..

4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



5 BANDWIDTH TEST

5.1 LIMIT

	FCC Part15, Subpart C (15.247)		
Section Test Item Limit			
15.247(a)	6 dB Bandwidth	500 kHz	

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT

Please refer to the APPENDIX D.



6 OUTPUT POWER TEST

6.1 LIMIT

	FCC Part15, Subpart C (15.247)	
Section	Test Item	Limit
15.247(b)	Maximum Output Power	1 Watt or 30dBm

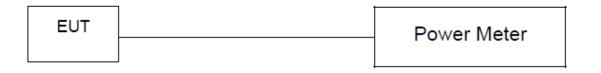
6.2 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance.

6.3 DEVIATION FROM TEST STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

Please refer to the APPENDIX E.



7 POWER SPECTRAL DENSITY

7.1 LIMIT

FCC Part15, Subpart C (15.247)				
Section	Test Item	Limit		
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)		

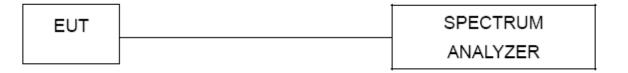
7.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW = 3 kHz, VBW = 10 kHz, Sweep time = Auto.

7.3 DEVIATION FROM TEST STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULT

Please refer to the APPENDIX F.





8 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST

8.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits.

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW = 100 kHz, VBW=300 kHz, Sweep time = Auto.
- c. Offset = antenna gain + cable loss.

8.3 DEVIATION FROM TEST STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULT

Please refer to the APPENDIX G.

9 LIST OF MEASURING EQUIPMENTS

	AC power line conducted emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until	
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	2019/3/18	2020/3/17	
2	Test Cable	EMCI	EMCCFD300-BM -BMR-6000	170715	2019/8/7	2020/8/6	
3	EMI Test Receiver	R&S	ESR7	101433	2019/12/11	2020/12/9	
4	Measurement Software	EZ	EZ_EMC (Version NB-03A)	N/A	N/A	N/A	

			Radiated Emission	ons		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC001340	980555	2019/4/12	2020/4/11
2	Preamplifier	EMCI	EMC02325B	980217	2019/4/12	2020/4/11
3	Preamplifier	EMCI	EMC012645B	980267	2019/4/12	2020/4/11
4	Test Cable	EMCI	EMC104-SM-SM- 800	150207	2019/4/12	2020/4/11
5	Test Cable	EMCI	EMC104-SM-SM- 3000	151205	2019/4/12	2020/4/11
6	Test Cable	EMCI	EMC-SM-SM-700 0	180408	2019/4/12	2020/4/11
7	MXE EMI Receiver	Agilent	N9038A	MY55420127	2019/3/26	2020/3/25
8	Signal Analyzer	Agilent	N9010A	MY56480554	2019/6/6	2020/6/5
9	Loop Ant	EMCO	EMCI-LPA600	274	2019/5/31	2020/5/30
10	Horm Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2019/6/10	2020/6/9
11	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	000992	2019/5/29	2020/5/28
12	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0508	2019/5/29	2020/5/28

			Bandwidth			
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

			Output Power	•		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Power Meter	Anritsu	ML2487A	6K00004714	2019/6/20	2020/6/19
2	Power Sensor	Anritsu	MA2491A	1725282	2019/6/20	2020/6/19

	Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22



em	Kind of	Manufacturer	conducted Spuric Type No.	Serial No.	Calibrated	Calibrated Until
1	Equipment Spectrum Analyzer	R&S	FSP40	100129	Date 2019/5/23	2020/5/22
emar		s no model name, n period of equipme	no serial no. or no ent list is one year.	calibration specifi	ed.	



10 EUT TEST PHOTO

Please refer to document Appendix No.: TP-1909H044-FCCP-1 (APPENDIX-TEST PHOTOS).

11 EUT PHOTOS

Please refer to document Appendix No.: EP-1909H044-1 (APPENDIX-EUT PHOTOS).



APPENDIX A AC POWER LINE CONDUCTED EMISSIONS



est Mode	Normal_Ir	ternal Ante	Teste	d Date	2020/1/21				
est Voltage	AC 120V/	60Hz			Phase	9	Line		
80.0 dBu¥									
70									
60									
50 1 ×	3								
40	4 ×								
30 2 X						5			
20						6 X	79 810		11 X 12 X
10							× ×		×
0.0									
0.150		0.5		(MHz)		5			30.000
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	Over				
М	Hz dBuV	dB	dBuV	dBuV	dB	Detecto	or Co	mment	
1 0.15	522 36.05	9.57	45.62	65.88	-20.26	QP			
2 0.15	522 17.57	9.57	27.14	55.88	-28.74	AVG			
3 0.36	336 34 47	9.62	44 09	58 65	-14 56	QP			

2	0.1522	17.57	9.57	27.14	55.88	-28.74	AVG
3	0.3636	34.47	9.62	44.09	58.65	-14.56	QP
4 *	0.3636	28.46	9.62	38.08	48.65	-10.57	AVG
5	4.2788	13.68	9.73	23.41	56.00	-32.59	QP
6	4.2788	7.63	9.73	17.36	46.00	-28.64	AVG
7	6.0113	9.46	9.78	19.24	60.00	-40.76	QP
8	6.0113	4.00	9.78	13.78	50.00	-36.22	AVG
9	7.6493	8.65	9.81	18.46	60.00	-41.54	QP
10	7.6493	4.26	9.81	14.07	50.00	-35.93	AVG
11	13.8458	7.28	9.91	17.19	60.00	-42.81	QP
12	13.8458	2.64	9.91	12.55	50.00	-37.45	AVG

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.



est Mode	Ν	lormal_Inte	ernal Ante	enna	Tested Da	te	2020/1/21			
est Voltage		C 120V/60		-	Phase		Neutral			
80.0 dB	N									
70										
60										
50 X		3 X								
40		4 X								
30 2 X					5 X 6 X	7 × 8 ×	9 X			
20					×	8 ×	10 X	11 X 12 X		
10								^		
0.0			_							
0.150			.5		(MHz)		5			30.000
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBuV	dB	dBuV	dBuV	dB	Detect	or Commer	ıt	
1 0	1522	35.64	9.61	45.25	65.88	-20.63	QP			
2 0	1522	15.83	9.61	25.44	55.88	-30.44	AVG	i		
3 0	.3615	35.38	9.67	45.05	58.69	-13.64	QP			
4 * 0	.3615	28.91	9.67	38.58	48.69	-10.11	AVG	ì		

REMARKS:

5

6

7

8

9

10

11

12

1.9500

1.9500

3.7725

3.7725

4.6973

4.6973

6.6300

6.6300

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

16.39

11.12

15.91

10.04

14.34

8.09

8.02

2.98

9.71

9.71

9.76

9.76

9.79

9.79

9.84

9.84

26.10

20.83

25.67

19.80

24.13

17.88

17.86

12.82

56.00

46.00

56.00

46.00

56.00

46.00

60.00

50.00

-29.90

-25.17

-30.33

-26.20

-31.87

-28.12

-42.14

-37.18

QP

AVG

QP

AVG

QP

AVG

QP

AVG



st Mode	Normal_E	kternal Ant	ested Date	2020/1/21				
est Voltage	AC 120V/6	60Hz		P	hase	Line		
80.0 dBu¥								
70								
60								
50	3							
40 ×	4 ×							
30 2 X	5 X 6				7	9 ×		
20	×				7 × 8 ×	X 10 X		11 X
10								12 X
0.0								
0.150		0.5		(MHz)		5		30.000
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	Over			
М	Hz dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1 0.1	522 34.66	9.57	44.23	65.88	-21.65	QP		
2 0.1	522 16.51	9.57	26.08	55.88	-29.80	AVG		
3 0.36	615 33.91	9.62	43.53	58.69	-15.16	QP		
4 * 0.36	615 27.42	9.62	37.04	48.69	-11.65	AVG		

QP

AVG

QP

AVG

QP AVG QP AVG

-26.84

-23.66

-33.81

-30.02

9	4.7310	13.57	9.75	23.32	56.00	-32.68	
10	4.7310	7.02	9.75	16.77	46.00	-29.23	
11	29.7938	8.53	10.00	18.53	60.00	-41.47	
12	29.7938	1.57	10.00	11.57	50.00	-38.43	

9.62

9.62

9.72

9.72

30.56

23.74

22.19

15.98

57.40

47.40

56.00

46.00

REMARKS:

5

6

7

8

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

20.94

14.12

12.47

6.26

0.4222

0.4222

3.8175

3.8175



est Mode	Norr	nal Ext	ternal A	ntenna			т	ested Date	2020/1/21
est Voltage		120V/60			-	Phase	Neutral		
cor voltage	7.0	120 1/00	<i></i>				P	11430	ricultur
80.0 dBu	/								
70									
60									
50 1 X		3 X							
40		4 ×							
30 2 X					5 X	7			
20					6 X	× 8 ×		9	11
10								× 10 ×	12 X
0.0									
0.150		0	.5		(MHz)		5		30.000
No. Mk. F	-	eading ₋evel	Correc Facto		Limit	Over			
	· ·	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1 0.1	1522 3	34.96	9.61	44.57	65.88	-21.31	QP		
2 0.	1522 ´	15.22	9.61	24.83	55.88	-31.05	AVG		
3 0.3	3614 3	34.98	9.67	44.65	58.70	-14.05	QP		
		28.59	9.67	38.26	48.70	-10.44	AVG		
		15.40	9.72	25.12	56.00	-30.88	QP		
		10.59 14.79	9.72 9.76	20.31 24.55	46.00 56.00	-25.69 -31.45	AVG QP		
		9.48	9.76	19.24	46.00	-31.45	AVG		
		9.40 6.23	9.96	19.24	60.00	-43.81	QP		

REMARKS:

10

11

12

13.3597

29.8455

29.8455

(1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value - Limit Value.

9.96

10.11

10.11

10.96

20.32

12.58

50.00

60.00

50.00

-39.04

-39.68

-37.42 AVG

AVG QP

1.00

10.21

2.47





APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

BIL

Test N	/lode		IEEE 80)2.11 <u>g</u>	_Inter	nal Ante	enna	а			Test Da	ate	2019/12	/3
Test F	reque	ncy	CH11: 2	462 N	lHz						Polariza	ation	Vertical	
80	0.0 d	BuV∕m												1
70	0													
60	0													
50	0		ſ											
40			ſ		3				5	6 X				
30	×	2 X			×	*			5 X					
20														
10 0.	.0													
	30.000	127.0			321.00	418.		515.00	612.0	00 709	.00 806	.00	1000.00	MHz
No.	Mk.	Freq.	Readi Leve	ĪĒ	orrect Factor	Meas mer	nt	Limit	Margi	in				
		MHz	dBu∖		dB	dBuV		dBuV/m	dB	Detecto	r Comme	nt		
1		9.1000			7.75	26.9		40.00	-13.02	•				
2		2.1500			7.58	24.7		43.50	-18.76	•				
3		7.1200			5.42	30.3		46.00	-15.63	•				
4		7.6300			3.22	28.2		46.00	-17.73	•				
5		0.3600			-9.72	30.0		46.00	-15.91	•				
6	* 63	0.4300	44.12	2.	-9.33	34.7	9	46.00	-11.21	l peak				

REMARKS:

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

BIL

Test Moc	le	IEEE 802	2.11g_Interr	nal Antenn	a			Test Date	2019/12/3
Test Fred	quency	CH11: 24	462 MHz					Polarization	Horizontal
80.0	dBuV/m								
70									
60									
50									
40			4 ×						
30	1 ×		3X	5 X		}	§		
20	n		×						
10									
0.0 30.	000 127.	00 224.	00 321.00	418.00	515.00	612.00	709.0	0 806.00	1000.00 MHz
No. Mk			Factor	Measure- ment	Limit	Margin			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	68.8000			23.77	40.00	-16.23	peak		
	107.6000			27.58	43.50	-15.92	peak		
	239.5200			22.60	46.00	-23.40	peak		
	319.0600			38.76	46.00	-7.24	peak		
	397.6300			31.35	46.00	-14.65	peak		
6	633.3400	38.80	-9.22	29.58	46.00	-16.42	peak		

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

BIL

Test Mode	IEEE 802	.11b_External	Antenna	а		Test Dat	e	2019/12/3
Test Frequen	cy CH11: 24	62 MHz				Polarizat	ion	Vertical
80.0 dBu	V/m							
70								
60								
50								
40								
30	2 X	4 ×	5 X		é X			
20		3						
10								
0.0	127.00 224.0	0 321.00	418.00	515.00	612.00	709.00 806.0	0	1000.00 MHz
	Reading Freq. Level	g Correct M Factor	leasure- ment	Limit	Margin			
	MHz dBuV			dBuV/m		tector Comment		
	1000 43.55		25.80	40.00		eak		
	3300 43.45		25.64	43.50		eak		
	5800 34.90		17.58	46.00	-	eak		
	8800 42.63		27.46	46.00		eak		
	6300 41.89		28.67	46.00		eak		
6 637.	2200 39.97	-9.05	30.92	46.00	-15.08 p	eak		

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

BIL

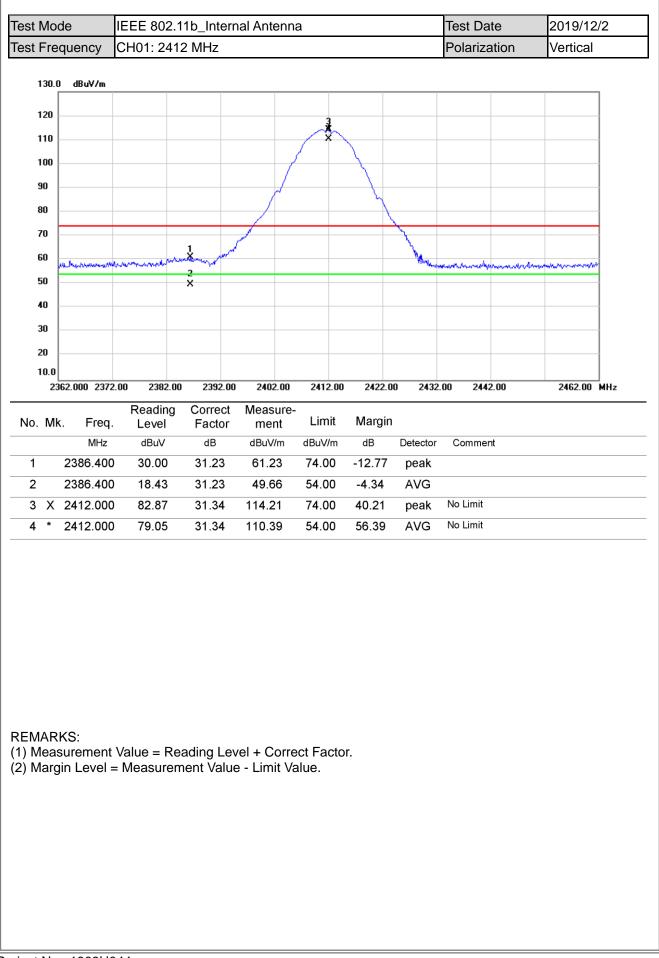
Test Mo	de	IEEE 802	2.11b_Exte	rnal Anteni	าล			Test Date	2019/12/3
Test Fre	equency	CH11: 24	162 MHz					Polarization	Horizontal
80.0	dBu¥/m								
70									
60									
50									
40			5						
30	2 1 X	3 X	4			ě			
20			^						
10									
0.0 30	D.000 127.	00 224.0	00 321.00	418.00	515.00	612.00	709.0	D 806.00	1000.00 MHz
No. M	k. Freq.	Readin Level	g Correct Factor	Measure- ment	Limit	Margin			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	53.2800			24.10	40.00	-15.90	peak		
2	116.3300			28.89	43.50	-14.61	peak		
3	166.7700			28.93	43.50	-14.57	peak		
4	239.5200			23.02	46.00	-22.98	peak		
5 *	318.0900			39.87	46.00	-6.13	peak		
6	600.3600	38.73	-9.72	29.01	46.00	-16.99	peak		

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

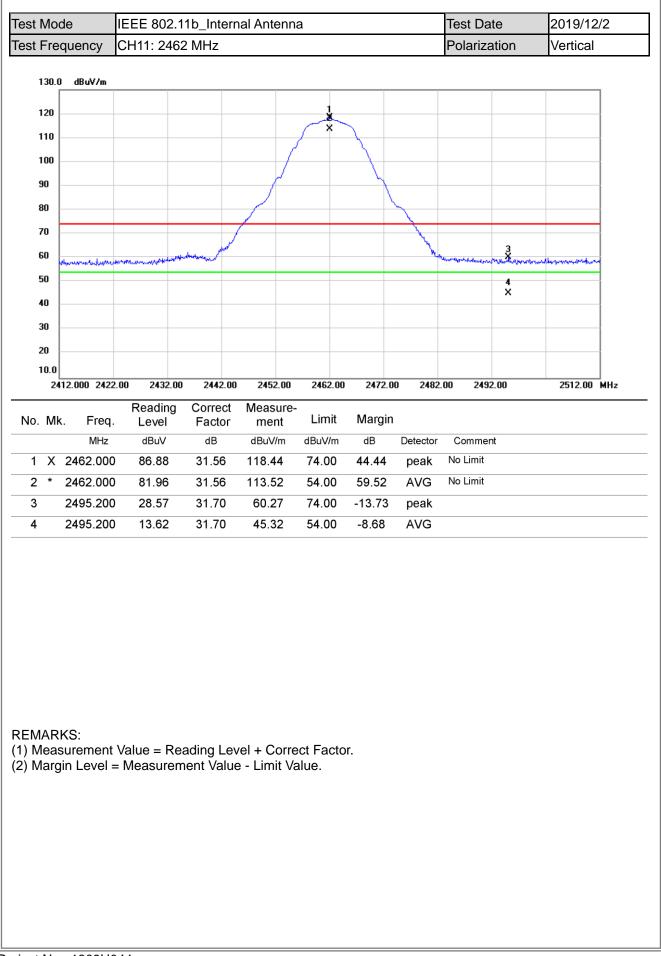


APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

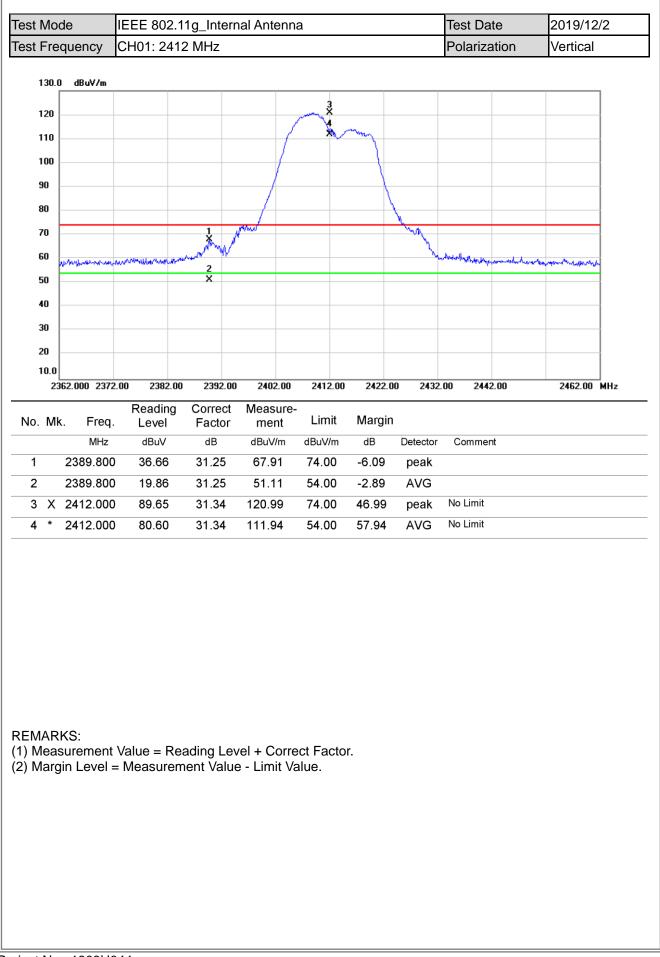




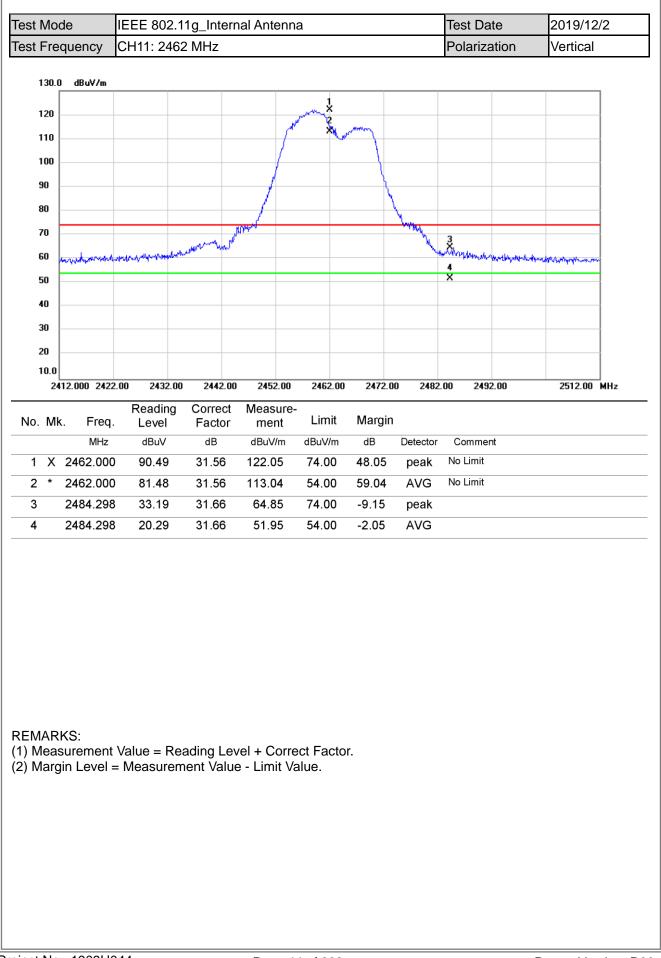




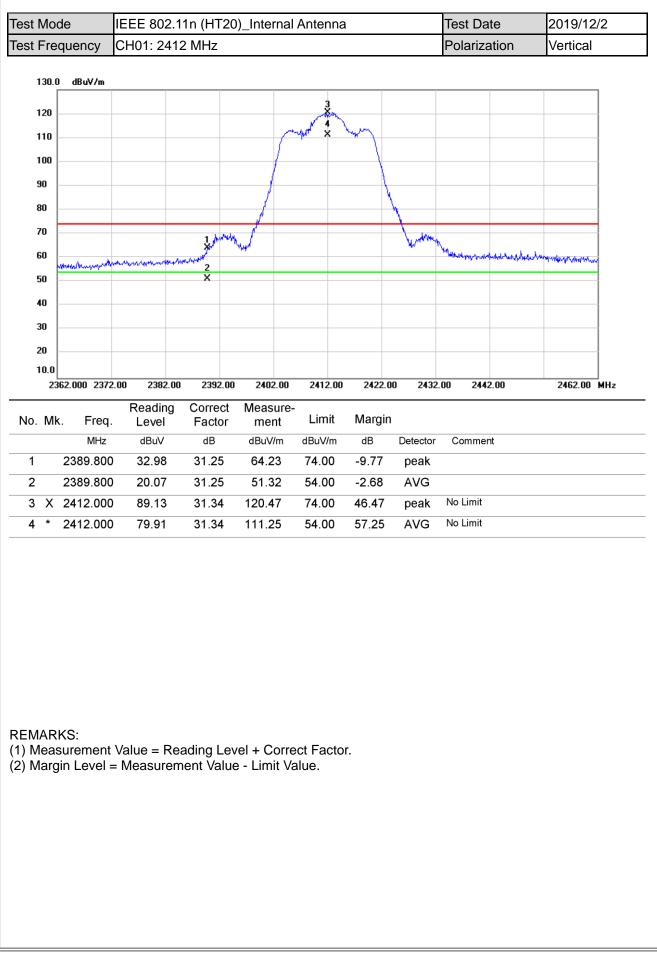




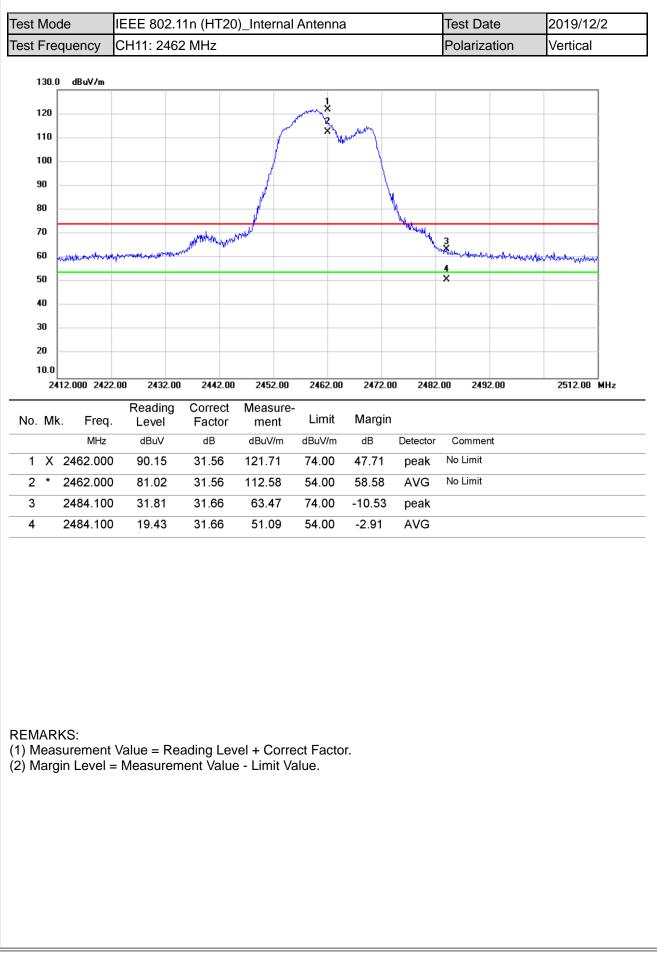














F			
Test Mode	IEEE 802.11n (HT40)_Internal Antenna	Test Date 2019	9/12/2
Test Frequency	CH03: 2422 MHz	Polarization Verti	cal
130.0 dBu∀/m			
120	3 		
110			
100	/ ~?^ \		
90			
80			
70	when the bar		
60	the manufactor of the state of	Man Marine Ma	
50	×	6	
40		X	
30			
20			
10.0			
2322.000 2342	2.00 2362.00 2382.00 2402.00 2422.00 2442.00	2462.00 2482.00 2522	2.00 MHz
No. Mk. Freq.	Reading Correct Measure- Level Factor ment Limit Margin		
MHz	dBuV dB dBuV/m dBuV/m dB Dete	ector Comment	
1 2386.600	35.93 31.23 67.16 74.00 -6.84 pe	ak	
2 2386.600	19.45 31.23 50.68 54.00 -3.32 A	/G	
3 X 2422.000	85.14 31.39 116.53 74.00 42.53 pe	ak No Limit	
4 * 2422.000	75.40 31.39 106.79 54.00 52.79 A	/G No Limit	
5 2496.600	28.71 31.72 60.43 74.00 -13.57 pe	ak	
6 2496.600	10.50 31.72 42.22 54.00 -11.78 A	/G	

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.



		-						7		
est Mo	ode	IEEE 802.1	1n (HT40)	_Internal	Antenna			Test Date	2019/12/	/2
est Fre	equency	CH09: 245	2 MHz					Polarization	Vertical	
130.	0 dBu∀/m									1
120					3					
110					- Å	- ^				
100				N. P	W X	MW 1				
90				 ſ₩						
80										
70				1			5			
60	and the second second	1 Namentage washing	a service the made	want			6	the manufacture and the second second	holes - bernall the second	
50		2 X					X			
40										
30										
20										
10.0										
2	352.000 2372	2.00 2392.00	2412.00	2432.00	2452.00	2472.0	0 2492	.00 2512.00	2552.00	MHz
No. M	k. Freq	Reading Level	Correct Factor	Measure- ment	Limit	Margin				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment		
1	2372.600) 27.37	31.17	58.54	74.00	-15.46	peak			
2	2372.600) 15.82	31.17	46.99	54.00	-7.01	AVG			
3 X	2452.000) 83.91	31.52	115.43	74.00	41.43	peak	No Limit		
4 *	2452.000	74.26	31.52	105.78	54.00	51.78	AVG	No Limit		
5	2489.200) 32.75	31.69	64.44	74.00	-9.56	peak			

REMARKS:

6

2489.200

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

19.45

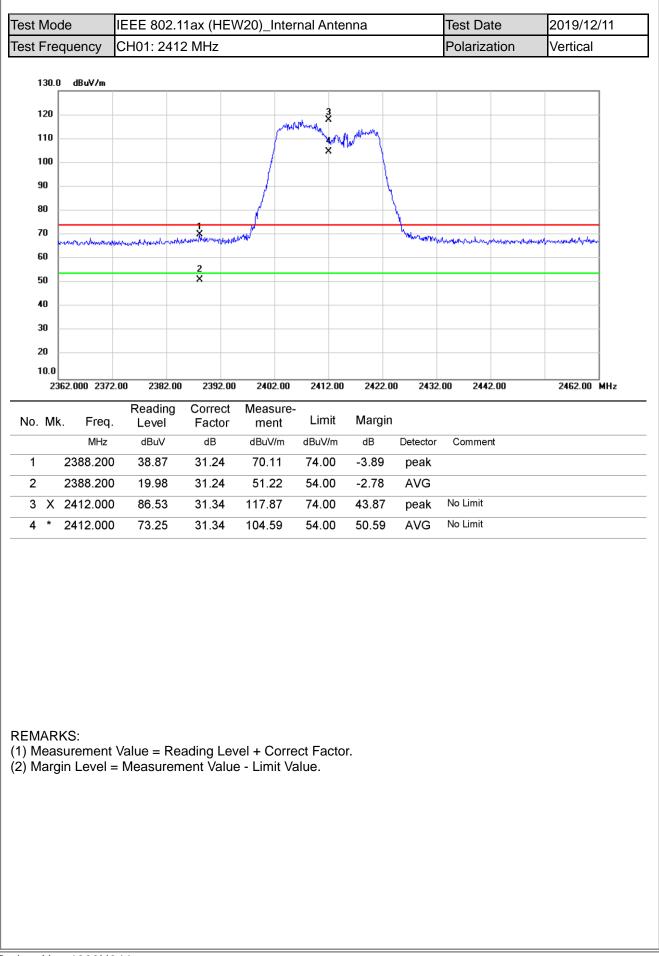
31.69

51.14

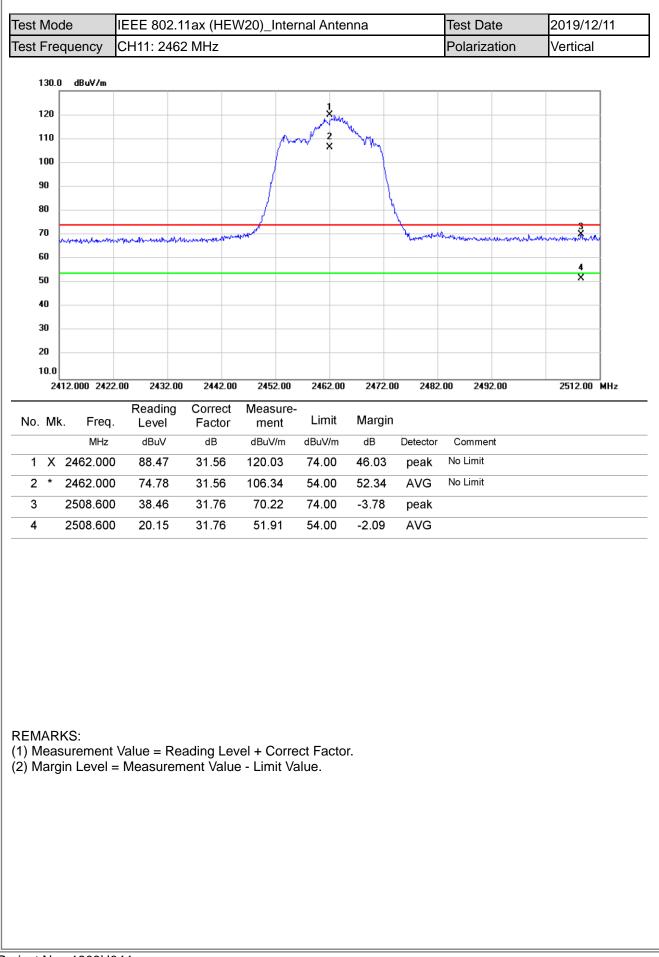
54.00 -2.86

AVG











								7	
Test Mo	ode	IEEE 802.2	11ax (HEV	V40)_Inte	ernal Ante	nna		Test Date	2019/12/12
Test Fre	equency	CH03: 242	2 MHz					Polarization	Vertical
130.	0 dBuV/m								
120					3				
110				Im	de al	A.			
100				Γ	w white "	~			
90				ſ		1			
80									
70				1			h Ah		
60				3 All Contraction			how we want	With 5	manuhanananan
50	anter application and	Mahiling and mining hadred	NAMAN	2 X					land the second s
40								6 ×	
30									
20 10.0									
	322.000 2342	2.00 2362.00	2382.00	2402.00	2422.00	2442.0	0 2462	.00 2482.00	2522.00 MHz
No. M	k. Freq	Reading Level	Correct Factor	Measure ment	e- Limit	Margin			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	2390.000) 32.36	31.25	63.61	74.00	-10.39	peak		
2	2390.000) 19.50	31.25	50.75	54.00	-3.25	AVG		
3 X	2422.000	86.18	31.39	117.57	74.00	43.57	peak	No Limit	
4 *	2422.000	74.78	31.39	106.17	54.00	52.17	AVG	No Limit	
5	2484.600	26.90	31.66	58.56	74.00	-15.44	peak		

54.00 -13.57

AVG

REMARKS:

6

2484.600

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

8.77

31.66

40.43



									7	
Test	Mod	de	IEEE 802	.11ax (HE	W40)_Int	ternal Ante	nna		Test Date	2019/12/12
Test	Free	quency	CH09: 24	52 MHz					Polarization	Vertical
1	30.0	dBuV/m								
1	20					3				
1	10				h	, Å				
1	00					www.x	Why L			
ę	90									
{	30									
7	70							4		
(50		1		months			La Maria		
ŗ	50	mangupun	mathemath	ann air chardran that				- Mught	Madharen and maker	weather and the second states and the second states and the second states and the second states and the second
	10		2							
	30		×							
	20									
	0.0									
	L	52.000 2372	2.00 2392	00 2412.0	0 2432.0	0 2452.00	2472.0	0 2492	.00 2512.00	2552.00 MHz
No.	Mk	. Freq.	Readin Level	g Correct Factor			Margin			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2379.600		31.20	58.27		-15.73	peak		
2		2379.600		31.20	37.92		-16.08	AVG		
3		2452.000		31.52	114.98		40.98	peak	No Limit	
4	*	2452.000		31.52	103.26		49.26	AVG	No Limit	
5		2493.200	32.50	31.70	64.20	74.00	-9.80	peak		

AVG

-3.17

REMARKS:

6

2493.200

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.

19.13

31.70

50.83

54.00



st Fre	de	IEEE 802.	11b_Interr	al Antenn	а			Test Dat	e	2019/12	2/2
	quency	CH01: 241	2 MHz					Polariza	tion	Vertical	
120.0) dBu∀/m										
											7
110											1
100											
90											
80											
70											
60											-
50		1 X									1
40		2 X									-
30											-
20											-
10											
0.0											
10	00.000 355) 16300.	.00 1885	0.00 2140	0.00	26500.00	JMHZ
o. Mł	k. Freq	Reading	Correct Factor	Measure- ment	Limit	Margin	I				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Commen	t		
1	4824.000		-10.52	47.21	74.00	-26.79	peak				
2 *	4824.000	0 49.08	-10.52	38.56	54.00	-15.44	AVG				
MAR Meas Marg	surement	t Value = Re = Measurer	⊧ading Lev nent Value	el + Corre - Limit Va	ect Facto alue.	r.					



st Fre	de	IEEE 802.	11b_Intern	al Antenna	а			Test Dat	е	2019/12/2
	equency	CH01: 241	2 MHz					Polariza	tion	Horizontal
120.	0 dBuV/m									
110										
100										
90										
80										
70										
60										
50		1 2 2								
40		×								
30										
20										
10										
0.0 1	000.000 355	0.00 6100.0	D 8650.00	11200.00	13750.0	0 16300.	00 1885	0.00 2140).00	26500.00 MHz
		Reading	Correct	Measure-						
э. М		Level	Factor	ment	Limit	Margin				
1	MHz 4824.00	dBuV 0 58.87	dB -10.52	dBuV/m 48.35	dBuV/m 74.00	dB -25.65	Detector peak	Comment		
2 *	4824.00		-10.52	40.35	54.00	-11.94	AVG			
MAR Mea Març	surement	t Value = Re = Measurer	eading Lev nent Value	el + Corre e - Limit Va	ect Facto alue.	r.				



et Ero	de	IEEE 802.	11b_Intern	al Antenna	а			Test I	Date	2019/12	/2
SUITE	quency	CH06: 243	7 MHz					Polar	ization	Vertical	
120.0	0 dBuV/m										
]
110											1
100											1
90											
80											
70											
60											
50		1 2									
40		×									
30											
20											
10											-
0.0 10	000.000 3550	0.00 6100.00	D 8650.00	11200.00	13750.0	0 16300.	00 1885	0.00 2	1400.00	26500.00	MHz
		Reading	Correct	Measure-							
o. M		Level	Factor	ment	Limit	Margin					
4	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comr	nent		
1 2 *	4874.000		-10.40 -10.40	48.80 42.63	74.00 54.00	-25.20 -11.37	peak AVG				
MAR Mea Març	surement	Value = Re = Measurer	ading Lev nent Value	el + Corre - Limit Va	ct Facto alue.	r.					



st Frequ	9	IEEE 802	.11b_Interi	nal Antenn	а			Test Da	ate	2019/12/2
	Jency	CH06: 24	37 MHz					Polariza	ation	Horizontal
120.0	dBuV/m									
110										
100										
90										
80										
70										
60 -										
50		ž								
40		×								
30										
20										
10										
0.0										
1000	.000 3550	.00 6100.0	0 8650.00	11200.00	13750.00) 16300	.00 1885	50.00 214	00.00	26500.00 MH
D. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margir	<u>ו</u>			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt	
1 4	874.000	60.89	-10.40	50.49	74.00	-23.51	peak			
2 * 4	874.000	55.74	-10.40	45.34	54.00	-8.66	AVG			
	irement	Value = R = Measure				r.				

st Fre	de	IEEE 802.	11b_Intern	al Antenna	а			Test D	ate	2019/	12/2
	quency	CH11: 246	2 MHz					Polariz	ation	Vertic	al
120.0) dBuV/m										
110											
110											
100											
90											
80											
70											
60											
50		1									
40		×									
30											
20											
10											
0.0 10)00.000 3550	0.00 6100.00	0 8650.00	11200.00	13750.00) 16300.	.00 1885	i0.00 21	400.00	26500	.00 MHz
		Reading	Correct	Measure-							
o. MI	k. Freq. MHz	. Level	Factor dB	ment dBuV/m	Limit dBuV/m	Margin dB		0	- nt		
1	4924.000		-10.28	48.89	74.00	ав -25.11	Detector peak	Comme	ent		
2 *	4924.000		-10.28	42.58	54.00	-11.42	AVG				
MAR Mea: Març	surement	: Value = Re = Measurer	eading Lev nent Value	el + Corre e - Limit Va	ect Facto alue.	r.					

st Fre	de	IEEE 802.	11b_Interr	al Antenna	а			Test Da	ate	2019/1	2/2
	quency	CH11: 246	2 MHz					Polariz	ation	Horizo	ntal
120.0) dBuV/m										
110											
100											
90											
80											
70											
60		1									
50		1 2 X									
40											
30											
20											
10 0.0											
)00.000 355(0.00 6100.0	0 8650.00	11200.00	13750.0	0 16300.	.00 1885	i0.00 214	00.00	26500.	00 MHz
o. Mł	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt		
1	4924.000	59.19	-10.28	48.91	74.00	-25.09	peak				
2 *	4924.000	52.96	-10.28	42.68	54.00	-11.32	AVG				
MAR Meas Marg	surement	Value = Re = Measurer	eading Lev nent Value	el + Corre	ect Facto alue.	r.					



st Fre	de	IEEE 802.	.11g_Inter	nal Antenr	าล			Test Da	ate	2019/1	2/2
	quency	CH01: 24	12 MHz					Polariz	ation	Vertica	ıl
120.0) dBuV/m										
110											
100											
90											
80											
70											
60											
50		1×									
40		2 X									
30		×									
20											
10											
0.0 10	00.000 3550	0.00 6100.0	0 8650.00	0 11200.00	D 13750.0	0 16300.	.00 1885	0.00 21	100.00	26500.0	 DO MHz
		Reading			-	Mail					
o. Mi	k. Freq MHz	. Level dBuV	Factor dB	ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comme	nt		
1	4824.000		-10.52	44.01	74.00	-29.99	peak	Comme	er it.		
2 *	4824.000		-10.52	31.34	54.00	-22.66	AVG				
	surement	: Value = R = Measure				r.					



st Fre	de	IEEE 802.	11g_Inter	nal Antenn	а			Test D	ate	2019/1	2/2
	quency	CH01: 24	12 MHz					Polariz	zation	Horizo	ntal
120.) dBu∀/m										
110											1
100											
90											
80											
70 60											
50											
40		1 X									
40 30		2 X									
20											
10											
0.0											
11	00.000 355) 16300.	.00 1885	50.00 21	400.00	26500.	DO MHz
o. M	k. Freq	Reading . Level	Correct Factor	Measure- ment	Limit	Margin	I				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comm	ent		
1	4824.000		-10.52	44.57	74.00	-29.43	peak				
2 *	4824.000	0 41.90	-10.52	31.38	54.00	-22.62	AVG				
MAR Mea Març	surement	: Value = R = Measure	eading Le ment Valu	vel + Corre e - Limit Va	ect Facto alue.	r.					

3โL

et Ero	de	IEEE 802.	11g_Intern	al Antenna	а			Test D	ate	2019	/12/2
ыгте	quency	CH06: 243	7 MHz					Polariz	ation	Verti	cal
120.0) dBuV/m										
110											
100											
90											
80											
70											
60											
50											
40		1 X									
30		2 X									
20											
10											
0.0											
10	00.000 3550			11200.00	13750.00	D 16300.	.00 1885	i0.00 21	100.00	2650	0.00 MHz
o. Mł	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	I				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent		
1	4874.000		-10.40	46.29	74.00	-27.71	peak				
2 *	4874.000	43.26	-10.40	32.86	54.00	-21.14	AVG				
EMAR Meas Marg	surement	Value = Re = Measurer	eading Lev nent Value	el + Corre - Limit Va	ect Facto alue.	r.					



+	de	IEEE 802.	11g_Intern	al Antenn	а			Test Da	ate	2019/12	/2
st Fre	quency	CH06: 243	37 MHz					Polariz	ation	Horizon	al
120.0) dBuV/m										
110]
											ĺ
100											ĺ
90											
80											
70											ĺ
60											
50		1×									
40		2 X									ĺ
30		<u>^</u>									
20											
10 0.0											ĺ
)00.000 355(0.00 6100.0	0 8650.00	11200.00	13750.0	0 16300.	.00 1885	i0.00 214	00.00	26500.00	MHz
b. MI	k. Freq	Reading	Correct Factor	Measure- ment	Limit	Margin	1				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt		
1	4874.000	56.03	-10.40	45.63	74.00	-28.37	peak				
2 *	4874.000	43.36	-10.40	32.96	54.00	-21.04	AVG				
MAR Mea: Març	surement	: Value = Re = Measurer	eading Lev nent Value	el + Corre - Limit Va	ect Facto alue.	r.					

est Fre	de	IEEE 802	.11g_Inter	nal Antenr	าล			Test Da	te	2019/12/2
	equency	CH11: 24	32 MHz					Polariza	ation	Vertical
120.0	0 dBu∀/m									
110										
110										
100										
90										
80										
70										
60										
50		×								
40		2 X								
30										
20										
10 0.0										
	000.000 3550	0.00 6100.0)0 8650.0	0 11200.00	0 13750.00	D 16300.	.00 1885	0.00 2140	0.00	26500.00 MH
lo. Mi	k. Freq	Reading Level	Correct Factor		- Limit	Margin	1			
JU. IVI	K. Fieq MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Commer	nt	
1	4924.000		-10.28	45.80	74.00	-28.20	peak			
2 *	4924.000) 43.24	-10.28	32.96	54.00	-21.04	AVG			
EMAR) Mea) Març	surement	Value = R = Measure	eading Le ment Valu	vel + Corr e - Limit V	ect Facto alue.	r.				

st Fre	de	IEEE 802.	11g_Interr	nal Antenna	а			Test Da	ate	2019/1	2/2
	quency	CH11: 246	2 MHz					Polariz	ation	Horizo	ntal
120.0) dBu∀/m										
110											
100											
											1
90											1
80											-
70											
60 50											-
эU 40		1 X									
40 30		2 X									
30 20											
10											
0.0											
10	000.000 355					D 16300.	.00 1885	0.00 214	00.00	26500.0	0 MHz
o. Mi	k. Freq	Reading	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt		
1	4924.000		-10.28	44.94	74.00	-29.06	peak				
2 *	4924.000	42.33	-10.28	32.05	54.00	-21.95	AVG				
MAR Mea Març	surement	: Value = Re = Measurer	eading Lev nent Value	/el + Corre ∋ - Limit Va	ect Facto alue.	r.					



est Fre	de	IEEE 802	.11n (HT2	20)_Interna	l Antenna	a		Test Da	ate	2019/12/2
	equency	CH01: 24	12 MHz					Polariz	ation	Vertical
120.	0 dBuV/m									
110										
100										
90										
80 70										
60										
50										
40		1 X								
30		2 X								
20										
10										
0.0										
1	000.000 3550	0.00 6100.0 Reading				0 16300.	.00 1885	50.00 214	100.00	26500.00 MHz
No. M	k. Freq.	Level	Factor		- Limit	Margin	ı			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent	
1 2 *	4824.000		-10.52	44.20 31.82	74.00 54.00	-29.80 -22.18	peak AVG			
EMAR 1) Mea 2) Març	surement	Value = R = Measure	eading Le ment Valu	evel + Corre ue - Limit V	ect Facto alue.	r.				



est Fre	de	IEEE 802.	11n (HT2)	0)_Internal	Antenna	ı		Test Da	ate	2019/12/2
	quency	CH01: 24′	12 MHz					Polariz	ation	Horizontal
120.0) dBu∀/m									
110										
110										
100										
90										
80 70										
60										
50										
40		1 X								
30		2 X								
20										
10										
0.0										
10	00.000 3550					0 16300.	.00 1885	50.00 214	100.00	26500.00 MHz
No. Mł	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	1			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent	
1 2 *	4824.000 4824.000		-10.52 -10.52	44.31 31.50	74.00 54.00	-29.69 -22.50	peak AVG			
EMAR) Meas 2) Marg	surement	Value = Re = Measure	eading Le ment Valu	vel + Corre e - Limit Va	ect Facto alue.	r.				



	de	IEEE 802	.11n (HT20)_Internal	Antenna	ì		Test	Date	2019/12/2	
est Fre	quency	CH06: 24	37 MHz					Polar	ization	Vertical	
120.	0 dBuV/m										
110											
100											
90											
90 80											
70											
60											
50											
40		×									
30		2 X									
20											
10											
0.0											
1	000.000 3550			11200.00		0 16300.	00 1885	0.00 2	21400.00	26500.00 MI	lz
No. M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Com	ment		
1	4874.000		-10.40	45.02	74.00	-28.98	peak				
2 *	4874.000	42.91	-10.40	32.51	54.00	-21.49	AVG				
EMAR 1) Mea 2) Març	surement	Value = R = Measure	eading Lev ment Value	rel + Corre e - Limit Va	ct Facto Ilue.	r.					



st Fre	de	IEEE 802.	11n (HT20)_Internal	Antenna	1		Test Da	ate	2019	/12/2
_	quency	CH06: 243	37 MHz					Polariz	ation	Horiz	ontal
120.0) dBuV/m										
110											
100											
90											
80 70											
60											
50											
40		1 X									
30		2 X									
20											
10											
0.0											
10	00.000 3550					0 16300.	00 1885	50.00 214	100.00	2650	0.00 MHz
o. MI	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent		
1	4874.000		-10.40	44.92	74.00	-29.08	peak				
2 *	4874.000	43.33	-10.40	32.93	54.00	-21.07	AVG				
MAR Meas Març	surement	Value = Re = Measurer	∋ading Lev nent Value	′el + Corre ⊱ - Limit Va	ect Facto alue.	r.					



st Fre	de	IEEE 802.	11n (HT20)_Internal	Antenna			Test Da	te	2019/12	2
	quency	CH11: 246	2 MHz					Polariza	ation	Vertical	
120.0) dBuV/m										
110											
110											
100											
90											
80											
70 60											
50											
50 40		1 X									
30		2 X									
20											
10											
0.0											
10	00.000 3550) 16300.	.00 1885	0.00 214	DO.OO	26500.00	MHz
o. Mi	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt		
1	4924.000		-10.28	45.13	74.00	-28.87	peak				
2 *	4924.000) 42.71	-10.28	32.43	54.00	-21.57	AVG				
EMAR Mea Marc	surement	Value = Re = Measurer	eading Lev nent Value	el + Corre - Limit Va	ct Facto alue.	r.					



st Fre	de	IEEE 802.1	1n (HT20)_Internal	Antenna	l		Test Da	ate	2019	/12/2
	equency	CH11: 246	2 MHz					Polariz	ation	Horiz	ontal
120.	0 dBuV/m										
110											
100											
90											
80											
70 60											
50 40		1 X									
40 30		2 X									
30 20											
10											
0.0											
1	000.000 3550			11200.00		D 16300.	00 1885	i0.00 214	00.00	2650	0.00 MHz
o. M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt		
1	4924.000		-10.28	45.18	74.00	-28.82	peak				
2 *	4924.000	42.58	-10.28	32.30	54.00	-21.70	AVG				
	surement	Value = Re = Measuren				r.					



	de	IEEE 802	.11n (HT40)_Internal	Antenna	a		Test D	ate	201	9/12/2
est Fre	equency	CH03: 24	22 MHz					Polariz	zation	Ver	tical
120.	0 dBuV/m										
110											
100											
90											
80											
70											
60 50											
50		1 X									
40		2 X									
30 20		^									
20 10											
0.0											
	000.000 3550).00 6100.0	0 8650.00	11200.00	13750.0	0 16300.	.00 188	50.00 21	400.00	26	500.00 MHz
No. M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	1				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comm	ent		
1	4844.000	55.31	-10.47	44.84	74.00	-29.16	peak				
2 *	1011000	44.05									
	4844.000	41.65	-10.47	31.18	54.00	-22.82	AVG				
REMAR 1) Mea 2) Març	RKS: surement	Value = R	-10.47 eading Lev ment Value	vel + Corre	ect Facto		AVG				



st Fre	de	IEEE 802.2	11n (HT40)_Internal	Antenna	l		Test Da	ate	2019	/12/2
	quency	CH03: 242	2 MHz					Polariz	ation	Horiz	zontal
120.0) dBuV/m										
110											
100											
90											
80											
70											
60											
50		1 X									
40		2									
30		x									
20											
10											_
0.0 1()00.000 3550).00 6100.00) 8650.00	11200.00	13750.00	D 16300.	00 1885	0.00 214	00.00	2650	0.00 MHz
		Reading	Correct	Measure-							
o. M			Factor	ment	Limit	Margin					
1	MHz 4844.000	dBuV 54.83	dB -10.47	dBuV/m 44.36	dBuV/m 74.00	dB -29.64	Detector peak	Comme	nt		
2 *	4844.000		-10.47	31.23	54.00	-23.04	AVG				
MAR Mea Març	surement	Value = Re = Measuren	eading Lev nent Value	el + Corre - Limit Va	ect Facto alue.	r.					



	de	IEEE 802.	11n (HT40)_Internal	Antenna	l		Test D	ate	2019/12/2	2
est Fre	quency	CH06: 243	37 MHz					Polari	zation	Vertical	
120.0) dBu∀/m										
110											
100											
90											
80 70											
60 50											
		1 X									
40		2 X									
30											
20 10											
10 0.0											
	00.000 3550	.00 6100.0	0 8650.00	11200.00	13750.00	D 16300.	00 1885	i0.00 21	400.00	26500.00 M	Hz
No. Mł	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comm	ent		
1	4874.000	55.53	-10.40	45.13	74.00	-28.87	peak				
2 *	4874.000	42.40	-10.40	32.00	54.00	-22.00	AVG				
	surement	Value = Re = Measure				r.					



st Fre	de	IEEE 802.	11n (HT40)_Internal	Antenna	1		Test D	ate	2019	9/12/2
	quency	CH06: 243	87 MHz					Polariz	ation	Horiz	zontal
120.0) dBuV/m										
110											
100											
90											
80											
70											
60											
50		1 X									
40 30		2 X									
30 20											
20 10											
0.0											
	000.000 3550			11200.00	13750.0	0 16300.	00 1885	i0.00 21	400.00	2650	00.00 MHz
o. MI	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent		
1	4874.000	54.66	-10.40	44.26	74.00	-29.74	peak				
2 *	4874.000	41.71	-10.40	31.31	54.00	-22.69	AVG				
MAR Mea Març	surement	Value = Re = Measurer	eading Lev nent Value	el + Corre - Limit Va	ect Facto alue.	r.					



st Fre	de	IEEE 802. ⁻	11n (HT40)_Internal	Antenna	l		Test D	ate	2019/	/12/2
	quency	CH11: 245	2 MHz					Polariz	ation	Vertic	al
120.0) dBuV/m										
110											
100											
90											
80											
70											
60											
50		1 X									
40 30		2 X									
30 20											
20 10											
0.0											
10	000.000 3550			11200.00	13750.0	0 16300.	00 1885	0.00 21	400.00	2650).00 MHz
o. MI	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent		
1	4904.000		-10.32	44.73	74.00	-29.27	peak				
2 *	4904.000	42.07	-10.32	31.75	54.00	-22.25	AVG				
MAR Mea Març	surement	Value = Re = Measurer	eading Lev nent Value	el + Corre - Limit Va	ct Facto llue.	r.					



. –	de	IEEE 802.	.11n (HT40)_Internal	Antenna	l		Test Da	ate	2019/12/2
est ⊢re	quency	CH11: 245	52 MHz					Polariz	ation	Horizontal
120.0) dBuV/m									
110										
100										
90										
80										
70										
60										
50		1 X								
40		2								
30		×								
20										
10										
0.0 1(00.000 3550).00 6100.0	0 8650.00	11200.00	13750.00) 16300.	00 1885	0.00 214	00.00	26500.00 MHz
	< E rog	Reading		Measure-	Limit	Margin				
No. MI	<. Freq. MHz	dBuV	Factor dB	ment dBuV/m	dBuV/m	dB	Detector	Comme	nt	
1 *	4904.000		-10.32	44.11	74.00	-29.89	peak			
2	4904.000		-10.32	31.73	74.00	-42.27	QP			
EMAR) Mea) Març	surement	Value = R = Measure	∋ading Lev ment Value	′el + Corre } - Limit Va	ect Factor มนe.	r.				