

FCC ID: EROTSW1070

Report No. Equipment Model Name Brand Name Applicant Address	 BTL-FCCP-3-1911T046 10.1 inch Touch Screen wall mount M201923003, TSW-1070-B-S, TSW-1070-W-S, TSW-1070P-B-S, TSW-1070P-W-S, TSS-1070-B-S, TSS-1070-W-S CRESTRON Crestron Electronics, Inc. 15 Volvo Drive, Rockleigh, NJ 07647
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	: 2018/11/28 : 2018/11/28 ~ 2020/1/5 : 2020/3/24

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 0659 Approved by Scott Hsu, Manager BTL Inc. No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com



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.



CONTENTS REPORT ISSUED HISTORY 5 1 SUMMARY OF TEST RESULTS 6 1.1 **TEST FACILITY** 7 MEASUREMENT UNCERTAINTY 1.2 7 1.3 TEST ENVIRONMENT CONDITIONS 8 1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING 8 1.5 DUTY CYCLE 9 **GENERAL INFORMATION** 2 10 2.1 DESCRIPTION OF EUT 10 2.2 **TEST MODES** 11 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 12 2.4 SUPPORT UNITS 12 3 RADIATED EMISSIONS TEST 13 13 3.1 LIMIT 3.2 **TEST PROCEDURE** 14 **DEVIATION FROM TEST STANDARD** 3.3 14 TEST SETUP 3.4 14 EUT OPERATING CONDITIONS 3.5 15 3.6 TEST RESULT - 9 KHZ TO 30 MHZ 16 3.7 TEST RESULT - 30 MHZ TO 1 GHZ 16 3.8 **TEST RESULT – ABOVE 1 GHZ** 16 **BANDWIDTH TEST** 4 17 4.1 LIMIT 17 4.2 **TEST PROCEDURE** 17 4.3 **DEVIATION FROM TEST STANDARD** 17 4.4 TEST SETUP 17 4.5 EUT OPERATING CONDITIONS 17 4.6 TEST RESULT 17 OUTPUT POWER TEST 18 5 18 5.1 LIMIT 5.2 **TEST PROCEDURE** 18 5.3 **DEVIATION FROM TEST STANDARD** 18 TEST SETUP 5.4 18 EUT OPERATING CONDITIONS 5.5 18 5.6 TEST RESULT 18 POWER SPECTRAL DENSITY 6 19 LIMIT 19 6.1 **TEST PROCEDURE** 6.2 19 **DEVIATION FROM TEST STANDARD** 6.3 19 TEST SETUP 19 6.4 6.5 EUT OPERATING CONDITIONS 19 6.6 TEST RESULT 19 7 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST 20 7.1 LIMIT 20 7.2 **TEST PROCEDURE** 20 **DEVIATION FROM TEST STANDARD** 20 7.3 7.4 TEST SETUP 20

7.5

EUT OPERATING CONDITIONS

20





7.6TEST RESULT28LIST OF MEASURING EQUIPMENTS29EUT TEST PHOTO210EUT PHOTOS2			
APPEND APPEND APPEND APPEND	IX B IX C	RADIATED EMISSIONS - 9 KHZ TO 30 MHZ RADIATED EMISSIONS - 30 MHZ TO 1 GHZ RADIATED EMISSIONS - ABOVE 1 GHZ BANDWIDTH	23 28 31 64
APPENDIX EOUTPUT POWERAPPENDIX FPOWER SPECTRAL DENSITYAPPENDIX GANTENNA CONDUCTED SPURIOUS EMISSIONS		69 71 74	



REPORT ISSUED HISTORY

	REPORT ISSUED HISTORY	
Report Version	Description	Issued Date
R00	Original Issue.	2020/1/21
R01	Revised report to address TCB's comments.	2020/3/24

SUMMARY OF TEST RESULTS 1

Test procedures according to the technical standards.

FCC Part 15, Subpart C (15.247)						
Standard(s) Section	Test Result	Judgement	Remark			
15.207	AC Power Line Conducted Emissions		N/A	NOTE(3)		
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX A 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.

(3) Input power is supplied by POE.



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. CB08 □ CB11 \boxtimes C05 CB15 □ CB16 **SR06** \boxtimes No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan The test sites and facilities are covered under FCC RN: 325517 and DN: TW1115. ⊠ CB18 C03 □ CB19 **MEASUREMENT UNCERTAINTY** 1.2 The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expanded uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k} = 2$, 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. Radiated emissions below 1 GHz test :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
	CISPR	30MHz ~ 200MHz	V	4.20
CB18		30MHz ~ 200MHz	Н	3.64
(3m)		200MHz ~ 1,000MHz	V	4.56
		200MHz ~ 1,000MHz	H	3.90

B. Radiated emissions above 1 GHz test :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
		1GHz ~ 6GHz	V	4.46
CB18		1GHz ~ 6GHz	Н	4.40
(3m)	CISPR	6GHz ~ 18GHz	V	3.88
		6GHz ~ 18GHz	Н	4.00

Test Site	Method	Measurement Frequency Range	U,(dB)
CB18		18 ~ 26.5 GHz	4.62
(1m)	CISPR	26.5 ~ 40 GHz	5.12

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	
Radiated emissions below 1 GHz	23 °C, 65 %	Hunter Chiang	
Radiated emissions above 1 GHz	23 °C, 65 %	Hunter Chiang	
Bandwidth	24.8 °C, 59.5 %	Jay Kao	
Output Power	24.8 °C, 59.5 %	Jay Kao	
Power Spectral Density	24.8 °C, 59.5 %	Jay Kao	
Antenna conducted Spurious Emission	24.8 °C, 59.5 %	Jay Kao	

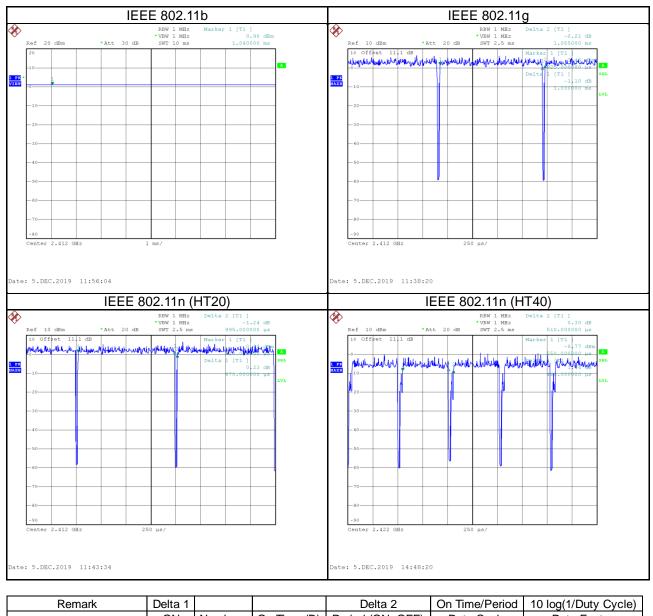
1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

Test Software	QRCT 4				
Mode	2412 MHz	2412 MHz 2437 MHz 2462 MHz Data Rate			
IEEE 802.11b	16	16	16	1 Mbps	
IEEE 802.11g	12	13	12	6 Mbps	
IEEE 802.11n (HT20)	12	13	12	MCS 0	
Mode	2422 MHz	2437 MHz	2452 MHz	Data Rate	
IEEE 802.11n (HT40)	11	12	11	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)
Mode	ON	Numbers	On Time (B)	Period (ON+OFF)	Duty Cycle	Duty Factor
lviode	(ms)	(ON)	(ms)	(ms)	(%)	(dB)
IEEE 802.11b	1.000	1	1.000	1.000	100.00%	0.00
IEEE 802.11g	1.030	1	1.030	1.055	97.63%	0.10
IEEE 802.11n (HT20)	0.970	1	0.970	0.995	97.49%	0.11
IEEE 802.11n (HT40)	0.460	1	0.460	0.510	90.20%	0.45

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

E en sie ee e et	40.4 in the Towell Common well as such			
Equipment	10.1 inch Touch Screen wall mount			
Model Name	M201923003, TSW-1070-B-S, TSW-1070-W-S, TSW-1070P-B-S,			
	TSW-1070P-W-S, TSS-1070-B-S, TSS-1070-W-S			
Brand Name				
	M201923003 includes six series: TSW-1070-B-S, TSW-1070-W-S,			
Model Difference	TSW-1070P-B-S, TSW-1070P-W-S, TSS-1070-B-S, TSS-1070-W-S			
	All modes are identical to each other except below:			
	B: Black, W: White, P: Portrait, S: Smooth, TSS: Touch Screen Scheduling			
Power Source	DC voltage supplied from POE.			
Power Rating	I/P: 48 VDC 350mA (802.3at type 1), 48 VDC 600mA (802.3at type 2)			
Products Covered	N/A			
Frequency Range	2400 MHz ~ 2483.5 MHz			
Operation Frequency	2412 MHz ~ 2462 MHz			
	IEEE 802.11b: DSSS			
Modulation Technology	IEEE 802.11g: OFDM			
	IEEE 802.11n: OFDM			
	IEEE 802.11b: 11/5.5/2/1 Mbps			
Transfer Rate	IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps			
	IEEE 802.11n: up to 150 Mbps			
	IEEE 802.11b: 19.04 dBm (0.0802 W)			
Output Bower Mey	IEEE 802.11g: 19.72 dBm (0.0938 W)			
Output Power Max.	IEEE 802.11n (HT20): 19.54 dBm (0.0899 W)			
	IEEE 802.11n (HT40): 19.02dBm (0.0798 W)			
Test Model	M201923003			
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) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452
02	2417	06	2437	10	2457
03	2422	07	2442	11	2462
04	2427	08	2447		

(3) Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	YAGEO	TSW WLAN MAIN	PIFA	IPEX	-3.92



2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	TX Mode_IEEE 802.11b	01	-
Transmitter Radiated Emissions (below 1GHz)	TX Mode_IEEE 802.11b	01	-
	TX Mode_IEEE 802.11b		
	TX Mode_IEEE 802.11g		Bandedge
	TX Mode_IEEE 802.11n (HT20)		Danueuge
Transmitter Radiated Emissions	TX Mode_IEEE 802.11n (HT40)	03/09	
(above 1GHz)	TX Mode_IEEE 802.11b		
	TX Mode_IEEE 802.11g	01/06/11	Harmonic
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	03/06/09	
	TX Mode_IEEE 802.11b		
Bandwidth	TX Mode_IEEE 802.11g	01/06/11	
Bandwidth	TX Mode_IEEE 802.11n (HT20)		-
	TX Mode_IEEE 802.11n (HT40)	03/06/09	
	TX Mode_IEEE 802.11b		
Output Power	TX Mode_IEEE 802.11g	01/06/11	
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	03/06/09	
	TX Mode_IEEE 802.11b		
Power Spectral Density	TX Mode_IEEE 802.11g	01/06/11	_
r ower opectial Density	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	03/06/09	
	TX Mode_IEEE 802.11b		
Antenna conducted Spurious Emission	TX Mode_IEEE 802.11g	01/06/11	-
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	03/06/09	

NOTE:

(1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.

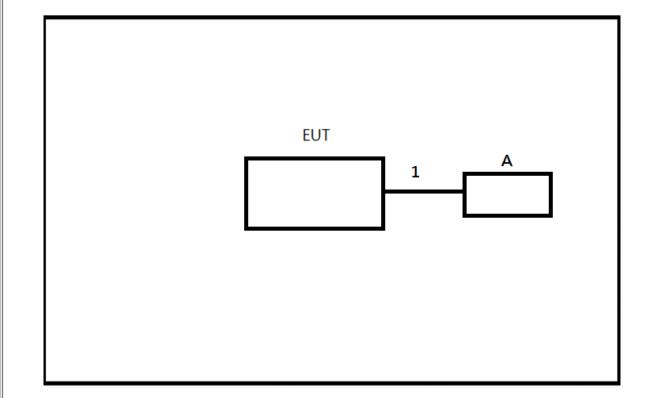
(2) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.

(3) All X, Y and Z axes are evaluated, but only the worst case (Y axis) is recorded.



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
A	MANAGED POE SWITCH	CRESTRON	CEN-SWPOE-16	N/A	-
Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	NO	NO	3m	LAN Cable	-



3 RADIATED EMISSIONS TEST

3.1 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	Radiated I (dBu	Measurement Distance	
(MHz)	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:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	Π	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	54	=	-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



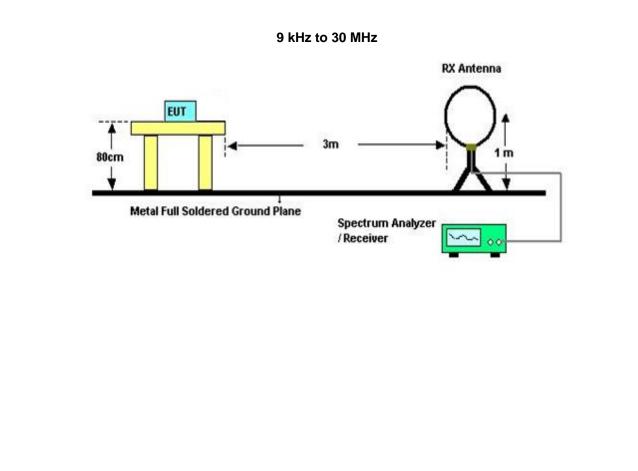
3.2 TEST PROCEDURE

- 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.

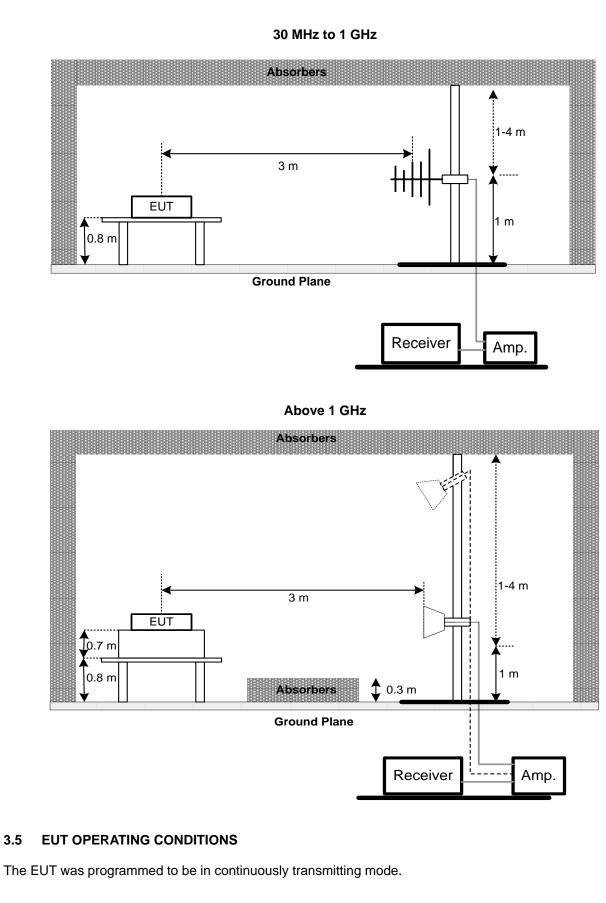
3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP









3.6 TEST RESULT – 9 KHZ TO 30 MHZ

Please refer to the APPENDIX A.

3.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

3.8 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.



4 BANDWIDTH TEST

4.1 LIMIT

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

4.2 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.

4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT

Please refer to the APPENDIX D.



5 OUTPUT POWER TEST

5.1 LIMIT

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

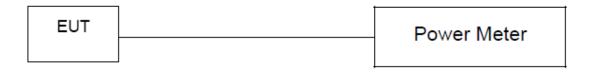
5.2 TEST PROCEDURE

- 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.

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 E.



6 POWER SPECTRAL DENSITY

6.1 LIMIT

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

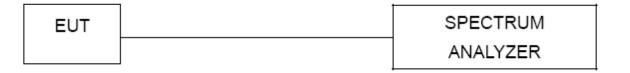
6.2 TEST PROCEDURE

- 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.

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 F.





7 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST

7.1 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.

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 = 100 kHz, VBW=300 kHz, Sweep time = Auto.
- c. Offset = antenna gain + cable loss.

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 G.



8 LIST OF MEASURING EQUIPMENTS

Dedicted Emissions										
			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	2020/6/18						
2	Power Sensor	Anritsu	MA2491A	1725282	2019/6/20	2020/6/18						

	Power Spectral Density												
lte	em	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						

	Antenna conducted Spurious Emission												
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							

Remark: "N/A" denotes no model name, no serial no. or no calibration specified. All calibration period of equipment list is one year.



9 EUT TEST PHOTO

Please refer to document Appendix No.: TP-1911T046-FCCP-1 (APPENDIX-TEST PHOTOS).

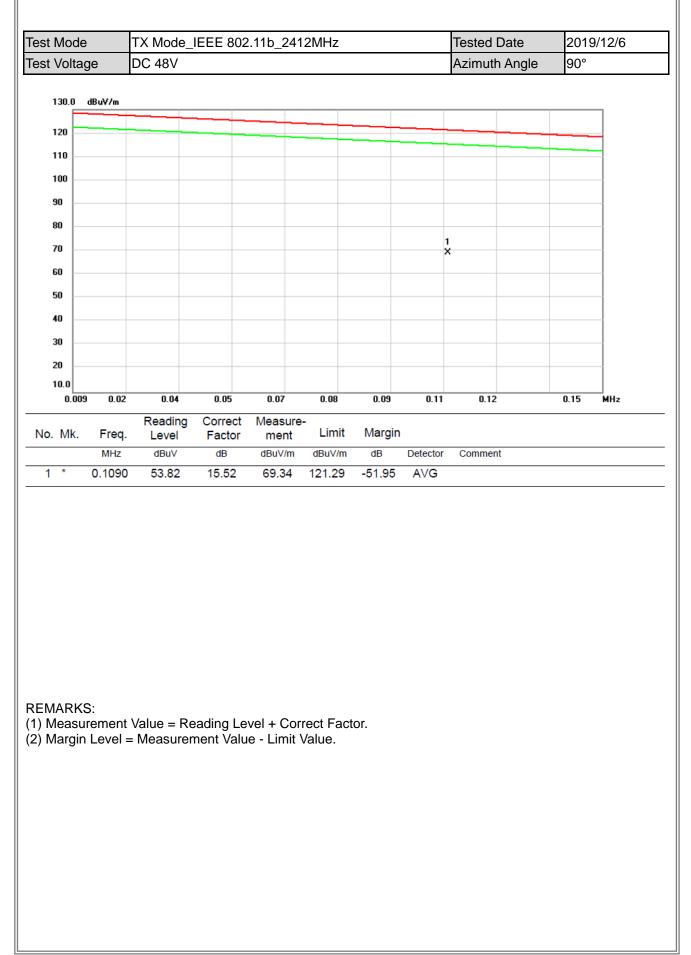
10 EUT PHOTOS

Please refer to document Appendix No.: EP-1911T046-1 (APPENDIX-EUT PHOTOS).



APPENDIX A RADIATED EMISSIONS - 9 KHZ TO 30 MHZ



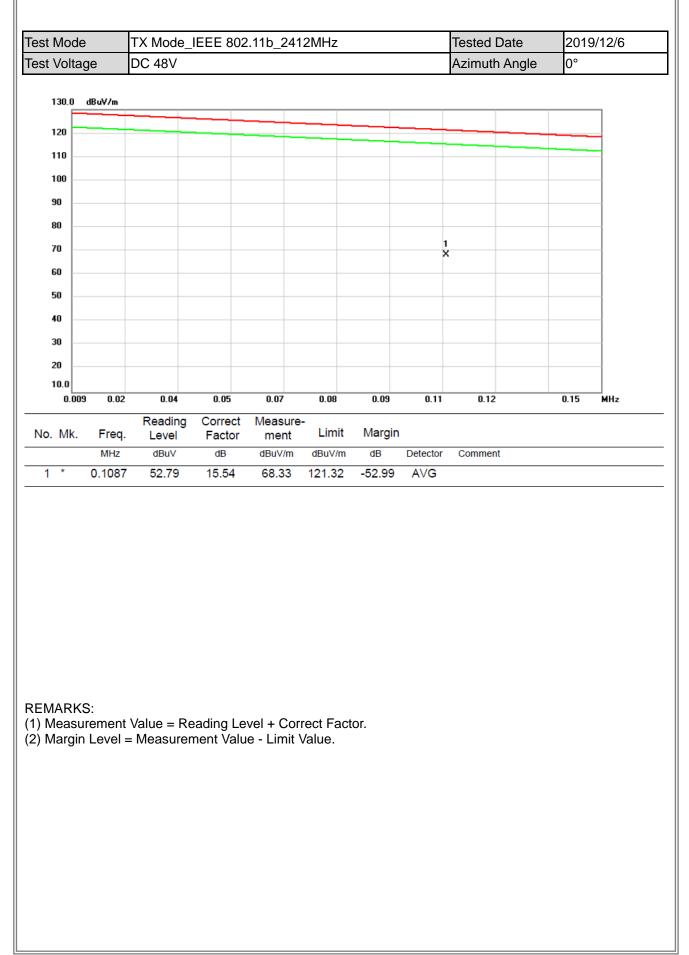




Fest Mod	е	TX Mode_	IEEE 802	2.11b_2412	2MHz			Tested Date	20	019/12/6	
Fest Volta	age	DC 48V						Azimuth Ang	le 90)°	
130.0	dBu∀/m										
120											
110											
100											
90											
80 -											
70											
60											
50											
40				2 X X							
30		1 X		^		4 ×		5	6 X		
20						^		x			
10.0	50 3.14	6.12	9.10	12.09	15.08	18.06	21.04	24.03	30.0	DO MHz	
0.13	JU J.14	Reading	Correct	Measure-	15.00	10.00	21.04	24.03	30.0	DU MH2	
No. Mk.	Freq.	Level	Factor	ment	Limit	Margin					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment			
1	3.7917		-3.77	29.96	73.32	-43.36	QP				
2	10.2094		-4.73	37.24	72.40	-35.16	QP				
3 *	12.2691		-4.82	40.57	72.10	-31.53	QP				
4	16.7764		-5.72	26.59	71.45	-44.86	QP				
5	22.9255		-7.20	23.30	70.56	-47.26	QP				
6	27.1343	36.26	-8.12	28.14	69.95	-41.81	QP				

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







est Mod	de	TX Mc	ode	EEE 80)2.11b_24	112MHz			Tested Date	2019	9/12/6
est Volt		DC 48							Azimuth Angle		
130.0 Г	dBuV/m										_
120											
110			_								_
100			_								_
90			_								_
80											_
70										_	
60											-
50											_
40					5						
30		1	2		34× ××		6 X				
20		×	×	{	^						
10.0											
0.1	150 3.14		12	9.10	12.09	15.08	18.06	21.04	24.03	30.00	MHz
No. Mk	. Freq.	Read Lev		Correct Factor			Margin	I			
	MHz	dBu		dB	dBuV/m		dB	Detector	Comment		
1	3.5530			-3.74	25.64		-47.72	QP			
2	7.0155			-4.12	27.33		-45.53	QP			
3	10.2094 11.0751			-4.73 -4.81	28.69 30.16		-43.71 -42.11				
5 *	11.9706			-4.82	34.31	72.14	-42.11				
6	16.7466			-5.70	30.05		-41.40	QP			

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





APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ



est Mod	de	TX Mode	_IEEE 802	2.11b_241	2MHz			Tested Date	2019/12/6	
Fest Volt	age	DC 48V						Polarization	Vertical	
80.0	dBuV/m									
70										
60										
50										
40										
30	¥	2 X		4 X	5 X		6 X			
20			3 X							
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	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment		
1 *	80.4400	44.40	-15.86	28.54	40.00	-11.46	peak			
2	157.0700	39.04	-11.35	27.69	43.50	-15.81	peak			
3	250.1900	33.40	-12.92	20.48	46.00	-25.52	peak			

46.00 -22.12

46.00 -14.31

-18.61

46.00

peak

peak

peak

REMARKS:

4

5

6

415.0900

500.4500

666.3200

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

31.77

37.81

30.52

-7.89

-6.12

-3.13

23.88

31.69

27.39



Fest Mod	10	TX Mod		802.11b_2	0/12MH-			Tested Date	2019/12/6
Fest Volt		DC 48		002.110_2	.412101112			Polarization	Horizontal
80.0	dBuV/m								
70									
60									
50 -									
40					5				
30	1 X	2 X	3 X	4	5X	ŝ			
20	×		<u>^</u>	Ŷ					
10									
0.0 30.	000 127.0	00 224	.00 321	.00 418.0)0 515.0	0 612.00	709.00) 806.00	1000.00 MHz
No. Mk	. Freq.	Readi Leve				t Margin			
	MHz	dBu∖	dB	dBuV/	m dBuV/r	n dB	Detector	Comment	
1	85.2900	40.8	5 -16.6	6 24.1	9 40.00) -15.81	peak		
2	158.0400	39.3	5 -11.3	1 28.0	4 43.50	-15.46	peak		

46.00 -20.71

46.00 -20.77

46.00 -12.03

-17.47

46.00

peak

peak

peak

peak

REMARKS:

3

4

6

5 *

236.6100

399.5700

500.4500

624.6100

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

38.86

33.59

40.09

32.07

-13.57

-8.36

-6.12

-3.54

25.29

25.23

33.97

28.53



APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ



est Mode	TXI	Node_	IEEE 8	302.1	1b_2	412 N	ИНz				Teste	d Date	2020/1/	5
est Voltage	DC ·	48V									Polarization		Vertical	
120.0 dBu∀	/m													1
110									_					
100				_			34	~						
90						کم		- Y						
80						/								
70					\sim	/			$\left< - \right>$	\sim				-
			1	r	· V				V	M				1
60			×2							1	-	~		1
50	handqubull	an a	x						-		-	- Manifelder Min	ym-fudinalisiaitfeitfaliaethi	1
40									-					1
30									-					{
20									_					
10				_										
0.0														
2362.000		2382		392.00		2.00	2412	.00 24	22.00	2432	2.00 2	2442.00	2462.00	MHz
No. Mk. F	req.	Readin Level		rect ctor	Meas me		Limi	t Ove	er					
M	Hz	dBuV	d	В	dBuV	/m	dBuV/ı	m dB		Detector	Con	nment		

1	2385.800	31.58	27.13	58.71	74.00	-15.29	peak	
2	2385.800	23.15	27.13	50.28	54.00	-3.72	AVG	
3)	X 2410.800	74.48	27.21	101.69	74.00	27.69	peak	No Limit
4 '	2412.000	70.81	27.22	98.03	54.00	44.03	AVG	No Limit

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



t Mode TX Mode_IEEE 802.11b_2462 MHz								Date	2020/1/5	
Voltage	DC 48V			Polariza	ation	Vertical				
									-	
120.0 dBu¥/	m									
110										
100										
90				1	- _					
80				/	$ \rightarrow $					
70			\sim	/		$\left(\right)$				
60			γ \vee			Vh	3			
50 Manufacture	Mr. Hernonglowelant	warmen and					× ×	had many marked as	การสารสารสารสารสาร	
40										
30										
20										
10										
0.0										
2412.000 2	422.00 243	2.00 244	2.00 2452	2.00 2462	2.00 247	2.00 2482	2.00 249	2.00	2512.00 MHz	

	No.	Mł	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1	Х	2462.000	72.63	27.38	100.01	74.00	26.01	peak	No Limit
-	2	*	2462.000	69.12	27.38	96.50	54.00	42.50	AVG	No Limit
_	3		2487.100	29.61	27.46	57.07	74.00	-16.93	peak	
_	4		2487.100	21.25	27.46	48.71	54.00	-5.29	AVG	



Mode	TX Mode	_IEEE 80			Tested Date		2020/1/5		
Voltage	DC 48V			Polariza	ation	Vertical			
120.0 dBu∀	/m								
110									
100				potentian and a	3				
90				<i>(</i>	× \				
80						Mary			
70		*. *	All Martinger			Noveluluin	Wa i		
60		. All					WWW WICH A		
50 ******	mannephanetel	2 X					, at least	Helicklyrouted	the work was the first and a second start of
40									
30									
20									
10									
2362.000	2222.00 220	2.00 2393	2.00 2402	00 241	2.00 242	2.00 2433	2.00 244	2.00	2462.00 MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2388.700	39.07	27.14	66.21	74.00	-7.79	peak	
2		2388.700	19.77	27.14	46.91	54.00	-7.09	AVG	
3	Х	2412.000	71.37	27.22	98.59	74.00	24.59	peak	No Limit
4	*	2412.000	61.15	27.22	88.37	54.00	34.37	AVG	No Limit



t Mode	TX Mode		Tested	Date	2020/1/5				
t Voltage	DC 48V			Polariz	ation	Vertical			
120.0 dBu∀/r	n								
110									
100				analysis of a	<				
90				1	many				
80			1	(}	u.			
70			Mar			M. Mary Marthe	12		
60		A Mart	ALIAN				12 Martin	#Northerades.com	
50 Junimensing	minuman	whether AN'					4 ×	Muslindersport	which the second
40							<u>^</u>		
30									
20									
10									
0.0									

No.	Mł	٢.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Х	246	2.000	69.44	27.38	96.82	74.00	22.82	peak	No Limit
2	*	246	2.000	60.31	27.38	87.69	54.00	33.69	AVG	No Limit
3		248	3.500	35.63	27.45	63.08	74.00	-10.92	peak	
4		248	3.500	20.49	27.45	47.94	54.00	-6.06	AVG	



st Mode	TX Mode_	IEEE 80	2.11n (H	T20)_24	12 MHz		Tested	Date	2019/12/4
st Voltage	DC 48V		Polariza	ation	Vertical				
120.0 dBu¥	//m								
110									
100				house	3 X				
90				/	× 1	1			
80						<u>\</u> .			
70			Mar Marthand			Muniter Ann	ANNU .		tur fan open twinter open
60 <u>\/~~~~~~~~~~</u>	an manager and a state of the	how the					What	unally ward	www.www.
50		2 X							
40									
30									
20									
10									
0.0									
2362.000	2372.00 2382	.00 2392	.00 2402	2.00 241	2.00 242	2.00 243	2.00 244	42.00	2462.00 MH:

	No.	Mk	. Freq.	Level	Factor	ment	Limit	Margin		
_			MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comment
_	1		2389.400	37.87	31.25	69.12	74.00	-4.88	peak	
_	2		2389.400	16.49	31.25	47.74	54.00	-6.26	AVG	
_	3	Х	2412.000	69.48	31.34	100.82	74.00	26.82	peak	No Limit
	4	*	2412.000	59.34	31.34	90.68	54.00	36.68	AVG	No Limit



est Mode	TX Mode	LEEE 80)2.11n (H	T20)_240	62 MHz		Tested	Date	2019/12/4
est Voltage	DC 48V						Polariza	ation	Vertical
120.0 dBu\	//m		1	Ì	1				
110									
100					1				
90					×				
80			p f						
70			A what we have			Ward Marine Agent	. 3		
60	rapantehananghahananga	marker marker weekend	MANU			, H	My July May 1944	ently monorial	mannahara
50							4 ×		
40									
30									
20									
10 0.0									
2412.000	2422.00 243	32.00 244	2.00 245	2.00 246	2.00 2472	2.00 2482	2.00 249)2.00	2512.00 MHz

	No.	Mk	. Freq.	Level	Factor	ment	Limit	Margin		
-			MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1	Х	2462.000	66.62	31.56	98.18	74.00	24.18	peak	No Limit
-	2	*	2462.000	57.33	31.56	88.89	54.00	34.89	AVG	No Limit
-	3		2485.100	32.89	31.66	64.55	74.00	-9.45	peak	
	4		2485.100	15.16	31.66	46.82	54.00	-7.18	AVG	



t Mode	TX Mode	_IEEE 80	2.11n (H	T40)_242	22 MHz		Tested	Date	2019/12	/4
st Voltage	DC 48V						Polariza	ation	Vertical	
120.0 dBu¥	/m						1	1		I
110										
100					3					
90				$f \rightarrow \gamma$	and the second					
80					(
70	that the second seco		-			Willow		E		
60 <u>Лића, то</u> ри 50	the Municipality	Vermen and WWW	2			Ju who w	thermouster	- and the second second	mananaphanaph	
40			X							
30								6 X		
20										
10										
0.0										
2322.000	2342.00 236	2.00 2382	2.00 2403	2.00 2423	2.00 2442	2.00 2462	2.00 248	2.00	2522.00	MHz

No.	Mk	. Freq.	Level	Factor	measure- ment	Limit	Margin		
		MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2388.800	34.45	31.24	65.69	74.00	-8.31	peak	
2		2388.800	17.61	31.24	48.85	54.00	-5.15	AVG	
3	Х	2422.000	63.77	31.39	95.16	74.00	21.16	peak	No Limit
4	*	2422.000	53.96	31.39	85.35	54.00	31.35	AVG	No Limit
5		2491.800	26.54	31.69	58.23	74.00	-15.77	peak	
6		2491.800	3.80	31.69	35.49	54.00	-18.51	AVG	

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



Mode	TX Mod	e_IEEE 80	2.11n (H	T40)_24	52 MHz		Tested D	ate	2019/12/4
Voltage	DC 48V						Polarizat	ion	Vertical
120.0 dBu\	//m								
110									
100				į	}				
90					$ \longrightarrow $				
BO									
70			. Ja why			MM .			notional generations and the
60 1 	unalisti and the set	and the second of the second	h-H-rollyppine				whitering	north work the	whompy me the section
50						×			
40 2 X									
30									
20									
10									
0.0									
2352.000	2372.00 23	392.00 2412	2.00 2432	2.00 2452	2.00 2472	2.00 2492	2.00 2512	00	2552.00 MHz

	No.	Mk	. Freq.	Level	Factor	ment	Limit	Margin		
			MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1		2354.000	26.12	31.08	57.20	74.00	-16.80	peak	
_	2		2354.000	4.13	31.08	35.21	54.00	-18.79	AVG	
	3	Х	2452.000	62.67	31.52	94.19	74.00	20.19	peak	No Limit
	4	*	2452.000	52.92	31.52	84.44	54.00	30.44	AVG	No Limit
_	5		2484.600	35.24	31.66	66.90	74.00	-7.10	peak	
	6		2484.600	17.50	31.66	49.16	54.00	-4.84	AVG	

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



est Mode	TX Mode_IE	EE 802.1	1b_2412	MHz			Tested Date	2020/1/5
est Voltage	DC 48V						Polarization	Vertical
120.0 dBuV	/m							
110								
100								
90								
80								
70								
60								
50	1							
40	1 2 X							
30								
20								
10								
0.0	3550.00 6100.00) 8650.00	11200.00	13750.00) 16300.	00 1885	i0.00 21 4 00.00	26500.00 MHz
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	Over			
	Hz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 4824.		-10.52	45.10	74.00	-28.90	peak		
2 * 4824.	000 48.26	-10.52	37.74	54.00	-16.26	AVG		



est Mode	TX Mode_IE	EE 802.1	1b_2412	MHz		Tes	sted Date	2020/1/5
est Voltage	DC 48V					Pol	arization	Horizontal
120.0 dBu\	'/m							
110								
100								
90								
80								
70								
60								
50	1 Ž							
40	×							
30								
20								
10 0.0								
1000.000	3550.00 6100.00	8650.00	11200.00	13750.00	16300.00	18850.00	21400.00	26500.00 MHz
No. Mk. F	Reading req. Level	Correct Factor	Measure- ment	Limit	Over			
	1Hz dBuV	dB	dBuV/m	dBuV/m			Comment	
1 4824 2 * 4824		-10.52	47.37	74.00 54.00		peak AVG		



est Mode	TX Mode	_IEEE 802.	11b_2437	MHz			Tested Date	2020/1/5
est Voltage	DC 48V						Polarization	Vertical
120.0 dBu 110 100 90 80	۷/m							
70 60								
50 40	1 8 ×							
30 20								
10								
1000.000	3550.00 610 Readi	0.00 8650.00 ng Correct	11200.00 Measure-	13750.00	D 16300	.00 1885	0.00 21400.00	26500.00 MHz
	Freq. Leve	Factor	ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment	
1 4874			48.44	74.00	-25.56	peak	Comment	
2 * 4874	.000 54.4	2 -10.40	44.02	54.00	-9.98	AVG		



st Mode	TX Mode_I	EEE 802.1	1b_2437	MHz			Tested Date	2020/1/5
est Voltage	DC 48V						Polarization	Horizontal
120.0 dBuV 110 100 90 80 70 60 50 40 30 20								
10								
1000.000	3550.00 6100.0	0 8650.00	11200.00	13750.00) 16300	.00 1885	0.00 21400.00	26500.00 MHz
	Reading req. Level	Correct Factor	Measure- ment	Limit	Over			
	IHz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 4874.		-10.40	51.72	74.00	-22.28	peak		
2 * 4874.	000 59.07	-10.40	48.67	54.00	-5.33	AVG		



est Mode	TX Mode_IE	EE 802.1	1b_2462	MHz			Tested I	Date	2020/1/5
est Voltage	DC 48V						Polariza	ation	Vertical
120.0 dBu 110 100 90	V/m								
80									
70									
60									
50	1 \$ X								
40									
30									
20									
0.0									
1000.000			11200.00	13750.00	16300.0	00 1885	50.00 214	00.00	26500.00 MHz
No. Mk. F	Reading Freq. Level	Correct Factor	Measure- ment	Limit	Over				
	MHz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt	
1 4924		-10.28	51.31	74.00	-22.69	peak			
2 * 4924	.000 57.71	-10.28	47.43	54.00	-6.57	AVG			



est Mo	ode	ΤX	Mode_IE	EE 802.1	1b_2462	MHz			Tested Date	2020/1/5
est Vo	ltage	DC	48V						Polarization	Horizontal
110 100 90		luV/m								
80 70 60 50			1 X							
40 30 20 10										
0.0		0 3550.00	6100.00	8650.00	11200.00	13750.00) 16300	.00 1885	0.00 21400.00	26500.00 MHz
No. N	/lk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 2 *		24.000 24.000	64.22 61.04	-10.28	53.94 50.76	74.00 54.00	-20.06	peak AVG		



Fest Mode	e TX	K Mode_IE	EE 802.1	1g_2412	MHz			Tested D	ate	2020/1/5
Fest Volta	age D	C 48V						Polarizat	ion	Vertical
120.0	dBuV/m									
110										
100 -										
90										
80										
70										
60										
50		1 X								
40		2 2								
30		x								
20										
10 0.0										
	0.000 3550.	00 6100.00	8650.00	11200.00	13750.00	16300.0	00 1885	0.00 21400	.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Commen		
	4824.000	53.47	-10.52	42.95	74.00	-31.05	peak			
2 * 4	4824.000	40.35	-10.52	29.83	54.00	-24.17	AVG			



Fest Mode	TX Mode_IE	EE 802.1	1g_2412	MHz			Tested Date	2020/1/5
Fest Voltage	DC 48V						Polarization	Horizontal
120.0 dBuV 110 100 90	/m							
80 70 60								
50	1 X							
30	2 X							
10								
1000.000	3550.00 6100.00	8650.00	11200.00	13750.00	16300.	.00 1885	0.00 21400.00	26500.00 MHz
No. Mk. Fi	Reading req. Level	Correct Factor	Measure- ment	Limit	Over			
M	IHz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 4824.	000 53.56	-10.52	43.04	74.00	-30.96	peak		
2 * 4824.	000 41.23	-10.52	30.71	54.00	-23.29	AVG		



est Mode	TX Mode_IE	EEE 802.1	1g_2437	MHz			Tested Date	2020/1/5
est Voltage	DC 48V						Polarization	Vertical
120.0 dBuV 110 100 90	//m							
80 70 60								
50	1 X							
30	2 X							
20								
10								
0.0	3550.00 6100.00) 8650.00	11200.00	13750.00	16300.	00 1885	i0.00 21 4 00.00	26500.00 MHz
	Reading req. Level	Correct Factor	Measure- ment	Limit	Over	00 1000	0.00 21400.00	20300.00 MHZ
	1Hz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 4874.	000 53.17	-10.40	42.77	74.00	-31.23	peak		
2 * 4874.	000 40.45	-10.40	30.05	54.00	-23.95	AVG		



Fest Mode	ТX	Mode_IE	EE 802.1	1g_2437	MHz			Tested D	Date	2020/1/5
est Voltag	je DC	248V						Polariza	tion	Horizontal
120.0	dBu∀/m									
110										
100										
90										
80										
70										
60										
50		1 X								
40		2 X								
30		×								
20										
10 0.0										
	000 3550.0	0 6100.00	8650.00	11200.00	13750.00	16300.	00 1885	0.00 2140	0.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	nt	
	374.000	54.49	-10.40	44.09	74.00	-29.91	peak			
2 * 48	374.000	41.66	-10.40	31.26	54.00	-22.74	AVG			



est Mode	TX Mode_IE	EE 802.1	1g_2462	MHz		Tes	sted Date	2020/1/5
est Voltage	DC 48V					Pol	arization	Vertical
120.0 dBu∀								
	/m							
110								
100								
90								
80								
70								
60								
50								
40	1 X							
30	2 X							
	^							
20								
10 0.0								
1000.000	3550.00 6100.00	8650.00	11200.00	13750.00	16300.00	18850.00	21400.00	26500.00 MHz
	Reading	Correct	Measure-					
	req. Level	Factor	ment	Limit	Over			
	1Hz dBuV	dB	dBuV/m	dBuV/m			Comment	
1 4924.		-10.28	44.13	74.00		peak		
2 * 4924.	000 41.28	-10.28	31.00	54.00	-23.00	AVG		



est Mode	ΤX	Mode_IE	EE 802.1	1g_2462	MHz			Tested Date	2020/1/5
est Voltage	e DC	48V						Polarization	Horizontal
120.0 d	Bu¥/m								
110									
100									
90									
80									
70									
60									
50		1 X							
40									
30		2 X							
20									
10									
0.0 1000.0	00 3550.00) 6100.00	8650.00	11200.00	13750.00	16300	.00 1885	0.00 21400.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
	24.000	54.38	-10.28	44.10	74.00	-29.90	peak		
2 * 493	24.000	41.13	-10.28	30.85	54.00	-23.15	AVG		



t Mode	T	X Mode	_IEEI	E 802	.11n (H	T20)_	_2412	MHz		Teste	d Date	2019/1	12/6
t Volta	ge D	DC 48V								Polar	ization	Vertica	al
120.0	dBuV/m												_
110													
100													
90 -													
80													
70													
60 -													
50		1											
40		1 X											
30 -		2 X											
20													
10													
0.0	.000 3550	100 610	0.00	8650.0	0 112	DO. 00	13750.0	0 1630	0 00 188	50.00	21400.00	26500.00	MH7
		Readir		Correct		ure-							
. Mk.	Freq.			Factor			Limit	Margi		. 0			
4	MHz 824.000	dBuV) 54.61		dB 10.52	dBu∨ 44.(dBuV/m 74.00	dB -29.91	Detecto peak	r Com	ment		
	824.000			10.52	30.8		54.00	-23.11	•				
MARK	S:												
	iremen	t Value =						ctor.					
Measu	iremen	t Value = = Measu						ctor.					



1200 d8uV/m 110 100 90 100 90 100 90 100 90 100 90 100 90 100 90 100 90 100 90 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 1000 100 1000 100 1000 100 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 10000 1000 <t< th=""><th>t Mode</th><th>TX Mode_I</th><th>EEE 802.1</th><th>1n (HT20</th><th>)_2412</th><th>MHz</th><th></th><th>Tested Date</th><th>2019/12/6</th></t<>	t Mode	TX Mode_I	EEE 802.1	1n (HT20)_2412	MHz		Tested Date	2019/12/6
110 10 <t< th=""><th>t Voltage</th><th>DC 48V</th><th></th><th></th><th></th><th></th><th></th><th>Polarization</th><th>Horizontal</th></t<>	t Voltage	DC 48V						Polarization	Horizontal
110 10 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>									
100 1	120.0 dBuV	//m							
100 1									
30									
80									
70 1	90								
60 1	80								
50 1	70								
40 3 3 1	60								
40 2 X Image: Contract Measure- ment Image: Contract Measure- Mea	50	1							
30 X Image: Contract of the solution	40								
10 10 10 10 1000.000 3550.00 6100.00 8650.00 11200.00 13750.00 16300.00 18850.00 21400.00 26500.00 MHz M.K. Freq. Level Factor Measure- ment Limit Margin Margin MHz dBuV dB dBuV/m dBuV/m dB Detector Comment 4824.000 54.80 -10.52 44.28 74.00 -29.72 peak * 4824.000 41.51 -10.52 30.99 54.00 -23.01 AVG	30	×							
0.0 1000.000 3550.00 6100.00 8650.00 11200.00 13750.00 16300.00 18850.00 21400.00 26500.00 MHz MK. Freq. Reading Level Correct Factor Measure- ment Limit Margin Vertice	20								
NK. Freq. Level Factor Measure- ment Margin MHz dBuV dB dBuV/m dBuV/m dB Detector Comment 4824.000 54.80 -10.52 44.28 74.00 -23.01 AVG * 4824.000 41.51 -10.52 30.99 54.00 -23.01 AVG	10								
Reading Level Correct Factor Measure- ment Limit Margin MHz dBuV dB dBuV/m dB Detector Comment 4824.000 54.80 -10.52 44.28 74.00 -29.72 peak 2 * 4824.000 41.51 -10.52 30.99 54.00 -23.01 AVG									
Mk. Freq. Level Factor ment Limit Margin MHz dBuV dB dBuV/m dBuV/m dB Detector Comment 4824.000 54.80 -10.52 44.28 74.00 -29.72 peak * 4824.000 41.51 -10.52 30.99 54.00 -23.01 AVG	1000.000					0 16300	.00 188:	0.00 21400.00	26500.00 MHz
MHz dBuV dB dBuV/m dB Detector Comment 4824.000 54.80 -10.52 44.28 74.00 -29.72 peak 2 * 4824.000 41.51 -10.52 30.99 54.00 -23.01 AVG	. Mk. Fi				Limit	Margin	1		
ARKS: Marks: Measurement Value = Reading Level + Correct Factor.	M				dBuV/m	dB	Detector	Comment	
MARKS: Measurement Value = Reading Level + Correct Factor.	4824.	000 54.80	-10.52	44.28	74.00	-29.72	peak		
Measurement Value = Reading Level + Correct Factor.	2 * 4824.	000 41.51	-10.52	30.99	54.00	-23.01	AVG		
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
Measurement Value = Reading Level + Correct Factor.									
			Zooding		rroot F oo	tor			
	Measurem					ctor.			
						ctor.			

Project No.: 1911T046



st Mode	TX Mode_IE	EE 802.1	1n (HT20)_2437 	MHz		Tested Date	2020/1/5
st Voltage	DC 48V						Polarization	Vertical
120.0 dBuV	Im.							
110								
100								
90								
80								
70								
60								
50								
40	1 X							
	2 X							
30	×							
20								
10								
0.0	3550.00 6100.00	8650.00	11200.00	13750.00	16300.	00 1885	0.00 21400.00	26500.00 MHz
	Reading	Correct	Measure					
No. Mk. Fr	req. Level	Factor	ment	Limit	Over			
	Hz dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 4874.		-10.40	43.37	74.00	-30.63	peak		
2 * 4874.	000 40.62	-10.40	30.22	54.00	-23.78	AVG		



est Mode	TX	Mode_IE	EE 802.1	1n (HT20)_2437 	ИНz		Tested I	Date	2020/1/5
est Volta	ge DC	; 48V						Polariza	ation	Horizontal
120.0	dBu∀/m									
110										
100										
90										
80										
70										
60										
50		1								
40		1 X 2								
30		×								
20 10										
0.0										
1000	.000 3550.00	0 6100.00	8650.00	11200.00	13750.00	16300.0)0 1885	0.00 214	00.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent	
	874.000	51.44	-10.40	41.04	74.00	-32.96	peak			
2 * 4	874.000	40.51	-10.40	30.11	54.00	-23.89	AVG			



St Voltage D 120.0 dBuV/m 110	DC 48V						Polariza		Vertical
110 100 90 80 70 60									
110 100 90 80 70 60									
100 90 80 70 60									
100 90 80 70 60									
90 80 70 60									
80 70 60									
70 60									
60									
	1								
40	X								
30	2 X								
20									
10									
0.0).00 6100.0	0 8650.00	11200.00	13750.00	0 16300.	.00 1885	0.00 214	DO. 00	26500.00 MHz
1000.000 0000	Reading		Measure-						
lo. Mk. Freq.	Level	Factor	ment	Limit	Margin				
MHz 1 4924.000	dBu∨) 55.55	dB -10.28	dBuV/m 45.27	dBuV/m 74.00	dB -28.73	Detector peak	Comme	nt	
2 * 4924.000		-10.28	31.78	54.00	-22.22	AVG			



	TX M	lode_II	EEE 802.	11n (HT20)_2462	ИНz		Tested	Date	2019/12/6
st Voltage	DC 4	·8V						Polariza	ation	Horizontal
120.0 dBu 110 100 90 80 70 60 50										
40		2 X								
20										
0.0	3550.00	6100.0	0 8650.0	0 11200.00	13750.00	16300.	.00 188	50.00 214	100.00	26500.00 MHz
p. Mk. – F		≀eading Level	Correct Factor	Measure- ment	Limit	Margin				
1	MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	r Comme	ent	
1 4924 2 * 4924	.000	55.30 42.11	-10.28 -10.28	45.02 31.83	74.00 54.00	-28.98 -22.17	peak AVG			
1 4924 2 * 4924 MARKS:	.000	42.11	-10.28		54.00	-22.17				



st Mode	TX Mode_I	EEE 802.1	1n (HT40))_2422 🛚	ИНz		Testec	l Date	2019/12/6
st Voltage	DC 48V						Polariz	zation	Vertical
120.0 dBuv 110 100 90 80	//m								
70 60 50	<u>1</u>								
40 30 20	2 X								
10 0.0 1000.000	3550.00 6100.0	DO 8650.00	11200.00	13750.00) 16300.0	00 1885	0.00 21	400.00	26500.00 MHz
lo. Mk. F	Reading req. Level) Correct Factor	Measure- ment	Limit	Margin				
N	MHz dBu∨	dB	dBuV/m	dBu//m	dB	Detector	Comm	ient	
1 4844.	.000 54.05	-10.47	43.58	74.00	-30.42	peak			



t Mode	TX Mode_	IEEE 802.	11n (HT40)_2422	MHz		Tested I	Date	2019/12/6
t Voltage	DC 48V						Polariza	ation	Horizontal
120.0 dBuV	7m								
110									
100									
90									
80									
70									
60									
50	1								
40	1 X								
30	2 X								
20									
10									
0.0	3550.00 6100	.00 8650.00) 11200.00) 13750.0)0 16300	.00 1885	50.00 214	00.00	26500.00 MHz
	Readin	g Correct	Measure	-					
	req. Level	Factor	ment	Limit	Margin		0.000	-+	
	1Hz dBu∨ 000 54.53		dBuV/m 44.06	dBuV/m 74.00	dB -29.94	Detector peak	Comme	ſ IL	
2 * 4844.			30.75	54.00	-23.25	AVG			
-									
MARKS: Measurem Margin Ley	nent Value =	Reading L	evel + Co	rrect Fa	ctor.				
Measurem	nent Value = vel = Measu	Reading L rement Va	evel + Co lue - Limit	rrect Fa Value.	ctor.				
Measurem	ient Value = vel = Measu	Reading L rement Va	evel + Co ue - Limit	rrect Fa Value.	ctor.				



est Mode	e TX	Mode_IE	EE 802.1	1n (HT40)_2437 I	MHz		Tested D	ate	2020/1/5
est Volta	ge DC	48V						Polarizat	ion	Vertical
120.0	dBu∀/m									
110										
100										
90										
80										
70										
60										
50		1 X								
40 30		2								
20		×								
10										
0.0	0.000 3550.00) 6100.00	8650.00	11200.00	13750.00) 16300.0	00 1885	D.00 2140	0.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Commen	t	
	1874.000 1874.000	52.66 40.25	-10.40	42.26 29.85	74.00 54.00	-31.74 -24.15	peak AVG			



est Mode	ΤX	Mode_IE	EE 802.1	1n (HT40)_2437 I	MHz		Tested I	Date	2020/1/5
est Voltage	e DC	48V						Polariza	ation	Horizontal
120.0 d	BuV/m									
110										
100										
90										
80										
70										
60										
50		1 X								
40										
30		2 X								
20										
10 0.0										
	00 3550.00) 6100.00	8650.00	11200.00	13750.00	16300.	00 1885	0.00 214	00.00	26500.00 MHz
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comme	ent	
	74.000	54.12	-10.40	43.72	74.00	-30.28	peak			
2 * 48	74.000	40.90	-10.40	30.50	54.00	-23.50	AVG			



st Mode	ТХ	< Mode_	IEEE 802	.11n (HT40)_2452 l	MHz		Teste	ed Date	2020/1/5
st Voltage)D	C 48V						Polar	ization	Vertical
120.0 dl	BuW/m									
120.0 0	547711									
110										
100										
90										
80										
70										
60										
50										
40		1 X								
30		2 X								
20										
10										
0.0										
1000.00	00 3550.0	00 6100.	.00 8650.0	00 11200.00	13750.00) 16300.	.00 1885	60.00	21400.00	26500.00 MHz
lo. Mk.	Freq.	Reading Level	g Correct Factor		Limit	Margin				
	MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Com	ment	
1 490	04.000	54.31	-10.32	43.99	74.00	-30.01	peak			
2 * 490	04.000	41.62	-10.32	31.30	54.00	-22.70	AVG			



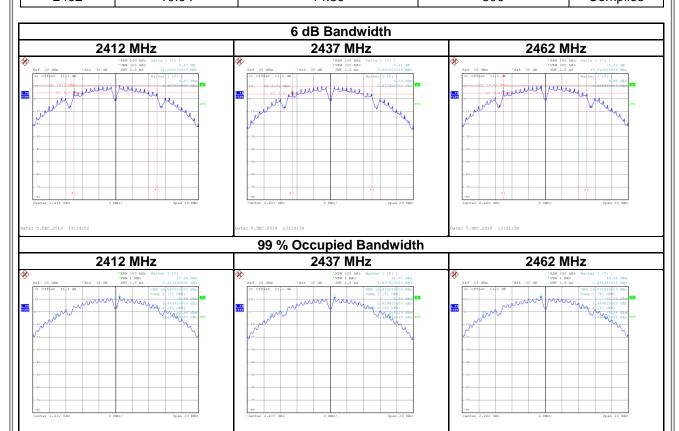
st Voltage		EEE 802.1	1n (HT40))_2452 N	ЛНz		Tested	Date	2020/1/5
	DC 48V						Polariz	ation	Horizontal
120.0 dBuV/ 110 100 90 80 70 60 50 40									
30	2 X								
20									
10 0.0									
1000.000 3	3550.00 6100.0	0 8650.00	11200.00	13750.00	16300.0	00 1885	0.00 21	400.00	26500.00 MHz
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	Margin				
M		dB	dBuV/m	dBuV/m	dB	Detector	Comm	ent	
1 4904.0 2 * 4904.0		-10.32	44.12 31.34	74.00 54.00	-29.88 -22.66	peak AVG			



APPENDIX D BANDWIDTH



Test Mode	IEEE 802.11b			
Test Voltage	DC 48V			
			1	
Frequency (MHz)	6dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)	Result
2412	10.00	14.68	500	Complies
2437	9.56	14.40	500	Complies
2462	10.04	14.80	500	Complies



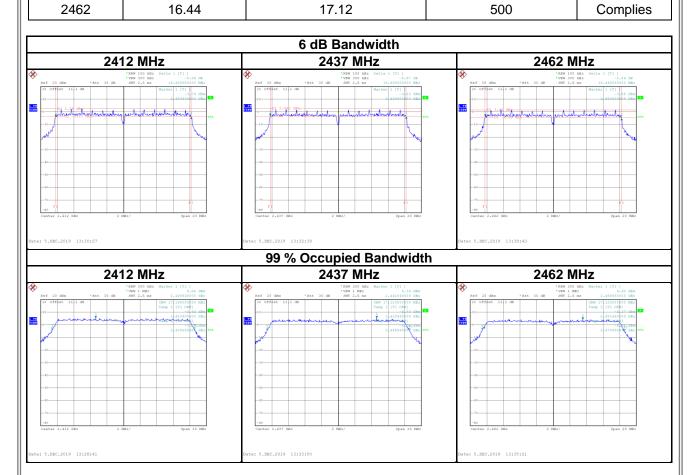
Date: 5.DEC.2019 13:16:56

te: 5.DEC.2019 13:17:54

te: 5.DEC.2019 13:23:07

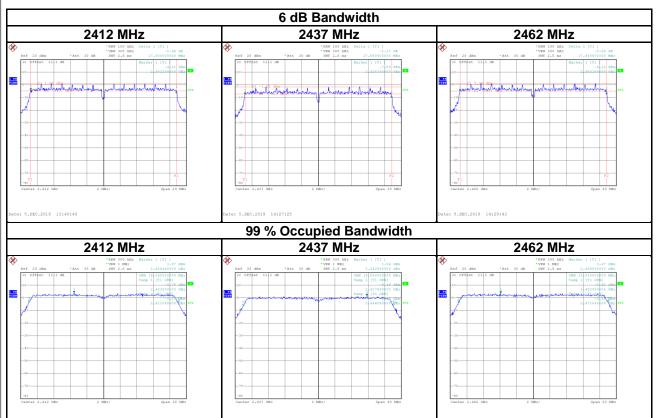


lŀ	Test Mode	IEEE 802.11g			
	Test Voltage	DC 48V			
	Frequency (MHz)	6dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)	Result
	2412	16.40	17.16	500	Complies
	2437	16.40	17.12	500	Complies
1	0.100	10.11	17.10		o "





Test Mode	IEEE 802.11n (HT20)						
Test Voltage	DC 48V						
Frequency (MHz)	6dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)	Result			
2412	17.60	18.04	500	Complies			
2437	17.68	18.08	500	Complies			
2462	17.68	18.04	500	Complies			



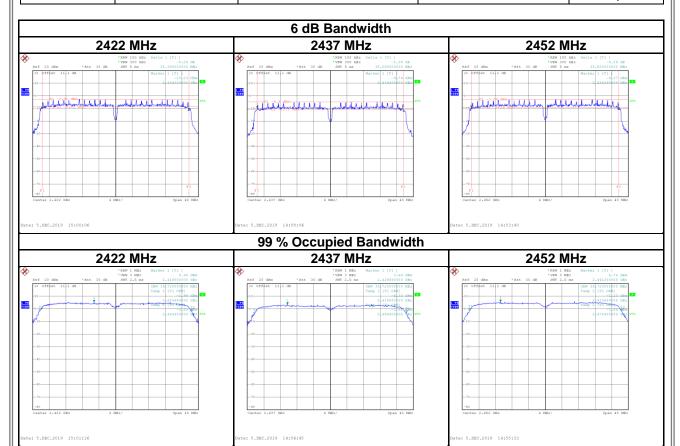
Date: 5.DEC.2019 13:41:44

te: 5.DEC.2019 14:25:27

te: 5.DEC.2019 14:34:28



Test Mode	IEEE 802.11n (HT4	EEE 802.11n (HT40)						
Test Voltage	DC 48V							
	•							
Frequency (MHz)	6dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)	Result				
2422	35.36	36.72	500	Complies				
2437	35.28	36.72	500	Complies				
2452	35.52	36.72	500	Complies				



APPENDIX E OUTPUT POWER

BIL



Teat March					040/40/5	
Test Mode	IEEE 802.11b		le	sted Date 20	019/12/5	
Test Voltage	DC 48V					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result	
2412	18.50	0.0708	30.00	1.0000	Complies	
2437	19.04	0.0802	30.00	1.0000	Complies	
2462	18.45	0.0700	30.00	1.0000	Complies	
Test Mode	IEEE 802.11g		Tes	sted Date 2	019/12/5	
Test Voltage	DC 48V					
_						
Frequency	Conducted Power	Conducted Power (W)	Limit	Limit	Result	
(MHz)	(dBm)	0.0755	(dBm)	(W)	O a marking	
2412	18.78	0.0755	30.00	1.0000	Complies	
2437	19.72	0.0938	30.00	1.0000	Complies	
2462	18.78	0.0755	30.00	1.0000	Complies	
Test Mode	IEEE 802.11n (HT2	20)	Te	sted Date 20	019/12/5	
Test Voltage	DC 48V					
Frequency	Conducted Power		Limit	Limit		
(MHz)	(dBm)	Conducted Power (W)	(dBm)	(W)	Result	
2412	19.17	0.0826	30.00	1.0000	Complies	
2437	19.54	0.0899	30.00	1.0000	Complies	
2462	19.04	0.0802	30.00	1.0000	Complies	
Test Mode	IEEE 802.11n (HT4	0)	Tes	sted Date 2	019/12/5	
Test Voltage	DC 48V					
	Conductor d D		1.1	1.1		
Frequency	Conducted Power	Conducted Power (W)	Limit	Limit	Result	
(MHz)	(dBm)	0.0040	(dBm)	(W)	Osmalias	
2422	18.08	0.0643	30.00	1.0000	Complies	
2437	19.02	0.0798	30.00	1.0000	Complies	
2452	17.84	0.0608	30.00	1.0000	Complies	





APPENDIX F	POWER SPECTRAL DENSITY



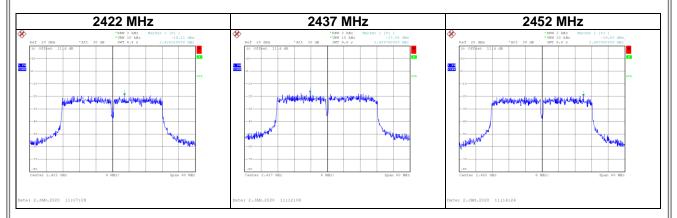
est Mode	IEEE 802	11b			
est Voltage	DC 48V				
Frequer (MHz	-	Power Density (dBm/3kHz)	Limit (dBm)		Result
2412		-7.06	8.00		Complies
2437	,	-7.07	8.00		Complies
2462		-6.24	8.00		Complies
241	2437	′ MHz		2462 MHz	
		1 1 <td></td> <td>Part 20 Sector 20 07594 31.6 m 40 </td> <td>- 2.5 MEZ MALE MALE MALE MALE MALE MALE MALE MALE</td>		Part 20 Sector 20 07594 31.6 m 40	- 2.5 MEZ MALE MALE MALE MALE MALE MALE MALE MALE
est Mode est Voltage Frequer	IEEE 802 DC 48V	Power Density	Limit		
(MHz					Result
		(dBm/3kHz)	(dBm)		
2412	· ·	(dBm/3kHz) -14.87	(dBm) 8.00		Complies
2412 2437	· ·	(dBm/3kHz) -14.87 -13.21	(dBm) 8.00 8.00		Complies Complies
2412 2437 2462	· ·	(dBm/3kHz) -14.87 -13.21 -14.53	(dBm) 8.00		Complies



Test Mode IEE	E 802.11n (HT	20)			
Test Voltage DC	48V				
Frequency		ower Density	Limit		Result
(MHz) 2412	()	dBm/3kHz) -14.70	(dBm) 8.00		Complies
2437		-13.75	8.00		Complies
2462		-15.29	8.00		Complies
2412 MHz		2437 MHz		2462 MHz	
	And a second sec	• V254	3 MB Mischer 1 (Tr.) 2 J Au 2000 Otto 2 J Au 2000 Otto 2 J Au 2000 Otto 2 J Au 2000 Otto 2 J Au 2000 Otto 4 J Au 2	PE 20 GBB R0 0.00 (Sec. 1).14 G 10	- 2.6 MEZ - 2.6 MEZ - 2.6

Test Mode	IEEE 802.11n (HT20)	
Test Voltage	DC 48V	

Frequency	Power Density	Limit	Result
(MHz)	(dBm/3kHz)	(dBm)	Rooun
2422	-19.11	8.00	Complies
2437	-17.06	8.00	Complies
2452	-19.83	8.00	Complies





APPENDIX G ANTENNA CONDUCTED SPURIOUS EMISSIONS



